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Top 5 drawbacks of "contribution counting" in 3GPP. (Don't count on it!)

9-12 分钟

In my previous blog post, we covered [the basics of how 3GPP operates](#) including how new features and technologies get introduced into the cellular ecosystem. As we discussed, there is no “Mr. or Mrs. 3GPP” driving these new features/technologies — most, if not all, the engineering work that gets initiated or completed in 3GPP relies on the R&D, technology inventions, and collaboration of 3GPP’s individual members. As incentive for their technical contributions and investments to the standard setting process, 3GPP members can seek intellectual property rights (IPR) in accordance with the IPR policies of the regional Standard Setting Organizations (SSOs) that 3GPP is partnered with (e.g., ETSI in Europe). These policies include disclosure and licensing of IPR essential to implementation of the standard.

Related to this is the topic of 3GPP leadership, or more specifically, assessing the relative impact of 3GPP members to cellular technology standardization. 3GPP leadership — and by extension cellular technology leadership — has been an ongoing topic of debate that has grown over time due to the global success of 3GPP-based technologies. And with the advent of [5G](#), this topic has intensified even further. Why? Because, as shown in Figure 1 below, 5G will expand the mobile ecosystem into to new industries, new spectrum bands and types, new deployments, new services, and new user experiences. This expansion requires, more than

ever, the technology contributions and leadership of 3GPP individual members to drive the cellular ecosystem in these new directions.

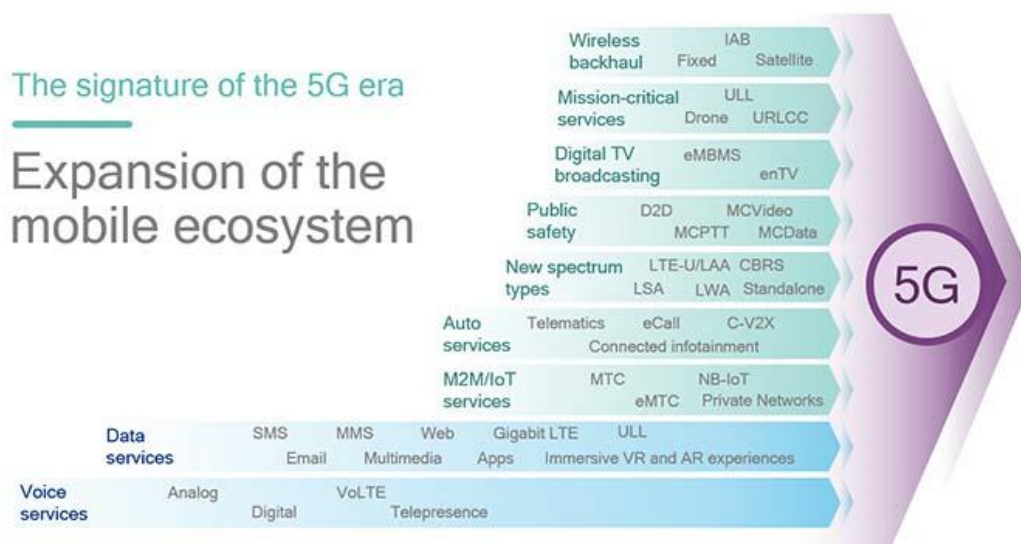


Figure 1: Expansion of the mobile ecosystem in 5G era.

But, how does one go about assessing the relative impact of 3GPP members to technology standardization? Which companies are actually driving 3GPP standardization through their technology inventions and overall ecosystem leadership? And, what tools do we have to measure this leadership?

The answers to these questions are not easy or straight forward by any means. Recently, some have attempted to simplify the topic of 3GPP leadership with various forms of *contribution counting*. Although different reports have attempted slightly different approaches, in general contribution counting leverages the fact that 3GPP members make technical contributions via written submissions called *Tdocs* that are publicly available on the 3GPP website (example Tdocs from recent RAN#76 Plenary Meeting in June 2017 can be found [here](#)). Each Tdoc identifies the company or companies who made the contribution. In addition, one can also assess the status of the contribution and whether it was approved or not at the 3GPP meeting, as this is contained in the meeting notes that are also publicly available.

I do admit — at first glance, this type of analysis can be compelling. It is nice to have clear numbers and nice bar charts to make this 3GPP leadership assessment. After all, these written technical documents are the formal way for 3GPP members to submit their contributions into the 3GPP process. However, when we look closer at this methodology, equipped with the knowledge of 3GPP working procedures we covered in my last blog post, we start to see the many drawbacks to utilizing this approach.

Drawback #1: Not all contributions are created equal — quality vs. quantity

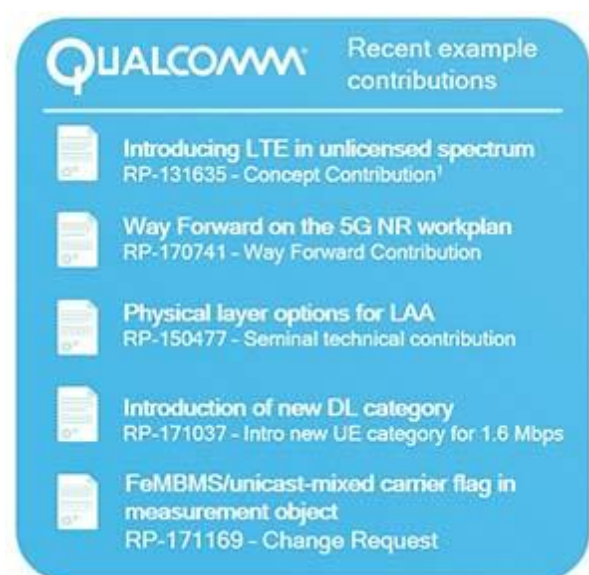


Figure 2: Recent contributions from Qualcomm.

There are many different types of contributions that 3GPP companies submit to the 3GPP standardization process — from smaller Change Requests (or error corrections), all the way to major proposals to introduce new features or services to the cellular ecosystem. Clearly not all contributions are created equal, and to demonstrate this, we have provided some examples of recent Qualcomm 3GPP contributions (Figure 2).

Quality of contribution is far more important than quantity of contributions. In fact, many 3GPP contributions do not contain any

new technology inventions.

Drawback #2: 3GPP specifications are not built via a direct mechanism of acceptance or rejection of individual contributions

As discussed in my previous blog post, the 3GPP decision-making process on technical contributions is consensus-based and non-linear. The technology implementation details that end up in 3GPP Technical Specifications are not based on the direct acceptance or rejection of individual member contributions, but rather through the progressive and collaborative refinements of specific core concepts. It is rare for anything to make it into a 3GPP Technical Specification untouched from the initial member contributions. As seen below in Figure 3, in the 3GPP Work Item phase the agreed-upon implementation details result from an iterative process that includes ongoing collaboration and negotiation between 3GPP members — much of which happens outside of 3GPP meetings and can take many months to finalize.

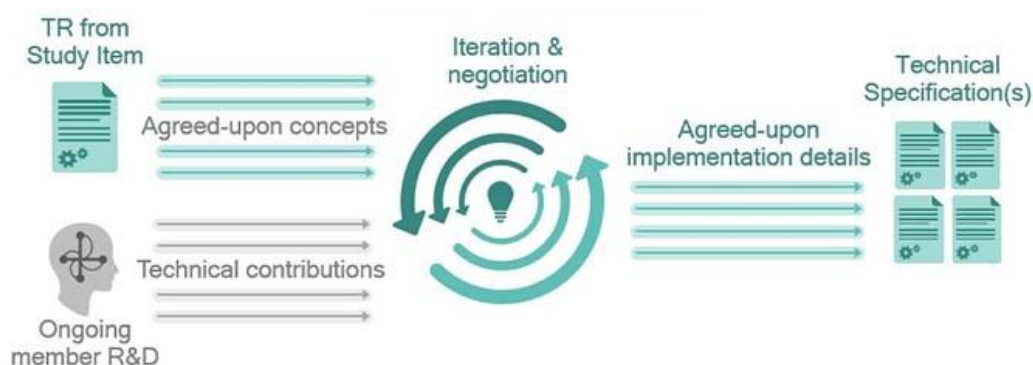


Figure 3: High-level process flow for 3GPP Work Item.

Drawback #3: Contribution counting is easily manipulated

3GPP members — especially those that are intimate with the way 3GPP works — can easily game any contribution counting system by incentivizing their 3GPP representatives on the number of contributions they submit and get approved. As an example (and

this has happened), a 3GPP member could take what would typically be a single technical contribution and split it into several contributions (or chapters) to increase the overall number. This non-productive behavior has already led multiple 3GPP Working Groups to start enforcing a policy of: One contribution per company per agenda item. Even with such policy changes, it is very difficult to limit the number of contributions a 3GPP company is making as there is no “quality-control” for submitting contributions. Therefore, it becomes very easy to manipulate the count. Furthermore, this type of behavior, especially if it becomes more widespread, has the potential to slow down the 3GPP process, and thus the ability to deliver impactful new features and technologies in a timely manner.

Drawback #4: Cellular technologies build upon previous work done both inside and outside 3GPP

As we discussed in my previous blog post, 3GPP Specifications evolve in a very iterative manner — building on top of each other and leveraging a lot of the fundamental inventions that came before. As an example, LTE adopts many technology concepts such as cell handovers and cell selection, that first originated with 2G and 3G technologies including technologies that were developed outside of 3GPP, for instance 3GPP2. Many contribution counting efforts look at a specific snapshot of 3GPP work, for example LTE in Release 8+, and therefore disregard these foundational technologies that continue to play an essential role in today’s cellular networks.

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

3GPP is an engineering effort and therefore the databases are built for the engineering work. The 3GPP databases are not built

for high-level analysis, such as contribution counting. For example, there is a lot of inconsistencies in reporting between the different 3GPP Working Groups and even within Working Groups over time. Furthermore, the criteria used for counting contributions can be modified to benefit one member over another. The various levers a company can use to manipulate the count in its favor include specifying which Working Groups are included, defining what to count as an approved contribution, and stipulating the time period for counting contributions. This drawback is exemplified by the inconsistencies between the various published reports on 3GPP contribution counting.

Is there another way?

Sort of. Let me explain...

When it comes to assessing 3GPP leadership, as we have seen in this blog post and my previous posts, there is no simple solution like contribution counting. These methods fulfill our desire for simple numbers and bar graphs, but are not reflective of how work really gets done in 3GPP and can be easily manipulated by 3GPP members.

At Qualcomm, we believe the real sign of 3GPP leadership is the ability to drive the evolution and expansion of the cellular ecosystem forward in new directions. All the tremendous impact that cellular networks have had on our society has been enabled by technologies that constantly push the boundaries of what is possible in wireless networks and push the cellular ecosystem in new directions. And over the last ~20 years, 3GPP has been the primary source of these technologies. So, which members are driving this evolution and expansion, and how do we measure it?

It starts with looking at the quality (rather than the quantity) of contributions from 3GPP members. It requires looking closely at

which 3GPP members are really leading the ecosystem in these new directions through building consensus and driving an end-to-end design through 3GPP. It is not easy and it requires much more in-depth research on a feature-by-feature basis. But if you want to really assess 3GPP leadership — and by extension technology leadership — we believe this is the only way to really assess 3GPP leadership.

In my next and final blog post in this series, "[How to lead the evolution and expansion of the 3GPP ecosystem](#)," I will introduce this approach to assessing 3GPP leadership, as well as provide an overview of Qualcomm's essential role in driving the evolution and expansion of the cellular ecosystem. As a way of showcasing this approach and as a proof point to Qualcomm's essential leadership role in 3GPP, we will provide an in-depth analysis of one of the recent features introduced into the 4G LTE ecosystem: Licensed Assisted Access (LAA).