

FCC CFR47 PART 15 SUBPART E CLASS II PERMISSIVE CHANGE TEST REPORT FOR

MC85 MINI CARD 11b/g/a/n RADIO CARD

MODEL NUMBER: MC85P

FCC ID: UAY-MMC85PA

REPORT NUMBER: 06U10412-2

ISSUE DATE: JULY 24, 2006

Prepared for MARVELL SEMICONDUCTOR, INC. 5488 MARVELL LANE SANTA CLARA CALIFORNIA, 95054, USA

Prepared by COMPLIANCE CERTIFICATION SERVICES 561F MONTEREY ROAD MORGAN HILL, CA 95037, USA TEL: (408) 463-0885 FAX: (408) 463-0888



Revision History

	Issue		
Rev.	Date	Revisions	Revised By
	7/24/2006	Initial Issue	A. Ilarina

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	MARVELL SEMICONDUCTOR, INC. 5488 MARVELL LANE SANTA CLARA, CA, 95054, USA					
EUT DESCRIPTION:	MC85 MINI CARD 11b/g/a/n RADIO CARD					
MODEL:	MC85P					
SERIAL NUMBER:	010					
DATE TESTED:	JULY 3 – JULY 18, 2006					
	APPLICABLE STANDARDS					
STANDARD	TEST RESULTS					
FCC PART 15 SUBF	ART 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:

Turin

ALVIN ILARINA EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

FRANK IBRAHIM EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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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 <u>http://www.ccsemc.com</u>.

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/b/g/n transceiver.

The radio module is manufactured by Marvell Semiconductor.

5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

Change #1 Adding Laptop PIFA Antenna

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range	Mode	Output Power	Output Power
(MHz)		(dBm)	(mW)

5150 to 5250 MHz Authorized Band

5180 - 5240	802.11a 20MHz	11.32	13.55			
5190 - 5230	802.11a 40MHz	14.93	31.12			
5180 - 5240	802.11n HT20	13.53	22.54			
5190 - 5230	802.11n HT40	15.90	38.90			

5250 to 5350 MHz Authorized Band

5260 - 5320	802.11a 20MHz	17.19	52.36
5270 - 5310	802.11a 40MHz	16.60	45.71
5260 - 5320	802.11n HT20	19.75	94.41
5270 - 5310	802.11n HT40	17.51	56.36

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5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the following antenna:

1) PIFA manufactured by Apple, maximum gain of -1.6 dBi in the 2.4 GHz band, and 4.06 dBi in the 5.0 GHz band.

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was PCI rev. 1.0.0.0.2, MFG 2.1.0.36

The EUT driver software installed in the Laptop during testing was Marvell Semiconductor, Inc. Labtools rev. 1.0.3.p3.

The board revision of the EUT tested is 1.8.

The test utility software used during testing was PCI.exe.

5.6. WORST-CASE CONFIGURATION AND MODE

The 2x3 configuration was used for all testing in this report.

The worst- case data rates are determined to be as follows for each mode based on investigation by measuring the average power, peak power and PPSD across all data rates, bandwidths, and modulations.

The worst-case data rates for the 2GHz bands are: 11 Mbps for 802.11b; 54Mbps for 802.11g; MCS11 for 802.11n HT20; MCS15 for 802.11n HT40. These are based on baseline testing with this chipset.

The worst-case data rates for the 5GHz bands are: 9 Mbps for 802.11a 20MHz and 802.11a 40MHz; MCS0 for 802.11n HT20 and 802.11n HT40. These are based on baseline testing with this chipset.

All emissions tests were made with the worst-case data rates.

5.7. MODIFICATIONS

There were no modifications made to the revision EUT during the testing.

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5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description	Manufacturer	Model	Serial Number	FCC ID			
Laptop PC	Apple	A1151	CS01768	DoC			
Power Adapter	Apple	A1172	052765-11	N/A			

I/O CABLES

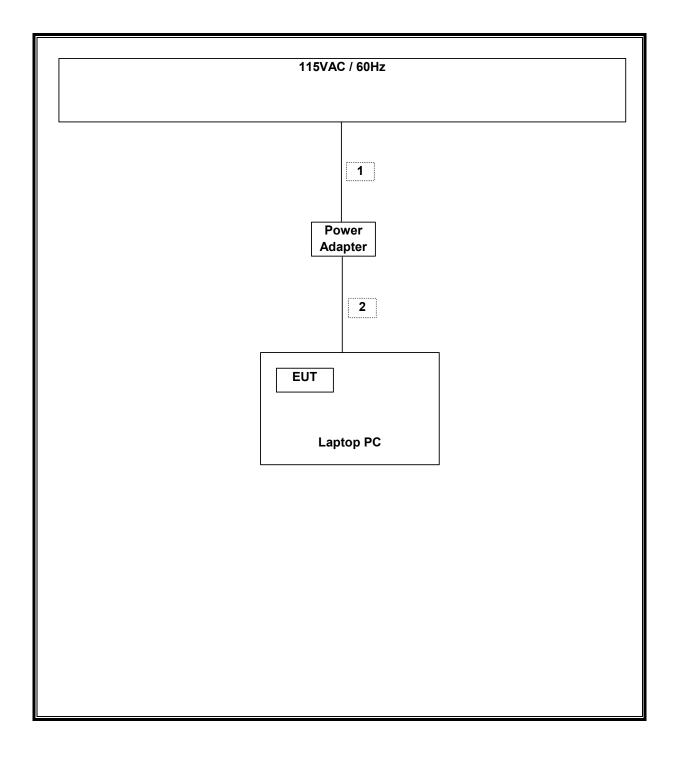
	I/O CABLE LIST								
Cable	Port	# of	Connector	Cable	Cable	Remarks			
No.		Identical	Туре	Туре	Length				
		Ports							
1	AC	1	AC	Unshielded	1.8m	N/A			
2	DC	А	DC	Unshielded	1.8m	N/A			

TEST SETUP

The EUT is installed inside a host laptop computer. Test software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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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		
EMI Test Receiver	R & S	ESHS 20	827129/006	6/3/2006		
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/2006		
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	2/4/2007		
RF Filter Section	Agilent / HP	85420E	3705A00256	2/4/2007		
Antenna, Bilog 30 MHz ~ 2 GHz	Sunol Sciences	JB1	A121003	9/3/2006		
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/2007		
Peak / Average Power Sensor	Agilent	E9327A	US40440755	12/2/2007		
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	4/22/2007		
Antenna, Horn 18 ~ 26 GHz	ARA	MWH-1826/B	1049	9/12/2006		
Preamplifier, 1 ~ 26 GHz	Miteq	NSP2600-SP	924342	9/2/2006		
Antenna, Horn 26 ~ 40 GHz	ARA	MWH-2640/B	1029	4/13/2007		
Preamplifier, 26 ~ 40 GHz	Miteq	NSP4000-SP2	924343	8/18/2006		
5.15-5.35 GHz Reject Filter	Micro-Tronics	BRC13190	1	CNR		
5.725-5.825 GHz Reject Filter	Micro-Tronics	BRC13192	1	CNR		
4.0 High Pass Filter	Micro Tronics	HPM13351	3	CNR		
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY45300064	12/19/2006		

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7. LIMITS AND RESULTS

7.1.1. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

Each chain is measured separately and the total power is calculated using:

Total Power = $10 \log (10^{\circ} (Chain 0 Power / 10) + 10^{\circ} (Chain 2 Power / 10))$

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RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Mode	Frequency	Average Power	Average Power	Average Power
Channel		Chain A	Chain B	Total
	(MHz)	(dBm)	(dBm)	(dBm)

802.11a 20M Mode

Low	5180	7.91	7.90	10.92
Middle	5260	13.19	13.23	16.22
High	5320	12.88	13.17	16.04

802.11a 40M Mode

Low	5190	11.07	11.10	14.10
Middle	5270	12.40	12.50	15.46
High	5310	9.53	9.20	12.38

802.11n HT20 Mode

Low	5180	9.84	10.04	12.95
Middle	5260	16.20	16.30	19.26
High	5320	13.52	13.50	16.52

802.11n HT40 Mode

Low	5190	12.07	11.75	14.92
Middle	5270	13.40	13.60	16.51
High	5310	11.97	11.78	14.89

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7.1.2. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

\$1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupational	I/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6
(B) Limits	for General Populati	ion/Uncontrolled Exp	posure	
0.3–1.34 1.34–30	614 824 <i>/</i> f	1.63 2.19/f	*(100) *(180/f ²)	30 30

TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)-Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
30–300 300–1500 1500–100,000	27.5	0.073	0.2 f/1500 1.0	30 30 30

f = frequency in MHz

t = trequency in MHz
 * = Plane-wave equivalent power density
 NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled is exposure also apply in situations when an individual is transient through a location where occupational/controlled is poulation/uncontrolled exposures apply in situations in which persons the general population/uncontrolled exposures apply in situations in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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CALCULATIONS

Given

 $E = \sqrt{(30 * P * G)} / d$

where

and

E = Field Strength in Volts/meter

P = Power in Watts

 $S = E^{2}/3770$

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations yields: $S = (30 * P * G) / (3770 * (d^2))$

Changing to units of Power to mW and Distance to cm, using: P (W) = P (mW) / 1000 and

d(m) = d(cm) / 100

and substituting the logarithmic form of power and gain using:

 $P(mW) = 10^{\circ} (P(dBm) / 10)$ and $G(numeric) = 10^{\circ} (G(dBi) / 10)$

yields

 $S = 0.0795 * 10^{(P+G)} / 10) / (d^2)$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm^2

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LIMITS

From 1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

RESULTS

Band	Power Density	Total	Antenna	MPE
	Limit	Power	Gain	Distance
(MHz)	(mW/cm^2)	(dBm)	(dBi)	(cm)
5150 to 5250	1.0	15.90	4.40	2.92
5250 to 5350	1.0	19.75	4.40	4.55

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7.2. RADIATED EMISSIONS

7.2.1. 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.

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\$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.

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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 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

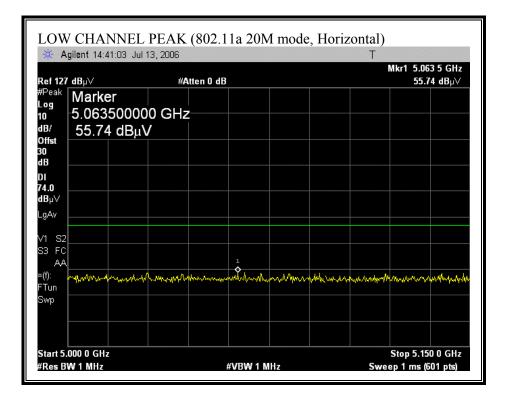
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

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7.2.2. TRANSMITTER ABOVE 1 GHz FOR 5150 TO 5350 MHz BAND

RESTRICTED BANDEDGE (802.11a 20M MODE, LOW CHANNEL)



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Marker	27 dBµ∨	#Atten 0 dB	Mkr1 5.004 8 0 43.79 dB
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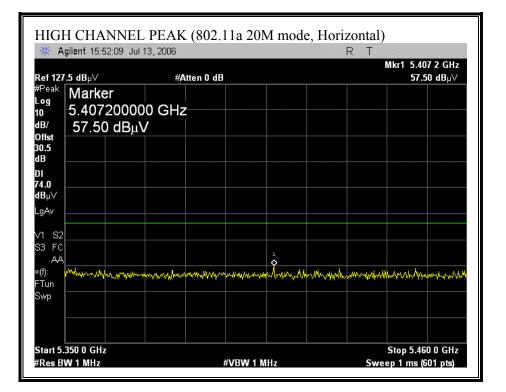
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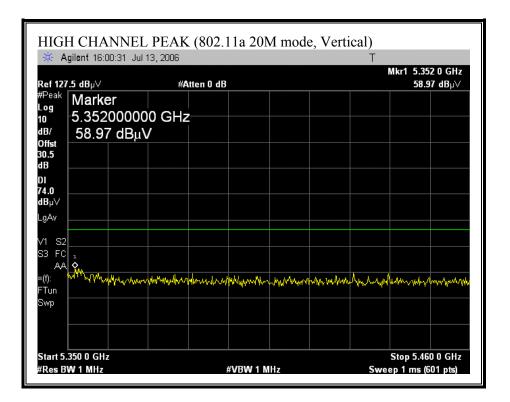
RESTRICTED BANDEDGE (802.11a 20M MODE, HIGH CHANNEL)



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1.0		
Bµ∨		
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Tun 1		
wp 🔦		

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Marker			
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, 47.40 dBμV			
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S2			
FC			
АА			

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HARMONICS AND SPURIOUS EMISSIONS (802.11a 20M MODE)

T 60; S / Hi Frequ	rn 1-1 N: 2238	8GHz	Pre-an												
Hi Frequ	N: 2238		Pre-amplifer 1-26GHz				Pre-amplifer 26-40GHz				Horn > 18GHz T89; ARA 18-26GHz; S/N:1049				
	iency Cab	_	187 Mi	teq 924	342	-			_	- 189	ARA 18-26	GHZ; 5/N:1	1049	-	
	2 foot	cable	3	foot c	able		12 1	foot c	able		HPF	Re	ject Filte	r	Peak Measurements RBW=VBW=1MHz
		•	Frank	177080	001	-	Frank 1	872090	•••			• R_	001	-	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)
540	3.0	0 MHz) 53.1	40.2	38.0	6.2	-41.3	0.0	0.0	56.0	43.2	74	54	-18.0	-10.8	V, Settings: 54 58 H, Settings: 54 58
540 Idle Ch	3.0 annel (5	53.6 260 MHz)	40.1	38.0	6.2	-41.3	0.0	0.0	56.6	43.1	74	54	-17.4	-10.9	
780 780 76 Char	3.0 3.0	52.1 52.3 20 MHz)	39.5 39.3	37.9 37.9	6.3 6.3	-41.2 -41.2	0.0 0.0	0.0	55.0 55.2	42.5 42.3	74 74	54 54	-19.0 -18.8	-11.5 -11.7	V, Settings: 5F 61 H, Settings: 5F 61
540 960	3.0 3.0	52.5 51.7	39.9 38.8	37.3 37.8	5.1 6.3	-39.4 -41.1	0.0	0.0	55.5 54.7	42.9 41.8	74 74	54 54	-18.5 -19.3	-11.1 -12.2	V, Settings: 5F 60 V, Settings: 5F 60
540 960	3.0 3.0	48.5 51.7	35.7 38.9	37.3 37.8	5.1 6.3	-39.4 -41.1	0.0	0.0	51.6 54.7	38.8 41.9	74 74	54 54	-22.4 -19.3	-15.2 -12.1	H, Settings: 5F 60 H, Settings: 5F 60
	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor			Avg Peak HPF		ed Peak	Strength @ Field Stre					: Average I : Peak Limi	
Γ was s	canned f	rom 1 GHz to	40 GHz, no oth	er signals	; from E	UT were o	detected abo	ve the n	oise floor.						

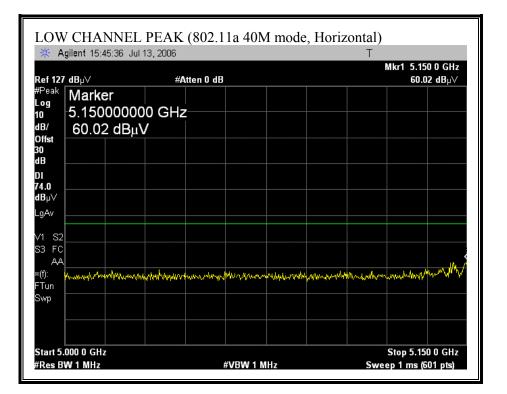
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REPORT NO: 06U10412-2 EUT: MC85 MINI CARD 11b/g/a/n RADIO CARD

Complis			Measureme Services, Mo		Iill One	en Field	Site								
Compan Project # Date: Test Eng	y: t: jineer:		Marvell 06U10412 07/18/06 Frank Ibrahim		Ĩ										
Configur S/N:	ration:		EUT with PIF. 010	A Antenr	na inside	Apple La	ptop PC								
Mode:			Continuously 7	Fransmitt	ting in 11	a 20M m	ode, 9Mbps								
<u>Test Equ</u>	ipment:	:													
	orn 1-1		Pre-amplifer 1-26GHz			Pre-am	plifer 2	26-40GHz		Horn > 18GHz					
	/N: 2238	_	T87 M	teq 924	1342	-			-					-	
	uency Cabl		3	foot o	able		12	foot c	able		HPF	Re	ject Filte	er	Peak Measurements RBW=VBW=1MHz
			Frank	177080	0001	-	Frank 1	872090	001 🚽			- R	001	-	Average Measurements RBW=1MHz ; VBW=10Hz
f	Dist			AE	CL		D Carrie	EI4:	Beak	<u> </u>	DL 1 :	_, ,	DL Mar		-
GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBm	Avg dBm	Pk Lim dBm	Avg Lim dBm	dB	Avg Mar dB	Notes (V/H)
10.520	3.0	5260 MHz) 54.2	40.8	37.4	5.1	-39.3	0.0	0.0	-37.9	-51.3	-7.0	-27.0	-30.9	-24.3	V, Settings: 5F 61
10.520	3.0	48.7	35.0	37.4	5.1	-39.3	0.0	0.0	-43.4	-57.1	-7.0	-27.0	-36.4	-30.1	H, Settings: 5F 61
	f Dist	Measureme Distance to	ent Frequenc	y		Amp D Corr	Preamp (Distance		ct to 3 mete	rs		Avg Lim Pk Lim		Field Streng d Strength I	
	Read	Analyzer R	teading			Avg	Average	Field S	Strength @	3 m		Avg Mar	Margin vs	s. Average l	Limit
	AF CL	Antenna Fa Cable Loss				Peak HPF	Calculate High Pas		k Field Stre r	ngth		Pk Mar	Margin vs	s. Peak Lim	it

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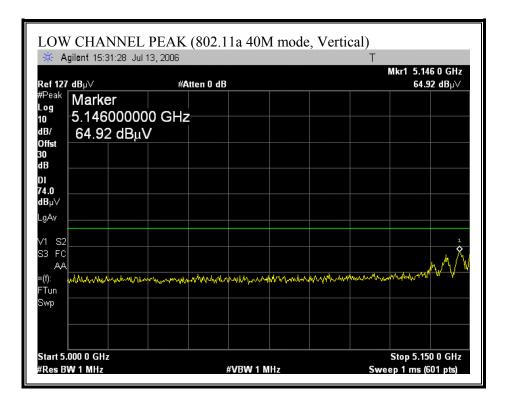
RESTRICTED BANDEDGE (802.11a 40M MODE, LOW CHANNEL)



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🔆 Agilent 15:44:55 J	Jul 13, 2006	R L
lef 127 dBµ∀	#Atten 0 dB	Mkr1 5.150 0 GHz 47.02 dBµ∀
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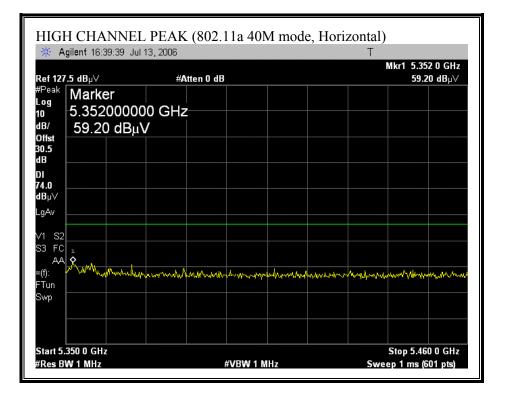


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-	13, 2006	Mkr1 5.146 0 GHz
f 127 dBµ∀	#Atten 0 dB	50.72 dBµ∨
^{eak} Marker 5.14600000		
5.14600000 / 50.72 dBμ\ ist		
0 µV		
Av		
S2 FC		
AA		
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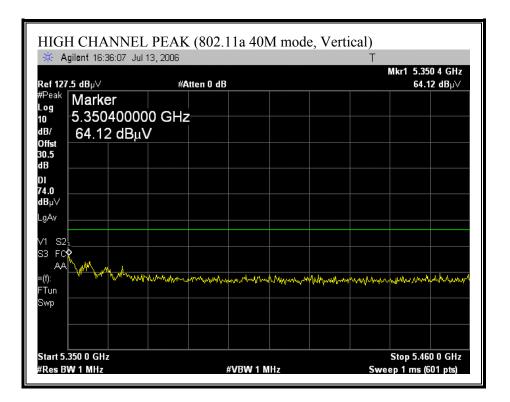
RESTRICTED BANDEDGE (802.11a 40M MODE, HIGH CHANNEL)



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Ref 127.5 dBµ∨	#Atten 0 dB	Mkr1 5.352 4 GHz 46.09 dBμ∀
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Agilent 16:35:30 Jul 13	, 2000	
127.5 dBµ∨	#Atten 0 dB	Mkr1 5.355 9 GH 48.72 dBµ∖
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5.355900000		
48.72 dBμV		
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#### HARMONICS AND SPURIOUS EMISSIONS (802.11a 40M MODE)

5.570         3.0         51.6         38.3         38.0         6.2         41.3         0.0         0.0         54.6         41.3         74         54         -19.4         -12.7         V, Settings: 5D 60           5570         3.0         50.9         37.6         38.0         6.2         41.3         0.0         0.0         53.9         40.6         74         54         -19.4         -12.7         V, Settings: 5D 60           liddle Channel (5270 MHz)	Company Project # Date: Cest Eng Configur /N: Aode: <u>Cest Equ</u>	ineer: ation: ipment:	-	Marvell 06U10412 07/18/06 Frank Ibrahin EUT with PIF 010 Continuously	⁷ A Antenn Transmitti	ing in 11	a 40M mo	ode, 9Mbps			1		orm > 194	CU-		
If Frequency Cables         2 foot cable       3 foot cable       12 foot cable       HPF       Reject Filter       Peak Measurements RBW=VBW=1MHz         6       Dist       Read Avg.       AF       CL       Amp       D Corr       Fitr       Peak       Avg       Peak       Masurements RBW=1MHz       Notes         6       Dist       Read Avg.       AF       CL       Amp       D Corr       Fitr       Peak       Avg       Peak       Mar       Avg Mar       Notes         6       Dist       Read Avg.       AF       CL       Amp       D Corr       Fitr       Peak       Avg       Mar       Avg Mar       Notes         5570       3.0       51.6       38.3       38.0       6.2       41.3       0.0       0.0       54.6       41.3       74       54       -19.4       -12.5       V, Settings: 50 60       55.70         5310       3.0       51.5       38.2       37.9       6.3       41.2       0.0       0.0       54.5       41.2       74       54       -19.4       -12.5       V, Settings: 60 6F       53.0         5410       3.0       51.5       38.2       37.9       6.3       41.2       0.0<								Pre-am	pliter		Т89				-	
Frank 177080001         Frank 187209001         R_001         R_001         RBW=VBW=1MHz           Average Measurements RBW=1MHz         Notes         Notes         Notes           GHz         (m)         dBuV         dBm/dB         dB         dB <th< th=""><th></th><th></th><th></th><th></th><th>3 foot c</th><th>able</th><th></th><th>12</th><th>foot c</th><th>_</th><th></th><th>HPF</th><th>Re</th><th>ect Filte</th><th>er l</th><th></th></th<>					3 foot c	able		12	foot c	_		HPF	Re	ect Filte	er l	
GHz         (m)         dBuV         dBm/d         dB         (V/H)           ow Channel (5190 MHz)         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -				Fran	k 177080	001	•	Frank 1	1872090	001				·	-	Average Measurements
ow Channel (5190 MHz)         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o         o																
fiddle Channel (5270 MHz)         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         54.0         0         0         0         0         54.2         41.5         74         54         -19.8         -12.5         V, Settings: 60 6F           5.810         3.0         51.5         38.2         37.9         6.3         41.2         0.0         0.0         54.5         41.2         74         54         -19.8         -12.8         H, Settings: 60 6F         50.60         50.60         51.5         38.2         74         54         -19.5         -12.8         H, Settings: 5A 5A         0.620         3.0         47.7         35.2         37.4         5.1         -39.4         0.0         0.0         50.8         38.3         74         54         -23.2         -15.7         H, Settings: 5A 5A           0.620         3.0         47.7         35.2         37.4         5.1         -39.4         0.0         0.0	.ow Char 5.570	nel (519 3.0	0 MHz) 51.6	38.3	38.0	6.2	-41.3	0.0	0.0	54.6	41.3	74	54	-19.4	-12.7	V, Settings: 5D 60
5.810         3.0         51.5         38.2         37.9         6.3         41.2         0.0         0.0         54.5         41.2         74         54         -19.5         -12.8         H, Settings: 6D 6F           ligh Channel (5310 MHz)         0         0.0         54.5         41.2         74         54         -19.5         -12.8         H, Settings: 6D 6F           ligh Channel (5310 MHz)         0         48.5         35.1         37.4         5.1         -39.4         0.0         0.0         51.5         38.2         74         54         -22.5         -15.8         V, Settings: 5A 5A           0.620         3.0         47.7         35.2         37.4         5.1         -39.4         0.0         0.0         50.8         38.3         74         54         -23.2         -15.7         H, Settings: 5A 5A           0.620         3.0         47.7         35.2         37.4         5.1         -39.4         0.0         0.0         50.8         38.3         74         54         -23.2         -15.7         H, Settings: 5A 5A           0.620         3.0         47.7         35.2         37.4         5.1         -39.4         0.0         0.0         50.8	fiddle Cl	hannel (5	5270 MHz)													
0.620         3.0         48.5         35.1         37.4         5.1         -39.4         0.0         0.0         51.5         38.2         74         54         -22.5         -15.8         V, Settings: 5A.5A           0.620         3.0         47.7         35.2         37.4         5.1         -39.4         0.0         0.0         50.8         38.3         74         54         -22.2         -15.7         H, Settings: 5A.5A           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           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average Limit           CL         Cable Loss         HPF         High Pass Filter         Pk Mar         Margin vs. Peak Limit	5.810	3.0	51.5													V, Settings: 6D 6F H, Settings: 6D 6F
fMeasurement FrequencyAmpPreamp GainAvg LimAverage Field Strength LimitDistDistance to AntennaD CorrDistance Correct to 3 metersPk LimPeak Field Strength LimitReadAnalyzer ReadingAvgAverage Field Strength (@ 3 m)Avg Mar Margin vs. Average LimitAFAntenna FactorPeakCalculated Peak Field StrengthPk MarMargin vs. Peak LimitCLCable LossHPFHigh Pass FilterPk MarMargin vs. Peak Limit	0.620	3.0	48.5	35.1	37.4	5.1	-39.4	0.0	0.0	51.5	38.2	74	54	-22.5	-15.8	V, Settings: 5A 5A
UT was scanned from 1 GHz to 40 GHz, no other signals from EUT were detected above the noise floor.		Read	Analyzer	leading			Avg	Average	Field S	Strength @						Limit
		AF	Antenna F	actor			Peak	Calculate	ed Peal	c Field Stre	3 m		Avg Mar	Margin vs	s. Average	

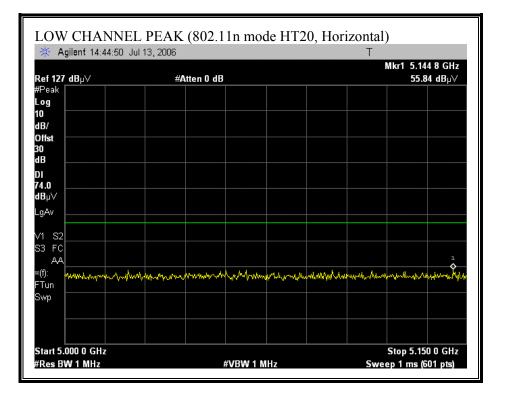
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#### REPORT NO: 06U10412-2 EUT: MC85 MINI CARD 11b/g/a/n RADIO CARD

High Frequency				
	/ Measurement Services, Morgan Hill Open Fiel	d Site		
Company: Project #: Date: Fest Engineer:	Marvell 06U10412 07/18/06 Frank Ibrahim			
Configuration: S/N:	EUT with PIFA Antenna inside Apple L 010			
Mode:	Continuously Transmitting in 11a 40M r	node, 9Mbps		
<u>Fest Equipment:</u>	1			
Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	
T60; S/N: 2238 @3m	T87 Miteq 924342		•	
2 foot cable	3 foot cable	12 foot cable	HPF Reject Filter	Peak Measurements RBW=VBW=1MHz
	Frank 177080001	Frank 187209001	- R_001 -	<u>Average Measurements</u> RBW=1MHz ; VBW=10Hz
f Dist Read Pk			Pk Lim Avg Lim Pk Mar Avg Ma	
GHz     (m)     dBuV       Middle Channel (5270 MHz)	dBuV dB/m dB dB	dB dB dBm dBm	dBm dBm dB dB	(V/H)
10.540         3.0         56.0           10.540         3.0         48.8	43.3         37.4         5.1         -39.3           35.2         37.4         5.1         -39.3		-7.0         -27.0         -29.1         -21.8           -7.0         -27.0         -36.3         -29.9	V, Settings: 6D 6F H, Settings: 6D 6F
AF Antenna F CL Cable Loss		Calculated Peak Field Strength High Pass Filter	Pk Mar Margin vs. Peak Lir	

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#### RESTRICTED BANDEDGE (802.11n MODE HT20, LOW CHANNEL)



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Agilent 14:44:20			•	Mkr1 5.018 5 GHz		
f 127 dBµ∀	#Atten 0 dE	3		43.80 dBµ∀		
eak Marker						
⁹ F 040500						
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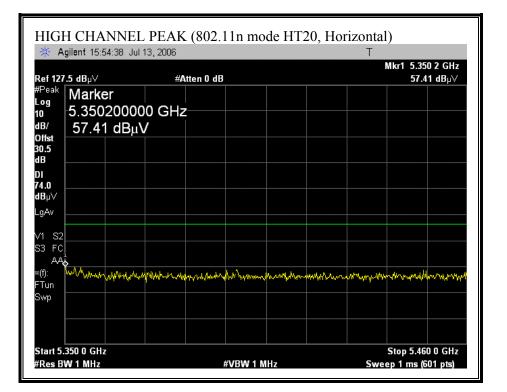
					Mkr1 5.11	
lef 127 dBµ∨ Peak	#Atte	en 0 dB			57.1	5 dBµ∨
o" ∣5.117000	000 GHz-					
^{B/} 57.15 dE	3μV					
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B						
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Ref 127 dBµ∀	#Atten 0 dB	Mkr1 5.150 0 GHz 44.98 dBµ∀
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Swp		

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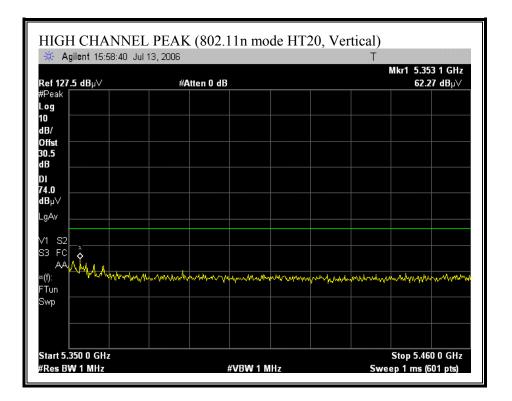
#### RESTRICTED BANDEDGE (802.11n MODE HT20, HIGH CHANNEL)



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	, 2006	Mkr1 5.350 0 G
27.5 dBµ∀	#Atten 0 dB	MKT 5.350 0 Gi 46.23 dBµ
Marker	matterio do	40.23 00
warker		
5.350000000	GHz	
46.23 dBμV		
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Ref 127.5 dBµ∨	#Atten 0 dB	Mkr1 5.351 5 GHz 48.38 dBμ∀
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IBµ∨		
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11 S2		
(f):		
Tun 💊		
Swp		

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#### HARMONICS AND SPURIOUS EMISSIONS (802.11n MODE HT20)

	: ineer: ation: ipment:	<u>.</u>	06U10412 07/18/06 Frank Ibrahim EUT with PIF. 010 Continuously	A Antenna Transmitti	ing in H	T 20M mc	ode, MCS0			1					
	orn 1-1 /N: 2238	8GHz @3m		mplifer iteq 924:		Hz T	Pre-am	plifer 2	26-40GHz	T 700	H ; ARA 18-2	orn > 180 6GHz; S/N:		-	
	uency Cab	es		3 foot c	ahle		121	foot c			HPF	D	ject Filte	_	Peak Measurements
	2 1001			k 177080		-	Frank 1						.001	-	RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr		Peak	Avg	Pk Lim	Avg Lim		Avg Mar	Notes
GHz		dBuV 0 MHz)	dBuV	dB/m 38.0	dB	dB -41.3	dB 0.0	dB 0.0	dBuV/m	dBuV/m	dBuV/m		dB	dB	(V/H)
5.540 5.540 liddle Cl	3.0 3.0	50.6 51.7 5260 MHz)	37.6 38.4	38.0 38.0	6.2 6.2	-41.3 -41.3	0.0	0.0	53.5 54.7	40.6 41.4	74 74	54 54	-20.5 -19.3	-13.4 -12.6	V, Settings: 68 5B H, Settings: 68 5B
5.780 5.780	3.0 3.0	50.5 50.7	37.9 37.8	37.9 37.9	6.3 6.3	-41.2 -41.2	0.0 0.0	0.0 0.0	53.5 53.7	40.9 40.8	74 74	54 54	-20.5 -20.3	-13.1 -13.2	V, Settings: 69 6B H, Settings: 69 6B
igh Chai ).640 ).640	nnel (532 3.0 3.0	20 MHz) 49.8 48.3	37.8 36.4	37.3 37.3	5.1 5.1	-39.4 -39.4	0.0	0.0	52.9 51.4	40.9 39.5	74 74	54 54	-21.1 -22.6	-13.1 -14.5	V, Settings: 5F 60 H, Settings: 5F 60
	AF	Distance to Analyzer R Antenna Fa	actor			Avg Peak	Calculate	ed Peal	Strength @ Field Stre					s. Average I s. Peak Lim	
UT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	ier signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
JT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	1er signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
UT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	er signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
UT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	ier signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
UT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	ier signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
UT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	ier signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
UJT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	her signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		
UT was s	Read AF CL	Analyzer R Antenna Fa Cable Loss	actor	her signals	s from E	Peak HPF	Calculate High Pas	ed Peal ss Filte	Strength @ Field Stre	3 m			Margin v		

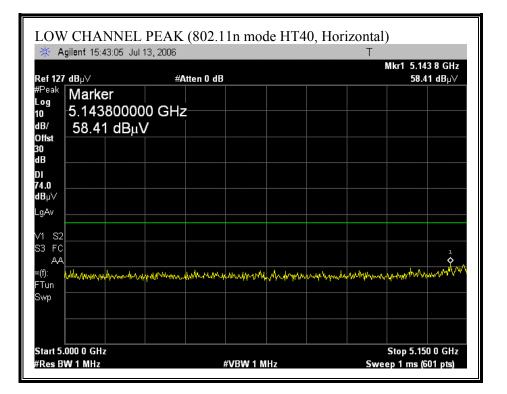
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#### REPORT NO: 06U10412-2 EUT: MC85 MINI CARD 11b/g/a/n RADIO CARD

High Frequency				
Compliance Certification	' Measurement Services, Morgan Hill Open Fiel	d Site		
Company: Project #: Date: Test Engineer: Configuration: S/N: Mode:	Marvell 06U10412 07/18/06 Frank Ibrahim EUT with PIFA Antenna inside Apple I 010 Continuously Transmitting in HT 20M 1			
Test Equipment:				
Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	
T60; S/N: 2238 @3m	T87 Miteq 924342 🗸		•	
Hi Frequency Cables	3 foot cable	12 foot cable	HPF Reject Filter	<u>Peak Measurements</u> RBW=VBW=1MHz
	Frank 177080001	Frank 187209001		<u>Average Measurements</u> RBW=1MHz ; VBW=10Hz
f Dist Read Pk GHz (m) dBuV	Read Avg. AF CL Amj dBuV dB/m dB dB		Pk Lim Avg Lim Pk Mar Avg Ma dBm dBm dB dB	
GHz         (m)         dBuV           Middle Channel (5260 MHz)         10.520         3.0         57.8	dBuv         dB/m         dB         dB           44.0         37.4         5.1         -39.3		dBm         dBm         dB         dB           -7.0         -27.0         -27.3         -21.1	(V/H)
10.520         3.0         57.8           10.520         3.0         49.7	44.0         37.4         5.1         -39.3           35.6         37.4         5.1         -39.3	0.0         0.0         -34.3         -48.1           0.0         0.0         -42.4         -56.5	-7.0 -27.0 -27.3 -21.1 -7.0 -27.0 -35.4 -29.5	V, Settings: 69 6B H, Settings: 69 6B
Read Analyzer F AF Antenna F CL Cable Los:	actor Peak	Average Field Strength @ 3 m Calculated Peak Field Strength High Pass Filter	Avg Mar Margin vs. Average Pk Mar Margin vs. Peak Lir	

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#### RESTRICTED BANDEDGE (802.11n MODE HT40, LOW CHANNEL)



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	<b>115</b> 11 0 10	Mkr1 5.148 8 G
7 dBµ∨	#Atten 0 dB	47.60 dB
Marker		
5.148800000	GHz	
47.60 dBμV		
		┼───┼───┼───

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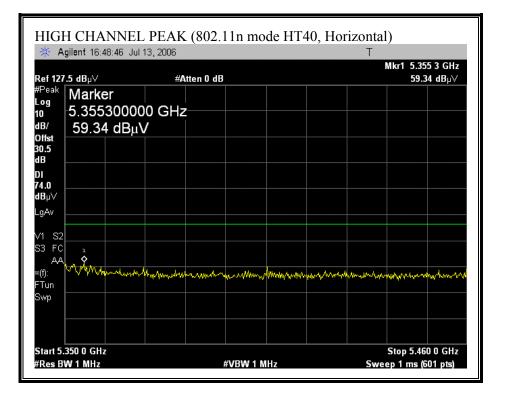
lef 127 dBµ∀		41	tten 0 dB					Mkr1 5.14	92 GHz 3dBµ∀
^{Peak} Mark og 5.149	920000	0 GHz							5 <b>U</b> Bµv
0 0 0 0 0 0 0 0	3 dBµ\ │								
B									
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Tun	Marry Marry	mhain	Manhar	mandund	MMm-MMmA	www.whith	haddened	Mary R. John	
Swp									

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		Mkr1 5.149 5 GHz
f 127 dBµ∨	#Atten 0 dB	52.53 dBµ∀
eak Marker		
⁹ 5.1495000		
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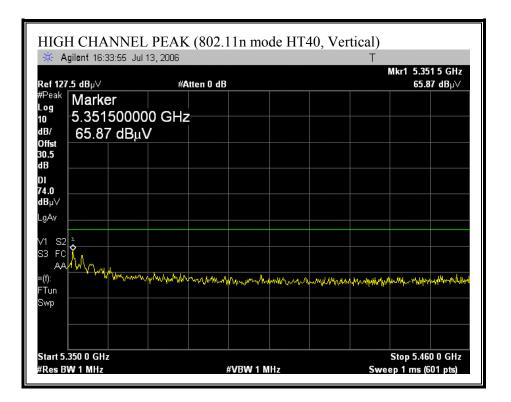
#### RESTRICTED BANDEDGE (802.11n MODE HT40, HIGH CHANNEL)



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•	, 2000	106 T						
7.5 dBµ∀	#Atten 0 dB	Mkr1 5.350 0 48.63 dl						
A andrea	#Allen 0 ub	48.85 u						
Marker								
5.350000000	GHz							
48.63 dBµV								
1								
••••••								

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🔆 Agilent 16:33:28 Ju	113,2000	R L Mkr1 5.351 5 GHz
lef 127.5 dBµ∀	#Atten 0 dB	52.60 dBµ∀
Peak		
og D		
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0.5 B		
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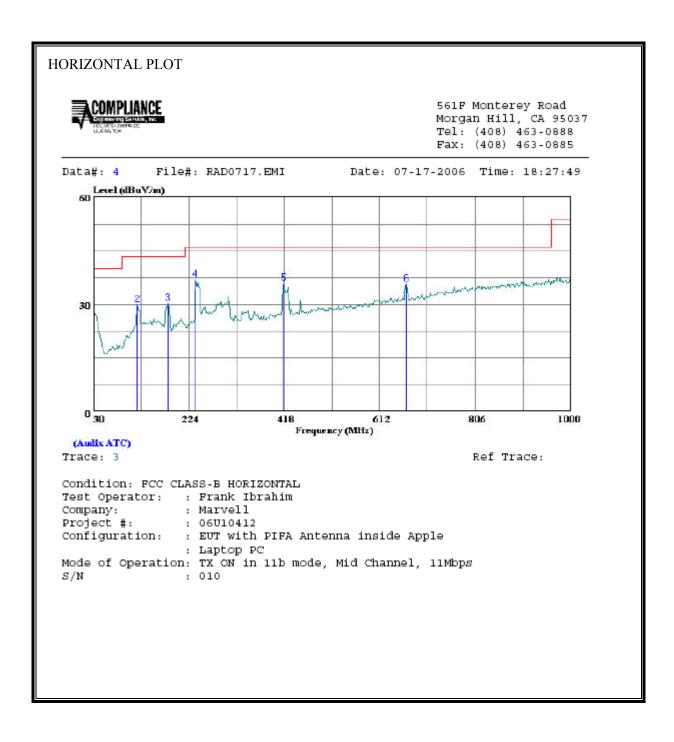
#### HARMONICS AND SPURIOUS EMISSIONS (802.11n MODE HT40)

N: lode:	: ineer: ation: ipment:		06U10412 07/18/06 Frank Ibrahim EUT with PIF, 010 Continuously 7	A Antenna											
	orn 1-1 /N: 2238	18GHz 8@3m		m <mark>plifer</mark> iteq 9243		Hz -	Pre-am	plifer 2	26-40GHz	Teo	Ho; ARA 18-20	orn > 18 6GHz; S/N:			
Hi Frequ	uency Cab	les ———				_	10		•						Del Marine de
	2 foot			6 foot ca		•	12 Frank 1	foot c	01		HPF		oo1	er	Peak Measurements RBW=VBW=1MHz Average Measurements
f	Dist		Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	RBW=1MHz ; VBW=10Hz Notes
GHz	(m)	dBuV 00 MHz)	dBuV	AF dB/m	dB	dB	dB	dB	dBuV/m	Avg dBuV/m			dB	dB	(V/H)
.570 .570	3.0 3.0	50.6 50.5 5270 MHz)	38.0 37.8	38.0 38.0	6.2 6.2	-41.3 -41.3	0.0 0.0	0.0 0.0	53.6 53.5	41.0 40.8	74 74	54 54	-20.4 -20.5	-13.0 -13.2	V, Settings: 5E 61 H, Settings: 5E 61
5.810 5.810	3.0 3.0	51.0 51.2	38.5 38.5	37.9 37.9	6.3 6.3	-41.2 -41.2	0.0 0.0	0.0 0.0	54.0 54.2	41.5 41.5	74 74	54 54	-20.0 -19.8	-12.5 -12.5	V, Settings: 6B 6D H, Settings: 6B 6D
igh Cha 0.620 0.620	nnel (53) 3.0 3.0	10 MHz) 49.0 48.1	36.3 36.5	37.4 37.4	5.1 5.1	-39.4 -39.4	0.0	0.0	52.1 51.2	39.4 39.6	74 74	54 54	-21.9 -22.8	-14.6 -14.4	V, Settings: 5E 5E H, Settings: 5E 5E
		Distance to Analyzer R	Reading			Avg	Average	Field S	t to 3 mete strength @	3 m			Margin v	d Strength I s. Average I	Limit
	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor			Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m			Margin v		Limit
JT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	ier signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit
JT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	ier signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit
JT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	ier signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit
JT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	er signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit
JT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	ier signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit
JJT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	ier signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit
JT was s	Dist Read AF CL	Analyzer R Antenna Fa Cable Loss	Reading actor	ner signals		Avg Peak HPF	Average Calculate High Pas	Field S ed Peak ss Filter	Strength @ Field Stre	3 m		Avg Mar	Margin v	s. Average l	Limit

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# 7.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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



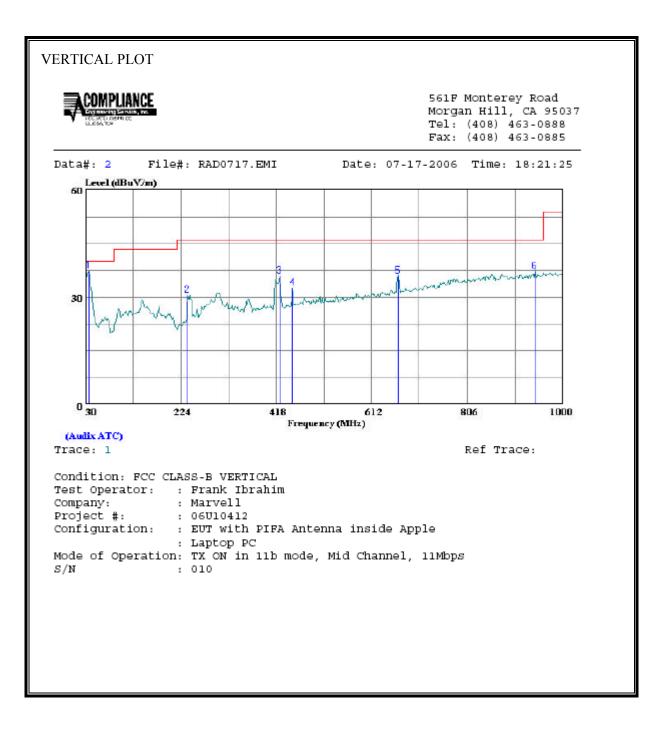
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#### REPORT NO: 06U10412-2 EUT: MC85 MINI CARD 11b/g/a/n RADIO CARD

HORIZO	ONTAL DATA						
	Freq	Read Level	Factor	Level	Limit Line		Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 2 3 4 5 6	30.000 119.240 182.290 237.580 417.030 667.290	17.50	15.05 12.95 13.39 18.47	29.84 30.24 37.01 35.97	40.00 43.50 46.00 46.00 46.00	-13.66 -13.26 -8.99 -10.03	Peak Peak Peak Peak

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



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Freq         Read Level         Factor         Level         Limit         Over Limit         Remark           MHz         dBuV         dB         dBuV/m         dBuV/m         dB         dBuV/m         dB           1         35.820         18.71         18.58         37.29         40.00         -2.71         Peak           2         237.580         17.17         13.39         30.56         46.00         -15.44         Peak           3         424.790         17.21         18.64         35.85         46.00         -10.15         Peak           4         450.980         13.31         19.20         32.51         46.00         -13.49         Peak           5         666.320         13.26         22.64         35.91         46.00         -10.09         Peak           6         942.770         10.70         26.43         37.13         46.00         -8.87         Peak	VERTI	CAL DATA						
1 35.820 18.71 18.58 37.29 40.00 -2.71 Peak 2 237.580 17.17 13.39 30.56 46.00 -15.44 Peak 3 424.790 17.21 18.64 35.85 46.00 -10.15 Peak 4 450.980 13.31 19.20 32.51 46.00 -13.49 Peak 5 666.320 13.26 22.64 35.91 46.00 -10.09 Peak		<u> </u>	Level			Line	Limit	Remark 
	2 3 4 5	35.820 237.580 424.790 450.980 666.320	18.71 17.17 17.21 13.31 13.26	18.58 13.39 18.64 19.20 22.64	37.29 30.56 35.85 32.51 35.91	40.00 46.00 46.00 46.00 46.00	-2.71 -15.44 -10.15 -13.49 -10.09	Peak Peak Peak Peak

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# 7.3. POWERLINE CONDUCTED EMISSIONS

## <u>LIMIT</u>

\$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  $\mu$ 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:

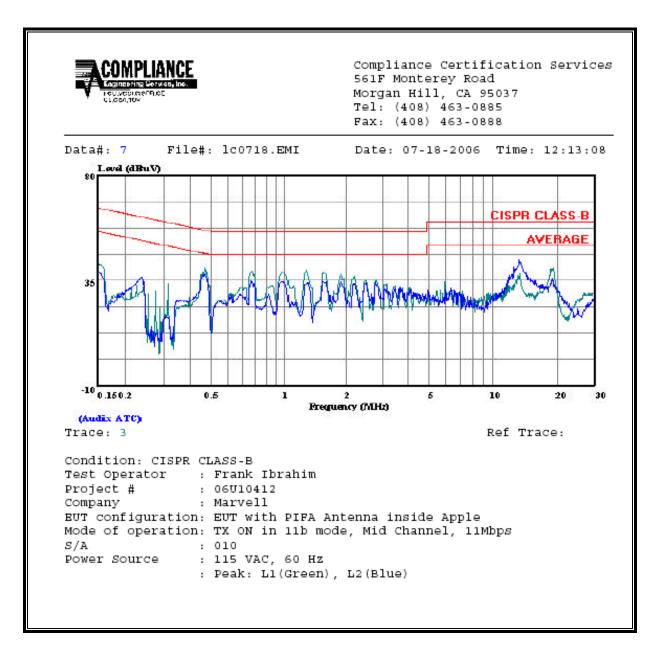
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#### **<u>6 WORST EMISSIONS</u>**

Freq.	Reading Close		Closs	Limit	EN_B	Mar	Remark		
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.47	40.28			0.00	56.58	46.58	-16.30	-6.30	L1
1.38	39.58			0.00	56.00	46.00	-16.42	-6.42	L1
19.22	40.40			0.00	60.00	50.00	-19.60	-9.60	L1
0.47	37.38			0.00	56.58	46.58	-19.20	-9.20	L2
0.76	34.62			0.00	56.00	46.00	-21.38	-11.38	L2
13.34	43.78			0.00	60.00	50.00	-16.22	-6.22	L2
6 Worst I	Data								

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#### LINE 1 AND LINE 2 RESULTS



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# 8. SETUP PHOTOS

# RADIATED RF MEASUREMENT SETUP



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#### POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



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# **END OF REPORT**

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