

FCC CFR47 PART 22 SUBPART H CERTIFICATION TEST REPORT

FOR

SINGLE BAND CDMA CELLULAR PHONE

MODEL NUMBER: VS510

FCC ID: GKRVS510

REPORT NUMBER: 05I3294

ISSUE DATE: MARCH 25, 2005

Prepared for

COMPAL ELECTRONICS, INC. 8F, NO. 500, JUIKUANG ROAD NEIHU, TAIPEI, TAIWAN ROC 114

Prepared by

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	Γ NO: 05U3294 NGLE BAND CDMA CELLULAR PHONE	DATE: 3/25/2005 FCC ID: GKRVS510
Revision	History	
Rev.	Revisions	Revised By

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: COMPAL ELECTRONICS INC.

8F, NO. 500, JUI-KUANG RD.

NEIHU, TAIPEI 114

TAIWAN

EUT DESCRIPTION: SINGLE BAND CDMA CELLULAR PHONE

MODEL: VS510

SERIAL NUMBER: 67255364

DATE TESTED: MARCH 15 – 23, 2005

APPLICABLE STANDARDS

STANDARD TEST RESULTS

FCC PART 22 SUBPART H NO NON-COMPLIANCE NOTED

DIGITAL DEVICE CONFIGURATION: NO NON-COMPLIANCE NOTED

FCC PART 15 SUBPART B

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:

THU CHAN
EMC SUPERVISOR

COMPLIANCE CERTIFICATION SERVICES

WILLIAM ZHUANG & VIEN TRAN EMC ENGINEERS COMPLIANCE CERTIFICATION SERVICES

William Thing

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603A (2001), ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15 and FCC CFR 47 Part 22.

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 a Single mode (CDMA only) portable mobile station of which frequency range is 824 - 894MHz

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum ERP as follows:

800 to 880 MHz Authorized Band								
Frequency Range Modulation Output Output								
		ERP	ERP					
(MHz)		(dBm)	(mW)					
824.76 - 848.31	CDMA	27.20	524.81					

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Helix -Fixed antenna with 1.5dBi gain.

5.4. 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 835.89 MHz.

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5.5. **DESCRIPTION OF TEST SETUP**

SET UP FOR RF TEST

SUPPORT EQUIPMENT

The EUT is installed as a stand-alone device during the tests

I/O CABLES

The EUT is installed as a stand-alone device during the tests

TEST SETUP

The EUT is installed as a stand-alone device during the tests

DATE: 3/25/2005

SET UP FOR DIGITAL TEST

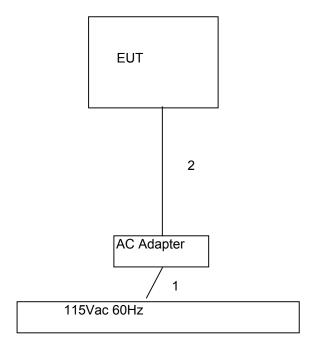
SUPPORT EQUIPMENT

TEST PERIPHERALS									
Device Type	Device Type Manufacturer Model Number Serial Number FCC ID								
AC Adapter Earphone	Compal Electronic NA	KWT05A7JL0017 NA	NA NA	DoC NA					

I/O CABLES

	TEST I / O CABLES										
Cable	Cable I/O # of I/O Connector Type of Cable Data										
No	Port	Port	Type	Cable	Length	Traffic	Bundled	Remark			
1	AC	1	US 115V	Un-shielded	2m	No	No	N/A			
2	DC	1	DC	Un-shielded	1m	No	No	N/A			

TEST SETUP



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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						
Peak / Average Power Sensor	Agilent	E9327A	US40440755	3/9/2006						
Peak Power Meter	Agilent	E4416A	GB41291160	3/9/06						
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	1/6/06						
Site A Preamplifier, 1300MHz	HP	8447D	2944A 06833	8/17/05						
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	US42070220	1/13/06						
Signal Generator, 2 ~ 40 GHz	R & S	SMP04	DE 34210	5/25/05						
Site B Antenna, Bilog	Chase	CBL6112B	2586	3/3/2006						
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/06						
Antenna, Tuned Dipoe	CDI	ROBERTS	117	5/15/05						
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	2/4/06						
Antenna, Tuned Dipoe	CDI	ROBERTS	117	5/15/05						
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/21/05						
EMI Test Receiver	R & S	ESHS 20	827129/006	10/22/05						
Line Filter	Lindgren	LMF-3489	497	CNR						

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7. LIMITS AND RESULTS

7.1. **OCCUPIED BANDWIDTH**

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the -26 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal -26 dB bandwidth function is utilized.

RESULTS

No non-compliance noted:

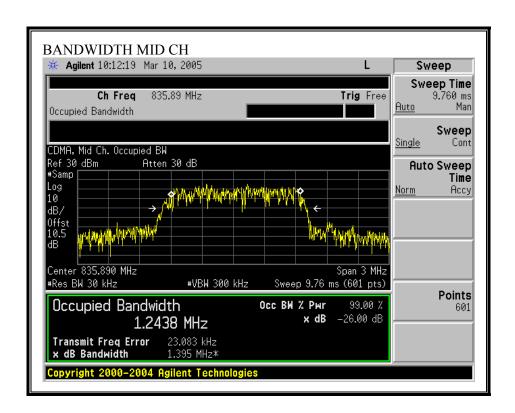
CDMA Modulation

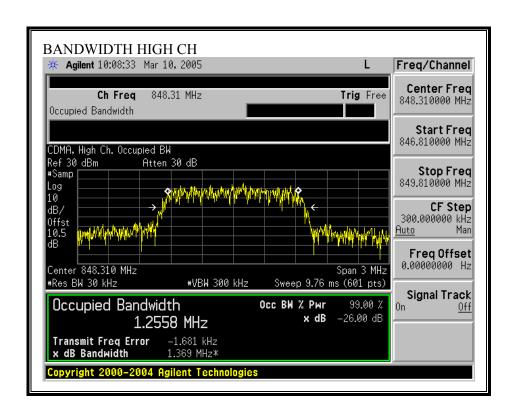
Channel	Frequency	Bandwidth
	(MHz)	(MHz)
Low	824.76	1.412
Middle	835.89	1.395
High	848.31	1.369

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BANDWIDTH LOW CH Agilent 10:16:09 Mar 10, 2005 Freq/Channel Center Freq 824.76 MHz Ch Freq Trig Free 824.700000 MHz Occupied Bandwidth Start Freq 823.200000 MHz CDMA, Low Ch. Occupied BW Ref 30 dBm #Samp Atten 30 dB Stop Freq 826.200000 MHz Log CF Step 300.0000000 kHz Auto Man <u>Auto</u> Freq Offset 0.00000000 Hz Center 824.760 MHz #Res BW 30 kHz Span 3 MHz #VBW 300 kHz Sweep 9.76 ms (601 pts) Signal Track Occupied Bandwidth 99.00 % Occ BW % Pwr x dB -26.00 dB 1.2414 MHz Transmit Freq Error x dB Bandwidth 69.858 kHz 1.412 MHz*

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7.2. RF POWER OUTPUT

<u>LIMIT</u>

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

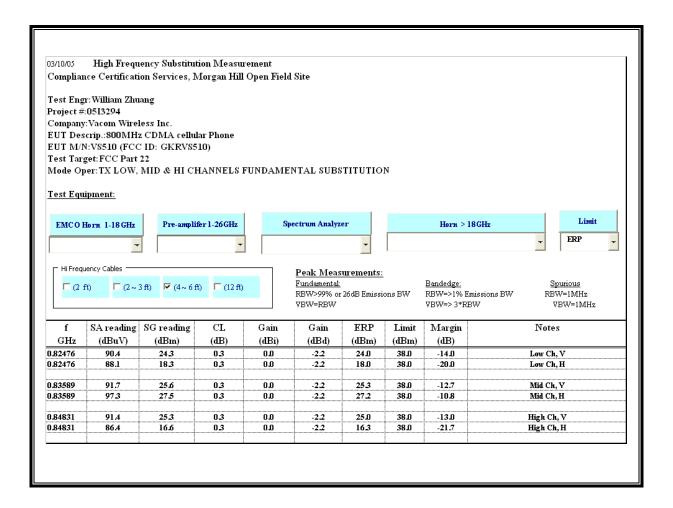
TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.2.17

RESULTS

No non-compliance noted.

CDMA Output Power (ERP)



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7.3. FREQUENCY STABILITY

LIMIT

§22.355 Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C–1 of this section.

For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is \pm 2.5 ppm.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.3.1 and 2.3.2

RESULTS

No non-compliance noted

No non-compliance noted.										
Refe	Reference Frequency: CDMA Mid Channel 835.23433MHz @ 25°C									
	Liı	mit: ± 2.5 ppm =	2088.086	Hz						
Power Supply	Environment	Frequency Devi	ation Measureed w	ith Time Elapse						
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)						
3.80	50	835.23383	0.599	± 2.5						
3.80	40	835.23423	0.122	± 2.5						
3.80	30	835.23430	0.042	± 2.5						
3.80	25	835.23433	0	± 2.5						
3.80	20	835.23415	0.220	± 2.5						
3.80	10	835.23426	0.087	± 2.5						
3.80	0	835.23427	0.068	± 2.5						
3.80	-10	835.23414	0.230	± 2.5						
3.80	-20	835.23439	-0.068	± 2.5						
3.80	-30	835.23456	-0.272	± 2.5						
3.23	25	835.23363	0.838	± 2.5						
4.37	25	835.23416	0.204	± 2.5						
3.0 (endpoint)	25	835.23303	1.556	± 2.5						

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7.4. SPURIOUS EMISSION AT ANTENNA TERMINAL

<u>LIMIT</u>

\$22.917 (e) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P) dB$.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 3.2.13 & FCC 22.917 (h)

RESULTS

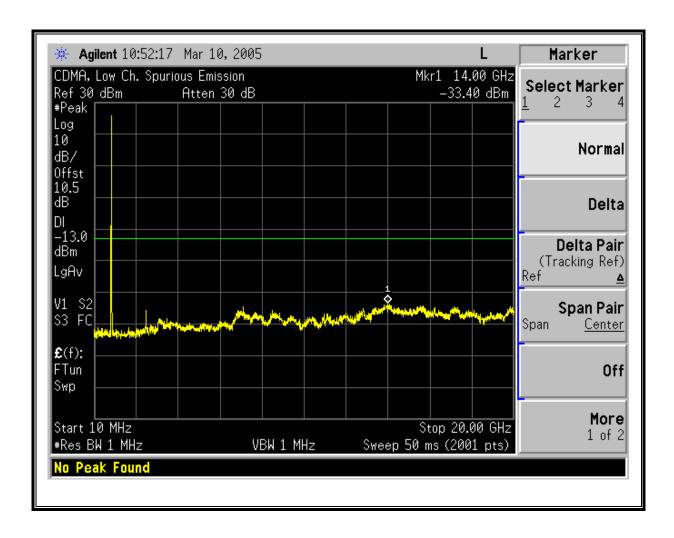
No non-compliance noted.

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FCC ID: GKRVS510

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CDMA Modulation: Low Channel Out-Of-Band Emissions



Agilent 10:57:20 Mar 10, 2005 Marker CDMA, Mid Ch. Spurious Emission Mkr1 15.52 GHz Select Marker -33.17 dBm Ref 30 dBm Atten 30 dB 2 #Peak Log Normal Delta -13.0Delta Pair dBm (Tracking Ref) LgAv Ref Ż V1 S2 Span Pair S3 FC Span Center **£**(f): FTun Off Swp More Stop 20.00 GHz Start 10 MHz 1 of 2 Sweep 50 ms (2001 pts) #Res BW 1 MHz VBW 1 MHz

No Peak Found

Agilent 10:55:23 Mar 10, 2005 Marker Mkr1 15.51 GHz CDMA, High Ch. Spurious Emission Select Marker Ref 30 dBm -33.15 dBm Atten 30 dB 3 #Peak Log 10 Normal dB/ Offst Delta -13.0Delta Pair dBm (Tracking Ref) LgAv Ref † • V1 S2 S3 FC Span Pair Span Center **£**(f): FTun Off Swp More Stop 20.00 GHz Start 10 MHz 1 of 2 #Res BW 1 MHz VBW 1 MHz Sweep 50 ms (2001 pts) No Peak Found

£(f): f>50k

Swp

Center 824.000 MHz

Illegal parameter value

#Res BW 15 kHz

Agilent 10:46:28 Mar 10, 2005 Marker Mkr1 824.000 MHz CDMA, Low Ch. Band Edge Select Marker -35.302 dBm Ref 30.5 dBm Atten 30 dB #Samp Log 10 Normal dB/ Offst 10.5 dΒ Delta DΙ -13.0Delta Pair dBm (Tracking Ref) LgAv Ref 100 W1 S2 S3 FS Span Pair MSpan Center

VBW 15 kHz

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Off

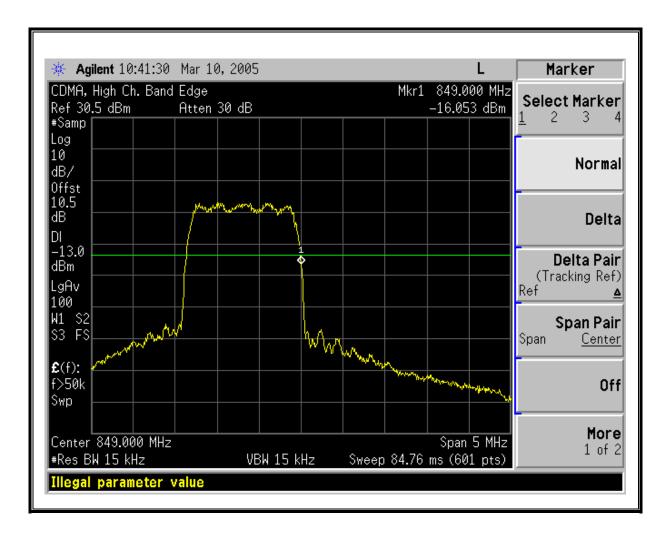
More

1 of 2

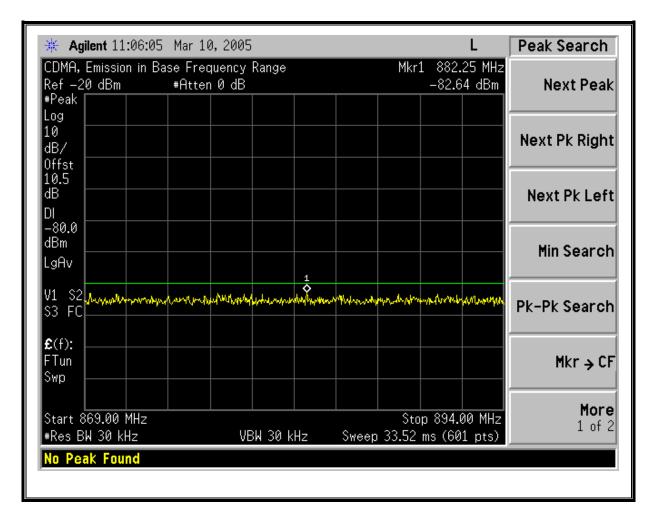
Span 5 MHz

Sweep 84.76 ms (601 pts)

CDMA Modulation: High Channel Band Edge



CDMA Mobile Emissions in Base Frequency Range



7.5. FIELD STRENGTH OF SPURIOUS RADIATION

<u>LIMIT</u>

 $\S22.917$ (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P) dB$.

TEST PROCEDURE

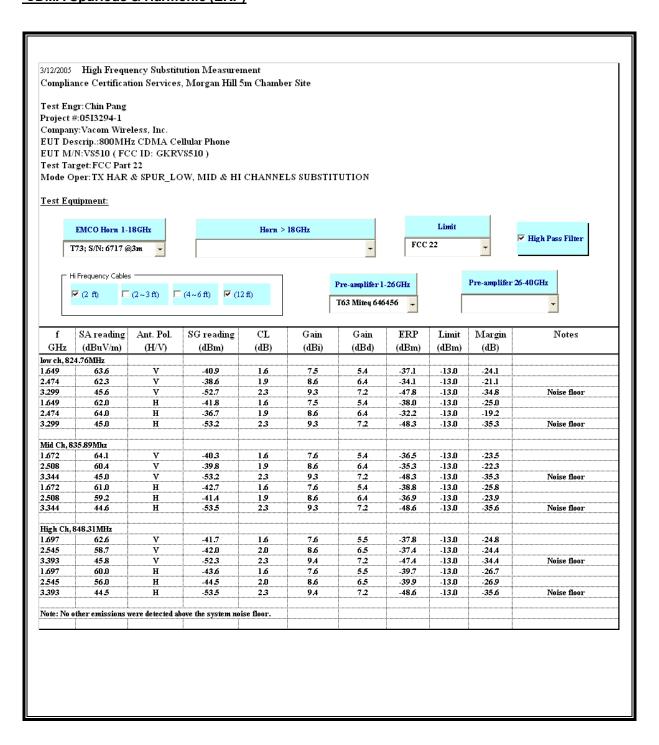
ANSI / TIA / EIA 603 Clause 3.2.12 & FCC 22.917 (b)

RESULTS

No non-compliance noted.

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CDMA Spurious & Harmonic (ERP)



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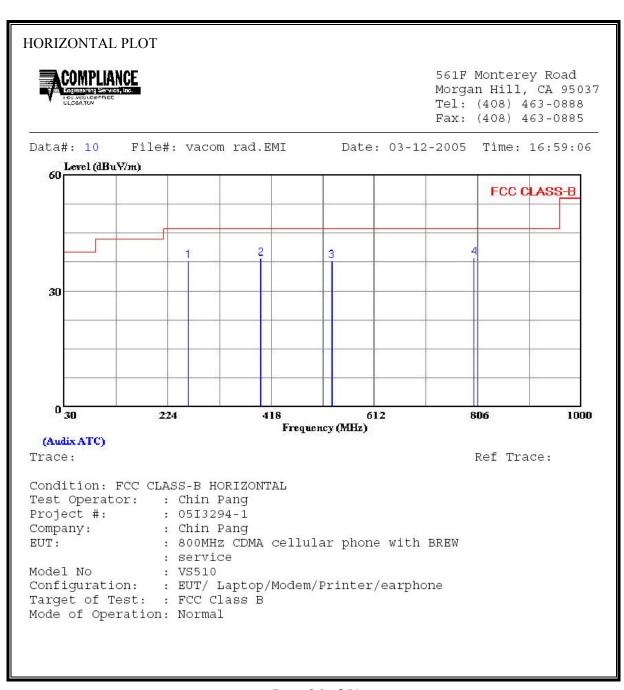
DATE: 3/25/2005

8. DIGITAL DEVICE CONFIGURATION - LIMITS AND RESULTS

WORST-CASE RADIATED EMISSIONS BELOW 1 GHz 8.1.

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

LINK TO LAPTOP



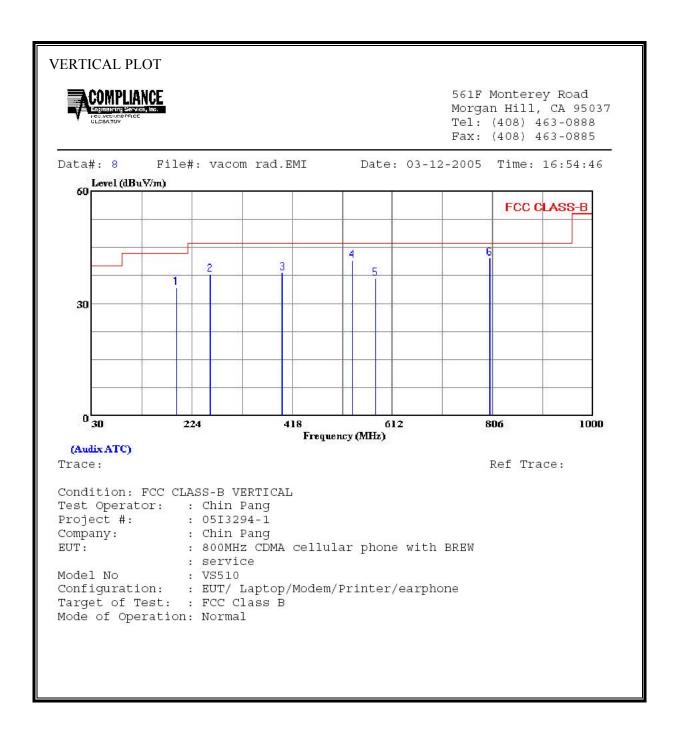
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HORIZONTAL DATA								
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	
_	MHZ	dBuV	dB	$\overline{\mathtt{dBuV/m}}$	$\overline{\mathtt{dBuV/m}}$	dB		
1 2 3 4	262.800 398.600 532.460 799.210	47.90 44.50	-9.55 -6.70	38.35 37.80		-7.65 -8.20	Peak Peak	

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



DATE: 3/25/2005

VERTICAL DATA								
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	
	MHZ	dBuV	dB	$\overline{\text{dBuV/m}}$	$\overline{\mathrm{dBuV/m}}$	dB		
1		48.30	-14.11	34.19	43.50			
2	258.920	51.10	-13.35	37.75	46.00	-8.25	Peak	
3	398.600	47.70	-9.55	38.15	46.00	-7.85	Peak	
4	533.430	48.20	-6.67	41.53	46.00	-4.47	Peak	
5	579.020	42.50	-5.83	36.67	46.00	-9.33	Peak	
6	800.180	44.00	-1.79	42.21	46.00	-3.79	Peak	

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

STAND-ALONE

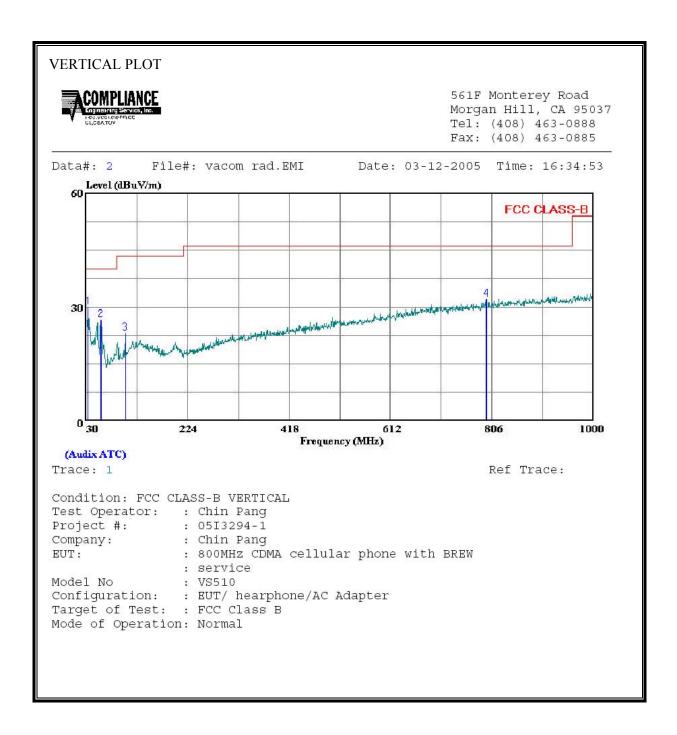


DATE: 3/25/2005

HORIZ	ONTAL DATA						
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHZ	dBu∇	dB	$\overline{\mathtt{dBuV/m}}$	$\overline{\mathtt{dBuV/m}}$	dB	
1	58.130						
2	301.600	39.70	-11.82	27.88	46.00	-18.12	Peak
3	380.170	36.90	-9.95	26.95	46.00	-19.05	Peak
4	870.990	34.30	-1.17	33.13	46.00	-12.87	Peak

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



DATE: 3/25/2005

VERTICAL DATA								
		Read			Limit	Over		
	Freq	Level	Factor	Level	Line	Limit	Remark	
	MHZ	dBuV	dB	$\overline{\text{dBuV/m}}$	$\overline{\mathtt{dBuV/m}}$	dB		
1	33.880	38.70	-8.87	29.83	40.00	-10.17	Peak	
2	58.130	45.80	-19.28	26.52	40.00	-13.48	Peak	
3	104.690	38.40	-15.42	22.98	43.50	-20.52	Peak	
4	795.330	33.80	-1.87	31.93	46.00	-14.07	Peak	

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8.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4

LIMIT

 $\S15.107$ (a) Except for Class A digital devices, for equipment 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 band edges.

Frequency range	Limits (dBµV)			
(MHz)	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

Notes:

- 1. The lower limit shall apply at the transition frequencies
- 2. The limit decreases linearly with the logarithm of the frequency in the range $0.15\,\mathrm{MHz}$ to $0.50\,\mathrm{MHz}$.

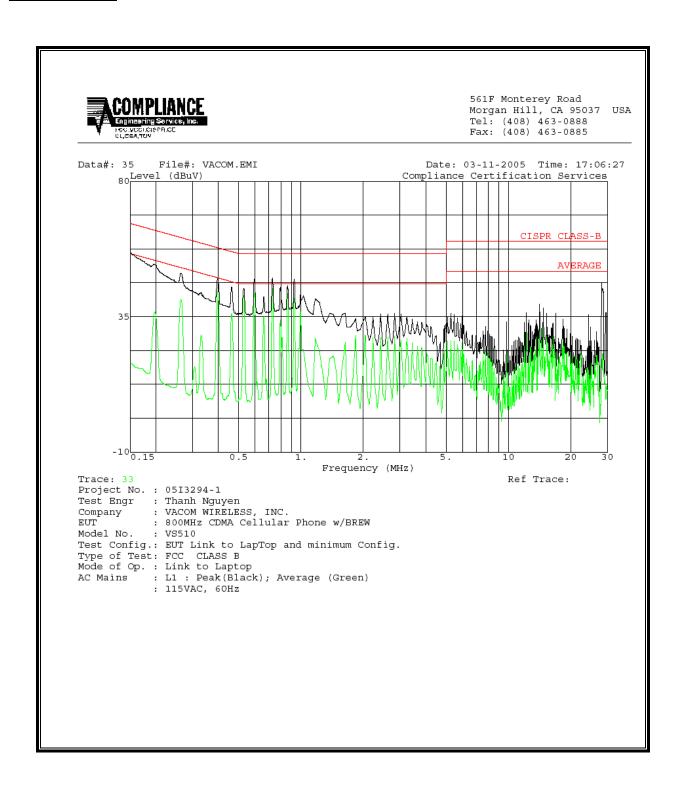
RESULTS

No non-compliance noted:

DATE: 3/25/2005

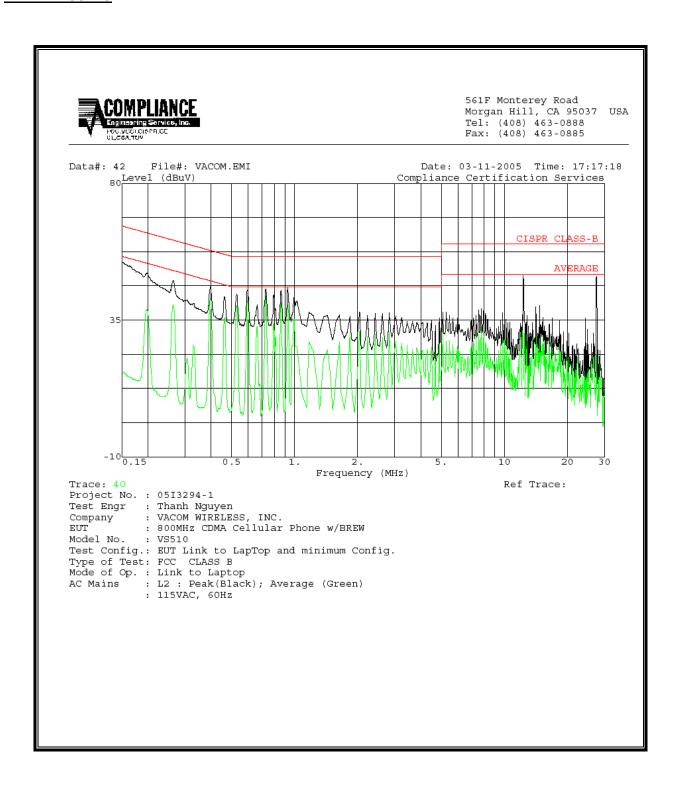
LINK TO LAPTOP

LINE 1 RESULTS



DATE: 3/25/2005

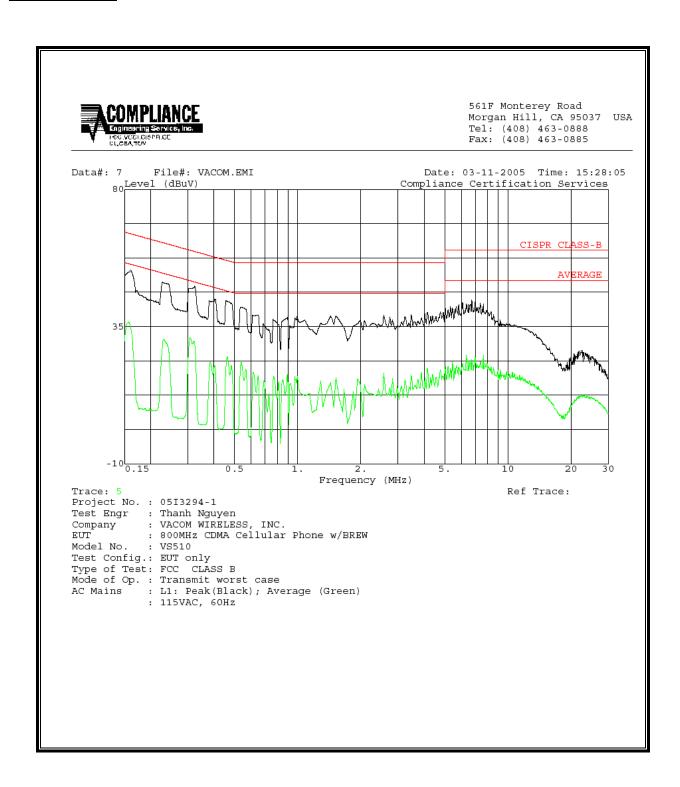
LINE 2 RESULTS



DATE: 3/25/2005

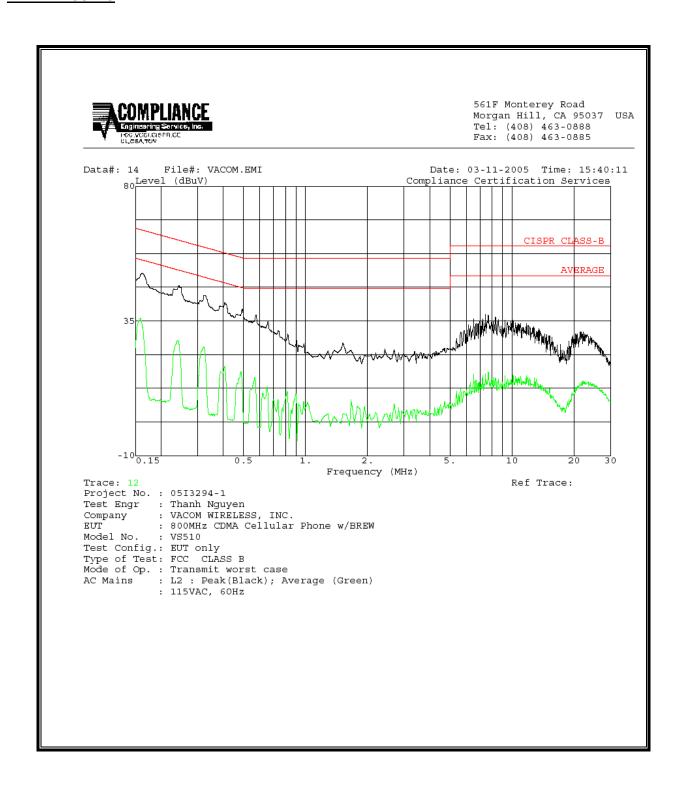
STAND-ALONE

LINE 1 RESULTS



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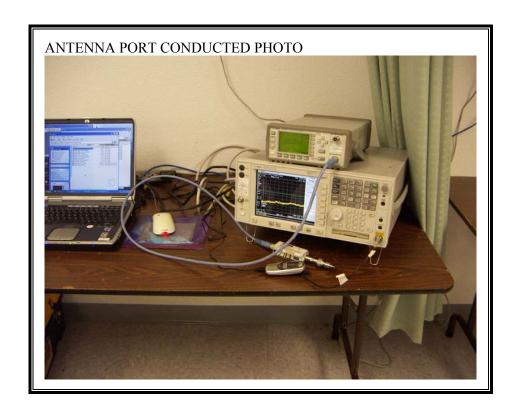
LINE 2 RESULTS



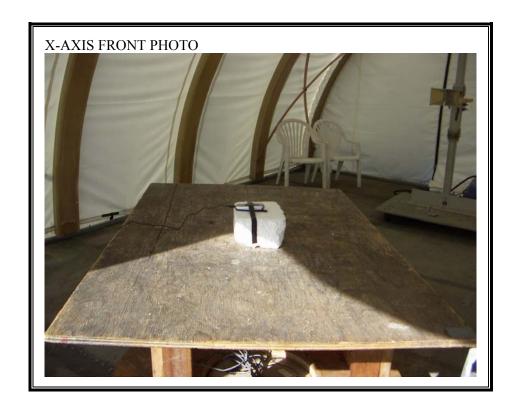
DATE: 3/25/2005

9. SETUP PHOTOS

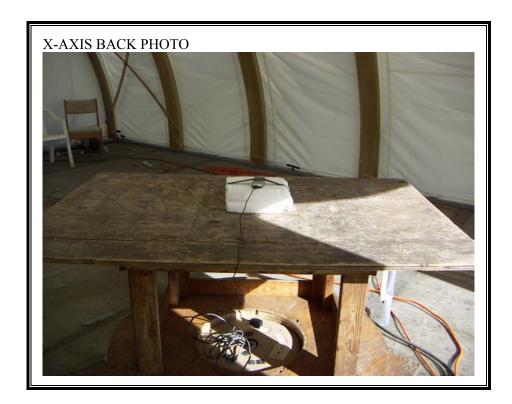
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

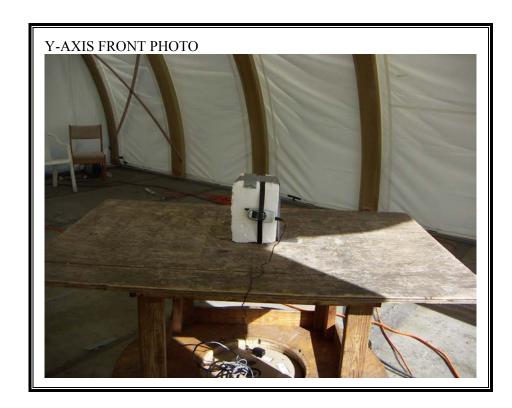


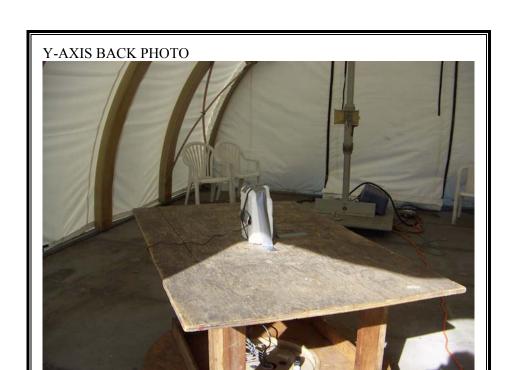
RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION



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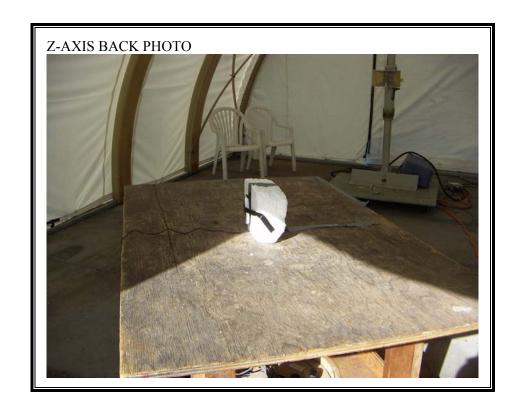






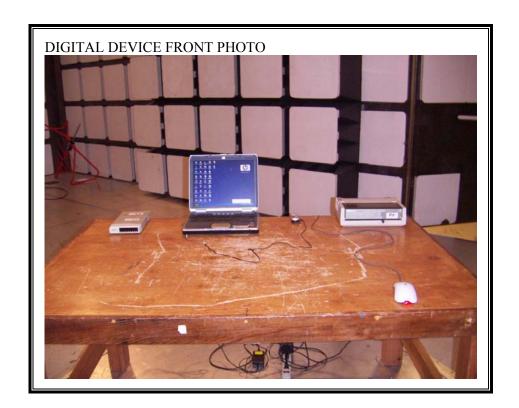
DATE: 3/25/2005





DIGITAL DEVICE RADIATED EMISSIONS SETUP

LINK TO LAPTOP



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POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

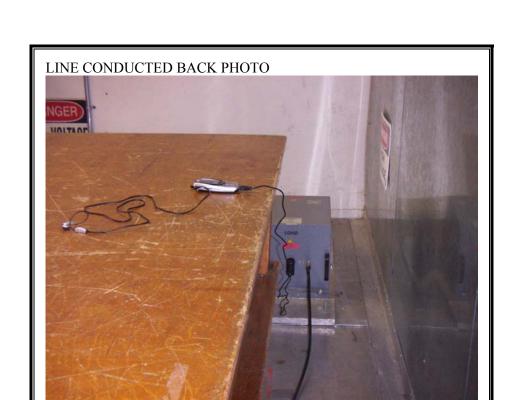
LINK TO LAPTOP







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END OF REPORT

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