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Memorandum

Digital Radio to complement analogue FM DRM+ trials in Europe

Introduction

This document includes an analysis and assessment of the present situation for digital radio introduction in Sweden with emphasis on small-scale broadcasting (community radio) and with an international perspective. In Europe there are conflicting viewpoints regarding the viability horizon of different digital systems as DAB+ and DRM+. Or even if digital radio is a good idea at all. The viewpoints in this document are the author's and do not present an official standpoint of the Community Media Forum Europe or any other organisation.

Background

The technical development of wireless digital radio broadcasting started 1989. In 1995 BBC introduced the Digital Audio Broadcasting system (DAB) and Swedish public Radio "Sveriges Radio" connected to this soon after. The idea was to find a replacement of analogue FM that included an enhancement of sound quality and multichannel capacity. Technically those goals were met. Ten years later the enhanced version DAB+ was introduced.

The DAB-system is copying the technical structure used for terrestrial digital television (DTT) with multiplexes and also using a higher frequency band than FM. The radio listener will not any longer tune into frequencies but solely pushbutton pre-set channels on his receiver.

The first version of DAB is established in Denmark, Norway and the U.K. but has not yet made any significant headway. Still a modernisation in form of the transition to DAB+ is still awaiting in those countries. In the UK DAB listening is just below 20 percent of the total radio audience and most people still listen to FM. Regular DAB+ broadcasting has been introduced in Australia, Switzerland, Germany and France. DAB has been tested in Portugal, Spain, Canada and Singapore but is now abandoned.

However, no country in the world has yet decided to switch off analogue FM on any set future date.¹ The present Swedish government will allow for DAB+ but solely on market

¹ Contrary to widespread rumours Norway has not taken any decision to "switch off FM". The government has decided that local radio stations can continue broadcasting on FM if they choose to. (Ministry of Culture: Meld. St. 8 (2010–2011) Melding til Stortinget).

terms and without any state funding. Also the government has declared (May 2012) that FM radio will not be switched off in a foreseeable future at least until a digital radio receiver population has reached a critical mass.

DRM is the only standard that covers the complete sound broadcasting spectrum. First it was established for digitalisation of AM (shortwave, medium wave and long wave) below 30 MHz. DRM30 has been used for a long time around the world by established international broadcasters as Deutsche Welle, BBC, Vatican Radio, All India Radio and Voice of Russia. The system is now implemented for domestic systems (medium wave) in India, Russia and Ukraine.

The same system has now also been developed for digitalisation of the VHF band I, II and III.² Successful tests of DRM+ has been made in several countries 2010-2012 as in Brazil, Germany, France, India, Sri Lanka, the UK (BBC)³, Slovakia⁴ and Italy (Turin and the Vatican). Although DAB+ has been introduced in Australia the government has concluded that a preference for DRM and DRM+ above HD Radio could be used to supplement DAB+ services in (some) local and regional areas.⁵

HD Radio (IBOC) is the system used in the U.S. to digitalise AM (medium wave) and FM. It makes it possible to broadcast one analogue and two digital radio channels on the same frequency. It has been established also in Mexico and is promoted widely in especially Latin America and the Far East. However for digitalisation in Europe this system has been regarded as economically and technically inferior to DAB and DRM. HD Radio is also a propriety system, which means that you have to pay a license to use it.

The International Telecommunications Union has December 2011 approved four global digital radio standards; two of European origin DAB and DRM respectively - and HD Radio (USA) and ISDB-T (Japan). There is not any single European standard. The European Commission has stated that the European Union does not currently have a common policy on radio broadcasting. According to the Commission public policy has to remain both neutral in terms of technological solutions and sufficiently flexible to adapt to future evolutions.⁶

In contrary to countries like the United Kingdom⁷ DRM+ is an unknown system for most in Sweden. Still there is no knowledge among politicians or in mainstream media that there are

² Band II is the FM-band (87,5-108 MHz) and Band III is where the present DAB-system is located. DRM+ can be used in all three bands.

³ *Results of the DRM+ High Power Field Trial in the United Kingdom* (Lindsay Cornell, BBC Research White Paper July 2011)

⁴ The test in Bratislava was run by the public broadcaster Radio and Television Slovakia (RTVS). The results were excellent and RTVS has been granted permission to continue DRM+ broadcasting on band II (the FM band) for the next ten years (April 2012).

⁵ "Review of technologies for digital radio in regional Australia", Final report 7 October 2011

⁶ Information Society and Media Directorate-General, European Commission letter to CMFE and AMARC-Europe 6 February 2012

⁷ The DRM Technical Office is located in BBC premises in London. BBC has been involved with DRM and DRM+ for a long time.

alternatives to DAB+. The agenda of digitalisation is set by the Swedish public radio company and the transmission company.

There are at least two main obstacles facing local terrestrial radio that warrant attention.

- The first concern is that many community radio stations are almost nowhere able to fill up multiplexes of DAB networks. The now widely planned DAB+ multiplexes allow for transmission of 20 programs or more. There are few community radio stations that are providing more than one or two programs and few local areas (in some bigger cities and regional areas) where more than five stations serve a common region. Hence many community radio stations are confronted with structural underutilization of (and therefore relatively expensive) DAB multiplexes, should they use these.

- Secondly there are hardly any countries so far that have assigned suitable band III or L-band frequencies for community (local) radio stations. In most cases areas that will be covered by DAB or DAB+ multiplexes are far larger than the area needed to reach local listeners.

This poses economic problems both in terms of transmitting in larger areas than needed and in terms of copyright levies that often are based on the number of potential listeners in an area and not on the subset thereof that constitutes the target audience. Also larger coverage areas could defeat the very purpose of many community radio stations servicing a particular, often local community.

In Europe there are approx. 3.000 community radio stations. However, since its introduction in the mid 90's stakeholders have developed DAB/DAB+ by without taken into account small-scale broadcasting as local or community radio. But on the official Europolitical agenda the matter of equality in the digital environment has attracted attention.

- The 2009 Declaration of the Committee of Ministers of the Council of Europe, *Draws attention to the desirability of allocating to community media, to the extent possible, a sufficient number of frequencies, both in analogue and digital environments, and ensuring that community broadcasting media are not disadvantaged after the transition to the digital environment;*⁸

- European Parliament resolution on Community Media in Europe (2008/2011(INI)), in where the European Parliament *Calls on Member States to make television and radio frequency spectrum available, both analogue and digital, bearing in mind that the service provided by community media is not to be assessed in terms of opportunity cost or justification of the cost of spectrum allocation but rather in the social value it represents;*⁹

⁸ The Declaration of the Committee of Ministers on the role of community media in promoting social cohesion and intercultural dialogue as adopted in 2009 by the Committee of Ministers of the 47 members states of the Council of Europe

⁹ - European Parliament resolution of 25 September 2008 on Community Media in Europe (2008/2011(INI))

Analysis

DAB/DAB+ has not yet made any audience success in Europe and its position outside Europe (except in Australia) is very feeble. There is a growing acceptance that the DAB/DAB+ system is too complex and expensive to make any global success. The multitude of channels might be seen as "overkill" while you now also can receive tens of thousands of digital radio channels on the Internet. Also the FM-transmitter system is very robust and convenient to handle especially for smaller radio stations (local or community radio).

The DAB-system is created primarily for public radio and commercial radio networks (large coverage area networks). It is remarkable that all DAB-systems have been introduced without any proof of consumer demand or market research and evaluation. In fact listeners have not yet complained about FM radio and have not demanded a multitude of digital radio channels. DAB+ stakeholders seem to be trying to deliver the audience to new unproven systems instead of delivering programs on the platforms where the audience is.

Because of the multitude of channel space on a multiplex DAB+ will offer lower cost per channel than any other system. But this is true only if *all* channels are utilized. Already today there are problems to find a proper quantity of program input from public, commercial and community radio to fully make use of this resource.¹⁰ Hence DAB+ might be "overkill" – *a solution trying to find its problem rather than the other way around.*

For DAB to be used effectively all the broadcasters should be in the same multiplex and antenna system which likely is operated by a third party.¹¹ However this will establish distribution monopolies. For a local community radio stations it is crucial to be independent of gatekeepers as transmission companies, public service companies or larger commercial networks. There is an advantage for a community radio operator to be able to build, own and operate the transmitter and antenna system. A FM transmitter nowadays is very compact and flexible with option of mobility.

Meanwhile in the mid-00 a consumer demand for a choice of more radio channels seem to have reached a level of satisfaction as digital radio on the Internet became common. Today it is estimated that you can access more than 25.000 radio channels for free on the Internet. Why then keeping wireless radio at all when you have this superior choice of channels online? A FM transmitter offers a more robust system for mobile listening and the listener is also anonymous. It is also very uncomplicated to build and put a FM transmitter system for on-air broadcasting.

Community radio stations or other smaller radio stations will continue to base their operations on broadcasting on a FM transmitter but are already using online streaming to

¹⁰ Unflexible frequency planning is notably, there are often not enough with radio stations to fill a local multiplex with 16 channels. For example German media regulator made a evaluation in Lower Saxony and Baden Württemberg and found out that there is not enough interest to fill a regional multiplex.

¹¹ At the Brussels conference *Communication Rights in the Digital Environment* (May 2012) AMARC-Europe and CMFE called upon the European Union and its Member States to ensure that digital broadcasting technologies and laws allow community radios the right to both own and operate their own transmission systems (Point 5 of six).

extend their reach. However, such radio stations will not replace broadcasting with being solely online. Authorities have always the ability to control who is using the Internet.

Also FM-radio has kept its strong position as the world standard for over the air listening partly because of the introduction of FM radios in mobile phones.¹²

In the view how different radio listening is to television viewing habits, the DAB transmission structure is quite questionable. *Planners seem to be pushing forward on the premise that digital sound broadcasting should be delivered through pre-packaged programme streams on DAB, similar to how access to digital television is now organised. The way in which the audience listens to sound programming differs considerably from how television is viewed. There is a demand for a wide range of content for listening but each individual only listens to a few favoured stations, maybe only one or two per day. In contrast, viewers move between TV channels quite promiscuously, often in “zapping” mode or during commercial breaks. The “set menu” offered by the DAB platform tends to restrict listener choice rather than enhance it.*¹³

Prognosis

DAB+ is a system that will meet a demand for a significant higher capacity than what the analogue FM system can offer for on-air radio broadcasting. However, there is still no proof in Sweden (or in any other country) that there is a consumer demand for more on-air channels. Alternative channels for listening – especially for music listening – are already well established on the Internet as well via services as Spotify and devices as the iPod.

The DAB system will not expand to Asia, Africa or the Americas and become an alternative to analogue FM radio as will DRM30 and DRM+. There are rising levels of doubts that the DAB system will survive even in its “mainland” - Western Europe. It will be too costly to keep the FM-network and also run a DAB-network in parallel. A successful introduction of DAB+ is only possible by a government enforcing a closure of the FM band while channelling state budget subsidies (or TV license funding) to the public service radio. But then the cost to consumers will be high; In Sweden alone 20-30 million of FM receivers (including car radios, mobile phones) will be useless.

Even if Sweden at the moment is not suffering too much of the financial crisis in the Eurozone there will be no political response for a costly introduction of DAB+. The sound broadcasting sector in Sweden is not becoming a growing industrial sector creating future profits and jobs.

Even if the public service radio in Sweden against all odds will start regular DAB+ service we do not envisage a successful introduction. This means a high level of risk taking and might in the end be a significant waste of money for the public good. Also it will be not quite

¹² A reason why DAB+ has not been introduced in mobile phone is according to a manufacturer in Sweden is that the battery consumption with DAB is 8-9 times higher than for a built-in FM receiver.

¹³ John Shaw, Telecom Consultant, in an open letter to Lord Patten, Chairman of the BBC Trust, May 28 2012

democratic as smaller radio stations – as community radio – are not able to join the public service and the commercial network in the DAB multiplex system because of ideological, technical and financial obstacles.

Probably, the DAB system will stay on in Western Europe for several years to come, as it will become a part of a multiplatform sound broadcasting output with receivers able to tune in both DAB+ and DRM+ as well as FM radio. The technical and economic realities of the market will decide the outcome not the politicians enforcing the citizens and listeners to adapt a system.

Even if FM networks will be running for many more years to come there might be demands for some more capacity and enhanced quality. Then other more modern system than DAB+ will be of interest. At the moment based on facts and knowledge of the international scene we are convinced that DAB+ will not survive but FM will and any digitalisation will be based on a system as DRM+ or similar. In short, an enhancement of the FM band, not replacing it.

The DRM+ technology is in fact more spectrum efficient than DAB+. Keeping sound quality on present FM stereo level, DRM+ can be approximately three times more spectrum efficient per program channel, than DAB+. Introduction of DRM+ can usually be done step by step without any linked planning for a parallel switch off of the analogue FM system. You can continue broadcast in analogue mode on your established frequency while starting a separate digital channel close to the same frequency, or where such space is available. Development will be possible on a moderate level without taking any major political or economical risk.

Continued DRM+ trials in Europe

After being tested in several countries around the world DRM+ is now on the verge to be officially adopted as the “down-to-earth” and sustainable alternative to DAB+. We envisage an increasing number of trials by various public service organisations and by community radio stations in different parts of Europe. Such local trials will be observed with interest by community media organisations as CMFE and AMARC-Europe.

A first probe has presented a genuine interest to make a trial of DRM+ also in Sweden by using a community radio transmitter and/or frequency. Initial discussions on this subject have included the DRM Technical Office in London and the Swedish Telecom Authority (PTS).

In the Stockholm county there are 18 FM radio frequencies allotted on community radio. Three channels are licensed to SNRF - the Stockholm Community Radio Association (88, 95,3 and 101,1 MHz) which owns and operate the transmitters including antennas on a common site. SNRF has now confirmed its interest to host the test project on condition that other stakeholders will contribute with their resources including technical knowhow and financing. Community Media Forum Europe will be a partner.

A project group will present a detailed project plan for local and international stakeholders as well as to the Swedish government in August/September 2012. The ambition is to start test transmissions during the fourth quarter of 2012.

Useful links:

Policy:

CMFE Correspondence with EU Commissioner Kroes regarding digital radio

http://www.cmfe.eu/docs/2011_12_19_CMFE_AMARCEUROPE_DIGITALREVOLUTION.pdf

http://www.cmfe.eu/docs/2012_02_06_The_European_Commission_response_digitalization.pdf

Technical:

Edinburgh Field Trials (BBC Research White Paper):

<http://www.communitymedia.se/digitalradio/WHP199.pdf>

EBU Digital Radio Technical Report: <http://tech.ebu.ch/docs/techreports/tr013.pdf>

DRM Broadcasters Guide: http://drm.org/uploads/files/broadcast_manual.pdf

ITU: Systems for terrestrial digital sound broadcasting to vehicular, portable and fixed receivers in the frequency range 30-3 000 MHz:

http://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1114-7-201112-I!!PDF-E.pdf

ITU: Technical basis for **planning** of terrestrial digital sound broadcasting in the VHF band:

http://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1660-5-201112-I!!PDF-E.pdf

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