Test Report Prepared By:

Electronics Test Centre
MPB Technologies Inc.
Unit 100
302 Legget Drive
Kanata Ontario K2K 1Y5

FCC REPORT
ON
Tripmaster "ranger 802.11b"
also known as
Aztech "LEX Gateway 802.11b"

IN ACCORDANCE WITH

FCC Part 15 Subpart C (July 12th, 2004)

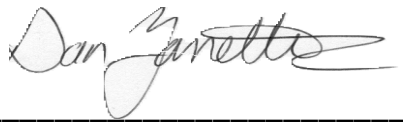
MPBT Report No.: A76R3105 **Customer P.O. No.: 041129A1**

Test Personnel: Scott Drysdale

Prepared for:

Aztech Associates Inc.
805 Bayridge Dr.
Kingston, Ontario
K7P 1T5

_____
Client Acceptance
Authorized Signatory



_____
Dan Zanette
Lab Manager
Electronic Test Centre
Kanata, Ontario
Authorized Signatory

Date: March 1, 2005
Page Composition: Pages 1 to 95

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Reviewed By

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1.0 INTRODUCTION

1.1 SCOPE

The purpose of this report is to present the findings and results of compliance testing performed, in accordance with FCC Part 15 Subpart C (July 12th 2004).

1.2 APPLICANT

This test report has been prepared for Aztech Associates Inc.

1.3 APPLICABILITY

All test procedures, limits, and results defined in this document apply to the "ranger 802.11b" unit which shall be referred to herein as the Equipment Under Test (**EUT**).

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by NVLAP or the Canadian or US governments.

1.4 TEST SAMPLE DESCRIPTION

The test sample provided for testing is as described below.

Product Type:	Pre-production unit
Serial Number:	2624450014
Model Number:	Wireless 802.11b
FCC ID:	SCLS000-0271
Part Number:	S 000-0271 (Aztech) S 000-0264 (OEM)
Cables:	See appendix A
Power Requirements:	12VDC@500mA (or provided by external 115Vac adaptor)
Peripheral Equipment:	See appendix A

1.5 GENERAL TEST CONDITIONS AND ASSUMPTIONS

The EUT was setup and exercised using the configurations, modes of operation and arrangements as defined in this report only. All inputs and outputs to and from other equipment associated with the EUT were adequately simulated.

Where relevant, the EUT was only tested using the monitoring methods and test criteria defined in this report.

All testing, unless otherwise noted, was performed under the following environmental conditions:

Temperature: 17 to 23 °C

Humidity: 45 to 75 %

Barometric Pressure: 68 to 106 kPa

1.6 SCOPE OF TESTING

Tests were performed in accordance with ANSI C63.4:2003.

1.6.1 VARIATIONS IN TEST METHODS

There following variations were made during testing:

The EUT will be firmware limited to operating at 1mpbs and 2mpbs only. Therefore only these data rates were tested at each of the channels required. If there was no observable difference in measurement, data is presented from 2mpbs tests.

1.6.2 TEST SAMPLE MODIFICATIONS

The test sample had the following modifications: A steward ferrite, #HFA150068-0A2, was applied to the cable around the antenna output port to reduce unintentional emissions below 1GHz..

2.0 TEST CONCLUSION

The EUT was subjected to the following tests. Compliance is designated by a **PASS;** non-compliance by a **FAIL**.

The following table summarizes the test results and details the tests performed in terms of the specification and class or level applied, the unique test sample identification, and the EUT modification state, the mode of operation, configuration and cable arrangement (if applicable).

Test Case	Test Type	Specification	Mod State	ENG./ QUAL	**Result / Justification**
2.1	Antenna Requirement(s)	FCC Part 15.203	N/A	QUAL	Justification See section 2.1
2.2	Restricted bands	FCC Part 15.205	Rx / Tx	QUAL	**Pass**
2.3	Powerline Conducted Emissions	FCC part 15.207	W / AC adaptor	QUAL	**Pass**
2.4	Unintentional Radiated Emissions / Bandedge radiated.	FCC part 15.209(a)	Rx / Tx	QUAL	**Pass**
2.5	6dB Bandwidth	FCC part 15.247(a)(2)	Tx	Qual	**Pass**
2.6	Peak Power / Voltage variations	FCC part 15.247(b)(3) FCC part 15.31(e)	Tx W/AC adaptor	Qual	**Pass**
2.7	Antenna gain	FCC part 15.247(c)	Tx	Qual	Justification See section 2.7
2.8	Antenna Conducted Emissions / Bandedge conducted.	FCC part 15.247(d)	Tx	Qual	**Pass**
2.9	Spectral Density	FCC part 15.247(e)	Tx	Qual	**Pass**
2.10	RF Exposure	FCC part 2.1091 FCC part 1.1307 FCC part 1.1310	Tx	Qual	Justification See section 2.10

STATEMENT OF COMPLIANCE

The client equipment referred to in this report was found to comply with the requirements as stated above.

ABBREVIATIONS

CE - Conducted Emissions
CS-Conducted Susceptibility(Immunity)
ESD - Electrostatic Discharge
EFT - Electrical Fast Transient Burst
E-Field - Electric Field
H-Field - Magnetic Field
N/T - Not Tested
N/A - Not Applicable
RE - Radiated Emissions
RS- Radiated Susceptibility(Immunity)

MEASUREMENT UNCERTAINTY

The following measurement uncertainty with 95% confidence level was calculated using the methods defined in NAMAS document NIS81: May 1994.

For Radiated E-Field Emissions

Frequency = $\pm$ 1kHz

Amplitude = $\pm$ 4.01 dB

For Conducted Emissions

Frequency = $\pm$ $1x10^{-3}$ MHz

Amplitude = $\pm$ 3.25 dB

For Frequency Stability /Temperature accuracy.

Frequency = +/- 20 Hz (determined by Freq counter in STD mode)

Temperature = +/- 0.5°C (For “K” type thermocouples)

2.1 ANTENNA REQUIREMENT(S)

Test Summary	
Test Personnel: Scott Drysdale	Test Date:

Test Description	
Objectives/Criteria	Specifications
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 the provisions of this Section.	**FCC Part 15.203** **Antenna requirement** Note: A reverse SMA antenna is authorized under DA 00- 2225 issued September 28, 2000.
Result: Justification – see below	
This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded. This unit must be professionally installed, as noted in Appendix A (Customer provided details), therefore this requirement does not apply.	

2.2 RESTRICTED BANDS

Test Summary	
Test Personnel: Scott Drysdale	Test Date: January 7th, 2005

Test Description	
Objectives/Criteria	Specifications
Only spurious emissions are permitted in any of the frequency bands listed in the table below.	**FCC Part 15 Subpart C** **FCC Part 15.205 – Restricted Bands**

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

Test Result: PASS

The intentional transmitter only intentionally transmits between the frequency ranges of 2400 MHz and 2483.5 MHz, which are not restricted bands.

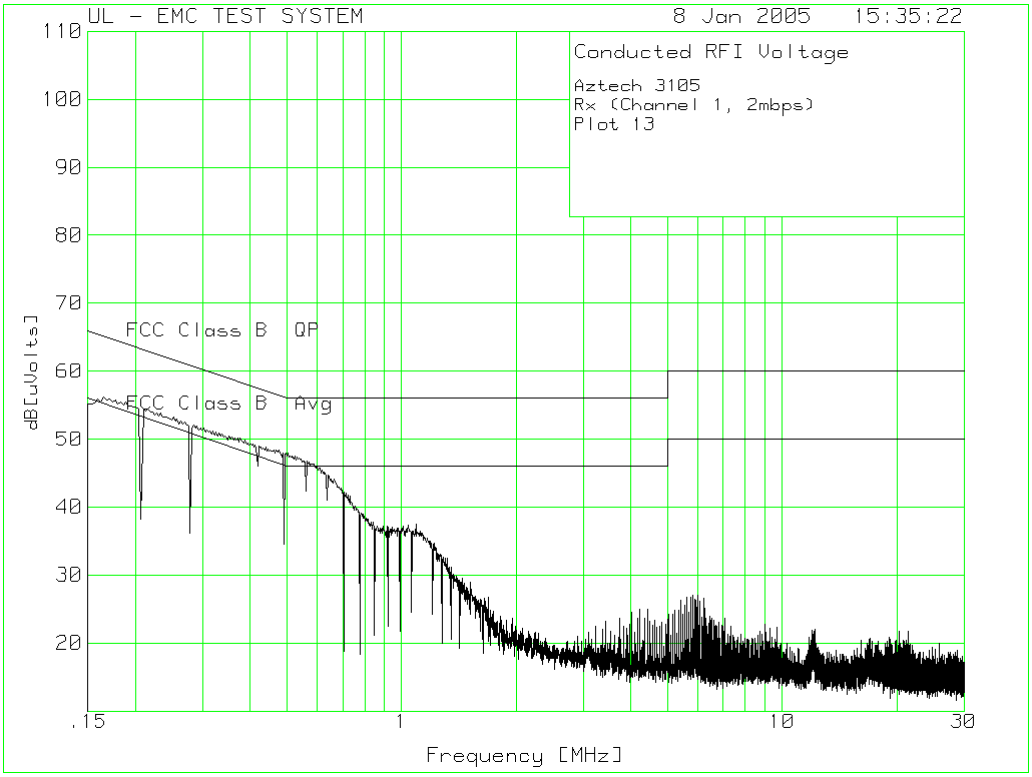
2.3 POWERLINE CONDUCTED EMISSIONS

Test Summary	
Test Personnel: Scott Drysdale	Test Date: 8th January, 2005

Test Description	
Objectives/Criteria	Specifications
The Conducted emissions from a system or sub-system shall not exceed the limits for the specifications as stated. **It is recommended that a margin of 6dB be allowed for manufacturing tolerances.** .	**FCC Part 15.207** **Frequency** **QP[1]** **AVG** .15 - .5 MHz 66-56 56-46 .5 - 5 MHz 56 46 5 - 30 MHz 60 50 **[1]: Quasi Peak Limit** **[2]: Average Limit**
Test Result Pass Note: The EUT will normally operate from a battery, but this data is presented as per customer request for filing that the EUT is also certified for AC operation. RX and TX at 1 mpbs and 2 mpbs and channels 1,6,11 scanned, with no appreciable difference. Sample results for RX and TX are presented at Channel 1, 2mbps.	

2.3.1 POWERLINE CONDUCTED EMISSIONS DATA

Line



Aztech 3105
Tx (Channel 1, 2mbps)
Plot 13 – Average data

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16493	28.12	-6.4	.2	21.92		65.2	55.2
			Margin [dB]:			-43.28	-33.28
.18281	28.22	-6.4	.1	21.92		64.4	54.4
			Margin [dB]:			-42.48	-32.48
.22754	27.02	-6.6	.1	20.52		62.5	52.5
			Margin [dB]:			-41.98	-31.98
.31999	24.42	-7	0	17.42		59.7	49.7
			Margin [dB]:			-42.28	-32.28
.38859	23.22	-7.3	0	15.92		58.1	48.1
			Margin [dB]:			-42.18	-32.18
.50191	21.92	-7.8	0	14.12		56	46
			Margin [dB]:			-41.88	-31.88

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE
File: 13AVGs.TXT

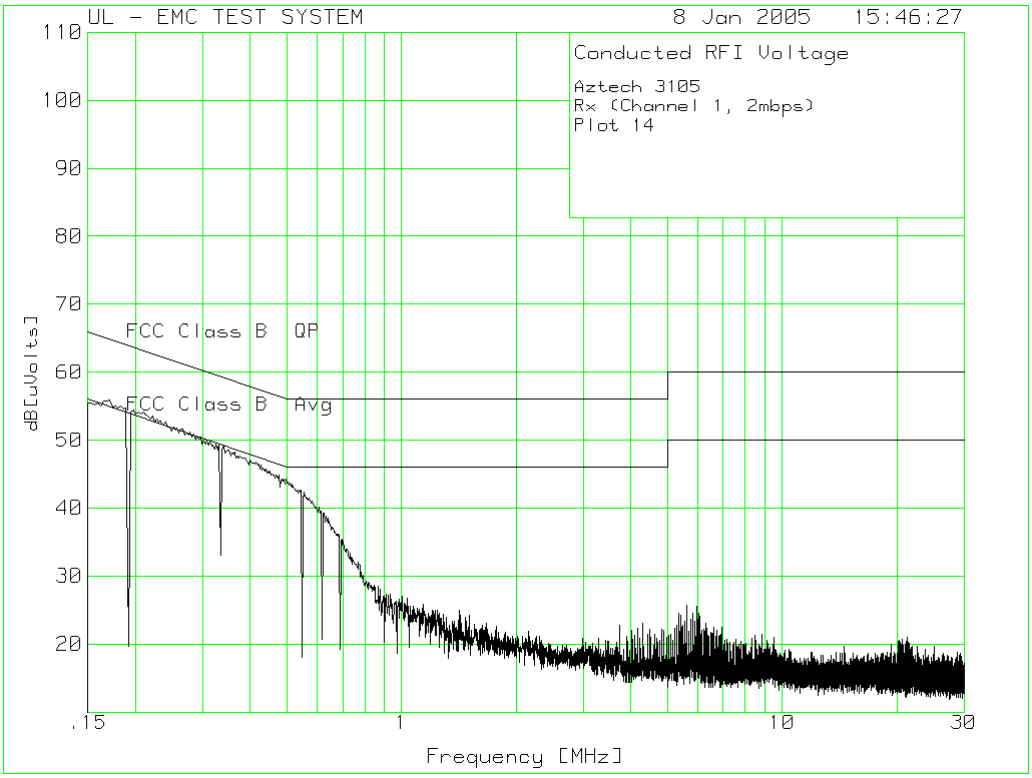
Aztech 3105
Tx (Channel 1, 2mbps)
Plot 13

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16179	58.05qp	-6.4	.2	51.85		65.4	55.4
			Margin [dB]:			-13.55	-3.55
.16806	58.15qp	-6.4	.2	51.95		65.1	55.1
			Margin [dB]:			-13.15	-3.15
.21274	56.68qp	-6.6	.1	50.18		63.1	53.1
			Margin [dB]:			-12.92	-2.92
.30706	54.41qp	-7	0	47.41		60	50
			Margin [dB]:			-12.59	-2.59
.37402	53.08qp	-7.3	0	45.78		58.4	48.4
			Margin [dB]:			-12.62	-2.62
.4877	51.53qp	-7.8	0	43.73		56.2	46.2
			Margin [dB]:			-12.47	-2.47

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE
File: 13QPS.TXT

Neutral



Aztech 3105
Rx (Channel 1, 2mbps)
Plot 14 - Average data

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.17088	27.92	-6.4	.2	21.72		64.9	54.9
			Margin [dB]:			-43.18	-33.18
.19772	27.82	-6.5	.1	21.42		63.7	53.7
			Margin [dB]:			-42.28	-32.28
.2514	25.22	-6.7	0	18.52		61.7	51.7
			Margin [dB]:			-43.18	-33.18
.29017	24.42	-6.9	0	17.52		60.5	50.5
			Margin [dB]:			-42.98	-32.98
.40052	20.92	-7.4	0	13.52		57.8	47.8
			Margin [dB]:			-44.28	-34.28
.49595	18.32	-7.8	0	10.52		56.1	46.1
			Margin [dB]:			-45.58	-35.58

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File: 14AVGS.TXT

Aztech 3105
Rx (Channel 1, 2mbps)
Plot 14

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16223	57.78qp	-6.4	.2	51.58		65.3	55.3
			Margin [dB]:			-13.72	-3.72
.18399	57.15qp	-6.4	.1	50.85		64.3	54.3
			Margin [dB]:			-13.45	-3.45
.23743	55.05qp	-6.7	.1	48.45		62.2	52.2
			Margin [dB]:			-13.75	-3.75
.27658	53.81qp	-6.9	0	46.91		60.9	50.9
			Margin [dB]:			-13.99	-3.99
.38641	50.5qp	-7.3	0	43.2		58.1	48.1
			Margin [dB]:			-14.9	-4.9
.48177	47.91qp	-7.8	0	40.11		56.3	46.3
			Margin [dB]:			-16.19	-6.19

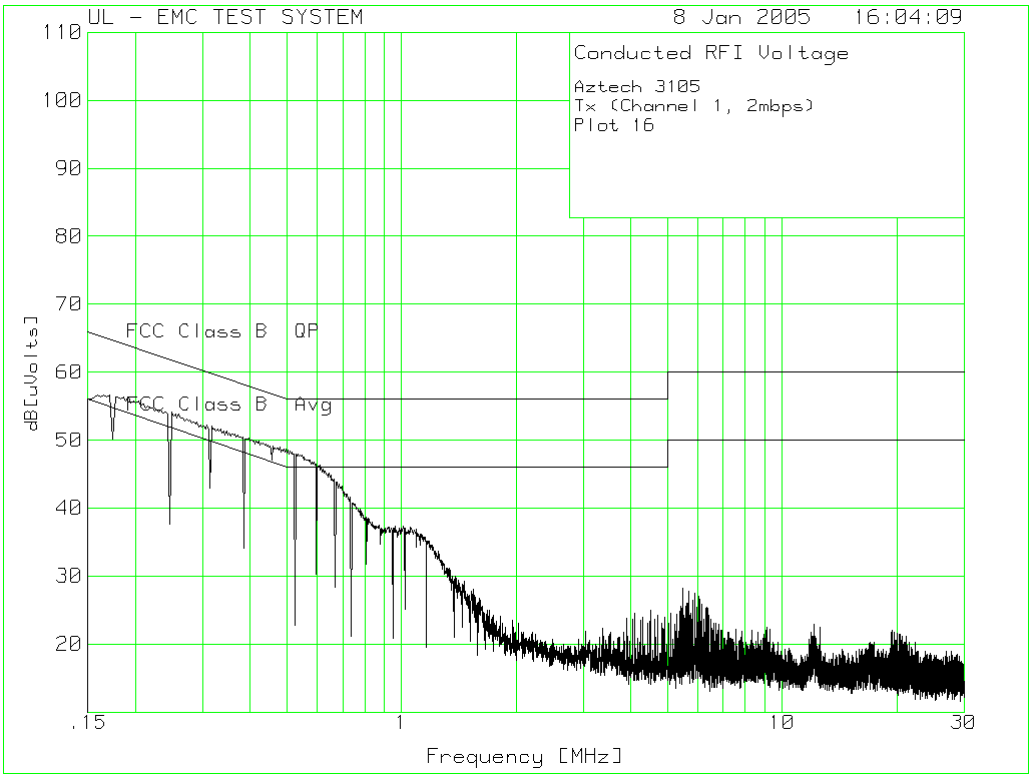
NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File: 14QPS.TXT

Line



Aztech 3105
Tx (Channel 1, 2mbps)
Plot 16 – Average data

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16493	28.92	-6.4	.2	22.72	65.2	55.2	
			Margin [dB]:		-42.48	-32.48	
.19175	28.72	-6.5	.1	22.32	64	54	
			Margin [dB]:		-41.68	-31.68	
.22754	28.12	-6.6	.1	21.62	62.5	52.5	
			Margin [dB]:		-40.88	-30.88	
.29017	26.42	-6.9	0	19.52	60.5	50.5	
			Margin [dB]:		-40.98	-30.98	
.35876	24.52	-7.2	0	17.32	58.8	48.8	
			Margin [dB]:		-41.48	-31.48	
.50191	22.42	-7.8	0	14.62	56	46	
			Margin [dB]:		-41.38	-31.38	

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File: 16AVGs.TXT

Aztech 3105
Tx (Channel 1, 2mbps)
Plot 16

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16713	58.78qp	-6.4	.2	52.58		65.1	55.1
			Margin [dB]:			-12.52	-2.52
.17691	58.64qp	-6.4	.1	52.34		64.6	54.6
			Margin [dB]:			-12.26	-2.26
.21355	57.39qp	-6.6	.1	50.89		63.1	53.1
			Margin [dB]:			-12.21	-2.21
.27542	55.62qp	-6.9	0	48.72		61	51
			Margin [dB]:			-12.28	-2.28
.34584	54.41qp	-7.2	0	47.21		59.1	49.1
			Margin [dB]:			-11.89	-1.89
.48779	52.36qp	-7.8	0	44.56		56.2	46.2
			Margin [dB]:			-11.64	-1.64

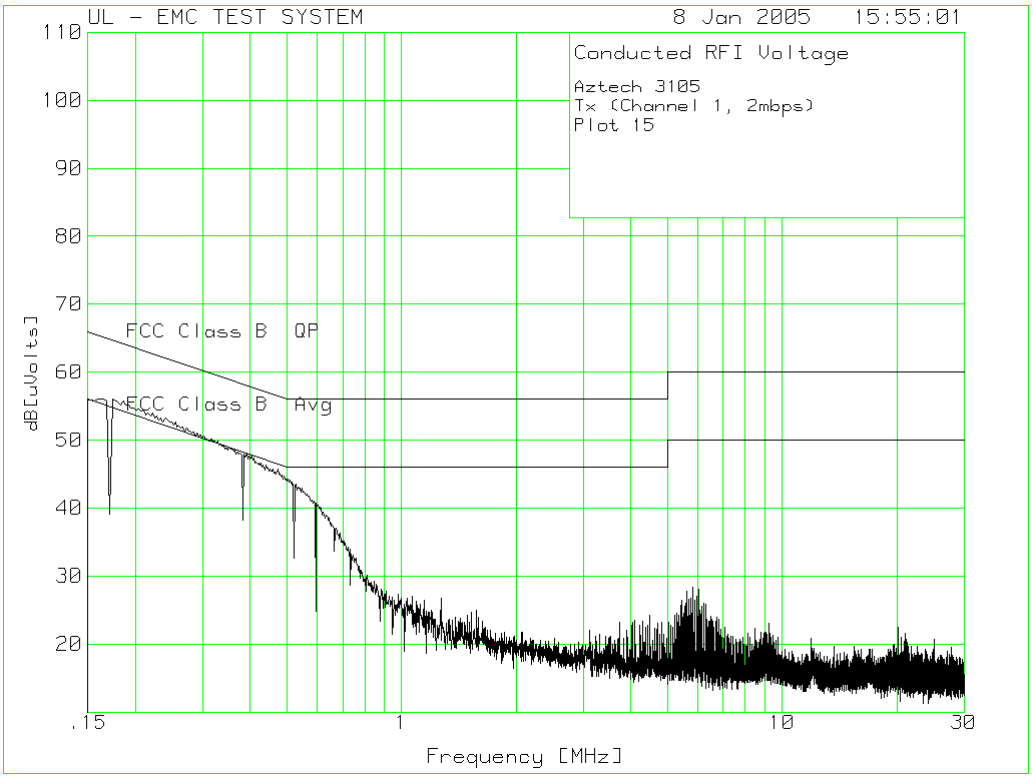
NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File: 16QPS.TXT

Neutral



Aztech 3105
Tx (Channel 1, 2mbps)
Plot 15 - Average data

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16789	28.62	-6.4	.2	22.42	65.1	55.1	
			Margin [dB]:		-42.68	-32.68	
.17684	28.52	-6.4	.1	22.22	64.6	54.6	
			Margin [dB]:		-42.38	-32.38	
.20368	28.22	-6.5	.1	21.82	63.5	53.5	
			Margin [dB]:		-41.68	-31.68	
.2514	26.22	-6.7	0	19.52	61.7	51.7	
			Margin [dB]:		-42.18	-32.18	
.30806	24.32	-7	0	17.32	60	50	
			Margin [dB]:		-42.68	-32.68	
.47209	19.52	-7.7	0	11.82	56.5	46.5	
			Margin [dB]:		-44.68	-34.68	

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File: 15AVGS.TXT

Aztech 3105
Tx (Channel 1, 2mbps)
Plot 15

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2	3
Range: 1 .15 - 30MHz							
.16108	58.41qp	-6.3	.2	52.31		65.4	55.4
			Margin [dB]:			-13.09	-3.09
.16574	58.46qp	-6.4	.2	52.26		65.2	55.2
			Margin [dB]:			-12.94	-2.94
.18945	57.78qp	-6.5	.1	51.38		64.1	54.1
			Margin [dB]:			-12.72	-2.72
.23678	55.93qp	-6.7	.1	49.33		62.2	52.2
			Margin [dB]:			-12.87	-2.87
.29332	53.88qp	-6.9	0	46.98		60.4	50.4
			Margin [dB]:			-13.42	-3.42
.45752	49.1qp	-7.7	0	41.4		56.7	46.7
			Margin [dB]:			-15.3	-5.3

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: NONE
LIMIT 2: FCC Class B QP
LIMIT 3: FCC Class B Avg
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File: 15QPS.TXT

2.3.2 POWERLINE CONDUCTED EMISSIONS SETUP

2.4 UNINTENTIONAL RADIATED EMISSIONS / BAND EDGE

Test Summary	
Test Personnel: Scott Drysdale	Test Date: January 7, 2005

Test Description	
Objectives/Criteria	Specifications
The electric fields radiated by a system or sub-system, shall not exceed the limits for the specifications as stated. Tests were performed in both Tx and Rx modes, with the EUT set at low, middle and also high frequency Rx/Tx.. All emissions, except 2390 MHz – 2400 MHz, were tested to have met the 15.209(a) limit, including those spurious emissions outside restricted bands. 2390 – 2400MHz met the requirement of 15.247(d) and does not fall within a restricted band.	**FCC Part 15.209(a)** **Frequency** **dBuV/m Limits** @3m X1* - 30 MHz 69.5 30-88 MHz 40.0 88-216 MHz 43.5 216-964 MHz 46.0 964 MHz – X2* 54.0 All limits below 1GHz are in Quasi Peak (120kHz), and above 1 GHz are average (1MHz). * - X1 represents lowest radio frequency signal generated in the device, as per FCC 15.33(a) * - X2 represents 10th harmonic of the highest frequency or 40 GHz, whichever is lower as per FCC 15.33(a).
Test Result: PASS	

Note: The EUT was scanned to 25 GHz which represents slightly higher then the 10th Harmonic.

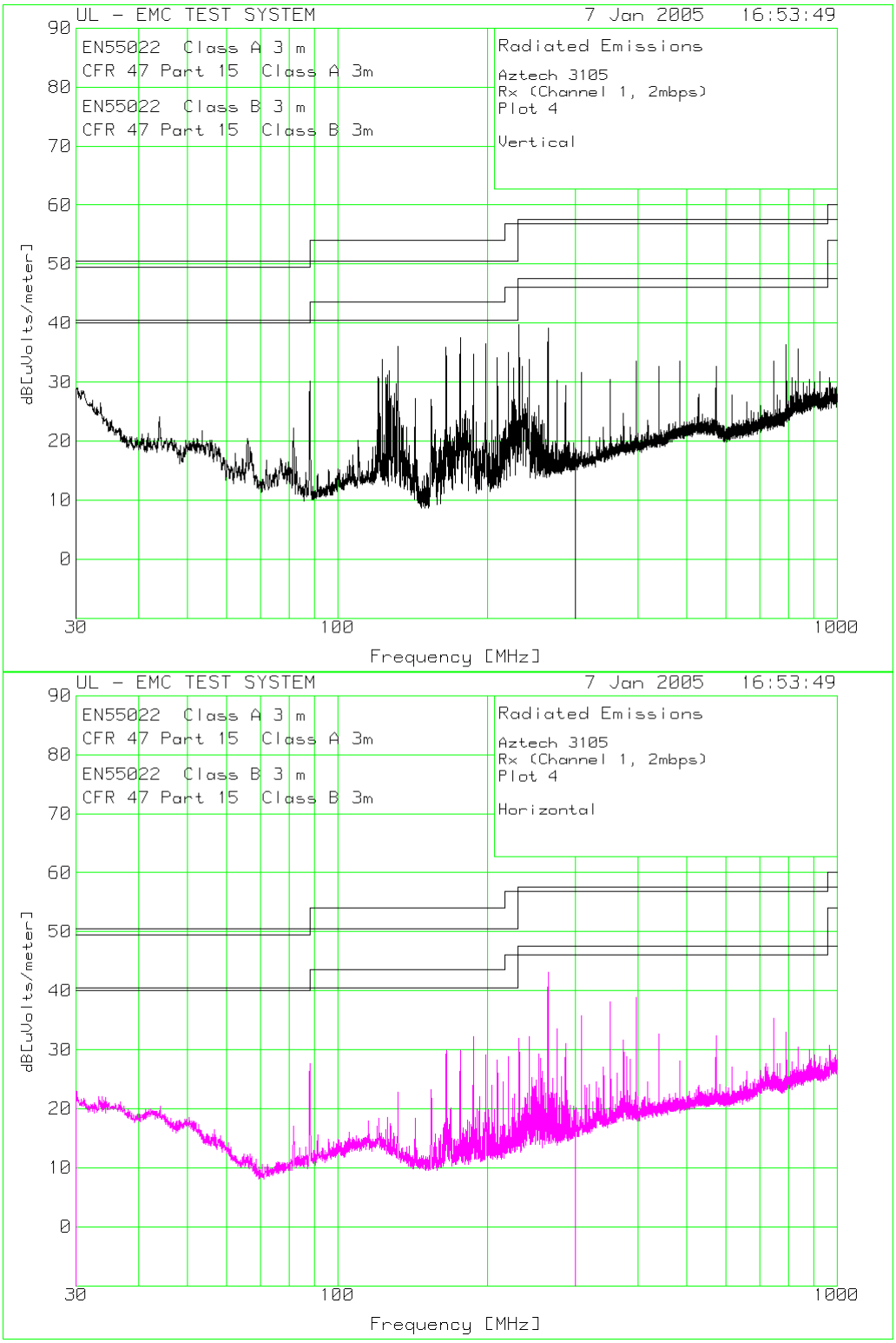
No emissions were detected above 18GHz at a measurement distance of 10 cm.

Tests were also performed in both AC & DC mode operation, DC results are presented as worst case. As per section 2.8 of this report, or section 15.247(d) attenuation below the general limits specified in Section 15.209(a) is not required, except for radiated emissions which fall in the restricted bands, as defined in FCC Section 15.205(a) and also Section 2.2 of this report.

1mbps and 2mpbs were scanned, with no observable difference. 2 mpbs results are reported below. Please see 6dB bandwidth results for further data supporting this statement.

2.4.1 UNINTENTIONAL RADIATED EMISSIONS DATA

2.4.1.1 Receive mode



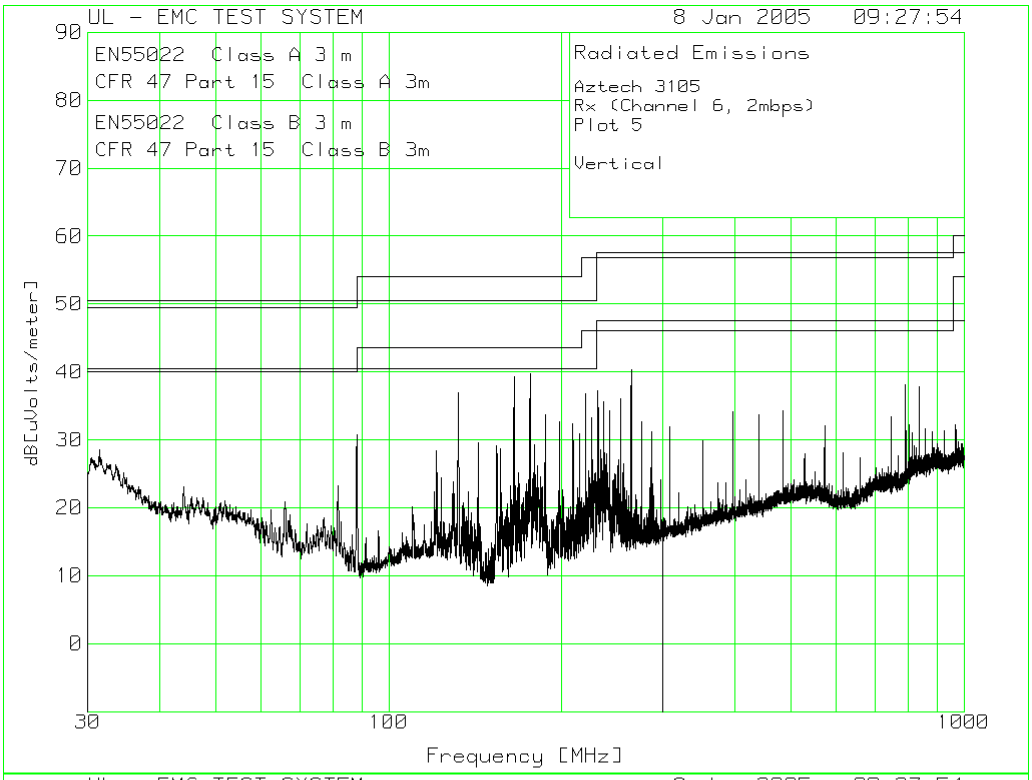
Aztech 3105
Rx (Channel 1, 2mbps)
Plot 4
Horizontal

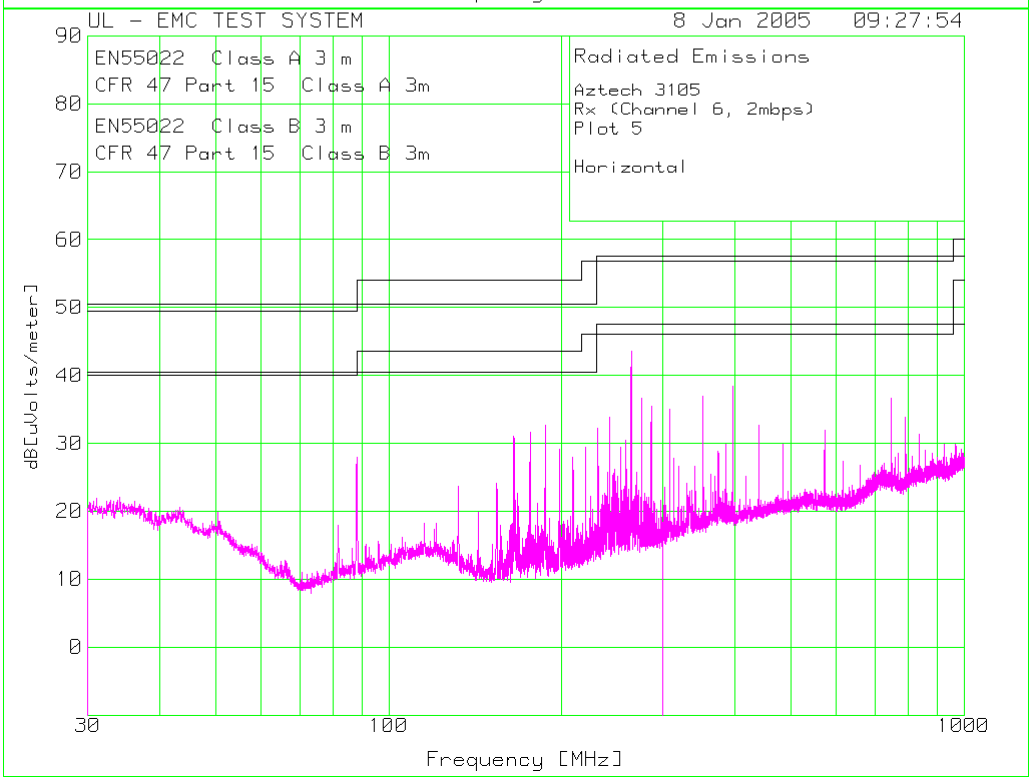
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Range: 1 30 - 300MHz								
175.9974	52.51 qp	-27.01	8.64	34.14	40.5	54	43.52	50.5
Azimuth: 121	Height:100	Vert		Margin [dB]:	-6.36	-19.86	-9.38	-16.36
198.0088	43.82 qp	-26.81	10.16	27.17	40.5	54	43.52	50.5
Azimuth: 332	Height:102	Vert		Margin [dB]:	-13.33	-26.83	-16.35	-23.33
230.9933	49.6 qp	-26.64	11.84	34.8	47.5	56.9	46.02	57.5
Azimuth: 117	Height:102	Vert		Margin [dB]:	-12.7	-22.1	-11.22	-22.7
263.993	53.16 qp	-26.31	12.97	39.82	47.5	56.9	46.02	57.5
Azimuth: 130	Height:100	Vert		Margin [dB]:	-7.68	-17.08	-6.2	-17.68
Range: 2 30 - 300MHz								
186.9853	45.82 qp	-27.06	9.91	28.67	40.5	54	43.52	50.5
Azimuth: 4	Height:160	Horz		Margin [dB]:	-11.83	-25.33	-14.85	-21.83
263.9906	56.66 qp	-26.31	12.69	43.04	47.5	56.9	46.02	57.5
Azimuth: 0	Height:102	Horz		Margin [dB]:	-4.46	-13.86	-2.98	-14.46

LIMIT 1: EN55022 Class B 3 m
LIMIT 2: CFR 47 Part 15 Class A 3m
LIMIT 3: CFR 47 Part 15 Class B 3m
LIMIT 4: EN55022 Class A 3 m
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 4QPS.TXT





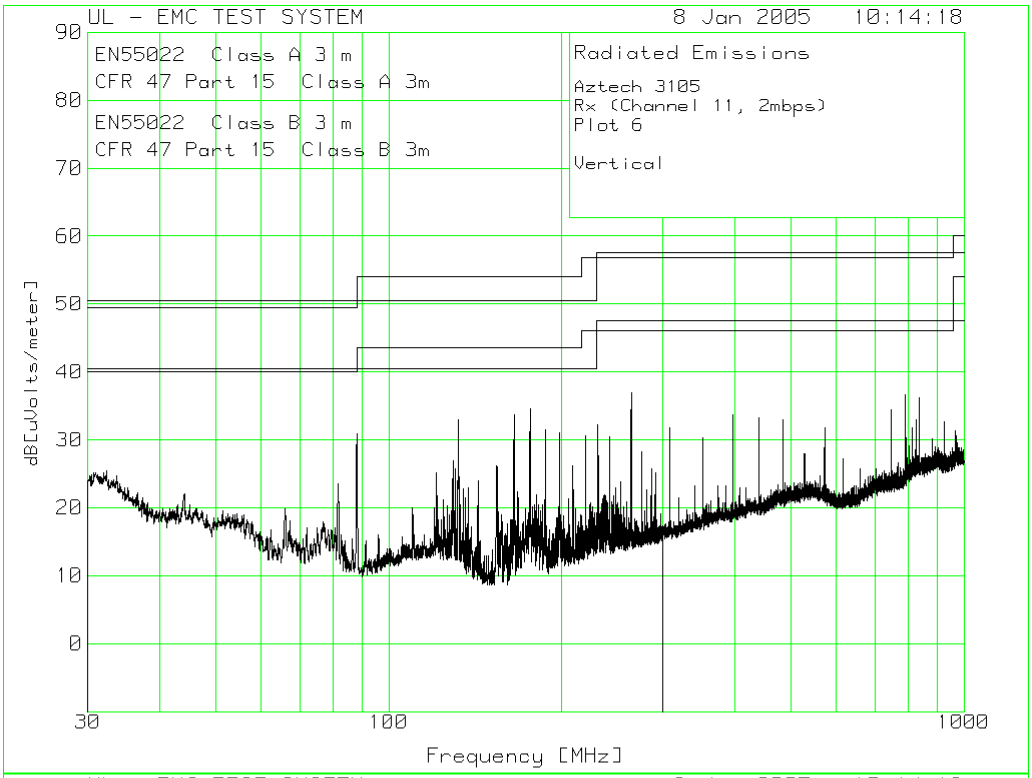
Aztech 3105
Rx (Channel 6, 2mbps)
Plot 5
Horizontal

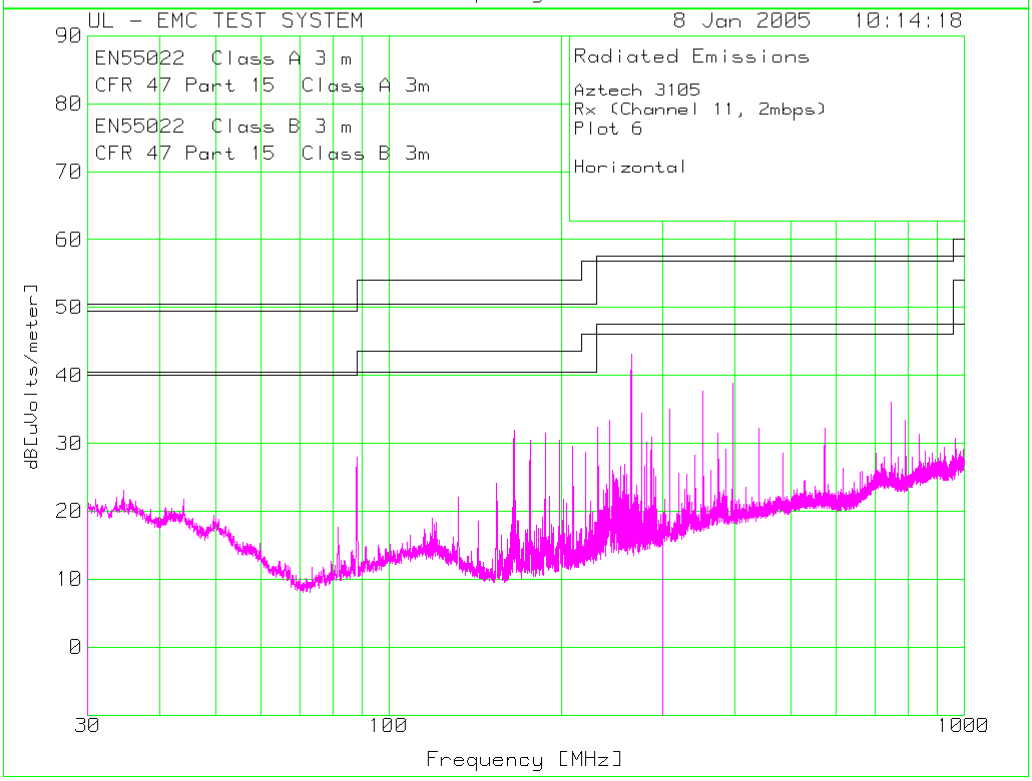
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Range: 1 30 - 300MHz								
164.9989	46.53 qp	-27.16	8.25	27.62	40.5	54	43.52	50.5
Azimuth: 119	Height:101 Vert		Margin [dB]:		-12.88	-26.38	-15.9	-22.88
176.0071	52.88 qp	-27.01	8.64	34.51	40.5	54	43.52	50.5
Azimuth: 116	Height:100 Vert		Margin [dB]:		-5.99	-19.49	-9.01	-15.99
263.9813	54.2 qp	-26.31	12.97	40.86	47.5	56.9	46.02	57.5
Azimuth: 134	Height:100 Vert		Margin [dB]:		-6.64	-16.04	-5.16	-16.64
131.9958	50.65 qp	-27.31	10.34	33.68	40.5	54	43.52	50.5
Azimuth: 44	Height:100 Vert		Margin [dB]:		-6.82	-20.32	-9.84	-16.82
Range: 2 30 - 300MHz								
263.982	57.22 qp	-26.31	12.69	43.6	47.5	56.9	46.02	57.5
Azimuth: 0	Height:100 Horz		Margin [dB]:		-3.9	-13.3	-2.42	-13.9
186.988	45.61 qp	-27.06	9.91	28.46	40.5	54	43.52	50.5
Azimuth: 0	Height:166 Horz		Margin [dB]:		-12.04	-25.54	-15.06	-22.04

LIMIT 1: EN55022 Class B 3 m
LIMIT 2: CFR 47 Part 15 Class A 3m
LIMIT 3: CFR 47 Part 15 Class B 3m
LIMIT 4: EN55022 Class A 3 m
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 5QPS.TXT





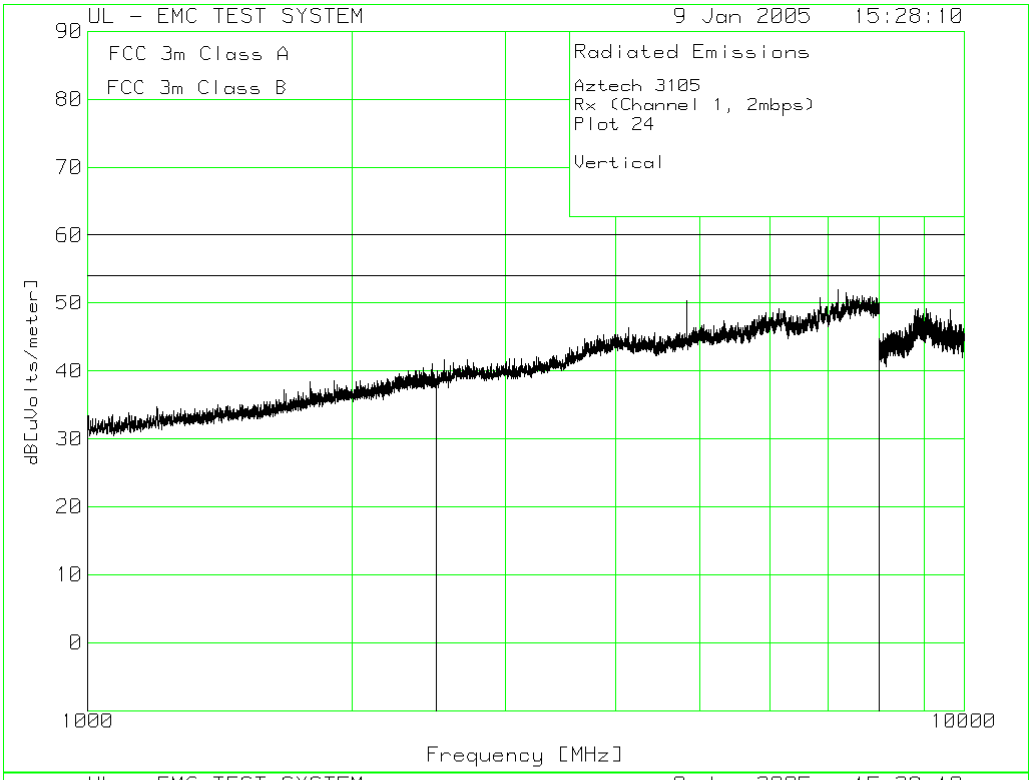
Aztech 3105
Rx (Channel 11, 2mbps)
Plot 6
Horizontal

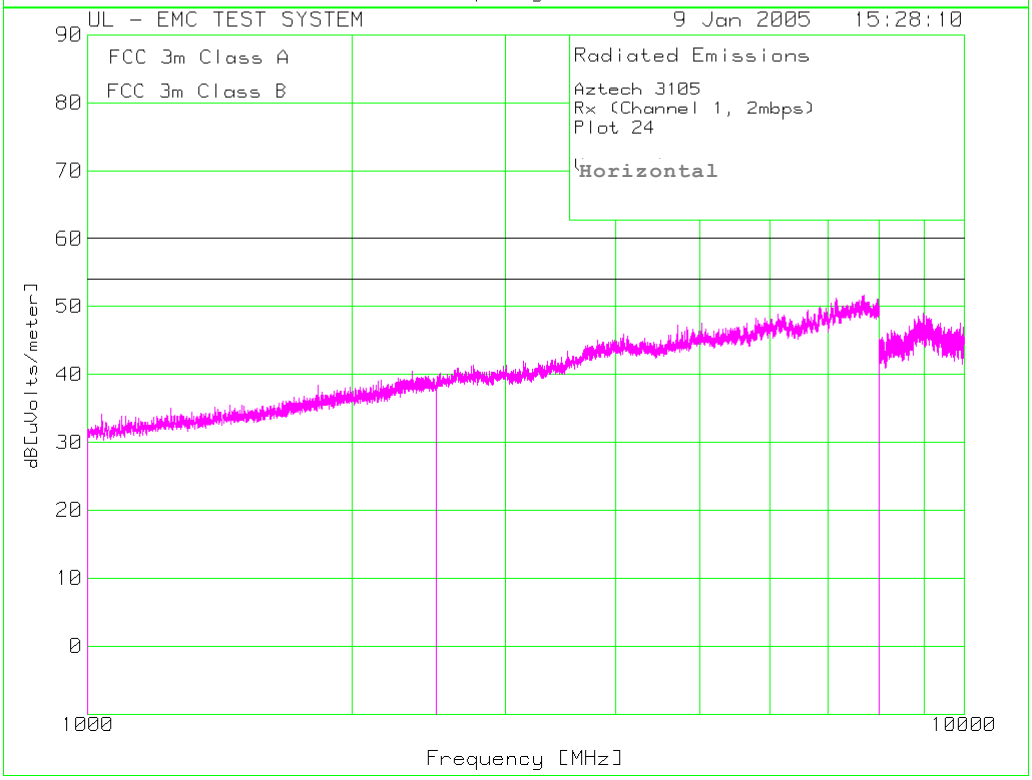
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Range: 1 30 - 300MHz								
164.992	46.63 qp	-27.16	8.25	27.72	40.5	54	43.52	50.5
Azimuth: 116	Height:101	Vert		Margin [dB]:	-12.78	-26.28	-15.8	-22.78
176.001	53.1 qp	-27.01	8.64	34.73	40.5	54	43.52	50.5
Azimuth: 121	Height:100	Vert		Margin [dB]:	-5.77	-19.27	-8.79	-15.77
263.9824	51.66 qp	-26.31	12.97	38.32	47.5	56.9	46.02	57.5
Azimuth: 48	Height:100	Vert		Margin [dB]:	-9.18	-18.58	-7.7	-19.18
Range: 2 30 - 300MHz								
165.0051	41.63 qp	-27.16	9.35	23.82	40.5	54	43.52	50.5
Azimuth: 15	Height:126	Horz		Margin [dB]:	-16.68	-30.18	-19.7	-26.68
176.0024	44.77 qp	-27.01	9.74	27.5	40.5	54	43.52	50.5
Azimuth: 354	Height:142	Horz		Margin [dB]:	-13	-26.5	-16.02	-23
263.9825	57.01 qp	-26.31	12.69	43.39	47.5	56.9	46.02	57.5
Azimuth: 0	Height:100	Horz		Margin [dB]:	-4.11	-13.51	-2.63	-14.11

LIMIT 1: EN55022 Class B 3 m
LIMIT 2: CFR 47 Part 15 Class A 3m
LIMIT 3: CFR 47 Part 15 Class B 3m
LIMIT 4: EN55022 Class A 3 m
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

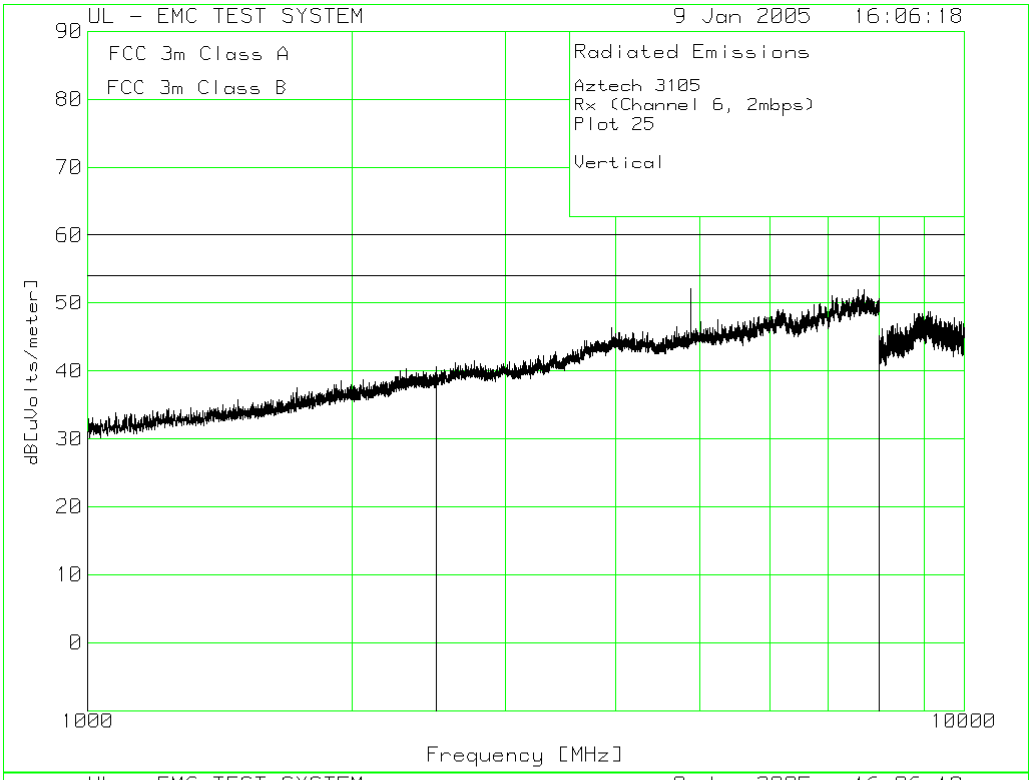
File: 6QPS.TXT

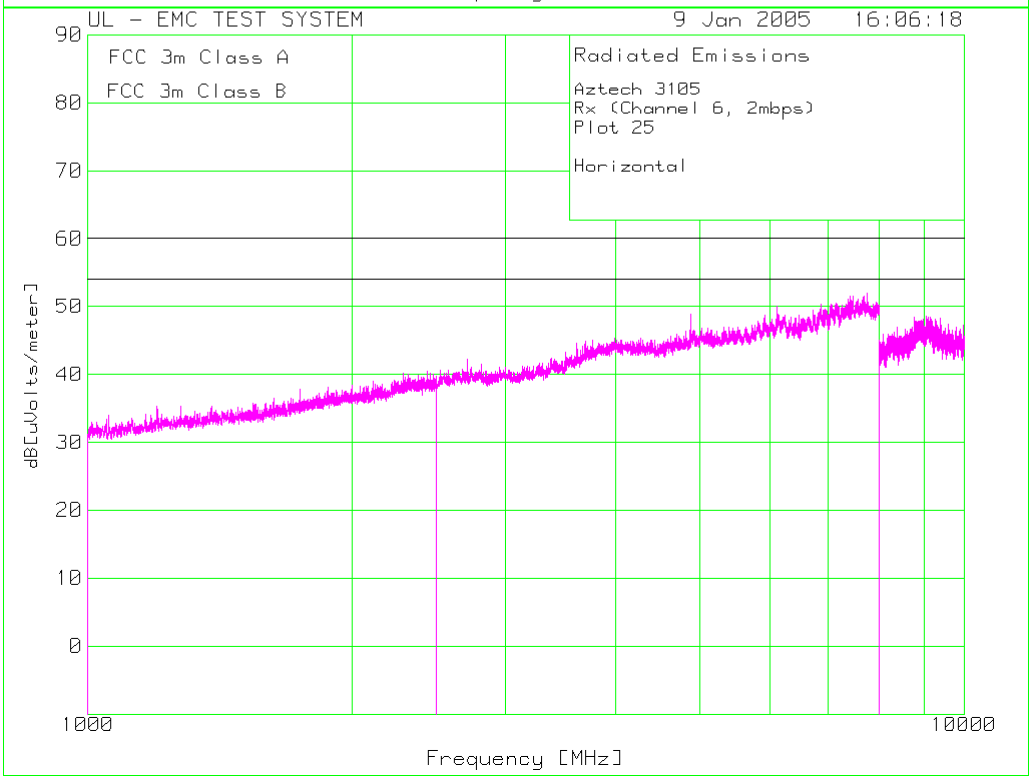




```
 Aztech 3105
 Rx (Channel 1, 2mbps)
 Plot 24

  Test     Meter     Gain/Loss  Transducer  Level  Limit:1      2
Frequency  Reading    Factor     Factor  dB[uVolts/meter]
 [MHz]     [dB(uV)]     [dB]      [dB]
=====================================================================
Range: 3 2500 - 8000MHz
4823.9035  52.7 avlg     -37.9     34.61     49.41   60       53.97
Azimuth: 286  Height:112 Vert         Margin [dB]:   -10.59   -4.56


LIMIT 1: FCC 3m Class A
LIMIT 2: FCC 3m Class B
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
```

File: 24AVG.TXT





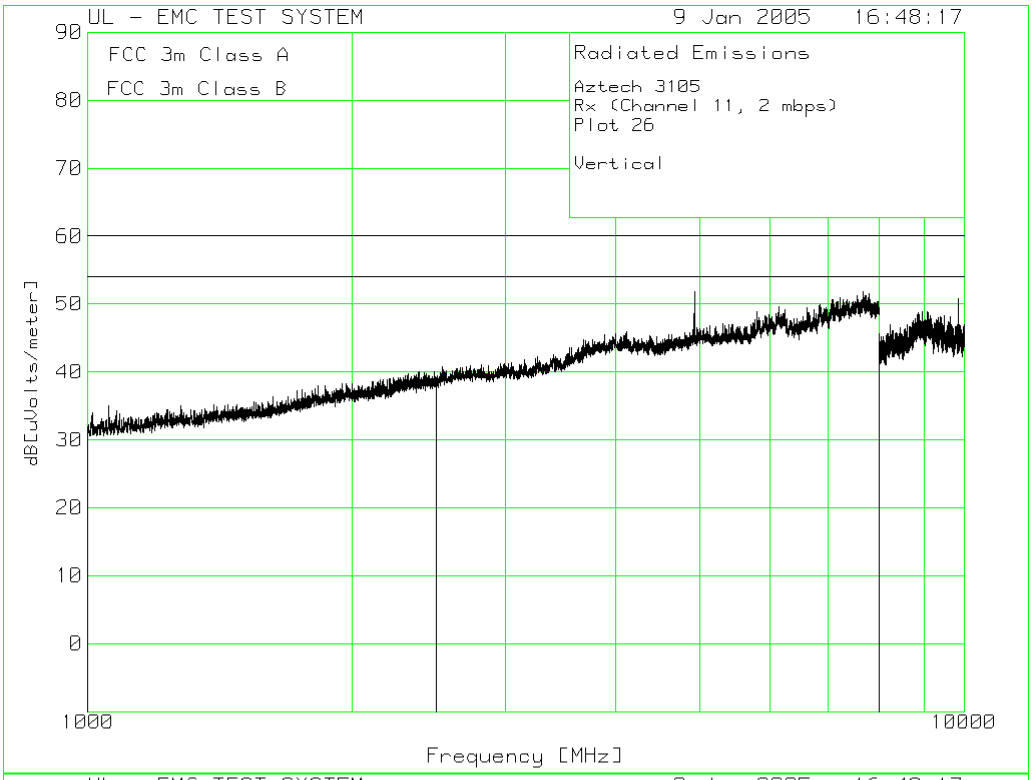
Aztech 3105
Rx (Channel 6, 2mbps)
Plot 25

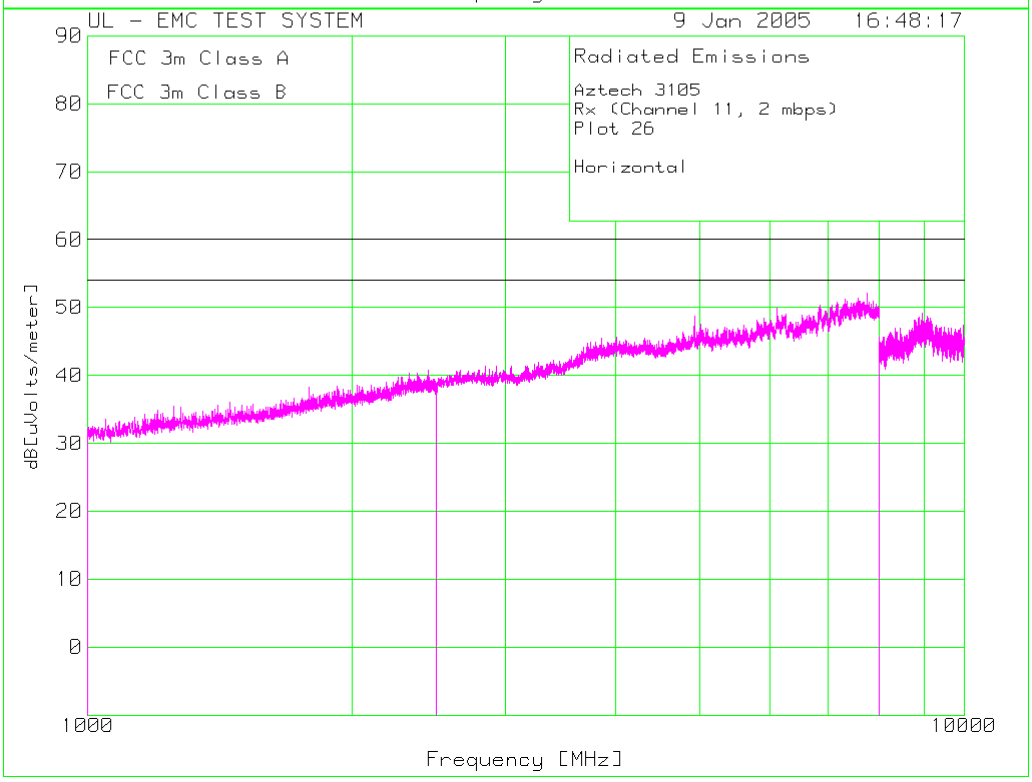
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
Range: 3 2500 - 8000MHz						
4873.947	55.2 avlg	-37.71	34.75	52.24	60	53.97
Azimuth: 284	Height:112 Vert		Margin [dB]:	-7.76		-1.73

LIMIT 1: FCC 3m Class A
LIMIT 2: FCC 3m Class B
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 25AVGs.TXT





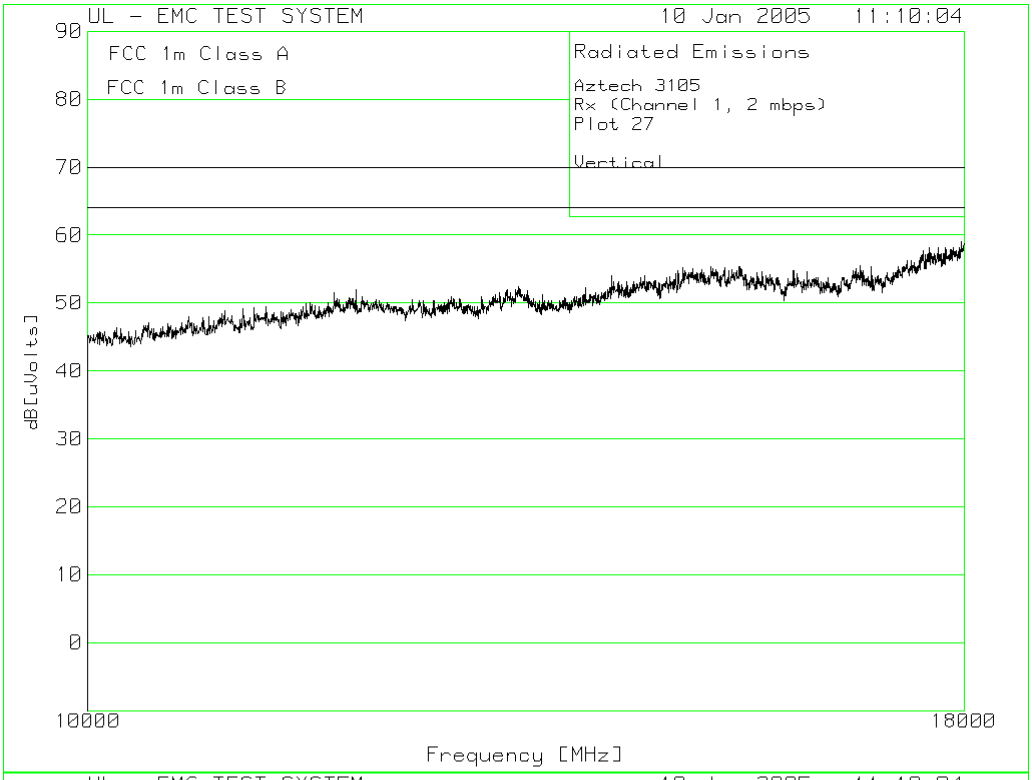
Aztech 3105
Rx (Channel 11, 2 mbps)
Plot 26

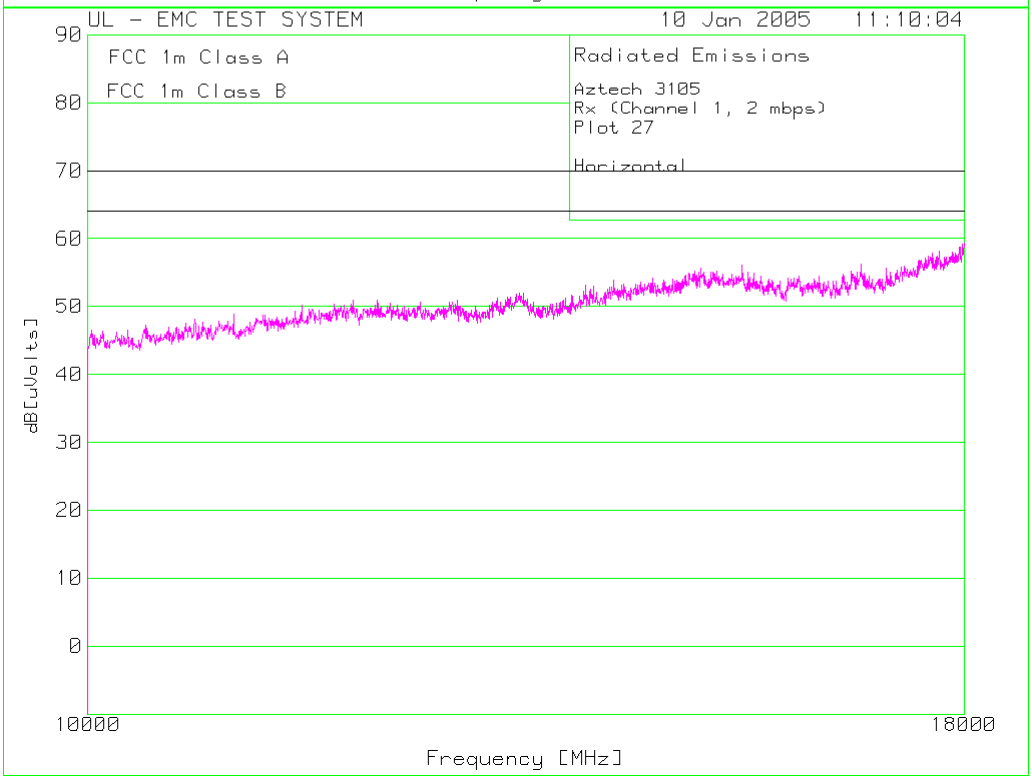
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
Range: 3 2500 - 8000MHz						
4923.916	54.5 avlg	-37.64	34.89	51.75	60	53.97
Azimuth: 283	Height:112 Vert		Margin [dB]:	-8.25		-2.22

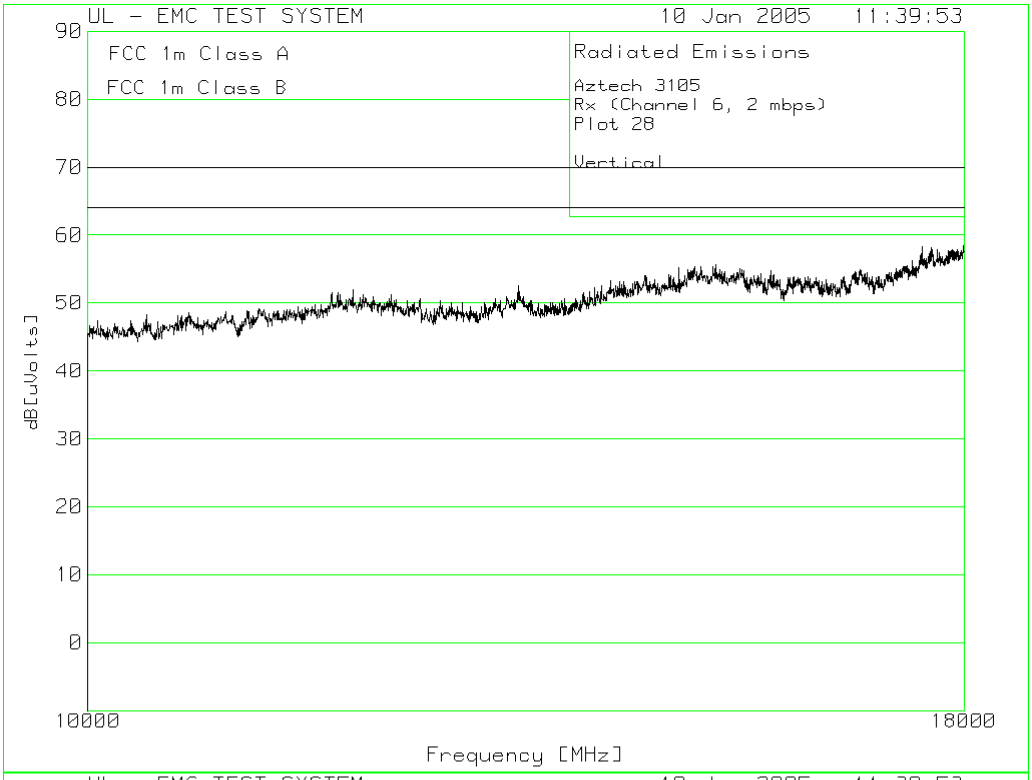
LIMIT 1: FCC 3m Class A
LIMIT 2: FCC 3m Class B
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

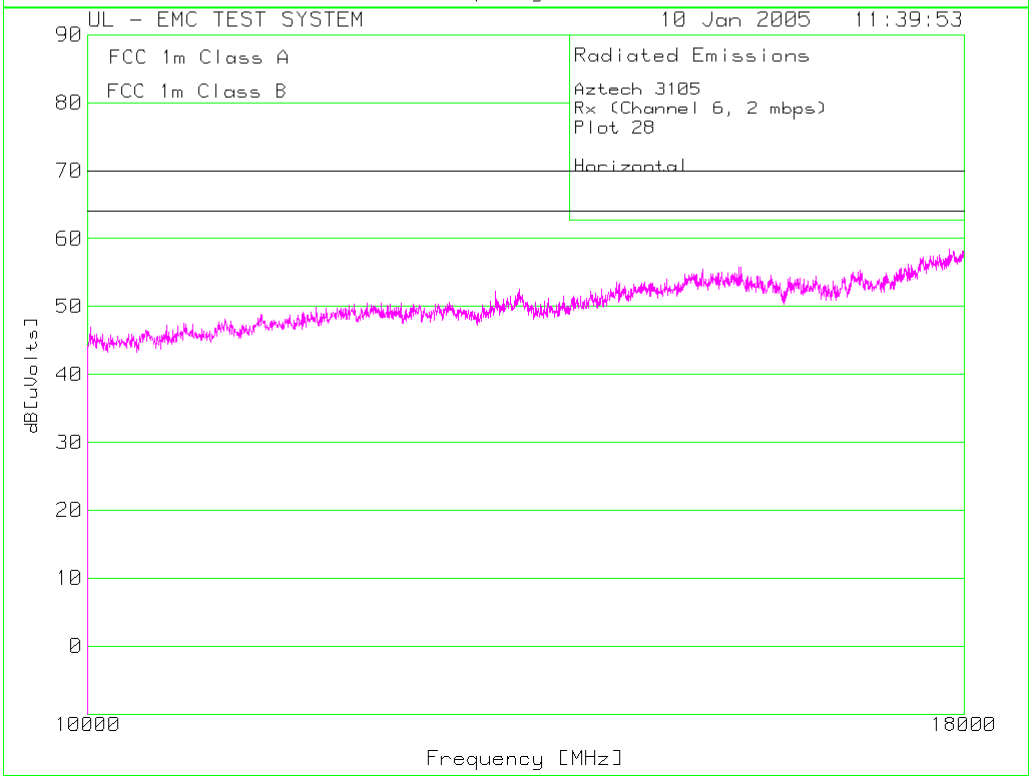
pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

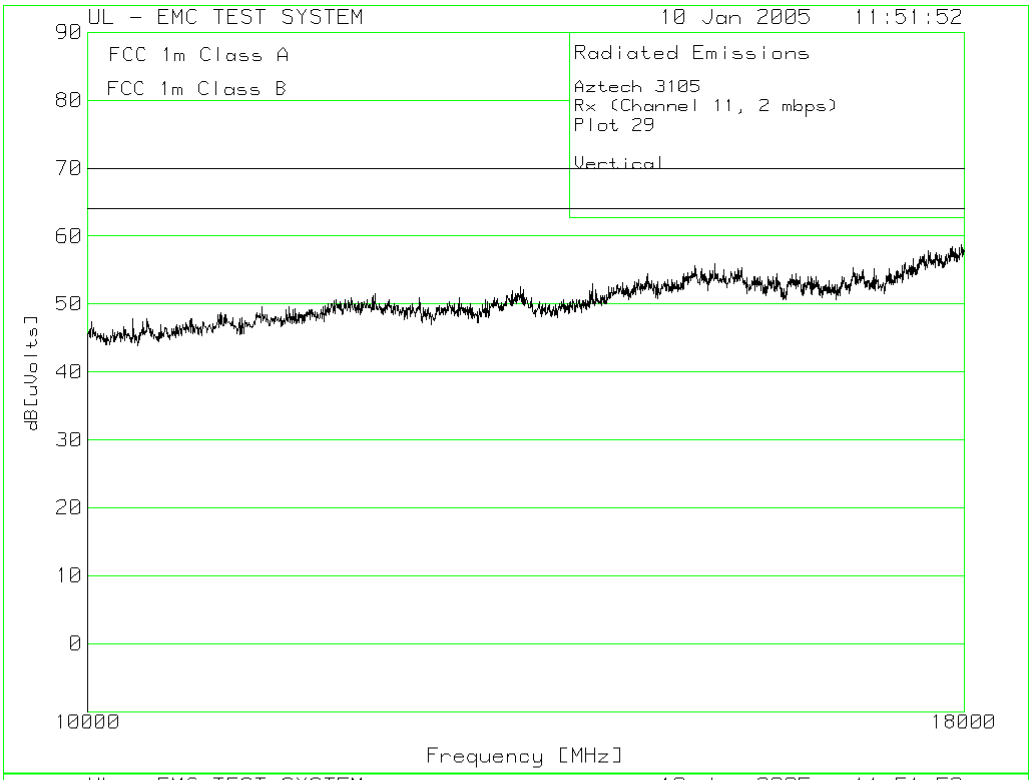
File: 26AVG.TXT

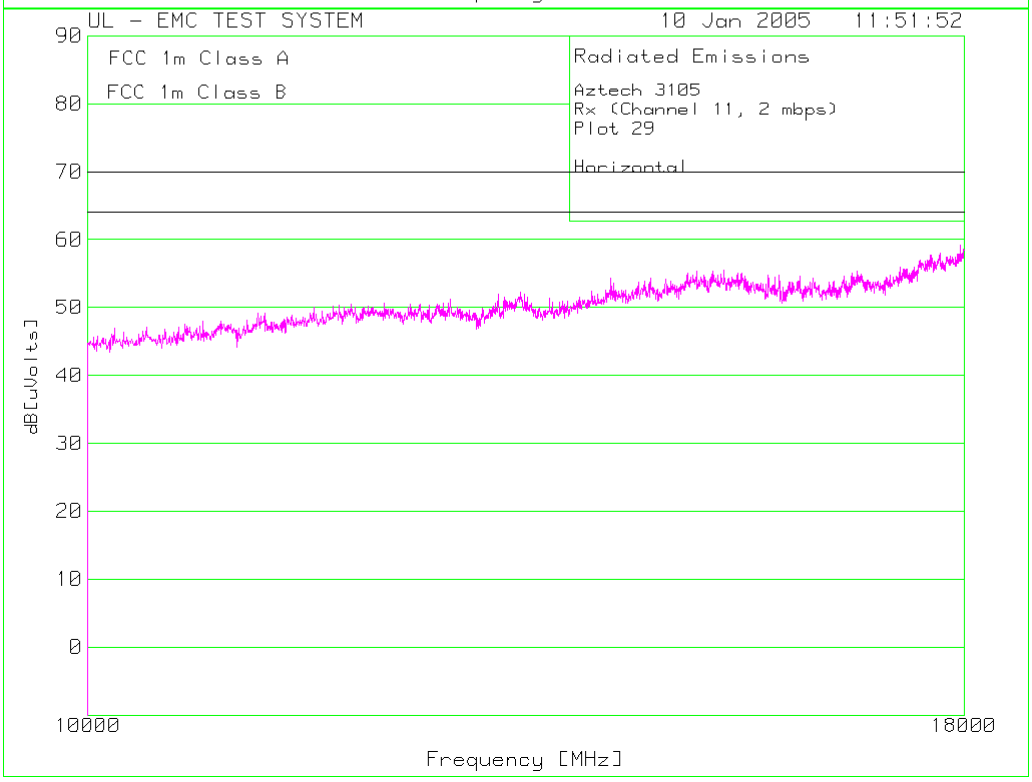




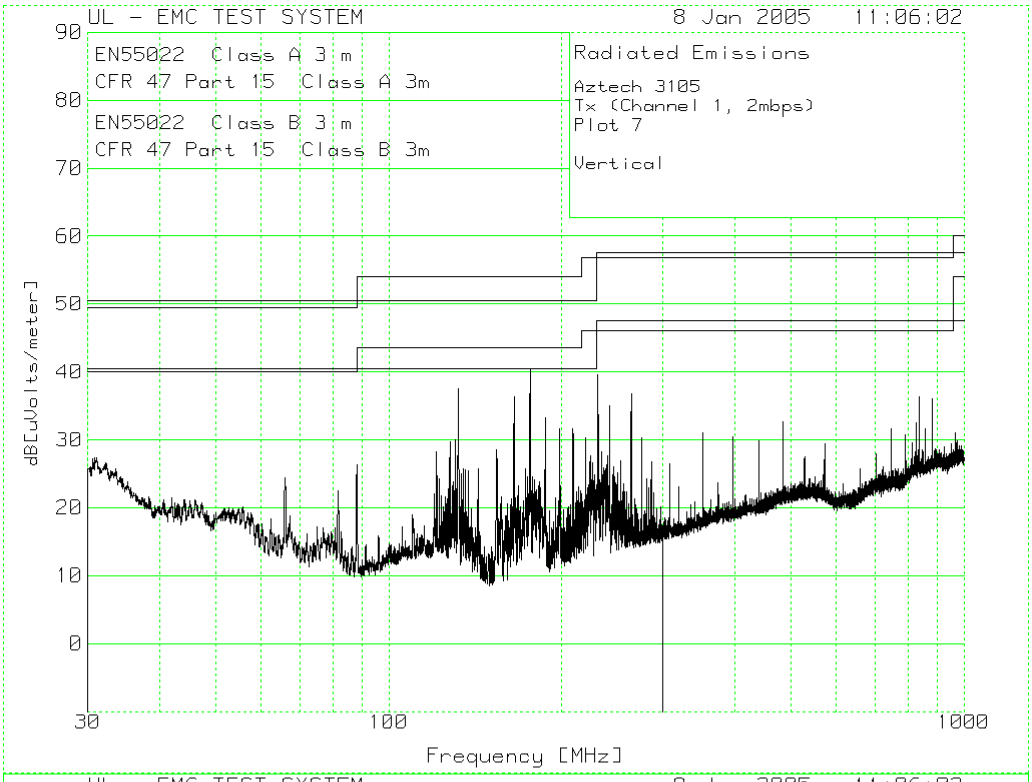


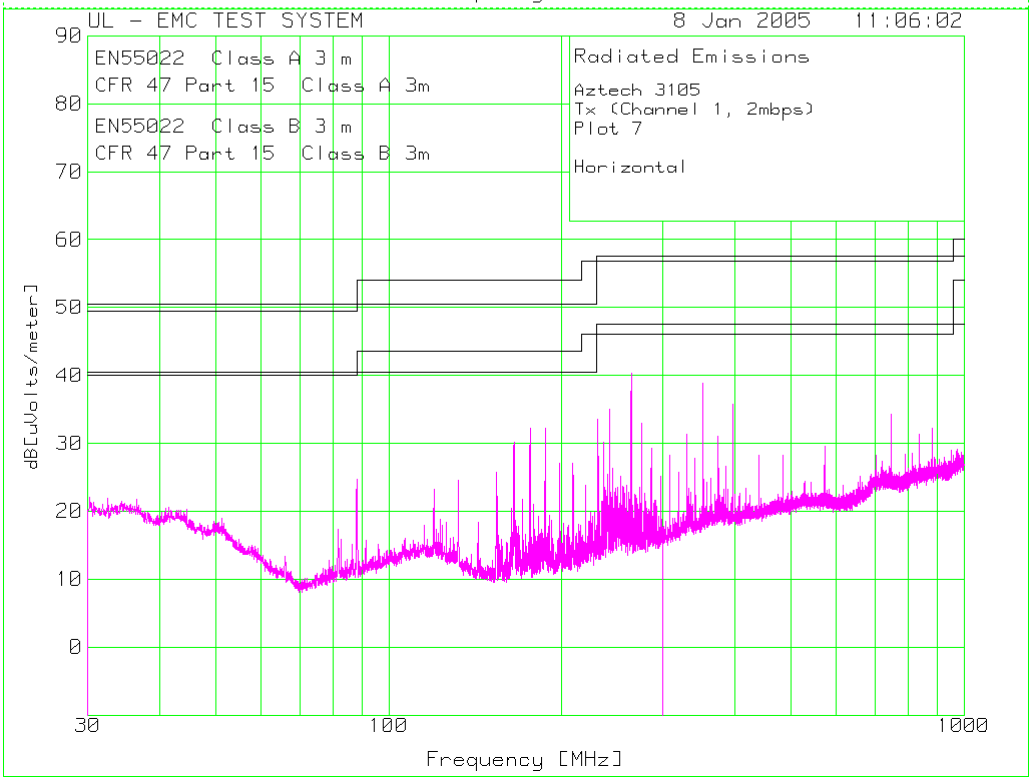






2.4.1.2 Transmit mode





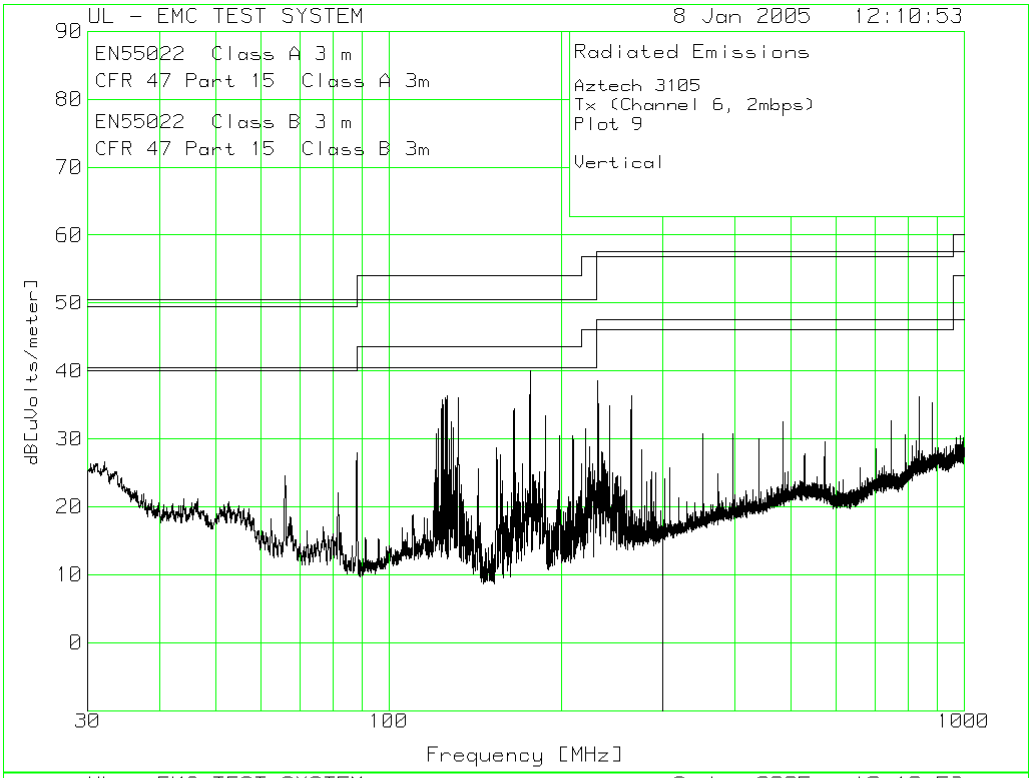
Aztech 3105
Tx (Channel 1, 2mbps)
Plot 7

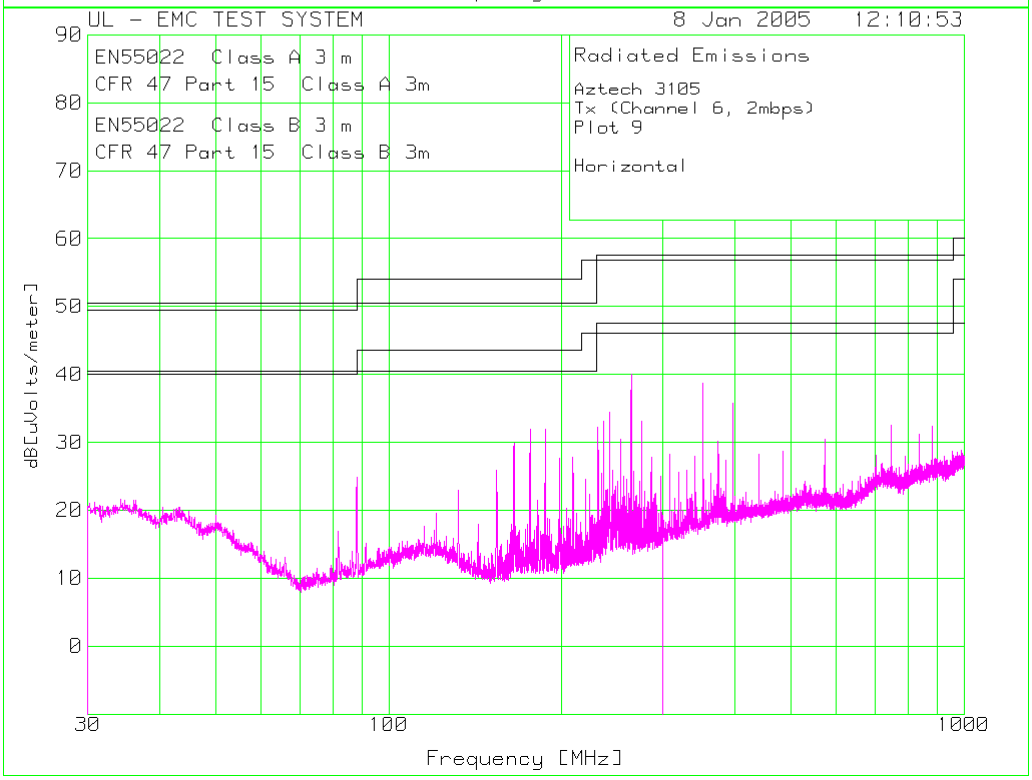
Test Frequency [MHz]	Meter Reading [dB(uV)]		Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Range: 1 30 - 300MHz									
175.9839	57	qp	-27.01	8.64	38.63	40.5	54	43.52	50.5
Azimuth: 121	Height:100	Vert		Margin [dB]:		-1.87	-15.37	-4.89	-11.87
230.9903	49.74	qp	-26.64	11.84	34.94	47.5	56.9	46.02	57.5
Azimuth: 119	Height:100	Vert		Margin [dB]:		-12.56	-21.96	-11.08	-22.56
131.9974	50.59	qp	-27.31	10.34	33.62	40.5	54	43.52	50.5
Azimuth: 56	Height:103	Vert		Margin [dB]:		-6.88	-20.38	-9.9	-16.88
Range: 2 30 - 300MHz									
263.9836	53.87	qp	-26.31	12.69	40.25	47.5	56.9	46.02	57.5
Azimuth: 0	Height:101	Horz		Margin [dB]:		-7.25	-16.65	-5.77	-17.25
230.9886	41.88	qp	-26.64	11.77	27.01	47.5	56.9	46.02	57.5
Azimuth: 0	Height:104	Horz		Margin [dB]:		-20.49	-29.89	-19.01	-30.49
164.9899	41.16	qp	-27.16	9.35	23.35	40.5	54	43.52	50.5
Azimuth: 0	Height:120	Horz		Margin [dB]:		-17.15	-30.65	-20.17	-27.15

LIMIT 1: EN55022 Class B 3 m
LIMIT 2: CFR 47 Part 15 Class A 3m
LIMIT 3: CFR 47 Part 15 Class B 3m
LIMIT 4: EN55022 Class A 3 m
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 7qps.TXT





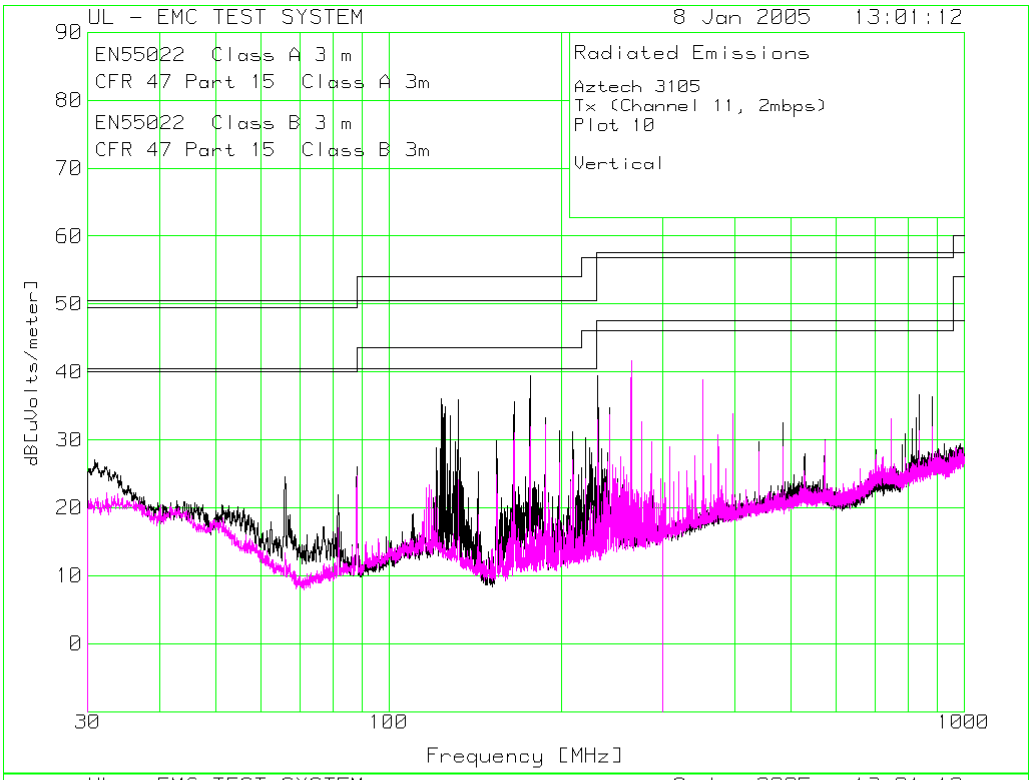
Aztech 3105
Tx (Channel 6, 2mbps)
Plot 9

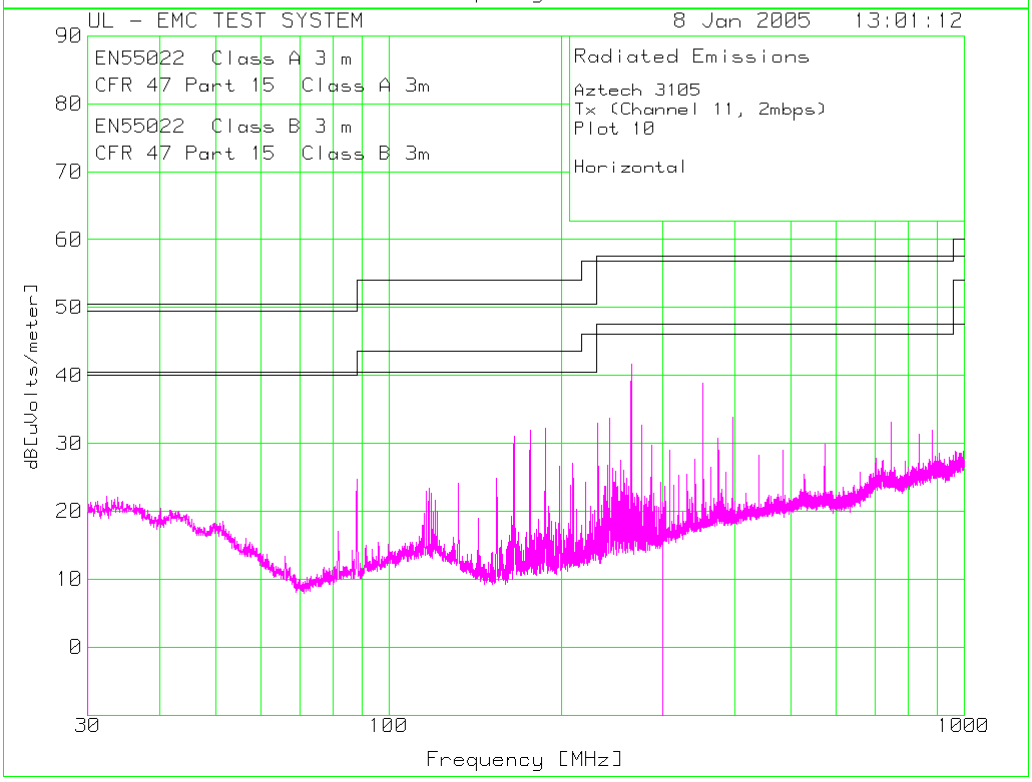
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Range: 1 30 - 300MHz								
175.9837	56.89 qp	-27.01	8.64	38.52	40.5	54	43.52	50.5
Azimuth: 120	Height:100	Vert		Margin [dB]:	-1.98	-15.48	-5	-11.98
230.9885	49.58 qp	-26.64	11.84	34.78	47.5	56.9	46.02	57.5
Azimuth: 117	Height:104	Vert		Margin [dB]:	-12.72	-22.12	-11.24	-22.72
263.9835	50.65 qp	-26.31	12.97	37.31	47.5	56.9	46.02	57.5
Azimuth: 132	Height:101	Vert		Margin [dB]:	-10.19	-19.59	-8.71	-20.19
Range: 2 30 - 300MHz								
186.9903	45.41 qp	-27.06	9.91	28.26	40.5	54	43.52	50.5
Azimuth: 5	Height:159	Horz		Margin [dB]:	-12.24	-25.74	-15.26	-22.24
230.9896	43.34 qp	-26.64	11.77	28.47	47.5	56.9	46.02	57.5
Azimuth: 359	Height:102	Horz		Margin [dB]:	-19.03	-28.43	-17.55	-29.03
263.9839	53.58 qp	-26.31	12.69	39.96	47.5	56.9	46.02	57.5
Azimuth: 0	Height:102	Horz		Margin [dB]:	-7.54	-16.94	-6.06	-17.54

LIMIT 1: EN55022 Class B 3 m
LIMIT 2: CFR 47 Part 15 Class A 3m
LIMIT 3: CFR 47 Part 15 Class B 3m
LIMIT 4: EN55022 Class A 3 m
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 9QPS.TXT





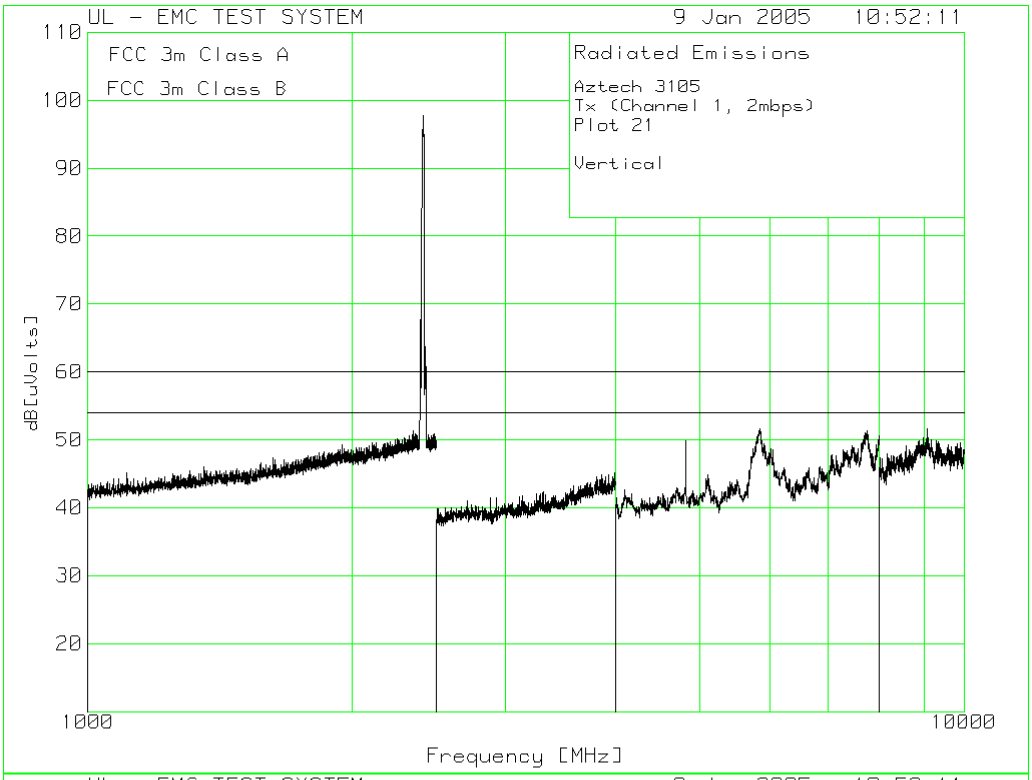
Aztech 3105
Tx (Channel 11, 2mbps)
Plot 10

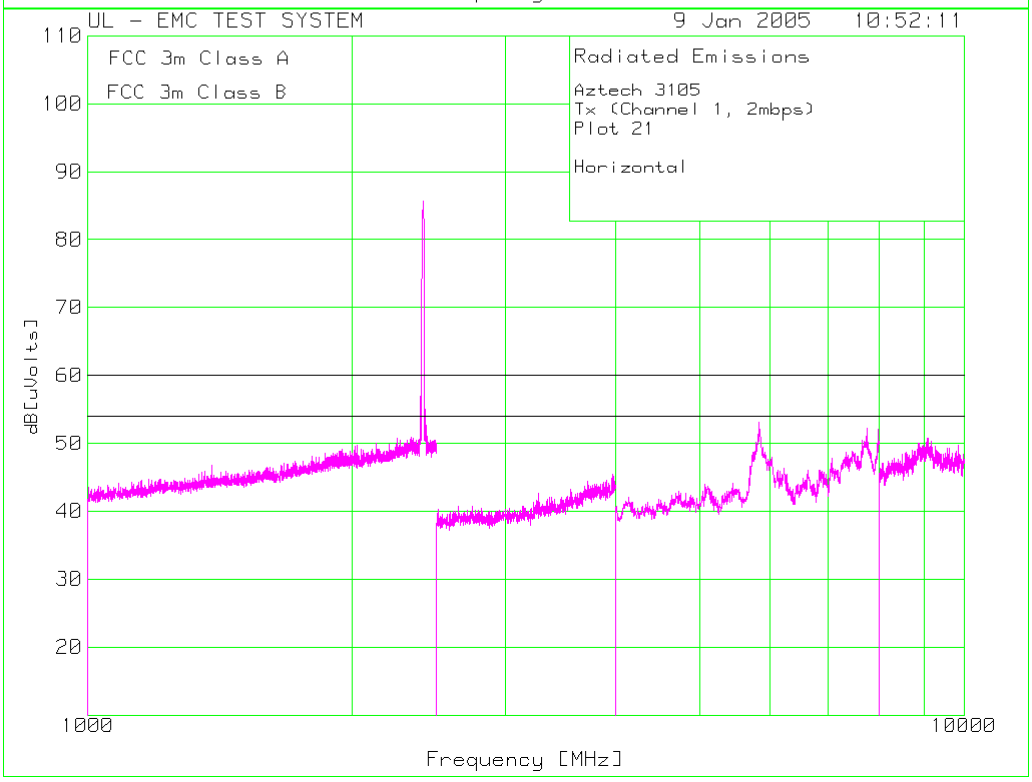
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4
Range: 1 30 - 300MHz								
175.9878	56.91 qp	-27.01	8.64	38.54	40.5	54	43.52	50.5
Azimuth: 120	Height:103	Vert		Margin [dB]:	-1.96	-15.46	-4.98	-11.96
230.9895	49.86 qp	-26.64	11.84	35.06	47.5	56.9	46.02	57.5
Azimuth: 114	Height:100	Vert		Margin [dB]:	-12.44	-21.84	-10.96	-22.44
264.0026	50.1 qp	-26.31	12.97	36.76	47.5	56.9	46.02	57.5
Azimuth: 133	Height:101	Vert		Margin [dB]:	-10.74	-20.14	-9.26	-20.74
Range: 2 30 - 300MHz								
175.9864	48.7 qp	-27.01	9.74	31.43	40.5	54	43.52	50.5
Azimuth: 354	Height:148	Horz		Margin [dB]:	-9.07	-22.57	-12.09	-19.07
230.989	41.97 qp	-26.64	11.77	27.1	47.5	56.9	46.02	57.5
Azimuth: 0	Height:100	Horz		Margin [dB]:	-20.4	-29.8	-18.92	-30.4
263.986	53.89 qp	-26.31	12.69	40.27	47.5	56.9	46.02	57.5
Azimuth: 0	Height:100	Horz		Margin [dB]:	-7.23	-16.63	-5.75	-17.23

LIMIT 1: EN55022 Class B 3 m
LIMIT 2: CFR 47 Part 15 Class A 3m
LIMIT 3: CFR 47 Part 15 Class B 3m
LIMIT 4: EN55022 Class A 3 m
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 10QPS.TXT





Aztech 3105
Tx (Channel 1, 2mbps)
Plot 21

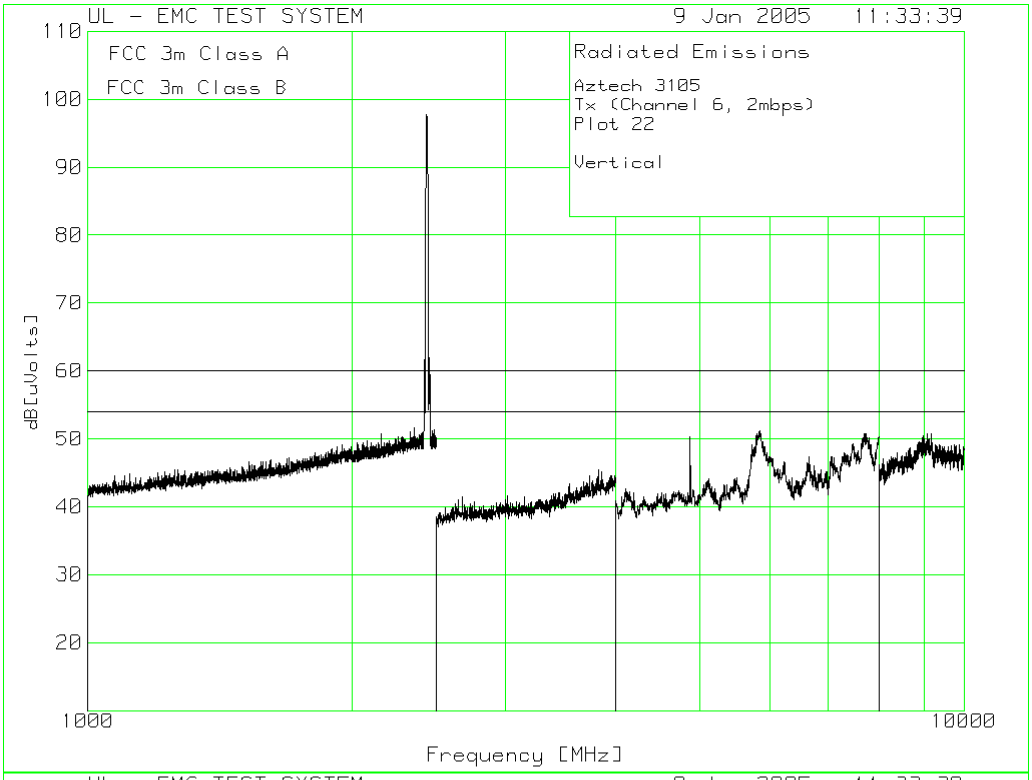
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2
Range: 1 1000 - 2500MHz						
2390	36.84 av	-28.64	30.3	38.5	60	53.97
Azimuth: 0	Height:100 Vert			Margin [dB]:	-21.5	-15.47
2390	47.35 pk	-28.64	30.3	49.01	60	53.97
Azimuth: 0	Height:100 Vert			Margin [dB]:	-10.99	-4.96
2412	82.9 avlg	-28.62	30.38	84.66	60	53.97
Azimuth: 322	Height:101 Vert			Margin [dB]:	24.66	30.69
2412	90.8 pk	-28.62	30.38	92.56	60	53.97
Azimuth: 322	Height:101 Vert			Margin [dB]:	32.56	38.59
2483.5	35.7 avlg	-28.77	30.64	37.57	60	53.97
Azimuth: 322	Height:101 Vert			Margin [dB]:	-22.43	-16.4
2483.5	45.2 pk	-28.77	30.64	47.07	60	53.97
Azimuth: 322	Height:101 Vert			Margin [dB]:	-12.93	-6.9

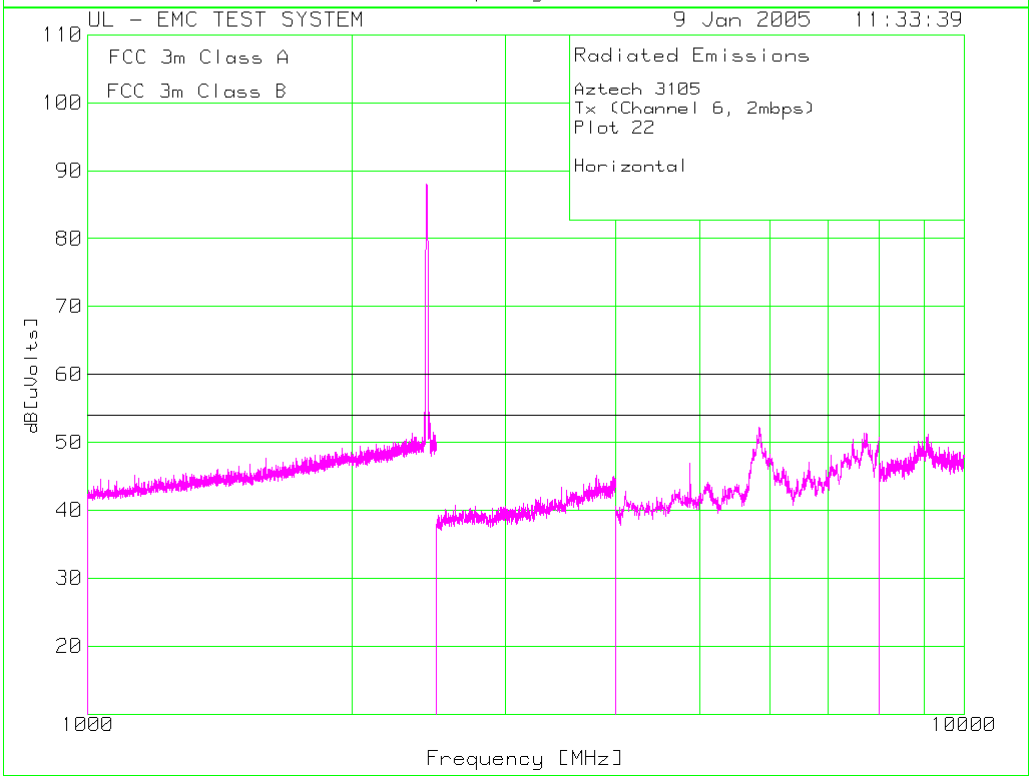
LIMIT 1: FCC 3m Class A
LIMIT 2: FCC 3m Class B
LIMIT 3: NONE

LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 21AVGs.TXT





Aztech 3105
Tx (Channel 6, 2mbps)
Plot 22

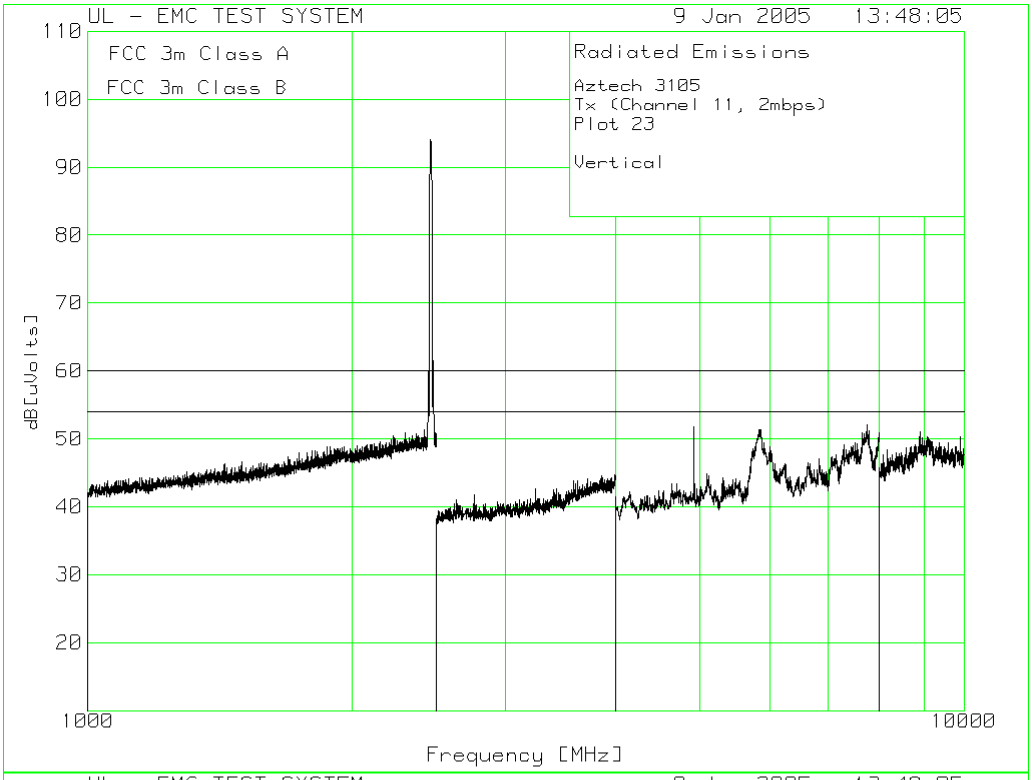
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2
Range: 1 1000 - 2500MHz						
2390	35.8 avlg	-28.64	30.3	37.46	60	53.97
Azimuth: 0	Height:101	Vert		Margin [dB]:	-22.54	-16.51
2390	43.5 pk	-28.64	30.3	45.16	60	53.97
Azimuth: 0	Height:101	Vert		Margin [dB]:	-14.84	-8.81
2437	85.3 avlg	-28.67	30.47	87.1	60	53.97
Azimuth: 46	Height:105	Vert		Margin [dB]:	27.1	33.13
2437	93.3 pk	-28.67	30.47	95.1	60	53.97
Azimuth: 46	Height:105	Vert		Margin [dB]:	35.1	41.13
2483.5	35.7 avlg	-28.77	30.64	37.57	60	53.97
Azimuth: 46	Height:105	Vert		Margin [dB]:	-22.43	-16.4
2483.5	49.3 pk	-28.77	30.64	51.17	60	53.97
Azimuth: 46	Height:105	Vert		Margin [dB]:	-8.83	-2.8

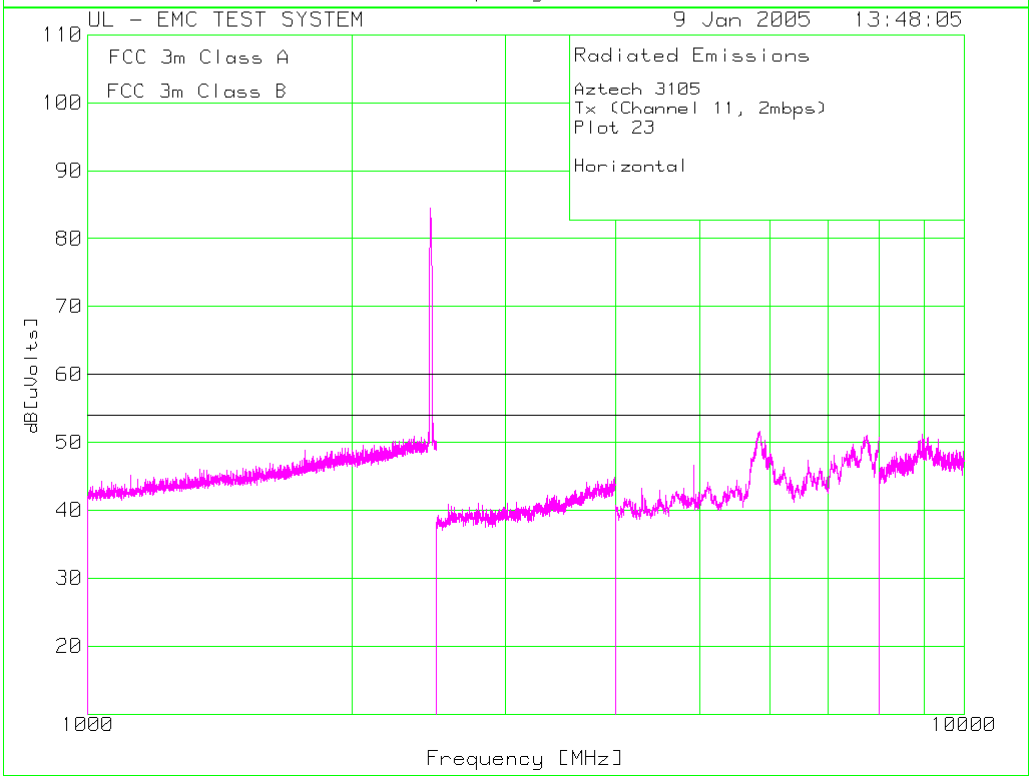
LIMIT 1: FCC 3m Class A
LIMIT 2: FCC 3m Class B
LIMIT 3: NONE

LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

File: 22AVGs.TXT





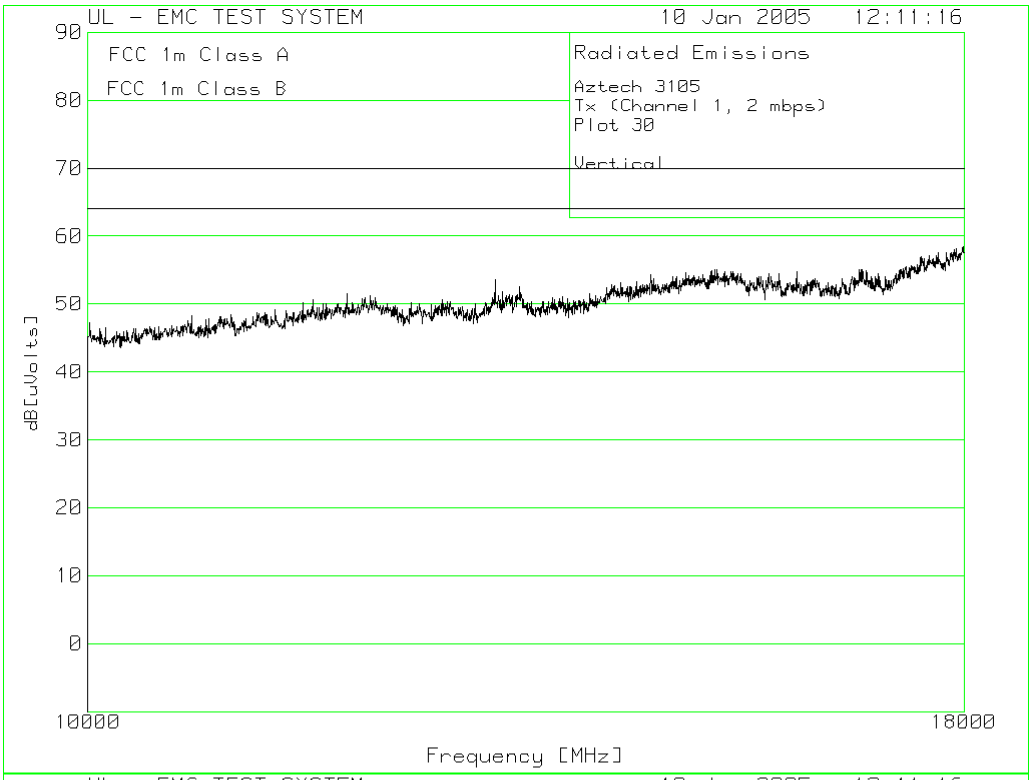
Aztech 3105
Tx (Channel 11, 2mbps)
Plot 23

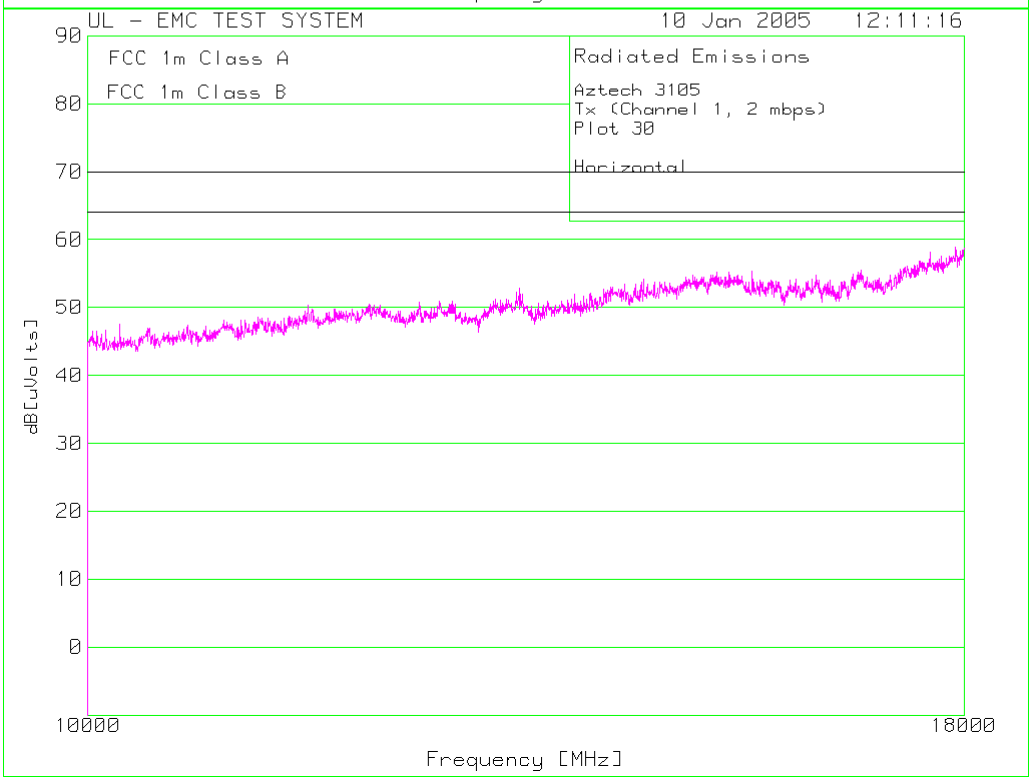
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit:1	2
Range: 1 1000 - 2500MHz						
2390	35.7 avlg	-28.64	30.3	37.36	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	-22.64	-16.61	
2390	45.8 pk	-28.64	30.3	47.46	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	-12.54	-6.51	
2462	83.7 avlg	-28.72	30.56	85.54	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	25.54	31.57	
2462	91.8 pk	-28.72	30.56	93.64	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	33.64	39.67	
2483.5	47.7 avlg	-28.77	30.64	49.57	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	-10.43	-4.4	
2483.5	47.7 pk	-28.77	30.64	49.57	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	-10.43	-4.4	
2483.5	44.8 pk	-28.77	30.64	46.67	60	53.97
Azimuth: 45	Height:128 Vert		Margin [dB]:	-13.33	-7.3	

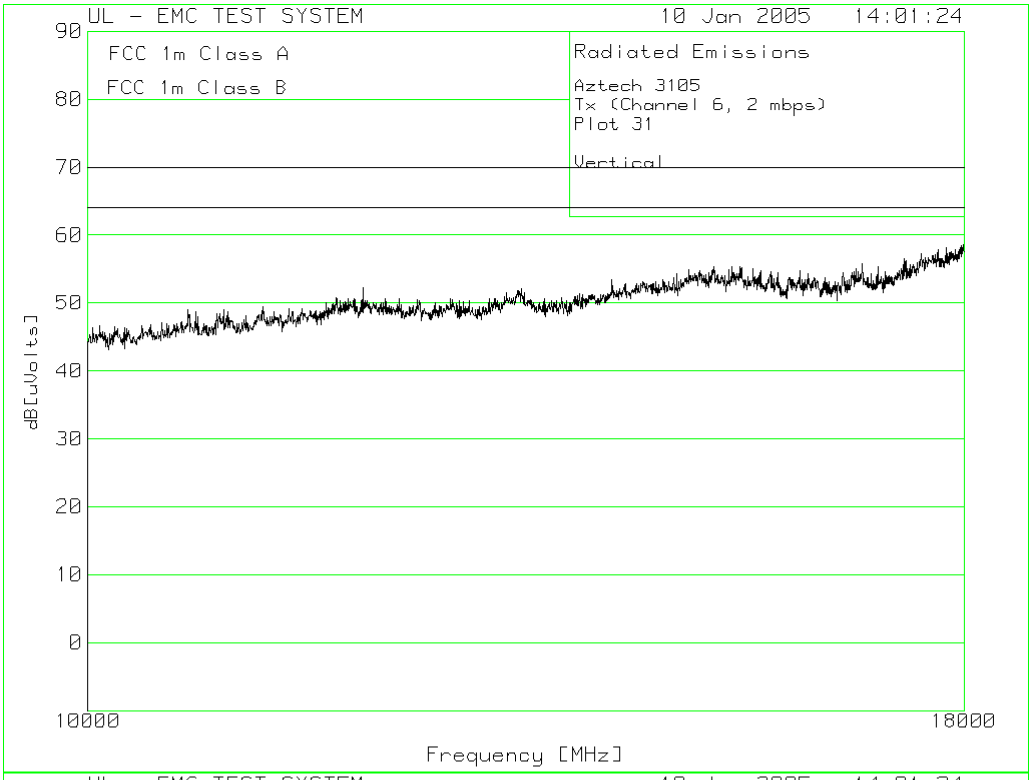
LIMIT 1: FCC 3m Class A
LIMIT 2: FCC 3m Class B
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

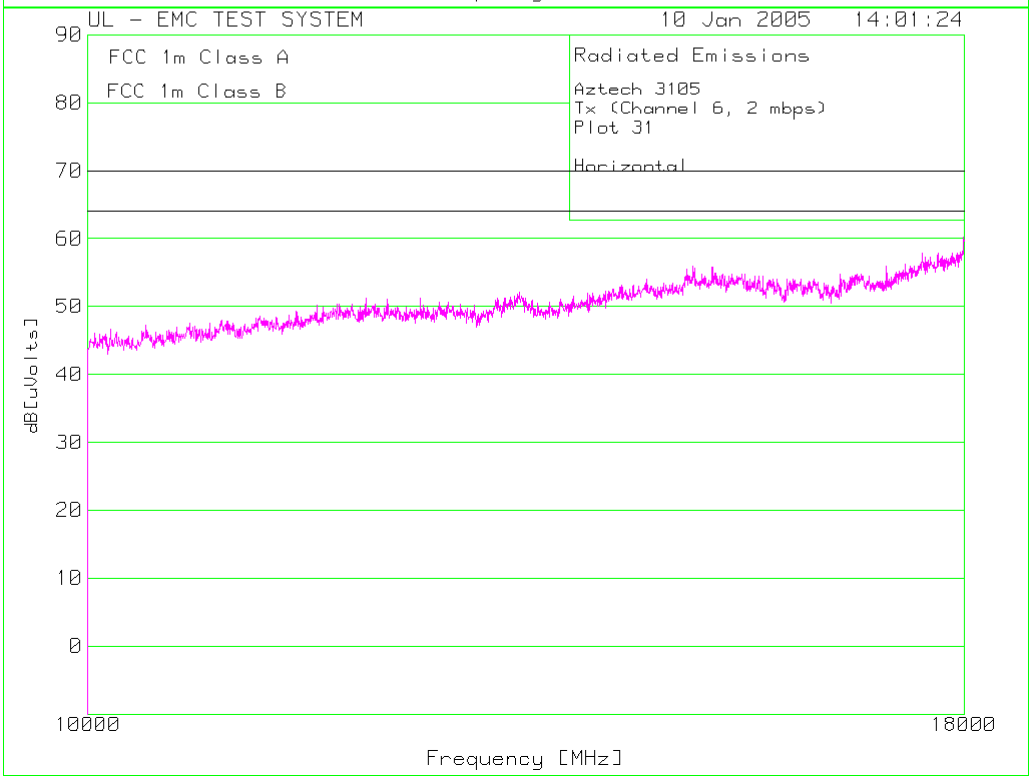
pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector

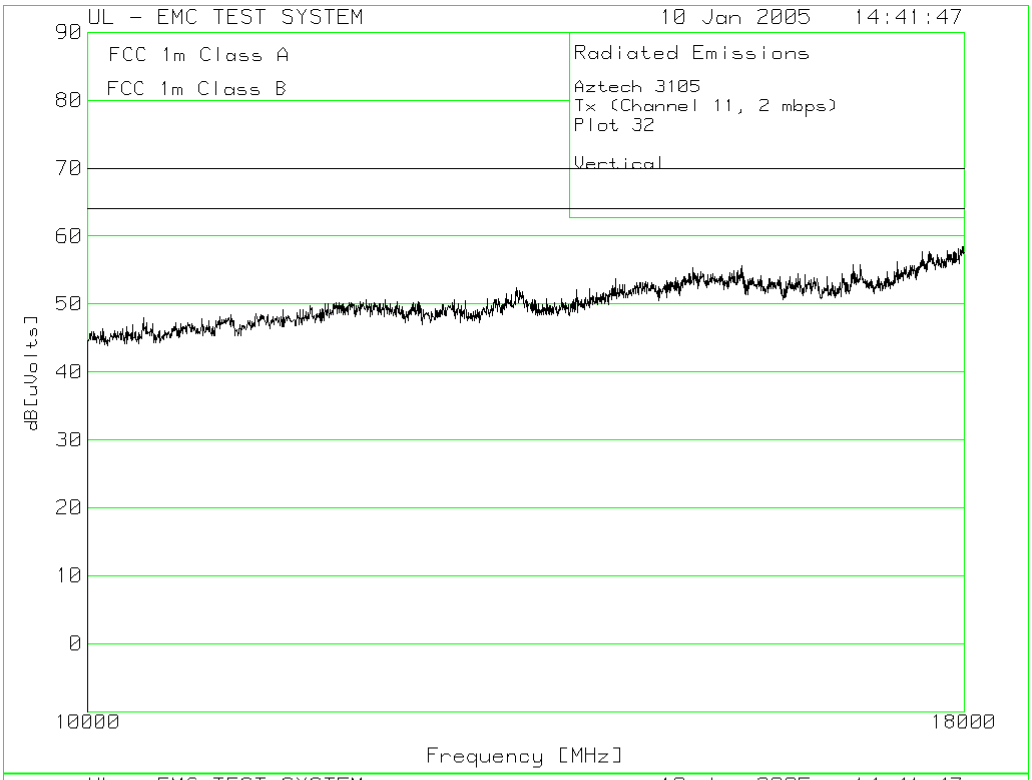
File: 23AVGs.TXT

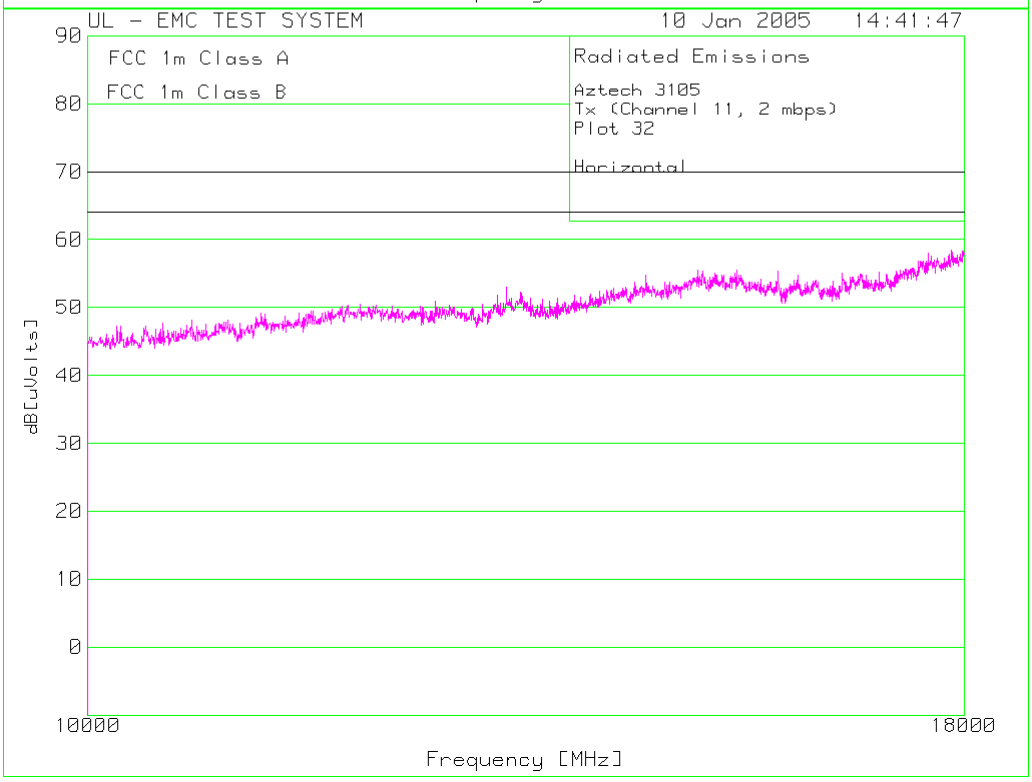












2.4.2 UNINTENTIONAL RADIATED EMISSIONS SETUP

DC Setup

DC Setup close-up

AC Setup

AC Setup close-up

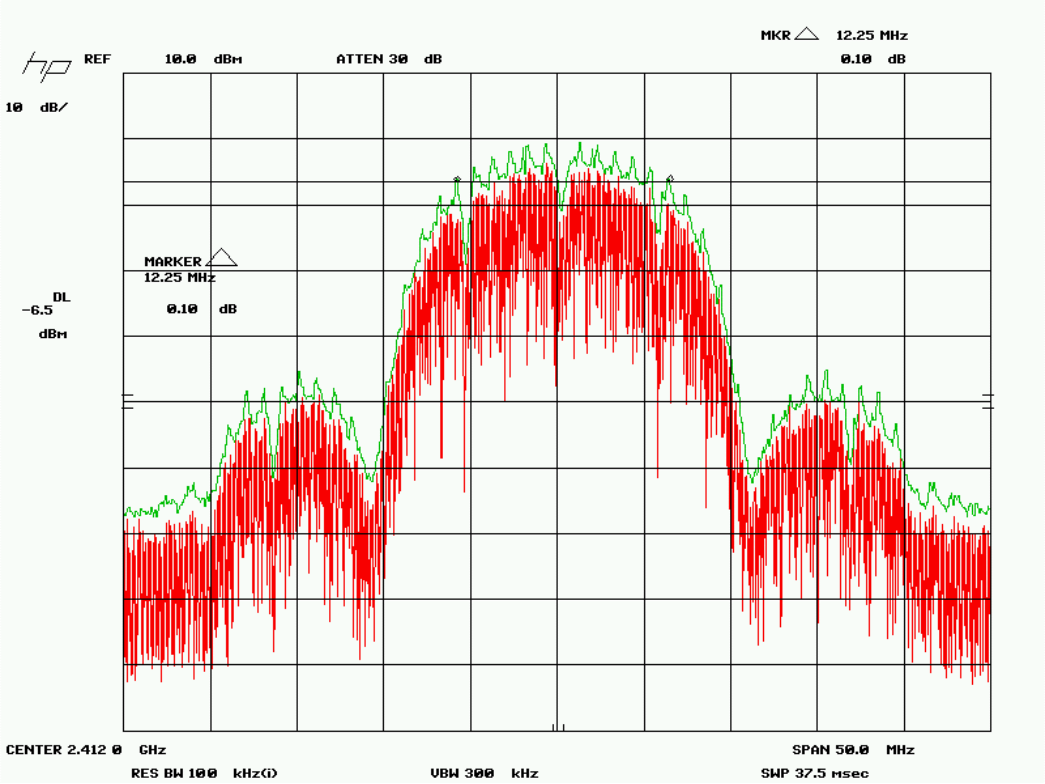
2.5 6dB BANDWIDTH

Test Summary	
Test Personnel: Scott Drysdale	Test Date: January 12th, 2005

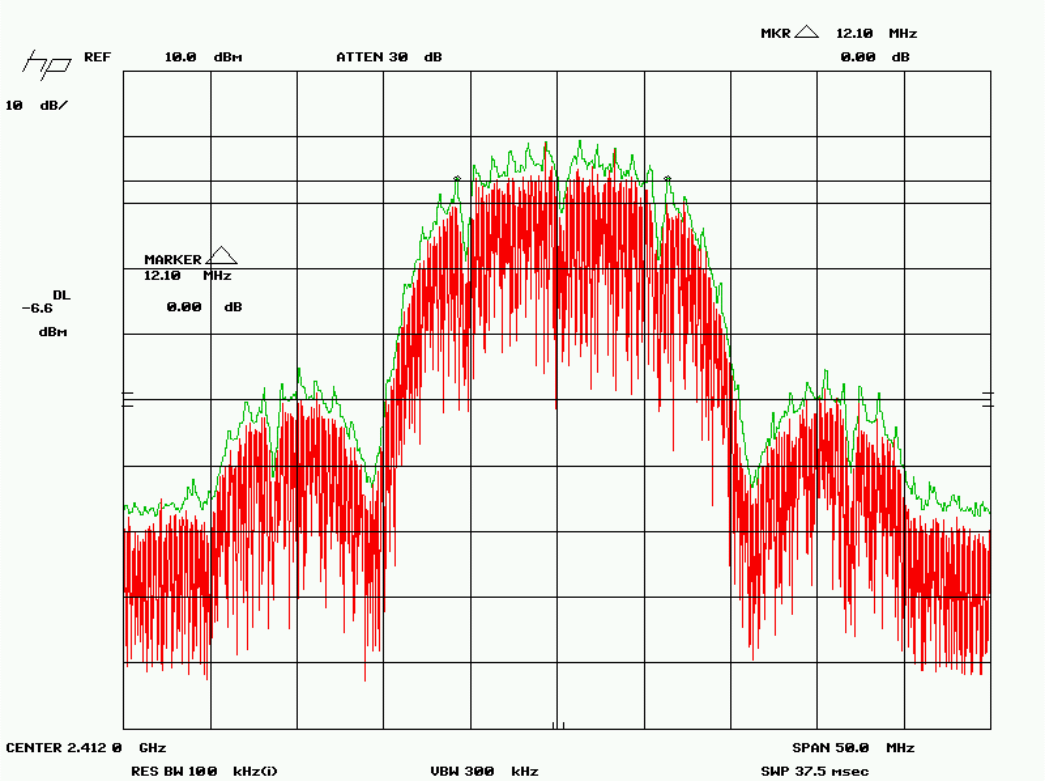
Test Description	
Objectives/Criteria	Specifications
The minimum 6 dB bandwidth shall be at least 500 kHz. It is recommended that a minimum margin of 100 kHz be allowed for manufacturing tolerances, frequency drift, etc. .	**FCC Part 15.247(a)(2)** **Must be tested at low, middle and high Tx frequencies.**
Test Result Pass	

2.5.1 6dB BANDWIDTH DATA

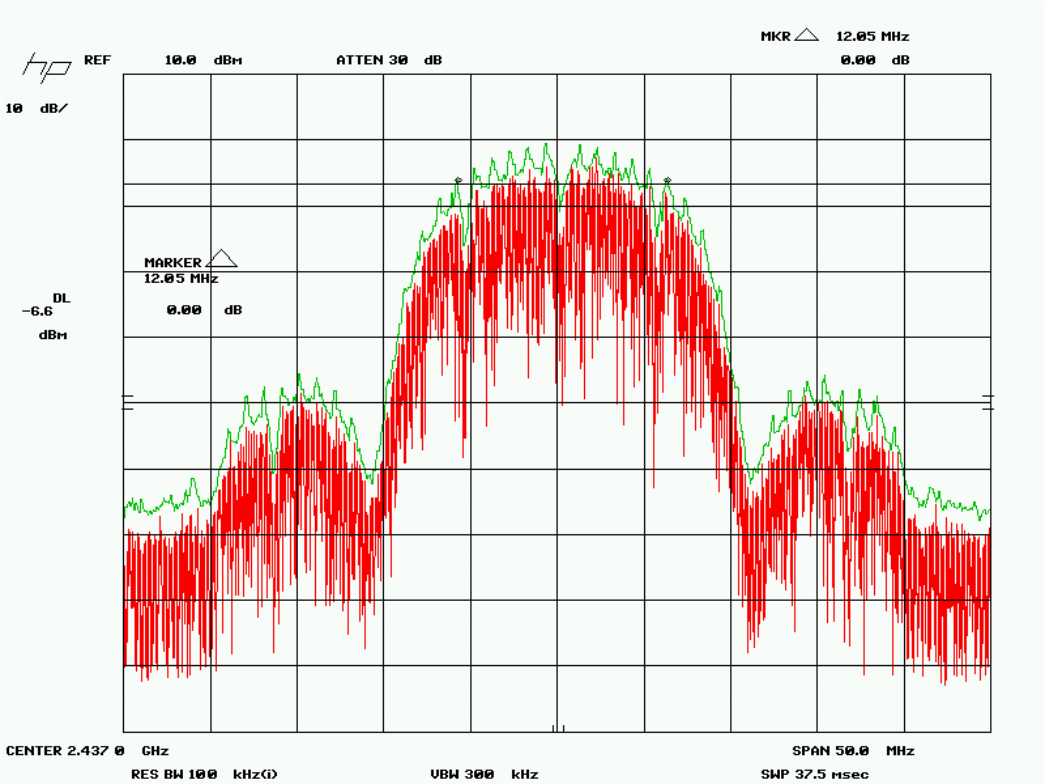
Channel 1, 1mpbs



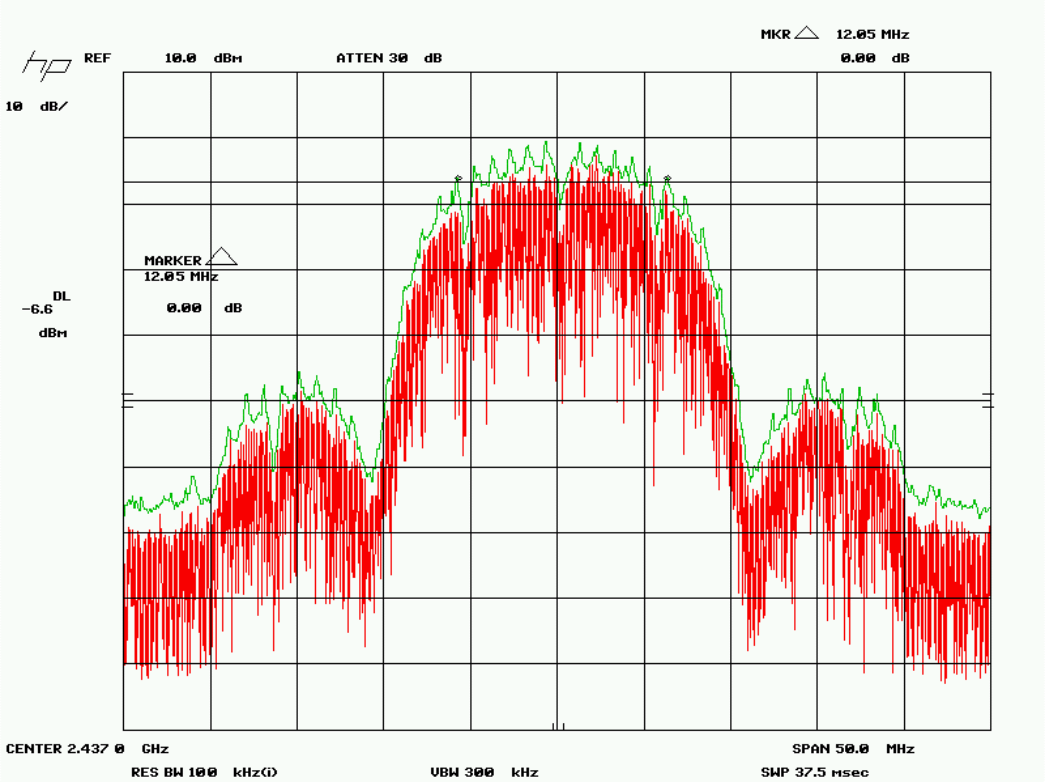
Channel 1, 2mpbs



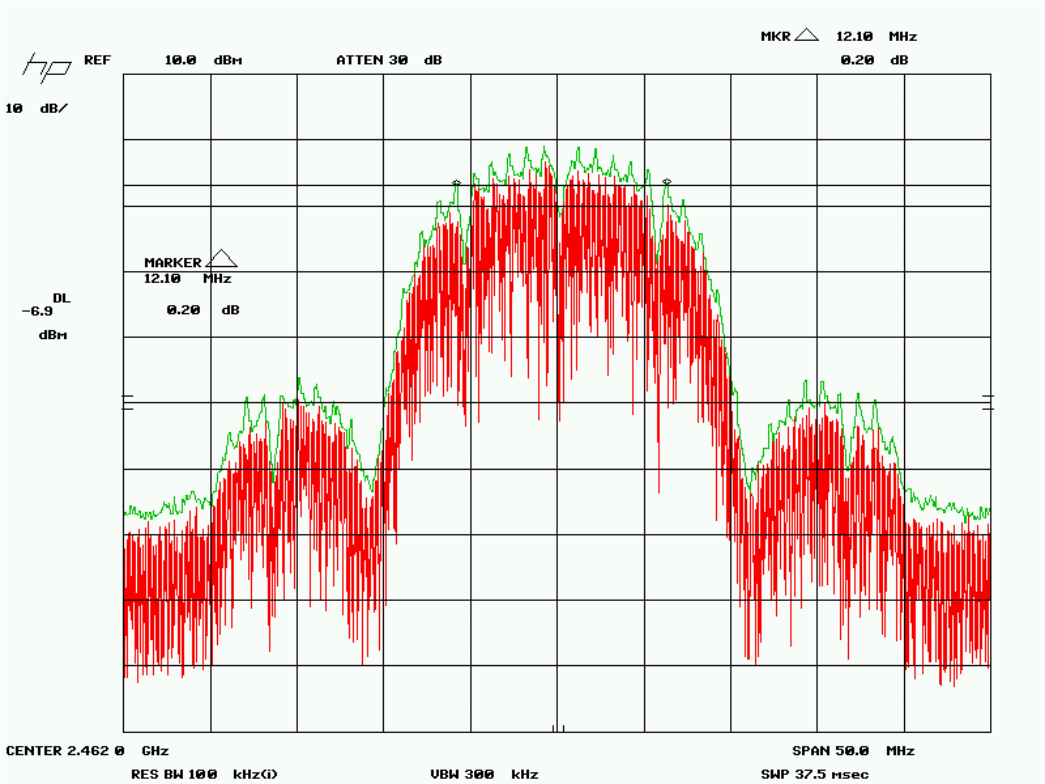
Channel 6, 1mpbs



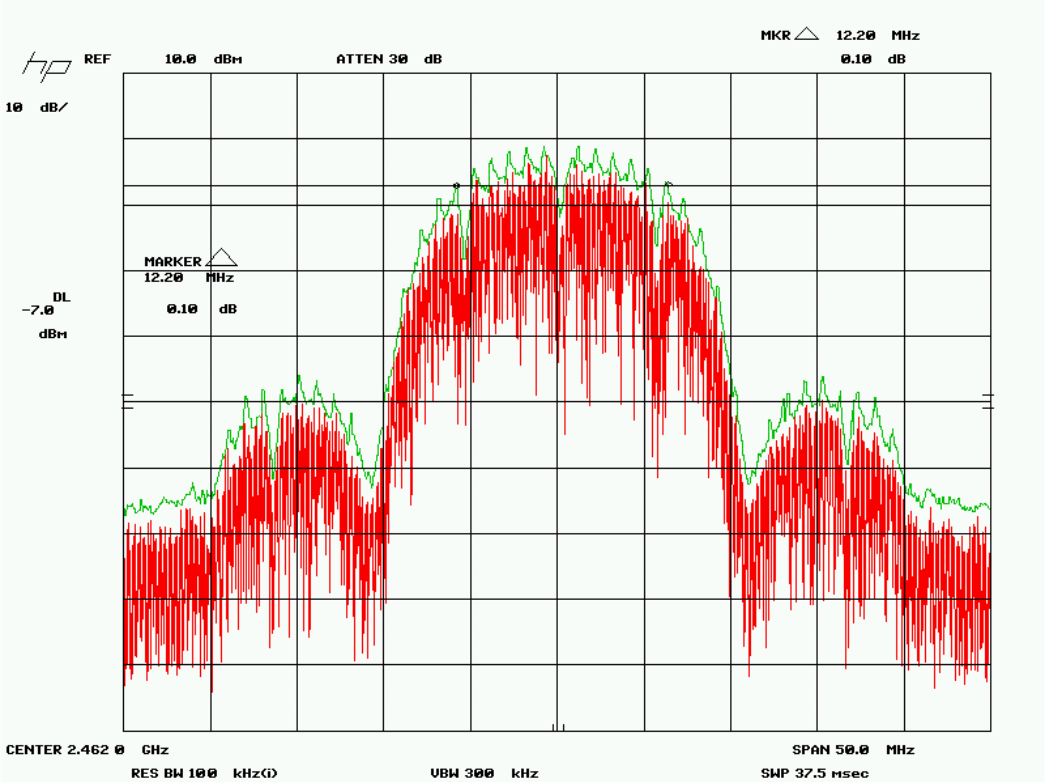
Channel 6, 2mpbs



Channel 11, 1mpbs



Channel 11, 2mpbs



2.5.2 6dB BANDWIDTH SETUP

2.6 PEAK POWER / VOLTAGE VARIATIONS

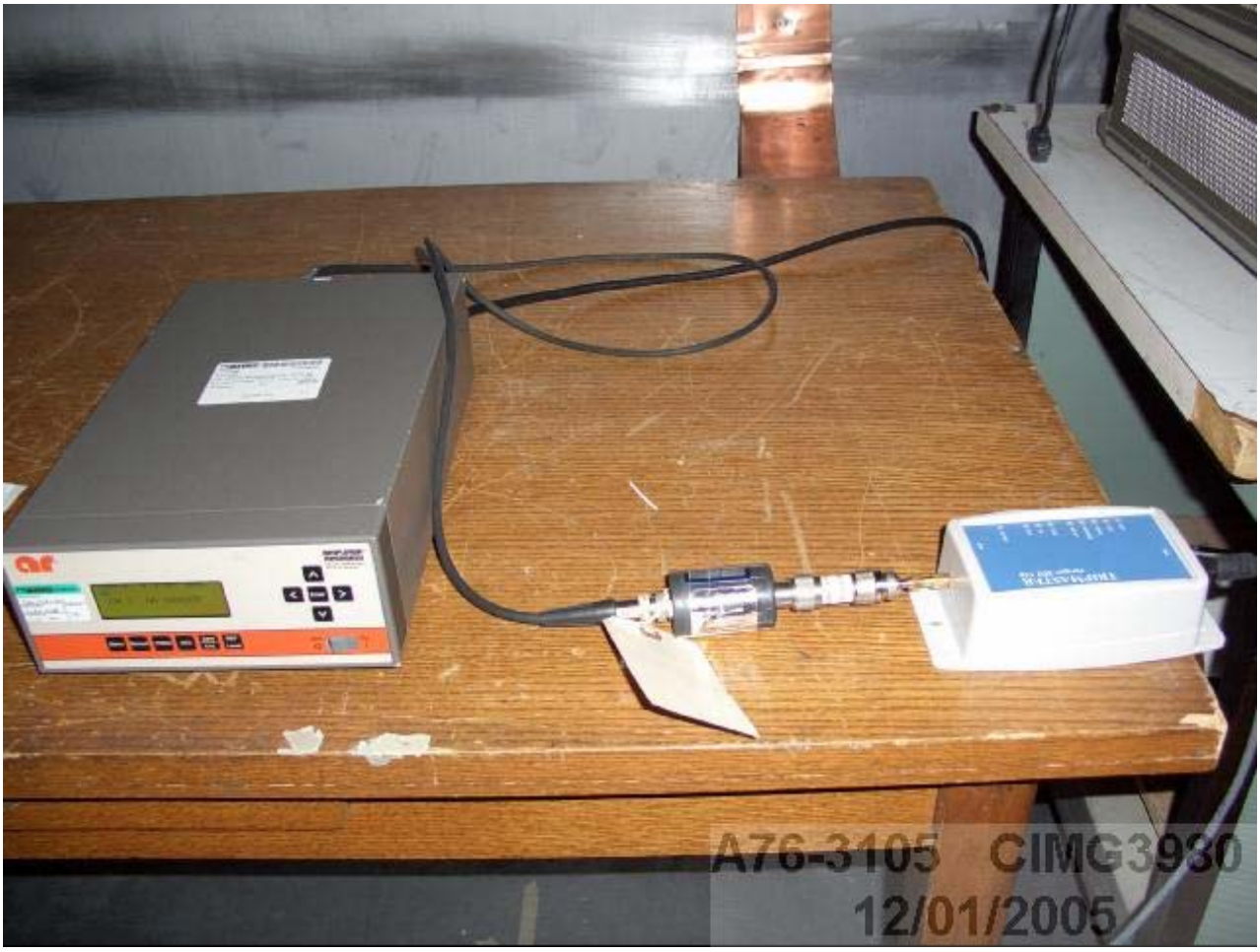
Test Summary	
Test Personnel: Scott Drysdale	Test Date: January 13, 2005

Test Description	
Objectives/Criteria	Specifications
For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt (30dBm) Compliance can be based on maximum conducted output power. It is recommended that a margin of 13dB be allowed. This recommendation is based on 10 dB for possible later European compliance (100mW) and 3 dB for manufacturing tolerances. .	**FCC Part 15.247(b)(3)** **Must be tested at low, middle and high Tx frequencies.**
Test Result Pass **Note: This was also tested by varying the AC supply voltage from 85% (97Vac) and 115% (133Vac) from the nominal 115Vac, with no affect on peak power output. Data is presented at 115Vac.**	

2.6.1 PEAK POWER DATA

Channel	Freq (GHz)	Bitrate (Mbps)	Power (dBm)
1	2.412	1	11.35
1	2.412	2	11.35
6	2.437	1	11.34
6	2.437	2	11.33
11	2.462	1	11.39
11	2.462	2	11.37

2.6.2 PEAK POWER SETUP



2.7 ANTENNA GAIN

Summary	
Test Personnel: Scott Drysdale	Test Date:

Description	
Objectives/Criteria	Specifications
Fixed point-to-point operation, single antenna: 2400-2483.5 MHz - maximum conducted output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. .	**FCC Part 15.247(c)** **< 6 dBi**
Result - Justification. The EUT has an antenna gain of less then 6dBi. See appendix A for further details.	

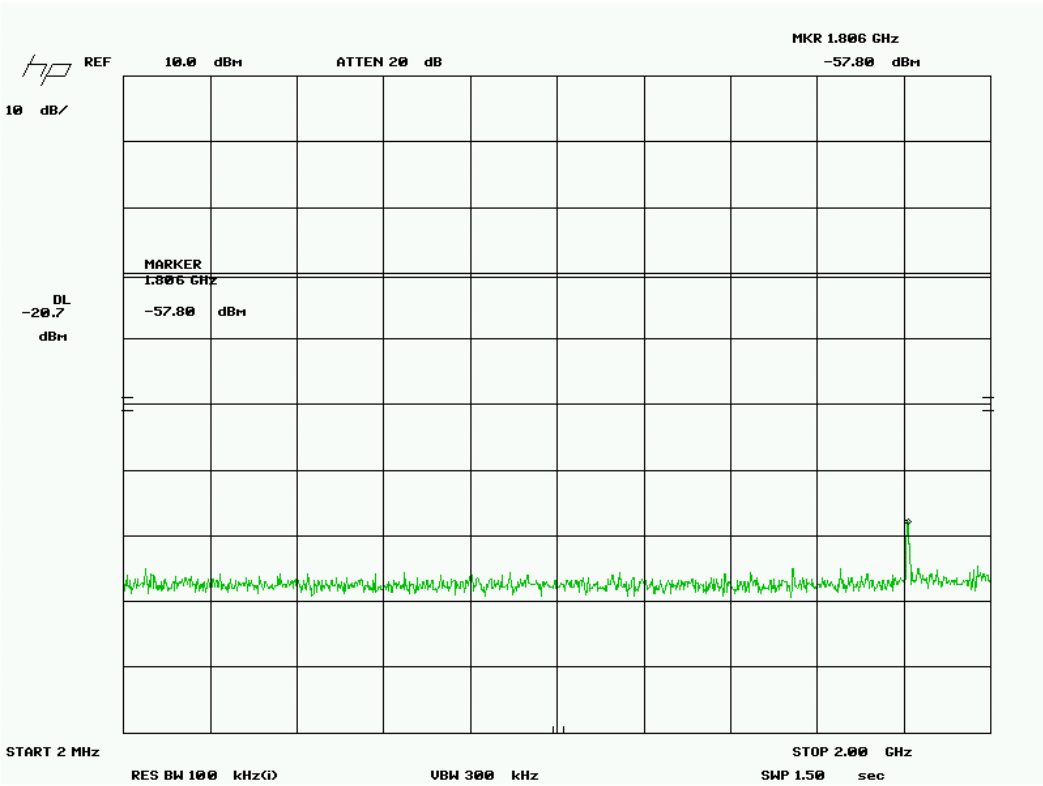
2.8 ANTENNA CONDUCTED

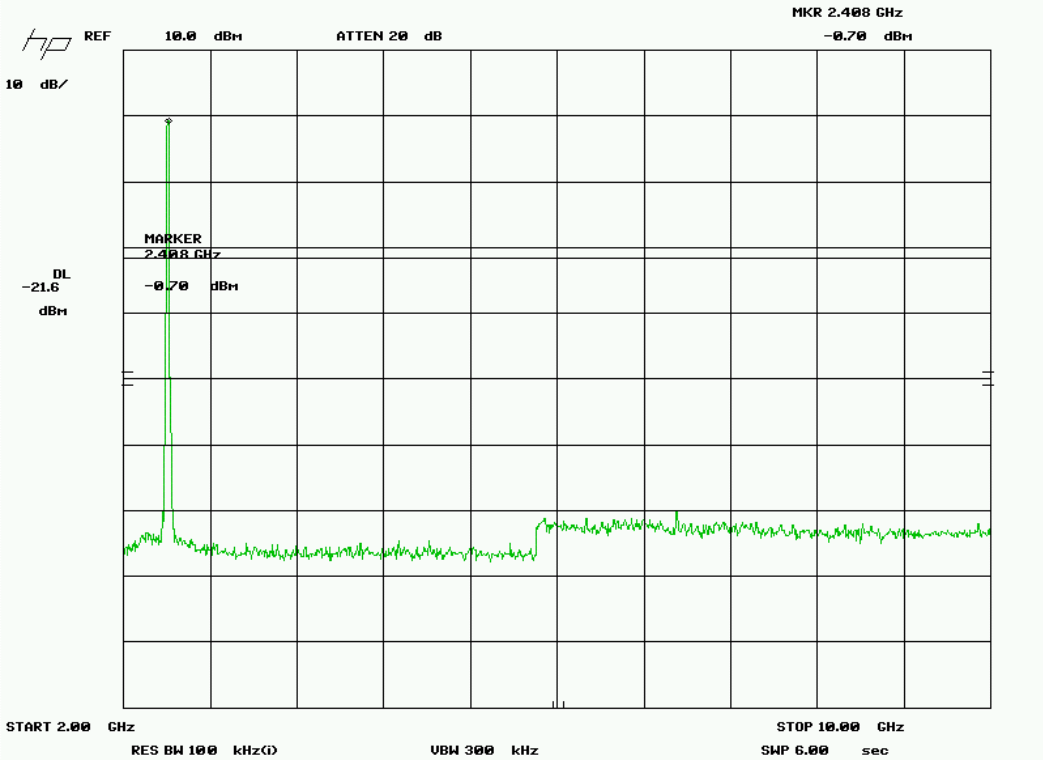
Test Summary	
Test Personnel: Scott Drysdale	Test Date: January 13th, 2005

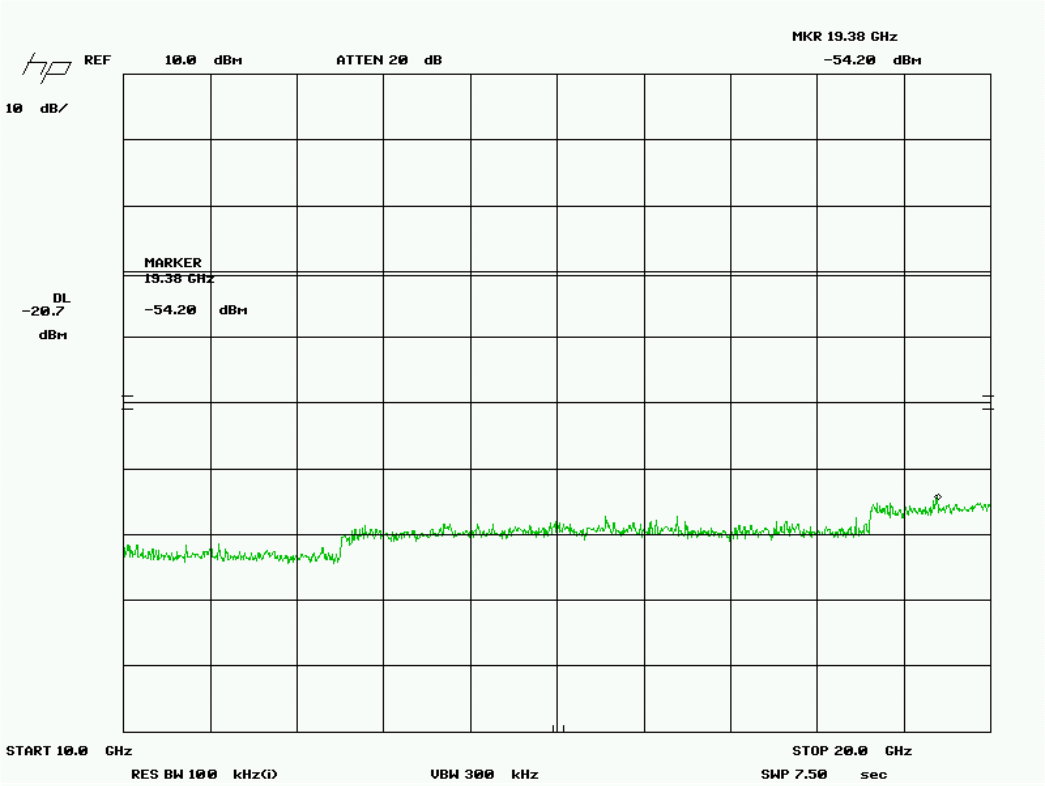
Test Description	
Objectives/Criteria	Specifications
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired. It is recommended that a minimum margin of 6 dB be allowed for manufacturing tolerances.	**FCC Part 15.247(d)** **Must be tested at low, middle and high Tx frequencies.**
Test Result Pass **Note: Testing was performed at channels 1,6,11 In each channel 1mbps and 2mpbs was checked with no observable difference. Data is presented at 2mbps.**	

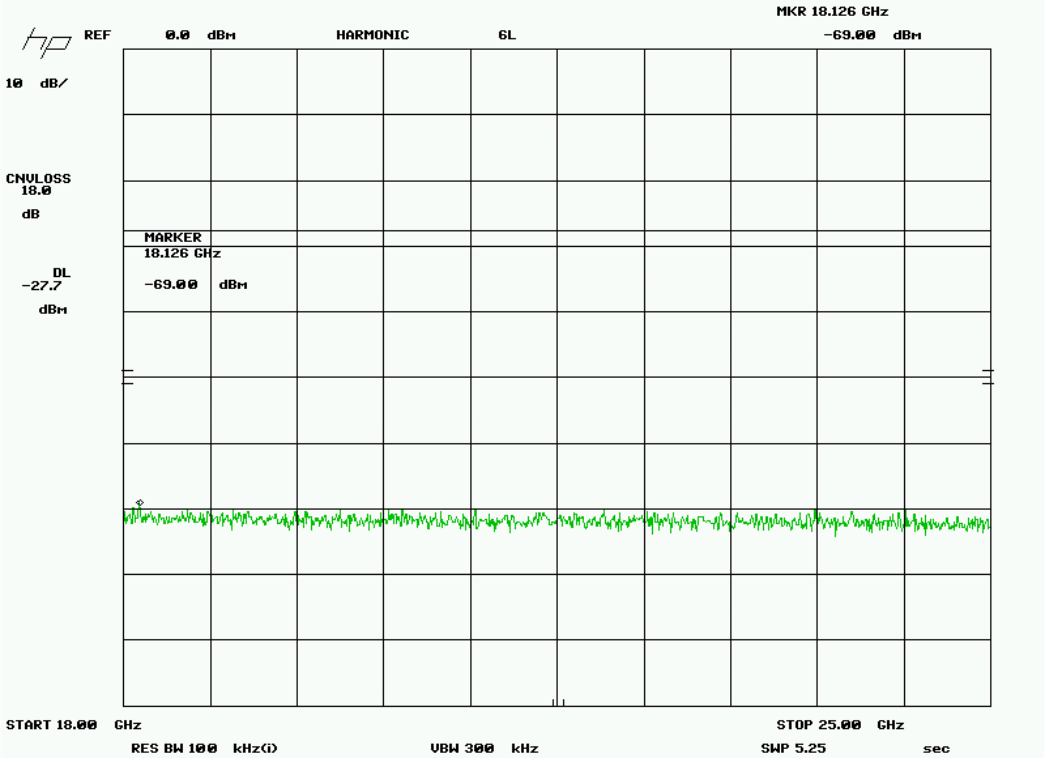
2.8.1 ANTENNA CONDUCTED DATA

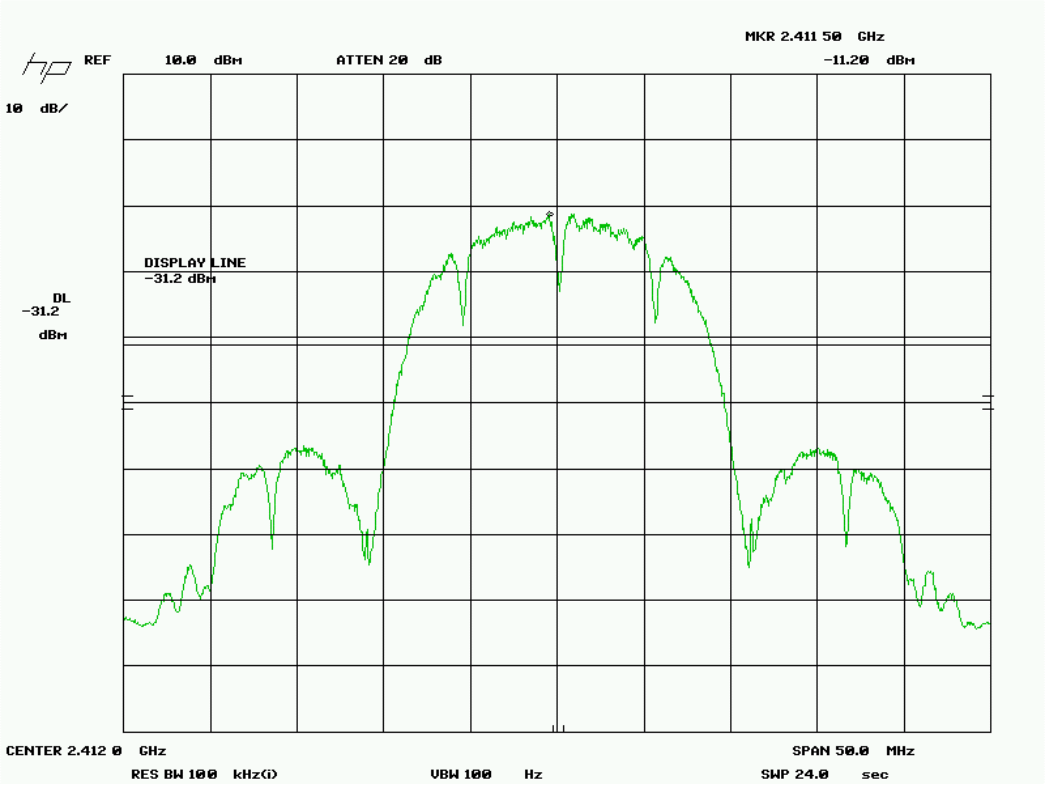
Channel 1



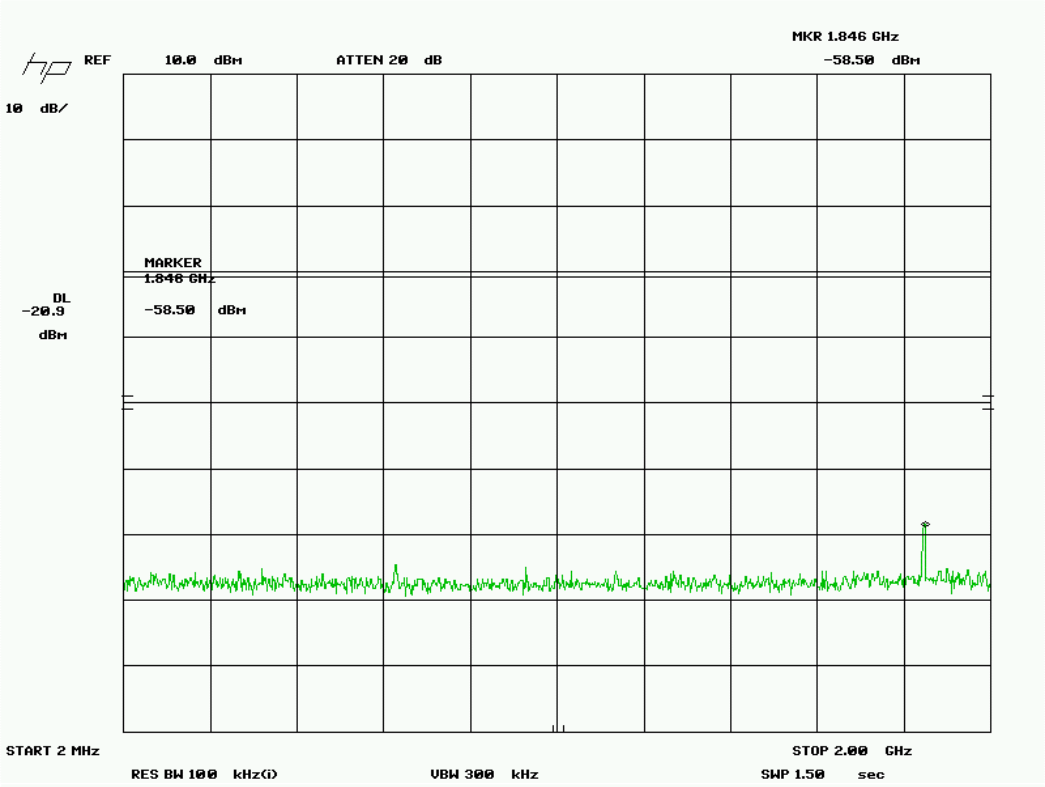


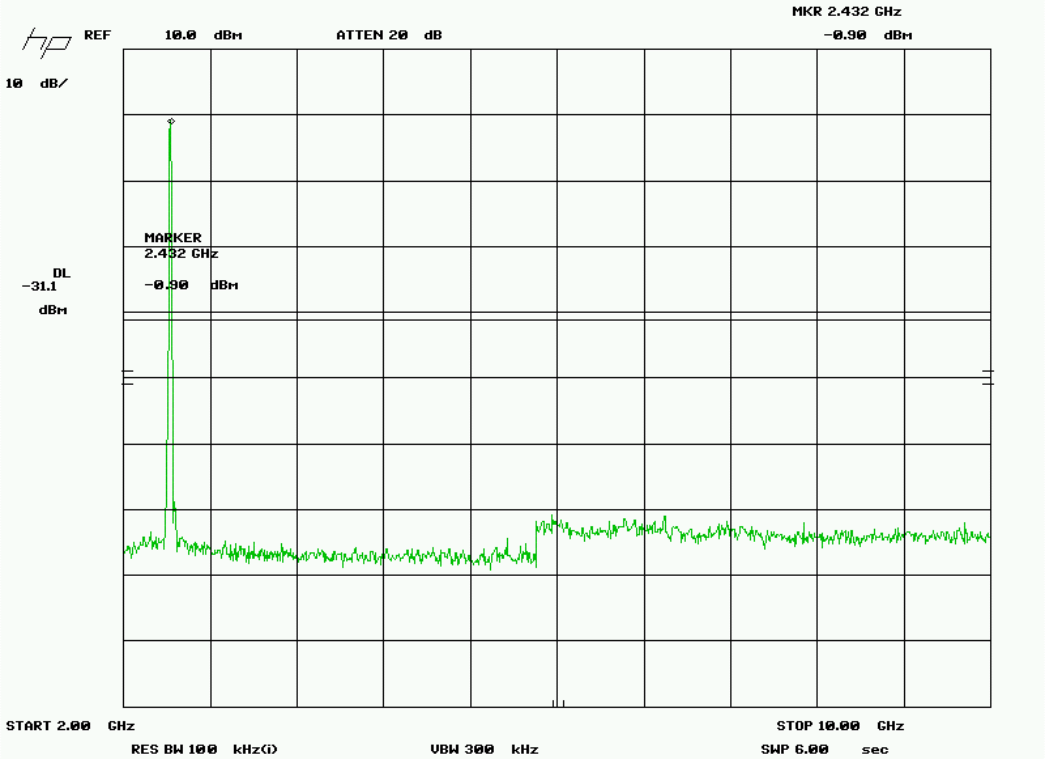


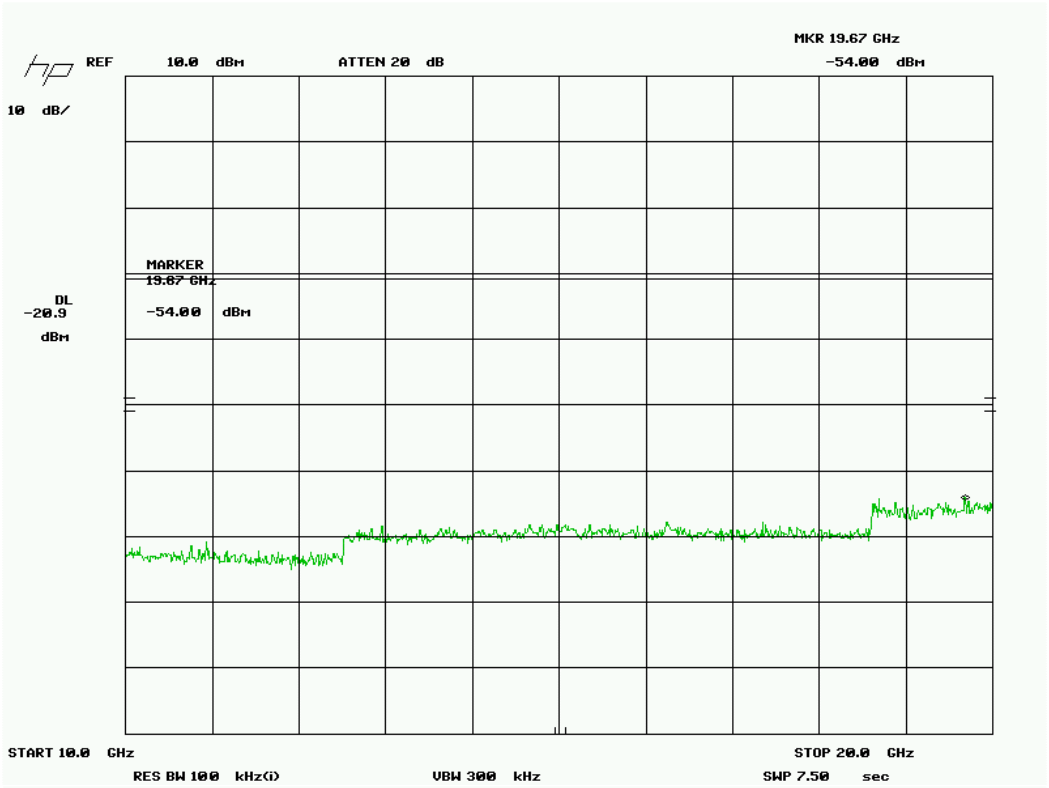


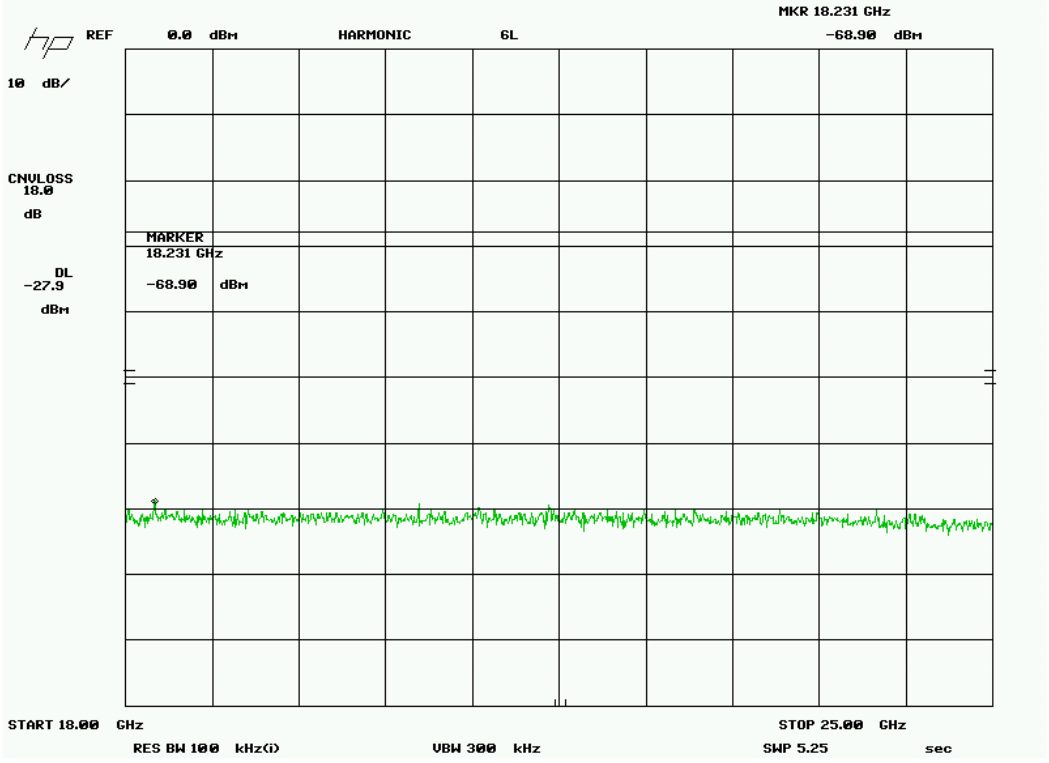


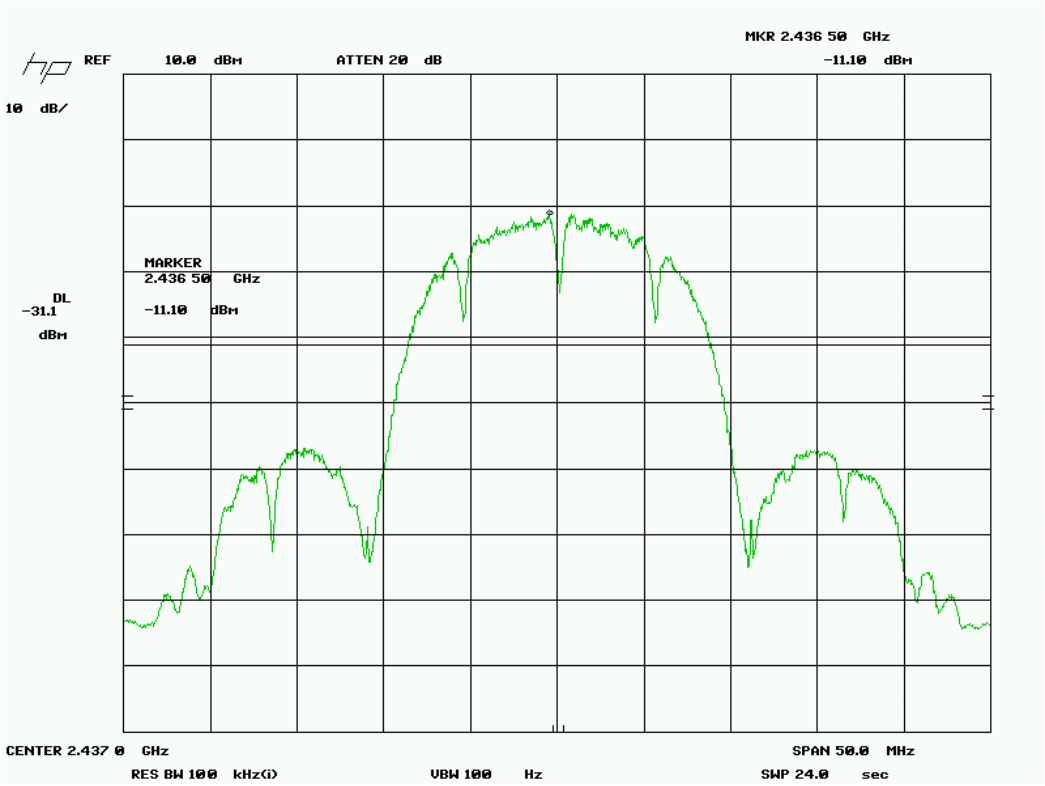
Channel 6



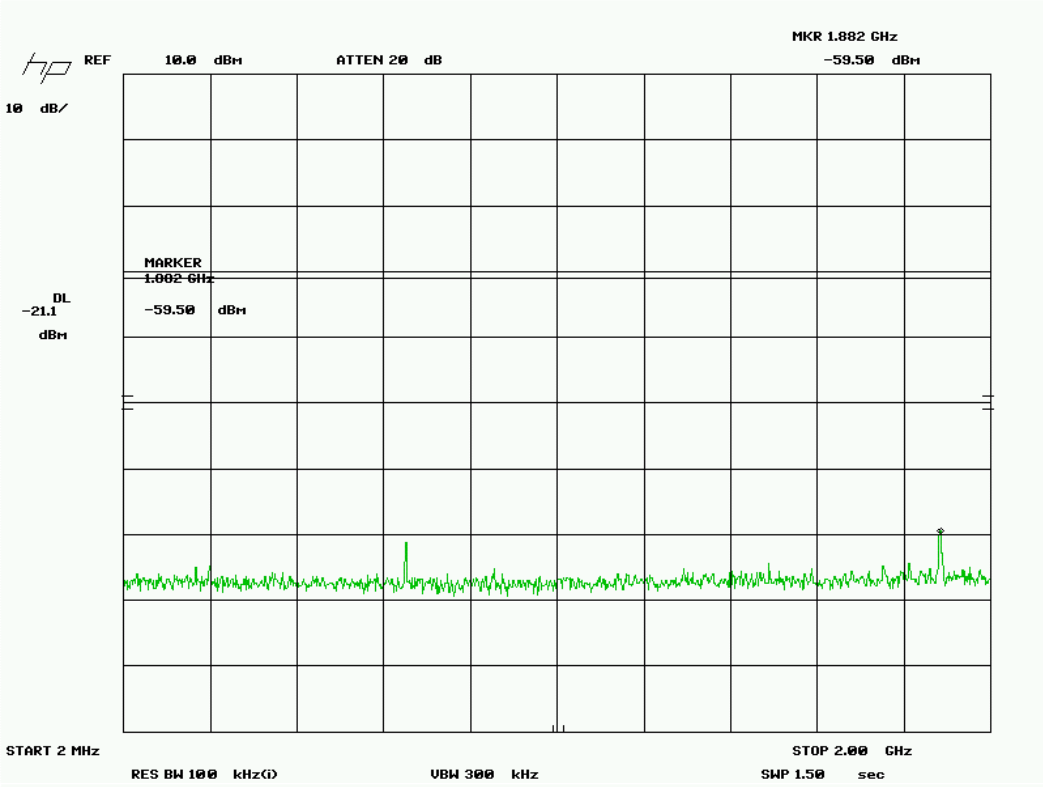


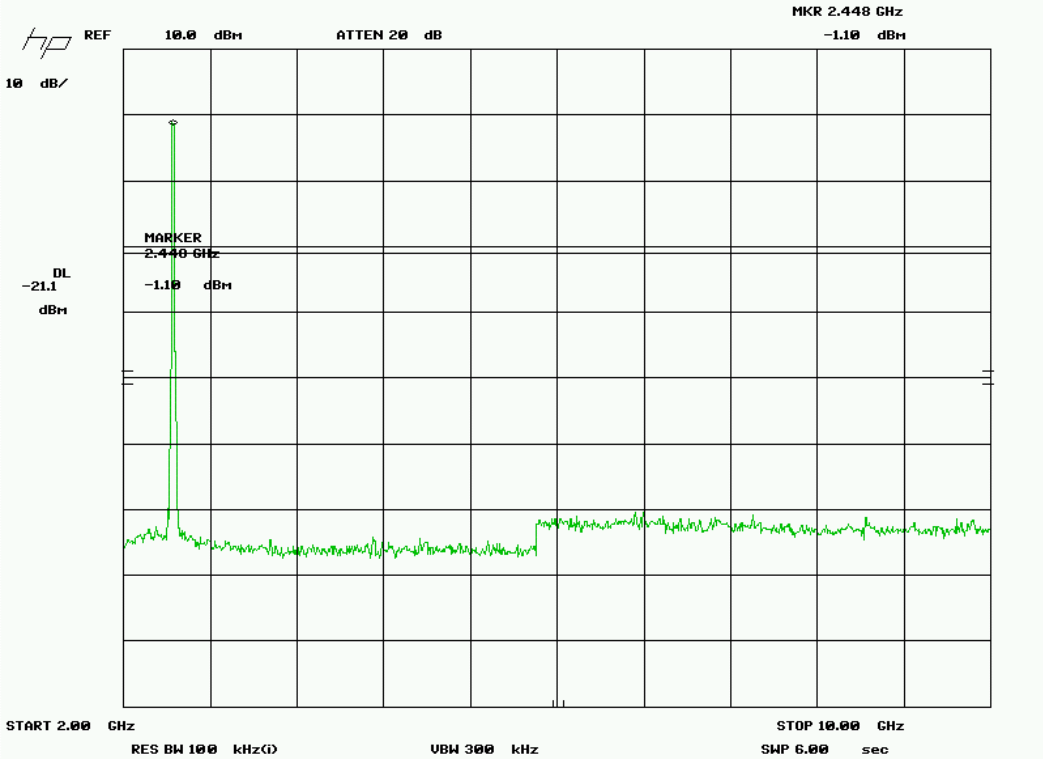


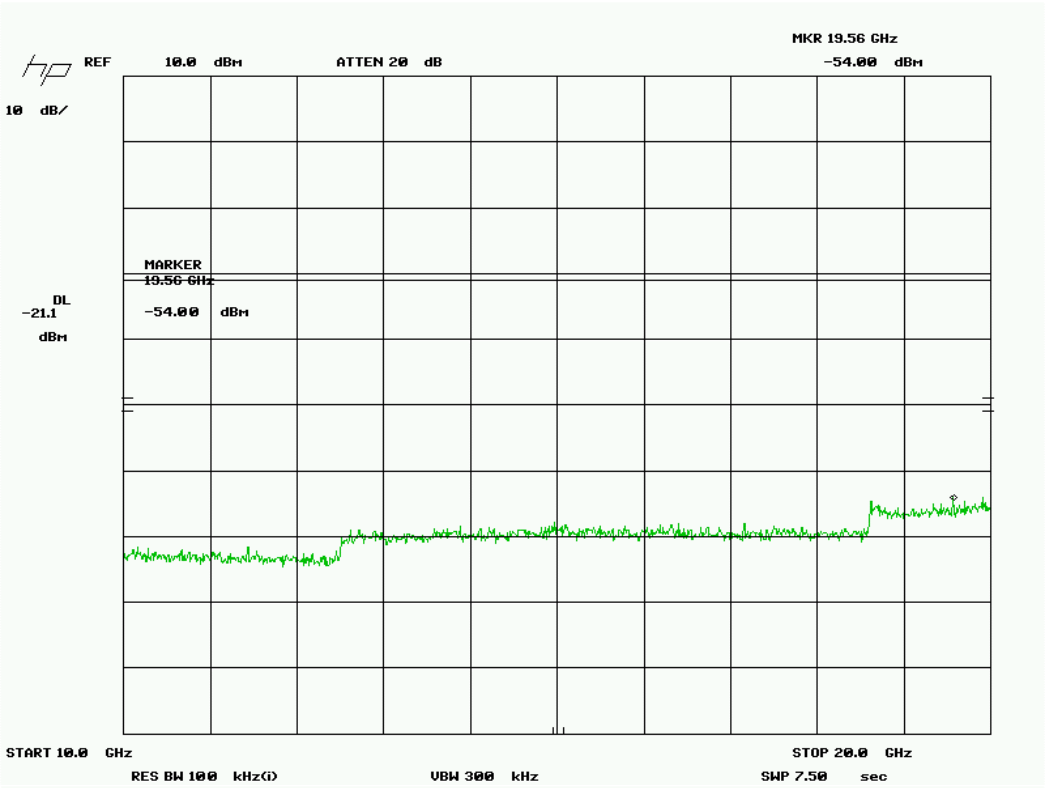


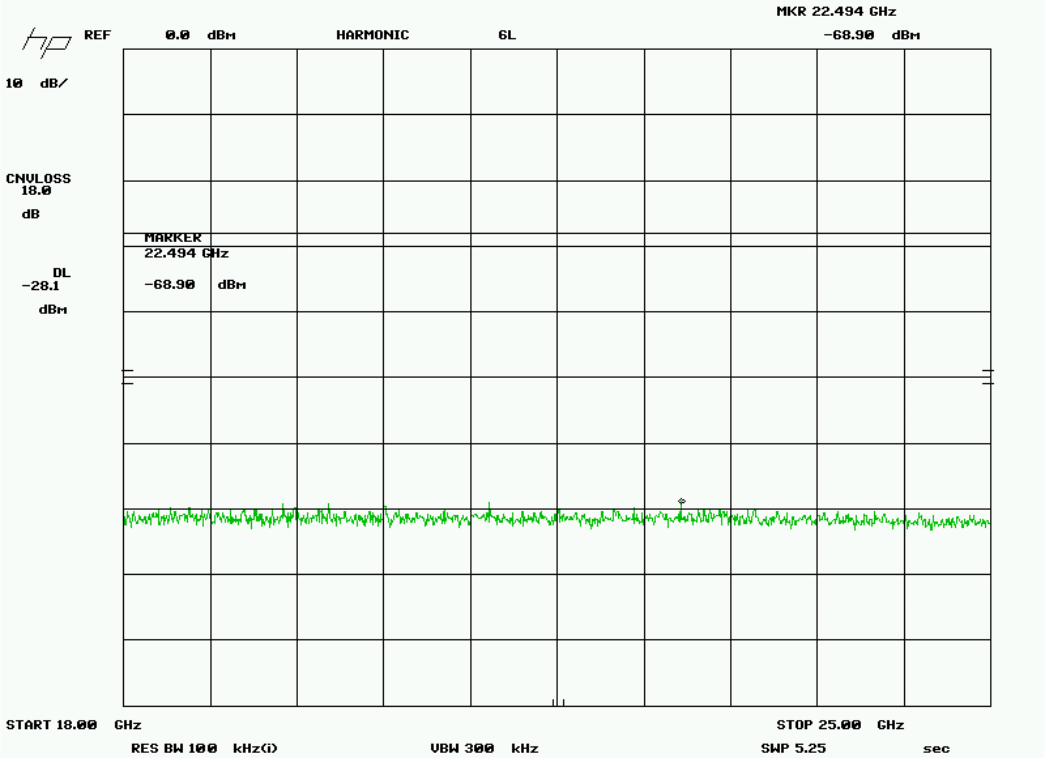


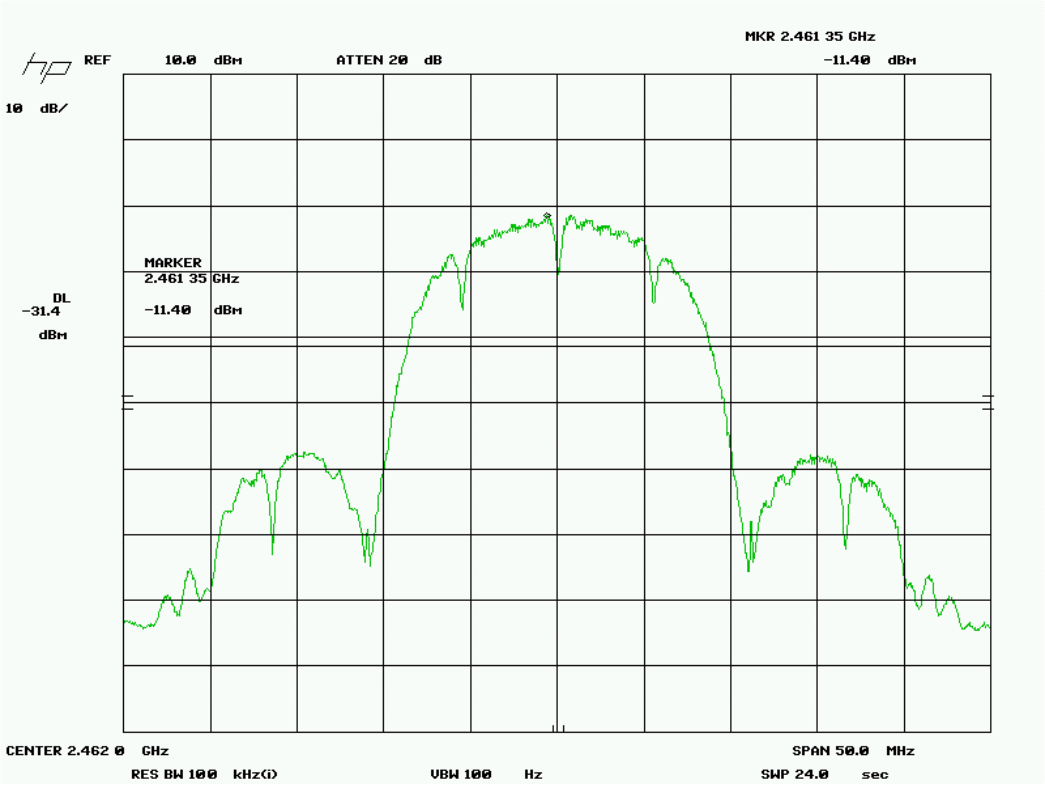
Channel 11











2.8.2 ANTENNA CONDUCTED SETUP

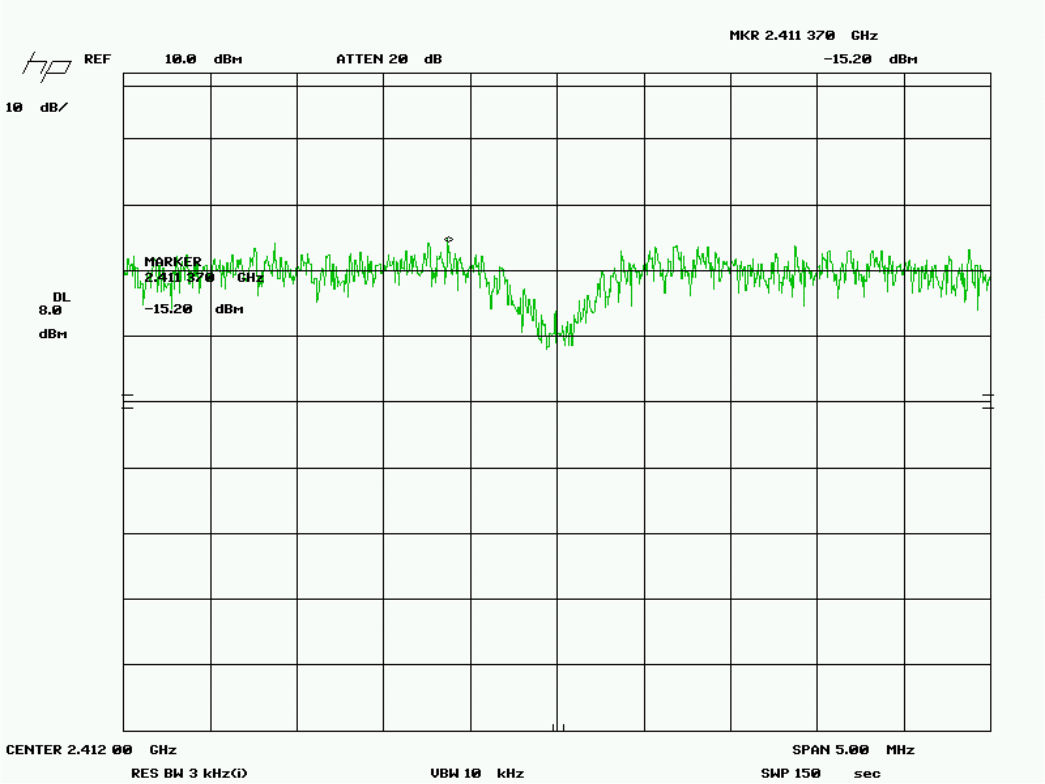
2.9 SPECTRAL DENSITY

Test Summary	
Test Personnel: Scott Drysdale	Test Date: January 11, 2005

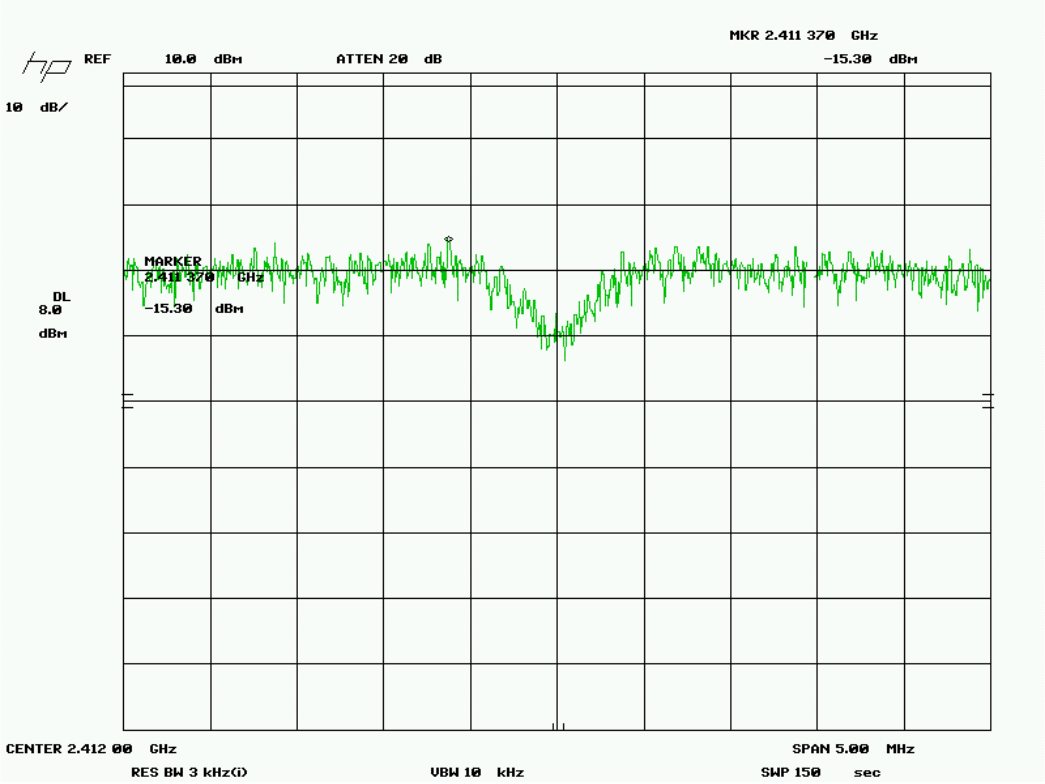
Test Description	
Objectives/Criteria	Specifications
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of the 15.247 section which is also stated in section 2.6 of this report The same method of determining the conducted output power shall be used to determine the power spectral density. It is recommended that a minimum margin of 13 dB be allowed for manufacturing tolerances and possible later European compliance.	**FCC Part 15.247(e)** **Must be tested at low, middle and high Tx frequencies.** **< 8dBm in any 3kHz band.** **Each scan represents a max hold of a minimum of 5 sweeps.**
Test Result Pass	

2.9.1 SPECTRAL DENSITY DATA

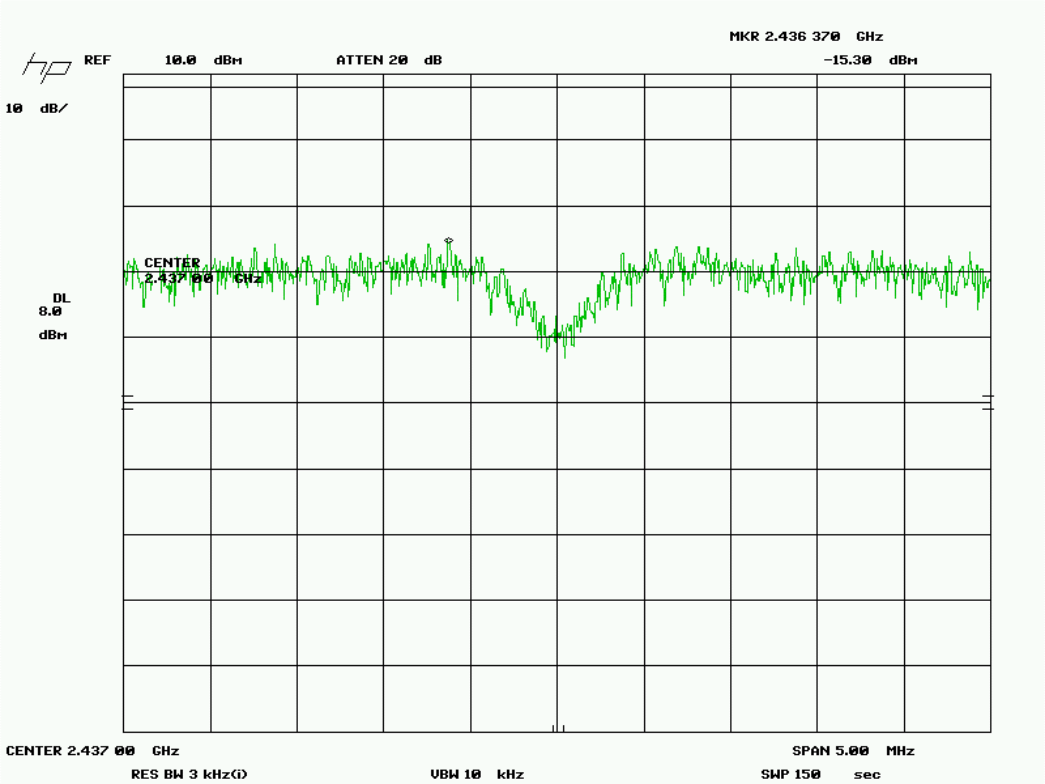
Channel 1, 1mpbs



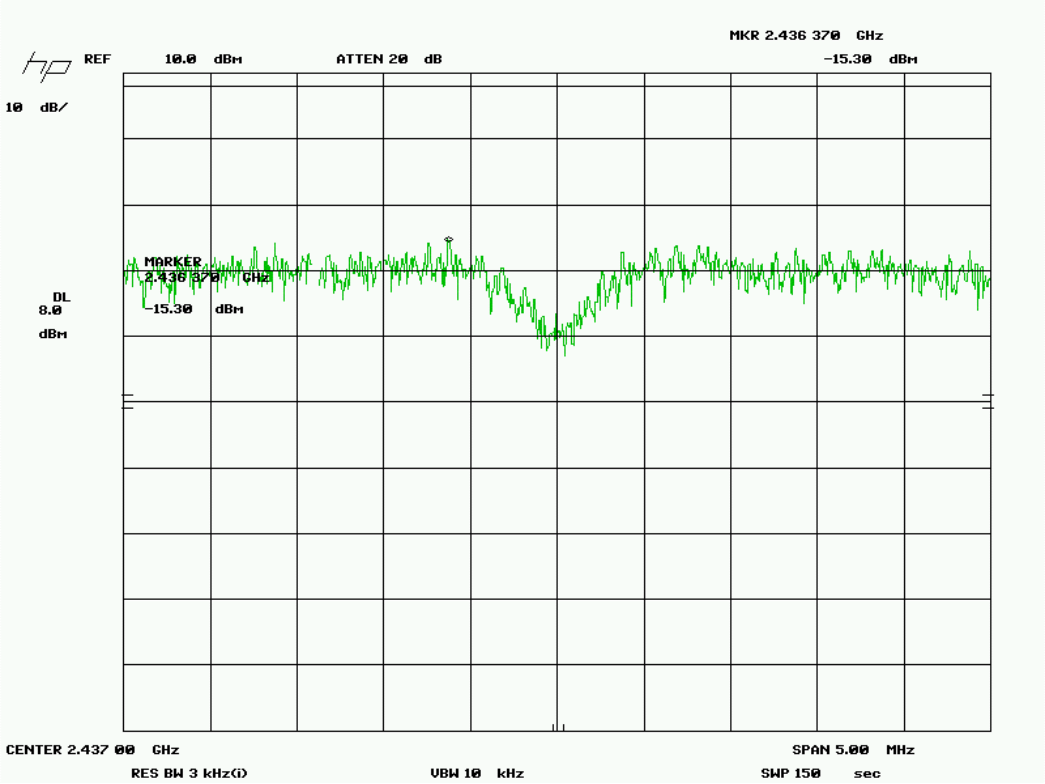
Channel 1, 2mpbs



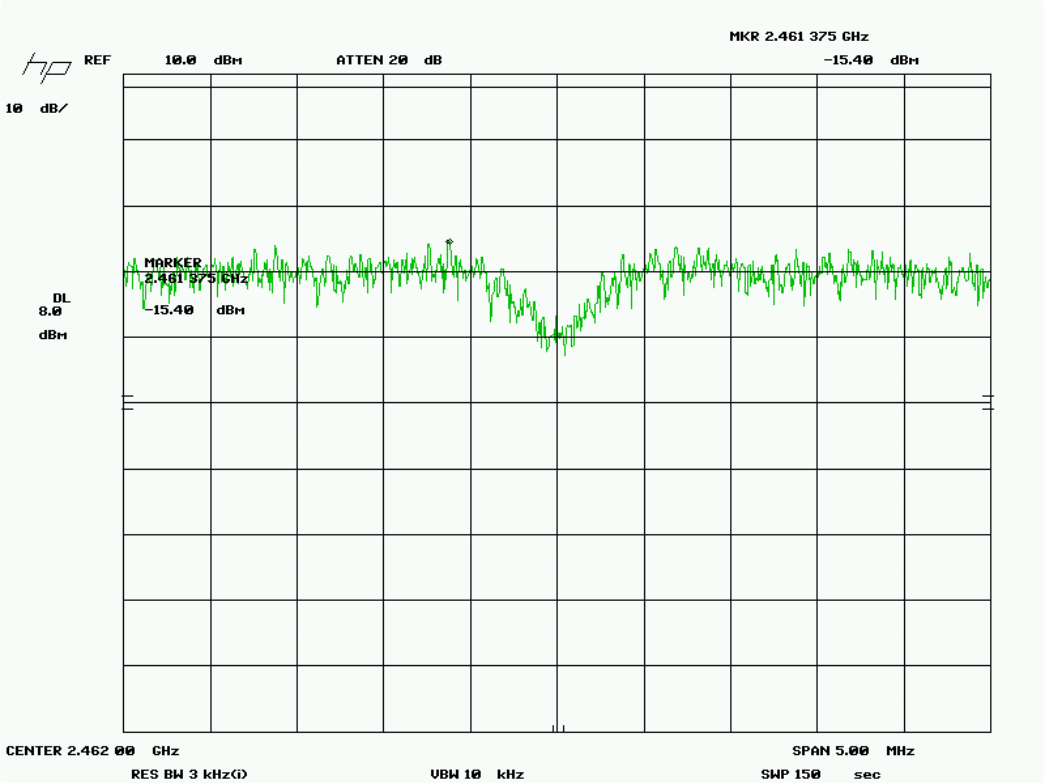
Channel 6, 1mpbs



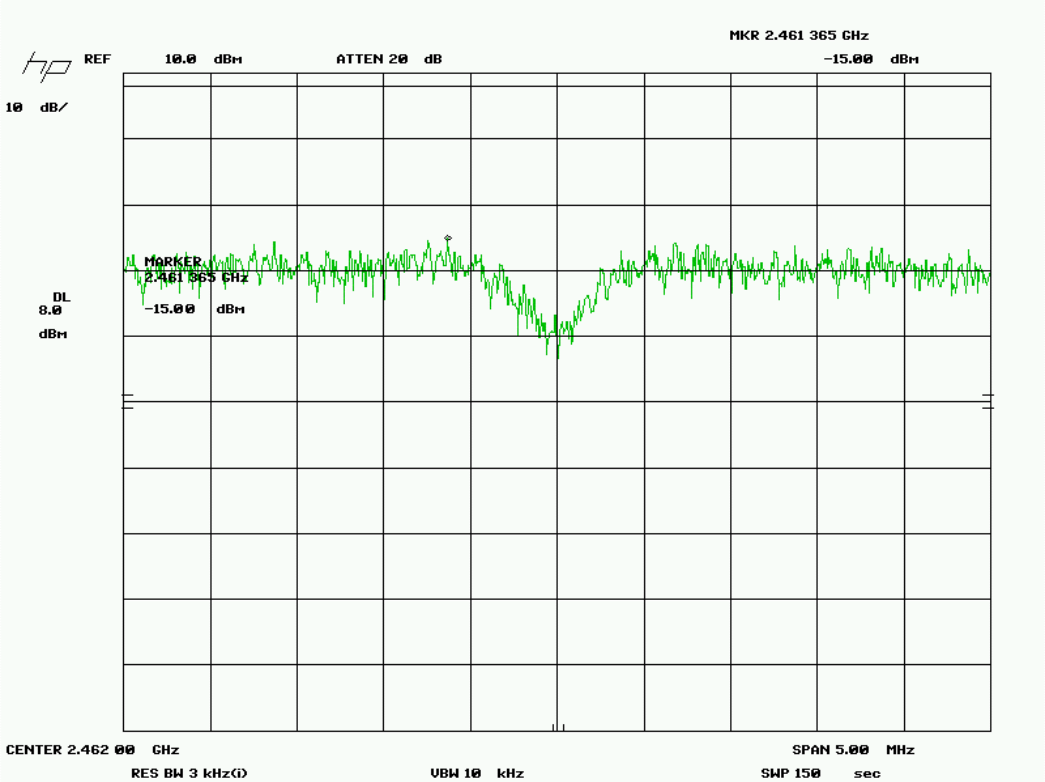
Channel 6, 2mpbs



Channel 11, 1mpbs



Channel 11, 2mpbs



2.9.2 SPECTRAL DENSITY SETUP

2.10 RF Exposure

Test Summary	
Test Personnel: Scott Drysdale	Test Date:

Test Description	
Objectives/Criteria	Specifications
To meet the National Environmental Policy Act by evaluating the environmental significance of this product.. It is recommended that a minimum margin of 6 dB be allowed for manufacturing tolerances.	**FCC part 2.1091** **FCC part 1.1307** **FCC part 1.1310**

Result: This test is categorically excluded, or not required, as per 2.1091(c). As it is not any of the below:

a) authorized under subpart H of part 22 , part 24, part 25, part 26, part 27, part 80 or part 90 of the FCC regulations.
b) Operating at frequencies of 1.5 GHz or below and the effective radiated power (ERP) is 1.5 watts or more
c) Operating at frequencies above 1.5 GHz and the ERP is 3 watts or more.
d) Unlicensed personal communications service device, unlicensed millimeter wave device or unlicensed NII device authorized under 15.253, 15.255, and subparts D and E of part 15 of the FCC regulations with ERP of 3 watts or more.
e) Meeting the definition of a portable device as specified in FCC part 2.1093(b) requiring evaluation under the provisions of that section. Note: the definition is currently defined as “the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.”
f) Meeting provisions of 1.1307(c), alleged possible environmental impact and confirmed by bureau.
g) Meeting provisions of 1.1307(d), request from bureau.

3.0 TEST FACILITY

3.1 LOCATION

The EUT was tested for Electromagnetic Compatibility at the Electronics Test Centre, located in Kanata, Ontario, Canada with the address as shown on page 1 or this report.

3.2 GROUNDING PLAN

The EUT was tested on a tabletop and is a battery operated unit. No grounding was required according to the Clients specifications.

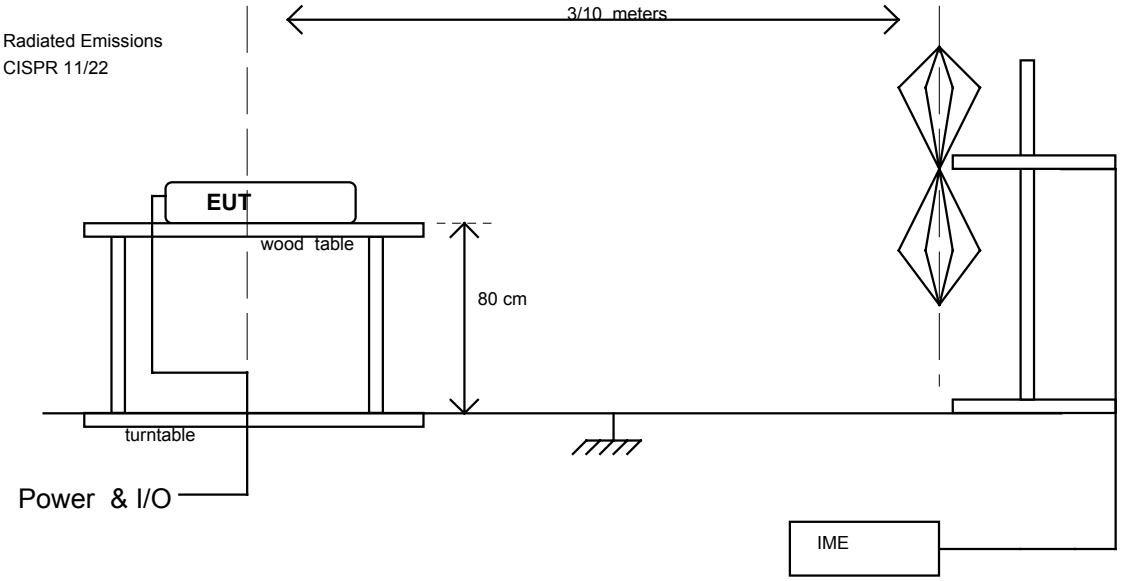
3.3 POWER

The EUT is intended to be installed (fixed) in a vehicle and it operates from an external source of power – i.e, the vehicle 12V nominal supply from the alternator/battery. All tests were commenced with an external fully charged battery or an AC adaptor providing the required DC voltage.

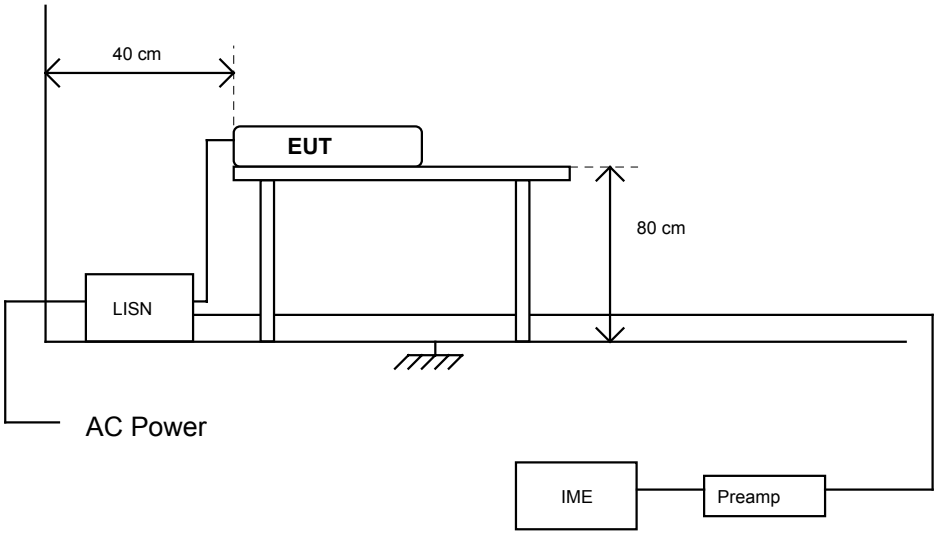
3.4 TEST CONFIGURATION

3.4.1 TABLE TOP EQUIPMENT

The following diagrams illustrate the configuration of the EUT test and measurement equipment used for Radiated and Conducted Emissions Testing.



Conducted Emissions CISPR 11 / 22



3.5 SAMPLE CALCULATIONS

Emissions:

Meter reading: 31.0 dBuV
Amplifier and Cable factors (Gain/Loss): -26.0 dB
Antenna factor (Transducer): 37.0 dB
Level = Meter + Gain/Loss + Transducer
Level = 31.0 + (-26.0) + 37 = 31 - 26 + 37 = 42.0 dBuV
Margin = Limit – Level
Margin = 124 – 42 = 82.0 dB

Frequency Stability:

Ideal Fc: 13560000 Hz
Worst case Fc: 13559785 Hz
Worst case Delta Fc (Hz): Reading – Fc = 215 Hz
Frequency stability = Delta Fc / Ideal Fc = 215 / 13560000 = 0.0159%
Limit(%): 0.01
Limit (Hz): 13560000 * (Limit(%) / 100) = 1356 Hz
Delta from limit = Limit(Hz) – (Delta Fc)

Fc denotes center frequency.

4.0 TEST EQUIPMENT

The following equipment was utilized for this procedure. Measurement devices except for some select devices, as listed, are calibrated annually traceable to NIST. Those devices not performed annually are performed on a two-year cycle.

4.1 RADIATED EMISSIONS

a) Spectrum Analyzer
b) Receiver with CISPR Quasi-peak Adapter
c) Power Isolation Transformers
d) Biconilog antenna (25 MHz to 2 GHz)
e) DRG Horn (1 GHz to 18 GHz)
f) Antenna mast positioner, and controller
g) Flush-mounted turntable, and controller

4.2 CONDUCTED EMISSIONS

a) Spectrum Analyzer
b) Line Impedance Stabilization Network, 50 μH
c) CISPR Quasi-peak Adapter
d) Power Isolation Transformer
e) Personal Computer and EMI/EMC Software

4.3 EMI SPECTRUM ANALYZER AND RECEIVER

4.3.1 SPECTRUM ANALYZER RANGE 1 of 2

Start Frequency	0.15 MHz
Stop Frequency	30 MHz
Transducer	LISN per CISPR 16
CISPR Bandwidths	200 Hz $_{Average}$/9 kHz
Spectrum Analyzer BW	10 kHz
Video Bandwidth	100 kHz
Reference Level	100 dBμV

4.3.2 SPECTRUM ANALYZER RANGE 2 of 2

Start Frequency	30 MHz
Stop Frequency	1000 MHz
Transducer	Biconilog Antenna
CISPR Bandwidth	120 kHz $_{Quasi-peak}$
Spectrum Analyzer BW	120 kHz
Video Bandwidth	1 MHz
Reference Level	100 dBμV

4.3.3 RECEIVER

Transducer	Biconilog Antenna
CISPR Bandwidth	120 kHz $_{Quasi-peak}$
Measurement Window	20 dBμV

APPENDIX A – CUSTOMER PROVIDED DETAILS

CLIENT SAMPLE DESCRIPTION

	New	Repeat

MPBT Personnel	Date	Project/Work Order

Contact	Jeff Tregunna	Address	
Company	Aztech Associates Inc.	805 Bayridge Dr.	
		Kingston, Ontario	
		K7P 1T5	
Client Code			
		Phone: (613)-384-9400	Fax: (613) 384-7139

Product Application	**Product Category**	**Product Type**
Military ☐ Commercial ■	Telecom ☐ Avionics ☐ Info Tech. ☐ Other ■ Space ☐	Production Unit ☐ Pre-production Unit ■ Prototype ☐

Product Name	Aztech - LEX Gateway 802.11b Tripmaster – ranger 802.11b
Part Number	S 000-0271 (Aztech) S 000-0264 (OEM)
Model Number	Wireless 802.11b
Serial Number	2624450014 2624450003
Power Requirements: AC/DC, Current	12VDC@500mA
Operational Frequency	2.400-2.4835 GHz
Typical Installation Instructions or Configuration	Connect Power and Communications cable to interface connector, connect the antenna to the antenna connector.
Ground EUT	No
# Interconnecting Leads	10 plus antenna connection.
Internal Clock Frequency	Main Board – 25MHz 802.11b Module – 4.5MHz CPU Clock, 32.768KHz RTC
Peripheral Equipment	This device is to be used with an RS-232 communications device connected to the communications port on the interface connector.
Cables	A Power and Communications Cable and antenna are required to operate the device.
Functional or Self-Test Duration	N/A
Brief Functional Description	The device is an intelligent modem that communicates over an RS-232 port to an OBC (On Board Computer, typically in a truck). The OBC sends commands and data to the device to be sent out by the 802.11b module. It also passes data that is received by the 802.11b module on to the OBC.
Other Remarks	This device is an OEM product that will be branded by the companies that use the device (ie: Tripmaster Corporation)

Prepared By:	Title:	Date:
J. Tregunna	EIT	Nov. 30/04

Low Profile Vertical Antennas

The MLPV antennas provide superior pattern coverage for all mobile and fixed applications using UHF frequencies from 380-512 MHz, 700/800/900 MHz frequencies from 760 to 960 MHz, and PCS/ISM frequencies from 1700 to 2500 MHz. Their low profile design provides industry leading wideband performance and reliability, with minimum loss and no tuning required. Dual band versions (MLPVDB series) are also available. The MLPV and MLPVDB antennas feature an attractive, compact package and are ideal for indoor or outdoor applications requiring minimum visibility. Color options are black/chrome, white/chrome or black/black. Dual band models are also available in a "short" housing for minimum visibility.

MLPV UHF (left)
BMLPV800HD (top)

BMLPV1700 or Dual band "S" version antenna (left)

WMLPV800 or WMLPVDB dual band antenna (right)

Features

- Attractive, low profile design is available in three color finishes.
- Wideband performance. Only three models are required to cover all 700 MHz, 800 MHz, 900 MHz, PCS and 2.4 GHz frequencies. Three models cover all UHF frequencies.
- Quad band coverage. A single model covers cellular and GSM, ISM, DCS and PCS frequencies. Dual band 902 MHz and 2.4 GHz version also available.
- BMLPV800HD heavy duty model available for 800/900 MHz frequencies. Designed to withstand the toughest operating conditions (black finish only).
- Excellent pattern coverage for mobile and base station applications.
- Compatible with all 3/4" hole mounts for easier installation.
- No tuning required. Allows faster, more reliable installations.

Electrical Specifications

Maximum Power:
150 Watts (all models, except UHF)
100 Watts (UHF models)
VSWR:
Less than 1.5:1
Less than 1.5:1/2:1 (dual band models)
Nominal Impedance:
50 Ohms
Antenna Type:
Low profile vertical

Mechanical Specifications

Radiator Material:
Solid brass
Antenna Dimensions:
MLPV1700 (all colors): 1.79" H x 1.5" OD
MLPV800 and MLPV700 (all colors): 2.4" H X 1.5" OD
BMLPV800HD, BMLPV800/1900HD: 2.4" H x 1.5" W x 1.7" D (at the base)
MLPV406 and MLPV380 (all colors): 3.38" H X 1.5" OD
MLPV430 (all colors): 3.38" H X 1.5" OD
MLPV450 (all colors): 3.38" H X 1.5" OD
MLPVDB800/1900 (all colors): 2.4" H X 1.5" OD
MLPVDB902/2400 (all colors): 2.4" H X 1.5" OD
MLPVDB800/1900S (all colors): 1.79" H x 1.5" OD
MLPVDB902/2400S (all colors): 1.79" H x 1.5" OD
BMLPVDB800/1900SHD: 1.79" H x 1.5" W x 1.7" D (at the base)

MAXRAD
An ISO-9001 Registered Company

Low Profile Vertical Antennas

Model #	Frequency Range	Bandwidth	Gain	Color	List Price
MLPV450	450-512 MHz	62 MHz	Unity	Black over chrome	$38.00
MLPV430	430-480 MHz	50 MHz	Unity	Black over chrome	$38.00
MLPV406	406-440 MHz	34 MHz	Unity	Black over chrome	$38.00
MLPV380	380-410 MHz	30 MHz	Unity	Black over chrome	$38.00
BMLPV450	450-512 MHz	62 MHz	Unity	Black over black	$38.00
BMLPV430	430-480 MHz	50 MHz	Unity	Black over black	$38.00
BMLPV406	406-440 MHz	34 MHz	Unity	Black over black	$38.00
BMLPV380	380-410 MHz	30 MHz	Unity	Black over black	$38.00
WMLPV450	450-512 MHz	62 MHz	Unity	White over chrome	$38.00
WMLPV430	430-480 MHz	50 MHz	Unity	White over chrome	$38.00
WMLPV406	406-440 MHz	34 MHz	Unity	White over chrome	$38.00
WMLPV380	380-410 MHz	30 MHz	Unity	White over chrome	$38.00
MLPV700	760-870 MHz	110 MHz	Ground plane and frequency dependent. Average gain value is 4 dBi.	Black over chrome	$35.00
BMLPV700	760-870 MHz	110 MHz		Black over black	$35.00
WMLPV700	760-870 MHz	110 MHz		White over chrome	$35.00
MLPV800	806-960 MHz	154 MHz	Ground plane and frequency dependent. Average gain value is 3 dBi.	Black over chrome	$35.00
BMLPV800	806-960 MHz	154 MHz		Black over black	$35.00
WMLPV800	806-960 MHz	154 MHz		White over chrome	$35.00
BMLPV800HD	806-960 MHz	154 MHz		Black over black	$42.95
MLPV1700	1700-2500 MHz	800 MHz	Ground plane and frequency dependent. Average gain value is 4 dBi.	Black over chrome	$40.00
BMLPV1700	1700-2500 MHz	800 MHz		Black over black	$40.00
WMLPV1700	1700-2500 MHz	800 MHz		White over chrome	$40.00
MLPVDB800/1900	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	Black over chrome	$45.00
MLPVDB902/2400	902-928 MHz and 2400-2500 MHz	26 MHz and 100 MHz	3 dBi	Black over chrome	$45.00
BMLPVDB800/1900	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	Black over black	$45.00
BMLPVDB902/2400	902-928 MHz and 2400-2500 MHz	26 MHz and 100 MHz	3 dBi	Black over black	$45.00
WMLPVDB800/1900	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	White over chrome	$45.00
WMLPVDB902/2400	902-928 MHz and 2400-2500 MHz	26 MHz and 100 MHz	3 dBi	White over chrome	$45.00
MLPVDB800/1900S	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	Black over chrome	$45.00
MLPVDB902/2400S	902-928 MHz and 2400-2500 MHz	26 MHz and 100 MHz	3 dBi	Black over chrome	$45.00
BMLPVDB800/1900S	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	Black over black	$45.00
BMLPVDB902/2400S	902-928 MHz and 2400-2500 MHz	26 MHz and 100 MHz	3 dBi	Black over black	$45.00
WMLPVDB800/1900S	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	White over chrome	$45.00
WMLPVDB902/2400S	902-928 MHz and 2400-2500 MHz	26 MHz and 100 MHz	3 dBi	White over chrome	$45.00
BMLPVDB800/1900HD	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	Black over black	$52.95
BMLPVDB800/1900SHD	806-960 MHz and 1710-1990 MHz	154 MHz and 280 MHz	3 dBi	Black over black	$52.95

APPENDIX B - TEST EQUIPMENT REPORT

Asset #	Device	Manufacturer	Model	Serial #	Cal. Date	Cal. Due date
2319	DRG Horn Antenna	Electrometrics	RGA60	2966	27-Dec-03	27-Dec-05
4297	Spectrum Analyzer	Hewlett Packard	HP8566B	2747A05484	23-Jul-04	23-Jul-05
4602	Standard Gain Horn	NRC	R14016	18G07TO26G55	18-Aug-03	18-Aug-05
5076	EMC Software	Underwriters Laboratories	V3.02	MC106399NK07147	Monitored	Monitored
5078	Biconilog Antenna	Amplifier Research	LPB-2520/A	1173	5-Aug-03	5-Aug-05
5279	Harmonic Mixer	Hewlett Packard	11970k	3003A02976	Monitored	Monitored
4990	Quasi Peak Adapter	Hewlett Packard	85650A	2521A00815	30-Dec-04	30-Dec-05
2316 (High Freq)	Amplifier	Miteq	AMF-60-010200-35-10P	699155	Monitored	Monitored
2316 (Low Freq)	Preamplifier	Electrometrics	BPA-1000	900710	Monitored	Monitored
5200	Power Head	Amp Research	PH2000	28741	3-Jan-05	3-Jan-06
5201	Power Meter	Amp Research	PM2002	26700	3-Jan-05	3-Jan-06