3GPP TSG-RAN WG2 #106 Tdoc R2-19xxxxx

Reno, Nevada, USA 13th - 17th May 2019

Agenda Item: x.x.x

Source: Ericsson

Title: Email discussion summary [105bis#12][NR/R15] Filters used to generate FeatureSets (Ericsson)

Document for: Discussion, Decision

# 1 Introduction

This document reports the following e-mail discussion:

[105bis#12][NR/R15] Filters used to generate FeatureSets (Ericsson)

To progress both 36.331 and 38.331 CRs to the next meeting

Intended outcome: CRs submitted to the next meeting

Deadline: Thursday 2019-05-02

# 2 Discussion

## 2.1 Consistency of Feature Set IDs according to filtering

In 38.331, 5.6.1.4 clause has the following procedures:

#### 5.6.1.4 Setting band combinations, feature set combinations and feature sets supported by the UE

The UE invokes the procedures in this clause if the NR or E-UTRA network requests UE capabilities for *nr*, *eutra-nr* or *eutra*. This procedure is invoked once per requested *rat-Type* (see clause 5.6.1.3 for capability enquiry by the NR network; see TS 36.331 [10], clause 5.6.3.3 for capability enquiry by the E-UTRA network). The UE shall ensure that the feature set IDs and feature set combination IDs are consistent across feature sets, feature set combinations and band combinations in all three UE capability containers that the network queries with the same *frequencyBandListFilter* and with the same eutra-nr-only flag (where applicable).

It is thus unclear whether consistency of feature set IDs and feature set combination IDs also applies for SRS carrier switching request. An example is given below to explain what it implies whether this consistency is applicable or not to SRS carrier switching request.

1) Consistency of feature set IDs and feature set combination IDs **applies** to SRS carrier switching request.

- Network performs a capability request for ***rat-Type* *eutra-nr*** including *FreqBandList* with bands A, B and C, and including ***srs-SwitchingTimeRequest* field**;

- When performing a subsequent request for ***rat-Type* *nr***, it should use the same *FreqBandList* (i.e. with bands A, B and C) and:

- If it includes *srs-SwitchingTimeRequest* field, it will expect that feature set IDs and feature set combination IDs are consistent between the former and current request;

- If it does not include *srs-SwitchingTimeRequest* field, it will not expect that feature set IDs and feature set combination IDs are consistent between the former and current request. Therefore, the network should either perform both *rat-Type* *eutra-nr* and *nr* requests with *srs-SwitchingTimeRequest* field or both requests without it;

2) Consistency of feature set IDs and feature set combination IDs **does not apply** to SRS carrier switching request.

- Network performs a capability request for ***rat-Type* *eutra-nr*** including *FreqBandList* with bands A, B and C, and including ***srs-SwitchingTimeRequest* field**;

- When performing a subsequent request for ***rat-Type* *nr***, it should use the same *FreqBandList* (i.e. with bands A, B and C) and:

- If it includes *srs-SwitchingTimeRequest* field, it will expect that feature set IDs and feature set combination IDs are consistent between the former and current request;

- If it does not include *srs-SwitchingTimeRequest* field, it will expect that feature set IDs and feature set combination IDs are consistent between the former and current request. Therefore, regardless of the inclusion or not of *srs-SwitchingTimeRequest* field for current request, feature set IDs and feature set combination IDs should be consistent between the former and current request;

**Question 1: Which is companies preferred option?**

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| **Company** | **1/2** | **Comments** |
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To avoid future confusion on whether specific filters may influence UE reported Feature Set IDs, and to clarify it for the current *srs-SwitchingTimeRequest* field, it was discussed in [1] how to make the statement above more generic, as also captured below:

#### 5.6.1.4 Setting band combinations, feature set combinations and feature sets supported by the UE

The UE invokes the procedures in this clause if the NR or E-UTRA network requests UE capabilities for *nr*, *eutra-nr* or *eutra*. This procedure is invoked once per requested *rat-Type* (see clause 5.6.1.3 for capability enquiry by the NR network; see TS 36.331 [10], clause 5.6.3.3 for capability enquiry by the E-UTRA network). The UE shall ensure that the feature set IDs and feature set combination IDs are consistent across feature sets, feature set combinations and band combinations in all three UE capability containers that the network queries with the same filters, i.e. UE-*CapabilityRequestFilterNR* and fields in *UECapabilityEnquiry* message (i.e. *requestedFreqBandsNR-MRDC*, *requestedCapabilityNR* and *eutra-nr-only* flag) as defined in TS 36.331 [x]where applicable.

The change above would also account for option 1 described for Question 1. It should be noted, however, that even if option 2 is preferred in Question 1, this should also be clarified in the same statement above. In general, the change would avoid the need to explicitly state filters and thus also avoid that new filters are included in the future without proper handling in the statement above.

**Question 2: Do companies agree to have the general statement above? Companies are also encouraged to provide comments to improve the statement if needed, or to express why the statement should not be added.**

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| **Company** | **Yes/No?** | **Comments** |
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## 2.2 Missing aspects on TS 36.331 for SRS carrier switching request

In [2] it was discussed that SRS carrier switching request handling is missing in 36.331. Two changes are proposed in [2]:

START OF FIRST CHANGE

3> if the UE supports EN-DC and if *requestedFreqBandsNR-MRDC* is included in the request:

4> include into *featureSetsEUTRA* the feature sets that are applicable for the received *requestedFreqBandsNR-MRDC* and *requestedCapabilityNR* (if present) as specified in TS 38.331 [82], clause 5.6.1.4.

END OF FIRST CHANGE

START OF SECOND CHANGE

2> if the *ue-CapabilityRequest* includes *eutra-nr* and if the UE supports EN-DC:

3> include the UE radio access capabilities for EUTRA-NR within a *ue-CapabilityRAT-Container*, with the *rat-Type* set to *eutra-nr*;

3> include band combinations and feature sets as specified in TS 38.331 [82], clause 5.6.1.4, considering the included *requestedFreqBandsNR-MRDC* and *requestedCapabilityNR* (if present)*;*

END OF SECOND CHANGE

In principle, first change would enable *srs-SwitchingTimeRequest* field to be taken into consideration for feature set generation, i.e. it would enable option 1 in question 1 (section 2.1); while option 2 in question 1 would not require any change. After further checking, however, it is identified that first change is not needed, even if option 1 is preferred in question 1. This is motivated by the fact that for *eutra-nr-only* flag, no handling is present in Feature Sets procedural text in 36.331 for *rat-Type* set to *eutra-nr*. But as stated in clause 5.6.1.4 from 38.331, *eutra-nr-only* should be taken into consideration for the report of consistent feature set IDs and feature set combination IDs.

1. No procedure in 36.331 feature set handling is defined for *eutra-nr-only* flag when *rat-Type* is set to *eutra-nr.*
2. 38.331 procedures already account that *eutra-nr-only* should be taken into consideration for the report of consistent feature set IDs and feature set combination IDs.

The mapping of procedural text and handling of *eutra-nr-only* flag is given in the example below:

1) eNB performs a capability request for ***rat-Type* *eutra-nr*** including *FreqBandList* with bands A, B and C, and including ***eutra-nr-only* flag**;

- No procedures are defined in 36.331 on how to handle the flag specifically for *rat-Type* *eutra-nr*.

- Procedures in 38.331 state that *eutra-nr-only* flag should be taken into consideration for the report of consistent feature set IDs and feature set combination IDs.

- No procedures are defined in 38.331 on how to handle the flag specifically for *rat-Type* *eutra-nr*. This should be straightforward since, apart from feature sets, the flag should not further influence on procedures for *rat-Type* *eutra-nr.*

- When performing a subsequent request for ***rat-Type* *nr***, it should use the same *FreqBandList* (i.e. with bands A, B and C) and ***eutra-nr-only* flag**;

- Procedures are defined in 36.331 on how to handle the flag for *rat-Type* *nr*.

- Procedures in 38.331 state that *eutra-nr-only* flag should be taken into consideration for the report of consistent feature set IDs and feature set combination IDs.

- Procedures are defined in 38.331 on how to handle the flag for *rat-Type* *nr*.

Therefore, similar to *eutra-nr-only* flag case, it seems current 38.331 procedures are also sufficient even if option 1 in question 1 (section 2.1) is the preferred one.

1. No further procedure in 36.331 feature set handling is needed for *srs-SwitchingTimeRequest*.

NOTE: Whether this is also applicable to late drop filters should be discussed as part of late drop.

**Question 3: Do companies agree with Observation 3?**

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| **Company** | **Yes/No?** | **Comments** |
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While the first change in [2] concerns Feature Set handling, second change in [2] inserts general capability handling for SRS-Switching request for *rat-Type* *eutra-nr*. More specifically, in 38.331, the following procedures apply:

1> else, if the requested *rat-Type* is *eutra-nr*:

2> include into *supportedBandCombinationList* as many E-UTRA-NR band combinations as possible from the list of "candidate band combinations", starting from the first entry;

3> if *srs-SwitchingTimeRequest* is received:

4> if SRS carrier switching is supported;

5> include *srs-SwitchingTimesListNR* and *srs-SwitchingTimesListEUTRA* for each band combination;

4> set *srs-SwitchingTimeRequested* to *true*;

But in 36.331 no handling is defined for SRS-Switching request for *rat-Type* *eutra-nr*, as shown also below:

2> if the *ue-CapabilityRequest* includes *eutra-nr* and if the UE supports EN-DC:

3> include the UE radio access capabilities for EUTRA-NR within a *ue-CapabilityRAT-Container*, with the *rat-Type* set to *eutra-nr*;

3> include band combinations and feature sets as specified in TS 38.331 [82], clause 5.6.1.4, considering the included *requestedFreqBandsNR-MRDC;*

In this manner, second change in [2] would be needed to account for this behaviour. It should also be noted that this would be a change needed regardless of decisions on questions 1-3.

Question 4: Do companies agree that a general handling of *srs-SwitchingTimeRequested* field should be included in 36.331 for *rat-Type eutra-nr*?

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| **Company** | **Yes/No?** | **Comments** |
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# 3 Conclusion

**No table of figures entries found.**

# 4 References

1. R2-1905396, Clarification on filters used to generate FeatureSets, Ericsson, 3GPP TSG-RAN WG2#105bis, Xian, China, 8th – 12th April 2019.
2. R2-1905463, Clarification on filters used to generate FeatureSets, Ericsson, 3GPP TSG-RAN WG2#105bis, Xian, China, 8th – 12th April 2019.