HARMONICS AND SPURIOUS EMISSIONS – LOW, MID, HIGH CHANNEL – HANDSET UNIT

05/16/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 03U1988-1
Company: CLIFFORD TECHNOLOGIES
EUT Descrip.: 2.4GHz SPREAD SPECTRUM CORDLESS PHONE_M/N: D727
EUT M/N: D272
Test Target: FCC15.247
Mode Oper: Tx at L/M/H_ Harmonic & Spur_EUT in Y Orientation_Handset

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifier 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T72; S/N: 6730 @3m	Miteq NSP2600-44	8593EM Analyzer		FCC 15.205

Hi Frequency Cables: ☐ (2 ft) ☐ (2 – 3 ft) ☑ (4 – 6 ft) ☑ (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth; 1MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth; 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
LOW															
4.810	9.8	58.4	50.2	33.2	3.4	-36.1	0.0	1.0	59.9	51.7	74.0	54.0	-14.1	-2.3	V
4.810	9.8	53.8	46.8	33.2	3.4	-36.1	0.0	1.0	55.3	48.3	74.0	54.0	-18.7	-5.7	H
MID															
4.878	9.8	53.4	43.6	33.3	3.4	-36.1	0.0	1.0	55.1	45.2	74.0	54.0	-18.9	-8.8	V
4.878	9.8	53.1	43.1	33.3	3.4	-36.1	0.0	1.0	54.7	44.7	74.0	54.0	-19.3	-9.3	H
HI															
4.950	9.8	59.7	51.2	33.3	3.5	-36.1	0.0	1.0	61.4	52.9	74.0	54.0	-12.6	-1.1	V
4.950	9.8	55.8	46.0	33.3	3.5	-36.1	0.0	1.0	57.5	47.7	74.0	54.0	-16.5	-6.3	H
NO OTHER EMISSION FOUND AFTER 2nd HARMONIC															
AVERAGE MINUS 6 dB DUE TO 50% DUTY CYCLE															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION) – BASE UNIT

COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #:	03U1988-1
Report #:	03U988-1 SITE C
Date& Time:	05/16/03 9:59 AM
Test Engr:	VIEN TRAN

Company:	CLIFFORD TECHNOLOGIES
EUT Description:	2.4 GHz SPREAD SPECTRUM CORDLESS PHONE / E272
Test Configuration :	EUT / LAPTOP _ BASE UNIT
Type of Test:	FCC CLASS B
Mode of Operation:	Tx at Middle channel

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
124.80	56.00	11.53	1.87	26.98	42.42	43.50	-1.08	3mH	0.00	1.00	P
547.72	49.40	18.00	4.29	27.67	44.02	46.00	-1.98	3mV	0.00	1.00	P
240.00	56.30	11.41	2.65	26.47	43.89	46.00	-2.11	3mH	0.00	1.00	P
259.13	54.70	12.13	2.76	26.42	43.17	46.00	-2.83	3mH	0.00	1.00	P
230.40	53.10	11.23	2.60	26.50	40.42	46.00	-5.58	3mH	0.00	1.00	P
278.71	50.50	13.27	2.88	26.41	40.24	46.00	-5.76	3mV	0.00	1.00	P
6 Worst Data											

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION) – HANDSET UNIT

COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
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Project #:	03U1988-1
Report #:	03U988-1 SITE C
Date& Time:	
Test Engr:	VIEN TRAN

Company:	CLIFFORD TECHNOLOGIES
EUT Description:	2.4 GHz SPREAD SPECTRUM CORDLESS PHONE / E272
Test Configuration :	EUT / HANDSET
Type of Test:	FCC CLASS B
Mode of Operation:	Tx at Mid Channel

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
374.33	50.04	15.15	3.42	26.93	41.67	46.00	-4.33	3mH	0.00	1.00	P
479.75	46.80	17.21	3.94	27.47	40.48	46.00	-5.52	3mV	0.00	1.00	P
479.75	45.90	17.21	3.94	27.47	39.58	46.00	-6.42	3mH	0.00	1.00	P
144.13	45.70	15.58	2.01	26.90	36.40	43.50	-7.10	3mV	0.00	1.00	P
192.30	46.00	14.22	2.42	26.62	36.02	43.50	-7.48	3mH	0.00	1.00	P
124.00	46.60	11.40	1.86	26.98	32.88	43.50	-10.62	3mV	0.00	1.00	P
6 Worst Data											

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

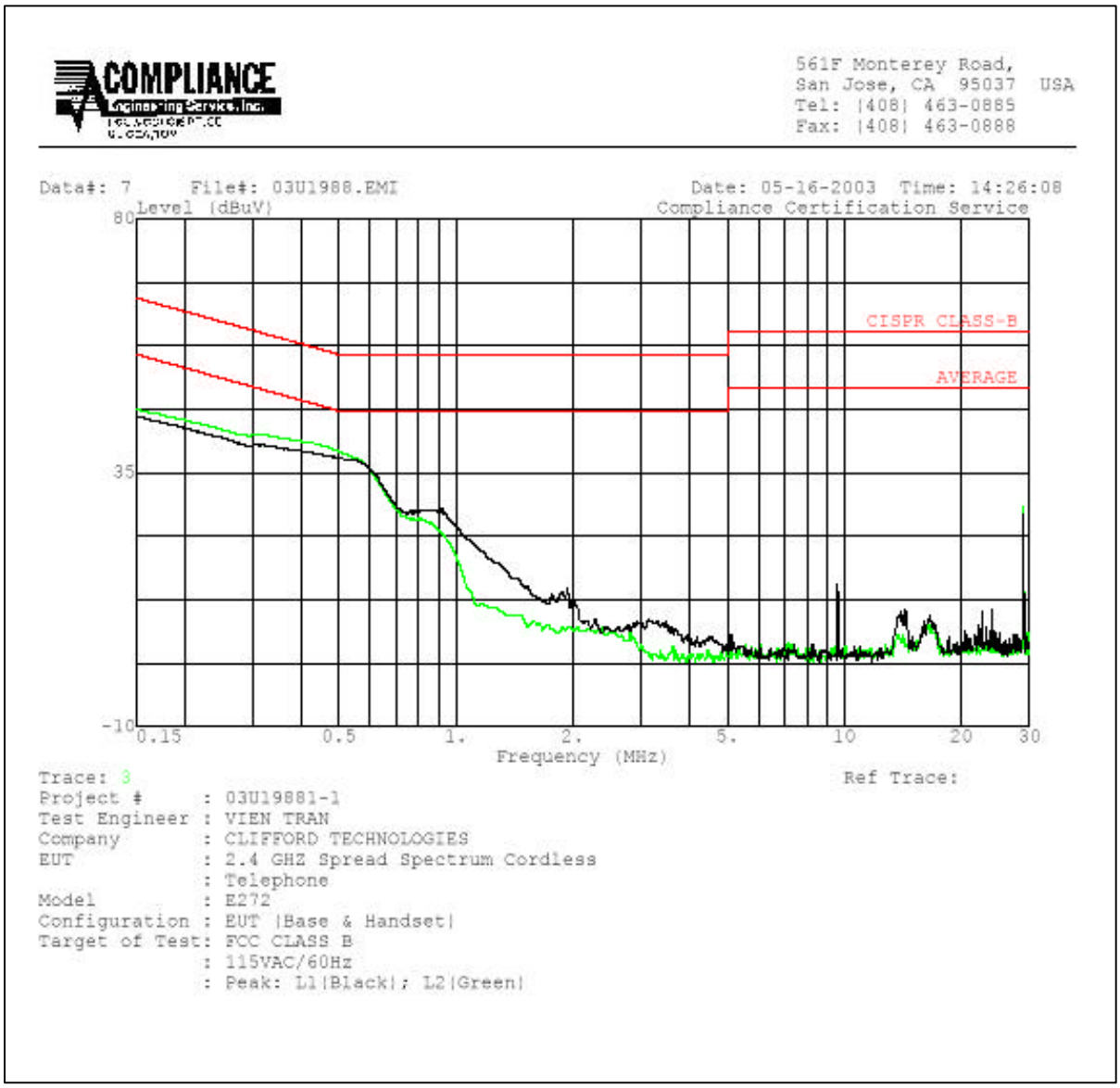
No non-compliance noted:

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)

Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	46.22	--	--	0.00	65.94	55.94	-19.72	-9.72	L1
0.31	41.72	--	--	0.00	61.57	51.57	-19.85	-9.85	L1
28.90	28.88	--	--	0.00	60.00	50.00	-31.12	-21.12	L1
0.15	44.94	--	--	0.00	65.94	55.94	-21.00	-11.00	L2
0.31	33.70	--	--	0.00	61.57	51.57	-27.87	-17.87	L2
28.90	27.60	--	--	0.00	60.00	50.00	-32.40	-22.40	L2
6 Worst Data									

LINE 1, LINE 2 (LINE) RESULTS



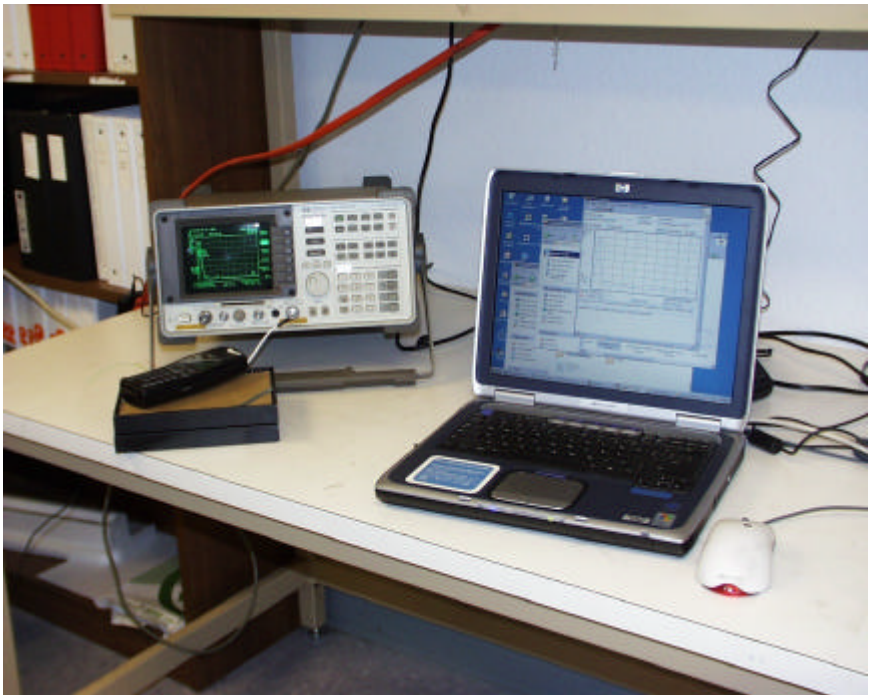
7.8 SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP – BASE UNIT

ANTENNA PORT CONDUCTED PHOTO

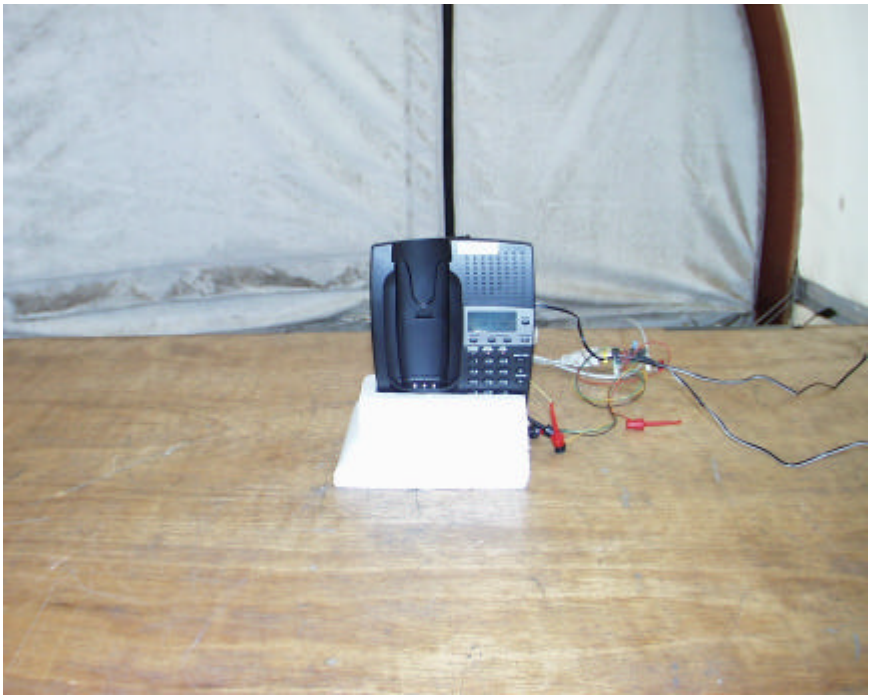
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP – HANDSET UNIT

ANTENNA PORT CONDUCTED PHOTO

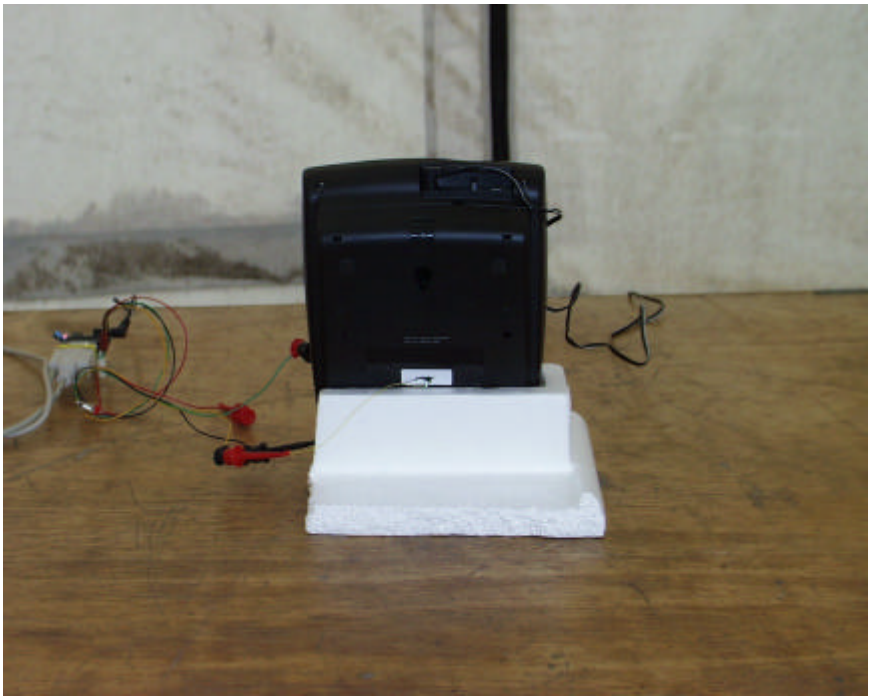


RADIATED RF MEASUREMENT SETUP – BASE UNIT

RADIATED FRONT PHOT



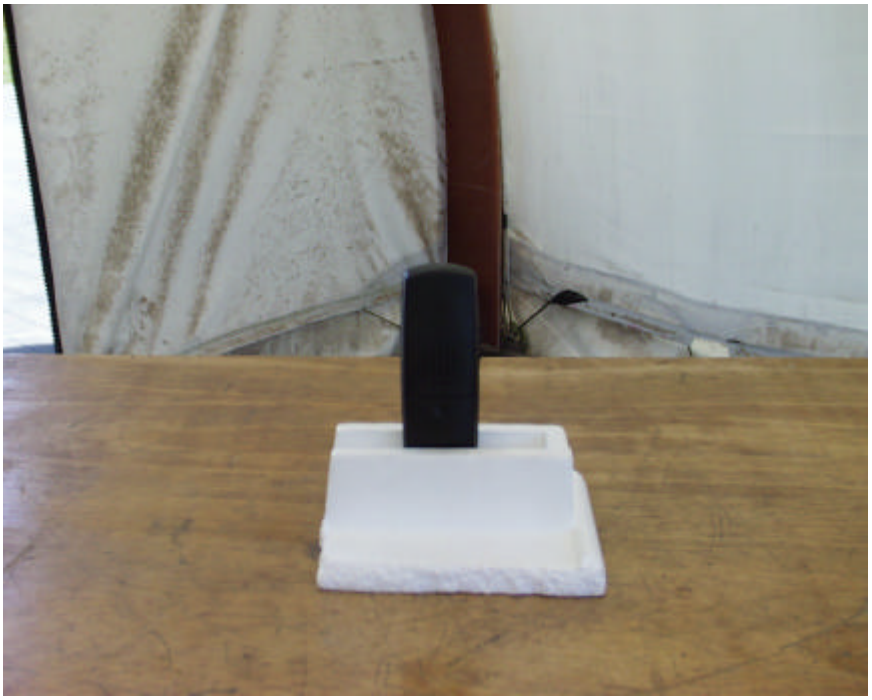
RADIATED BACK PHOTO



RADIATED RF MEASUREMENT SETUP – HANDSET UNIT

RADIATED FRONT PHOTO

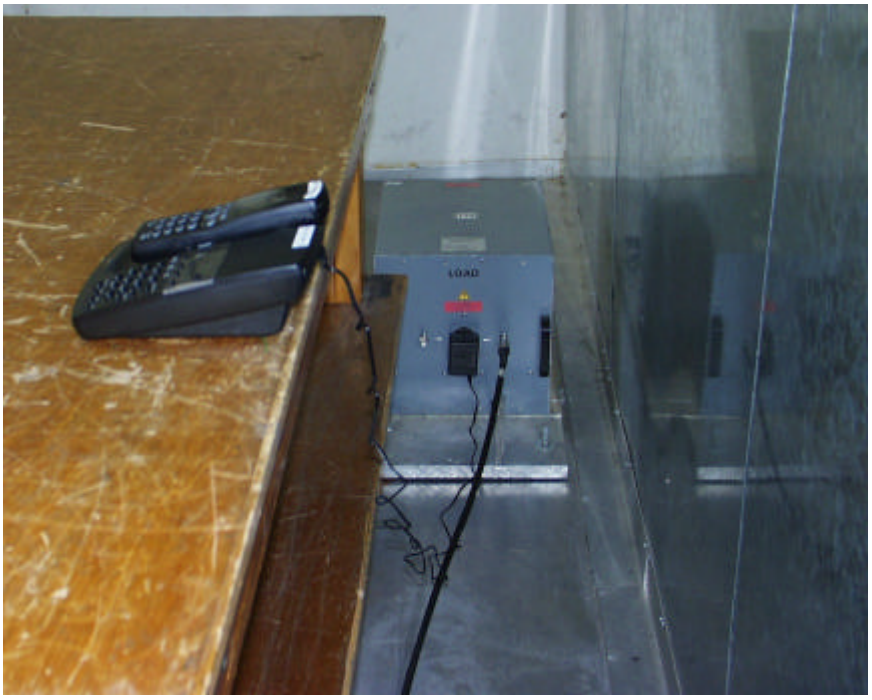
RADIATED FRONT PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP FOR BOTH BASE AND HANDSET UNITS

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO



INTERAL PHOTOS

BASE UNIT

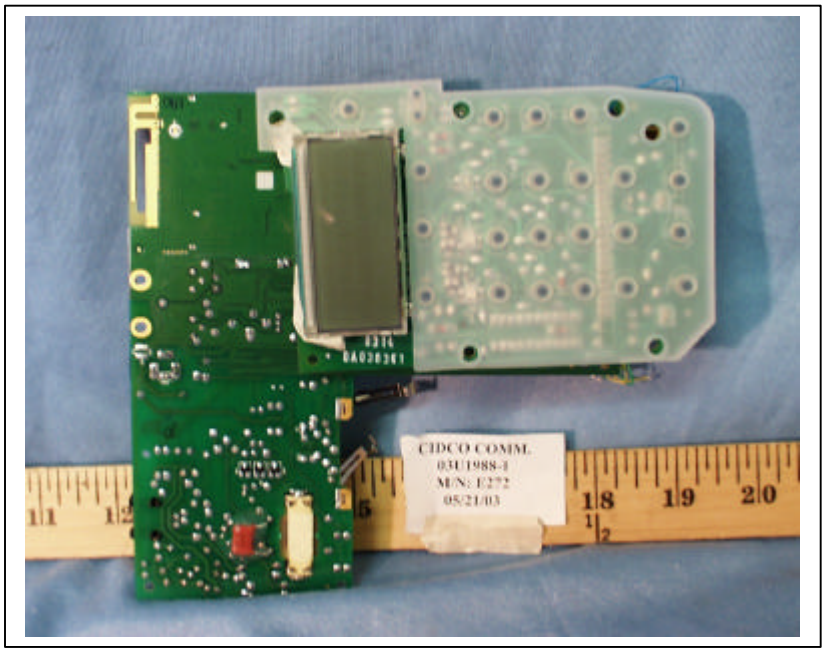
FRONT

BACK

BACK

BACK

BACK



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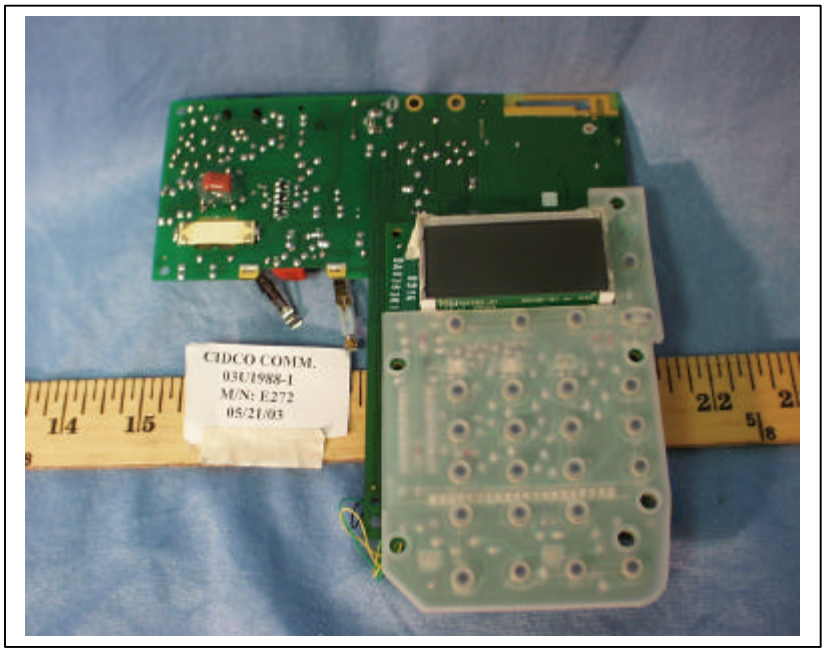

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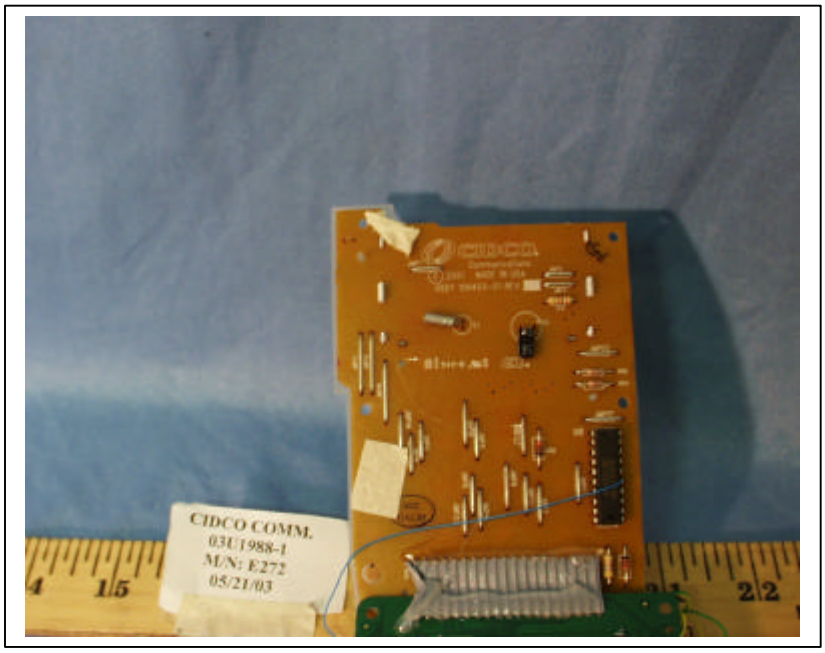
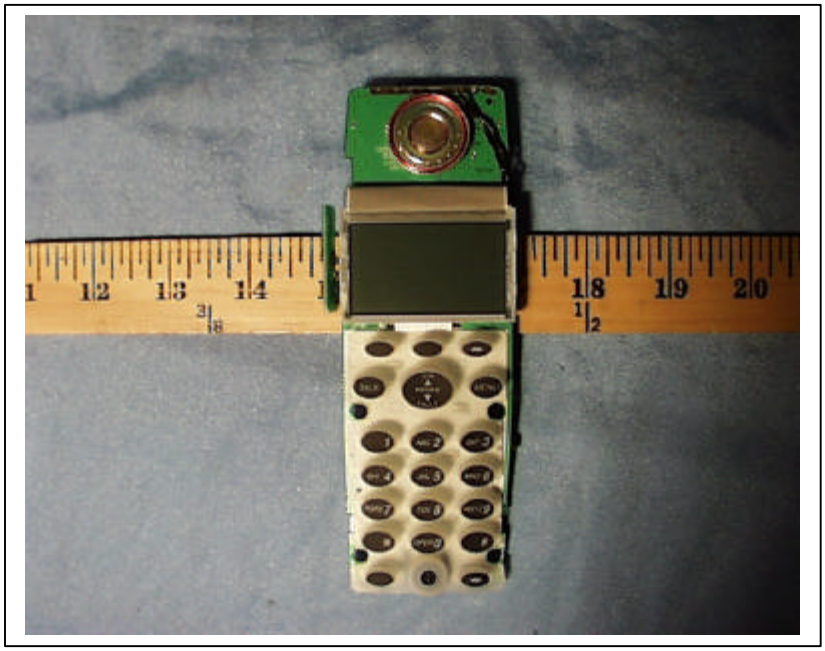


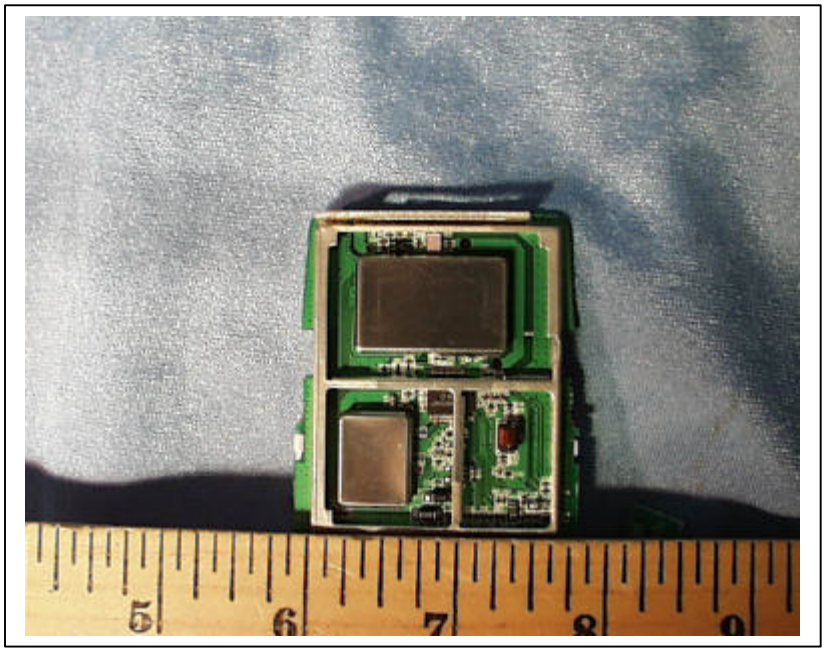
BACK

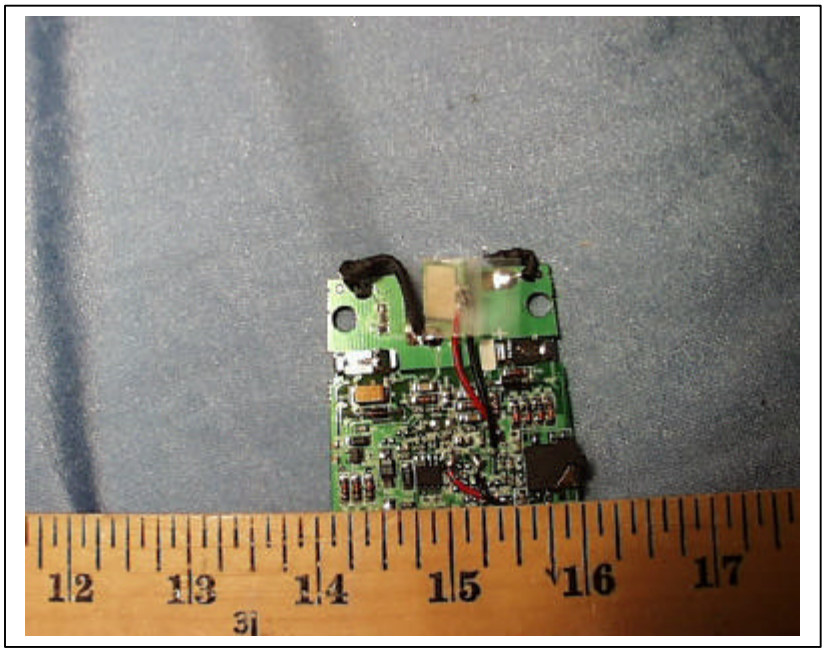
HANDSET UNIT

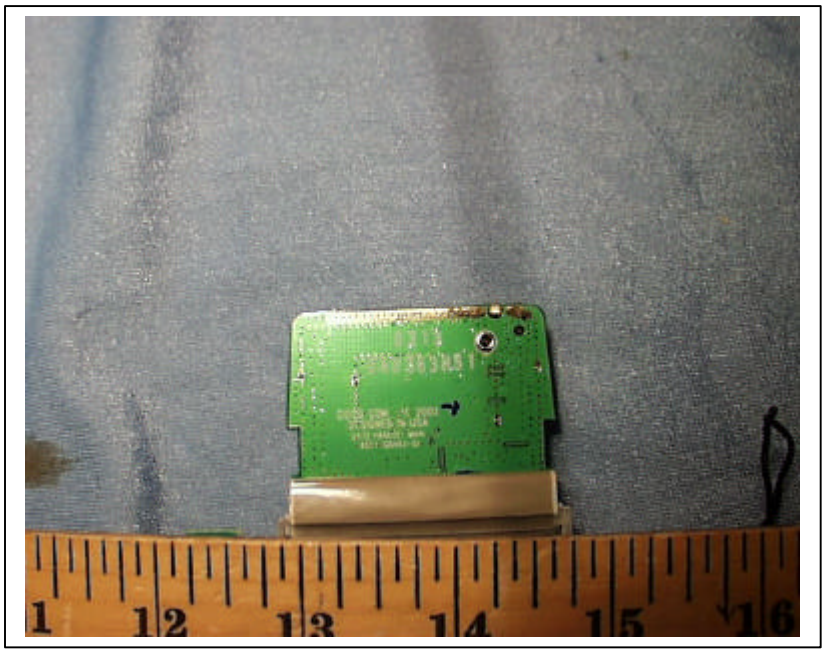
FRONT

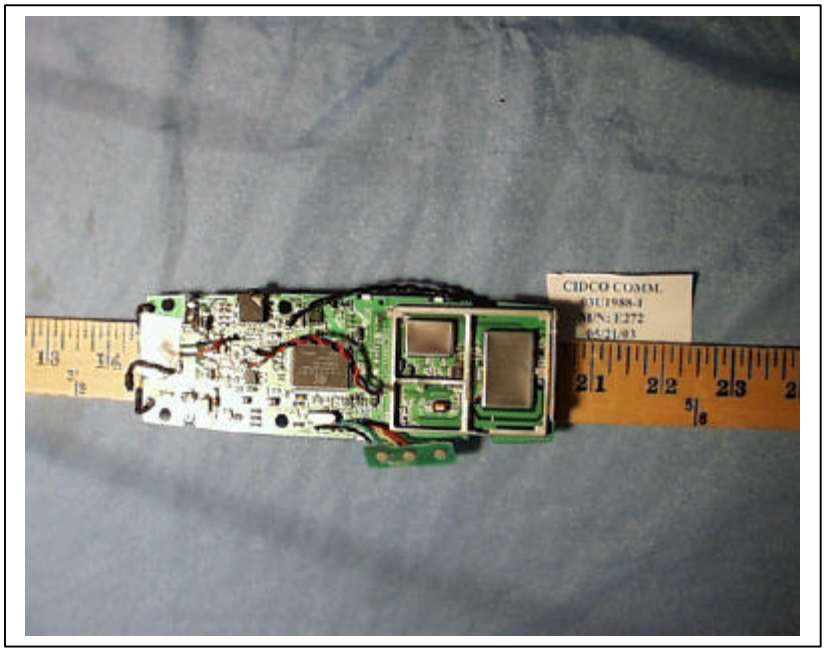
BACK

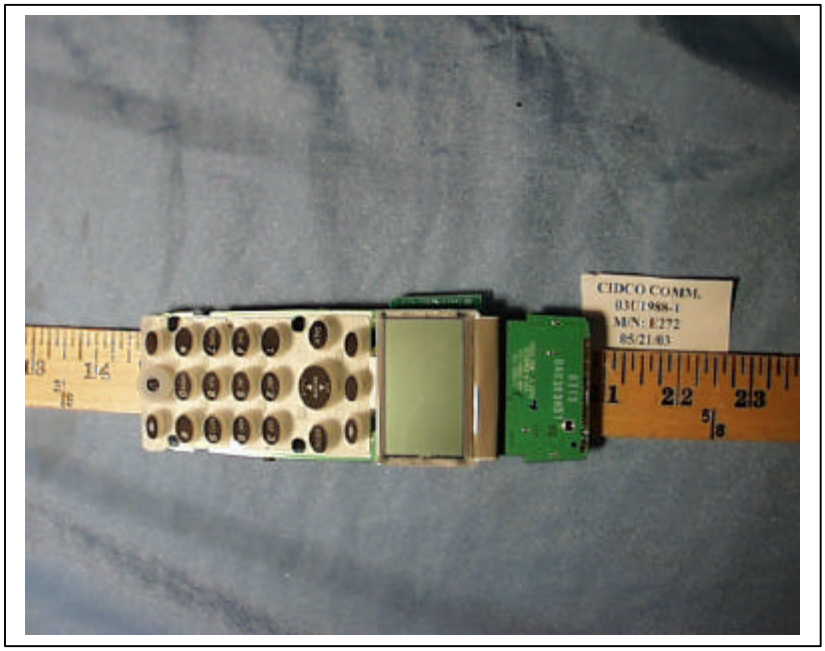


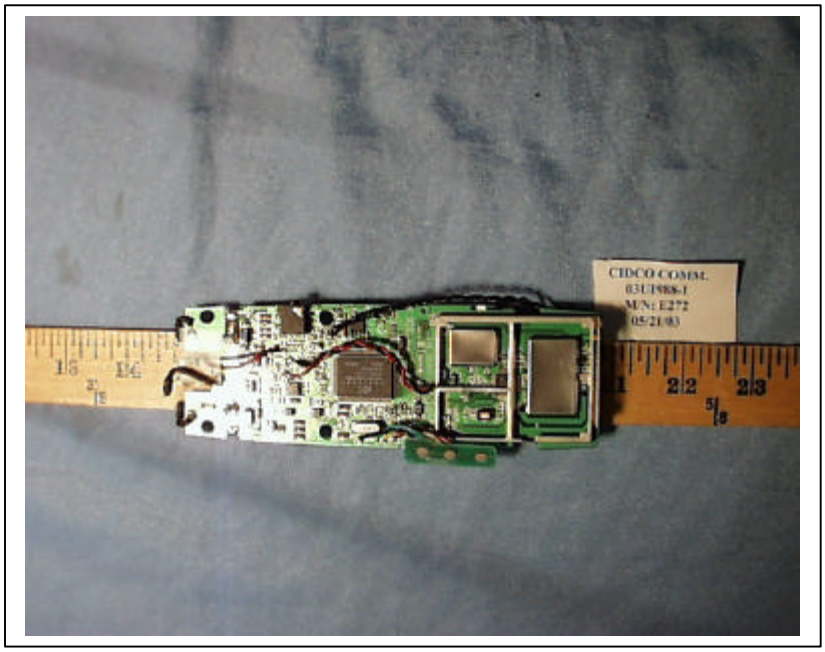


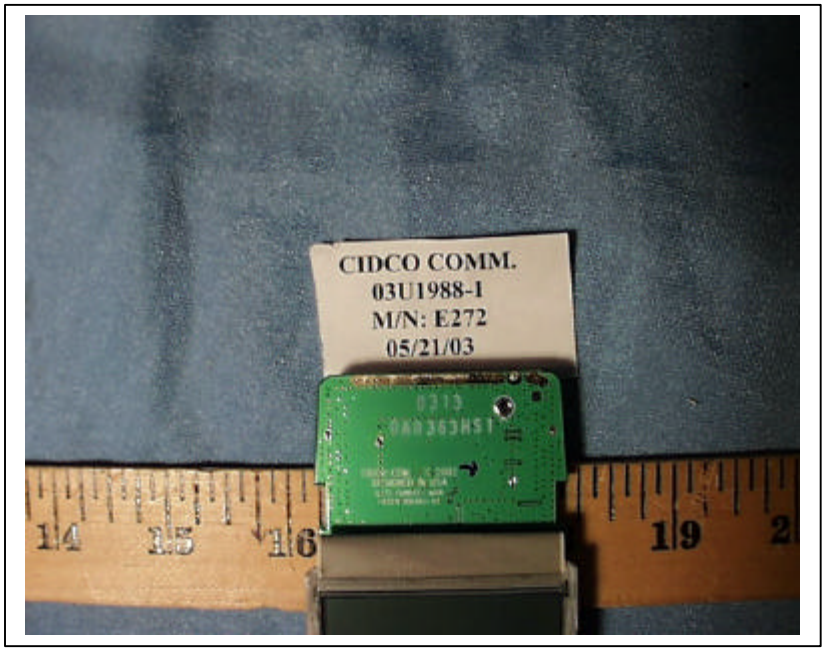


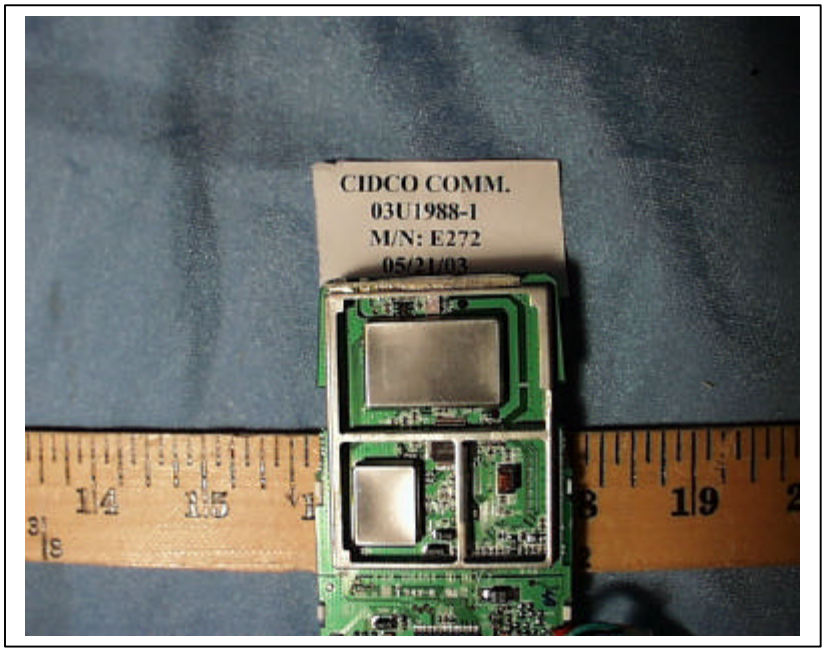


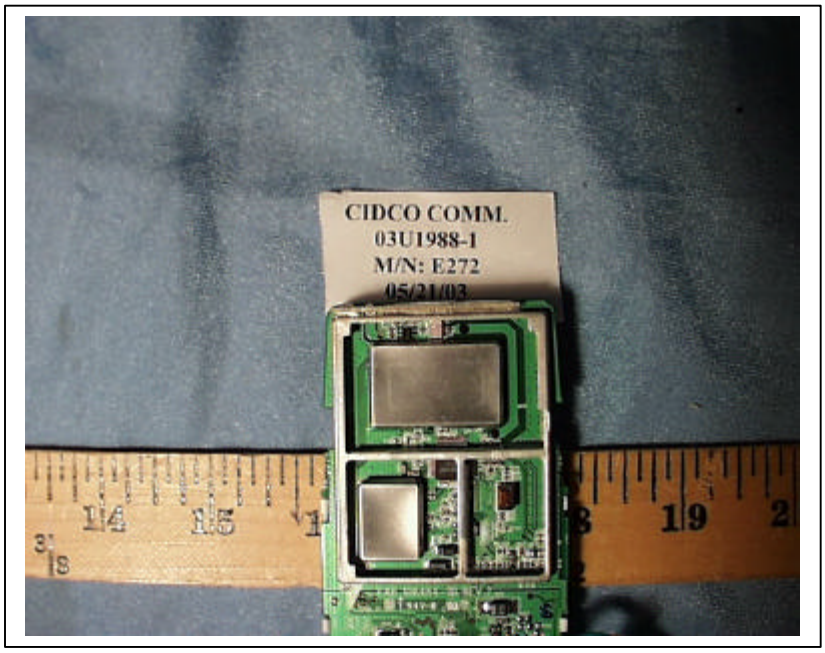












END OF REPORT