

Agenda Item: 8.11.3 (OFDM SI)  
Source: Huawei  
Title: Discussion on Advanced OFDM Technologies  
Document for: Discussion  
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### Introduction:

On RAN1#34, Huawei has proposed in R1-030971, to create a new Section 4.5, "Advanced OFDM Technologies" in the TR25.892. This section should contain those technologies and enhancing methods whose impact on the OFDM performance has been demonstrated and which are therefore sufficiently interesting for further study, but which, for instance, are perceived by RAN1 as too early for use in the actual evaluation, or for which time is too short to do a full feasibility evaluation.

An introductory paragraph made this purpose clear. Modulation diversity was one of the methods that were intended to be described in this section.

The major and only argument of the opponents of this text proposal is that **it is not within the Scope of this study item**, which according to them allows only the study of something they call a "textbook" OFDM. However, it can be easily demonstrated that the advanced OFDM technologies are without any doubt within the scope of this study item.

### Arguments:

1. Let start from the Scope itself. The first sentence of the Scope begins with: "*The scope of this Study Item is to consider the performance of OFDM in the mobile environment...*", so it is obvious that it does not imply any limitation on the OFDM modulation.
2. Then, further specified in the Scope, the first aim of the study is "*to consider the advantages that may be gained by introducing a new modulation technique in 3GPP RAN systems...*", so it does not say that the new OFDM modulation should exclusively be of some "textbook" type.
3. As of textbooks, it is completely unclear what is a "textbook" technique, because many books describe advanced techniques, both for CDMA and OFDM. For example, modulation diversity can be now considered as a "textbook" technique, because it is described in the textbook "Multi-antenna transceiver techniques for 3G and beyond", by A.Hottinen et al, John Wiley & Sons, 2003.
4. Further on, the scope explicitly specifies that the "support for MIMO and other advanced antenna array techniques" is an example of the areas that are to be considered in the study, so it **explicitly allows** ADVANCED techniques to be studied.
5. An example of advanced OFDM technique that has **already been recorded** in the TR, is OFDM/OQAM modulation (called IOTA). Note that it was explicitly said in the TR that it is "**an alternative to classical OFDM modulation**" (see TR25.892, Sect. 4.2.1).
6. Some companies are using advanced CDMA receivers, such as MMSE, for all the evaluations of CDMA-based HSDPA, while in the same time they do not allow use of advanced techniques for the OFDM. If this is tolerated, then the results of the study might be misleading, and the final conclusion might not be credible.

### Proposal for decision:

The above arguments clearly demonstrate that the advanced OFDM technologies are definitely within the Scope of TR25.892, and are actually already included in the TR (IOTA is an example). Hence, **there should not be any formal obstacles to study all the techniques that could contribute to the success of this study.**