Aerial Facilities Limited

R F System Engineering.
Radio Site Engineering.
Tel: +44(0)1494 777000
Fax: +44(0)1494 777002

Aerial House,
Asheridge Road,
Chesham, Buckinghamshire,
England, HP5 2QD

1st August,, 2005

CKC Certification Services
4933 Sierra Pines Dr.
Mariposa,
CA
95338

System Description: Air interface and Fibre Optic feed remote amplifiers UHF1, 60-055901, FCC ID NEOCCE-470N3, UHF 2, 60-055902, FCC ID NEOCCE-480N4.

Remote Units have been tested by TRL FCC grants to be applied for. Unit 1 60-056101, FCC ID NEOCE-470BDA and Unit 2 60-056102, FCC ID NEOCE-480BDA.

As noted by the FCC this system consists of six pieces of equipment, two we refer to as Air interfaces and then four remote units (two sets of two units).

The purpose of the air interfaces are to take signals to and from an existing site using directional yagi antennas, then highly selective channel filter's are used to ensure only wanted signals are amplified in either direction.

The air interfaces are connected to the two remote sites via a fibre optic link which translates the RF onto the optical signal and strips it off again without demodulating / modulating the RF.

The remote sites then amplify the signal received via the fibre link and is then connected to a radiating cable or leaky feeder which allows the signal to be radiated down a tunnel.

To look at actual signals and gains, firstly in the downlink, the off air signal is expected to be -72dBm in the case of UHF1, 60-055901, FCC ID NEOCCE-470N3, TC 277458 and -82dBm in the case of UHF 2, 60-055902, FCC ID NEOCCE-480N4, TC987964. The wanted signals are selected using channel filters and then go through amplifiers and ALC circuits to give a level of -15dBm at the fibre link. The ALC limits the levels to -15dBm to ensure neither the fibre link or the remote units can be overdriven and both wanted signals levels and intermodulation products remain to the system design and within FCC limits. The level of -15dBm (minus any optical loss) are received at the remote sites here they are amplified in two units to a level of 20dBm at the outputs. The outputs feed in to a leaky feeder with a typical coupling loss of 70dB at the frequencies being distributed. In effect the radiated wanted signal from the system in the tunnels is a maximum of -50dBm, any intermodulation products will be a minimum of 33dBc below these as the FCC requirement has been applied at the 'Booster' output, <-83dBm.

For completeness looking at the uplink. Signals are taken from the leaky feeder into the remote sites, the maximum level is predicted to be -60dBm and amplified to a level of -15dBm, in the uplink at the remote we have ALC to ensure that the level of each signal at the fibre is limited to -15dBm, this is primarily to protect the fibre link which we limit the PEP of the combined carriers to 0dBm. This are again transported via the fibre to the air interface units.
Again the received signals at the air interface is -15dBm(minus any optical losses) and these are amplified to the antenna port. As this is 'to air' ALC is again employed in the air interface to limit the carrier levels to an output of +20dBm, the ALC circuitry is integrated into the channel filters so we have complete control that only wanted carriers are at the antenna port and their level is limited.

As we know this unit is to be used with yagi antennas the level of +20dBm per carrier (3 carriers at 20dBm in the case of UHF1 and 4 Carriers in the case of UHF2 give a predicted maximum intermodulation level of >-30dBm.

If you have any further questions or comments do not hesitate to contact me.

Yours faithfully

For and on behalf

Aerial Facilities Limited

Peter L Bradfield
Senior Systems Engineer
Tel: +44 1494 777020
Fax +44 1494 777002
peterb@aerial.co.uk