MEMORANDUM

DATE:

TO:

FROM:

SUBJECT:

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Li Wendong

Ye Zhang, BUPT (Class 2013215109 S.N. 2013213181)

Overview of the Latest 5G Technology

# INTRODUCTORY SUMMARY

I have just finished a research about the Latest 5G Technology and take some exciting achievements. The research contains of three parts as following.

Part 1: Compare of 5G and historic communication technology and the challenges from future exceptions.

Part 2: The potential technology to reach 5G

Part 3: The research progress of 5G now.

This memo report will give my results on all the three parts.

# CHANLLENGES OF 5G

From thoughts to practical, there are lots of challenges that researchers have to face.

The development of 5G will show some new features as scientist expected. More attention on the user experience like the network delay, more trying to seek improvement on the system framework, the changed dominant position from outdoor service to indoor, the fusion of the wireless network and wired network, and the use of SDN are the main of the new features. To reach the capability of 5G, researchers sees the main improvement will be on new wireless transmission technology, system structure and frequency resource.

Thus the core challenges of 5G can be summarized as power, environment, anti-interference, spectrum and cost, from the demands except by people.

# THE POTENTIAL TECHNOLOGY TO 5G

To deal with all these problem or some other problem which are not effect so much as these but also important, researchers have set up lots of smart ideas.

## MASSIVE MIMO

A new technology develop on MIMO named massive MIMO is seen as a solution of the problem of spectrum and power efficiency of mobile communication in the future for 5G. It is to replace the multi antenna which is used currently at each node to large array antenna, thus forming a large-scale MIMO wireless communication environment to use the depth of excavation space dimension of wireless resources. As for MIMO, abbreviation of multiple input multiple output, it is an effective means used in 3G and 4G now to improve the performance of communication system. Research on massive MIMO wireless communication technology is still in its infancy.

## FBMC

FBMC, filter-bank based multicarrier, is a collectively of a series of non-OFDM technology. In FBMC, the impulse response and the frequency response of the prototype filter can be designed according to needs. There’s no need to be orthogonal between each carrier. Thus we can easily achieve flexible control overlapping degree of each sub carrier bandwidth settings, between each sub carrier, and control the interference between adjacent subcarriers flexibly, also easy to use some scattered spectrum resources.

## SON

SON, Self-Organized Network, is another technic which is long seemed promising. SON is to give the network intelligent to have self-organization ability, including self-configuration, self-healing, and self-optimization.

5G system will take a huge complex framework to support its capability. Thus the cost of the management of the whole system will increase highly. In order to solve the problem of the complexity of network deployment and optimization, to reduce operation and maintenance costs relative to total income ratio, we can say that SON will take a more important role in the 5G system. The success of the using of SON in LTE network, Wi-Fi, etc. shows that this technology is potential in 5G system

# The PROGRESS OF 5G

Before 4G entered the commercial stage, 5G have started to be researched. In 2013, IMT-2020(5G) Group have been set up, and ITU started the research work of 5G demands, spectrum and technology trends. In May 2014, IMT-2020(5G) WHITE PAPER ON 5G VISION AND REQUIREMENTS have been published by IMT-2020 Group. 5G is coming at high speed.

Up to the present, although 5G is still in the process of standardization, the definition is clear for the most part. The International Telecommunication Union (ITU) will complete the early research on 5G standard soon after and have clearly put forward the work plan, the international mainstream mobile communication standards organization 3GPP also recently launched the 5G related issue. According to the European Telecommunications Standards Institute (ETSI), 3GPP and IMT-2020 projections, 5g networks is expected to begin to carry out the test and commercial trial global in 2017 or 2018, and finally in 2020 the official business.

# CONCLUSION

The research of 5G technology have come into its middle stage, the technical requirements and key indicators have been determined, the implementation technology will be also determined in the next few years. Related research are in the process, some of the work will finish soon. We will see that the near stage is to study and establishment of substantive standardized, and the next stage will be test and fix the technology.