Intelligent Transport Systems (ITS)  
5.9 GHz in Europe and worldwide

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Overview on the 5.9 GHz band (ECA Table)

Radio Services / radio applications in the frequency range 5855 - 5925 MHz within CEPT according to ERC Report 25 (ECA Table, October 2011):

**Mobile Service:**
ITS (5855-5925 MHz)

**Fixed Service:**
BFWA (5725-5875 MHz)

**Fixed-Satellite Service (Earth-to-space):**
Earth stations

**Other (5725-5875 MHz):**
Non-specific SRDs, ISM applications (RR 5.150)

All ECC deliverables are available on http://www.erodocdb.dk
ITS in the 5.9 GHz band

ITS includes:

• Inter Vehicle Communication (IVC) and
• related Roadside to Vehicle Communication (R2V)

• ECC studies have shown that a realistic estimate of the needed bandwidth in the 5.9 GHz band is between 30 to 50 MHz, including 20 MHz for time critical road safety applications
### Relevant radio compatibility studies

#### ECC Report 101

<table>
<thead>
<tr>
<th>Services and applications</th>
<th>ITS as interferer</th>
<th>ITS as victim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Amateur</td>
<td>Compatibility is achieved.</td>
<td>Compatibility is achieved.</td>
</tr>
<tr>
<td>FSS</td>
<td>Compatibility is achieved.</td>
<td>Compatibility achieved in most cases taking into account the limited number of earth stations and real terrain shielding.</td>
</tr>
<tr>
<td>Radiolocation</td>
<td>Compatibility assumed with ITS unwanted power of -55dBm/MHz, below 5850 MHz.</td>
<td>Between 5855-5875 MHz ITS may suffer from interference.</td>
</tr>
<tr>
<td>SRD</td>
<td>Compatibility is assumed if ITS are operating above 5875 MHz. Mitigation techniques are required in the frequency range 5855 – 5875 MHz.</td>
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### Relevant radio compatibility studies

#### ECC Report 101 (cont.)

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<tr>
<td>RTTT</td>
<td>Compatibility is achieved if ITS are operating with unwanted power less than -65dBm/MHz below 5815 MHz</td>
<td>Interference depend to the antenna beams alignment and is limited to the RTTT communication zone.</td>
</tr>
<tr>
<td>FS</td>
<td>Co-frequency: no study done since few systems exist(^2). Adjacent band: ITS unwanted power less than -65dBm/MHz, above 5925 MHz (frequency separation(^1) or filtering required).</td>
<td>ITS within the band 5905-5925 MHz may suffer from interference.</td>
</tr>
</tbody>
</table>

RTTT: "Road Transport and Traffic Telematics"
Relevant radio compatibility studies

ECC Report 101 (general conclusions):

- Between 5875-5905 MHz ITS will not suffer from excessive interference from other radio services / radio applications.
- Protection of ITS cannot be ensured in the “extension band” 5905 - 5925 MHz.
- ITS between 5855 - 5925 MHz will not interfere other radio services / radio applications providing that the ITS unwanted emissions levels are:
  < -55 dBm/MHz e.i.r.p. below 5850 MHz,
  < -65 dBm/MHz e.i.r.p. below 5815 MHz,
  < -65 dBm/MHz e.i.r.p. above 5925 MHz, and that
- mitigation techniques are required for ITS in the range 5855-5875 MHz to ensure compatibility with BFWA and SRDs.

(B)FWA: "(Broadband) Fixed Wireless Access"
ECC Report 109

- The existing results of the different compatibility studies between each of the systems BFWA, BBDR, ITS and existing services will not be significantly changed by their aggregate impact.

Possible future compatibility issues

- The ECC Decision on ITS ensures that future Fixed and Mobile Service systems in the band 5875 - 5925 MHz will have to prove their compatibility with ITS.
Current discussions regarding the 5.9 GHz band

- **PPDR**
  ECC Report 110 was adopted and published in 2007, the frequency band 5875-5925 MHz is not the prime candidate for BBDR. New FM PT 49 on PPDR/BBDR was established in 2011.

- **Broadband Direct-Air-to-Ground Communications (DA2GC)**
  The frequency band 5855-5875 MHz is currently under study (FM PT 48 and SE PT 44). The frequency band 5905-5925 MHz might be studied in the future (depending on the outcome of the current studies).

- **Devices using Ultra-Wideband (UWB) technology**
  ECC Decision (06)04, amended 9 December 2011, is related to harmonised conditions for devices using UWB technology in bands below 10.6 GHz.

- **Wireless industrial applications (non-UWB)**
  Frequency band 5725-5875 MHz under study (among others).

The ToR of the Project Teams and further information is available on [http://www.cept.org/ECC](http://www.cept.org/ECC)
ECC Decision of 14 March 2008
on the harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS),
ECC/DEC/(08)01

- ITS applications providing communication to and from mobile units are considered as applications in the Mobile Service.

- ITS cannot claim protection from FSS Earth stations in the frequency band 5875-5925 MHz.
ECC Decision of 14 March 2008 on the harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS), ECC/DEC/(08)01

- Harmonisation/Designation of 30 MHz (5875-5905 MHz) for ITS road safety applications on a non-exclusive basis.

- Band 5905-5925 MHz to be considered for future ITS extensions (within a future review of the Decision).
ECC Decision of 14 March 2008 on the harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS), ECC/DEC/(08)01

**Limits for ITS stations:**

- Maximum spectral power density: 23 dBm/MHz e.i.r.p.
- Maximum total power: 33 dBm e.i.r.p.
- Transmit Power Control (TPC) range (for 33 dBm e.i.r.p.): at least 30 dB
ECC Decision of 14 March 2008 on the harmonised use of the 5875-5925 MHz frequency band for Intelligent Transport Systems (ITS), ECC/DEC/(08)01

- Protection of existing services in the ITS band and in adjacent bands.
- Free circulation and use of ITS equipment.
- Exemption of in-vehicle ITS equipment from individual licensing.

23 CEPT administrations have completely implemented the ECC Decision by January 2012.
CEPT Report 20

- ECC developed and approved **CEPT Report 20** on “the harmonised radio spectrum use for safety critical applications of Intelligent Transport Systems (ITS) in the European Union” of 21 December 2007 in response to a **Mandate** issued by the European Commission.

ECC Recommendation (08)01 of February 2008: Use of the band 5855-5875 MHz for Intelligent Transport Systems (ITS)

It is recommended:

• to make available the band 5855 - 5875 MHz for ITS non-safety applications,

• to limit the spectral power density for ITS stations to 23 dBm/MHz e.i.r.p. with a TPC range of 30 dB,

• to permit free circulation and use of ITS equipment,

• to exempt in-vehicle ITS equipment from individual licensing,

• that the deployment should be on a non-protected and non-interference basis.
Regulation for RTTT at 5.8 GHz

Band 5795 - 5815 MHz

- ERC Recommendation 70-03 (Annex 5) for RTTT
  Power limit: 2 W e.i.r.p. or 8 W e.i.r.p.,
  individual licences recommended for e.i.r.p. values above 2 W.

- Revised version had been under public consultation until 30 December 2011 and is planned for final adoption in April 2012.
Other frequency bands (63 GHz)

**Frequency band 63 - 64 GHz:**

- **ECC Report 113** describes compatibility studies between ITS and other radio services / radio applications at 63 - 64 GHz (e.g. with MGWS and P-P FS):
  ITS needs to implement mitigation techniques (guard band) in order to reduce the impact of the unwanted emissions from FS systems close to 64 GHz.

- **ECC Decision (09)01** of 13 March 2009 “on the harmonised use of the 63-64 GHz frequency band for Intelligent Transport Systems (ITS)”
  Maximum radiated power for ITS stations: 40 dBm e.i.r.p.

- The two bands (63 GHz and 5.9 GHz) are complementary due to different propagation conditions, applied technologies and envisaged applications.

MGWS: “Multigigabit Wireless System”
Any other business?

Thank you very much for your attention.

Any Questions?
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