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15/ENG04/038

EEE 512: DIGITAL COMMUNICATION

1. (i).

UMTS = Universal Mobile Telecommunications Service
RNC = Radio Network Controller
RNS = Radio Network Subsystem
UE = User Equipment

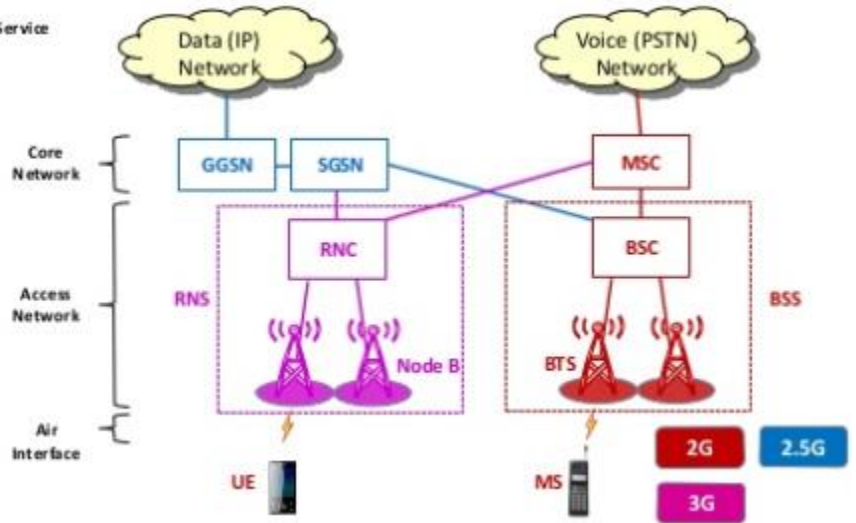


Figure 13: 3G NETWORK ARCHITECTURE

EPC = Evolved Packet Core
MME = Mobility Management Entity
S-GW = Serving Gateway
P-GW = PDN Gateway
PDN = Packet Data Network
eNodeB = evolved NodeB

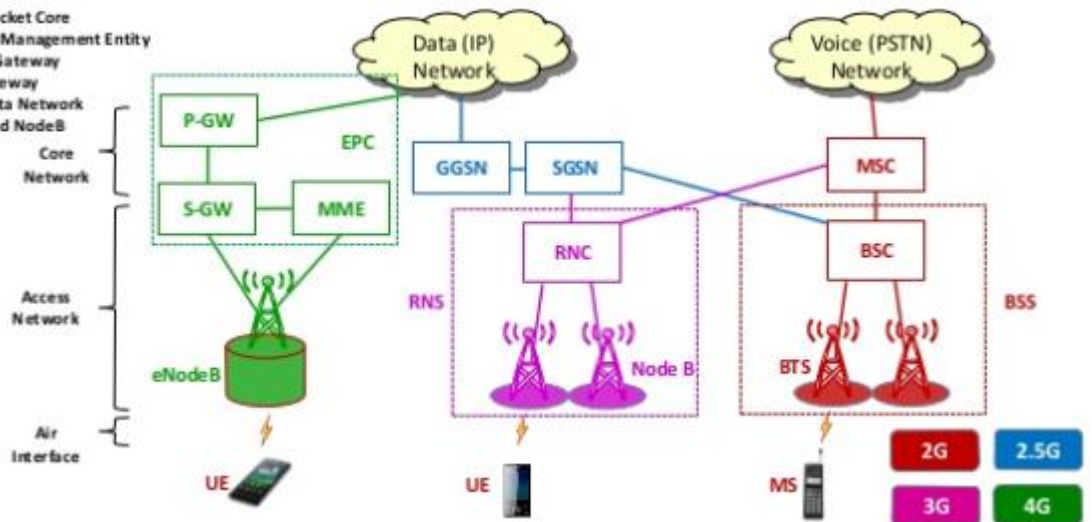


Figure 2: 4G LTE NETWORK ARCHITECTURE

NGCN = Next Generation Core Network
 gNodeB = next generation NodeB
 NR = New Radio

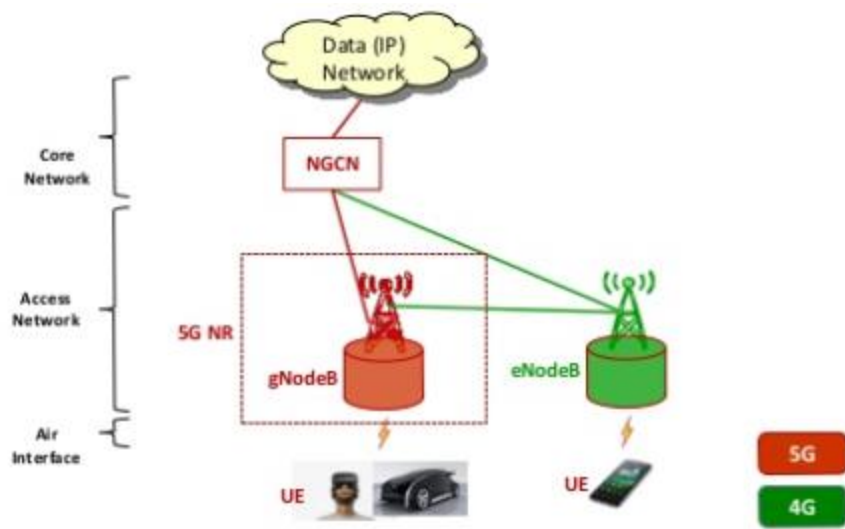


Figure 3: 5G PHASE 1 NETWORK ARCHITECTURE

gNodeB = next generation NodeB
 NR = New Radio

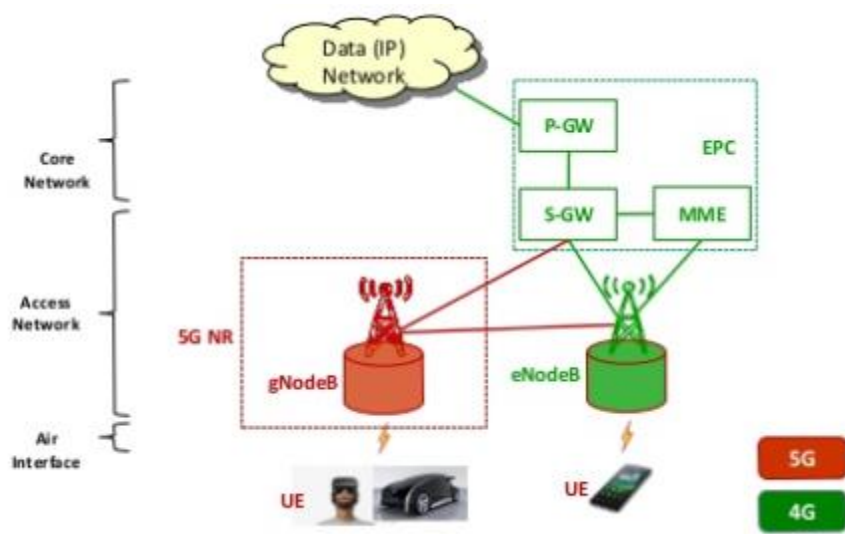


Figure 4: 5G PHASE 2 NETWORK ARCHITECTURE

NGCN = Next Generation Core Network
gNodeB = next generation NodeB
NR = New Radio

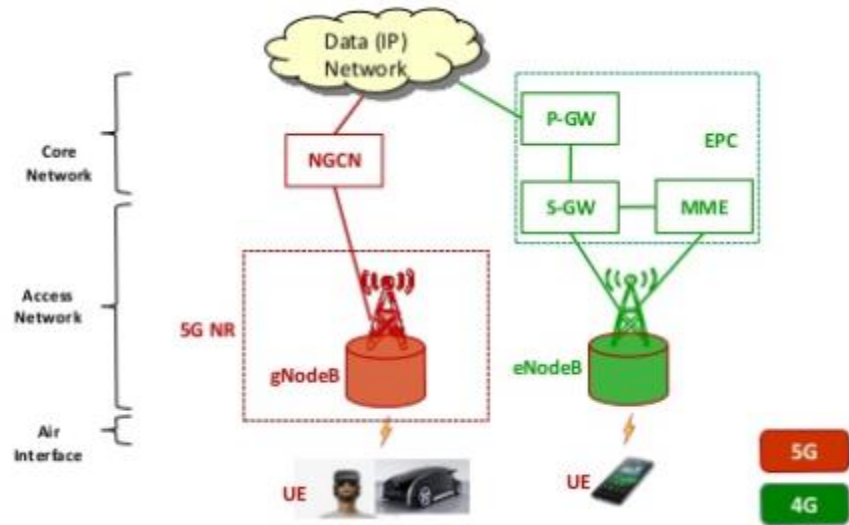


Figure 5: 5G PHASE 3 NETWORK ARCHITECTURE

1. (ii).

ADVANTAGES AND DISADVANTAGES OF 3G

	ADVANTAGES	DISADVANTAGES
1.	Overcrowding is relieved in existing systems with radio spectrum	Roaming and data/voice work together has not yet been implemented
2.	Support to devices with backward compatibility with existing networks	Power consumption is high
3.	Provides interoperability among service providers	Requires closer base stations and are expensive
4.	Always online devices – 3G uses IP connectivity which is packet based	Spectrum-license costs, network deployment costs and handset subsidies subscribers are tremendous

ADVANTAGES AND DISADVANTAGES OF 4G

	ADVANTAGES	DISADVANTAGES
1.	It enhances internet speed both for download and upload.	High consumption of data.
2.	It provides clear video calling and voice facility.	High data prices for users.
3.	The network provides a high bandwidth network.	Limited 4G network towers.
4.	This network is beneficial for using multimedia services.	4G network uses more power.

ADVANTAGES AND DISADVANTAGES OF 5G

	ADVANTAGES	DISADVANTAGES
1.	High resolution and bi-directional large bandwidth shaping.	Technology is still under process and research on its viability is going on.
2.	Technology to gather all networks on one platform.	The speed, this technology is claiming seems difficult to achieve (in future, it might be) because of the incompetent technological support in most parts of the world.
3.	Most likely, will provide a huge broadcasting data (in Gigabit), which will support more than 60,000 connections.	Developing infrastructure needs high cost.
4.	Possible to provide uniform, uninterrupted, and consistent connectivity across the world.	Security and privacy issue yet to be solved.

2.

FEATURES	2G	3G	4G	5G
Start/Development	1980/1990	1990/2002	2000/2010	2010/2015
Technology	GSM	WCMDA	LTE, WiMax	MIMO, mm Wave
Frequency	1.8 GHz	1.6 – 2 GHz	2 – 8 GHz	3 – 30 GHz
Bandwidth	14.4 – 64 kbps	2 Mbps	2000 Mbps – 1 Gbps	1 Gbps or higher
Access System	TDMA/CDMA	CDMA	CDMA	OFDM/BDMA

Core Network	PSTN	Pack Network	Internet	Internet
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3. (i). No.

(ii). I do not support the assertion that 5G evolution will aid in the spread of the corona virus because the proponents of the theory do not provide any scientific basis for the theory, they only assume it is without any proof whatsoever. The corona virus is cannot be transmitted wirelessly via any network, it can only be transmitted via physical contact, hence the idea that a wireless network 0can aid its spread is not accurate. Another reason why I believe it is not true is because the proponents of these theories are not experts in the field or science, they are not recognized persons in the any scientific or medical field and the reason they give are very scientifically inaccurate.