Submission by CASBAA Ltd, in response to OFCA's Consultation on Proposed Change in the Allocation of the 3.4-3.7 GHz Band from Fixed Satellite Service to Mobile Service

September 5, 2017

CASBAA welcomes this Consultation Paper and the opportunity to respond to it.

Headquartered in Hong Kong, CASBAA is an Asian industry association with members and activities in 17 Asia-Pacific markets. The Association is dedicated to the promotion of multi-channel television via cable, satellite, broadband and wireless video networks across the Asia-Pacific region and represents about 100 corporations, which in turn serve more than 3 billion people. Member organizations with significant operations in Hong Kong include Asiasat, APT Satellite, Asia Broadcast Satellite, Celestial Tiger Entertainment, Fox Network Group, Sony Pictures Television International, Turner International Asia Pacific, TVB, 21st Century Fox, and Time Warner.

Hong Kong has been a regional hub for the international broadcasting sector. It has won this role because of the supportive environment it offers for a dynamic industry which is constantly mutating, in both technical and commercial senses. Hong Kong is also a hub of the Asian satellite industry.

The ongoing growth and development of these twin industries brings major economic benefits to the SAR. This is a dynamic, high-tech sector that will continue to make a very important contribution to Hong Kong's economic growth for the foreseeable future – as long as the SAR continues the policies which have favoured the sector's growth.

These industries – broadcasting and satellite – together also bring great "branding" benefits to the SAR.; the presence of this "shopfront" sector in the SAR advertises the city's role as a regional hub, and is a living testament to the vitality of the "one-country, two-systems" concept.

CASBAA welcomes the fact that OFCA has clearly set out many of the issues and potentially impacted services in the Consultation Paper.

CASBAA and specifically its satellite operator members support the introduction of 5G services. Indeed, many of CASBAA's satellite operator members are actively involved in providing infrastructure that will be critical to the success of 5G.

CASBAA refers OFCA to its response to the Ministry of Industry and Information Technology's (MIIT) recent Open Solicitation of Feedback on 5G Communications Systems in the Millimetre-Wave (mmWave) Bands (公开征集在毫米波频段规划第五代国际移动通信系统（5G）使用频率的意见), included as Annex A to this submission, which sets out some of the uses of satellite infrastructure in supporting 5G services, as well as CASBAA's position on proposed re-allocations of various FSS frequency bands.

CASBAA has a number of observations on and concerns with certain assumptions and assertions made in the Consultation Paper, and with OFCA's proposed approach to re-allocation of spectrum currently allocated to FSS.

1. CASBAA understands that many of the MS frequency requests are initiated and driven by telecommunications equipment manufacturers. CASBAA believes that wider consultation to involve impacted service providers and end-users should be made sooner rather than later. The prospect of newer, higher revenue, wider user base services allocated by one regulator-approved process should not impair existing services or service providers using spectrum that was previously fully approved for such use by another regulator-approved process, without fair and full commercial compensation.

2. CASBAA recommends less haste and more warning for all concerned parties, including end users whose services may be lost altogether or significantly degraded if the FSS spectrum is re-allocated according to the CA's proposal.

Section 20 in the Consultation Paper acknowledges that there is no possibility to retro-fit a geostationary satellite once launched. However, it does not specifically acknowledge that the design and deployment cycles for satellites approach or exceed 20 years. From 30 months before launch there is a design freeze, and a typical geostationary satellite has a design lifetime of 15 years, which with careful management is comfortably exceeded by 1-3 years. Operators of two of the affected satellites were granted Outer Space Licences by the Chief Executive of the HKSAR and Space Station Carrier Licences by the Communications Authority within three years prior to the issue of this Consultation Paper.

3. The Consultation Paper acknowledges in Section 3 that current MS frequency assignments are not fully utilised, with 35 MHz unassigned, but does not mention how much new sub-6 GHz spectrum is actually required for MS. It appears unreasonable to set out to re-allocate spectrum from FSS to MS without a clear explanation of why the existing sub-6 GHz spectrum allocated for MS is underutilised, nor a forecast of the total sub-6 GHz MS spectrum requirement. The impression created is that this is but part of a wider raid on FSS spectrum to feed unquantified and unqualified requirements for 5G MS.

4. In Section 15 and its Annex, the Consultation Paper cites a number of countries adopting 3.4-3.7 GHz for public mobile service under MS allocation, most of which do not experience tropical climates and corresponding high rain fade rates anywhere in their territories, thus have less need for C-band and extended C-band for reliable distribution of critical services including, but not limited to, television. In fact, C-band is used by almost all CASBAA member broadcast

media organisations, for example, for widest distribution of their content internationally and intercontinentally. The Consultation Paper also omits to mention that the majority of administrations in ITU Region 3 do not show support for such adoption of public mobile service under MS allocation at the expense of FSS allocation.

5. The discussion in Sections 18 and 19 on percentages of domestic satellite operators' FSS downlink capacity in the 3.4-3.7 GHz band for reassignment is specious, taking no account of the high utilisation of this band as compared to many others in the public Hong Kong Table of Frequency Allocations[1], nor does it take account of the level of harm likely to be caused to existing end-users of the services carried in this band – television and otherwise.

6. The distinctions made in Sections 23 and 24 on whether services are licensed or not and their users are licensees or not will not change the level of harm likely to be caused to existing end-users of the services carried in this band, nor the notice period they require to make other arrangements – if indeed any are practicable.

The Consultation Paper acknowledges in Section 22 that Hong Kong has an "open sky policy", but the proposed change in frequency allocation will reduce the number of channels receivable on SMATV and TVRO systems by at least 16% (75 of 462 channels receivable), restrict choice, reduce diversity and cut Hong Kong off from certain sources of international content.

Notably, of the nine channels directly impacted – none of which are receivable on either of Hong Kong's two licensed pay TV platforms – three are Hindi language (Sahara, Samay, Samay Bihar / Jharkand) and two Nepali (Nepal TV, NTV Plus) – representing the only broadcast TV content in Nepali available in Hong Kong. According to the 2016 by-census[2], there are over 25,000 Nepalese in Hong Kong.

Of the remaining channels, two are Arabic language (Al Jazeera Channel, Dubai Sports 3), one Italian (RAI Italia Asia) and one Mandarin (Southeast Television – 東南衞視). The Arabic and Italian channels are the only Arabic and Italian broadcast channels available live off-air in Hong Kong.

7. The mitigating measures proposed in Sections 26 to 32 of the Consultation Paper are overall too simplistic and superficial.

8. Satellite TT&C protection (Section 27) is particularly important, and CASBAA is not aware of any international precedent for allocating frequencies to public mobile service under MS allocation and thus knowingly creating interference to such critical communications. If lost for any sustained period, these mission-critical communications could have drastic consequences, including potentially loss of one or more satellites – not only those of the relevant

[1] As posted at: http://www.ofca.gov.hk/filemanager/ofca/common/Industry/broadcasting/hk_freq_table_en.pdf As an example of a relatively under-utilised band, the table notes state that "50% of the frequency channels in the band 4400 - 4940 MHz are vacant." That equates to 275 MHz unused spectrum. The current Hong Kong allocation of 4400 – 4940 MHz is for Fixed services only.

[2] Population by Ethnicity and Year, Table A104, at: http://www.bycensus2016.gov.hk/en/bc-mt.html

domestic satellite operators – to casualties on the ground. The consultation paper is silent on who should pay for mitigation measures adopted by the domestic satellite operators, or for additional insurance against loss of control of satellites, and how this should be mediated.

9. EFTNS and SPETS services (Section 28), by their "external" designation and nature, are provided between and across many territories. It is unrealistic to assume that an entire network spanning many territories would be able to re-configure transponder leases if (say) its Hong Kong terminals comprise a few percent or less of the total terminals.

10. Regarding the nine television services that OFCA is aware are carried on 173 SMATV systems (Sections 29 to 31) – and doubtless more services received on TVROs that OFCA is not aware of – re-tuning to alternative services will not mitigate the loss of those channels to those most needing them – e.g. the Nepalese community – which is a substantial underprivileged minority in Hong Kong. It is also even less likely than in the case of EFTNS and SPETS that content providers would be able to move frequencies and transponders, because the population of reception terminals outside Hong Kong far, far exceeds that within[3].

11. The Consultation Paper acknowledges in Section 32 that "the operator of the public mobile services, as the late comer, should be accountable for the necessary rectification work, i.e. in offering protection to the legacy systems with mitigating measures already in place or in adjusting the concerned radio base stations." CASBAA takes issue with OFCA's use of the term "legacy systems", which implies that the existing FSS systems are in some way out-dated or obsolescent. Moreover, the paper is not clear on how the cost of such mitigation measures will be borne by the late comer(s) and how this should be mediated.

12. Section 35 in the Consultation Paper states: "in view of the official launch by the Mainland of 5G services in the 3.4 – 3.6 GHz band in 2020, it is incumbent upon us to clear the 3.4 – 3.7 GHz band earlier in order to prevent any widespread harmful interference to existing radio users."

As noted in Section 10 of this response, none of the affected TV services that OFCA has identified are targeted solely at Hong Kong, and thus their providers are unlikely to move transponders due to any action by OFCA affecting Hong Kong solely.

On the other hand, the recipients of the sole live Nepali, Arabic and Italian TV services in Hong Kong, not to mention of the three Hindi services and one Mandarin service, may not immediately have an alternative means to receive those services, so any prior "clearing of the band" they use would definitely impact them earlier than necessary.

Moreover, Hong Kong is not technically obligated to follow the Mainland in all spectrum allocation, due to the natural terrain of much of the New Territories, effectively blocking line-of-sight communications in the 3.4 – 3.7 GHz band to much of Hong Kong SAR territory, and the

[3] For example, the Nepalese TV content mentioned in the Consultation Paper is carried on a transponder connected to a Global beam antenna, with coverage ranging from North Western Europe to South Eastern Australia and from South Western Africa to North Eastern Russia and Western Alaska, as depicted in light grey at: http://www.thaicom.net/en/satellites/coverage/thaicom-5.

fact that all geostationary satellite antennas point towards the southern sky. The Mainland islands to the South of Hong Kong are not heavily populated and 5G infrastructure there could avoid use of these frequencies or limit radiated power towards Hong Kong territory.

13. The Consultation Paper leaves the reader with a distinct feeling of uncertainty about and lack of confidence in the future of any and all satellite FSS bands in Hong Kong and the processes and timescales by which OFCA will impinge on these in future years. Such uncertainty is inimical to the business of all of CASBAA's members – media companies as well as satellite operators – in Hong Kong.

CASBAA's responses to OFCA's specific questions raised in the Consultation Paper are set out below.

Q1 What are your views on the above Proposed Re-Allocation

CASBAA strongly opposes the Re-Allocation.

CASBAA recommends less haste and more warning for all concerned parties, including end users whose services may be lost altogether or significantly degraded if the FSS spectrum is re-allocated according to the CA's proposal.

Section 20 in the Consultation Paper acknowledges that there is no possibility to retro-fit a geostationary satellite once launched. However, it does not specifically acknowledge that the design and deployment cycles for satellites approach or exceed 20 years. From 30 months before launch there is a design freeze, and a typical geostationary satellite has a design lifetime of 15 years, which with careful management is comfortably exceeded by 1-3 years. Operators of two of the affected satellites were granted Outer Space Licences by the Chief Executive of the HKSAR and Space Station Carrier Licences by the Communications Authority within three years prior to the issue of this Consultation Paper.

The Consultation Paper acknowledges in Section 3. that current MS frequency assignments are not fully utilised, with 35 MHz unassigned, but does not mention how much new sub-6 GHz spectrum is actually required for MS. It appears unreasonable to set out to re-allocate spectrum from FSS to MS without a clear explanation of why the existing sub-6 GHz spectrum allocated for MS is underutilised, nor a forecast of the total sub-6 GHz MS spectrum requirement. The impression created is that this is but part of a wider raid on FSS spectrum to feed unquantified and unqualified requirements for 5G MS.

In Section 15 and its Annex, the Consultation Paper cites a number of countries adopting 3.4-3.7 GHz for public mobile service under MS allocation, most of which do not experience tropical climates and corresponding high rain fade rates anywhere in their territories, thus have less need for C-band and extended C-band for reliable distribution of critical services including television. In fact, C-band is used by almost all CASBAA member broadcast media organisations, for example, for widest distribution of their content internationally and intercontinentally. The Consultation Paper also omits to mention that the majority of administrations in ITU Region 3 do

not show support for such adoption of public mobile service under MS allocation at the expense of FSS allocation.

The discussion in Sections 18 and 19 on percentages of domestic satellite operators' FSS downlink capacity in the 3.4-3.7 GHz band for reassignment is specious, taking no account of the high utilisation of this band as compared to many others in the public Hong Kong Table of Frequency Allocations[4], nor does it take account of the level of harm likely to be caused to existing end-users of the services carried in this band – television and otherwise.

The distinctions made in Sections 2. and 24 on whether services are licensed or not and their users are licensees or not will not change the level of harm likely to be caused to existing end-users of the services carried in this band, nor the notice period they require to make other arrangements – if indeed any are practicable.

The Consultation Paper acknowledges in Section 22. that Hong Kong has an "open sky policy", but the proposed change in frequency allocation will reduce the number of channels receivable on SMATV and TVRO systems by at least 16% (75 of 462 receivable channels), restrict choice, reduce diversity and cut Hong Kong off from certain sources of international content.

Notably, of the nine channels directly impacted – none of which are receivable on either of Hong Kong's two licensed pay TV platforms – three are Hindi language (Sahara, Samay, Samay Bihar / Jharkand) and two Nepali (Nepal TV, NTV Plus) – representing the only broadcast TV content in Nepali available in Hong Kong. According to the 2016 by-census[5], there are over 25,000 Nepalese in Hong Kong.

Of the remaining channels, two are Arabic language (Al Jazeera Channel, Dubai Sports 3), one Italian (RAI Italia Asia) and one Mandarin (Southeast Television – 東南衞視). The Arabic and Italian channels are the only Arabic and Italian broadcast channels available live off-air in Hong Kong.

Q2 Do you agree with the principle of protecting existing SMATV/EFTNS/SPETS systems operating in the adjacent band of 3.7 – 4.2 GHz with the implementation of the mitigating measures?

CASBAA agrees with this protection principle for existing systems and proposes extending the protection to future SMATV/EFTNS/SPETS systems. It also proposes that TT&C and TVRO systems need protection at the expense of public mobile service licensee late comer(s).

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The mitigating measures proposed in Sections 26 to 32 of the Consultation Paper are overall too simplistic and superficial.

Satellite TT&C protection (Section 27) is particularly important, and CASBAA is not aware of any international precedent for allocating frequencies to public mobile service under MS allocation and thus creating interference to such critical communications. If lost for any sustained period, these mission-critical communications could have drastic consequences, including potentially loss of one or more satellites – not only those of the relevant domestic satellite operators – to casualties on the ground. The consultation paper is silent on who should pay for mitigation measures adopted by the domestic satellite operators, or for additional insurance against loss of control of satellites, and how this should be mediated.

EFTNS and SPETS services (Section 28), by their "external" designation and nature, are provided between and across many territories. It is unrealistic to assume that an entire network spanning many territories would be able to re-configure transponder leases if (say) its Hong Kong terminals comprise a few percent or less of the total terminals.

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The Consultation Paper acknowledges in Section 32 that "the operator of the public mobile services, as the late comer, should be accountable for the necessary rectification work, i.e. in offering protection to the legacy systems with mitigating measures already in place or in

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adjusting the concerned radio base stations." CASBAA takes issue with OFCA's use of the term "legacy systems", which implies that the existing FSS systems are in some way out-dated or obsolescent. Moreover, the paper is not clear on how the cost of such mitigation measures will be borne by the late comer(s) and how this should be mediated.

Q3 For implementation of the Proposed Re-Allocation, please suggest or give your views about any mitigating measures to be implemented for the existing systems and services as well as any precautions to be taken for the operation of the new mobile base stations to be operating in the 3.4 – 3.6 GHz band.

CASBAA leaves the details of proposed technical mitigating measures to its satellite operator members better qualified to advise on these, acknowledging that the precise details are commercially and operationally sensitive.

Q4 What are your views on effecting the Proposed Re-Allocation in the early 2020, giving an advance notice period of two years if the relevant decision of the CA is made in early 2018?

CASBAA strongly opposes the Re-Allocation in principle. CASBAA even more strongly opposes the shortened notice period, which is even shorter than the TA Statement, without adequate rationale or justification. Normally, a shortened notice period is applicable if a licensee is failing to meet some licence requirements, for example to roll out or to continue adequately to provide a licensed service. This is clearly not the case here. The satellite operators, their service provider and content provider customers and end-users of the services have done nothing wrong, yet will be penalised by such action.

CASBAA believes this sets a dangerous precedent for spectrum assignment and regulation in Hong Kong, signalling that any spectrum may be "up for grabs" at any time at the regulator's whim, regardless of its current utilisation compared to other available spectrum.

Section 35 in the Consultation Paper states: "in view of the official launch by the Mainland of 5G services in the 3.4 – 3.6 GHz band in 2020, it is incumbent upon us to clear the 3.4 – 3.7 GHz band earlier in order to prevent any widespread harmful interference to existing radio users." As noted in Section 10 of this response, none of the affected TV services that OFCA has identified are targeted solely at Hong Kong, and thus their providers are unlikely to move transponders due to any action by OFCA affecting solely Hong Kong.

On the other hand, the recipients of the sole live Nepali, Arabic and Italian TV services in Hong Kong, not to mention of the three Hindi services and one Mandarin service, may not immediately have an alternative means to receive them.

Moreover, Hong Kong is not technically obligated to follow the Mainland in all spectrum allocation, due to the natural terrain of much of the New Territories, effectively blocking line-of-sight communications in the 3.4 – 3.7 GHz band to much of Hong Kong SAR territory, and the fact that all geostationary satellite antennas point towards the southern sky. The Mainland islands

to the South of Hong Kong are not heavily populated and 5G infrastructure there could avoid use of these frequencies or limit radiated power towards Hong Kong territory.

Q5 What are your views on the need to protect the TT&C channels of the licensed satellite networks at their specific locations from any harmful interference to be caused by public mobile services?

CASBAA believes that such protection is essential.

Furthermore, CASBAA believes that the HKSARG should indemnify the domestic satellite operators from damage to or loss of their own and/or other operators' satellites due to interference caused to TT&C systems and for consequent damage or loss, injury or fatality due loss of control of the domestic satellite operators' or any other impacted operators' satellites.

CASBAA is not aware of any international precedent for allocating frequencies to public mobile service under MS allocation and thus knowingly creating interference to such critical communications.

If lost for any sustained period, these mission-critical communications could have drastic consequences, including potentially loss of one or more satellites – not only those of the relevant domestic satellite operators – to casualties on the ground.

The Consultation Paper is not clear on who should pay for mitigation measures adopted by the domestic satellite operators, or for additional insurance against loss of control of satellites, and how this should be mediated.

CASBAA believes that the mitigation measures should be carried out at the expense of the mobile service licensee late comer(s) and any increase in insurance against loss of control of satellites should either be borne by the late comer(s) or by HKSARG, which will be collecting significant 5G licensing revenues from these parties for the new 5G services.

Q6 Do you have any views on other aspects of or issues relevant to this consultation?

The Consultation Paper leaves the reader with a distinct feeling of uncertainty about and lack of confidence in the future of any and all satellite FSS bands in Hong Kong and the processes and timescales by which OFCA will encroach on these in future years.

There appears to have been a major shift in OFCA's position on re-assignment of this frequency band in the past year. This, plus the shortened notice periods and the lack of acknowledgement of the need for late comers to pay for all of the required mitigation measures, let alone compensate for loss of or disruption to established services, undermines confidence in the fairness, reasonableness and predictability of the spectrum regulatory framework and process in Hong Kong for those with significant investments in established services.

The combination of uncertainty, investment risk and the impact of closing Hong Kong off from live international television broadcasts in three languages: Nepali, Arabic and Italian, and substantially reducing those available in a fourth, Hindi, threaten substantially to diminish Hong Kong's claim to be Asia's World City[8].

[8] As made for example at: http://www.brandhk.gov.hk/html/en/index.html, which is linked directly from OFCA's website: http://www.ofca.gov.hk/.