

**TEST REPORT**

Report Number: 3107209ATL-014

November 29, 2006

**Product Designation: Wireless Gateway 2.4**

Standard: FCC Part 15, ICES-003, EN 55022:1998+A1:2000 +A2:2003

Tested by:

Intertek Testing Services NA Inc.  
1950 Evergreen Blvd., Suite 100  
Duluth, GA 30096

Client:

BodyMedia, Inc.  
4 Smithfield Street  
Suite 1200  
Pittsburgh, PA 15222  
Contact: Scott Boehmke  
Phone: 412.288.9901  
Fax: 412.288.9902

Tests performed by:



Shawn K. McGuinness  
EMC Project Engineer

Report reviewed by:



David J. Schramm  
EMC Department Manager

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## 1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

## 2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	Conducted emissions on AC power lines (Conducted Emissions)	11/08/2006	PASS
6.0	Radiated emissions (E-field) (Radiated Emissions)	11/08/2006	PASS
7.0	Revision History (Revision History)		

### 3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Wireless Gateway	BodyMedia	Wireless Gateway 2.4	Prototype
AC Power Supply	BodyMedia	AD-405U-1055	Not labeled
EUT receive date:			10-25-2006
EUT receive condition:			Prototype/good

Description of EUT provided by Client:

The EUT is a wireless central data collection point used to process physiological data from a data communicator. The processor has an integrated 2.4GHz RF transceiver. It is a synthesizer baser transceiver with a 26MHz 10ppm crystal source which serves as the clock source for the CPU, serial port, Serial EEPROM and the 2.4GHz radio. The transceiver is intended to operate with < 1mW output power at the antenna.

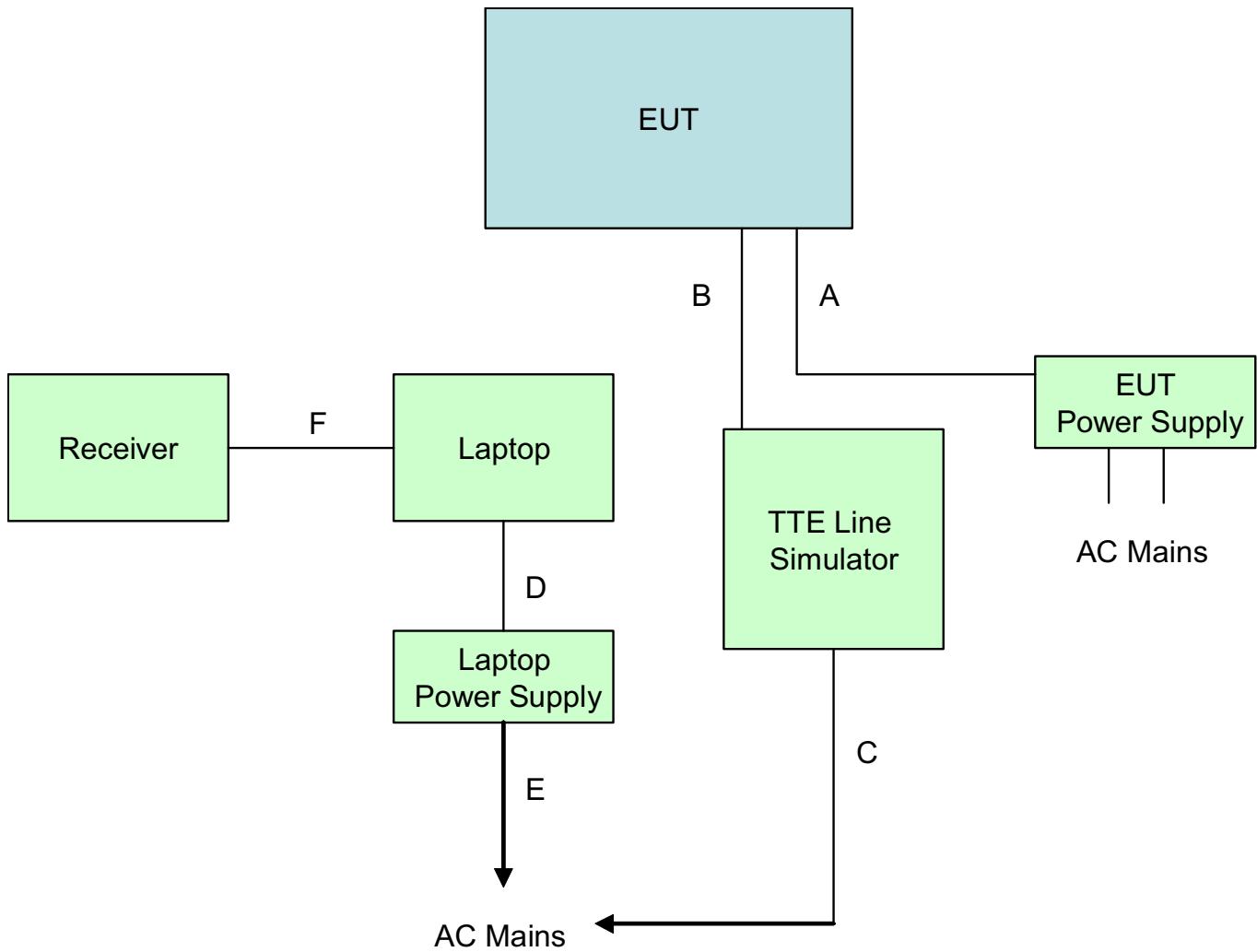
Description of EUT exercising:

The EUT was tested in transmit mode. When tested in transmit mode the EUT was tested in its mid channel setting. EUT transmit output power was set to its maximum programmable setting.

#### 4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

**Method:**

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

**Photo:**

EUT Set up block diagram

#### 4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

**Data:**

EUT Cabling						
ID	Description	Length	Shielding	Ferrites	Connection	
					From	To
A	Power Cord	1.8m	No	No	EUT	AC Mains
B	RJ11	1.5m	No	No	EUT	Line Simulator
C	Power Cord	1.5m	No	No	Line Simulator	AC Mains
D	Power Cord	2m	No	Yes	Laptop	Laptop Power Supply
E	Power Cord	2m	No	No	Laptop Power Supply	AC Mains
F	USB	1.5m	No	Yes	Laptop	Receiver

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Line Simulator	Teltone	TLS-5	99784
Laptop	Compaq	Evo N620c	CNU3400PHK
Laptop Power Supply	Compaq	1X1559556LC	5482AOALLMJC
Receiver	Bodymedia	Bodybugg	6256798

## 5.0 Conducted emissions on AC power lines (Conducted Emissions)

### Method:

Equipment setup for conducted disturbance tests shall follow the guidelines of ANSI C63.4:2003, EN 55022:1998 +A1:2000 +A2:2003.

Measurements in the frequency range of 150kHz to 30 MHz shall be performed with a quasi-peak or average detector instrument that meets the requirements of Section One of CISPR 16. An AMN shall be used to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN defined in CISPR 16 shall be used.

In the frequency range of 150 kHz to 30 MHz, a resolution/video bandwidth of 9kHz/30kHz or greater shall be used.

The EUT shall be located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

If a flexible mains cord is provided by the manufacturer that is in excess of 1m, the excess cable shall be folded back and forth as far as possible to form a bundle not exceeding 0.4m in length.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance shall be measured between each current carrying conductor and the reference ground. Each measured values shall be reported.

If EUT is intended for tabletop use, the EUT shall be placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is to be placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the floor standing EUT shall be placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material. The metal ground plane shall extend at least 0.5m beyond the boundaries of the EUT and had minimum dimensions of 2m by 2m.

### TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

### MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of k=2.

150 kHz to 30 MHz: +/- 2.8 dB

### Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable TT5	Andrews	Cable TT5	211405	05/11/2006	05/11/2007
Coaxial Cable, 6ft, N(Male) to N(Male)	Mini-Circuits	CBL-6FT-NMNM	TT1	05/11/2006	05/11/2007
EMI Receiver	Hewlett Packard	8546A	211388	08/04/2006	08/04/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	211389	08/04/2006	08/04/2007
Excel spreadsheet for conducted emissions tests	Intertek Software	SW (CE Worksheet	SW002	08/01/2006	08/01/2007
LISN (TT5)	Fischer Custom Comm	FCC-LISN-50-50-M	211407	08/04/2006	08/04/2007
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

**Results: The sample tested was found to Comply.**

## 5.0 Conducted emissions on AC power lines (Conducted Emissions)

**Photo:**



Test set up front

## 5.0 Conducted emissions on AC power lines (Conducted Emissions)

**Photo:**



Test set up rear

**5.0 Conducted emissions on AC power lines (Conducted Emissions)****Data:**

Conducted Emissions Summary			
Rule Part	Limit	Input Voltage	Result
FCC Part 15.107	CISPR Class B	120 Vac / 60 Hz	Pass
EN 55022 Section 9	CISPR Class B	230 Vac / 50 Hz	Pass
AS/NZS CISPR 22 Section 9	CISPR Class B	230 Vac / 50 Hz	Pass

## 5.0 Conducted emissions on AC power lines (Conducted Emissions)

### Data:

**Client:** Bodymedia

**Model Number:** Wireless Gateway

**Project Number:** 3107209

**Tested By:** RCB

**Date:** 11/8/2006

**Frequency Range (MHz):** .150-30

**Input power:** 120 Vac / 60 Hz

**Receiver:** HP 8546A

**Cables:** TT1+TT5

**LISN 1:** TT5 LISN Line 1

**LISN 2:** TT5 LISN Line 2

**Limit:** CISPR Class B

**Modifications for compliance (y/n):** N

A	B	C	D	E	F	G	H	I
LISN Number 1,2	Detector (P,QP,A)	Frequency MHz	Reading dBuV	Cable Loss dB	LISN Ins. Loss dB	Net dBuV	Limit dBuV	Margin dB
1	QP	0.223	44.0	0.6	6.1	50.7	62.8	-12.1
1	A	0.223	37.6	0.6	6.1	44.3	52.8	-8.5
1	QP	0.281	48.3	0.6	6.1	55.0	60.8	-5.8
1	A	0.281	42.1	0.6	6.1	48.8	50.8	-2.0
1	QP	0.335	45.0	0.6	6.1	51.7	59.3	-7.6
1	A	0.335	38.6	0.6	6.1	45.3	49.3	-4.0
1	QP	0.448	40.8	0.6	6.0	47.4	57.0	-9.6
1	A	0.448	34.0	0.6	6.0	40.6	47.0	-6.4
1	QP	0.505	38.7	0.6	6.0	45.3	56.0	-10.7
1	A	0.505	31.3	0.6	6.0	37.9	46.0	-8.1
1	QP	0.896	39.6	0.6	6.0	46.2	56.0	-9.8
1	A	0.896	32.8	0.6	6.0	39.4	46.0	-6.6
2	QP	0.224	40.3	0.6	6.1	47.0	62.8	-15.8
2	A	0.224	27.4	0.6	6.1	34.1	52.8	-18.7
2	QP	0.281	43.9	0.6	6.1	50.6	60.8	-10.2
2	A	0.281	30.8	0.6	6.1	37.5	50.8	-13.3
2	QP	0.336	42.8	0.6	6.1	49.5	59.3	-9.8
2	A	0.336	27.5	0.6	6.1	34.2	49.3	-15.1
2	QP	0.450	35.7	0.6	6.0	42.3	56.9	-14.6
2	A	0.450	23.4	0.6	6.0	30.0	46.9	-16.9
2	QP	0.506	33.2	0.6	6.0	39.8	56.0	-16.2
2	A	0.506	21.2	0.6	6.0	27.8	46.0	-18.2
2	QP	0.899	35.9	0.6	6.0	42.5	56.0	-13.5
2	A	0.899	22.5	0.6	6.0	29.1	46.0	-16.9
<b>Calculations</b>		$G=D+E+F$		$I=G-H$				

Note: Peak measurements are compared to the average limit.

Test results - 120 Vac / 60 Hz

## 5.0 Conducted emissions on AC power lines (Conducted Emissions)

### Data:

**Client:** Bodymedia

**Model Number:** Wireless Gateway

**Project Number:** 3107209

**Tested By:** RCB

**Date:** 11/8/2006

**Frequency Range (MHz):** .150-30

**Input power:** 230 Vac / 50 Hz

**Receiver:** HP 8546A

**Cables:** TT1+TT5

**LISN 1:** TT5 LISN Line 1

**LISN 2:** TT5 LISN Line 2

**Limit:** CISPR Class B

**Modifications for compliance (y/n):** N

A	B	C	D	E	F	G	H	I
LISN Number 1,2	Detector (P,QP,A)	Frequency MHz	Reading dBuV	Cable Loss dB	LISN Ins. Loss dB	Net dBuV	Limit dBuV	Margin dB
1	QP	0.158	53.1	0.6	6.1	59.8	65.7	-5.9
1	A	0.158	33.8	0.6	6.1	40.5	55.7	-15.2
1	QP	0.169	52.4	0.6	6.1	59.1	65.2	-6.1
1	A	0.169	29.7	0.6	6.1	36.4	55.2	-18.8
1	QP	0.193	50.7	0.6	6.1	57.4	64.0	-6.6
1	A	0.193	24.8	0.6	6.1	31.5	54.0	-22.5
1	QP	0.268	48.5	0.6	6.1	55.2	61.3	-6.1
1	A	0.268	30.8	0.6	6.1	37.5	51.3	-13.8
1	QP	0.331	45.3	0.6	6.1	52.0	59.5	-7.5
1	A	0.331	36.1	0.6	6.1	42.8	49.5	-6.7
1	QP	0.338	42.1	0.6	6.1	48.8	59.3	-10.5
1	A	0.338	25.5	0.6	6.1	32.2	49.3	-17.1
2	QP	0.160	52.9	0.6	6.1	59.6	65.5	-5.9
2	A	0.160	28.8	0.6	6.1	35.5	55.5	-20.0
2	QP	0.190	50.9	0.6	6.1	57.6	64.0	-6.4
2	A	0.190	29.5	0.6	6.1	36.2	54.0	-17.8
2	QP	0.263	46.9	0.6	6.1	53.6	61.4	-7.8
2	A	0.263	27.9	0.6	6.1	34.6	51.4	-16.8
2	QP	0.456	39.4	0.6	6.0	46.0	56.8	-10.8
2	A	0.456	25.5	0.6	6.0	32.1	46.8	-14.7
2	QP	0.718	39.3	0.6	6.0	45.9	56.0	-10.1
2	A	0.718	23.5	0.6	6.0	30.1	46.0	-15.9
2	QP	1.560	36.3	0.6	6.0	42.9	56.0	-13.1
2	A	1.560	25.0	0.6	6.0	31.6	46.0	-14.4
<b>Calculations</b>		$G=D+E+F$		$I=G-H$				

Test results - 230 Vac / 50 Hz

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

### Method:

Measurements in the frequency range of 30 MHz to 1000 MHz shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16. Above 1000 MHz, a peak detector shall be used. Peak values converted to average by applying the duty cycle correction factor, when applicable. When an average detector is used, it shall meet the requirements of Section One of CISPR 16. The measuring antenna shall correlate to a balanced dipole.

#### Bandwidths:

30 MHz to 1000 MHz: 120 kHz RBW and 1 MHz VBW

Above 1000 MHz: 1 MHz RBW and 3 MHz VBW

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003, EN 55022:1998 +A1:2000 +A2:2003.

### TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

### MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of k=2.

30 MHz to 1000 MHz at 3 meters: +/- 3.9 dB

30 MHz to 1000 MHz at 10 meters: +/- 3.6 dB

1 GHz to 18 GHz at 3 meters: +/- 4.2 dB

### Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog (20MHz to 2GHz)	Chase	CBL6112A	211518	12/08/2005	12/08/2006
Antenna, Horn, 1-18 GHz	EMCO	3115	213061	03/28/2006	03/28/2007
Cable E01 (Formerly PE7000N-N2 or N2)	Pasternack	RG214/U	E01	05/11/2006	05/11/2007
Cable E05 (Formerly HS 1500 N-N)	Huber-Suhner	Sucoflex 104PEA	E05	05/11/2006	05/11/2007
Cable E11 (Formerly HS 7000 N-SMA)	Huber-Suhner	Sucoflex 104PEA	E11 211266	05/11/2006	05/11/2007
Cable, 18 GHz, N, 394 inches	Megaphase	G919-NKNK-394	MP3	05/11/2006	05/11/2007
Coaxial Cable, 6ft, N(Male) to N(Male)	Mini-Circuits	CBL-6FT-NMNM	TT1	05/11/2006	05/11/2007
EMI Receiver	Hewlett Packard	8546A	211388	08/04/2006	08/04/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	211389	08/04/2006	08/04/2007
Excel spreadsheet for radiated emissions	Intertek Software	SW (RE Worksheet)	SW004	08/01/2006	08/01/2007
Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	200074	01/24/2006	01/24/2007
Preamplifier, 1-26 GHz	Hewlett Packard	8449B	213191	05/04/2006	05/04/2007
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

**Results: The sample tested was found to Comply.**

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

**Photo:**



Test set up front

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

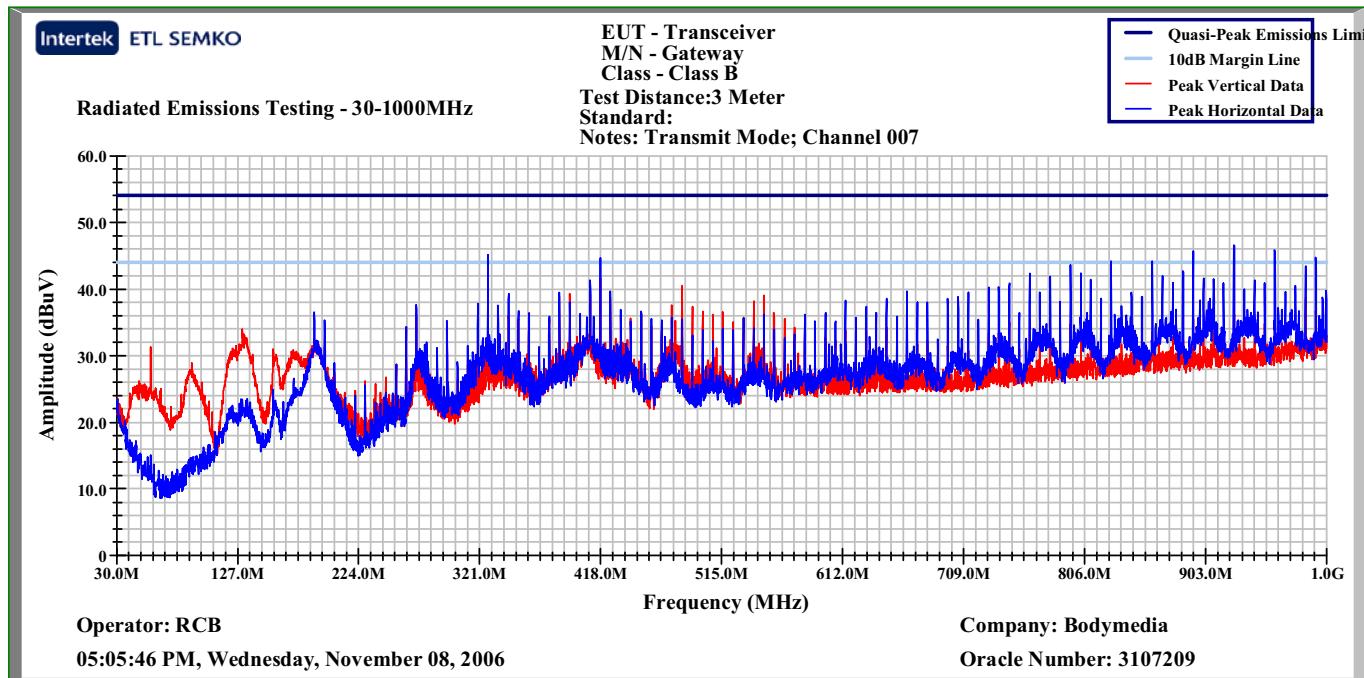
**Photo:**



Test set up rear

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

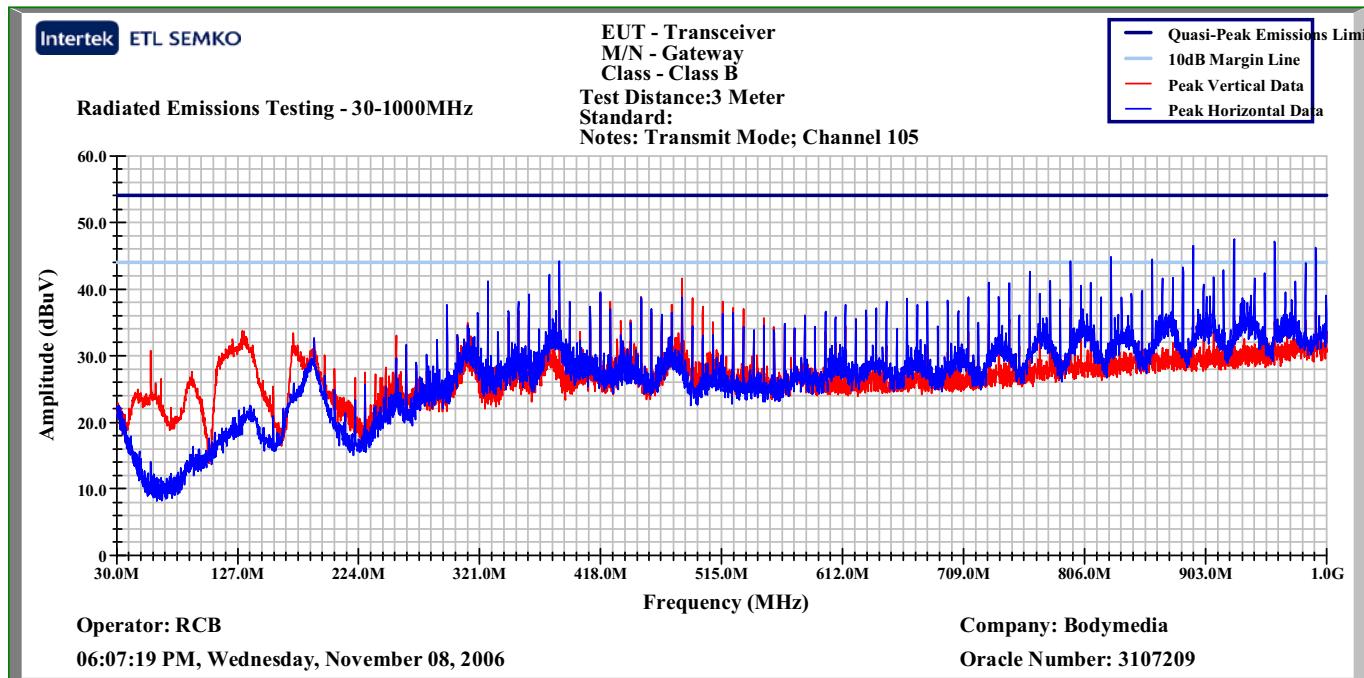
Plot:



Scan plot Tx mode Ch. Low

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

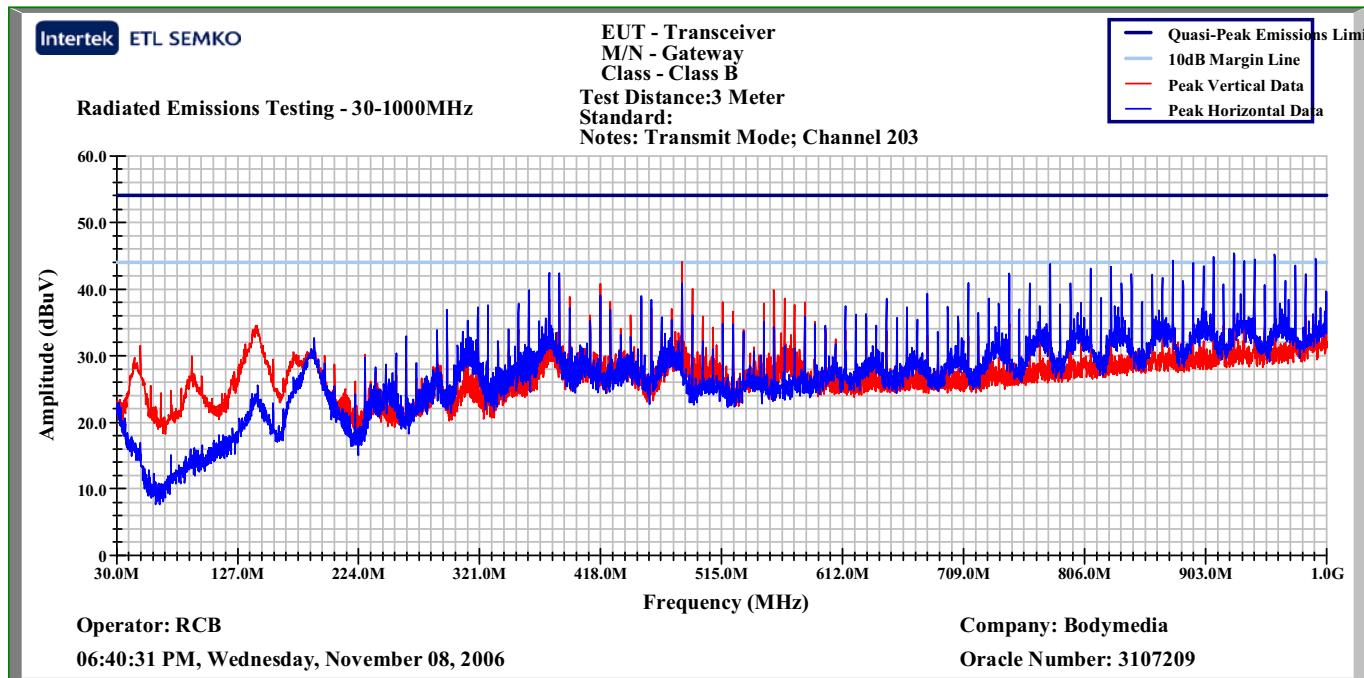
Plot:



Scan plot Tx mode Ch.mid

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

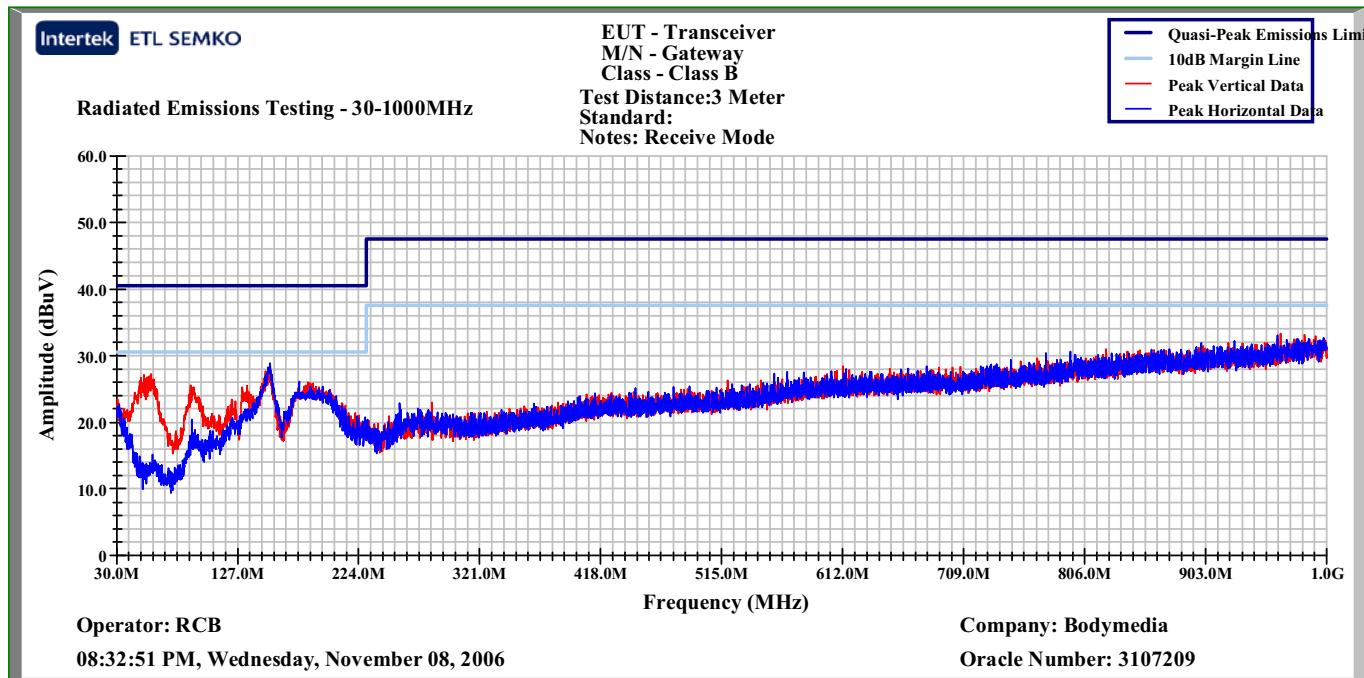
Plot:



Scan plot Tx mode Ch. High

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

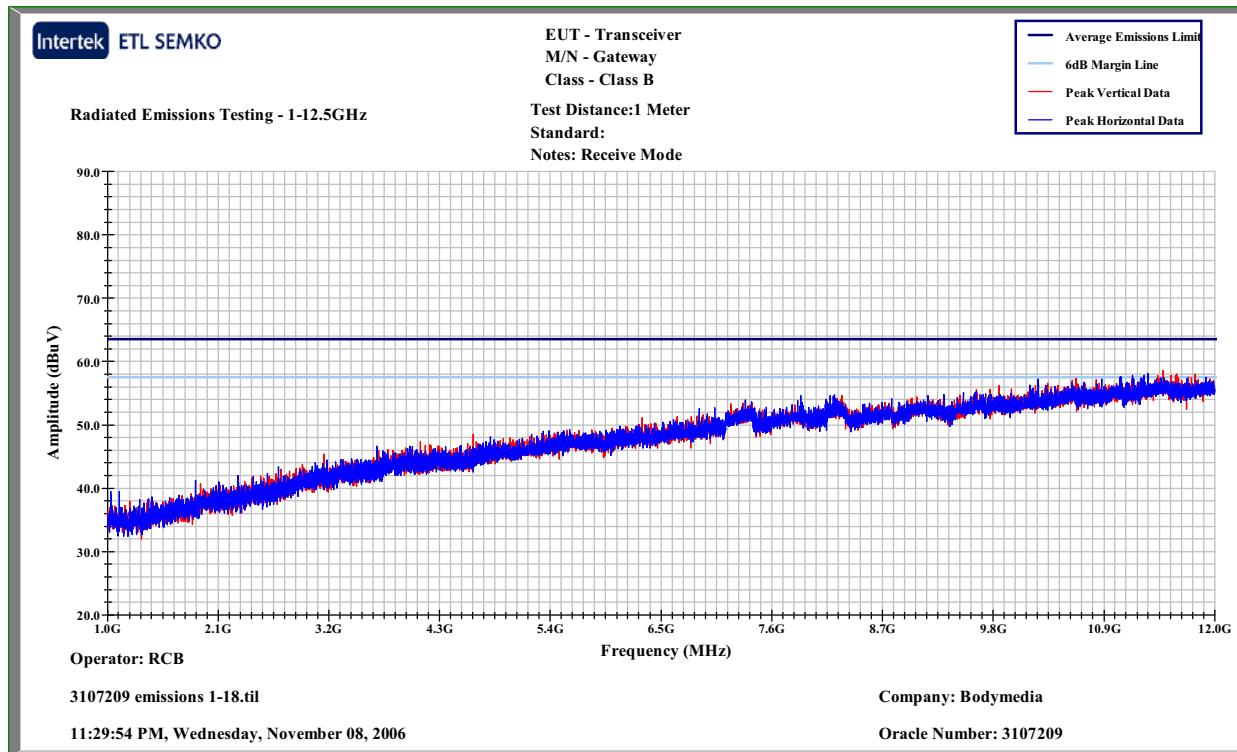
Plot:



Scan plot Rx mode

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

Plot:



Scan plot Rx mode 1-12GHz

## 6.0 Radiated emissions (E-field) (Radiated Emissions)

## Data:

Frequency Range (MHz): 30-12500

Test Distance (m): 3

Input power: 230 Vac / 50 Hz

Modifications for compliance (y/n): No

A	B	C	D	E	F	G	H	I
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB
<b>Channel 007</b>								
H	327.688	55.0	14.6	3.3	28.0	44.9	54.0	-9.1
H	417.786	50.3	17.0	3.8	27.9	43.2	54.0	-10.8
H	892.918	48.2	21.4	5.2	27.7	47.2	54.0	-6.8
H	925.691	48.0	21.6	5.9	27.6	47.8	54.0	-6.2
H	958.452	46.9	21.9	5.9	27.6	47.1	54.0	-6.9
H	991.226	45.2	22.3	5.9	27.6	45.7	54.0	-8.3
<b>Channel 105</b>								
H	385.026	55.0	15.9	3.3	28.0	46.2	54.0	-7.8
H	827.392	47.7	20.9	5.2	27.7	46.2	54.0	-7.8
H	892.906	48.6	21.4	5.2	27.7	47.5	54.0	-6.5
H	925.683	48.8	21.6	5.9	27.6	48.7	54.0	-5.3
H	958.456	47.9	21.9	5.9	27.6	48.0	54.0	-6.0
H	991.240	46.0	22.3	5.9	27.6	46.5	54.0	-7.5
<b>Channel 203</b>								
H	483.322	50.5	17.6	3.8	27.9	44.0	54.0	-10.0
H	778.230	48.4	20.4	4.8	27.8	45.8	54.0	-8.2
H	909.307	46.9	21.5	5.9	27.6	46.7	54.0	-7.3
H	925.708	48.1	21.6	5.9	27.6	48.0	54.0	-6.0
H	958.455	46.1	21.9	5.9	27.6	46.2	54.0	-7.8
H	991.210	44.6	22.3	5.9	27.6	45.2	54.0	-8.8
<b>Calculations</b>		$G=C+D+E-F$			$I=G-H$			

## 7.0 Revision History (Revision History)

**Method:**

Document the history of the report.

**Data:**

Revision Level	Date	Report Number	Notes
Original issue	November 9, 2006	3107209-004	--
1	November 27, 2006	3107209-014	Corrected report number