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Draft RSPG Opinion in spectrum relatet aspects for next generation wireless systems (5)

Dear Sir or Madam,

1&1 welcomes the initiative of RSPG to contribute to the development of mobile broadband, known as fifth generation „5G".

Although there is no clear definition of 5G yet, Japan and Korea are starting field trials and the ITU has already stated the main performance goals for 5G. These include very high speed, low latency and high connection density. In order not to lag behind Europe needs a harmonised strategy in order to facilitate the launch of 5G by 2020.

Spectrum is the main resource for mobile applications. The World Radio Conferences organized by the ITU-T are the responsible institutions to provide directions for international harmonisation of spectrum usage. Spectrum for 5G is on the agenda for the World radio conference „WRC" 2019. Therefore it is important to start consultations in order to identify the best way forward for Europe.

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A. 1&1 likes to provide some high level considerations for the identification of 5G spectrum bands:

Transition: Consideration should be given to the current use of identified 5G spectrum. The process of freeing-up spectrum is cumbersome and costly but necessary. The digital dividend has shown that this process needs to be planned carefully. The new 5G air interface will work in several frequency bands and a concatenation of spectrum in different bands is foreseen. Different portions of the 5G spectrum will be interesting for different kinds of services. It is important to foster a harmonized approach to achieve economies of scale.

Competition: It is important to foster competition in 5G deployment and on 5G networks. The high cost of Infrastructure deployment in mobile networks has led to a situation where only a few country-wide mobile access networks are available in each European country.

1&1 would like to point out some possible scenarios:

- **5G requires new base stations:** It is expected that 5G requires still smaller cells (because of the propagation characteristics when using higher spectrum bands). This requires a huge amount of investment, which still increases the threshold for new entrants. Only big players can afford to acquire and use the new spectrum resources. There are, however various ways to improve the competitive situation.

- **Infrastructure sharing:** A first approach – that is already being used – is infrastructure sharing. Site sharing is common practice and radio access network sharing is also possible. With the implementation of 5G, new forms of infrastructure sharing shall be explored. The aim is to share the cost of infrastructure between various players.

- **The way towards a single mobile infrastructure company:** The evolution of mobile networks leads to flat IP networks . This offers the opportunity to focus on an MVNO model, where application servers are supplied by the MVNO using the access network of an MNO. A possible final stage in this evolution could be a mobile infrastructure company that provides IP access (just the access network, the packet domain and mobility management), while other companies provide services. These application servers (like IMS) could even be situated in the Cloud. This would allow new business models, a low threshold for access to mobile services and a high amount of value creation. With the emergence of 5G the possible new business models should be explored, in order to avoid a further concentration of the market.

- **Regional / local licenses:** Today spectrum allocations are issued for national use of spectrum, often providing a huge income for the state based on auction procedures. This requires that the purchaser of the spectrum usage rights has to earn the money back from the customers. 5G may provide the opportunity to deploy heterogeneous mobile networks similar to the autonomous systems in the Internet. This would lead to a situation where regional licenses for spectrum usage particular for special services may become interesting to certain operators (e.g. local fixed wireless access providers). The result would be a mobile Internet similar to the Internet we know today, just with much more capable air interfaces. There would be room for many players providing base stations in different regions, integrating WiFi networks. However, the heterogeneous landscape of services will create challenges in terms of the spectrum assignment process. Auctions, as they are used for the 2 to 4G spectrum, will most likely disadvantage services / operators who do not have a the financial means (e.g. regional or public operators) to compete with MNOs. Additionally, the concept of national roaming needs to be rethought.

With these considerations 1&1 would like to foster a discussion about the possibilities of 5G in order to improve the competitive situation.

Innovation: 5G is not just mobile broadband. Services envisaged on 5G networks include M2M applications, IoT, turnaround in energy policy ("Energiewende"), Smart grid, Industry 4.0, automated driving and broadcast. 5G also encompasses new forms of spectrum usage like white spaces, software defined radio and self organizing networks. The various possibilities should be explored and an open architecture provided, that allows access by competitors. Whether the telecom landscape becomes more fragmented or the MVNO access will be more regulated is still open. However, the flat IP architecture allows for new ways of network access.

B. In particular 1&1 would like to comment on the strategic roadmap for 5G in Europe laid out in section 2 of the draft RSPG opinion:

(1) Currently 3 x 21 MHz spectrum and 2 x 20 MHz unpaired spectrum is allocated in the 3,4 GHz band in Germany. The envisaged spectrum between 3,4 and 3,8 GHz is further used for fixed satellite, microwave services and wireless cameras. A transition concept should be developed with high priority.

(2) The process of refarming has already been started. The usage of most of the mobile spectrum is no longer restricted to a specific technology rsp. service. It is expected that 5G requires a new air interface, optimized for mobile broadband. It shall be possible to deploy this air interface in all available spectrum bands. It is important to also use spectrum below 1 GHz because of the superior propagation characteristics.

(3) To facilitate the effective realisation of 5G, proper regulatory conditions must be ensured.. In particular, Mobile Termination rates must be calculated ex-ante on the basis of pure LRIC. The Termatnation Market is an market with an natural monopol. That's why regulation will be also needed in the future. Furthermore the access to 5G is important to foster competition in all national mobile markets as already mentioned.

(4) Frequency bands above 24 GHz can provide the resources for high-speed mobile broadband. However the propagation characteristics in these bands require line-of-sight and are restricted to a few kilometers. Therefore, the 5G environment will consist of many frequency bands that have to be coordinated and used as the situation requires.

(5) The bands listed by WRC-15 shall provide the basis for the selection process. It is important to identify which of the bands are best suited for a harmionised introduction of 5G. It should be identified for which applications these bands are used today and how a transition could be achieved.

(6) Depending on the results of the previous task, early harmonisation measures can be useful and may contribute to the European harmonisation of 5G spectrum.

For further information or if you have any questions please do not hesitate to contact us.

Yours sincerely

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