NATS

Additional comments:

NATS welcomes the opportunity to respond to the Ofcom Call for Input on the Future demand for mobile broadband spectrum and consideration of potential candidate bands. NATS has no views at this time on the issues raised around the spectrum requirement forecasts and we will therefore not address questions 1 to 7. References in our response to "Annex 6" refer to that Annex of the Call for Input document, unless otherwise stated.

NATS wishes to draw Ofcom's attention to the fact that portions of both of the only bands readily available for long and medium range primary air traffic control radar systems are being considered within the context of agenda item 1.1 and the results of compatibility studies to date at 3 GHz and extrapolated to 1.3 GHz suggest that sharing with mobile broadband / IMT is unlikely to be feasible in either band. There is an on-going requirement for the current types of primary radar system in these bands in the absence of either a mature, proven technology alternative that meets the requirements going forward or a change in the need for non-cooperative air surveillance, i.e. that which doesn't require radio equipment on board the aircraft. There is a relatively small market for air traffic control radar and modern designs are largely limited to the currently allocated ARNS bands, with little capability to be refarmed to other, even adjacent bands without potentially significant system changes. Such changes would only be possible once equipment had been designed, proven and certified for operation in the new bands. Thus the potential for the negative impact of allocations being made for mobile broadband use in those bands used by radar systems, on aviation's ability to manage airspace with the capacities and efficiencies enjoyed today and envisaged to be built upon in the future must be carefully considered in the agenda item 1.1 preparations. With this in mind, NATS would like to draw Ofcom's attention to the work published by the Air Transport Action Group providing global, regional and national perspectives on aviation's economic and social benefits. It is based on studies carried out by Oxford Economics and may be found at the following address: http://www.aviationbenefitsbeyondborders.org/

NATS looks forward to continuing to work with Ofcom in the context of the UK preparations for WRC-15 agenda item 1.1.

Question 1: How much do you expect UK mobile data demand to change in the period 2015-2030? Please provide evidence for the trend and, where possible, please indicate how demand might vary across the device categories listed in paragraph 4.7. How should we account for factors (including pricing) that would constrain demand?:

No response

Question 2: What evidence do you think is relevant to assessing the extent of consumer benefits associated with meeting the increase in demand for mobile data?:

No response

Question 3: What proportion of mobile data traffic do you expect to be carried over (a) Wi-Fi and similar systems in licence-exempt spectrum and (b) mobile networks in licensed spectrum? How do you expect this to change over the period 2015-2030 and how do you expect total data demand for Wi-Fi and similar systems in licence-exempt spectrum to change over the same period? How might this vary by location, environment etc.?:

No response

Question 4: What factors will act to change the spectral efficiency of mobile technologies in the future? What spectral efficiency values are appropriate for consideration in our study for the period 2015-2030?:

No response

Question 5: What service bit rate values are appropriate for consideration in our study for the period 2015-2030? What evidence do you have of changing needs for service bit rates?:

No response

Question 6: What proportion of traffic do you consider should be assumed to be carried on each cell types for the period 2015-2030? How will this vary with service environment i.e. between home, office, public areas, rural, suburban and urban? What evidence do you have of the factors affecting the uptake of small cells in licensed spectrum in the future?:

No response

Question 7: Given the current mix of services on cellular networks what is the ratio of downlink to uplink capacity currently dimensioned for and how would you expect this to change over time by 2015, 2020, 2025 and 2030? How do you expect the ratio of downlink to uplink demand to vary for the service categories given in Table A5.4 of Annex 5, and what factors might affect this? How does this ratio of downlink to uplink capacity change (if at all) with network radio access technology and offload to licence-exempt systems?:

No response

Question 8: What are your views about the pros and cons of the frequency ranges in Table A6.1 in Annex 6 for mobile broadband and for existing applications using this spectrum? Do you have views on other bands that are not in Table A6.1?:

1 300 - 1 400 MHz frequency band:

NATS uses primary radar systems for ranges up to approximately 250nm within the 1215 - 1350 MHz band identified in Annex 6 - we would however consider these to operate under the Radionavigation Service, i.e. under footnote UK81 in the UK FAT rather than under the Radiolocation allocation as implied in the Annex. The systems used by NATS operate in the band 1 250 - 1 350 MHz and each system needs a combination of frequencies above and below 1 300 MHz in order to meet its operational requirements.

In terms of the potential of 1 300 - 1 350 MHz as a candidate band for mobile broadband, NATS would anticipate the compatibility issues between radar and mobile applications as being similar to those at 2 700 - 2 900 MHz (see e.g. ITU-R Report M.2112) with the better propagation due to the lower frequency band further increasing the necessary separation distances over those at 2 700 MHz. The feasibility of sharing this band between the two Services would therefore appear to be low. The radar systems are already at risk of interference from satellite navigation downlinks in the band 1 260 - 1 300 MHz and restrictions on the use of the band above 1 300 MHz for radar systems due to the Mobile Service could seriously impact the operation of long range primary radar and thus adversely affect airspace capacity and efficiency.

NATS would also observe that no reference is made in Annex 6 to the RNSS (E-s) allocation in the band 1 300 - 1 350 MHz that NATS had understood to be of interest to the Galileo system, at least at the time of that allocation being made.

1 518 - 1 559 MHz frequency band:

Aviation plans, including those through the EU SESAR programme, foresee continued and increasing use of the MSS for safety communications, including the use of 1 544 - 1 545 MHz portion for the relay of emergency beacon messages. NATS would also observe that there is a body of work addressing adjacent band compatibility between terrestrial mobile below and RNSS above 1 559 MHz that appeared to show that there may be a compatibility problem across the band edge.

2 700 - 2 900 MHz frequency band:

NATS and other Air Navigation Service Providers use medium range (<80nm) primary radar systems in this band - please note that Annex 6, in NATS' view incorrectly, refers to these as "long range" systems. As with our earlier comments, there is an on-going requirement for non-cooperative surveillance in this band and there is a body of evidence indicating significant compatibility issues between radar and mobile applications (ITU-R Report M.2112 etc.), however with the work that NATS understands to be being carried out within Government on this band in the context of the Public Sector release being at an early stage, it would be inappropriate to comment further at this point.

NATS notes an apparent reference in Annex 6 to some kind of "arrangement" around the management of radars in this band. NATS would welcome some clarification from Ofcom on what it means by this.

3 800 - 4 200 MHz frequency band:

The ICAO SADIS system uses a portion of this band for the satellite distribution of meteorological data for use at ground locations across Europe, Africa, the Middle East and

Asia.

5 350 - 5 470 MHz frequency band:

NATS wishes to draw Ofcom's attention to the possibility of airborne weather radar / windshear radar operating in this band on certain aircraft that may fly into the UK. Characteristics of these may be found in ITU-R Recommendation M.1638, however at this time NATS can offer no further information on this use of the band as these are not systems that we operate.

Question 9: Are there any other bands that are not in Table A6.1 for which you think we should be considering their pros and cons for mobile broadband and for existing applications using this spectrum? :

No response

Question 10: What are your views on bands which should be a priority for consideration for mobile broadband?:

In response to both questions 9 and 10, NATS supports the priority consideration of those bands already allocated to the Mobile Service (with the exception of those used for aviation safety purposes) for identification for use for mobile broadband, taking due account of the other allocations in the bands and necessary adjacent band compatibility issues. In this context, NATS noted an input paper to the Joint Task Group (Document 4-5-6-7/31-E) that considered existing global, primary allocations to the Mobile Service. This paper identified that in the bands between 450 MHz and 30 GHz there are 18 GHz of primary Mobile Service allocations within which there is 17 GHz of potential bandwidth available for additional IMT identification, of which around 1900 MHz was in the range 1 to 6 GHz.