**1st ITU INTER-REGIONAL WORKSHOP ON WRC-19 PREPARATION
(Geneva, 21-22 November 2017)**

Urgent studies in preparation for WRC-19 - Narrowband and broadband machine-type communication infrastructures
**WRC-19 agenda item
9.1/9.1.8**

*Stuart Cooke
(on behalf of WP5D Chair)*

ITUWORKSHOPS

1st ITU Inter-regional Workshop on WRC-19 Preparation

21 – 22 November 2017
Geneva, Switzerland

www.itu.int/go/ITU-R/wrc-19-irwsp-17

ITUWRC
WORLD RADIOCOMMUNICATION CONFERENCE

90th Anniversary
CCIR - ITU-R Study Groups
(1927-2017)

Organized by:
ITU

RESOLUTION 958 (WRC-15)

Urgent studies required in preparation for the 2019 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 2015),

considering

a) that the agenda of this conference included consideration of items for the agenda for the 2019 World Radiocommunication Conference (WRC-19);

b) b) that the agenda of this conference included consideration of items for the preliminary agenda for the 2023 World Radiocommunication Conference (WRC-23);

c) c) that items for the agenda for WRC-19 have been identified in Resolution 809 (WRC-15); d) that items for the preliminary agenda for WRC-23 have been identified in Resolution 810 (WRC-15),

resolves

to complete studies on the topics identified in this Resolution and its annex,

invites ITU-R

as a matter of urgency, to complete the studies called for in this Resolution,

instructs the Director of the Radiocommunication Bureau

to report on these studies under agenda item 9.1 of WRC-19, as appropriate, based on the results of studies.

WRC-19 agenda item 9.1/9.1.8
Resolution 958 (WRC-15) - Urgent studies required in preparation for WRC-19 - narrowband and broadband machine-type communication infrastructures

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ANNEX TO RESOLUTION 958 (WRC-15)

Urgent studies required in preparation for the 2019 World Radiocommunication Conference

1. Studies concerning Wireless Power Transmission (WPT) for electric vehicles…….

2. Studies to examine….

3. Studies on the technical and operational aspects of radio networks and systems, as well as spectrum needed, including possible harmonized use of spectrum to support the implementation of narrowband and broadband machine-type communication infrastructures, in order to develop Recommendations, Reports and/or Handbooks, as appropriate, and to take appropriate actions within the ITU Radiocommunication Sector (ITU-R) scope of work.

WRC-19 agenda item 9.1/9.1.8
**Resolution 958 (WRC-15) - Urgent studies required in preparation for WRC-19 -
narrowband and broadband machine-type communication infrastructures**

Responsible group
ITU-R WP 5D (IMT Systems).

Other relevant groups
ITU-R WP 5A https://www.itu.int/dms_pub/itu-r/md/15/wp5a/c/R15-WP5A-C-0469!N36!MSW-E.docx
ITU-R WP 5C
ITU-R WP 1B https://www.itu.int/dms_ties/itu-r/md/15/wp1b/c/R15-WP1B-C-0193!N10!MSW-E.docx

Deliverable
ITU-R WP5D. Working document towards a preliminary draft new report ITU-R M.[MTC*] ''The
use of the terrestrial component of International Mobile Telecommunication (IMT) for
narrowband and broadband machine-type communication" https://www.itu.int/md/R15-WP5D-
C-0758/en chapter 3 of meeting report of working group general aspects attachment 3.1

Timing
Finalise PDNR ITU-R M.[IMT.MTC] and send to Study Group 5 for consideration by 30th June 2018.

Definition
*MTC is also known as machine-to-machine (M2M) or Internet of Things (IoT), and these terms
are used interchangeably in this text.

IMT MTC Standards & Use Case Examples

(The following material has been included by the moderator to help illustrate IMT.MTC)
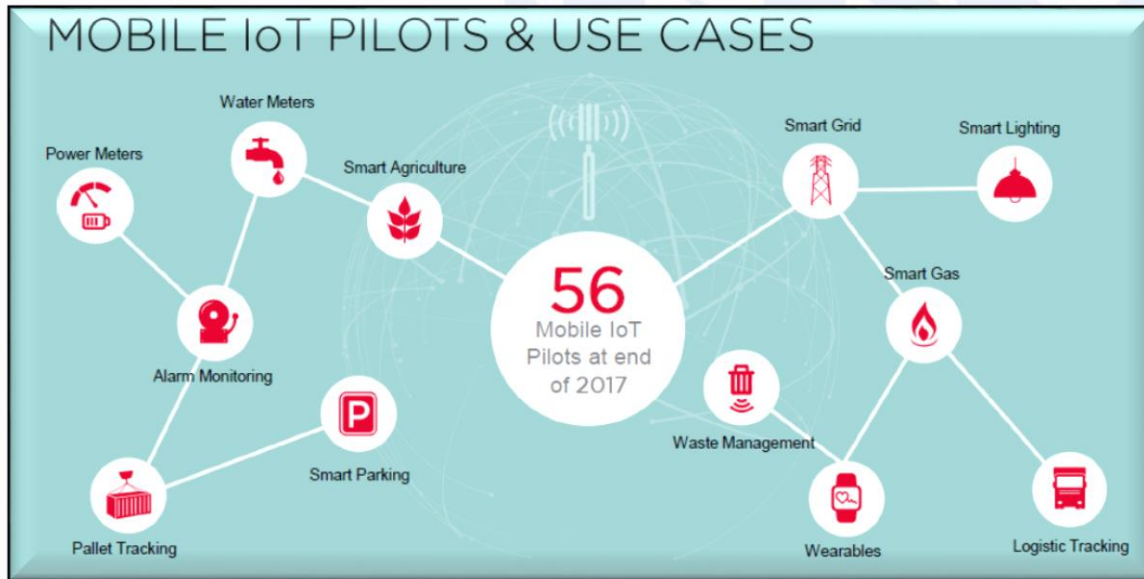
Standards

Source; GSMA

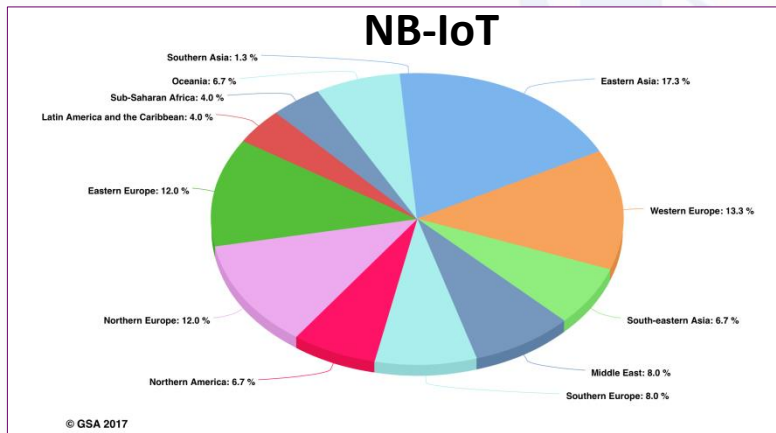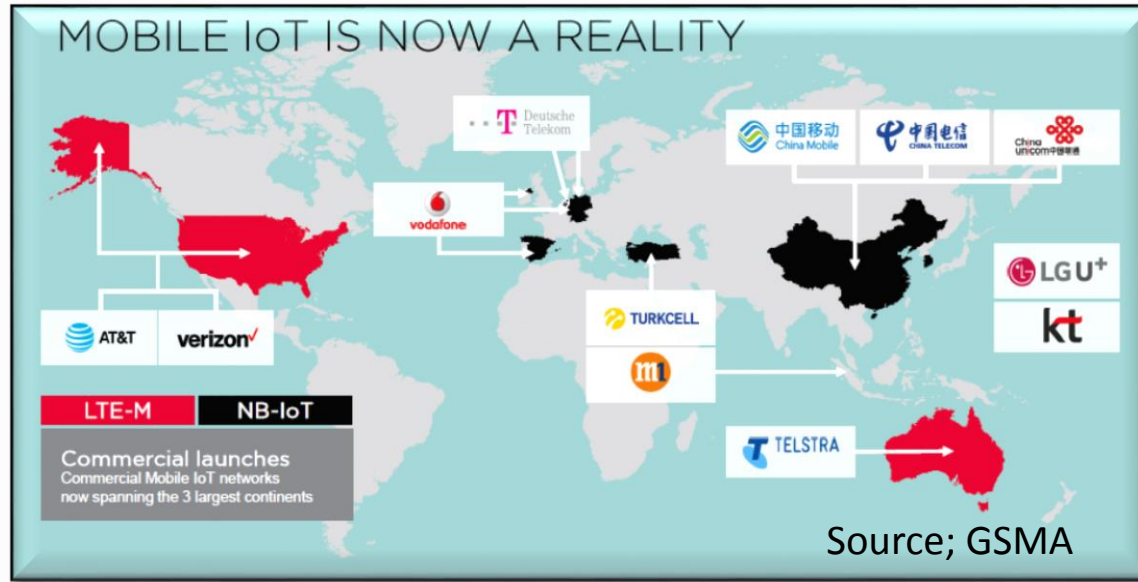## Use Cases Examples

Source; GSMA

IMT MTC Frequency Bands
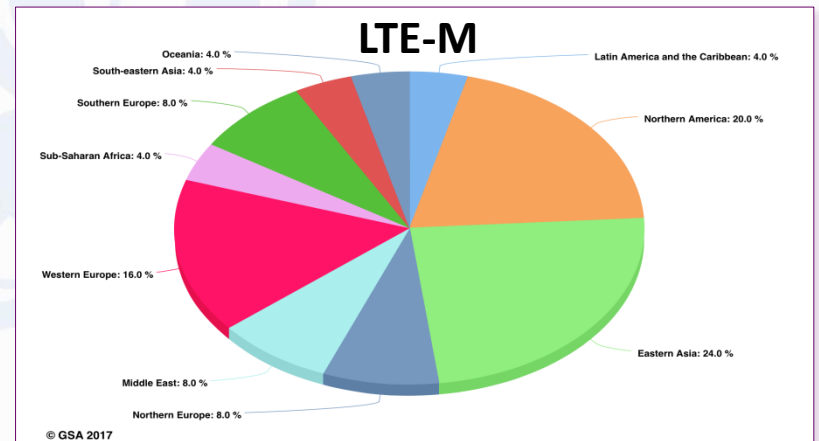## (The following material has been included by the moderator to help illustrate IMT.MTC)

	LTE M	NB-IoT	EC-GSM-IoT
Deployment	In-band LTE	In-band & Guard-band LTE, standalone	In-band GSM
Freq Bands (3GPP Nomenclature)	LTE bands 1, 2, 3, 5, 7, 8, 11,12, 13, 17, 18, 19, 20, 21, 26, 27, 28, 31(HD/FD – FDD) 39, 41 (TDD)	LTE bands 1, 2, 3, 5, 8, 12, 13, 17, 18, 19, 20, 26, 28, 66	Available for all GSM bands
Bandwidth	1.08 MHz	180 KHz	200kHz per channel. Typical system bandwidth of 2.4MHz [smaller bandwidth down to 600 kHz being studied within Rel-13]
Duplexing	FD & HD (type B), FDD & TDD	HD (type B), FDD	HD, FDD
Coverage	155.7 dB (23 dBm power class)	164 dB for standalone (23 dBm power class)	164 dB, with 33dBm power class 154 dB, with 23dBm power class

IMT MTC Commercial Networks

(The following material has been included by the moderator to help illustrate IMT.MTC)

MOBILE IoT IS NOW A REALITY

LTE-M   NB-IoT

Commercial launches
Commercial Mobile IoT networks
now spanning the 3 largest continents

Source; GSMA

NB-IoT

Southern Asia: 1.3 %
Oceania: 6.7 %
Sub-Saharan Africa: 4.0 %
Latin America and the Caribbean: 4.0 %
Eastern Europe: 12.0 %
Northern Europe: 12.0 %
Northern America: 6.7 %
Eastern Asia: 17.3 %
Western Europe: 13.3 %
South-eastern Asia: 6.7 %
Middle East: 8.0 %
Southern Europe: 8.0 %
© GSA 2017

Source; GSA

LTE-M

Oceania: 4.0 %
South-eastern Asia: 4.0 %
Southern Europe: 8.0 %
Sub-Saharan Africa: 4.0 %
Western Europe: 16.0 %
Middle East: 8.0 %
Northern Europe: 8.0 %
Latin America and the Caribbean: 4.0 %
Northern America: 20.0 %
Eastern Asia: 24.0 %
© GSA 2017

- **75 operators** investing in NB-IoT
- **18 networks** launched in 15 countries
- **26 trials** in 22 countries

- **25 operators** investing in LTE-M / Cat-M1
- **5 networks** launched in 4 countries
- **8 trials** in 7 countries

IMT MTC Devices & Examples

(The following material has been included by the moderator to help illustrate IMT.MTC)

59 IMT MTC devices identified

Source; GSA
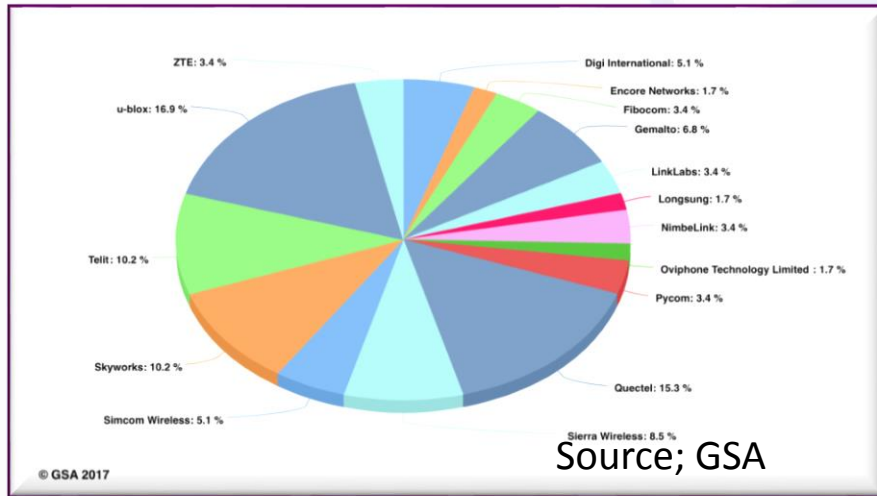
Smart Cows
pH & Temp bolus
IMT MTC
Productivity increases
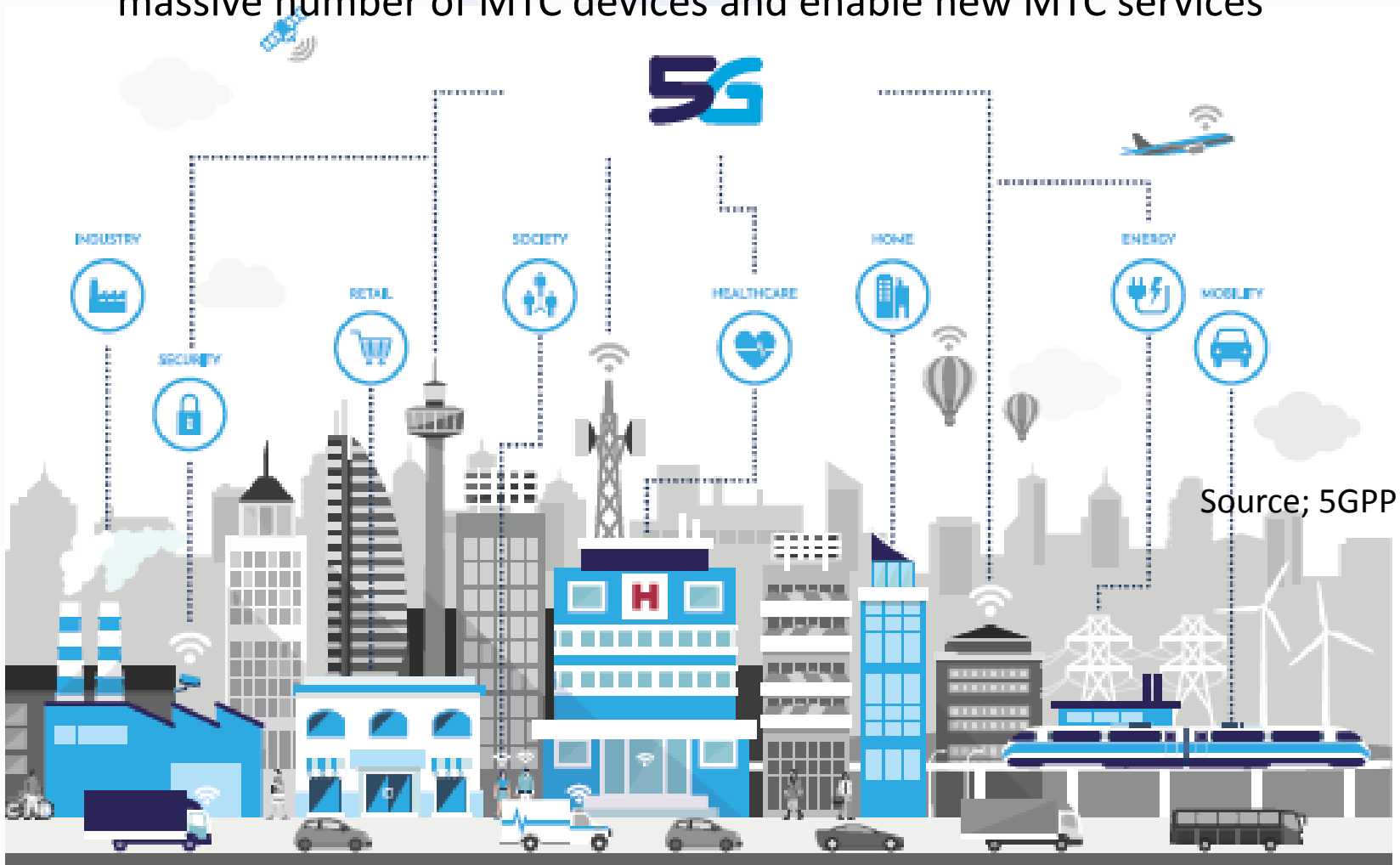& emission reductions

Smart Water
Water usage & leakage
IMT MTC
Productivity increases & water conservation

IMT-2020 features of low latency & high bandwidths provide support for a massive number of MTC devices and enable new MTC services

Source; 5GPP

Issues for discussion

(These have been developed by the moderator to help facilitate a discussion)

a) Is there a problem we are trying to solve ?
To help create the regulatory environment to enable a global ecosystem for IMT.MTC chipsets, devices and infrastructures?

b) Are current IMT harmonised frequency arrangements sufficient?
Are the current harmonised frequency bands and arrangements for IMT sufficient or do we need additional specific harmonised arrangements for narrowband and broadband IMT.MTC?

c) Are any changes to the Radio Regulations needed ?
The latest ITU-R WP5D Working document towards a preliminary draft new report ITU-R M.[MTC] indicates that no change to the Radio Regulations is required