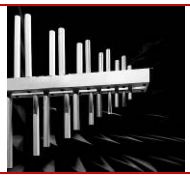
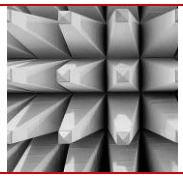




CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Deutscher Akkreditierungs Rat DAR

Test report no.: 1-2890-01-03/10-A

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited test laboratory:
The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAR registration number: DGA-PL-176/94-D1

Area of Testing: Radio/Satellite Communications

Applicant

Philips Medizin Systeme Böblingen GmbH

Hewlett-Packard-Strasse 2
71034 Böblingen / Germany
Phone:
Fax: +49-7031-463 2442
Contact: Mr. Markus Stacha
e-mail: markus.stacha@philips.com
Phone: +49-7031-463 2840

Manufacturer

Philips Medizin Systeme Böblingen GmbH

Hewlett-Packard-Strasse 2
71034 Böblingen / Germany

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
47 CFR Part 2	Title 47 of the Code of Federal Regulations; Chapter I Federal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations
RSS - 210 Issue 8	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test item

Kind of test item:	**SRR Module Intended for 865241 and 865242 Patient Monitors**
Model name:	**Dual SRR Module**
FCC ID:	**PQC-SRRBV1**
IC:	**3549C-SRRBV1**
Frequency:	**2400.00 MHz – 2483.50 MHz**
Power supply:	**110 V AC**
Operating Temperature range:	**0 °C - 40 °C**

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test performed:

cn=Jakob Reschke, o=CETECOM ICT Services GmbH, ou=RES-101109, email=Jakob.Reschke@cetecom.com, c=DE
2011.05.26 08:13:22 +02'00'

Jakob Reschke

Test report authorised:

cn=Stefan Boes, o=Cetecom ICT Services GmbH, ou=BOE-100817, email=Stefan.Boes@cetecom.com, c=DE
2011.05.26 10:16:43 +02'00'

Stefan Bös

1 Table of contents

2 General information

2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations 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 CETECOM ICT Services GmbH.
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2011-01-26
Date of receipt of test item:	2011-03-03
Start of test:	2011-03-03
End of test:	2011-03-05
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Version	Test standard description
47 CFR Part 2	2009-10	Title 47 of the Code of Federal Regulations; Chapter IFederal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations
47 CFR Part 15	2009-10	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	2010-02	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test environment

Temperature:	T_{nom}	23	°C during room temperature tests
	T_{max}	-/-	°C during high temperature test
	T_{min}	-/-	°C during low temperature test
Relative humidity content:		33 %	
Air pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	110 V	AC
	V_{max}	-/- V	
	V_{min}	-/- V	

5 Test item

Kind of test item	**:**	**Dual SRR Module**
Type identification	**:**	**Dual Short Range Radio Module Intended for 865241 and 865242 Patient Monitors** **Monitor Product Number: 865241 with Module M8100-66491** **Monitor Serial Number: DE051Y0111** **Module Hardware Status: 1032** **Module Software Status: A.00.83**
Frequency band	**:**	**2400.00 MHz – 2483.50 MHz**
Type of modulation	**:**	**OQPSK**
Number of channels	**:**	**16**
Antenna	**:**	**Integrated antenna (for more information please see pictures in the annex)**
Power supply	**:**	**110 V AC**
Operating Temperature range	**:**	**0 °C – 40 °C**

Max. power radiated (EIRP) radio 1: -0.83 dBm / 0.83 mW
Max. power radiated (EIRP) radio 2: -0.20 dBm / 0.95 mW

SAR/RF Exposure Statement:

According to the FCC and IC regulations SAR/RF exposure tests are not required because the maximum radiated output power of the Short Range Radio module is 0.95 mW. This value is far below the SAR/RF exposure limit of 25 mW (60/F[GHz]).

6 Test laboratories sub-contracted

None

7 Summary of measurement results

☒ **No deviations from the technical specifications were ascertained**

☐ There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 7, Annex 8	Passed	2011-05-26	Only delta measurements performed

Test specification clause	Test case	Temperature conditions	Power source voltages	Pass	Fail	NA	NP	Results (max.)
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	Nominal	Nominal	☐	☐	☐	☒	
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	☐	☐	☐	☒	
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	☐	☐	☐	☒	
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	☐	☐	☐	☒	
§15.247(a)(1) (iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	☐	☐	☐	☒	
§15.247(a)(1) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	☐	☐	☐	☒	
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	☐	☐	☐	☒	
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	☐	☐	☐	☒	
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.109 RSS-Gen.	RX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

See section 8.2 for reason why tests have not been performed

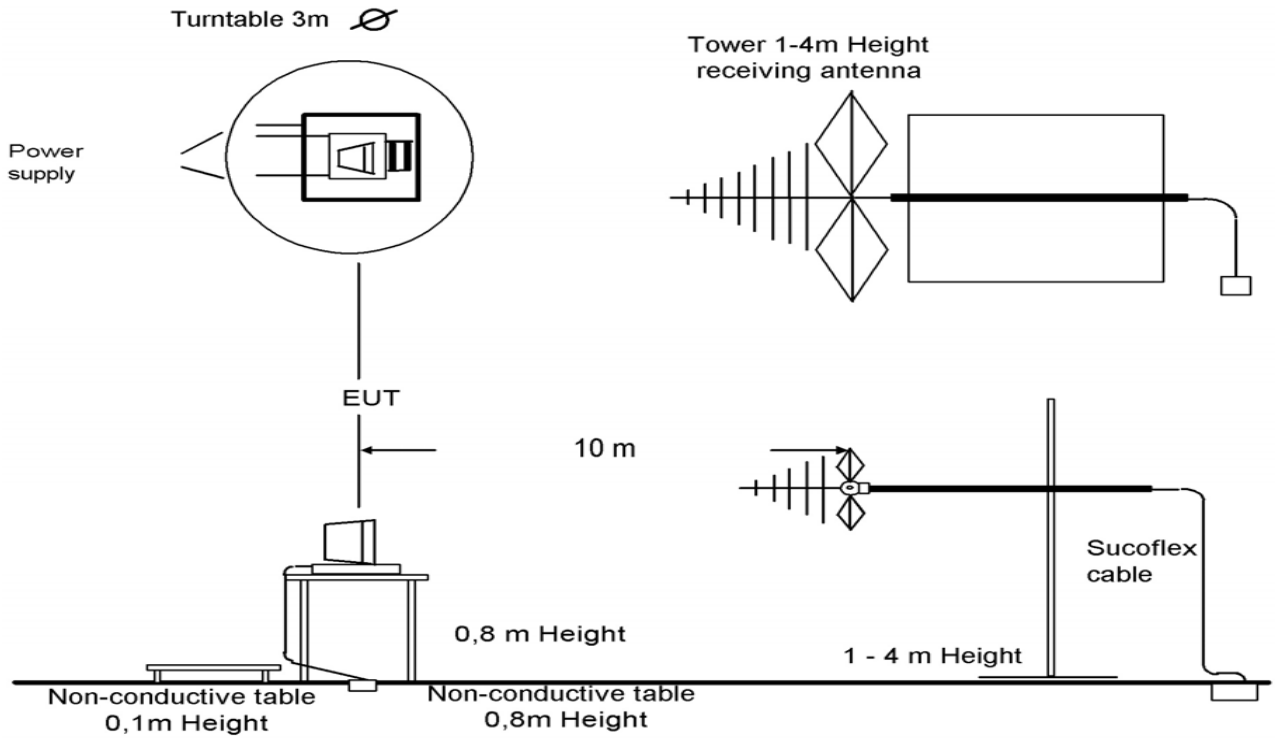
8 RF measurement testing

8.1 Description of test setup

8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2003 clause 4.2.
Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber

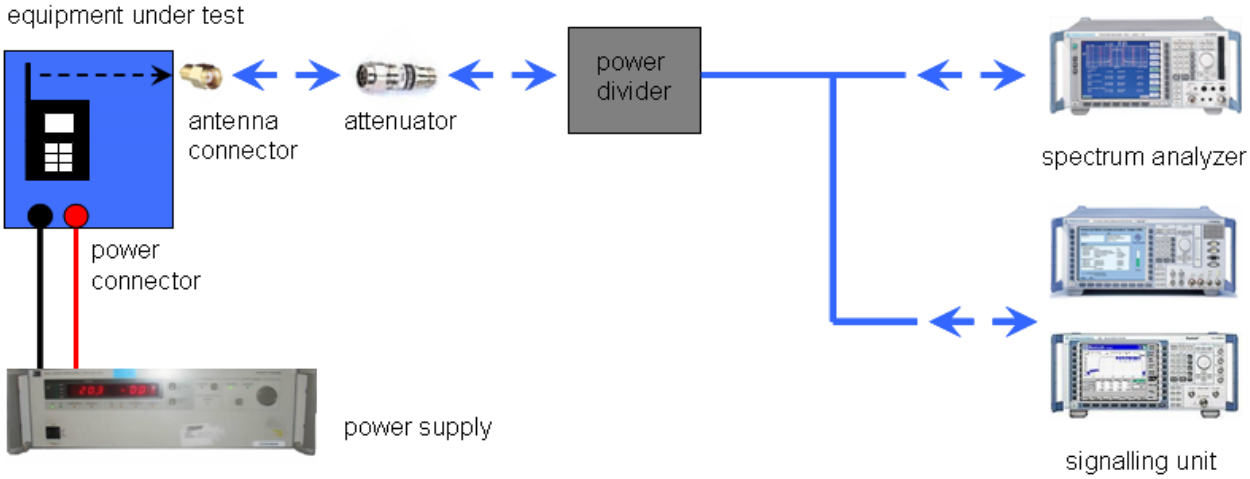


Picture 1: Diagram radiated measurements

9 kHz - 30 MHz:	active loop antenna
30 MHz – 1 GHz:	tri-log antenna
> 1 GHz:	horn antenna

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

8.2 Additional comments

Rationale:
The full test suite has been performed on the M8100-66491 radio module and those tests have been documented in the test report 1-0384-01-03/08-C. This report contains only tests deemed to be necessary in the new host device, because both host devices contain the same radio module. Test cases referring to a module specific parameter, which cannot be influenced by a host system, have not been repeated.

All tests documented in this test report have been performed on the patient monitor model 865241. All test results are also valid for the model 865242, which is almost identical to the model 865241. The only difference between models 865241 and 865242 is that the 865241 uses a display with touch screen, while the 865242 uses a display without touch screen. The touch screen is located directly above the display panel. Both touch screen and display panel represent conductive surfaces, therefore any effects on the short range radio will be equivalent.

Special test descriptions: The EUT has two transmitters. Each transmitter was tested separately.

Test mode:	X	Special software is used. EUT is transmitting pseudo random data by itself

8.3 RSP100 test report cover sheet / performance test data

Test report number	:	**1-2890-01-03/10-A**
Equipment model number	:	**Dual SRR Module Intended for 865241 and 865242 Patient Monitors**
Certification number	:	**3549C-SRRBV1**
Manufacturer (complete address)	:	**Philips Medizin Systeme Böblingen GmbH Hewlett-Packard-Strasse 2 71034 Böblingen / Germany**
Tested to radio standards specification no.	:	**RSS 210, Issue 8, Annex 8**
Open area test site IC No.	:	**IC 3462C-1**
Frequency range	:	**2400 – 2483.5 MHz-band (2405 – 2480 MHz)**
RF-power [W] (max.)	:	**EIRP: 0.83 mW (Transmitter 1) EIRP: 0.95 mW (Transmitter 2)**
Occupied bandwidth (99%-BW) [kHz]	:	**See test report 1-0384-01-03/08-C**
Type of modulation	:	**OQPSK**
Emission designator (TRC-43)	:	**See test report 1-0384-01-03/08-C**
Antenna information	:	**Integrated antenna**
Transmitter spurious (worst case) [µV/m @ 3m]	:	**244 µV/m @ 4880 MHz**
Receiver spurious (worst case) [µV/m @ 3m]	:	**56 µV/m @ 1200 MHz**

ATTESTATION:
DECLARATION OF COMPLIANCE:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory manager:

cn=Jakob Reschke, o=CETECOM ICT Services GmbH, ou=RES-101109, email=Jakob.Reschke@cetecom.com, c=DE
2011.05.26 08:13:40 +02'00'

2011-05-26	Jakob Reschke	
Date	Name	Signature

9 Measurement results

9.1 Antenna gain

Not performed

9.2 Power spectral density

Not performed

9.3 Carrier frequency separation

Not performed

9.4 Number of hopping channels

Not performed

9.5 Time of occupancy (dwell time)

Not performed

9.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Not performed

9.7 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. EUT in single channel mode.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	3 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (b)(1)	RSS 210, Issue 7, A 8.4(2)
Maximum output power	
[Conducted: 0.125 W – antenna gain max. 6 dBi] Systems using more than 75 hopping channels: Conducted: 1.0 W – antenna gain max. 6 dBi	

Result:

Modulation	Maximum output power radiated - EIRP [dBm]		
Frequency	Lowest channel	Middle channel	Highest channel
Transmitter 1	-1.20	-1.70	-0.83
Transmitter 2	-0.56	-0.80	-0.20
Measurement uncertainty	± 3 dB		

Result: **The result of the measurement is passed.**

9.8 Band edge compliance conducted

Not performed

9.9 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to the lowest channel for the lower restricted band and the highest channel for the upper restricted band. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	10 Hz
Resolution bandwidth:	1 MHz
Span:	Lower Band: 2300 – 2400 MHz higher Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

Limits:

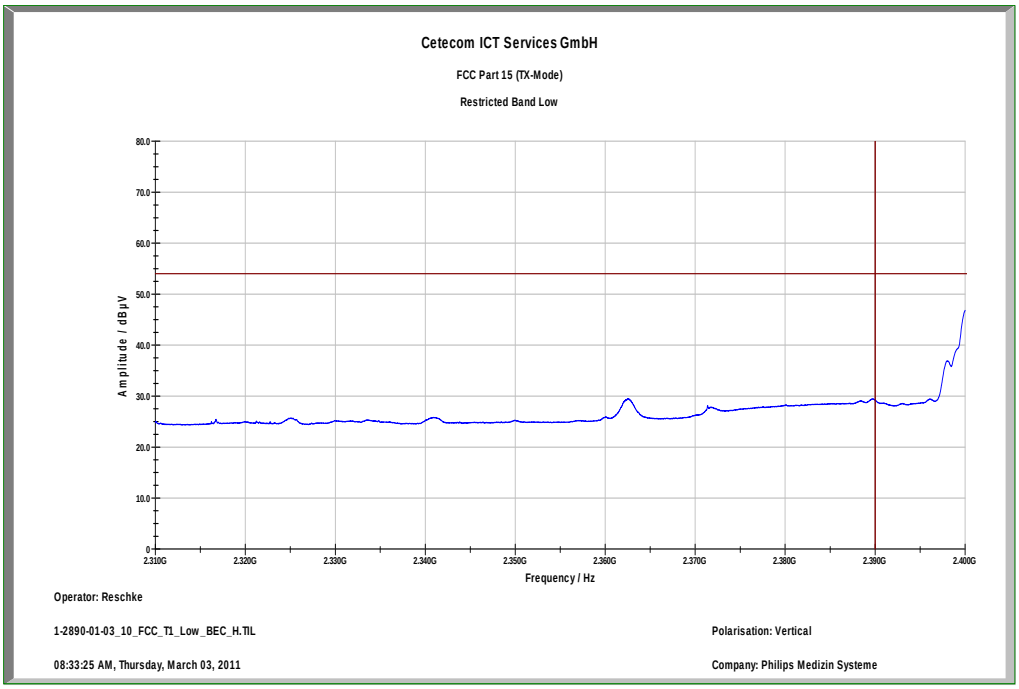
FCC	IC
CFR Part 15.205	RSS 210, Issue 7, A 8.5
Band edge compliance radiated	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).	
54 dBµV/m AVG	

Result: Also see plots

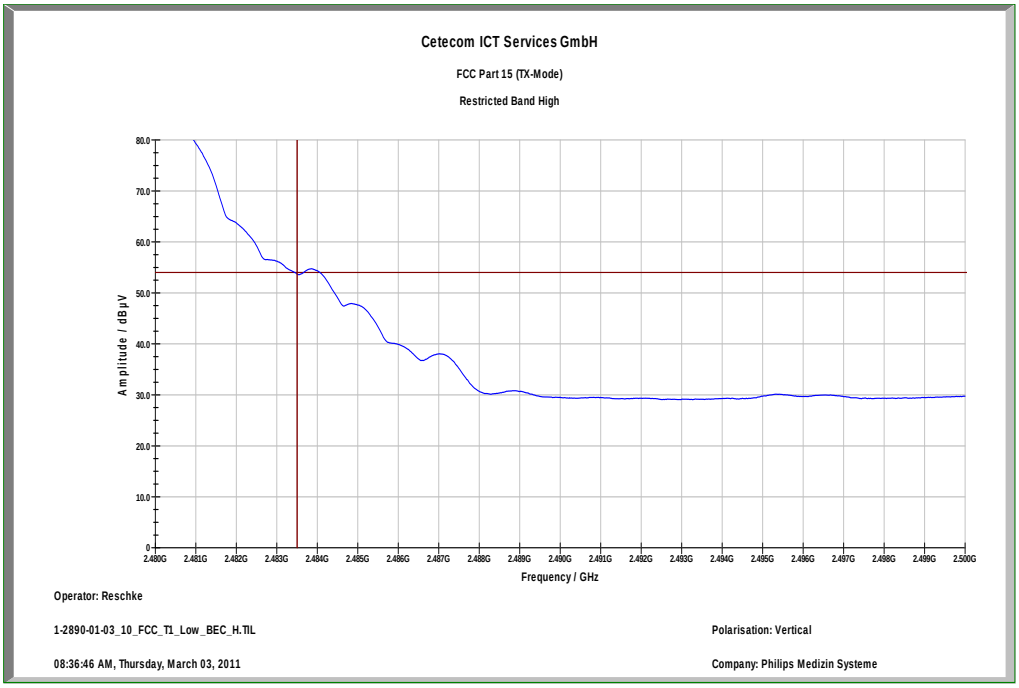
Szenario	Band edge compliance radiated [dBµV/m]	
Modulation	Transmitter 1	Transmitter 2
Lower restricted band	< 54 (see plot 1)	< 54 (see plot 3)
Upper restricted band	< 54 (see plot 2)	< 54 (see plot 4)
Measurement uncertainty	± 3 dB	

Result: The result of the measurement is passed.

Plot 1: Lower Restricted Band / Transmitter 1



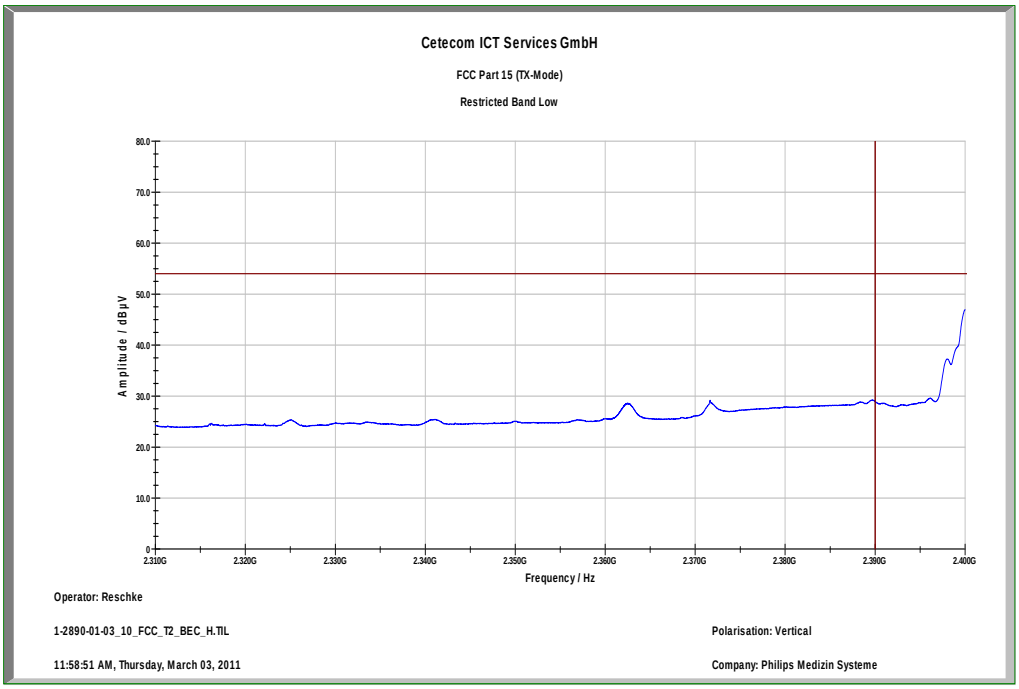
Plot 2: Upper Restricted Band / Transmitter 1



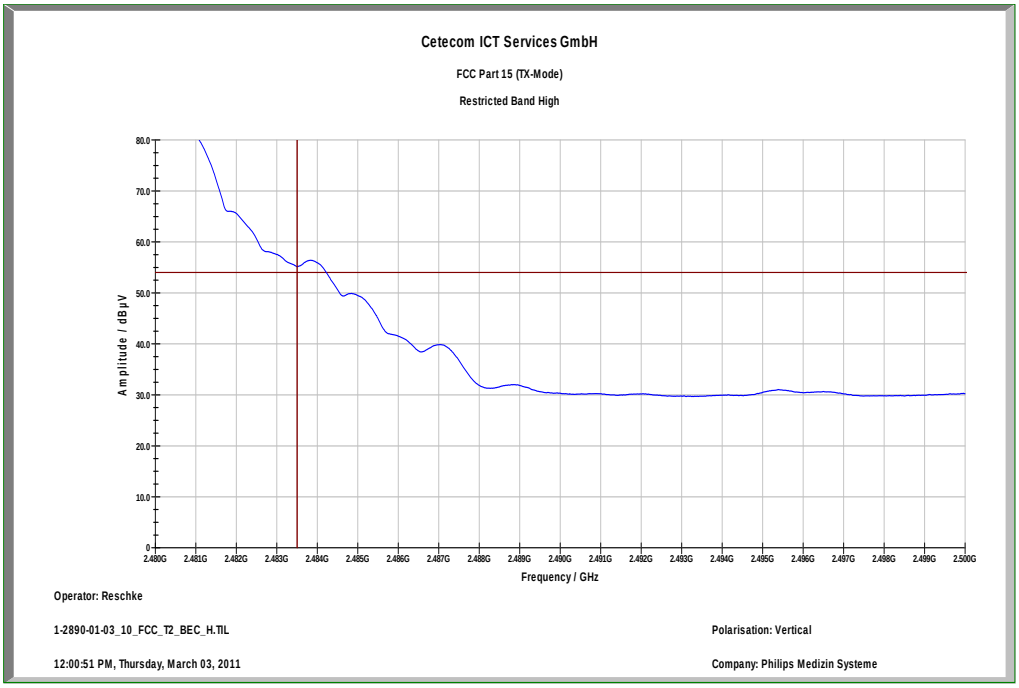
From the manufacturer declared normal use duty cycle = 17.024%
Duty cycle correction factor = 20*log (TX_time@100ms/100ms) = -15.38dB

Highest value in the restricted band found = 56.00dBuV/m
Highest value in the restricted re-calculated = 40.662dBuV/m

Plot 3: Lower Restricted Band / Transmitter 2



Plot 4: Upper Restricted Band / Transmitter 2



From the manufacturer declared normal use duty cycle = 17.024%
Duty cycle correction factor = 20*log (TX_time@100ms/100ms) = -15.38dB

Highest value in the restricted band found = 57.06dBuV/m
Highest value in the restricted re-calculated = 41.68dBuV/m

9.10 TX spurious emissions conducted

Not performed

9.11 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 11, channel 18 and channel 26.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Re-measurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC	IC	
CFR Part 15.247(d)	RSS 210, Issue 7, A 8.5	
TX spurious emissions radiated		
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
§15.209		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Result: **Transmitter 1 (Also see plots)**

TX spurious emissions radiated [dBµV/m]								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
Please see table below the plot 30 MHz – 1 GHz			Please see table below the plot 30 MHz – 1 GHz			Please see table below the plot 30 MHz – 1 GHz		
Measurement uncertainty			± 3 dB					

Result: **Transmitter 2 (Also see plots)**

TX spurious emissions radiated [dBµV/m]								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
Please see table below the plot 30 MHz – 1 GHz			Please see table below the plot 30 MHz – 1 GHz			Please see table below the plot 30 MHz – 1 GHz		
4810	1 MHz	47.00	4880	1 MHz	47.74	4960	1 MHz	47.33
Measurement uncertainty			± 3 dB					

Result: **The result of the measurement is passed.**

Transmitter 1

Plot 1: 30 MHz to 1 GHz / lowest channel (horizontal/vertical)

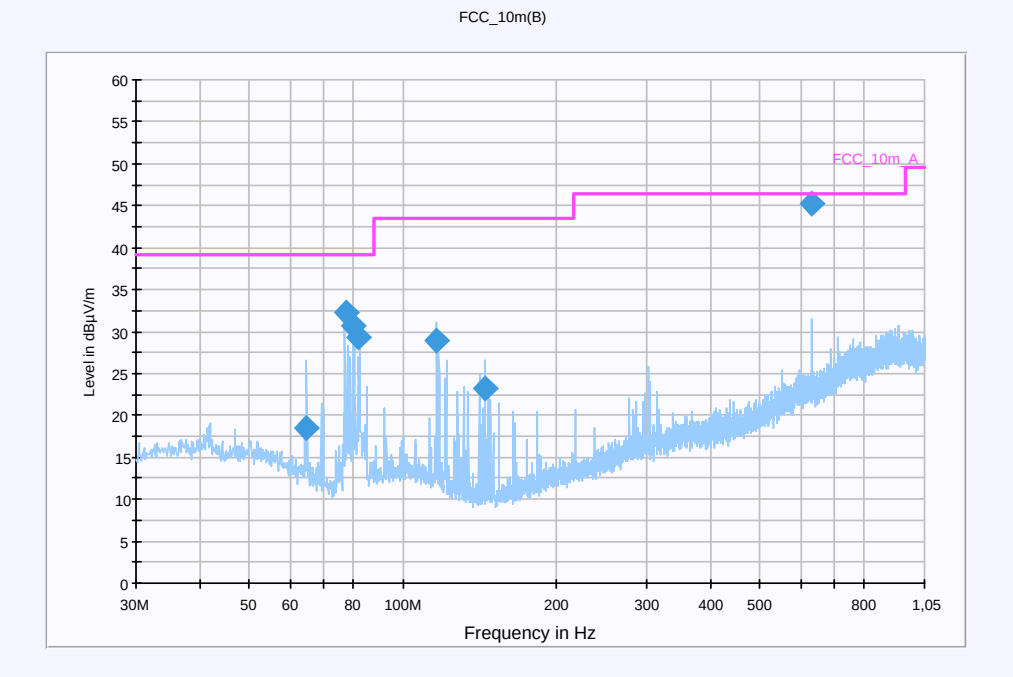
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	radio 1: Tx Ch 11
Operator Name:	LAN
Comment:	AC 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

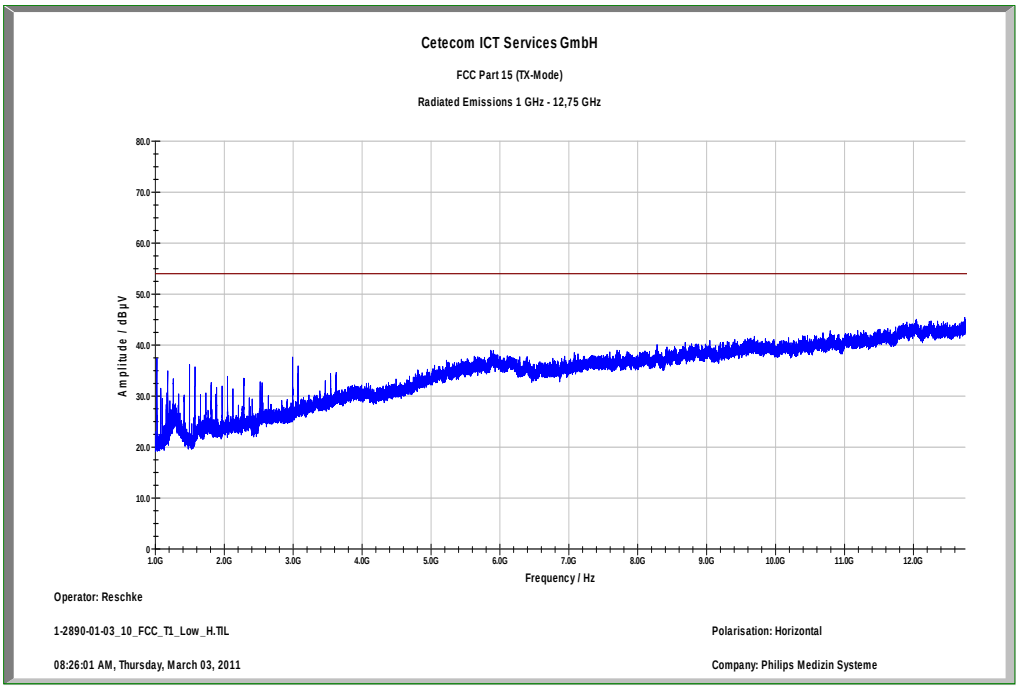
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

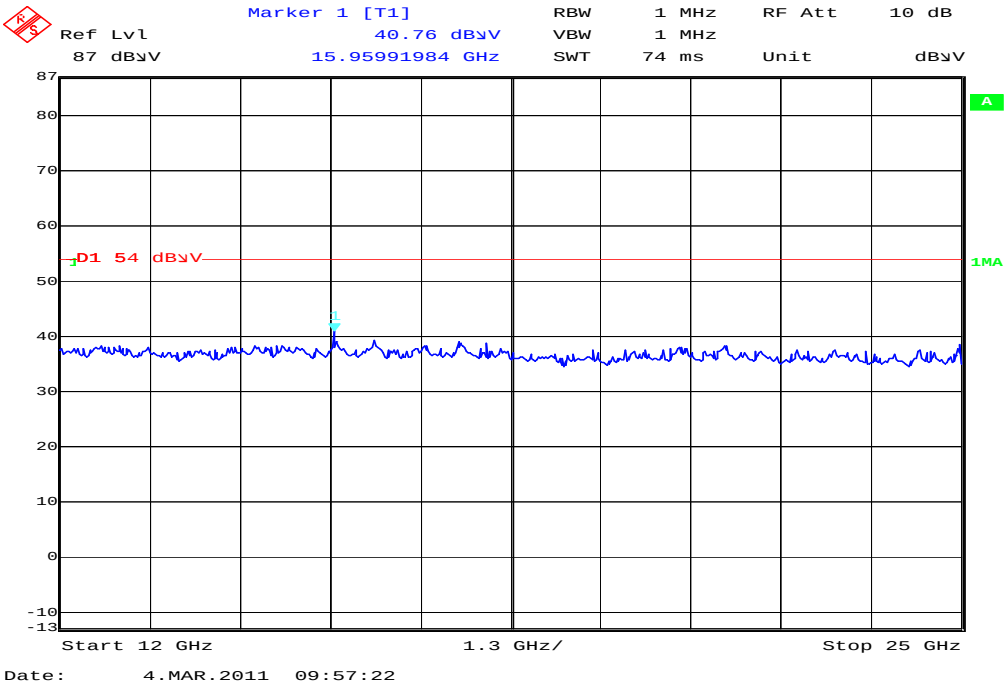
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
64.722450	18.5	15000.000	120.000	400.0	V	8.0	10.5	11.5	30.0	
77.453100	32.2	15000.000	120.000	233.0	V	49.0	9.1	-2.2	30.0	
80.140950	30.8	15000.000	120.000	400.0	V	20.0	9.1	-0.8	30.0	
81.898050	29.4	15000.000	120.000	400.0	V	21.0	9.4	0.6	30.0	
116.534700	29.0	15000.000	120.000	200.0	V	49.0	10.5	4.5	33.5	
144.379650	23.2	15000.000	120.000	212.0	V	-7.0	8.8	10.3	33.5	
629.860500	45.3	15000.000	120.000	114.0	H	257.0	21.0	-9.3	36.0	

Plot 2: 1 GHz to 12.75 GHz / lowest channel (horizontal/vertical)



Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 3: 12 GHz to 25 GHz / lowest channel (horizontal/vertical) – valid for all channels



Plot 4: 30 MHz to 1 GHz / middle channel (horizontal/vertical)

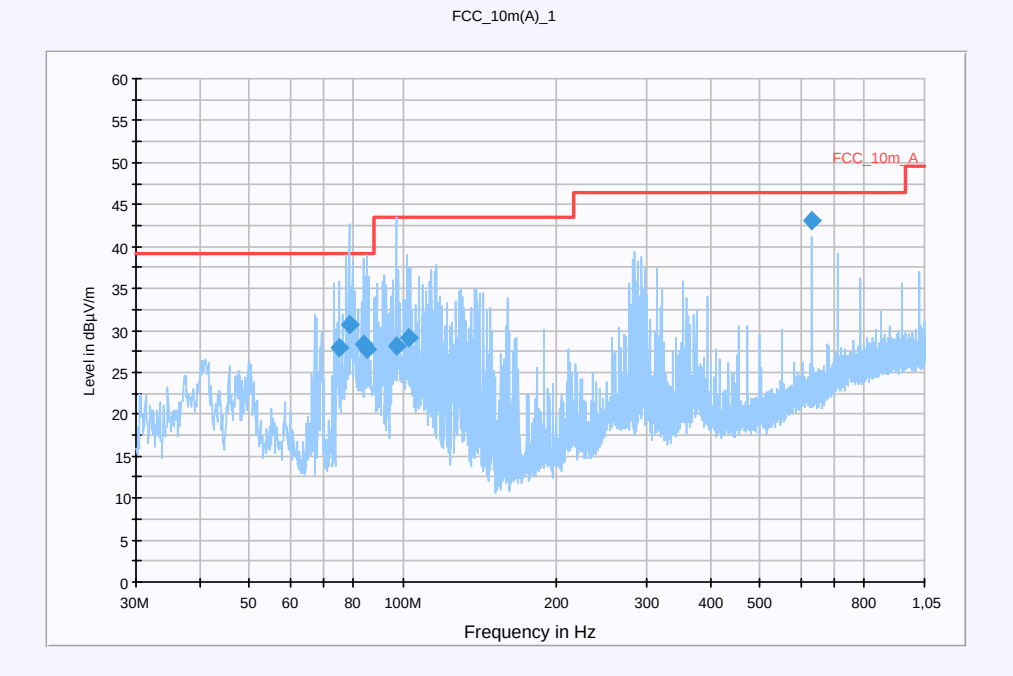
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	radio 1: Tx Ch 18
Operator Name:	LAN
Comment:	AC 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

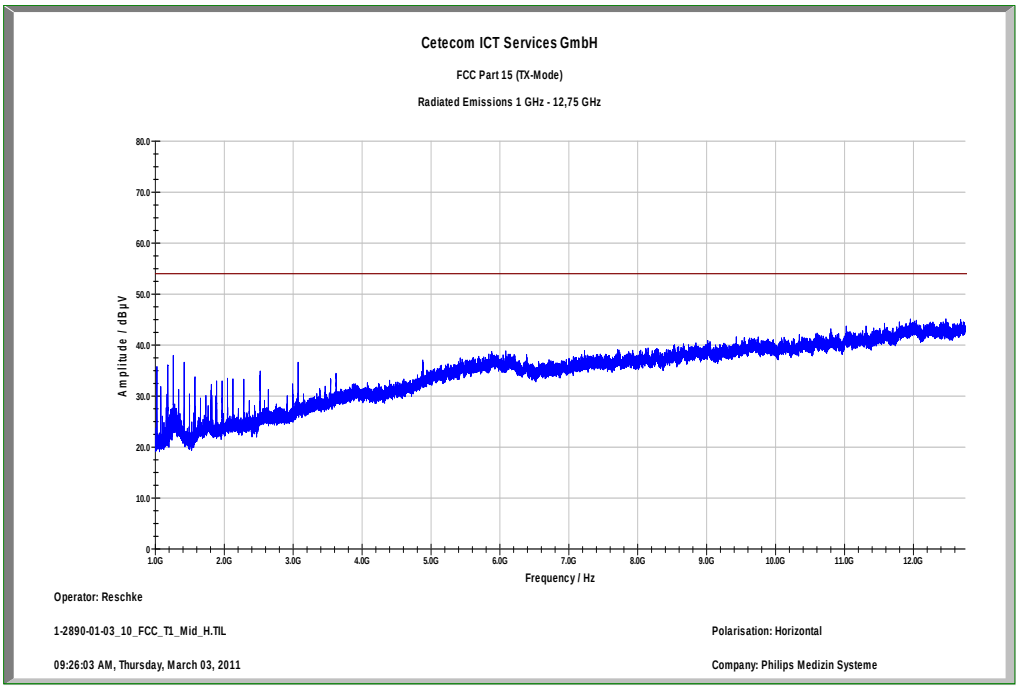
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
74.858700	27.9	15000.000	120.000	400.0	V	219.0	9.2	11.2	39.1	
78.573900	30.6	15000.000	120.000	200.0	V	173.0	9.1	8.5	39.1	
83.891400	28.3	15000.000	120.000	266.0	V	109.0	9.7	10.8	39.1	
84.975150	27.8	15000.000	120.000	198.0	V	168.0	9.8	11.3	39.1	
97.311300	28.1	15000.000	120.000	186.0	V	7.0	11.5	15.4	43.5	
102.255900	29.2	15000.000	120.000	98.0	V	11.0	11.7	14.3	43.5	
629.934000	43.1	15000.000	120.000	134.0	H	242.0	21.0	3.3	46.4	

Plot 5: 1 GHz to 12.75 GHz / middle channel (horizontal/vertical)



Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 6: 30 MHz to 1 GHz / highest channel (horizontal/vertical)

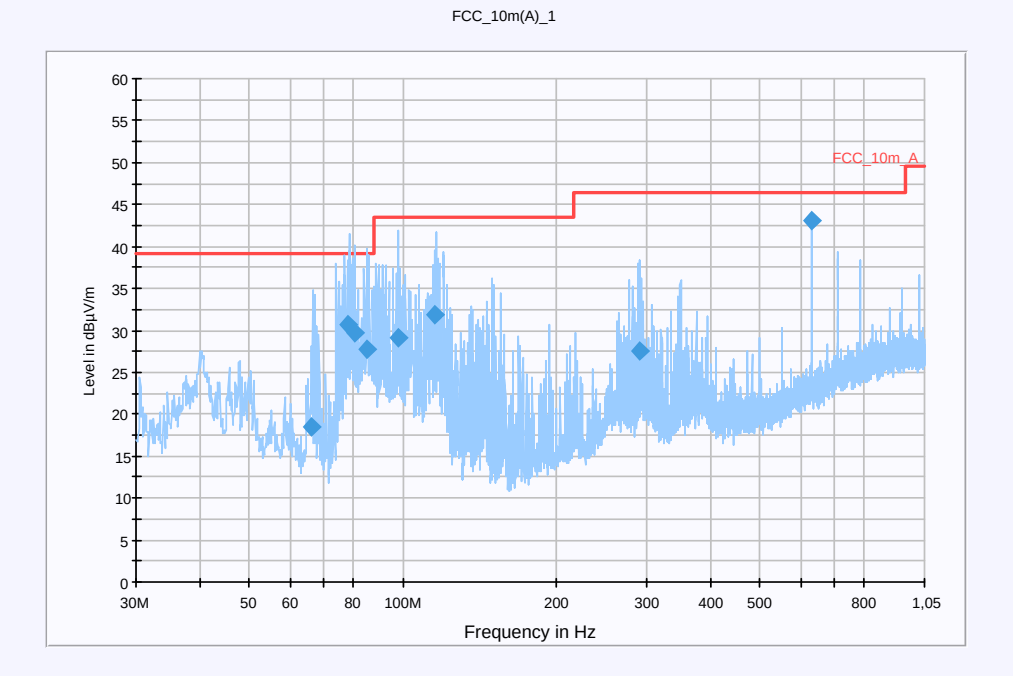
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	radio 1: Tx Ch 26
Operator Name:	LAN
Comment:	AC 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

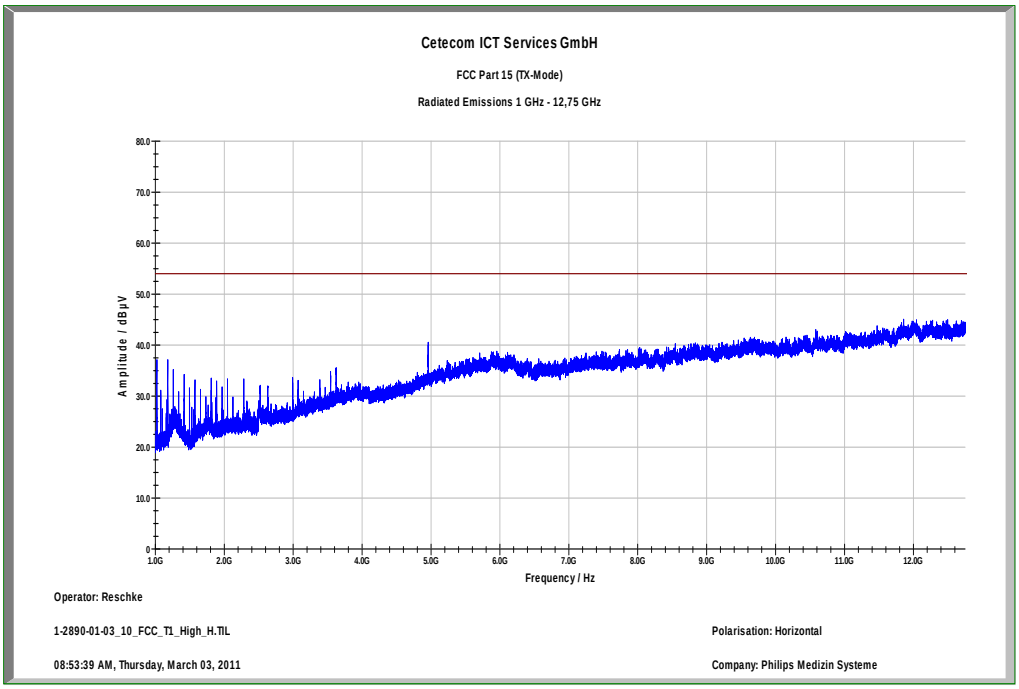
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
66.107250	18.6	15000.000	120.000	400.0	V	232.0	10.2	20.5	39.1	
78.279150	30.6	15000.000	120.000	400.0	V	251.0	9.1	8.5	39.1	
80.357850	29.7	15000.000	120.000	400.0	V	209.0	9.1	9.4	39.1	
85.270800	27.8	15000.000	120.000	400.0	V	10.0	9.9	11.3	39.1	
97.899600	29.1	15000.000	120.000	400.0	V	188.0	11.6	14.4	43.5	
115.765950	31.9	15000.000	120.000	105.0	V	132.0	10.6	11.6	43.5	
290.427900	27.5	15000.000	120.000	98.0	V	173.0	14.3	18.9	46.4	
...	...	...	...	...	...	...	...	...	...	...

Plot 7: 1 GHz to 12.75 GHz / highest channel (horizontal/vertical)



Carrier suppressed with a 2.4 GHz-band rejection filter.

Transmitter 2

Plot 1: 30 MHz to 1 GHz / lowest channel (horizontal/vertical)

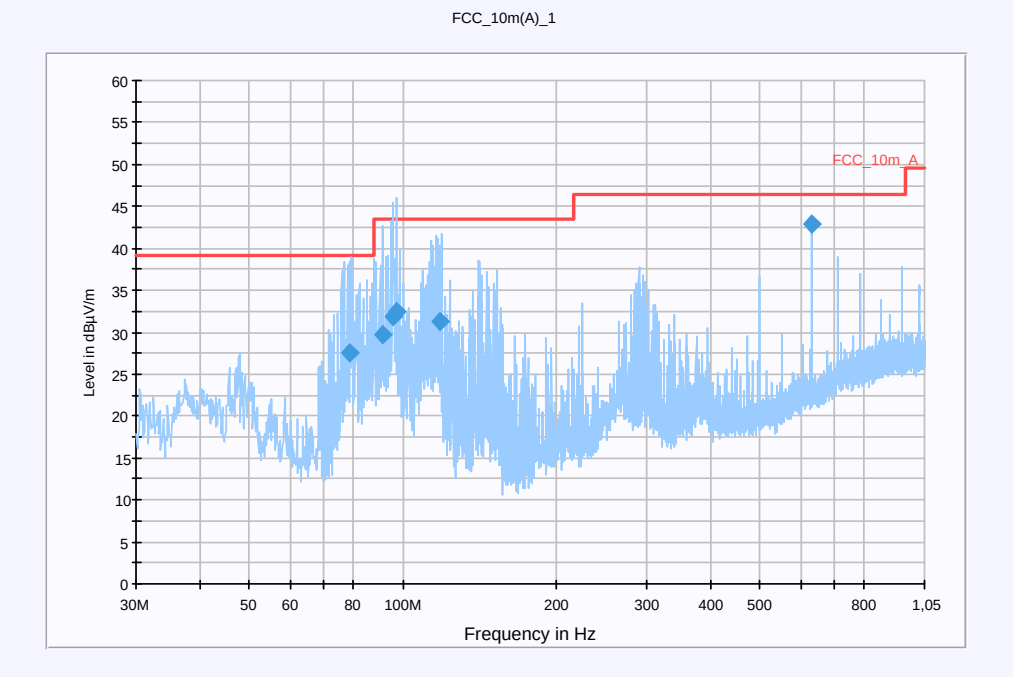
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	radio 2: Tx Ch. 11
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

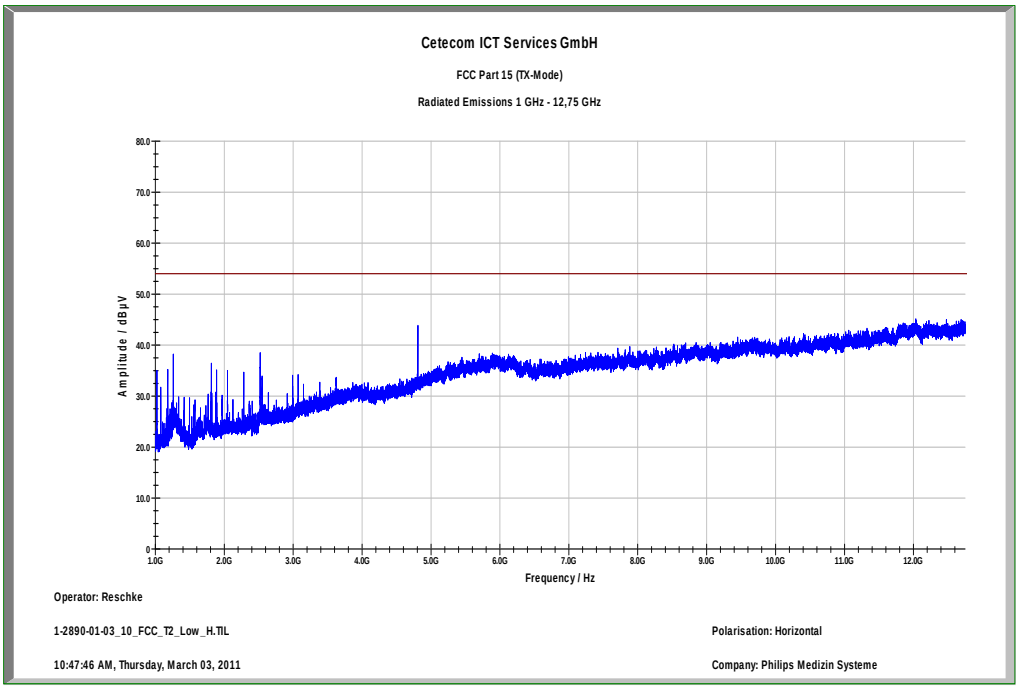
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

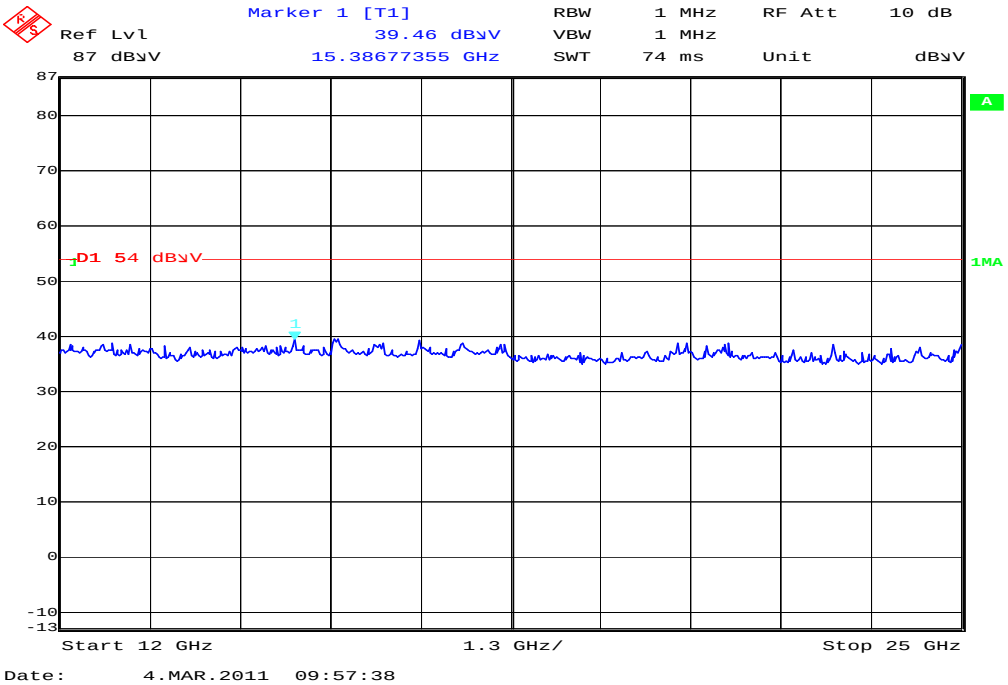
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
78.770700	27.5	15000.000	120.000	198.0	V	107.0	9.1	11.6	39.1	
91.362300	29.8	15000.000	120.000	149.0	V	154.0	10.7	13.7	43.5	
95.817000	31.8	15000.000	120.000	400.0	V	226.0	11.3	11.7	43.5	
97.167900	32.4	15000.000	120.000	221.0	V	281.0	11.5	11.1	43.5	
118.198200	31.3	15000.000	120.000	192.0	V	324.0	10.4	12.2	43.5	
630.099150	42.9	15000.000	120.000	114.0	H	252.0	21.0	3.5	46.4	

Plot 2: 1 GHz to 12.75 GHz / lowest channel (horizontal/vertical)



Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 3: 12 GHz to 25 GHz / lowest channel (horizontal/vertical) – valid for all channels



Plot 4: 30 MHz to 1 GHz / middle channel (horizontal/vertical)

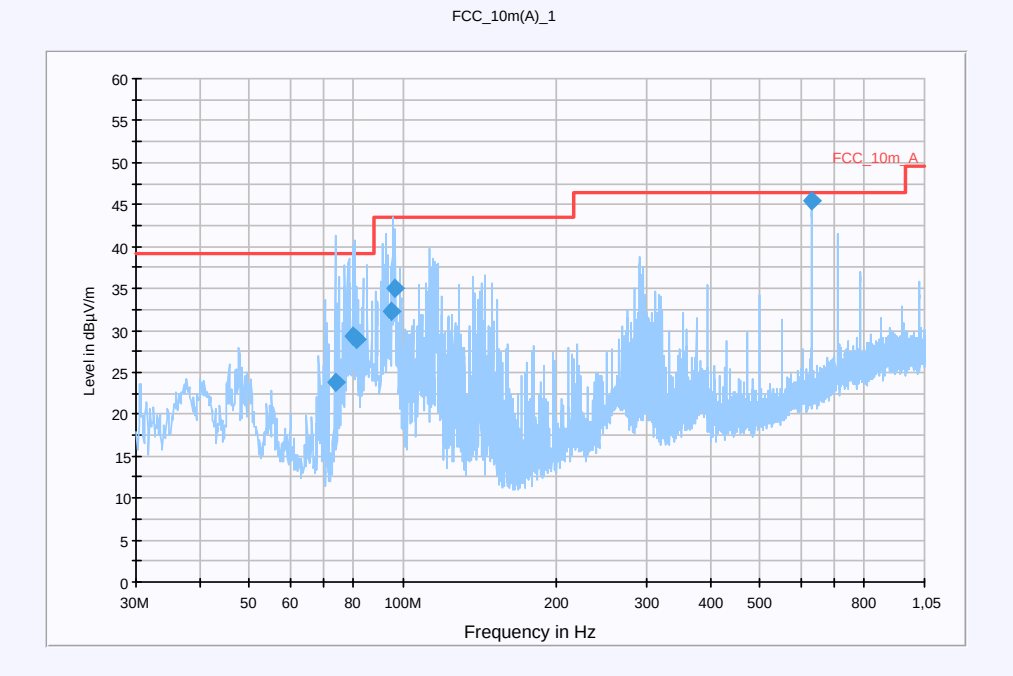
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	radio 2: Tx Ch. 18
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

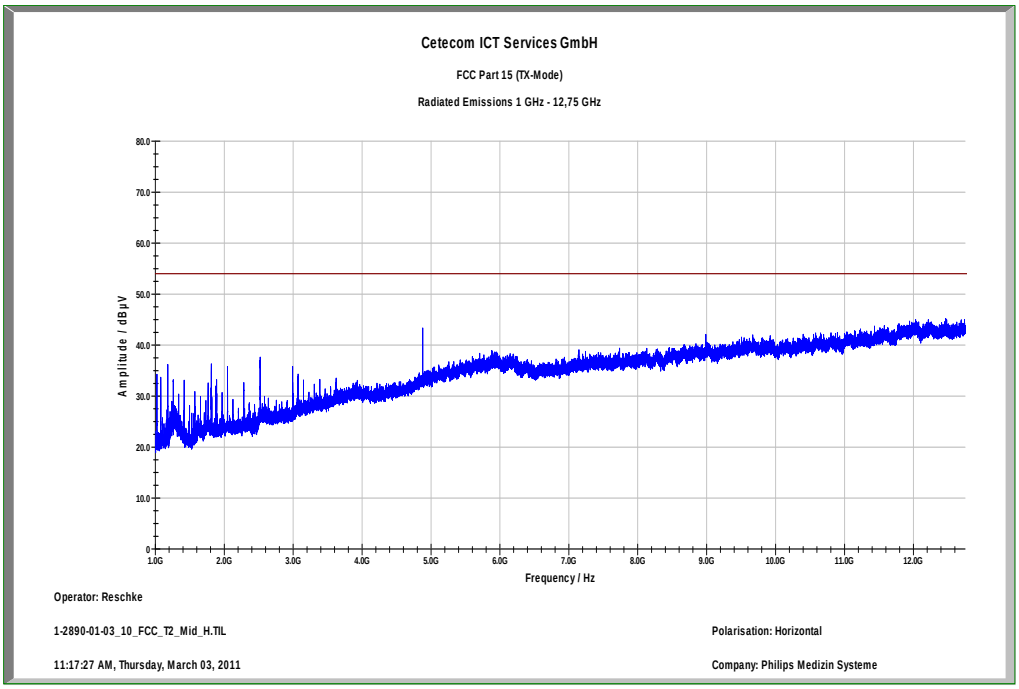
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
73.640850	23.8	15000.000	120.000	365.0	V	48.0	9.2	15.3	39.1	
79.700400	29.2	15000.000	120.000	269.0	V	141.0	9.1	9.9	39.1	
81.022500	29.0	15000.000	120.000	329.0	V	147.0	9.2	10.1	39.1	
95.198400	32.2	15000.000	120.000	200.0	V	310.0	11.3	11.3	43.5	
96.721500	35.0	15000.000	120.000	207.0	V	-7.0	11.5	8.5	43.5	
629.942850	45.4	15000.000	120.000	120.0	H	254.0	21.0	1.0	46.4	

Plot 5: 1 GHz to 12.75 GHz / middle channel (horizontal/vertical)



Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 6: 30 MHz to 1 GHz / highest channel (horizontal/vertical)

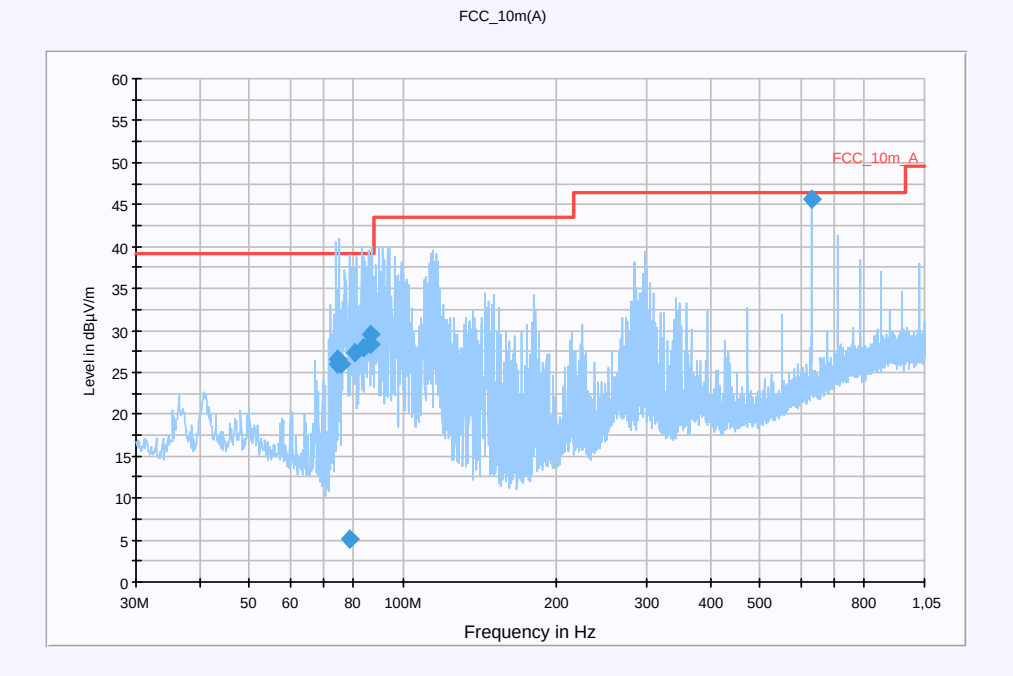
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	radio 2: Tx Ch. 26
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

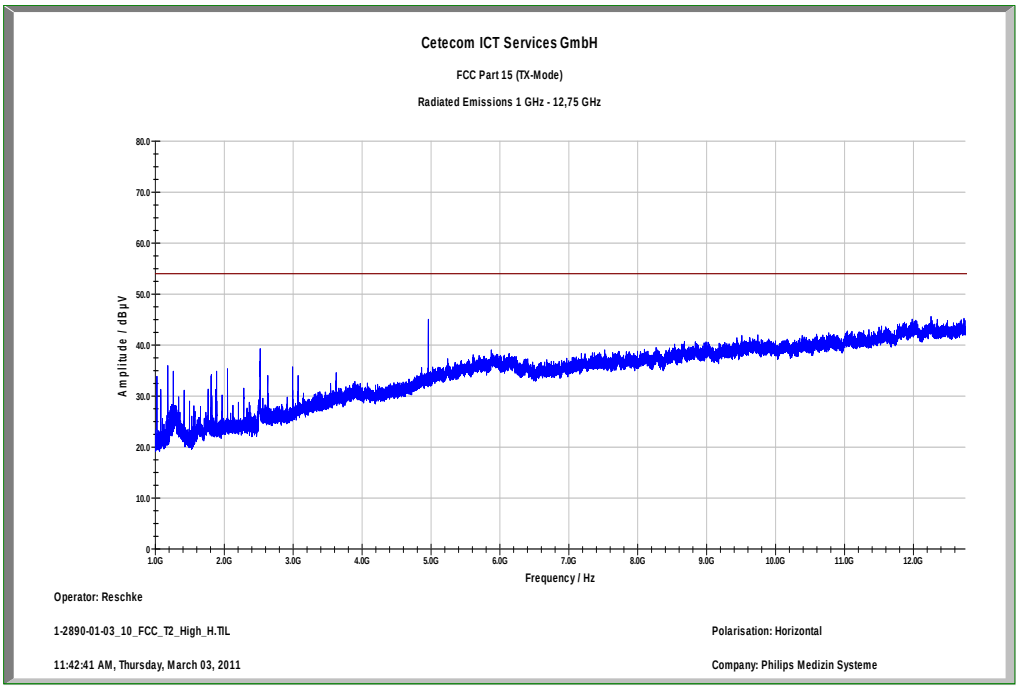
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
74.438850	25.9	15000.000	120.000	356.0	V	197.0	9.2	13.2	39.1	
74.439600	26.5	15000.000	120.000	342.0	V	174.0	9.2	12.6	39.1	
75.406800	25.9	15000.000	120.000	300.0	V	206.0	9.2	13.2	39.1	
78.377250	5.2	15000.000	120.000	400.0	V	218.0	9.1	33.9	39.1	
80.714700	27.3	15000.000	120.000	400.0	V	150.0	9.2	11.8	39.1	
83.631000	27.9	15000.000	120.000	207.0	V	204.0	9.6	11.2	39.1	
86.046150	28.3	15000.000	120.000	171.0	V	139.0	10.0	10.8	39.1	
86.572950	29.5	15000.000	120.000	176.0	V	167.0	10.1	9.6	39.1	
630.132000	45.6	15000.000	120.000	128.0	H	245.0	21.0	0.8	46.4	

Plot 7: 1 GHz to 12.75 GHz / highest channel (horizontal/vertical)



Carrier suppressed with a 2.4 GHz-band rejection filter.

9.12 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode. The EUT is detached so all oszillators are active.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part 15.109		RSS Gen, Issue 2, 4.10
RX Spurious Emissions Radiated		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Result: **Also see plots**

RX spurious emissions radiated [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
Please see the table below the Plot (30 MHz – 1 GHz)		
Measurement uncertainty	±3 dB	

Result: **The result of the measurement is passed.**

Plot 1: 30 MHz to 1 GHz / idle-mode (horizontal/vertical)

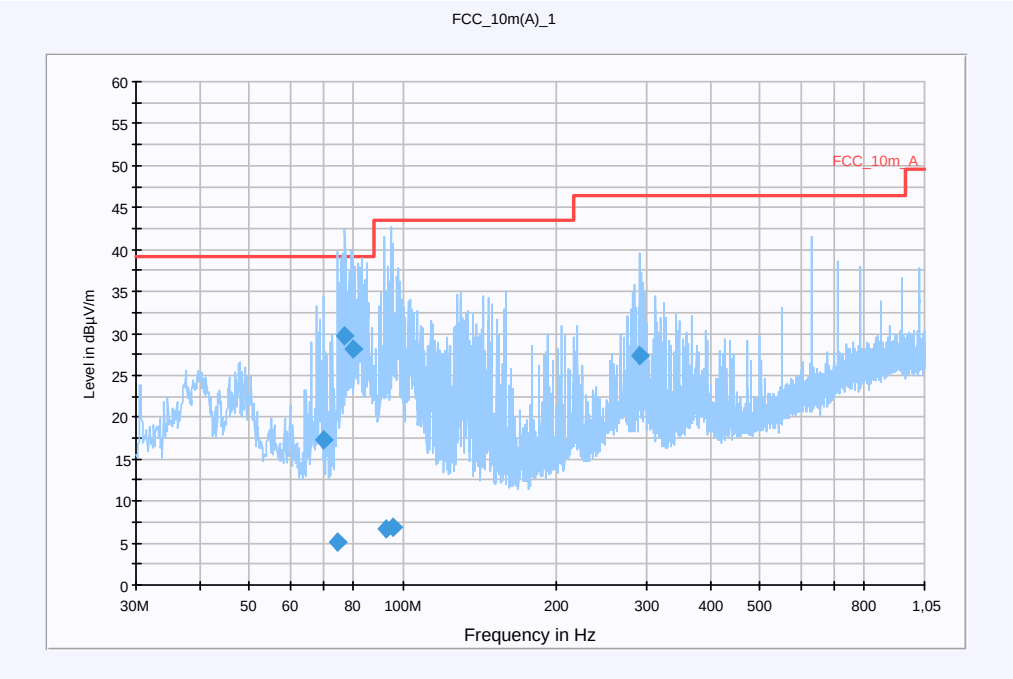
Common Information

EUT:	865241 Patient monitor
Serial Number:	
Test Description:	FCC Part 15 C Class A
Operating Conditions:	RX
Operator Name:	LAN
Comment:	AC 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

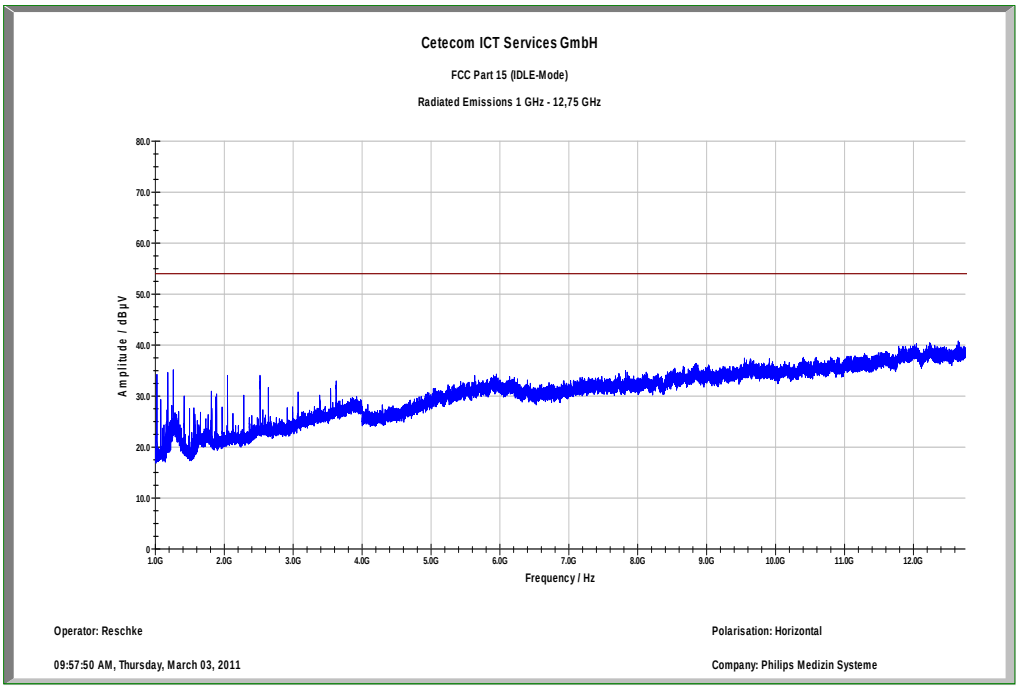
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



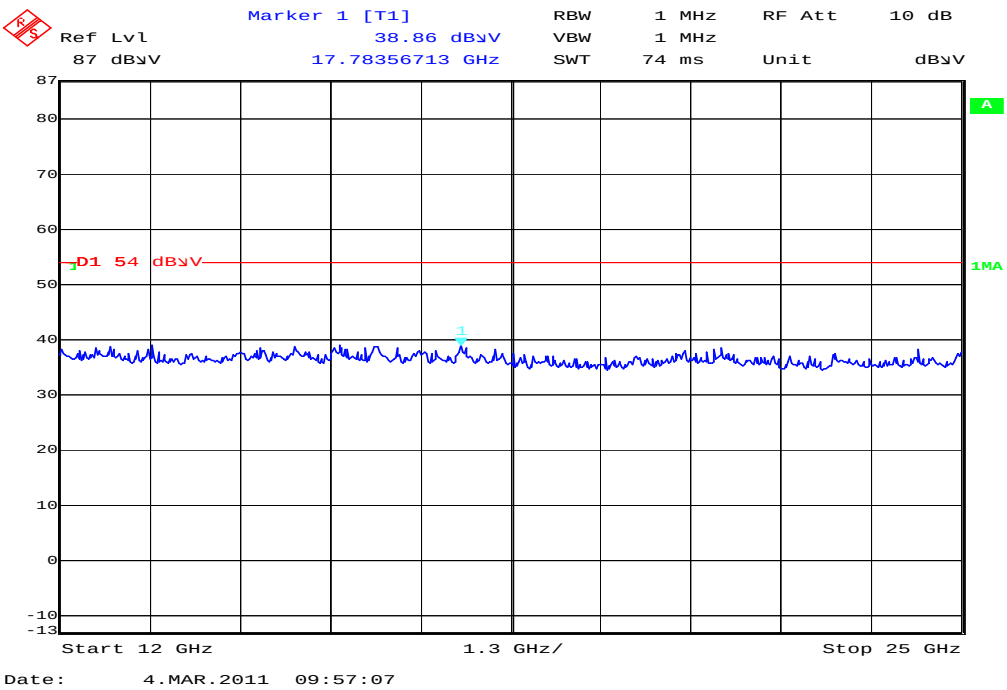
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
69.672000	17.4	15000.000	120.000	200.0	V	223.0	9.4	21.7	39.1	
74.428350	5.2	15000.000	120.000	198.0	V	113.0	9.2	33.9	39.1	
76.788600	29.7	15000.000	120.000	198.0	V	135.0	9.1	9.4	39.1	
79.569900	28.1	15000.000	120.000	373.0	V	187.0	9.1	11.0	39.1	
92.412000	6.7	15000.000	120.000	129.0	V	146.0	10.9	36.8	43.5	
95.480100	6.9	15000.000	120.000	198.0	V	146.0	11.3	36.6	43.5	
290.463450	27.4	15000.000	120.000	105.0	V	183.0	14.3	19.0	46.4	

Plot 2: 1 GHz to 12.75 GHz / idle-mode (horizontal/vertical)



Plot 3: 12 GHz to 25 GHz / idle-mode (horizontal/vertical)



9.13 TX spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 18. This measurement is representative for all channels and modes. If critical peaks are found lowest channel and highest channel will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

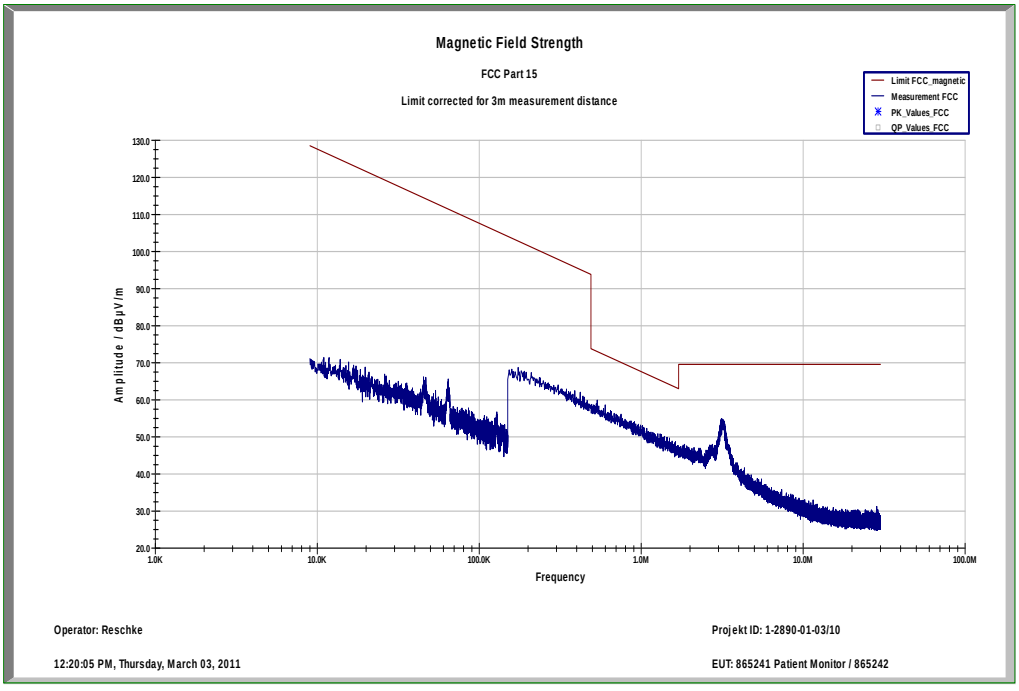
FCC		IC
CFR Part 15.209(a)		RSS 210, Issue 7, 2.2
TX spurious emissions radiated < 30 MHz		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Result: **Also see plot**

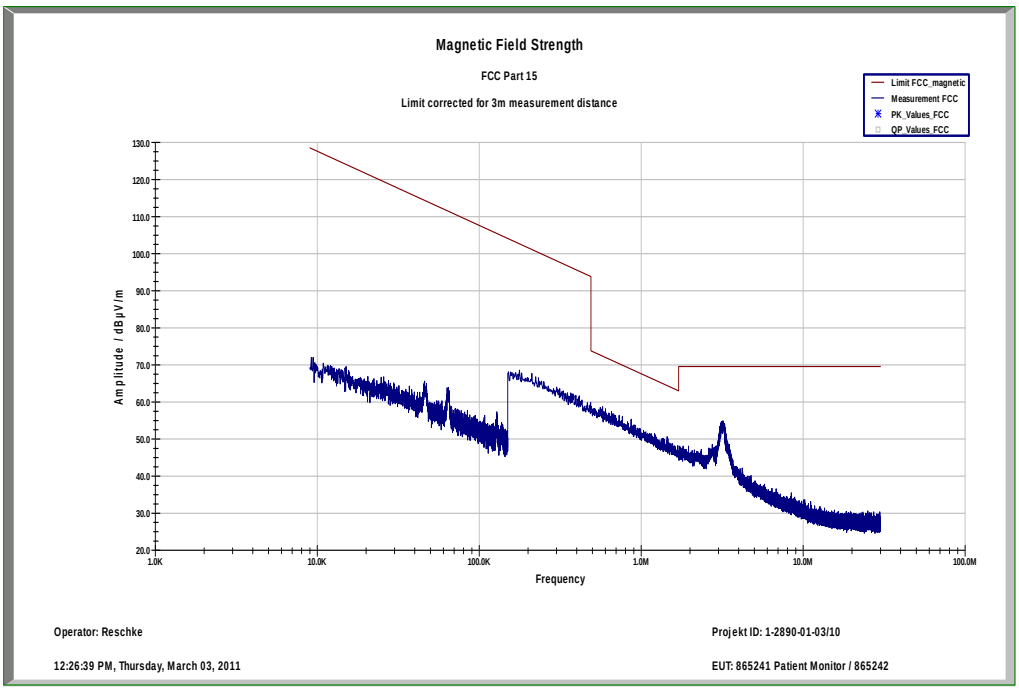
TX spurious emissions radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks found		
Measurement uncertainty	± 3 dB	

Result: **The result of the measurement is passed.**

Plot 1: 9 kHz to 30 MHz / Transmitter 1 (valid for all channels)



Plot 2: 9 kHz to 30 MHz / Transmitter 2 (valid for all channels)



9.14 TX spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 39. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 78 will be measured too. The measurement is performed in the mode with the highest output power. Both power lines, phase and neutral line, are measured. Found peaks are remeasured with average and quasi peak detection to show compliance to the limits.

Measurement:

Measurement parameter	
Detector:	Peak - Quasi peak / average
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part 15.107(a)		ICES-003, Issue 4
TX spurious emissions conducted < 30 MHz		
Frequency (MHz)	Quasi-peak (dBµV/m)	Average (dBµV/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

*Decreases with the logarithm of the frequency

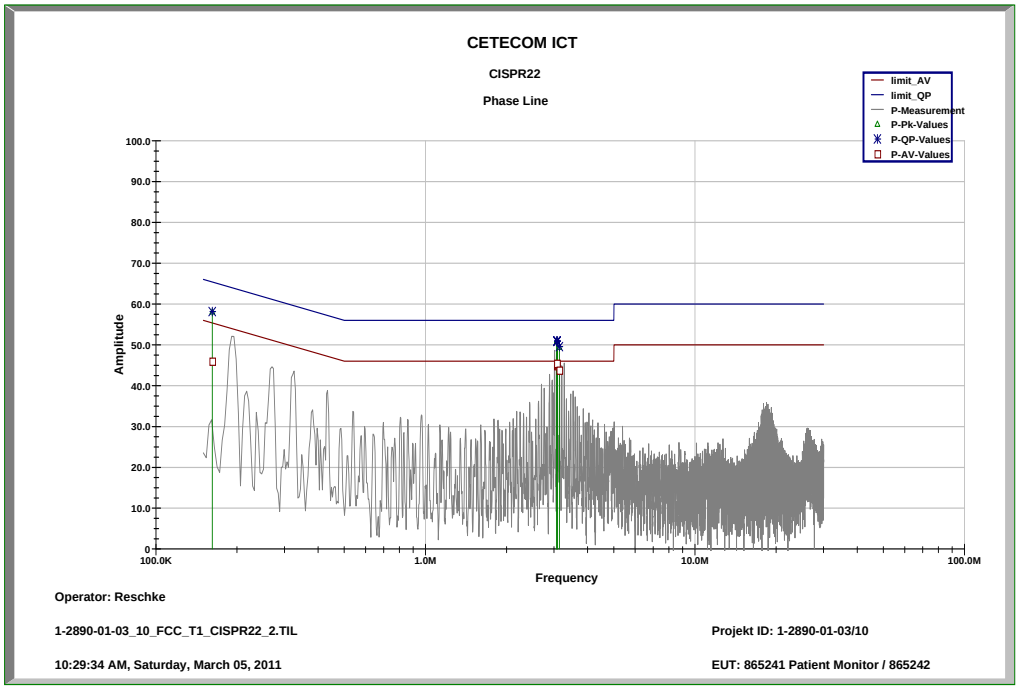
Result: **Also see plots**

TX spurious emissions conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks found		
Measurement uncertainty	± 3 dB	

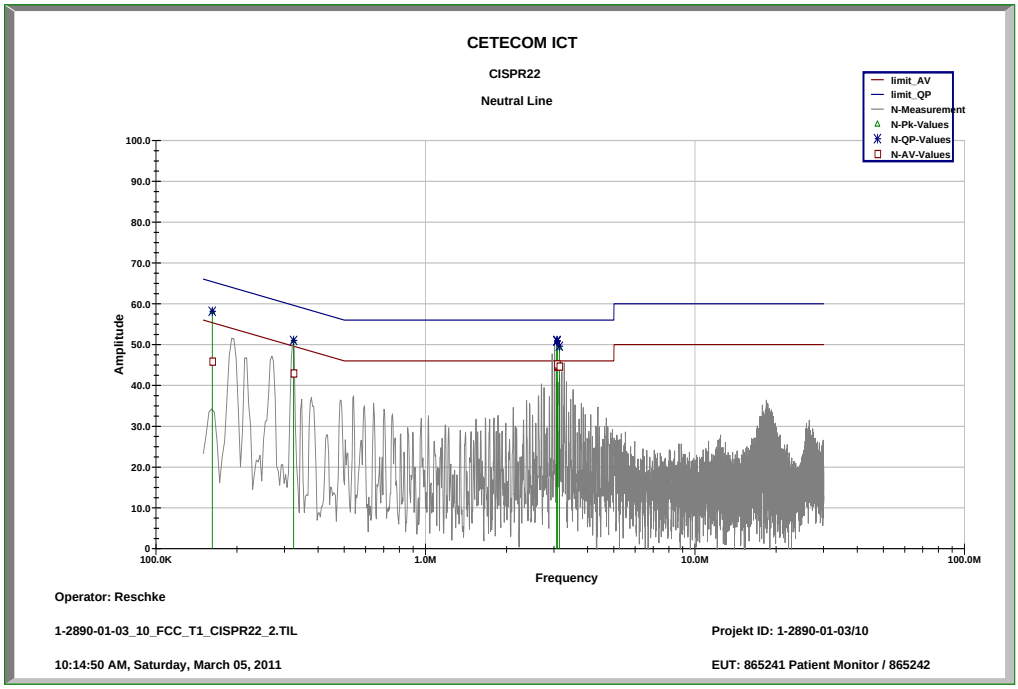
Result: **The result of the measurement is passed.**

Transmitter 1:

Plot 1: 9 kHz to 30 MHz / phase Line

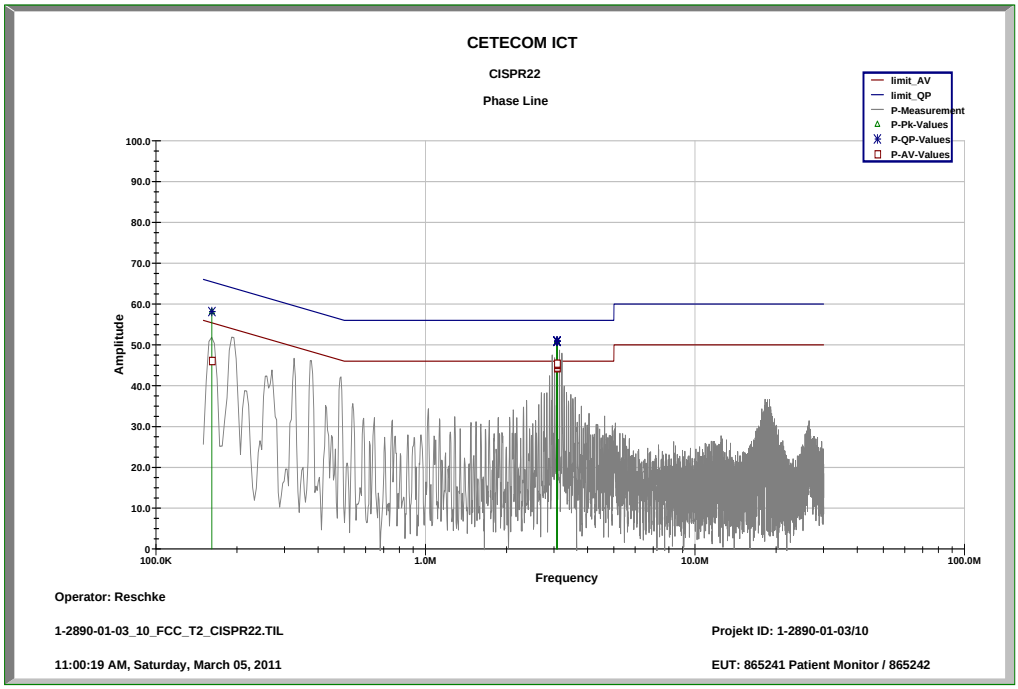


Plot 2: 9 kHz to 30 MHz / neutral Line

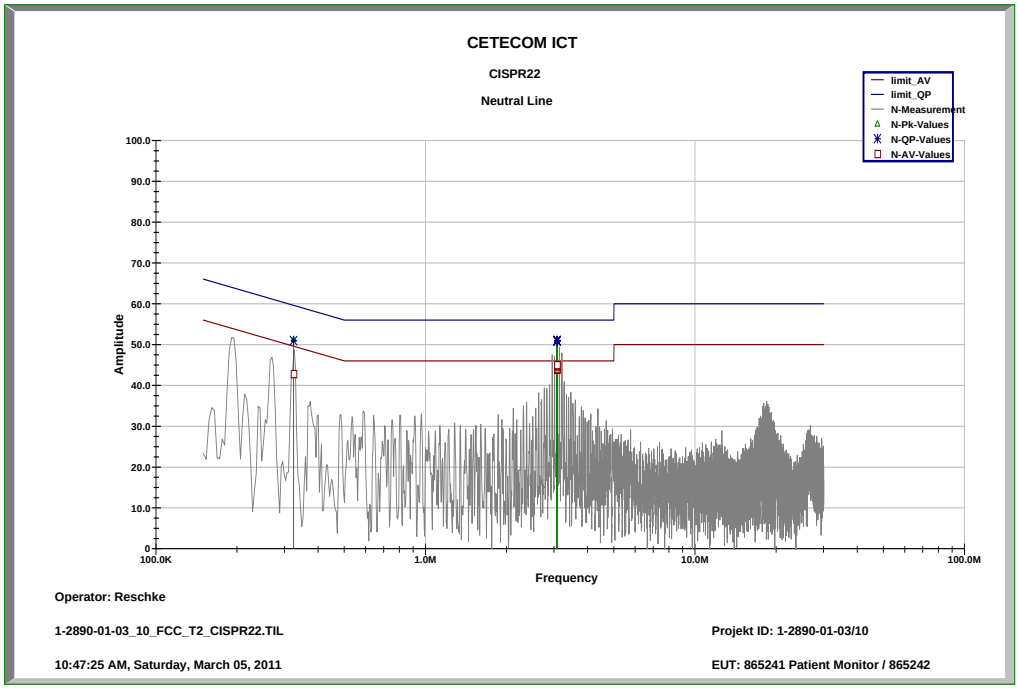


Transmitter 2:

Plot 1: 9 kHz to 30 MHz / phase Line



Plot 2: 9 kHz to 30 MHz / neutral Line



10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
2	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
3	n. a.	PowerAttenuator	8325	Byrd	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!		
5	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
6	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
7	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
8	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
9	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
10	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
11	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
12	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
13	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
14	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
16	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
17	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
18	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
19	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
20	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
21	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
22	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012
23	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlKl!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKl!	17.12.2008	17.12.2011
25	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		

26	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	k	11.01.2011	11.01.2013
27	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
28	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
29	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	01.06.2009	01.06.2011
30	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
31	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
32	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
33	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
34	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
35	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2011-04-15
-A	Photos removed	2011-05-26

Annex B Further information

Glossary

DUT - Device under Test
EMC - Electromagnetic Compatibility
EUT - Equipment under Test
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - not applicable
S/N - Serial Number
SW - Software