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RADIO SPECTRUM POLICY GROUP

2nd Progress Report of the RSPG Working Group
on "Spectrum issues on Wireless Backhaul"

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The working group had two meetings after the RSPG 35# (12 November 2014) where the outline for the draft report was presented as a basis for the future work. The first meeting was held on 2nd December 2014 and the other on 14th January 2015, both in Budapest.

Representatives of the following Member States were present: Austria (only at the January meeting) Finland, France, Germany, Hungary, Norway, Sweden and the UK (only at the December meeting).

The scope that had been defined as a basis for the work:

➢ identifying and analyzing strategic spectrum issues relative to wireless backhaul for mobile networks (lessons learnt, various types of backhaul, trends, needs, etc.) due to:

- higher capacity needs for existing macro-cellular sites
- the densification of base stations and the small cells approach (trends, foreseen impact on spectrum management, non-line of sight wireless backhaul issues) in mobile networks infrastructures

➢ reviewing of state-of-the-art developments and trends in wireless backhaul in public mobile cellular networks (including use of small cells and mesh networks) including identification of any relevant spectrum sharing and spectrum efficiency issues and an assessment of any implications for spectrum management policies at the EU level.

Based on the skeleton several contributions were received to develop the main body of the document and detailed text in the different chapters to be included. Some modifications were made in the initial skeleton in order to have the most suitable chapters that are needed to cover all the issues raised by the GSMA (triggering this work item) and defined in the scope.

It should be noted that there are several ongoing studies in the ITU-R (and some related in CEPT) regarding the small cell backhauling and when identifying the relevant documents some working documents got in the focus developed by some ITU-R working parties. Maybe it would be beneficial to wait until these documents are finalized to some extent, but taking into account the short time-frame to develop this draft report these working documents are referred for the time being.

The main concept in the draft report was to identify the requirements for the 4G and 5G mobile systems. So the first part of the document (after introduction and scope) deals with broadband mobile networks. Following it, some general description of the wireless backhaul is introduced taking into account the main characteristics of them and the fixed service frequency bands suitable for mobile backhauling.

Based on this concept the structure of the report is the following:

1. **Introduction**: describing the background of the work item, why it is an important issue
2. **Scope**: defining the main issues that have to be dealt with
3. **List of abbreviations**
4. **Broadband mobile networks**:
   - this chapter deals with the mid-term (4G) and the long-term (5G) aspects of the mobile networks – developments, requirements for the future, trends (densification of cells, technology) taking into account the two extreme deployment scenarios: rural and dense urban environment
   - detailed texts on heterogeneous networks, C-RAN and fronthaul
5. **Wireless backhaul for mobile infrastructure**:
   - basic topologies – how can be applied in future mobile networks (benefits and drawbacks)
   - new backhaul requirements (to meet enhanced broadband mobile demand)
   - self-backhauling
   - FS frequency bands and their characteristics
6. **Technology trends and spectrum efficiency in FS systems**: this chapter deals with such technologies that can be used for improving capacity, enhancing spectrum usage and minimizing interference
   - Modulation (including adaptive modulation)
   - ATPC
   - Bandwidth adaptive systems
   - Polarization
   - MIMO
   - Adaptive antenna systems
   - Full duplex radios
   - Increasing channel width
   - Asymmetrical point-to-point links
7. **Fixed service assignment methods**: this chapter deals with different categories of licensing methods with respect to wireless backhaul (LSA approach is also mentioned as a solution)
8. **Cross-border frequency coordination**: coordination of PP and PMP links is an important issue with regard to minimizing interference
9. **Analysis and conclusion**: this chapter contains the relevant points that should be taken into account in relation with wireless backhaul when defining requirements for mobile systems conclusions (how can the future requirements be fulfilled with wireless backhaul considering technological and spectrum issues, as well)
10. **Summary**: highlighting the most important points of the draft report

As it can be seen the draft report is not completely finalized – it has been discussed at the last meeting that there are some elements that has to be modified in order to have a consistent text and avoid redundancy. In addition the 9th chapter should be restructured a little bit to have clear conclusions (backhaul aspects of the requirements). And based on the conclusions we will have the summary.

Due to the short time-frame and the ongoing studies it was a big challenge to finalize the document, so one or two more working group meeting might be needed in order to have a clear text.

As we have been working after the last WG meeting now there is an improved text that might be finalized between the RSPG preparatory and plenary meeting by correspondence – that would be another option.

Timetable

The milestones for the working group:

- 1st WG meeting in Budapest on 2 October 2014
- 1st Progress Report and Draft Report at RSPG#35 on 12 November 2014
- 2nd WG meeting in Budapest on 2 December 2014
- 3rd WG meeting in Budapest on 14 January 2015
- Draft report for RSPG#36 on 19 February 2015
- Planned Final report at RSPG#37 on 11 June 2015 (according to the RSPG Work programme)

ANNEX

Draft RSPG Report on Spectrum issues on Wireless Backhaul