RF CODE, INC. ADDENDUM TO FC01-074

FOR THE

SCORPION I, 05101297-26/05101297-27/05101297-28/05101297-29

FCC PART 15 SUBPART C SECTION 15.209

COMPLIANCE

DATE OF ISSUE: NOVEMBER 15, 2001

PREPARED FOR:

RF Code, Inc
1250 South Clearview, Suite 104
Mesa, AZ 85208

P.O. No.: 101-2993
W.O. No.: 77783

PREPARED BY:

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CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: September 28 - October 2, 2001

Report No.: FC01-074A

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	September 28 - October 2, 2001
DATE OF RECEIPT:	September 28, 2001
PURPOSE OF TEST:	To demonstrate the compliance of the Scorpion I, 05101297-26/05101297-27/05101297-28/05101297-29 with the requirements for FCC Part 15 Subpart C Section 15.209 devices. The addendum is to correct the following clerical errors; reference to conducted testing, biconilog antenna and incorrect bandwidth settings on page 12.
TEST METHOD:	ANSI C63.4 (1992)
MANUFACTURER:	RF Code, Inc 1250 South Clearview, Suite 104 Mesa, AZ 85208
REPRESENTATIVE:	John Coulthard
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the RF Code, Inc Scorpion I, 05101297-26/05101297-27/05101297-28/05101297-29 was found to be fully compliant with the following standards and specifications:

United States

- FCC Part 15 Subpart C Section 15.209
  - ANSI C63.4 (1992) method

Canada

RSS-210 Issue 4 Section 6.1

- FCC Part 15 Subpart C Section 15.209
  - ANSI C63.4 (1992) method

The results in this report apply only to the items tested, as identified herein.

MODIFICATIONS REQUIRED FOR COMPLIANCE

No modifications were necessary for compliance.

APPROVALS

QUALITY ASSURANCE:

Dennis Ward

Dennis Ward, Quality Manager

TEST PERSONNEL:

Chuck Kendall

Chuck Kendall, EMC/Lab Manager

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT is a RFID used for real time inventory and asset tracking. The devices tested by CKC were production units. Model SFST2S has been re-named to 05101297-26, model SFST5S has been re-named to 05101297-27, model SFST10S has been re-named to 05101297-28 and model SFST15S has been re-named to 05101297-29. The models are identical electrically to the ones which were tested, or any differences between them do not affect their EMC characteristics, and therefore they comply to the level of testing equivalent to the tested models.

EQUIPMENT UNDER TEST

Scorpion I

Manuf:	RF Code, Inc.
Models:	05101297-26/05101297-27/05101297-28/05101297-29
Serial:	NA
FCC ID:	N3S2001B03 (pending)

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

15.33 FREQUENCY RANGE TESTED

The frequency range of 9 kHz – 4 GHz was tested.

EUT OPERATING FREQUENCY

The devices operate in the frequencies of 303.704 – 303.922 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the Scorpion I, 05101297-26/05101297-27/05101297-28/05101297-29. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix B.

Table 1: Fundamental Radiated Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
303.704	39.0	21.1	-26.5	3.7		37.3	46.0	-8.7	HQ - 10
303.765	31.0	21.1	-26.5	3.7		29.3	46.0	-16.7	HQ - 15
303.880	43.3	21.0	-26.5	3.7		41.5	46.0	-4.5	HQ - 5
303.913	16.4	21.0	-26.5	3.7		14.6	46.0	-31.4	HA - 2
303.922	45.8	21.0	-26.5	3.7		44.0	46.0	-2.0	HQ - 2

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 3 Meters

NOTES:
H = Horizontal Polarization
Q = Quasi Peak Reading
2 = model SFST2S
5 = model SFST5S
10 = model SFST10S
15 = model SFST15S

COMMENTS: Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Table 2: Six Highest Radiated Emission Levels: 0.01 - 30 MHz									
	METER	CORRECTION FACTORS				CORRECTED	SPEC		
FREQUENCY MHz	READING dBµV	Ant dB	Amp dB	Cable dB	15.31 dB	READING dBµV/m	LIMIT dBµV/m	MARGIN dB	NOTES
0.101	61.3	10.0		0.1	-80.0	-8.6	27.5	-36.1	V
2.230	24.2	10.3		0.3	-40.0	-5.2	29.5	-34.7	V
4.606	23.0	10.5		0.4	-40.0	-6.1	29.5	-35.6	V
6.710	17.8	10.6		0.5	-40.0	-11.1	29.5	-40.6	V
17.053	17.8	9.4		0.7	-40.0	-12.1	29.5	-41.6	V
21.950	23.9	8.4		0.8	-40.0	-6.9	29.5	-36.4	V

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 3 Meters

NOTES: V = Vertical Polarization

COMMENTS: Transmitter on top of an 80 cm high wooden table. Vertical position of PCB worst case for this frequency range.

Table 3: Highest Radiated Emission Levels: 30 - 1000 MHz

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
607.765	35.2	19.5	-27.9	5.3		32.1	46.0	-13.9	HQ
911.549	29.8	23.7	-27.4	6.8		32.9	46.0	-13.1	HQ

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
Q = Quasi Peak Reading

COMMENTS: Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Table 4: Six Highest Radiated Emission Levels: 1 - 4 GHz									
FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
2430.741	22.9	28.6	-34.6	8.2		25.1	54.0	-28.9	HA
3038.390	21.4	30.3	-34.7	8.3		25.3	54.0	-28.7	HA
3342.295	21.1	31.1	-34.3	9.3		27.2	54.0	-26.8	HA
3645.695	33.3	31.5	-34.2	10.2		40.8	54.0	-13.2	H
3949.722	34.9	32.7	-34.2	11.4		44.8	54.0	-9.2	H
4253.561	32.7	32.0	-33.2	11.8		43.3	54.0	-10.7	H

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
A = Average Reading

COMMENTS: Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 4dB measurement uncertainty.

EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The radiated emissions data of the Scorpion I, 05101297-26/05101297-27/05101297-28/05101297-29, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS

	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

A typical data sheet will display the following in column format:

#	Freq	Rdng	Amp	Bicon	Log 1	Cable	Corr	Spec	Margin	Polar
			15.31	Horn	Loop					

means reading number.
Freq is the frequency in MHz of the obtained reading.
Rdng is the reading obtained on the spectrum analyzer in dBµV.
Amp is the preamplifier factor or gain in dB.
Bicon is the biconical antenna factor in dB.
Log 1 is the log periodic antenna factor in dB.
Horn is the horn antenna factor in dB.
Loop is the magnetic loop antenna factor in dB.
Cable is the cable loss in dB of the coaxial cable on the OATS.
Dist is the distance factor in dB used when testing at a different test distance than the one stated in the spec.
Corr is the corrected reading in dBµV/m (field strength).
Spec is the specification limit (dB) stated in the FCC regulations.
Margin is the closeness to the specified limit in dB; + is over and - is under the limit.
Polar is the polarity of the antenna with respect to earth.
15.31 is the distance correction factor for frequencies below 30 MHz in accordance with FCC Part 15.31.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed on the data sheets in Appendix B were used to collect the radiated emissions data for the Scorpion I, 05101297-26/05101297-27/05101297-28/05101297-29. The magnetic loop antenna was used for frequencies below 30 MHz. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. The horn antenna was used for frequencies above 1000 MHz.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

FCC SECTION 15.35:
TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	4000 MHz	1 MHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Scorpion I, 05101297-26/05101297-27/05101297-28/05101297-29.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

EUT TESTING

Radiated Emissions

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For frequencies below 30 MHz the magnetic loop antenna was used. The frequency range of 30 MHz to 88 MHz was scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. The frequency range of 100 to 300 MHz was then scanned in the same manner using the biconical antenna and the peaks recorded. Lastly, a scan of the FM band from 88 to 110 MHz was made, using a reduced resolution bandwidth and frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 to 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 to 1000 MHz was again scanned. For frequencies exceeding 1000 MHz, the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

TRANSMITTER CHARACTERISTICS

15.203 Antenna Requirements

The antenna is an integral part of the EUT and is NON-Removable; therefore the EUT complies with Section 15.203 of the FCC rules.

15.205 Restricted Bands

The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules.

Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

APPENDIX A

TEST SETUP PHOTOS

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View Using Bicon Antenna

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Back View Using Log Periodic Antenna

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Back View Using Bicon Antenna

APPENDIX B

MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **RF Code, Inc**
Specification: **FCC 15.209**
Work Order #: **77783** Date: 10/1/2001
Test Type: **ERP-Output Power** Time: 14:16:34
Equipment: **Transmitter** Sequence#: 9
Manufacturer: RF Code Tested By: Chuck Kendall
Model: SFST2S
S/N: 40631

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
QP Adapter	2811A01267	11/03/2000	11/03/2001	478
Preamplifier	1937A02604	03/29/2001	03/29/2002	0
Log Periodic	154	05/07/2001	05/07/2002	0
3/10 m Coax Hardline	N/A	02/27/2001	02/27/2002	0

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST2S	40631

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Amp dB	Log 1 dB	Bicon dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	303.922M QP	45.8	-26.5	+21.0	+0.0	+3.7	+0.0	44.0	46.0	-2.0	Horiz
^	303.896M	81.4	-26.5	+21.0	+0.0	+3.7	+0.0	79.6	46.0	+33.6	Horiz
3	303.913M Ave	16.4	-26.5	+21.0	+0.0	+3.7	+0.0	14.6	46.0	-31.4	Horiz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **RF Code, Inc**
Specification: **FCC 15.209**
Work Order #: **77783** Date: 10/2/2001
Test Type: **Output Power** Time: 14:41:21
Equipment: **Transmitter** Sequence#: 15
Manufacturer: RF Code Tested By: Chuck Kendall
Model: SFST5S
S/N: 72062

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
QP Adapter	2811A01267	11/03/2000	11/03/2001	478
Preamplifier	1937A02604	03/29/2001	03/29/2002	0
Log Periodic	154	05/07/2001	05/07/2002	0
Biconical Antenna	156	12/18/2000	12/18/2001	0

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST5S	72062

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	Amp	Log 1	Bicon	Cable	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	303.880M	43.3	-26.5	+21.0	+0.0	+3.7	+0.0	41.5	46.0	-4.5	Horiz
	QP										
^	303.883M	79.4	-26.5	+21.0	+0.0	+3.7	+0.0	77.6	46.0	+31.6	Horiz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **RF Code, Inc**
Specification: **FCC 15.209**
Work Order #: **77783** Date: 10/02/2001
Test Type: **Output Power** Time: 15:21:50
Equipment: **Transmitter** Sequence#: 16
Manufacturer: RF Code Tested By: Chuck Kendall
Model: SFST10S
S/N: 40540

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
QP Adapter	2811A01267	11/03/2000	11/03/2001	478
HP-8447D Pre-Amp	1937A082604	03/29/2001	03/03/2002	99
Antenna A&H Log SAS-200/510	154	05/07/2001	05/07/2002	1330
3/10 m Coax Hardline	N/A	02/27/2001	02/27/2002	0

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST10S	40540

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	Amp	Log 1	Bicon	Cable	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	303.704M	39.0	-26.5	+21.1	+0.0	+3.7	+0.0	37.3	46.0	-8.7	Horiz
	QP										
^	303.730M	76.7	-26.5	+21.1	+0.0	+3.7	+0.0	75.0	46.0	+29.0	Horiz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **RF Code, Inc**
Specification: **FCC 15.209**
Work Order #: **77783** Date: 10/02/2001
Test Type: **Output Power** Time: 11:38:39
Equipment: **Transmitter** Sequence#: 14
Manufacturer: RF Code Tested By: Chuck Kendall
Model: SFST15S
S/N: 50410

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
QP Adapter	2811A01267	11/03/2000	11/03/2001	478
Preamplifier	1937A02604	03/29/2001	03/29/2002	0
Log Periodic	154	05/07/2001	05/07/2002	0
Biconical Antenna	156	12/18/2000	12/18/2001	0

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST15S	50410

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Amp dB	Log 1 dB	Bicon dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	303.765M QP	31.0	-26.5	+21.1	+0.0	+3.7	+0.0	29.3	46.0	-16.7	Horiz
^	303.765M	78.6	-26.5	+21.1	+0.0	+3.7	+0.0	76.9	46.0	+30.9	Horiz

Test Location:	CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362		
Customer:	**RF Code, Inc**		
Specification:	**FCC 15.209**		
Work Order #:	**77783**	Date:	10/2/2001
Test Type:	**Spurious Emissions (0.01-30 MHz)**	Time:	09:41:22
Equipment:	**Transmitter**	Sequence#:	12
Manufacturer:	RF Code	Tested By:	Chuck Kendall
Model:	SFST2S		
S/N:	40631		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
QP Adapter	2811A01267	11/03/2000	11/03/2001	478
Mag Loop EMCO 6502	1074	05/31/2001	05/31/2002	226
3/10 m Coax Hardline	N/A	02/27/2001	02/27/2002	0

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST2S	40631

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. Vertical position of PCB worst case for this frequency range.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Loop dB	15.31 dB	dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2.230M	24.2	+10.3	-40.0		+0.3	+0.0	-5.2	29.5	-34.7	Vert
2	4.606M	23.0	+10.5	-40.0		+0.4	+0.0	-6.1	29.5	-35.6	Vert
3	100.600k	61.3	+10.0	-80.0		+0.1	+0.0	-8.6	27.5	-36.1	Vert
4	21.950M	23.9	+8.4	-40.0		+0.8	+0.0	-6.9	29.5	-36.4	Vert
5	6.710M	17.8	+10.6	-40.0		+0.5	+0.0	-11.1	29.5	-40.6	Vert
6	17.053M	17.8	+9.4	-40.0		+0.7	+0.0	-12.1	29.5	-41.6	Vert
7	30.030M	15.7	+6.5	-40.0		+1.1	+0.0	-16.7	29.5	-46.2	Vert
8	342.000k	37.5	+10.0	-80.0		+0.0	+0.0	-32.5	17.0	-49.5	Vert
9	63.300k	38.9	+10.6	-80.0		+0.1	+0.0	-30.4	31.5	-61.9	Vert
10	10.200k	50.3	+15.2	-80.0		+0.0	+0.0	-14.5	47.5	-62.0	Vert
11	148.100k	21.4	+10.2	-80.0		+0.2	+0.0	-48.2	24.2	-72.4	Vert

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **RF Code, Inc**
Specification: **FCC 15.209**
Work Order #: **77783** Date: 10/1/2001
Test Type: **Radiated Spurious Emissions <1GHz** Time: 15:18:27
Equipment: **Transmitter** Sequence#: 10
Manufacturer: RF Code Tested By: Chuck Kendall
Model: SFST2S
S/N: 40631

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
QP Adapter	2811A01267	11/03/2000	11/03/2001	478
Preamplifier	1937A02604	03/29/2001	03/29/2002	0
Log Periodic	154	05/07/2001	05/07/2002	0
3/10 m Coax Hardline	N/A	02/27/2001	02/27/2002	0
Antenna, Bicon	156	12/08/2000	12/08/2001	00225

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST2S	40631

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	Amp	Log 1	Bicon	Cable					
	MHz	dBµV	Amp dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	911.549M	29.8	-27.4	+23.7	+0.0	+6.8	+0.0	32.9	46.0	-13.1	Horiz
	QP		+0.0								
^	911.573M	49.3	-27.4	+23.7	+0.0	+6.8	+0.0	52.4	46.0	+6.4	Horiz
			+0.0								
3	607.765M	35.2	-27.9	+19.5	+0.0	+5.3	+0.0	32.1	46.0	-13.9	Horiz
	QP		+0.0								
^	607.740M	55.8	-27.9	+19.4	+0.0	+5.3	+0.0	52.6	46.0	+6.6	Horiz
			+0.0								

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **RF Code, Inc**
Specification: **FCC 15.209**
Work Order #: **77783** Date: 10/1/2001
Test Type: **Radiated Spurious Emissions (1-4GHz)** Time: 15:18:27
Equipment: **Transmitter** Sequence#: 10
Manufacturer: RF Code Tested By: Chuck Kendall
Model: SFST2S
S/N: 40631

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer RF Section	2209A01404	11/03/2000	11/03/2001	490
Spectrum Analyzer Display	2403A08241	11/03/2000	11/03/2001	489
HP-8449B Pre-Amp	3008A00301	10/13/2000	10/13/2001	2010
1-18GHz Horn Ant EMCO 3115	9307-4085	02/28/2001	02/28/2002	656
Cable #1 (30') Andrew	N/A	04/16/2001	04/16/2002	0
Cable #4 (50') Andrew	N/A	04/16/2001	04/16/2002	0

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Transmitter*	RF Code	SFST2S	40631

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Transmitter on top of an 80 cm high wooden table. PCB horizontal on the table with the antenna polarized in the horizontal position also. Tried the other two orientations but they resulted in lower signal strength.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Amp Cable dB	Horn Cable dB	Cable dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	3949.722M	34.9	-34.2 +0.6	+32.7 +1.5	+2.5	+6.8	+0.0	44.8	54.0	-9.2	Horiz
2	4253.561M	32.7	-33.2 +0.8	+32.0 +1.3	+2.7	+7.0	+0.0	43.3	54.0	-10.7	Horiz
3	3645.695M	33.3	-34.2 +0.3	+31.5 +1.1	+2.7	+6.1	+0.0	40.8	54.0	-13.2	Horiz
4	3342.295M Ave	21.1	-34.3 +0.6	+31.1 +0.8	+2.4	+5.5	+0.0	27.2	54.0	-26.8	Horiz
^	3342.280M	40.1	-34.3 +0.6	+31.1 +0.8	+2.4	+5.5	+0.0	46.2	54.0	-7.8	Horiz
6	3038.390M Ave	21.4	-34.7 +1.4	+30.3 +0.5	+1.4	+5.0	+0.0	25.3	54.0	-28.7	Horiz
^	3038.440M	48.5	-34.7 +1.4	+30.3 +0.5	+1.4	+5.0	+0.0	52.4	54.0	-1.6	Horiz
8	2430.741M Ave	22.9	-34.6 +0.3	+28.6 +1.2	+1.5	+5.2	+0.0	25.1	54.0	-28.9	Horiz
^	2430.733M	40.5	-34.6 +0.3	+28.6 +1.2	+1.5	+5.2	+0.0	42.7	54.0	-11.3	Horiz

10	1823.097M Ave	23.6	-35.0 +0.2	+27.8 +1.2	+2.3	+4.3	+0.0	24.4	54.0	-29.6	Horiz
^	1823.081M	71.1	-35.0 +0.2	+27.8 +1.2	+2.3	+4.3	+0.0	71.9	54.0	+17.9	Horiz
12	2126.966M Ave	22.9	-34.9 +0.2	+27.5 +1.4	+2.2	+4.7	+0.0	24.0	54.0	-30.0	Horiz
^	2126.935M	65.4	-34.9 +0.2	+27.5 +1.4	+2.2	+4.7	+0.0	66.5	54.0	+12.5	Horiz
14	2734.616M Ave	19.3	-34.6 +0.9	+28.9 +0.8	+1.4	+5.1	+0.0	21.8	54.0	-32.2	Horiz
^	2734.598M	48.8	-34.6 +0.9	+28.9 +0.8	+1.4	+5.1	+0.0	51.3	54.0	-2.7	Horiz
16	1519.207M Ave	23.7	-35.0 +0.2	+25.0 +0.5	+2.0	+3.8	+0.0	20.2	54.0	-33.8	Horiz
^	1519.241M	64.6	-35.0 +0.2	+25.0 +0.5	+2.0	+3.8	+0.0	61.1	54.0	+7.1	Horiz
18	1215.389M Ave	24.7	-35.4 +0.1	+25.0 +0.3	+1.8	+3.5	+0.0	20.0	54.0	-34.0	Horiz
^	1215.419M	70.4	-35.4 +0.1	+25.0 +0.3	+1.8	+3.5	+0.0	65.7	54.0	+11.7	Horiz