

**TELEFUNKEN SenderSysteme Berlin presents digital medium wave transmitters**

The broadcasting scenery is subject to continuous change and evolution. In the year 1923, the future mass medium radio started the era of entertainment with a 700 W medium wave transmitter of TELEFUNKEN. Just a some years later, Germany had already a network of long wave, medium wave and short wave transmitters. After the war, Germany lost a major part of these frequencies and regional authorities were entrusted with frequency regulatory tasks. Necessity is the mother of invention and lead in the fifties to the implementation of frequency modulated broadcast. Due to its excellent audio quality, FM gained more and more terrain over the amplitude modulated broadcast. With the admission of private radio corporations in the eighties, the frequency allocation fast met its limits in the FM bands. Though the satellite and cable frequencies as well as the internet expanded the radio spectrum, the insatiable requirement for transmission capacity, in particular in the mobile reception persists.

One approach to solve the transmission problem is the introduction of the digital broadcasting DAB. The lack of radio sets at affordable price did not lead to the expected success in the trial period of regional DAB pilot projects in Germany and really did not get beyond the trial stage.

Moreover, FM and DAB serve especially for regional terrestrial coverage as well as for cable nets. To achieve a national cover with nets of these techniques would result in high expenditures, for most countries.

The in the last decades somewhat neglected AM frequencies, in particular long wave and medium wave, offer a real alternative for autonomous terrestrial broadcast.

With a few long wave and medium wave transmitters the whole German territory can be reached to offer programs for specific country-wide audience groups. Quite a number of broadcasters have seized this chance and the regional institutions (Landesmedienanstalten) are faced with a run for medium wave frequencies.

Once a licence has been obtained, these institutions watch start and continuity of operation. As existing equipment mainly consists of tube transmitters which are cost-intensive in operational use, a replacement by solid state transmitters constitutes the economic solution.

The transmission quality of analog medium wave and long wave remains a challenge. Though the international experience, in particular of the United States, the United Kingdom and the Netherlands that the major part of listeners accepts for their favorite programs a lower signal quality, on medium and long term at least only FM equalling quality for audio sounds will succeed in competition.

Worldwide big efforts are made for digitalization of the long wave, medium wave and short wave ranges, the so called AM bands below 30 MHz; an FM like sound quality is expected.

Digital Radio Mondiale (DRM) is the name of the international consortium, established 1996 in Paris, with the aim to find agreement on a world standard for a digital AM system design and to facilitate coordination and implementation of this technology.

A draft for a worldwide standard for digitalization of the long wave, medium wave and short wave has passed the DRM approval in fall 2000 and was submitted to the ITU for examination.

Experiments with digitalization are in process in Germany. In Saxony-Anhalt a pilot project was created in which the net user, program organizer and data provider cooperate. Project partners are the Deutsche Telekom AG, the Fachhochschule (college of advanced technology) Merseburg and the Fraunhofer Institute. In this project a digital broadcast system shall be erected and put in operational use on short term on 531 kHz, based on principles of the DRM draft. The transmitter serving for emission of the programm is supposed to be provided by TELEFUNKEN SenderSysteme Berlin.

Propagation of the digital information and its reception with corresponding radio receiver sets shall be tested.



TELEFUNKEN SenderSysteme Berlin follows actively together with the Deutsche Telekom, Fraunhofer Institute for Integrated Circuits, Deutschland Radio Berlin, SFB and SWR another interesting project in the same domain.

At the international radio fair „Internationale Funkausstellung (IFA)“ 2001 in Berlin it is scheduled to transmit in Berlin four digital broadcast programs on medium wave with real program modulation. Technical equipment will be provided by Fraunhofer Institute and TELEFUNKEN SenderSysteme Berlin. It is worth to mention that the use of standard transmitters of the TRAM series, belonging to the product scope of TELEFUNKEN SenderSysteme Berlin, shall demonstrate their suitability for digital application.

According to the actual planning, the trial digital transmissions shall take place on 810 kHz, 855 kHz, 891 kHz and 1485 kHz during the IFA. All transmitters and modulators will be provided by TELEFUNKEN. The digital signal encoding is intended with content servers developed by the Fraunhofer Institute and will be placed in the respective studio facilities. Transmission of the digital program modulation inclusive additional information from the studio to the transmitter sites will be arranged over existing capacities on 2 MB data links used by the broadcasters. For the transmitters only equipment of the TRAM series will be used. For the trial reception common AM radio sets with personal computers (PC) and sound cards will be used. The digital reception signal will be picked up in the AM radio set's AF section and routed to the sound entry of the PC operating with a special decoding program, and audio reproduction takes place via the sound card resp. external stereo amplifier.

On successful achievement of these tests, TELEFUNKEN SenderSysteme Berlin will carry forward development of the modulator up to production line status and adjust the modulator's software parallelly to DRM's progress in standardization in order to assist the broadcasters in their efforts to dispose of equipment in conformity with DRM standard.

TELEFUNKEN SenderSysteme Berlin plans to market the complete system from the encoder to the antenna and to offer its customers worldwide the unique opportunity to get digital AM system design based on DRM principles from one source, including update service and technical assistance.

Berlin, in July 2001