

SECTION 26. Radio-technique. Electronics. Telecommunications.**Gennadii Gennadyevich Miroshnikov**

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ggmiroshnikov@gmail.com**PROSPECTS OF THE USE OF WIRELESS ACCESS NETWORKS FOR IPTV SERVICES**

Abstract: *The Internet Protocol Television (IPTV) services are becoming very popular among telecommunications companies most of all because they can provide television programs anytime and anywhere. IPTV is based on protocol IP and supports such features, as bandwidth efficiency and simple management. IPTV can support broadcast and unicast services, such as Broadcasting of TV channels, Video On Demand or Time-Shifted Television. In meantime some of wireless technologies (LTE, WiMAX) are capable of providing high bandwidths and low latencies. It makes them suitable for delivering multimedia services. Besides, some of them also can provide wide area coverage, mobility support, and non-line-of-sight operation. That's why broadband wireless technologies could be a promising solution for delivering IPTV services anytime anywhere, especially to countryside areas or remote locations. This article describes the various requirements for broadband wireless technologies, which are essential for the provision of IPTV services.*

Key words: *Internet Protocol Television, LTE, WiMAX, HSDPA technology, wireless broadband technology, streaming IP-video, wireless access network, data rate, interactive television.*

The increasing popularity of Internet Protocol Television (IPTV) services may reside on its versatility at providing multimedia services [1-4]. The next logical step should be to provide those services right where subscribers are [5]. As traditional wired networks can only deliver data to fixated points, wireless broadband technology could be an alternative for achieving so. That is, however, considering that streaming IP-video imposes special requirements on the network and video traffic do require a stable high speed bandwidth.

VoIP and general traffic over the Internet is always characterized by constant fluctuations of speed and more prone to delays. Table 1 shows the requirements of data rate for different parameters of video stream. As streams grow in definition and quality they require increments of bandwidth per channel with subsequent investments in equipment and technology.

Table 1**Video type characteristics comparison**

Video Type	Format	fps	Dimension (Mega pixels)	Streamed Mbps	
				MPEG-2	MPEG-4
Analogue	NTSC	30	0.2	6 MHz	6 MHz
Standard Definition	480i	30	0.5	7	2
High Definition (HDTV)	1080i or 720p	30	2	20	8

Video Type	Format	fps	Dimension (Mega pixels)	Streamed Mbps	
				MPEG-2	MPEG-4
Super HD (SHDTV)	2160i	30	8	60	32
Ultra HD (UHDTV)	4320i	60	32	480	256

Now we shall consider the characteristics of an IPTV system should be deployed on a broadband wireless access network. Features of multimedia broadcasting services for technology HSPA, LTE [6-7] and WiMAX [8-9] are described on Table 2 (functioning parameters of these technologies are shown in tabular form that may facilitate a comparison).

Table 2

Comparison of technical parameters of wireless broadband data

Technology	WiMAX	HSDPA	LTE Rel.8
Band, GHz	802.16d - 1,5-11, 802.16e - 2,3-13,6	1,9-2,2	1,4-20
The maximum downlink rate, Mbit/s	802.16d - 75, 802.16e - 40	21 (HSPA+)	58
Channel width, MHz	FDD - 2×5, TDD - 10	2×5	до 20
Access Method DL	OFDMA	OFDMA	OFDMA
Access Method UL	OFDMA	SC-FDMA	SC-FDMA
Duplex method	FDD/TDD	FDD	FDD
Frame, ms	5	2	1
QoS	Yes	Yes	Yes
MIMO	Yes	Yes	Yes
HARQ (Hybrid automatic repeat request)	Yes (802.16e)	Yes	Yes
Handover	Yes (802.16e)	Yes	Yes
Multicast	Yes	Yes	Yes

The 3GPP LTE - 3GPP consortium [10] project aimed to develop standard technologies to improve mobile data on CDMA and UMTS. More importantly, this technology was primarily designed for mobile operators allowing a better integration of new LTE equipment with existing equipment making this widely welcome.

Benefiting from the strong competition between television and cable, it seems possible that IPTV over wireless broadband could become soon part of the services provided by mobile operators as well as other Internet providers. The defining property being its more interactive nature, a feature not truly available on regular TV broadcasting.

From a technical point of view, implementation and deployment of IPTV services on the existing operator's network should account for bandwidth requirements together with low latency parameters. This certainly would involve an update of QoS mechanisms as well as a competent marketing policy for subscribers to prevent network over loadings.

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