



FCC CFR47 PARTS 24 E & 15

CERTIFICATION TEST REPORT

FOR

1900 MHz GSM/GPRS PDA COMMUNICATOR

MODEL: Tungsten W (aka Palm i710)

FCC ID: O3W710000

REPORT NUMBER: 02U1278-1

ISSUE DATE: MAY 16, 2002

Prepared for
PALM SOLUTIONS GROUP
400 N. McCarthy Blvd.
Milpitas, CA 95035-5112
USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD, ROUTE 2
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

TABLE OF CONTENT

1. TEST RESULT CERTIFICATION	3
2. EUT DESCRIPTION	4
3. TEST METHODOLOGY	4
4. TEST FACILITY	4
5. ACCREDITATION AND LISTING	5
6. MEASURING INSTRUMENT CALIBRATION	5
7. APPLICABLE RULES AND BRIEF TEST RESULT	6
8. TEST SETUP, PROCEDURE AND RESULT	10
8.1. SECTION 2.1046: RF POWER OUTPUT – CONDUCTED MEASUREMENTS	10
8.2. SECTION 2.1046: RF POWER OUTPUT – RADIATED MEASUREMENTS	15
8.3. SECTION 2.1047: MODULATION CHARACTERISTICS	16
8.4. SECTION 2.1049: OCCUPIED BANDWIDTH	16
8.5. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL	20
8.6. SECTION 2.1053 & 15.209: FIELD STRENGTH OF SPURIOUS RADIATION	33
8.7. SECTION 2.1055: FREQUENCY STABILITY	46
8.8. SECTION 15.207: CONDUCTED EMISSIONS:	50

1. TEST RESULT CERTIFICATION

COMPANY NAME: PALM SOLUTIONS GROUP
400 N. McCarthy Blvd.
Milpitas, CA 95035 USA

EUT DESCRIPTION: 1900 MHZ GSM/GPRS PDA COMMUNICATOR

MODEL NAME: Tungsten W (aka Palm i710)

DATE TESTED: MAY 16, 2002

EQUIPMENT TYPE	GSM/GPRS VOICE/ DATA PDA COMMUNICATOR
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 24 Subpart E, and PART 15 Subpart C

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 24 Subpart E and CFR47, Part 15 Subpart C. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

Warning : 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.

Released For CCS By:



MICHAEL HECKROTTE
EMC CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



FRANK IBRAHIM
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

Voice and Data PDA with ear jack and holster , 1900 MHz GSM/GPRS PDA communicator, two input flavours; one with keyboard and stylus, second with only stylus. The antenna of the EUT is internal helical antenna with a gain of 0.4 dBi. There are two models: i710 and Tungsten W. The Models difference is for marketing purposes only.

3. 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.

4. 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.

5. 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. 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.

EQUIPMENT LIST:

Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Spectrum Analyzer RF Section	Hewlett Packard	8566b	210A01296	5/4/02
Display Spectrum Analyzer	Hewlett Packard	8566	3026A19146	6/28/02
Quasi Peak Detector	Hewlett Packard	6565QA	2811A01335	5/4/02

7. APPLICABLE RULES AND BRIEF TEST RESULT

§24.232- POWER LIMIT

24.232(a); Maximum Peak output power for base station transmitters should not exceed 100 Watts EIRP (equivalent isotropically radiated power).

24.232(b); Mobile/Portable stations are limited to 2 Watts EIRP peak power.

Spec limit: As specified above, 2W maximum.

Test result: No non-compliance noted.

TYPE OF EMISSIONS

GXW

§24.235- FREQUENCY STABILITY

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Spec limit: 2.5 PPM

Test result: No non-compliance noted.

§24.238- EMISSION LIMITS

24.238(a); The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a licensee's frequency block.

Power Amplifier Mean Power = 100 Watts (50dBm)

$43 + 10 \log (100 \text{ Watts}) = 63 \text{ dB}$

Out-of-Band and Band-Edges emissions must be attenuated by the following amount:

$50 \text{ dBm} - 63 \text{ dB} = -13 \text{ dBm}$

24.238(b) & (c);

- (1) Compliance with the out-of-band emissions requirement is based on test being performed with 1MHz analyzer RES BW.
- (2) At block edges, RES BW may be adjusted to a level at least as large as 1% of emission bandwidth. The emissions bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. For the EUT this is at least:

TDMA:

$0.01 * 314 \text{ kHz} = 3.14 \text{ kHz}$. A RES BW of 3 kHz was used for measuring at the block edges.

Spec limit: As specified as above.

Test result: No non-compliance noted.

§2.1057- SPECTRUM RANGE TO BE INVESTIGATED

Lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency.

Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

Spec limit: Frequency investigation range from 30MHz to tenth harmonic (i.e. 20 GHz.)

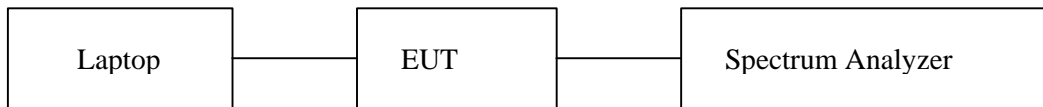
Radiated Emission Technical Requirements FCC 15.209 Limits	
Frequency (MHz)	FCC limits @ 3 meter Quasi-Peak/dBuV/m
30 – 88	40.0
88 - 216	43.5
216 - 960	46.0
960 - 1000	54.0
Above 1000	54.0

Conducted Emission Technical Requirements FCC 15.207 Limits	
Frequency Range	FCC limits Quasi-Peak/dBuV
450kHz - 30MHz	48

8. TEST SETUP, PROCEDURE AND RESULT

8.1. SECTION 2.1046: RF POWER OUTPUT – CONDUCTED MEASUREMENTS

TEST SETUP:

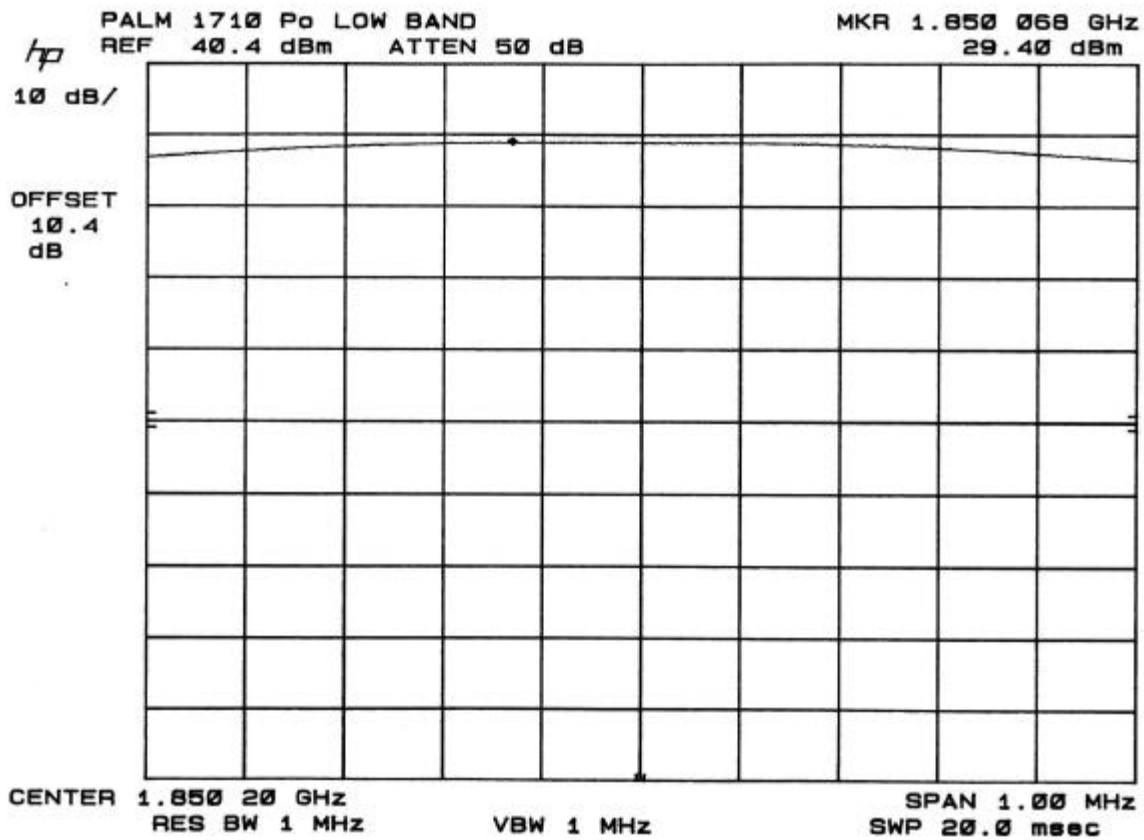


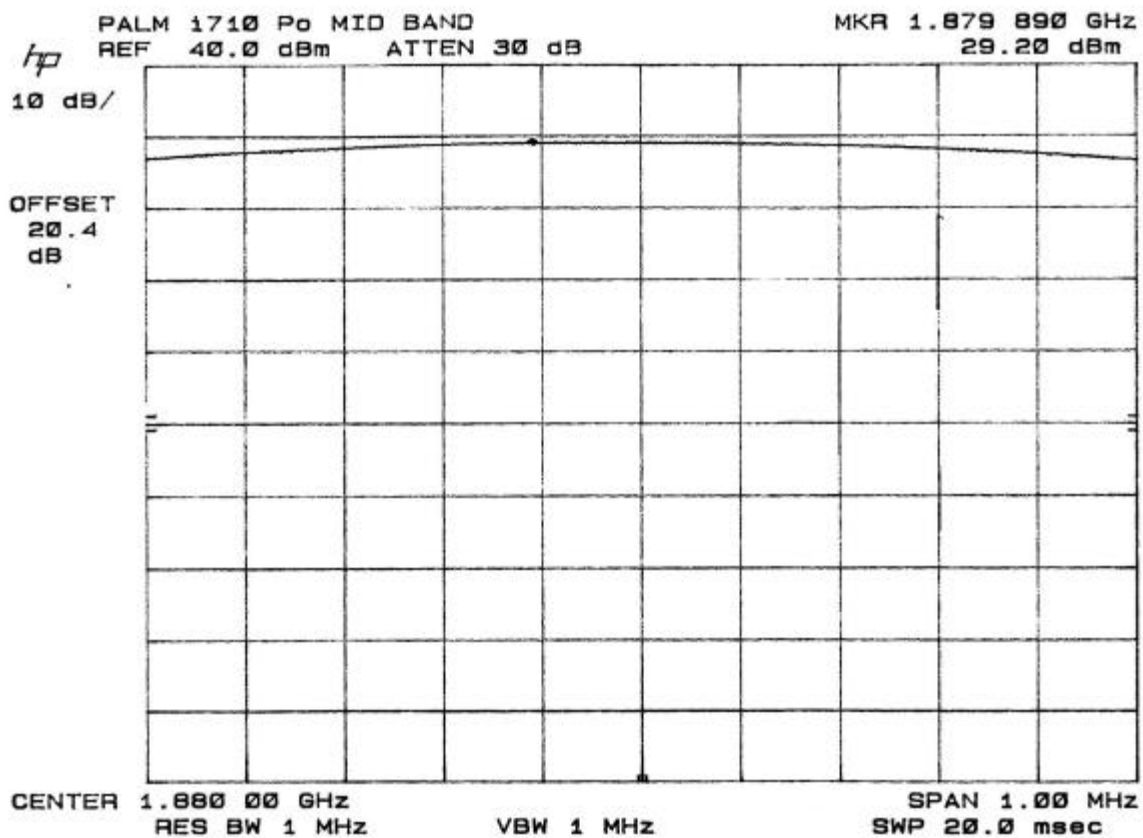
TEST PROCEDURE:

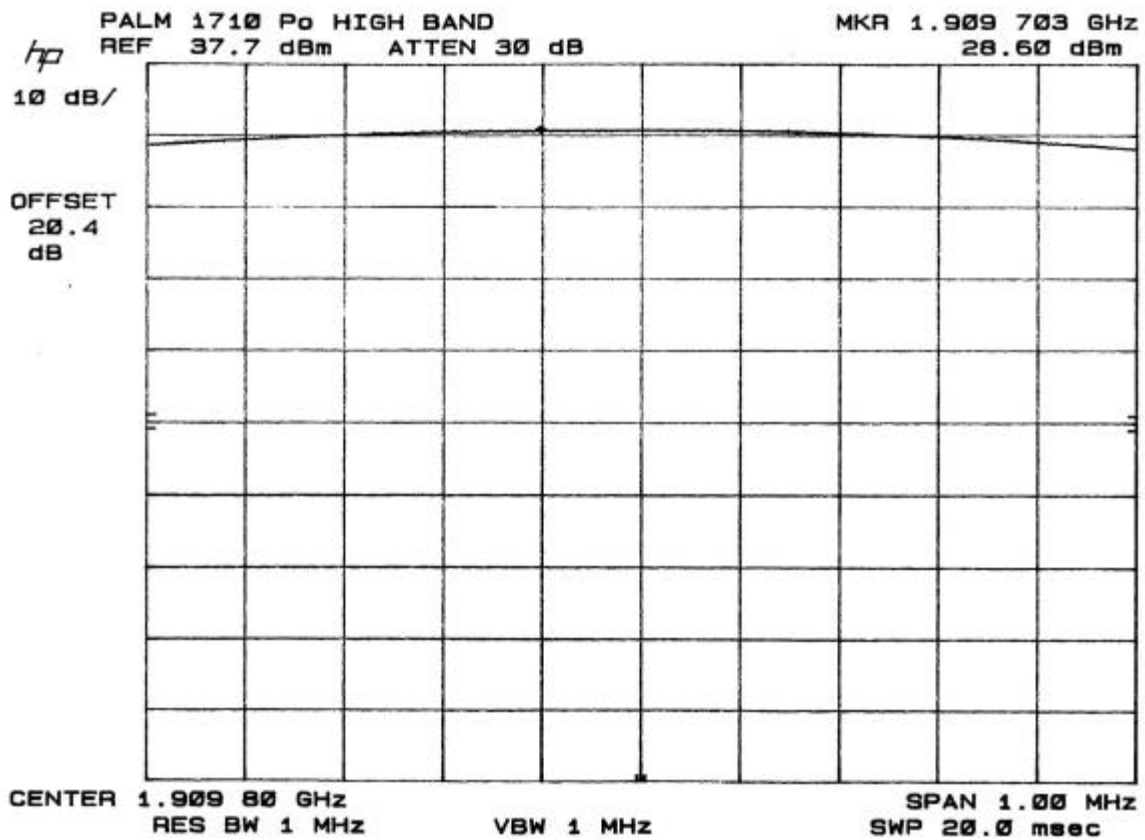
Output port of the EUT was connected to a spectrum analyzer, 1MHz RBW and 1MHz VBW settings were used for the spectrum analyzer, reading of the peak power level was recorded.

RESULT: No non-compliance noted.

Band	Spectrum Analyzer Reading (dBm)	Limit (dBm)	Margin (dB)
Low Band	29.4	33	-3.6
Middle Band	29.2	33	-3.8
High Band	28.6	33	-4.4







RF Output Power Setup Photo

8.2. SECTION 2.1046: RF POWER OUTPUT – RADIATED MEASUREMENTS

Compliance Certification Services

Radiated Emissions

24.232

PALM i710

GSM 1900 Single modulation cell phone

5/2/02

B-Site (1 meter)

Jerry Hovey

Report#:02U1278-1

Channel: 512

fo = 1850 MHz

Frequency (MHz)	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1850V	109.8	21.8	0.95	8.3	29.15	33	-3.85
1850H	101	21.9	0.95	8.3	29.25	33	-3.75

Channel: 661

fo = 1880 MHz

Frequency (MHz)	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1880V	111.2	23.2	0.95	8.3	30.55	33	-2.45
1880H	109.5	23	0.95	8.3	30.35	33	-2.65

Channel: 810

fo = 1909 MHz

Frequency (MHz)	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1909V	110.7	23.7	0.95	8.3	31.05	33	-1.95
1909H	93	23.5	0.95	8.3	30.85	33	-2.15

NOTE1: Used Pre-Amp with +30db gain

NOTE2: H=horizontal and V=vertical

EIRP = SG reading - CL + Gain (dBi)

Margin = EIRP - Limit

Note : For test procedures and setup see section 8.6

8.3. SECTION 2.1047: MODULATION CHARACTERISTICS

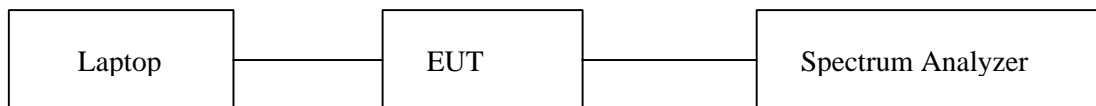
(NOT APPLICABLE)

8.4. SECTION 2.1049: OCCUPIED BANDWIDTH

SECTION 2.1049(i)

Transmitters designed for other types of modulation – when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

TEST SETUP:

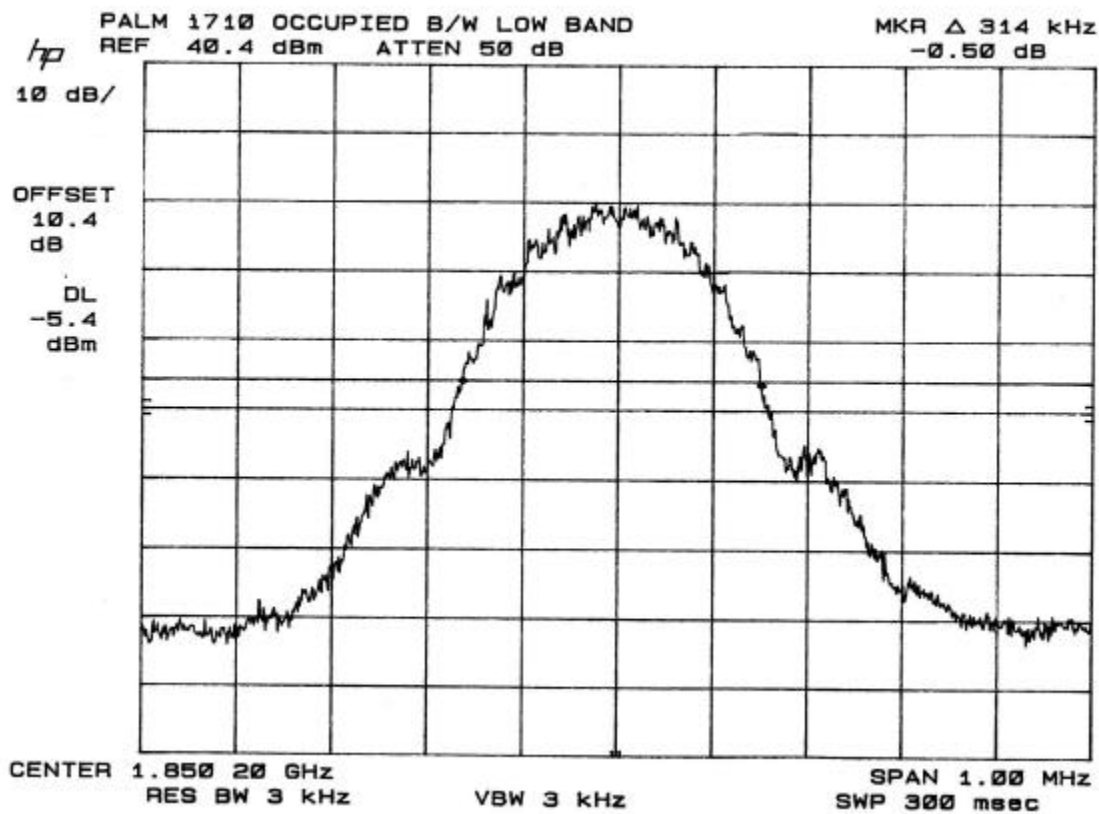


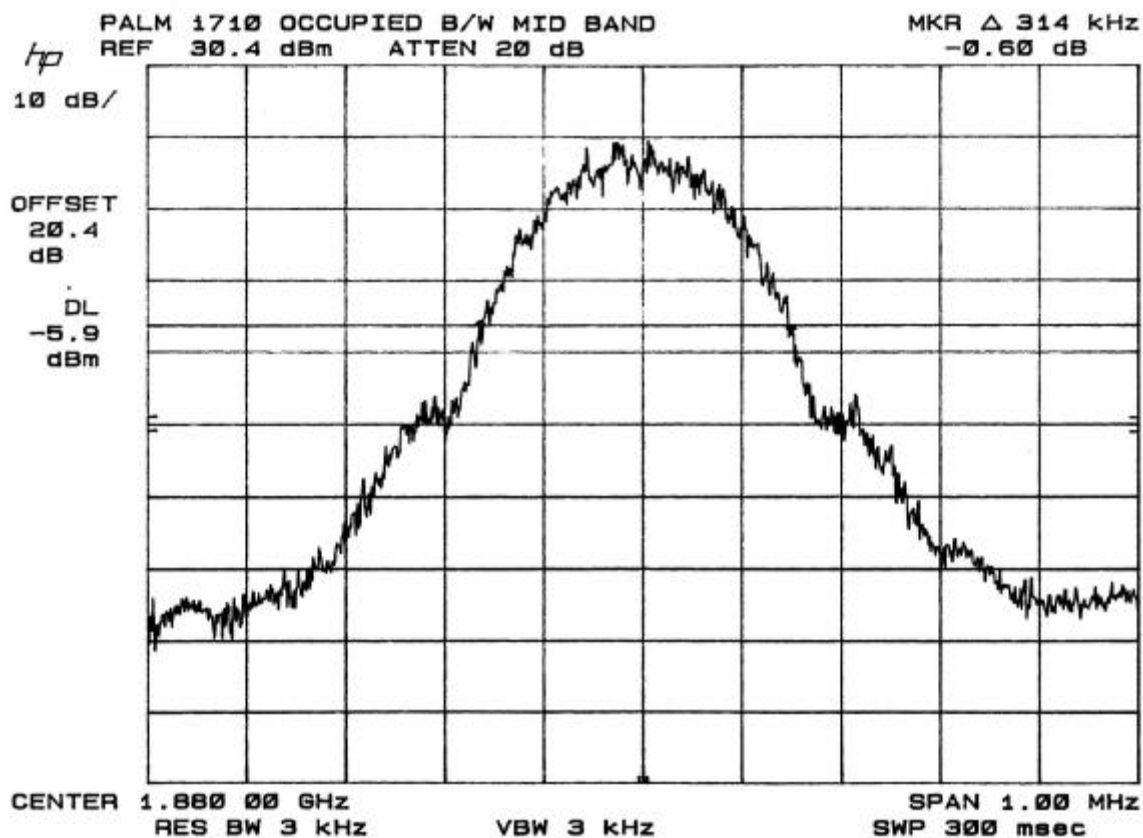
TEST PROCEDURE:

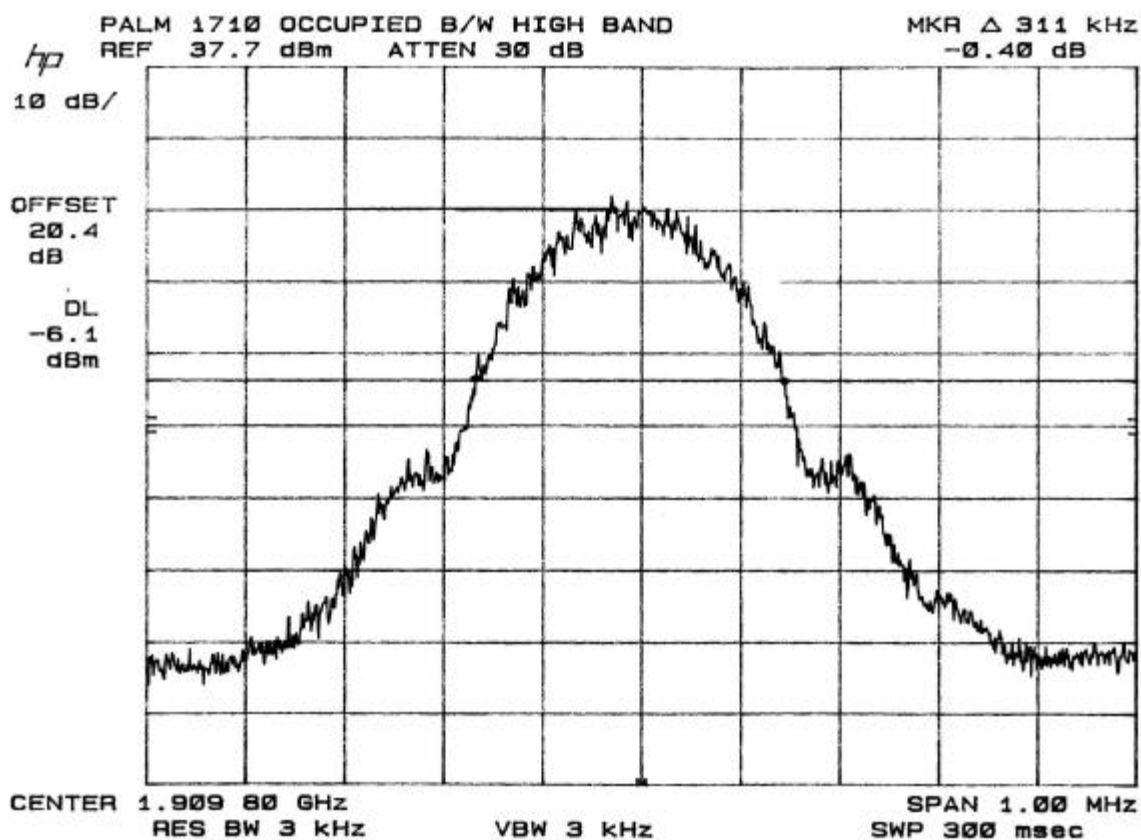
A line of 26 dBc was inserted on the display of the spectrum analyzer, marker and delta method was used to show the bandwidth which is the frequency difference between two marker positions on the plot where all signals outside this band are attenuated by more than 26 dB. RBW of more than 1% of emissions bandwidth was used, and that is 3kHz

RESULT: No non-compliance noted.

Freq (MHz)	Bandwidth (KHz)
1850	314
1880	314
1910	311







8.5. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL

TEST SETUP:



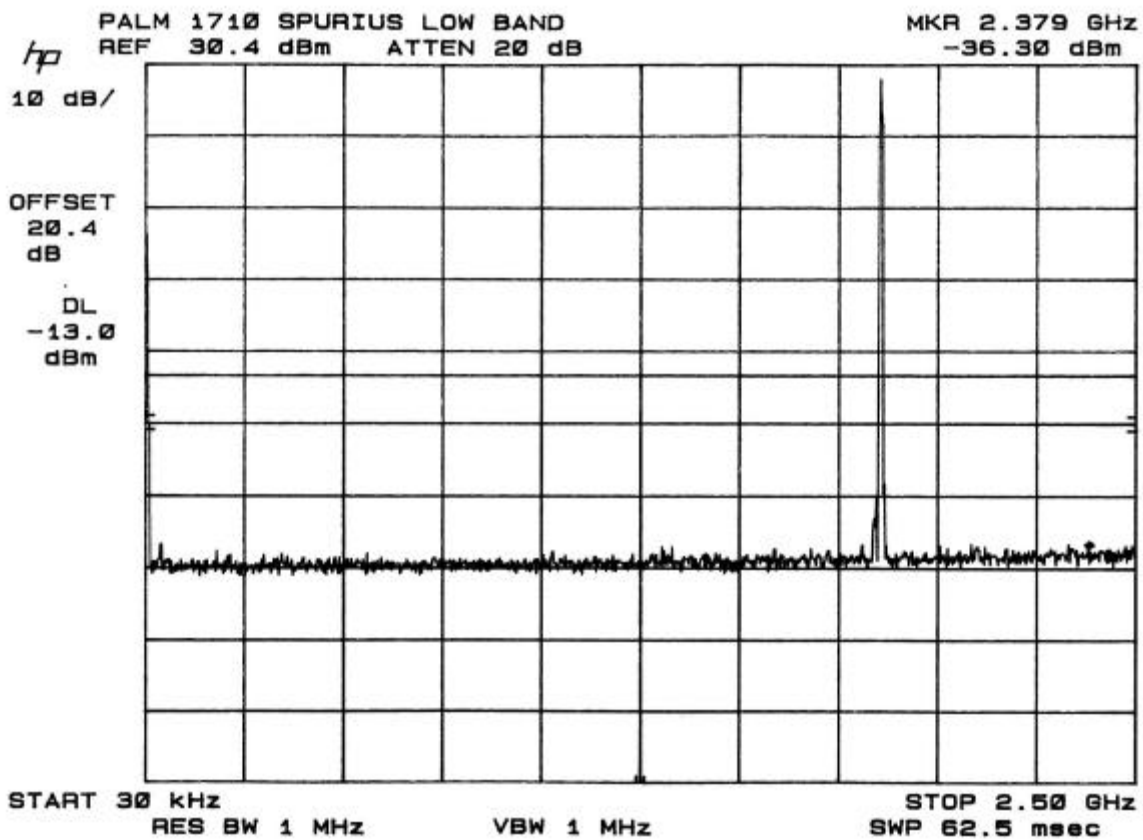
TEST PROCEDURE:

- 1) Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm limit, in the 1 MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.
- 2) For the Out-of-Band measurements a 1 MHz RES BW was used to scan from 30 MHz to 20 GHz. A display line was placed at -13dBm to show compliance.

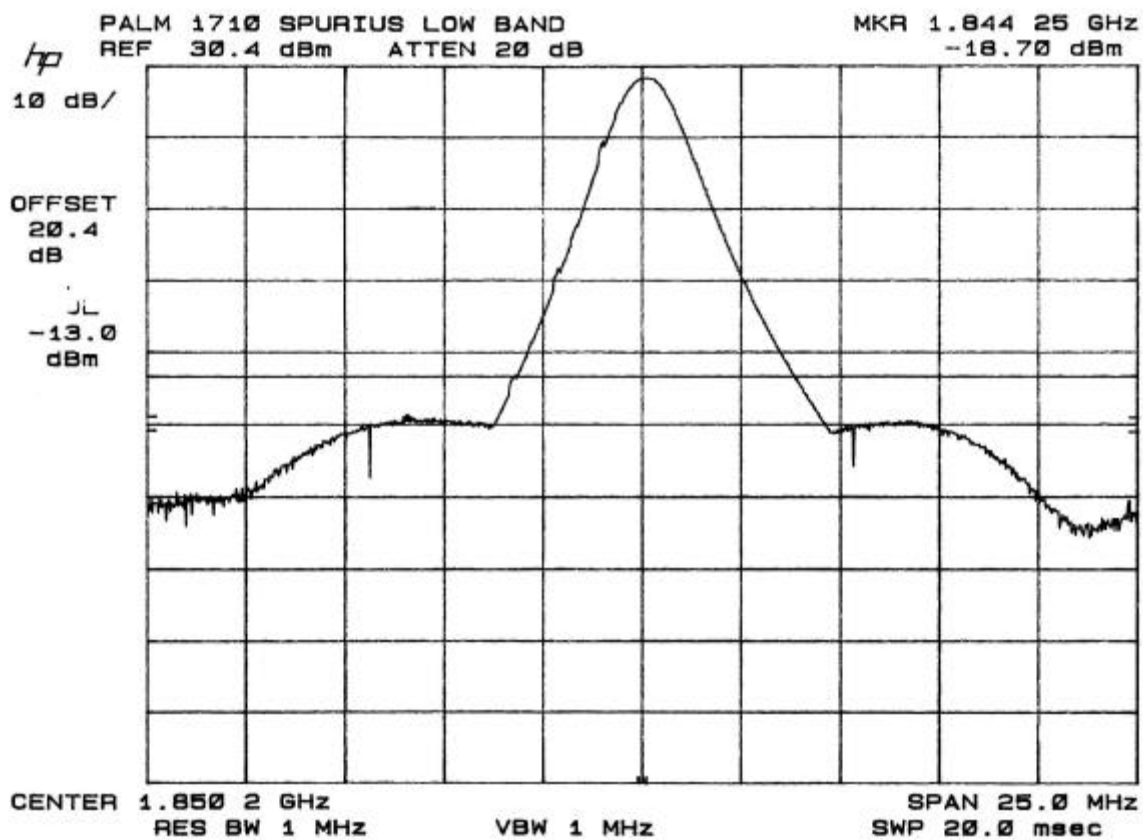
RESULT

The following table indicates the plot number associated with the Block Edges and Out-of-Band emission plots. All measurements are in peak detector mode.

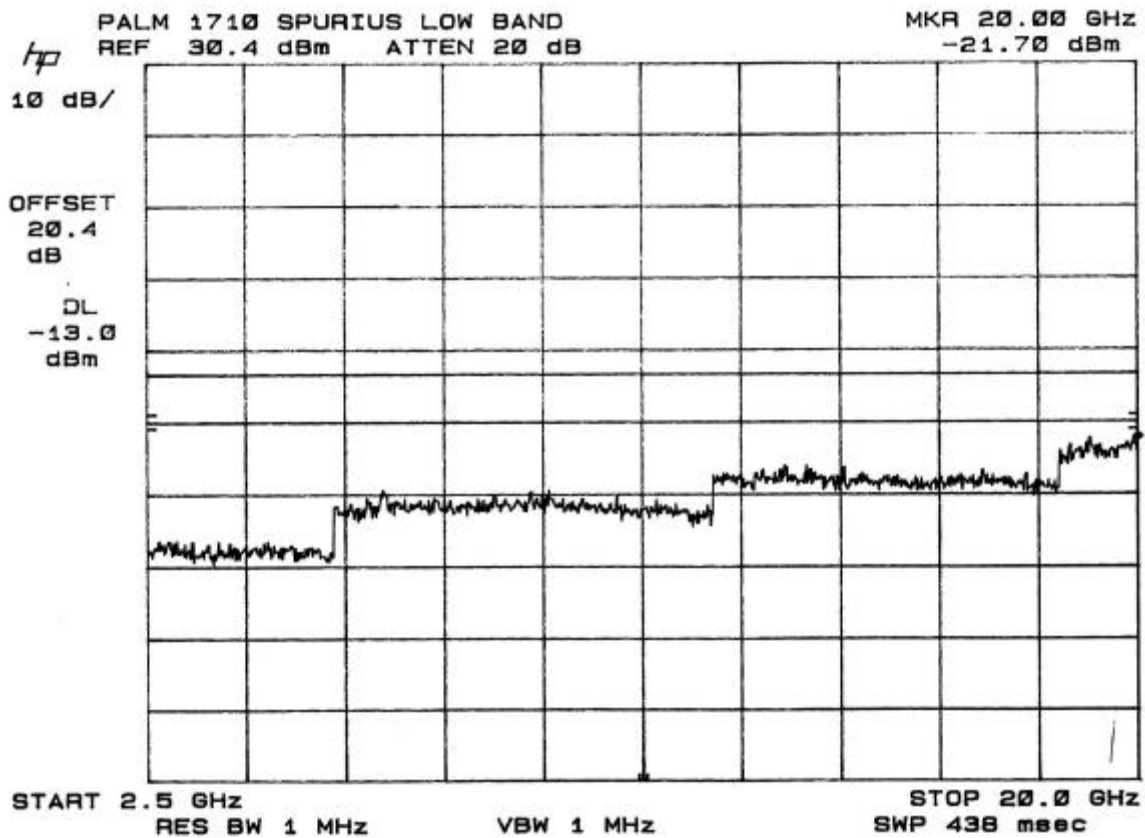
*** TDMA ***		
Plot#	Description	Frequency Range (MHz)
1	Low Band, Spurious	30 kHz – 2.5 GHz
2	Low Band, Spurious	1837.5 – 1862.5
3	Low Band, Spurious	2500 - 20000
4	Low Band, Bandedge	1850
5	Middle Band, Spurious	30 kHz – 2.5 GHz
6	Middle Band, Spurious	1867.5 – 1892.5
7	Middle Band, Spurious	2500 - 20000
8	High Band, Spurious	30 kHz – 2.5 GHz
9	High Band, Spurious	1897.5 – 1922.5
10	High Band, Spurious	2500 - 20000
11	High Band, Bandedge	1910



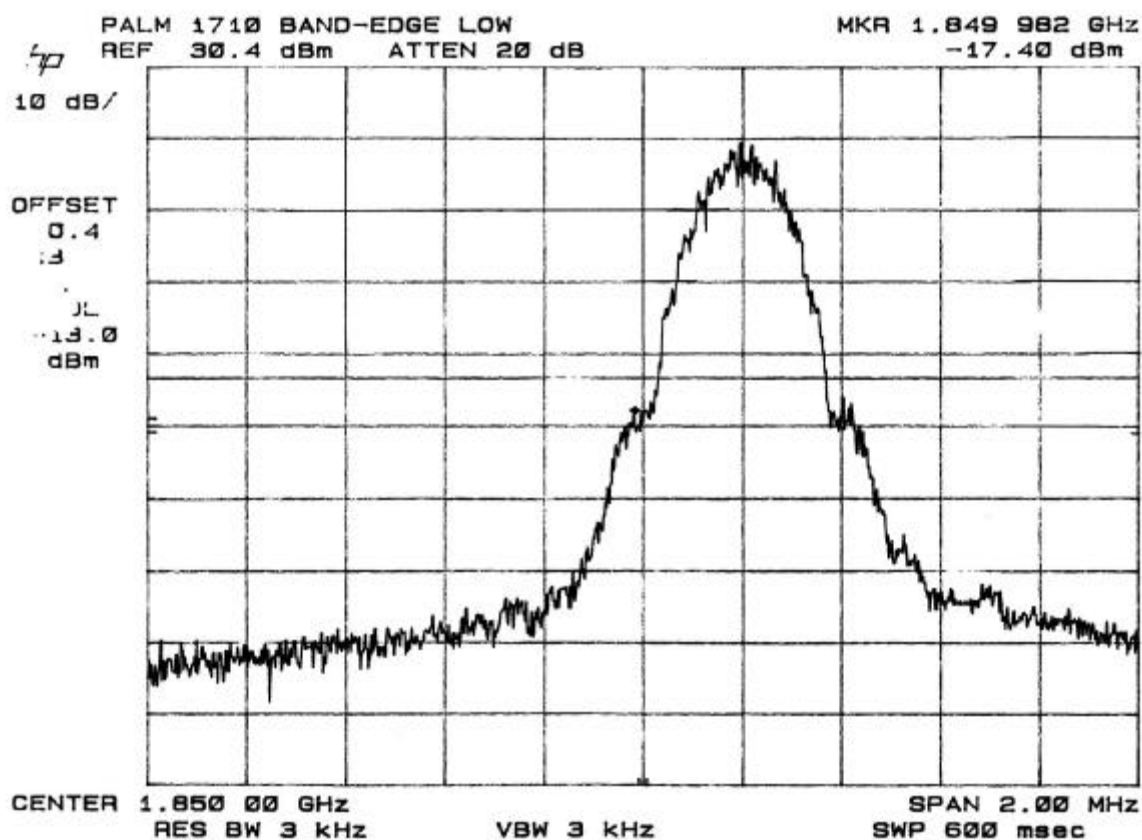
(Plot # 1)



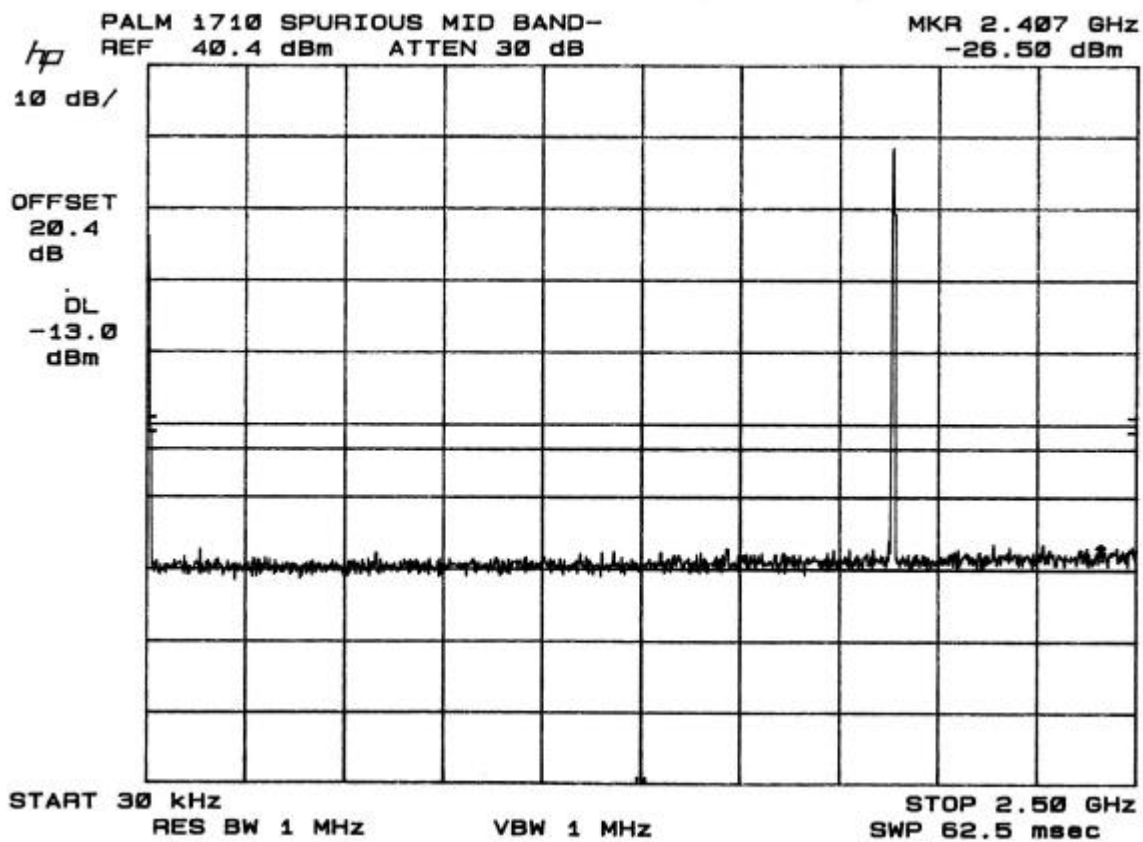
(Plot # 2)



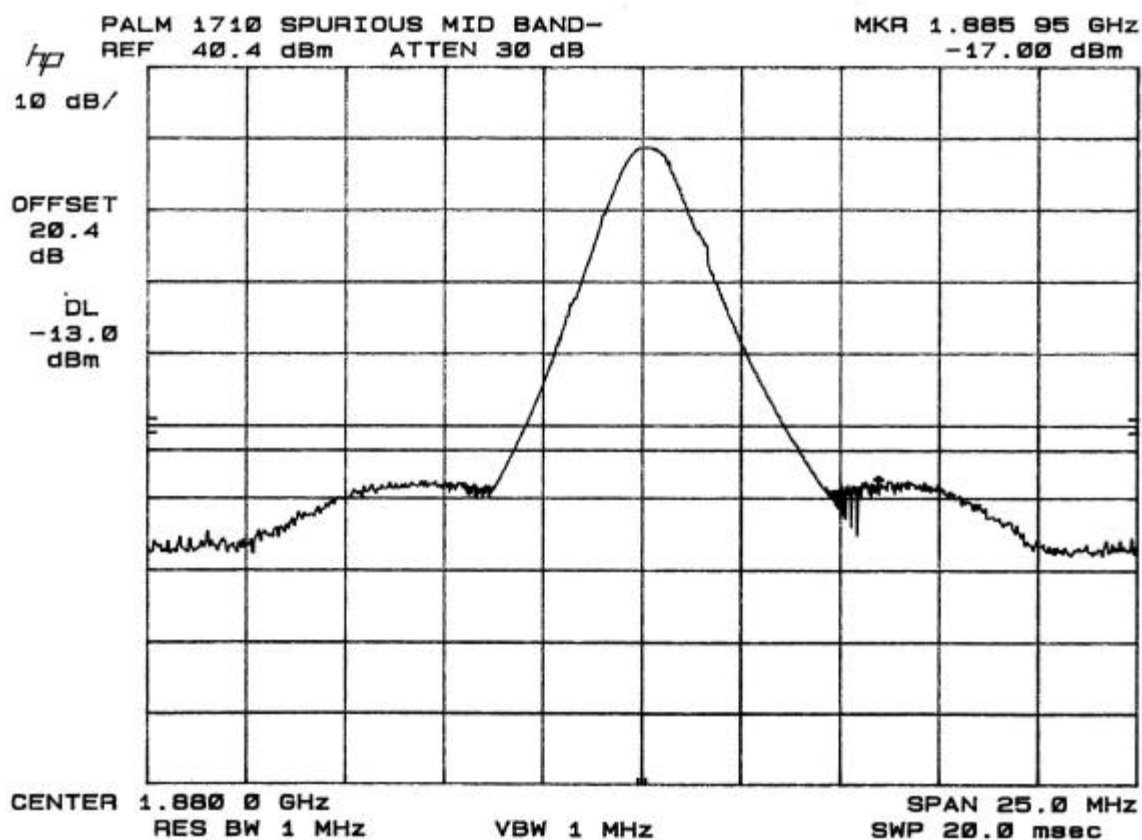
(Plot # 3)



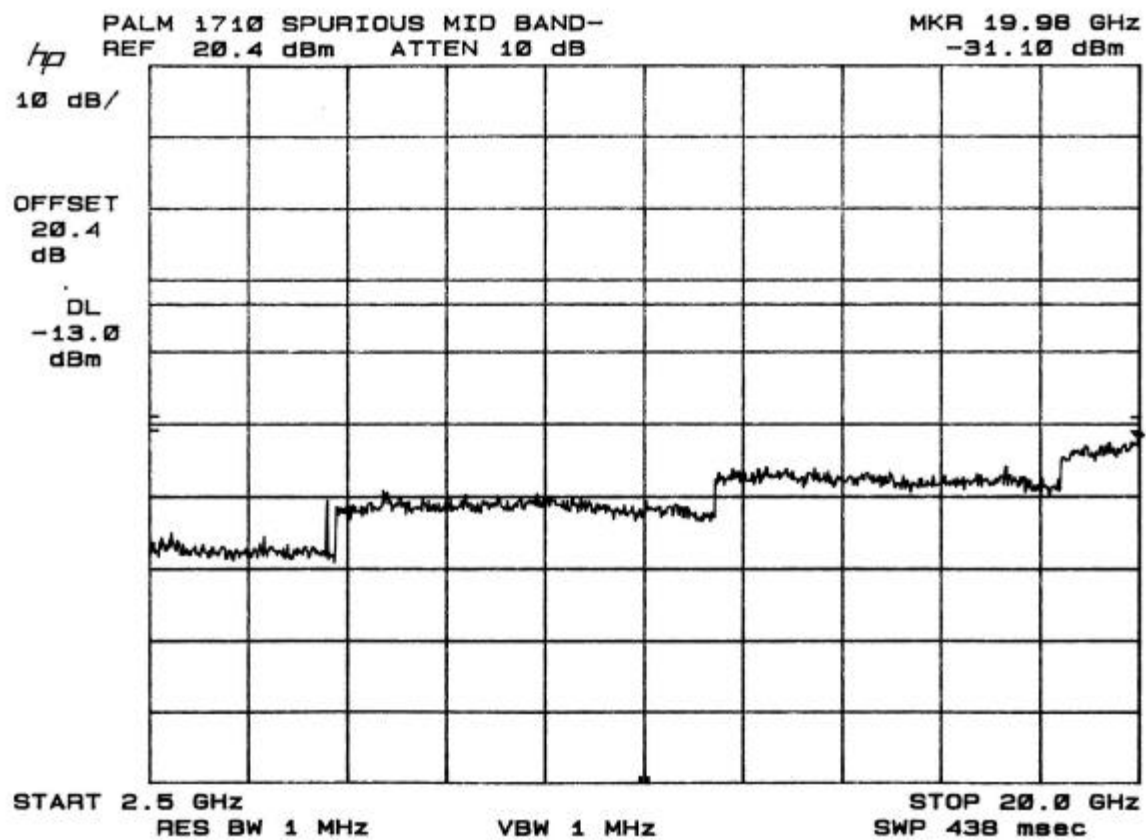
(Plot # 4)



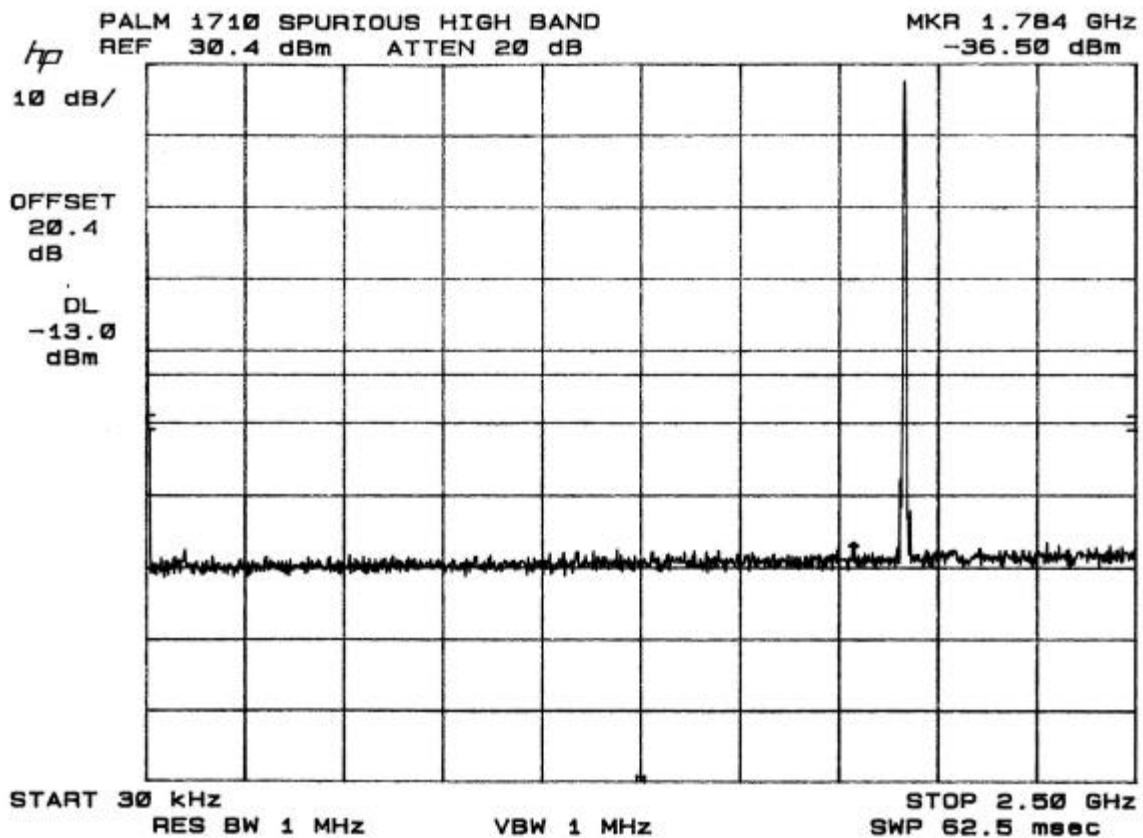
(Plot # 5)



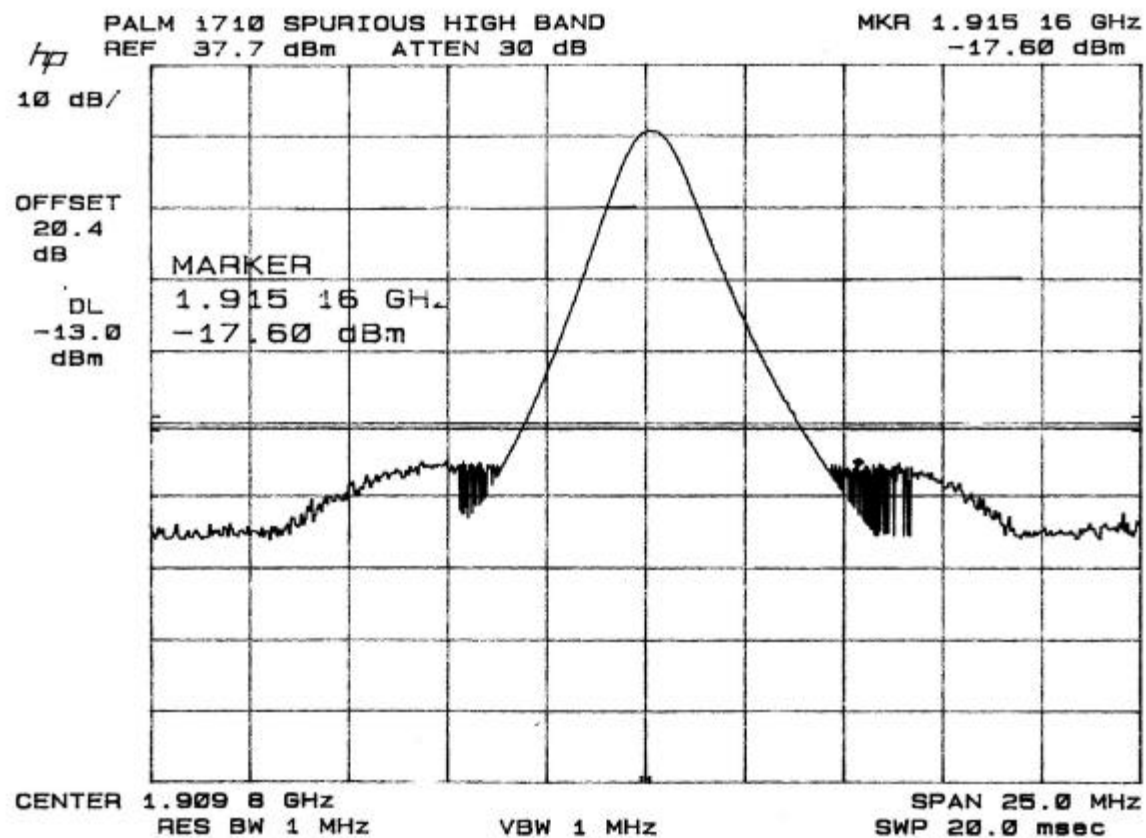
(Plot # 6)



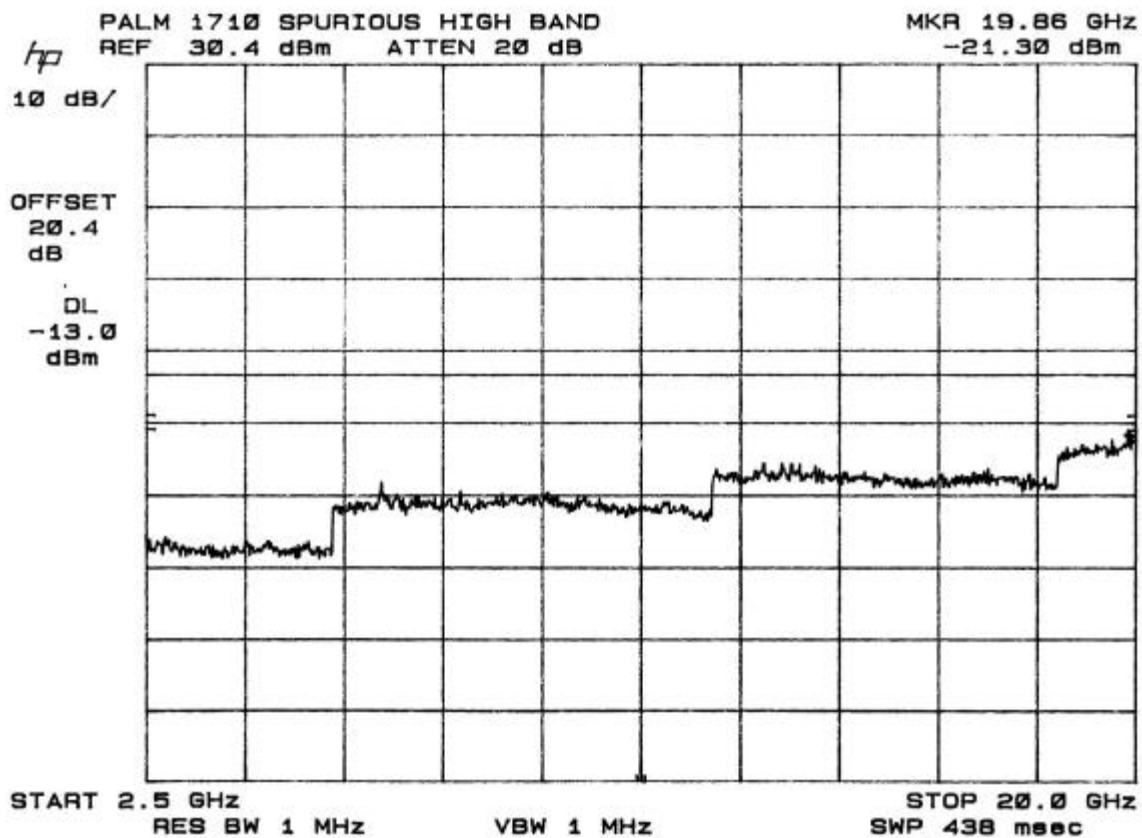
(Plot # 7)



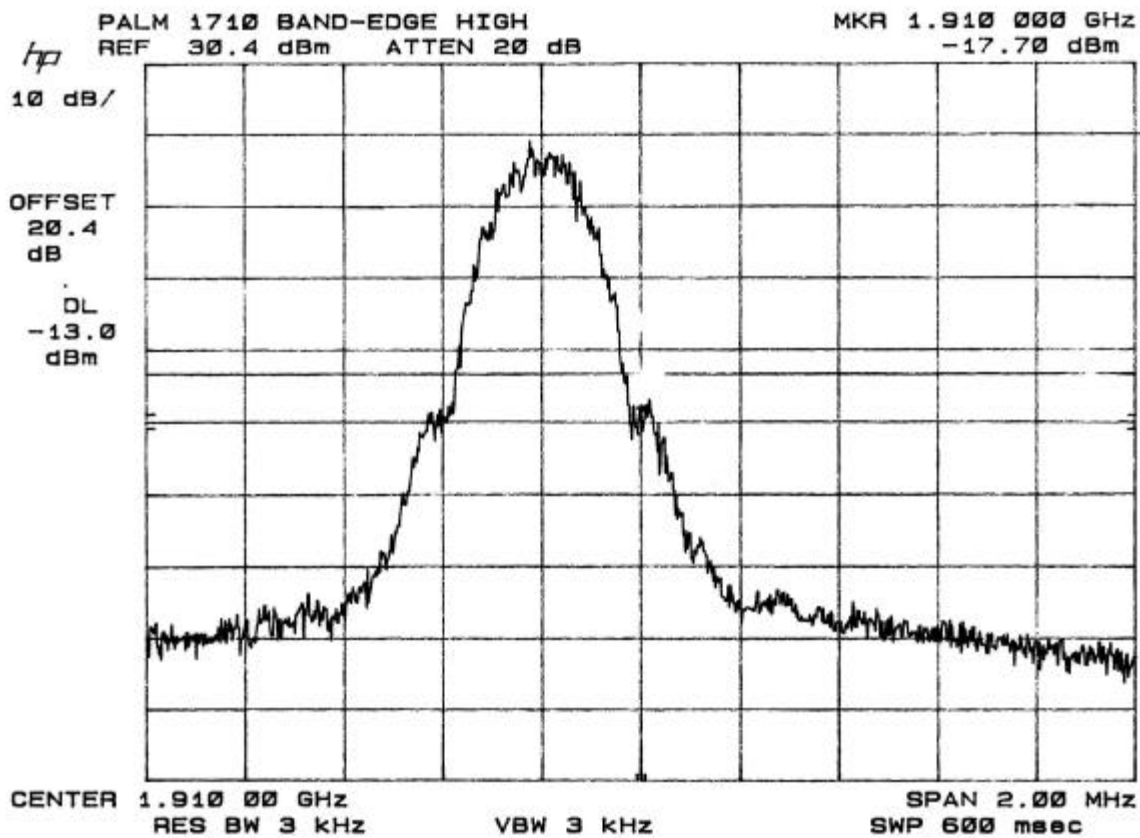
(Plot # 8)



(Plot # 9)



(Plot # 10)



(Plot # 11)

8.6. SECTION 2.1053 & 15.209: FIELD STRENGTH OF SPURIOUS RADIATION

INSTRUMENTS LIST

TEST EQUIPMENTS LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Spectrum Analyzer	HP100Hz - 22GHz	8566B	3014A06685	6/28/02
Spectrum Display	HP	85662A	2152A03066	5/10/02
Quasi-Peak Detector	HP9K - 1GHz	85650A	3145A01654	6/28/02
Pre-Amplifier, 25 dB	HP0.1 - 1300MHz	8447D (P8)	2944A06589	8/10/02
Antenna, Bilog	Schaffner-Chase 30M-2GHz	CBL6112B	2586	8/2/02
LISN	Fischer 9k - 100MHz	FCC-LISN-50/250-25-2	114	8/8/02
Line Filter	Lindgren 10k - 10GHz	LMF-3489	497	N.C.R.
LISN	Solar Elec. Co.	8012-50-R-24-BNC	837990	8/8/02
EMI Test Receiver	Rohde & Schwarz	ESHS 20	827129/006	4/2/02
AC Power Source	Advanced Central Systems	AFC-10K-AFC2	J1568	N.C.R.

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	<input checked="" type="checkbox"/> Peak	<input checked="" type="checkbox"/> 1 MHz	<input checked="" type="checkbox"/> 1 MHz
	<input type="checkbox"/> Average	<input type="checkbox"/> 1 MHz	<input type="checkbox"/> 10 Hz

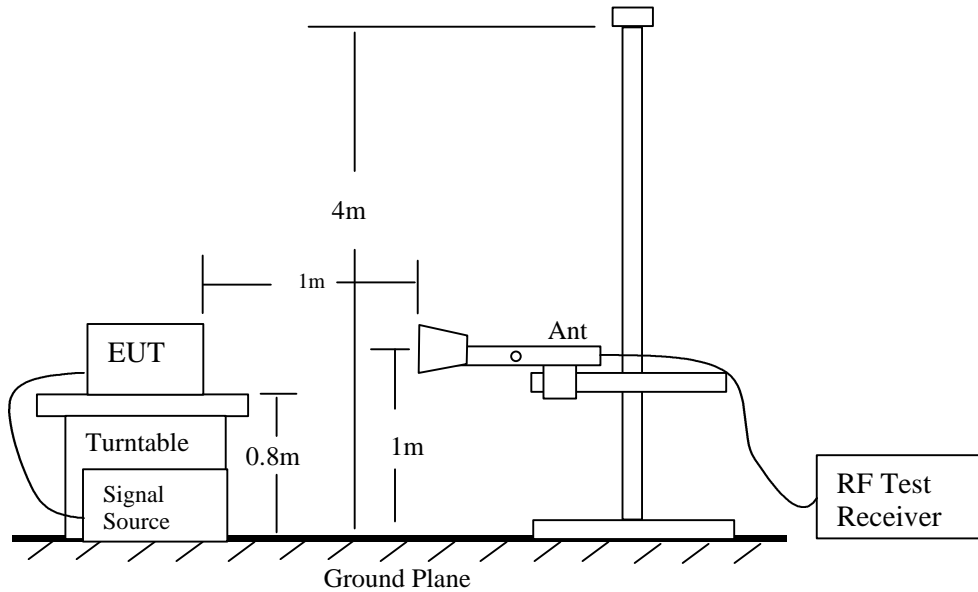
TEST SETUP

Fig 1: Radiated Emission Measurement

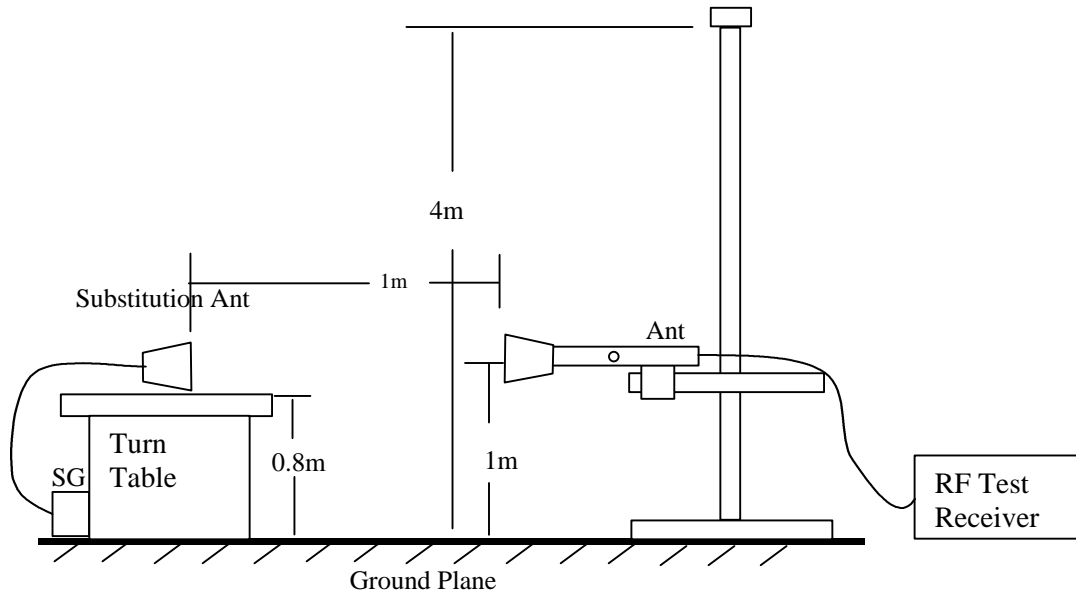


Fig 2: Radiated Emission – Substitution Method set-up

1 – 20 GHz Radiated Emission Setup Photos

1 – 20 GHz Substitution Method Setup Photo

TEST PROCEDURE

- 1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- 2). The test antenna shall be oriented initially for vertical polarization located 1m from the EUT to correspond to the frequency of the transmitter.
- 3). The output of the test antenna shall be connected to the measuring receiver and either a peak or average detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- 4). The transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- 5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 6). The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- 7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 8). The maximum signal level detected by the measuring receiver shall be noted.
- 9). The transmitter shall be replaced by a substitution antenna.
- 10). The substitution antenna shall be oriented for vertical polarization.
- 11). The substitution antenna shall be connected to a calibrated signal generator.
- 12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- 13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- 14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- 15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- 16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
- 17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

RESULT

No non-compliance noted.

Compliance Certification Services

Radiated Emissions

24.238

5/2/02

B-Site (1 meter)

Jerry Hovey

02U1278-1

PALM i710

GSM 1900 Single modulation cell phone

Channel: 512**fo = 1850 MHz**

Frequency (MHz)	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3700V	49	-47	4.76	8.9	-42.86	-13	-29.86
5550V	49.4	-47	5.95	9.7	-43.25	-13	-30.25
7400V	50.9	-48	6.8	10.4	-44.4	-13	-31.4
9250V	49.59	-47	7.31	11.1	-43.21	-13	-30.21
11100V	49.83	-46	8.16	12.1	-42.06	-13	-29.06
12950V	51.36	-46	9	12.1	-42.9	-13	-29.9
14800V	52.11	-46	9.86	12.8	-43.06	-13	-30.06
16650V	52.32	-46	10.88	15	-41.88	-13	-28.88
18500V	53	-46	11.9	15.4	-42.5	-13	-29.5

NOTE1: Used High Pass Filter (4750MHZ) starting from frequencies of 5550 MHz**NOTE2: H=horizontal and V=vertical****EIRP** = SG reading - CL + Gain (dBi)**Margin** = EIRP - Limit

Compliance Certification Services

Radiated Emissions

24.238

PALM i710

GSM 1900 Single modulation cell phone

5/2/02

B-Site (1 meter)

Jerry Hovey

Report#:02U1278-1

Channel: 661**fo = 1880 MHz**

Frequency (MHz)	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3760V	49.4	-47	4.76	8.9	-42.86	-13	-29.86
5640V	48.4	-47	5.95	9.7	-43.25	-13	-30.25
7520V	52.9	-48	6.8	10.4	-44.4	-13	-31.4
9400V	52.8	-47	7.31	11.1	-43.21	-13	-30.21
11280V	50.24	-46	8.16	12.1	-42.06	-13	-29.06
13160V	51.56	-46	9	12.1	-42.9	-13	-29.9
15040V	51.7	-46	9.86	12.8	-43.06	-13	-30.06
16920V	51.8	-46	10.88	15	-41.88	-13	-28.88
18800V	52.16	-46	11.9	15.4	-42.5	-13	-29.5

NOTE1: Used High Pass Filter (4750MHz) starting from frequencies of 5640 MHz**NOTE2: H=horizontal and V=vertical****EIRP** = SG reading - CL + Gain (dBi)**Margin** = EIRP - Limit

Compliance Certification Services

Radiated Emissions

24.238

PALM i710

GSM 1900 Single modulation cell phone

5/2/02

B-Site (1 meter)

Jerry Hovey

Report#:02U1278-1

Channel: 810**fo = 1909 MHz**

Frequency (MHz)	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3820V	50.2	-47	4.76	8.9	-42.86	-13	-29.86
5730V	49.63	-47	5.95	9.7	-43.25	-13	-30.25
7639V	51.64	-48	6.8	10.4	-44.4	-13	-31.4
9548V	50.66	-47	7.31	11.1	-43.21	-13	-30.21
11457V	51.06	-46	8.1	12.1	-42	-13	-29
13366V	50.64	-46	9	12.1	-42.9	-13	-29.9
15275V	51.64	-46	9.86	12.8	-43.06	-13	-30.06
17184V	52.1	-46	10.88	15	-41.88	-13	-28.88
19093V	52.4	-46	11.9	15.4	-42.5	-13	-29.5

NOTE1: Used High Pass Filter (4750MHZ) starting from frequencies of 5730 MHz**NOTE2: H=horizontal and V=vertical****EIPR = SG reading - CL + Gain (dBi)****Margin = EIPR - Limit**



FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

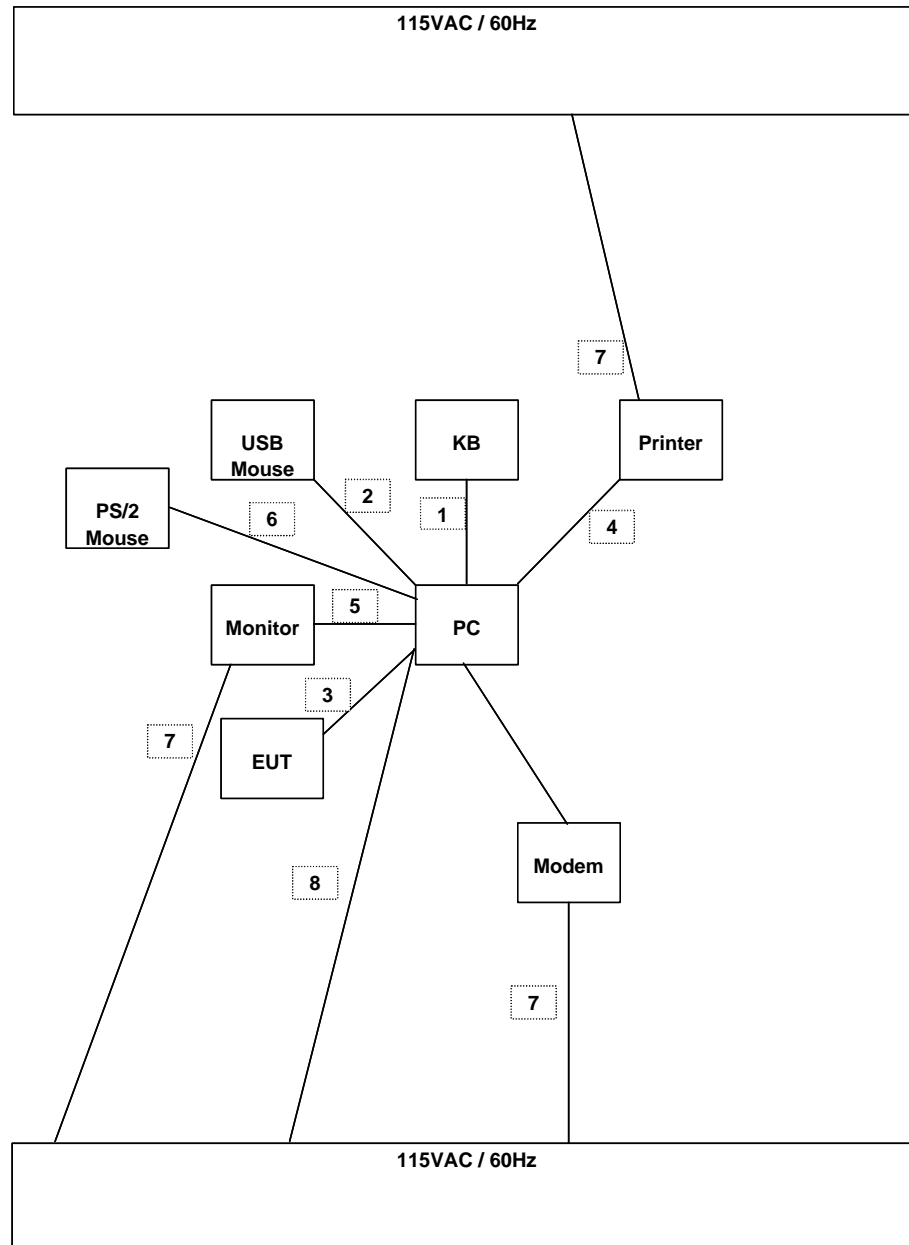
561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 02U1278-1
Report #: 020430B01
Date & Time: 04/30/02 9:46 AM
Test Engr: Frank Ibrahim

Company: Palm, Inc.
EUT Description: 900/1800/1900 MHz GSM/GPRS Communicator Voice/ Data PDA w/ Ear Jack & Flip Cover
Test Configuration : EUT, PC, Monitor, Printer, Modem, KB, USB Mouse, PS/2 Mouse
Type of Test: FCC PART 15, CLASS B
Mode of Operation: EUT generating H pattern, idle (not transmitting)

[<< 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)
265.87	45.40	12.41	3.51	28.89	32.43	46.00	-13.57	3mH	0.00	1.00	P
243.70	45.20	11.72	3.33	28.95	31.30	46.00	-14.70	3mH	0.00	1.00	P
228.92	46.30	10.72	3.21	29.01	31.21	46.00	-14.79	3mH	0.00	1.00	P
273.26	43.60	12.53	3.57	28.87	30.82	46.00	-15.18	3mH	0.00	1.00	P
251.09	43.30	12.17	3.39	28.92	29.94	46.00	-16.06	3mH	0.00	1.00	P
236.31	44.30	11.22	3.27	28.98	29.81	46.00	-16.19	3mH	0.00	1.00	P
6 Worst Data											

Radiated Emissions Setup Diagram:

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	AC	4	US 115V	Un-Shielded	2m	No	No	N/A
2	Video	1	DB15	Shielded	2m	Yes	Yes	One Torroid on Each End
3	USB	1	USB	Un-Shielded	2m	Yes	No	N/A
4	Parallel	1	DB25	Shielded	2m	Yes	Yes	N/A
5	Serial	1	DB9	Shielded	1m	Yes	No	N/A
6	KB	1	PS/2	Shielded	2m	Yes	No	N/A
7	Mouse	1	PS/2	Un-Shielded	2m	Yes	No	N/A

Radiated Emissions Setup Photos:

8.7. SECTION 2.1055: FREQUENCY STABILITY

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Spectrum Analyzer RF Section	Hewlett Packard	8566b	210A01296	5/4/02
Display Spectrum Analyzer	Hewlett Packard	8566	3026A19146	6/28/02
Quasi Peak Detector	Hewlett Packard	6565QA	2811A01335	5/4/02

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	Peak	300 Hz	300 Hz

TEST SETUP

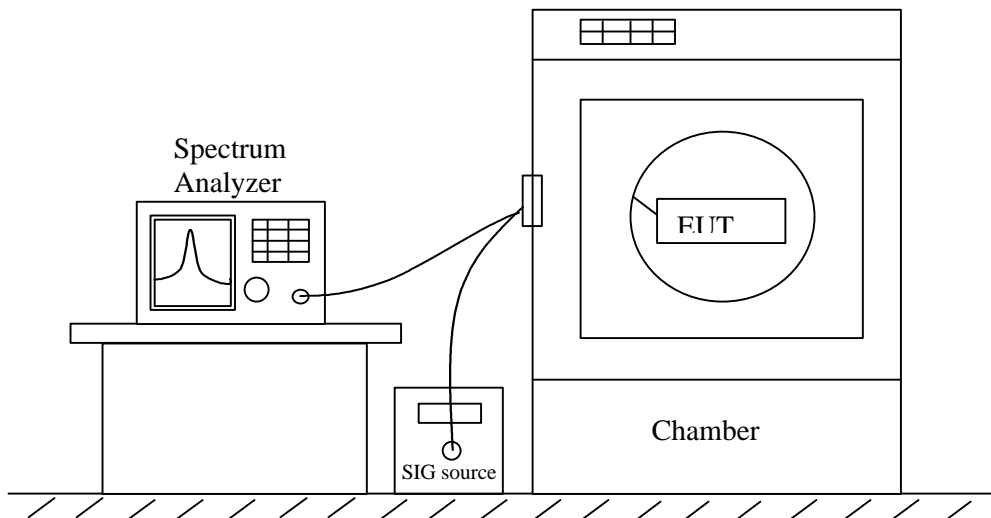


Fig. 3: Frequency Stability Setup

TEST PROCEDURE

- Frequency stability versus environmental temperature**

- 1). Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 20°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 20°C operating frequency as reference frequency.
- 2). Turn EUT off and set Chamber temperature to -30°C.
- 3). Allow sufficient time (approximately 20 to 30 minus after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
- 4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

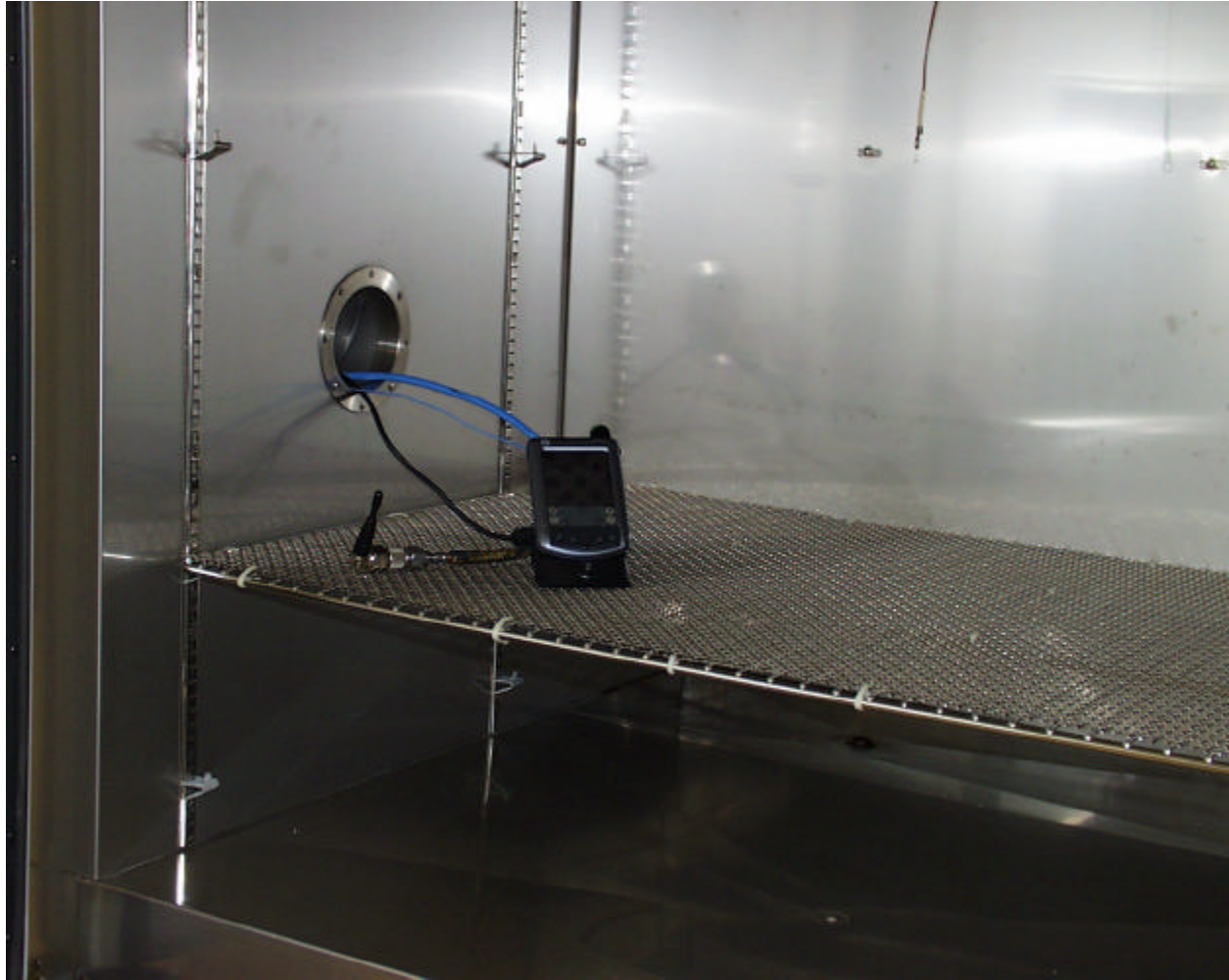
- **Frequency stability versus AC input voltage**

- 1). Setup the configuration per figure 6 and set chamber temperature to 25°C. Use a variable AC power supply to power the EUT and set AC output voltage to EUT nominal input AC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
- 2). Slowly reduce the EUT input voltage to specified extreme voltage variation and record the maximum frequency change.

RESULT: Complies.

Compliance Certification ServicesFrequency Stability
24.235PALM i710
GSM 1900 Single modulation cell phone5/3/02
safty Room
Jerry Hovey
Report#:02U1278-1

Reference Frequency: GSM Mid Channel 1880MHz @ 25? C				
Limit: to stay ± 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (? C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.95	50	1879.9997	-0.160	± 2.5
3.95	40	1879.9998	-0.133	± 2.5
3.95	30	1879.9996	-0.202	± 2.5
3.95	25	1880.0000	0	± 2.5
3.95	20	1879.9998	-0.093	± 2.5
3.95	10	1879.9998	-0.081	± 2.5
3.95	0	1880.0005	0.239	± 2.5
3.95	-10	1880.0005	0.266	± 2.5
3.95	-20	1880.0004	0.213	± 2.5
3.95	-30	1880.0006	0.319	± 2.5
3.40	25	1879.9996	-0.213	± 2.5
4.54	25	1879.9998	-0.106	± 2.5
3.4 (End Point)	25	1879.9996	-0.213	± 2.5

Frequency Stability Setup Photo

8.8. SECTION 15.207: CONDUCTED EMISSIONS:

Conducted Emission Test Procedures:

The EUT was setup and located so that the distance between the boundary of the EUT and the closest surface to the LISN was 0.8m or more.

EUT test configuration was according to Section 7 of ANSI C63.4/1992.

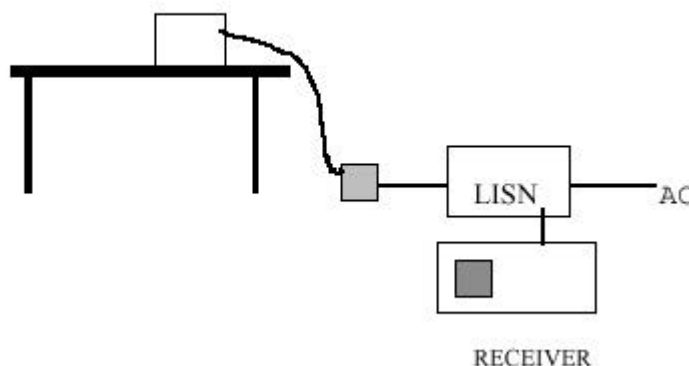
Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz was investigated.

The EMI receiver was set to PEAK detector setting, and swept continuously over the frequency range to be investigated. The resolution bandwidth was set to 10kHz minimum. The EMI receiver input cable was connected to LINE 1 RF measurement connection on the LISN. A 50ohm terminator was connected to the unused RF port on the LISN. For each mode of EUT operation, emissions readings were maximized by manipulating cable and wire positions. The configuration for each EUT power cord which produced emissions closest to the limit was recorded. The same procedure was repeated for LINE 2 of each EUT power cord.

Instrument Settings:

Frequency Range	Peak	Quasi-Peak	Average
0.45 – 30 MHz	10 kHz	10 kHz	10 Hz

Measurement Instrument Configuration:



CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	OP (dBuV)	AV (dBuV)	(dB)	OP	AV	OP (dB)	AV (dB)	L1 / L2
10.95	17.31	--	--	0.00	48.00	--	-30.69	--	L1
16.46	20.06	--	--	0.00	48.00	--	-27.94	--	L1
24.01	31.58	--	--	0.00	48.00	--	-16.42	--	L1
24.01	30.67	--	--	0.00	48.00	--	-17.33	--	L2
27.12	19.31	--	--	0.00	48.00	--	-28.69	--	L2
28.77	25.71	--	--	0.00	48.00	--	-22.29	--	L2
6 Worst Data									

AC/DC Adapter # 1

MEI International, P/N: MADA - 3025 - PS, S/N: 0401

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	OP (dBuV)	AV (dBuV)	(dB)	OP	AV	OP (dB)	AV (dB)	L1 / L2
0.45	20.95	--	--	0.00	48.00	--	-27.05	--	L1
20.99	19.28	--	--	0.00	48.00	--	-28.72	--	L1
24.01	28.33	--	--	0.00	48.00	--	-19.67	--	L1
11.18	32.57	--	--	0.00	48.00	--	-15.43	--	L2
13.56	45.03	--	--	0.00	48.00	--	-2.97	--	L2
24.01	29.60	--	--	0.00	48.00	--	-18.40	--	L2
6 Worst Data									

AC/DC Adapter # 2

Motorola, Model: R410510, S/N: 0007

Conducted Emissions Setup Photos:**END OF REPORT**