

# **Status of DAB Around the World**

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Digital Audio Broadcasting has been implemented or is being planned in a number of countries around the world. The following report looks at the status of DAB from each country. According to the WorldDAB Project Office, some 475 million people around the world have access to DAB radio services and over 800 channels are being broadcast in DAB. Much of the information in this report comes from the WorldDAB project. For more information see their website [www.worlddab.org](http://www.worlddab.org).

## Europe

### United Kingdom

The BBC has been promoting its DAB channels since 1995 and as of late 2004 covered 85% of the population, including the major highway network. By late 2005, it was expected that coverage would expand to 90% of the population. The BBC simulcasts its five analogue services and the World Service as well as five digital-only national services.

The national commercial DAB network, DAB 1, covers 85% of the population as well. They provide three simulcast stations and five digital-only signals. At present a high power digital data service for hand held portable receivers is being tested on this network by BT Livetime, providing three streamed video channels and an electronic program guide.

There is a total of 424 stations broadcasting on DAB, with a mix of analogue stations simulcast in the same area as the analogue counterparts, analogue stations broadcast outside their area of analogue broadcast and DAB only channels. Put differently, there are a total of 170 different brands on DAB in the UK. Of these 39 are DAB only brands; 118 are straightforward analogue simulcasts and the remaining 13 are analogue stations broadcast on DAB out of analogue TX area.

Over 200 different kinds of receivers are available to the consumer market and are promoted heavily by the manufacturers.

DAB and other new platforms have a growing impact on radio listening in the UK as of the third quarter of 2005.<sup>1</sup>

- **DAB ownership and listening** - Home ownership of digital radio sets has risen to a record 10.5%. To date some 2.2 million sets have been sold in the UK. The rate of sales continues to rise each month. For example, in November 2005, 122,900 sets were sold compared to 86,300. A study undertaken for DRRB predicts that 1.5 Million sets would be sold in 2005, growing to 2.3 Million sales in 2006 and to 6.5 Million sales in 2009.<sup>2</sup> This will mean a total of over 20 Million sets will

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<sup>1</sup> Statistics from the Radio Advertising Bureau of the UK and Digital Radio Development Bureau.

<sup>2</sup> Data from a study undertaken for DRRB and Digital One in the UK by Oliver and Ohlbaum Associates

be in the marketplace by the end of 2009. The number of adults listening to digital only services has risen to 4.1 million listeners per week from 3.2 million a year ago.

- **Digital TV** - The number of adults who have ever tuned in to the radio via digital TV has risen to 35.1%.
- **Internet** - Listening via the Internet is also on the increase with the number of adults who say they have visited a station web site rising to 28.3%.
- **Mobile phones** – 6.1% of adults are now listening via their mobile phones.

According to the ratings service, RAJAR, people now are listening more to DAB radio than to DTV and Internet combined. In the August-September 2005 survey, DAB listening had increased 165% compared to the previous year, while for DTV the increase was 24% and for Internet radio 84%.<sup>3</sup>

## **Ireland**

The public broadcaster, RTE, started a trial in Dublin and the North East of the country on January 1<sup>st</sup>, 2006. The trial is expected to last three months. It is projected that they will apply for a more permanent licence to serve this area later this year. Dublin represents about 30% of the population. It should be noted that RTE makes all four of its services, RTÉ Radio 1, 2 FM, Lyric FM and Raidió Na Gaeltachta are now carried in stereo on available on the Sky Astra Digital satellite, 24 hours a day. They are also streamed on the Internet.

Ireland will benefit from the roll out of lower cost consumer sets in the UK since many of the same retailers operate in both countries.

## **Belgium**

The Flemish and French public broadcasters each operate multiplex transmitters that cover 98% of the respective linguistic groups. They have been in operation since 1997 and coverage is expected to go to 100% in the near future. The Flemish multiplex provides 10 channels, four of which are unique to DAB, while the French multiplex provides 5 channels, all of which are existing stations, including one from Germany.

## **Netherlands**

In February 2004, Nozema started broadcast of three public channels in Lopik on frequency block 12 C. In April of the same year, three additional services were added, another in February 2005 and an eighth in April 2005. At present 70% of the population is covered and in two further steps, the coverage rises to 90% and then 100%. The

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<sup>3</sup> Listening information from a report on Digital Media Europe - <http://www.dmeurope.com/default.asp?ArticleID=11534>

channels available at present are - Radio 1, Radio 2, 3FM, Radio 4, 747AM, de Concertzender, 24Nieuws, Radio Top 2000 en FunX.<sup>4</sup>

The Ministry of Economic Affairs is planning to issue DAB licences for commercial stations will fill two more national multiplexes and another multiplex in Randstadt which reaches Amsterdam, den Hague and Rotterdam. It is expected that some 48 stations will be available in Band III. Later L band capacity will be used for local and regional stations. They plan to phase out analogue broadcast by 2015.

## **France**

In 1997, Télédiffusion de France (TDF) launched two multiplexes broadcasting 13 channels in Paris while TowerCast provided a further five channels. Today only one multiplex survives providing six public service channels to about 10 million people, 17% of France's population. Since 1998, TDF has operated multiplexes in Marseilles, Nantes and Toulouse, which carry 6 Radio France services. In Lyon, TDF only provides a traffic service. However, another operator, VDF, provides 7 channels and has launched an 8 channel service in Paris. In 1999, TDF set up a network on the highway between Tours and Poitier. In total about one quarter of France's population is covered by DAB.

The French Government has moved through a series of steps to set up a legal framework for the granting of new DAB licences. Legislation has been in place since mid-2004. In 2005, they undertook consultations with a view to identifying the public's needs. At the end of this process, the regulatory body, CSA, is expected to call for tenders for the use of the DAB band. To date DAB has been in the 1.5 Ghz band and it is expected that the new licences will be in the VHF III band.

There are currently some tests of DMB being undertaken in France. However, there is no launch of DAB to date.

There are a wide range of Digital Radio receivers available in France with car sets, home receivers, portable, walkman type and PC cards in a range of prices, although mostly high end at present.

## **Monaco**

Three existing public channels are available on the Riviera and throughout the principality.

## **Germany**

All of the Federal States have launched DAB services and about 80% of the country's population is covered by DAB signals. Most states, with the exception of those in the North, have close to 100% coverage and have had this for some time. There are some 80

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<sup>4</sup> For more information see the website of NOS <http://portal.omroep.nl/>. All information seems to be available only in Dutch.

channels in operation – 16 of which are unique to DAB, the rest being rebroadcasts of popular FM stations. Separate licences are required for network and multiplex operations and for program services.

The consortium promoting DAB includes all of the equipment manufacturers and the broadcasters. The automobile industry has also been active in promoting the use of DAB.

There are currently tests of T-DMB being undertaken in Germany and it is expected that this will be expanded to permit broadcast of the FIFA World Cup matches in 2006.

## **Austria**

As of January 2005, there was one multiplex operating in Vienna, the capital, providing three existing stations to some 1.5 Million people. The public broadcaster, ORF, was awarded a trial licence to serve the state of Tyrol and have set up two transmitters covering the Inn Valley. This enables continuous DAB coverage from Northern Italy through to Germany.

Approximately 19% of the Austrian population receives DAB coverage.

## **Switzerland**

In late 1999, regular transmissions started in both the Berne area and in Zurich. In 2000, the Basle and Geneva/Lausanne were added, raising coverage to 4 million people or about 60% of the population. DAB can currently be received in the regions of Zurich, Bern, Basel, Geneva and Lausanne as well as along the main east-west traffic artery (the N1) and in northern Ticino (Locarno/Bellinzona). This means that about 60% of the Swiss population can receive DAB.

In spring 2006, the North-Eastern parts of Switzerland and the southern part of the Ticino (along the main traffic artery) will be fitted out for DAB reception. Central Switzerland will be added to the DAB reception area in the second half of 2006, and by the end of 2007, the whole German speaking population should be within reach of one of the DAB stations. The tunnels along the main traffic arteries should be covered by DAB by the end of 2007. The remaining regions will be fitted out for DAB reception during the years 2007 to 2010. By 2010, DAB will be available in all of Switzerland.

There are 11 services in German on Channel 12 B (6 only available on DAB), 10 in French on Channel 12 C (four of which are only available on DAB) and 9 in Italian on Channel 12 A (6 only available on DAB). All services are from the Swiss public broadcaster and are made up of a mix of available FM services (one of which has poor FM coverage), some channels only available on satellite and various services made available to the other linguistic groups via DAB.<sup>5</sup>

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<sup>5</sup> The information concerning the number of channels in each language comes from the Swiss French-language public broadcaster SRG SSR. For additional information see their website [www.broadcast.ch](http://www.broadcast.ch).

At present there are some 169 models of receiver available for sale in Switzerland.

## **Spain**

DAB started with experiments in 1998 and has progressed to the point that 18 stations exist at present. They are a mix of public and commercial stations, with most being simulcasts but a few stations unique to DAB are available. All of the DAB only stations are commercial with three owned by newspaper groups.

In Catalonia, 2 regional and 8 local commercial multiplexes were licensed at the end of 2003.

At present coverage is 52% of the population and is expected to rise to 80% in 2006.

## **Portugal**

Tests by the public broadcaster, RDP, started in 1998 and in the following year, it was awarded a licence to install and operate the national multiplex, using Channel 12 B. At present it provides five channels and is testing a Classical music service on the sixth. At present, 42 transmitters provide coverage of about 75% of the population. Another 32 are planned to ensure almost universal coverage.

At that time, RDP will provide three channels while the remaining capacity will be licensed to commercial operators.

## **Italy**

In 1996, RAI began broadcasting its own services on DAB. At present they provide five channels, reaching 20% of the population. Coverage on Channel 12 has been reduced to allow the deployment of DVB-T, once the new national broadcasting law is passed. In 1998, eight commercial national network operators banded together to provide an additional national multiplex to rebroadcast their analogue services. They provided six commercial and two non-commercial services but are now on hold awaiting the regulatory framework.

The private consortium EuroDAB has extended coverage, now reaching 50% of the population, providing five simulcast services and three unique to DAB. In the South Tyrol province, three transmitters operated by the local public operator, RAS, operate in Band III and the L band. RAS provides a dozen channels, of which a few are unique to DAB. Others are rebroadcasts of existing analogue services from Italy and Switzerland, some in Italian, some in German and some in French. In total three blocks of 8 stations

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Additional information also from the DAB consortium at [www.dab-digitalradio.ch](http://www.dab-digitalradio.ch). For a description of the channels see <http://www.dab-digitalradio.ch/?lang=en&c=sender>.

each are broadcast on Channels 12 A, 12 D and 9 D.<sup>6</sup> RAS uses 12 transmitters to cover about 80% of the South Tyrol, including in some of the tunnels.

Club Italian DAB indicates: “We think that about 5.000 DAB receivers are circulating in Italy at present time. This has a number of reasons:

- no regular services on air at present
- no licenses for network operators for a regular broadcasting regime (we are waiting for these licenses)
- therefore no marketing for receivers”<sup>7</sup>

## **Greece**

They are currently running tests in Band III.

## **Sweden**

Swedish Radio offers 6 unique channels on DAB, although some of the elements of these channels are available on FM and all are available on the Internet. They also provide some of their existing analogue radio services on DAB and from time to time test new content on DAB. The unique services are:

- **P3 Star**, a teenage-channel with lots of hits,
- **SR Klassiskt**, a classical music channel,
- **SR X**, mature pop, rock and soul,
- **SR Sverige**, world wide, multicultural news and music,
- **P7 Sisuradio**, a Finnish speaking channel,
- **SR Minnen**, an archive channel with programs from the SR archives and the data channel “**SR Plus**”, material from sr.se transmitted as HTML pages.

A cutback in government funding has meant a cutback in transmission to the four major cities, Stockholm, Goteborg, Malmo and Lulea – approximately 37% of the population was covered in 2003.

In December 2005, the government announced that it would **not** propose a plan for an expansion of DAB broadcasts (Digital Audio Broadcasting) and a switch from analogue FM radio to DAB. The government has thereby rejected the proposed gradual transition from FM to DAB and the long term goal of analogue FM network switch-off as suggested by an all-party Committee in February 2004.

## **Norway**

The national network started operations in 1999, with two thirds of the capacity dedicated to the public broadcaster. The remaining capacity has been divided between two

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<sup>6</sup> For greater detail on the channels provided, see RAS’ website [http://www.ras.bz.it/en/tv\\_radio/dab.htm](http://www.ras.bz.it/en/tv_radio/dab.htm).

<sup>7</sup> Information from an e-mail from Hanns Wolter of Club DAB Italia.

commercial broadcasters. At present some 70% of the population is covered and particular attention has been paid to ensuring continuous coverage on the major highways. They expect to extend coverage to 95% within the next few years.

A second national coverage is intended to provide the public broadcaster's regional and local services. The first area covered in the Oslo area, which includes about 30% of the national population. At present about 50% of the country is covered and six channels are provided.

In 2005, 51,000 DAB radios were sold in Norway with another 5,000 sold previously.

At present some 18 radio stations are broadcast on DAB of which three are unique to DAB (and to Webcasting). The remaining are rebroadcasts of existing services within their own service areas. It is expected that three more services unique to DAB and the Web will be added within the next year.<sup>8</sup> The broadcasters are also providing some data and DLS audio services and there is also some video being provided over DAB.

## **Denmark**

Denmark has a national DAB network that has 80% coverage of the outdoors and 70% indoors as well as two regional networks, one in Jutland and the other covering Funen, Zealand and the nearby islands, with similar coverage. 100% coverage is planned for all networks in 2006 and 2007.

The Danish Broadcasting Corporation broadcasts 15 channels, with a variety of music and spoken word content. All but two of these channels are unique to DAB although some FM stations are also broadcast.<sup>9</sup> One commercial FM station, Radio 100FM/Talpa Radio, is also rebroadcast on DAB. In September 2005, two commercial operators received 25% of the spectrum and simulcast their existing FM stations.

DAB Danmark estimates that, by the end of 2005, some 160-180,000 DAB sets had been sold in the country, most of them of the "kitchen radio" variety. The fourth quarter of 2005 saw a 49% increase in number of sets sold over the previous quarter. It is assumed that each year will see a doubling of the number of receivers sold over the previous year, according to Broadcast Service Denmark.<sup>10</sup>

## **Finland**

The national broadcaster YLE launched 10 transmitters in 1999 and an eleventh in 2001 which covered 2 million people, about 40% of the population. Shortly after a regional network was launched covering 1.2 million people. YLE simulcast its 5 analogue

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<sup>8</sup> Information on the DAB situation in Norway from WorldDAB and from an e-mail reply to an inquiry from NRK. Additional information on sales of sets from BSD in reply to an e-mail of inquiry.

<sup>9</sup> For a description of the channels available in the Danish language see <http://www.dabradio.dk/kanaler/>. Information on the sale of DAB receivers from a reply to an e-mail of inquiry to DAB Danmark.

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services and then added 5 new unique services.

In 2002, a licence to operate the networks was awarded to a private company, Digita – YLE keeps 2/3rds of the spectrum. It is expected that licences for private services will become available in due course.

In April 2005, the public broadcaster, YLE, announced that it would discontinue operation of its DAB transmission network, primarily due to low receiver penetration in that country. Digita has no plans to relaunch DAB but they have used DVB-T technology for radio transmissions and have undertaken some experiments using DVB-H technology.

### **Estonia**

Estonia has been carrying out experimental broadcasts of four channels since 2000. They cover about 28% of their national population.

### **Lithuania**

The national public broadcaster, SC LRTC, started T-DAB test transmissions on two multiplexes in the capital, Vilnius in June 2001. They provide two public radio channels and four commercial channels to about 20% of the Lithuanian population.

### **Hungary**

The public broadcaster, Magyar Radio and the broadcast network operator, have been providing 2 250Kw transmitters, broadcasting three Magyar Radio services as well as a DAB only service to Budapest since 1997. They reach about 30% of the population. Data services are also provided but on an irregular basis.

### **Czech Republic**

While there are not yet any DAB transmissions, the infrastructure is in place to cover Prague, representing about 20% of the country's population. Further roll out of infrastructure to Brno and Ostrava in July 2006 will increase coverage to 40% and it is planned to reach 95% coverage by the end of 2006.

Three channels have been assembled by the national broadcaster, Czech Radio.

### **Slovakia**

A public policy framework is now in place and Slovakia expects to start regular T-DAB transmission in Western Slovakia in 2006 in the L band. Subsequently, they intend to start T-DAB transmission in the VHF band after DVB-T implementation enables analogue television on Channel 12 to be discontinued.

## **Poland**

There is one multiplex operating in Warsaw, covering about 8% of the Polish population. It operates in Block 10B and provides five channels, four national services from the public broadcaster and one local one from the same source.

## **Croatia**

The public broadcaster HRT has been carrying out DAB transmissions since 1997. There is coverage in Northern Croatia and in the capital, Zagreb and its suburbs. More than 1.2 million people are covered. They plan to extend coverage once there are sets available to sufficient numbers.

## **Slovenia**

The national broadcaster has been carrying out tests in the area of the capital, Ljubljana, since 1997. About half a million people are covered by the transmissions.

## **Turkey**

The public broadcaster started tests in 2002 and one transmitter covers Ankara, the capital and its 2 million people. It provides four existing FM channels along with PAD data and other data such as traffic and weather information. It is planned to add a new transmitter offering a SFN in Istanbul, the largest city.

## **Asia**

### **Brunei**

The public broadcaster, RTB, started a trial in 2000. They provide five channels, one of which includes short data streams. They continue to monitor the developments and no plans for further roll out have been announced.

### **Malaysia**

In its 2002 spectrum plan, Malaysia identified two Digital Sound Broadcasting (DSB) systems, Eureka 147 and DRM. However, there are no experiments to date.

### **China**

China started its first DAB broadcasting in 1995. The first three station Eureka Single Frequency Network (SFN) was set up in 1997 in Guangdong Province. A second SFN was set up in Beijing in 2005.

Beijing trials started in 2005 and provide two music channels, reaching some 12 million people and 1.5 million automobiles. It is expected that a further 6 channels will be launched within the year. Blaupunkt and JVC have started marketing their in car receivers in the city.

Shanghai is planning of the launch of 12 DAB/DMB channels in the near future, that will reach some 16 million people.

### **Hong Kong**

RTHK holds a DAB trial licence in Band III and provides all of its seven services in one multiplex. They add DLS to each of these channels and update them daily. They have two transmitters to create a Single Frequency Network.

### **Taiwan**

Taiwan has had trials involving nine transmitters providing a SFN along the western motorway and an additional one in Hualian – in total 90% of the population is covered by DAB broadcasts. In 2002, the Broadcasting Corporation of China (BCC) launched 6 channels in Taipei, covering 2.8 million people – subsequently they have added 10 transmitters through the country. There is also a trial involving a consortium of commercial broadcasters.

In June 2005, the government awarded 6 DAB commercial licences – three national SFNs and three regional. The BCC received one of the national licences while two were awarded to commercial consortia. The regional licences went to leading local broadcast operators and Taiwan Mobile, a telecommunications operator.

### **Japan**

Japan has decided to use ISDB-T (Terrestrial Integrated Services Digital Broadcasting), a technology to broadcast both digital radio and television at both narrow and wide bandwidths. It used similar coding technology to DAB. They expect to deploy services from 2005 to 2007. They are the only country to have chosen this technology to date.

### **South Korea**

South Korea has decided to use Digital Multimedia Broadcasting (DMB) which permits the broadcast of audio, video and data to mobile hand sets using Eureka 147. They allocated two television channels, 8 and 12 for DAB. In 2005, six providers were licensed to provide DMB services. Three were incumbent broadcasters and three were newcomers.

Seoul Metro was to be covered by the end of the year with national coverage to be achieved in 2006. The six providers will transmit a total of 6 video, 12 audio and 12-18 data programs, all provided initially free of charge to encourage roll out.

Receiver manufacturers such as Hyundai Motors, Pantek & Curitel, LG Electronics and Samsung are developing in-car, portable and handset receivers for the new service. An estimated 22,000 mobile devices have already been sold in Seoul, with sales of two million expected by the end of 2006.

## **Singapore**

MediaCorp Radio Singapore Pte. Ltd, launched its DAB service in 1999 and covers all of the population. The service, called SmartRadio, provides 14 channels on Channel 7B, six of which are unique to DAB. The other eight channels are simulcasts of existing FM services. The six unique services are:

- **Cruise** – *English oldies from the 50s and 60s and Jazz Standards*
- **Club Play** – *Dance hits from techno to trance*
- **JK-Pop** – *Japanese and Korean hits*
- **Chinese Evergreens** – *Chinese classics from the 60s to 80s*
- **Planet Bollywood** – *Gyrating Indian hits in Hindi, Tamil & Punjabi*
- **Bloomberg** – *Financial news.*

On a trial service on Channel 7C, another 7 analogue services are being simulcast. All channels provide additional data and multimedia services, including PAD information on the music played, financial and other news and weather and traffic.

A second provider Rediffusion Singapore was licensed in 2001 and provides subscription radio.

Receivers have rolled out well with four models of Hyundai and two of Mitsubishi equipped with DAB radios. In June 2005 home sets were made available commercially.

## **Indonesia**

Trials of DAB, Digital Radio Mondiale (DRM) and IBOC were carried out between August and October 2005 in Jakarta. Indonesia chose Eureka 147 over ISDB-T (Terrestrial Integrated Services Digital Broadcasting).

## **India**

All India Radio (AIR), the public broadcaster, started an experiment in regular DAB broadcasts in New Delhi in late 1997. The area covered represents 1% of the country's population. India plans to start to provide more regular service starting at the end of 2005 in Delhi and extending to Calcutta, Mumbai (Bombay) and Chennai in a second phase. They will provide 6 channels of AIR programming in stereo.

The major sticking point in India is the cost of the receivers as the Indian consumer is quite price conscious and sensitive. India is in negotiation with British manufacturers to

try to find a solution. It is expected that they will seek to manufacture sets in India, thereby significantly reducing the cost.

## **Africa**

### **South Africa**

Experiments started in 1997 in the Johannesburg area in both Band III and the L band. In 1999, these were replaced by simulcasts of seven services (public and private) already broadcast in Gauteng Province. In 2000, a two transmitter SFN operating in Band III was inaugurated providing coverage of about 18% of the population.

At present the legal and regulatory framework are not yet established.

### **Namibia**

Namibia is coordinating its plans with South Africa and other Southern African countries. While the priority seems to be the deployment of digital terrestrial television, there have been some digital radio trials in South Africa.

## **Australia and New Zealand**

### **Australia**

As of May 2005, two trials were being undertaken in Australia. In Sydney, the commercial radio networks as well as the two public broadcasters began a trial on VHF Band 3 spectrum using the Eureka147 standard on 17 December 2003. This follows up on work done by several commercial broadcasters and the Australian Broadcasting Corporation (ABC) on the L band, started five years ago. Stations involved in the digital radio trials in Sydney are Nova, Vega, 2GB, 2CH, 2UE, 2DAY FM, Triple M, 2KY, 2SM, WSFM, ABC Classic FM, ABC dig radio and SBS One and Two.<sup>11</sup> Most of these stations are rebroadcasts of analogue stations but one that is unique to DAB and to the Internet. In two cases, the stations are rebroadcasts of analogue stations and an additional sideband channel each, which are unique to DAB.

Broadcast Australia (BA) commenced a DRB trial in Melbourne using Eureka 147 end 2003 in association with content partners ABC, SBS, Sport 927, Community Broadcasting Association of Australia (CBAA) and WorldAudio. The trial utilizes ensemble C on ch9A and is being transmitted from BA's facility at Mt Dandenong.

The trials will allow comparison of Band 3 and L Band as well as consumer and other market reaction. The industry is in discussion with the government to develop a policy for the roll out of digital radio across Australia. A framework for the allocation of

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<sup>11</sup> For a description of these stations see <http://www.commercialradio.com.au/> under the listener tab at the end of the page.

licences was announced by the Minister responsible in October. Legislation is expected to follow in a year or perhaps two.

The broadcasters' organization, Commercial Radio Australia, has conducted focus tests with a panel of listeners and have discovered that those with digital radio sets devote more than half of their listening time to digital radio and that they devote more hours per week to radio listening than they did previous to going digital.

Very little effort has gone into marketing receivers because of the uncertain nature of the developments. Commercial Radio Australia, which is the Australian equivalent of the CAB's radio side, is reluctant to make any kind of push which could leave consumers with sets which would not be able to receive the signals once a system has been decided upon.<sup>12</sup>

## **Middle East**

### **Israel**

Bezeq, the Telecommunications Corporation, has piloted DAB experiments since 1996 using the 12/VHF band. There are now 6 transmitters in a Single Frequency Network configuration in Jerusalem, Givataim, Haifa, Beer Sheva, Eitanem and Hadera) covering 85% of the population. They provide seven stereo channels, including music channels, news, business news and traffic.

Bezeq is planning to apply to change frequencies inside VHF Band III when official approval for regular broadcast is granted.

## **North America**

### **United States**

In the United States, the choice for digital audio broadcasting is In Band On Channel digital broadcasting, also being branded as HD Audio. Stations bundle their existing analogue stations with digital programming as well as data information. This information is compressed and broadcast on the station's existing frequency. HD Audio sets decode the information.

HD advocates indicate that the technique limits multipath and other technical problems and provides broadcasters with the capacity to add additional program sources.

In December 2005, the 8 largest radio companies in the US announced the formation of the HD Alliance to ensure an orderly and organized roll out of IBOC in the United States. In late January of 2006, the consortium had grown to a dozen companies and they

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<sup>12</sup> Information from an e-mail from Richard Morris, Principal Engineer, Digital Radio Projects, Commercial Radio Australia.

announced the roll out of sideband channels in 28 cities across the US – the top 13 markets and 15 others. The sideband channels will represent diverse format opportunities rather than cannibalizing the existing formats offered on analogue. In addition to 70 sideband channels already available another 286 channels in total across the country will be added. Among the formats announced were Viva La Voce (Opera), Classic Alternative, Traditional Jazz & Blues, Coffee House, Female Talk, Future Country, Extreme Hip Hop, and in-depth News. Other channels in development include Deep Cuts Classic Rock, Live Rock, New Alternative, Fusion Hispanic-Anglo Rock, Chick Rock, Indie & New Rock.

At present some 624 stations are broadcasting in HD across the US and the number is expected to double this year. Fifteen manufacturers are making receivers and it is expected that the number of consumers with sets will number in the hundreds of thousands by the end of 2006 and in the millions by the end of 2007.

## **Mexico**

There are several terrestrial and satellite experiments in the L-Band at present.

### **Availability of Receivers**

At present there are over 200 DAB receivers available around the world. Most major equipment manufacturers now have a variety of DAB products on the market, although availability varies by country. Many of the products are for FM and DAB although some are DAB only. Some products also include CD players and/or MP 3 players. The kinds of sets include clock radios, car radios, hand held mobile sets, tuners for use with home stereo systems, PCI cards for use with computers and others.

Table top sets range from a low of 60 Euros (about \$ 100 Cdn) to 560 Euros (about \$ 800 Cdn). Handheld devices range in price from 90 Euros to about 280 Euros. Car stereo systems range from about 100 Euros to as much as 1200 Euros for full AM-FM-DAB-CD multi speaker systems. PCI cards range from about 140 Euros to 300 Euros.

Among the providers are Acoustic Solutions, Alba, Alpine, Arcam, Bush, Clarion, Denon, Goodman's, Harman Kardon, Hitachi, Blaupunkt, JVC, Matsui, Panasonic, Philips, Pioneer, Roberts, Samsung, Siemens, Sony, and TEAC. For a full description of the sets available see the Worldwide DAB site [www.worlddab.org/dabprod.aspx](http://www.worlddab.org/dabprod.aspx).

According to the DAB market study "Eureca", there will be about forty million DAB receivers in Europe around the year 2010. There will be seventeen million such devices in the UK alone. However, DAB and DVB will not be the only standards for digital radio. There will also be DRM (Digital Radio Mondiale) and the proprietary DSR (Digital Satellite Radio). Last autumn, the DRM Consortium concluded an agreement with the DAB Consortium to start the development of DAB/DVB/DRM receivers (see the prototype from Starwaves). (source: Eureca Research)