

## TEST & MEASUREMENT DATA REPORT FOR "TEAM TALK" TRANSCEIVER

FILE NAME: SAF0201

EUT NAME: "Team Talk" SAV-100

THE EUT IS A REDUCED POWER, FRS-BASED TRANSCEIVER.

IT IS POWERED BY A SINGLE 9VDC ALKALINE BATTERY.

THE EUT IS A PROTOTYPE, USE SERIAL NUMBER: " PROTO1."

CUSTOMER REPRESENTATIVE: CURT SEATON (not present)

MEASURED BY STEVE PETIX ON 5/22/02 TO FCC PART 95 USING 3 METER OPEN AREA TEST SITES, (OATS).

### **THE EUT MEASURING ANTENNAS ARE:**

A SCHWARZBECK MODEL VHA9103 BICONICAL ANTENNA, (s/n: A) IS USED FOR 30 TO 300 MHz.

AN AILTECH MODEL 96005, (s/n 1095), LOG PERIODIC ANTENNA IS USED FOR 300 TO 1000 MHz.

AN EMCO MODEL 3115 s/n 2498 GUIDED RIDGE HORN ANTENNA IS USED FOR 1 TO 18 GHz.

### **THE SUBSTITUTION ANTENNAS IS:**

A SCHWARZBECK MODEL UHA-9105 TUNED DIPOLE IS USED FOR 300 TO 1000 MHz.

THE ANTENNAS ARE FACING THE YELLOW TRANSMIT BUTTON SIDE FOR ALL MEASUREMENTS.  
THE EUT IS 1.5 METERS ABOVE THE SHEET STEEL GROUND PLANE.

ALL MEASUREMENTS USE PEAK DETECTION.

ADVANTEST MODEL R3361A & HP MODEL 8569B SPECTRUM ANALYZERS ARE USED.

The EUT is based on a previously approved FRS radio core. Its FCC ID is: PHC-1428.

This FRS radio core is used in the Audiovox model FR-1428 Two Way Family Radio.

It is manufactured by Linkomm Communications Network of South Korea.

Safety Tech Industries, Inc. is using this FRS radio core electronically unchanged. It places the radio core inside a new housing that is to be mounted on the face mask of firefighters. The housing contains circuitry on a mother board that interfaces with the FR-1428's controls.

This circuitry allows the use of any of the 14 channels. Safety Tech Industries elected to use channel 12 (467.6625MHz) for a "common" channel on all units. The only RF modification is the use of a PCB antenna with a 47 ohm loading resistor mounted on the interface electronics board. The PCB antenna and load resistor reduce the effective radiated power from the 300 milliwatts claimed by Linkomm Communications for the PHC-148 radio core.

In this unit, Channel, 467.714 MHz, is used for all measurements.

All measurements are performed with the bottom edge of the TeamTalk housing parallel to the ground.

This is similar to its actual orientation on the firefighter's face mask when he/she is looking straight ahead.

The TeamTalk FCC ID is: QDQ-100.

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**CARRIER FIELD STRENGTH MEASUREMENTS:**

The EUT's unmodulated carrier is measured on a spectrum analyzer. The maximum level is measured by scanning the receive antenna height from 1 to 4 meters. No preamplifier is used at the spectrum analyzer input. No amplifier is used at the signal generator output.

**THE 300 TO 1000MHz ANTENNA IS VERTICAL**

FREQ. (MHz)	AMPL QUASI-P dB(µV)	CABLE LOSS, dB	ANTENNA FACTORS dB/m	TOTAL FIELD dB(µV/m)	
467.714	79	4.44	16.88	100.32	

**THE 300 TO 1000MHz ANTENNA IS HORIZONTAL**

FREQ. (MHz)	AMPL QUASI-P dB(µV)	CABLE LOSS, dB	ANTENNA FACTORS dB/m	TOTAL FIELD dB(µV/m)	
467.714	87	4.44	16.88	108.32	

**Sections 2.1046(a) & 95.639: RF POWER OUTPUT:**

The EUT is replaced with the tuned dipole antenna located in the exact position the EUT was for the measurements above. The dipole is energized with a Marconi model 2022C signal generator. Due to insufficient power, a 32 dB preamplifier on the spectrum analyzer input was needed to boost the signal from the receive antenna. The output of the signal generator was raised until the resulting 467.714MHz signal level matched the level recorded from the field strength measurement above.

**THE 300 TO 1000MHz SUBSTITUTION DIPOLE IS VERTICAL.**

FREQ. (MHz)	LENGTH OF EACH DIPOLE AERIAL (mm)	MATCH SIG GEN OUTPUT (dBm)	LAB to OATS REF ANT CABLE LOSS (dB)	DIPOLE ANTENNA. GAIN (dBi)	R14601 PREAMP GAIN (dB)	EFFECTIVE RADIATED POWER (dBm)	EFFECTIVE RADIATED POWER (mw)
467.711	155.00	-24.00	4.7	2.20	32	5.50	3.55

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467.711	155.00	-13.00	4.7	2.20	32	16.50	44.67

Using the higher power rating from the horizontal measurements, the emission mask formula;  $43 + 10\log(P)$ , with  $P = .04467$  watts, yields 29.5 dB. This is the level spurious emissions need to be attenuated by, relative to the carrier.

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**Sections 2.1053 and 95.635(b) (4): SPURIOUS EMISSIONS MEASUREMENTS:**

The following measurements are of spurious emissions that appear only when the transmitter is activated.

"Atten Below Max Carrier Level" = 108 - "Total Field".

"Margin" = 29.5 - "Atten Below Carrier".

<b>THE 30 TO 300 MHz ANTENNA IS VERTICAL AND AT 3 METERS.</b>							
FREQ. (MHz)	AMPL dB(µV)	CABLE LOSS, dB	ANTENNA FACTORS dB/m	TOTAL FIELD dB(µV/m)	ATTEN BELOW MAX CARRIER LEVEL	PASS? (YES)	MARGIN dB
NO SIGNIFICANT EUT SIGNALS FOUND FOR THIS RANGE.							

<b>THE 30 TO 300 MHz ANTENNA IS HORIZONTAL &amp; AT 3 METERS.</b>							
FREQ. (MHz)	AMPL dB(µV)	CABLE LOSS, dB	ANTENNA FACTORS dB/m	TOTAL FIELD dB(µV/m)	ATTEN BELOW MAX CARRIER LEVEL	PASS? (YES)	MARGIN dB
NO SIGNIFICANT EUT SIGNALS FOUND FOR THIS RANGE.							

<b>THE 300 TO 1000MHz ANTENNA IS HORIZONTAL &amp; AT 3 METERS.</b>							
FREQ. (MHz)	AMPL dB(µV)	CABLE LOSS, dB	ANTENNA FACTORS dB/m	TOTAL FIELD dB(µV/m)	ATTEN BELOW MAX CARRIER LEVEL	PASS?	MARGIN dB
935.900	38	13.08	23.19	74.27	33.73	YES	4.23
NO OTHER SIGNIFICANT EUT SIGNALS FOUND FOR THIS RANGE.							

<b>THE 300 TO 1000MHz ANTENNA IS VERTICAL &amp; AT 3 METERS.</b>							
FREQ. (MHz)	AMPL dB(µV)	CABLE LOSS, dB	ANTENNA FACTORS dB/m	TOTAL FIELD dB(µV/m)	ATTEN BELOW MAX CARRIER LEVEL	PASS?	MARGIN dB
935.900	11	13.08	23.19	47.27	60.73	YES	31.23
NO OTHER SIGNIFICANT EUT SIGNALS FOUND FOR THIS RANGE.							

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**THE 1 TO 18 GHz ANTENNA IS VERTICAL AND AT 3 METERS.**

FREQ. (MHz)	AMPL dBm	AMPL dBuV	CABLE LOSS dB	HORN ANTENNA FACTOR	TOTAL FIELD (dBuV/m)	ATTEN BELOW MAX CARRIER LEVEL	PASS?	MARGIN (dB $\mu$ V)
1406	0.00	107	0.00	25.76	133	-24.76	NO	54.26
1871	-84	23	0.00	27.5	51	57.50	YES	28.00
2339	-78	29	1.00	28.62	59	49.38	YES	19.88
2807	-75	32	2.00	30.14	64	43.86	YES	14.36
3276	-80	27	3.00	31.66	62	46.34	YES	16.84
3746	-76	31	0.00	32.9	64	44.10	YES	14.60
4208	-83	24	0.00	33.38	57	50.62	YES	21.12

NO OTHER SIGNIFICANT EUT SIGNALS FOUND THROUGH 5GHz.

**THE 1 TO 18 GHz ANTENNA IS HORIZONTAL AND AT 3 METERS.**

FREQ. (MHz)	AMPL dBm	AMPL dBuV	CABLE LOSS dB	HORN ANTENNA FACTOR	TOTAL FIELD (dBuV/m)	ATTEN BELOW MAX CARRIER LEVEL	PASS?	MARGIN (dB $\mu$ V)
1406	-55	52	0.00	25.76	78	30.24	YES	0.74
1871	-78	29	0.00	27.5	57	51.50	YES	22.00
2339	-80	27	1.00	28.62	57	51.38	YES	21.88
2807	-79	28	2.00	30.14	60	47.86	YES	18.36
3276	-82	25	3.00	31.66	60	48.34	YES	18.84
3746	-78	29	0.00	32.9	62	46.10	YES	16.60
4208	-83	24	0.00	33.38	57	50.62	YES	21.12
4676	-85	22	5.00	33.44	60	47.56	YES	18.06
5144	-86	21	1.00	34.6	57	51.40	YES	21.90

NO OTHER SIGNIFICANT EUT SIGNALS FOUND THROUGH 5GHz.