**3GPP TSG RAN WG2#116bis-e R2-220xxxx**

**Electronic meeting, 17th January - 25th January, 2022**

**Source: ZTE Corporation, Sanechips**

**Title:** **[DRAFT] R2-22xxxx Summary of [Offline 877][SON/MDT] MDT aspects (ZTE)**

**Agenda item:** **8.13.3**

**Document for:** **Discussion and Decision**

# Introduction

This is to address following discussion

**[AT116bise][877][SON/MDT] MDT aspects (ZTE)**

      Based on proposals not concluded yet in R2-2201658 and R2-2201691

      Intended outcome: Report with easy agreements and reasonable WF.

 First phase deadline for companies feedback: 22:22 UTC, Friday Jan 21

 Second phase deadline for summary review: 22:22 UTC, Monday Jan 24

Please add company contact details into the following table to assist communication between delegates.

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# Discussion

## D1 configuration

Current TS38.331only allows configuring one D1 per CG while it is agreed that the node holding the PDCP entity would configure the UE with D1 measurements, which means it is possible for both MN and SN to configure UE with D1 measurements, thus for one CG there will be multiple D1 configurations.

In order to resolve to misalignment between current specs and precious agreements two solutions are proposed:

* Option 1: Remove the restriction in 38.331 specs, and allows NW to configure more than one D1 per CG;
* Option 2: Keep current restriction (i.e., one D1 is allowed per CG)

Moreover if option 2 is confirmed RAN2 will need to further clarify how to avoid configuring multiple D1 to UE per one CG. in [2] following alternatives are proposed:

* alt1: Only the node where RLC is terminated can configure D1
* alt 2: Coordination is required to guarantee single DT configuration is used per CG

To align between specs and RAN2 agreements, it is proposed RAN2 to confirm whether multiple D1 can be configured per CG. Companies are encouraged to provide their preference and comments if any in table below.

**Question-1: Which of the following options do you prefer for configuring D1 to UE.**

* **Option 1: Remove the restriction in 38.331 specs, and allows NW to configure more than one D1 per CG;**
* **Option 2: Keep current restriction (i.e., one D1 is allowed per CG)**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Option 2 | Prefer to keep the at most one D1 per CG |
| Ericsson | Option 1 | I think the basis of this restriction in Rel 16 didn’t include **cross node D1 configuration**. In Rel 16, D1 for MCG bearer was configured only by MN and D1 for SCG bearers were configured by SN. **But based on the current agreements in rel 17, cross node configuration is possible** e.g., MN configures D1 for an SCG bearer. Hence, we need to revise this restriction to consider the scenarios when we have cross RAN node configurations in DC scenarios.**Having said that, we propose to revise the text in the specification so that “each node” (MN or SN) can configure at most one D1 configuration per CG (MCG or SCG)** |
| OPPO | Option 2 |  |
| Nokia | Option 2 | Follow made agreement  |
| Sharp  | Option 2 |  |
| Samsung | Option 2 |  |
| Huawei, HiSilicon | Modified option 2 | We want to underline that it is the CU to configure the measConfig in R15~R17. “*measConfig* associated with a CG”“ measurement identity across all CGs”“ one measurement identity per CG” does not mean it is the DU to configure the measurement. Also RAN2 has agreed that the node holding the PDCP entity would configure the UE with D1 measurements,In our understanding, the current text has the following meaning:* For Rel-16, only one network node can configure D1, and thus the text is correct
* For Rel-17, as mentioned by the email rapporteur that “which means it is possible for both MN and SN to configure UE with D1 measurements“, we think the current text is also correct because it is described from network point of view, i.e. MN-CU can configure at most one D1 per CG, SN-CU can configure at most one D1 per CG

In general, we think that the curent text can work by considering RAN2 agreements made so far.If some companies think the current text is not clear, we suggest the following text: to configure at most one measurement identity **per node hosting the PDCP entity** using a reporting configuration with the *ul-DelayValueConfig;***[Ericsson]**Huawei approach is very similar to us (same approach), but in order to capture what they have described in the highlighted text above, we think per CG should be added somewhere in their proposed text. Otherwise, MN can configure D1 measurements “only” either to MN terminated MCG bearer or to the MN terminated SCG bearer. That means configuring D1 for both MN terminated MCG and MN terminated SCG will not be possible. Therefore, if the above text is an agreeable procedural text, we propose the following addition:“**to configure at most one measurement identity per node per CG using a reporting configuration with the *ul-DelayValueConfig;****”*Given the limited time we think this is the simplest solution with minimum standard impact. |
| CMCC | See comments | Support the modification by Huawei, which can reflect the agreement and is clear. |
| ZTE |  | Share same view as Huawei |
| CATT | Option 2 | Keeping the current restriction for configuring D1 can reduce the overhead. |
| Apple | Option 2  |  |

**Question-1a: If your answer to Q1 is option 2, please further indicate which of the following alternatives you prefer to guarantee only one D1 is configured per CG?**

* **Alt1: Only the node where RLC is terminated can configure D1**
* **Alt 2: Coordination is required to guarantee single D1 configuration is used per CG**
* **Others (Please indicate in comments if you have other suggestions)**

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| **Company** | **Alt1/Alt2/others** | **Comments** |
| Qualcomm | Alt2 | MN and SN can coordinate to make sure that a single onfiguration is used per CG. |
| Ericsson |  | We prefer Option 1 in Question 1. If that is not agreeable to revise the restriction so that each node configure at most one D1 per CG, then we prefer Alt1 |
| OPPO | Alt2 | Alt1 seems breaking the agreement already made by us that the node holding the PDCP entity could configure the UE with D1 measurements |
| Nokia | Alt2, but | Can be left to nework implementation  |
| Sharp  | Alt 2 |  |
| Samsung | Alt 2 |  |
| Huawei, HiSilicon |  | See our comments in Q-1.We think the node here should be: **the node where PDCP is terminated can configure D1**. |
| CMCC |  | Agree with Huawei. |
| ZTE |  | We found following statement in subclause 4.2.2 of TS 37340:“From a network perspective, each bearer (MCG, SCG and split bearer) can be terminated either in MN or in SN. ” therefore if confirmed only the node PDCP is terminated can configure D1 then it shall be able to align with existing specification. |
| CATT | Alt2 | The coordination between MN and SN can guarantee single D1 configurarion per CG.  |
| Apple | Alt 2 |  |

**Rapporteur summary:**

To be added later

## Signalling-based logged MDT protection

It remains uncertain if explicit or implicit T330 indication is needed for signalling based MDT protection. Furthermore, based on companies’ comments in Tuesday online session it worth clarifying that whether to use two indications (both sigLogMeasConfigAvailable and T330 status), or to use one indication (either T330 status or sigLogMeasConfigAvailable) to prevent signalling based MDT configuration from overwritten by management based MDT. Based on contribution in [1][2], following are possible options:

* **Opt1: Implicit solution:**
* The UE can report the flag of T330 status (whether it is running or not)
* T330 status is present if the UE has sig-based logged MDT config or if UE has sig-based logged MDT results otherwise it is absent:
* If T330 status is present, the flag is set to true (or running) if T330 is running, otherwise set to false (or expiry)
* **Opt2: Explicit solution:**
* The UE can report the flag of available sig-based logged MDT, e.g. ENUMERATE {true}
* If the UE has sig-based logged MDT config or if UE has sig-based logged MDT results, the flag is set, otherwise absence
* **Opt3: Both indication as given in opt1/2 is used.**

To have a better comparison of each solutions, the required indications of each solution for different scenarios are summarized in table below.

(logMeasAvailable is legacy indication used to indicate the availability of MDT results regardless type )

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| --- | --- | --- | --- |
| Scenarios | Option1 | Option 2 | Option 3 |
| Scenario 1:Available signalling MDT configuration and available signalling based MDT results | T330 status set to truelogMeasAvailable  | sigLogMeasConfigAvailable logMeasAvailable  | T330 status set to truesigLogMeasConfigAvailable logMeasAvailable  |
| Scenario 2:Available signalling MDT configuration and no available results | T330 status set to true | sigLogMeasConfigAvailable | T330 status set to truesigLogMeasConfigAvailable |
| Scenario 3:No signalling MDT configuration (i.e., T330 expired) and available signalling results | T330 status set to falselogMeasAvailable  | sigLogMeasConfigAvailablelogMeasAvailable  | T330 status set to falsesigLogMeasConfigAvailablelogMeasAvailable  |
| Others | logMeasAvailable is optionally present if there is management based MDT results availableT330 status is absent | logMeasAvailable is optionally present if there is management based MDT results availablesigLogMeasConfigAvailableis absent | logMeasAvailable is optionally present if there is management based MDT results availablesigLogMeasConfigAvailable is absentT330 status is absent |

Based on above table, it can be observed that all solutions can help NW to know if there is available signalling based logged MDT configuration and/or signalling based logged MDT results. But apparently two indication (i.e., T330 status and sigLogMeasConfigAvailable) can achieve the same purpose thus no need to duplicate this information.

Further based on the comparison table above it can be observed that option 1 can further help NW to differentiate each individual scenarios based on different T330 status in combination with logMeasAvailable indication.

Based on above analysis it is proposed to first confirm that only one explicit indication is needed for signalling based MDT protection. (ffs sigLogMeasConfigAvailable or T330 status )

**Question-2: Do you agree only one explicit indication is needed for signalling based MDT protection. (ffs sigLogMeasConfigAvailable or T330 status ). Please add your comments if any.**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Agree | “T330 status“ indication reporting only when signaling-based logged MDT is configured provides the required information. Therefore, one explicit indicator is sufficient.  |
| Ericsson | We agree but | In RAN2#115 it has been agreed to have an explicit flag for the T330 timer status 4 Include an indicator to indicate the signaling based logged MDT configuration availability in RRCSetupComplete / RRCConnectionSetupComplete and RRCResumeComplete / RRCConnectionResumeComplete. FFS: Implicit (flag indicating T330 is running or not) vs explicit indication5 UE includes an indication regarding whether the T330 timer is running or not in RRCSetupComplete / RRCConnectionSetupComplete and RRCResumeComplete / RRCConnectionResumeComplete.While the FFS under agreement number 4 questions whether to use the same flag i.e., T330 timer status flag to indicate whether the UE is configured with the signalling based MDT measurement configuration or not.According to the RRC spec, T330 timer will be always running as long as the UE is configured with the signalling based MDT configuration and the configuration will be released when the timer expired. Hence T330 timer status flag implicitly indicates that UE is configured with the signalling based MDT configuration.**Hence we agree that only one flag (i.e., T330 timer status flag) is enough.** |
| OPPO | Agree | From the above analysis, it could be found that one explict indication, either sigLogMeasConfigAvailable or T330 status, is enough |
| **Nokia** | Agree | One explicit indicator on configuration presence: sigLogMeasConfigAvailable, as this cover all cases and avoids extra complexity |
| Sharp  | Agree  | One indication is enough. |
| Samsung | Agree | One explicit indication is sufficient |
| Huawei, HiSilicon | Agree | We think one indication is enough, and name/meaning of the indication can be further discussed. |
| CMCC | Agree | One indication is enough. |
| ZTE | Agree |  |
| CATT | Agree | One explicit indicator is enough. |
| Apple | Agree |  |

**Rapporteur summary:**

To be added later

Furthermore companies are invited to show preference on which options are preferred to assist signalling MDT protection.

**Question-2a: Which of the following options do you prefer for UE to perform signalling based MDT protection in logged MDT:**

* **Opt1: Implicit solution:**
* The UE can report the flag of T330 status (whether it is running or not)
* T330 status is present if the UE has sig-based logged MDT config or if UE has sig-based logged MDT results otherwise it is absent:
* If T330 status is present, the flag is set to true (or running) if T330 is running, otherwise set to false (or expiry)
* **Opt2: Explicit solution:**
* The UE can report the flag of available sig-based logged MDT, e.g. ENUMERATE {true}
* If the UE has sig-based logged MDT config or if UE has sig-based logged MDT results, the flag is set, otherwise absence
* **Others (Please indicate in comments if you have other suggestions)**

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| **Company** | **opt1/opt2/others** | **Comments** |
| Qualcomm | Option 1 | In RAN2#115-emeeting, we had the following agreements:* Include an indicator to indicate the signaling based logged MDT configuration availability in RRCSetupComplete / RRCConnectionSetupComplete and RRCResumeComplete / RRCConnectionResumeComplete. FFS: Implicit (flag indicating T330 is running or not) vs explicit indication
* UE includes an indication regarding whether the T330 timer is running or not in RRCSetupComplete / RRCConnectionSetupComplete and RRCResumeComplete / RRCConnectionResumeComplete.

Considering our previous agreement, UE can include the flag to indicate “whether the T330 timer is running or not”. Furthermore, to reduce the signaling overhead, we can include the agreed flag only if signaling-based logged MDT is configured at the UE. This provides the required information “whether signaling-based logged MDT is configured (implicitly)” and “whether T330 is running” without much signaling overhead.  |
| Ericsson | Option 1 |  |
| OPPO | T330 variant | T330 status only tells the network currently there is signaling-based MDT is configured in UE. But how long time left for the T330 to be expired is not known by the network, which is not good for the network to know from when to send the management-based MDT towards the UE is likely to be proper.Another way is to indicate the catogry of the time left for the T330 to be expired to the Network, for example: long time left, short time left (<1 hour may be), which also consumes only 1 bit. |
| **Nokia** | Modified Opt 2 | We are confused about the question on EMR?But when it comes to reporting assistance information, in our understanding the agreement: Include an indicator to indicate the signaling based logged MDT configuration availability in RRCSetupComplete / RRCConnectionSetupComplete and RRCResumeComplete / RRCConnectionResumeComplete.Was on explicit indicator and thats why rapporteurs implemented the flag in the runnign CRs.It should be always send, there is no point to introduce complexity with teh second condition:* If the UE has sig-based logged MDT config or if UE has sig-based logged MDT results, the flag is set, otherwise absence

As this will be known from the legacy flag on data availability. |
| Sharp  | Option 2 | We shared Nokia’s view for the undersntanding of the agreement. The explicit indicator is used to indicate the signaling based logged MDT configuration availability. |
| Samsung | Option 2 | Option 2 seems further clear signalling. RAN2 made the following agreement for signaling based logged MDT override protection:*Signaling based logged MDT override protection is applicable in the following scenarios:**1) Signaling based Logged MDT is configured, but no results are available e.g. so far nothing stored, or all previously stored results retrieved**2) Signaling based Logged MDT configuration is stopped (i.e. the expiry of T330), but UE still has un-retrieved results that would be discarded upon accepting a new configuration*Running T330 is just one of protection scenarios above. Furthermore, the suggested ‘T330 status‘ should implicitly include other scenarios.Thus, generally, the option 2 is preferable. In the option 2, the flag of available sig-based logged MDT would means that UE is in the protection scenario(s). |
| Huawei, HiSilicon | Modified Opt 2 | First, we think RAN2 has agreed that the ssistance information is used to indicate the signaling based logged MDT configuration availability, so we think using the sigLogMeasConfigAvailable IE name is straightforward.Secondly, We agree with the comments from Nokia that the second condition is not needed and can be modified as the following.* If the UE has sig-based logged MDT config, the flag is set to true;
* Else if the UE has released the sig-based logged MDT configuration, the flag is set to false;
* Else: the flag is absent. (i.e. the UE has not been configured the sig-based logged MDT)

We think the network can know the Scenario 3 based on the sigLogMeasConfigAvailable (the flag is set to false) and the legacy available flag on logged MDT results. An example of modified opt 2 is shown as below:Scenario 1: sigLogMeasConfigAvailable = true; logMeasAvailableScenario 2: sigLogMeasConfigAvailable = true;Scenario 3: sigLogMeasConfigAvailable = false; logMeasAvailableOthers: sigLogMeasConfigAvailable is absent; logMeasAvailable of the m-based logged MDT |
| CMCC | Option2 |  |
| ZTE | Option 1 or option 2 | Based on comments we think either can work. The only difference is the terminology of IE and filed description. Regarding the question from Nokia why the following condition is needed:* If the UE has sig-based logged MDT config or if UE has sig-based logged MDT results, the flag is set, otherwise absence

I think the intention is that when there is no available signalling based MDT configuration but only signalling based MDT results, and only legacy availability results is stored NW cannot know if the unfetched results is signalling based or management based since there is for logged MDT once the configuration is configured there is no need for NW to store the context anymore. |
| CATT | Option 2 | Considering that the initial problem we want to solve is how to prevent signalling based MDT configuration from overwritten by management based MDT, one explicit indication is enough. If the signaling based logged MDT configuration and/or signaling based logged MDT results is available, the indication is set to true; otherwise, the indication is absent as current running CR captured. We concerned that opt1(implicit solution) may bring some ambiguity/misunderstanding in the interpretation of the parameter in the future. Therefore, we prefer opt2. |
| Apple | Option 2 |  |

**Rapporteur summary:**

To be added later

## EMR

Based on [1] there are two interpretation on how *earlyMeasIndication-r17* and *AreaConfig* and/or *InterFreqTargetInfo* iscan be used in combination. And the main difference is how to interpret *earlyMeasIndication-r17,* which includes following understanding:

* Interpretation 1([R2-2200397](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200397.zip)): It is used to indicate whether UE log early Measurement frequency results in logged MDT based on MDT principles or based on early measurement principles
* Interpretation 2([R2-2200889](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200889.zip)): It is used to indicate whether UE shall log early measurement results in logged MDT or not.

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Further, following options has been proposed to interpret different configuration of *earlyMeasIndication-r17* and extended *AreaConfig* and/or *InterFreqTargetInfo:*

* Opt 1[([R2-2200397](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200397.zip))], following detailed behavior are proposed:
1. If *earlyMeasIndication-r17* is configured in *loggedMeasurementConfiguration* and extended *AreaConfig* and/or *InterFreqTargetInfo* is not present:

- UE performs logged MDT measurement and logging according to legacy MDT measurement performance principles

 - UE logs early measurement results which is measured based on early measurement performance principles in logged MDT measurement report

1. If *earlyMeasIndication-r17* is not configured in *oggedMeasurementConfiguration* and extended *AreaConfig* and/or *InterFreqTargetInfo* is present:

- UE performs logged MDT measurement and logging according to legacy MDT measurement performance principles

1. If *earlyMeasIndication-r17* is configured in *oggedMeasurementConfiguration* and extended *AreaConfig* and/or *InterFreqTargetInfo* is present:

- UE ignores *earlyMeasIndication-r17*

- UE performs logged MDT measurement and logging according to legacy MDT measurement performance principles

* Opt 2 ([R2-2200889](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200889.zip)) detailed understanding of EMR related MDT configuration is as below (for ease of reading we have provided the text proposal in the Annex A in paper [R2-2200889](file://D://3GPP%20Sync%5C%5CRAN2%5C%5CTSGR2_116bis-e%5C%5CDocs%5C%5CR2-2200889.zip)):
1. The UE can be configured with an explicit flag to indicate whether early measurement related frequencies should be logged in MDT report
	1. If this flag is present, then the UE is allowed to log early measurement frequencies in logged MDT report
	2. If this flag is absent, then the UE is not allowed to log early measurement frequencies in logged MDT report
2. If the UE is configured with ***InterFreqTargetInfo*** then the UE performs logging of measurements only on these frequencies.
	1. If the OAM has configured the flag in 1), the OAM is allowed to configure early measurement frequencies in ***InterFreqTargetInfo*** (implementation can take care of such requirement)
3. If the UE is **not** configured with ***InterFreqTargetInfo,*** the UE performs logging of measurements on:
	1. If the flag in 1) is set, the UE logs measurements for early measurements frequencies and reselection frequencies.

**Question-3: which of above understanding do you agree for EMR logging in logged MDT, please indicate in the comments if you have different suggestions.**

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| **Company** | **Opt1/opt2/others** | **Comments** |
| Qualcomm | Opt2 | I have the following understanding:1. UE does not perform any specific measurement for logged MDT. UE just logs the measurements that were performed for cell reselection (in rel-16 and earlier). UE may log the measurements that were performed for EMR (in rel-17) in logged MDT report. UE will not perform any additional measurement.
2. UE may log the measurements on EMR frequencies if *earlyMeasIndication-r17* is set to TRUE. The network needs to configure EMR frequencies in ***InterFreqTargetInfo* only** if it has set *earlyMeasIndication-r17* to TRUE.
 |
| Ericsson | Opt2 | Note that the only different between Option 1 and Option 2 is that in Option 1 if *earlyMeasIndication* is configured in *loggedMeasurementConfiguration* and extended AreaConfig and/or *InterFreqTargetInfo* is present then the UE ignores *earlyMeasIndication*However we think this scenario is practically invalid, if the UE is going to ignore the *earlyMeasIndication* why OAM should configure it at all?We think in such scenario is EM relevance is indicated the UE shall provide the EM for the frequencies included in both InterFreqTargetInfo and early measurement frequencies i.e., measIdleConfig |
| OPPO | Option 1 | Personally, I cannot understand a. in option 1. Whether UE should perform the early measurement MDT should only depends on the presence of the *earlyMeasIndication*. Preferring to avoid complexity for the UE behavour and specification. |
| Nokia | Option 1 | EMR results can be retrieved by the network anyway, no need to extend Logged MDT report with teh same content as early Measuremnet results |
| Sharp  | Option 1 | But we donot fully understand the intention of c in option 1, seems c is not that needed, the network can simply implement it by not configure the *earlyMeasIndication.* |
| Samsung | Opt 2 |  |
| Huawei, HiSilicon | See our comments | In our understanding, the MDT configuration is from the OAM, but the EMR is only from the gNB. It may lead to extra work to know the frequecies of the EMR before configuring the logged MDT.The gNB may configure different EMR frequeices for different UEs (e.g. based on the CA/DC capabilities of the UE), so it is difficult for the OAM to include the EMR frequecies in the frequecies range of logged MDT.Also we need to consider some cases that the network only wants the results of F1 and F2 in the legacy logged MDT, and some nodes want some UEs to perform the measurement of F1, F2 and F3 in the EMR. According to the prinicipes in option 2, the OAM will include the F3 in the frequcies of logged MDT. In this case, if the F3 is also the cell reselection frequecies, the UE will store the results of F3 even if the UE does not have the EMR configuration, which is not reasonable.In general, we think logged MDT and EMR are two different features, so we should avoid the coupling between them. We think the simplest solution is :The OAM will only configure a flag, i.e. whether the EMR results are needed in the logged MDT. In this case, the OAM does not need to know the frequecies of EMR. The UE will send the EMR results together with the legacy logged MDT results to the network if there is *earlyMeasIndication* indication in the logged MDT configuration. |
| **CMCC** | **Option2** |  |
| ZTE | Option 2 |  |
| CATT | Opt1 | We think that the main controversy between Opt1 and Opt2 is whether the extend *InterFreqTargetInfo* is allowed to be configured when the *earlyMeasIndication* is not indicated in *loggedMeasurementConfiguration*. In our view, there is no need to limit the network implementation. If network only configures the extend *InterFreqTargetInfo* in *loggedMeasurementConfiguration*, the UE can  naturally perform logged MDT measurement and logging according to legacy MDT measurement performance principles. |
| **Aple** | **Option 2** | **The „detailed description“ is somewhat unclear though and needs further revision**  |

**Rapporteur summary:**

To be added later

**Moreover following proposal are made in [2] to discuss how to log EMR MDT results together with MDT results:**

**Proposal 4: For how the UE sets the EMR results in logged MDT results, it is proposed to decide on one option from the following options:**

Option A: no impacts to logged MDT results, and the UE just replaces logged MDT results with EMR results

Option B: introduce new fields of EMR results into logged MDT results

**Question-3a: which of following options do you agree for setting EMR results in logged MDT results:**

* **Option 1: no impacts to logged MDT results, and the UE just replaces logged MDT results with EMR results**
* **Option 2: introduce new fields of EMR results into logged MDT results**
* **Option 3: no impact on the ASN.1 but the neighbour cell measurements included in the logged MDT results (*measResultNeighCells*) contains both EMR frequencies measurements (amongst *measIdleCarrierListNR and/or measIdleCarrierListEUTRA)* and cell reselection frequencies measurements (included in SIB4 and SIB5)**
* **Others (please indicate in the comments if you have different understandings)**

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| **Company** | **Opt1/opt2/opt3/others** | **Comments** |
| Qualcomm | Agree with Ericsson’s comment (maybe option3 is most appropriate) | Ue logs measurements on cell-reselection frequencies and EMR frequencies if *earlyMeasIndication-r17* is set to TRUE. |
| Ericsson | Option 3 |  |
| OPPO | Option 2 | The EMR frequencies measurement should be differentiated from the cell reselection frequencies measurement, for the network to know it may be the reason of early measurement configuration is no longer valid, once the EMR frequencies related measurement dispear in the latter logged MDT results. |
| **Nokia** | **Option 3** |  |
| Sharp  | Option 3 |  |
| Samsung | Option 3 | We do not see any need to introduce new fields of EMR results. |
| Huawei, HiSilicon | Option 2 | In the current TS 38.331, we find that EMR results and logged MDT results are not exactly the same, and detailed are shown as below. Following option 1 and 3, we may need to check the Ies one by one and see how the UE performs. Option 2 is a clean approach.MeasResultIdleEUTRA-r16 (for EMR)MeasResultIdleNR-r16 (for EMR)(For logged MDT) measResultServingCell-r16 MeasResultServingCell-r16 OPTIONAL, measResultNeighCells-r16 SEQUENCE { measResultNeighCellListNR MeasResultListLogging2NR-r16 OPTIONAL, measResultNeighCellListEUTRA MeasResultList2EUTRA-r16 OPTIONAL },For option 2, we suggest to put the EMR restuls in the entry level of logged MDT measurements, and the specification impacts are limited. |
| **CMCC** | **Option 3** |  |
| ZTE | Prefer option 2 or modified option 3 is also acceptable | We share similar view with Huawei. Since the ASN.1 design for logged MDT neighboring cell results and EMR results reporting is different, for option 2 UE just copy paste the stored EMR results and put them into LogMeasReport-r16, while for option 3 UE will need to re-fill the results to accommodate with LogMeasInfo structure. Therefore option 2 is a cleaner solution and is preferred.With option 3, since the intention is to combine the EMR and logged MDT results at least the maximum number of results can be stored shall be extended.  |
| CATT | Option 3 | Agree with Ericsson’s comment, Option 3 is more appropriate. |
| **Apple** | **Option 3** |  |

## CEF report

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| --- | --- | --- |
| **TDoc** | **Company name** | **Proposals** |
| [R2-2200397](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200397.zip) | CATT | **Proposal 3: RAN2 to agree only one PLMN could be recorded in the CEF list.****Proposal 4: RAN2 to agree structure 3 (figure 3), i.e. each entry for each connection failure on a cell or on different cell for multiple CEF reports.** |
| [R2-2200648](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200648.zip) | Samsung | **Proposal 1: Clarify that multiple CEF reports are associated with one single cell.** **Proposal 2: Upon RPLMN changes or the latest failure cell changes the UE clears the consecutive connection establishment/resume failure information if stored as in R16.** **Proposal 3: Existing availability indicator (e.g. connEstFailInfoAvailable) is used for indicating single CEF report with multiple CEF information.** **Proposal 4: Existing retrieval indicator (e.g. connEstFailReportReq) is used for retriving single CEF report with multiple CEF information.****Proposal 5: Make the feature of multiple CEF reports optional without reporting.**  |
| [R2-2200889](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200889.zip) | Ericsson | [**Proposal 8 RAN2 introduces a new capability bit for UEs capable of multiple CEF reports.**](#_Toc90647047)[**Proposal 9 RAN2 agree to flush the existing CEF reports upon logging a CEF report in a cell with a new RPLMN identity.**](#_Toc90647048)[**Proposal 10 RAN2 agree that UE logs one CEF report entry in multiple CEF report list, for the failures happening consecutively in the same cell.**](#_Toc90647049)[**Proposal 11 RAN2 agree that the maximum number of CEF reports is equal to 8.**](#_Toc90647050) |
| [R2-2201042](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2201042.zip)  | Nokia, Nokia Shanghai Bell, CMCC | **Proposal 5: UEInformationResponse with multiple CEF reports do not convey detailed RACH reports.****Proposal 6: The UE indicates separate availability indicator for multiple CEF reports.****Proposal 7:** **The UE indicates separate availability indicator for RACH report.** |

Several proposals are made on different aspects on MDT configuration, since this is first time RAN2 discuss details on multiple CEF reports thus all proposals will be considered with possible merging to reduce redundancy.

**Stored conditions**

Three companies made proposals on the condition to store multiple CEF reports and two companies propose to only allow Multiple CEF reports in one PLMN, which means upon change or RPLMN UE will delete the stored CEF if available.

Moreover, following enhancements are raised:

In [R2-2200648](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200648.zip) it is further propose to only allow multiple CEF within the same cell, but based on this solution it also implies that only one PLMN is allowed in multiple CEF.

In [R2-2200889](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200889.zip) is suggest that to allow one CEF entry for consecutive failure in the same cell can further decrease the overhead.

In [R2-2200397](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200397.zip), a comparison is given on how numberOfConnFail and each entry can be stored in case multiple CEF reports are stored and following option is suggest to log multiple CEF report

* Each CEF report can be for the same or different cell ,where numberOfConnFail can be set across cell and is dummy across entries;

Based on above analysis, it is consensus that only one PLMN is allowed in multiple CEF, thus Rapporteur propose first confirm the understanding in P4, and then further discuss which of above options is preferred for logging of multiple CEF report.

**Proposal : Only one PLMN is allowed in multiple CEF reports and UE clears stored connection establishment/resume failure information upon logging a CEF report in a cell with a different RPLMN identity**

**Question-4: Do you agree on above proposal ? Please add your comments if any.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Agree |  |
| Ericsson | Agree |  |
| OPPO | Agree |  |
| Nokia | Agree |  |
| Sharp | Agree |  |
| Samsung | Agree |  |
| Huawei, HiSilicon | Agree |  |
| **CMCC** | **Agree** |  |
| ZTE | Agree |  |
| CATT | Agree |  |
| **Apple** | **Agree** |  |

**Rapporteur summary:**

To be added later

**Question-5: Which of the following alternatives do you prefer for logging multiple CEF reports? Please add your comments if any.**

* **Opt1: UE logs multiple CEF in the same cell**
* **Opt2:UE logs one CEF report entry in multiple CEF report list, for the failures happening consecutively in the same cell.**
* **Opt3: UE logs multiple CEF in the same or different cell and numberOfConnFail can be dummy across different CEF entries**
* **Others (please indicate in comments if you have other suggestions)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Opt1/opt2/opt3/others** | **Comments** |
| Qualcomm | Opt2 | One CEF report entry in multiple CEF report , for the failures happening consecutively in the same cell should be sufficient for a given cell.  |
| Ericsson | Opt 2 | We prefer Option 2, but are fine with Option 3 as well |
| OPPO | Opt2 |  |
| **Nokia** | **Others** | UE should be allowed to log multiple CEF in the same or different cell (no need to dummy), otherwise the report wont reflect the problem  |
| Sharp | Opt2 |  |
| Samsung | Opt1 or Opt 2 | We understand that the difference between Opt 1 and Opt 2 lies in Stage 3 details but either option is OK to us.  |
| Huawei, HiSilicon | Opt1, open to Opt3 | We think the typical use case of UL/DL match is a certain area, and it is very likely to be a cell. So we think that logging of multiple CEF in the same cell should be high priority, and we are also open about logging in different cells. |
| **CMCC** | **Opt 2 or 3** | **Logging multiple CEF report entry seems not no necessary.**  |
| ZTE | Opt 2 | If UE has experience consecutive failure in the same cell only one CEF report is sufficient and numOfConnFail can used to address this information.  |
| CATT | Opt3 | We prefer to Opt3 as it can solve the problem about both intra-cell and inter-cell UL/DL coverage balance. |
| **Apple** | **Opt 2 or 3** |  |

**Rapporteur summary:**

To be added later

It is suggested in [2] to further discuss the maximum number of CEF reports allowed, and in [[R2-2200889](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200889.zip)] 8 is proposed as the max number of CEF report stored.

**Question-6: Do you agree that the maximum number of CEF report is 8? If not please give your suggestion in table below.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree | Considering requirement for UE memory, UE suggest to keep it low, for example, 4.  |
| Ericsson | Agree |  |
| OPPO | Disagree | Agree with Qualcomm, 4 is enough. |
| Nokia | No need to decide now | It depends on the other agreements, if there is one entry for teh same cell 4 may be enough |
| Sharp | Agree |  |
| Samsung | Disagree | We also think that maximum value 4 is sufficient.  |
| Huawei, HiSIlicon | Disagree | One CEF report may be large because it may contain neighbour cell measurements and per RA info, and it may be also extended in the future. So we agree with other companies that 4 is ok. |
| **CMCC** | **No strong view** |  |
| ZTE | No strong view | We are fine with either 4 or 8. |
| CATT | Agree | We are fine to the maximum number of CEF report is 8. |
| **Apple** | **Disagree** | **Agree with Qualcomm, 4 is sufficient** |

**Rapporteur summary:**

To be added later

**CEF content:**

In [R2-2201042](file://D://3GPP%20Sync%5C%5CRAN2%5C%5CTSGR2_116bis-e%5C%5CDocs%5C%5CR2-2201042.zip) it is observed that current CEF mandatory contains perRAInfoList which will be extended to include multiple RACH reports when multiple CEF reports are stored, thus it will lead to problem on associate RA attempt to the corresponding CEF. Therefore it suggests to remove the detailed RA report outside CEF report if multiple CEF report is stored. Rapporteur consider it is important that companies have consensus on how RA information will be included multiple CEF reports therefore suggest to further discuss how to handle the logging of RA information when multiple CEF report is stored.

**Question-7: Do you agree to remove detailed RACH report (i.e., perRAInfoList) out of CEF report if multiple CEF is stored? Please add your comments if any.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree |  |
| Ericsson | Disagree for seperating the perRAInfoList completely from the CEF report | We agree that entire RA report is not needed. We think only perRAInfoList is enough as it is added to the ConnEstFailReport in Rel 16.In addition, maybe some enhancements of RA report in Rel 17 such as msgATransMax and dlpathlossRSRP can be disccused one by one.Regarding separating the perRAInfoList from CEF report, we have some concerns here. This makes the network implemention compelx as a network node has to fetch both RAReport and CEFReport to fetch all the information from the UE. Practically, you will not get any benefit of reducing the size of the CEF report. Further, separating perRAInfoList needs time stamp inclusion in both CEF report and RA report so that the network can coordinate these features. This is complex both for a UE and for a network implemetnation. Thus, we have some concern over separating perRAInfoList from CEF report.Further, we would like mention that perRAInfoList might be much smaller than its maximum size i.e., most likely a UE would continue to perform RA on the same SSB and thus it includes a >>1 value in numberOfPreamblesSentOnSSB IE. Thus, the size of message might be much smaller than the max size. |
| OPPO | Disagree | RACH report only includes the RACH information for the successful case. |
| Nokia | Agree | perRAInfoList is a collective record from RA procedures and is mandatorily included into CEFreport. It shoudl be possible to construct multiple CEFreport structure in a way it does not require perRAInfoList includion, as with multiple failures recording the association tot he RACH report becomes much more complex |
| Sharp | Disagree | We consider RA information in CEF report is needed for the network. So is the tention of the proposal to move the RA information of CEF to RACH report? If so, we do not see any benefit of signaling overhead. |
| Samsung | Disagree |  |
| Huawei, HiSilicon | Disagree |  |
| **CMCC** |  | **Agree with Ericsson.** |
| ZTE | Disagree | To separate RA information from CEF report will increase additional complexity in linking each CEF report to its related RA information.  |
| CATT | Disagree |  |
| **Apple** | **Disagree** |  |

**Rapporteur summary:**

To be added later

**Request/Report procedure:**

Two options has been proposed to indicate the availability of multiple CEF reports:

* Option 1: Existing availability bit and request bit is used for multiple CEF reports;
* Option 2: Separate availability bit is used to indicate presence multiple CEF reports

**Question-8: Which of the following options you prefer to indicate availability of multiple CEF report?**

* **Option 1: Existing availability bit and request bit is used for multiple CEF reports;**
* **Option 2: Separate availability bit is used to indicate presence multiple CEF reports**
* **Others (please indicate in comments if you have other suggestions)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Opt1/opt2/others** | **Comments** |
| Qualcomm | Option1 | Existing availability method should be sufficent. No need for further enhacement.  |
| Ericsson | Option 1 | We should be careful in non-essential increasing the size of the RRCXXComplete messages  |
| OPPO | Option 1 |  |
| Nokia | Option 2 | If the structure is differentiated from single CEFreport |
| Sharp  | Option 1 |  |
| Samsung | Option 1 |  |
| Huawei, HiSilicon | Option 1 |  |
| **CMCC** | **Option 1** |  |
| ZTE | Option 1 |  |
| CATT | Option 1 | Existing availability bit and request bit is enough. |
| **Apple** | **Option 1** |  |

**Rapporteur summary:**

To be added later

**Capability bit**

There are two options proposed for capability handling of CEF report, it is suggest RAN2 to further discuss below options:

* Opt 1: New capability bit is introduced to indicate if UE supports multiple CEF
* Opt 2: Multiple CEF is optional without signalling

**Question-9: Which of the following options you prefer for multiple CEF report capability signalling:**

* **Opt 1: New capability bit is introduced to indicate if UE supports multiple CEF**
* **Opt 2: Multiple CEF is optional without signalling**
* **Others (please indicate in comments if you have other suggestions)**

|  |  |  |
| --- | --- | --- |
| **Company** | **Opt1/opt2/others** | **Comments** |
| Qualcomm | Option1  |  |
| Ericsson  | Option1 |  |
| OPPO | Option 1 |  |
| Nokia | No strong view |  |
| Sharp  | Opt 2 | Sligntly prefer option 2 |
| Samsung | Option 2 | We prefer Option 2 but can accept Option 1 if it is useful. |
| Huawei, HiSilicon | Option 2 | In our paper (as below), we prefer to have an optional without capability signalling for mutliple CEF reporting feature.R2-2200968 Discussion on UE capabilities for R17 SON and MDT Huawei, HiSilicon |
| **CMCC** | **No strong view** |  |
| ZTE | Option 2 | For multiple CEF report there is no pre-configuration required. If UE support logging multiple CEF report then it will store multiple CEF report otherwise only one report is stored. Also for last question we prefer to reuse exiting report bit which means there seems no strong motivation to signalling such capability to NW. |
| CATT | Option2 |  |
| **Apple** | **Option 1** |  |

**Rapporteur summary:**

To be added later

## IMM MDT scenario clarification

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Company name** | **Proposals** |
| [R2-2200396](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200396.zip) | CATT | **Proposal 1: Change“Immediate MDT is supported for EN-DC scenario” to “Immediate MDT is supported for all MR-DC scenarios” in section 5.4.1.3 Immediate MDT for MR-DC in TS 37.320.** |
| [R2-2201042](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2201042.zip) | Nokia, Nokia Shanghai Bell, CMCC | **Proposal 11:** M5 ~ M7 configuration triggers can apply to MR-DC. |

|  |
| --- |
| R2-2104441 Report of [AT113b-e][803][NR/R17 SON/MDT] IMM MDT HuaweiAgreements:1 For MN terminated SCG bearer and SN terminated MCG bearer, the terminated node, e.g., MN in case of MN terminated SCG bearer,configures the configuration to UE.=> RAN2 understanding is that for the accuracy of the result, the M6 result can be indicated with data marker (duplication indicator). => All the immediate MDT configurations and reporting in EN-DC scenario (i.e. section 5.4.1.3 Immediate MDT for MR-DC in TS 37.320) are also applicable for (NG)EN-DC, NE-DC and NR-DC.  |

There are three companies mentioned that IMM MDT can be extended to all MR-DC scenarios. Based on above highlighted agreements rapporteur consider it is fair to confirm the understanding and capture the agreements in stage 2 CR. Therefore following proposal is made:

**Proposal : Capture in 37320 that M5 ~ M7 configuration triggers can apply to MR-DC.**

**Question-10: Do you agree on proposal given above? Please add your comments if any.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Agree. |  |
| Ericsson | Agree |  |
| Nokia | Agree |  |
| Sharp  | Agree  |  |
| Samsung | Agree |  |
| Huawei, HiSilicon | Agree |  |
| **CMCC** | **Agree** |  |
| ZTE | Agree |  |
| CATT | Agree |  |
| **Apple** | **Agree** |  |

## On-demand SI

|  |  |  |
| --- | --- | --- |
| [R2-2200397](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200397.zip) | CATT | **Proposal 5: RAN2 to take the connected on-demand SI request cases into consideration.** |
| [R2-2200889](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2200889.zip) | Ericsson | [**Proposal 2 RAN2 agree to include the successful SI request procedure related information in RA report by removing the conditions that preclude logging of successful SI request related information.**](#_Toc90647038) |
| [R2-2201327](file://D://3GPP%20Sync%5CRAN2%5CTSGR2_116bis-e%5CDocs%5CR2-2201327.zip) | ZTE | **Proposal 1: UE includes intended requested SI for successful Msg1/Msg3 on-demand SI request case in RA report.** |

Three companies suggest to support more on-demand SI scenarios. Speaking from rapporteur point of view, for connected on demand SI, since it is not requested through RACH procedure thus it will require RAN2 to discuss proper signalling to carry such information, which might not be able to complete in this release, thus it is suggest not to pursue in this release..

Rapporteur shares some sympathy on supporting logging of successful on-demand SI in RACH procedure since the signalling is already there, and it does provide additional gain. Therefore it is suggested to have one last try on below proposal:

**Proposal : RAN2 agree to include the successful SI request procedure related information in RA report by removing the conditions that preclude logging of successful SI request related information.**

**Question-11: Do you agree on proposal given above? Please add your comments if any.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree | For the restructuring of SI information failed SI statistics are sufficient, there is no need for logging successful on-demand SI.  |
| Ericsson | Agree | Here the discussion about successful on deamnd SI request and thus implementing this is not a overhead as the UE anyway needs to generate a RA report entry for successful on demand SI request (already in rel16). The UE only needs to add intended SIBs in this RA report entry. This is already possible from ASN.1 point of view. Just a small update in procedural text would suffice for enabling this. |
| OPPO | NO |  |
| Sharp | Disagree  | Don’t see strong need for this, the network can get the information since the procedure is successful. |
| Samsung | Agree | Regardless of success or failure, the information on SIB(s) intended by UE is also beneficial for the network to re-construct the SI messages with specific SIBs, for instance, the network may re-construct a SI message with SIBs frequently requested by UEs, and/or periodically broadcast the SI message. |
| Huawei, HiSilicon | Agree | We share similar views as Ericsson R2-2200889 that given the current implementation of the running CR, it can be noticed that there are no further changes required to the ASN.1 while supporting successful on-demand SI as the RA report is already included for successful msg1 based SI request and successful msg-3 based SI request. |
| **CMCC** | **Agree** | **Share the view with Ericsson and Huawei.** |
| ZTE | Agree | Share the view with Ericsson and Huawei. |
| CATT | Agree | Both successful and failure on-demand SI request information could be included in RA report. |
| **Apple** | **Disagree** |  |

**Rapporteur summary:**

To be added later

# Conclusion

To be added later

# Reference

1. R2-2201658 Summary on MDT aspects ZTE
2. R2-2201691 Summary on issues for MDT RRC CR Huawei
3. R2-2200010, Running 38.331 for introducing R17 MDT, Huawei, HiSilicon