“5G” timeline in 3GPP

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Introduction

This presentation is an initial attempt to draw a timeline for the work on “5G” in 3GPP

The proposed timeline is tentative and may be revisited at later time
IMT 2020, “5G” and other useful clarifications
On IMT 2020

- ITU-R finally agreed the workplan for IMT 2020, reported in the Annex of this presentation for your convenience.

- Like for past generations, it is assumed that 3GPP will submit a candidate technology for IMT 2020.

- RAN will lead the 3GPP submission process to ITU-R, with ITU-R AH being responsible for the actual submissions and coordination with other TSGs, if needed.

- So we need to start planning to make sure that we will have a timely submission to IMT 2020.
On “5G” (1)

The IMT 2020 effort kicks off a broader discussion to define next generation cellular technology, aka “5G”

What this means in practice is that, when the discussion starts, RAN will *import* the relevant IMT 2020 requirements and then may add its own requirements on top of that
On “5G” (2)

- Like for previous generations, RAN should probably not explicitly use the term “5G” during the actual work.

- “5G” will remain a marketing term that companies will use as they see fit (like it was the case for “4G”).

- So - to the disappointment of some - this may be one of the last times we use the term “5G” explicitly 😊
On the new radio for “5G” (1)

From ongoing discussions it is clear that a new radio will be part of “5G”

What is yet not clear is the exact scope and requirements of such new radio, which will have to be agreed by RAN

 Depending on the exact scope and requirements of the new radio, a new system/architecture may be needed as well

• Which will then have to be developed in close cooperation with the System groups, as it was done for past generations

Note: that a new system/architecture may also be needed because of new service requirements established by the System groups. More on this later …
On the new radio for “5G” (2)

So, what name should we use in the future for the new radio (and possibly new system)?

In the last generation, the name of the new radio was *randomly* generated --- remember how “LTE” came to be 😊

This time it may be wise to involve 3GPP Marcomm Officer and companies in a more explicit name selection process.

It would be good to settle on the name of the new radio by the time the work starts (and we start documenting things about it).
Initial timeline for “5G” in RAN
Key constraints

IMT 2020 submission deadlines

- Initial technology submission
  - **Deadline:** Jun. 2019 (5D #32)
  - Expected input: high-level description of the technology

- Detailed specification submission
  - **Deadline:** Oct. 2020 (5D #36)
  - Expected input: actual stage-3 specifications

As clarified by the ITU-R AH, 3GPP should submit the final specs at the 5D meeting in Feb 2020, based on functionally frozen specs by Dec 2019

Start of the “5G” work shall not impact Rel-13 work and schedule

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1 Sufficient description to allow third parties to evaluate the technology against IMT 2020 requirements
“5G” timeline in 3GPP

- **IMT 2020**
  - Evaluation criteria
  - Requirements
  - Evaluation
  - Initial submissions of proposals
  - IMT-2020 specifications

- **RAN Workshop**
  - RAN 5G: scope & requirements
  - RAN WG 5G: evaluation of solutions
  - RAN WG WI: specification of solutions
  - Channel modeling
  - SA1 SMARTER SI
  - SA1 SMARTER WI
  - SA system work
  - HSPA/LTE evolution

- **RAN86**
  - June 20

- **RAN85**
  - September 2015

- **RAN84**
  - December 2015

- **SDM26**
  - February 2016

- **SDM27**
  - June 2016

- **SDM28**
  - October 2016

- **SDM29**
  - October 2017

- **SDM30**
  - June 2018

- **SDM31**
  - February 2019

- **SDM32**
  - June 2019

- **SDM33**
  - February 2020

- **SDM34**
  - October 2020
On the RAN SI (1)

Discussion should start in RAN to establish the key radio requirements & scope of the work - For such discussion a RAN SI could be opened in Dec. 2015

The bulk of the requirements should be agreed in the first 6 months of the RAN discussion to guide the work in the WGs
  • But the RAN SI can remain formally open until the corresponding ITU-R task is closed (for this reason the RAN SI is shown as a fading block in the timeline diagram)

As mentioned earlier, RAN may add its own requirements on top of the relevant IMT 2020 requirements
  • While this did not happen in the past, it is also possible for RAN to provide ITU-R with feedback on IMT 2020 requirements or evaluation framework
On the RAN SI (2)

In line with the earlier recommendation the SI should not contain the term “5G” (at least not in the Title, Objectives & TR)
- One possibility would be to talk more generically about “next generation radio technology”

The SI top level objective could be to define usecases and requirements for next generation radio technology

As part of the above goal, the SI should then clearly identify & document:
- A. Requirements needed for IMT 2020
- B. Scope / usecases / requirements for the new radio

The above so that later
- => A. is used by the ITU-R AH to drive the IMT 2020 submission to ITU-R (which may include LTE
- => B. is used by the WGs to drive the design of the new radio (in parallel to the LTE evolution)
RAN Workshop

Before the approval of the RAN SI, it would be beneficial to have a workshop where companies can share their views on next generation radio technology.

After some discussion in RAN it was decided to have the workshop on Thursday and Friday of the week of RAN#69:

- Exceptionally RAN#69 will run from Mon to Wed.
- Given the compressed schedule, RAN#69 will not discuss new proposals on core features, beyond existing items that are moving from study to normative phase.
Work in the RAN WGs

Discussion could tentatively start in the WGs in Mar. 2016, when Rel-13 is scheduled to freeze.

If Rel-13 is delayed, then the start of the discussion in the WGs may also be delayed, unless it is decided to have additional parallel sessions in the WGs.
From the ongoing discussions, it is clear that the “5G” work will include operation above 6 GHz.

Because of that, it is also clear that some channel modeling effort will be required in RAN.

Various channel modeling efforts are ongoing in the industry and RAN may want to leverage the work done by some of them.

How much needs to be developed by RAN vs. imported from external organizations is TBD and should be discussed further by companies.
As channel modeling can take time, it would be good that the work is started a bit earlier to have sufficient progress by the time we discuss next generation radio technologies in the WGs.

Not to impact the Rel-13 work the task can be done in an ad-hoc / parallel session.

The tentative proposal is that a channel modelling task is started in Sep. 2015, with the following understanding:

- In Q4-15 RAN will identify the key bands of interest above 6 GHz
- From Q1-16 the actual channel modelling discussion will start in a new parallel / ad-hoc session of RAN1
  - The amount of time per week that will be dedicated to the task is TBD; it was also noted that we should try to avoid overlap with 3D-MIMO discussions.
“5G” timeline in RAN (cont’d)

- No further assumptions are made at this stage on the exact schedule of the technical work beyond the ITU-R deadlines for initial and specification submission.

- In particular no assumptions are made on:
  - Schedule for the transition from SI phase to WI phase in the WGs
  - Exact timing of Rel-14, Rel-15, Rel-16 etc...
  - When & in which release there will be the first generation of “5G” specs and what will be in it.

- Ideally we should converge on the above open issues by the time the work starts in the WGs, so companies have more time to discuss and converge.
  - By that time, the discussion on the exact content and phasing of the technical work will also benefit from a better understanding on the scope and requirements.

- Given the above, the technical work is currently represented in the timeline chart as a SI (bright green) turning at some point into a WI (dark green).
Coordination between RAN and SA

As mentioned earlier, a new system/architecture may be needed for “5G” as well and will have to be developed in closed cooperation with the System groups

- So a tentative SA2 container should be planned so that the technical work starts around the same time in RAN WGs and SA2 for the architectural work related to the new radio

In particular, once the discussion moves to the WGs, the definition of the new system/architecture will be based on two potential streams of requirements

1. Radio requirements established by RAN
2. Service/System requirements established by SA1/SA2

- This discussion has already started in SA1 with the SMARTER SI

To establish a clear worksplit between WGs on system/architecture aspects we could have a joint workshop between RAN and SA (or the relevant WGs) in H2 2016

In any case it is anticipated that SA2 will have a critical role in reconciling requirements from #1 and #2 and in making sure that there will be a coherent and consistent architecture/system
System aspects (SA)

Handling of ‘5G’ related work on system aspects is subject to the regular 3GPP procedures (WI/SI approval, etc...)

SA1 input is invited to the RAN workshop in Sept/2015 to present an overview on their service requirements work

Heads ups for further inter-TSG coordination
  • Tentatively plan a container in SA2 from H2-16 for the possible architecture work related to the new radio
  • Tentatively plan a RAN-SA workshop in H2-16 on the architecture evolution when both radio and service/system requirements will be available
Conclusions

The document presents a tentative 3GPP timeline for the work on “5G”

At this stage, the proposal is more defined regarding when & how to start the work in RAN and the IMT 2020 submission deadlines ...

...But it makes no assumptions on what will happen in between, as more discussion and convergence is needed among companies on that

In the short term (2015) the proposed timeline will lead to the following events:

• Sep. 2015, RAN workshop
• Sep. 2015, approval of SI on channel modeling*
  • With work starting in RAN1 only from Q1-16
• Dec. 2015, approval of RAN SI on scope & requirements*

* Subject to the regular approval process
Workplan for IMT-2020

2014
- Report Technology trends
- Report IMT feasibility above 6 GHz
- Recommendation Vision of IMT beyond 2020
- Modifications of Resolutions 58/57

2015
- WRC-15
  - 5D #18
  - 5D #19
  - 5D #20
  - 5D #21
  - 5D #22

2016
- 5D #23
- 5D #24
- 5D #25
- 5D #26
- 5D #27

2017
- 5D #28
- 5D #29
- 5D #30
- 5D #31

2018
- WRC-19
- 5D #32
- 5D #33
- 5D #34
- 5D #35
- 5D #36

2019
- Proposals “IMT-2020”
- Evaluation
- Consensus building
- Outcome & Decision
- “IMT-2020” Specifications

2020
- Workshop
- Background & Process

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