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Agenda Item: 8.12
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Title: UMTS 2600 MHz: Issues for Consideration and Decision FDD/TDD
Document for: Decision

1 Introduction

At the 15th meeting (September 2004) of ECC PT1, a draft decision on the harmonized use of the spectrum band 2500 – 2690MHz for IMT2000/UMTS was completed [1]. This decision defined paired bands for FDD (internal) operation and an unpaired band for use with either TDD or FDD (external) downlink. Guard bands between the upper and lower (internal) paired bands and the central unpaired band were not specified, however the liaison statement [2] presented to RAN#25 plenary expressed a desire to minimize the total amount of spectrum (if any) to be used as guard bands.

2 RAN 4 WI on UMTS 2600MHz

In the liaison statement [2] circulated at RAN#25, ECC PT1 requested that RAN start development of the specifications for UTRA operating at 2600MHz. At the same meeting a WI proposal [3] was also tabled and approved in principle, however RAN4 was tasked to review the ECC decision, LS and WI description sheet and revise it if necessary [4]. The WI proposal was reviewed in RAN4#33 with conclusion was that RAN4 endorsed a modified version of the WI to include co-existence studies with other IMT2000 technologies [5]. An attempt to modify the scope of the WI to include TDD technology [6], [7], was not endorsed by RAN4, however it was indicated that there may be support for a separate work item concentrating on the use of TDD in the 2600MHz band. Consequently a WI proposal to address TDD technologies [8] is presented for approval. Two separate WIs will therefore have responsibility for specifying technologies for different sections of the 2500MHz to 2690MHz band.

Whilst both WIs include co-existence with other IMT2000 technologies amongst their objectives, this may not result in specifications which define rules for the operation of systems utilizing paired and unpaired spectrum in the same geographic area. As far as base station performance is concerned:

- Existing FDD specifications are not compatible with TDD specifications regarding co-existence around the 1920MHz boundary. In particular, the FDD blocking specifications are not matched to the corresponding TDD out-of band emission specifications.
- It is stated in [1] that any guard bands required for co-existence will be taken from the unpaired band. As such there is no incentive for FDD specifications to adopt additional requirements in order to minimize guard bands and maximize spectral utilization if FDD is studied in isolation.

- It has been decided not to study FDD DL (external) in the unpaired band, therefore no consideration can be given to the FDD receiver specifications necessary for co-existence.
- Reliance on unspecified site-engineering solutions is not a sufficient justification for electing not to fully specify FDD equipment in co-existence scenarios.
- Site engineering solutions simply transfer the burden of solving the co-existence issues from equipment manufactures to operators.

It is currently understood that the intention is to try to make minimal changes to the base station FDD radio specifications while specifying FDD for the 2600MHz band [10]. Hence there is currently no proposal to

- develop specifications for the case where FDD and TDD are co-sited
- address the receiver blocking performance to take account of either TDD or external FDD DL transmissions in the unpaired band.

Considering the points discussed above, it is clear that the FDD WI covering the 2600MHz band can not generate a complete set of balanced specifications without considering the specifications of all other technologies. In deployments where technologies co-exist in adjacent spectrum, transmit specifications for one band require matching receive specifications in the adjacent band. Co-ordination of FDD and TDD WIs is required to deal with deployment in adjacent spectrum allocations.

Adoption of 3GPP specification for use in future mobile systems is likely to depend upon their ability to make efficient use of spectrum. Hence there is a need to require minimal guard bands between FDD and TDD. 3GPP should therefore develop a set of balanced specifications covering all possible uses of the paired and unpaired 2600MHz spectrum allocations. This is particularly important if 3GPP specifications are to be competitive and are to be adopted in different regions at 2600 MHz, where various mixtures of paired and unpaired allocations are already in use. Outside Europe guard bands will not come from adjacent band allocations (this is particularly true in the USA where adjacent bands are in many cases already be owned by other operators). Hence lax FDD specifications might preclude FDD operation at 2600 MHz in many regions.

RAN is therefore requested to ensure that

- All aspects of FDD/TDD co-existence are studied at 2600 MHz
- Minimal guard bands are required
- Specifications are developed for the case where FDD and TDD are co-sited
- Specifications address receiver blocking performance, taking into account TDD and external FDD DL transmissions in the unpaired band.
- Overall costs for deploying networks employing technology in both paired and unpaired spectrum should be considered, rather than the cost of deploying systems in isolation.

3 References

- [1] 15th ECC PT1 Meeting, Draft ECC Decision on the harmonized utilization of the band 2500 – 2690MHz for IMT-2000/UMTS
- [2] RP-040394 Liaison Statement from ECC PT1. CEPT band plan for IMT2000 in the 2500 - 2690MHz band.
- [3] RP-040377 Work Item Proposal for UMTS 2600MHz
- [4] RP#25 Meeting Report.
- [5] RP-040419 Status Report: UMTS 2600 MHz
- [6] R4-040661 Amendments to WI proposal for UMTS 2600 MHz
- [7] R4-040662 Revised WI proposal for UMTS 2600 MHz
- [8] RP-040453 WI Proposal for UMTS 2600 MHz (TDD)
- [9] TR25.942 RF System Scenarios
- [10] R4-040616 Changes to 25.101 and 25.104 related to UMTS 2600MHz