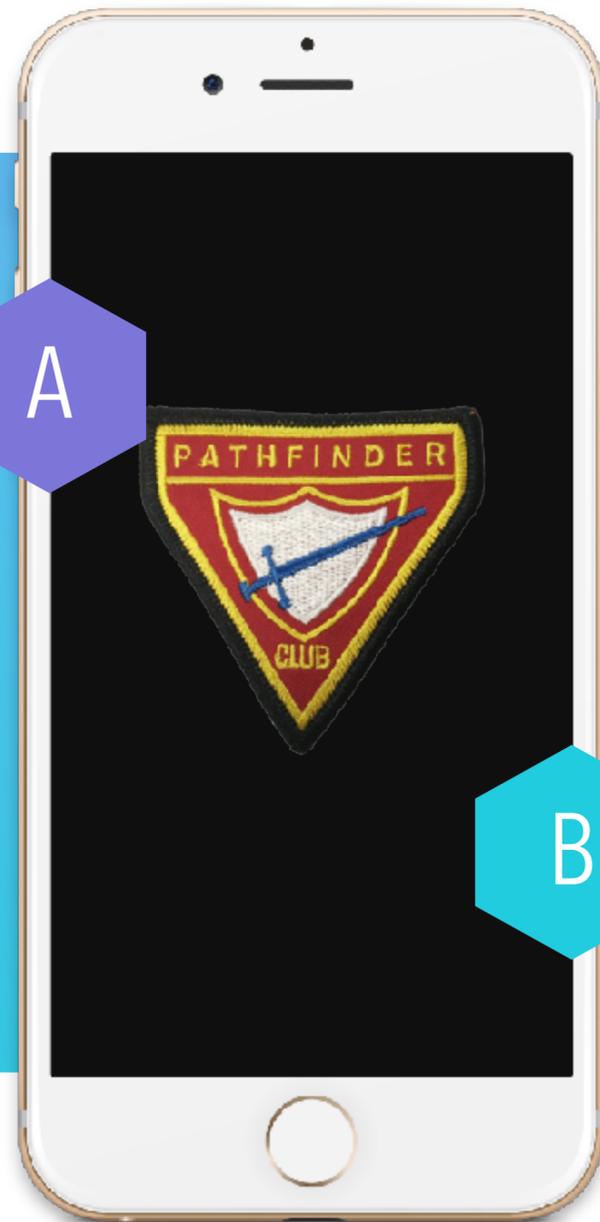




# MOBILE TECHNOLOGY

Pathfinder Honour as per the curriculum outlined on [www.pathfindersonline.org/honors/vocational/607-mobile-technology](http://www.pathfindersonline.org/honors/vocational/607-mobile-technology)



An overview of Mobile communications, Cell Phone Technology & practical use.



Presented by Daryl Gungadoo

ADVENTIST  
**REVIEW**  
MINISTRIES



# MOBILE TECHNOLOGY

1. **What** is a mobile device? (4 examples)
2. Draw a diagram showing how mobile technology uses **cell sites** (show Coverage, Density, Location tracking, Call hand-off)
3. **Safety** precautions concerning the use of a mobile device.
4. Create a list of **different types** of mobile devices. (discuss advantages and disadvantages of each mobile device listed).
5. With a group, discuss ways in which mobile technology can be used to **benefit society** and industry such as: Business, Personal Recreation, Safety and Protection, Education, Health Care, Transportation, Homework
6. Describe the following types of cell sites: **Camouflage, Off-grid System, Temporary Setup**
7. Illustrate through drawings, sketches, or photographs a **cell tower**. Be able to identify a cell tower in an open area.
8. Create a speech, presentation, video, or game that illustrates what you have learned about mobile technology while earning this honour.
9. Discuss with a group some of the ways in which mobile technology can be integrated into **ministry to share the gospel** throughout the world. (also answers 4b)
10. Discuss with a group how mobile technology can be used to **enhance** the following aspects of your **spiritual life**: Devotionals, Inspirational songs, Prayer reminder, Join worship services, Share inspirational messages
11. Discuss with a group how the following Bible passages apply to the use of mobile technology: Matthew 24:14, 1 Corinthians 6:12
12. Evaluate how being a Christian should affect your use of mobile technology.
13. Do the following individually or with a group:
  - Create a temporary contact list of your friends. Gain permission to send them a daily text message. At a selected time each day, share an inspirational text with those on the contact list for a minimum of one week. Respect any requests to be removed from the list.
  - Over a period of 3 services, evaluate when people use their devices during a worship service, and for what purposes.

Pathfinder Honour as per the curriculum outlined on: [www.pathfindersonline.org/honors/vocational/607-mobile-technology](http://www.pathfindersonline.org/honors/vocational/607-mobile-technology)



# 1&4) WHAT IS A MOBILE DEVICE ?



Mobile Computer



Wearable Computer



Mobile Phone



MP3 Player



Digital Camera



Personal Navigation



Pager



# 1) WHAT IS A MOBILE DEVICE ?





**1 Newspapers**

**2 High quality camera**  
(for photography)

**3 Video camera**

**4 Cookery book**

**5 English dictionary**

**6 Foreign phrasebook**

**7 Portable games console**

**8 Digital weighing scales\***

**9 Colouring book\***

**10 TV remote\***

**11 Novel\***

**12 Diary**

**13 Notebook**

**14 Address book**

**15 Train/bus timetables**

**16 Tape measure**

**17 Playing cards**

\*Features you may have  
to pay extra to download



**18 Calculator**

**19 Ruler**

**20 Debit cards**

**21 Cheque book**

**22 Pen**

**23 Alarm clock**

**24 Watch**

**25 Crayons**

**26 CDs\***

**27 DVDs\***

**28 Compact mirror**

**29 Polaroid camera**

**30 Telephone**

**31 OS route maps\***

**32 World atlas**



**33 Takeaway menus**

**34 Photo album**

**35 MP3 player (iPod)**

**36 Fitness tracker**

**37 Compass**

**38 Stop watch**

**39 Torch**

**40 Clock**

**41 Television\***

**42 Board games\***

**43 Encyclopaedia**

**44 Road map**

**45 Spirit level\***

**46 Portable speaker**

**47 Magazines\***

**48 Holiday brochures**

**49 Lifestyle book\***

**50 Satnav**



Combined  
weight:  
**75lb**



# MOBILE GENERATIONS (1G TO 4G)

1st Car phone  
40kg



1956





# MOBILE GENERATIONS (1G TO 4G)

1st Public Mobile Phone Call

Dr Martin Cooper general manager at Motorola

1.1 Kg



1973





# MOBILE GENERATIONS (1G TO 4G)

Technical specs for **GSM** Standards: it focused on interoperability across national boundaries and consequent different frequency bands, call quality and low costs.

# 1987





# MOBILE GENERATIONS (1G TO 4G)

1st SMS sent  
"Merry Christmas"



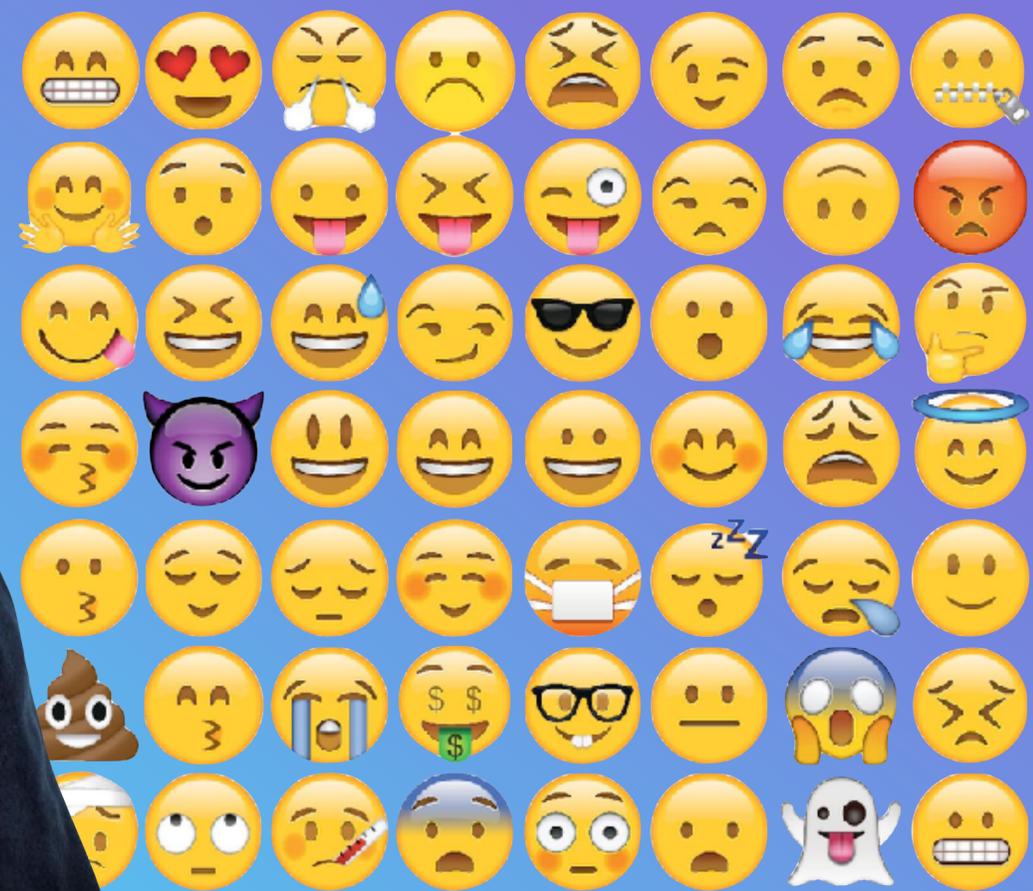
1992





# MOBILE GENERATIONS (1G TO 4G)

Emojis invented by  
Shigetaka Kurita in Japan



1999





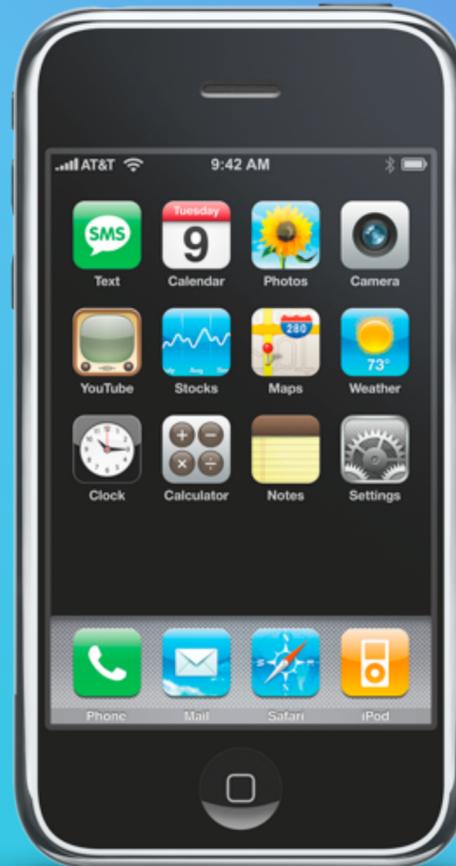
# MOBILE GENERATIONS (1G TO 4G)



**1G**  
Analog  
from 1979



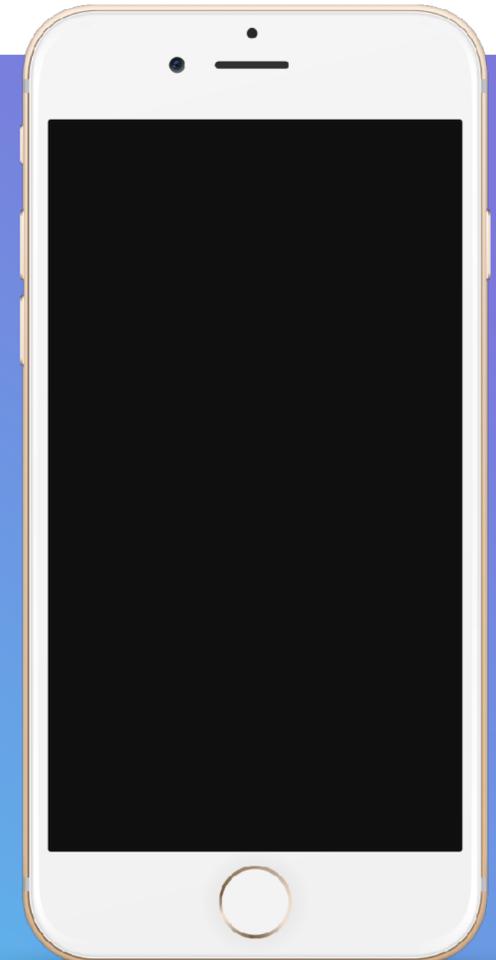
**2G**  
Digital (GSM)  
from 1991 MMS  
50 kbps



**2.5G**  
Digital (GPRS/Edge)  
from 1995  
0.1 - 0.3 Mbps



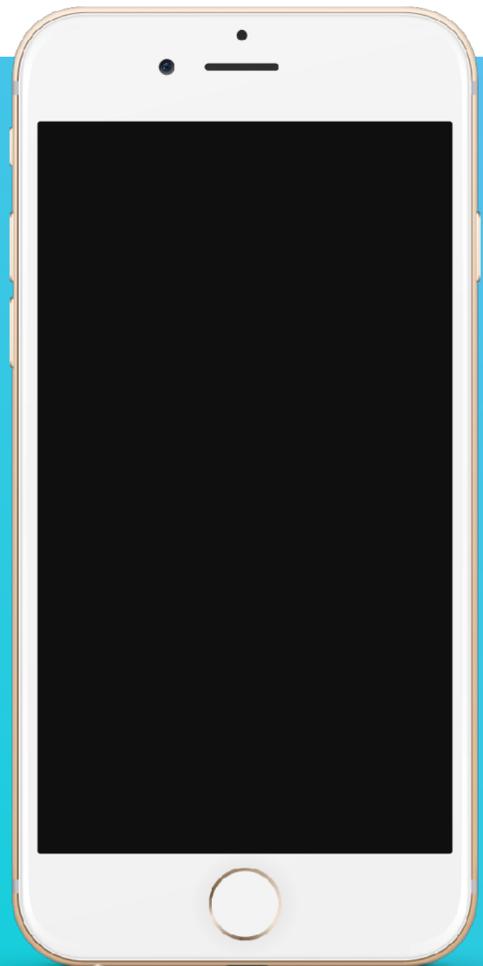
**3G**  
Digital (HSDPA)  
from 1998  
0.3 - 42 Mbps



**4G**  
Digital (LTE)  
from 2008  
150 - 600 Mbps



# MOBILE GENERATIONS (5G+)



**3G**  
Digital (HSDPA)  
from 1998  
0.3 - 42 Mbps

**4G**  
+Speed (LTE/MIMO)  
from 2008  
150 - 900 Mbps  
2 to 2.5 Ghz

**5G**  
Digital (eMBB/URLLC/MMTC)  
from 2020  
1,000-10,000 Mbps  
Up to 95 Ghz

**6G**  
+Satellite  
from 2030  
1,000-10,000 Mbps  
100+ Ghz



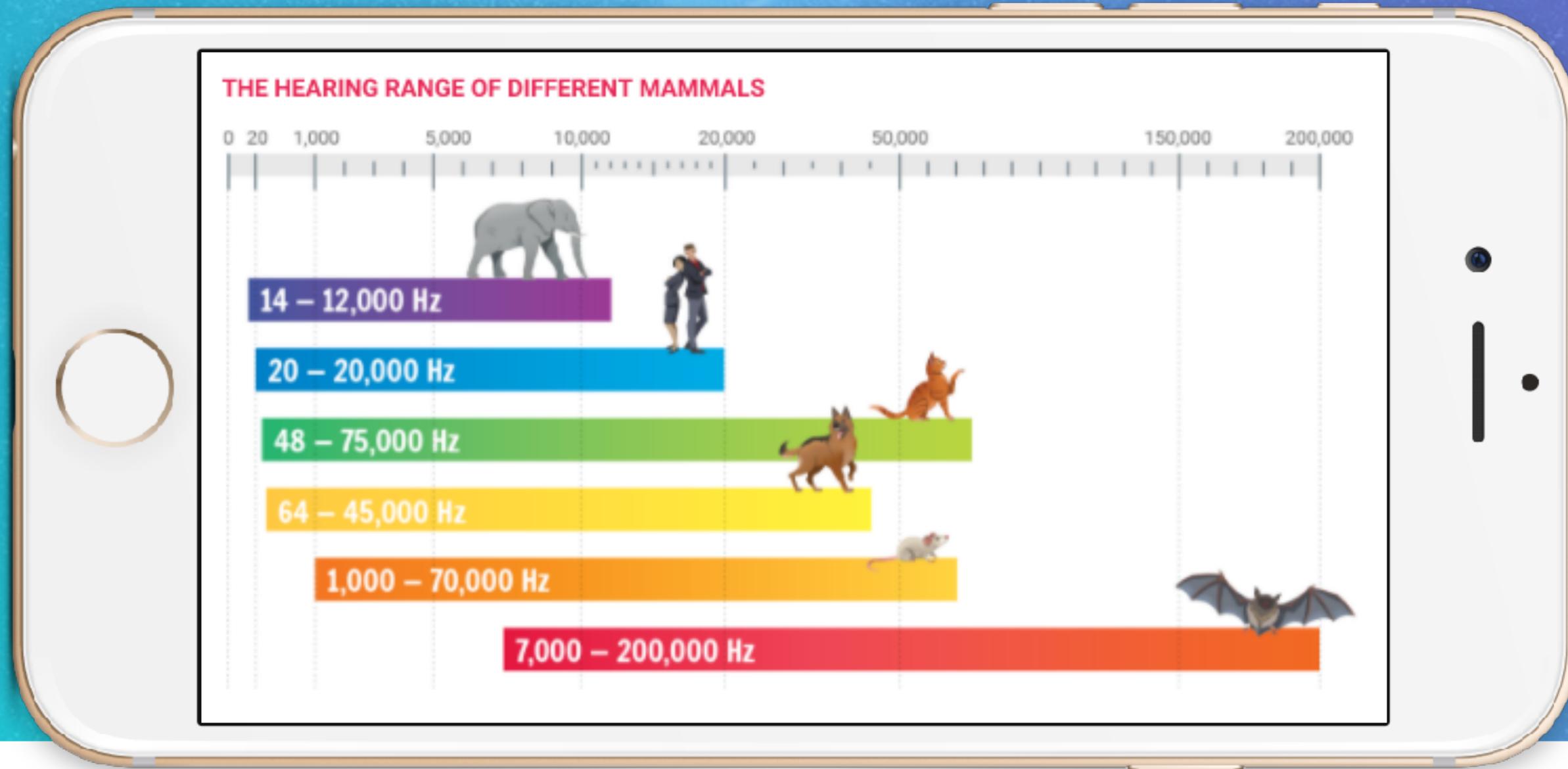
2) HOW DOES IT WORK ?

RAIDIO

FREQUENCY



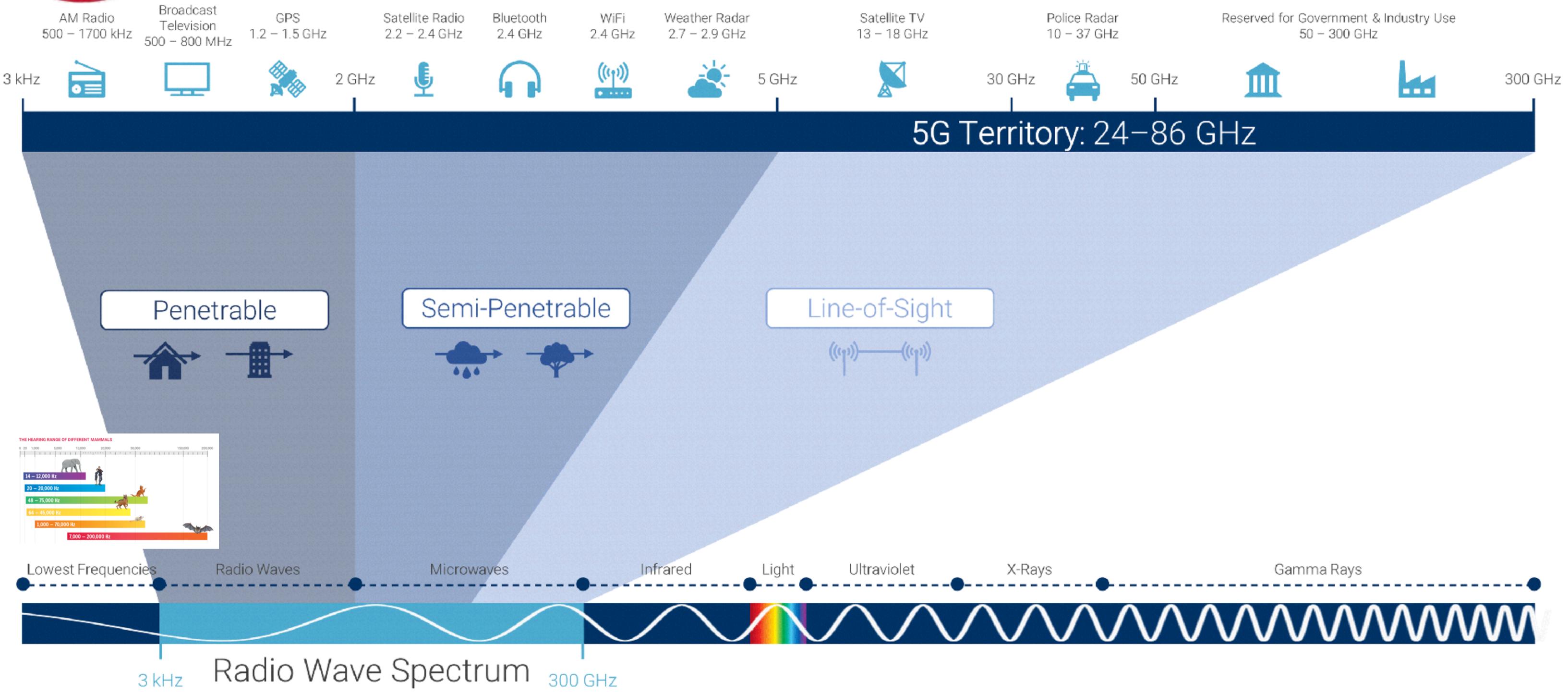
# UNDERSTANDING RADIO WAVES 20,000 Hz



# Demo



# MOBILE GENERATIONS (5G)



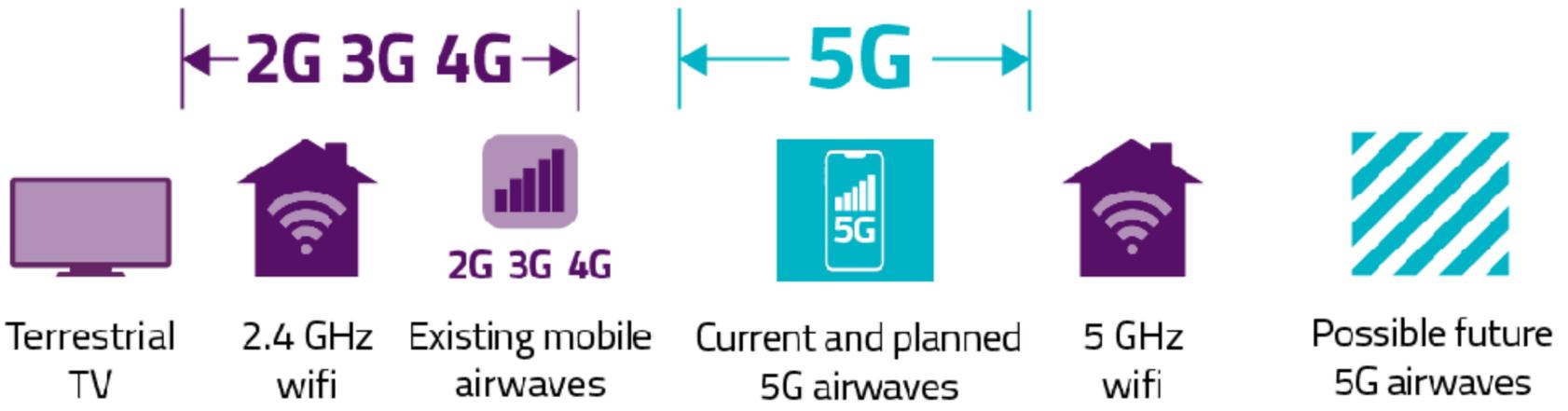
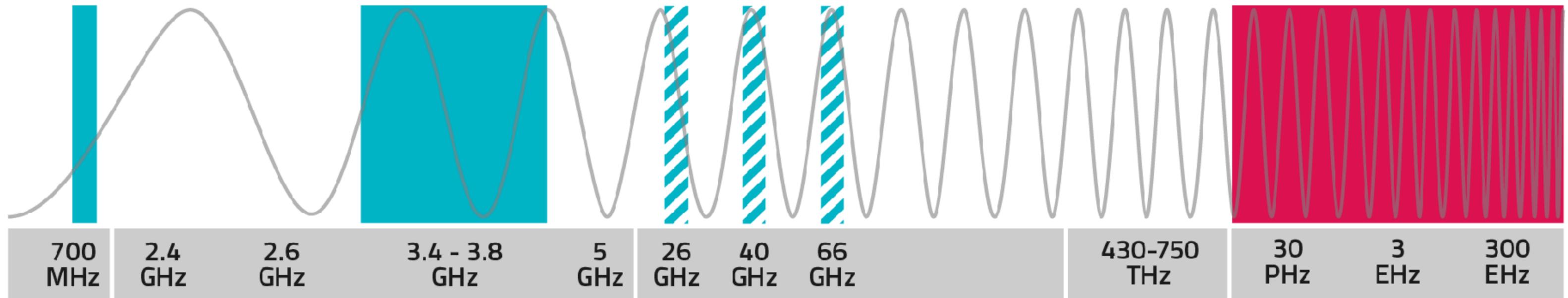


# RADIO WAVES & SPECTRUM



Non-ionising radiation\*

Ionising radiation\*



\*Radio frequencies needed for common household items to work, from televisions to microwave ovens (usually between 3KHz and 300GHz), produce radiation which is classed as 'non-ionising'. This means that it does not have sufficient energy to break chemical bonds or remove electrons, as opposed to 'ionising radiation', which occurs at much higher frequencies and is generally considered to be hazardous to humans. (Source: International Commission for Non-Ionizing Radiation Protection (ICNIRP))

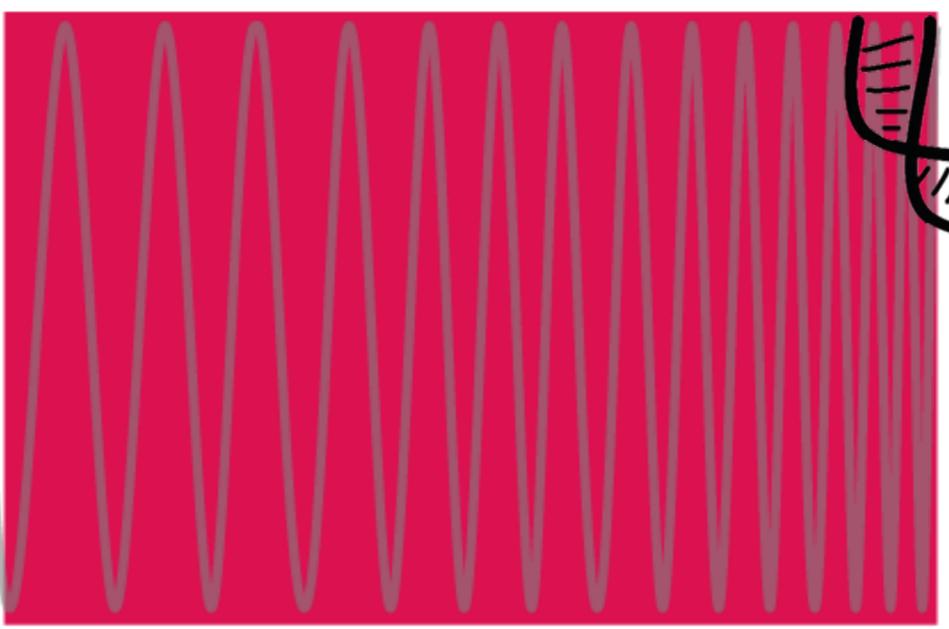
Hertz (Hz) key:  
 kHz: kilohertz =  $10^3$  Hz      THz: terahertz =  $10^{12}$  Hz  
 MHz: megahertz =  $10^6$  Hz      PHz: petahertz =  $10^{15}$  Hz  
 GHz: gigahertz =  $10^9$  Hz      EHz: exahertz =  $10^{18}$  Hz



# RADIO WAVES & SPECTRUM



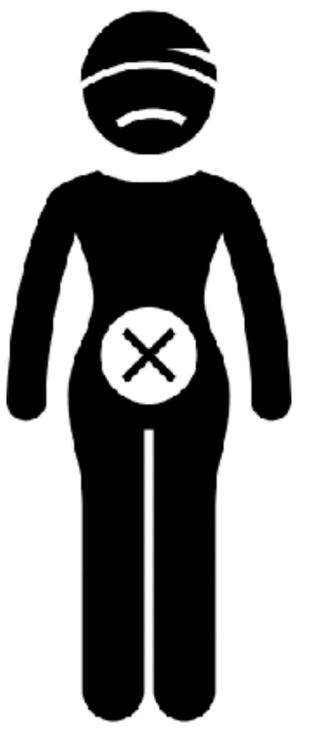
← Ionising radiation\* →



30  
PHz

3  
EHz

300  
EHz



Ultraviolet



X-rays

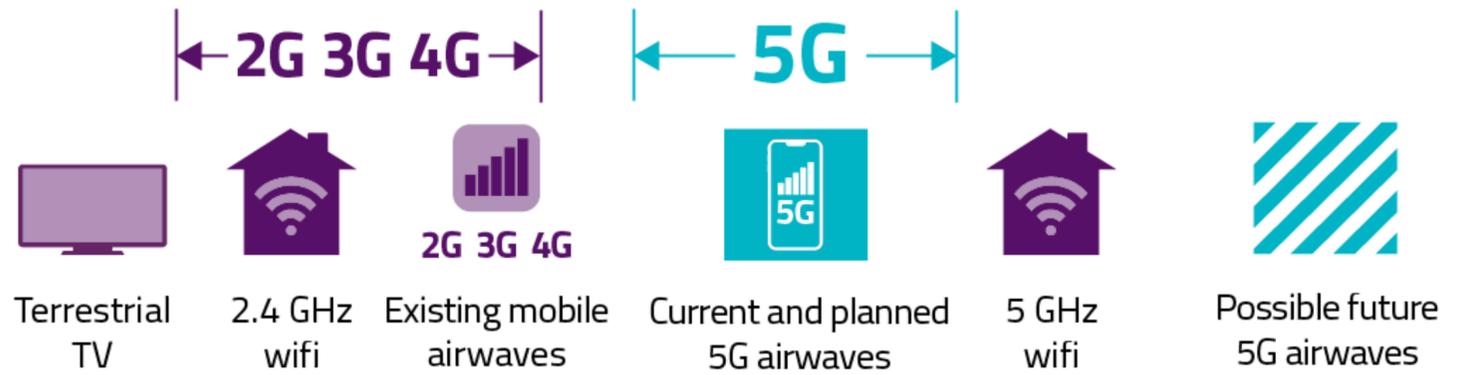
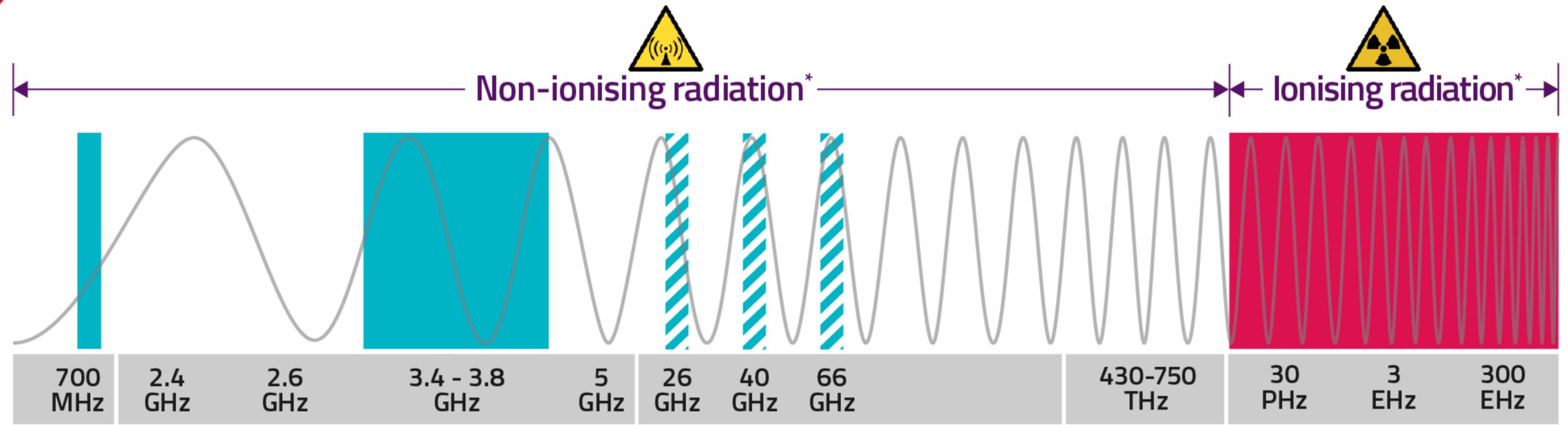


Gamma  
rays

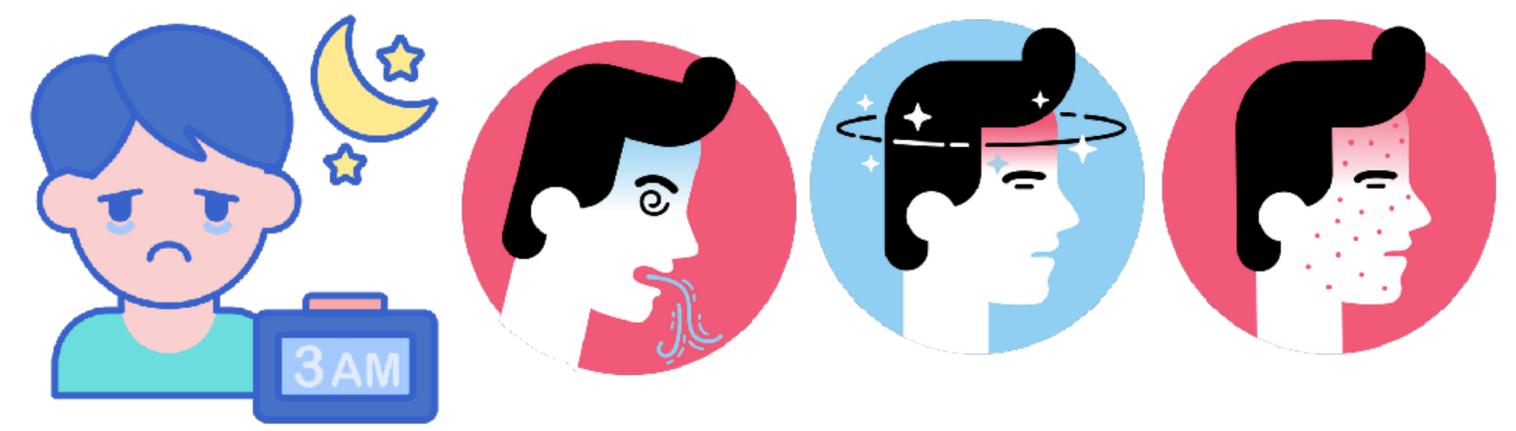




# RADIO WAVES & SPECTRUM

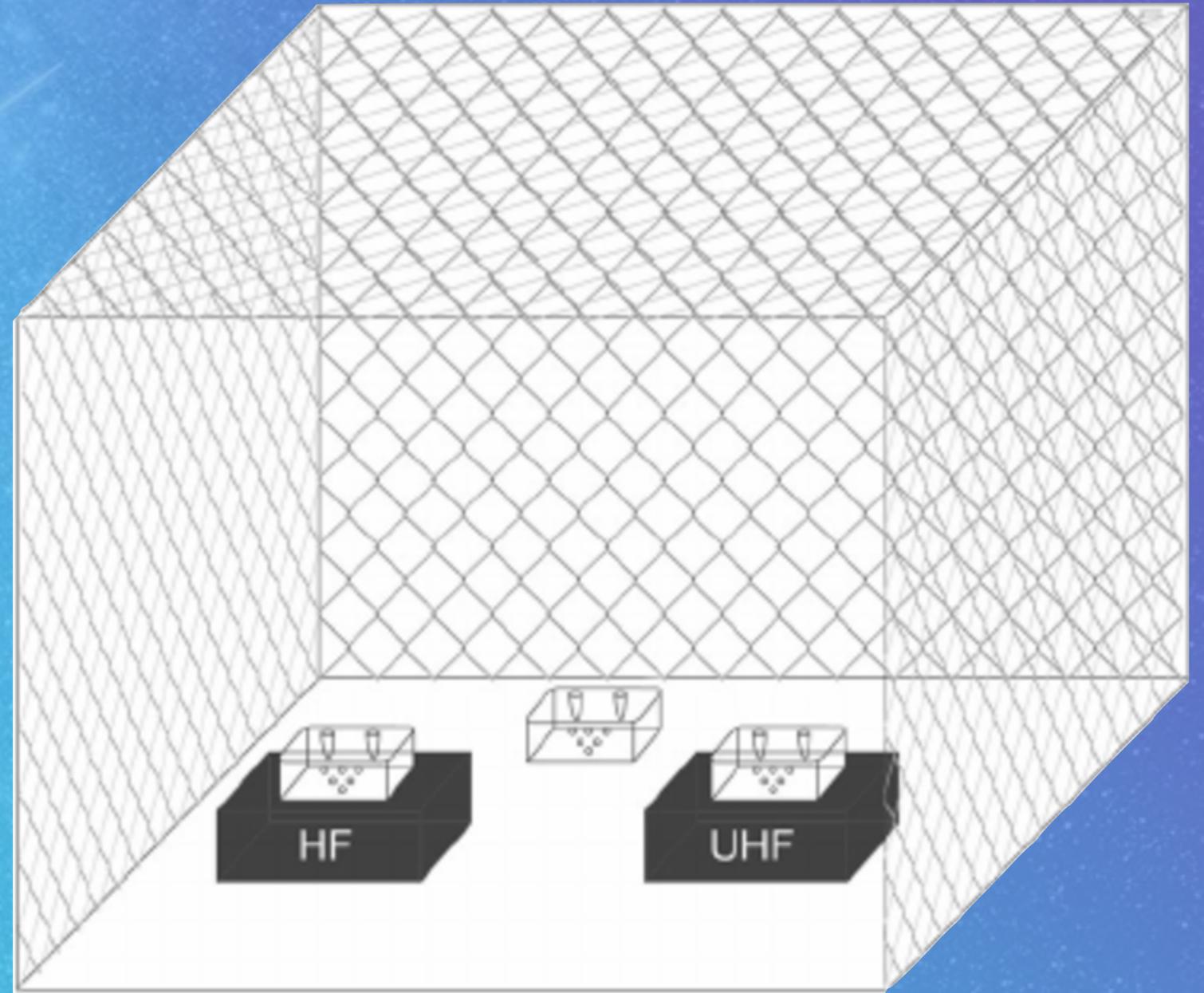



## Electromagnetic hypersensitivity (EHS)





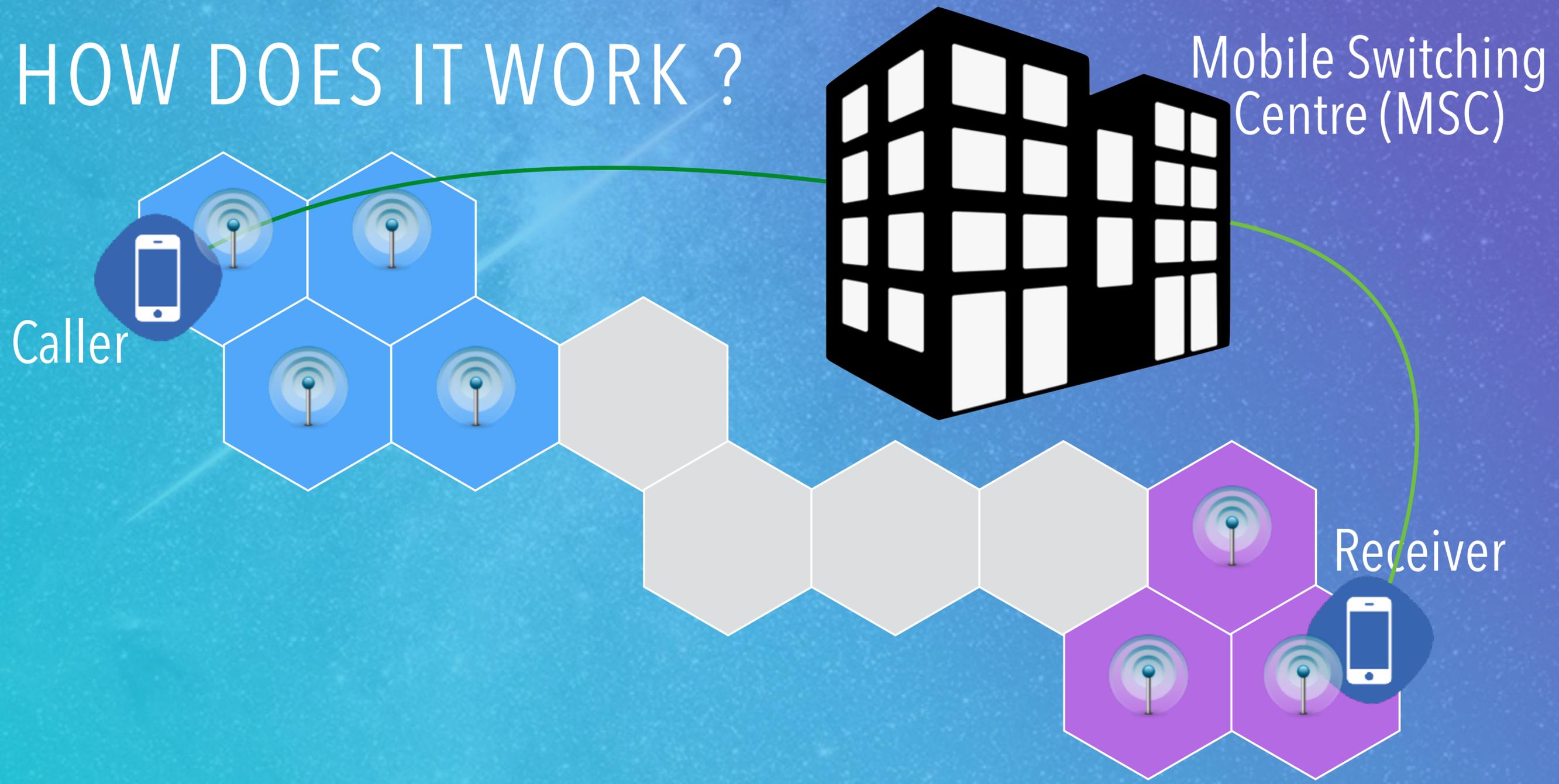
# 3) TECHNICAL SAFETY



**Electromagnetic hypersensitivity (EHS)**

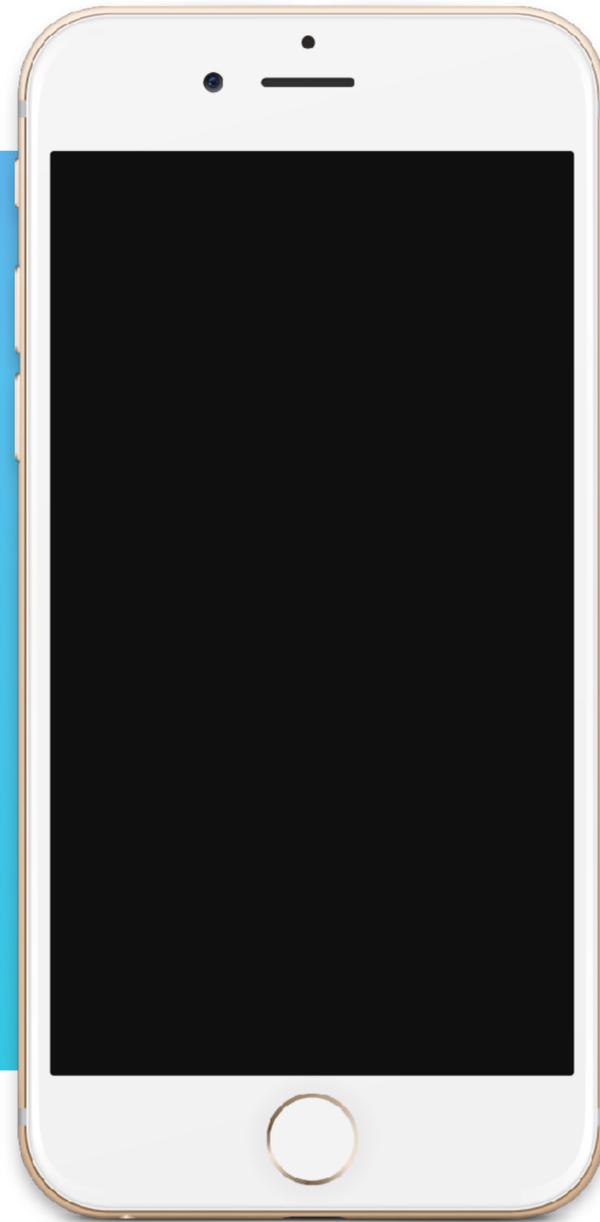


# 2) HOW DOES IT WORK ?



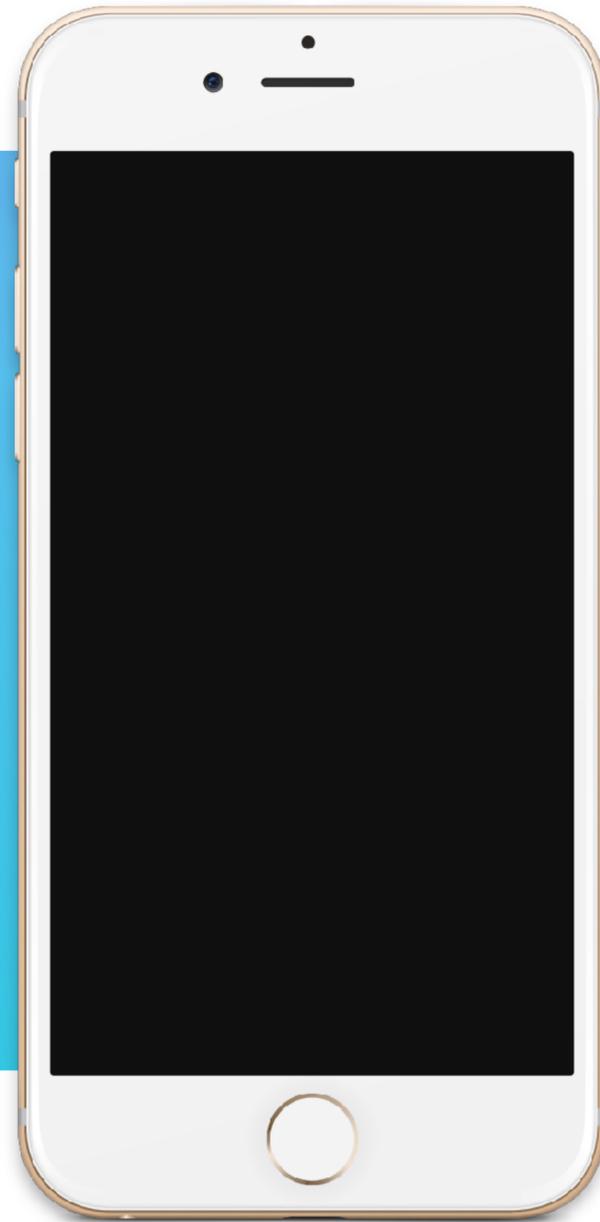


# MOBILE DEVICE DISSECTION (COMPONENTS)



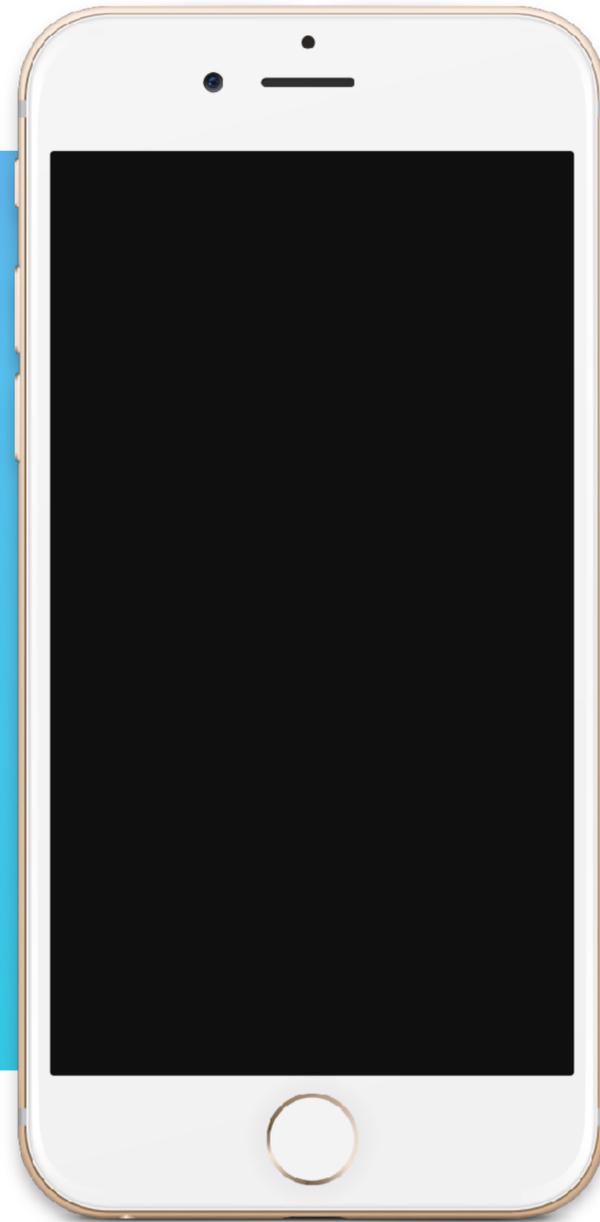


# SIGNAL TRANSMISSION



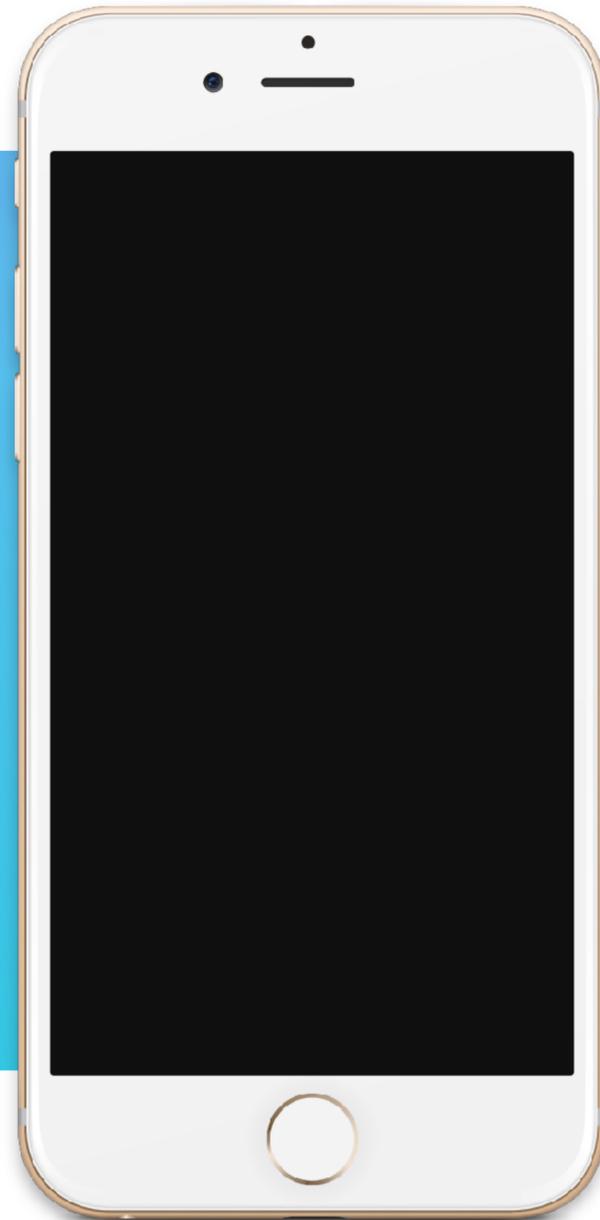


# COVERAGE CELLS





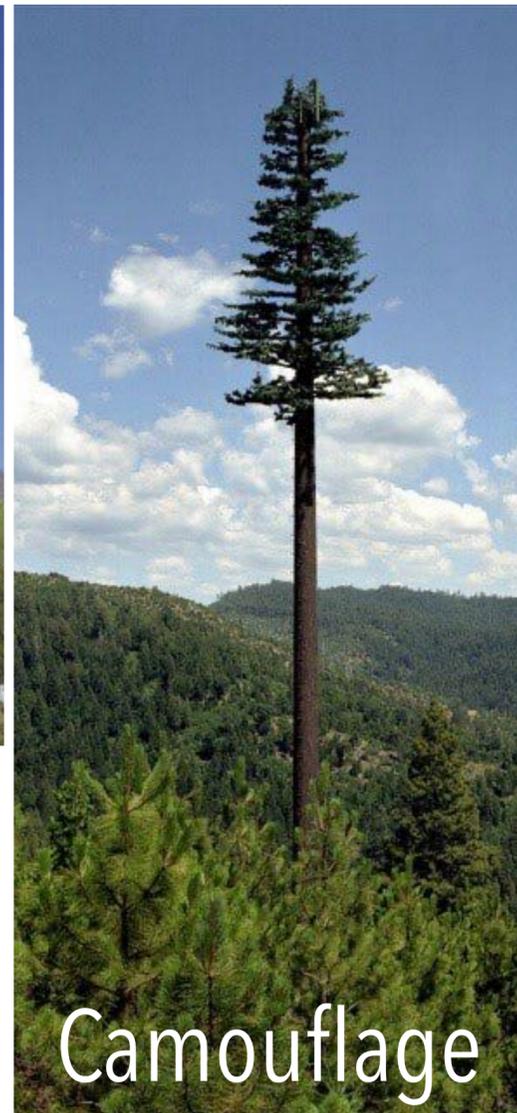
# CELL TOWERS





# CELL TOWERS (FOR Q 6&7)

Regular Towers ->



Camouflage





# CELL TOWERS (FOR Q6) CAMOUFLAGE & OFF-GRID



Temp Setup



Off-Grid

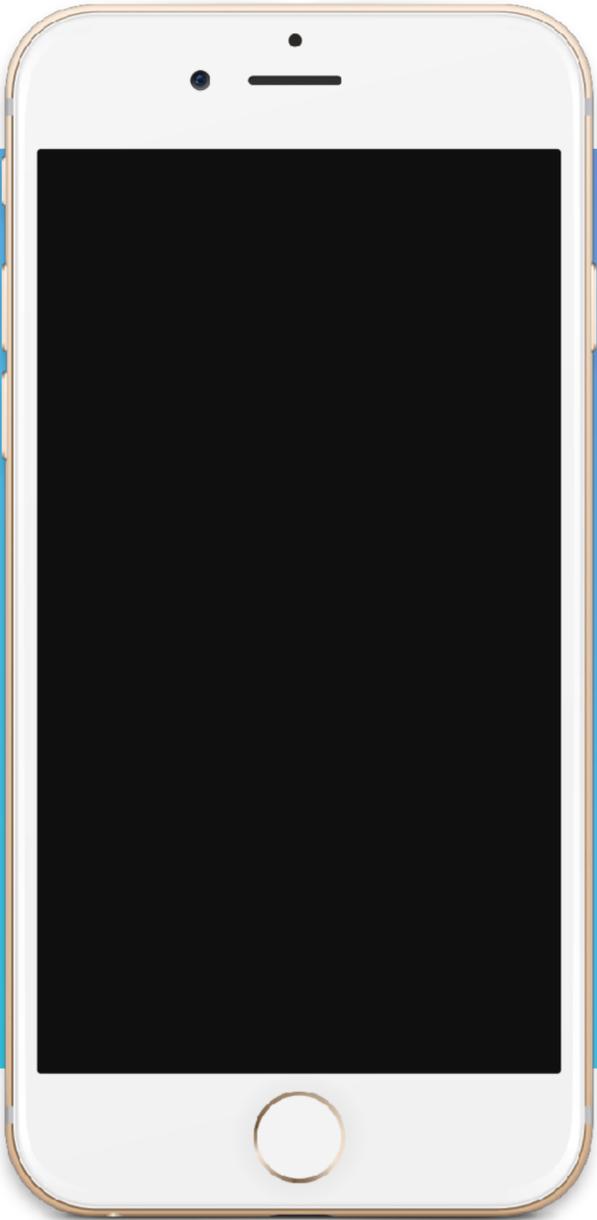


Camouflage



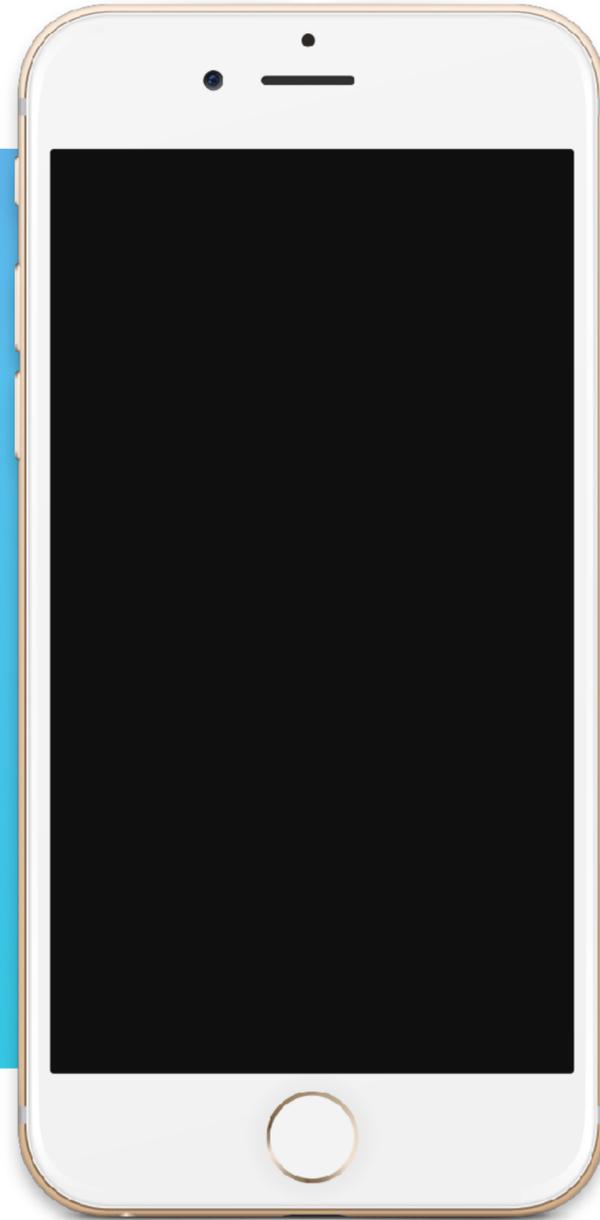


DENSITY



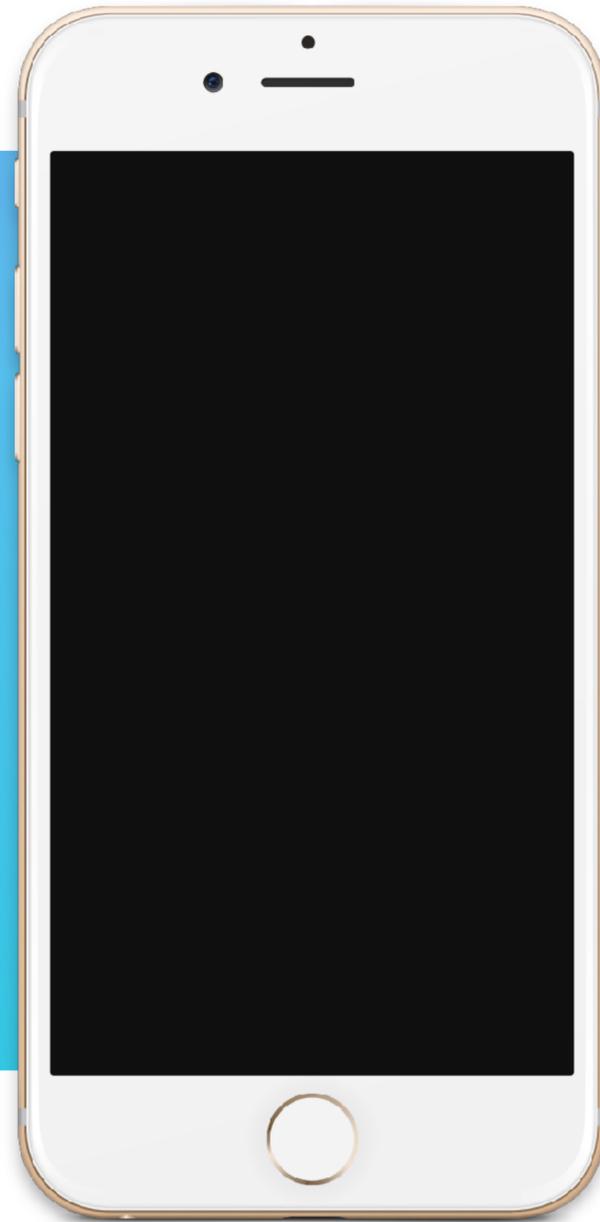


# LOCATION TRACKING & CALL HAND-OFF





# EXAMPLE (EMMA CALLS JOHN)







## 3) USAGE SAFETY (TXT & CALLS)

1. Remember if you are being **bullied** it isn't your fault and there is nothing so awful that you can't speak to someone about it. Talk to a trusted adult at home or at school.
2. Don't reply to any **nasty messages** you receive.
3. Don't reply to a **text** from someone you don't know.
4. **Keep** the messages you have been sent so you can show them to a **trusted adult** and make a note of the time and date of the messages or calls you receive.
5. Don't answer **calls** from withheld numbers or numbers you don't recognise, let it go to voicemail.
6. **Block** numbers from people who are sending you nasty messages.
7. If you are bullied repeatedly, you can change your number.
8. Don't give your **mobile number** to someone you don't know.
9. Don't send **pictures** to someone you don't know.
10. If the problem is serious you can **report** it to the police, cyber mentors, or childline

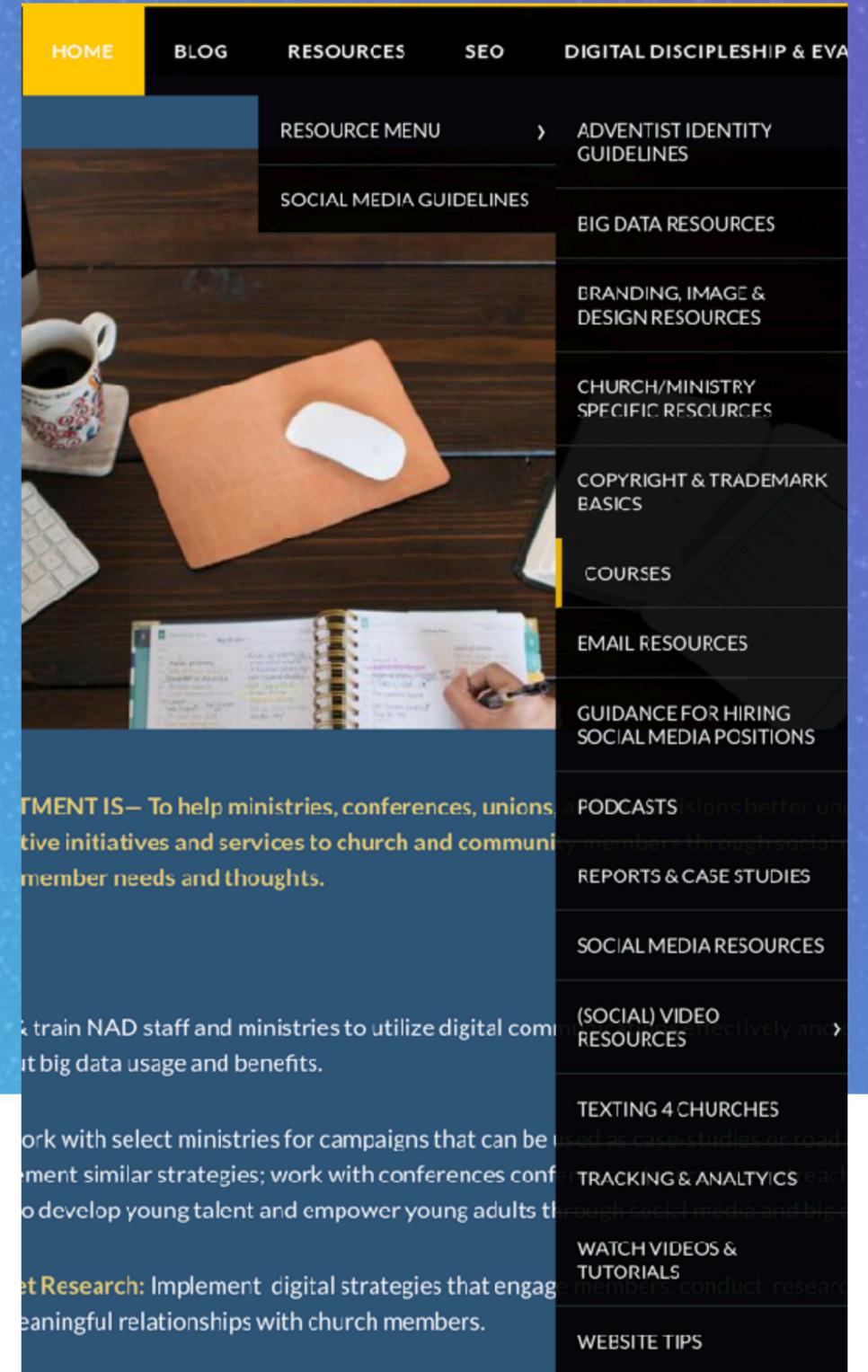


# 9&10) SHARE THE GOSPEL USING MOBILE TECH.

# <https://www.sdadata.org>

- Encouraging TXTs
- Uplifting Podcasts
- Inspiring Short Videos
- Online Giving

# Demo





9&10) SHARE THE GOSPEL USING MOBILE TECH.

📖 of Genesis: 01:001:004

& 🙇 saw the 💡,

that it was 👍:

& 🙇 divided the 💡

from the darkness.

[www.bibleemoji.com](http://www.bibleemoji.com)



# 11) SPIRITUAL PERSPECTIVE

## Matthew 24:14 (NIV)

And this gospel of the kingdom will be preached in the whole world as a testimony to all nations, and then the end will come.

A



B

## 1 Corinthians 6:12 (The Message)

Just because something is technically legal doesn't mean that it's spiritually appropriate. If I went around doing whatever I thought I could get by with, I'd be a slave to my whims.



# 12) CHRISTIAN USE OF MOBILE TECH.

<https://www.sdadata.org>

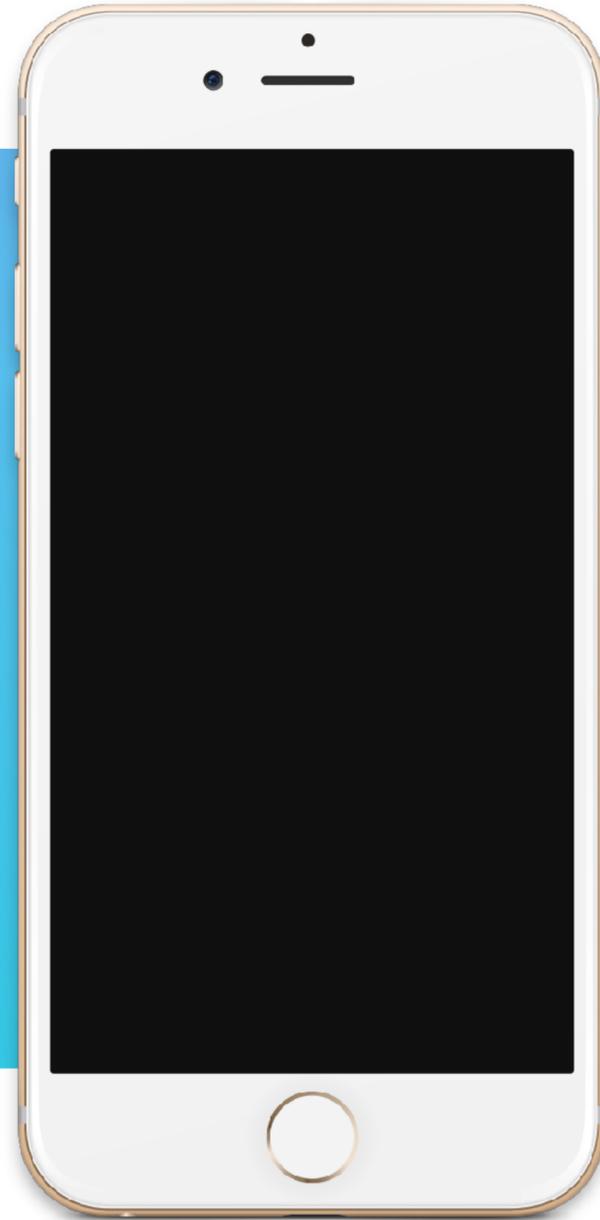
The screenshot displays the SDADATA website interface. At the top, there is a navigation bar with the following menu items: HOME, BLOG, RESOURCES, SEO, and DIGITAL DISCIPLESHIP & EVALUATION. Below the navigation bar, a dropdown menu is open under the 'RESOURCES' tab, listing various resource categories. The background of the website features a photograph of a desk with a laptop, a mouse, a coffee cup, and an open notebook.

Navigation Menu	Resource List
HOME	RESOURCE MENU
BLOG	SOCIAL MEDIA GUIDELINES
RESOURCES	ADVENTIST IDENTITY GUIDELINES
SEO	BIG DATA RESOURCES
DIGITAL DISCIPLESHIP & EVALUATION	BRANDING, IMAGE & DESIGN RESOURCES
	CHURCH/MINISTRY SPECIFIC RESOURCES
	COPYRIGHT & TRADEMARK BASICS
	COURSES
	EMAIL RESOURCES
	GUIDANCE FOR HIRING SOCIAL MEDIA POSITIONS
	PODCASTS
	REPORTS & CASE STUDIES
	SOCIAL MEDIA RESOURCES
	(SOCIAL) VIDEO RESOURCES
	TEXTING 4 CHURCHES
	TRACKING & ANALYTICS
	WATCH VIDEOS & TUTORIALS
	WEBSITE TIPS





# MOBILE GENERATIONS (5G)



# Bonus



# MOBILE GENERATIONS (5G)



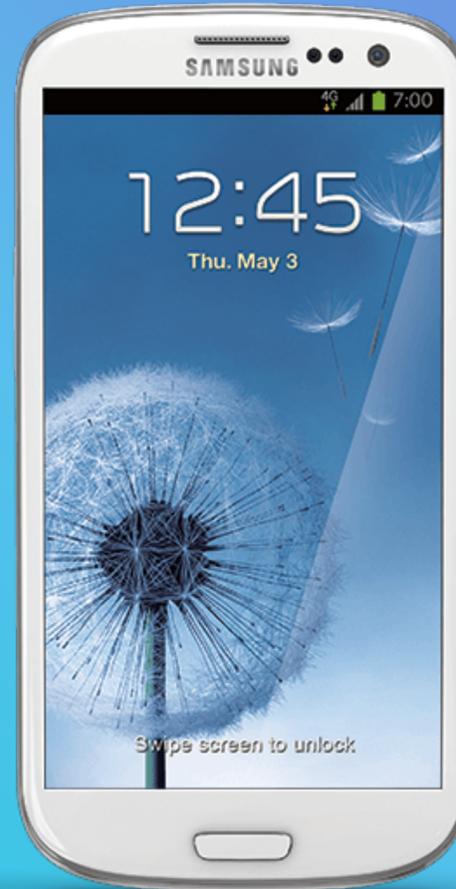
**1G**  
Analog (TACS)  
from 1979  
150 Mhz - 900 Mhz



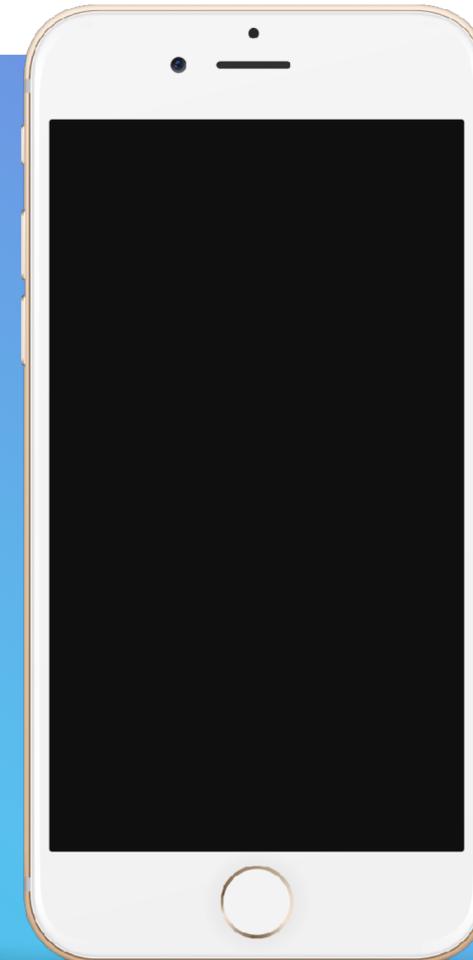
**2G**  
Digital (GSM)  
from 1991 MMS  
64 kbps  
Up to 1.9 Ghz



**2.5G**  
+Camera (GPRS/Edge)  
from 1995  
0.1 - 0.3 Mbps  
Up to 1.9 Ghz



**3G**  
+Video Call (CDMA/UMTS)  
from 1998  
0.3 - 8 Mbps (2 avg)  
1.6 to 2.1 Ghz



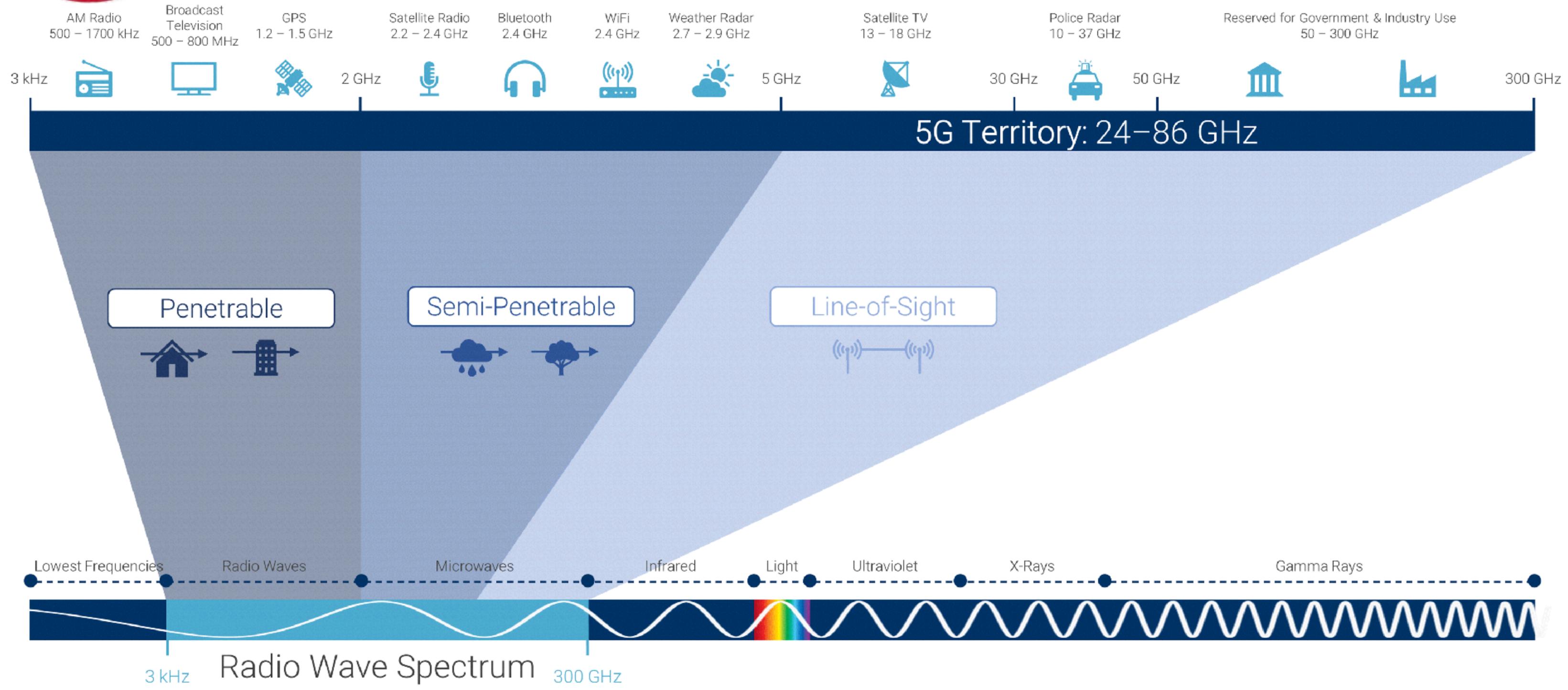
**4G**  
+Speed (LTE/MIMO)  
from 2008  
150 - 900 Mbps (15 avg)  
2 to 2.5 Ghz



**5G**  
Digital (eMBB/URLLC/MMTC)  
from 2020  
1,000-10,000 Mbps  
Up to 95 Ghz



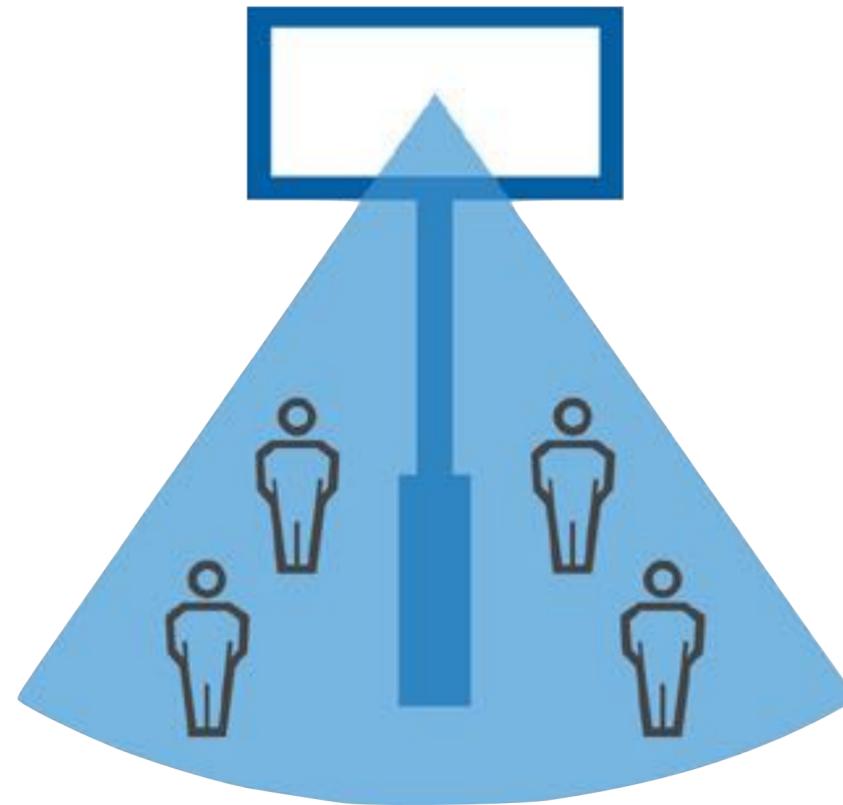
# MOBILE GENERATIONS (5G)



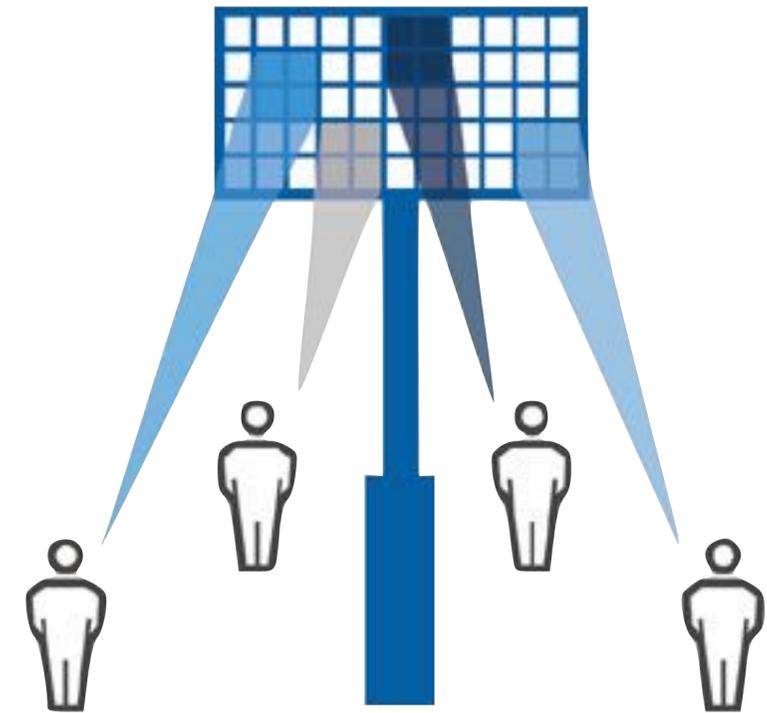


# 5G ANTENNAS

4G

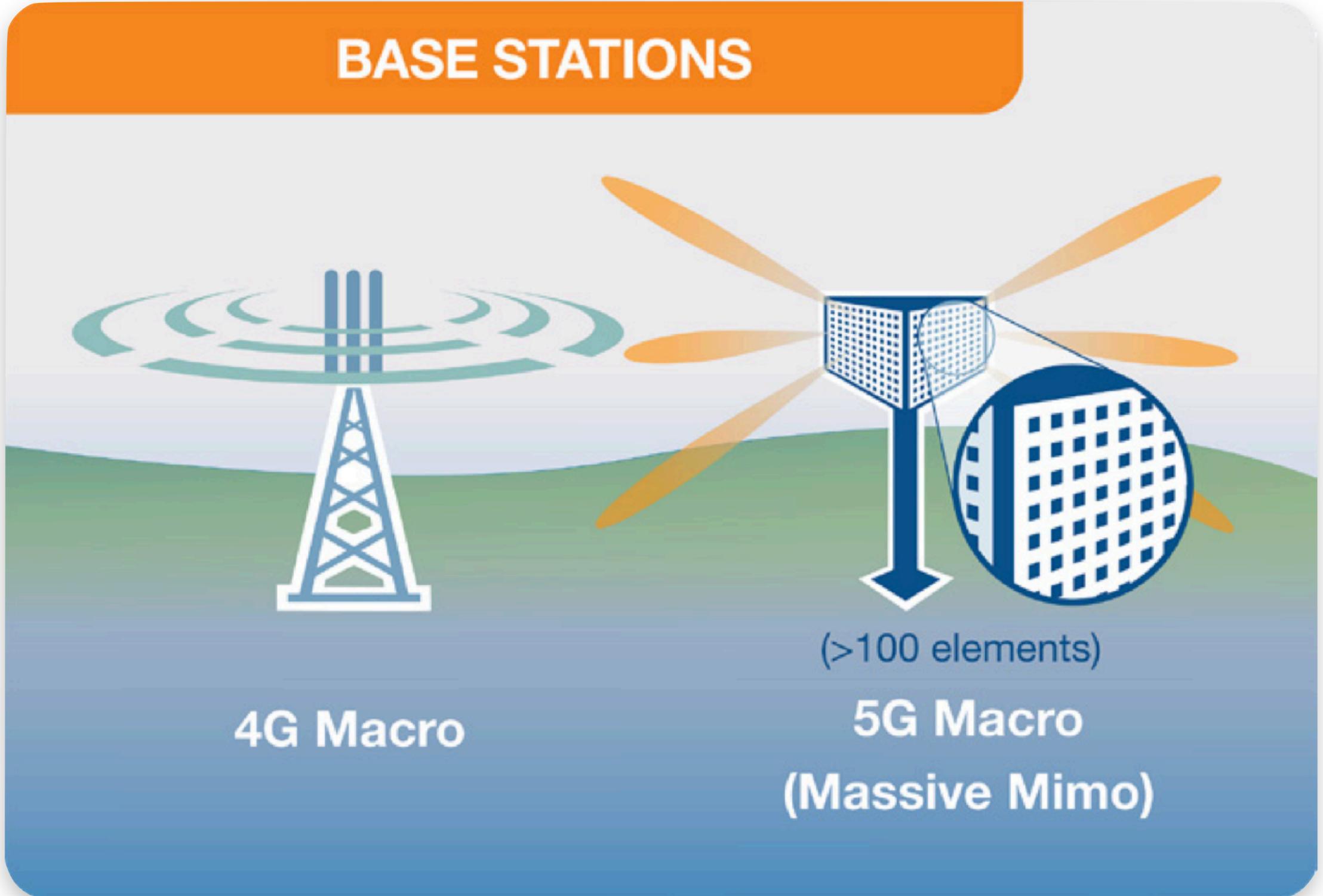
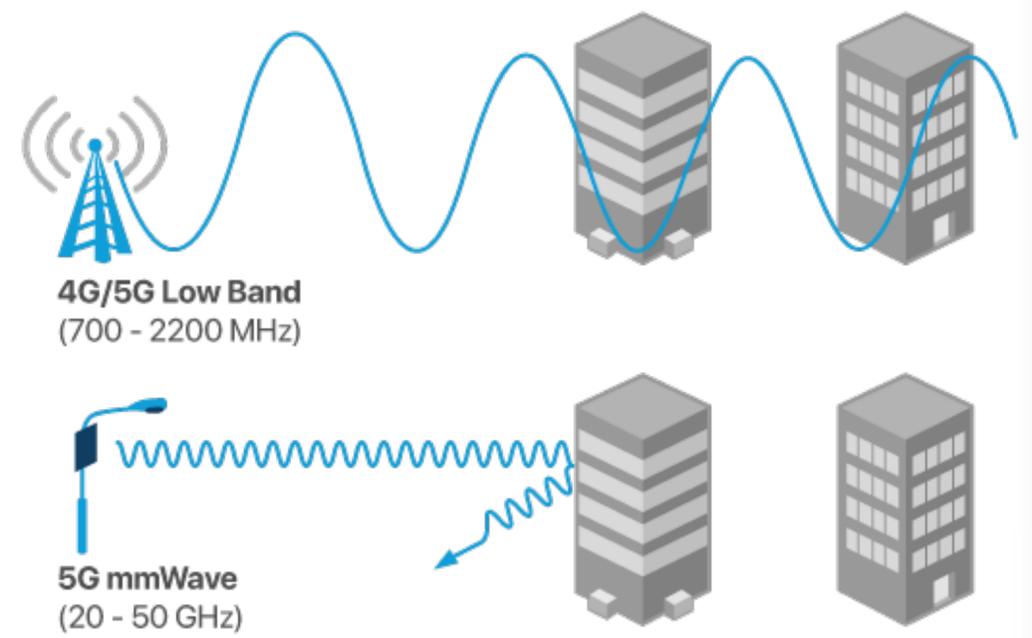


5G





# 5G ANTENNAS





# 5G ANTENNAS

## 5G SPECTRUM

Existing Mobile Spectrum

New Mobile Spectrum

Coverage & Capacity

Capacity

Below 1 GHz

1-6 GHz

30 GHz

mmWave band

100 GHz

TV

WiFi

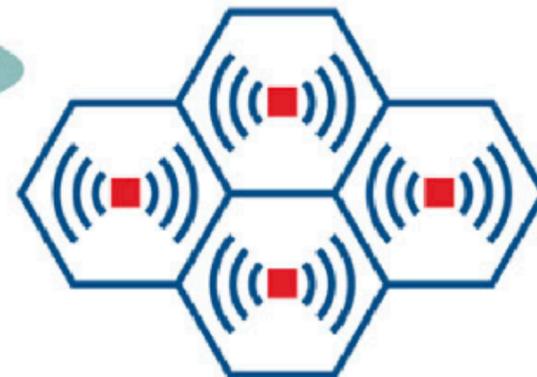
WiFi

Fixed links and Satellite

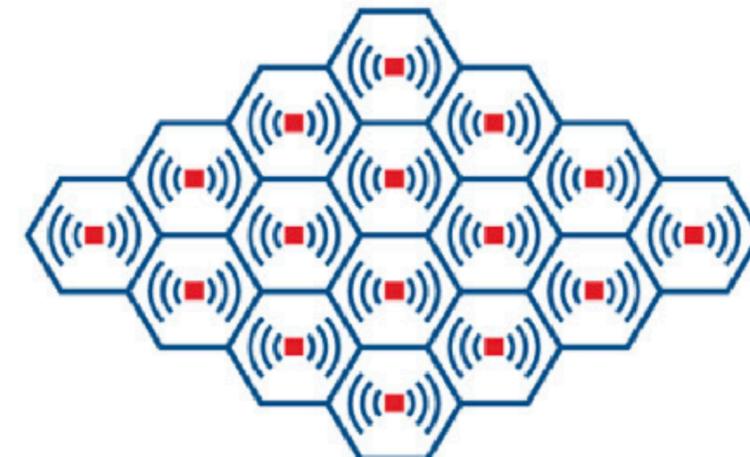
Existing Mobile



Macro cells



Macro and small cells

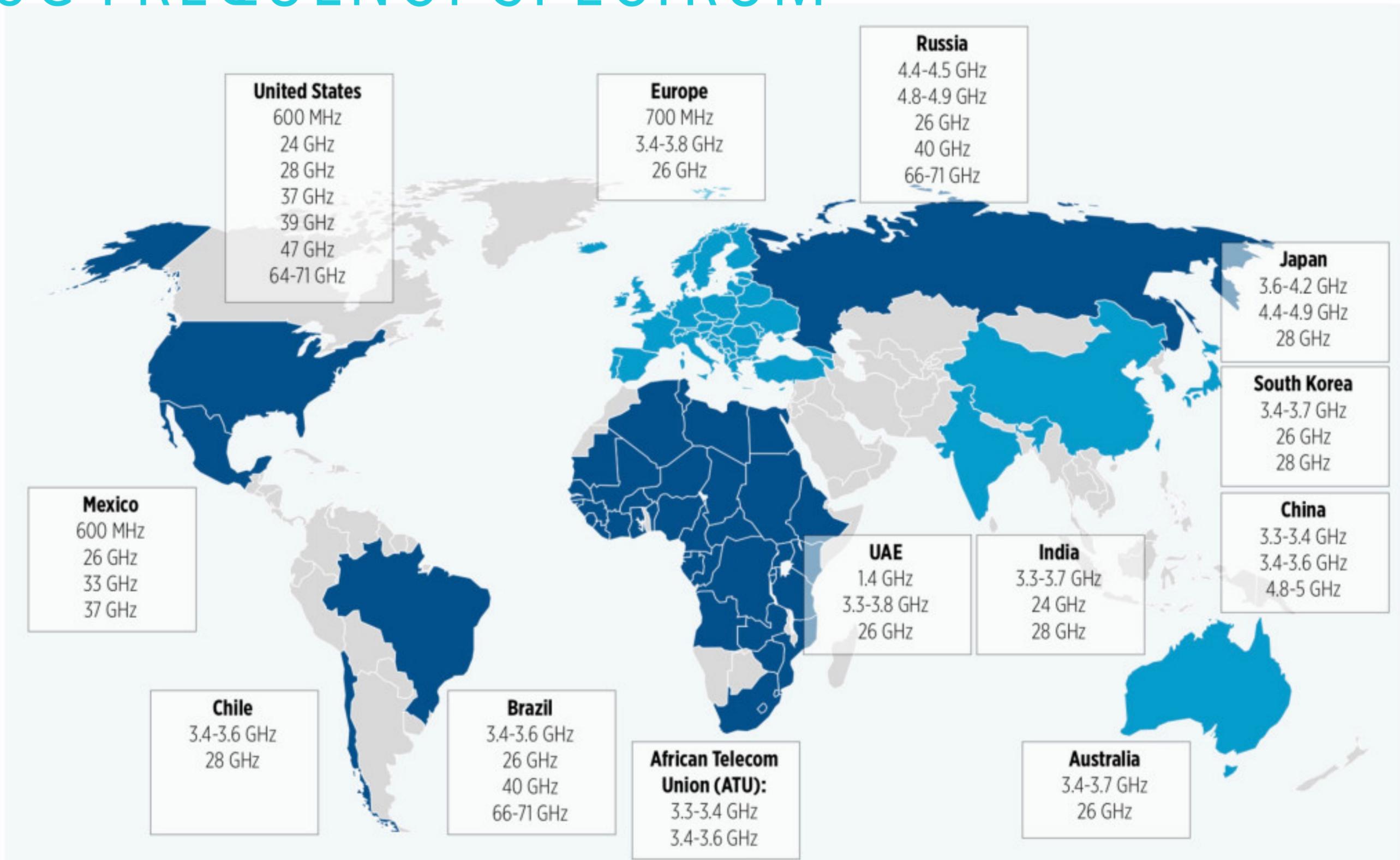


Small cells





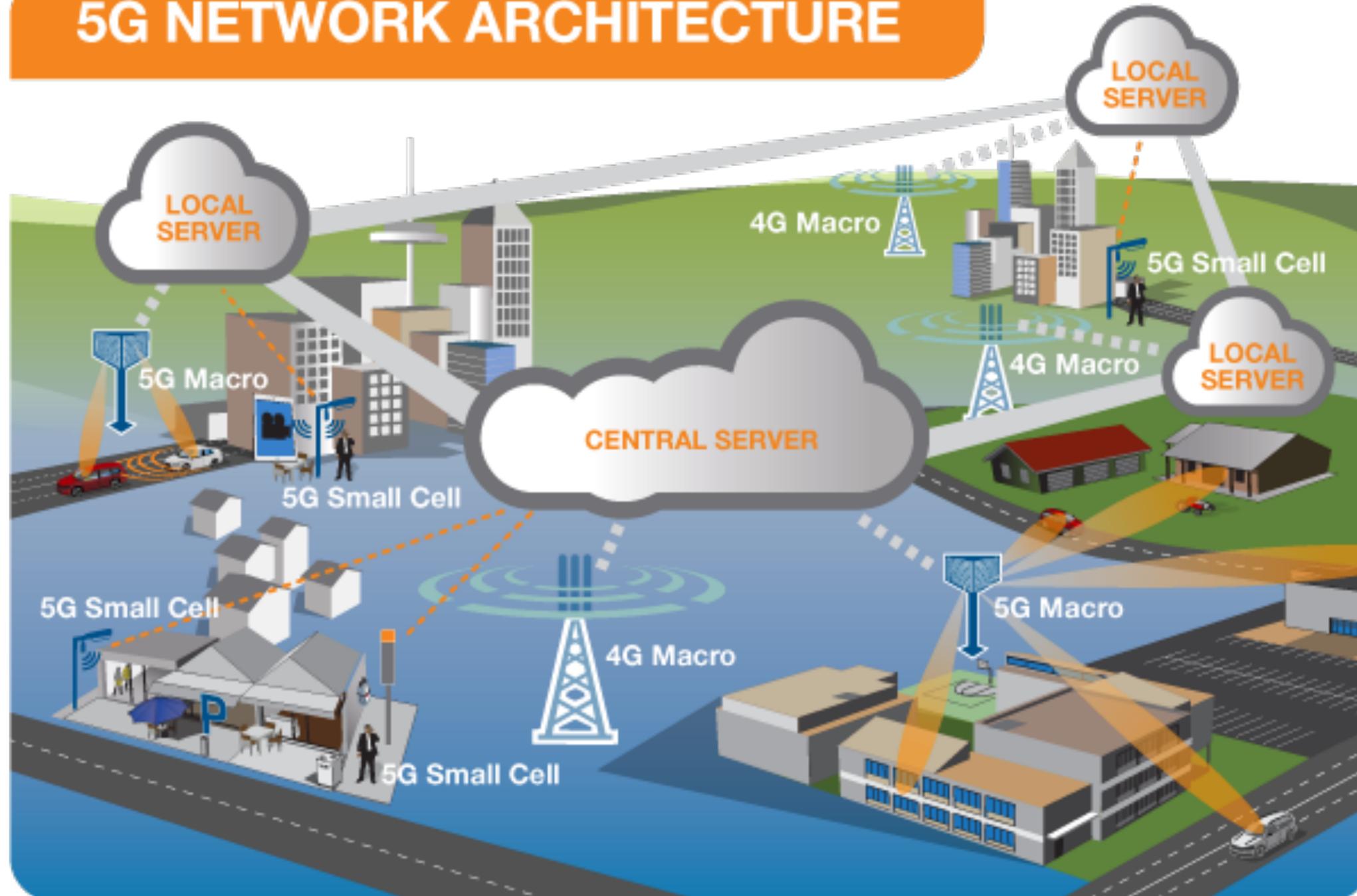
# 5G FREQUENCY SPECTRUM





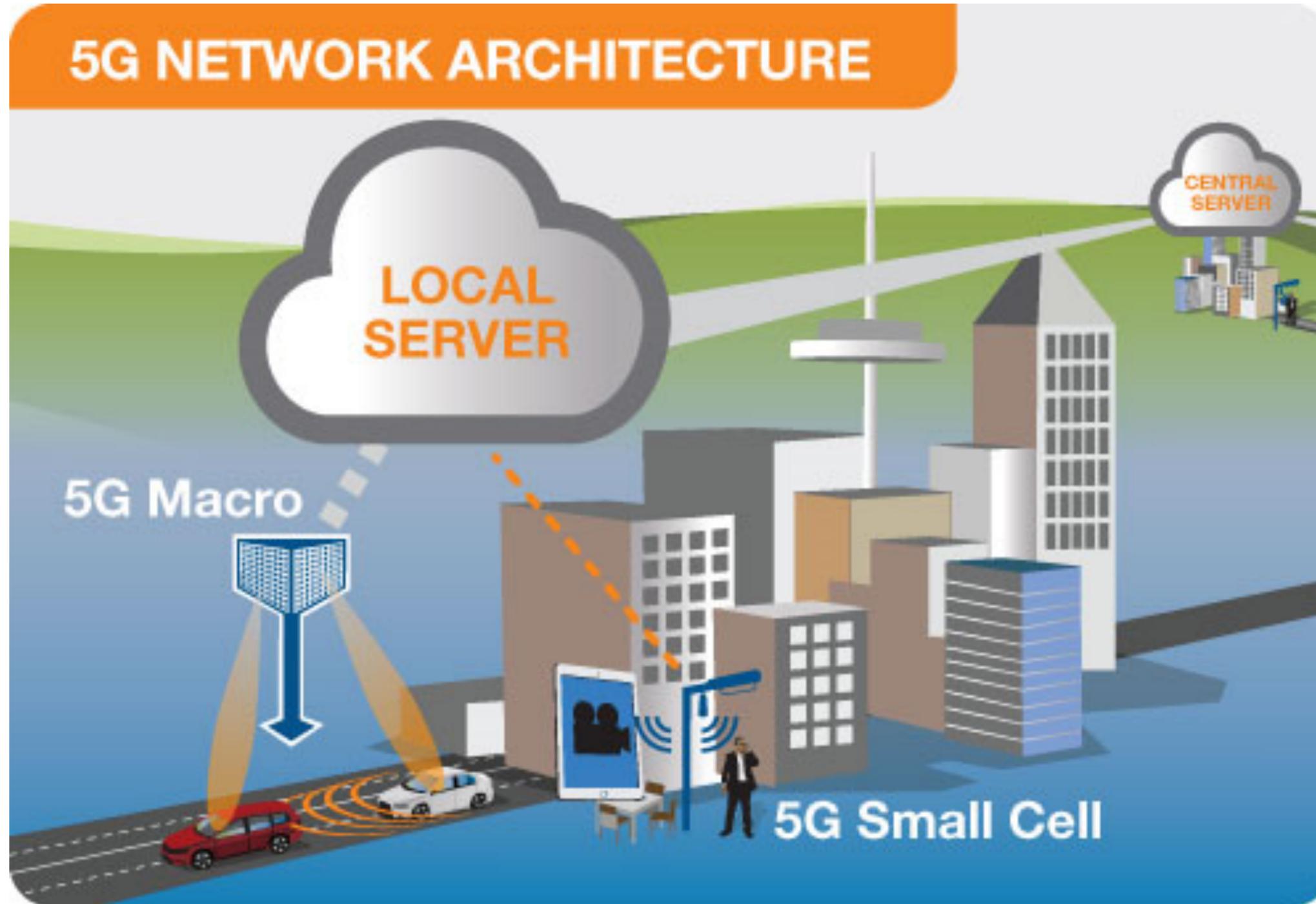
# ANTENNAS

## 5G NETWORK ARCHITECTURE



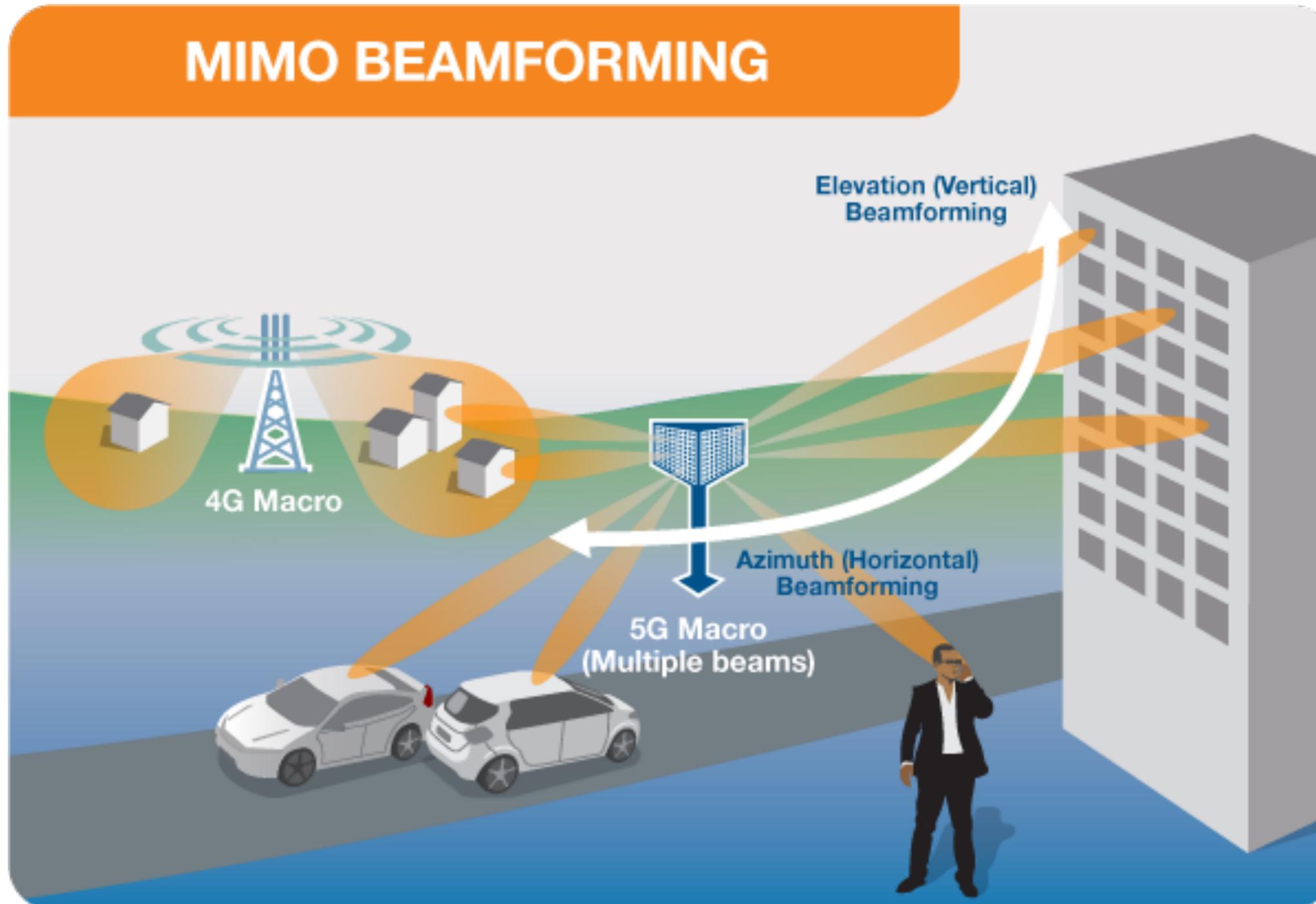


# ANTENNAS



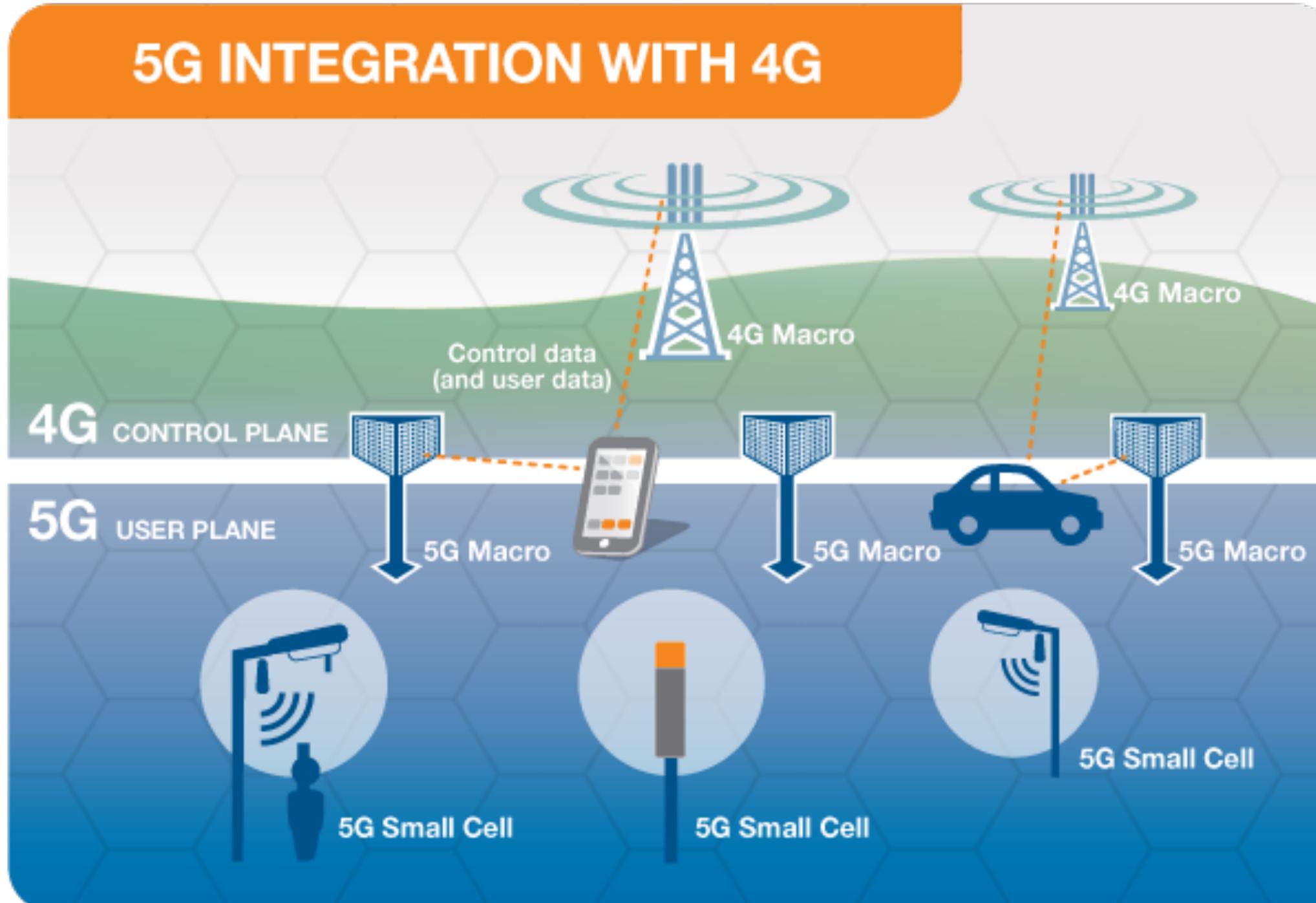


# ANTENNAS





# ANTENNAS





# ANTENNAS

**Macrocells for wide area coverage**



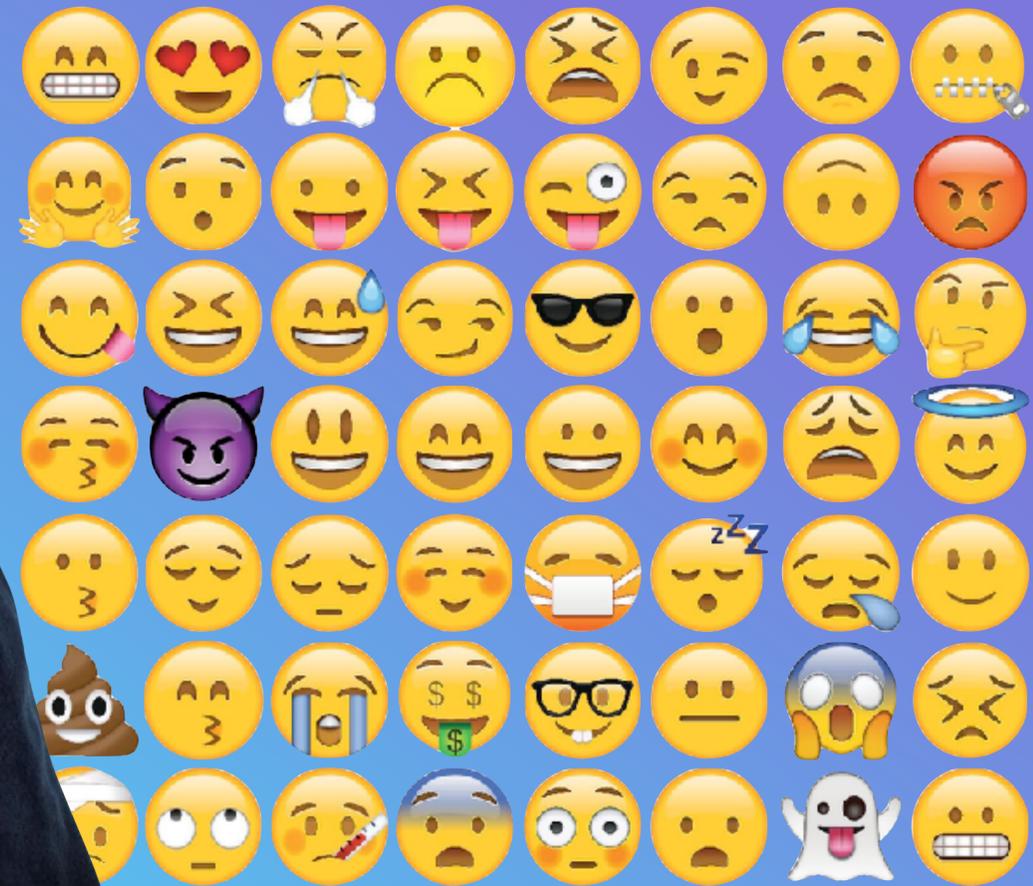
**In-building and street small cells**

**Home small cells**



# MOBILE GENERATIONS (1G TO 4G)

Emojis invented by  
Shigetaka Kurita in Japan

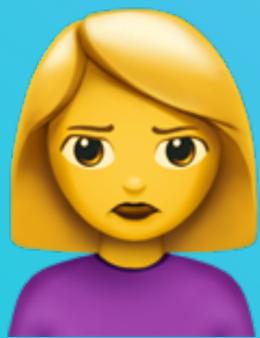


# Bonus 2



EMOJIS

1)



**Quiz** (guess the bible character)



EMOJIS

2)



**Quiz** (guess the bible character)



# EMOJIS

3)



**Quiz** (guess the bible character)