GCF™
Global Certification Forum

5G – where next?
The challenges of ensuring interoperability in a 5G world

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Dubai, 25 November 2019

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Chris Hogg

Kensington Communication Consultants

- **19 years mobile and telecoms industry experience.**
- **Director/Principal at Kensington Communication Consultants.**
  - Strategic advice to telecoms businesses and users.
- **Programme and Strategic Management of GCF.**
  - Advising GCF on how to deal with changes in the market.
  - Previously a standards manager in Nortel (ITU-T, ETSI, 3GPP)
- **MBA, Imperial College, London** (2014)
- **Professional Engineer (UK CEng)**
  - Master of Electrical Engineering, University of Strathclyde, Glasgow (2000)

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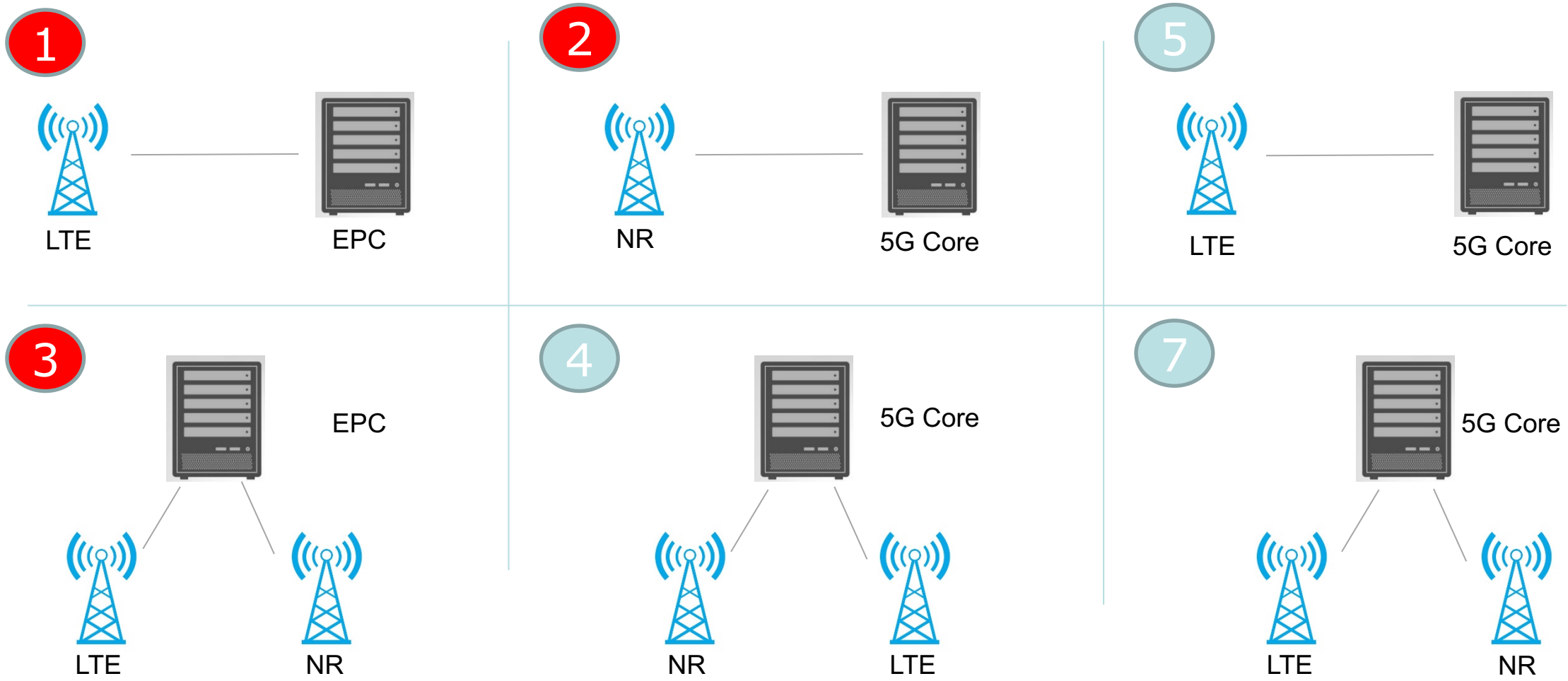
Key questions…

- Latest news in 5G bands and coverage in GCF Certification.
- How will 5G support operators' businesses?
- How does GCF Certification support 5G deployment?

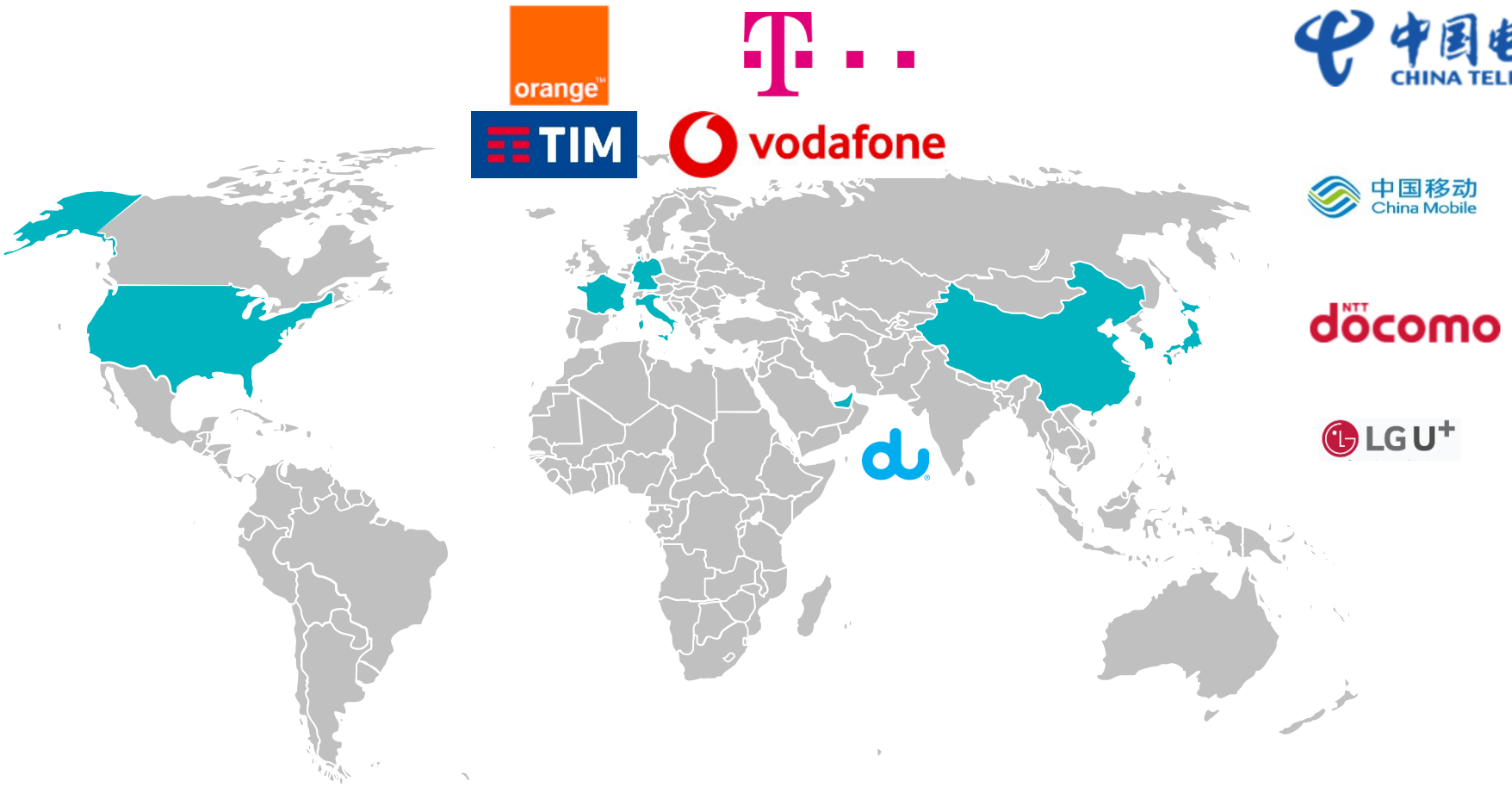
What we presently cover in GCF for 5G …

Standalone (SA)



Non-Standalone (NSA) – ‘Dual Connectivity’

GCF 5G Certification covers 11 operators now



* Shown GCF Operators that have included 5G certification test requirements into GCF's work program..

GCF 5G Band Coverage

Band Coverage SA Option 2				
n1	n3	**n41**	**n78**	**n79**

Band Coverage NSA Option 3			
1A_n77A	3A_n257A	13A_n261A	28A_n78A
1A_n78A	4A_n260A	18A_n77A	**39A_n41A**
1A_n79A	4A_n261A	18A_n78A	39A_n78A
20A_n78A	5A_n2A	18A_n79A	39A_n79A
1A_n257A	5A_n66A	18A_n257A	40A_n41A
2A_n5A	**5A_n78A**	19A_n77A	41A_n41A
2A_n66A	5A_n260A	19A_n78A	41A_n78A
2A_n260A	5A_n261A	19A_n79A	41A_n79A
2A_n261A	7A_n28A	19A_n257A	66A_n2A
3A_n28A	7A_n78A	20A_n78A	66A_n5A
3A_n41A	8A_n41A	21A_n77A	66A_n260A
3A_n77A	8A_n78A	21A_n78A	66A_n261A
3A_n78A	8A_n79A	21A_n79A	(n)41AA
3A_n79A	13A_n260A	21A_n257A	

XA_nYYA	**Active in GCF Certification**
XA_nYYA	In development
3A_n41A	**EITC's band (active)**

Current 5G Work Items

Number	Area	Type
WI-500-XX	**5G RF**	**Conformance**
WI-501-XX	**5G RRM**	**Conformance**
WI-502-XX	**5G De-Mod / CSI**	**Conformance**
WI-503-XX	**5G AS Protocol**	**Conformance**
WI-504-XX	**5G NAS Protocol**	**Conformance**
WI-505-XX	5G IMS	Conformance
WI-506-XX	**5G Positioning**	**Conformance**
WI-507-XX	**5G Field Trials**	**Field Trials**
WI-508-NR	**USIM Interworking**	**Conformance**
WI-509-xx	USAT interworking	Conformance
WI-513-xx	**Rel-15 Interworking between NR with 5GC and E-UTRA with EPC**	**Conformance**

XX denotes the band information
Bold **Work Items** have test loaded test cases in the DCC.

GCF 5G Field Trials

FT Test Case count

Field Trials	5G option	Test cases
NR	2	27
EN-DC	3	36

FTQ Operators

Operator	5G Option	Declaration Date
TIM	**3**	**25 June 2019**
Deutsche Telekom	**3**	**13 September 2019**
Vodafone Spain	**3**	**11 November 2019**

5G Test Platforms and labs

Test Platforms

Test equipment vendors have declared 10 test platforms:

- 7 different vendors
- 5 Test Platform have validated tests

Test Laboratories

Nine 3rd Party labs have submitted 5G C-RTO declarations

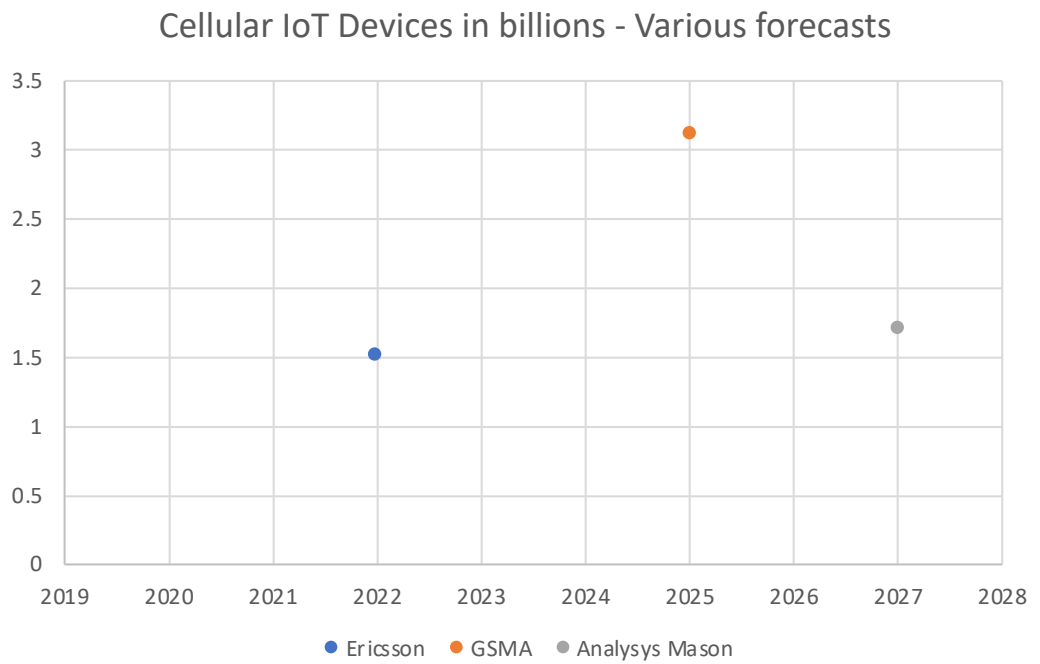
- 3 x China
- 3 x Taiwan
- 1 x US
- 2 x South Korea

What is the 5G short term priorities

- Increase the number of validated test cases
- Accelerate the activation of work items
- Increase number of FTQ operators
- Include bands for more operators
- **Ensure GCF Certification meets the needs of key industry verticals.**

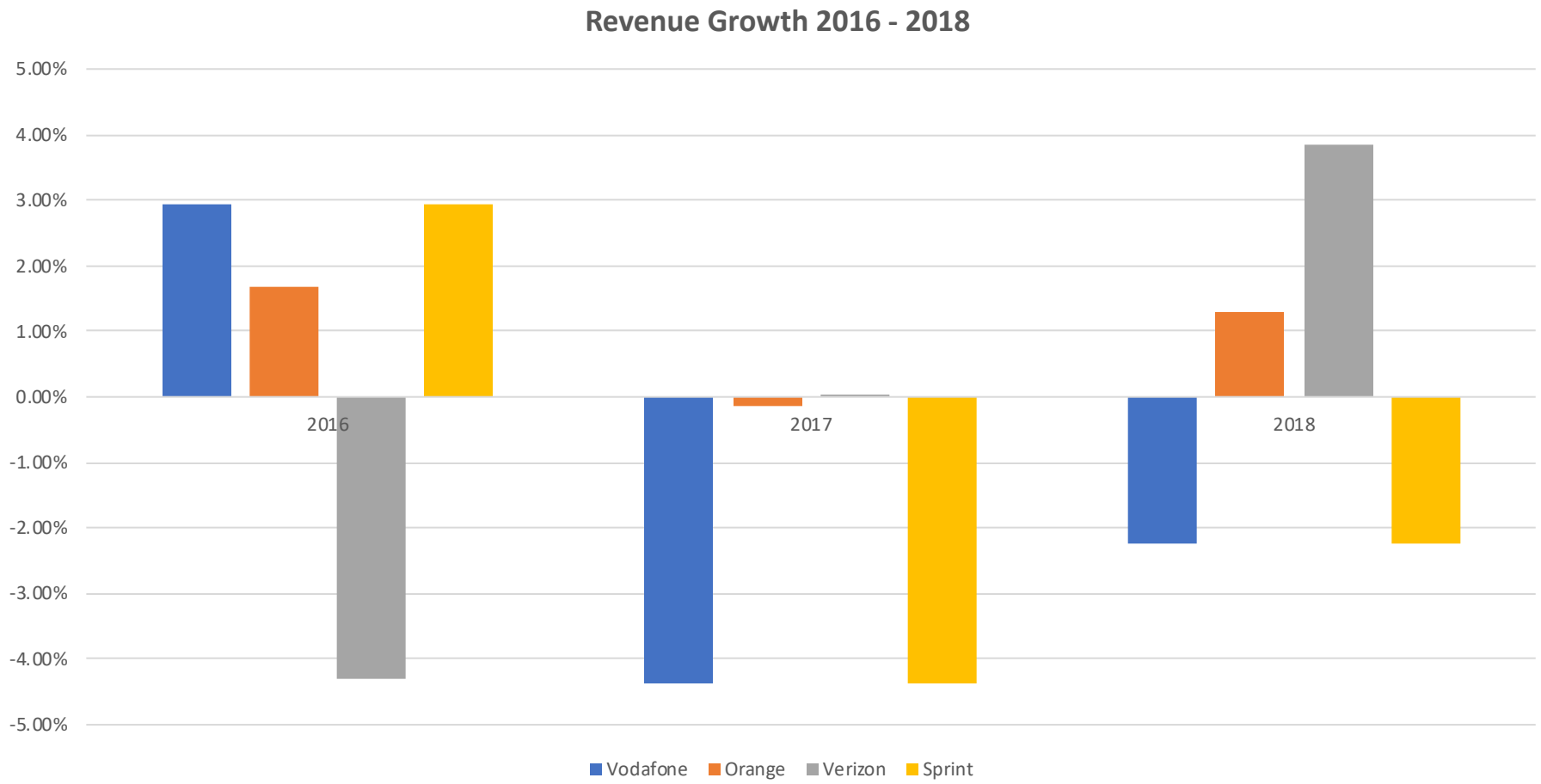
Most analysts continue to predict IoT growth..

- 25 billion devices by 2025
- Cellular estimated between 1.5 - 3.5 bn devices by 2025.
- Other technologies are also helping this trend
  - AI / Machine Learning / Big Data / Analytics.



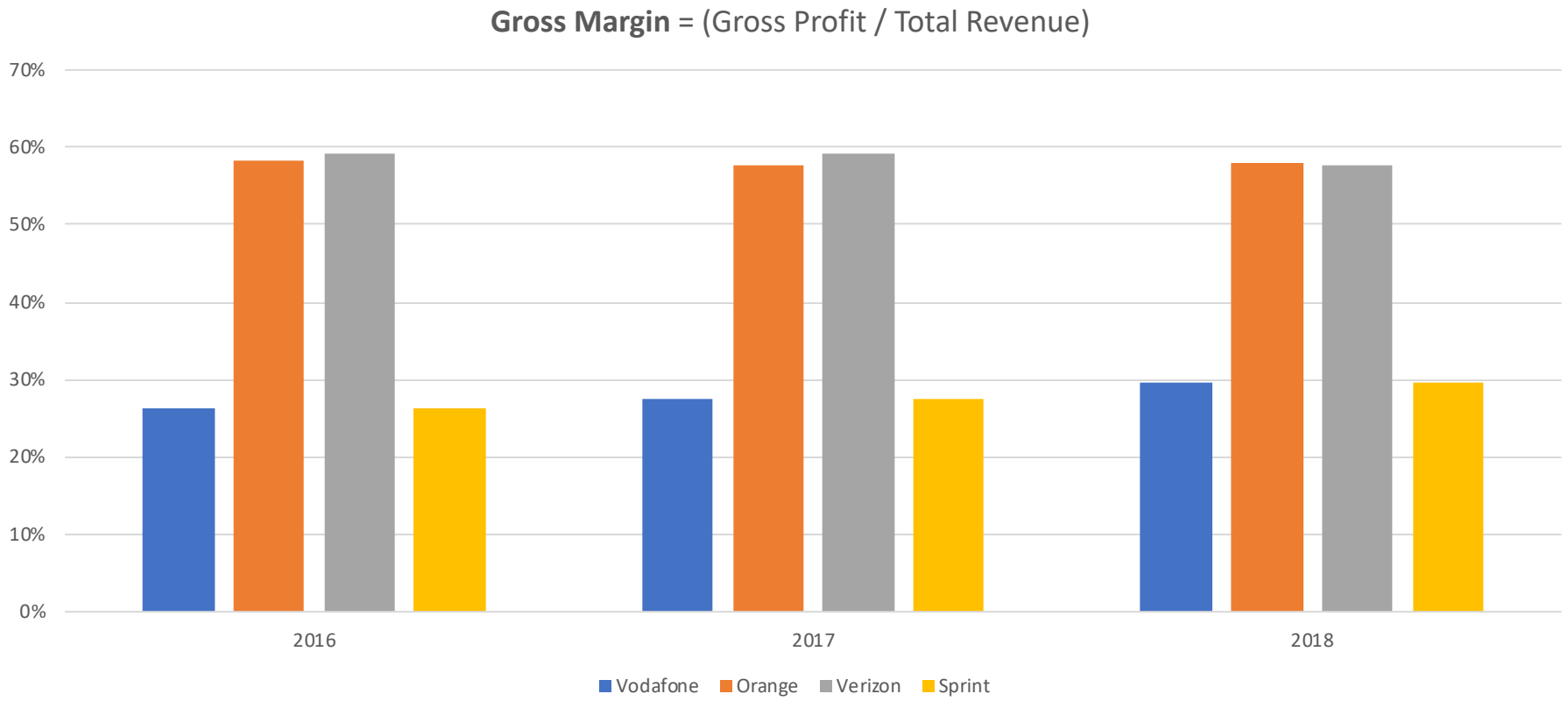
5G alongside NB-IoT / Cat M1 will play an increasing role in IoT

Operators need to find new growth…

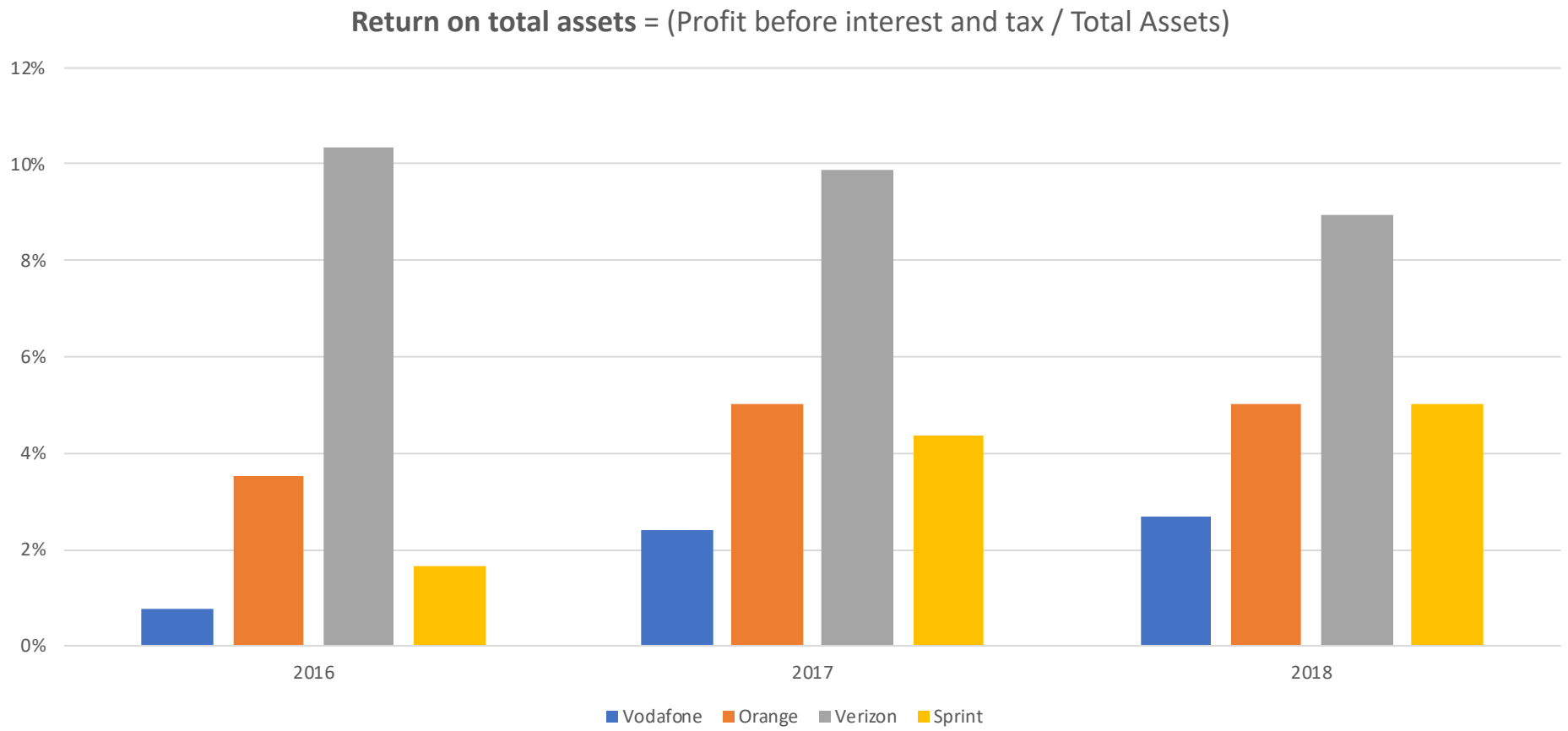


Very low growth and/or declining revenues

Operators are still profitable…

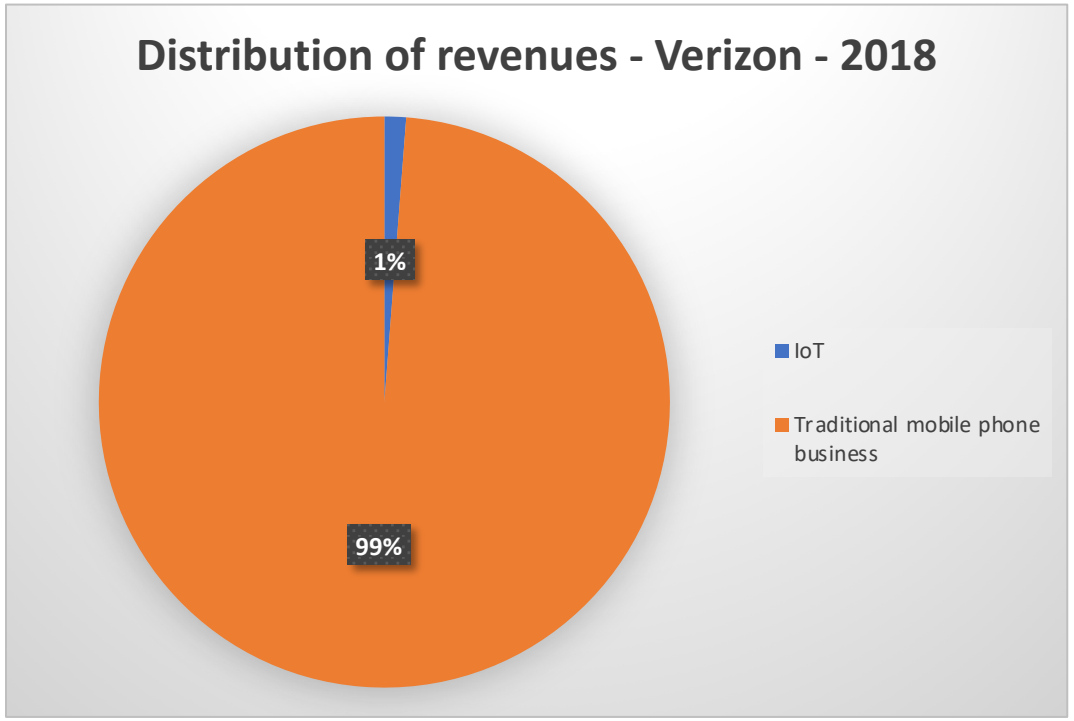


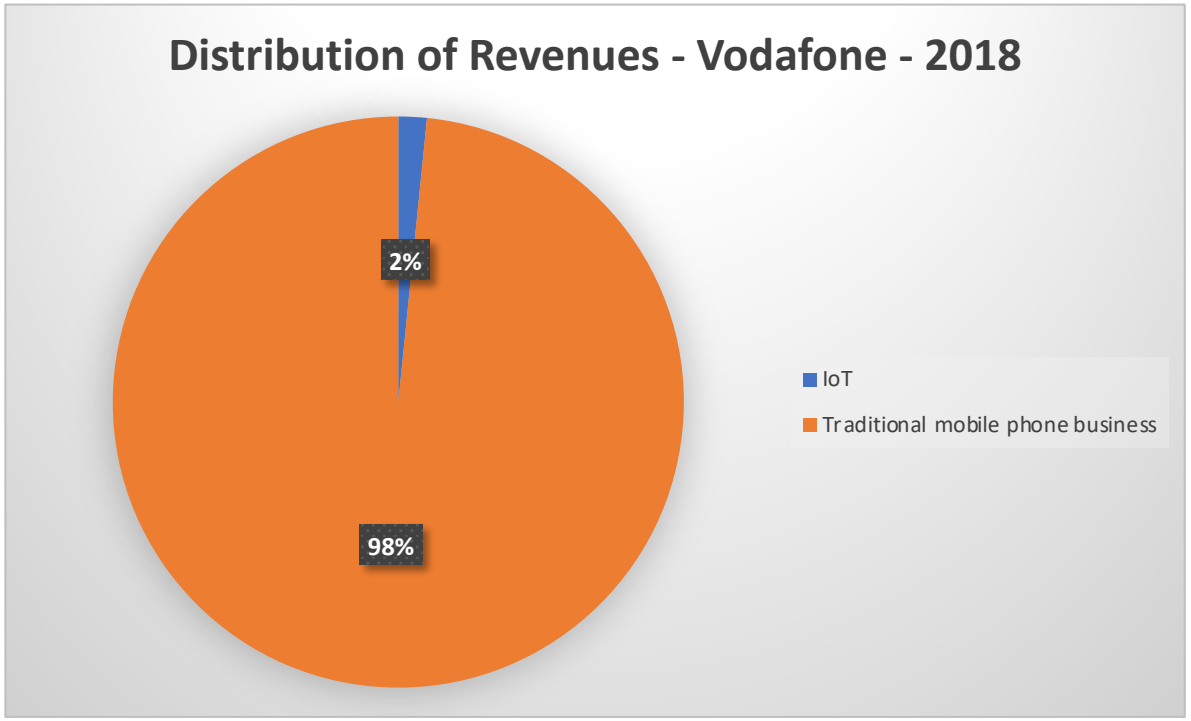
But are capital intensive businesses that require large investments…



Low returns compared to size of asset base.

5G and IoT provide a future revenue stream… but these businesses remain relatively small





5G opportunities: The challenges…

Turn new use cases into businesses.

Organisation and Partners

Ensure interoperability

What new businesses?

Example:

- Often long queues at airport rental car desks.
  - Paper based process.
  - Documents check.
  - Frustrating for customers.

- Solutions…
  - Electronic document check.
  - Cameras in parking garage.
  - Download car key to your smartphone.

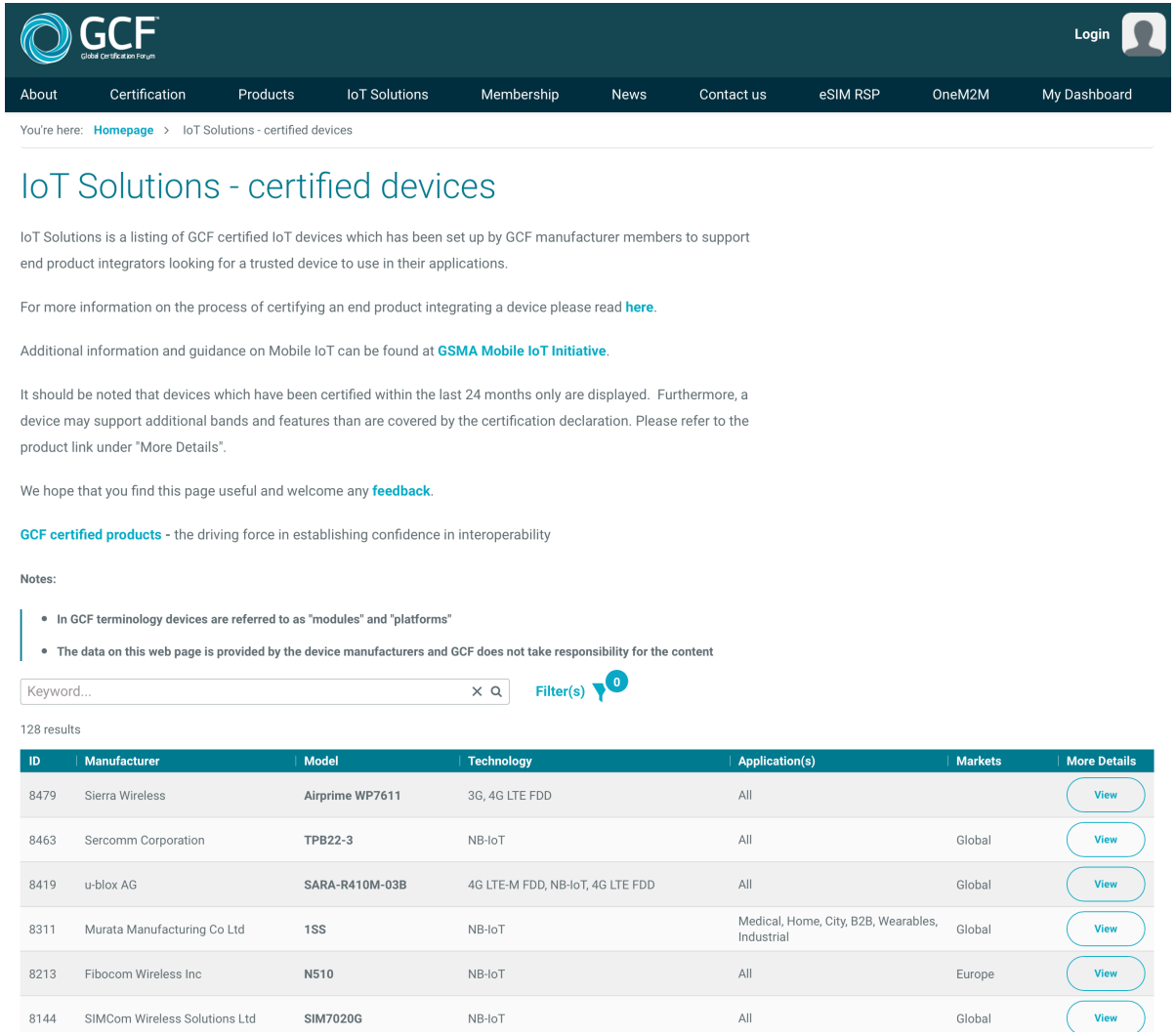
New opportunities across all sectors…

Automotive / Transport	Energy	Logistics (any sector)	Manufacturing	Health	Services (any sector)
Autopilot	Micro / local generation	Asset tracking	Automation	Health tracking	Insurance
Robot-cars / taxis	Grid management	People tracking	Process improvements	Patient management	Retail
Fleet management	Smart appliances		Turn products into services.		Leisure
Hire car experience					Security
Parking management					

New customers, new needs, new services, new devices.

How does GCF Certification help in new sectors?

- Use a GCF Certified module in your IoT project.
- Prove device-network interoperability to partners.
- Focus on developing the new business.



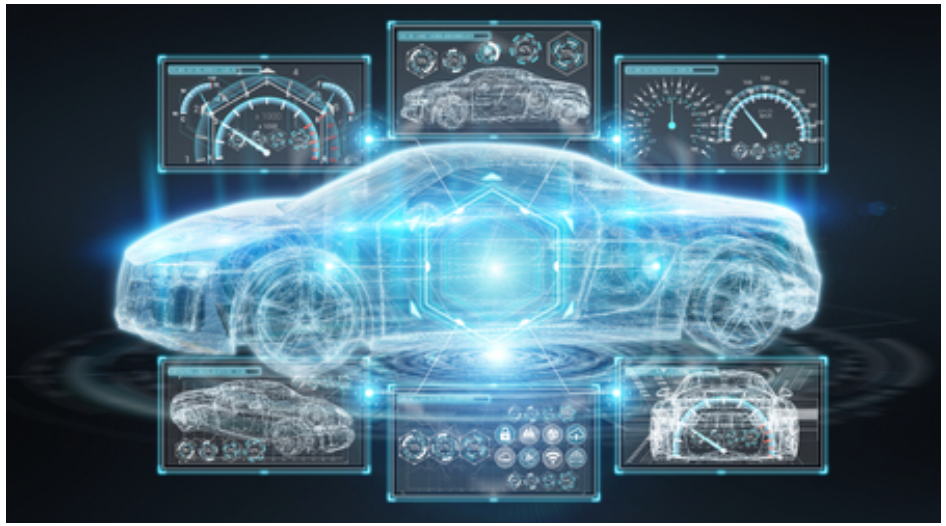
Automotive: GCF and 5GAA

- GCF Certification already includes some Automotive features
  - LTE V2V / V2X in band 47 (E-UTRA / Rel-14).
  - E-Call non-modem procedures.

- Automotive industry is defining frameworks for applications.
  - C-ITS (Co-operative – Intelligent Transport Systems).

- GCF and 5GAA are working to investigate and develop a C-ITS certification covering both radio and application layers.

- Current plan is to launch in 2021.



Critical Comms: TCCA and GCF

- **Emergency Communications is moving onto 4G and 5G networks.**
  - Gain economies of scale.
  - Enable emergency services to better manage emergency responses by use of a data connection.
- **Critical Communications may also be used by other 'professional' users.**
  - Transport Authorities.
  - Airports.
  - Mining / Oil and Gas.
- **Critical Communications services have additional requirements.**
  - Services (MCPTT / Direct Mode)
  - Underlying 3GPP features (MBMS)
  - High power UE.
  - Security.

New Member category: Mission Critical Operator

GCF is working with TCCA to ensure mission critical needs certification needs are addressed.

Other partnerships…

Service level APIs for Internet of Things

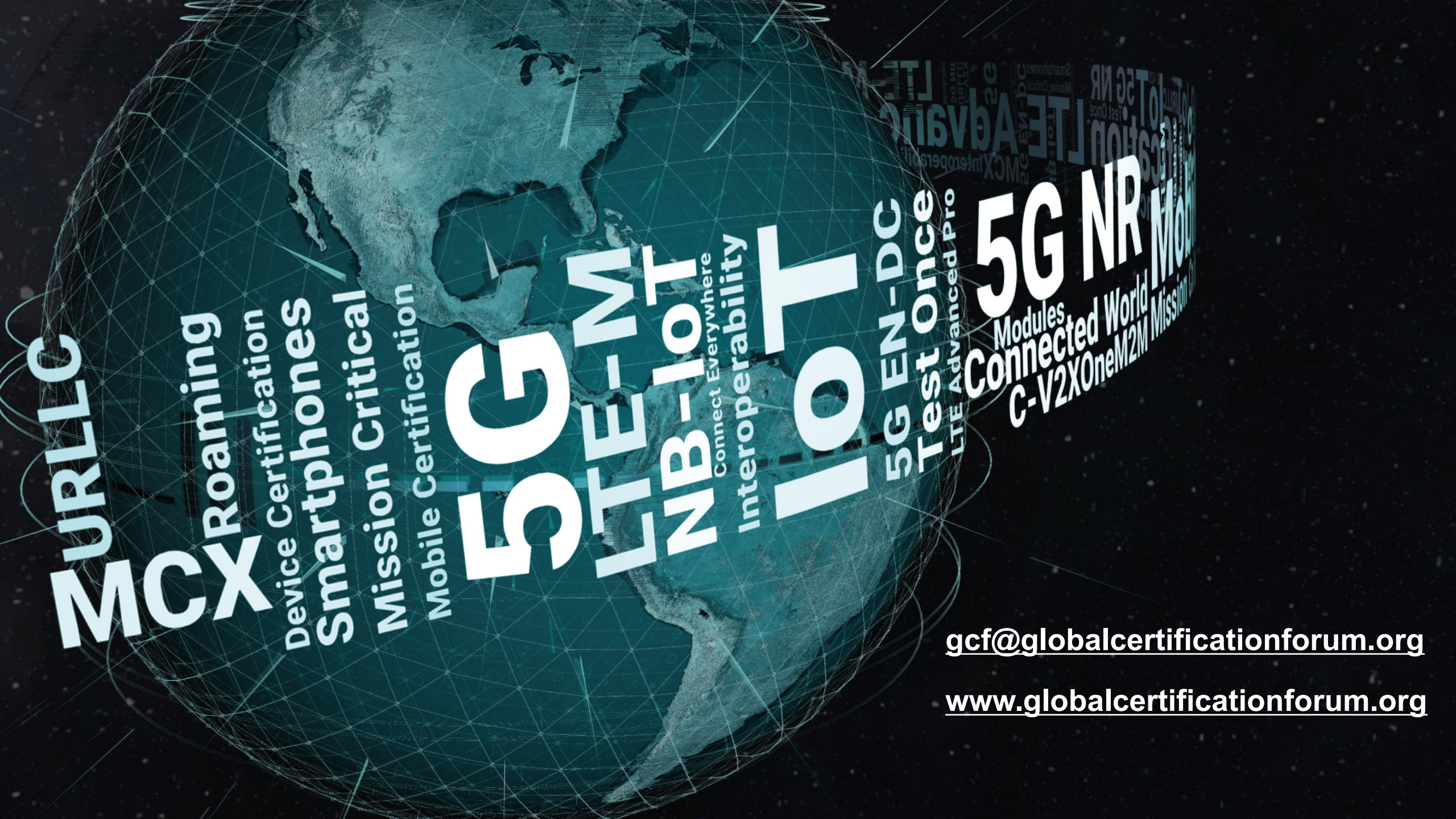
Manufacturing and process automation

NFC payments and other applications

Remote SIM Provisioning

Summary

- GCF certification for 5G is progressing well.
- For operators to benefit from GCF Certification you should ensure your particular 5G bands and configuration is included in our program.
- The key challenge for mobile operators is how to diversify into serving new markets.
- GCF Certification helps to prove to your partners and users that devices used in IoT projects / services will be interoperable with networks.
- GCF is working with industry ecosystem partners to develop certification solutions for specific verticals.



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