

Design of Indigenous 5G Network at IIT Kanpur (Led by Dr. Rohit Budhiraja, EE. Dept)

In a multi-institutional project approved by Department of Telecommunication, the mandate was to indigenously build the complete hardware and software for the 5G network. A 5G network, as shown in Fig. 1 below, consists of

- **Core network** - performs among various functions, user billing and authentication.
- **Baseband unit (BBU)** - heart of a 5G network and executes the complete software stack.
- **Remote radio head (RRH)** - upconverts and radiates the signals.

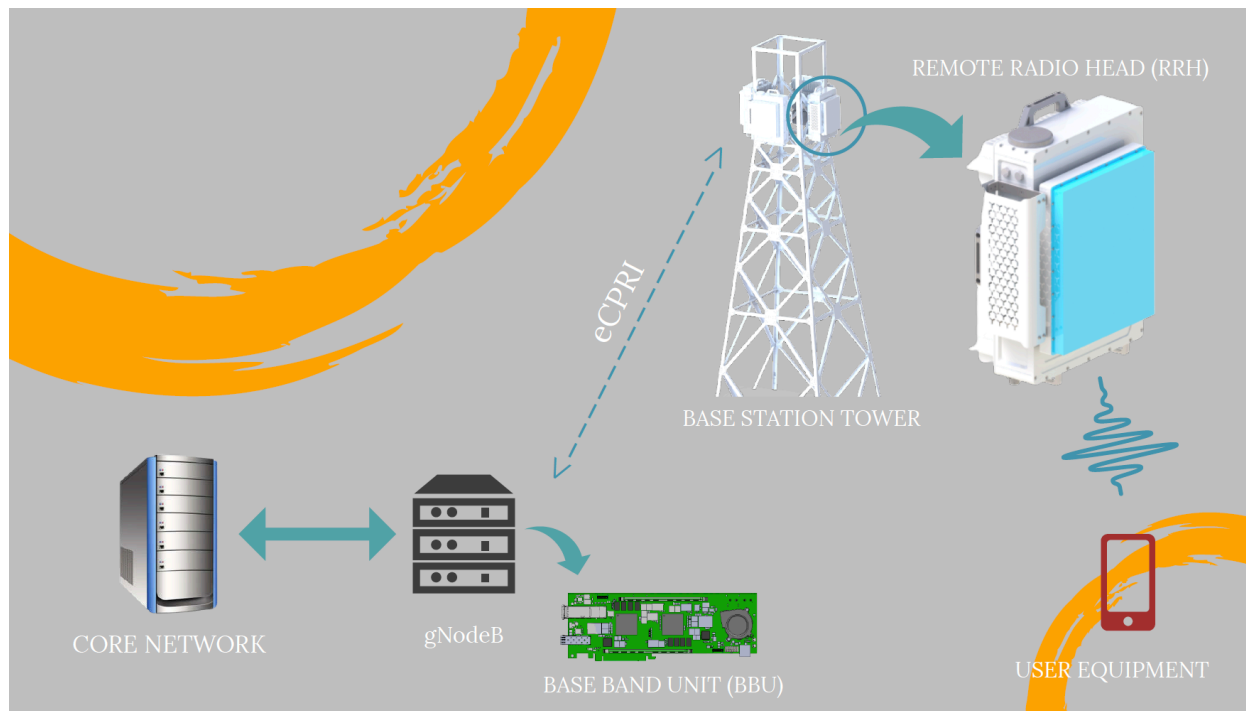


Fig. 1: Complete architecture of the indigenous 5G network.

IIT Kanpur had to build the BBU hardware and software from scratch, while IIT Bombay and IIT Madras built the core network and RRH, respectively. The BBU, completely designed at IIT Kanpur by the group of Dr. Rohit Budhiraja, and shown in Fig. 2 below, executes the complete software stack of a 5G network, and then transfers the processed signals to the RRH using high-speed optical interface. The BBU is designed to be compliant with the industry-driven ORAN standard. This enables BBU to be interfaced with any commercial off-the-shelf RRH.



Fig. 2: Baseband unit designed at IIT Kanpur by the group of Dr. Rohit Budhiraja. Also shown is the close-up of the hardware.

Different components of the 5G network have now been successfully integrated. It was recently showcased in UP Global Investor and G20 Summit. Our 5G technology will not only soon be transferred to two companies, but also be used to build our own private 5G network at IITK campus.



Fig. 3: 5G network being showcased in UP Global Investor and G20 Summit in Lucknow.

Our efforts in building the 5G network were recently appreciated by honourable prime minister

<https://www.youtube.com/watch?v=qYlO18uDRnk>

<https://www.youtube.com/watch?v=O7zGH3iYEV8&feature=youtu.be>