

FCC CFR47 PART 15 CERTIFICATION



TEST REPORT

FOR

Wireless HAND PC

MODEL: S160

FCC ID: A3LS160

REPORT NUMBER: 02I1394

ISSUE DATE: JULY 08, 2002

Prepared for

**SAMSUNG ELECTRONICS CO., LTD.
#416, MAETAN-3 DONG, PARDAL-GU
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(SOUTH) KOREA**

Prepared by

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1. TEST RESULT CERTIFICATION

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
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EUT DESCRIPTION: WIRELESS HAND PC

MODEL NAME: S160

DATE TESTED: JULY 1 – 3, 2002

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	2.4GHz TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 15 Subpart C

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 15 Subpart C. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

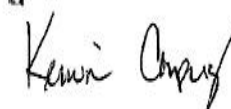
Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:



STEVE CHENG
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



KERWIN CORPUZ
ASSOCIATE EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The S160 is a Wireless HAND PC. This product includes a wireless LAN that operates through 2.4 GHz access point. The maximum peak output power is 25.53 dBm (corresponding to 18 dBm average measurement) with a surface-mount (SMT) Intergrated Miniaturized Antenna that has a peak gain of 3 dB, typical gain of 2 dB.

3. EUT MODIFICATION

Modification made to comply with PART 15, added ferrite core (FAIR-RITE, part# 0444173951) onto connetor side of Mic/Headphone cable with 3 turns.

4. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

5. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

6. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

6.1. Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	 R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	 ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	 ELA-171
Taiwan	BSMI	CNS 13438	 SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	 IC2324 A,B,C, and F

*No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government

7. CALIBRATION AND UNCERTAINTY

7.1. Measuring Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

7.2. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

7.3. Test and Measurement Equipment

The following test and measurement equipment was utilized for the tests documented in this report:

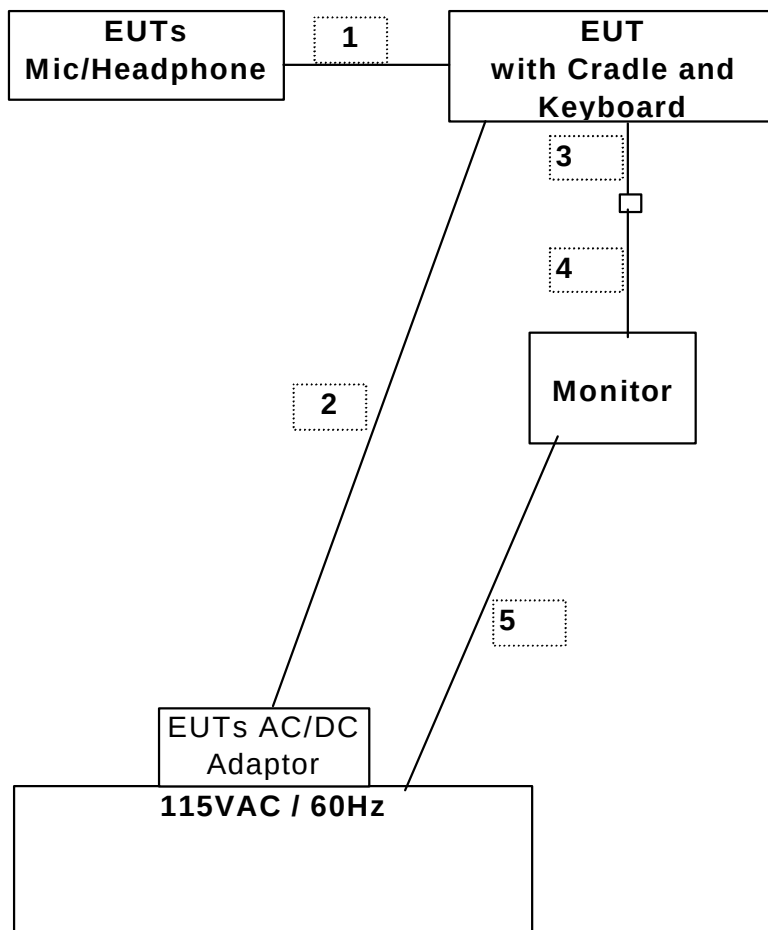
TEST AND MEASUREMENT EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8593EM	3710A00205	6/11/03
Preamplifier	HP	8447D	2944A06589	8/10/02
Bilog Antenna	Schaffner-Chase	CBL6112B	2586	8/2/02
Line Filter	Lindgren	LMF-3489	497	N.C.R.
LISN	Fisher Custom Communication	LISN-50/250-25-2	2023	8/2/02
EMI Test Receiver	Rohde & Schwarz	ESHS 20	827129/006	4/17/03
Preamplifier (1 - 26.5GHz)	MITEQ	NSP2600-44	646456	4/26/03
Horn Antenna (1 - 18GHz)	EMCO	3115	6739	1/31/03
Horn Antenna (18 - 26GHz)	Antenna Research Associates	MWH 1826/B	1013	7/26/02
High Pass Filter (4.57GHz)	FSY Microwave	FM-4570-9SS	003	N.C.R.
Power Meter	Rohde & Schwarz	NRVD	842093/017	1/21/03
Power Sensor	Rohde & Schwarz	NRV-Z51	841275/013	1/21/03

8. SUPPORT EQUIPMENT / EUT SETUP

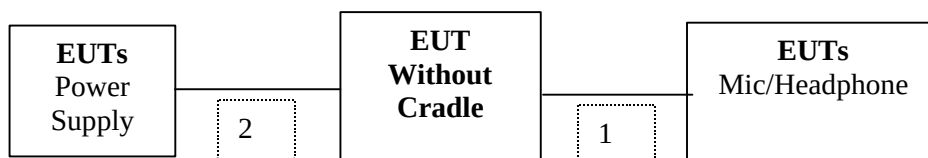
The following peripheral support equipment was utilized to operate the equipment under test:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Monitor	WIN LAB	TE767A	01401	E80TE767

The following setup was used to operate the equipment under test:



SETUP BELOW 1 GHz TEST



SETUP ABOVE 1 GHz TEST

I/O CABLES

TEST I / O CABLES								
Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	Mic/ Headphone	1	Mini Jack	Un-shielded	1m	Yes	No	Ferrite at connector side
2	AC/DC	1	US 115V	Un-shielded	2m	No	Yes	Bundled during LC test
3	VGA	1	DSUB15	Shielded	0.4m	Yes	No	N/A
4	Monitor	1	DSUB15	Shielded	1m	Yes	Yes	Ferrite at connector side
5	AC	1	US 115V	Un-shielded	1.8m	No	No	N/A

9. APPLICABLE RULES AND BRIEF TEST RESULT

§15.247 (a) (2) - BANDWIDTH LIMITATION

(a) (2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

Spec limit: > 500 kHz.

Test result: No non-compliance noted.

Channel	Frequency (MHz)	Bandwidth (MHz)
LOW	2412	11.25
MID	2437	10.63
HIGH	2462	11.38

§15.247 (b) (1) - POWER OUTPUT

(b) The maximum peak output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400-2483.5 MHz or 5725-5850 MHz band, and all direct sequence systems: 1 watt.

Spec limit: As specified above, 1W maximum.

Test result: No non-compliance noted.

Peak Power = measured power + 10logB; where B is measured bandwidth

Channel	Frequency (MHz)	Output Power (watts)
LOW	2412	0.357 (25.53 dBm)
MID	2437	0.319 (25.03 dBm)
HIGH	2462	0.339 (25.30 dBm)

Average Power measured with power meter

Channel	Frequency (MHz)	Output Power (watts)
LOW	2412	0.0693 (18.41 dBm)
MID	2437	0.0674 (18.29 dBm)
HIGH	2462	0.0674 (18.29 dBm)

§15.247 (c) – SPURIOUS EMISSION

(c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test result: No non-compliance noted. See section 10.3.

§15.247 (d) - PEAK POWER SPECTRAL DENSITY

(d) For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Spec limit: < 8dBm.

Test result: No non-compliance noted.

<i>Channel</i>	<i>Frequency (MHz)</i>	<i>Results (dBm)</i>
<i>LOW</i>	<i>2412</i>	<i>-4.66</i>
<i>MID</i>	<i>2437</i>	<i>-3.14</i>
<i>HIGH</i>	<i>2462</i>	<i>-3.54</i>

§15.205- RESTRICTED BANDS OF OPERATIONS

(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	2655 - 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			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

Spec limit: As specified above,.

Test result: No non-compliance noted. See section 10.6 Radiated Emission.

§15.207- CONDUCTED LIMITS

(a) For an intentional radiator which 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 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

FCC 15.207		
FREQUENCY RANGE	FIELD STRENGTH (Microvolts)	FIELD STRENGTH (dBuV)/QP
450kHz-30MHz	250	48

Spec limit: As specified above.

Test result: No non-compliance noted.

§15.209- RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Spec limit: As specified above.

Test result: No non-compliance noted.

10. TEST SETUP, PROCEDURE AND RESULT

10.1. PEAK POWER OUTPUT

TEST SETUP



TEST PROCEDURE

The EUT is configured on a test bench as shown above in a continuously transmitting mode. For each channel measured, the highest reading is corrected for the emissions bandwidth of that channel to yield the peak power.

RESULT

No non-compliance noted. See plots below measured with Spectrum Analyzer.

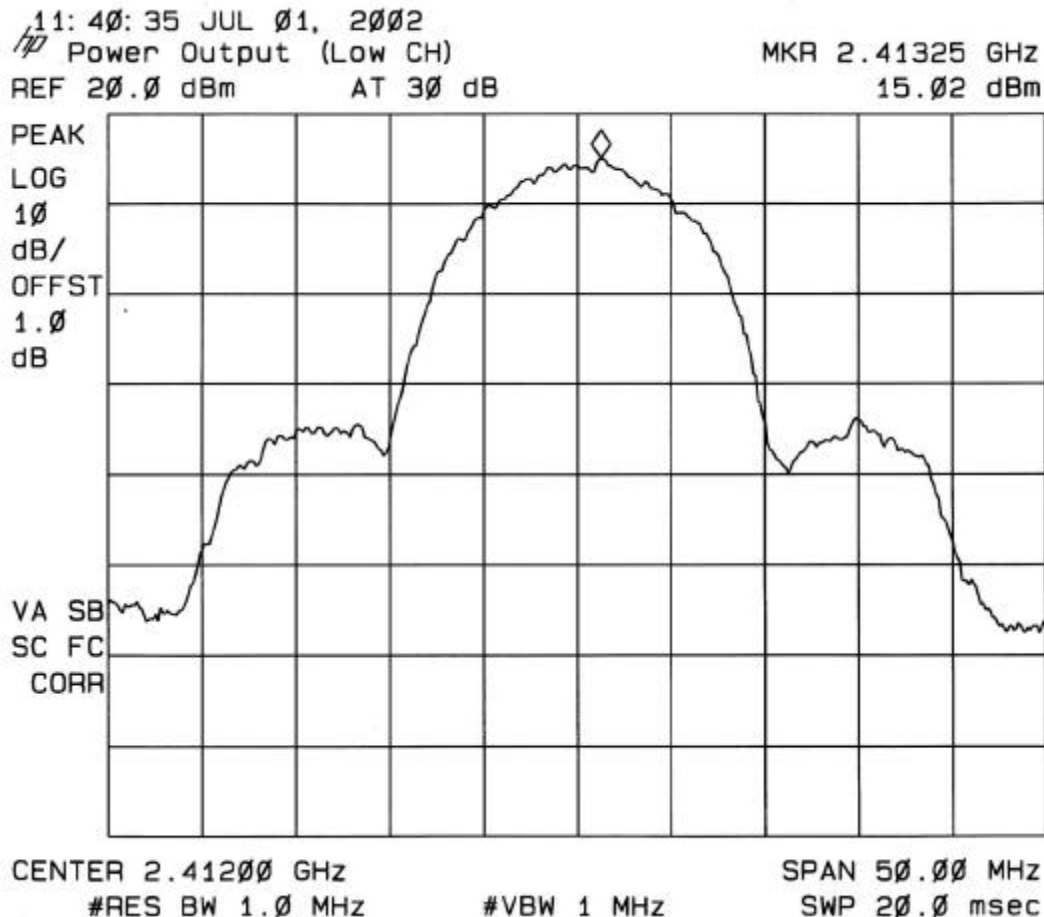
Peak Power = measured reading + 10 log (B), B as measured in Section 10.2.

Channel	Frequency (MHz)	B (MHz)	Peak Power(watts)
LOW	2412	11.25	0.357 (25.53 dBm)
MID	2437	10.63	0.319 (25.03 dBm)
HIGH	2462	11.38	0.339 (25.30 dBm)

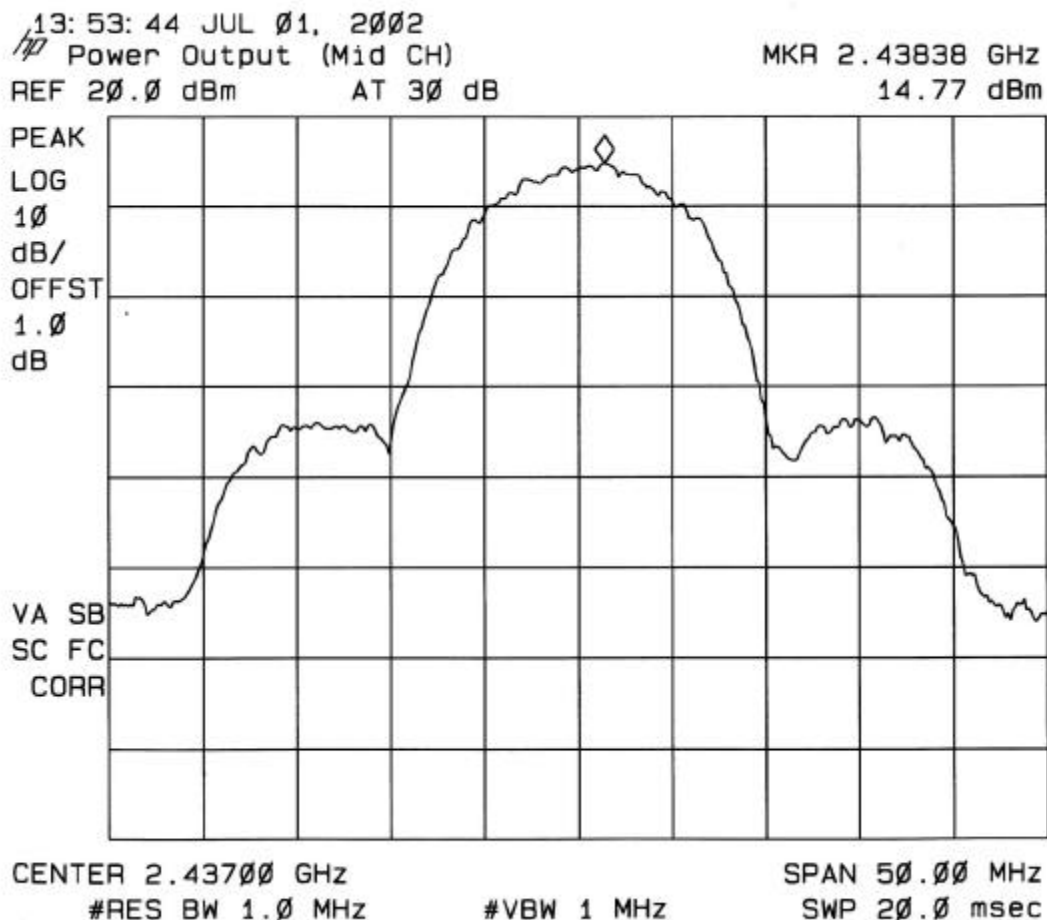
Average Power measured with power meter

Channel	Frequency (MHz)	Output Power (watts)
LOW	2412	0.0693 (18.41 dBm)
MID	2437	0.0674 (18.29 dBm)
HIGH	2462	0.0674 (18.29 dBm)

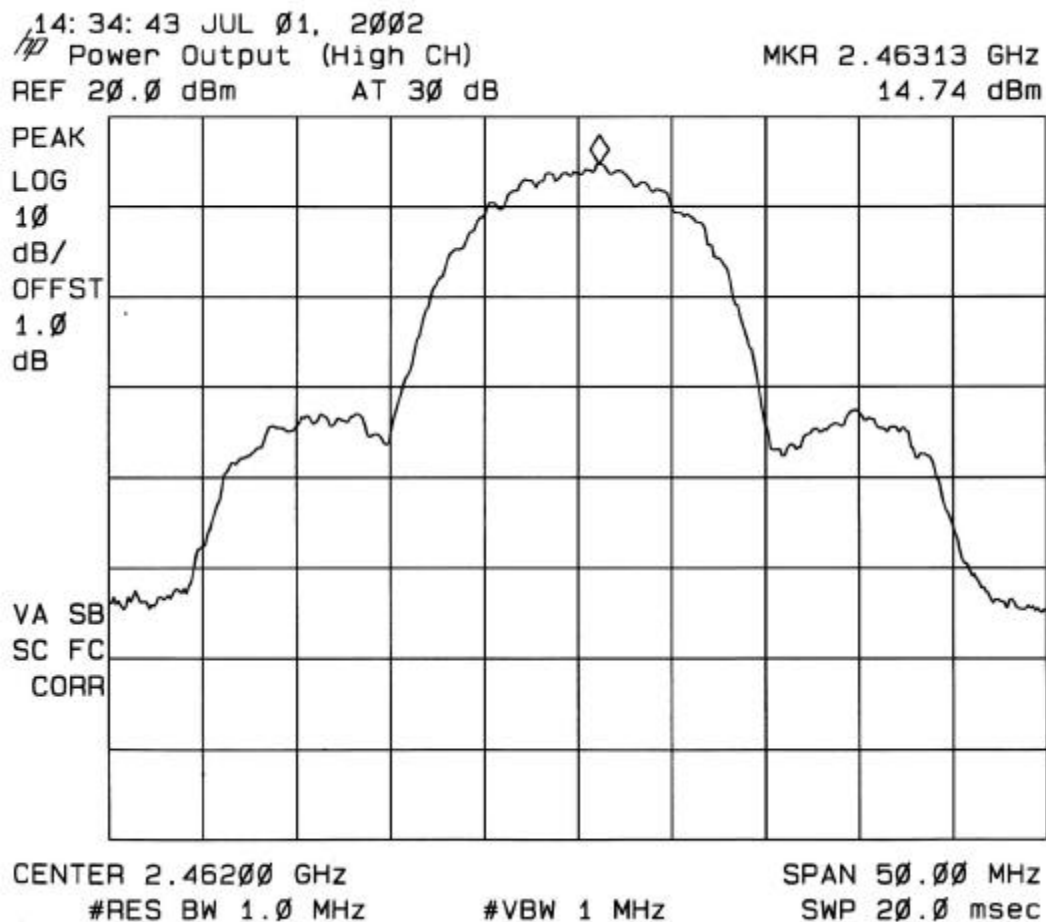
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



10.2. 6 dB BANDWIDTH MEASUREMENT

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak	☒ 100 kHz	☒ 100 kHz



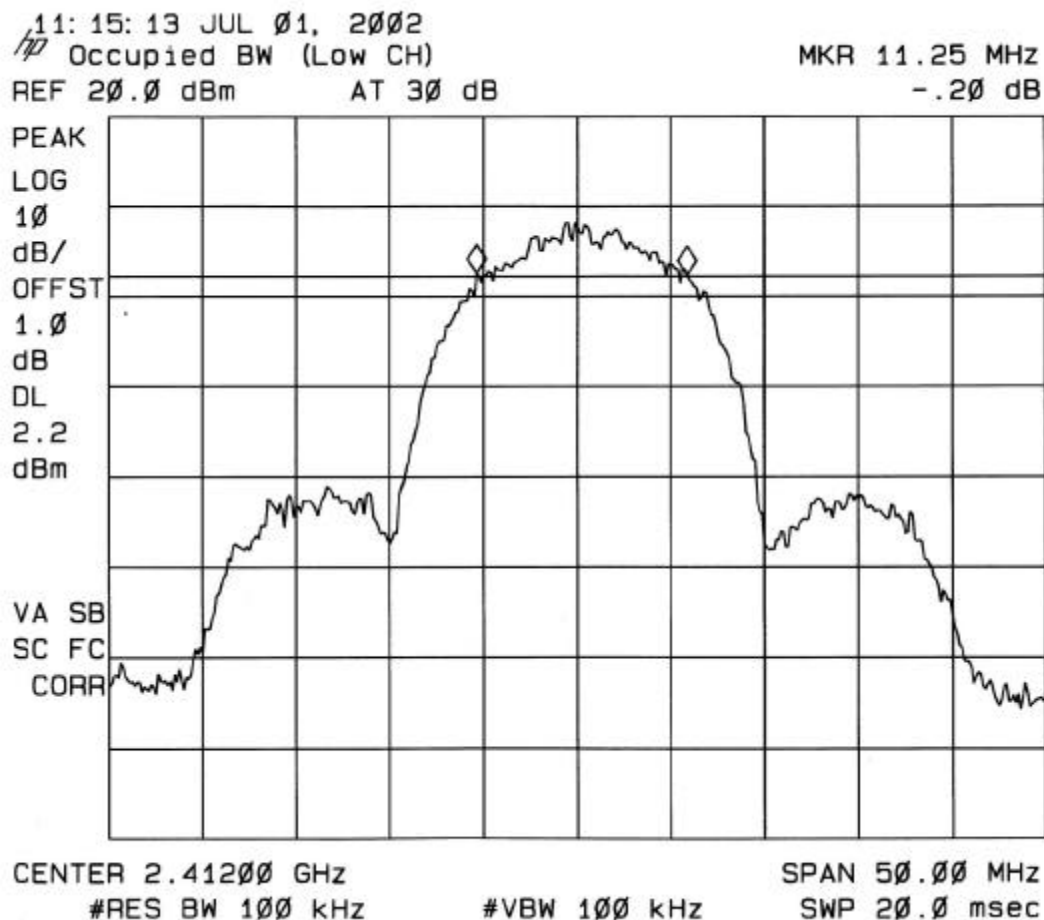
TEST PROCEDURE

The EUT transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW.

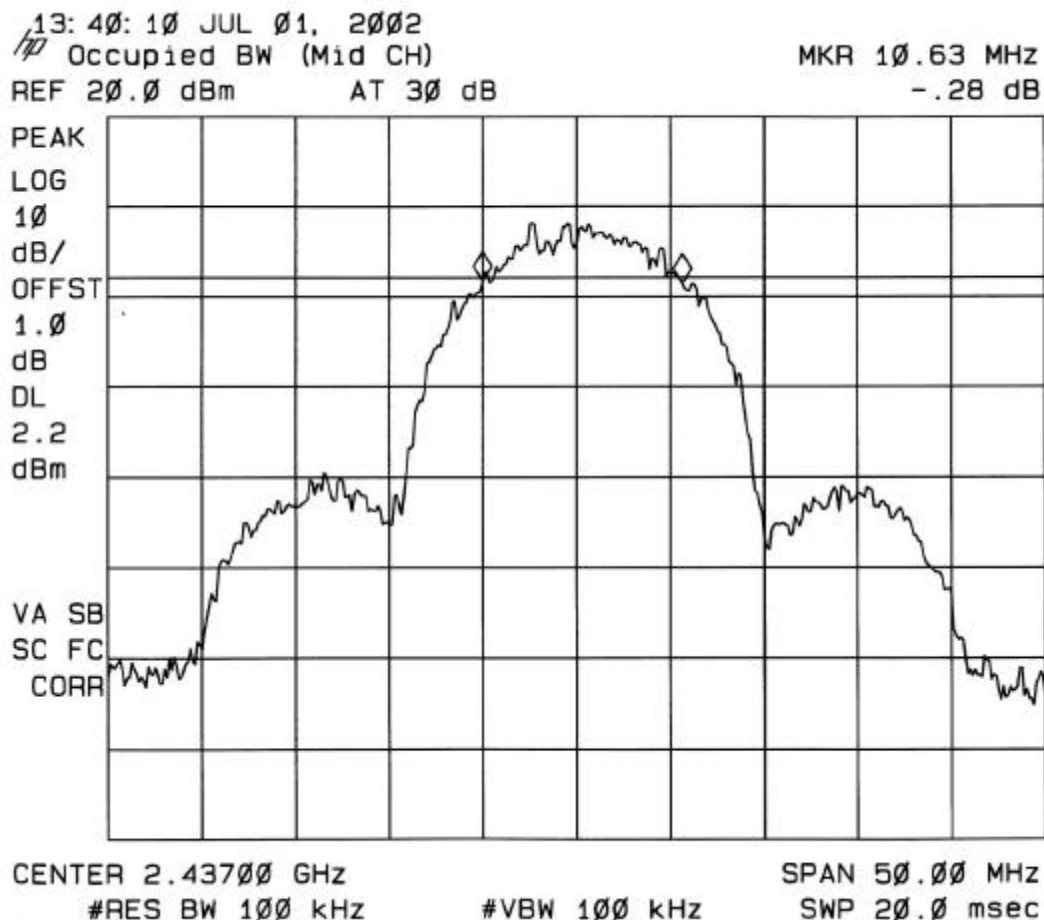
RESULT

No non-compliance noted. See below plots for LOW, MID, HIGH channels.

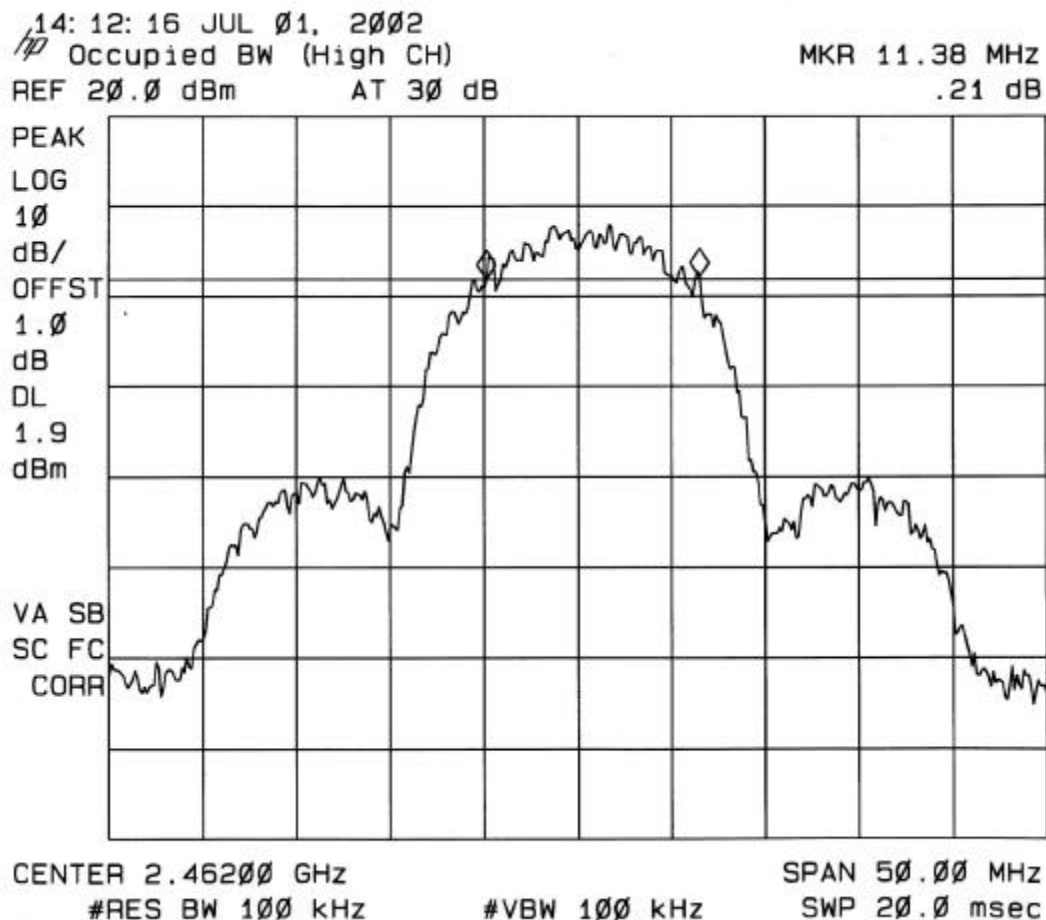
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



10.3. CONDUCTED SPURIOUS EMISSION

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 - 25000	☒ Peak	☒ 100 kHz	☒ 100 kHz



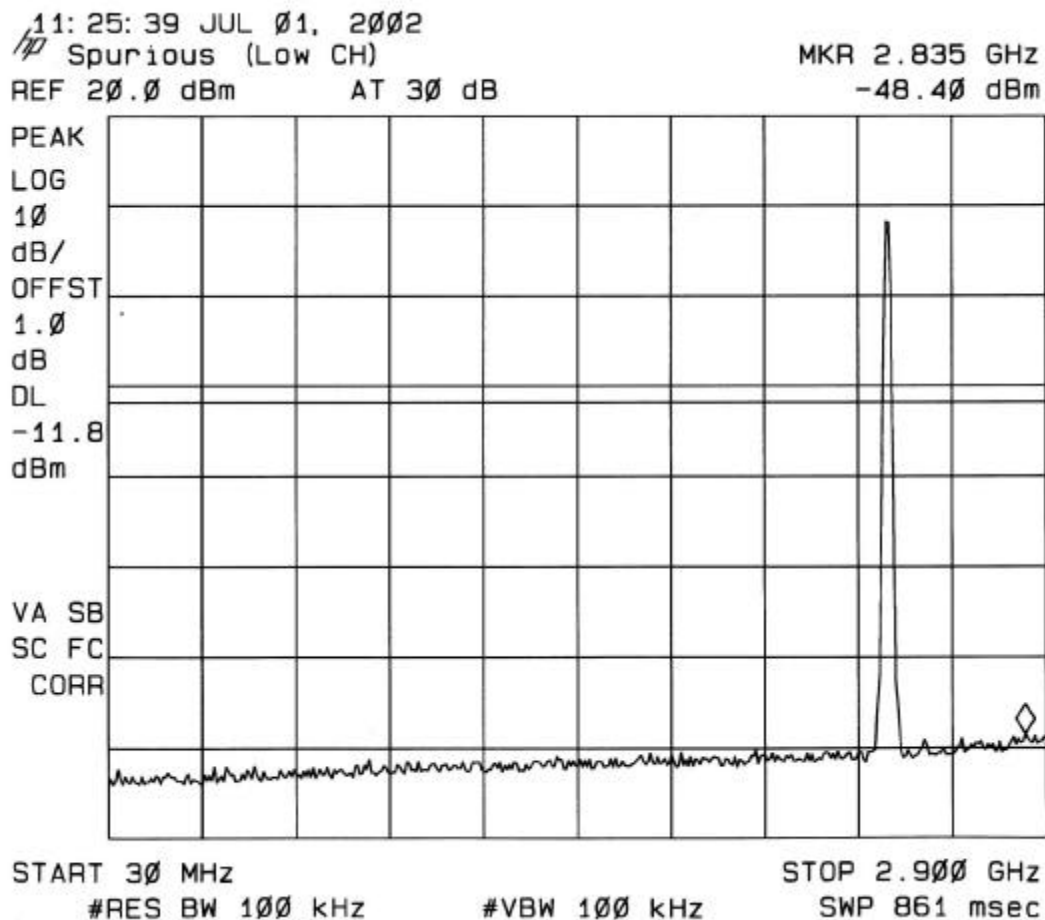
TEST PROCEDURE

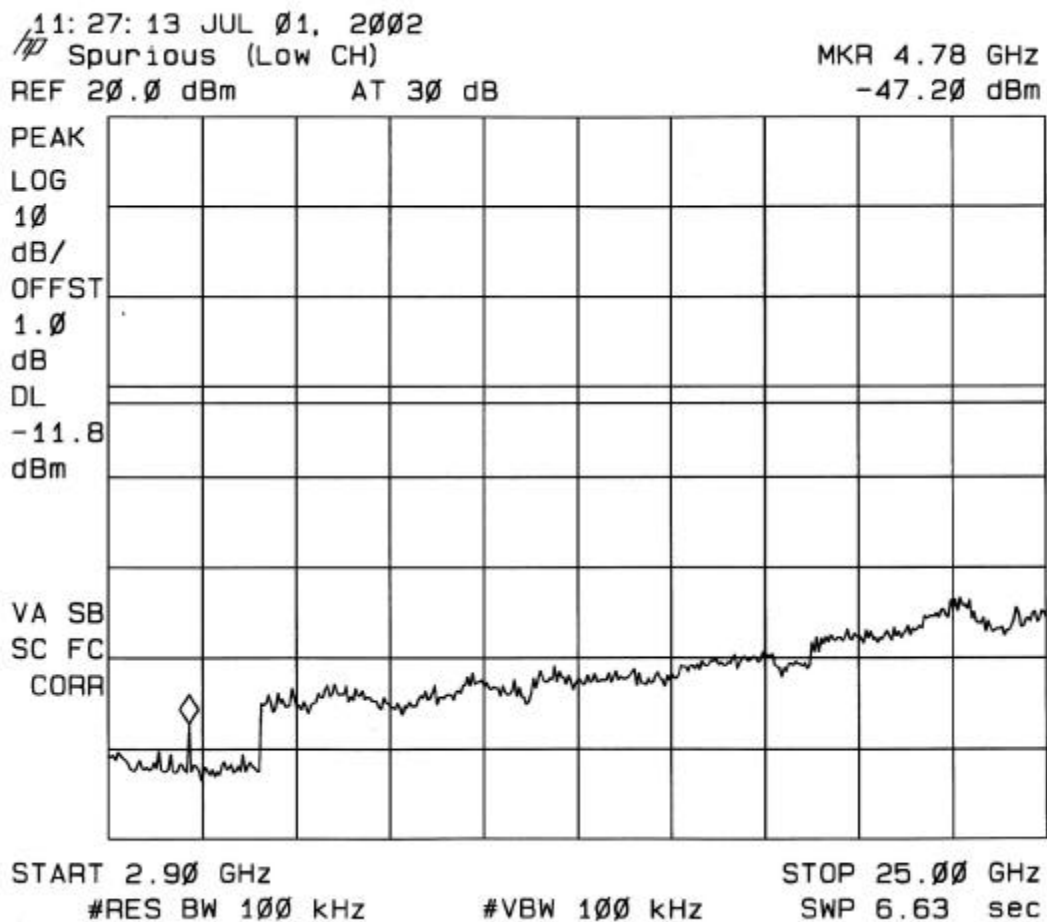
Connect the Eut's antenna port to the Spectrum Analyzer's input port.
Set Display Line to 20 dB down from the highest emission of fundamental frequency.
Investigate the entire frequency of the carrier frequency, up to the tenth harmonic.

RESULT

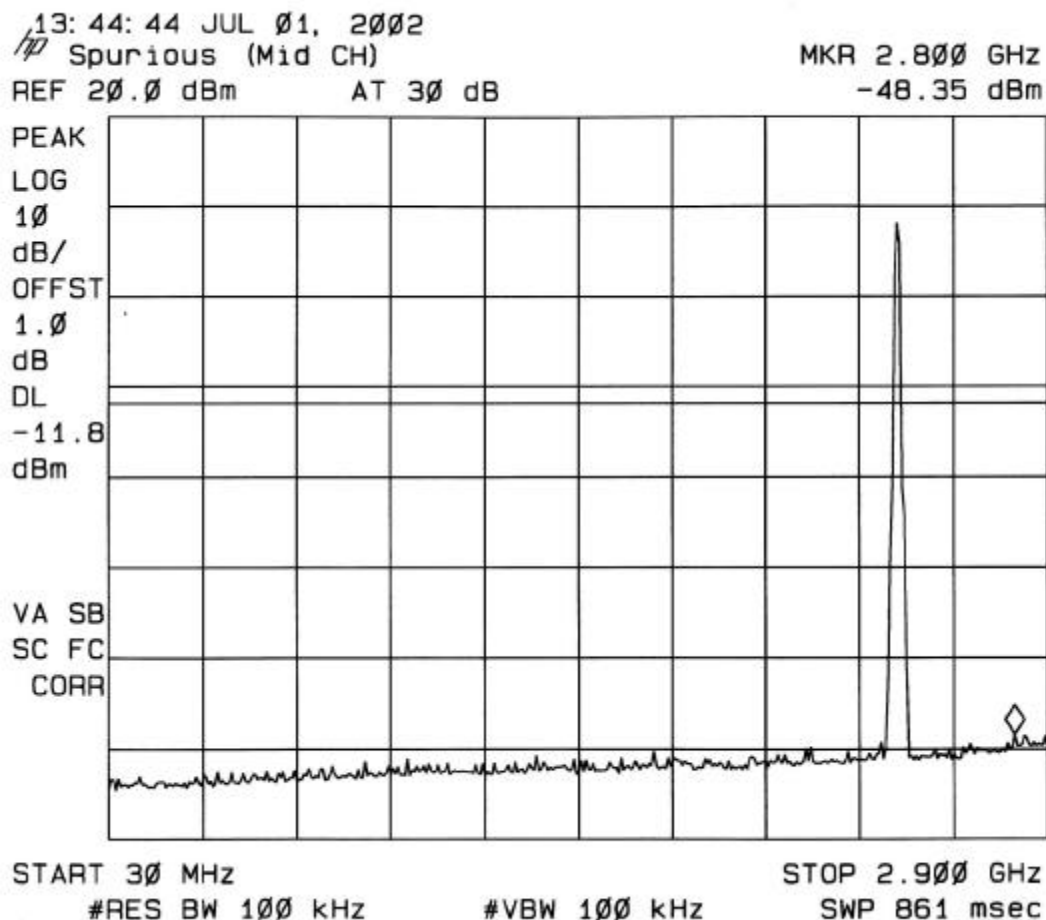
No non-compliance noted. See below plots for LOW, MID, HIGH channels.

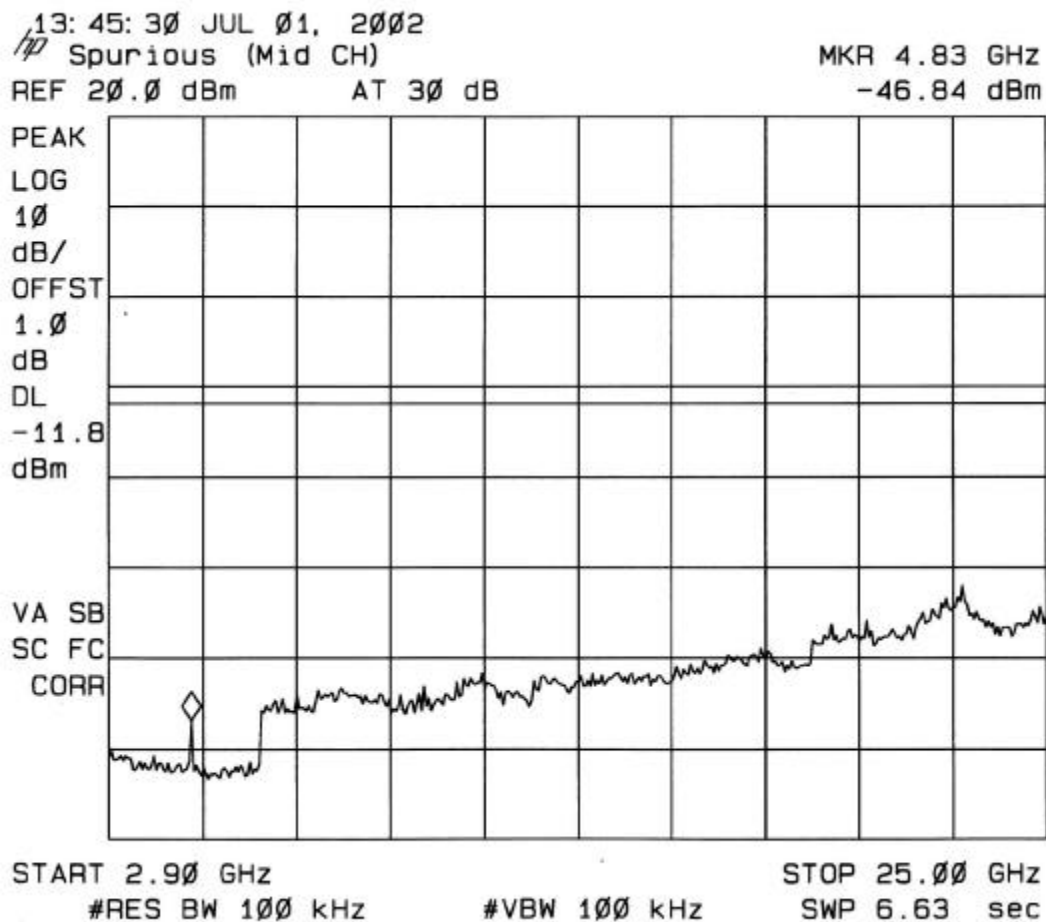
LOW CHANNEL



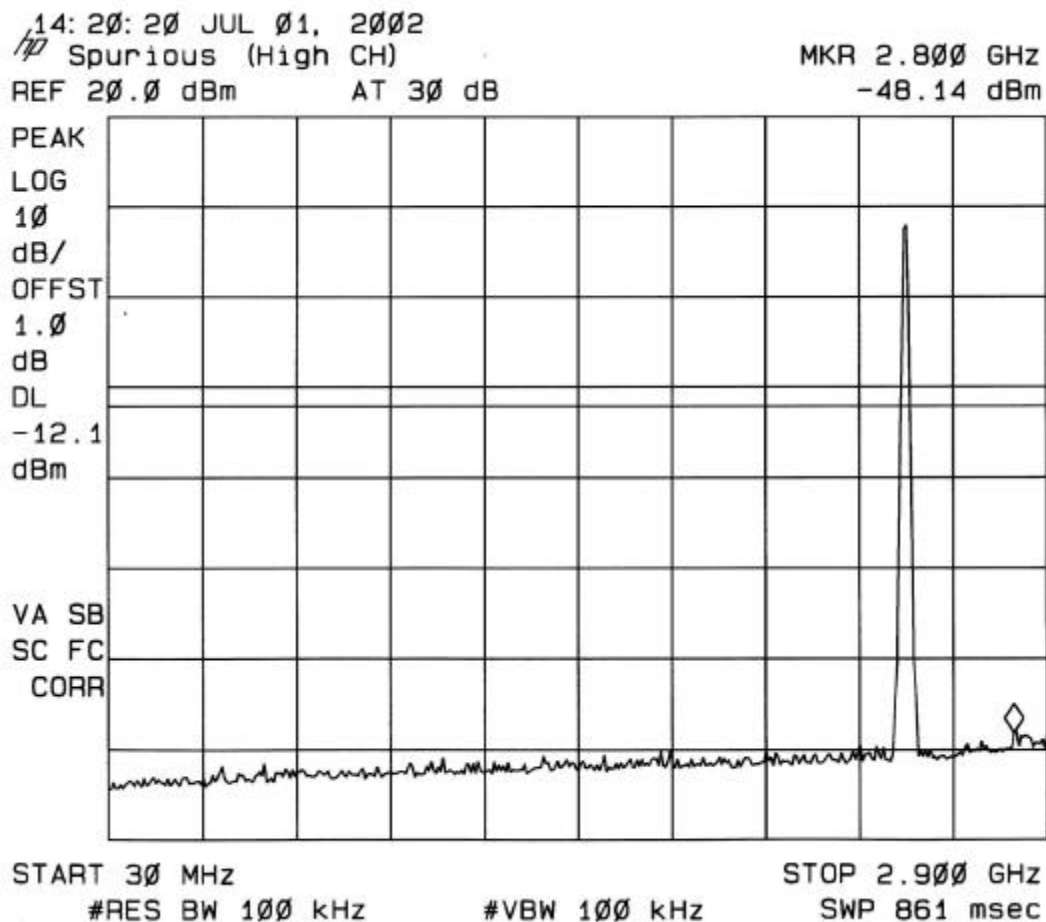


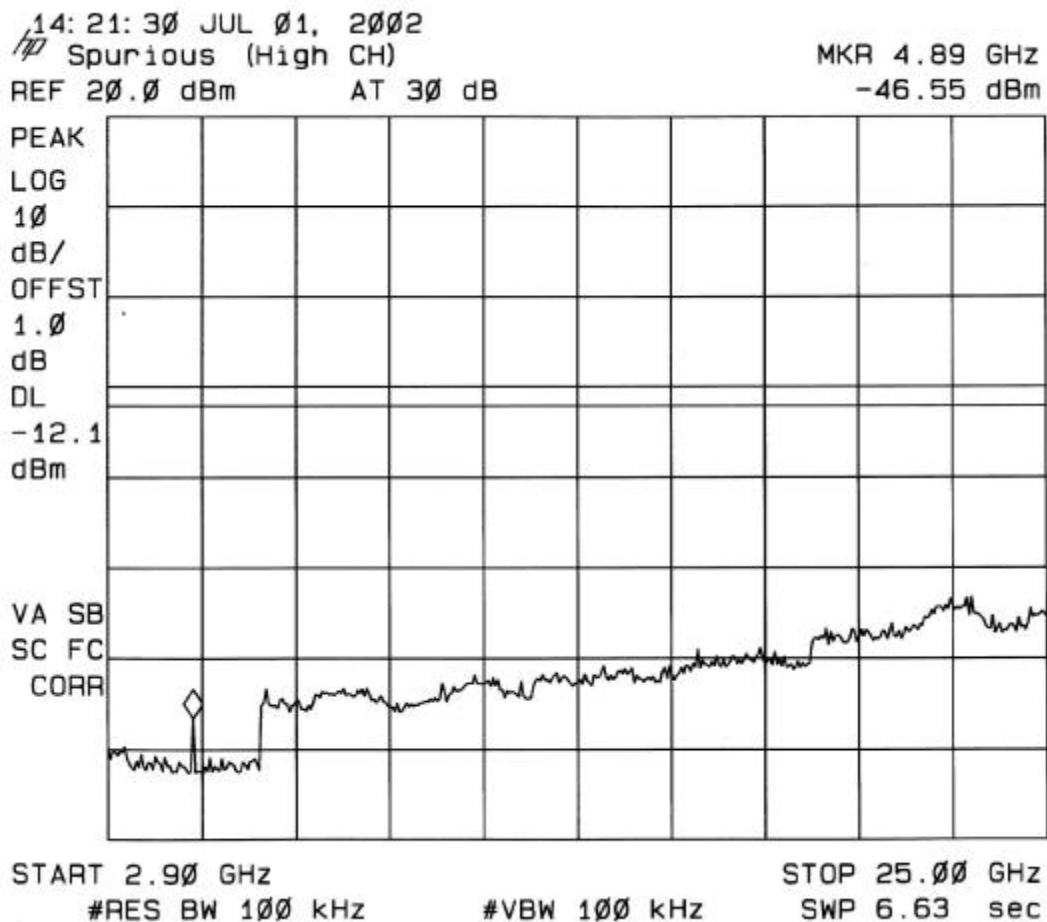
MID CHANNEL





HIGH CHANNEL





10.4. PEAK POWER SPECTRAL DENSITY

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak	☒ 3 kHz	☒ 3 kHz



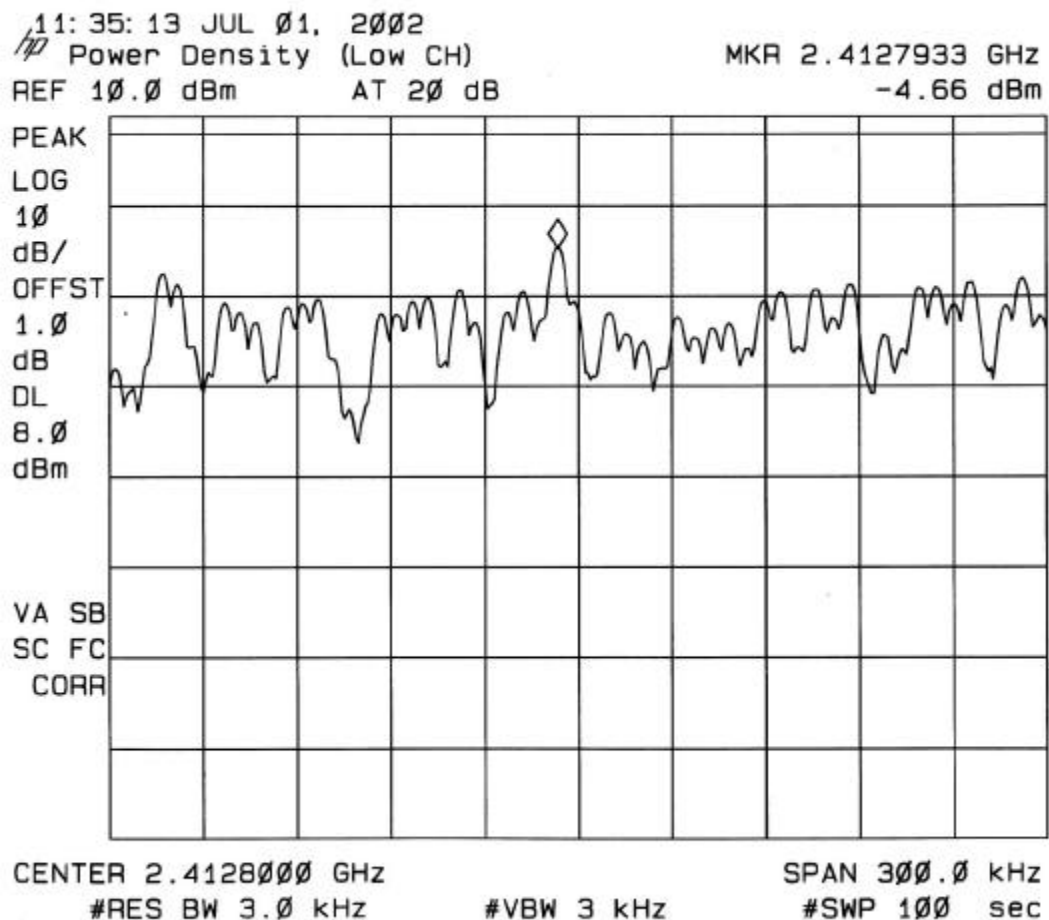
TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 3 kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

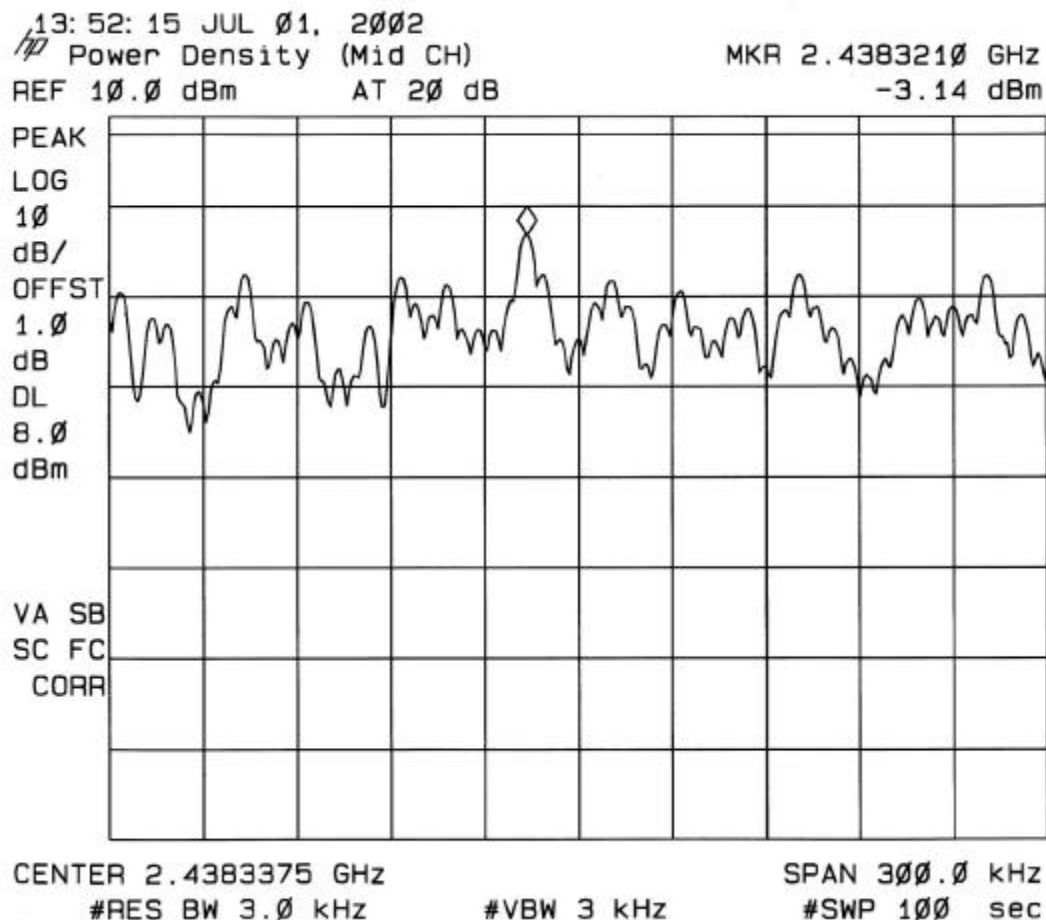
Result:

No non-compliance noted. See below plots for LOW, MID, HIGH channels.

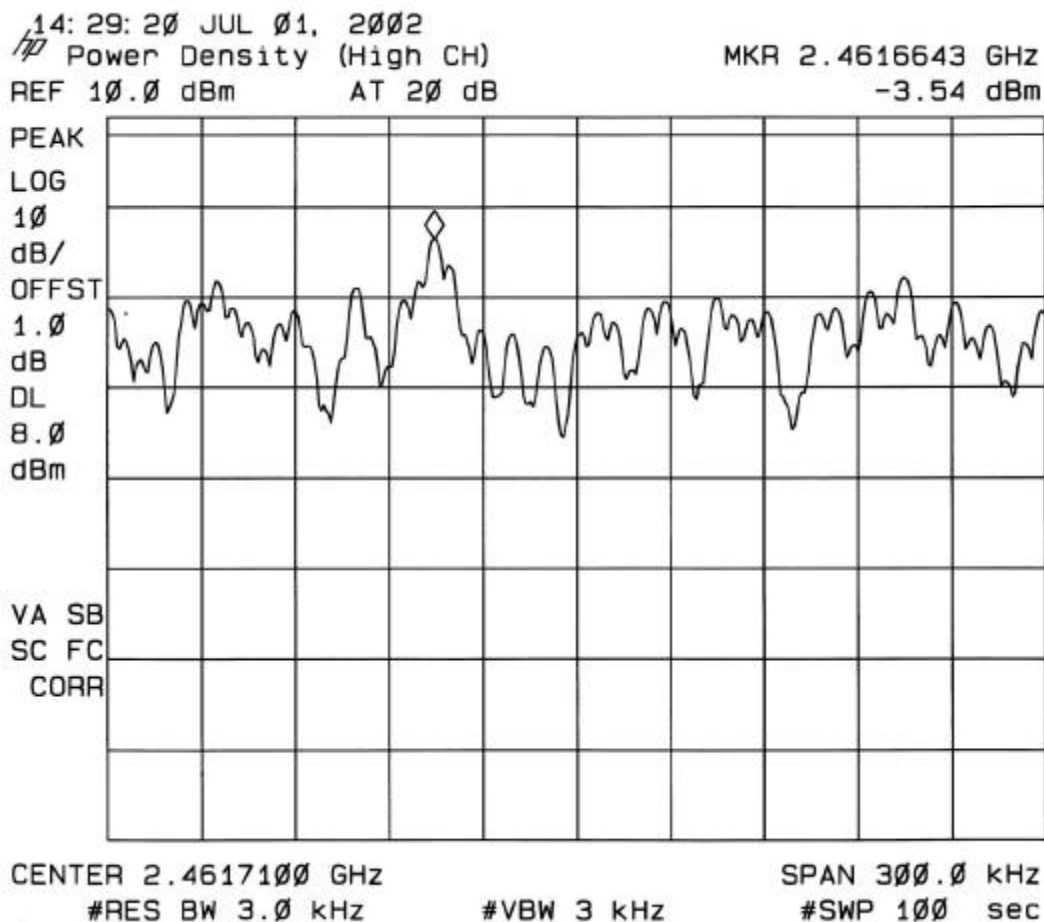
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



10.5. RESTRICTED BAND EDGE MEASUREMENT

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak ☐ Average	☒ 100 KHz ☐ 1 MHz	☒ 100 KHz ☐ 10 Hz



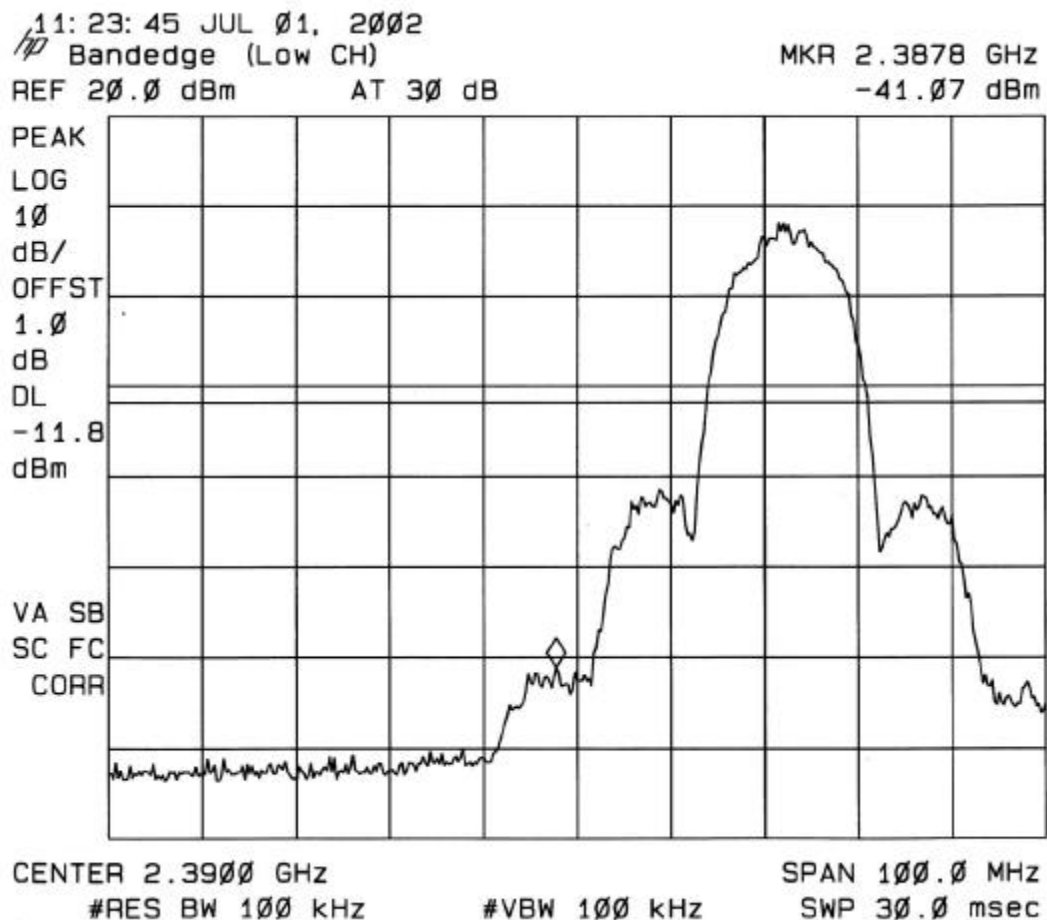
TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator; the lower and upper band edge of the EUT is investigated.
The resolutions and video bandwidth were set to 100kHz.

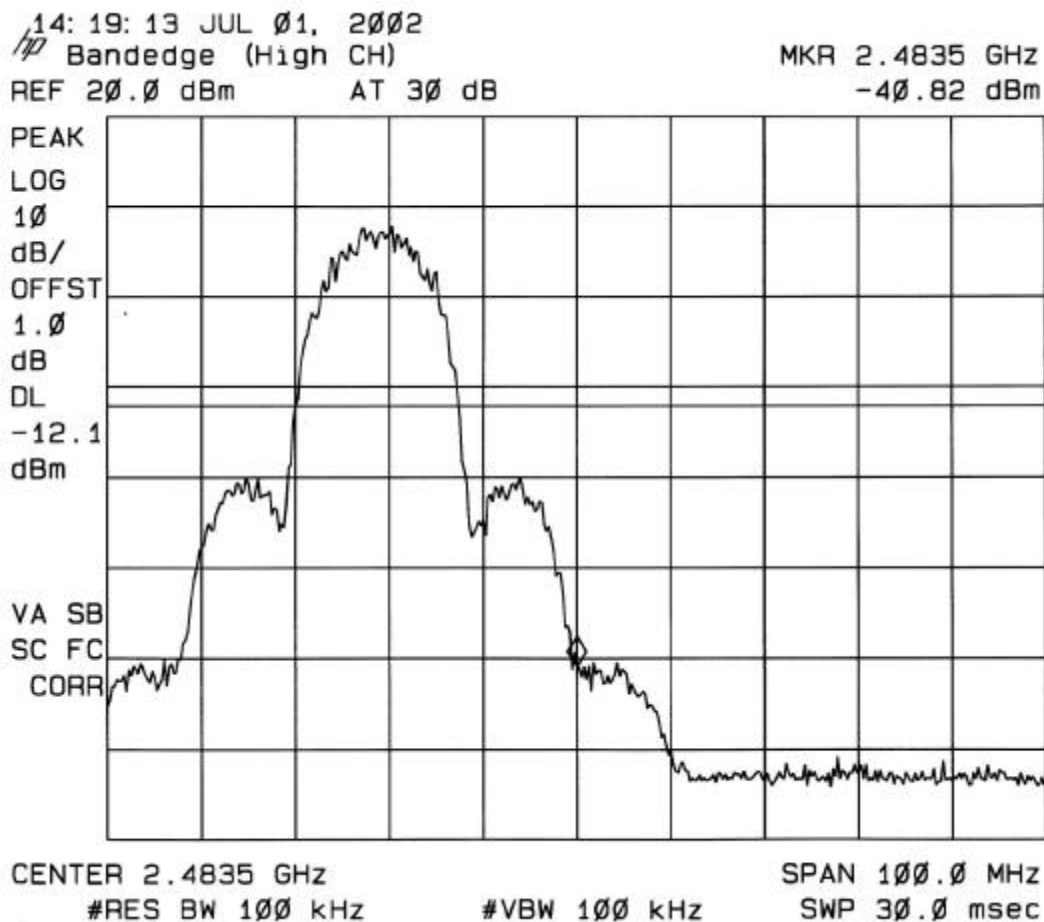
RESULT

No non-compliance noted. See below plots for LOW and HIGH channels

BANDEDGE @ LOW CHANNEL



BANDEDGE @ HIGH CHANNEL



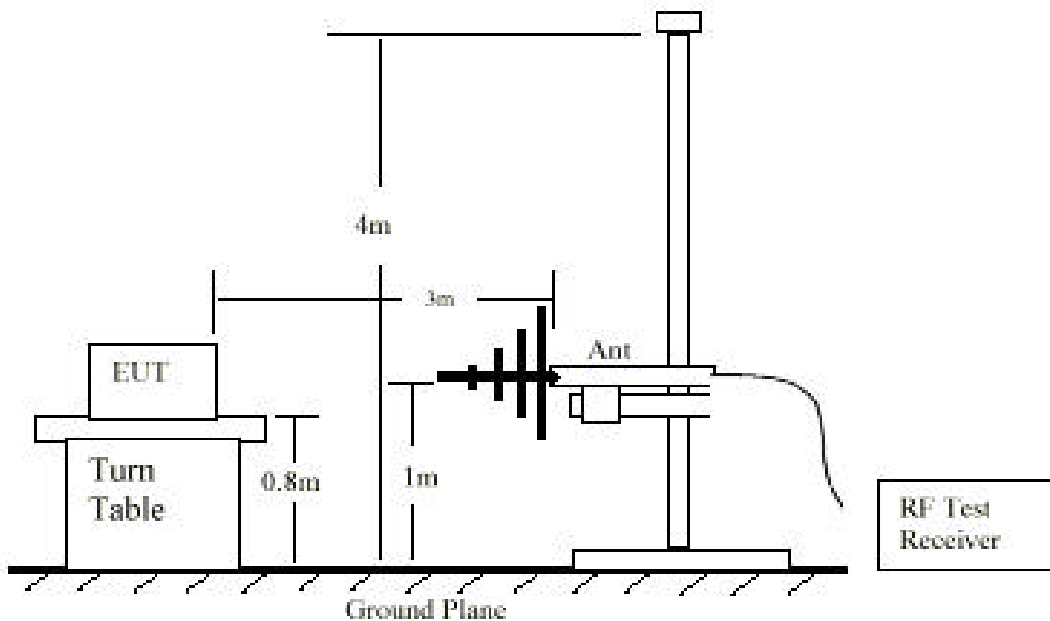
10.6. RADIATED EMISSION

10.6.1. RADIATED EMISSION AND RESTRICTED BANDS

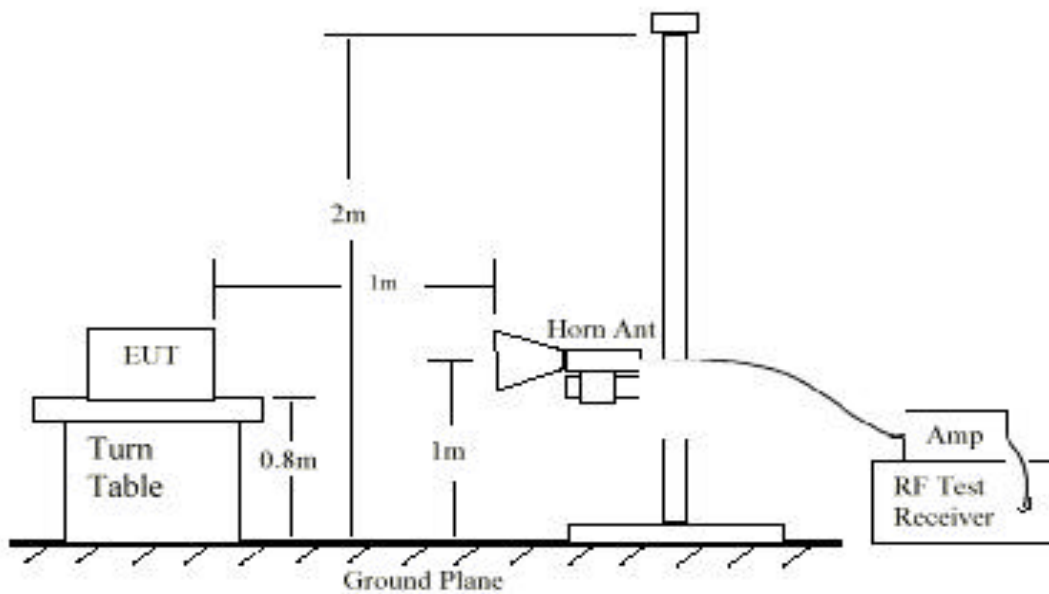
TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak	☒ 100 KHz	☒ 100 KHz
	☒ Quasi Peak	☒ 1 MHz	☒ 1 MHz
Above 1000	☒ Peak	☒ 1 MHz	☒ 1 MHz
	☒ Average	☒ 1 MHz	☒ 10 Hz



Radiated Emission Test 30 – 1000 MHz (Bilog)



Radiated Emission Test 1 – 25 GHz (Horn)

TEST PROCEDURE

1. The EUT was placed on the turntable 0.8 meter above ground in 3 meter open area test site.
2. Set the resolution bandwidth to 100KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turntable and stop at the angle where the measurement device has maximum reading.
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak.
7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures (3)~(6). If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.

8. Set the resolution and video bandwidth of the spectrum analyzer to 1MHz and repeat procedures (3)~(6) for frequency band from 1 GHz to 10 times carrier frequency.
9. If the reading for the local peak is lower than the Average limit, no further testing is needed in this local peak and this reading should be recorded. If it is higher than Average limit but lower than Peak limit, then set the resolution bandwidth to 1MHz and video bandwidth to 10Hz. Repeat procedures (3)~(6). If the maximum reading is lower than Average limit, then this reading should be recorded. If it is higher, then the test is fail.

RESULT

No non-compliance noted. See data below.

						Project #: 0211394 Report #: 020703B1 Date & Time: 07/03/02 9:24 AM Test Engr: KERWIN CORPUZ	
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							
Company: Samsung Electronics CO., LTD. EUT Description: Wireless HAND PC (M/N: S160) Test Configuration : EUT with Headphone-Mic/Keyboard/Cradle/Monitor (UNIT#2) Type of Test: FCC CLASS B Mode of Operation: Rx/Recording (EUT worst position @ Y axis)							
						<< Main Sheet	

Freq.	Reading	AF	Closs	Pre-amp	Level	Limit	Margin	Pol	Az	Height	Mark
(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	FCC_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)
335.45	54.90	13.98	4.06	29.00	43.94	46.00	-2.06	3mV	180.00	1.00	P
335.46	54.40	13.98	4.06	29.00	43.44	46.00	-2.56	3mH	200.00	2.00	QP
184.31	58.20	8.89	2.85	29.23	40.71	43.50	-2.79	3mH	270.00	1.60	P
135.17	53.50	11.25	2.46	29.45	37.76	43.50	-5.74	3mV	0.00	1.00	P
215.66	53.20	9.81	3.10	29.06	37.05	43.50	-6.45	3mH	200.00	1.60	P
298.58	51.40	12.94	3.77	28.82	39.28	46.00	-6.72	3mH	200.00	1.60	P
6 Worst Data											

COMPLIANCE CERTIFICATION SERVICES, INC.

Radiated Emissions
FCC 15.205

07/02/02
Kerwin Corpuz
B-Site (1.0 Meter)

Samsung Electronics CO., LTD.
Wireless HAND PC (model: S160)

fo = 2412 MHz (low channel)

TX mode

FREQ (MHz)	READING (dBuV)		AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	HPF (dB)	TOTAL (dBuV/m)		LIMIT (dBuV/m)		MARGIN (dB)	
	Pk	Avg						Pk	Avg	Pk	Avg	Pk	Avg
4824V	63.7	50.9	33.4	4	36.1	9.54	1	56.46	43.66	74	54	-17.5	-10.3
4824H	62.6	49.8	33.4	4	36.1	9.54	1	55.36	42.56	74	54	-18.6	-11.4
7236V	51.7	41.1	37	5	36.4	9.54	1	48.76	38.16	74	54	-25.2	-15.8
7236H	48.9	37.7	37	5	36.4	9.54	1	45.96	34.76	74	54	-28	-19.2
9648*	44.8	32.7	38.4	5.9	35.5	9.54	1	45.06	32.96	74	54	-28.9	-21
12060*	46.2	34.3	39.3	6.5	36.3	9.54	1	47.16	35.26	74	54	-26.8	-18.7
14472*	49.2	37.5	41.2	7.5	38	9.54	1	51.36	39.66	74	54	-22.6	-14.3
16884*	50.3	38.4	41.5	8.5	38.9	9.54	1	52.86	40.96	74	54	-21.1	-13
19296*	52	41	31.9	9.4	39.3	15.56	1	39.44	28.44	74	54	-34.6	-25.6
21708*	54.5	43	32.5	10.2	38.1	15.56	1	44.54	33.04	74	54	-29.5	-21
24120*	54.7	43.1	32.5	11	39.1	15.56	1	44.54	32.94	74	54	-29.5	-21.1

fo = 2437 MHz (mid channel)

TX mode

FREQ (MHz)	READING (dBuV)		AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	HPF (dB)	TOTAL (dBuV/m)		LIMIT (dBuV/m)		MARGIN (dB)	
	Pk	Avg						Pk	Avg	Pk	Avg	Pk	Avg
4874V	62.1	49.2	33.4	4	36.1	9.54	1	54.86	41.96	74	54	-19.1	-12
4874H	59.4	46.5	33.4	4	36.1	9.54	1	52.16	39.26	74	54	-21.8	-14.7
7311V	51.4	40.1	37	5	36.4	9.54	1	48.46	37.16	74	54	-25.5	-16.8
7311H	52	40.7	37	5	36.4	9.54	1	49.06	37.76	74	54	-24.9	-16.2
9748*	44.8	32.7	38.4	5.9	35.5	9.54	1	45.06	32.96	74	54	-28.9	-21
12185*	46.2	34.3	39.3	6.5	36.3	9.54	1	47.16	35.26	74	54	-26.8	-18.7
14622*	49.2	37.5	41.2	7.5	38	9.54	1	51.36	39.66	74	54	-22.6	-14.3
17059*	50.3	38.4	41.5	8.5	38.9	9.54	1	52.86	40.96	74	54	-21.1	-13
19496*	52	41	31.9	9.4	39.3	15.56	1	39.44	28.44	74	54	-34.6	-25.6
21933*	54.5	43	32.5	10.2	38.1	15.56	1	44.54	33.04	74	54	-29.5	-21
24370*	54.7	43.1	32.5	11	39.1	15.56	1	44.54	32.94	74	54	-29.5	-21.1

fo = 2462 MHz (high channel)

TX mode

FREQ (MHz)	READING (dBuV)		AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	HPF (dB)	TOTAL (dBuV/m)		LIMIT (dBuV/m)		MARGIN (dB)	
	Pk	Avg						Pk	Avg	Pk	Avg	Pk	Avg
4924V	62.6	49.6	33.4	4	36.1	9.54	1	55.36	42.36	74	54	-18.6	-11.6
4924H	57.8	44.6	33.4	4	36.1	9.54	1	50.56	37.36	74	54	-23.4	-16.6
7386V	55.8	44.6	37	5	36.4	9.54	1	52.86	41.66	74	54	-21.1	-12.3
7386H	50.5	38.6	37	5	36.4	9.54	1	47.56	35.66	74	54	-26.4	-18.3
9848*	44.8	32.7	38.4	5.9	35.5	9.54	1	45.06	32.96	74	54	-28.9	-21
12310*	46.2	34.3	39.3	6.5	36.3	9.54	1	47.16	35.26	74	54	-26.8	-18.7
14772*	49.2	37.5	41.2	7.5	38	9.54	1	51.36	39.66	74	54	-22.6	-14.3
17234*	50.3	38.4	41.5	8.5	38.9	9.54	1	52.86	40.96	74	54	-21.1	-13
19696*	52	41	31.9	9.4	39.3	15.56	1	39.44	28.44	74	54	-34.6	-25.6
22158*	54.5	43	32.5	10.2	38.1	15.56	1	44.54	33.04	74	54	-29.5	-21
24620*	54.7	43.1	32.5	11	39.1	15.56	1	44.54	32.94	74	54	-29.5	-21.1

Spot checked X, Y, and Z axis; Worst position is X axis.

NOTE: * Measured noise floor (worse case vertical), horizontal (H) and vertical (V)

DIST: extrapolate reading from 3m specification distance to 1m measurement distance = **-9.54dB**

extrapolate reading from 3m specification distance to 0.5m measurement distance = **-15.56dB**

AF: Antenna Factor

AMP: Pre-amp gain

CL: SMA cable loss (13ft)

HPF: FSF High pass filter insertion loss (4.57GHz; S/N:003)

ANALYZER SETTINGS

Peak(Pk):

Average(Avg):

RES BW

1MHz

1MHz

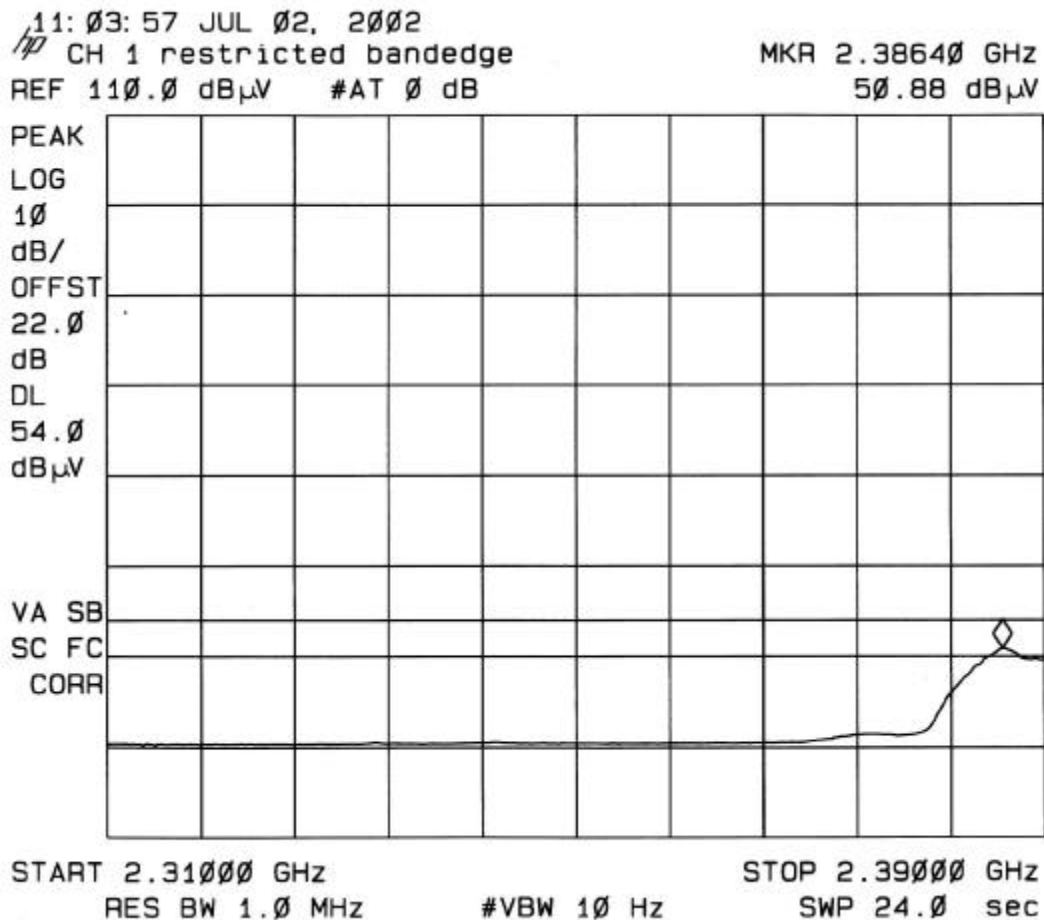
AVG BW

1MHz

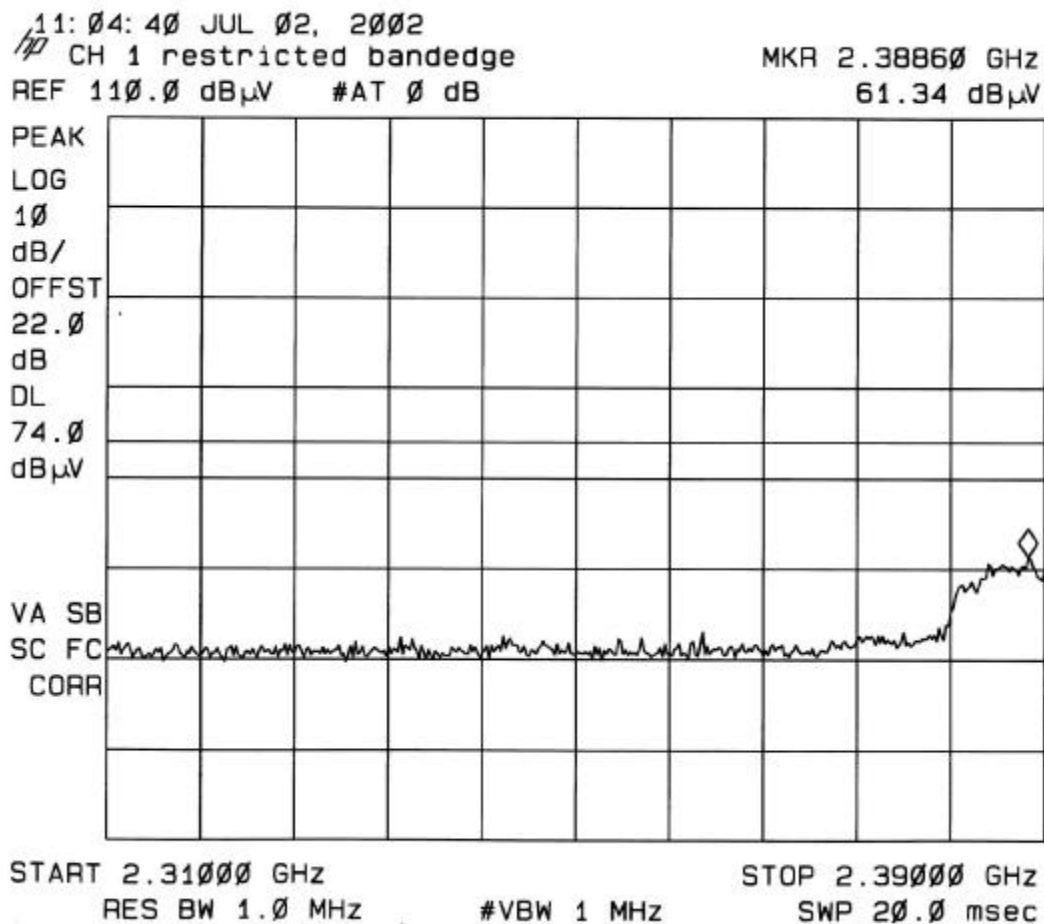
10Hz

RESTRICTED BANDEGE: 2310 – 2390 MHz and 2483.5 – 2500 MHz

BOTTOM BANDEGE @ LOW CHANNEL

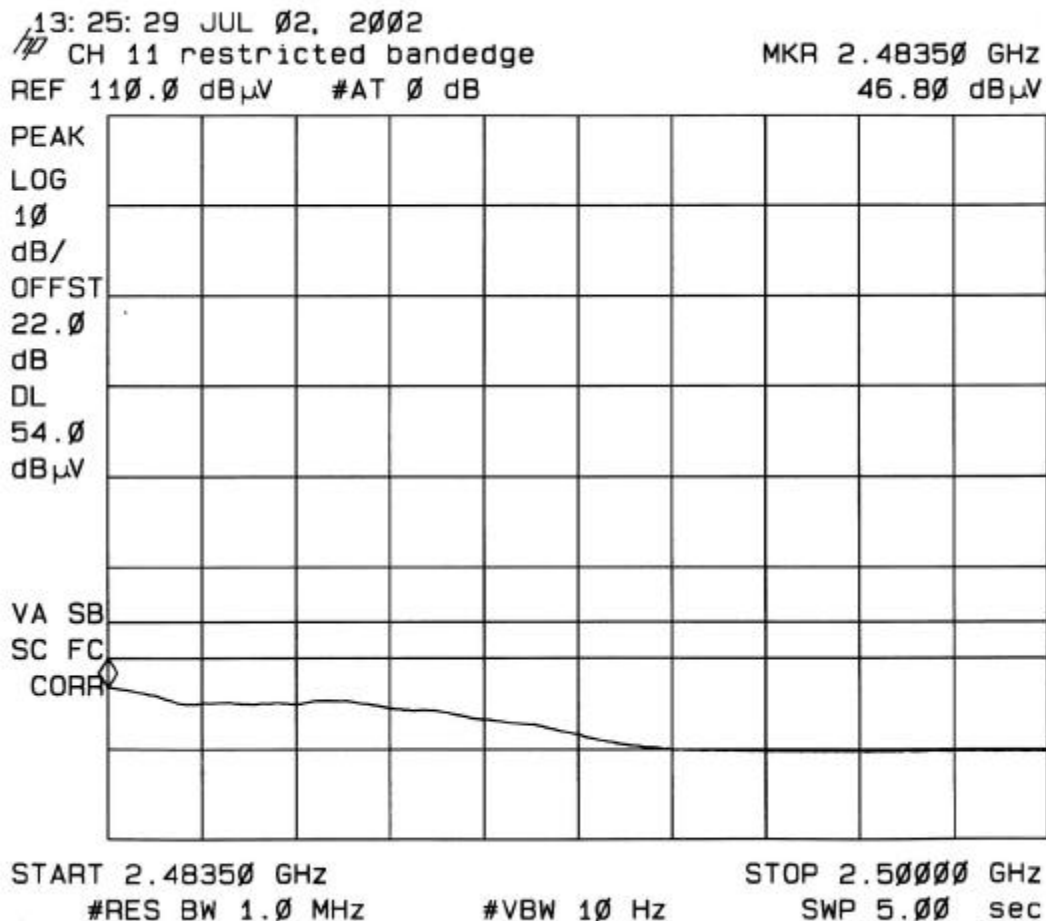


AVERAGE MEASUREMENT

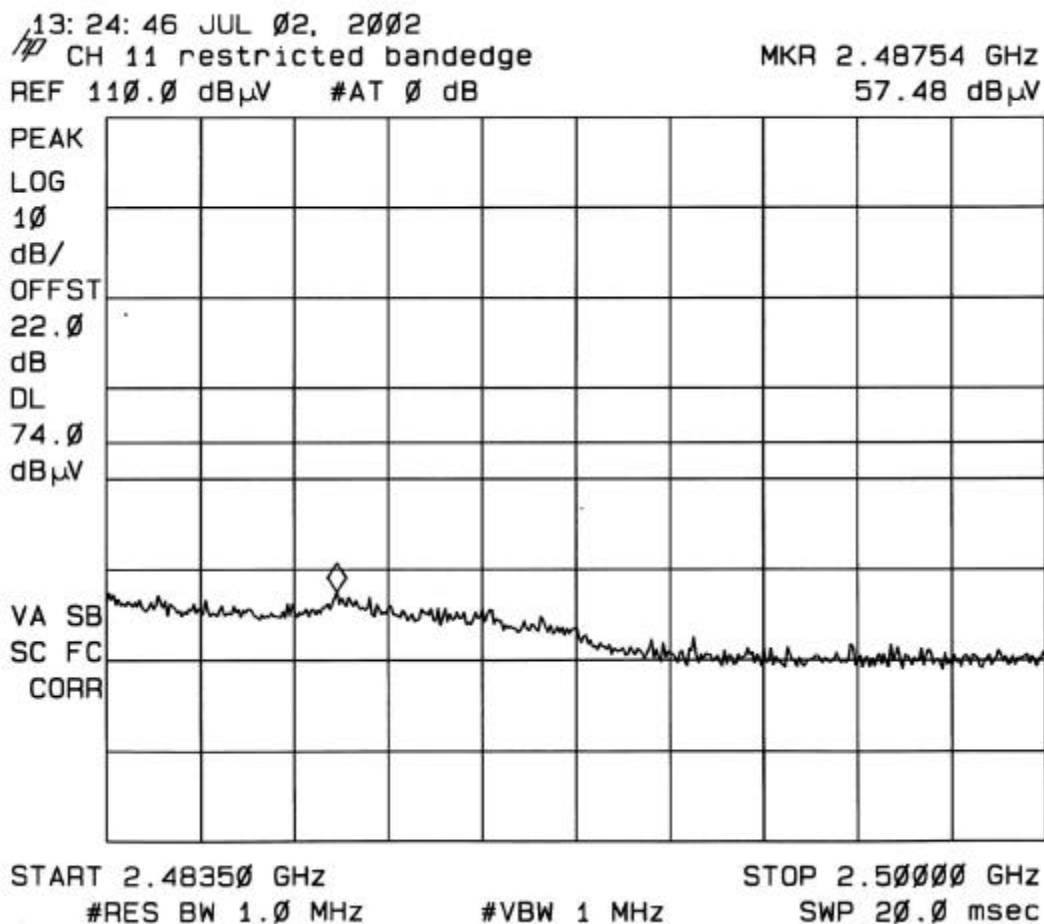


PEAK MEASUREMENT

TOP BANDEDGE @ HIGH CHANNEL



AVERAGE MEASUREMENT



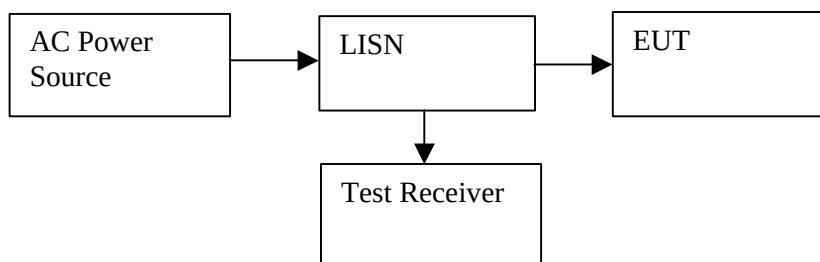
PEAK MEASUREMENT

10.7. POWER LINE CONDUCTED EMISSION

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
450 KHz to 30 MHz	☐ Peak ☒ Quasi Peak	☒ 10 KHz	☒ 10 KHz



TEST PROCEDURE

1. The EUT was placed on a wooden table 80 cm above the horizontal ground plane and 40 cm away from the vertical ground plane. The EUT was set to transmit / receive in a continuous mode.
2. Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz was investigated.

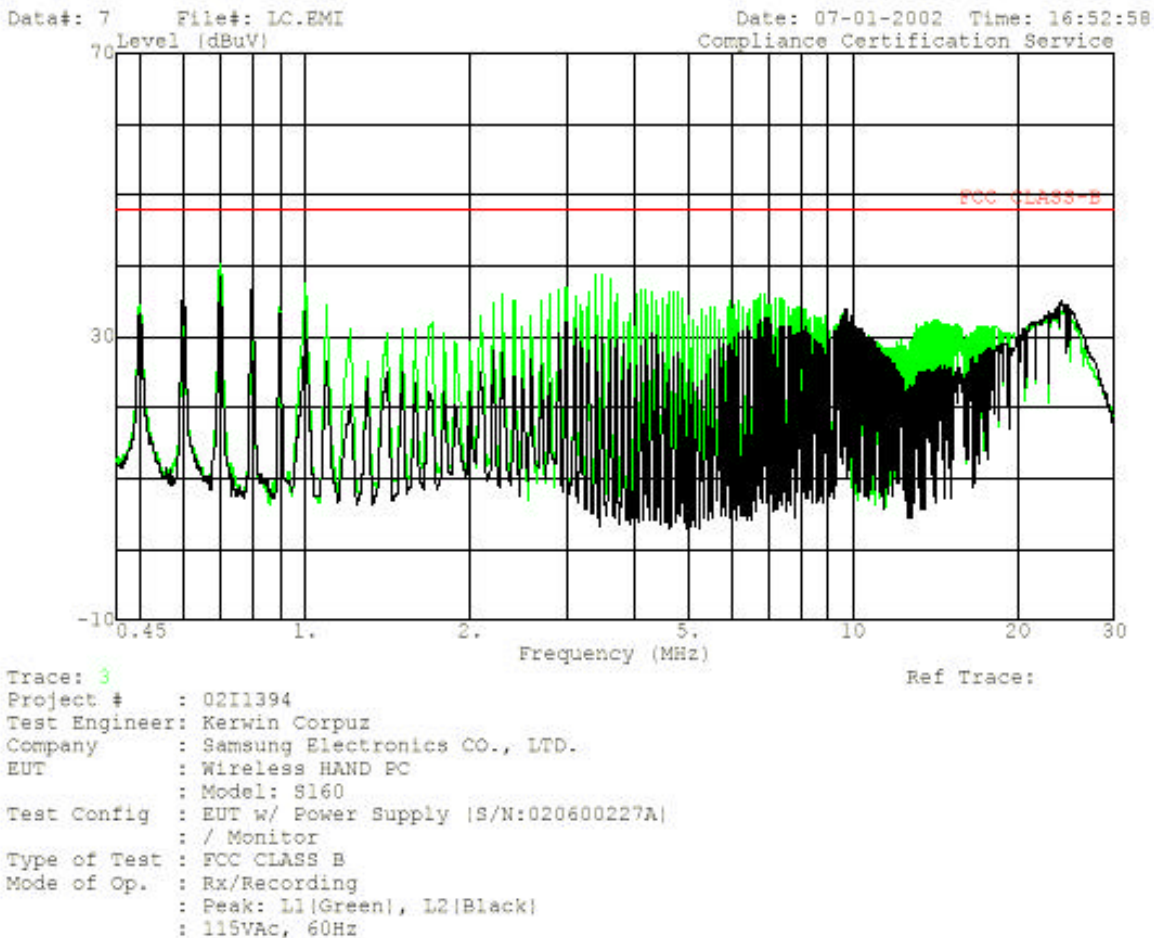
RESULT

No non-compliance noted. See Line Conduction plot

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.70	40.23	--	--	0.00	48.00	--	-7.77	--	L1
1.00	37.50	--	--	0.00	48.00	--	-10.50	--	L1
3.39	38.79	--	--	0.00	48.00	--	-9.21	--	L1
0.60	35.43	--	--	0.00	48.00	--	-12.57	--	L2
0.70	35.47	--	--	0.00	48.00	--	-12.53	--	L2
0.80	36.82	--	--	0.00	48.00	--	-11.18	--	L2
6 Worst Data									

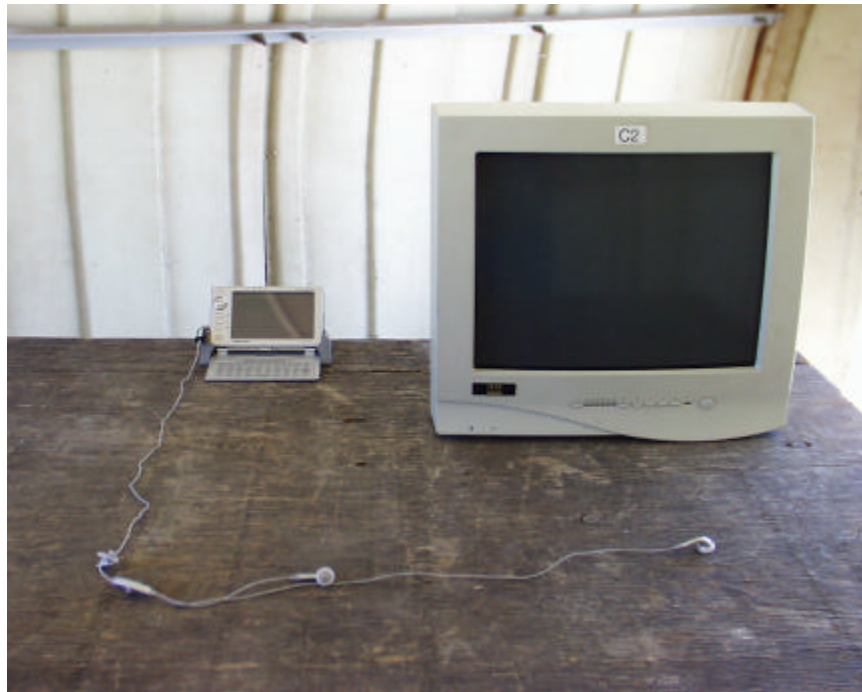


561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



10.8. SETUP PHOTOS

Radiated Emission below 1 GHz measurement



Y axis with Cradle front side (worst case)



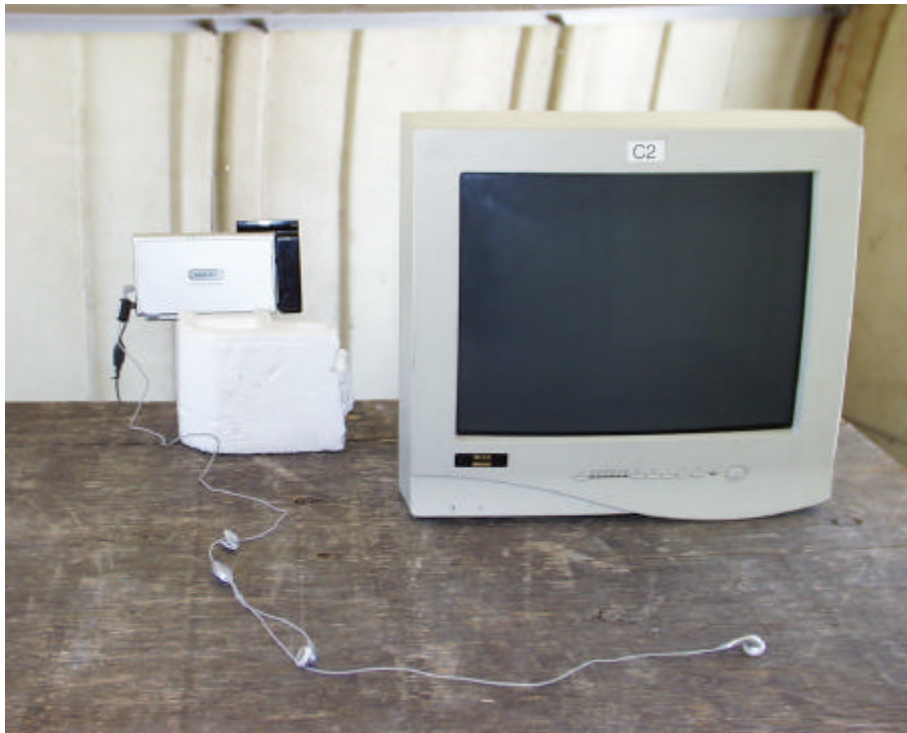
Y axis with Cradle back side



X axis position

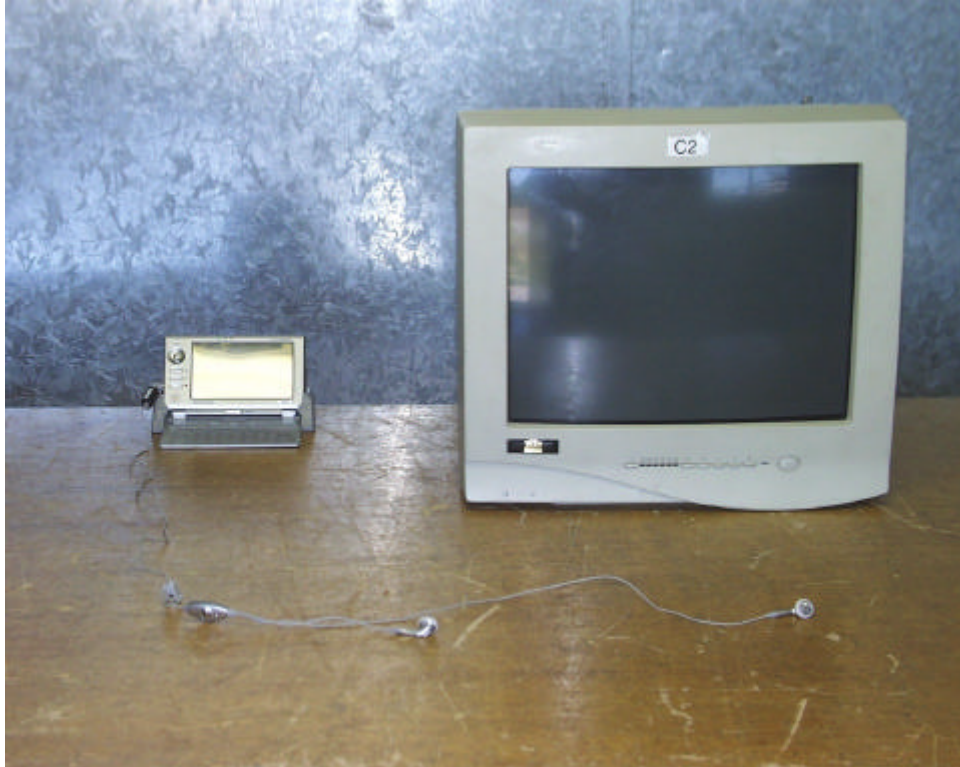


Z axis position

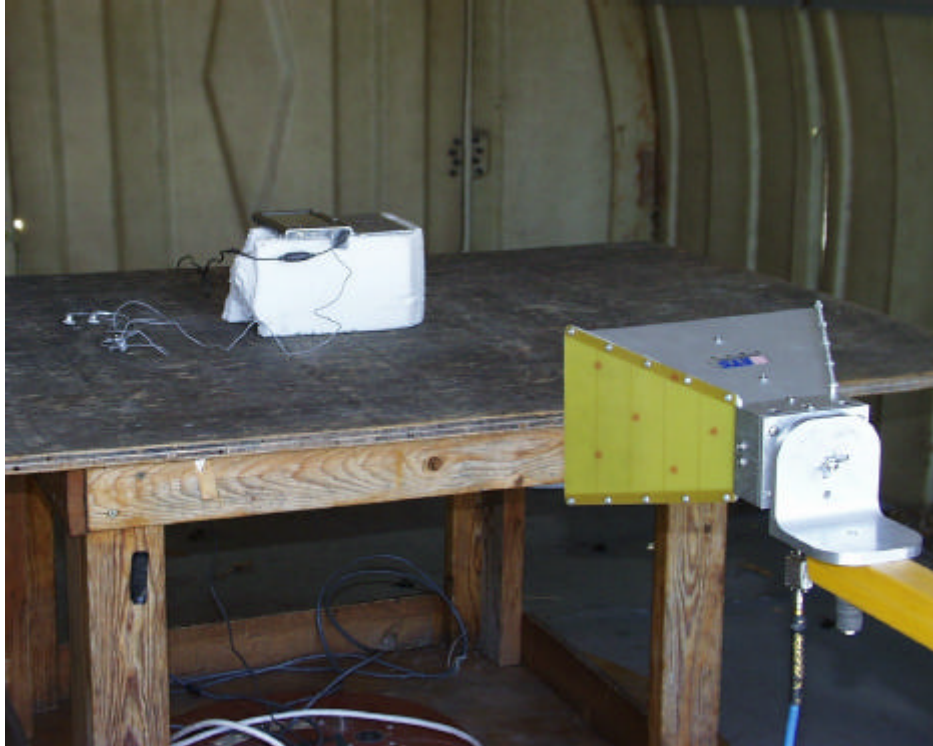


Y axis with PCMCIA Card adaptor

Conducted Emission measurement



Radiated Emission above 1 GHz measurement



X axis position (worst case)



Y axis position



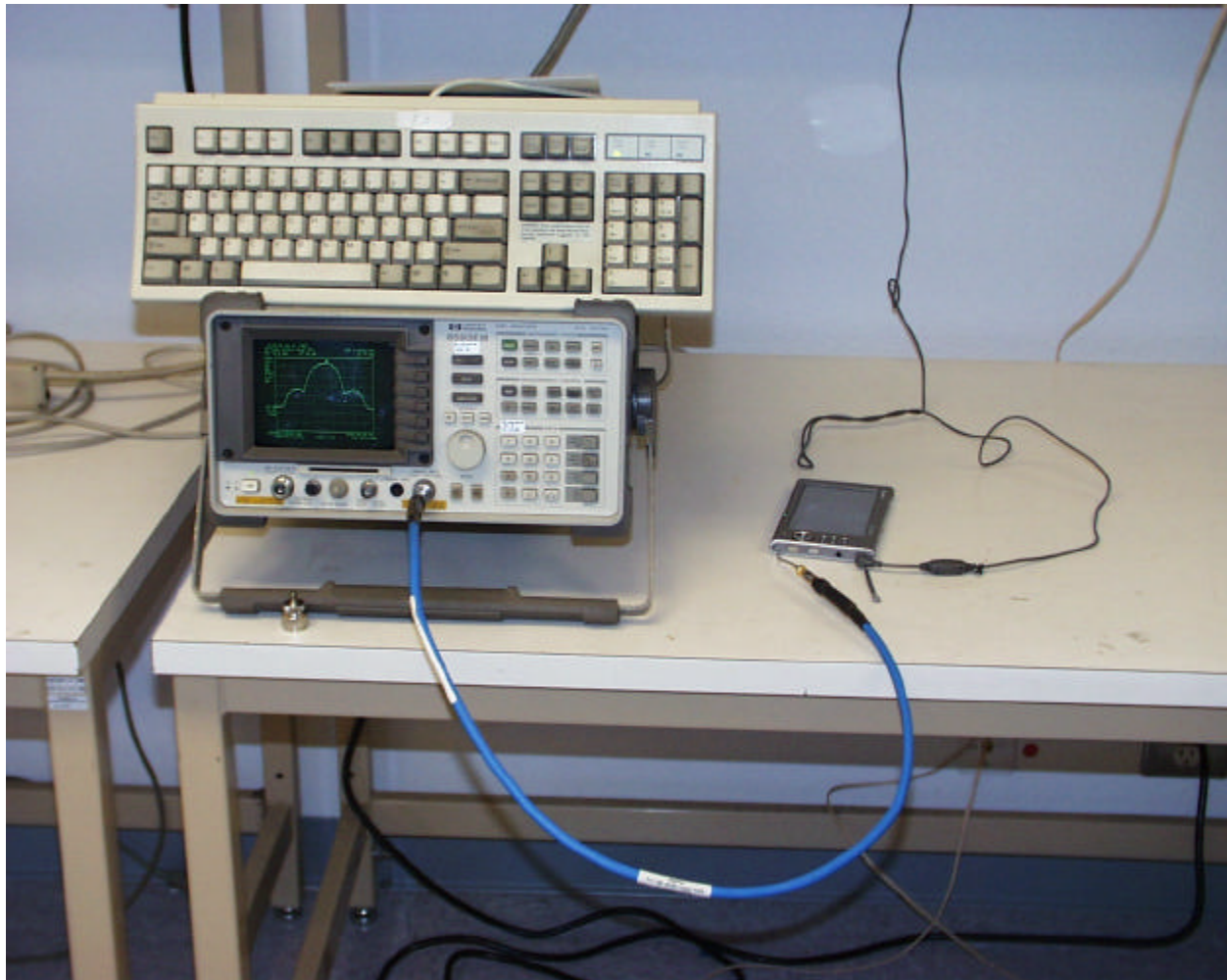
Z axis position

Radiated Emission above 18 GHz measurement



X axis position (worst case)

Antenna Port Terminal measurement



END OF REPORT