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450 MHz for Smart Metering & Smart Grid

Deployment of NB-IoT & LTE-M Networks in 450 MHz

Why 450 MHz MTC network?

- Facilitation of intelligent power generation, distribution, control and consumption in critical infrastructure like power, gas, (waste) water and district heating
- Extended coverage area + better penetration compared to LTE 800/900MHz
- Digitalization through NB-IoT & LTE-M modules
- Candidate frequency bands are B31, B72 & B73*

* www.bundesnetzagentur.de/450mhz

Challenges

Link Budget

Antenna Detuning

PA Efficiency

Radio Resource Management

Protocol & Signaling Overhead

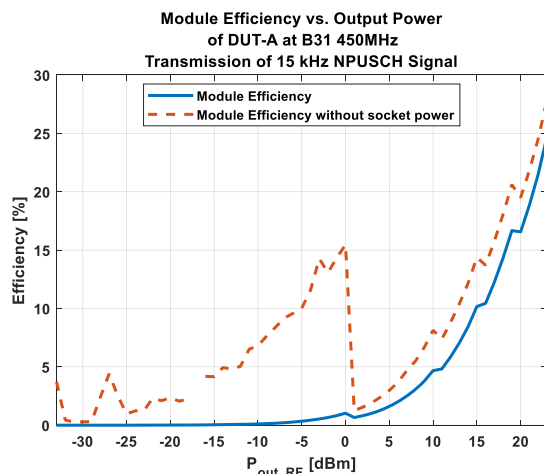
Resource Utilization

DUT-A Efficiency

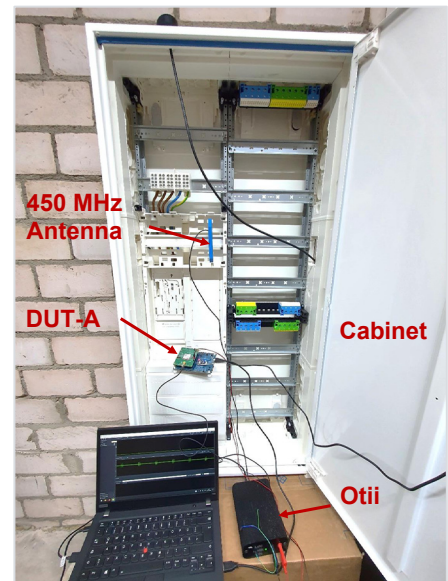
$$\text{Module Efficiency (ME)} = \frac{P_{out, RF}}{P_{in, DC}}$$

$$\text{ME without Socket Power} = \frac{P_{out, RF}}{P_{in, DC} - P_{Socket, DC}}$$

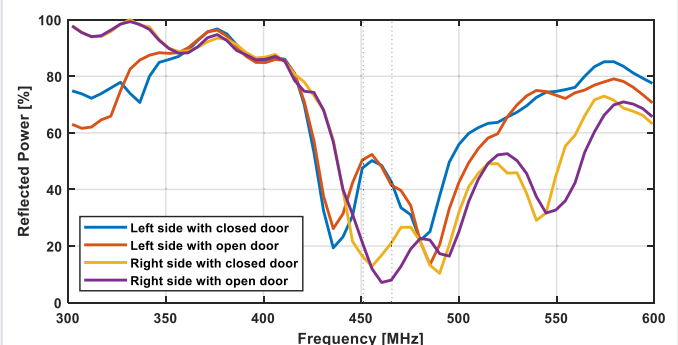
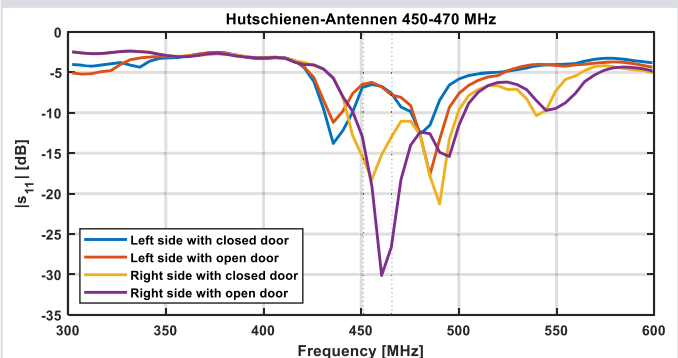
where $P_{Socket, DC} = \min(P_{in, DC})$



450 MHz Measurement Setup



Antenna Measurements



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