

FCC Test Report

FCC Part 15.407 for UNII Devices/ CANADA RSS-210 issue 5 for Lelean Devices

FOR:

Handheld PC

MODEL #: PCG-1J1L

SONY CORPORATION 6-7-35, KITASHINAGAWA, SHINAGAWA-KU TOKYO 141-0001 JAPAN

FCC ID: AK8PCG1J1L IC ID: 409B-PCG1J1L

TEST REPORT #: SONYE_005_06001_15.407A DATE:



Bluetooth

Bluetooth Qualification

Test Facility

(BQTF)



FCC listed # 101450

IC recognized # 3925

CETECOM Inc.

411 Dixon Landing Road • Milpitas, CA 95035 • U.S.A.

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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686

Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

Test Report #:

SONYE_005_06001_15.407A

Date of Report: Page 2 of 35



TABLE OF CONTENTS

1	Asso	Assessment		
2	Adn	ninistrative Data	4	
	2.1	Identification of the Testing Laboratory Issuing the EMC Test Report	4	
	2.2	Identification of the Client		
	2.3	Identification of the Manufacturer		
3	Equ	tipment under Test (EUT)		
	3.1	Identification of the Equipment under Test		
	3.2	Identification of Accessory equipment		
4	Sub	ject Of Investigation		
5	Med	asurements	7	
	5.1 5.1.1 5.1.2	MAXIMUM PEAK OUTPUT POWER § 15.407 (RADIATED)LIMIT SUB CLAUSE § 15.407 (a)	7	
	5.2.1 5.2.2 5.2.3	RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.407(b)/15.205 LIMITS a MODE (5180MHz)	12 12 13	
	5.3 5.3.1 5.3.2	TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.407(b)/15.205/15.209LIMITS	17 17	
	5.4 5.4.1 5.4.2	RECEIVER SPURIOUS RADIATION § 15.209/RSS210 LIMITS RESULTS	26	
	5.5 5.5.1 5.5.2	AC POWER LINE CONDUCTED EMISSIONS § 15.107/207 LIMITS RESULTS	32	
	5.6	TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS		
	5.7	BLOCK DIAGRAMS	35	

Test Report #:

SONYE 005 06001 15.407A

Date of Report: Page 3 of 35



1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.407 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS210.

Company	Description	Model #
SONY CORP.	HANDHELD PC	PCG-1J1L
		PCG-1K1L

Pete Krebill Project Leader Lothar Schmidt
Test Lab Manager

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

Date of Report: Page 4 of 35



2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name: CETECOM Inc.

Department: EMC

411 Dixon Landing Road

Address: Milpitas, CA 95035

U.S.A.

Telephone: +1 (408) 586 6200
Fax: +1 (408) 586 6299
Responsible Test Lab Manager: Lothar Schmidt
Responsible Project Leader: Pete Krebill

Date of test: 3/31/2006

2.2 Identification of the Client

Applicant's Name:	SONY Corporation
Street Address:	6-7-35, Kitashinagawa, Shinagawa-ku,
City/Zip Code	Tokyo 141-0001
Country	Japan
Contact Person:	Takumi Ozawa
Phone No.	81-3-5795-8716
Fax:	81-3-5795-8981
e-mail:	ozawa@sm.sony.co.jp

2.3 Identification of the Manufacturer

Manufacturer's Name:	Sony EMCS Corporation
Manufacturers Address:	5432 Toyoshima, Azumino-shi,
City/Zip Code	Nagano 399-8282,
Country	Japan

Date of Report: Page 5 of 35



3 Equipment under Test (EUT)

3.1 Identification of the Equipment under Test

Marketing Name: PCG-1J1L

PCG-1K1L (identical device with different memory size)

Description: Handheld PC

Model No: PCG-1J1L

FCC ID: AK8PCG1J1L IC ID: 409B-PCG1J1L

Frequency Range: 5150-5250MHz, 5250-5350MHz

*Type(s) of Modulation: **OFDM**

Number of Channels: 29

Antenna Type: \(\lambda\)/monopole (Inverted F Antenna)

a mode: 0.068 W EIRP @ 5180MHz

Output Power: a mode: 0.065 W EIRP @ 5260MHz

a mode: 0.036 W EIRP @ 5320MHz

3.2 Identification of Accessory equipment

TYPE	MANF.	MODEL
AC ADAPTER	SONY	VGP-AC16V7

^{*}This report contains data for FCC15.407 "a" mode for all "b" and "g" mode data please see report SONYE_004_05002_15.247BG and for FCC15.247 "a" mode data please see report SONYE_005_06001_15.247A.

Date of Report: Page 6 of 35



4 Subject Of Investigation

All testing was performed on the PCG-1J1L referred to as EUT. The EUT carries a pre-certified WLAN module with FCC ID# PD9WM3945ABG. This test report contains full radiated testing as per FCC15.407 on the EUT with the pre-certified WLAN module. All conducted measurements are covered under *test report# INTEL-051020F*

During the testing process the EUT was tested in "a" mode with 1Mbps data rate which yielded the worst case results. All testing was performed on main antenna which yielded the highest gain, all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.407 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210.

Test Report #:

SONYE_005_06001_15.407A

Date of Report: Page 7 of 35



5 <u>Measurements</u>

5.1 MAXIMUM PEAK OUTPUT POWER § 15.407 (RADIATED)

5.1.1 LIMIT SUB CLAUSE § 15.407 (a)

Frequency range	RF power output
5180MHz	17.68 dBm EIRP
5260MHz	24.68 dBm EIRP
5320MHz	25.04 dBm EIRP

^{*}limit is based upon 26dB bandwidth from report# # INTEL-051020F

5.1.2 EIRP a MODE:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		5180	5260	5320
T _{nom} (23)°C	V _{nom} VDC	14.84	18.13	15.57
Measurement uncertainty		±0.5dBm		

Date of Report: Page 8 of 35



EIRP a Mode (5180)

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: handheld

Customer: Sony

Operating Mode: 5180 MHz TX

Antenna: H EUT: V

Test operator: Pete Voltage: AC 110 V Sweep: EIRP

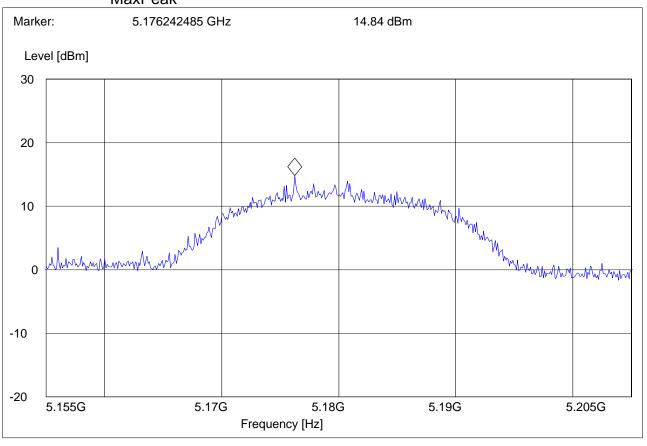
SWEEP TABLE: "EIRP 802.11a 36"

Short Description: EIRP channel-5180 MHz Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.2 GHz 5.2 GHz MaxPeak Coupled 10 MHz DUMMY-DBM

MaxPeak



Date of Report: Page 9 of 35



Date of Report: Page 10 of 35



EIRP a Mode (5260MHz)

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5260 MHz

Antenna: H EUT: V

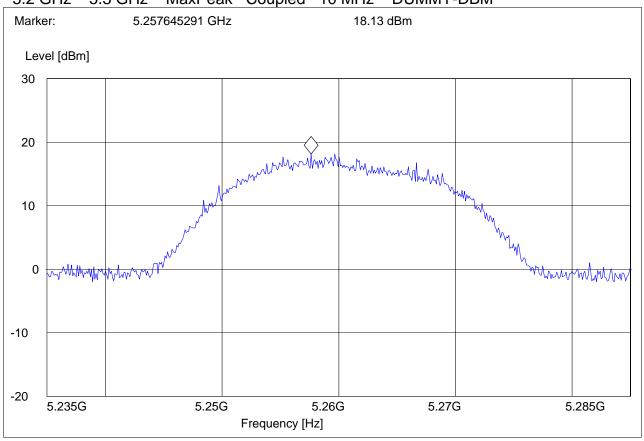
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "EIRP 802.11a 52"

Short Description: EIRP channel-5260 MHz Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.2 GHz 5.3 GHz MaxPeak Coupled 10 MHz DUMMY-DBM



Date of Report: Page 11 of 35



EIRP a Mode (5320MHz)

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5320 MHz

Antenna: H EUT: V

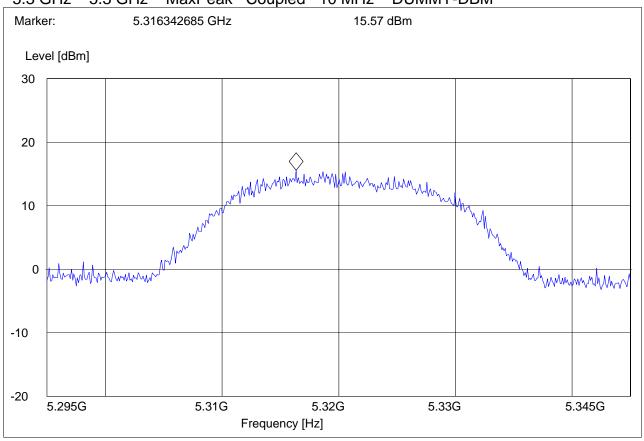
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "EIRP 802.11a 64"

Short Description: EIRP channel-5320 MHz Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.3 GHz 5.3 GHz MaxPeak Coupled 10 MHz DUMMY-DBM



Date of Report: Page 12 of 35



5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.407(b)/15.205

5.2.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

^{*}PEAK LIMIT= 74dBuV/m

^{*}AVG. LIMIT= 54dBuV/m

Date of Report: Page 13 of 35



5.2.2 a MODE (5180MHz)

PEAK

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5180 MHz

Antenna: H EUT: V

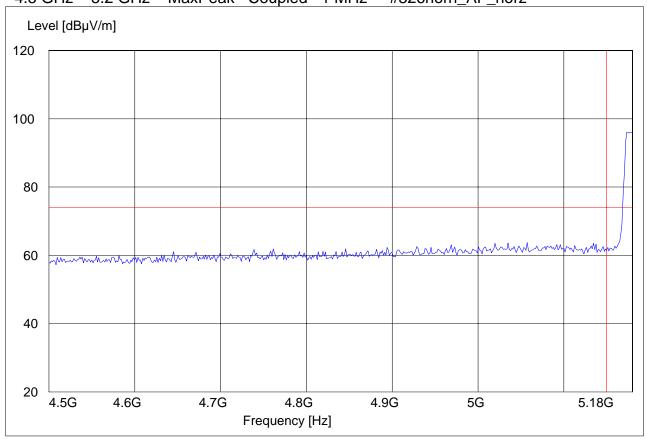
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.407 A_LBE_PK"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

4.5 GHz 5.2 GHz MaxPeak Coupled 1 MHz #326horn_AF_horz



Date of Report: Page 14 of 35



AVG

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5180 MHz

Antenna: H EUT: V

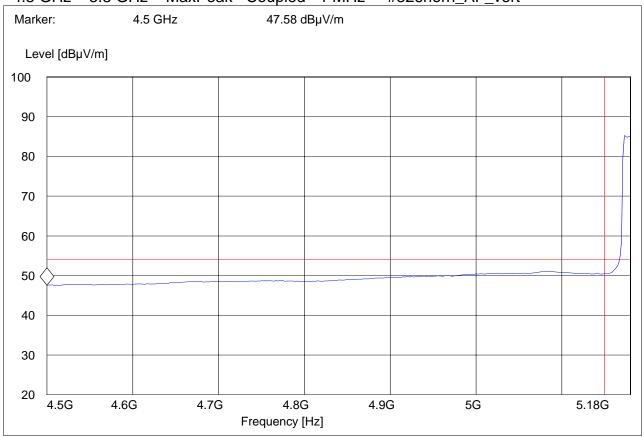
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.407 A LBE AVG"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

4.5 GHz 5.3 GHz MaxPeak Coupled 1 MHz #326horn_AF_vert



Date of Report: Page 15 of 35



5.2.3 a MODE (5320MHz)

PEAK

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5320 MHz

Antenna: H EUT: V

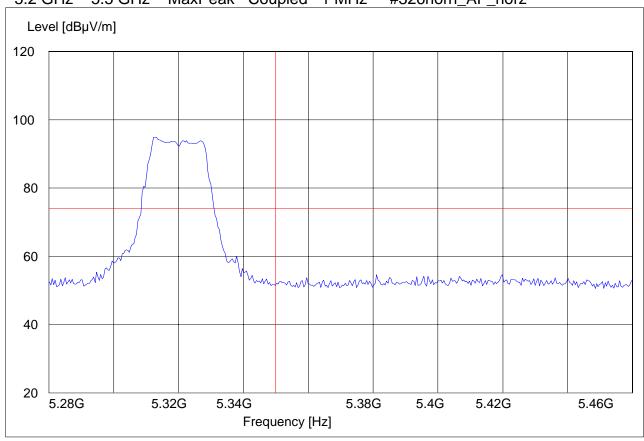
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.407 A_HBE_PK"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.2 GHz 5.5 GHz MaxPeak Coupled 1 MHz #326horn_AF_horz



Page 16 of 35 Date of Report:



AVG

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Sony Electronics Customer: Operating Mode: TX5320 MHz

Antenna: Η EUT: V

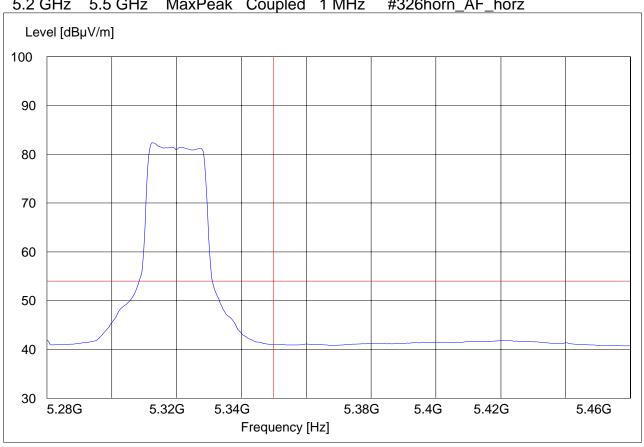
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.407 A_HBE_AVG"

Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.2 GHz 5.5 GHz MaxPeak Coupled 1 MHz #326horn_AF_horz



Date of Report: Page 17 of 35



5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.407(b)/15.205/15.209

5.3.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

^{*}PEAK LIMIT= 74dBuV/m for spurious in restricted bands

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit, unless specified with the plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested
JKHZ – JUMHZ		channels

^{*}AVG. LIMIT= 54dBuV/m for spurious in restricted bands

^{*}PEAK LIMIT= 68.2dBuV/m for spurious NOT in restricted bands

Date of Report: Page 18 of 35



5.3.2 RESULTS a MODE

30MHz – 1GHz

Antenna:

Note: This plot is valid for low, mid, high channels horizontal and vertical polarities (worst-case

plot).

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX 5180 Mhz

Antenna: V EUT: V

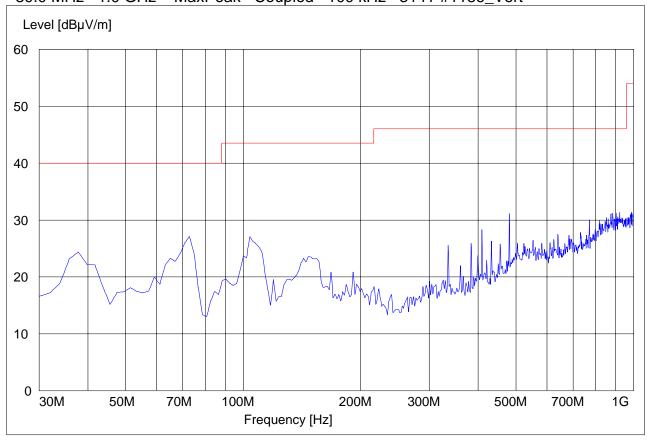
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz 3141-#1186_Vert



Date of Report: Page 19 of 35



1-18GHz (5180MHz)

Note: The peaks above the limit line is the carrier freq.

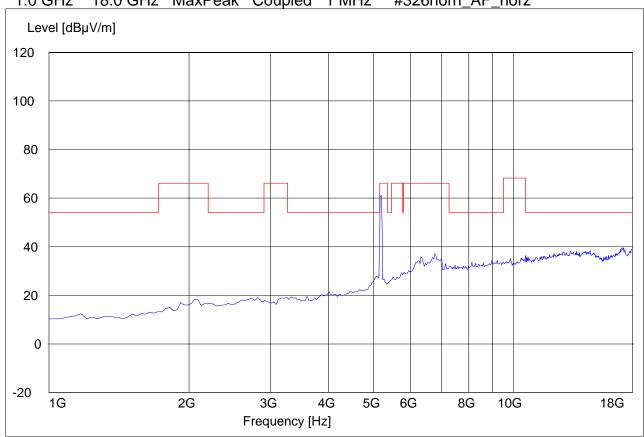
Note: Peak Reading vs. Average limit

SWEEP TABLE: "FCC 15.407 1-18G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #326horn_AF_horz



Date of Report: Page 20 of 35



1-18GHz (5260MHz)

Note: The peaks above the limit line is the carrier freq.

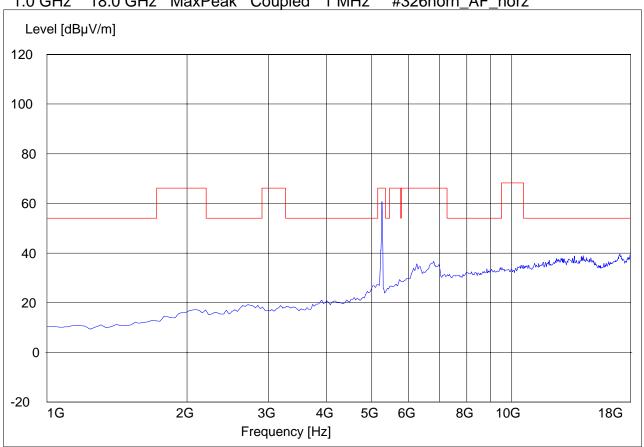
Note: Peak Reading vs. Average limit

SWEEP TABLE: "FCC 15.407 1-18G"

Stop Detector Meas. Transducer Start

Frequency Frequency Time Bandw.

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #326horn_AF_horz



Date of Report: Page 21 of 35



1-18GHz (5320MHz)

Note: The peaks above the limit line is the carrier freq.

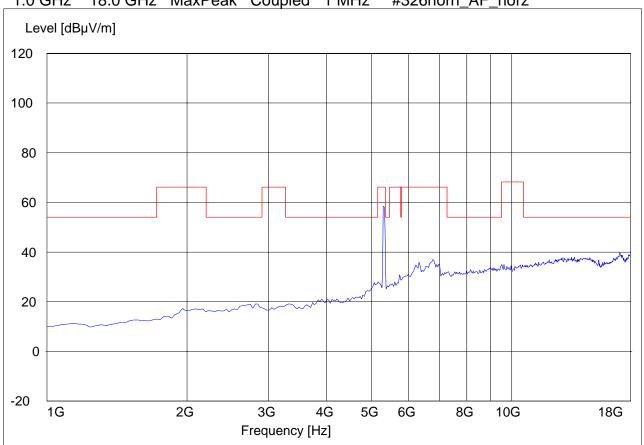
Note: Peak Reading vs. Average limit

SWEEP TABLE: "FCC 15.407 1-18G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #326horn_AF_horz



Date of Report: Page 22 of 35



18-26.5GHz (5180MHz)

Note: Peak Reading vs. Average limit,

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5180 MHz

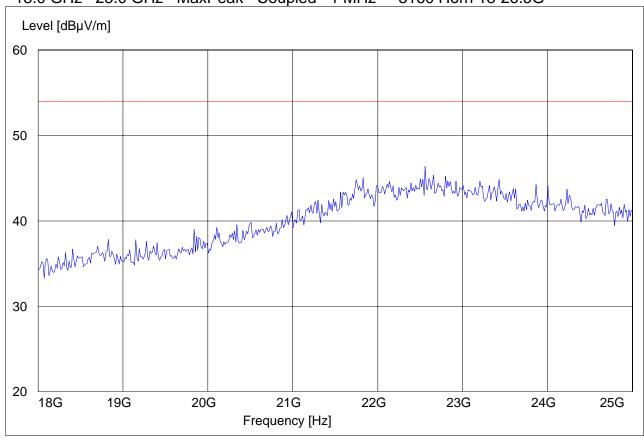
Antenna: H EUT: V

Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.247 18-26.5G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.



Date of Report: Page 23 of 35



18-26.5GHz (5260MHz)

Note: Peak Reading vs. Average limit,

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5180 MHz

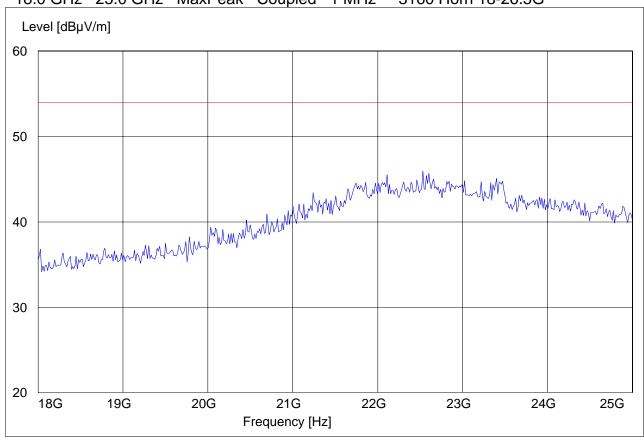
Antenna: H EUT: V

Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.247 18-26.5G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.



Date of Report: Page 24 of 35



18-26.5GHz (5320MHz)

Note: Peak Reading vs. Average limit,

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5180 MHz

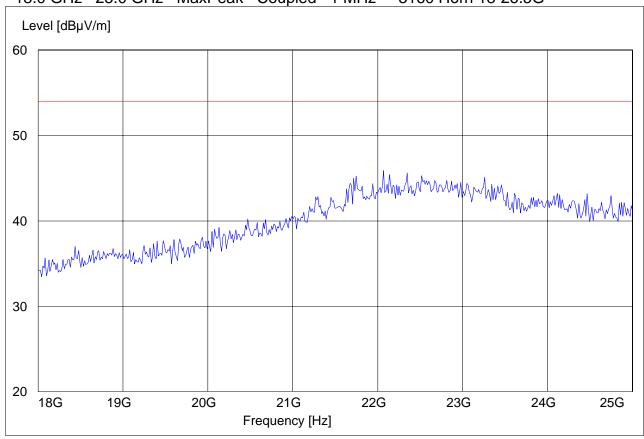
Antenna: H EUT: V

Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.247 18-26.5G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.



Date of Report: Page 25 of 35



26-40GHz

Note: This plot is valid for low, mid, high channels (worst-case plot)

Note: Peak Reading vs. Average limit,

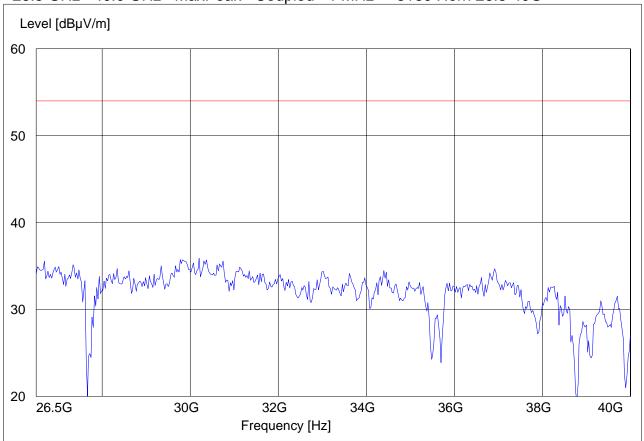
SWEEP TABLE: "FCC15.247 26.5-40G"

Short Description: Bluetooth 18 - 26 GHz

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

26.5 GHz 40.0 GHz MaxPeak Coupled 1 MHz 3160 Horn 26.5-40G



Date of Report: Page 26 of 35



5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.4.1 LIMITS

Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

NOTE:

- 1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.
- 2. All measurements are done in peak mode using an average limit, unless specified with the plots.

Date of Report: Page 27 of 35



5.4.2 RESULTS 30MHz – 1GHz Antenna: vertical

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics

Operating Mode: RX

Antenna: V EUT: V

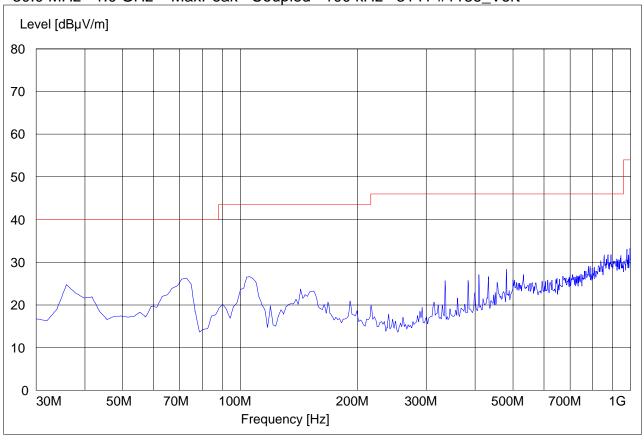
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "CANADA RE_30M-1G_Ver"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

30.0 MHz 1.0 GHz MaxPeak Coupled 100 kHz 3141-#1186_Vert



Date of Report: Page 28 of 35



1-3**GHz**

Note: Peak Reading vs. Average limit

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics

Operating Mode: RX Antenna: H EUT: V

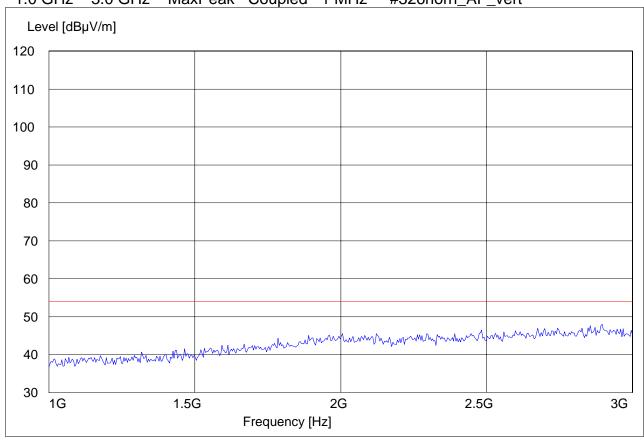
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "CANADA RE_1-3G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 3.0 GHz MaxPeak Coupled 1 MHz #326horn_AF_vert



Date of Report: Page 29 of 35



3-18GHz

Note: Peak Reading vs. Average limit

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics

Operating Mode: RX Antenna: H EUT: V

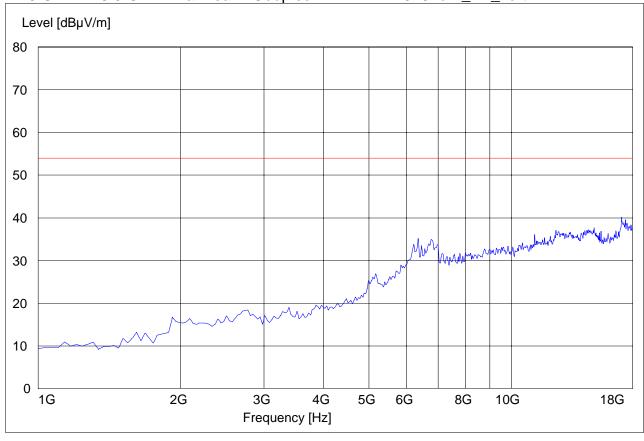
Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "CANADA RE_3-18G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #326horn_AF_vert



Date of Report: Page 30 of 35



18-26.5GHz

Note: Peak Reading vs. Average limit

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Handheld E Customer: Sony Electronics Operating Mode: TX5180 MHz

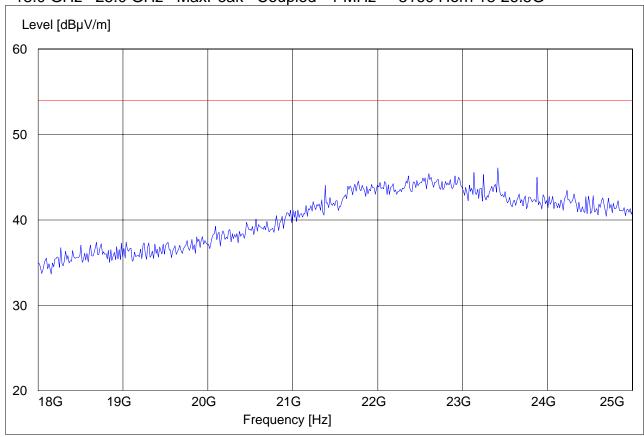
Antenna: H EUT: V

Test operator: Pete Voltage: AC/DC Sweep: closed

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.



Date of Report: Page 31 of 35



26.5-40GHz

Note: Peak Reading vs. Average limit

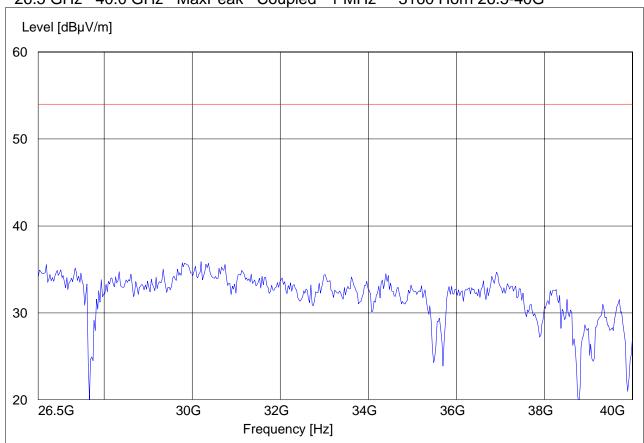
SWEEP TABLE: "FCC15.247_26.5-40G"

Short Description: Bluetooth 18 - 26 GHz

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

26.5 GHz 40.0 GHz MaxPeak Coupled 1 MHz 3160 Horn 26.5-40G



Date of Report: Page 32 of 35



5.5 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

5.5.1 LIMITS

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

Limit

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz

VBW = 10KHz

Date of Report: Page 33 of 35



5.5.2 RESULTS

LISN

411 Dixon Landing Road, CA 95035

EUT / Description: Handheld E Manufacturer: Sony Electronics

Test Engineer: Mike Phase: Mike

Comment: EN55022 AC/DC adapter

Start of Test: 4/5/2006 / 1:43:51PM

SWEEP TABLE: "EN 55022 Voltage"

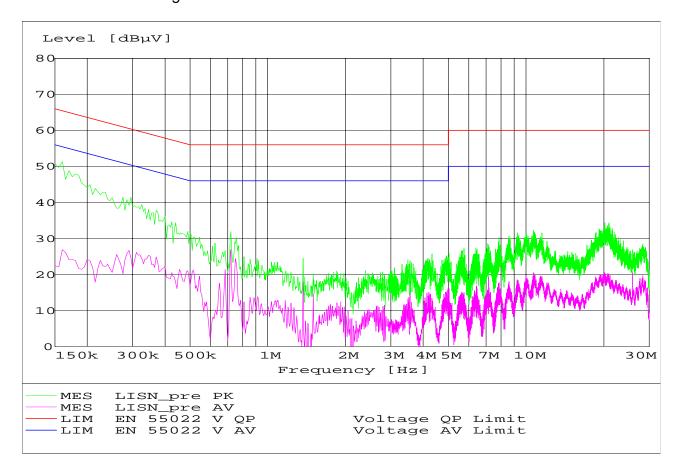
Short Description: EN 55022 Voltage

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

150.0 kHz 30.0 MHz MaxPeak Coupled 9 kHz None

Average



Date of Report: Page 34 of 35



5.6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancill	Type	Manufacturer	Serial No.	Cal Due	Interval
	ary					
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2006	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2006	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/01 1	May 2006	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008 .02	May 2006	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2006	1 year
06	Horn Antenna (1- 18GHz)	SAS-200/571	AH Systems	325	June 2006	1 year
07	Horn Antenna (18- 26.5GHz)	3160-09	EMCO	1240	June 2006	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2006	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4- 00102600	Miteq	00616	May 2006	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2006	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/00 8	May 2006	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2006	1 year
16	Horn Antenna (26.5-40GHz)	3160-10	EMCO	1156	June 2006	1 year

Test Report #:

SONYE_005_06001_15.407A

Date of Report: Page 35 of 35



5.7 BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER

