Supplement Information to Test Report 1985-A

Necessary Bandwidth and Emission Designators

SPECIFICATION: FCC 47 CFR 2.202

The Necessary Bandwidth is the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed.
This is calculated using the following formula.

$Bn = 2M + 2DK$ Where: Bn = Necessary Bandwidth
M = Maximum modulation frequency
For Data transmission
M = B/2
Where: B = Modulation rate in Baud
D = Peak deviation
K = Constant
For Analogue transmission this is 1
For Data transmission this is typically 1.2

1. Analogue Voice

		Necessary bandwidth			Emission Designator
12.5kHz Bandwidth					
	M	=	3 kHz		**11K0F3E**
	D	=	2.5 kHz		F3E represents a FM voice
	Bn	=	6 + 5 x 1		transmission
		=	11kHz		
25kHz Bandwidth		Necessary bandwidth			Emission Designator
	M	=	3 kHz		**16K0F3E**
	D	=	5 kHz		F3E represents a FM voice
	Bn	=	6 + 10 x 1		transmission
		=	16 kHz		

2. Fast Frequency Shift Keying (FFSK)

		Necessary bandwidth			Emission Designator
12.5kHz Bandwidth					
	M	=	1.8 kHz		**6K60F2D**
	D	=	1.5 kHz		F2D represents a FM data
	Bn	=	3.6 + 3 x 1		transmission with the use of a
		=	6.6 kHz		modulating sub carrier
25kHz Bandwidth		Necessary bandwidth			Emission Designator
	M	=	1.8 kHz		**9K60F2D**
	D	=	3 kHz		F2D represents a FM data
	Bn	=	3.6 + 6 x 1		transmission with the use of a
		=	9.6 kHz		modulating sub carrier

Necessary Bandwidth and Emission Designators (cont)

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3. Tait High Speed Date (THSD)

THSD uses a 4 level gaussian frequency shift keying (CP-4GFSK) modulation scheme. It can be used when transferring data between two radios. Data is transmitted at a rate of 12000bps for narrow band channels, and 19200bps for wide-band channels.

Due to the difficulties in determining the value of k, the necessary bandwidth has been measured using the 99% energy rule.

12.5kHz Bandwidth	99% bandwidth 7.7 kHz	Emission Designator **7K70F1D** F1D represents a FM data transmission without the use of a modulating sub carrier
25kHz Bandwidth	99% bandwidth 12.6 kHz	Emission Designator **12K6F1D** F1D represents a FM data transmission without the use of a modulating sub carrier