# Leading-edge mobile and Wi-Fi networks form core of advanced all-round mobile communications experience
# 全方位流動通訊體驗 建基尖端的流動及 Wi-Fi 網絡

## Hutchison Telecommunications (Hong Kong) Limited
## 和記電訊(香港)有限公司


Preparing Hong Kong to become a smart city of global renown while facilitating IoT development is a priority for 3 Hong Kong.
3香港以促進香港成為全球知名的智能城市，以及推動物聯網的發展為一項首要任務。

Hutchison Telecommunications (Hong Kong) Limited (HTHK) runs both mobile and fixed-line operations in Hong Kong. 3 Hong Kong is the only local cellular operator in possession of 900, 1800, 2100, 2300 and 2600 MHz spectrums. And every effort is made to maximise the collective benefits of this spectrum pool in order to deliver unprecedented mobile convenience and a best-in-town user experience.

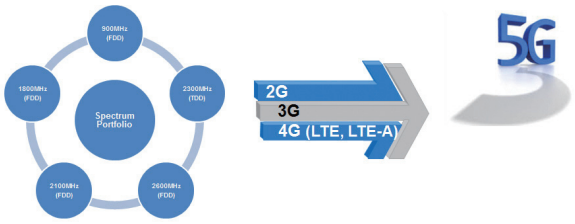
### Committed to establishing a 5CC LTE-Advanced (LTE-A) network

HTHK's mobile and Wi-Fi capabilities are served by a world-class 1G optical-fibre backbone network. In order to utilise spectrum resources to the full and map out long-term network deployment plans, 3 Hong Kong is establishing an LTE-A network based on carrier aggregation (CA) involving five components carriers (CC).

和記電訊(香港)有限公司（和記電訊香港）在香港同時營運流動及固網業務，而3香港是本港唯一擁有900兆赫、1800兆赫、2100兆赫、2300兆赫及2600兆赫頻段的流動通訊營辦商，透過充分善用各頻段，發揮頻譜庫的最大功用，為流動通訊服務帶來前所未有的便利，打造城中首屈一指的用戶體驗。

### 致力建立5CC LTE-Advanced(LTE-A)網絡

和記電訊香港的流動及Wi-Fi服務均由世界級的1G光纖骨幹支援，而3香港為充分利用頻譜資源及部署長遠的網絡發展，一直致力以載波聚合技術發展五個元件載波(component carriers或CC) 5CC LTE-A網絡。




3 Hong Kong is the only local operator to possess blocks of spectrum across the 900MHz, 1800MHz, 2100MHz, 2300MHz and 2600MHz bands.
3香港是目前本港唯一擁有橫跨900兆赫、1800兆赫、2100兆赫、2300兆赫及2600兆赫五個頻譜制式頻段的網絡商。

CA technology combines two or more intra-band or inter-band carriers, thereby providing wider bandwidth to deliver higher data transmission rates. Integration of frequency division duplex (FDD) and time division duplex (TDD) technologies enables optimum TDD/FDD performance.

3 Hong Kong demonstrated Hong Kong's first end-to-end FDD/TDD LTE-A commercial network in 2015 and aims to launch a 3CC CA-capable LTE-A network in the second half of 2016. This will be followed by a four-carrier CA in 2017 to support multi-mode devices, then five carriers (900/1800/2100/2300/2600MHz) in 2018 to boost data speeds and network capacity. This means speeds are expected to rise from some 300Mbps in 2016 to more than 400Mbps in 2017 and in excess of 500Mbps in 2018.

## At the forefront of technology

### Cloud-radio access network (C-RAN)

3 Hong Kong re-farmed part of its 900MHz spectrum in the first half of 2016 in order to enhance indoor LTE coverage, and will re-farm 2100MHz spectrum to achieve a better 4G customer experience.

A major step will follow to reconfigure conventional base stations using C-RAN infrastructure. This can be brought into play by relocating base station baseband units (BBU) at remote sites to a central location such as a data centre, and connecting the BBU with remote radio units (RRU) located at remote sites using dark fibre.

The effect will be to reduce the number of remote equipment rooms, leading to centralised management, plus rental savings and greater operational efficiency. C-RAN architecture positions 3 Hong Kong ideally to embark on network transformation and pave the way for further introducing technologies such as network functions virtualisation (NFV) and software-defined networking (SDN).

### Small cells

3 Hong Kong also deploys small cells to improve signal reception over densely-populated and heavy-use areas, while increasing network capacity. This has the effect of boosting network speed and improving the overall customer experience.

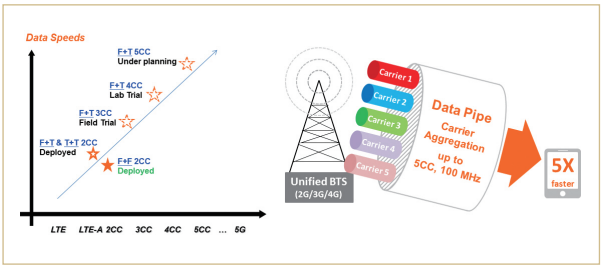
## Services available from an advanced LTE network

### VoLTE and Voice-over-Wi-Fi (VoWi-Fi)

3 Hong Kong took voice call quality to new heights with its LTE network, and was one of the world's first operators to launch a VoLTE HD voice capability in 2014, allowing faster VoLTE call set-up and smooth switching between voice and video. Customers now enjoy high-speed data network performance and HD voice calls seamlessly and simultaneously.

載波聚合技術將兩個或以上的載波(來自相同或不同的頻段)相聚合，提供更高頻寬，以提升數據傳輸速度。整合頻分雙工（FDD）及時分雙工（TDD）頻段的技術，可讓FDD/ TDD頻段的功能發揮得淋漓盡致。

3香港於2015年演示了全港首個商用端對端FDD/TDD LTE-A網絡，目標於2016年下半年推出利用載波聚合技術產生的3CC LTE-A網絡。公司計劃於2017年推出4CC網絡以支援多制式的裝置，並於2018年聚合5CC頻譜(900/1800/2100/2300/2600兆赫)，以提升數據傳輸速度及網絡容量。網絡速度可望由2016年的300Mbps提升至2017年超過400Mbps，2018年更可突破500 Mbps。




3 Hong Kong aims to launch a 5CC-capable LTE-Advanced network in the near future.
3香港計劃於不久將來推出利用載波聚合技術發展的5CC LTE-A網絡。

## 走在科技潮流的尖端

### 雲端無線接入網絡

3香港於2016年上半年完成重組部分900兆赫頻譜的工程，提升室內LTE網絡覆蓋，並計劃重組2100兆赫頻譜，以達致更佳的4G客戶體驗。

另一項重要發展，是利用雲端無線接入網絡架構重新配置傳統基站，將眾多遠端基站的基頻單元裝置（BBU）集中放置到數據中心等位置重新配置，並利用現有暗光纖資源，將BBU連接至基站站點的多頻段遠端無線射頻單元裝置（RRU）。

此舉不但可減少放置遠端基站設備機房的數目，方便集中管理，亦可節省租金及提升營運效益。採用雲端無線接入網絡架構，標誌著3香港已開始部署網絡架構轉型，並為進一步引入網絡功能虛擬化(NFV)及軟體定義網絡(SDN)技術鋪路。

### 小型基站

3香港亦透過小型基站改善人流密集及高數據用量地區的訊號接收，同時提升網絡容量，以提高網絡速度及改善整體客戶體驗。

## 由先進LTE網絡衍生的服務

### VoLTE 及VoWi-Fi服務

3香港透過其LTE網絡，將話音通訊的質素提升至另一境界，並於2014年成為全球其中一家率先推出VoLTE高清話

3 Hong Kong launched Voice-over-Wi-Fi in 2015 by integrating IP multimedia subsystem (IMS), 4G LTE and Wi-Fi technologies – a move that enables seamless handover between VoLTE and VoWi-Fi plus improved call continuity. Customers using compatible handsets benefit from stable high-quality voice communications via any Hong Kong Wi-Fi network.

### Premium VoWi-Fi

The service was upgraded to premium VoWi-Fi in 2016, since when customers have been able to make and receive non-SIM voice calls using up to five devices such as a smartwatch, tablet and PCs – all via a smartphone connected to the same cloud service account. Another non-SIM convenience is that calls can be made or answered on another device, even when a previously-made/answered call is still in session. The move breaks free from the limitations normally associated with SIM cards.

### Internet of Things (IoT)

3 Hong Kong's plan for the future also includes making use of the reliable connectivity provided by our innovative mobile and Wi-Fi networks to develop the Internet of Things (IoT) concept. This will cover transportation such as in the context of onboard entertainment, navigation and traffic info; as well as consumer electronics and smart wearables including watches, jewelry and clothes; plus remote control and security for homes, sensor metering for power grid, automation and weather, along with health care and education functionality.

Mobile broadband (MBB) connections become increasingly diverse when new-generation FDD and TDD networks are combined to form a one LTE network used in conjunction with upcoming technologies applied to logistics, homes and cars. All this is expected to result in huge volumes of traffic carrying massive numbers of connections – and will require ultra-reliable low-latency connectivity, which will send demand for bandwidth and network capacity soaring. It is believed modernistic services involving robot networks and drone-based logistics will gain popularity as network bandwidth improves to make it all possible.

## Hong Kong's largest Wi-Fi service provider *

3 Hong Kong has been developing mobile and Wi-Fi capabilities by increasing network coverage and capacity such that they complement one another to provide a stable, reliable and high-speed overall communications experience. 3 Hong Kong boasts more than 20,000 hotspots throughout Hong Kong, making it the city's largest Wi-Fi service provider*. The advanced 802.11ac standard has already been adopted by some of 3 Hong Kong's hotspots, which are served by a 1Gbps optical-fibre backhaul facility to ensure smooth and stable internet access. In fact, the number of hotspots operated by 3 Hong Kong is expected to reach 23,000 by end of 2016.

Preparing Hong Kong to become a smart city of global renown while facilitating IoT development is a priority for 3 Hong Kong. The company is working on every single aspect of providing the ultimate all-round mobile experience in terms of service quality, availability, speed, apps, user features and customer service – all made possible by best-of-breed networks.

* *Based on a review of the number of hotspots featured by the websites of six Wi-Fi service providers in Hong Kong at midnight, 17 Oct 2016. Each Wi-Fi service location provides one or more Wi-Fi hotspots.*

音通訊功能的網絡商，讓VoLTE通話連接得更快，並可無縫切換語音及視像通話。現時，客戶可同時享受高速數據網絡及高清話音通訊。

2015年，3香港結合IP多媒體子系統、4G LTE及Wi-Fi技術，推出VoWi-Fi服務，讓VoLTE及VoWi-Fi無縫切換，提升通話的連續性。客戶使用支援有關技術的手機型號，便可於香港任何Wi-Fi網絡享受穩定、優質的話音通訊。

### 升級版VoWi-Fi

及至2016年，3香港推出升級版VoWi-Fi服務，客戶可利用多達5部智能裝置，包括智能手錶、平板電腦及個人電腦等，連接至同一雲端服務帳戶，接聽或打出電話，實現無SIM通話。其另一方便之處是於通話期間，可透過另一裝置接聽或打出電話，突破一般SIM卡的限制。

### 物聯網

3香港的未來發展計劃，亦包括使用由創新的流動及Wi-Fi網絡所提供的可靠網絡連接，發展物聯網。物聯網概念涵蓋交通，例如交通工具上的娛樂、導航系統及交通訊息；消費電子產品及智能穿戴式裝置，包括手錶、配飾及衣物；以及家居遙控及保安，以至應用於電網、自動化程序及天氣等的傳感計量裝置，配合保健及教育功能。

新一代FDD及TDD網絡結合，建構出統一LTE網絡，並聯合未來應用於物流、家居及汽車的科技一同使用，讓流動寬頻的連接日趨多元化。此趨勢預期會產生大量連接及龐大的數據流量，需要極可靠及低時延的網絡連接，因此大大提升市場對頻寬及網絡容量的需求量。當網絡頻寬日漸提升，與機械人網絡及無人駕駛裝置相關的現代化服務亦將日益受歡迎。

## 全港最大的Wi-Fi服務供應商*

3香港透過增加網絡覆蓋及容量，持續提升流動及Wi-Fi網絡的能力，使其互相補足，提供穩定可靠、高速全方位的通訊體驗。3香港擁有逾20,000個Wi-Fi熱點，是全港最大的Wi-Fi服務供應商*。部分3香港熱點已採用先進的802.11ac標準，並以1Gbps光纖骨幹作支援，確保網絡服務順暢及穩定。3香港的熱點數目，預期於2016年底將達23,000個。

3香港以促進香港成為全球知名的智能城市，以及推動物聯網的發展為一項首要任務。公司正循不同的層面，包括服務質素、可用性、速度、應用程式、用戶功能及客戶服務，打造全方位的流動通訊體驗，而這一切均建基於優質可靠的網絡。

**以香港 6 家 Wi-Fi 服務供應商截至 2016 年 10 月 17 日零時零分在其官方網站所公佈的 Wi-Fi 熱點數目計算。每個 Wi-Fi 服務點提供一個或以上之Wi-Fi 熱點。*