



GE HARRIS
Railway Electronics

Document No. 5001365

16 April 1999

Exhibit E

Frequency Stability Data:

Variation of Primary Power Supply Voltage



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E.1 Introduction

The frequency stability of the CCU was measured with variation of the primary power supply voltage. The following data supports FCC requirements outlined in Section 2.995.

E.2 Equipment

- Sorensen LT 30-3 DC Power Supply
- HP Spectrum Analyzer 8563 E
- Maintenance Monitor with special test mode software

E.3 Overview

Testing for power supply stability took place at GE Harris under the supervision of Michael Lipsky.

In compliance with FCC code 2.995,(d),1, the voltage supply was varied from 85 to 115 percent of the nominal value (12 V).

In compliance with FCC code 2.995,(d),3, measurements were made at the input to the cable normally provided with the equipment.

For this test, the radio was placed in a test mode that causes it to generate two non-spread tones at $f_c \pm 5.5$ MHz. The actual center frequency is derived by calculating the centerpoint between the frequencies of these tones. This center frequency was determined for ambient temperatures from -40°C to +70°C, the operating temperature range of the device. The test data and a plot of frequency deviation vs. ITCU temperature is provided below.



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E.4 Test Data

Varied Power Supply Stability Test 17-Mar-99
(Center Frequency – 2438 MHz)

Varied Power	Equivalent Voltage	Lower	Upper	Center (Calculated - kHz)	Variation from Nominal Center Freq (kHz)
85%	10.2 V	2.4325046	2.4435045	2438004.525	4.525
100%	12.0 V	2.43250459	2.4435044	2438004.495	4.495000001
115%	13.8 V	2.4325044	2.4435041	2438004.27	4.27

Table E.4 Varied Power Stability Test Data

E.5 Test Results

The test data presented in Section E.4 proves the CCU is frequency stable under various power supply voltages. The largest frequency deviation was 4.525 kHz, which occurred at 85% power.