3GPP TSG GERAN #19 **GP-040869**
Cancun, Mexico; April 19th – 23rd, 2004 **Agenda Item: 7.1.5.12, 7.3.5.12**

Title: LS on mobile testing requirements for ARP
Response to:
Release: REL-6
Work Item: Advanced Receiver Performance (ARP)

Source: GERAN WG1
To: GERAN WG3
Cc:

Contact Person: Mark Pecen
E-mail Address: Mark.Pecen@Motorola.com

Attachments:

---

1. Overall Description:

The Advanced Receiver Performance (ARP) work item would increase the tolerance of all ARP-equipped mobile terminals to interference, including interference scenarios comprising multiple sources. GERAN WG1 is currently considering methods to simplify the GERAN interferer scenarios in a way that still captures the intent of the original assumptions in order to help speed the specification of ARP performance requirements. The work in GERAN WG1 has progressed to the point that we require guidance from the experts in GERAN WG3 regarding the realistic impact on mobile terminal tests (cf. attached [1], Section 9 "*Test Considerations*"), and WG1 kindly requests your input on the following issues:

1.1 Number and Type of Discrete Interferers

a. How many simultaneous co- and adjacent channel interferers can be realistically supported by real-time test equipment of moderate complexity and cost, where each interferer is subject to independent multipath channel emulation according to the customary TU, HT and RA models?

b. Does the simultaneous support of co- and adjacent channel interfering signals present an additional obstacle to implementation, or can co- and adjacent channel interferers be treated the same from the perspective of implementation complexity?

c. Does the requirement to frequency-hop more than one co- or first (cf. Note 1) adjacent channel interfering signal using the same hopping pattern impose an unrealistic constraint to testing?

(Note 1: The term "adjacent channel" for the purpose of this document refers to the first adjacent channel interferer.)

1.2 Residual Interference - WG1 has been using a filtered AWGN signal to simultaneously model *residual* co- and adjacent channel interference.

a. Does the requirement of this type of residual interference to be generated in combination with the discrete interfering signal sources noted above (including the frequency hopping case) present unreasonable implementation difficulties?

b. Would the use of AWGN (as opposed to filtered AWGN) significantly reduce the complexity of testing? If this method were adopted, does it present unreasonable implementation difficulties?

c. Does the simultaneous support of co- and adjacent channel residual interferers cause unreasonable implementation difficulties?

1.3 Time Synchronisation

a. Does the process of imposing a TDMA burst structure on the discrete interfering signals, e.g. power ramping, impose an unreasonable implementation difficulty (cf. Annex B of [2]).

b. Does burst synchronization with full time alignment of the respective burst structures of the desired signal and one or more co- and adjacent channel interfering signals present unreasonable implementation difficulties?

c If synchronisation is feasible between the desired and interfering signals, is there unreasonable difficulty in supporting a fixed relative delay of each interfering signal with respect to the desired signal burst (i.e. time-invariant delay maintained throughout the test).

d. Would the addition of support for time-varying relative interferer burst delays (selected at random on a burst by burst basis) add unreasonable implementation difficulty?

e. Is the generation of two independent randomly time varying bursts per discrete interferer, each partially overlapping the desired signal burst (cf. [1] Section 5.4, and clause 1.1 above) supportable at moderate levels of equipment complexity?

1.4 Training Sequence Generation - In WG1's current ARP interference scenarios, the interfering signal midambles are constructed by selecting and applying, at random on a burst by burst basis, training sequence codes (TSC's) from either a) the entire set of TSC's applicable to GMSK, or b) a subset of TSC's.

a. Do you foresee unreasonable difficulty in realising interfering signals whose midamble is so constructed?

b. If the construction of a burst having a random TSC (as per 1.4 a. above) is unreasonable, would the substitution of fixed interferer TSC's (i.e. where a TSC is assigned to each discrete interferer for the duration of the test) significantly simplify the realisation? [Note: In this case, different interferers would be allowed to have different TSC's].

1.5 Interfering Signal Payload – At present, standard signal I_1 is generated by using a pseudo-random sequence of limited length.

a. Would the specification of a per-interferer pseudo-random sequence pose unreasonable difficulty (to avoid the same sequence being used for all interferers)?

b. Could the length of the pseudo-random sequence be readily extended?

1.6 Frequency Offset – WG1's current ARP interferer model requires that the relative frequency offset of the discrete interfering signals (which may be different for each interferer) with respect to the desired signal be generated according to an independent Gaussian distribution with non-zero mean.

a. Is support for the pseudo-random generation of interferer frequency offsets seen as an unreasonable technical obstacle?

1.7 Power Control and DTX – The asynchronous model currently employed by WG1 for ARP feasibility assessment varies the power level of the interfering signals by application of a pseudo-randomly selected power control gain, and (optionally) by selectively suppressing the transmission of interfering bursts (in order to model DTX), (cf. [1], Section 5.4).

a. Are unreasonable difficulties foreseen in providing support for the power control and DTX aspects of the WG1 ARP asynchronous link model?

2. Actions:

To GERAN WG3

ACTION:

GERAN WG1 kindly asks GERAN WG3 i) to advise WG1 on the aforementioned issues and ii) to offer any expert suggestions regarding the rapid resolution of realistic test definitions for ARP.

3. Date of Next GERAN Meetings:

GERAN #20	21 – 25 June 2004	Bilbao, Spain
GERAN #21	23 – 27 August 2004	Montreal, Canada

4. References

[1] GP-032675, Rapporteur, “DRAFT Feasibility Study on Single Antenna Interference Cancellation (SAIC) for GSM Networks”

[2] 3GPP TS 45.005, “Technical Specification - 3rd Generation Partnership Project; Technical Specification Group GSM/EDGE Radio Access Network; Radio transmission and reception”, (Release 5)