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STATE GRID
中国电力科学研究院有限公司
CHINA ELECTRIC POWER RESEARCH INSTITUTE

Study on the scenarios and requirements for high density access in power system

CEPRI

Background

- Facing the great challenges of globe warming and energy crisis, strategies such as carbon peaking and carbon neutrality have been elevated to the highest position by many countries around the world, including China.
- As one of the leading companies in the electricity industry in China, State Grid sees urgent requirement for more advanced technologies to monitor the real time status of electricity consumption of our customers.
- Our vision is to enable adaptive measurement, monitoring and control of electricity consumption, and these need to come with more precision, reliability, and flexibility.
- We encourage 3GPP RAN to discuss our interested use cases and evaluate the potential gap when fulfilling the corresponding requirements.

Use case explanations

- In one of the densest residential area in China, there are 300 hundred buildings, each with no less than 40 floors.
- Assuming 500m ISD for the 5G network, our estimation is that for each 5G site there is a requirement to serve around 1500 electricity meters (one for each household).
- Looking into the next several years, we will need to deploy the advanced electricity control / charging solution, which requires separate measurements and collections of different types of appliances (e.g., air conditioning, and refrigerator, etc.). This may multiply the terminal density by ten!

Example of requirements

The following are some example requirements for remote data collection from large number of electricity meters.

Dimensions	Description of the example requirements
Available bandwidth	5 to 10 Mhz considering the cost, as well as the typical restriction of sharing the bandwidth with ‘2C’ services
Interval of package Tx.	1~3 seconds
Typical package size	10k bits or 1k bits , depending on the terminal types
Density of terminals	~4000 terminals with 10k bits package size, or 20k terminals with 1k bits package size @ per site
Latency	100 milliseconds
Other aspects	Dedicated RAN resources required than those used for other ‘2C’ services

Proposal

- It is proposed that 3GPP RAN consider the corresponding use cases and evaluate whether the high density access requirements can be fulfilled by the exiting 5G-A technologies.

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Thanks!