

Structure Analysis for Aircraft Mission Equipment With Anti-Vibration Mount

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1.

(Mission Equipment) (Bush) (Rigid Body Element)
 (stiffness) (damping ratio)
 (Radio Frequency) (Guide Pin) (Retainer) 가
 (preload)
 RF
 가
 RF
 RF
 M.S.(Margin of Safety) 가
 RF
 가
 가

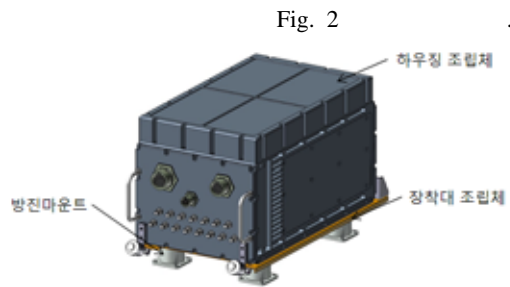


Fig. 1 RF mission equipment configuration

2.

RF
 Fig. 1
 RF

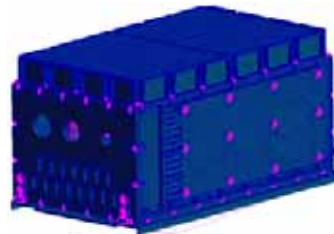


Fig. 2 FE model of RF mission equipment

3.

Fig. 3

Normal mode
1~3 20 Hz (saft)
Mode $\sqrt{2}$
가
Random vibration analysis
3. 30 Hz
가
RF
4.
4. RF
가
RF

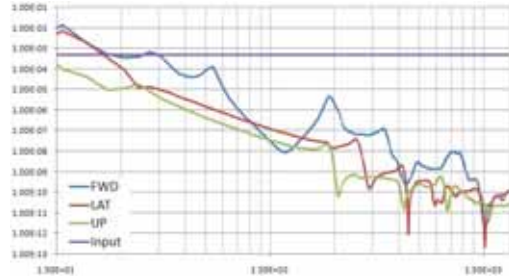
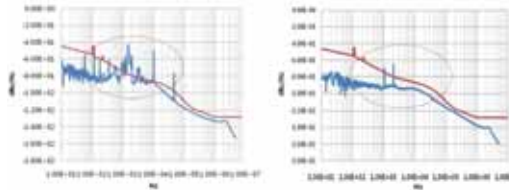


Fig. 3 Results of random Vibration Analysis for the RF mission equipment



(a) With mount (b) Without mount
Fig. 4 Performance of the RF component during random vibration test

4.

$$1\sigma_{n1} = X(\text{Hz}, \text{고유진동수}) \times \text{time}(\text{hr}) \times 3600(\text{sec/hr}) \times 0.683$$

$$2\sigma_{n2} = X(\text{Hz}, \text{고유진동수}) \times \text{time}(\text{hr}) \times 3600(\text{sec/hr}) \times 0.271$$

$$3\sigma_{n3} = X(\text{Hz}, \text{고유진동수}) \times \text{time}(\text{hr}) \times 3600(\text{sec/hr}) \times 0.043$$

Minor's rule

$$R = \sum_{i=1}^j \frac{n_i}{N_i} = \frac{n_1}{N_1} + \frac{n_2}{N_2} + \frac{n_3}{N_3}$$

1, 2, 3

MIL-HDBK-5J
(S-N Curve)

1. MIL-STD-810F, Department of Defense Test Methods Standard for Environmental Engineering Consideration and Laboratory Tests, (2000)
2. 서육석, "Ansys Workbench 를 이용한 해석 성공 사례-랜덤진동에 대한 피로 분석", CAD & Graphics 2008년 11월호

.0MPa,
96.0 MPa