## Avanti Communications Group

## Response toOfcom's Consultation On

## "A Review Of The Management Of The Spectrum Currently Used For

Point To Point Fixed Links And Other Services That Share This Spectrum"

April 30,2 012

# 1. The Importance OfEnsuring Viable Access to Spectrum For Ka-band Satellite Systems

Satellite systems and networks require hundreds of millions of pounds of investment, and years of advance planning and construction prior to deployment. Investment decisions related to the development of networks are made based on a business case and require sufficient useable spectrum to provide service to those countries within the satellite coverage footprint. Once a satellite is operational, its commercial viability depends on the continued availability of spectrum and the stable applicable regulatory regimes in the countruesthat the satellite network will be serving.

Satellite is the only available means of communications that is able to efficiently and immediately deliver high quality broadband services to all underserved or un-served areas. Avanti uses its Ka-band satellites to deliver a full range of broadband services.

For example, satellites are an ideal means of providing affordable broadband connectivity to rural and remote areas in the UK and Europe where , according to the European Commission, more than 10 million households<sup>1</sup> are unable to access basic broadband services. Satellites also provide critical emergency services to first responders particularly when other means of communications are unavailable.

The success and stability of those satellite services provided by Avanti are inextricably linked to the ability of Avanti to access enough Ka-band spectrum that is free of damaging or unacceptable interference, and without the risk that such spectrum could be taken away once Avanti's investments has been made.Satellite systems are based on long business cycles

<sup>&</sup>lt;sup>11</sup>http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/11/401&format=HTML&aged=1&language=EN&guiLanguage=en

(typically 15-20 years) which require that rules and charges associated with them are predictable and remain stable over time.

Ofcom should take into account the general objectives of the EU telecoms regulatory framework, which include "*encouraging efficient investment in infrastructure and promoting innovation, taking into account investment risks*" as well as "*promoting regulatory predictability*."

Avanti CommunicationsGroup plc, which is one of the 3 main UK HQedsatellites operators, has invested heavily in Ka-band satellite systemswith its HYLAS-1 (in operation since February 2011 and serving the UK and Europe), HYLAS-2 (to be launched in July 2012 and capable of providing Ka-band services over UK and Europe) and HYLAS-3. Avanti and will increasingly use Ka-band spectrum to grow and expand capacity for a broad range of services including broadband, private networks, backhaulas well as fixed applications and more in the UK and in other countries.

Avanti requires regulatory certainty to assure access to Ka-band spectrum to roll-out planned Ka-band services in UK, Europe and elsewhere. To leave any doubt regarding satellite access to the Ka-band will place at risk thedelivery of critical services to consumers as well as to the substantial underlying investments that are now being made by Avanti.

As a result of the high susceptibility of the satellites and the end-user terminals to interference and given the need to rely on large contiguous blocks of spectrum for links between the hub Earth stations and the satellite, the International Telecommunication Union (ITU) has allocated Ka-band spectrum in a way that, already, some frequencies are exclusive to satellite and other frequencies are subject to specific sharing conditions (addressed in Europe by the current CEPT regulation).

As technology keeps developing one sees new satellite services in the Ka band requiring the deployment of a large number of small transmit (uplink) / receive (downlink) user terminals. Because of the sensitivity of these satellite terminals to interference and the ubiquitous nature of these terminals, it is not possible for these Ka band satellite services to share the same spectrum over the same geographical area with other services such as terrestrial fixed and mobile services.

As much of the Ka-band spectrum allocated to satellites is also allocated to other services or is reserved for exclusive government usage, which could constrain the development of new commercial satellite services. The Ka-band is of the utmost strategic importance to Avanti's future plans which has been under development for several years.

The main Ka-band frequency bands, which Avanti Communications Group has a direct and immediate interest in, are identified and discussed below.

The bands including 19.7 – 20.2 GHz (downlink),20.2 – 21.2 GHz (downlink, 21.4 – 22.0 (GHz), 29.5 – 30.0 GHz (uplink(, 30.0 – 31.0 GHz (uplink). These bands are understood as not subject to this Ofcom review. Avanti urges Ofcom to retain these frequency bands on an exclusive basis for FSS use in the UK (plus the other satellite

services as allocated by the ITU). Avanti urges the band 21.4 – 22.0 GHz be made available in the UK for FSS and BSS services to support future linear and non-linear IPTV services coupled with two-way broadband services on a converged basis.

- WRC-2012 allocated 600 MHz on the 24.65 25.25 GHz (uplink) for FSS(BSS feederlink) uplinks this band is paired with 21.4 22.0 GHz (downlink). Avanti urges Ofcom to allocate this 24 / 25 GHz band to FSS (uplink) in the UK. Avanti is planning the use of this spectrum for its future Ka-band satellite systems.
- 3. The band **25.5 27.0 GHz (downlink)** allocated to EESS. The EDRS-A and the ESDRS-C / Hylas-3 will use this band to support the EDRS. Avanti urges Ofcom to ensure that this band should remain available for viable EESS use in the UK.
- The band 17.3 17.7 GHz (downlink) is also allocated to FSS downlinks. This band is understood as not subject to this Ofcomreview. Avanti urges Ofcom to ensure that this band sbe allocated on an exclusive basis for FSS downlink satellite use on a shared basis with BSS feederlinks.
- 5. The band 17.7 19.7 GHz. See Section 2 below.
- 6. The band 27.5 29.5 GHz. See Section 3 below.
- 7. Avanti has a long term interest in the potential use of FSS / MSS allocations at Q band and V band to supportfeederlinks to Ka-band satellite services in the UK and Europe in the post 2018/2020 timeframe. However, Avanti considers that it is in near to medium term (i.e. prior to 2018) much more important to enable additional useable access to Kaband spectrum in the UK in order to support the next generation of future high capacity broadband systems in the UK in Ka-band rather than in Q/V band.

# 2. Necessity For Additional Useable Downlink FSS Spectrum Within The 17.7 – 19.7 GHz Band

- FSS uncoordinated earth stations (space-to-Earth) in the band 17.7-19.7 GHz may operate within CEPT on an unprotected basis with respect to the Fixed Service (FS). The adjacent band 19.7-20.2 GHz which is allocated exclusively to satellite services has so far been considered by satellite operators and administrations for widespread FSS earth station deployment. However, with the development of high capacity Ka-band satellites systems, and traffic asymmetry that generally requires more downlink FSSspectrum than uplinkFSS spectrum, there is a critical need to enable the viable operation of FSS uncoordinated earth stations under acceptable FS interference conditions within the band 17.7-19.7 GHz on a sustainable long term basis.
- In urban areas, the 17.7-19.7 GHz range may be fully used by FS, or the prospect of reaching saturation is possible. While in rural and remote areas of the UK, it is quite likely that the saturation of FS will never be reached, even on the long term. One of the major identified applications in ECC Report 152 for Ka-band satellite systems is broadband

connectivity for users beyond the coverage of terrestrial services. Therefore, the areas where spectrum would be most needed for Ka-band FSS broadband would generally be those of less need for the FS.

- Therefore, we would encourage Ofcom to characterise the FS interference environment as experienced by a FSS earth station, so that specific areas and/or sub-bands of 17.7-19.7 GHz in various rural and suburban areas and possibly urban areas can be identified as more favourable for Ka-band FSS use.
- Ofcom should take steps to encourage new FSlinks to make use of alternative spectrum outside the range 17.7 - 19.7 GHz– including by freezing new FS link licence applications and grandfathering existing FSlicences in parts of this band (e.g. in / near FS channel band gaps) as a minimum in rural / remote areas of the UK. This will progressively allow for sustainable use by broadband and other Ka-band FSS satellite systems to serve customers within the UK without risk of harmful interference from terrestrial FS links in those geographical areas and frequency segments.

# 3. Necessity For Additional FSS Uplink Spectrum Within The Band 27.5 – 29.5 GHz

- The band segmentation between FS and FSS in the 28 GHz is provided by ECC Decision ECC/DEC (05)01 designating each frequency for either uncoordinated FSS earth station uplinks or FS. In the paired uplink band 27.5-29.5 GHz, the bands 27.5-27.8285 GHz, 28.4445-28.8365 GHz and 29.4525-29.5 GHz are identified for the use of uncoordinated FSS Earth stations. The only exception is in the band 28.8365 28.9485 GHz, designated for uncoordinated FSS, but taking into account that some FS networks were already licensed in some countries at the time the Decision was approved (*decides 2*). In this specific case, new FS links were to be limited to additions on the existing networks (*decides 4*). UK has not committed to implementing this Decision, and OFCOM has auctioned off various segments of 27.8285 27.9405 GHz band.
- Very little of this 27 / 28 / 29 GHz auctioned band by Ofcom in 2002/2003 has actually been used in the UK by the terrestrial spectrum rights owners and the vast majority of that spectrum is lying fallow. This represents highly inefficient and ineffective spectrum use. Some of those spectrum award blocks are coming up to their end of spectrum award term. There should no presumption for automatic extension of the spectrum award term to incumbent 28 GHz terrestrial spectrum rights owners.
- Based on the above analysis and future market trends for Ka-band FSS satellite services, we at Avanti recommend that Ofcom should release these un-utilised spectrum band segments which are coming up to their end of term for use by uncoordinated 'license exempt' FSS use. This in turn will allow the use of ubiquitous satellite user terminals to operate exclusively for satellite usage.
- Based on the above considerations and future market trends for Ka-band FSS satellite services, Avanti recommends that Ofcom should release this un-utilised spectrum band

segments which are coming up to their end of term for use by uncoordinated 'license exempt' FSS use. This in turn will allow the use of ubiquitous satellite user terminals to operate exclusively for satellite usage.

• Furthermore, Avanti considers it very important to be able to access the full uplink band 27.5-29.5 GHz on a shared basis for coordinated Ka-band gateway Permanent Earth Stations (PES), as implicitly recognized by ECC Decision ECC/DEC (05)01.

#### 4. Conclusion

Avanti notes that the UK Broadband Stakeholder's Group (BSG), taking into account studies conducted by Analysys Mason for the BSG in 2010/2011, has supported the need for additional useable spectrum for satellites at Ka-band to enable the development and deployment of high capacity Ka-band satellite systems capable of meeting the HMGrequriements for super-fast broadband services in various parts of the UK.

The current generation of high-end Ka-band satellites have a throughput capacity of circa 100 – 150 Gbit/sec per satellite. Based on recent studies undertaken by the European Space Agency (ESA), the next generation of high-end Ka-band satellite, which would be expected to be deployed by the end of this decade, will have a throughput capacity of 1 Terabit/sec per satellite. To support that level of throughput capacity, the provision of additional Ka-band spectrum is vital otherwise investments in next generation of Ka-band satellite system to serve the UK broadband market and converged broadband / broadcast markets will be stymied.

Avanti also believes that the future potential demand for capacity to support 3G/4G backhaul requirements can be largely met by fibre based networks in the UK as opposed to use of FS links. There should be a progressive reduction in need for spectrum in the 17.7 – 19.7 GHz and 27.5 – 29.5 GHz band to support 3G/4G backhaul FSneeds. Furthermore, such 3G/4G backhaul FS spectrum requriements can and should be catered for above 31.0 GHz, given that there is considerable spectrum allocated to the FSon a primary or co-primary basis in the UK above 31.0 GHz and the technology is already widely available to support FS link deployments above 31.0 GHz.

Avanti therefore urges Ofcomto continue to support the commercial satellite sector's access to the Ka-band spectrum <u>as identified above</u>, so as to protect existing Ka-band satellite services and to enable the development and roll-out of planned Ka-band satellites services that uniquely satisfy demand for state-of-the-art communications for governments, businesses and citizens in the UK over the next 10 – 20 years and beyond.