ISDB-T/ISDB-T$_B$: The Versatile Standards

TV, Mobile TV and Sound Broadcasting

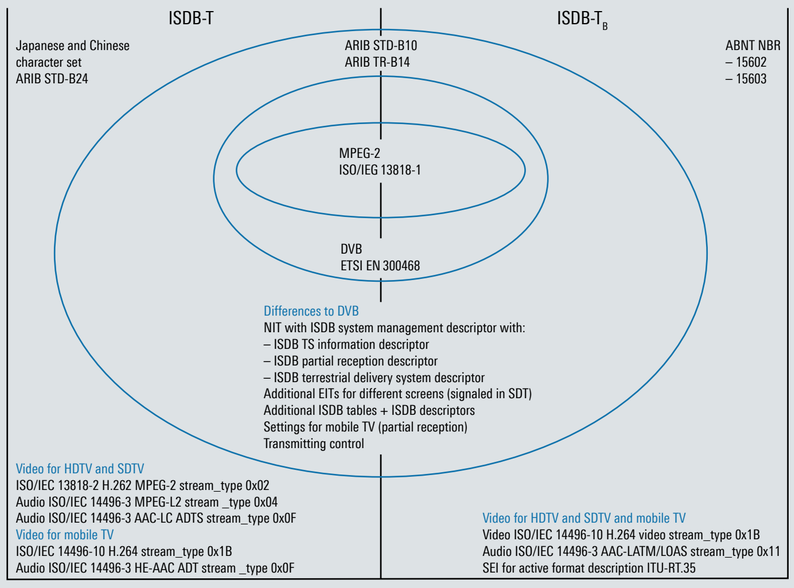
The Japanese approach to digital terrestrial TV is terrestrial integrated services digital broadcasting (ISDB-T) and was adopted in 1999. A special form of ISDB-T is the 1-segment mode (partial reception), which is used for mobile TV applications. For terrestrial digital sound broadcasting ISDB-T$_{sb}$ has been created by adapting the spectral bandwidth and omitting the video content. Parts of Latin America adopted the ISDB-T standard for terrestrial broadcasting under the name ISDB-T$_B$ with slight changes in the content layer.

Key performance features of ISDB-T/ISDB-T$_B$:

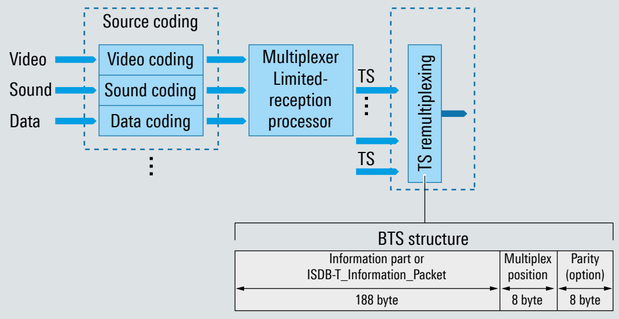
- Simultaneous broadcasting of HD, SD and mobile TV content in one channel
- Orthogonal frequency division multiplexing (OFDM) for robustness and single frequency networks (SFN)
- Divison of one channel into 13 segments for flexible spectrum allocation
- Segments can be allocated to transmission layers A, B, C
- Bit and time interleaving for improved mobile and indoor reception

Rohde&Schwarz provides a wide variety of transmitter and test&measurement products for the major global standards. Over 50 years of experience in sound and TV broadcast applications make Rohde&Schwarz a qualified partner for network operators and electronic equipment manufacturers.

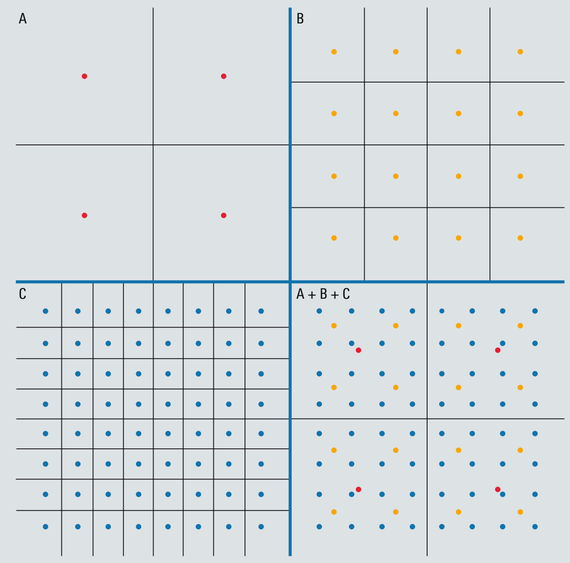
Baseband structure



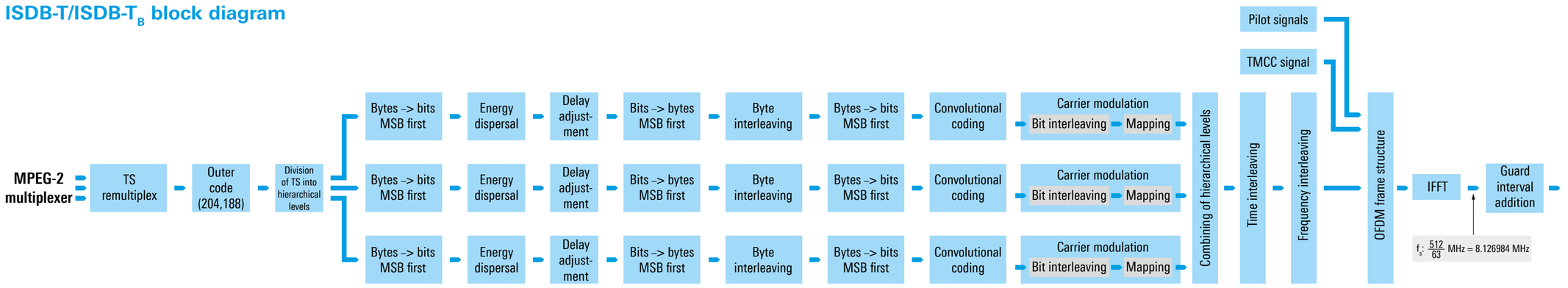
BTS multiplexer



Constellation



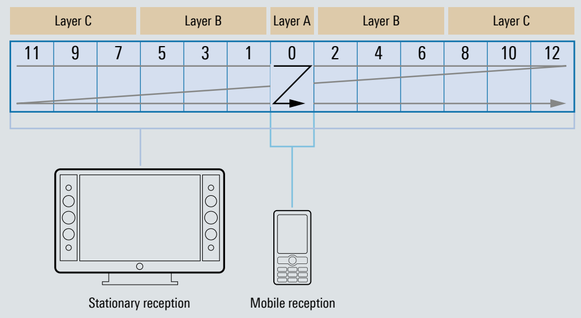
ISDB-T/ISDB-T$_B$ block diagram



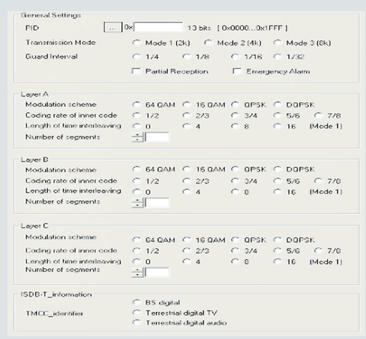
OFDM parameter

Mode		Mode 1 (2K)	Mode 2 (4K)	Mode 3 (8K)
Bandwidth		5.573 MHz		
Sample frequency		512/63 MHz = 8.126984 MHz		
Number of carriers	Total	108 × 13 + 1 = 1405	216 × 13 + 1 = 2809	432 × 13 + 1 = 5617
	Data	96 × 13 = 1248	192 × 13 = 2496	384 × 13 = 4992
Effective symbol length		252 µs	504 µs	1008 µs
Carrier modulation		QPSK, 16QAM, 64QAM, DQPSK		

Transmission spectrum



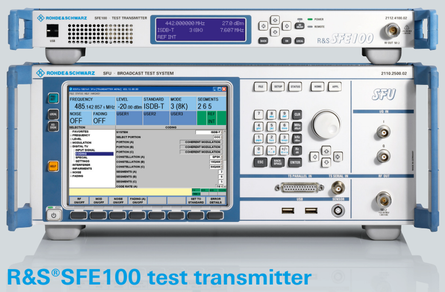
TMCC parameter



Glossary:
AAC = Advanced Audio Coding; **ABNT** = Associação Brasileira de Normas Técnicas; **ABNT NBR** = ABNT technical standard; **ADTS** = Audio Data Transport Stream; **ARIB** = Association of Radio Industries and Businesses; **BTS** = Broadcasting Transport Stream; **ETSI** = European Telecommunications Standards Institute; **HD** = High Definition; **IEC** = International Electrotechnical Commission; **IFFT** = Inverse Fast Fourier Transformation; **ISDB** = Integrated Services Digital Broadcasting; **ISDB-T** = ISDB for Terrestrial Television Broadcasting; **ISDB-TB** = ISDB for Terrestrial Television Broadcasting Brazil; **ISO** = International Organization for Standardization; **MPEG** = Moving Picture Experts Group; **MSB** = Most Significant Bit; **NIT** = Network Information Table; **OFDM** = Orthogonal Frequency Division Multiplex; **QAM** = Quadrature Amplitude Modulation; **QPSK** = Quadrature Phase Shift Keying; **SD** = Standard Definition; **TMCC** = Transmission and Multiplexing Configuration Control; **TS** = Transport Stream; **TV** = Television

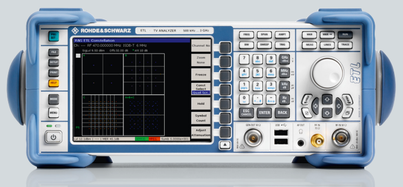
Selection of Rohde&Schwarz solutions for ISDB-T/ISDB-T$_B$

R&S®DVSG digital video signal generator

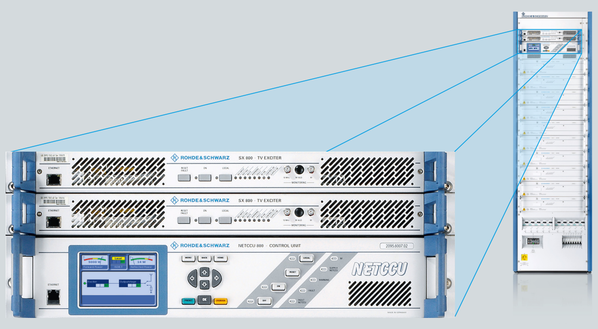


R&S®SFE100 test transmitter
R&S®SFU broadcast test system

R&S®SFE broadcast tester



R&S®ETL TV analyzer



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