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Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
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Subject: Outcome of the 2019 World Radiocommunication Conference and its impact on future Earth observation satellite systems

Action required: To ensure that national and regional radio frequency authorities are made aware of the importance of radio frequency protections for our Earth observation systems to provide a safe and sustainable future for all

Dear Sir/Madam,

Following a number of discussions and interventions at the recent American Meteorological Society session, I am writing to alert you to the outcome of the World Radiocommunication Conference in November 2019 and to advise you that this outcome may have a serious adverse impact on Numerical Weather Prediction (NWP) systems that, as you know, are heavily reliant on Earth observation satellite systems.

The World Radiocommunication Conference (WRC), organized by the International Telecommunication Union (ITU), is the global decision-making mechanism for the allocation of bandwidths of the world's radio spectrum. The spectrum is a limited and increasingly contested resource with emerging technologies such as 5G further raising demand. The 2019 conference (WRC-19), attended by more than 160 nations, agreed to protect the microwave bands that support life-saving severe weather early warning systems, but with time-limited provisions, leaving the future of these systems uncertain.

As information providers, WMO and its Members stand to benefit from 5G, for instance, it facilitates the rapid transfer of data to decision makers and people in crisis; but in taking advantage of this technology, it is essential that the transmitting systems used are not detrimental to the quality of the information we distribute.

The technologies used within severe weather early warning systems to gather and disseminate their critical information, are dependent on access to specific radio spectrum bandwidths. The roll-out of 5G, officially known as International Mobile Telecommunications-2020 (IMT-2020), similarly dependent, threatens to limit the usability of these bandwidths by meteorological observation systems around the world.

Specifically, the WRC-19 decision permits 5G technologies to emit noise in the 24GHz meteorological satellites observation frequency band up to -33 dB(W/200MHz). This raised limit could lead to nearly 10 times more interfering out-of-band emissions than the lower limit recommended by ITU studies and WMO. The decision specifies that:

- A limit of -39 dB(W/200 MHz) will apply to IMT base stations brought into use after 1 September 2027. This limit will not apply to IMT base stations which have been brought into use prior to this date. For those IMT base stations, the limit of -33 dB(W/200 MHz) will continue to apply after this date;

To: Permanent Representatives (or Directors of Meteorological or Hydrometeorological Services) of Members of WMO

cc: Hydrological Advisers to Permanent Representatives

- A limit of -35 dB(W/200 MHz) will apply to IMT mobile stations brought into use after 1 September 2027. This limit will not apply to IMT mobile stations which have been brought into use prior to this date. For those IMT mobile stations, the limit of -29 dB(W/200 MHz) will continue to apply after this date.

The risk, therefore, is if 5G networks roll out more quickly than initially anticipated, this could create an unregulated increase in interference in the 24GHz meteorological satellite observation frequency radio spectrum band. The final impact will depend a lot on the roll-out rate of the 5G network and the number of users.

The potential repercussions are so serious for weather forecasting that, as Secretary-General, I intervened directly with the ITU Secretary-General to voice the concern of the entire meteorological community.

"This WRC-19 decision has the potential to significantly degrade the accuracy of data collected in this frequency band which would jeopardize the operation of existing Earth observation satellite systems essential for all weather forecasting and warning activities of the national weather services", I warned in my written intervention. "Potential effects of this could be felt across multiple impact areas including aviation, shipping, agricultural meteorology and warning of extreme events, as well as our common ability to monitor climate change in the future".

The intervention followed a resolution at the Eighteenth World Meteorological Congress calling for the protection of radio frequencies.

I will be seeking a meeting with the Secretary-General of ITU to follow up on this intervention and to ensure that in the next WRC round of consultation there is an increased awareness of the impact of insufficient protection of passive bands on NWP and other prediction systems.

WMO will continue to support our partners such as the European Centre for Medium-Range Weather Forecasts (ECMWF) in highlighting this issue. Therefore, I request that, as Permanent Representatives to WMO, you also ensure that national and regional authorities are kept aware of the importance of our systems to a safe and sustainable future for all.

Yours faithfully,

(P. Taalas)
Secretary-General