

Radio Spectrum and Technical Standards Advisory Committee

SSAC Paper 1/2014 for Discussion:

**WRC-15 Agenda Item on
Suitable Frequency Bands for IMT Services**

Office of the Communications Authority
16 January 2014

Background

- **World Radiocommunication Conference 2015 (WRC-15)**
 - To be held in Geneva over 2 - 27 November 2015
- **WRC-15 agenda item 1.1**
 - To consider possible additional spectrum allocations to mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT)

Spectrum Already Identified for IMT in Region 3 (1)

Band (MHz)	Region 3 Primary Allocation	Hong Kong Band Plan
450 – 470	FIXED, MOBILE	450-458.85 Mobile radio systems 458.85-459 On site paging 459-470 Mobile radio systems
698 – 960	FIXED, MOBILE, BROADCASTING	470-806 Television broadcasting, Wireless microphone, Broadcast-type mobile TV 806-819.1, 851-864.1 Trunked radio system 819.1-825 Telecommunications apparatus, 2-way paging 825-837.5, 870-915, 930-960 Mobile 864.1-868.1, 915-925 Telecommunications apparatus 868.1-870 2-Way Paging

Spectrum Already Identified for IMT in Region 3 (2)

Band (MHz)	Region 3 Primary Allocation	Hong Kong Band Plan
1 710 – 2 025	1710-1980, 2010-2025 FIXED, MOBILE 1980-2010 FIXED, MOBILE, MOBILE-SATELLITE (Earth to space)	1710-1785, 1805-1880 Mobile 1880-1900, 1895-1906.1, 1980-2010 Telecommunications apparatus 1920.3-1979.7, 1904.9-1919.9, 2019.7-2024.7 Mobile
2 110 – 2 200	2110-2120 FIXED, MOBILE, SPACE RESEARCH (Earth to space) 2120-2170 FIXED, MOBILE 2170-2200 FIXED, MOBILE, MOBILE-SATELLITE (space to Earth)	2110-2170 Mobile 2170-2200 Telecommunications apparatus
2 300 – 2 400	FIXED, MOBILE, RADIOLOCATION	2300-2390 Broadband Wireless Access

Spectrum Already Identified for IMT in Region 3 (3)

Band (MHz)	Region 3 Primary Allocation	Hong Kong Band Plan
2 500 – 2 690	2500-2520 FIXED, MOBILE, FIXED-SATELLITE (SPACE TO EARTH), MOBILE-SATELLITE (space to Earth) 2520-2535 FIXED, MOBILE, FIXED-SATELLITE (space to Earth), BROADCASTING-SATELLITE 2535-2655 FIXED, MOBILE, BROADCASTING-SATELLITE 2655-2670 FIXED, MOBILE, FIXED-SATELLITE (Earth to space), BROADCASTING-SATELLITE 2670-2690 FIXED, MOBILE, FIXED-SATELLITE (Earth to space), MOBILE-SATELLITE (Earth to space)	2500-2570, 2620-2690 Broadband Wireless Access 2575-2615 Government service
3 400 – 3 600	3400-3500 FIXED, FIXED-SATELLITE (space to Earth) 3500-3600 FIXED, MOBILE, FIXED-SATELLITE (space to Earth)	Fixed-satellite (space to Earth)

Working Method of Identifying New IMT spectrum

- Working Party 5A & 5D (WP 5A & 5D) to identify spectrum requirements for the mobile services, including **suitable frequency bands** for IMT by July 2013
- Based on the input from ITU Members and WP 5A & 5D, Joint Task Group 4-5-6-7 (JTG 4-5-6-7) to consider spectrum sharing/compatibility of the suitable frequency bands with other services and recommend **candidate frequency bands** for IMT by August 2014
- Conference Preparatory Meeting (CPM) of WRC-15 to review candidate frequency bands identified by JTG 4-5-6-7 for IMT and make recommendations to WRC-15 by April 2015
- WRC-15 to consider the relevant CPM Report and to decide new frequency bands for IMT in November 2015

Roles of JTG 4-5-6-7

- ITU Members are invited to suggest suitable frequency bands and conduct relevant sharing/compatibility studies
- JTG 4-5-6-7 to consider results of sharing/compatibility studies (both existing and new ones) on suitable frequency bands identified by WP 5A & 5D or by ITU Members
- Those bands supported by relevant sharing/compatibility study results may be considered as candidate frequency bands for mobile services including IMT
- It is likely that those suitable frequency bands without any sharing/compatibility studies conducted will not be further considered
- Deadline for submission of sharing/compatibility study results to JTG 4-5-6-7 is 13 February 2014
- By August 2014, JTG 4-5-6-7 shall recommend candidate frequency bands for consideration by WRC-15

Suitable Frequency Bands Suggested for JTG 4-5-6-7 Consideration

Band (MHz)
410 – 430
470 – 698
1 300 – 1 400
1 427 – 1 527
1 695 – 1 710
2 025 – 2 110
2 200 – 2 290
2 700 – 3 100
3 300 – 3 400
3 600 – 4 200
4 400 – 5 000
5 350 – 5 470
5 725 – 6 725

Progress of JTG 4-5-6-7 Studies (1)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
410-430	410 - 420 FIXED MOBILE (except aeronautical mobile) SPACE RESEARCH (space to space) 420 - 430 FIXED MOBILE (except aeronautical mobile) Radiolocation	410 - 430 Government Telecom apparatus (409.74 – 410)	<ul style="list-style-type: none"> ➤ So far, no sharing study results have been submitted to JTG 4-5-6-7 ➤ If no sharing study results are submitted to JTG 4-5-6-7 by the deadline, 13 Feb 2014, it is likely that this band will not be considered as a candidate band ➤ OFCA will keep in view any further development
470-698	470-585 FIXED MOBILE BROADCASTING 585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION 610-698 FIXED MOBILE BROADCASTING	470-698 TV broadcasting (678–686) Wireless microphone (479–565) Broadcast-type Mobile TV (678–686)	<ul style="list-style-type: none"> ➤ Some ITU study results on co-existence of IMT and digital terrestrial TV broadcast (DTTB), broadcasting service, fixed service and other mobile service in this band were published in 2007 and 2012, but further studies on compatibility between IMT and DTTB are underway ➤ Some lately submitted study results suggest co-existence of mobile service and TV broadcasting service infeasible ➤ In Hong Kong, this band is primarily used for TV broadcasting service ➤ OFCA will keep in view the development of relevant studies

Progress of JTG 4-5-6-7 Studies (2)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
1300-1400	1300-1350 AERONAUTICAL RADIONAVIGATION RADIOLOCATION RADIONAVIATION-SATELLITE (Earth to space) 1350-1400 RADIOLOCATION	1300-1350 Aeronautical radionavigation 1350-1400 Radiolocation	<ul style="list-style-type: none"> ➤ Some study results indicate possibility of IMT services causing harmful interference to existing aeronautical radionavigation and radiolocation services, and further studies on compatibility between IMT systems and radiolocation systems are underway ➤ In Hong Kong, this band is used for aeronautical radionavigation and radiolocation services ➤ OFCA will keep in view the development of relevant studies

Progress of JTG 4-5-6-7 Studies (3)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
1427-1527	<p>1427-1429 SPACE OPERATION (Earth to space) FIXED MOBILE (except aeronautical mobile)</p> <p>1429-1452 FIXED MOBILE</p> <p>1452-1492 FIXED MOBILE BROADCASTING BROADCASTING-SATELLITE</p> <p>1492-1518 FIXED MOBILE</p> <p>1518-1525 FIXED MOBILE MOBILE-SATELLITE (space to Earth)</p> <p>1525-1527 SPACE OPERATION (space to Earth) FIXED MOBILE-SATELLITE (space to Earth) Earth exploration-satellite Mobile</p>	<p>1429-1525 Fixed Telecom apparatus (1518-1525)</p> <p>1525-1527 Fixed Telecom apparatus (1525-1530)</p>	<ul style="list-style-type: none"> ➤ Some study results suggest favourable possibility of IMT systems sharing this band with fixed links whereas some other study results suggest co-existence of IMT service and mobile satellite service infeasible ➤ In Hong Kong, this band is used primarily for fixed links, plus some licence-exempted spectrum for mobile satellite service ➤ Given the favourable study results so far and the good propagation characteristics of this band, it would possibly be a candidate frequency band for IMT services. OFCA will keep in view the development of relevant studies

Progress of JTG 4-5-6-7 Studies (4)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
1695-1710	1695-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space to Earth) 1700-1710 FIXED METEOROLOGICAL-SATELLITE (space to Earth) MOBILE except aeronautical mobile	1695-1700 Meteorological-satellite (space to Earth) 1700-1710 Meteorological-satellite (space to Earth)	<ul style="list-style-type: none"> ➤ Some study results support the co-existence of IMT systems and meteorological satellite systems whereas some other study results suggest otherwise ➤ In Hong Kong, this band is used for meteorological satellite service ➤ OFCA will keep in view the development of relevant studies
2025-2110, 2200-2290	2025-2110 SPACE OPERATION (Earth to space) (space to space) EARTH EXPLORATION-SATELLITE (Earth to space)(space to space) FIXED MOBILE SPACE-RESEARCH (Earth to space) (space to space) 2200-2299 SPACE OPERATION (space to Earth) (space to space) EARTH EXPLORATION-SATELLITE (space to Earth)(space to space) FIXED MOBILE SPACE-RESEARCH (space to Earth) (space to space)	2025-2110 Electronic news gathering links / Outside broadcast links (2055-2095) 2200-2299 Electronic news gathering links / Outside broadcast links (2200-2290)	<ul style="list-style-type: none"> ➤ So far, sharing study results submitted to JTG 4-5-6-7 covered mainly the compatibility between IMT systems and earth exploration-satellite, space operation and space-research earth stations but not fixed links ➤ In Hong Kong, this band is used for electronic news gathering links and outside broadcast links ➤ OFCA will keep in view the development of relevant studies

Progress of JTG 4-5-6-7 Studies (5)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
2700-3100	2700-2900 AERONAUTICAL RADIONAVIGATION Radiolocation 2900-3100 RADONAVIGATION RADIOLOCATION	2700-2900 Meteorological aids 2900-3100 Radiolocation	<ul style="list-style-type: none"> ➤ Some ITU study results on co-existence of radars and IMT systems within the band 2700-2900 MHz were published in 2007, but further compatibility studies are underway ➤ In Hong Kong, this band is used for meteorological aids and radiolocation services ➤ OFCA will keep in view the development of the relevant studies
3300-3400	3300-3400 RADIOLOCATION Amateur	3300-3400 Radiolocation	<ul style="list-style-type: none"> ➤ Some study results support the co-existence of IMT indoor system with radar system, and further compatibility studies are underway ➤ In Hong Kong, this band is used for radiolocation service ➤ OFCA will keep in view the development of the relevant studies

Progress of JTG 4-5-6-7 Studies (6)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
3600-4200	3600-3700 FIXED FIXED-SATELLITE (space to Earth) MOBILE except aeronautical mobile Radiolocation 3700-4200 FIXED FIXED-SATELLITE (space to Earth) MOBILE except aeronautical mobile	3600-4200 Fixed-satellite (space to Earth)	<ul style="list-style-type: none"> ➤ Some ITU study results on co-existence of IMT systems and fixed-satellite systems in the band 3400-4200 MHz were published in 2007, but further compatibility studies are underway ➤ In Hong Kong, this band is used for fixed satellite service ➤ OFCA will keep in view the development of the relevant studies
4400-4500	4400-4500 FIXED MOBILE	4400-4500 Fixed	<ul style="list-style-type: none"> ➤ Some study results support the co-existence of IMT system with fixed link system ➤ In Hong Kong, this band is used for fixed service ➤ OFCA will keep in view the development of the relevant studies

Progress of JTG 4-5-6-7 Studies (7)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
4500-4800	4500-4800 FIXED FIXED-SATELLITE (space to Earth) MOBILE	4500-4800 Fixed	<ul style="list-style-type: none"> ➤ Following some ITU studies, the protection criteria for fixed links from radio local area networks (RLAN) in the 4 to 6 GHz range were published in the concerned ITU-R Recommendation in 2005 ➤ Some members were of view that the previous study results were still valid and expected that new IMT technology could further improve sharing with fixed service ➤ In Hong Kong, this band is used for fixed links ➤ OFCA will keep in view the development of relevant studies
4800-5000	4800-4990 FIXED MOBILE Radio astronomy 4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive)	4800-4940 Fixed 4940-4990 Government	<ul style="list-style-type: none"> ➤ Some study results support the co-existence of IMT system with fixed link system ➤ In Hong Kong, this band is used for fixed service ➤ OFCA will keep in view the development of the relevant studies

Progress of JTG 4-5-6-7 Studies (8)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
5350-5470	5350-5460 EARTH EXPLORATION SATELLITE (active) SPACE RESEARCH (active) AERONAUTICAL RADIONAVIGATION RADIOLOCATION 5460-5470 RADIONAVIGATION EARTH EXPLORATION SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION	5350-5470 Reserved for government aeronautical radionavigation system	<ul style="list-style-type: none"> ➤ Some study results suggest the co-existence of RLAN and earth exploration-satellite (active) infeasible, but further studies on respective compatibility of RLAN system with radiolocation system and earth exploration satellite system are underway ➤ In Hong Kong, all frequency channels in this band are vacant ➤ OFCA will keep in view the development of relevant studies
5725-5850	5725-5830 RADIOLOCATION Amateur 5830-5850 RADIOLOCATION Amateur Amateur-satellite (space to Earth)	5725-5850 Industrial, scientific and medical equipment Amateur Telecom apparatus	<ul style="list-style-type: none"> ➤ So far, no sharing study results have been submitted to JTG 4-5-6-7 ➤ If no sharing study results are submitted to JTG 4-5-6-7 by the deadline, 13 Feb 2014, it is likely that this band will not be considered as a candidate band ➤ OFCA will keep in view any further development

Progress of JTG 4-5-6-7 Studies (9)

Frequency Band (MHz)	Region 3 Allocation	Hong Kong Band Plan	Status
5850-6725	<p>5850-5925 FIXED FIXED-SATELLITE (Earth to space) MOBILE Radiolocation</p> <p>5925-6700 FIXED FIXED-SATELLITE (Earth to space) MOBILE</p> <p>6700-6725 FIXED FIXED-SATELLITE (Earth to space) (space to Earth) MOBILE</p>	<p>5850-5875 Fixed (point-to-multipoint distribution) Fixed-satellite (Earth to space) Industrial, scientific and medical equipment</p> <p>5875-5950 Fixed (point-to-multipoint distribution) Fixed-satellite (Earth to space)</p> <p>5950-6425 Fixed-satellite (Earth to space)</p> <p>6425-6725 Fixed (6440-7100) Fixed-satellite (Earth to space) (6425-6650)</p>	<ul style="list-style-type: none"> ➤ Some study results show possibility of IMT services causing harmful interference to fixed satellite services whereas some other study results suggest otherwise ➤ In Hong Kong, this band is used for industrial, scientific and medical equipment, point-to-multipoint distribution systems and fixed satellite systems ➤ OFCA will keep in view the development of relevant studies

Views Sought

- Members are welcome to give their views on the suitable frequency bands for IMT