

## **Electromagnetic Compatibility Test Report**

**Test Report No: ODF 140805**

**Issued on: August 14, 2005**

**Product Name**

**Eye Ball R1**

**FCC ID: TII-EBR1**

**Tested According to  
47 CFR, Part 15, Subpart C**

**Tests Performed for  
ODF Optronics Ltd.**

65 Ygal Alon St. Toyota Tower, Tel Aviv 67443, Israel  
Tel.: 03-6255870

***QualiTech EMC Laboratory***

30 Hasivim St,  
Petah-Tikva, 49130, Israel  
Tel: 972-3-926 8443  
Fax: 972-3-928 7490



1633.01

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## Test personnel



Tests Performed By: -----

Rami Nataf

Ilya Arbitman



Report Prepared By: -----

Bina Talkar



Report Reviewed By: -----

Y. Zucker  
QA and Lab. Manager  
QualiTech EMC Laboratory



1633.01

## **Test Report details:**

Test commencement date: 17.07.2005  
Test completion date: 04.07.2005  
Customer's Representative: Vitaly Korakoz  
Issued on: **14.08.2005**

## **Assessment information:**

This report contains an assessment of the EUT against Electromagnetic Compatibility based upon tests carried out on the samples submitted. The results contained in this report relate only to the items tested. Manufactured products will not necessarily give identical results due to production and measurement tolerances. QualiTech, EMC Lab does not assume responsibility for any conclusion and generalization drawn from the test results with regards to other specimens or samples of type of the equipment represented by test item.

The EUT was set up and exercised using the configuration, modes of operation and arrangements defined in this report only.

## **Modifications:**

### **Modifications made to the EUT**

Ferrite bead on DC line, two turns - Fair-Rite P/N:-0443164151

### **Modifications made to the Test Standard**

No modifications were made to the Test Standard.

## Summary of Compliance Status

Test Spec. Clause	Test Case	Remarks	Notes
§15.203	Antenna Connector requirement	N/A	<i>An integral antenna used</i>
§15.247 (a) (2)	Minimum 6 dB bandwidth shall be at least 500kHz.	Pass	-
§15.247 (b) (3)	Maximum Peak Conducted Output Power	Pass	-
§15.247 (d)	Band-Edge compliance of RF Conducted Emission (Transmitter)	Pass	-
§15.205	Band-Edge compliance of Radiated Emission, Restricted Bands	Pass	-
§15.247 (d)	Spurious Emission Conducted (Transmitter)	Pass	-
§15.247 (d)	Spurious Emission Radiated (Transmitter)	Pass	-
§15.207	Conducted Emission	Pass	-



1633.01

## ***Table of Content***

<b>1. GENERAL DESCRIPTION .....</b>	<b>6</b>
1.1. Description of the EUT system/test Item:.....	6
<i>Product name: EYE BALL R1 .....</i>	<i>6</i>
1.2. EUT Configuration .....	7
1.3. Method of Measurements .....	7
<b>2. TEST FACILITY &amp; UNCERTAINTY OF MEASUREMENT .....</b>	<b>8</b>
2.1. Accreditation/ Registration reference: .....	8
2.2. Test Facility description.....	8
2.3. Uncertainty of Measurement: .....	9
<b>3. REPORT OF MEASUREMENTS AND EXAMINATIONS.....</b>	<b>10</b>
3.1. Antenna Connector Requirements .....	10
3.2. Maximum Peak Conducted Output Power.....	11
3.3. Band-edge compliance of RF Conducted Emission .....	12
3.4. Band-edge compliance of Radiated Emission, restricted Bands.....	13
3.5. Spurious Emission- Conducted (Transmitter).....	14
3.6. Spurious Emission- Radiated (Transmitter).....	15
3.7. Conducted Emission .....	17
<b>4. APPENDIX .....</b>	<b>18</b>

## 1. General Description

### 1.1. Description of the EUT system/test Item:

**Product name:** EYE BALL R1

**S/N:** 001005

**P/N:** 010-R1BL1-04

**FCC ID:** TII-EBR1

**Description:**

The Eye Ball sensor is a hand-held durable ball, which contains a video camera, transmitter and additional electronic components. The ball can be thrown or rolled to a remote location. The ball self stabilizes and transmits live video and audio from its location to a remote display unit (PDU). Due to its unique structure, the ball can sustain shocks, which are the result of the throw. The ball also has an internal engine, which enables the ball to rotate and provide continuous scan of the scene around it.

**Maximum rated Power:** 2.41GHz-2.48GHz, 27dbm max.(500mWatt)

**H/W status:** Production\_Rev 02

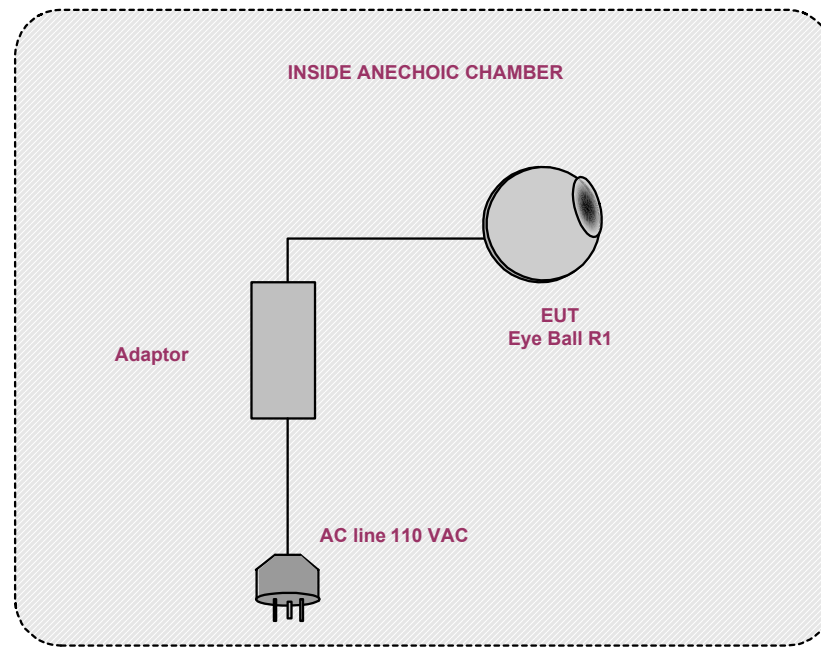
**S/W status:** Production\_Rev 2.0

**Antenna:** Internal Omnidirectional Antenna  
Freq.Range: 2.4 – 2.5GHz  
Polarization: linear  
Gain: 2dbi  
Nominal Impedance: 50ohm  
VSWR: < 2.0:1

**Power-Supply:** Internal:LI-ION Rechargeable Battery Pack:7.4Vdc, 1100 mAh  
External: LI-ION Batteries Charger: 0.9 Ah

**Temp. Range:** -30°C to +50°C

## 1.2. EUT Configuration



## 1.3. Method of Measurements

### Conducted measurements:

The RF output of the transmitter under test was directly connected to the input of the Spectrum analyzer through a specialized antenna connector provided by the manufacturer, and a 10dB attenuator. The measurements readings were corrected by the set-up loss.

### Radiated Emission measurements:

Measurements were performed at a 3-meter measurement distance in the semi-anechoic chamber in order to evaluate the radiated electromagnetic interference characteristics of the EUT. The EUT was placed on a non-metallic table, 0.8m above the turntable, was configured, arranged and operated in a manner consistent with typical application and load conditions. The test program of exercising the equipment ensured that various parts of the EUT were exercised to permit detection of all EUT disturbances. An appropriate antenna depending upon the frequency range, per ANSI C63.4-2003 clause 4.1.5 was used. While the turntable was being rotated, the height of the antenna was varied from 1 to 4m for the frequency range of 30MHz to 1GHz. The highest radiated emission was detected by manipulating the system cables to the worst-case position. This process was repeated for both antenna polarizations. The amplitudes of worst-case emission were measured with the detector modes and resolution bandwidths over various frequency ranges according to the requirements of C63.4-2003 clause 4.2.

## 2. Test Facility & Uncertainty of Measurement

### 2.1. Accreditation/ Registration reference:

- A2LA Certificate Number: 1633.01
- FCC Registration Number: 102724

### 2.2. Test Facility description

The tests were performed at the QualiTech EMC Laboratory.

**Address:** 30, Hasivim St., Petah Tikva, Israel.  
Tel: 972-3-926-8443

### 3m Anechoic Chamber:

The 3m-screened chamber is used in two configurations: the semi-anechoic configuration for Radiated Emission measurements and the full-anechoic configuration for Radiated Immunity tests.

#### Semi Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	9.5m x 6.5m x 5.2m
Antenna height	1 - 4m
Shielding Effectiveness	Magnetic field $\geq 80\text{dB}$ at 15 kHz $\geq 90\text{dB}$ at 100 kHz Electric field $> 120\text{dB}$ from 1MHz to 1GHz $> 110\text{dB}$ from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls
Normalized Site Attenuation measured at 5 positions	$\pm 3.49\text{dB}$ , 30MHz to 1GHz
Transmission Loss measured at 5 positions, at 1.5m height	$\pm 3\text{dB}$ , 1GHz to 18GHz



### 2.3. Uncertainty of Measurement:

Test Name	Test Method & Range	Uncertainty	
		Combined std. Uc(y)	Expanded U
<b>Radiated Emission</b>	30MHz÷230MHz, Horiz. polar.	[dB] 1.8	[dB] 3.6
	30MHz÷230MHz, Ver. polar.	1.967	3.934
	230MHz÷1000MHz, Horiz. polar.	1.487	2.973
	230MHz÷1000MHz, Vert. polar.	1.499	2.998
<b>Conducted Emission</b>	9 kHz÷150 kHz	[dB] 1.378	[dB] 2.756
	150 kHz÷30MHz	1.095	2.190

### 3. Report of Measurements and examinations

#### 3.1. Antenna Connector Requirements

Reference document:	<b>47 CFR §15.203</b>	
Test Requirements:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with provisions of this section.	
Test Result:	An Integral Antenna is used.	<b>N/A</b>

#### 3.2. Minimum 6 dB bandwidth

Reference document:	<b>47 CFR §15.247 (a) (2)</b>		
Test Requirements:	Minimum 6 dB bandwidth shall be at least 500 kHz.		
Date of Test:	17.07.2005	<b>Pass</b>	
Test setup:	Setup 1		
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 1 MHz, VBW: 1 MHz, Span: 10MHz		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 1 – Plot 3	

#### Test results:

Channel	Frequency [GHz]	6 dB BW [MHz]	Standard [MHz]	Reference	Result
Lowest	2.413	2.43	>0.5MHz	Plot 1	<b>Pass</b>
Middle	2.432	2.48	>0.5MHz	Plot 2	<b>Pass</b>
Highest	2.467	2.5	>0.5MHz	Plot 3	<b>Pass</b>

### 3.2. Maximum Peak Conducted Output Power

Reference document:	47 CFR §15.247 (b) (3)		
Test Requirements:	The maximum peak conducted output power shall not exceed 1Watt (30dBm)		
Date of Test:	17.07.2005	<b>Pass</b>	
Test setup:	Setup 1		
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 3 MHz, VBW: 3 MHz, Span: 10 MHz		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4 – Plot 6	

#### Test results:

Channel	Frequency [GHz]	External cable Loss [dB]	Max. Peak Output power* [dBm]	Max. Peak Output power* mW	Reference
Lowest	2.413	0.45	24.68	325.84	Plot 4
Middle	2.432	0.45	24.77	332.66	Plot 5
Highest	2.467	0.45	25.07	356.45	Plot 6

\*Corrected for external attenuations

### 3.3. Band-edge compliance of RF Conducted Emission

Reference document:	<b>47 CFR §15.247 (d)</b>		
Test Requirements and limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator <b>shall be at least 20 dB below that in the 100 kHz bandwidth within the band</b> that contains the highest level of the desired power, based on either an RF <b>conducted</b> or a radiated <b>measurement</b> . Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 5.205(c).		
Date of Test:	18.07.2005	<b>Pass</b>	
Test setup:	Setup 1		
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 100kHz,		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 7– Plot 8	

#### Test results:

Channel	Frequency [GHz]	Delta value [dB]	Reference
Lowest	2.413	-57.01	Plot 7
Highest	2.467	-54.97	Plot 8

### 3.4. Band-edge compliance of Radiated Emission, restricted Bands

Reference document:	<b>47 CFR §15.205</b>		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 Section 15.209(a) is not required. In addition, <b>radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a)</b> (See section 5.205(c).		
Limit:	54dBμV/m	<b>Pass</b>	
Date of Test:	23.07.2005		
Test setup:	Setup 1		
Operating conditions:	Under normal test conditions		
Method of testing:	Radiated		
S.A. Settings:	RBW: 1MHz, VBW: 3MHz,		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 9-Plot 12	

#### Test results:

Channel	Frequency [GHz]	Max. Measured in restricted band at 3m [dBμV/m]	Limit [dBμV/m]	Reference	Result
Lowest	2.413	40.98	54	Plot 9- Plot10	Pass
Highest	2.467	46.13	54	Plot 11- Plot12	Pass

### 3.5. Spurious Emission- Conducted (Transmitter)

Reference document:	<b>47 CFR §15.247 (d)</b>		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band <b>at least 20 dB below the highest level of the desired power</b> . 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))		
Date of Test:	18.07.2005	<b>Pass</b>	
Test setup:	Setup 1		
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 300kHz,		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 13 – Plot 15	

#### Test results:

Channel	Frequency [GHz]	Spurious Frequency [GHz]	Limit: Max. Allowed emission power	Delta spurious emission below frequency of operation [dBc]	Result	Reference
Lowest	2.413	7.239	-20dBc	-51.47	Pass	Plot 13
Middle	2.432	7.296		-51.66	Pass	Plot 14
Highest	2.467	7.401		-53.85	Pass	Plot 15

### 3.6. Spurious Emission- Radiated (Transmitter)

Reference document:	47 CFR §15.247 (d)		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band at least 20 dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the <b>radiated emission limits specified in §15.209(a)</b> (see §15.205(c))		
Date of Test:	19.07.2005	<b>Pass</b>	
Test setup:	Setup 2		
Operating conditions:	Under normal test conditions		
Method of testing:	Radiated		
S.A. Settings:	F <1GHz: RBW: 120kHz, VBW: 1MHz F >1GHz: RBW: 1MHz, VBW: 3MHz		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 16 – Plot 51	

## Test results

Lowest channel, 2.401					
Frequency [MHz]	Detector	Spurious level [dBμV/m]	Limit [dBμV/m]	Result	Reference
32.361800	QP	27.5	40	Pass	Plot 16 –Plot 27
41.905900	QP	29.3	40	Pass	
139.634602	QP	35.7	43.5	Pass	
143.371202	QP	37.3	43.5	Pass	
147.179902	QP	35.4	43.5	Pass	
4824.0000	AV	37.6	54	Pass	
7246.527284	AV	36.0	54	Pass	
9660.786034	AV	30.0	54	Pass	
12072.127284	AV	44.6	54	Pass	
14485.443534	AV	31.7	54	Pass	

Middle channel, 2.443					
Frequency [MHz]	Detector	Spurious level [dBμV/m]	Limit [dBμV/m]	Result	Reference
39.874600	QP	30.3	40	Pass	Plot 28 –Plot 39
64.779100	QP	33.2	40	Pass	
141.157702	QP	42.6	43.5	Pass	
142.431602	QP	42.8	43.5	Pass	
143.669602	QP	41.2	43.5	Pass	
4866.385000	AV	43.3	54	Pass	
7298.050000	AV	43.2	54	Pass	
9729.120000	AV	29.5	54	Pass	
12159.422500	AV	47.4	54	Pass	
14592.471250	AV	34.0	54	Pass	

Highest channel, 2.482					
Frequency [MHz]	Detector	Spurious level [dBμV/m]	Limit [dBμV/m]	Result	Reference
39.893900	QP	30.2	40	Pass	Plot 40–Plot 51
63.106200	QP	32.4	40	Pass	
64.778600	QP	31.1	40	Pass	
141.056300	QP	42.3	43.5	Pass	
142.314400	QP	42.6	43.5	Pass	
143.537600	QP	40.9	43.5	Pass	
4936.0000	AV	48.9	54	Pass	
7402.928469	AV	44.0	54	Pass	
9869.320969	AV	33.9	54	Pass	
12341.777219	AV	44.6	54	Pass	
14809.155969	AV	35.2	54	Pass	



### 3.7. Conducted Emission

Reference document:	<b>47 CFR §15.207</b>		
Test Requirements:	Emission Level shall not exceed §15.207 limits		
Date of Test:	26.01.2005	<b>Pass</b>	
Test setup:	Setup 3		
Operating conditions:	Under normal test conditions		
Method of testing:	Radiated		
S.A. Settings:	RBW: 9kHz, VBW: 30 kHz,		
Environment conditions:	Ambient Temperature: 21°C	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 52– Plot 53	

### Test results:

#### “Phase” Lead

Frequency [MHz]	Measured Result [dBμV]		Class B Limit [dBμV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.164832	50.9	40.1	65.22	55.22	-14.32	-15.12	Pass
0.24534	50.3	45.9	61.91	51.91	-11.61	-6.01	Pass
0.287782	43	34.9	60.59	50.59	-17.59	-15.69	Pass
0.776858	31.5	19	56.00	46.00	-24.50	-27.00	Pass
0.797053	32.4	14.3	56.00	46.00	-23.60	-31.70	Pass
19.74	35.2	19.6	60.00	50.00	-24.80	-30.40	Pass

#### “Neutral” Lead

Frequency [MHz]	Measured Result [dBμV]		Class B Limit [dBμV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.163259	52.7	39.9	65.30	55.30	-12.60	-15.40	Pass
0.244695	46.6	42	61.94	51.94	-15.34	-9.94	Pass
0.287628	38.9	33.6	60.59	50.59	-21.69	-16.99	Pass
0.451909	30.8	25	56.84	46.84	-26.04	-21.84	Pass
1.892498	21	5.4	56.00	46.00	-35.00	-40.60	Pass
29.489724	49.3	45	60.00	50.00	-10.70	-5.00	Pass

## 4. Appendix

### Appendix A: List of Measuring Equipment used:

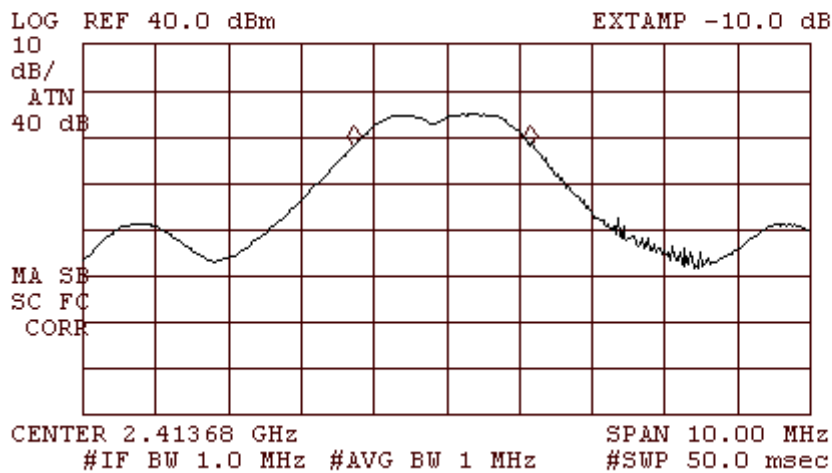
Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR16 EMI Receiver	HP8546A	3710A00392	30-06-06
Spectrum Analyzer 9kHz ÷ 22 GHz	HP 8593EM	3536A00131	30-06-06
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	30-06-06
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	01-01-06
Dual Ridged Guide Ant. 1-18 GHz	EMCO 3115	9602-4677	01-01-06
Antenna 15 GHz ÷ 40 GHz	BBHA 9170	BBHA9170214	01-01-06
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 – 200 MHz	Schwarzbeck VHBB9124	9124/0255	16-05-06
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	16-05-06
LNA Amplifier 18 GHz -26.5 GHz	MiTeq, AMF-5F-18002650-30-10P	945372	01-01-06
LISN	Fischer 50/250-25-2	-	30-06-06
Transient Limiter	HP11947A	-	30-06-06
Notch Filter	Micro-Tronics BRM50702-05	0001	01-01-06

## Appendix B: Plots

### Plot 1 Lowest

15:32:05 JUL 17, 2005  
/30

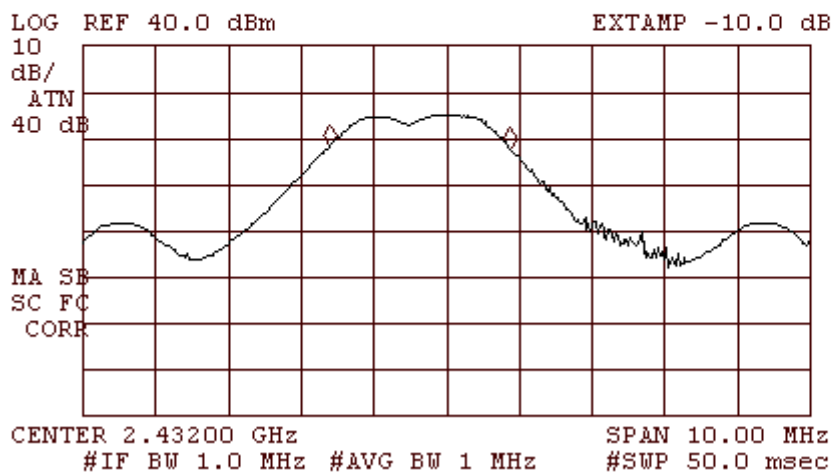
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.43 MHz  
-.06 dB



### Plot 2 Middle

15:37:07 JUL 17, 2005  
/30

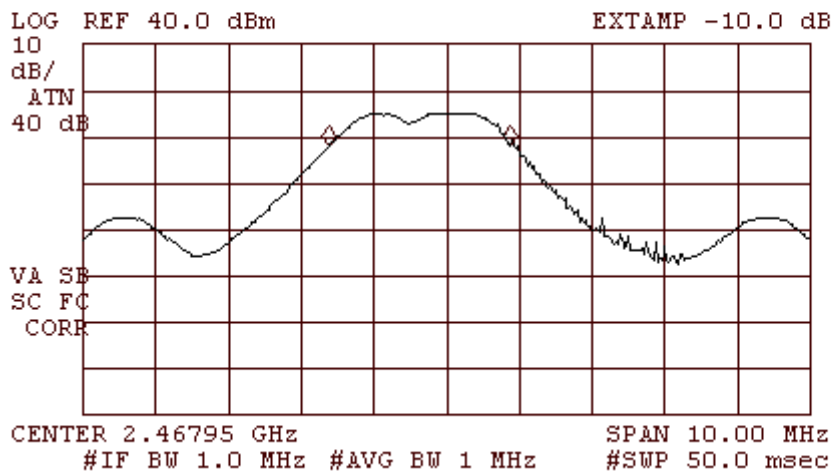
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.48 MHz  
-.65 dB



### Plot 3 Highest

15:40:35 JUL 17, 2005  
/30

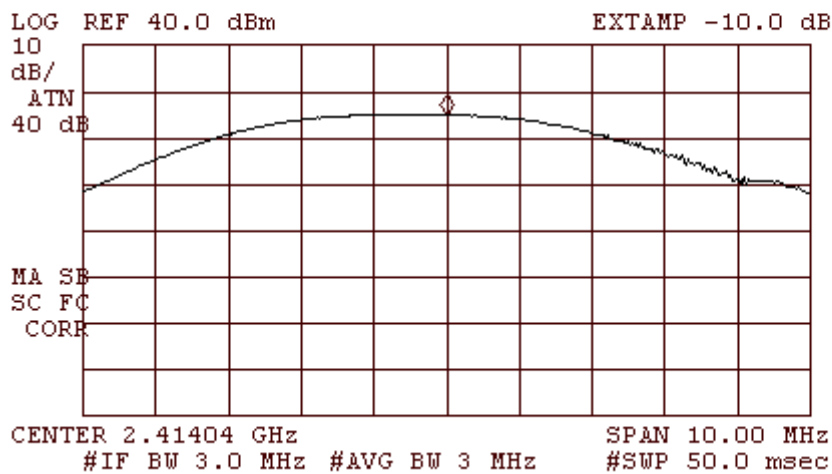
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.50 MHz  
.00 dB



### Plot 4 Lowest

16:26:57 JUL 17, 2005  
/30

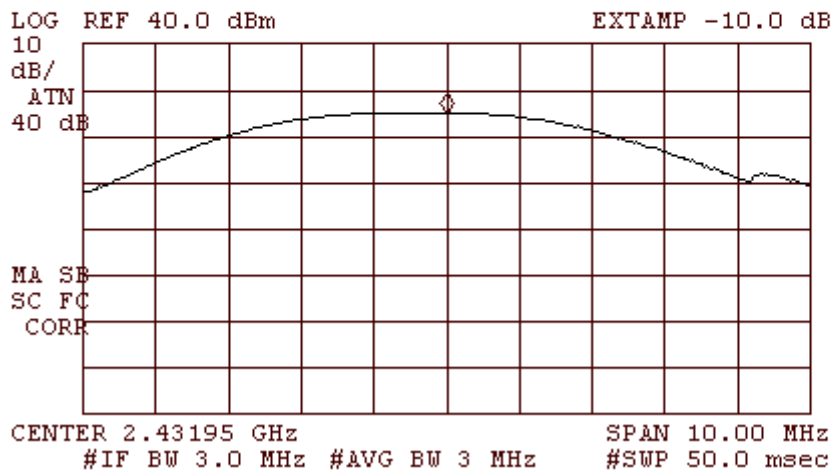
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.41404 GHz  
24.68 dBm



**Plot 5  
Middle**

16:36:22 JUL 17, 2005  
/30

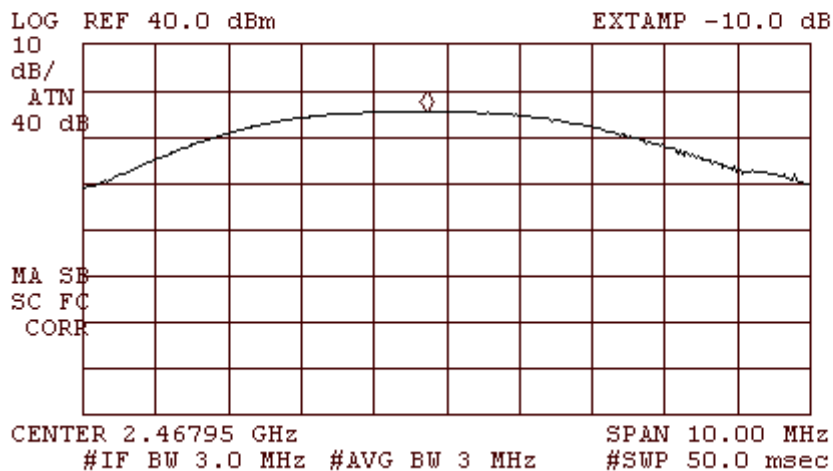
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.43195 GHz  
24.77 dBm



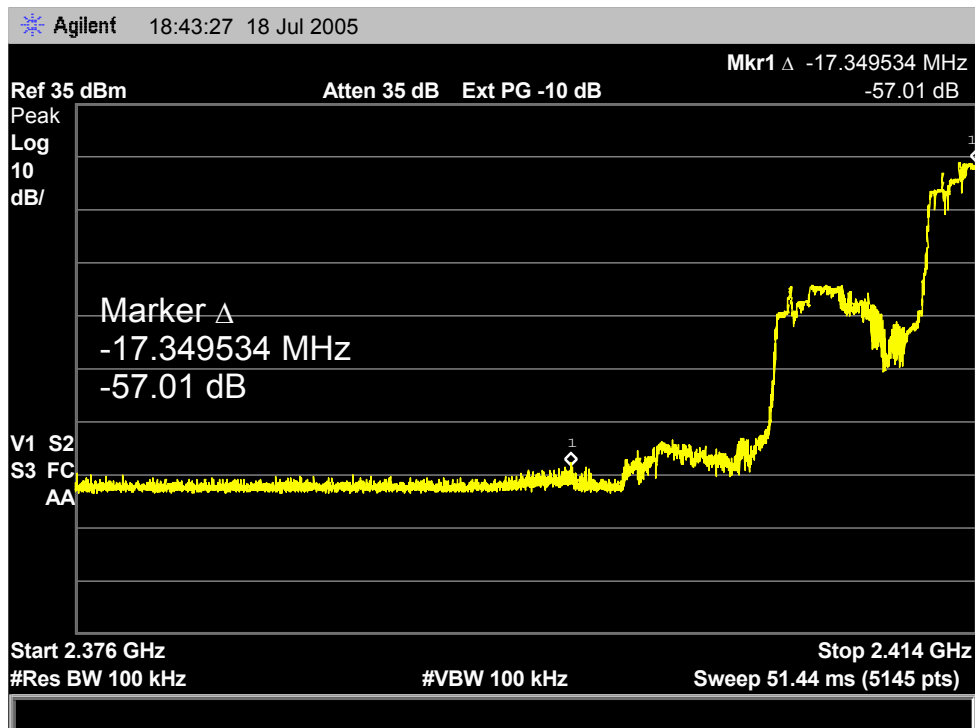
**Plot 6  
Highest**

15:57:55 JUL 17, 2005  
/30

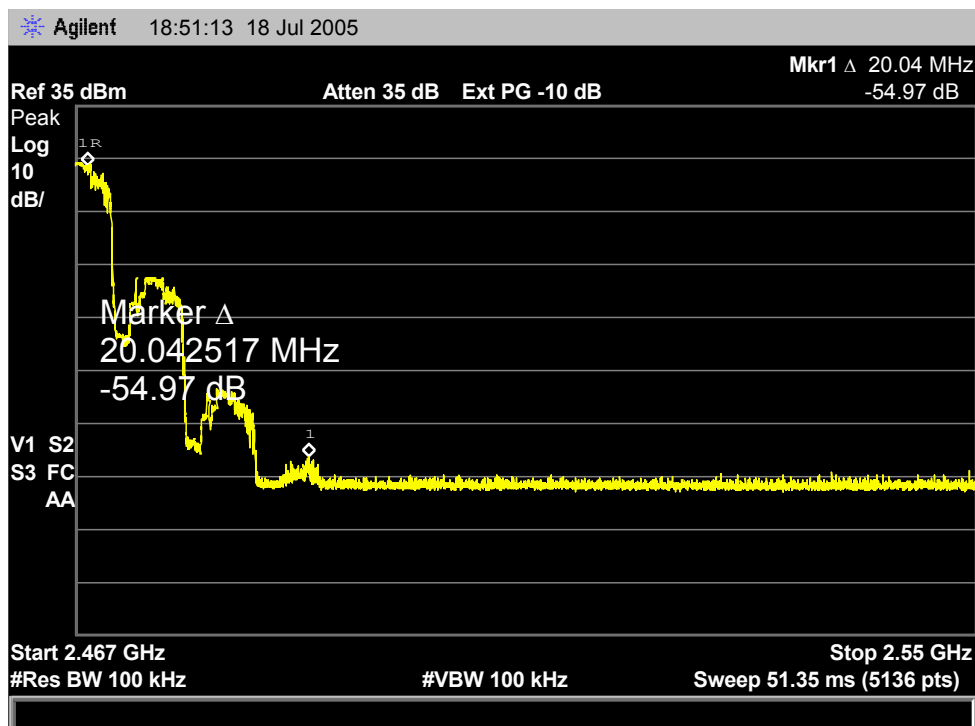
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.46768 GHz  
25.07 dBm



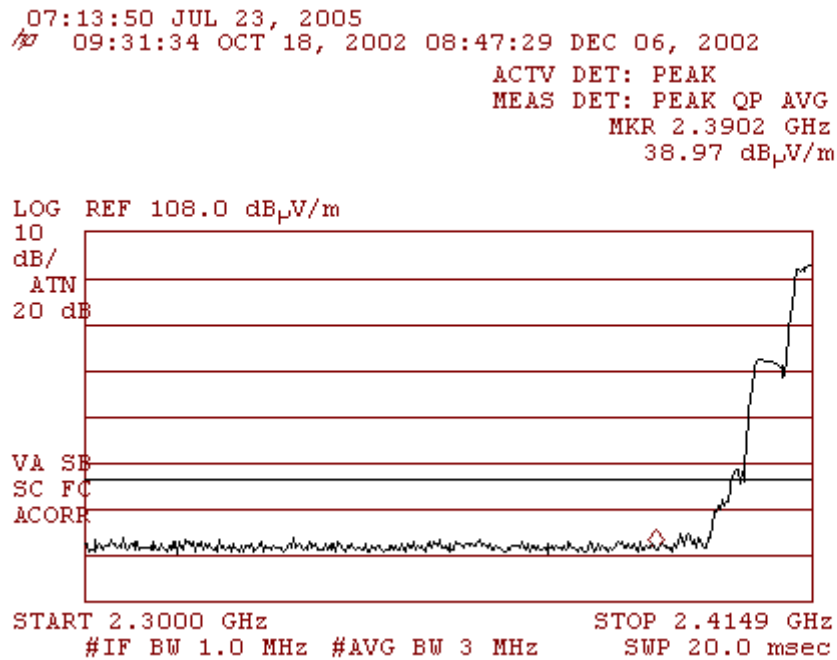
**Plot 7  
Lowest**



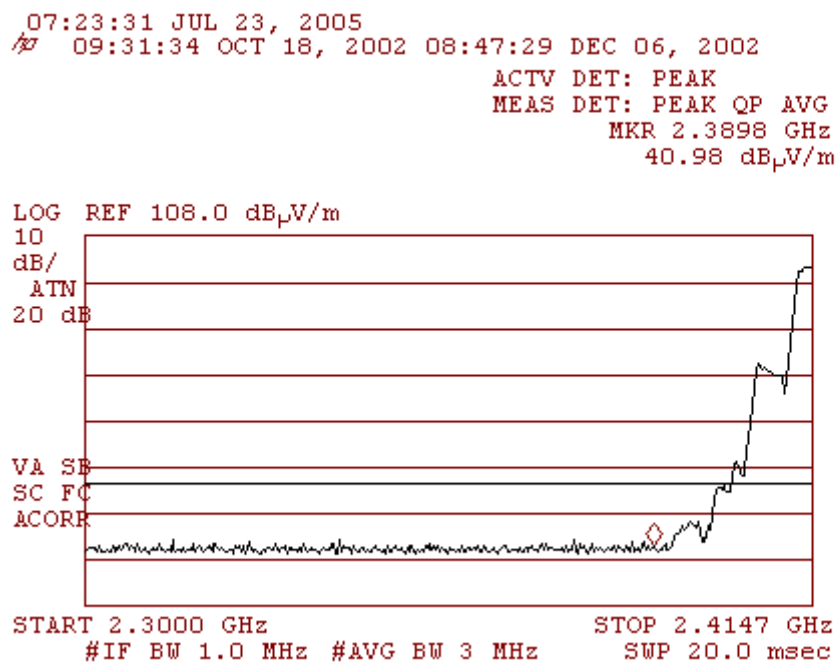
**Plot 8  
Highest**



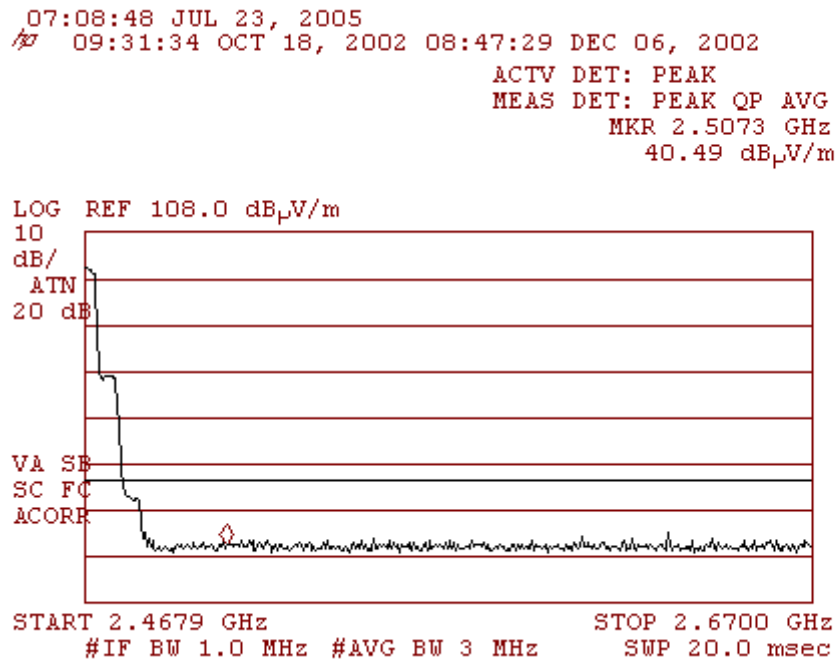
**Plot 9**  
**Lowest**  
**Horizontal polarization**



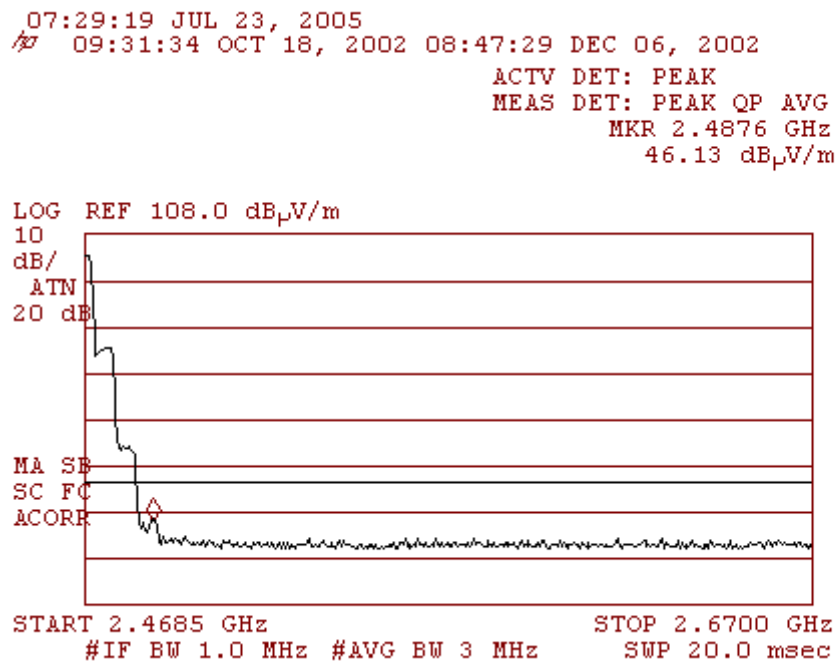
**Plot 10**  
**Lowest**  
**Vertical polarization**



**Plot 11  
Highest  
Horizontal Polarization**

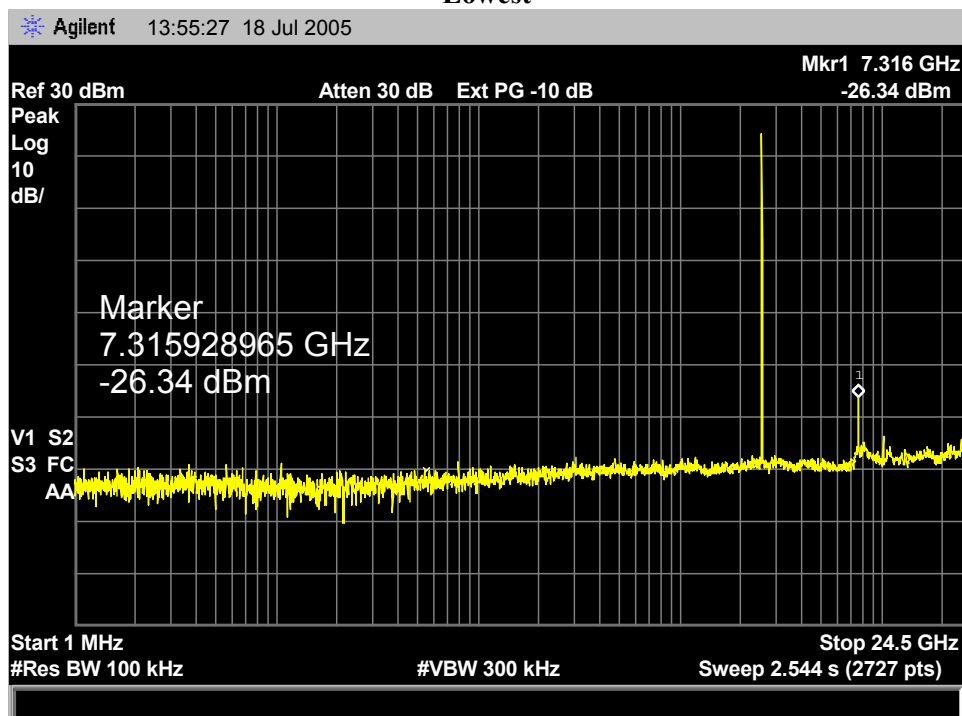


**Plot 12  
Highest  
Vertical Polarization**

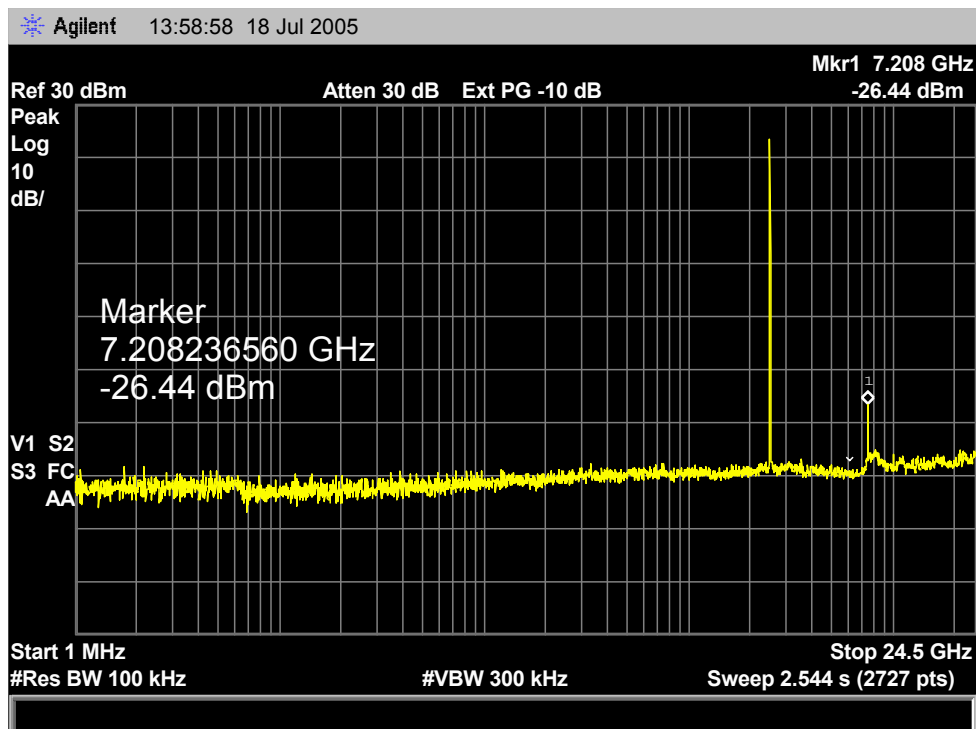




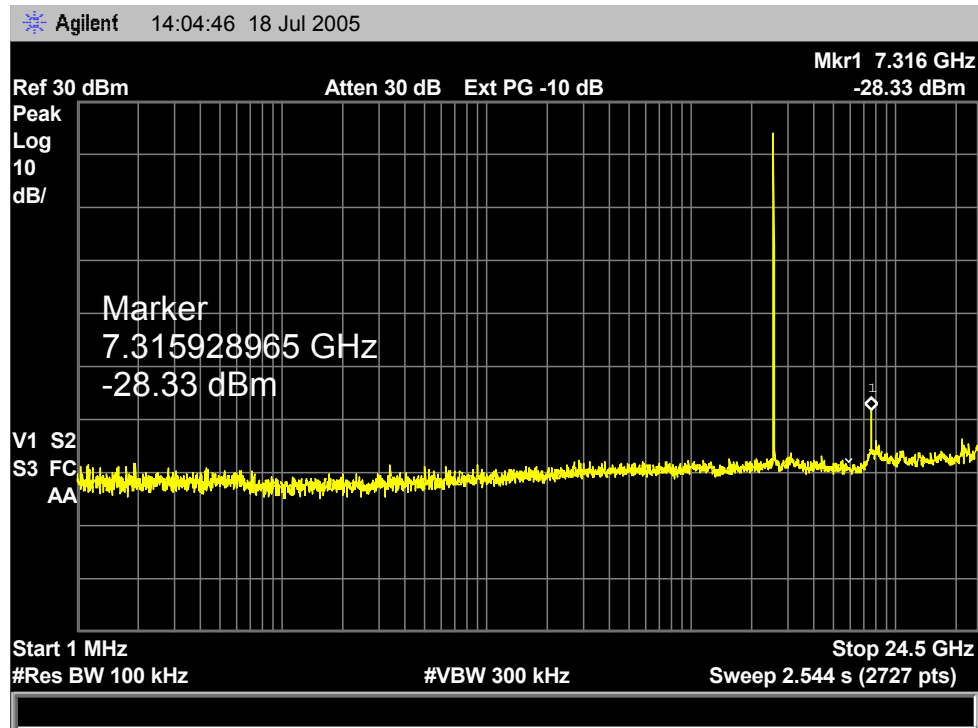
**Plot 13**  
**Lowest**



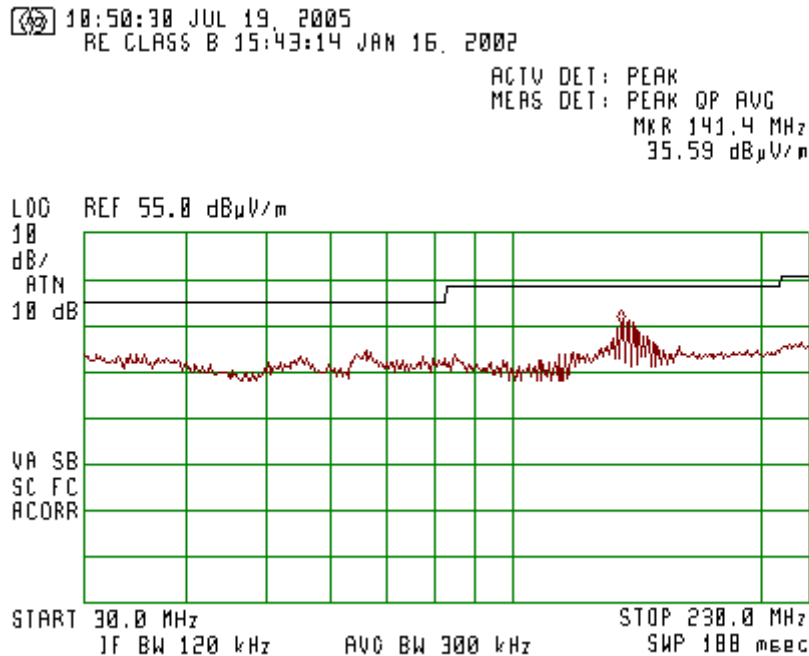
**Plot 14**  
**Middle**



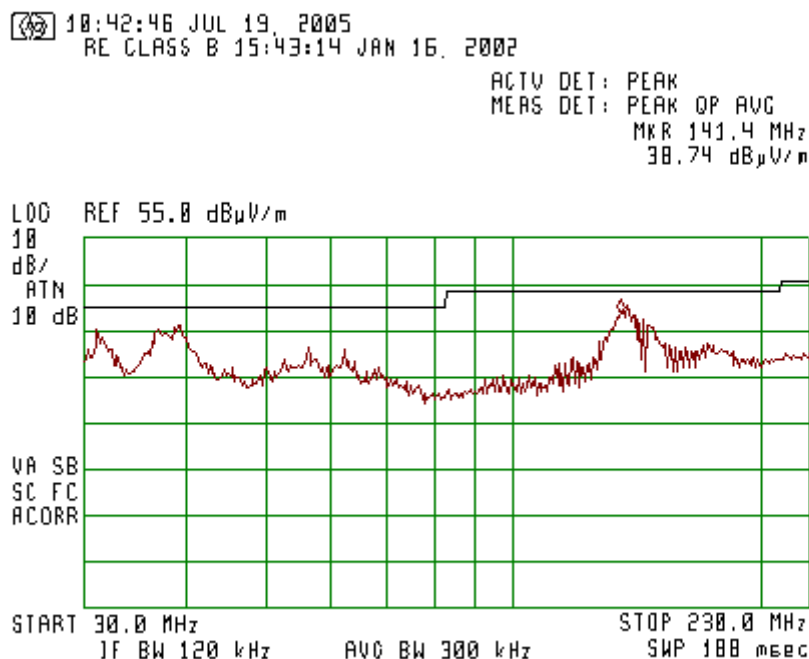
**Plot 15**  
**Highest**



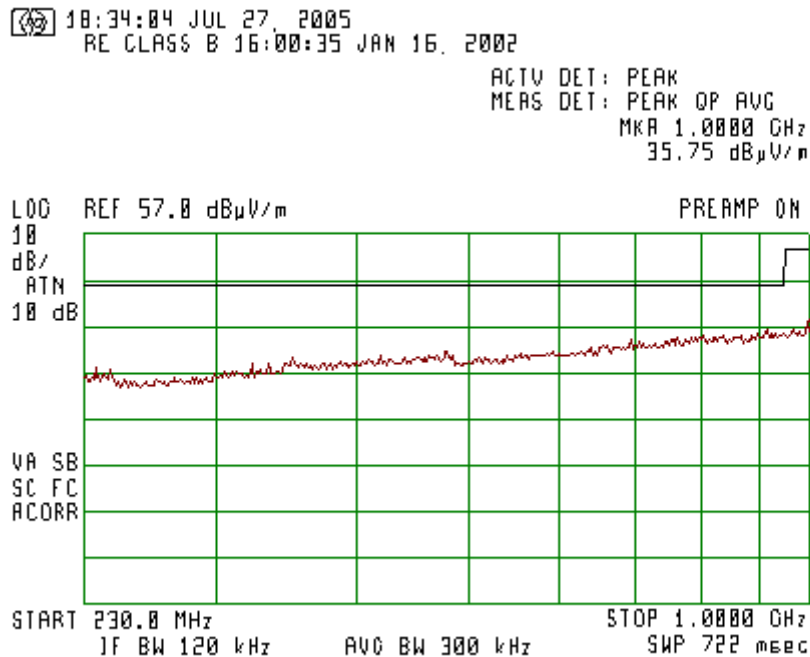
**Plot 16**  
**Lowest**  
**Horizontal Polarization**



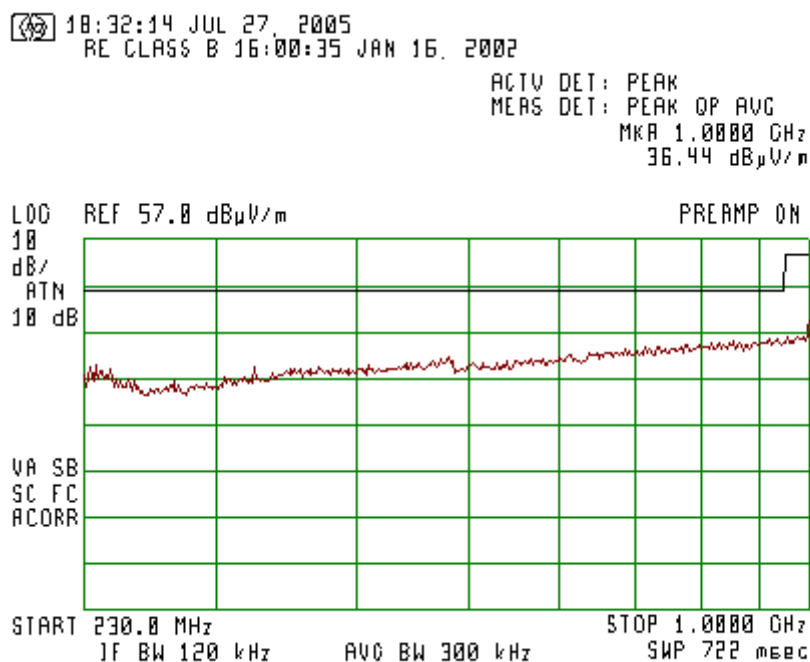
**Plot 17**  
**Lowest**  
**Vertical Polarization**



**Plot 18**  
**Lowest**  
**Horizontal Polarization**



**Plot 19**  
**Lowest**  
**Vertical Polarization**

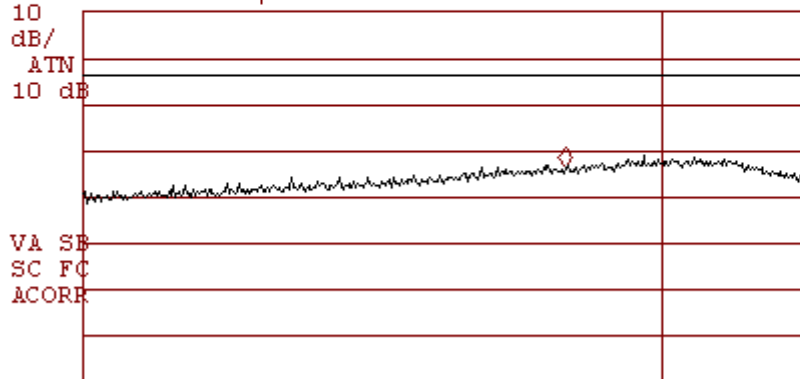


**Plot 20**  
**Lowest**  
**Horizontal Polarization**

09:08:34 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.819 GHz  
34.10 dB $\mu$ V/m

LOG REF 68.0 dB $\mu$ V/m



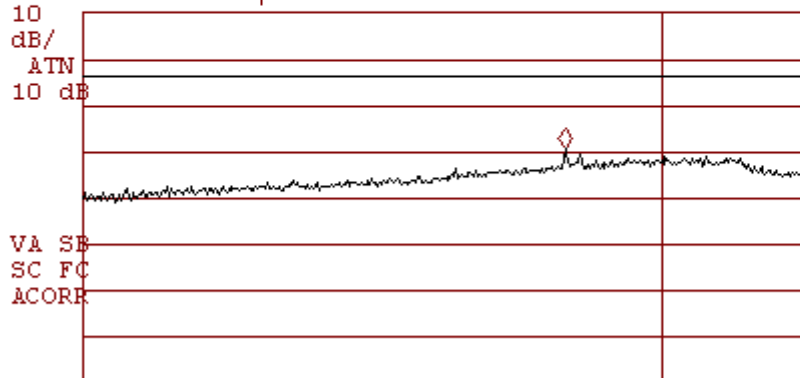
START 1.000 GHz STOP 2.390 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 40.0 msec

**Plot 21**  
**Lowest**  
**Vertical Polarization**

09:05:10 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.819 GHz  
38.27 dB $\mu$ V/m

LOG REF 68.0 dB $\mu$ V/m



START 1.000 GHz STOP 2.390 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 40.0 msec

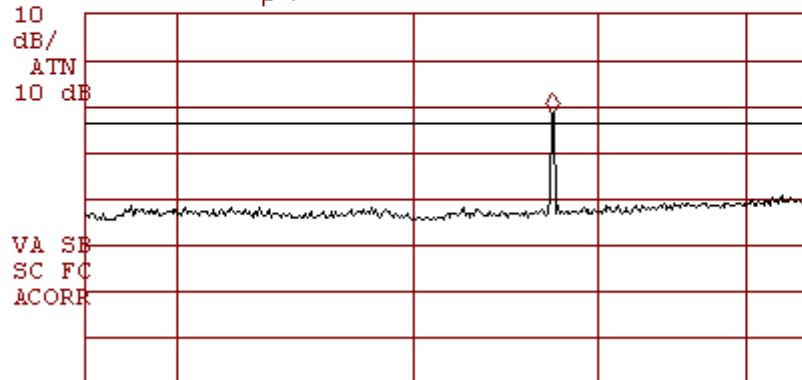
**Plot 22**  
**Lowest**  
**Horizontal Polarization**

09:34:58 JUL 26, 2005

*fpo*

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 4.831 GHz  
56.23 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m



START 2.679 GHz STOP 6.500 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 76.4 msec

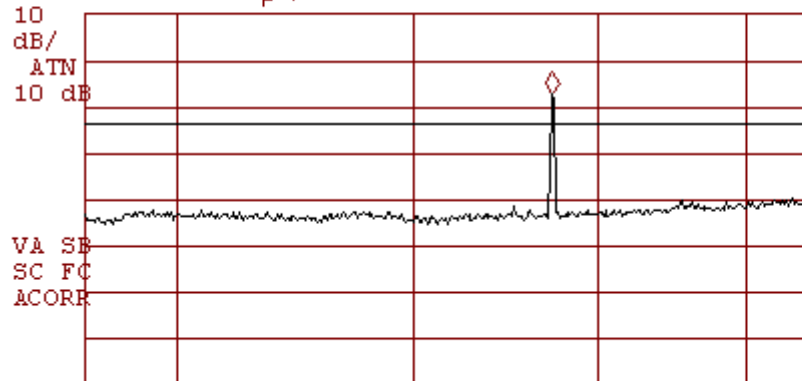
**Plot 23**  
**Lowest**  
**Vertical Polarization**

09:30:22 JUL 26, 2005

*fpo*

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 4.831 GHz  
60.75 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m



START 2.679 GHz STOP 6.500 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 76.4 msec

**Plot 24**  
**Lowest**  
**Horizontal Polarization**

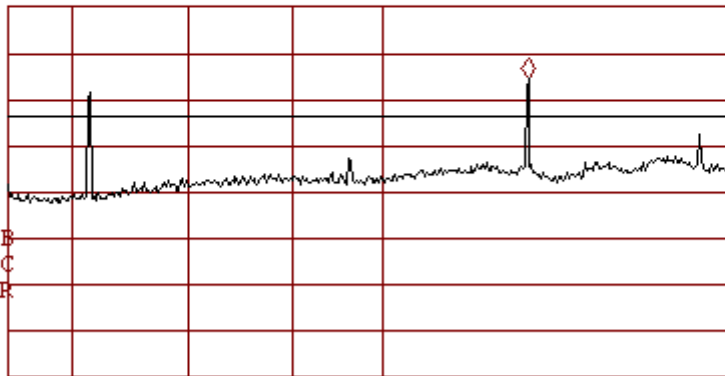
09:50:30 JUL 26, 2005  
/go

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.074 GHz  
62.26 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



START 6.500 GHz

STOP 15.000 GHz

#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 190 msec

**Plot 25**  
**Lowest**  
**Vertical Polarization**

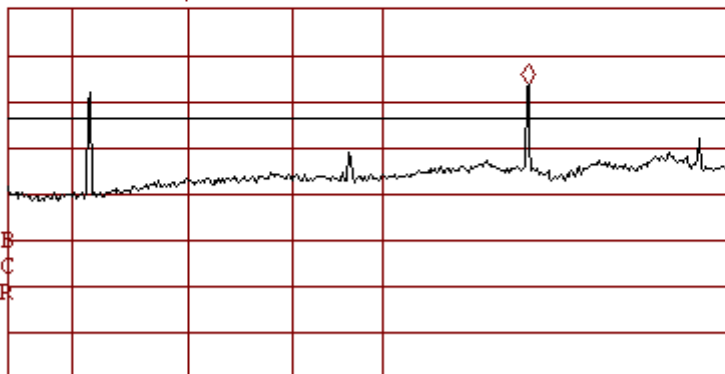
10:04:32 JUL 26, 2005  
/go

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.074 GHz  
61.43 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



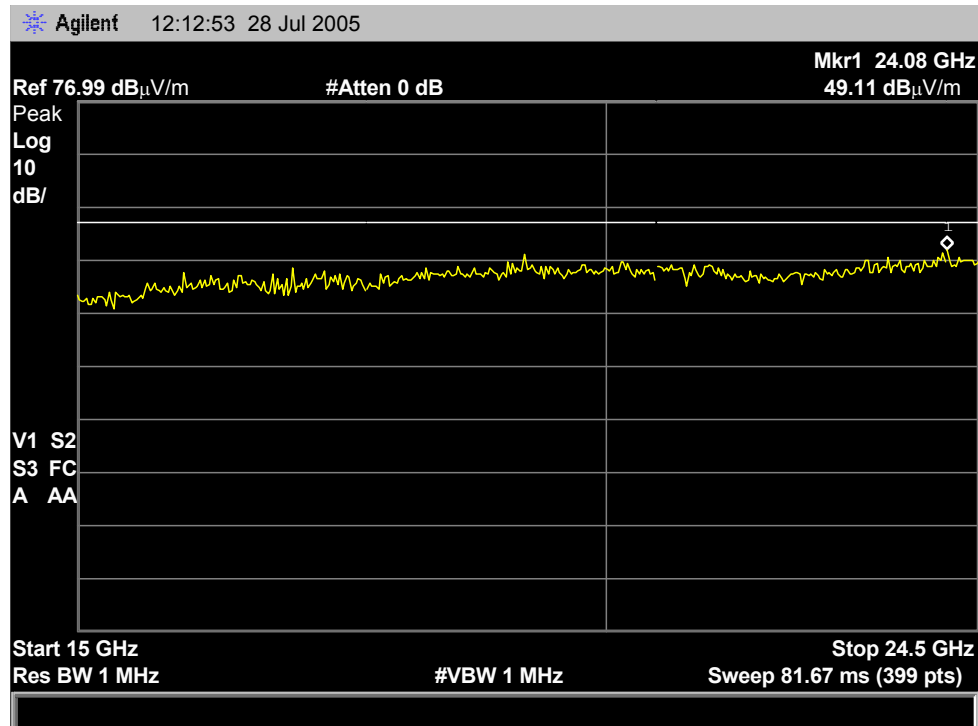
START 6.500 GHz

STOP 15.000 GHz

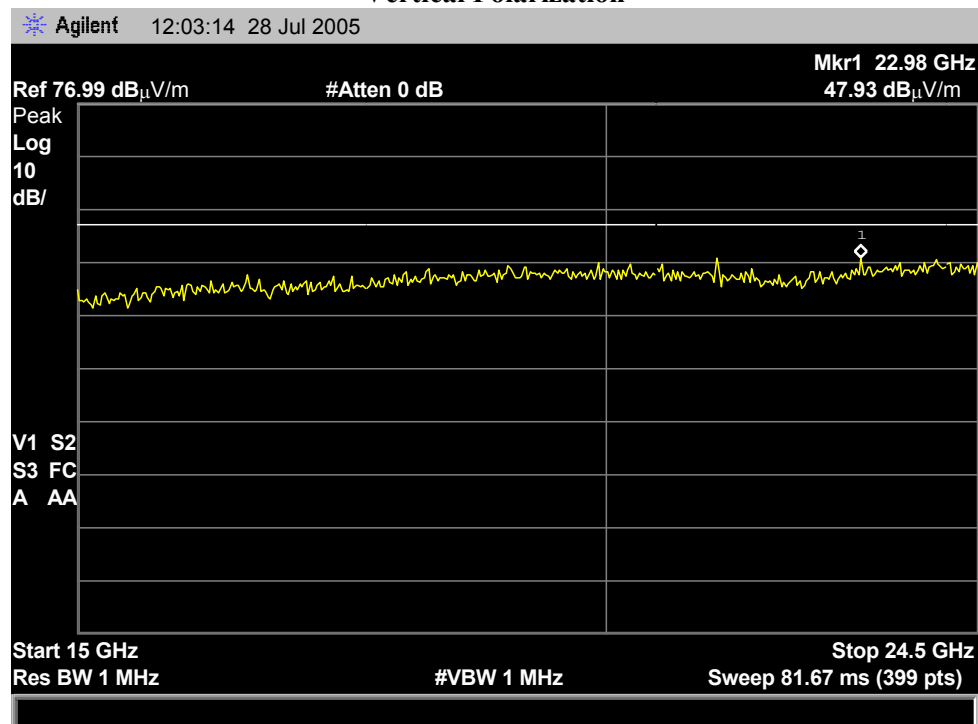
#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 190 msec

**Plot 26**  
**Lowest**  
**Horizontal Polarization**

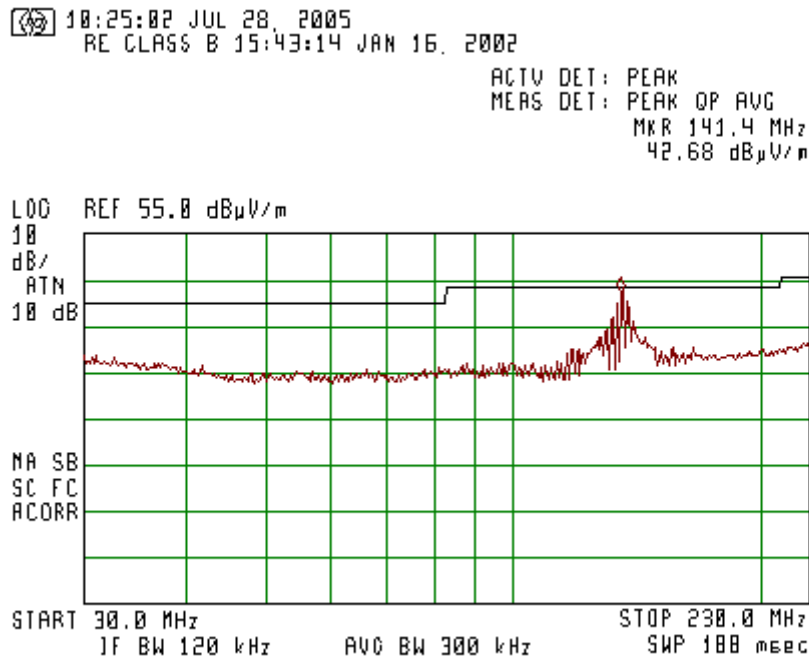


**Plot 27**  
**Lowest**  
**Vertical Polarization**

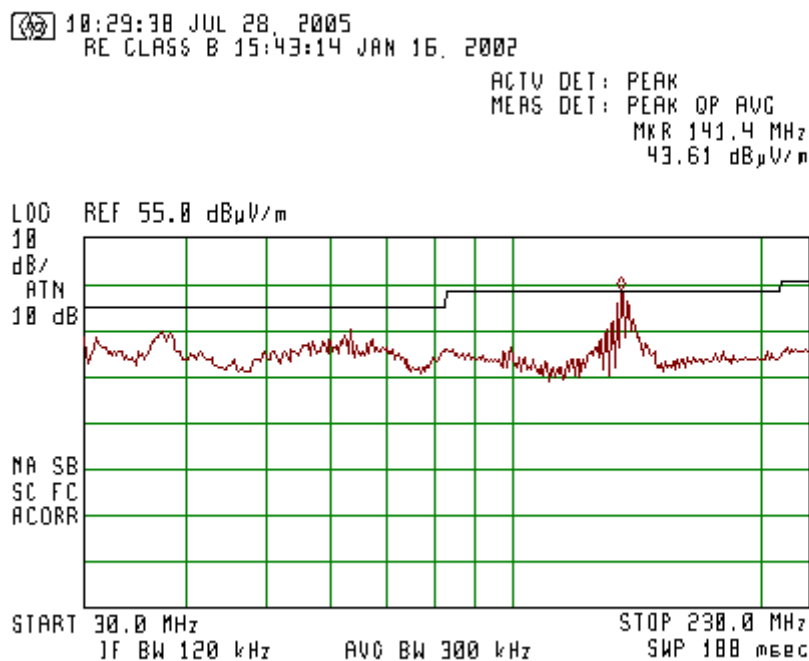




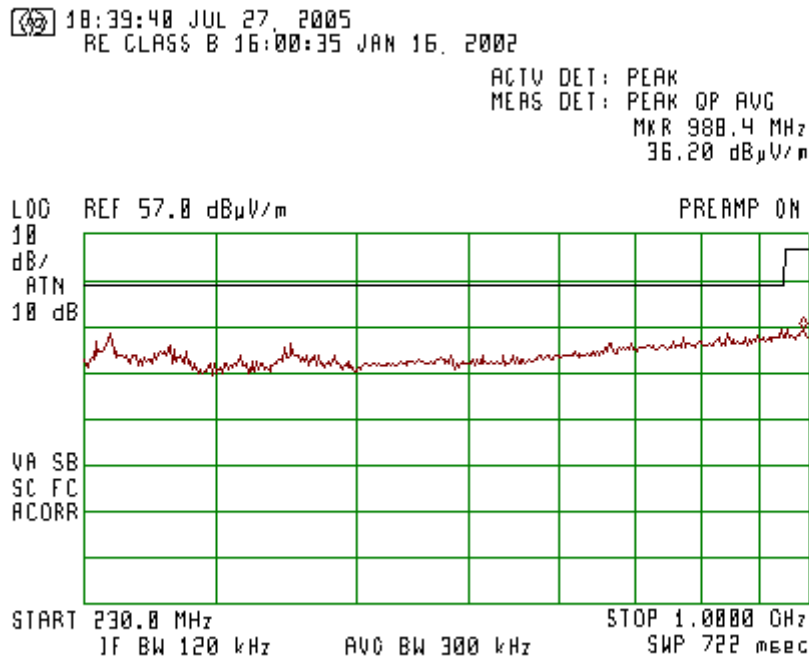
**Plot 28**  
**Middle**  
**Horizontal Polarization**



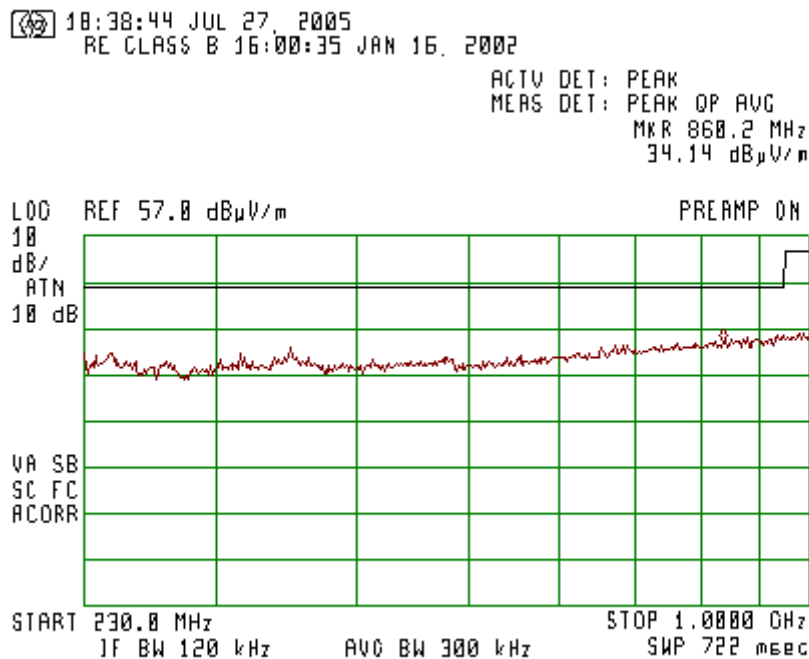
**Plot 29**  
**Middle**  
**Vertical Polarization**



**Plot 30**  
**Middle**  
**Horizontal Polarization**



**Plot 31**  
**Middle**  
**Vertical Polarization**



**Plot 32**  
**Middle**  
**Horizontal Polarization**

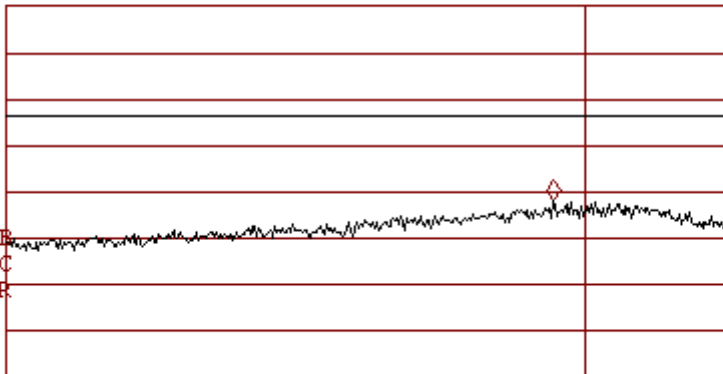
11:28:51 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.971 GHz  
35.89 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SE  
SC FC  
ACORR



START 1.000 GHz STOP 2.390 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 40.0 msec

**Plot 33**  
**Middle**  
**Vertical Polarization**

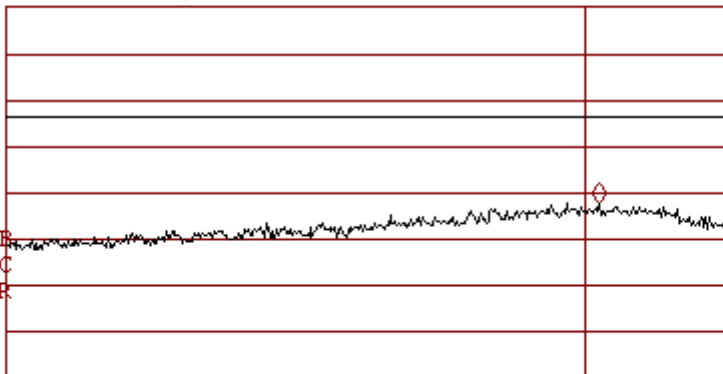
11:32:14 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.077 GHz  
35.30 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

MA SE  
SC FC  
ACORR



START 1.000 GHz STOP 2.390 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 40.0 msec

**Plot 34  
Middle  
Horizontal Polarization**

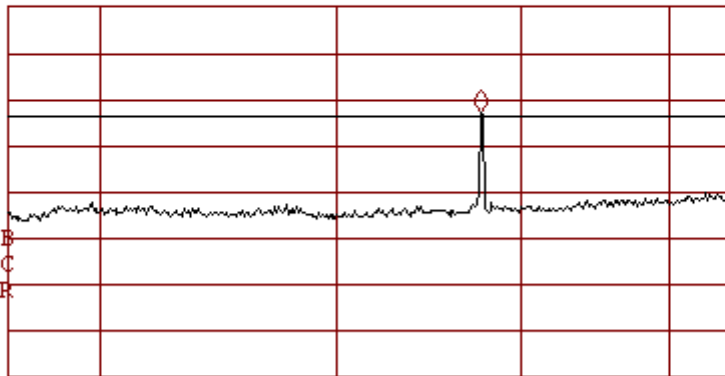
11:34:05 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 4.866 GHz  
55.18 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



START 2.679 GHz

STOP 6.500 GHz

#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 76.4 msec

**Plot 35  
Middle  
Vertical Polarization**

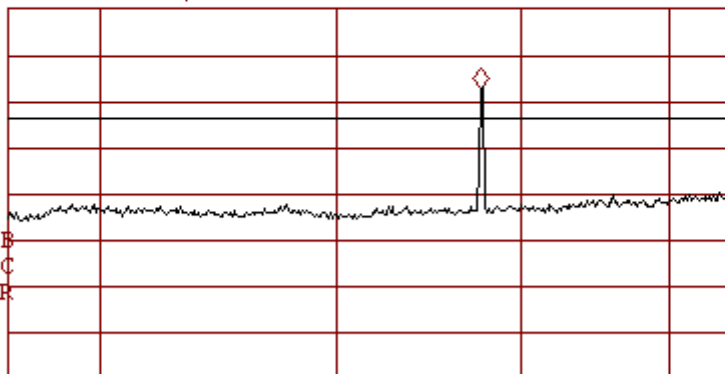
11:42:14 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 4.866 GHz  
60.64 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



START 2.679 GHz

STOP 6.500 GHz

#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 76.4 msec

**Plot 36**  
**Middle**  
**Horizontal Polarization**

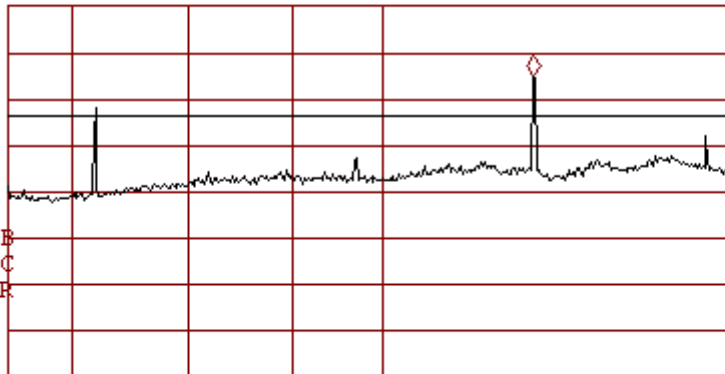
12:20:27 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.151 GHz  
62.56 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



START 6.500 GHz

STOP 15.000 GHz

#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 190 msec

**Plot 37**  
**Middle**  
**Vertical Polarization**

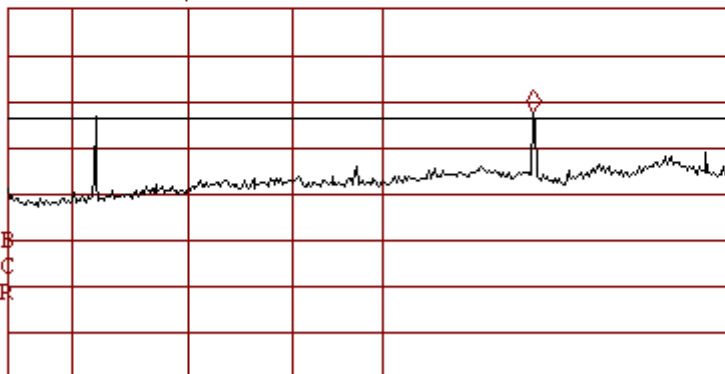
12:14:20 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.151 GHz  
55.60 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



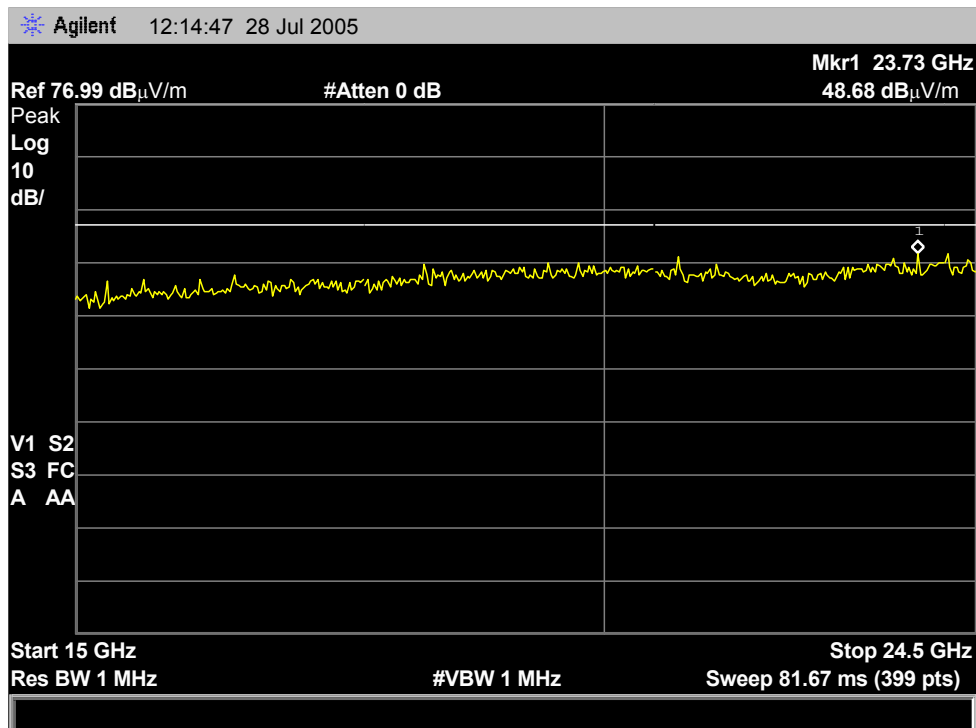
START 6.500 GHz

STOP 15.000 GHz

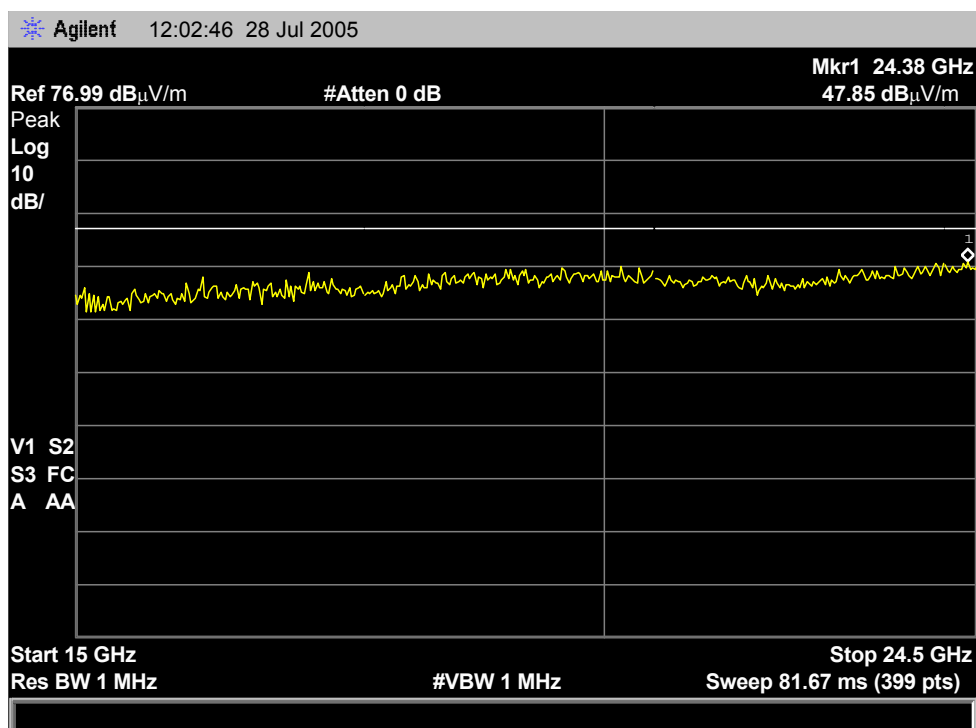
#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 190 msec

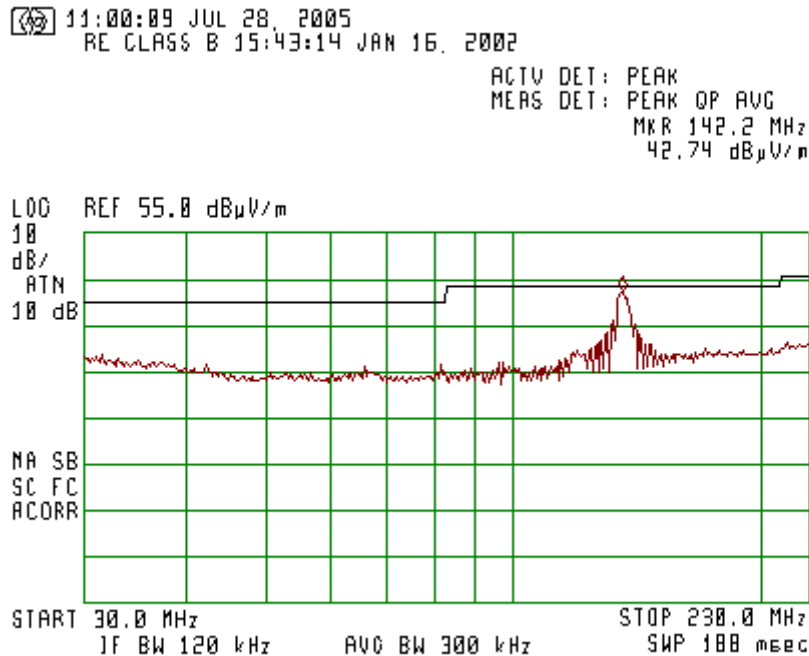
**Plot 38**  
**Middle**  
**Horizontal Polarization**



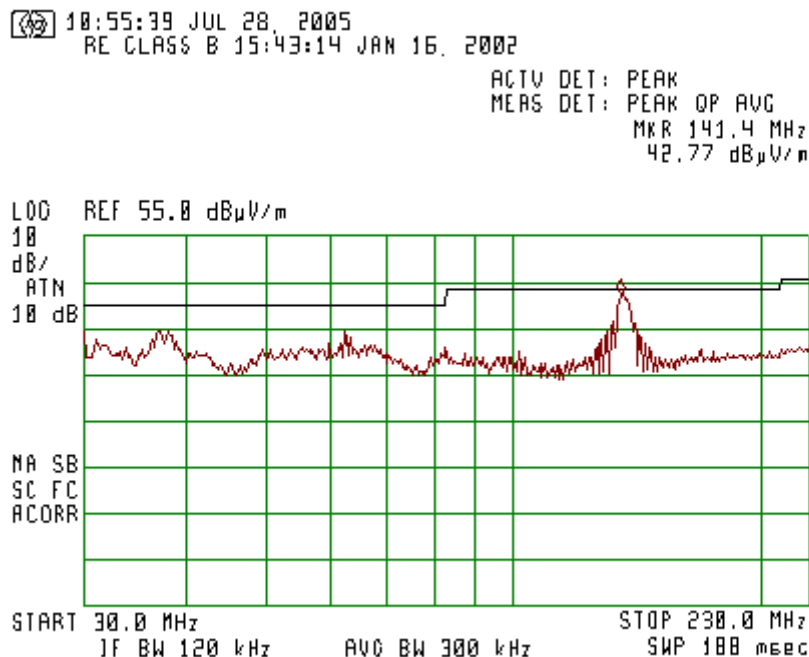
**Plot 39**  
**Middle**  
**Vertical Polarization**



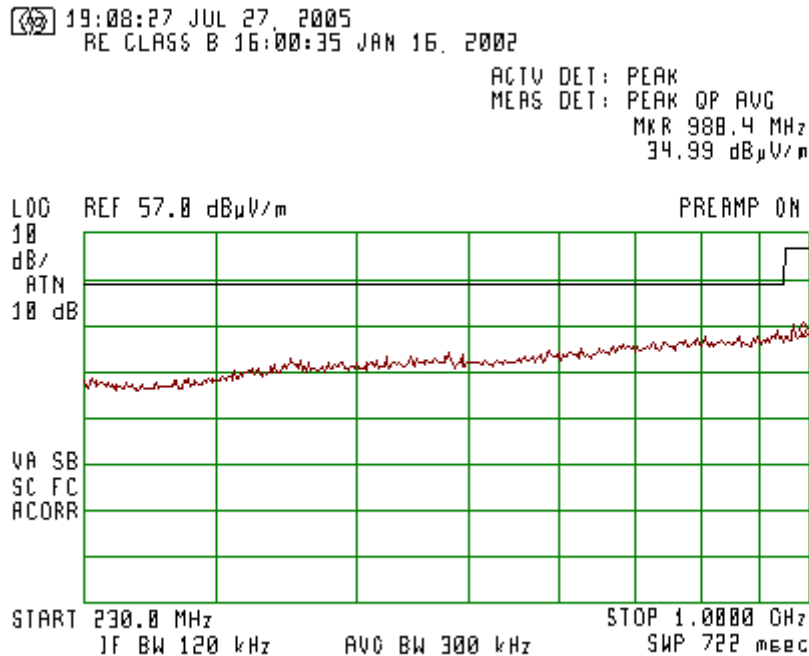
**Plot 40  
Highest  
Horizontal Polarization**



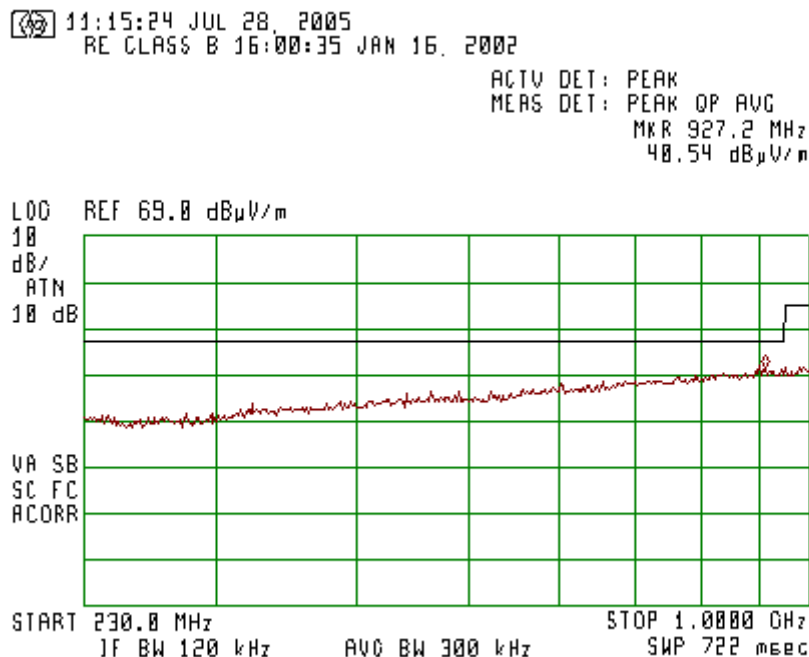
**Plot 41  
Highest  
Vertical Polarization**



**Plot 42  
Highest  
Horizontal Polarization**



**Plot 43  
Highest  
Vertical Polarization**





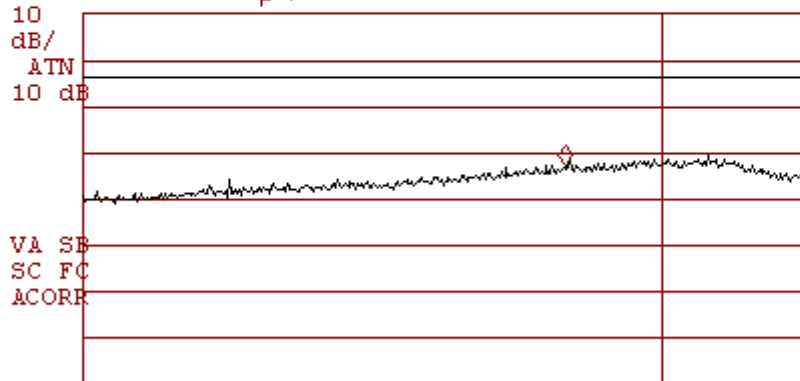
**Plot 44**  
**Highest**  
**Horizontal Polarization**

09:14:40 JUL 26, 2005

1/20

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.819 GHz  
34.84 dB<sub>μ</sub>V/m

LOG REF 68.0 dB<sub>μ</sub>V/m



START 1.000 GHz STOP 2.390 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 40.0 msec

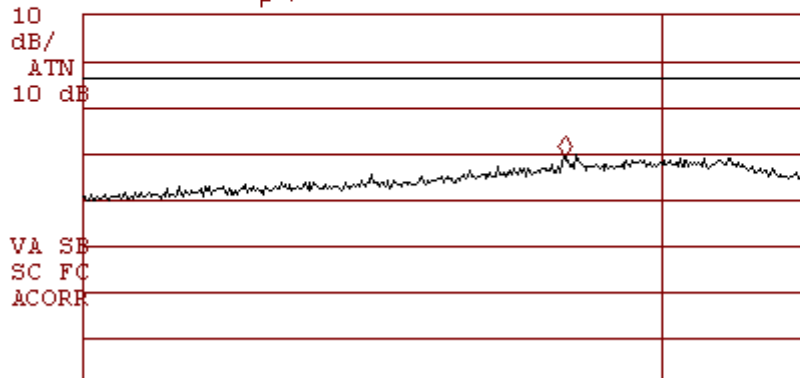
**Plot 45**  
**Highest**  
**Vertical Polarization**

09:28:16 JUL 26, 2005

1/20

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.819 GHz  
37.27 dB<sub>μ</sub>V/m

LOG REF 68.0 dB<sub>μ</sub>V/m



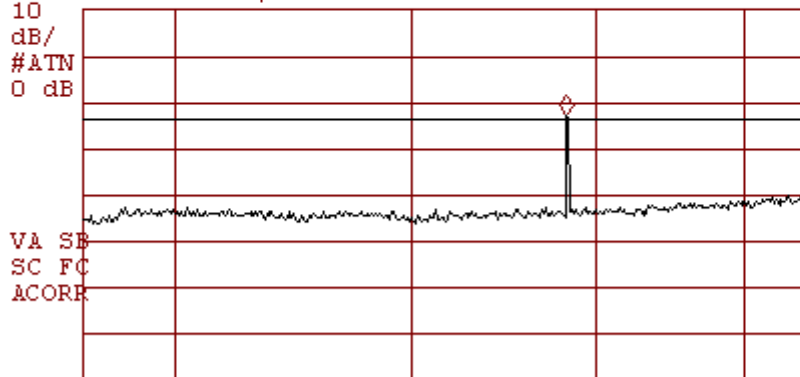
START 1.000 GHz STOP 2.390 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 40.0 msec

**Plot 46  
Highest  
Horizontal Polarization**

10:45:30 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 4.936 GHz  
55.00 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m  
10  
dB/  
#ATN  
0 dB



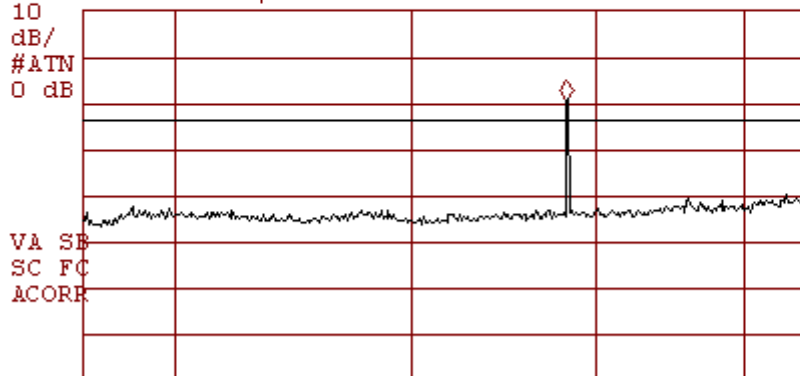
START 2.679 GHz STOP 6.500 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 76.4 msec

**Plot 47  
Highest  
Vertical Polarization**

10:47:29 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 4.936 GHz  
58.35 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m  
10  
dB/  
#ATN  
0 dB



START 2.679 GHz STOP 6.500 GHz  
#IF BW 1.0 MHz #AVG BW 3 MHz SWP 76.4 msec

**Plot 48  
Highest  
Horizontal Polarization**

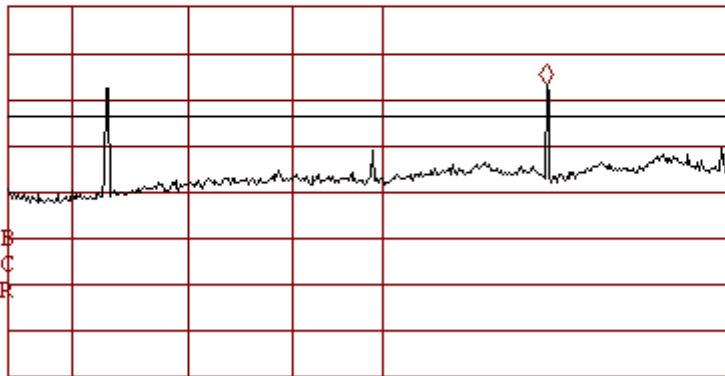
11:06:43 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.331 GHz  
60.92 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



START 6.500 GHz

STOP 15.000 GHz

#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 190 msec

**Plot 49  
Highest  
Vertical Polarization**

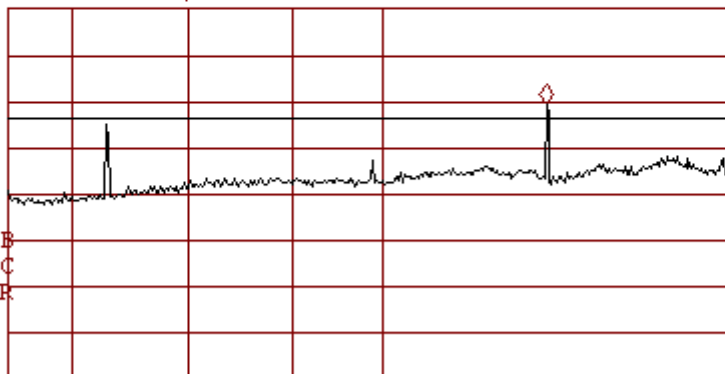
11:04:38 JUL 26, 2005  
/30

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 12.331 GHz  
57.02 dB $\mu$ V/m

LOG REF 78.0 dB $\mu$ V/m

10  
dB/  
#ATN  
0 dB

VA SB  
SC FC  
ACORR



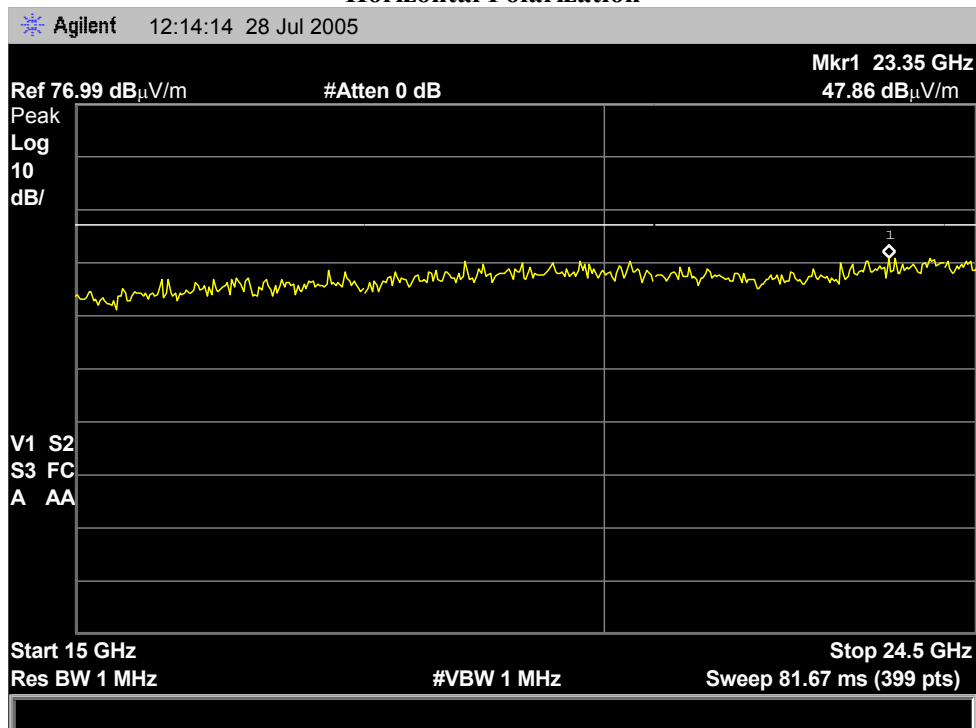
START 6.500 GHz

STOP 15.000 GHz

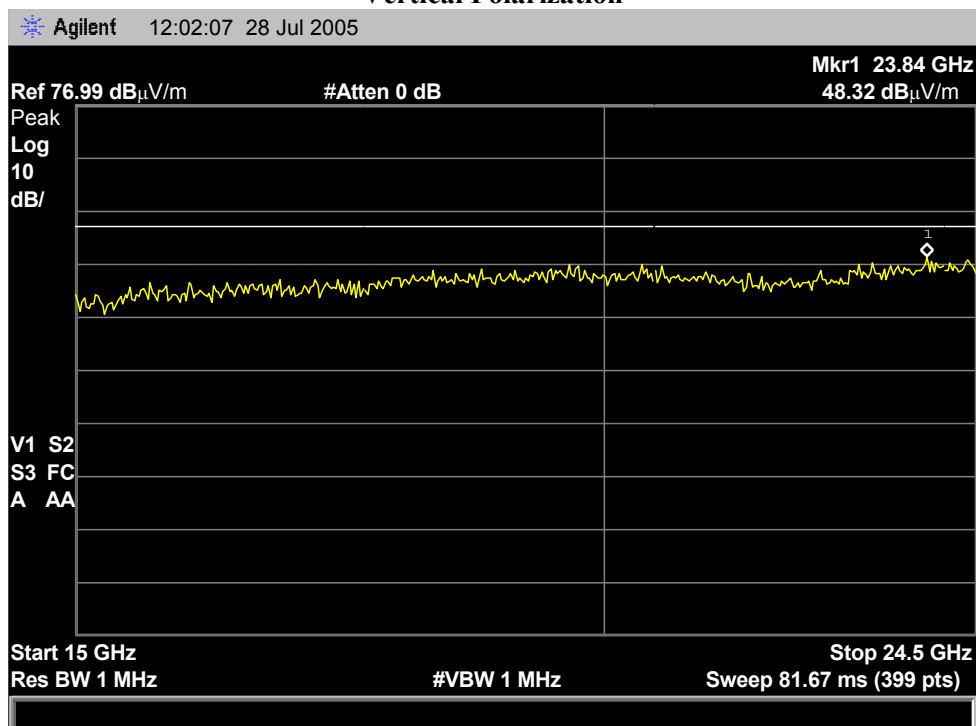
#IF BW 1.0 MHz #AVG BW 3 MHz

SWP 190 msec

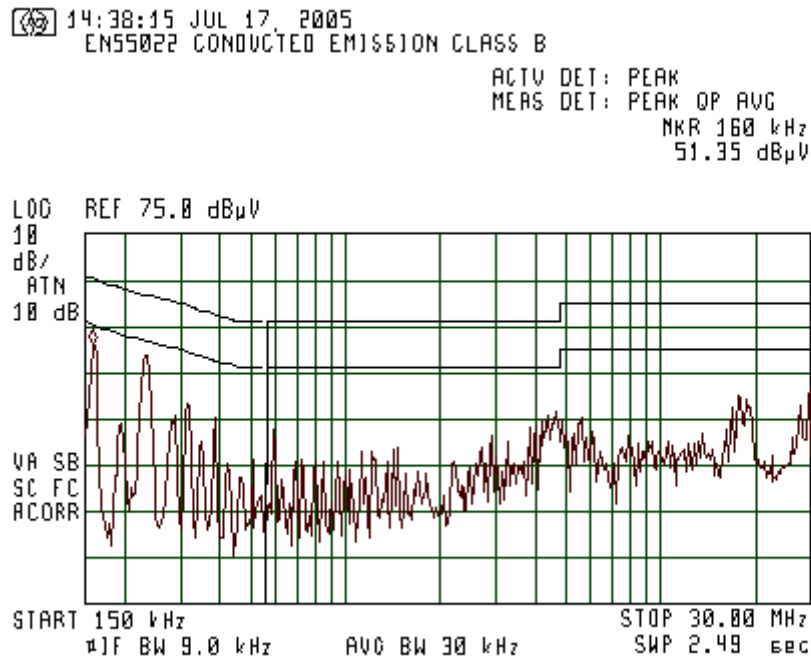
**Plot 50**  
**Highest**  
**Horizontal Polarization**



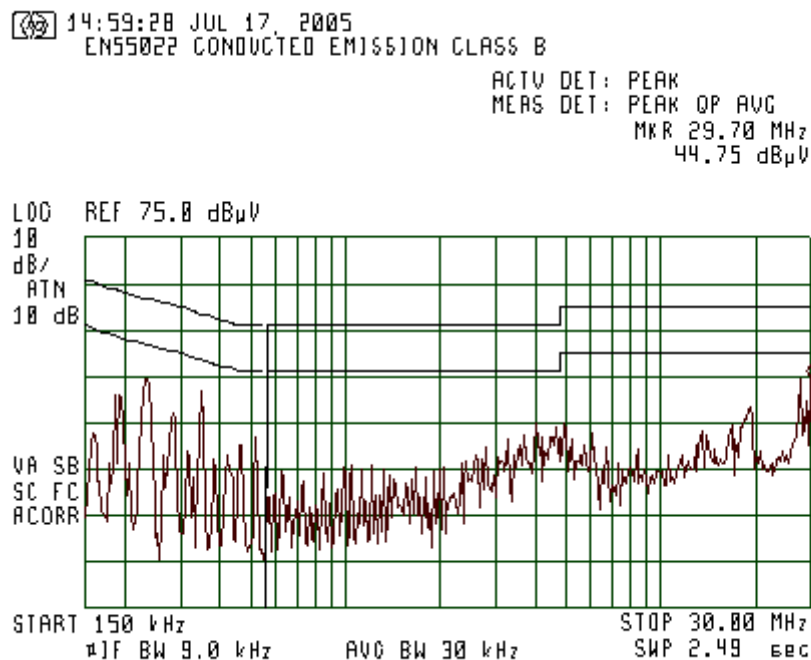
**Plot 51**  
**Highest**  
**Vertical Polarization**



**Plot 52**  
**Phase**

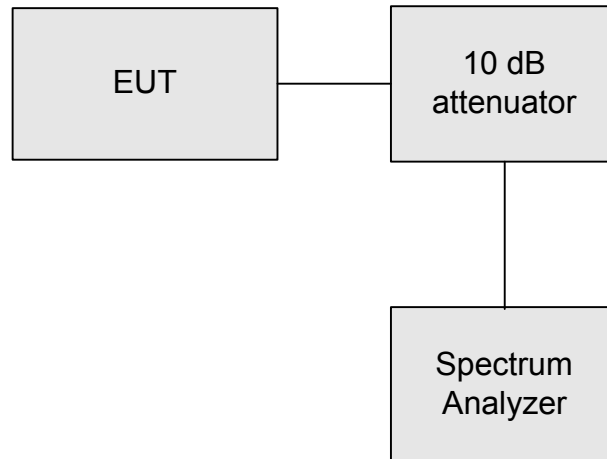


**Plot 53**  
**Neutral**

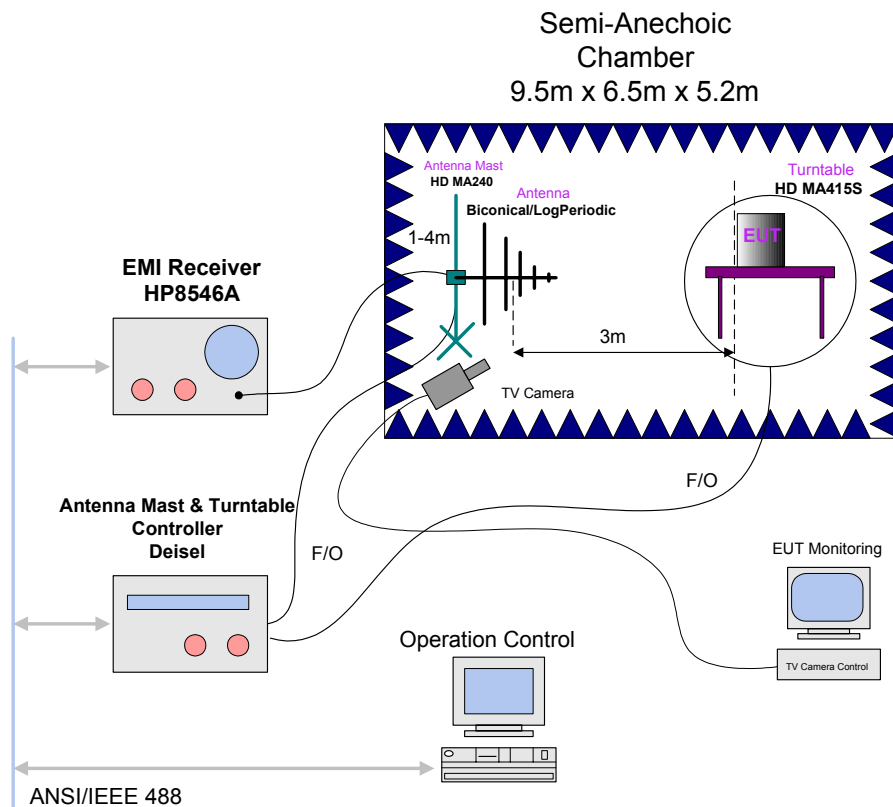


## Appendix C: Test setups

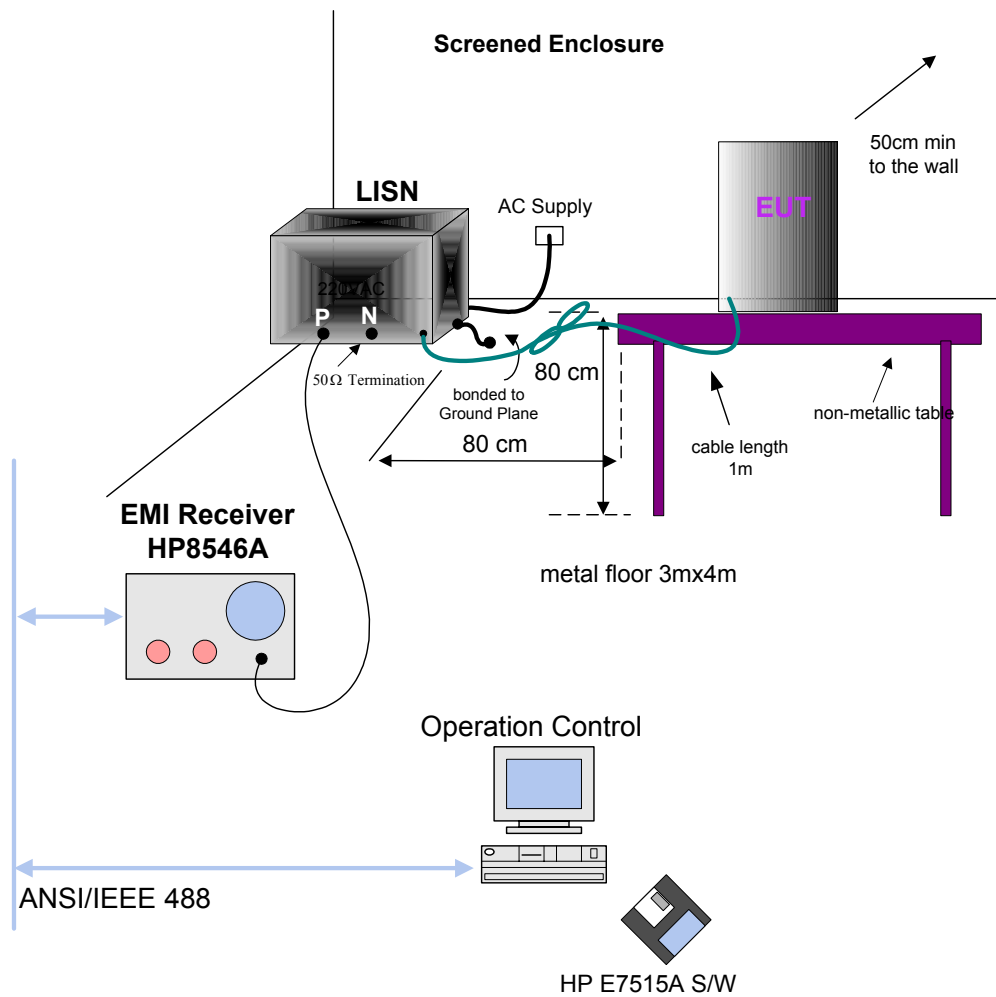
### Setup 1



### Setup 2



### Setup 3



## Appendix D: Test Photograph





***End of the Test Report***