

2.2.2.3 Modulation Type

Data **shall** be modulated onto the carrier using binary Continuous Phase Frequency Shift Keying. The modulation index, h , **shall** be 0.6; this implies that if the data rate is R_b , then the nominal frequency separation between “mark” (binary 1) and “space” (binary 0) is $\Delta f = h \cdot R_b$. A binary 1 **shall** be indicated by a shift up in frequency from the nominal carrier frequency of $\Delta f/2$ (+312.5 kHz) and a binary 0 by a shift of $-\Delta f/2$ (-312.5 kHz). These frequency deviations apply at the optimum sampling points for the bit interval.

Notes:

1. *Filtration of the transmitted signal (at base band and/or after frequency modulation), will be required to meet the spectral containment requirement of §2.2.2.6. This filtration will cause the deviation to exceed these values at points other than the optimum sampling points.*
2. *The optimum sampling point of a received bit stream is at the nominal center of each bit period, when the frequency offset deviation is either plus or minus 312.5 kHz.*
3. *Due to filtering of the transmitted signal, the received frequency offset varies continuously between the nominal values of ± 312.5 kHz (and beyond), and the optimal sampling point may not be easily identified. This point can be defined in terms of the so-called “eye diagram” of the received signal. The eye diagram is a superposition of samples of the post-detection waveform shifted by multiples of the bit period (0.96 microseconds). The optimum sampling point is the point during the bit period at which the opening of the eye diagram (i.e., the minimum separation between positive and negative frequency offsets at very high signal-to-noise ratios) is maximized.*

2.2.2.4 Modulation Distortion

The minimum vertical opening of the eye diagram of the transmitted signal (measured at the optimum sampling points) **shall** be no less than 560 kHz when measured over an entire Long ADS-B Message containing pseudorandom payload data.

The minimum horizontal opening of the eye diagram of the transmitted signal (measured at 978 MHz) shall be no less than 0.624 microseconds (0.65 symbol periods) when measured over an entire Long ADS-B Message containing pseudorandom payload data.

2.2.2.5 Transmitter Power Output

The Time/Amplitude profile of an ADS-B Message Transmission **shall** fall within the following limits relative to a *reference time* defined as 0.48 microseconds prior to the center of the first bit of the synchronization sequence (§2.2.3.1.1) appearing at the output port of the equipment.

All power measurements for subparagraphs “**a**” through “**f**” below apply to the selected antenna port for installations that support transmitter diversity (§2.2.6.1.3). The RF power output on the non-selected antenna port **shall** be at least 20 dB below the level on the selected port.

All power measurements for subparagraphs “**a**” and “**f**” assume a 300 kHz bandwidth. All power measurements for subparagraphs “**b**,” “**c**,” “**d**” and “**e**” assume a 2 MHz bandwidth.