

Status Report for SI to TSG

Work Item Name: [Feasibility Study for WideBand Distribution Systems](#)

SOURCE: [Rapporteur \(Carlo Matarasso – Tekmar Sistemi Srl\)](#) **TSG:** RAN **WG:** 4

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Ref. to SI sheet: [RAN_Work_Items.doc](#)

Progress Report since the last TSG (for all involved WGs):

- Definition of WDS in FDD UTRAN:
 - WDS Architecture
 - Practical Deployment Examples of WDS
 - In-building Deployment
 - Outdoor Deployment for Small Cells
- A simulation campaign has been carried out. The simulation programme was focussed on the downlink parameters which were highlighted as the primary concern for system feasibility. **ACLR** was identified as the main area of focus, in the single and multi-carrier scenario. Other parameters of interest included **Spectrum Emission Mask** (Out of Band) and Measurement of **Occupied Bandwidth**.

The simulation programme and hence the results set out to demonstrate two specific areas of interest.

1. The range of input levels available to a system which would feed a WDS system and its relationship to current specifications.
2. The margin required with the introduction of WDS over a number of output power classes.

It was found that a 3dB margin is typically required to accommodate the effects of the inclusion of a WDS to an existing Base Station set-up.

- **Operation & Maintenance:** the communication interface between WDS and other network elements was discussed within RAN3 (R3-011933) and SA5 (R5-010481). No impact was found on existing specs because of WDS, and it appeared that existing specifications don't prevent possible network configuration including WDS.
- A formal TR draft (R4-011516) was submitted to WG4, but its first version was not accepted. After more offline discussions it was agreed to add possible configuration diagrams and clarification on overall impact due to WDS. It became clear that WDS, because of its specific application for small cells, is related to the ongoing WI on local area BS classification. A new draft was submitted to RAN4 (R4-011660), this version was accepted after discussion in RAN4#20. It was agreed to present the TR to TSG RAN for information as version 1.0.0.

List of Completed elements (for complex work items):

- RF Feasibility Study: it addresses the technical analysis of WDS performance based on its non-linear characteristics that may affect RF transmission through it, and derived as a function of a set of RF parameters at its interface with BS. The simulations results show the impact of WDS from an RF perspective on most critical downlink parameters, with certain requirements at BS interface point.
- Network Performance Evaluation (End to End System Simulations): the potential impact on network performance and QoS connected to the deployment of WDS were assessed by means of end to end system simulations for a number of practical scenarios that result from the site sharing opportunities offered by WDS. During RAN4#20 a concern was raised, that the end-to-end simulations may not be in line with the RAN principles.
- Location Services (LCS): the co-existence between WDS and location services (LCS) has been addressed. No impact on LCS is envisaged due to inclusion of WDS, the only provision for inclusion of WDS will be the requirement that the RNC is aware of the base station architecture including the length of transmission delay in order to make accurate positional calculations.

List of open issues:

The relationship between the WDS and the BS classification is still to be defined due to the fact that the WI on the BS classes is not yet finished. Because of the specific interest for using WDS for small cell applications, the way WDS may be included in 3GPP specs is not clear yet and needs further co-ordination with other ongoing work in

related areas (e.g. BS classification and Repeaters). Concluding the work on WDS may be completed only after completion of the WI on BS classification (TR25.951, TR25.952).

Further work may be required to verify the recommended margin consistency for the remaining uplink parameters (e.g. Noise Figure, Blocking, and Intermodulation) and downlink parameters (e.g. Modulation Accuracy, Frequency Stability and Accuracy, Output Power Stability and Accuracy) for all scenarios, particularly in the multi-carrier case. More work is also required in order to address all practical issues that may arise from system integration activities, this may require co-ordination with RAN3, and SA5.

Estimates of the level of completion (when possible):

75%

SI completion date review resulting from the discussion at the working group:

June 2002

References to WG's internal documentation and/or TRs:

RP-010794: TR25.867 (v.1.0.0) "Feasibility Study for Wideband Distribution Systems in 3rd generation Networks (Release 5)".

TR25.951 "FDD Base Station Classification" (Release 4).

TR25.952 "TDD Base Station Classification" (Release 5).

From the draft report of meeting 20 of RAN#4 in New Jersey:

- R4-011578
- R4-011579
- R4-011609
- R4-011660