



European Radiocommunications Committee (ERC) within the
European Conference of Postal and Telecommunications Administrations (CEPT)



DSI PHASE II (900 MHz ISSUES)

SERVICES ANCILLARY TO PROGRAM MAKING

Saariselkä, January 1998

**DSI PHASE II (900 MHz ISSUES)
SERVICES ANCILLARY TO PROGRAM MAKING**

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**DSI PHASE II (900 MHz ISSUES)
SERVICES ANCILLARY TO PROGRAM MAKING**

1 SUMMARY

The DSI Phase II report recommends that SAB (Services Ancillary to Broadcasting) - or Services Ancillary to Program making (SAP) as it will be referred to in this Report - be allocated a band between 862 - 875 MHz. Furthermore, page 178 of the harmonised table of frequency allocations indicates an allocation for SAB in the Major Utilisations column with Cordless Microphones between 862-875 MHz.

Rec 32.
Three bands should be made available for cordless microphones 29.70-34.90 MHz, 174.00-175.50 MHz and 862-875 MHz. The band 174.00-175.50 MHz could already be available in some countries but may only become generally available following the transition from analogue to digital TV broadcasting. (Section 10.10.3)

The ERC response to this recommendation is as follows:

The ERC cannot provide a complete solution to the problem of frequency allocations for wireless microphones but studies are being undertaken by the Frequency Management and Spectrum Engineering Working Groups to find harmonised bands.

The ERC response to recommendations 14, 15, 16 and 17 are shown in **Annex 2**.

CEPT PT-SE19 has made recommendations for other frequencies than those indicated above.

The following WG-SE findings are to be noted;

Recent work on the revision of Recommendation T/R 75-02, places civil TETRA at 870-876 / 915-921 MHz. This means that the upper part of the top sub-band identified within DSI recommendation 32 (5MHz) for cordless microphones, is not available for SAP and that this requirement should be accommodated elsewhere.

Furthermore, accepting the permanent position of CT systems in the 864-868 MHz band, further spectrum needs to be identified for cordless microphones elsewhere.

2 INTRODUCTION

Within the DSI the term SAB (Services Ancillary to Broadcasting) has been used. Services ancillary to broadcasting (SAB) consist of a range of devices listed in **Table 1** page 71 of the report and are listed below.

Table 1

Service	Category	Transmission Mode
Radio Microphone	wide band / low power	continuous single frequency
Programme Circuits	wide band / high power	continuous single frequency
Production Talkback	narrow band / high power narrow band / low power	continuous, full duplex or press to talk on return path
Production Communications	narrow band / high or low power	single, frequency, press-to-talk
Data	narrow band / low power	continuous

This radio infrastructure is used both by official broadcasters and independent companies working in the entertainment sector for the manufacture of programmes. The word 'programme' is used to cover a wide range of activities including TV main programmes, TV advertisements, corporate videos, sporting events, theatre productions and conference use. We therefore propose to use the term SAP, "Services ancillary to Programme Making" as opposed to SAB "Services ancillary to Broadcasting" which has connotations of use by official broadcasters only.

The term SAP has increasingly been used as defined above leaving the abbreviation SAB for the actual requirements of the broadcasters. A continuous band for SAP use is not the most efficient use of the spectrum. Smaller blocks spread over the band would be of more use and generate better spectrum efficiency. However, spectral efficiency in such a band is obtained in some countries by dynamic frequency allocations on a geographical basis. These allocations can be from a few hours to weeks dependant upon the subject matter being covered.

This ERC Report is based upon the earlier study on DSI-II carried out within CEPT WG-SE, entitled *DSI Phase II Examination of 900 MHz Issues*, see SE(96)21 Annex 8.

The report considers the spectrum engineering issues associated with the recommendation embodied within the DSI Phase II report and lists recommendations for consideration by frequency managers.

Definitions of the following terms used within this report are shown in **Annex 1**;

- Minimum Carrier Separation,
- Minimum Frequency Separation,
- Co-exist.

3 STUDY

Opportunities for Sharing.

CT2 is at present well established in a number of countries and is unlikely to have ceased functioning by the year 2008. Only low power regulated devices (50 mW) such as radio microphones would be able to use the adjacent bands, though tests have shown that a minimum frequency separation of no more than 200 kHz would be required. This will mean in those countries where the spectrum is available for CT2, it will be unavailable for all other devices.

Sharing with defence applications is an option which is already in place in some countries and due to the regulated nature of the devices has proven successful. Further work in this area is required.

UIC is proposed as a geographical based system covering the railway track, associated peripheral yards, major stations and termini areas as well as their immediate environments. Unlike GSM, this is not a public correspondence system and there will be areas away from the rail routes where sharing will be possible on a coordinated basis. Further work in this area is required.

CEPT PT-FM27 is considering specific frequency allocations for SAP services across Europe. This has resulted in further compatibility studies.

Radio microphone Receiver Rejection of CT2 Transmissions.

The DSI phase II report recommends that radio microphones be allocated spectrum within the '900 MHz band'. Some of this spectrum is currently used by CT2. In an attempt at establishing the minimum frequency separation required between radio microphone receivers and CT2, some limited measurements have been undertaken. The results of which are shown below.

The unwanted signal levels at which a radio microphone receiver suffered impairment are shown in **Figure 1**, and presented in terms of carrier separation versus geographical separation in **Figure 2** overleaf.

It was noted that only a small increase in the unwanted signal level was required to change the impairment from grade 4 (perceptible, but not annoying), to grade 3 (slightly annoying). This is believed to be a function of the companders employed in Radio microphone systems. When assessing the magnitude of the potential interference, the manner in which the impairment rapidly changes may also need to be considered.

Figure 1

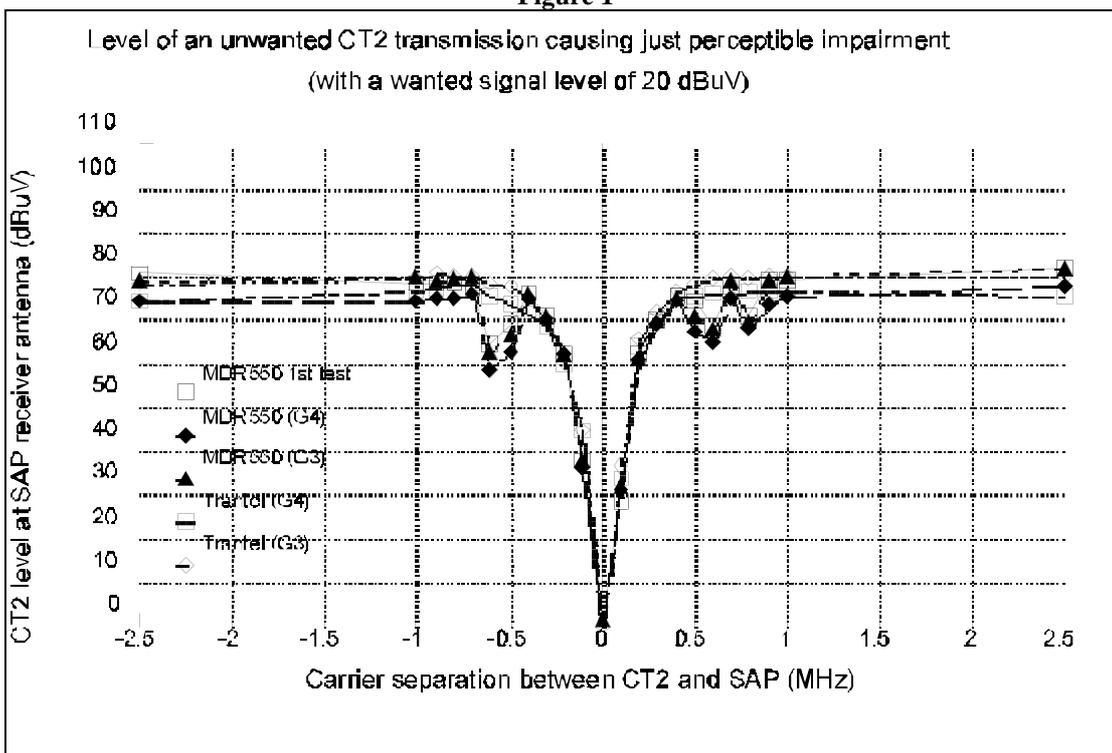
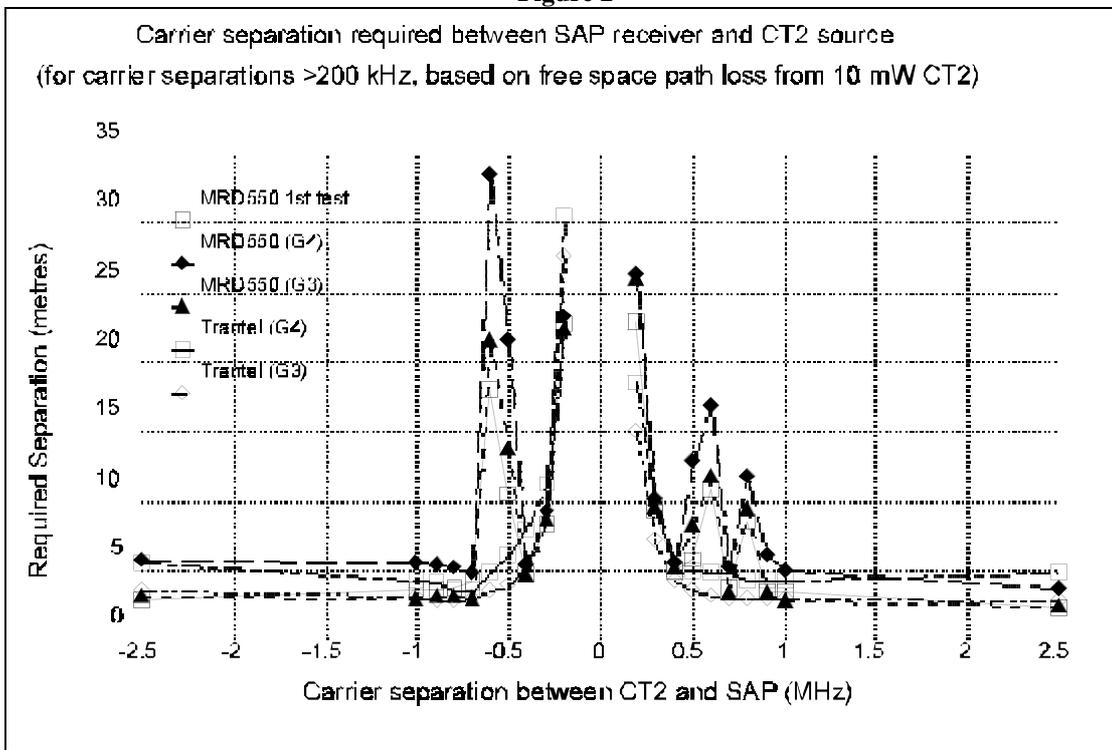


Figure 2



4 CONCLUSIONS

The ERC response to recommendation 32 is as follows:

The ERC cannot provide a complete solution to the problem of frequency allocations for wireless microphones but studies are being undertaken by the Frequency Management and Spectrum Engineering Working Groups to find harmonised bands.

Recent work on the revision of Recommendation T/R 75-02, places civil TETRA at 870-876 / 915-921 MHz. This means that the sub-band 870-875 MHz identified within DSI recommendation 32 for cordless microphones, is not available for SAP and that this requirement should be accommodated elsewhere.

Accepting the permanent position of CT systems in the 864-868 MHz band in certain countries, further spectrum needs to be identified for cordless microphones elsewhere.

The Services Ancillary to Broadcasting (SAB) form just part of the broader category of Services Ancillary to Programme making (SAP).

The single 13 MHz block for SAB Cordless Microphones (page 178 of the DSI report), may better serve the requirements of SAP if the available spectrum is split into discrete blocks elsewhere in the 900 MHz band.

It is possible to locate low power SAP services, consisting of regulated (i.e. frequency planned) radio microphone services having a power output of 50 mW or less, adjacent to CT2 services without the need for large frequency separations.

In practice, the determining factor will be the level of intrinsic immunity demonstrated by a SAP radio microphone receiver, to an adjacent CT2 transmission. This will require further study, including operational characteristics and differing receiver parameters.

ANNEX 1

DEFINITIONS OF TERMS USED IN THIS REPORT:

MINIMUM CARRIER SEPARATION: -

The minimum separation (kHz) required between the nearest carriers of two adjacent band systems for them to co-exist.

MINIMUM FREQUENCY SEPARATION: -

The minimum separation (kHz) required between the band edges of two adjacent band systems for them to co-exist.

Minimum Frequency Separation is less than the Minimum Carrier Separation.

The difference is of the order of one half of the sum of the two systems channel spacing.

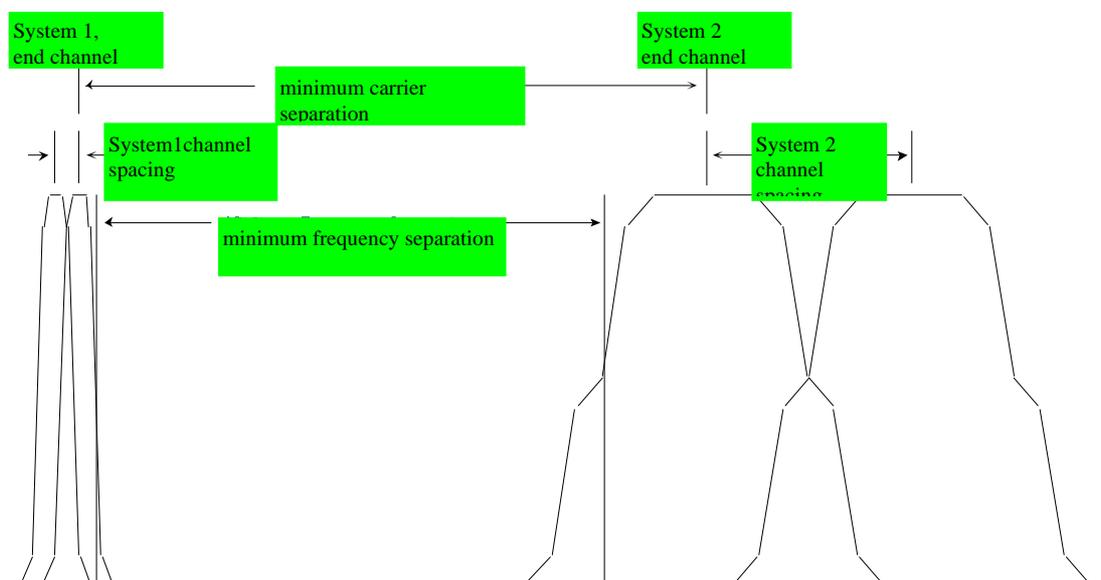
e.g. for GSM and TETRA a minimum frequency separation of 'x' kHz equates to a minimum carrier separation of 'x' + 112.5 kHz. See **Figure 3** below.

CO-EXIST: -

The systems will operate satisfactorily in adjacent bands.

i.e. the magnitude of the interference anticipated is considered acceptable.

Figure 3



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ANNEX 2

ERC RESPONSE TO RECOMMENDATIONS 14, 15, 16 AND 17 OF THE DSI PHASE II REPORT

SERVICES ANCILLARY TO BROADCASTING

14. Every effort should be made to harmonise SAB frequency allocations and equipment parameters. (Section 7.4.5)

R. *The ERC accepts this recommendation on the understanding that wherever possible the concept of tuning ranges developed within the Frequency Management Working Group should be used in order to minimise equipment costs. In the case of deregulated use harmonised bands are essential. Furthermore, the ERC recommends the same approach for SAP (services ancillary to programme making) and it is recommended that SAB/SAP allocations should consist of two parts:*
a harmonised segment allowing use throughout CEPT countries for cross-border operation
a national allocation which would cater for requirements in that country.

ETSI has produced a series of standards covering production talk-back and audio links for which the ERC is also preparing Decisions on the implementation of the standards, so it is essential that there should be continuing close liaison between the ERC and ETSI on the development of SAB equipment standards.

See also Recommendation 32.

15. When the use of broadcasting spectrum is not feasible, the bands primarily identified for defence applications might be considered for SAB on a pre-emptive basis, with geographical constraints as necessary. (Section 7.4.5)

R. *The ERC accepts the principle of this recommendation. SAB and SAP should mainly share with broadcasting services. If sharing with broadcasting services is not possible then SAB/SAP could share with military frequency bands, where such sharing is practicable.*

16. Following the transition from analogue to digital broadcasting, the future bands to be used for broadcasting should only be shared with services ancillary to broadcasting. (Section 7.4.5)

R. *The ERC does not accept this recommendation. The broadcasting bands should not only be shared with SAB/SAP. Examples already exist where it is possible to share with other services (e.g.. MOBILE in Band III). The temporary use of broadcasting spectrum for other services within a CEPT country on a co-ordinated basis should also not be excluded.*

In some European countries SAB/SAP share television broadcast Bands IV and V on the basis that they must not cause interference to domestic TV reception. Uses include audio links, studio talkback and radio microphones. SAB and SAP operators have developed and refined computer based algorithms to optimise use of broadcast spectrum whilst ensuring non-interference to domestic reception. Detailed maps are regularly produced for all the TV bands, showing geographic areas where, due to potential interference to broadcasting services, SAB/SAP operations may and may not operate. With the introduction of DVB appropriate sharing criteria should be developed to ensure that similar spectrum sharing efficiencies can be achieved.

During the transition period, between the introduction of digital services and the closure of the old analogue services, there will be major compatibility problems between the new in-coming digital services and existing SAB/SAP systems. Therefore the migration path needs to be addressed in detail within individual CEPT countries so that a rational phased implementation can be attained.

17. National SAB structures should be established to monitor, co-ordinate and rapidly respond to SAB requirements. Further, arrangements should be instigated to meet the needs of SAB users crossing national borders. The DSI Management Team recommend that the ERC consider in due course, the establishment of a joint CEPT/EBU SAB forum. This combined forum should manage the dynamic process of allocation and reallocation of SAB frequency bands and assignments, monitor the overall requirement for SAB and advise on all other regulatory and operational aspects in relation to the successful operation of SAB in Europe. (Section 7.4.5)

R. *The ERC does not accept this recommendation. It is the view of the ERC that the short timescales involved in implementation and co-ordination of SAB/SAP assignments would mitigate against successful operation of a joint European SAB/SAP forum to manage the dynamic process of allocation and reallocation of SAB frequency bands and assignments. Therefore there is no need for such a forum.*

However, in view of the introduction of DVB-T and its likely impact on SAB/SAP services, it is proposed that the FMWG should look at the implications for the longer term use of SAB/SAP in the broadcasting Bands IV and V.

The problem of free circulation and use of broadcast equipment could be resolved by further efforts to harmonise the use of frequencies and to improve the regulatory framework.