



DVB-T2 Performance Comparison with other Standards

DVB – NCA Seminar
18 – 19 August 2010
Bangkok

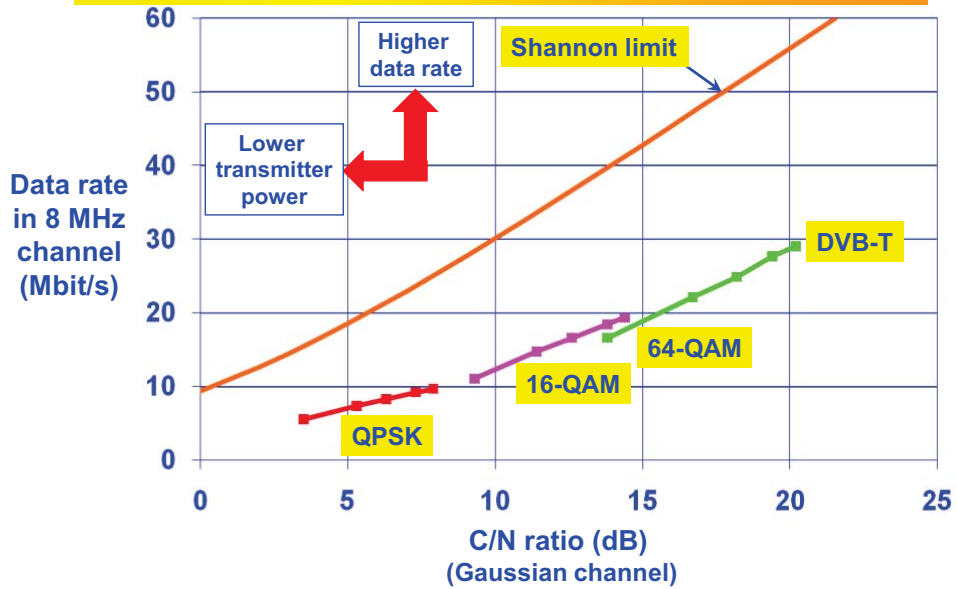
John Bigeni
bigeni@dvb.org

DVB-T2 Technical Comparison



	DVB-T		DVB-T2	
COFDM	Guard Interval OFDM		Guard Interval OFDM	
FEC	5	Reed Solomon 1/2; 2/3; 3/4; 5/6; 7/8	6	Low Density Parity Check 1/2; 3/5; 2/3; 3/4; 4/5; 5/6
Modes	3	QPSK; 16QAM; 64QAM	4	QPSK; 16QAM; 64QAM; 256QAM
Guard Interval	4	1/4; 1/8; 1/16; 1/32	8	1/4; 5/32; 1/8; 5/64; 1/16; 1/32; 1/64; 1/128
FFT size	2	2K; 8K	6	1K; 2K; 4K; 8K; 16K; 32K
Scattered Pilots	12%		1%	
Continual Pilots	2.6%		0.35%	

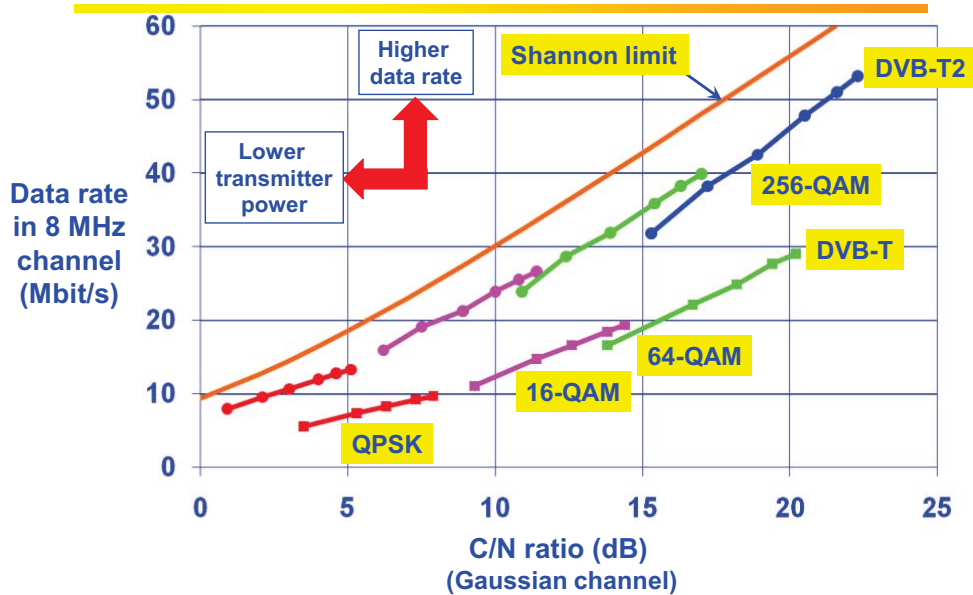
DVB-T



DVB-T data from Table A1 of ETSI EN 300 744 V1.6.1.

3

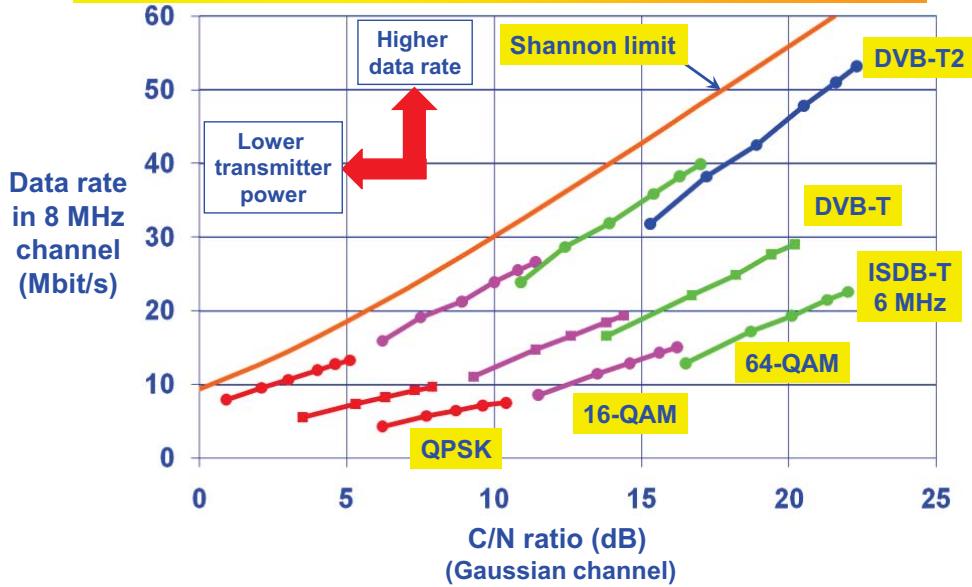
DVB-T & DVB-T2



DVB-T data from Table A1 of ETSI EN 300 744 V1.6.1. DVB-T2 data from Table 44 of DVB Blue Book A133.

4

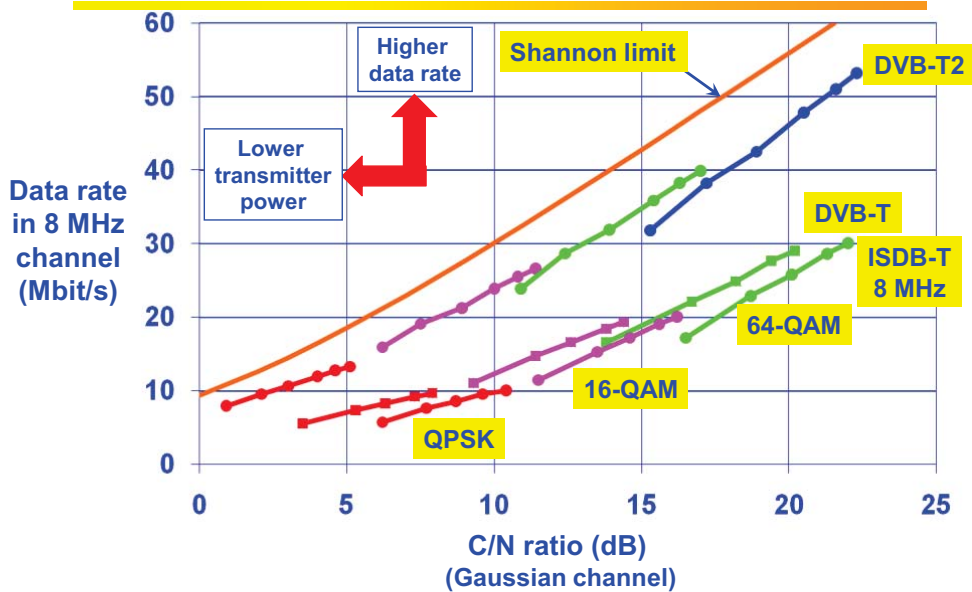
DVB-T, DVB-T2 and ISDB-T (6 MHz)



ISDB-T data from Table 3-4 and Table A3.3-2 of ARIB STD-B31 Version 1.6

5

DVB-T, DVB-T2 and ISDB-T (8 MHz)



6

SYSTEM COMPARISON – Fixed C/N

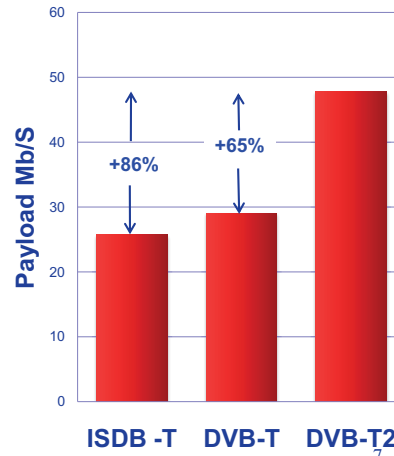
Higher Payload = Higher Spectrum Efficiency

- Useful data rate at fixed C/N ratio

	C/N dB	Data rate Mbit/s
ISDB-T*	20.3	25.7
DVB-T	20.2	29.0
DVB-T2	20.5	47.8

- ISDB-T similar to DVB-T
- DVB-T2 is the **BEST**

Fixed C/N = Fixed Service Coverage + Larger payload



* ISDB-T figures assume 8 MHz variant with no hand-held segment

SYSTEM COMPARISON for Fixed Payload

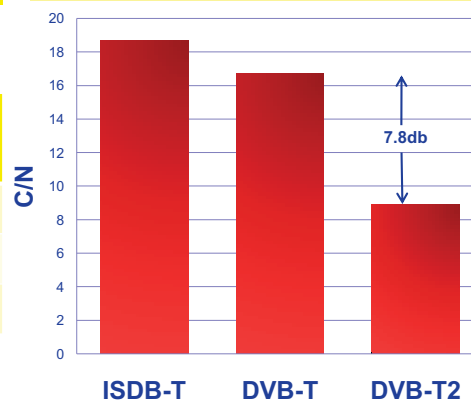
Fixed Payload increases Coverage - RUGGEDNESS

- Required C/N ratio at fixed useful data rate

	Data rate Mbit/s	C/N dB
ISDB-T*	22.9	18.7
DVB-T	22.1	16.7
DVB-T2	21.3	8.9

- ISDB-T similar to DVB-T
- DVB-T2 is the **BEST**

Increased ruggedness = Less C/N = Less TX Power (same Coverage)



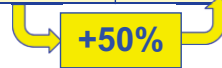
6db = 1/4 power reduction

* ISDB-T figures assume 8 MHz variant with no hand-held segment

DVB-T v. DVB-T2: PORTABLE



	DVB-T	DVB-T2
Channel bandwidth (MHz)	8	8
Modulation	16-QAM	256-QAM
FFT size	8k	16k
Guard interval	1/4	1/8
FEC	2/3 CC + RS	5/6 LPDC + BCH
C/N ratio (dB)	11.4	11.4
Useful bit rate (Mbit/s)	13.3	19.9

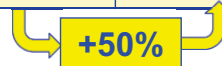


9

DVB-T v. DVB-T2: : ROOF-TOP AERIAL



	DVB-T	DVB-T2
Channel bandwidth (MHz)	8	8
Modulation	64-QAM	256-QAM
FFT size	2k	32k
Guard interval	1/32	1/128
FEC	2/3 CC + RS	3/5 LPDC + BCH
C/N ratio (dB)	16.5	17.2
Useful bit rate (Mbit/s)	24.1	36.1



10

Example – Southwest Germany

	DVB-T	DVB-T2 same Emin	DVB-T2 same data rate
Modulation	16-QAM	64-QAM	16-QAM
FFT Size	8K	16K	16K
Guard Interval	1/4	1/8	1/8
Code Rate	2/3	2/3	3/5
Carrier Mode	Normal	Extended	Extended
Capacity	13.3 Mbit/s	25.0 Mbit/s	15.0 Mbit/s
Number of Programs (MPEG4)	6 SD 1 HD	14 SD 2 HD	6 SD 1 HD
E_{min} (500 MHz; 1.5 m)	68.4 dB μ V/m	68.6 dB μ V/m	62.4 dB μ V/m

+88%

+6.2db

2 options using 3 transmitters SW Germany

- T2 to increase payload capacity

- T2 to increase mobile & indoor coverage

Significant coverage increase = 6.2 db = (4 x power)

Combinations of 2 options can be achieved by using different PLP for different types of service.

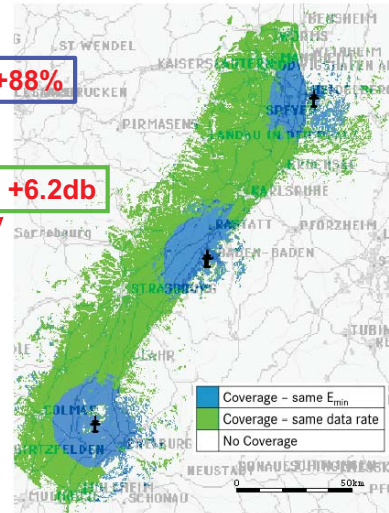


Figure 13: Coverage portable indoor reception for same E_{min} and same data rate

Courtesy of Tobias Vieracker LS Telecom

SYSTEM PERFORMANCE

- Compared with DVB-T (or ISDB-T)
 - DVB-T2 can give 50% ++ increase in payload capacity at the same C/N ratio
 - 4 – 6 HDTV services in one RF channel
 - 15 – 20 SDTV services
 - Effective Spectrum saving 50% +++
 - OR
 - DVB-T2 can deliver the same payload with 5 dB – 7 dB weaker signals
 - Reduction of Transmitter power to 1/4 (-75%) (Compared with DVB-T & ISDB)