1.1.1 Tx Chain

1.1.1.1 Tx Line-Up

The maximum output level from the RF chip (RF2000) is 0 dBm.

From the RF chip to the PA, the insertion loss is approximately 1dB.

From the PA to the antenna connector, the insertion loss is approximately 2 dB.

The PA gain is approximately 24 dB, and since 1dB margin is required for the Tx gain control, the maximum possible transmit power at the antenna connector is 10dBm.

1.1.1.2 Tx up- Conversion

In the transmit path, an analog baseband signal is converted to RF frequencies using a two stage conversion with a 380 MHz IF. The baseband and IF stages include analog filters for image rejection. The final Power Amplifier operates in Class A/B mode and includes further analog filters on the output to mitigate spurious emissions.

1.1.1.3 Transmit Power Control

The RF chip (RF2000) includes two gain stages that can be individually controlled to give 40 dB transmit output power dynamic range. With appropriate calibration and temperature compensation, the software adjusts the Tx power in open loop, following the request from the Base Station. The Tx power can be adjusted from 20dBm to less than -20dBm.

1.1.1.4 Frequency Control

The RF chipset includes internal fractional PLLs to synthesize the required frequencies for the IF and RF conversion. A single high-accuracy VCTCXO reference is shared between each module.

1.1.1.5 RF Filter

The Band Pass Filter, between the RF switch and the antenna connector, provides enough rejection for the spurious and harmonics. The insertion loss is about 1.5 dB and the return loss is better that 10dB.

1.1.1.6 Power Amplifier

The power amplifier is Sirenza SZA-3044Z. This is a very efficient class-AB amplifier,delivering about 20 dBm at the antenna port in the whole 3.3 GHz to 3.6 GHz band with an EVM below 3%. This power amplifier does not require any matching network elements; even RF bypass capacitors are not required.
The band 3.6 GHz to 3.8 GHz can also be covered, but the Tx power is reduced.