

**CETECOM**™

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consulting - testing - certification >>>

## TEST REPORT

Test Report No.: 1-2530-01-03/10



### Testing Laboratory

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#### 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

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### Manufacturer

#### AMEDTEC Medizintechnik Aue GmbH

Schneeberger Straße 5

08280 Aue/GERMANY

### Test Standard/s

47 CFR Part 15 Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission  
subchapter A - general, Part 15-Radio frequency devices

RSS - 210 Issue 7 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: Electrocardiograph (ECG)

Model name: CareCenter MD BT

FCC ID: X8X-CCMD-BT

Frequency [MHz]: 2402 MHz– 2480 MHz

(2400 – 2483.5 MHz ISM Band)

Power supply: 3.0 V DC via 2x 1.5 V DC Mignon AA or  
2.4 V DC via 2 x 1.5 V DC NiMH Accu

Temperature range: -20 °C to +55 °C



### Test performed:

### Test Report authorised:

2010-08-05 Daniel Muyunga

2010-08-05 Jakob Reschke

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## 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 electronical signatures, the public keys can be requested at the testing laboratory.

### 2.2 Application details

Date of receipt of order:	2010-08-02
Date of receipt of test item:	2010-08-02
Start of test:	2010-08-02
End of test:	2010-08-04
Person(s) present during the test:	Karl-Friedrich Pfefferkorn AMEDTEC Medizintechnik Aue GmbH

## 3 Test standard/s

Test Standard	Version	Test Standard Description
47 CFR Part 15	2009-10	Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

## 4 Test Environment

Temperature:	$T_{\text{nom}}$	+23 °C during room temperature tests
	$T_{\text{max}}$	+55 °C during high temperature test
	$T_{\text{min}}$	-20 °C during low temperature test
Relative humidity content:		43 %
Air pressure:		not relevant for this kind of testing
Power supply:	$V_{\text{nom}}$	3.0 V DC
	$V_{\text{max}}$	-/- V
	$V_{\text{min}}$	-/- V

## 5 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	2010-08-05	-/-

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	Mode	Pass	Fail	NA	NP	Results (max.)
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna Gain	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) (iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.109 RSS-Gen.	RX spurious emissions radiated	Nominal	Nominal	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**Note:**NA = Not Applicable; NP = Not Performed

## 6 RF measurement testing

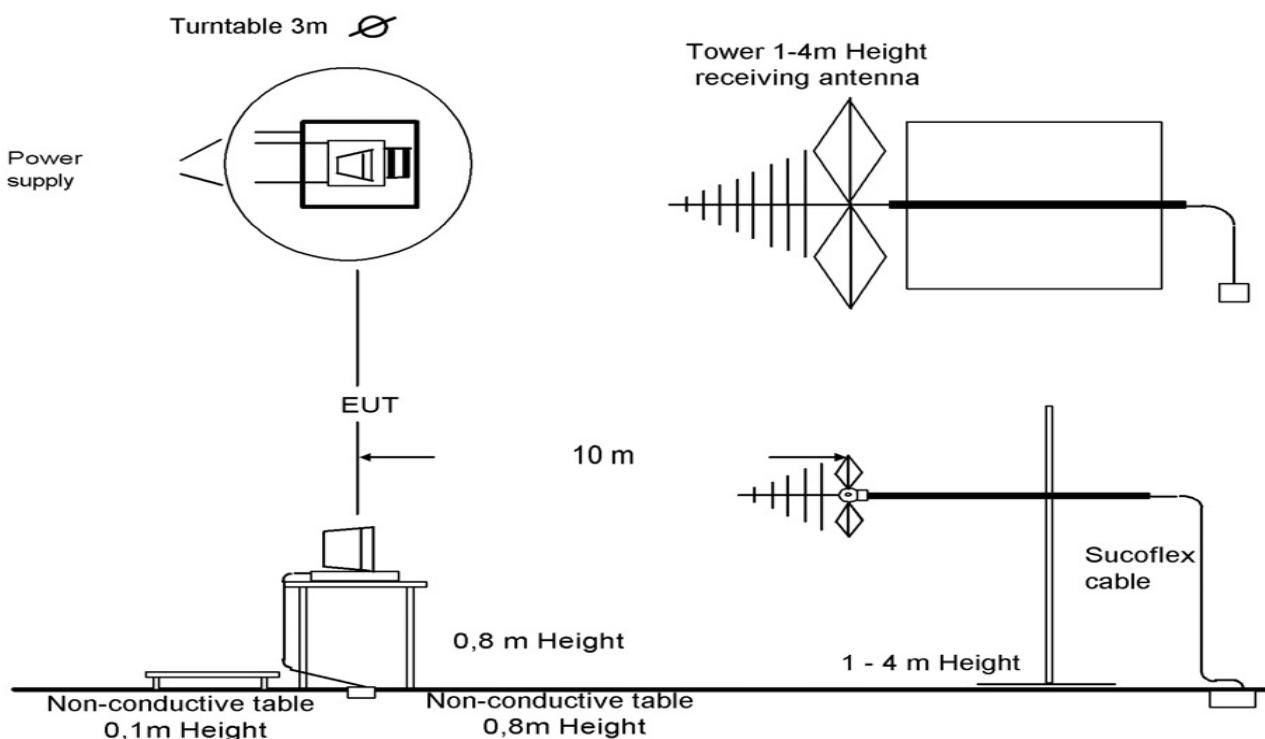
### 6.1 Description of test setup

#### 6.1.1 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

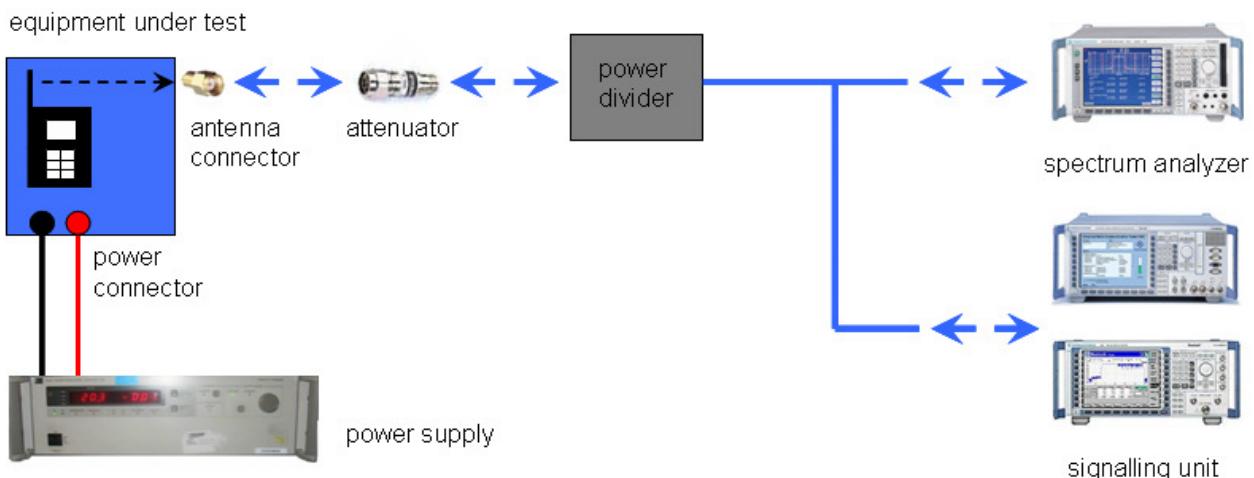
All measurements are done in accordance with the Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems DA 00-705 and Appendix A “BLUETOOTH® APPROVALS”

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

## 6.1.2 Conducted measurements

### Not performed

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

## 6.2 Additional comments

Some modifications were made on the EUT for passing the compliance test. A small filter circuit was additionally soldered to antenna output.

The Bluetooth® word mark and logos are owned by the Bluetooth SIG Inc. and any use of such marks by Cetecom ICT Services GmbH is under license.

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

- Test mode:
- Bluetooth Test mode loop back enabled  
(EUT is controlled over CBT/CMU)
  - Special software is used.  
EUT is transmitting pseudo random data by itself

### 6.3 Test Item

Kind of test item	: Electrocardiograph (ECG)
Type identification	: CareCenter MD BT
S/N serial number	: A1004300108 , A0908300021, A1007300210
HW hardware status	: Not specified
SW software status	: Not specified
Frequency Band [MHz]	: 2400 – 2483.5 MHz ISM Band (2402 – 2480 MHz)
Type of Modulation	: GFSK, Pi/4 DQPSK and 8 DPSK
Number of channels	: 79
Antenna	: Internal dielectric antenna
Power Supply	: 3.0 V DC via 2x 1.5 V DC Mignon AA or 2.4 V DC via 2 x 1.5 V DC NiMH Accu
Temperature Range	: -20°C to +55 °C

## 6.4 RSP100 Test Report Cover Sheet / Performance Test Data

Test Report Number	:	1-2530-01-03/10
Equipment Model Number	:	CareCenter MD BT
Certification Number	:	
Manufacturer (complete Address)	:	AMEDTEC Medizintechnik Aue GmbH Schneeberger Straße 5 08280 Aue / GERMANY
Tested to radio standards specification no.	:	RSS 210, Issue 7, Annex 8
Open Area Test Site IC No.	:	IC 3462C-1
Frequency Range	:	2400 – 2483.5 MHz ISM Band (2402 – 2480 MHz)
RF-power [W] (max.)	:	EIRP: 3.94 mW (GFSK) EIRP: 2.47 mW (Pi/4-DQPSK) EIRP: 2.30 mW (8DPSK) For conducted values, please refer to full test report
Occupied bandwidth (99%-BW) [kHz]	:	Please refer to full test report
Type of modulation	:	GFSK; Pi/4-DQPSK; 8DPSK
Emission Designator (TRC-43)	:	Please refer to full test report
Antenna Information	:	Internal dielectrical antenna
Transmitter Spurious (worst case) [µV/m @ 3m]	:	428.54 µV/m @ 4804 MHz
Receiver Spurious (worst case) [µV/m @ 3m]	:	316.22 µV/m (noise floor)

**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:**

2010-08-05	Daniel Muyunga	
Date	Name	Signature

## 7 Measurement Results

### 7.1 Antenna Gain

**Measurement:**

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal Bluetooth® devices, the GFSK modulation is used.

**Result:** The result of the measurement is not applicable.

### 7.2 Power Spectral Density

**Description:**

Measurement of the power spectral density of a digital modulated system. This requirement is only valid for digitally modulated systems without hopping functionality.

**Result:** The result of the measurement is not applicable.

### 7.3 Carrier Frequency Separation

**Description:**

Measurement of the carrier frequency separation of a hopping system. The carrier frequency separation is constant for all modulation-modes. We use GFSK-modulation to show compliance. EUT in hopping mode.

**Result:** The result of the measurement is not applicable.

### 7.4 Number of Hopping Channels

**Description:**

Measurement of the total number of used hopping channels. The number of hopping channels is constant for all modulation-modes. We use GFSK-modulation to show compliance. EUT in hopping mode.

**Result:** The result of the measurement is not applicable.

### 7.5 Time of Occupancy (Dwell Time)

**Measurement:**

For Bluetooth® devices no measurements mandatory depending on the fixed requirements according to the Bluetooth® Core Specifications!

**Result:** The result of the measurement is not applicable.

## 7.6 Spectrum Bandwidth of a FHSS System – 20 dB Bandwidth

### Description:

Measurement of the 20dB bandwidth of the modulated signal. The measurement is performed according to the "Measurement Guidelines" (DA 00-705, March 30, 2000). EUT in single channel mode.

**Result:** The result of the measurement is not applicable.

## 7.7 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:**

<b>Modulation</b>	<b>Maximum Output Power Conducted [dBm]</b>		
	2402 MHz	2441 MHz	2480 MHz
GFSK			
Pi/4 DQPSK			<b>Not performed !</b>
8DPSK			
Measurement uncertainty	<b>± 0.5 dB</b>		

<b>Modulation</b>	<b>Maximum Output Power Radiated - EIRP [dBm]</b>		
	2402 MHz	2441 MHz	2480 MHz
GFSK	5.62	5.96	5.36
Pi/4 DQPSK	3.21	3.94	3.23
8DPSK	3.28	3.62	3.43
Measurement uncertainty	<b>± 2.0 dB</b>		

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

## 7.8 Band Edge Compliance Conducted

### Description:

Measurement of the conducted band edge compliance. EUT is measured at the lower and upper band edge in single channel and hopping mode. The measurement is repeated for all modulations.

**Result:** The result of the measurement is not applicable.

## 7.9 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 single channel mode and the transmit channel is channel 00 for the lower restricted band and channel 78 for the upper restricted band. The measurement is repeated for all modulations. 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:

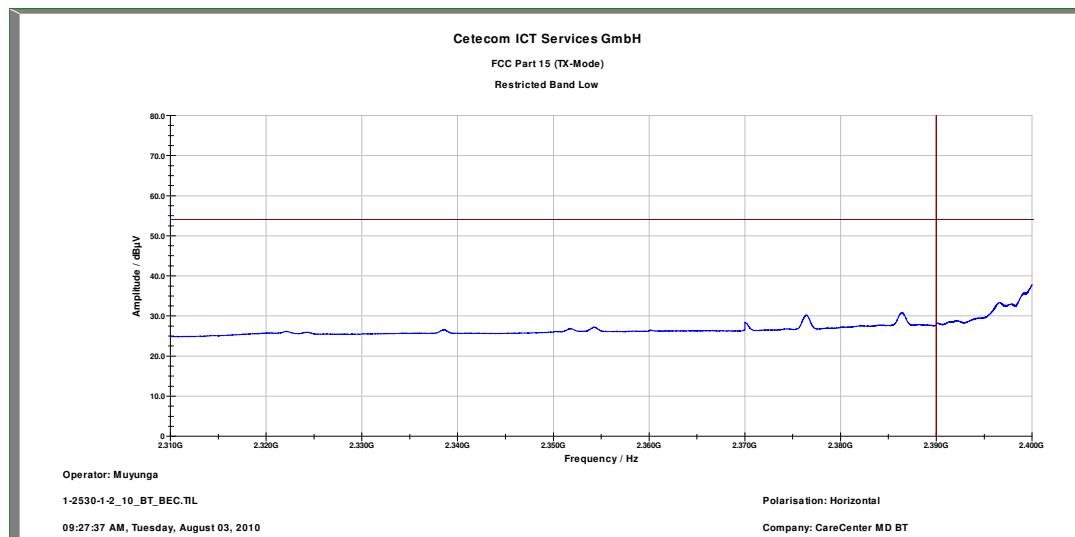
FCC	IC
CFR Part 15.205	RSS 210, Issue 7, A 8.5
Band Edge Compliance Radiated	
<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at 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)).</p>	
54 dB $\mu$ V/m AVG	

**Result: Also see plots**

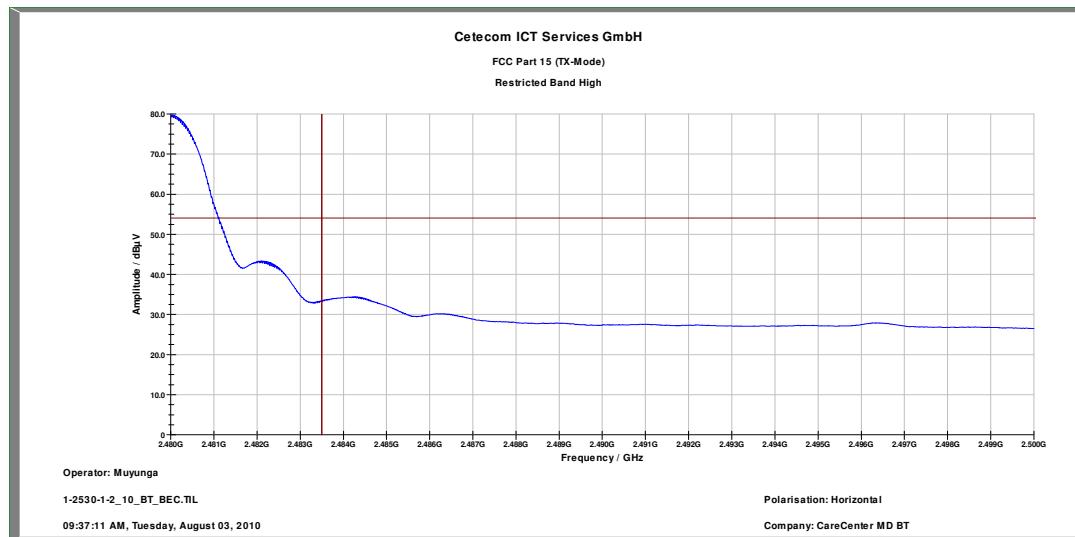
Szenario	Band Edge Compliance Radiated [dB $\mu$ V/m]		
	GFSK	Pi/4 DQPSK	8DPSK
Lower Restricted Band	< 54 (see plot 1)	< 54 (see plot 3)	< 54 (see plot 5)
Upper Restricted Band	< 54 (see plot 2)	< 54 (see plot 4)	< 54 (see plot 6)
Measurement uncertainty	$\pm 2$ dB		

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

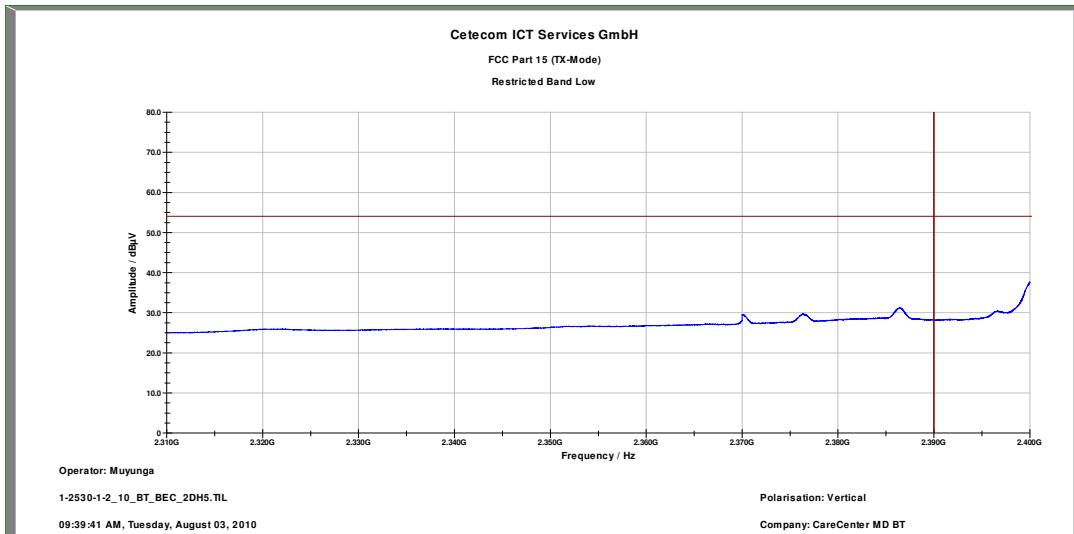
**Plot 1: Lower Restricted Band / GFSK (radiated)**



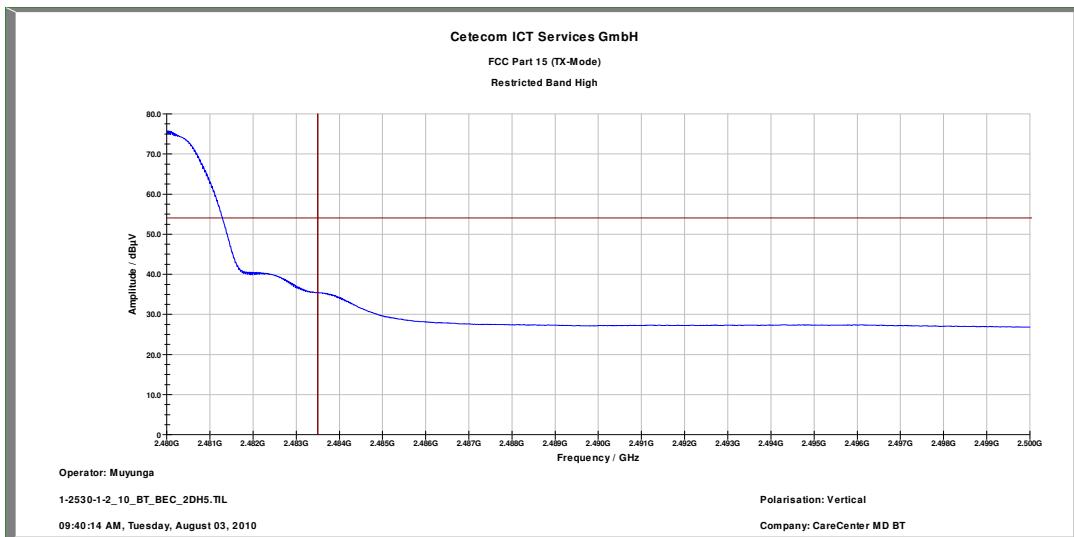
**Plot 2: Upper Restricted Band / GFSK (radiated)**



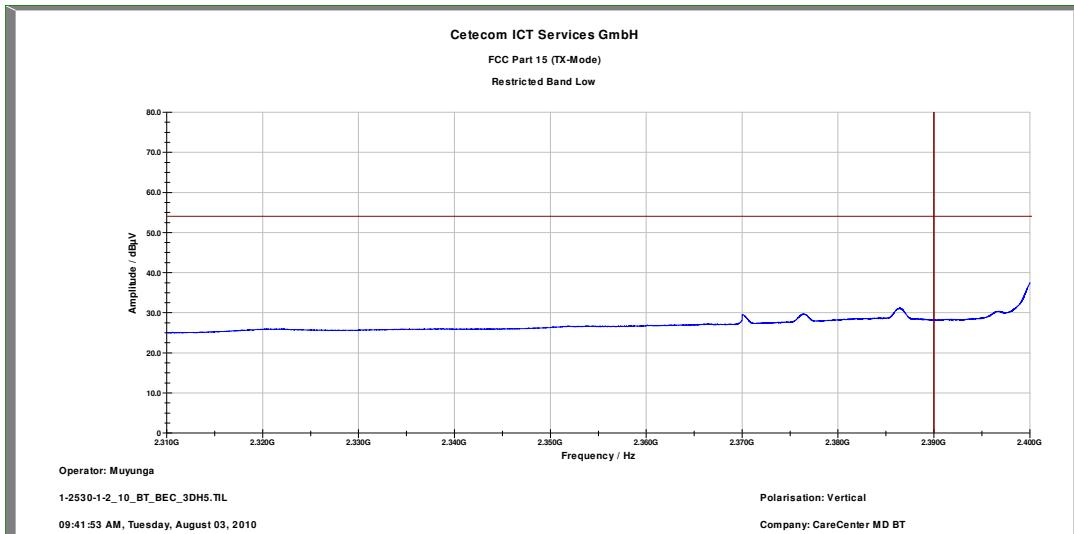
### Plot 3: Lower Restricted Band / Pi/4 DQPSK (radiated)



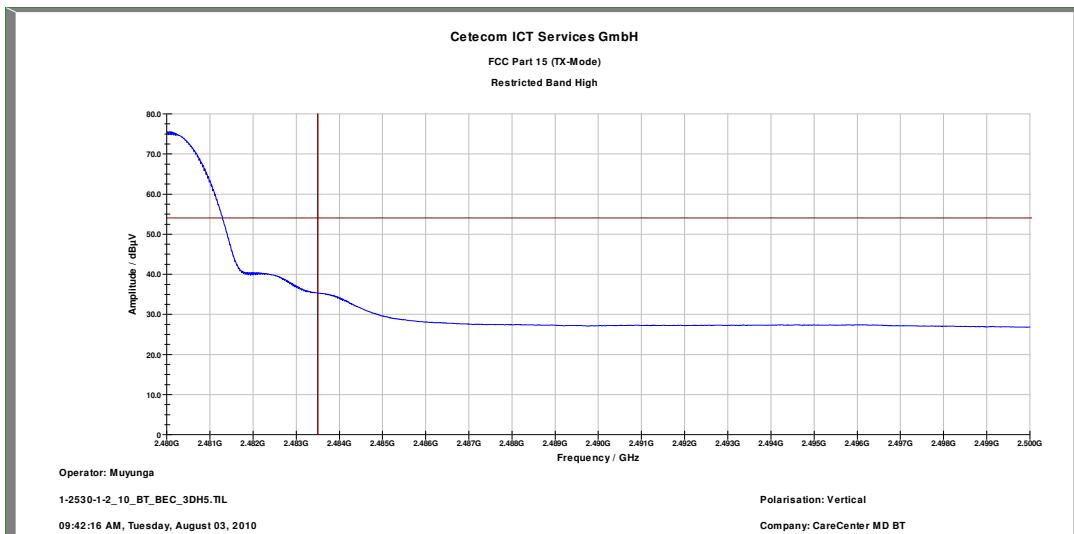
### Plot 4: Upper Restricted Band / Pi/4 DQPSK (radiated)



### Plot 5: Lower Restricted Band / 8DPSK (radiated)



### Plot 6: Upper Restricted Band / 8DPSK (radiated)



## 7.10 TX Spurious Emissions Conducted

### Description:

Measurement of the conducted spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is repeated for all modulations.

**Result:** The result of the measurement is not applicable.

## 7.11 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 00, channel 39 and channel 78. The measurement is performed in the mode with the highest output power.

### 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
Measured Modulation:	<input checked="" type="checkbox"/> GFSK <input checked="" type="checkbox"/> Pi/4 DQPSK <input checked="" type="checkbox"/> 8DPSK

The modulation with the highest output power i.e. GFSK was used to perform the transmitter spurious emissions. If spurious is detected, a re-measurement will be performed on the detected frequency with each modulation.

### 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 (dB $\mu$ V/m)	Measurement distance
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
Above 960	54.0	3

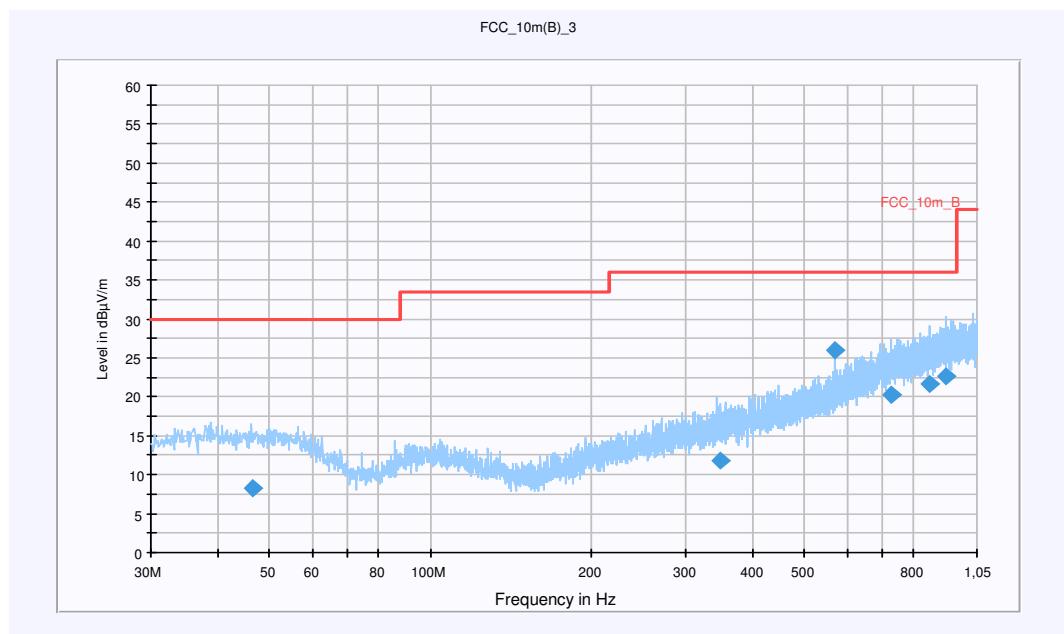
**Result: Also see plots**

TX Spurious Emissions Radiated [dB $\mu$ V/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dB $\mu$ V/m]	F [MHz]	Detector	Level [dB $\mu$ V/m]	F [MHz]	Detector	Level [dB $\mu$ V/m]
All modulations								
1600	Peak	44.59*)	1600	Peak	44.59*)	1600	Peak	44.59*)
1830	Peak	45.07*)	1830	Peak	45.07*)	1830	Peak	45.07*)
4575	Peak	50.21*)	4575*)	Peak	50.21*)	4575	Peak	50.21*)
GFSK								
4804	Peak	52.64	4882	Peak	50.32	4960	Peak	51.12
Pi/4 DQPSK								
4804	Peak	48.02	4882	Peak	48.12	4960	Peak	49.24
8DPSK								
4804	Peak	49.33	4882	Peak	48.65	4960	Peak	48.58
Measurement uncertainty			± 3 dB					

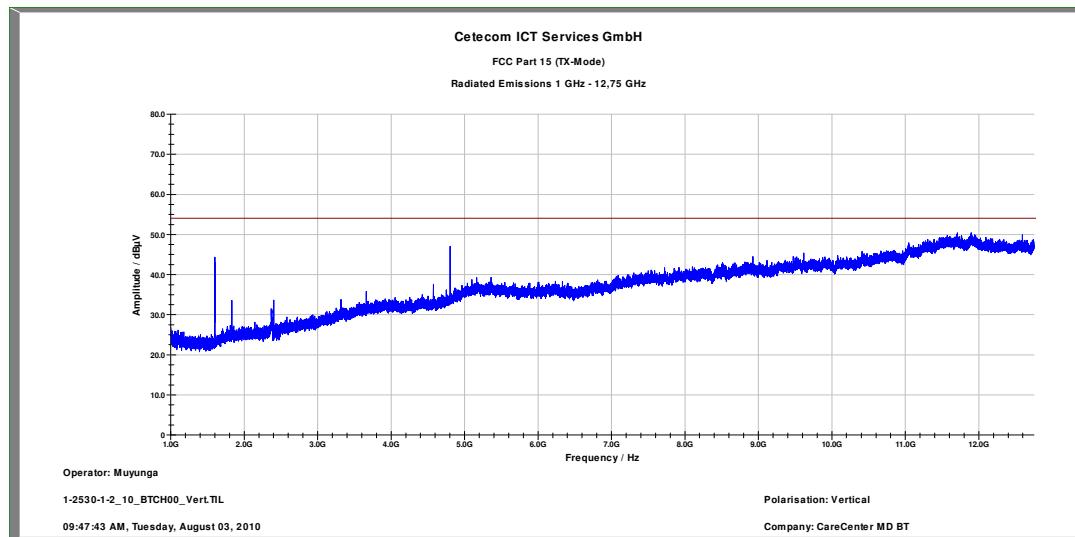
\*) Same level and independent from Transmit channel

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

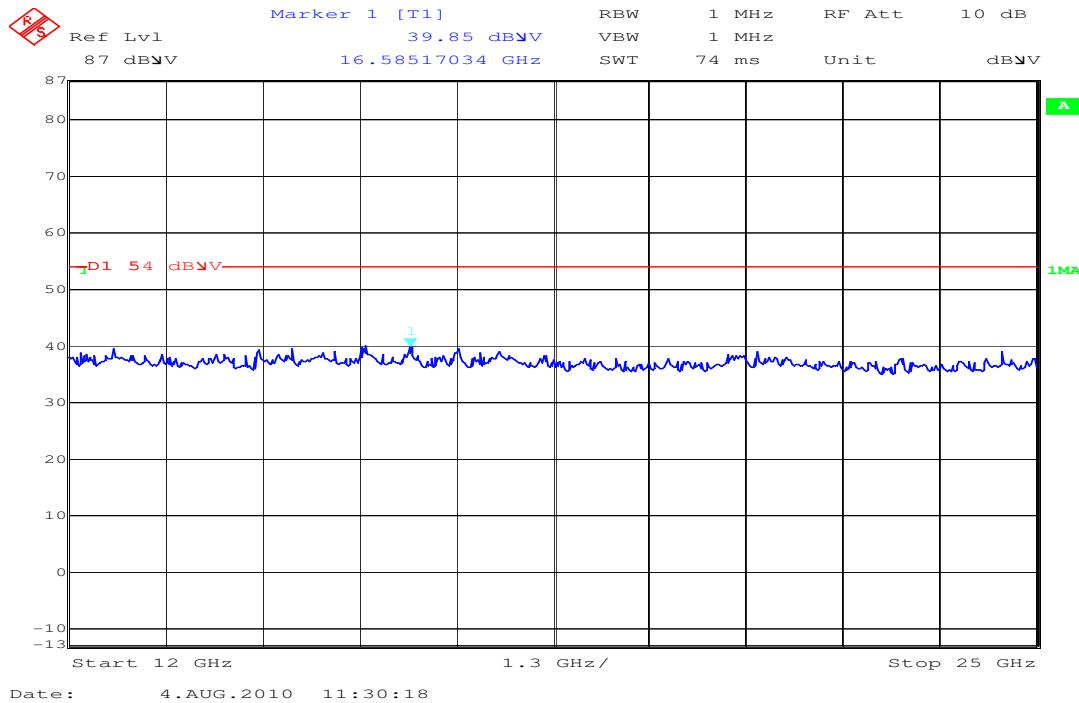
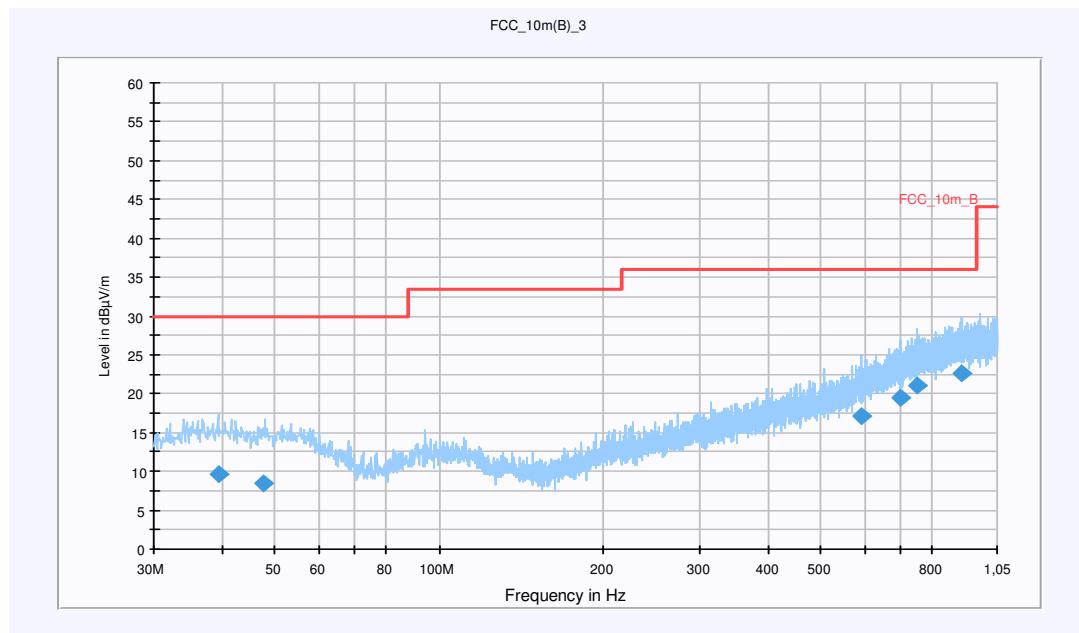
**Plot 1: 30 MHz to 1 GHz / Channel 00 (horizontal/vertical)**



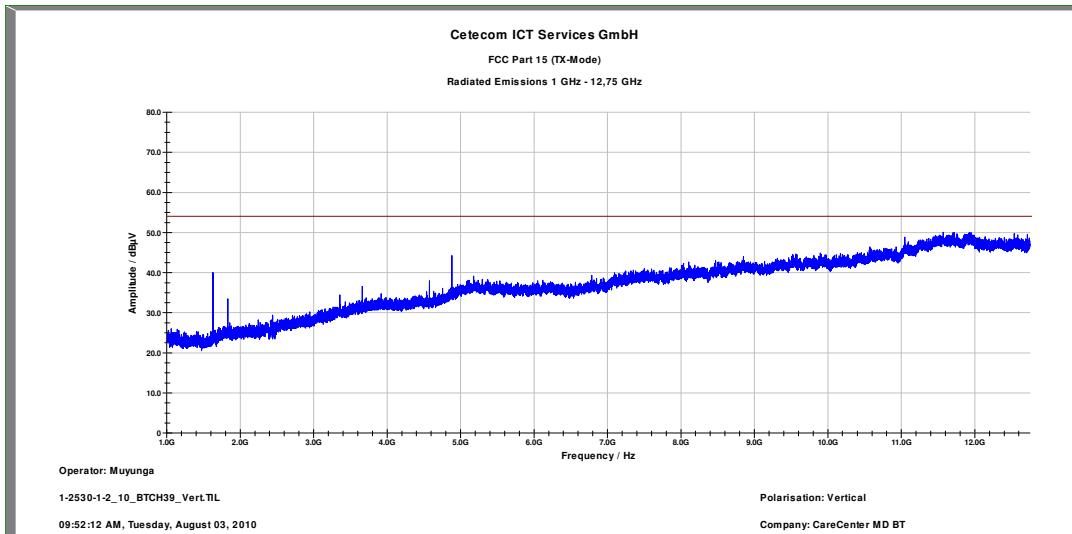
**Plot 2: 1 GHz to 12.75 GHz / Channel 00 (horizontal/vertical)**



Carrier suppressed with a 2.4 GHz-band rejection filter.

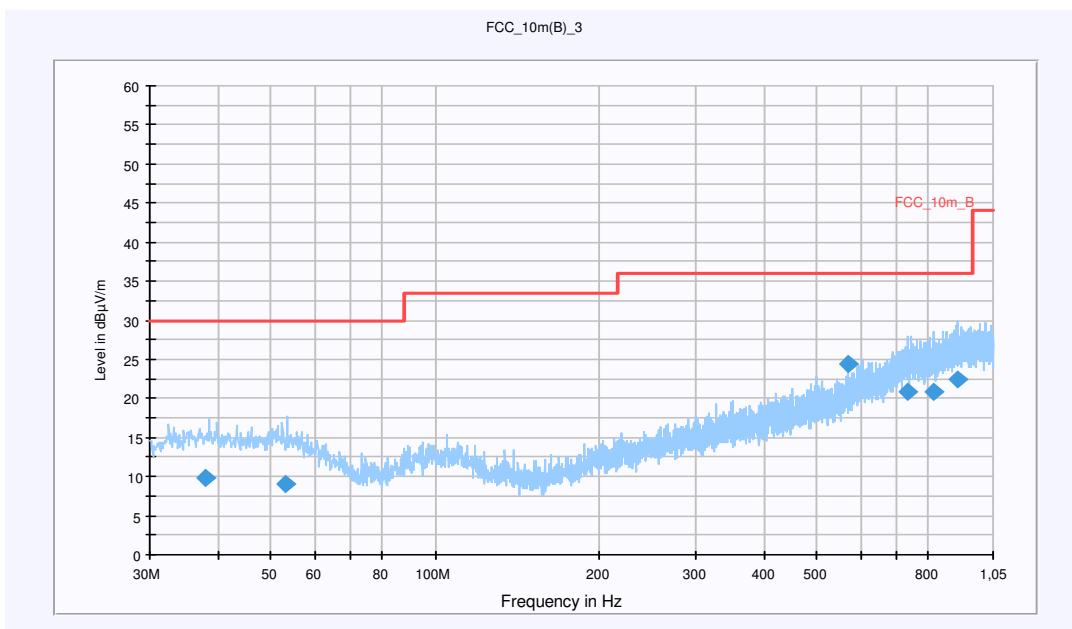
**Plot 3: 12 GHz to 25 GHz / Channel 00 (horizontal/vertical) – valid for all channels**

**Plot 4: 30 MHz to 1 GHz / Channel 39 (horizontal/vertical)**


### Plot 5: 1 GHz to 12.75 GHz / Channel 39 (horizontal/vertical)

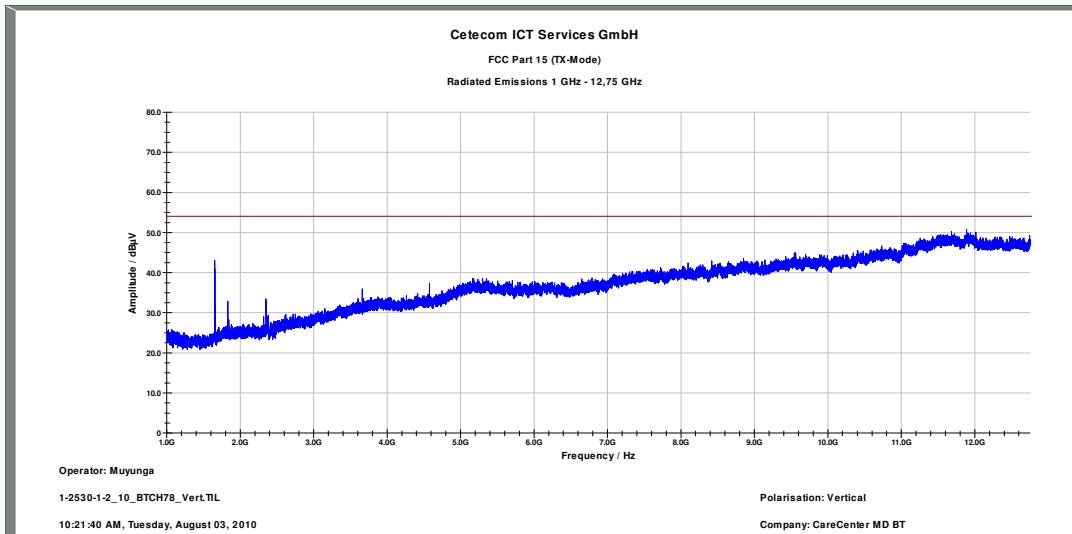


Carrier suppressed with a 2.4 GHz-band rejection filter.

### Plot 6: 30 MHz to 1 GHz / Channel 78 (horizontal/vertical)



**Plot 7: 1 GHz to 12.75 GHz / Channel 78 (horizontal/vertical)**



Carrier suppressed with a 2.4 GHz-band rejection filter.

## 7.12 RX Spurious Emissions Radiated

### Description:

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

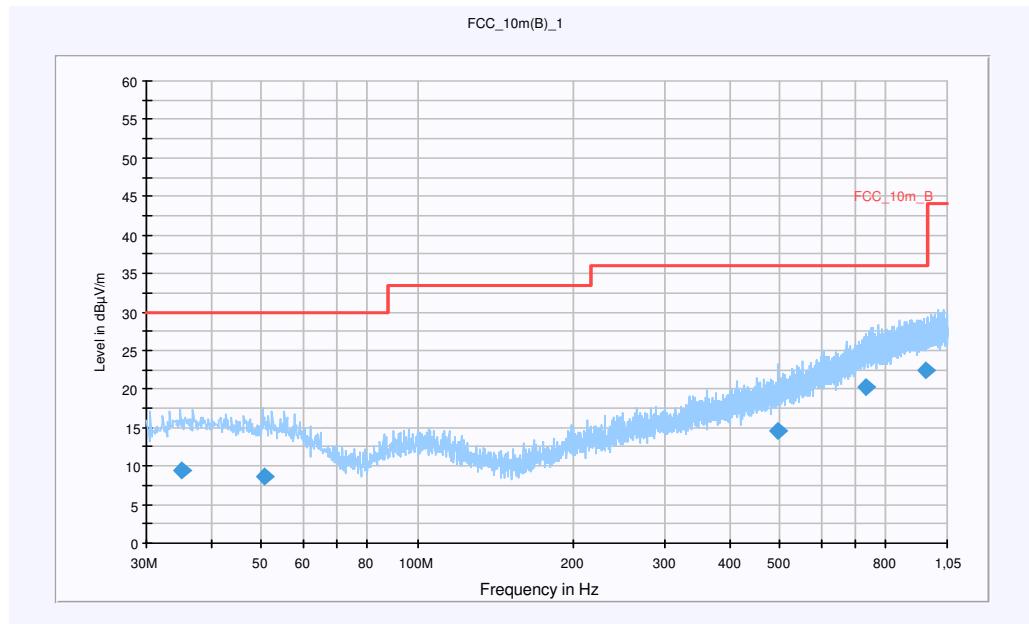
### Limits:

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

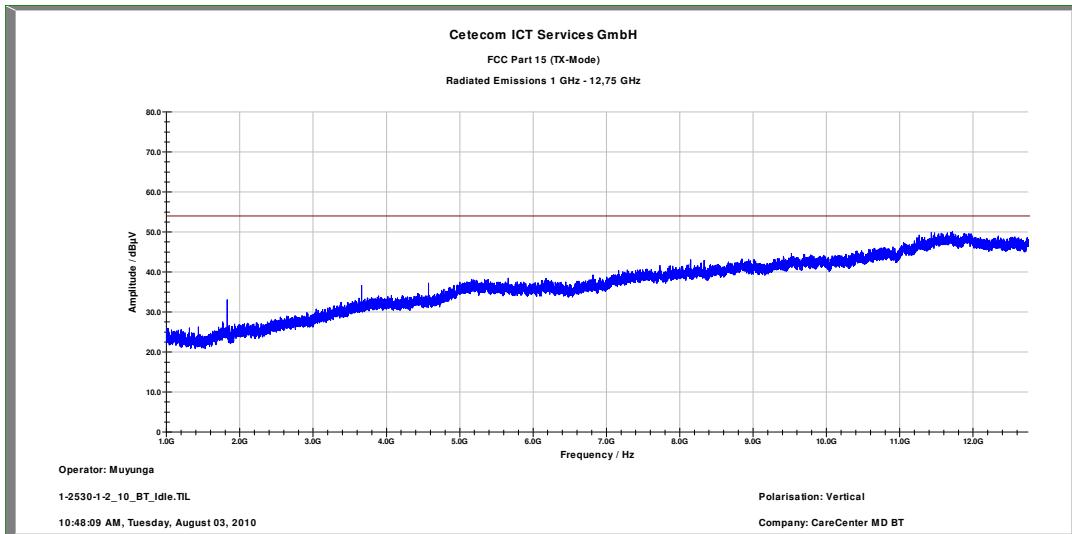
## Result: Also see plots

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

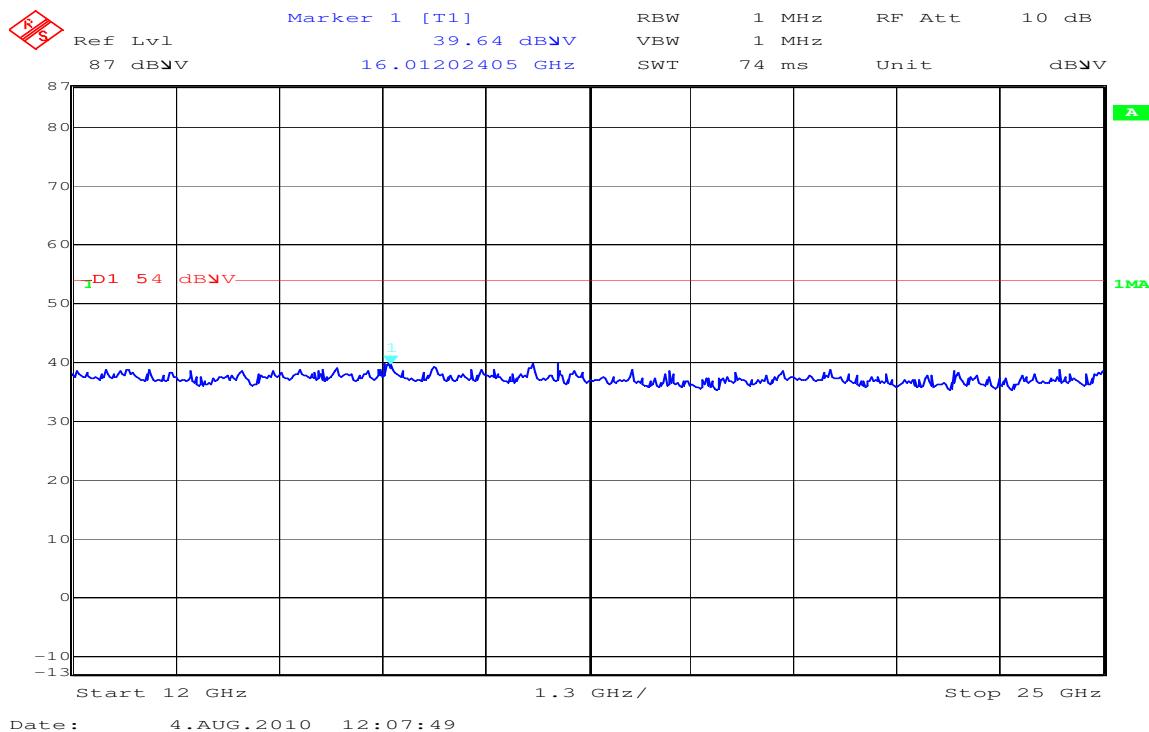
### Plot 1: 30 MHz to 1 GHz / Idle-mode (horizontal/vertical)



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



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



## 7.13 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 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. 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

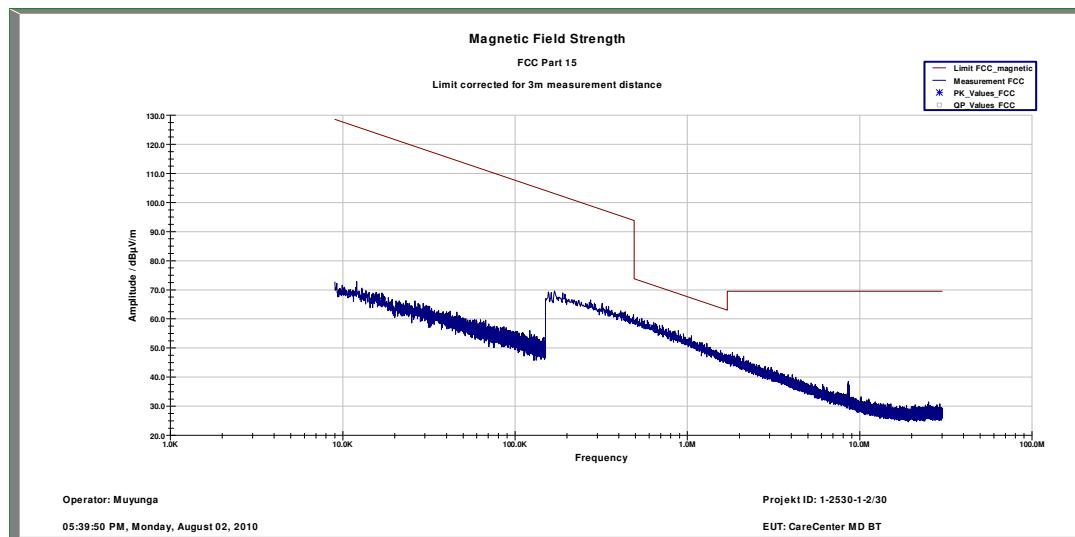
### Limits:

FCC	IC	
CFR Part 15.209(a)	RSS 210, Issue 7, 2.2	
TX Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dB $\mu$ V/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

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

## Plot 1: 9 kHz to 30 MHz / Channel 39 (valid for all channels and modes)



## 7.14 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 (dB $\mu$ V/m)	Average (dB $\mu$ V/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:** The result of the measurement is not applicable.

## 8 Test equipment and ancillaries used for tests

In order to simplify the identification of the equipment used at each specific test, each item of test equipment and ancillaries are provided with an identifier or number in the equipment list below.

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).

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kal. Art	Last Calibration	Next Calibration
1	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
2	n. a.	PowerAttenuator	8325	Byrd	1530	300001595			
3	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	05.03.2009	05.03.2011
4	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
5	n. a.	Anechoic chamber		MWB	87400/02	300000996			
6	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
7	9	Artificial Mains 9 kHz to 30 MHz, 4 x 25 Ampere	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
8	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
9	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
10	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
11	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
12	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
13	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
14	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
15	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
16	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
17	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
18	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
19	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	05.08.2008	05.08.2010
20	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	06.08.2008	06.08.2010
21	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlKI!	19.08.2008	19.08.2010
22	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKI!	17.12.2008	17.12.2010
24	n. a.	Isolating Transformer	913501	Erfi		300001205	ne		
25	4	Radiocom. Analyzer	CMTA 54	R&S	894043/010	300001175	NK!	06.06.2007	
26	9	Signal Generator 0.1-4320 MHz,	SMHU	R&S	894055/005	300001190	Ve	05.01.2010	05.01.2013

		AM/FM/PHIM/Puls Mod.							
28	n. a.	DC Power Supply 0 – 32V	1108-32	Heiden	001802	300001383	Ve	23.06.2010	23.06.2013
29	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04590	300001041	Ve	08.01.2009	08.01.2012
30	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	Ve	28.05.2009	28.05.2011
31	n. a.	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	k	08.01.2010	08.01.2012
32	n. a.	Signal Analyzer 20Hz-26.5GHz-150 to + 30 dBm	FSIQ26	R&S	835111/0004	300002678	Ve	06.01.2009	06.01.2011
33	n. a.	Temperature Test Chamber	T-40/50	CTS GmbH	064023	300003540	vlKI!	04.06.2009	04.06.2011
34	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
35	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	k	06.01.2009	06.01.2011
36	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
37	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
38	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	01.06.2009	01.06.2011
39	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
40	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
41	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
42	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
43	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
44	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012

## Annex A Photographs of the Test Set-up

Photo documentation

Photo 1:

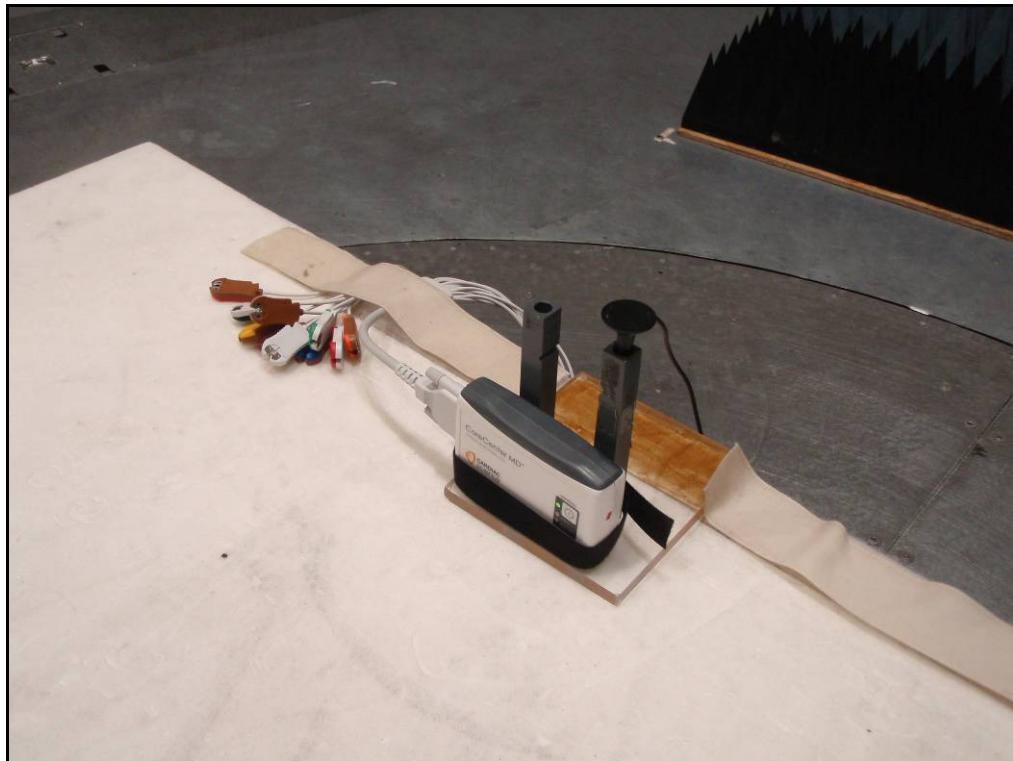
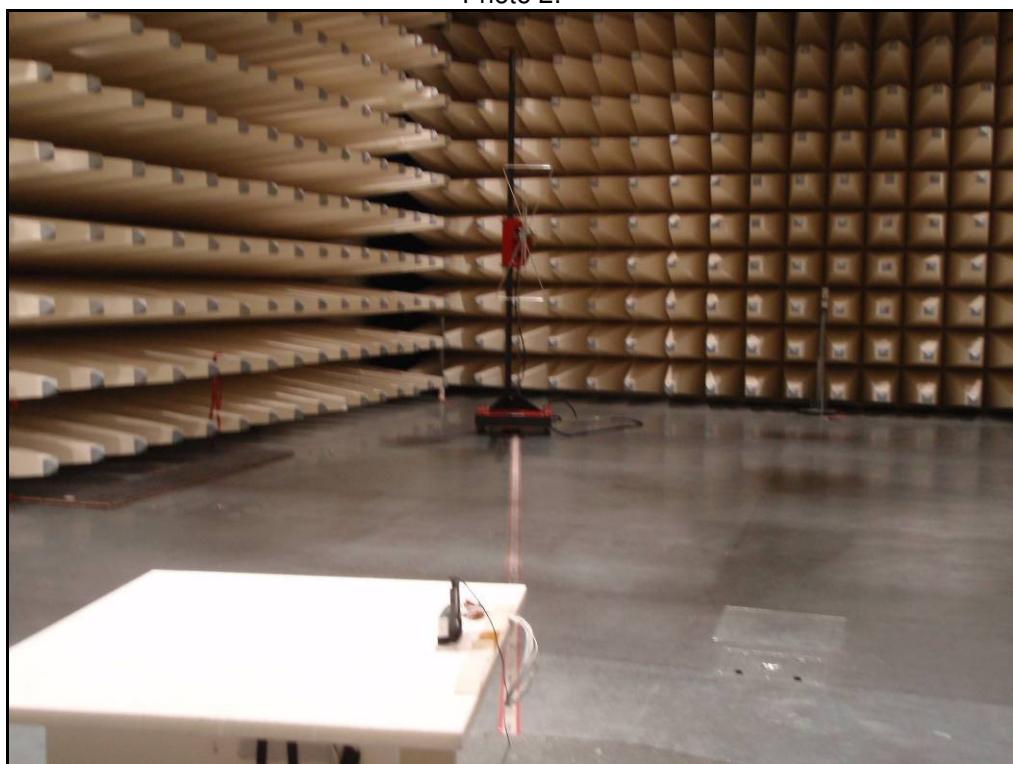


Photo 2:



## Annex B External Photographs of the EUT

Photo documentation

Photo 3:



Photo 4:



## Annex C Internal Photographs of the EUT

Photo documentation

Photo 5:

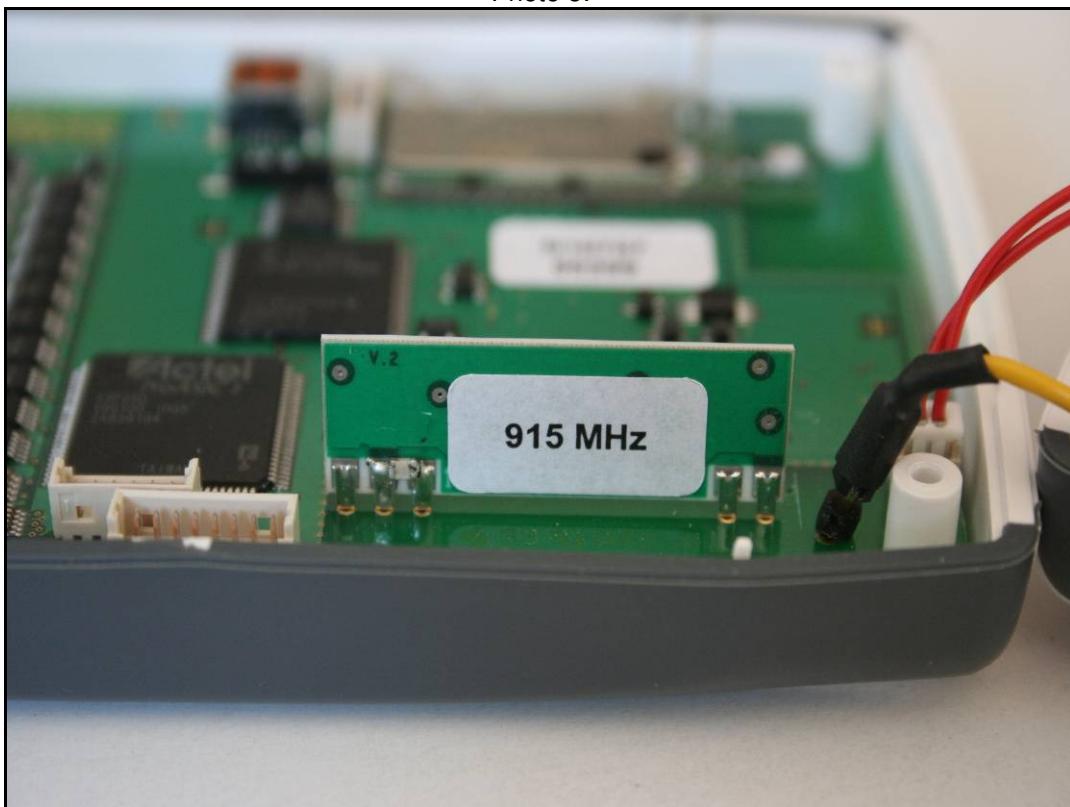


Photo 6:

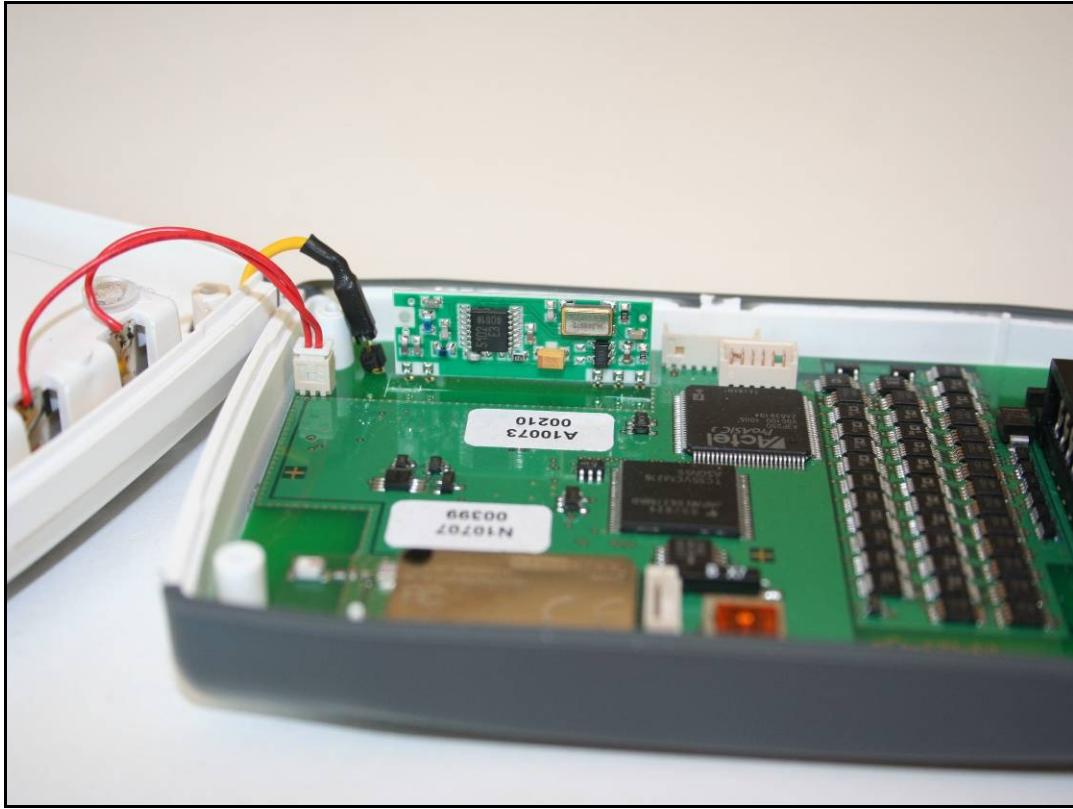


Photo 7:

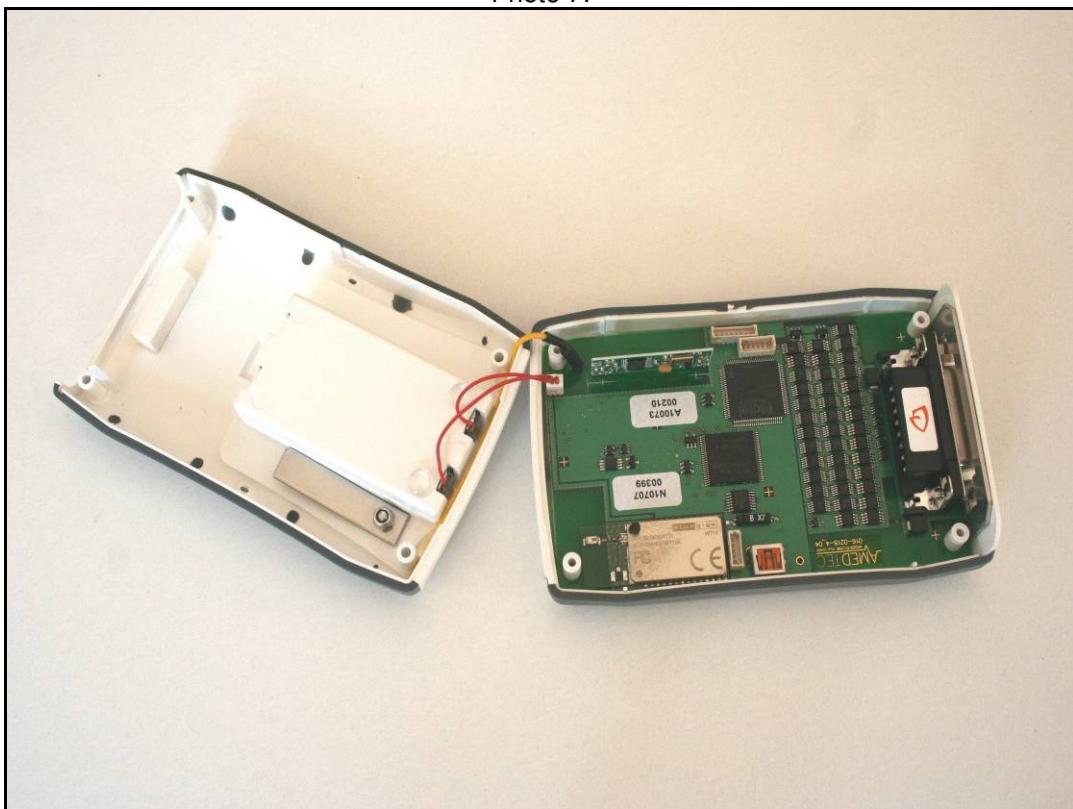


Photo 8:

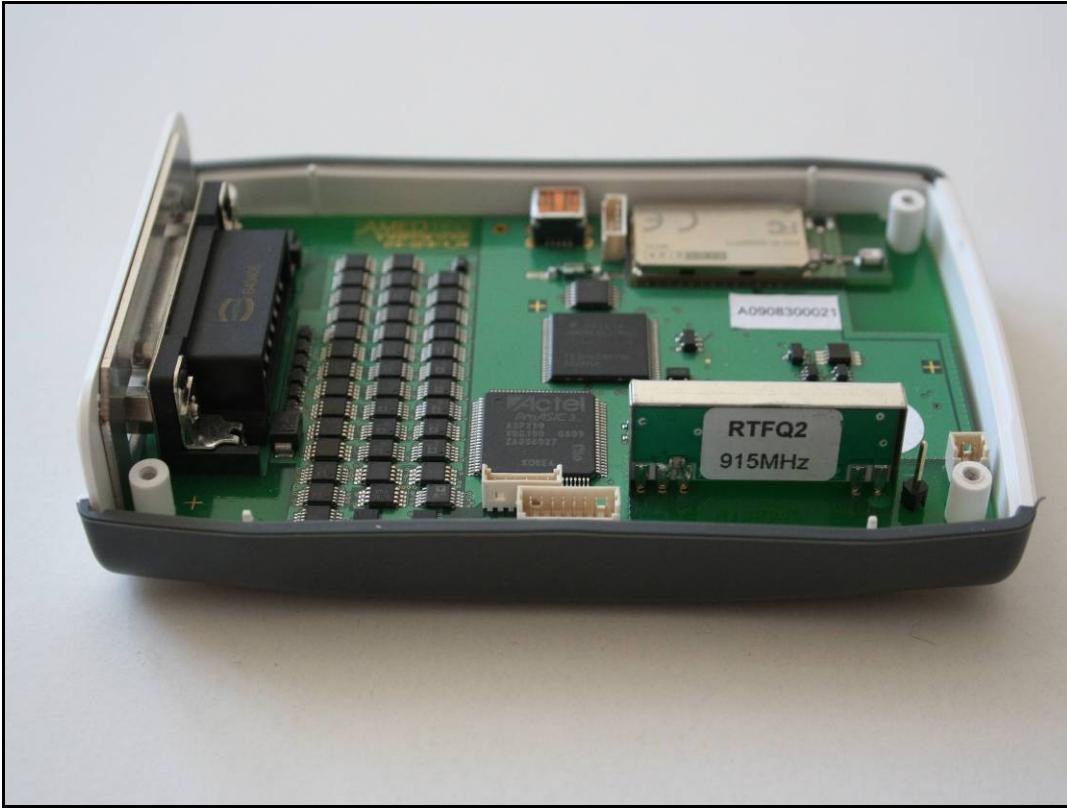


Photo 9:

