

05/20/2023

High Frequency Measurement

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:

NEELESH RAJ

Project #:

Company:

ATHEROS

EUT Descip.:

EUT M/N:

Test Target:

Mode Oper:

B MODE

Test Equipment:

EMCO Horn 1-18GHz

T60; S/N: 2238 @3m

Pre-amplifer 1-26GHz

T86 Miteq 924341

Spectrum Analyzer

HP 8566B Analyzer

Horn > 18GHz

T87; ARA 18-26GHz; S/N:1049

Hi Frequency Cables

☐ (2 ft)
☒ (2 ~ 3 ft)
☐ (4 ~ 6 ft)
☒ (12 ft)

Peak Measurements:

1 MHz Resolution Bandwidth

1MHz Video Bandwidth

Average Measurements:

1 MHz Resolution Bandwidth

10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
HARMONICS HIGH CHANNEL=2462															
4.927	9.8	59.9	58.1	33.2	3.0	-45.7	0.0	1.0	51.3	49.5	74.0	54.0	-22.7	-4.5	V
7.380	9.8	57.0	50.7	36.3	3.8	-46.5	0.0	1.0	51.5	45.2	74.0	54.0	-22.5	-8.8	V
12.305	9.8	46.1	37.0	39.4	5.2	-45.7	0.0	1.0	45.9	36.8	74.0	54.0	-28.1	-17.2	V
4.927	9.8	57.8	53.8	33.2	3.0	-45.7	0.0	1.0	49.2	45.2	74.0	54.0	-24.8	-8.8	H
7.380	9.8	50.5	42.6	36.3	3.8	-46.5	0.0	1.0	45.0	37.1	74.0	54.0	-29.0	-16.9	H
12.305	9.8	46.2	36.9	39.4	5.2	-45.7	0.0	1.0	46.0	36.7	74.0	54.0	-28.0	-17.3	H
								1.0							V
			spur												
2.688	9.8	51.3	46.2	30.1	2.1	-44.0	0.0	1.0	40.4	35.3	74.0	54.0	-33.6	-18.7	V
2.688	9.8	49.9	45.0	30.1	2.1	-44.0	0.0	1.0	39.0	34.1	74.0	54.0	-35.0	-19.9	V

f

Measurement Frequency

Dist

Distance to Antenna

Read

Analyzer Reading

AF

Antenna Factor

CL

Cable Loss

Amp

Preamp Gain

D Corr

Distance Correct to 3 meters

AF

Average Field Strength @ 3 m

Peak

Calculated Peak Field Strength

HPF

High Pass Filter

Avg Lim

Average Field Strength Limit

Pk Lim

Peak Field Strength Limit

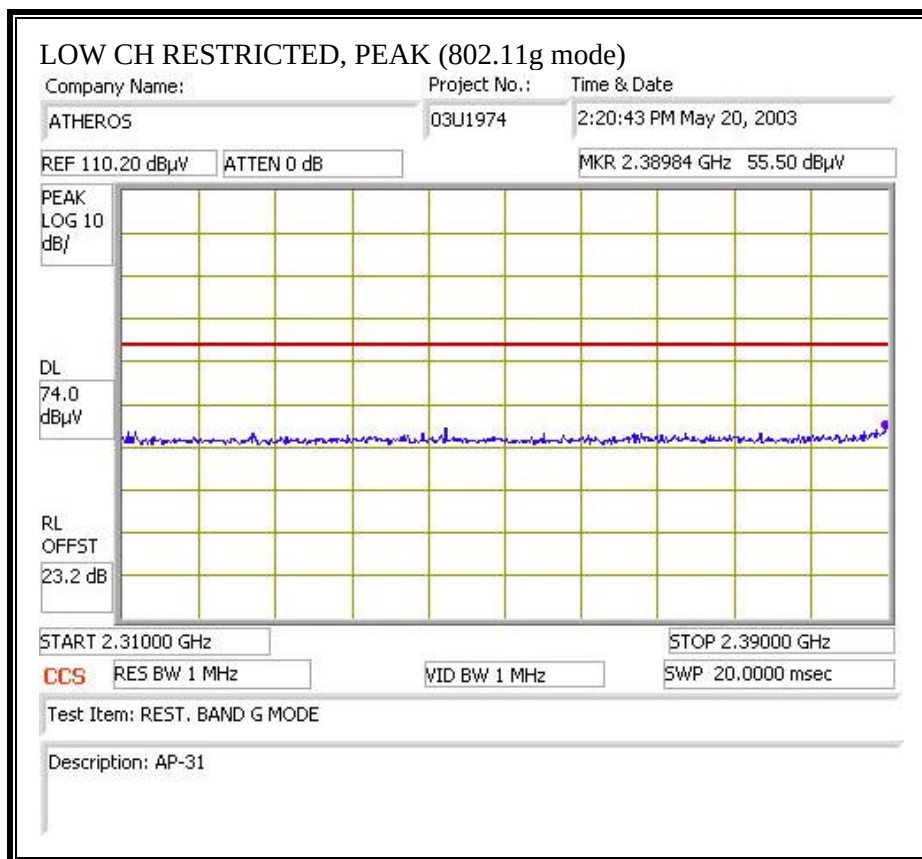
Avg Mar

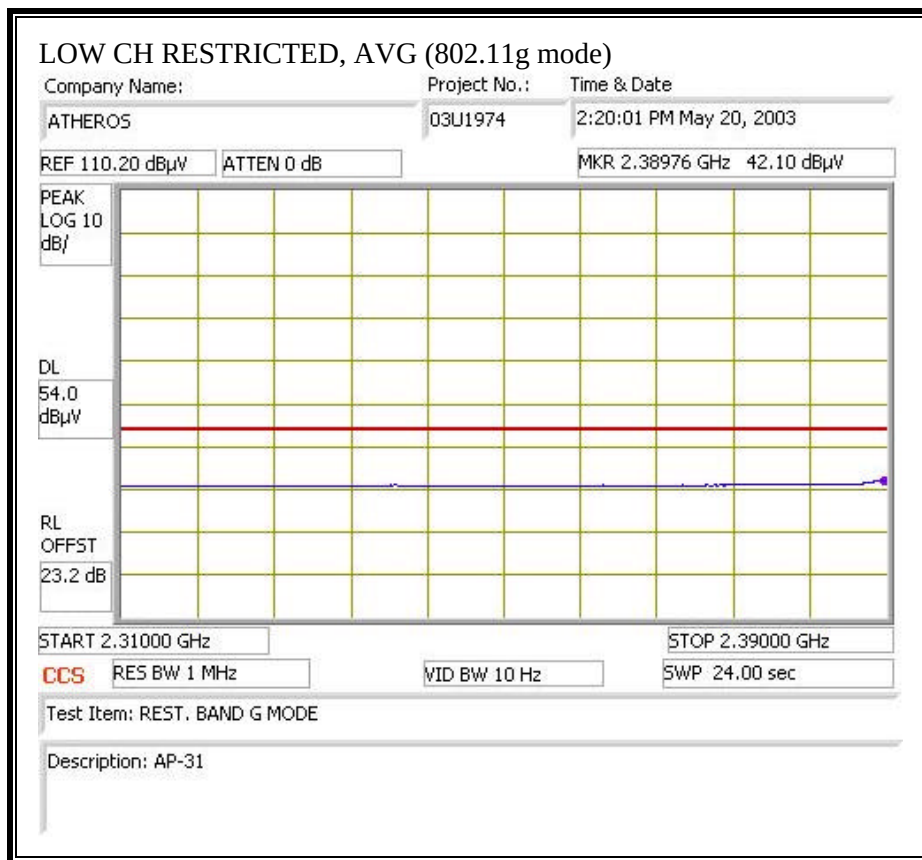
Margin vs. Average Limit

Pk Mar

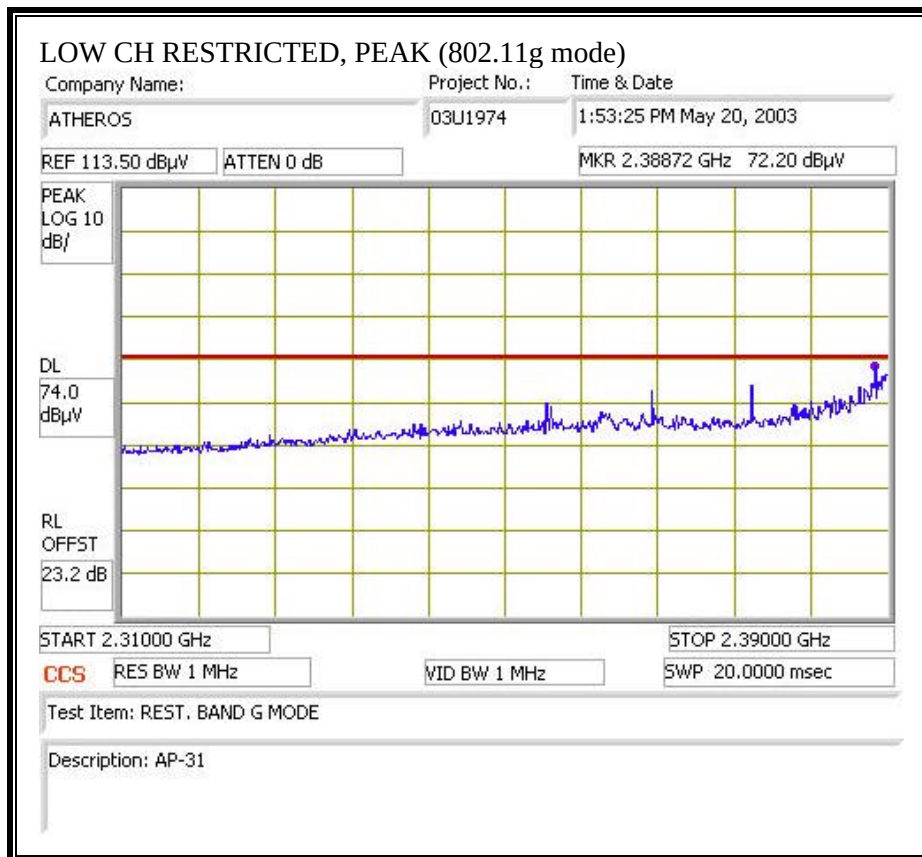
Margin vs. Peak Limit

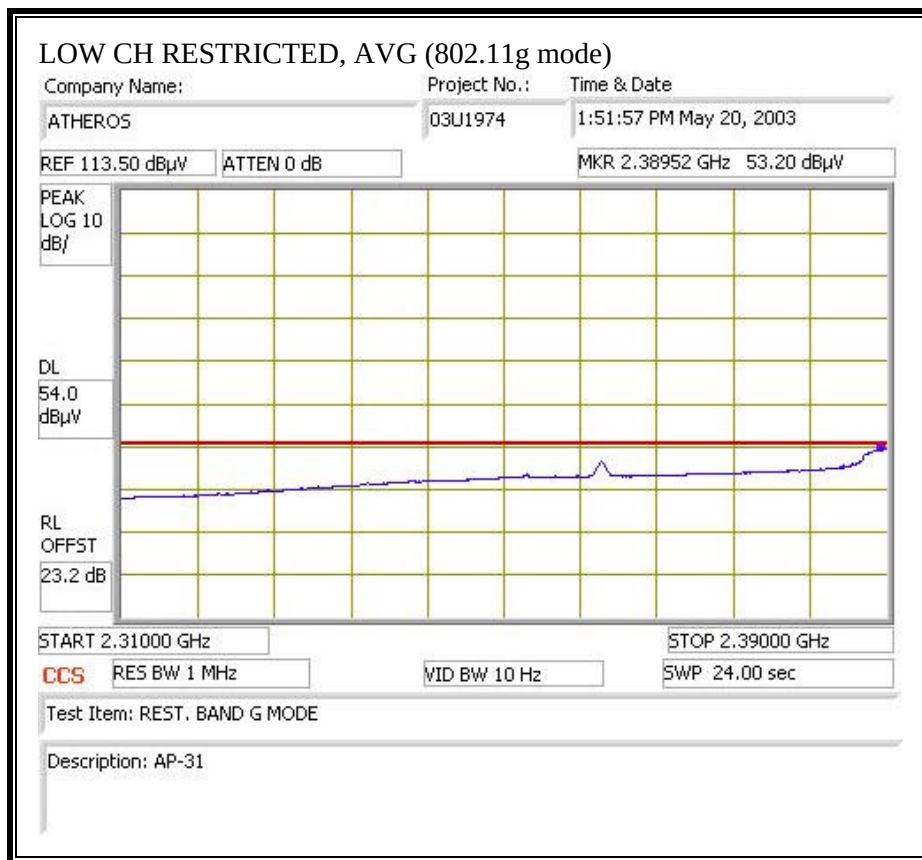
RESTRICTED BANDEDGE (g NORMAL MODE, LOW CHANNEL, HORIZONTAL)



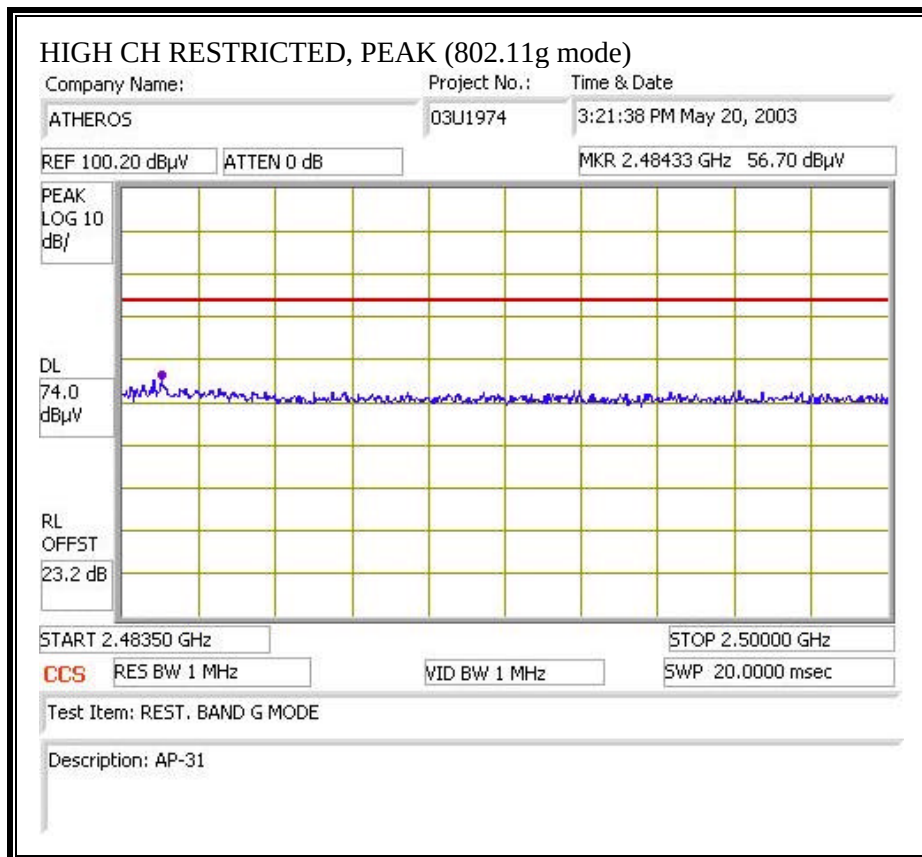


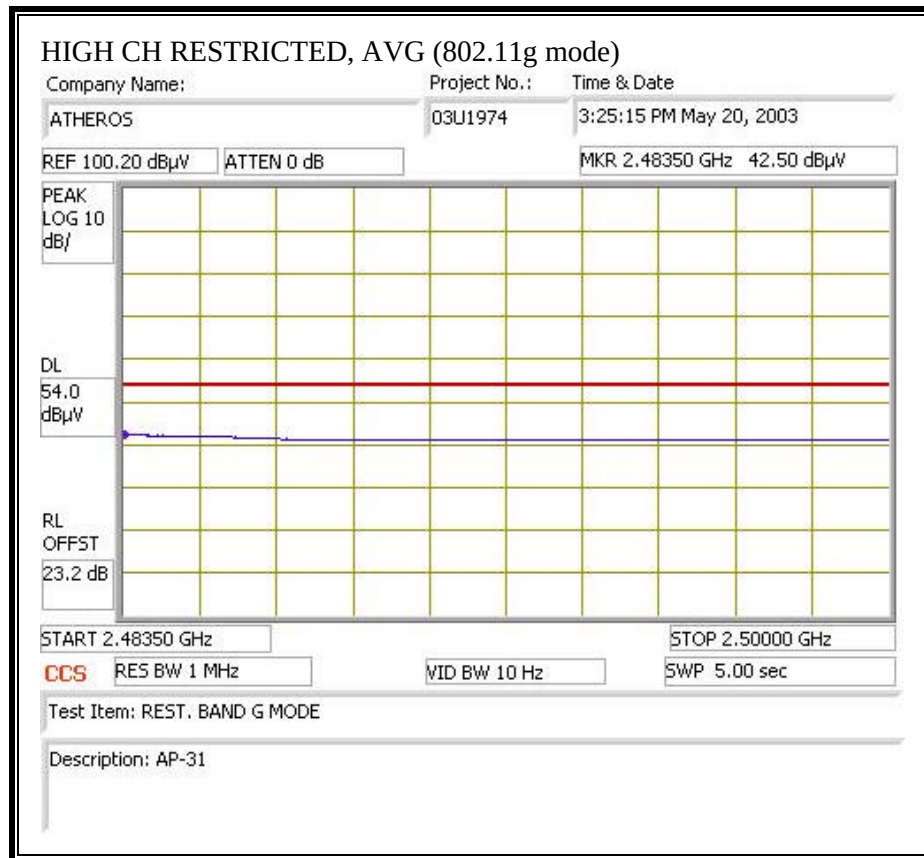
RESTRICTED BANDEDGE (g NORMAL MODE, LOW CHANNEL, VERTICAL)



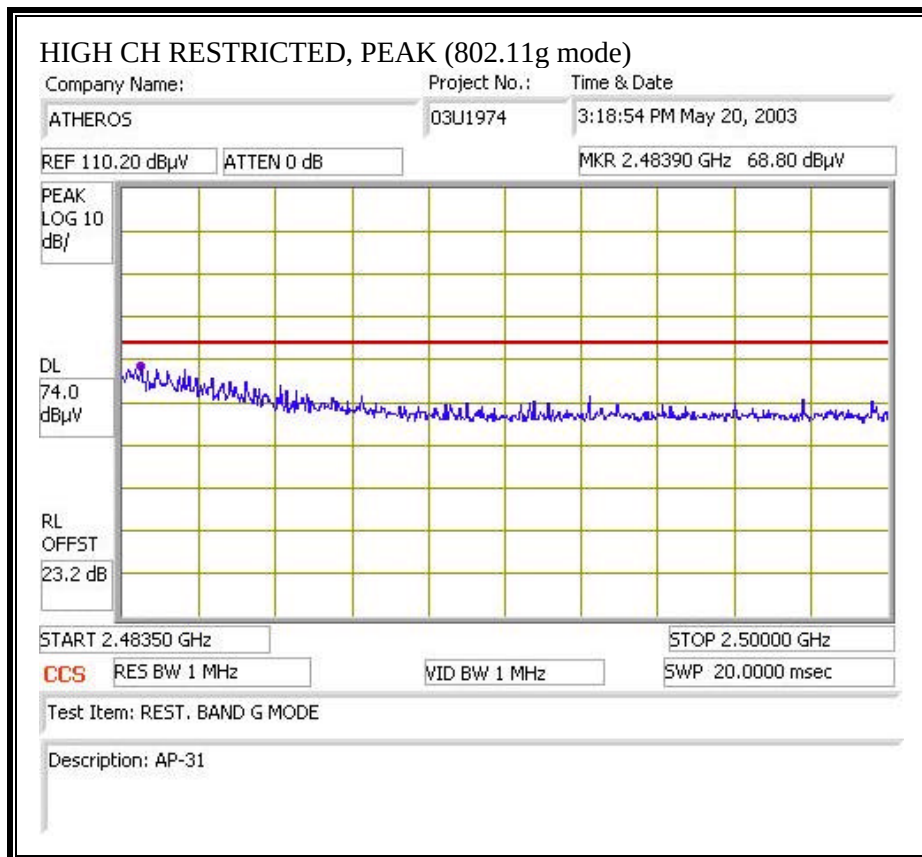


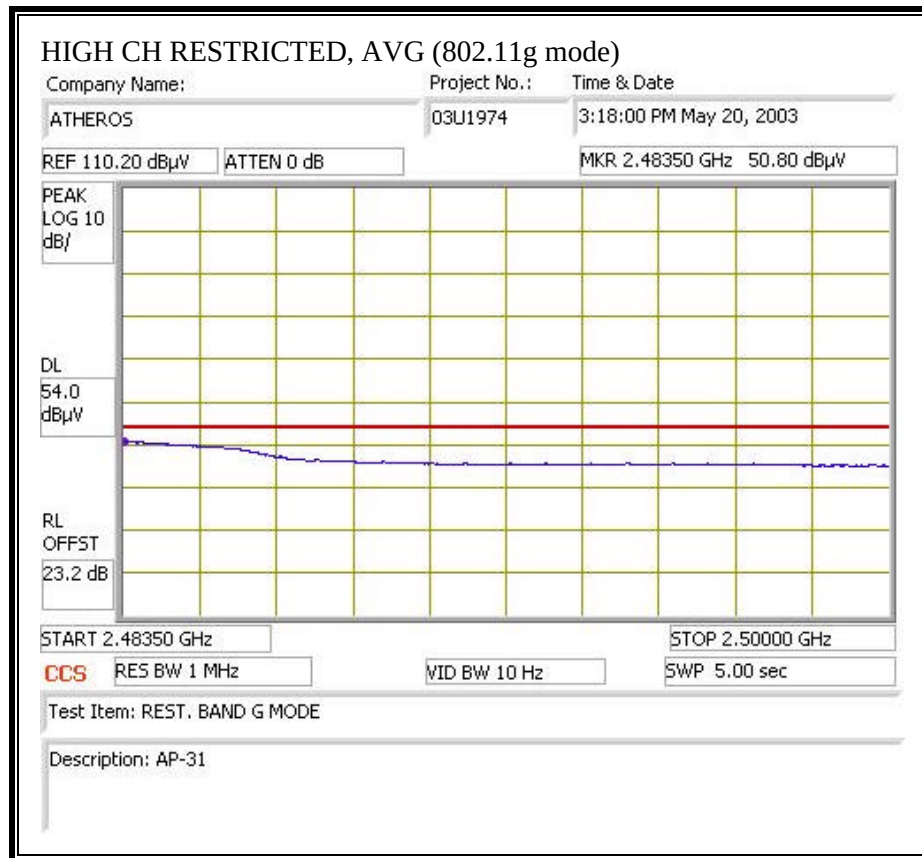
RESTRICTED BANDEDGE (g NORMAL MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (g NORMAL MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (q NORMAL MODE, LOW CHANNEL)

05/20/03 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: NEELESH RAJ Project #: Company: AETHEROS EUT Descrip.: EUT M/N: Test Target: Mode Oper: G MODE															
Test Equipment:															
EMCO Horn 1-18GHz T60; S/N: 2238 @3m				Pre-amplifier 1-26GHz T86 Miteq924341				Spectrum Analyzer HP 8566B Analyzer				Horn > 18GHz T87; ARA 18-26GHz; S/N:1049			
Hi Frequency Cables ☐ (2 ft) ☒ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)															
Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth															
Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth															
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
HARMONICS LOW CHANNEL=2412															
4.824	9.8	54.1	41.9	33.1	2.9	-45.6	0.0	1.0	45.5	33.3	74.0	54.0	-28.5	-20.7	V
12.059	9.8	45.7	37.0	39.3	5.1	-45.4	0.0	1.0	45.7	37.0	74.0	54.0	-28.3	-17.0	V
4.824	9.8	54.0	41.7	33.1	2.9	-45.6	0.0	1.0	45.4	33.1	74.0	54.0	-28.6	-20.9	V
12.059	9.8	46.6	36.1	39.3	5.1	-45.4	0.0	1.0	46.6	36.1	74.0	54.0	-27.4	-17.9	H
spur															
2.668	9.8	54.0	49.0	30.0	2.0	-44.0	0.0	1.0	43.1	38.1	74.0	54.0	-30.9	-15.9	V
2.668	9.8	54.2	48.9	30.0	2.0	-44.0	0.0	1.0	43.3	38.0	74.0	54.0	-30.7	-16.0	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															

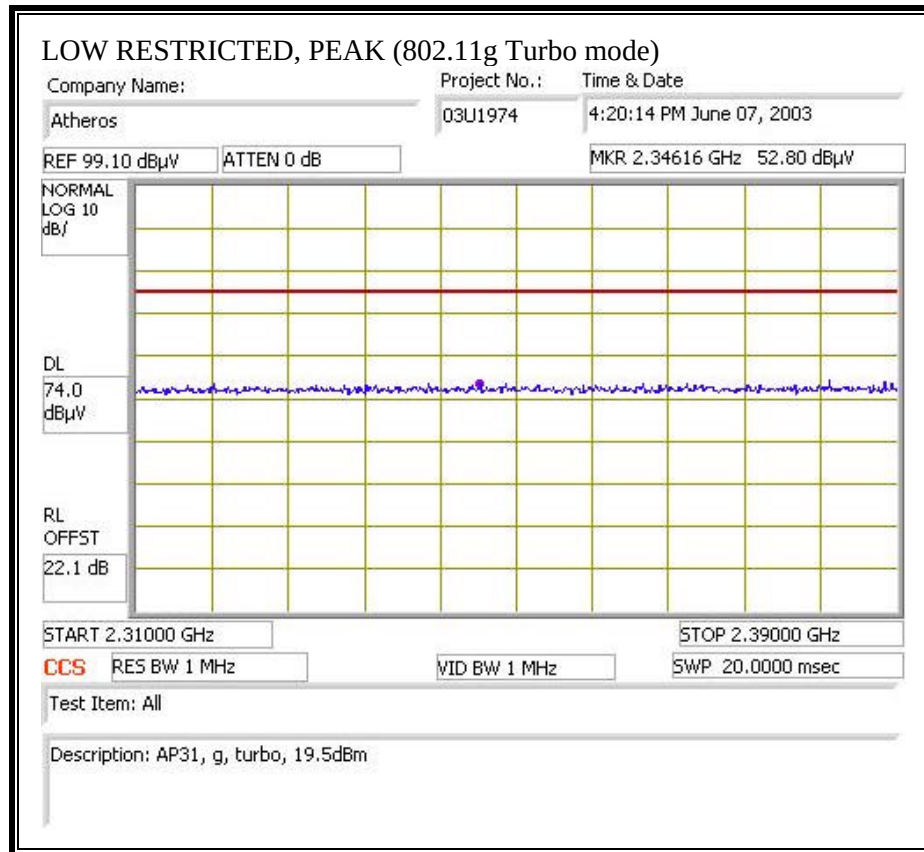
HARMONICS AND SPURIOUS EMISSIONS (g NORMAL MODE, MID CHANNEL)

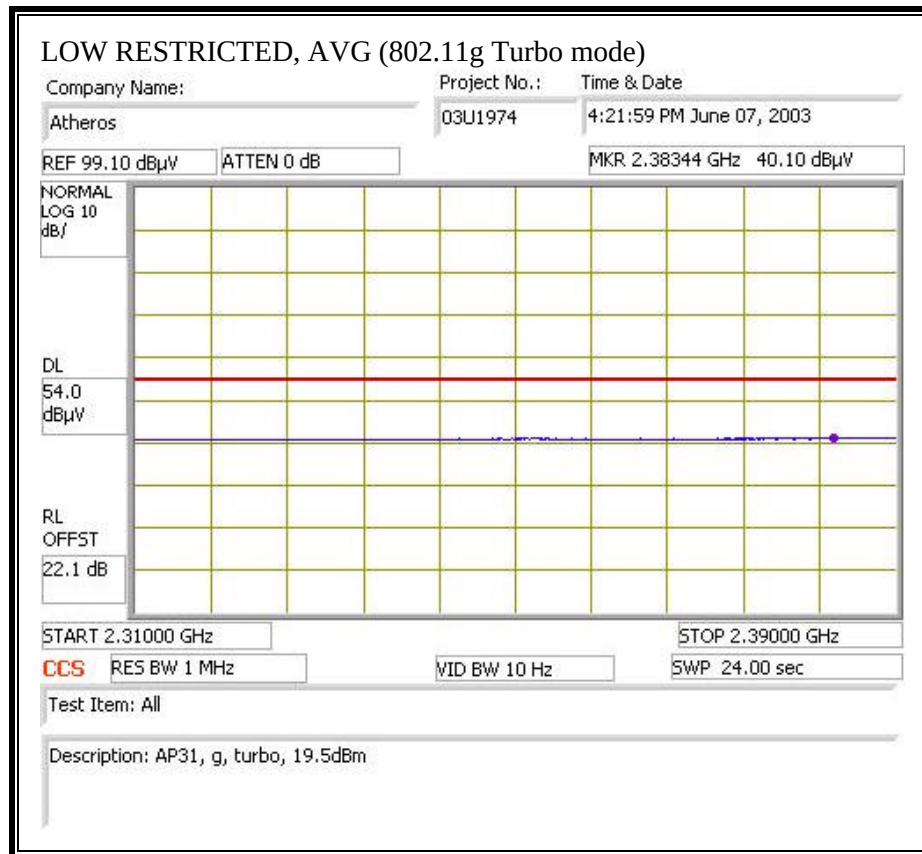
05/20/03 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr:		NEELSH RAO													
Project #:															
Company:		ATHEROS													
EUT Descrip.:															
EUT M/N:															
Test Target:															
Mode Oper:		G MODE													
Test Equipment:															
EMCO Horn 1-18GHz		Pre-amplifier 1-26GHz		Spectrum Analyzer				Horn > 18GHz							
T60; S/N: 2238 @3m		T86 Miteq 924341		HP 8566B Analyzer				T87; ARA 18-26GHz; S/N:1049							
Hi Frequency Cables															
☐ (2 ft) ☒ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)															
Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth															
Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth															
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
HARMONICS MIDDLE CHANNEL=2437															
4.875	9.8	53.7	42.3	33.1	3.0	-45.6	0.0	1.0	45.1	33.7	74.0	54.0	-28.9	-20.3	V
7.305	9.8	53.9	41.1	36.2	3.8	-46.6	0.0	1.0	48.3	35.5	74.0	54.0	-25.7	-18.5	V
12.186	9.8	49.6	37.0	39.4	5.2	-45.6	0.0	1.0	49.5	36.9	74.0	54.0	-24.5	-17.1	V
4.875	9.8	53.1	41.0	33.1	3.0	-45.6	0.0	1.0	44.5	32.4	74.0	54.0	-29.5	-21.6	H
7.305	9.8	49.7	39.3	36.2	3.8	-46.6	0.0	1.0	44.1	33.7	74.0	54.0	-29.9	-20.3	H
12.186	9.8	49.0	37.2	39.4	5.2	-45.6	0.0	1.0	48.9	37.1	74.0	54.0	-25.1	-16.9	H
								1.0							V
								1.0							V
			spur												
2.668	9.8	54.4	48.5	30.0	2.0	-44.0	0.0	1.0	43.5	37.5	74.0	54.0	-30.5	-16.5	V
2.668	9.8	53.2	47.2	30.0	2.0	-44.0	0.0	1.0	42.3	36.3	74.0	54.0	-31.7	-17.7	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								

HARMONICS AND SPURIOUS EMISSIONS (q NORMAL MODE, HIGH CHANNEL)

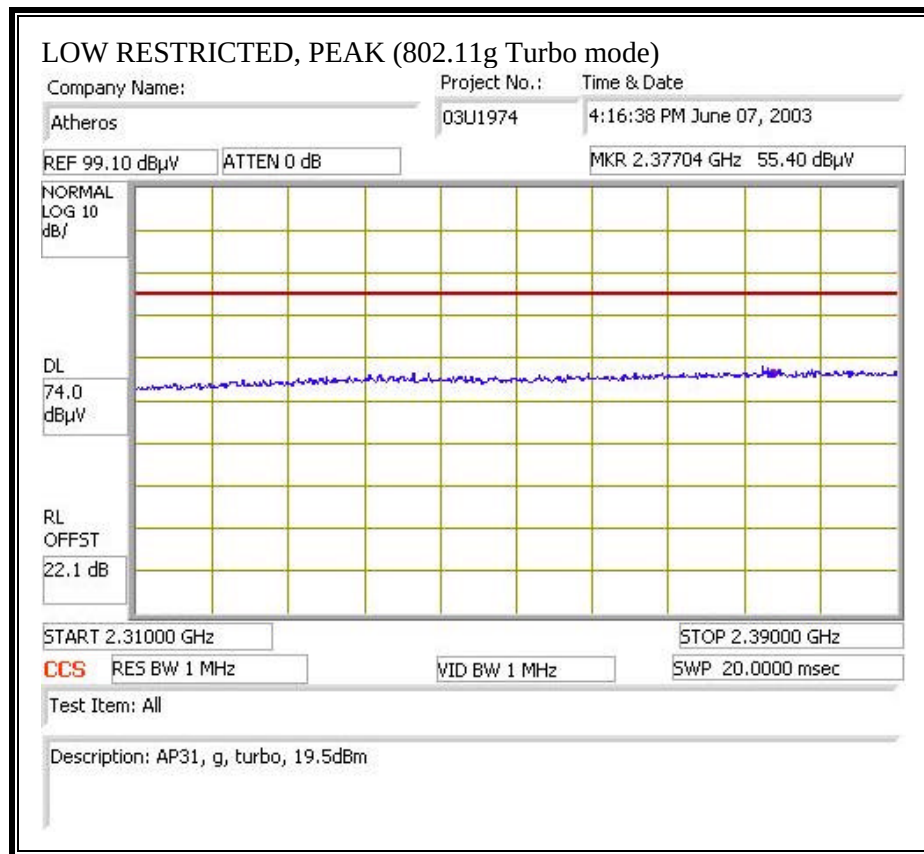
05/20/03 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: NEELESH RAJ Project #: Company: ATHEROS EUT Descrip.: EUT M/N: Test Target: Mode Oper: G MODE															
Test Equipment:															
EMCO Horn 1-18GHz T60; S/N: 2238 @3m		Pre-amplifier 1-26GHz T86 Miteq 924341		Spectrum Analyzer HP 8566B Analyzer		Horn > 18GHz T87; ARA 18-26GHz; S/N:1049									
Hi Frequency Cables ☐ (2 ft) ☒ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)								Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth				Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth			
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
HARMONICS HIGH CHANNEL=2462															
4.927	9.8	53.9	41.8	33.2	3.0	-45.7	0.0	1.0	45.3	33.2	74.0	54.0	-28.7	-20.8	V
7.380	9.8	55.3	43.2	36.3	3.8	-46.5	0.0	1.0	49.8	37.7	74.0	54.0	-24.2	-16.3	V
12.305	9.8	48.3	37.8	39.4	5.2	-45.7	0.0	1.0	48.1	37.6	74.0	54.0	-25.9	-16.4	V
4.927	9.8	52.6	41.1	33.2	3.0	-45.7	0.0	1.0	44.0	32.5	74.0	54.0	-30.0	-21.5	H
7.380	9.8	51.2	40.3	36.3	3.8	-46.5	0.0	1.0	45.7	34.8	74.0	54.0	-28.3	-19.2	H
12.305	9.8	48.5	37.9	39.4	5.2	-45.7	0.0	1.0	48.3	37.7	74.0	54.0	-25.7	-16.3	H
								1.0							V
								1.0							V
			spur												
2.668	9.8	55.3	49.9	30.0	2.0	-44.0	0.0	1.0	44.4	39.0	74.0	54.0	-29.6	-15.0	V
2.668	9.8	54.3	48.1	30.0	2.0	-44.0	0.0	1.0	43.4	37.2	74.0	54.0	-30.6	-16.8	V
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								

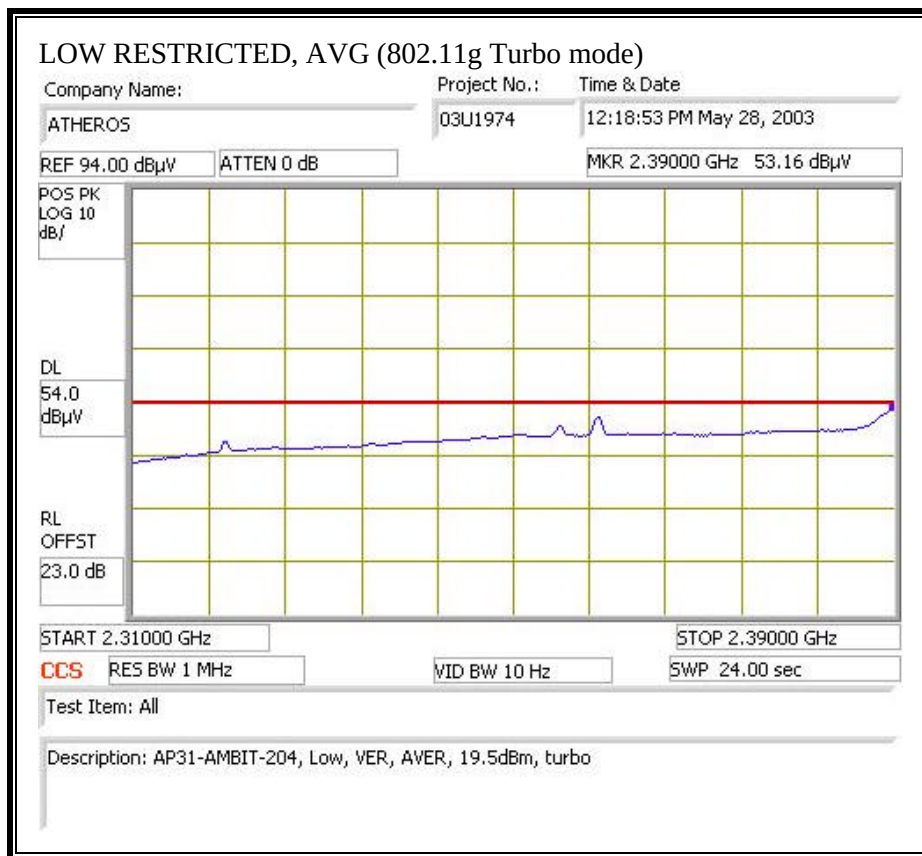
LOW RESTRICTED BANDEGE (g TURBO MODE, HORIZONTAL)



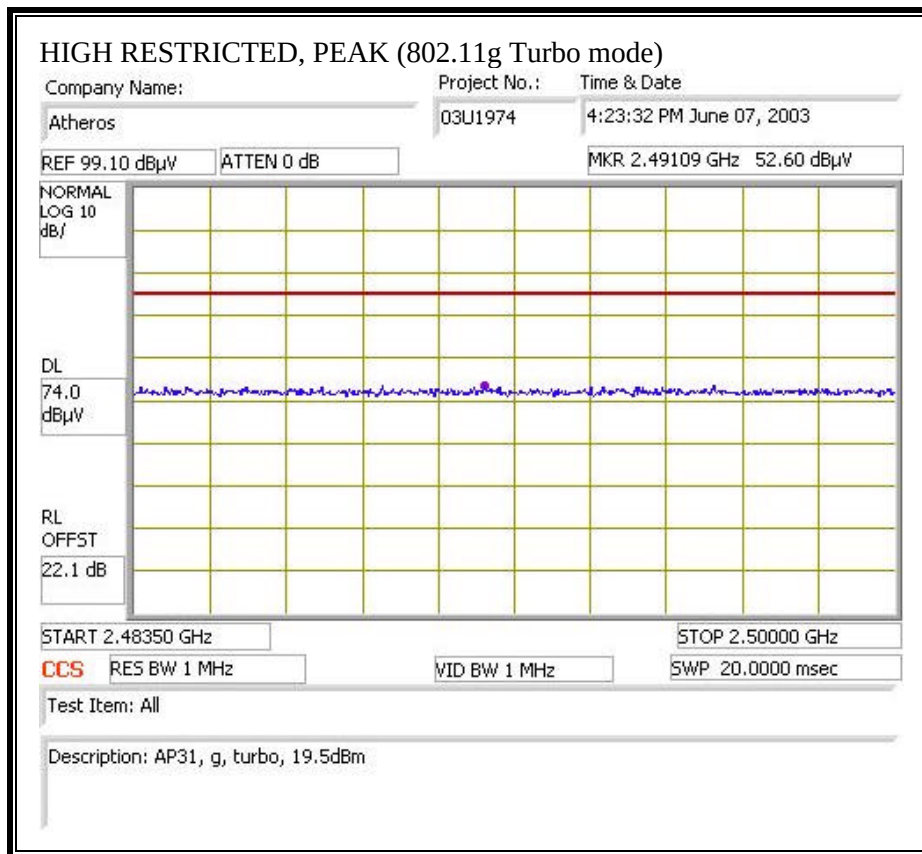


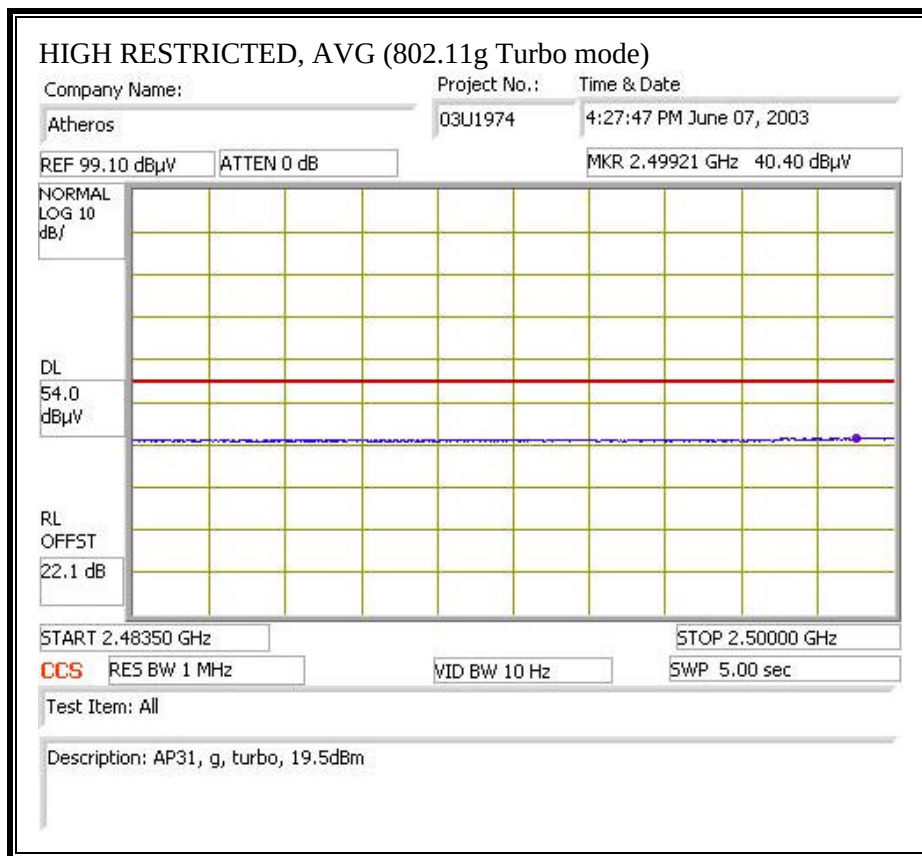
LOW RESTRICTED BANDEDGE (g TURBO MODE, VERTICAL)



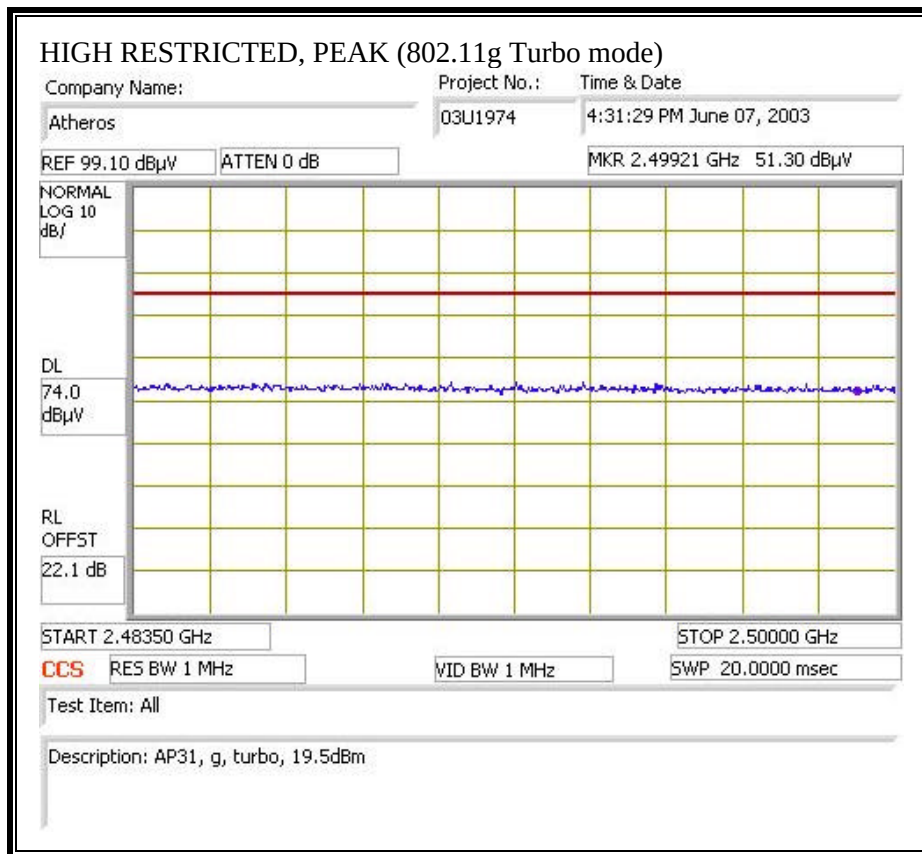


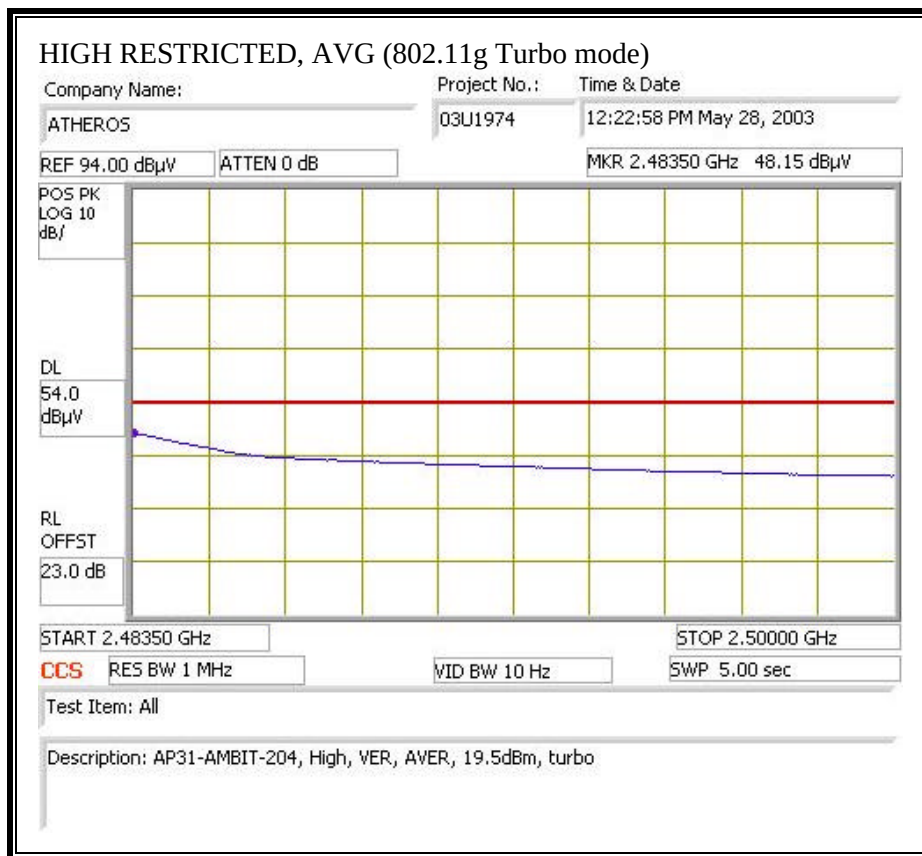
HIGH RESTRICTED BANDEDGE (g TURBO MODE, HORIZONTAL)





HIGH RESTRICTED BANDEDGE (g TURBO MODE, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

05/20/03 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: NEELESH RAJ															
Project #:															
Company: Atheros															
EUT Descrip.:															
EUT M/N:															
Test Target:															
Mode Oper: G MODE															
Test Equipment:															
EMCO Horn 1-18GHz T60; S/N: 2238 @3m				Pre-amplifier 1-26GHz T86 Miteq924341				Spectrum Analyzer HP 8566B Analyzer				Horn > 18GHz T87; ARA 18-26GHz; S/N:1049			
Hi Frequency Cables: ☐ (2 ft) ☒ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)															
Peak Measurements: Average Measurements: 1 MHz Resolution Bandwidth 1 MHz Resolution Bandwidth 1MHz Video Bandwidth 10Hz Video Bandwidth															
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
HARMONICS MIDDLE CHANNEL=2437 TURBO															
4.875	9.8	53.1	41.5	33.1	3.0	-45.6	0.0	1.0	44.5	32.9	74.0	54.0	-29.5	-21.1	V
7.305	9.8	50.9	39.4	36.2	3.8	-46.6	0.0	1.0	45.3	33.8	74.0	54.0	-28.7	-20.2	V
12.186	9.8	48.3	37.0	39.4	5.2	-45.6	0.0	1.0	48.2	36.9	74.0	54.0	-25.8	-17.1	V
4.875	9.8	51.7	40.0	33.1	3.0	-45.6	0.0	1.0	43.1	31.4	74.0	54.0	-30.9	-22.6	H
7.305	9.8	50.3	39.0	36.2	3.8	-46.6	0.0	1.0	44.7	33.4	74.0	54.0	-29.3	-20.6	H
12.186	9.8	48.2	37.3	39.4	5.2	-45.6	0.0	1.0	48.1	37.2	74.0	54.0	-25.9	-16.8	H
								1.0							V
								1.0							V
			spur												
2.668	9.8	54.0	47.3	30.0	2.0	-44.0	0.0	1.0	43.1	36.4	74.0	54.0	-30.9	-17.6	V
2.668	9.8	54.1	47.2	30.0	2.0	-44.0	0.0	1.0	43.2	36.3	74.0	54.0	-30.8	-17.7	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								

Project #:	03U1974-1
Report #:	030514B1
Date& Time:	05/14/03 9:41 AM
Test Engr:	Chin Pang

[<< Main Sheet](#)

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7.7. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

6 WORST EMISSIONS

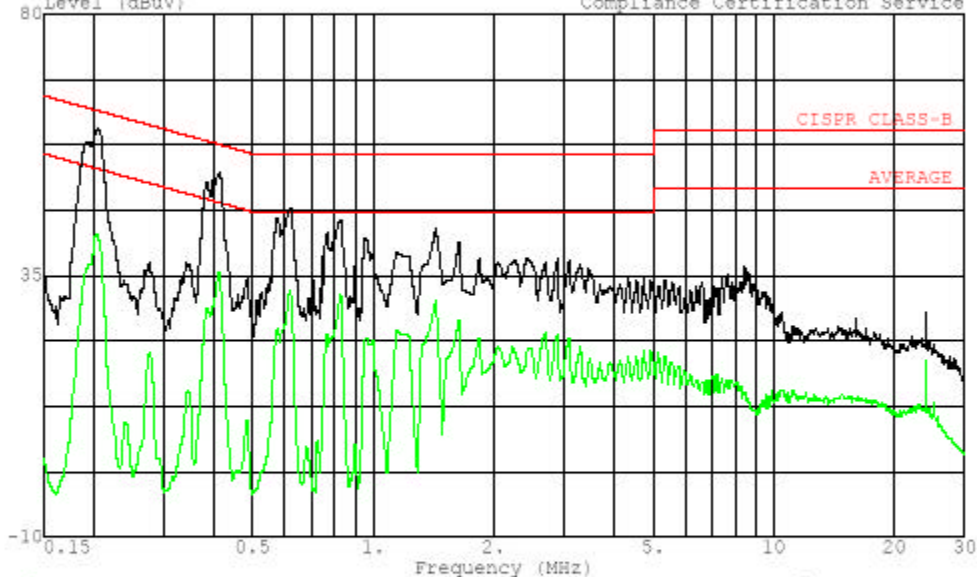
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.21	60.28	--	41.92	0.00	64.43	54.43	-4.15	-12.51	L1
0.41	52.68	--	35.61	0.00	58.49	48.49	-5.81	-12.88	L1
0.62	46.58	--	33.04	0.00	56.00	46.00	-9.42	-12.96	L1
0.21	56.20	--	48.36	0.00	64.43	54.43	-8.23	-6.07	L2
0.41	52.82	--	45.13	0.00	58.57	48.57	-5.75	-3.44	L2
1.41	49.39	--	37.19	0.00	56.00	46.00	-6.61	-8.81	L2
6 Worst Data									

LINE 1 (LINE) RESULTS



561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 7 File#: 1974LC.EMI Date: 06-02-2003 Time: 17:25:16
Level (dBuV) Compliance Certification Service



Trace: 5
Project #: 03U1974-1
Test Engineer: Chin Pang
Company: Atheros
EUT: 802.11 b/g w/Turbo Access Point
Model: TBA
Configuration: EUT/Netgear Hub
Target of Test: FCC Class B
: 115Vac, 60Hz
: L1: Peak | Black |, Ave | Green |

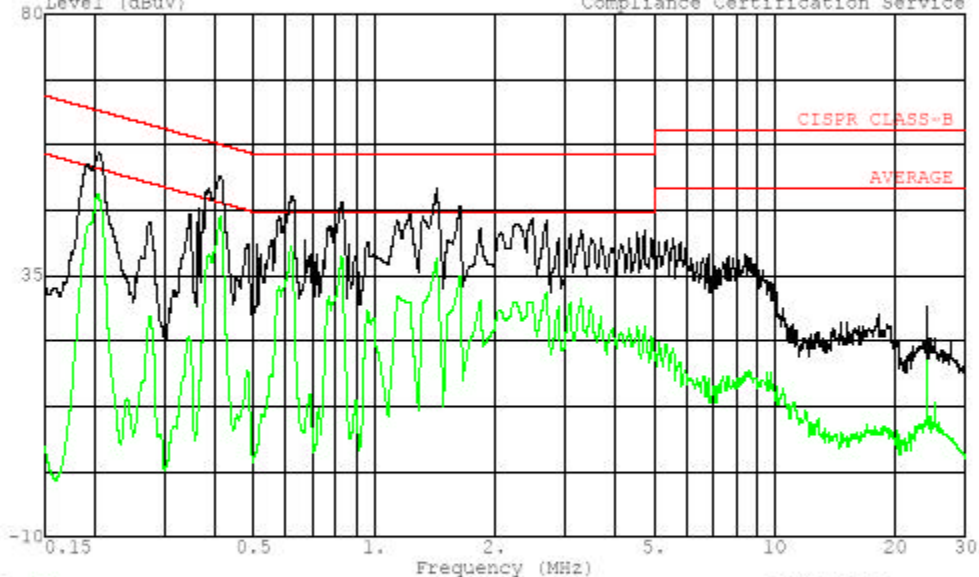
Ref Trace:

LINE 2 (NEUTRAL) RESULTS



561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 14 File#: 1974LC.EMI Date: 06-02-2003 Time: 17:34:15
Level (dBuV) Compliance Certification Service

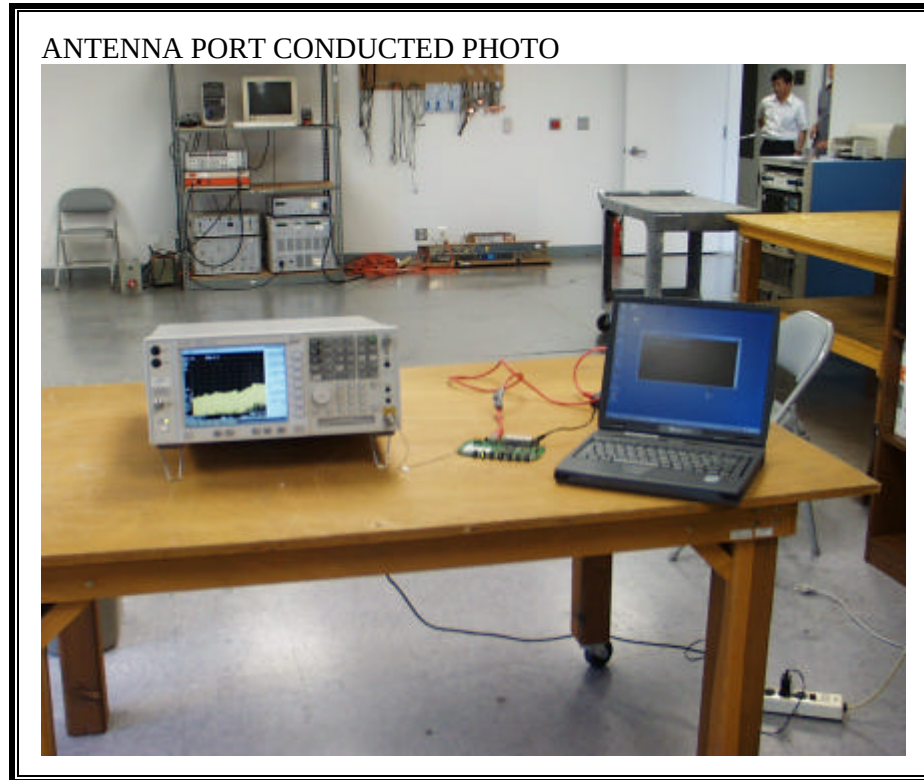


Trace: 12
Project #: 03U1974-1
Test Engineer: Chin Pang
Company: Atheros
EUT: 802.11 b/g w/Turbo Access Point
Model: TBA
Configuration: EUT/Netgear Hub
Target of Test: FCC Class B
: 115Vac, 60Hz
: L2: Peak | black |, Ave | Green |

Ref Trace:

8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



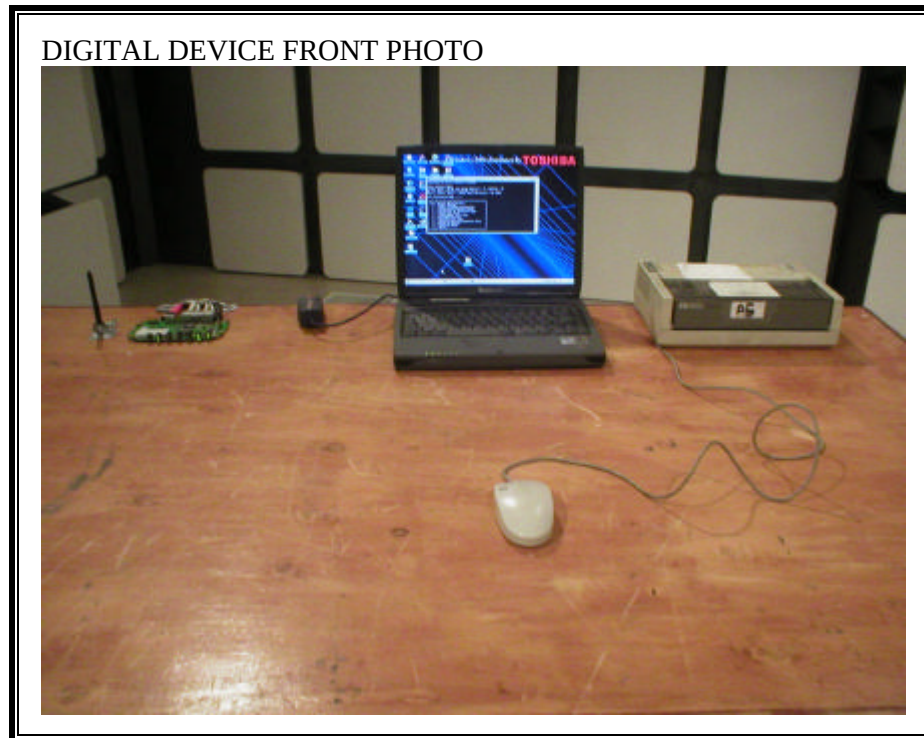
RADIATED RF MEASUREMENT SETUP



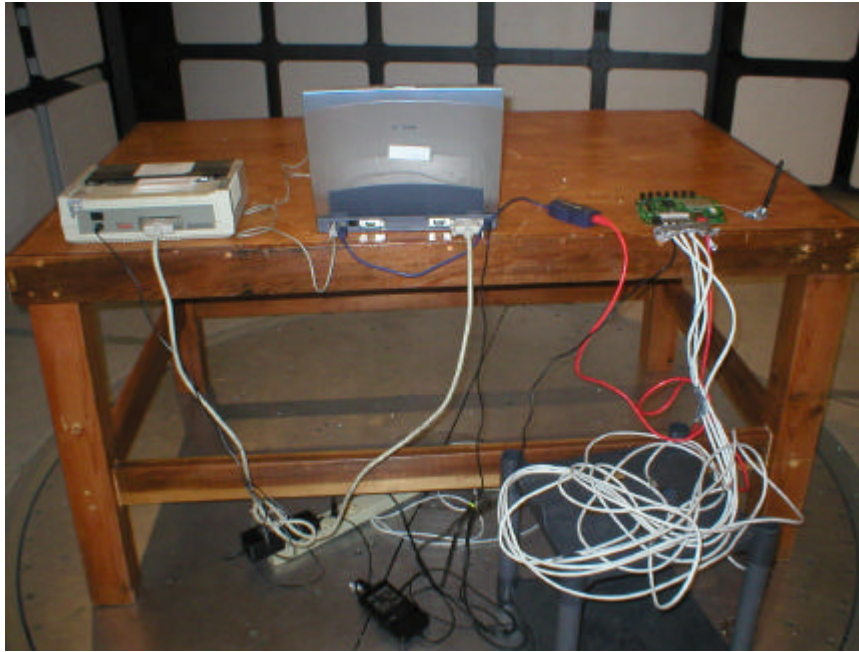
RADIATED BACK PHOTO



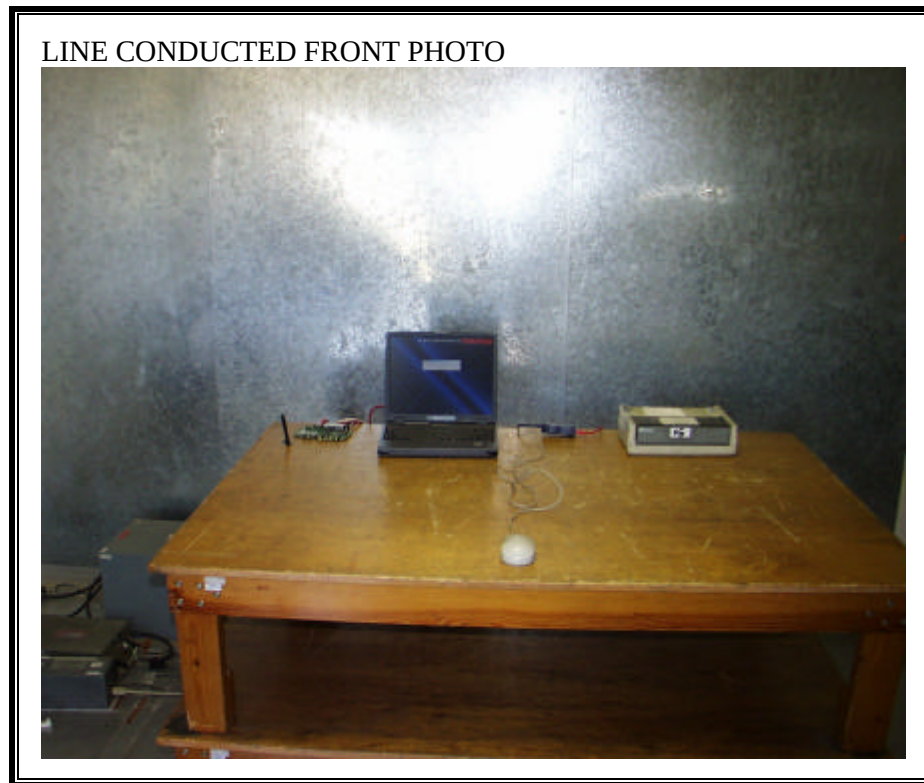
DIGITAL DEVICE MEASUREMENT SETUP



DIGITAL DEVICE BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



LINE CONDUCTED BACK PHOTO



END OF REPORT