Spectrum reassignment in Hong Kong – the case of the 1.9-2.2GHz band

Phillipa Marks and Ken Pearson

25th March 2013

Plum Consulting, **London**, **T** +44 (0)20 7047 1919, **www.plumconsulting.co.uk**

What is the issue?

- **The four 3G licences in the 1.9-2.2 GHz band expire in October 2016 *but* 3G traffic will grow and services continue into the 2020s**
- **OFCA has considered 3 options using a public interest test: service continuity; investment & innovation; efficiency; competition**

Option 1 Renew 2.1 GHz licences Apply SUF	**Option 2** Re-auction ALL 2.1 GHz spectrum	**Option 3** Re-auction 1/3 2.1 GHz spectrum Apply SUF on 2/3
?	Rejected X	?
Potentially an option	OFCA considers disruption cost is too high	**Favoured option By OFCA**

Is Option 1 or Option 3 in the public interest? What should be the SUF?

What has been done before in Hong Kong and elsewhere?

- **In Hong Kong**
  - 2G licences at 900MHz and 1800MHz were renewed at an SUF set by the regulator i.e. Option 1
  - 2G licence at 850 MHz was re-auctioned for CDMA2000 due to inefficient use
- **Internationally**
  - There is no single approach
  - But renewal/right of first refusal is commonly used in developed markets together with spectrum trading e.g. Australia, Canada, New Zealand, USA, numerous EU countries including UK, etc

In deciding the right approach it is important to take account of national policy objectives and market circumstances

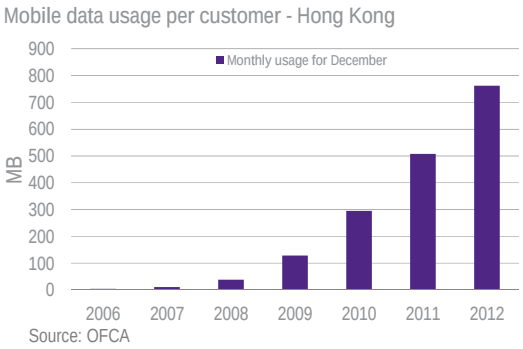
We appraised options using OFCA's criteria: 5=best, 1= worst

Criteria	Our score for each option			Major impacts of spectrum deprival (under Option 3)
	1	2	3	
Service continuity	5	2	3	Significant degradation of service quality Unnecessary network investment Higher prices for consumers
Investment and service innovation	5	2	2	Increased uncertainty for operators Reduced short term investment in 3G
Efficient spectrum utilisation	-	-	-	No existing measures are available from OFCA. But existing high levels of competition should ensure spectrum use remains efficient; Spectrum fragmentation would lower efficiency
Promotion of effective competition	3	1	1	Little improvement expected as already competitive mobile market. Risk of weaker competition due to reduced investment and innovation, or spectrum fragmentation

Service continuity

Now

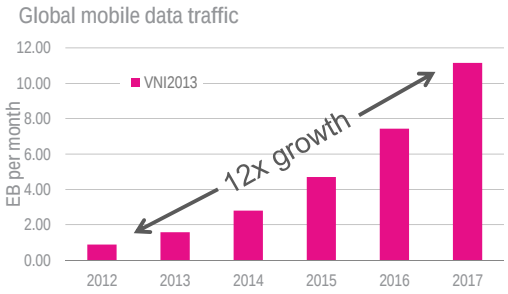
- **OFCA statistics show rapid growth in data traffic**



Source: OFCA

And in future…

- **12-fold increase in traffic to 2017**
- **Increasing demand for both 3G and 4G services**



Source: Cisco

Service continuity – congestion impacts ….

- **With less spectrum, OFCA acknowledges that significant congestion will occur**
- **OFCA estimates an 18% reduction in service quality will occur but the reality will be far worse**
  - OFCA assumes network capacity can double with technology enhancements
  - But operators already deploying most advanced technology
- **Reduced service quality means**
  - Dropped calls/data sessions
  - Low data rates at peak hours
  - Poor quality roaming experience
- **Costs of network investment incurred when trying to maintain service quality will be passed on to consumers**

Impact on investment and innovation

- **As traffic growth takes off it is important to develop the capacity of both 3G and 4G networks**
  - 3G networks because traffic per user is increasing
  - 4G networks to support the development of new high data rate services

Option 1

All operators have certainty over their spectrum holding in this critical period to 2016 and after to support the traffic growth

Operators can invest to develop their networks to face the rising traffic demand for both 3G and 4G services

Option 3

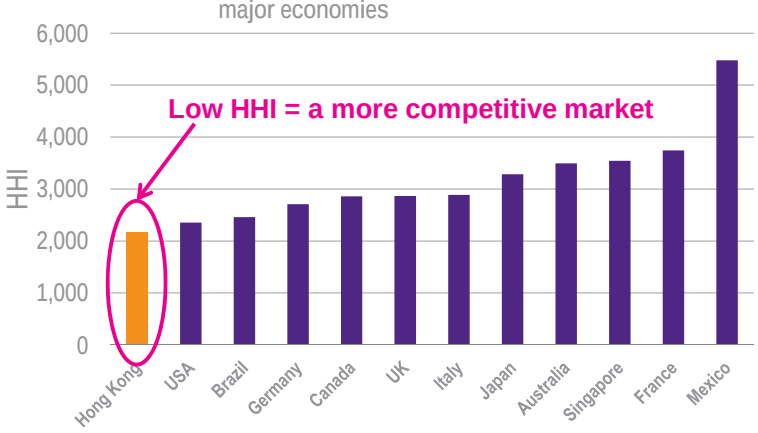
3G operators using 2.1 GHz face the uncertainty of losing 1/3 of their 3G spectrum

Investment funds and management time will be diverted to trying to maintain service quality rather than developing innovative services

Consumers of 3G and 4G services will suffer lower data throughput and fewer innovative services under Option 3

Impact on competition

Concentration index of mobile industry for a selection of major economies



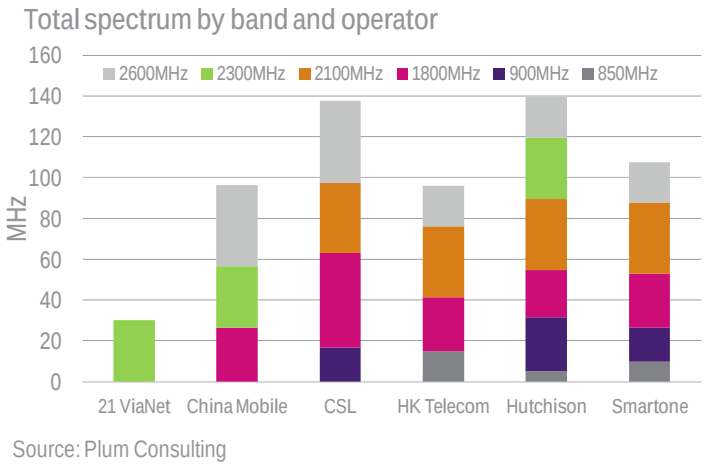
Source: Plum Consulting, GSMA (2011)

The Herfindahl-Herschmann Index (HHI) is a measure of industry concentration calculated from the distribution of market shares

- **The Hong Kong mobile market is exceptionally competitive**
- **Hong Kong has 5 operators – a very high number for a mature market**

There is no evidence of lack of competition that justifies regulatory intervention

Six entities have spectrum to deliver 3G/4G services



Source: Plum Consulting

* Vianet has not deployed a network yet

Additional spectrum will become available. Regulatory focus should be on increasing overall spectrum supply rather than redistributing existing holdings

Option 1 provides greater net benefits to consumers than Option 3

Option 1

Preserves the already competitive Hong Kong market

Avoids risk of substantial consumer costs

The operator that does not have 2.1 GHz has other spectrum for provision of 3G and 4G services

More spectrum could be released by 2016 e.g. digital dividend spectrum

Option 3

Competition benefits of Option 3 are unlikely and highly speculative

?

Significantly reduced service quality when existing operators lose spectrum

Enforced churn to avoid poor service – costs of disruption and new handsets

Additional investment costs incurred by operators trying to hold onto customers

Option 3 has clear costs to consumers

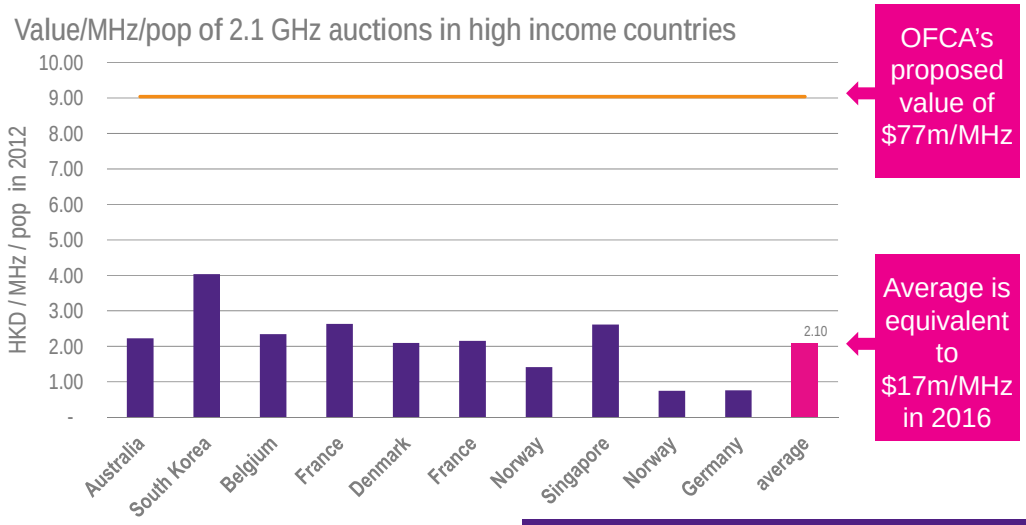
A fair and reasonable SUF needs to be set for renewed spectrum

- **OFCA has proposals for Option 3**

Method 1: Higher of **$77m / MHz** and the auction price	Method 2: Average of **$80m / MHz** and the auction price
Based on final year SUF paid on current 2.1 GHz spectrum licences	Based on weighted average of selected recent auctions in Hong Kong

- **SUF for Option 1 is not specified by OFCA**

OFCA's proposed values are too high – by up to a factor of 4



Note: Values have been normalised to 15 year licence duration.
Source: Plum Consulting, Regulators' websites

Unlike other regulators OFCA makes no reference to international benchmarks

The issues with OFCA's approach are …..

Method 1

$77m/MHz

- **The $77m is too high because of flaws in OFCA's approach**
  - Final year payment not average is used
  - Future values should have been discounted
  - Some spectrum bought was not counted
- **Correcting for these factors gives values that are less than half of the $77m/MHz proposed**

Method 2

$80m/MHz

- **The $80m is too high because OFCA selectively uses past Hong Kong auction results**
  - Past results range from $5m/MHz – $108m/MHz
  - OFCA's calculations are not transparent
  - OFCA favours the high values which are for very different, low frequency bands

Recommendations

- **Option 1 (i.e. spectrum renewal) should be adopted. It is in the best interests of consumers and the Hong Kong economy**
- **Option 3 should not be adopted. It will reduce service quality and increase costs for consumers**
- **An SUF value at about 25% of OFCA's proposals should be adopted. This would be consistent with relevant past auction prices in Hong Kong and globally**
- **More generally a better approach to achieving good outcomes is to allow spectrum trading with licences that are renewable**