

TEST RESULT SUMMARY

EN 300 330-2 v1.1.1: 2001
Subclauses 7.2, 7.3, 7.4

| | |
|------------------------|---|
| MANUFACTURER'S NAME | Medtronic, Incorporated |
| NAME OF EQUIPMENT | Home Monitor |
| MODEL NUMBER | 2490E |
| TYPE OF EQUIPMENT | Product for communication with implantable medical devices. |
| MANUFACTURER'S ADDRESS | 7000 Central Avenue NE Fridley MN 55432 |
| TEST REPORT NUMBER | NC204549.3 |
| TEST DATE | 29 August 2002 |


According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the emission requirements defined in European Telecommunication Standard EN 300 330.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.


TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the emission requirements of European Telecommunication Standard EN 300 330: "Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Technical Characteristics and Test Methods for Radio Equipment in the Frequency Range 9 kHz to 25 MHz and Inductive Loop Systems in the Frequency Range 9 kHz to 30 MHz."

Date: 09 September 2002

Location: Taylors Falls MN
USA



Tested By:
G. S. Jakubowski



T. K. Swanson
Test Technician

Not Transferable

D I R E C T O R Y / SUB-CLAUSE PARAMETER TO BE MEASURED PAGE

| A) Documentation | Page(s) |
|-------------------------------------|----------------|
| Test Result Summary | <u>1</u> |
| Directory/Parameters to be measured | <u>2 - 8</u> |
| Test Setup Photos | <u>A1 – A3</u> |

The complete list of measurements called for in EN 300 330 is given below.

Transmitter parameters - Ambient temperature22°C Relative humidity55%

| | | | |
|-------|---|--------------|------------|
| 7.2.1 | Transmitter Carrier Output Levels | | <u>3</u> |
| 7.2.2 | RF Carrier Current | Class 3 Only | <u>N/A</u> |
| 7.2.3 | Radiated E-Field | Class 4 Only | <u>N/A</u> |
| 7.3.1 | Permitted Frequency Range of Modulation bandwidth | | <u>4</u> |
| 7.4.2 | Conducted Spurious Emissions (Operating) | Class 3 Only | <u>N/A</u> |
| 7.4.2 | Conducted Spurious Emissions (Standby) | Class 3 Only | <u>N/A</u> |
| 7.4.3 | Radiated Field Strength (Transmit < 30 MHz) | | <u>5</u> |
| 7.4.3 | Radiated Field Strength (Standby < 30 MHz) | | <u>6</u> |
| 7.4.4 | Radiated Field Strength (Transmit > 30 MHz) | | <u>6</u> |
| 7.4.4 | Radiated Field Strength (Standby > 30 MHz) | | <u>7</u> |

Receiver parameters -

| | | |
|-------|--|------------|
| 8.1.2 | Receiver Spurious Radiation (Frequencies < 30 MHz) | <u>N/A</u> |
| 8.1.2 | Receiver Spurious Radiation (Frequencies > 30 MHz) | <u>N/A</u> |

H-FIELD FIELD STRENGTH - SUB-CLAUSE 7.2.1 (Class 1)

Rated field strength (maximum) -6 dB μ A/m at 10 metres

| | | | | |
|---|--|----------------|----------------|--|
| Test conditions | Nominal System Operating Frequency: 150 kHz Maximum Transmitter Field Strength (dB μ A/m) | | | |
| $T_{nom}(..22...)^{\circ}C$ | | Final 10 Metre | 10 Metre Limit | |
| $V_{nom}(..6)VDC$ | | -6 | 37.24 | |
| Maximum deviation from rated output under normal test conditions (dB) | | | | |
| Measurement uncertainty (dB μ A/m) | ± 1 | | | |
| The noise floor measurement at 10 metres is -16.5dBuA/m. | | | | |

LIMIT SUB-CLAUSE 7.2.1.3

| Frequency range - (MHz) | H-field field strength limit (Hf) - dB μ A/m at 10 m |
|---|---|
| $0,009 \leq f < 0,03$ | 72 or per note on loop coil antenna area |
| $0,03 \leq f < 0,07$ $0,119 \leq f < 0,135$ | 72 at 0,03 MHz descending 3 dB/oct or per note on loop coil antenna area |
| $0,05975 \leq f < 0,06025$ $0,07 \leq f < 0,119$ | 42 |
| $0,135 \leq f < 1,0$ $1,0 \leq f < 4,642$ $4,642 \leq f < 30$ | 37,7 at 0,135 MHz descending 3 dB/oct 29 at 1,0 MHz descending 9 dB/oct 9 |
| $6,765 \leq f \leq 6,795$ (ISM) $13,553 \leq f \leq 13,567$ (ISM) $26,957 \leq f \leq 27,283$ (ISM) | 42 |

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference see test equipment listing)

1,2,3

Ambient temperature22.°C Relative humidity55%

RF CARRIER CURRENT - SUB-CLAUSE 7.2.2 (Class 2)

N/A

RADIATED E-FIELD, FIELD STRENGTH (measured as H-field) - SUB-CLAUSE 7.2.3 (Class 4)

N/A

PERMITTED FREQUENCY RANGE OF MODULATION BANDWIDTH - SUB-CLAUSE 7.3.1

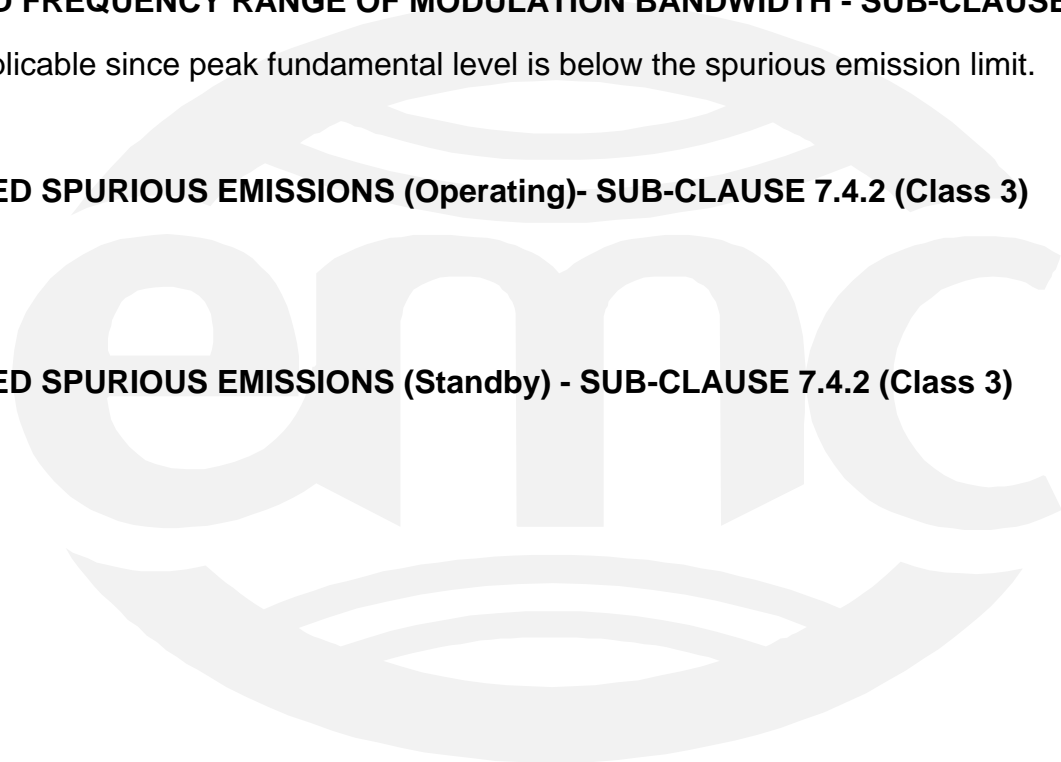
Test not applicable since peak fundamental level is below the spurious emission limit.

CONDUCTED SPURIOUS EMISSIONS (Operating)- SUB-CLAUSE 7.4.2 (Class 3)

N/A

CONDUCTED SPURIOUS EMISSIONS (Standby) - SUB-CLAUSE 7.4.2 (Class 3)

N/A



TRANSMITTER RADIATED SPURIOUS EMISSIONS (Transmit < 30 MHz) - SUB-CLAUSE 7.4.3

| | dBuA/m | dBuA/m | dBuA/m | dBuA/m | spec limit | 10 meters | |
|----------|-----------|---------|----------|-----------|------------|-----------|-------------------|
| MHz | 0.3 meter | 1 meter | 3 meters | 10 meters | 300 330 | | |
| transmit | | | | | dBuA/m | dBuV/m | |
| 0.009 | | | | | 27 | 78.5 | |
| 0.15 | 57 | 38 | 13 | | 14.78151 | 66.28151 | fundamental - n/a |
| 0.45 | 36 | 18 | -8 | | 10.0103 | 61.5103 | |
| 0.75 | 27 | 9 | -11 | | 7.791812 | 59.29181 | |
| 1.05 | 21 | 3 | | | 6.330532 | 57.83053 | |
| 1.35 | 17 | 0 | | | 5.239087 | 56.73909 | |
| 0.2 | 54 | 36 | 5 | | 13.53213 | 65.03213 | |
| 0.6 | 33 | 16 | -9 | | 8.760913 | 60.26091 | |
| 1 | 24 | 6 | -16 | | 6.542425 | 58.04243 | |
| 1.4 | 18 | 2 | | | 5.081145 | 56.58114 | |
| 1.75 | | | | | 4.112045 | 55.61204 | |
| 2.28 | | | | | 2.963077 | 54.46308 | |
| 3.16 | | | | | 1.545554 | 53.04555 | |
| 4.04 | | | | | 0.478611 | 51.97861 | |
| 6.32 | | | | | -1.46475 | 50.03525 | |
| 8.08 | | | | | -2.53169 | 48.96831 | |
| 3.623 | | | | | 0.951742 | 52.45174 | |
| 10 | | | | | -3.45757 | 48.04243 | |
| 30 | | | | | -3.5 | 48 | |

Quasi-Peak

Final measurements made at 1 or 3 Meters when compared to a 10 meter limit still indicate a passing result. Levels measured at 1 or 3 are extrapolated to 10 Meters using a conservative inverse linear relationship. Extrapolated 10 meter levels also indicate a passing result.

Transmitter operating with normal internal modulation.

LIMIT SUB-CLAUSE 7.4.3.2

| State | Frequency 9 kHz ≤ f < 10 MHz | Frequency 10 MHz ≤ f < 30 MHz |
|----------|-------------------------------|-------------------------------|
| Transmit | 27 dBμA/m descending 3 dB/oct | -3,5 dBμA/m |

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference see test equipment listing)

1,2,3

Ambient temperature22.°C Relative humidity55%

TRANSMITTER RADIATED SPURIOUS EMISSIONS (standby < 30 MHz) - SUB-CLAUSE 7.4.3

No spurious emissions detected in standby mode below 30 MHz.

LIMIT SUB-CLAUSE 7.4.3.2

| | | |
|---------|---|--|
| State | Frequency $9 \text{ kHz} \leq f < 10 \text{ MHz}$ | Frequency $10 \text{ MHz} \leq f < 30 \text{ MHz}$ |
| Standby | 6 dB μ A/m descending 3 dB/oct | -24,5 dB μ A/m |

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference see test equipment listing)

1,2,3

Ambient temperature22.°C Relative humidity55%

TRANSMITTER RADIATED SPURIOUS EMISSIONS (Transmit > 30 MHz) - SUB-CLAUSE 7.4.4

No spurious emissions detected in Transmit mode above 30 MHz.

LIMIT SUB-CLAUSE 7.4.4.2

| | | |
|-----------|---|--|
| State | 47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz | Other Frequencies between 30 to 1000 MHz |
| Operating | 4 nW | 250 nW |

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference see test equipment listing)

4,5,6,7,8

Ambient temperature22.°C Relative humidity55%

TRANSMITTER RADIATED SPURIOUS EMISSIONS (standby > 30 MHz) - SUB-CLAUSE 7.4.4

No spurious emissions detected in standby mode above 30 MHz.

LIMIT SUB-CLAUSE 7.4.4.2

| | | |
|---------|---|--|
| State | 47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz | Other Frequencies between 30 to 1000 MHz |
| Standby | 2 nW | 2 nW |

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED (for reference see test equipment listing)

4,5,6,7,8

Ambient temperature22.°C

Relative humidity55%

RECEIVER SPURIOUS RADIATION (< 30 MHz) - SUB-CLAUSE 8.1

N/A

RECEIVER SPURIOUS RADIATION (>30 MHz) SUB-CLAUSE 8.1

N/A

TEST EQUIPMENT

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

| Ref. No. | Instrument/Ancillary | Type | Manufacturer | Serial No. |
|----------|----------------------|-----------|-----------------|------------|
| 01 | Loop Antenna | HFH2-Z2 | Polarad | 879285/036 |
| 02 | EMI Receiver | ESH-20 | Rohde-Schwarz | 837055/003 |
| 03 | Coaxial cable | | Polarad | |
| 04 | Spectrum Analyzer | 8566B | HP | 2430A00930 |
| 05 | Analyzer Display | 85662A | HP | 2403A08134 |
| 06 | Quasi-Peak Adapter | 85650A | HP | 2521A01006 |
| 07 | Preamplifier | ZHL-1042J | Mini-Circuits | 32296 |
| 08 | Biconicalog Antenna | EM-6917B | Electro-Metrics | 106 |

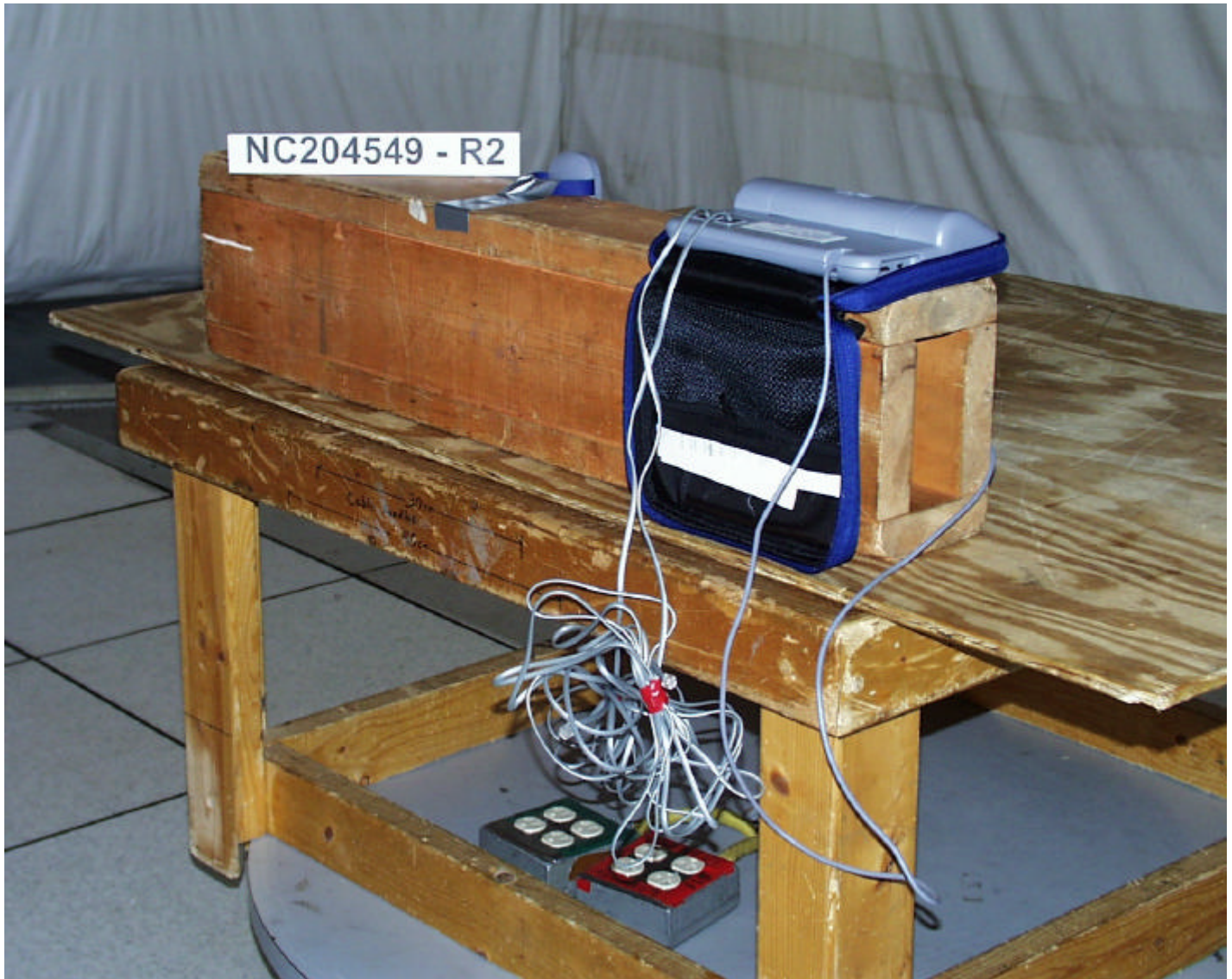
ADDITIONAL INFORMATION SUPPLEMENTARY TO THE TEST REPORT

Photographs other than of the test-setup are sent independently from report.

TEST SETUP PHOTOS



Test-setup photo(s):
Radiated Emission



Test-setup photo(s):

Radiated Emission

