RADIATED EMISSIONS DATA FCC PART 15 SUBPART C LIMITS AT A 3 METER EUT TO ANTENNA DISTANCE.

FILE NAME: NAT0101
EUT NAME: MINIATURE WIRELESS TV TRANSMITTERS.

THE EUT IS POWERED BY AN ON-BOARD BATTERY.
THERE WILL BE 10 EUT's MEASURED WITH SERIAL NUMBERS 1 TO 10.
CUSTOMER REPRESENTATIVE: JIM USSAILIS

SINCE ALL TRANSMITTING FREQUENCIES ARE BETWEEN 902 AND 928 MHz, FCC PART 15, SUBPART C, SECTION 15.249 ALLOWS THE TRANSMITTER A LIMIT OF 93.98 dBuV/m.
OTHER EMISSIONS MUST BE BELOW 53.97 dBuV/m.
THE ALLOWED BANDWIDTH IS +/- 0.5% OF THE TRANSMIT FREQUENCY.

TESTED BY: STEVE PETIX ON 1/23/01 TO FCC PART 15 FOR INTENTIONALLY AND UNINTENTIONALLY RADIATING DEVICES THE 3 METER OPEN AREA TEST SITE.

A SCHWARZBECK MODEL VHA9103 BICONICAL ANTENNA, (s/n: A) IS USED FOR 30 TO 200 MHz.
AN AILTECH MODEL 96005, (s/n 1095), LOG PERIODIC ANTENNA IS USED FOR 200 TO 1000 MHz.
AN ELECTROMECHANICS MODEL 3115, s/n 2498 DOUBLE RIDGE WAVEGUIDE ANTENNA IS USED FOR 1000 TO 1800 MHz.

ALL MEASUREMENTS BELOW 1000 MHz USE QUASI-PEAK DETECTION AND PEAK DETECTION FOR ABOVE 1000 MHz UNLESS NOTED OTHERWISE.

Prior to each measurement table, a 10 MHz wide spectrum analyzer trace was taken of the fundamental frequency. All measurements were performed while the EUT was completely operational and transmitting an image to a remote monitor.

The TV transmitter antennas are laying parallel to the ground plane on top of a 1.5 meter tall foam block. The measurement antenna is oriented horizontally in the plane of the EUT's transmitting antenna and atthe optimum height for maximum coupling.

Continued on the following page.

For all TV transmitters:

THE 30 TO 300 MHz ANTENNA IS VERTICAL AND AT 3 METERS.							
FREQ. (MHz)	**AMPL QUASI-P dB(µV)**	**CABLE LOSS dB(µV)**	**ANTENNA FACTORS dB**	**TOTAL FIELD dB(µV/m)**	**LIMIT QUASI-P dB(µV)**	**PASS?**	**MARGIN dB**
NO SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

For all TV transmitters:

THE 30 TO 300 MHz ANTENNA IS HORIZONTAL AND AT 3 METERS.							
FREQ. (MHz)	**AMPL QUASI-P (dBµV)**	**CABLE LOSS**	**ANTENNA FACTORS**	**TOTAL FIELD dBµV/m**	**LIMIT QUASI-P (dBµV)**	**PASS?**	**MARGIN (dBµV)**
NO SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 1 (Fundamental frequency of 916.5 MHz)

THE 300 TO 1000 MHz ANTENNA IS VERTICAL AND AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P (dBμV)	CABLE LOSS	ANTENNA FACTORS	TOTAL FIELD dBμV/m	LIMIT QUASI-P (dBμV)	PASS?	MARGIN (dBμV)
912.00	1	11.31	30.22	42.53	46	YES	3.5
916.50	48	11.31	29.89	89.20	93.98	YES	4.8
920.00	4	11.31	29.57	44.88	46	YES	1.1
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 1 (Fundamental frequency of 916.5 MHz)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
912.00	2	11.31	30.22	43.53	46	YES	2.5
916.50	51	11.31	29.89	92.20	93.98	YES	1.8
920.00	5	11.31	29.57	45.88	46	YES	0.1
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 2 (Fundamental frequency of 920 MHz)

THE 300 TO 1000 MHz ANTENNA IS VERTICAL AND AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P (dBμV)	CABLE LOSS	ANTENNA FACTORS	TOTAL FIELD dBμV/m	LIMIT QUASI-P (dBμV)	PASS?	MARGIN (dBμV)
912.00	0	11.31	30.22	41.53	46	YES	4.5
920.00	35	11.31	29.57	75.88	93.98	YES	18.1
924.00	1	11.31	29.25	41.56	46	YES	4.4
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

Continued on the following page.

TV transmitter # 2 (Fundamental frequency of 920 MHz)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
912.00	0	11.31	30.22	41.53	46	YES	4.5
920.00	49	11.31	29.57	89.88	93.98	YES	4.1
924.00	1	11.31	29.25	41.56	46	YES	4.4
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 3 (Fundamental frequency of 916.5 MHz)

THE 300 TO 1000 MHz ANTENNA IS VERTICAL AND AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P (dBμV)	CABLE LOSS	ANTENNA FACTORS	TOTAL FIELD dBμV/m	LIMIT QUASI-P (dBμV)	PASS?	MARGIN (dBμV)
916.50	36	11.31	29.89	77.20	93.98	YES	16.8
920.00	0	11.31	29.57	40.88	46	YES	5.1
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 3 (Fundamental frequency of 916.5 MHz)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.

FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
904.00	8	11.31	30.86	50.17	46	NO	4.2
904 MHz is an ambient TV signal.							
916.50	47	11.31	29.89	88.20	93.98	YES	5.8
920.00	4	11.31	29.57	44.88	46	YES	1.1
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

Because the transmitter is oriented horizontally, and to save time, measurements are only made with the receive antenna oriented horizontally.

TV transmitter # 4 (Fundamental frequency of 906 MHz)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
906.00	48	11.31	30.70	90.01	93.98	YES	4.0
910.00	0	11.31	30.38	41.69	46	YES	4.3
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

Continued on the following page.

TV transmitter # 5 (Fundamental frequency of 920 MHz, color camera.)
This camera has two spurious signals near the fundamental.

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
916.39	12	11.31	29.89	53.20	46	NO	7.2
919.87	44	11.31	29.65	84.96	93.98	YES	9.0
923.50	13	11.31	29.33	53.64	46	NO	7.6
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 6 (Fundamental frequency of 916.5 MHz, color camera.)
This camera has two spurious signals near the fundamental.

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
912.85	12	11.31	30.22	53.53	46	NO	7.5
916.50	50	11.31	29.89	91.20	93.98	YES	2.8
919.98	13	11.31	29.65	53.96	46	NO	8.0
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 7 (Fundamental frequency of 906 MHz, color camera.)
This camera has two spurious signals near the fundamental.

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	AMPL QUASI-P dB(μV)	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
901.57	10	11.31	31.10	52.42	46	NO	6.4
905.91	44	11.31	30.78	86.09	93.98	YES	7.9
910.37	12	11.31	30.38	53.69	46	NO	7.7

NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.

TV transmitter # 8 (Fundamental frequency of 920 MHz with no camera elements.)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	**AMPL QUASI-P dB(μV)**	**CABLE LOSS dB(μV)**	**ANTENNA FACTORS dB**	**TOTAL FIELD dB(μV/m)**	**LIMIT QUASI-P dB(μV)**	**PASS?**	**MARGIN dB**
919.61	46	11.31	29.65	86.96	93.98	YES	7.0
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 9 (Fundamental frequency of 916.5 MHz with no camera elements.)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	**AMPL QUASI-P dB(μV)**	**CABLE LOSS dB(μV)**	**ANTENNA FACTORS dB**	**TOTAL FIELD dB(μV/m)**	**LIMIT QUASI-P dB(μV)**	**PASS?**	**MARGIN dB**
916.36	49	11.31	29.89	90.20	93.98	YES	3.8
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

Continued on the following page.

TV transmitter # 10 (Fundamental frequency of 906 MHz with no camera elements.)

THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL & AT 3 METERS.							
FREQ. (MHz)	**AMPL QUASI-P dB(μV)**	**CABLE LOSS dB(μV)**	**ANTENNA FACTORS dB**	**TOTAL FIELD dB(μV/m)**	**LIMIT QUASI-P dB(μV)**	**PASS?**	**MARGIN dB**
905.77	48	11.31	30.78	90.09	93.98	YES	3.9
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

For the following measurements, the EUTs are moved into the laboratory and a short length of solid shield SMA cable with negligible cable loss is used to connect the guided double ridge antenna to the spectrum analyzer. A one meter antenna to EUT separation is used.

The limits used for these measurements use AVERAGE detection, or as an alternative, PEAK detection may be used. In the PEAK detection case, the limits are increased by 20 dB.
For this project, PEAK detection is used. A 1 MHz resolution bandwidth is used.

TV transmitter # 1 (Fundamental frequency of 916.5 MHz)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
1833.00	-76	31.00	26.00	57.00	74	YES	17.0
2750.40	-71	36.00	29.70	65.70	74	YES	8.3
3669.40	-71	36.00	32.50	68.50	74	YES	5.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 2 (Fundamental frequency of 920 MHz)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
2760.10	-72	35.00	29.70	64.70	74	YES	9.3
3682.40	-68	39.00	32.50	71.50	74	YES	2.5

3676.80	-67	40.00	32.50	72.50	74	YES	1.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 3 (Fundamental frequency of 916.5 MHz)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
2750.40	-67	40.00	29.70	69.70	74	YES	4.3
3669.30	-68	39.00	32.50	71.50	74	YES	2.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

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TV transmitter # 4 (Fundamental frequency of 906 MHz)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
2718.50	-64	43.00	29.70	72.70	74	YES	1.3
3626.80	-70	37.00	32.50	69.50	74	YES	4.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 5 (Fundamental frequency of 920 MHz. This is a color camera.)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
2760.70	-71	36.00	29.70	65.70	74	YES	8.3
3683.40	-68	39.00	32.50	71.50	74	YES	2.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 6 (Fundamental frequency of 916.5 MHz. This is a color camera.)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
2750.40	-65	42.00	29.70	71.70	74	YES	2.3
3669.40	-67	40.00	32.50	72.50	74	YES	1.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 7 (Fundamental frequency of 906 MHz. This is a color camera.)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	**AMPL PEAK Dbm**	**AMPL PEAK dB(μV)**	**ANTENNA FACTORS dB/m**	**TOTAL FIELD dB(μV/m)**	**FCC LIMIT PEAK dB(μV/m)**	**PASS?**	**MARGIN dB**
2718.70	-65	42.00	29.70	71.70	74	YES	2.3
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 8 (Fundamental frequency of 920 MHz. This does not have a camera.)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.

FREQ. (MHz)	AMPL PEAK Dbm	AMPL PEAK dB(μV)	ANTENNA FACTORS dB/m	TOTAL FIELD dB(μV/m)	FCC LIMIT PEAK dB(μV/m)	PASS?	MARGIN dB
2760.00	-64	43.00	29.70	72.70	74	YES	1.3
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

Continued on the following page.

TV transmitter # 9 (Fundamental frequency of 916.5 MHz. This does not have a camera.)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	AMPL PEAK Dbm	AMPL PEAK dB(μV)	ANTENNA FACTORS dB/m	TOTAL FIELD dB(μV/m)	FCC LIMIT PEAK dB(μV/m)	PASS?	MARGIN dB
2702.00	-66	41.00	29.70	70.70	74	YES	3.3
3669.20	-66	41.00	32.50	73.50	74	YES	0.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

TV transmitter # 10 (Fundamental frequency of 906 MHz, no camera.)

THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 1 METER.							
FREQ. (MHz)	AMPL PEAK Dbm	AMPL PEAK dB(μV)	ANTENNA FACTORS dB/m	TOTAL FIELD dB(μV/m)	FCC LIMIT PEAK dB(μV/m)	PASS?	MARGIN dB
2718.30	-63	44.00	29.70	73.70	74	YES	0.3
3626.50	-67	40.00	32.50	72.50	74	YES	1.5
NO OTHER SIGNIFICANT EUT GENERATED SIGNALS FOUND FOR THIS RANGE.							

THE NATIONAL WIRELESS TV TRANSMITTER MODULES MEET THE RADIATED EMISSIONS REQUIREMENT OF FCC PART 15, SUBPART C WITHOUT MODIFICATIONS.