Clarifications for system options with AICH and PICH

Introduction.

Currently there are a large number of options, which UE needs to read before accessing UTRAN. Also the case when handover from GSM is to be performed, there is very limited amount of information that can be given to the UE in GSM side. In order to limit the possible cases review of the needed parameters UE needs to have for the cell access (or paging state) was done. The following topics were identified from this study:

?? Phase reference for PICH and PCH.
?? Scrambling codes for PICH and PCH
?? Use of secondary scrambling code for AICH

Phase reference for PICH and PCH

For the PICH it naturally needs to be transmitted over the whole cell, and thus the obvious phase reference in the Primary CPICH. The same requirement is valid for PCH but for that the phase reference currently more options are allowed. In Theory the phase reference could be e.g. secondary CPICH but sending secondary CPICH over the whole cell does not make sense since the primary CPICH is there already.

Thus for the PICH and PCH (or S-CCPCH carrying the PCH) is it proposed to add to the specification that they both have the primary CPICH as the phase reference. This does not exclude any possibility of having dedicated pilot symbols on the S-CCPCH but UE would need to receive only one CPICH for this case.

Scrambling code for PICH and PCH

The second issue is the use of secondary or primary scrambling codes for PICH and PCH. Now there is currently full flexibility in the system for the both channels to have either primary or one of the secondary scrambling codes. As in practise for channels to be sent with full power for the whole cell, use of secondary scrambling codes does not make sense, it is proposed that spec would put both the PICH and PCH (or again the S-CCPCH carrying the PCH) under the primary scrambling code.

Scrambling code with AICH

Third point is the use of AICH with secondary scrambling codes. Currently AICH can be under the primary or a secondary scrambling code. For the use of secondary scrambling point with AICH there is no good reasons identified so far. The justification in favour of limiting the AICH to the primary scrambling code is:

?? AICH can not be applied any beamforming, since all the UEs in the RACH access phase need to hear the AICH signalling

?? Also the phase reference is CPICH; thus the same antenna needs to be used as well.

?? The AICH reliability is expected to suffer if subject to non-orthogonal interference from all the other channels (no interleaving on AICH). If AICH detection fails, more serious problems with RACH procedure may occur since UEs do not stop when they should with their RACH process.

?? AICH needs to be sent with such a power level that whole cell area is reached, thus orthogonality for other code channels is again important due to the interference generated by the AICH it self to the other channels in the downlink direction.

Conclusions

Comments on the mentioned issues are invited and if the suggested simplifications are found not causing problems (i.e. there is no practical use of the options identified) then CRs on the mentioned items shall be done on the issues later at this meeting or at WG1#17. On these points other RAN WGs need to be informed as well to ensure alignment.