Spectrum for IoT

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Warm up…

- Connected home
- Smart cities
- Health
- Intelligent transport systems
- Smart industry

In March 2017 12, 7 M of SIM cards for Machine to Machine Communications + 2, 7 M in one year (France)

In 2015 4, 9 B of connections (M2M)

12 B in 2020

In 2015 38 % of data transfers are Machine to Machine Communications

58% in 2020

Ref. ARCEP
Visual Networking Index

Needs and today's solutions

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General
Authorisations
« license exempt »

Shared Spectrum

SIGFOX
One network A billion dreams
LoRa

Wide Range
Low data rate
Very Low Power Consumption
Large coverage

Wi Fi
Bluetooth

Short Range
High Data Rate

Individual
Authorisations
« individual license »

Dedicated Spectrum

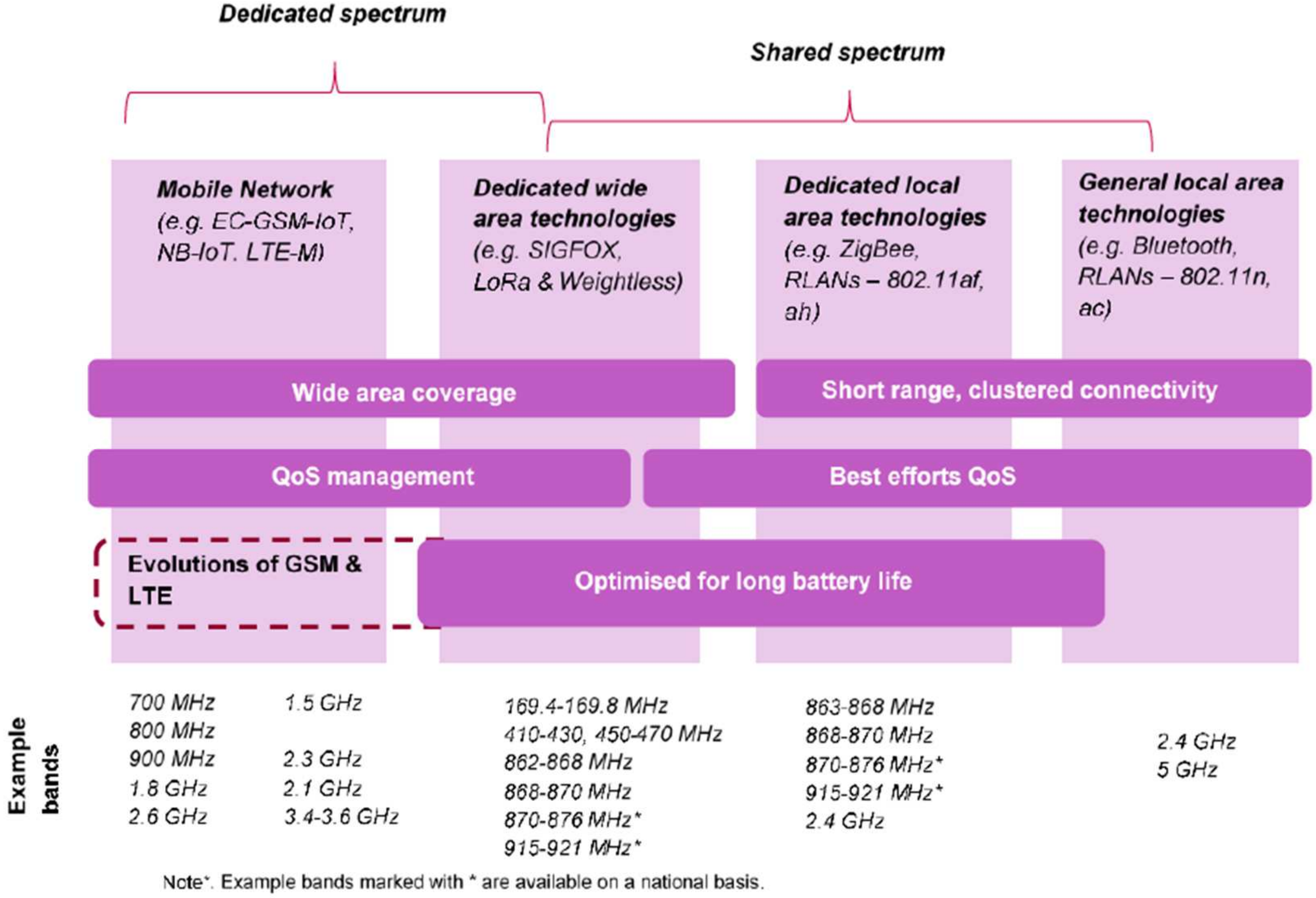
2G– 3G –4G
Mobile
Networks

Wide Range
Various Data Rates
Power Consumption
Protection against interferences

Private
Mobile
Networks

Communication on dedicated area
Protection against interferences

The current spectrum portfolio



Source RSPG Opinion – IoT – 02/17- RSPG 17-006

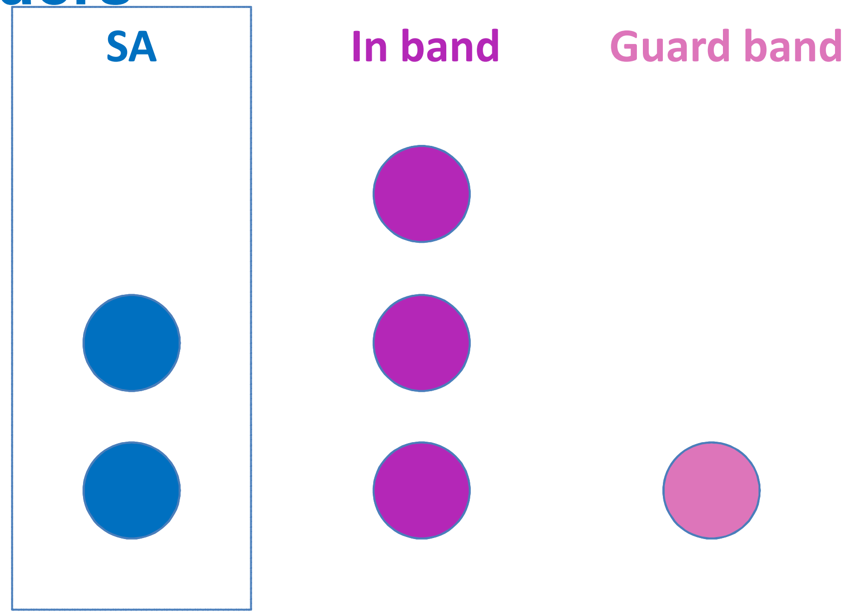
New solutions for Mobile Operators

… but also for others stakeholders

LTE-eMTC 6x180kHz =1080 kHz
(LTE evolved Machine Type Communication)

EC-GSM-IoT 200 kHz
(Extended Coverage GSM IoT)

NB-IoT (Narrowband IoT) 200 kHz



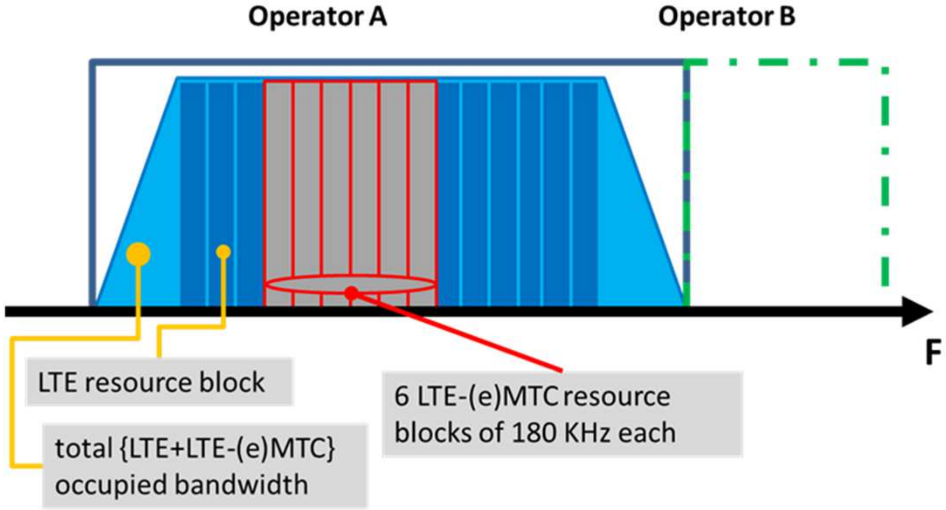
Fully independent deployment (standalone(SA) deployment)

Pre-empting some of the resources of an existing carrier (In-band deployment)

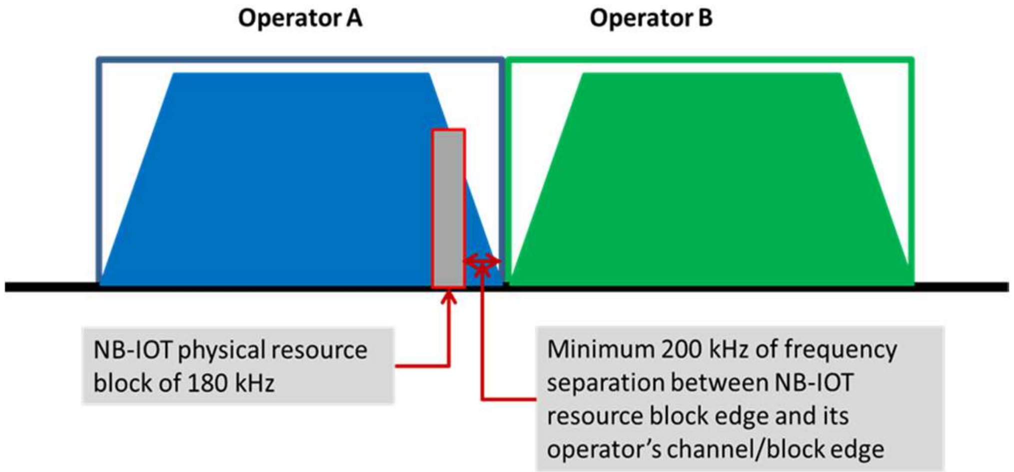
Deployed on the side of an existing carrier (guard-band (GB) deployment)

Suitability of technology neutral framework ?

LTE-eMTC
In- band
"scenario"



NB IoT
Guard band
"scenario"



Which solutions in which frequency bands ?

EC-GSM-IoT		In 900/1800 MHz as GSM
LTE-eMTC		As LTE in all CEPT “harmonised” bands (FDD) including in 900/1800 MHz
NB-IoT	SA	A need to update the 900/1800 MHz Framework 200 kHz separation from operator’s bock edge
	In band	Same conditions as LTE-eMTC
	Guard band	A need to update the 900/1800 MHz Framework 200 kHz separation from operator’s bock edge + In others in all CEPT “harmonised” bands (FDD) To respect the BEM and 200 kHz separation from operator’s bock edge

See ECC report 266
Analysis on ECC
Harmonised mobile bands

“Unlicensed Spectrum” additional harmonised spectrum

EC Decision on SRD → **Two additional entries in 863 – 868 MHz**

Publication in summer 2017

SIGFOX One network A billion dreams

LoRa™

Satellite IoT

Low Earth Orbit (LEO)
in the range of
500 km to 700 km of altitude ? →

Under investigation in CEPT

Terminals used in low density networks within 862-863 MHz - uplink communications (Earth-to-space)

Downlink (space-to-Earth) from the satellite - frequencies below 1 GHz

Other investigations on M2M/IoT via satellite not restricted to frequencies below 1 GHz and not limited to SRD regulatory framework

To fuel IoT

"Unlicensed Spectrum" additional harmonised spectrum

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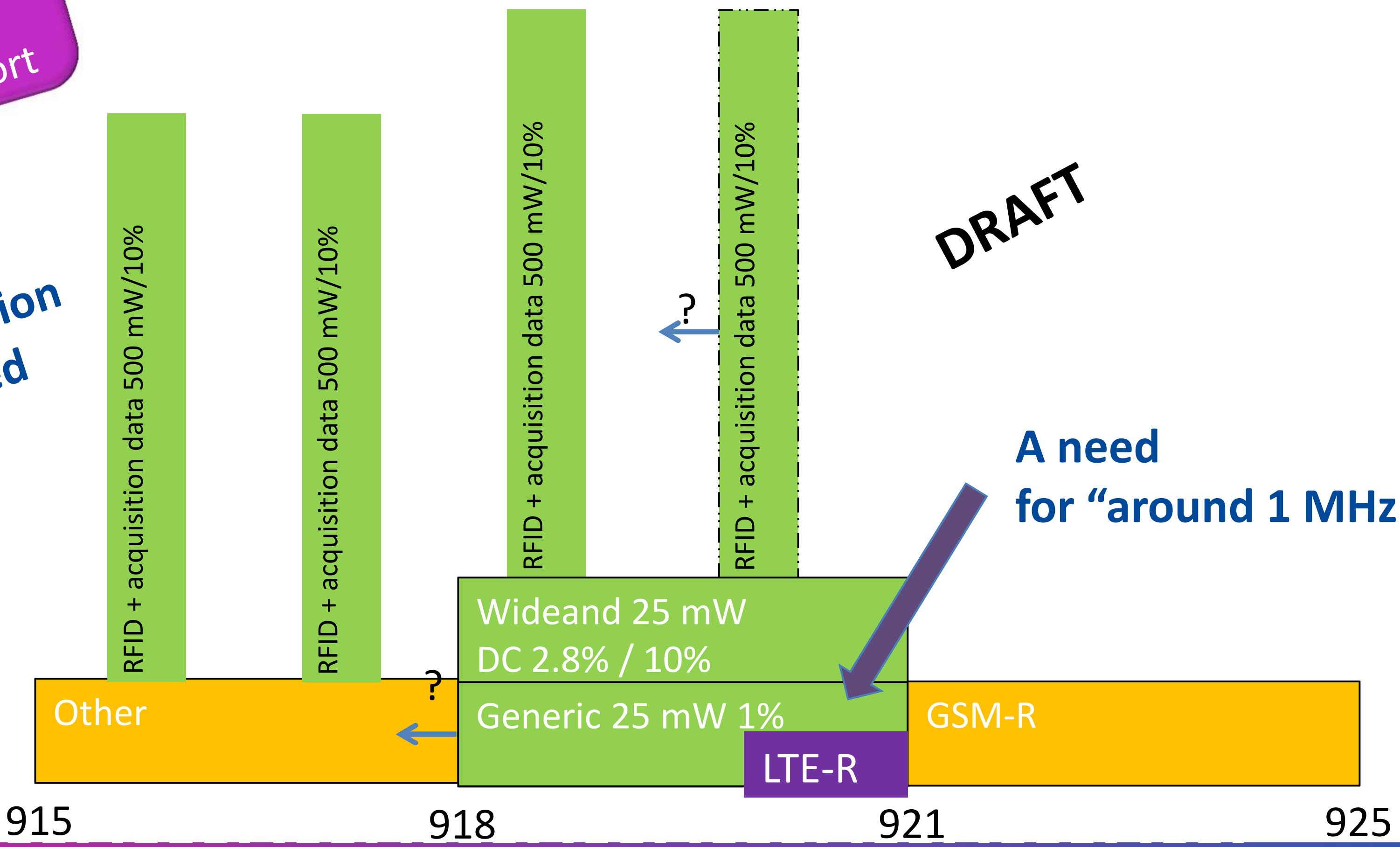
Smart home (Halow 802.11ah) : 1 MHz channel, 915-921 MHz
RFID 915-921 MHz
Smart metering (Sigfox, Lora) : more power, 915-921 MHz

Under development
Based on CEPT report

A new EC decision Is expected

DRAFT

A need for "around 1 MHz ?



PMR also new opportunities?

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Private Mobile Radio (80 MHz, 150 MHz, 400 MHz)
Solutions available for metering for utilities (transport, energy …)

410-430 MHz

+

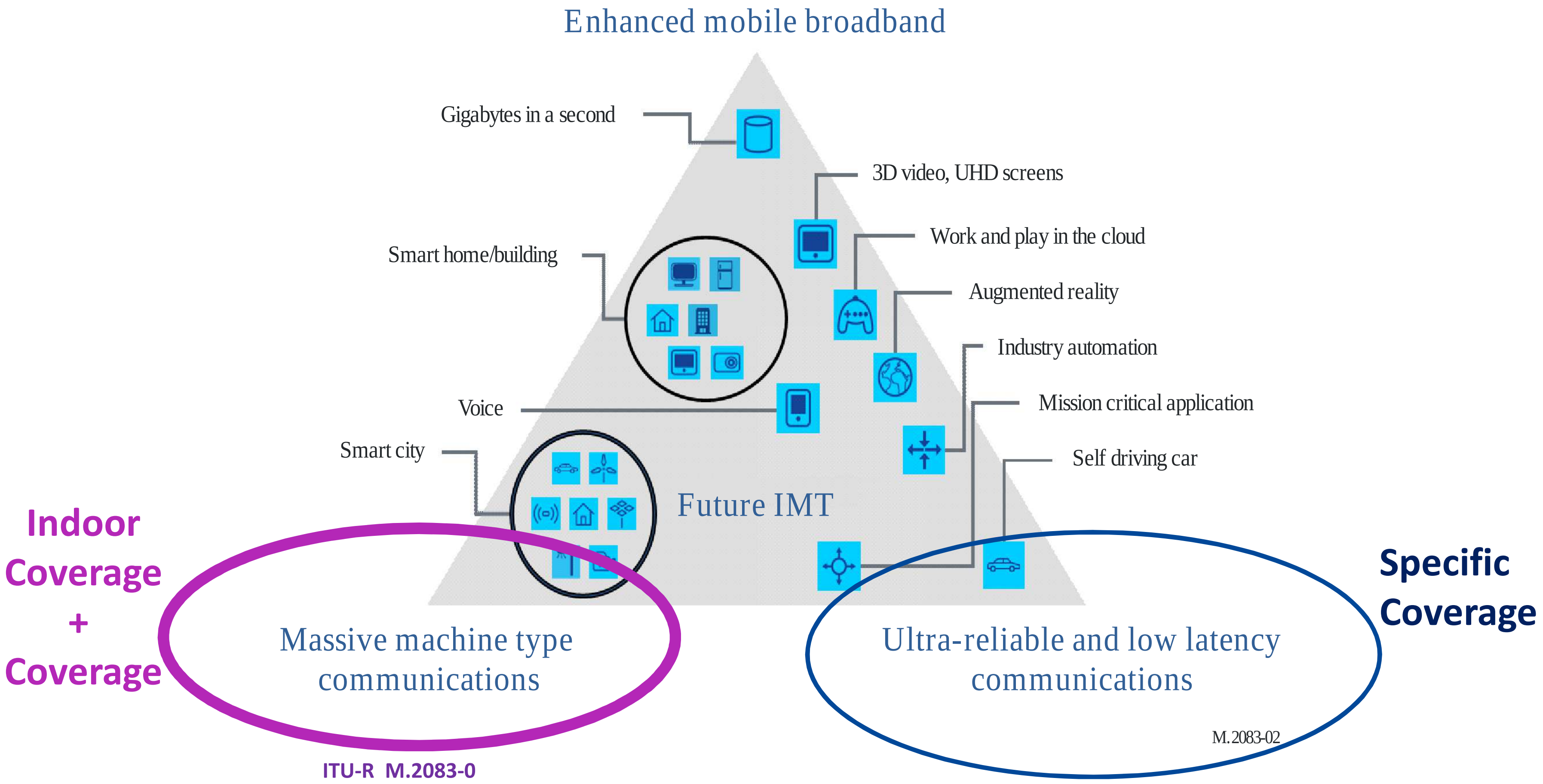
450-470 MHz
'already harmonised for BB PPDR'

Under investigation in CEPT
Various needs

PMR 'LTE based'
LTE 1,4 MHz, 3 MHz et 5 MHz (non MFCN)
LTE-MTC, NB-IoT et EC-GSM
Sigfox, Lora
Shared IoT networks? National IoT platforms?
Other usages : PPDR, radiolocation, governmental

To fuel IoT

The ultimate horizon : 5G ?



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