Operational Description

800 band:

"Axell Wireless" BSR 3308 PS NFPA is 800 MHz RF Signal Booster, medium power repeater. It's actually bi-directional (Downlink/Uplink) amplifier.

Key features:

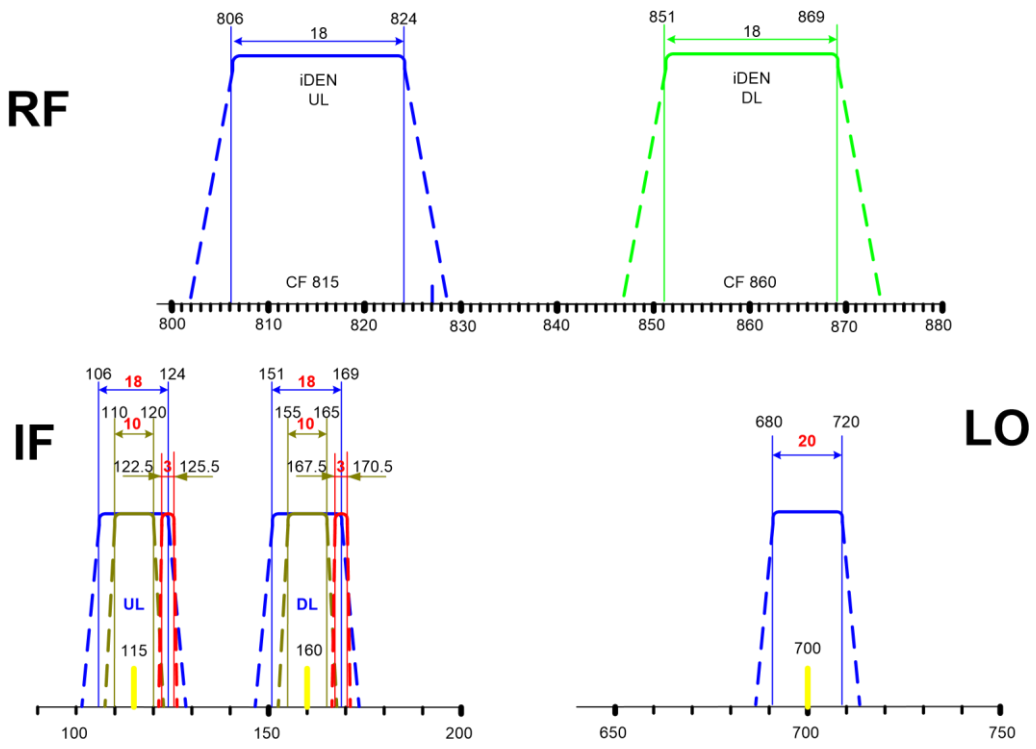
- Band selective mini booster for SMR, ESMR and public safety networks
- NFPA 72-2010, chapter 24 and IFC 510.1 compliant
- IF-SAW filtering – high out-of-band rejection
- Indoor coverage up to 100,000 square feet
- Features Axell Wireless' SmartALC™ technology
- Switchable bandwidth option
  – User-selectable and tuneable across the 800 MHz band –
  Accommodates all re-banding phases without changing hardware
- Web Based management

It has 2 RF interfaces to 2 antennas: Donor (Base), Service (Mobile).

Downlink chain functionally symmetrical to Uplink chain. At the beginning of the chain we have cavity band duplexer that provides primary filtering and isolation between bands. After it we have LNA block consists of LNA amplifier, RF filter for additional isolation.

Down Convert block consists of additional RF amplifiers, Digital step attenuator, and image rejection filter.

Synt/Mix section consists of integrated PLL, VCO and mixer and its work environment components. RF centre frequency is converted to 106-170.5MHz IF frequency band.



Frequency Spectrum Diagram

IF block consists of IF amplifiers, attenuator, and SAW filters (18MHz, 10MHz and 3MHz) before entering A2D.

Filters are user configurable and software defined.

IF signal is filtered and amplified in IF block.

IF signal is converted back to RF in Synt/Mix section.

Up Convert block consists of LO leakage filter, RF amplifiers, RF filter for additional isolation.

PA block consists of Pre amplifier, Power amplifier, and output power detector.

Signal is transmitted to antenna through duplexer's.

Clock section consists of clock buffer and distributor that provides reference clocks and timing to all system.

CPU holds embedded software that responsible for system functionality: SALC – Gain and Power Control, sub band selection, etc.

Interface area consists of LAN and RS485 interfaces that enable communication with the system.

SmartALC™

When incorporating an RF repeater within a CDMA and WCDMA network, a standard procedure is to set the repeater's desired uplink and downlink levels. However, if an inappropriate gain and/or level is chosen, this may result in a non-linear signal compression, which in-turn may not only disturb the normal performance of the mobile devices but also might partially disable the ability of the base station to control the output power of the mobile devices connected to it.

To keep this from happening, the normal Automatic Level Control (ALC) mechanism, which is implemented in most RF repeaters, is used. The standard ALC circuit "sees" that the repeaters' output power is kept at a predefined level (a level in which all components function linearly). The standard ALC, however, does not provide a suitable answer to the "Cell Breathing" phenomena.

Confronting the challenge of producing a "network friendly", cell transparent, CDMA and WCDMA repeater, Axell Wireless has developed its proprietary Smart Automatic Level Control (SALC). The idea behind this technology within the development of RF repeaters is to incorporate a digital RF Gain Controller that, when combined with advanced control algorithms can perform gradual learning of traffic load characteristics and adjust the repeater gain accordingly (according to the actual levels as sampled during the network actual activation and following their changing paths). In practice, this automatic operation substitutes the need of special settings during installation and/or initial setup that usually require a knowledgeable technician and some laboratory equipment. It practically removes the need for initial settings at maximal traffic load conditions as well as repeated site visits for the purpose of gain adjustment and allows for a virtual "plug and play" deployment.