



Telefónica Group response to consultation on draft RSPG Report on "Cognitive Technologies"

General comments

Telefónica would like to thank the Radio Spectrum Policy Group (RSPG) for giving stakeholders the opportunity to comment on the final draft Report on Cognitive Technologies (CT). We consider this to be an important long term issue that is complementary to the previous RSPG Opinion on aspects of a European approach to the collective use of spectrum. Telefónica agrees that cognitive technologies have the **potential** to play an important role in enhancing spectrum management by increasing the efficiency of spectrum usage, and to increase the opportunity for innovation in spectrum using industries.

Telefónica believes that one of the most important considerations when assessing the potential of Cognitive Radios (CR) is the need for a global perspective. Not only are there significant economies of scale to be reached when technologies with global applicability are developed, but there are important lessons to be learnt for the business and regulatory environments in Europe from the experiences gained in other regions. We therefore welcome the inclusion of a summary of the US "white space" framework in the draft Report.

The increasing demand on new electronic communications services and applications by users requires an increasingly efficient management of resources, including the radio spectrum. Within this context, Telefónica believes that CR/CT should not be seen as a stand-alone issue, but as complementary to the current and future spectrum management regime, especially as we move in Europe towards greater flexibility/neutrality in spectrum usage. CR/CT can indeed assist in the move from a relatively static spectrum management to a more flexible and efficient dynamic spectrum access management, as envisaged by the WAPECS framework.

However, the development and implementation of CR/CT is still at a nascent stage. We consider that a gradual and evolutionary approach should be adopted in Europe, through close cooperation between industry stakeholders, regulators and other relevant institutions. In particular, Telefónica agrees with most of the foreseen challenges identified by the RSPG regarding CR/CT.

Main opportunities:

- CR/CT have the potential to provide a more flexible way of spectrum usage allowing devices to work with portions of spectrum that are not being used in a specific time and place, thereby increasing the efficiency of spectrum management.
- Innovative use of technology could bring forward new markets and deliver significant economic and social benefits in the longer term. Telefónica believes that such new service/application opportunities should be driven by the market.

CR/CT allow devices to access both licensed bands and licence exempt bands. In addition there are two situations, which overlap to a large extent with these two licensing models, that use different sharing arrangements, vertical sharing (where there is a single primary spectrum usage rights holder) and horizontal sharing (where there is some or total sharing of usage rights). As we noted in our response to the public consultation on the draft RSPG Opinion on the collective use of spectrum (CUS), CUS complements individual usage rights, and we noted that with the definition of CUS adopted by the RSPG there are some instances, such as the private commons, where CUS is achieved within an individual authorisation. However, Telefónica considers that most services currently being provided over radio spectrum need individual rights to be granted in order to ensure an appropriate quality of service by avoiding the threat of harmful interference, and that this puts limits on the applicability of the hybrid (private commons) approach. It is our view that this requirement for guaranteed quality of service will also limit the applicability of CT in many licensed spectrum bands, especially where there is a primary rights holder, although we acknowledge that there may be exceptions (for example, the use of “white spaces” in terrestrial broadcasting bands). In addition, some CT are more applicable to shared bands, and others may be applicable only to licence exempt bands. Due to the different implications in each case, Telefónica believes that there is a need for a case-by-case, evolutionary approach to the introduction of CR/CT.

The greater degree of liberalisation in spectrum use that comes with the introduction of CR/CT implies more flexibility in the technical conditions associated to such use. Telefónica supports change of use in principle as a way to favour a more efficient use of spectrum, but believes that this must be accompanied by the introduction of a spectrum trading regime to gain the full benefits of a liberalised use of radio spectrum. The introduction of trading will, in particular, facilitate the potential use of CR/CT where there is a single primary rights holder. In addition, we consider it to be important to ensure that the detailed technical issues and international harmonisation questions surrounding liberalisation are resolved; this includes a detailed consideration of the implications of CT, otherwise there is a risk that interference problems surpass the potential benefits of greater flexibility in general and CR in particular.

Main challenges:

- CRT development still presents strong technological challenges. These require a large amount of investment in R&D to identify practical and economic solutions.
- There is a potential threat that the real-time analysis of local spectrum usage by CR, and other CT mechanisms, may not guarantee the security, reliability and integrity levels that ensure the operation of CR devices will not result in interference with others, potentially impacting current authorised users of the radio spectrum.

Although Telefónica agrees that cognitive technologies have the potential to play an important role in enhancing spectrum management, by increasing the efficiency of spectrum usage, we believe that further work is needed to examine different CR/CT enablers (databases, CPC, sensing, etc). In addition, we agree with the draft Report that there is a need to establish viable CR business models, although we acknowledge that whilst the

regulatory framework remains unclear this issue will be difficult to be conclusive on. Telefónica observes that high CR/CT complexity and possible deployment restrictions are likely to reduce some of the initially predicted benefits. These technological difficulties and regulatory uncertainties, along with the impact that potential interference could impose on current electronic communication systems, reinforces our current conclusion that CR/CT should be the subject of case-by-case study (there is no “one size fits all” solution). It also confirms our view that careful management of the introductory phase is needed, to ensure an appropriate transition to the use of CR/CT within current spectrum usage and alignment with basic regulatory principles.

Conclusions

Telefónica believes there is a need for further debate and engagement among spectrum stakeholders, including industry and regulators, before the widespread introduction of CR/CT. We support the ongoing studies and initiatives regarding CR/CT, in particular within the ITU, CEPT and ETSI. Further R&D should also be considered in order to address the challenges foreseen.

A harmonised approach, both at an international as well as at EU level, towards CR/CT is considered by Telefónica as the right way to move gradually forward in the implementation phase. Stakeholders need to consider technological, business and regulatory issues; in particular, business models are critical for success.

Experiences with pre-cognitive technologies need to be taken into account. Opportunities for further experience/trials in certain specific bands and applications (with lower demand) would seem to be appropriate. In particular, Telefónica supports the further examination of the use of white spaces in the UHF band for CR.

The widespread use of CR/CT is seen by Telefónica to be a medium-to-long term issue. Any steps taken should consider current spectrum users and uses, in order to avoid any potential disruption to their ongoing operations. There is a need for confidence to be maintained in the regulatory approach to spectrum management.