

**COMPLIANCE WORLDWIDE INC.
TEST REPORT 278-11AR2**

In Accordance with the Requirements of
**MPE Calculation for
FCC PART 15.247, SUBPART C
INDUSTRY CANADA RSS 210, ISSUE 8**

Issued to

**Philips Medical Systems
3000 Minuteman Drive
Andover, MA 01810
978-659-2800**

for the

**Philips Telemetry System
MX40 Patient Worn Monitor
2.4 GHz CTS Radio**

**FCC ID: PQC-MX40SH24
IC: 3549B-MX40SH24**

Report Issued on August 5, 2011

Tested by



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Reviewed by



Larry K. Stillings

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RF Exposure Requirements: 1.1307(b)(1) and 1.1.307(b)(2): Systems operating under the provision of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission’s guidelines.

RF Radiation Exposure Limit: 1.1310: As specified in this section, the Maximum Permissible Exposure (MPE) limit shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in Section 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec 2.1093 of this chapter.

Test Results: Compliant. A summation of the power densities of each of the individual radios shows that the combination of all three radios are in compliance with the limit.

Channel	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density (mW/cm ²)	Power Density (W/m ²)	Limit (mW/cm ²)	Result
	(1)	(2)	(3)	(4)	(4)	(5)	
2.4 GHz	2.5	15.40	-3.0	0.2212637	2.2126367	1.00	Compliant
SRR	2.5	0.60	0.3	0.0156591	0.1565914	1.00	Compliant
WLAN	2.5	13.64	1.0	0.3707075	3.7070750	1.00	Compliant
SUM	2.5	N/A	N/A	0.6076303	6.0763032	1.00	Compliant

7. Measurement Data for 2.4 GHz CTS Radio from Test Report #278-11R1

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm ²)	Result
				(mW/cm ²)	(W/m ²)		
				(1)	(2)		
2401.060	2.5	15.40	-3.0	0.22126	2.21264	1	Compliant
2442.320	2.5	15.00	-3.0	0.20179	2.01795	1	Compliant
2482.252	2.5	13.70	-3.0	0.14959	1.49593	1	Compliant

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

- PD = Power Density (mW/cm²)
- OP = DUT Output Power (dBm)
- AG = DUT Antenna Gain (dBi)
- d = MPE Distance (cm)

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 2.5 centimeters of the body of the user.
2. Section 7.4 of this test report.
3. Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

7. Measurement Data (continued)

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

The calculated output power can be referenced in column 6 of the table below. The calculated peak output power is greater than the 24.17 mW requirement for performing SAR testing using the formula: $60 / F$ (GHz).

Channel	Frequency	Peak Field Strength	Distance	Antenna Gain ¹	Measured Output Power	Time Averaged Power
	(MHz)	(dB μ V/m)	(m)	(dBi)	(mW)	(mW)
Low	2401.1	107.60	3.0	-3.0	34.44	0.0086
Middle	2442.3	107.20	3.0	-3.0	31.41	0.0079
High	2482.3	105.90	3.0	-3.0	23.29	0.0058

However the time averaged power is significantly lower then the 24.17 mW requirement for 47CFR 1.1307 and 20 mW requirement for RSS-102

Channel Frequency (MHz)	Output Power (mW)	Time Averaging Duty Cycle Correction	Power Density		Limit (mW/cm ²)	Result
			(mW/cm ²)	(W/m ²)		
2401.060	34.44	0.01575	0.01051	0.10509	1	Compliant
2442.320	31.41	0.01575	0.00958	0.09584	1	Compliant
2482.252	23.29	0.01575	0.00710	0.07105	1	Compliant

RSS-102 Section 2.5, 2.5.1 & 2.5.2 Requirements:

- 2.5 - All transmitters are exempt from routine SAR and RF exposure evaluations provided that output power complies with the power levels of sections 2.5.1 or 2.5.2. If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C).
- 2.5.1 - SAR evaluation is required if the separation distance between the user and the radiating element of the device is less than or equal to 20 cm, except when the device operates as follows:
- above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use and 100 mW for controlled use
- 2.5.2 - RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:
- at or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W.

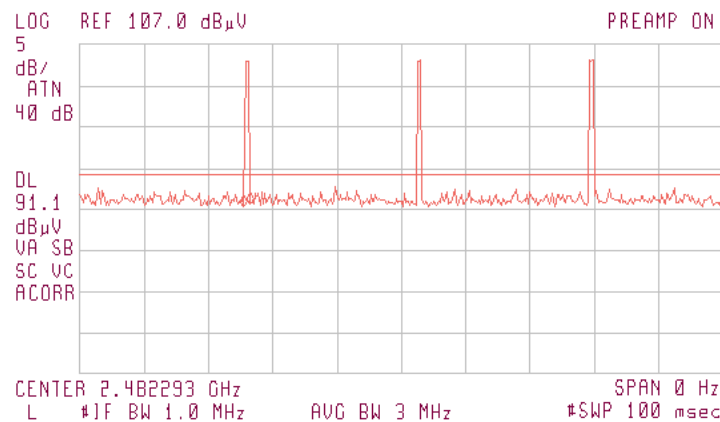
7. Measurement Data (continued)

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (continued)

Time Average Reduction = $20 \log (1.575 \text{ mS} / 100 \text{ mS}) = -36.05 \text{ dB}$

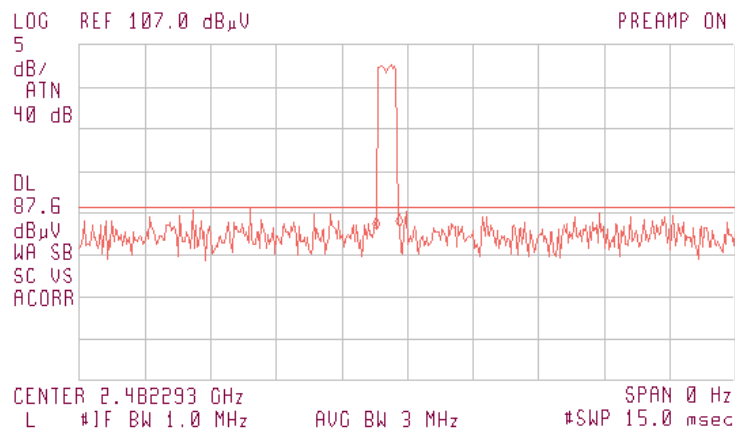
7.10.1 Determination of time averaged output power – 3 Pulses in 100 mS

11:30:00 JUN 30, 2011 NUMBER OF PULSES IN 100mS
278-11 PHILIPS 2.4GHZ SH (CTS) CH47
ACTV DET: PEAK
MEAS DET: PEAK AVG
MKRΔ 1.0000 msec
.31 dB



7.10.2 Determination of time averaged output power – Pulse width = 525 uS

11:52:13 JUN 30, 2011 PULSE WIDTH 525 uS
278-11 PHILIPS 2.4GHZ SH (CTS) CH47
ACTV DET: PEAK
MEAS DET: PEAK AVG
MKRΔ 525.00 μsec
.20 dB



7. Measurement Data for SRR Radio from Test Report #264-11R1

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm ²)	Result
				(mW/cm ²)	(W/m ²)		
				(1)	(2)		
2405	2.5	-5.83	0.3	0.00356	0.03565	1	Compliant
2440	2.5	-4.50	0.3	0.00484	0.04842	1	Compliant
2480	2.5	-2.23	0.3	0.00817	0.08166	1	Compliant

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

- PD = Power Density (mW/cm²)
- OP = DUT Output Power (dBm)
- AG = DUT Antenna Gain (dBi)
- d = MPE Distance (cm)

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 2.5 centimeters of the body of the user.
2. Section 7.4 of this test report.
3. Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

RSS-102 Section 2.5, 2.5.1 & 2.5.2 Requirements:

- 2.5 - All transmitters are exempt from routine SAR and RF exposure evaluations provided that output power complies with the power levels of sections 2.5.1 or 2.5.2. If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C).
- 2.5.1 - SAR evaluation is required if the separation distance between the user and the radiating element of the device is less than or equal to 20 cm, except when the device operates as follows:
 - above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use and 100 mW for controlled use
- 2.5.2 - RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:
 - at or above 1.5 GHz and the maximum EIRP of the device is equal to or less than 5 W.

7. Measurement Data (continued) for WLAN from Test Report #304-11R2

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm ²)	Result
				(mW/cm ²)	(W/m ²)		
				(1)	(2)		
2412	2.5	0.64	1.0	0.01858	0.18579	1	Compliant
2437	2.5	0.94	1.0	0.01991	0.19908	1	Compliant
2462	2.5	0.48	1.0	0.01791	0.17907	1	Compliant
2412	2.5	12.37	1.0	0.27671	2.76714	1	Compliant
2437	2.5	12.37	1.0	0.27671	2.76714	1	Compliant
2462	2.5	12.05	1.0	0.25706	2.57058	1	Compliant
2412	2.5	-0.87	1.0	0.01312	0.13123	1	Compliant
2437	2.5	-1.20	1.0	0.01216	0.12163	1	Compliant
2462	2.5	-1.20	1.0	0.01216	0.12163	1	Compliant
2412	2.5	13.07	1.0	0.32511	3.25111	1	Compliant
2437	2.5	13.15	1.0	0.33116	3.31155	1	Compliant
2462	2.5	13.64	1.0	0.37071	3.70708	1	Compliant

Note: 802.11b and 802.11g analyzed with both energy in a 1 MHz RBW and integrated 26 dB BW power.

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

- PD = Power Density (mW/cm²)
- OP = DUT Output Power (dBm)
- AG = DUT Antenna Gain (dBi)
- d = MPE Distance (cm)

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 2.5 centimeters of the body of the user.
2. Section 7.4 of this test report.
3. Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

7. Measurement Data (continued)

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (cont.)

The calculated output power can be referenced in column 6 of the table below. The calculated peak output power is lower than the 24.37 mW requirement for performing SAR testing using the formula: $60 / F$ (GHz).

Channel	Frequency	Peak Field Strength	Distance	Antenna Gain ¹	Measured Output Power	Time Averaged Power
	(MHz)	(dBµV/m)	(m)	(dBi)	(mW)	(mW)
Low	2412.0	96.87	3.0	1.0	1.16	0.0000059
Mid	2437.0	97.17	3.0	1.0	1.24	0.0000063
High	2462.0	96.71	3.0	1.0	1.12	0.0000057
Low	2412.0	108.60	3.0	1.0	17.26	0.0000873
Mid	2437.0	108.60	3.0	1.0	17.26	0.0000873
High	2462.0	108.28	3.0	1.0	16.04	0.0000811
Low	2412.0	95.36	3.0	1.0	0.82	0.0000041
Mid	2437.0	95.03	3.0	1.0	0.76	0.0000038
High	2462.0	95.03	3.0	1.0	0.76	0.0000038
Low	2412.0	109.30	3.0	1.0	20.28	0.0001026
Mid	2437.0	109.38	3.0	1.0	20.66	0.0001045
High	2462.0	109.87	3.0	1.0	23.13	0.0001170

¹ Taken from the antenna manufacturer's data guide.

RSS-102 Section 2.5, 2.5.1 & 2.5.2 Requirements:

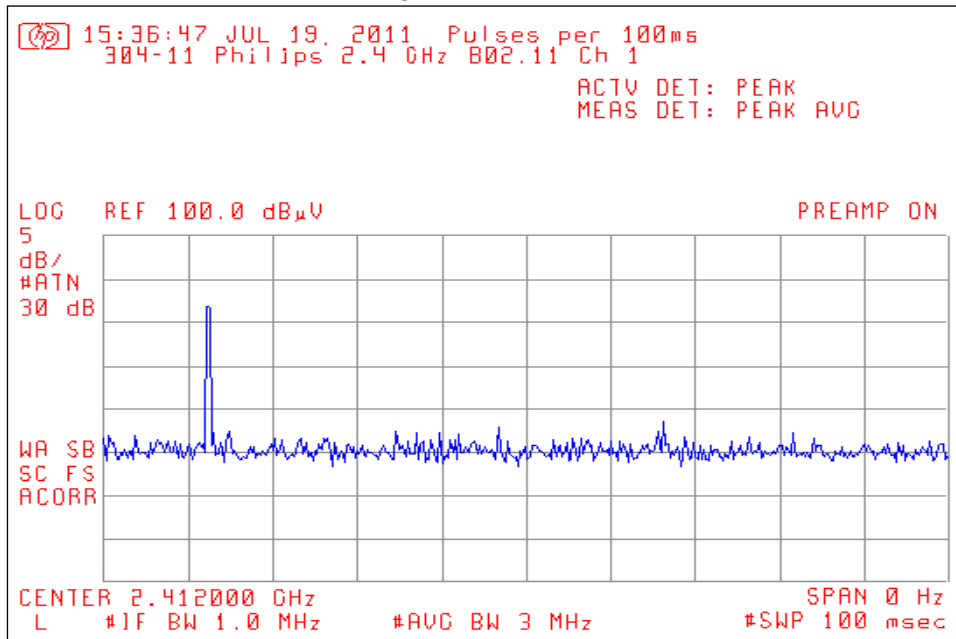
- 2.5 - All transmitters are exempt from routine SAR and RF exposure evaluations provided that output power complies with the power levels of sections 2.5.1 or 2.5.2. If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C).
- 2.5.1 - SAR evaluation is required if the separation distance between the user and the radiating element of the device is less than or equal to 20 cm, except when the device operates as follows:
 - above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use and 100 mW for controlled use
- 2.5.2 - RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:
 - at or above 1.5 GHz and the maximum EIRP of the device is equal to or less than 5 W.

7. Measurement Data (continued)

7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (continued)

Time Average Reduction = $20 \log_{10} (.225 \text{ ms} / 100 \text{ ms}) = -52.96 \text{ dB}$.

7.10.1 Determination of time averaged output power – 1 Pulse per 100 ms period.



7.10.2 Determination of time averaged output power – Pulse width = 225 µs.

