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## **Digital Switchover (DSO) Programme**

# **Radio DSO Block 12D N Ireland**

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Company Confidential

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# 1 N Ireland (12D) DSO Narrative

Block 12D, assigned to N Ireland, is an existing allocation. Six transmitters, listed below, are currently On-Air.

Transmitter	ERP (kW)
Black Mountain	7.000
Brougher Mountain	5.000
Colinward	1.000
Limavady	6.200
Londonderry	5.000
Strabane	5.000

There are nine proposed Block 12D allocations throughout UK :-

West & Mid Wales

Leeds

Stoke-on-Trent

Edinburgh

Coventry

Reading & Basingstoke

Southend & Chelmsford

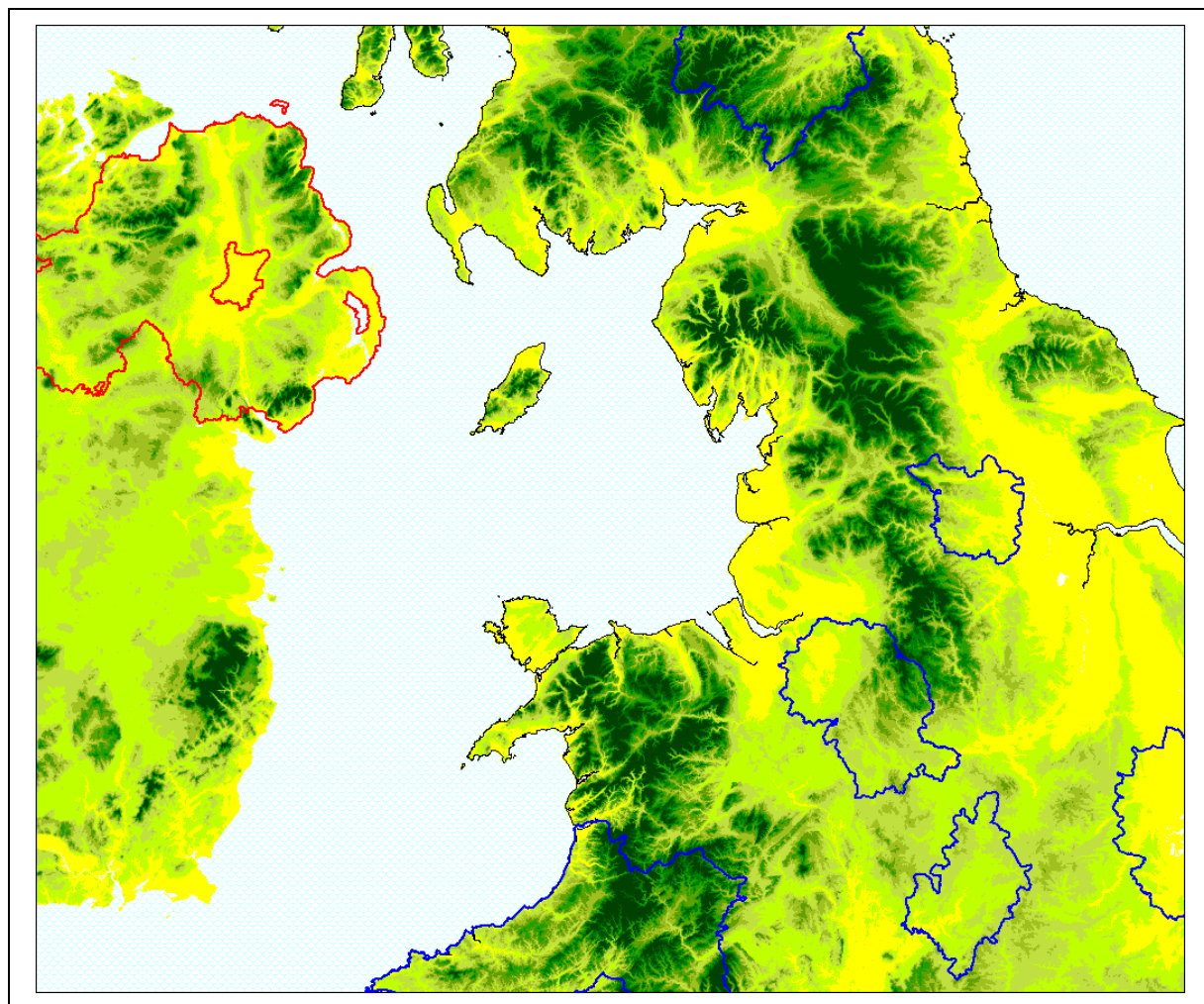
Peterborough

N Ireland

All these multiplexes, above, are currently radiating on block 12D with the exception of West & Mid Wales which has not been implemented. In addition, West Wilts(12D) is also currently radiating, but the area covered by this multiplex is to be re-allocated to another block. By virtue of the terrain and distances between multiplexes, the only 12D multiplexes having any affect upon N Ireland (12D) are West & Mid Wales (12D) and Stoke (12D); although even these have relatively small impact upon N Ireland (12D). Similarly, N Ireland (12D) has very little effect upon West & Mid Wales (12D), Edinburgh (12D) and Stoke (12D) and no impact upon the other distant 12D multiplexes.

Figure 1.1 shows these proposed multiplexes in the context of N Ireland (12D). This also illustrates the terrain in the editorial area in relation to the other co-block allocations.

The proposed editorial area of the 12D allocation in N Ireland remains unchanged from that of the original proposal.



**Figure 1.1: Proposed Block 12D Allocations**

The multiplex is contained entirely within the province of N Ireland and there is no overlap with any other Local Multiplex

FM Radio coverage is currently provided by BBC Radio Ulster (from *Brougher Mountain, Londonderry, Limavady, Ballycastle, Larne, Carmoney Hill, Divis, Kilkeel, Rostrevor Forest, and Camlough* transmitters). Independent Radio is provided by Downtown Radio/Cool FM (from *Brougher Mountain, Londonderry, Limavady, Portlengone, Larne, Black Mountain, Newcastle, and Camlough* transmitters). Considering the terrain, mountainous in places, FM predictions show much of the area as relatively well served by these combined FM services; although some deep valleys remain poorly served.

*Map Copyright: The Automobile Association*

In planning for each multiplex, Ofcom have required coverage assessments:

- For each area four sets of maps should be produced as follows:
  1. **Current Situation** - Map showing current actual coverage (or launch plans where a multiplex 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.

#### For case 1: Current situation

*Figures 2-1 and 2-2* show the current situation in N Ireland (12D). There are six transmitters 'On-Air' and these are listed at beginning of *Section 1*. The antenna horizontal radiation patterns (HRP) are overlaid onto these maps. Interference limited coverage includes the nine co-block interferers including West Wilts (12D), although only West & Mid Wales (12D) and Stoke (12D) impact slightly N Ireland (12D) – and the affect of these is relatively small because of their distance and interposing terrain.

In the proposed plan, the West Wilts (12D) allocation will move to another block.

The current N Ireland (12D) coverage is essentially limited by terrain rather co-block interference; its coverage is reasonable with 74.91% Indoor and 72.61% Roads, considering the number of transmitters, the area and terrain

#### For case 2: Modified network 1

It is proposed to modify the existing network :-

- Replace Black Mountain and Colinward with Divis and Carmoney Hill – this solution has currently been implemented by BBC and improves coverage in the Belfast area.
- Londonderry – replace current antenna with BBC antenna which is higher; increase ERP to 6.3 kW, as with BBC.
- Strabane – replace existing antenna with that used by BBC and ERP 1.6 kW; this antenna is taller

Percentage Coverage is slightly more than Case 1 with 77.8% Indoor and 76.35% roads coverage *Figures 2-3 & 2-4 show the predicted coverage's.*

#### For case 3: Modified Network 2

In this it was required to serve areas where there is existing local FM coverage. The area is predicted to be well served by combined FM services; exceptions being some of the deep valleys in the more remote central areas. Eleven further transmitters are required in order to

emulate the FM coverage, but even so, coverage will not match that of the FM. A large number of small transmitters will be required to serve fully the deep valleys. A significant area remaining unserved is the deep Glennelly Valley running east-west from Maghera to Plumbridge. Measurements will be required here and elsewhere to determine the true nature of coverage; it is possible that there may be adequate coverage by virtue of reflections off the steep hillsides.

Seven of the proposed sites are either 'On Air' (*Armagh, Tully Quarry, Larne, Enniskillen, Maddybenny More*) or at an advanced stage of planning (*Camlough, Newcastle*) for BBC DAB National service.

*Figures 2-5 and 2-6 show this coverage.*

#### For case 4: Modified Network 3

For this case it was required to 'fill' the multiplex to achieve near universal coverage (within practical planning limits).

The plan remains unchanged from that for Case 3 (previous case) Further transmitters may be added for small communities – as is the case with terrestrial TV relays - but in order to complete road coverage within some of the remote valleys, many more transmitters would be required; most likely be of the size and density of cellular phone masts.

With 17 planned transmitters, indoor proportional coverage was predicted to be 93.14% of the Editorial Area (1% Time interference). Outdoor (Road) coverage is 90.05% (1% Time interference)

Timing within the multiplex will require addressing because of the number, and distribution, of relatively high power transmitters over a large area makes this problem complex. (e.g. although Tully Quarry adds net population households, see *Table 2-1*, it causes interference to roads resulting in a net loss of 5.2km, (*Table 2-2*).

### **1.1 Incoming interference and sensitivity to other co-block multiplexes**

The general 'Benchmark' for indoor and outdoor co-block interference protection is for 99% time and predicted coverage held up well to these levels so further predictions for 95% time interference were not necessary.

There is very slight co-block interference from West and Mid Wales (12D) in the south east of the Province; Stoke (12D) impacts some very remote locations on the coast.

### **1.2 Outgoing interference to other co-block multiplexes**

The terrain and remoteness of this multiplex precludes any significant outgoing interference. There is only a slight impact to West and Mid Wales (12D), mainly small areas of the coastal road, from proposals contained in this report.



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## 2 Coverage of the Multiplex

### 2.1 Coverage Maps

Coverage maps for the DAB are generally presented with three colours unless otherwise stated:

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)

*Figure 2-1* Existing Situation

*Figure 2-2* Existing Situation – Outdoor Only: 1% Time Interference

*Figure 2-3* Modified Network 1

*Figure 2-4* Modified Network 1 – Outdoor Only: 1% Time Interference

*Figure 2-5* Modified Network 2

*Figure 2-6* Modified Network 2 – Outdoor Only: 1% Time Interference

*Note* Modified Network 3 remains unchanged from Modified Network 2

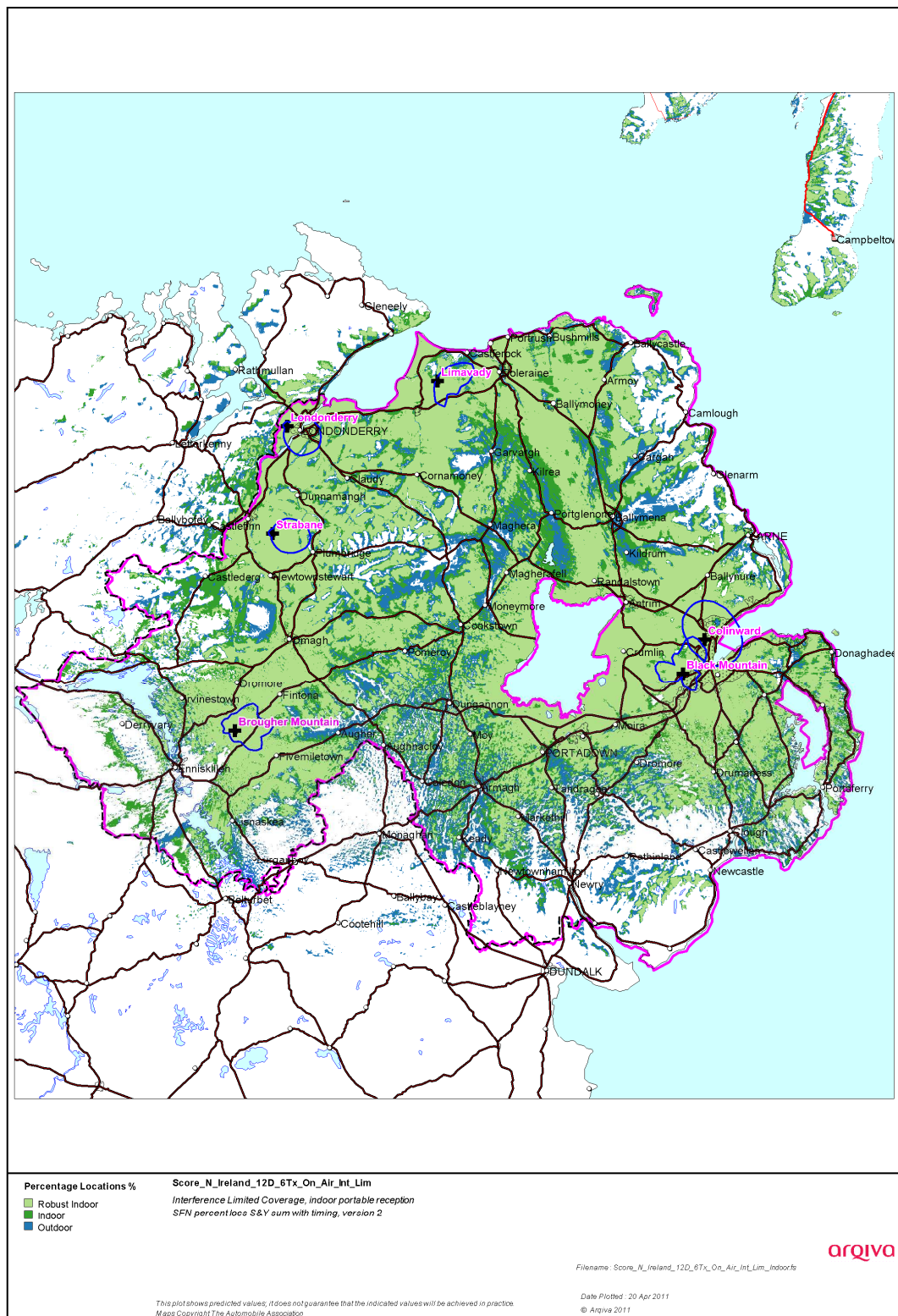


Figure 2-1. Current Situation

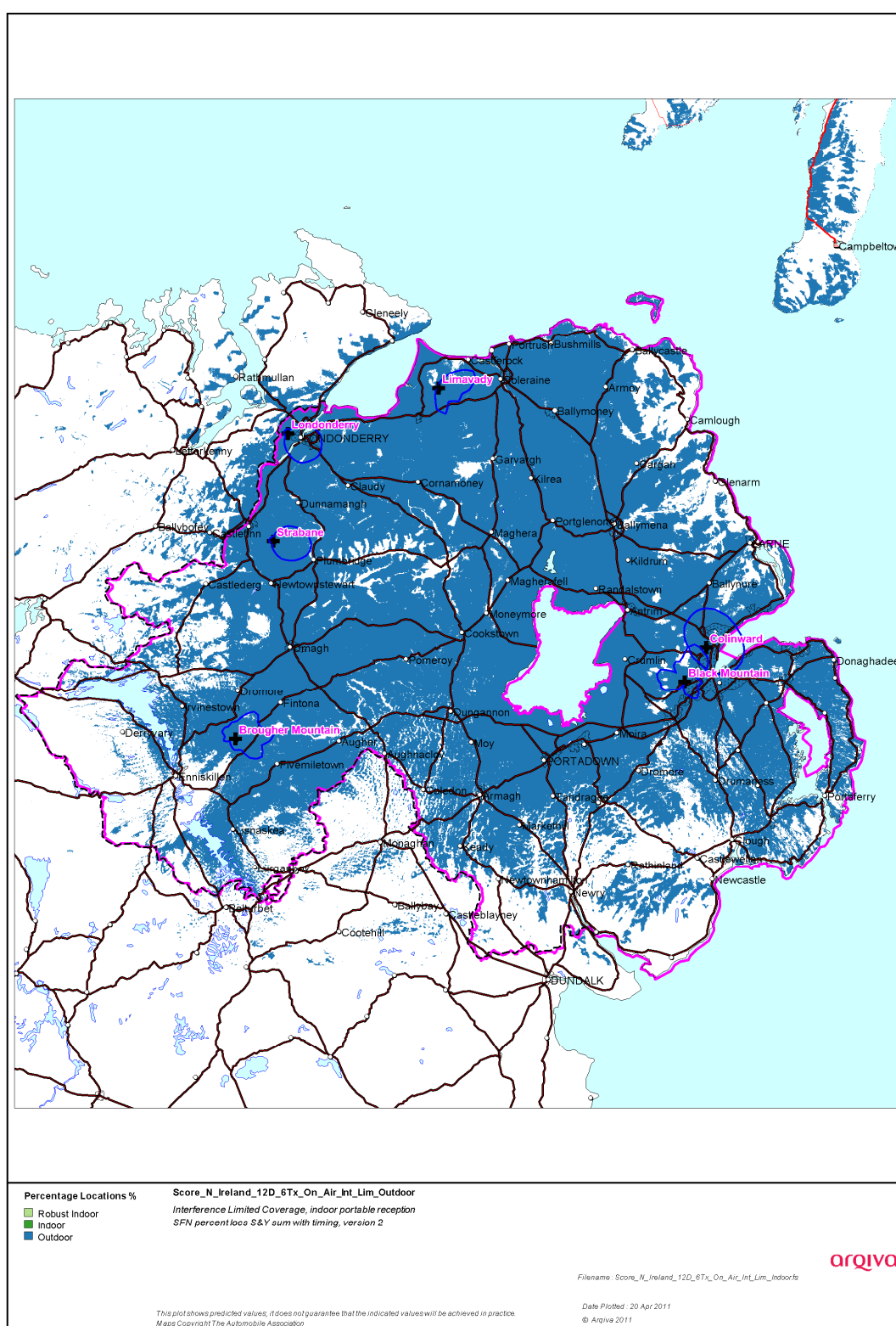


Figure 2-2. Current Situation – Outdoor Only, 1% Time Interference



Figure 2-3. Modified Network 1



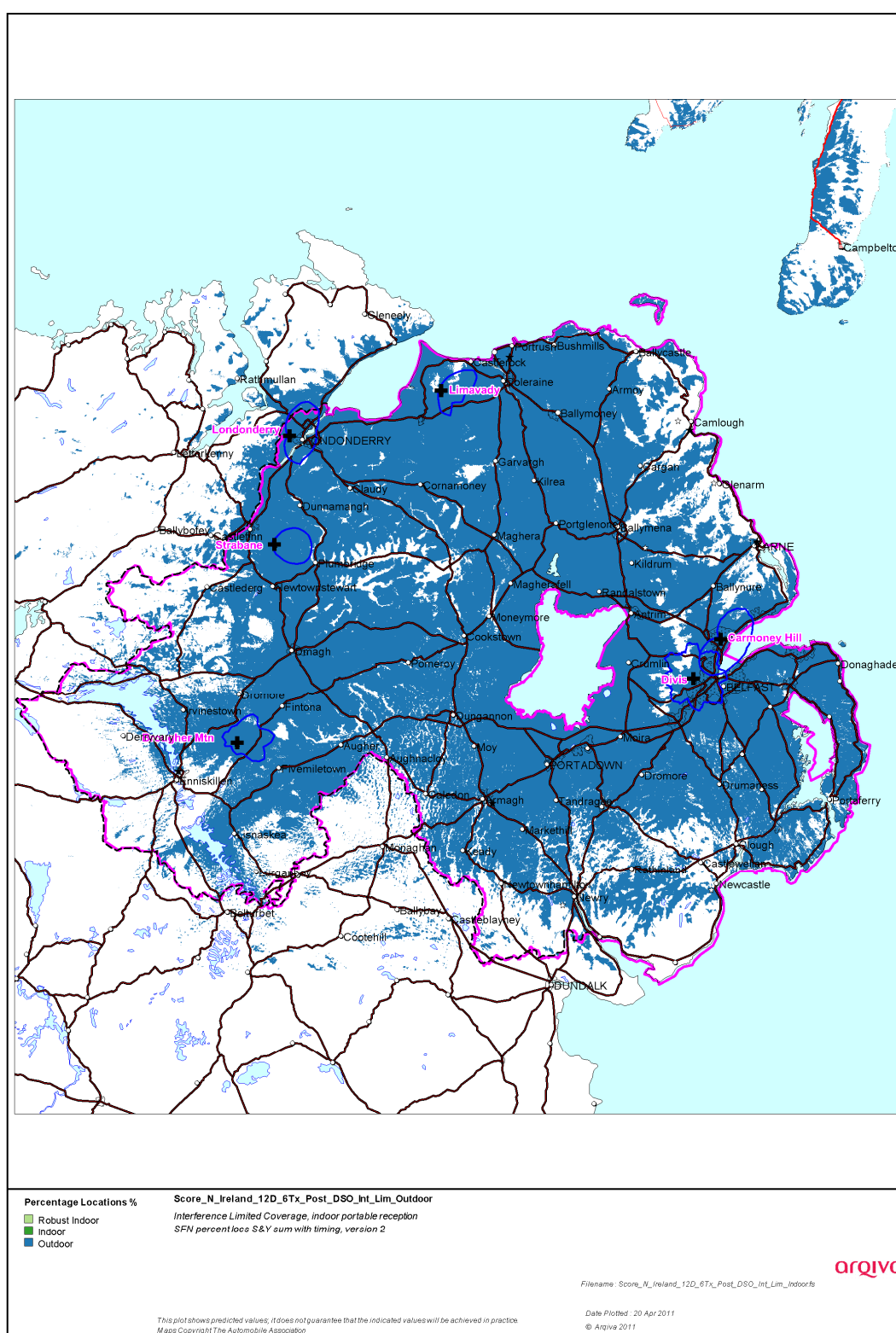


Figure 2-4. Modified Network 1 – Outdoor Only, 1% Time Interference



Figure 2-5. Modified Network 2

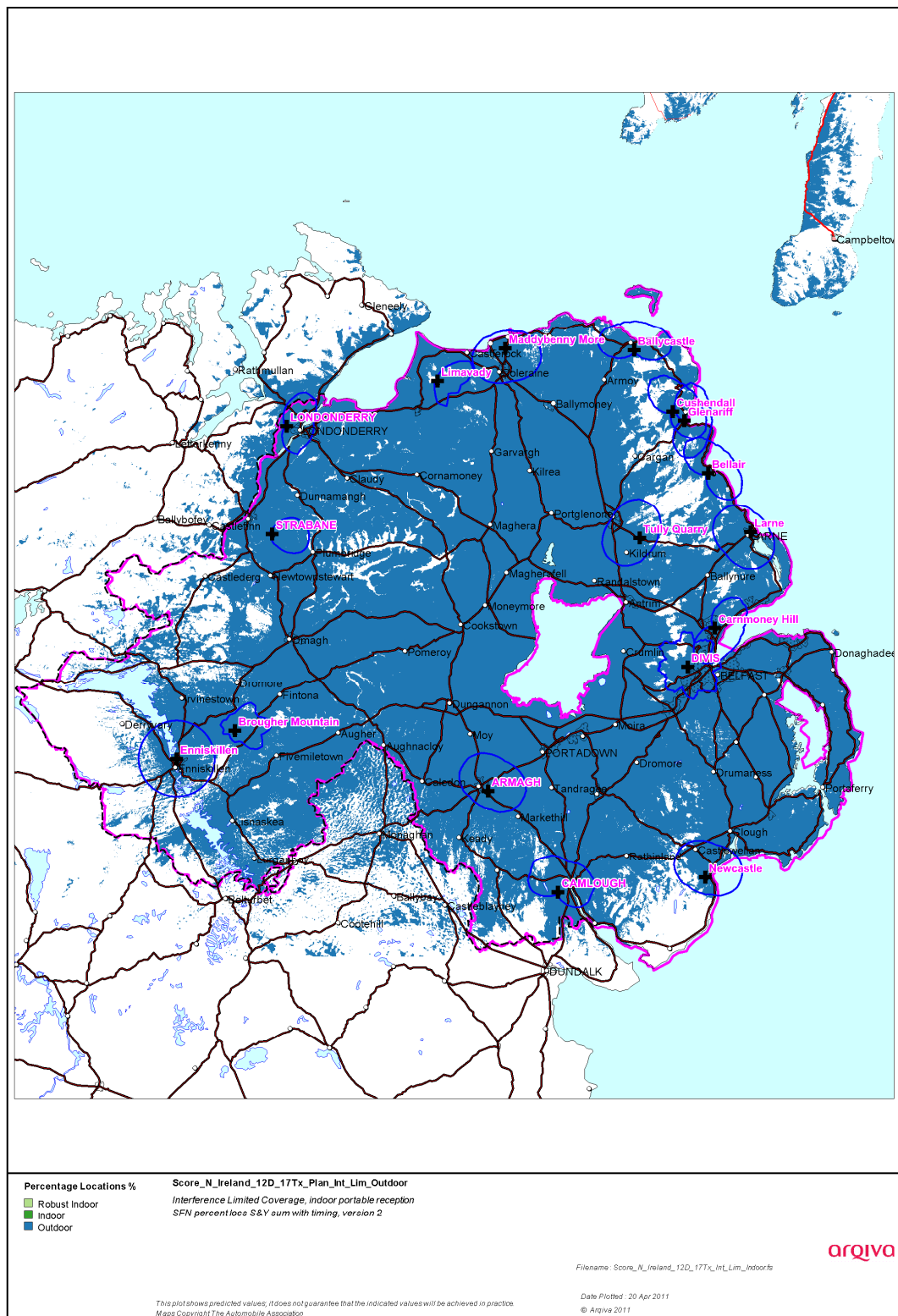


Figure 2-6. Modified Network 2 – Outdoor Only, 1% Time Interference

## 2.2 Population Coverage tables within Editorial Area

Table 2-1 Population - Proportional Indoor Coverage: Total households 683,927

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 (6Tx)	Existing	-	512,327	-	-	74.91
Current (6Tx)	Some New, Existing Infrastructure	-	533,446	21,119	3.09	78.00
CamLough	New, Existing Infrastructure	48,440 (7.08%)	568,718	35,272	5.15	83.15
Armagh	New, Existing Infrastructure	58,574 (3.17%)	587,274	18,556	2.72	85.87
Tully Quarry	New, Existing Infrastructure	21,666 (3.17%)	598,239	10,965	1.60	87.47
Newcastle	New, Existing Infrastructure	17,225 (2.52%)	611,080	12,841	1.88	89.35
Larne	New, Existing Infrastructure	10,066 (1.47%)	619,294	8,214	1.20	90.55
Enniskillen	New, Existing Infrastructure	7,307 (1.07%)	626,469	7,175	1.05	91.60
Maddybenny More	New, Existing Infrastructure	29,013 (4.24%)	631,524	5,055	0.74	92.34
Ballycastle	New	2,915 (0.43%)	634,287	2,763	0.40	92.74
Bellair	New	1,219 (0.18%)	635,621	1,334	0.20	92.94
Glenariff	New	1,152 (0.17%)	636,773	1,152	0.17	93.11
Cushendall	New	1,025 (0.15%)	637,035	262	0.03	93.14

Case 1

Light yellow

Existing Network

Case 2

-

Purple

Modified Network 1

Case 3

-

Blue

Modified Network 2

Case 4

-

Blue + Green

Modified Network 3 n/a - same as Case 3



*Table 2-2. Road Coverage 99% Locations and 99% Time Interference Protection**Total Roads 2,359.0 km*

Site Scenario and Incremental Additional Sites	Site Type	Total Road Length (km)	Increase in Road Length (km)	Incremental Percentage of Road Length (%)	Percentage of Roads within Editorial Area (%)
Current (6Tx)	Existing	1,712.8	-	-	72.6
Current (6Tx)	Some New, Existing Infrastructure	1,801.0	88.2	3.7	76.3
Camlough	New, Existing Infrastructure	1,941.7	140.7	6.0	82.3
Armagh	New, Existing Infrastructure	1,998.1	56.4	2.4	84.7
Tully Quarry	New, Existing Infrastructure	1,992.9	-5.2	-0.2	84.5
Newcastle	New, Existing Infrastructure	2,021.8	28.9	1.2	85.7
Larne	New	2,044.0	22.2	0.9	86.6
Enniskillen	New	2,076.6	32.6	1.4	88.0
Maddybenny More	New	2,085.7	9.1	0.4	88.4
Ballycastle	New	2,094.7	9.0	0.4	88.8
Bellair	New	2,106.4	11.7	0.5	89.3
Glenariff	New	2,121.7	15.3	0.6	89.9
Cudhendall	New	2,124.4	2.7	0.2	90.1

Case 1                      Light yellow  
Case 2                      -      Purple  
Case 3                      -      Blue  
Case 4                      -      Blue + Green

Existing Network  
Modified Network 1  
Modified Network 2  
Modified Network 3    n/a – same as Case 3

Table 2-3. Summary of Coverage within Mid &amp; West Wales (12D) Editorial Area for each case

Case	Indoor Households & (percentage coverage) <i>Proportional &amp; 99% Time Interference Protection</i>	Mobile Coverage km & (percentage coverage) <i>99% Locations &amp; 99% Time Interference Protection</i>
1	512,327 (74.91%)	1,712.8 (72.6%)
2	533,466 (78.0%)	1,801.0 (76.3%)
3	637,035 (93.14%)	2,124.4 (90.1%)
4	637,035 (93.14%)	2,124.4 (90.1%)

Case 1		Light yellow	Existing Network
Case 2	-	Purple	Modified Network 1
Case 3	-	Blue	Modified Network 2
Case 4	-	Blue + Green	Modified Network 3 same as Case 3