

5G Standalone Challenges compared with 5G NSA

Optimization



Technology



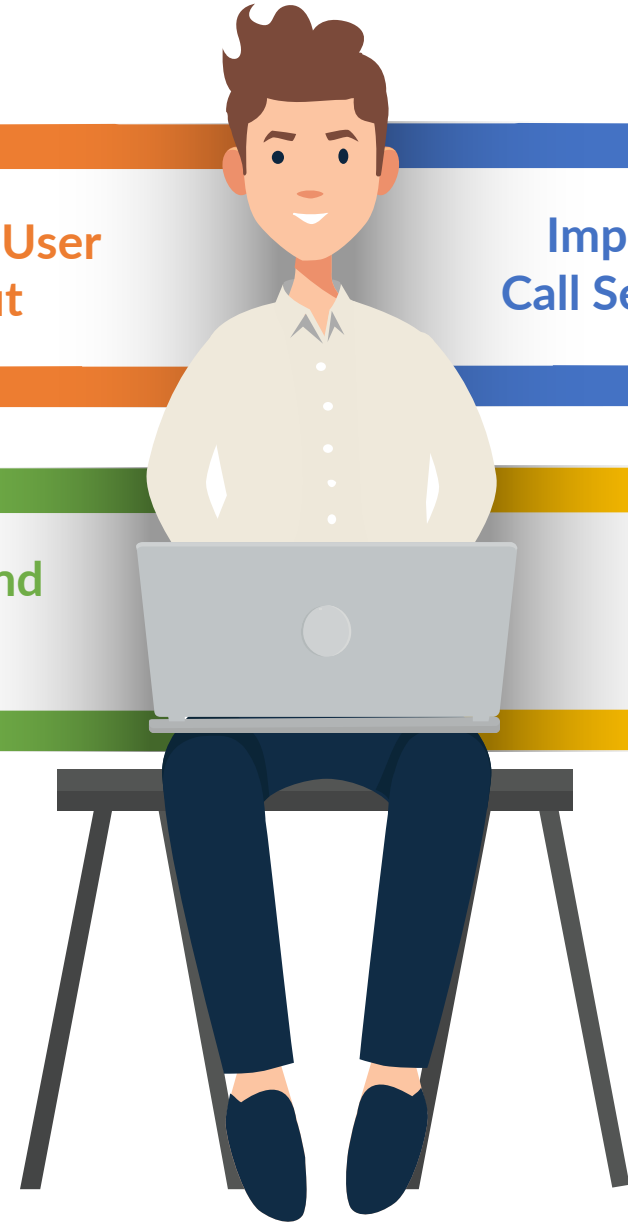
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Content

A Impact on DL User throughput **B** Impact on Voice Call Setup time delay

C Other Challenges and Considerations **D** Impact on UL Performance



5G SA Offers less DL User throughput compared with NSA

- 5G Standalone will offer less speed compared with 5G NSA due to two main reasons that will be presented below with examples.
- The examples used in this section consider the following assumption: 8SSBs, SCS 30kHz, SIB1 using 48RBs, SIB1 Periodicity is 20ms, 5G BW is 40Mhz, and 4G BW is 20Mhz.

1- Extra SIB1 Overhead in 5G SA

- NSA SIB1 has less content than SA; 5G SA SIB1 will use more resource blocks.
- 5G SA Use at least 48 up to 96 RBs for SIB1 CORESET0.

*Table 13-4: 3GPP 38213-h40

Index	Multiplexing pattern	Number of RBs	Number of Symbols
0	1	24	2
1	1	24	2
2	1	24	2
3	1	24	2
4	1	24	2
5	1	24	3
6	1	24	3
7	1	24	3
8	1	24	3
9	1	24	3
10	1	48	1
11	1	48	1
12	1	48	1
13	1	48	2
14	1	48	2
15	1	48	2

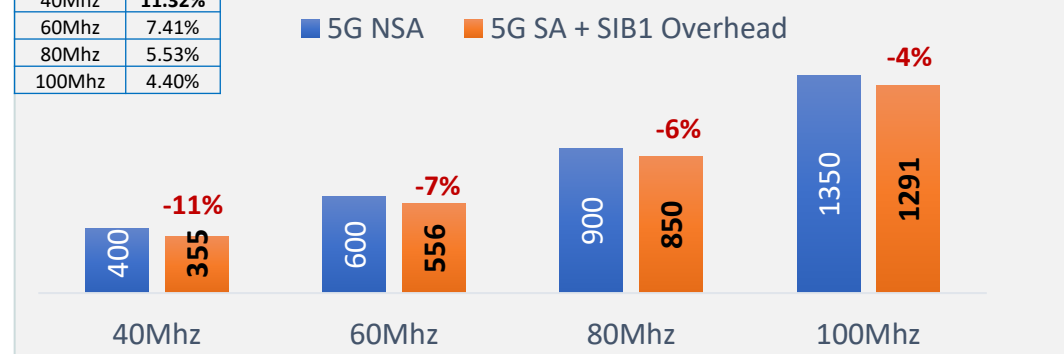
SIB1 Overhead – Estimated calculation

Parameters	Value
SIB1 Periodicity	20
Slot duration(ms)	0.5
Total Slots in 20msec cycle	40
Frame assignment	8:2
SIB1 Occupied DL Slots in 8:2	32
DL RBs occupied for SIB1 in 8 Slots	48
Total Channel Bandwidth RBs	106
SIB1 Total Occupied RBs	12
SIB1 Overhead	11.32%

SIB-CORESET0 Table

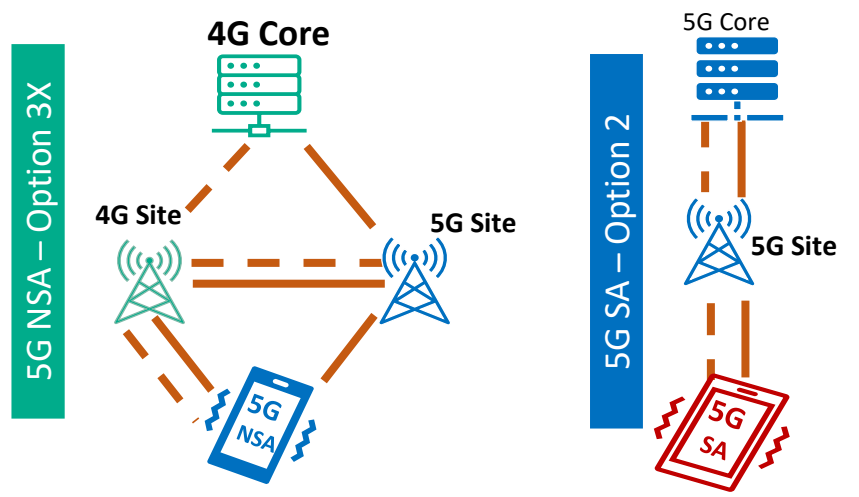
5G Band-width	SIB1 Overhead
40Mhz	11.32%
60Mhz	7.41%
80Mhz	5.53%
100Mhz	4.40%

5G DL User Throughput (Mbps)

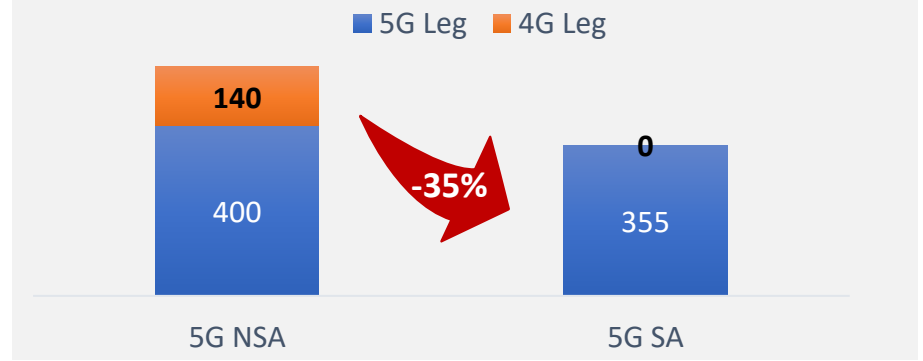


2- No LTE Data Splitting in 5G SA

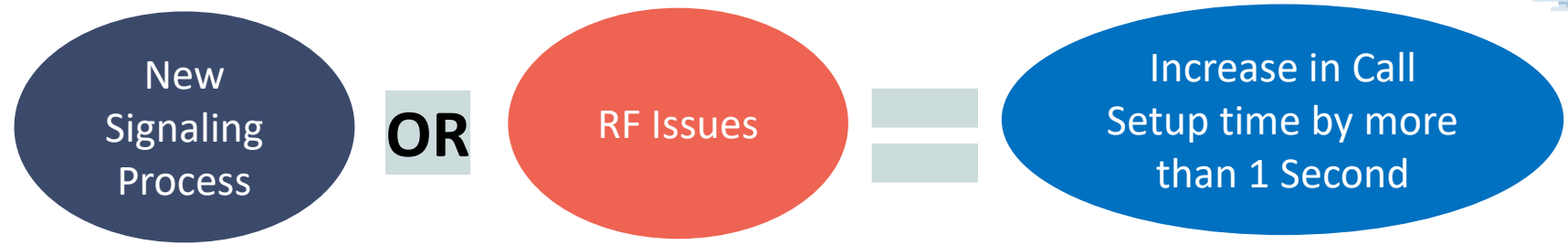
- 5G SA Speed will only be generated from 5G Leg.



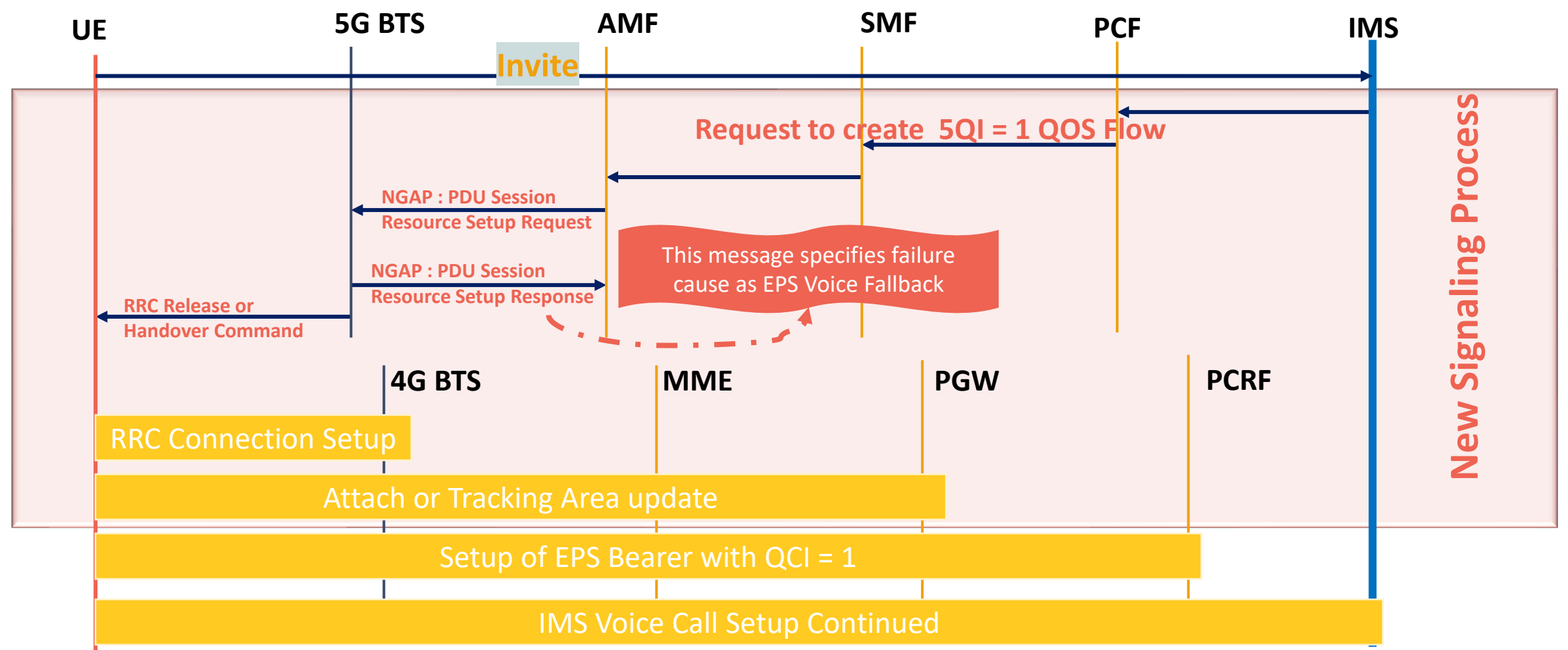
5G DL User Throughput (Mbps)



Higher Call-Setup time delay in case if VONR not supported

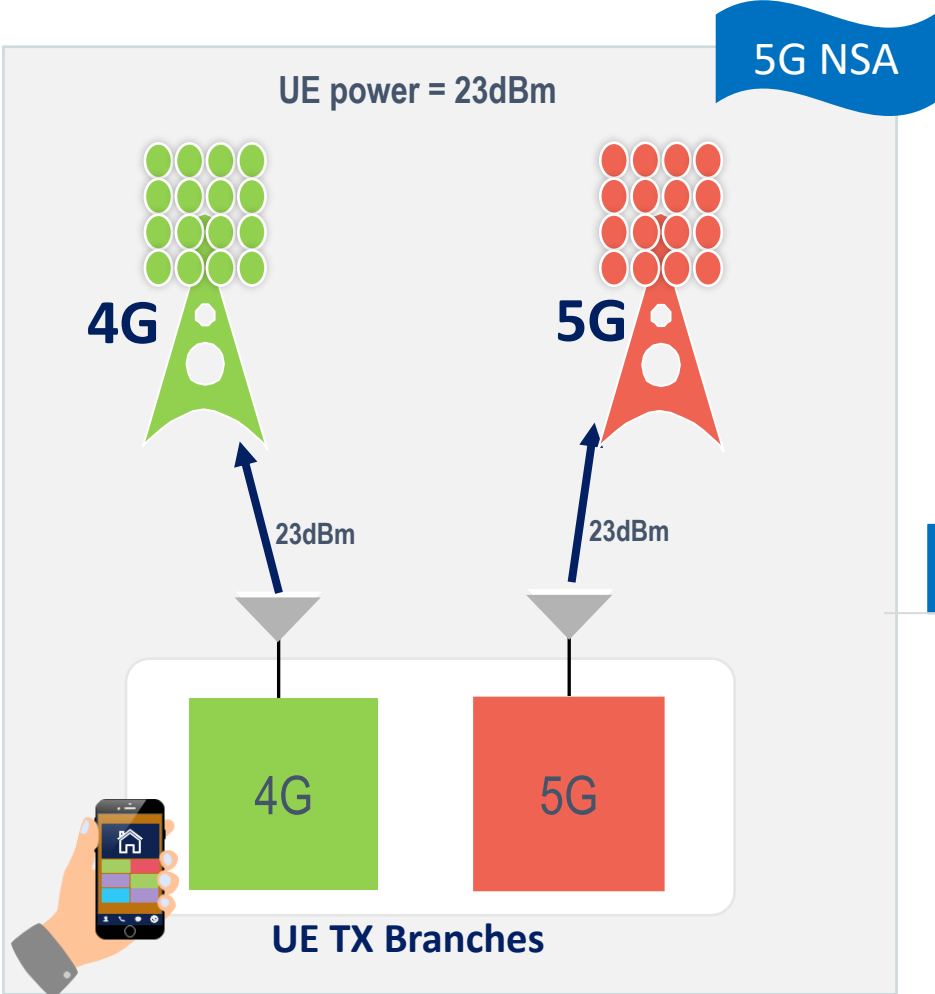


In some abnormal cases, the call setup time might increase by up to 4~5 Seconds

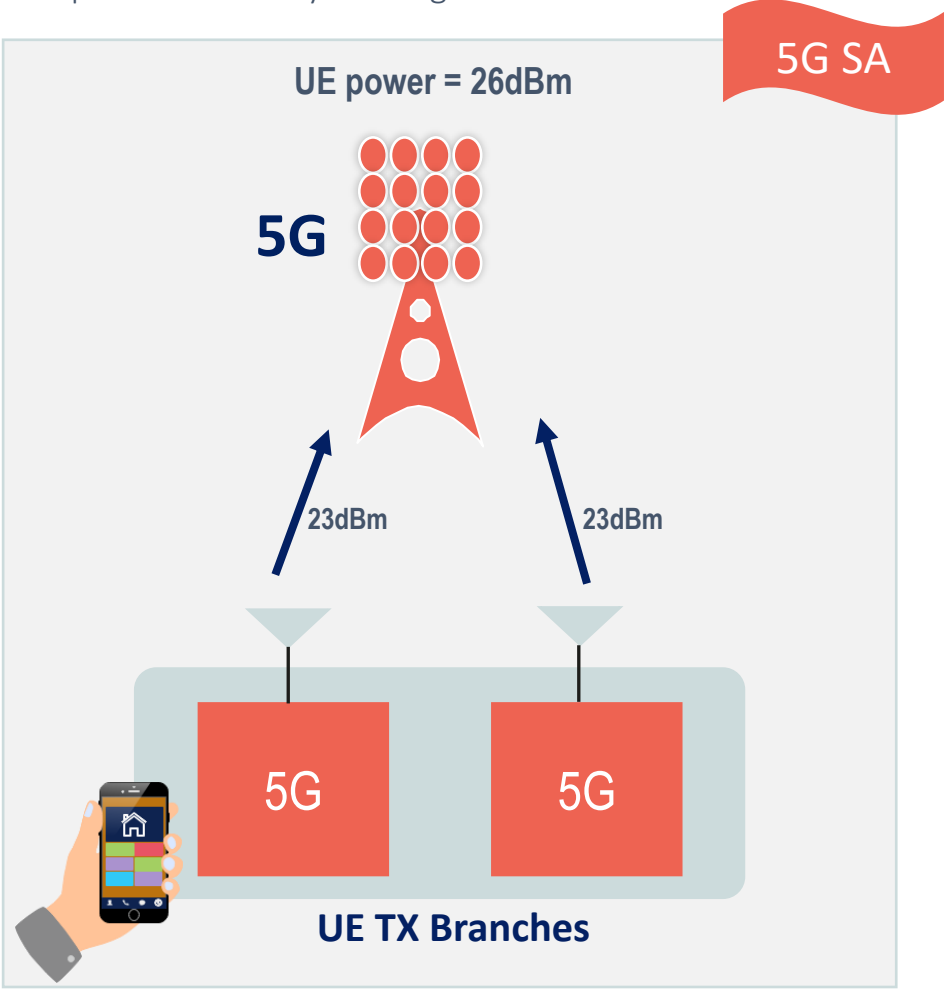


5G Stand-alone offers better UL Coverage and performance compared with 5G NSA

Due to dual connectivity, UE will lose 3dB Tx power and 1 Tx transmission channel in NSA architecture.



SA architecture offers better coverage by 3dB and better UL speed due to fully utilizing 2 UE TX for SA.



*This example assuming UE Capability supporting 26dB