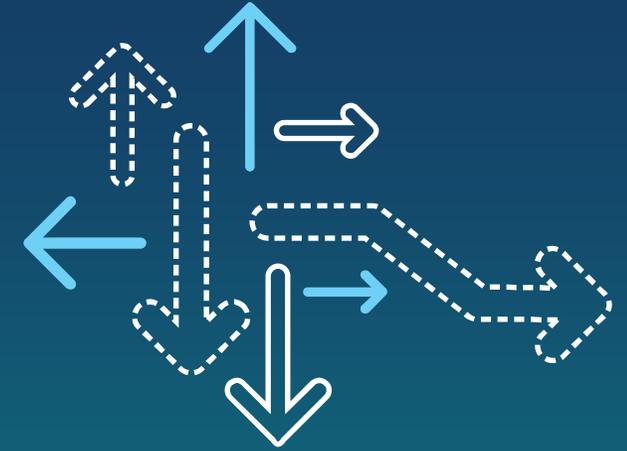


RP-190626

3GPP RAN #83
Shenzhen, China
March 18-21, 2019



LTE Gapless Measurement on FR2

Qualcomm Incorporated, Verizon, AT&T, KDDI, Nokia, OPPO, Softbank Mobile

FR2 Measurement in LTE Standalone (SA)

Scenario:

UE is served by a LTE SA cell and is requested to perform IRAT measurement on FR2

Current supported options in 3GPP Rel. 15:

Option#1: Per-UE measurement gap

- UE has to tune away from LTE when performing measurement on FR2

Challenges

- *Throughput degradation*, as UE will not be served during gap
- *Gap-SSB alignment*: NW has to align the gap on LTE, for all NR capable UEs, with the SSB window

Option#2: Per-FR measurement gap

- Gapless measurement on FR2 could be performed

Challenges: need for *multiple / significant concurrency requirements* to be supported, to list few:

- LTE to FR2 gapless search
- FR1 to FR2 gapless search
- EN-DC (LTE+FR1) to FR2 gapless search
- Gap search with independent gaps for multiple RAT combos
- ...

FR2 Gapless Measurement in LTE SA

UE may have the ability to support FR2 gapless measurement in limited cases

- There can be sets of devices that:
 - Support FR2 gapless measurement while the UE is served by LTE serving cells (only)
 - But do not support all FR2 gapless measurements, and independent gaps, required by “per-FR” gap feature
 1. LTE to FR2 gapless measurement
 - ~~2. FR1 to FR2 gapless measurement~~
 - ~~3. EN-DC (LTE+FR1) to FR2 gapless measurement~~
 - ~~4. Gap based measurement with independent gap pattern for multiple combination of RATs~~
- Such devices can overcome the challenges raised earlier, while still providing the benefits of gapless measurements on FR2.
- Such UE capability is not supported by current signalling options

Proposal

FR2 Gapless Measurement in LTE SA (only)

- **Proposal:** Support an optional capability for FR2 Gapless measurement in LTE standalone
 - “Per-UE” Boolean flag, irrespective of the FR2 band, e.g. (pseudo RRC/ASN1 text):

```
IRAT-ParametersNR-v15xy ::= SEQUENCE {  
    MeasFR2-WithoutGap-r15    ENUMERATED {supported}  
    OPTIONAL}
```

MeasFR2-WithoutGap:

Indicates whether the UE supports gapless FR2 measurement for NR, while the UE is served by only E-UTRA serving cell(s).

- No interoperability issues
 - *Optional, with UE capability signaling*
- Spec changes: minor
 - *36.331 (UE capability signalling) & 36.306 (UE capability definition)*

Annex

RAN2 Background

- “Per-FR gap” capability defined in TS38.306 today

independentGapConfig

This field indicates whether the UE supports two independent measurement gap configurations for FR1 and FR2 specified in TS 38.133 [5]. The field also indicates whether the UE supports the FR2 inter-RAT measurement without gaps when EN-DC is not configured.

- The highlighted part was added by CR [R2-1817040](#), based on RAN4 input [R2-1813531](#) (R4-1811405)
- The proposal described in previous slides was submitted and discussed at RAN2#105 (Feb 2019)
 - See R2-1902688 (summary of offline discussion)
 - Large support (10-12 companies)
 - Few concerns (1-2 companies)
 - No agreement
 - “RAN2 could not conclude on the addition of this new capability”