

FCC Test Report Test report no.: EMC 573FCC15.407 2003 5745 5805

FCC Part 15.407 for UNII Devices / CANADA RSS-210 Issue 5 for LELEAN Devices

EUT: WLAN Model: BCM94309MP HOST: Dell Laptop Model: PP05X FCC ID: QDS-BRCM1007



🛞 Bluetooth

Bluetooth Qualification Test Facility (BQTF)



FCC listed # 101450

IC recognized # 3925

CETECOM Inc.

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1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

TEST REPORT PREPARED BY: EMC Engineer: Harpreet Sidhu

1.2 Testing laboratory CETECOM Inc. 411 Dixon Landing Road, Milpitas, CA-95035, USA Phone: +1 408 586 6200 Fax: +1 408 586 6299 E-mail: <u>lothar.schmidt@cetecomusa.com</u> Internet: <u>www.cetecom.com</u>



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1.3 Details of applicant

Name	:		Broadcom corporation			
Street	:		190 Mathilda Place			
City / Zip Code :			Sunnyvale, CA 94086			
Country	:		USA			
Contact	:		Dan Lawless			
Telephone	:		408-922-5870			
Tele-fax	:		408-543-3399			
e-mail	:		<u>dlawless@broadcom.com</u>			
1.4 Application detai	ils					
Date of receipt test item		:	2003-11-11			
Date of test		:	2003-11-12 to 2003-11-19, 2003-12-19			
1.5 Test item						
Manufacturer	:		Applicant			
Model No. (EUT)	:		BCM94309MP			
Model No. (Host)	:		PP05X (Dell Laptop)			
Description	:		WLAN MiniPCI Multiband card incorporating 2.4GHz and			
			5GHz radios			
FCC ID	:		QDS-BRCM1007			
Additional information						
Frequency	:		2412MHz – 2462MHz for 2.4GHz band			
			5180MHz -5320MHz, 5745MHz - 5805MHz for 5GHz band			
Type of modulation	:		DSSS / OFDM (orthogonal frequency division multiplexing)			
Number of channels	:		11 for 2.4GHz band			
			8 for lower and middle bands, 4 for upper band of 5GHz band			
Antenna	:		5.6dBi max. gain antenna for 5GHz band			
			(Hitachi model HFT01-DL01)			
Power supply	:		3.3 VDC from Host			
Output power :			20.5dBm conducted peak power			
Extreme temp. Tolerance	:		0° C to $+70^{\circ}$ C			
1.6 Test standa	rds:		FCC Part 15 §15.247 / CANADA RSS-210 Measurements done as per DA 02-2138			



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PROJECT OVERVIEW:

A class-2 permissive change is being proposed to FCC ID: QDS-BRCM1007 for following two changes;

1) Addition of new version of WLAN radio module model# BCM94309MP (See *Manufacturer's Declaration*)

2) Adding new freq. range of 5745MHz to 5805MHz

This test report covers full testing as per FCC 15.407 (DA 02-2138) on WLAN model# BCM94309MP in laptop model# PP05X in frequency range of 5745MHz to 5805MHz. WLAN was tested at different data rates. Test report shows only worst-case test results of all data rates.

For test results in Lower and Middle bands (5180 to 5320MHz) please refer to test report# EMC_573FCC15.407_2003

For test results in 2.4GHz band please refer to test report# EMC_573FCC15.247_2003



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2 **Technical test**

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Summary of test results 2.1

No deviations from the technical specification(s) were ascertained in the course of the tests Performed			
Final Verdict: (Only "passed" if all single measurements are "passed")	Passed		

Technical responsibility for area of testing:

		Siegfried Lehmann	Saffred bellacon
2004-01-16	EMC & Radio	(Technical Manager)	V

Date Section Name

Signature

Responsible for test report and project leader:

Date

2004-01-16

Section

EMC & Radio

Harpreet Sidhu (EMC Engineer) Name

Signature



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2.2 Test report

TEST REPORT

Test report no.: EMC_573FCC15.407_2003_5745_5805

FCC Part 15.407 for UNII Devices / CANADA RSS-210



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TEST REPORT REFERENCE

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EMISSION BANDWIDTH

§15.407(a)(3)

26dB bandwidth (Data rate – 6Mbps)

6Mbps is found to be worst-case for this measurement. Following method as defined in DA 02-2138 was used for this measurement.

Test Procedure:

- Use a RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW
- Use a peak detector
- Do not use the max hold function. Rather, use the view button to capture the emission.
- Measure the maximum width of the emission that is 26dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Test Results

TEST CONDITIONS		26 dB BANDWIDTH (MHz)	
Frequency (MHz)		5745	5805
T _{nom} (23)°C	V _{nom} (3.3) VDC	40.38	41.48

LIMIT

SUBCLAUSE §15.401(c)

Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

ANALYZER SETTINGS: RBW=300KHz, VBW=1MHz





§15.407(a)(3)

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EMISSION BANDWIDTH 26 dB bandwidth (Data rate – 6Mbps)

Lowest Channel: 5745MHz







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§15.407(a)(3)

EMISSION BANDWIDTH 26 dB bandwidth (Data rate – 6Mbps)

Highest Channel: 5805MHz







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99% POWER BANDWIDTH 20 dB bandwidth (Data rate – 6Mbps) RSS-210 §6.2.2(q1)(iii)

Test Results

TEST CONDITIONS		20 dB BANDW	/IDTH (MHz)
Frequer	ncy (MHz)	5745	5805
T _{nom} (23)°C	V _{nom} (3.3) VDC	28.55	30.76

ANALYZER SETTINGS: RBW=300KHz, VBW=1MHz



RSS-210 §6.2.2(q1)(iii)

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99% POWER BANDWIDTH 20 dB bandwidth (Data rate – 6Mbps)

Lowest Channel: 5745MHz





RSS-210 §6.2.2(q1)(iii)

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99% POWER BANDWIDTH 20 dB bandwidth (Data rate – 6Mbps)

Highest Channel: 5805MHz



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PEAK OUTPUT POWER (Conducted)

(Data rate – 54Mbps)

54Mbps is found to be worst-case for peak output power.

Test Procedure:

In original equipment authorization peak output power measurements were done using peak power meter; therefore same method has been adopted this time in order to keep consistency in test method.

Test Results

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)			5745	5805
T _{nom} (23)°C	(23)°C V _{nom} (3.3) VDC		*20.5	*20.45
Measurement uncertainty			±0.5	dBm

*Measurements done using peak power meter.

LIMIT	SUBCLAUSE § 15.407 (a)(1)(2)(3)
Frequency range (GHz)	Conducted Peak Power
5.15 - 5.25	17dBm
5.25 - 5.35	24dBm
5.725 - 5.825	30dBm



§ 15.407 (a)(3)



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MAXIMUM PEAK OUTPUT POWER§ 15.407 (a)(3)(RADIATED)(Data rate - 54Mbps)54Mbps is found to be worst-case for peak output power.EIRP:

Test Results

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		5745	5805	
$T_{nom}(23)^{\circ}C \qquad V_{nom}(3.3) \text{ VDC}$		*26.1 *26.05		
Measurement uncertainty			±0.5dBm	

*Note: EIRP is calculated based on 5.6dBi antenna gain and conducted peak power measurements.

LIMIT

SUBCLAUSE § 15.407 (a)(1)(2)(3)

Frequency range (GHz)	Conducted Peak Power		
5.15 - 5.25	17dBm		
5.25 - 5.35	24dBm		
5.725 - 5.825	30dBm		
If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak spectral density shall be reduced by the amount in dB that the directional gain of the enterna succeeds (dDi			

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PEAK POWER SPECTRAL DENSITY

§15.407 (a)(3)(5)

(Data rate – 6Mbps)

6Mbps is found to be worst-case data rate for Power spectral density. Method-2 from DA 02-2138 was used for this measurement.

Test Procedure (Method-2):

Use sample detector and power averaging (not video averaging) mode. Set RBW=1MHz, VBW>1MHz. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging. This method is permitted only if the transmission pulse or sequence of pulses remains at maximum transmit power throughout each of the 100 sweeps of averaging and that the interval between pulses is not included in any of the sweeps. (e.g.; 100 sweeps occur during one transmission, or each sweep gated to occur during a transmission)

Test Results

TEST CONDITIONS		POWER SPECTRAL DENSITY (dBm)		
Frequency (MHz)		5745	5805	
T _{nom} (23)°C	V _{nom} (3.3) VDC	5.08	4.64	

LIMIT	SUBCLAUSE § 15.407 (a)(1)(2)				
Frequency range (GHz)	Conducted Peak Power				
5.15 - 5.25	4dBm in any 1MHz band				
5.25 - 5.35	11dBm in any 1MHz band				
5.725 - 5.825	17dBm in any 1MHz band				
If transmitting antennas of directional gain greater that	an 6dBi are used, both the peak transmit				
power and the peak spectral density shall be reduced by the amount in dB that the directional					
gain of the antenna exceeds 6dBi					
ANALYZER SETTINGS: RBW=1MHz, VBW=3MHz					





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POWER SPECTRAL DENSITY (Data rate – 6Mbps)

§15.407(a)(1)(2)(5)

Lowest Channel: 5745MHz



Date: 18.NOV.2003 14:15:19



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POWER SPECTRAL DENSITY (Data rate – 6Mbps) §15.407(a)(1)(2)(5)

Highest Channel: 5805MHz





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POWER SPECTRAL DENSITY (Data rate – 6Mbps) RSS-210 §6.2.2(q1)(iii)

Test Results

TEST CO	NDITIONS	POWER SPECTRA	AL DENSITY (dBm)		
Frequen	cy (MHz)	5745 5805			
T _{nom} (23)°C	V _{nom} (3.3) VDC	5.66	5.13		

LIMIT	RSS-210				
Frequency range (GHz)	Conducted Peak Power				
5.15 - 5.25	10dBm in any 1MHz band				
5.25 - 5.35	11dBm in any 1MHz band				
5.725 - 5.825	17dBm in any 1MHz band				
If transmitting antennas of directional gain greater that	an 6dBi are used, both the peak transmit				
power and the peak spectral density shall be reduced	by the amount in dB that the directional				
gain of the antenna exceeds 6dBi					

ANALYZER SETTINGS: RBW=VBW=1MHz



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POWER SPECTRAL DENSITY (Data rate – 6Mbps)

RSS-210 §6.2.2(q1)(iii)

Lowest Channel: 5745MHz





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POWER SPECTRAL DENSITY (Data rate – 6Mbps)

RSS-210 §6.2.2(q1)(i)(ii)

Highest Channel: 5805MHz





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PEAK EXCURSION

(Data rate – 54Mbps)

54Mbps is found to be worst-case for this measurement. Following method as defined in DA 02-2138 was used for this measurement.

Test Procedure:

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be ≤ 13 dB for all frequencies across the emission bandwidth. Submit a plot.

1st Trace:

• Set RBW=1MHz, VBW≥3MHz with peak detector and max hold settings

2nd Trace:

- If method #1 was used for the peak conducted transmit output power test, then create the 2nd trace using the settings described in method #1.
- If method #2 or #3 were used for the peak conducted transmit power test, then create the 2nd trace using the settings described in method #3.

Since method #3 is applicable for measuring peak output power for EUT following analyzer settings were used;

 1^{st} Trace: RBW = 1MHz, VBW = 3MHz 2^{nd} Trace: RBW = 1MHz, VBW = 5KHz

<u>Test Results</u>

TEST CC	ONDITIONS	PEAK EXCURSION RATIO (dB)			
Freque	ncy (MHz)	5745	5805		
T _{nom} (23)°C	V _{nom} (3.3) VDC	12.25	12.18		

LIMIT

SUBCLAUSE §15.407(a)(6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth which ever is less.



§15.407 (a)(6)



§15.407 (a)(6)

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PEAK EXCURSION (Data rate – 54Mbps) Lowest Channel: 5745MHz







§15.407 (a)(6)

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PEAK EXCURSION (Data rate – 54Mbps) Highest Channel: 5805MHz





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BAND EDGE COMPLIANCE (Data rate – 54Mbps)

§15.407 (b)(3)(4)(6)

Low frequency section (Average measurement)

Antenna: EUT plane:		Horizontal Horizontal	with screen	vertical @ 90	o	
Operating co SWEEP TAP Limit Line he	ndition BLE orizontal	:	Tx at 5745] "FCC15.40 54dBμV	MHz 17 LBE_AVG'	'	
Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
5.545 GHz	5.75 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)





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BAND EDGE COMPLIANCE (Data rate – 54Mbps)

Low frequency section (Peak measurement)

§15.407 (b)(3)(4)(6)

Antenna: EUT plane:		Horizontal Horizontal with screen vertical @ 90°						
Operating condition SWEEP TABLE Limit Line horizontal		:	Tx at 5745] "FCC15.40 74dBμV	x at 5745MHz FCC15.407 LBE_Pk" 4dBµV				
Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer		
5.545 GHz	5.75 GHz	MaxPeak	Coupled	1MHz	1MHz	#326 horn (dBi)		





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BAND EDGE COMPLIANCE (Data rate – 54Mbps) High frequency section (Average measurement)

§15.407 (b)(3)(4)(6)

Antenna: EUT plane:	:	Horizontal Horizontal with screen vertical @ 90°						
Operating condition SWEEP TABLE Limit Line horizontal		:	Tx at 5805 "FCC15.40 54dBμV	<u>,</u> ,,				
Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer		
5.805 GHz	6.005 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)		





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BAND EDGE COMPLIANCE (Data rate – 54Mbps) High frequency section (Peak measurement)

§15.407 (b)(3)(4)(6)

Antenna: EUT plane:		Horizontal Horizontal w	vith screen ve	rtical @ 90°		
Operating co SWEEP TAE Limit Line ho	ndition BLE orizontal	:	Tx at 5805MI "FCC15.407 74dBμV	Hz HBE_Pk"		
Start Frequency 5.8 GHz	Stop Frequency 6.005 GHz	Detector Time MaxPeak	Meas. Bandw. Coupled	RBW 1 MHz	VBW 1MHz	Transducer #326 horn (dBi)





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io iuge 2)

EMISSION LIMITATIONS Transmitter (Radiated) (Data rate – 54Mbps)

§ 15.407 (b)(3)(4)(6)

Limits		§ 15.209 / § 15.407
Freq. (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)
0.009-0.490	2400/F (kHz)	
0.490-1.750	24000/F (kHz)	
1.705-30.0	30	29.54
30-88	100	40.00
88-216	150	43.52
216-960	200	46.02
Above 960*	500	53.97
1000-40000**	2013.8	66.08

*) Limit in restricted bands

**) Limit outside restricted bands

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 40 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode unless specified with the plots.



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Transmit at	t Lowest channel	Frequency 5180MHz				
Frequency (MHz)		Level (dBµV/m)				
	Peak	Quasi-Peak	Average			
	SEE PLO	TS				
Transmit at	t Middle channel	Frequency 5260MHz	,			
Frequency (MHz)		Level (dBµV/m)				
	Peak	Quasi-Peak	Average			
Transmit at	Highest channel	Frequency 5320MHz	2			
Frequency (MHz)		Level (dBµV/m)				
	Peak	Quasi-Peak	Average			

30

20

10

30M

50M

70M

100M

Frequency [Hz]



M. Muhhu

500M

700M

1G

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EMISSIC Lowest C (Data rate	N LIMITA hannel (574 e – 54Mbps	ATIONS - 45MHz): 3 3)	Radiated (0MHz – 10	Fransmitter GHz	r) §	15.407 (b)	(3)(4)(6)		
Antenna: EUT plane:		Vertical Horizonta	l with screen	vertical @ 90	0				
Note: Thi SWEEP TA	s plot is val BLE:	l id for low "FCC 15.4	, mid, high 07 30-1G V"	channels (w	vorst-case plot)				
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW VBW	Transducer				
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186				
Freq. (MHz 37.77	2)	Pk Level (40.15	(dBµV/m)	QPk Leve 35.15	(dBµV/m)				
Marker:		37.775551 N	1Hz		40.15 dBµV/m				
Level [dE	μV/m]								
70									
60									
50									
10	\diamond								
+0						1/W			
				=		v ^m ∣).		t la 👘	L MMMMM

hrynn

200M

300M

1.0 GHz

MaxPeak

Coupled

30.0 MHz



Test report no.: EMC 573FCC15.407 2003 5745 5805 Issue date: 2004-01-16 Page 32 (49) **EMISSION LIMITATIONS - Radiated (Transmitter)** § 15.407 (b)(3)(4)(6) Lowest Channel (5745MHz): 30MHz – 1GHz (Data rate - 54Mbps) Antenna: Horizontal **EUT plane:** Horizontal with screen vertical @ 90° Note: This plot is valid for low, mid, high channels (worst-case plot) "FCC 15.407 30-1G_H" SWEEP TABLE: Start Stop Detector Meas. RBW Transducer Frequency Frequency Time VBW

100 kHz

3141-#1186



0

1G

-20



restrep	ort n	o.: EMC_57	73FCC15.407	_2003_5745_	_5805 Iss	ue date: 2004	4-01-16	Page 33 (49)
EMISS Lowest (Averag (Data r	SION t Cha e) rate -	N LIMITA annel (574 – 54Mbps	ATIONS - F (5MHz): 10)	Radiated (T GHz – 7GH	Fransmitte Iz	r)	§ 15.407	' (b)(3)(4)(6)
Antenna EUT pla	ı: ıne:		Horizontal Horizontal	with screen	vertical @ 9	0°		
Note: T SWEEP Start Frequenc 1GHz	Г he ј таві су	Deak abov LE: Stop Frequency 7.0 GHz	e the limit "FCC 15.40 Detector MaxPeak	line is the 7 1-7G" Meas. Time Coupled	carrier fre RBW 1MHz	q. VBW 10Hz	Transduce 326 horn	r
Marke	r:	5	5.749498998 (GHz		96.16 dBµ\	//m	
120	ei [aB]	µV/mJ						
100								
80								
60								
40		·····	~~~~~				*****	

2G

Frequency [Hz]

3G

4G

5Ġ

6G

7G

20

7G

8G

10G



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EMISSI(Lowest C (Data rat	DN LIMITA Channel (574 Se – 54Mbps	ATIONS - F 45MHz): 7(6)	Radiated (1 GHz – 18G	ſransmitt Hz	er)	§ 15.4	07 (b)(3)	(4)(6)
Antenna: EUT plane	:	Horizontal Horizontal	with screen	vertical @	90°			
SWEEP TA Start Frequency 7GHz	ABLE: Stop Frequency 18.0 GHz	"FCC 15.40 Detector MaxPeak	7 7-18G" Meas. Time Coupled	RBW VBW 1MHz	Transducer 326 horn			
Marker: Level [d	1 BµV/m]	1.496993988	GHz		40.48 dBµV/m	1		
70								
60								
50								
40								
30	Anton			<u>JL here</u>				~

12G

Frequency [Hz]

14G

16G

18G



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EMISSIO Highest C (Average) (Data rate)N LIMITA Jhannel (58 e – 54Mbps	ATIONS - F 05MHz): 1 5)	Radiated (1 GHz – 7Gl	[ransmitte Hz	er)	§ 15.4	407 (b)(3)(4)(6)	
Antenna: EUT plane:	:	Horizontal Horizontal	with screen	vertical @ 9	0°			
Note: The SWEEP TA	e peak abov BLE:	v e the limit "FCC 15.4(line is the a	carrier fre	eq.			
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transc	lucer	
1GHz	7.0 GHz	MaxPeak	Coupled	1MHz	10Hz	326 hc)rn	
Marker:		5.809619238 (GHz		96.99 dBµV	//m		
Level [d	BμV/m]							





Test report no.: EMC_573FCC15.407_2003_5745_5805 Issue date: 2004-01-16 Page 36 (49) **EMISSION LIMITATIONS - Radiated (Transmitter)** § 15.407 (b)(3)(4)(6) Highest Channel (5805MHz): 7GHz – 18GHz (Data rate – 54Mbps) Antenna: Horizontal **EUT plane:** Horizontal with screen vertical @ 90° SWEEP TABLE: "FCC 15.407 7-18G" Start Stop Detector Meas. RBW Transducer Frequency Frequency Time VBW 7GHz 18.0 GHz Coupled 326 horn MaxPeak 1MHz Marker: 11.607214429 GHz 43.04 dBµV/m Level [dBµV/m] 80 70 60 50 40 30 20 7G 10G 8G 12G 14G 16G 18G Frequency [Hz]

Frequency

26.5 GHz

Frequency

18GHz



Issue date: 2004-01-16 Test report no.: EMC_573FCC15.407_2003_5745_5805 Page 37 (49) **EMISSION LIMITATIONS - Radiated (Transmitter)** § 15.407 (b)(3)(4)(6) 18GHz – 26.5GHz (Data rate - 54Mbps) Antenna: Horizontal **EUT plane:** Horizontal with screen vertical @ 90° Note: This plot is valid for low & high channels (worst-case plot) SWEEP TABLE: "FCC 15.407 18-26.5G" RBW Start Stop Detector Meas. Transducer

VBW

1MHz

3160-09 horn

Time

MaxPeak

Coupled





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EMISSIC	N LIMITA	TIONS - H	Radiated (T	ransmitte	r) §	§ 15.40	07 (b)(3)(4)(6)	
26.5GHz	– 40GHz		-			-		
(Data rate	e – 54Mbps)						
Antenna:	-	Horizontal						
EUT plane:		Horizontal	with screen	vertical @ 90) °			
Note: Thi	s plot is val	id for low	& high cha	nnels (wor	st-case plot)			
SWEEP TA	BLE:	"FCC 15.40	07 26.5-40G"					
Start	Stop	Detector	Meas.	RBW	Transducer			
Frequency	Frequency		Time	VBW				
26.5GHz	40 GHz	MaxPeak	Coupled	1MHz	3160-10 horn			





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CONDUCTED EMISSIONS

§ 15.107/207

Measured with AC/DC power adapter

SWEEP TABLE: "55022 cond"

Short Descrip	otion:	EN 55022 for	r 150KHz-30N	/Hz	
Start	Stop	Detector	Meas	IF	Transducer
Frequency	Frequency		Time	Bandw.	
150.0 kHz	30.0 MHz	MaxPeak	Coupled	10 kHz	None

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002) Limit

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

* Decreases with logarithm of the frequency

ANALYZER SETTINGS: RBW = 10KHz

VBW = 10KHz





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RECEIVER SPURIOUS RADIATION

§ 15.209

Limits

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

NOTE:

The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.



§ 15.209

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RECEIVER SPURIOUS RADIATION 30MHz – 1GHz

Antenna: EUT plane:		Vertical Horizontal with screen vertical @ 90°						
SWEEP TAI	BLE:	"WLAN Sp	uri hi 30-1G"					
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW VBW	Transducer			
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186			
Freq. (MHz) 37.77		Pk Level (dBμV/m) 40.00		QPk Level (dBµV/m) 35.00				





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RECEIVER SPURIOUS RADIATION 30MHz – 1GHz

§ 15.209

	-		
Antenna:		Horizontal	

Antunna.	Horizontai
EUT plane:	Horizontal with screen vertical @ 90 $^\circ$

SWEEP TABLE:		"WLAN Sp	ouri hi 30-1G"		
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency		Time	VBW	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186





§ 15.209

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RECEIVER SPURIOUS RADIATION 1GHz – 7GHz

Antenna: EUT plane:		Horizontal Horizontal	Horizontal Horizontal with screen vertical @ 90°							
SWEEP TAI	BLE:	"WLAN Sp	uri hi 1-7G"							
Start	Stop	Detector	Meas.	RBW		Transducer				
Frequency	Frequency	Time	Bandw.		VBW					
1.0 GHz	7.0 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)				





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RECEIVER SPURIOUS RADIATION 7GHz – 18GHz

§ 15.209

Antenna: EUT plane:		Horizontal Horizontal	Horizontal Horizontal with screen vertical @ 90°					
SWEEP	TABLE:	"WLAN St	ouri hi 7-180)" 1				
Start	Stop	Detector	Meas	RBW	Tra			

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
7.0 GHz	18 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)





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RECEIVER SPURIOUS RADIATION 18GHz – 26.5GHz

§ 15.209

Antenna:	Horizontal
EUT plane:	Horizontal with screen vertical @ 90°
SWEED TARLE.	"WI AN Spuri bi 18 26 5G"

SWEEP TABLE:		WLAN Spuri ni 18-20.3G			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#141 horn (dBi)



40 GHz

26.5 GHz



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1 MHz

RECEIVER SPURIOUS RADIATION 26.5GHz – 40GHz

§ 15.209

3160-10 horn

Antenna: EUT plane: SWEEP TABLE:		Horizontal Horizontal with screen vertical @ 90°			
		"WLAN Spuri hi 26.5-40G"			
Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	

Coupled

MaxPeak





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TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Туре	Manufacturer	Serial No.
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
03	Biconilog Antenna	3141	EMCO	0005-1186
04	Horn Antenna (700M-18GHz)	SAS-200/571	AH Systems	325
05	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
06	Horn Antenna (26.5-40GHz)	3160-10	EMCO	1156
07	2-3GHz Band reject filter	BRM50701	Microtronics	6
08	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02
09	Pre-Amplifier	TS-ANA	Rohde & Schwarz	
10	Pre-Amplifier	JS4-00102600	Miteq	00616



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BLOCK DIAGRAMS Conducted Testing





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Radiated Testing



ANECHOIC CHAMBER