

Exhibit 9 – Measured Data Index

Motorola Head-end Transceiver (HUB)

FCC ID: MIJMILHUB-USA-01

Millitech Part No. 9031291001

9.0 Measured Data Index

9.1 *RF Output Measured Data*

9.1.1 Transmitter Output Power

The Hub Data transmitter output power is +24dBm typical at room temperature. The Hub Pilot transmitter output power is also +24dBm typical at room temperature. The specified minimum output power is +22dBm minimum from -30° to $+50^{\circ}$ C. The HUB Data transmitter is operated at a nominal output power of +18dBm. The HUB Pilot transmitter is operated at its saturated power output (nominal +28dBm). The frequency range that the HUB Data transmitter operates in is 28.05 to 28.35 GHz. The frequency that the HUB Pilot transmitter operates at is 27.644 GHz

9.1.2 Effective Isotropic Radiated Power

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

$$\begin{aligned}\text{Power (nominal)} &= +18\text{dBm} = -12 \text{ dBW} \\ \text{Antenna Gain} &= 15 \text{ dBi} \\ \text{EIRP} &= -12 + 15 = 3 \text{ dBW}\end{aligned}$$

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

$$\begin{aligned}\text{Power (sat.)} &= +28\text{dBm} = -2 \text{ dBW} \\ \text{Antenna Gain} &= 15 \text{ dBi} \\ \text{EIRP} &= -2 + 15 = 13 \text{ dBW}\end{aligned}$$

9.2 Occupied Bandwidth Tables

The occupied bandwidth measurements were performed in a radiated mode. The 99% occupied bandwidth measurement is an automated measurement performed by the spectrum analyzer. See Tables 9.2-1 and 9.2-2 below for the Data and Pilot occupied bandwidth measurements, respectively.

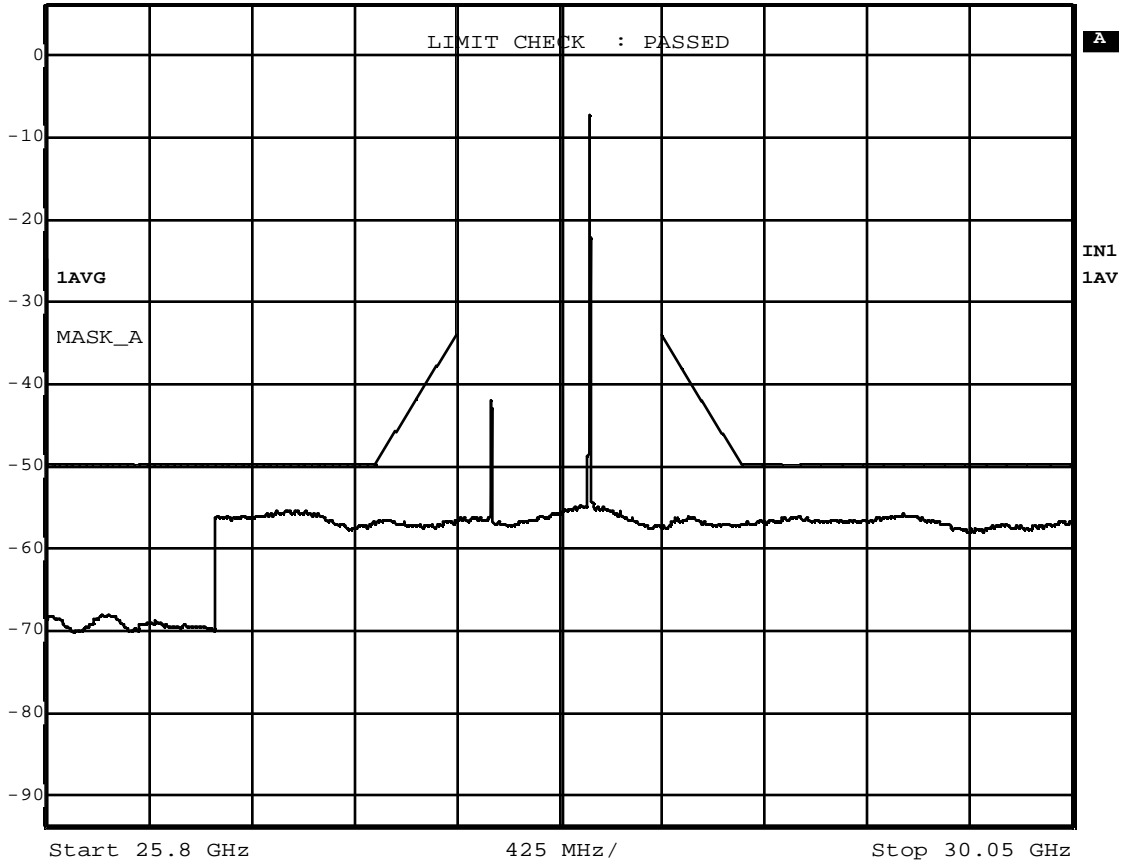
RF Transmit Frequency (GHz)	Modulation Scheme	Occupied Bandwidth (MHz)
28.05	64 QAM – 5.056941 MSmpl/sec	6.36
28.20	64 QAM – 5.056941 MSmpl/sec	6.46
28.3434	64 QAM – 5.056941 MSmpl/sec	6.36
28.05	QPSK – 5 MSmpl/sec	6.46
28.20	QPSK – 5 MSmpl/sec	6.56
28.3434	QPSK – 5 MSmpl/sec	6.46

Table 9.2-1 Occupied Bandwidth for the Data transmit frequencies

RF Transmit Frequency (GHz)	Modulation Scheme	Occupied Bandwidth (MHz)
27.644	FM 24.414 kHz Mod Freq, 10 MHz Deviation	10.9

Table 9.2-2 Occupied Bandwidth for the Pilot Tone

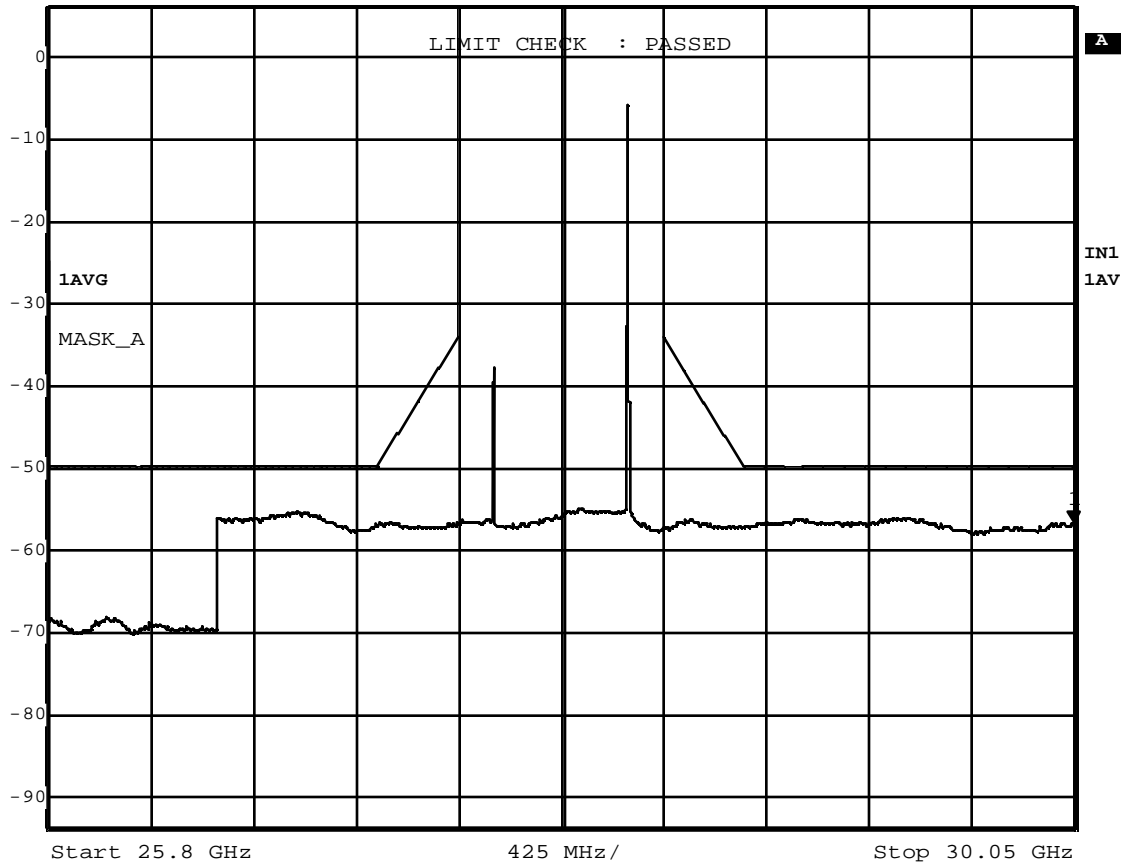
Ref Lvl 6.3 dBm RBW 1 MHz RF Att 20 dB
VBW 3 MHz
SWT 24.5 ms Unit dBm



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Figure 9.3-2 HUB Radiated Spurious emissions at 28.05 GHz and QPSK Modulation

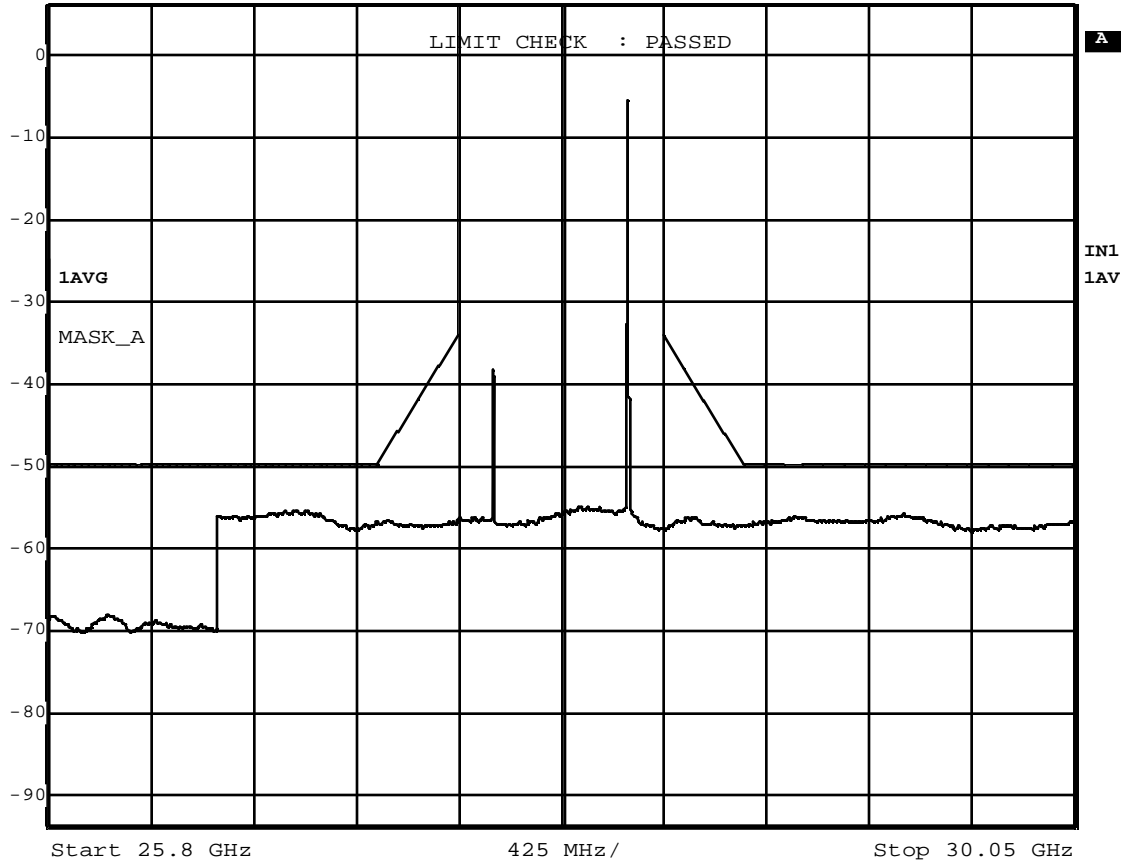
Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl -56.67 dBm VBW 3 MHz
 6.3 dBm 30.05000000 GHz SWT 24.5 ms Unit dBm



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Figure 9.3-3 HUB Radiated Spurious emissions at 28.2 GHz and 64 QAM Modulation

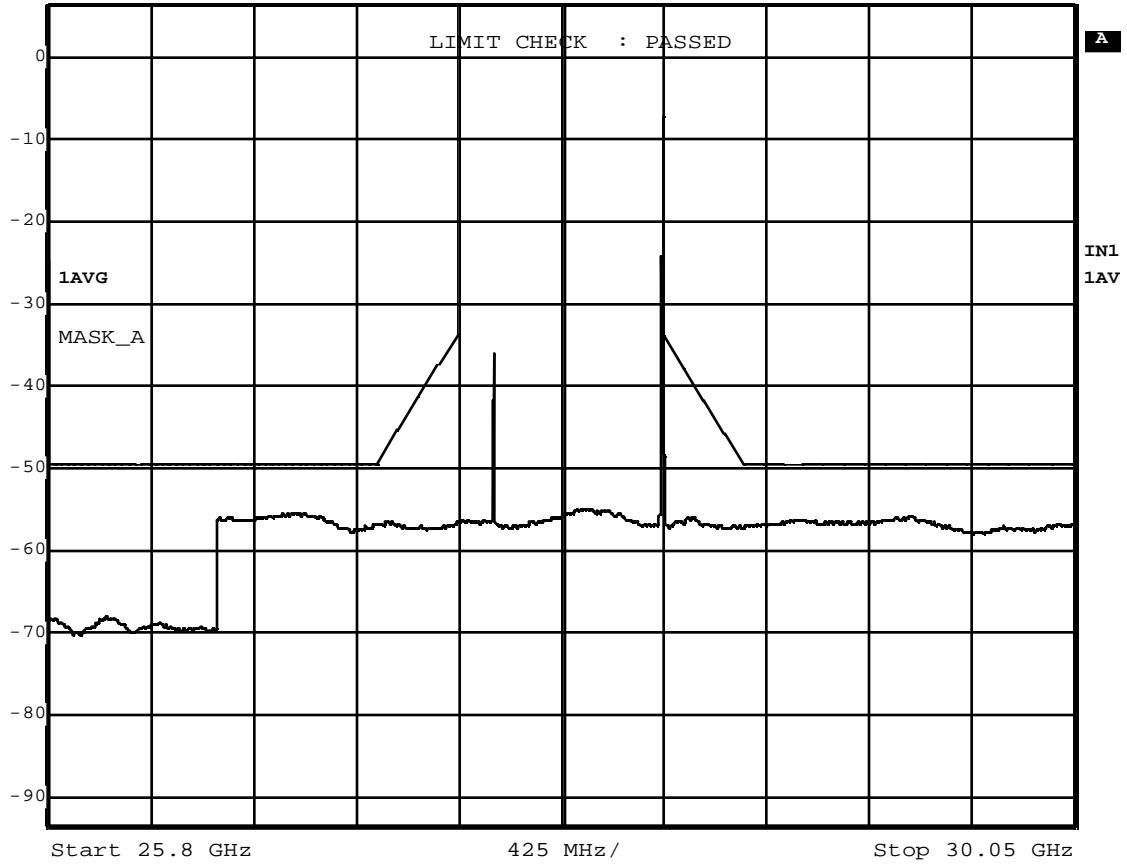
Ref Lvl	RBW	1 MHz	RF Att	20 dB
6.3 dBm	VBW	3 MHz	Unit	dBm
	SWT	24.5 ms		



Date: 22.FEB.2000 14:04:13

Figure 9.3-4 HUB Radiated Spurious emissions at 28.2 GHz and QPSK Modulation

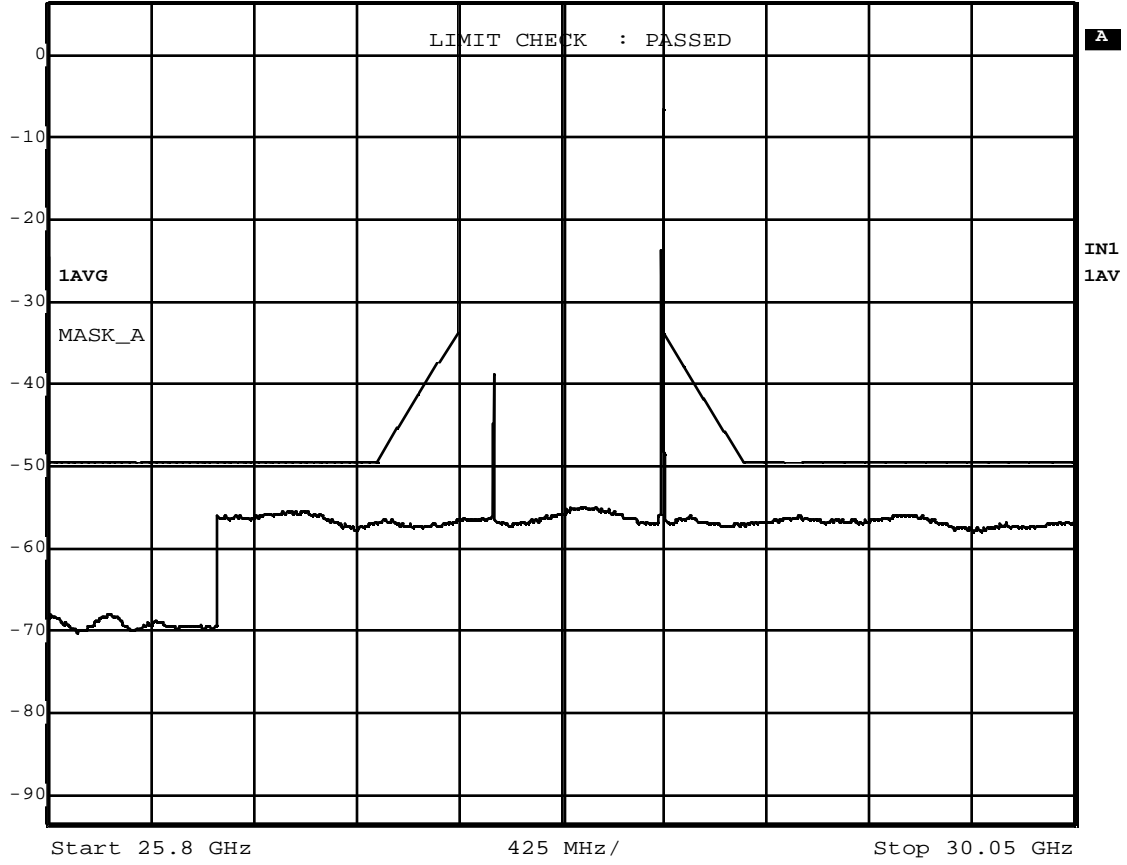
Ref Lvl 6.5 dBm
 RBW 1 MHz RF Att 20 dB
 VBW 3 MHz
 SWT 24.5 ms Unit dBm



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Figure 9.3-5 HUB Radiated Spurious emissions at 28.3434 GHz and 64 QAM Modulation

Ref Lvl 6.5 dBm
RBW 1 MHz RF Att 20 dB
VBW 3 MHz
SWT 24.5 ms Unit dBm



Date: 22.FEB.2000 14:00:20

Figure 9.3-6 HUB Radiated Spurious emissions at 28.3434 GHz and QPSK Modulation

9.4 Emission Mask

Below are the measurement plots showing the Data carrier as compared to the emissions mask for the selected band.

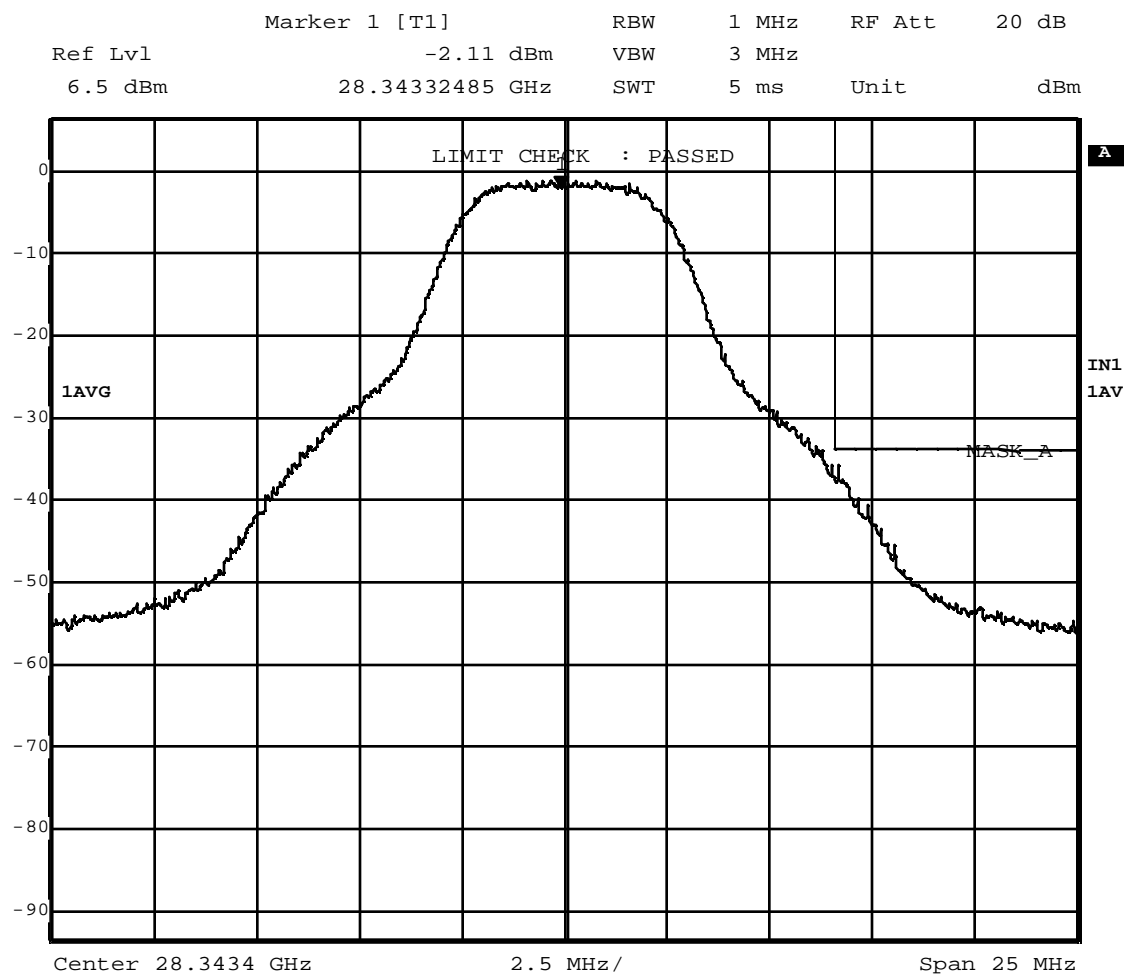
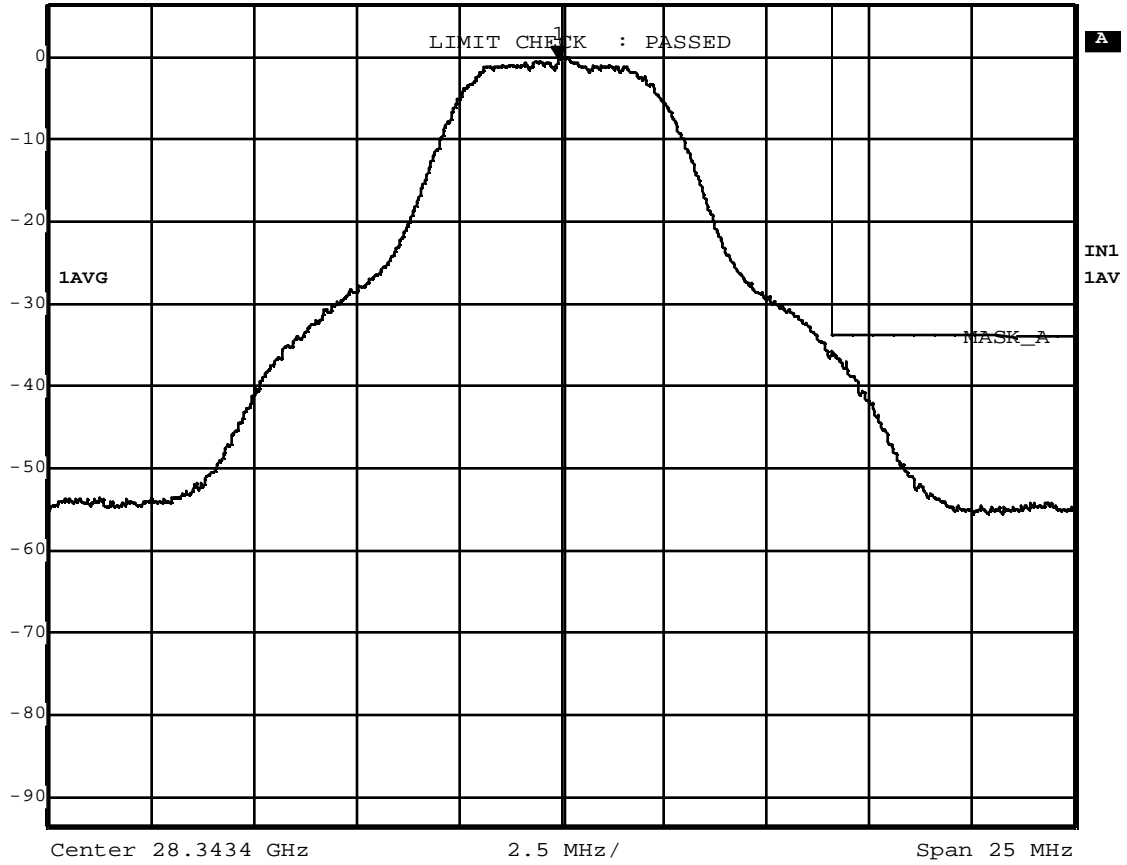


Figure 9.4-1 HUB Data transmit frequency of 28.3434 GHz and 64 QAM Modulation

	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
Ref Lvl	-0.14 dBm	VBW	3 MHz		
6.5 dBm	28.34332485 GHz	SWT	5 ms	Unit	dBm



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Figure 9.4-2 HUB Data transmit frequency of 28.3434 GHz and QPSK Modulation

9.5 Frequency Stability vs Temperature and Voltage

The HUB was tested for frequency stability over a temperature range of -30° to $+50^{\circ}$ C while its input supply voltage was varied between $\pm 15\%$ of its rated value. All test were performed with the Hub operating at its nominal rated output power (+18dBm for Data and +28 dBm for Pilot). See Table 9.5-1 for actual test data and Figure 9.5-1 for a graphical presentation of the stability data for the HUB Data carrier. See Table 9.5-2 for actual test data and Figure 9.5-2 for a graphical presentation of the stability data for the HUB Pilot carrier.

f_0	28.070000	GHz	% Error		
$^{\circ}$ C	f @ -15% rated voltage in GHz	f @ +15% rated voltage in GHz	% Error @ - 15% rated voltage	% Error @ +15% rated voltage	FCC Limit
-30	28.07000407	28.07000407	0.000014%	0.000014%	$\pm 0.0005\%$
-20	28.07000403	28.07000407	0.000014%	0.000014%	$\pm 0.0005\%$
-10	28.07000367	28.07000367	0.000013%	0.000013%	$\pm 0.0005\%$
0	28.07000303	28.07000300	0.000011%	0.000011%	$\pm 0.0005\%$
10	28.07000240	28.07000240	0.000009%	0.000009%	$\pm 0.0005\%$
20	28.07000177	28.07000173	0.000006%	0.000006%	$\pm 0.0005\%$
30	28.07000067	28.07000067	0.000002%	0.000002%	$\pm 0.0005\%$
40	28.06999953	28.06999950	-0.000002%	-0.000002%	$\pm 0.0005\%$
50	28.06999807	28.06999800	-0.000007%	-0.000007%	$\pm 0.0005\%$

Table 9.5-1 Frequency Stability Test Data – HUB Data

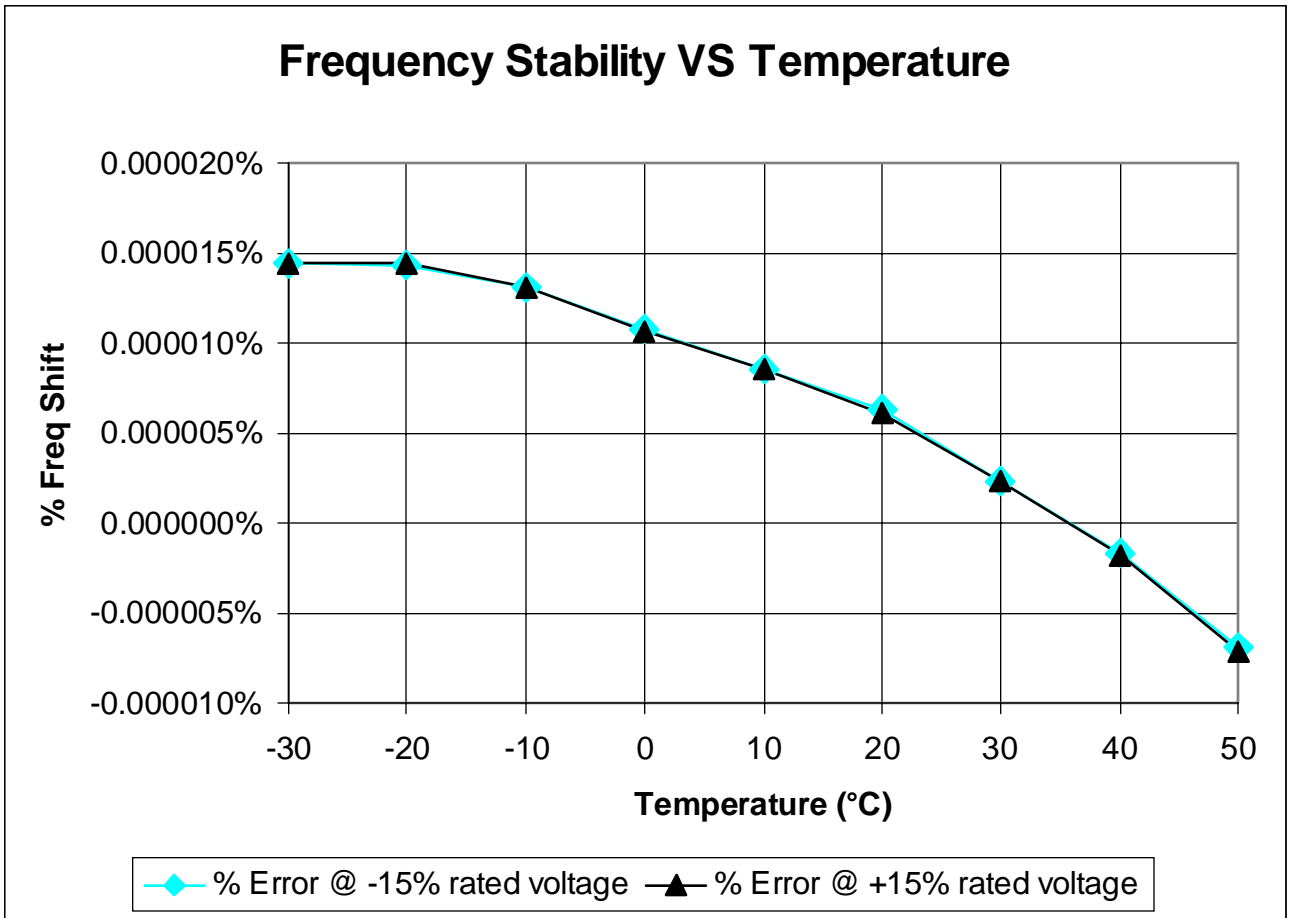


Figure 9.5-1 Frequency Stability Graph – HUB Data

Table 9.4-2 Frequency Stability Test Data – HUB Pilot

	f_0	27.644000	GHz	% Error	
°C	Center Frequency @ -15% rated voltage in GHZ	Center Frequency @ +15% rated voltage in GHZ	% Error @ -15% rated voltage	% Error @ +15% rated voltage	limit %
-30	27.64392000	27.64392000	0.0003%	0.0003%	+/-0.0005%
-20	27.64386000	27.64386000	0.0001%	0.0001%	+/-0.0005%
-10	27.64377000	27.64377000	-0.0003%	-0.0003%	+/-0.0005%
0	27.64395000	27.64395000	0.0004%	0.0004%	+/-0.0005%
10	27.64386000	27.64386000	0.0001%	0.0001%	+/-0.0005%
20	27.64385000	27.64385000	0.0000%	0.0000%	+/-0.0005%
30	27.64388000	27.64388000	0.0001%	0.0001%	+/-0.0005%
40	27.64393000	27.64393000	0.0003%	0.0003%	+/-0.0005%
50	27.64378000	27.64378000	-0.0002%	-0.0002%	+/-0.0005%

NOTE: Because the FM modulation could not be defeated, the frequency measurement was made at the upper peak of the FM waveform (27.64384 GHz).

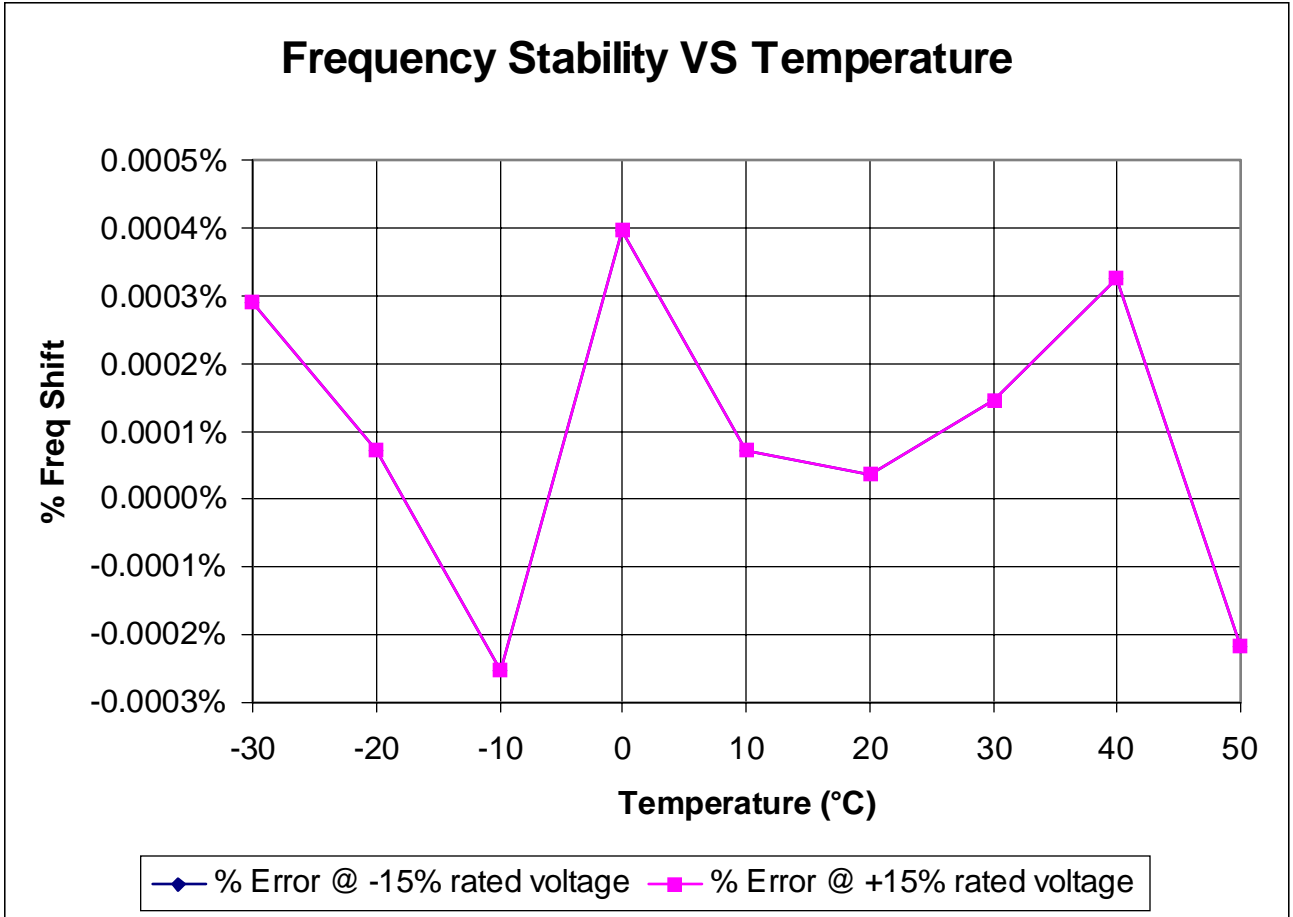


Figure 9.4-2 Frequency Stability Graph – HUB Pilot