



ADDENDUM TEST REPORT TO FC02-009

FOR THE

SCORPION 1M TAGS, MODELS 05101677-01 & 05101677-11

FCC PART 15 SUBPART C SECTION 15.231

COMPLIANCE

DATE OF ISSUE: FEBRUARY 13, 2002

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Date of test: December 13, 2001 through
February 11, 2002

Report No.: FC02-009A

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TABLE OF CONTENTS

Administrative Information	4
Summary of Results.....	5
Conditions for Compliance.....	5
Approvals.....	5
Equipment Under Test (EUT) Description.....	6
Transmitter Characteristics.....	6
EUT Operating Frequency.....	6
15.31(e) Voltage Variation.....	6
15.31(m) Number of Channels.....	6
15.33(a) Frequency Ranges Tested	6
15.203 Antenna Requirements	6
15.205 Restricted Bands	7
Equipment Under Test.....	7
Peripheral Devices.....	7
Temperature and Humidity During Testing	7
Report of Measurements.....	8
Table 1:Dynamic: 15.231(b) Peak Power Output	8
Table 2:Dynamic:15.209 Highest Radiated Emission Levels: 9kHz-30MHz.....	9
Table 3:Dynamic: 15.231(b) Highest & Spurious: 30-1000MHz	10
Table 4:Dynamic: 15.231(b) Highest Spurious Emission Levels: 1-4GHz	11
Table 5:Static: 15.231(e) Peak Power Output	12
Table 6:Static: 15.209 Highest Radiated Emission Levels: 9kHz-30MHz	13
Table 7:Static: 15.231(e) Highest Spurious: 30-1000MHz	14
Table 8:Static: 15.231(e) Highest Spurious Emission Levels: 1-4GHz	15
Measurement Uncertainty.....	16
EUT Setup	16
Correction Factors	16
Table A: Sample Calculations	16
Test Instrumentation and Analyzer Settings.....	17
Table B: 15.35 Analyzer Bandwidth Settings Per Frequency Range.....	17
Spectrum Analyzer Detector Functions.....	17
Peak	17
Quasi-Peak.....	18
Average.....	18
EUT Testing	18
Radiated Emissions	18
Appendix A: Test Setup Photographs	20
Photograph Showing Radiated Emissions.....	21
Photograph Showing Radiated Emissions.....	22
Appendix B: Test Equipment List.....	23

Appendix C: Measurement Data Sheets	24
15.231(c) Occupied Bandwidth Plot	25
15.231(c) Occupied Bandwidth Plot	26
15.231(e) Timing Plot.....	27
Pulse Duration In Alarm Mode	28
Pulse Duration In Standby Mode.....	29
Dynamic: 15.231(b) Peak Power Output.....	30
Dynamic: 15.209	31
Dynamic: 15.231(b) Spurious: 30-1000MHz.....	33
Dynamic: 15.231(b) Spurious: 1-4GHz.....	34
Static: 15.231(e) Peak Power Output	36
Static: 15.209	37
Static: 15.231(e) Spurious: 30-1000MHz.....	39
Static: 15.231(e) Spurious: 1-4GHz	40

CKC Laboratories, Inc. has received Certificates of Accreditation from the following agencies:

A2LA (USA); DATech (Germany); BSMI (Taiwan); Nemko (Norway); and GOST (Russia).

CKC Laboratories, Inc has received test site Registration Acceptance from the following agencies:

FCC (USA); VCCI (Japan); and Industry Canada.

CKC Laboratories, Inc. has received Letters of Acceptance through an MRA for the following agencies:

ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); Radio Communications Agency (RA); HOKLAS (Hong Kong); Bakom (Swiss); BIPT (Belgium); Denmark Telestyrelsen; RvA (Netherlands); SEE (Luxembourg) SITTEL (Bolivia); and UKAS (UK).

ADMINISTRATIVE INFORMATION

DATE OF TEST:	December 13, 2001 – February 11, 2002
DATE OF RECEIPT:	December 13, 2001
PURPOSE OF TEST:	To demonstrate the compliance of the Scorpion 1M Tags, Models 05101677-01 & 05101677-011 with the requirements for FCC Part 15 Subpart C Section 15.231 devices. Addendum A revises data to reflect testing in dynamic and static modes. Additional plots were included to show compliance to pulse duration testing.
TEST METHOD:	ANSI C63.4 (1992)
MANUFACTURER:	RF Code, Inc. 1250 S. Clearview, Suite 104 Mesa, AZ 85208
REPRESENTATIVE:	Dale Parvey
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the RF Code, Inc. Scorpion 1M Tags, Models 05101677-01 & 05101677-11 was found to be fully compliant with the following standards and specifications:

United States

- FCC Part 15 Subpart B Section 15.231
- ANSI C63.4 (1992) method

Canada

RSS-210 using:

- FCC Part 15 Subpart B Section 15.231
 - ANSI C63.4 (1992) method
- Industry of Canada File No. IC 3082-D

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

CONDITIONS FOR COMPLIANCE

Conducted emissions testing not required for this device. No modifications were required for compliance.

APPROVALS

QUALITY ASSURANCE:

A handwritten signature in cursive script that reads "Dennis Ward".

Dennis Ward, Quality Manager

TEST PERSONNEL:

A handwritten signature in cursive script that reads "Chuck Kendall".

Chuck Kendall, EMC/Lab Manager

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The Scorpion 1M Tag is a RFID form of real time inventory and asset tracking (active tag transmitter) with motion sensing. The emissions designator is 20K0PXD. The EUT tested by CKC Laboratories is representative of a production unit. During testing the device was documented as RF Tag, Scorpion Motion Tag. RF Code, Inc. has since changed the name of the device to Scorpion 1M Tag, Model 05101677-01.

Note that there are two versions of the tag: Model 05101677-01 with the motion sensor installed and Model 05101677-11 without the motion sensor capability, otherwise they are identical. Both act in exactly the same in every respect when they are stationary except that when moved the Model 05101677-11 does not change to the faster beacon rate as the Model 05101677-01, which was tested. Essentially the motion sensor switch is permanently off on the Model 05101677-11.

TRANSMITTER CHARACTERISTICS

EUT Operating Frequency

The EUT was operating at 303.915 MHz

15.31(e) Voltage Variation

Not applicable to this device because it is battery powered.

15.31(m) Number of Channels

The device operates on a single channel.

15.33(a) Frequency Ranges Tested

15.231(b) Radiated Emissions: 9 kHz – 4 GHz

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.

EQUIPMENT UNDER TEST

Scorpion 1M Tag

Manuf: RF Code
Model: Model 05101677-01
Serial: 12
FCC ID: P6F2001C04 (Pending)

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

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 1M Tags, Model 05101677-01. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: Dynamic: 15.231(b) Peak Power Output									
FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
303.857	77.6	21.1	-26.5	3.7		75.9	74.2	1.7	V
303.915	60.4	21.0	-26.5	3.7		58.6	74.2	-15.6	VQ

Test Method:	ANSI C63.4 (1992)	NOTES:	Q = Quasi Peak Reading
Spec Limit :	FCC Part 15 Subpart C Section 15.231(b)		V = Vertical Polarization
Test Distance:	3 Meters		

COMMENTS: Worst case of all three positions. Frequency range tested: 30-1000 MHz.

Table 2: Dynamic: 15.209 Highest Radiated Emission Levels: 9kHz-30MHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Corr dB	Cable dB	Dist dB				
0.479	44.0	10.1	-80.0	0.1		-25.8	14.0	-39.8	V
0.928	51.8	10.1	-40.0	0.2		22.1	28.2	-6.1	V
1.080	49.8	10.2	-40.0	0.2		20.2	26.9	-6.7	V
1.358	49.7	10.2	-40.0	0.2		20.1	24.9	-4.8	V
8.724	54.4	10.7	-40.0	0.6		25.7	29.5	-3.8	VQ
9.001	53.8	10.7	-40.0	0.6		25.1	29.5	-4.4	V

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

NOTES: Q = Quasi Peak Reading
V = Vertical Polarization

COMMENTS: Worst case of all three positions.

Table 3: Dynamic: 15.231(b) Highest Spurious: 30-1000MHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
607.688	51.2	19.4	-27.9	5.5		48.2	54.2	-6.0	VQ
911.510	43.2	23.7	-27.4	6.9		46.4	54.2	-7.8	VQ
911.578	17.2	23.7	-27.4	6.9		20.4	54.2	-33.8	VA

Test Method: ANSI C63.4 (1992)
Spec Limit : FCC Part 15 Subpart C Section 15.231(b)
Test Distance: 3 Meters

NOTES: V = Vertical Polarization
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: Worst case of all three positions.

Table 4: Dynamic: 15.231(b) Highest Spurious Emission Levels: 1-4GHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
1215.331	33.9	0.0	-35.8	3.9		2.0	54.0	-52.0	VA
1822.306	32.5	0.0	-34.8	5.0		2.7	54.0	-51.3	VA
1822.775	54.4	0.0	-34.8	5.0		24.6	54.0	-29.4	V
2734.510	20.2	0.0	-32.0	6.8		-5.0	54.0	-59.0	VA
3038.363	55.2	0.0	-31.8	7.4		30.8	54.0	-23.2	V
3342.164	20.5	0.0	-31.9	7.5		-3.9	54.0	-57.9	VA

Test Method: ANSI C63.4 (1992)
Spec Limit : FCC Part 15 Subpart C Section 15.231(b)
Test Distance: 3 Meters

NOTES: A = Average Reading
V = Vertical Polarization

COMMENTS: Worst case of all three positions.

Table 5: Static: 15.231(e) Peak Power Output

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
303.857	73.5	21.1	-26.5	3.7		71.8	66.3	5.5	V
303.915	64.1	21.0	-26.5	3.7		62.3	66.3	-4.0	VQ

Test Method: ANSI C63.4 (1992)
Spec Limit : FCC Part 15 Subpart C Section 15.231(e)
Test Distance: 3 Meters

NOTES: Q = Quasi Peak Reading
V = Vertical Polarization

COMMENTS: Worst case of all three positions. Frequency range tested: 30-1000 MHz.

Table 6: Static: 15.209 Highest Radiated Emission Levels: 9kHz-30MHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Corr dB	Cable dB	Dist dB				
0.101	54.1	10.0	-80.0	0.0		-15.9	27.5	-43.4	V
0.425	40.4	10.1	-80.0	0.1		-29.4	15.0	-44.4	V
0.479	43.8	10.1	-80.0	0.1		-26.0	14.0	-40.0	V
0.928	51.0	10.2	-40.0	0.2		21.3	28.2	-6.9	V
8.723	53.5	10.7	-40.0	0.6		24.8	29.5	-4.7	VQ
9.000	53.2	10.7	-40.0	0.6		24.5	29.5	-5.0	V

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

NOTES: Q = Quasi Peak Reading
V = Vertical Polarization

COMMENTS: Worst case of all three positions.

Table 7: Static: 15.231(e) Highest Spurious: 30-1000MHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
607.678	16.3	19.4	-27.9	5.5		13.3	46.5	-33.2	VA
911.559	16.7	23.7	-27.4	6.9		19.9	46.5	-26.6	VA

Test Method: ANSI C63.4 (1992)
Spec Limit : FCC Part 15 Subpart C Section 15.231(e)
Test Distance: 3 Meters

NOTES: V = Vertical Polarization
A = Average Reading

COMMENTS: Worst case of all three positions.

Table 8: Static: 15.231(e) Highest Spurious Emission Levels: 1-4GHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
1215.328	32.1	0.0	-35.8	3.9		0.2	54.0	-53.8	VA
1822.300	32.0	0.0	-34.8	5.0		2.2	54.0	-51.8	VA
2430.669	20.2	0.0	-32.5	6.2		-6.1	54.0	-60.1	VA
2734.500	19.3	0.0	-32.0	6.8		-5.9	54.0	-59.9	VA
3038.363	53.5	0.0	-31.8	7.4		29.1	54.0	-24.9	V
3342.167	19.6	0.0	-31.9	7.5		-4.8	54.0	-58.8	VA

Test Method: ANSI C63.4 (1992)
Spec Limit : FCC Part 15 Subpart C Section 15.231(e)
Test Distance: 3 Meters

NOTES: A = Average Reading
V = Vertical Polarization

COMMENTS: Worst case of all three positions.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a $\pm 4\text{dB}$ 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 and conducted emissions data of the Scorpion 1M Tags, Model 05101677-01, 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 $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ 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	($\text{dB}\mu\text{V}$)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect the radiated emissions data for the Scorpion 1M Tags, Model 05101677-01. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. 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 dB μ V, 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	4 GHz	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 1M Tags, Model 05101677-01.

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 radiated measurements from 9 kHz to 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.

APPENDIX A

TEST SETUP PHOTOGRAPHS

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

APPENDIX B

TEST EQUIPMENT LIST

Radiated Emissions <30 MHz

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer (RF Section)	2209A01404	11/09/2001	11/09/2002	490
Spectrum Analyzer (Display)	2403A08241	11/09/2001	11/09/2002	489
QP Adapter	2811A01267	11/09/2001	11/09/2002	478
3/10/30 m site cal		04/24/2001	04/24/2002	0
Magnetic Loop Antenna	1074	05/31/2001	05/31/2002	226

Radiated Emissions

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer (RF Section)	2209A01404	11/09/2001	11/09/2002	490
Spectrum Analyzer (Display)	2403A08241	11/09/2001	11/09/2002	489
QP Adapter	2811A01267	11/09/2001	11/09/2002	478
PreAmp	1937A02604	03/29/2001	03/29/2002	99
Bicon Antenna	156	12/06/2001	12/06/2002	225
Log Antenna	154	05/07/2001	05/07/2002	1330
3/10/30 m site cal		04/24/2001	04/24/2002	0

>1 GHz

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer (RF Section)	2209A01404	11/09/2001	11/09/2002	490
Spectrum Analyzer (Display)	2403A08241	11/09/2001	11/09/2002	489
3/10/30 m site cal		04/24/2001	04/24/2002	0
8449B PreAmp	3008A00301	10/19/2001	10/19/2002	2010
Horn Antenna	9307-4085	02/28/2001	02/28/2002	656
Cable #2 (2')	FSJ1-50A	04/16/2001	04/16/2002	0
Cable #4 (50')	FSJ1-50A	04/16/2001	04/16/2002	0
Cable #8 (6')	FSJ1-50A	04/16/2001	04/16/2002	0

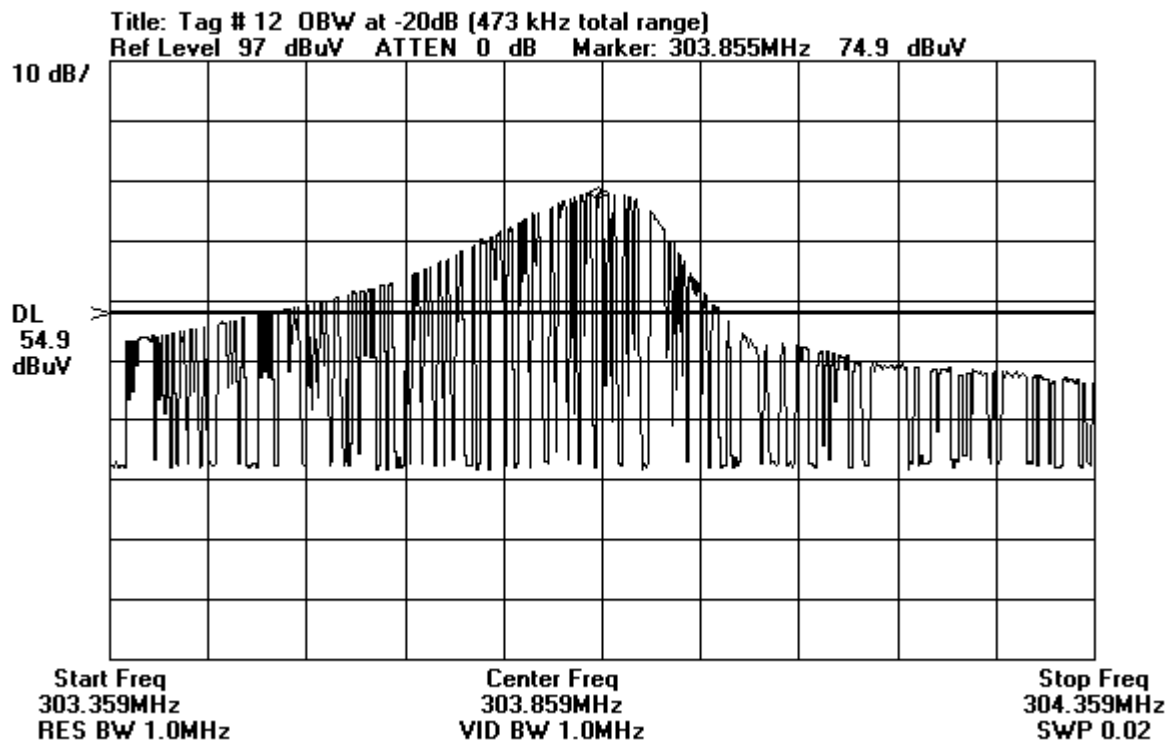
Occupied Bandwidth

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer (RF Section)	2209A01404	11/09/2001	11/09/2002	490
Spectrum Analyzer (Display)	2403A08241	11/09/2001	11/09/2002	489
QP Adapter	2811A01267	11/09/2001	11/09/2002	478
Log Antenna	154	05/07/2001	05/07/2002	1330
3/10/30 m site cal		04/24/2001	04/24/2002	0

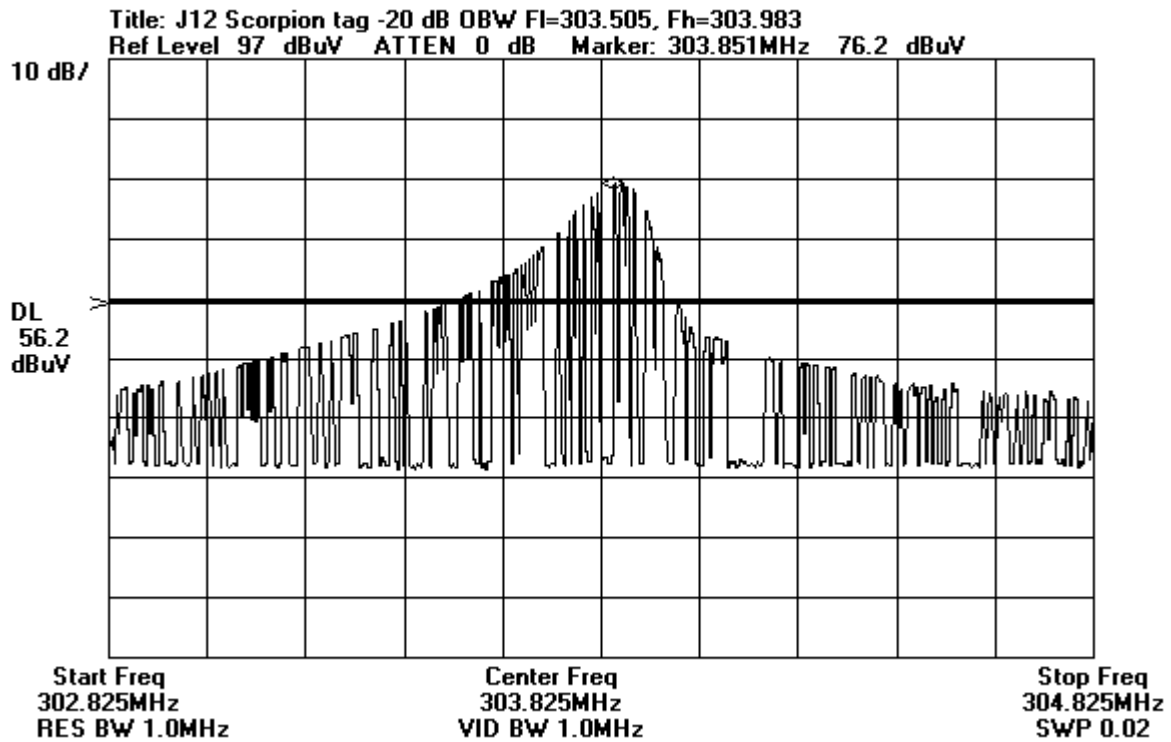
APPENDIX C

MEASUREMENT DATA SHEETS

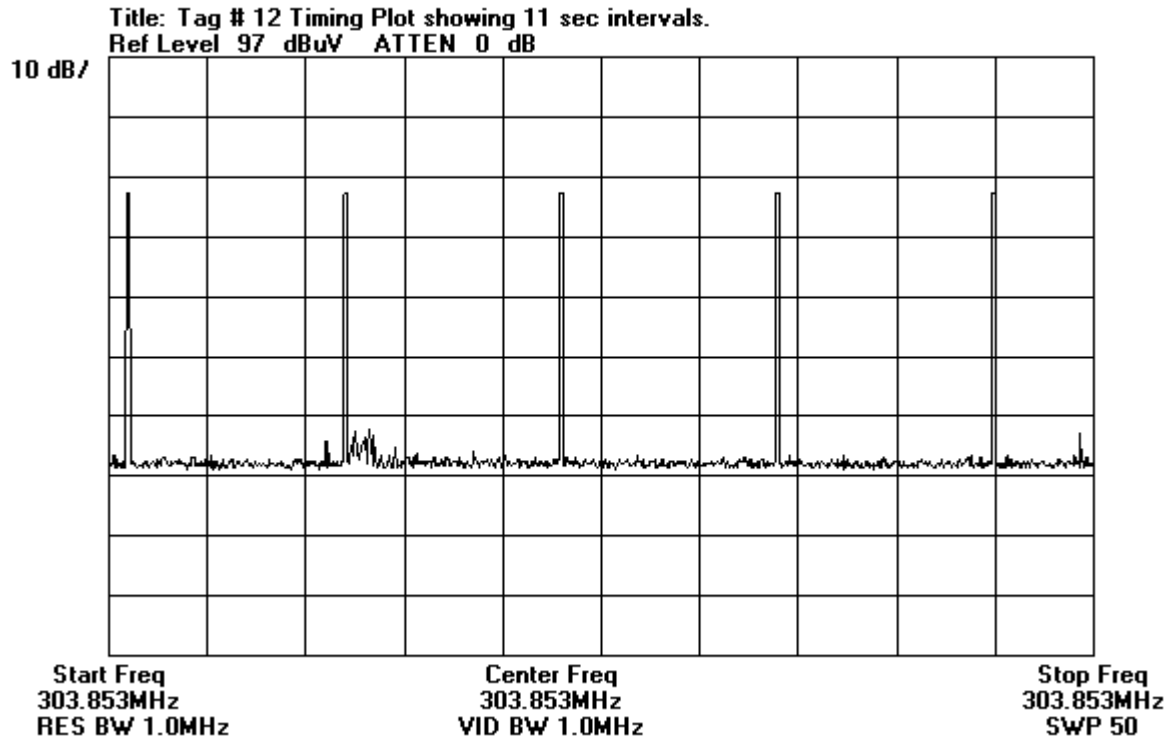
15.231(c) OCCUPIED BANDWIDTH PLOT



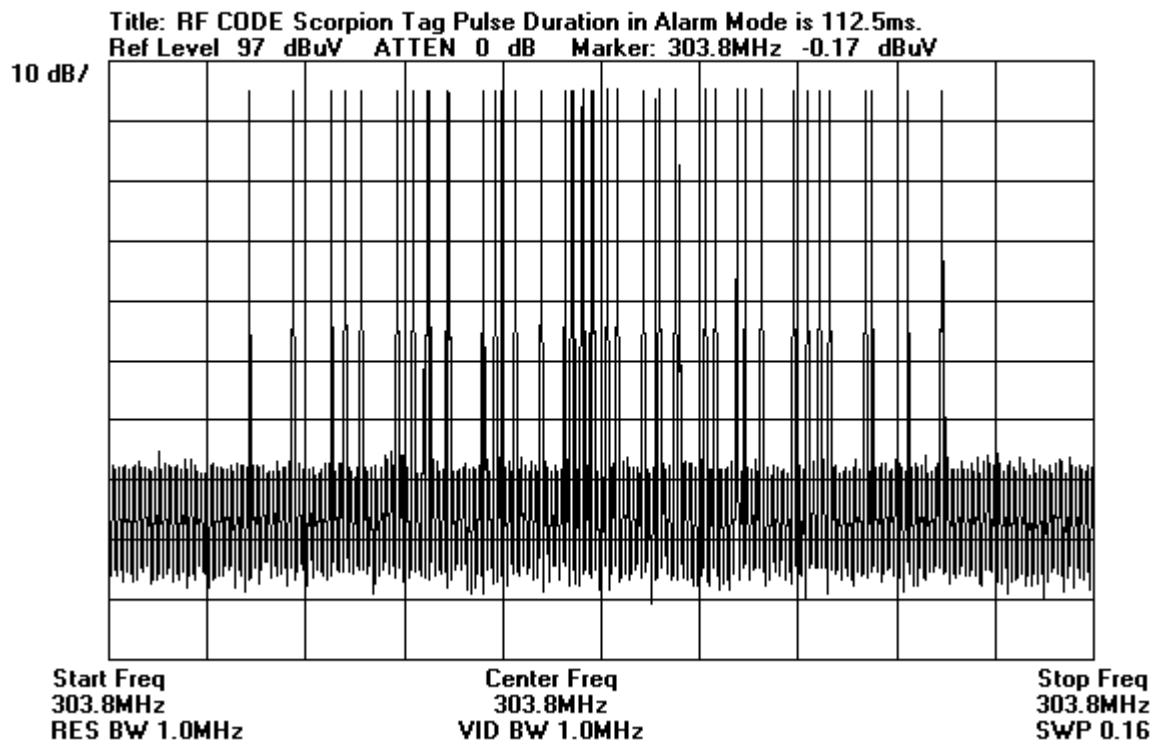
15.231(c) OCCUPIED BANDWIDTH PLOT



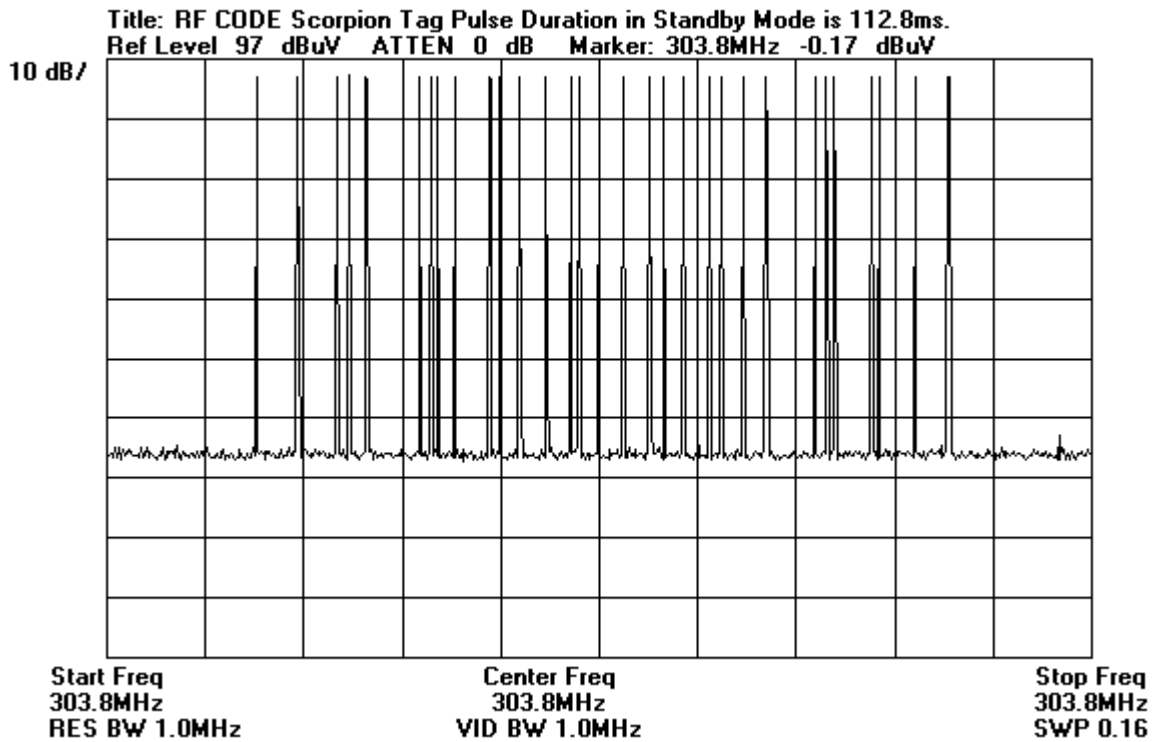
15.231(e) TIMING PLOT



PULSE DURATION IN ALARM MODE



PULSE DURATION IN STANDBY MODE



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

Customer: **RF Code**
 Specification: **FCC 15.231(b) Peak Power Output**
 Work Order #: **77850** Date: 12/14/01
 Test Type: **Maximized Emissions** Time: 17:17:31
 Equipment: **RF TAG** Sequence#: 5
 Manufacturer: **RF CODE** Tested By: Chuck Kendall
 Model: **RF1D**
 S/N: **J12**

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	RF1D	J12

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Dynamic mode. Worst case of all three positions.

Transducer Legend:

T1=Amp - S/N 1937A02604	T2=Log 154
T3=Cable - 10 Meter	

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	303.915M	60.4	-26.5	+21.0	+3.7		+0.0	58.6	74.2	-15.6	Vert
QP											
^	303.857M	77.6	-26.5	+21.1	+3.7		+0.0	75.9	74.2	+1.7	Vert
									Movement of tag made by tapping on its side with a pencil.		

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

Customer: **RF Code**
 Specification: **FCC 15.209**
 Work Order #: **78016** Date: 12/14/01
 Test Type: **Maximized Emissions** Time: 12:15:40
 Equipment: **RF TAG** Sequence#: 3
 Manufacturer: **RF CODE** Tested By: Chuck Kendall
 Model: **Scorpion Motion Tag**
 S/N: 12

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	Scorpion Motion Tag	12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Dynamic mode. Worst case of all three positions. Frequency range tested: 9kHz-30MHz.

Transducer Legend:

T1=Cable - 10 Meter	T2=Loop 1074
T3=15.31 40dB/Dec Correction	

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	848.799k Ambient	58.3	+0.2	+10.1	-40.0		+0.0	28.6	29.0	-0.4	Vert
2	8.724M QP	54.4	+0.6	+10.7	-40.0		+0.0	25.7	29.5	-3.8	Vert
^	8.724M	57.5	+0.6	+10.7	-40.0		+0.0	28.8	29.5	-0.7	Vert
4	9.001M	53.8	+0.6	+10.7	-40.0		+0.0	25.1	29.5	-4.4	Vert
5	1.358M	49.7	+0.2	+10.2	-40.0		+0.0	20.1	24.9	-4.8	Vert
6	927.983k	51.8	+0.2	+10.1	-40.0		+0.0	22.1	28.2	-6.1	Vert
7	1.080M	49.8	+0.2	+10.2	-40.0		+0.0	20.2	26.9	-6.7	Vert
8	478.614k	44.0	+0.1	+10.1	-80.0		+0.0	-25.8	14.0	-39.8	Vert
9	100.703k	54.4	+0.0	+10.0	-80.0		+0.0	-15.6	27.5	-43.1	Vert
10	425.164k	41.1	+0.1	+10.1	-80.0		+0.0	-28.7	15.0	-43.7	Vert
11	98.186k	54.1	+0.0	+10.0	-80.0		+0.0	-15.9	27.8	-43.7	Vert
12	468.716k	39.3	+0.1	+10.1	-80.0		+0.0	-30.5	14.2	-44.7	Vert
13	370.725k	41.2	+0.1	+10.1	-80.0		+0.0	-28.6	16.2	-44.8	Vert

14	312.327k	42.2	+0.1	+10.0	-80.0	+0.0	-27.7	17.7	-45.4	Vert
15	235.123k	44.3	+0.1	+10.0	-80.0	+0.0	-25.6	20.2	-45.8	Vert
16	408.338k	39.2	+0.1	+10.1	-80.0	+0.0	-30.6	15.4	-46.0	Vert
17	102.923k	51.0	+0.0	+10.0	-80.0	+0.0	-19.0	27.3	-46.3	Vert
18	332.123k	40.7	+0.1	+10.0	-80.0	+0.0	-29.2	17.2	-46.4	Vert
19	260.858k	42.7	+0.1	+10.0	-80.0	+0.0	-27.2	19.3	-46.5	Vert
20	357.858k	39.7	+0.1	+10.1	-80.0	+0.0	-30.1	16.5	-46.6	Vert
21	173.755k	45.7	+0.1	+10.1	-80.0	+0.0	-24.1	22.8	-46.9	Vert

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

Customer: **RF Code**
 Specification: **FCC 15.231(b) Spurious**
 Work Order #: **78016** Date: 12/13/01
 Test Type: **Maximized Emissions** Time: 17:55:24
 Equipment: **RF TAG** Sequence#: 1
 Manufacturer: **RF CODE** Tested By: Chuck Kendall
 Model: Scorpion Motion Tag
 S/N: 12

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	Scorpion Motion Tag	12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Dynamic mode. Worst case of all three positions. Frequency range tested: 30-1000MHz.
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Transducer Legend:

T1=Amp - S/N 1937A02604	T2=Log 154
T3=Cable - 10 Meter	

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

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	607.688M	51.2	-27.9	+19.4	+5.5		+0.0	48.2	54.2	-6.0	Vert
	QP										
^	607.680M	58.9	-27.9	+19.4	+5.5		+0.0	55.9	54.2	+1.7	Vert
3	911.510M	43.2	-27.4	+23.7	+6.9		+0.0	46.4	54.2	-7.8	Vert
	QP										
4	911.578M	17.2	-27.4	+23.7	+6.9		+0.0	20.4	54.2	-33.8	Vert
	Ave										
^	911.552M	52.8	-27.4	+23.7	+6.9		+0.0	56.0	54.2	+1.8	Vert

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

Customer: **RF Code**
 Specification: **FCC 15.231(b) Spurious**
 Work Order #: **78067**
 Test Type: **Maximized Emissions**
 Equipment: **RF TAG**
 Manufacturer: **RF CODE**
 Model: **Scorpion Motion Tag**
 S/N: **12**

Date: 12/14/01
 Time: 11:06:18
 Sequence#: 3
 Tested By: Chuck Kendall

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	Scorpion Motion Tag	12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Dynamic mode. Worst case of all three positions. Frequency range tested: 1-4GHz.
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Transducer Legend:

T1=Amp - S/N3008A00301	T2=Cable GHz #2
T3=Cable GHz #4	T4=Cable GHz #8

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	3038.363M	55.2	-31.8	+1.4	+5.0	+1.0	+0.0	30.8	54.0	-23.2	Vert
2	1822.775M	54.4	-34.8	+0.2	+4.3	+0.5	+0.0	24.6	54.0	-29.4	Vert
3	1822.306M Ave	32.5	-34.8	+0.2	+4.3	+0.5	+0.0	2.7	54.0	-51.3	Vert
4	1215.331M Ave	33.9	-35.8	+0.1	+3.5	+0.3	+0.0	2.0	54.0	-52.0	Vert
^	1215.334M	62.8	-35.8	+0.1	+3.5	+0.3	+0.0	30.9	54.0	-23.1	Vert
6	3342.164M Ave	20.5	-31.9	+0.6	+5.5	+1.4	+0.0	-3.9	54.0	-57.9	Vert
^	3342.173M	38.1	-31.9	+0.6	+5.5	+1.4	+0.0	13.7	54.0	-40.3	Vert
8	2734.510M Ave	20.2	-32.0	+0.9	+5.1	+0.8	+0.0	-5.0	54.0	-59.0	Vert
^	2734.518M	56.2	-32.0	+0.9	+5.1	+0.8	+0.0	31.0	54.0	-23.0	Vert
10	2430.671M Ave	21.1	-32.5	+0.3	+5.2	+0.7	+0.0	-5.3	54.0	-59.3	Vert
^	2430.671M	71.8	-32.5	+0.3	+5.2	+0.7	+0.0	45.5	54.0	-8.5	Vert
12	1519.159M Ave	23.7	-35.4	+0.2	+3.8	+0.4	+0.0	-7.3	54.0	-61.3	Vert
^	1519.172M	59.4	-35.4	+0.2	+3.8	+0.4	+0.0	28.4	54.0	-25.6	Vert

14	2126.826M	19.8	-33.9	+0.2	+4.7	+0.6	+0.0	-8.6	54.0	-62.6	Vert
	Ave										
^	2126.845M	67.1	-33.9	+0.2	+4.7	+0.6	+0.0	38.7	54.0	-15.3	Vert

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

Customer: **RF Code**
 Specification: **FCC 15.231(e) Peak Power Output**
 Work Order #: **77850** Date: 12/14/01
 Test Type: **Maximized Emissions** Time: 17:23:31
 Equipment: **RF TAG** Sequence#: 5
 Manufacturer: **RF CODE** Tested By: Chuck Kendall
 Model: **RF1D**
 S/N: **J12**

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	RF1D	J12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Worst case of all three positions. Static mode.

Transducer Legend:

T1=Amp - S/N 1937A02604	T2=Log 154
T3=Cable - 10 Meter	

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	303.915M	64.1	-26.5	+21.0	+3.7		+0.0	62.3	66.3	-4.0	Vert
QP											
^	303.857M	73.5	-26.5	+21.1	+3.7		+0.0	71.8	66.3	+5.5	Vert

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

Customer: **RF Code**
 Specification: **FCC 15.209**
 Work Order #: **78016**
 Test Type: **Maximized Emissions**
 Equipment: **RF TAG**
 Manufacturer: **RF CODE**
 Model: **Scorpion Motion Tag**
 S/N: **12**

Date: 12/14/01
 Time: 12:15:40
 Sequence#: 3
 Tested By: Chuck Kendall

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	Scorpion Motion Tag	12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Static mode. Worst case of all three positions. Frequency range tested: 9kHz-30MHz.

Transducer Legend:

T1=Cable - 10 Meter	T2=Loop 1074
T3=15.31 40dB/Dec Correction	

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	848.781k Ambient	57.5	+0.2	+10.1	-40.0		+0.0	27.8	29.0	-1.2	Vert
2	8.723M QP	53.5	+0.6	+10.7	-40.0		+0.0	24.8	29.5	-4.7	Vert
^	8.723M	56.5	+0.6	+10.7	-40.0		+0.0	27.8	29.5	-1.7	Vert
4	9.000M	53.2	+0.6	+10.7	-40.0		+0.0	24.5	29.5	-5.0	Vert
5	1.358M Ambient	49.2	+0.2	+10.2	-40.0		+0.0	19.6	24.9	-5.3	Vert
6	1.080M Ambient	49.6	+0.2	+10.2	-40.0		+0.0	20.0	26.9	-6.9	Vert
7	927.980k	51.0	+0.2	+10.1	-40.0		+0.0	21.3	28.2	-6.9	Vert
8	478.616k	43.8	+0.1	+10.1	-80.0		+0.0	-26.0	14.0	-40.0	Vert
9	100.703k	54.1	+0.0	+10.0	-80.0		+0.0	-15.9	27.5	-43.4	Vert
10	425.165k	40.4	+0.1	+10.1	-80.0		+0.0	-29.4	15.0	-44.4	Vert
11	98.188k	53.1	+0.0	+10.0	-80.0		+0.0	-16.9	27.8	-44.7	Vert
12	370.726k	41.0	+0.1	+10.1	-80.0		+0.0	-28.8	16.2	-45.0	Vert
13	468.717k	38.5	+0.1	+10.1	-80.0		+0.0	-31.3	14.2	-45.5	Vert

14	235.121k	44.0	+0.1	+10.0	-80.0	+0.0	-25.9	20.2	-46.1	Vert
15	312.325k	41.4	+0.1	+10.0	-80.0	+0.0	-28.5	17.7	-46.2	Vert
16	102.926k	50.8	+0.0	+10.0	-80.0	+0.0	-19.2	27.3	-46.5	Vert
17	408.340k	38.3	+0.1	+10.1	-80.0	+0.0	-31.5	15.4	-46.9	Vert
18	357.854k	39.2	+0.1	+10.1	-80.0	+0.0	-30.6	16.5	-47.1	Vert
19	332.126k	39.9	+0.1	+10.0	-80.0	+0.0	-30.0	17.2	-47.2	Vert
20	260.856k	41.9	+0.1	+10.0	-80.0	+0.0	-28.0	19.3	-47.3	Vert
21	173.759k	44.8	+0.1	+10.1	-80.0	+0.0	-25.0	22.8	-47.8	Vert

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

Customer: **RF Code**
 Specification: **FCC 15.231(e) Spurious**
 Work Order #: **78016** Date: 2/11/02
 Test Type: **Maximized Emissions** Time: 17:57:50
 Equipment: **RF TAG** Sequence#: 1
 Manufacturer: **RF CODE** Tested By: Chuck Kendall
 Model: **Scorpion Motion Tag**
 S/N: **12**

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	Scorpion Motion Tag	12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Worst case of all three positions. Static mode. Frequency range tested: 30-1000MHz.

Transducer Legend:

T1=Amp - S/N 1937A02604	T2=Log 154
T3=Cable - 10 Meter	

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	911.559M	16.7	-27.4	+23.7	+6.9		+0.0	19.9	46.5	-26.6	Vert
	Ave										
^	911.550M	50.3	-27.4	+23.7	+6.9		+0.0	53.5	46.5	+7.0	Vert
3	607.678M	16.3	-27.9	+19.4	+5.5		+0.0	13.3	46.5	-33.2	Vert
	Ave										
^	607.678M	57.9	-27.9	+19.4	+5.5		+0.0	54.9	46.5	+8.4	Vert

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

Customer: **RF Code**
 Specification: **15.2231(e) Spurious**
 Work Order #: **78067**
 Test Type: **Maximized Emissions**
 Equipment: **RF TAG**
 Manufacturer: **RF CODE**
 Model: **Scorpion Motion Tag**
 S/N: **12**

Date: 12/14/01
 Time: 09:06:17
 Sequence#: 3
 Tested By: Chuck Kendall

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF TAG*	RF CODE	Scorpion Motion Tag	12

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Static mode. Worst case of all three positions. Frequency range tested: 1-4GHz.

Transducer Legend:

T1=Amp - S/N3008A00301	T2=Cable GHz #2
T3=Cable GHz #4	T4=Cable GHz #8

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	3038.363M	53.5	-31.8	+1.4	+5.0	+1.0	+0.0	29.1	54.0	-24.9	Vert
2	1822.300M	32.0	-34.8	+0.2	+4.3	+0.5	+0.0	2.2	54.0	-51.8	Vert
^	1822.300M	53.5	-34.8	+0.2	+4.3	+0.5	+0.0	23.7	54.0	-30.3	Vert
4	1215.328M	32.1	-35.8	+0.1	+3.5	+0.3	+0.0	0.2	54.0	-53.8	Vert
^	1215.327M	60.5	-35.8	+0.1	+3.5	+0.3	+0.0	28.6	54.0	-25.4	Vert
6	3342.167M	19.6	-31.9	+0.6	+5.5	+1.4	+0.0	-4.8	54.0	-58.8	Vert
^	3342.167M	37.1	-31.9	+0.6	+5.5	+1.4	+0.0	12.7	54.0	-41.3	Vert
8	2734.500M	19.3	-32.0	+0.9	+5.1	+0.8	+0.0	-5.9	54.0	-59.9	Vert
^	2734.500M	55.4	-32.0	+0.9	+5.1	+0.8	+0.0	30.2	54.0	-23.8	Vert
10	2430.669M	20.2	-32.5	+0.3	+5.2	+0.7	+0.0	-6.1	54.0	-60.1	Vert
^	2430.669M	70.0	-32.5	+0.3	+5.2	+0.7	+0.0	43.7	54.0	-10.3	Vert
12	1519.161M	23.0	-35.4	+0.2	+3.8	+0.4	+0.0	-8.0	54.0	-62.0	Vert
^	1519.162M	58.3	-35.4	+0.2	+3.8	+0.4	+0.0	27.3	54.0	-26.7	Vert

14	2126.825M	18.2	-33.9	+0.2	+4.7	+0.6	+0.0	-10.2	54.0	-64.2	Vert
	Ave										
^	2126.825M	64.1	-33.9	+0.2	+4.7	+0.6	+0.0	35.7	54.0	-18.3	Vert