

R&S®THU9 high-power TV transmitter commissioned for use by Chinese network operator

When digital television coverage is required for large regions, the R&S®THU9 liquid-cooled TV transmitters are the answer. Their advantages with respect to power efficiency, space requirements and operability were enough to convince Hunan TV, the second-largest TV network operator in China.

In China, if you were to ask anyone on the street about Hunan TV – Hunan Wei Shi in Chinese – you would very likely get an immediate, positive response. “Yes, of course I know it! I watch programs like ‘Happy Camp’, ‘Super Girl’, ... every week ...”. In fact, many of the programs and TV series produced by Hunan TV have garnered top ratings and are even known outside China.

This success – making Hunan TV one of the most-loved TV broadcasters and the second-largest TV network operator in China after the national broadcaster CCTV – is based on the operator’s determination, passion and drive for innovation. It was these qualities, as well as a spirit of pioneering, that Hunan TV also exhibited in 2012 with the decision to announce the first large-scale DTV project. Digitization of the terrestrial TV

network is still in its infancy in China, with the State Administration of Radio, Film and Television (SARFT) shifting out the analog switchoff (ASO) date from 2015 to 2020.

Because cable and IPTV dominate the markets in Chinese cities, the focus for terrestrial TV broadcasting lies on coverage for rural and fragmented regions where inhabitants cannot afford high



Two of the R&S®THU9 liquid-cooled high-power TV transmitters that provide the southern Chinese province of Hunan with digital television.



The world's first terrestrial UHD TV network in Korea uses Rohde&Schwarz transmitters

Televisions with UltraHD resolution (also known as UHD or 4K) are quickly becoming a favorite among consumers, who are impressed by the picture quality. However, true 4K programming is thin on the ground. Korean Broadcasting System (KBS), Korea's largest public broadcaster, filled this gap earlier this year and was the first broadcaster in the world to start regular, terrestrial transmission of 4K programs – initially limited to the capital city Seoul and environs. The transmitters, which are operated in DVB-T2 mode, were supplied by Rohde&Schwarz (models R&S®THU9 and R&S®SVC8302). To be able to deliver the high data rates required by a UHD program, all of the resources provided for by the DVB-T2 standard must be put into play. The 4K transmission channel carries only a single program in place of the usual four multiplexed programs. The powerful 256QAM option (rotated) is used as the modulation mode, and the HEVC coder (H.265) was selected for video encoding, allowing double the compression of the typical H.264 coder at the same quality. This permits a bandwidth of only 6 MHz to carry a data rate

of more than 25 Mbit/s, which together with data reduction measures is sufficient to transmit a 4K program with impressive quality.



The KBS antenna tower (left) is used to broadcast the world's first terrestrial 4K programs.

cable fees. The Hunan province in the south of China (one of China's most densely populated regions; see map) was therefore selected. More than 638 million people, representing 41 ethnic groups, live on approximately 200 000 square kilometers. The province is home to numerous mountain ranges, and transmitter stations are positioned on mountains with peaks at least 1000 meters above sea level to facilitate broadcast coverage. Some of these peaks now sport transmitters from Rohde&Schwarz. Rohde&Schwarz terrestrial TV transmitters have long had an excellent reputation with network operators in China as a result of their technical characteristics, quality and the dedicated service provided by the local Rohde&Schwarz subsidiary. This is why Rohde&Schwarz remains the market leader, in particular for liquid-cooled

high-power TV transmitters, in spite of stiff competition.

Thanks to its R&S®THU9 liquid-cooled TV transmitters (see figure), Rohde&Schwarz has now also added Hunan TV as a customer. The efficiency advantages offered by the transmitters with respect to power efficiency, space requirements and operability were key selling points.

The first project involved four transmitters at 5.2 kW output power and two at 2.6 kW at a total of three stations, broadcasting 20 TV programs over two multiplexers. The pump and the band-pass filters for the 5.2 kW transmitters were integrated into the transmitter rack. This all-in-one concept saves space and reduces the installation effort. As a result, Rohde&Schwarz China

was able to install and commission the systems, including combiners, antennas, etc. at all stations within only a few weeks. Even a delay caused by a continual downpour lasting six days did not put the completion date in jeopardy.

Since 2013, the transmitters have been broadcasting signals in compliance with the DTMB standard, to the complete satisfaction of the customer. In the meantime, all station engineers have been trained on the new transmitters during multi-day sessions conducted by Rohde&Schwarz China.

The first DTMB project with the R&S®THU9 transmitter family is a significant milestone for both parties and a good basis for many more success stories.

Fang Yang; Owen Zhang