

KTL Test Report: 8R00987

Applicant: VTECH Engineering Canada Ltd.
200-7671 Alderbridge Way
Richmond, B.C.
V6X 1Z9

**Equipment Under Test:
(E.U.T.)** Sony SPP-900
Analog 900 MHz Cordless Telephone

In Accordance With: **FCC Part 15, Subpart B**
Radio Receivers

Tested By: KTL Ottawa Inc.
3325 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By: _____
W. Waterhouse, RF Engineering Lab Manager

Date: _____

Total Number of Pages: 30

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

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EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

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EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 1. Summary of Test Results

General:

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart B. Measurement procedure ANSI C63.4-1992 was used for all tests. Radiated Emissions were measured on an open area test site.

Abstract:

Name Of Test	Para. No.	Results
Antenna Conducted Emissions	15.111	Not Applicable
Radiated Emissions	15.109	Complies
Powerline Conducted Emissions	15.107	Complies

THIS REPORT APPLIES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. None



NVLAP Lab Code: 100351-0

It is recommended that the margin of compliance be improved to allow for manufacturing tolerances.

TESTED BY: _____ DATE: _____
Kevin Carr, Technologist

TECHNICAL REVIEW: _____ DATE: _____
Tom Tidwell, Wireless Group Manager

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This report applies only to the items tested.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 2. Equipment Under Test (E.U.T.)

Manufacturer: VTECH Engineering Canada Ltd.

Model No.: Sony SPP-900, MK2A and MK2B

Serial No.: None

Class II
 Permissive Change

New
 Submission

Production
 Unit

Pre-Production
 Unit

Equipment Code

Equipment Details

	<u>Base</u>	<u>Handset</u>
Frequency Range:	923.10 – 927.75 MHz	902.3 – 906.65 MHz
Number of Channels:	30	30
Operating Frequency(ies) of Sample:	923.10, 925.05 MHz	905.00, 905.15 MHz
Crystal Frequency(ies):	Not Applicable	Not Applicable
Primary Power Requirement:	9 Vdc via 120 VAC, 60 Hz (AC Adapter)	3.6 Vdc (NICD Battery)
Bandwidth and Emission Designator:	165KF1D	165KF1D
Intermediate Frequency(ies):	10.7 MHz	10.7 MHz

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Description of E.U.T.

The E.U.T. is a 30 channel analog cordless telephone.

Modifications Incorporated in E.U.T.

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Theory of Operation

The Sony SPP-900 is a basic analog cordless telephone. It has 30-channel operation which is operator controllable. It is intended to be compatible with most types of central office equipment in Canada, the United States and South America.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Justification

The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst case configuration:

BASE: 3-Orthogonal Orientations

- (1) Lying flat on the table, antenna pointing up.
- (2) Lying flat on the table, antenna pointing straight back.
- (3) Vertically mounted, antenna pointing up.

HANDSET: 3-Orthogonal Orientations

- (1) Lying flat on its back.
- (2) Vertical
- (3) Lying on its side.

Exercise Program

The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

Exercise mode:

- (1) Off hook, loaded telephone line, carrier enabled.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 3. Equipment Configuration

Equipment Configuration List:

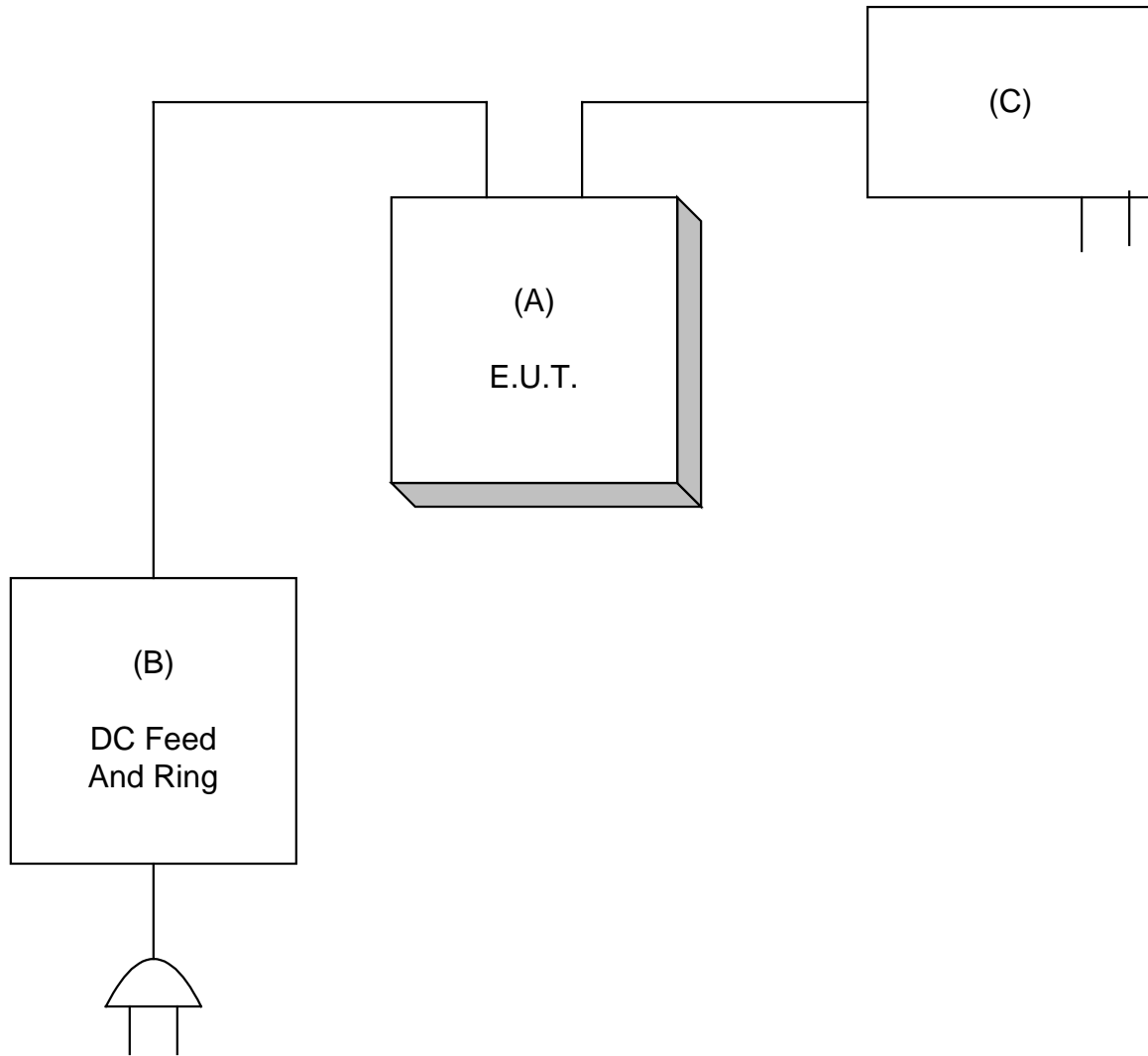
Item	Description	Model No.	Serial.	Rev.
(A)	Cordless Telephone (EUT)	SPP-900	None	
(B)	DC Feed and Ring	CLI043	002	
(C)	120 VAC to 9 Vdc Adapter	AD-960	None	

Inter-connection Cables:

Item	Description	Length (m)
(1)	Telephone Cable	3.0

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Configuration of the Equipment Under Test (E.U.T)



EQUIPMENT: *Sony SPP-900 Analog 900 MHz Cordless Telephone*

Section 4. Receiver Antenna Conducted Emissions

NAME OF TEST: Receiver Antenna Conducted Emissions	PARA. NO.: 15.111
TESTED BY:	DATE:

Test Conditions: Test Voltage: _____ VAC
Temperature: _____ °C
Humidity: _____ %

Test Results: Complies/Does Not Comply. See attached graphs and table.

Measurement Data: See attached graphs and table.

NOT APPLICABLE

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 5(A). Radiated Emissions: Base

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.109(a)
TESTED BY: Kevin Carr	DATE: November 23, 1998

Test Conditions: Test Voltage: 9Vdc via 120 VAC, 60 Hz Adapter
 Temperature: 21 °C
 Humidity: 29 %

Minimum Standard:

Frequency(MHz)	Field Strength (dBμV/m @ 3m)
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0

Test Results: Complies. The worst-case emission level is 52.4 dBμV/m @ 3m at 9143.5 MHz. This is 1.6 dB below the specification limit.

Measurement Data: See attached table.

For super-regenerative receivers the receiver is coerhered using a signal generator and dipole antenna.

Handheld equipment and equipment not designed to be mounted in any fixed orientation, the E.U.T. is tested in three orthogonal axis to obtain worst case results.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Test Data - Radiated Emissions (Base)

Worst Case Emissions of MK2A and MK2B Systems

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP HP8566B		RBW(kHz): 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Channel: 01 LO											
914.35	R/D4	V			8.5	34.6			43.1	46.0	2.9
914.35	R/D4	H			8.7	34.6			43.3	46.0	2.7
1828.7	Hrn2	V			52.6	30.2	-44.2		38.6	54.0	15.4
1828.7	Hrn2	H			54.1	30.2	-44.2		40.1	54.0	13.9
2743.1	Hrn2	V			59.0	32.0	-45.2		45.8	54.0	8.2
2743.1	Hrn2	H			57.6	32.0	-45.2		44.4	54.0	9.6
3657.4	Hrn2	V			51.8	35.5	-42.3		45.0	54.0	9.0
3657.4	Hrn2	H			52.0	35.5	-42.3		45.2	54.0	8.8
4571.8	Hrn2	V			52.7	37.6	-43.5		46.8	54.0	7.2
4571.8	Hrn2	H			51.4	37.6	-43.5		45.5	54.0	8.5
5486.1	Hrn2	V			49.0	40.0	-43.7		45.3	54.0	8.7
5486.1	Hrn2	H			47.8	40.0	-43.7		44.1	54.0	9.9
6400.45	Hrn2	V			47.2	42.8	-40.8		49.2	54.0	4.8
6400.45	Hrn2	H			47.0	42.8	-40.8		49.0	54.0	5.0
7314.8	Hrn2	V			46.1	44.6	-42.2		48.5	54.0	5.5
7314.8	Hrn2	H			47.8	44.6	-42.2		50.2	54.0	3.8
8229.2	Hrn2	V			45.0	47.5	-43.9		48.6	54.0	5.4
8229.2	Hrn2	H			45.0	47.5	-43.9		48.6	54.0	5.4
9143.5	Hrn2	V			45.1	50.5	-43.4		52.2	54.0	1.8
9143.5	Hrn2	H			45.3	50.5	-43.4		52.4	54.0	1.6

Notes:
 B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
 * Re-measured using dipole antenna.
 ** Includes cable loss when amplifier is not used.
 *** Includes cable loss.
 () Denotes failing emission level.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Test Data - Radiated Emissions (Base)

Worst Case Emissions of MK2A and MK2B Systems

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP HP8566B		RBW(kHz): 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Channel: 20 LO											
912.4	R/D4	V			6.0	34.6			40.6	46.0	5.4
912.4	R/D4	H			7.0	34.6			41.6	46.0	4.4
1824.8	Hrn2	V			53.0	30.1	-44.1		39.0	54.0	15.0
1824.8	Hrn2	H			52.0	30.1	-44.1		38.0	54.0	16.0
2737.2	Hrn2	V			57.5	32.0	-45.1		44.4	54.0	9.6
2737.2	Hrn2	H			56.4	32.0	-45.1		43.3	54.0	10.7
3649.6	Hrn2	V			53.8	35.5	-42.3		47.0	54.0	7.0
3649.6	Hrn2	H			52.4	35.5	-42.3		45.6	54.0	8.4
4562.0	Hrn2	V			51.2	37.6	-43.5		45.3	54.0	8.7
4562.0	Hrn2	H			49.6	37.6	-43.5		43.7	54.0	10.3
5474.4	Hrn2	V			46.5	40.0	-43.7		42.8	54.0	11.2
5474.4	Hrn2	H			47.4	40.0	-43.7		43.7	54.0	10.3
6386.8	Hrn2	V			47.4	42.7	-40.8		49.3	54.0	4.7
6386.8	Hrn2	H			48.0	42.7	-40.8		49.9	54.0	4.1
7299.2	Hrn2	V			46.8	44.5	-42.2		49.1	54.0	4.9
7299.2	Hrn2	H			46.8	44.5	-42.2		49.1	54.0	4.9
8211.6	Hrn2	V			45.6	47.4	-43.9		49.1	54.0	4.9
8211.6	Hrn2	H			45.1	47.4	-43.9		48.6	54.0	5.4
9124.0	Hrn2	V			45.2	50.5	-43.4		52.3	54.0	1.7
9124.0	Hrn2	H			45.2	50.5	-43.4		52.3	54.0	1.7

Notes:
 B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
 * Re-measured using dipole antenna.
 ** Includes cable loss when amplifier is not used.
 *** Includes cable loss.
 () Denotes failing emission level.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Radiated Photographs (Worst Case Configuration) Base

FRONT VIEW

REAR VIEW

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 5(A). Radiated Emissions: Handset

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.109(a)
TESTED BY: Kevin Carr	DATE: November 23, 1998

Test Conditions: Test Voltage: 3.6 Vdc
 Temperature: 21 °C
 Humidity: 29 %

Minimum Standard:

Frequency(MHz)	Field Strength (dBµV/m @ 3m)
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0

Test Results: Complies. The worst-case emission level is 52.9 dBµV/m @ 3m at 3662.8 MHz. This is 1.1 dB below the specification limit.

Measurement Data: See attached table.

For super-regenerative receivers the receiver is coerhered using a signal generator and dipole antenna.

Handheld equipment and equipment not designed to be mounted in any fixed orientation, the E.U.T. is tested in three orthogonal axis to obtain worst case results.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Test Data - Radiated Emissions (Handset)

Worst Case Emissions of MK2A and MK2B Systems

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP HP8566B		RBW(kHz): 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Channel: 10 LO											
915.7	R/D4	V			6.0	34.6			40.6	46.0	5.4
915.7	R/D4	H			6.5	34.6			41.1	46.0	4.9
1831.4	Hrn2	V			49.5	31.1	-45.8		34.8	54.0	19.2
1831.4	Hrn2	H			49.2	31.1	-45.8		34.5	54.0	19.5
2747.1	Hrn2	V			53.8	34.0	-45.9		41.9	54.0	12.1
2747.1	Hrn2	H			51.1	34.0	-45.9		39.2	54.0	14.8
3662.8	Hrn2	V			58.0	40.2	-45.3		52.9	54.0	1.1
3662.8	Hrn2	H			56.0	40.2	-45.3		50.9	54.0	3.1
4578.5	Hrn2	V			49.4	40.0	-45.6		43.8	54.0	10.2
4578.5	Hrn2	H			48.6	40.0	-45.6		43.0	54.0	11.0
5494.2	Hrn2	V			48.2	42.6	-45.7		45.1	54.0	8.9
5494.2	Hrn2	H			48.6	42.6	-45.7		45.5	54.0	8.5
6409.9	Hrn2	V			47.8	42.8	-40.8		49.8	54.0	4.2
6409.9	Hrn2	H			46.5	42.8	-40.8		48.5	54.0	5.5
7326.6	Hrn2	V			46.5	44.6	-42.2		48.9	54.0	5.1
7326.6	Hrn2	H			44.6	44.6	-42.2		47.0	54.0	7.0
8241.3	Hrn2	V			45.5	48.6	-43.9		50.2	54.0	3.8
8241.3	Hrn2	H			45.4	48.6	-43.9		50.1	54.0	3.9
9157.0	Hrn2	V			44.7	50.5	-43.4		51.8	54.0	2.2
9157.0	Hrn2	H			44.6	50.5	-43.4		51.7	54.0	2.3
Notes: 44.6 B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole * Re-measured using dipole antenna. ** Includes cable loss when amplifier is not used. *** Includes cable loss. () Denotes failing emission level.											

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Test Data - Radiated Emissions (Handset)

Worst Case Emissions of MK2A and MK2B Systems

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP HP8566B		RBW(kHz): 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Channel: 20 LO											
915.85	R/D4	V			6.0	34.6			40.6	46.0	5.4
915.85	R/D4	H			4.5	34.6			40.1	46.0	5.9
1831.7	Hrn2	V			54.6	31.1	-45.8		39.9	54.0	14.1
1831.7	Hrn2	H			52.0	31.1	-45.8		37.3	54.0	16.7
2747.55	Hrn2	V			53.3	34.1	-45.9		41.5	54.0	12.5
2747.55	Hrn2	H			52.3	34.1	-45.9		40.5	54.0	13.5
3663.4	Hrn2	V			57.2	40.2	-45.3		52.1	54.0	1.9
3663.4	Hrn2	H			55.1	40.2	-45.3		50.0	54.0	4.0
4579.25	Hrn2	V			50.5	40.0	-45.6		44.9	54.0	9.1
4579.25	Hrn2	H			48.7	40.0	-45.6		43.1	54.0	10.9
5495.1	Hrn2	V			50.5	40.0	-43.7		46.8	54.0	7.2
5495.1	Hrn2	H			47.0	40.0	-43.7		43.3	54.0	10.7
6410.95	Hrn2	V			47.8	44.7	-45.2		47.3	54.0	6.7
6410.95	Hrn2	H			46.5	44.7	-45.2		46.0	54.0	8.0
7326.8	Hrn2	V			46.5	46.4	-45.7		47.2	54.0	6.8
7326.8	Hrn2	H			47.4	46.4	-45.7		48.1	54.0	5.9
8242.65	Hrn2	V			45.5	48.6	-43.9		50.2	54.0	3.8
8242.65	Hrn2	H			45.8	48.6	-43.9		50.5	54.0	3.5
9158.5	Hrn2	V			45.3	50.5	-43.4		52.4	54.0	1.6
9158.5	Hrn2	H			45.1	50.5	-43.4		52.2	54.0	1.8

Notes:
 B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
 * Re-measured using dipole antenna.
 ** Includes cable loss when amplifier is not used.
 *** Includes cable loss.
 () Denotes failing emission level.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Radiated Photographs (Worst Case Configuration) Handset

FRONT VIEW

REAR VIEW

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 5(B). Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.109(b)
TESTED BY:	DATE:

Test Conditions: Test Voltage: _____ VAC
 Temperature: _____ °C
 Humidity: _____ %

Minimum Standard: Equipment manufactured or imported before June 23, 1999 is permitted the following limits:

Frequency (MHz)	Field Strength (dBµV/m @ 3m)
30-70	320 (50.1 dBµV/m)
70-130	500 (54.0 dBµV/m)
130-174	500 - 1500 dBµV/m
174-260	1500 (63.5 dBµV/m)
260-470	1500 - 5000 (linear interpolation)
Above 470	5000 (74.0 dBµV/m)

Test Results: Complies / Does Not Comply. The worst-case emission level is _____ dBµV/m @ 3m at _____ MHz. This is _____ dB above/below the specification limit.

Measurement Data: See attached table.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Radiated Photographs (Worst Case Configuration)

FRONT VIEW

NOT APPLICABLE

REAR VIEW

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 6. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.107
TESTED BY: Kevin Carr	DATE: November 16, 1998

Test Conditions: Test Voltage: 9 Vdc via 120 VAC, 60 Hz Adapter
Temperature: 21°C
Humidity: 29 %

Minimum Standard: The RF energy feed back into the power lines shall not exceed 48 dBμV on any frequency between 0.45 MHz and 30 MHz inclusive.

Test Results: Complies. See attached graphs.

Measurement Data: See attached graphs.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Powerline Conducted Photographs (Worst Case Configuration)

FRONT VIEW

REAR VIEW

KTL Ottawa

FCC PART 15, SUBPART B
RADIO RECEIVERS
PROJECT NO.: 8R00987

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

INSERT GRAPHS

KTL Ottawa

FCC PART 15, SUBPART B

RADIO RECEIVERS

PROJECT NO.: 8R00987

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 7. Sample Calculations

Conducted Emissions:

If the Quasi-Peak to Average ratio is greater than 6 dB, then the emission is classified as broadband and its Quasi-Peak level is reduced by 13 dB for comparison to the limit.

- i.e. Quasi-Peak level = 40 dB μ V
 Average level = 34 dB μ V
 Corrected level = 40 - 13 = 27 dB μ V

Radiated Emissions

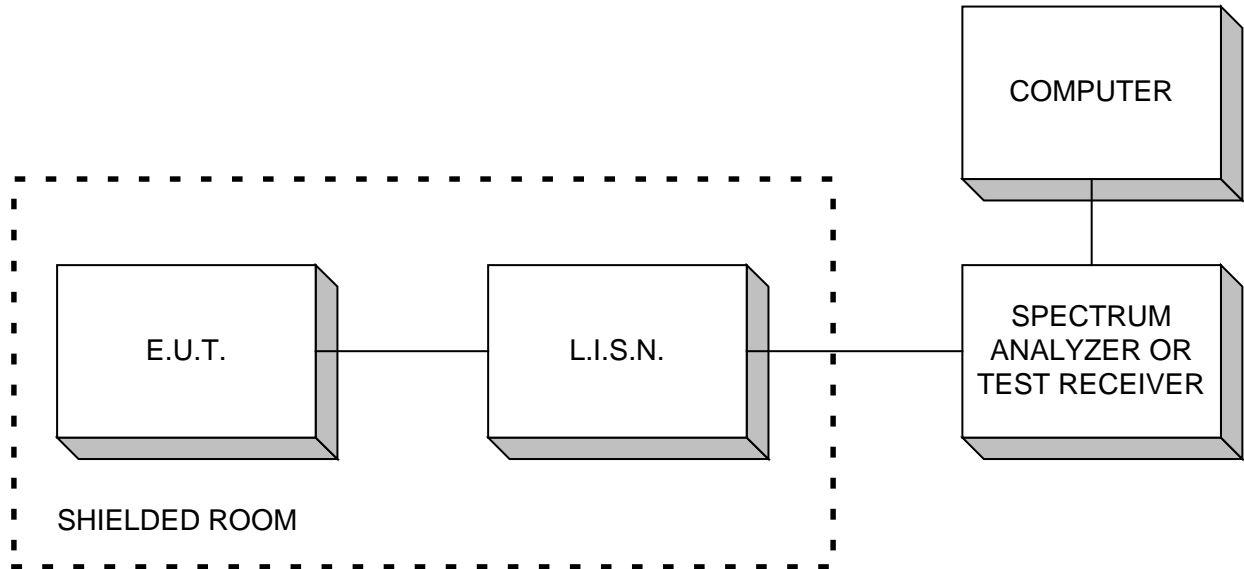
Emissions are measured at a distance of 3 meters and corrected for antenna factor and cable loss.

- i.e. Received Signal = 25 dB μ V @ 100 MHz
 Antenna Factor & Cable Loss = 9.8 dB
 Field Intensity = 25 + 9.8 = 34.8 dB μ V/m @ 3 m

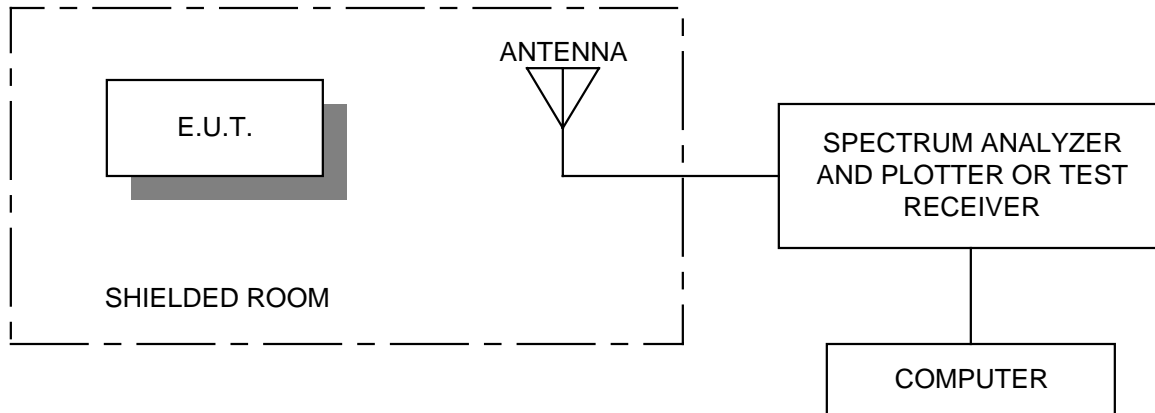
EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 8. Block Diagrams

Conducted Emissions

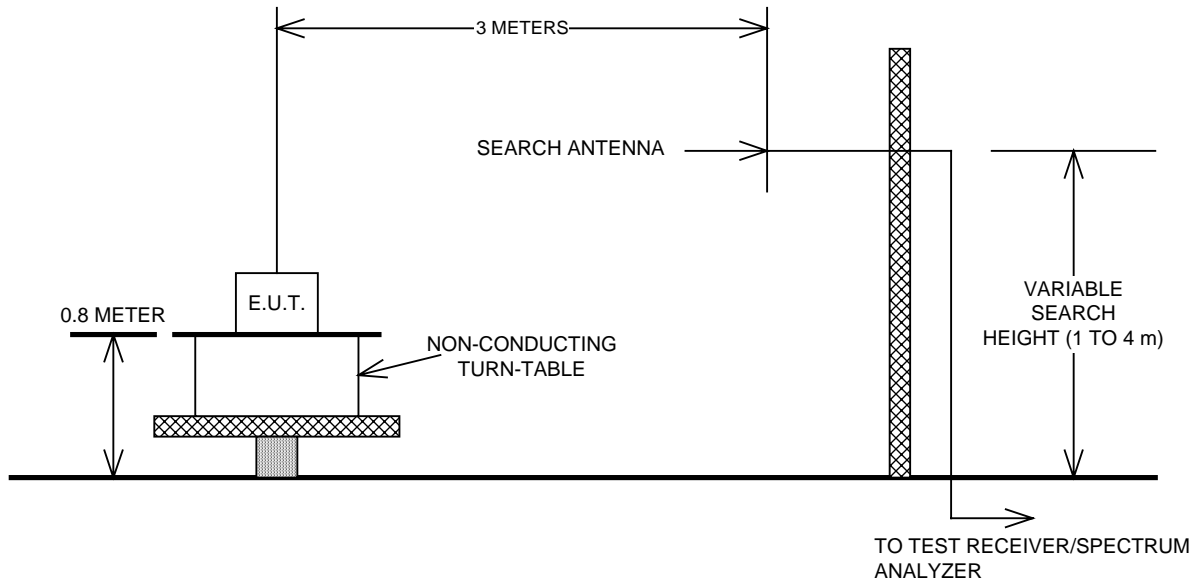


Radiated Prescan



EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Outdoor Test Site For Radiated Emissions



The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.

EQUIPMENT: Sony SPP-900 Analog 900 MHz Cordless Telephone

Section 9. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
1 Year	Spectrum Analyzer-2	Hewlett Packard	8566B	1950A00400	July 22/98	July 22/99	
1 Year	Spectrum Analyzer Display-2	Hewlett Packard	85662A	1950A01177	July 22/98	July 22/99	
1 Year	Quasi Peak Adaptor-2	Hewlett Packard	85650A	2251A00620	July 22/98	July 22/99	
1 Year	LISN	Tegam	95300-50	T-12855/56	July 24/98	July 24/99	
1 Year	Receiver	Rohde & Schwarz	ESVP	892661/014	Mar. 31/98	Mar. 31/99	
2 Year	Horn Antenna	EMCO #2	3115	4336	Oct. 30/97	Oct. 30/99	
1 Year	Dipole Antenna	Roberts Inst.	N/A	FA000747	June 8/98	June 8/99	
1 Year	Low Noise Amplifier	Avantek	AWT-8035	1005	Aug. 4/98	Aug. 4/99	
1 Year	Low Noise Amplifier	DBS Microwave	DWT-13035	9623	Aug. 4/98	Aug. 4/99	
1 Year	Plotter	Hewlett Packard	7550A	FA001129	NCR	NCR	

NA: Not Applicable
 NCR: No Cal Required