

## 2.2.8.2 Receiver Performance

### 2.2.8.2.1 Receiver Sensitivity

#### 2.2.8.2.1.1 Long ADS-B Message ~~is~~ As Desired Signal

A desired signal level of  $-93$  dBm applied at the antenna end of the feedline **shall** produce a rate of Successful Message Reception of 90% or better under the following simultaneous conditions:

- a. ~~The~~ When the desired signal is ~~subject to of~~ nominal modulation (i.e., FM deviation is 625 kHz) and at the maximum ~~permitted~~ signal frequency offsets, plus and subject to air-to-air Doppler shift at 1200 knots closure/opening.
- b. ~~The~~ When the desired signal is ~~subject to the of~~ maximum modulation distortion allowed in §2.2.2.4, at the nominal transmission frequency +/- 1 PPM, and subject to air-to-air Doppler shift at 1200 knots closure/opening.

**Note:** The receiver criteria for Successful Message Reception of UAT ADS-B Messages are provided in §2.2.8.3.1. This also ensures that the Basic ADS-B Message will be received at the same desired signal level.

#### 2.2.8.2.1.2 Basic ADS-B Message As Desired Signal

A desired signal level of  $-94$  dBm applied at the antenna end of the feedline **shall** produce a rate of Successful Message Reception of 90% or better under the following conditions:

- a. When the desired signal is of nominal modulation (i.e., FM deviation is 625 KHz) and at the maximum signal frequency offsets, and subject to air-to-air Doppler shift at 1200 knots closure/opening.
- b. When the desired signal is of maximum modulation distortion allowed in §2.2.2.4, at the nominal transmission frequency +/- 1 PPM, and subject to air-to-air Doppler shift at 1200 knots closure/opening.

**Note:** The receiver criteria for Successful Message Reception of UAT ADS-B Messages are provided in §2.2.8.3.1.

#### 2.2.8.2.1.2.2.2.8.2.1.3 Ground Uplink Message ~~is~~ As Desired Signal

A desired signal level of  $-91$  dBm applied at the antenna end of the feedline **shall** produce a rate of Successful Message Reception of 90% or better under the following simultaneous conditions:

- a. ~~The~~ When the desired signal is ~~subject to of~~ nominal modulation (i.e., FM deviation is 625 kHz) and at the maximum ~~permitted~~ signal frequency offsets, plus and subject to ground-to-air Doppler shift at 600-850 knots closure/opening.

Note: The 850 knot ground station closure rate is derived from a 600 knot true air speed, added to a 250 knot worst-case wind velocity. The 1200 knot air-to-air closure remains valid because both aircraft are assumed to be within the same air mass, so the wind velocity makes no difference to the closure rate.

- b. ~~The~~ ~~When the~~ desired signal is ~~subject to the~~ of maximum modulation distortion allowed in §2.2.2.4, at the nominal transmission frequency +/- 1 PPM, and subject to ground-to-air Doppler shift at 850 knots closure/opening.

**Note:** ~~This requirement assumes that the baud rate accuracy of the ground transmitter is 2 PPM. This requirement ensures the baud rate accuracy supporting demodulation in the UAT equipment is adequate to properly receive the longer Ground Uplink Message (assuming that the baud rate accuracy of the ground transmitter is 2 PPM).~~

### 2.2.8.2.2 Receiver Desired Signal Dynamic Range

The receiver **shall** achieve a Successful Message Reception rate for Long ADS-B Messages of 99% or better when the desired signal level is between -90 dBm and -10 dBm at the antenna in the absence of any interfering signals.

**Notes:**

1. The value of -10 dBm represents 120-foot separation from an A3 transmitter at maximum allowed power.
2. Certain installations that rely on over-air reception of the ownship transmission to meet the requirements of §2.2.6.3 may need to achieve Successful Message Reception at significantly higher levels than -10 dBm.

### 2.2.8.2.3 Receiver Selectivity

The receiver **shall** provide the following minimum signal rejection ratios as a function of frequency offset as listed in Table 2-65, for reception of Long ADS-B Messages at a 90% Successful Message Reception rate, applied at a level of -93 dBm or less. The interference source is an un-modulated carrier applied at the frequency offset.

**Table 2-65: Selectivity Rejection Ratios**

Frequency Offset from Center	Minimum Rejection Ratio (Undesired/Desired level in dB)	
	Equipment Class A0, A1L, A1H, A2	Equipment Class A3
-1.0 MHz	10	30
+1.0 MHz	<del>15</del>	40
(+/-) 2.0 MHz	50	50
(+/-) 10.0 MHz	60	60

**Notes:**

1. The undesired signal used is an un-modulated carrier applied at the frequency offset.
2. This requirement establishes the receiver's rejection of off channel energy.