

Case studies on migration from Analogue to DTTB of Poland

(March 2009)

1. Policy and regulatory aspects

The Ministry of Infrastructure published the Strategy for Switchover from Analogue to Digital Broadcasting of Television Programmes in 2005. The strategy made allowances for all circumstances at that time and specified the best proposal. After the RRC06 the strategy was not renewed and accepted by the government until now.

(The case study does not make any references to it.)

The problem is similar in other countries, where the present analogue broadcasters' licenses last longer than the deadline of the analogue switch off. The challenge is that how we could become attractive and offer new content, new services, etc, at the same time.

It would be desirable for the parties to have a close cooperation with each other becoming more familiar with one another's needs in order to find the best solution possible. The EU regulation draws a very clear line between the fields of communication and audiovisual media. (Independent rules, legal background and organizations for both fields.)

Regulatory Priorities:

- Ensure media pluralism by some channels,
- Ensure multi-pluralism,
- Protection of national culture and language
- Increase access for the public to regional or local content
- Extension of the broadcasting services

On the basis of these goals it will be decided in what way the access and should be provided to digital terrestrial broadcasting.

The ministry and Office of Electronic Communications want to support the future-proof solution they would like to embrace the HDTV and interactive services from the beginning. Nonetheless HD content possibly will not be on the second multiplex initially. No decision has yet been made about the format (MHP or MHEG-5).

MPEG 4 AVC will be the coding system due to circumstances. (A lot of analogue channels are necessary to be moved to the DVB-T platform.)

The first step seems to be difficult, when all existing analogue terrestrial broadcasters including commercial and public have to be used on one multiplex. One problem could be the capacity of the multiplex. The authority will solve this question. The other problem could be who will operate this multiplex. The broadcasters established the Polish Television Operator so that it would operate this multiplex. The Polish Television Operator will have to choose a transmitter provider.

1.1 Licensing /Authorization schemes

Holders of broadcasting licenses and frequency reservations (spectrum rights) are entitled to transmit and retransmit radio and television programme services in Poland.

Broadcasting licence which is required for transmission of programme service, is awarded by the Chairman of the National Broadcasting Council in agreement with the President of the Office of Electronic Communications (UKE). The broadcasting license specifies in particular:

- The identity of the broadcaster and his place
- The nature of activity covered by the broadcasting license
- The method of transmitting the programme service (by terrestrial diffusion, satellite distribution and cable system)
- Programming conditions of transmission of the programme service/channel (in particular the frequency as well as the power and location of transmitters intended for emission of the programme service)

Frequency reservation, which is required for terrestrial transmission of programme service (both commercial and public broadcasters), is granted by the President of the Office of Electronic Communications in agreement with chairman of the National Broadcasting Council.

Besides the frequency license it is required to use a transmitter by broadcasters or transmission network owners. The frequency license is issued by the president of the Office of Electronic Communications.

A registration is required for programme services which are retransmitted in cable networks. This requirement does not apply to the retransmission of national programme services of public radio and television and other programme services of domestic broadcasters receivable within the coverage area by means of receivers for use by general public. The Chairman of the National Council is the registering authority.

Receiving the right to operate the DVB-T and DVB-H will be different in the upcoming years. First of all it has to be made possible that the present all analogue TV programmes should be on the DVB-T. The launch of the first one is planned for this year. The current analogue license will be converted for digital by modification and sometimes issuing new license.

The second one will be available as of next year and right will be granted by beauty contest. At the moment it has not been defined what content will be available and in which format.

All the remaining multiplexes will be available after the analogue switch-off. The next tables describe the ideas about the future multiplexes.

Table 1. Multiplexes capacity

Transition period:

Multiplex 1 (UHF).

Public broadcaster			Commercial broadcasters			
TVP1	TVP2	TVP3	POLSAT	TVN	TV4	PULS

Multiplex 2 (UHF).

Public broadcaster			Commercial broadcasters			
7 SD	or	4 SD	+	1 HD	channels	

Ration between the public and commercial broadcasters has not yet been decided on the second multiplex. Maybe the radio programme will be available on this multiplex also.

After ASO:

Multiplex 1(UHF).

Commercial broadcasters (FTA)			
POLSAT	TVN	TV4	PULS

Multiplex 2. (UHF).

Commercial broadcasters (partly Pay TV)						
7 SD	or	4 SD	+	1 HD	channels	

Multiplex 3. (UHF).

Commercial broadcaster (FTA or Pay TV)						
SD	SD	SD	SD	SD	SD	SD

Multiplex 4. (UHF).

Commercial broadcaster (FTA or Pay TV)						
SD	SD	SD	SD	SD	SD	SD

Multiplex 5. (UHF).

Public broadcaster (FTA)						
TVP1	TVP2	TVP3	and other	channels	SD or HD	

Multiplex 6. (UHF).

DVB-H network						

Multiplex 7. (UHF).

Digital Dividend						

Multiplex 8. (VHF).

Commercial broadcaster (FTA or Pay TV)						
SD	and	or	HD	channels		

1.2 Spectrum planning

The Office of Electronic Communications is responsible for frequency management. President of the Office of Electronic Communications takes actions (international coordinations, new frequency resources for analogue and digital broadcasting) in order to meet the needs of broadcasters.

The President of the Office of Electronic Communications in agreement with the Chairman of the National Broadcasting Council determines the frequency management plans for broadcasting transmission and they grant frequency reservation (spectrum rights, frequency assignment) to transit programme services.

The present situation in UHF and VHF band.

The UHF band is used for different services, but basically for TV broadcasting D1 system 8 MHz bandwidth. Some channels are used for military purposes (61, 62,63,68,69). Channel 65 is used for mobile services based on CDMA. Channel 64, 67 are not in use at the moment.

The frequencies between 174 – 216 MHz and 470 – 862 MHz are used for secondary services as wireless microphones. The frequencies between 470 – 862 MHz are used similarly for PMSE purposes.

On the basis of the GE06 Agreement, Poland was allocated seven layers (networks) for digital broadcasting of television programme in the UHF and one layer (network) in the VHF band.

Additional channels were also allocated in the wider territory of the main cities. Poland was allocated forty-four distribution zones in the UHF band. The distribution zones in the UHF band are shown in Figure 1. The design of networks for digital broadcasting will be performed on the basis of the final Act of GE06. The frequency planning is fundamentally based on MFN but SFN based in the given allotment (region).

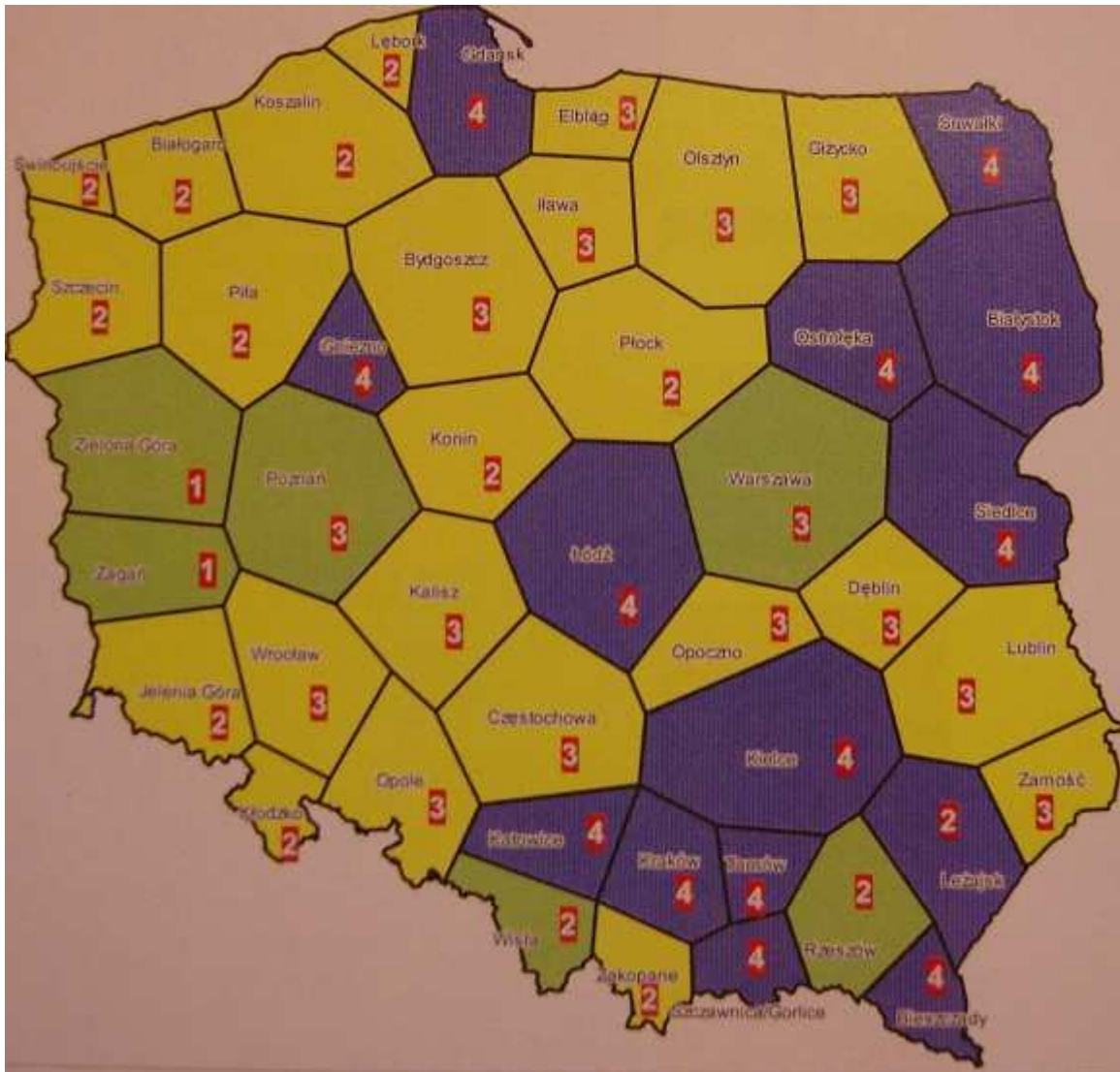


Figure 1. Distribution zones for DVB-T in the UHF band

The switchover planned by regions are shown in Figure 1 and Table 2.

Table 2. Switchover in the regions

Etap	Region	Planned date to launch DVB-T	Planned date to switch off the Analogue network
I	Zielon Góra	30.09.2009	30.06.2011
	Zagan		30.06.2011
	Warszawa		30.09.2012
	Poznan		30.09.2012
	Rzeszów		30.09.2011
	Wisla		30.09.2011
II	Kalisz	31.03.2010	30.09.2012

	Czestochowa		30.09.2012
	Opole		30.09.2012
	Szczecin		30.09.2011
	Bydgoszcz		30.09.2012
	Wroclaw		30.09.2012
	Lublin Olsztyn		30.09.2012
	Konin		30.09.2012
	Pila		30.09.2011
	Bialogard		30.09.2011
	Swinoujscie		30.09.2011
	Koszalin		30.09.2011
	Lebork Plock		30.09.2011
	Opoczno		30.09.2012
	Jelenia Góra		30.09.2011
	Klodzko		30.09.2011
	Zakopane-Rabka		30.09.2011
	Deblin		30.09.2012
	Zamosc		30.09.2012
	Elblag		30.09.2012
	Gizycko		30.09.2012
	Ilawa		30.09.2012
III	Lezajsk-Przemysl	31.07.2011	30.09.2011
	Gniezno		30.07.2013
	Katowice		30.07.2013
	Lódz		30.07.2013
	Gdansk		30.07.2013
	Ostroteka		30.07.2013
	Siedlce		30.07.2013
	Kraków		30.07.2013
	Tarnów		30.07.2013
	Szcawnica/Gorlice		30.07.2013
	Bieszczady		30.07.2013
	Kielce		30.07.2013
	Bialystok		30.07.2013
	Suwalki		30.07.2013

One layer is affected by the digital dividend. The broadcasting may lose 14.28% of the available frequencies.

Digital Dividend

Due to the massive analogue use and switchover process the dividend will be available after 2015. It has not yet been decided what access could be possible in the future. It could be a tender or auction. The accessibility of dividend does not only depend on national use, it is largely dependent on military services In Russia and Ukraine.

The purpose of use has not been decided yet either, it could be IMT advanced service or other.

1.3 Applicable Standards

DTT is based on DVB-T standards. DVB-T2 standard was published last year, which enables 30 to 50 percents bitrate increase, as compared to the first generation standards. Between 2012 and 2020 when the new multiplexes will be available the DVB-T2 could be introduced. Mobile TV will be based on DVB-H standards.

The MPEG-4 (AVC/H.264) Audio Musicam or and Dolby Digital Plus (E-AC3) standard may further the fast switchover in consideration of the circumstances. The disadvantage of this solution is the price of the set top box, which decreases year by year. On the other hand it will support the initiation of the high resolution High Definition Television (HDTV) after the analogue switch-off.

The standards provide a lot of options for the service provider. It is necessary to notice that it establishes a claim to regulation in the interest of the picture quality. The member of the public broadcaster (TVP) underlined that they provide the quality as well not only content, therefore it is important to control their signal quality. It is necessary to define the bitrate of SD and HD format.

(The trial, which was launched at Rzeószv, is based on the MPEG-2 standard.)

1.4 Broadcasting network structure (ownership of multiplex, transmission network);

This document is not focused on the analogue transmission, but it is necessary to mention it. The Broadcasting Act, which was accepted end of 1992, determinates the rules for television services. The present situation:

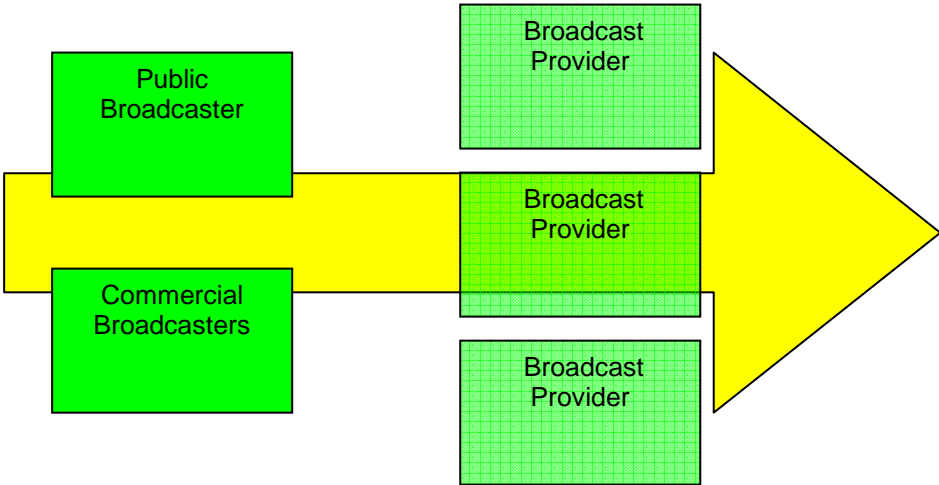


Figure 2. Network structure

(The small broadcasters have own network or transmitter.)

The main broadcast provider is TP Emitel. The main owner is France Telecom.

Table 3. Broadcasters

Name of broadcasters	Coverage	Type	Channels (Terrestrial)	Remarks	Coverage Population %	Coverage Area %
TVP	Nationwide	Public	TVP1, TVP2, TVP3	TVP 3 is a regional channel	TVP1 97,6% TVP2 97,6 % TVP3 72,1 %	TVP1 95,8 % TVP2 93,8 % TVP3 55,3 %
Polsat	Nationwide	Commercial	Polsat		81,1 %	64,6 %
TVN	Local, subregional	Commercial	TVN		43,1 %	18,5 %
TV4	Local, subregional	Commercial	TV4		25,1 %	11,9 %
Puls	Local, subregional	Commercial	Puls		24,8 %	11,8 %

Dates of the ending license for analogue broadcaster fall in 2014, 2015 and 2016.

Table 4. Broadcast provider

Name of Broadcast provider	Main owners	Infrastructure	
TP Emitel	100 % Telekomunikacja Polska S.A. (France Telekom)	The company has the largest infrastructure (based on plan of Stockholm 1961).	DVB-T trial from 2001 together with TVP S.A., TVN, Polsat)
PSN	100 % TDF		
Info-TV-FM		Few own station	
RSTV			

Networks structure could be in the future:

- Broadcaster which is a multiplex operator (frequency owner) and uses the service of the broadcast provider.

- Broadcast operator which is a multiplex operator (frequency owner) and provide the service for broadcaster
- Three independent entities: broadcaster, multiplex operator (frequency owner), broadcast provider

1.5 Strategies and process of transition to DTTV and introduction of MTV;

Timeline for introduction of DVB-T:

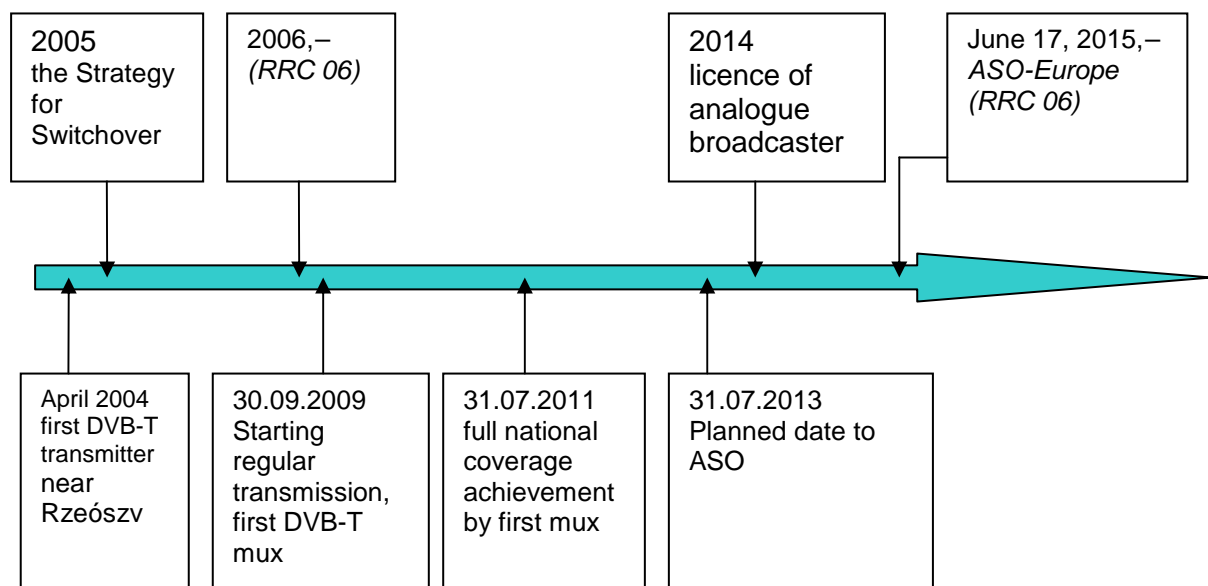


Figure 3. Timeline of DVB-T

At the moment there are two available multiplexes for the simulcast period. 7 SD programs are planned on the first multiplex, the second MUX is also used for SD or HD services for the transition period.

Pay TV will not be available on the first multiplexes due to the scant capacity of the HD service. It will only be available from the launch of the third multiplex.

Mobile TV:

Mobile TV means the DVB-H technology in this context. This year (30.09.2009) one provider has been given the right to operate the mobile TV service by Info-TV-FM in the country. The service will probably commence in 3 months, at present the players concerned are making contracts wit each other. The service will be available in the 31 biggest cities and around by the middle of 2015. The used frequencies are additional ones which do not constitute the nationwide 7 layers (coverage). On the other hand one DVB-H layer could be created from

seven layers in the future. It has not been decided yet who could be the operator for this layer from 2015.

The business model:

The market players involved:

- Public and commercial broadcasters
- Transmission and broadcast provider(s)
- Mobile network operators

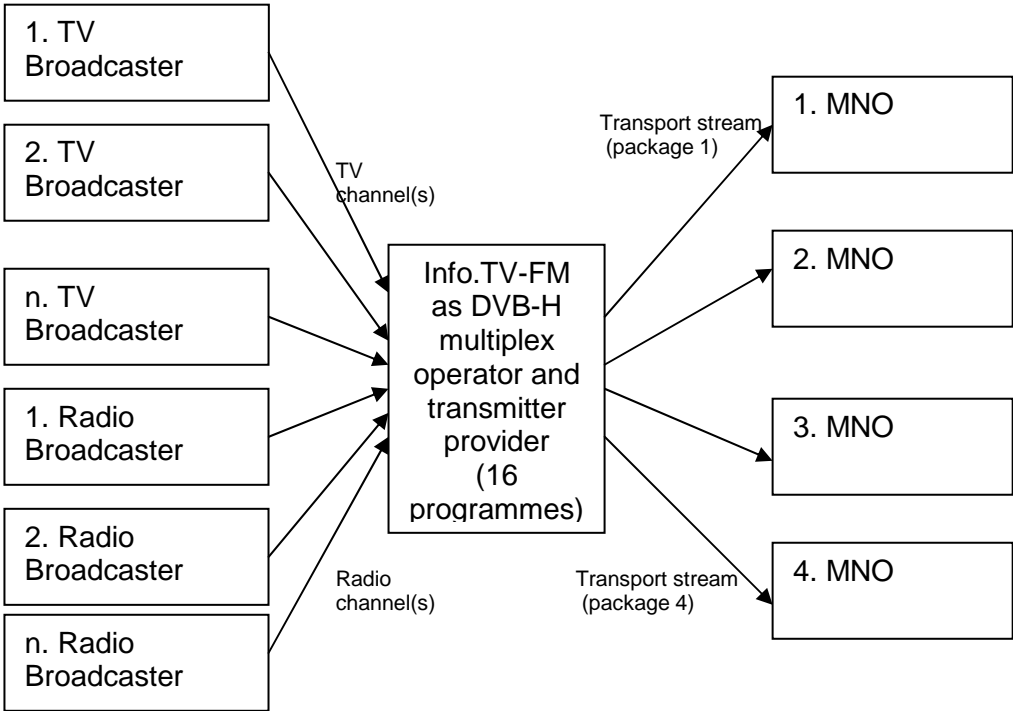


Figure 4. Info-TV-FM business model

The DVB-H operator provides this service as a wholesale one. They would like to use the existing infrastructure. If they cannot rent the suitable sites (towers), then they will built them. The operator makes no exception to anybody, they offer the same conditions to the four mobile operators, and do the same towards the content providers. In this case by content providers we mean the TV and radio broadcasters.

The market research constituted as confidential information, but they believe in market potential and fast development of this service. So far mobile device availability has not been reported as a problem.

Broadcasters support this service because they increase their ratings. The idea of producing special content for the mobile TV has arisen, but the cost of it seems to be high at the moment. The same content will be available as in the other format (e.g. terrestrial, satellite broadcasting). We have not spoken about the DVB-T service, which should be competition to

DVB-H service. If the DVB-T network offers portable or mobile reception mode and the contents are available free to air it will challenge for DVB-H operator.

At the moment there are four mobile network operators in the country:

Table 5. MNOs in Poland

Operator	Technology	Subscribers (in millions)	Ownership
T-Mobile/ Era	GSM, GPRS, EDGE UMTS, HSDPA LTE	12.9	Deutsche Telekom (97%)
Orange	GSM, GPRS, EDGE UMTS, CDMA, NMT 450	13.9	TPSA (France Télécom is a key investor (47,50%) in TPSA)
Plus	GSM, GPRS, EDGE UMTS	13	Vodafone, TDC, KGHM, PKN Orlen, PSE
Play	GSM, GPRS, EDGE UMTS	2	Novator, Tollerton

(Data from middle of 2008)

1.6 Measures to promote investment and switchover;

The first multiplex will be available without any call for tender or auction for the present analogue broadcasters at end of this year. It is necessary to manage to reach some kind of agreement with the present broadcasters that they support the digitalization and will become the role players while the state has respect for their analogue license.

1.7 Costs and benefits analysis related issues;

Analogue terrestrial broadcasting is a popular reception mode in Poland, but the market share of DTH increases year by year. Relatively many programmes are available due to the Broadcasters and they can be reached free (FTA). The cable television providers offer their services mainly in the big cities DVB-C, and IPTV appeared on the market, but a their share is negligible. The present market overview:

Table 6. Market share of platforms

Platform	Market player(s)	Market share (%)
Terrestrial (analogue)	TP Emitel , PSN Info-TV-FM, RSTV	30,7
Terrestrial (digital)		Cannot be measured (trial)
Cable (analogue)	UPC, Aster, Multimedia Polska, Netia TP	30,7
Cable (digital)		Cannot be measured
Satellite (DTH)	Cyfra +, Cyfrowy Polsat	38,9
IPTV	Telekomunikacja Polska	0,5

The digitalization is generally a market-oriented process except for the terrestrial platform. The frequency is a state resource therefore the state has to take part in the process actively.

1.8 Convergence and competition policies.

Poland as member of EU accepted the directives of EU and the country put them into practice before the deadlines. The regulatory framework of EU determines the basic principles for the communications- and audiovisual market.

On the other hand the Telecommunications Act and the Broadcast Act require several modifications with respect to switchover and the government has been working on it.

Other activities:

The GSM association has started a strong lobby activity that the digital dividend should be available for the Mobile Network Operators as soon as possible and it should be supported by the given country.

2. Economic aspects

The planning of funds and monitoring of expenses over the period of transition are important and serve the interest of a successful switchover.

The switchover in television broadcasting has been planned as a market oriented process, based on the principles of transparency, non-discrimination, market subsidiarity and technical neutrality, with clearly defined objectives and procedures for the existing broadcasters and broadcast providers based on EU legislation.

Digitalization will contribute to the better (more profitable) utilization of the broadcasting frequencies which are limited public resources and on the other hand provides a larger number of different television programmes, and the availability of interactive services for the users.

The switchover of terrestrial television broadcasting, cannot be implemented successfully without the precise identification of the necessary financial means and sources of funds for these purposes.

The subsidizing of the viewers has not been laid down yet. The question is how to promote the viewers and which process are in compliance with EU rules. It has to be decided that who could become subsidized and how to define this group.

2.1. Business model and plan (including potential services, cost and funding);

The business model determined due to the analogue situation at the first multiplexes. It does depend on market players (including broadcasters, the transmitter provider, etc.) and technical possibilities like available multiplexes in the transition period. Their main problem is how they can make the service attractive to viewers until all the channels are transmitted digitally they have to provide something "extra" to appeal to the public.

The present economic crisis compounds the situation for both parties. Due to the financial crisis the implementation will probably take more time.

2.2. Market analysis related issues.

Besides the one in paragraph 1.7, there are no other analyses. The DVB-H service provider has a market analysis for mobile TV but it is business confidential.

3. Consumer aspects

3.1. Consumer understanding issues

Since the digital broadcasting is still in its early days the viewers are not familiar with it. (Except for the people involved in the trial.) During the introduction it is of high importance that the public should be properly informed in due time and in the right form. (see the Figure 1 of planned ASO by regions) Digital broadcasting is a new technology and opportunity for the viewers, but on the other hand they are going to lose the possibility of the reception of former analogue broadcasting, especially the regional broadcasting (TVP3). (They might feel that the state deprived them of something they used to have.)

3.2. Consumer research issues (trends and appropriate services)

No needs analysis has been performed to date. It is desirable that the quality of the digital terrestrial broadcasting should exceed the quality of the analogue service. (e.g. picture quality, reception mode) According to the public broadcaster (TVP) the quality of the signal (transport stream) is very important.

3.3. Consumer support issues

The success of the switchover largely depends on the participation of the general public in the digitalization process, that is, on a comprehensive promotional campaign that will be primarily directed towards the general public with the aim to:

- Inform the citizens about the definition and nature of digital television and about the reasons for the switchover from analogue to digital broadcasting of television programmes;
- Educate the citizens about the benefits of digital television and potential ways of using new possibilities offered by new technologies;
- Provide all citizens with the right to information on the dynamics and other details of the switchover from analogue to digital broadcasting of television programmes, and to offer assistance to citizens in the process of the digital switchover.

All broadcasters who have a programme on the first two multiplexes will support promotional activities.