

CETECOM ICT Services GmbH

Radio Satellite Communication

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RSC11

issue test report consist of

30 Pages

Page 1 (30)



TTI-P-G166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 4_0602-01-03TX/02

FCC Part 15.242 / 95.1115

M2720A Avalon CTS Cordless Fetal Transducer System

CETECOM – ICT Services GmbH

Untertürkheimerstr. 6-10

66117 Saarbrücken, Germany

Telephone: + 49 (0) 681 / 598-0

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Deutschland

Telefon : + 49 681 598 - 9100

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Internet : www.cetecom.de

Accredited testing laboratory

DAR-registration number : TTI-P-G-166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

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1.3 Details of applicant

Name : Philips Medizinsysteme Böblingen GmbH

Street : Hewlett-Packard-Str.2

City : D-71034 Böblingen

Country : Germany

Telephone : +49(0)7031 / 463-0

Telefax : +49(0)7031 / 463-2944

Contact : Mr. Hansjörg Geywitz

Telephone : +49(0)7031 / 463-0

1.4 Application details

Date of receipt of application : 2002-07-25

Date of receipt of test item : 2002-07-25

Date of test : 2002-07-25

1.5 Test item

Type of equipment : Wireless medical telemetry system

Type designation : **M2720A Avalon CTS Cordless Fetal Transducer System consisting of three equal transmitters: M2725 Toco Transducer, M2726A US Transducer and M2727A ECG Transducer (tested) and M2720A Base Station (receiver)**

Product name : Avalon CTS Cordless Fetal Transducer System

Additional informations:

Frequency : 608.0125 – 613.9875 MHz/ Channel separation: 12.5 kHz
10K0F2D

we tested 608.0125 MHz, 611.0 MHz and 613.9875 MHz

output power rad. max : QP: -15.4 dBm (0.03mW) / 82.1 dB μ V/m at 3m EIRP

Number of channels : 478 (3 tested)

Antenna : Printed antenna on PCB (TX)

Power supply : Tx: Li-Ion rechargeable battery 4.2 V

1.6 Test standards

FCC Part §15.242 / §95.1115

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2 Technical test

The radiated measurements were performed vertical and horizontal over the whole frequency range. We start at 1 m high with vertical receiving antenna and rotate the dish continuously. During rotation we use the antenna lift system to vary the high from 1 to 4 m. So we find maximum radiation output. At this points we do manual remeasurements. After this we do the same measurements in horizontal position of the receiving antenna. This (horizontal and vertical) is made for all the three planes of the test sample. We use the maximum received results. The radiated power was measured by substitution method according to FCC standard.

The detector function and selection of bandwidth are according ANSI C63.2-1996 / 8.2.1 and ANSI C63.4-1992 Item 4.2. Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn

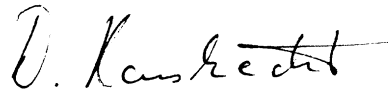
2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

FINAL VERDICT : PASS

Technical responsibility for area of testing :

2002-11-11 RSC8412 Hausknecht D.



Date	Section	Name	Signature
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2002-11-11 RSC8414 Ames H.



Date	Section	Name	Signature
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2.2 Testreport

TEST REPORT

FCC Part 15.242 / 95.1115

Testreport no.: 4_0602-01-03TX/02

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TEST REPORT REFERENCE

LIST OF MEASUREMENTS

The list of measurements called for in FCC Part 15.242 / 95.1115 is given below.

Paragraph	PARAMETER TO BE MEASURED	PAGE
	Transmitter parameters	
§ 15.242/95.1115	Field strength - Radiated	7
§ 15.242/95.1115	Spurious radiations - Radiated	7
	SAR statement	7
§ 95.1115	Channel use	20
	Test equipment listing	21
	Photographs of the equipment	23

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TRANSMITTER FIELD STRENGTH and OUTPUT POWER FCC Part 15.242/95.1115 RADIATED

TX: M2727A ECG-Transducer

FIELD STRENGTH ($\mu\text{V/m}$)								
low channel			mid channel			high channel		
f (MHz)	Detector	Level dB $\mu\text{V/m}$	f (MHz)	Detect or	Level dB $\mu\text{V/m}$	f (MHz)	Detector	Level dB $\mu\text{V/m}$
608.0125 Carrier	QP	82.1	611.0 Carrier	QP	80.0	613.9875 Carrier	QP	80.9
128.5	QP	39.5	126.8	QP	40.2	141.5	QP	39.9
1217	AV	48.4	1222	AV	51.9	1229	AV	49.2
1824	AV	35.3	1833	AV	40.2	1844	AV	37.4
2433	AV	43.9	2444	AV	44.0	2456	AV	37.7
4864	AV	19.2	3055	AV	40.6			
carrier	QP	-15.4 dBm EIRP	carrier	QP	-17.5 dBm EIRP	carrier	QP	-16.6 dBm EIRP
		0.03mW EIRP			0.02 mW EIRP			0.02 mW EIRP
Measurement uncertainty			± 3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f \geq 1GHz : RBW/VBW: 1 MHz

Limit for carrier: 106 dB $\mu\text{V/m}$ at 3m distance QP. (Part 95)

Limit for spurious: 46 dB $\mu\text{V/m}$ at 3m distance QP below 960 MHz. (Part 95)

Limit for spurious: 54 dB $\mu\text{V/m}$ at 3m distance AV above 960 MHz. (Part 95)

Limit for carrier: 106 dB $\mu\text{V/m}$ at 3m distance QP. (Part 15)

Limit for spurious: see general limits 15.209. (Part 15)

RF Exposure compliance issues:

The max RF EIRP power output from the device is less than 1 mW. If the entire RF power were absorbed by 1 gram of tissue (not possible considering typical RF circuits) the SAR limit of 1.6 mW/g would still not be exceeded.

Therefore no warning labels, no RF exposure warnings in the manual or other protection measures are required for the transmitter.

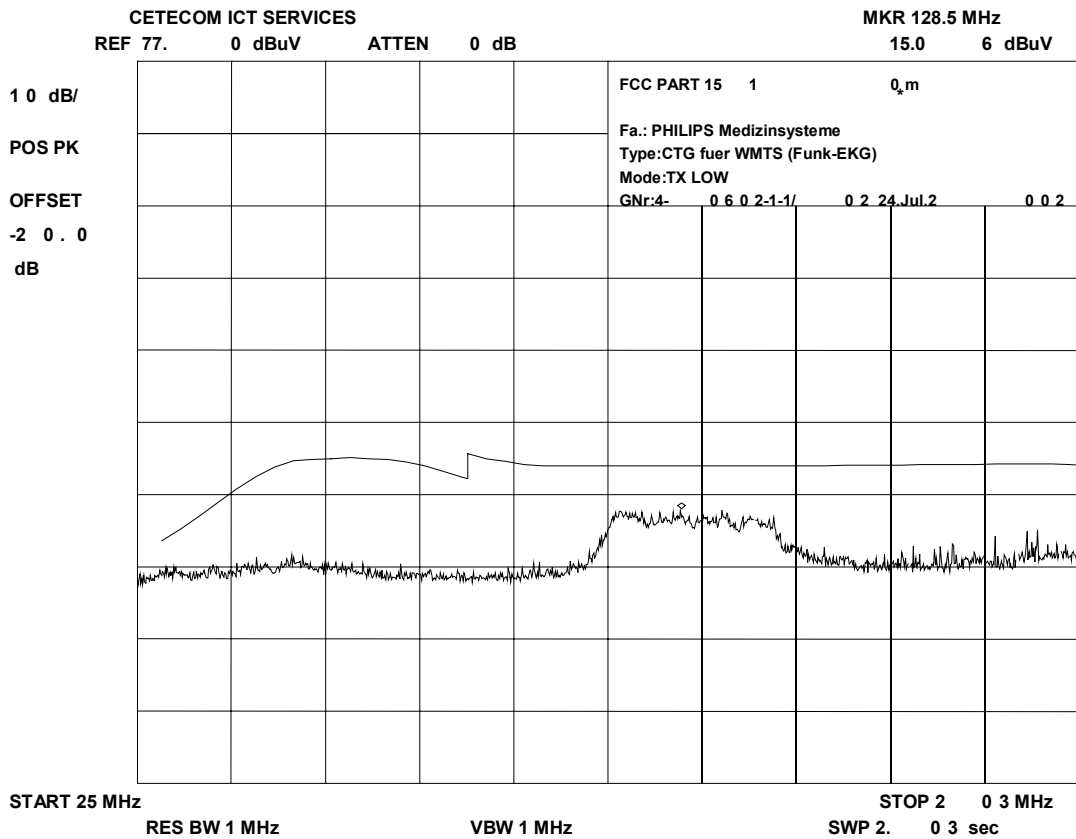
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
low channel, 30 – 200 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 10m distance. We made additional measurements with CISPR QP Detector and recalculated the results to 3m distance by adding 10.5 dB.

All peaks were below limit.

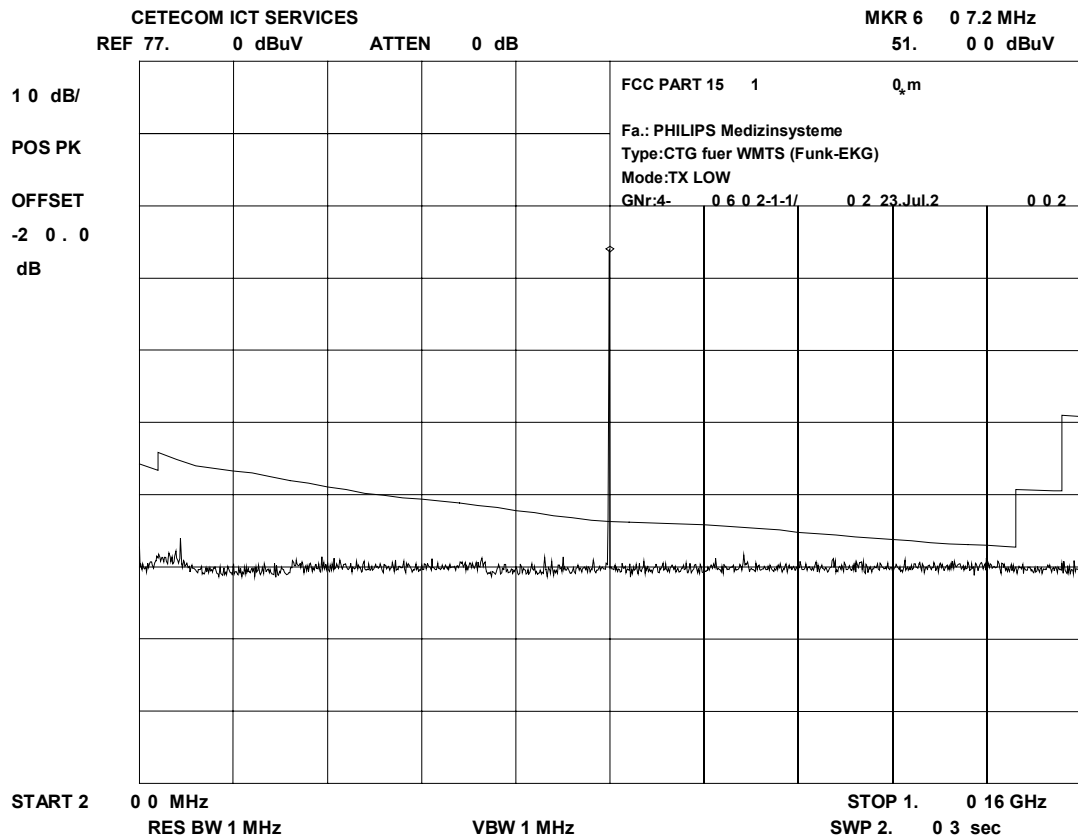
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
low channel, 200 – 1000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 10m distance. We made additional measurements with CISPR QP Detector and recalculated the results to 3m distance by adding 10.5 dB.

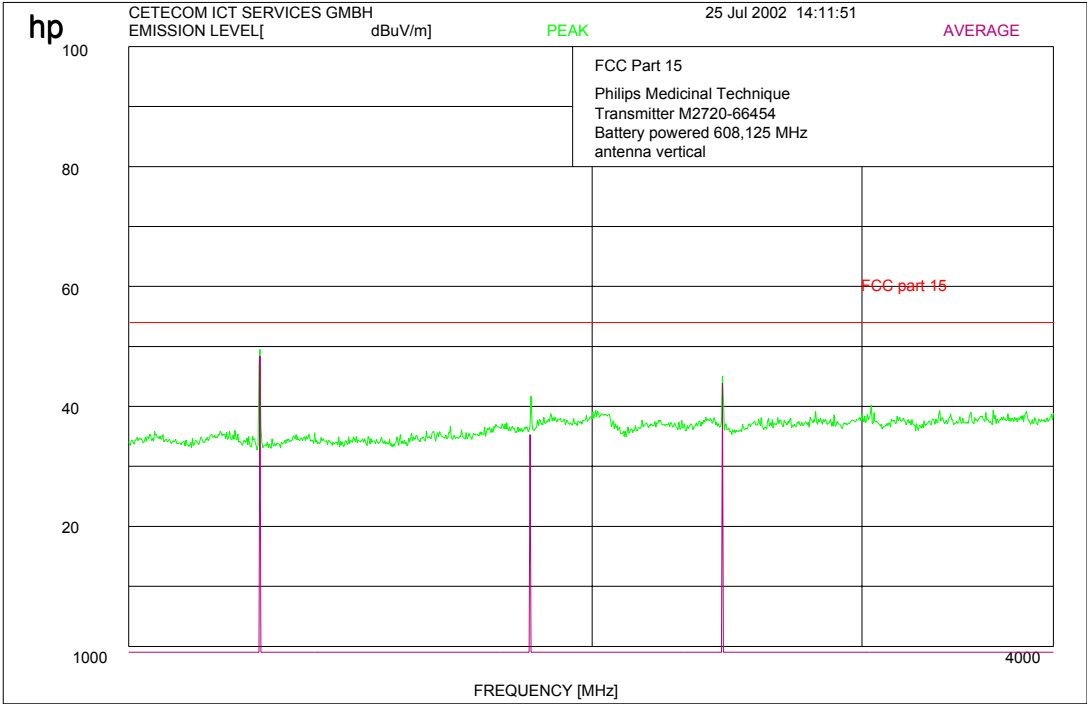
All peaks were below limit.

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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
low channel, 1000 - 4000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 3m distance. We made additional measurements with AV Detector.

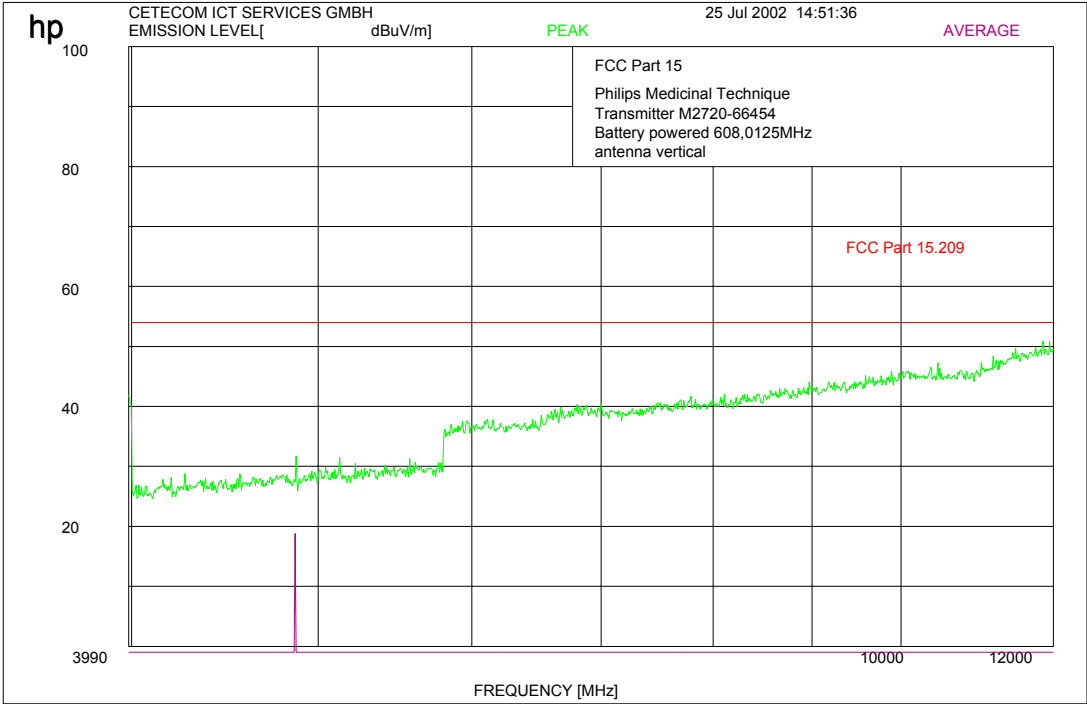
All peaks were below limit.

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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
low channel, 4000 - 12000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 3m distance. We made additional measurements with AV Detector.

All peaks were below limit.

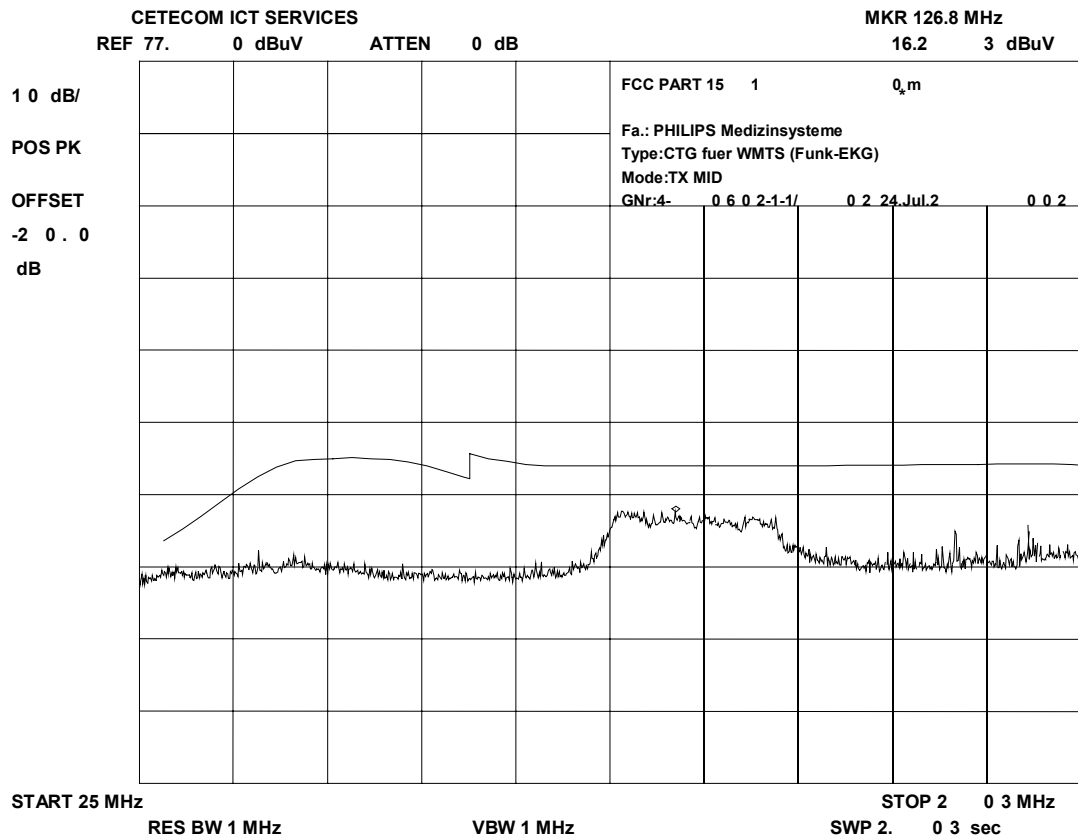
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
mid channel, 30 - 200 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 10m distance. We made additional measurements with CISPR QP Detector and recalculated the results to 3m distance by adding 10.5 dB.

All peaks were below limit.

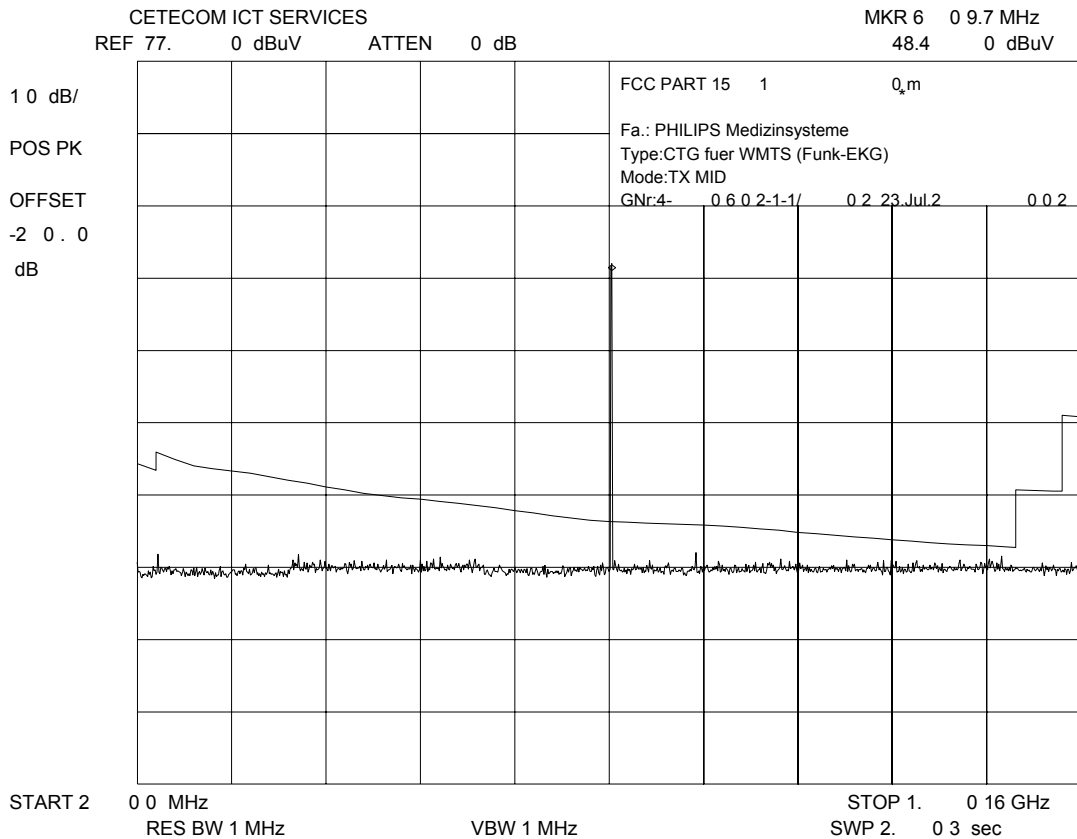
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
mid channel, 200 – 1000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 10m distance. We made additional measurements with CISPR QP Detector and recalculated the results to 3m distance by adding 10.5 dB.

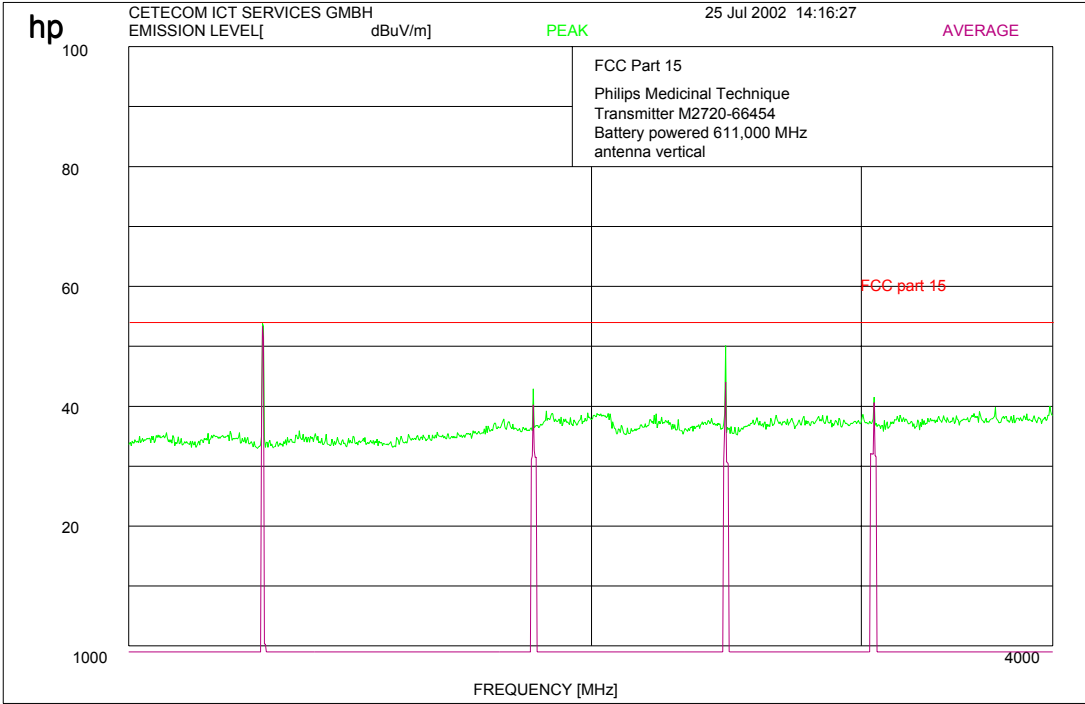
All peaks were below limit.

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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
mid channel, 1000 - 4000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 3m distance. We made additional measurements with AV Detector.

All peaks were below limit.

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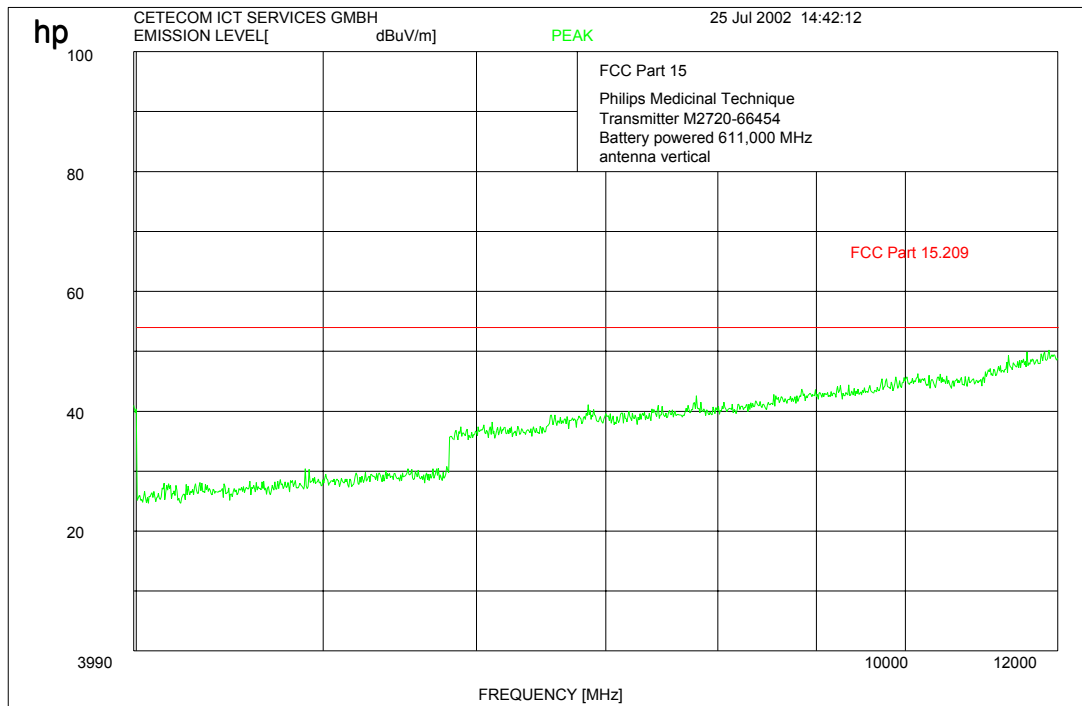
Page 15 (30)

TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated

mid channel, 4000 - 12000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 3m distance. We made additional measurements with AV Detector.

All peaks were below limit.

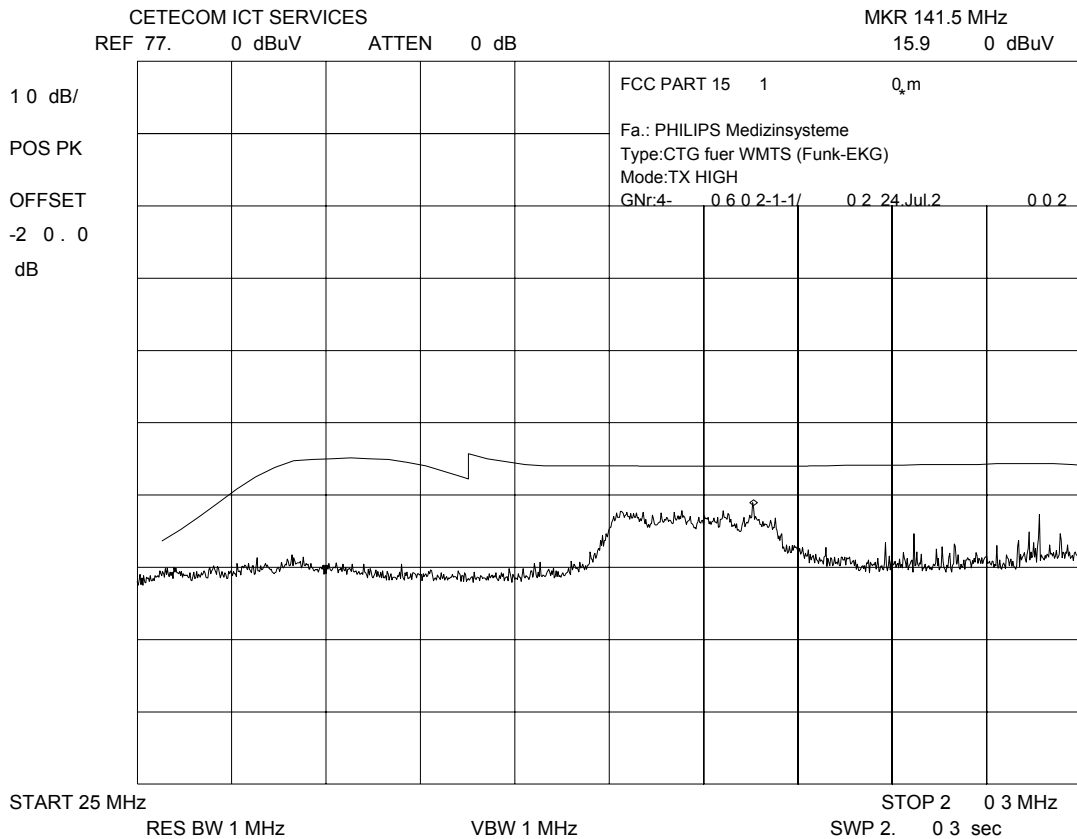
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
high channel, 30 - 200 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 10m distance. We made additional measurements with CISPR QP Detector and recalculated the results to 3m distance by adding 10.5 dB.

All peaks were below limit.

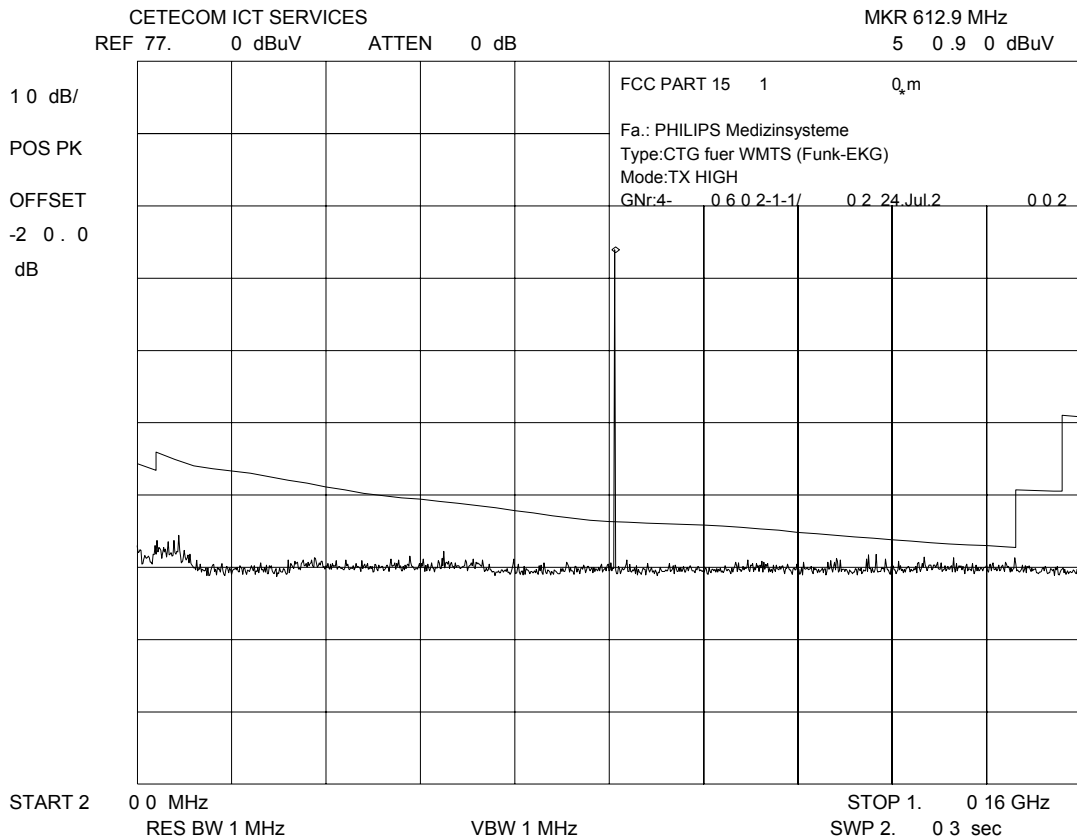
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
high channel, 200 – 1000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 10m distance. We made additional measurements with CISPR QP Detector and recalculated the results to 3m distance by adding 10.5 dB.

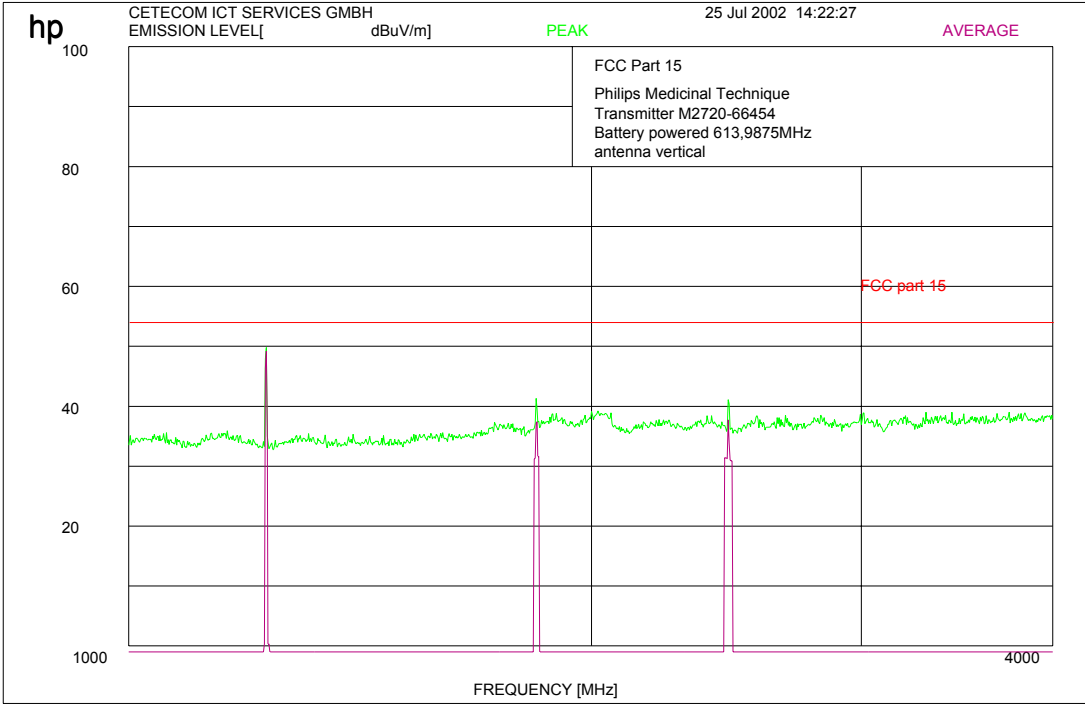
All peaks were below limit.

CETECOM ICT Services GmbH

TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
high channel, 1000 - 4000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 3m distance. We made additional measurements with AV Detector.

All peaks were below limit.

CETECOM ICT Services GmbH

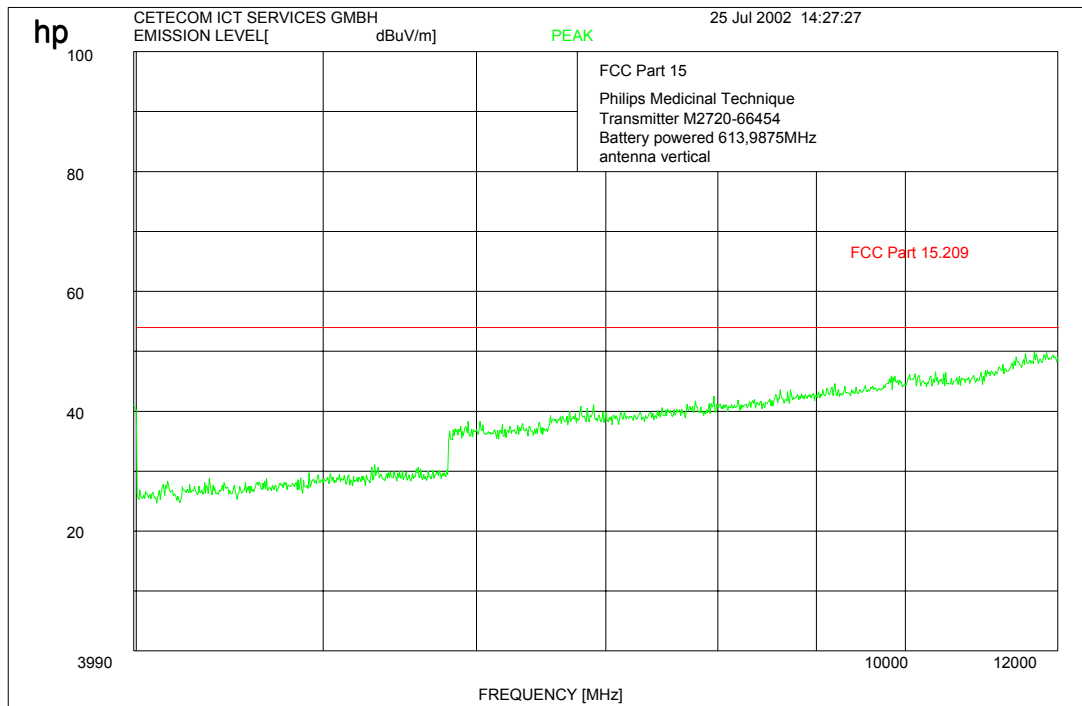
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TRANSMITTER SPURIOUS RADIATION

FCC Part 15.242 / 95.1115

Radiated
high channel, 4000 - 12000 MHz vertical



This plot shows peak values and the limit according to FCC15.209 at 3m distance. We made additional measurements with AV Detector.

All peaks were below limit.

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CHANNEL USE

FCC Part 95/1115

The transmitters are designed to operate in the 4 channels according to FCC 95.1115.

The transmitters have a used bandwidth of 10 kHz. They are able to work with a channel separation of 12.5 kHz.

So they fulfill the requirements of the new FCC Part 95.1115.

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TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Receiver	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

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TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

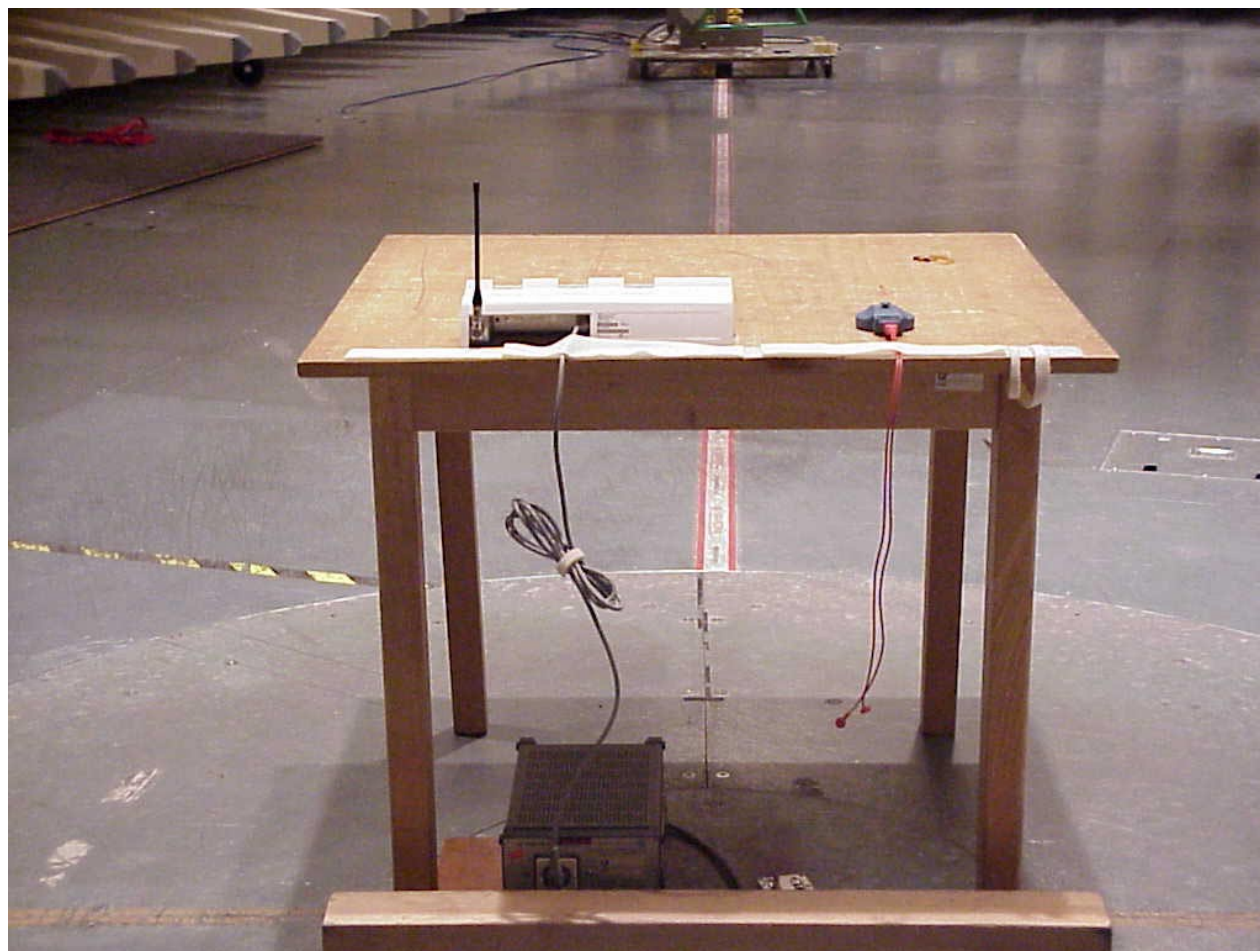
To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Control Computer	HD 100	Deisel	100/322/93
37	Relay Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relay Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spectrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Measuring Receiver	ESH 3	Rohde & Schwarz	890 174/002
43	Measuring Receiver	ESVP	Rohde & Schwarz	891 752/005
44	Bicon Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisation Network	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridged Horn Antenna 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Controler	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Network	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Network	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phase V-Network	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phase V-Network	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Power Supply	6032A	Rohde & Schwarz	2933A05441
59	RF-Test Receiver	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	RF-Test Receiver	ESH3	Rohde & Schwarz	881 515/002
62	Relay Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relay Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
66				
67				
68				

PHOTOGRAPHS OF THE EQUIPMENT

Radiation test site

Photograph no.: 1



PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

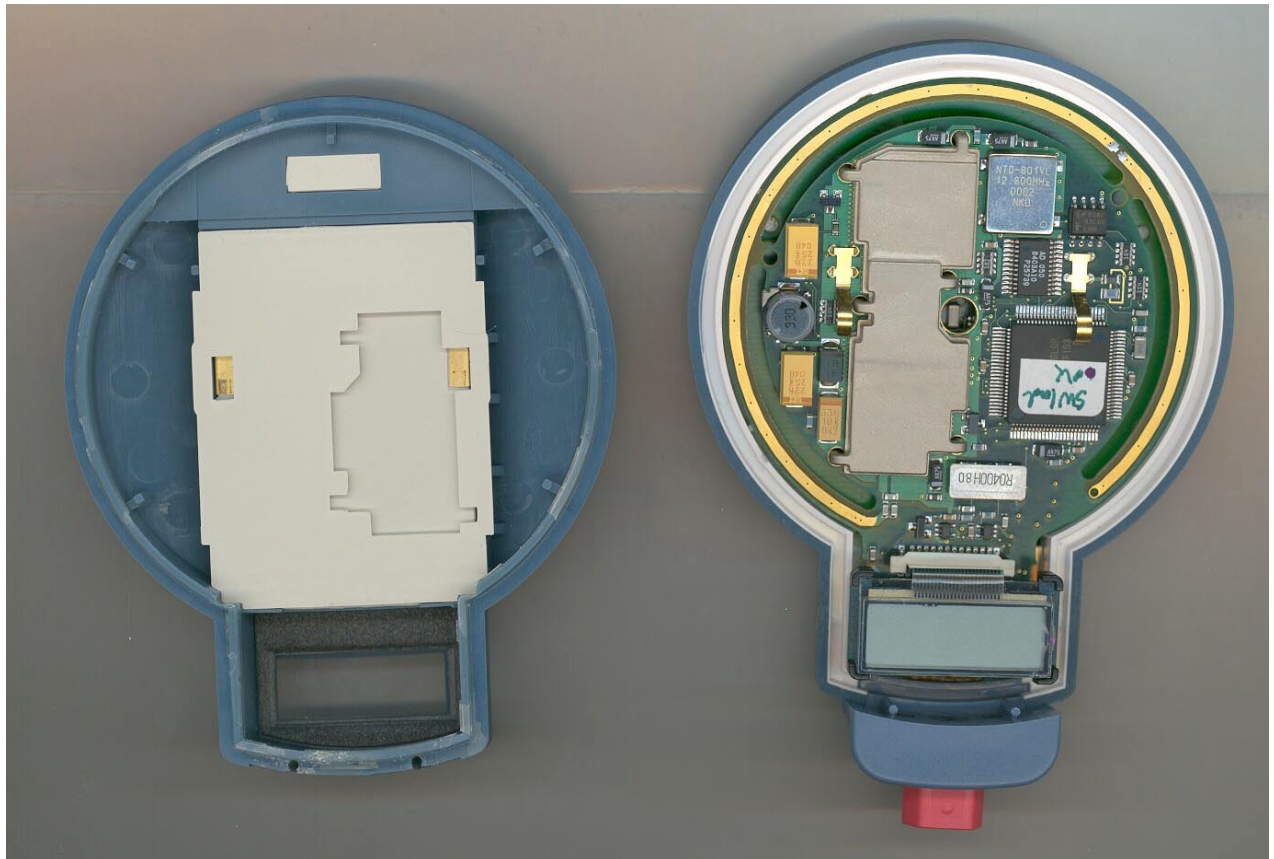
Photograph no.: 2



PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

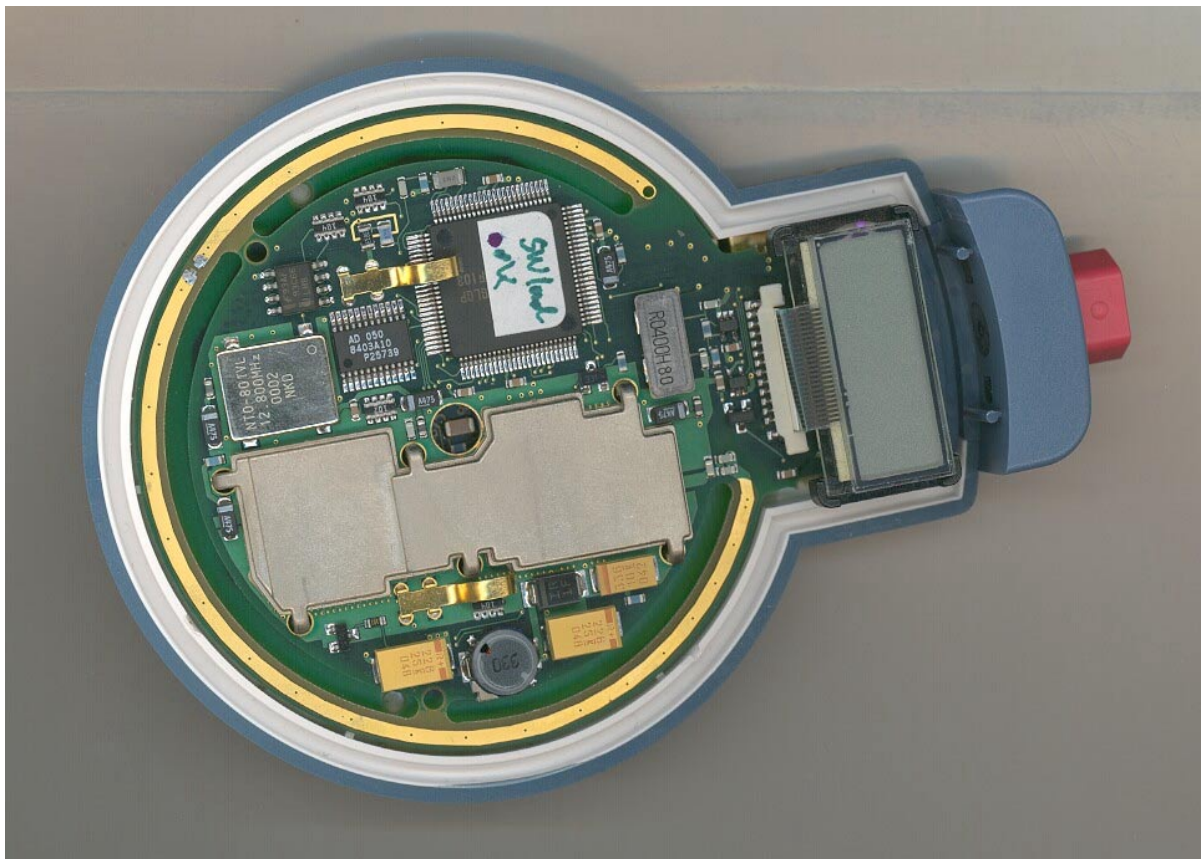
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PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

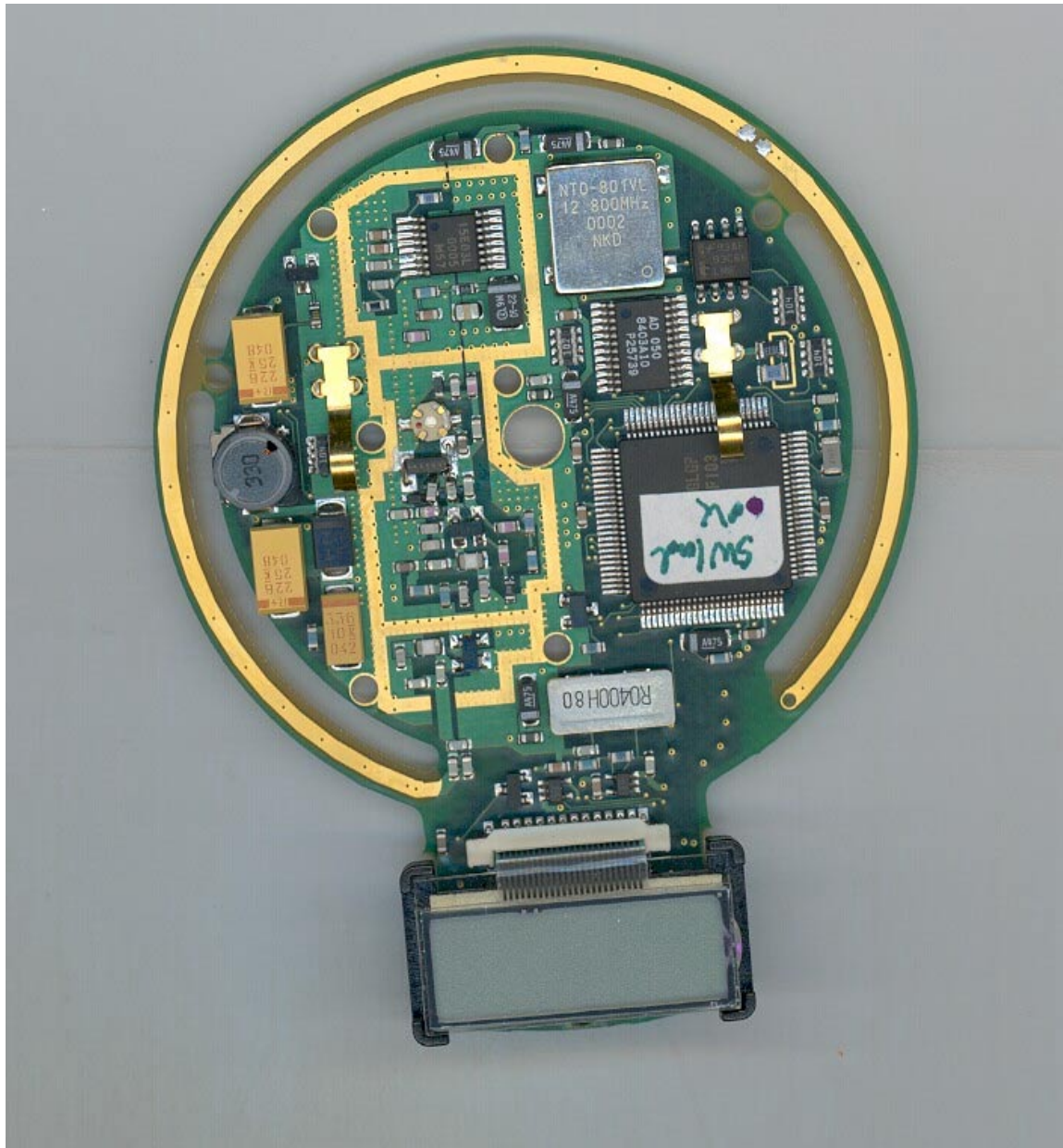
Photograph no.: 4



PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

Photograph no.: 5



PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

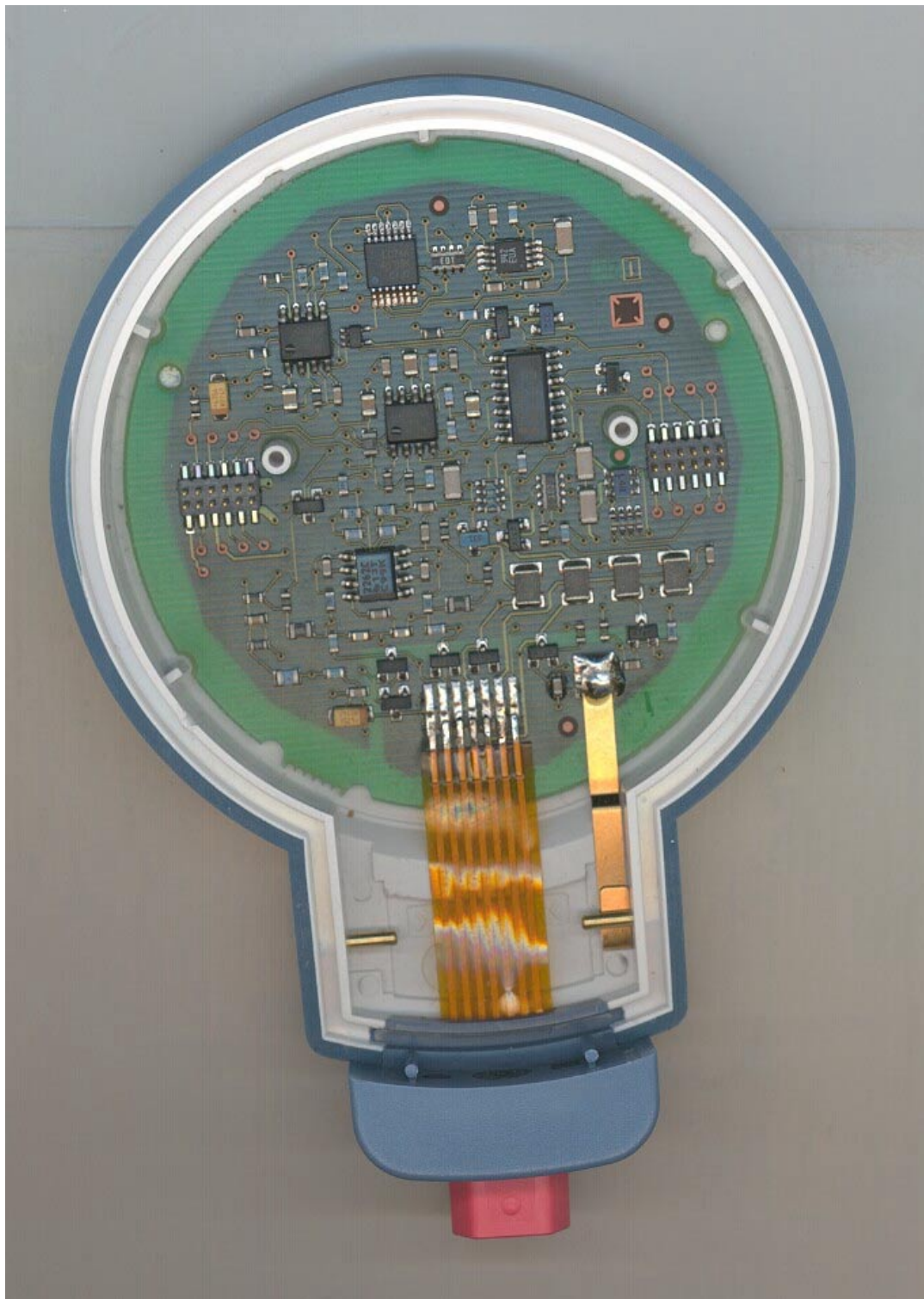
Photograph no.: 6



PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

Photograph no.: 7



PHOTOGRAPHS OF THE EQUIPMENT

M2727A ECG-Transducer

Photograph no.: 8

