ERC TG1
London,
1-3 September:

Liaison statement from ERC TG1 to 3GPP

From: ERC TG1

To: 3GPP TSG RAN WGs 1 and 4
Copy: 3GPP TSG RAN

Title: Acceptable interference level from third generation systems into a UMTS MS receiver for the purpose of the cross border co-ordination of UMTS systems.

1. Introduction

Working Group 1 of ERC TG1 is currently preparing a recommendation on the cross-border coordination of UMTS systems. To ensure the efficient use of the spectrum at border areas, and to maintain equitable access to the spectrum for operators in neighbouring countries, innovative and flexible solutions must be developed.

The group is currently developing proposals based on UMTS code-sharing, in conjunction with a maximum level of acceptable interference into an UMTS MS receiver at the border between two countries. The proposals under development in TG1 are outlined in detail at Annex A to this document. These proposals are based on a number of assumptions. ERC TG1 requests 3GPP's TSG's guidance on the validity of these.

2. Interference criterion.

The proposed level of maximum interference to a UMTS MS receiver (*37.1 dB(µV/m) in a 5MHz BW*) is calculated on the basis of an interference criteria equivalent to a 50% increase of noise at the MS receiver. This has been retained from ERC/REC T/R 22-08, which deals with the cross-border coordination of DCS1800 systems.

2.1 The maximum interference level was calculated as follows:

If the coverage without interference is D_0 and the coverage with an interference level of I is D, provided that the propagation law is in power 4, then

$(1+I/N_T)=(D_0/D)^4$

A 50% increase of noise is therefore equivalent to a loss of coverage of 10%.

Provided that:
N_0 (Thermal noise) = -174 dBm/Hz
NF (Noise factor for MS) = 5 dB
BW (Receiver Bandwidth) = 3.84 MHz
the UMTS™ noise level is $N+N_0+NF+10.\log_{10}(BW)$=-103.2 dBm.

The maximum acceptable interference level is therefore
$I_{MAX}=N+10\log_{10}(50\%)$=-106.2 dBm

For a MS omnidirectional antenna, the maximum interfering acceptable electromagnetic field level is therefore
$E_{MAX}=I_{MAX}+77.3+20*\log_{10}(2000\ MHz)$=**37.1 dB(µV/m) in a 5 MHz BW.**

2.2 Validity of Interference Criterion.

TG1 would welcome clarification of the following issues from 3GPP TSG:

(a) Is the maximum level of acceptable interference to a UMTS MS receiver (37.1 dB(μV/m) in a 5 MHz BW) valid, both for FDD and TDD UMTS systems.
(b) TG1 has assumed that interference at a UMTS receiver from any non-UMTS system will be de-spread to Gaussian noise. Is this a reasonable assumption on which to base interference limits.

3. Code Co-ordination.

TSG1 would also wish to draw the groups attention to the liaison statement from ERC TG1 to 3GPP TSG RAN produced at its June meeting (15-16th June, Mainz, Germany). Answers to the issues raised in this liaison statement are required to develop successful coordination mechanisms for third generation networks and thus aid the rapid completion of the licensing of these systems in Europe.

In addition to the information requested in the June liaison statement TG1 would welcome clarification of the following issue:

(a) What is the impact on the success of the code sharing proposals of other codes in the UMTS system (e.g. PRACH, SCH) ?

4. Conclusion.

TG1 require this information to take forward its work on efficient cross-border co-ordination of UMTS services. The next meeting of TG1 takes place on the 2/11/99. We would greatly appreciate a response in time for that meeting.

Attachment : Document TG1(99)136 “UMTS Cross-border co-ordination”.