FCC Certification
RELM Communication, Inc.
Antenna Conducted Spurious Emissions (Middle)

FCC ID: K95APV5

Test Performed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Frequency (MHz)	Raw Reading (dBm)	Level Below Fundamental (dB)
(Fundamental)		
155.5	37.2	0
311.6	-28.1	-65.3

Limit = 50 + 10 Log (P) = 57.2 dB

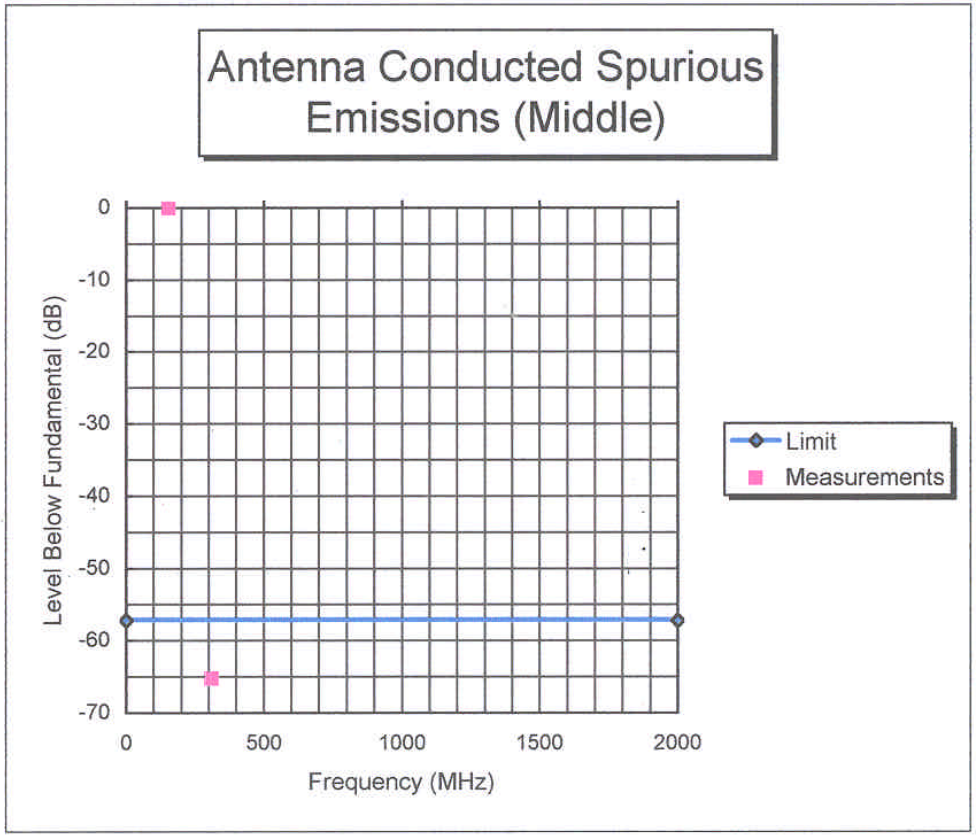


Figure 6b
Spurious Emissions at Antenna Terminals (Middle)

FCC ID: K95APV5

FCC Certification
RELM Communication, Inc.
Antenna Conducted Spurious Emissions (High)

FCC ID: K95APV5

Test Performed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Frequency (MHz)	Raw Reading (dBm)	Level Below Fundamental (dB)
(Fundamental)		
173.8	36.8	0
345.5	-28.7	-65.5

Limit = 50 + 10 Log (P) = 56.9 dB

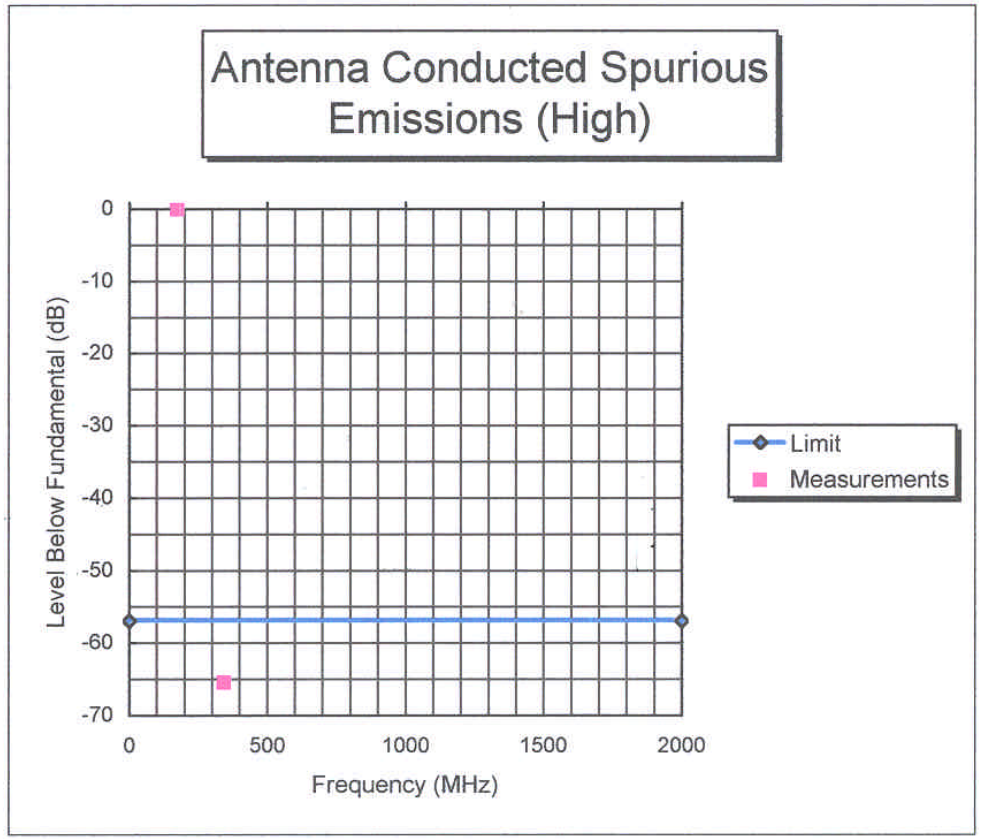


Figure 6c
Spurious Emissions at Antenna Terminals (High)

2.10 Field Strength of Spurious Radiation (FCC Section 2.1053)

Spurious emissions were evaluated from 30 MHz to 2.0 GHz at an EUT to antenna distance of 3 meters. The EUT was tested with a new battery. Measurements for 30 to 1000 MHz were made with the analyzer's bandwidth set to 120 kHz. Measurements above 1 GHz were made with the analyzer's bandwidth set to 1 MHz. Results are shown in Table 4. Following is an example of how the data was calculated.

The spurious radiation measured is interpolated to 30 meters using:

dBm @ 3 meters + 20 log(3/30) = dBm @ 30 meters

this level is compared to the level a transmitter would produce at 30 meters if connected to a 1/2 wave dipole using:

$$E = \frac{(30\ P_t\ G_t)^{1/2}}{d} \text{ volts per meter}$$

E = Field intensity (volts per meter)

P_t = Power output of transmitter (watts)

G_t = Gain of antenna (1.64 for 1/2 wave dipole)

d = distance (meters)

For Example: A 25 watt transmitter would produce

$$\frac{[(30)(25)(1.64)]^{1/2}}{30.0} \text{ volts per meter}$$

= 1,150,635 microvolts per meter @ 30 meters

FCC Minimum Standard

FCC Part 22.359, 74.462, 80.211 and 90.210 (25 kHz bandwidth only)

On any frequency removed from the center of the assigned channel by more than 250 percent at least:

Low: $43 + 10 \log (P_{Watts}) = 43 + 10 \log (4.8) = 49.8$ dB
Middle: $43 + 10 \log (P_{Watts}) = 43 + 10 \log (5.2) = 50.2$ dB
High: $43 + 10 \log (P_{Watts}) = 43 + 10 \log (4.9) = 49.9$ dB

FCC Part 90.210 (12.5 kHz Bandwidth only)

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

Low: $50 + 10 \log (P_{Watts}) = 50 + 10 \log (4.8) = 56.8$ dB
Middle: $50 + 10 \log (P_{Watts}) = 50 + 10 \log (5.2) = 57.2$ dB
High: $50 + 10 \log (P_{Watts}) = 50 + 10 \log (4.9) = 56.9$ dB

NOTE: In general, the worse case attenuation requirement shown above was applied.

FIELD STRENGTH OF SPURIOUS RADIATION

Test Date: May 4, 2000 - May 10, 2000
UST Project: 00-0167
Customer: RELM Communication, Inc.
Model: Aurora (APV5240 & APV5016)

FCC Minimum Standard: 50 + 10 log (4.8) = 56.8 dB
Fundamental = Corrected Reading in Far Field (30m) = +7.2 dBm

TABLE 4a (Low)

FREQ (MHz)	MEASUREMENT @ 3 m (dBm)	CORRECTION AF + CL - AMP GAIN	CORRECTED MEASUREMENT @ 30 m (dBm)	ATTENUATED LEVEL BELOW CARRIER POWER (dB)
409.0	-66.0	20.6	-65.4	72.6
545.0	-69.0	24.0	-65.0	72.2
681.0	-70.0	27.2	-62.8	70.0
1499.5	-53.2	-5.6	-78.8	86.0

SAMPLE CALCULATION:
Results dBm @ 30 m:
-66.0 + 20.6 - 20 = -65.4

CONVERSION FROM 3m to 30m = 20 log (3/30) = -20 dBm

Test Results
Reviewed By: _____ Name: Tim R. Johnson

FIELD STRENGTH OF SPURIOUS RADIATION

Test Date: May 4, 2000 - May 10, 2000
UST Project: 00-0167
Customer: RELM Communication, Inc.
Model: Aurora (APV5240 & APV5016)

FCC Minimum Standard: 50 + 10 log (5.2) = 57.2 dB
Fundamental = Corrected Reading in Far Field (30m) = +7.5 dBm

TABLE 4b (Middle)

FREQ (MHz)	MEASUREMENT @ 3 m (dBm)	CORRECTION AF + CL - AMP GAIN	CORRECTED MEASUREMENT @ 30 m (dBm)	ATTENUATED LEVEL BELOW CARRIER POWER (dB)
311.0	-62.0	18.5	-63.5	71.0
466.0	-60.0	22.2	-62.2	69.7
1399.4	-45.5	-6.1	-71.6	79.1

SAMPLE CALCULATION:
Results dBm @ 30 m:
-62.0 + 18.5 - 20 = -63.5

CONVERSION FROM 3m to 30m = 20 log (3/30) = -20 dBm

Test Results
Reviewed By: _____ Name: Tim R. Johnson

FIELD STRENGTH OF SPURIOUS RADIATION

Test Date: May 4, 2000 - May 10, 2000
UST Project: 00-0167
Customer: RELM Communication, Inc.
Model: Aurora (APV5240 & APV5016)

FCC Minimum Standard: 50 + 10 log (4.9) = 56.9 dB
Fundamental = Corrected Reading in Far Field (30m) = +7.3 dBm

TABLE 4c (High)

FREQ (MHz)	MEASUREMENT @ 3 m (dBm)	CORRECTION AF + CL - AMP GAIN	CORRECTED MEASUREMENT @ 30 m (dBm)	ATTENUATED LEVEL BELOW CARRIER POWER (dB)
347.0	-65.0	19.1	-65.9	73.2
521.0	-68.0	23.5	-64.5	71.8
1390.4	-50.4	-6.1	-76.5	83.8

SAMPLE CALCULATION:
Results dBm @ 30 m:
-65.0 + 19.1 - 20 = -65.9

CONVERSION FROM 3m to 30m = 20 log (3/30) = -20 dBm

Test Results
Reviewed By: _____ **Name:** Tim R. Johnson

2.11 Frequency Stability (FCC Section 2.1055)

The frequency tolerance of the carrier signal was measured by while ambient temperature was varied from -30 to 50 degrees centigrade. The frequency tolerance was verified at 10 degree increments. The EUT was tested while powered from 9.6 VDC. Additionally, the supply voltage was varied from 85% to 115% of the nominal value (except for hand carried, battery powered equipment which was additionally measured at battery endpoint). The data is shown in the following tables and figures.

FCC Minimum Standard

FCC Part 22.355
5.0 ppm for Mobile > 3 Watts, 50 ppm for ≤ 3 Watts

FCC Part 74.464
0.0005% (5 ppm) for > 3 Watts, 0.005% (50 ppm) for ≤ 3 Watts

FCC Part 80.209
5.0 ppm for Coast Stations > 3 Watts, 10 ppm for ≤ 3 Watts

FCC Part 90.213
5.0 ppm for > 2 Watts

FCC Certification
RELM Communication, Inc.
Frequency Stability vs. Temperature (At Startup)

FCC ID: K95APV5

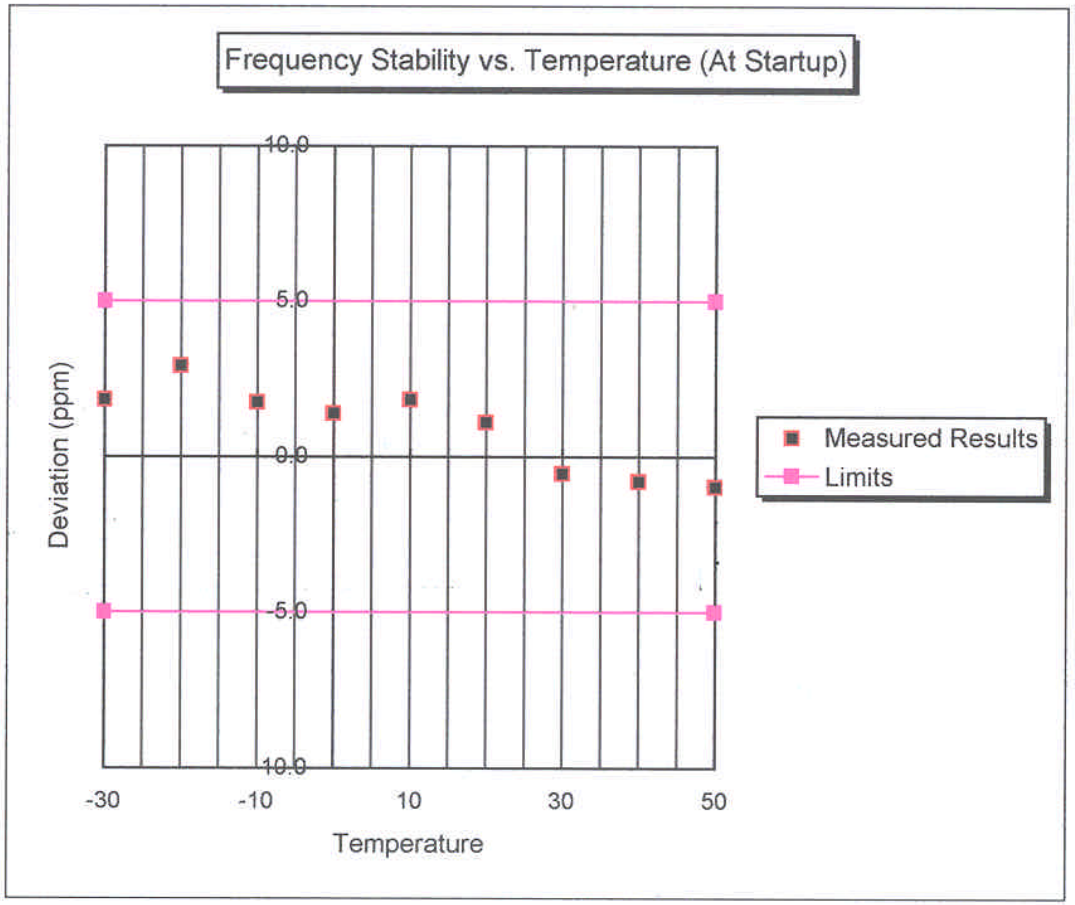
Test Results Reviewed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	136.300248	1.8
-20	136.300398	2.9
-10	136.300238	1.7
0	136.300188	1.4
10	136.300248	1.8
20	136.300150	1.1
30	136.299925	-0.6
40	136.299889	-0.8
50	136.299867	-1.0

Actual TX Frequency was: 136.300 MHz

Maximum Deviation = 5 ppm



FCC ID: K95APV5

FCC Certification
RELM Communication, Inc.
Frequency Stability vs. Temperature (2 Minutes After Startup)

FCC ID: K95APV5

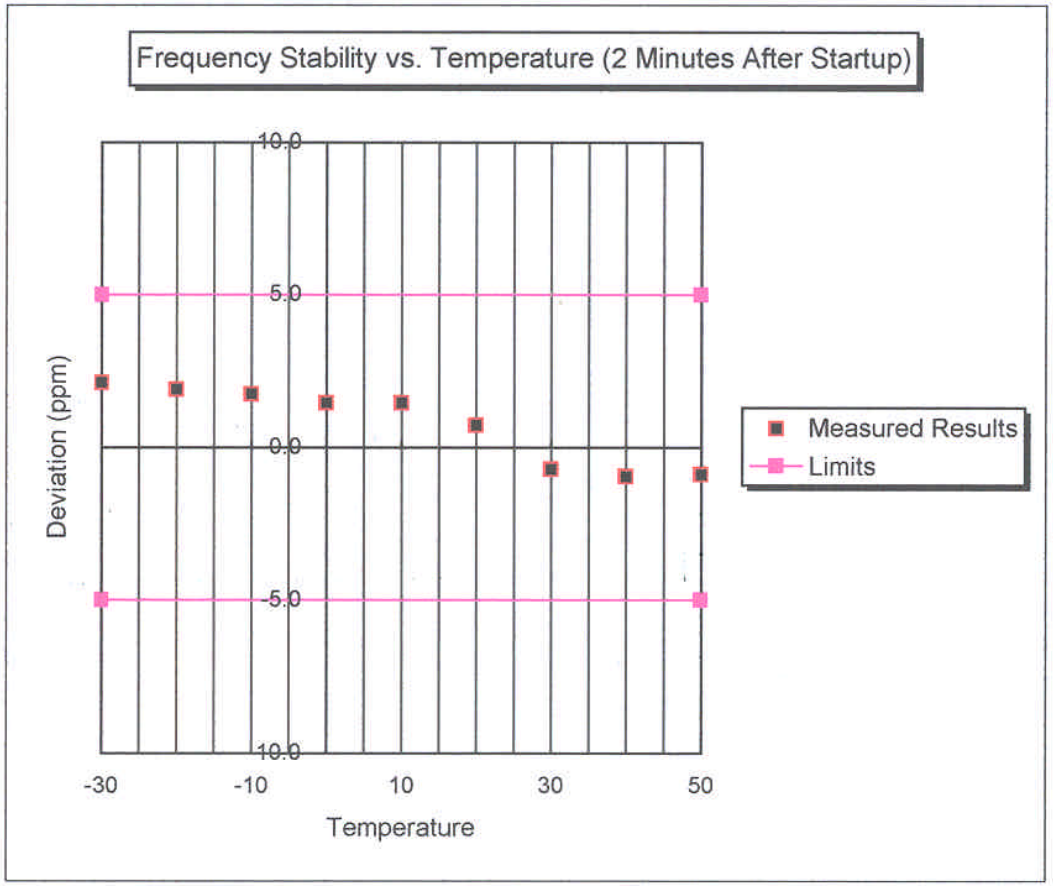
Test Results Reviewed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	136.300288	2.1
-20	136.300258	1.9
-10	136.300238	1.7
0	136.300198	1.5
10	136.300198	1.5
20	136.300098	0.7
30	136.299901	-0.7
40	136.299870	-1.0
50	136.299879	-0.9

Actual TX Frequency was: 136.300 MHz

Maximum Deviation = 5 ppm



FCC Certification
RELM Communication, Inc.
Frequency Stability vs. Temperature (5 Minutes After Startup)

FCC ID: K95APV5

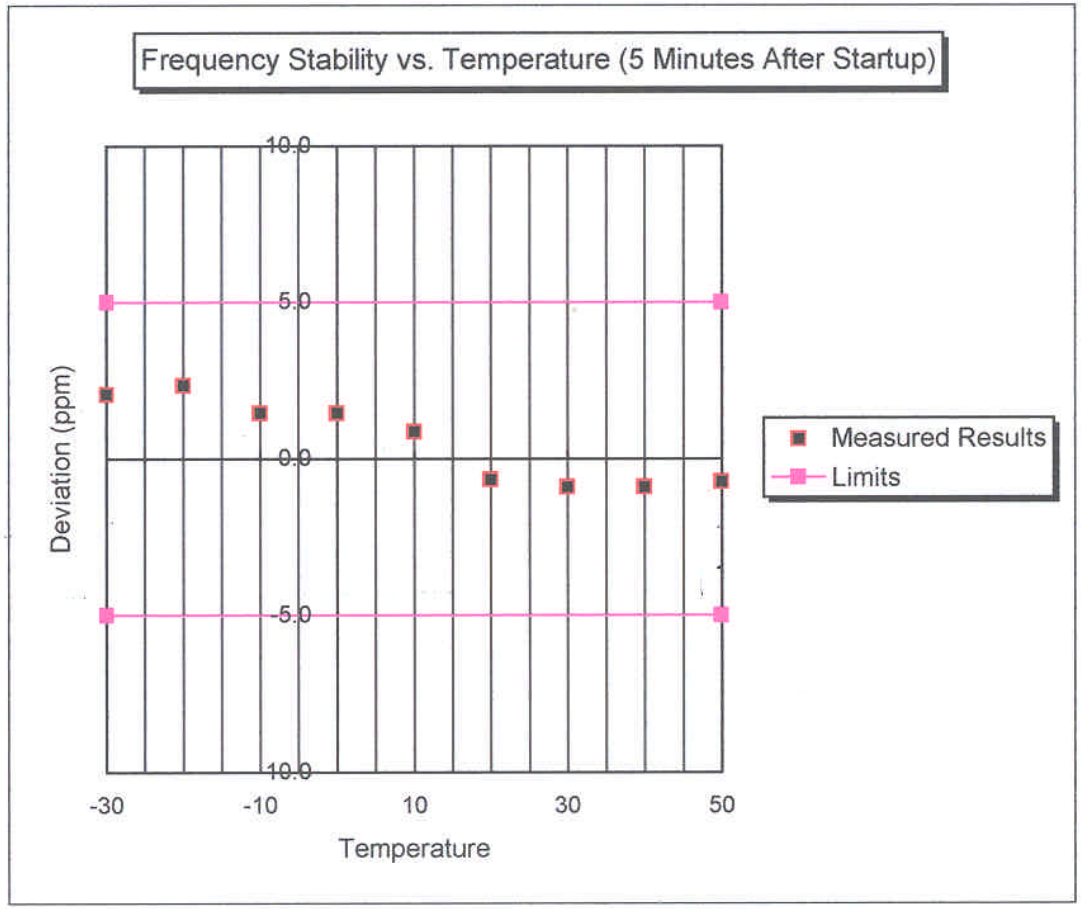
Test Results Reviewed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	136.300278	2.0
-20	136.300318	2.3
-10	136.300198	1.5
0	136.300198	1.5
10	136.300118	0.9
20	136.299908	-0.7
30	136.299876	-0.9
40	136.299875	-0.9
50	136.299899	-0.7

Actual TX Frequency was: 136.300 MHz

Maximum Deviation = 5 ppm



FCC ID: K95APV5

FCC Certification
RELM Communication, Inc.
Frequency Stability vs. Temperature (10 Minutes After Startup)

FCC ID: K95APV5

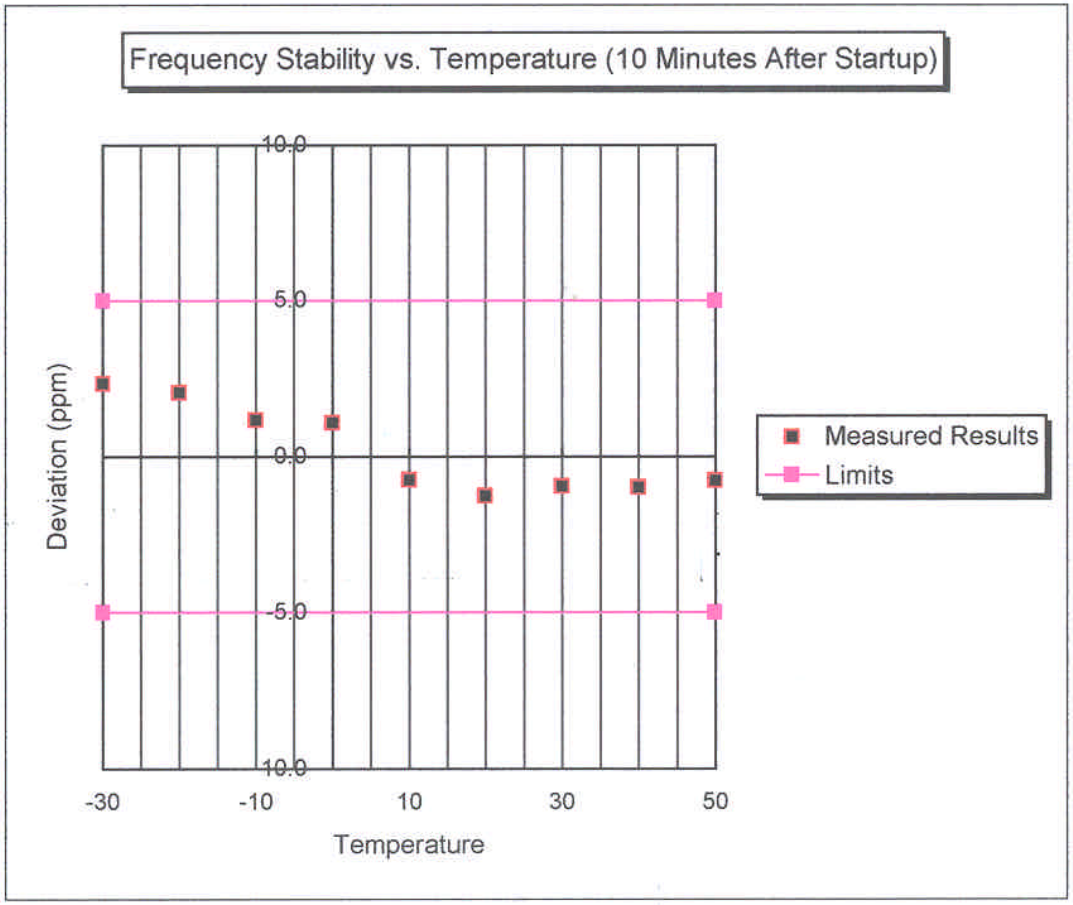
Test Results Reviewed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	136.300318	2.3
-20	136.300278	2.0
-10	136.300158	1.2
0	136.300148	1.1
10	136.299898	-0.7
20	136.299828	-1.3
30	136.299869	-1.0
40	136.299864	-1.0
50	136.299895	-0.8

Actual TX Frequency was: 136.300 MHz

Maximum Deviation = 5 ppm



FCC ID: K95APV5

FCC Certification
RELM Communications, Inc.
Frequency Stability vs. Voltage

FCC ID: K95APV5

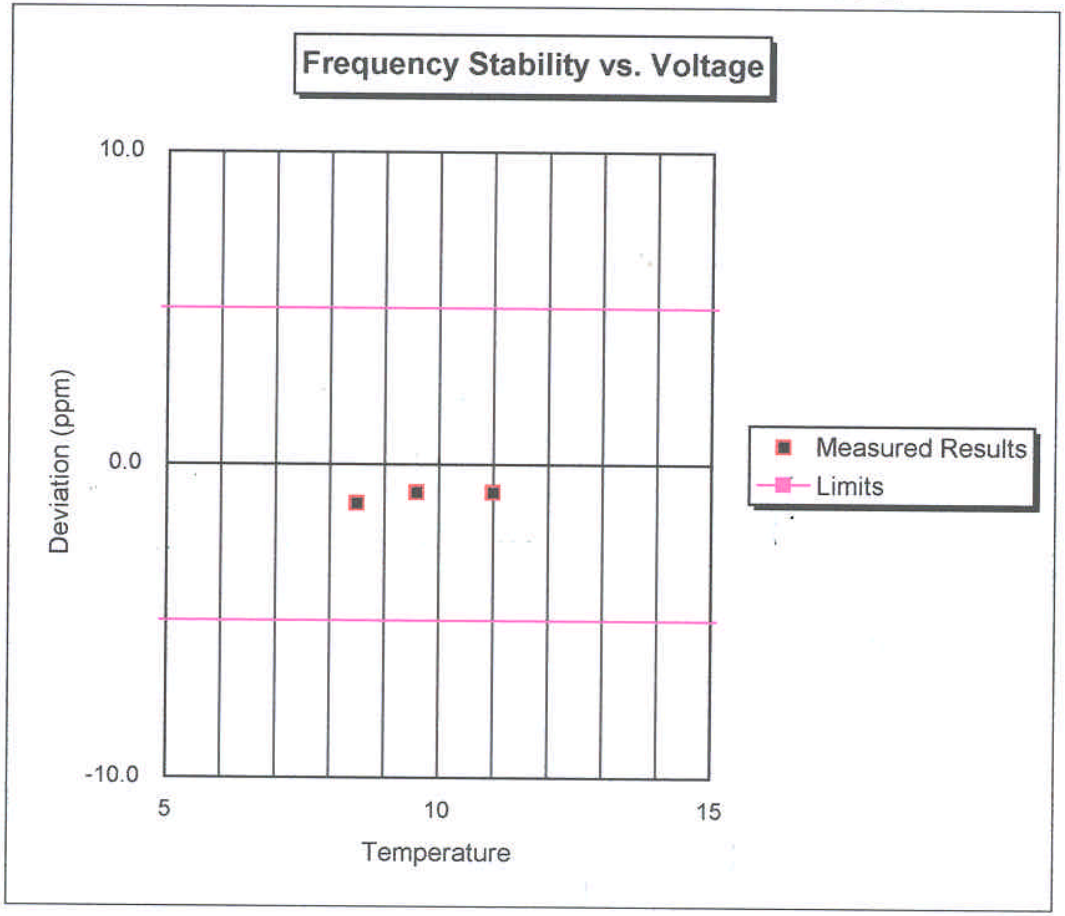
Test Results Reviewed By:

Tim Johnson
NARTE Certified Engineer
No. EMC-002205-NE

Voltage (V DC)	Measured Frequency (MHz)	Deviation (ppm)
11	136.2999	-0.9
9.6	136.2999	-0.9
8.5	136.2998	-1.3

Actual TX Frequency was: 136.300 MHz

Maximum Deviation = 5 ppm

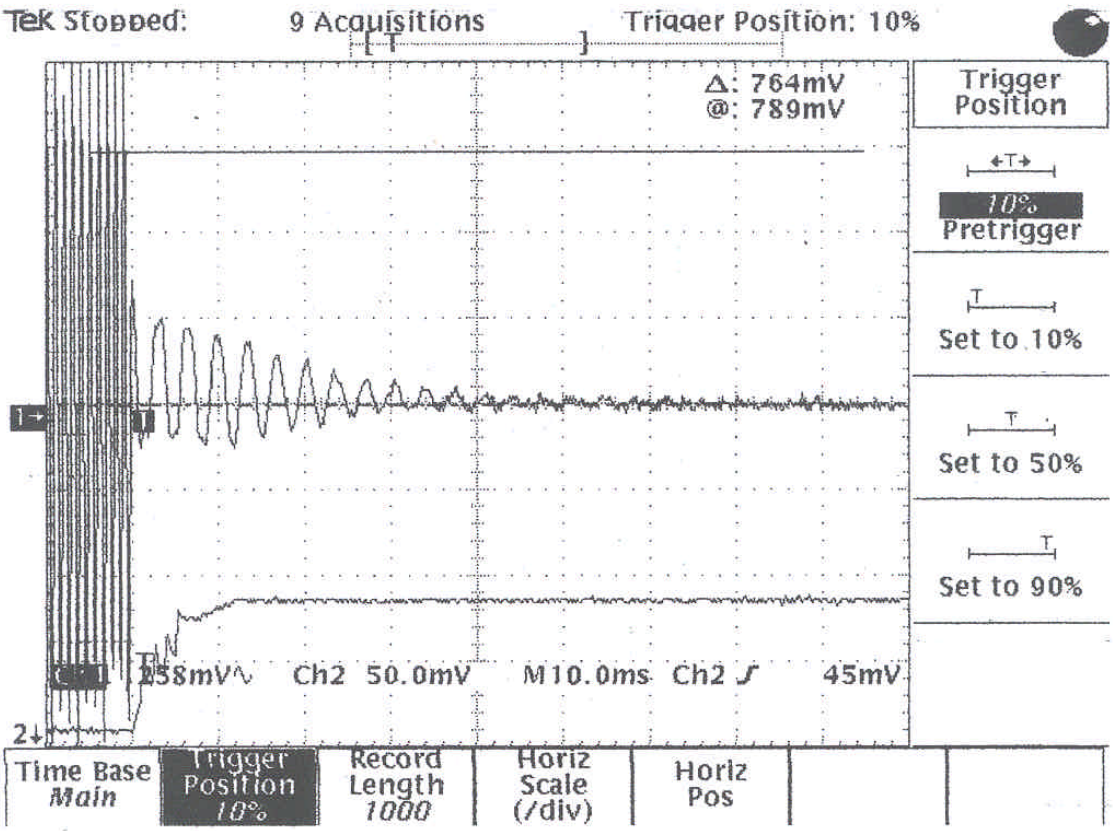


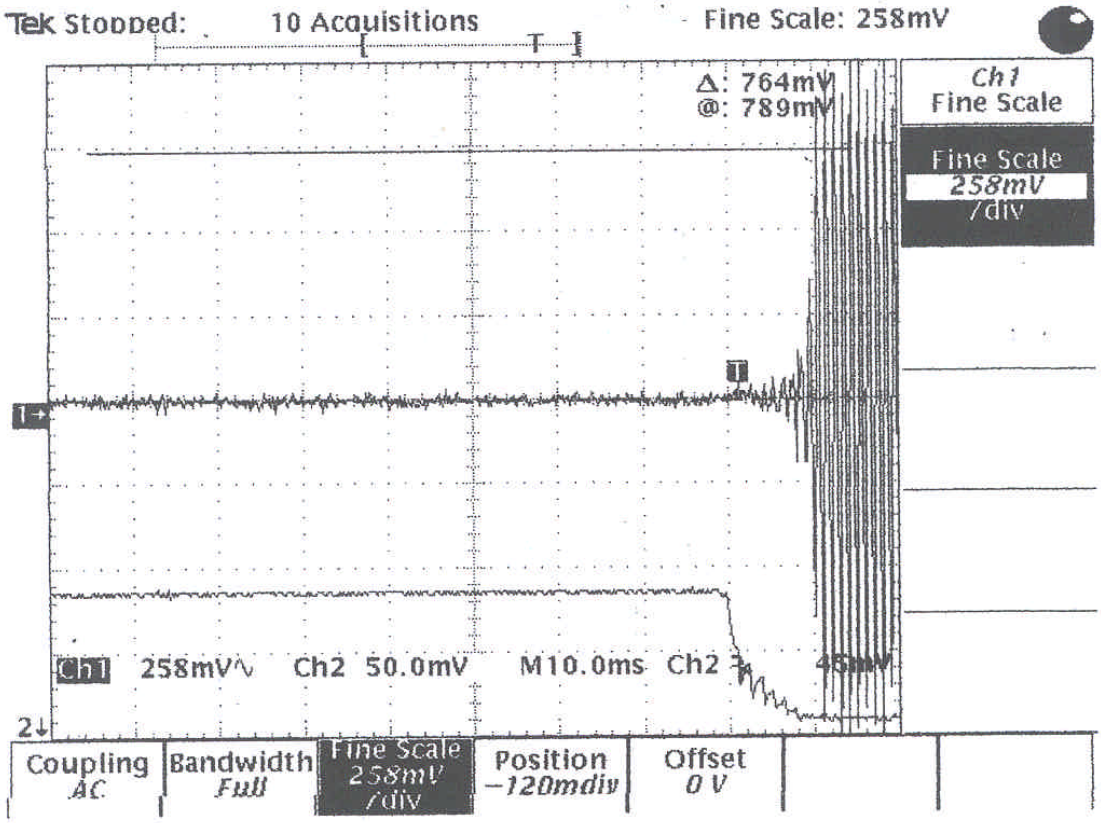
FCC ID: K95APV5

2.12 Transient Frequency Behavior (FCC Section 90.214)

Information regarding this requirement has been supplied by RELM Communications. Plots are provided for both 25 kHz and 12.5 kHz Channel Bandwidths in the following figures.

25 kHz Bandwidth





12.5 kHz Bandwidth