भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IITH 5G TestBed

IIT HYDERABAD

IITH Activities

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

- IITH Activities
  - 5G NR Base Station and User Equipment (UE) prototype
    - PHY and stack + 3rd party core
    - 100-200 MHz BW, at least 1 Gbps data rate
    - Sub 6 and mmwave support with MIMO capabilities
  - 5G UE: NB-IoT ASIC (SOC)
    - Enables Narrow-band applications such as sensors connected to base stations
    - Low power, long range
  - Contributions to 3GPP, TSDSI standards and ITU

IITH Test Bed

- 5G NR Base Station and UE
  - PHY running on FPGA, Stack functional on x86
  - Full system bring up with RF ongoing
- 5G NB-IoT UE ASIC (SOC) design
  - FPGA version of chip to be ready end of Feb 2020
  - First Tapeout May 2020, Fabout and chip bring up by Aug 2020
  - SOC testing in live NB-IoT Network to kick-start after chip tapeout
- Testing and testbed facilities at IITH
  - NB-IoT BS and UE end-to-end testing facilities available
    - Some companies provided access to IITH facilities for testing purposes

IITH Test Bed - Contd…

- 5G BS and UE, PHY and stack component level testing facilities available now, full testbed and network level testing will be made available in 2020/21
  - Set up a 5G BS, UE, Core stack level testing facility at IDRBT Hyderabad towards development of next Gen Banking applications
- Standardization
  - Contributions towards: LMLC requirements, standards and specifications
    - Introduction of waveform proposals (Pi/2 BPSK with spectrum shaping, LMLC coverage enhancement) at 3GPP Rel-16/17, TSDSI specs, and ITU-RIT ongoing

5G NR RF Demo

Setup Description:

DL frame transmitted from ZCU 111 RFSOC

1. SSB, 1 SSB in 5 ms half frame, 10ms periodicity
2. PDCCH, 2 symbols
3. PDSCH, 64 QAM

R&S decodes WiSig downlink Tx frame