



Ref: Joint Task Group (JTG) - India

07 September 2009

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Dear Shri Kushvava,

Thank you for offering us the opportunity to provide a formal input to the Joint Task Group on 700 MHz.

The GSM Association represents over 800 operator members deploying GSM/GPRS, 3G, IMT2000, HSPA and lately LTE based networks. In addition, we have strong relationships with manufacturers (both device and infrastructure) with over 100 companies contributing to GSMA activities in building a comprehensive mobile ecosystem supporting mobile broadband.

We believe that we share a common interest in the successful development of the 700 MHz band in India. We have ongoing work and activity on the Digital Dividend with ITU-R Study Group 5, with US operators on the development of a common plan for Region 2, ongoing activity in Region 1 with CEPT, the European Commission and the African Telecoms Union, and are active in Region 3 with operators and administrations. In addition, the GSMA are working closely with key manufacturers to optimise band plans which reflect regional requirements whilst supporting the need for harmonisation.

The GSMA proposes that all countries should consider the use of the UHF band for mobile services, in order to benefit from significant propagation advantages this band provides in providing ubiquitous, affordable, mobile broadband services. For the full benefits of the UHF band to be realised it is important that markets align regionally to realise the potential economies of scale, driving down handset and network equipment costs.

Fragmentation creates unnecessary costs. GSMA analysis<sup>1</sup> of economies of scale at the handset level showed that fragmentation would significantly increase handset costs whilst

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<sup>1</sup> [http://gsmworld.com/documents/Advantages\\_of\\_Common\\_Frequency\\_Bands.pdf](http://gsmworld.com/documents/Advantages_of_Common_Frequency_Bands.pdf)

also reducing radio frequency efficiency. These costs have the biggest negative consequences for consumers that are most sensitive to price, hence the need for India to choose a band plan arrangement that will deliver the highest benefits to the Indian consumers in terms of economies of scale.

## **Band Plan Options**

In considering a band plan for India, it is especially important to take into account:

- Limited spectrum availability in India for mobile services
- The need to deploy wide channels to facilitate current and future broadband data needs
- The need to deliver cost effective wide area network mobile broadband coverage to rural communities
- The need for regional harmonisation to drive handset economies of scale and to minimise the 'cost of ownership'

Additional technical key considerations should also be noted:

- The need to minimise spectrum wasted in guard bands. This suggests both FDD and TDD should not be deployed in such a small band.
- That given the Indian operator preference for FDD, the band should be planned in this basis (FDD only) in India
- The main benefit of the band is enhanced rural coverage. Any band plan should ensure there is minimum impact on the link budget advantage the band offers.

As outlined and presented in our meeting of 16th July there are a number of band plans for the 700 MHz band that are being publicly discussed and debated within APT. These are outlined below.

In this context, it may be noted that while Europe and the US have settled their respective 700 MHz band plans, Region 3 is yet to achieve consensus on its preferred band plan in 700MHz.

### **2x50 MHz - 700 MHz band plan**

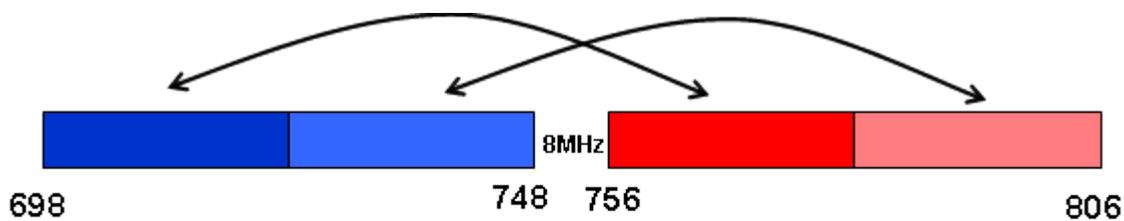
In light of the above considerations we believe that the 2X50MHz band plan may be considered more suitable for India's particular domestic situation, because it:

- Maximizes the use of the limited spectrum available in India
- Delivers large contiguous blocks of spectrum for mobile broadband

- Avoids the potential fragmentation of the band and possible in band interference issues
- Is technically the most efficient design of the band

The band plan is a simple 2x50 MHz FDD arrangement, comprising two sub-bands with separate duplexers. Due to the two interleaved duplex arrangements, the gap between DL and UL bands can be reduced, minimizing the spectrum left unused in the 'centre gap'.

Figure 2: 2x50 MHz 700 MHz Band Plan



The band plan of 2x50 MHz with two sub-bands can handle wide (LTE) carrier bandwidths (up to 20 MHz) that may be of interest to India. We understand that these 2 duplexers can be implemented with current standard filter technology.

The duplex direction depends on the co-existence scenarios at the boundaries of the mobile spectrum. Both conventional and reverse duplex direction have their respective advantages and duplex direction should be decided based upon what is the best solution taking carefully into consideration the conditions for co-existence with radio services in the neighbouring bands.

If India wishes the same band plan to be adopted in other Region 3 countries, it would be advisable also to consider the possibly different coexistence scenarios in these countries. GSMA believes that these details are to be determined at a future date and in discussion with other administrations.

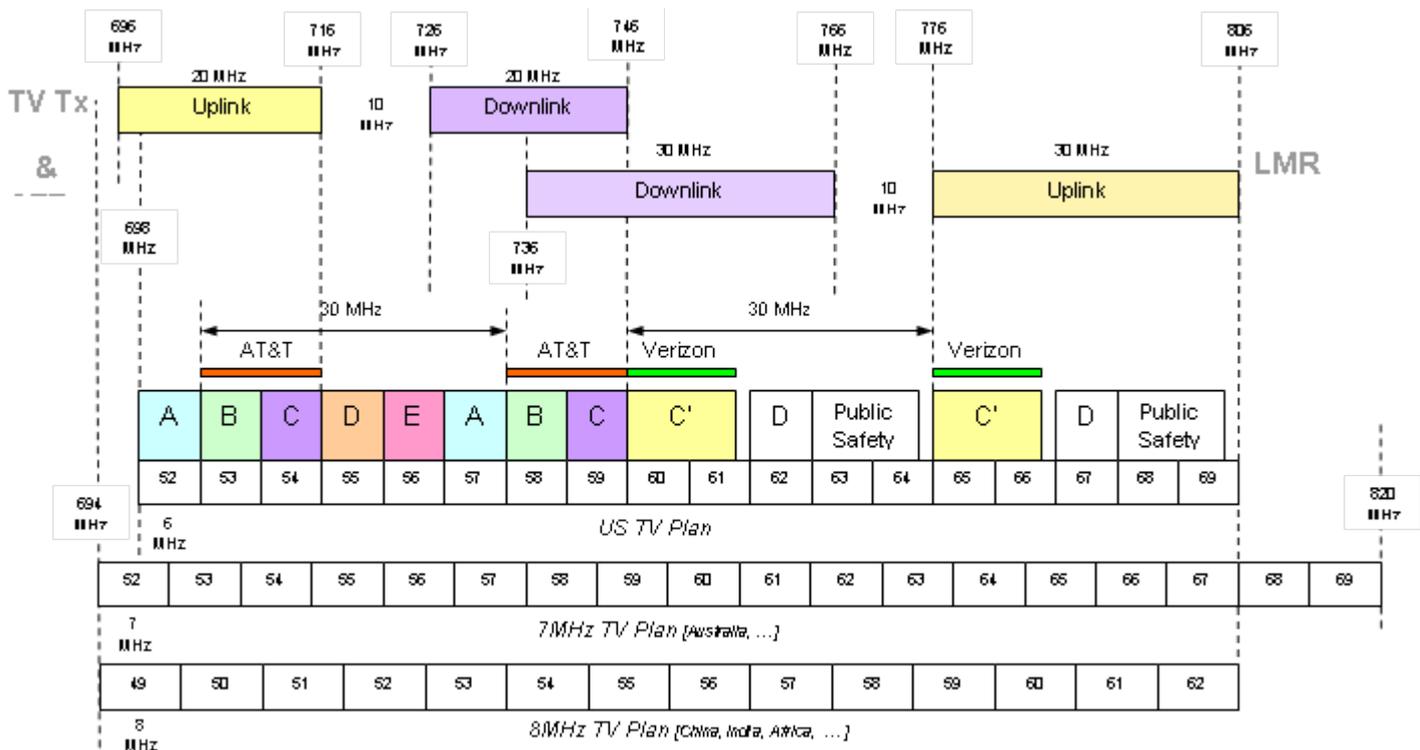
For the full benefits of the 700 MHz band to be realised it is important the JTG makes decisions that reflect the domestic needs of India and also its desire to integrate into the international community. A minimum number of band plan options globally allows for efficient use of the available digital dividend spectrum in the greatest number of countries in Asia.

## Evolved US 700 MHz Band Plan

This variant band plan implicitly recognises the influence of the US in terms of international commerce and trade, and the decisions already made by FCC in regard to the 700 MHz band. Factors such as roaming and export market opportunities, and the technology choices already made by network operators in other countries, were considered in developing this 'evolved' plan. However, in contrast to the US arrangements (which are also accommodated), this band plan offers full 20 MHz block sizes, consistent with preferred LTE bandwidth options (5, 10 or 20 MHz) and otherwise improving spectrum usage efficiency.

Other structural features are aimed at optimising handset filter performance, while minimising the number of filter components, to allow as many other 3G modes (850, 900, 1800/1900, 2500 MHz) as possible to be included in handsets/user devices. This is particularly advantageous in the case of progressive/staged LTE rollouts, to allow reversion to other legacy services when beyond 700 MHz service coverage areas, and to maximise international roaming options.

Figure 2: Evolved US Band Plan with US Allocation



The plan combines two FDD duplexers in a 'back-to-back' arrangement – with the two 'downlink' segments positioned in the centre, to protect adjacent band receivers (TV STBs below 696 MHz and public safety systems above 806 MHz) while also avoiding large LTE

'dead zones' caused by high-powered TV broadcasting transmitters below the lower boundary saturating LTE handsets. The bottom end of the mobile band is extended down to 696 MHz – noting that, for countries with 7 MHz or 8 MHz TV channels, the top TV channels stops at 694 MHz, so this extension does not affect the number of available TV channels.

## **Conclusion**

India has limited bandwidth available in other internationally harmonised mobile bands such as the 900, 1800 and 2100 MHz bands where economies of scale have allowed for lowest possible handset cost (and most efficient roaming opportunities).

This limited bandwidth combined with the rapid roll-out of mobile networks and extensive subscriber growth in the Indian market, leads to a situation where making maximum spectrum available in the UHF band and utilizing the same in the most efficient manner is of utmost importance.

As already outlined above, the 2x50 band plan option may be the preferred option for India because it will:

- Maximize the use of the limited spectrum available in India
- Deliver large contiguous blocks of spectrum for mobile broadband
- Avoid potential fragmentation of the band and possible in-band interference issues
- Is technically the most efficient design of the band

Harmonisation of spectrum produces substantial benefits for businesses, consumers, governments and the mobile industry. Fragmentation creates unnecessary costs. In this respect the minimum number of international band plan options will allow the most efficient use of the available digital dividend spectrum in the greatest number of countries across Asia. It is therefore important that any domestic band plan decision should also find international consensus.

By allocating spectrum in the most efficient way and in a manner that reflects the domestic needs of India and also it's desire to integrate into the international community, the JTG will facilitate the possibility of India's businesses and consumers realising the greatest potential social and economic benefits from the UHF spectrum.

Yours sincerely

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