MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: RELM Communications

MODEL: S-Series (Models SRU50A, SRU50B, and SRU50C)

FCC ID: ARUSRU50ABC

DATE: August 31, 1998

This report concerns (check one):
Original grant __X__

Class II change_____

Equipment type: Transceiver

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No__X__

If yes, defer until:_____
date

__N.A.__ agrees to notify the Commission by__N.A.__
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

United States Technologies, Inc.

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GENERAL INFORMATION

USERS MANUAL

Includes:

Theory Of Operation
Tune Up Procedure

This has been provided in 2 separate files from Relm Communications (Word relmmanual.doc & relmmanual1.doc)

PARTS LIST

At the time of submital, this information was not available from Relm Communications

SCHEMATICS

These have been provided in separate files

LABELING INFORMATION

This information has been provided in a separate file from Relm Communications (Word Document fcclbl.doc)

PHOTOGRAPHS

PHOTOGRAPHS

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These have been provided in separate files

TESTS AND MEASUREMENTS

TESTS AND MEASUREMENTS

Product Description

The Equipment Under Test (EUT) is the RELM Communications, Inc. S Series (Models SRU50A, SRU50B, & SRU50C). The S Series (Models SRU50A, SRU50B, & SRU50C) of radio systems uses state-of-the-art design and construction methods to deliver a range of high-performance, ultra-reliable radio devices. These radio systems are ideally suited for use in VHF or UHF two-way voice radio systems; however, the S Series (Models SRU50A, SRU50B, & SRU50C) can perform any number of applications where the added advantage of linear frequency and phase response from DC to 5KHz can be used. The S Series (Models SRU50A, SRU50B, & SRU50C), unlike conventional PLL radio systems, uses a two-point modulation method synthesizer for extended low-end VF transmit frequency response.

The flexibility of the S Series (Models SRU50A, SRU50B, & SRU50C) allows it to be configured for a wide range of applications:

- Standard or wideband voice, full duplex radio
- Cellular or trunking systems
- POCSAG paging transmitter
- Direct FSK modulation
- Two- or four-level FSK transmissions
- Other paging formats
- Cross band link or repeater

Three separate units were tested to cover the 400-435 MHz (N2), 450-485 MHz (P2), and 485-520 MHz (Q) bands.

These units are identical in design nature except for a few minor component value changes to cover each individual band. Each model equates to the following frequency bands:

SRU50A 400-435 MHz
SRU50B 450-485 MHz
SRU50C 485-520 MHz

Test Methodology

Prepared in accordance with the requirements of FCC Rules and Regulations Part 2 Subpart F, Paragraphs 2.983 through 2.999 and applicable portions of Parts 24, 74, 80 and 90. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Interconnecting cables were manipulated as necessary to maximize emissions. A block diagram of the tested system is shown in Figure 1.

Test Facility

Testing was performed at US Tech's measurement facility as described to the FCC and acknowledged in their letter marked 31040/SIT/US TECH. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number IC2982.

Test Equipment

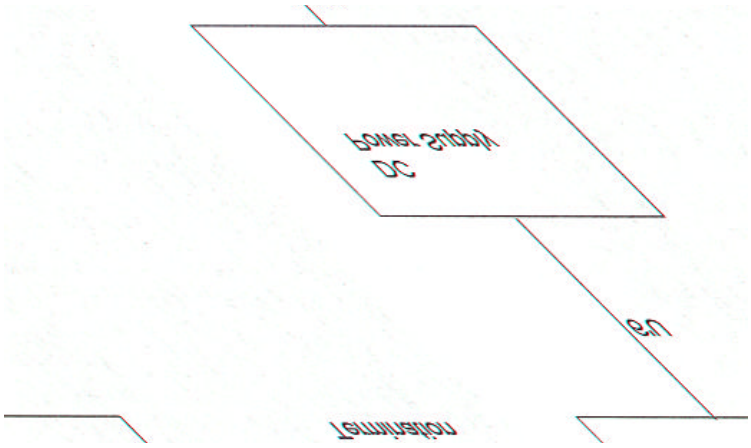
Table 1 describes test equipment used to evaluate this product.

Modifications

US Tech did not make any modifications to bring the EUT into compliance.

Test Date: July 15, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

Figure 1
System Block Diagram



Test Date: July 15, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 1

EUT AND PERIPHERALS

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Base Station RELM Communications (EUT)	SRU50A-N2 SRU50B-P2 SRU50C-QQ	None	ARUSRU50ABC (Pending)	50 Ω Term. Attenuation
DC Power Supply Astron	VS-35M	311364	None	6'U 6'U Power Cord

Test Date: July 15, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

RADIATED EMISSION TEST SET-UP PHOTO

These have been provided in additional files (2 photos)

TABLE 2

TEST INSTRUMENTS

TYPE	MANUFACTURER	MODEL	SN.
SPECTRUM ANALYZER	HEWLETT-PACKARD	8593E	3205A00124
SPECTRUM ANALYZER	HEWLETT-PACKARD	8558B	2332A09900
S A DISPLAY	HEWLETT-PACKARD	853A	2404A02387
COMB GENERATOR	HEWLETT-PACKARD	8406A	1632A01519
RF PREAMP	HEWLETT-PACKARD	8447D	1937A03355
RF PREAMP	HEWLETT-PACKARD	8449B	3008A00480
BICONICAL ANTENNA	EMCO	3110	9307-1431
LOG PERIODIC ANTENNA	EMCO	3146	9110-3600
HORN ANTENNA	EMCO	3115	167
THERMOMETER	FLUKE	52	5215250
MULTIMETER	FLUKE	85	53710469
DUAL OUTPUT POWER SUPPLY	HEWLETT-PACKARD	E3620A	KR41200373
PLOTTER	HEWLETT-PACKARD	7475A	2325A65394

MEASUREMENT PROCEDURE

Subpart 2.985(a), 90.205(d)

RF Power Output

The EUT was directly connected to a spectrum analyzer with the input resistance set to 50Ω. An external 30 dB attenuation was used during the test. The maximum RF output power was measured and compared to the manufacturer's rating. The connector and cable that was used to connect the EUT to the spectrum analyzer has an unknown loss. Only the highest power measured is reported for each unit.

FCC Minimum Standard

Typically (+/-) 20 % of the manufacturer's rated output power and less than the maximum power.

Mfg. Rated Power: +46.99 dBm/50,000.0 mW across 50 Ω at output terminals

Power Measured (corrected)

		Power (dBm)	Power (mW)
Figure 2A	SRU50A	46.8	47,973
Figure 2B	SRU50B	46.3	43,152
Figure 2C	SRU50C	47.8	59,979

Example Calculation

Power in mW = antilog (46.8 /10) = 47,973

Results

Reviewed By: _____

Name: Tim R. Johnson

Figure 2A RF Power Output
Model SRU50A

Refer to file fig2a.jpg

Figure 2B RF Power Output
Model SRU50B

Refer to file fig2b.jpg

Figure 2C RF Power Output
Model SRU50C

Refer to file fig2c.jpg

MEASUREMENT PROCEDURE

Subpart 2.989(h), 90.210(b)

BANDWIDTH OF FUNDAMENTAL EMISSION UNDER MODULATION

The EUT was modulated by a 2.5kHz tone. Table 3 and Figure 3 show the data for 25 kHz channel bandwidth.

FCC Minimum Standard

25 kHz Channel Bandwidth

10 kHz up to and including 20 kHz 25 dB

20 kHz up to and including 50 kHz 35 dB

> 50 kHz 43 + 10 log (P) dB

Test Date: July 23, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 3A
25 kHz CHANNEL BANDWIDTH
Model SRU50A

FREQUENCY (kHz) FROM CARRIER	ATTENUATION BELOW CARRIER LEVEL	MINIMUM STANDARD
-16.6	73.7	25.0
-14.4	69.0	25.0
-12.5	60.1	25.0
-10.0	42.9	25.0
10.0	43.7	25.0
12.5	59.3	25.0
14.9	73.9	25.0
16.1	75.2	25.0

Tester Signature: _____

Name: Erik Collins

Test Date: July 23, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 3B
25 kHz CHANNEL BANDWIDTH
Model SRU50B

FREQUENCY (kHz) FROM CARRIER	ATTENUATION BELOW CARRIER LEVEL	MINIMUM STANDARD
-15.6	73.1	25.0
-13.5	68.4	25.0
-12.5	58.9	25.0
-10.0	43.2	25.0
10.0	43.6	25.0
12.6	59.4	25.0
14.7	71.3	25.0
15.5	73.5	25.0

Tester Signature: _____ **Name:** Erik Collins

Test Date: July 23, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 3C
25 kHz CHANNEL BANDWIDTH
Model SRU50C

FREQUENCY (kHz) FROM CARRIER	ATTENUATION BELOW CARRIER LEVEL	MINIMUM STANDARD
-17.5	68.8	25.0
-15.0	56.1	25.0
-12.5	41.7	25.0
-10.0	28.1	25.0
10.0	28.4	25.0
12.5	41.7	25.0
15.1	56.4	25.0
17.5	67.0	25.0

Tester Signature: _____

Name: Erik Collins

FIGURE 3A
25 kHz CHANNEL BANDWIDTH
Model SRU50A

Refer to file fig3a.jpg

FIGURE 3B
25 kHz CHANNEL BANDWIDTH
Model SRU50B

Refer to file fig3b.jpg

FIGURE 3C
25 kHz CHANNEL BANDWIDTH
Model SRU50C

Refer to file fig3c.jpg

MEASUREMENT PROCEDURE

Subpart 2.991, 90.210(b), 22.359(a), and 74.462(c)

Transmitter Spurious Emmissions At Antenna Terminals

FCC Minimum Standard

25 kHz Channel Bandwidth

43 + 10 log (P) = dB

P = Measured Power

Transmitter Spurious Emissions At Antenna Terminals (Subpart 2.911 and 90.210(c))

Test Date: June 27, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

Table 4A
Model SRU50A

FREQUENCY (MHz)	ATTENUATED LEVEL (dB) BELOW CARRIER POWER	MINIMUM STANDARD
800.0	62.3	59.8
1200.0	63.5	59.8
1600.0	70.4	59.8
2000.0	73.8	59.8

Results Reviewed By: _____
Name: Tim R. Johnson

Transmitter Spurious Emissions At Antenna Terminals (Subpart 2.911 and 90.210(c))

Test Date: June 27, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

Table 4B
Model SRU50B

FREQUENCY (MHz)	ATTENUATED LEVEL (dB) BELOW CARRIER POWER	MINIMUM STANDARD
970.0	62.3	59.4
1455.0	64.3	59.4
1940.0	76.9	59.4
2424.8	78.5	59.4

Results Reviewed By: _____
Name: Tim R. Johnson

Transmitter Spurious Emissions At Antenna Terminals (Subpart 2.911 and 90.210(c))

Test Date: June 27, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

Table 4C
Model SRU50C

FREQUENCY (MHz)	ATTENUATED LEVEL (dB) BELOW CARRIER POWER	MINIMUM STANDARD
1000.0	62.3	60.8
1500.0	63.1	60.8
3000.0	73.9	60.8
2500.0	74.3	60.8

Results Reviewed By: _____

Name: Tim R. Johnson

MEASUREMENT PROCEDURE

Subpart 2.993(a), 90.210(b), 22.359(a), and 74.462(c)

Field Strength of Spurious Radiation

Spurious emissions were evaluated from 30 MHz to 2.0 GHz at an EUT to antenna distance of 3 meters. Measurements for 30 to 1000 MHz were made with the analyzer's bandwidth set to 120 kHz. Measurements above 1000 MHz were made with the analyzer's bandwidth set to 1 MHz. Since the EUT is part of a portable handheld configuration, the EUT was rotated through three orthogonal axis to produce the highest emission relative to the limit.

This level 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:

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

E = Field intensity (volts per meter)

Pt = Power output of transmitter (watts)

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

d = distance (meters)

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

25 kHz Channel Bandwidth

43 + 10 Log_{10} (P) = attenuation below carrier (dB)

FIELD STRENGTH OF SPURIOUS RADIATION

Test Date: June 27, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

25 kHz Channel Bandwidth
FCC Minimum Standard: 50 + 10 log (48.0) = 59.8 dB
Fundamental = Corrected Reading in Far Field (30m) = 17.1 dBm

TABLE 5A
SRU50A

FREQ (MHz)	MEASUREMENT @ 3 m (dBm)*	CORRECTION AF + CL + AMP GAIN	CORRECTED MEASUREMENT @ 30 m (dBm)	ATTENUATED LEVEL BELOW CARRIER POWER (dB)
800.06	-71.7	29.2	-62.5	79.6
1200.05	-21.5	-6.4	-47.9	65.0
1600.13	-49.4	-5.0	-74.4	91.5
2000.25	-49.3	-2.6	-71.9	89.0
2400.10	-44.7	-.3	-65.0	82.1
2800.13	-47.9	.7	-67.2	84.3
3200.20	-54.6	1.5	-73.1	90.2
3600.20	-55.4	3.0	-72.4	89.5
4000.10	-59.0	4.7	-74.3	91.4

SAMPLE CALCULATION:

Results dBm @ 30 m:

-71.7 + 29.2 - 20 = -62.5

CONVERSION FROM 3 METERS TO 30 METERS = 20 dB

*** = Measurments were made with a 50W termination connected to the antenna port.**

Results Reviewed By: _____

Name: Tim R. Johnson

FIELD STRENGTH OF SPURIOUS RADIATION

Test Date: June 27, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

25 kHz Channel Bandwidth
FCC Minimum Standard: 50 + 10 log (46.3) = 59.4 dB
Fundamental = Corrected Reading in Far Field (30m) = 17.0 dBm

TABLE 5B
SRU50B

FREQ (MHz)	MEASUREMENT @ 3 m (dBm)*	CORRECTION AF + CL + AMP GAIN	CORRECTED MEASUREMENT @ 30 m (dBm)	ATTENUATED LEVEL BELOW CARRIER POWER (dB)
970.04	-71.7	32.4	-59.3	76.3
1454.83	-23.8	-5.7	-49.5	66.5
1939.90	-58.8	-3.0	-81.8	98.8
2424.78	-44.0	-.2	-64.2	81.2
2909.68	-49.4	.9	-68.5	85.5
3394.83	-57.5	2.2	-75.3	92.3
3879.80	-62.2	4.2	-78.0	95.0
4364.55	-54.6	4.5	-69.5	86.5
4849.85	-58.2	4.7	-73.5	90.5

SAMPLE CALCULATION:
Results dBm @ 30 m:

-71.7 + 32.4 - 20 = -59.3

CONVERSION FROM 3 METERS TO 30 METERS = 20

dB

* = Measurments were made with a 50W termination connected to the antenna port.

Results

Reviewed By: _____

Name: Tim R. Johnson

FIELD STRENGTH OF SPURIOUS RADIATION

Test Date: June 27, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

25 kHz Channel Bandwidth
FCC Minimum Standard: 50 + 10 log (60.0) = 69.8 dB
Fundamental = Corrected Reading in Far Field (30m) = 18.2 dBm

TABLE 5C
SRU50C

FREQ (MHz)	MEASUREMENT @ 3 m (dBm)*	CORRECTION AF + CL + AMP GAIN	CORRECTED MEASUREMENT @ 30 m (dBm)	ATTENUATED LEVEL BELOW CARRIER POWER (dB)
1499.95	-74.3	-6.9	-101.2	119.4
1999.90	-28.0	-5.7	-53.7	71.9
2499.90	-46.7	-2.6	-69.3	87.5
2999.95	-47.9	0.3	-67.6	85.8
3500.05	-42.1	1.0	-61.1	79.3
3999.95	-53.1	2.4	-70.7	88.9
4500.05	-57.6	4.7	-72.9	91.1
4999.95	-54.4	4.3	-70.1	88.3
4849.85	-56.6	4.8	-71.8	90.0

SAMPLE CALCULATION:
Results dBm @ 30 m:

-74.3 + -6.9 - 20 = -101.2

CONVERSION FROM 3 METERS TO 30 METERS = 20

dB

*** = Measurments were made with a 50W termination connected to the antenna port.**

Results Reviewed By: _____

Name: Tim R. Johnson

MEASUREMENT PROCEDURE

Frequency Stability

Subpart 2.995, 90.213, and 22.355

The frequency tolerance of the carrier signal was measured while ambient temperature was varied from -30 to 50 degrees centigrade. The frequency tolerance was verified at 10 degree increments. The EUT was tested with fully charged batteries. The supply voltage was varied from 11.7 Volts to 15.9 Volts. The data is shown in the following tables and figures.

FCC Minimum Standard

< 2.5 ppm

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 6A
SRU50A

At Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	420.00100	< 2.5ppm
-20.0	420.00100	< 2.5ppm
-10.0	420.00092	< 2.5ppm
-0.0	420.00100	< 2.5ppm
10.0	420.00076	< 2.5ppm
20.0	420.00052	< 2.5ppm
30.0	420.00062	< 2.5ppm
40.0	420.00078	< 2.5ppm
50.0	420.00078	< 2.5ppm

Tester

Signature: _____

Name: **Erik D. Collins**

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 6B
SRU50A

2 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	420.00100	< 2.5ppm
-20.0	420.00100	< 2.5ppm
-10.0	420.00094	< 2.5ppm
-0.0	420.00098	< 2.5ppm
10.0	420.00076	< 2.5ppm
20.0	420.00044	< 2.5ppm
30.0	420.00043	< 2.5ppm
40.0	420.00052	< 2.5ppm
50.0	420.00078	< 2.5ppm

Tester

Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 6C
SRU50A

5 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	420.00100	< 2.5ppm
-20.0	420.00104	< 2.5ppm
-10.0	420.00102	< 2.5ppm
-0.0	420.00090	< 2.5ppm
10.0	420.00084	< 2.5ppm
20.0	420.00044	< 2.5ppm
30.0	420.00058	< 2.5ppm
40.0	420.00058	< 2.5ppm
50.0	420.00059	< 2.5ppm

Tester Signature: _____ Name: Erik D. Collins

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 6D
SRU50A

10 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	420.00100	< 2.5ppm
-20.0	420.00100	< 2.5ppm
-10.0	420.00096	< 2.5ppm
-0.0	420.00100	< 2.5ppm
10.0	420.00086	< 2.5ppm
20.0	420.00054	< 2.5ppm

30.0	420.00054	< 2.5ppm
40.0	420.00061	< 2.5ppm
50.0	420.00070	< 2.5ppm

Results
Reviewed By: _____
Name: Tim R. Johnson

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 7A
SRU50B

At Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	460.00110	< 2.5ppm
-20.0	460.00110	< 2.5ppm

-10.0	460.00110	< 2.5ppm
-0.0	460.00110	< 2.5ppm
10.0	460.00094	< 2.5ppm
20.0	460.00078	< 2.5ppm
30.0	460.00078	< 2.5ppm
40.0	460.00110	< 2.5ppm
50.0	460.00110	< 2.5ppm

Tester Signature: _____

Name: **Erik D. Collins**

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: **July 8-13, 1998**
UST Project: **98-280**
Customer: **RELM Communications**
Model: **S Series (Models SRU50A, SRU50B, & SRU50C)**

TABLE 7B
SRU50B

2 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC

		DEVIATION
-30.0	460.00110	< 2.5ppm
-20.0	460.00110	< 2.5ppm
-10.0	460.00110	< 2.5ppm
-0.0	460.00110	< 2.5ppm
10.0	460.00098	< 2.5ppm
20.0	460.00078	< 2.5ppm
30.0	460.00078	< 2.5ppm
40.0	460.00110	< 2.5ppm
50.0	460.00110	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 7C
SRU50B

5 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	460.00110	< 2.5ppm
-20.0	460.00110	< 2.5ppm
-10.0	460.00110	< 2.5ppm
-0.0	460.00108	< 2.5ppm
10.0	460.00090	< 2.5ppm
20.0	460.00086	< 2.5ppm
30.0	460.00074	< 2.5ppm
40.0	460.00100	< 2.5ppm
50.0	460.00110	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 7D
SRU50B

10 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	460.00110	< 2.5ppm
-20.0	460.00110	< 2.5ppm
-10.0	460.00110	< 2.5ppm
-0.0	460.00110	< 2.5ppm
10.0	460.00090	< 2.5ppm
20.0	460.00076	< 2.5ppm
30.0	460.00078	< 2.5ppm
40.0	460.00110	< 2.5ppm
50.0	460.00110	< 2.5ppm

Tester Signature: _____

Name: **Erik D. Collins**

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 8A
SRU50C

At Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	500.00120	< 2.5ppm
-20.0	500.00100	< 2.5ppm
-10.0	500.00058	< 2.5ppm
-0.0	500.00100	< 2.5ppm
10.0	500.00063	< 2.5ppm
20.0	500.00120	< 2.5ppm
30.0	500.00058	< 2.5ppm
40.0	500.00120	< 2.5ppm
50.0	500.00114	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 8B
SRU50C

2 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	500.00120	< 2.5ppm
-20.0	500.00098	< 2.5ppm
-10.0	500.00058	< 2.5ppm
-0.0	500.00066	< 2.5ppm
10.0	500.00063	< 2.5ppm
20.0	500.00124	< 2.5ppm
30.0	500.00120	< 2.5ppm
40.0	500.00120	< 2.5ppm
50.0	500.00110	< 2.5ppm

Results Reviewed By: _____

Name: Tim R. Johnson

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 8C
SRU50C

5 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	500.00120	< 2.5ppm
-20.0	500.00120	< 2.5ppm
-10.0	500.00068	< 2.5ppm
-0.0	500.00062	< 2.5ppm
10.0	500.00063	< 2.5ppm
20.0	500.00120	< 2.5ppm
30.0	500.00120	< 2.5ppm

40.0	500.00120	< 2.5ppm
50.0	500.00114	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY (Subpart 2.995 and 90.213)

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 8D
SRU50C

10 Minutes After Startup

TEMP (°C)	FREQ. (MHz)	FCC DEVIATION
-30.0	500.00120	< 2.5ppm
-20.0	500.00120	< 2.5ppm
-10.0	500.00068	< 2.5ppm

-0.0	500.00070	< 2.5ppm
10.0	500.00063	< 2.5ppm
20.0	500.00120	< 2.5ppm
30.0	500.00120	< 2.5ppm
40.0	500.00120	< 2.5ppm
50.0	500.00108	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY WITH VARIATION OF PRIMARY SUPPLY VOLTAGE

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 9A
SRU50A

VOLTAGE	FREQUENCY (MHz)	FCC DEVIATION
11.7	420.00058	< 2.5ppm
12.8	420.00052	< 2.5ppm

13.8	420.00052	< 2.5ppm
14.8	420.00052	< 2.5ppm
15.9	420.00058	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY WITH VARIATION OF PRIMARY SUPPLY VOLTAGE

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 9B
SRU50B

VOLTAGE	FREQUENCY (MHz)	FCC DEVIATION
11.7	460.00078	< 2.5ppm
12.8	460.00076	< 2.5ppm
13.8	460.00078	< 2.5ppm
14.8	460.00078	< 2.5ppm
15.9	460.00078	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

FREQUENCY STABILITY WITH VARIATION OF PRIMARY SUPPLY VOLTAGE

Test Date: July 8-13, 1998
UST Project: 98-280
Customer: RELM Communications
Model: S Series (Models SRU50A, SRU50B, & SRU50C)

TABLE 9C
SRU50C

VOLTAGE	FREQUENCY (MHz)	FCC DEVIATION
11.7	500.00120	< 2.5ppm
12.8	500.00120	< 2.5ppm
13.8	500.00120	< 2.5ppm
14.8	500.00104	< 2.5ppm
15.9	500.00114	< 2.5ppm

Tester Signature: _____

Name: Erik D. Collins

MEASUREMENT PROCEDURE

Subpart 90.214

TRANSIENT FREQUENCY BEHAVIOR

Information regarding this requirement has been supplied by RELM Communications. The data is shown in Figure 4.

TRANSIENT FREQUENCY BEHAVIOR

Figure 4A
SRU50A

Refer to file fig4a.jpg

TRANSIENT FREQUENCY BEHAVIOR

Figure 4B
SRU50B

Refer to file fig4b.jpg

TRANSIENT FREQUENCY BEHAVIOR

Figure 4C
SRU50C

Refer to file fig4c.jpg