

FR2 RRM requirements evolution

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Beam management L1 measurement enhancement in FR2

- Motivation

- As UE BM related processing capability may be limited (e.g. number of BM resources), network either configures limited BM resources which results in frequent reconfiguration of BM resources; or network configures more resources over UE capability, in which case resources to be measured are up to UE implementation.

```
BeamManagementSSB-CSI-RS ::= SEQUENCE {  
    maxNumberSSB-CSI-RS-ResourceOneTx    ENUMERATED {n0, n8, n16, n32, n64},  
    maxNumberCSI-RS-Resource             ENUMERATED {n0, n4, n8, n16, n32, n64},  
    maxNumberCSI-RS-ResourceTwoTx       ENUMERATED {n0, n4, n8, n16, n32, n64},  
    supportedCSI-RS-Density              ENUMERATED {one, three, oneAndThree}  
    maxNumberAperiodicCSI-RS-Resource    ENUMERATED {n0, n1, n4, n8, n16, n32, n64}  
}
```

- Even if UE has high processing capability, and network configures large resources, UE has to measure **all** configured BM resources, which degrades UE power efficiency.

- R18 Proposal:

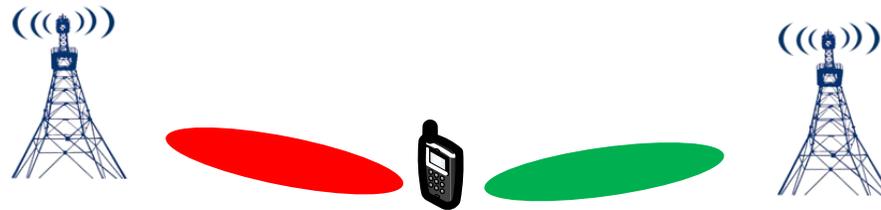
- Enable Network to configure more resources to avoid frequent re-configuration
- Standard UE behavior on how to measure on limited configured BM resources

Mobility enhancement in FR2

- Motivation

- In R16, DAPS is not applicable to FR2-FR2 handover
- For IBM supported UE, it is feasible to support inter-band FR2-FR2 DAPS handover

- 6.1.3 NR DAPS Handover
 - 6.1.3.1 Introduction
 - 6.1.3.2 NR FR1 - NR FR1 DAPS Handover
 - 6.1.3.3 NR FR2- NR FR1 DAPS Handover
 - 6.1.3.4 NR FR1- NR FR2 DAPS Handover



Source cell @ f1 in FR2 band #a

Target cell @ f2 in FR2 band #b

- R18 Proposal

- Support FR2-FR2 DAPS handover for inter-band scenario

SCell activation enhancement in FR2

- Motivation

- FR2 SCell activation is based on TCI indication from NW for PDCCH, PDSCH and CSI-RS for CSI. This requires NW to indicate TCI during activation process, and delays the usage of the SCell
- FR2 SCell activation for unknown SCell involves L1-RSRP measurement and reporting where L1-RSRP measurement requires UE Rx beam sweeping. Long delay is consumed.

If the PCell/PSCell and the target SCell are configured as FR1-FR2 CA or if the PCell/PSCell and the target SCell are in a FR2 band pair with independent beam management, and the target SCell is unknown to UE and semi-persistent CSI-RS is used for CSI reporting, provided that the side condition $\hat{E}_s/I_{ot} \geq -2\text{dB}$ is fulfilled, then $T_{\text{activation_time}}$ is:

$$- 6\text{ms} + T_{\text{FirstSSB_MAX}} + 15 * T_{\text{SMTc_MAX}} + 8 * T_{\text{rs}} + T_{\text{L1-RSRP, measure}} + T_{\text{L1-RSRP, report}} + T_{\text{HARQ}} + \max(T_{\text{uncertainty_MAC}} + T_{\text{FineTiming}} + 2\text{ms}, T_{\text{uncertainty_SP}}).$$

- In R16 no requirements for multiple SCell activation/deactivation in FR2 inter-band CA (Only FR2 in one band is considered in R16)

- R18 Proposal:

- Enhance SCell activation enhancement in FR2
 - Minimize or eliminate the time needed for TCI indication during activation process
 - Minimize or eliminate the time needed for L1-RSRP measurement and/or reporting during activation process
- Multiple SCell activation/deactivation in FR2 inter-band CA

BWP switch enhancement in FR2

- Motivation

- In FR2 BWP switching delay for type2 is considerably large

	NR Slot length (ms)	BWP switch delay $T_{\text{BWPswitchDelay}}$ (slots)	
		Type 1 ^{Note 1}	Type 2 ^{Note 1}
0	1	1	3
1	0.5	2	5
2	0.25	3	9
3	0.125	6	18

Note 1: Depends on UE capability.
Note 2: If the BWP switch involves changing of SCS, the BWP switch delay is determined by the smaller SCS between the SCS before BWP switch and the SCS after BWP switch.

- Single CC BWP switch is the baseline for Scell dormancy and BWP switch in multiple CC

- R18 Proposal:

- Enhance BWP switching delay in FR2