FCC CLASS II PERMISSIVE CHANGE TEST REPORT

for

IntelliSense
(C&K Systems, Inc.)
625 Coolidge Drive
Folsom, CA 95630

FCC ID: C2DLWSN-30-DX

June 29, 2001

WLL PROJECT #: 6386X

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1.0 Introduction

This report has been prepared on behalf of IntelliSense (C & K Systems, Inc.) to support the attached Class II Permissive Change. The test and application are submitted for an Intentional Radiator under Section 15.247 of the FCC Rules and Regulations. The Equipment Under Test was an IntelliSense (C & K Systems, Inc.) Direct Sequence Spread Spectrum Transmitter, SN931 Outdoor Spread Spectrum Transmitter.

All measurements herein were performed according to the 1992 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and field Strength Instrumentation. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

All measurements were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The results of this test report relate only to the item tested. This report shall not be used to claim product endorsement by NVLAP or any agency of the US Government. The measurement uncertainty of the data contained herein is ±2.3 dB. Refer to Appendix A for Statement of Measurement Uncertainty.

1.1 Summary

The IntelliSense (C & K Systems, Inc.) Direct Sequence Spread Spectrum Transmitter complies with the limits for an Intentional Radiator under Section 15.247.

2.0 Description of Equipment Under Test (EUT)

The IntelliSense (C & K Systems, Inc.) Direct Sequence Spread Spectrum Transmitter, SN931 Outdoor Spread Spectrum Transmitter is a 923.58 MHz low power spread spectrum transmitter used for residential security systems. The unit is deisgned to transmit a signal to a receiver/control panel when a magnetic contact is tripped. The unit contains a permanently attached (soldered) internal antenna and is powered via two 3.6V lithium batteries. The device transmits 7.6 ms "on" pulse followed by a 250ms blank, or "off" pulse.

The transmitter board used in the unit is the same board used in a previously approved C&K Systems transmitter, FCC ID: C2DLWSN-30-DX. The changes to the unit are an addition of a small daughter board containing 3 reed switches to detect movement of a door or window which has a magnet attached to it. Also, the unit is housed in a new polycarbonate enclosure for outdoor use. All of the radiated emissions testing were performed on this unit. New photographs depicting the changes have been for addition to the certification file.

2.1 On-board Oscillators

The IntelliSense (C & K Systems, Inc.) SN931 Direct Sequence Spread Spectrum Transmitter contains a 14.660 MHz oscillator.

3.0 Test Configuration

To complete the test configuration required by the FCC, the SN931 Direct Sequence Spread Spectrum Transmitter was tested all orthogonal planes.

3.1 Testing Algorithm

The transmitter was powered on and setup to continuously transmit. Worst-case emissions are recorded in the data tables. Since no changes were made to the original PCB, only radiated spurious emissions testing and the 20dBc test were performed.

3.2 Conducted Emissions Testing

Conducted emissions testing was not performed, as the unit is battery powered.

3.3 Radiated Emissions Testing

The EUT was placed on an 80 cm high 1 x 1.5 meters non-conductive motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Biconical, log periodic, and horn broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The peripherals were placed on the table in accordance with ANSI C63.4-1992. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak for frequencies below 1000 MHz and peak for frequencies above 1000 MHz. For frequencies below 1000 MHz, the measurement bandwidth on the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. For frequencies above 1000 MHz, the resolution bandwidth on the spectrum analyzer system was set to 1 MHz and the video bandwidth on the spectrum analyzer system was set to 1 MHz for peak measurements.

3.3.1 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are grouped into a composite antenna factor (AFc) and are supplied in the AFc column of Tables 1 and 2. The AFc in dB/m is algebraically added to the Spectrum Analyzer Voltage in dbµV to obtain the Radiated Electric Field in dBµV/m.

Since the FCC limits above 1 GHz are average levels, the peak spectrum analyzer reading is corrected using the duty cycle of the pulse modulated signal (over the worst case 0.1 second interval). The duty cycle factor (AFd) is added to the spectrum analyzer level to convert the peak level to an average level (Section 15.35). This level is then compared with the FCC limit. For emissions below 1 GHz, the FCC limits are in quasi-peak and the duty cycle factor is not used since the measurements are taken using a quasi-peak detector.

Example:

Duty Cycle:	AFd = 7.6 ms on-time/100 ms = 7.6% = -22.38 dB (Maximum 20dB correction used for duty cycle)
Spectrum Analyzer Voltage:	VdB V
Composite Antenna Factor:	AFcdB/m
Electric Field:	EdB V/m = VdB V + AFcdB/m = AFddB
To convert to linear units:	E V/m = antilog (EdB V/m/20)

Data are recorded in Table 1. Emissions data are given for all three orthogonal positions: X = Flat, Y = Horizontal, Z = Vertical

Table 1: FCC Part 15.247(c) 3M Radiated Emissions Data

Client: INTELLISENSE (C & K SYSTEMS, INC.)
Job#: 6386X
Model: SN 931 Outdoor Spectrum
Test Engineer: John Lam
Date: April 20, 2001
Tx frequency: 923.58 Mhz
Clock: 14.66 MHz

Peak Measurements

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (QP) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
X										
960.21	V	270.00	1.25	9.50	29.0	38.5	84.6	500.0	-15.4	
960.21	H	202.00	1.0	16.5	29.0	45.5	189.4	500.0	-8.4	
967.54	V	180.00	1.25	10.50	29.2	39.7	96.2	500.0	-14.3	
967.54	H	202.00	1.0	19.1	29.2	48.3	258.9	500.0	-5.7	
Y										
960.21	V	270.00	1.60	14.30	29.0	43.3	147.0	500.0	-10.6	
960.21	H	202.00	1.0	14.4	29.0	43.4	148.7	500.0	-10.5	
967.54	H	225.00	1.0	15.5	29.2	44.7	171.1	500.0	-9.3	
967.54	V	180.00	1.60	16.30	29.2	45.5	187.6	500.0	-8.5	
Z										
960.21	V	0.00	1.00	11.20	29.0	40.2	102.9	500.0	-13.7	
960.21	H	90.00	1.0	15.9	29.0	44.9	176.8	500.0	-9.0	
967.54	V	338.00	1.00	12.90	29.2	42.1	126.8	500.0	-11.9	
967.54	H	225.00	1.0	15.5	29.2	44.7	171.1	500.0	-9.3	
X										
1216.80	V	180-22	1.0	57.50	-10.9	46.6	213.2	5000.0	-27.4	
1231.44	V	202.00	1.0	73.33	-10.8	62.5	1336.5	5000.0	-11.5	
1539.30	V	248.00	1.0	59.20	-8.7	50.5	335.8	5000.0	-23.5	
2770.83	V	22.00	1.0	58.5	-4.8	53.7	483.9	5000.0	-20.3	
3694.44	V	135.00	1.0	64.0	-3.6	60.4	1045.0	5000.0	-13.6	
4603.62	V	225.00	1.0	55.0	-2.7	52.3	411.6	5000.0	-21.7	
4618.05	V	225.00	1.0	57.2	-2.7	54.5	531.0	5000.0	-19.5	
4926.80	V	0.00	1.0	46.8	-2.4	44.4	166.0	5000.0	-29.6	amb

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (QP) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
5406.00	V	0.00	1.0	48.3	-2.0	46.3	206.1	5000.0	-27.7	amb
7388.64	V	180.00	1.0	57.0	2.2	59.2	912.0	5000.0	-14.8	
8312.22	V	0.00	1.0	43.0	2.2	45.2	182.0	5000.0	-28.8	amb
9384.00	V	0.00	1.0	43.3	2.7	46.0	199.1	5000.0	-28.0	amb
1216.80	H	225.00	1.0	58.0	-10.9	47.1	225.8	5000.0	-26.9	
1231.44	H	270.00	1.0	73.8	-10.8	63.0	1410.8	5000.0	-11.0	
1539.30	H	225.00	1.0	68.0	-8.7	59.3	924.8	5000.0	-14.7	
2770.83	H	68.00	1.0	56.0	-4.8	51.2	362.9	5000.0	-22.8	
3694.44	H	135.00	1.0	61.8	-3.6	58.2	813.9	5000.0	-15.8	
4603.62	H	225.00	1.0	55.3	-2.7	52.6	427.5	5000.0	-21.4	
4618.05	H	225.00	1.0	53.0	-2.7	50.3	327.4	5000.0	-23.7	
4926.80	H	0.00	1.0	48.0	-2.4	45.6	189.9	5000.0	-28.4	amb
5406.00	H	0.00	1.0	46.8	-2.0	44.8	172.8	5000.0	-29.2	amb
7388.64	H	180.00	1.0	53.0	2.2	55.2	575.4	5000.0	-18.8	
8312.22	H	0.00	1.0	44.5	2.2	46.7	216.3	5000.0	-27.3	amb
9384.00	H	180.00	1.0	48.0	2.7	50.7	342.0	5000.0	-23.3	amb
Y										
1216.80	V	22.00	1.0	62.20	-10.9	51.3	366.2	5000.0	-22.7	
1231.44	V	22.00	1.0	79.00	-10.8	68.2	2567.2	5000.0	-5.8	
1539.30	V	135.00	1.0	60.33	-8.7	51.7	382.4	5000.0	-22.3	
2770.83	V	180.00	1.0	56.25	-4.8	51.4	373.5	5000.0	-22.5	
3694.44	V	0.00	1.0	61.50	-3.6	57.9	783.6	5000.0	-16.1	
4603.62	V	180.00	1.0	55.00	-2.7	52.3	411.6	5000.0	-21.7	
4618.05	V	0.00	1.0	57.20	-2.7	54.5	531.0	5000.0	-19.5	
4926.80	V	0.00	1.0	45.90	-2.4	43.5	149.1	5000.0	-30.5	amb
5541.36	V	180.00	1.0	50.00	-1.9	48.1	252.8	5000.0	-25.9	
7388.64	V	90.00	1.0	54.0	2.2	56.2	645.7	5000.0	-17.8	
8312.22	V	0.00	1.0	45.0	2.2	47.2	229.1	5000.0	-26.8	amb
9384.00	V	0.00	1.0	46.00	2.7	48.7	271.7	5000.0	-25.3	amb
1216.80	H	180.00	1.0	53.00	-10.9	37.1	71.4	5000.0	-36.9	
1231.44	H	225.00	1.0	66.50	-10.8	55.7	608.8	5000.0	-18.3	
1539.30	H	180.00	1.0	59.83	-8.7	51.2	361.0	5000.0	-22.8	
2770.83	H	158.00	1.0	61.83	-4.8	57.0	710.0	5000.0	-17.0	

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (QP) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
3694.44	H	315.00	1.0	60.83	-3.6	57.2	725.4	5000.0	-16.8	
4603.62	H	315.00	1.0	55.50	-2.7	52.8	436.0	5000.0	-21.2	
4618.05	H	315.00	1.0	56.50	-2.7	53.8	489.9	5000.0	-20.2	
4926.80	H	202.00	1.0	48.00	-2.4	45.6	189.9	5000.0	-28.4	
5541.36	H	315.00	1.0	51.00	-1.9	49.1	283.6	5000.0	-24.9	
7388.64	H	202.50	1.0	51.0	2.2	53.2	457.1	5000.0	-20.8	
8312.22	H	0.00	1.0	44.2	2.2	46.4	208.2	5000.0	-27.6	amb
9384.00	H	0.00	1.0	48.00	2.7	50.7	342.0	5000.0	-23.3	amb
Z										
1216.80	V	45.00	1.0	51.83	-10.9	40.9	111.0	5000.0	-33.1	
1231.44	V	45.00	1.0	67.83	-10.8	57.0	709.5	5000.0	-17.0	
1539.30	V	202.00	1.0	56.50	-8.7	47.8	246.1	5000.0	-26.2	
2770.83	V	90.00	1.0	55.83	-4.8	51.0	355.8	5000.0	-23.0	
3694.44	V	225.00	1.0	60.17	-3.6	56.6	672.4	5000.0	-17.4	
4603.62	V	315.00	1.0	49.00	-2.7	46.3	206.3	5000.0	-27.7	
4618.05	V	0.00	1.0	44.00	-2.7	41.3	116.2	5000.0	-32.7	amb
4926.80	V	0.00	1.0	44.30	-2.4	41.9	124.0	5000.0	-32.1	amb
5541.36	V	248.00	1.0	47.20	-1.9	45.3	183.1	5000.0	-28.7	
7388.64	V	180.00	1.0	55.5	2.2	57.7	767.4	5000.0	-16.3	
8312.22	V	0.00	1.0	46.3	2.2	48.5	266.1	5000.0	-25.5	amb
9384.00	V	0.00	1.0	46.67	2.7	49.4	293.5	5000.0	-24.6	amb
1216.80	H	315.00	1.0	56.20	-10.9	45.3	183.5	5000.0	-28.7	
1231.44	H	315.00	1.0	72.70	-10.8	61.9	1243.0	5000.0	-12.1	
1539.30	H	315.00	1.0	64.00	-8.7	55.3	583.5	5000.0	-18.7	
2770.83	H	315.00	1.0	63.50	-4.8	58.7	860.5	5000.0	-15.3	
3694.44	H	270.00	1.0	63.00	-3.6	59.4	931.3	5000.0	-14.6	
4603.62	H	338.00	1.0	54.80	-2.7	52.1	402.2	5000.0	-21.9	
4618.05	H	180.00	1.0	53.00	-2.7	50.3	327.4	5000.0	-23.7	
4926.80	H	0.00	1.0	48.50	-2.4	46.1	201.1	5000.0	-27.9	.
5541.36	H	180.00	1.0	50.00	-1.9	48.1	252.8	5000.0	-25.9	
7388.64	H	180.00	1.0	56.7	2.2	58.9	881.0	5000.0	-15.1	
8312.22	H	0.00	1.0	46.0	2.2	48.2	257.0	5000.0	-25.8	amb
9384.00	H	0.00	1.0	47.00	2.7	49.7	304.8	5000.0	-24.3	amb

Average Measurements Above 1 GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (PEAK) dBuV	Afd dB	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
X											
1216.80	V	180-22	1.0	57.50	-20.0	-10.9	26.6	21.3	500.0	-27.4	
1231.44	V	202.00	1.0	73.33	-20.0	-10.8	42.5	133.6	500.0	-11.5	
1539.30	V	248.00	1.0	59.20	-20.0	-8.7	30.5	33.6	500.0	-23.5	
2770.83	V	22.00	1.0	58.5	-20.0	-4.8	33.7	48.4	500.0	-20.3	
3694.44	V	135.00	1.0	64.0	-20.0	-3.6	40.4	104.5	500.0	-13.6	
4603.62	V	225.00	1.0	55.0	-20.0	-2.7	32.3	41.2	500.0	-21.7	
4618.05	V	225.00	1.0	57.2	-20.0	-2.7	34.5	53.1	500.0	-19.5	
4926.80	V	0.00	1.0	46.8	-20.0	-2.4	24.4	16.6	500.0	-29.6	amb
5406.00	V	0.00	1.0	48.3	-20.0	-2.0	26.3	20.6	500.0	-27.7	amb
7388.64	V	180.00	1.0	57.0	-20.0	2.2	39.2	91.2	500.0	-14.8	
8312.22	V	0.00	1.0	43.0	-20.0	2.2	25.2	18.2	500.0	-28.8	amb
9384.00	V	0.00	1.0	43.3	-20.0	2.7	26.0	19.9	500.0	-28.0	amb
1216.80	H	225.00	1.0	58.0	-20.0	-10.9	27.1	22.6	500.0	-26.9	
1231.44	H	270.00	1.0	73.8	-20.0	-10.8	43.0	141.1	500.0	-11.0	
1539.30	H	225.00	1.0	68.0	-20.0	-8.7	39.3	92.5	500.0	-14.7	
2770.83	H	68.00	1.0	56.0	-20.0	-4.8	31.2	36.3	500.0	-22.8	
3694.44	H	135.00	1.0	61.8	-20.0	-3.6	38.2	81.4	500.0	-15.8	
4603.62	H	225.00	1.0	55.3	-20.0	-2.7	32.6	42.8	500.0	-21.4	
4618.05	H	225.00	1.0	53.0	-20.0	-2.7	30.3	32.7	500.0	-23.7	
4926.80	H	0.00	1.0	48.0	-20.0	-2.4	25.6	19.0	500.0	-28.4	amb
5406.00	H	0.00	1.0	46.8	-20.0	-2.0	24.8	17.3	500.0	-29.2	amb
7388.64	H	180.00	1.0	53.0	-20.0	2.2	35.2	57.5	500.0	-18.8	
8312.22	H	0.00	1.0	44.5	-20.0	2.2	26.7	21.6	500.0	-27.3	amb
9384.00	H	180.00	1.0	48.0	-20.0	2.7	30.7	34.2	500.0	-23.3	amb
Y											
1216.80	V	22.00	1.0	62.20	-20.0	-10.9	31.3	36.6	500.0	-22.7	
1231.44	V	22.00	1.0	79.00	-20.0	-10.8	48.2	256.7	500.0	-5.8	
1539.30	V	135.00	1.0	60.33	-20.0	-8.7	31.7	38.2	500.0	-22.3	
2770.83	V	180.00	1.0	56.25	-20.0	-4.8	31.4	37.3	500.0	-22.5	

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (PEAK) dBuV	Afd dB	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
3694.44	V	0.00	1.0	61.50	-20.0	-3.6	37.9	78.4	500.0	-16.1	
4603.62	V	180.00	1.0	55.00	-20.0	-2.7	32.3	41.2	500.0	-21.7	
4618.05	V	0.00	1.0	57.20	-20.0	-2.7	34.5	53.1	500.0	-19.5	
4926.80	V	0.00	1.0	45.90	-20.0	-2.4	23.5	14.9	500.0	-30.5	amb
5541.36	V	180.00	1.0	50.00	-20.0	-1.9	28.1	25.3	500.0	-25.9	
7388.64	V	90.00	1.0	54.0	-20.0	2.2	36.2	64.6	500.0	-17.8	
8312.22	V	0.00	1.0	45.0	-20.0	2.2	27.2	22.9	500.0	-26.8	amb
9384.00	V	0.00	1.0	46.00	-20.0	2.7	28.7	27.2	500.0	-25.3	amb
1216.80	H	180.00	1.0	53.00	-20.0	-10.9	37.1	71.4	500.0	-16.9	
1231.44	H	225.00	1.0	66.50	-20.0	-10.8	35.7	60.9	500.0	-18.3	
1539.30	H	180.00	1.0	59.83	-20.0	-8.7	31.2	36.1	500.0	-22.8	
2770.83	H	158.00	1.0	61.83	-20.0	-4.8	37.0	71.0	500.0	-17.0	
3694.44	H	315.00	1.0	60.83	-20.0	-3.6	37.2	72.5	500.0	-16.8	
4603.62	H	315.00	1.0	55.50	-20.0	-2.7	32.8	43.6	500.0	-21.2	
4618.05	H	315.00	1.0	56.50	-20.0	-2.7	33.8	49.0	500.0	-20.2	
4926.80	H	202.00	1.0	48.00	-20.0	-2.4	25.6	19.0	500.0	-28.4	
5541.36	H	315.00	1.0	51.00	-20.0	-1.9	29.1	28.4	500.0	-24.9	
7388.64	H	202.50	1.0	51.0	-20.0	2.2	33.2	45.7	500.0	-20.8	
8312.22	H	0.00	1.0	44.2	-20.0	2.2	26.4	20.8	500.0	-27.6	amb
9384.00	H	0.00	1.0	48.00	-20.0	2.7	30.7	34.2	500.0	-23.3	amb
Z											
1216.80	V	45.00	1.0	51.83	-20.0	-10.9	20.9	11.1	500.0	-33.1	
1231.44	V	45.00	1.0	67.83	-20.0	-10.8	37.0	71.0	500.0	-17.0	
1539.30	V	202.00	1.0	56.50	-20.0	-8.7	27.8	24.6	500.0	-26.2	
2770.83	V	90.00	1.0	55.83	-20.0	-4.8	31.0	35.6	500.0	-23.0	
3694.44	V	225.00	1.0	60.17	-20.0	-3.6	36.6	67.2	500.0	-17.4	
4603.62	V	315.00	1.0	49.00	-20.0	-2.7	26.3	20.6	500.0	-27.7	
4618.05	V	0.00	1.0	44.00	-20.0	-2.7	21.3	11.6	500.0	-32.7	amb
4926.80	V	0.00	1.0	44.30	-20.0	-2.4	21.9	12.4	500.0	-32.1	amb
5541.36	V	248.00	1.0	47.20	-20.0	-1.9	25.3	18.3	500.0	-28.7	
7388.64	V	180.00	1.0	55.5	-20.0	2.2	37.7	76.7	500.0	-16.3	
8312.22	V	0.00	1.0	46.3	-20.0	2.2	28.5	26.6	500.0	-25.5	amb
9384.00	V	0.00	1.0	46.67	-20.0	2.7	29.4	29.3	500.0	-24.6	amb

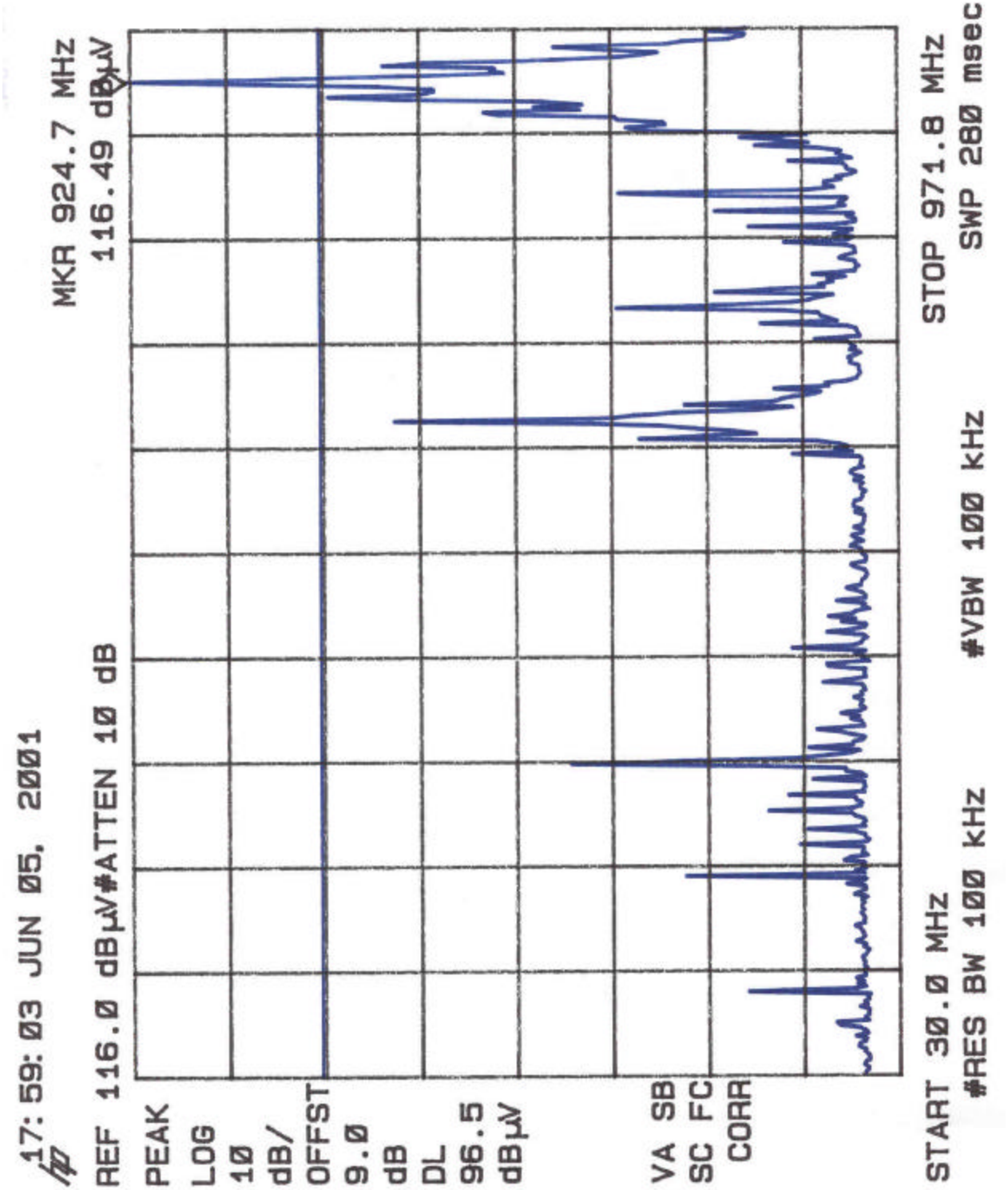
Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (PEAK) dBuV	Afd dB	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
1216.80	H	315.00	1.0	56.20	-20.0	-10.9	25.3	18.4	500.0	-28.7	
1231.44	H	315.00	1.0	72.70	-20.0	-10.8	41.9	124.3	500.0	-12.1	
1539.30	H	315.00	1.0	64.00	-20.0	-8.7	35.3	58.4	500.0	-18.7	
2770.83	H	315.00	1.0	63.50	-20.0	-4.8	38.7	86.0	500.0	-15.3	
3694.44	H	270.00	1.0	63.00	-20.0	-3.6	39.4	93.1	500.0	-14.6	
4603.62	H	338.00	1.0	54.80	-20.0	-2.7	32.1	40.2	500.0	-21.9	
4618.05	H	180.00	1.0	53.00	-20.0	-2.7	30.3	32.7	500.0	-23.7	
4926.80	H	0.00	1.0	48.50	-20.0	-2.4	26.1	20.1	500.0	-27.9	.
5541.36	H	180.00	1.0	50.00	-20.0	-1.9	28.1	25.3	500.0	-25.9	
7388.64	H	180.00	1.0	56.7	-20.0	2.2	38.9	88.1	500.0	-15.1	
8312.22	H	0.00	1.0	46.0	-20.0	2.2	28.2	25.7	500.0	-25.8	amb
9384.00	H	0.00	1.0	47.00	-20.0	2.7	29.7	30.5	500.0	-24.3	amb

3.4 RF Antenna Conducted Spurious Emissions Testing

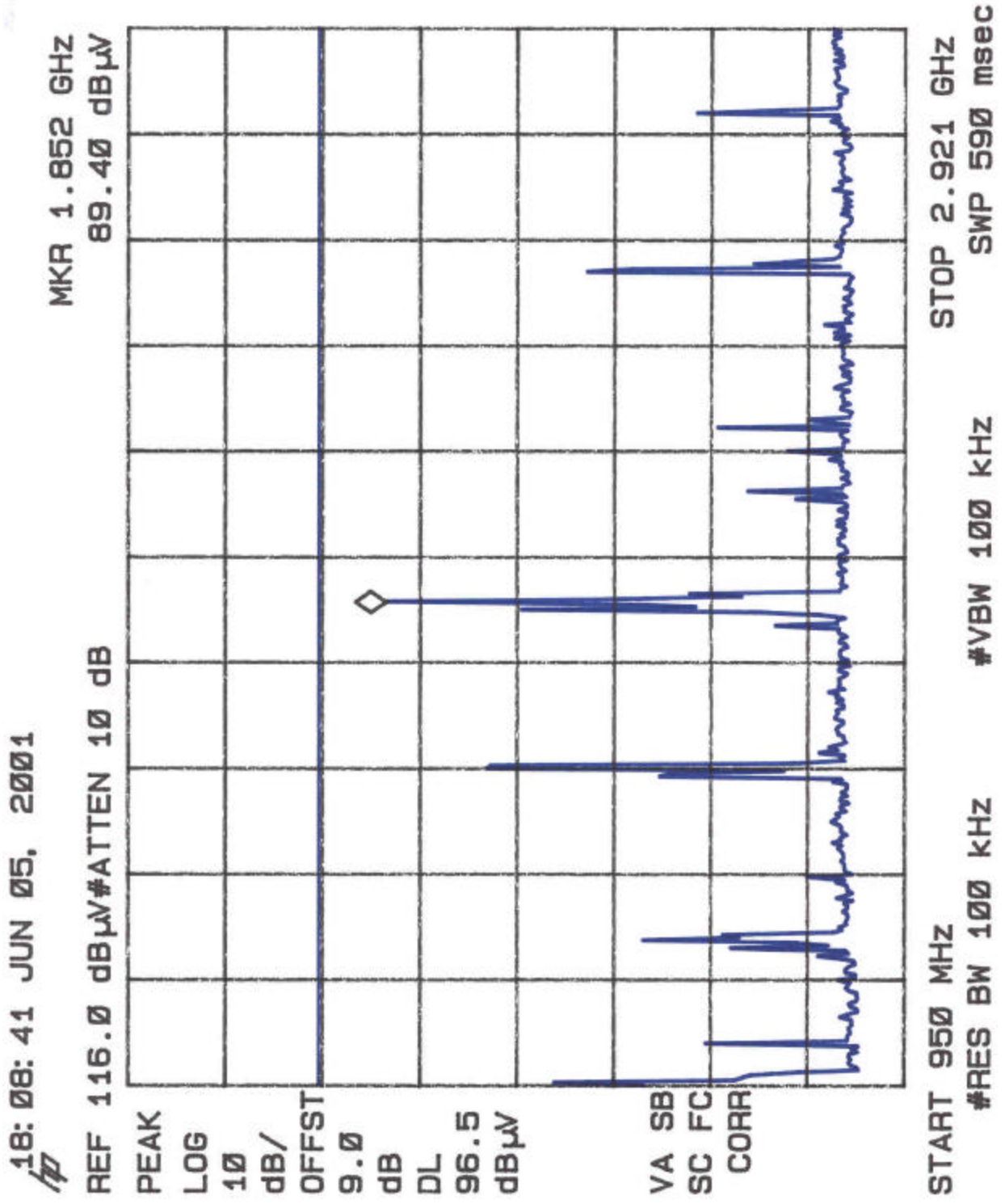
The EUT antenna was replaced with a short piece of microwave "hard line" coaxial cable and the cable was connected directly into the spectrum analyzer input. The analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 100 kHz. The emissions were scanned up to the tenth harmonic of the carrier. At each frequency, an external attenuator or filter was used to confirm that the transmitter input was not overloading the spectrum analyzer input.

Data are included in the following spectrum analyzer plots. All spurious emissions were verified to be 20dB down from the carrier power up to the tenth harmonic.

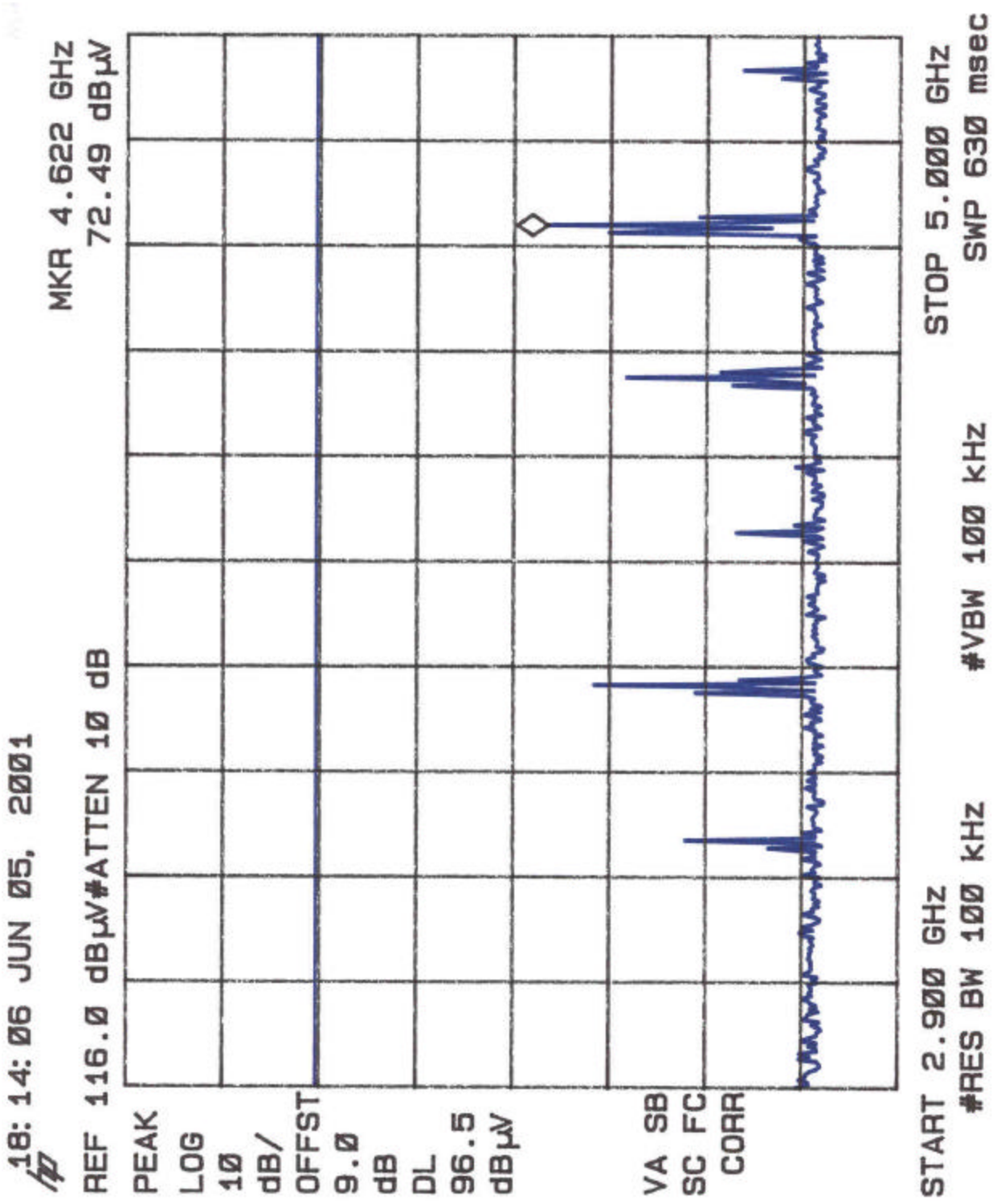
Plot #1: Conducted Spurious Emissions at Antenna Terminal
20dBc



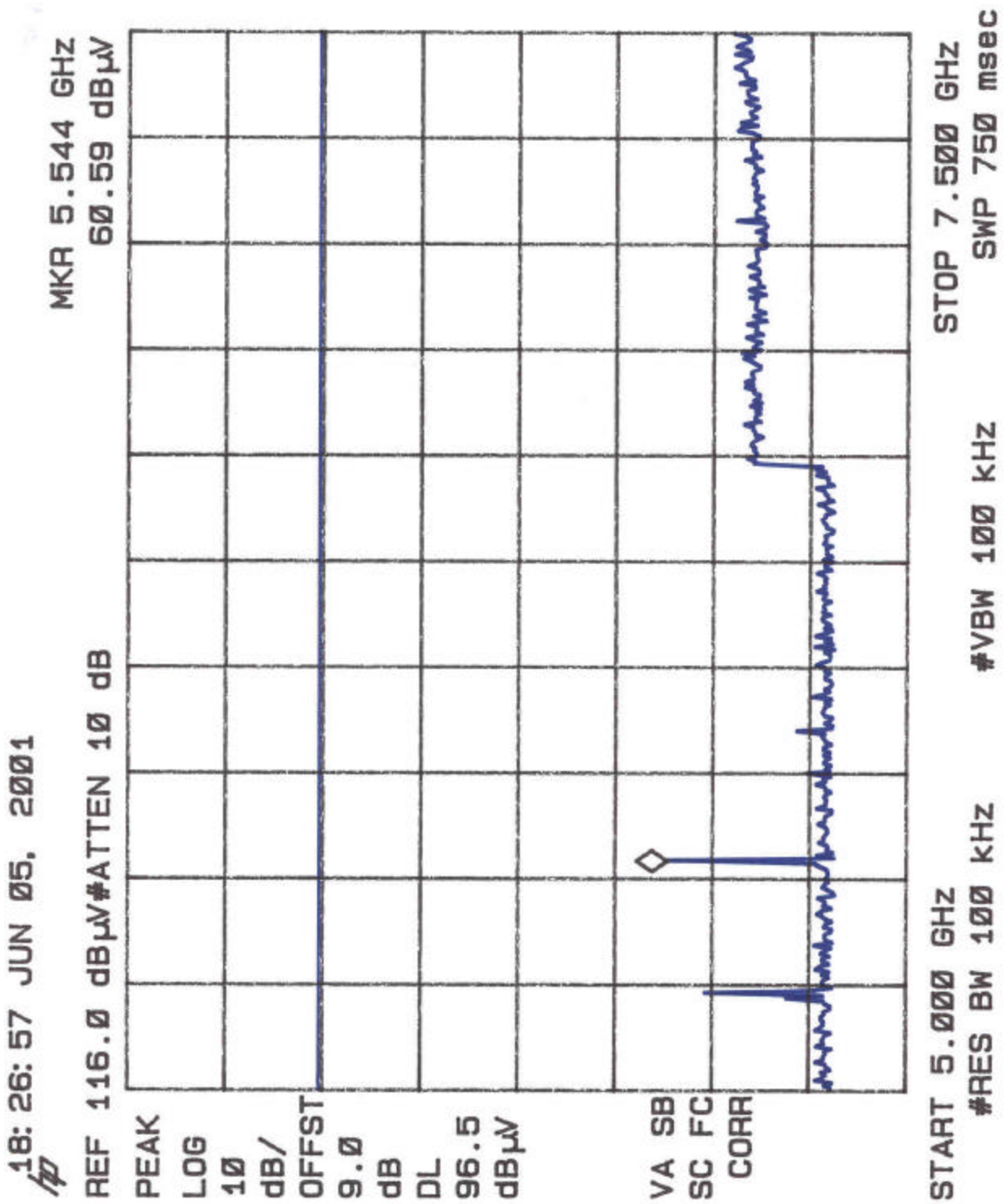
Plot #2: Conducted Spurious Emissions at Antenna Terminal
20dBc



Plot #3: Conducted Spurious Emissions at Antenna Terminal
20dBc



Plot #4: Conducted Spurious Emissions at Antenna Terminal
20dBc



Plot #5: Conducted Spurious Emissions at Antenna Terminal
20dBc

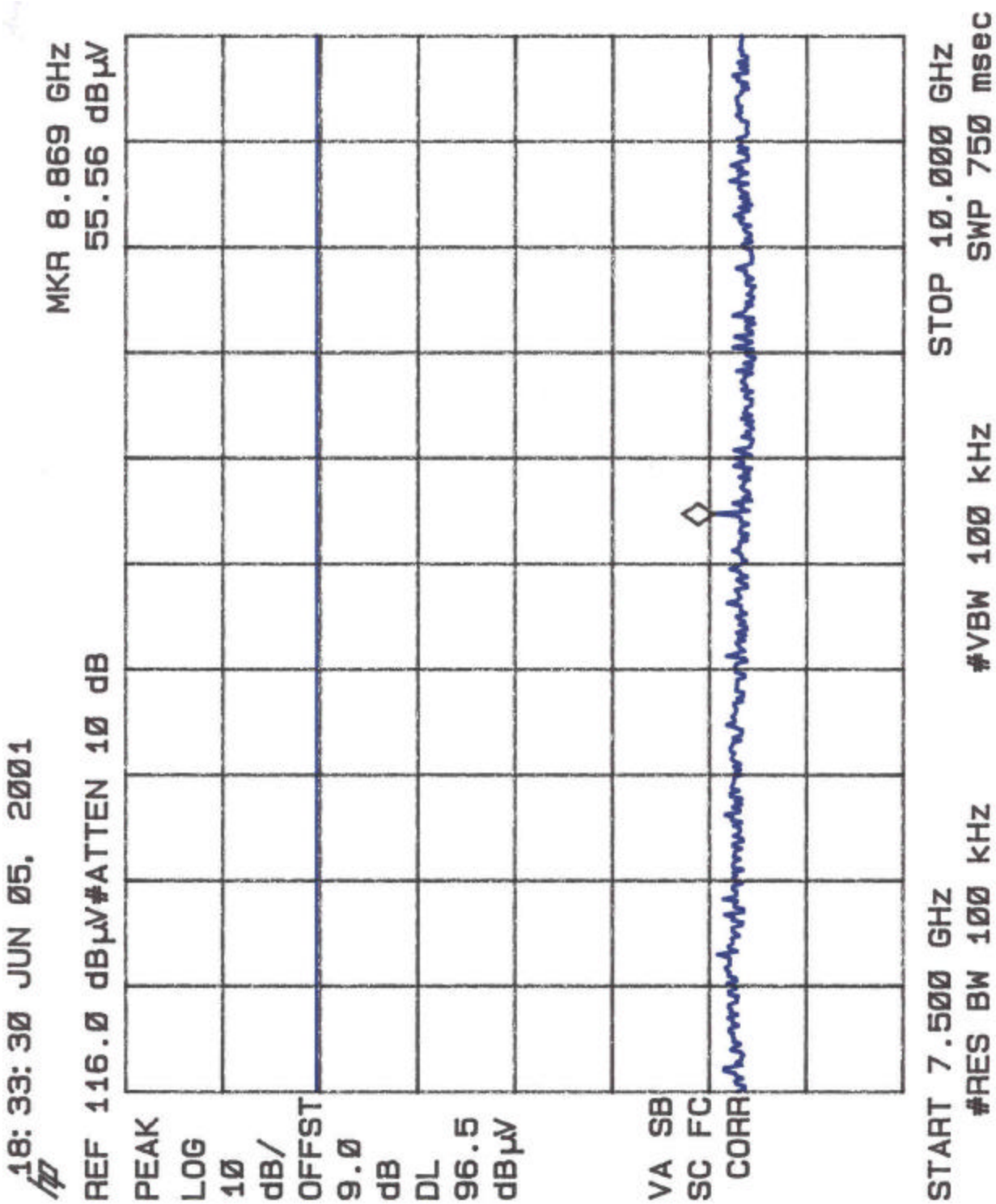


Table 2: System Under Test

FCC ID: C2DLWSN-30-DX

EUT: IntelliSense (C & K Systems, Inc.) SN931 Outdoor Spread Spectrum Transmitter; FCC ID: C2DLWSN-30-DX

Table 3: Measurement Equipment Used

The following equipment is used to perform measurements:

Hewlett-Packard Spectrum Analyzer: HP 8568B

Hewlett-Packard Quasi-Peak Adapter: HP 85650A

Hewlett-Packard Preselector: HP 85685A

Hewlett-Packard Spectrum Analyzer: HP 8564E

Hewlett-Packard Pre-Amplifier: HP 8449A

Antenna Research Associates, Inc. Biconical Log Periodic Antenna: LPB-2520A (Site 2)

Antenna Research Associates, Inc. Horn Antenna: DRG-118/A

Solar 50 Ω/50 µH Line Impedance Stabilization Network: 8012-50-R-24-BNC

Solar 50 Ω/50 µH Line Impedance Stabilization Network: 8028-50-TS-24-BNC

AH Systems, Inc. Portable Antenna Mast: AMS-4 (Site 2)

AH Systems, Inc. Motorized Turntable (Site 2)

RG-214 semi-rigid coaxial cable

RG-223 double-shielded coaxial cable

Appendix A

Statement of Measurement Uncertainty

For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ±2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:
A = Antenna calibration uncertainty, in dB = 2 dB
B = Spectrum Analyzer uncertainty, in dB = 1 dB
C = Site uncertainty, in dB = 4 dB
n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5\ (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB