The international CETECOM group

AECS – eCall
Cellular Frequency Overview
Content

➤ CETECOM
➤ Cellular frequencies in different countries
➤ Versions of wireless automotive modules
➤ Antenna requirements
➤ Conclusion
Testhouse wireless telecommunication devices

- Mobile phones, smartphones or wireless radio modules
- Radio in various parts (2G, 3G, 4G, WLAN, BT)
- In 2013 we hostet the 3rd european ERTICO eCall testfest
Cellular frequency overview

**Europe**
- **GSM**: 900;1800 MHz
- **UMTS**: 900;2100 MHz

**America**
- **GSM**: 850;1900 MHz
- **UMTS**: 850;1700/2100;1900 MHz

**Asia**
- **GSM**: 900 MHz (China, India)
  - 1800 MHz (Hong Kong, India)
- **UMTS**: 2100 MHz (China, Korea, India)
  - 1700/2100 MHz (Japan)

*cellular frequencies "worldwide"*

one „frequency“ ≠ for the whole „world“
Current Versions
of wireless automotive modules

➢ Wireless module manufacturer usually provides products for different markets

➢ European “only” version
GSM 900, 1800 MHz
UMTS 900, 2100 MHz

➢ “World” version
GSM 850, 900, 1800, 1900 MHz
UMTS 850, 900, 1700/2100 MHz
Coverage of cellular frequency

Europe
- GSM: 900;1800 MHz
- UMTS: 900;2100 MHz

America
- GSM: 850;1900 MHz
- UMTS: 850;1700/2100;1900 MHz

Asia
- GSM: 900 MHz (China, India)
  1800 MHz (Hong Kong, India)
- UMTS: 2100 MHz (China, Korea, India)
  1700/2100 MHz (Japan)

GSM/UMTS module „world“ (example)

cellular coverage
Antenna remarks

➤ different cellular module versions
  ➤ different antenna designs
➤ The **antenna** of the car needs to cover all of the requested frequencies
  ➤ “Local” versions are cheaper than “world” versions
➤ A so called **quad band antenna** may cover the requested frequencies from 800 to 2100 MHz
  ➤ But the **quality** of the antenna is **not the same** in between the whole **frequency range**
Quality examples of cellular Antennas

Antenna stubs attached to a small board

matching of external stub antennas depends e.g. on ground plane size
Conclusion

➢ If a **global coverage** of worldwide used GSM/UMTS frequencies is required:
   - **both the module and the antenna should support the dedicated frequencies**
   - To make sure that the **eCall** is possible **at any time and in any case**

➢ Taking the above into account:
   - **Where is the best place** for the antenna (cellular and navigation)?
   - **What are minimum performance** requirements for the **antennas**?
Thank you very much for your attention …

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