FCC CFR47 CLASS II PERMISSIVE CHANGE CERTIFICATION

TEST REPORT

FOR

WIRELESS ETHERNET TRANSCEIVER

MODEL NUMBER: P5010M-INT AND P5010M-EXT

FCC ID: NCYP5010M

REPORT NUMBER: 05U3296-2

ISSUE DATE: APRIL 26, 2005

Prepared for

TRANGO SYSTEMS, INC.
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SAN DIEGO, CA 92128
U.S.A.

Prepared by

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Revision History

Rev.	Revisions	Revised By

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TRANGO SYSTEMS, INC.
15070 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128

EUT DESCRIPTION: Wireless Ethernet Transceiver

MODEL: P5010M-INT AND P5010M-EXT

DATE TESTED: MARCH 21 – APRIL 26, 2005

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART E	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By: Tested By:

YAN ZHENG
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

DAVID GARCIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a Transceiver used for Ethernet Data point-to-point operation.

The EUT is manufactured by Trango Systems.

5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

This class II permissive change adds a 32.5 dBi external dish antenna. The radio circuitry is changed as follows: The fixed 5 dB attenuator in the RF output path is replaced with a switch-selectable attenuator or filter. Switching is performed automatically by the firmware, depending on the band of operation. The new 8 dB attenuator is switched in for operation in the 5.2 GHz band and the new filter is switched in for operation in the 5.8 GHz band.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Dish antenna with a maximum gain of 32.5dBi (including cable loss) or a Panel antenna with a maximum gain of 23 dBi.

5.4. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows (By using the method #3 for UNII band peak power measurement):

5250 to 5350 MHz Authorized Band

Frequency Range (MHz)	Antenna Type/Gain	Output Power (dBm)	Output Power (mW)
5260 - 5325	Panel / 23 dBi	2.56	1.80
5260 - 5325	Dish / 32.5 dBi	-3.92	0.41

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 0.9a, rev. P5010M_0p9a0.
The test utility software used during testing was Atlas PtP-5010M, rev. 0p9a1D0501118022.

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 5300 MHz.

The worst-case data rate for this channel is determined to be 6 Mb/s, based on measurements taken on the EUT to determine worst-case data.

Thus the worst-case emissions tests were made in the 802.11a mode was at 5300 MHz, 6 Mb/s.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacture**	**Model**	**Serial Number**	**FCC ID**
Laptop PC	Sony	Vaio; PCG-643L	3525952	DoC
Docking Station	Sony	PCGA-DSM51	1035361	DoC
AC Adapter	Sony	PCGA-AC19W1	183529	N/A
POE Adapter	Trango Systems	N/A	N/A	N/A
AC Adapter	CUI Inc.	3A181WP2L	N/A	N/A

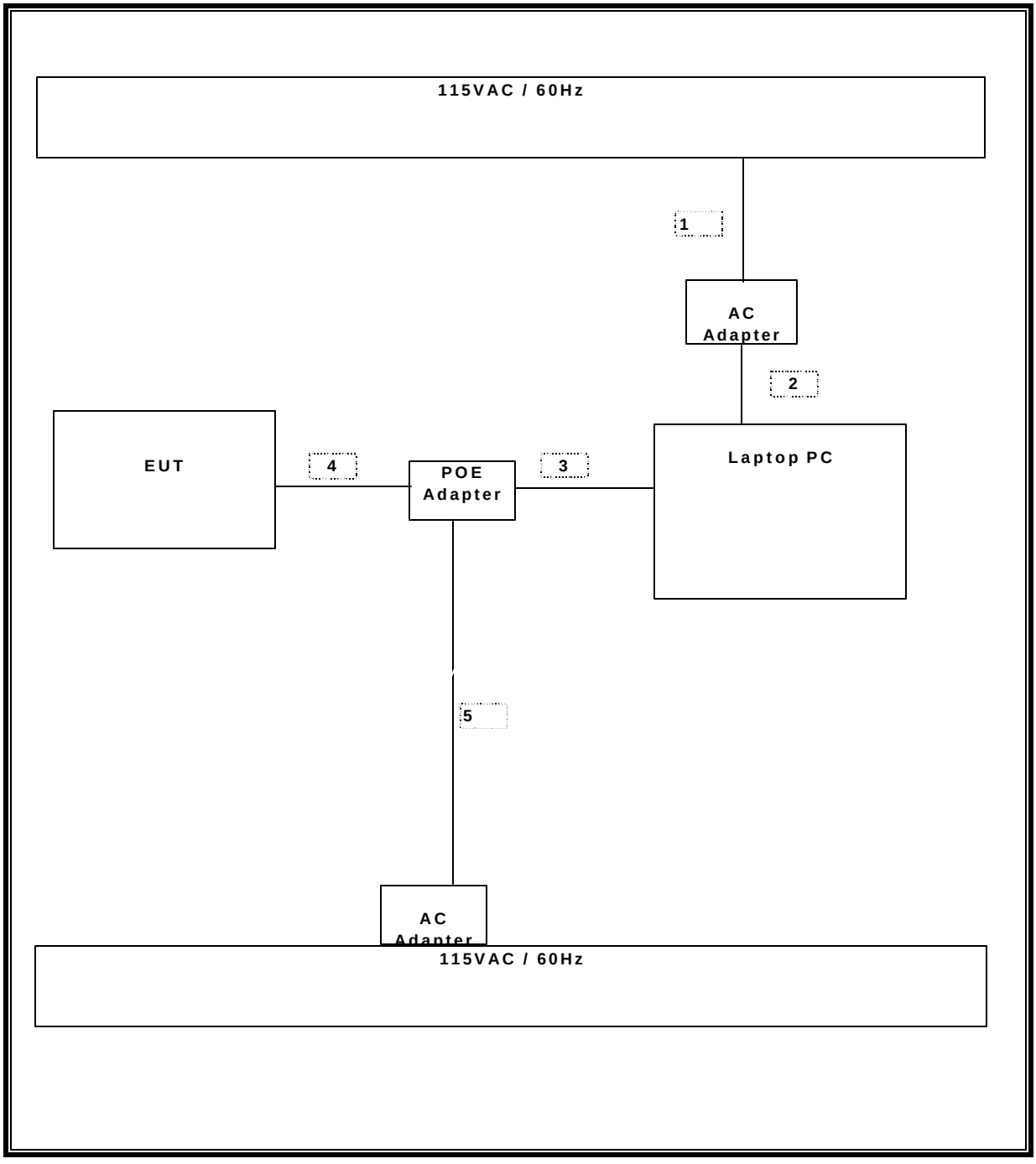
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	IEC	Unshielded	1.5m	
2	DC	1	DC	Unshielded	1.8m	
3	LAN	1	RJ-45	Unshielded	3m	
4	LAN	1	RJ-45	Unshielded	3+m	
5	DC	1	DC	Unshielded	1.8m	

TEST SETUP

The EUT is connected to a laptop computer via a power over Ethernet adapter. The test software exercised the radio.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
EMI Test Receiver	R & S	ESHS 20	827129/006	10/22/2005
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/21/2005
Site A Line Stabilizer/Conditioner	Tripplite	LC-1800a	A005181	CNR
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	9/12/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	9/12/2005
Antenna, Horn, 18 ~ 26 GHz	ARA	MWH-1826/B	1013	9/12/2005
30MHz---- 2Ghz	Sunol Sciences	JB1 Antenna	A121003	9/22/2005
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	1/6/2006
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	US42510266	8/25/2005
Site A Preamplifier, 1300MHz	HP	8447D	2944A06833	8/17/2005
Power Meter	R & S	NRVS	DE 12101	10/21/2005
Power Sensor,18GHz,300 mW	R&S	NVR-Z51	DE 13014	10/20/2005
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924341	12/23/05

7. LIMITS AND RESULTS

7.1. CHANNEL TESTS AT ORIGINAL POWER SETTING FOR 23dBi PANEL ANTENNA

7.1.1. PEAK POWER

LIMIT

§15.407 (a) (1) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output does not operate continuously therefore Method # 3 is used.

LIMITS AND RESULTS

No non-compliance noted:

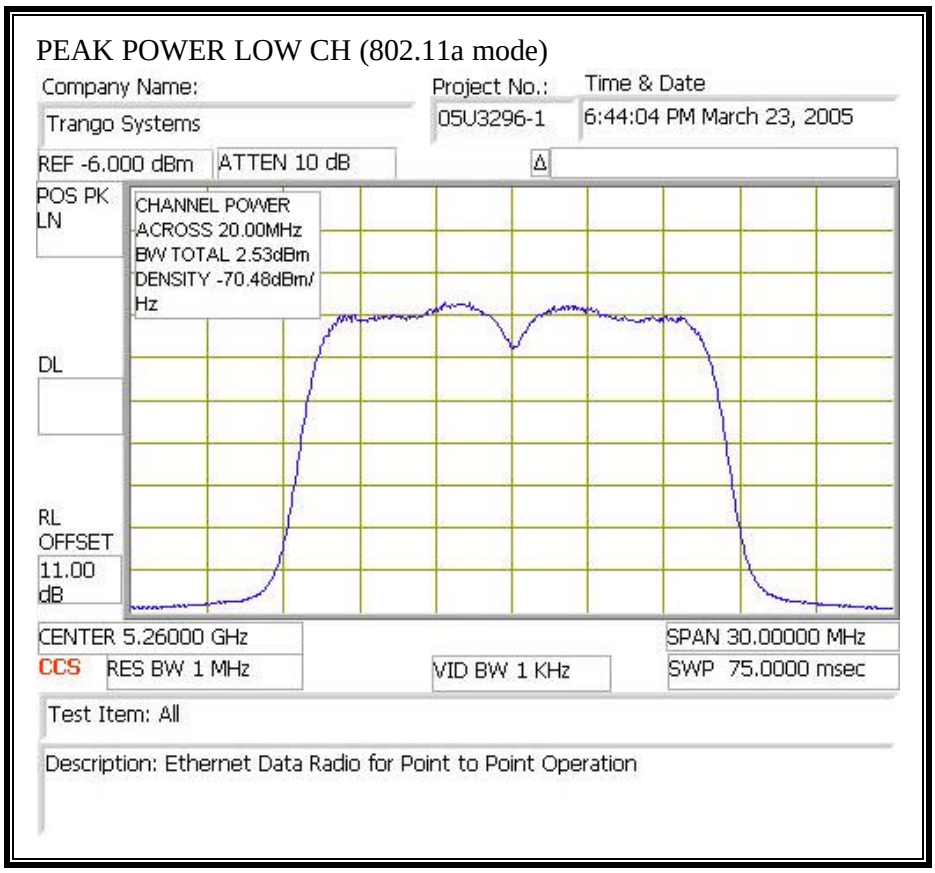
Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	24	18.933	23.77	23.00	6.77
Mid	5295	24	18.918	23.77	23.00	6.77
High	5325	24	19.022	23.79	23.00	6.79

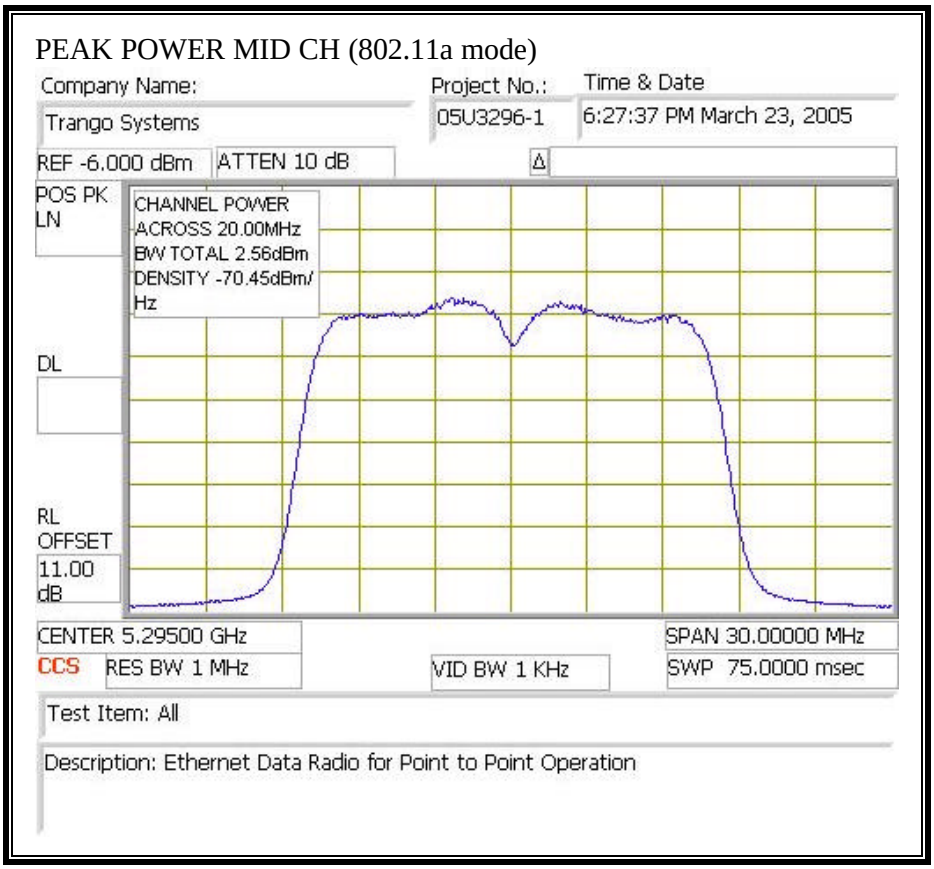
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	2.53	6.77	-4.24
Mid	5295	2.56	6.77	-4.21
High	5325	2.36	6.79	-4.43

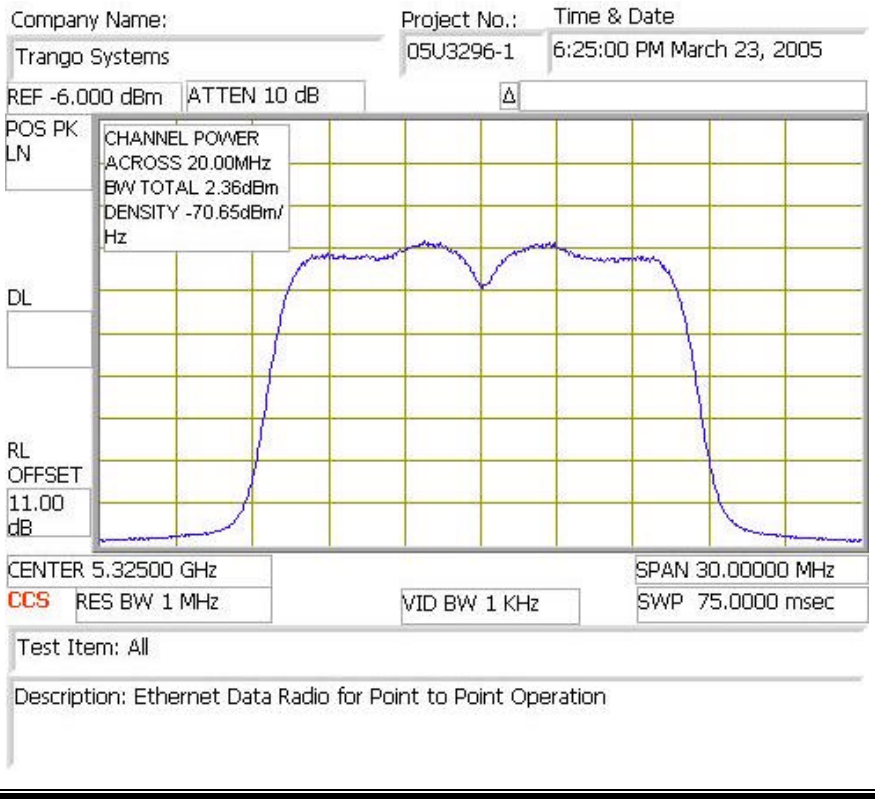
PEAK POWER (802.11a MODE)



PEAK POWER MID CH (802.11a mode)



PEAK POWER HIGH CH (802.11a mode)



7.1.2. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.407 (b) (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels. The transmitter is set to maximum power and the limit line is based on the maximum antenna gain.

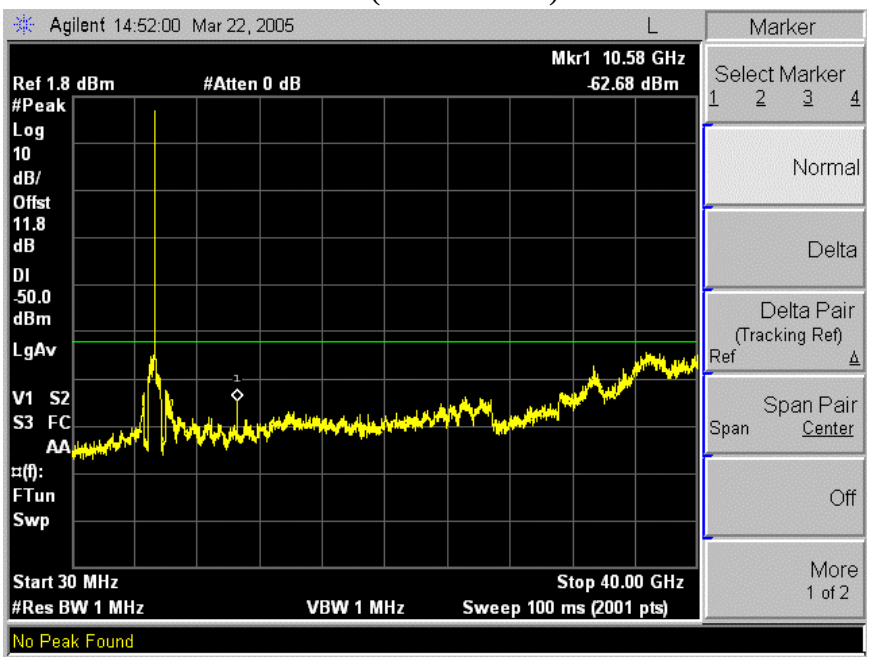
RESULTS

No non-compliance noted:

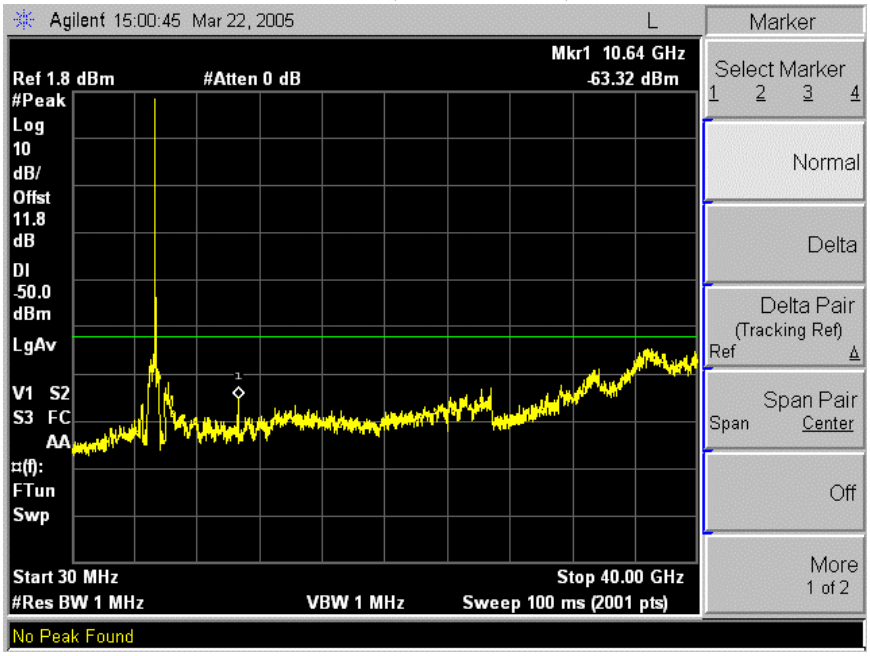
SPURIOUS EMISSIONS (802.11a MODE)

LOW CH SPURIOUS (802.11a mode)

MID CHANNEL SPURIOUS (802.11a mode)



HIGH CHANNEL SPURIOUS (802.11a mode)



7.2. CHANNEL TESTS AT REDUCED POWER SETTING FOR 32.5dBi DISH ANTENNA

7.2.1. PEAK POWER

LIMIT

§15.407 (a) (1) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output does not operate continuously therefore Method # 3 is used.

LIMITS AND RESULTS

No non-compliance noted:

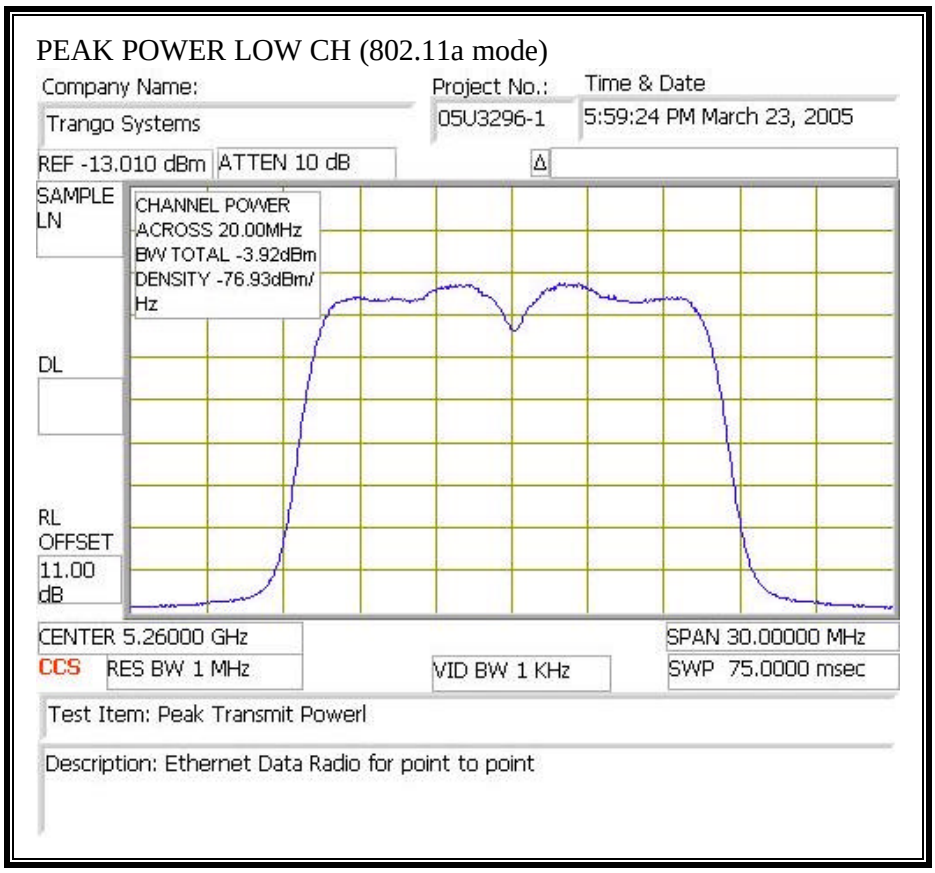
Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	24	18.933	23.77	32.50	-2.73
Mid	5295	24	18.918	23.77	32.50	-2.73
High	5325	24	19.022	23.79	32.50	-2.71

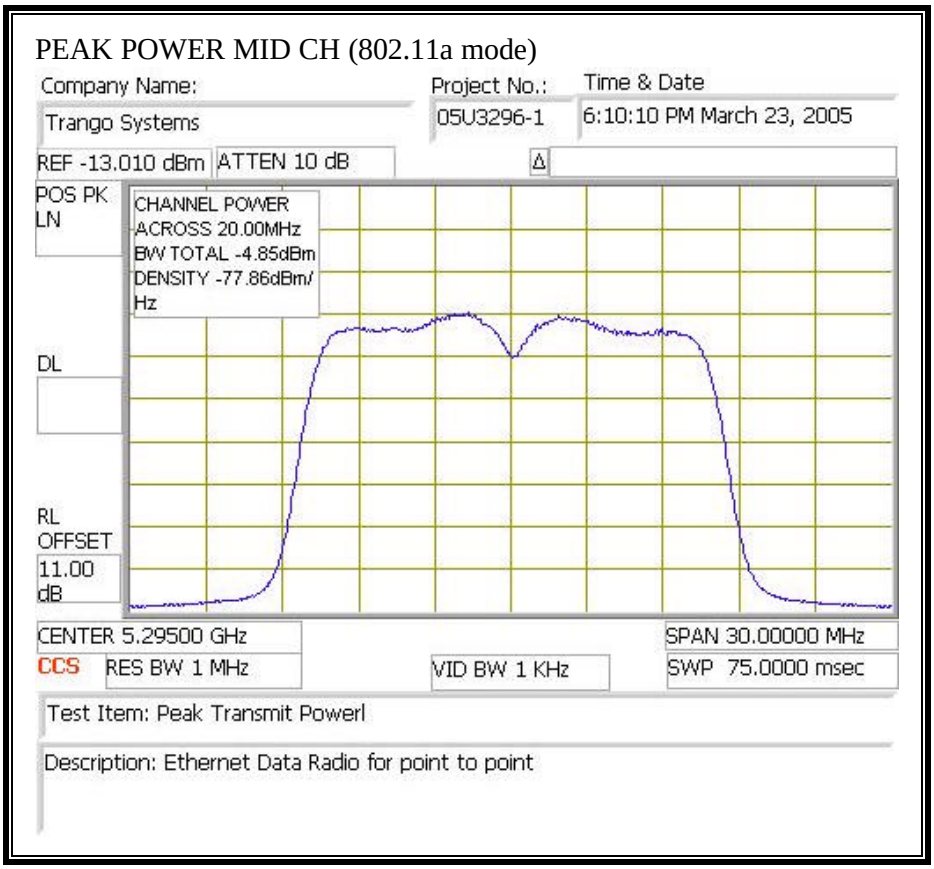
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	-3.92	-2.73	-1.19
Mid	5295	-4.85	-2.73	-2.12
High	5325	-5.12	-2.71	-2.41

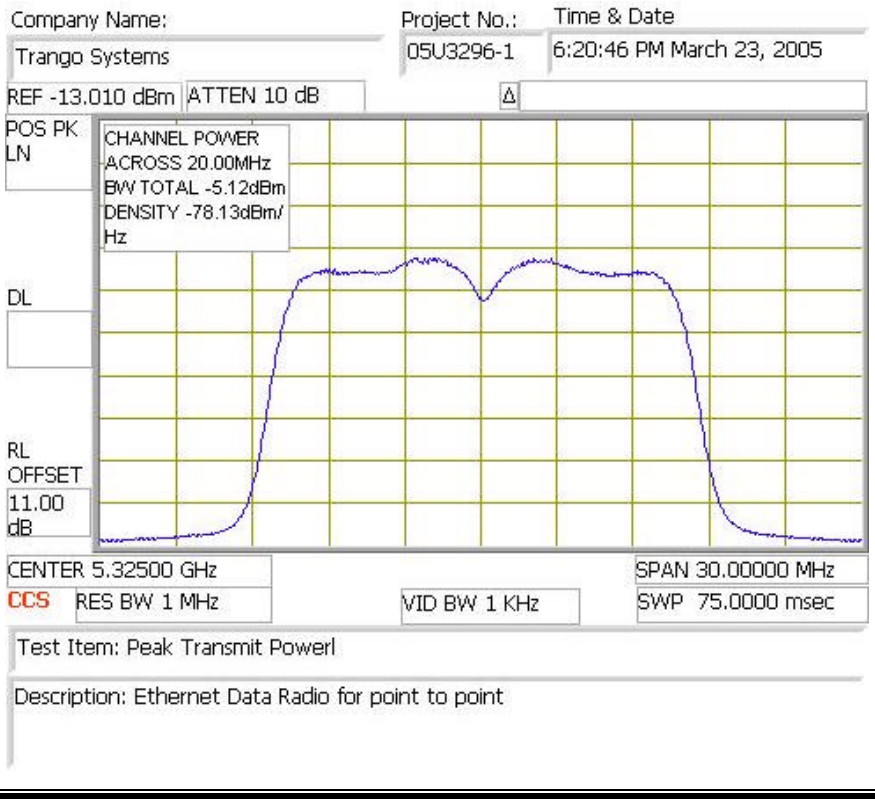
PEAK POWER (802.11a MODE)



PEAK POWER MID CH (802.11a mode)



PEAK POWER HIGH CH (802.11a mode)



7.2.2. PEAK POWER SPECTRAL DENSITY

LIMIT

§15.407 (a) (1) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain = 32.5dBi, therefore there is a reduction due to antenna gain. The peak power spectral density limit is –15.5dBm.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

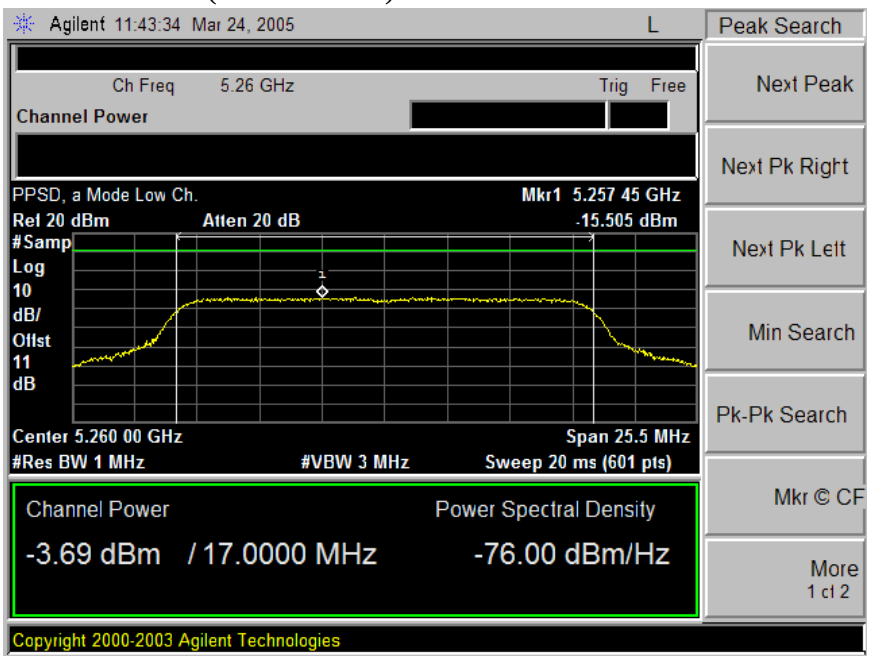
No non-compliance noted:

802.11a Mode

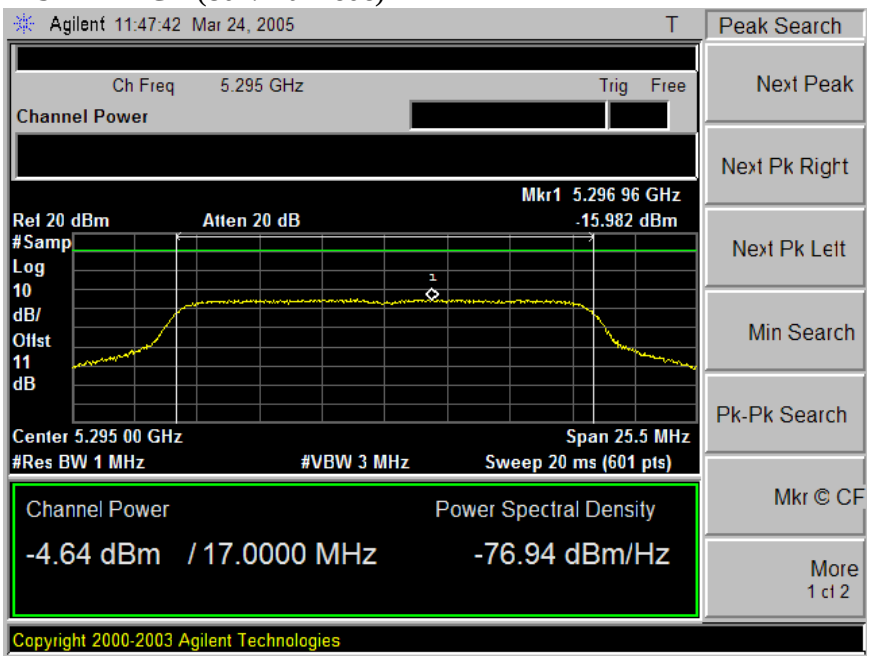
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	-15.51	-15.50	-0.01
Mid	5295	-15.98	-15.50	-0.48
High	5325	-15.58	-15.50	-0.08

PEAK POWER SPECTRAL DENSITY (802.11a MODE)

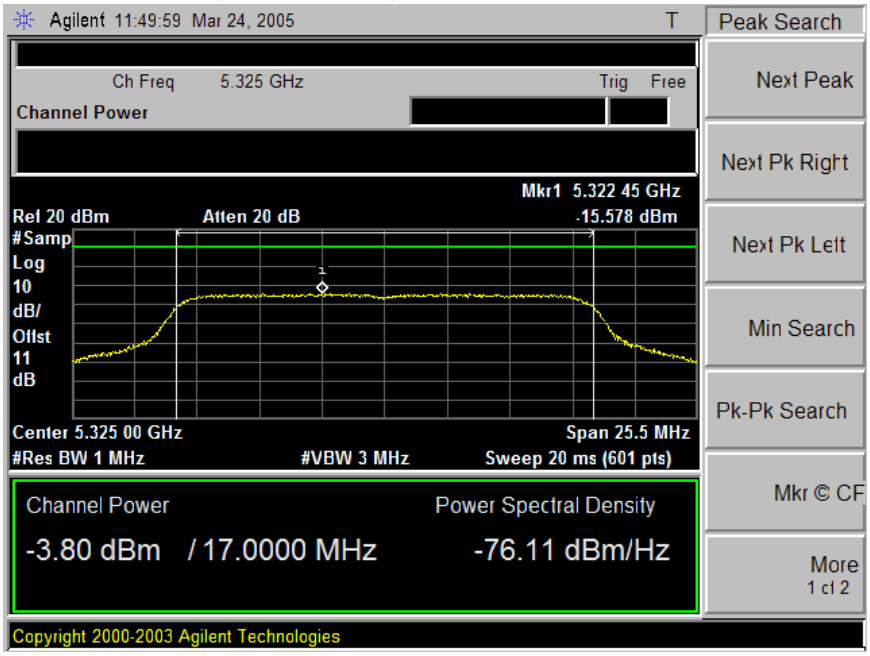
PPSD LOW CH (802.11a mode)



PPSD MID CH (802.11a mode)



PPSD HIGH CH (802.11a mode)



7.2.3. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.407 (b) (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

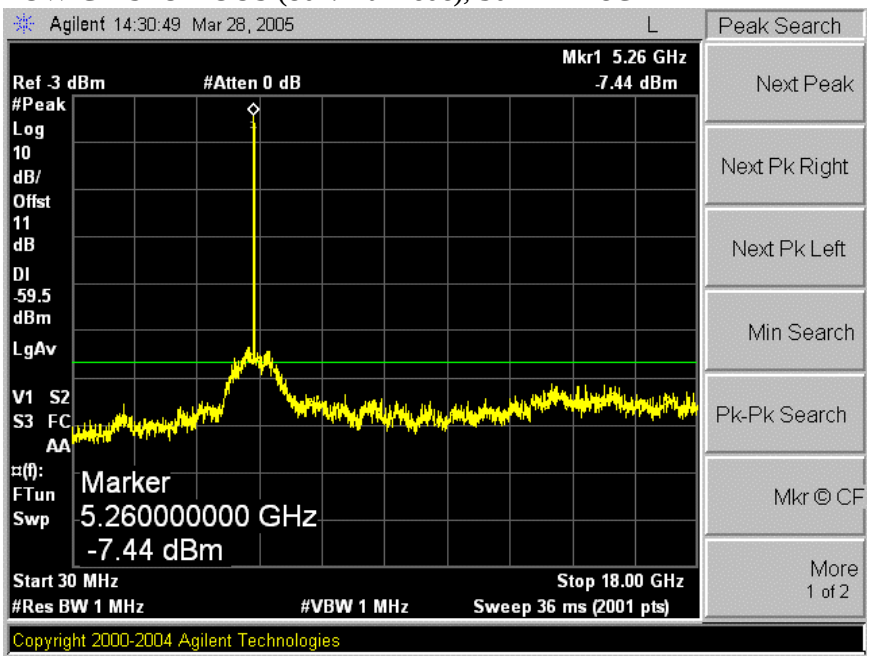
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels. The transmitter is set to maximum power and the limit line is based on the maximum antenna gain.

RESULTS

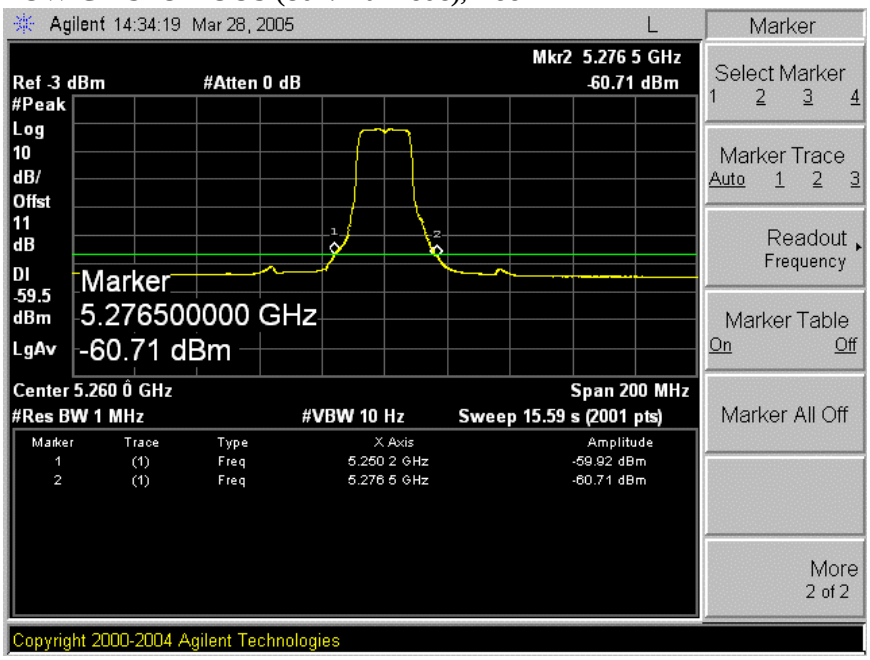
No non-compliance noted:

SPURIOUS EMISSIONS (802.11a MODE)

LOW CH SPURIOUS (802.11a mode), 30MHz~18GHz

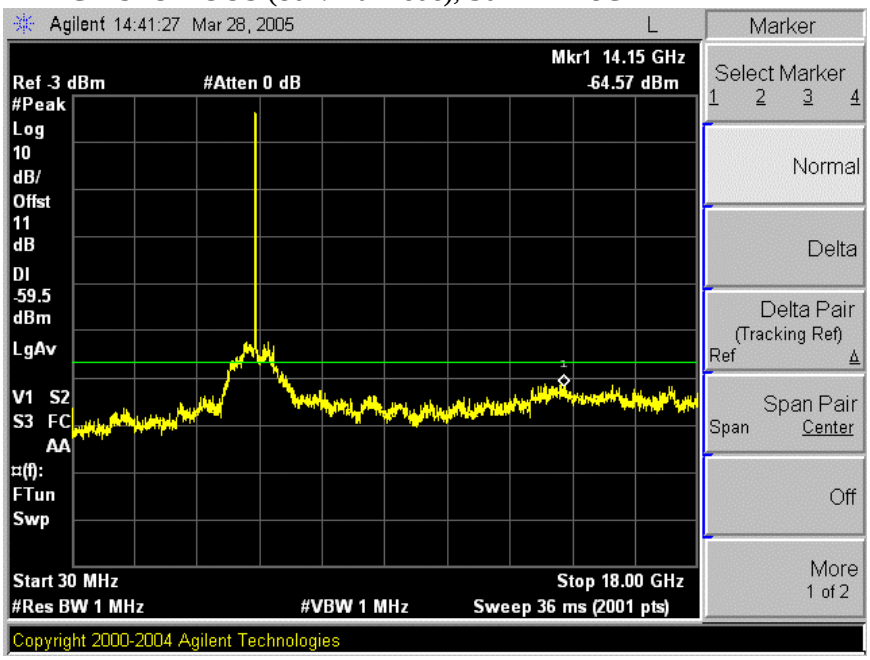


LOW CH SPURIOUS (802.11a mode), Zoom in

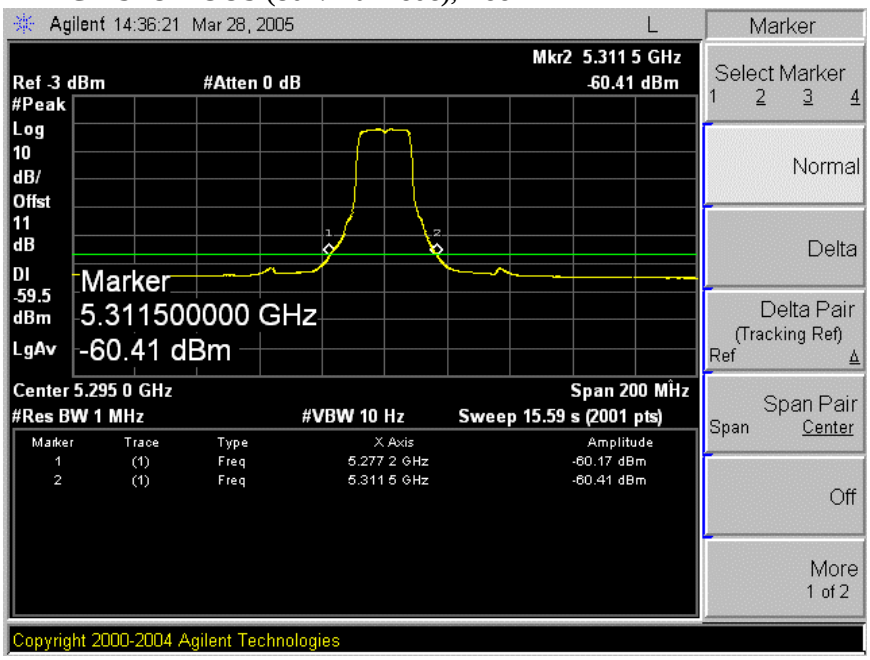


LOW CH SPURIOUS (802.11a mode), 18~40GHz

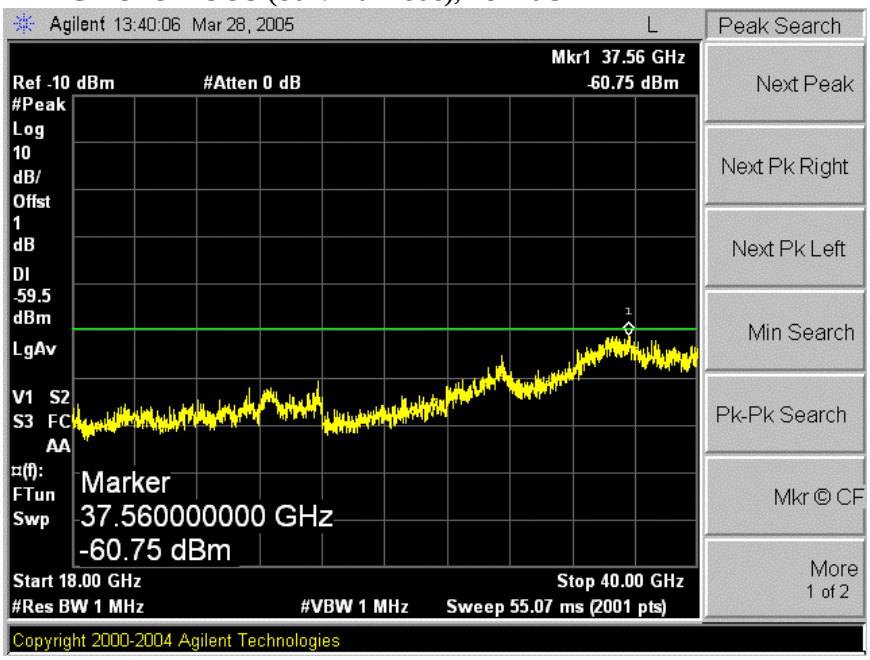
MID CH SPURIOUS (802.11a mode), 30MHz~18GHz



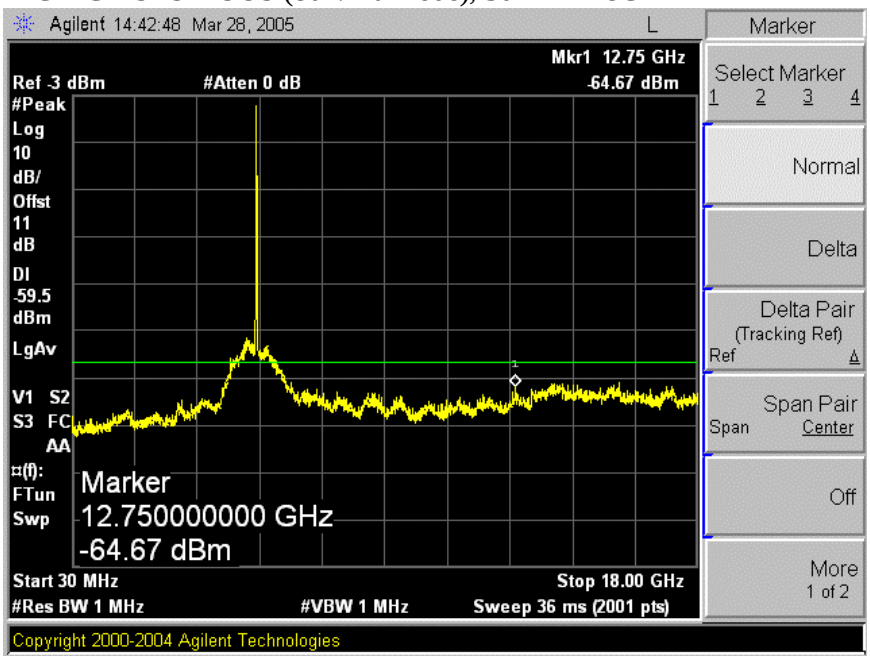
MID CH SPURIOUS (802.11a mode), Zoom in



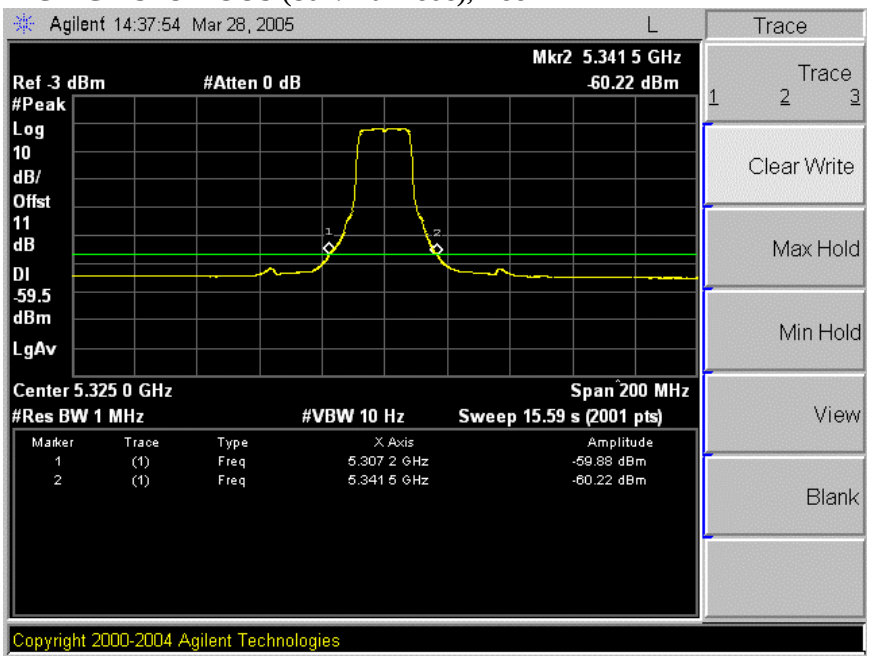
MID CH SPURIOUS (802.11a mode), 18~40GHz



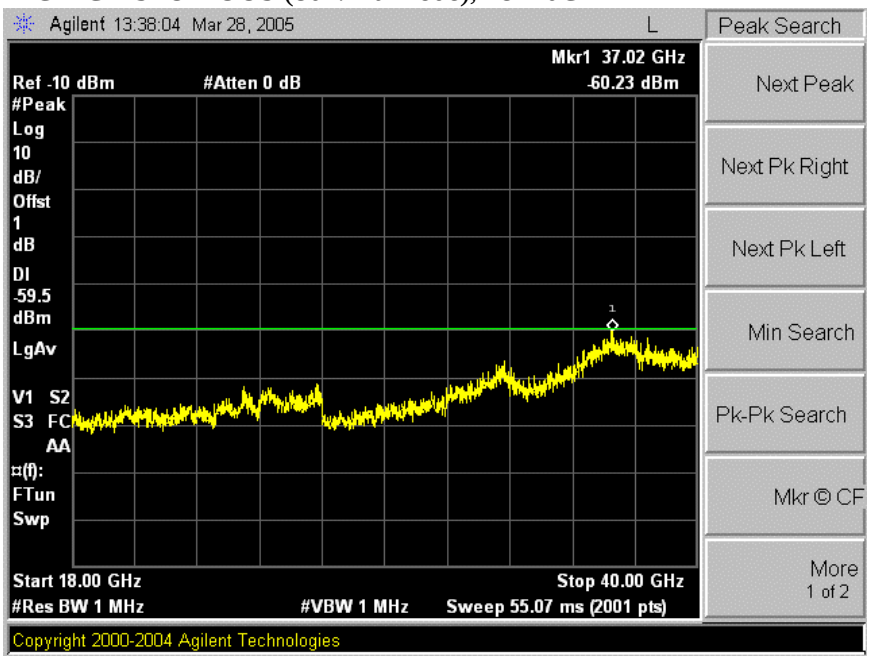
HIGH CH SPURIOUS (802.11a mode), 30MHz~18GHz



HIGH CH SPURIOUS (802.11a mode), Zoom in



HIGH CH SPURIOUS (802.11a mode), 18~40GHz



7.3. RADIATED SPURIOUS EMISSIONS

7.3.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

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

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

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

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

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

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

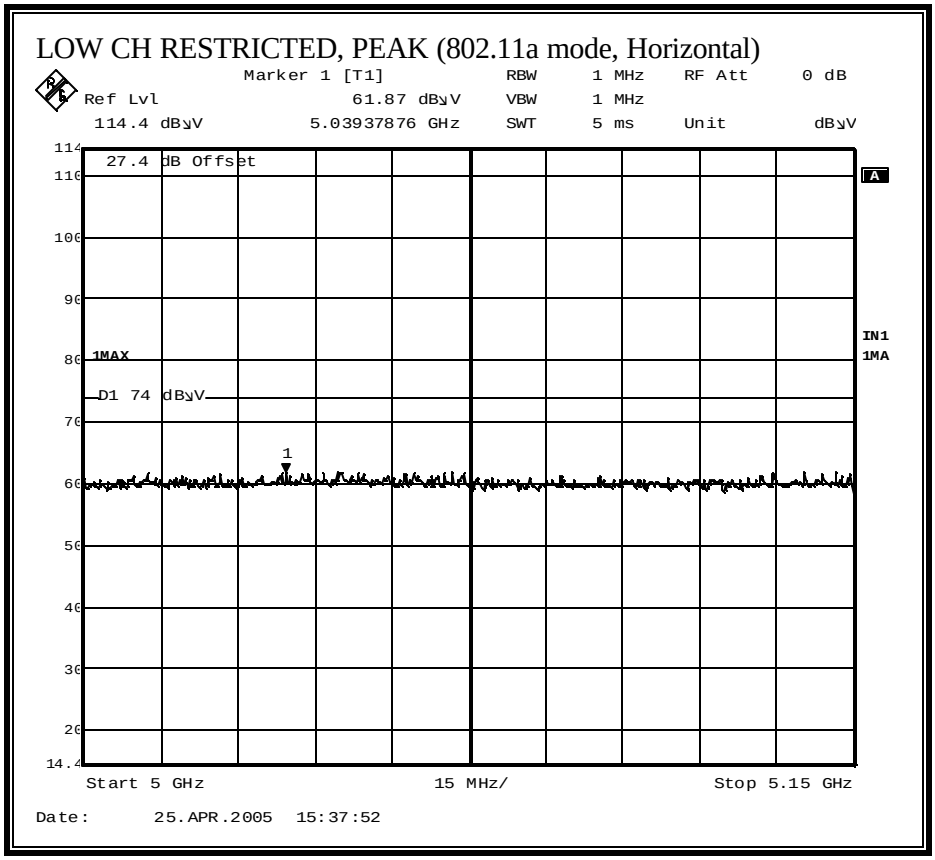
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each band.

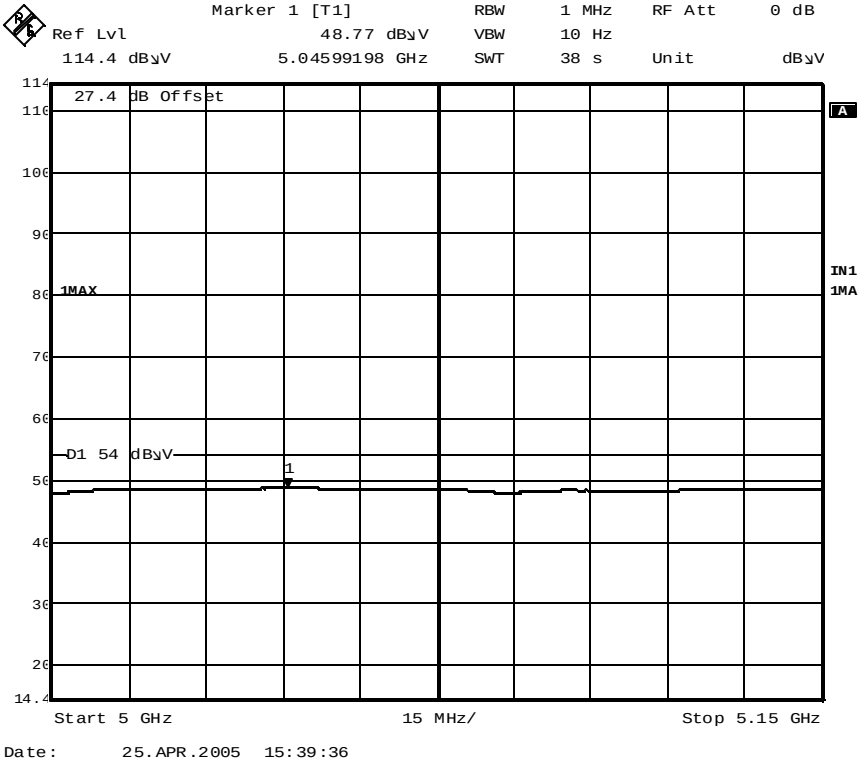
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

7.3.2. TRANSMITTER ABOVE 1 GHZ FOR 5250 TO 5350 MHz BAND WITH 23dBi PANEL ANTENNA

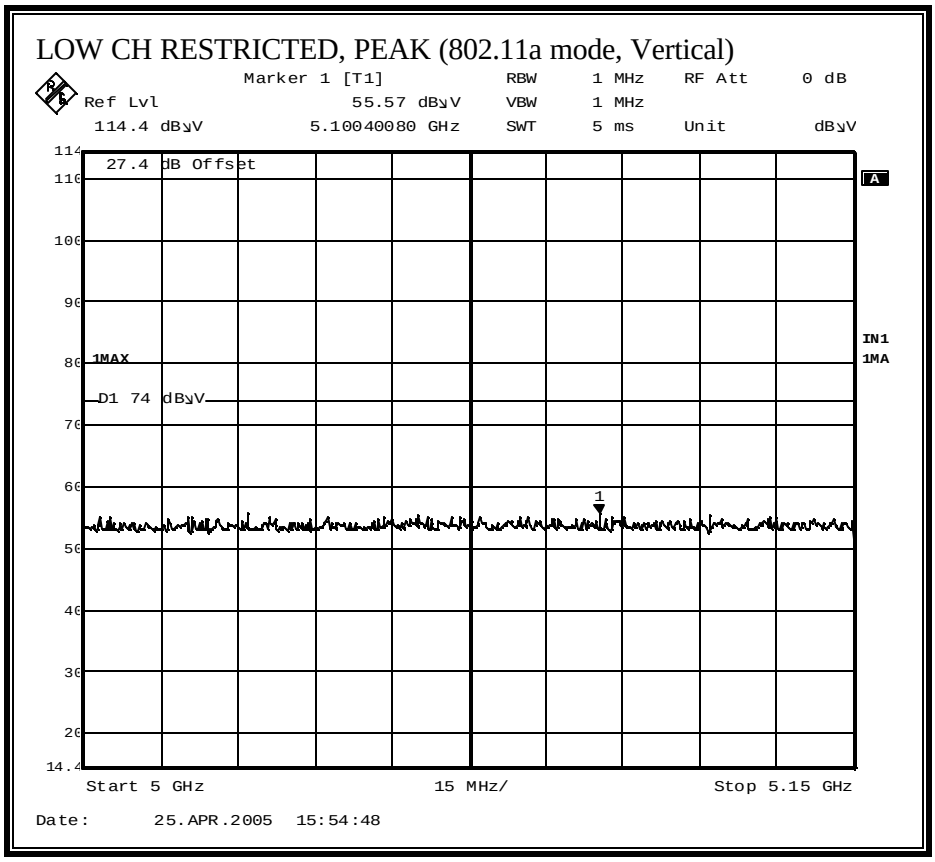
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)



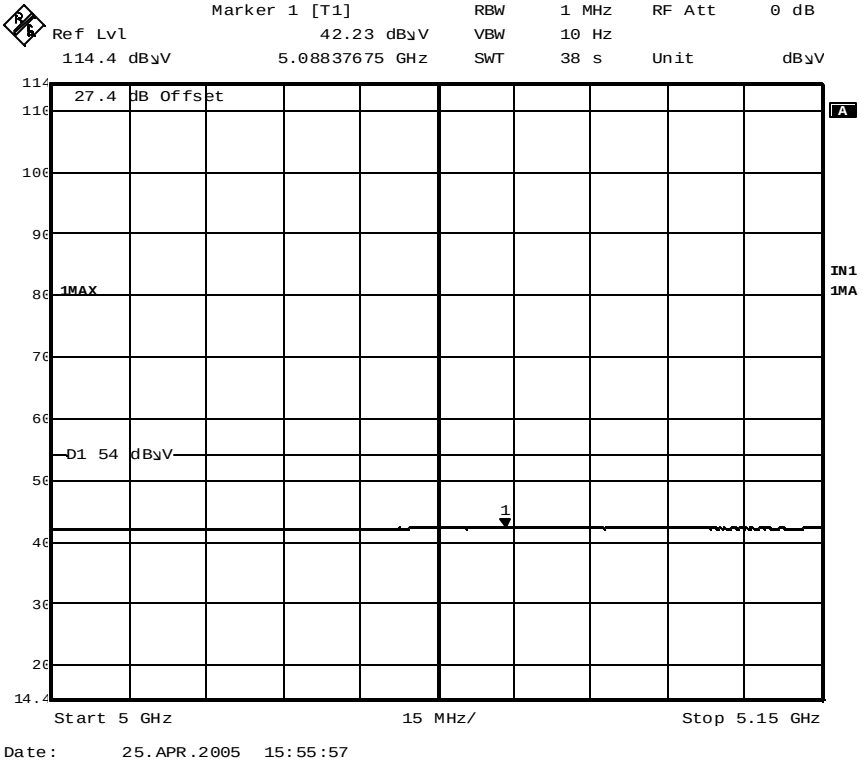
LOW CH RESTRICTED, AVG (802.11a mode, Horizontal)



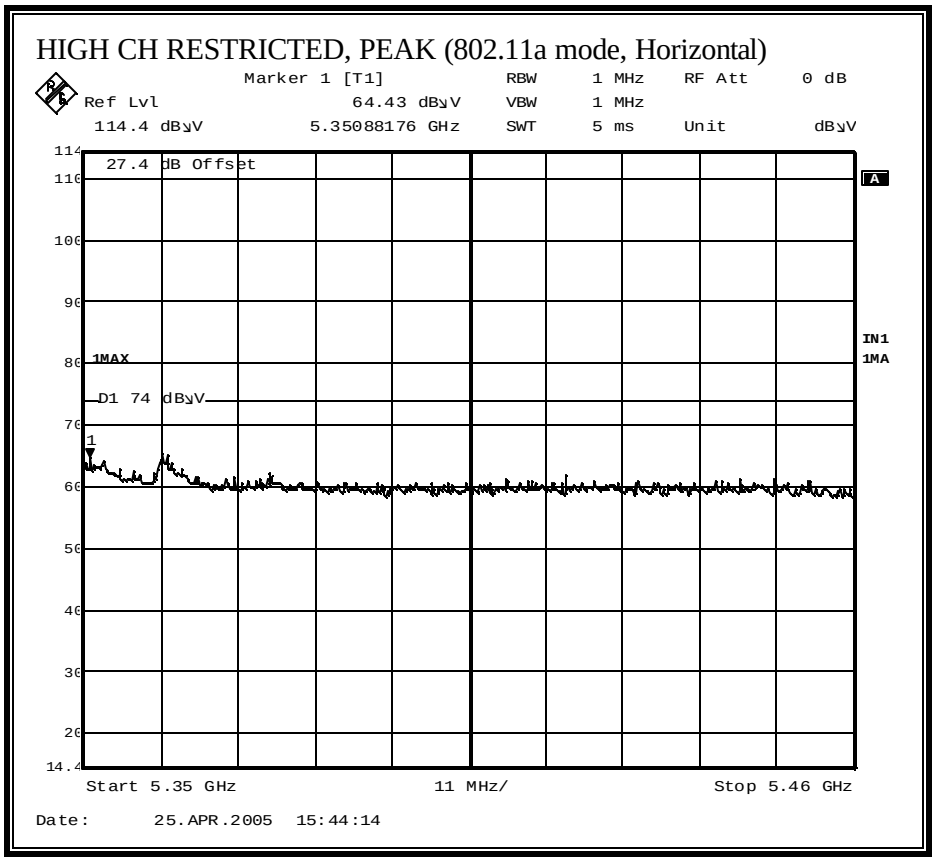
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)

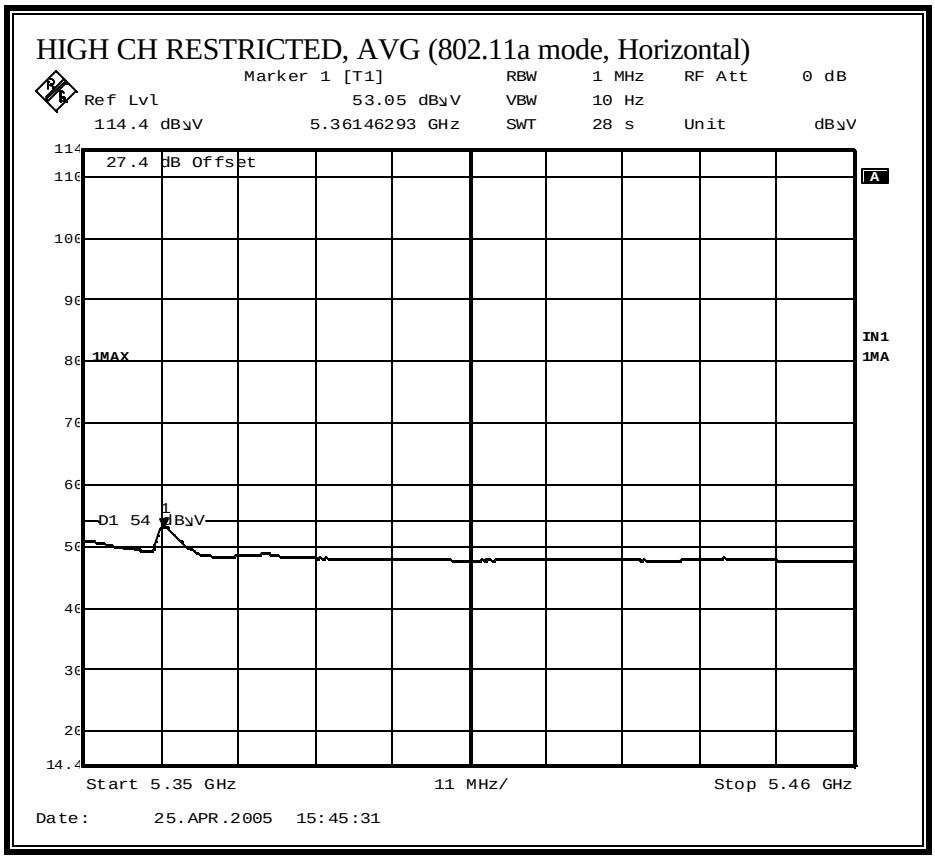


LOW CH RESTRICTED, AVG (802.11a mode, Vertical)

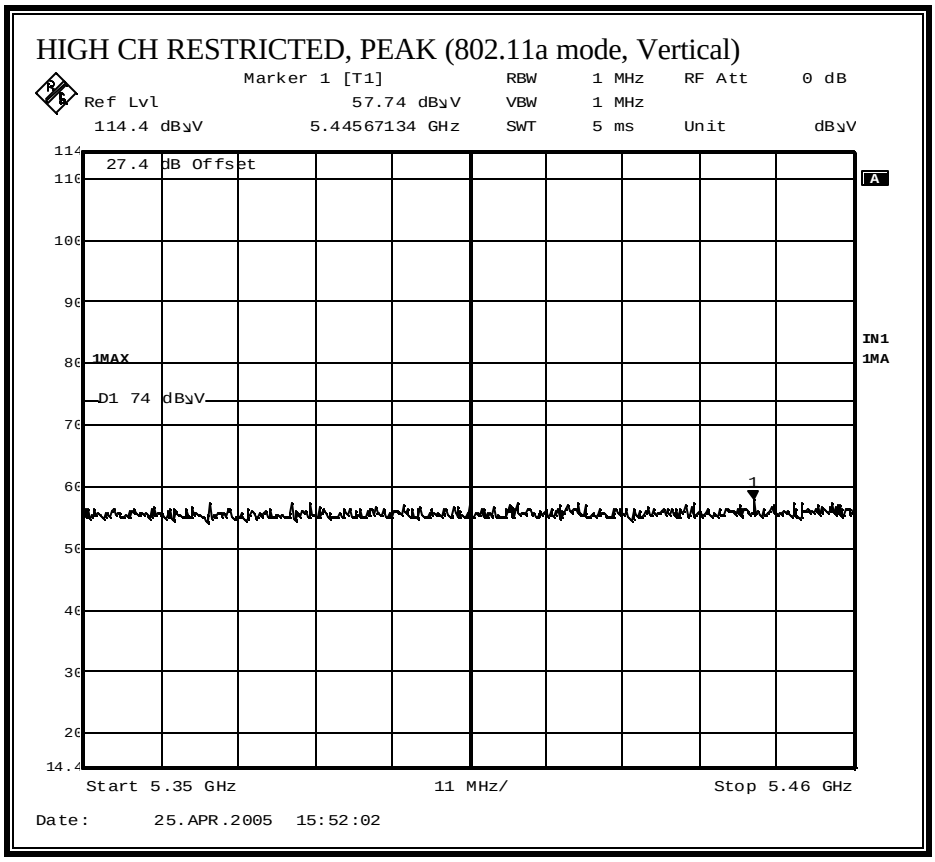


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

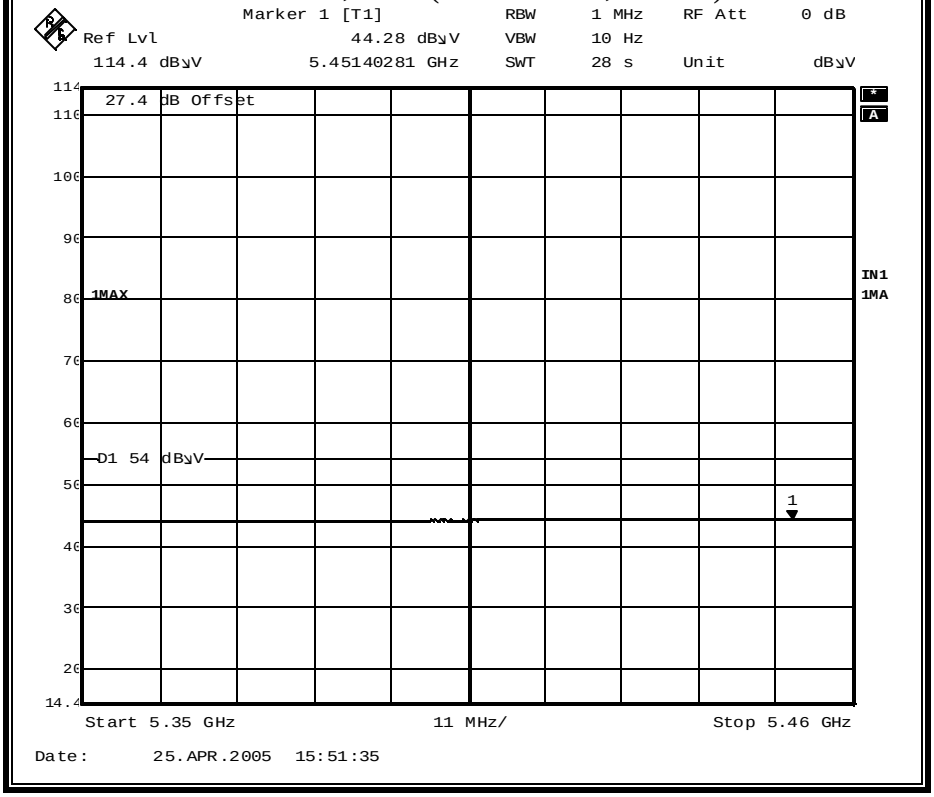




RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)



HIGH CH RESTRICTED, AVG (802.11a mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE) WITH 23dBi PANEL ANTENNA

3/25/2005 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: HITESH H. SOLANKI
Project #: 05U3296
Company: TRANGO SYSTEMS
EUT Descrip.: Ethernet Data Radio For Point to Point Operations with 23dBi PATCH ANTENNA
EUT M/N: Altas P5010M-INT
Test Target: FCC CLASS B
Mode Oper: TX, 5.2 GHz BAND

Test Equipment:

EMCO Horn 1-18GHz: T60; S/N: 2238 @3m
Pre-amplifer 1-26GHz: T86 Miteq 924341
Pre-amplifer 26-40GHz:
Horn > 18GHz:
Hi Frequency Cables: 2 foot cable; 3 foot cable: 3_Vien; 4 foot cable; 12 foot cable: 12_Hitesh
HPF: HPF_4.0GHz
Reject Filter: R_001

~~Peak Measurements~~
RBW=VBW=1MHz

~~Average Measurements~~
RBW=1MHz ; VBW=10Hz

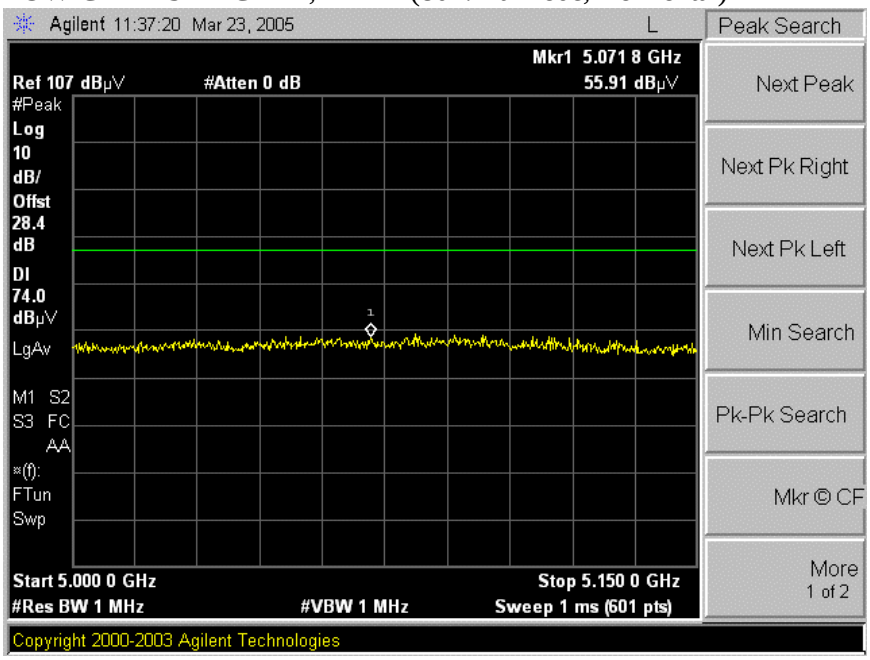
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL															
15.780	3.0	53.6	39.8	38.9	9.8	-45.0	0.0	1.1	58.4	44.6	74	54	-15.6	-9.4	V
21.040	3.0	50.8	37.5	36.4	11.0	-42.2	0.0	0.0	55.9	42.6	74	54	-18.1	-11.4	V
MIDDLE CHANNEL															
10.590	3.0	47.5	34.9	38.1	7.0	-42.1	0.0	0.9	51.4	38.8	74	54	-22.6	-15.2	V
15.885	3.0	52.6	39.5	38.7	9.8	-45.0	0.0	1.1	57.3	44.2	74	54	-16.7	-9.8	V
HIGH CHANNEL															
10.650	3.0	48.7	35.0	38.0	7.1	-42.2	0.0	0.9	52.5	38.8	74	54	-21.5	-15.2	V
15.975	3.0	53.4	39.7	38.6	9.9	-45.1	0.0	1.2	58.0	44.3	74	54	-16.0	-9.7	V
LOW CHANNEL															
15.780	3.0	53.9	40.1	38.9	9.8	-45.0	0.0	1.1	58.7	44.9	74	54	-15.3	-9.1	H
21.040	3.0	50.6	37.1	36.4	11.0	-42.2	0.0	0.0	55.8	42.2	74	54	-18.2	-11.8	H
MIDDLE CHANNEL															
10.590	3.0	49.1	35.0	38.1	7.0	-42.1	0.0	0.9	53.0	38.9	74	54	-21.0	-15.1	H
15.885	3.0	53.2	39.7	38.7	9.8	-45.0	0.0	1.1	57.9	44.4	74	54	-16.1	-9.6	H
HIGH CHANNEL															
10.650	3.0	51.4	37.4	38.0	7.1	-42.2	0.0	0.9	55.2	41.2	74	54	-18.8	-12.8	H
15.975	3.0	53.2	39.9	38.6	9.9	-45.1	0.0	1.2	57.8	44.5	74	54	-16.2	-9.5	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

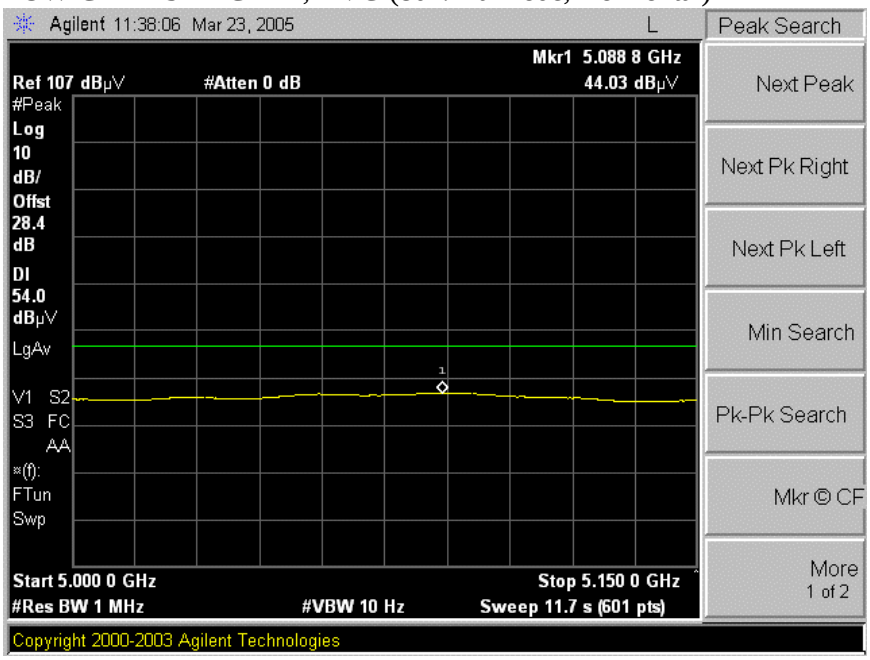
7.3.3. TRANSMITTER ABOVE 1 GHZ FOR 5250 TO 5350 MHz BAND WITH 32.5dBi DISH ANTENNA

RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Horizontal)

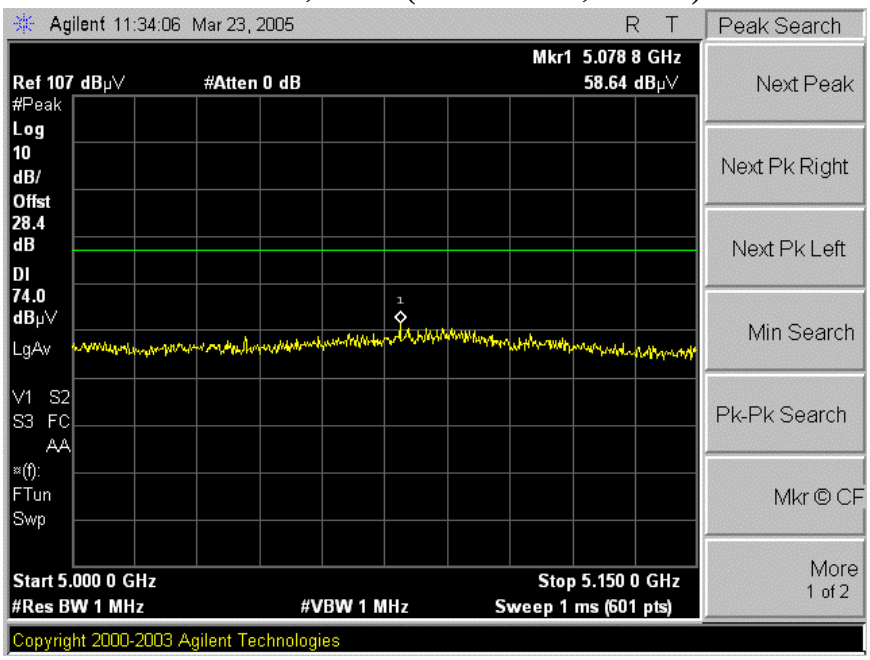


LOW CH RESTRICTED, AVG (802.11a mode, Horizontal)

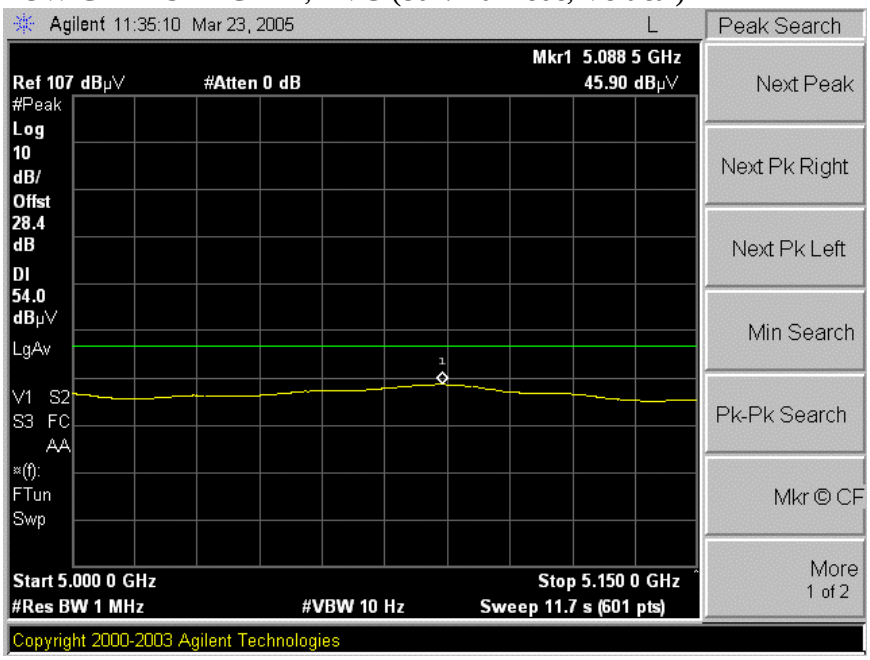


RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (802.11a mode, Vertical)

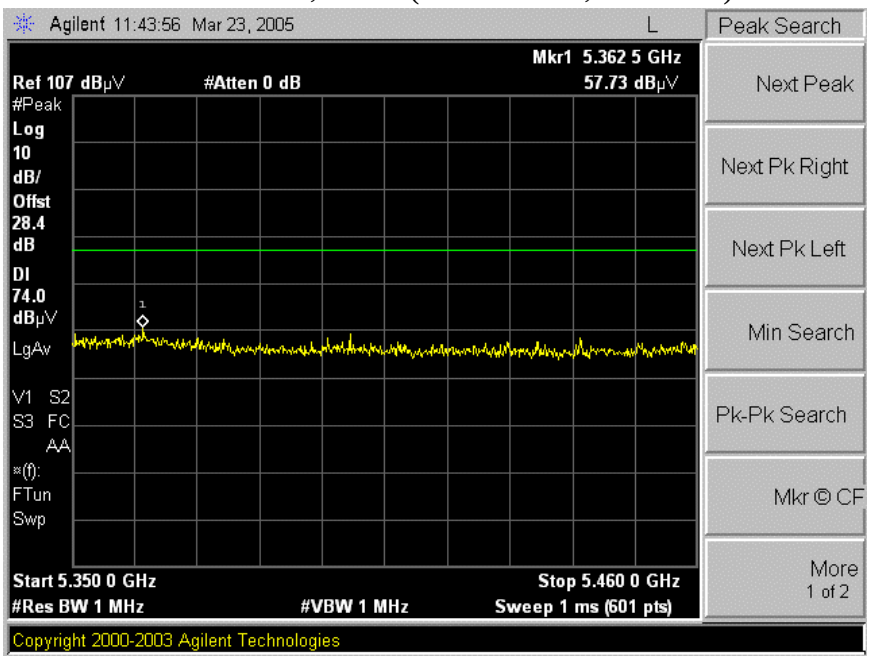


LOW CH RESTRICTED, AVG (802.11a mode, Vertical)

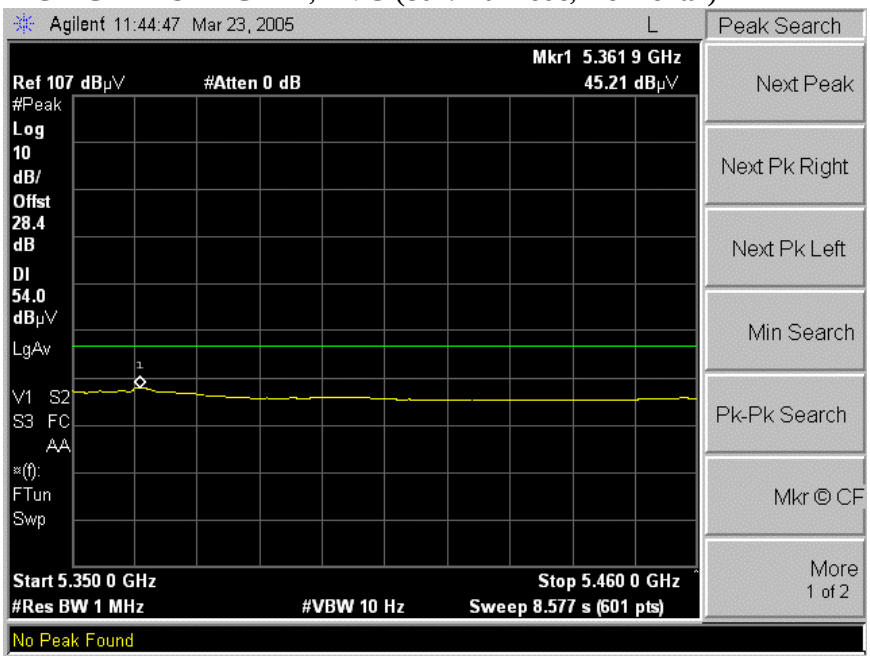


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Horizontal)

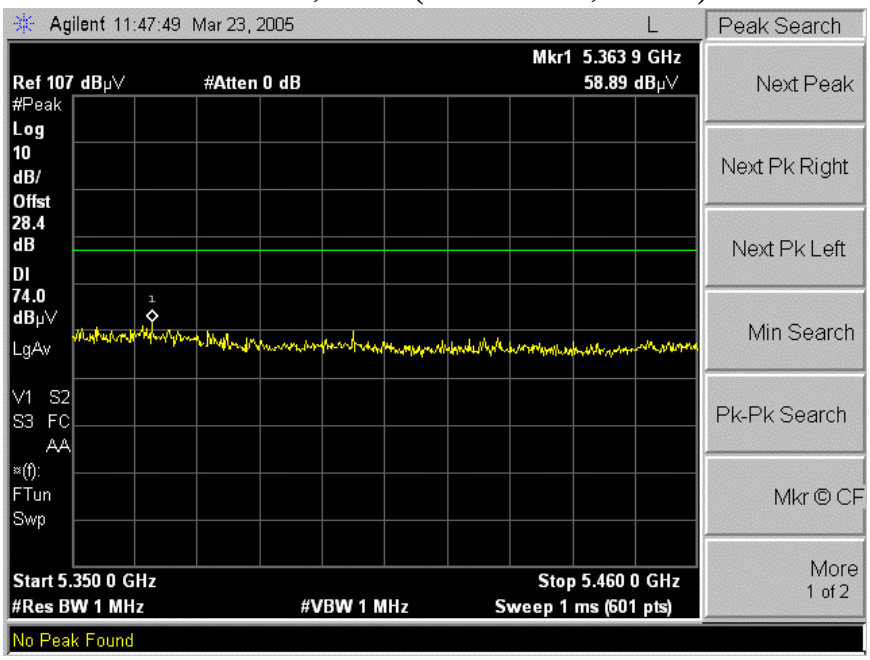


HIGH CH RESTRICTED, AVG (802.11a mode, Horizontal)

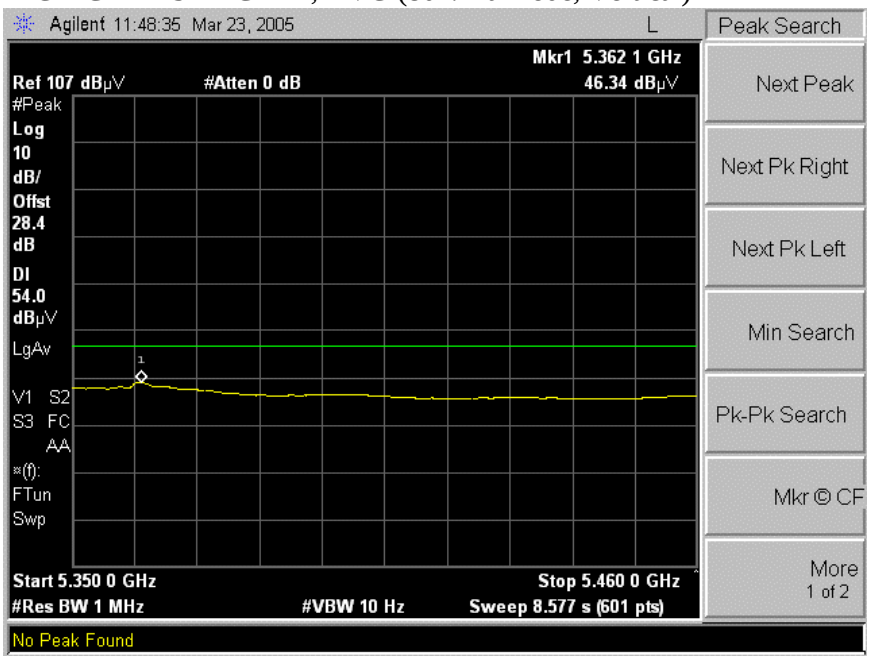


RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (802.11a mode, Vertical)



HIGH CH RESTRICTED, AVG (802.11a mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE) WITH 32.5dBi DISH ANTENNA

3/23/2005 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:Chin Pang
05U3296-1
Company:Trango Systems, Inc.
EUT Descrip.:Ethernet Data Radio For Point to Point Operations with 4 feet antenna
EUT M/N:Altas P5010M-INT, -EXT, CSPC
Test Target:FCC Class B
Mode Oper:TX, 5.2GHz Band

Test Equipment:

EMCO Horn 1-18GHz: T59; S/N: 3245 @3m
Pre-amplifer 1-26GHz: T63 Miteq 646456
Pre-amplifer 26-40GHz:
Horn > 18GHz:
Hi Frequency Cables: 2 foot cable: 2_Chin; 3 foot cable:; 4 foot cable:; 12 foot cable: 12_Vien
HPF: HPF_7.6GHz
Reject Filter: R_001

Peak Measurements
RBW=VBW=1MHz

Average Measurements
RBW=1MHz ; VBW=10Hz

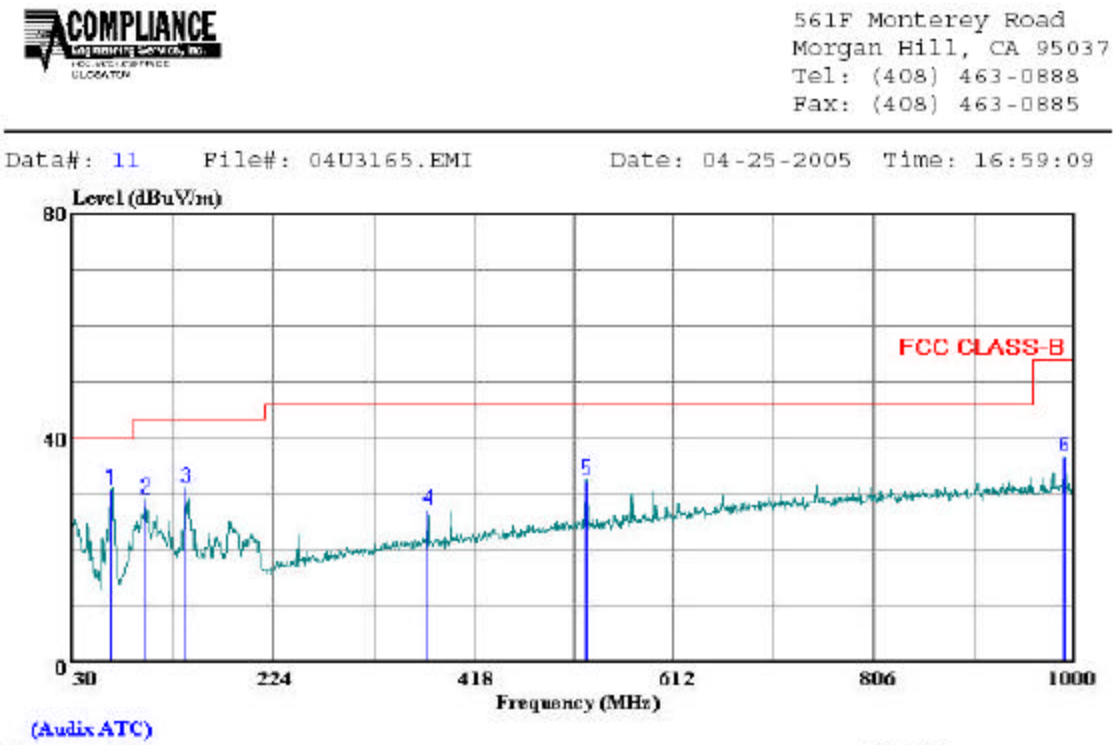
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
low ch, 5260MHz															
15.780	3.0	47.5	35.0	38.8	5.8	-38.3	0.0	0.7	54.5	42.0	74	54	-19.5	-12.0	V
15.780	3.0	46.8	34.7	38.8	5.8	-38.3	0.0	0.7	53.8	41.7	74	54	-20.2	-12.3	H
Mid , 5295MHz															
15.885	3.0	47.5	34.8	38.5	5.9	-38.1	0.0	0.7	54.4	41.7	74	54	-19.6	-12.3	V
15.885	3.0	47.2	34.6	38.5	5.9	-38.1	0.0	0.7	54.1	41.5	74	54	-19.9	-12.5	H
High, 5325MHz															
10.650	3.0	45.0	33.0	37.8	4.9	-36.5	0.0	0.8	52.0	40.0	74	54	-22.0	-14.0	V
15.975	3.0	47.5	34.3	38.3	5.9	-38.0	0.0	0.7	54.4	41.2	74	54	-19.6	-12.8	V
10.650	3.0	44.5	32.7	37.8	4.9	-36.5	0.0	0.8	51.5	39.7	74	54	-22.5	-14.3	H
15.975	3.0	47.3	34.2	38.3	5.9	-38.0	0.0	0.7	54.2	41.1	74	54	-19.8	-12.9	H
Note: No other emissions were detected above the system noise floor.															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

7.3.4. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz WITH 23dBi PANEL ANTENNA

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



HORIZONTAL DATA

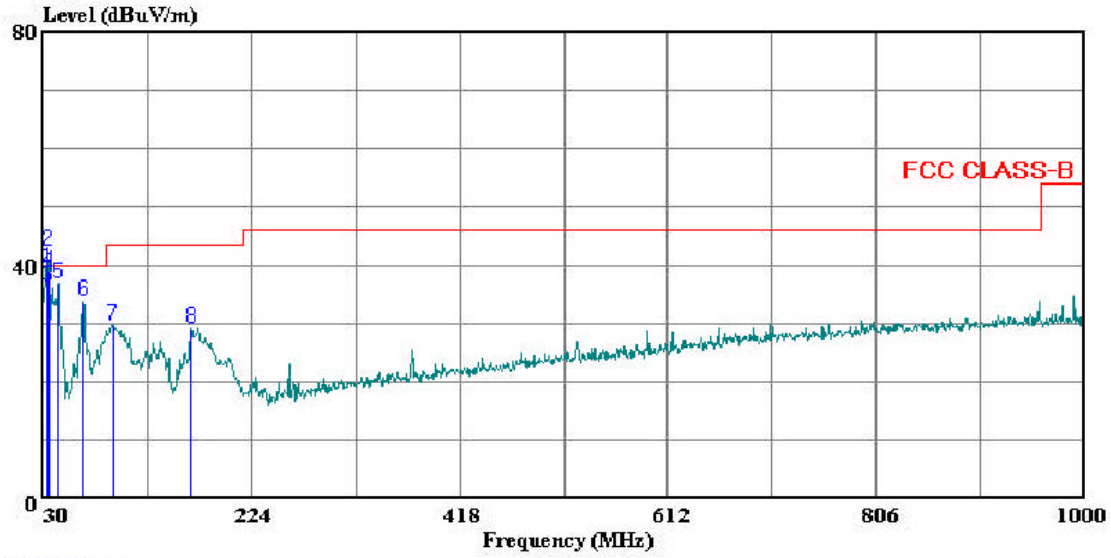
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	66.860	49.40	-18.68	30.72	40.00	-9.28	Peak
2	100.810	45.20	-16.21	28.99	43.50	-14.51	Peak
3	139.610	44.00	-12.95	31.05	43.50	-12.45	Peak
4	373.380	37.30	-10.09	27.21	46.00	-18.79	Peak
5	527.610	39.20	-6.77	32.43	46.00	-13.57	Peak
6	990.300	36.90	-0.42	36.49	54.00	-17.52	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 9 File#: 04U3165.EMI Date: 04-25-2005 Time: 16:53:33



(Audix ATC)

Trace: 6 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator : David Garcia
Project # : 04U3165
Company : Trango Systems
EUT : Wireless Ethernet Point to Point Xcvr.
: Internal unit
Model No : P5010M-INT
Configuration : EUT ONLY
Target of Test : FCC Class B
Mode of Operation: Tx Worst Case, 5.8 GHz Band

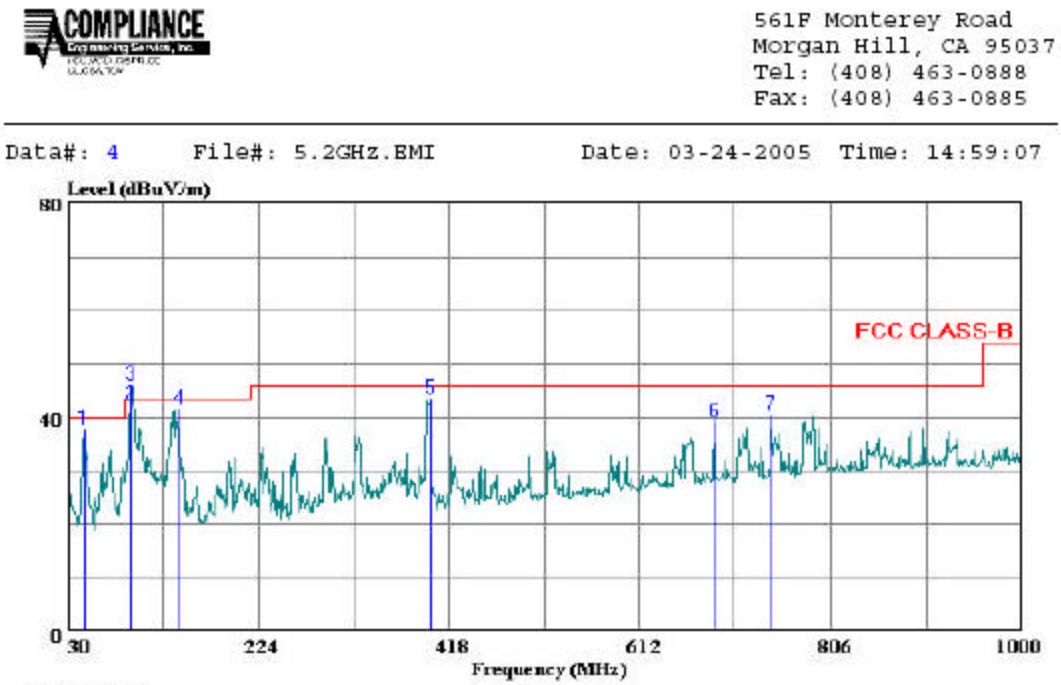
VERTICAL DATA

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		33.880	48.23	-8.87	39.36	40.00	-0.64	QP
2	*	33.880	51.10	-8.87	42.23	40.00	2.23	Peak
3		34.850	45.76	-9.35	36.41	40.00	-3.59	QP
4		34.850	47.51	-8.87	38.65	40.00	-1.35	Peak
5		43.580	51.80	-14.89	36.91	40.00	-3.09	Peak
6		66.860	52.40	-18.68	33.72	40.00	-6.28	Peak
7		94.990	47.30	-17.67	29.63	43.50	-13.87	Peak
8		167.740	43.40	-14.20	29.20	43.50	-14.30	Peak

7.3.5. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz WITH 32.5dBi DISH ANTENNA

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



HORIZONTAL DATA

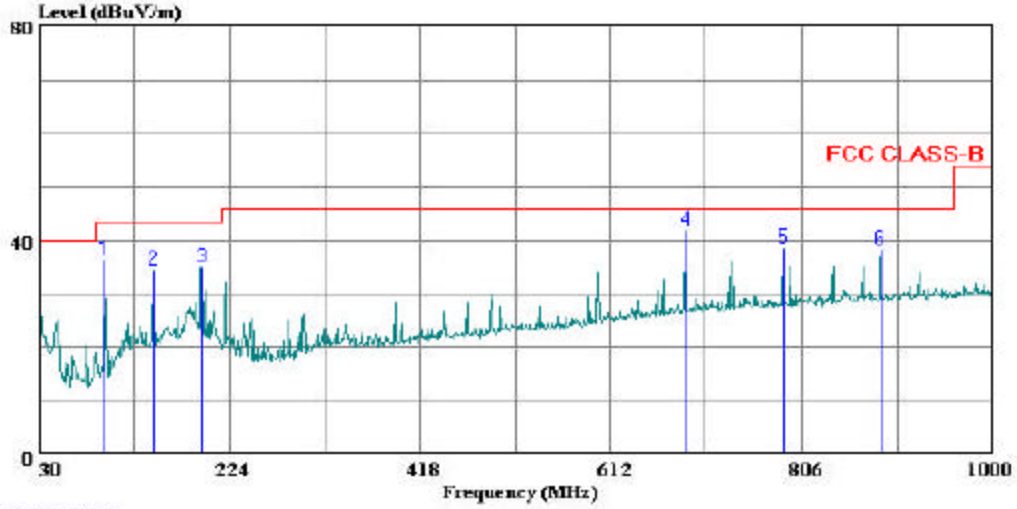
		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		46.490	53.79	-16.12	37.67	40.00	-2.33	Peak
2		94.020	60.50	-18.23	42.27	43.50	-1.23	QP
3	*	94.020	63.80	-17.95	45.85	43.50	2.35	Peak
4		142.520	54.50	-13.08	41.42	43.50	-2.08	Peak
5		399.570	52.90	-9.55	43.35	46.00	-2.65	Peak
6		688.630	42.60	-3.46	39.14	46.00	-6.86	Peak
7		745.860	42.80	-2.51	40.29	46.00	-5.71	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 2 File#: 5,2 GHz 1.EMI Date: 03-24-2005 Time: 15:24:08



(Audix ATC)
Trace: 1 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : VIENTRAN
Project #: : 05U3296-1
Company: : TRANGO SYSTEM
EUT: : ETHERNET DATA RADIOS FOR POINT
: TO POINT OPERRATION
Model No : ATLAS P5010M-INT, -EXT, C2PC
Configuration: : EUT only
Target of Test: : FCC CLASS B
Mode of Operation: TX WORST CASE _ 5.2GHz BAND

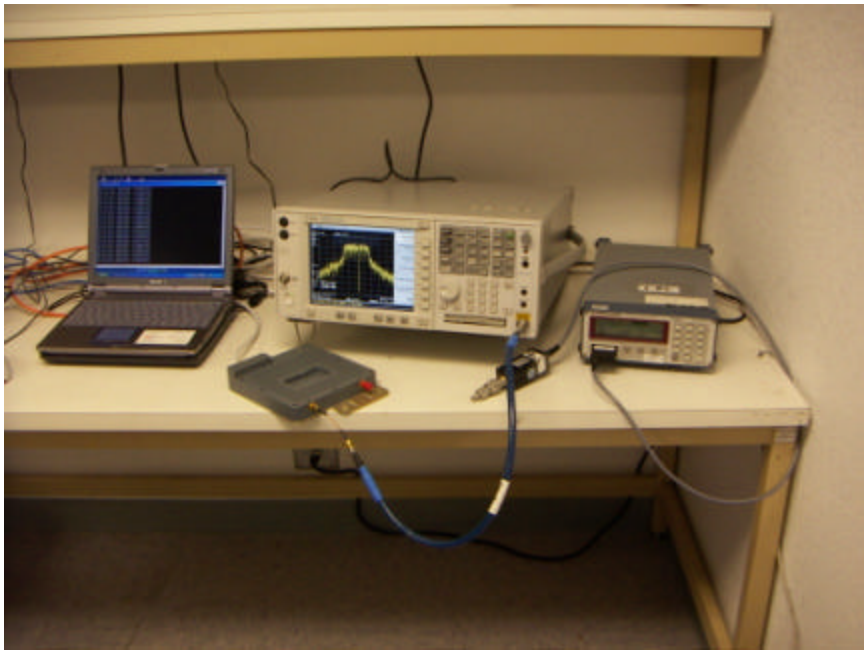
VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	96.930	53.50	-17.24	36.26	43.50	-7.24	Peak
2	146.400	47.60	-13.38	34.22	43.50	-9.28	Peak
3	195.870	48.70	-13.77	34.93	43.50	-8.57	Peak
4	688.630	45.20	-3.46	41.74	46.00	-4.26	Peak
5	786.600	40.40	-2.01	38.39	46.00	-7.61	Peak
6	885.540	39.40	-1.19	38.21	46.00	-7.79	Peak

8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

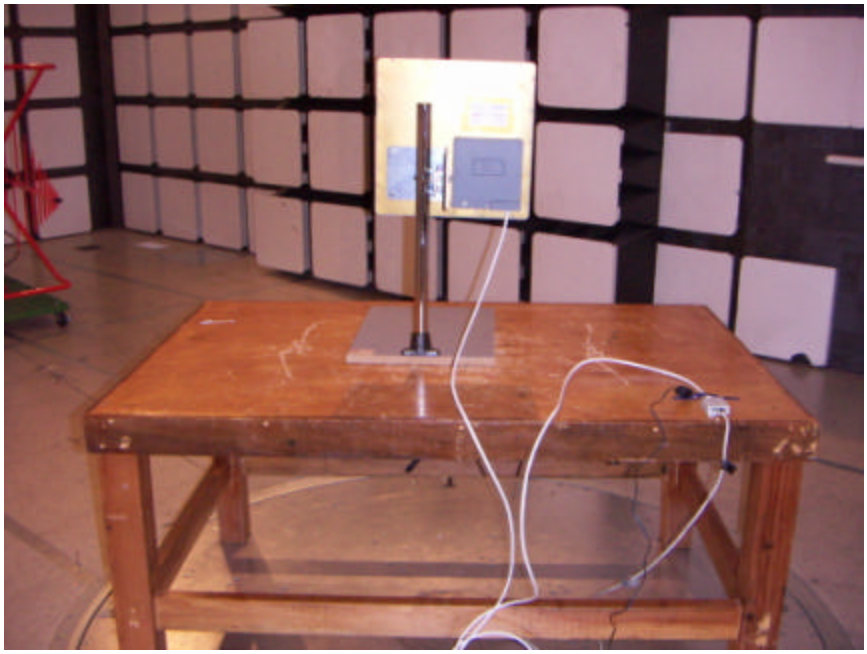
ANTENNA PORT CONDUCTED PHOTO



RADIATED RF MEASUREMENT SETUP WITH 23dBi PANEL ANTENNA

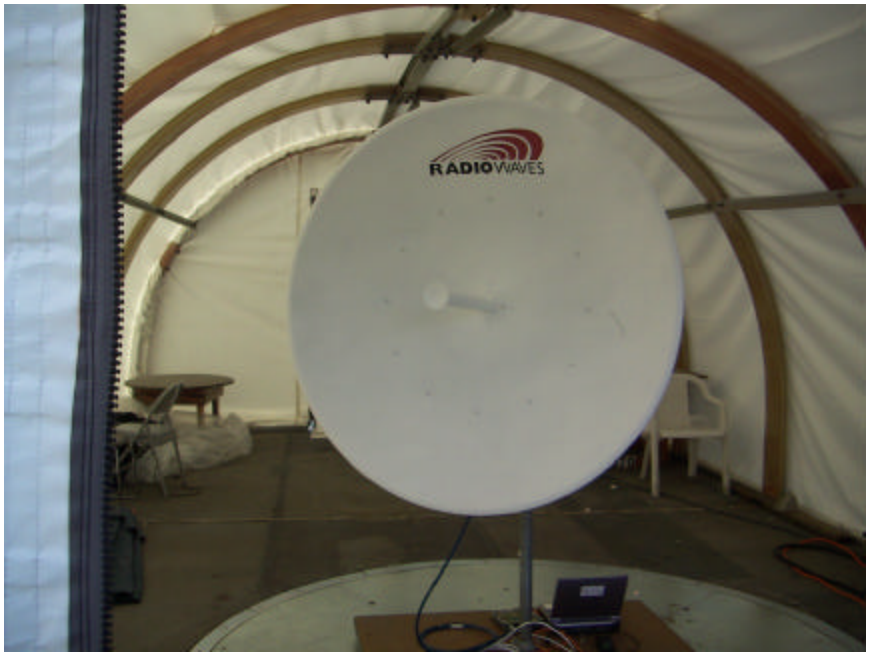
RADIATED FRONT PHOTO

RADIATED BACK PHOTO



RADIATED RF MEASUREMENT SETUP WITH 32.5dBi DISH ANTENNA

RADIATED FRONT PHOTO



RADIATED BACK PHOTO

END OF REPORT