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**Circular letter**  
**6/LCCE/78**

11 May 2012

**To Administrations of Member States of the ITU, Radiocommunication  
Sector Members, ITU-R Associates participating in the work of  
Radiocommunication Study Group 6 and ITU-R Academia**

**Subject:** Questionnaire on spectrum requirements for terrestrial television broadcasting in connection with WRC-15 Agenda item 1.2

**References:** Administrative Circular CA/201

1 Consistent with the directives set forth by Administrative Circular [CA/201](#) and in accordance with the outcomes of the first session of the Conference Preparatory Meeting 15-1, ITU-R Working Party 6A seeks estimates from Members States and Sector Members of current and future spectrum requirements for terrestrial television broadcasting in Region 1 and Iran.

2 One particular question that will be addressed by the JTG 4-5-6-7 is to confirm the lower edge of the allocation to the mobile service made at WRC-12 from 694-790 MHz. As a result Working Party 6A realizes the JTG 4-5-6-7 needs to be fully informed about the implications to the broadcasting service consequential to that decision.

3 The following questionnaire, which is being sent to all Administrations and Sector Members in Region 1 and Iran, is designed to gather information on spectrum use in the band 694-790 MHz for television broadcasting.

4 Administrations and Sector Members are also invited to make more detailed inputs addressing the matter of current and future spectrum requirements for television broadcasting to the next meeting of WP 6A.

5 Administrations and Sector Members are requested to submit responses to [brsgd@itu.int](mailto:brsgd@itu.int) or [rsg6@itu.int](mailto:rsg6@itu.int) by 31 July 2012.

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At the request of the Chairman of Study Group 6 the attached questionnaire is published for consideration of the Administrations of Member States, Sector Members and Associates, as appropriate. The Radiocommunication Bureau does not make any engagement nor assume any responsibility with respect to the content of the attachment or any follow-up action as may be required.

**Distribution:**

- Administrations of Member States of the ITU and Radiocommunication Sector Members participating in the work of Radiocommunication Study Group 6
- ITU-R Associates participating in the work of Radiocommunication Study Group 6
- ITU-R Academia
- Chairman and Vice-Chairmen of Radiocommunication Study Group 6
- Secretary General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the Telecommunication Development Bureau

## QUESTIONNAIRE ON SPECTRUM REQUIREMENTS FOR TERRESTRIAL TELEVISION BROADCASTING IN CONNECTION WITH WRC-15 AGENDA ITEM 1.2

This questionnaire can be completed online at the following web page:

<https://extranet.itu.int/rsg-meetings/sg6/wp6a/Lists/DTTB%20Questionnaire/overview.aspx>

Login as: **Username:** (your TIES username)@ties.itu.int  
**Password:** (your TIES password)

NOTE - Electronic versions of Annexes 1, 2 & 2 can be found under QUESTIONNAIRE in the WP 6A Share Folder on the WP 6A Sharepoint site.

**Name of the Administration/Sector Member: BBC (British Broadcasting Corporation)**

**For sector members please indicate the geographical area over which you operate:**

**The responses to the Questionnaire represent an agreed position for all UK terrestrial TV multiplex licensees. Requirements expressed relate to the whole of the United Kingdom, including the Channel Islands and Isle of Man.**

**Contact person:**

**E-mail address:** [alan.boyle@bbc.co.uk](mailto:alan.boyle@bbc.co.uk) **Telephone number:** +44 20 8008 5279

- 1
- a) What standards have you adopted for digital terrestrial television broadcasting?
  - b) Have you started introduction of digital terrestrial television services?
  - c) If yes, please provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they are intended to cover and the total spectrum use to inform WP 6A.

A proposed format for detailed responses is provided in Annex 1.

**Reply:**

- a) The UK adopted DVB-T for its six original DTT multiplexes in 1998. One of these has since been migrated to DVB-T2. Full technical details are shown in Annex 1.
- b) DTT services were introduced in 1998.
- c) Technical characteristics of the current multiplexes are shown in Annex 1. As the UK is currently still undergoing analogue to digital migration, the figures represent the situation at the end of the switchover and the 800 MHz clearance processes by the middle of 2013.

- 2
- a) Have you commenced analogue television switch-off?
  - b) If you have any such plans, when do you expect to have completed the analogue switch-off process?

**Reply:**

- a) The UK started analogue TV switch-off in 2008, and has been proceeding on a region-by-region basis since then.
- b) The final UK region to switch off analogue TV will do so in October 2012.

- 3
- a) What is the percentage of viewer uptake of terrestrial television in your country, including those whose service provider uses terrestrial broadcast re-transmission (e.g. in cable networks)?
  - b) If possible, please also provide details of the number or proportion of users who receive television primarily by terrestrial means.

**Reply:**

- a) The UK Government has mandated that the Public Service multiplexes are required to reach a coverage level of 98.5%. This will be exceeded by all three Public Service multiplexes after the completion of the switchover programme. For the commercial multiplexes, no such mandated target was set, but levels in excess of 90% have been reached. Digital terrestrial television is the single most widely used television platform in the UK. Industry estimates indicate that terrestrial television accounts for around 46% of all TV viewing in the UK. Of this, less than 1% is to the remaining analogue TV transmissions.
- b) The latest figures available at the time of writing indicate that around 42% of UK households (around 25 million people) use DTT for reception on their primary sets, and that around 71% of UK households (around 43 million people) use DTT when reception on secondary sets is included. Note that for most secondary sets, DTT is the only available reception means

- 4
- a) Indicate how many analogue television transmitters use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**).
  - b) How many are in the remaining part of the UHF band.

**Reply:**

- a) By the end of 2012, the UK will have no remaining analogue TV transmitters in any part of the UHF band.
- b) Not applicable.

- 5
- a) What frequencies/channels are currently used or intended to be used by digital terrestrial television broadcasting in your country? Please distinguish between those in use and those intended to be used.
  - b) If allotments/SFNs are in use, a sketch map of frequency allocations could be included, with an accompanying table of allocations, as shown in Annex 2. Otherwise, it might be possible to show main transmitters and channels, grouped in layers, in a table.
  - c) Please indicate how many digital television assignments/allotments use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**), and
  - d) How many are in the remaining part of the UHF band.

**Reply:**

- a) At the time of writing, the frequency bands  
470 – 550 MHz (chs 21-30 inclusive), and  
614 – 806 MHz (chs 39-62 inclusive).

are used for UK multiplexes 1 to 6.

The frequency band

550 – 606 MHz (chs 31 – 37 inclusive)

has been coordinated for, and is intended for use by, UK multiplexes 7 to 9.

By the time of completion of clearance of the 800 MHz band in mid-2013, chs 61 & 62 will no longer be used.

- b) The UK uses a largely MFN assignment plan for its DTT transmissions in layers 1 to 6, with some exceptions where SFNs are deployed. Frequencies used are across the band from 470-790 MHz. Transmission frequencies are often grouped into parts of that band, such that many transmitters have frequencies assigned that are all above 694 MHz. Layers 7 & 8 are planned as a mix of MFN and SFN. Layer 9 is a national SFN.
- c) In total, after completion of the 800 MHz clearance, 1342 assignments will be in use in the sub-band 694-790 MHz.
- d) Again after completion of the 800 MHz clearance in mid-2013, 2379 assignments will be in use in the rest of the UHF band. A further 317 assignments below 694 MHz have been coordinated and were expected to come into use in 2013/14 (but see Answer to 10b below).

- 6
  - a) Are those frequency bands also shared with other primary services?
  - b) If yes, please give details of those systems and their spectrum use.

**Reply:**

- a) No other primary services share those bands in the UK.
- b) Not applicable.

- 7
  - a) Are those frequency bands also shared with secondary services such as PMSE (Programme Making and Special Events), radio astronomy or wind-profile radar?
  - b) If yes, please give details of those systems and their spectrum use.

**Reply:**

- a) There is extensive interleaved use of the UHF band for PMSE in the UK.
- b) PMSE shares the bands 470 – 550 MHz and 614 – 790 MHz on a secondary basis. Access for PMSE in these bands is on an individual licensed basis. PMSE use is coordinated geographically to ensure protection for digital television broadcasting and also coordinated with other PMSE users.

The band 606.5 – 613.5 MHz is exclusively used by PMSE. Access for PMSE is on a licensed basis throughout UK but without coordination (i.e. a “light licence”). PMSE use in this band is for low power use only.

PMSE applications in these bands are mainly wireless microphones and personal monitors but also include full duplex wireless stage intercoms. Typical PMSE applications are low power; 10 mW erp for hand-held equipment or 50 mW erp for body-worn equipment. Exceptionally, higher powers are required for longer range applications. Most PMSE systems currently use analogue modulation but digital systems are available. Occupied bandwidth is typically up to 200 kHz for each device.

- 8
  - a) Do you foresee the adoption or expansion of television services broadcast using second-generation systems such as DVB-T2?
  - b) If yes, please give indicative details of the planned transition, including any simulcast period.

**Reply:**

- a) The UK has already adopted DVB-T2 for one national coverage, and has announced the addition of one further DVB-T2 regional coverage in Northern Ireland (to come into service in October 2012). Beyond that, discussions about migration of the 5 remaining layers currently operating using DVB-T to DVB-T2 are at an early stage.  
We estimate that DVB-T2 DTT equipment provided the primary source of TV reception in 1.6m homes at the end of 2011, and that T2 take-up on primary sets is forecast to increase to 3.4m by the end of 2012. Additionally, we estimate that DVB-T2 DTT equipment was used on 1.7m further non-primary sets at the end of 2011, with this forecast to increase to 4.5m non-primary sets by the end of 2012.
- b) No details are yet known of any transition to DVB-T2 or of any simulcast period.

- 9
- a) Do you foresee a requirement for new and enhanced services, including HD and 3D television, on the terrestrial television platform?
  - b) If yes, please give indicative details of the number and nature of services planned, and if known, the expected timeframe for their introduction.

**Reply:**

- a) Yes. In the UK, there are currently 51 SD video streams, as well as 5 HD video streams, delivered by the DTT platform. The UK broadcasters believe that in time viewers will demand that the majority of these services be delivered in High Definition on the DTT platform. The introduction of additional capacity on multiplexes 7 to 9 potentially offer the DTT platform the additional capacity necessary to facilitate the platform transition to DVB-T2 and ultimately enable the opportunity for additional services (those known being HD, 3D, UHD and 60fps) as well as new technologies (such as HEVC) required to cope with additional demand for data-rate caused by the additional services.
- b) There is no defined time frame for the introduction of additional services. These - plus the technologies required to enable them - are, to an extent, dependent on the release of further frequencies for use by broadcast services and the rate of adoption of DVB-T2 enabled receivers.

- 10
- a) Are there plans in your country to launch more multiplexes in the future?
  - b) If yes, how many more and when? Please also indicate the expected timeframe for their introduction.

**Reply:**

- a) Yes.
- b) The UK government has identified spectrum for use at 74 locations for local layers to carry local TV programming. These new low power services will be interleaved in spectrum used by UK layers 1 to 6. Additionally, market soundings were taking place regarding the deployment of three layers in the "600 MHz" band (550 – 606 MHz, chs 31-37 inclusive). That process has now been halted pending resolution of the 700 MHz issue.

- 11
- a) What is the amount of spectrum you foresee that will be required for terrestrial television broadcasting, if plans in Questions 8, 9 and 10 are to be supported, and services identified in Questions 6 and 7 are to be taken into account? Please indicate the modes of transmission that will be used, and timeframes.  
If appropriate, a suggested form to express these requirements is shown in Annex 3.

**Reply:**

The UK multiplex licensees are keen to continue extending and expanding the DTT platform to accommodate more HD and in future 3D, UHD and 60fps services. Whilst a move from DVB-T to DVB-T2 service delivery will provide for spectrum efficiency gains in the long term, in the short to medium terms there will be a need for transitional access to spectrum to facilitate that migration. . Furthermore, it is important to note that future enhancements to the technical standards on which the terrestrial services operate will also require additional spectrum to make future transitions possible.

Until further planning studies are done, and gains from using DVB-T2 can be realised, the holders of UK television spectrum licences consider that the spectrum they currently use remains their requirement.

As yet no timetables for full transition to DVB-T2 or the introduction of new services are known. As a result of this uncertainty, no detailed information is given in Annex 3.



## ANNEX 1

Suggested form of presentation of reply to Question 1: *What standards have you adopted for digital terrestrial television broadcasting? Have you started introduction of digital terrestrial television services? If yes, provide further detail on the number of multiplexes in use, their technical specifications, the percentage of geographic area or population they are intended to cover and the total spectrum use.*

A sample response is shown for guidance only.

Country	No of multiplexes	System & modulation	FEC	GI	Reception mode <sup>1</sup>	Capacity per multiplex (Mb/s)	Current percentage population coverage	Intended percentage population coverage	Content per multiplex	Total capacity (Mb/s)	Total spectrum bandwidth used or intended for implementation (MHz) <sup>2</sup>	Any additional comments (e.g. duration of licences)
G	2	DVB-T, 64-QAM	2/3	1/32	Fixed	24.10	98.0%	99.2%	9 SD MPEG2	169.7 for national coverage plus 19.0 for local/regional coverages	256 (note that a further 56 MHz is coordinated and ready for further multiplexes)	Public service multiplexes one licensed until 2022, one licensed indefinitely
	1	DVB-T2, 256-QAM	2/3	1/128	Fixed	40.20	98.0%	99.2%	5 HD MPEG4			Public service multiplex licensed until 2026
	3	DVB-T, 64-QAM	3/4	1/32	Fixed	27.10	89.0%	92.0%	11 SD MPEG2			One licensed until 2022; two licensed until 2026
	1	DVB-T, QPSK	3/4	1/32	Fixed	9.1	0%	~50%	~3 SD MPEG2			Provisional details for expected local multiplex from around 50 sites only, using interleaved spectrum

<sup>1</sup> E.g. fixed, portable outdoor/mobile, portable indoor.

<sup>2</sup> Refer Sections 2 and 3 on page 1 of this circular.

	1	DVB-T2, QPSK	2/3	1/128	Fixed	9.9	0%	~2% of UK ~78% of Northern Ireland	~3 SD MPEG4			Expected local multiplex for Northern Ireland only
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## ANNEX 2

Suggested presentation of reply to Question 5: *What frequencies/channels are currently used or intended to be used by digital terrestrial television broadcasting in your country? Please distinguish between those in use and those intended to be used.*

If allotments/SFNs are in use, a sketch map of frequency allocations could be included, with an accompanying table of allocations, as shown in Annex 2.

Otherwise, it might be possible to show main transmitters and channels, grouped in layers, in a table.

Please indicate how many digital television assignments/allotments use channels in the frequency sub-band 694-790 MHz (as indicated in Resolution **232 (WRC-12)**), and how many are in the remaining part of the UHF band.

### ANNEX 3

Suggested form of presentation of reply to Question 11: *What is the minimum amount of spectrum you foresee that will be required for digital terrestrial television broadcasting in Bands IV & V, if plans in Questions 8, 9 and 10 are to be supported, and services identified in Questions 6 and 7 are to be taken into account? Please indicate the modes of transmission that will be used, and timeframes.*

One example methodology showing how spectrum requirements can be calculated from the different parameters using a set of assumptions can be found in Doc. [6A/59](#) submitted to WP 6A and which is currently under debate in this Working Party.

A sample response is shown for guidance only.

Country	No of multiplexes	System & modulation	FEC	GI	Reception mode <sup>3</sup>	Capacity per multiplex (Mb/s)	Intended percentage population coverage	Content per multiplex	Total capacity (Mb/s)	Total spectrum bandwidth needed (MHz) <sup>4</sup>	Any additional comments including time frames
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<sup>3</sup> E.g. fixed, portable outdoor/mobile, portable indoor.

<sup>4</sup> Refer Sections 2 and 3 on page 1 of this circular.