Spectrum for IoT/M2M

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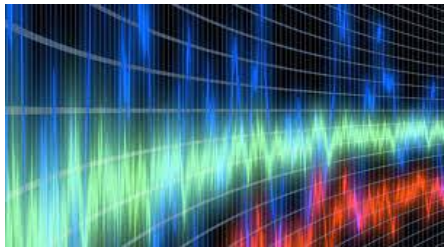
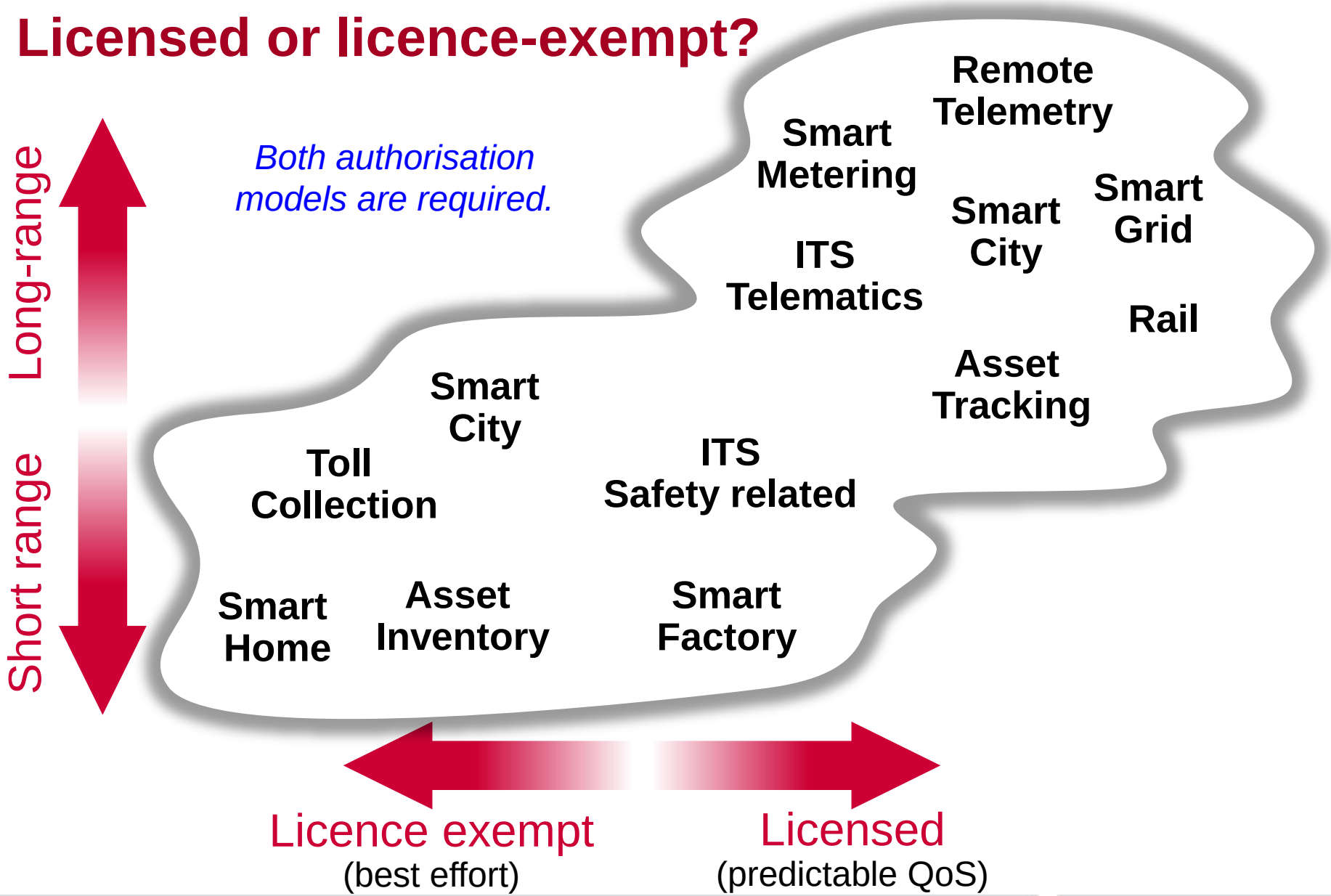
Contents

Questions on radio spectrum and M2M…

- Some key questions:
  - Should M2M spectrum be licensed or licence-exempt ?
  - What is the relevance of WRC allocations?
  - Use of mobile broadband (MBB) spectrum for M2M?
  - What is the preferred CEPT/EC designation?
  - Who should own the spectrum usage rights for M2M?
  - What is the role of public and private wireless networks in M2M?



Licensed or licence-exempt?



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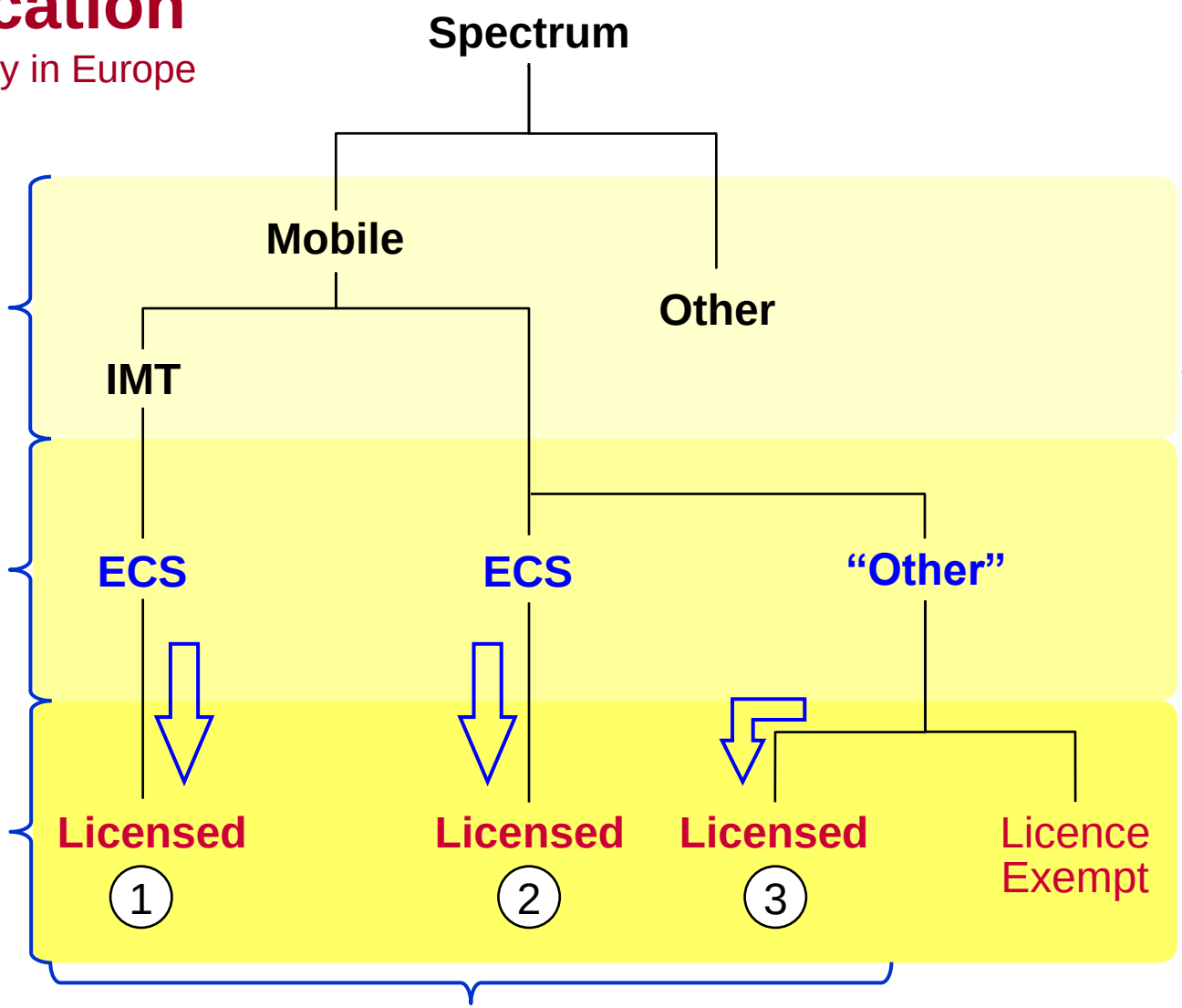
Classification

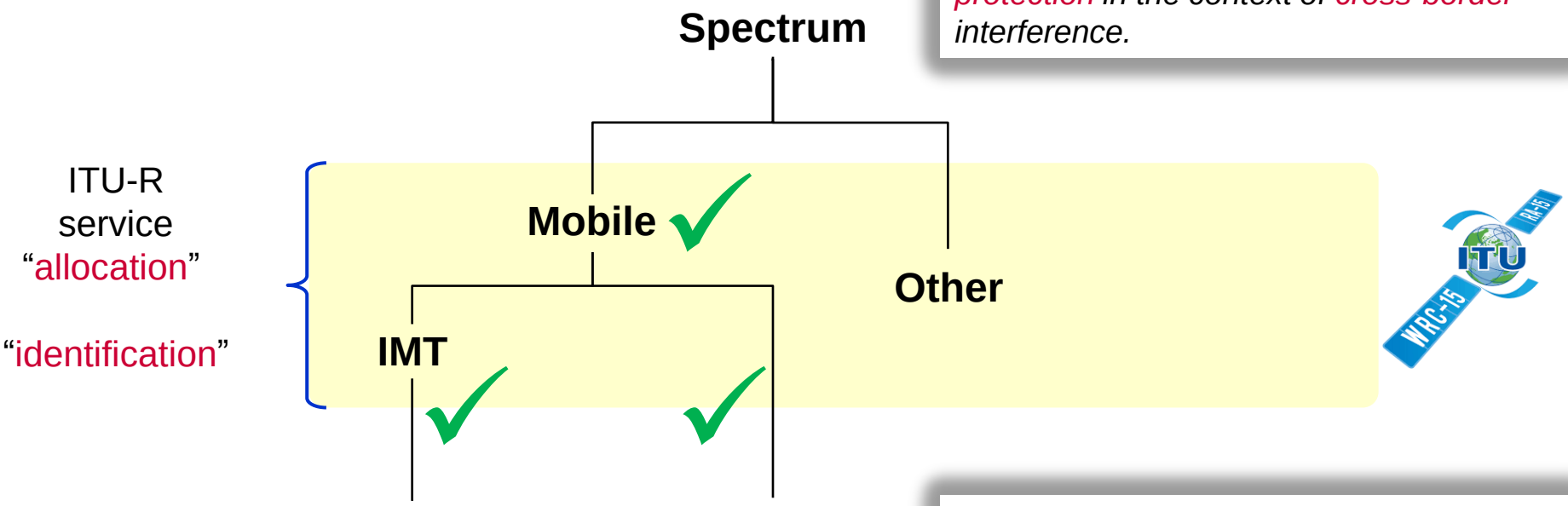
and terminology in Europe



ITU-R Radio Regulations

Mobile Service is a natural match for M2M

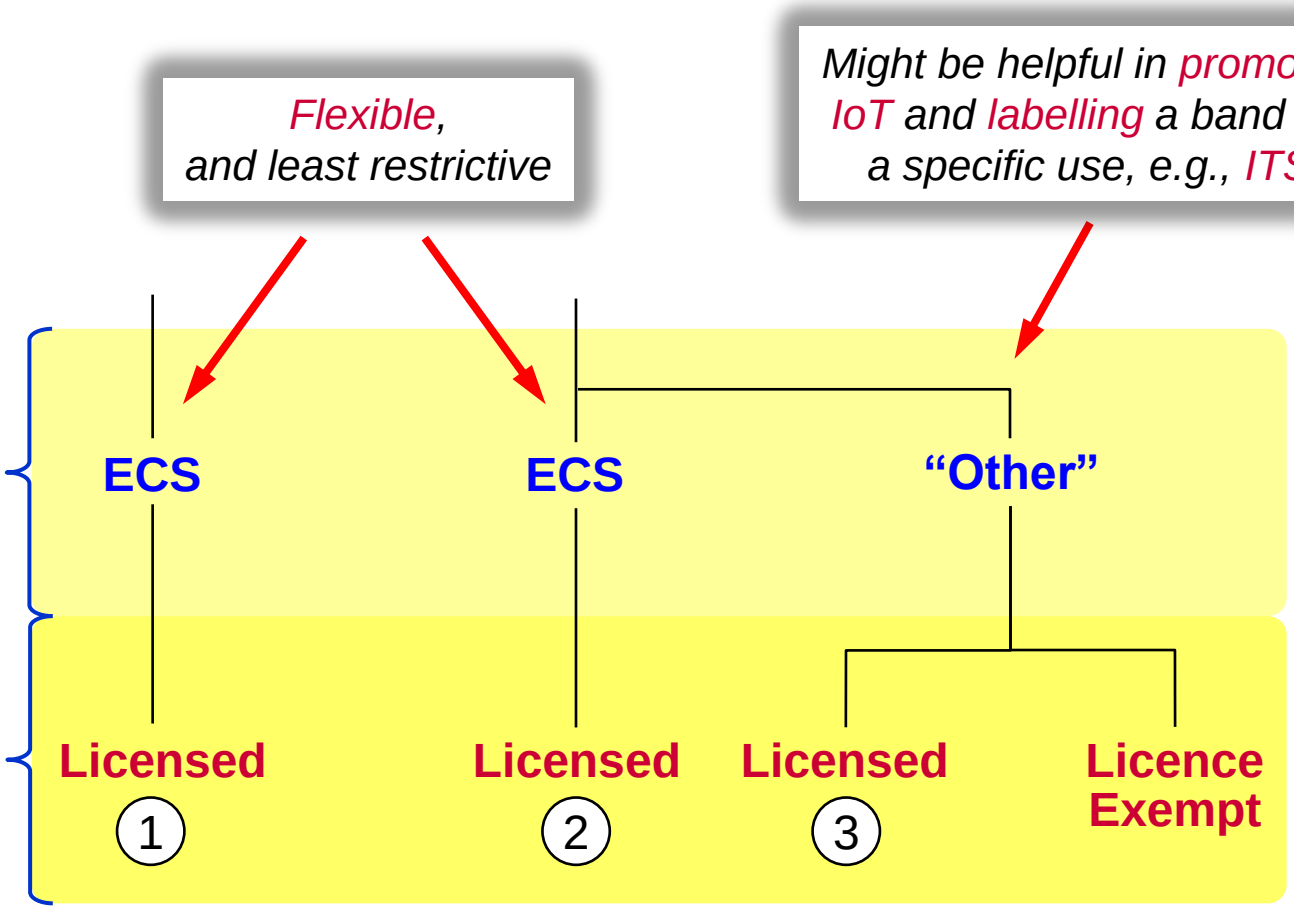
Primary allocation to the Mobile Service is a natural match for M2M, and affords legal protection in the context of cross-border interference.



IMT identification does not afford any legal rights. It is merely a mechanism to mitigate uncertainty, and encourage investment in mass market equipment. Accordingly, it is important but is not strictly essential.

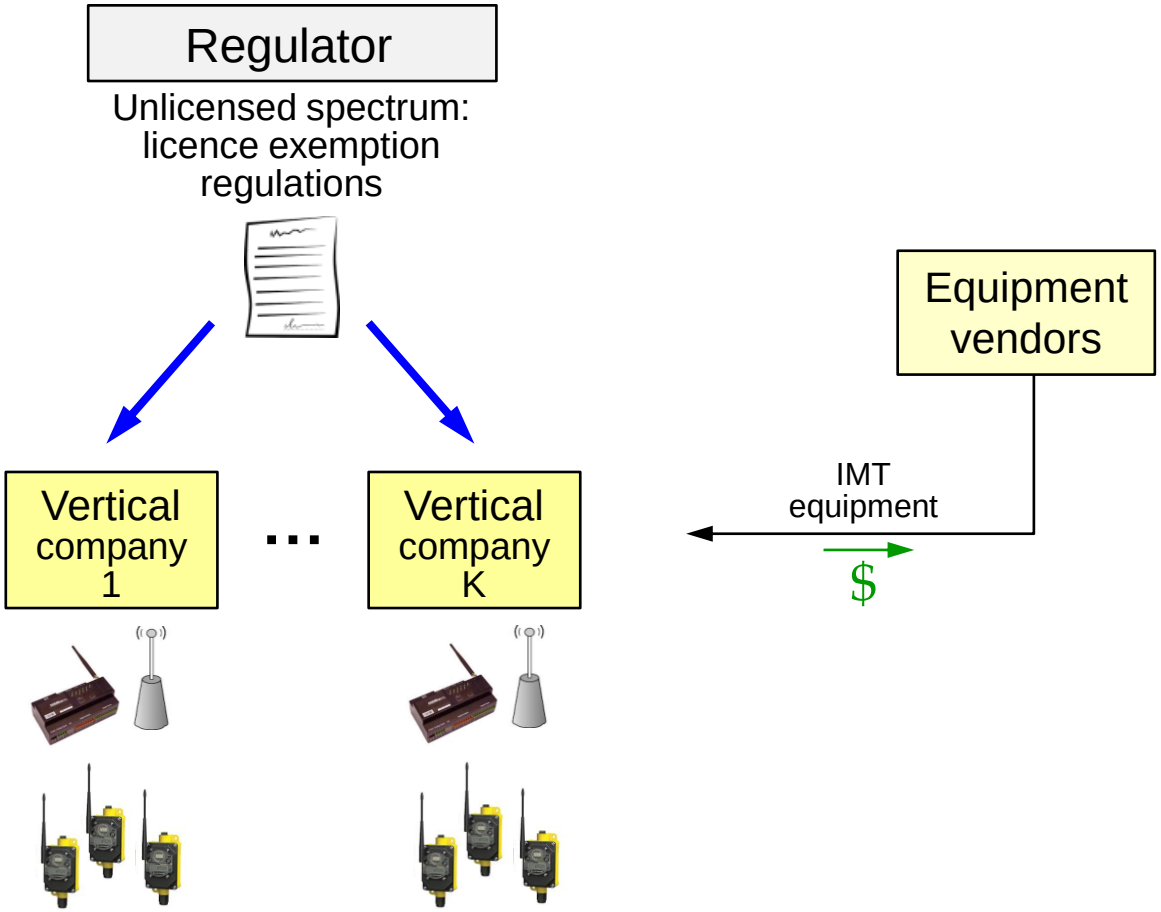
- ITU-R Radio Regulations are about cross-border interference.
- Primary allocations have priority over secondary allocations.
- What happens inside a region/country is up to the regional/national regulators.

ECS or M2M designation?



Licence-exempt spectrum

No financial transaction between regulator and users for access to spectrum.



*M2M **today**:*

RFID;
Electronic toll collection;
Smart Home;

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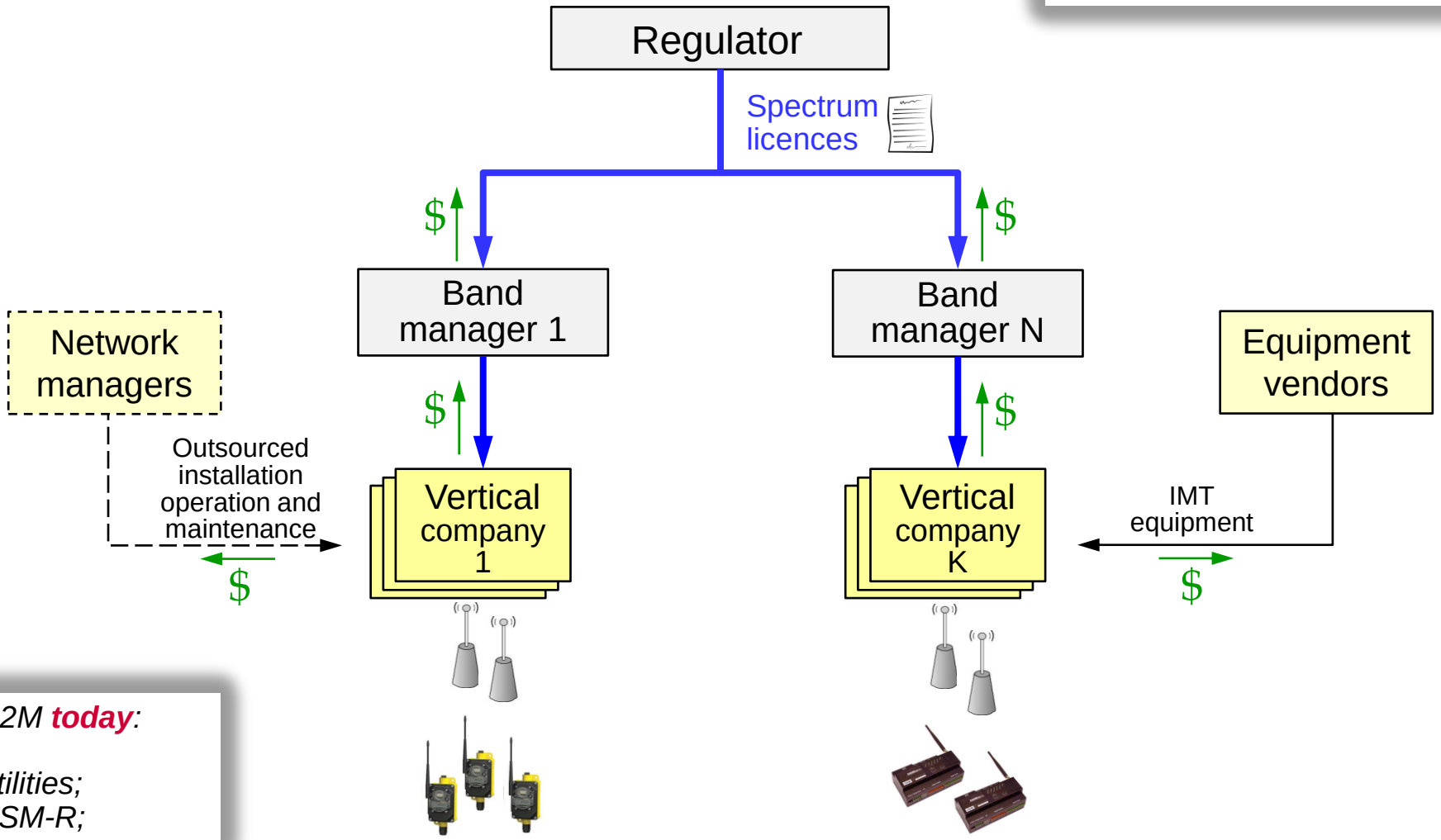
Licensed spectrum

Private network model

Existing model – The band manager aggregates the demand for spectrum from various Verticals with their own radio infrastructure.



*M2M **today**:*

Utilities;
GSM-R;

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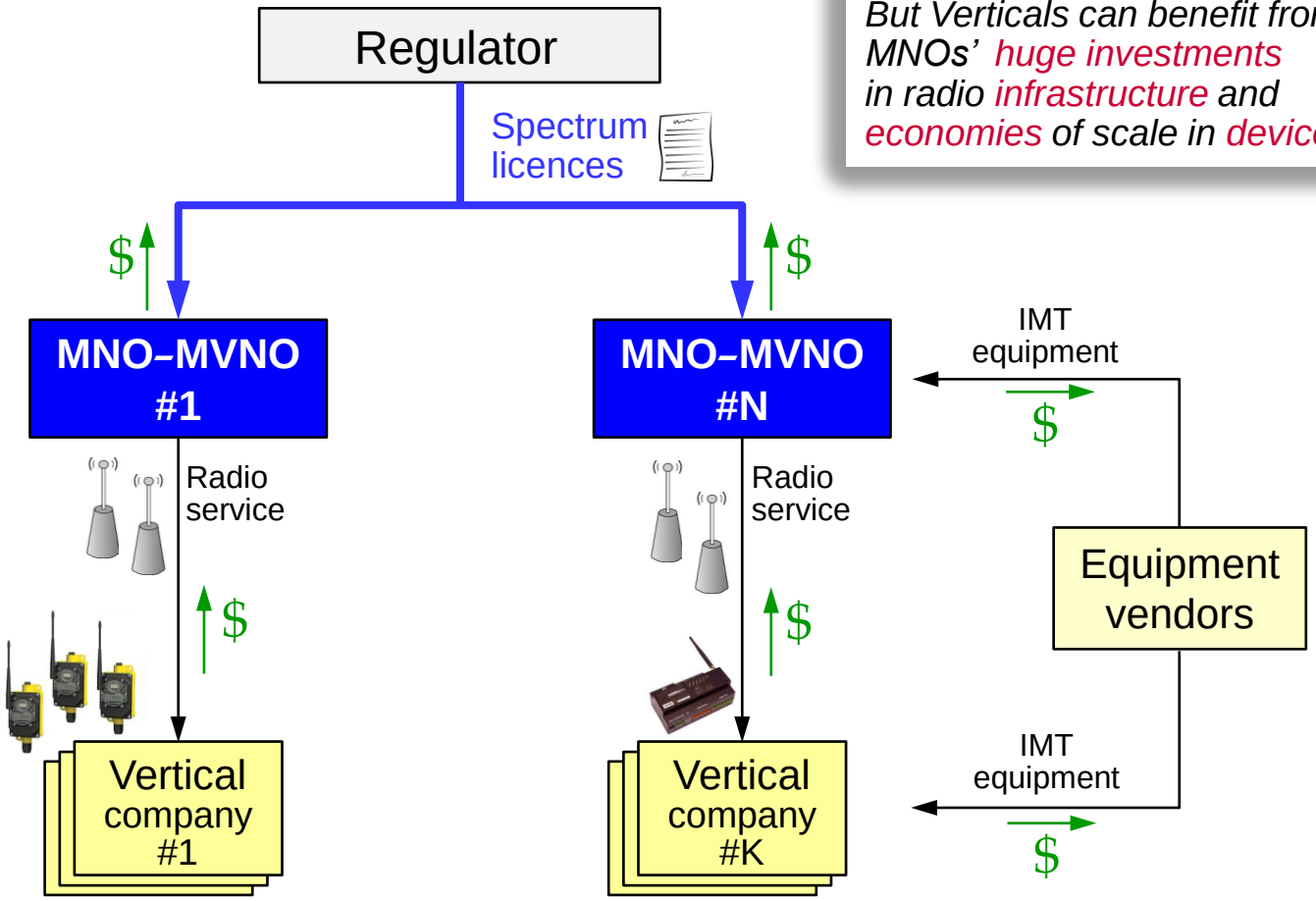
Licensed spectrum

Public mobile network model

Some Verticals are cautious of this model: concerned with lack of control, reliability, security and lock-in.

But Verticals can benefit from MNOs' huge investments in radio infrastructure and economies of scale in devices.



*M2M **today**:*

Smart metering;
PPDR[1];

1 Public mobile networks considered for PPDR in some countries. PPDR is not strictly M2M, but is an example of MNOs serving a Vertical.

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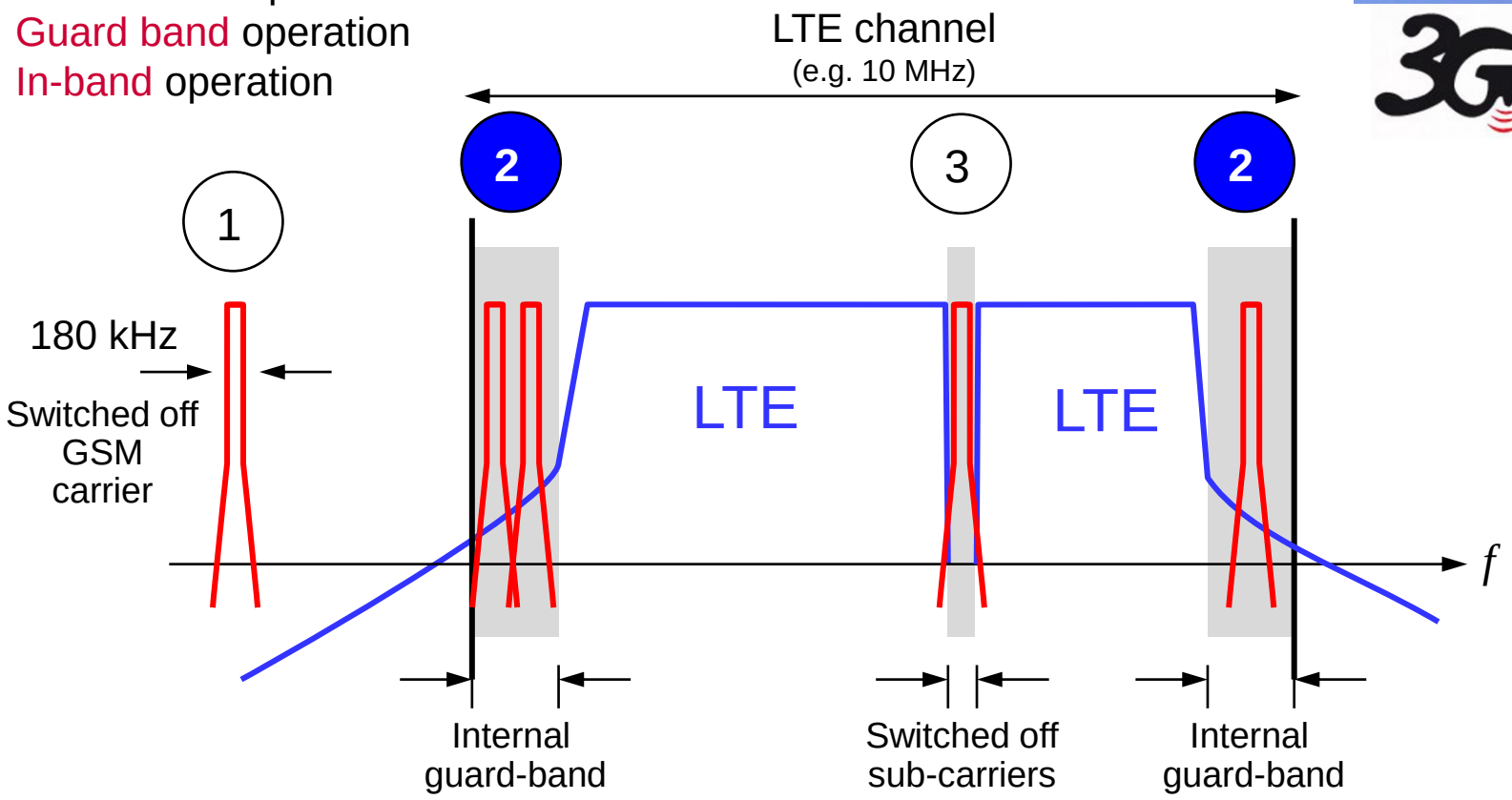
Comparison

- We acknowledge that some Verticals may be initially cautious about the use of public mobile communication networks, and may prefer private networks.
- But the infrastructure CAPEX and expertise needed to operate advanced wireless networks must not be under-estimated.
- We believe public mobile networks are well placed to provide the appropriate levels of service for M2M communications to a range of Verticals, and can exploit huge investments in radio infrastructure and economies of scale in equipment.

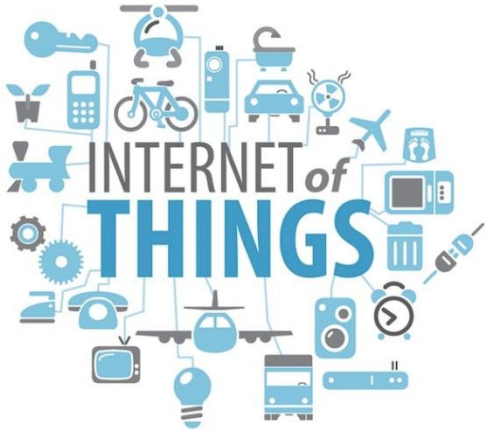
Contents

NB-IoT: Efficient use of MBB spectrum

- NB-IoT is an innovative technology and allows efficient use of spectrum:
  1) Stand-alone operation
  2) Guard band operation
  3) In-band operation



NB-IoT and European regulations



- There is broad consensus that NB-IoT can be deployed in Mobile bands with little/no increase in the likelihood of harmful interference as compared to GSM or LTE.
- Japan and China have also recently concluded that there are no issues of interference from NB-IoT, and that there is no need for coexistence studies.
- CEPT broadly agrees[1], but requires amendments to the ECC/EC regulations. This process can be lengthy, with substantial negative implications for the planned deployments of NB-IoT during 2017.
- Where there is consensus that the risk of harmful interference is low, we request that the EC adopts a pragmatic approach to allow NB-IoT deployments in the Member States, in the interim, while the text of ECC/EC Decisions are being amended at CEPT and the EC.

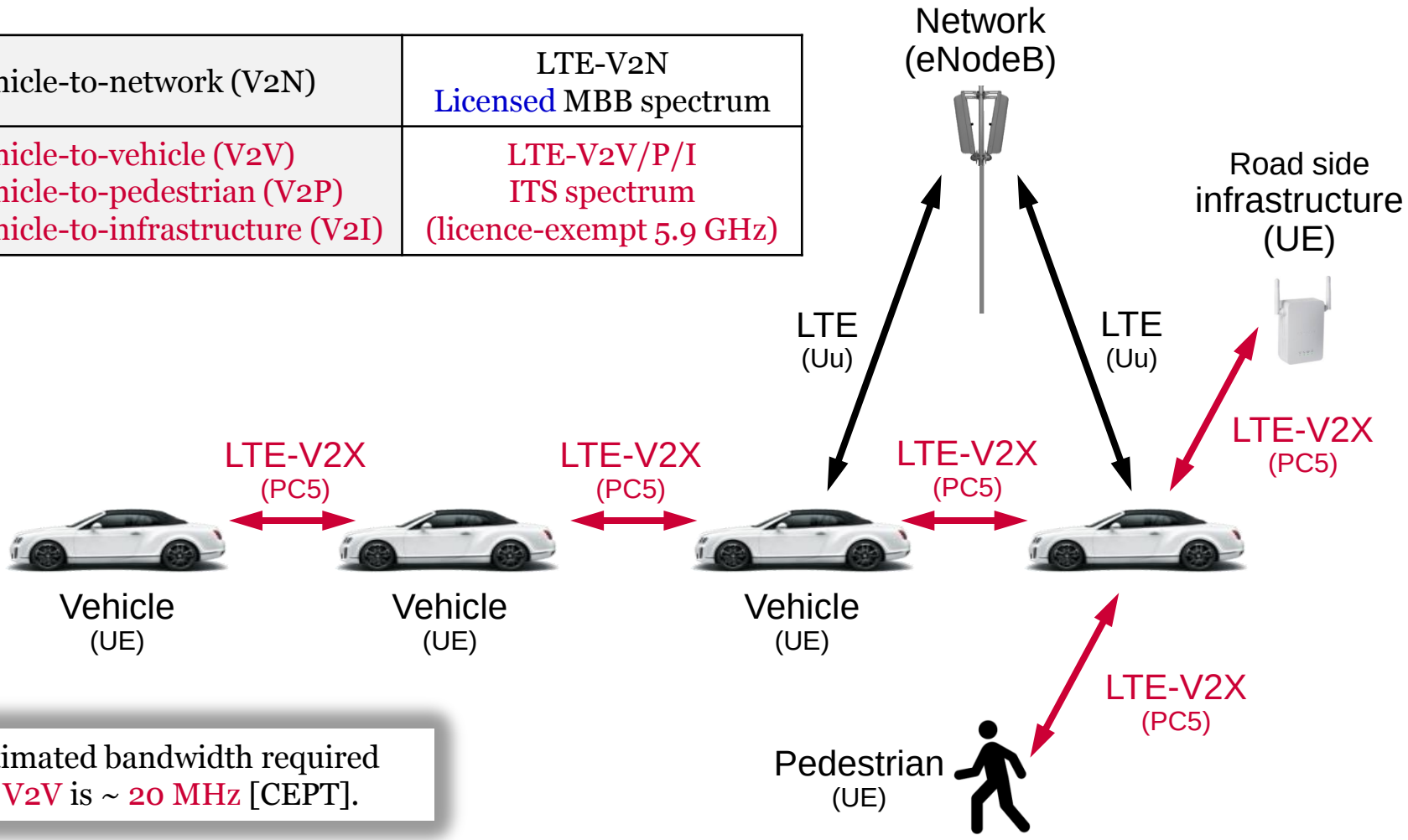
1 An exception is the case of interference from guard band NB-IoT to services adjacent to the mobile bands. The position of certain CEPT administrations is that while the risk of harmful interference here is again likely to be small, there will need to be formal studies to confirm this.

Contents

3GPP LTE-V2X

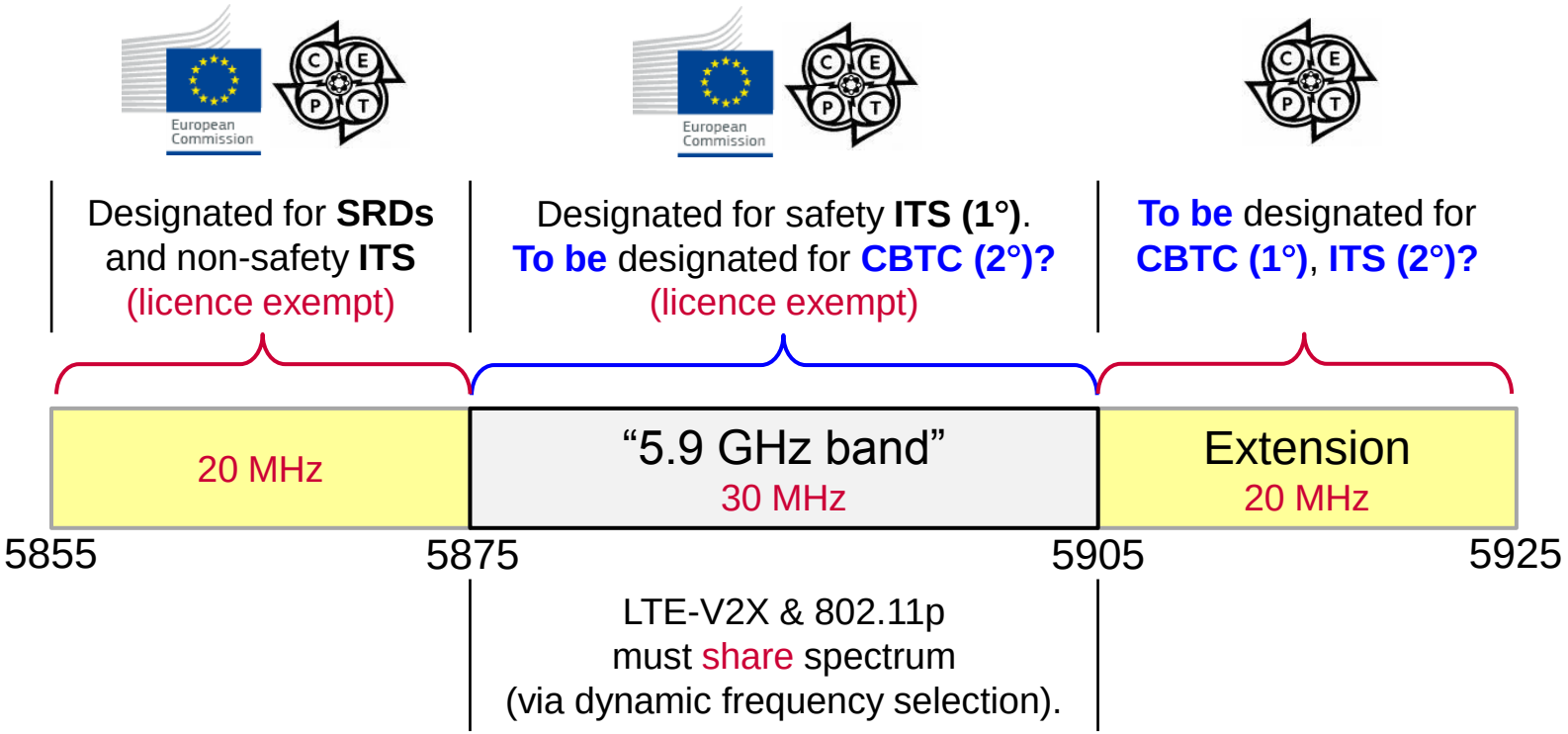
Safety-related ITS and connected cars

Vehicle-to-network (V2N)	LTE-V2N Licensed MBB spectrum
Vehicle-to-vehicle (V2V) Vehicle-to-pedestrian (V2P) Vehicle-to-infrastructure (V2I)	LTE-V2V/P/I ITS spectrum (licence-exempt 5.9 GHz)



Estimated bandwidth required for V2V is ~ 20 MHz [CEPT].

Harmonised spectrum for ITS



RSPG draft Opinion (Nov-2016):

"*Given the potential future use of the spectrum for ITS, the RSPG recommends that the impact on current and potential future ITS in 5855-5875, 5875-5905 and 5905-5925 MHz should be taken account of when considering changes to spectrum use in these and adjacent bands.*"

CBTC: Communications based train control.
SRD: Short range devices.

Considerations for ITS

- 5.9 GHz is available on a technology neutral and license exempt basis.
- We strongly support the European principle of technology neutral regulations. The market (rather than regulations) is best placed to make technology decisions.
- However, licence exemption may not be optimal for safety-related ITS.
- This is because technologies such as LTE-V2X and IEEE 802.11p would need to coexist via mechanisms such as “mutual detect-and-avoid”, and this can degrade performance/reliability.
- We are committed to the specification and implementation of such mitigation mechanisms for 5.9 GHz.
- However, we encourage the EC to consider alternatives to pure licence exemption for V2V/I/P in ITS spectrum. These would allow owners of spectrum usage rights to control the access to spectrum, and better manage harmful interference for safety-related ITS.

Contents

Summary

- We acknowledge that both licensed and licence-exempt spectrum is needed for M2M.
- Licensed spectrum is essential for M2M where reliability and predictability are required.
- Bands with primary ITU-R allocation to the Mobile Service are a good match for M2M. IMT identification is beneficial for harmonisation and encouraging investment, but is not essential.
- ECS designations are suitable for M2M because they are flexible and least restrictive (as compared to a specific M2M designation).
- Mobile network operators are well placed to provide M2M services to the Verticals, exploiting huge investments in radio infrastructure and economies of scale in equipment.

Summary

- NB-IoT is a powerful new narrowband radio technology for the provision of low-cost massive M2M by re-using MBB spectrum without increased risk of harmful interference.
- We request that the EC and national administrations adopt a pragmatic approach and allow the planned deployments of NB-IoT in the EU during 2017, while the text of the ECC/EC Decisions are being amended at CEPT/EC.
- LTE-V2X is an efficient new technology for V2V/P/I at 5.9 GHz. This band is harmonised for safety related ITS in the EU, and is licence exempt.
- We are committed to enabling coexistence of multiple technologies at 5.9 GHz. However, licence exemption is not ideal for safety related ITS, and we encourage the EC and national administrations to consider alternative authorisation models to mitigate the risk of harmful interference.

Thank you

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