Towards a 5G future

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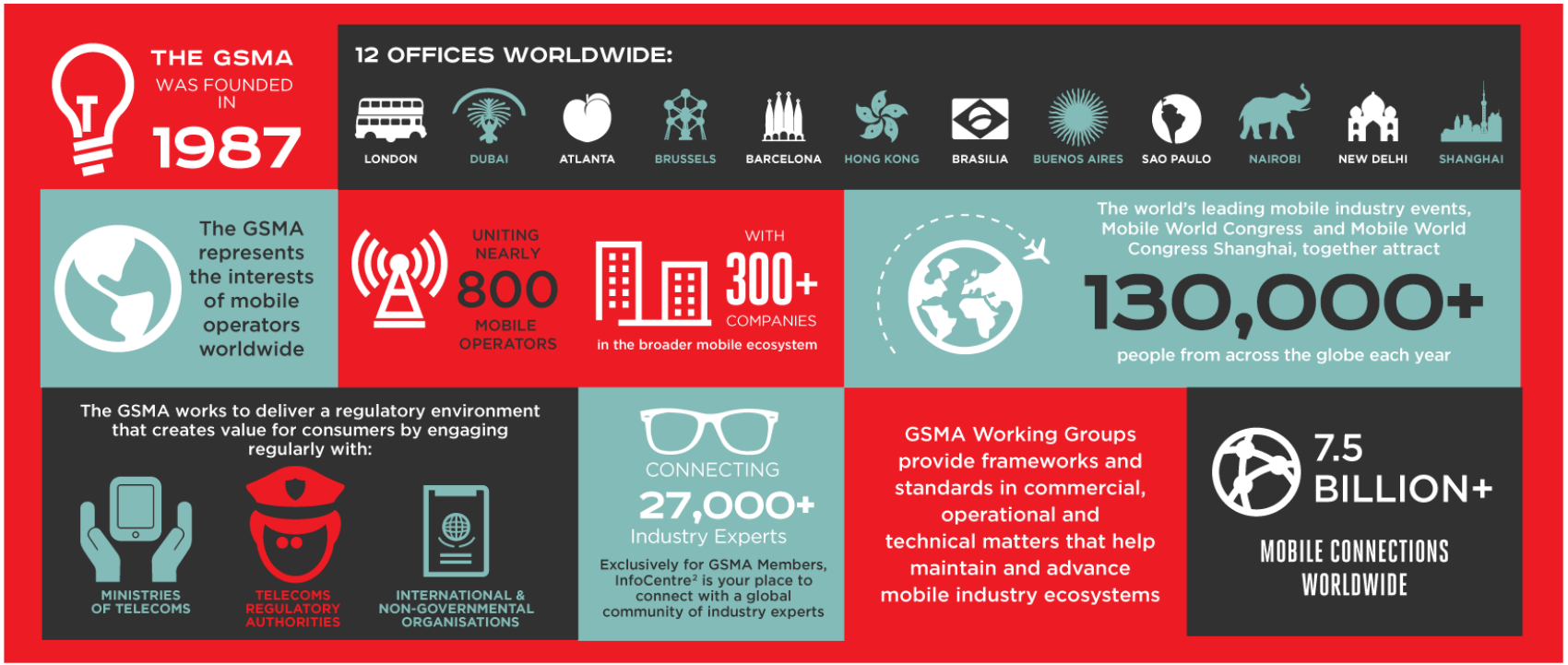
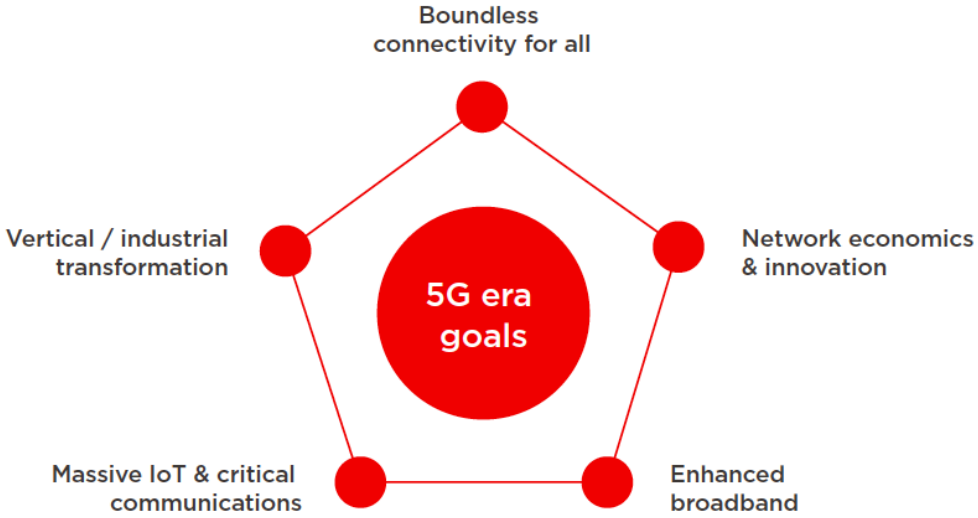
About the GSMA



Agenda

- *5G - A network of opportunity*
- *5G Spectrum – International perspective*
- *5G and WRC-19*

Five mobile industry goals with 5G

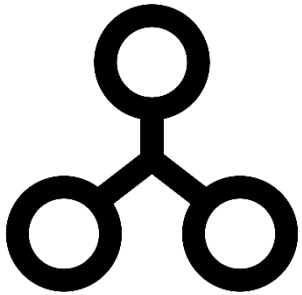


"As demand for continuous connectivity grows, 5G is an opportunity to create an agile, purpose-built network tailored to the different needs of citizens and the economy"

- Mats Granryd, Director General, GSMA

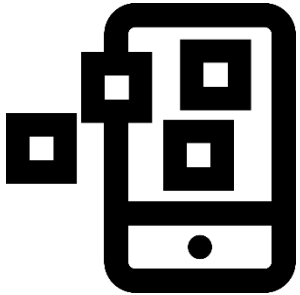
Future growth requires 5G

Cellular IoT connections



2012 – 142 million
2020 – 975 million

Mobile Data Traffic



2016 – 7.2 EB/month
2021 – 49 EB/month

5G will revolutionise key industries

MULTI-MEDIA EVERYWHERE

SMART TRANSPORT

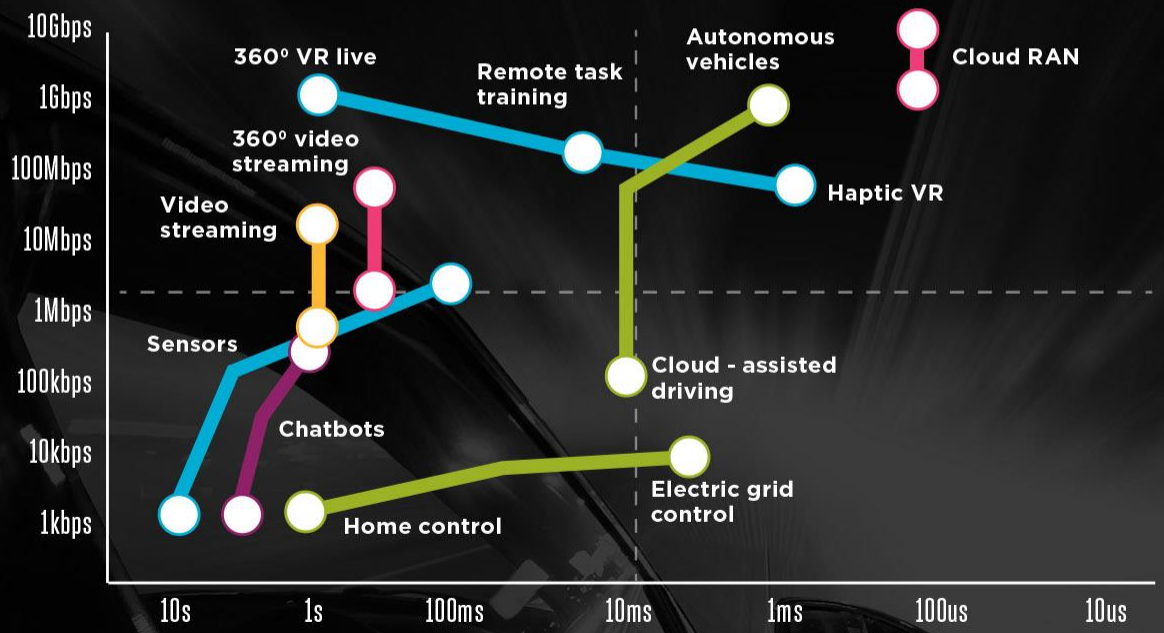
CRITICAL SERVICES

REMOTE CONTROL

AUGMENTED REALITY

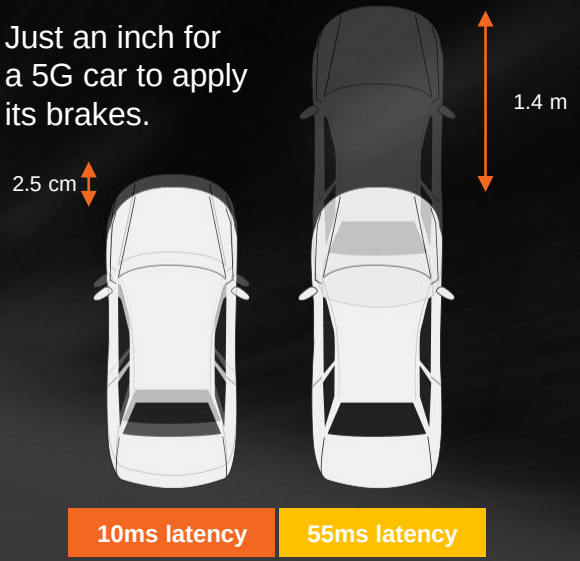
SENSORS NETWORKS

Where latency and throughput matters



REDUCED LATENCY HAS SIGNIFICANT REAL-WORLD IMPLICATIONS.

- 4.6 feet for a 4G car to apply its brakes.
- Just an inch for a 5G car to apply its brakes.



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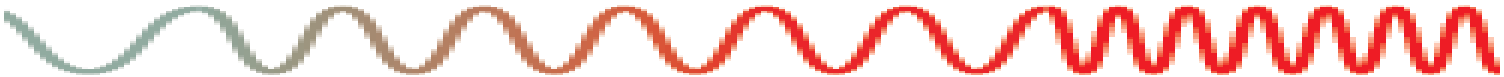
- *Spectrum for 5G – International perspective*
- *5G and WRC-19*

What spectrum bands should we use for 5G?

- Significant new widely harmonised mobile spectrum needed to ensure 5G services meet future expectations and deliver full range of potential capabilities
- 5G needs spectrum within three key frequency ranges to deliver widespread coverage and support all use cases;



Sub-1 GHz

- Will support widespread coverage across urban, suburban and rural areas and help support Internet of Things (IoT) services

1-6 GHz (incl. refarming)

- Offers a good mixture of coverage and capacity benefit
- Includes C-band which is likely to be basis of many initial 5G services

Above 6 GHz (incl. mm waves)

- Supports ultra-high broadband speeds envisioned for 5G
- Focus on above 24 GHz inc 26 GHz and/or 28 GHz bands
- Some interest in exploring bands in the 6-24 GHz range

5G spectrum regime recommendations

- **Licensed spectrum** should remain the core 5G management approach but unlicensed spectrum and other spectrum sharing have a role to play
  - Exclusive licensed spectrum provides QoS and access guarantees enabling secure long-term, heavy investment
  - Unlicensed spectrum could be used to augment licensed 5G bands
  - Higher 5G frequency ranges suit sharing as small coverage areas mean more manageable interference – potential for sharing spectrum with satellite bands (in different areas)
- **Significant potential for coexistence** of 5G and other wireless services (e.g. satellite and fixed links) in higher frequency bands (e.g. above 24 GHz)
- **Technology neutral spectrum licences** essential to allow existing mobile bands to be easily refarmed for 5G

Mobile operators are getting ready for 5G

South Korea – KT has announced it will launch commercial services in 2019

China – China Mobile plans to deploy 10,000 base stations by 2020

Japan – NTT DoCoMo has announced it will launch commercial services in 2020

Europe – in July 2016, the major operators published a 5G manifesto, which indicated a target of launching 5G in at least one city in each of the member states by 2020

US – operators have been testing and developing fixed-wireless solutions using mmW technologies, and are expected to be among the first to launch commercial services

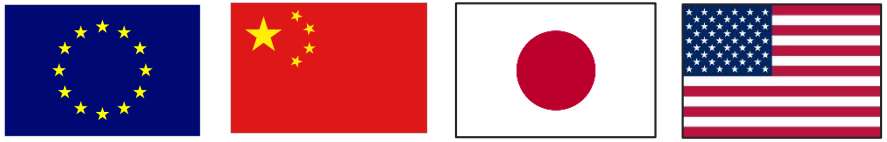
Middle East – Etisalat has indicated that it will launch a nationwide 5G network in time for Expo 2020 in the UAE

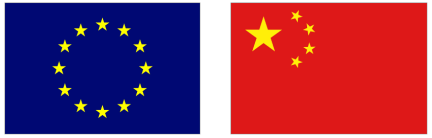
Source: GSMA Intelligence

5G spectrum – an international summary

600 MHz 

700 MHz 

C-Band 

26 GHz 

28 GHz 

It is vital that 5G spectrum bands are **widely harmonised**

- Enables the greater **economies of scale** needed for a good choice of low cost devices
- Enables roaming and facilitates **cross border coordination**
- **Avoid spectrum fragmentation** and incompatibilities between markets

Agenda

- *5G - a network of opportunity*
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Agenda Item 1.13

*"to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution **238**"*

Seven spectrum ranges

24.25-27.5 GHz
31.8-33.4 GHz
37-43.5 GHz
45.5-50.2 GHz
50.4-52.6 GHz
66-76 GHz
81-86 GHz

WRC-19 preparation paves the way for 5G

Until March 31 2017

- WP5D to provide spectrum needs and system characteristics
- SG3 WPs to provide propagation models for bands above 24 GHz
- Other WPs to provide characteristics of incumbent services

Concluded

Between March 31 2017 and CPM19-2

- ITU-R finalises studies and CPM draft
- CPM-2 meeting approves final CPM report
- Regions and administrations agree on proposals

Task Group 5/1 will help make 5G a reality

Task Group TG 5/1 has the important job of carrying out sharing studies and draft the CPM text for agenda item 1.13. AI 1.13 calls for consideration of identification of multiple frequency bands for the future development of IMT, including possible additional allocations to mobile services on a primary basis.

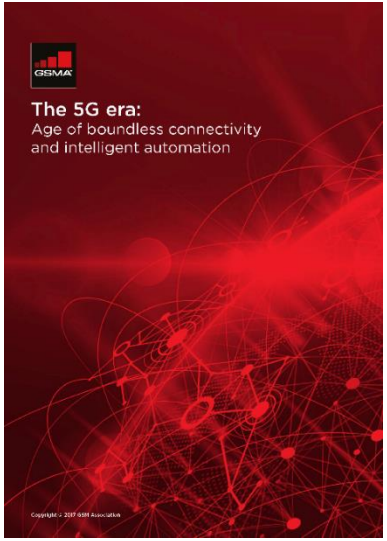
- WG 1 – CPM
- WG 2 – Bands around 30 GHz
- WG 3 – Bands around 40 / 50 GHz
- WG 4 – Bands around 70 / 80 GHz

Two meetings are planned to take place in 2017. Another three are scheduled for 2018 as the groups work to finish the draft CPM text.

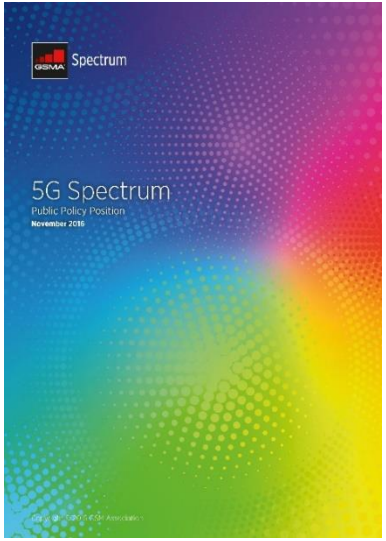
Summary – 5G in five steps

- **Significant new widely harmonised mobile spectrum is needed**
  - to ensure 5G meets future expectations
  - WRC-19 is vital for the ultra-high-speed vision for 5G
- **5G needs spectrum below 1 GHz, 1-6 GHz and above 6 GHz**
  - to deliver widespread coverage and support all use cases
- **Licensed spectrum should remain the core 5G management approach but unlicensed spectrum and other shared spectrum have a role to play**
- **Technology neutral spectrum licences are essential to enable refarming**
- **Governments should encourage investment-friendly 5G policies**
  - National broadband plans with a 5G action plan and spectrum roadmap
  - Support long-term 5G licences with a clear renewal process
  - Avoid artificially high 5G spectrum prices (inc reserve prices) which risk bands going unsold and deterring investment (which will need to be major)

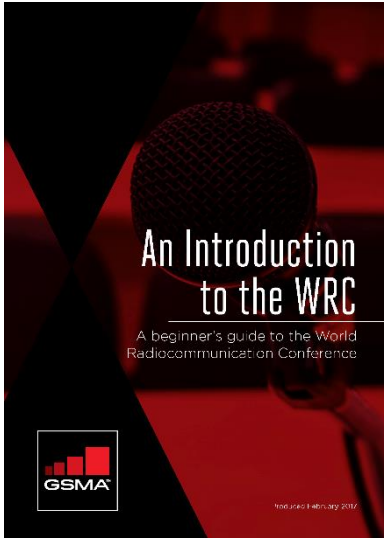
Read more about it



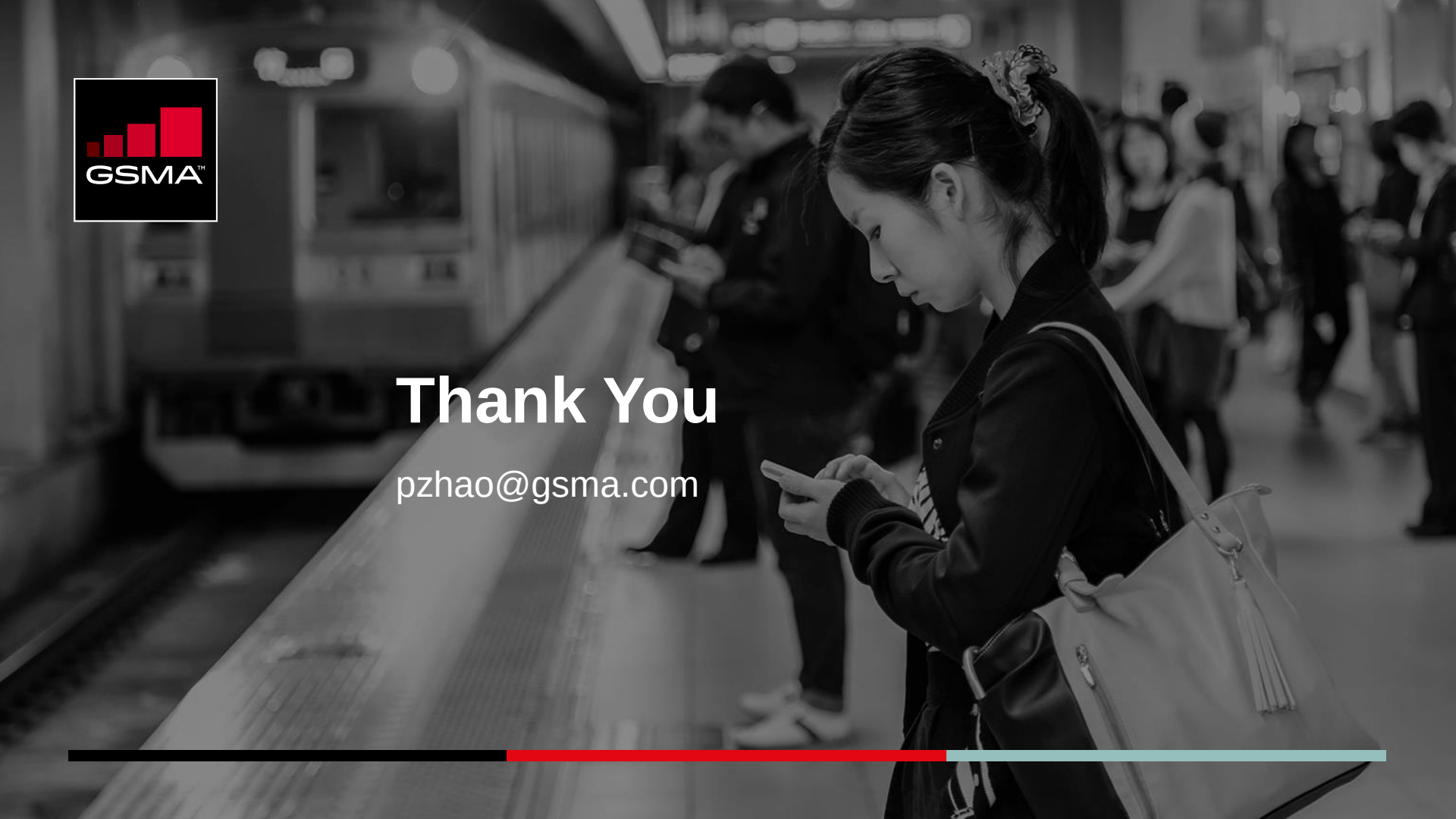
http://www.gsma.com/newsroom/press-release/new-gsma-report-sets-out-industry-vision-for-the-5g-era/



http://www.gsma.com/spectrum/5g-spectrum-policy-position/



http://www.gsma.com/spectrum/wrc-intro/



Thank You

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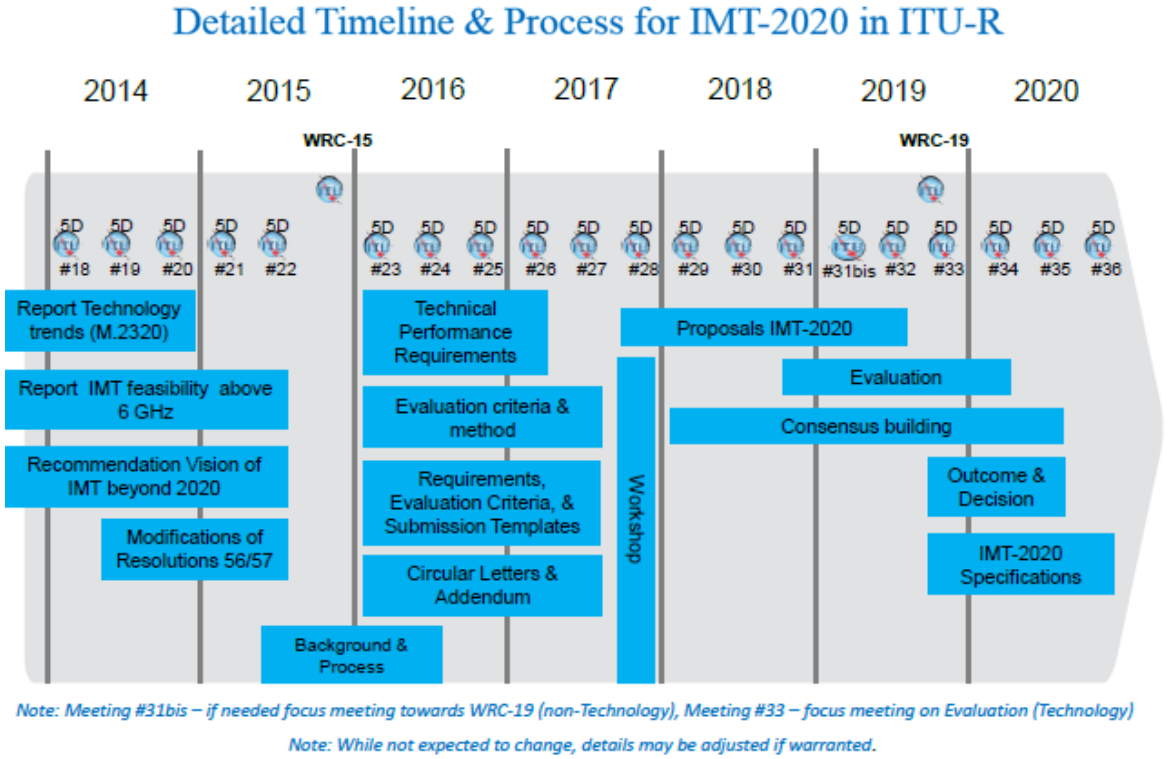
ANNEX

ITU-R WP5D - IMT 2020

ITU towards “IMT for 2020 and beyond”



- *Mobile Broadband is Not Optional in Society*
- *Technology Evolution and Additional Spectrum are a Must If the Societal Benefits are to Continue*
- *ITU has a rich history in the development of radio interface standards for mobile communications.*

https://www.itu.int/en/ITU-R/study-groups/rsg5/rwp5d/imt-2020/Pages/default.aspx

ITU-R M.2083 IMT Vision

Framework and overall objectives of the future development of IMT for 2020 and beyond