**3GPP TSG-RAN WG2 Meeting #110-e draft\_R2-2005795**

**Electronic, 1-12 June 2020**

**Agenda item: 6.18.3**

**Source: Qualcomm (38.304 Rapporteur)**

**Title: Offline discussion 105: PRN - 38304 open issues - first round**

**WID/SID: NG\_RAN\_PRN-Core - Release 16**

**Document for: Discussion and Decision**

# 1 Introduction

This document covers two aspects:

At the conclusion of RAN2#109bis-e, a CR to 38.304 (R2-2003908) was agreed. Some comments were received at a somewhat late stage, resulting in Editor’s Notes in the CR. This document proposes rapporteur’s resolutions to these comments and implements the changes in accompanying draft CR.

During RAN2#110-e, a number of papers with 38.304 impact were assigned to offline discussion [105][PRN]. This document creates an offline discussion about the proposals in these papers.

[R2-2004522](file:///C:\Data\3GPP\RAN2\Docs\R2-2004522.zip) Remaining Issues related to 38.304 CATT discussion Rel-16 38.304 NG\_RAN\_PRN-Core

* to be discussed in offline [105]

[R2-2004603](file:///C:\Data\3GPP\RAN2\Docs\R2-2004603.zip) Remaining open issues in the specification of NPN Lenovo, Motorola Mobility discussion Rel-16 NG\_RAN\_PRN-Core

* proposal 1 to be discussed in offline [104]
* other can be discussed in offline [105]

[R2-2004728](file:///C:\Data\3GPP\RAN2\Docs\R2-2004728.zip) Remaining issues for Manual CAG selection Intel Corporation discussion Rel-16 NG\_RAN\_PRN-Core

* Generally covered by [R2-2004481](file:///C:\Data\3GPP\RAN2\Docs\R2-2004481.zip) and offline [104]. Wording can be discussed in offline [105]

[R2-2004744](file:///C:\Data\3GPP\RAN2\Docs\R2-2004744.zip) Discussion on manual CAG selection vivo discussion

* can be discussed in offline [105]

[R2-2005364](file:///C:\Data\3GPP\RAN2\Docs\R2-2005364.zip) Clarification of cell reselection for NPN-capable U China Telecom discussion Rel-16

* can be discussed in offline [105]

[R2-2005680](file:///C:\Data\3GPP\RAN2\Docs\R2-2005680.zip) Emergency Calls in CAG Cells for UE supporting NPN-ANR QUALCOMM Europe Inc. - Italy discussion

* can be discussed in offline [105]

**In the first phase of discussion, the rapporteur hopes that the issues in section 3 can be agreed via email discussion before the online session on June 3. Please comment on whether you object to any of the rapporteur views in section 3.**

# 2 Open Issues and New Issues

## 2.1 Handling of forbidden TA in shared spectrum

The restructuring of text in Section 5.2.4.4. led to an Editor’s note about UE behaviour in shared spectrum in case the strongest cell belongs to a forbidden TA.

Scenario for shared spectrum: Highest ranked cell is not suitable because it is part of the "list of 5GS forbidden TAs for roaming".

The specification should pick one of these two behaviours:

* A (per 38.304v16.0.0): UE considers frequency as barred for max of 300s
* B (per restructured text in 38.304 PRN running CR): UE considers other cells on this frequency.

Rapporteur recommendation: Pick ‘B’, and simply delete the EN in 38.304 PRN running CR.

* It is desirable to have uniform UE behaviour in all cases in shared spectrum where the UE was not eligible to access the highest ranked cell.
* There does not seem any compelling reason to make an exception for forbidden TA case
* This behaviour does not create a disconnect between legacy UE and Rel-16 UE because it is specific to shared spectrum.

Option B however does have the procedural drawback of changing a UE behaviour that is outside PRN scope.

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| If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable due to one or more of the following reasons:   * this cell being part of the "list of 5GS forbidden TAs for roaming", or * this cell belongs to a PLMN that is not indicated as being equivalent to the registered PLMN, or * this cell is a CAG cell that belongs to a PLMN which is equivalent to the registered PLMN but with no CAG ID that is present in the UE’s allowed CAG list being broadcasted, or * this cell is not a CAG cell and the CAG-only indication in the UE is set, or * this cell is a SNPN cell that belongs to a SNPN that is not equal to the registered SNPN of the UE in SNPN access mode.,   the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.  Editor’s Note: It is FFS if the condition for registered SNPN in the above paragraph should be extended to include selected SNPN.  For operation with shared spectrum channel access, when the highest ranked cell or best cell is not a candidate for reselection per the previous paragraph, if the second highest ranked cell on this frequency is also not suitable due to one or more of the above reasons,the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds.  Editor’s Note: It requires confirmation whether the case of second highest ranked cell belonging to forbidden TA should be part of the conditions associated with "one or more of the above reasons". |

**Question 2.1: Do you prefer Option A or B to resolve the Editor’s Note? If A, is your motivation procedural (i.e. this should be handled in NR-U session, or technical, or both)?**

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| **Company** | **Option A or B** | **Reason for picking A (technical/procedural/both)** | **Comments** |
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## 2.2 Modelling of Manual selection

#### 2.2.1 HRNN reporting between AS and NAS and AS awareness of selection mode:

The paper from CATT (R2-2004522) raises the following issue.

As we have addressed in the contribution [2] ([R2-2002734](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002734.zip)) to RAN2#109bis-e,to enable AS to provide HRNNs to NAS in manual CAG selection mode and manual SNPN selection mode only, interaction between NAS and AS is needed. We suggest RAN2 decides which option is applied, and the agreement should be reflected in 38.304 and CT1 specification.

Proposal 5: RAN2 decides which option to address HRNN reporting issue, then sends LS to inform the RAN2 agreement to CT1.

Option 1: To make AS aware of the automatic or manual SNPN/CAG selection mode, The SNPN/CAG selection mode is required to be sent from NAS to AS when manual SNPN/CAG selection is triggered. Then AS can determine to read HRNNs and report it together with available NPN IDs in manual SNPN or CAG selection mode.

Option 2: AS should not be aware of automatic or manual SNPN/CAG selection mode as legacy PLMN selection. AS is required to report HRNNs to NAS only when NAS request it. Then extra interaction between NAS and AS is needed for NAS to request HRNNs from AS.

Rapporteur comment: This issue is dependent on email discussion R2-2004481, and impacts to 38.304 can be discussed subsequently.

#### 2.2.2 Suitable cell definition

Intel (R2-2004728) argues that the definition of suitable cell, subsequent to manual CAG selection, has a gap, and the text should be amended to say “Allowed CAG list of the selected CAG ID”.

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| **suitable cell:**  For UE not operating in SNPN Access Mode, a cell is considered as suitable if the following conditions are fulfilled:  - The cell is part of either the selected PLMN or the registered PLMN or PLMN of the Equivalent PLMN list, and for that PLMN either:  - The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false;  - Allowed CAG list in the UE for that PLMN (TS 23.501 [10]) includes a CAG-ID broadcast by the cell for that PLMN;  - The cell selection criteria are fulfilled, see clause 5.2.3.2.  According to the latest information provided by NAS:  - The cell is not barred, see clause 5.3.1;  - The cell is part of at least one TA that is not part of the list of "Forbidden Tracking Areas" (TS 22.261 [12]), which belongs to a PLMN that fulfils the first bullet above.  Editor's note: It is FFS whether the above needs to be updated to consider manually selected CAG ID.  For UE operating in SNPN Access Mode, a cell is considered as suitable if the following conditions are fulfilled:  - The cell is part of either the selected SNPN or the registered SNPN of the UE;  - The cell selection criteria are fulfilled, see clause 5.2.3.2; |

Rapporteur comment: Section 5.1.1.2 says:

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| To support manual CAG selection, the UE shall upon request by NAS report available CAG ID(s) together with their HRNN (if broadcast) and PLMN(s) to the NAS. If NAS has selected a CAG and provided this selection to AS, the UE shall search for an acceptable or suitable cell belonging to the selected CAG to camp on. |

Given the above procedure it is possible to use the “acceptable” option and then the definition of suitable does not need to be modified to include the manually selected CAG.

**Question 2.2.2: Is there a need to modify the definition of “suitable cell” to include cells belonging to the manually selected CAG, or is it enough to model manual selection via acceptable cell.**

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| **Company** | **Need to modify suitable cell definition? (yes/no)** | **Comments** |
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#### 2.2.3 Indication from AS to NAS of “manual selection allowed” indication

Vivo (R2-2004744) discusses the CT1 LS response (R2-2004178) and concludes that the new indicator in SIB regarding whether operator policy “allows a user to manually select a CAG-ID supported by the CAG cell but outside the UE’s allowed CAG list”.

Vivo also discusses the CT1 CR to argue that NAS needs to be aware of the operator policy broadcasted via SIB.

**Question 2.2.3: Do you agree that during manual CAG selection, along-with the PLMN-ID and associated CAG ID, the UE AS shall report operator policy indicator in the SIB, if present, to UE NAS (i.e. indicator of whether operator allows a user to manually select a CAG-ID supported by the CAG cell but outside the UE’s allowed CAG list).**

Rapporteur note: The specific text in 38.304 can be developed in the second phase of the email.

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| **Company** | **Agree? (yes/no)** | **Comments** |
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## 2.3 Definition of NPN-Capable

### 2.3.1 Clarification of definition

China Telecom (R2-2005364) argues that the following term “NPN-Capable” needs to be defined further, and is not sufficiently clear.

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| When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and not "true" for future use:  - All NPN-capable UEs shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred". |

CT proposes that a UE should be considered NPN-capable if any of the following is true:

* UE is operating in SNPN access mode
* UE is CAG-capable

**Question 2.3.1: Is it necessary to clarify the definition of NPN-capable? (Note that this term is currently not defined in the specification).**

The specific text can be developed in next stage of email, if there is agreement to make the change.

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| **Company** | **Agree clarification needed? (yes/no)** | **Agree on clarification direction in CT proposal? (yes/no)** | **Comments** |
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### 2.3.2 Emergency call restrictions

Qualcomm (R2-2005680) argues that UEs that are capable of ANR for NPNs should not treat CAG-only cells as barred, as that places an unnecessary restriction on emergency calling, and the main reason the restriction was originally introduced was the SI reading/parsing burden of the UE.

**Question 2.3.2: Should a UE that is NPN non-capable, but sets *nr-CGI-Reporting-NPN=true* be prohibited to make emergency calls from CAG-only cells?**

The specific text can be developed in next stage of email, if there is agreement to make the change.

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| **Company** | **Should UE be prohibited? (yes/no)** | **Comments** |
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## 2.4 Autonomous Selection to frequency of CAG cells

Lenovo and Motorola Mobility (R2-2004603) propose that.

**“**Proposal 2:Allow autonomous inter-RAT cell reselection to CAG cell irrespective of the dedicated priority settings by the inter-RAT cell.”

The motivation is that in an area with NR-CAG surrounded by LTE public cells, it can be expected that the LTE public cells rely on UE based mobility (e.g. like LTE CSG) instead of relying on the NR principle of network advertised frequency priorities.

**Question: Do you agree that inter-RAT cell reselection from non-NR RATs to NR CAG cell can be based on UE autonomously considering the frequency of the member NR CAG cell to be highest priority?**

Rapporteur note: An operator that has NR spectrum should configure LTE cells to advertise NR frequencies as highest priority, though that may have a battery life cost if the operator does so in an area without any public NR deployments.

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| **Company** | **Yes/No** | **Comments** |
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# 3 Nearly Editorial Issues

## 3.1 “Registered SNPN” or “Registered/Selected SNPN” in case of highest rank cell not allowed for the UE

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| If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable due to one or more of the following reasons:   * this cell being part of the "list of 5GS forbidden TAs for roaming", or * this cell belongs to a PLMN that is not indicated as being equivalent to the registered PLMN, or * this cell is a CAG cell that belongs to a PLMN which is equivalent to the registered PLMN but with no CAG ID that is present in the UE’s allowed CAG list being broadcasted, or * this cell is not a CAG cell and the CAG-only indication in the UE is set, or * this cell is a SNPN cell that belongs to a SNPN that is not equal to the registered SNPN of the UE in SNPN access mode.,   the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.  Editor’s Note: It is FFS if the condition for registered SNPN in the above paragraph should be extended to include selected SNPN. |

In almost all places in 38.304, the same handling is used for registered and selected SNPN. Hence, it is proposed to delete the Editor’s note and replace “registered SNPN” by “registered or selected SNPN”.

The changes are provided in the accompanying CR.

**Question 3.1: Do you object to changing “registered SNPN” to “registered or selected SNPN” in the case of highest ranked cell or best not allowed?**

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| **Company** | **Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | No |  |

## 3.2 Usage of cellReservedForFutureUse IE

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| 5.3.1 Cell status and cell reservations Cell status and cell reservations are indicated in the *MIB or SIB1* message as specified in TS 38.331 [3] by means of following fields:  - *cellBarred* (IE type: "barred" or "not barred")  Indicated in *MIB* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs  - *cellReservedForOperatorUse* (IE type: "reserved" or "not reserved")  Indicated in *SIB1* message*.* In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is specified per PLMN or per SNPN.  - *cellReservedForOtherUse* (IE type: "true")  Indicated in *SIB1* message. In case of multiple PLMNs indicated in *SIB1*, this field is common for all PLMNs.  *- cellReservedForFutureUse* (IE type: "true")  Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs.  NOTE: For IAB node, it ignores the *cellBarred*, *cellReservedForOperatorUse* and *cellReservedForOtherUse* as defined in TS 38.331 [3].  - *iab-Support* (IE type: "true") Indicated in *SIB1* message. In case of multiple PLMNs indicated in *SIB1*, this field is specified per PLMN.  When cell status is indicated as "not barred" and "not reserved" for operator use and not "true" for other use and *cellReservedForFutureUse* IE is not indicated as"true",  - All UEs shall treat this cell as candidate during the cell selection and cell reselection procedures.  When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All NPN-capable UEs shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred".  Editor's note: The terminology *cellReservedForFutureUse* IE is not indicated as "true" should be updated to not "true" for future use for consistency with other IEs.  When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,  - The UE shall treat this cell as if cell status is "barred".  When *cellReservedForFutureUse* IEis indicated as "*true"*,  - The UE shall treat this cell as if cell status is "barred".  When cell status is indicated as "not barred" and "reserved" for operator use for any PLMN/SNPN and not "true" for other use and *cellReservedForFutureUse* IE is not indicated as"true",  - UEs assigned to Access Identity 11 or 15 operating in their HPLMN/EHPLMN shall treat this cell as candidate during the cell selection and reselection procedures if the field *cellReservedForOperatorUse* for that PLMN set to "reserved".  - UEs assigned to Access Identity 11 or 15 shall treat this cell as candidate during the cell selection and reselection procedures if the field *cellReservedForOperatorUse* for selected/registered SNPN is set to "reserved".  - UEs assigned to an Access Identity 0, 1, 2 and 12 to 14 shall behave as if the cell status is "barred" in case the cell is "reserved for operator use" for the registered PLMN/SNPN or the selected PLMN/SNPN.  NOTE 1: Access Identities 11, 15 are only valid for use in the HPLMN/ EHPLMN; Access Identities 12, 13, 14 are only valid for use in the home country as specified in TS 22.261 [12]. |

For consistency in the usage of IEs and the logical values, the Editor’s note can be deleted and replaced by the changes provided in the accompanying CR.

**Question 3.2: Do you object to change “*cellReservedForFutureUse* IE is not indicated as"true" ” to “not "true" for future use” in Section 5.3.1.**

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| **Company** | **Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | No |  |

## 3.3 SNPN selection and shared spectrum

The paper from CATT (R2-2004522) raises the following issue.

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| 5.1.1.2 NR case [PLMN Selection]  The UE shall scan all RF channels in the NR bands according to its capabilities to find available PLMNs and available CAGs. On each carrier, the UE shall search for the strongest cell and read its system information, in order to find out which PLMN(s) the cell belongs to and any associated CAG(s). For operation with shared spectrum channel access, the UE may also read the system information of multiple strongest cell(s). If the UE can read one or several PLMN identities in the strongest cell or the multiple strongest cell(s) in case of operation with shared spectrum channel access, each found PLMN (see the PLMN reading in TS 38.331 [3]) shall be reported to the NAS as a high quality PLMN (but without the RSRP value) and any associated CAG-ID, …  5.1.2.2 NR case [SNPN Selection]  The UE shall scan all RF channels in the NR bands according to its capabilities to find available SNPNs. On each carrier, the UE shall search for the strongest cell and read its system information, in order to find out which SNPN(s) the cell belongs to. If the UE can read one or several SNPN identities in the strongest cell, each found SNPN (see the SNPN reading in TS 38.331 [3]) shall be reported to the NAS. |

However, Section 5.1.2.2 on SNPN selection does not include the clarification about shared spectrum that is included in PLMN selection (highlighted above)

**Question 3.3: Do you object to adding a clarification about shared spectrum in SNPN case, allowing the UE to search for multiple cells on the same frequency, in section 5.1.2.2.**

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| **Company** | **Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | No |  |

## 3.4 SNPN selection and RAT

The paper from CATT (R2-2004522) raises the following issue.

During PLMN selection, when a PLMN is selected, the associated RAT may also be selected by NAS and inform AS.in the latest 38.304, it has been added that associated RAT may also be set for the selected SNPN.

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| 4.1 Overview  When a UE is switched on, a public land mobile network (PLMN) or a SNPN is selected by NAS. For the selected PLMN/SNPN, associated RAT(s) may be set, as specified in TS 23.122 [9]. The NAS shall provide a list of equivalent PLMNs, if available, that the AS shall use for cell selection and cell reselection. |

**Question 3.4a: Do you agree that for SNPN there is no need for RAT to be set by NAS?  
Question 3.4b: Do you object to delete “SNPN” in red quoted above?   
Rapporteur note on 4b: The existing text is still technically correct because of the “may” language int the sentence.**

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| **Company** | **3.4a: Yes/No** | **3.4b: Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | Yes | No |  |

## 3.5 Case of PLMN-ID present in both plmn-IdentityList and npn-IdentityInfoList-r16

The paper from CATT (R2-2004522) raises the following issue.

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| **suitable cell:**  For UE not operating in SNPN Access Mode, a cell is considered as suitable if the following conditions are fulfilled:  - The cell is part of either the selected PLMN or the registered PLMN or PLMN of the Equivalent PLMN list, and for that PLMN either:  - The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false;  - Allowed CAG list in the UE for that PLMN (TS 23.501 [10]) includes a CAG-ID broadcast by the cell for that PLMN;  - The cell selection criteria are fulfilled, see clause 5.2.3.2. |

CATT Understanding: For the sentence “The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs”, we understand it means there is no any CAG ID associated to the PLMN-ID in the cell, in other words, the PLMN-ID only exists in *plmn-IdentityList* in SIB1, but does not exist in *npn-IdentityInfoList-r16*. Hence, CATT view is that the case PLMN-ID present in both *plmn-IdentityList* and *npn-IdentityInfoList-r16* is currently not covered by the first bullet.

Rapporteur Comment: The CATT understanding would be valid if the text said “is **only** broadcast with by the cell with no associated CAG-ID”. But there is no only in the text, and hence the current text is valid.

**Question 3.5: Is there a need to make a change, e.g by saying “PLMN is broadcast by the cell in plmn-IdentityList in SIB1” instead of the current text “PLMN is broadcast by the cell with no associated CAG-IDs”.**

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| **Company** | **Need for change: Yes/No** | **If yes, rapporteur proposed text ok?** | **Comments** |
| Rapporteur view (Qualcomm) | No | Yes |  |

# 4. Issues needing no further discussion

### 4.1 Measurements and reporting of detected cells

Lenovo and Motorola Mobility (R2-2004603) propose that.

**“**Proposal 3:Confirm that no restrictions apply for the CAG UE with regards to detected cell measurements and reporting. That means, in accordance with its capabilities the CAG UE may include detected NR public cells in measurement reporting in a CAG cell, and detected CAG cells in measurement reporting in a NR public cell.”

*Rapporteur comment: The current RRC does not have any such restrictions, and such restrictions were not agreed previously. Request the proponents to highlight any gaps they see in the specification/CR text.*