Marstech Limited

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Authorized by: Professional Engineers Ontario

Engineering & Administrative

CERTIFICATED UL AGENCY

Testing For FCC Submissions/Verifications

Industry Canada Industrie Canada

Approved Test Facility

Qualified SP Facility

TEST REPORT

REPORT DATE:	May 22, 1998	REPORT NO: 98178D	
CONTENTS:	See Table of Contents		
SUBMITTOR:	TOTTORI SANYO ELECTRIC CO. LTD. 7-101 Tachikawa-Cho Tottori City Tottori Ken, JAPAN		
SUBJECT:	Model No:	CLT-9840	
	FCC ID:	NRNCLT-9840	
TEST SPECIFICATION	FCC CFR 47 15.233 AND 2.989 Sections: 15.35, 15.107, 15.109, 15.207 and 15.209 NOTE: Tests Conducted Are "Type" Tests.		
DATE SAMPLE RECEIVED:	April 23, 1998	DATE TESTED:	May 11 & 25, 1998
RESULTS:	Equipment tested complies with referenced specification.		
ALTERATIONS	None		
Tested by:	Original Signed By: Jim Sims	Approved and Certified by:	Original Signed By:
	Ed. Chang		Robert G. Marshall, P. Eng.
	Edward Chang	Date:	May 2/98

EXHIBIT D

(FCC Ref. 2.1033(b)(6))

"Report of Measurements"

EXHIBIT D(1)

DEVICE MEASURED

(FCC Ref. 2.1033(b)(6))

APPLICANT:	Tottori Sanyo Electric Co. Ltd. 7-101 Tachikawa-Cho Tottori City, Tottori Ken, Japan
MANUFACTURER:	Tottori Sanyo Electric (Philippines) Gateway Business Park BO, Javalera, Gen. Trias, Cavite, Philippines Sanyo Electric (Penang) Sdn. Bhd. 150-C, Jalan Kampung Jawa, Bayan Lepas Free Industrial Zone Phase III, Bayan Lepas, 11900 Penang, Malaysia
FCC IDENTIFIER:	NRNCLT-9840
TRADE NAME:	Sanyo
MODEL NUMBER:	CLT-9840
SERIAL NO.:	Not Marked

Marstech Limited
11 Kelfield Street
Etobicoke, Ontario
M9W 5A1 CANADA

TECHNICIANS:
Jim Sims - Com-Serve Corp.
Edward Chang - Marstech Ltd.

Robert G. Marshall, P. Eng.

Date: June 2/98

EXHIBIT D(2)

TEST FACILITY AND EQUIPMENT LIST

FACILITIES

Radiated — ANSI C63.4 (FCC OET/55) open field 3 meter test range. This test range is protected from the cold and moisture by a non-conductive enclosure.

Conducted — 2.5m Anechoic Chamber

EQUIPMENT

Anritsu 2601 A spectrum analyzer.
Advantest R3261A Spectrum Analyzer
Hewlett-Packard RF generator # 8640 B with an 002 doubler
Hewlett-Packard R8449B Preamp. (30dB)..1.0 Mhz to 26.5 GHZ
A.H. Systems biconical antenna; ..... 20 MHZ - 330 MHZ
A.H. Systems log periodic antenna; ..... 300 MHZ - 1.8 GHZ
A.H. Systems log periodic antenna; ..... 1.0 GHZ - 12.4 GHZ
Eaton dipole antennas; T1, T2, T3 ..... 25 MHZ - 1.0 GHZ
CDI Roberts dipole antennas; T1, T2, T3 & T4 25 MHZ - 1.0 GHZ
Compliance Design P950 Preamp (16 dB)...25MHZ - 1.0 GHZ
Notch Filter; Model FIL01605001.....30 dB at 920 MHZ
M/A-COM High Frequency Cable Assembly; No. 2026-0600

NOTE:

The Anritsu 2601 A spectrum analyzer, the Hewlett-Packard spectrum analyzer and the Advantest R3261A spectrum analyzer are calibrated annually, and that calibration is directly traceable to the National Research Council of Canada (NRC). This equipment is only used by qualified technicians and only for the purpose of EMI measurements. The three meter test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

September 23, 1997

IN REPLY REFER TO
31040/SIT
1300F2

Electrohome Electronics Ltd
809 Wellington Street, North
Kitchener, Ontario N2G 4J6, Canada

Attention: Gerry Gallagher

Re: Measurement facility located at Roseville
(3 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,

Thomas W. Phillips
Electronics Engineer
Customer Service Branch

FCC ID: NRNCLT-9840
EXHIBIT D(2)-2
Marstech Report No. 98178D

EXHIBIT D(2)

SPECTRUM ANALYZER -	ANRITSU MS2601A S/N MT64544 - NEXT CALIBRATION APRIL 1999
MULTIMETER -	FLUKE 75

SUMMARY OF RESULTS

	COMPLIANCE (yes)	(no)
FIELD STRENGTH OF THE CARRIER FREQUENCIES	(x)	
OCCUPIED BANDWIDTH	(x)	
SPURIOUS RADIATED EMISSIONS	(x)	
LINE CONDUCTED SPURIOUS EMISSIONS	(x)	

EQUIPMENT REQUIREMENTS AND IDENTIFICATION

a) Manufacturers or applicants name:	(x)	( )
b) FCC ID:	(x)	( )
c) Serial number:	(N/M)	( )
d) Antenna:	(x)	( )
e) Operator controls:	(x)	( )
f) Security Coding	(x)	( )
g) Equipment/Packaging Marking	(x)	( )

CARRIER FREQUENCY FIELD STRENGTH

RESULTS

Handset: **Maximum field strength of 17,280 μV/M; at 902.100 MHz.**

Base Station:
Telephone: **Maximum field strength of 49,170 μV/M; at 926.000 MHz.**

Note: All channels were checked for highest carrier frequency field strength.

TEST CONDITIONS

Equipment Positioning:

Handset:	Vertical or upright
Base Station:	Standing on its back with the antenna extended in the vertical plane.

Antenna Polarization:

Handset:	Vertical
Base Station:	Vertical

Antenna Type: T.4; tuned half wave dipole

Measurement Bandwidth: 100/120 KHz (IF/Q.P.)

Supply Voltages:

Handset:	3.6 VDC from an internal battery.
Base Station:	120 VAC/60 Hz to 12 VDC (adapter)

METHODS OF MEASUREMENT

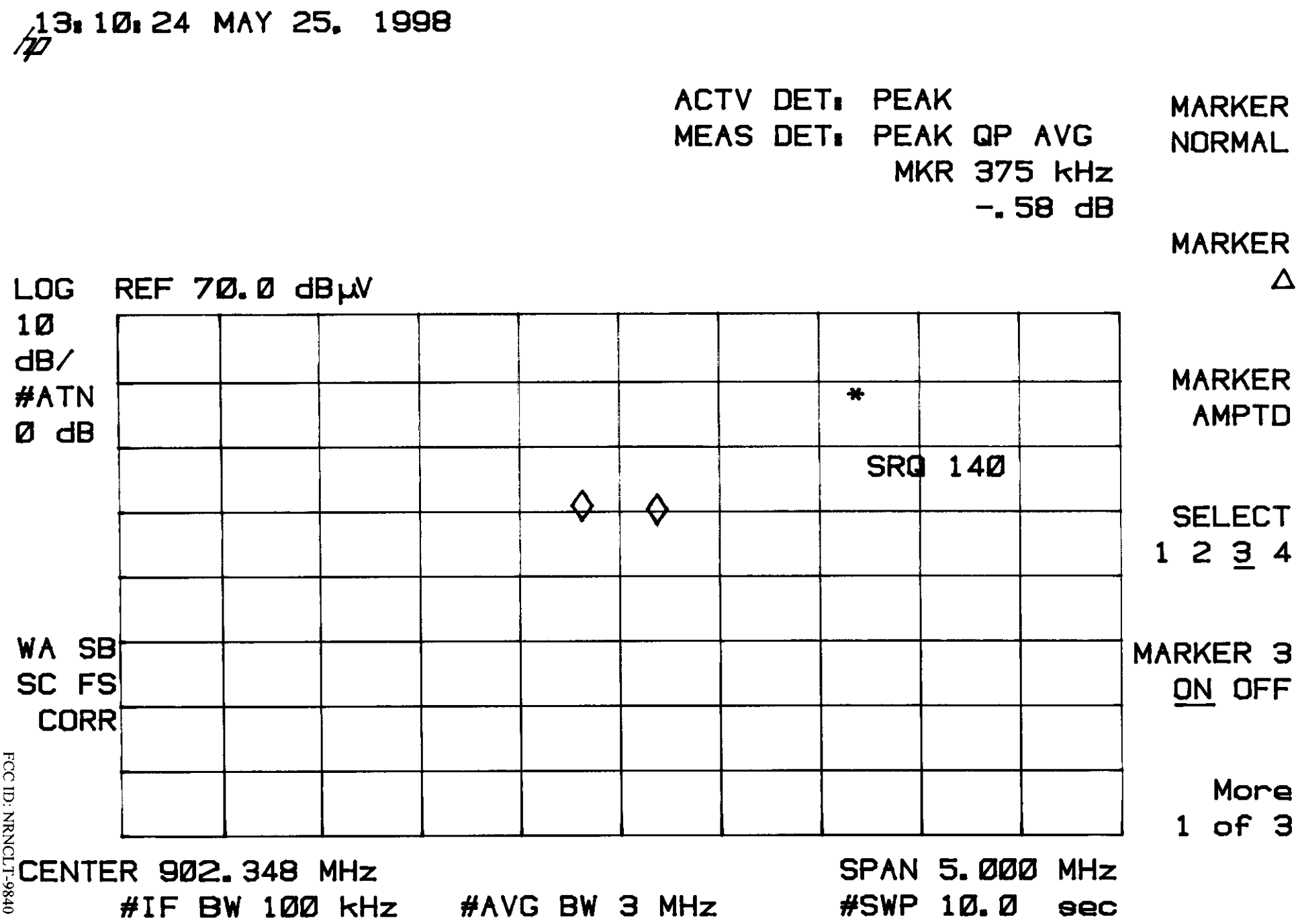
The cordless phone components were placed in turn on a one metre high, non-metallic turntable and set at maximum output level. Measurements were made in a minimum of 3 positions for the handset and 2 for the base station. If adjustable, the whip antennas were fully extended.

For each of the above conditions the turntable was rotated through 360 degrees while the receiving antenna was varied in height from 1 to 4 metres and set in both planes of polarization to find the maximum signal strength. The level was measured using a spectrum analyzer and a substitution signal from an RF generator. The measured level was converted to a field strength using the antenna correction factors, correction for search height and cable losses.

All base station measurements were made with the equipment under test connected to an artificial telephone line network, with 48 VDC applied.

OCCUPIED BANDWIDTH RESULTS (47 CFR Part 2.989

The bandwidth was 375 KHz (Refer Exhibit D(3)-4).


13:10:24 MAY 25, 1998
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 375 kHz
-.58 dB
MARKER
NORMAL
MARKER
Δ
LOG REF 70.0 dBμV
10
dB/
#ATN
0 dB
SRQ 140
MARKER
AMPTD
SELECT
1 2 3 4
WA SB
SC FS
CORR
MARKER 3
ON OFF
More
1 of 3
CENTER 902.348 MHz
SPAN 5.000 MHz
#IF BW 100 kHz
#AVG BW 3 MHz
#SWP 10.0 sec

SPURIOUS RADIATED EMISSIONS

RESULTS

The maximum field strength of any spurious emission between 25 MHz and 5,000 MHz while transmitting or receiving was:

Handset:
Maximum field strength of: **NONE FOUND at 000.00 MHz Spurious Emissions.**
Maximum field strength of: **NONE FOUND at 0.0000 GHz Harmonic Emissions.**
Base Station:
Maximum field strength of : **59.0 μV/M: at 48.2 MHz Spurious Emissions.**
Maximum field strength of: **NONE FOUND at 0.0000 GHz Harmonic Emissions.**

TEST CONDITIONS

Equipment Positioning:

Handset: SPURIOUS	Standing upright and laying on its side
Handset: HARMONICS	Standing upright and laying on its side
Base Station: SPURIOUS	Standing on its back with the antenna extended in the vertical plane.
Base Station: HARMONICS	Standing vertically and on its back with the antenna extended in the vertical plane.

Antenna Polarization:

Handset: SPURIOUS	Vertical and horizontal
Handset: HARMONICS	Vertical and horizontal
Base Station: SPURIOUS	Vertical
Base Station: HARMONICS	Vertical and horizontal

Measurement Bandwidth: 100 KHz Peak and 1.0 MHz (IF)

Supply Voltages:

Handset:	3.6 VDC from an internal battery.
Base Station:	120 VAC/60 Hz to 12 VDC (adapter)

METHODS OF MEASUREMENT

The cordless phone components were placed in turn on a one metre high, non-metallic turntable and set at maximum output level. Measurements were made in a minimum of 3 positions for the handset and 2 for the base station. If adjustable, the whip antennas were fully extended.

For each of the above conditions the turntable was rotated through 360 degrees while the receiving antenna was varied in height from 1 to 4 metres and set in both planes of polarization to find the maximum signal strength. The level was measured using a spectrum analyzer and the measured level was converted to a field strength using the antenna correction factors and signal cable losses.

All base station measurements were made with the equipment under test connected to an artificial telephone line network, with 48 VDC applied.

SPURIOUS RADIATED EMISSIONS

BW: 100 KHz Peak and 1 MHz
Span: 5 to 50 MHz

BASE STATION

TEST # MODE	FREQ MHz BAND	LEVEL μV	ANT. TYPE (PZ)	ANT. FACT.	F.S. μV/M	LIMIT μV/M	DIFF. TO LIMIT; dB
01 RX	47.85	11.2	B/C V	3.7	41.4	100	-7.65
TX	48.2	11.8	BC/V	5	59.0	100	-4.58
RX	93.18	14.2	BL/V	1.41	20.0	150	-17.49
TX	461.0	21.1	LP/V	3.16	66.7	200	-9.54
CARRIER	926.000	1,100.00	RT.4 V	44.7	49170.0	50,000	-0.15

HANDSET

TEST # MODE	FREQ MHz BAND	LEVEL μV	ANT. TYPE (PZ)	ANT. FACT.	F.S. μV/M	LIMIT μV/M	DIFF. TO LIMIT; dB
CARRIER	902.100	400.00	RT.4 V	43.2	17280.0	50,000	-9.23

POWERLINE CONDUCTED EMISSIONS

RESULTS

The largest RF voltages on the AC power lines, over the frequency range of 450 KHz to 30 MHz, was **171.79μV (44.70 dBμV) at 0.452 MHz** from the base station while transmitting and/or receiving. (A side of the line in the speakerphone off hook mode) Refer to the attached results.

TEST CONDITIONS

Measurement Bandwidth:	9 KHz Q.P. (IF)
AC Test Voltage:	120 VAC (filtered and stabilized)
Mode of Operation:	Telephone

METHODS OF MEASUREMENT

The base station portion of the cordless phone was placed on a wooden table directly above a 50 ohm line impedance stabilization network.(LISN) If adjustable, the whip antenna was fully extended vertically and the AC power attachment cord went directly down to the LISN. The LISN is grounded directly to the floor of the test facility. Excess AC cord was coiled in a figure eight pattern before connecting directly to the 50 micro-henry LISN.

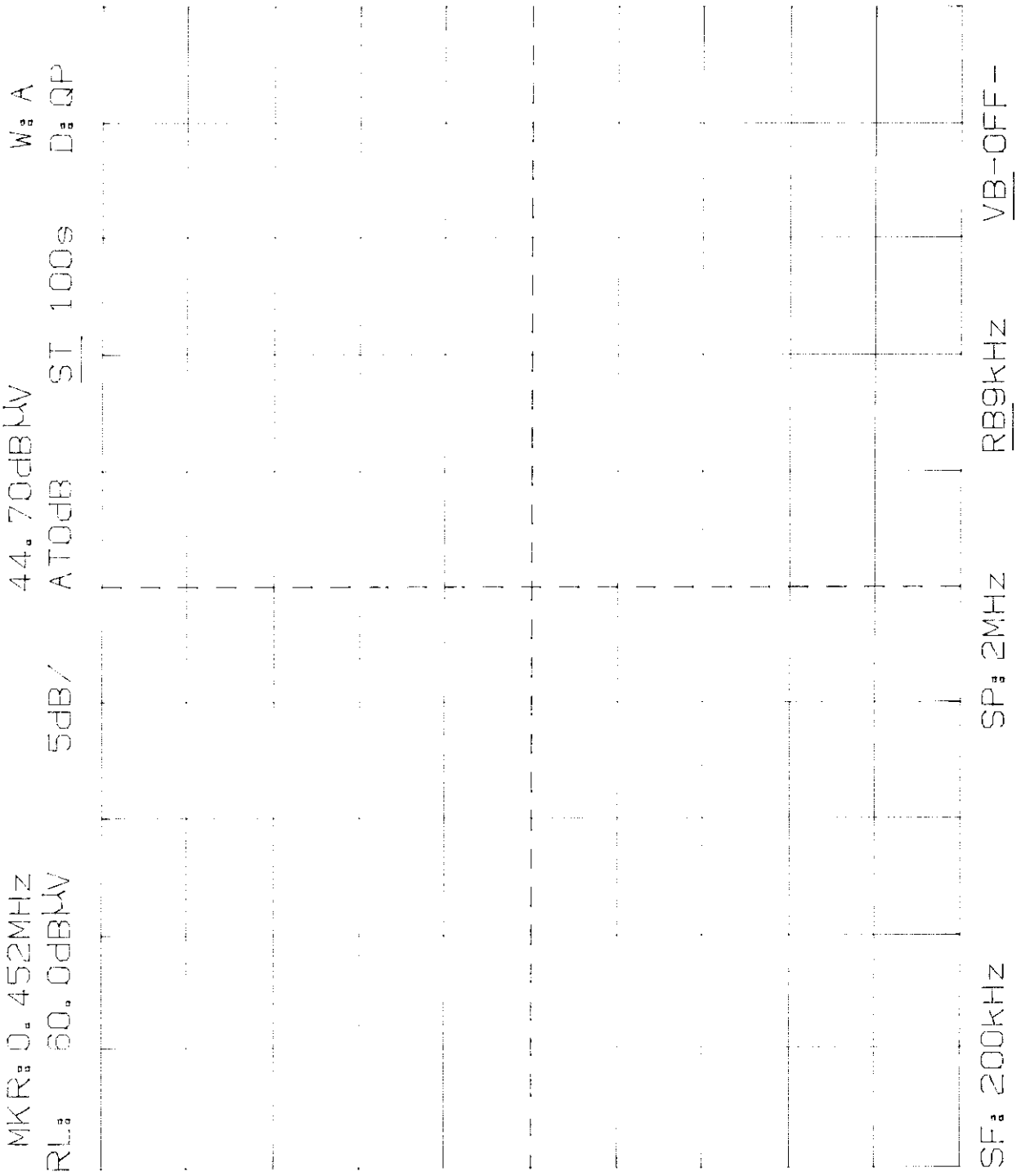
The base station was connected to a simulated 9,000 foot phone line and 48 VDC was applied. The 9,000 foot phone line network was grounded to the nearest AC outlet with a test lead.

A length of low loss RF foam cable was used to couple the RF voltages from the LISN to the spectrum analyzer. The base station transmitter was keyed on by the handset transmitting nearby. All of the RF voltages were recorded and are attached.

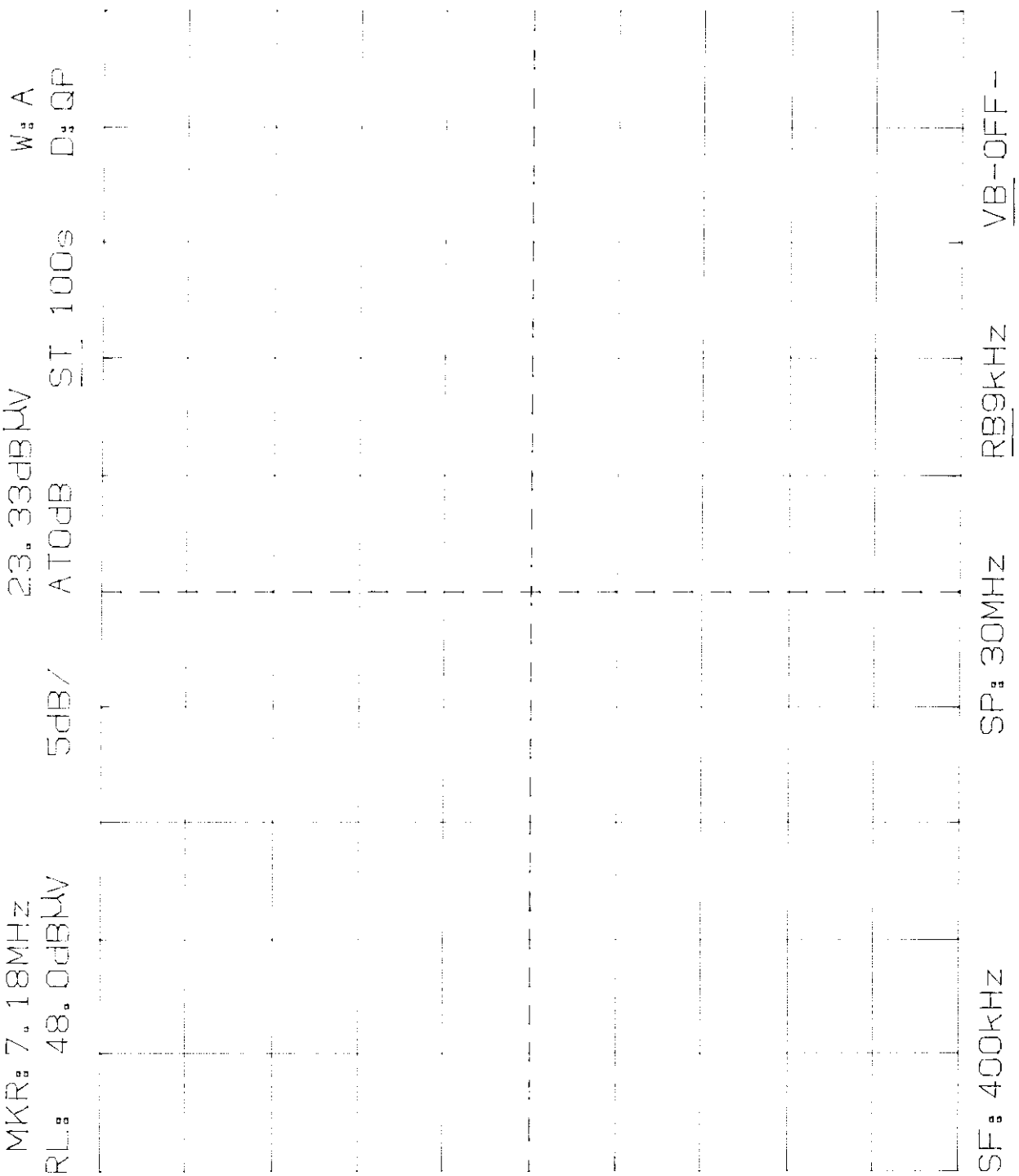
The base station was tested in all modes of operation which were applicable to the specific equipment under test. This included operating modes such as "calling/paging", quiescent or receive mode and standard telephone/transmit operation.

If the cordless phone contained an intercom mode of operation, then this test was repeated in that mode. The attached results represent the **worst case results** in each test condition.

POWER LINE CONDUCTED EMISSIONS
MODEL CLT-9840 - SIDE A
HANDSET SPEAKERPHONE OFF-HOOK



POWER LINE CONDUCTED EMISSIONS
MODEL CLT-9840
SIDE: A



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POWER LINE CONDUCTED EMISSIONS
MODEL CLT-9840 - SIDE B
HANDSET SPEAKERPHONE OFF-HOOK

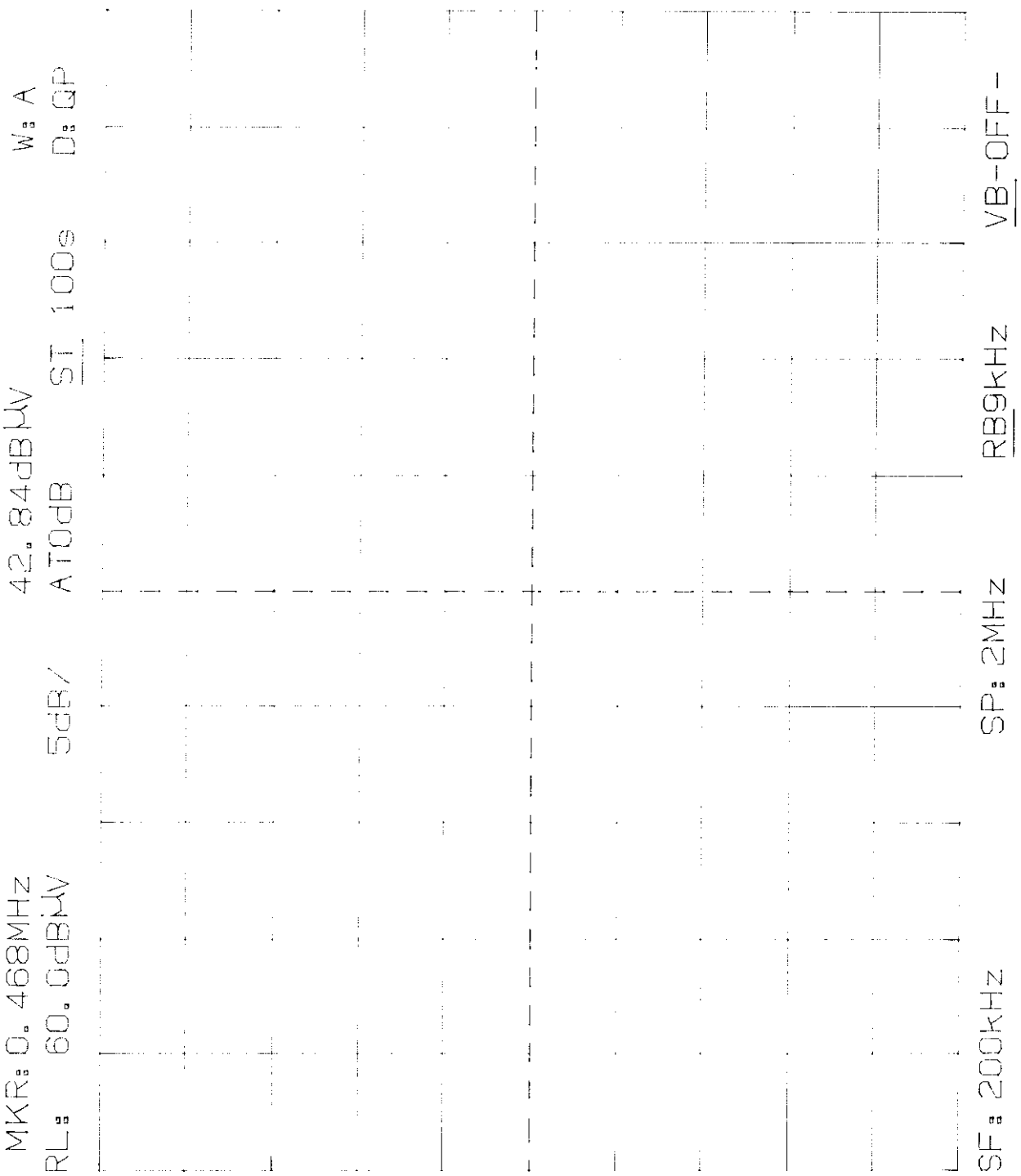

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EXHIBIT D(3)-10
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POWER LINE CONDUCTED EMISSIONS
MODEL CLT-9840
SIDE: B

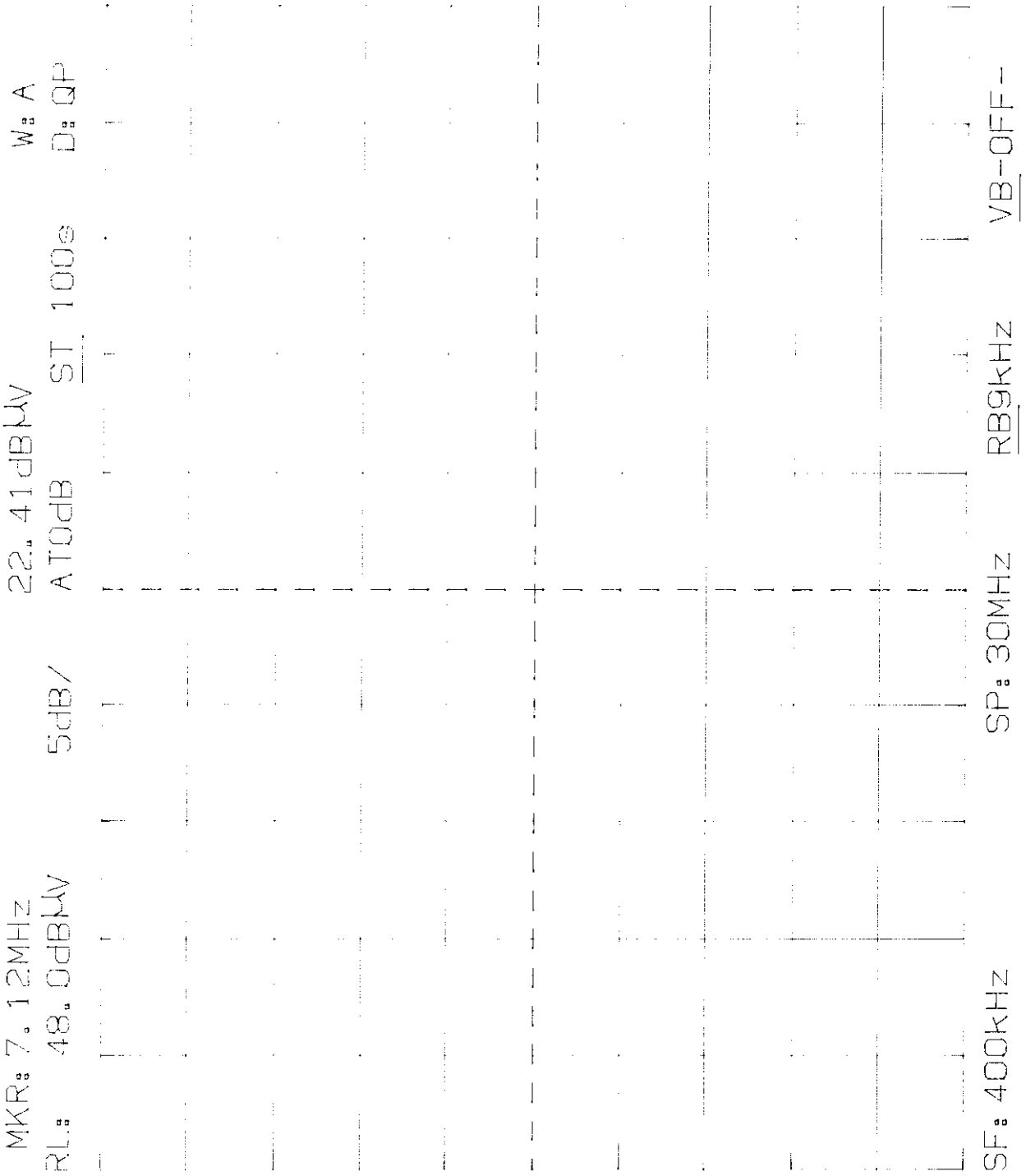

EXHIBIT E

(FCC Ref. 2.1033(b)(7))

"Photographs"