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Dear Mr. Gupta,

Asia Satellite Telecommunications Co. Ltd. (AsiaSat) is a Hong Kong based satellite operator. All the AsiaSat satellites (AsiaSat-2 in the orbit location 100.5°E, AsiaSat-3S in 105.5°E and AsiaSat-4 in 122°E) have been indentified by Indian authorities as fulfilling all the requirements for having users licensed in India. Subsequently, several Indian companies provide their services through the AsiaSat satellites.

AsiaSat welcomes the consultation paper no. 8/2008 by the Telecom Regulatory Authority of India (TRAI) and is pleased to offer its comments. AsiaSat's comments are limited to the technical implications on satellite operation in the 3400-4200 MHz band by BWA networks deployed in the 3400-3600 and 3300-3400 MHz bands.

AsiaSat would be pleased to share with TRAI its practical experience regarding co-existence between BWA and FSS networks in these bands and the studies and field trials conducted on this issue.

#### **Introduction**

The current AsiaSat fleet of satellites operates in the 3625-4200 MHz band and the projected BWA networks will thus not operate in exactly the same bands as the current AsiaSat satellites. However, AsiaSat notes from several practical cases of interference experienced by AsiaSat's customers, as well as from technical studies and field trials, that also BWA in adjacent bands can have a detrimental impact on FSS reception. Moreover, AsiaSat notes that several satellite operators operating in India, including the domestic INSAT fleet of satellites operate in the 3400-3625 MHz band. AsiaSat also anticipate that future AsiaSat satellites will eventually make use of this frequency band.

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Technical studies conducted within ITU, the Asia-Pacific Telecommunity (APT) and other organizations on the technical feasibility of deploying terrestrial networks in large numbers within a portion of the 3400-4200 MHz band have shown that to provide protection of the FSS receive earth stations, some separation distance relative to the stations of the terrestrial network is required. The magnitude of this separation distance depends on the parameters of the networks and the deployment of the two services. Three different interference mechanisms, leading to different requirements for guaranteed separation distances to protect the satellite receiving earth stations have been identified:

1. In-band, co-channel operations  
The minimum required separation distances when taking into account only the long-term interference criterion specified by ITU are at least in the tens of kilometres. When including the short-term interference criterion as specified by ITU, the separation distances generally exceed one hundred kilometres.
2. Adjacent band operations  
Concerning interference from unwanted emissions arising from out-of-band and spurious domains of terrestrial transmitters (base stations and user terminals) and falling within the band used by the FSS receiver, the minimum required separation distances are up to some tens of kilometres.
3. Overdrive of the FSS receiver  
Studies have shown that emissions from a terrestrial station can overdrive the FSS receiver LNA, or bring it into non-linear operation, if the separation distance is less than some kilometres or some hundreds metres with respect to base stations and user terminals respectively.

The two latter cases apply to the current AsiaSat fleet of satellites.

The studies all conclude that if FSS and/or the terrestrial network is deployed in a ubiquitous manner and/or with no individual licensing of FSS earth stations, sharing is not feasible in the same geographical area since no minimum separation distance can be guaranteed.



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**BWA in the 3.4-3.6 GHz band**

AsiaSat is pleased to note the recognition by TRAI of the importance of the services provided by satellite networks and the need of protecting satellite reception in the process of introducing BWA and the decision to have DoT coordinate with the Department of Space (DoS). AsiaSat notes that TRAI seek to identify 100 MHz within the 3400-3600 MHz range.

However, AsiaSat would like to observe that, even a band segmentation approach and disregarding the in-band interference, with the required separation distances in respect of protection for adjacent band operation and avoiding overdrive of the FSS receiver BWA in even only a portion of the 3400-3600 MHz band will make reliable FSS reception in the entire 3400-4200 MHz band within the same city infeasible.

Noting the widespread use of satellite networks in the 3400-4200 MHz band throughout India and the impact on these by BWA stations, AsiaSat strongly recommends that TRAI consider use of other bands than the 3400-3600 MHz for BWA.

**BWA in the 3.3-3.4 GHz band**

The band 3300-3400 MHz is not used by satellite networks and for this reason there are no in-band interference issues. However, AsiaSat expects that the interference with respect to adjacent band operation and overdrive of the FSS receivers will be effectively the same from BWA stations operating in this band as from BWA stations operating in the 3400-3600 MHz band. As a result, BWA stations in the 3300-3400 MHz band, deployed in a city, would exclude reliable FSS reception in the 3400-4200 MHz band within the same city.

AsiaSat therefore recommends that deployment in this band is not considered until the desired protection of FSS reception in the 3400-4200 MHz band has been demonstrated.

Yours faithfully,  
ASIA SATELLITE TELECOMMUNICATIONS CO. LTD.

A handwritten signature in black ink, appearing to read "Per Hovstad". The signature is stylized and written over a horizontal line.

Per Hovstad  
Manager Spectrum Management Section

PH/pc