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Assessment of Spectrum Considerations for 5G Mobile Broadband Communication Systems

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Outline of the presentation



- Aim and motivation of the research
- Main idea and objectives of the research
- Previous studies
- Present results of the research
- Planned studies
- Conclusions

Aim and motivation of the research



- Increased demand of consumers on services in the mobile environment with high data rate and technologically developed mobile broadband communication systems (IMT) will require more spectrum to be available in the future. The new technologies require frequencies for their development.
- 5G is the next generation of broadband communication technologies, known also as IMT-2020.
- One of the main objectives of 5G is to increase the current data rates up to several gigabits per second (Gbit/s) with even more than 10 Gbit/s in hot spot environments. Today, carrier aggregation (e.g. LTE-A) already enables us to increase data rates but its complexity is exponential with the number of possible combinations of frequency bands used. As a consequence, industry wants to consider the use of higher frequencies in order to increase the bandwidth available, which is necessary to achieve such speed.

Main idea and objectives of the research



- Main idea of the research is investigate the available land mobile frequency bands above 6 GHz for possible allocation worldwide and in Europe for IMT after WRC-19.
- IMT-2020 technologies after appropriate standards development, can be putted into use for land mobile service only when all necessary electromagnetic compatibility / frequency sharing studies will be completed and technical conditions of use of frequencies will be determined.
- In the framework of the research a particular attention will be paid to the evaluation of perspective use of the considered frequency bands by land mobile service for 5G technologies.

Previous studies



- Framework and overall objectives of the future development of IMT-2020, as well the technical feasibility of IMT in bands above 6 GHz have been studied in ITU.
- Under European Common Proposals (ECPs) for the work of WRC-15 Agenda Item 10 (which foresee inclusion items in the agenda for the next WRC-19), CEPT has prepared a proposal to consider additional spectrum allocations to the mobile service on a primary basis and identification of frequency bands above 6 GHz for IMT.

Present results of the research



Under preparation work for WRC-15 Agenda Item 10 the considered frequency ranges by CEPT:

- 31.8-33.4 GHz
- 40.5-43.5 GHz
- 45.5-48.9 GHz
- 66-71 GHz
- 71-76 GHz
- 81-86 GHz
- 24.5-27.5 GHz

Work on development of proposals for the consideration of possible frequency ranges above 6 GHz for IMT-2020 have been performed also in other regional organisations and finally will be decided by WRC-15 if the new agenda item for WRC-19 will be agreed in the conference.

Planned studies



- Evaluation of perspective use of the considered frequency bands by land mobile service for IMT-2020.
- Perform electromagnetic compatibility and frequency sharing assessment between different services (existing services vs. IMT-2020), taking into account the need to ensure the protection of existing services also in adjacent frequency bands.
- Examine related frequency cross border coordination issues with neighboring countries.

Conclusions



- 5G broadband communication technologies will require higher frequencies in order to increase the bandwidth available, which is necessary to achieve data rates up to several gigabits per second.
- Results of the research can be used for further assessment of suitability of considered frequency bands for land mobile service (IMT-2020) above 6 GHz band performing appropriate compatibility studies.
- Identification of frequency ranges above 6 GHz for IMT-2020 by WRC-19 will provide new opportunities for development and enhancement of mobile broadband services.



**Thank you
for your attention!**

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