Applying Dynamic Time Limits after Available Spectrum Query

Technical Note

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This technical note aims at giving clarity on how to apply dynamic time limits after requesting available spectrum. The focus will be on the regulatory time limits for a Fixed device. The same said herein also holds for Nomadic devices within its defined regulatory limits.

Regulatory Time limits

The following time limits can still be hard coded in the firmware to ensure devices operate within regulatory limits:

◆ ***regulatoryOperation*** = 24 hrs (1440 minutes)

◆ ***ceaseOperation*** = 48 hrs (2880 minutes)

Database Spectrum Response Limits

When a device request for available spectrum, a successful response contains:

◆ ***spectrumSpecs***: Detailed operational parameters, thus available spectrum and maximum EIRP per channel

◆ ***eventTime***: Defines the ***startTime*** and ***stopTime*** for the validity period of the available spectrum. This period may be 24 hrs or less, and it can calculated as ***stopTime*** - ***startTime***. Let us call *it* **spectrumValidity**.

◆ ***rulesetInfo***:Specifies amongst others ***maxPollingSecs***, which limits/tells how often can a device request for available spectrum, even before the 24 hours (or ***stopTime***). This can be far less than 24 hrs to allow a device not to wait that long should the intelligence of the device require switching from the current channel it transmitting on. So, ***maxPollingSecs*** shall always be less than or equal to ***spectrumValidity***.

When next can/should a device request for available spectrum? The answer is given by the following equation:

◆ ***nextSpectrumRequest*** = minimum of (***regulatoryOperation*** and ***spectrumValidity***); When not considering ***maxPollingSecs***

◆ ***nextSpectrumRequest*** = minimum of (*regulatoryOperation*, *spectrumValidity* and *maxPollingSecs*)

Applying Dynamic Limits

From the regulatory limits, we can infer that cease operation is twice the duration of operational validity. This also applies to Nomadic device, so it is safe to say:

◆ ***deviceCeaseTx*** = minimum of (***regulatoryOperation*** and ***spectrumValidity***) miltiplied by 2;

deviceCeaseTx maybe far less than the regulatory limit for cease operation which is 48 hours. This is useful during assessment. Therefore, it is maybe useful to have a functionality to switch between the maximum regulatory limit (*ceaseOperation*) as well as the dynamic *deviceCeaseTx*.

Database Re-Configuration of Limits

Configurations such as *maxPollingSecs*, *spectrumValidity* are reconfigurable on the CSIR Spectrum Switch. Since a device only knows about them in the response of available spectrum request, they should not be hard coded in the device firmware.

spectrumValidity is currently configured as 24 hours, which equals the regulatory limit. But it can be changed to any value less than the regulatory limit (e.g. 20 minutes) during the assessment. Since Spectrum Switch is used for assessing/testing different device compliance with respect to the communication with the database, as well as for pre-commercial TVWS trials, these configurations are only changed when required.

The End!