

December 17, 1996

## ONCORE™ Active Antenna System

### Introduction:

Both the gain and the noise of the overall system affect the performance of the A/D convertor in a GPS receiver. The illustration below, shows typical values for the ONCORE™ family of GPS receivers when used with the Motorola antenna and standard RG-58 cable. The thresholds and ranges listed should be considered with a tolerance of 2 to 3 dB.

### System Constraints:

**Gain:** The gain in decibells is cumulative through all stages (i.e.,  $G = G1 + G2 + G3 \dots$ ). The optimal gain of the antenna, cabling and any in-line amplifiers and splitters is 18 dB + or - 8 dB. The ONCORE receiver may operate outside of the optimal gain range but performance will degrade. Therefore, Motorola does not recommend operating outside of the optimal gain range.

For the system below, the gain is 18 dB in front of the receiver.

**Noise:** System noise (F) is not to exceed 4 dB. The cascaded system noise figure formula is:

$$F = F1 + \frac{F2 - 1}{G1} + \frac{F3 - 1}{G1 \cdot G2} + \dots$$

( = 2.7 dB for the system below)

Where F1 is the noise figure for stage one and G1 is the gain for stage one, etc. Note that all of these values are absolute. Recall the formula for converting absolute values to decibels:

$$F(\text{dB}) = 10 \text{ Log } (F)$$

### Satellite Signal Strength:

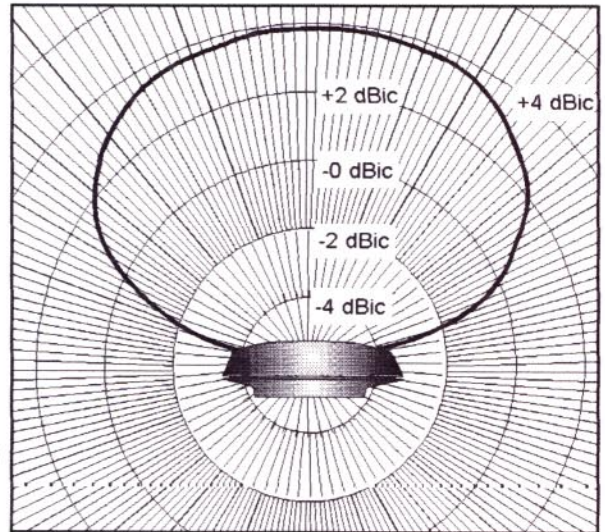
- 130 dBm minimum specification at end of life
- 124 dBm typical received today with no blockage

### Sensitivity at Antenna:

- 110 dBm acquisition level maximum
- 137 dBm acquisition level threshold
- 145 dBm tracking level threshold

### Sensitivity at Receiver:

- 128 dBm acquisition level threshold
- 135 dBm tracking level threshold



**Antenna Gain Pattern**

#### Stage 1:

Antenna with low noise amplifier (LNA)  
G = 24 dB, F = 2.5 dB

#### Stage 3:

GPS receiver  
G = 68 dB, F = 7.5 dB

#### Stage 2:

Cable: 6 m of RG-58  
G = - 6 dB, F = 6 dB

For configuration assistance, order placement and technical support call:

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