

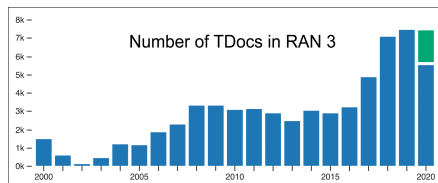
R3 RAN WG3 is responsible for the Overall UTRAN/E-UTRAN architecture and the specification of protocols for the Lu, Lur, Lub, S1 and X2 access network interfaces in 3GPP. This case study defines metrics and tries to make sense of high level views for this working group.

Apex Standards (www.apexstandards.com) is a TDoc analysis tool provider that helps clients stay on top of ever increasing TDocs by locating relevant documents and differentiating important ones from less important ones. Across intensive meetings, front line delegates and back office researchers focus on technical building blocks that move standardization forward. This often means disaggregated, focal views over the details. Zooming out, however, there are other scenarios where aggregated analysis can shed critical insight.

“The amount of TDocs sent into just one of these working groups, for one meeting, is around two and a half times what Shakespeare wrote in his entire life.”

-- Stefan Parkvall (Ericsson)

Take a look at the counts of TDocs by year for RAN 3:



It shows momentum of increase from 2002 to 2008, when the working of 3G took place, and again from 2015 onward as soon as 5G became works in progress.

These TDoc counts are updated as of Oct 1, 2020. While there is a lesser number seen in 2020. One would expect a similar number to that of 2019 when extrapolated (in green) by the end of 2020. From 2018 to 2020, there are about 7,000 TDocs per year, a significant increase from just 5,000 in 2017 or 4,000 in 2016.

Although it is tempting to eyeball these numbers and come up with quick interpretations about the trends or for business reporting purposes, it has been pointed out, however, that it is not easy to make sense of them in a meaningful way.

“Top 5 drawbacks of "contribution counting" in 3GPP.

#1: Not all contributions are created equal - quality v. quantity

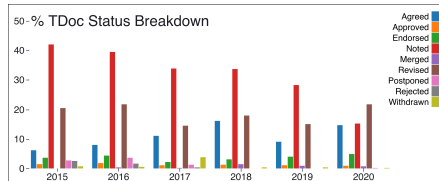
#3: Contribution counting is easily manipulated

#5: Contribution counting is prone to error and open to interpretation

-- Lorenzo Casaccia (Qualcomm)

In the following, Apex Standards analysts propose methods to slice and dice the underlying TDoc data in hope to extract interesting insight, unbiased, unmanipulated, yet not overly interpreted.

As a first step, naturally, we would be curious: which TDocs are more important than others. One way of doing so, is to track the status of TDocs as recorded in the meeting spreadsheets by the Chairman and/or the 3GPP Secretary. Such TDoc status information becomes more consistently available since 2015. Therefore, we try a breakdown of TDocs by their status during the period of 2015 - 2020.



These statuses have their literally meaning although they may be used differently across Working Groups. Besides the nine statuses listed above, there are others indicating "not seen", "not treated", "not pursued", etc, which collectively are assumed less important.

3GPP defines some positive statuses as:

Agreed

no sustained objection to its being forwarded to the TSG for approval

Approved

no sustained objection to its being implemented into the corresponding TS/TR. (final decision)

Endorsed

consensus at WG level that CR is technically correct, but there may be other solutions (which may be presented in parallel to TSG) [formerly "technically endorsed"]

Noted

not presented for decision at the present time, therefore just taken as information. This status is deprecated, since the term "noted" is ambiguous ("We have noted its contents, and will act accordingly" vs "We have noted its contents and will take no further action.").

For RAN 3, we have observed:

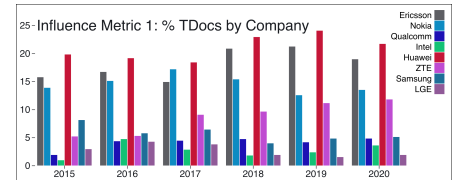
1. a steady percentage drop of "Noted" TDocs (in red), e.g., from 42% in 2015 to 15% in 2020. A reason might be that of a reporting change, the continual deprecation of a "Noted" status or avoidance of ambiguity.

2. a steady percentage increase of "Endorsed" TDocs (in green), e.g., from 2% in 2017 to 6% in 2020. This could mean an increasing percentage of TDocs receiving a more definitive status, being technically endorsed over time, possibly suggesting an improvement of TDoc quality over time.

3. a steady percentage drop of "Postponed" TDocs (in pink), e.g., from 4% in 2016 to 1% in 2020, possibly suggesting an improvement of meeting efficiency.

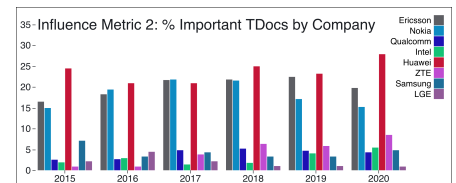
4. especially in 2019 and 2020, TDocs, if considered, are assigned to more meaningful statuses, i.e., anything but "Noted". Also, the combined percentage drops may suggest a fixed number of TDocs that may pass the funnel of being considered (a fixed R3 bandwidth), by taking into account the observation of high number of TDocs in the recent years. Namely, as the total number of TDocs increases but the total number of considered TDocs remains about the same, then the combined percentage of such TDocs necessarily drops.

The next question: who contributes more than others? One intuitive assessment would be to simply count the number of TDocs eight major companies initiated:



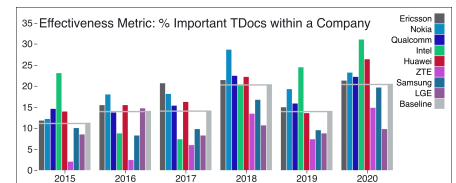
We lump Huawei, HiSilicon, Futurewei as collectively "Huawei", and, Nokia, Nokia Networks, Nokia Shanghai Bell, Alcatel-Lucent as collectively "Nokia". In recent years, Huawei continuously accounts to the highest number of TDocs, topping 24% in 2019, followed by Ericsson and Nokia (who briefly surpassed Ericsson in 2017, 17% v. 15%). ZTE has a steady increase from 5% to 10%; Samsung has a steady decrease from 8% to 5%. In the U.S., Qualcomm and Intel each takes about 4%.

These raw counts represent a crude metric to measure investments over the TDocs. Refining, we consider "important TDocs". Although there are multiple ways to define "important", a general understanding refers to: those which are selected in the consensus process of 3GPP for the next TR/TS. Going that far, it becomes complicated to measure relative contributions. Taking one step back, we define the important TDocs as being eventually "Agreed", "Approved" or "Endorsed".



Among these important TDocs, Huawei, Ericsson and Nokia consistently take the top three spots along the same order of magnitude. Intel and ZTE have a steady increase, LGE a steady decrease. Qualcomm and Samsung take about the same percentage in recent years, in between 4-6%.

Besides trying to measure relative contributions company-by-company, one can measure effectiveness of a company in the sense that: if a company submit only a small number of TDocs but a high % of them become important, then, that company proves to be effective albeit a smaller representation of TDocs, a smaller team size or a relatively smaller investment.



Different from the previous figures, we add a baseline (in gray), representing the % of total important TDocs over total TDocs within RAN 3 for comparison. Ericsson, Nokia, Huawei and Qualcomm appear to be consistently above each year's baseline. Intel had a down time in 2016 and 2017 but has proven effective by securing the top spot in 2019 and 2020. Nokia seized #1 in 2016, 2018 and Ericsson in 2017. Qualcomm, despite smaller investment in RAN 3, manages to maintain its effective position. Huawei keeps its stronghold with both influences and effectiveness. Not surprisingly, we observe that in the years of Release Freeze (Rel-15 in 2018, Rel-16 in 2020) the effectiveness goes up due to the mounting pressure for the decisions to be made. ■