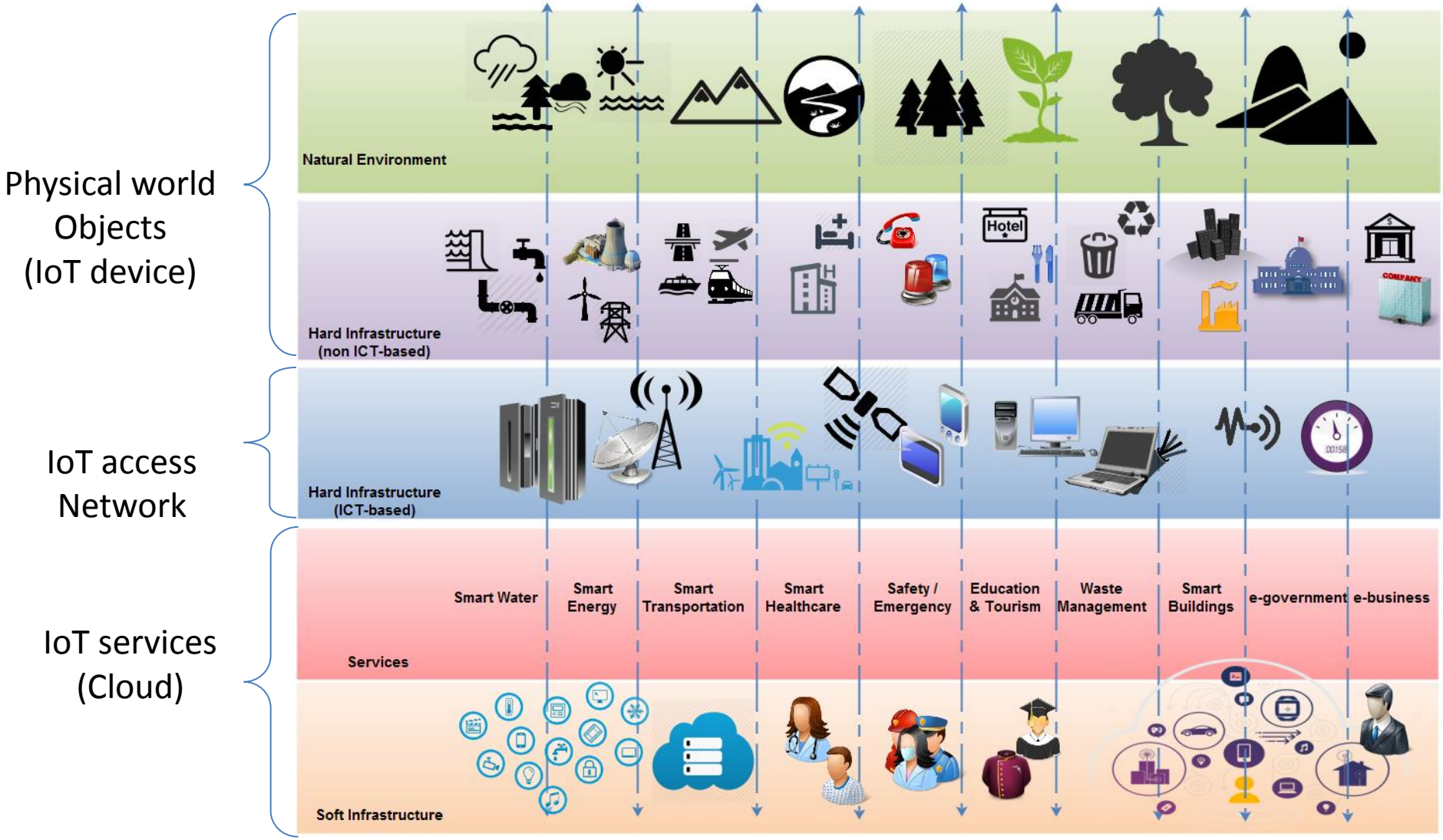
View on IoT spectrum regulation

(questions from Regulator)

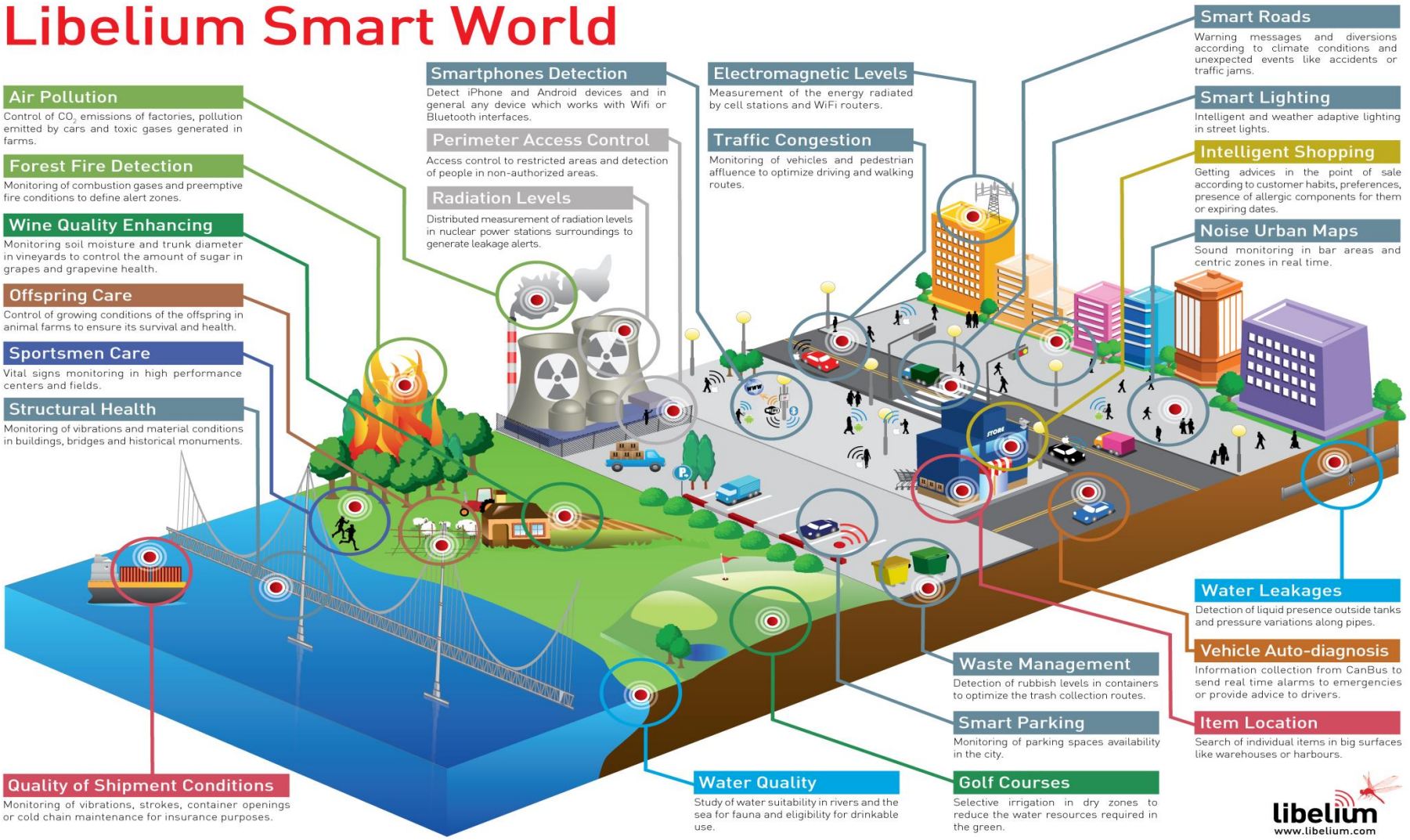
S. Pastukh (Russian Federation)

ITU concept of Internet of Things



IoT – is there something new?

Example of IoT services according to concept of Smart World



Essential elements: Object, Network, Data Center (Cloud), and of course Internet !

Spectrum regulation of IoT challenges

Zoo of standards for LPLA & LPWA. What to do?

IEEE 802.11ac

IEEE 802.11ah

ZigBee (IEEE 802.15)

Bluetooth LE (IEEE 802.15)

WiSun (IEEE 802.15)

Weightless

DASH7

6LoWPAN

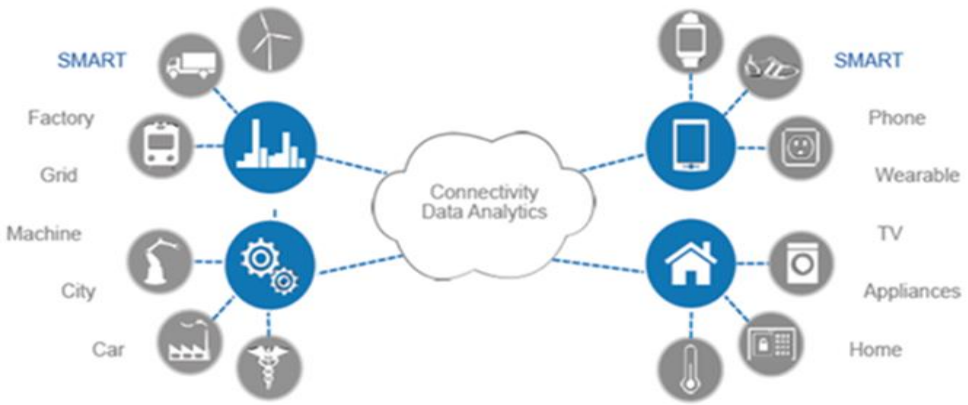
….. and many others proprietary standards

	SIGFOX	LoRa	clean slate	NB LTE-M Rel.13	EC-GSM Rel.13	LTE-M Rel.12/13	5G (планы)
Long range	<13km	<11 km	<15km	<15km	<15km	<11 km	<15km
Spectrum	Unlicensed below 1 GHz	Unlicensed below 1 GHz	Licensed below 1 GHz	Licensed below 1 ГГц	Licensed below 1 ГГц	Licensed below 1 ГГц	Licensed below 1 ГГц
Data Rate	<100 bps	<10 kbps	<50 kbps	<150 kbps	10 kbps	<1 Mbps	<1 Mbps
Battery Life	>10 years	>10 years	>10 years	>10 years	>10 years	>10 years	>10 years
Date of issue	2015	2015	2016	2016	2016	2016	after 2020

NB-IoT Rel.13 EC-GSM- IoT

Harmonization of Standards and Frequency Bands or Technology Neutrality?

Current view on IoT in Russia



IoT devices:

RFIDs – 13&865&921 MHz …
SRR – 77 GHz
Alarm – 433&865 MHz …
Movement - 10&24 GHz …
TLPR – 10&25 GHz …
Location – GLONASS, GPS
……..

IoT network:

LPWA – 868 MHz
LPLA – 2.4&5 GHz
ITS – 5.8&64 GHz
Cellular Mobile – GSM, IMT
Medical – 403 MHz …
Smart metering – 433 MHz, 868 MHz, 2.4 GHz

Is there any lack of spectrum for IoT? What are spectrum requirements for IoT services?

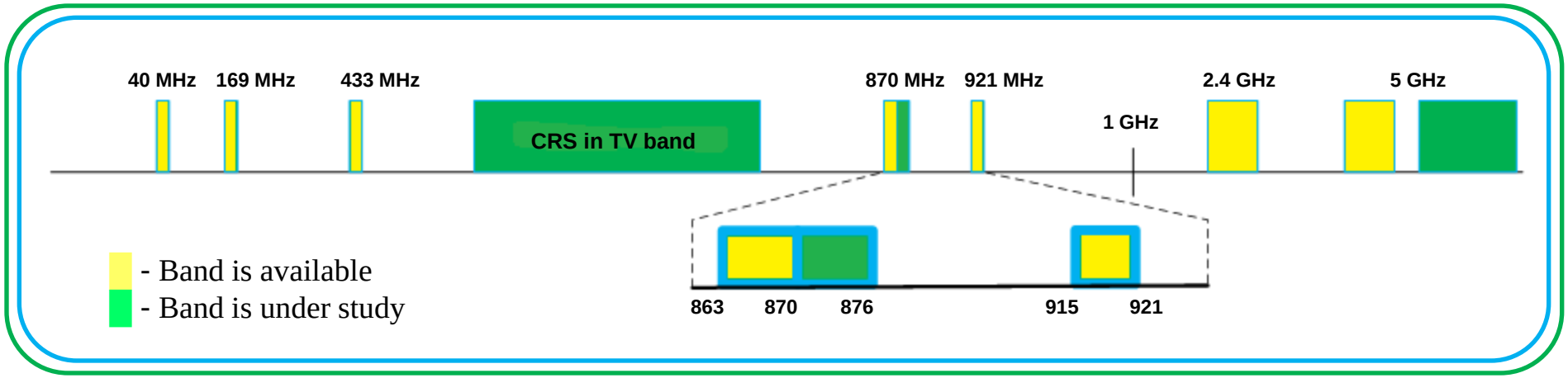
Consideration of spectrum regulation of IoT

- Licensing and spectrum management
  - ✓ Licensed vs Unlicensed spectrum
  - ✓ Dedicated vs Shared network
- Switching and roaming
  - ✓ SIMs with remotely updatable IMSI
  - ✓ MNC for broader range of services
- Addressing and numbering
  - ✓ IPv6
  - ✓ International Mobile Subscriber Identifier
- Competition
  - ✓ Manufactories
  - ✓ Network operators
  - ✓ IoT platform providers
- Security and privacy

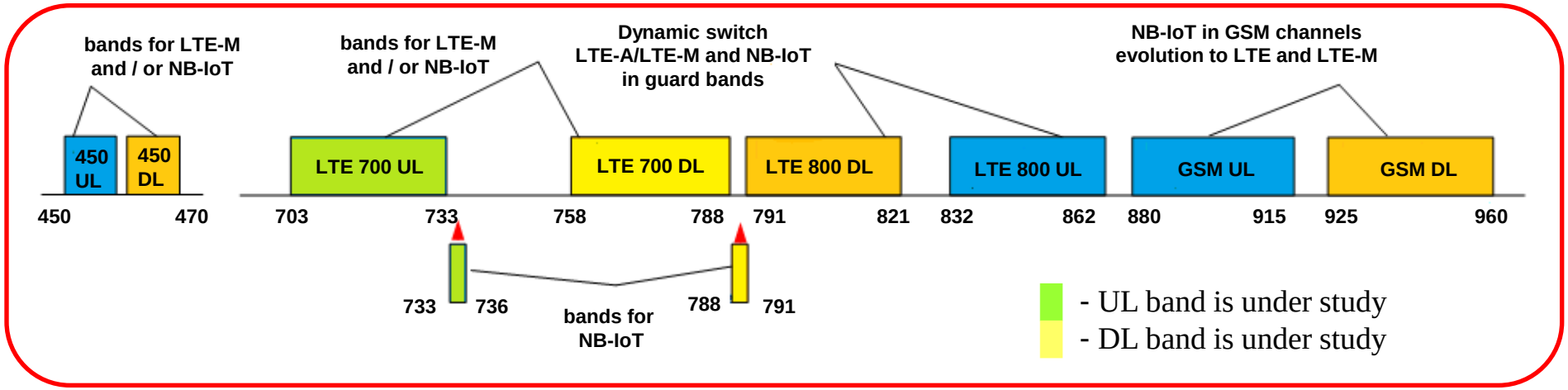
What is the most critical regulatory issue for IoT development?

Licensing and spectrum management challenges

Possible unlicensed band for IoT in Russia



Possible licensed bands for IoT in Russia



Should Licensed and Unlicenced spectrum be designated for IoT?

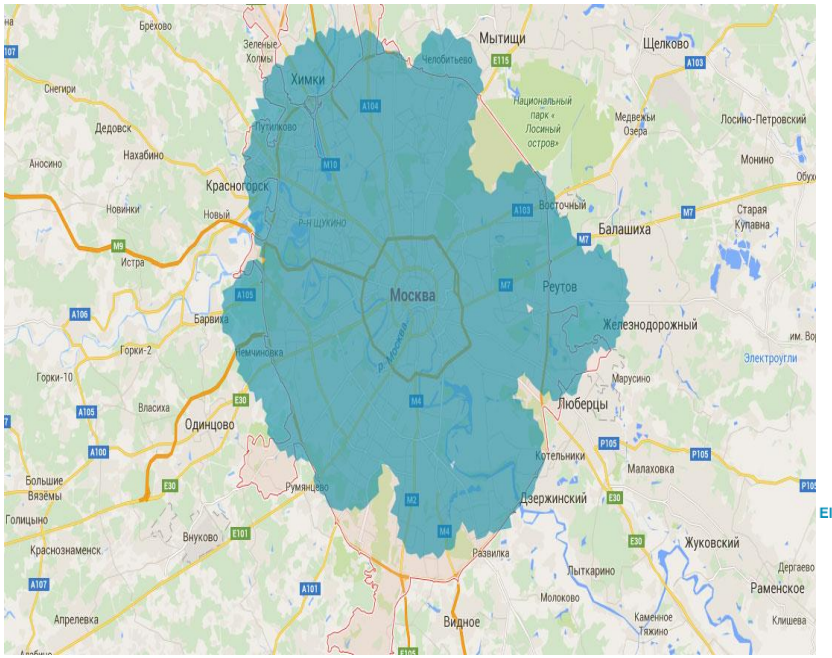
IoT network – Dedicated or Shared?

Special network for IoT application - Dedicated spectrum

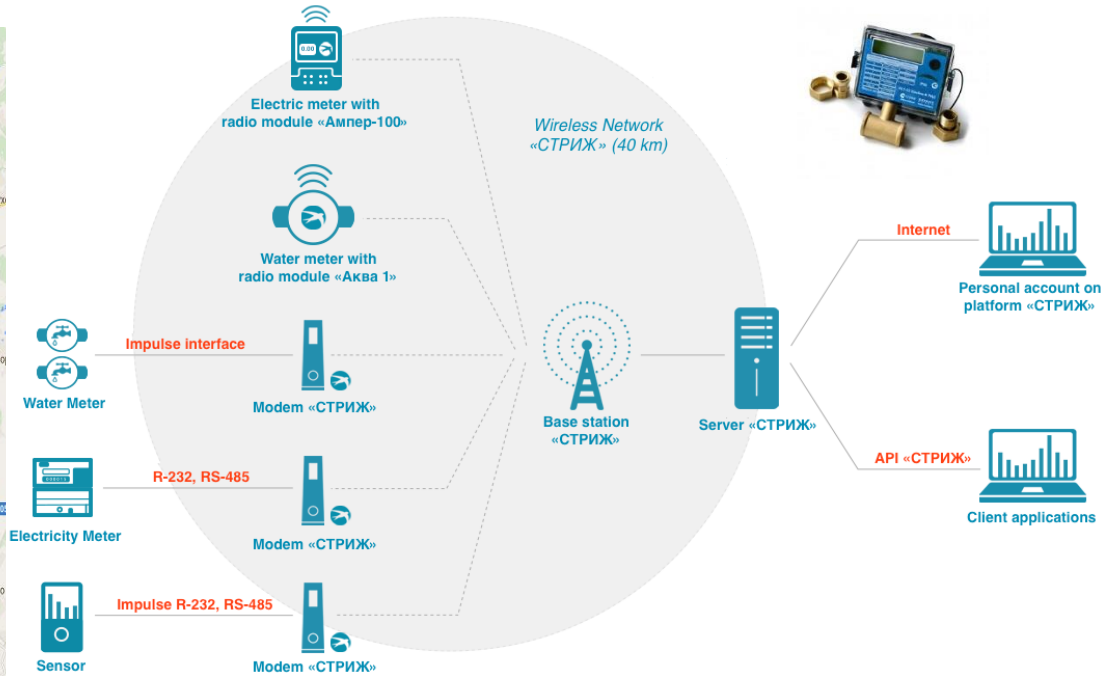
– ITS in 5.8 GHz band
– GSM in 900&1800 MHz for POS terminals …..

One network for different IoT applications - Shared spectrum

- *Стриж* Network in 868 MHz for smart metering and IoT sensors



Coverage 100% of Moscow city
70 Base Stations, 500 kHz spectrum in 868 MHz



Shared network is preferable for “public” IoT and specialized network for IIoT?

thank you
danke
謝謝
ngiyabonga
teşekkür ederim
gracias
tapadh leat
спасибо
Баярлалаа
рахмат
dank je
mochchakkeram
go raibh maith agat
dziękuję
bedankt
obrigado
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kop khun krap
merci
grazie
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terima kasih
감사합니다
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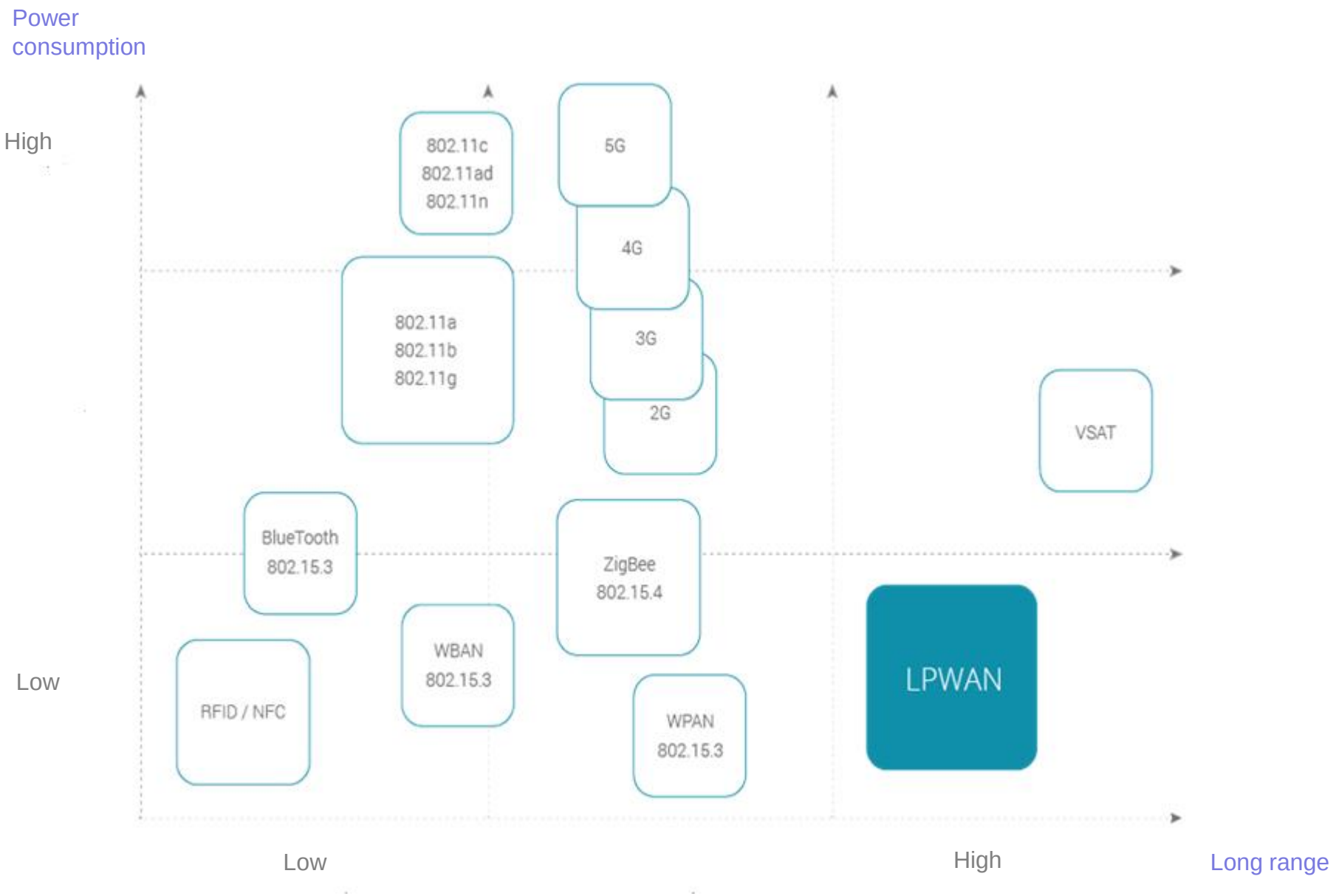
IoT standards comparison