



Additional Spectrum for Transportable Earth Stations

Statement

Publication date: 17 November 2010

Contents

Section		Page
1	Executive Summary	1
2	Our Consultation	2
3	Summary of Responses	3
4	Our Decision and Next Steps	8

Section 1

Executive Summary

- 1.1 We have decided to go ahead with our proposals to make additional spectrum available for Transportable Earth Stations (TES) satellite uplinks in the following frequency bands:
- “C band”:
 - 5925 – 7075 MHz
 - “Ka band”:
 - 27.5 – 27.8185 GHz
 - 28.4545 – 28.8265 GHz
 - 29.4625 – 30 GHz
- 1.2 This Statement summarises the issues raised in response to our consultation¹ on these proposals and our evaluation of those issues. We had a number of supportive responses although specific concerns were raised by others in respect of:
- protection of fixed link receivers from TES transmitters in C band;
 - the potential impact of authorising TES use on future fixed link use of C band; and
 - the pricing of TES licences.
- 1.3 This statement explains why we do not think there is cause for material concern on the first two issues. On the pricing issue, we have decided to go ahead as proposed with fees equivalent to those in the Ku band (13.78 – 14.5 GHz) where TES use is currently licensed. This is because the practical alternative would be to hold back from releasing the C and Ka bands for TES use, something that we do not consider would be in anyone’s interest.

¹ <http://stakeholders.ofcom.org.uk/binaries/consultations/tes-additional-spectrum/summary/tes-additional-spectrum.pdf>

Section 2

Our Consultation

- 2.1 In our consultation², which was published on 13 September 2010 and closed on 11th October, we set out proposals to make additional spectrum available for Transportable Earth Station (TES) satellite uplinks in order to meet demand from stakeholders and to relieve excessive demand on satellite capacity in the currently licensed frequency band 13.78 – 14.5 GHz (referred to as “Ku band”).
- 2.2 The additional frequency bands that we proposed to make available were:
- “C band”:
 - 5925 - 7075 MHz
 - “Ka band”:
 - 27.5 - 27.8185 GHz
 - 28.4545 - 28.8265 GHz
 - 29.4625 - 30 GHz
- 2.3 We set out our specific proposals for licensing and authorisation of TES uplinks in the additional spectrum. We explained that we intend to retain the three existing categories of TES licence, allowing a single TES licence to cover multiple earth stations irrespective of whether they operate in C band, Ku band or Ka band, but providing each earth station is of the same licence category determined by the operational maximum power and bandwidth of the earth station.
- 2.4 As is the case in Ku band, we proposed that licensees for C and Ka band TES equipment would need to apply for individual TES uplink authorisations. For this purpose we proposed to extend the functionality of our online tool SPECTRAsc to allow clearance and coordination of C and Ka band TES equipment. We also set out the types of clearance and coordination processes that would be applicable in each band according to the different sharing arrangements that would exist.
- 2.5 On extending the TES licensing regime into C and Ka band, we proposed to apply the same principles and approach for fee charging as are used for TES use in Ku band. It was noted that Ofcom is currently consulting on a revised framework for spectrum pricing³, which may result in a review of TES licence fees in due course.

² <http://stakeholders.ofcom.org.uk/binaries/consultations/tes-additional-spectrum/summary/tes-additional-spectrum.pdf>

³ <http://www.ofcom.org.uk/consult/condocs/srsp/>

Section 3

Summary of Responses

3.1 We received nine responses to our consultation, two of which have been kept confidential at the request of those respondents. Many respondents were generally supportive of our proposals although specific concerns were raised in some areas including our approach to setting fees and the impact of TES use on fixed links in C band.

3.2 In the following paragraphs we summarise the responses to the specific questions asked in the consultation and provide a summary of Ofcom's view with respect to each item.

Question 1. Do you have any comments on our proposal to make C and Ka band frequencies available for TES licensing?

3.3 Six out of the nine respondents were either supportive of, or stated that they did not have a strong objection to, Ofcom's proposal to make C and Ka band frequencies available for TES licensing. These included stakeholders who represent potential users of the new bands.

3.4 Everything Everywhere opposed TES deployment in C band without an impact assessment of the long term coexistence of TES and fixed links in the band and further consultation with stakeholders. We address this issue in the discussion on Question 2 below.

Question 2. Do you have any comments on the proposed arrangements for licensing, clearance and authorisation of TES?

3.5 Four respondents either supported, or stated that they had no strong objection to, Ofcom's proposals in relation to the arrangements for licensing, clearance and authorisation of TES. UK Uplink Providers (UK-UP) was pleased to see that the proposed licensing/coordination arrangements would be an extension of the existing SPECTRAsc system, allowing for smoother operation for the TES operator.

3.6 Three respondents, each with fixed link interests, expressed some concern on the potential impact of future TES use on fixed links in these bands. These concerns are discussed in the sub-sections below.

TES impact on fixed links in C band

3.7 Everything Everywhere opposed TES deployment in C band without an impact assessment of the long term coexistence of TES and fixed links in the band and further consultation with stakeholders. In such an impact assessment, Everything Everywhere would expect to see researched empirical evidence of both future TES and fixed link demand for the band together with analysis as to whether long term coexistence is sustainable. They recalled that the band 14.25-14.5 GHz was closed to new fixed link assignments some years ago, and suggested that the difficulty in TES coordination due to the growth in number of fixed links in the band was the primary reason for the closure.

3.8 Nera Telecom indicated that some of its fixed link customers expressed great concern as to how the spectrum will be managed and coordinated for new TES

licence awards, as to the effect on the existing fixed link licence awards and potential new frequency allocations in the 6 GHz band. One other respondent asked what confidence Ofcom can give that deploying TES equipment in C band will not lead to interference. That same respondent questioned what control Ofcom would have over the location of the equipment if it is mobile, given that the deployment of TES equipment in C band is aimed at media agencies covering unplanned fast breaking news stories.

- 3.9 In practice, we do not believe that the above issues give rise to material causes for concern for the reasons given below.
- 3.10 The manner in which TES deployment in C band will be coordinated with respect to fixed links means that the implementation of our proposals as stated cannot constrain the future deployment of fixed links in C band. This is because our fixed link assignment tool will not take account of TES deployments in determining if a fixed link licence application can be approved. Conversely, TES use is required to be pre-coordinated against licensed fixed links so as not to cause interference to them. For this purpose, we shall run established frequency coordination procedures, as happens now in the Ku band, on all TES uplink requests to make sure that interference from each TES meets fixed link frequency assignment criteria. Furthermore, TES will operate on a non-interference, non-protected (NINP) basis with respect to other licensed users.
- 3.11 As proposed in the consultation, we will time-limit each C band TES authorisation to a maximum period of one calendar month. We noted that there is a theoretical risk of harmful interference if fixed links are licensed and then deployed within the 1 month period for which a TES clearance is valid. However, based on feedback from a number of fixed link operators, the time lapse between the issue of a fixed link licence and subsequent deployment is typically greater than 1 month. We therefore consider that any risks of this nature are very small in practice.
- 3.12 In the unlikely event that the TES licensee wished to uplink for a period greater than one calendar month, the licensee would need to re-apply for authorisation, thus ensuring that coordination is carried out with the most up to date database of licensed fixed links.
- 3.13 Turning to Everything Everywhere's concern about longer term fixed link access to the band, we believe that the implicit concern can only relate to a potential policy reaction in a scenario where there was increasingly heavy use of C band by fixed links over time to the point where it became increasingly difficult for TESs to achieve successful coordination against them. The concern would be that if this did happen, and if Ofcom then judged the ability to deploy TESs to be a more optimal use of this spectrum than fixed link use, then Ofcom might decide at some point in the future to close the band for fixed link use. Indeed, this is what Everything Everywhere suggests may have happened in the case of the Ku band.
- 3.14 We do not consider this to be a likely scenario. But in any case, we emphasise that no proposal is being made, nor is one envisaged, that would lead to the closure of C band for fixed link use on account of future TES activity in the band.
- 3.15 In this context, we do not anticipate significant UK investment in C band TES equipment because the equipment needs to be relatively large at this frequency (e.g. dish diameters of around 3 metres): as a result portability and ease of use is compromised by comparison with smaller Ku and Ka band equipment. C band will be most suited for occasional use by foreign broadcasters wishing to use their own C

band equipment to cover international news or sport events in the UK (note that C band TES equipment is used predominantly in countries where there is very heavy rainfall which causes high levels of rain fade of transmissions in the higher Ku and Ka frequency bands).

- 3.16 The above comments notwithstanding, if we were ever to contemplate closure of C band to fixed links on account of TES activity then this would be subject to a consultation at that time. For these reasons, we do not believe it is appropriate to conduct a detailed impact assessment now of this hypothetical scenario.
- 3.17 In light of Everything Everywhere's reference to Ku band, we have looked back at the material relating to the decision to close this band to new fixed links. Based on historical Radiocommunications Agency (RA) stakeholder committee papers, it appears that the RA first indicated its future policy consideration to cease new fixed link licences in the 14.25 – 14.5 GHz band on 28 March 2001 and the band was closed to new fixed link assignments nearly 2 years later on 31 January 2003.
- 3.18 The historical committee papers stated that the primary reason for the closure of Ku band was not that TES coordination was becoming more difficult but that certain organisations (and countries) were looking to enable Earth Stations on Board Vessels (ESV) in the band and that there was an issue with protection of existing Fixed and Fixed-Satellite services. It was also stated that use of the band for fixed links was not widely adopted in Europe and there was no European equipment standard and hence it was not considered suitable as a band for future fixed link expansion.
- 3.19 We note that, whilst the 14.25 – 14.5 GHz band was closed to new fixed link assignments, it was not cleared of existing fixed links. In addition, based on a proposal from Orange (on 15 January 2002), the RA agreed a 12 month extension of the band closure, until January 2004, to allow fixed link operators to relocate 14 GHz links on a one-for-one basis.
- 3.20 Regarding the concern about mobile TES equipment, it should be noted that, as happens for existing TES operation at Ku band, we will only authorise TES equipment at specified fixed locations and we will not authorise TES equipment to operate while on the move.

TES impact on satellite ground stations

- 3.21 Paradigm Services advocated a method of protection around sites where the bands are also used for spacecraft TT&C (telemetry, telecommand and control), i.e. that approval of TES licence applications should be based on successful coordination with satellite ground stations and/or TES licences should not be granted in the vicinity of C or Ka band satellite ground stations.
- 3.22 We do not consider this to be necessary or appropriate. This is because it is not possible for one earth station transmitter to interfere with another earth station transmitter. An earth station transmitter could interfere with the receiver on a satellite but there are arrangements in place already to manage this issue via coordination between satellite networks that takes place within a framework of international rules administered by the International Telecommunications Union (ITU). Ofcom acts as the UK administration for the filing and coordination of satellite networks through the ITU.

TES clearance

- 3.23 The Civil Aviation Authority (CAA) did not object to the proposal to make C and Ka band available for TES licensing on the condition that all other conditions for TES operation remain unchanged, i.e. that the existing maximum e.i.r.p. (equivalent isotropically radiated power) levels and areas of protection against TES emissions are maintained.
- 3.24 Ofcom will maintain the existing conditions on TES operation to ensure that emissions from a TES transmitter do not interfere with sensitive electronic equipment such as aircraft flight control systems in the vicinity of airfields. Where a proposed TES is deemed not to interfere with these systems but the TES is located in the vicinity of one or more civil airfields, the TES licensee would be required to notify the Air Traffic Controller of each airfield prior to transmission.
- 3.25 SAP REG and Intellect said that electromagnetic compatibility (EMC) clearance with Ministry of Defence (MoD) and CAA could lead to undesirable constraints on the locations for TES operations. These respondents supported a review of these requirements to see whether they can be relaxed, particularly in Ka band, where one might expect the EMC protection criteria to be less stringent than for lower frequencies.
- 3.26 SAP REG and Intellect also noted that Ofcom is currently putting into place regulations to licence exempt HDFSS earth stations (with e.i.r.p. up to 55 dBW) in the same spectrum in Ka-band as is proposed for TES operations. We can confirm their understanding that TES equipment complying with Interface Requirement 2066 (which includes the requirement that e.i.r.p. from a single terminal is ≤ 55 dBW), is now exempt from the need to obtain a wireless telegraphy licence and that the new TES licence fees would apply only to earth stations in Ka band with e.i.r.p. exceeding 55 dBW.
- 3.27 We note that this new 55 dBW exemption threshold was put in place recently following a review of EMC protection requirements with MoD and CAA that resulted in a relaxation of the previous 50 dBW threshold in the Ku and Ka bands. The introduction of licence exemption below this 50 dBW limit was itself the result of deregulatory activity over the previous 3-4 years. We will continue to consider ways of reducing regulation further where this becomes possible.

Question 3. Do you have any comments on the proposed fees for Transportable Earth Station licences in C and Ka band?

- 3.28 Three respondents indicated an acceptance of Ofcom's proposed fees for TES in C and Ka band.
- 3.29 Two other respondents did not agree with the proposals with reference to the use TES systems which offer dual or tri-band operation, which is where the transmitter is capable of being operated in one of up to two or three bands (for example C, Ku or Ka) – although not simultaneously. These respondents commented that the proposal would mean that a dual band TES system would require two amounts of fees to be paid and a tri band system would require three amounts of fees to be paid. These respondents said that because these systems can only be used in one band at any one time, charging two or three amounts of fees would not be fair. One of these respondents, UK Uplink Providers, proposed that an already licensed Ku band TES should not pay any additional fee for use at C or Ka band. The other respondent added that, given the driver for opening up additional spectrum is to relieve

congestion, which benefits all, then charging additional fees is unjust. UK Uplink Providers also said that bearing in mind the lower congestion in the C band now compared to ten years ago, the band factor is questionably too high in any case.

- 3.30 We can confirm that the operator of a dual or tri band TES system would be required to pay the appropriate licence fee in each of the frequency bands that they elected to use (although there is no obligation for them to use all bands).
- 3.31 Our consideration of these issues is driven primarily by the benefits of pragmatism. We proposed in our consultation to apply licence fees for TES use in C and Ka bands on an equivalent basis to fees charged for TES use in Ku band. Only in this way can these additional bands be made available for TES use ahead of a full fee review for a number of licence classes (including TES) which is expected to follow the conclusion of the consultation on a revised framework for spectrum pricing⁴.
- 3.32 As explained in our TES consultation, it would not be practical or sensible to carry out a bespoke fee review for TES use in C and Ka bands ahead of, and in isolation from, this full fee review. Accordingly, the only practical alternative to the fee proposals we set out would be to defer making C and Ka bands available for TES use until a fee review is complete. But delaying access to these bands would prevent TES operators, and downstream citizen and consumer beneficiaries of TES use, from benefitting in the meantime. By definition, making the additional spectrum available as soon as possible (with fees set on an 'equivalent-fee' basis) can not be to the disadvantage of TES operators (by comparison with not making the spectrum available); they can continue to use Ku band as they do now and will have the opportunity, but not the obligation, to use C and/or Ka band as well.
- 3.33 The specific comments on fee charging made by some respondents are among the issues we could consider in the anticipated future fee review.

Additional comments

- 3.34 Regarding the use of Ka band frequencies, SAP REG and Intellect noted that work is currently underway within CEPT to review the designation of bands for uncoordinated FSS earth stations, and this work could lead to the possibility of other parts of Ka band (in addition to the Ka band frequencies referred to in this statement) being available for TES operations. This could, in the future, lead to the need for changes to frequency bands applicable to Ka band TES operations.
- 3.35 Ofcom understands that one element of the work initiated within CEPT is to study whether the band 27.5-29.5 GHz could be made available for the use of uncoordinated FSS earth stations. If the work results in other parts of the band being identified for uncoordinated FSS use, Ofcom, acting on behalf of the UK administration, would need to consider its suitability for implementation within national UK regulations taking into account the particular situation in the UK. It should be noted that in the UK, parts of the bands 27.8285 – 28.4445 GHz and 28.8365 – 29.4525 GHz have been awarded, by way of auction, for use on a technology and service neutral basis. This may therefore constrain or limit our ability to individually licence TES use in these bands, although TES use could still be possible via agreement with the parties who hold rights to operate in the bands quoted.

⁴ <http://www.ofcom.org.uk/consult/condocs/srsp/>

Section 4

Our Decision and Next Steps

What we have decided

- 4.1 In light of the consultation responses, we have decided to make the C and Ka band frequencies available for licensed TES use.
- 4.2 In line with the consultation, we shall implement our specific proposals for licensing, clearance and authorisation of TES uplinks in these bands. This is, by and large, an extension of the existing arrangements for TES use in Ku band. Individual TES uplinks in C and Ka bands will need to be authorised and transmissions will be on a non-interference basis. Similarly, our decision does not affect any reception at the TES (for example, in the FSS space-to-Earth bands including 3600 – 4200 MHz, 10.7 – 12.75 GHz, 17.7 – 20.2 GHz); such reception will be afforded no additional rights and will operate on a non-protected basis.
- 4.3 We shall also implement TES licence fees in C and Ka bands as set out in the consultation, and repeated below in Table 1. Note that Table 1 includes the existing TES licence fees in Ku band for reference. As stated in section 3, TES equipment complying with Interface Requirement 2066 (which includes the requirement that e.i.r.p. from a single terminal is ≤ 55 dBW), is exempt from the need to obtain a wireless telegraphy licence.

Table 1. Proposed TES licence fees for C and Ka band

	C band	Ku band	Ka band
	Annual licence fee per earth station	Annual licence fee per earth station	Annual licence fee per earth station
Category 1	£ 500	£ 300	£ 200
Category 2	£ 2,400	£ 1,400	£ 800
Category 3	£ 7,400	£ 4,300	£ 2,600

Next steps

- 4.4 We shall soon be making changes to fees regulations for other wireless telegraphy licences and we intend to use this opportunity to incorporate the fees for TES use in C and Ka bands. We expect to publish a Notice on fees regulations soon and we anticipate these to take effect by the second quarter of 2011.
- 4.5 We shall also make the necessary changes to our spectrum management system (SMS) to facilitate licensing, coordination and authorisation of TES in C and Ka bands. We aim to implement these changes and be in a position to start licensing TES use in the additional bands also in the second quarter of 2011. A further announcement will be made once we are ready to accept TES licence applications in the additional frequency bands.