Test of GORMAN-REDLICH Mfg. Co.
Universal Intermediate Device Model CAP-DEC 1

Temperature and Humidity Test

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Gorman Redlich Mfg.Co.
Athens, OH 47501

Introduction

Testing to meet FCC section 11:32 was performed by Gorman-Redlich Mfg Co over a two day period using a Tenney Environmental chamber. The purpose of this testing was to evaluate the effects of temperature and humidity on the performance of the CAP-DEC 1 Universal Intermediary Device ("the device").

Test procedure

The device was placed in the Tenney Enviromental Chamber and connected to a counter and a voltmeter/distortion analyzer in order to take readings over a range of temperature and humidity. (See **Photos**)

Each data point on the following data sheet (See **Table 1**) for the measured parameters of the CAP-DEC 1 was checked at the limits of the line voltage variation (102V, 120V, 138V) with absolutely no variation in any parameter at either extreme of line voltage. At each data point each tone was generated by the device under test and the frequency, amplitude and total harmonic distortion (THD) was recorded while terminated in 600Ω.

The environmental chamber was cooled to -10^{o}C with the equipment under test (EUT) powered off for an overnight soak to check that the device could power up when turned on. After the reading at -10^{o}C was taken a small plastic water filled container was removed from the environmental chamber to confirm that it was frozen solid, which it was.

The specification for the attention signal tones is not to exceed 5% THD, which testers calculate to be -27 dBm. The data in **Table** 1 shows the attention signal tones met and exceeded this specification by 10 dBm over the temperature range -10^{o}C to +60^{o}C.

The requirement that everything outside of 200Hz to 4000Hz be attenuated by at least 40 dBm with respect to the FSK tones was met and exceeded by 10 dBm THD on the 1562.5Hz tone and by 10 dBm THD on the 2083.3Hz tone over the temperature range -10^{o}C to +60^{o}C. The frequency of the attention signal tones did not vary over this temperature range by more than 0.01Hz and the FSK tones never varied by more than 0.02Hz. The output levels for the attention signal exceeded -10 dBm over the temperature range.

Results

The tests described above indicate that various temperatures and humidity had no effect on the performance of the CAP-DEC 1 Universal Intermediary Device. As such, the device meets the FCC Section 11:32 requirement.

Table 1

Temperature and Humidity Readings

			853			960			1562.5 Space			2083.3 Mark	
Temp	Time	Output	Freq Hz	THD	Output	Freq Hz	THD	Output	Freq Hz	THD	Output	Freq Hz	THD
Celsius	2/25-2/26	AMP Dbm		Dbm	AMP Dbm		Dbm	AMP Dbm		Dbm	AMP Dbm		Dbm
-10	7AM	-9.5	852.98	-37	-9.5	959.97	-38	-11	1562.49	-50	-11	2083.3	-50
0	9AM	-9.5	852.98	-37	-9.5	959.98	-38	-10.5	1562.49	-50	-10.5	2083.32	-50
10	11AM	-9.5	852.98	-38	-9.5	959.98	-39	-11	1562.49	-50	-11	2083.3	-50
20	1PM	-9.5	852.98	-37	-9.5	959.97	-39	-11	1562.49	-50	-11	2083.3	-50
30	3PM	-9.5	852.98	-37	-9.5	959.97	-38	-11	1562.49	-50	-11	2083.3	-50
40	5PM	-9.5	852.98	-37	-9.5	959.98	-38	-11	1562.49	-50	-11	2083.3	-50
50	7PM	-9.5	852.98	-37	-9.5	959.98	-38	-11	1562.49	-50	-11	2083.3	-50
60	9AM	-9.5	852.99	-37	-9.5	959.98	-39	-11	1562.5	-50	-11	2083.3	-50

NOTES:

The device was powered off the previous evening of 2/24/2012 and held at -10°C to test that it would start when powered on the next morning.

After taking the reading at -10°C, a small plastic water-filled container was removed from the chamber to confirm that the water was frozen solid, which it was.

At +60°C the device was left on overnight and soaked at 95% humidity.

At each test point, all the parameters were measured at line voltages of 102VAC, 120VAC and 138VAC with no variations in recorded data.

Equipment Used in Testing

Tenney Engineering Inc. TH Jr. Temperature Humidity Test Chamber; SN 7813-71H-526

HP 332A Distortion analyzer; SN 1145A 22780; Calibrated 2/21/2012 by Caltec Labs

Audio Out from CAP-DEC 1 was terminated in resistor which was measured to be 600Ω with three different multimeters.

Metex MXG 9802 counter; SN MB 00010903; Calibrated 2/21/2102 by Caltec Labs

Superior Electric Co. Powerstat/variable autotransformer Type 116B

Photos

Photo 1 - Tenney Environmental Chamber

Photo 2 - Controls on Tenney Enviromental Chamber

Photo 3 - CAP-DEC 1 placement inside Tenney Environmental chamber

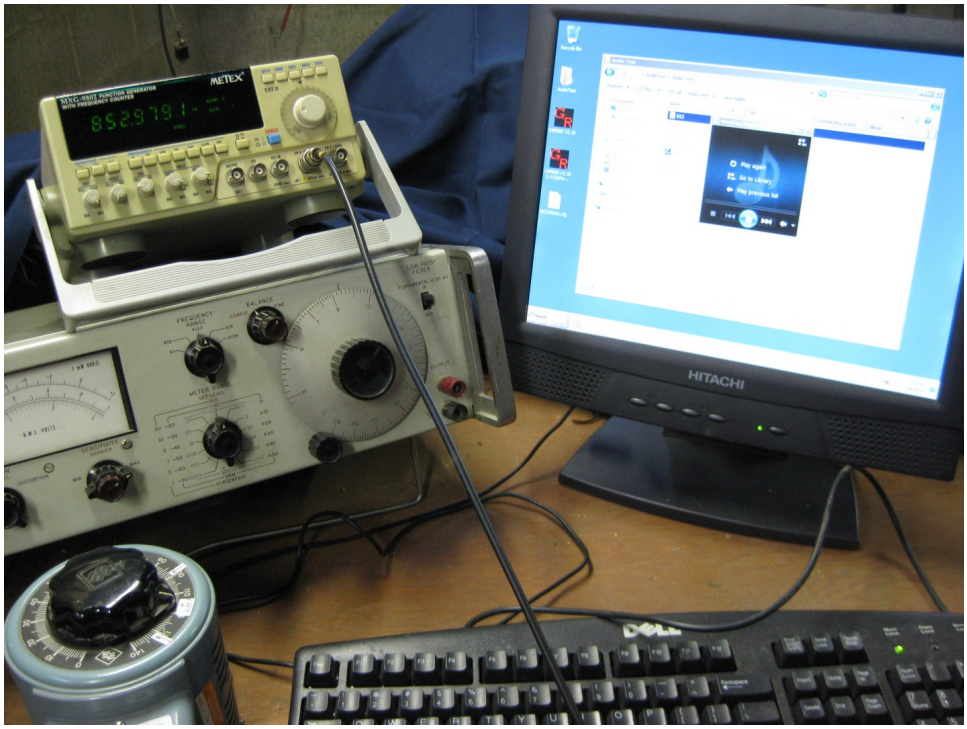

Photo 4 - Taking readings of Temperture and Humidity

Photo 5 - Taking reading of CAP-DEC 1 showing reading on meter