

RF Exposure Info / MPE Sample Calculation

Model: AF 4037

FCC-ID: XS5-AF4037W4

The Node A is designed to amplify signals between multiple mobiles and a base station. The unit consists of a filter and amplifier chain in the downlink and one filter and amplifier chain in the uplink. The uplink and downlink paths are connected via a duplexer on both ends of each path. After that the signals are combined by the crossband coupler with the other frequency bands.

In the uplink path, a signal originating from the mobile is divided by the crossband coupler into the different frequency bands and is separated from the downlink signal via the UL IN duplexer. It is then amplified by a low noise amplifier (LNA), which is part of the RF card. The RF card down-converts the signals to the IF and converts the analogue signal into a digital signal. This signal is forwarded to the Main Board, where digital filtering takes place. After the digital signal processing the signals comes back to the RF card, where the digital signal is converted into an analogue signal, is up-converted and amplified. Finally, the signal is sent to the PA and combined with the downlink signal. After that the signals from all RF cards are combined at the crossband coupler and forwarded to the Base Station port of the Node A system.

In the downlink path, a signal originating from the base station is divided by the crossband coupler into the different frequency bands and is separated from the uplink signal in the donor duplexer. It is then amplified by a low noise amplifier (LNA), which is part of the RF card. The RF card down-converts the signals to the IF and converts the analogue signal into a digital signal. This signal is forwarded to the Main Board, where digital filtering takes place. After the digital signal processing the signals comes back to the RF card, where the digital signal is converted into an analogue signal, is up-converted and amplified. Finally, the signal is sent to the PA and combined with the uplink signal. After that the signals from all RF cards are combined at the crossband coupler and forwarded to the mobile port of the Node A system.

The specific device generally will be professionally installed.

Hereby the gain of the finally installed antenna(s), cable attenuation and antenna height will be defined site specific at the time of licensing with the appropriate FCC Bureau(s).

The maximum permissible exposure limit is defined in **47 CFR 1.1310 (B)**.

Limits for General Population / Uncontrolled Exposures

Frequency Range (MHz)	Power Density (mW/cm ²)
300 – 1500	f/1500

The NoteA operates in the frequency range of 450 – 470 MHz, so that the worst case Power Density Limit is **450/150 = 3 W/m²**.

The max measured conducted output power is:

- max composite output power based on one carrier (rated) per path: 7,08W (38.5dBm)

The maximum permitted level is to be calculated using general equation:

$$S = P \cdot G / 4\pi R^2$$

P = 20W; G = antenna-cable attenuation to be defined (numeric gain); $\pi = 3,1416$

The min separation distance between the antenna and any human body is to be calculated (solving for R in cm) with the final actual antenna gain/cable attenuation where the limit of 3mW/cm² is kept.

The antenna(s) used with device must be fixed-mounted on permanent structures with a distance to any human body to comply with the RF Exposure limit.