**3GPP Conference Call on 3GPP Spec Modernization #1 6GSM-250045**

**Electronic, 6 August 2025, 13:00-15:00 UTC *was 6GSM-250031***

**Source: Samsung, Huawei, ZTE**

**Title: pCR 21.802 – Annex A – 3GPP Stakeholder Survey on CR Tools**

**Document for: Discussion, Endorsement**

**Agenda Item: 5.4**

**Work Item / Release: Study on Modernization of Specification Format and Procedures for 6G (FS\_6Gspecs) / Release 20**

***Abstract of the contribution:***

*This pCR proposes to capture the high level results of the 3GPP survey of stakeholders concerning CR Tools in 2022.*

**Discussion**

This information will complement the study and provide a useful starting point for identifying requirements and community preferences.

CHANGES MADE IN 6GSM-250045-001 compared to 000

- Replace the text on interpretation of the annex with clearer text. (Huawei)

- Fixed spelling errors / typographic errors (thanks Vodafone, Huawei)

- Fixed many instances of NOTE # where there wasn't a **non-breaking space** between "NOTE" and the #. (Vodafone)

CHANGES MADE IN 6GSM-250045 000 compared to 6GSM-250031

*none!*

**Proposal**

It is proposed to make the changes proposed to TR 21.802, v0.0.0.

BEGIN CHANGES

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[x] Report on User Requirements for a Next Generation Specification Development Tool, NWM Project Oversight Committee, 08.12.22. <https://www.3gpp.org/ftp/Email_Discussions/3GPP/221208-Report-Requirements-for-NG-Spec-Tool.zip> *(accessed 07.07.2025)*

[y] Supplement to Report on Next Generation Specification Tools Requirements, NWM Project Oversight Committee, 12.01.23.  
<https://www.3gpp.org/ftp/Email_Discussions/3GPP/230112-supplemental-report-requirements-for-ng-spec-tool-01.zip> *(accessed 07.07.2025)*

SECOND CHANGE

## 3.1 Terms

For the purposes of the present document, the terms given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**source specification:** A version of a 3GPP TR or TS used as the basis for revision, to produce a new version.

**target specification:** A 3GPP TR or TS resulting from a source specification and a set of approved changes.

NOTE: The above definitions for source specification and target specification apply both to specifications under change control and those not yet under change control.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

µ Average

σ Standard Deviation

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

WYSIWYG What You See Is What You Get

THIRD CHANGE

Annex A:  
3GPP Stakeholder Survey on CR Tools

As part of the effort to develop tools ‘New Working Methods’ during the years 2015-2022, a 3GPP stakeholder survey was performed in 2022 [x]. The goal of this survey was to provide clear input on requirements and expectations with respect to specification development with CRs. A summary of results of the survey are presented here.

NOTE: For those interested, the reference [x] includes also the data set used for the assessment summarized in the present document. There were also many interesting comments provided by responders to the survey which are omitted in this synopsis.

The interpretation of the survey is merely intended to be well-founded input to the present document.

The terms ‘must have’ or ‘low priority’ were used in the analysis of the survey. These terms are informative only.

## A.1 Methodology

3GPP stakeholders were surveyed, with input specifically solicited from delegates, implementers, secretaries, OP delegates, 3GPP leaders (working group and TSG chairs, vice chairs).

Table A.1-1: Survey Response

|  |  |  |
| --- | --- | --- |
| Category | Responses | % of total |
| Delegate | 556 | 91.3 |
| Rapporteur of Specifiation Editor | 144 | 23.7 |
| Leader (Chair, Vice Chair) | 17 | 2.8 |
| Secretary or MCC | 7 | 1.2 |
| OP transposer | 2 | 0.3 |
| Moderator / Feature Leads | 58 | 9.5 |
| Engineer (who implements specifications in products or services) | 39 | 6.4 |
| Other (please specify) | 17 | 2.8 |

The categories were not exclusive. A single responder could check both ‘Delegate’ and ‘Rapporteur’ for example. The categories were useful to select for specific evaluation for analysis and comparison.

All questions were of the form “I need…” and could be answered with results shown below. Only results that were not ‘non-applicable’ were counted.

0 [non-applicable];

1 [Not useful, **don’t do this**];

2 [I don’t need this, others might];

3 [Useful, would be helpful];

4 [I need this from time to time];

5 [I need this very often, a **‘must have’**]

In order to assess the results for each question, the following was used to categorize the results:

Table A.1-2: Survey Response Interpretation

|  |  |  |  |
| --- | --- | --- | --- |
| Interpretation | Positive Responses (3, 4 or 5) | Must have % rating “5” | µ and σ |
| Must Have | > 0.82 | > 45% responses | µ + σ > 5.25 |
| High Priority | 0.75 > x > 0.82 | 40 – 45% responses | µ + σ > 4.8 |
| Medium Priority |  |  |  |
| Low priority | < 65% | < 30% responses | µ - σ < 2 |
| Strong indication of low priority | < 55% | < 20% responses | µ + σ < 1.5 |

The range of experience of responders varied, less than 3 years (newcomers) 20.5%, 3-6 years (since 5G) 24.8%, 7-14 years (since 4G) 29.6%, >14 years (since 3G) 25.1%

## A.2 Major Findings

In the tables below, the needs are listed in their relative levels of needs. The survey question numbers (in the # column) remain so these items can be references in the rest of the TR. Please refer to the survey report [x].

Table A.2-1: Must have needs

|  |  |  |
| --- | --- | --- |
| # | Topic | Need |
| 3.1 | General | I need to review, edit and otherwise access CRs off-line, that is, with no access to the Internet. |
| 3.5 | General | I rely on 'recovery features' so that I do not lose work if there is an interruption or failure of some kind (computer, software, network, etc.) while editing or creating CRs. |
| 3.6 | General | I rely on tools to indicate incorrect spelling in documents I edit or compose. |
| 3.8 | General | I use 'advanced search' capabilities for search and replace (match case, find whole words, use wildcards, search 'up' vs. 'down', etc.) |
| 3.9 | General | I rely on 'what you see is what you get' presentation of content on pages as I edit or create content in CRs. |
| 3.14 | General | I need to be able to use the tool to open multiple windows (or to split windows) to different parts of the same document. |
| 3.16 | General | I need the tool to capture every change made in a CR such that the change identifies who made the change and when it was made (similar to Microsoft Word Revision Marks). |
| 3.14 | General | I need to be able to use the tool to open multiple windows (or to split windows) to different parts of the same document. |
| 3.18 | General | I need the tool to capture every change made in a CR such that the change identifies who made the change and when it was made (similar to Microsoft Word Revision Marks). |
| 3.19 | General | I need to be able to add comments to any content in a CR including text, figures, header fields, etc. These comments need to capture my name and the time they were made. |
| 3.20 | General | I need to be able to delete comments from CRs. |
| 3.21 | General | I need to be able to respond to comments so that the response is kept in the context of the comment. |
| 3.22 | General | I need to be able to see comments and responses to comments, so that I see who provided the comment and when. |
| 3.24 | General | I need the tool to enable me to reject any change. [NOTE 1] |
| 8.1 | Tables | I need to adjust the column and row widths, as the automatic width and height settings are insufficient. |
| 8.5 | Tables | I merge cells. |
| 8.6 | Tables | I split cells. |
| 8.7 | Tables | I adjust cell alignment (e.g. upper left, centered, lower right, etc.). |
| 10.1 | Text | I need to identify the appropriate clause number when inserting a new clause into a specification under change control. |
| 10.2 | Text | I highlight text. |
| 10.3 | Text | I enter or modify subscripts and superscripts in text. |
| 10.4 | Text | I insert symbols (non-alphanumeric characters). |
| 10.9 | Text | I create and modify multi-level bulleted lists in CRs. |
| 13.1 | Equations | I need to have a 'what you see is what you get' style of equation editor, such as the Open Math ML editor. |
| 17.3 | Code | I need code to be displayed in a form optimized for readability of the given language, e.g. appropriate indentations, colors, etc.) |
| 17.6 | Code | I need the tool to identify every character that is proposed to be changed by a CR (similar to word revision marks) rather than just identifying entire lines that are proposed to be changed. |
| 23.1 | CR check | I need to check the CR specification information (is the specification number correct, the latest version used for the corresponding release, the CR number correct (assigned to this CR) and that the work item code (WIC) exists in the release corresponding to this CR (or allowed for a mirror CR.) |
| 23.4 | CR check | I need to check whether the source, reason for change, summary of change and consequences if not approved sections are filled in. I need to identify multiple sources and authors in the source field. |
| 23.5 | CR check | I need to check whether the category is filled in and is an allowed value. |
| 23.6 | CR check | I need to check whether the CR header is 'clean' (no revision marks or comments) since these are not allowed in the revision of CRs that can be agreed in WG or approved in TSG. |
| 23.7 | CR check | I need to check whether the sections affected field is filled in and that this corresponds exactly to the sections included in the set of changes that the CR contains. |
| 23.8 | CR check | I need to check whether the 'Other specs affected' tick boxes are checked, and if they are, that they correspond to existing specifications. |
| 23.9 | CR check | I need to check that the CR revision number is correct. |
| 23.11 | CR check | I need to check that a CR is based on the most recent version of the specification, for the specification and release targeted by the CR. |
| 27.1 | CR impl. | I need to be able to identify a set of CRs and a source specification to which the changes will be applied. As a result I need to produce two versions of the target specification - one 'clean' and the other 'revision marked.' |
| NOTE 1: 'Accepting changes' to the source specification in a CR is not allowed since a CR must show all changes to the unmodified specification text. The only way to accept changes in a CR is for TSG to approve the CR and the change to be implemented to create a new version of a specification. | | |

Table A.2-2: High priority needs

|  |  |  |
| --- | --- | --- |
| # | Topic | Need |
| 3.13 | General | My company / organization needs to create, modify and otherwise develop CRs (and specifications) autonomously, so that the data is only stored and accessible by my company / organization. |
| 3.23 | General | I need to be able to search for comments from specific authors (see all comments by a particular commenter.) |
| 5.1 | Figures | I adjust the formatting of images (png, jpg, etc.) in CRs (e.g. size, centering). |
| 5.3 | Figures | I create editable figures within the tool (using figure drawing mechanisms to drop elements, resize, type text, etc.) |
| 5.4 | Figures | I create (and edit) editable figures externally from the tool and import or paste them in. |
| 8.4 | Tables | I adjust the indentation of cells (above, below, left, right) surrounding the text content of the cells. |
| 8.8 | Tables | I adjust text direction (e.g. to write vertically instead of horizontally.) |
| 8.9 | Tables | I shade rows or columns (e.g. with light gray). |
| 8.10 | Tables | I need to add equations to cells in tables. |
| 8.12 | Tables | I need to add figures to cells in tables. |
| 10.5 | Text | I insert non-printing characters (e.g. non-breaking spaces) in text. |
| 10.6 | Text | I remove all formatting of text. |
| 10.7 | Text | I view non-printing characters (including non-breaking spaces, carriage return, tabs, etc.) |
| 13.3 | Equations | I need the tool to capture every change made in an equation such that the change identifies who made the change and when it was made. [NOTE 1] |
| 17.1 | Code | I need code to be embedded within the same document as the rest of the Technical Specification to which the code is associated. Note: this question asks how important it is, in your opinion, that code is embedded in the specification itself rather than provided some other way, e.g. by reference or as a component in the CR or specification 'zip file', etc. |
| 20.1 | MSC | I need MSC to be embedded within the same document as the rest of the Technical Specification to which the code is associated. [NOTE 2] |
| 20.2 | MSC | I need the machine-readable format of MSCs to be stored in a CR or specification such that it can be modified by others. |
| 23.2 | CR check | I need to check that the CR title does not change after it is assigned. |
| 23.3 | CR check | I need to check whether the date is in the proper format. |
| 25.1 | CR check | I need to check CRs for compliance to TR 21.801 drafting rules, e.g. use of styles, non-breaking spaces, avoiding use of tabs, avoiding 'hanging paragraphs,' etc. |
| 25.2 | CR check | I need to check that CRs use the latest CR Form (template). |
| 25.4 | CR check | I need to identify all abbreviations in a CR that are neither defined in the specification, nor in TR 21.905, nor in the cited 3GPP specifications in the reference section. |
| 25.7 | CR check | I need to check whether a set of CRs clash with each other where the CRs target the same version of the same release of a specification. Note: A CR clash is when more than one CR proposes changes to the same text. |
| 25.8 | CR check | I need to check if a CR includes all changes compared with the previous specification version and against a previous rev of the same CR. Note: This could happen if a change were made without 'track changes' being activated. This question also asks whether it is difficult to identify 'new' changes if all changes are marked the same way. |
| 27.2 | CR impl. | I need to check if there are clashes between the set of CRs applied to the same source specification. If this is the case I need to create a list of all the clashes to resolve in order to create a new version of the specification correctly. |
| 27.3 | CR impl. | I need to determine if there are any 'warnings' or 'errors' present in all the input CRs. If so, I need to list all these warnings and errors. The errors must all be corrected in order to create a new version of the specification correctly. |
| NOTE 1: This requirement would go beyond Revision Marks in Microsoft Word that merely show that an equation has changed and not what in a figure has changed.  NOTE 2: This question asks how important it is, in your opinion, that code is embedded in the specification itself as it is (as MSC) as opposed to using an external tool to generate a figure (e.g. PNG file) and including that in the specification. | | |

Table A.2-3: Medium priority (missing some ‘high priority’ criteria)

|  |  |  |
| --- | --- | --- |
| # | Topic | Need |
| 3.4 | General | I need a tool that allows importing of documents and content created in Microsoft Word. [NOTE 1] |
| 3.10 | General | I need a way to compare two user-specified versions of the same specification, (e.g. TS 38.331 v17.2.0 vs v17.0.0) to identify the differences. I also need to be able to filter this 'difference' presentation, so that I can select a specific Work Item Code, (e.g. only show changes due to NR\_MBS-Core). [NOTE 1] |
| 3.12 | General | I rely on keyboard shortcuts for efficiency (beyond cut/copy/paste/undo). [NOTE 2] |
| 3.17 | General | I need for the tool to enforce the marking of any change in a CR compared to the latest version of the targeted release of the source specification. [NOTE 2][NOTE 3] |
| 5.5 | Figures | I create and import non-editable images (png, jpg, etc.) instead of editable figures when I cannot create the figure I require. |
| 5.6 | Figures | I need images that are not editable in the tool to be stored as an editable source file in the CR or specification so that the image can be modified by others. |
| 5.7 | Figures | I need the tool to capture every change made in a figure such that the change identifies who made the change and when it was made. |
| 8.2 | Tables | I need to apply formatting to tables beyond those provided in 21.801 styles, and beyond basic text formatting (e.g. bold). Examples of ‘going beyond 21.801’ are shading of rows. |
| 8.11 | Figures | I need to add figures to cells in tables. |
| 10.8 | Text | I adjust paragraph attributes that are not in the 3GPP template (e.g. alignment, indentation, spacing before and after lines.) [NOTE 2] |
| 13.2 | Equations | I need to have a mark-up language based editor for equations, such as latex. |
| 17.2 | Code | If embedded within the same document as the rest of the technical specification, I need the tool to provide automatic extraction of the code portions in the technical specification. [NOTE 2] |
| 17.4 | Code | I need the tool used for creating and editing code to perform syntax checking. [NOTE 2] |
| 17.5 | Code | I need the tool used for creating and editing code to perform compilation checking of the code. [NOTE 2] |
| 17.7 | Code | I need the tool to identify conflicts (i.e. that would result in syntax or compilation errors) with code in other CRs and the specification that the CR targets. [NOTE 2] |
| 23.10 | CR check | I need to warn me if there are no 'change affects' tick boxes ticked as this is a 'warning': though in some special cases this is intended, lack of tick boxes ticked is generally an error. [NOTE 2] |
| 23.12 | CR check | I need the tool to help create mirror CRs, especially so that the header page is set up properly. [NOTE 2] |
| 25.3 | CR check | I need to check references: does each reference added have text in the specification that refers to it? Do all references added to specification text have corresponding references? [NOTE 2] |
| 25.6 | CR check | I need to search change marked documents for all changes by a specific source 'individual member' (associated with the marked revision.) [NOTE 2] |
| 27.4 | CR impl. | I need to be able to use the CR and specification tool to apply pseudo-CRs as changes to a source specification. [NOTE 4] |
| 27.5 | CR impl. | I need to create a next version of the target specification with as much assistance from automated implementation as possible. [NOTE 5] |
| 27.6 | CR impl. | I need to create an interim version of the target specification that reflects the specification status after the first of more than one working group meeting in a single quarter. [NOTE 6] |
| NOTE 1: Though many were positive about this, there was a high σ, resulting in a strong trailing edge. Skepticism?  NOTE 2: There was a large variation in responses.  NOTE 3: This is not true today. Change marking is manually controlled by the user. It is thus possible to improperly create an incorrect CR with changes that are not marked.  NOTE 4: pseudo-CRs are currently informally structured documents. Please take into account in answering this question that in order to support implementation of pseudo-CRs in a tool, it may be necessary that pseudo-CRs documents become more formal in their structure. For example, it may be necessary to define and fill in a pseudo-CR header page.  NOTE 5: This was a ‘must have’ when rapporteurs and secretariats are selected as the responding group. In general responses, only 72% responded positively. The criteria for unambiguous ‘high priority’ is 75% or higher response of 3, 4 or 5.  NOTE 6: Though interim versions of specifications have no official status since CRs are only sent to TSG for approval at the end of a quarter, some delegates may benefit from the ability to view the cumulative result of all agreed CRs (and even postponed CRs) to a given specification. | | |

In all rows of Table A.2-3, there was less than 40% ‘must have’ responses.

Table A.2-4: Low and very low priority

|  |  |  |
| --- | --- | --- |
| # | Topic | Need |
| 3.2 | General | I need a tool which does not require any additional software to be installed on my PC beyond those tools used today. |
| 3.3 | General | I use in-company or other non-3GPP tools which require access to the CR database and/or the full set of CR files. |
| 3.7 | General | I use different layouts of CRs while I work on them, including print layout and 'web' layout (without pages or fixed width). |
| 3.11 | General | I rely on help facilities. |
| 3.15 | General | I need to collect all source files together with the CR, for example, the source file used to create a figure, equation, etc. Note that even though it is not required today in all 3GPP groups to collect all source files for figures, equations, etc. with the CR, in future this could become a requirement. |
| 5.2 | Figures | I embellish the presentation of images in CRs (e.g. adding a border, drop shadow, other 'effects.') |
| 25.5 | CR check | I need to search change marked documents for all changes after a given date, e.g. after CEST yesterday. |

## A.3 Specific Requirements for Rapporteurs and Secretaries

In a follow up study, Q25 and Q27 were reviewed specifically in the responses of secretaries and rapporteurs.

Q25: Do you have any other needs with respect to filling in or checking the header sheets of CRs?

Q27: Do you have any other needs with respect to checking the correctness of CRs?

Table A.2-4: Must Have for Rapporteurs and Secretaries

|  |  |  |
| --- | --- | --- |
| # | Topic | Need |
| 25.1 | CR check | I need to check CRs for compliance to TR 21.801 drafting rules, e.g. use of styles, non-breaking spaces, avoiding use of tabs, avoiding 'hanging paragraphs,' etc. |
| 25.2 | CR check | I need to check that CRs use the latest CR Form (template). |
| 25.3 | CR check | I need to check references: does each reference added have text in the specification that refers to it? Do all references added to specification text have corresponding references? |
| 25.7 | CR check | I need to check whether a set of CRs clash with each other where the CRs target the same version of the same release of a specification. Note: A CR clash is when more than one CR proposes changes to the same text. |
| 25.8 | CR check | I need to check if a CR includes all changes compared with the previous specification version and against a previous rev of the same CR. [NOTE 1] |
| 27.1 | CR impl. | I need to be able to identify a set of CRs and a source specification to which the changes will be applied. As a result I need to produce two versions of the target specification - one 'clean' and the other 'revision marked.' |
| 27.2 | CR check | I need to check if there are clashes between the set of CRs applied to the same source specification. If this is the case, I need to create a list of all the clashes to resolve in order to create a new version of the specification correctly. |
| 27.3 | CR check | I need to determine if there are any 'warnings' or 'errors' present in all the input CRs. If so, I need to list all these warnings and errors. The errors must all be corrected in order to create a new version of the specification correctly. |
| 27.5 | CR impl. | I need to create a next version of the target specification with as much assistance from automated implementation as possible. |
| NOTE 1: This could happen if a change were made without 'track changes' being activated. This question also asks whether it is difficult to identify 'new' changes if all changes are marked the same way. | | |

Interestingly, secretaries agreed that the following is very important, but some rapporteurs disagreed:

25.4 I need to identify all abbreviations in a CR that are neither defined in the specification, nor in 21.905, nor in the cited 3GPP specifications in the reference section.

Some secretaries found this useful, but most found the feature unimportant:

25.5 I need to search change marked documents for all changes after a given date, e.g. after CEST yesterday.

While most rapporteurs agreed this was important, there was disagreement with secretaries. One even commented: “don’t do this!”

27.6 I need to create an interim version of the target specification that reflects the specification status after the first of more than one working group meeting in a single quarter.

Note: Though interim versions of specifications have no official status since CRs are only sent to TSG for approval at the end of a quarter, some delegates may benefit from the ability to view the cumulative result of all agreed CRs (and even postponed CRs) to a given specification

While some rapporteurs found this important, there is disagreement. Secretaries do not see this as important.

27.4 I need to be able to use the CR and specification tool to apply pseudo-CRs as changes to a source specification.

Note: Pseudo-CRs (pCRs) are currently informally structured documents. Please take into account in answering this question that in order support implementation of pseudo-CRs in a tool, it may be necessary that pseudo-CRs documents become more formal in their structure. For example, it may be necessary to define and fill in a pseudo-CR header page.

This topic could have been underdeveloped in the survey. It seems very strange that one would automate CR quality improvement and implementation, but not support pCRs. During the early phase of development of specifications, pCRs are used to incorporate most of the content that will remain forever, before change control begins.

END OF CHANGES