5G PA Requirements

5G Standards will be based on scalable platform which supports various radio air interfaces. The scalability will be in multiple dimensions, such as bandwidth, power consumptions, latency, efficiency, and etc.

This implies scalable requirements mixed signal converters in terms of sampling frequency, oversampling ratio, effective number of bits, image rejection, bandwidth, and etc.

This document walks through single scenario and shows detail in how to define PA requirements.

Readers are encouraged to send their comments and/or questions to the author, Shafie@ieee.org, and I will be more than happy to address them.

5G PA Requirements

FCC is planning to release 4 bands above 24GHz dedicated to 5G.

It is believed that 28-29 GHz would be the first band.

5G modulation will be having 10dB PAR.

EIRP of +20dBm will be assumed as part of 5G standard.

Therefore, delivered power to antenna input of +27dBm is required assuming 3dB antenna gain.

5G Tx front end will have about 3dB of insertion loss, that would imply +30dBm output power from PA.

$$V_P = \sqrt{P.R} = \sqrt{1W.50\Omega} = 7.07V$$

$$I_P = \frac{V_P}{R} = \frac{7.07V}{50\Omega} = 141mA$$

Transducer power gain of G_T=20dB will be assumed.

N±1 and N±2 ACLR will be 12 and 6 dB relaxation above FCC current requirements, respectively.