
Digital Switchover (DSO) Programme

Radio DSO Block 11C Cardiff and Newport

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1 Cardiff and Newport DSO Narrative

The current allocation for Cardiff and Newport is 11C and this has not been changed. The nearest co-block multiplexes are for Birmingham to the north-east, Swindon to the east, South Hampshire to the south-east and Exeter and Torbay to the south. These areas are shown below in Figure 1.1; the Cardiff and Newport multiplex is shown in red.

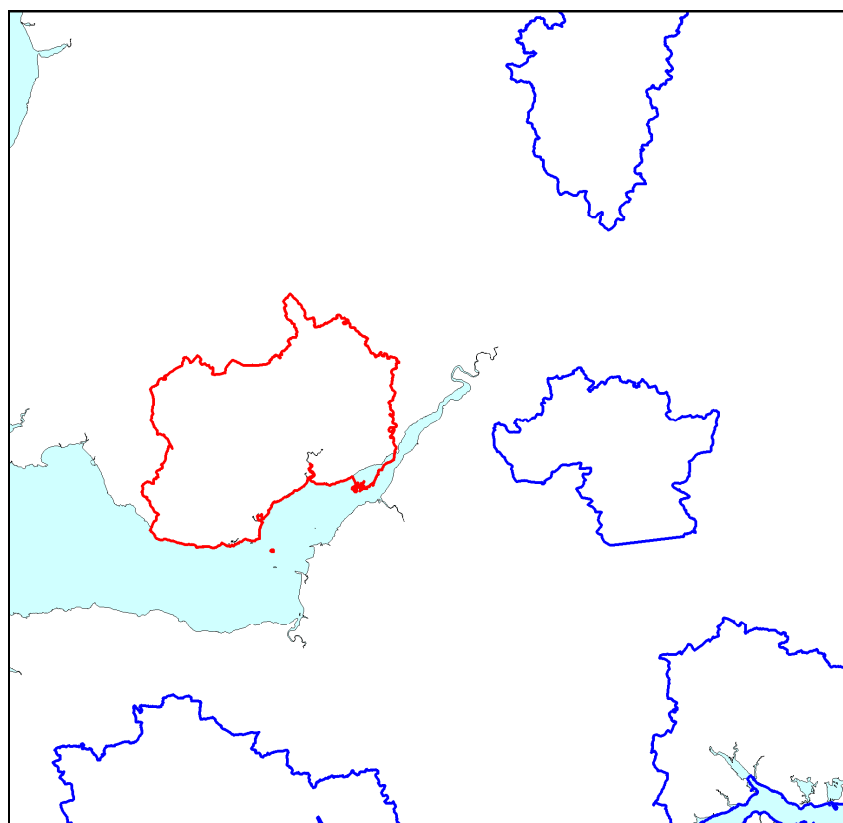


Figure 1.1: Cardiff and Newport (shown in red) – Adjacent 11C Multiplexes

There are three transmitters currently on air for the Cardiff and Newport multiplex; these are shown in Table 1.1.

Site Name	ERP	Site height m a.o.d.	Antenna height m a.g.l.	Antenna Type
Christchurch	2 kW	94	50	Yagis
St Hilary	2kW	126	207	Yagis
Wenault Lane	0.5 kW	226	52	Cardioids

Table 1.1: Cardiff and Newport – Current Transmission Characteristics

The editorial area for Cardiff and Newport has been changed somewhat; it now includes the Heads of the Valleys area of South Wales i.e. the towns of Tonypany, Aberdare, Merthyr Tydfil, Ebbw Vale, Abergavenny and Monmouth to the north, see figure 1.2

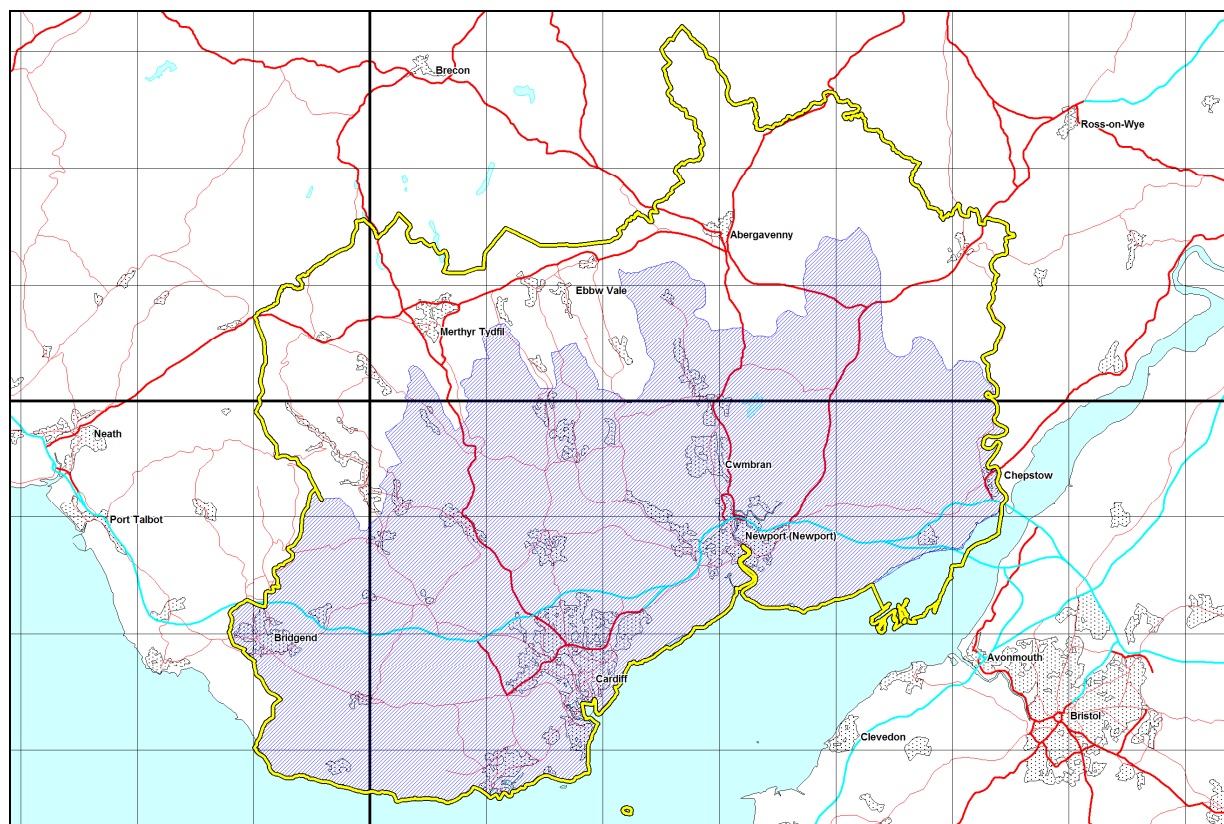


Figure 1.2: Cardiff and Newport – Changes to the editorial area.

Existing area is shown in Blue and the new editorial area is shown in Yellow

In planning for each multiplex Ofcom have required coverage assessments:

- For each area four maps should be produced as follows:
 1. **Current Situation** - Map showing current actual coverage (or launch plans where a mux hasn't yet launched), including any transmitters which are required as part of the current licence, but which are not yet operational.
 2. **Modified Network 1** - Map showing the above, plus any improvements to existing infrastructure.
 3. **Modified Network 2** - Map of the above, plus additional smaller infill transmitters focused on areas where FM coverage is robust.
 4. **Modified Network 3** - Map of the above, plus additional transmitters to provide near universal coverage.

The Cardiff and Newport multiplex is surrounded by five other multiplexes, as shown in Figure 1.3. There is an overlap with the Swansea multiplex in the west.

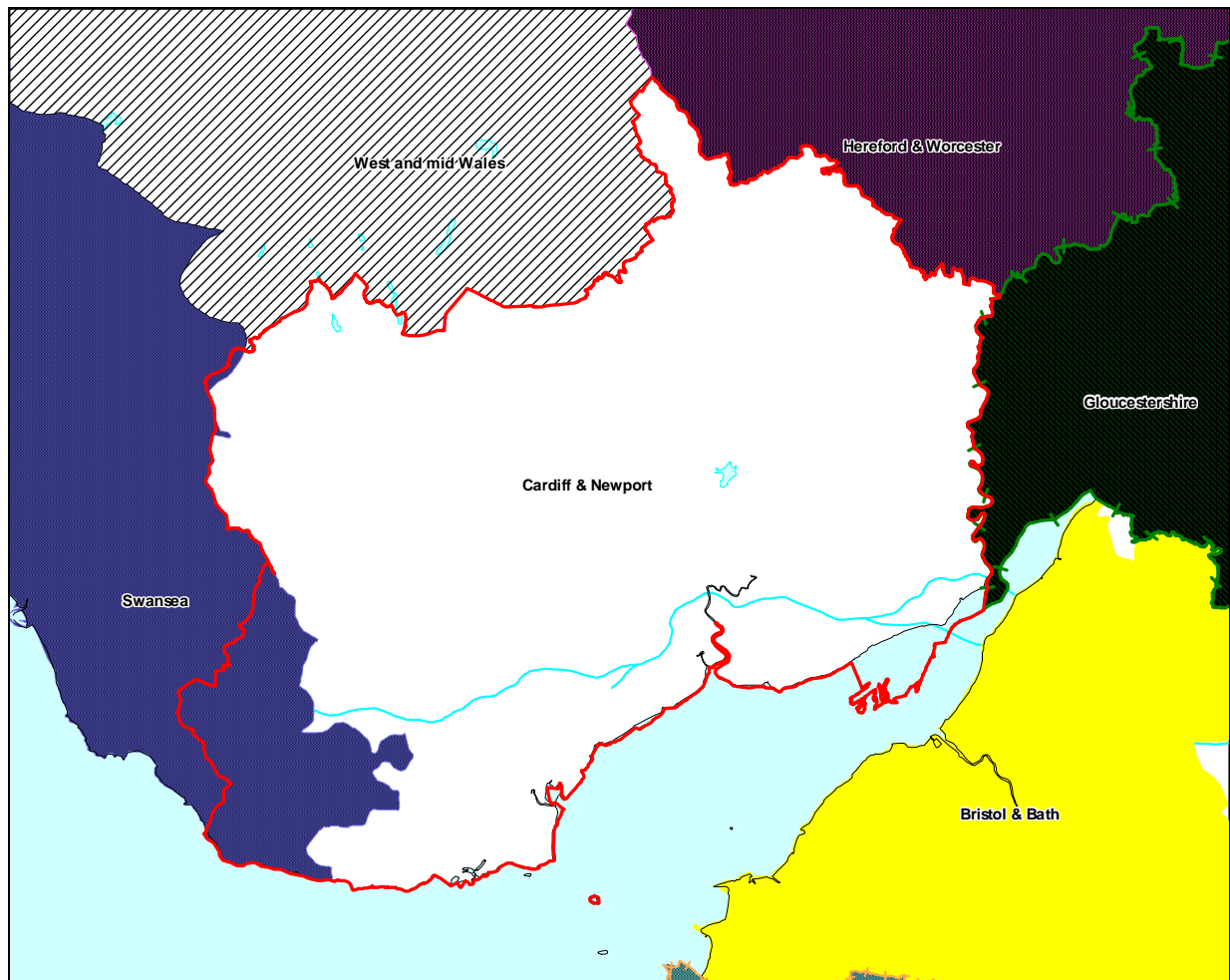


Figure 1.3: Cardiff and Newport Multiplex – Adjacent Multiplexes

The other adjacent multiplexes: West and Mid Wales, Hereford and Worcester, Gloucestershire and Bristol and Bath do not overlap with the Cardiff and Newport multiplex.

1.1 Outgoing interference and sensitivity to other co-block multiplexes

1.1.1 Existing Coverage (Case 1)

The noise limited coverage for Cardiff and Newport is shown in Figure 2.1.

The interference limited coverage for the existing Cardiff and Newport multiplex is shown in Figure 2.2. The existing coverage is restricted by co-block interference from the Cambridge, Swindon and Manchester multiplexes, the multiplex that contributes the most incoming interference is Swindon.

For information figure 2.3 shows the mobile outdoor coverage for interference at 1% time, for case 1.

1.1.2 Proposed DSO Coverage – Improvements to Existing Infrastructure (Case 2, Modified Network 1)

Consideration was given to modifying the existing Cardiff and Newport infrastructure; however, moving the DAB transmissions from the Wenault to share the Wenvoe transmitter should improve the coverage.

Wenvoe hosts DAB services from Digital 1 and BBC and the regional Severn Estuary multiplexes; it should be possible to share the existing DAB infrastructure at Wenvoe.

Figure 2.4 shows the interference limited coverage 1% time for this scenario, and has been designated as the Case 2, Modified Network 1 prediction.

Figure 2.5 shows the mobile outdoor interference limited coverage 1% time for Case 2, Modified Network 1.

The co-block relationship between Exeter & Torbay and Cardiff & Newport also significantly limits the Cardiff & Newport coverage; currently the post-DSO proposal is that the Exeter & Torbay transmitter at Stockland Hill could use the national antenna with an ERP of 5kW (directional of maximum radiation, approx 340° ETN); the current Exeter & Torbay antenna at Stockland Hill is a very directional antenna on a main bearing of 255° ETN, ERP 500W. This DSO proposal for Stockland Hill significantly limits the Cardiff & Newport coverage. The pro & cons of this will need to be considered in detail to promote optimum coverage for both of these multiplexes. Both of these multiplexes areas provide significant challenges to provide good coverage with the minimum number of transmitters.

The edge Swindon editorial area, at it's closest point is only 15 miles (about 25 km) from the edge of the Cardiff and Newport multiplex editorial area, any interference from Swindon into the Cardiff and Newport multiplex is likely to be continuous.

1.1.3 Proposed DSO Coverage (Case 3, Modified Network 2)

In order to improve the coverage of the Cardiff and Newport multiplex, another 12 transmitters have been considered to endeavour to provide DAB coverage where there is robust FM coverage. The transmitters included are: - Mynydd Machen, Heolgerrig, Rhondda A, Ebbw Vale, Abertillery, Abergavenny, Pontypool, Mynydd Baedan, Rhymney, Cefn Eglwysilan, Monmouth and Aberdare (all of which are either built or in the process of being built for the BBC national multiplex).

The ERP at the Mynydd Machen and Rhymney transmitters has been limited to minimise outgoing co-block interference to the Swindon multiplex. If Swindon were not co-block with the Cardiff and Newport multiplex, then increases in ERP of 3dB or more may be possible for the Mynydd Machen and Rhymney transmitters.

Figure 2.6 shows the Cardiff and Newport Case 3 Modified Network 2 coverage at 1% time. Figure 2.7 shows the mobile outdoor coverage.

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The edge Swindon editorial area, at it's closest point is only 15 miles (about 25 km) from the edge of the Cardiff and Newport multiplex editorial area, any interference from Swindon into the Cardiff and Newport multiplex is likely to be continuous. If Swindon and Cardiff and Newport were not co-block, it may be possible to improve the Cardiff and Newport coverage significantly, especially in east of the Cardiff and Newport editorial area, along the M4 between Newport and Chepstow.

1.1.4 Expanded DSO Coverage (Case 4, Modified Network 3)

There is no Case 4 network proposed for the Cardiff and Newport multiplex. The Case 3, Modified Network 2, is about the best that can be achieved for this area, without using additional transmitters that lie outside of the editorial area in England. The use of the Mendip transmitter in Somerset could potentially expand the coverage for Cardiff and Newport, but the risk of outgoing interference to the co-block multiplexes at Swindon and Exeter & Torbay precludes the use of this site.

Figures 2.8 and 2.9 show the indoor and outdoor coverage's for case 3 (4) for continuous interference.

2 Coverage of Multiplex

2.1 Coverage Maps

Coverage maps for DAB are presented with three colours.

Blue = Mobile coverage (99% locations at 99% time)

Dark Green = Indoor coverage (80-95% locations at 99% time)

Light Green = Robust Indoor coverage (>95% locations at 99% time)

These maps included with this report are shown below.

Figure 2.1 Case 1 -Current NOISE limited coverage for Cardiff and Newport (3 transmitters)

Figure 2.2 Case1 - Current interference limited coverage for Cardiff and Newport 1% time - (3 transmitters)

Figure 2.3 Case 1 - Mobile outdoor Coverage for Cardiff and Newport interference limited 1% time - (3 transmitters)

Figure 2.4 Case 2, Interference limited coverage for Cardiff and Newport, Modified network 1, 1% time – *Wenault replaced by Wenvoe (3 transmitters)*

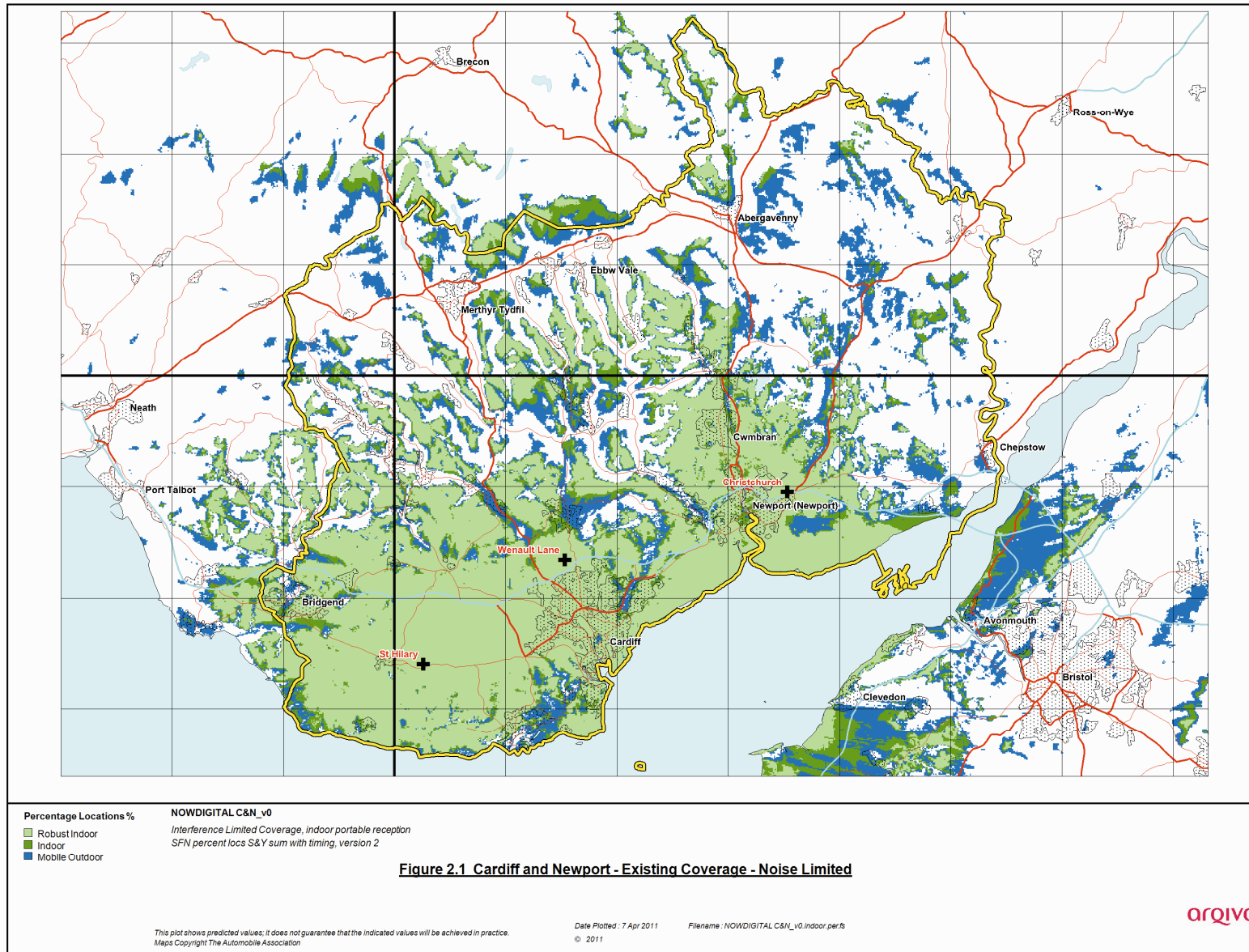
Figure 2.5 Case 2, Mobile outdoor - Interference limited coverage for Cardiff and Newport,
Modified network 1, 1% time – *Wenault replaced by Wenvoe (3 transmitters)*

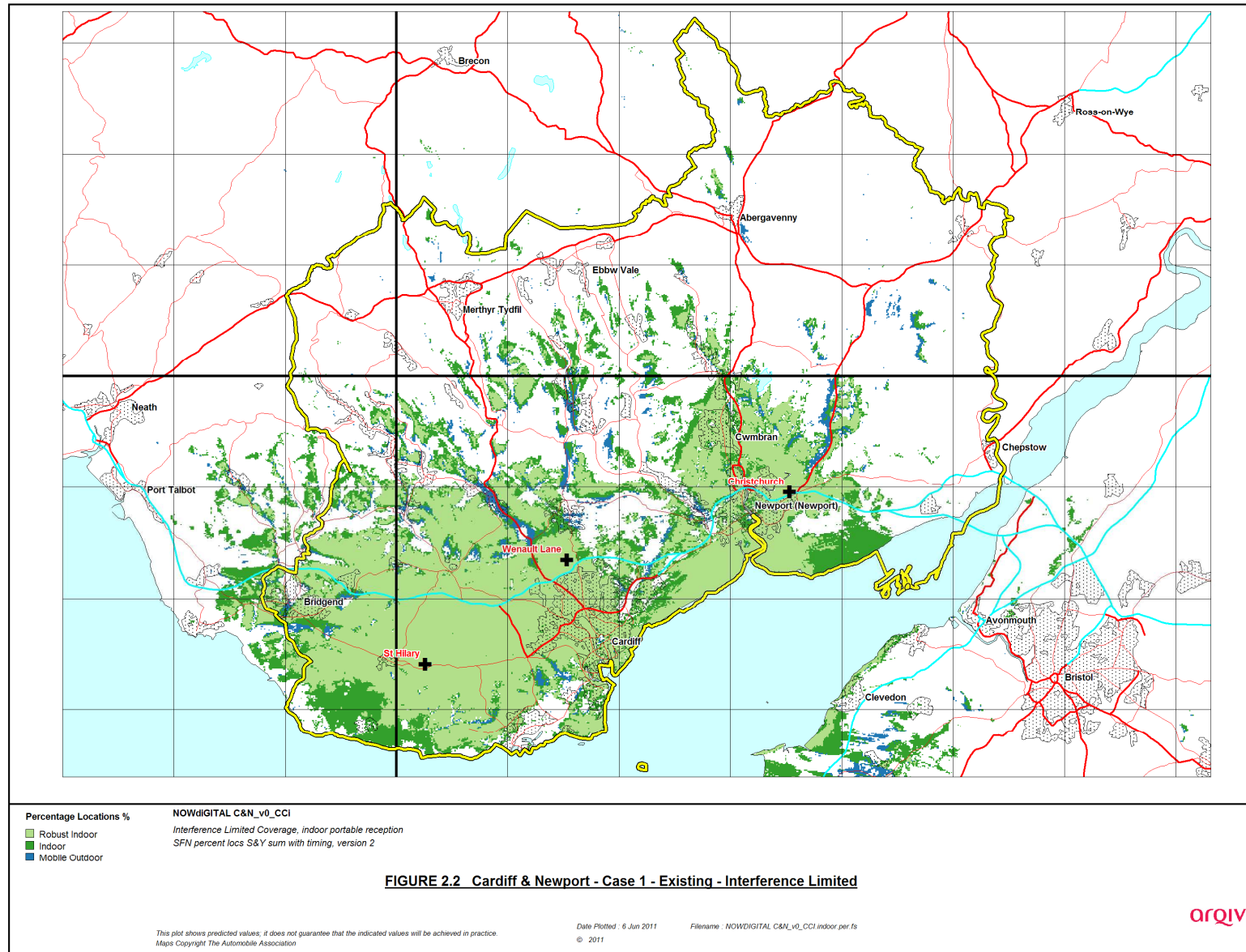
Figure 2.6 Case 3, Interference Limited coverage for Cardiff and Newport 1% time,
Modified Network 2 (15 transmitters)

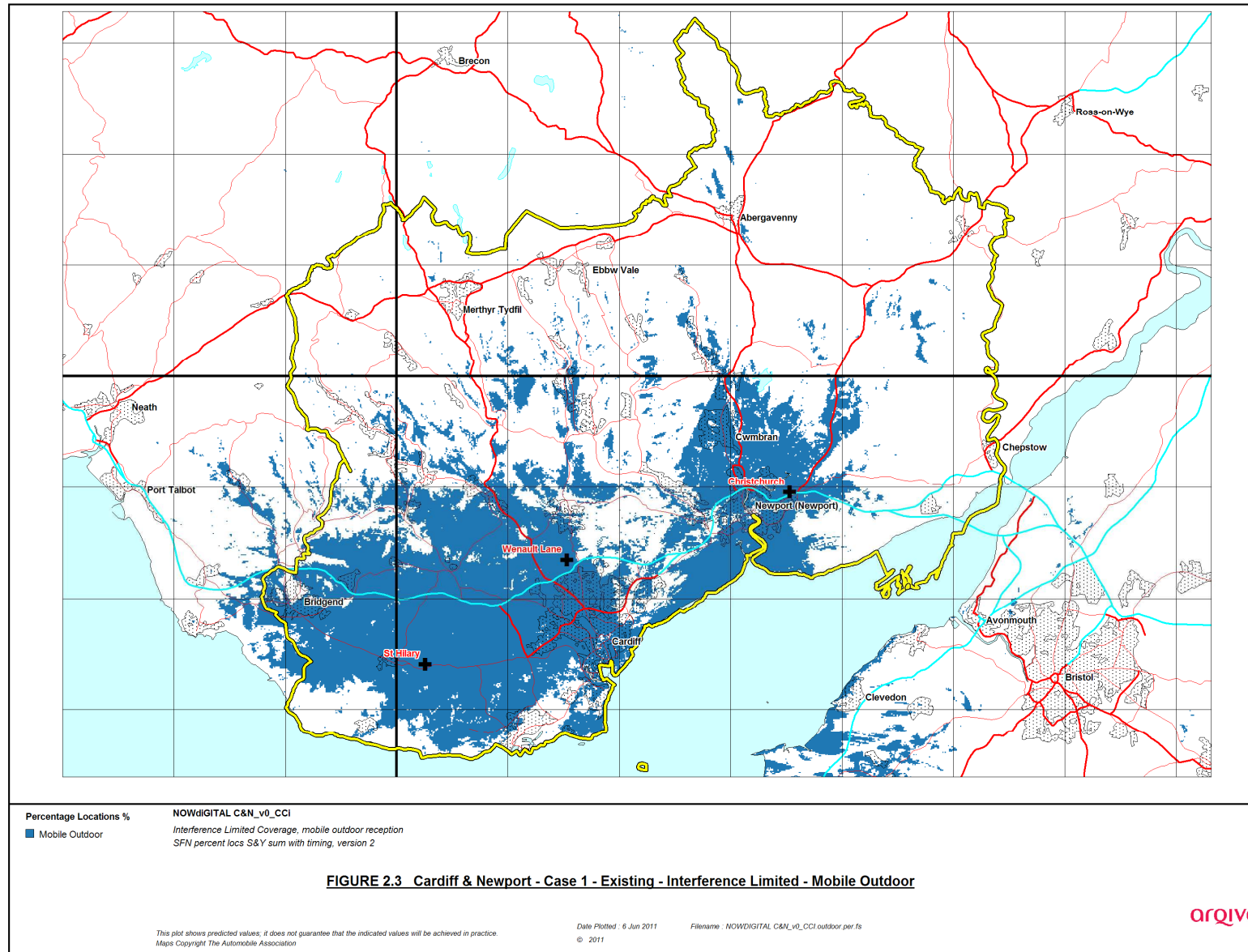
Figure 2.7 Case 3, Mobile Outdoor Interference Limited coverage for Cardiff and Newport 1% time
Modified Network 2 (15 transmitters)

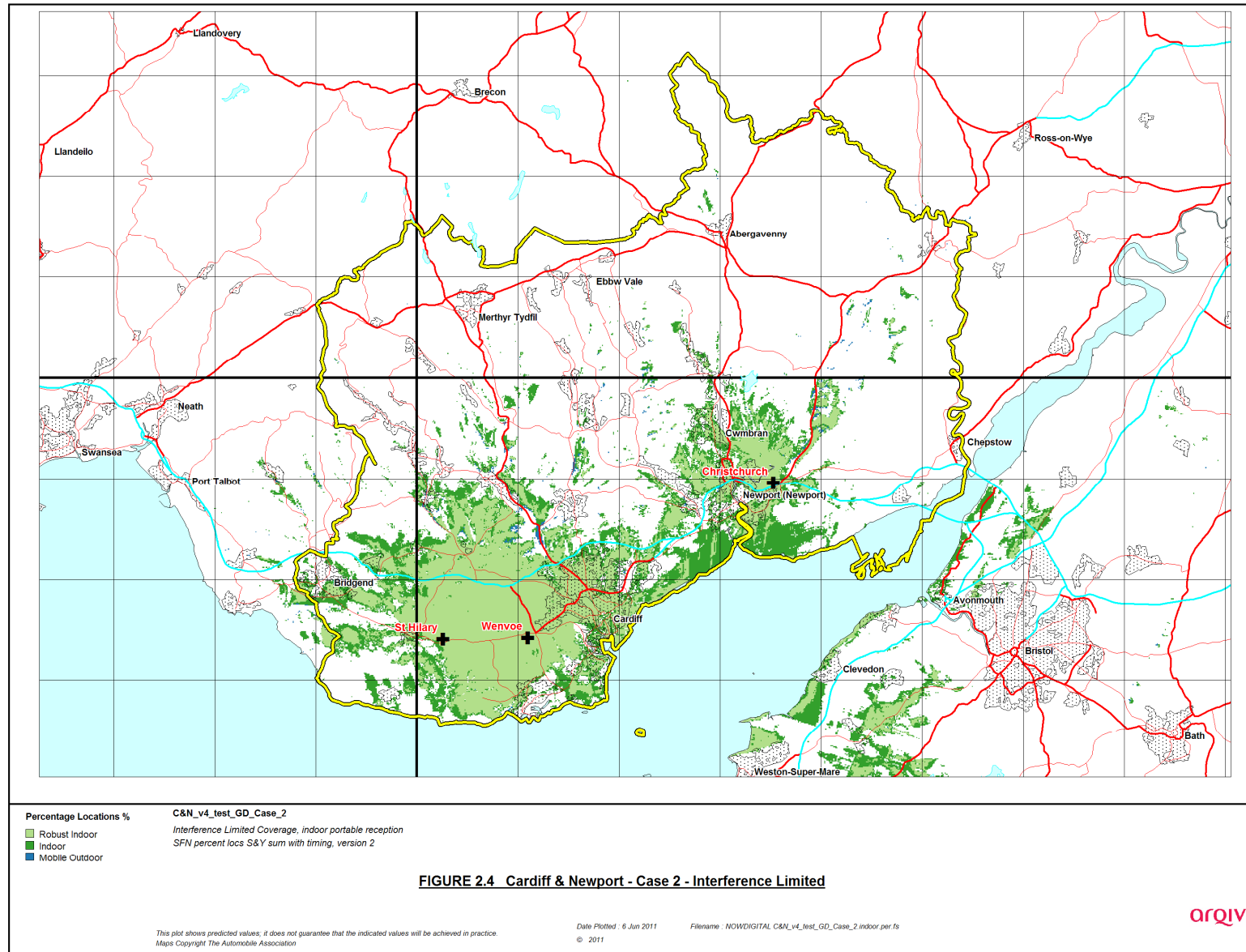
Figure 2.8 Case 3 (4), Interference Limited coverage for Cardiff and Newport 50% time
Modified Network 2 (15 transmitters)

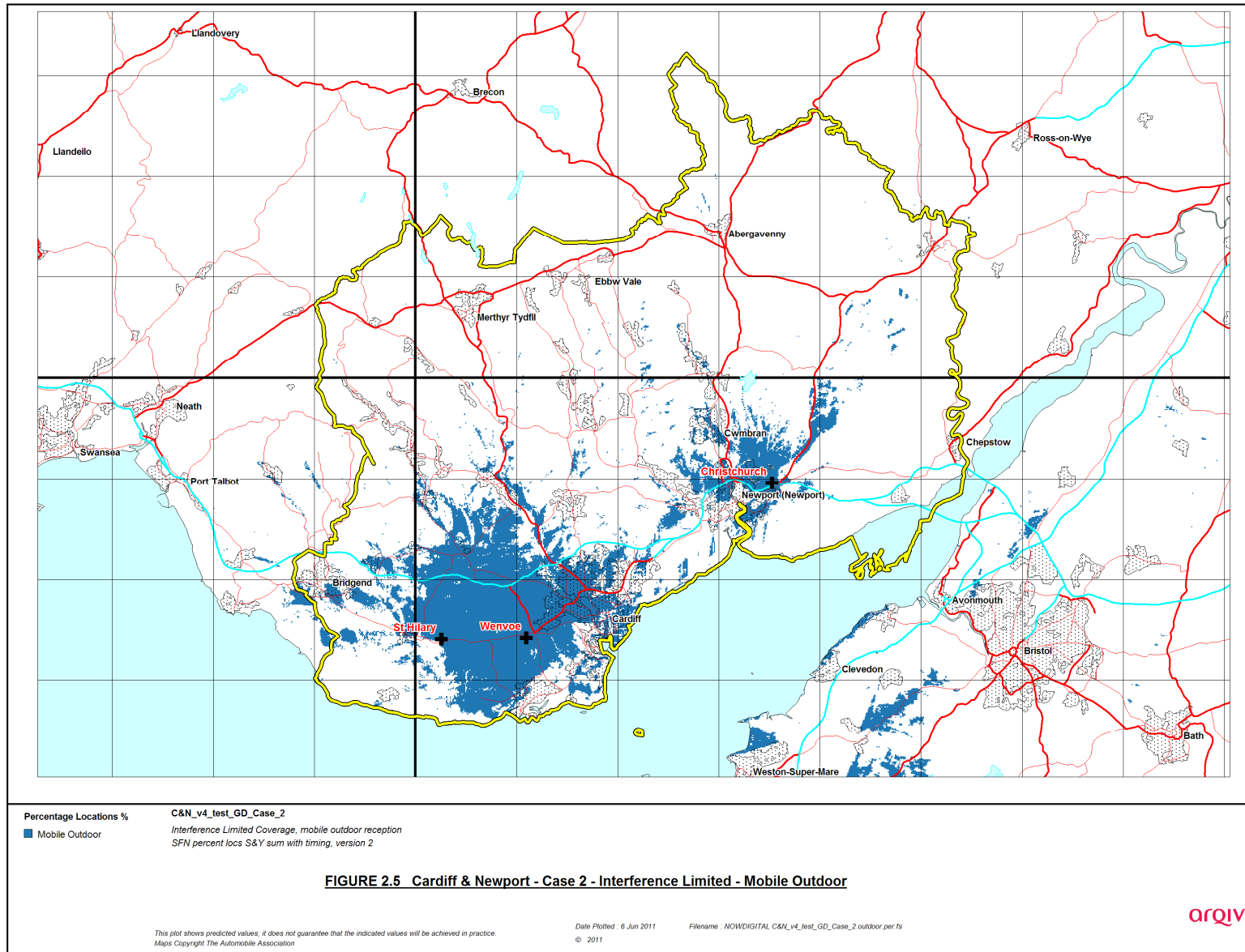
Figure 2.9 Case 3(4), Mobile Outdoor Interference Limited coverage for Cardiff and Newport 50% time
Modified Network 2 (15 transmitters)

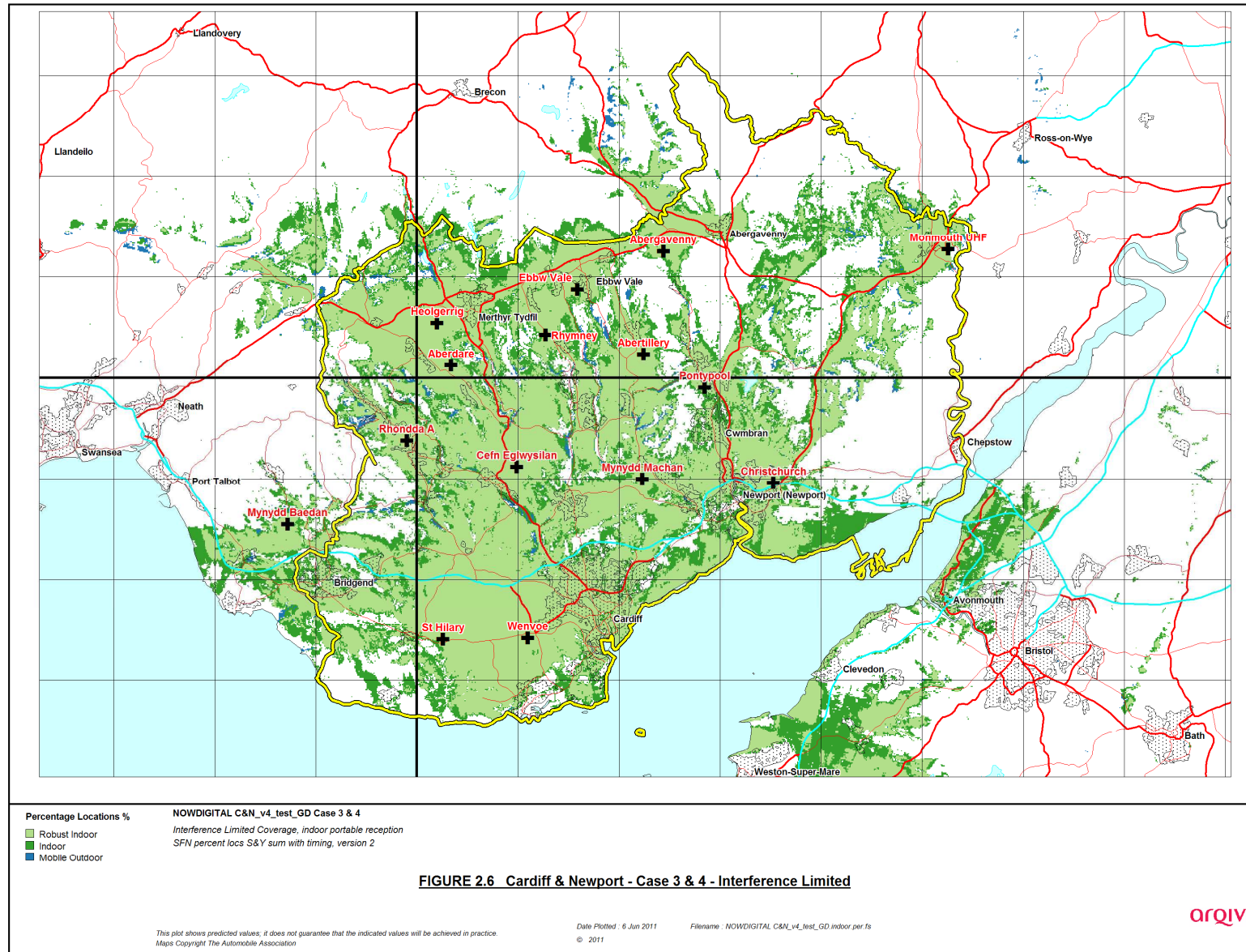


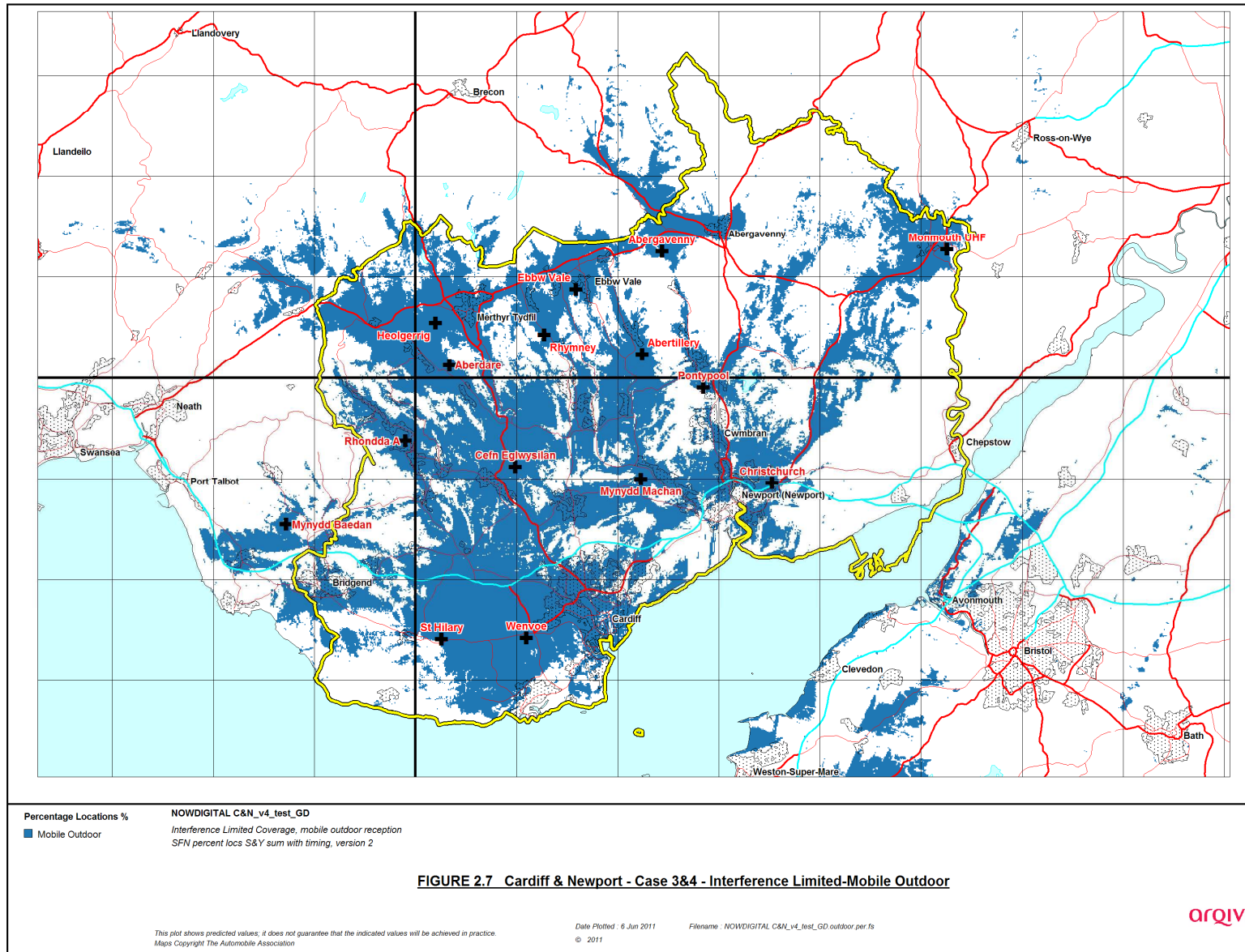


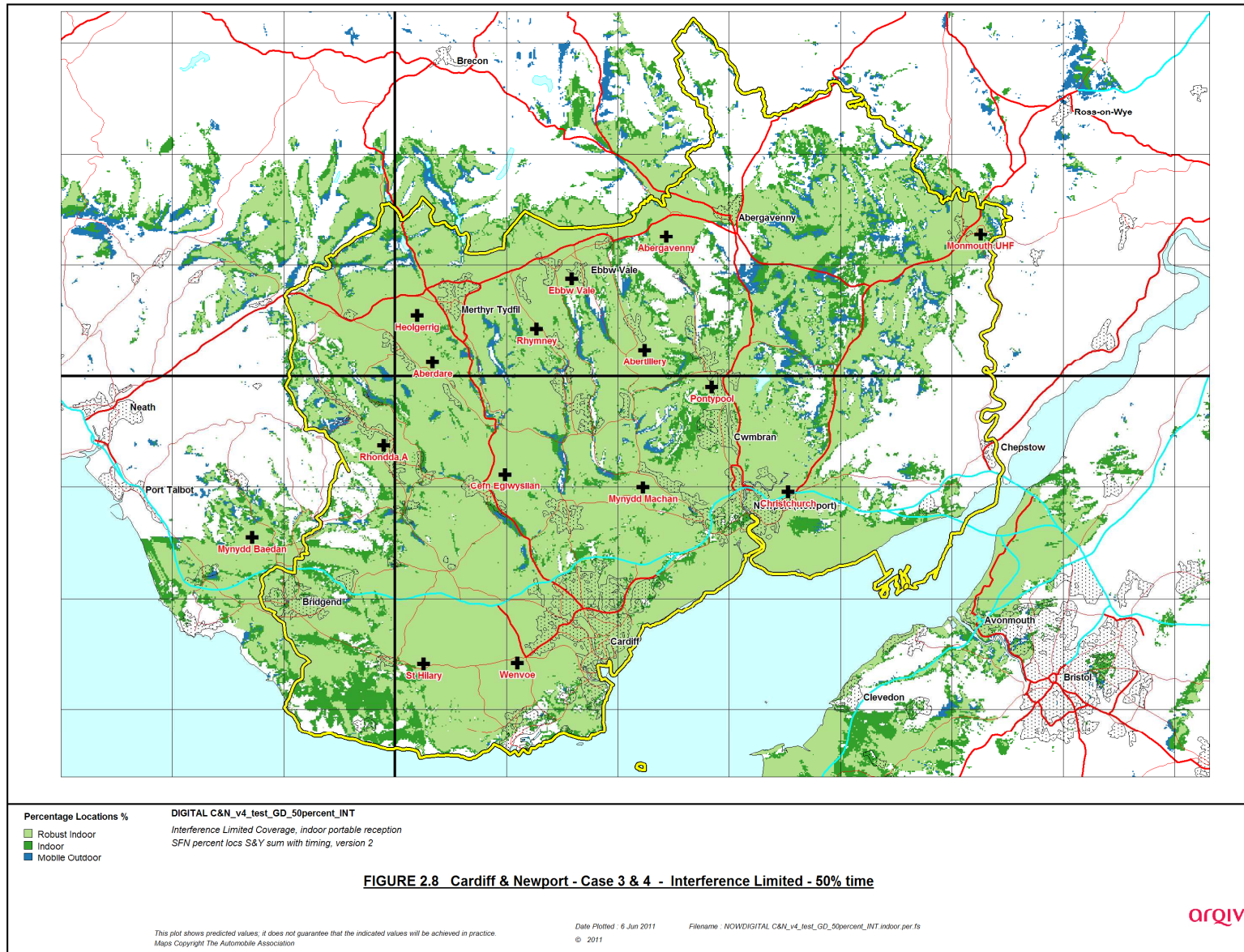


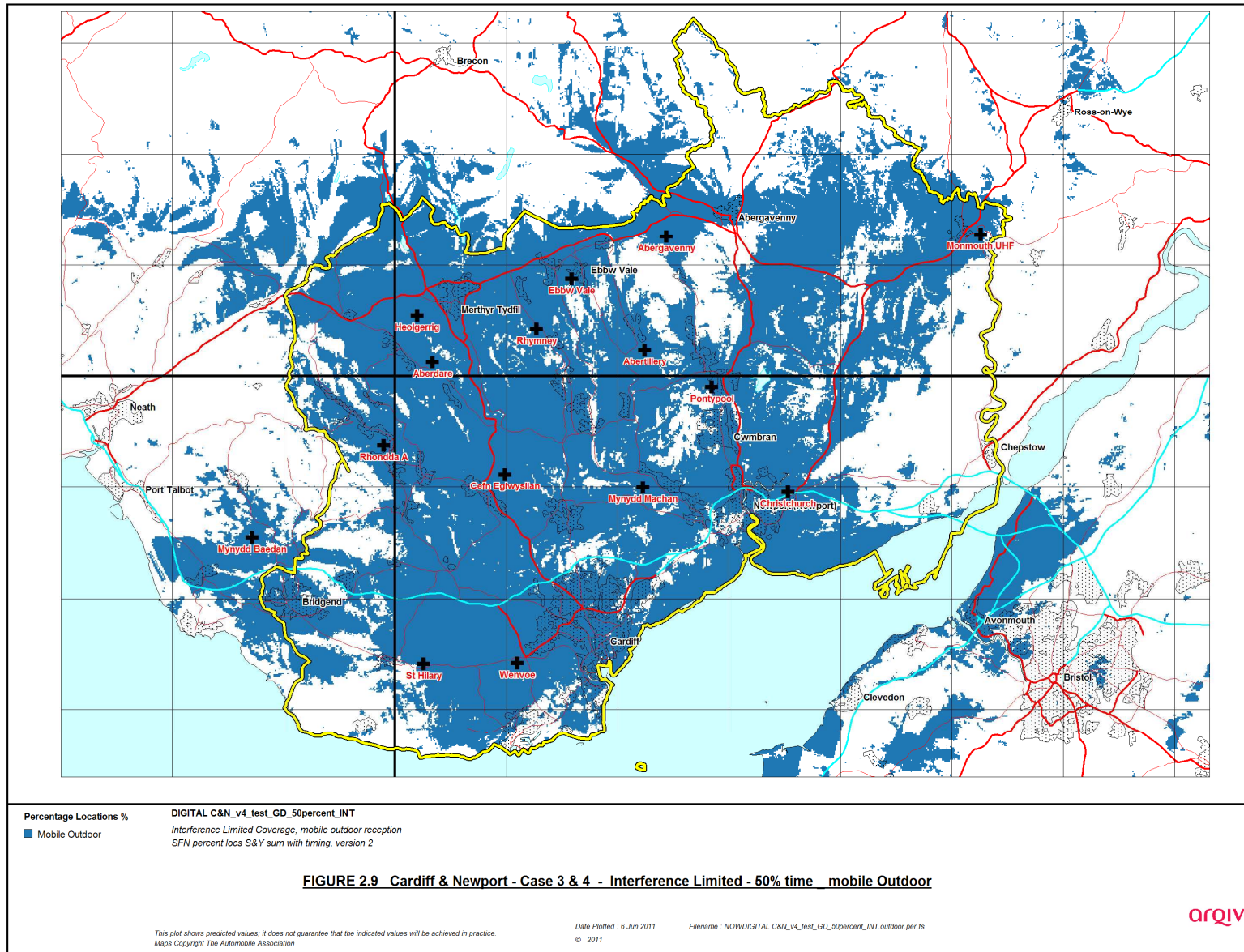












2.2 Population Coverage Tables

The following tables 2.1 and 2.2 and 2.3 show the population figures and the roads coverage for Kent. These tables are colour coded thus:-

Existing Kent	Case 1 (<i>5 transmitters</i>)
	- Yellow = Existing sites unchanged
	-
Case 2	Modified Network 1
	- Orange
	-
Case 3	Modified Network 2
	- Improved Network (<i>15 transmitters</i>)
	- Orange + Green = modified network 2
Case 4	No Case 4

Table 2-1. Population coverage proportional indoor 99%T Total 609491

Site scenario and incremental additional sites	Site Type	Individual Gross Interference Limited coverage within Editorial Area	Number of households within Editorial Area	Increase in number of households	Incremental percentage increase of population	Percentage of Editorial Area
Current (3 Tx) Case 1	Existing DAB	300142	300864			49.39
Current (3 Tx) Wenault replaced by Wenvoe	Shared DAB site		255154	-45710	-10.31	39.08
Cefn Eglwysilan	Shared DAB site	67138 (11.02%)	307693	52539	11.57	50.65
Heolgerrig	Shared DAB site	37076 (6.08%)	341137	33444	5.32	55.97
Mynydd Machan	Shared DAB site	88001 (14.44%)	389606	48469	7.95	63.92
Rhondda A	Shared DAB site	26405 (4.33%)	414813	25207	4.16	68.08
Ebbw Vale	Shared DAB site	16982 (2.79%)	431501	16698	2.72	70.80
Abertillery	Shared DAB site	24122 (3.96%)	448201	16699	2.74	73.54
Abergavenny	Shared DAB site	8840 (1.45%)	457260	9059	1.49	75.02
Pontypool	Shared DAB site	15644 (2.57%)	473567	16307	2.68	77.70
Rhymney	Shared DAB site	14243 (2.34%)	483408	9841	1.61	79.31
Mynydd Baedan	Shared DAB site	9028 (1.48%)	492132	8725	1.43	80.74
Monmouth UHF	Shared DAB site	5388 (0.88%)	497713	5581	0.92	81.66
Aberdare	Shared DAB site	22604 (3.71%)	502745	5031	0.83	82.49

Table 2-2 Road coverage 99% locations, 99%T Total 900.4 km

Site scenario and incremental additional sites	Site Type	Total road length in km	Increase in number of road length in km	Incremental percentage increase of road length	Percentage of roads within the editorial area
Current (3 Tx) Case 1	Existing DAB	332.5			39.93
Current (3 Tx) Wenault replaced by Wenvoe	Shared DAB site	238.2	-94.3	-17.45	22.48
Cefn Eglwysilan	Shared DAB site	294.7	56.5	10.25	32.73
Heolgerrig	Shared DAB site	367.6	72.9	8.09	40.82
Mynydd Machan	Shared DAB site	425.5	57.9	6.44	47.26
Rhondda A	Shared DAB site	454.5	29.0	3.21	50.47
Ebbw Vale	Shared DAB site	477.1	22.6	2.49	52.96
Abertillery	Shared DAB site	507.2	30.1	3.34	56.30
Abergavenny	Shared DAB site	554.3	24.9	2.76	61.54
Pontypool	Shared DAB site	554.3	24.9	2.76	61.54
Rhymney	Shared DAB site	576.3	22.0	2.44	63.98
Mynydd Baedan	Shared DAB site	586.5	10.2	1.14	65.11
Monmouth UHF	Shared DAB site	608.2	21.7	2.41	67.52
Aberdare	Shared DAB site	611.6	3.4	0.37	67.89

Table 2-5. Summary of Coverage within Editorial Area for Each Case

Case	Indoor Household (& percentage coverage)	Mobile Road Coverage (& percentage coverage) 99% locations
1	300864 (49.4%)	332.5 (39.9%)
2	255154 (39.08%)	238.2 (22.5%)
3	502745 (82.48%)	611.6 (67.9%)
4 (same as case 3)	502745 (82.48%)	611.6 (67.9%)
4 (continuous interference 50% time)	548147 (89.9%)	718 (79.77%)

- Case 1 - Light Yellow = existing sites unchanged
- Case 2 - Orange = Modified Network 1
- Case 3 - Orange + green = modified network 2
- Case 4 - Orange + green + blue = modified network 3
- No Case 4 for Cardiff & Newport