
Digital TV, Radio & Amateurs - What's Next...

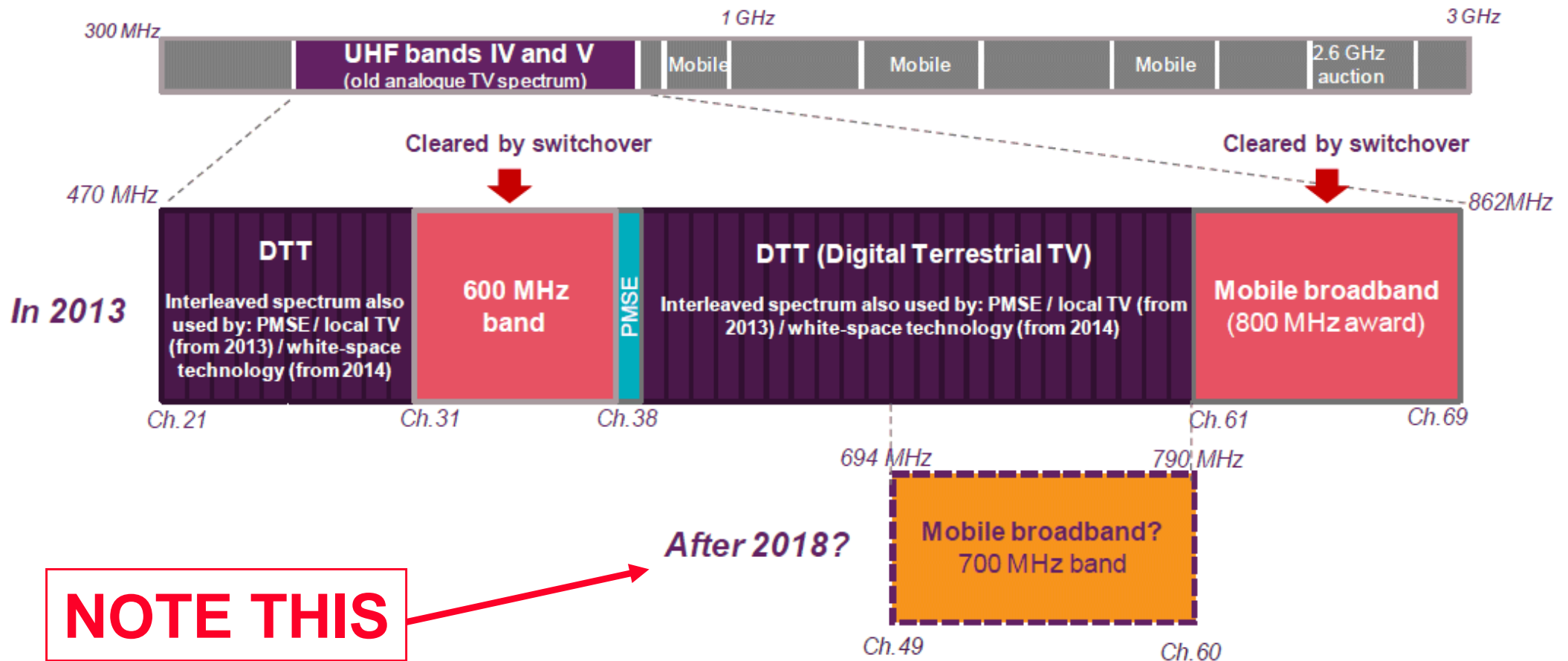
**By
Murray Niman G6JYB**

Four Topics

- **Digital TV**
- **Digital Radio**
- **Amateur Digital Radio**
- **Amateur Digital TV**

TV Switchover-2

- Ofcom UHF Strategy consultation had this diagram...
- 700MHz band for Mobile was agreed at WRC-12, currently being band planned in detail for WRC-15
- Possibly mandated across EU by 2020
- Squeeze-up is only easy if HD-modulation (DVB-T2) is use to save space



Digital-TV Now and Future

- UHF TV is a series of 8MHz channels
- Band-IV is 470-598MHz & Band-V 598-854 MHz

Today –

Red=4G

Grey=new HD

Mix of

SD & HD TV

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

Future –

Red=5G

Mix of

SD & HD TV

But only with

HD tuners!!!!

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

New Channels – Carrot or Trojan Horse???

- Local TV = QPSK - London Live started today on Ch-8
- Extra HDs on Crystal Palace use new 600 MHz Multiplex-7 and-8
- Gives HD to BBC-2, 3, 4, News HD, Al Jazeera and will have CH4-HD extras too. But not much space on Sudbury.....
- **These HDs are the Carrot to get you to buy new kit so that come 2018-2020, the next sell off can occur**
- Not all new channels are HD - some are SD but use HD modulation to squeeze in !!!
- Note that the new channels and sell-off can cause issues for Aerial Groups, Diplexers etc

So Be Prepared and only buy....



NB: It may be that MPEG-HEVC may come with Ultra-HD (4K) and need even newer TVs/Chipsets.....**

- and already speculation on Switchover-3 – the end of UHF

****HEVC – High Efficiency Video Coding – the MPEG 4 successor**

Radio Switchover

- the end of AM & FM ?

In the UK Digital Radios Sales outstrip analogue by £value

**AM unpopular with commercial broadcasters
and LW & MW already disappearing from some radios**

Beware of the Apparent Delay

- **Speculation was that Switchover would be in 2015 - never true**
- **There is no delay! – just no public date until 50% threshold reached and Transmitter network upgraded**
- **BBC/Arqiva leading build-out of National DAB Coverage will be complete soon – almost a new Tx every week**
- **Some Local AM frequencies being gradually switched off now!**
- **Well established plan to boost existing indoor levels/coverage**
- **Funded by premium in License fee**
- **Many regional multiplexes reorganised**
- **Ofcom to sell new Second National Commercial DAB multiplex shortly**
- **Chip Standards have covered DAB+ for a while**
- **Ofcom trials of local ‘micro-DAB’ for community stations too**
- **Latest Cars have really good DAB in**
- **Will they switch at same time as TV? – the schedule look about right**

Digital Amateur Radio / TV

- **Story so far – D-Star**
- **Radio**
 - DMR (TDMA)
 - FDMA
- **Amateur DATV**

D-Star Today

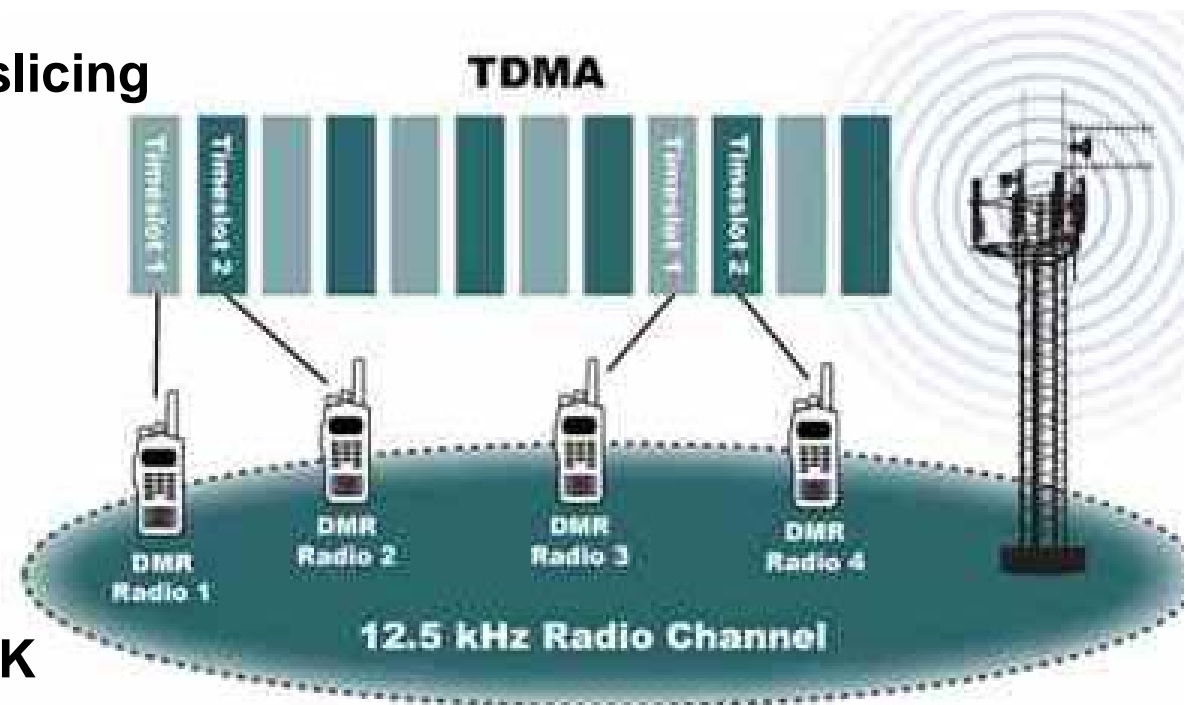
- The UK has:-
 - 70 D-Star Repeaters**
 - 80 D-Star Gateways**
- Well established and some are dual mode FM/DV
- Almost all VHF/UHF Digital Voice – very few 23cm DD
- Local Systems:
 - GB7SS** – 430/439.7375 – W&S
 - GB7ZP** – 430/439.4875 – ERG
- Gateways: MB6CE etc
- GB7ZP just upgraded to dplus 2.2k for reflector connections



UK D-Star Repeaters

DMR

- DMR - Digital Mobile Radio
- An ETSI Standard, supported by Motorola and others
- Far simpler than its Tetra cousin
- Use two-voice/data slots by time slicing (TDMA) in a 12.5kHz std channel
- This Enables
 - Single frequency duplex
 - On frequency repeaters
- Adapted in USA/Germany/Austria for amateur usage – and now in UK



DMR in Amateur radio

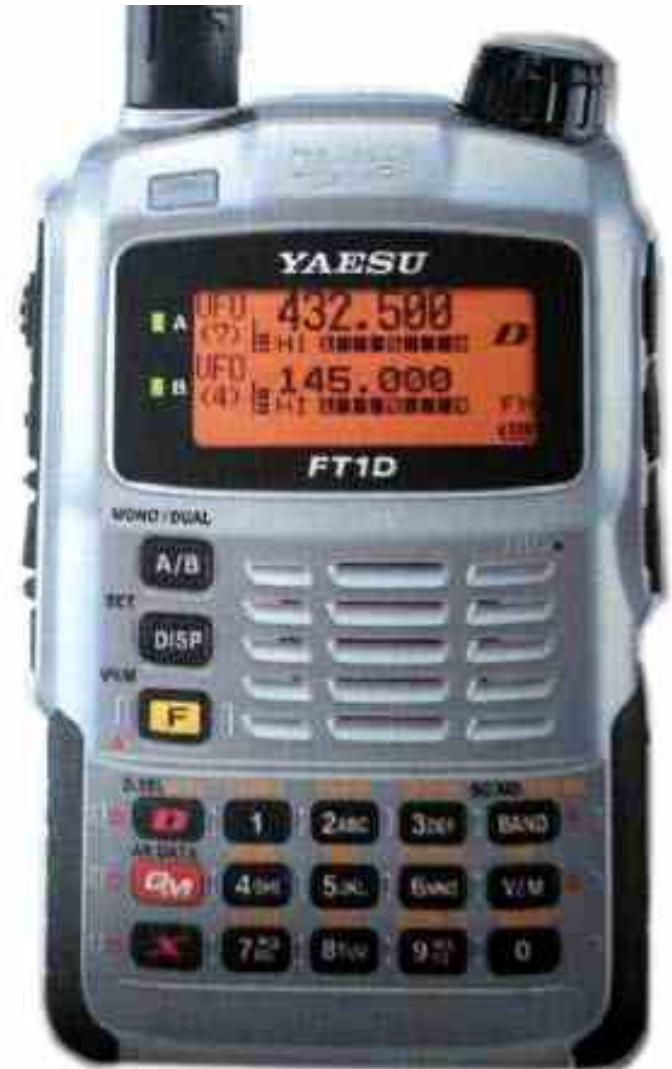
- Centred around Motorola-only kit to achieve best compatibility
- 200 repeaters networked across the world
- 10 recently licensed in the UK
- See ukrepeater.net



	Nr.	Date/Time (UTC)	Rptr-ID	Rptr-Call	Location	State	Frequency	Offset	Network-Name	CC	TS1	TS2
●	1	2014-03-01 14:48:46	235999	GB7DMR	TEST	DEMO			DL-DMR-MARC	1		
●	2	2014-03-04 17:03:11	235300	GB7HM	Hope Mountain	Flintshire	439.63750	-9.000	DL-DMR-MARC	1	●	●
●	3	2014-03-04 17:02:29	235140	GB7HX	Huddersfield	West Yorkshire	433.22500	1.600	DL-DMR-MARC	1	●	●
●	4	2014-03-04 17:02:25	235105	GB7LP	Liverpool	Merseyside	439.40000	-9.000	DL-DMR-MARC	1	●	●
●	5	2014-03-04 17:03:11	235130	GB7NS	Caterham	Surrey	439.16250	-9.000	DL-DMR-MARC	3	●	●
●	6	2014-03-04 17:02:24	235100	GB7TD	Wakefield	West Yorkshire	439.16250	-9.000	DL-DMR-MARC	1	●	●
●	7	2014-03-04 17:02:41	235141	GB7TP	Keighley	West Yorkshire	439.68750	-9.000	DL-DMR-MARC	1	●	●

Yaesu's new offering...

- C4FM-FDMA
- Dual mode
- FM or Digital Voice over FM
- Not the same as other systems!
- No benefits over FM BW
- Very late into the market
 - No UK infrastructure
- We now have multiple systems in the market but no final winner....



More Opportunities at VHF ?

- VHF Usage changes give new opportunities *(but perhaps rather less so in Scotland...)*
- **Requests to be based on value/innovation – not natter!**
- Ofcom Consultation imminent

Summary – simplex frequency allocations

Sector	1 st pairing (MHz)	2 nd pairing (MHz)	Total (MHz)	Geographic restrictions	Frequency restriction
Amateur Radio	146	147	1	NI, S	Yes
Private Mobile Radio	152	152.3	0.3	S	No
Licence Exempt	152.3	152.5	0.2	S	No
PMSE	152.5	152.8	0.3	S	No
Maritime / Search and Rescue	152.8	153	0.2	S	No

Frequency Range Start (MHz)	Frequency Range End (MHz)	Spectrum total (MHz)	Geographic availability
56	60	4	UK Wide
63	67	4	UK Wide
70.5*	71.5	1	E, W, NI
80*	81.5	1.5	E, W, NI
83.5	84	0.5	UK Wide

Summary – duplex frequency allocations

Sector	1 st pairing (MHz)	2 nd pairing (MHz)	Duplex split (MHz)	Total (MHz)	Geographic restrictions	Frequency restriction
Spectrum Award	143 – 144	154 – 155	11	2	NI, S	No
PMSE	147 – 147.3	155.5 – 155.8	8.5	0.6	S	No
Maritime / Search and Rescue	147.3 – 147.5	155.8 – 156.0	8.5	0.4	S	Yes (MCA)
Private Mobile Radio	147.5 – 148	155 – 155.5	8.5	1	NI, S	Yes, 1 Fire Service channel

Source: Ofcom BRIG slides, 24-Apr-2013

Note Amateur 146-147 provision. Opportunities near 60, 70 and 80 MHz

Digital Amateur TV

- DigiLite and other Amateur projects such as ISS Ham TV seeing rapid developments
- Will help mitigate loss of Amateur Microwave Bands
- Enable Colour DATV in 70cm and in new VHF Bands
- Revamped IARU ATV Contests and other changes also being used to promote activity
- DATV - an Amateur Radio Killer App for the 21st Century!



ANY QUESTIONS ?

After the break...