Spectrum for drones

30/05/2018 – Antone Borissov & Vincent Durepaire
Outside of current CEPT’s work

Drones **certified** by Civil Aviation authorities

⇒ Aeronautical mobile frequency bands
Within current CEPT’s work

Non-certified drones

- non-professional via SRD regulation
- professional via MFCN
- professional via PMR
- professional via video PMSE regulation (temporary individual authorisation)
- professional via a dedicated band (temporary individual authorisation)
Non-professional drones via SRD regulation

- Such as toys

- Use of current SRD regulation, in particular:
  - ERC/REC 70-03 Annex 8 (emphasis on the 35 MHz band for flying models)
  - WiFi in the 2.4 GHz band

- See Explanatory paper FM(18)059Annex037
  www.efis.dk/documents/79124

- Reminder: WiFi in the 5 GHz bands (5150-5725 MHz range) as per ECC/DEC/(04)08 is not allowed for drones!
Professional drones via MFCN

- Main focus of the market

- For control-command and optionally data acquisition

- Three points of attention:
  - MFCN coverage in the air (low altitude)
  - MXA bands → why this restriction ? which consequence ? (in particular at CEPT borders)
  - 2.6 GHz bands, FDD and TDD: coexistence with radars in 2.7-2.9 GHz

- Studies are on-going within PT1
Professional drones via PMR

• Professional drones via PMR are similar to via MFCN

• But more local and the user may be the PMR owner

• No investigation required within CEPT at this stage
Professional drones via video PMSE regulation

• Temporary individual authorisation regime
  • as video PMSE

• For control-command and data acquisition

• Relevant video PMSE tuning ranges:
  • 2010-2110 MHz
  • 2200-2500 MHz
  • 7.0-8.5 GHz

• To be investigated
Is there a market demand?
• But high interest for governmental drones

Professional drones
• Priority to control-command
• Data acquisition requires more spectrum, thus making the identification of dedicated band for that purpose impossible
• Temporary individual authorisation regime

Governmental drones
• Control-command and data acquisition

Several bands considered by the CG Drones
• to be continued
<table>
<thead>
<tr>
<th>Band</th>
<th>Proposal</th>
<th>Coexistence issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1880-1900 MHz</td>
<td>Not considered yet by the CG Proposal for governmental drones only</td>
<td>Coexistence with DECT* should be fine: very local and very punctual use</td>
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<tr>
<td></td>
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<tr>
<td>1900-1920 MHz</td>
<td>To be investigated for professional and governmental drones</td>
<td>Coexistence with MFCN BS above 1920 MHz, similar to professional drones via MFCN</td>
</tr>
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* see Directive 91/287/EEC
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<td>5000-5010 MHz</td>
<td>e.g. for low-power LoS drones</td>
<td>In particular Galileo ground-to-space link: power restrictions foreseen. Footnote 5.443AA doesn’t apply to drones controlled by a ground base station.</td>
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<tr>
<td></td>
<td>To be investigated?</td>
<td></td>
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<td>5030-5091 MHz</td>
<td>Band only for certified drones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>⇒ No possibility</td>
<td></td>
</tr>
<tr>
<td>5091-5150 MHz</td>
<td>No possibility</td>
<td>Aeronautical telemetry and AeroMACS in the band</td>
</tr>
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<td>Proposal</td>
<td></td>
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<tr>
<td>2.3-2.4 GHz</td>
<td>Covered by “via MFCN” and “via video PMSE regulation” No specific investigation required</td>
<td></td>
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<tr>
<td>5150-5250 MHz</td>
<td>Covered by “via SRD regulation” No specific investigation required</td>
<td></td>
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<tr>
<td>5875-5925 MHz</td>
<td>No possibility with road ITS and CBTC in that band</td>
<td></td>
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</table>
Main target on “via MFCN” (PT1 studies starting)

Investigate “via video PMSE regulation”
  • 2010-2110 MHz, 2200-2500 MHz, 7.0-8.5 GHz

Two or three dedicated bands to be investigated

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<th>Data</th>
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Spectrum for non-certified professional drones
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Spectrum needs for professional drones

• Control-Command: 1 MHz to 3 MHz

• Data acquisition (mission-critical): up to 10 MHz or more, depending on the payload to be transmitted

• Additional regulatory and administrative needs (e.g. identification) remain to be quantified, likely < 1 MHz