



## ITU Workshop on Spectrum Management for Internet of Things Deployment (Geneva, 22 November 2016)

# Brazilian and Colombian Perspectives for IoT Network Slices

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ITU WORKSHOP ON SPECTRUM  
MANAGEMENT FOR INTERNET  
OF THINGS DEPLOYMENT

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[www.itu.int/go/ITU-R/RSG1SG5-IoT-16](http://www.itu.int/go/ITU-R/RSG1SG5-IoT-16)

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# M2M Chamber - Brazil



- The Ministry of Science, Technology, Innovation and Communications has created in October 2014, the Chamber of Management and Monitoring of the Machine Type Communication Systems Development.
- The main two objectives of this Chamber are:
  - Monitoring the growth of the Internet of Things in Brazil and encourage its development.
  - Monitoring the impact of tax reduction on machine-to-machine communication (Installation Inspection Fee and Operation Inspection Fee).
- The M2M Chamber is a multisector body, composed of government officials, academia and associations, representing different market sectors.
- This Chamber is being developed together with the Public Policies studies for future 5G implementation.



# Spectrum policy in Colombia



Spectrum policy objective:

To promote the optimal use of Spectrum, in order to maximize the benefit to the Colombian society and to ensure the availability of this resource for all the radiocommunications services.

Equitable  
access

Efficient use

Tech  
neutrality

Promotion of  
competition

Innovative spectrum  
management

Transparency

ANE was created in 2009 to plan, allocate, monitor and control the Spectrum in Colombia. It is a technical entity that advises the ICT Ministry about the efficient use of this the Spectrum and promotes the knowledge about it.

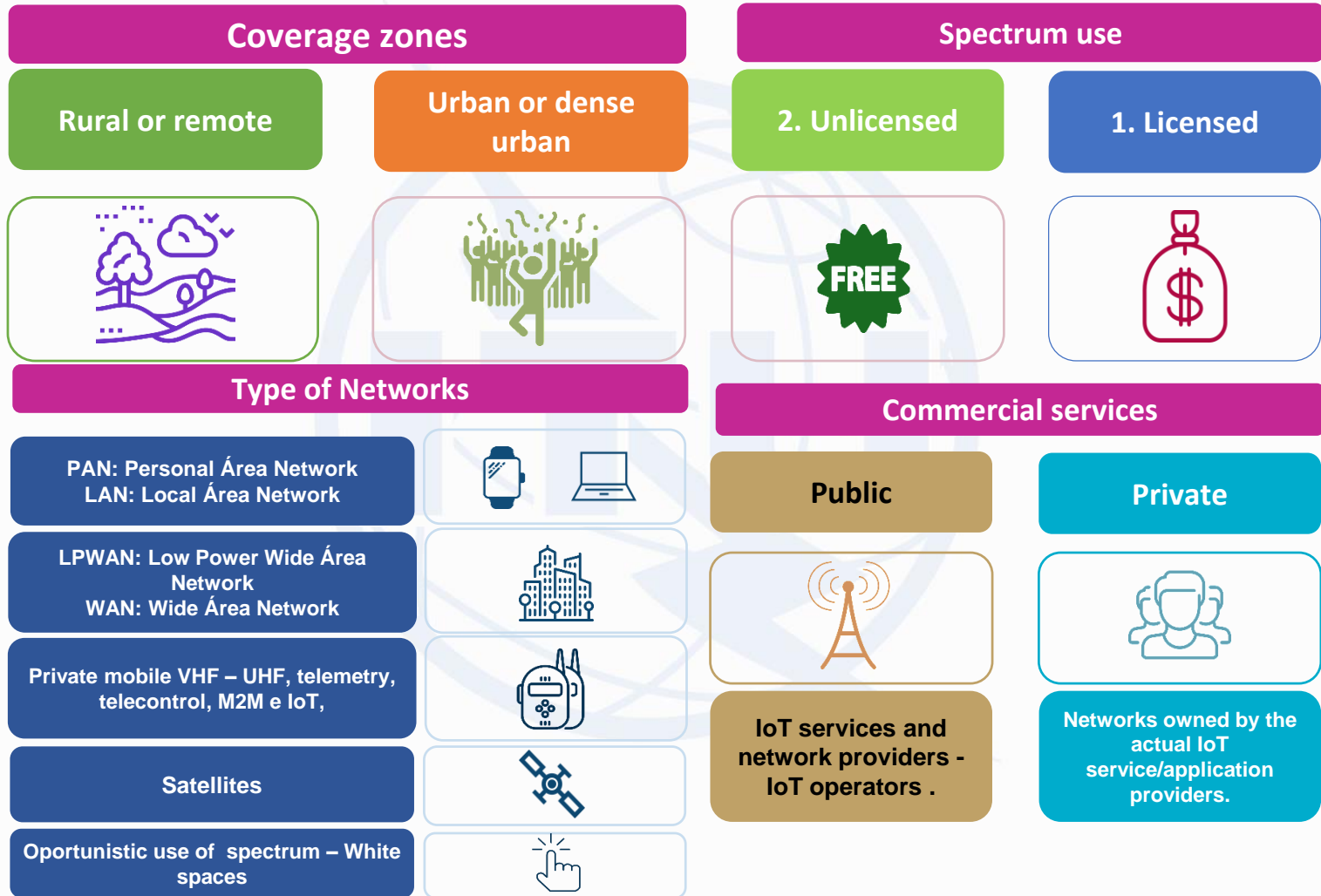


# General view's

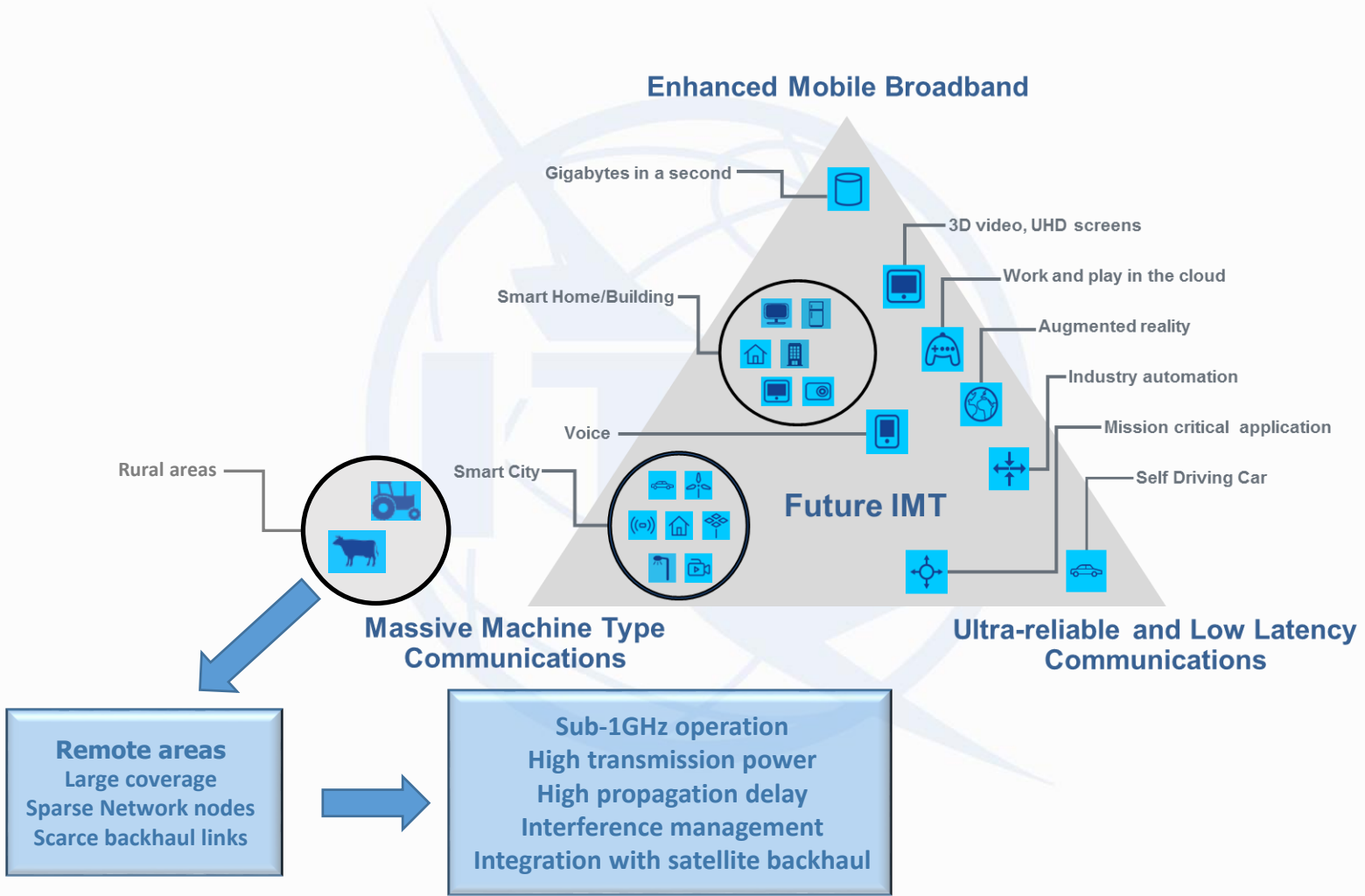


- All current frequency bands and the future ones identified to International Mobile Telecommunication (IMT) could be used by IoT and M2M systems, as well as, non IMT bands.
- IMT is a mobile service and IoT or M2M are applications that can be one or more slices in the IMT-2020 networks.
- Other networks, can be implemented having IoT as an application or using specific wireless technology mainly targetted for M2M and IoT, in different frequency bands (e.g. LoRa – IEEE 802.15.4g), for example unlicensed bands.

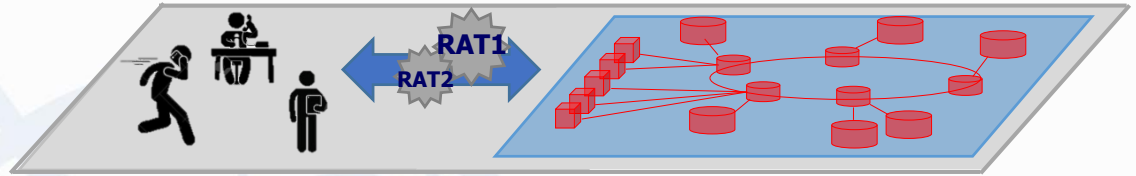
# IoT usage cases



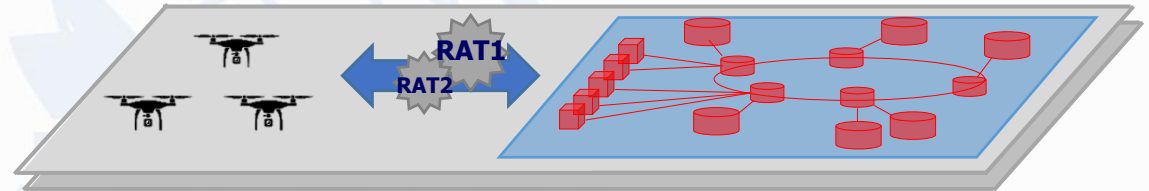
# IoT supported on IMT



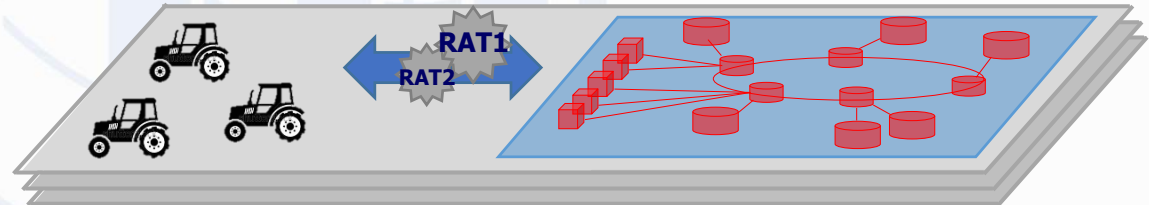
**5G Slice 1**  
**(Mobile broadband access)**



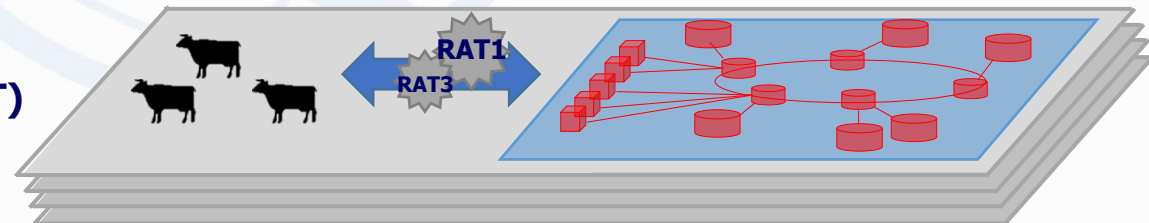
**5G Slice 2**  
**(High resolution mobile video )**



**5G Slice 3**  
**(Real time data, voice and video)**



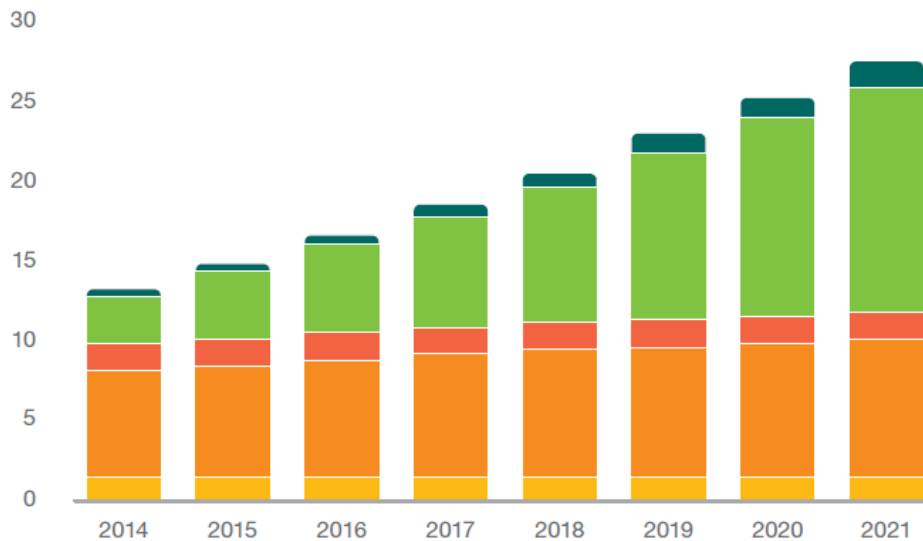
**5G Slice 4**  
**(very low data rate, low mobility IoT)**



Source: Intel presentation in 2nd Global 5G PPP meeting

## IoT connected devices will drive the growth of connections.

Connected devices (billions)



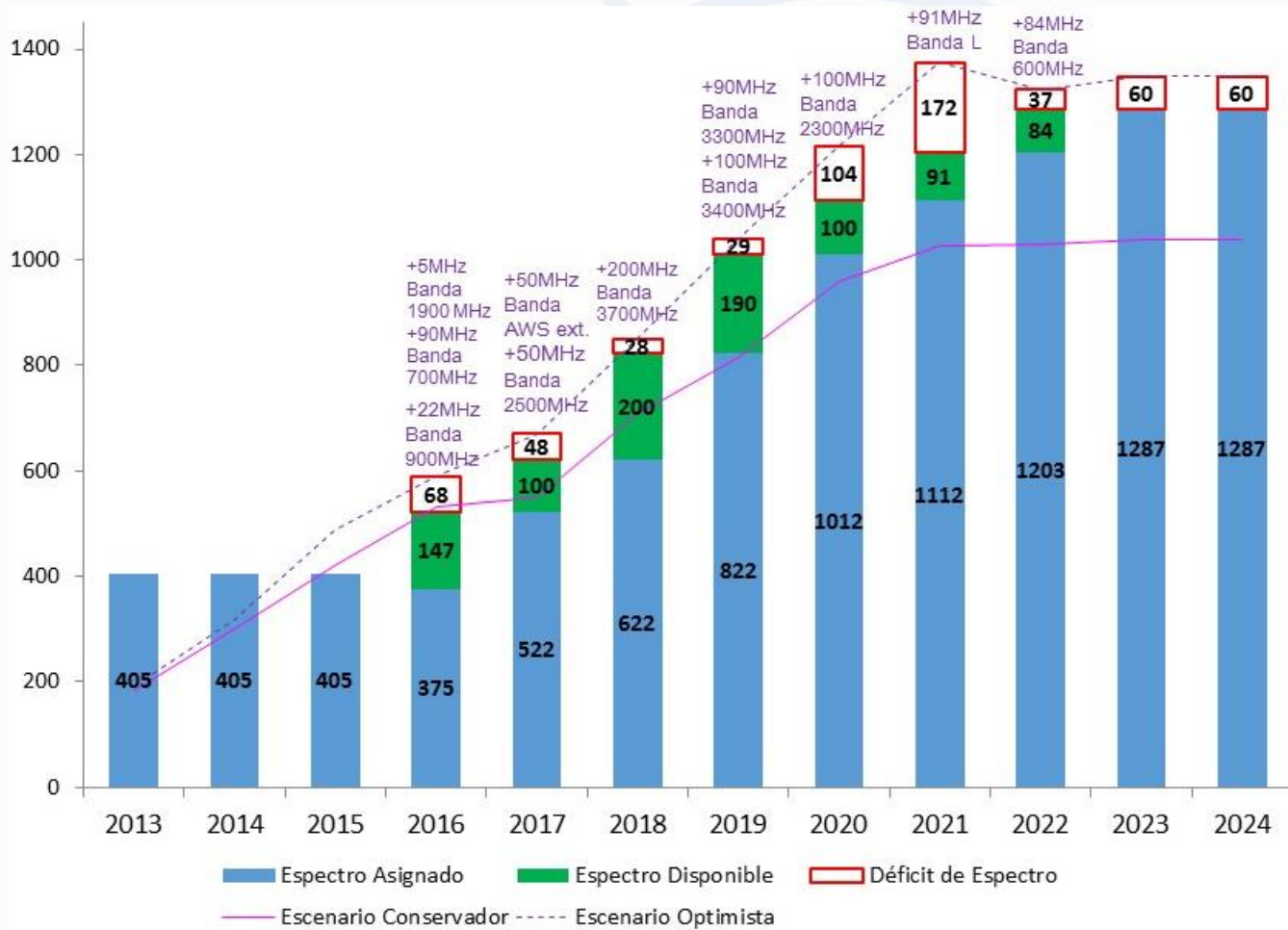
	15 billion	28 billion	CAGR 2015–2021
Cellular IoT	0.4	1.5	27%
Non-cellular IoT	4.2	14.2	22%
PC/laptop/tablet	1.7	1.8	1%
Mobile phones	7.1	8.6	3%
Fixed phones	1.3	1.4	0%

Fuente: Ericsson mobility report 2016.  
<https://www.ericsson.com/res/docs/2016/ericsson-mobility-report-2016.pdf>



# 1. Licensed IMT

## Planning to support growth in connections



Technical and administrative actions oriented to make available IMT spectrum according with the market growth and spectrum needs projections, looking for the best cost-benefit relation for the society.

➤ **ANE resolution 711 of October 2016 established the administrative and technical conditions for the usage of unlicensed spectrum.**

- **Identification of needs**

**Preliminary consultation to interested parties.**

- **Benchmark**
- **Validation: Public consultation.**



**Analysis of more of 50 GHz, bands proposal, applications, impact analysis on current spectrum usage and assignments**

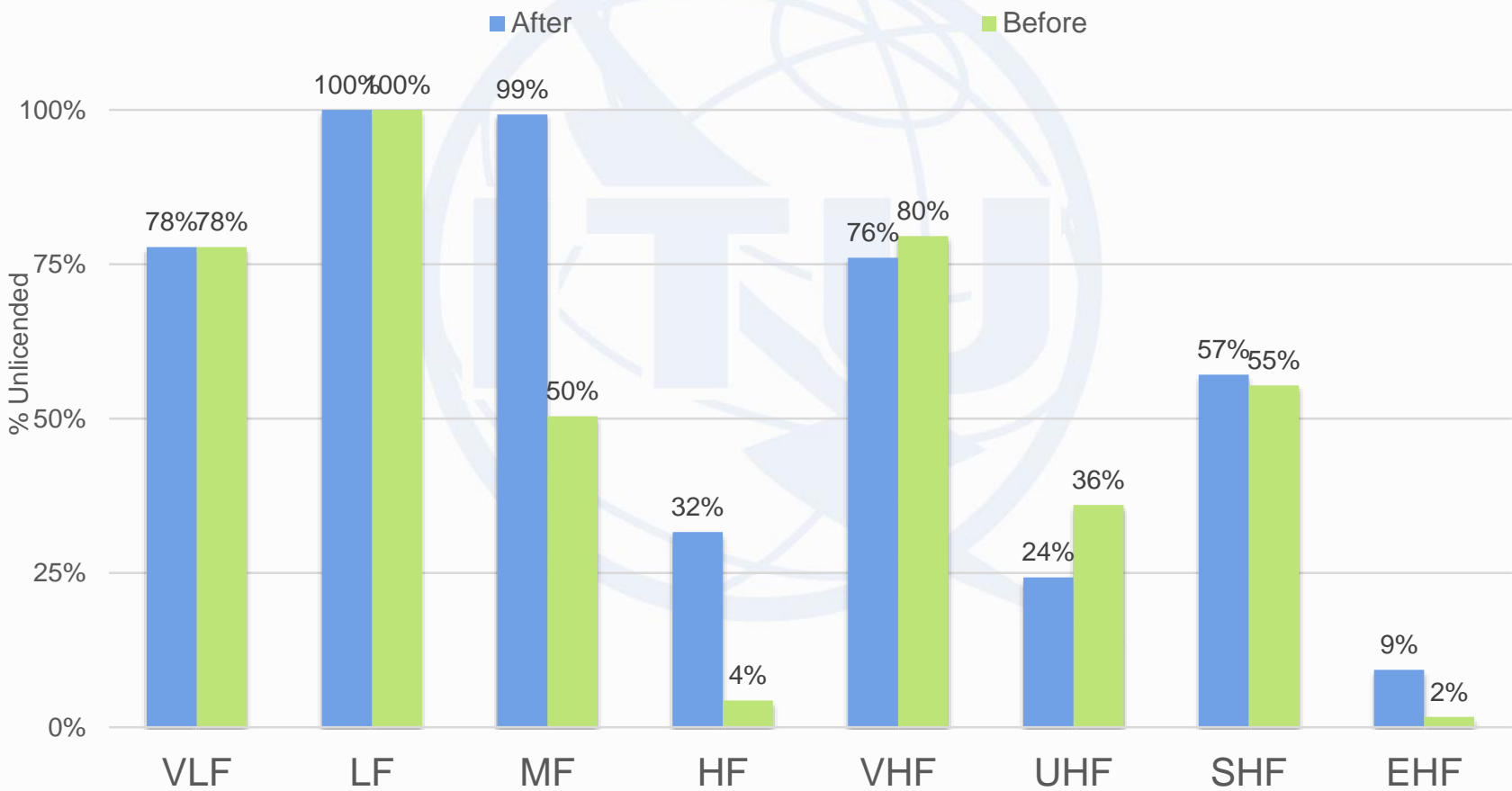
**40 GHz**

**To unlicensed use**

**Unlicensed spectrum will allow the development of new ecosystems and applications for IoT and other trends**

# 2. Unlicensed spectrum

## Current % of available unlicensed spectrum



# Conclusions

- Even though, the M2M applications are under studies in Brazil, Brazil is already the 3<sup>rd</sup> largest M2M market in the world.<sup>1</sup>
- It is being developed LTE technologies in 250 MHz<sup>2</sup> band by a Brazilian R&D Company (CPqD) mainly for rural areas applications.
- Depending on the IoT application, different frequency bands may be more suitable, for example, 250 MHz, 450 MHz, 700 MHz, 900 MHz etc. Nevertheless, no specific frequency bands should be identified for this application.
- Colombia is committed to ensure the spectrum availability for IoT and M2M applications.
- Even when the plans for spectrum availability are already proposed (for both unlicensed and licensed bands), ANE is looking for continue working with manufacturers, academy, operators and other administrations to promote the development of IoT.

<sup>1</sup>: <http://blog.futurecom.com.br/brasil-e-o-terceiro-maior-mercado-de-conexoes-m2m-moveis-do-mundo/>

<sup>2</sup>: to avoid high levels of man-made noise, the higher portion of VHF and the lower portion UHF is suitable, as it is described in ITU-R Report M.2224.



# ***Thank you very much!***

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