ITU RADIO REGULATIONS
related to
SMALL SATELLITE
Earth Stations (TA)

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Small satellites - plot of the maximum peak power (pep_max) against the satellite apogee value

Notifications
Maximum pep_max vs. apogee distance
In conformity with No. 25.11 of the RR, any amateur-satellite operator shall set up at least one TT&C earth station (TA) to ensure that any harmful interference caused by emissions from its satellite can be terminated immediately (No. 22.1)

TA TT&C station, have to be operated by an operator with a valid amateur license (duly authorized person) (Nos. 1.56 and 1.57 and ART 25) and callsign (ART 19)
TT&C station is a critical part of the amateur-satellite systems with technical and operational challenges

visibility/access time (in-view window), of a satellite for a given Earth station is very short due to low orbit height and varies from approximately 10-15 minutes in the best case to no coverage at all for most of the 16 daily orbits
Small satellite ground segment - 3

- Small satellite operators may improve this situation by setting up an Internet connected special dedicated network of numerous/multiple remote amateur-satellite Earth stations (ARS-ES) along its satellite track (instead of one amateur-satellite Earth station, waiting for downlink opportunities)

  ➢ to increase a satellite availability, and
  ➢ to extend access time, and
  ➢ practically to have a global coverage (service area), capable to track and download telemetry or mission science data from the satellite at any place and any time if at least one “networked” ARS-ES can see (in-view-window) the satellite, in this case

  ➢ the satellite service area have to be notified as **XVE – VISIBLE EARTH**
In most cases the “networked” remote ARS-ES are outside of its satellite service area and ADM very rarely notify this “extended service area” in the satellite filing to the Bureau.

This missing information may generate a harmful interference situation when the amateur-satellite is operating in the bands shared with other services (No. 5.282) on a non-interference basis and the satellite is “active” (transmitting with a high power) outside of its service area.
Administrations may authorize operation of these *specific* ARS-ES (TA),

Which can *receive* the telemetry or mission science data from *any amateur-satellite* and

Send this data *by Internet* to the particular amateur-satellite Mission Control Centre.

However, *to protect frequency assignments and gain international recognition* of such ARS-ES (TA) in application of Resolution 642 (WARC-97), administrations should under No. 11.2 *Notify* these ARS-ES (TA) to the Bureau

In contrary, it’s necessary to note that a *remote transmission (uplink) by Internet and remote utilisation of ARS-ES TT&C earth command station for transmission (uplink) is prohibited*, *unless the Administrations concerned authorize it.* (See Resolution 1 and ART 18)
RES-642 Relating to the bringing into use of earth stations in the amateur-satellite service

- Procedures of Articles 9 and 11 are applicable to the amateur-satellite service (ARS)
- Characteristics of TA vary widely
- Space stations in the ARS are intended for multiple access by TA in all countries
  - Coordination among ARS TA is without the need for formal procedures
  - Burden of terminating any HI is placed on the ADM authorizing a space station in the ARS (No. 25.11)
When an ADM intends to establish a satellite system in the ARS and wishes to publish information with respect to TA it may:

1. Communicate to the Bureau all or part of the information listed in APP 4; the Bureau shall publish such information in a Special Section
2. Requesting comments to be communicated within a period of four months after the date of publication
3. Notify under Nos. 11.2 to 11.8 all or part of the information listed in APP 4
4. The Bureau shall record it in a special list
5. This information shall include at least the characteristics of a typical TA having the facility to transmit signals to the space station to initiate, modify, or terminate the functions of the space station (No. 25.11)
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Questions ?