

Facilitating the Development of an Untethered Society

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Wireless Technologies for Mobility

- In general, users prefer mobility
- Mobility requires use of wireless technologies
 - *radio waves (up to 3000 GHz)*
 - *infra-red (above 3000 GHz but below frequencies of visible light)*
- Technological constraints:
 - *spectrum availability*
 - *capacity restriction (compared with, for example, optical fibres)*

Wireless Technologies for Mobility (2)

- Capacity constraints are gradually overcome by technological developments
 - *from analogue to digital*
 - *newer generations of equipment*
 - *short range communications enabling spectrum-reuse*
 - *smarter antennas*
 - *underlay systems (Ultra Wide Band)*
 - *agile radio, etc.*

Facilitating Wireless Technologies

- Government facilitates the use of wireless technologies (the traditional approach)
 - *makes the spectrum available (spectrum planning)*
 - *licenses the use of the spectrum (individual licensing or class licensing)*
 - *alternatively, permits the use of spectrum without licensing (exemption)*
 - *maintains technology neutrality: lets the market decide the technology*

Facilitating Wireless Technologies (2)

- Past
 - *3G spectrum licensing in 2001*
 - *reserved 2500 – 2690 MHz band for 3G expansion*
 - *shared spectrum for wireless LAN or PAN such as Wi-Fi and Bluetooth in 2.4 GHz/5 GHz bands*
 - *extended exemption order for other radio devices (e.g. cordless phones, contactless smartcards, etc.)*

Facilitating Wireless Technologies (3)

- In progress
 - *re-licensing and refarming of 2G spectrum*
 - *Broadband Wireless Access (BWA)*
 - *Radio Frequency Identification (RFID)*
 - *Digital Terrestrial Television (DTT)*
- Future
 - *Ultra Wide Band (UWB)*
 - *agile radio*

Broadband Wireless Access

- Industry consultation closing 21 February 2005
- 3.4 – 3.6 GHz band proposed to be allocated
- Three 14 MHz x 2 *paired* blocks and four 20 MHz *unpaired* blocks are available
- Subject to payment of Spectrum Utilisation Fee
- Assignment by auctioning
- Market to decide technical standard to be used
- Initially proposed to be for “fixed” services
- “Fixed” services will include “nomadic” services

Broadband Wireless Access (2)

- Some in industry consider that the initial OFTA proposal of restricting use of spectrum to “fixed” services
 - *deviates from “technology neutrality” principle*
 - *restricts business case for use of BWA spectrum*
- OFTA maintains an open mind and welcomes comments in submissions

Broadband Wireless Access (3)

- Not a deviation from “technology neutrality” principle as it is normal (under existing spectrum management regime) to allocate spectrum for specific use
- Initial proposal reflects technological readiness (if market decides to adopt WiMax, this technology would not be ready for “full mobility” commercial operation in initial years)

Broadband Wireless Access (4)

- It may be premature to invite spectrum bids for “full mobility” services using BWA technologies in view of uncertainties (timing, market acceptance, business case, etc.)
- There is a practical need to provide spectrum for “last mile” access before withdrawal of mandatory Type II interconnection for fixed networks by 30 June 2008 (about 20% of households may not be covered by wired alternative customer access networks other than the hybrid-fibre coaxial cable TV network)

Spectrum Management Mechanisms

- This points to limitations of existing “command-and-control” mode of spectrum management
- This traditional mode has served Hong Kong well in the past
- Regulator decides on which band for what use and at what time and by whom
- Introduction of new services like BWA will have to await decisions of the regulator
- Would an economic mechanism do better to make those decisions?

Spectrum Management Mechanisms (2)

- Economic mechanisms have been used in 3G licensing
 - *to provide an objective method of deciding who should operate in the spectrum*
 - *to value spectrum as a scarce and valuable public resource*
 - *to promote efficient use of the resource*
- What are the potential and costs/benefits of extending such mechanisms to other bands?

Spectrum Management Mechanisms (3)

- Would further steps generate higher net economic benefits to the community from spectrum through
 - *change of users (trading)*
 - *change of usage (liberalisation)*
- These are the issues to be addressed in the spectrum policy review to be initiated by the Government within 2005

Spectrum Management Mechanisms (4)

- New radio technologies necessitate review of spectrum management and other regulatory issues
 - *Ultra Wide Band (underlays on spectrum of existing users)*
 - *Agile Radio (intrusion into spectrum of existing users during periods of non-usage)*
 - *Mesh Radio (users participating in routing third party traffic)*

Fixed-Mobile Convergence

- Boundary between fixed and mobile network will become increasingly blurred
 - *BWA technologies in due course will be usable for fixed and mobile applications*
 - *converged devices and services will emerge*
 - *DTT will be usable for fixed and mobile transmission*
- Need to merge Fixed Carrier licence and Mobile Carrier licence and review interconnection and fixed/mobile number portability arrangements

Conclusions

- Wireless access technologies will play an important role in next generation networks
- Regulation should facilitate the investment in such technologies and enhance consumer welfare
- Market to decide success or otherwise of such technologies
- Traditional spectrum management approaches will need to be reviewed in light of technological developments



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