										(Fini	ish	Cancel
													* indicates a required
What s	standar	ds have y	ou adopted for di	gital terr	estrial br	oadcasting ?							
			is based on DVB-T ig technology. See										
Have y Yes No	you star	ted introd	duction of digital	terrestria	l televisi	on services ?	*						
r and t	the total	spectrur	further details on m use to inform Viled responses is	VP 6A.									n they are intende
					Font	Name Si	zė						
ound scated in ansmit	98 perc in rural tters tha	ent of all l areas ou at only co ll digital	ntside DTT and I ontain the NRK platforms.	seholds a DTH cov	ind ca 87 erage (s	7 percent of a atellite shade ic broadcaste	all cottages ow areas). T er) multiple Capacity	and leisure ho These househo ex. This to fulf	omes. About olds are cover ill an obligat	6000 permane red by a "satel ion to cover 1	ent househo lite shadow 00 % of the	lds (approx. 1 network" with a population w	4 000 people) are th 541 low power
	·	multi- plexes	modulation			mode[1]	per multiplex (Mb/s)	percentage population coverage	percentage population coverage	multiplex	capacity (Mb/s)	spectrum bandwidth used or intended for imple- mentation (MHz)[2]	comments (e.g. duration of licences)
		3	DVB-T, 64- QAM	2/3	1/8	Fixed	22.12	Approx. 98%	95%	16 MPEG4 (11 SDTV and 5 HDTV) 19 MPEG4	110,6		Frequency block 470-790MHz licensed until 2. June 2021
No	orway	2	DVB-T, 64- QAM	2/3	1/8	Fixed	22.12	Approx. 98%	95%	(HDTV)		320	
NO	Norway	1	DVB-T, 64- QAM	2/3	1/8	Fixed	22.12	Oslo area (approx. 16 – 20 %)	Oslo area	3 SDTV MPEG4	22,12	320	
	-						1						
E.g.	g. fixed,	1 (future option)	DVB-T or DVB-T2	TBD	TBD	Fixed	TBD	TBD	95%	Future option	TBD		
Design Have	gn you con	(future option) portable portable HTML	T2	, portable f this circ	e indoors					Future option	TBD		
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Designer Personner Personn	gn u have a e switch- t is the p works)? wer below essible, p etration o ent of the tent is inc	(future option) portable portable ions 2 an HTML mmenced any such p off for all r percentag v olease also of terrestric household cluded). In	outdoor/mobile ad 3 on page 1 o analogue televisi blans, when do yo egions was comple e of viewer uptal o provide details al television in Non is (when househole	of the nu	e indoor. cular. to have a sember 200 sestrial tel	completed the	e analogue s ur country, li users who r	witch-off proce ncluding those eceive television	whose service on primarily by	e provider uses y terrestrial me	eans.	orway utilized th	

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 an intended to be used.

In actual use: CH 21-CH 60 (470 - 790) MHz Intended to be used: CH 21-CH 60 (470 - 790) MHz

5 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 (see file DTTB-Q-A2.de QUESTIONNAIRE in the WP 6A Share Folder). Otherwise, it might be possible to show main transmitters and channels, grouped in layers, in a table.

- 1			
ı	List of main transmitters in	SFN-networks, with 5	mux as-built today:

Main transmitter	L1	L2	L3	L4	L5	L6
Halden	32	42	21	38	45	
Tryvasshøgda	52	58	46	30	40	57
Kongsvinger	24	48	55	28	41	
Bangsberget	23	29	35	47	60	
Nordhue	33	43	56	27	31	
Bagn	32	39	42	22	59	
Tron	26	34	49	23	40	
Hommelfjell	29	35	38	22	39	
Jetta	45	48	58	41	51	
Gran	38	57	55	36	45	
Gol 1	47	52	55	26	29	
Ringerike	23	31	49	41	33	
Kongsberg	60	34	51	43	44	***********
Skien	60	34	54	24	44	
Gausta	25	27	35	32	42	
Fennefossknipen	26	39	31	28	45	
Hovdefjell	41	52	48	55	58	
Greipstad	51	54	47	36	60	
Lyngdal	25	53	47	32	33	***************************************
Bjerkreim	23	26	30	27	34	
Lifjell Stavanger	31	26	45	41	51	
Bokn	36	54	57	44	35	
Stord	55	58	60	47	50	
	33	49	39	47		
Bergen	48				53	
Grimo	31	52	39	45	54	
Lønahorgi		41	44	46	54	
Gulen	37	42	26	29	23	
Bremanger	25	28	31	46	52	
Nordfjordeid	40	44	33	27	30	P
Førde	35	45	48	22	32	
Sogndal	21	24	34	38	57	
Gamlemsveten	37	38	54	24	34	
Reinsfjell	39	42	35	29	53	
Kopparen	26	40	45	23	36	
Ålmenberget	31	32	59	24	46	
Melhus	55	28	25	30	33	
Mosvik	44	47	46	37	41	
Vega	25	32	37	22	28	
Hemnes	42	45	48	29	39	
Kappfjell	23	26	44	47	52	
Salten	50	43	60	30	33	
Steigen	31	41	44	47	55	
-ladsel	45	48	58	25	38	
Andenes	53	56	59	35	49	
Narvik	21	27	37	24	34	
larstad	26	46	51	23	36	
Cistefjell	26	46	43	23	36	
rolltind	27	39	42	34	22	
romsø	47	50	55	37	40	
Alta	36	51	54	29	44	
lammerfest	33	37	48	41	26	
Karasjok	21	41	54	26	55	
Nordkapp	30	40	43	23		
Nordkapp Store Jekkir	22	24	43	23 35	53 32	
	36	21				
Tana	28	33	60	49	52	

Changes in M1-M5 are marked with bold font.

Main transmitter	L1	L2	L3	L4	L5	L6	L7
Halden	32	42	21	38	45	59	
Tryvasshøgda	52	58	46	30	40	54	57
Kongsvinger	24	48	55	28	41	29	
Bangsberget	23	34	35	47	60	44	
Nordhue	33	43	56	27	31	37	
Bagn	32	39	42	22	59	50	
Tron	26	34	49	23	40	57	
Hommelfjell	29	35	38	22	39	57	
Jetta	45	48	58	41	51	21	
Gran	38	57	55	36	45	53	
Gol 1	47	52	55	26	29	58	
GOLI	4/	32	33	20	29	36	
Ringerike	23	31	49	41	33	48	
Kongsberg	60	34	51	43	44	47	
Skien	60	34	54	24	44	47	
Gausta	25	27	35	32	42	45	
Fennefossknipen	26	39	31	28	45	34	
Hovdefjell	41	52	48	55	58	54	
Greipstad	51	36	47	26	60	44	
Lyngdal	25	53	47	32	33	46	
Bjerkreim	23	26	30	27	34	37	
Lifjell Stavanger	31	26	45	41	51	37	
Bokn	36	54	57	44	35	40	
Stord	55	58	60	47	50	48	
Bergen	33	49	39	43	53	56	
Grimo	48	52	39	45	54	30	
Lønahorgi	31	41	44	46	54	30	
Gulen	37	42	26	29	23	51	
Bremanger	25	28	31	46	52	59	
Nordfjordeid	40	44	33	27	30	36	
Førde	35	45	48	22	32	55	
Sogndal	21	24	34	38	57	47	
	37	38	54	24	34	60	
Gamlemsveten	39	42		29	53	50	
Reinsfjell			35				
Kopparen	26	40	45	23	36	56	
Almenberget	31	32	59	24	46	27	
Melhus	55	28	25	30	33	43	
Mosvik	44	47	46	37	41	60	
Grong	21	31	35	24	34	38	
Vega	25	32	37	22	28	49	
Hemnes	42	45	48	29	39	51	
Kappfjell	23	26	44	47	52	55	
	50	43	60	30	33	54	
Salten		43	44	47	55	57	
Steigen	31			The second secon	-		
Hadsel	45	48	58	25	38	52	
Andenes	53	56	59	35	49	42	
Narvik	21	27	37	24	34	40	
Harstad	26	46	51	23	36	33	
Kistefjell	26	46	43	23	36	33	
Trolltind	27	39	42	34	22	52	
Tromsø	47	50	55	37	40	58	
Alta	36	51	54	29	44	47	
		37	48	41	26	55	
Hammerfest	33						
Kautokeino	46	56	59	33	43	31	
Karasjok	21	41	54	26	55	49	
Nordkapp	30	40	43	23	53	50	
Store Jekkir	22	24	42	35	32	39	
Tana	36	21	60	49	52	58	
Varanger	28	33	50	35	41	56	

PMSE (Wireless microphones) as a secondary use can utilize white spots in the frequency range 510–790MHz. Max. radiated power is 50mW e.r.p. a) Do you foresee the adoption or expansion of television services broadcast using second-generation systems such as DVB-T2? Yes No standards. The deployment of the fairly new and extensive DTT platform has been expense. Hence all the IRDs used are relatively new. An introduction of DVB-T2 or other technologies would mean that both this equipment and the network transmitter. Will have to be replaced before the operator gets the expected return on their in the requirements for more capacity will surely reach DTT operation in Norway before 2 June 2021 (expiry date of frequency licence) and may release the dem MPEG4 video encoding and HC-AAC audio encoding. IRDs (Integrated Receiver/Decoder) in Norway support these encoding a) Do you foresee a requirement for new and enhanced services, including HD and 3D television, on the terrestrial television platform? Yes, please give indicative details of the number and nature of services planned, and if known, the expected timeframe for their introduction. There has been a strong focus on convenience and handleld devices and a rather modest interest in 3DTV. In terms of HD, there	c) Please indicate how many digital television assignments/allo	rements use channels in the frequency sub-band 694-790	o minz (as indicated in Resolution 232 (WRC-12), and
Are those frequency bands also shared with other primary services? 19 Are those frequency bands also shared with secondary services? 19 By Type, please give details of those systams and their spectrum use. 20 a answer shove 20 Are those frequency bands also shared with secondary services such as PMSE, radioestronomy or wind-profits radiar? 20 Are those frequency bands also shared with secondary services such as PMSE, radioestronomy or wind-profits radiar? 20 Are those frequency bands also shared with secondary services such as PMSE, radioestronomy or wind-profits radiar? 20 Are those frequency bands also shared with secondary services such as PMSE, radioestronomy or wind-profits radiar? 20 Are those frequency bands also shared with secondary services such as PMSE, radioestronomy or wind-profits radiar? 20 Are those frequency bands also shared with secondary services such as PMSE, radioestronomy or wind-profits radiar? 20 Are those services the secondary use as such as secondary use as such as profits radiar? 20 Are those services introduced with secondary services and secondary second-generation systems such as DMD-T2? 20 Are services introduced by the secondary secondary second-generation systems such as DMD-T2? 20 Are services introduced by the secondary secondary second-generation systems such as DMD-T2? 21 Are services introduced by the secondary secondary second-generation systems such as DMD-T2? 22 Are services are requirement and the network treatment of the failty rew and controlled by DMD-T2? 23 Are services and secondary secondary secondary second-generation systems such as DMD-T2? 24 Are services as secondary secondary secondary secondary second-generation systems such as DMD-T2? 25 Are services as a secondary seconda	Assignments in use in the sub-band 694 - 790 MHz: 784		
Are those frequency bands also shared with other primary services? 19 Are those frequency bands also shared with other primary services? 19 Are those frequency bands also shared with secondary services? 19 Are those frequency hands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 19 Are those frequency hands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 19 By yes, please give details of those systems and their spectrum use. 19 Are those frequency hands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 19 By yes, please give details of these systems and their spectrum use. 19 By yes, please give indicative shared services are an utilize while yes in the frequency please	¥		
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b) If yes, please give details of those systems and their spectrum use. See answer above 3) Are those frequency bands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 3) The seed of the seed o			
3) Are those frequency bands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 3) If yes, please give dealls of those systems and their spectrum use. 4) If yes, please give dealls of those systems and their spectrum use. 5) If yes, please give dealls of those systems and their spectrum use. 5) By your foresee the adoption or expansion of television services broadcast using second-generation systems such as DVB-T2? 5) Dy your foresee the adoption or expansion of television services broadcast using second-generation systems such as DVB-T2? 5) If yes, please give indicative details of the planned transition, including any simulcast period-free gilt be liftle used are relatively new An introduction of DVB-T2 or other technologies would mean that both its equipment and the neverok transmitter of the control of	● No		
2) Are those frequency bands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 3) Tyres, please give details of those systems and their spectrum use. PMSE as a secondary use may utilize white spots in the frequency range 470-50Msc. (Lenence needed) PMSE was a secondary use may utilize white spots in the frequency range 470-50Msc. (Lenence needed) PMSE was a secondary use may utilize white spots in the frequency range 430-790Msc. (Lenence needed) PMSE was a secondary use may utilize white spots in the frequency range 430-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence needed) PMSE (Wreters miscophone) as a soondary use can utilize white spots in the frequency range 510-790Msc. (Lenence) and the spots of the frequency f	b) If yes, please give details of those systems and their spectru	m use.	
a) Are those frequency bands also shared with secondary services such as PMSE, radioastronomy or wind-profile radar? 10 10 10 11 Yes, please give details of those systems and their spectrum use. 10 10 11 Yes, please give details of those systems and their spectrum use. 10 10 11 Yes, please give details of those systems and their spectrum use. 10 10 11 Yes, please give details of those systems and their spectrum use. 10 10 11 Yes, please give indicative details of the planned varieties broadcast using second-generation systems such as DVB-T2? 10 10 11 Yes, please give indicative details of the planned transition, including any simulcast period. It is used Yes relatively new. An insoluction of DVB-T2 or other in the scale Yes remain maybe. 10 Yes please give indicative details of the planned transition, including any simulcast period. It is used Yes relatively new. An insoluction of DVB-T2 or other in the scale Yes remain maybe. 10 Yes please give indicative details of the planned transition, including any simulcast period. It is used Yes relatively new. An insoluction of DVB-T2 or other in the scale Yes remain maybe. 10 In this case Yes remain maybe. 11 In this case Yes remain maybe. 12 In this case Yes remain maybe. 13 De you foresee a requirement for new and enhanced services, including ND and 3D television, on the terrestrial television platform? 13 De you foresee a requirement for new and enhanced services, including ND and 3D television, on the terrestrial television platform? 13 De you foresee a requirement for new and enhanced services, including ND and 3D television. 14 Deference when the process of the planned variety in the current of the future capacity demands that more content in HD resolution and multi-charnel audio will require. 15 De you foresee a requirement for new and enhanced services, including ND and 3D television, on the terrestrial television platform? 15 Department of the future capacity forestrial the defended on our convenience and handled devices and a rather modest			
The properties of the services and ender of the number of			
The properties of the services and ender of the number of			
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Prior to the expiration of the current DTT licence in June 2021, changes for new technologies have to be prepared for the network. The way it looks today, the dominating standards in 2021 will be DVB-T2 v MPEG4 and HEVC encoding. New visual requirements, like Ultra-high definition resolution (UHDTV) and 3D (Service Compatible), will be a part of future services. These new demands for visual and audio del technology development to keep "status quo" in spectrum/content requirements.

The number of TV services in the network is considered to increase marginally, but supplementary services could increase, e.g. HbbTV, services for visual/hearing impaired people etc. Further NTV estimate a for mobile TV broadcasted services where DVB-T2 Lite or Next Generation Handheld can be considered.

Based on the above demands, 6 national frequency layers (plus the local Oslo multiplex) are believed to fulfill the requirements from 2021.

If parts of or the entire 700 MHz band is assigned to mobile services an extensive re-planning of the channel allocations is necessary to try to secure the capacity rec terrestrial television broadcasting.

Country	No of multi- plexes	System & modulation	FEC	GI	Reception mode[1]	Capacity per multiplex (Mb/s)	Intended percentage population coverage	Content per multiplex	Total capacity (Mb/s)	Total spectrum bandwidth needed (MHz)[2]	Any additional comments including time frames
	4	DVB-T2, 256- QAM	3/5	1/16	Fixed	32.32	98%	4 UHDTV/ 26 (most HDTV). H265	151,4	320[3]	1
N	1	DVB-T2[4], 256- QAM	3/5	1/16	Fixed	32.32	98%	5+ (HDTV)	32,32		
Norway	1	DVB-T2, 64- QAM	2/3	1/8	Portable indoor	23.31	TBD	TBD	23,31		from June 2021
	1	DVB-T, 64-QAM	2/3	1/8	Fixed	22,12	Oslo area (approx. 16 – 20 %)	3 SD	22,12		

- [1] E.g. fixed, portable outdoor/mobile, portable indoor.
- [2] Refer Sections 2 and 3 on page 1 of this circular.
- [3] We consider the capacity of 6 national layers (plus the local Oslo multiplex) to be necessary for the continued competitiveness of the DTT platform in Norway. If parts of or MHz band is assigned to mobile services, an extensive re-planning of the channel allocations is necessary to try to secure the capacity requirements for terrestrial television broadc
- [4] As the time frame of a system migration is unknown, it might be necessary to keep one layer of DVB-T beyond 2021 during a migration period.
- Please provide the following information:
 Name of the Administration/Sector Member:
 For Sector members please indicate the geographical area over which you operate:
 Contact person:
 Email address:
- e) Telephone number:

Font Name Size a) Norwegian Post and Telecommunications Authority c) Stig Johannessen d) sjo@npt.no e) +47 22 82 46 50 Design

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