Service following and traffic announcements technical trial

April 2013

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Annexes

1.0 Summary of results

- When tested, many of the receivers did not implement service following at all, but where they did implement service following, most receivers switched from DAB to FM correctly using the implied linkage association for hard linked services
- Where traffic announcement functionality was supported by a receiver, it was implemented correctly.

Results showed that improved performance could be obtained by ensuring good communication of expected receiver behavior, between radio broadcasters and receiver manufacturers.

1.1 Background

This trial is not part of a specific task in the Digital Radio Action Plan (DRAP). However, this trial was initiated as a direct result of the work in the Technology & Equipment Group (TEG) on the UK Minimum Receiver Specifications.

The DRAP has been set up by the UK Government in order to help in the decision making process leading up to Digital Radio Switchover. The TEG was set up as part of the DRAP to focus primarily on consumer equipment. One of the tasks for TEG included the development of a set of minimum technical specifications for equipment used to receive digital radio transmissions in the UK [4] [5]. These criteria are to be used as the basis of a future Digital Radio Switchover Certification Mark.

The in-vehicle element of the UK Minimum Specifications requires service following and (traffic) announcement switching as a minimum criteria. Thus in order for a vehicle manufacturer or receiver manufacturer to be granted use of the Digital Radio Switchover Certification Mark (at the point it is launched), they must implement service following and traffic announcements correctly.

Service following and traffic announcements have been implemented across the FM infrastructure. However, prior to April 2012, only limited service following and traffic announcements had been implemented across the UK's DAB network. Furthermore, it was agreed amongst industry experts that there was a lack of understanding about exactly how service following and traffic announcements should be implemented – by service providers, multiplex operators, broadcasters, vehicle manufacturers and receiver manufacturers. Thus the industry trial was launched, to test the implementation and ensure that the DAB infrastructure was in place to handle service following and traffic announcements.

The following paper has been written by Digital Radio UK and Arqiva.

1.2 Trial objectives

The trial objectives were as follows:

- To ensure UK DAB networks and services meet the requirements for implementing service following and traffic announcement features
- To provide a platform for manufacturers to test receiver behavior according to the technical specifications for service following [1] [2]
- To provide a platform for manufacturers to test receiver behavior according to the technical report for announcement switching [1] [3]
- To assess how current in-vehicle digital radios handle service following and traffic announcements in a simulated post-switchover environment, and assist the development of future in-vehicle receivers
- To log any other technical issues affecting digital radio networks and receiver performance, associated with service following and traffic announcements
- To provide a set of ETI files for World DMB members and receiver manufacturers to test receiver behavior for service following and traffic announcements

1.3 Service following

Service following is the term applied to maintaining the same audio or data content ("hard linked") or associated audio or data content ("soft linked"), in spite of the varying reception conditions, or while roaming between Ensemble areas.

Two Digital Audio Broadcasting (DAB) broadcast network topologies are possible:

- The tuned service may be carried on one Ensemble using a single frequency network (SFN) or on a multiple frequency network (MFN) covering a wide geographical area
- The tuned service may be carried on other Ensembles (SFN or MFN) covering smaller geographical areas

In geographical areas, where DAB is not available, the same audio or data content (hard linked and/or soft linked) may be available on an FM broadcast bearer. DAB provides signaling that enables service providers to inform receivers about the broadcast networks and service configurations that allow service following to take place and to allow the information to be dynamically controlled to take into account of the changes during the day.

Three types of information may be involved with service following:

- Service linking information
- Other Ensemble Services information

- Frequency information

1.4 Announcement switching

The Announcements feature is a (short) vectored interruption of the currently selected programme service. There are two types of announcement switching, depending on whether the announcement message is carried on the same service that the listener is tuned to or whether it is provided by another service, either on the same Ensemble or on a different Ensemble. After an announcement, the originally selected programme service should be restored to the user (listener).

In the case of the spoken announcement message being carried on the same service that the listener is tuned to, there will be no re-direction from the tuned service, but the volume will increase. However, in the case of the spoken announcement message being carried by a service, whilst the listener is listening to a CD or mp3 player, the listener will be temporarily re-directed from the current selected audio source to an audio source which delivers a spoken message in the form of a (short) announcement.

2.0 The trial

The trial route was live between 15th April 2012 and 15th August 2012. The correct infrastructure was set up around the South East of England, within the broadcast area of the following multiplexes (respective coverage areas are shown in Figure 1):

- London 1
- London 2
- Kent
- Sussex Coast
- Berkshire North Hampshire

Note – the BBC and Digital 1 national Ensembles also participated in the technical trial, however their coverage is not shown in Figure 1. FM transmitters are shown for the Heart service only.
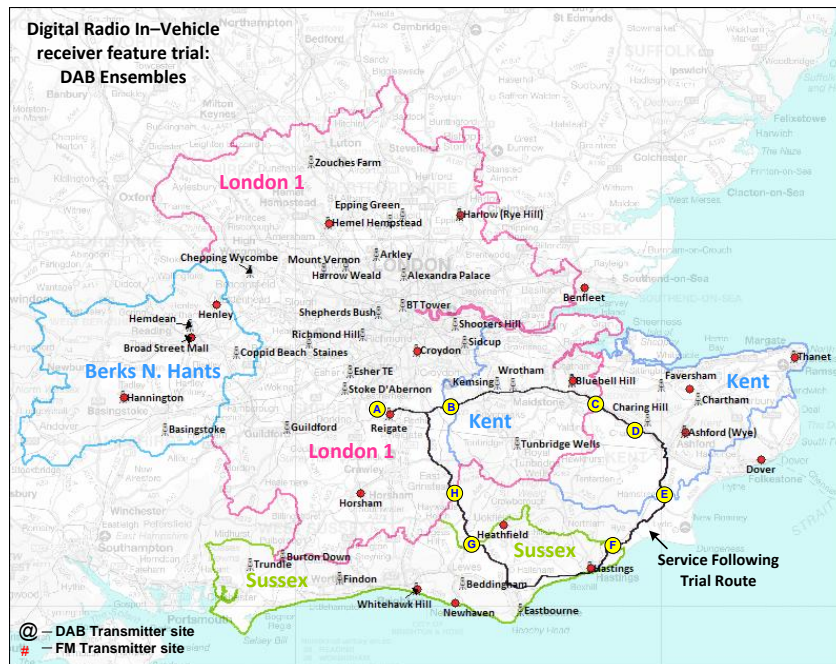
Figure 1 - Map describing DAB Ensembles and the trial route

The trial route was designed to exploit the service following and traffic announcement features in order to give the maximum opportunity for vehicle manufacturers and receiver manufactures to experience the functionality.

As part of the trial, vehicle manufacturers and receiver manufactures were tasked with driving the trial route and recording receiver behavior on a response form (see Annex A). A set of ETI files were produced for the trial in order to enable manufacturer bench testing. The relevant ETI files are available from www.worlddab.org/eti_library for WorldDMB members only. For the duration of the trial they were made available for trial participants by mark.sutcliffe@arqiva.com.

The ETI files provided by the DRAP technical trial represented a snapshot of the Ensemble configurations at the time the ETI files were captured. During the trial period, the Service following and Announcement signaling conditions were flexed to trial the various configuration options, therefore, it is possible that the data captured by trialists may not exactly match the content of the DRAP ETI files.

The actual receiver behavior (as recorded as part of the trial) was then compared with the expected behavior of the receiver (as understood by the manufacturer), and – where there was a significant difference between actual and expected behavior – a dialogue commenced between the broadcasters, Arqiva and the manufacturer in question, in order to diagnose the problem(s) and seek solutions.

Note – for each of the participating DAB Ensembles, the fast information channel (FIC), fast information group (FIG) data for the service following and announcement signaling information is shown in Annex B.

Service information is shown in Annex C detailing the Ensemble and service identifiers used for each of the participating radio stations. Here, service linking information is provided. This was done in order for manufacturers to make a link between services on one Ensemble to another Ensemble or FM service, according to the user case specified in [2].

3.0 Summary of findings

27 products were tested during the trial – driving the trial route, using the ETI files, and/or providing information based on a manufacturers questionnaire as shown in Annex D. Although not all participants were keen to share their results in full, the following is a brief summation of the trial's findings:

Note – although there were 27 trial respondents who took part in the trial, the number of trial participants does not match the number of receivers listed in the trial report because not all trial results were fed back appropriately.

Note – we have anonomised the identities of receiver manufacturers and vehicle manufacturers who took part in the trial. Each manufacture has been allocated a unique OEM reference.

Note – we have split the results into three groups, defined by their year of manufacturer (i.e. the date they were manufacturered).

3.1.0 Service Following

| Year of Manufacturer (Before 2010) | | Service Following test cases (see Note 1) | | | | | | | | | |
OEM Reference		A.1	A.2	A.3	A.4	A.5	A.6a	A.6b	A.7	A.8	Time to switch (sec)
3		FAIL	FAIL	FAIL	No Data	FAIL	FAIL	FAIL	FAIL	No Data	
9		FAIL	FAIL	FAIL	No Data	FAIL	FAIL	FAIL	FAIL	No Data	
11		FAIL	FAIL	FAIL	No Data	FAIL	PASS	FAIL	FAIL	No Data	1
12		FAIL	FAIL	FAIL	No Data	FAIL	PASS	FAIL	FAIL	No Data	1
13		FAIL	FAIL	FAIL	No Data	FAIL	FAIL	FAIL	FAIL	No Data	
14		PASS	PASS	FAIL	No Data	FAIL	PASS	FAIL	FAIL	No Data	1 - 30
15		PASS	FAIL	FAIL	No Data	FAIL	PASS	FAIL	FAIL	No Data	30
16		PASS	PASS	FAIL	No Data	FAIL	FAIL	FAIL	FAIL	No Data	
17		PASS	PASS	FAIL	No Data	FAIL	FAIL	FAIL	FAIL	No Data	
19		FAIL	FAIL	FAIL	No Data	FAIL	FAIL	FAIL	FAIL	No Data	

Table 1a – Service following results for receivers manufactured before 2010

Green Block indicates a use case PASS

Red Block indicates a use case FAIL

Grey Block indicates No Data

Year of Manufacturer (2010 to 2012)		Service Following test cases (see Note 1)									
OEM Reference		A.1	A.2	A.3	A.4	A.5	A.6a	A.6b	A.7	A.8	Time to Switch (sec)
1		Red	Red	Red		Red	Red	Red	Red		
4		Green	Green	Green		Red	Green	Green	Red		
6		Green	Green	Green		Red	Green	Green	Green		
7		Green	Green	Green		Red	Green	Green	Green		
8		Green	Green	Green		Red	Green	Green	Green		5-10
10		Green	Green	Green		Red	Green	Green	Red		
18		Green	Green	Red		Red	Red	Red	Red		
20		Red	Red	Red		Red	Red	Red	Red		
21		Red	Red	Red		Red	Red	Red	Red		
22		Green	Green	Green		Green	Green	Green	Green		
23		Green	Green	Green		Red	Green	Green	Red		
24		Red	Red	Red		Red	Red	Red	Red		
25		Green	Green	Green		Red	Red	Red	Red		
26		Green	Green	Green		Red	Green	Green	Green		

Table 1b – Service following results for receivers manufactured between 2010 and 2012

Year of Manufacturer (Next Generation products)		Service Following test cases (see Note 1)									
OEM Reference		A.1	A.2	A.3	A.4	A.5	A.6a	A.6b	A.7	A.8	Time to Switch (sec)
2		Green	Green	Green		Red	Green	Green	Green	Green	
5		Green	Green	Green		Red	Green	Green	Red		
27		Green	Green	Green		Red	Green	Green	Green		

Table 1c – Service following predicted results for next generation receivers

3.1.1

Key to Table 1 - service following use cases

- A.1, DAB to DAB link in Multi-Frequency Networks
- A.2, Linking to the same service on different Ensembles
- A.3, Linking regional variations of a service on different Ensembles
- A.4, Linking technology variations of a service on different Ensembles
- A.5, Soft linking of services
- A.6a, Linkage of DAB and FM-RDS services (implicit linkage)
- A.6b, Linkage of DAB and FM-RDS services (explicit linkage)
- A.7, Linkage of DAB and FM-RDS services with time varying network relationships
- A.8 , Preventing implicit linkage to FM-RDS

3.1.2 Description of results

- Many of the receivers did not implement service following at all
- Where service following was implemented by the receiver, only partial support was provided (i.e. not all use cases were implemented)
- Where service following was implemented by the receiver, it was found that hard linked DAB to FM RDS services (where DAB SId codes are identical to the FM PI codes) switched and worked correctly
- There was no trial evidence that soft linkage was supported by any manufacturer
- There was no trial evidence that use of the linkage actuator flag signaling was supported by any manufacturer
- Manufacturers have queried the rapid activation and deactivation of hard linked sets
- Manufacturers have queried the signaling and usage of the OE Fig header flag
- Manufacturers have queried whether the Reference Service Id in FIG 0/06 was correctly signaled in all cases
- Linked Regional Services could benefit from further signaling optimisation to improve receiver performance when switching
- Many receivers have Service Following disabled by default

3.2 Announcement Switching

OEM Reference		Announcement Switching Test cases (See Note 2)			
		ASw.1	ASw.2	ASw.3	ASw.4
1					
2		Green (hatched)	Red	Green	Green (hatched)
3					
4		Green	Red	Green	Green
5		Green	Red	Green	Green
6		Green	Red	Green	Green
7		Red	Red	Green	Green
8		Green	Red	Green	Green
9					
10		Green	Red	Green	Green
11		Green	Red	Green	Green
12		Green	Red	Green	Green
13		Green	Red	Green	Green
14		Green	Red	Green	Green
15		Green	Red	Green	Green
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

Green Block indicates a use case PASS

Red Block indicates a use case FAIL

Grey Block indicates No Data

Table 2. Announcement switching receiver results

3.2.1 Note 2.

Key to Table 2 – Announcement switching use cases

- ASw.1 Announcements carried on same Ensemble
- ASw.2 Announcements carried on Other Ensembles
- ASw.3 FM Announcements interrupts DAB
- ASw.4 Compliant usage of DAB Cluster ID

3.2.2 Description of results

- Where traffic announcement functionality was supported by a receiver, it was implemented correctly
- There was one case of incorrect receiver behavior found. A domestic HI-FI receiver interrupted services by vectoring listeners to other announcement channels carried on the same DAB Ensemble
- There was no trial evidence that announcement switching to other Ensembles was supported

4.0 Recommendations and next steps

This paper makes the following suggestions as next steps.

1. Launch a technical group to resolve issues caused as a result of Digital Radio Switchover:

- Draft a set of implementation guidelines for manufacturers and broadcasters on how to implement service following and traffic announcements correctly. This will point to relevant international technical specifications.
- Reach a broadcaster agreement on scope of service linking, including soft linking. As part of this Ofcom will be required to write a set of guidelines for broadcasters
- Relevant ETI files should be made available to all manufacturers distributing in the UK, in order to test the functionality of specific service following and traffic announcement elements of the UK Minimum Specification
- The industry should carry out a switchover trial in a specific area of the UK to investigate the consumer opinion surrounding traffic announcements (Do people want them? Are they useful?)
- Further trialing of DAB functionality should take place, such as EPG, DL+, Journaline and TPEG services. The DRAP's Optional Specification Paper is a suitable reference in identifying which functionality should be trialed
- Provide feedback to manufacturers who raised technical queries during the trial

2. Roll-out service following and traffic announcements on the UK DAB infrastructure:

- The trial infrastructure for DAB-DAB and DAB-FM service following should be restored as soon as is reasonably practicable across all Ensembles on the trial route, to provide manufacturers with a reference implementation
- Where DAB-DAB and DAB-FM linking is in place already in the UK, this should be implemented correctly. However, if it is implemented incorrectly on any UK DAB Ensemble, it should be removed

- The trial infrastructure for traffic announcement signaling should be restored as soon as is reasonably practicable across all Ensembles on the trial route, to provide manufacturers with a reference implementation.
- A coordinated plan by stakeholders to implement service following and traffic announcements should be sought for the whole UK DAB network as soon as possible

5.0 Acknowledgements

The authors would like to thank all who participated in the trial, and the organisations that have generously permitted their staff to participate. Due to the confidentiality requirements of this report, it is not possible to mention them by name, thank you – they know who they are.

6.0 References

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2. ETSI TS 103 176 V1.1.1 (2012-08) Digital Audio Broadcasting (DAB); Rules of implementation;

Service information features.

3. ETSI TR 101 496-2 v1.1.2 (2001-05) Digital Audio Broadcasting (DAB); Guidelines and rules for implementation and operation; part2: System features technical report.

4. UNITED KINGDOM DIGITAL RADIO ACTION PLAN UK (DRAP) TECHNICAL EQUIPMENT GROUP (TEG) MINIMUM SPECIFICATIONS FOR DAB & DAB+ IN-VEHICLE DIGITAL RADIO RECEIVERS AND ADAPTORS. DRAP-TEG-03 V01

5. UNITED KINGDOM DIGITAL RADIO ACTION PLAN (DRAP) TECHNICAL EQUIPMENT GROUP (TEG) MINIMUM SPECIFICATIONS FOR DAB & DAB+ PERSONAL & DOMESTIC DIGITAL RADIO RECEIVERS. DRAP-TEG-002 V02

Annex A: Receiver behavior on a response form

Annex B: Details of the Ensembles and Services participating in the trial

Annex C: Service following tables

Annex D: Manufacturers questionnaire

Annex A: Trial route and Receiver behavior on a response form

6.1 Trial Route

The trial route has been designed to exploit the service following feature to give the maximum benefit to receiver manufactures. It should be used in conjunction with Figure 1.

Road	Distance (miles)	Directions Route (A – B – C – D – E – F – G – H – A) as shown in Figure 1.	
	0.0	Start out on Fort Lane Reigate Transmission Site Grid Ref:TQ256521	A – Coverage is provided by the London 1 & London 2 DAB Ensembles
M25	0.20	At Reigate Hill interchange roundabout, join M25 Motorway Signposted Gatwick Airport, Dartford, Brighton	A Receiver with low DAB signal strength should switch to the FM alternative service between Points A to B
	2.92	Continue forward at junction 7 Signposted Dartford, M11	
	7.83	Arrive Clacket Lane Services	B – Coverage is started to be provided by Kent DAB Ensemble
	0.42	Continue forward onto the M25	A Receiver with low DAB signal strength should switch to the DAB or FM alternative service between Points B to C
M26	4.5	Keep in right hand lanes at junction 5 then continue forward onto the M26 signposted Channel Tunnel, Dover	
M20	17.0	Continue forward onto the M20 signposted Maidstone, Channel Tunnel	C – Coverage from the London Ensembles is starting to fail – receivers should have followed the tuned service

			onto the Kent Ensemble
	11.0	Travelling along M20 Arrive Charing area	D – Point D is of special interest due to potential ACI issues, BBC National Ensemble available from Charing Hill
A2070	6.9	Leave M20 motorway at junction 10 take A2070/A292 exit to Ashford/Brenzell	A Receiver with low DAB signal strength should switch to the FM alternative service between Points C to E
	0.2	At roundabout, take the 4th exit onto Bad Munstereifel Road/A2070	
	2.1	Take A2070 ramp to Hastings/Lydd Airport/Hamstreet	
	0.3	At the roundabout take 2nd exit onto A2070	
	6.7	Arrive Snave	E - – Coverage from the Kent Ensemble is starting to fail – receivers should switch to the FM alternative
A259	1.7	At the roundabout, take the 2nd exit onto Straight Lane/A259 continue to follow A259	
	2.7	Turn right to stay on A259	
	4.9	At the roundabout, take the 1st exit onto Fishmarket Road/A259 Continue to follow A259	
	0.6	At the roundabout, take the 1st exit onto Winchelsea Road/A259 Continue to follow A259	

	2.0	Turn right to stay on A259	
	0.4	Take the 2nd left onto Ferry Hill/A259 Continue to follow A259	
	2.1	Arrive Icklesham – Continue to follow A259	F - Coverage is started to be provided by Sussex DAB Ensemble, receivers should switch to the DAB Ensemble to follow the tuned service.
	5.28	Bear left Signposted Town centre Brighton – Continue to follow A259	A Receiver with low DAB signal strength should switch to the FM alternative service between Points F to G
A27	12	At Pevensey Roundabout take the 3rd exit onto A27 signposted London, Eastbourne A22, Brighton	
	3.08	At roundabout take 2nd exit onto the A27 signposted London, Brighton, East Grinstead, Lewes	
A22	1.71	At roundabout take the 4th exit onto A22 signposted London	
	9.5	Arrive Halland – continue to follow A22	G - Coverage from the Sussex Ensemble is starting to fail – receivers should switch to the FM alternative
		Continue to follow A22	A Receiver with low DAB signal strength should switch to the FM alternative service between Points G to H
	12	Arrive Wych Cross, Forest Row – Continue to follow A22	H - Coverage is started to be provided by London 1 & London 2 DAB Ensembles, receivers should switch to the

			DAB Ensemble to follow the tuned service.
M25	15	At Godstone interchange roundabout take the 2nd exit, then join the M25 motorway	
	5.0	Leave the m25 at junction 8, and then at Reigate hill interchange roundabout take the 2nd exit onto Fort Lane.	
	1.79	Arrive Fort Lane Reigate	A

Table 2 – Trial route

6.2 Service following checklist

*Please note, if you are doing the trial and listening to BBC Radio Kent between 01:00 and 06:00 you will receive audio from BBC Radio 5 Live.

1) **Travel (as stated in Table 2)**

At Reigate Hill interchange roundabout, join M25 Motorway Signposted "Gatwick Airport, Dartford, Brighton"

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐
- Switch from XFM DAB to XFM FM ☐
- Switch from Kiss DAB to Kiss 100 FM ☐
- Switch from Magic DAB to Magic FM ☐
- Switch from BBC London DAB to BBC London FM ☐
- Switch from Absolute 70s DAB to Absolute Radio FM ☐
- Switch from Absolute 00s DAB to Absolute Radio FM ☐
- Switch from ClassicFM (DAB) to ClassicFM (FM) ☐
- Switch from BBC Radio 1 DAB to BBC Radio 1 FM ☐
- Switch from BBC Radio 2 DAB to BBC Radio 2 FM ☐
- Switch from BBC Radio 3 DAB to BBC Radio 3 FM ☐
- Switch from BBC Radio 4 DAB to BBC Radio 4 FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

2) Travel (as stated in Table 2)

Arrive Clacket Lane Services

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from Capital DAB (London mux) to Capital DAB (Kent mux) ☐
- Switch from Capital DAB (London mux) to Capital FM ☐
- Switch from Heart DAB (London mux) to Heart DAB (Kent mux) ☐
- Switch from Heart DAB (London mux) to Heart FM ☐
- Switch from Kiss DAB (London mux) to Kiss DAB (Kent mux) ☐
- Switch from BBC London to BBC Radio Kent DAB ☐
- Switch from XFM DAB (London mux) to XFM DAB (Kent mux) ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

3) Travel (as stated in Table 2)

Continue forward onto the M25

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from BBC Radio Kent DAB to BBC Radio Kent FM ☐
- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐
- Switch from ClassicFM (DAB) to ClassicFM (FM) ☐
- Switch from BBC Radio 1 DAB to BBC Radio 1 FM ☐
- Switch from BBC Radio 2 DAB to BBC Radio 2 FM ☐
- Switch from BBC Radio 3 DAB to BBC Radio 3 FM ☐
- Switch from BBC Radio 4 DAB to BBC Radio 4 FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

4) Travel (as stated in Table 2)

Continue forward onto the M20 signposted Maidstone, Channel Tunnel

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from Capital DAB (London mux) to Capital DAB (Kent mux)
- Switch from Capital DAB (London mux) to Capital FM
- Switch from Heart DAB (London mux) to Heart DAB (Kent mux)
- Switch from Heart DAB (London mux) to Heart FM
- Switch from Kiss DAB (London mux) to Kiss DAB (Kent mux)
- Switch from BBC London to BBC Radio Kent DAB
- Switch from XFM DAB (London mux) to XFM DAB (Kent mux)

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

5) Travel (as stated in Table 2)

Travelling along M20 Arrive Charing area

Which station are you listening (prior to the switch)?

Does your receiver switch to a BBC national service? _____

Which station? _____

If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

6) Travel (as stated in Table 2)

Leave M20 motorway at junction 10 take A2070/A292 exit to Ashford/Brenzell

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from BBC Radio Kent DAB to BBC Radio Kent FM ☐
- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐
- Switch from ClassicFM (DAB) to ClassicFM (FM) ☐
- Switch from BBC Radio 1 DAB to BBC Radio 1 FM ☐
- Switch from BBC Radio 2 DAB to BBC Radio 2 FM ☐
- Switch from BBC Radio 3 DAB to BBC Radio 3 FM ☐
- Switch from BBC Radio 4 DAB to BBC Radio 4 FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

7) Travel (as stated in Table 2)

Arrive Snave

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from BBC Radio Kent DAB to BBC Radio Kent FM ☐
- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

8) Travel (as stated in Table 2)

Arrive Icklesham – Continue to follow A259

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from Capital DAB (Kent mux) to Capital DAB (Sussex mux) ☐
- Switch from Capital DAB (Kent mux) to Capital FM ☐
- Heart DAB (Kent mux) to Heart DAB (Sussex mux) ☐
- Heart DAB (Kent mux) to Heart FM ☐
- Kiss DAB (Kent mux)to Kiss DAB (Sussex mux) ☐
- XFM DAB (Kent mux) to Sussex DAB (Kent mux) ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

9) Travel (as stated in Table 2)

Bear left Signposted Town centre Brighton – Continue to follow A259

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from BBC R Sussex DAB to BBC R Sussex FM ☐
- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐
- Switch from ClassicFM (DAB) to ClassicFM (FM) ☐
- Switch from BBC Radio 1 DAB to BBC Radio 1 FM ☐
- Switch from BBC Radio 2 DAB to BBC Radio 2 FM ☐
- Switch from BBC Radio 3 DAB to BBC Radio 3 FM ☐
- Switch from BBC Radio 4 DAB to BBC Radio 4 FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

10) Travel (as stated in Table 2)

Arrive Halland – continue to follow A22

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from BBC R Sussex DAB to BBC R Sussex FM ☐
- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

11) Travel (as stated in Table 2)

Continue to follow A22

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from BBC R Sussex DAB to BBC R Sussex FM ☐
- Switch from Capital DAB to Capital FM ☐
- Switch from Heart DAB to Heart FM ☐
- Switch from ClassicFM (DAB) to ClassicFM (FM) ☐
- Switch from BBC Radio 1 DAB to BBC Radio 1 FM ☐
- Switch from BBC Radio 2 DAB to BBC Radio 2 FM ☐
- Switch from BBC Radio 3 DAB to BBC Radio 3 FM ☐
- Switch from BBC Radio 4 DAB to BBC Radio 4 FM ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

- - - - - - - -

12) Travel (as stated in Table 2)

Arrive Wych Cross, Forest Row – Continue to follow A22

Which station are you listening (prior to the switch)?

Does your receiver do the following (please tick appropriately)?

- Switch from Capital DAB (Sussex mux) to Capital DAB (London mux) ☐
- Switch from Capital DAB (Sussex mux) to Capital FM ☐
- Switch from Heart DAB (Sussex mux) to Heart DAB (London mux) ☐
- Switch from Heart DAB (Sussex mux) to Heart FM ☐
- Switch from Kiss DAB (Sussex mux) to Kiss DAB (London mux) ☐
- Switch from Kiss DAB (Sussex mux) to Kiss FM ☐
- Switch from XFM DAB (Sussex mux) to XFM DAB (London mux) ☐

Did the switch work as intended?
If "no" to the above, are you aware of any reasons for this?
Additional comments:

Annex B: Details of the Ensembles and Services participating in the trial

BBC National
Ensemble Information

Label	BBC National DAB
EId	CE15
Frequency	12B (225.648 MHz)

Service Information

Service	SId	SubChn Id	
BBC Radio 1	C221	1	DAB Audio
BBC Radio 2	C222	2	DAB Audio
BBC Radio 3	C223	3	DAB Audio
BBC Radio 4	C224	4	DAB Audio
BBC Radio 5 Live	C225	5	DAB Audio
BBC Radio 1Xtra	C22A	10	DAB Audio
BBC Radio 6Music	C22B	11	DAB Audio
BBC Radio 4Extra	C22C	12	DAB Audio
BBC AsianNetwork	C236	7	DAB Audio
BBC WorldService	C238	9	DAB Audio
BBC Guide	E1C79E5E	62	EPG – Packet Data
BBC Travel	E1C79E60	62	TPEG – Packet Data

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
BBC R 5 Live AM	0	C205	AM	False	639kHz, 909kHz, 990kHz

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
BBC Radio 1 DAB - FM	0	Active	Hard	0x01	RDS PI	C221, C201
BBC Radio 2 DAB - FM	0	Active	Hard	0x03	RDS PI	C222, C202
BBC Radio 3 DAB - FM	0	Active	Hard	0x05	RDS PI	C223, C203
BBC Radio 4 DAB - FM	0	Active	Hard	0x07	RDS PI	C224, C204
BBC Radio 5 DAB - AM	0	Active	Hard	0x09	AM Dummy	C225, C205

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List

D1 National
Ensemble Information

Label	D1 National
EId	C181
Frequency	11D (222.064 MHz) England, Wales & Northern Ireland 12A (223.936 MHz) Scotland

Service Information

Service	SId	SubChn Id	
Absolute R 80s	C4C1	14	DAB Audio
Absolute R Extra	C0C1	3	DAB Audio
Absolute Rad 90s	C4C0	12	DAB Audio
Absolute Radio	C1C0	3	DAB Audio
BFBS Radio	C3C0	9	DAB Audio
Classic FM	C2A1	1	DAB Audio
Jazz FM	C0C2	11	DAB Audio
Planet Rock	C2C0	5	DAB Audio
PremierChristian	C7C1	6	DAB Audio
Smooth Radio 70s	C3C5	15	DAB Audio
Smooth Radio UK	C6C0	8	DAB Audio
talkSPORT	C0C0	2	DAB Audio
Test A	C7C0	4	DAB Audio
UCB UK Christian	C4CA	7	DAB Audio
Whats's On	E1C000B1	25	EPG – Packet Data
Traffic Master	E1C000B8	26	TPEG – Packet Data
INRIX UK TPEG	E1C000BA	35	TPEG – Packet Data

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
D1 MFN	0	C181	DAB	True	222.064 MHz, 223.936 MHz
Absolute Radio – FM	0	C4B4	FM	false	105.8 MHz

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
Absolute Radio – FM	0	Active	Hard	0x192	RDS PI	C1C0, C4B4
Absolute "Group Services"	0	Active	Soft	0x192	DAB	C1C0, C1C2, CDC1

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List

London 1
Ensemble Information

Label	London 1
EId	C185
Frequency	12C (227.360 MHz)

Service Information

Service	SId	SubChn Id	
Capital	C479	1	DAB Audio
Choice	C37B	3	DAB Audio
Heart	C460	6	DAB Audio
heat radio	CDCE	16	DAB Audio
KISS	C483	5	DAB Audio
LBC 97.3	C478	12	DAB Audio
LBC News 1152	C5C2	8	DAB Audio
MAGIC	C788	4	DAB Audio
Sunrise Radio	CCC1	2	DAB Audio
EPG+Slideshow	E1C00098	30	EPG – Packet Data
EPG+Slideshow	E1C00098	30	Slideshow – Packet Data

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
Adjacent Cambridge DAB Ensemble carrying linked services	0	C1AF	DAB	false	220.352 MHz
Adjacent Kent DAB Ensemble carrying linked services	0	C1AB	DAB	false	220.352 MHz
Adjacent Peterborough DAB Ensemble carrying linked services	0	C1A1	DAB	false	229.072 MHz
Adjacent Berks & N Hants DAB Ensemble carrying linked services	0	C1AD	DAB	false	229.072 MHz
Adjacent Essex DAB Ensemble carrying linked services	0	C19C	DAB	false	229.072 MHz
Adjacent South Hants DAB Ensemble carrying linked services	0	C1A3	DAB	false	220.352 MHz
Adjacent Sussex DAB Ensemble carrying linked services	0	C1A9	DAB	false	218.640 MHz
Capital FM	0	C479	FM	false	95.8MHz
Capital FM	0	C870	FM	false	103.2 MHz
Heart FM	0	C361	FM	false	97.0, 97.4, 102.6, 102.9, 103.4
Heart FM	0	C362	FM	false	95.9, 96.1, 97.0, 102.8, 103.1
Heart FM	0	C363	FM	false	96.6, 96.9, 97.6, 103.3
Heart FM	0	C364	FM	false	96.1, 96.3, 97.5, 101.7, 102.6
Heart FM	0	C368	FM	false	96.9, 97.5, 102.0, 102.4, 102.7, 103.5
Heart FM	0	C36A	FM	false	97.4, 102.7, 103.0
Heart FM	0	C36C	FM	false	96.4, 97.1, 102.4
Heart FM	0	C460	FM	false	106.2
Kiss 100 FM	0	C483	FM	false	100.0
Magic FM	0	C788	FM	false	105.4

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
Capital - DAB	0	switched	Hard	0x196	DAB	C479, C47F, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – DAB	0	Active	Soft	0x196	DAB	C479, C47F, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – Networked DAB	0	Switched	Hard	0x1A9	DAB	C479, C47F
Capital – FM	0	switched	Hard	0x196	FM	C479, C370, C371, C372, C377, C37A, C670, C671, C870
Capital – FM	0	Active	Soft	0x192	FM	C479, C370, C371, C372, C377, C37A, C470, C471, C477, C47A, C570, C571, C577, C57A, C670, C677, C671, C777, C870
Heart - DAB	0	switched	Hard	0x197	DAB	C460, C361, C362, C364, C365, C366, C368, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – DAB	0	Active	Soft	0x197	DAB	C460, C361, C362, C364, C365, C366, C368, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – Networked DAB	0	Switched	Hard	0x1A7	DAB	C460, C560
Heart – FM	0	switched	Hard	0x197	FM	C460, C361, C362, C363, C364, C365, C366, C368, C369, C36A, C36B, C36C, C36E, C36F, C467
Heart – FM	0	Active	Soft	0x197	FM	C460, C361, C362, C363, C364, C365, C366, C368, C369, C36A, C36B, C36C, C36E, C36F, C461, C462, C463, C464, C465, C466, C467, C468, C469, C46A, C46B, C46C, C46E, C46F, C561, C562, C563, C564, C565, C566, C568, C569, C56A, C56B, C56C, C56E, C56F, C661, C663, C664, C665, C668, C669, C66B, C66C, C66F, C761, C763, C764, C768, C769, C76B, C76F, C864, C869
KISS - DAB	0	Active	Hard	0x193	DAB	C483, C0C9, C2C3, C2C4, C2C5, C3A5, C4C3, C6C1, C7C7, C883, C8C4, C8CA, C9CB, CAC5, CAC8, CBC3, CBCA, CE83

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List
Capital Other Ensembles	0	C47F	C1A9, C1AD, C1AF, C19C, C1AB, C1A1
Capital Other Ensembles	0	C870	C1A3
Heart Other Ensembles	0	C36A	C1AF
Heart Other Ensembles	0	C362	C1AB
Heart Other Ensembles	0	C56A	C1A1
Heart Other Ensembles	0	C361	C1AD
Heart Other Ensembles	0	C364	C19C
Heart Other Ensembles	0	C365	C1A3
Heart Other Ensembles	0	C368	C1A9
KISS Other Ensembles	0	C883	C1AF, C1A1
KISS Other Ensembles	0	CBCA	C1AB
KISS Other Ensembles	0	CAC8	C1AD, C1A9
KISS Other Ensembles	0	CACA	C19C
KISS Other Ensembles	0	C483	C1A3

Announcement Support (Fig 0/18)

Announcement Description	SId	Cluster Id	Support Flags
Capital	C479	0x06	Road Traffic Flash, Transport Flash
Heart	C460	0x08	Road Traffic Flash, Transport Flash
KISS	C483	0x03	Road Traffic Flash, Transport Flash
Magic	C788	0x05	Road Traffic Flash, Transport Flash

Announcement Switching (Fig 0/19)

Announcement Description	Cluster Id	Switching Flags	SubChn Id
Capital	0x06	Road Traffic Flash	1
Heart	0x08	Road Traffic Flash	6
KISS	0x03	Road Traffic Flash	5
Magic	0x05	Road Traffic Flash	4

London 2
Ensemble Information

Label	London 2
EId	C186
Frequency	12A (223.936 MHz)

Service Information

Service	Sid	SubChn Id	
Absolute Rad 00s	CDC1	1	DAB Audio
Absolute Rad 70s	C1C2	14	DAB Audio
BBC London	CC31	9	DAB Audio
French Radio Ldn	C0CF	3	DAB Audio
Gold - London	C8D3	5	DAB Audio
KERRANG!	C7CE	11	DAB Audio
Punjabi Radio	CBCB	10	DAB Audio
Sout Al Khaleej	CFC1	6	DAB Audio
Spectrum Radio	CCC0	12	DAB Audio
The Hits	CCCC	4	DAB Audio
UCB Gospel	CED0	8	DAB Audio
UCBinspirational	CFD0	7	DAB Audio
Voice of Russia	CCCF	13	DAB Audio
XFM	C474	2	DAB Audio

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
Adjacent Cambridge DAB Ensemble carrying linked services	0	C1AF	DAB	false	220.352 MHz
Adjacent Kent DAB Ensemble carrying linked services	0	C1AB	DAB	false	220.352 MHz
Adjacent Peterborough DAB Ensemble carrying linked services	0	C1A1	DAB	false	229.072 MHz
Adjacent Berks & N Hants DAB Ensemble carrying linked services	0	C1AD	DAB	false	229.072 MHz
Adjacent Essex DAB Ensemble carrying linked services	0	C19C	DAB	false	229.072 MHz
Adjacent South Hants DAB Ensemble carrying linked services	0	C1A3	DAB	false	220.352 MHz
Adjacent Sussex DAB Ensemble carrying linked services	0	C1A9	DAB	false	218.640 MHz
Adjacent D1 DAB Ensemble carrying linked services	0	C181	DAB	False	222.064 MHz
Un-Adjacent D1 DAB Ensemble carrying linked services	0	C181	DAB	False	223.936 MHz
XFM FM	0	C474	FM	false	104.9 MHz
BBC London	0	CC11	FM	false	94.9 MHz

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
XFM - DAB	0	Switched	Hard	0x198	DAB	C474, C574
XFM – DAB	0	Active	Soft	0x198	DAB	C474, C574
XFM – FM	0	switched	Hard	0x198	FM	C474, C574
XFM – FM	0	Active	Soft	0x198	FM	C474, C574
Absolute Group - DAB	0	Active	Soft	0x192	DAB	C1C2, CDC1, C1C0
BBC R London	0	Active	Hard	0x4D	DAB	CC31, CC11

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List
XFM Other Ensembles	0	C474	C1AF, C1AB, C1A1, C1AD, C19C, C1A3, C1A9

Kent
Ensemble Information

Label	Kent
EId	C1AB
Frequency	11C (220.352 MHz)

Service Information

Service	Sid	SubChn Id	
BBC Radio Kent	C631	6	DAB Audio
Capital	C47F	9	DAB Audio
Gold - Kent	C7D2	2	DAB Audio
Heart Kent	C362	1	DAB Audio
Kiss	CBCA	12	DAB Audio
Kmfm Extra	C4CF	5	DAB Audio
Pop Up Radio	CFCF	10	DAB Audio
XFM	C474	3	DAB Audio
EPG Kent	E1C000C2	21	EPG – Packet Data

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
Adjacent London 1 DAB Ensemble carrying linked services	0	C185	DAB	false	227.360 MHz
Adjacent London 2 DAB Ensemble carrying linked services	0	C186	DAB	false	220.352 MHz
Adjacent Essex DAB Ensemble carrying linked services	0	C19C	DAB	false	229.072 MHz
Adjacent Sussex DAB Ensemble carrying linked services	0	C1A9	DAB	false	218.640 MHz
Capital FM	0	C479	FM	false	95.8MHz
Capital FM	0	C870	FM	false	103.2 MHz
Heart FM	0	C362	FM	false	95.9, 96.1, 97.0, 102.8, 103.1
Heart FM	0	C363	FM	false	96.6, 96.9, 97.6, 103.3
Heart FM	0	C364	FM	false	96.1, 96.3, 97.5, 101.7, 102.6
Heart FM	0	C368	FM	false	96.9, 97.5, 102.0, 102.4, 102.7, 103.5
Heart FM	0	C36C	FM	false	96.4, 97.1, 102.4
Heart FM	0	C460	FM	false	106.2
Heart FM	0	C462	FM	false	102.8
Heart FM	0	C562	FM	false	95.9, 96.1, 97.0, 103.1
Kiss 100 FM	0	C483	FM	false	100.0
XFM FM	0	C474	FM	false	104.9 MHz
BBC R Kent	0	C619	FM	false	96.7, 97.6, 104.2 MHz

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
Capital - DAB	0	switched	Hard	0x196	DAB	C47F, C479, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – DAB	0	Active	Soft	0x196	DAB	C47F, C479, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – Networked DAB	0	Switched	Hard	0x1A9	DAB	C47F, C479
Capital – FM	0	switched	Hard	0x196	FM	C47F, C370, C371, C372, C377, C37A, C479, C670, C671, C870
Capital – FM	0	Active	Soft	0x196	FM	C47F, C370, C371, C372, C377, C37A, C470, C471, C477, C479, C47A, C570, C571, C577, C57A, C670, C677, C671, C777, C870
Heart - DAB	0	switched	Hard	0x197	DAB	C362, C361, C460, C364, C365, C366, C368, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – DAB	0	Active	Soft	0x197	DAB	C362, C361, C460, C364, C365, C366, C368, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – Networked DAB	0	Switched	Hard	0x1A7	DAB	C460, C560
Heart – FM	0	switched	Hard	0x197	FM	C362, C361, C460, C363, C364, C365, C366, C368, C369, C36A, C36B, C36C, C36E, C36F, C467
Heart – FM	0	Active	Soft	0x197	FM	C362, C361, C460, C363, C364, C365, C366, C368, C369, C36A, C36B, C36C, C36E, C36F, C461, C462, C463, C464, C465, C466, C467, C468, C469, C46A, C46B, C46C, C46E, C46F, C561, C562, C563, C564, C565, C566, C568, C569, C56A, C56B, C56C, C56E, C56F, C661, C663, C664, C665, C668, C669, C66B, C66C, C66F, C761, C763, C764, C768, C769, C76B, C76F, C864, C869
KISS - DAB	0	Active	Hard	0x193	DAB	CBCA, C0C9, C2C3, C2C4, C2C5, C3A5, C4C3, C6C1, C7C7, C883, C8C4, C8CA, C9CB, CAC5, CAC8, CBC3, C483, CE83
XFM - DAB	0	Switched	Hard	0x198	DAB	C474, C574
XFM – DAB	0	Active	Soft	0x198	DAB	C474, C574
XFM – FM	0	switched	Hard	0x198	FM	C474, C574
XFM – FM	0	Active	Soft	0x198	FM	C474, C574
BBC R Kent - DAB	0	Switched	Hard	0x09	DAB	C631, C225
BBC R Kent - FM	0	Active	Hard	0x43	FM	C631, C619

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List
Capital Other Ensembles	0	C47F	C19C, C1A9
Capital Other Ensembles	0	C479	C185
Heart Other Ensembles	0	C460	C185
Heart Other Ensembles	0	C364	C19C
Heart Other Ensembles	0	C368	C1A9
KISS Other Ensembles	0	CAC8	C1AD, C1A9
KISS Other Ensembles	0	CACA	C19C
KISS Other Ensembles	0	C483	C1A3
XFM Other Ensembles	0	C474	C186, C19C, C1A9

Announcement Support (Fig 0/18)

Announcement Description	SId	Cluster Id	Support Flags
Capital	C47F	0x06	Road Traffic Flash, Transport Flash
Heart Kent	C362	0x08	Road Traffic Flash, Transport Flash
KISS	CBCA	0x03	Road Traffic Flash, Transport Flash

Announcement Switching (Fig 0/19)

Announcement Description	Cluster Id	Switching Flags	SubChn Id
Capital	0x06	Road Traffic Flash	9
Heart	0x08	Road Traffic Flash	1
KISS	0x03	Road Traffic Flash	12

Sussex Coast
Ensemble Information

Label	Sussex Coast
EId	C1A9
Frequency	11B (218.640 MHz)

Service Information

Service	Sid	SubChn Id	
BBC Sussex	CD32	7	DAB Audio
Capital	C47F	9	DAB Audio
Gaydar Radio	CBCE	5	DAB Audio
Gold - Sussex	C0D3	3	DAB Audio
Heart	C368	1	DAB Audio
Juice Digital	C099	6	DAB Audio
Kiss	CAC8	14	DAB Audio
Pop Up Radio	CFCF	15	DAB Audio
XFM	C474	2	DAB Audio
EPG Sussex Coast	E1C000CB	22	EPG – Packet Data

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
Adjacent London 1 DAB Ensemble carrying linked services	0	C185	DAB	false	227.360 MHz
Adjacent London 2 DAB Ensemble carrying linked services	0	C186	DAB	false	220.352 MHz
Adjacent Essex DAB Ensemble carrying linked services	0	C19C	DAB	false	229.072 MHz
Adjacent South Hampshire DAB Ensemble carrying linked services	0	C1A3	DAB	false	220.352 MHz
Capital FM	0	C479	FM	false	95.8MHz
Capital FM	0	C870	FM	false	103.2 MHz
Heart FM	0	C361	FM	false	97.0, 97.4, 102.6, 102.9, 103.4
Heart FM	0	C362	FM	false	95.9, 96.1, 97.0, 102.8, 103.1
Heart FM	0	C368	FM	false	96.9, 97.5, 102.0, 102.4, 102.7, 103.5
Heart FM	0	C460	FM	false	106.2
Heart FM	0	C468	FM	false	96.9, 103.5
Heart FM	0	C568	FM	false	102.4
Heart FM	0	C668	FM	false	102.0
Heart FM	0	C768	FM	false	97.5, 102.7
Kiss 100 FM	0	C483	FM	false	100.0
XFM FM	0	C474	FM	false	104.9 MHz
BBC R Sussex	0	CD12	FM	false	95.0, 95.1, 95.3, 104.5, 104.8 MHz

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
Capital - DAB	0	switched	Hard	0x196	DAB	C47F, C479, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – DAB	0	Active	Soft	0x196	DAB	C47F, C479, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – Networked DAB	0	Switched	Hard	0x1A9	DAB	C47F, C479
Capital – FM	0	switched	Hard	0x196	FM	C47F, C370, C371, C372, C377, C37A, C479, C670, C671, C870
Capital – FM	0	Active	Soft	0x196	FM	C47F, C370, C371, C372, C377, C37A, C470, C471, C477, C479, C47A, C570, C571, C577, C57A, C670, C677, C671, C777, C870
Heart - DAB	0	switched	Hard	0x197	DAB	C368, C361, C460, C364, C365, C366, C362, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – DAB	0	Active	Soft	0x197	DAB	C368, C361, C460, C364, C365, C366, C3682C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – Networked DAB	0	Switched	Hard	0x1A7	DAB	C460, C560
Heart – FM	0	switched	Hard	0x197	FM	C368, C361, C460, C363, C364, C365, C366, C362, C369, C36A, C36B, C36C, C36E, C36F, C467
Heart – FM	0	Active	Soft	0x197	FM	C368, C361, C460, C363, C364, C365, C366, C362, C369, C36A, C36B, C36C, C36E, C36F, C461, C462, C463, C464, C465, C466, C467, C468, C469, C46A, C46B, C46C, C46E, C46F, C561, C562, C563, C564, C565, C566, C568, C569, C56A, C56B, C56C, C56E, C56F, C661, C663, C664, C665, C668, C669, C66B, C66C, C66F, C761, C763, C764, C768, C769, C76B, C76F, C864, C869
KISS - DAB	0	Active	Hard	0x193	DAB	CAC8, C0C9, C2C3, C2C4, C2C5, C3A5,C483, C4C3, C6C1, C7C7, C883, C8C4, C8CA, C9CB, CAC5, CBC8, CBC3, CBCA, CE83
XFM - DAB	0	Switched	Hard	0x198	DAB	C474, C574
XFM – DAB	0	Active	Soft	0x198	DAB	C474, C574
XFM – FM	0	switched	Hard	0x198	FM	C474, C574
XFM – FM	0	Active	Soft	0x198	FM	C474, C574
BBC R Sussex - FM	0	Active	Hard	0x72	FM	CD32, CD12

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List
Capital Other Ensembles	0	C47F	C1AB
Capital Other Ensembles	0	C479	C185
Capital Other Ensembles	0	C870	C1A3
Heart Other Ensembles	0	C460	C185
Heart Other Ensembles	0	C362	C1AB
Heart Other Ensembles	0	C365	C1A3
KISS Other Ensembles	0	CBCA	C1AB
KISS Other Ensembles	0	C483	C1A3, C185
XFM Other Ensembles	0	C474	C186, C1AB, C1A3

Announcement Support (Fig 0/18)

Announcement Description	SId	Cluster Id	Support Flags
Capital	C47F	0x06	Road Traffic Flash, Transport Flash
Heart	C368	0x08	Road Traffic Flash, Transport Flash
KISS	CAC8	0x03	Road Traffic Flash, Transport Flash

Announcement Switching (Fig 0/19)

Announcement Description	Cluster Id	Switching Flags	SubChn Id
Capital	0x06	Road Traffic Flash	9
Heart	0x08	Road Traffic Flash	1
KISS	0x03	Road Traffic Flash	14

Berks N. Hants
Ensemble Information

Label	Berks & N Hants
EId	C1AD
Frequency	12D (229.072 MHz)

Service Information

Service	Sid	SubChn Id	
BBC Radio Berks	CD31	5	DAB Audio
Capital	C47F	11	DAB Audio
Gold Berks/Hants	CD31	5	DAB Audio
Heart Berkshire	C361	1	DAB Audio
KISS	CAC8	4	DAB Audio
NME Radio	CEC1	15	DAB Audio
Pop Up Radio	CFCF	14	DAB Audio
XFM	C474	3	DAB Audio
EPG Berks/Hants	E1C000BB	21	EPG – Packet Data

Frequency Information (Fig 0/21)

Frequency Description	OE	Identifier	Bearer	Continuity	Frequency List
Adjacent London 1 DAB Ensemble carrying linked services	0	C185	DAB	false	227.360 MHz
Adjacent London 2 DAB Ensemble carrying linked services	0	C186	DAB	false	220.352 MHz
Adjacent Swindon DAB Ensemble carrying linked services	0	C1A4	DAB	false	220.352 MHz
Adjacent South Hampshire DAB Ensemble carrying linked services	0	C1A3	DAB	false	220.352 MHz
Capital FM	0	C479	FM	false	95.8MHz
Capital FM	0	C870	FM	false	103.2 MHz
Heart FM	0	C361	FM	false	97.0, 97.4, 102.6, 102.9, 103.4
Heart FM	0	C363	FM	false	96.6, 96.9, 97.6, 103.3
Heart FM	0	C368	FM	false	96.9, 97.5, 102.0, 102.4, 102.7, 103.5
Heart FM	0	C460	FM	false	106.2
Heart FM	0	C461	FM	false	97.0, 103.4
Heart FM	0	C561	FM	false	102.9
Heart FM	0	C661	FM	false	102.6
Heart FM	0	C761	FM	false	97.4
Kiss 100 FM	0	C483	FM	false	100.0
XFM FM	0	C474	FM	false	104.9 MHz
BBC R Berkshire	0	C71A	FM	false	94.6, 95.4, 104.1, 104.4 MHz

Linkage Information (Fig 0/06)

Link Description	OE	LA	Soft/Hard	LSN (Hex)	List Id	Id List
Capital - DAB	0	switched	Hard	0x196	DAB	C47F, C479, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – DAB	0	Active	Soft	0x196	DAB	C47F, C479, C370, C371, C372, C377, C37A, C670, C671, C777, C870
Capital – Networked DAB	0	Switched	Hard	0x1A9	DAB	C47F, C479
Capital – FM	0	switched	Hard	0x196	FM	C47F, C370, C371, C372, C377, C37A, C479, C670, C671, C870
Capital – FM	0	Active	Soft	0x196	FM	C47F, C370, C371, C372, C377, C37A, C470, C471, C477, C479, C47A, C570, C571, C577, C57A, C670, C677, C671, C777, C870
Heart - DAB	0	switched	Hard	0x197	DAB	C361, C362, C364, C365, C366, C368, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – DAB	0	Active	Soft	0x197	DAB	C361, C362, C364, C365, C366, C368, C369, C36A, C36B, C36C, C467, C560, C566, C56A, C665, C66B, C869
Heart – Networked DAB	0	Switched	Hard	0x1A7	DAB	C460, C560
Heart – FM	0	switched	Hard	0x197	FM	C361, C362, C460, C363, C364, C365, C366, C368, C369, C36A, C36B, C36C, C36E, C36F, C467
Heart – FM	0	Active	Soft	0x197	FM	C361, C362, C460, C363, C364, C365, C366, C362, C369, C36A, C36B, C36C, C36E, C36F, C461, C462, C463, C464, C465, C466, C467, C468, C469, C46A, C46B, C46C, C46E, C46F, C561, C562, C563, C564, C565, C566, C568, C569, C56A, C56B, C56C, C56E, C56F, C661, C663, C664, C665, C668, C669, C66B, C66C, C66F, C761, C763, C764, C768, C769, C76B, C76F, C864, C869
KISS - DAB	0	Active	Hard	0x193	DAB	CAC8, C0C9, C2C3, C2C4, C2C5, C3A5, C4C3, C6C1, C7C7, C883, C8C4, C8CA, C9CB, CAC5, C483, CBC3, CBCA, CE83
XFM - DAB	0	Switched	Hard	0x198	DAB	C474, C574
XFM – DAB	0	Active	Soft	0x198	DAB	C474, C574
XFM – FM	0	switched	Hard	0x198	FM	C474, C574
XFM – FM	0	Active	Soft	0x198	FM	C474, C574
BBC R Berkshire - FM	0	Active	Hard	0x19	FM	CD31, C71A

Other Ensemble Services (Fig 0/24)

OE Services Description	OE	Identifier	Id List
Capital Other Ensembles	0	C47F	C1A4
Capital Other Ensembles	0	C479	C185
Capital Other Ensembles	0	C870	C1A3
Heart Other Ensembles	0	C460	C185
Heart Other Ensembles	0	C366	C1A4
Heart Other Ensembles	0	C365	C1A3
KISS Other Ensembles	0	C8C4	C1A4
KISS Other Ensembles	OE	C483	C1A3, C185
XFM Other Ensembles	0	C474	C186, C1A4

Announcement Support (Fig 0/18)

Announcement Description	SId	Cluster Id	Support Flags
Capital	C47F	0x06	Road Traffic Flash, Transport Flash
Heart Berkshire	C361	0x08	Road Traffic Flash, Transport Flash
KISS	CAC8	0x03	Road Traffic Flash, Transport Flash

Announcement Switching (Fig 0/19)

Announcement Description	Cluster Id	Switching Flags	SubChn Id
Capital	0x06	Road Traffic Flash	11
Heart	0x08	Road Traffic Flash	1
KISS	0x03	Road Traffic Flash	4

Annex C: Service following tables

Heart

	London 1	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C185	C1AB	C1A9	C1AD	C1A3	C19C	C1A4	C1AF	C1A1
Block	12C	11C	11B	12D	11C	12D	11C	11C	12D
Frequency	227.360	220.350	218.640	229.072	220.350	229.072	220.350	220.350	229.072
SId	C460	C362	C368	C361	C365	C364	C366	C36A	C56A
LSN	0X197	0X197	0X197	0X197	0X197	0X197	0X197	0X197	0X197

Capital

	London 1	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C185	C1AB	C1A9	C1AD	C1A3	C19C	C1A4	C1AF	C1A1
Block	12C	11C	11B	12D	11C	12D	11C	11C	12D
Frequency	227.360	220.350	218.640	229.072	220.350	229.072	220.350	220.350	229.072
SId	C479	C47F	C47F	C47F	C870	C47F	C47F	C47F	C47F
LSN	0X196	0X196	0X196	0X196	0X196	0X196	0X196	0X196	0X196

XFM

	London 2	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C186	C1AB	C1A9	C1AD		C19C	C1A4	C1AF	C1A1
Block	12A	11C	11B	12D		12D	11C	11C	12D
Frequency	223.936	220.350	218.640	229.072		229.072	220.350	220.350	229.072
SId	C474	C474	C474	C474		C474	C474	C474	C474
LSN	0X198	0X196	0X196	0X196		0X196	0X196	0X196	0X196

					Kiss				
	London 1	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C185	C1AB	C1A9	C1AD	C1A3	C19C	C1A4	C1AF	C1A1
Block	12C	11C	11B	12D	11C	12D	11C	11C	12D
Frequency	227.360	220.350	218.640	229.072	220.350	229.072	220.350	220.350	229.072
SId	C483	CBCA	CAC8	CAC8	C483	C8CA	C8C4	C883	C883
LSN	0X193	0X193	0X193	0X193	0X193	0X193	0X193	0X193	0X193

					Magic				
	London 1	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C185								
Block	12C								
Frequency	227.360								
SId	C788 (8)								
LSN									

					BBC Local Services				
	London 2	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C186	C1AB	C1A9	C1AD	C1A3	C19C	C1A4	C1AF	C1A1
Block	12A	11C	11B	12D	11C	12D	11C	11C	12D
Frequency	223.936	220.350	218.640	229.072	220.350	229.072	220.350	220.350	229.072
SId	CC31	C631	CD32	CD31	C932	CE31	CA32	C43A	C53A
LSN		0X09							

Absolute Group Services							
	London 2	London 2	London 3	London 3	D1	D1	D1
EId	C186	C186	C1AB	C1AB	C181	C181	C181
Block	12A	12A	11C	11C	11D/12A	11D/12A	11D/12A
Frequency	223.936	223.936	220.350	220.350	222.064	222.064	222.064
SId	CDC1	C1C2	C7C9(13)	C3C4(13)	C1C0	C4C1	C4C0
LSN							

Classic FM							
	D1						
EId	C181						
Block	11D/12A						
Frequency	222.064						
SId	C2A1						
LSN							

NME									
	London 1	Kent	Sussex	Berks N. Hants	South Hants	Essex	Swindon	Cambridge	Peterborough
EId	C185	C1AB	C1A9	C1AD	C1A3	C19C	C1A4	C1AF	C1A1
Block	12C	11C	11B	12D	11C	12D	11C	11C	12D
Frequency	227.360	220.350	218.640	229.072	220.350	229.072	220.350	220.350	229.072
SId				CEC1(8)		CEC1(8)		CEC1(8)	
LSN									

Annex D: Manufacturers questionnaire

Query Number	Tuner	Function support Query	Comments
1	FM	Number of independent FM tuners	
2		FM to FM RDS service linking methods (A / B / EON)	
3		FM to FM RDS Regionalisation PI nibble 2	
4		FM to FM RDS linkage – Extended Generic	
5	DAB/DAB+ to DAB/DAB+	Number of independent DAB tuners	
6		DAB To DAB service Linking Same service alternate frequency (MFN) (Sid=SID and EId = EId) method to determine alternative frequency i.e. scan/search or FIG 0/21	
7		DAB To DAB service Linking Same service alternate Ensemble (Sid=Sid and EId ≠ EId) Hard Linked	
8		DAB To DAB service Linking Same Regional service alternate Ensemble (Sid ≠ Sid and EId ≠ EId) Hard Linked	
9		DAB To DAB service Linking Same Regional service alternate Ensemble (Sid ≠ Sid and EId ≠ EId) Soft Linked	
10		DAB To DAB service Linking Related service alternate Ensemble (Sid ≠ Sid and EId ≠ EId) Soft Linked	
11		Can the state 0f DAB FIG 0/6 Linkage Actuator (LA) flag Enable or Disable a link	
12		Is FIG 0/21 used in service following Region = 0	
13		Is Fig 0/21 and Fig 0/11 regionalisation implemented	
14		Is FIG 0/24 used in service following	
15	DAB/DAB+ to FM	DAB to FM implied (Sid = PI)	
16		DAB to FM Explicit (Sid ≠ PI) Hard Link	
17		DAB to FM Explicit (Sid ≠ PI) Soft Link	
18		Is FIG 0/21 used in service following Region = 0	
19	Other	Is Service following enabled or disabled by default	
20		Time to switch to alternative Service	
21		Are Audio levels equalised during switching	
22		Is audio delay introduced during switching	