

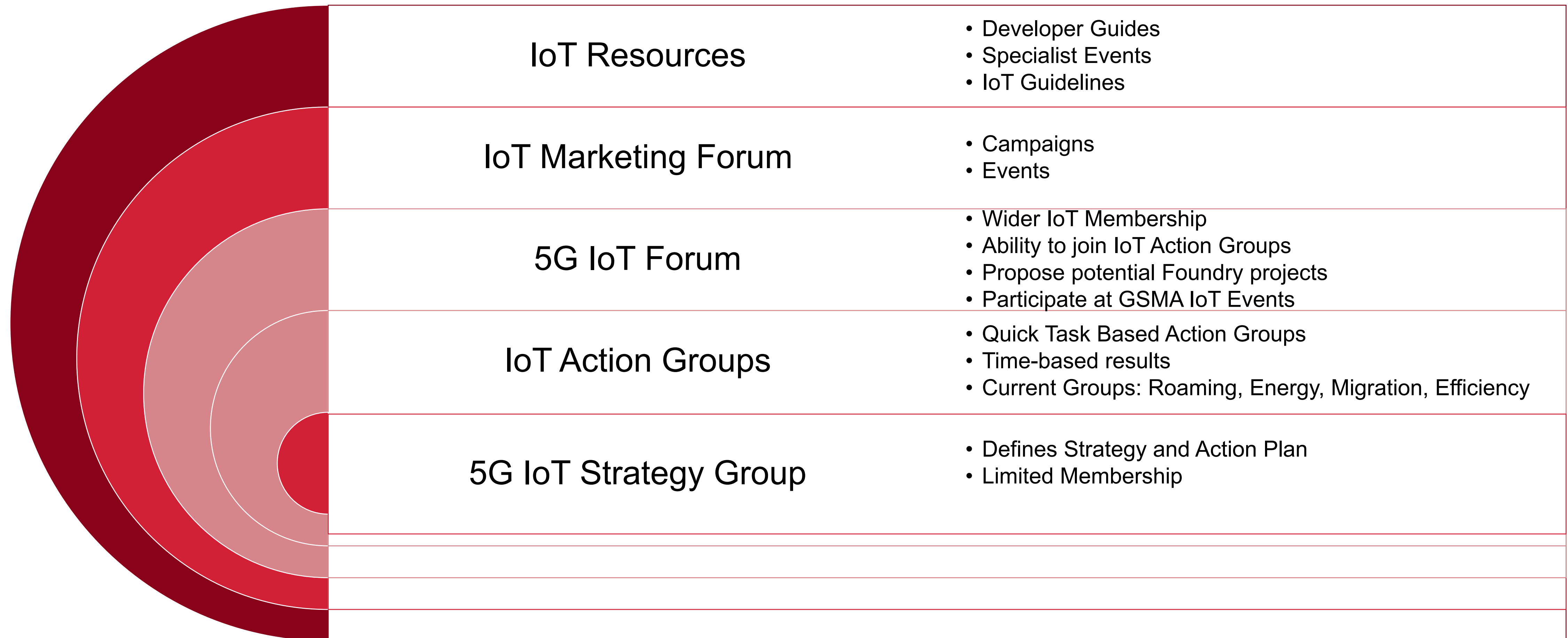
# Creating Automated IoT Solutions for Green Energy and a better Environment

ETSI Green IoT Week  
July 2023

Dr Shane Rooney  
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# GSMA Internet of Things Community

Building an active, adaptive and dynamic community that scales **Mobile IoT** ( LTE-M & NB-IOT) on the path to **Massive IoT** to meet customer needs . All part of the 5G evolution



# Introducing the GSMA 5G IoT Forum

**To evolve the GSMA IoT Community from LTE-M/ NB-IoT to Massive IoT and part of the 5G evolution to scale and grow 5G IoT Business**

**5G IoT Forum launched on 24 May 2022**

**3-4 Forum Meetings per year**

**Enlarge the IoT Community**

**Ability to join IoT Action Groups**

**Propose potential Foundry projects**

**Participate at GSMA IoT Events**

**Currently**

- 60 Companies
- 100 Members

**Contact [5GloTForum@gsma.com](mailto:5GloTForum@gsma.com) for details to join**

**(must be a GSMA member)**

# GSMA IoT Community Theme

## Automating Energy and Environmental Industries with Mobile IoT

- Pandemic
- Cellular LPWAN designed for these applications
- Cost of Human Intervention



# Automation Opportunities in Energy and Environment

- **Smart Metering**
  - Gas/Electric
  - Water
- **Renewables**
  - Wind /Solar
- **Monitoring**
  - Rivers/Sewage
  - Soil /crops
  - Pollution
- **Sustainable Transport**
  - Electric charging / bikes / scooters
  - Street. Lighting / Safety



# Customer Requirements

- **Technology**

- Customers don't care about Technology

- **Coverage**

- Must have Connectivity where the product is

- **Lifecycle**

- Must last the lifetime of the product

- **Operational Costs**

- CAPEX
- OPEX
- Set-up

- **Automation**

- Minimum Human intervention



# Why do we need smart meters?



## Solving Japan's Smart Gas Metering Challenges

### At a Glance

**Situation:** Following the 2011 Great East Japan Earthquake, the Japanese government mandated that 100 million buildings and households be fitted with smart meters by 2020.

**Challenges:** To develop a solution that enables continuous network availability and remote access, while allowing smart gas meters to maintain over 10 years of battery life in the field.

**Solution:** The Sierra Wireless AirPrime® HL78 module, featuring Sony's Altair highly integrated LTE-M/NB-IoT chipset.

**Results:** The Sony Altair chipsets now provide continuous LTE-M connectivity for all cellular-connected gas meters in Japan.



Collaboration across the mobile industry brought together an automated IoT solution so that the customer was able to understand how assets were performing



# TPG Telecom has won a 15-year contract with Australian water utility Yarra Valley Water for the management of up to **1 million NB-IoT** devices



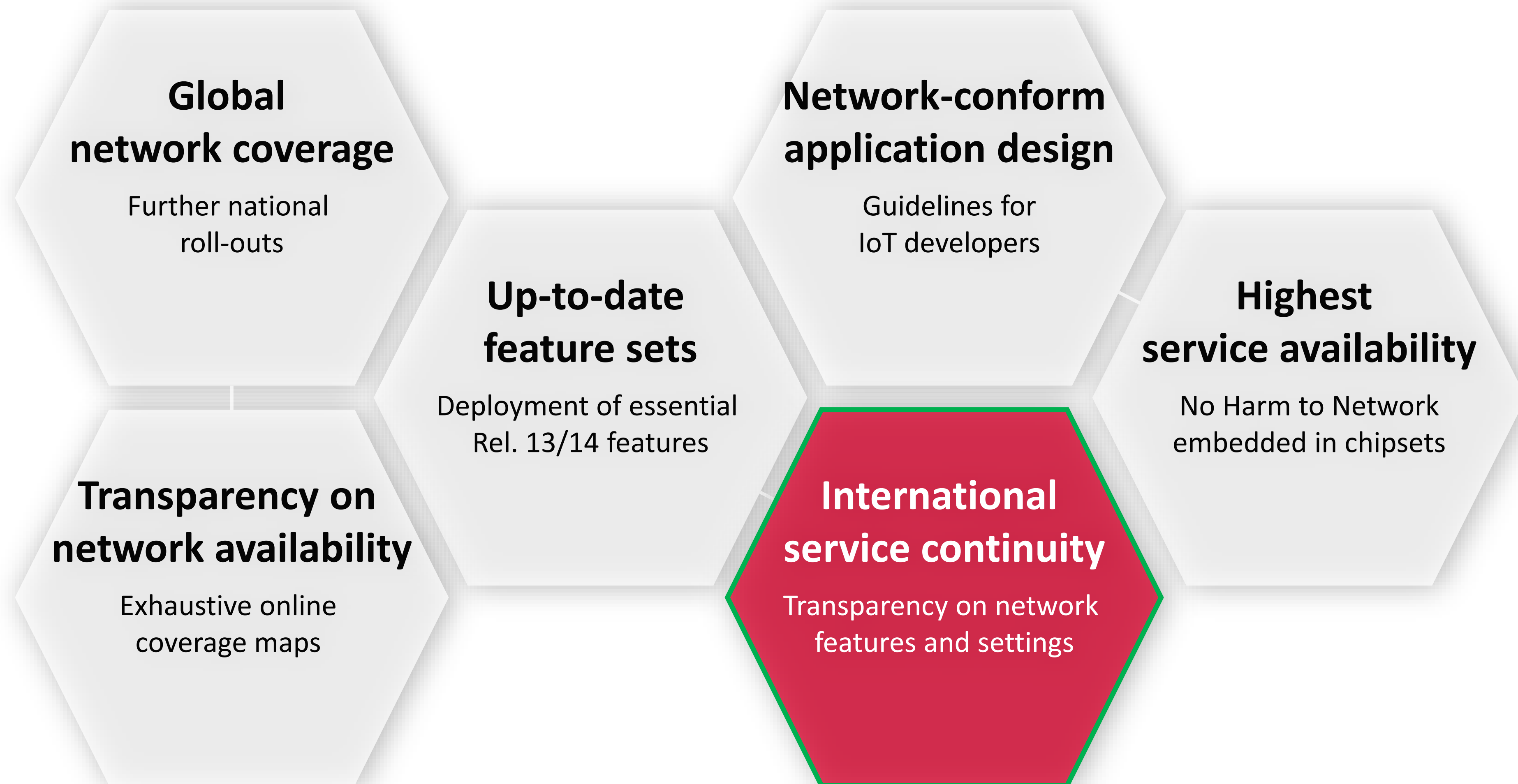
*"IoT devices present a significant opportunity for the water industry to gain better visibility of asset networks,"* said Yarra Valley Water managing director Pat McCafferty

- **Device management** platform across Yarra Valley Water's 20,000-kilometre pipe network over the next five to 10 years.
- **Enable near real-time visibility and monitoring** of significant issues, including leaks, water losses, sewer spills and major breaks across the network.
- **Measure water volume;** water pressure sensors that flag network deficiencies and sewer level sensors that can track sewer flow and potential blockages.
- Prior to this, the water utility's pipe network has been difficult to monitor underground and placed the onus on customers

# Cellular LPWAN - LTE-M and NB-IoT

- > Better connectivity and coverage especially in hard-to-reach places in buildings
- > Battery powered with up to 10 years lifetime (usage dependent)
- > Ideal for small data messages and fully scalable
- > Reliable and secure networks operating in licenced spectrum
- > Nationwide service from established blue-chip companies
- > International standards-based solution available in 200+ countries
- > Future-proof for the lifetime of the meter - part of the 5G evolution
- > Ability to change service provider as required, unlike proprietary solutions
- > Over the air (OTA) provisioning available

# Ensuring an excellent NB-IoT/LTE-M roaming experience



# Mobile IoT Roaming Parameter Transparency

## Situation

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- Key user benefits of NB-IoT and LTE-M include **low power consumption** and **enhanced reachability** of IoT modules
- This is achieved through new power-saving features (e.g. **PSM, LP TAU, eDRX**) and by optimizing signaling protocol and radio transmission capabilities (e.g. **Coverage Enhancement Mode**)
- MNOs today support their own (retail) customers by sharing (only) **their specific network configurations**

## Complication


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- Customers/developers expect a **seamless experience in Mobile IoT roaming**
- This requires **full knowledge of available features and associated parameters** in each visited network
- Unfortunately, a network provider or a developer only has **limited visibility** into the feature configuration of other networks (roaming partners)
- This can lead to **poor IoT solution designs** for international usage

# Mobile IoT Roaming Parameter Transparency

## Solution

- Information on the configuration of customer-facing features shall be shared between all roaming partners
- This will ensure the best possible customer experience in roaming by **transparent communication on key parameters** (e.g. power-saving features incl. default settings)
- This information is **collected and maintained centrally in the GSMA Roaming database** reusing existing documents (IR.21) and tools (RoamSys)
- Moreover, it is also **published on the GSMA website**

Change Request Form	
	<b>IR.21 CR1070 IoT Quality Parameters</b>
Document Summary	
Official Document Number, Document Title and Version Number	IR.21 GSM Association Roaming Database, Structure and Updating Procedures v14.1 (Current)
Official Document Type	Binding Permanent Reference Document
Change Request Security Classification	Confidential - Full, Rapporteur, Associate and Affiliate Members
Is this a new document or a Major or Minor Change?	Major Update
Will this Change Request result in a Major or Minor version update?	Major Version
This document is for	[This document is for]
Input Editor and Organisation	Wayne Law, GSMA 5G IoT Strategy Group
Additional Contributors	Deutsche Telekom Telstra
Issuing Group/Project	5G IoT Strategy Group
Approving Group/Project	NG
Change Request Creation Date	01/03/2021
What are the reasons for and benefits of creating this new document or Change Request?	This CR includes additional parameters into Section 27 of IR.21 so operators could have greater visibility of key mobile network settings that might adversely influence some IoT use cases

# Mobile IoT Roaming Parameter Transparency – Status

## Current status

- IoT roaming parameters partially available in IR.21
- Publication on the GSMA Mobile IoT website  
<https://www.gsma.com/iot/mobile-iot/roaming/>
- Number of currently reported network definitions (as of 06.06.2023):
  - NB-IoT networks: 29 (out of 137, i.e. 21%)
  - LTE-M networks: 15 (out of 115, i.e. 13%)

### Mobile IoT (LPWA) Features in Roaming

+ NB-IoT Features in Roaming

+ LTE-M Features in Roaming

Additional information about coverage:

Mobile IoT Deployment Map

Mobile IoT Commercial Launches

### Mobile IoT Roaming – Operator Settings (Version June 2022)

Operator LTE-M Settings

Operator NB-IoT Settings

Please submit your roaming features to [IoTMarketing@gsma.com](mailto:IoTMarketing@gsma.com).

All operator members are kindly asked to

- submit their **network configuration details** to the GSMA (email to [IoTMarketing@gsma.com](mailto:IoTMarketing@gsma.com))
- update their **IR.21 document**

# Example: Mobile IoT Roaming Feature Matrix (DT data sets)

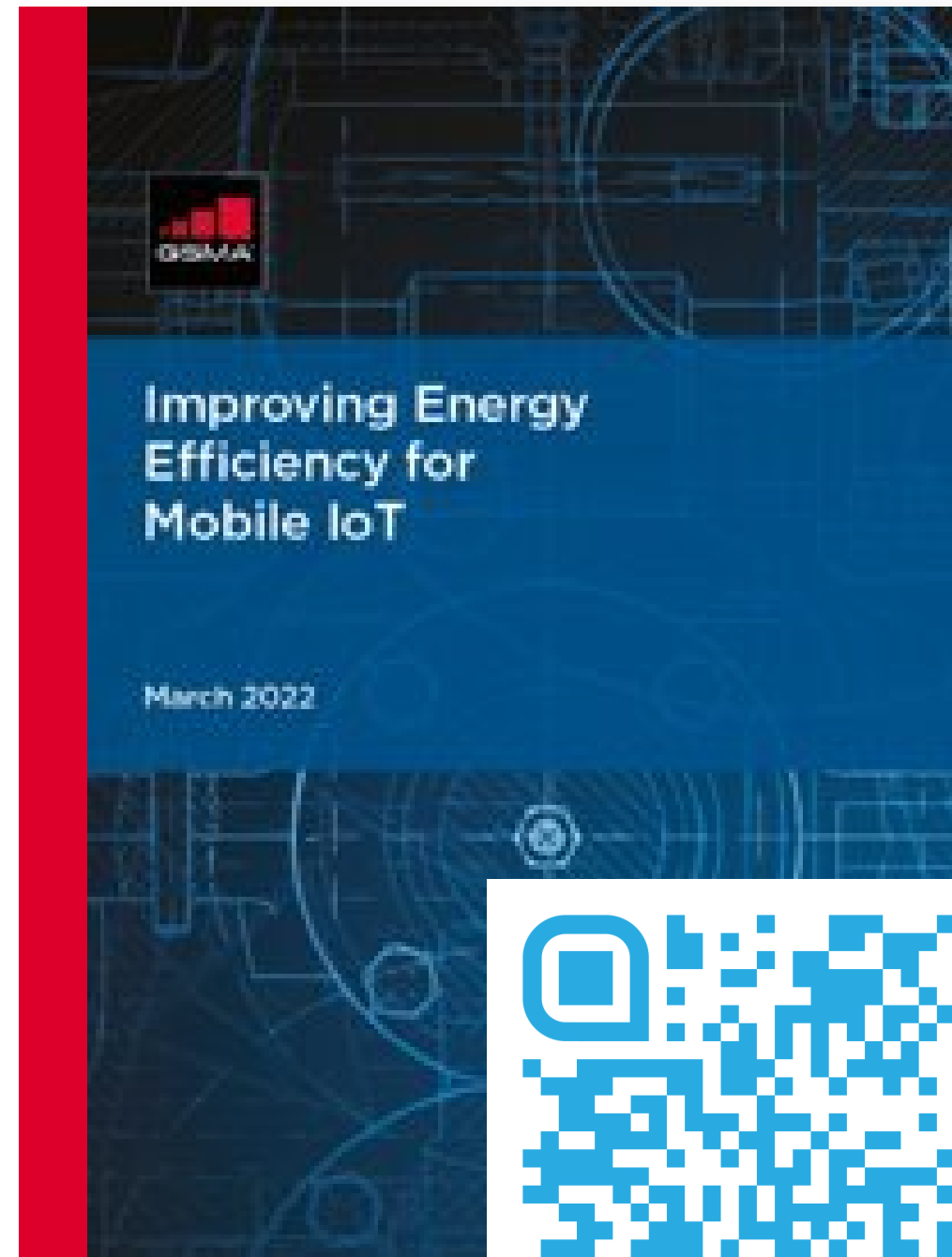
## NB-IoT

Country	Features	Network Code	Band	IP Roaming	Non-IP Roaming	Data Transportation via		RRC Activity Timer	Release Assistance Indication		PSM PSM Activity Timer T3324			Data Packet Buffering (HLCom)		LP-TAU Extended timer T3412				eDRX				SMS support	Power Classes (3, 5, 6)	CE Level (0, 1, 2)
						Control Plane	User Plane		NAS (Rel. 13)	Access Stratum (Rel. 14)	No/static/dynamic	min value	max value	Yes/No	Nb of Packets	No/static/dynamic	Min value	Max value	No/static/dynamic	T eDRX Min value	T eDRX Max value	T PTW Min value	T PTW Max value			
Austria	Magenta Telekom	23203	Band 8	IPv4, IPv6	No	Yes	No	8s/12s/22s	Yes	Yes	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	Dynamic	20.48 s	10485.76 s	2.56 s	40.96 s	No	3,5	0,1,2
Croatia	Hrvatski Telekom	21901	Band 20	IPv4, IPv6	No	Yes	No	10s/15s/20s	Yes	No	Dynamic	0s	186 min	Yes	10	No	TBC	TBC	No	N/A	N/A	N/A	N/A	No	3,5	0,1,2
Czech Republic	T-Mobile Czech	23001	Band 20	IPv4, IPv6	No	Yes	No	20s/20s/20s	Yes	No	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	No	N/A	N/A	N/A	N/A	No	3,5	0,1,2
Germany	Telekom Deutschland	26201	Band 8	IPv4, IPv6	No	Yes	No	8s/12s/22s	Yes	Yes	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	Dynamic	20.48 s	10485.76 s	2.56 s	40.96 s	No	3,5	0,1,2
Greece	Cosmote	20201	Band 20	IPv4, IPv6	No	Yes	Yes	10s/10s/10s	Yes	No	Dynamic	0s	186 min	No	NA	Dynamic	1 hr	310 hrs	No	N/A	N/A	N/A	N/A	Yes	3,5	0,1,2
Hungary	Magyar Telekom	21630	Band 8 & 20	IPv4, IPv6	No	Yes	No	10s/15s/20s	Yes	No	Dynamic	0s	186 min	Yes	TBC	Dynamic	1 hr	310 hrs	No	N/A	N/A	N/A	N/A	No	3,5	0,1,2
Poland	T-Mobile Poland	26002	Band 20	IPv4, IPv6	No	Yes	No	5s, 7s, 17s	Partially	No	Dynamic	0s	186 min	Yes	TBC	Dynamic	54min	9920 hrs	No	N/A	N/A	N/A	N/A	Yes	3,5	0,1,2
Slovakia	Slovak Telekom	23102	Band 20	IPv4, IPv6	No	Yes	No	10s/15s/20s	Yes	No	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	Dynamic	20,48 s	10485.76 s	5.12 s	40.96 s	No	3,5	0,1,2

## LTE-M

Country	Features	Network Code	Deployment band(s)	IP Roaming	Non-IP Roaming	Data Transport via...		RRC Activity Timer	Release Assistance Indication (RAI)	Dynamic PSM PSM Activity Timer T3324			Data Packet Buffering (HLCom)		LP-TAU Extended timer T3412				eDRX				SMS Support		Voice Support (VoLTE)	Coverage Enhancement		GTP-IDLE Timer on IPX Firewall
						Control Plane	User Plane			T RRC	Access Stratum (Rel. 14)	no/static/dynamic	min value (seconds)	max value (minutes)	Yes/No	Nb of packets	no/static/dynamic	min value	max value	no/static/dynamic	t eDRX min value	T eDRX max value	T PTW Min Value	T PTW max value		SMS over SGS	SMS over SGd	
Austria	Magenta Telekom	23203	Band 3, 8 & 20	IPv4	No	No	Yes	10s	No	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	Dynamic	5,12s	2621,44s	1,28s	20,48s	Yes	No	No	Yes	No	24 hrs
Germany	Telekom Deutschland	26201	Band 3 & 20	IPv4, IPv6	No	No	Yes	10s	No	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	No	N/A	N/A	N/A	N/A	Yes	No	No	Yes	No	24 hrs
Hungary	Magyar Telekom	21630	Band 3 & 20	IPv4, IPv6	No	No	Yes	10s	No	Dynamic	0s	186 min	Yes	10	Dynamic	1 hr	310 hrs	No	N/A	N/A	N/A	N/A	Yes	No	No	Yes	No	24 hrs

# Work created by the GSMA IoT Community





# Next 5G IoT Forum

13 September  
2023



**Thank You**

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