

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:** abertis telecom.

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

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- Q 1**
- What standards have you adopted for digital terrestrial television broadcasting?
  - Have you started introduction of digital terrestrial television services?
  - 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 1:**

- For the time being, DVB-T MPEG2 for SD services & MPEG4 for HD services.
- DTT in full service (analogue TV switched off).
- See ANNEX 1 table.

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

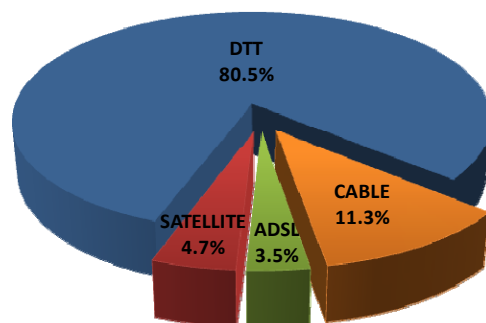
**Reply 2:**

- Commenced and finished on 3/4/2010.
- Already finished.

- Q 3**
- 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)?
  - If possible, please also provide details of the number or proportion of users who receive television primarily by terrestrial means.

**Reply 3:**

- Percentage of viewer uptake (screen share) (source Kantar Media, 05-12):
  - DTT: 80,5%
  - Cable: 11,3 %
  - IP TV (ADSL): 3,5%
  - Satellite: 4.7%



- The users who receive television primarily by terrestrial means are approximately the 80,5%.

- Q 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 4:**

- a) None (analogue TV switch-off on 3/4/2010).
- b) None (analogue TV switch-off on 3/4/2010).

- Q 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 5:**

- a) DTT channels:
- i. **Currently used:** 49 channels, from channel 21 to 69 (470 – 862 MHz).
  - ii. **Intended to be used:** after Digital Dividend migration, 40 channels, from channel 21 to 60 (470 – 790 MHz). The current allocated frequencies in subband 790-862MHz must be changed to channels 21-49 but the migration process and frequencial planification, are to be defined.

b) See ANNEX 2 table.

c) / d)

For the 11 layers described on ANNEX 2 table, there are 769 frequency allocations distributed as:

Sub-band	Assignments	%
790-862 MHz	324	42,1%
694-790 MHz	143	18,6%
420-694 MHz	302	39,3%
<b>TOTAL:</b>	<b>769</b>	

The 324 allotments on the 790-862 sub-band will be changed because the Digital Dividend.

- Q 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 6:**

- a) No.
- b) N/A.

- Q 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 7:**

- a) No  
b) N/A

Although the allocation of the band 470-862 MHz in Spain does not include any secondary use as PMSE (Programme Making and Special Events), radio astronomy or wind-profile radar, some broadcasters are using wireless microphones.

- Q 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 8:**

- a) New services will require more bandwidth and DVB-T2 could be an alternative.  
b) There are no plans at present to transition DVB-T networks to DVB-T2 and hence no arrangements have been made for a simulcast period.

- Q 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 9:**

- a) Yes.  
b) There is an inherent need for the platform to develop and evolve over time to keep up with competing platform developments and consumer demand. Central to this continued platform development will be an expansion of the range of HD content available (initially HDTV 1080i / 720p and then in due course HDTV 1080p) and in future the provision of services in 3D. The proportion of content that will need to be provided in HD and 3D will be a function of local demand and also proportion of content available in these formats, not all content will need to be in 3D. In addition other service enhancements will be required by the consumer over time and the DTT platform needs the appropriate amounts of spectrum to afford it the flexibility to provide these services when considered appropriate, e.g. improved audio quality, Ultra High Definition TV (4k HD), services for second screens, and 'over the air' interactive services.

- Q 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 10:**

- a) The national technical plan of DTT (2005) defined a mobile DTT mux but, currently, is still pending planning.
- b) Not available.

**Q 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 11:**

- a) Taking account of the responses made to questions 1, 8, 9 & 10 above Spain is currently utilising ch. 21 – 69 to operate largely DVB-T based networks to deliver National, Regional and Local multiplexes as per the GE06 plan. It is also important to consider the range of service enhancements, see response to question 9, that will be critical to ensuring that terrestrial broadcast services remain competitive and continue to develop to support consumers' demand.

However, whilst the means by which you introduce these service enhancements is likely to initially be via the widespread introduction of DVB-T2 services there is currently no plan to or timetable for the services to be delivered utilising DVB-T2. Furthermore, since the spectrum ch. 21 – 69<sup>1</sup> is extensively utilised to provide existing services it is unclear how such a transition may be facilitated, i.e. where will the additional spectrum for any simulcast arrangements come from and this aspect needs to be considered within the long term provision of spectrum for terrestrial broadcasting, i.e. how can platform evolution be taken account of in future spectrum co-ordination. Finally, whilst a move from DVB-T to DVB-T2 service delivery would provide for spectrum efficiency gains in the long run, in the short term it is very likely that transitional spectrum would be needed to facilitate such a service / consumer migration and such a transition would take a number of years.

The period for transition from DVB-T to DVB-T2 would be different to that involved in the transition from analogue to digital TV where there was a clear benefit to the consumer through additional programme content and choice. In addition there were clear benefits to the broadcast industry to enable innovation and competition whilst the enhanced spectrum efficiency achieved through the migration to DTT delivered the digital dividend spectrum to the Mobile Operators for wireless broadband purposes. No equivalent 'win-win' market outcome would be delivered through a future transition from DVB-T to DVB-T2 and as such it is important that the consequences and costs of such a transition, which are likely to be considerably higher than those associated with clearance of the 800MHz band,

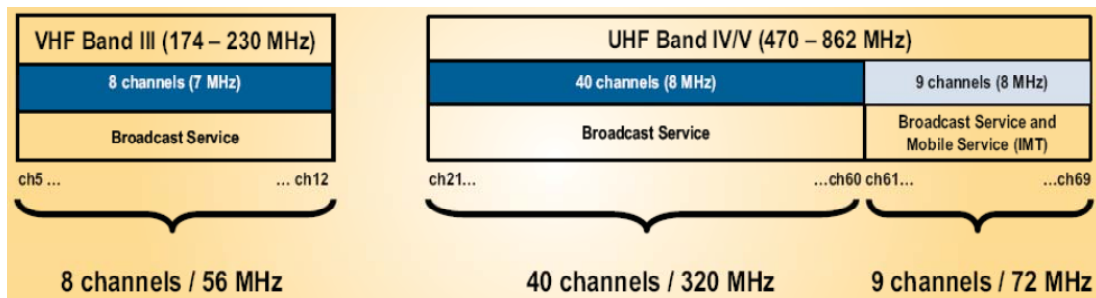
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<sup>1</sup> Until 800 MHz clearance completes in 2015 terrestrial broadcast services will be delivered in this frequency range. Post 2015 terrestrial broadcast services will occupy chs. 21 – 60 (320 MHz).

be given due consideration taking account of the impact to consumers, the content creation industry and the broadcasters of such a transition. To this end we emphasise the importance of addressing prior to any decision the societal impact of such a future transition from DVB-T to DVB-T2 not just the spectrum optimisation aspect.

Finally, whilst gains associated with a switch to DVB-T2 could make it easier to enable the introduction of the service enhancements described in question 9, the extent to which these services are introduced will determine the long term requirements of spectrum for the provision of terrestrial broadcast services. It is therefore difficult to be definitive over the exact amount of spectrum needed. However, it is likely that the amount of spectrum necessary will not be dissimilar to that which will be utilised after clearance of the 800MHz band, i.e. ch. 21 – 60, recognising that spectrum efficiency gains realised through developments such as DVB-T2 and future higher performing compression standards are likely to be offset by the higher bandwidth requirements of new enhanced services.

Also, for future applications and services will need to consider the use of channels reserved to the broadcast in band III (VHF).



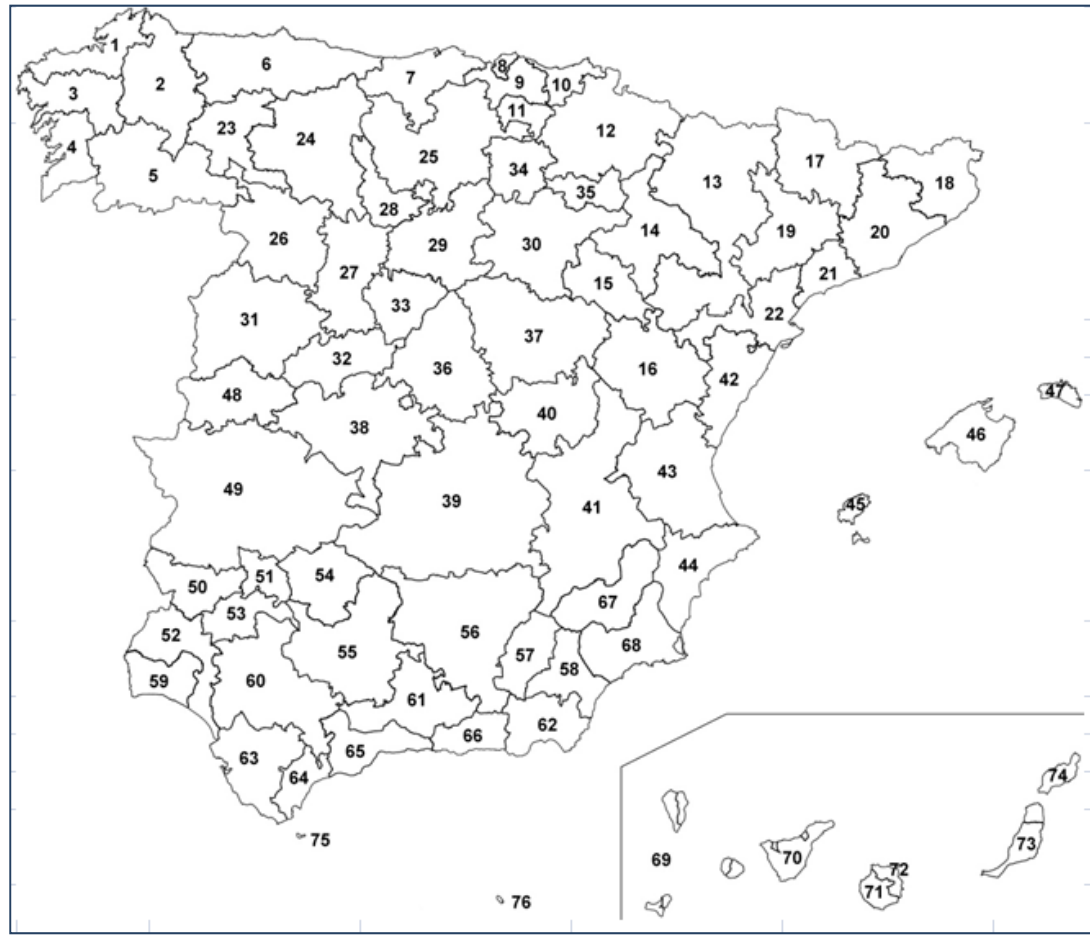
## ANNEX 1.

Country	No of Multiplexes	System & Modulation	FEC	GI	Reception Mode	Capacity per multiplex (Mb/s)	Current Percentage Population Coverage	Intended Percentage Population Coverage	Content per Multiplex	Total Capacity (Mb/s)	Total Bandwidth Used or intended for implementation (MHz)	Any additional comments (eg duration of licences)
Spain	1	DVB-T, 64-QAM	2/3	1/4	Fixed	19,905	98,8%		4 SD MPEG2	From 199,05 (regions with 10 mux) to 258,76 (regions with 13 mux).	Number of channels: 49 TV channels from channel number 21 to 69.  Spectrum bandwidth and boundaries: 49 x 8 = 392 MHz, from 470 to 862 MHz.	National public licensed until 2025  Regional_1 DTT licensed until 2025. Population Coverage referred to the Regional_1 DTT of Catalonia.  Regional_2 DTT licensed until 2025. In the case of Catalonia, there are Regional 2 and Regional 3 DTT in use. Population Coverage referred to the Regional_2 and Regional_3 DTT of Catalonia.  Local DTT. Population Coverage referred to the Local DTT of Madrid licensed until 2016
	1							1 SD MPEG2 + 1 HD MPEG4 + 1 HD MPEG4 (planned).				
	1											
	1											
	1											
	1											
	1											
	1 (17 Regions) (*)						99,8%	4 SD MPEG2 / 3 SD MPEG2 + 1 HD MPEG4				
	1 (17 Regions)						99,8%	4 SD MPEG2 / 3 SD MPEG2 + 1 HD MPEG4				
1-2 (256 local Regions)	99,9%	4 SD MPEG2										

(\*) In the region of Extremadura, there is a different mux configuration:

No of Multiplexes	System & Modulation	FEC	GI	Reception Mode	Capacity per multiplex (Mb/s)	Current Percentage Population Coverage	Intended Percentage Population Coverage	Content per Multiplex	Any additional comments (eg duration of licences)
1	DVB-T, QPSK	1/2	1/4	Fixed	4,98	99,8%		1 SD MPEG2	Regional DTT of Extremadura

## ANNEX 2





Area	L1 RGE	L2 RGE2	L3 MUX67	L4 MUX68	L5 MUX69	L6 MUX1	L7 MUX2	L8 MUX3	L9 REG1	L10 REG2	L11 REG3
1	63	22	67	68	69	35	38	28	61		
2	63	47	67	68	69	44	32	58	59		
3	63	22	67	68	69	46	38	28	40/61		
4	63	54	45/31/55/67	68	48/69	66/46	39	64/43	58/41		
5	63	47	67/35	68	69/38	53	39	43	62		
6	64	39	67	68	69	35	32	28	60		
7	58	40	67	68	69	46	32	29	59		
8	63	22	67	68	69	36	38	59	61		
9	63	22	67	68	69	36	38	59	61/47		
10	63	48	67/32	68	69/40	44	31	41	60/64		
11	63	22	67	68	69	36	33	45	58		
12	59	29	67	68	69	55	37	53	62/26		
13	64	45	67	68	69	44	54	48	57		
14	61	46	67	68	69	22	54	30	63		
15	61	39	67	68	69	32	54	30	63		
16	61	39	67	68	69	32	54	30	62		
17	64	39	67	68	69	47	32	35	58	56	53
18	64	45	67	68	69	38	32	35	60	52	36
19	64	49	67	68	69	47	32	35	58	52	53
20	64	31	67	68	69	47	27	34	61	44	33
21	64	57	67	68	69	47	40	35	59	36	51
22	64	39	67	68	69	47	40	35	59	36	51
23	57	21	67	68	69	52	34	58	65		
24	57	37	67	68	69	54	34	31	65		
25	57	51	67	68	69	54	48	31	65		
26	57	37	35	68	38	52	34	58	59		
27	57	43	67	68	69	53	56	58	25		
28	57	37	67	68	69	54	48	31	62		
29	57	38	67	68	69	32	59	31	65		
30	57/45	45	67	68	69	22	27	21	58		
31	57	36	35/67	68	38/69	53	39	29	65		
32	57	55	67	68	69	47	37	48	64		
33	57	38	67	68	69	53	59	48	60		
34	64	46	67	68	69	54	48	40	60		
35	64	46	67	68	69	55	43	51	60		
36	58	55	67	68	69	33	59	49	63	53	

Area	L1 RGE	L2 RGE2	L3 MUX67	L4 MUX68	L5 MUX69	L6 MUX1	L7 MUX2	L8 MUX3	L9 REG1	L10 REG2	L11 REG3
37	59/29	55	67	68	69	37	47	31	56	28	
38	59	21	67	68	69	32	48	25	53/65	23	
39	40/36	31	67	68	69	47	37	25	60	23	
40	59	21	67	68	69	32	48	53	61/64	23	
41	59	56	67	68	69	46	50	53	63	37	
42	58	22	67	68	69	46	40	49	60	63	
43	58	22	67	68	69	46	40	43	57/29	32	
44	58	22	67	68	69	32	50	53	62	44	
45	63	54	67	68	69	32	48	53	65	26	
46	63	54	67	68	69	47	48	35	65	26	
47	63	31	67	68	69	47	40	35	65	26	
48	63	36	67	68	69	28	26	59	61		
48	63/42	36	39/67	68	69	66/38	26	59	61		
50	63	31/33	42/67	68	45/69	49	58	59	50/28		
51	63	33	67	68	69	49	40	59	50/28		
52	54/57	62/33	48	68	51	65/35	22	36	26/58	45	
53	57	33	67	68	69	49	40	59	61		
54	57	21	67	68	69	44	48	41	55	60	
55	57	21	67	68	69	58	24	27	55	60	
56	57	39	67	68	69	32	35	49	62	42	
57	57	33	67	68	69	66/58	41	44	21	40	
58	57	55	67	68	69	32	41	45	59/25	30	
59	64	32	48	68	51	35	41	66/31	58	42	
60	57	52	67	68	69	44	41	38	61	60	
61	57	52	67	68	69	66/58	53	56	50	29	
62	57/38	47	67	68	69	58	41	44	59/25	31	
63	64/57	33	67	68	69	53	55	49	59	45	
64	57	27	67	68	69	53	21	49	46/59	34	
65	57	33	67	68	69	39	42	49	63	35	
66	57/38	33	67	68	69	66/58	41	44	50	29	
67	61	33	67	68	69	42	38	44	60	29	
68	61	55	67	68	69	42	38	44	60	29	
69	60	27	67	68	69	23	29	26	59		
70	60	45	67	68	69	23	29	26	59		
71	60	28	67	68	69	35	32	38	65		
72	60	28	67	68	69	35	32	38	65		

Area	L1 RGE	L2 RGE2	L3 MUX67	L4 MUX68	L5 MUX69	L6 MUX1	L7 MUX2	L8 MUX3	L9 REG1	L10 REG2	L11 REG3
73	60	52	67	68	69	35	32	34	65		
74	60	52	67	68	69	35	32	34	65		
75	52	55	67	68	69	53	44	49	62		
76	64	27	67	68	69	21	41	45	61		

