4. SYSTEM DESCRIPTION

Britecell is a low power distribution system designed to provide indoor coverage for mobile communication networks.

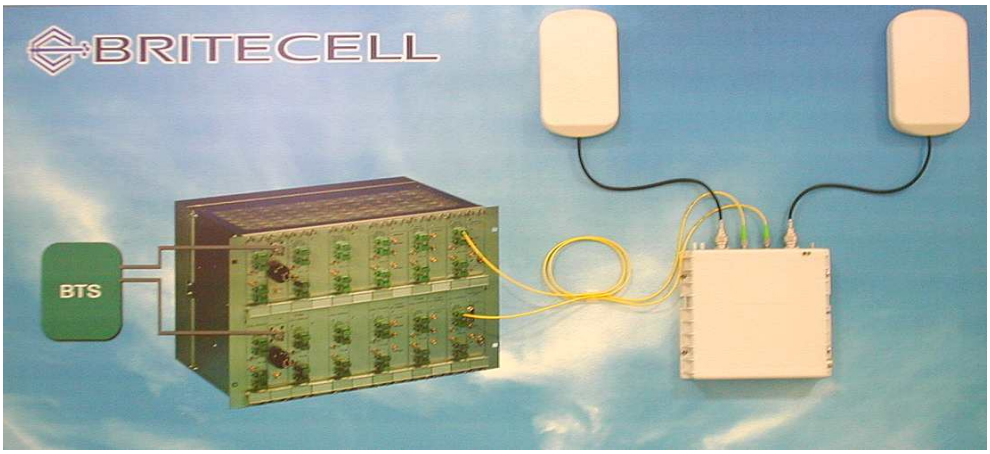
.The whole system is based on the fiberoptic transmission of multiple RF carriers from an optical donor unit interfacing to the BTSs (TFL) and an optical remote unit located in remote sites (TFA) near an antenna.

The transmission of the uplink and downlink RF signals is attained by using bi-directional fiberoptic links. Furthermore it is possible to reach and feed multiple remote antennas by distributing a number of fiberoptic links in a star configuration.

The system has been designed to make use of the concept of "low power distributed antenna system" (DAS). The premise of the DAS system is to achieve good link quality through the use of many lower power radiating points (fed by TFAs).

The advantage of this system is lower costs and higher reliability. This is possible because high power amplifiers are both costly and less reliable than low power devises.

Britecell is very simply and including a built-in AGC. As such it requires a minimum design, installation and set-up effort, in contrast with a comparable active cable systems, which require considerable uplink and downlink design and optimisation.



The system.
A rack complete with 6 donor units (TFLs), a remote unit (TFA) and two antennas

4.1. Services

The Britecell system can operate with single band or dual-band. The following is a list of possible standards with related frequencies:

FREQUENCY OPTIONS	
UHF	GSM900+GSM1800
VHF paging	GSM900+PCS
TRUNKING RADIO	AMPS+PCS
AMPS	AMPS+DCS
GSM900	TRUNKING+PCS
PDC1500	E-GSM+GSM1800
GSM1800	E-GSM+PCS
PCS	UMTS (UTRA FDD)
E-GSM	

BANDWIDTH [MHz]		
	uplink	*downlink*
UHF	406:512	406:512
VHF paging	---	270:290
TRUNKING RADIO	805:825	850:870
PDC800	810:830	940:960
AMPS	824:849	869:894
E-GSM	880:915	925:960
GSM	890:915	935:960
PDC1500	1429:1453	1477:1501
GSM1800	1710:1785	1805:1880
PCS	1850:1910	1930:1990
UMTS	1920:1980	2110:2170

Tab. 1 - services

4.2. Block diagram

This is a basic system configuration. The overall system design and coverage project may need different architectures, and different ancillary configurations.

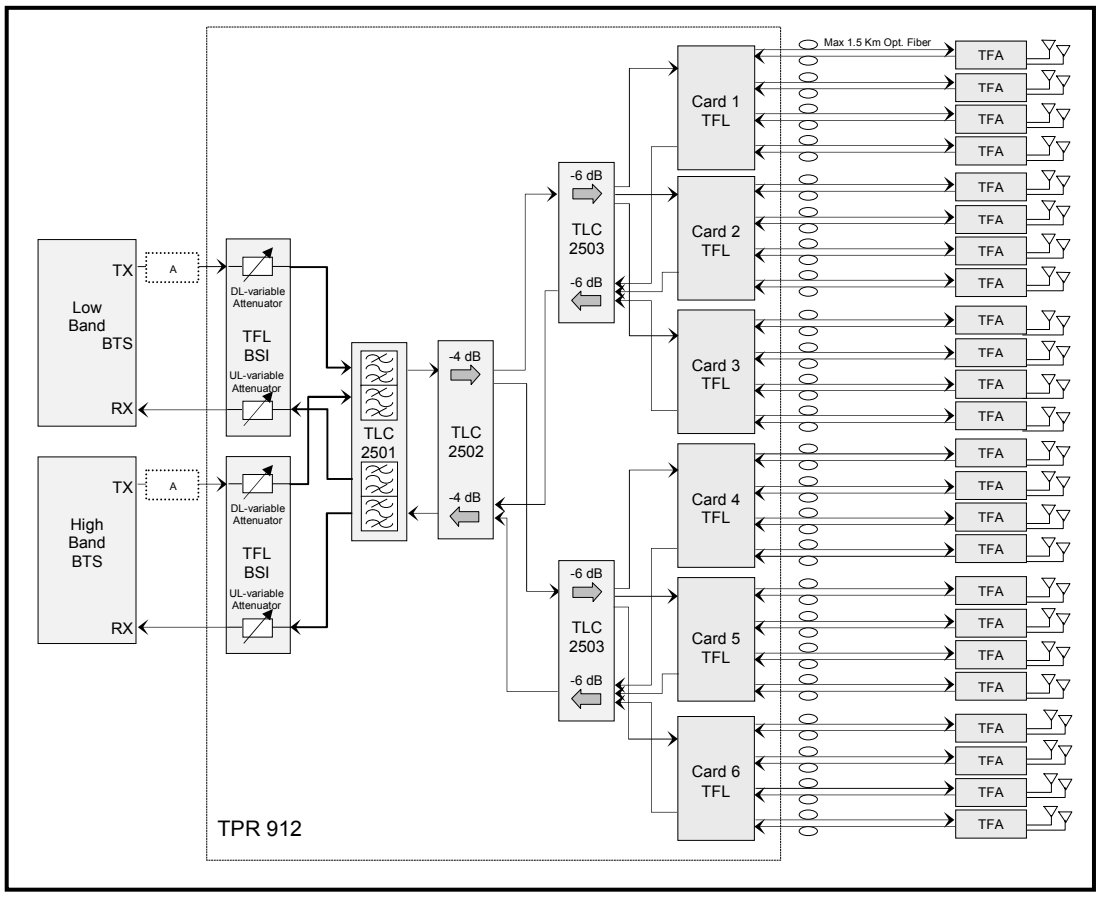


Fig. 2 - Block diagram

4.3. Functional description

The basic system blocks are the fiber donor unit TFL (Local Unit) and the fiber remote unit TFA (Remote Unit).

They are connected in both directions (uplink and downlink) through single mode optical fibre.

The system has a built-in Automatic Gain Control (AGC), which automatically adjust the up link and down link gain in order to compensate for optical link loss[1].

This allows the downlink transmit power and the up link sensitivity to be virtually independent on fibre length and on the number of splices or optical connectors present along the fibre link.

Each Local unit can support and constantly monitor up to 4 remote units.

Moreover up to 6 central units can be housed, together with power supply, in the same subrack 19".

The TFA feeds up to two coverage antennas. In this way it is possible to set up a network of 24 transceivers and up to 48 coverage antennae (see Fig.2).

The connection between the BTS and Britecell system can either be direct or, through a repeater.

In Fig. 1, a typical direct connection to BTS is showed for a dual band system. The building blocks of the combining network are:

- two/three way combiners and splitters (TLC2502/3);
- cross-band couplers (TLC2501);
- variable attenuators (TFL-BSI).

The combining network has to be carefully designed in order to optimise the connection to the BTS and the system performances.

[1] provided that the specified limits are not exceeded (please refer to datasheets)