

# Berlin goes digital

The switchover of terrestrial television  
from analogue to digital transmission  
in Berlin-Brandenburg

Experiences and perspectives



**DVB-T: Das Überall Fernsehen**

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### Experiences and perspectives

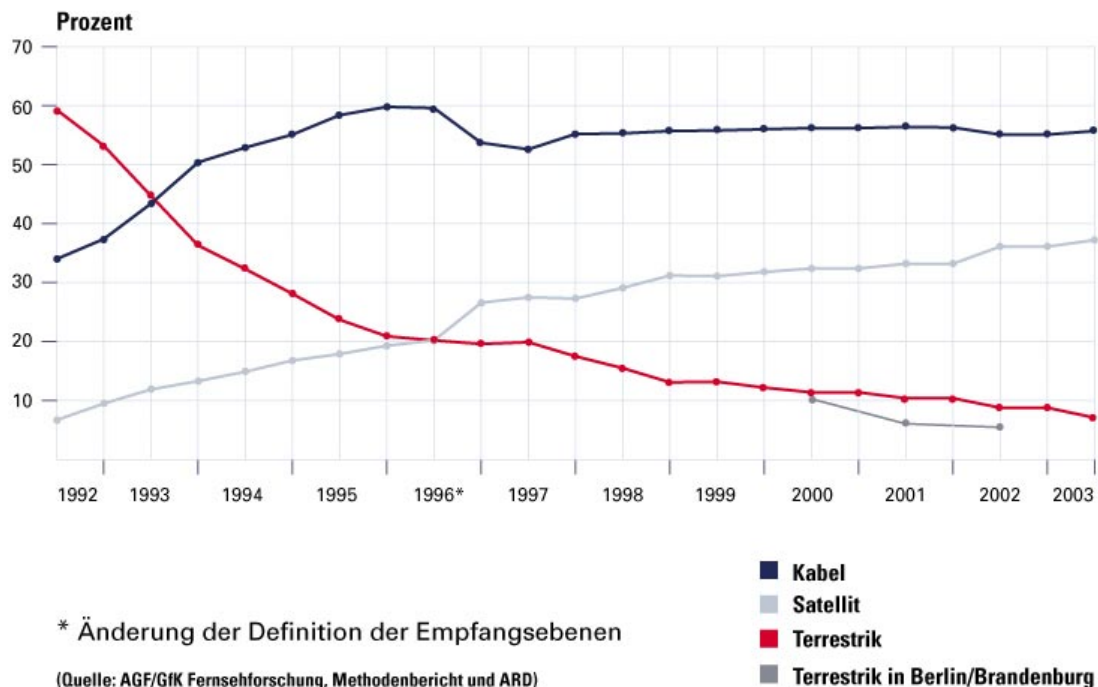
The switch-off of the last analogue terrestrial frequencies in Berlin-Potsdam on 4 August 2003 marks the completion of the world's first switchover from traditional terrestrial TV transmission to DTT.

The results of this process provide encouraging findings to continue along this route. The report below presents the switchover scenario, the experiences gained and the perspectives to be developed from it; a comprehensive documentation is under preparation.

## 1. The start-up scenario for the switchover

### The decline of terrestrial reception

The number of homes receiving TV through the air has been going down continually in recent years. In national terms, the trend is as follows:



This decline could not even be slowed down by the above-average number of analogue services available in Berlin-Brandenburg where as many as 12 channels could be received terrestrially.

### Analogue services prior to switchover



Analog bis November 2002

Before DTT roll-out, terrestrial reception was as follows:

- 160.000 homes with terrestrial reception only
- 90.000 homes with terrestrial reception for 2nd and 3rd sets
- of 1.8 millions television households in the area of reception overall.

### The DTT pilot project and experiences with DTT all over the world

- DTT test operation since August 1997 in single-frequency networks in a joint pilot project of Deutsche Telekom, mabb and SFB.
- First frequency (channel 51, n-tv) switched from analogue to digital transmission.
- 16-QAM 2/3 modulation established as suitable transmission technology for achieving portable indoor reception.
- The failure of digital subscription (pay) television in the UK and Spain underline that switchover must be undertaken with free-to-air television.

### The legal framework for the switchover

Under the Digital Broadcasting Initiative of the Federal government and the German states, transmission should be completely digital by the year 2010. Under the specifications of the Telecommunications Act (TKG), television frequencies must be operated exclusively in digital technology as of 2010.

The switchover is a prime objective of the European Union's e-Europe action plan. The states of Berlin and Brandenburg were the first regions in Germany taking an according initiative: an early amendment of the interstate media services treaty governing the cooperation of the states of Berlin and Brandenburg in the broadcasting sector and an according amendment of the Broadcasting Act for the public-sector broadcasting corporation (ORB) paved the way towards appropriate legislation for the switchover. At the initiative of the states, the Interstate Broadcasting Treaty governing broadcasting in all German states was also amended to permit all public-sector broadcasters to effect the technology changeover as well. Section 52 lit a) entitles public-sector broadcasters to gradually discontinue analogue terrestrial transmission under certain conditions to allow for the build-up and allocation of digital terrestrial transmission capacities in a phased process.

Under section 52 lit a) of the Interstate Broadcasting Treaty, television services so far using analogue transmission capacities must be given preference when the first digital terrestrial transmission capacities are allocated. The interstate media services treaty taken out between Berlin and Brandenburg in addition requires the cable network operators to continue re-transmission of services after switchover that had been awarded analogue capacities before.

Section 46 of the interstate media services treaty regulates the role and participation of the Berlin-Brandenburg regulatory authority, mabb, in the switchover process and entitles mabb to draw up special statutes governing the allocation of digital terrestrial frequencies. Under this statute, capacities permitting the transmission of broadcasting services, media services and other services may be decided upon and allocated jointly. The allocation can be effected under public law via a public contract. The mabb media council based its decision of 9 July 2001 on this provision.

In the Memorandum of Understanding agreed on 13 February 2002,

- the public-sector broadcasting corporations ARD, ZDF, RBB (successor to ORB and SFB as of May 2003),
- the private broadcasting services of the RTL group and the ProSiebenSAT.1 Media AG,
- and the mabb

laid down the key elements of the switchover.

### **The concept for switchover**

The switchover was scheduled to take three stages:

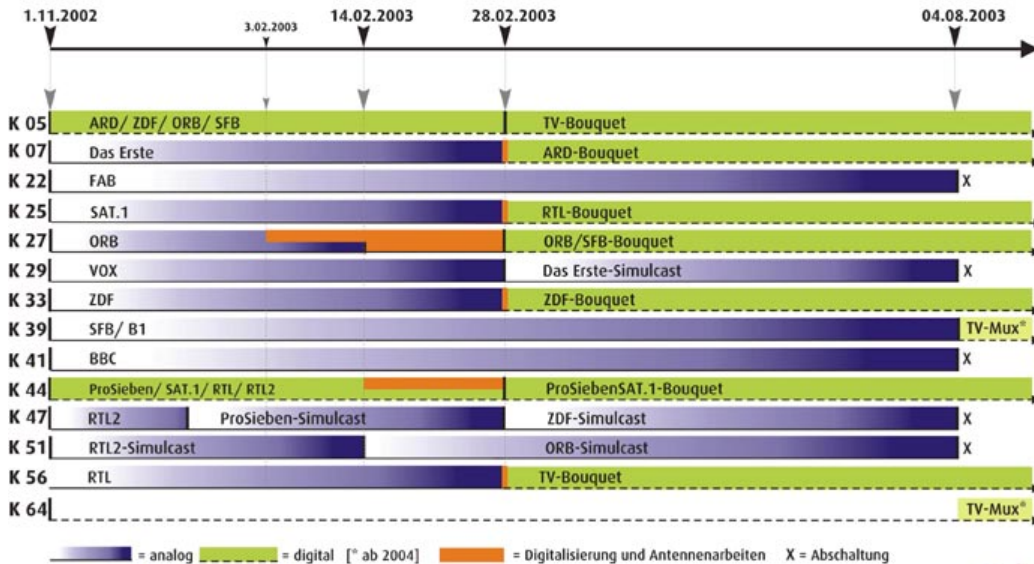
- During stage one, at least one high-power analogue channel was to be switched to digital transmission to demonstrate the quality of DTT and to provide some orientation for the households affected regarding new receivers to be purchased.
- In stage two, the high-power transmitters were to be switched to digital signals; analogue transmission of all national commercial broadcasters would stop, and the public-sector services would continue analogue transmission only via lower-power frequencies.
- In stage three, all analogue frequencies were to be switched off completely.

The following picture shows how the various frequencies were used during switchover:

### Switchover from analogue to digital terrestrial transmission (switchover scenario)



DVB-T: Das Überall Fernsehen



### Availability of receivers

To benefit from the switchover, consumers had to purchase a set-top box or an integrated TV receiver. Support from subscription (pay-TV) services or subsidies for the provision of low-cost set-top boxes were not expected to materialize.

The start of the switchover was therefore linked to the requirement for the receiver manufacturers and retail traders to offer basic receivers not exceeding € 200 in price at the start of the switchover. Several manufacturers met this prerequisite by the start of the switchover process.

Furthermore, VHF reception (Band III) had to be ensured, the sets had to be more advanced compared to DTT receivers employed elsewhere.

## 2. The switchover in progress

### Communication campaign

The communication campaign aimed at informing the homes affected by the switchover without yielding any negative effect on homes receiving television via cable or satellite. The homes affected had to be notified of the various stages of the switchover and their effects on television reception; they also had to be given objective details on the advantages of the various modes of transmission so as to help consumers with their decision on their future mode of television reception. Special information was required for DTT which was not available at the time at all.

Together with the television broadcasters, a communication concept was developed which was put into practice by the "Die Brandenburgs" agency.

The key media for communication was provided by the TV channels themselves: information spots and running bar information specifically devised for the campaign, were intensively broadcast during the various "hot" stages of the switchover, reaching all affected homes in Berlin and Brandenburg.

In addition, the broadcasters also reported on the switchover in their local news and current affairs programmes.

The most cost-intensive measure was a letter sent to every home in February 2003 which clarified once more that only homes which receive television via roof antenna are affected by the switchover.

For the information in the shops and for supplementary information, leaflets, brochures and newsletters were developed; no cost-intensive advertising or poster campaigns were run.

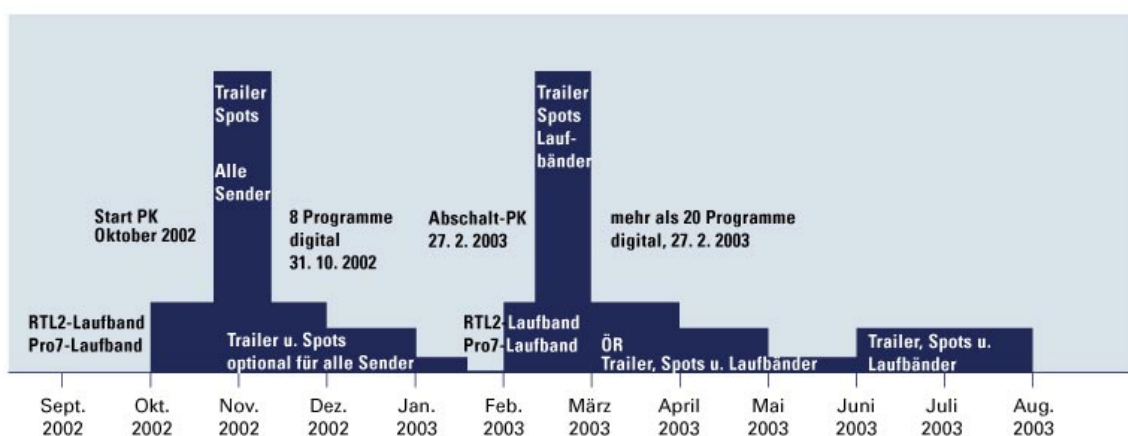
The parties to the switchover process also cooperated closely with the Berlin tenants' association and the local consumer associations. The product quality assessment board (Stiftung Warentest) tested receivers at an early stage and provided information on the developments.

During the switchover process, a joint telephone hotline was set up linking experts working for the broadcasters, the mabb and the GARV (the joint company of mabb, ORB and the Mecklenburg-Vorpommern regulatory authority promoting infrastructure). The hotline dealt with some 22.000 calls, and only 600 of the problems described could not be solved directly over the phone.

The campaign was supported via an internet website which had been designed in cooperation with Deutsche TV-Plattform ([www.ueberallfernsehen.de](http://www.ueberallfernsehen.de)).

The cost of the communication campaign were covered by the broadcasters and the mabb; they remained below the budgeted sum of €1.2 million.

### The key components of the communication concept



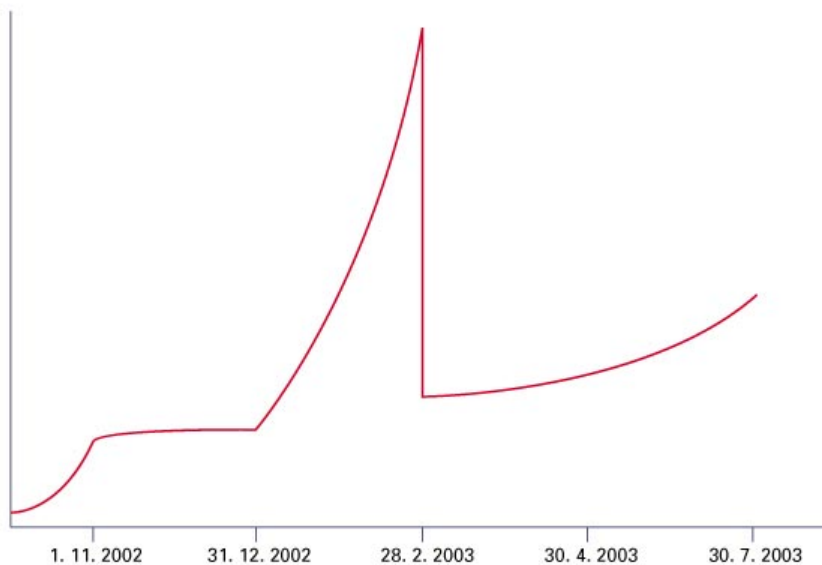
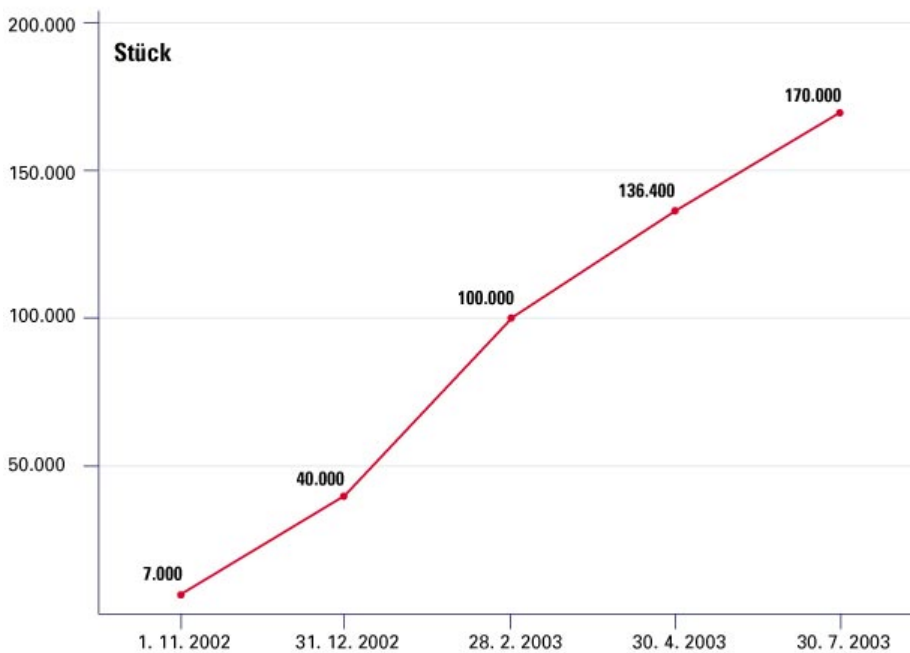
## Receivers (set-top boxes)

The retail trade was informed about the switchover and its technical details in a series of information events conducted in spring 2002 by the Deutsche TV-Plattform (a cooperation of service providers, network operators, regulatory authorities and others) and the Berlin/Potsdam chamber of industry and commerce.

The range of set-top boxes offered in the shops exceeded expectations for this limited market.

The key factor for the development of sales was the main stage of the switchover in February 2003; thereafter, sales initially went down again but recovered subsequently.

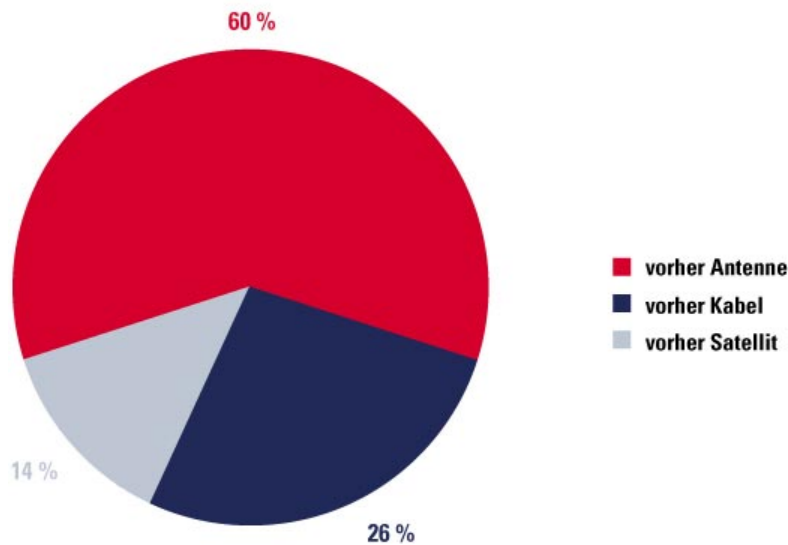
Development of sales figures



(Quelle: MABB)

The following picture provides a preliminary overview of homes purchasing set-top boxes.

### Who bought a set-top box?



(Quelle: Emnid-Studie, Stand 30.04.2003)

### The switchover in a socially acceptable manner

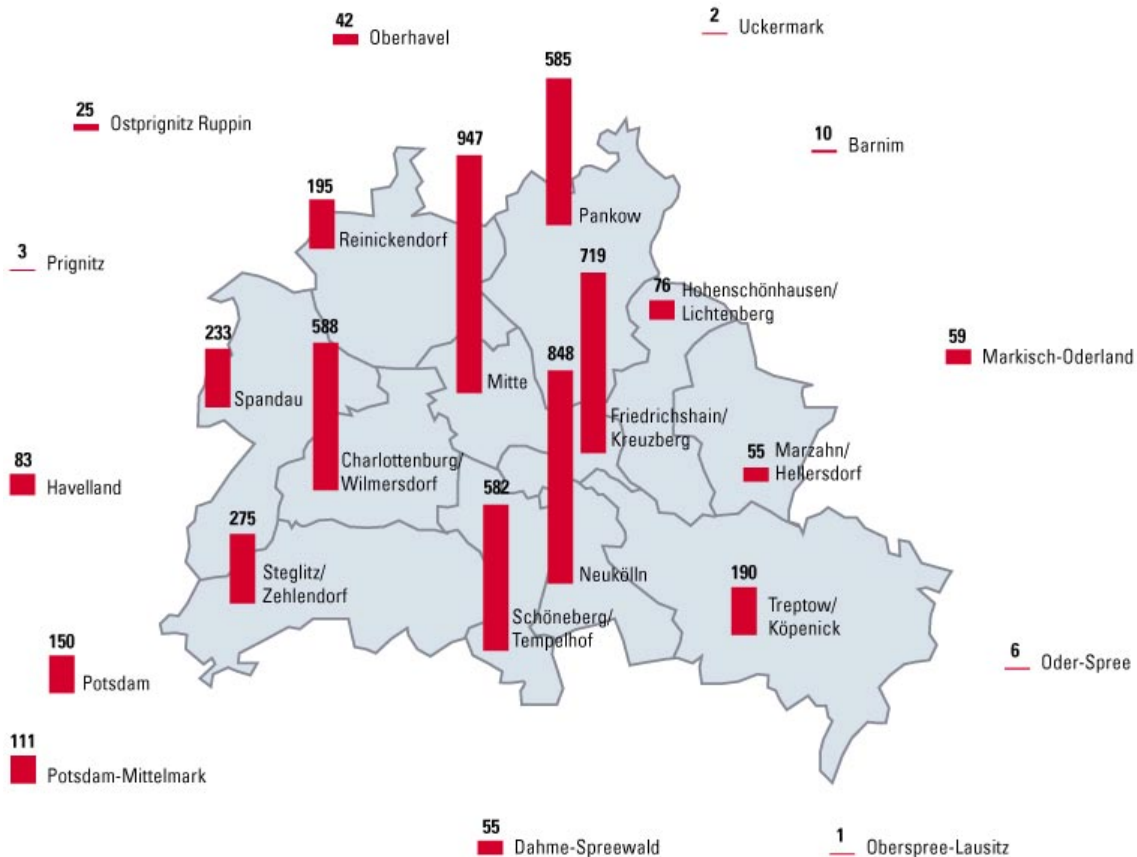
The parties involved in the switchover process were in agreement that a key issue to be resolved in the switchover process was how to make the switchover affordable also for homes with only a low income.

The receiver industry contributed towards this objective by providing sets for hire purchase, offering boxes at € 8.50 per month during the introduction phase to low-income homes. However, little use was made of this offer.

A special solution had to be found for homes entitled to a TV set under the German social security rules. Homes dependent on terrestrial reception were entitled to a set-top box. In an agreement with the social security services in Berlin and Brandenburg, mabb agreed to arrange for the low-cost provision of set-top boxes. The media council budgeted a maximum of € 1 million for this purpose on the provision that the social security services take over 25 per cent of the cost as their own share and also agree to take on assessment of who would be entitled to any support. Support was strictly limited to the switchover period and only covered homes that had previously received television via roof antenna only. The social security services also had to investigate whether cable or satellite reception might not provide a more economical option in each case.

The provision and distribution of set-top boxes and the billing were organized via Rundfunkhilfe e.V., an institution set up by the association of free welfare organizations (Freie Wohlfahrtsverbände). It organized some 6.000 sets.

The distribution of the boxes showed a notable demand in the western districts and in Berlin-Mitte while in the areas more remote from Berlin and the cities in the state of Brandenburg, demand was limited (distribution see graph).



(Quelle: MABB)

## Planning and operation of the transmitter networks

mabb as the institution in charge of arranging technical transmission capacities for broadcasting in the states of Berlin and Brandenburg applied for the technical capacities required under the switchover agreement with the German Regulatory Authority for Telecommunications and Posts (RegTP).

RegTP conducted the procedure of frequency allocation under the Telecommunications Act (TKG) and initiated the necessary measures of coordination.

Close cooperation and agreement resulted in meeting the requirements of telecommunications legislation in good time prior to the respective stages of the switchover process. This had presented a specific challenge for the network operators who handed back licences for analogue transmission that had been allocated to them for an unlimited period, and had to face up to a completely new procedure.

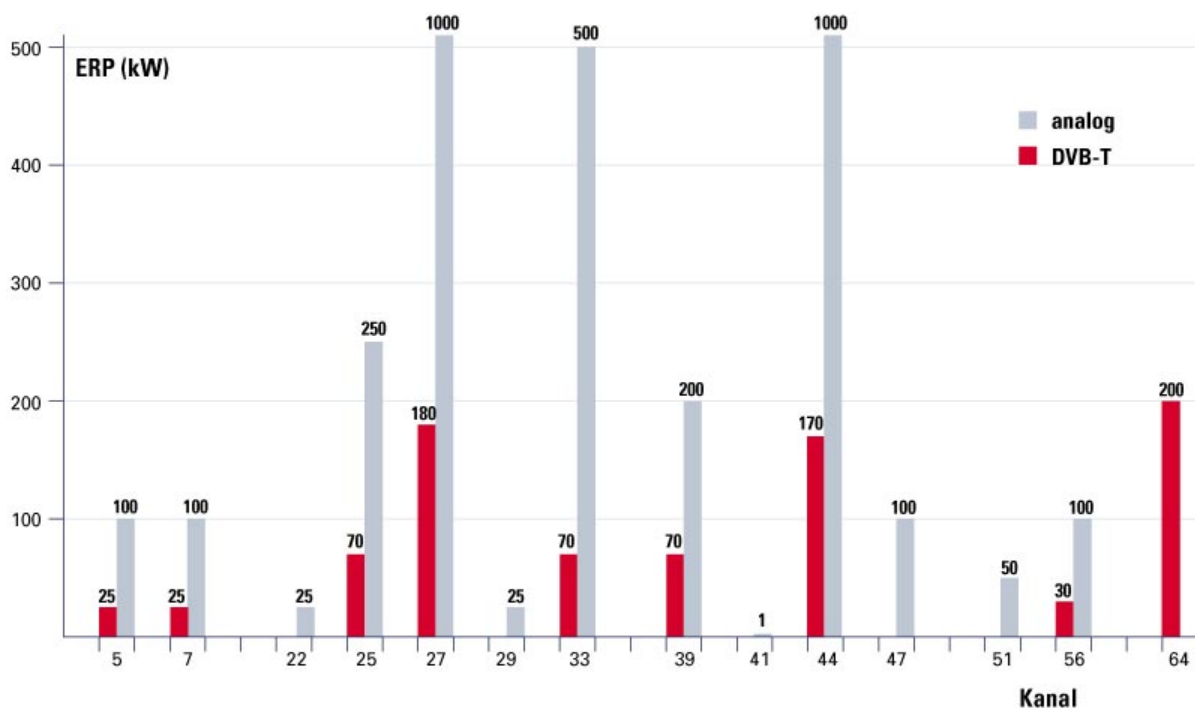
Deutsche Telekom AG (German Telekom) aligned the build-up of the transmission networks with its subsidiary T-Systems Media Broadcast and the future users at an early stage. By securing the necessary funding and the provision of the technical components early on, the network operators T-Systems and RBB (formerly SFB) could keep within the tight schedule.

GARV with its expertise contributed to developing solutions which met the interests of the broadcasters in the most economical manner. First of all, two transmitter stations were established in a single-frequency network. Further transmitter locations could improve reception, but this would require considerable additional expenditure.

International coordination was helped by the understanding which other European states showed for the switchover deliberations, especially neighbouring Poland.

Below, the performance of analogue frequencies prior to switchover is compared to frequency capacities after switchover.

### Frequency capacities



(Quelle: GARV)

Forecasts for the reception of digital services were largely confirmed by practical experience.

As an example, the forecast given for the reception of channel 44 shows that in practically all areas in the state of Brandenburg, DTT can be received via roof antenna; in the largest part of the city area, a room antenna is sufficient for DTT reception.




## Reception forecast for channel 44



OVB-T: DasÜberallFernsehen



Rasterkarte R u. V Verlag

-  Empfang mit Zimmerantenne
-  Empfang mit Außenantenne
-  Empfang mit Dachantenne

Senderstandorte (SFN): Berlin-Alexanderplatz und -Schäferberg

T Systems



### Switchover of cable networks, information of the housing industry

As cable network operators and operators of community antenna systems use a certain segment in the terrestrial transmission chain to feed the services into the cable networks or house distribution systems, some changes were also required in this delivery process. By switching to satellite reception and feeding digital terrestrial services into the networks following re-conversion to analogue transmission, continued supply was secured for the homes connected.

Even before the switchover commenced, the issue was investigated in detail under the guidance of GARV; the housing community and the cable network operators were informed about the measures to be taken at an early stage. For the first time, too, transposition of digital terrestrial signals in analogue cable networks was employed, and any resulting problems analysed and solved almost without exception.

Most cable operators and housing companies coped well with these challenges; the number and scope of problems during switchover could thus be limited to the absolute minimum.

## Funding the switchover

The complexity of the switchover from analogue to digital transmission from a technical angle is matched by the complexity of funding the DTT roll-out: communication and information are among the prime tasks of the regulatory authority and its partners, i.e. the public-service broadcasting corporations funded through the licence fee, and the commercial broadcasters which are financed through advertising revenue. Solving the issue of social acceptability of the switchover is a public duty to be fulfilled by the state. The re-construction of the transmitter stations falls within the responsibility of the Regulatory Authority for Telecommunications and Posts which selects and licences the network operators in a tender process.

The licence fee revenue granted to the public-sector broadcasters also includes a certain share allocated to changes in transmission technologies: The calculation of the licence fee by the commission establishing the funds required by public-sector broadcasters for their operations (KEF) explicitly includes DTT. For the whole of Germany, the ARD network has an annual budget of € 18.4 million at its disposal while the funds for ZDF come to € 9.2 million per annum which are to be put towards the development of new infrastructures.

Unlike the public-sector broadcasters, the commercial broadcasters cannot bank on such funding options. For them, the switchover does not produce any additional income, but on the contrary might even result in a loss of audience shares. However, having the commercial services included in the overall DTT package was essential for attracting consumers to spend money on a new receiver.

Under the Interstate Broadcasting Treaty, the regulatory authorities can grant support to measures serving technical infrastructure from their budgets which are derived from a fixed percentage of the licence fee revenue. The switchover actually became possible subsequently as the commercial broadcasters handed back the licences allocated to them for analogue transmission. In return, mabb lends support to the commercial broadcasters for a limited period.

In its support, mabb adopted the guideline that the commercial broadcasters in all cases bear those costs that would have accrued from the continued analogue operation.

The support granted for a channel varies from € 60.000 to € 70.000 per annum, depending on its technical design.

The two major commercial broadcasting groups, RTL and ProSiebenSAT.1 Media AG agreed to transmit their services for a minimum of five years via digital terrestrial technology, thus providing a reliable basis for consumers deciding on the purchase of a new receiver set.

mabb also supports the switchover of BBC World and of FAB, the local commercial TV broadcaster, who have both also handed back their analogue frequencies at comparable conditions.

Some other broadcasters who had not so far been allocated terrestrial frequencies are also granted support for reasons of equality.

## **Allocation of capacities**

The Berlin-Brandenburg interstate media services treaty allows for the allocation of capacities via the DTT statute issued by mabb to accommodate the specificities of digital transmission and the process of switchover from analogue to digital.

The capacities to be allocated to the public-sector broadcasting corporations and the commercial television groups can be awarded under public law as complete multiplexes, provided a minimum of two multiplexes is available for other broadcasters and for new applications.

mabb put to tender the available capacities under a decision of its media council taken on 8 May 2002.

Experience to date has shown that there is no scarcity of capacities at present as many broadcasters who had previously not been allocated terrestrial capacities are currently not in a position to fund the additional cost incurred in digital terrestrial transmission.

Several applications were put on hold for the time being as they can only be realized in the next stages of DTT development.

The use of capacities by the subscription (pay-TV) service Premiere has not yet been decided. Another issue awaiting clarification is the question to what extent capacities will have to be provided for new applications and combinations of television services and other services. Several approaches to this effect incorporating mobile telephony providers have already been presented.

## **3. Experiences and findings gathered during the switchover process in Berlin-Brandenburg**

### **The switchover took place at the right moment.**

DTT roll-out could not have been effected any earlier as receiver prices would have had a adverse effect on acceptance. Nor should the switchover have come any later - even though the Digital Broadcasting Initiative envisages 2010 as the deadline for switchover.

The incentive for switchover decreases in direct proportion to the decline in the number of households receiving television through the air; the lower this proportion, the lower the interest of commercial television broadcasters in this mode of transmission. However, without the participation of commercial broadcasters, terrestrial transmission could only continue if public support were increased.

### **The acceptance of television broadcasters and consumers is the key prerequisite for switchover.**

In any switchover process, the various interests must be balanced and mediated against each other: An attractive range of services for consumers must include programmes of both the public-sector broadcasters and the commercial broadcasters.

**Without the switch-off of analogue signals and fast switchover, DTT would have little chance of being accepted by consumers and broadcasters.**

Only by switching off some high-power analogue frequencies could the spectrum necessary to bring home to consumers the two key benefits of DTT be made available. Benefits include a sufficiently attractive range of services and portable indoor reception without the need to resort to a CATV system.

For the broadcasters, switch-off was essential to avoid costs from doubling as a result of parallel analogue and digital transmission (simulcast); the commercial broadcasters would not have been in a position to meet such expenses.

The available funds would not have sufficed for a longer simulcast operation or increased support for the commercial broadcasters; spending money in this way would also have been counter to the principles guiding the economic deployment of funds.

**As a key for switchover, funding of commercial broadcasters dependent on advertising revenue must be resolved.**

For the consumers, DTT holds attractions as it does not incur any additional expenditure while for the commercial broadcasters, terrestrial transmission is an expensive mode of transmission as unlike in the case of cable reception, consumers do not contribute to the cost of service provision.

Additional revenue cannot be generated for the time being as DTT does not currently present an audience reach creating any interest within the advertising industry.

However, the commercial broadcasters should be interested in upholding the third mode of transmission as that way they can avoid becoming dependent on cable or satellite distribution alone, and can also develop new mobile and portable applications.

DTT is of special interest for the consumer and for the development of an broadcasting infrastructure which has some significance for the public at large. This is one of the reasons why public funds are put towards the realization of DTT.

**Switchover is also justifiable as it contributes to an economic use of licence fee revenue.**

For the terrestrial distribution of their services, the public-sector broadcasters spend a total of € 305 million per annum. However, the number of viewers reached through the air is continually going down. Under the Interstate Broadcasting Treaty, public-sector broadcasters may switch to digital transmission, but they must not suddenly cease analogue transmission altogether. The transition from analogue to digital transmission will only work in conjunction with the commercial broadcasters following along the same route.

The world of analogue transmission was characterized by the separate development of the various infrastructures; as a consequence, no overall funding concept for digital transmission has as yet developed. Instead, the public-sector broadcasters follow their

own approach while the regulatory authorities support the funding of the infrastructures to be used by commercial broadcasters. Looking at infrastructure development as a whole, however, it would seem that re-allocating the money earmarked for analogue transmission until now could be sufficient to completely fund the digital infrastructure provided that the concept of overall terrestrial coverage everywhere and the strategy of closing gaps in terrestrial transmission in rural areas are given up; satellite transmission has long since made this approach obsolete.

### **For consumers, it is worth it to switch over.**

Even though analogue services were switched off, the switchover resulted in less protest than had been anticipated.

The switchover quite deliberately did not bank on parallel (simulcast) operation which would have meant that analogue transmission was only discontinued once 90 per cent of homes were supplied with digital terrestrial TV. As the experience proves, switch-off is accepted by a considerable number of viewers provided that adequate substitutes are available.

It was possible to convey that the idea the third mode of transmission can only be secured through modernization. Switch-off without anything to compensate for it would probably not have met with acceptance.

The added value of receiving more services for which the licence fee is paid which previously, however, were not available terrestrially due to the scarcity of transmission capacities (e.g., arte, 3Sat, Kinderkanal, Phoenix), as well as the improved quality of reception (independence from CATV systems, portable indoor reception) were sufficient to bring the benefits of DTT home to consumers. Numerous comments by viewers on these services as well as on those not available (e.g., BR 3) refute the claim that the viewers traditionally receiving television through the air would be content with fewer services - the opposite is the case.

**Digital receivers were accepted despite the additional expenditure**, and even though they currently still include some disadvantages compared to analogue reception (additional cost for set-top boxes, one additional set each per TV set or video recorder, switchover problems with the video programming system, VPS).

Consumers appear to accept that more services mean more expenditure, be it in the form of ongoing fees as is the case for cable reception, or in the form of the one-off expense incurred for a satellite dish or a set-top box for digital terrestrial reception.

### **The development of the receiver market**

The receiver market is characterised by stationary receivers largely based on satellite receiver technology. Within a very short time, lively competition ensued, resulting in a clear drop of prices from which consumers benefit.

Switchover in Berlin was possible only because the synergies within the DTT range of products permitted low-cost stationary receivers to be put in the shops, and because Berlin could draw on the experience gained in other countries.

Prices in special sales promotions dropped to less than € 100 per set-top box. In the decisive period, retailers supported the introduction of DTT with large-scale advertising campaigns.

As is the case for the first introduction of any new technology, special difficulties were also expected for DTT: The equipment could only be tested after it had been brought into the market. A certificate "suitable for DTT" did not exist. The sensitivity of receivers or room aeriels even under problematic conditions of reception could only be tested once the technology and the sets had been introduced; depending on the various types of receiver, reception varies in quality. The ease of operation also differs, as does the software employed, resulting in certain problems during switchover and the necessary re-adjustment of channels.

It proved impossible to arrange for joint communication measures of the receiver industry; experiences regarding consultation of the retail trade differed.

Considering that a large number of households affected by the switchover was not prepared to acquire the latest sets developed and had little experience in the use of digital equipment, the number of complaints and problems remained remarkably small.

For most consumers, the additional services available in good quality proved satisfactory, and the electronic programme guide (EPG) is accepted as a useful add-on. For additional interactive services it will be necessary to align the specifications of receivers to a greater degree.

Another issue awaiting solution is the downloading of new software through the air. This service is required as not every household has access to the internet or can download software via the world-wide web.

**Reservations about digital television were allayed as a result of the experiences gained during analogue-digital switchover in Berlin-Brandenburg.** Until then, digital television had been associated with subscription (pay) TV and the d-box in Germany and had been rated accordingly critically. From this change of assessment, the digitization of other modes of transmission could well benefit.

**The fast switchover has opened up the entire frequency spectrum for digital services, for more television channels and for other applications.**

Digitization provides an opportunity to the present users of frequencies to extend their range of services.

At the same time, access to terrestrial capacities is now open to other service providers who previously did not transmit their services terrestrially.

Apart from broadcasting services, other applications, and in particular interactive services can be developed.

Competition in this route of transmission is thus increased.

### **Competing infrastructures**

Terrestrial transmission is gaining in attractiveness and thus presents an alternative to cable reception above all in densely-populated areas where satellite reception is frequently hampered.

Consumers welcome such an alternative so as to avoid becoming dependent solely on cable reception.

By comparison to terrestrial reception, cable offers certain advantages, especially the higher number of services available and the options for interactive applications.

Furthermore, even if not digitized, cable has the benefit of comfortable and easy use, a major factor especially for elderly viewers. However: This comfort presents an impediment for the development of new receiver technologies. Digital satellite reception and digital terrestrial reception will be the decisive factors for technology standards. Competition must be an incentive for cable operators to advance the benefits of cable even if the margins for price increases without increased performance have become smaller.

A more detailed range of products meets the demands of consumers: Many consumers accept fewer television services, and reception via second and third sets will rise.

### **Experiences gathered during the the communication campaign**

It took considerable time and effort until a communication concept had been developed which was carried jointly by all television service providers and mabb, especially since there were plenty of varied ideas, but no previous experiences to draw on.

As a key starting point it was agreed that the communication campaign should not focus on promoting a new product, e.g. as a competitor to cable transmission, but should rather concentrate on informing the public about an impending change of technology affecting many homes. It appeared appropriate to replace the term "DTT" by "EverywhereTelevision". However, this term turned out to be slightly misleading as the concept also requires some activities by consumers in providing suitable conditions for reception.

What was atypical by comparison to other countries was that in Berlin-Brandenburg, there was no platform operator as is the case for cable networks or the ASTRA chain of satellites, or Digitenne which promoted the new mode of transmission in the Netherlands.

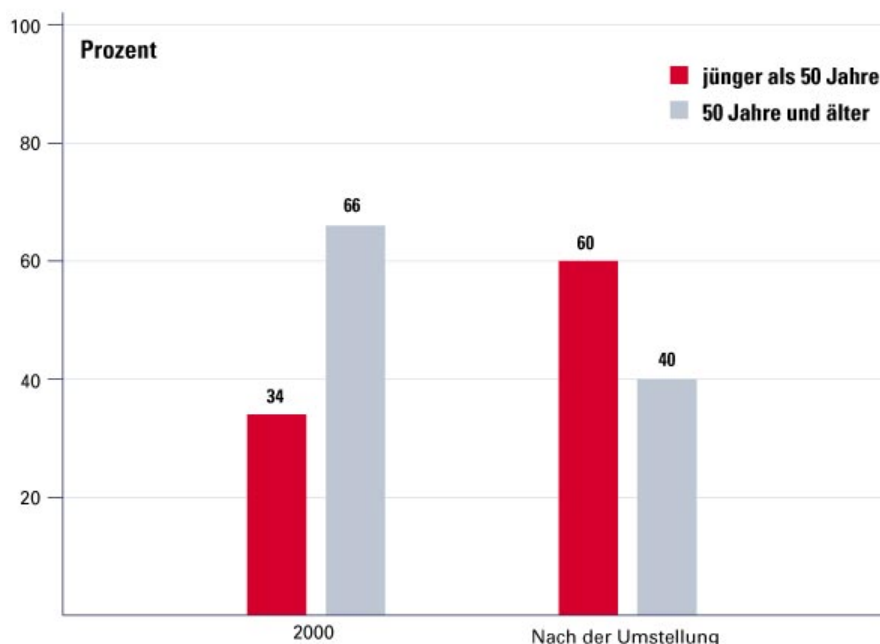
### **Experience to date on migration: terrestrial reception attracts younger audiences**

Trends observed so far show that terrestrial reception attracts younger audiences and holds a strong position for second and third sets in the home. A large part of terrestrial households thus kept to terrestrial reception. Homes switching to cable reception included a large share of older audiences, partly because this proved more comfortable, but mostly because housing associations discontinued terrestrial reception.

On the other hand, however, good DTT reception is gaining in significance as an alternative for those consumers who are dissatisfied with the services available via cable. Price increases in this context can play a part in this as much as the service provided by the cable operators and the development of the range of services available via cable.

First results are shown in the following figure:

### Terrestrial television now attracts younger audiences.



(Quelle: MABB/ARD)

More findings are expected from the research conducted by ARD and ZDF on the switchover.

It will, however, take another two to three years for a comprehensive picture to emerge on how attractive terrestrial reception can be for the consumer, especially since portable and mobile reception are only just getting off the ground.

### Experiences gained with regulation and mediation

The flexible framework provided by the Berlin-Brandenburg interstate media services treaty and the DTT statute supported the switchover process. The regulation available for the analogue world would not have been sufficient as the service providers using analogue frequencies had to be offered incentives to switch from analogue to digital transmission. Agreements in the form of a contract proved particularly suitable to meet this requirement as they can accommodate all issues requiring regulation, both concerning the allocation of capacities and the support mechanisms as well as the schedules.

mabb proved to be well capable of mediating among the various interested parties as it is responsible for capacity allocation both to public-sector broadcasters and to commercial broadcasters and conducted intensive research of all aspects of digitization.

The fast decision-making processes proved to be of particular benefit in this context: the mabb media council had long decided on co-funding measures covering communication and social acceptability while the equivalent commissions of ARD and ZDF could not conclude their deliberations in good time.

## **4. Further perspectives**

### **Switchover is only the start of a new development**

During the switchover process, the prime objective was to get consumers to accept the switchover even in the light of some negative side-effects including the switch-off of analogue frequencies and some additional costs for new receivers.

This objective has been fully achieved as a result of the creation of an attractive alternative for stationary reception.

Without this basis, new applications and new target groups cannot be generated; the switch-off of analogue frequencies would not have been accepted without attractive substitute solutions.

Now the objective must be to promote the further advantages of DTT including portable and mobile applications in conjunction with the further development of digital reception technology.

For providing sufficient thrust in this, other city areas in Germany must follow the Berlin example.

### **Some details of the next stages of development: Development of stationary receivers and aerials**

The increasing performance and the performance range of set-top boxes in the satellite sector will also present advantages for DTT; this includes hard disks for storage.

The sensitivity of reception of the receiver equipment can also be expected to improve. Regarding DTT this will relate above all to the development of aerials (rod antennae). Activities in this field have so far been limited as there are no synergies with the satellite sector.

Aerial technology will become even more important when mobile and portable reception increases.

Consideration should be given to certifying receivers prior to further switchover processes so that additional applications can be warranted to be available via all receivers.

Minimum standards concerning sensitivity of reception and ease of operation, e.g. for channel tuning, should help to reduce problems during switchover. Special consideration should be given to devise receiver equipment in a manner also suited for operation by persons with disabilities.

### **Promotion of interactive uses through the Multimedia Home Platform (MHP)**

Because of the wide range of receivers on offer and the development of a purchase market, an open standard will be required to ensure that receivers are suited for interactive services. MHP presents such a standard.

The market for DTT, however, will only provide the necessary economic basis for new services in conjunction with the satellite market.

It would appear obvious, therefore, to introduce MHP together with a technology also permitting addressing and billing procedures.

Here, too, appropriate agreements relating both to the satellite market and the DTT market, would appear to be the best way forward.

### **Portable receivers**

Portable sets with integrated receivers and aerials can bring across the key advantage of DTT, namely the reception of television via a portable set in different locations.

Price reductions as experienced with flat screens in combination with integrated receivers could already allow television to be watched in many locations where it has so far never been watched, e.g., the kitchen or the sailing boat.

In the medium term, measuring audiences watching TV on portable receivers will gain particular importance as the technology employed so far is linked to stationary receivers; portable reception will be of special relevance for commercial broadcasters.

### **Mobile applications - development of DTT-H**

On the basis of DTT, new transmission processes can be developed which are particularly suited for reception on hand-held sets (PDA and mobile telephones). The smaller displays and new compression technologies permit larger video streams to be transmitted than has been the case for stationary reception so far.

The frequency spectrum which has become available as a result of the switchover to DTT permits such new applications to be tested and used in hybrid structures in conjunction with mobile communications networks.

The interconnection to mobile communications networks also offers the advantage of billing, thereby opening additional funding options for terrestrial routes of transmission.

Digital broadcasting transmission routes permit the transmission of audiovisual contents at low cost, especially contents attracting large audiences (e.g. live transmission of football matches). The share of the fee to be employed for funding contents is far higher than in the case of 3G applications which also incur high costs of transmission for broadband applications. This presents another incentive for the development of new contents for mobile transmission.

### **National perspectives for DTT**

The acceptance with which the switchover in Berlin-Brandenburg has been met is a sound basis for continuing switchover efforts in other major city areas in Germany.

Frequency problems could thus also be resolved if city areas are addressed first regarding DTT switchover.

The switchover elsewhere could draw on the experiences gained regarding communications and social acceptability.

To agree on a national concept solving the entire range of issues concerning terrestrial transmission and its funding, however, would not appear to present a realistic option at present.

Switchover in major city areas in Germany will itself provide new incentives for the next steps and will enhance the development of the market especially by offering opportunities to consumers to determine the future developments via his or her choice.

The opportunity of a fast switch-off as proven during the DTT roll-out in Berlin-Brandenburg, is a precondition for funding the future digital terrestrial infrastructure. Parallel operation of analogue and digital television would result in similar problems as encountered with digital audio broadcasting (DAB).

### **Assessment of the experiences for other digitization processes**

The experiences gained during the switchover in Berlin-Brandenburg may lend support to the identification and possibly even the solving of problems which might occur during other digitization processes.

While digitization of satellite transmission is making progress as it is driven by the market, digitization of cable networks is still hampered with major problems as is the digitization of audio broadcasting (DAB).

**The switchover in Berlin and Brandenburg has shown that it can be worthwhile to venture off familiar paths. Media politics should take courage from the experience and should promote digitization in other regions as well.**

**Now the next challenge has to be faced: the development of portable and mobile applications and their connection to mobile communications networks.**

## ANNEX

### The key data at a glance

August 1997	DTT test operation starts.
November 1998	The interstate media services treaty is amended.
July 2001	The DTT statute is passed.
23 August 2001	mabb presents the introduction scenario for DTT in Berlin-Brandenburg during the Media Forum held in conjunction with the Internationale Funkausstellung 2001.
29 November 2001	The agreement with the television broadcasters on the switchover is initialled.
17 December 2001	The mabb media council decides to support the switchover financially.
13 February 2002	The agreement between mabb, ARD, ORB, SFB, ZDF, ProSiebenSAT.1 Media AG and RTL Television on the switchover to digital terrestrial television transmission in Berlin-Potsdam is signed.
7 May 2002	The capacity requirements for the states of Berlin and Brandenburg are filed with the Regulatory Authority for Telecommunications and Posts (RegTP), coordination of capacities starts.
October 2002	RegTP allocates the frequencies required.
31 October 2002	Stage one of the switchover: Two high-power frequencies are switched from analogue to digital transmission.
28 February 2003	Analogue transmission of all national commercial television services ends; the high-power public-service frequencies (except for channel 39) are switched to digital operation; the public-services programmes are switched to lower-power analogue channels.
4 August 2003	Analogue transmission of terrestrial television in Berlin-Potsdam ends.

## DTT services available at present



Digital seit August 2003