

2nd Preparatory Workshop on World Radiocommunication Conference 2012 (WRC-12)

Some highlights from India

by

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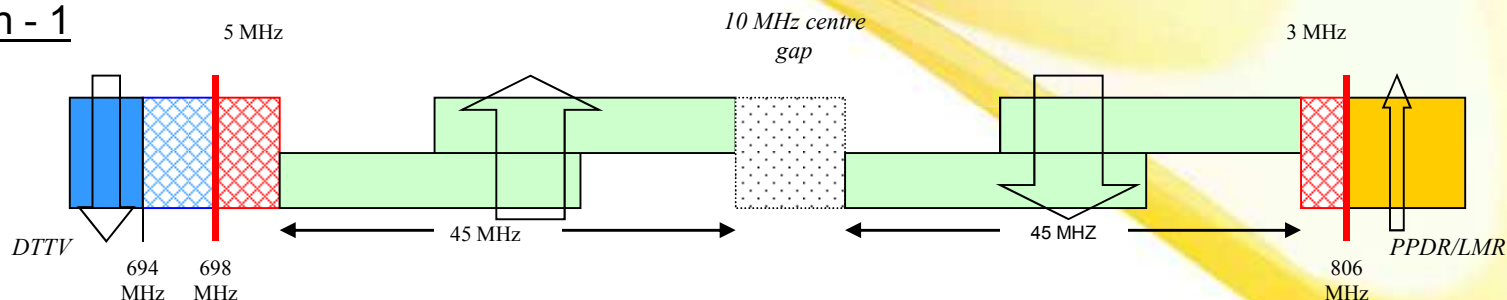
- World Radio Conference/WRC-07 identified several bands for 'IMT' which included UHF 698-806 MHz frequency band (often referred as Digital Dividend band) for ITU Region-3/Asia including India. Thus in total 108 MHz spectrum could be available for 'IMT' in 698-806 MHz frequency band in India and several Asian countries.
- From industry point of view, deployment of this band is of significant interest for mobile broadband services (mBB),
 - Propagation characteristics provide wide area network coverage, specially suitable for our rural areas.
 - Favourable deep in-building coverage.
 - Can provide large blocks of spectrum (multiples of 5/10 MHz), a basic requirement for efficient mobile broadband access.
 - Wide harmonization of the band plan would make available benefits of economies of scale, smooth interoperability and roaming.
- India took the lead and initiated two frequency arrangements/band plans for this frequency band (698-806 MHz) for 'IMT' services, almost 3/4 years back at the APT Wireless Group (AWG), as well as ITU Working Party 5D (ITU WP5D) for widest possible harmonization in Region-3 (Asia).
- At the AWG meetings, Australia withdrew their proposals in favour of India and we got good support from several countries.
- The two band plan proposals (one – 2 x 45 MHz/FDD, and the other – all TDD) were piloted by India through a series of technical study group meetings during last 3 years, both at AWG and ITU-WP5D (including exhaustive technical studies by a AWG Correspondence Group), it involved our active off-line interactions with several countries, mainly interference issues (Australia, New Zealand, Korea, China etc).

- In the process, the initially proposed band plans underwent some technical changes, like increase in centre gap from 8 MHz to 10 MHz, in FDD mode, provision of guard band of 5 MHz at the lower end (698 MHz) and 3 MHz at higher end (806 MHz). Same guard bands would also be applicable to all TDD band plan. Thus 90 MHz remained available for 'IMT'.

The AWG/APT recommended two band plans were included by WP5D as part of Revision of ITU-R M.1036/Rev.3 for IMT (A-5 & A-6).

- The finalized two band plans by AWG & WP5D are indicated below:
- India is not supporting mixed FDD and TDD mixed band plan, as such mix would lead to significant wastage of spectrum in guard bands to avoid FDD/TDD interference implications.

Option - 1



- **45+45 MHz FDD arrangement with 10 MHz central gap (in brief, 2 x 45 MHz band plan).**
- **Conventional duplex arrangement, where the mobile transmit function is allocated to the lower spectrum block of the FDD pair (the earlier proposed reverse duplex arrangement, based on technical studies, had to be modified to conventional, to safeguard interference issues with GNSS).**
- **Dual duplexer arrangement.**
- **Internal guard band at 698 MHz = 5 MHz**
- **Internal guard band at 806 MHz = 3 MHz**
- **Additional 4 MHz external guard band (below 698 MHz deploying 8 MHz TV channel raster as in India). [A few countries deploying 6 MHz channel would need to provide the additional external guard band (4 MHz) at 698 MHz level internally in the band 698-806 MHz].**

Option - 2

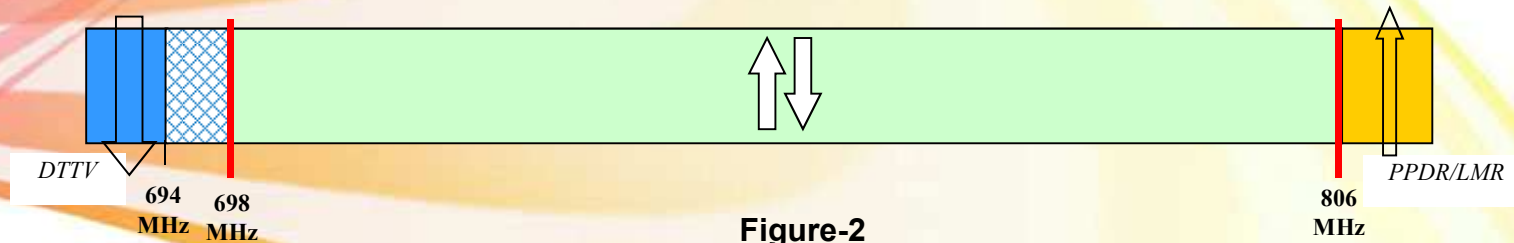


Figure-2

Harmonised TDD arrangement of 698-806 MHz band

- The proposed TDD option frequency arrangements in the band 698-806 MHz has also been considered with appropriate guard bands on both sides as shown in Figure 2.
 - This arrangement includes an internal guard band of 5 MHz at 698 MHz and another internal guard band of 3 MHz at 806 MHz.
 - Additional “internal” guard-bands may also be required between unsynchronized TDD networks.
 - Additional 4 MHz external guard band below 698 MHz is also available because of the 8 MHz TV channel raster in India.
- All these efforts culminated in final approval by WP5D (A-5 & A-6) at its 12th Meeting, held at Goa (October 2011), hosted by India.
 - We were also successful by our timely interventions at the Meetings on a few issues of importance, at the AWG#11 and WP5D#12 related to these band plans (off-line interactions).
 - the proposal of Australia for out-of-band emission limits of (-)40 dBm for IMT UE’s/mobile devices in the band (to safeguard broadcast receivers at the 698 edge) were got modified to (-)34 dBm, based on economic considerations (complexity in filter design and increased filter costs), thereby enabling availability of UE’s/mobile devices at affordable prices & facilitating broadband penetration in rural India.

- The mixed band plan (FDD & TDD), which we/India were not supporting all along was finally deleted by WP5D from the finalized ITU-R M.1036/Revision.3 document (WP5D#12, Goa) (widely supported by Korea, New Zealand, Australia and India).
 - The International Standardisation Body 3GPP was approached through the AWG forum to prioritize timely release of specifications for these band plans. 3GPP agreed to our (AWG) request and has targetted for March 2012 (India is planning auction of 698-806 MHz band for Wireless Broadband services/likely LTE in 2H2012).
 - The two finalized band plan/frequency arrangement had since been sent by WP5D to SG5 of ITU (November 2011) and would now be considered by World Radio Assembly (RA-2012)/WRC-12, due to be held from mid-Jan, 2012 at Geneva.
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Preliminary Agenda Common Proposals (PACP's) for consideration of WRC-12 & RA-12

- India had submitted several documents to ITU-WP5D and APT#5 meeting held at Busan/Korea for consideration of WRC-12. Most of these have been accepted by APT for inclusion in WRC-12 Agenda. It included our document on 'Assessment and Forecast of IMT Spectrum for Mobile Broadband deployments'.
- India has endorsed 55 PACP's for WRC-12 & RA-12, which were of interest to India.
- The PACP's include endorsement for WRC-12 Agenda Item AI 8.2/Attachment-5 (Resolution 806/WRC-07), widely supported by the Industry namely, 'APT' common proposal on,
"Study on Spectrum demands, regulatory provisions, additional allocations to the Mobile Service and possible additional identification of frequency bands to support the terrestrial component of International Mobile Telecommunications (IMT)".