

**Submission to  
the Telecom Regulatory Authority of  
India (TRAI):**

**Comments on  
Consultation Paper on  
In Flight Connectivity (IFC)**

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**SAMSUNG**



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## 1. Executive Summary

Samsung Electronics Co., Ltd (hereinafter Samsung) is pleased to submit a response to the TRAI consultation paper on “In Flight Connectivity (IFC)”<sup>1</sup>.

In section 2, Samsung provides views on this IFC consultation. In principle, Samsung supports TRAI’s view to provide IFC services taking into account a huge territory in India with a rapidly growing domestic aviation market, and a unique opportunity of establishing a locally deployed satellite and AMSS/IFC systems. Meanwhile, Samsung would like to request TRAI to consider recent global movements toward 5G and terrestrial mobile/fixed communication services using some of higher frequency bands like mmWave bands, when considering IFC services in India. In addition, we have outlined some questions around the applicability of IFC services in the Indian context e.g. the need for gate-to-gate service, the level/scope of IFC services and the associated service, security, and interoperability aspects, which may require careful assessment for a successful deployment of IFC services with India.

Finally Samsung thanks the TRAI for the opportunity to comment on this consultation, and looks forward to working closely with TRAI continuously.

## 2. Comments and Suggestions

In this section, Samsung provides comments and suggestions for some questions listed in the consultation paper. Specifically, below are our responses to Q1-Q4, and Q17-Q18.

### **Q1. Which of the following IFC services be permitted in India? (a) Internet services (b) Mobile Communication services (MCA service) (c) Both, Internet and MCA**

Both, Internet and MCA could be considered. However the IFC service provider may have the flexibility of whether to provide MCA services or not. In the case IFC service provider would offer both internet and MCA services, we need to ensure that IFC services shall not create any interferences and constraints to existing and/or planned terrestrial mobile/fixed communications networks.

For MCA in particular, it may be desirable to understand the service aspects for IFC services in the Indian context e.g. do we expect the same level of mobile service experience that a user experiences with current terrestrial networks? This is especially relevant in India where the geography is divided in 22 circles, and the operator that is providing the service on-board may or may not have service-level agreement within all circles when airborne? Does the user need to take specific actions to enable such service e.g. turn roaming on/off? Further, do we anticipate a deployment where only one operator network (pico cell) is available in-flight, or can there be multiple operators networks to allow flexibility to the user to use his/her home operator. To this end, a decision may need to be made on whether a single or multiple spectrum licensees for IFC operations is necessary similar to terrestrial networks.

Regarding Internet services, due diligence may be required to understand the types of services and the content that is made accessible during flight, and also review such services in the context of user privacy/distraction, etc. For instance, it may be more appropriate to only allow services that can complement the existing inflight entertainment services e.g. movies, news, live TV, etc. that are

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<sup>1</sup> Available at [http://www.trai.gov.in/sites/default/files/Consultation%20Paper\\_29092017.pdf](http://www.trai.gov.in/sites/default/files/Consultation%20Paper_29092017.pdf)

becoming increasingly popular. In other words, it may be desirable to understand those critical applications that in-flight users would like to use in addition to native services currently offered by the airlines. While allowing both voice and data offers meaningful services, we no need to be cautious not to waste spectrum on 4K/8K videos etc. that may not be essential.

**Q2. Should the global standards of AES/ESIM, shown in Table 2.1, be mandated for the provision of AMSS in Indian airspace?**

Adhering to global standards for AES/ESIM, as shown in Table 2.1 will ensure harmonization across Ka/Ku bands, and compatibility with the AMSS architecture. This approach will be very meaningful especially for international flights. However, for specific aspects concerning IFC services, please refer to response in Q.1

In terms of deployments, for a large country like India with a significant domestic aviation market, having locally deployed satellite and AMSS/IFC systems. If such satellite capabilities are available, International IFC operators must switch over to such local IFC system while flying over the Indian air space. This will fulfill the legal monitoring intercept requirements etc. (e.g. in line with prevailing Telegraph Acts). Such direction may require work in the area of interoperability of IFC system and service requirements, which may be carried out through TSDSI, for example.

**Q3. If MCA services are permitted in Indian airspace, what measures should be adopted to prevent an airborne mobile phone from interfering with terrestrial cellular mobile network? Should it be made technology and frequency neutral or restricted to GSM services in the 1800 MHz frequency band, UMTS in the 2100 MHz band and LTE in the 1800 MHz band in line with EU regulations?**

While NCU (Network Control Unit) will be helpful in preventing an airborne mobile phone from interfering with terrestrial cellular networks, it would be highly beneficial if MCA services are restricted to a certain altitude such as cruising altitude of at least 3000m or above, a measure that is widely supported globally both from interference, and as well as aviation/passenger safety standpoint.

Adhering to EU regulations will help IFC services in Indian Airspace to provide similar customer experience. However, in this particular case, we request TRAI to take note of the rapid growth in the deployment and user adoption of new radio access technologies such as LTE in India, and decreasing use of legacy technologies such as GSM. According to the recent reports from COAI, 90% of the new mobile communication infrastructure installations are based on LTE. In light of this, we would suggest the TRAI to consider putting more emphasis on LTE, compared to GSM. Also, as you may be aware in the coming years, 5G will be a very important technology enabler so preparations for 5G need to also be considered in this context.

**Q4. Do you foresee any challenges, if the internet services be made available ‘gate to gate’ i.e. from the boarding gate of the departure airport until the disembarking gate at the arrival airport?**

Since the terrestrial networks use the same frequencies for internet and voice traffic, interference is a major concern for ‘gate to gate’ approach. The most critical part of an air flight is takeoff and landing while passengers and the crew are always ready to meet any eventuality. This leads us to believe that potential security and safety concerns may arise with the use of IFC or internet services below certain altitude such as the cruising altitude (e.g. 3000m).

Our recommendation is to consider a phased approach to IFC services. During the initial phase, we suggest IFC services be restricted to a minimum altitude to protect existing and/or planned terrestrial mobile/fixed communication services, while we continue to understand the in-flight usage levels in India and around the world, but also until WRC-19 where a clearer picture will emerge with respect to studies pertaining to satellite communications for IFC services.

**NOTE: For Q5 to Q16, we do not provide specific comments.**

**Q17. Should satellite frequency spectrum bands be specified for the provisioning of the IFC services or spectrum neutral approach be adopted?**

IFC services should be independent of the satellite frequency spectrum bands. As indicated in Q.1, since the intent of IFC services is to offer both internet and MCA services, the bands in which IFC services are offered should not be restricted to satellite frequency spectrum bands but a spectrum neutral approach is recommended, such as unlicensed (e.g. 2.4GHz/5GHz for internet services over Wi-Fi, and licensed spectrum e.g. <6GHz for MCA services).

Regarding the satellite frequency spectrum bands, as clearly described in the IFC consultation paper, the spectrum bands 19.7 – 20.2 GHz (Space to earth) and 29.5 – 30.0 GHz (Earth to space) has been allocated to the ESIM (Earth Station In Motion) on the basis of FSS (Fixed Satellite Service) allocation, in accordance with RR 5.527A and Resolution 156 (WRC-15) in Radio Regulations. We believe that the bandwidth provided by these frequency bands is adequate for providing IFC services using ESIM, as detailed in our response to Q1. At the same time, we do recognize that WRC-15 has decided to study spectrum bands 17.7 – 19.7 GHz (Space to earth) and 27.5 – 29.5 GHz (Earth to space) for extended ESIM service in accordance with Resolution 158 (WRC-15). In the meanwhile, however, the band 27.5 – 29.5 GHz has been allocated to several other services on a primary basis such as mobile service. As we indicated in our response to the consultation paper No. 10/2017 by the TRAI, this band is widely considered as mobile service in many countries and industry for 5G service before 2020, and therefore Samsung would like to suggest to the TRAI that mmWave bands (e.g. 28 GHz, a “Frontier” band<sup>2</sup> for 5G) is not recommended for IFC/MCA services based on satellite communications, especially in situations where it may conflict with the terrestrial networks and services.

**Q18. If stakeholders are of the view that IFC services be permitted only in specified satellite frequency bands, which frequency spectrum bands should be specified for this purpose?**

Referring to our response to Q.17, the spectrum bands 19.7 – 20.2 GHz (Space to earth) and 29.5 – 30.0 GHz (Earth to space) has been allocated to the ESIM applications for supporting IFC services. Therefore, we recommend that frequency bands for IFC service should be considered in these bands ONLY.

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<sup>2</sup> Refer to <https://gsacom.com/paper/initiative-develop-global-5g-market-28-ghz-spectrum-band/>

### 3. Acronyms and Abbreviation

3GPP	3 <sup>rd</sup> Generation Partnership Project
AES	Aircraft Earth Station
AMSS	Aeronautical Mobile Satellite Service
ESIM	Earth Station In Motion
EC	European Commission
FSS	Fixed Satellite Service
IFC	In-Flight Connectivity
IMT	International Mobile Telecommunications
ITU	International Telecommunications Union
MCA	Mobile Communications on board Aircraft
NCU	Network Control Unit
TSDSI	Telecom Standards Development Society of India
WRC	World Radiocommunication Conferences

### 4. Contacts

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