

Telecommunications Regulatory Affairs Advisory Committee

Handover between Access Points for Public Wi-Fi Service

PURPOSE

This paper informs Members' about the licensing arrangement for the provision of public Wi-Fi service by carrier licensees, under which handover between access points ("APs") will be authorised.

THE EXISTING LICENSING FRAMEWORK FOR PUBLIC WI-FI SERVICE

2. Provision of public wireless local area network service, using wireless technologies such as Wi-Fi, was first authorised under the Class Licence for the Provision of Public Wireless Local Area Network ("LAN") Services ("Class Licence")¹ created in 2003. It enables the provision of Wi-Fi service as a public telecommunications service within private premises, such as shopping malls, coffee shops, universities, etc., subject to the terms and conditions of the Class Licence. Under the Class Licence, there is no restriction on handover between APs². However, in accordance with clause 8 of the Class Licence, licensees must not offer public Wi-Fi service on or across unleased Government lands and public streets.

3. For the provision of public Wi-Fi on or across unleased Government lands and public streets, a carrier licence issued for the establishment or maintenance of a telecommunications network is required. It was first licensed under the Fixed Carrier Licence ("FCL") and a total of five fixed network operators ("FNOs") have been

¹ The Class Licence for the Provision of Public Wireless LAN Services is available at:
[http://www.coms-auth.hk/filemanager/common/licensing/Wireless_Local_Area_Network_Services_\(Eng\).pdf](http://www.coms-auth.hk/filemanager/common/licensing/Wireless_Local_Area_Network_Services_(Eng).pdf).

² "Handover" means the process of transferring the control or connection of customer equipment from one AP to another without loss or interruption of service.

authorised since 2007 to provide public Wi-Fi service under their FCLs or Fixed Telecommunications Network Services (“FTNS”) Licences. Under Schedule 3 of the FCL / FTNS Licence, the authorised FNO was assigned frequency spectrum in the 2.4 GHz and 5 GHz bands for deployment at the fixed wireless APs. In line with the scope of public fixed telecommunications services under the FCL / FTNS Licence, the concerned frequency spectrum was assigned with the restriction of handover between the fixed wireless APs.

4. Following the creation of the Unified Carrier Licence (“UCL”) in 2008, the five FNOs authorised to provide public Wi-Fi service took up the UCL between 2010 and 2015 upon expiry of their FCLs / FTNS Licences³, with the scope of service remaining largely unchanged. All the terms contained in the FCLs / FTNS Licences regarding the provision of public Wi-Fi service, including the restriction of handover between APs, were transplanted to Schedule 3 of the UCLs granted to these FNOs.

PUBLIC WI-FI SERVICE WITH HANDOVER BETWEEN ACCESS POINTS

5. With the advance in technological developments, handover between Wi-Fi APs has become technically feasible in recent years and new Wi-Fi network equipment is now commonly enabled with the APs handover function by default. To keep pace with technological developments, it is timely to update the licensing arrangement such that all UCL holders, irrespective of whether they are FNOs or mobile network operators (“MNOs”), may be authorised under their UCLs to provide public Wi-Fi service without handover restriction. In fact, with the establishment of the UCL regime since 2008, a UCL holder can be authorised to provide any fixed, mobile and/or converged service and there is in principle no regulatory concern over authorising operators to provide public Wi-Fi service without the restriction of handover under a UCL.

³ The five FNOs authorised to provide public Wi-Fi service under the FCLs / FTNS Licences are Hong Kong Broadband Network Limited, Hutchison Global Communications Limited, New World Telecommunications Limited, PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited, and Wharf T&T Limited.

6. While the public Wi-Fi service without handover restriction on APs can offer users with a certain degree of mobility, it is still not having all the attributes of a “full” mobile service, considering that (1) communications via Wi-Fi across fast moving locations such as cars and trains are still technically infeasible; (2) coverage of Wi-Fi networks is unlikely comparable to that of traditional mobile networks; and (3) operation of public Wi-Fi service in the unlicensed frequency bands does not have carrier grade performance on service quality. Therefore, the public Wi-Fi service without handover restriction is neither a full-fledged mobile service, nor a conventional fixed service.

7. From the regulatory perspective, the above arrangement will create a level playing field among FNOs, MNOs and class licensees insofar as the handover function of APs is concerned. In addition, with a higher degree of mobility enabled by handover between APs, it may be more attractive for incumbent local network operators and new entrants to provide territory-wide public Wi-Fi service as another solution to meet the demand for wireless data connectivity. The existing MNOs would also be able to provide more effective mobile data offload through the enhanced public Wi-Fi service. Furthermore, it supports the initiative of the Government in the development of “Smart City”, where plans are in place to double the number of APs under the Wi-Fi.HK programme offering free Wi-Fi services from 17 000 to 34 000 within three years, and many of these APs will be installed on or across unleased Government lands and public streets, at places like parks, sitting-out areas, promenades, tourist spots, public transport interchanges, land boundary control points, etc⁴.

THE UPDATED LICENSING ARRANGEMENT

Service Authorisation

8. As explained in paragraph 6 above, the public Wi-Fi service with

⁴ For more details about the Smart City initiative, please refer to the 2016 Policy Address, which is available at: <http://www.policyaddress.gov.hk/2016/eng/p84.html>.

handover between APs is neither a full-fledged mobile service nor a conventional fixed service. As such, it is to be named as “*public wireless local area network ('LAN') services*”, which will be a new category of service under the UCL.

9. Operators, including existing FNOs and MNOs currently not providing public Wi-Fi service, may apply for authorisation to provide public wireless LAN services under the UCL. There will not be any restriction on them regarding handover between the APs for public Wi-Fi, but they will be subject to the licensing requirements as set out in paragraph 8 above and paragraphs 10 to 13 below. For existing FNOs currently authorised to provide public Wi-Fi service, they are encouraged to return their UCLs to the Communications Authority (“CA”) for amendment so that they will be able to provide the service without the restriction on handover between APs, otherwise they shall continue to be subject to the restriction of handover between APs.

Assignment of Frequency Spectrum

10. Carrier licensees authorised to provide public wireless LAN services will be assigned frequency spectrum in the 2.4 GHz and 5 GHz bands (i.e. 2400 – 2483.5 MHz, 5150 – 5350 MHz, 5470 – 5725 MHz and 5725 – 5850 MHz) under Schedule 3 of the UCL. The assignment will be made on the condition that the concerned frequencies could only be used for the provision of public wireless LAN services. In particular, MNOs which are authorised to provide the services shall not use the concerned frequencies for the provision of traditional mobile services such as the evolving LTE in unlicensed band (“LTE-U”) services which should be subject to separate consideration by the CA should it receive any such request in the future.

11. To control interference and promote efficient use of the spectrum, the radiocommunications equipment employed for the provision of public wireless LAN services shall operate within the assigned frequency bands and shall generate the output and spurious emissions within the specified levels. Details of the relevant technical particulars which are set out in

Annex A will be included under Schedule 3 of the UCL⁵. They will also be incorporated into the UCL of FNOs currently authorised to provide public Wi-Fi service, when they return their UCLs for the amendment in respect of the removal of the restriction on handover between APs.

Licence Fee Payable

12. At present, for the provision of public Wi-Fi service by a FNO, the FNO shall report one customer connection for each AP connected to the broadband access line for the calculation of annual licence fee payable for its customer connections. The same calculation principles will apply under the licensing framework for the public wireless LAN services provided by a UCL holder. In particular, if a licensee is authorised to provide the services, irrespective of whether it leases the broadband access line from FNOs or self provide for it, the above customer connection fee will apply. For the avoidance of doubt, if multiple APs are connected to the same broadband access line for the provision of public wireless LAN services, the licensee providing the services is required to report one customer connection for each AP established (e.g. two customer connections if two APs are connected to the same broadband access line).

Licence Condition

13. Special Condition 37 in the sample UCL on registration for public wireless LAN services, as set out in **Annex B**, is relevant and applicable for any licensee authorised to provide the public wireless LAN services under UCL. It requires the licensee to register with the CA information about the locations of the APs and the frequency band(s) in use at individual locations⁶.

⁵ The technical particulars are the same as those specified in HKCA 1039 “*Performance Specification for Radiocommunications Apparatus Operating in the 2.4 GHz or 5 GHz Band and Employing Frequency Hopping or Digital Modulation*”. They are also the same as those specified in the Class Licence for Provision of Public Wireless LAN Services.

⁶ The registration requirements are the same as those specified for class licensees providing public Wi-Fi service.

14. To make clear the above licensing arrangement for the public wireless LAN services which may be authorised under UCL, the Office of the Communications Authority will accordingly amend the UCL application guidelines for reference by prospective applicants.

VIEWS SOUGHT

15. Members are invited to take note of the content of this paper. Any views and comments from Members in relation to the provision of public Wi-Fi service with the handover restriction lifted are welcome.

**Office of the Communications Authority
June 2016**

Annex A

**Technical Particulars of Radio Stations for the Provision of
Public Wireless Local Area Network Services**

Column 1	Column 2	Column 3
Frequency Band	Output Level	Spurious Emission Level
2400 – 2483.5 MHz	(a) peak e.i.r.p. not to exceed 4 W for frequency hopping spread spectrum modulation or digital modulation systems; or (b) aggregate e.r.p. not to exceed 100 mW for any modulation	e.r.p. not to exceed 10 µW outside the frequency band in which the fundamental frequencies are located
5150 – 5350 MHz ⁷	e.i.r.p. not to exceed 200 mW using only digital modulation	e.r.p. not to exceed 10 µW
5470 – 5725 MHz ⁸	e.i.r.p. not to exceed 1 W	e.r.p. not to exceed 10 µW
5725 – 5850 MHz	(a) peak e.i.r.p. not to exceed 4 W for frequency hopping spread spectrum modulation or digital modulation systems; or (b) aggregate e.r.p. not to exceed 100 mW for any modulation	e.r.p. not to exceed 10 µW outside the frequency band in which the fundamental frequencies are located

⁷ Use of the band 5150 – 5350 MHz is restricted to indoor operations until the requirements of the International Telecommunication Union (“ITU”) as applicable to the band are available, by which time the use of the band shall be in compliance with the requirements as laid down by the ITU.

⁸ Use of the band 5470 – 5725 MHz shall comply with the technical requirements in Recommendation ITU-R M.1652 “Dynamic frequency selection (DFS) in wireless access systems including radio local area networks for the purpose of protecting the radiodetermination service in the 5 GHz band” approved by the ITU as revised from time to time.

Annex B

Special Condition 37 in the Sample Unified Carrier Licence

37. REGISTRATION FOR PUBLIC WIRELESS LOCAL AREA NETWORK SERVICES

- 37.1 Where the licensee provides public wireless local area network services, it shall register the following information with the Authority before the commencement of services:
- (a) the location in which the radiocommunications apparatus is established or maintained; and
 - (b) the frequency band employed by the radiocommunications apparatus.
- 37.2 The licensee shall update the registered information provided under Special Condition 37.1 before putting into effect any change to the registered details.
- 37.3 The licensee shall notify the Authority within one month after ceasing to provide public wireless local area network services.