
Digital Switchover (DSO) Programme

Radio DSO Block 11C Glasgow

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Table of Contents

1	Glasgow (extended to include Ayr) DSO Narrative	4
1.1	Outgoing Interference and Sensitivity to Other Co-Block Multiplexes.....	7
2	Coverage of Multiplex.....	7
2.1	Existing Multiplex Considerations – Case 1	7
2.1.1	Glasgow 11C Multiplex Considerations –Glasgow	7
2.1.2	Ayr 11B Multiplex Considerations - Ayr.....	7
2.2	Modification to Existing Infrastructure – Case 2	8
2.3	Comparison to existing coverage – Case 3.....	8
2.4	Extension of DAB coverage to the Roads Network – Case 4	9
2.5	Coverage Maps	10
2.6	Population Coverage Tables.....	16

1 Glasgow (extended to include Ayr) DSO Narrative

The current allocation for Glasgow is 11C and this has not been changed. The editorial area however has been significantly changed and extended. It has been extended in some places and shrunk in other areas.

The nearest co-block multiplexes are for Aberdeen and Tyne & Wear. These are shown below in Figure 1.1

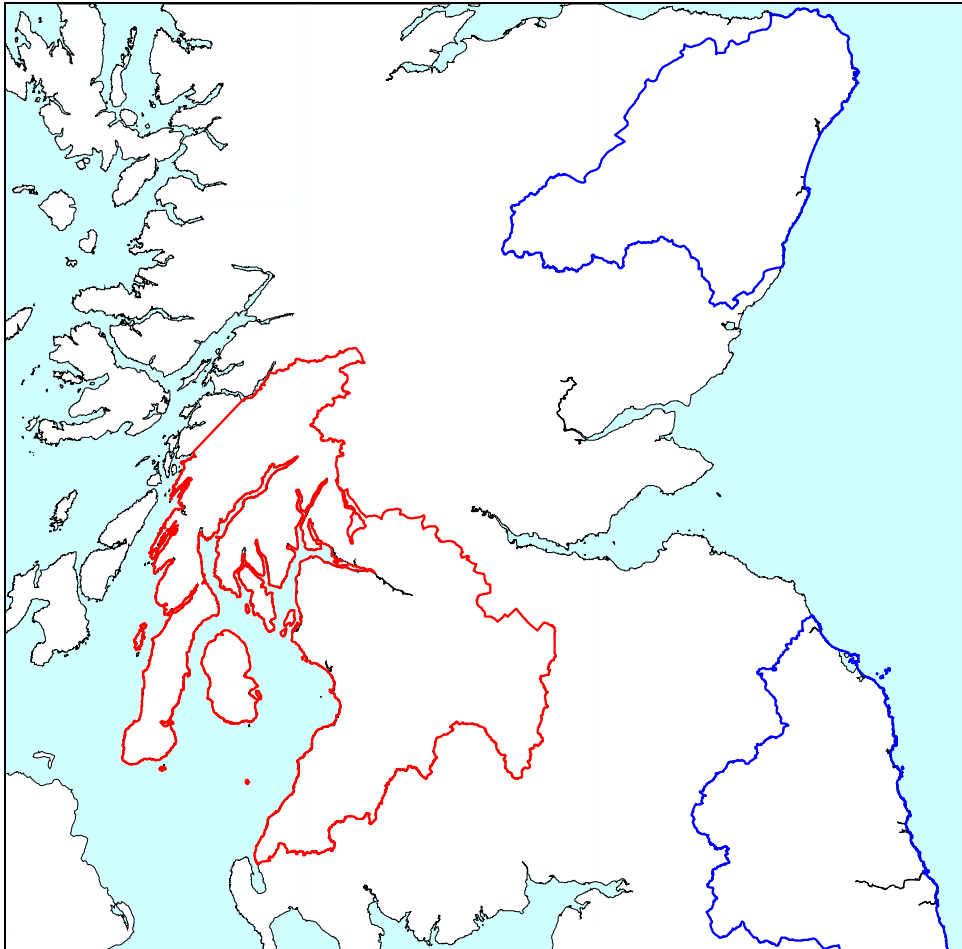


Figure 1.1: Proposed 11C Block Allocation

Figure 1.2 shows the existing Glasgow editorial area (blue diagonal shading) and the existing Ayr editorial area (green diagonal shading). The proposed new Glasgow editorial area is shown by red boundary.

The Glasgow area has changed to include the entire original Ayr editorial area; Ayr is currently on air on block 11B. The revised Glasgow area now no longer includes the area to the north-east around the city of Stirling; but has been extended to include the south-west Highlands

(including the majority of the Argyll and Bute area), including the Kintyre peninsular. The Isle of Arran is also included in the revised Glasgow editorial area.

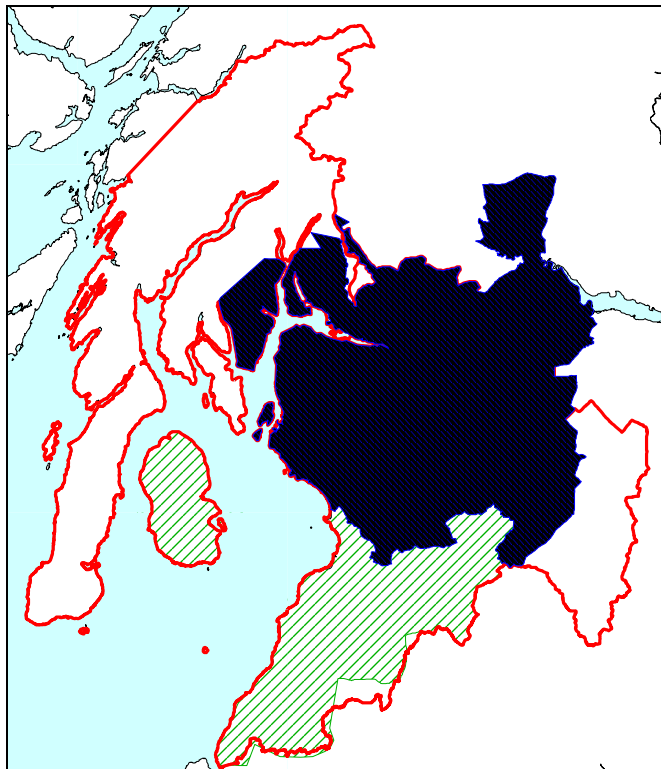


Figure 2.1: Proposed Glasgow Allocation with existing Glasgow and Ayr Editorial Areas Shown

The combining of Glasgow and the Ayr multiplexes permits significant changes to existing infrastructure. The Glasgow - Earls Hill transmitter can be removed from the Glasgow multiplex, as it will be used for the Edinburgh 12D multiplex. The Earls Hill transmitter is entirely within the existing Edinburgh PPA (and the revised Edinburgh area) and Central Scotland Regional editorial area. The Central Scotland multiplex also uses the Earls Hill transmitter.

In addition, both the multiplexes currently use the Darvel transmitter site, but with different antennas at different heights. The current transmission characteristics for Ayr are shown in table 1.1, and the current transmission characteristics for Glasgow are shown in table 1.2.

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 current situation is shown in tables 1.1 and 1.2. The case 1 scenarios for Glasgow and for Ayr are shown in tables 1.1 and 1.2. The coverage for Glasgow 11C case 1 is shown in figure 2.1 and the coverage for Ayr 11B case 1 is shown in figure 2.2.

Site name	ERP	Site height m a.o.d.	Antenna height m a.g.l.	Antenna type
Brown Carrick Hill	4 kW	273	30	Cardioid
Darvel	750 W	285	152	Cardioid
West Kilbride	1.51 kW	169	34	Yagis

Table 1.1: Ayr 11B Current Transmission Characteristics

Site name	ERP	Site height m a.o.d.	Antenna height m a.g.l.	Antenna type
Black Hill	4.23 kW	277.5	292	Cardioid
Sergeant Law	886 W	230	32	Screened dipoles
Darvel	1 kW	285	148	Cardioid
Earls Hill	250 W	415	37	Cardioid

Table 1.2: Glasgow 11C Current Transmission Characteristics

Case 2: Modified Network 1

By combining these two multiplex regions, the changes contemplated are, using three of the four Glasgow sites 'as is' Black Hill, Darvel and Sargeant Law, and not using Earl's Hill, which is now outside the revised editorial boundary. Also using two of the three Ayr sites, with no change (except for rechanneling from 11B to 11C) 'as is'; West Kilbride and Brown Carrick Hill. The choice of using Glasgow's Darvel antenna; is based on trying to minimise potential interference to Eire.

1.1 Outgoing Interference and Sensitivity to Other Co-Block Multiplexes

The expanded Aberdeen and Tyne & Wear multiplexes are largely unaffected by additions proposed to expand the extended Glasgow multiplex. In addition, the proposed increases in the extended Glasgow coverage is not predicted to be significantly impacted by these co-block transmissions within the United Kingdom, however there may be outgoing impact on 11C usage in Eire.

2 Coverage of Multiplex

2.1 Existing Multiplex Considerations – Case 1

2.1.1 Glasgow 11C Multiplex Considerations –Glasgow

The existing coverage from Glasgow is show in Figure 2.1 – Case 1 – Glasgow.

2.1.2 Ayr 11B Multiplex Considerations - Ayr

The existing coverage from Ayr 11B is show in Figure 2.2 Case 1 – Ayr.

2.2 Modification to Existing Infrastructure – Case 2

Increasing the DAB coverage for the Glasgow multiplex over this new area, some consideration has been given to modifying the existing Glasgow and Ayr transmitters, and no changes are proposed.

It is proposed that the Ayr 11B, Darvel antenna should become redundant, with the new extended 11C Glasgow multiplex using the Glasgow antenna.

For Brown Carrick Hill and West Kilbride, the only modification proposed is the change of frequency block, from 11B to 11C

The Darvel site, with two different antennae, is in use by both Ayr 11B and Glasgow 11C multiplexes, it is proposed that the extended Glasgow DSO should use Glasgow antenna, mainly to minimise potential interference to Eire.

Case 2, modified existing network 1, and is derived from combining two Ayr transmitters and three Glasgow transmitters, this is shown in Figure 2.3. There is a difference between the indoor and outdoor 1% interference limited coverage, the indoor coverage is predicted to be higher than the outdoor coverage due to extensive A road networks in un-populated areas.

2.3 Comparison to existing coverage – Case 3

In order to improve coverage and emulate coverage that more closely echoes the robust VHF coverage throughout the expanded Glasgow editorial area, the Glasgow city centre a site at the Glasgow Hilton has been added to the proposed DSO plan. The Glasgow Hilton site is also likely to be of interest for use by BBC, Digital 1 and Central Scotland multiplexes.

Additionally the following existing FM sites have been added to the DSO plan:-

Campbeltown, Girvan, Millburn Muir, Rosneath, Rothesay, South Knapdale and Strachur. The BBC national DAB service is either using or planning to use the following sites: - Millburn Muir, Rosneath, Rothesay and South Knapdale.

This is shown in Figure 2.4 “Case 3 Modified Network coverage-interference limited 1% time.”

There is a difference between the indoor and outdoor 1% interference limited coverage. The indoor coverage is predicted to be higher than the outdoor coverage. This is exacerbated by large expanses between the populated areas for this multiplex.

The case 3 scenario does not give particularly high coverage to the roads network.

2.4 Extension of DAB coverage to the Roads Network – Case 4

In order to improve the mobile outdoor coverage, the following transmitter sites have been considered:-

Abington, Arrochar, Ballantrae, Biggar, Blackwaterfoot, Clachan, Dalmally, Pinwherry and Kirkfieldbank.

The only transmitters that have been included from this list are (in order of population increase) are: - Biggar, Kirkfieldbank, Abington, Arrochar and Ballantrae. Arrochar and Ballantrae add less than 500 households each to the overall population, but do provide some strategic benefit to the roads network, Ballantrae to the south of Girvan on the coast and Arrochar to the north; providing a some additional roads coverage in a sparsely populated region in the hills to the north of Glasgow, but on one of the major routes through the area. The use of Ballantrae will provide coverage along some of the coast road to the south, for those drivers en route to Dumfries and the port at Stranraer. This coverage is shown in Figure 2.5.

Some of these transmitters have been left with omni-directional characteristics at the moment; many of these transmitters are likely to be limited by the local terrain, and detailed transmission characteristics have not been developed at this time.

Kirkfieldbank is also being considered for use by the Central Scotland multiplex.

There are some differences between the indoor and mobile outdoor 1% time interference limited coverage's, the indoor coverage is predicted to be higher than the outdoor coverage but with these extra sites the gap has narrowed. This is exacerbated by large expanses between the populated areas for this multiplex.

The coast road on the western part of the Mull of Kintyre is very difficult to serve from within the Glasgow editorial area; it may be possible to serve this area from the Inverness editorial area (Islay transmitters). Re-allocating the Islay transmitters from Inverness multiplex to Glasgow would make coverage on the main A83 coastal route would make the journey to Campbeltown contiguous.

The population centres are well served, however, the extensive roads network through unpopulated areas means that the roads coverage is lower (as a percentage) than the households populations. Given the significant areas within the editorial area that are predominantly unpopulated and the road network within this editorial area is untypically extensive, further numerous additional roadside transmitters that would serve minimal or zero additional population have not at this time been considered further.

2.5 Coverage Maps

These maps included with this report are

Figure 2.1 Glasgow 11C Existing Case 1 interference limited coverage 1%

Figure 2.2 Ayr 11B Existing Case 1 interference limited coverage 1%

Figure 2.3 Case 2 Modified Network 1- Existing Ayr Existing (2 txs) & Glasgow (3 txs) interference limited coverage 1%

Figure 2.4 Case 3 – Modified Network2, interference limited coverage 1%

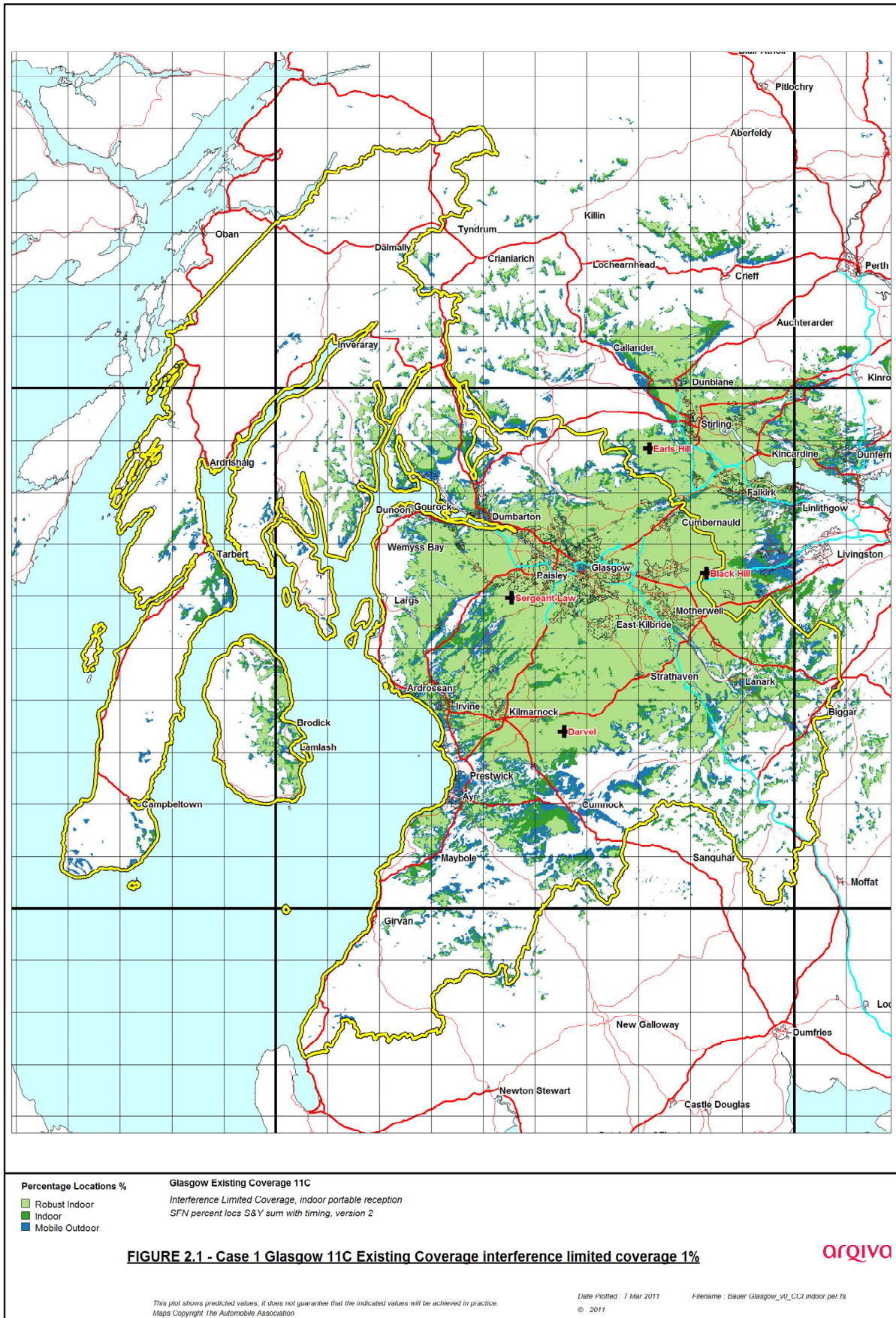
Figure 2.5 Case 4 - Modified Network 3 - Interference Limited 1%

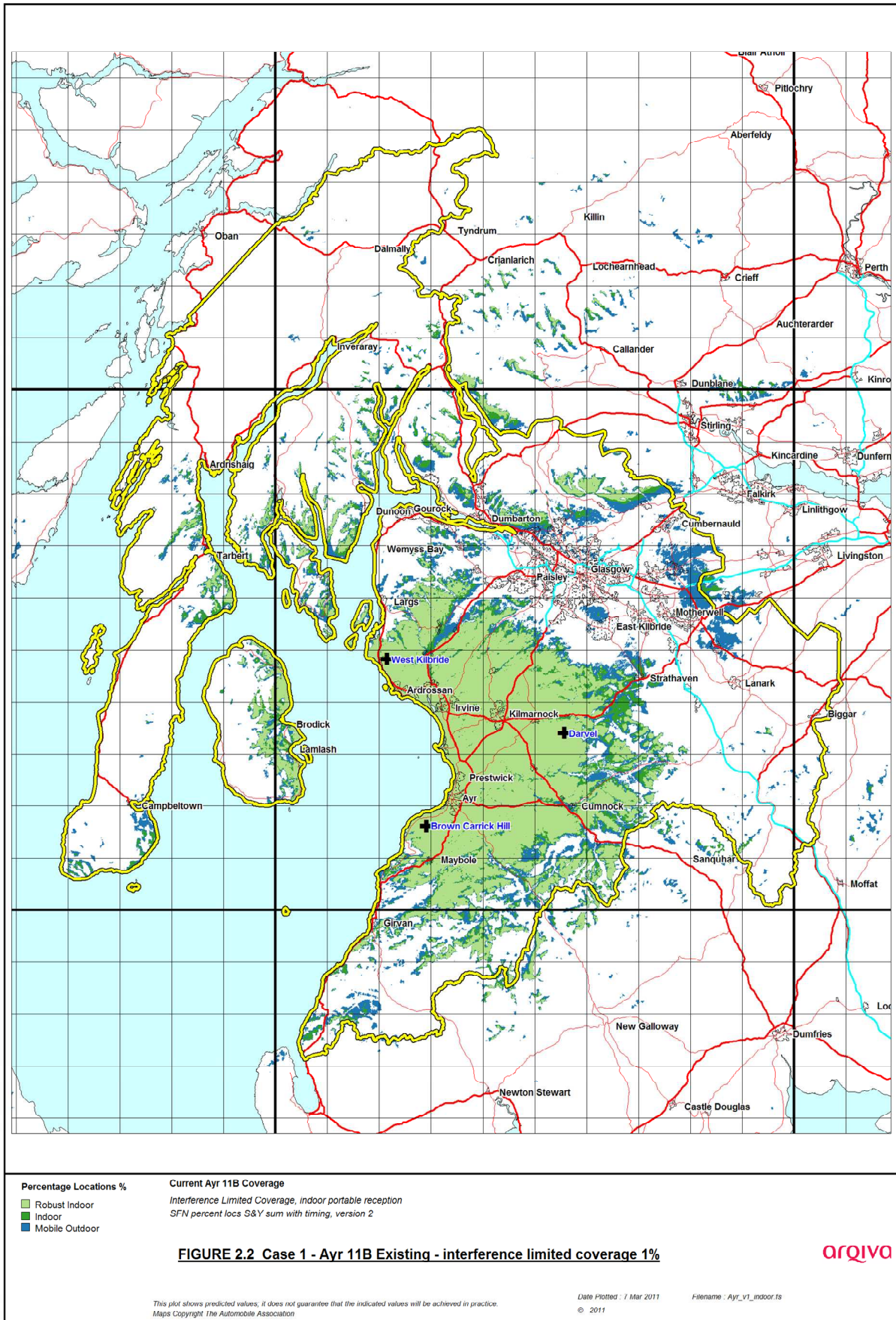
Coverage maps for DAB are presented with three colours.

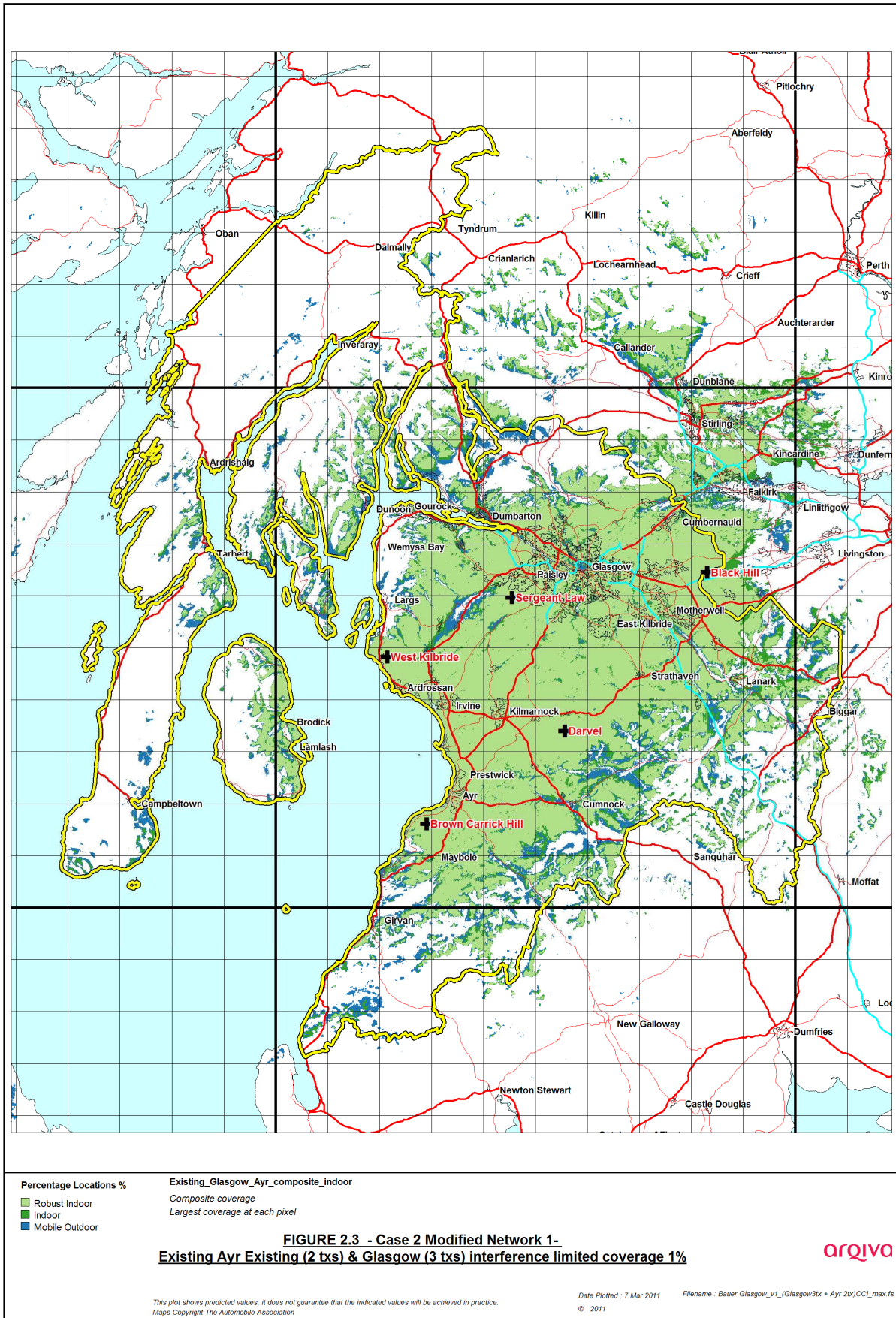
Blue = Mobile coverage (99% locations at 99% time)

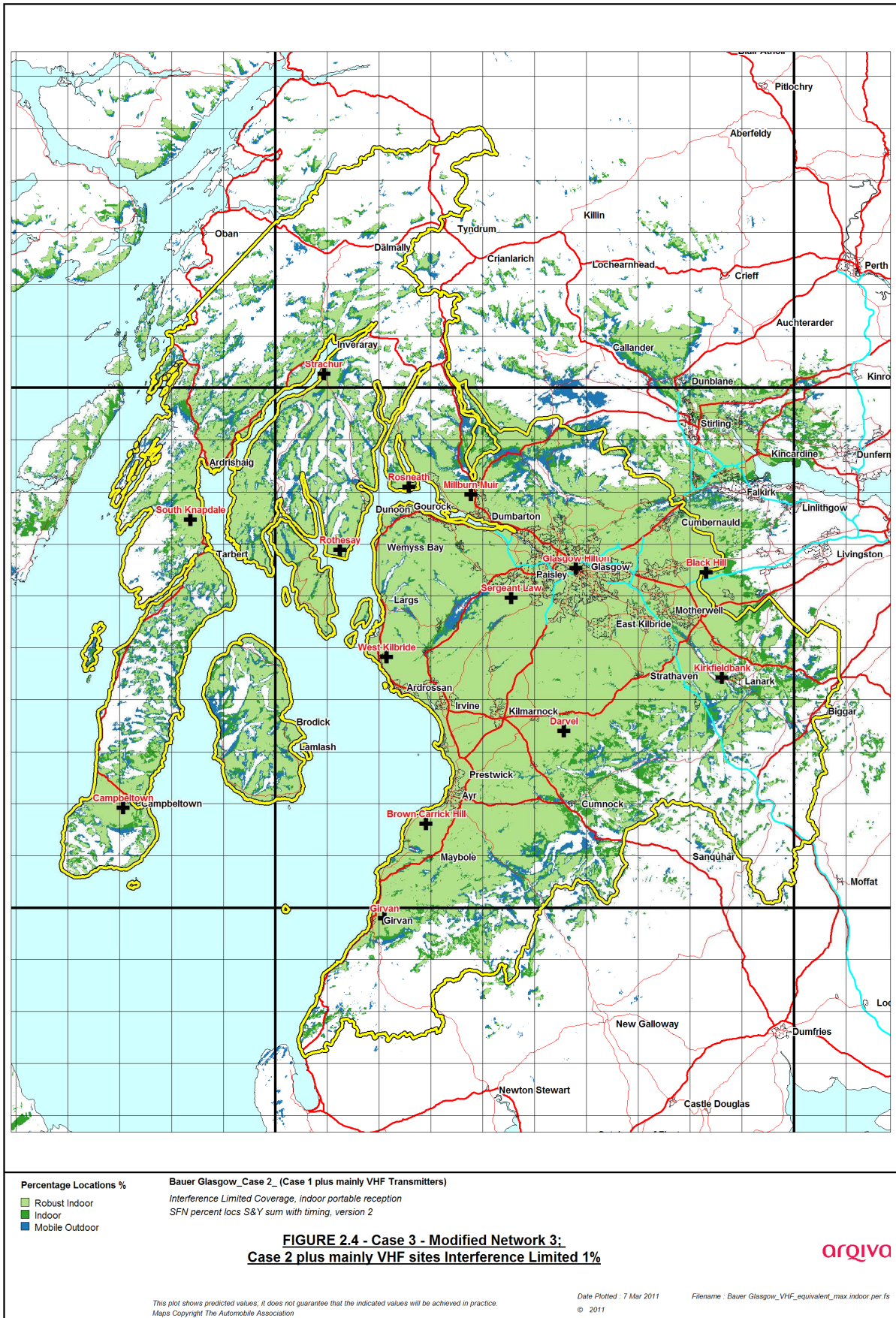
Dark Green = Indoor coverage (80-95% locations at 99% time)

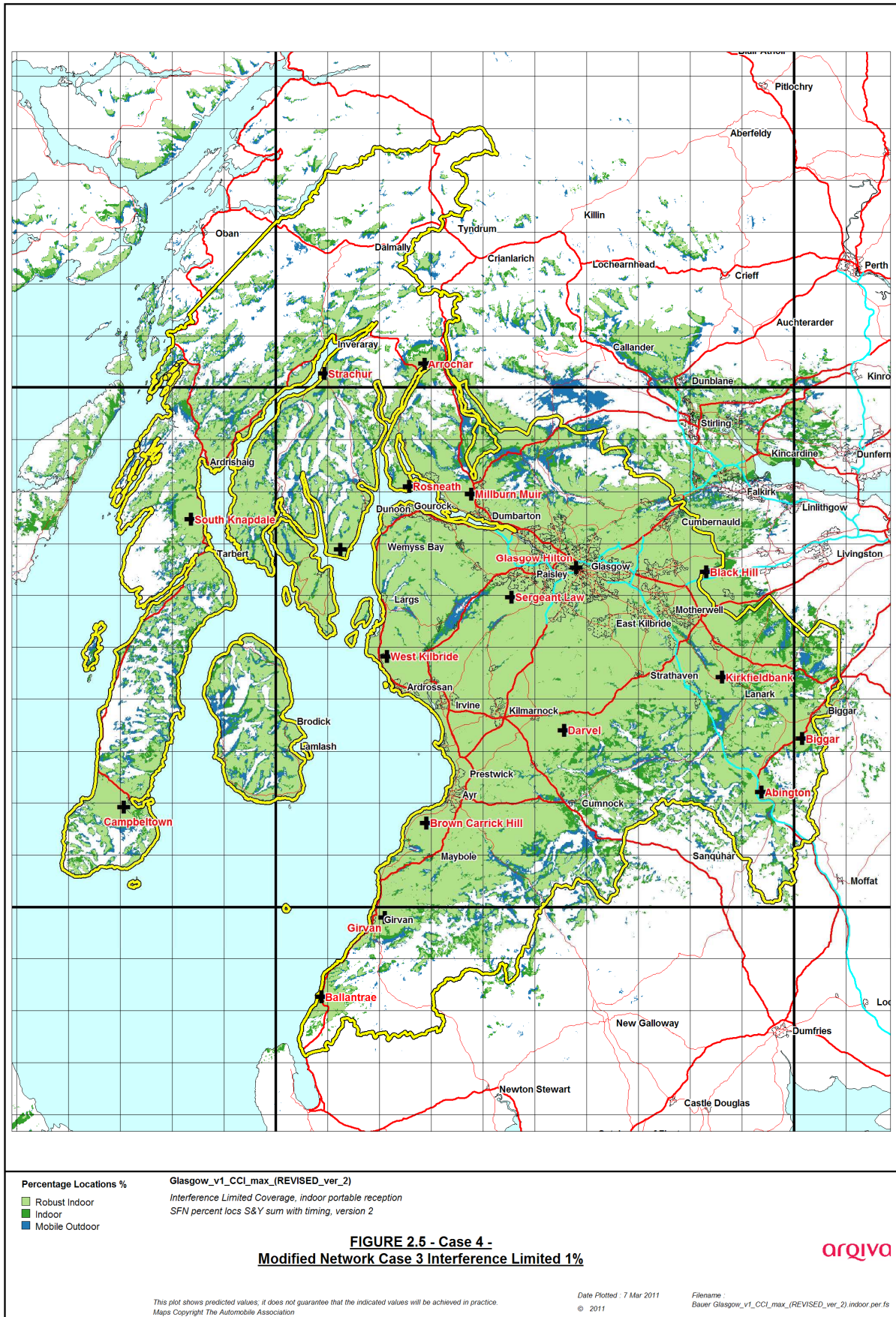
Light Green = Robust Indoor coverage (>95% locations at 99% time)











2.6 Population Coverage Tables

The following population tables Table 2.1 and Table 2.2 are colour coded thus:-

Existing Glasgow (<i>4 transmitters</i>)	-	Light Yellow = Glasgow existing sites unchanged)
Existing Ayr (<i>3 transmitters</i>)	-	Light Pink = Ayr existing sites unchanged
Case 1 (<i>5 transmitters</i>)	-	Light Blue = Modified Network 1. Three Glasgow transmitters plus Two Ayr Transmitters (on 11C)
Case 2 (<i>13 transmitters</i>)	-	Light Blue + orange = modified network 2
Case 3 (<i>18 transmitters</i>)	-	Light Blue + orange + green = modified network 3

Table 2-1. Population coverage proportional indoor 99%T: Total 1054463

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 Glasgow Mux (4 Tx)	Existing infrastructure		802254			76.08
Current Ayr Mux (3 Tx)	Existing infrastructure		151235			14.34
Modified Glasgow (3txs) PLUS Ayr (2txs)	Shared Existing Infrastructure		883568			83.79
Glasgow Hilton	New city centre site	291356 (27.63%)	929649	48081	4.37	88.16
Rosneath	VHF site	56840 (5.39%)	970744	41095	3.9	92.06
Millburn Muir	"	33584 (3.18%)	982615	11871	1.13	93.19
Rothesay	"	12951 (1.235)	995131	12516	1.18	94.37
Girvan	"	16791 (1.59%)	1001597	6466	0.62	94.99
South Knapdale	"	26435 (2.51%)	1006556	4959	0.47	95.46
Campbeltown	"	3707 (0.35%)	1010240	3684	0.35	95.81
Strachur	"	893 (0.08%)	1011155	915	0.09	95.89
Biggar	Extra sites	4444 (0.42%)	1014709	3554	0.34	96.23
Kirkfieldbank	"	33264 (1.53%)	1016268	1559	0.15	96.38
Abington	"	516 (0.05%)	1017222	954	0.39	96.47
Arrochar	"	419 (0.04%)	1017691	469	0.04	96.51
Ballantrae	"	430 (0.04%)	1018088	397	0.04	96.55

Table 2-2. Road coverage 99% locations, 99%T: Total 2171 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	Site scenario and incremental additional sites
Current Glasgow Mux (4 Tx)	Existing infrastructure		1160			53.4
Current Ayr Mux (3 Tx)	Existing infrastructure		540			24.9
Modified Glasgow (3txs) PLUS Ayr (2txs)	Shared Existing Infrastructure		1321			60.9
Glasgow Hilton	New city centre site	295.958	1335	13.8	0.63	61.5
Rosneath	VHF site	137.882	1416	6.2	3.7	65.2
Millburn Muir	"	91.083	1435	19.2	0.28	66.1
Rothesay	"	83.4	1494	59.8	2.65	68.8
Girvan	"	92.210	1518	23.7	1.1	69.9
South Knapdale	"	241.428	1598	81.3	3.66	73.6
Campbeltown	"	10.731	1608	11.7	0.5	74.1
Strachur	"	43.572	1640	31.7	1.46	75.6
Biggar	Extra sites	61.819	1692	38.2	2.40	77.9
Kirkfieldbank	"	33.264	1705	12.3	0.57	78.5
Abington	"	46.487	1750	45.7	2.1	80.6
Arrochar	"	25.299	1775	24.4	1.12	81.7
Ballantrae	"	11.244	1781	7.7	0.69	82.1