



FCC Test Report

FCC Part 15.247 for DSSS systems/ CANADA RSS-210

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_15.247A
DATE:



TTI-P-G 081/94-A0

Accredited according to ISO/IEC 17025



Bluetooth Qualification
Test Facility
(BQTF)



FCC listed # 101450

IC recognized # 3925

CETECOM Inc.

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

Phone: + 1 (408) 586 6200 • Fax: + 1 (408) 586 6299 • E-mail: info@cetecomusa.com • <http://www.cetecom.com>

CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

TABLE OF CONTENTS

1	Assessment	3
2	Administrative Data	4
2.1	Identification of the Testing Laboratory Issuing the EMC Test Report	4
2.2	Identification of the Client	4
2.3	Identification of the Manufacturer	4
3	Equipment under Test (EUT)	5
3.1	Identification of the Equipment under Test	5
3.2	Identification of Accessory equipment	5
4	Subject Of Investigation	6
5	Measurements	7
5.1	MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)	7
5.1.1	LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)	7
5.1.2	EIRP a MODE:	7
5.2	TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209	11
5.2.1	LIMITS	11
5.2.2	RESULTS a MODE	12
5.3	RECEIVER SPURIOUS RADIATION § 15.209/RSS210	21
5.3.1	LIMITS	21
5.3.2	RESULTS	22
5.4	AC POWER LINE CONDUCTED EMISSIONS § 15.107/207	27
5.4.1	LIMITS	27
5.4.2	RESULTS	28
5.5	TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS	29
5.6	BLOCK DIAGRAMS	30

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 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.



2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road 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

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:	5725-5850MHz
*Type(s) of Modulation:	OFDM
Number of Channels:	17
Antenna Type:	λ/monopole (Inverted F Antenna)
Output Power:	a mode: 0.024 W EIRP @ 5825 MHz

***This report contains data for FCC15.247 “a” mode for all “b” and “g” mode data please see report SONYE_004_05002_15.247BG and for FCC15.407 “a” mode data please see report SONYE_005_06001_15.407A.**

3.2 Identification of Accessory equipment

TYPE	MANF.	MODEL
AC ADAPTER	SONY	VGP-AC16V7



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 FCC15.247 on the EUT with the pre-certified WLAN module. All conducted measurements are covered under *test report# INTEL-050901F*

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 aux 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 15.247 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210.

5 Measurements

5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)

5.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)

Frequency range	RF power output
5725-5850 MHz	36dBm EIRP

*limit is based upon antenna gain of less than or equal to 6dBi.

5.1.2 EIRP a MODE:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		5745	5785	5825
T _{nom} (23)°C	V _{nom} VDC	12.85	12.92	13.71
Measurement uncertainty		±0.5dBm		

**EIRP a Mode (5745)****CETECOM Inc.****411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Handheld E

Customer: Sony Electronics

Operating Mode: TX 5745 MHz

Antenna: V

EUT: V

Test operator: Pete

Voltage: AC/DC

Sweep: eirp

SWEEP TABLE: "EIRP 802.11a_149"

Short Description: EIRP channel-5260 MHz

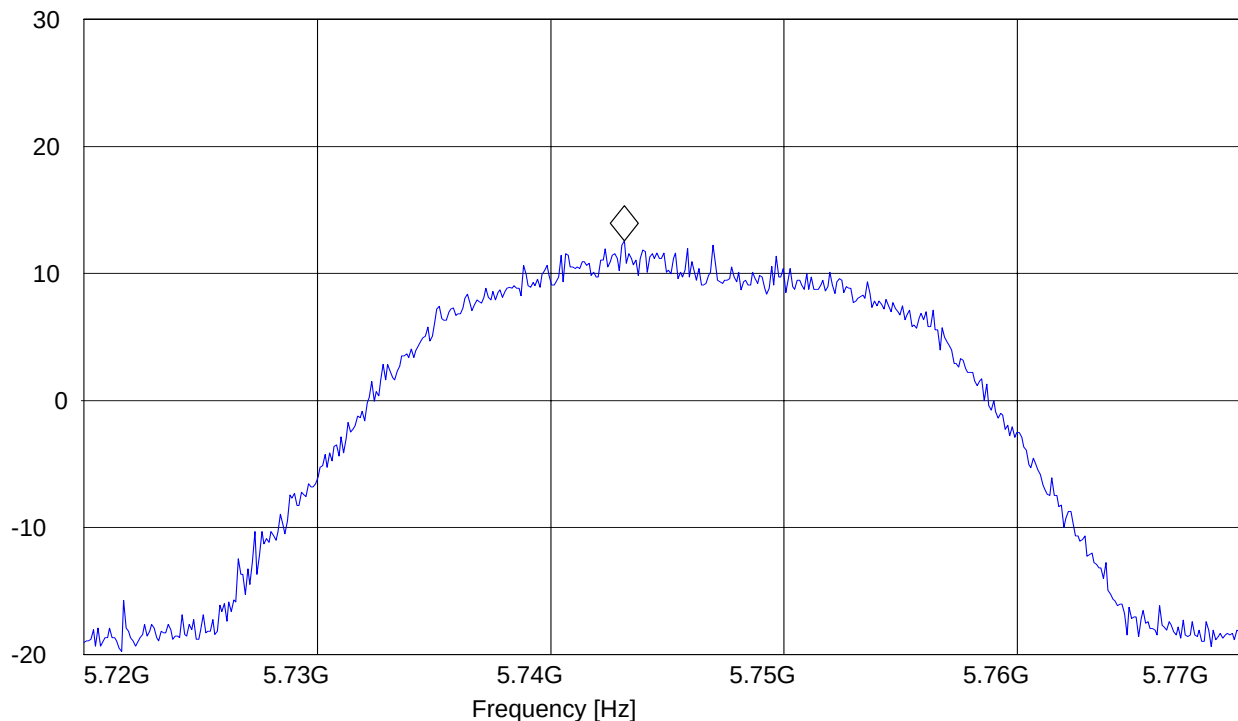
Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.7 GHz 5.8 GHz MaxPeak Coupled 10 MHz DUMMY-DBM

Marker: 5.743146293 GHz 12.58 dBm

Level [dBm]



**EIRP a Mode (5785MHz)****CETECOM Inc.****411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Handheld E

Customer: Sony Electronics

Operating Mode: TX 5785 MHz

Antenna: V

EUT: V

Test operator: Pete

Voltage: AC/DC

Sweep: eirp

SWEEP TABLE: "EIRP 802.11a_157"

Short Description: EIRP channel-5260 MHz

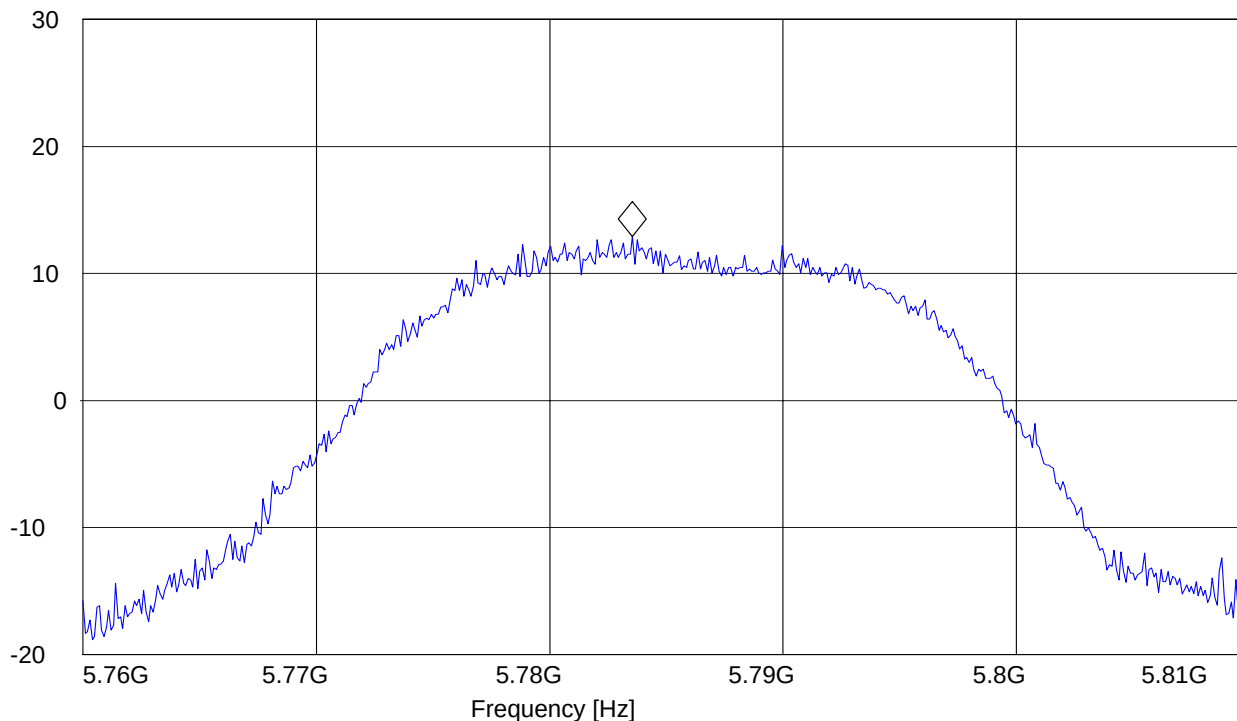
Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

5.8 GHz 5.8 GHz MaxPeak Coupled 10 MHz DUMMY-DBM

Marker: 5.783547094 GHz 12.92 dBm

Level [dBm]



**EIRP a Mode (5825MHz)****CETECOM Inc.****411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Handheld E

Customer: Sony Electronics

Operating Mode: TX 5825 MHz

Antenna: V

EUT: V

Test operator: Pete

Voltage: AC/DC

Sweep: eirp

SWEEP TABLE: "EIRP 802.11a_165"

Short Description: EIRP channel-5260 MHz

Start Stop Detector Meas. IF Transducer

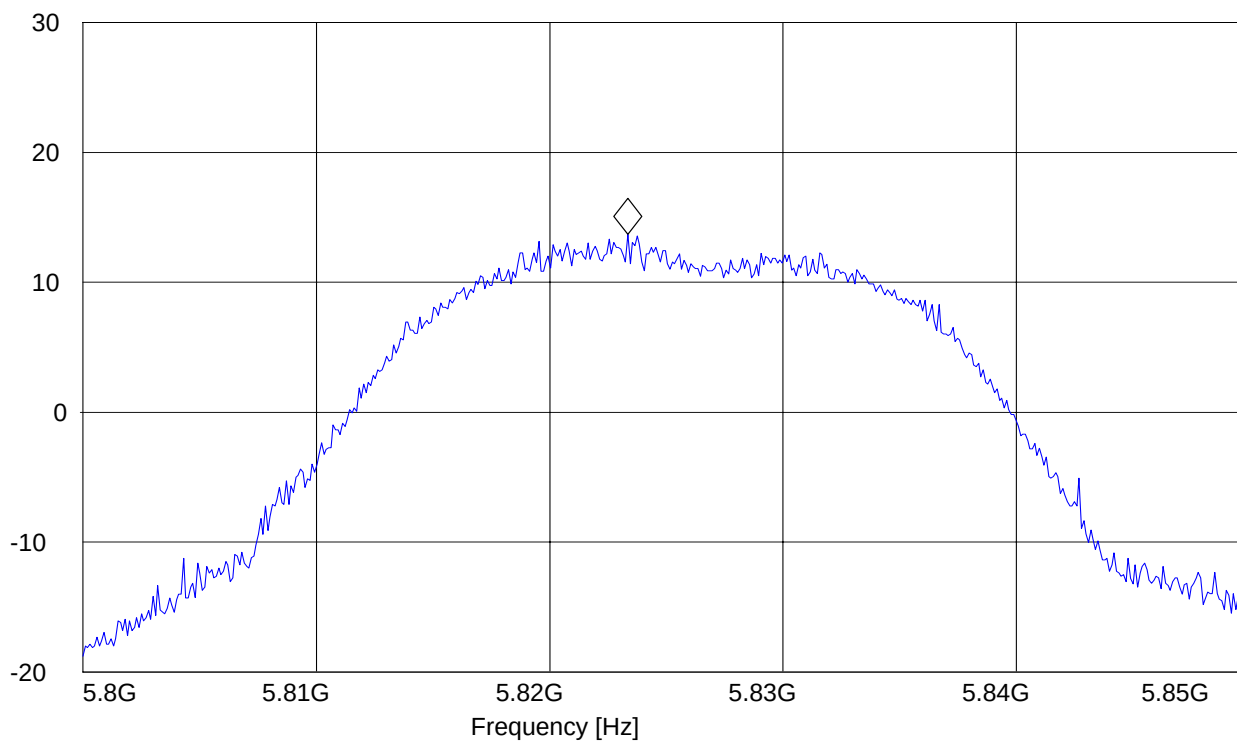
Frequency Frequency Time Bandw.

5.8 GHz 5.9 GHz MaxPeak Coupled 10 MHz DUMMY-DBM

Marker: 5.823346693 GHz

13.71 dBm

Level [dBm]



5.2 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

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**

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 channels

**5.2.2 RESULTS a MODE****30MHz – 1GHz****Antenna: vertical****Note: This plot is valid for low, mid, high channels (worst-case plot)****Note: Peak reading vs. Quasi-peak limit****CETECOM Inc.****411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Handheld E

Customer: Sony Electronics

Operating Mode: TX 5825 MHz

Antenna: V

EUT: V

Test operator: Pete

Voltage: AC/DC

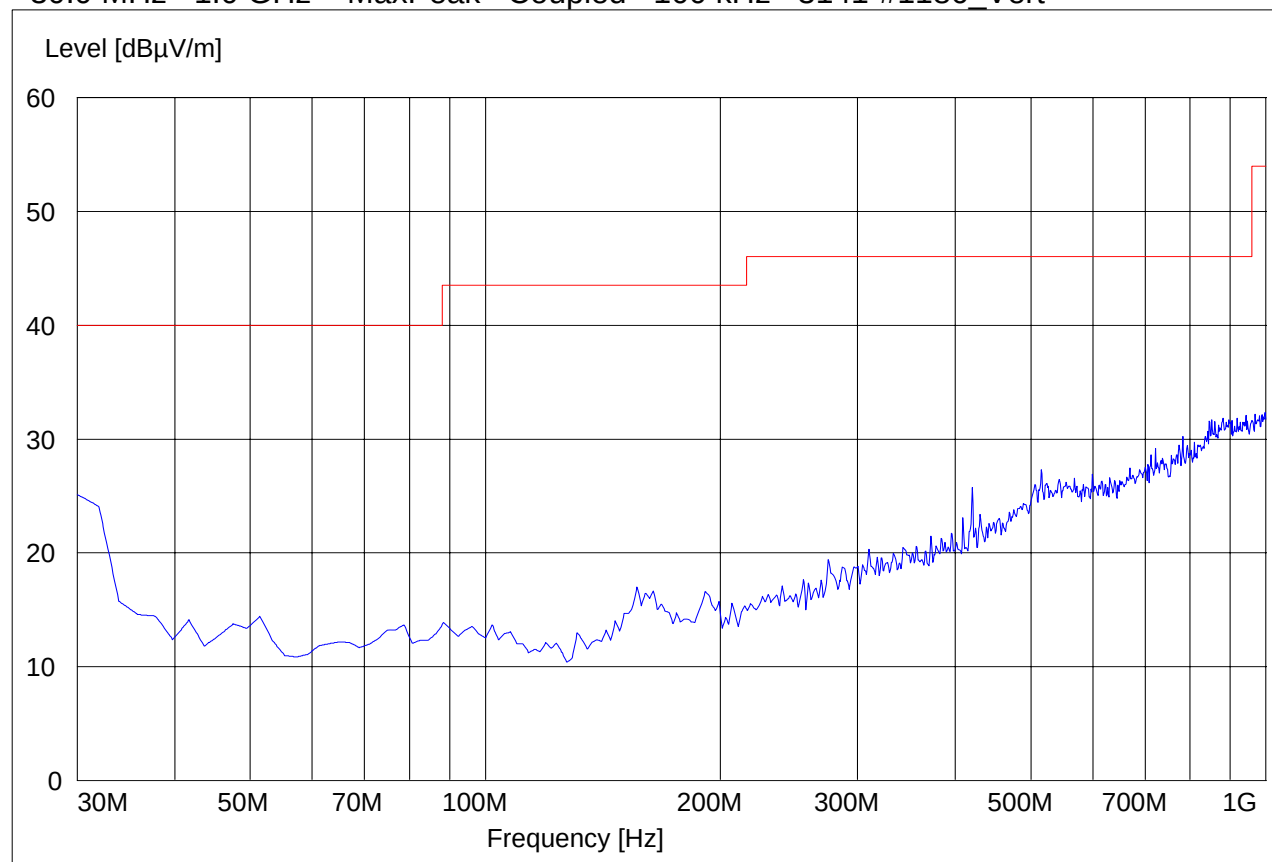
Sweep: 30-1000 MHz

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



**30MHz – 1GHz****Antenna: horizontal****Note: This plot is valid for low, mid, high channels (worst-case plot)****Note: Peak reading vs. Quasi-peak limit****CETECOM Inc.****411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Handheld E

Customer: Sony Electronics

Operating Mode: TX 5825 MHz

Antenna: H

EUT: V

Test operator: Pete

Voltage: AC/DC

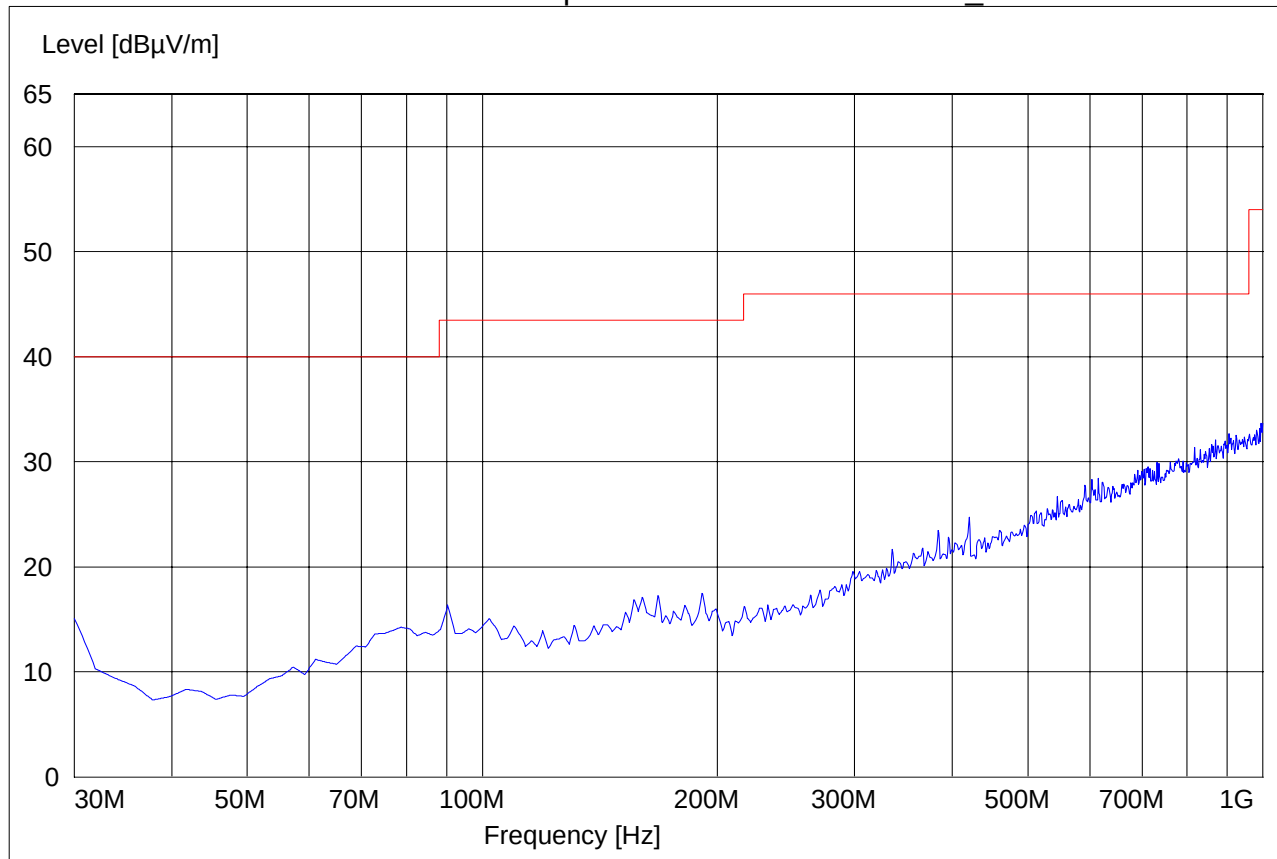
Sweep: 30-1000 MHz

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

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

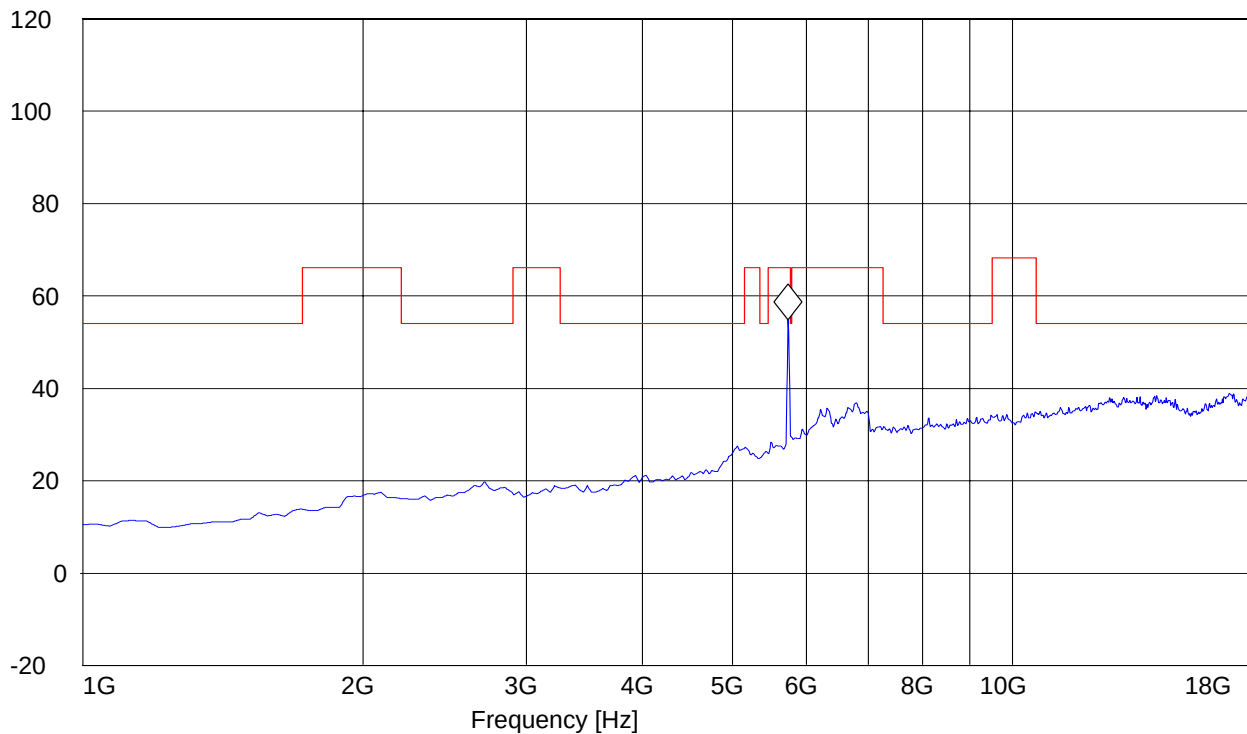


1-8GHz (5745MHz)**Note: The peaks above the limit line is the carrier freq.****Note: Peak Reading vs. Average limit*****SWEEP TABLE: "FCC 15.407 1-18G"***

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

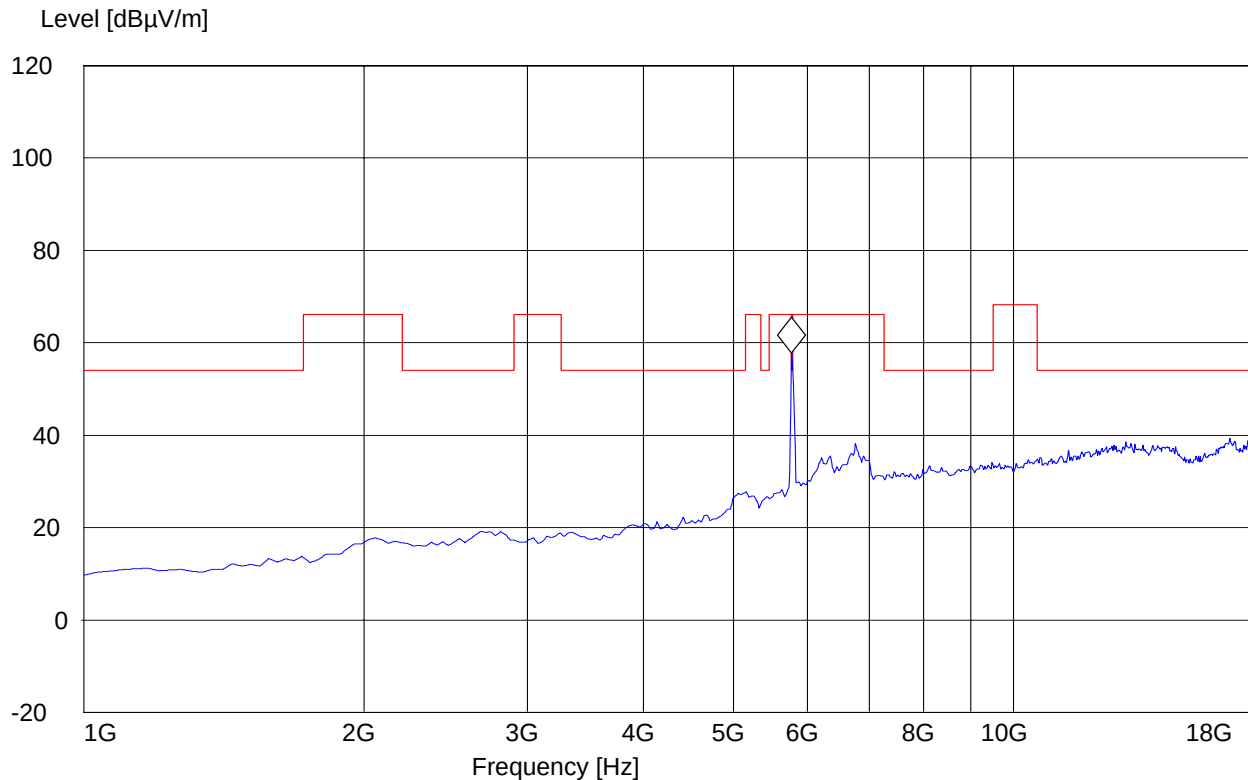
Marker: 5.735470942 GHz 54.86 dBμV/m

Level [dBμV/m]



1-18GHz (5785MHz)**Note: The peaks above the limit line is the carrier freq.****Note: Peak Reading vs. Average limit*****SWEEP TABLE: "FCC 15.407 1-18G"***

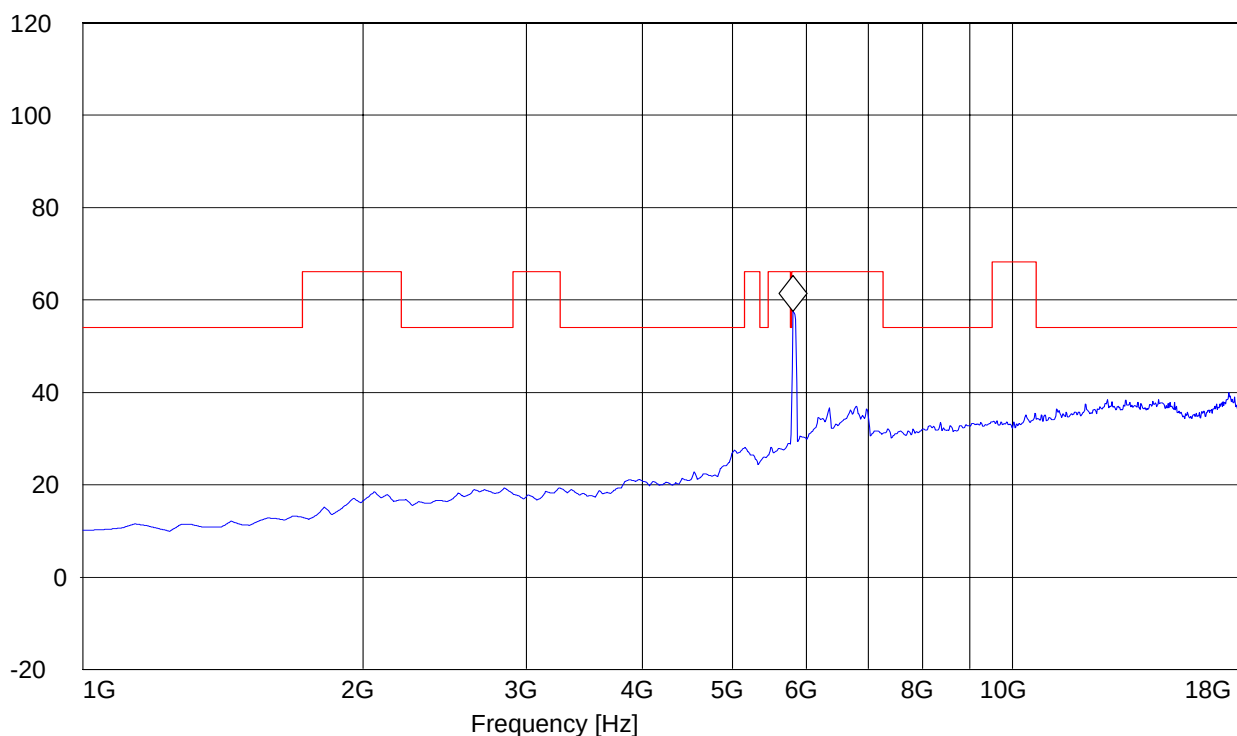
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

Marker: 5.769539078 GHz 57.78 dB μ V/m

1-18GHz (5825MHz)**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

Marker: 5.803607214 GHz

57.57 dB μ V/mLevel [dB μ V/m]

**18-26.5GHz (5745MHz)****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: TX5745MHz

Antenna: H

EUT: V

Test operator: Pete

Voltage: AC/DC

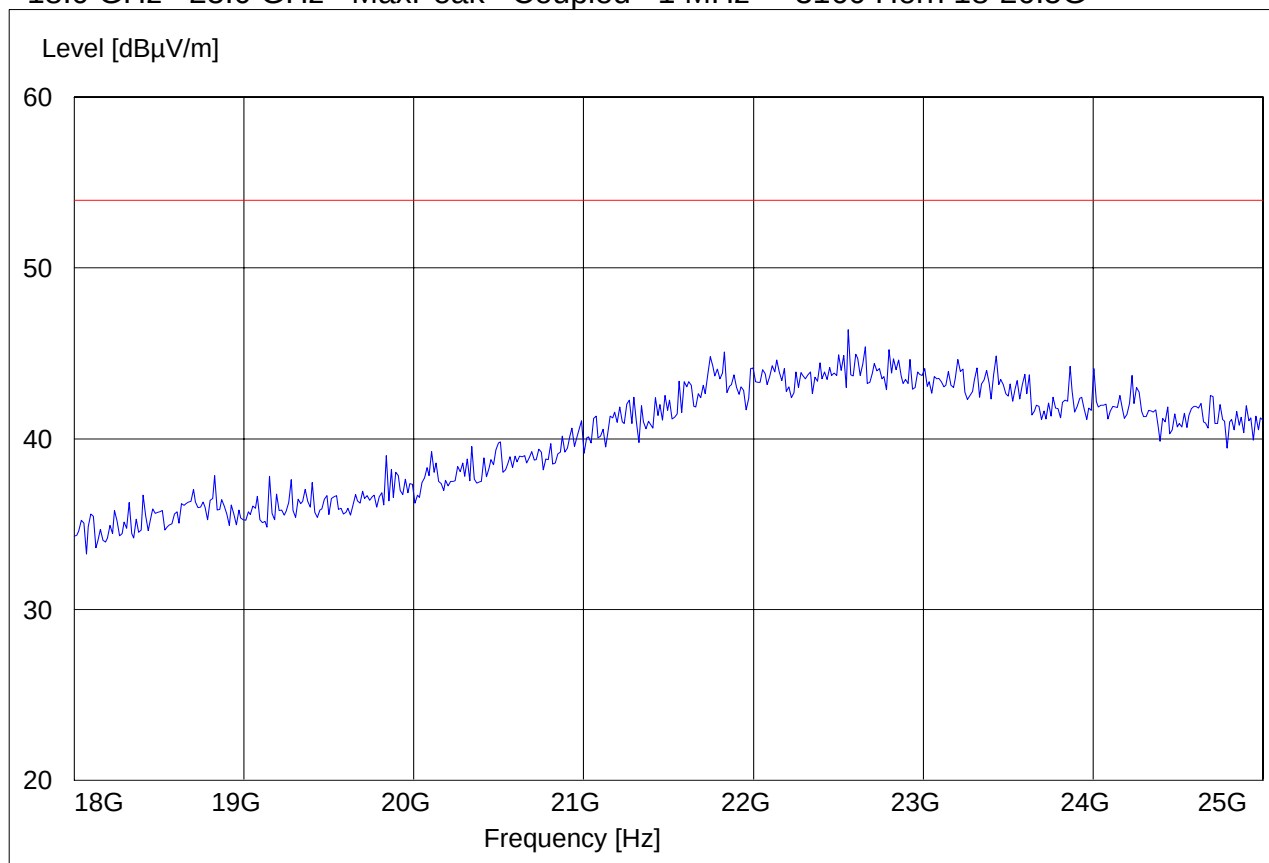
Sweep: closed

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

18.0 GHz 25.0 GHz MaxPeak Coupled 1 MHz 3160 Horn 18-26.5G



**18-26.5GHz (5785MHz)****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: TX5785 MHz

Antenna: H

EUT: V

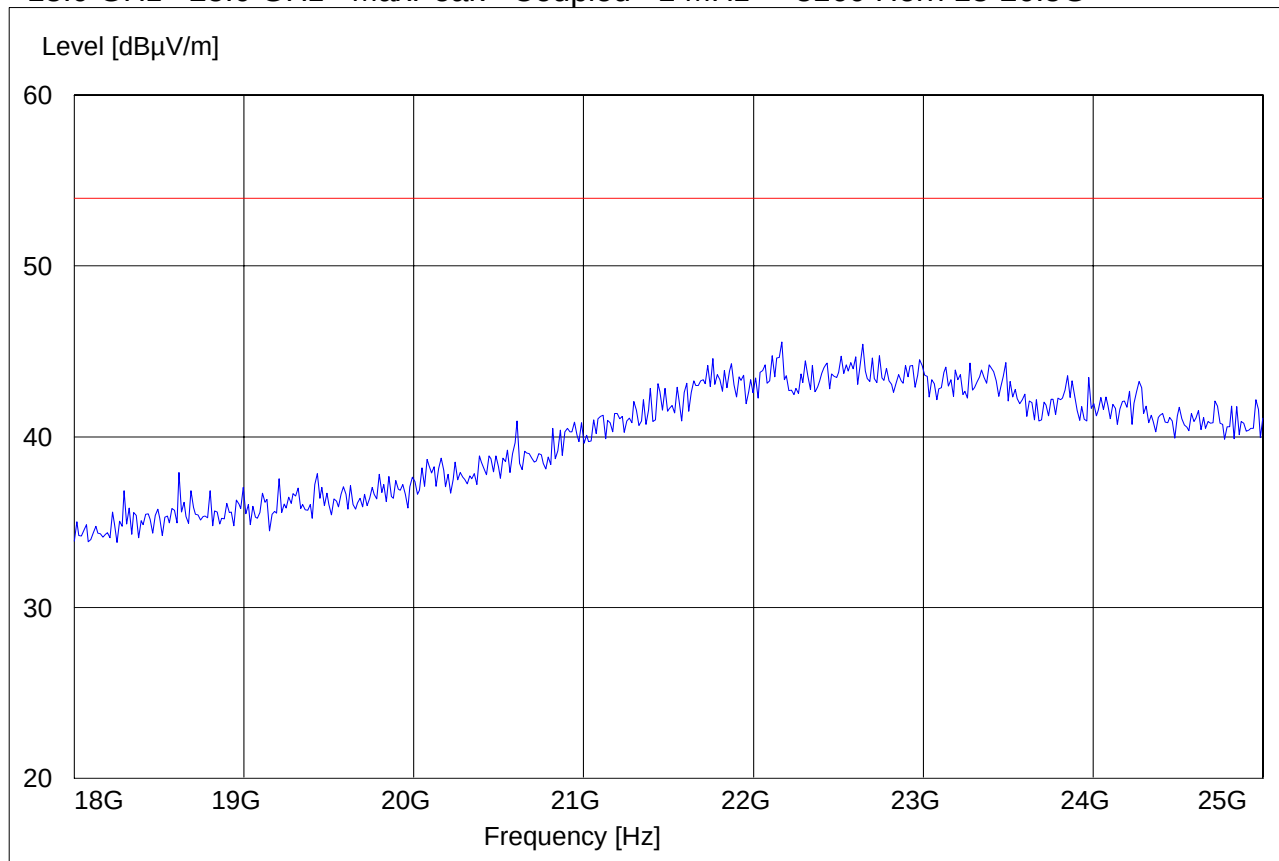
Test operator: Pete

Voltage: AC/DC

Sweep: closed

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

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
18.0 GHz	25.0 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 18-26.5G



**18-26.5GHz (5825MHz)****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: TX5825 MHz

Antenna: H

EUT: V

Test operator: Pete

Voltage: AC/DC

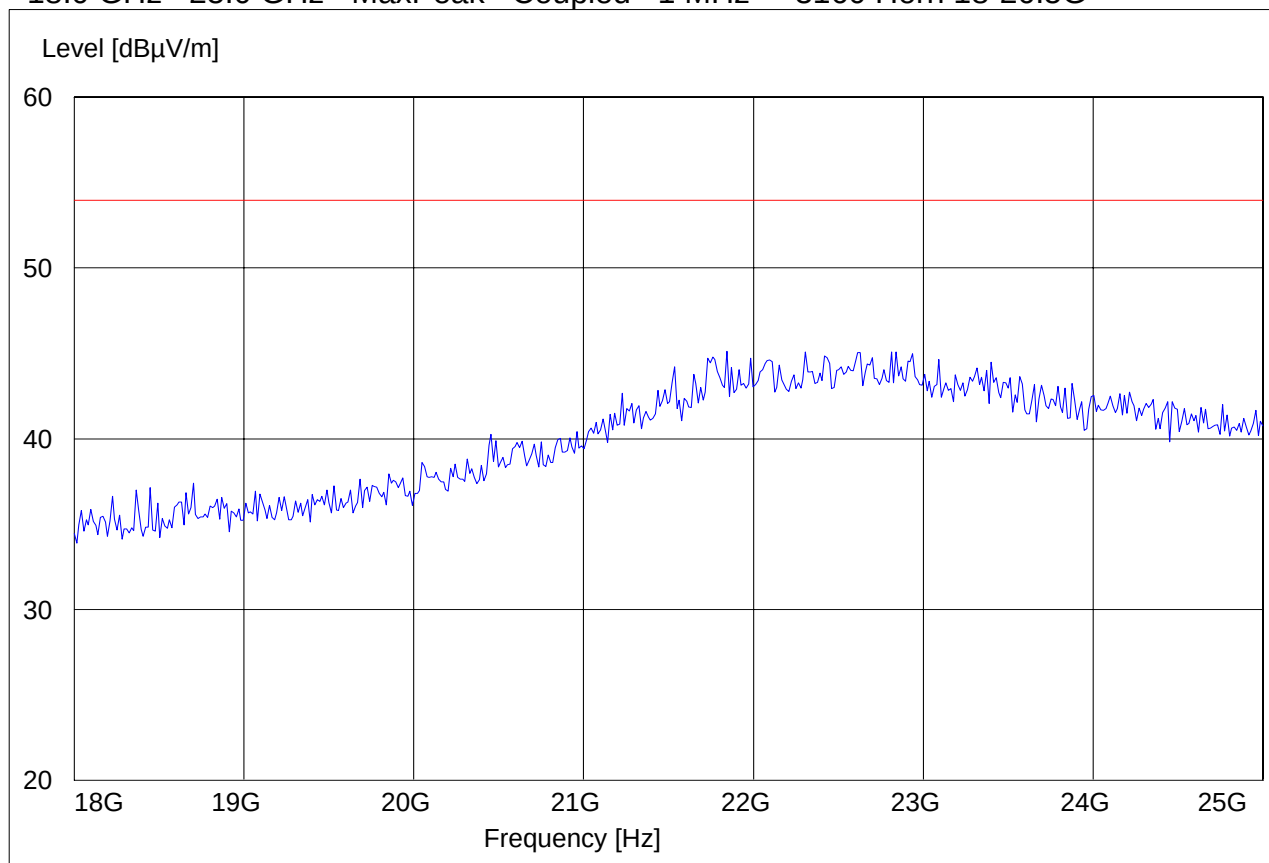
Sweep: closed

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

18.0 GHz 25.0 GHz MaxPeak Coupled 1 MHz 3160 Horn 18-26.5G



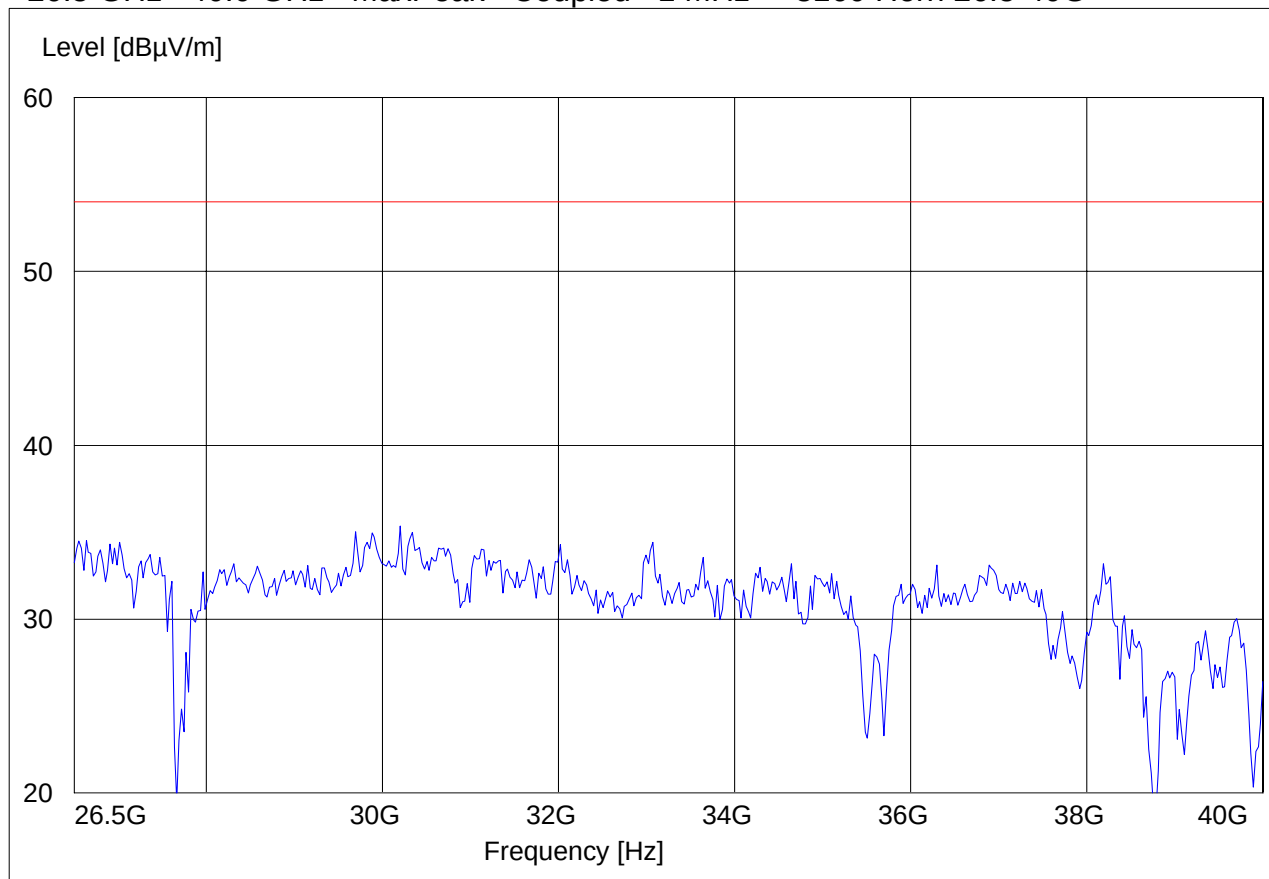
26-40GHz**Note: This plot is valid for low, mid, high channels (worst-case plot)****Note: Peak Reading vs. Average limit ,*****SWEEP TABLE: "FCC15.247_26.5-40G"***

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



5.3 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.3.1 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.

**5.3.2 RESULTS****30MHz – 1GHz****Antenna: vertical****Note: Peak Reading vs. Quasi-peak limit****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

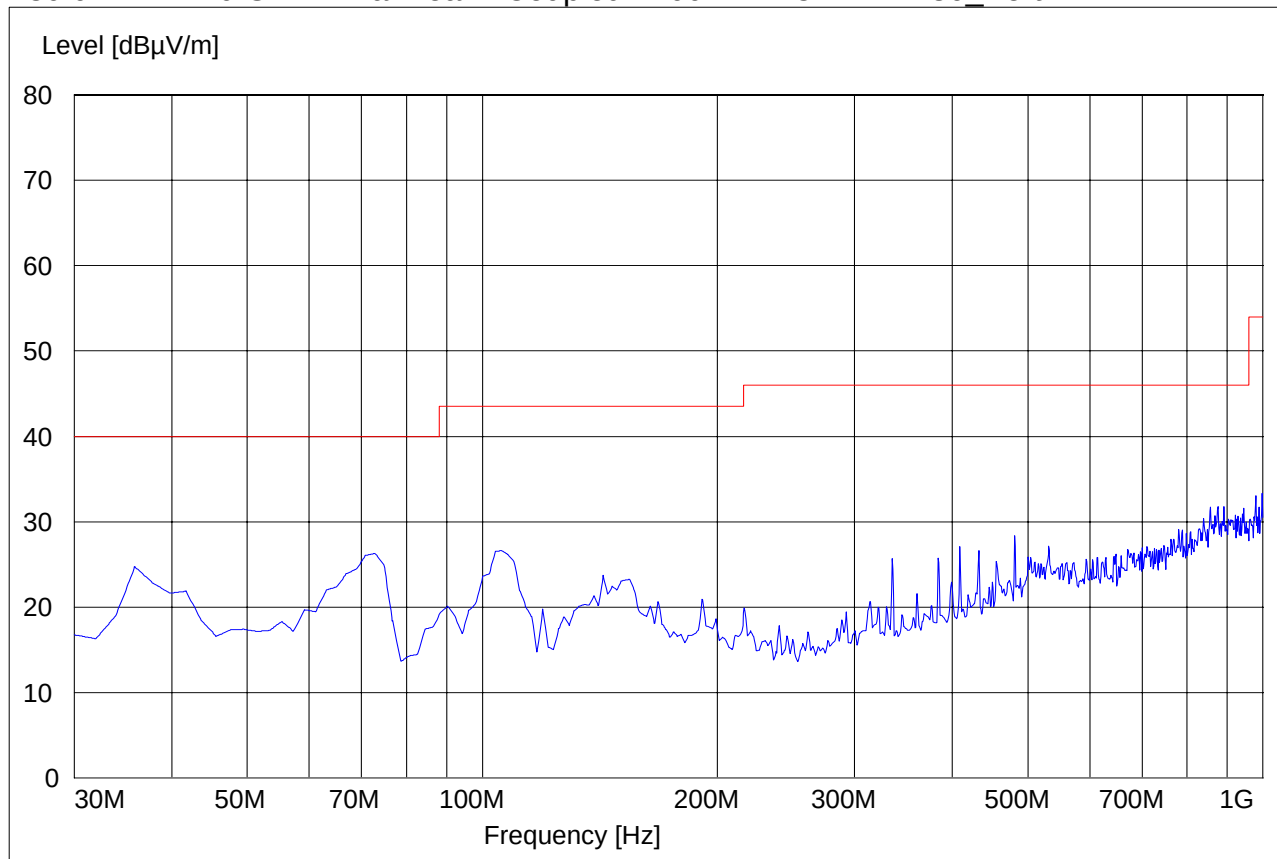
Sweep: closed

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



**1-3GHz****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

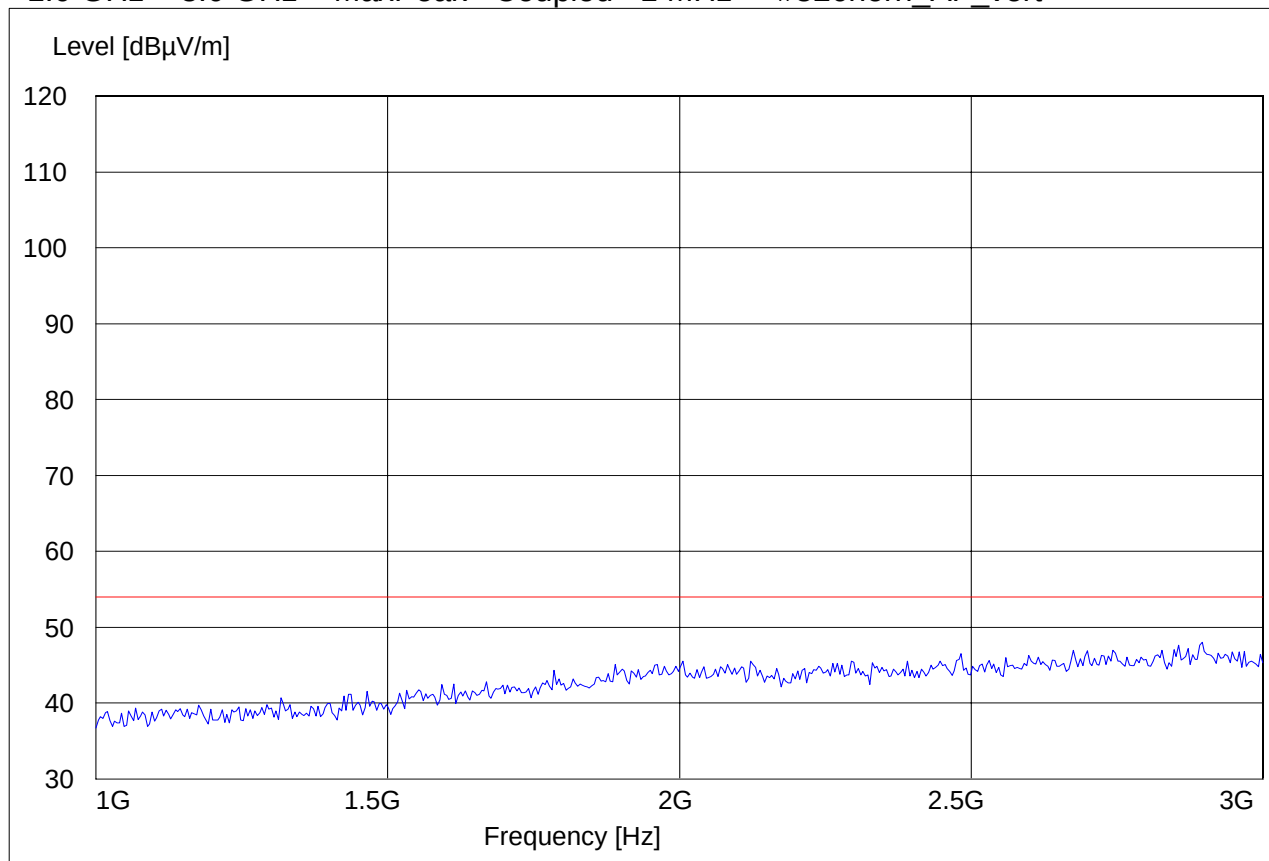
Sweep: closed

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



**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

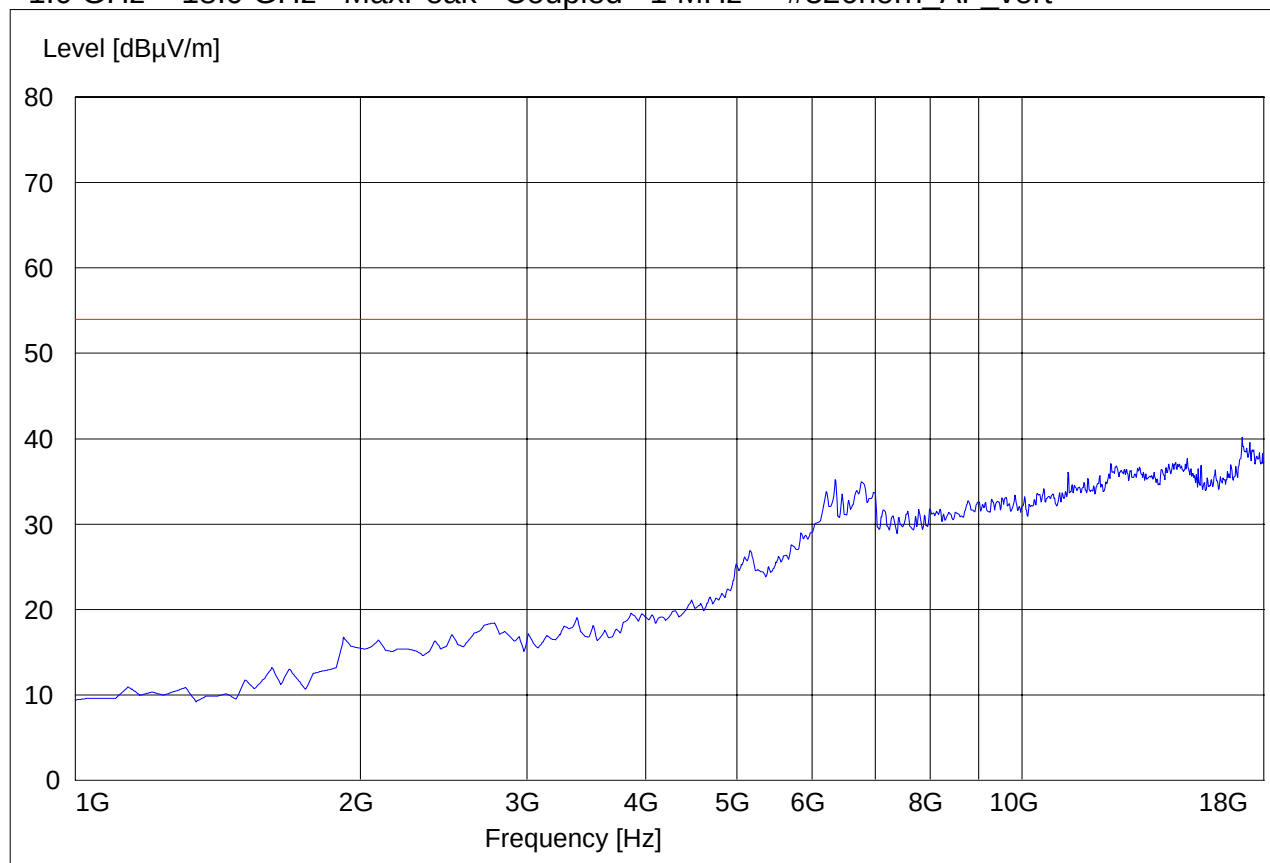
Test operator: Pete

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



**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

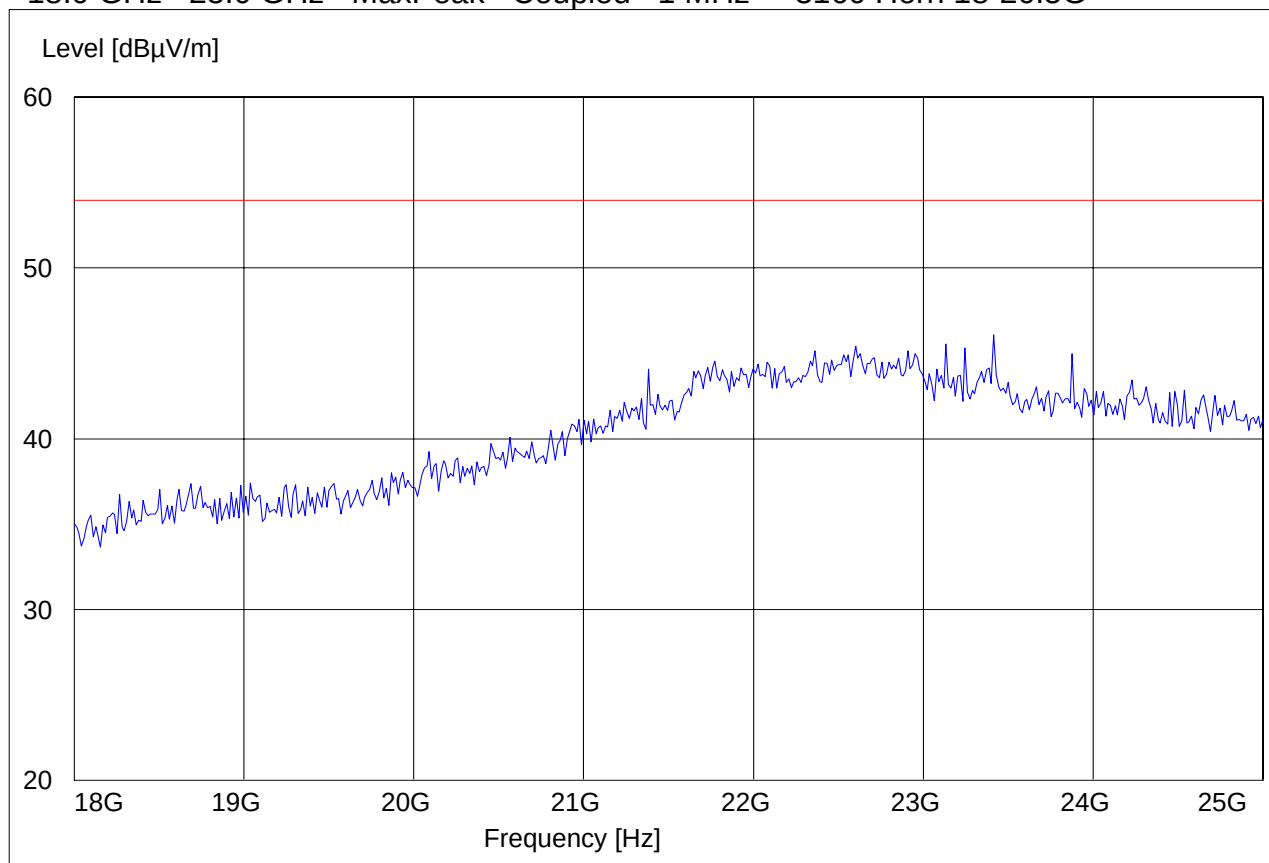
Sweep: closed

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

18.0 GHz 25.0 GHz MaxPeak Coupled 1 MHz 3160 Horn 18-26.5G



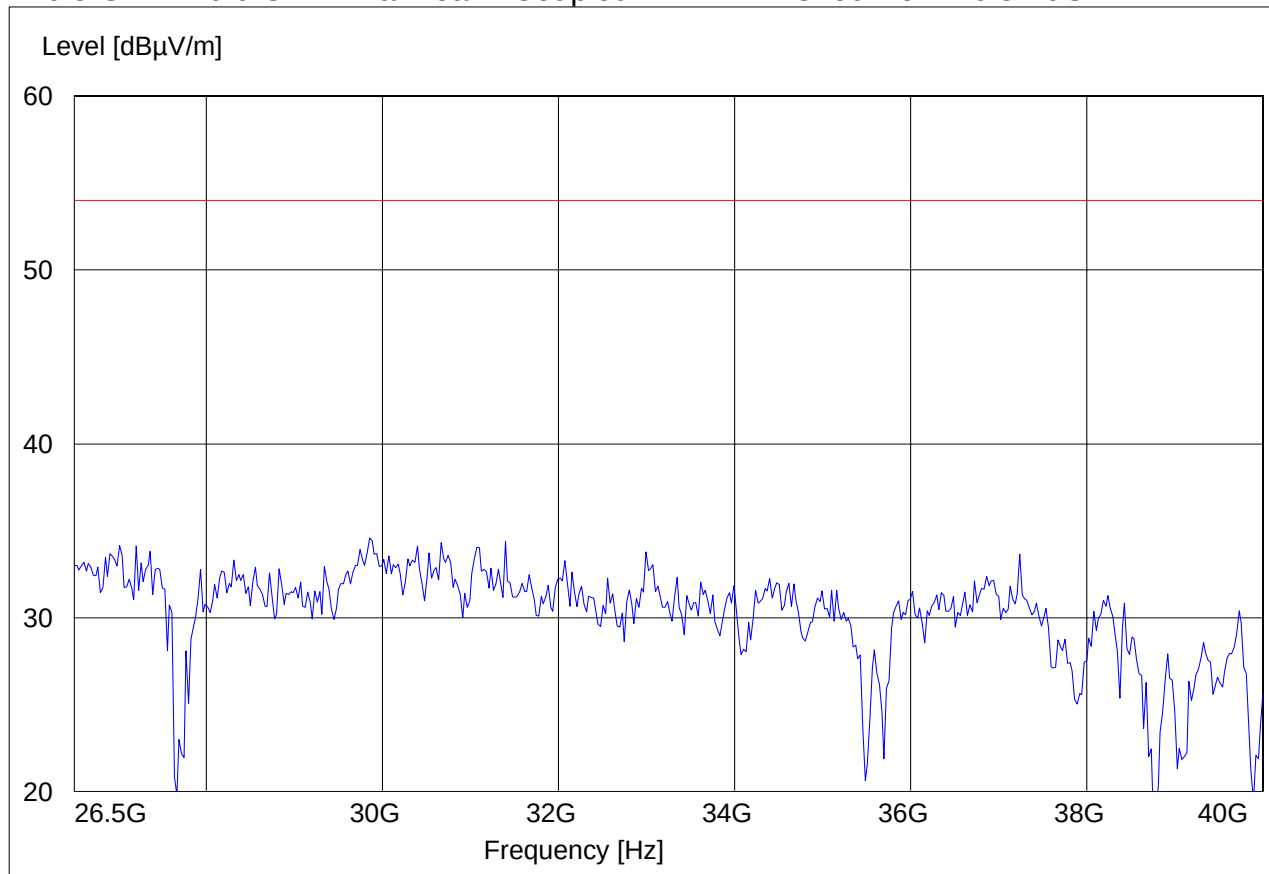
26.5-40GHz**Note: Peak Reading vs. Average limit*****SWEEP TABLE: "FCC15.247_26.5-40G"***

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



5.4 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207**5.4.1 LIMITS****Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)****Limit**

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	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**

5.4.2 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"

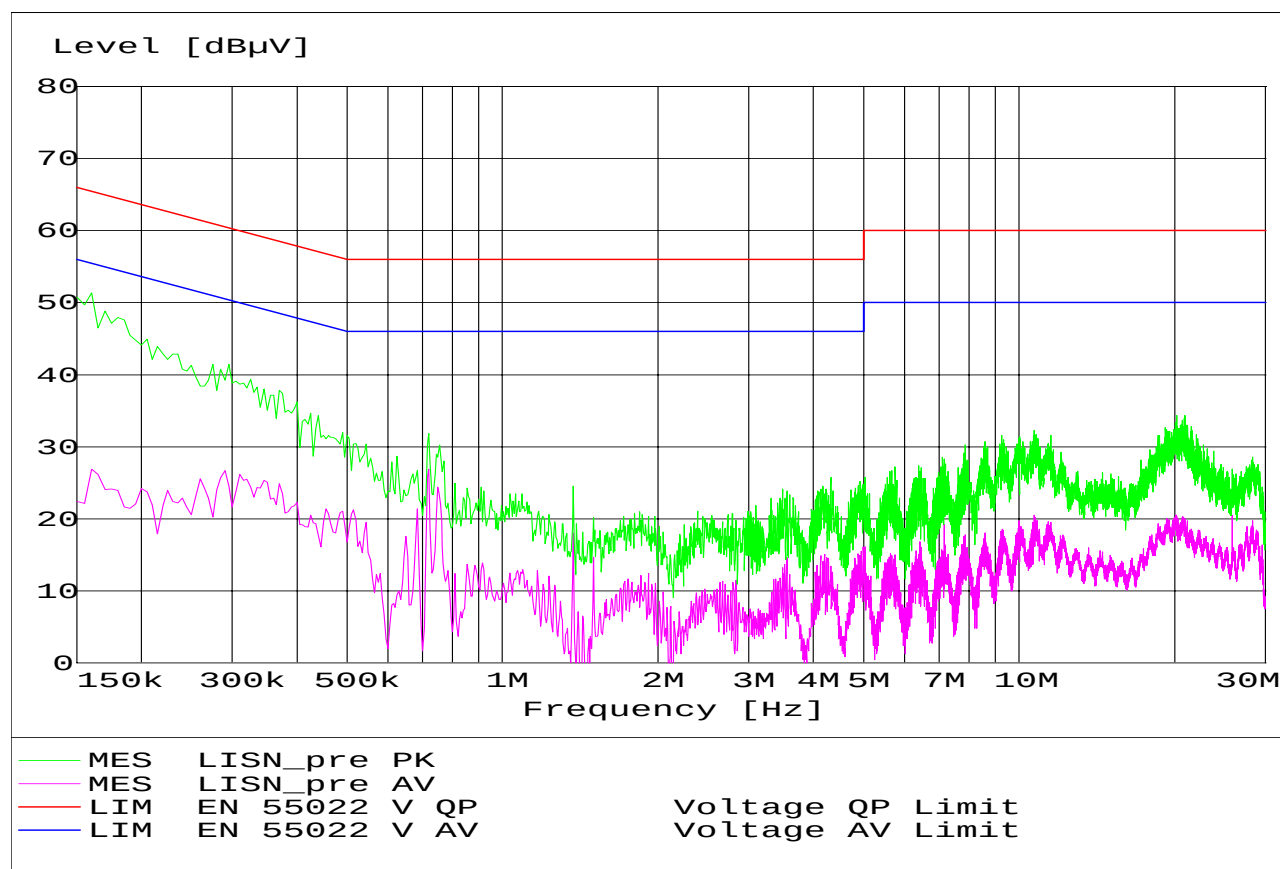
Short Description: EN 55022 Voltage

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

150.0 kHz 30.0 MHz MaxPeak Coupled 9 kHz None

Average



5.5 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
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	836878/011	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	847958/008	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

5.6 BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER

