

ITU-R RECOMMENDATION RA.769 AND RADIO ASTRONOMY HARMFUL INTERFERENCE LEVELS IN THE 21ST CENTURY

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It is widely known among those interested in radio observatory protection and spectrum managers that the harmful interference levels (HIL) for radio astronomy are given in Recommendation ITU-R RA.769, usually referred to as Rec. 769. Even a summary reading of Rec. 769 reveals however, that while the methodology for the derivation of HILs is clearly described, the values listed in the relevant Tables were derived for single dish telescopes and are based on specific assumptions, e.g. that the maximum observed bandwidth is the width of the radio astronomy band and that a 2000 sec integration time is used in the observation. These standardized assumptions and the HILs in Rec. 769 that are based on them have served radio astronomy very well for over half a century.

Most radio telescopes envisioned for use in the 21st century, some of which are under construction or in various phases of design, are not single dish telescopes and the projected modes of observation are difficult to assimilate to the assumptions in Rec. 769. For example, the Square Kilometer Array (SKA) is envisioned as consisting of a compact core, and a sparse outer component with elements located possibly as far as 3000 km away. Further, the SKA plans to cover a frequency range of 200 MHz to 20 GHz with a large instantaneous bandwidth, and will possibly have multiple beams on the sky. Other instruments, under construction or planned (e.g. ALMA, EVLA, LO-FAR, LWA), are also difficult to assimilate to a single-dish telescope concept, under the assumptions of Rec. 769.

It therefore appears to be timely for the radio astronomy community to consider if: a) the Rec. 769 HIL levels should continue to be used for the next generation of instruments or b) instrument specific levels, that take into account, e.g. the geographical outlay and frequency coverage of the instrument should be calculated on a case-by-case basis. If the first approach is adopted, then a solid justification should be provided why the Rec. 769 levels continue to be valid under the changed circumstances. The second approach will require that the community dedicate substantial resources to carry out the work that will be needed within various national and international regulatory fora. I discuss some of these issues in more detail (but provide no answers to the questions raised)

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