3GPP TSG RAN WG4 (Radio) Meeting #46 R4-08313
Sorrento, Italy
11th February to 15th February, 2008

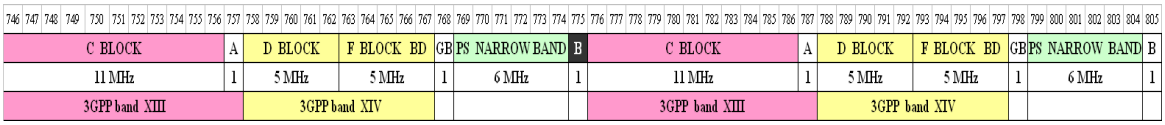
Source:	**Motorola**
Title:	**TS36.101: TP for addition of Upper 700 MHz band**
Agenda Item:	**6.1.2.1**
Document for:	**Approval**

1 Introduction

It is proposed that the operating bands for the Upper 700 MHz are included in Table 5.2.-1 (EUTRA operating bands). However, we propose the operating frequency range is slightly modified from that proposed in [1] for Band 13 / XIII, so as to maximise the Tx-Rx duplex gap and hence minimise the impact of self- interference (desense) and C Block to Public Safety co-existence. A TP is provided for TS36.101

2 Background

The current FCC channel plan and 3GPP plan [1] is provided below



Based on the above, the current 3GPP Band XIII includes both A block (2x1MHz) as well as C block (2x11MHz). The FCC channel plan is not optimum, however, using the FCC channel as a base line we note;

a) E-UTRA is designed to support 1.4, 3, 5, 10, 15, 20 MHz channel options – so any specified 3GPP operating band should be optimised for these deployed channels taking into account the FCC channel plan

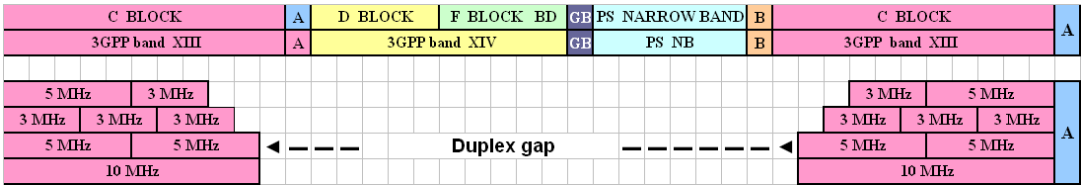
b) Addition of A Block as part of Band XIII will reduce the UE duplex gap and hence will increase the self interference for a C block UE. This reduced duplex gap will also decrease the possibility of supporting higher channel bandwidths. The same concern would apply if any "guard" band for PS protection within C block is included as part of the 3GPP band XIII as this cannot then be included as part of the duplexer stop band

c) Upper block A (1/2 GPS frequency) is designated by FCC as a sub-harmonic protection band for GPS, hence it is not clear why this is included as part of 3GPP Band XIII. So this is an unnecessary requirement that the UE should also transmit on this sub-harmonic GPS frequency where additional Tx filtering for GPS protecting is needed

2.1 Impact of channel bandwidth

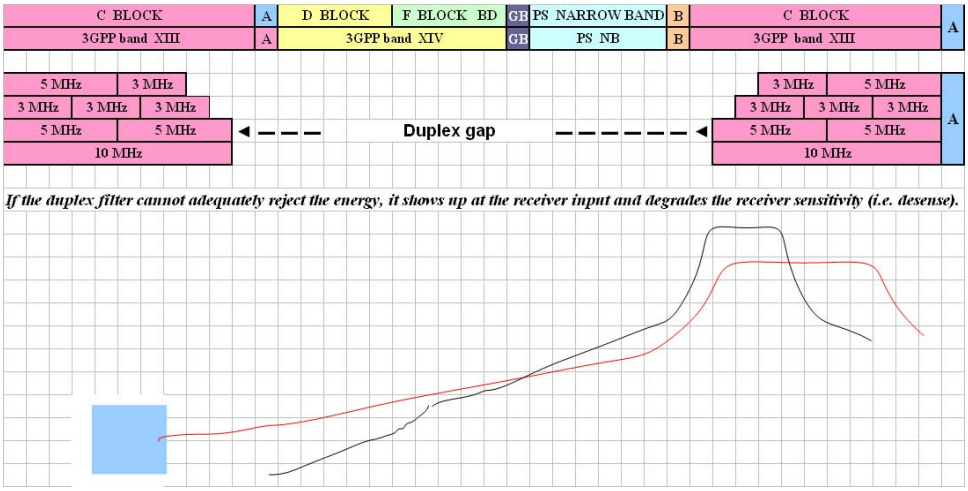
C block allocation is 2 x 11 MHz. In this case a number of different channel plans can be deployed which impact the achievable duplex gap. This is illustrated below for 3 channel bandwidth options.

Figure 2.1-1 impact on channel plan on duplex gap



Impact of self interference

Self interference is a function of, Tx – Rx spacing, duplex filter performance, Tx power and transmitted RB(s). For a fixed duplex gap the self interference increases with channel bandwidth, transmit power and RB allocation. The blue block shows the impact of channel bandwidth for different channel bandwidth options

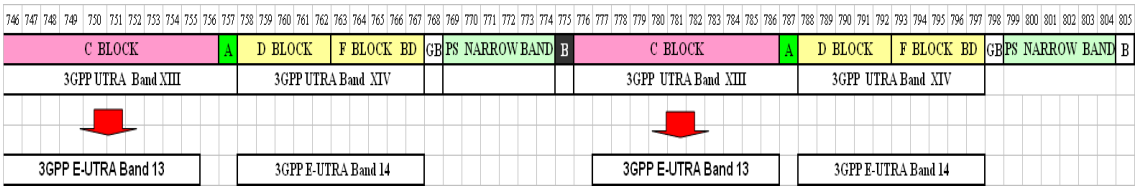


2.2 Duplex performance

The performance of the UE duplexer is quite critical for C Block deployment. For this band, duplexer performance is sub-optimal due to the reverse duplex operation needed. Additional, we need to account for the impact of filter drift due to temperature associated with a small duplex gap. Hence, we need to maximize the duplex gap to in order to ensure sufficient stop/ pass band performance is available over temperature.

3 Proposal / Conclusions

It is proposed for EUTRA Band 13 should exclude A block and take into account realistic channel bandwidth deployments. A TP proposal for E-UTRA operating band for the Upper 700MHz is shown below;



The advantages of the proposed changes to the operating band are as follows;

1) Reduce the impact of UE self- interference (desense) for both normal and additional channel bandwidths
2) Increase the protection to Public Safety by increasing the guard band to upper C block. Note the FCC requirements are *Incumbent on the commercial provider to solve interference issues with Public Safety:*

   systems. Finally, if interference to Public Safety systems does take place, 700 MHz Commercial Services Band licensees are expected to take whatever actions are necessary to mitigate the interference (*e.g.*, reducing out-of-band emissions, reducing power levels, changing operating frequencies, etc.). (¶ 117-119)

3) Reduce the eNode B Tx filtering requirements from C Block to D Block
4) Reduce the requirement for UE GPS filtering requirement near the upper A block

A TP is provided below for TS36.101

-------- Start of TP for TS36.101 ----------

3.1 5.1 General

The channel arrangements presented in this clause are based on the frequency bands and channel bandwidths defined in the present release of specifications.

NOTE: Other frequency bands and channel bandwidths may be considered in future releases.

3.2 5.2 Frequency bands

E-UTRA is designed to operate in the frequency bands defined in Table 5.2-1.

Table 5.2-1 E-UTRA frequency bands

E-UTRA Band	Uplink (UL) eNode B receive UE transmit	Downlink (DL) eNode B transmit UE receive	UL-DL Band separation	Duplex Mode
	F_{UL_low} – F_{UL_high}	F_{DL_low} – F_{DL_high}	F_{DL_low} - F_{UL_high}	
1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	130 MHz	FDD
2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	20 MHz	FDD
3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	20 MHz	FDD
4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	355 MHz	FDD
5	824 MHz – 849 MHz	869 MHz – 894MHz	20 MHz	FDD
6	830 MHz – 840 MHz	875 MHz – 885 MHz	35 MHz	FDD
7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	50 MHz	FDD
8	880 MHz – 915 MHz	925 MHz – 960 MHz	10 MHz	FDD
9	1749.9 MHz – 1784.9 MHz	1844.9 MHz – 1879.9 MHz	60 MHz	FDD
10	1710 MHz – 1770 MHz	2110 MHz – 2170 MHz	340 MHz	FDD
11	1427.9 MHz – 1452.9 MHz	1475.9 MHz – 1500.9 MHz	23 MHz	FDD
12	[TBD] – [TBD]	[TBD] – [TBD]	[TBD]	FDD
13	777 – 787	746 – 756	21	FDD
14	788 – 798	758 – 768	20	FDD
...				
33	1900 MHz – 1920 MHz	1900 MHz – 1920 MHz	N/A	TDD
34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	N/A	TDD
35	1850 MHz – 1910 MHz	1850 MHz – 1910 MHz	N/A	TDD
36	1930 MHz – 1990 MHz	1930 MHz – 1990 MHz	N/A	TDD
37	1910 MHz – 1930 MHz	1910 MHz – 1930 MHz	N/A	TDD
38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	N/A	TDD

Deleted: [TBD]
Deleted: [TBD]
Deleted: [TBD]
Deleted: TBD]
Deleted: [TBD]
Deleted: [TBD]
Deleted: TBD]
Deleted: [TBD
Deleted: [TBD]
Deleted: [TBD]

5.3 TX–RX frequency separation

4 References

[1] 3GPP TR25.822 v1.0.0 UMTS 700 MHz Work Item Technical Report