Satel 868 ... 869 MHz frequency range duty cycle limitation

The duty cycle is defined as the ratio, expressed as a percentage, of the maximum transmitter “on” time monitored over one hour, relative to a one hour period. The purpose of the duty cycle limit is to ensure that no single application can occupy this license-free band for more than a certain percentage of time. The limitations are mentioned in ETSI standard specifications EN 300 220-1 and EN 300 220-2.

Earlier than 3.63.4 firmware versions for the SATEL Compact-Proof (869), SATELLINE-EASy 869 and SATELLINE-M3-TR1 869 do not include the automatic duty cycle limitation. In these cases the duty cycle limitation has been left to the responsibility of the connected hardware, as an upper layer application task.

If the upper layer application is not capable of limiting the duty cycle according to the latest ETSI specification requirements, the firmware of the SATEL Compact-Proof (869), SATELLINE-EASy 869 and SATELLINE-M3-TR1 869 products shall be updated to the required minimum level, version 3.63.4 or later. It is always recommended to use the latest firmware version in the devices for the Satel radio modems.

Updating older than 3.63.4 firmware version to the latest version, the subband of the radio modem shall be selected by the user in order to take the automatic duty cycle limitation in use in the radio modem at first time. This task can be executed either from the programming menu via terminal connection, via LCD user interface or via SL-commands with terminal connection.

The subband settings for SATELLINE-EASy 869 and SATELLINE-M3-TR1 869 with latest firmware versions are by default:

<table>
<thead>
<tr>
<th>Subband</th>
<th>Subband 1</th>
<th>Subband 2</th>
<th>Subband 3</th>
<th>Subband 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>869.4000 – 869.6500 MHz</td>
<td>869.6500 – 869.7000 MHz</td>
<td>869.7000 – 870.0000 MHz</td>
<td>869.7000 – 870.0000 MHz</td>
</tr>
<tr>
<td>Max Tx Power</td>
<td>500 mW</td>
<td>25 mW</td>
<td>25 mW</td>
<td>5 mW</td>
</tr>
<tr>
<td>Max Duty cycle</td>
<td>10 %</td>
<td>10 %</td>
<td>1 %</td>
<td>100 % (no limit)</td>
</tr>
<tr>
<td>Available Frequencies</td>
<td>869.4125 MHz, 869.4375 MHz, 869.4625 MHz, 869.4875 MHz, 869.5125 MHz, 869.5375 MHz, 869.5625 MHz, 869.5875 MHz, 869.6125 MHz, 869.6375 MHz, 869.6625 MHz, 869.6875 MHz, 869.7075 MHz, 869.7375 MHz, 869.7625 MHz, 869.7875 MHz, 869.8125 MHz, 869.8375 MHz, 869.8625 MHz, 869.8875 MHz, 869.9125 MHz, 869.9375 MHz, 869.9625 MHz, 869.9875 MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Active default subband: Subband 1
Active default frequency: 869.4125 MHz

When the user selects the active subband, RX/TX frequencies will also switch to subband min. freq +12.5 kHz (for example 869.4125 MHz for Subband 1).

Duty cycle is limited by the firmware by adapting to the transmitted data. The absolute maximum for a transmission is 1 second after which the transmitter is switched off.
Example of the 10% duty cycle limitation:

Using subband 2: 869.6500 – 869.7000 MHz, 25 mW, 10 % duty cycle

TX time 100ms ⇆ RX time before activating the transmitter again = 900 ms (90 %) of the time.

- Any transmitted data appearing at the serial port outside the duty cycle period is ignored.
- Also the SATELLINE-M3-TR8 product includes the automatic duty cycle limitation, but the subbands differ and are mentioned in the user manual of the product.
- LCD UI and SATEL Configuration Manager do not currently support the active subband selection (9/2016). The subband selection can be made in the programming menu or by using SL commands with terminal connection.

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