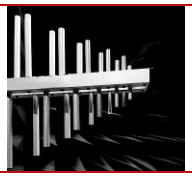
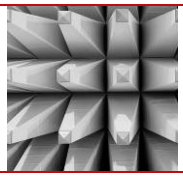




CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Test report no.: 1-3016-01-23/11

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: D-PL-12076-01-01

Area of Testing: Radio/Satellite Communications

Applicant

Research In Motion Limited
305 Phillip Street
Waterloo, ON N2L 3W8 / Canada
Phone: +1-519-888-7465
Fax: +1-519-888-6906
Contact: Masud Attayi
e-mail: mattayi@rim.com
Phone: +1-519-888-7465

Manufacturer

Research In Motion Limited
305 Phillip Street
Waterloo, ON N2L 3W8 / Canada

Test standard	Version	Test standard description
47 CFR Part 15	2009-10	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices

Test item

Kind of test item:	**Blackberry GSM Phones**
Model name:	**RDU71CW Rev 1 (until 2011-02-23)** **RDU71CW Rev 2 (after 2011-02-23)**
Frequency:	**ISM – band 2400 MHz to 2483.5 MHz** **(BT - lowest channel 2402 MHz;** **highest channel 2480 MHz / WLAN- lowest channel 2412 MHz; highest channel 2462 MHz)** **GSM band 824.2 – 848.8 MHz (836.4 MHz – middle channel 189)** **GSM band 1850.2 – 1909.8 MHz (1880 MHz – middle channel 661)**
Power supply:	**3.7V DC by Lithium battery**
Temperature range:	**+22 °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=Stefan Boes, o=Cetecom ICT Services GmbH, ou=BOE-100817, email=Stefan.Boes@cetecom.com, c=DE
2011.07.05 15:28:20 +02'00'

Stefan Bös

Test report authorised:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-100826, email=marco.bertolino@cetecom.com, c=DE
2011.07.05 15:19:53 +02'00'

Marco Bertolino

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:	2011-02-02
Date of receipt of test item:	2011-02-02
Start of test:	2011-02-02
End of test:	2011-04-12
Person(s) present during the test:	-/-

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 Part 15 - Radio frequency devices

4 Test environment

Temperature:	T_{nom}	+22	°C during room temperature tests
	T_{max}	-/-	°C during high temperature test
	T_{min}	-/-	°C during low temperature test
Relative humidity content:		45 %	
Air pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	3.7 V	Lithium battery
	V_{max}	-/- V	
	V_{min}	-/- V	

5 Test item

Kind of test item	:	Blackberry GSM Phones
Type identification	:	RDU71CW Rev 1 (until 2011-02-23) RDU71CW Rev 2 (after 2011-02-23)
S/N serial number	:	MEID-HEX A000002587BB8C
HW/ SW hardware status:		PRD- 39474-703 CPR 14791 ASY-39471-001 Rev H POP-39387-003 Rev A
Frequency band [MHz]	:	Bluetooth® ISM – band 2400 MHz to 2483.5 MHz (lowest channel 2402 MHz; highest channel 2480 MHz) WLAN ISM – band 2400 MHz to 2483.5 MHz (lowest channel 2412 MHz; highest channel 2462 MHz) GSM band 824.2 – 848.8 MHz (836.4 MHz – middle channel 189) PCS band 1850.2 – 1909.8 MHz (1880 MHz – middle channel 661)
Type of modulation	:	FHSS technology with GFSK, Pi/4 DQPSK and 8 DPSK modulation. DSSS & OFDM technology with BPSK, QPSK, 16 – & 64 – QAM modulation. GSM / PCS technology with GMSK modulation. UMTS / WCDMA technology with QPSK modulation.
Antenna	:	Integrated antenna
Power supply	:	3.7 V DC by Lithium battery
Temperature range	:	22 °C

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 8, Annex 8	Passed	2011-07-05	Delta tests according to customer test plan!

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Results (max.)
§15.247(d) RSS-210	TX spurious emissions radiated	Nominal	Nominal	Mode 1 Mode 2	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies

Note: NA = Not Applicable; NP = Not Performed

Note:

Mode 1: GSM 850 (GMSK) + BT (GFSK) + WiFi OFDM / g – mode

Mode 2: PCS 1900 (GMSK) + BT (Pi/4 DQPSK) + WiFi DSSS / b – mode

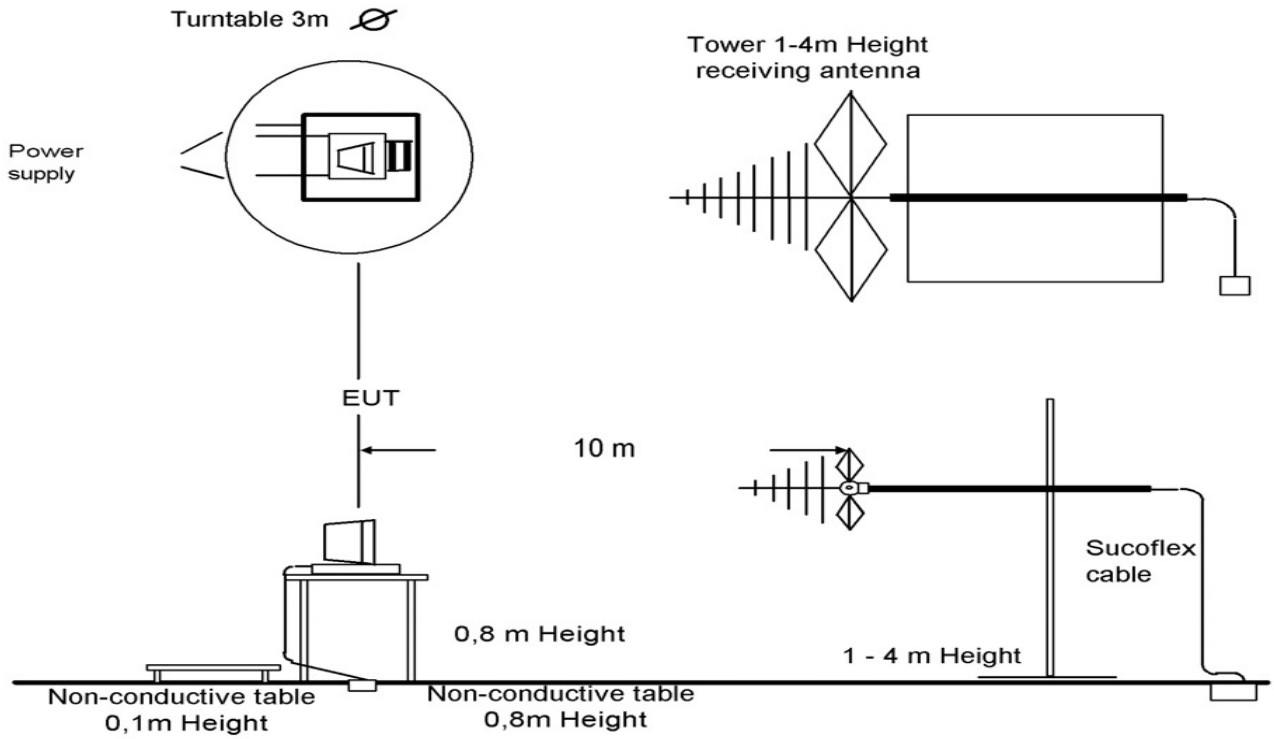
8 RF measurement testing

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 C63.4-2009 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 C63-4-2009 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.

8.2 Additional comments

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: Customer test plan

Mode 1: GSM 850 (GMSK) + BT (GFSK) + WiFi OFDM / g – mode

Mode 2: PCS 1900 (GMSK) + BT (Pi/4 DQPSK) + WiFi DSSS / b – mode

WLAN settings:

1 Mbps and power level 18000 (DSSS / b - mode)

6 Mbps and power level 18000 (OFDM / g - mode)

Configuration descriptions: TX tests: were performed with x-DH5 packets and static PRBS pattern payload.
RX/Standby tests: BT test mode enabled, scan enabled, TX Idle

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

9 Measurement results

9.1 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode.

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 26 GHz
Trace-Mode:	Max Hold
Measured Modulation:	☒ GFSK ☒ Pi/4 DQPSK ☐ 8DPSK ☒ DSSS ☒ OFDM / g – mode ☒ GMSK

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

Limits:

FCC	IC	
CFR Part 15.247(d)	RSS 210, Issue 8	
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

Results:

Mode 1: GSM 850 (GMSK)/Middle Channel + BT (GFSK)/Channel 00 + WiFi OFDM / g – mode / Channel 11

TX spurious emissions radiated [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
Emissions are not rated! Please take a look at the plots!		
Measurement uncertainty		± 3 dB

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

Results:

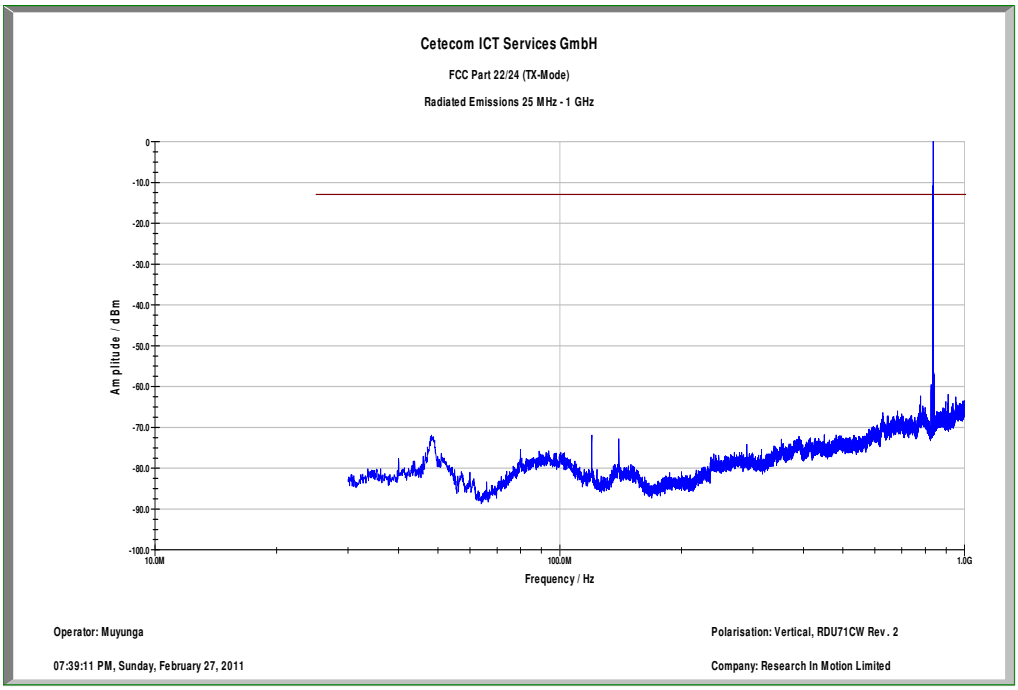
Mode 2: PCS 1900 (GMSK)/Middle Channel + BT (GFSK)/Channel 00 + WiFi OFDM / g – mode / Channel 11

TX spurious emissions radiated [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
Emissions are not rated! Please take a look at the plots!		
Measurement uncertainty		± 3 dB

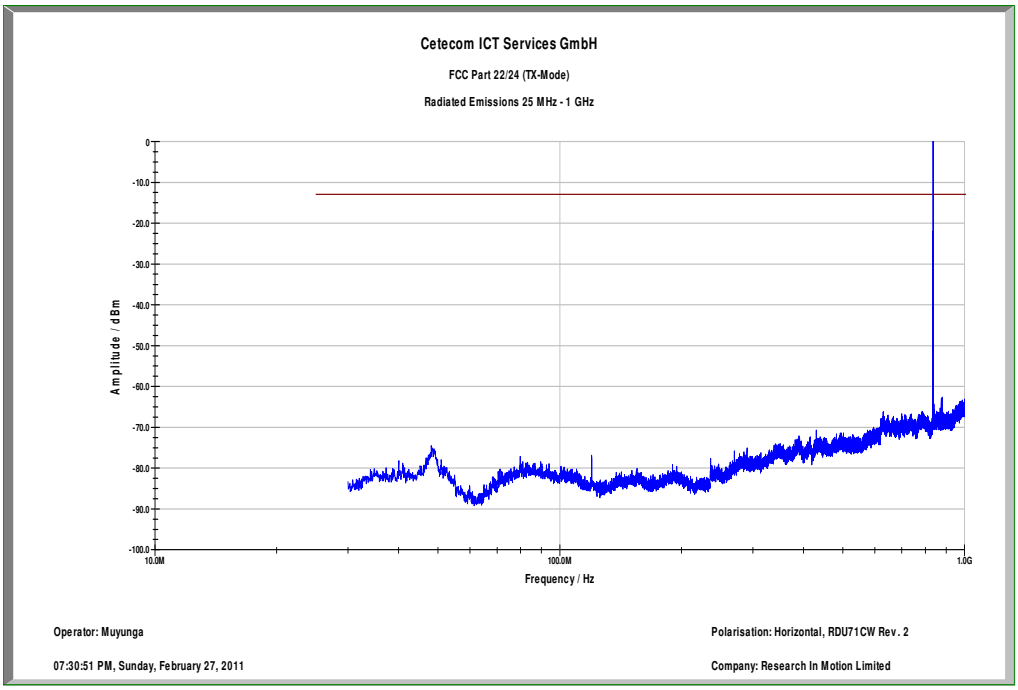
Result: **The result of the measurement is passed.**

Mode 1: GSM 850 (GMSK)/Middle Channel + BT (GFSK)/Channel 00 + WiFi OFDM / g – mode / Channel 11

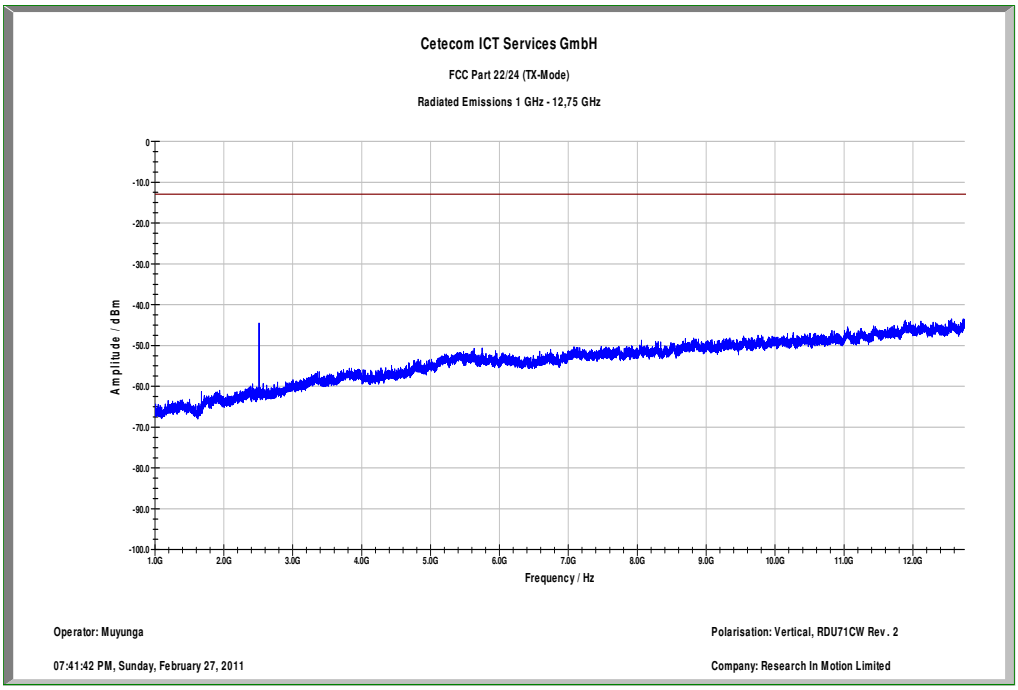
Plot 1: 30 MHz to 1 GHz, vertical polarization



Plot 2: 30 MHz to 1 GHz, horizontal polarization

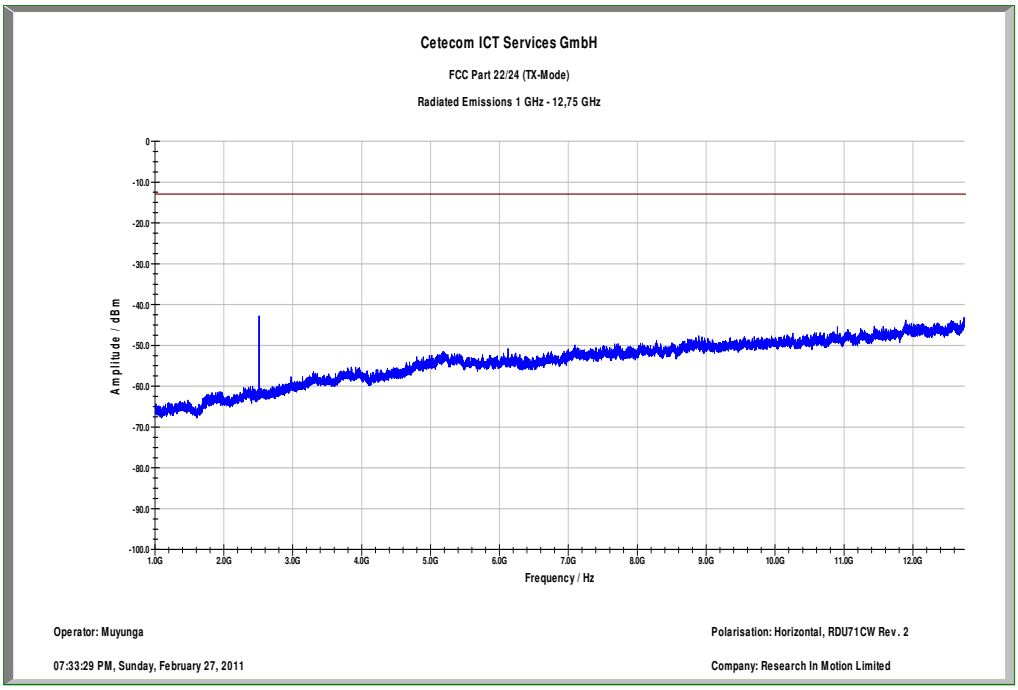


Plot 3: 1 GHz to 12.75 GHz, vertical polarization



Carrier suppressed with a 2.4 GHz-band rejection filter.

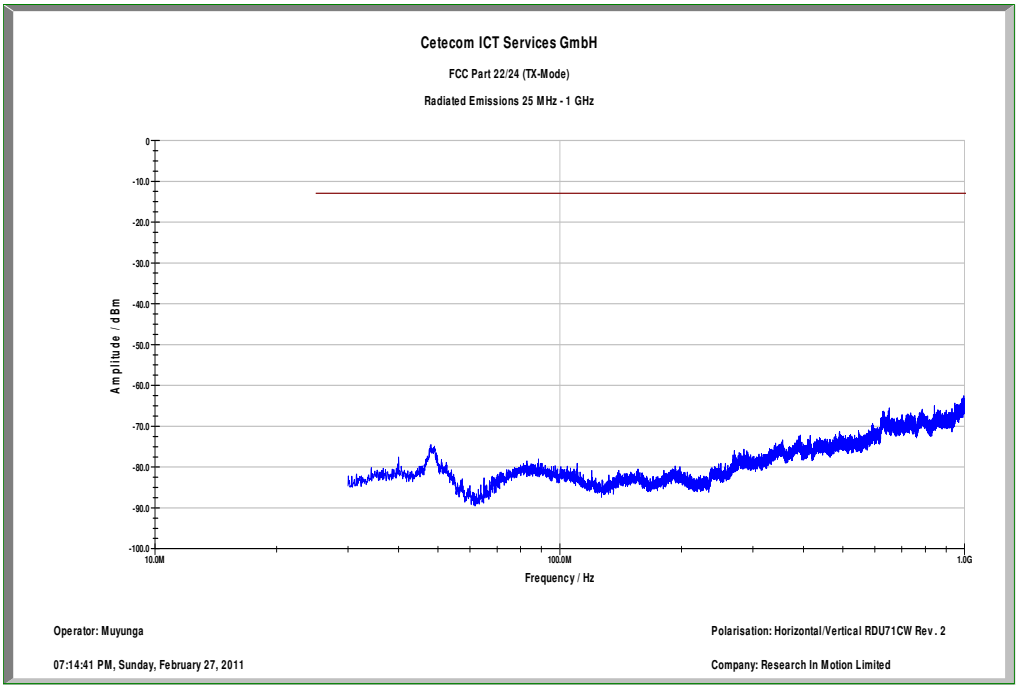
Plot 4: 1 GHz to 12.75 GHz, horizontal polarization



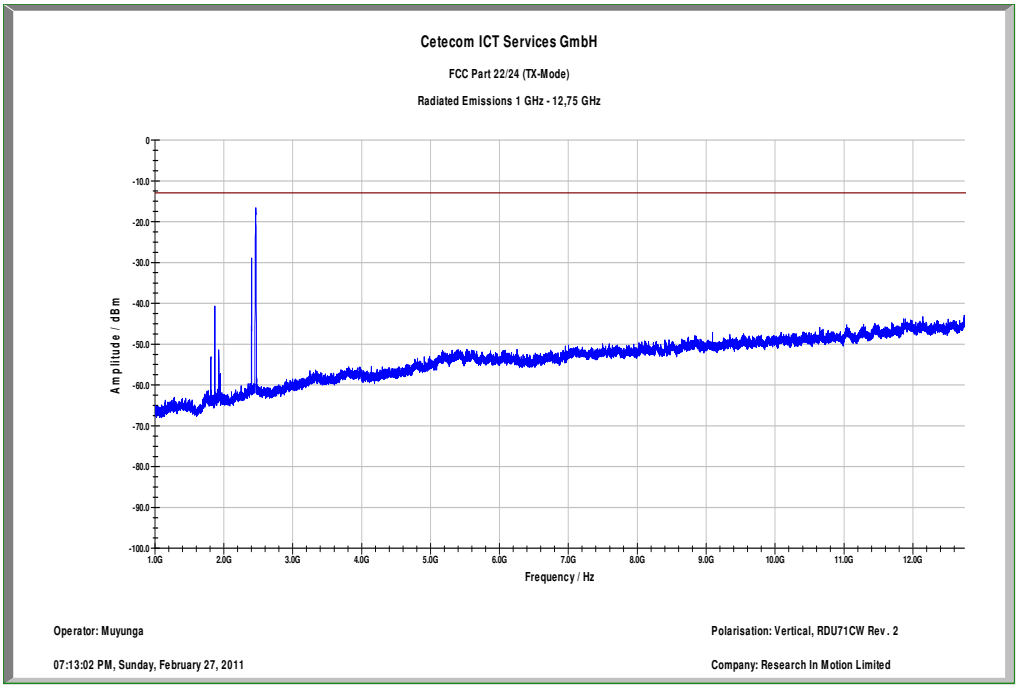
Carrier suppressed with a 2.4 GHz-band rejection filter.

Mode 2: PCS 1900 (GMSK)/Middle Channel + BT (GFSK)/Channel 00 + WiFi OFDM / g–mode / Channel 11

Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization

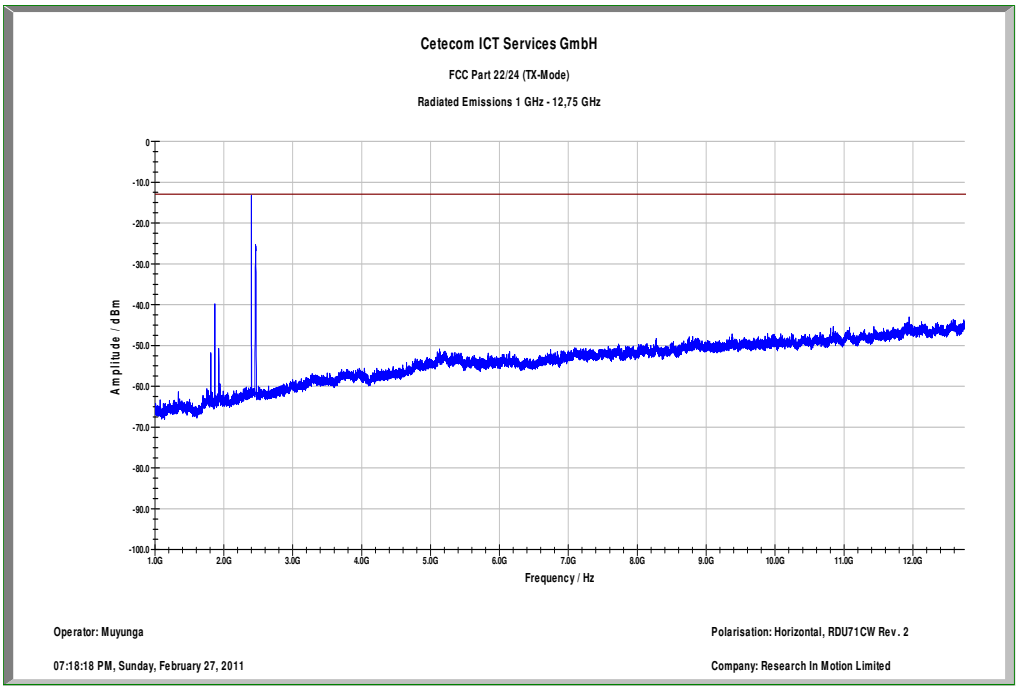


Plot 3: 1 GHz to 12.75 GHz, vertical polarization



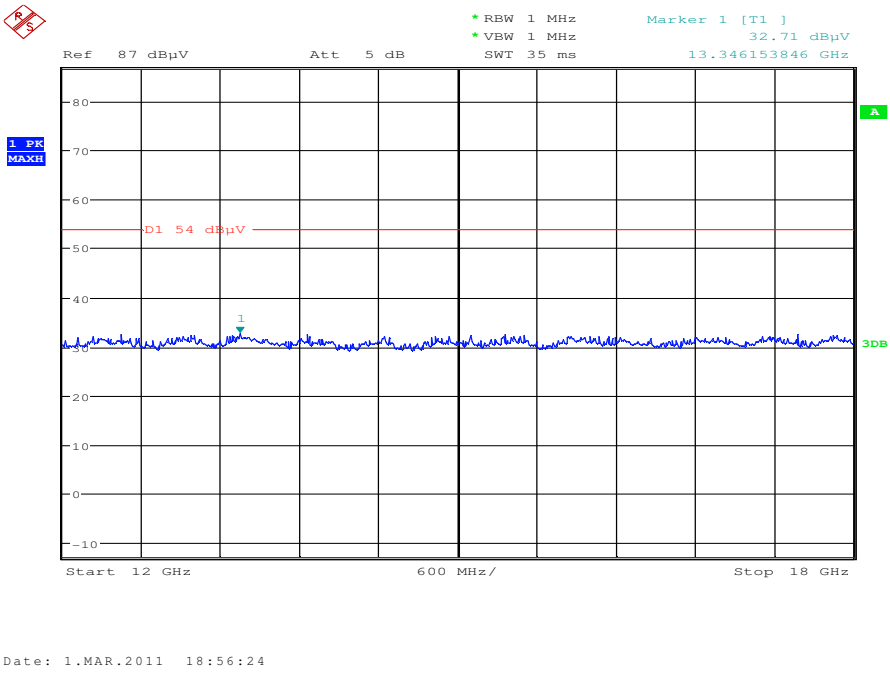
Carrier suppressed with a 1.9 GHz-band and 2.4 GHz-band rejection filter.

Plot 4: 1 GHz to 12.75 GHz, horizontal polarization

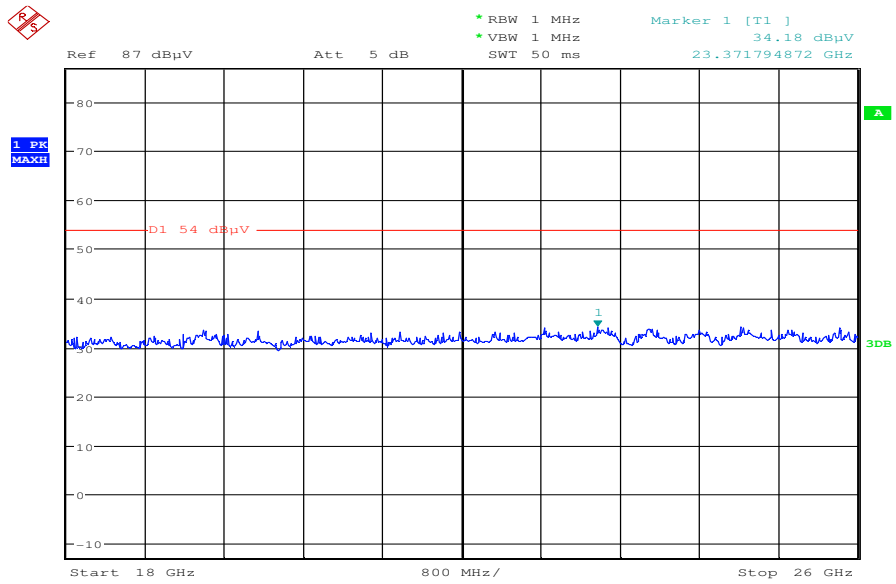


Carrier suppressed with a 1.9 GHz-band and 2.4 GHz-band rejection filter.

Plot 5: 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 6: 18 GHz to 26 GHz, vertical & horizontal polarization



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.	Coaxial Attenuator 30dB/500W	8325	Bird	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	05.03.2009	05.09.2011
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	VULB9163	Schwarzbeck	371	300003854	vlKl!	17.12.2008	17.12.2011

		Broadband Test-Antenna 30 MHz - 3 GHz							

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
vlkI!	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	2011-05-02

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