

For information
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Legislative Council
Panel on Information Technology and Broadcasting
Digital Audio Broadcasting

Purpose

This paper provides the background of the formulation of the existing policy on digital audio broadcasting (DAB) in Hong Kong and examines the key issues affecting the development of this technology which may impact on its introduction or otherwise into Hong Kong.

Background

2. Conventional sound broadcasting services are transmitted in the analogue format in the MF band for AM services and VHF band for FM services. DAB generally refers to broadcasting audio contents in the digital format. However, in many cases including Hong Kong, it specifically means digital terrestrial audio broadcasting. The benefits of DAB, as compared with analogue sound broadcasting, are -

- (a) better sound quality and interference immunity;
- (b) additional services such as transmission of pictures, texts and videos for small displays; and
- (c) better utilisation of spectrum resulting in more radio programme channels.

3. Broadcasters need to invest in digital transmission equipment to launch digital broadcasting while listeners need to acquire new compatible digital receivers to receive digital services.

4. A variety of digital broadcast technical standards have been developed. The European Eureka 147, developed in the 1980s, is the first digital radio broadcast standard endorsed by the International Telecommunication Union. It has so far been the most popular technical standard adopted by continental European countries, the United Kingdom, Canada, Singapore, South Korea and recently Australia (for major cosmopolitan areas). Eureka 147 enables multi-channel broadcasting by combining several different radio services into a single stream of digital data, and transmission of pictures, text and videos for small displays. Eureka 147 can operate in both the L-band (1452-1492 MHz) and Band III (174 – 240 MHz). Since the majority of economies which have adopted Eureka 147 for DAB chose to transmit their signals in Band III, at present the majority of DAB receivers available in the market operate in the Band III.

5. The In-Band-On-Channel (IBOC) standard developed in the United States offers an integrated analogue/digital broadcasting system that enables broadcasters to operate a digital frequency on either side of the analogue frequency in MF or VHF bands. This means that it allows existing analogue broadcasters to add digital broadcasts to their existing transmission in the existing spectrum assigned to them for analogue broadcasting. No extra spectrum is required for adding new digital services under the frequency plan of the US. However, Hong Kong has adopted a narrower bandwidth for the FM channel that could not accommodate the additional digital frequency of the IBOC system. Besides, a major limitation is that the IBOC standard as currently implemented is unable to provide multi-programming streams.

6. The Swiss-based Digital Radio Mondiale (DRM) standard operates in the HF and MF Bands for broadcasting over extremely long distances. There are experimental trials to use DRM to transmit multimedia services to public transport. Australia may also consider using DRM or a combination of technologies for serving regional and remote areas.

7. The Japanese ISDB-Tn or Integrated Services Digital Broadcasting – Terrestrial (narrowband) standard is based on the technical standard developed for digital terrestrial television broadcasting. It is designed to operate alongside digital television broadcast transmission and has so far only been adopted by Japan. It has the technical potential of carrying more programmes per frequency channel than the Eureka 147 standard.

Policy Development

8. We have been following an evidence-based approach to the formulation of the policy framework for digital terrestrial broadcasting, taking into account technical and market considerations. We recognize the small market size of Hong Kong and the position of Hong Kong as a technology adopter rather than a pioneer.

9. In February 1998, the then Information Technology and Broadcasting Bureau (ITBB) established the Digital Audio Broadcasting Steering Committee to steer and co-ordinate a technical trial of DAB using L-Band by Radio Television Hong Kong (RTHK), Hong Kong Commercial Broadcasting Company Limited and Metro Broadcast Corporation Limited. The results indicate that using Eureka 147 in the L-band for DAB services is technically feasible in the Hong Kong environment. DAB is superior to conventional FM broadcasting in terms of sound quality and interference immunity. Reports of the technical trial are available at the website of the Communications and Technology Branch at www.citb.gov.hk/ctb.

10. In addition, the then ITBB commissioned a consultancy study to assess the economic and market potential of DAB. In essence, the economic study indicated that consumers were positive about the capability of DAB in providing more radio content. However, they were unwilling to buy digital receivers unless their price fell to below HK\$500. The consultant also pointed out that the prospect of DAB was still uncertain given that emerging new technologies had enabled the provision of similar digital services on new media platforms (e.g. 3G mobile platform and wireless Internet). The consultancy report is available at the website of the Communications and Technology Branch.

11. Based on the above technical and economic considerations, the Government proposed in the *Digital Terrestrial Broadcasting in Hong Kong – A Consultation Paper* issued on 1 December 2000 that the introduction of DAB services into Hong Kong should be driven by market forces. We believed that consumers' interest would be best served when DAB service is introduced at a time when the service is commercially viable and DAB receivers are affordable to the general public. We recommended that applications for DAB services should be considered when the following market conditions materialize –

- (a) the market potential of DAB and associated non-broadcasting applications become clearer;
- (b) the price of DAB receivers comes down to an affordable level for consumers; and
- (c) the worldwide penetration of DAB services picks up momentum.

12. The Government also proposed that existing sound broadcasters should be allowed, under their respective licence conditions, to continue to make use of the existing frequencies assigned to them for analogue AM/FM broadcasts. Prior to licensing of DAB services, the Government proposed that it would consider applications from the industry and education institutions to use the reserved frequencies in the L-band for conducting test transmission of DAB services.

13. Respondents to the public consultation generally supported the above recommendations. In the *Second Consultation Paper on Digital Terrestrial Broadcasting* issued on 5 December 2003, we maintained our recommendation in the first consultation that the launch of DAB services should be market-led.

Considerations

14. When examining whether and if so when to introduce DAB services into Hong Kong, we need to consider the following key issues.

Spectrum issues

15. We have reserved frequency channels in the L-band and identified frequency channels in the Band III for Eureka 147-based DAB services for co-ordination with the Mainland authorities. As mentioned in paragraph 4 above, most broadcasters which have adopted Eureka 147 for trial or commercial DAB services are using Band III for transmission. As such, at present widely available compatible receivers operate in Band III. Australia has recently decided to use Band III for DAB services in metropolitan areas and L-band to supplement coverage. It is therefore possible that L-band or dual-band digital receivers may be readily available in the future if the launch of DAB services in Australia materialises.

16. It is unlikely that the small market size of Hong Kong alone will induce manufacturers to produce affordable receivers for L-band. We will need to follow the international trend of using Band III if DAB services are to be introduced into Hong Kong. This means that as a pre-requisite for introducing DAB services into Hong Kong, we need to finalise the Band III frequency plan with the Mainland authorities and clear the frequency band concerned for DAB services. RTHK is currently testing digital transmission using Eureka 147 in Band III.

Uncertain Prospect of DAB

17. Those involved in developing the European Eureka 147 technical standard such as manufacturers and broadcasters, have been rigorously promoting DAB services worldwide. The World DAB Forum is established as the champion of DAB services based on the Eureka 147 standard. Despite rigorous promotional efforts, consumer take-up of DAB is increasing but not phenomenal. Unlike digital terrestrial television where governments require broadcasters to launch digital broadcasting according to a specific timetable with a view to switching off analogue broadcasting in the foreseeable future, governments like Australia and the UK believe that DAB will at best complement analogue broadcasting but not replace it.

18. From the many international studies done on DAB, the challenges DAB faces can be summarized below :

19. First, existing FM stereo services are already meeting the needs of the majority of listeners in terms of sound quality and interference immunity. Unlike television, which is still primarily an entertainment at home, radio is listened to at home, workplace and in the mobile and portable mode. People often listen to the radio while doing other things at the same time. Radio is a primary medium for live news and information. The majority of radio listeners are therefore unlikely to be willing to buy digital receivers purely for CD-quality sound programmes promised by DAB services. In addition,

unlike digital television which offers discernible value-added in terms of superior audiovisual home entertainment (e.g. high-definition TV) that drives the majority of TV viewers to switch over to digital, the value-added in terms of sound quality and additional features promised by DAB services may not be strong enough to urge the majority of listeners to invest in new digital receivers to take up DAB services.¹

20. Secondly, radio is commonly accessible because it is universally available and free of charge. Analogue receivers are not only affordable but also extremely low-cost, enabling high penetration of radio to the mass. When examining the problems of the discouraging take-up of DAB services in the UK, the Ofcom, the regulator for the entire electronic communications sector there, points out that although the retail price of digital receivers has come down to an affordable level, it is still relatively much higher than that of analogue receivers². Thus, digital receivers are affordable but not yet acceptable by the mass consumer market like analogue receivers. DAB remain a high-end alternative but not a substitute for analogue FM broadcasting. Since it is unlikely that the price of digital receivers will drop to a level close to that of analogue receivers in the near future, DAB will remain a niche service accessible by the better-off but not the mass. This may explain why some governments take the view that DAB services will be supplementary to existing analogue services instead of a replacement like digital television.

21. Thirdly, emergence of competing wireless technologies delivering audio or multimedia contents had made the prospect of DAB uncertain. In addition to terrestrial DAB services, digital radio is available via coaxial cable, satellite, the 3G mobile platform, and as online radio via wireless or fixed Internet connection in many countries. In many cases, digital radio is carried by cable and satellite pay TV service providers as free bonus for subscribers. Consumers may not be willing to buy a digital receiver when supplementary digital radio services are already accessible via their existing electronic devices. Also, given new wireless transmission technologies are capable of carrying multimedia services, operators would invest in infrastructure to provide multimedia services that have bigger market potential instead of sound-only digital radio services. In fact, in South Korea, operators have recently launched Eureka 147-based Digital Multimedia Broadcasting (DMB) services for reception by hand-helds (e.g. mobile phones) via satellite and terrestrial radiocommunications. US and some European countries are also conducting trials of similar multimedia applications using the MediaFLO technology and DVB-H standard (part of the family of technical standards for

¹ “radio is primarily audio and not dependent on additional features like pictures and text. It is linear and mostly live. Unlike television, recorded radio, for time-shift listening, is not generally popular and timed audio recorders are rarely sold or use” extracted from *Radio Regulation for the 21st Century*, submission to the Department of Culture, Media and Sport and Department of Trade and Industry (June 2000) by the UK Radio Authority.

² *Radio – Preparing for the Future Phase 1 – developing a new framework* issued by the Ofcom on 15 December 2004.

digital terrestrial television) respectively. The development of variants of applications having better market appeal, coupled with the fact that the majority of radio listeners are content with FM analogue services, raises further doubts about the prospect of sound-only DAB services.

Market Consideration

22. One of the often quoted advantages of introducing DAB services is to provide more channels to the listeners. Such an advantage should be weighted against the economic consideration of the impact of audience fragmentation on the radio market.

23. Audience fragmentation refers to dispersion of a critical mass of audience into different fragments of audience groups that could be reached out to by each individual programme channel when the number of programme channels increases. In the multi-channel environment, service providers tend to establish distinctive identity for each channel. This is what we see in multi-channel pay TV services which comprise an array of niche channels such as 24-hour news, health, food and fashion, music TV, and specific sports and pastimes like angling, traveling, golf, etc. Different channels appeal to different audience fragments.

24. Audience fragmentation may not be a concern to providers of pay broadcasting services because their major source of revenue is subscription rather than advertising. Commercial implications of audience fragmentation would have minimal impact on publicly-funded broadcasters. For free-to-air terrestrial radio broadcasters relying on advertising as their major source of revenues, audience fragmentation is a significant operating concern. The advertising rate of a radio channel for a specific timeslot is proportional to the estimated number of listeners tuning in to a channel at that timeslot. Provided that the total number of listeners remains constant, more channels will inevitably lead to audience fragmentation, meaning that there could be downward pressure on the advertising rate. We therefore need to critically assess the extent of resultant audience fragmentation due to the availability of new digital channels and how many commercially viable radio channels the market of Hong Kong can sustain in such circumstances.

Regulatory Issues

25. At present, the licensing regime for sound broadcasting services is specifically designed for sound-only services. If we are to license operators to use the allocated spectrum for new DAB services which may include additional multimedia features, we may need to devise a new licensing framework to accommodate the new services.

Innovation and Technology Adoption

26. New technologies promising superior technical performance often cause excitement. Whether a new technology will take off however has to pass the test of market dynamics. There could be variants of technological applications that utilize the spectrum in a more efficient manner and have brighter market prospects so as to generate new commercial opportunities for innovative services benefiting consumers. The Eureka 147-based DMB service mentioned in paragraph 21 above is an example of such a variant. Commercial ventures, which must be justified by an evaluation of the risk and return involved, represent better assessments of the prospect of new technologies, how it should be adopted or varied, and the timing for making the investment. Along the market-led philosophy, we should facilitate commercial ventures to test new services in Hong Kong using the reserved spectrum for DAB services.

Conclusion

27. Formulating a framework in response to a new technology is a complex exercise involving an assessment of the benefits the technology would bring to the public, a delicate balance of various considerations affecting different stakeholders, and sufficient understanding of an economy's competitive edge in innovation against application. We are mindful that Hong Kong's competitive edge lies in adopting at the right time the best available proven technology, both in terms of technicality and market acceptability.

28. Noting the challenges facing the development of DAB worldwide, we maintain that the market-led approach is most suitable to the situation in Hong Kong. The conditions for introducing DAB services into Hong Kong proposed in the first consultation paper on digital terrestrial broadcasting as replicated in paragraph 11 above still apply. Adhering to the evidence-based approach, we will continue to take stock of international development and, if necessary, commission further studies into the actual market situation and the prospect of different competing technologies to enable us to make the best assessment based on up-to-date information. In the meantime, we welcome trials of new applications on the frequencies reserved for DAB.

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