

Exhibit 9 – Measured Data Index

Motorola Head-end Transceiver (HUB)

FCC ID: MIJTELHUB-USB-01

Telaxis Model No. ST4-31-UB1H-R1-E

9.0 Measured Data Index

9.1 *RF Output Measured Data*

9.1.1 Transmitter Output Power

The specified output power for the HUB Data transmitter is +24 dBm. The specified output power for the HUB Pilot transmitter is +16 dBm \pm 1 dB.

9.1.2 Effective Isotropic Radiated Power

The calculated EIRP based on the saturated output power of the HUB Data is:

$$\begin{aligned}\text{Power (nominal)} &= +24\text{dBm} = -6 \text{ dBw} \\ \text{Antenna Gain} &= 15 \text{ dBi} \\ \text{EIRP} &= -6 + 15 = 9 \text{ dBw}\end{aligned}$$

The calculated EIRP based on the saturated output power of the HUB Pilot is:

$$\begin{aligned}\text{Power (saturated)} &= +16\text{dBm} = -14 \text{ dBw} \\ \text{Antenna Gain} &= 15 \text{ dBi} \\ \text{EIRP} &= -14 + 15 = 1 \text{ dBw}\end{aligned}$$

9.2 Occupied Bandwidth Graphs

9.2-1 Data occupied bandwidth

The occupied bandwidth for the Data transmitter was measured at 5.85 MHz (See Figure 9.2-1).

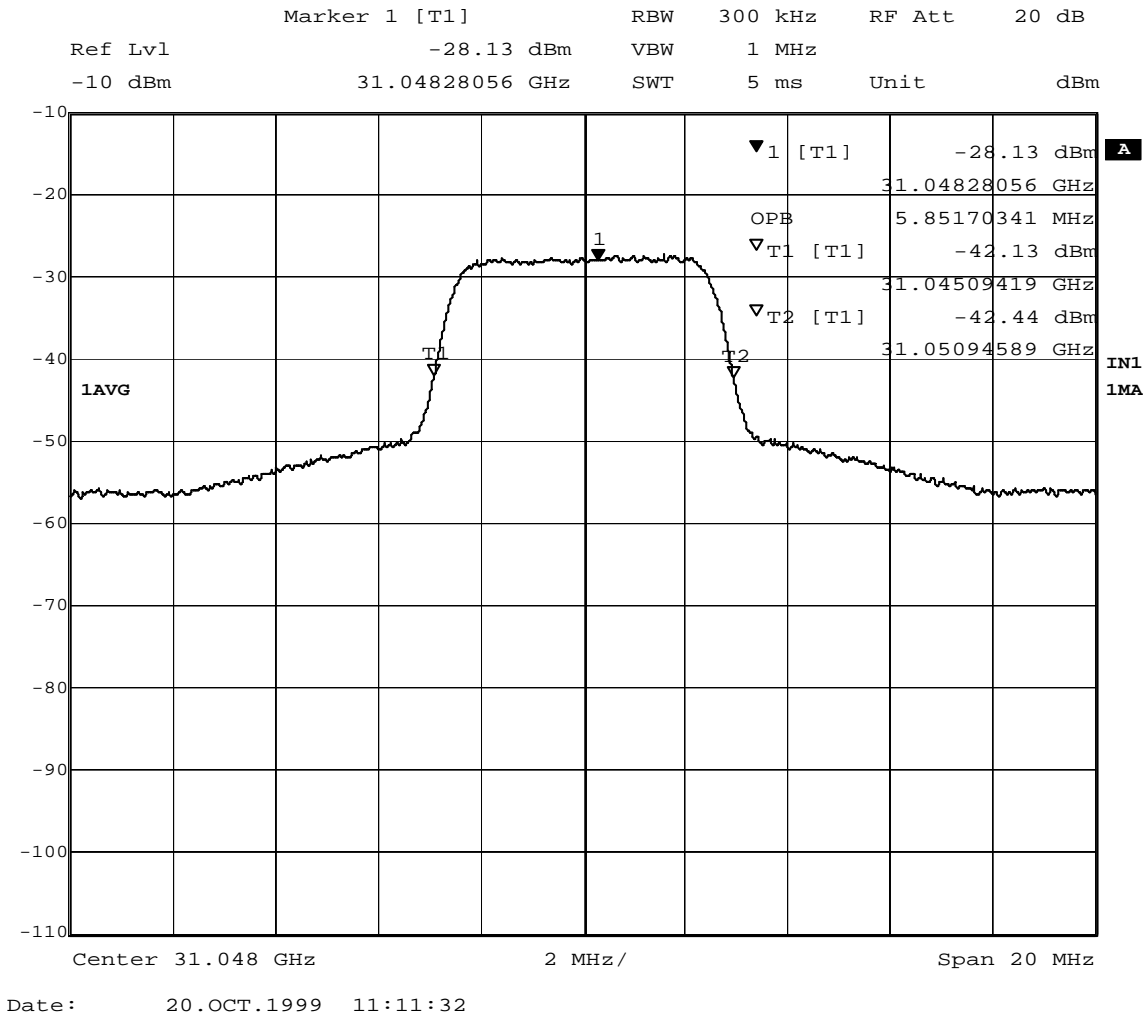


Figure 9.2-1 HUB Data Occupied Bandwidth Graph

9.2-2 Pilot occupied bandwidth

The occupied bandwidth for the Pilot transmitter was measured at 2.28 MHz (See Figure 9.2-2).

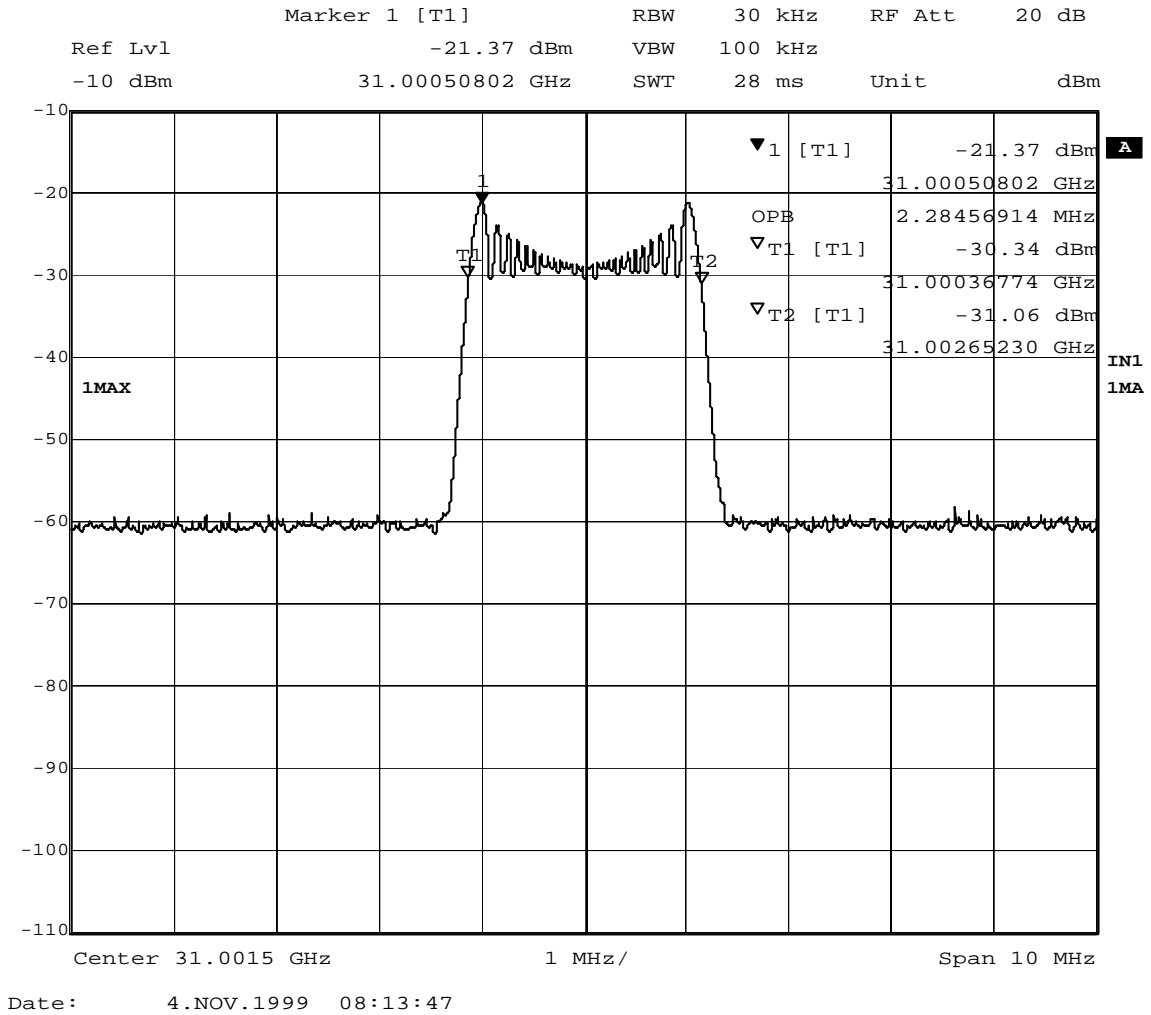
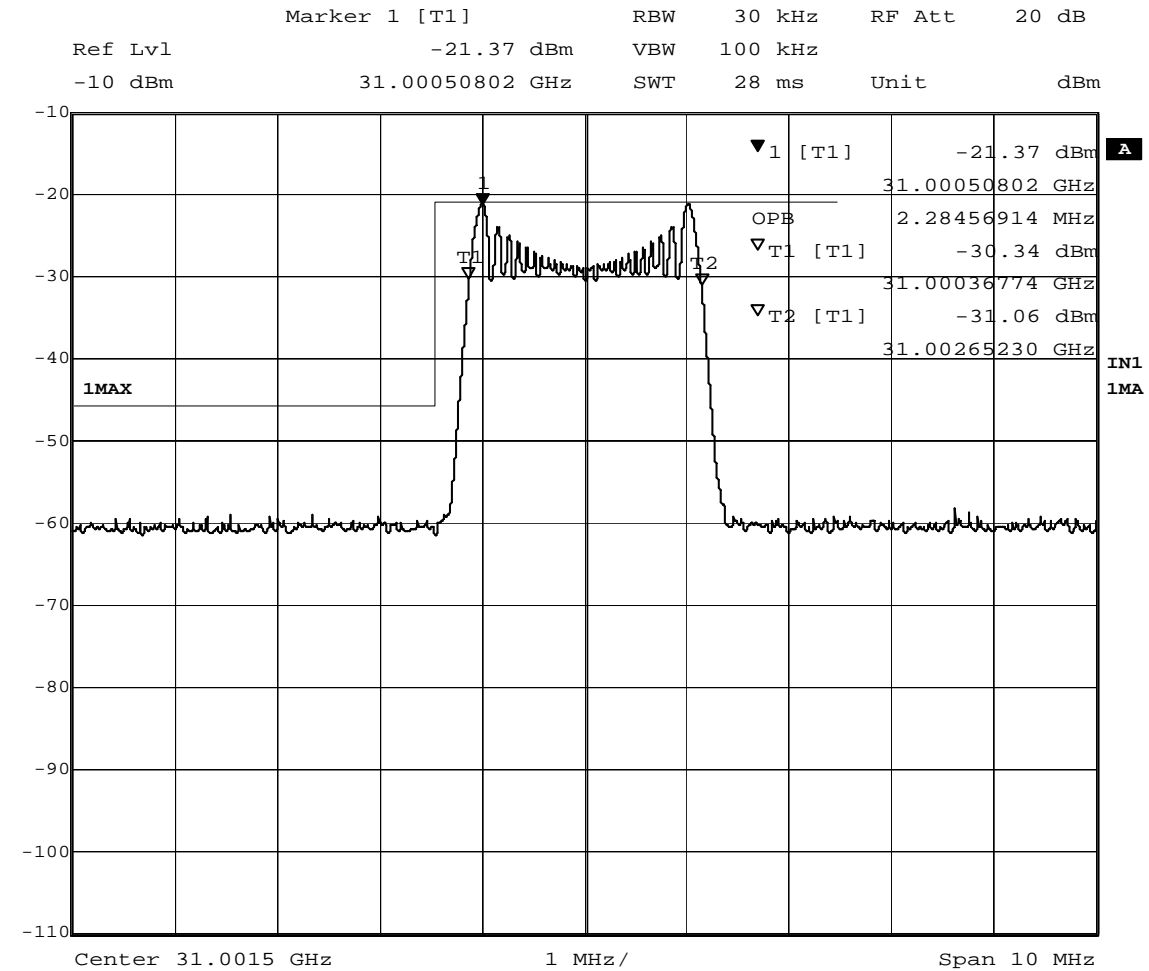


Figure 9.2-2 HUB Pilot Occupied Bandwidth Graph

9.2-3 Pilot emission mask

The Pilot transmits at 31.0015 GHz and therefore, is located near the band edge of 31.000 GHz. Figure 9.2-3 shows the Pilot emission with regards to the attenuation requirements at 31.000 GHz (25 dBc).



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Figure 9.2-3 HUB Pilot Emission Mask Graph

9.3 FCC Radiated Spurious Emissions Graphs

Emission Frequency (GHz)	Received Power Level (dBμV)	Measurement Bandwidth	Cable Loss * (dB)	Antenna Factor (dB)	Radiated Emission Level (dBμV/m/4kHz BW)	Limit Level (dBμV/m/4kHz BW)	Comments	dB above the limit
31.048	91	1 MHz	6	35.9	132.9	n/a	HUB Data Carrier - Level not corrected to 4kHz BW	n/a
62.096	20	3 kHz	1	43.3	66.8	95.9	2nd Harmonic - no emission detected; receiver noise floor	Pass
93.144	25	3 kHz	1	46.7	75.2	95.9	3rd Harmonic - no emission detected; receiver noise floor	Pass

* Cable loss above 40 GHz is for external mixer IF (221MHz) cable loss.
 ** All other emissions greater than 20 dB below the specification were not reported
 *** Spectrum search performed from 30 MHz to 100GHz

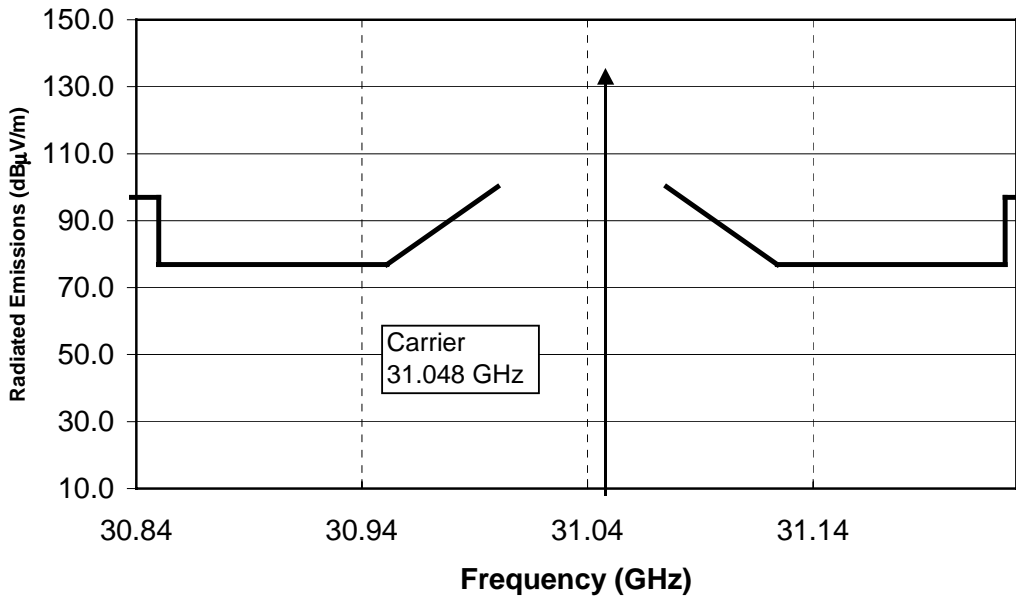


Figure 9.3-1 HUB Data radiated emissions

Emission Frequency (GHz)	Received Power Level (dBμV)	Measurement Bandwidth	Cable Loss * (dB)	Antenna Factor (dB)	Radiated Emission Level (dBμV/m/4kHz BW)	Limit Level (dBμV/m/4kHz BW)	Comments	dB above the limit
31.0015	86	1 MHz	5	35.9	126.9	n/a	HUB Pilot Carrier - Level not corrected to 4kHz BW	n/a
62.003	20	3 kHz	1	43.3	66.8	97.9	2nd Harmonic - no emission detected; receiver noise floor	Pass
93.0045	25	3 kHz	1	46.7	75.2	97.9	3rd Harmonic - no emission detected; receiver noise floor	Pass

* Cable loss above 40 GHz is for external mixer IF (221MHz) cable loss.
 ** All other emissions greater than 20 dB below the specification were not reported
 *** Spectrum search performed from 30 MHz to 100 GHz

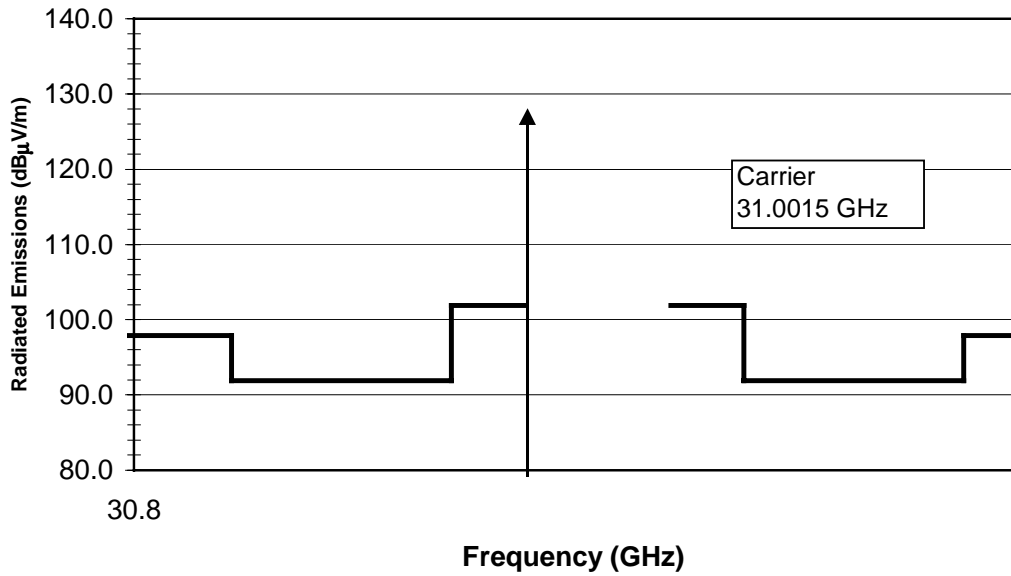


Figure 9.3-2 HUB Pilot radiated emissions

9.4 Frequency Stability vs Temperature and Voltage

The HUB was tested for frequency stability over a temperature range of -30° to $+50^{\circ}$ C and an input supply voltage of $\pm 15\%$ at its nominal rated output power (+24dBm for Data and +16 dBm for Pilot). See Table 9.4-1 for actual test data and Figure 9.4-1 for a graphical presentation of the stability data for the HUB Data carrier. See Table 9.4-2 for actual test data and Figure 9.4-2 for a graphical presentation of the stability data for the HUB Pilot carrier.

Table 9.4-1 Frequency Stability Test Data – HUB Data

f_0	31.048 GHz		% Error		FCC Limit
$^{\circ}$ C	f @ -15% rated voltage in GHz	f @ +15% rated voltage in GHz	% Error @ -15% rated voltage	% Error @ +15% rated voltage	
-30	31.04799800	31.04799800	-0.00000644%	-0.00000644%	0.001%
-20	31.04799870	31.04799800	-0.00000419%	-0.00000644%	0.001%
-10	31.04799800	31.04799800	-0.00000644%	-0.00000644%	0.001%
0	31.04799730	31.04799730	-0.00000870%	-0.00000870%	0.001%
10	31.04799730	31.04799700	-0.00000870%	-0.00000966%	0.001%
20	31.04799674	31.04799670	-0.00001050%	-0.00001063%	0.001%
30	31.04799600	31.04799600	-0.00001288%	-0.00001288%	0.001%
40	31.04799530	31.04799530	-0.00001514%	-0.00001514%	0.001%
50	31.04799470	31.04799470	-0.00001707%	-0.00001707%	0.001%

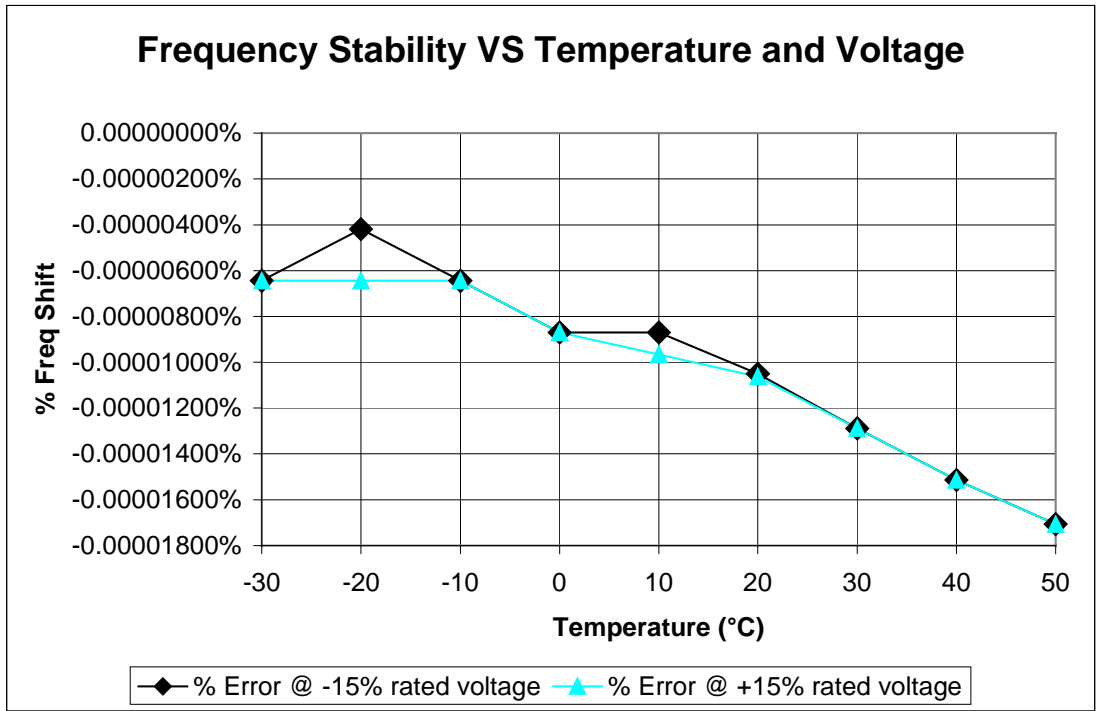


Figure 9.4-1 Frequency Stability Graph – HUB Data

Table 9.4-2 Frequency Stability Test Data – HUB Pilot

f ₀ °C	31.0015 GHz		% Error		FCC Limit
	f @ -15% rated voltage in GHz	f @ +15% rated voltage in GHz	% Error @ -15% rated voltage	% Error @ +15% rated voltage	
-30	31.00249920	31.00249580	0.00001355%	0.00000258%	0.001%
-20	31.00250800	31.00250800	0.00004193%	0.00004193%	0.001%
-10	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%
0	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%
10	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%
20	31.00249580	31.00249750	0.00000258%	0.00000806%	0.001%
30	31.00249580	31.00249580	0.00000258%	0.00000258%	0.001%
40	31.00249500	31.00249080	0.00000000%	-0.00001355%	0.001%
50	31.00249420	31.00249420	-0.00000258%	-0.00000258%	0.001%

NOTE: Because the FM modulation could not be defeated, the frequency measurement was made at the upper peak of the FM waveform (31.002495 GHz).

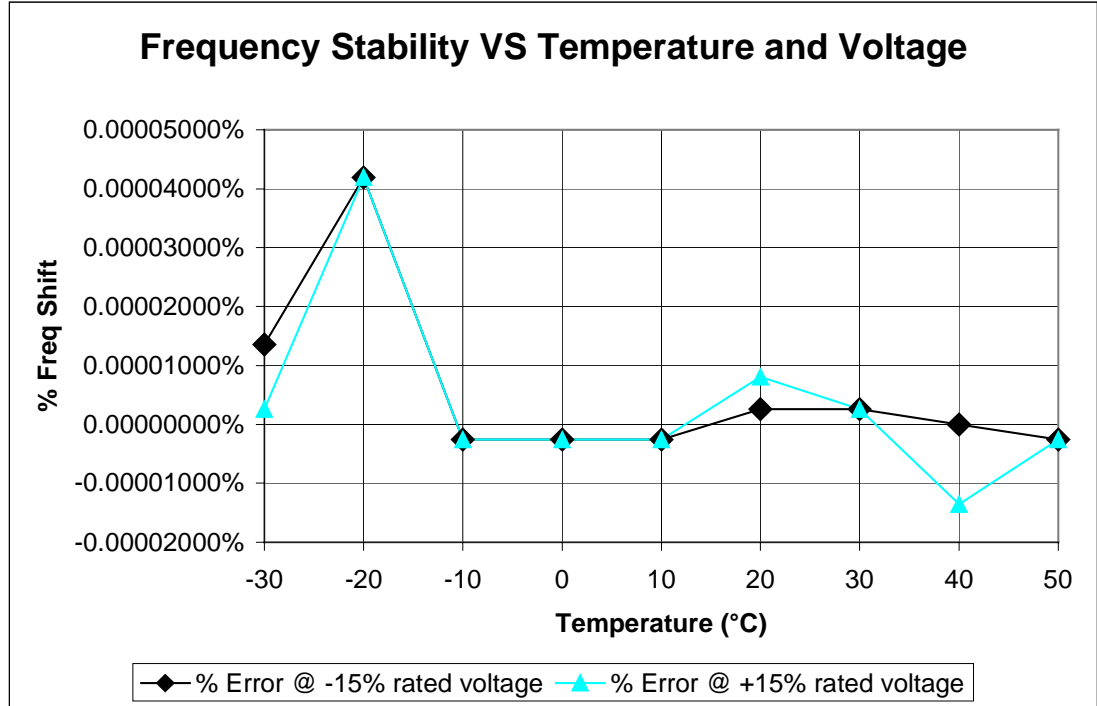


Figure 9.4-2 Frequency Stability Graph – HUB Pilot