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REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:

TWENTY PENCE TEST SITE

**Twenty Pence Road,
 Cottenham,
 Cambridge
 U.K.
 CB4 4PS**

on

DATALOGIC SPA

OM6010-R

dated

13 October 1999

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Equipment Under Test (EUT):

OM6010-R

Test Commissioned by:

DATALOGIC SPA
Via Candini, 2
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Lippo di Calderara di Reno
Bologna
Italy

Representative:

Maurizio De Girolami

Test Started:

6 October 1999

Test Completed:

11 October 1999

Test Engineer:

Dave Smith

Date of Report:

13 October 1999

Report:

Written by: _ _ _ _ Dave Smith _ _ _ _ .

Checked by: _ _ _ _ _ _ _ _ _ _ .

Signature: _ _ _ _ _ _ _ _ _ _ .

Signature: _ _ _ _ _ _ _ _ _ _ .

Date: _ _ _ _ _ _ _ _ _ _ .

Date: _ _ _ _ _ _ _ _ _ _ .

Test Standards Applied

CFR 47 : 1998
Class A

Code of Federal Regulations: Part 15 Subpart B- Radio Frequency Devices - **PASS**
Unintentional Radiators

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Test Results Summary

CFR 47 : 1998					PASS
Test	Port	Method	Limit	PASS/FAIL	Notes
Conducted Emissions	ac power	ANSI C63.4:1992	FCC15 A	PASS	
Radiated Emissions		ANSI C63.4:1992	FCC15 A	PASS	

CFR 47 : 1998					PASS
Test	Port	Method	Limit	PASS/FAIL	Notes
Conducted Emissions	ac power	ANSI C63.4:1992	FCC15 sub C	PASS	
Radiated Emissions		ANSI C63.4:1992	FCC15 sub C	PASS	

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1 EUT Details

1.1 General

The EUT was a DataLogic OM6010-R which forms part of a cordless bar code reader system. The unit acts as a base station receiving data via a radio link to a cordless bar code reader (DataLogic DLL6000-R series). The OM6010-R also acts as an interface to peripheral equipment such as a personal computer. The radio link operates at 910MHz.

The device was therefore considered as an intentional radiator (CFR47 part 15 sub-section C - section 15.249) and also as a class A digital device.

The unit is powered via an external power adapter. The unit also functions as a battery charger for the cordless bar code readers.

The EUT has a single port for connection to a PC. This port may be configured for a different types of interface and was tested as a serial interface and a 'wedge' interface (connects between PC and keyboard).

Although the EUT also has two ports for connection to a Field Bus interface this feature is not supported on this version of the unit. Further tests will be made on the unit with this option at a later date.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	Notes
1	Datalogic	OM6010R	Cradle	098N05041	OMJ0001
2	Datalogic	DLL6110-R-NM	EUT with display	C90E09730	OMJ0000
3	DataLogic	PG11/DVE	ac adaptor	A9909	N/A
4	Dell	SYS 210	Computer	SYS210031921	E2K50YDELL210
5	Hewlett Packard	Deskjet 850C	Printer	SG563160GC	B94C2145X
6	Dell	SK-1000REW	Keyboard	M951222710	GYUR26SK
7	Olivetti	DSM 28-142 PS	Monitor	7042360	BEJCY410
8	Dell	MR-829FDL	mouse	LT079010457	DZL6QBC

1.2 Modifications to EUT and Peripherals

Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

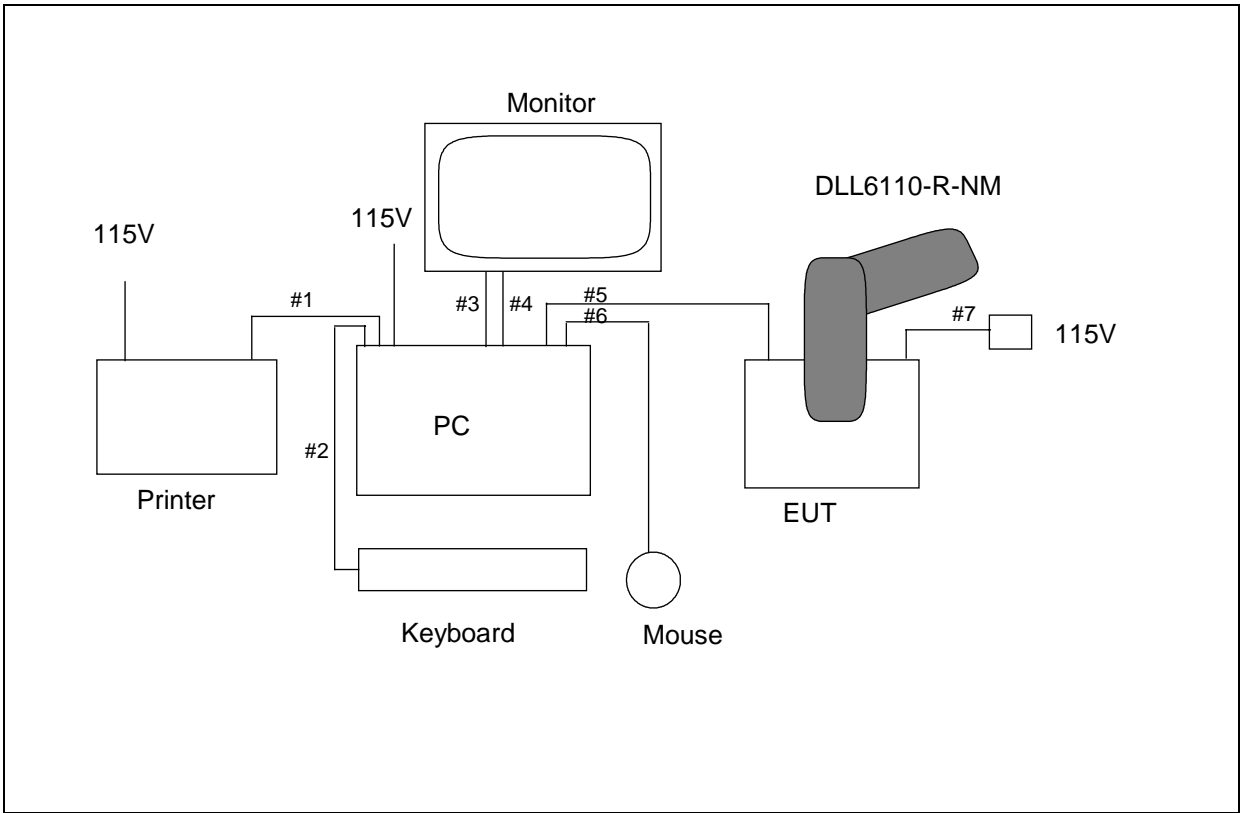
Mod No:	Details
1	L10 changed to 100R resistor in order to reduce radio transmit level.

1.3 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual test result sheets reference the operating mode of the EUT.

Operating Mode	Details
1	Normal operating mode with processors fully active waiting for radio signal from remote bar code reader. Serial connection to PC.
2	As mode 1 with 'wedge' connection to PC via keyboard interface.
3	Set to test mode which permanently activates radio transmitter.
4	Gun located in cradle with battery charging.

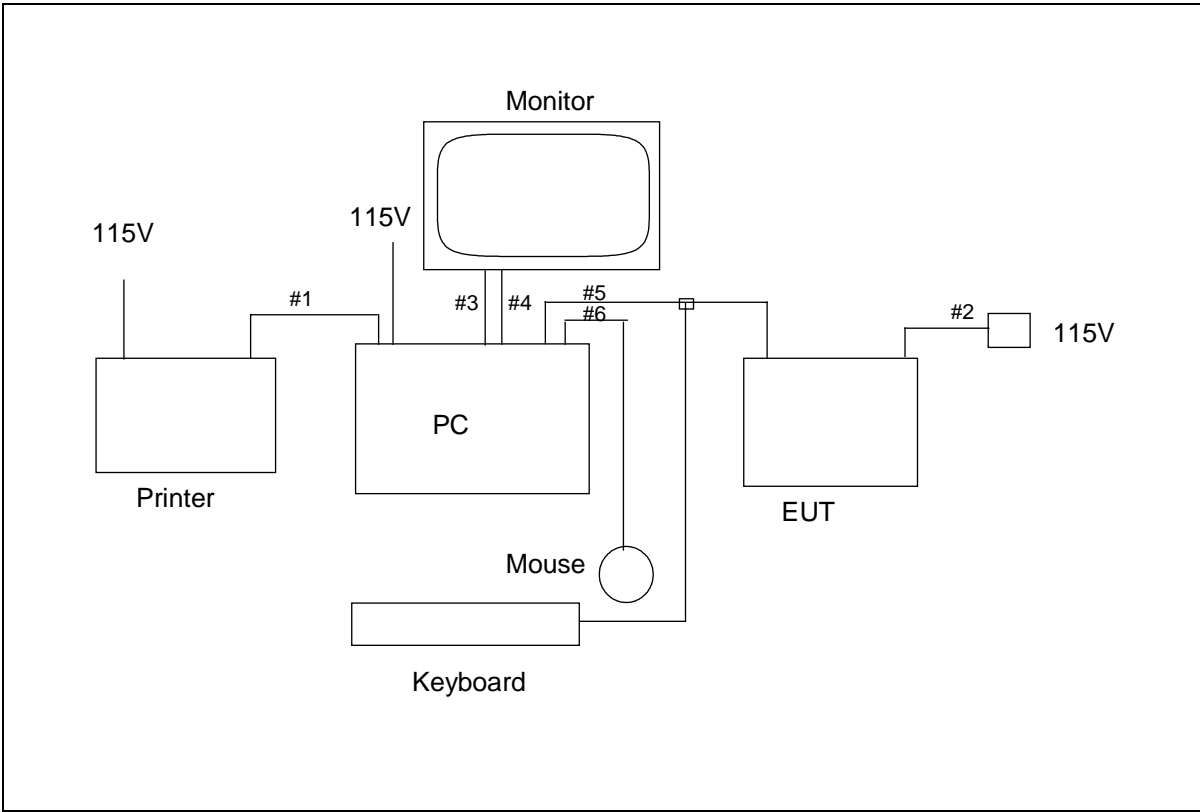
Figure 1: General Arrangement of EUT and Peripherals - with serial connection



- | | | | |
|----|--|---------|-------|
| #1 | screened | printer | cable |
| #2 | 1.5m screened keyboard cable | | |
| #3 | 1.5m screened video cable | | |
| #4 | 1m unscreened power cable | | |
| #5 | 1.5m unscreened cable from cradle to serial port | | |
| #6 | 1.5m screened mouse cable | | |
| #7 | 1.5m unscreened power cable | | |

Note: this set up was used only for conducted emissions with the EUT charging the gun. Radiated emissions were measured in normal operating mode with the gun removed from the cradle.

Figure 2: General Arrangement of EUT and Peripherals - with wedge connection



- #1 screened printer cable
- #2 1.5m unscreened power cable
- #3 1.5m screened video cable
- #4 1m unscreened power cable
- #5 1.5m unscreened cable from PC keyboard interface with split to keyboard and EUT
- #6 1.5m screened mouse cable
- #7 1.5m unscreened power cable

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Photograph 1: EUT and Peripherals - Conducted Emissions - Back

See Test Setup Photographs File

Photograph 2: EUT and Peripherals - Conducted Emissions - Front

See Test Setup Photographs File

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Photograph 3: EUT and Peripherals - Radiated Emissions Back

See Test Setup Photographs File

Photograph 4: EUT and Peripherals - Radiated Emissions - Front

See Test Setup Photographs File

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2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Manufacturer	Model	Description	Serial	Cal Date
R1	Chase	LHR7000	RF Receiver 10kHz - 30MHz	1056	30 June 99
R4	Rohde and Schwarz	ESVHS10	RF Receiver 20MHz - 1GHz	843744/00	23 June 99
R5 R5B	Hewlett Packard Hewlett Packard	HP 8595E HP87405A	Spectrum Analyser Pre-amp	3412A00701 3207A00322	1 Oct 98
R6	Marconi Instruments	2390	Spectrum Analyser	23901010	16 Sep 99
L1	EMCO	1912.5	LISN	1358	18 Mar 99
L2	Rohde and Schwarz	ESH3-Z5	LISN	843862/009	18 Mar 99
A2	EMCO	3146	Log Periodic Antenna 200MHz - 1GHz	2011	15 Jul 99
DR	EMCO	3115	Waveguide Ridge Antenna 1GHz - 20GHz	9605-4793	20 May 99
A4	Chase	CBL6112	Bilog Antenna 30MHz - 2GHz	2027	15 Jul 99
A5	Chase	CBL111A	Bilog Antenna 30MHz - 1GHz	1760	15 Jul 99

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3 Test Methods

3.1 Conducted Emissions - ac power

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Bench top EUTs and peripheral equipment are normally placed on a 0.8m high non-conducting bench, positioned 0.4m from one of the metallic walls of a screened room. Floor standing EUTs are normally placed 0.1m above the metallic floor of the screened room. Mains leads are bundled so as not to exceed 1m.

The EUT is powered using a 50ohm/50uH Line Impedance Stabilisation Network (LISN). Peripherals are powered using a second a 50ohm/50uH LISN. These LISNs are bonded to the screened room floor.

With the correct supply voltage applied to the EUT scans are performed on both the live and neutral line outputs of the LISN using quasi-peak detection over the specified frequency range. The results of these scans are shown in the plots section at the end of the report.

Significant emissions identified by the scans are measured and the results tabulated. The table of results is shown in the conducted emissions results section.

3.4 Radiated Emissions

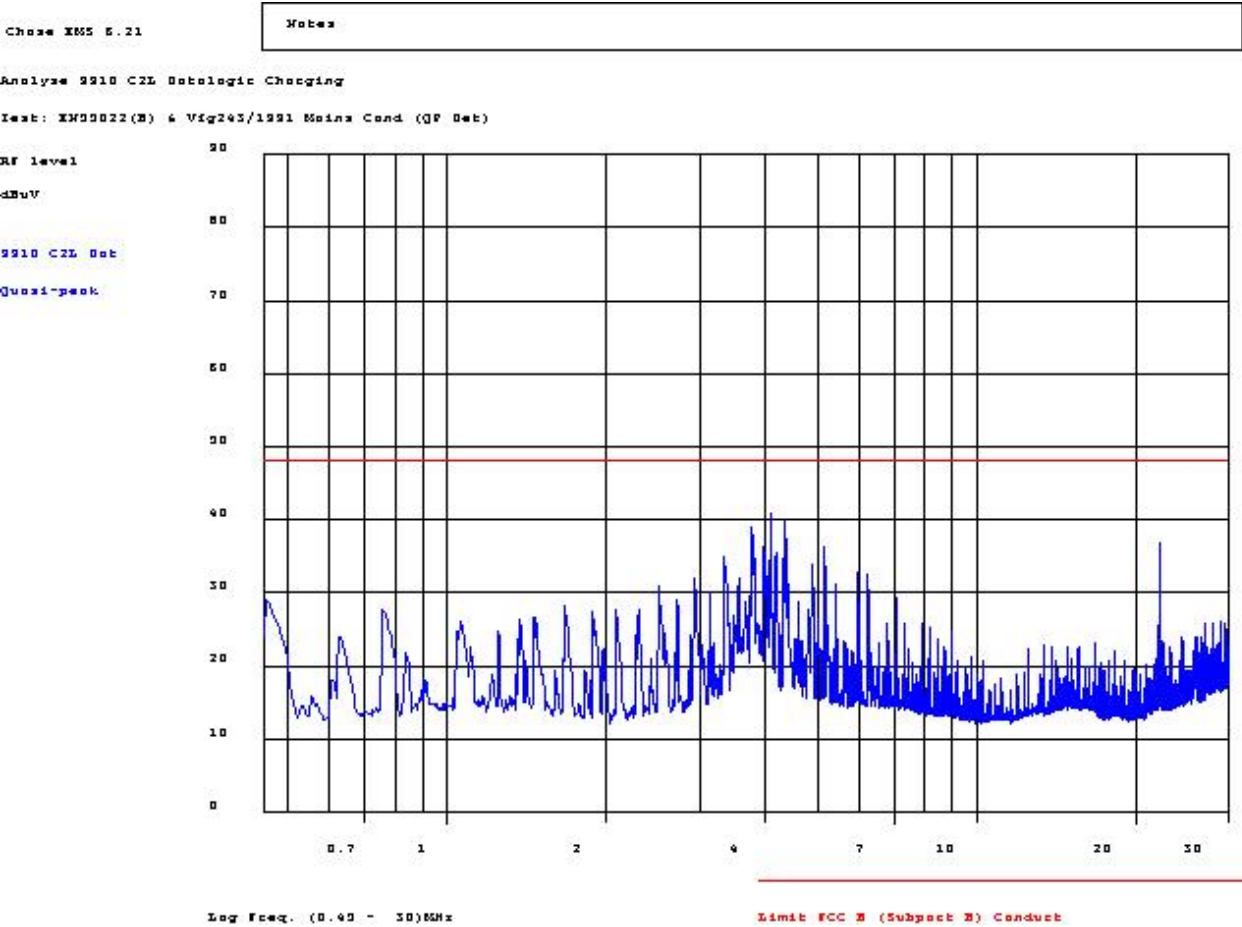
This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of 3m. Scans are performed over the frequency range 30MHz to 1GHz with the antenna both horizontally and vertically polarised. During these scans the EUT and peripherals are rotated through 360°. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report.

Significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using a CISPR16 quasi-peak receiver. Maximised readings are obtained by rotating the EUT through 360° and adjusting the height of the antenna from 1m to 4m. Measurements are made with the antenna both horizontally and vertically polarised and the results tabulated.

4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.

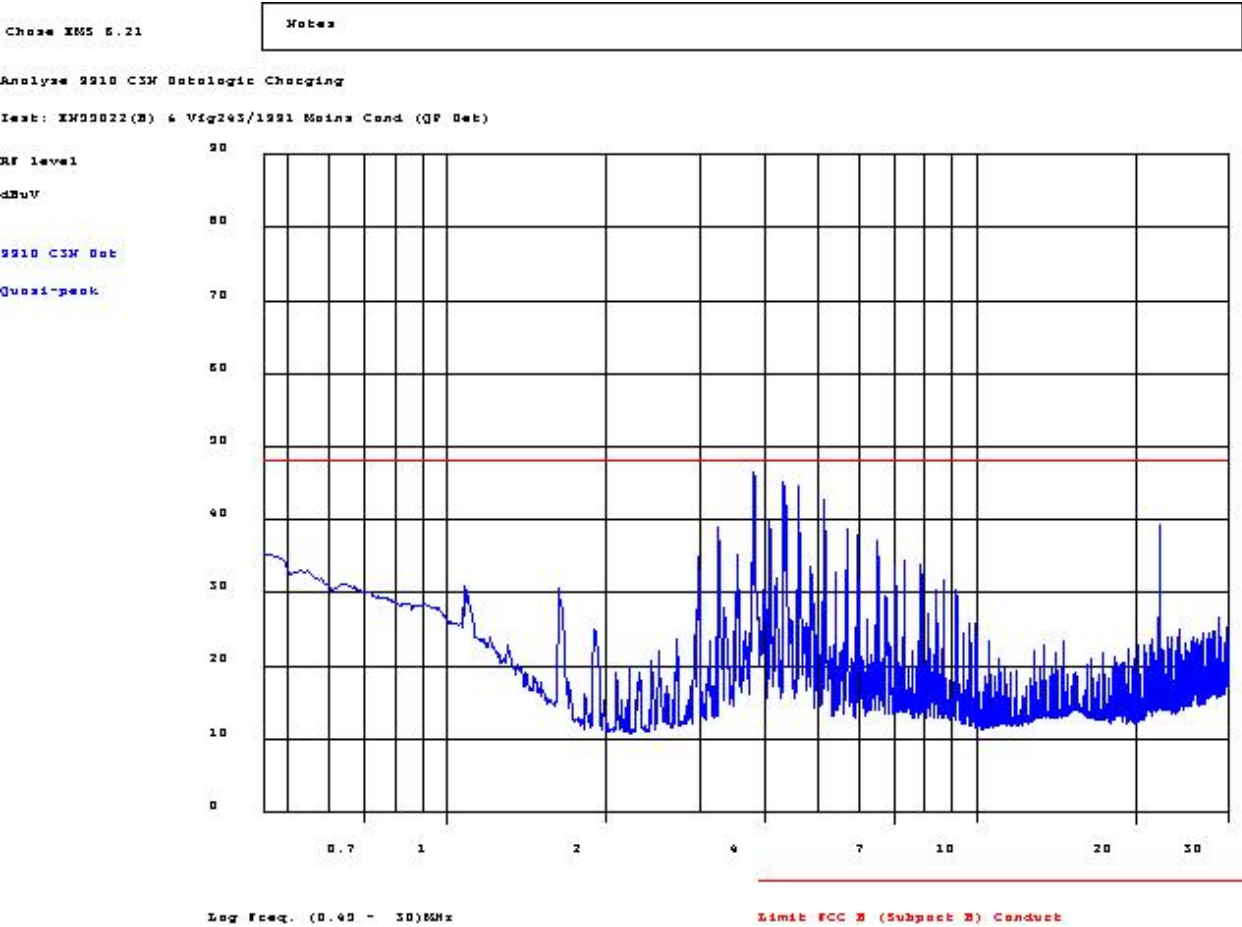


Frequency List (MHz)

3.752	22.175		
4.075			
4.341			
5.161			
6.250			

PLOT 1 Conducted Emission Scan - Charging

Test	Line	Mod	Op. Mode	Test Engineer	Date
C1	L	1	4	DS	11 Oct 99

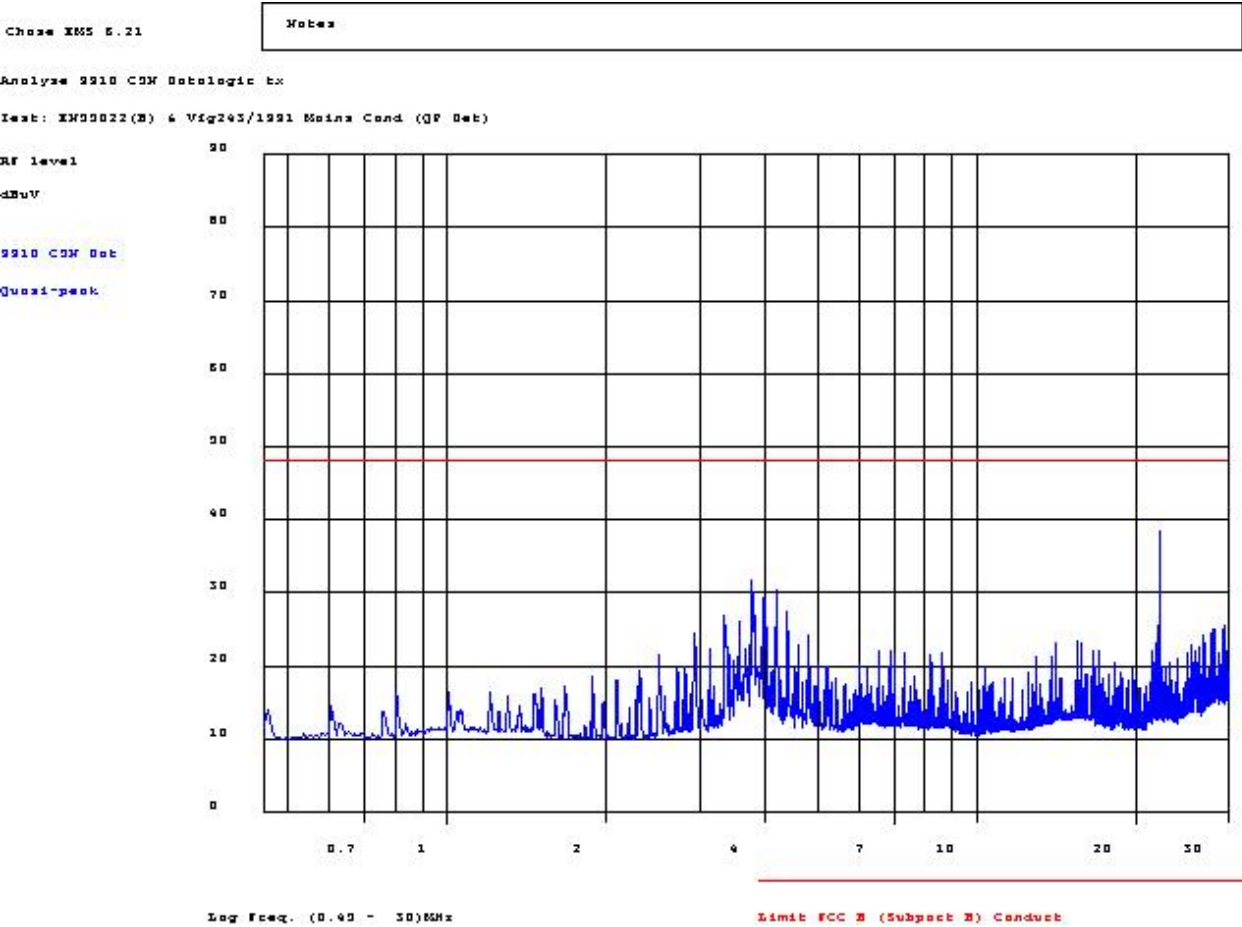


Frequency List (MHz)

3.760	22.176		
4.295			
4.564			
5.099			
5.634			

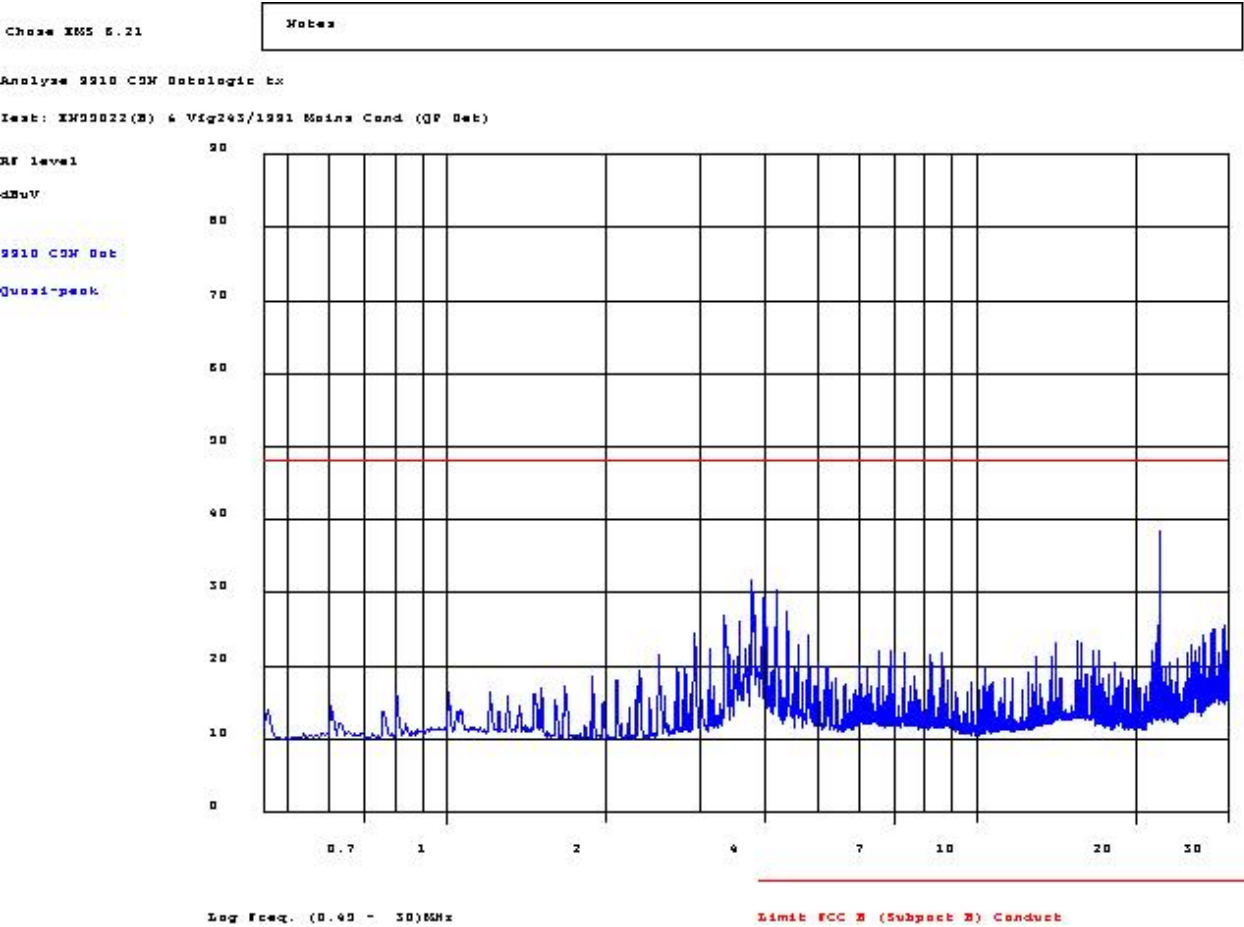
PLOT 2 Conducted Emission Scan - Charging

Test	Line	Mod	Op. Mode	Test Engineer	Date
C2	N	1	4	DS	11 Oct 99



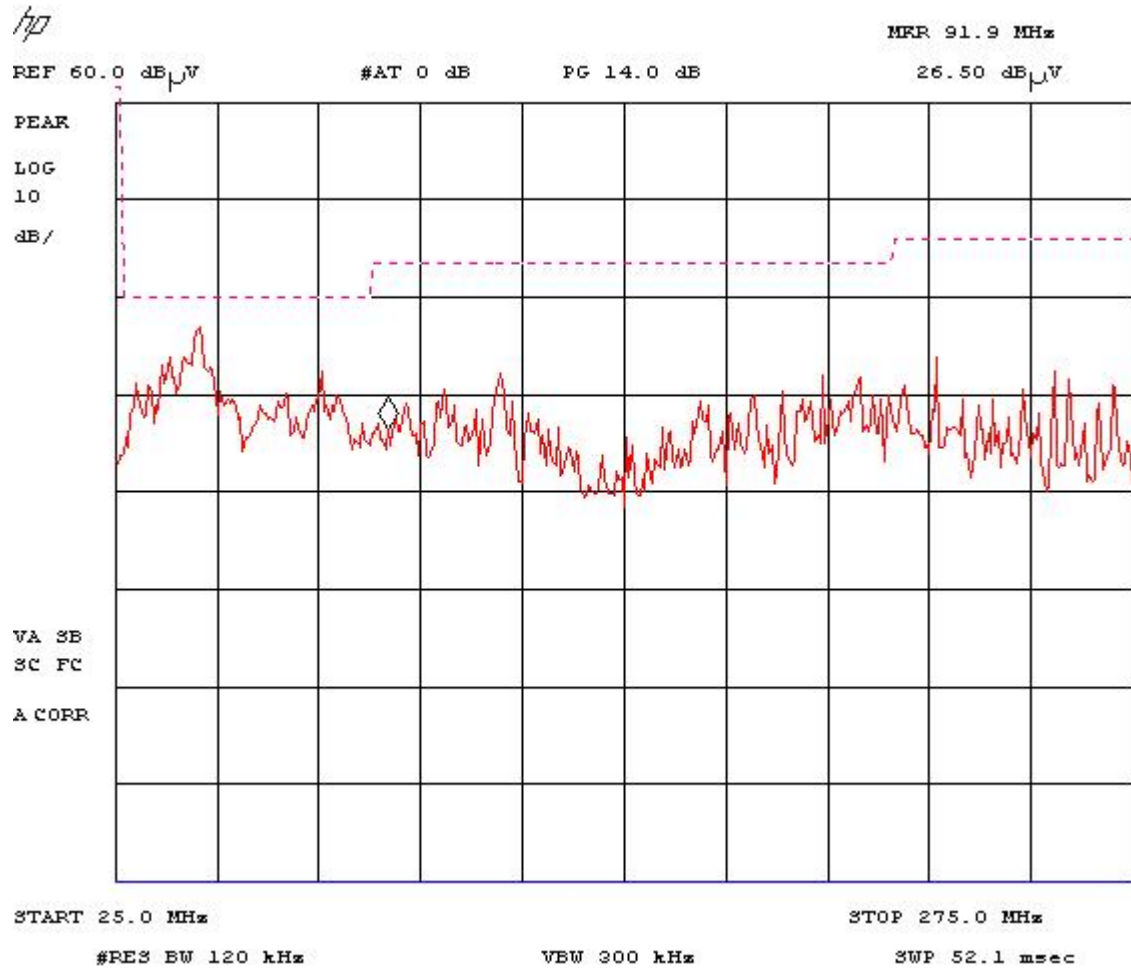
PLOT 3 Conducted Emission Scan - No Gun - Tx On

Test	Line	Mod	Op. Mode	Test Engineer	Date
C3	L	1	3	DS	11 Oct 99



PLOT 4 Conducted Emission Scan - No Gun - Tx On

Test	Line	Mod	Op. Mode	Test Engineer	Date
C4	N	1	4	DS	11 Oct 99



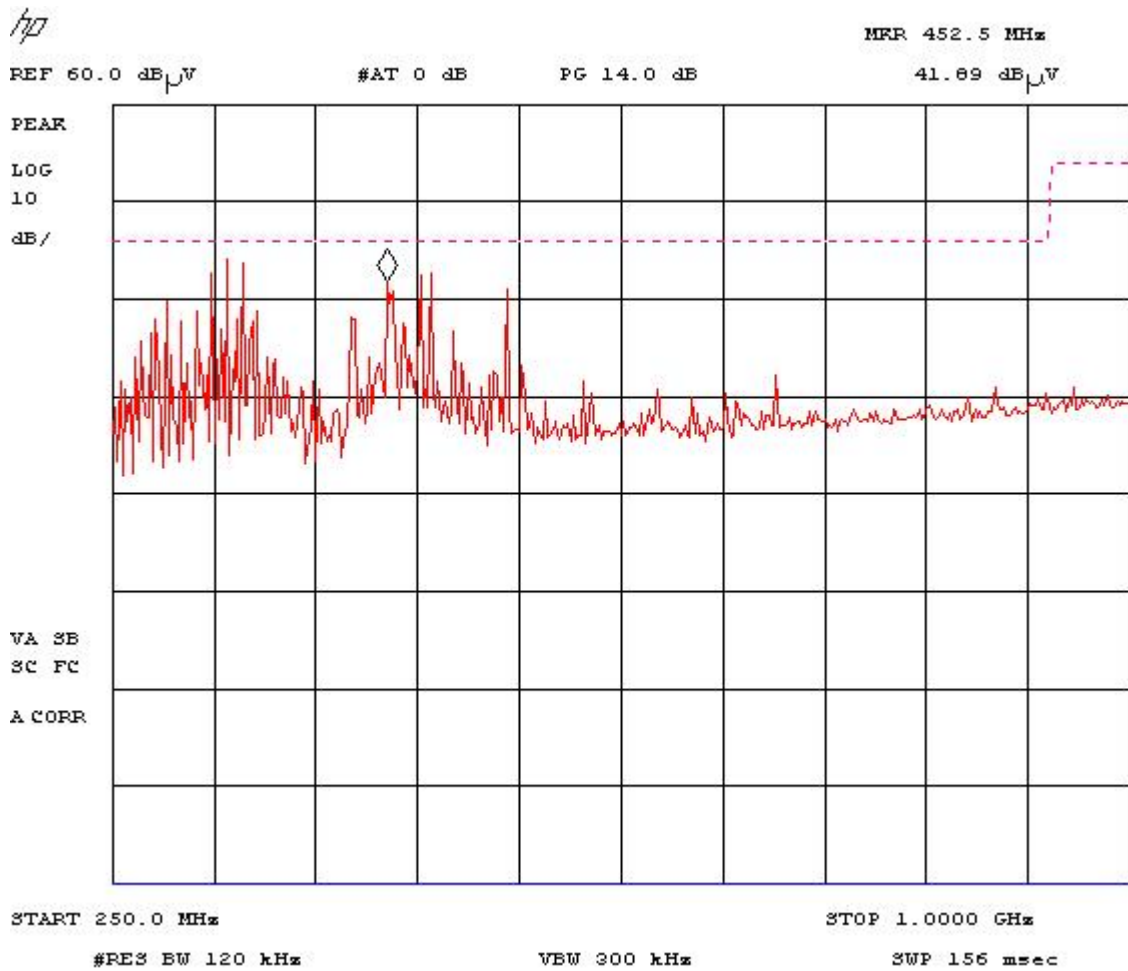
Note - limit shown is Class B.
The higher class A limits were applied in this mode.

Frequency List (MHz)

45.021			
75.017			
119.054			
198.259			
226.585			

PLOT 5 Radiated Scan: 25MHz - 275MHz - Serial Port - Tx Off

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V+H	3	1	1	1	DS	6 Oct 99



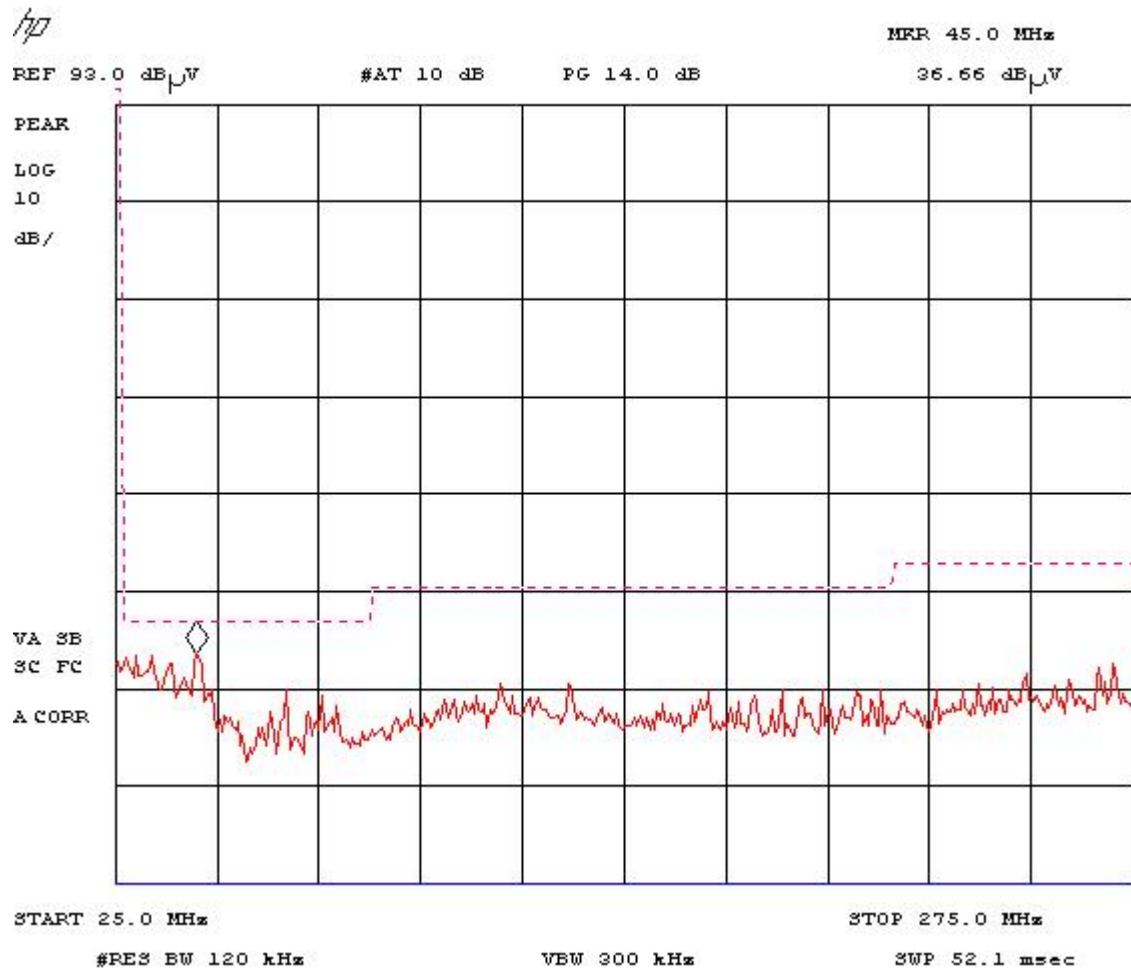
Note - limit shown is Class B.
The higher class A limits were applied in this mode.

Frequency List (MHz)

288.279	449.988		
310.464	475.026		
321.554	481.461		
332.652	538.111		
343.770			

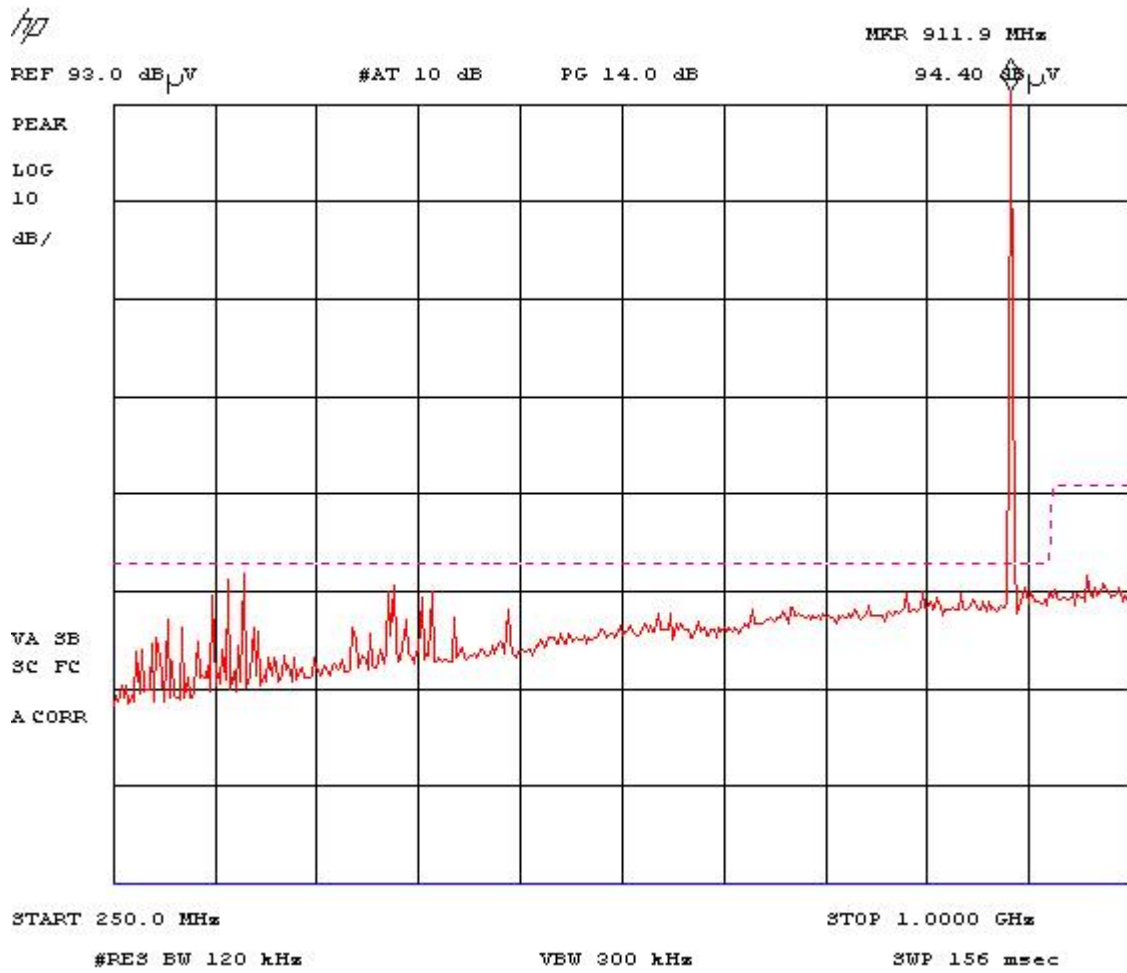
PLOT 6 Radiated Scan: 250MHz - 1GHz - Serial Port - Tx Off

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V+H	3	1	1	1	DS	6 Oct 99



PLOT 7 Radiated Scan: 25MHz - 275MHz - Serial Port - Tx On

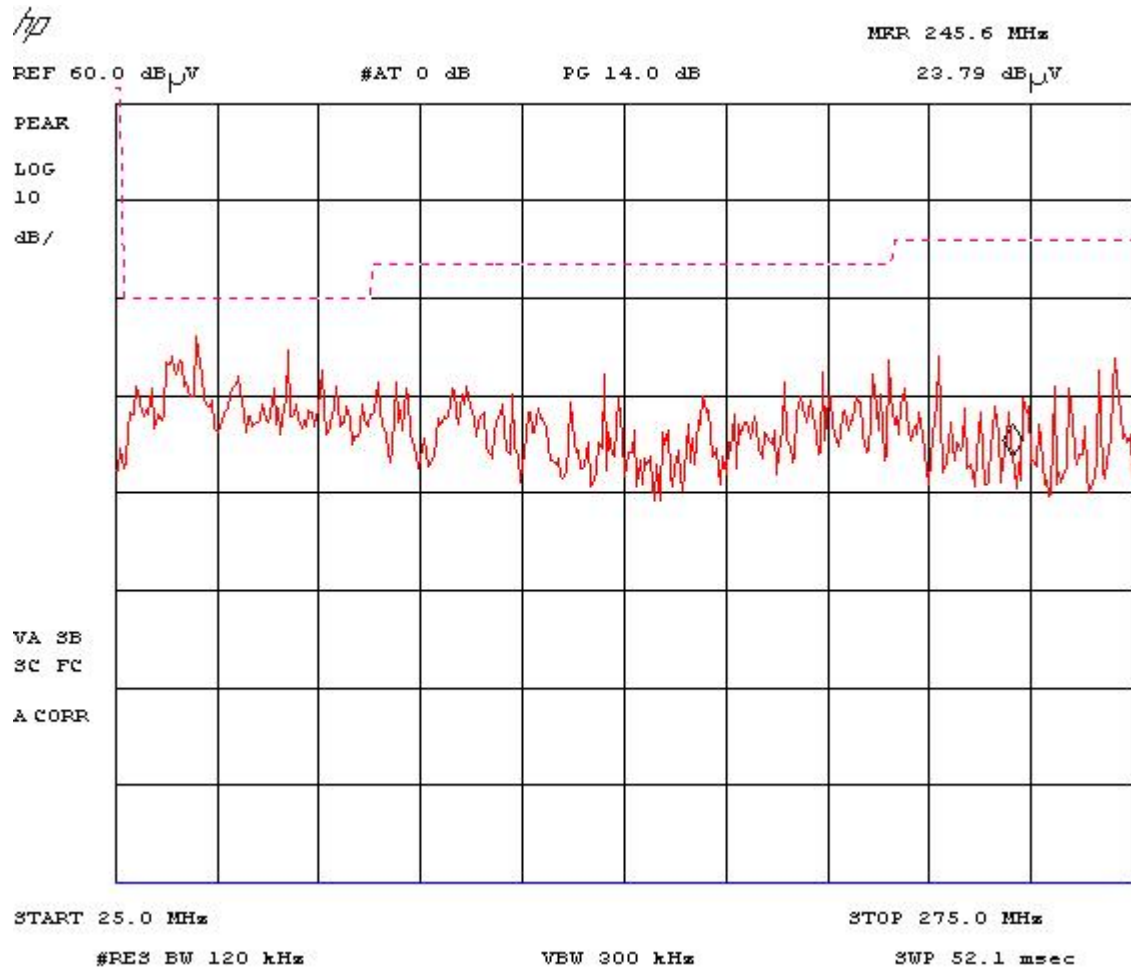
Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V+H	3	1	1	3	DS	6 Oct 99



Note: only emission significantly higher when transmitter turned on = 910MHz

PLOT 8 Radiated Scan: 250MHz - 1GHz - Serial Port - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V+H	3	1	1	3	DS	6 Oct 99



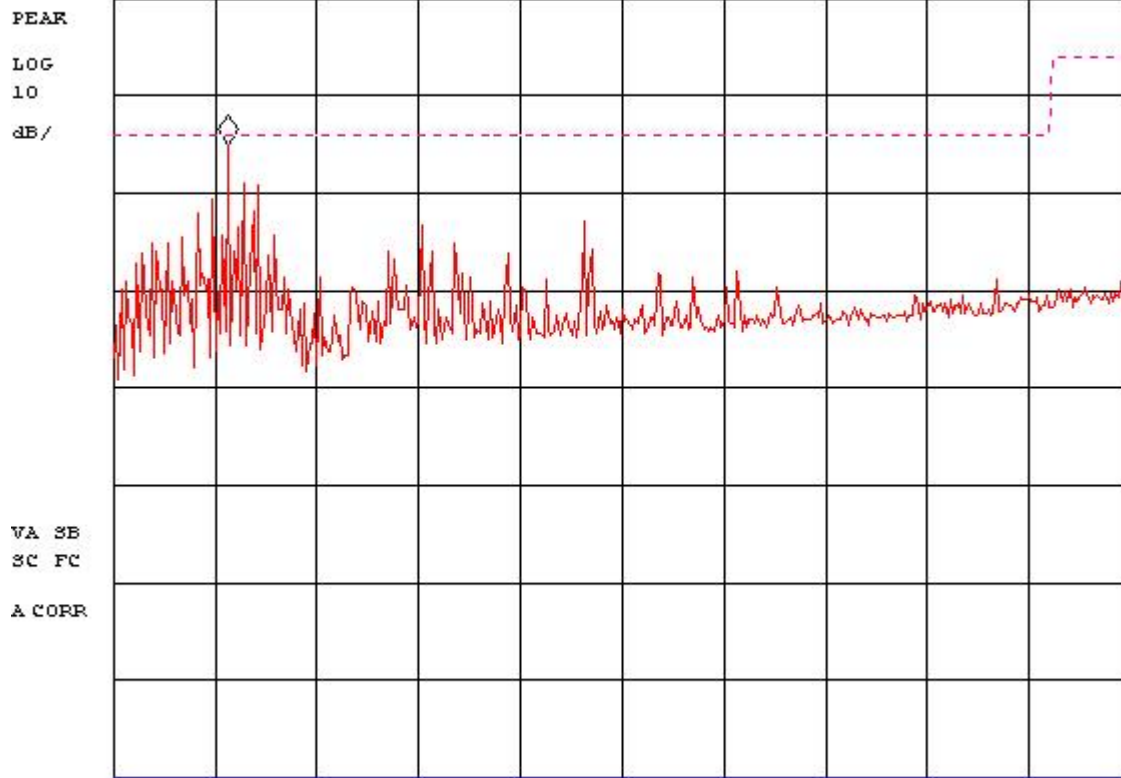
Emissions levels not significantly different from EUT using serial port.

PLOT 9 Radiated Scan: 25MHz - 275MHz - Wedge - Tx Off

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V+H	3	1	1	2	DS	6 Oct 99

hp

REF 60.0 dB_{μV} #AT 0 dB PG 14.0 dB MFR 334.4 MHz 44.91 dB_{μV}

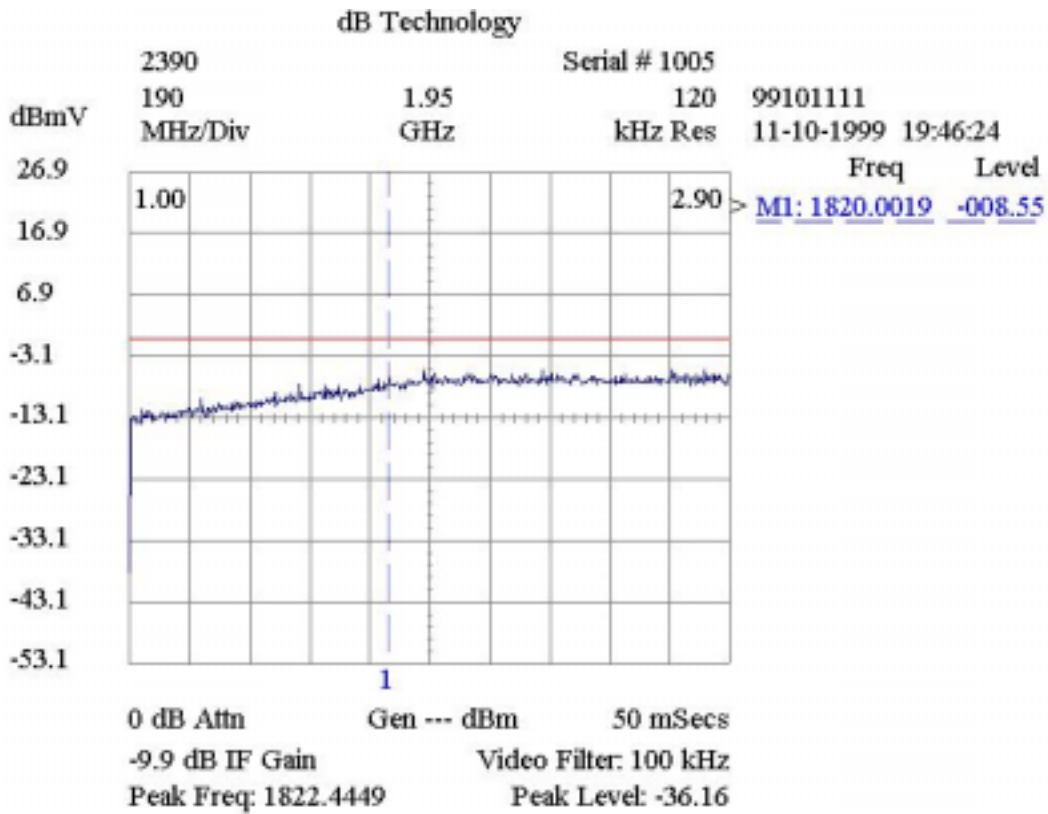


START 250.0 MHz STOP 1.0000 GHz
#RES BW 120 kHz VBW 300 kHz SWP 156 msec

Emissions levels not significantly different from EUT using serial port.

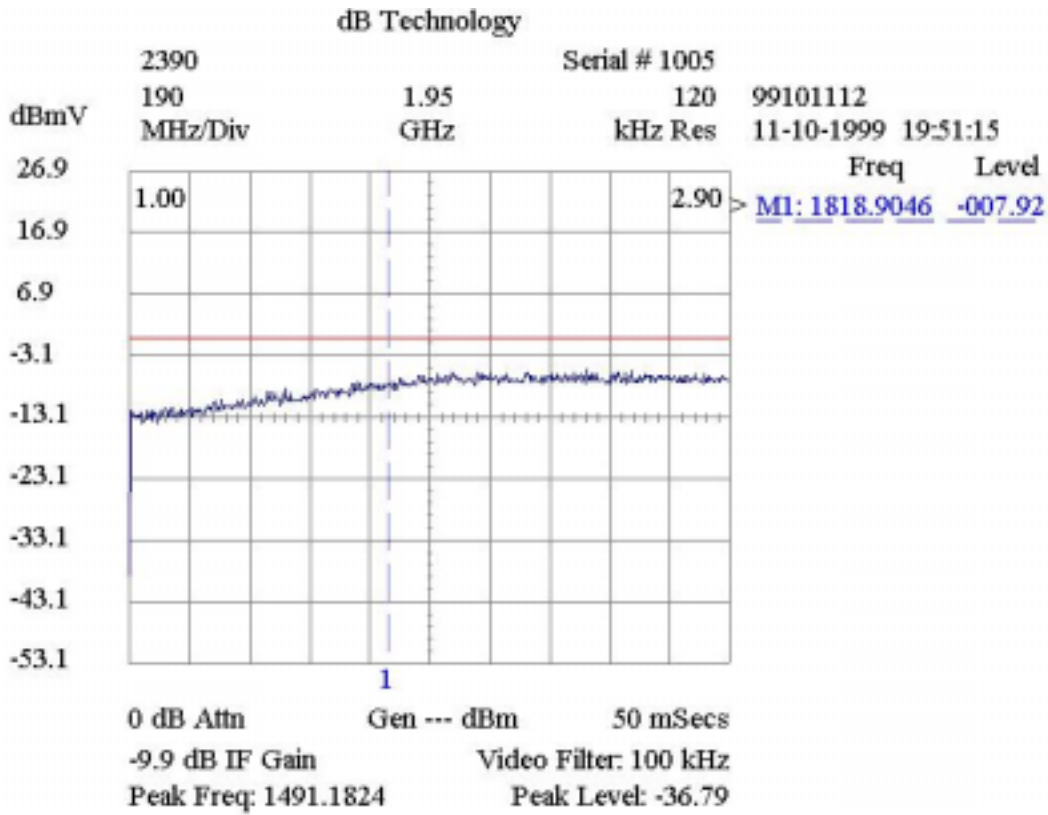
PLOT 10 Radiated Scan: 250MHz - 1GHz - Wedge - Tx Off

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V+H	3	1	1	2	DS	6 Oct 99



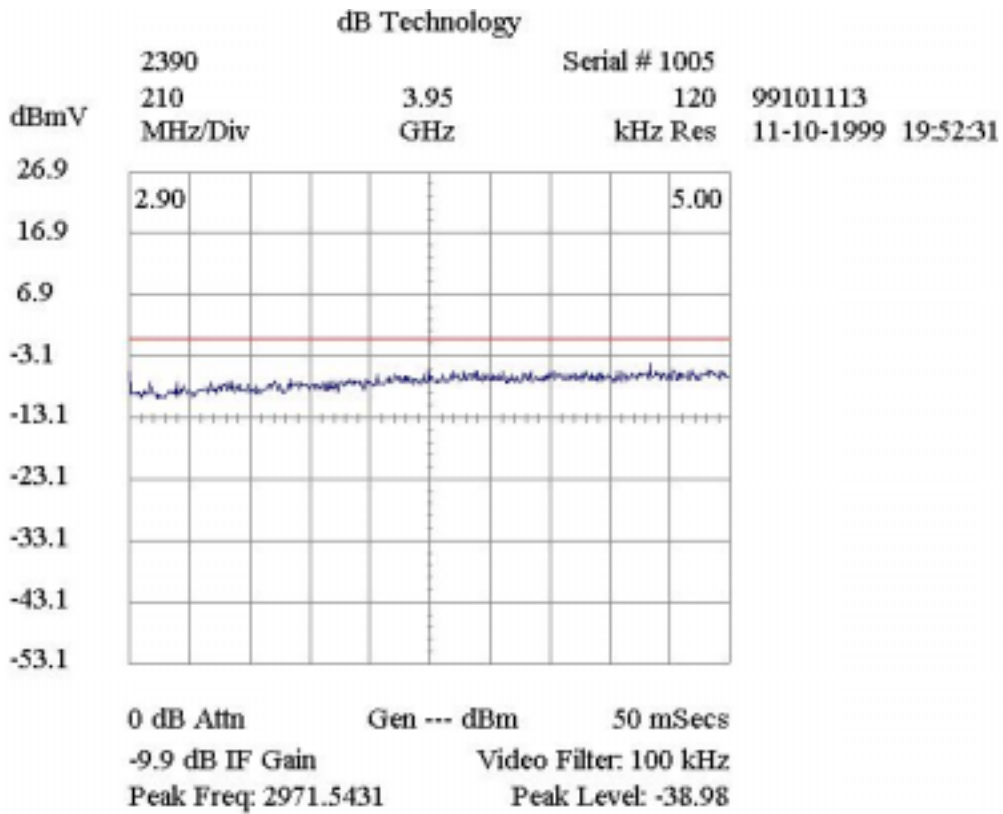
PLOT 11 Radiated Scan: 1GHz - 2.9GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	H	1	1	1	3	DS	11 Oct 99



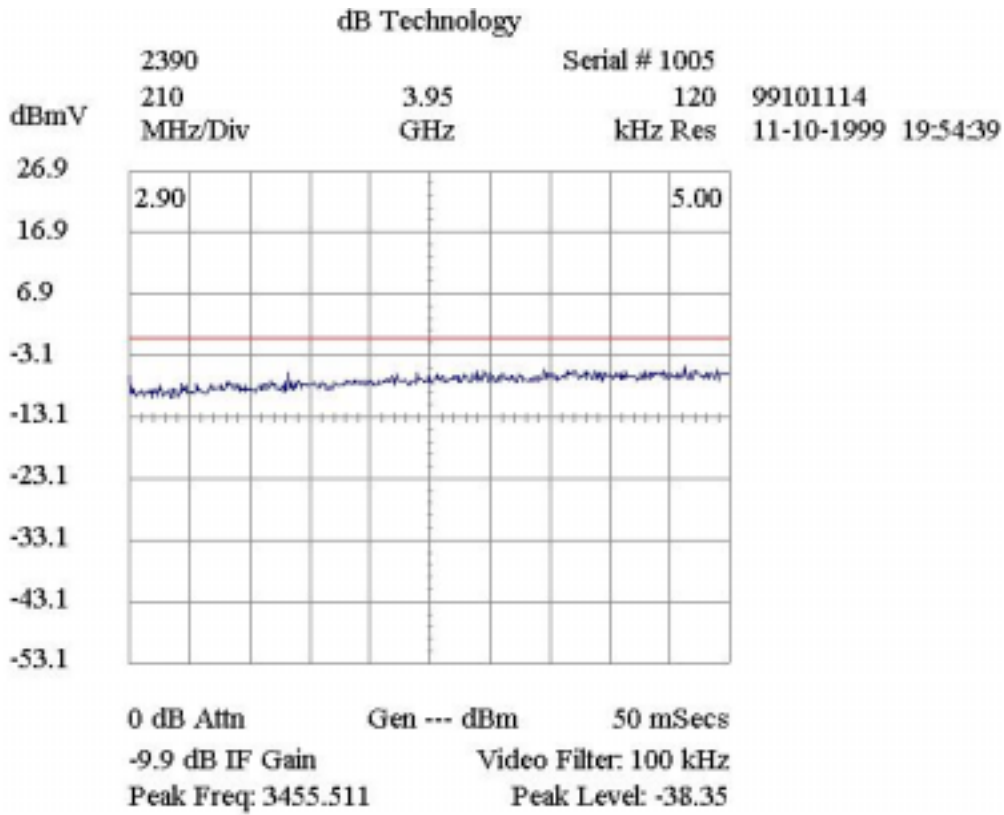
PLOT 12 Radiated Scan: 1GHz - 2.9GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V	1	1	1	3	DS	11 Oct 99



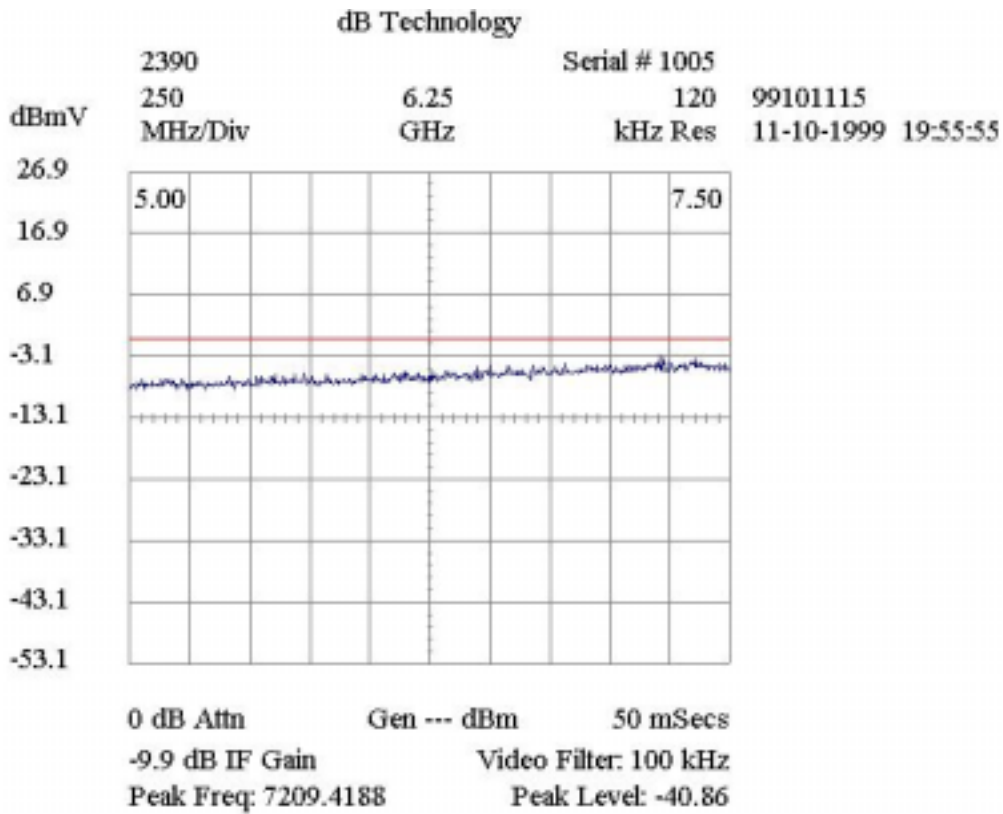
PLOT 13 Radiated Scan: 2.9GHz - 5GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	H	1	1	1	3	DS	11 Oct 99



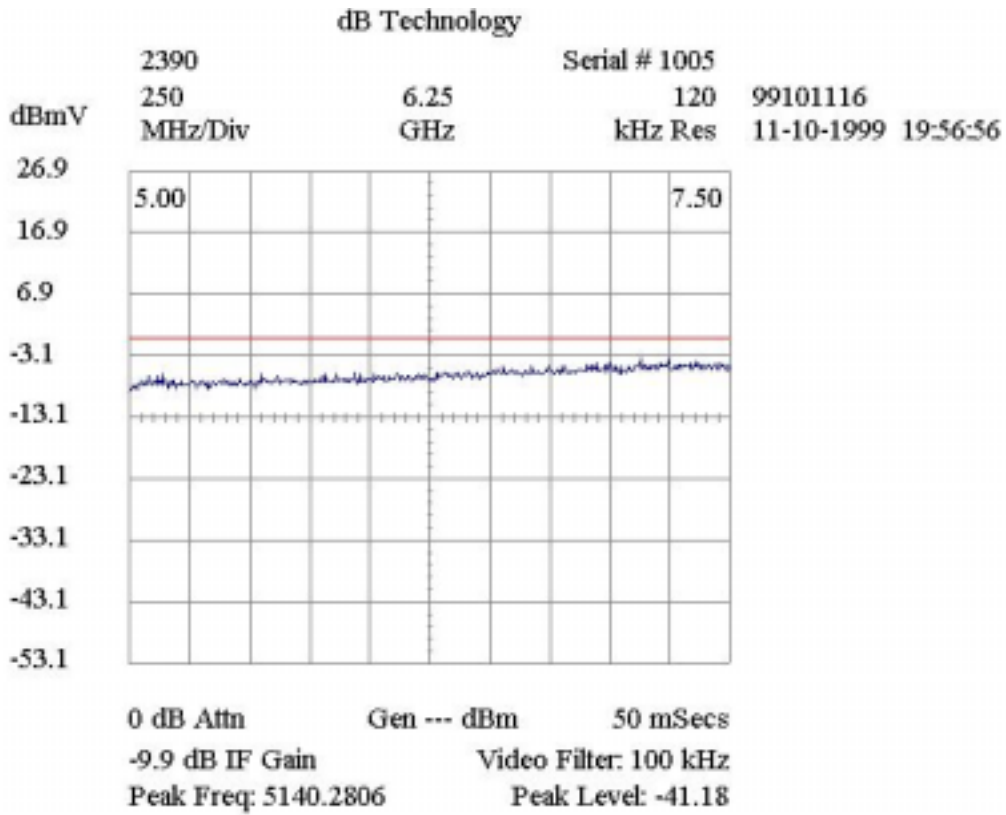
PLOT 14 Radiated Scan: 2.9GHz - 5GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V	1	1	1	3	DS	11 Oct 99



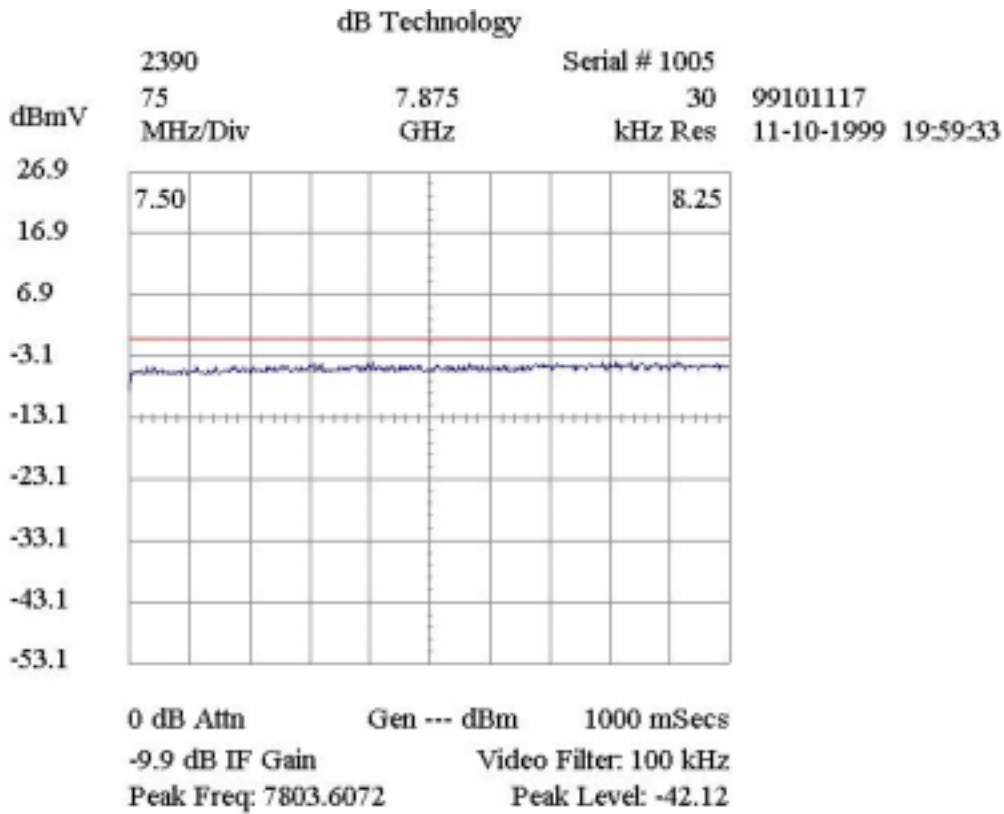
PLOT 15 Radiated Scan: 5.0GHz - 7.5GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	H	1	1	1	3	DS	11 Oct 99



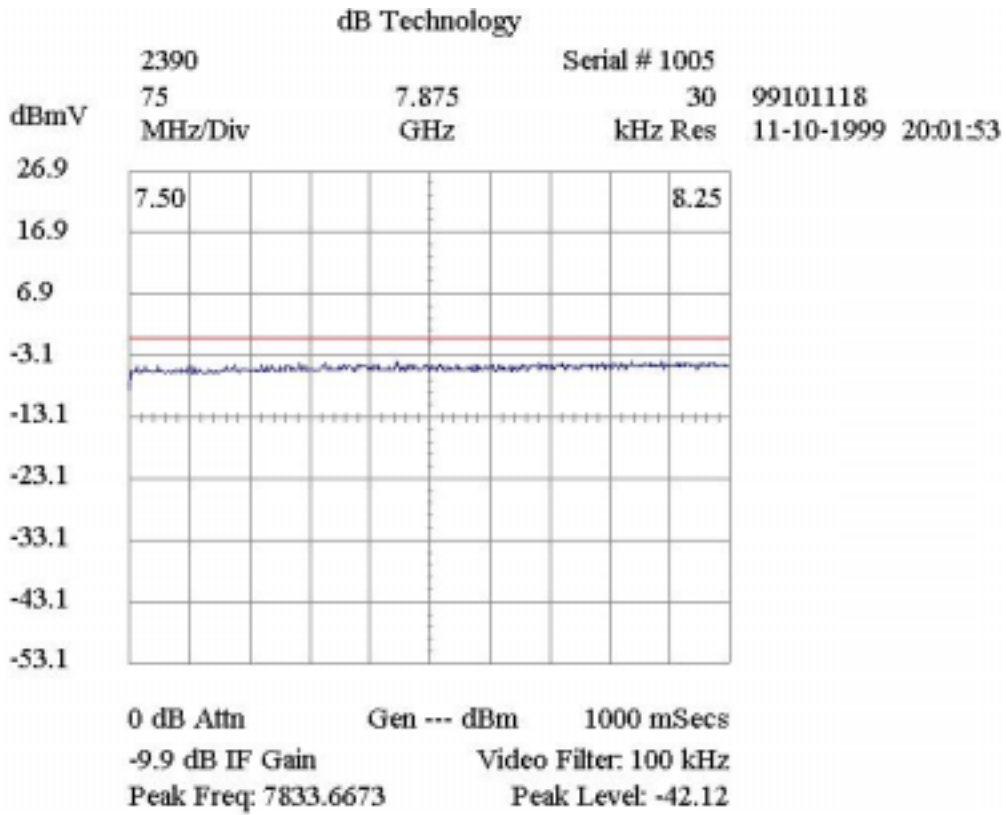
PLOT 16 Radiated Scan: 5.0GHz - 7.5GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V	1	1	1	3	DS	11 Oct 99



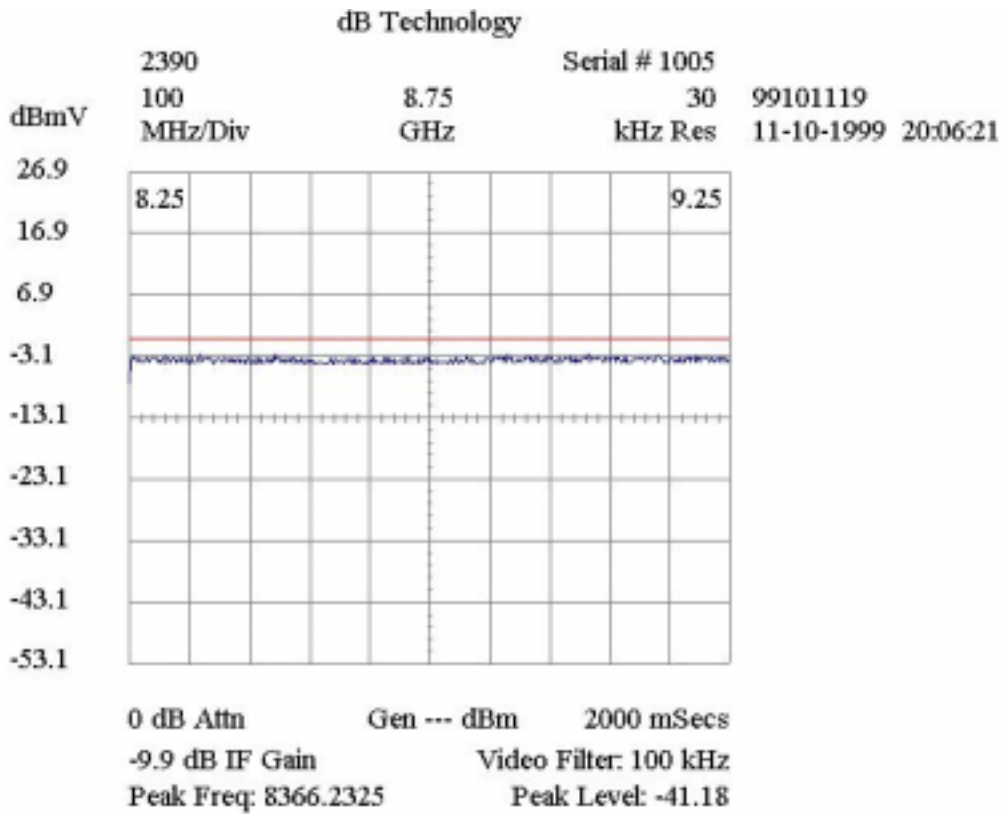
PLOT 17 Radiated Scan: 7.5GHz - 8.25GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	H	1	1	1	3	DS	11 Oct 99



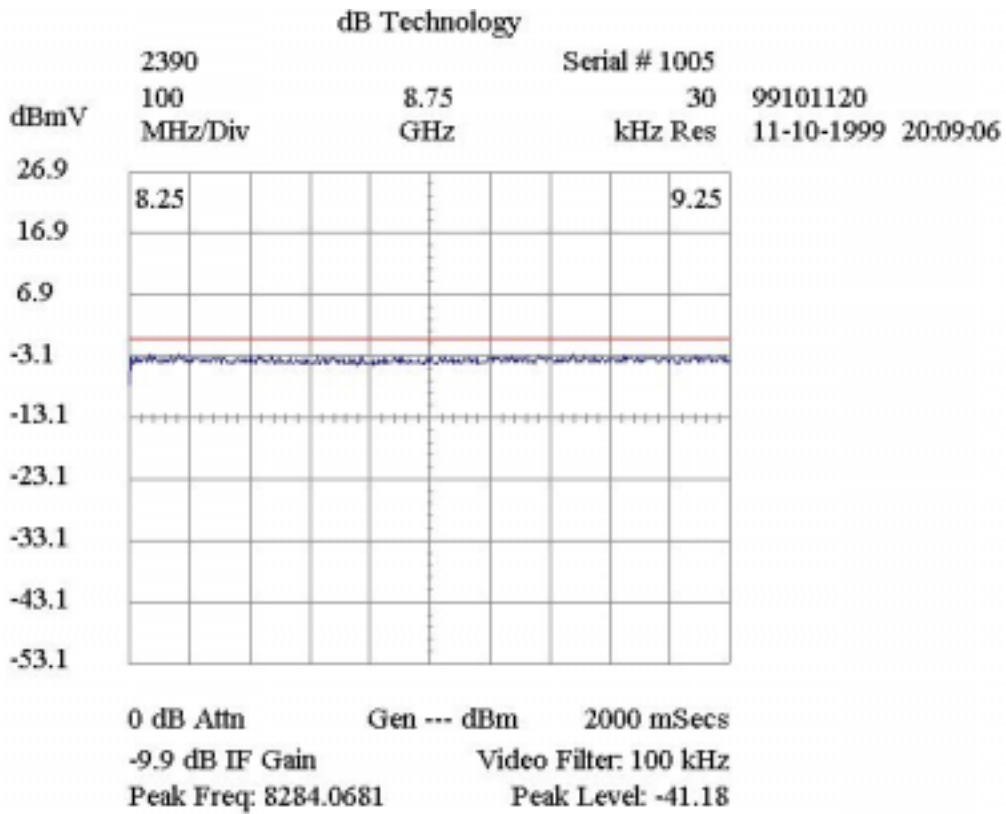
PLOT 18 Radiated Scan: 7.5GHz - 8.25GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	V	1	1	1	3	DS	11 Oct 99



PLOT 19 Radiated Scan: 8.25GHz - 9.25GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	H	1	1	1	3	DS	11 Oct 99



PLOT 20 Radiated Scan: 8.25GHz - 9.25GHz - Tx On

Test	Pol	Dist. (m)	Height (m)	Mod	Op. Mode	Test Engineer	Date
R	H	1	1	1	3	DS	11 Oct 99