application note

VHF Omni Directional Range Frequency and FM Deviation Control of the 9960 Hz Sub-Carrier

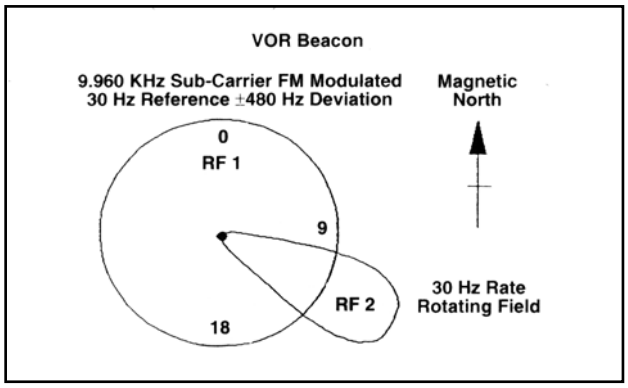
Variation of the VOR sub-carrier frequency and FM deviation on the 2030/40 series Signal Generators can be achieved by adjustment of the 30 Hz VOR rate parameter

Variation of the VOR sub-carrier frequency and FM deviation

Introduction

The test specifications for the VHF Omni-Directional Range (VOR) are detailed at Annex 10 of the ICAO VOR reference document. Part of the specification calls for the variation of the 9960 Hz sub-carrier in both the carrier frequency and the modulating 30 Hz FM deviation. A further requirement is to switch off the 480 Hz frequency modulation.

The VOR 9960 Hz sub-carrier is 332 times the 30 Hz VOR rate and the 480 Hz FM deviation is 16 times the 30 Hz VOR rate. The ICAO specification for the 9960 Hz sub-carrier frequency tolerance is ±1% or 99.6 Hz. The FM deviation must be within the limits of 15: 1 to 17:1 ratios of the 30 Hz rate (450 to 510 Hz).



2030/40 Avionics Signal Generator

In the VOR mode the signal generator's digital audio synthesizer system ensures that the sub-carrier frequency and 30 Hz FM rate maintain a fixed 332:1 and 16:1 relationship.

The sub-carrier frequency and sub-carrier deviation can be varied on the 2030 by varying the VOR 30 Hz rate with either the rotary control, keyboard entry or the increment keys. Adjustment of the 30 Hz rate will result in a shift of both the sub-carrier frequency and FM deviation. Resolution is 0.1 Hz which results in the sub-carrier frequency varying by 33.2 Hz per increment and the 480 Hz FM deviation varying by 1.6 Hz per increment.

Tables 1 and 2 show the 30 Hz rate setting required to check VOR receivers and monitors to the ICAO specification.

Table 1

Sub-Carrier Frequency	*Frequency Limit*	*VOR Rate*
9960 Hz	Centre	30 Hz
10060 Hz	+100 Hz	30.3 Hz
9860 Hz	-100 Hz	29.7 Hz

Table 2

FM Deviation	*VOR Rate*	*Ratio*
480 Hz	30 Hz	16:1
510 Hz	31.9 Hz	17:1
450 Hz	28.1 Hz	15:1

To generate a VOR signal with no 30 Hz FM present it is necessary to leave the Avionics mode and enter the normal signal generator mode. To generate the required signal the instrument should be set as follows:

Parameter	Setting
RF Carrier	VOR channel frequency to be tested
RF Level	As required
Modulation Mode	Composite AM
Modulation Depth	
AM1	30%
AM2	30%
Modulating Tone	
AM1	9960 Hz
AM2	30 Hz

All of the operational settings described above can be stored in the Full Store memories ready for immediate recall.

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