Towards 5G Enabled Gigabit Society

Exploring Spectrum Issues Related to 5G in 26/28 GHz Bands

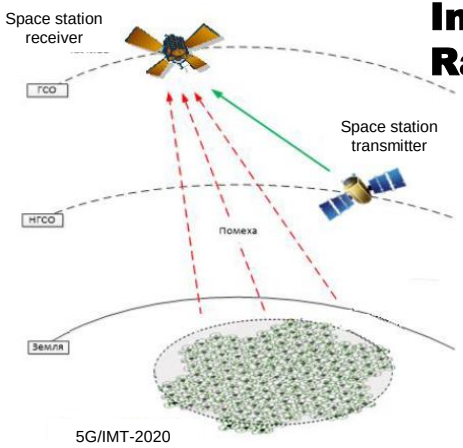
11-12 October 2018, Athens, Greece

HELLENIC REPUBLIC
Ministry of Digital Policy, Telecommunications and Media

Ministry of Digital Policy, Telecommunications & Media
TODAY, FOR EVERYONE

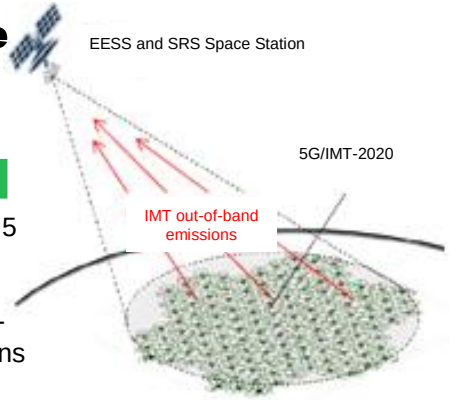
ITU

The Landscape of Incumbent Services in 24,25-29,5 GHz



Inter Satellite Radio Service

Earth Exploration Satellite and Space Research Radio Services (Passive)



IMT-2020

EESS 24,25 27,5

23,6 24

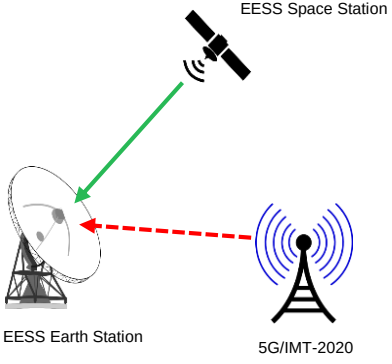
Interference from 5G/IMT-2020 towards space station receievers

Interference from 5G/IMT-2020 out-of-band emissions

5G

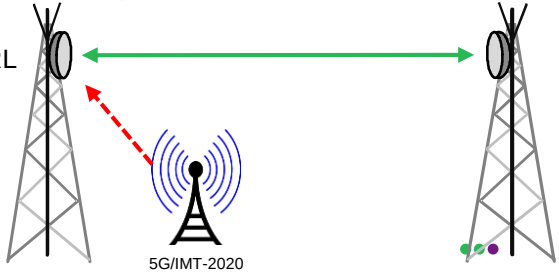
Earth Exploration Satellite Radio Service (Active)

Interference from 5G/IMT-2020 towards Earth satellite stations (Earth Remote Sensing)

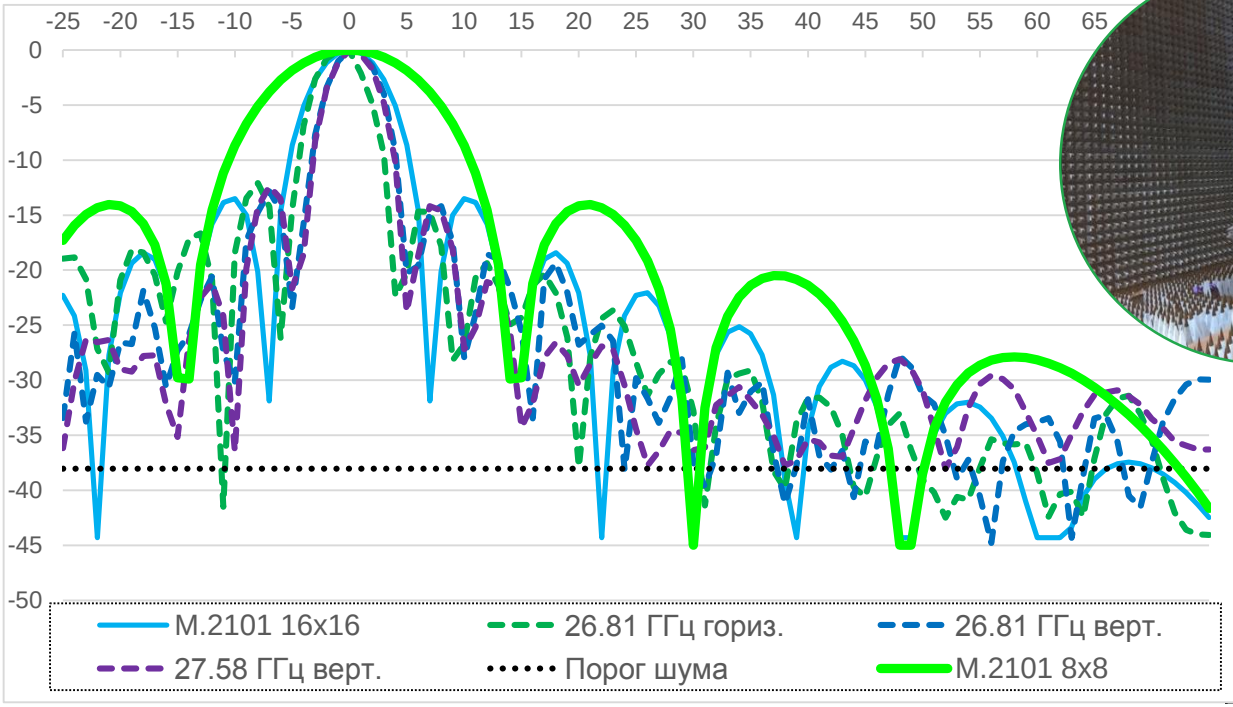


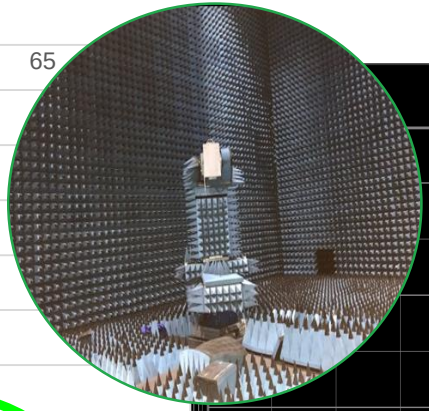
Fixed Service (Point-to-Point, Point-to-Multipoint)

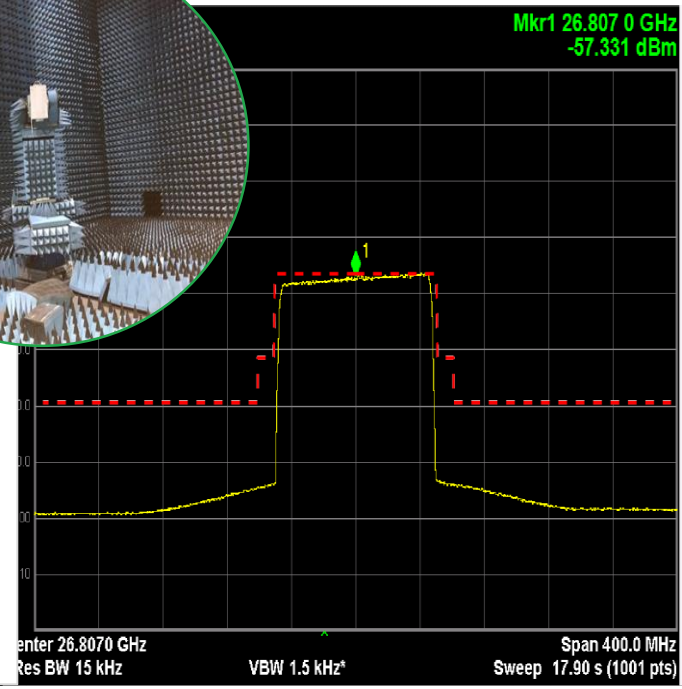
Interference from 5G/IMT-2020 to RRL or FWA



5G/IMT-2020 Parameters Tests in Echoless Camera







Patterns of active antenna array (Massive MIMO) and spectrum masks (out-of-band emissions) were measured.

1. Antenna patterns (dotted lines) measured are well fitted with the requirements in ITU M. 2101 (firm lines) recommended for simulations of interference/sharing scenarios with incumbent radio services.
2. Levels of out-of-band emissions as obtained in the trials are below the mask recommended in 3GPP TS 38.104.

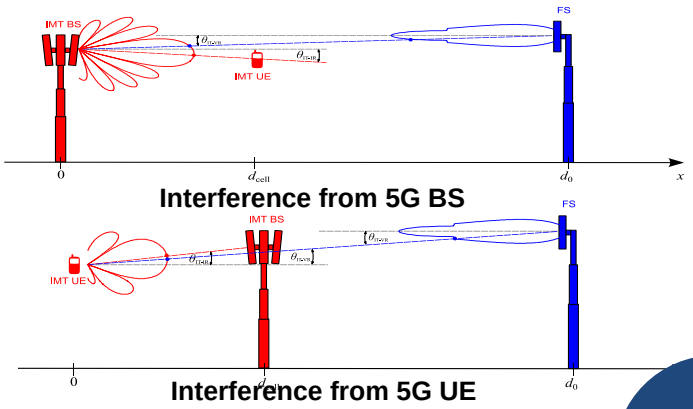
Sharing Studies for Stations Within Fixed Service

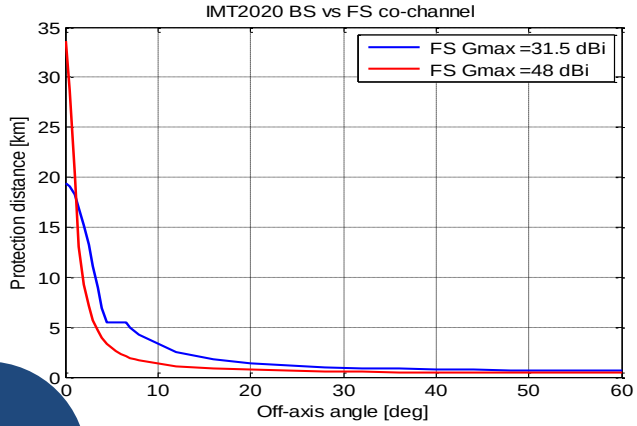
In theory harmful interference to FS stations in 26 GHz band can occur

but…

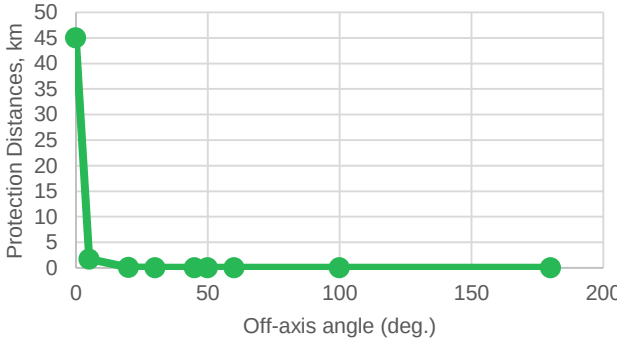
having due account to directivity of FS antennas, beamforming and high dynamics of 5G antenna patterns along with fading margin used for planning of microwave links (ITU-R F.758-6 20% in time)

there is a low risk of harmful interference in practice

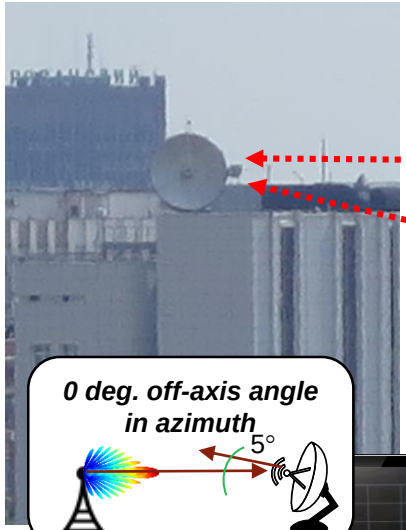




RRL

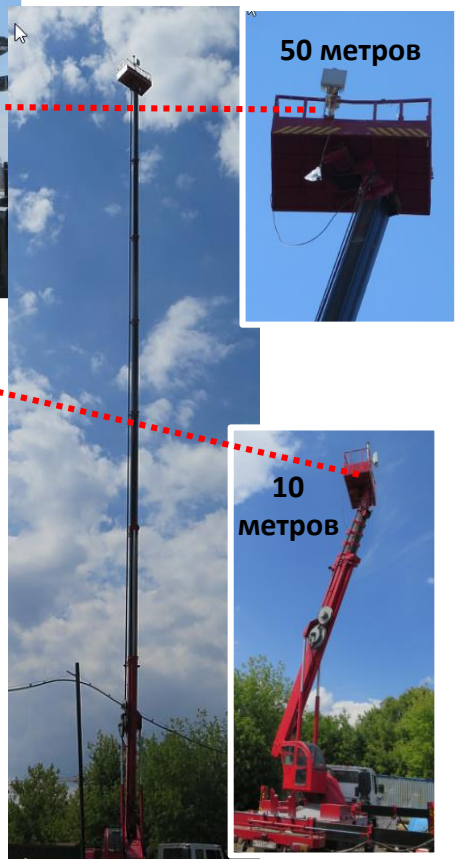


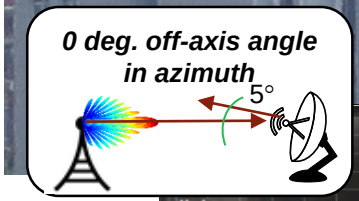
Sharing Studies with Earth Station Within EESS

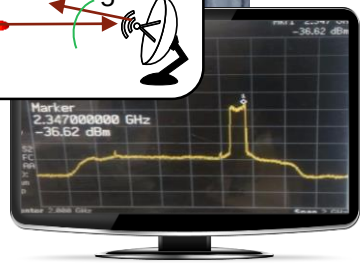


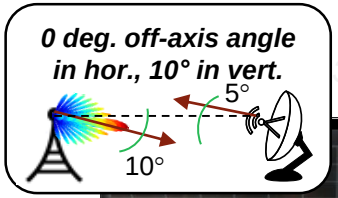
Direction towards
source of interference

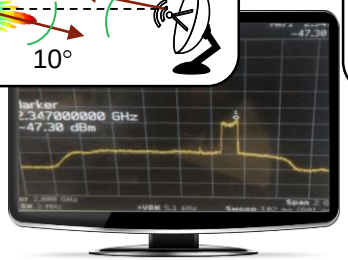
Interfering 5G BS

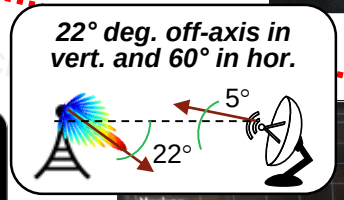










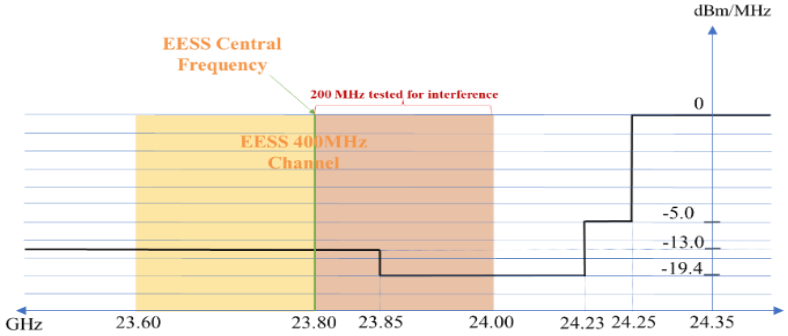


Critical interference from 5G BS towards EESS Earth Station had been recorded with the direct line of sight of antennas or extremely small off-axis angles. The resulting protection distances are several km maximum. Compatibility could be ensured by means of coordinated location of 5G transmitters.

Sharing Challenges with Other Space Radio Services

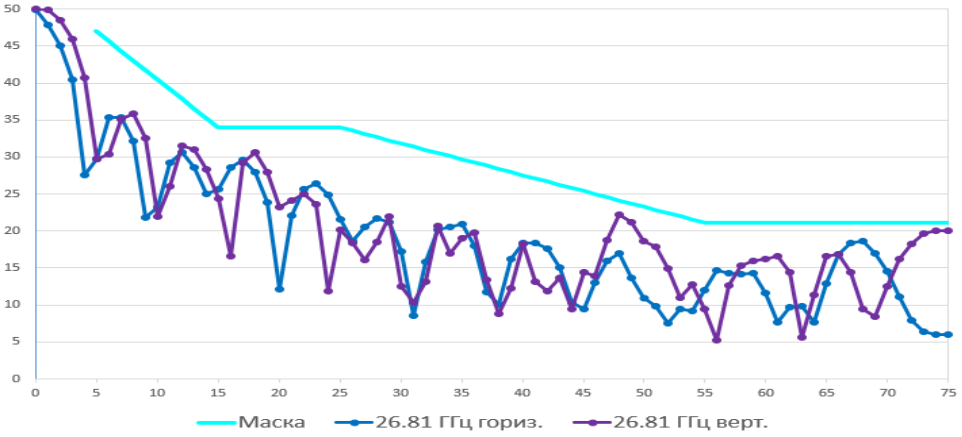
EESS and SRS (Passive)

- ITU is exploring out-of-band emissions from 5G/IMT-2020 spectrum bands to the adjacent bands of EESS and SRS to protect space receiving stations of passive scientific services.
- Additional restrictions on spectrum masks will impose complexity and price of 5G equipment.



ISS

- Studies available up-to-date do not reveal crucial interfering scenarios for ISS.
- Position of few administrations in ITU assumes certain limits on emissions into upper hemisphere.
- Theoretically calculated limits are well fitted with the existing 5G equipment as it was demonstrated during trials.



CONCLUSION

01 Pilot projects and trials are of great value to study both technical aspects and use cases as well as in establishing the most effective regulatory environment for implementation of 5G.

02 The results of tests and measurements provide firm confidence in 26/28 GHz availability for 5G networks as well as deliver background information for future decisions at WRC-19.

03 26/28 GHz is the obligatory spectrum to provide the wide scope of innovative 5G services (use cases). It accommodates the list of matured use cases specific for mm waves.