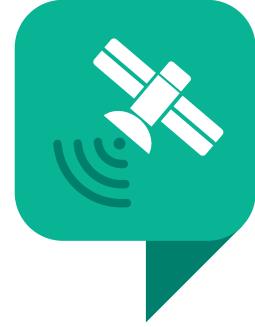


CHAPTER

5

Overview of Major Developments in the Communications Market





BROADCASTING

5.1 An Overview of the Developments in the Broadcasting Market

5.1.1 Number of Licensees and Channels

Television Programme Services

As at March 2022, there were a total of 14 TV licensees, including three free TV licensees, two pay TV licensees and nine non-domestic TV licensees. They provided 550 television channels³, of which about 80 non-domestic TV channels were receivable in Hong Kong. An overview of the television channels provided by the commercial licensees and RTHK, the public service broadcaster, is shown in **Figure 1**.

Hong Kong implemented full digital TV broadcast on 1 December 2020. As at March 2022, the three **free TV licensees**, viz. Fantastic TV, HKTVE and TVB, provided a total of nine digital channels in high definition television (HDTV) format, viz. “Hong Kong Open TV” and “Hong Kong International Business Channel” (by Fantastic TV), “ViuTV” and “ViuTVsix” (by HKTVE), “Jade”, “Pearl”, “J2”, “TVB News Channel” and “TVB Finance & Information Channel” (by TVB). RTHK, the public service broadcaster in Hong Kong, provided three digital channels.

As at March 2022, the two **pay TV licensees**, viz. Hong Kong Cable Television Limited (HKCTV) and PCCW Media Limited (PCCW Media) provided a total of 335 pay television channels and were offering a diverse range of local and non-local productions. Among those channels, over 120 were HDTV channels.

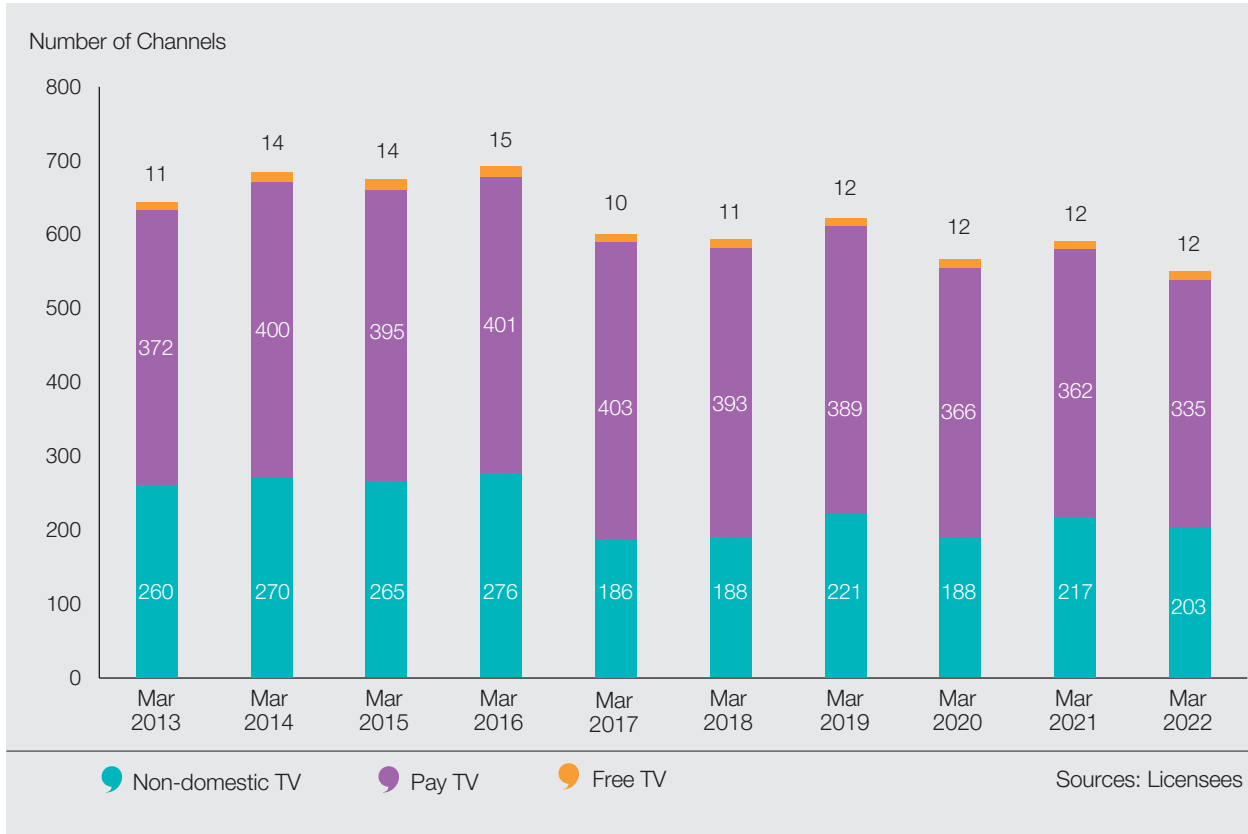
As at March 2022, there were nine **non-domestic TV licensees** providing over 200 television channels. Hong Kong viewers could receive about 80 of those channels.

During the period under review, there were 20 **other licensable TV licensees** providing television programme services in about 60 hotels in Hong Kong.

³ Some channels were provided by more than one licensee at the same time.

Overview of Major Developments in the Communications Market

Figure 1: Television Channels Provided by Commercial Licensees and RTHK in Hong Kong (as at 31 March 2022)



* While some free TV channels were simulcast in both analogue and digital formats during the period of 2013 to 2020, the total number of free TV channels is calculated by reference to the channels broadcast in digital format only.



In addition to satellite television channels provided by non-domestic TV licensees, Hong Kong viewers can also receive free unencrypted satellite television programme channels uplinked from outside Hong Kong. As at March 2022, there were around 600 free-to-air satellite television channels available for reception via the Satellite Master Antenna Television Systems in Hong Kong. A list of these channels is available at http://www.ofca.gov.hk/filemanager/ofca/en/content_295/st_smatv.pdf.



Sound Broadcasting Services

During the period under review, there were two **sound broadcasting licensees**, viz. CRHK and Metro. RTHK, the public service broadcaster in Hong Kong, also provided sound broadcasting service.

As at March 2022, there were a total of 13 radio channels (three by CRHK, three by Metro and seven by RTHK) providing round-the-clock sound broadcasting services to the public.

5.1.2 Transmission Modes

Television

The regulatory framework for television programme services in Hong Kong as enshrined in the BO is technology-neutral⁴. Licensees are free to choose their transmission arrangements for delivery of television services. Broadcasters may build their own transmission networks to deliver their services and apply for a carrier licence from the Authority to cover the transmission network. Alternatively, they may engage any of the existing carrier licensees to provide the transmission service. Licensees may also provide their television programme services via multiple transmission platforms so as to extend their coverage.

The transmission modes employed by television programme service licensees are set out in **Figure 2**.

⁴ An exception is that a service provided on the Internet is exempted from the regulatory framework under the BO.

Overview of Major Developments in the Communications Market

Figure 2: Transmission Modes Employed by Television Programme Service Licensees

Licensee	Transmission Mode	Network Coverage (as at March 2022)
Free TV		
TVB	Terrestrial UHF ⁵	99% of population
HKTVE	Terrestrial UHF and Fixed broadband network	
Fantastic TV	HFC ⁶ and MMDS ⁷	Around 95% of total households ⁸
Pay TV		
HKCTV	HFC, MMDS and satellite (Digital)	Around 96% of total households
PCCW Media	PON and DSL ⁹ Broadband network (Digital)	Around 98% of total households
Non-domestic TV		
8 licensees ¹⁰	Satellite (Digital)	Around 28% of total households ¹³
1 licensee ¹¹	IPLC ¹² and Satellite (Digital)	

Penetration of Different Broadcasting Services

The penetration rate of free TV services stood at about 95% of the total households as at end of March 2022¹⁴.

The penetration of licensed pay TV services was about 78%¹⁵ of the total households as at end of March 2022. The total number of subscribers to licensed pay TV services stood at about 2.1 million in March 2022¹⁶. The changes in total number of subscribers from 2013 to 2022 are set out in **Figure 3**.

5 Terrestrial Ultra High Frequency

6 Hybrid Fibre Coaxial Cable

7 Microwave Multipoint Distribution System

8 From April 2022, Fantastic TV started using spectrum, on top of fixed network, for transmission of its free TV services. At the initial stage, the spectrum-based service covered 75% of the population. Fantastic TV would expand its service coverage to at least 99% of the population by 24 May 2023.

9 Passive Optical Network and Digital Subscriber Line

10 The licensees concerned are APT Satellite TV Development Limited, Auspicious Colour Limited, Hong Kong TV International Media Group Limited, One TV Media Global Limited, Phoenix Satellite Television Company Limited, Star China Media Limited, Sun Television Cybernetworks Enterprise Limited and WarnerMedia Asia Pacific (HK) Limited.

11 The licensee concerned is Starbucks (HK) Limited.

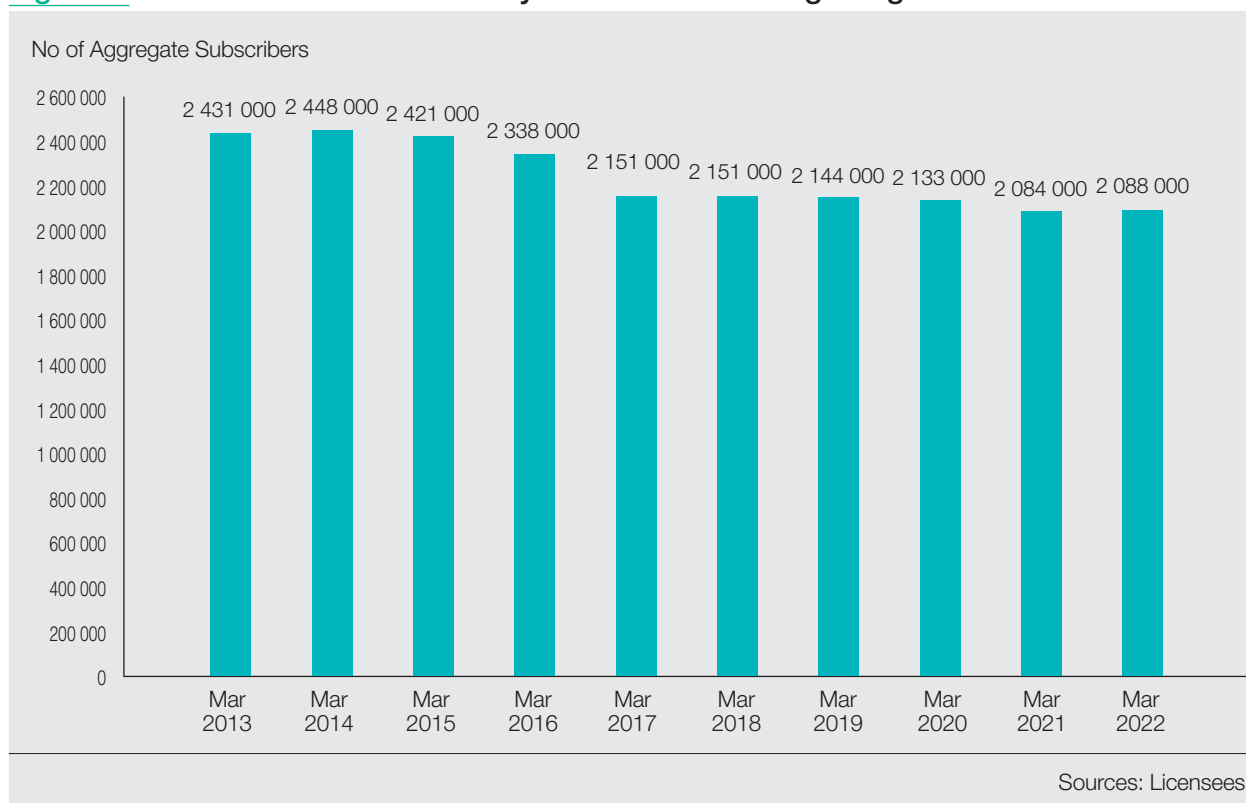
12 International Private Lease Circuit.

13 The non-domestic TV services mainly serve viewers in the Asia-Pacific region, Europe and Africa and do not target Hong Kong, but some Hong Kong households (around 747 000) can receive the unencrypted channels.

14 Source: HKTAM Establishment Survey, CSM Media Research

15 Penetration of licensed pay TV services is calculated by dividing the total number of subscribers to licensed pay TV services by the total number of households. Some subscribers were counted more than once if they subscribed to more than one pay TV services.

16 Some subscribers were counted more than once if they subscribed to more than one services.

Figure 3: Subscribers to Licensed Pay TV Services in Hong Kong

Sound Broadcasting

Radio broadcasters in Hong Kong use frequency modulation (FM) and amplitude modulation (AM) to provide their sound broadcasting services. As at 31 March 2022, seven FM programme channels were provided through seven principal transmitting stations, supplemented by two low-power FM fill-in stations, while six AM programme channels were broadcast from two principal transmitting stations, supplemented by five low-power AM/FM fill-in stations. The services practically covered the whole area of Hong Kong.

5.1.3 Broadcasting Revenues and Investment

Licensed broadcasting services contributed an estimated \$6.7 billion¹⁷ to the Hong Kong economy, which represented about 0.2% of the gross domestic product in 2021. There are two main sources of revenues for the provision of broadcasting services, viz. advertising and subscription. The incomes of free TV licensees and sound broadcasting licensees mainly come from advertising sales¹⁸. Pay TV licensees, on the other hand, derive their incomes mainly from subscription fees with advertising sales as a secondary income source.

¹⁷ Source: Company reports of major broadcasting licensees providing television programme services in Hong Kong

¹⁸ These include sales of advertising spots within programme breaks, programme/event sponsorship, product placement as well as related production fees of advertisements and tailor-made content.

Overview of Major Developments in the Communications Market

Advertising Revenue

According to the research of PricewaterhouseCoopers (PwC)¹⁹, television and radio accounted for 11% (about \$2.7 billion) and 4% (about \$1 billion) respectively of the accumulated \$23.4 billion advertising revenues in the entertainment and media industry of Hong Kong in 2021²⁰.

In 2021, the actual advertising revenues of HKTVE and TVB were around \$615 million and \$1,024 million respectively. The actual advertising revenues of other licensees were not publicly available.

Subscription Revenue

According to the annual report of HKT Trust and HKT Limited (HKT), the holding company of PCCW Media, the turnover of its pay TV services and related services provided in Hong Kong under the “Now TV” brand was \$2.5 billion in 2021.

The subscription revenue of HKCTV was not publicly available.

Investment in Broadcasting Industry



Key investment projects in the television industry in recent years include the digital terrestrial broadcasting network, HDTV content and production technology, interactive television services, and regular network maintenance and upgrades that are required to maintain or expand the ever-advancing scope of services.

Fantastic TV, HKTVE and TVB have respectively committed to investing a total of \$1.3 billion for the six-year period from 2016 to 2022, \$1.5 billion for the six-year period from 2015 to 2021 and \$6.3 billion for the six-year period from 2016 to 2021 for the provision of free TV services. Investment commitments of Fantastic TV, HKTVE and TVB comprise capital expenditures and programming expenditures. As at March 2022, Fantastic TV, HKTVE and TVB provided 336, 289 and 821 hours of HDTV programmes per week respectively. Fantastic TV and TVB also provided 116 and 1 101 hours of independent local productions in their programming respectively in 2021 according to their commitments.

¹⁹ PwC is a network of firms delivering assurance, advisory and tax services. Its research provides consumer and advertiser spending data including television, radio, print, digital, mobile and social media, etc.

²⁰ Source: PwC Global Entertainment and Media Outlook: 2022-2026, www.pwc.com/outlook. All advertising revenues are net spending excluding agency commissions, production costs and discounts.



As regards the pay TV market, i-CABLE Communications Limited, the parent company of HKCTV, reported in its 2021 Annual Report that the capital expenditure of the group increased from \$100 million in 2020 to \$120 million in 2021. Its major items of investment included property, plant and equipment. According to the 2021 Annual Report of HKT, the holding company of PCCW Media, the capital expenditure on its pay TV business was \$121 million in 2021. Its major

items of investment included property, plant and equipment, and interests in leasehold land.

On the sound broadcasting side, CRHK and Metro have committed in accordance with the Authority's approval made in October 2020 and April 2021 to investing a total of \$703 million and \$617 million²¹ respectively for the six-year period from 2016 to 2022 covering programming improvement and upgrading of infrastructure and facilities and other developments brought about by technological advancement to further enhance their service quality.



5.1.4 Programme Variety and Positive Programme Requirements

(a) Programme Variety and Diversity

Number of Broadcast Hours and Hours of Station Productions

As at March 2022, the licensees broadcast about 67 489 hours of television programmes a week. The nine digital channels of Fantastic TV, HKTVE and TVB provided a total of 1 463 broadcast hours per week, while the 335 channels of the two pay TV licensees provided a total of 52 586 broadcast hours per week. As a public service broadcaster, RTHK provided 504 hours on its three digital channels per week. About 80 channels of non-domestic TV licensees receivable in Hong Kong provided about 13 400 broadcast hours per week.

The total broadcast hours per week provided by CRHK, Metro and RTHK as at March 2022 were 2 184.

²¹ The Authority approved in October 2020 and April 2021 respectively that the investment commitment of CRHK be adjusted from \$909 million to \$703 million and the investment commitment of Metro be adjusted from \$685 million to \$617 million.

Overview of Major Developments in the Communications Market

For the period under review, there were a total of 34 048 hours of station productions broadcast on Fantastic TV, HKTVE and TVB. Of the 335 channels provided by pay TV licensees, 69 channels (20.6%) were produced by the licensees themselves.



Free TV Services

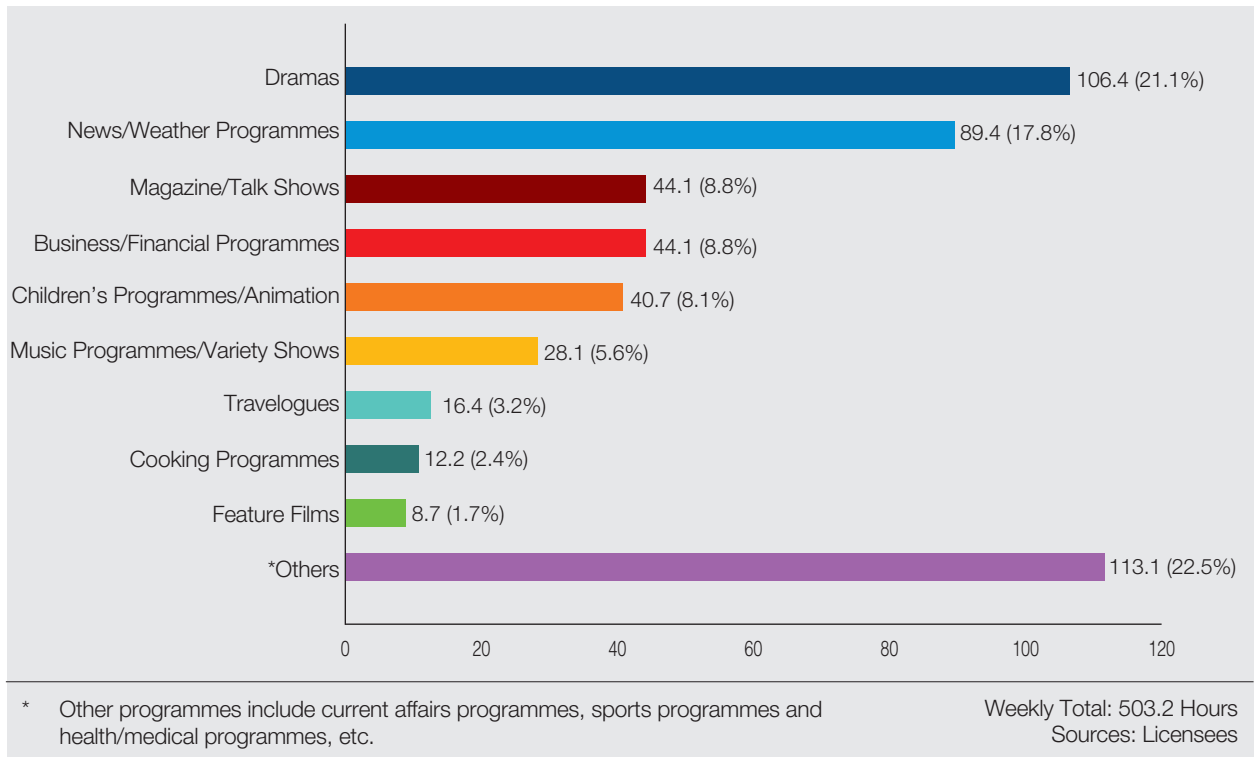
Chinese and English Channels



During the period under review, drama series and news/weather programmes continued to be the dominating programme genres during prime time on the Chinese channels (viz. “Hong Kong Open TV”, “Jade” and “ViuTV”). Drama series on “Jade” were mostly in-house productions; while “Hong Kong Open TV”, “Jade” and “ViuTV” broadcast Mainland, Korean and Japanese drama series. In addition,

business/financial programmes, children’s programmes/animation, magazine/talk shows, music programmes/variety shows, travelogues and feature films, etc. were also broadcast during prime time on the Chinese channels. The three channels provided by RTHK presented a variety of programmes to serve a broad spectrum of audiences and cater for the needs of minority interest groups.

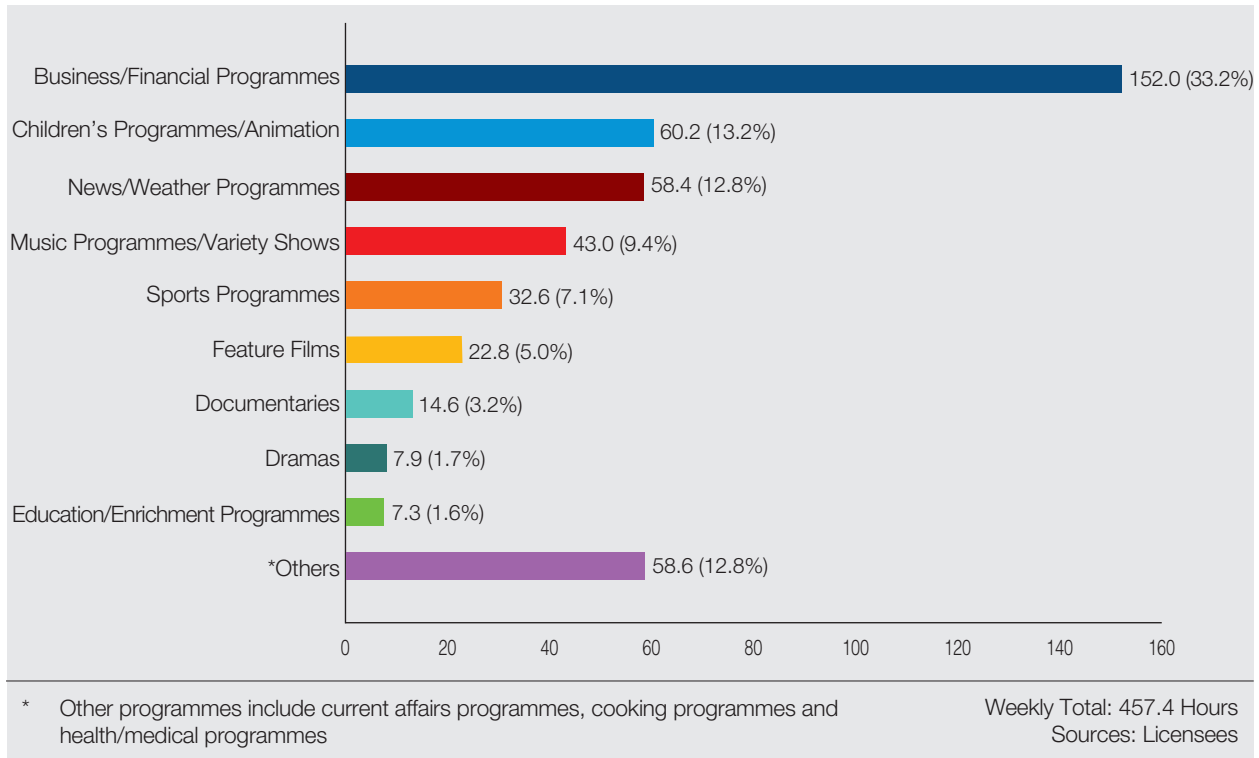
Figure 4: Weekly Hours of Different Types of Programmes Broadcast on Hong Kong Open TV, Jade and ViuTV (as at March 2022)



The English channels (viz. “Hong Kong International Business Channel”, “Pearl” and “ViuTVsix”) broadcast a wide range of programmes, including business/financial programmes, children’s programmes/animation, news/weather programmes, music programmes/variety shows, sports programmes, feature films, documentaries, imported popular drama series and education/enrichment programmes.

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Figure 5: Weekly Hours of Different Types of Programmes Broadcast on Hong Kong International Business Channel, Pearl and ViuTVsix (as at March 2022)



Thematic Channels

During the period under review, TVB provided acquired dramas, documentaries, variety shows, news, finance information programmes, etc. on “J2”, “TVB News Channel” and “TVB Finance & Information Channel”.

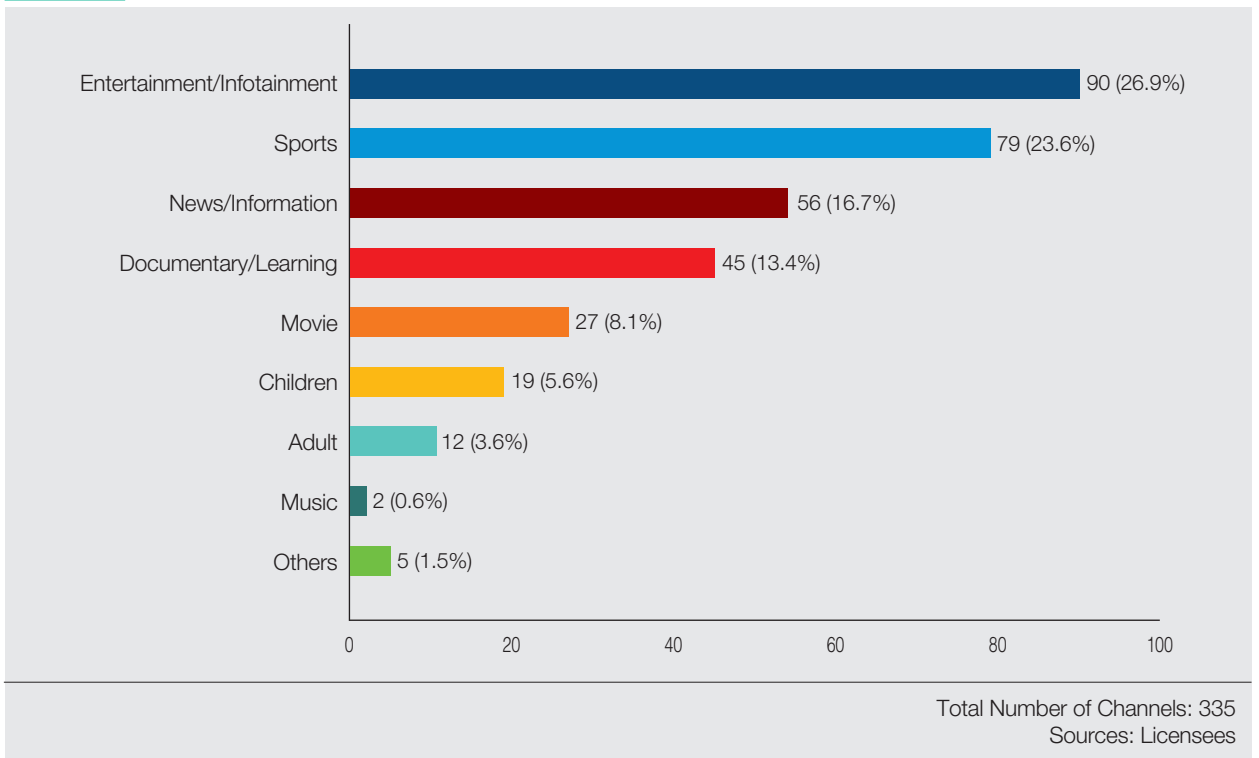


Pay TV Services

During the period under review, a great variety of channels were offered on pay TV services, including entertainment/infotainment channels (26.9%), sports channels (23.6%), news/information channels (16.7%), documentary/learning channels (13.4%), and movie channels (8.1%).



Figure 6: Nature of Pay TV Channels (as at March 2022)



As at March 2022, HKCTV offered 124 channels (including 42 HDTV channels). PCCW Media’s “Now TV” service offered 144 channels (including 80 HDTV channels) and 67 video-on-demand services.

Overview of Major Developments in the Communications Market

Sound Broadcasting

As at March 2022, CRHK operated two FM Cantonese channels, viz. “CR1” and “CR2”, and one AM English channel, viz. “AM 864”. “CR1” mainly provided news, current affairs, financial and personal view programmes. “CR2”, targeting younger listeners, featured pop culture and music programmes. “AM864” was primarily a music channel.

Metro operated two FM Cantonese channels, viz. “Metro Finance” and “Metro Info”, and one AM English channel, viz. “Metro Plus”. “Metro Finance” provided real-time, market-moving news and information on financial markets around the world. “Metro Info” provided music and programmes on lifestyle, health, market news and other information of interest to the public. “Metro Plus” was primarily a music channel which also provided some programmes for ethnic groups including the Filipino, Indian and Thai communities in Hong Kong.

RTHK operated seven radio channels, providing Cantonese, English and Putonghua services. It offered a variety of thematic channels ranging from information to general entertainment and culture.

(b) Positive Programme Requirements

Free TV Services

During the period under review, free TV licensees (viz. Fantastic TV, HKTVE and TVB) were respectively required to broadcast at least 27.5, 41.5 and 45.5 hours of positive programmes²² per week. They all met the requirements²³.



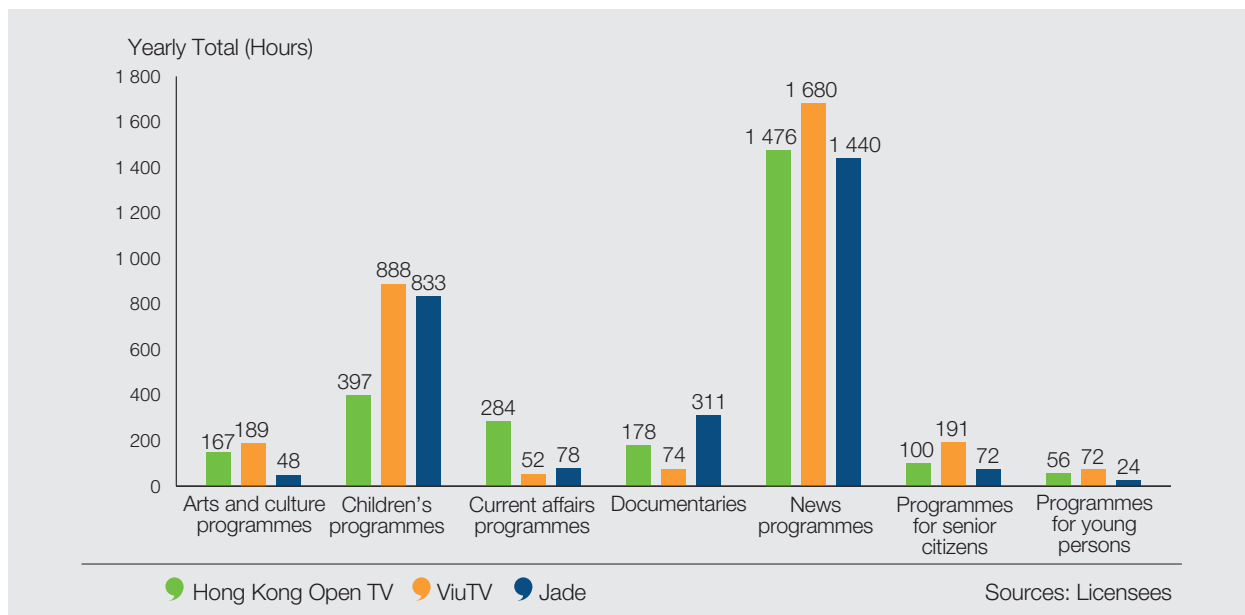
The reports submitted by the licensees to the Authority on six types of positive programmes, viz. current affairs programmes, documentaries, children’s programmes, programmes for young persons, programmes for senior citizens, and arts and culture programmes, are available at https://www.coms-auth.hk/en/licensing/broadcasting/compliance_reports/index.html.

²² The positive programmes that Fantastic TV, HKTVE and TVB were required to broadcast comprised news, current affairs programmes, documentaries, arts and culture programmes, children’s programmes and programmes for senior citizens and young persons.

²³ TVB was required to broadcast at least 45.5 hours of positive programmes per week, including four hours of positive programmes per week on its thematic channels (viz. “J2”, “TVB Finance & Information Channel” and “TVB News Channel”). HKTVE was required to broadcast at least 41.5 hours of positive programmes per week.

During the period under review, Fantastic TV used a fixed network as its sole transmission means to deliver free TV service, the programme requirements of Fantastic TV were less stringent than those applicable to other spectrum-based free TV licensees (viz. HKTVE and TVB). It was required to broadcast at least 27.5 hours of positive programmes per week. Following its use of spectrum as an additional means of transmission on 1 April 2022, Fantastic TV would be subject to largely the same set of programme requirements that apply to HKTVE and TVB.

Figure 7: Broadcast of Positive Programmes on the Chinese Channels of Fantastic TV, HKTVE and TVB (as at March 2022)



Free TV licensees were required to provide Chinese subtitles for all news, current affairs programmes, weather programmes and emergency announcements, as well as programmes broadcast during prime time (7:00 p.m. to 11:00 p.m.) on the Chinese channels²⁴. They were also required to provide English subtitles for all news, current affairs programmes, weather programmes, emergency announcements and educational programmes for teenagers (two hours per week) on the English channels. HKTVE and TVB were required to provide Chinese subtitling for all drama programmes on the Chinese channels and English subtitling for all programmes broadcast on the English channels between 8:00 p.m. and 11:30 p.m.²⁵. On the whole, Fantastic TV, HKTVE and TVB complied with the requirements on the provision of subtitles.

To meet public demand for easier access to information by persons with hearing impairment, the Authority issued a direction requiring TVB²⁶ to provide sign language interpretation, in addition to subtitles, for a Cantonese news programme broadcast on its “Pearl” channel each day with effect from July 2018. TVB met the requirement.

Pursuant to licence requirements, Fantastic TV, HKTVE and TVB were required to broadcast two minutes of Announcements in the Public Interest (APIs) in every two clock hours on each channel. Also, they were required to broadcast, on a weekly basis, not more than five minutes in aggregate of publicity material for the Authority on each of the Chinese and English integrated channels²⁷. During the period under review, Fantastic TV, HKTVE and TVB broadcast a total of 1 304 hours of the two types of materials.

24 TVB was also required to provide, on its thematic channels, Chinese subtitles for all news, current affairs programmes, weather programmes and emergency announcements as well as programmes broadcast during prime time.

25 Following its use of spectrum as an additional means of transmission since 1 April 2022, Fantastic TV would be subject to the same set of subtitling requirements that apply to HKTVE and TVB.

26 In the context of the licence renewal exercise of TVB in 2015, the Authority took note of the increasing demand from persons with hearing impairment for sign language interpretation for news programmes and agreed to facilitate the provision of sign language interpretation for news programmes as a new initiative. The CE in C accepted the Authority’s recommendation and included an enabling provision in TVB’s renewed licence to require it to provide sign language for its free TV services as directed by the Authority.

27 For the three thematic channels of TVB, they were required to broadcast two minutes of publicity material for the Authority per week.

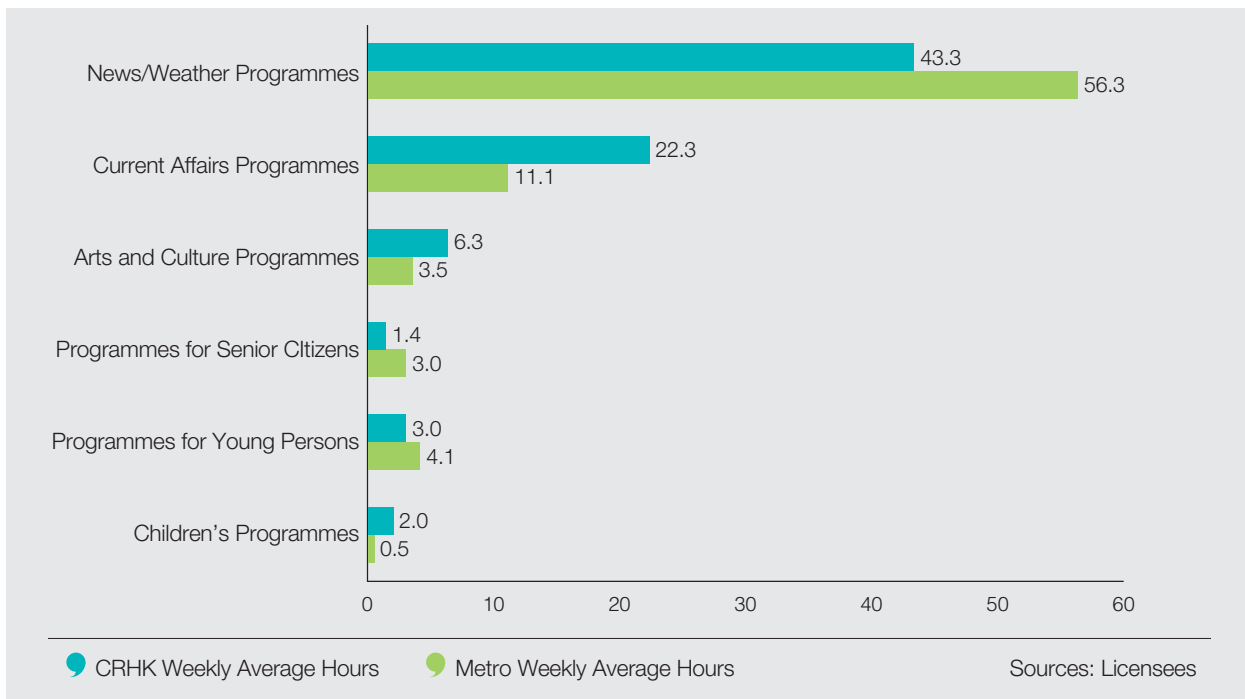
Overview of Major Developments in the Communications Market

Sound Broadcasting

CRHK and Metro were each required to broadcast at least 28.5 hours of positive programmes²⁸ per week under their respective licences. During the period under review, CRHK and Metro broadcast the required amount of positive programmes.

CRHK and Metro also fulfilled the requirements on the broadcast of one minute of APIs in each hour and not more than five minutes of publicity material for the Authority each week on each service channel. The reports submitted by the licensees to the Authority on positive programmes are available at https://www.coms-auth.hk/en/licensing/broadcasting/compliance_reports/index.html.

Figure 8: Broadcast of Positive Programmes on Sound Broadcasting Services (as at March 2022)



5.1.5 Hong Kong as a Regional Broadcasting Hub

Hong Kong is a broadcasting hub in the Asia-Pacific region. As at March 2022, there were nine non-domestic TV licensees operating in and broadcasting from Hong Kong. Altogether, they offered over 200 satellite television channels serving viewers in the Asia-Pacific region, Europe and Africa, with about 80 channels receivable in Hong Kong. A summary of the non-domestic TV services as at March 2022 is at **Annex 1**.

²⁸ CRHK and Metro were required to broadcast news and weather programmes, current affairs programmes, arts and culture programmes, programmes for young persons, senior citizens and children, in their respective sound broadcasting service.

TELECOMMUNICATIONS

5.2 An Overview of the Telecommunications Market

Hong Kong has one of the most sophisticated and advanced telecommunications markets in the world. This has been an important factor in Hong Kong's development as a leading business and financial centre. The telecommunications sector employed around 20 000 persons in 2021, whilst its gross output amounted to \$104 billion in 2020.

All sectors of Hong Kong's telecommunications market have been liberalised with no foreign ownership restrictions on telecommunications operators. The Authority's objectives are to maintain a level playing field in the open and competitive telecommunications market and to ensure that consumers get the best services available in terms of efficiency, quality and price.

5.2.1 The Telecommunications Regulatory Framework

Carrier Licences

The Authority issues carrier licences to facility-based operators, authorising them to establish and maintain telecommunications networks and facilities which may cross unleased Government land and public streets, for the provision of public telecommunications services.

The unified carrier licensing framework has been implemented since 1 August 2008 as the single licensing vehicle for the provision of facility-based fixed, mobile and/or converged telecommunications services in Hong Kong.

A Unified Carrier Licence (UCL) for the provision of local fixed service authorises the licensee to establish and maintain fixed network, wireline-based or wireless-based, or a combination of both where applicable, to provide local telecommunications services between fixed points within Hong Kong. A UCL for the provision of external fixed service authorises the licensee to provide external transmissions and services operated over external facilities such as submarine cable and satellite communications systems. A UCL for the provision of mobile service enables the licensee to provide two-way communications between moving locations or between a moving location and a fixed location in Hong Kong. The issue of new UCL for the provision of mobile service is subject to the availability of radio spectrum for assignment. An operator may apply for a single UCL to provide all the above services.

As at March 2022, there were a total of 60 holders of UCL, providing local fixed services, cable-based external fixed services, non-cable-based external fixed services and/or mobile services.

Overview of Major Developments in the Communications Market

Public Radiocommunications Service Licences

Services which may be authorised under the Public Radiocommunications Service (PRS) Licence include radio paging, community repeater (trunked radio) services, vehicle location information services, one way data message services, public mobile radio data services and railway signaling services.

As the provision of radiocommunications services requires the assignment of suitable operating frequencies, PRS Licences are granted only when the required radio spectrum is available.

As at March 2022, there were a total of seven PRS licensees.

Services-based Operator Licences

Services-based Operators (SBOs) make use of the networks and facilities of other licensed facility-based operators for the provision of public telecommunications services, but they are not authorised to establish or maintain any telecommunications means which cross public streets or unleased Government lands.

SBO licence covers three types of services, namely, Class 1 and Class 2 local voice telephony services, and Class 3 services which may include external telecommunications service, Internet access service, international value-added network service, MVNO service, private payphone service, public radio communications relay service, security and fire alarm signals transmission service, teleconferencing service and mobile communications service on board an aircraft.

As at March 2022, there were a total of 522 SBO licensees.

Class Licences

The class licensing framework does not require any licence applications. Parties meeting the specified eligibility criteria and conditions (including any registration requirement) automatically become the class licensees, and are required to comply with the conditions set out in the relevant Class Licence as well as the TO. Currently, there are ten types of Class Licences:

- Class Licence for 6 GHz Device
- Class Licence for 60 GHz Device
- Class Licence for 79 GHz Automotive Radar
- Class Licence for Citizens Band Radio Station
- Class Licence for In-building Telecommunications Systems
- Class Licence for Medical Implant Communication System Device
- Class Licence for Short Range Device
- Class Licence for Taxi Mobile Station
- Class Licence for Offer of Telecommunications Services
- Class Licence for Provision of Public Wireless Local Area Network Services

Other Licences

Apart from the licences mentioned above, there are a number of miscellaneous licences under the purview of the Authority.

A breakdown of the types and numbers of all telecommunications licences is at **Annex 2**.

Overview of Major Developments in the Communications Market

5.2.2 Developments in the Telecommunications Market and Technology Trends



Mobile Communications Services

Competition in public mobile services has always been keen. As at March 2022, four major MNOs, namely, China Mobile Hong Kong Company Limited, Hong Kong Telecommunications (HKT) Limited, Hutchison Telephone Company Limited (Hutchison) and SmarTone Mobile Communications Limited, were providing a wide range of public mobile services.

MNOs provide second generation (2G), 3G, 4G and 5G mobile services in Hong Kong at very affordable prices. As at March 2022, there were about 26.1 million subscriptions to mobile communications services. The mobile subscriber penetration rate reached 341.7%, one of the highest in the world, with over 99% of them being subscriptions of 3G, 4G and 5G mobile services. Further to the commercial launch of 5G services since April 2020, 5G mobile subscriptions reached 3.3 million in March 2022, representing a mobile subscriber penetration rate of 44.2%. With the continued development of 5G services, increasingly higher speed of mobile communications will be supported.

With an ever growing demand for mobile data services, the monthly mobile data usage surged to 124 885.7 Terabytes in March 2022, representing 1.3 times and 1.7 times of the monthly usage over the same period in 2021 and 2020 respectively. The monthly mobile data usage per capita reached 16 811.4 Megabytes in March 2022, compared with 12 628.5 Megabytes in March 2021 and 10 054.9 Megabytes in March 2020. The launch of 5G services and development of innovative applications enabled by 5G will further boost mobile data usage in the future.

Figure 9: Number of Mobile Subscriptions (2012 to 2021)

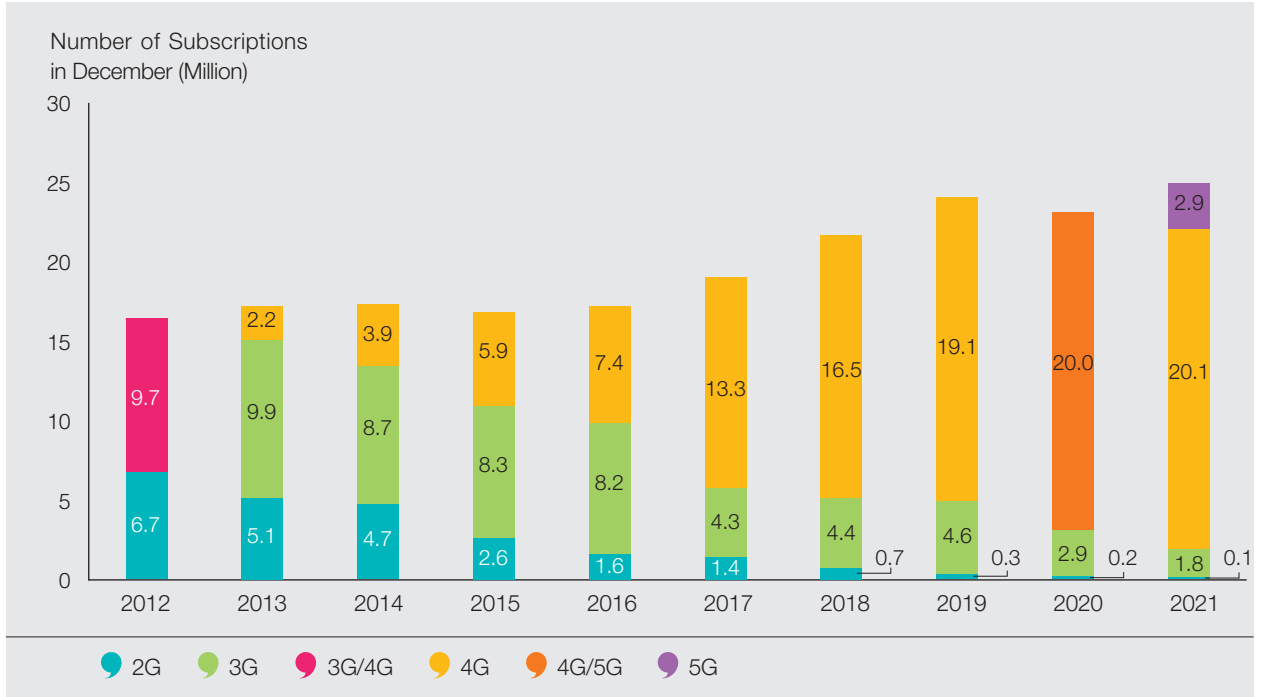
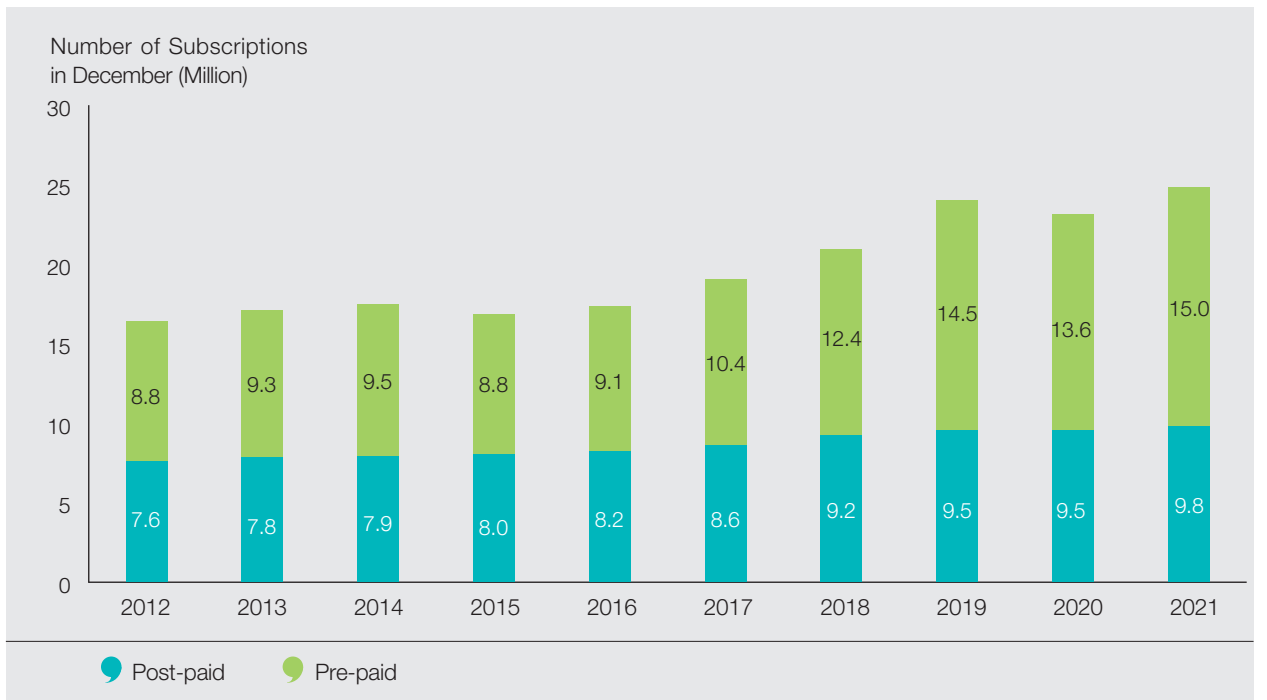
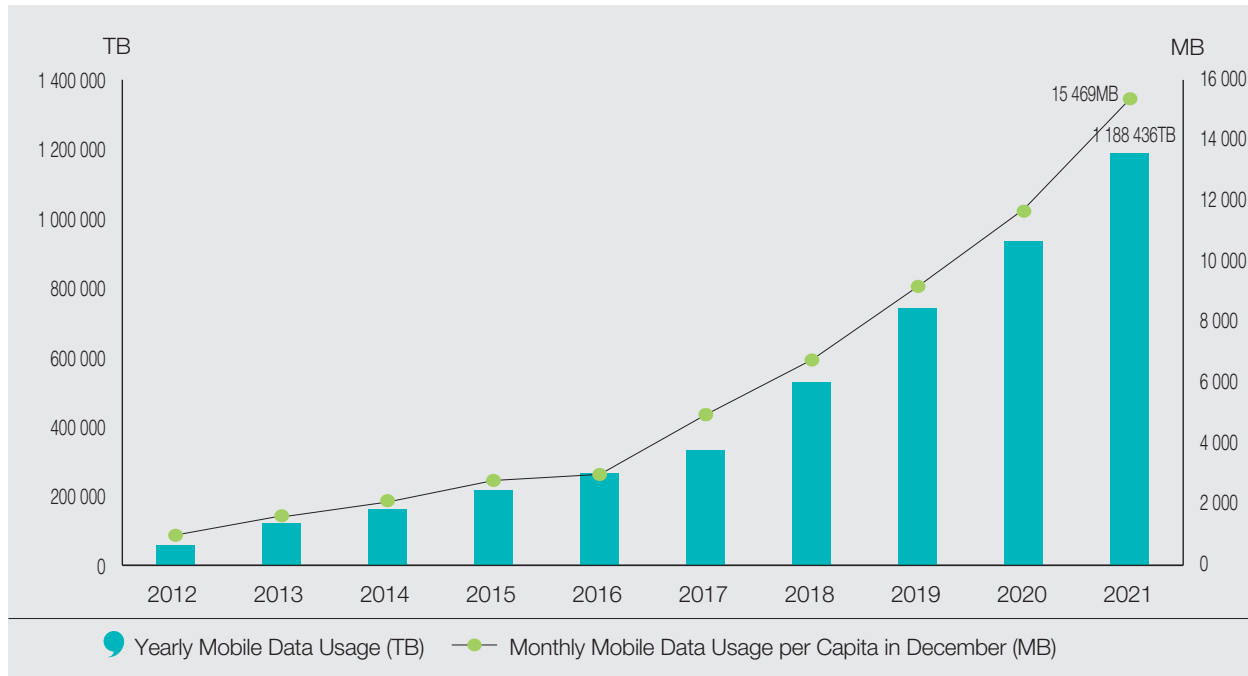


Figure 10: Mobile Subscriptions of Postpaid and Prepaid SIM (2012 to 2021)



Overview of Major Developments in the Communications Market

Figure 11: Mobile Data Usage (2012 to 2021)



Fixed Communications Services

The local fixed communications services market has been fully liberalised with no preset limit on the number of licences to be issued for fixed services, or deadline for submission of licence applications. Furthermore, there is no specific requirement on network roll-out and investment and licensees may provide their services according to their proposals.

As at March 2022, there were 27 local FNOs holding UCLs for the provision of local fixed services, providing around 78 fixed lines per 100 households, one of the highest in the world. They were, in alphabetical order:

- China Mobile Hong Kong Company Limited
- China Mobile International Limited
- China Telecom Global Limited
- China Unicom (Hong Kong) Operations Limited
- ComNet Telecom (HK) Limited
- Easy Tone Network Limited
- Equinix Hong Kong Limited

- HGC Global Communications Limited
- HKBN Enterprise Solutions HK Limited
- HKBN Enterprise Solutions Limited
- HKC Network Limited
- Hong Kong Broadband Network Limited
- Hong Kong Cable Television Limited
- Hong Kong Telecommunications (HKT) Limited
- NTT Com Asia Limited
- PCCW Global (HK) Limited
- PCCW-HKT Telephone Limited and Hong Kong Telecommunications (HKT) Limited
- Reach Networks Hong Kong Limited and Reach Cable Networks Limited
- SmarTone Communications Limited
- Superloop (Hong Kong) Limited
- Telstra International Limited
- Towngas Telecommunications Fixed Network Limited
- TraxComm Limited
- Verizon Hong Kong Limited
- Village Telephone Limited
- VNET Group Limited (formerly known as 21 ViaNet Group Limited)
- Vodafone Enterprise Hong Kong Limited

As at March 2022, 91.4% and 80.3% of households were able to enjoy a choice of at least two and three self-built customer access networks respectively. It is expected that the figures will keep growing as the carriers continue to roll out their networks.

Overview of Major Developments in the Communications Market

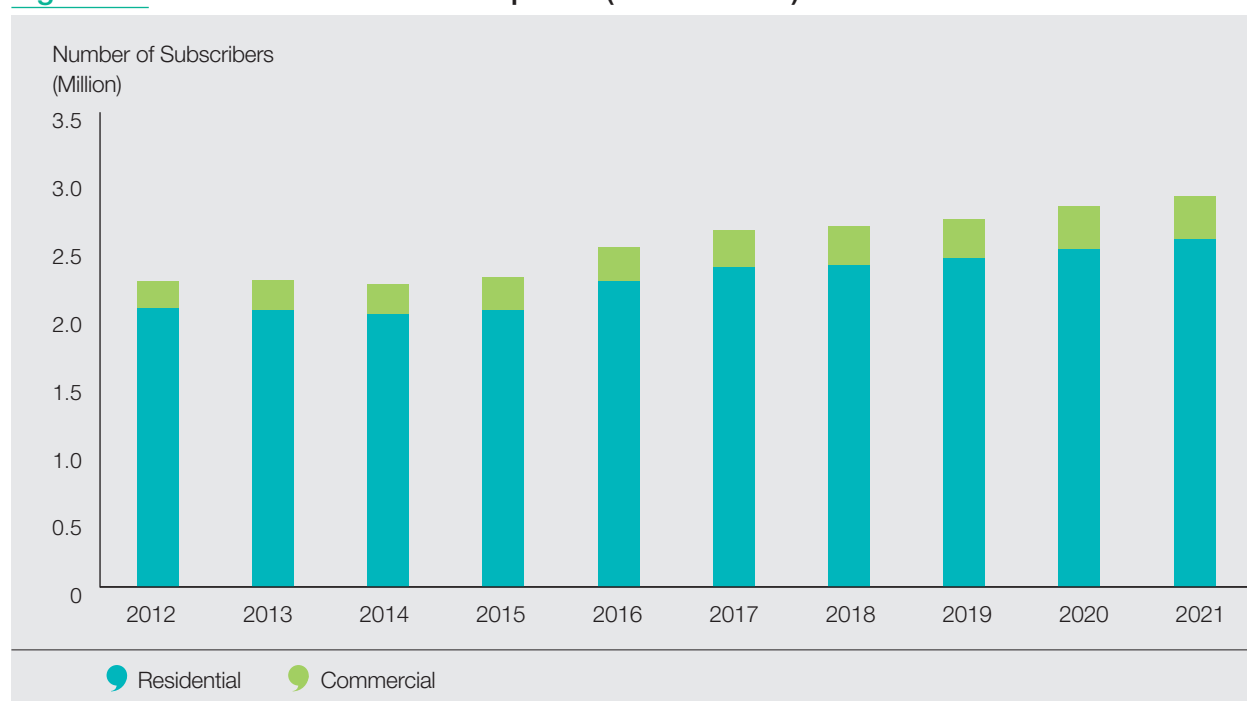
Fixed Broadband Services

As at March 2022, 27 FNOs and 267 SBOs were authorised to provide broadband Internet access services in Hong Kong. With the continuous network rollout of FNOs, the Hong Kong community can enjoy nearly ubiquitous coverage of broadband networks through the deployment of various technologies including asymmetric digital subscriber line, hybrid fibre coaxial cable, fibre-to-the-building, fibre-to-the-home, etc. Broadband access to various applications and content services has become an integral part of the life of people in Hong Kong. As at March 2022, there were around 2.9 million residential and commercial fixed broadband subscriptions, with a household penetration rate of 98%. Broadband services are available at speeds up to 10 gigabits per second (Gbps). Around 86% of the fixed broadband subscriptions are supported by broadband services with speeds of 100 megabits per second (Mbps) or above. The statistics of fixed broadband subscriptions as at March 2022 and the statistics for the past 10 years are shown in **Figure 12** and **Figure 13** respectively.

Figure 12: Statistics of Fixed Broadband Subscriptions (as at March 2022)

	No. of subscriptions	% share
Total no. of broadband subscriptions	2 935 378	100%
Broadband speed of 100 Mbps or above	2 530 259	86.2%
Broadband speed below 100 Mbps	405 119	13.8%
Residential	2 611 138	89.0%
Commercial	324 240	11.0%

Figure 13: Fixed Broadband Subscriptions (2012 to 2021)





Internet of Things Services

Internet of Things (IoT) is a technology which enables the provision of communications platforms and services for interconnected devices to generate, exchange and consume data with minimal human intervention. Currently, Wireless Internet of Things (WIoT) licensees, MNOs and MVNOs are authorised to provide WIoT services. Since the creation of the WIoT licence in December 2017, three WIoT licences have been issued. With the development of new wireless technologies such as 5G mobile technologies and smart city applications, it is expected that an increasing number of WIoT devices connecting to the public telecommunications networks will be available in future.

Public Wi-Fi Services

Operators have been actively rolling out Wi-Fi networks. Eight network operators and 234 class licensees are providing public Wi-Fi services in various locations of the territory. As at March 2022, there were 83 095 public Wi-Fi hotspots in the city and the number will continue to grow.

External Telecommunications Services

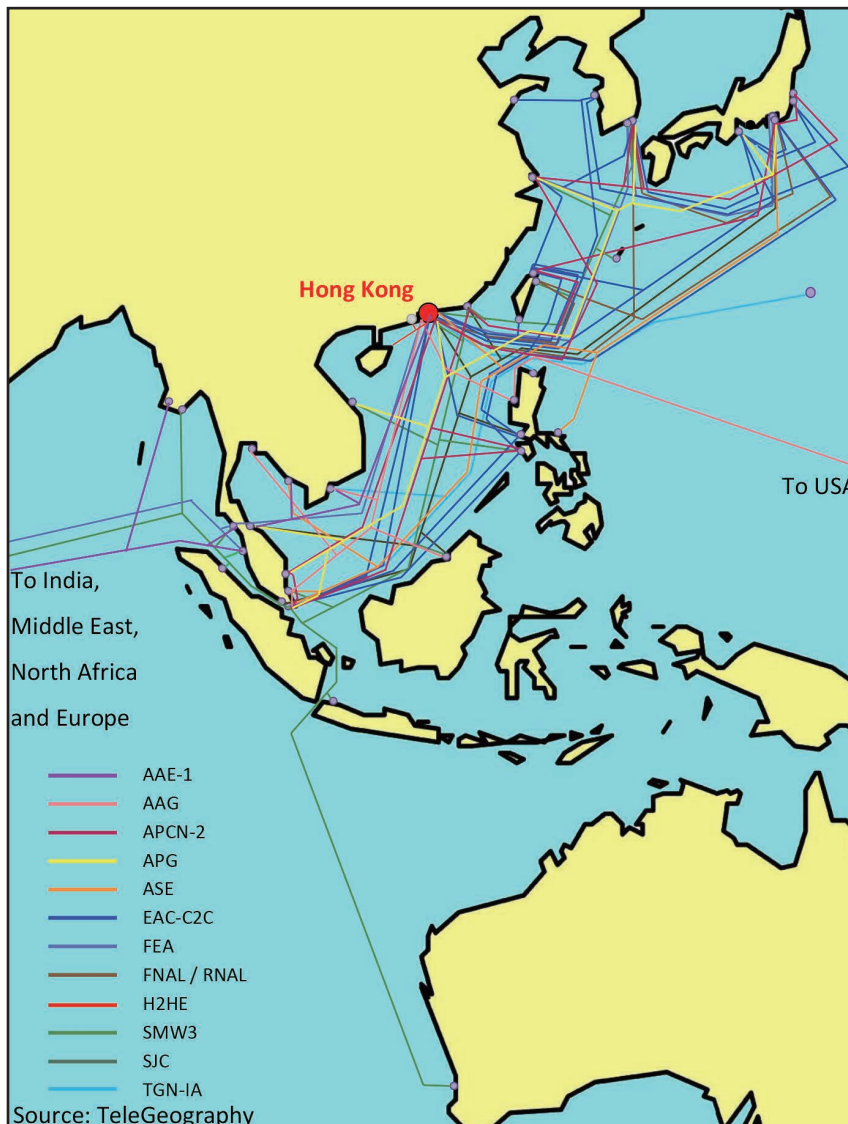
The external telecommunications facilities market has been fully liberalised. As at March 2022, 41 FNOs were authorised to provide cable-based and/or non-cable-based external telecommunications facilities.

As at March 2022, there were eight cable landing stations in Hong Kong: two in Tong Fuk, three in Tseung Kwan O and the other three in Deep Water Bay, Chung Hom Kok and Cape D'Aguiar respectively, making it a major telecommunications and Internet hub in the region.

Overview of Major Developments in the Communications Market

In March 2022, Hong Kong was connected to 12 regional and transcontinental submarine cable systems. They are Asia Africa Europe-1 (AAE-1), Asia-America Gateway Cable System (AAG), Asia Pacific Cable Network 2 (APCN-2), Asia Pacific Gateway (APG), Asia Submarine-Cable Express (ASE), EAC – C2C, FLAG Europe Asia (FEA), FLAG North Asia Loop (FNAL)/REACH North Asia Loop (RNAL), Hainan to Hong Kong Express (H2HE), Sea-Me-We 3 (SMW3), South-East Asia Japan Cable System (SJC) and TGN-Intra Asia Cable System (TGN-IA). As at March 2022, the total equipped external capacity exceeded 158 259 Gbps. Total external telephone traffic was 1.6 billion minutes for the period from January to December 2021. Landing of some new submarine cable systems is in the pipeline and they are expected to be ready for service between 2023 and 2024.

Figure 14: Submarine Cables between Hong Kong and Other Economies



Satellite Services

Hong Kong adopts an open sky policy in regulating the provision of satellite services. Satellite-based telecommunications and television broadcasting services are provided via a multitude of satellites in the region with more than 180 transmitting/receiving satellite antennae in earth stations operated by a number of FNOs.

Licences are required for the operation of satellites and associated facilities. As at March 2022, two Hong Kong companies were licensed to operate satellites for providing communications services, namely Asia Satellite Telecommunications Company Limited and APT Satellite Company Limited, operating a total of nine in-orbit satellites.