Accredited testing-laboratory

DAR registration number: DGA-PL-176/94-D1

Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97

Recognized by the Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3462C-1 (IC)
Certification ID: DE 0001
Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

Test report no.	**:**	**1-2190-01-02/10-B**
Type identification	**:**	**RDB71UW**
Applicant	**:**	**Research In Motion Limited**
FCC ID	**:**	**L6ARDB70UW**
IC Certification No	**:**	**2503A-RDB70UW**
Test standards	**:**	**47 CFR Part 2**
		47 CFR Part 22
		47 CFR Part 24
		47 CFR Part 27
		RSS - 132 Issue 2
		RSS - 133 Issue 5
		RSS - 139 Issue 2

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The 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 the CETECOM ICT Services GmbH.

Test laboratory manager:

cn=Jakob Reschke, o=CETECOM ICT Services GmbH, ou=RES-100323, email=Jakob.Reschke@ict.cetecom.de, c=DE 2010.06.10 15:20:28 +02'00'

2010-05-25	**Daniel K. Muyunga**	**i.A.**
Date	Name	Signature

Technical responsibility for area of testing:

cn=Stefan Boes, o=Cetecom ICT Services GmbH, ou=BOE-100120, email=Stefan.Boes@ict.cetecom.de, c=DE 2010.06.10 15:22:52 +02'00'

2010-05-25	**Stefan Bös**	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
e-mail: info@ICT.cetecom.de
Internet: http://www.cetecom-ict.de

State of accreditation:	**The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025** **DAR registration number: DGA-PL-176/94-D1**
Accredited by:	**Federal Motor Transport Authority (KBA)** **DAR registration number: KBA-P 00070-97**

Testing location, if different from CETECOM ICT Services GmbH:

Name :
Street :
Town :
Country :
Phone :
Fax :

1.3 Details of applicant

Name:	**Research In Motion Limited**
Street:	**305 Phillip Street**
Town:	**Waterloo, ON N2L 3W8**
Country:	**Canada**
Telephone:	**+1-519-888-7465**
Fax:	**+1-519-888-6906**
Contact:	**Masud Attayi**
E-mail:	**mattayi@rim.com**
Telephone:	**+1-519-888-7465**

1.4 Application details

Date of receipt of order:	**2010-04-15**
Date of receipt of test item:	**2010-04-15**
Date of start test:	**2010-04-21**
Date of end test	**2010-05-20**
Persons(s) who have been present during the test:	**-/-**

2 Test standard/s

47 CFR Part 2	**2009-10**	**Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations**
47 CFR Part 22	**2009-10**	**Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission subchapter B - common carrier services, Part 22-Public mobile services**
47 CFR Part 24	**2009-10**	**Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission subchapter B - common carrier services, Part 24-Personal communications services**
47 CFR Part 27	**2009-10**	**Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission Miscellaneous Wireless Communications Service**
RSS - 132 Issue 2	**2005-09**	**Spectrum Management and Telecommunications Policy - Radio Standards Specifications Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz**
RSS - 133 Issue 4	**2008-02**	**Spectrum Management and Telecommunications Policy - Radio Standards Specifications 2 GHz Personal Communication Services**
RSS – 139 Issue 2	**2009-02**	**Advanced Wireless Services Equipement Operating in the Bands 1710-1755 MHz and 2110-2155 MHz**

3 Technical tests

3.1 Details of manufacturer

Name:	**Research In Motion Limited**
Street:	**305 Phillip Street**
Town:	**Waterloo, ON N2L 3W8**
Country:	**Canada**

3.1.1 Test item

Kind of test item	:	**Blackberry GSM Phone**
Type identification	:	**RDB71UW**
Serial Number	:	**IMEI004401136104755**
Frequency	:	**824.2 – 848.8 MHz (GSM850)** **1850.2 – 1909.8 MHz (PCS1900)** **1712.4 – 1752.6 MHz (UMTS FDD4)**
Type of modulation	:	**GMSK; 8-PSK** **QPSK; 16QAM**
Number of channels	:	**125 (PCS850), 300 (PCS1900), 201 (FDD IV)**
Antenna Type	:	**Integrated antenna**
Power supply (normal)	:	**Li-ion battery**
Output power GSM 850 / GMSK	:	**ERP: 33.4 dBm**
Output power GSM 1900 / GMSK	:	**Not performed**
Output power GSM 850 / 8-PSK	:	**ERP: 26.9 dBm**
Output power GSM 1900 / 8-PSK	:	**Not performed**
Output power UMTS FDD IV	:	**ERP: 24.8 dBm**
Transmitter Spurious (worst case)	:	**488.7 nW / -33.11 dBm**
FCC ID	:	**L6ARDB70UW**
Certification No. IC	:	**2503A-RDB70UW**
Open Area Test Site IC No.	:	**IC 3462C-1**
IC Standards	:	**RSS132, Issue 2; RSS133, Issue 5; RSS139, Issue 1**

ATTESTATION:
DECLARATION OF COMPLIANCE:
I declare 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-100323, email=Jakob.Reschke@ict.cetecom.de, c=DE
2010.06.10 15:20:46 +02'00'

2010-05-25	**Daniel Muyunga**	**i.A.**
Date	Name	Signature

3.2 Test Setup

Hardware	:	CER-31896-001 Rev 1
Software	:	V5.0.0.606 (Bundle 1019, Platform: 6.3.0.1)

Mobile; (cond. measurements)	:	-/-
Mobile; (rad. measurements)	:	IMEI004401136104755

The radiated measurements were performed with Standard world wide charger.

4 Statement of Compliance

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

4.1 Summary of Measurement Results

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

☐ There were deviations from the technical specifications ascertained

4.1.1 Labeling requirements

Section in this Report	Test Name	Verdict
5.1	Labeling	not performed

4.1.2 PCS 1900 - GSM/circuit switched; EGPRS (EDGE)/packet switched

Section in this Report	Test Name	Verdict
5.1.1	RF Power Output	not performed
5.1.2	Frequency Stability	not performed
5.1.3	Radiated Emissions	pass
5.1.4	Conducted Spurious Emissions	not performed
5.1.5	Block Edge Compliance	not performed
5.1.6	Occupied Bandwidth	not performed

4.1.3 GSM 850 - GSM/circuit switched; EGPRS (EDGE)/packet switched

Section in this Report	Test Name	Verdict
5.2.1	RF Power Output	pass
5.2.2	Frequency Stability	not performed
5.2.3	Radiated Emissions	pass
5.2.4	Conducted Spurious Emissions	not performed
5.2.5	Block Edge Compliance	not performed
5.2.6	Occupied Bandwidth	not performed

4.1.4 UMTS FDD 4

Section in this Report	Test Name	Verdict
5.4.1	RF Power Output	pass
5.4.2	Frequency Stability	not performed
5.4.3	Radiated Emissions	pass
5.4.4	Conducted Spurious Emissions	not performed
5.4.5	Block Edge Compliance	not performed
5.4.6	Occupied Bandwidth	not performed

4.1.5 Receiver

Section in this Report	Test Name	Verdict
5.5.1	Receiver Radiated emissions	not performed

5 Measurements and results

5.1 PART PCS 1900

For Part 24/22 we use the substitution method (TIA/EIA 603).
All measurements in this report are done in GSM mode. The device is able to transmit data in GPRS mode also.
But because the current measurements are performed in PEAK mode no other results from GPRS mode are possible.
The only different is the modulation average power, which is 3 dB higher (by using 2 timeslots in the Up-link).
All relevant tests have been repeated in 8-PSK Modulation if EDGE Mode is supported.

5.1.1 RF Power Output

Reference

FCC:	CFR Part 24.232, 2.1046
IC:	RSS 133, Issue 5, Section 6.4

Summary:

This paragraph contains both average/peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation.
The power was measured with R&S Signal Analyzer FSIQ 26 (peak and average)
These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0 MHz and 1909.8 MHz (bottom, middle and top of operational frequency range).

Limits:

Nominal Peak Output Power (dBm)
+33

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Not performed

Test Results: Output Power (conducted) GMSK Mode

Frequency (MHz)	**Average Output Power (dBm)**	**Peak-to-Average Ratio (dB)**
1850.2		
1880.0		
1909.8		
Measurement uncertainty	±0.5 dB	

Test Results: Output Power (conducted) 8-PSK Mode

Frequency (MHz)	**Average Output Power (dBm)**	**Peak-to-Average Ratio (dB)**
1850.2		
1880.0		
1909.8		
Measurement uncertainty	±0.5 dB	

EIRP Measurements

Description:

This is the test for the maximum radiated power from the phone.
Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts e.i.r.p. peak power…" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method
(a) The measurements were performed with full rf output power and modulation.
(b) Test was performed at listed 3m test site (listed with FCC, IC).
(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)
(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.
(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(f) Set the EMI Receiver and #2 as follows:
Center Frequency: test frequency
Resolution BW: 100 kHz
Video BW: same
Detector Mode: positive
Average: off
Span: 3 x the signal bandwidth
(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.
(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.
(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.
(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.
(l) Repeat for all different test signal frequencies

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:
Center Frequency : equal to the signal source
Resolution BW : 10 kHz
Video BW : same
Detector Mode : positive
Average : off
Span : 3 x the signal bandwidth
(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(c) Select the frequency and E-field levels for ERP/EIRP measurements.
(d) Substitute the EUT by a signal generator and one of the following transmitting antennas (substitution antenna): DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz}.
(e) Mount the transmitting antenna at 0.8 meter high from the ground plane.
(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.
(g) If the DIPOLE antenna is used, tune its elements to the frequency as specified in the calibration manual.
(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.
(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.
(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:
P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB
Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1
Where: P: Actual RF Power fed into the substitution antenna port after corrected.
P1: Power output from the signal generator
P2: Power measured at attenuator A input
P3: Power reading on the Average Power Meter
EIRP: EIRP after correction
ERP: ERP after correction
(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)
(p) Repeat step (d) to (o) for different test frequency
(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.
(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Limits:

Nominal Peak Output Power (dBm)
+33

Not performed

Test Results: Output Power (radiated) GMSK Mode

Frequency (MHz)	**Peak (dBm)**
1850.2	
1880.0	
1909.8	
Measurement uncertainty	±0.5 dB

Test Results: Output Power (radiated) 8-PSK Mode

Frequency (MHz)	**Peak (dBm)**
1850.2	
1880.0	
1909.8	
Measurement uncertainty	±0.5 dB

Sample Calculation:

Freq	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	EIRP Result			
MHz	dBµV	dBm	dBi	dBd	dB	dBm			
1909.8	132.3	24.6	8.4	0.0	3.3	29.7			

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

5.1.2 Frequency Stability

Reference

FCC:	CFR Part 24.235, 2.1055
IC:	RSS 133, Issue 5, Section 6.3

Not performed

5.1.3 Radiated Emissions

Reference

FCC:	CFR Part 24.238, 2.1053
IC:	RSS 133, Issue 5, Section 6.5

Measurement Procedure:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2003 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
b) The antenna output was terminated in a 50 ohm load.
c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and I MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded.
e) Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603.

Measurement Limit:

Sec. 24.238 Emission Limits.
(a) On any frequency outside a licensee' s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Measurement Results: Radiated Emissions

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the USPCS band (1850.2 MHz, 1880.0 MHz and 1909.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next table.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked, too. The found values are stated in the table below.
As can be seen from this data, the emissions from the test item were within the specification limit.

Harmonic	Tx ch.-512 Freq. (MHz)	Level (dBm)	Tx ch.-661 Freq. (MHz)	Level (dBm)	Tx ch.-810 Freq. (MHz)	Level (dBm)
2	3700.4	-	3760	-	3819.6	-
3	5550.6	-	5640	-	5729.4	-
4	7400.8	-	7520	-	7639.2	-
5	9251.0	-	9400	-	9549.0	-
6	11101.2	-	11280	-	11458.8	-
7	12951.4	-	13160	-	13368.6	-
8	14801.6	-	15040	-	15278.4	-
9	16651.8	-	16920	-	17188.2	-
10	18502.0	-	18800	-	19098.0	-

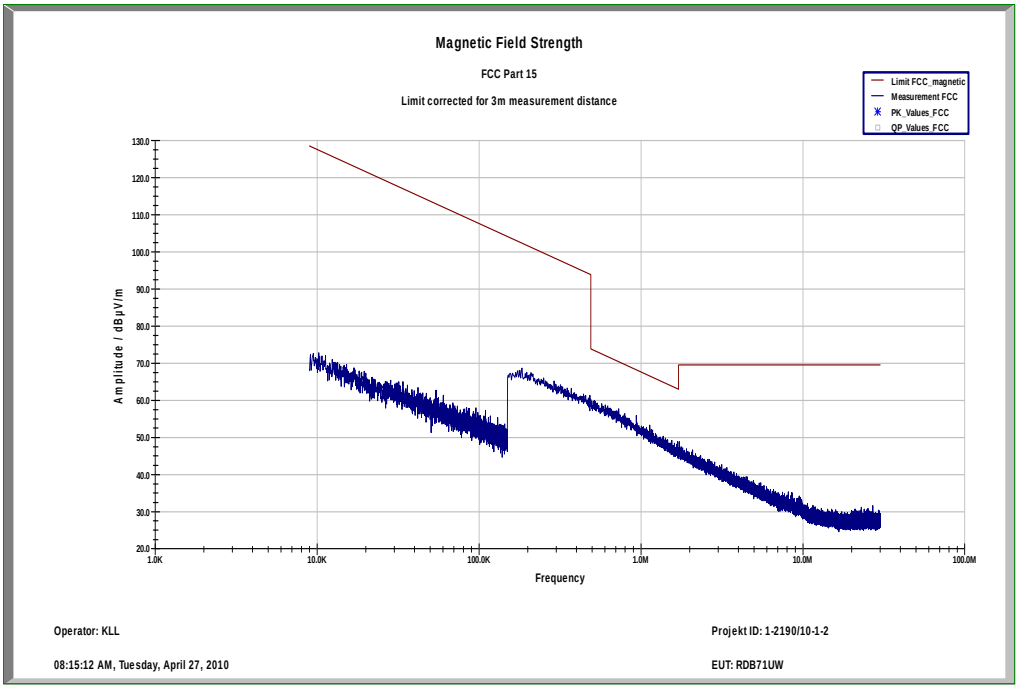
No peaks found > 20 dB below limit.

Sample calculation:

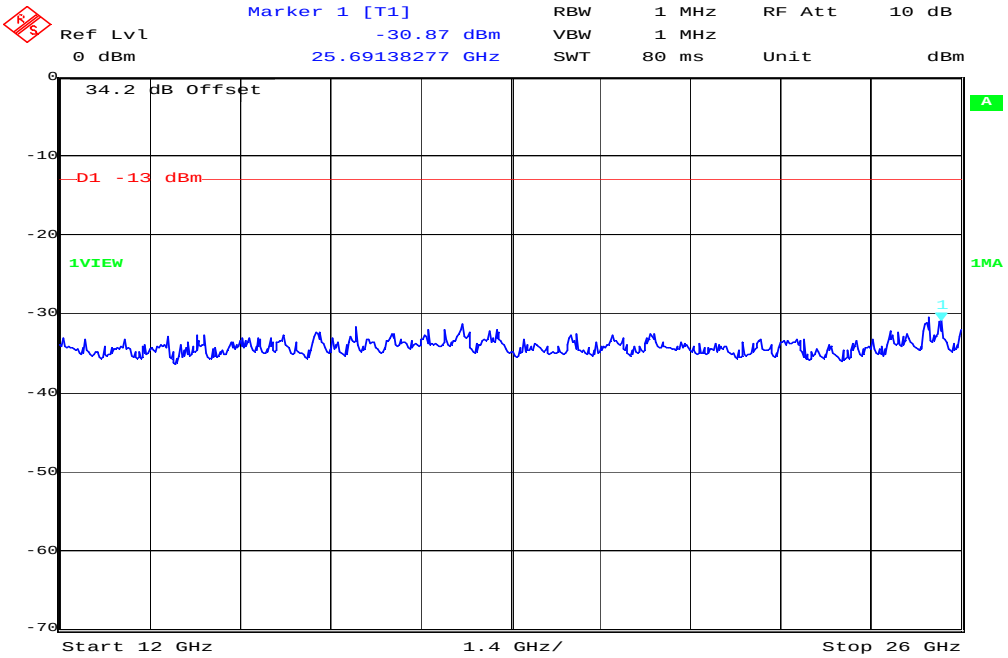
Freq	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	EIRP Result			
MHz	dBµV	dBm	dBi	dBd	dB	dBm			
1909.8	132.3	24.6	8.4	0.0	3.3	29.7			

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

Channel 512 GSM (Traffic mode up to 30 MHz) valid for all 3 channels



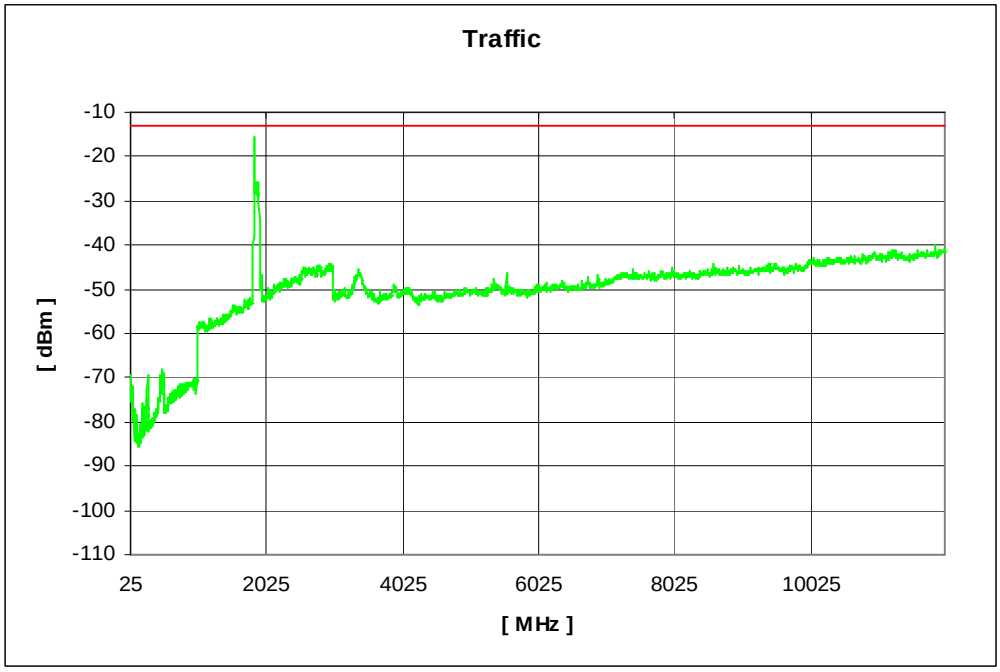
Channel 512 GSM (12 GHz - 25 GHz) valid for all 3 channels



f ≥ 1GHz : RBW / VBW 1 MHz

Channel 512 GSM (30 MHz – 12 GHz) antenna vertical

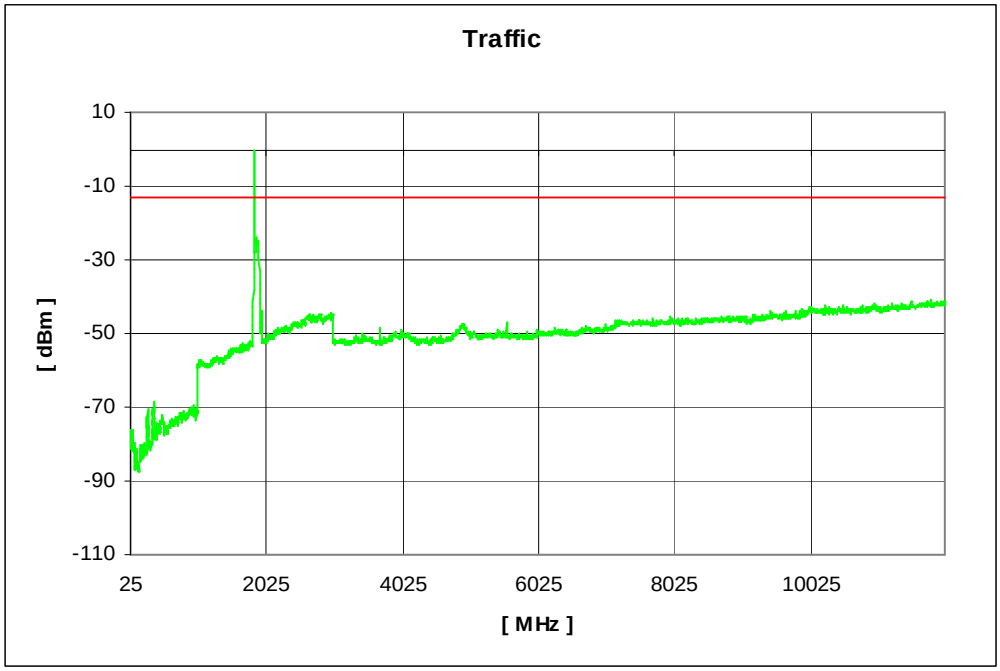
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 16:10:09	Vmin:	
Standard:	FCC_24_1900	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 512 GSM (30 MHz – 12 GHz) antenna horizontal

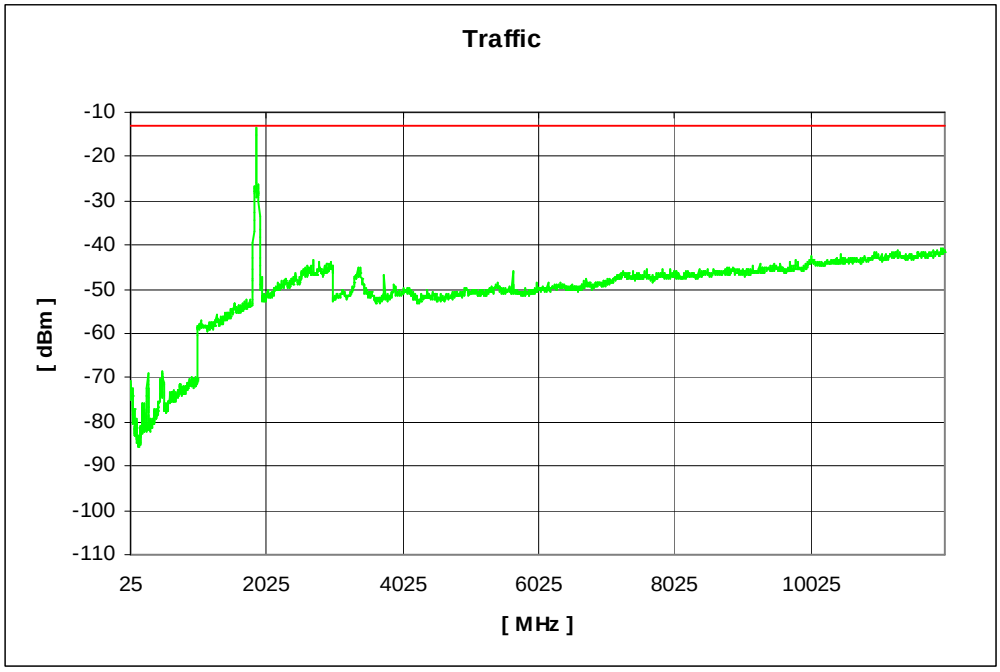
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 16:06:01	Vmin:	
Standard:	FCC_24_1900	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 661 GSM (30 MHz – 12 GHz) antenna vertical

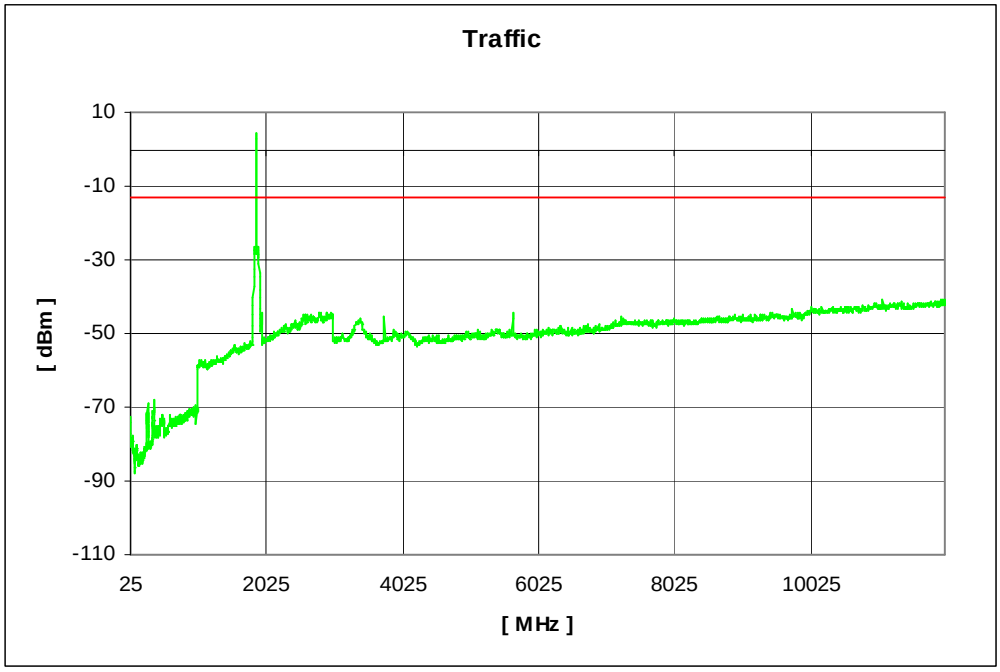
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 16:14:40	Vmin:	
Standard:	FCC_24_1900	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 661 GSM (30 MHz – 12GHz) antenna horizontal

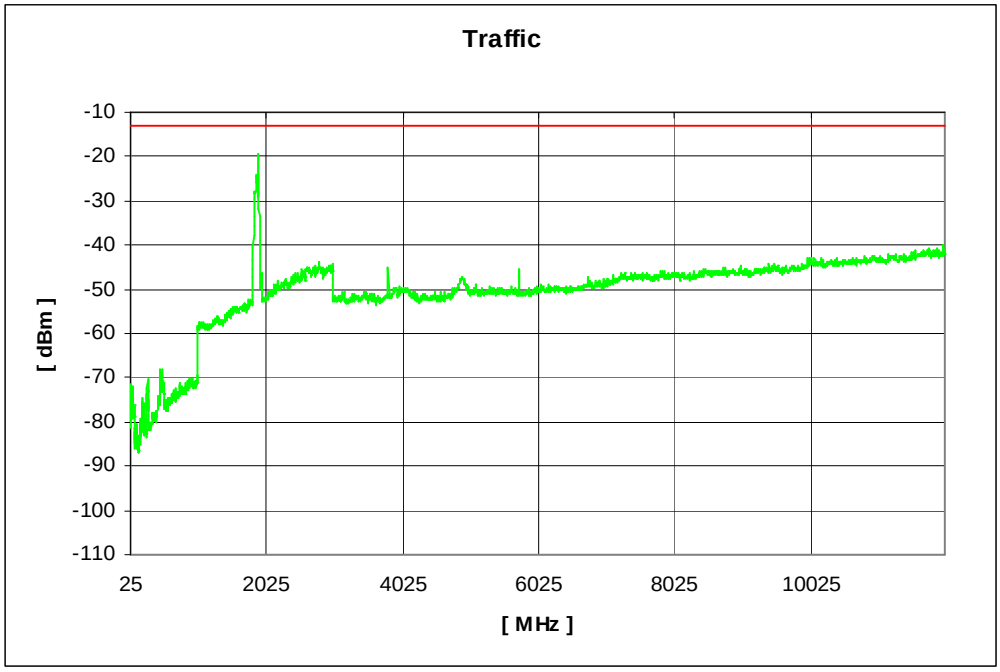
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 16:18:48	Vmin:	
Standard:	FCC_24_1900	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 810 GSM (30 MHz – 12GHz) antenna vertical

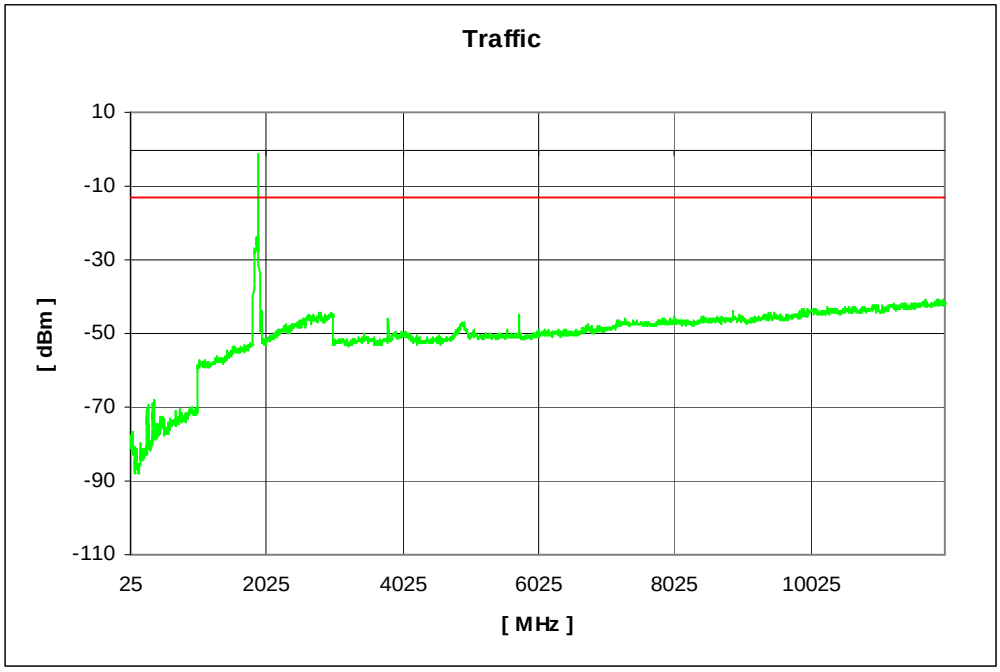
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 16:27:32	Vmin:	
Standard:	FCC_24_1900	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

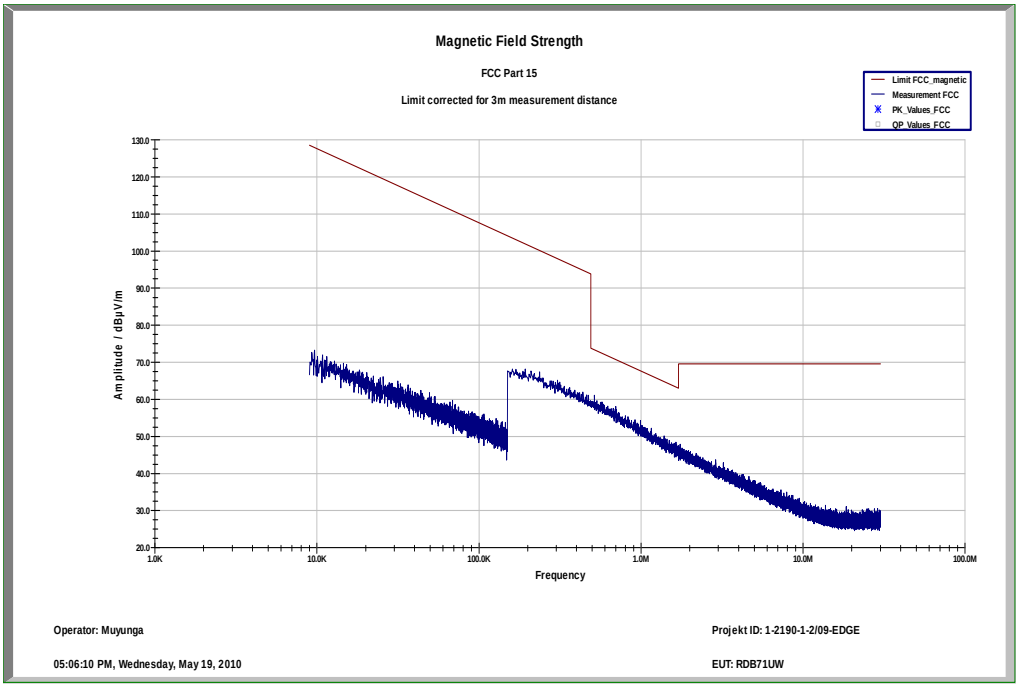
Channel 810 GSM (30 MHz – 12GHz) antenna horizontal

EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 16:23:22	Vmin:	
Standard:	FCC_24_1900	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000

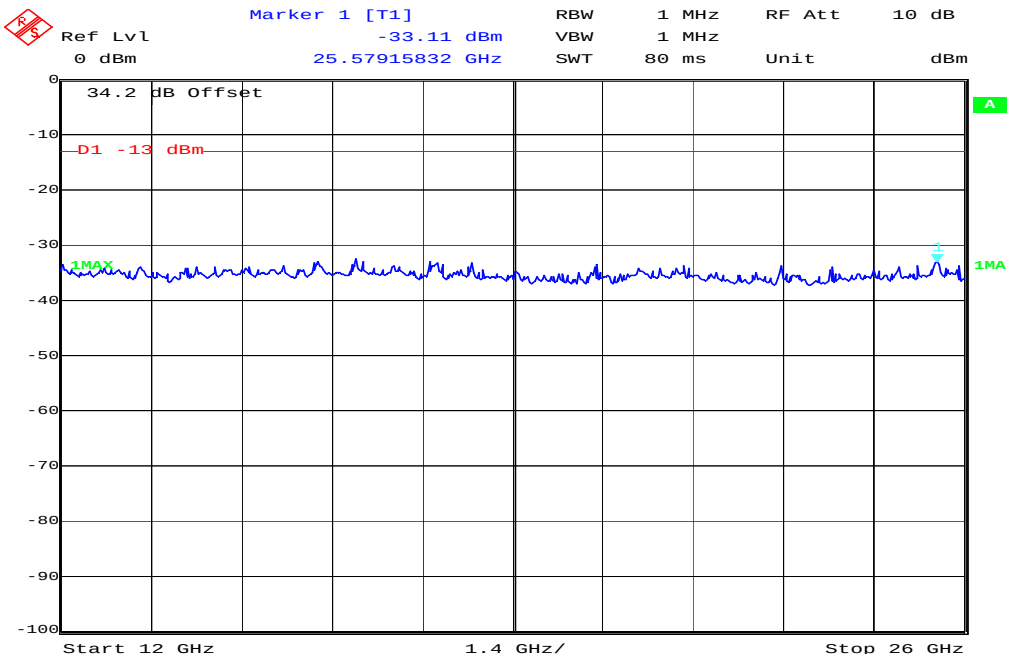


f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 512 EDGE (Traffic mode up to 30 MHz) valid for all 3 channels

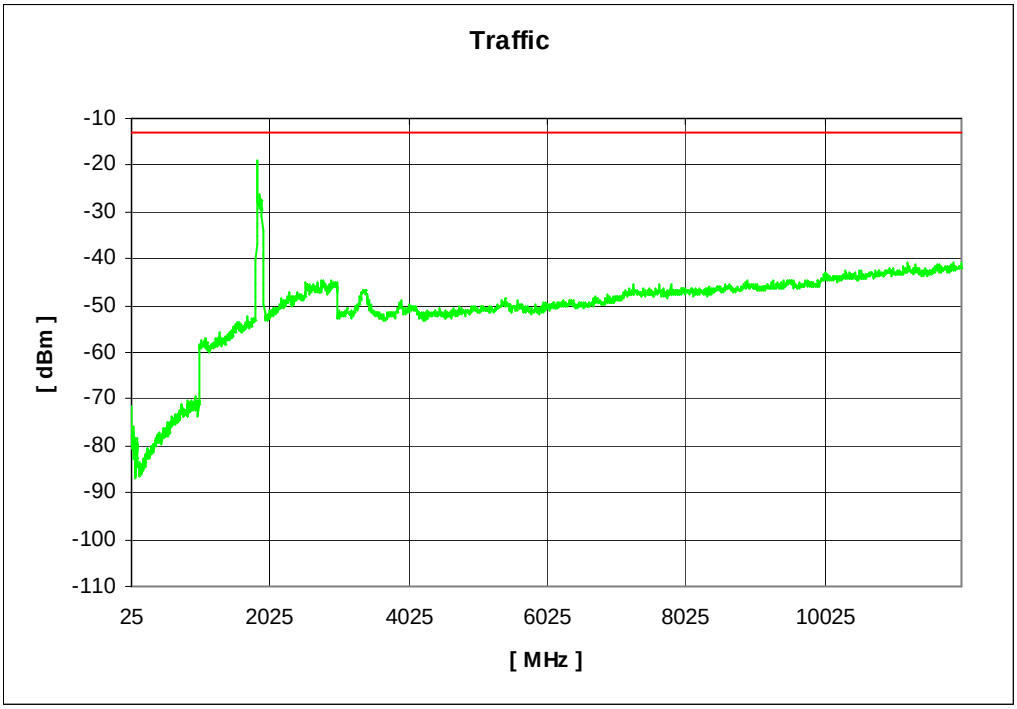


Channel 512 EDGE (12 GHz - 25 GHz) valid for all 3 channels



Channel 512 EDGE (30 MHz – 12GHz) antenna vertical

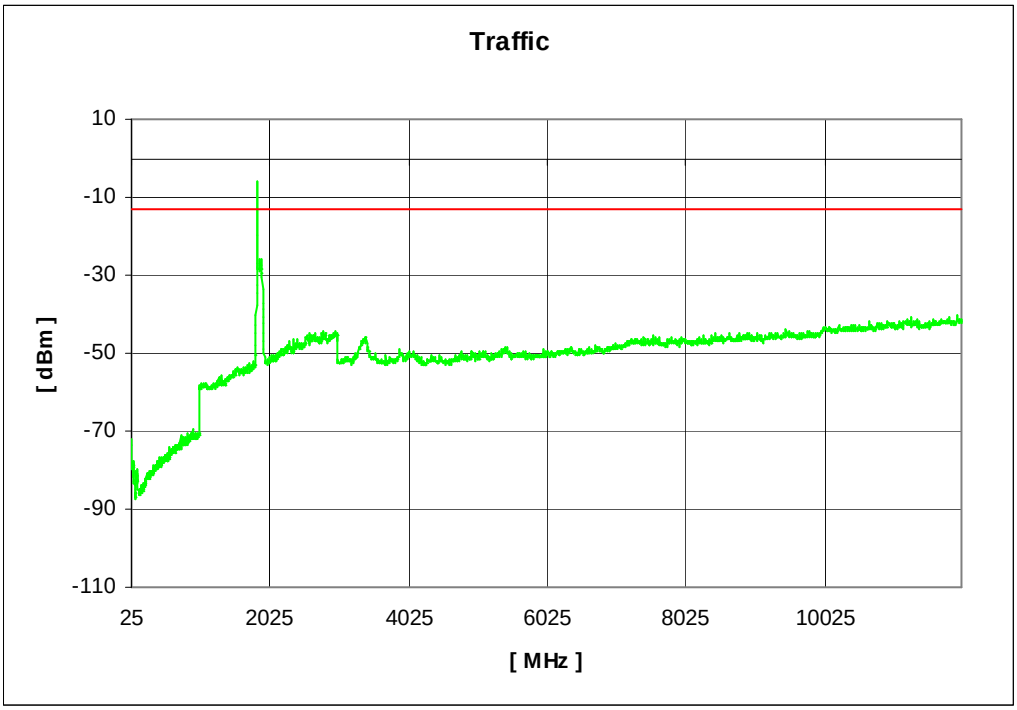
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 15:50:29	Vmin:	
Standard:	FCC_24_1900	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 512 EDGE (30 MHz – 12GHz) antenna horizontal

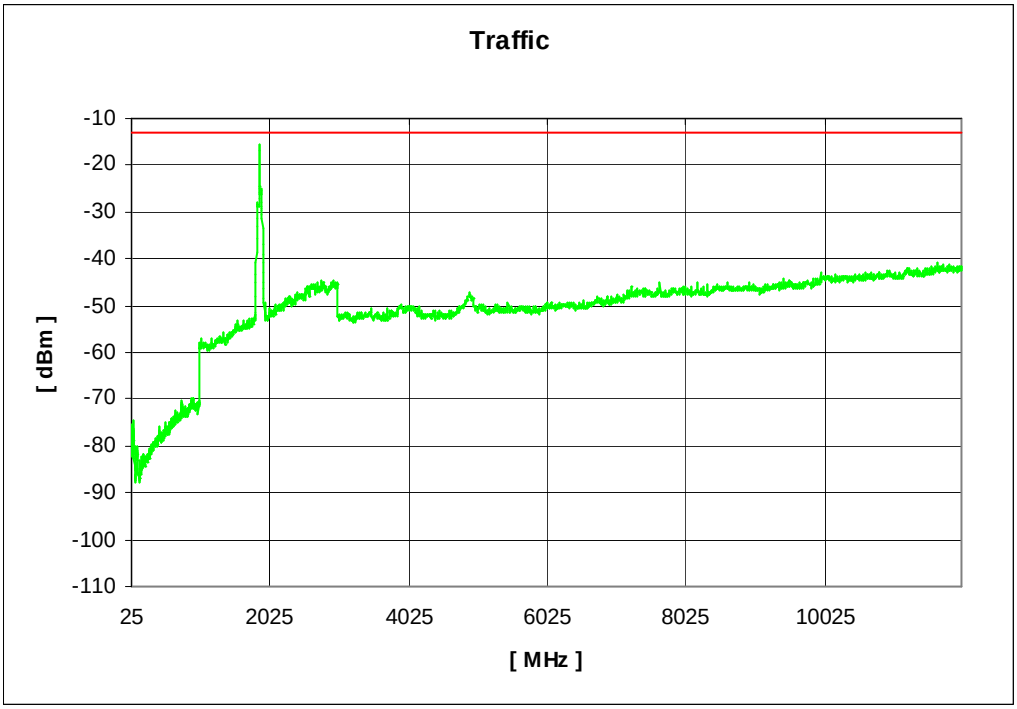
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 15:56:01	Vmin:	
Standard:	FCC_24_1900	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 661 EDGE (30 MHz – 12GHz) antenna vertical

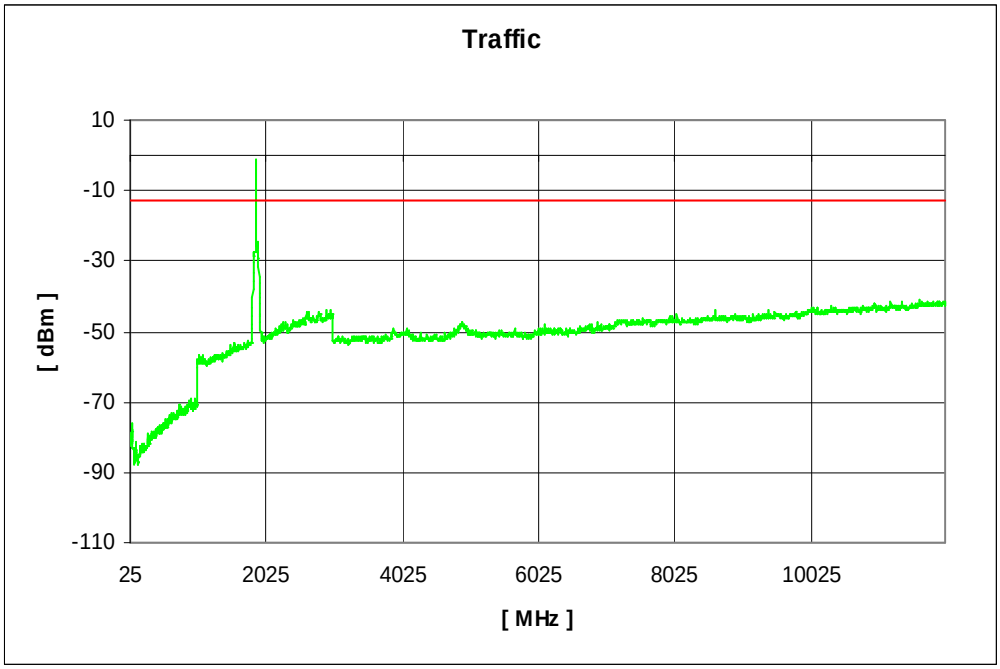
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 15:43:57	Vmin:	
Standard:	FCC_24_1900	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 661 EDGE (30 MHz – 12GHz) antenna horizontal

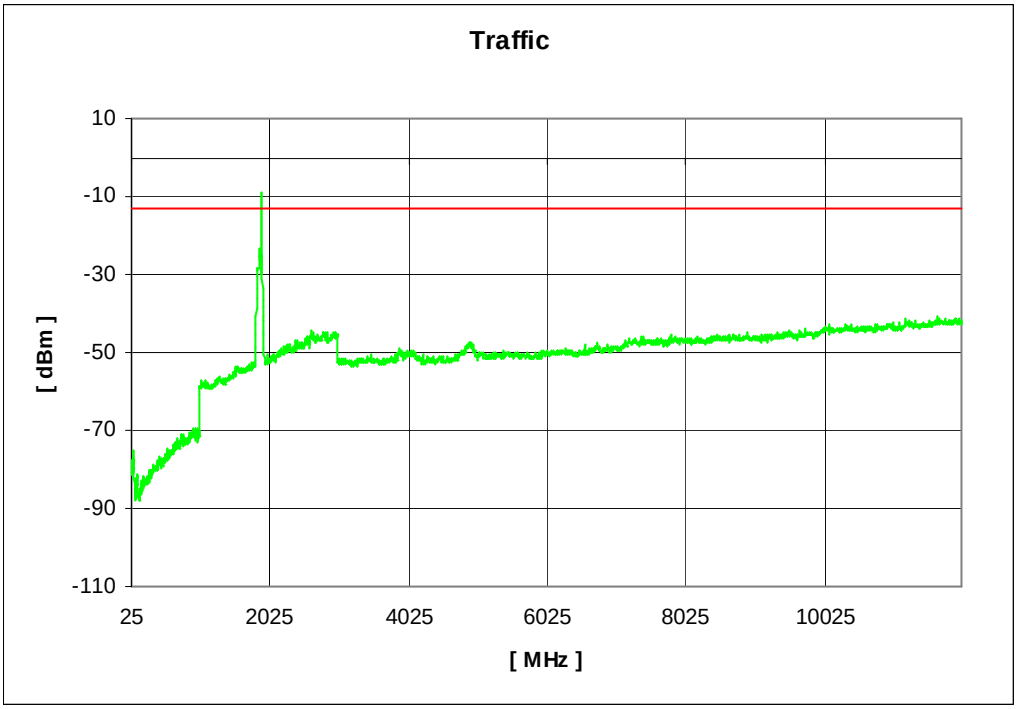
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 15:38:47	Vmin:	
Standard:	FCC_24_1900	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 810 EDGE (30 MHz – 12GHz) antenna vertical

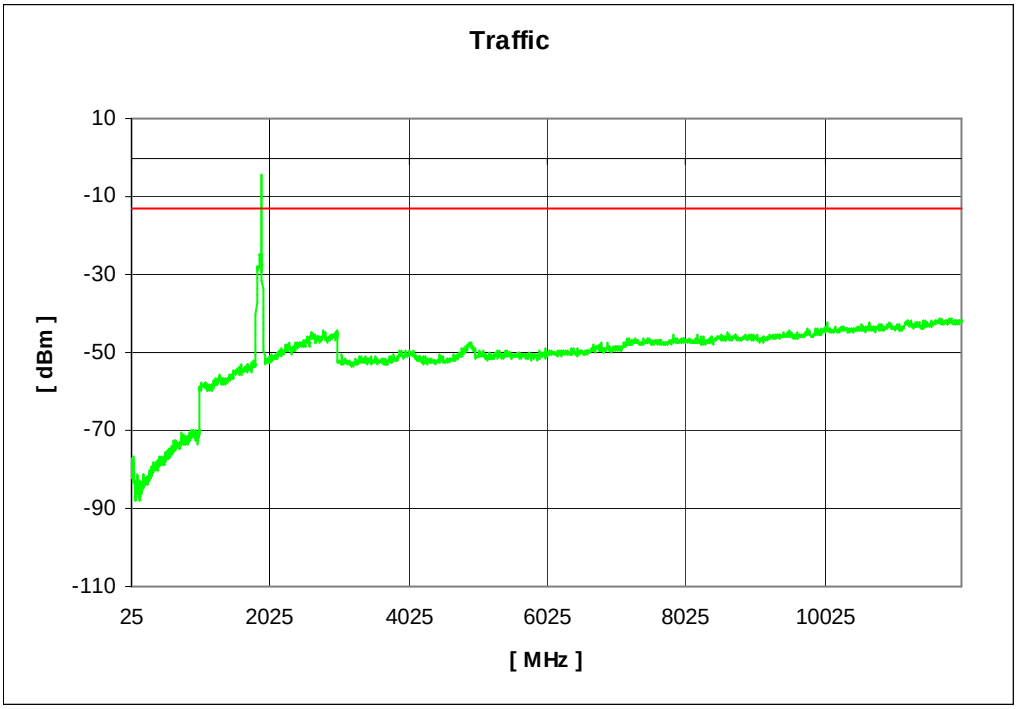
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 16:15:27	Vmin:	
Standard:	FCC_24_1900	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 810 EDGE (30 MHz – 12GHz) antenna horizontal

EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 16:11:26	Vmin:	
Standard:	FCC_24_1900	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_24_1900\Transducer_FCC_24_1900.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

5.1.4 Conducted Spurious Emissions

Reference

FCC:	CFR Part 24.238, 2.10.51
IC:	RSS 133, Issue 5, Section 6.5

Not performed

5.1.5 Block Edge Compliance

Reference

FCC:	CFR Part 24.238
IC:	RSS 133, Issue 5, Section 6.5

Not performed

5.1.6 Occupied Bandwidth

Reference

FCC:	CFR Part 24.238, 2.1049
IC:	RSS 133, Issue 5, Section 6.5

Not performed

5.2 PART GSM 850

5.2.1 RF Power Output

Reference

FCC:	CFR Part 22.9.1.3, 2.1046
IC:	RSS 132, Issue 2, Section 4.4 and 6.4

Summary:

This paragraph contains both average, peak output powers and EIRP measurements for the mobile station.
In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation.
The power was measured with R&S Signal Analyzer FSIQ 26 (peak and average)
These measurements were done at 3 frequencies, 824.2 MHz, 836.4 MHz and 848.8 MHz (bottom, middle and top of operational frequency range).

Limits:

Nominal Peak Output Power (dBm)
+38.45

Not performed

Test Results: Output Power (conducted) GMSK Mode

Frequency (MHz)	**Average Output Power (dBm)**	**Peak-to-Average Ratio (dB)**
824.2		
836.4		
848.8		
Measurement uncertainty	±0.5 dB	

Test Results: Output Power (conducted) 8-PSK Mode

Frequency (MHz)	**Average Output Power (dBm)**	**Peak-to-Average Ratio (dB)**
824.2		
836.4		
848.8		
Measurement uncertainty	±0.5 dB	

ERP Measurements
Description: This is the test for the maximum radiated power from the phone.
Rule Part 22.913 specifies that "Mobile/portable stations are limited to 7 watts ERP.

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method
(a) The measurements were performed with full rf output power and modulation.
(b) Test was performed at listed 3m test site (listed with FCC, IC).
(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)
(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.
(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(f) Set the EMI Receiver and #2 as follows:
Center Frequency: test frequency
Resolution BW: 100 kHz
Video BW: same
Detector Mode: positive
Average: off
Span: 3 x the signal bandwidth
(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.
(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.
(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.
(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.
(l) Repeat for all different test signal frequencies

Measuring the ERP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring ERP) as follows:

Center Frequency	: equal to the signal source
Resolution BW	: 10 kHz
Video BW	: same
Detector Mode	: positive
Average	: off
Span	: 3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(c) Select the frequency and E-field levels for ERP/EIRP measurements.
(d) Substitute the EUT by a signal generator and one of the following transmitting antennas (substitution antenna): .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz}.
(e) Mount the transmitting antenna at 0.8 meter high from the ground plane.
(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.
(g) If the DIPOLE antenna is used, tune its elements to the frequency as specified in the calibration manual.
(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.
(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.
(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:
P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB

Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1
Where: P: Actual RF Power fed into the substitution antenna port after corrected.
P1: Power output from the signal generator
P2: Power measured at attenuator A input
P3: Power reading on the Average Power Meter
EIRP: EIRP after correction
ERP: ERP after correction
(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)
(p) Repeat step (d) to (o) for different test frequency
(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.
(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Limits:

Nominal Peak Output Power (dBm)
+38.45

Test Results: Output Power (radiated) GMSK Mode

Frequency (MHz)	**Peak (dBm)**
824.2	31.2
836.4	32.7
848.8	33.4
Measurement uncertainty	±0.5 dB

Test Results: Output Power (radiated) 8-PSK Mode

Frequency (MHz)	**Peak (dBm)**
824.2	26.3
836.4	26.9
848.8	26.8
Measurement uncertainty	±0.5 dB

Sample calculation:

Freg	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERP	Substitution Antenna
MHz	dBµV	dBm	dBi	dBd	dB	dBm	
848.8	137.8	26.6	8.4	0.0	3.3	31.7	UHAP Schwarzbeck S/N 460

ERP = SG (dBm) - Cable Loss (dB) + Ant. gain (dB)
*ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.1dBi

5.2.2 Frequency Stability

Reference

FCC:	CFR Part 22.355, 2.1055
IC:	RSS 132, Issue 2, Section 4.3 and 6.3

Not performed

5.2.3 Radiated Emissions

Reference

FCC:	CFR Part 22.917, 2.1053
IC:	RSS 132, Issue 2, Section 4.5 and 6.5

Measurement Procedure:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2003 requirements and is recognized by the FCC to be in compliance for a 3 and a10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest
frequency generated within the equipment, which is the transmitted carrier that can be as high as 848.8 MHz. This was rounded up to 12 GHz. The resolution bandwidth is set as outlined in Part 22.917. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
b) The antenna output was terminated in a 50 ohm load.
c) A double ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and I MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was calculated from the field intensity levels measured at 3 meters using the equation shown below:
e)Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603 .

Measurement Limit:

Sec. 22.917 Emission Limits.
(a) On any frequency outside a licensee' s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Measurement Results:

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the USPCS band (824.2 MHz, 836.4 MHz and 848.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next pages.
All measurements were done in horizontal and vertical polarization; the plots shows the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked, too.
The found values are stated in the table below.

As can be seen from this data, the emissions from the test item were within the specification limit.

Harmonic	Tx ch.-128 Freq. (MHz)	Level (dBm)	Tx ch.-189 Freq. (MHz)	Level (dBm)	Tx ch.-251 Freq. (MHz)	Level (dBm)
2	1648.4	-	1672.8	-	1697.6	-
3	2472.6	-	2509.2	-	2546.4	-
4	3296.8	-	3345.6	-	3395.2	-
5	4121.0	-	4182.0	-	4244.0	-
6	4945.2	-	5018.4	-	5092.8	-
7	5769.4	-	5854.8	-	5941.6	-
8	6593.6	-	6691.2	-	6790.4	-
9	7417.8	-	7527.6	-	7639.2	-
10	8242.0	-	8364.0	-	8488.0	-

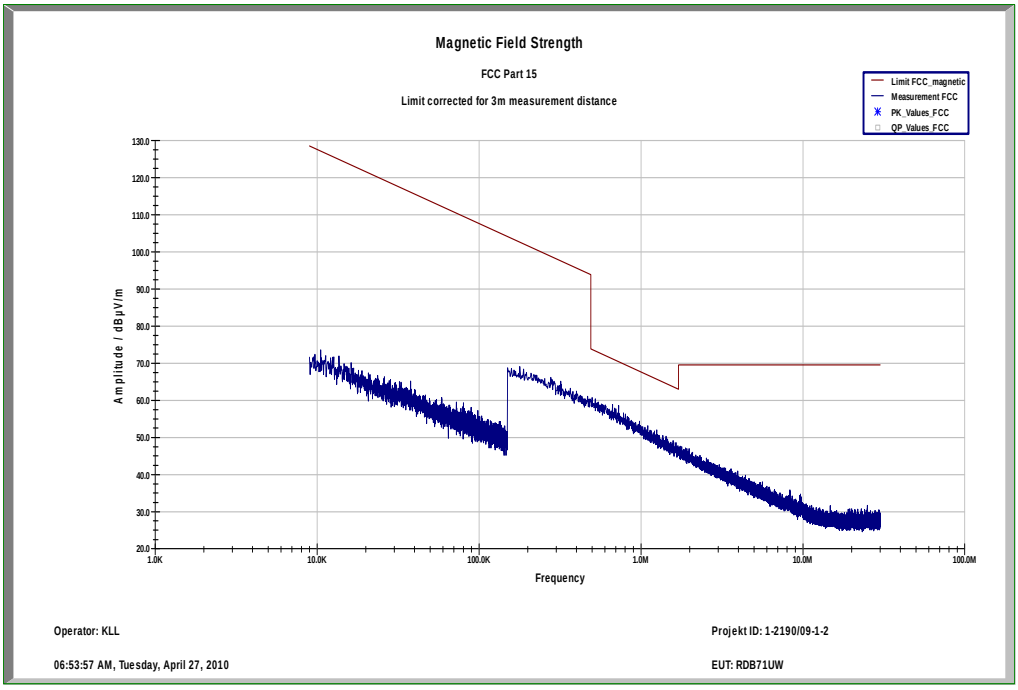
No peaks found > 20 dB below limit.

Sample calculation:

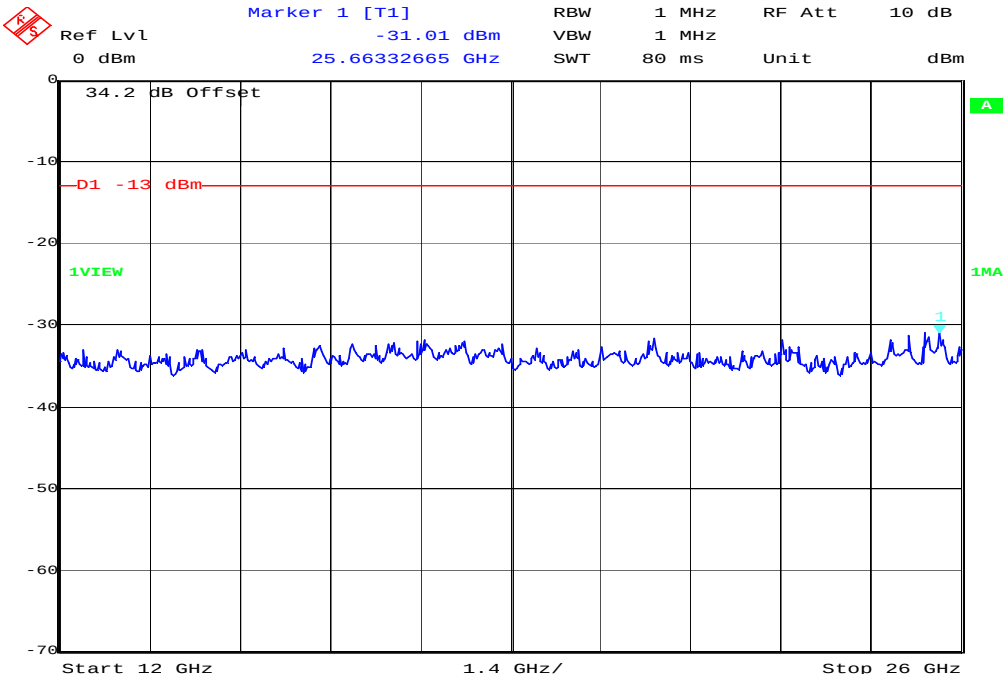
Freg	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERP	Substitution Antenna
MHz	dBµV	dBm	dBi	dBd	dB	dBm	
848.8	137.8	26.6	8.4	0.0	3.3	31.7	UHAP Schwarzbeck S/N 460

ERP = SG (dBm) - Cable Loss (dB) + Ant. gain (dB)
*ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.1dBi

Channel 128 GSM (Traffic mode up to 30 MHz) valid for all 3 channels



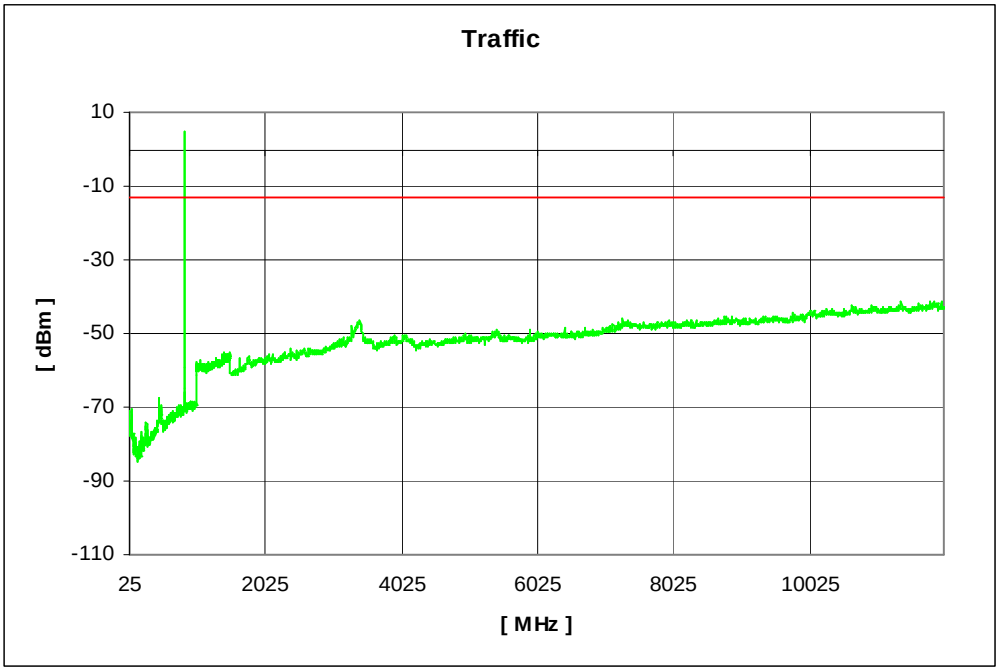
Channel 128 GSM (12 GHz - 25 GHz) valid for all 3 channels



f ≥ 1GHz : RBW / VBW 1 MHz

Channel 128 GSM (30 MHz – 12 GHz) antenna vertical

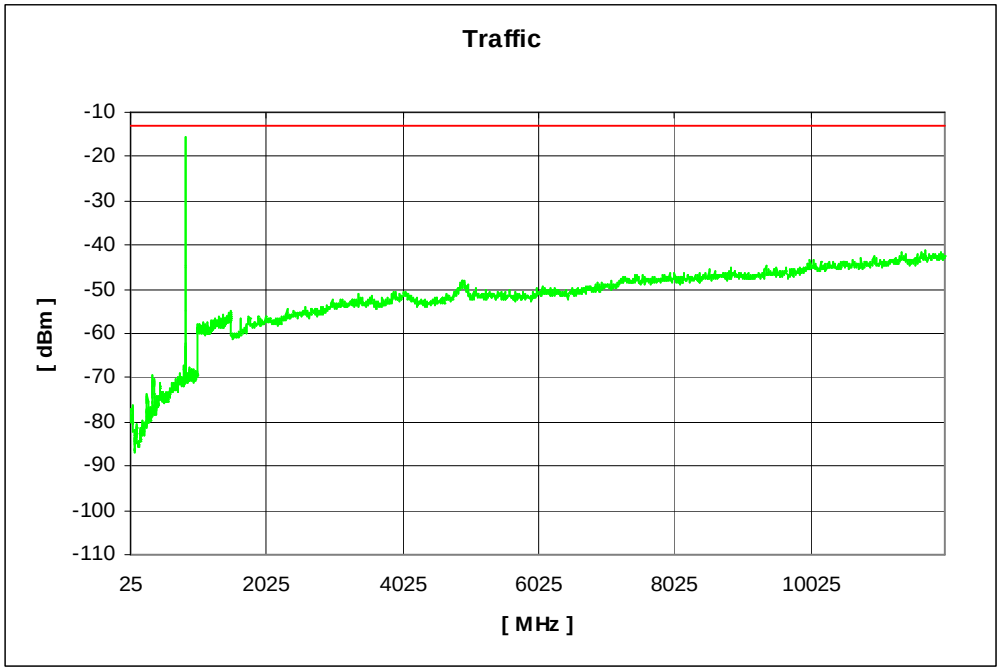
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 13:20:28	Vmin:	
Standard:	FCC_22_850	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 128 GSM (30 MHz – 12 GHz) antenna horizontal

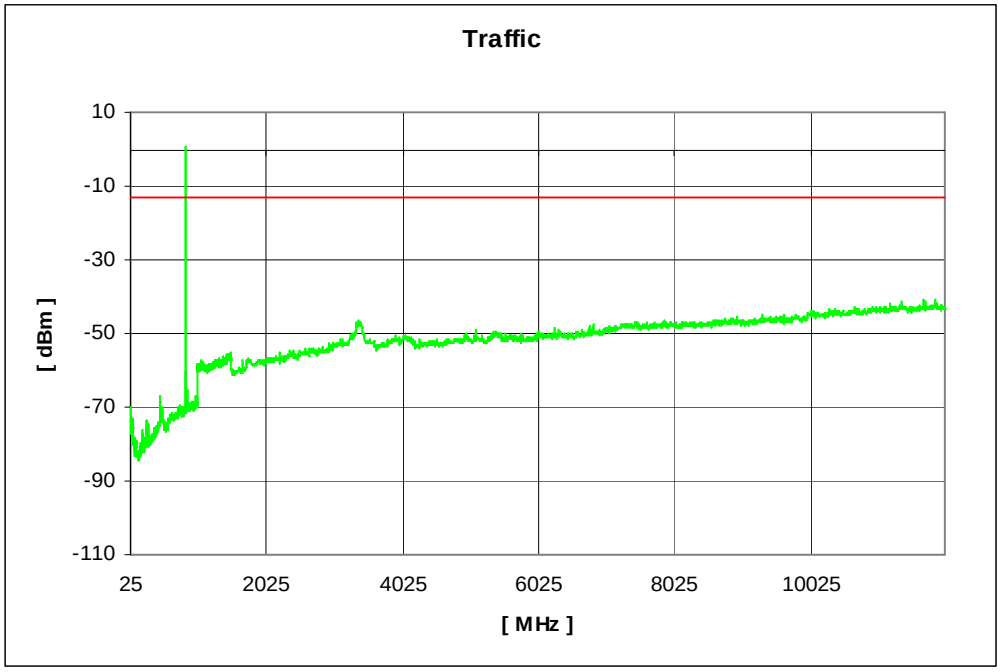
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 13:17:48	Vmin:	
Standard:	FCC_22_850	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 189 GSM (30 MHz – 12 GHz) antenna vertical

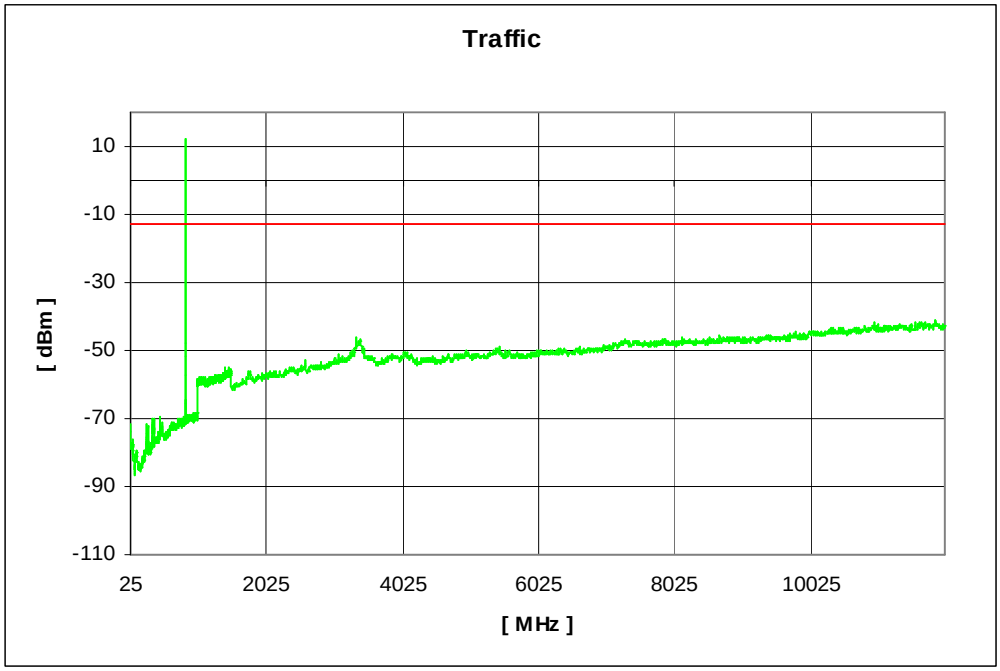
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 13:24:50	Vmin:	
Standard:	FCC_22_850	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 189 GSM (30 MHz – 12GHz) antenna horizontal

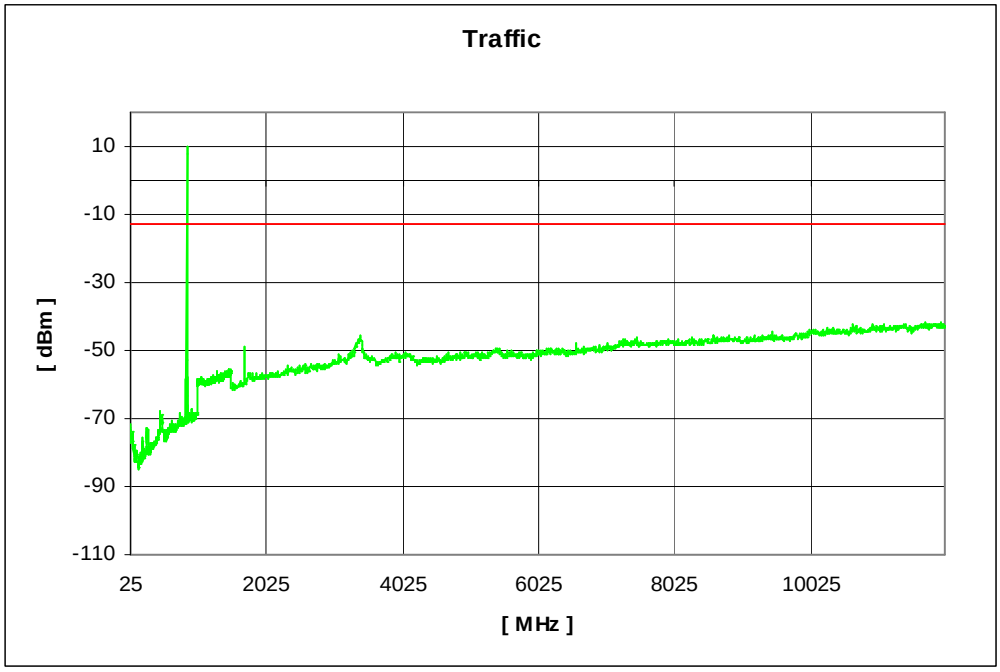
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 13:27:00	Vmin:	
Standard:	FCC_22_850	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 251 GSM (30 MHz – 12GHz) antenna vertical

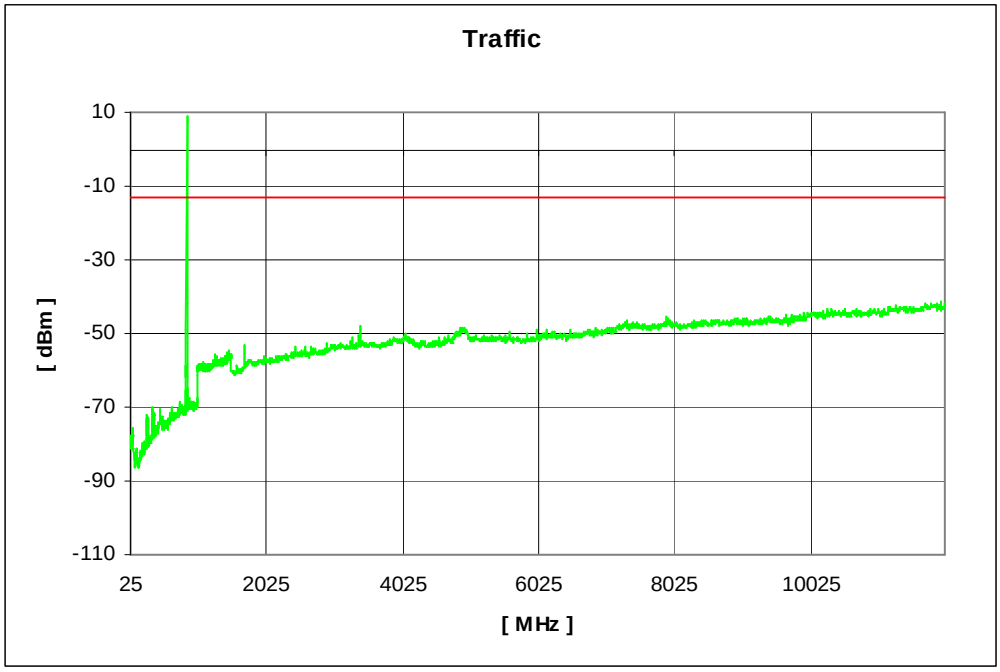
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 13:34:30	Vmin:	
Standard:	FCC_22_850	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

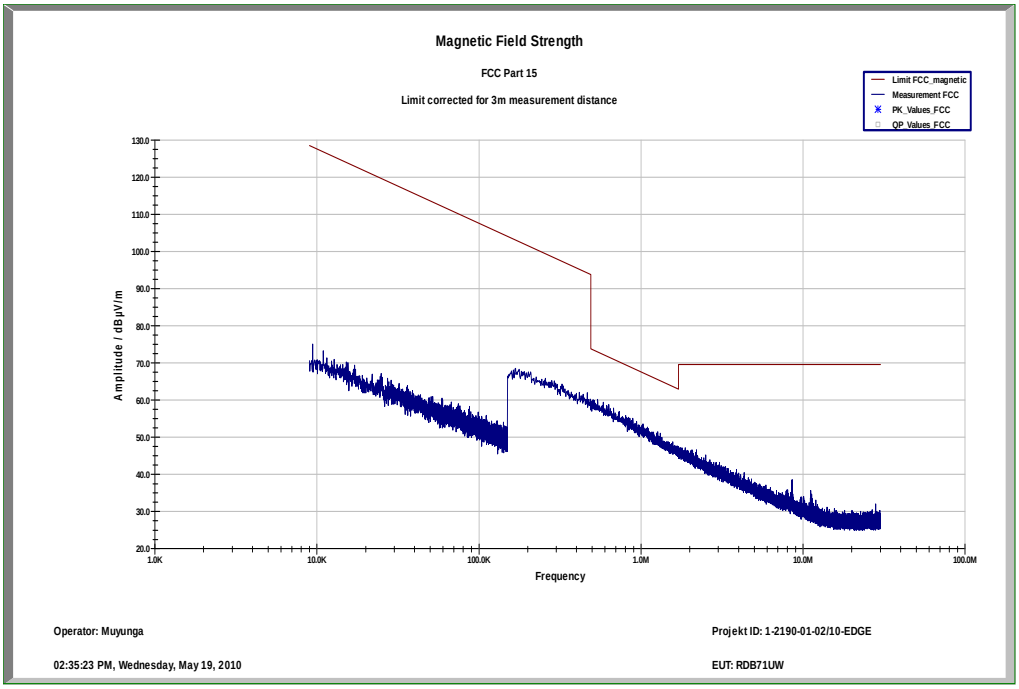
Channel 251 GSM (30 MHz – 12GHz) antenna horizontal

EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	Research In Motion Limited	Battery:	AC/DC power supply
IMEI:	004401136104750	HW:	
Operator:	KLL	SW:	
Start of Test :	21.04.2010 13:29:55	Vmin:	
Standard:	FCC_22_850	Vnom:	3,7V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000

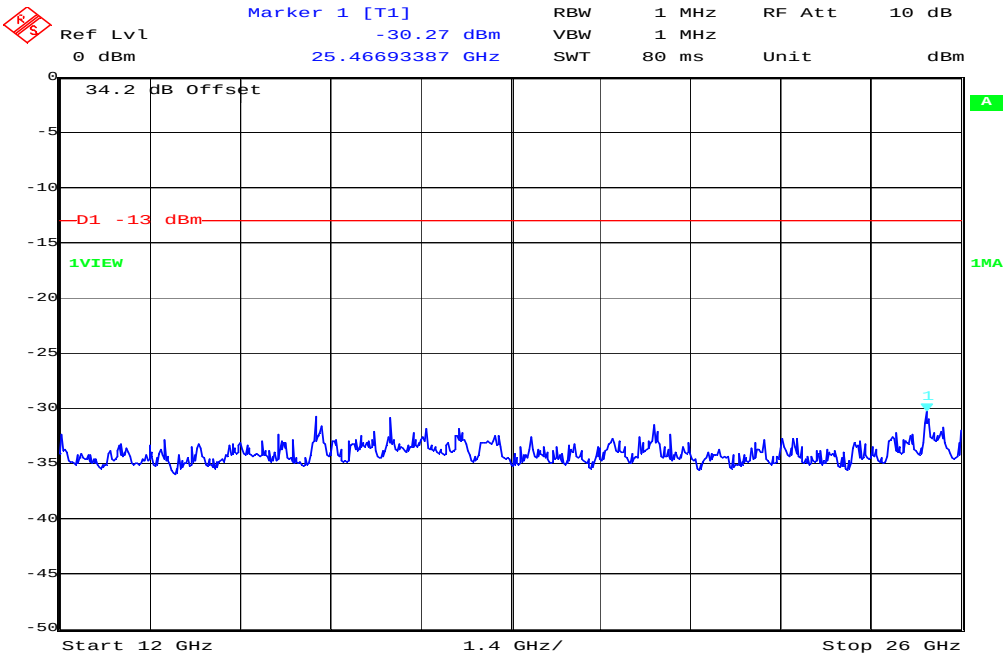


f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 128 EDGE (Traffic mode up to 30 MHz) valid for all 3 channels



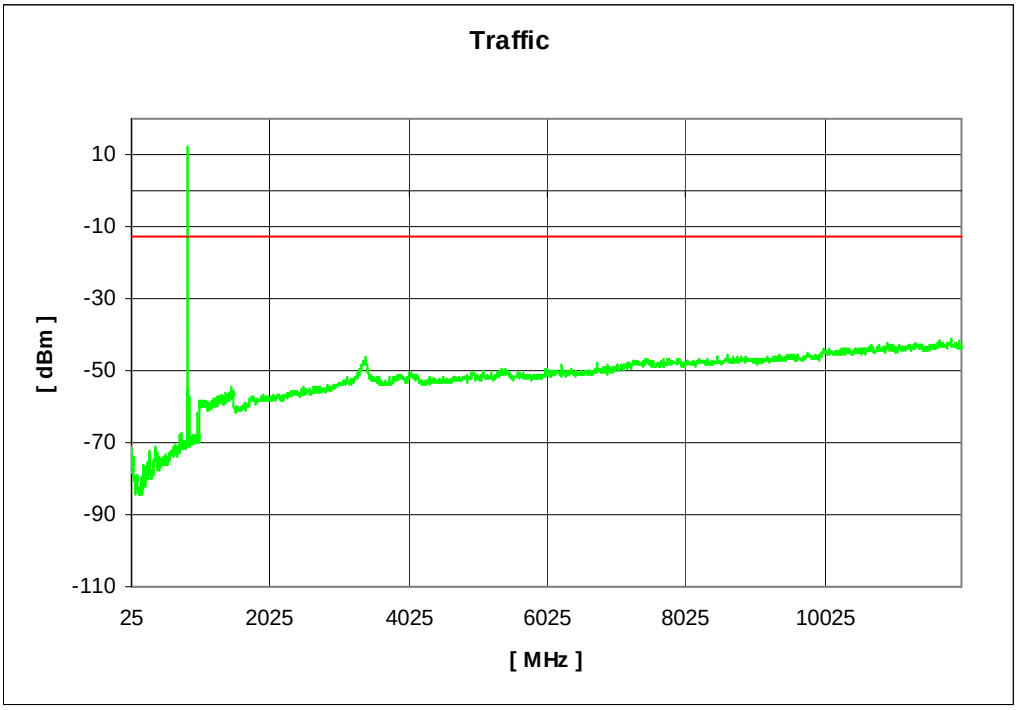
Channel 128 EDGE (12 GHz - 25 GHz) valid for all 3 channels



f ≥ 1GHz : RBW / VBW 1 MHz

Channel 128 EDGE (30 MHz – 12 GHz) antenna vertical

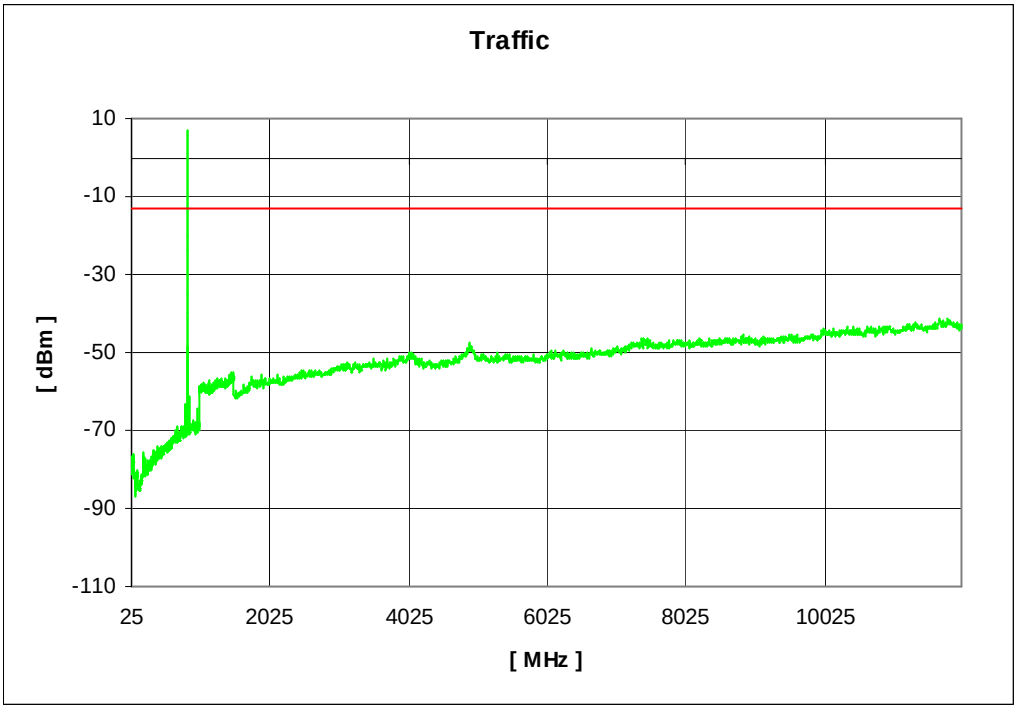
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 11:25:41	Vmin:	
Standard:	FCC_22_850	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 128 EDGE (30 MHz – 12 GHz) antenna horizontal

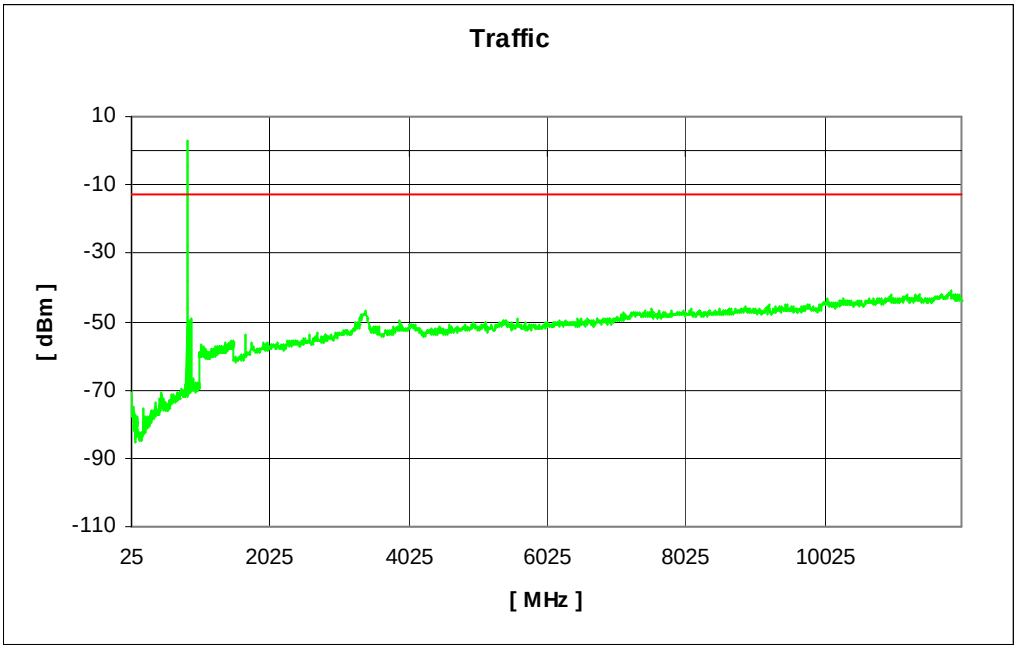
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 12:29:42	Vmin:	
Standard:	FCC_22_850	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 189 EDGE (30 MHz – 12 GHz) antenna vertical

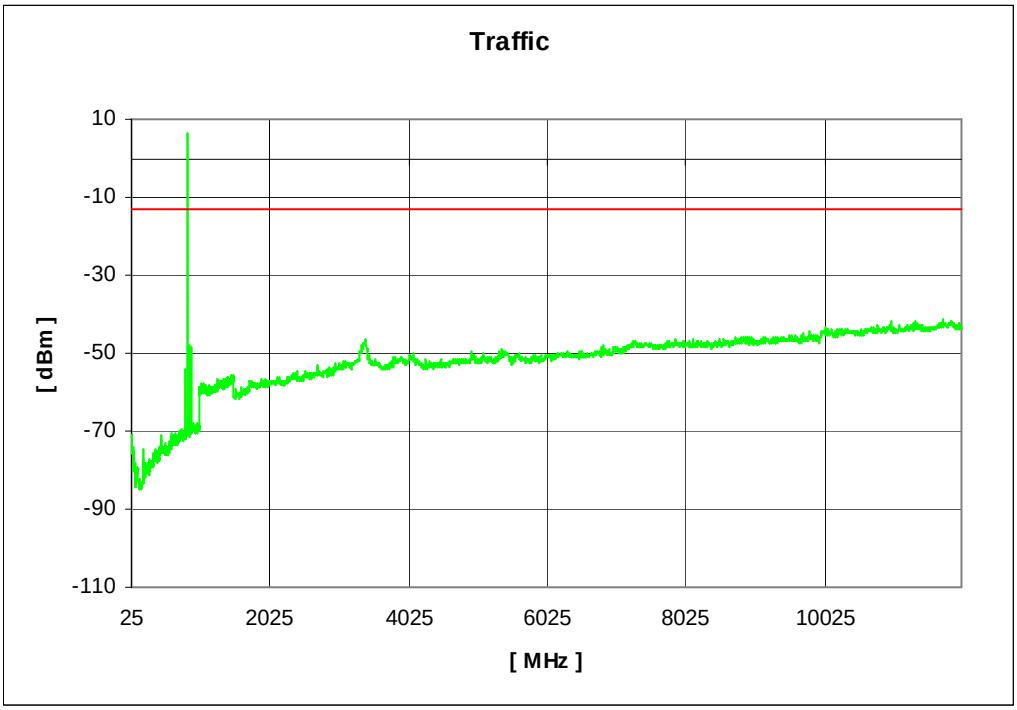
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 11:46:00	Vmin:	
Standard:	FCC_22_850	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 189 EDGE (30 MHz – 12GHz) antenna horizontal

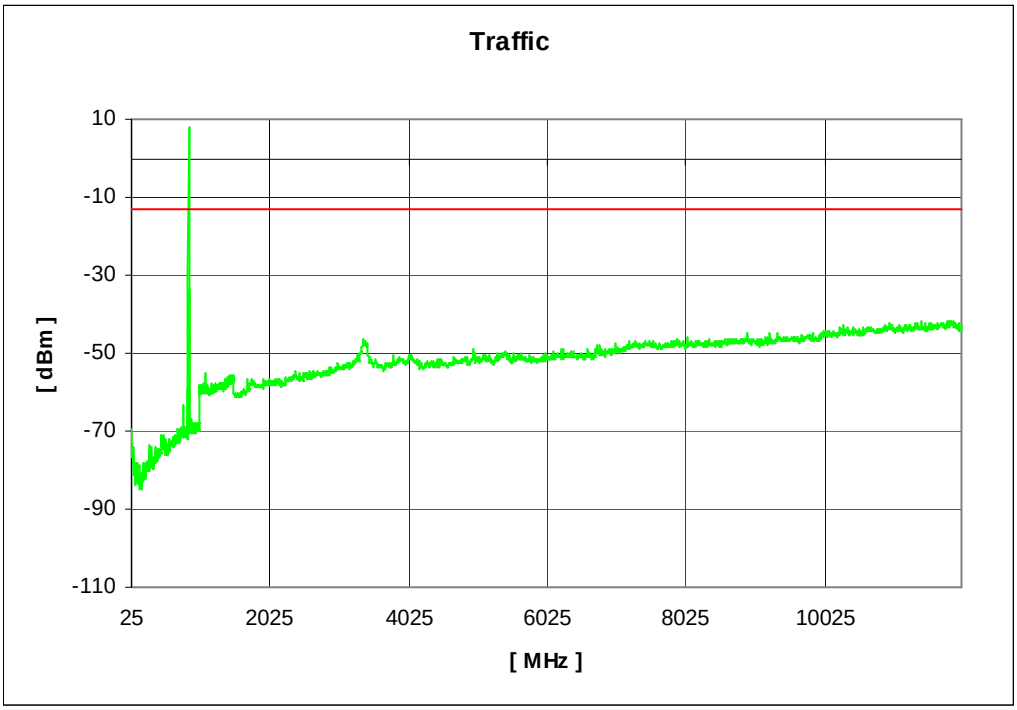
EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 11:49:15	Vmin:	
Standard:	FCC_22_850	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 251 EDGE (30 MHz – 12GHz) antenna vertical

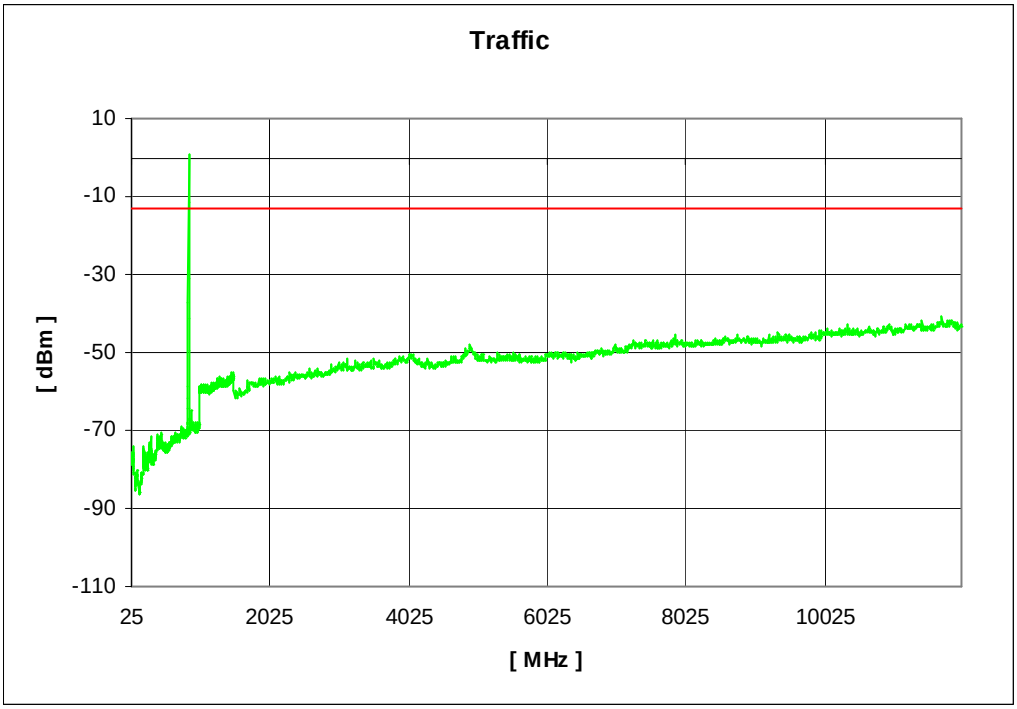
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 12:04:47	Vmin:	
Standard:	FCC_22_850	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 251 EDGE (30 MHz – 12GHz) antenna horizontal

EUT:	RDB71UW	Polarisation:	horizonta
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 12:06:51	Vmin:	
Standard:	FCC_22_850	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_22_850\Transducer_FCC_22_850.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

5.2.4 Conducted Spurious Emissions

Reference

FCC:	CFR Part 22.917, 1.1051
IC:	RSS 132, Issue 2, Section 4.5 and 6.5

Not performed

5.2.5 Block Edge Compliance

Reference

FCC:	CFR Part 22.917
IC:	RSS 132, Issue 2, Section 6.5

Not performed

5.2.6 Occupied Bandwidth

Reference

FCC:	CFR Part 22.917, 2.1049
IC:	RSS 132, Issue 2, Section 4.2

Not performed

5.3 PART UMTS Band IV

5.3.1 RF Power Output

Reference

FCC:	CFR Part 27.50, 2.1046
IC:	RSS – 139 Issue 2, Section 6.4

Summary:

This paragraph contains both average/peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

Method of Measurements:

The mobile was set up for the max. output power with pseudo random data modulation.
The power was measured with R&S Signal Analyzer FSIQ 26 (peak and average)
These measurements were done at 3 frequencies, bottom, middle and top of operational frequency range.

Settings for maximum output power were used.

Not performed!

Limits:

Nominal Peak Output Power (dBm)
+33

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test Results: Output Power (conducted) UMTS Mode

Frequency (MHz)	**Average Output Power (dBm)**	**Peak-to-Average Ratio (dB)**
1712.4		
1732.4		
1752.6		
Measurement uncertainty	±0.5 dB	

The following HSDPA sub-tests are defined by 3GPP 34.121 (table C.10.1.4)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK}, $\Delta_{CQI} = 8 \Longleftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Longleftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2 : CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$
Note 3 : For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

Table 1: Subtests for UMTS Release 5 HSDPA

It was checked that the EUT supports the HSDPA-Mode and fulfils the requirements of the table above. The exact power-values are part of the SAR-report.

The following HSUPA sub-tests are defined by 3GPP 34.121 (table C.11.1.3)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK}, $\Delta_{CQI} = 8 \Longleftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Longleftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2 : CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference
Note 3 : For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$
Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$
Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g
Note 6 : β_{ed} can not be set directly; it is set by Absolute Grant Value

Table 2: Subtests for UMTS Release 6 HSUPA

It was checked that the EUT supports the HSUPA-Mode and fulfils the requirements of the table above. The exact power-values are part of the SAR-report.

EIRP Measurements

Description:

This is the test for the maximum radiated power from the phone.
Rule Part 24.232(b) specifies that "Mobile/portable stations are limited to 2 watts e.i.r.p. peak power…" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method
(a) The measurements were performed with full rf output power and modulation.
(b) Test was performed at listed 3m test site (listed with FCC, IC).
(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)
(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.
(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(f) Set the EMI Receiver and #2 as follows:
Center Frequency: test frequency
Resolution BW: 100 kHz
Video BW: same
Detector Mode: positive
Average: off
Span: 3 x the signal bandwidth
(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.
(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.
(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.
(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.
(l) Repeat for all different test signal frequencies

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:
Center Frequency : equal to the signal source
Resolution BW : 10 kHz
Video BW : same
Detector Mode : positive
Average : off
Span : 3 x the signal bandwidth
(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(c) Select the frequency and E-field levels for ERP/EIRP measurements.
(d) Substitute the EUT by a signal generator and one of the following transmitting antennas (substitution antenna):
DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz}.
(e) Mount the transmitting antenna at 0.8 meter high from the ground plane.
(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.
(g) If the DIPOLE antenna is used, tune its elements to the frequency as specified in the calibration manual.
(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.
(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.
(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:
P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB
Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1
Where: P: Actual RF Power fed into the substitution antenna port after corrected.
P1: Power output from the signal generator
P2: Power measured at attenuator A input
P3: Power reading on the Average Power Meter
EIRP: EIRP after correction
ERP: ERP after correction
(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)
(p) Repeat step (d) to (o) for different test frequency
(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.
(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Limits:

Nominal Peak Output Power (dBm)
+33

Test Results: Output Power (radiated) UMTS Mode

Frequency (MHz)	**Average EIRP (dBm)**
1712.4	24.6
1732.4	23.5
1752.6	24.8
Measurement uncertainty	±0.5 dB

Sample Calculation:

Freq	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	EIRP Result			
MHz	dBµV	dBm	dBi	dBd	dB	dBm			
1852.4	125.8	22.6	8.4	0.0	3.3	27.7			

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

5.3.2 Frequency Stability

Not performed!

5.3.3 Radiated Emissions

Reference

FCC:	CFR Part 27.53, 2.1053
IC:	RSS 139, Issue 2, Section 6.5

Measurement Procedure:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2003 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. This was rounded up to 20 GHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

The final open field emission (here 10m semi-anechoic chamber listed by FCC) test procedure is as follows:

a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
b) The antenna output was terminated in a 50 ohm load.
c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of the harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and I MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded.
e) Now each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603.

Measurement Limit:

Sec. 24.238 Emission Limits.
(a) On any frequency outside a licensee' s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Measurement Results: Radiated Emissions

Radiated emissions measurements were made only at the upper, center, and lower carrier frequencies of the UMTS band (1852.4 MHz, 1880.0 MHz and 1907.6 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the UMTS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

The final open field radiated levels are presented on the next table.

All measurements were done in horizontal and vertical polarization; the plots show the worst case.
The plots show only the middle channel. If spurious were detected, the lowest and highest channel were checked, too. The found values are stated in the table below.
As can be seen from this data, the emissions from the test item were within the specification limit.

Harmonic	Tx ch.-1312 Freq. (MHz)	Level (dBm)	Tx ch.-1412 Freq. (MHz)	Level (dBm)	Tx ch.-1513 Freq. (MHz)	Level (dBm)
2	3424,8	-	3464,8	-	3505,2	-
3	5137,2	-	5197,2	-	5257,8	-
4	6849,6	-	6929,6	-	7010,4	-
5	8562	-	8662	-	8763	-
6	10274,4	-	10394,4	-	10515,6	-
7	11986,8	-	12126,8	-	12268,2	-
8	13699,2	-	13859,2	-	14020,8	-
9	15411,6	-	15591,6	-	15773,4	-
10	17124	-	17324	-	17526	-

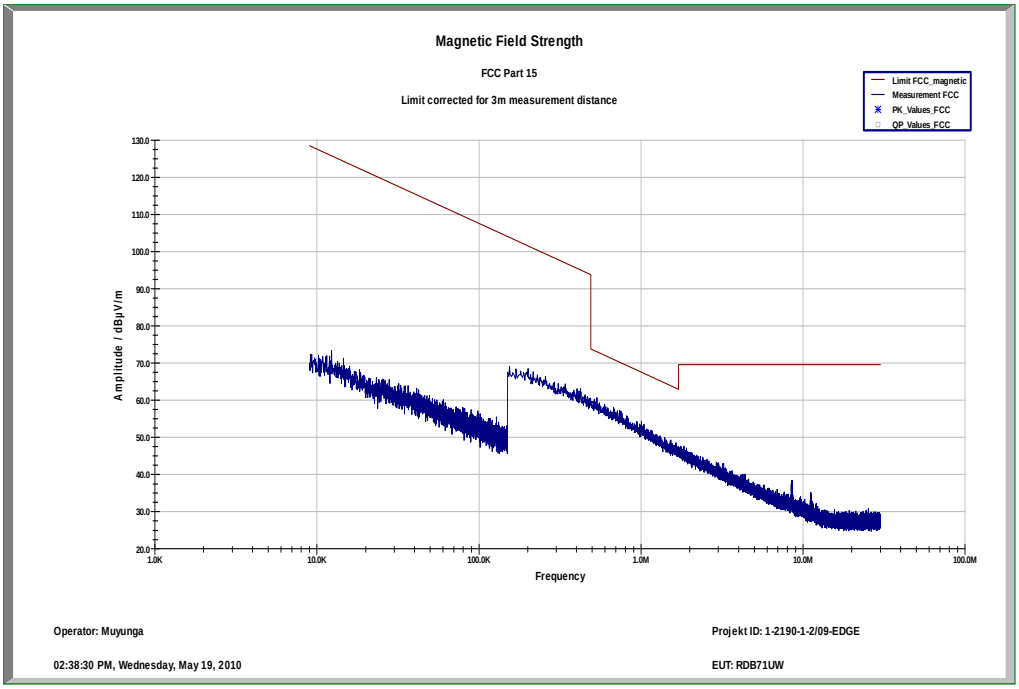
No peaks found < 20 dB below limit.

Sample calculation:

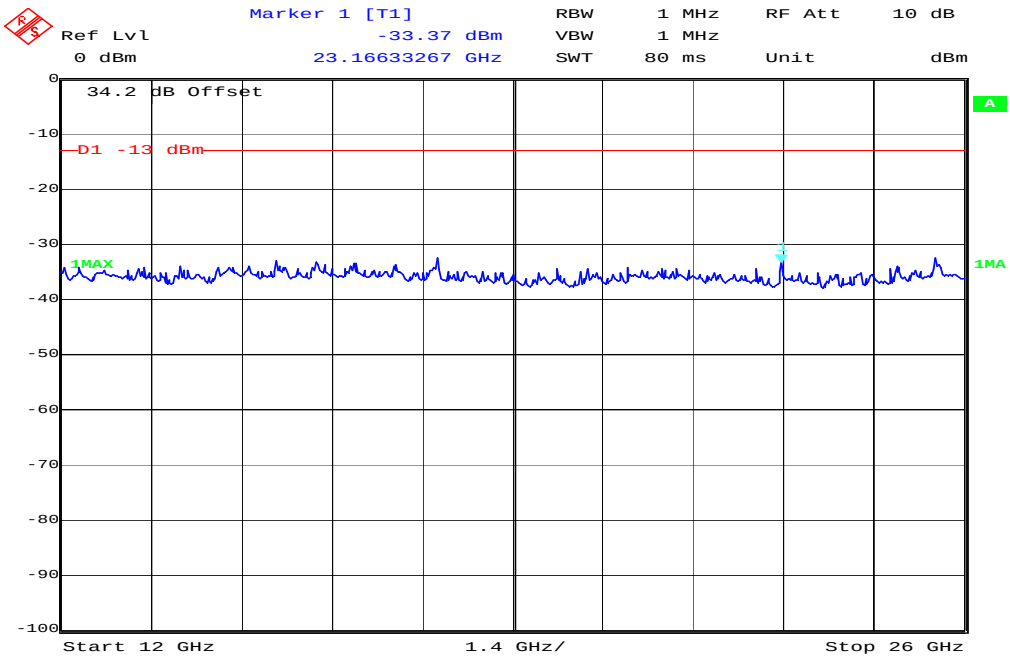
Freq	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	EIRP Result			
MHz	dBµV	dBm	dBi	dBd	dB	dBm			
1852.4	125.8	22.6	8.4	0.0	3.3	27.7			

EIRP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

Channel 1312 (Traffic mode up to 30 MHz) valid for all 3 channels



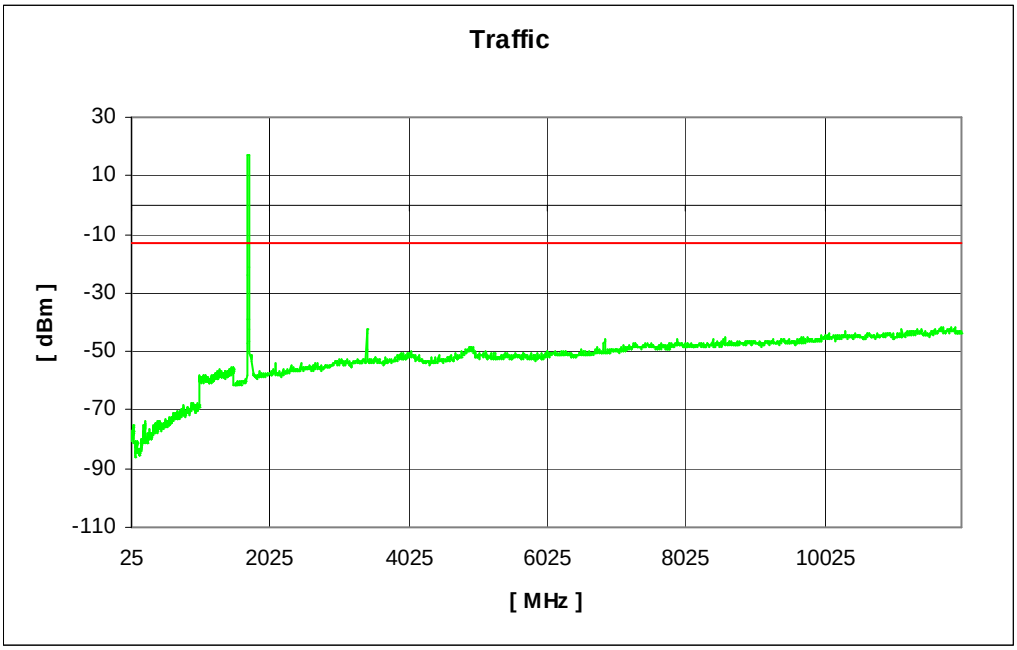
Channel 1312 (12 GHz - 25 GHz) valid for all 3 channels



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 1312 (30 MHz – 12 GHz) antenna vertical

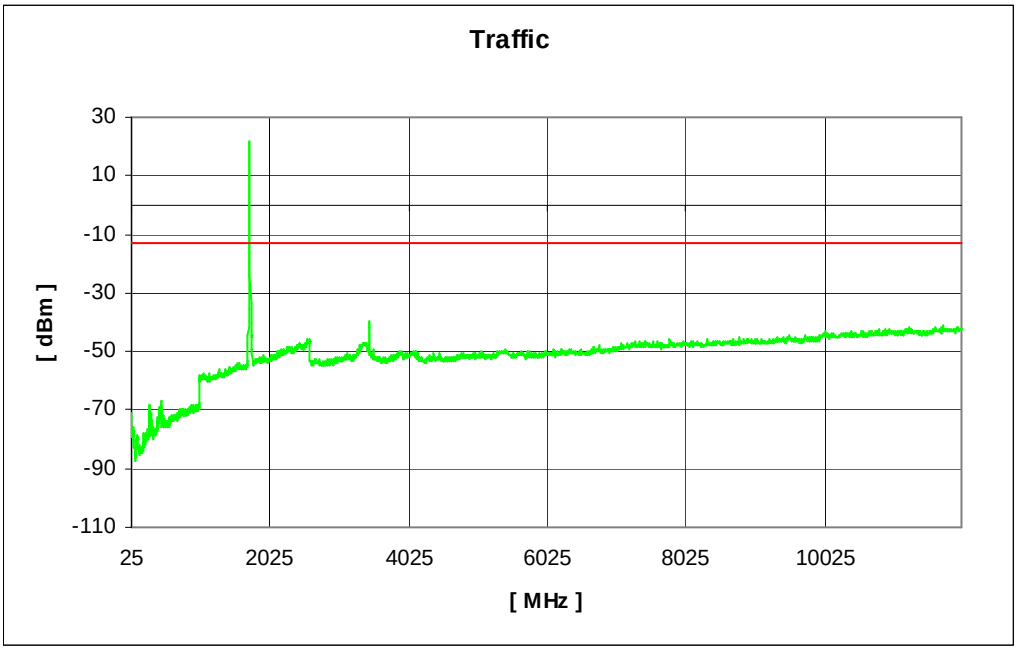
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 13:03:51	Vmin:	
Standard:	FCC_27	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_27\Transducer_FCC_27.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 1312 (30 MHz – 12 GHz) antenna horizontal

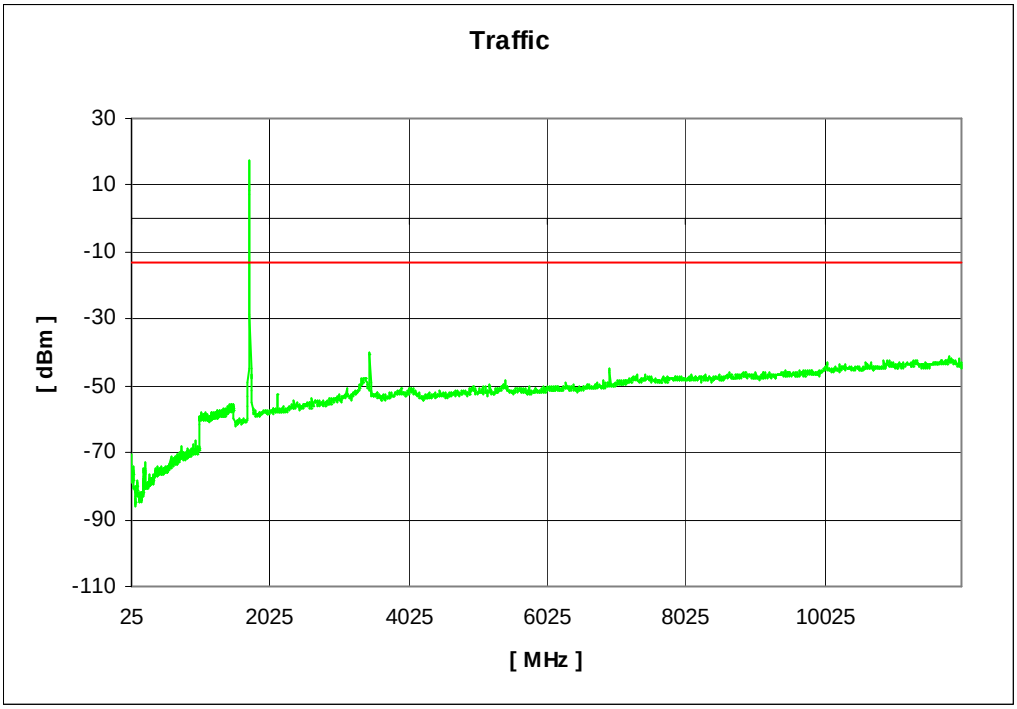
EUT:	RDB71UW	Polarisation:	horizontal, AC/DC power supply
Manufacturer:	RIM	Battery:	
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 13:29:33	Vmin:	
Standard:	FCC_27	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_27\Transducer_FCC_27.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 1412 (30 MHz – 12 GHz) antenna vertical

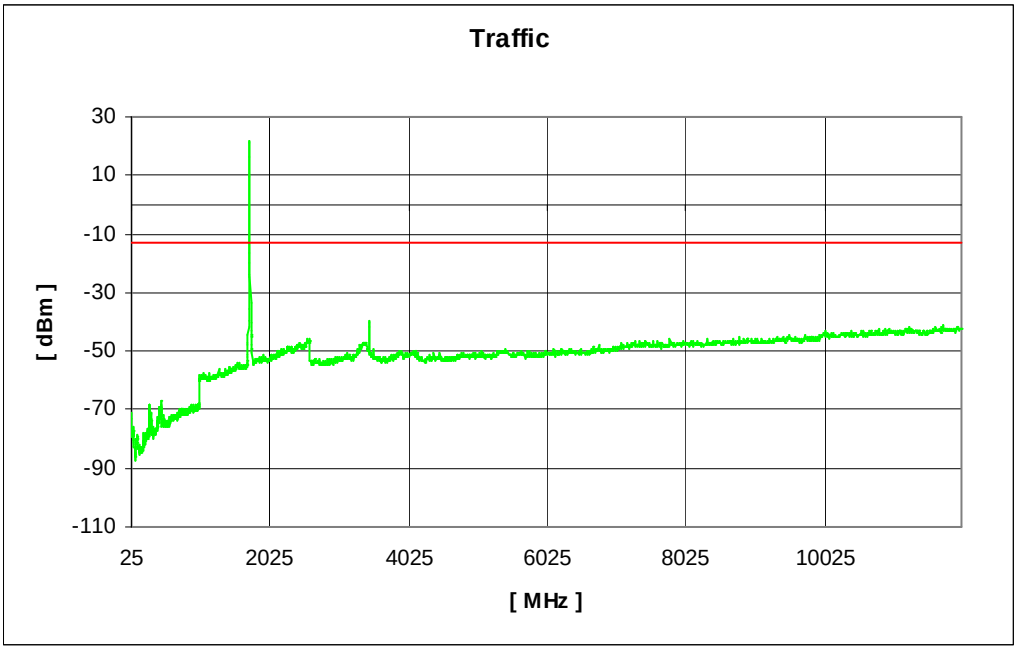
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 13:10:50	Vmin:	
Standard:	FCC_27	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_27\Transducer_FCC_27.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 1412 (30 MHz – 12GHz) antenna horizontal

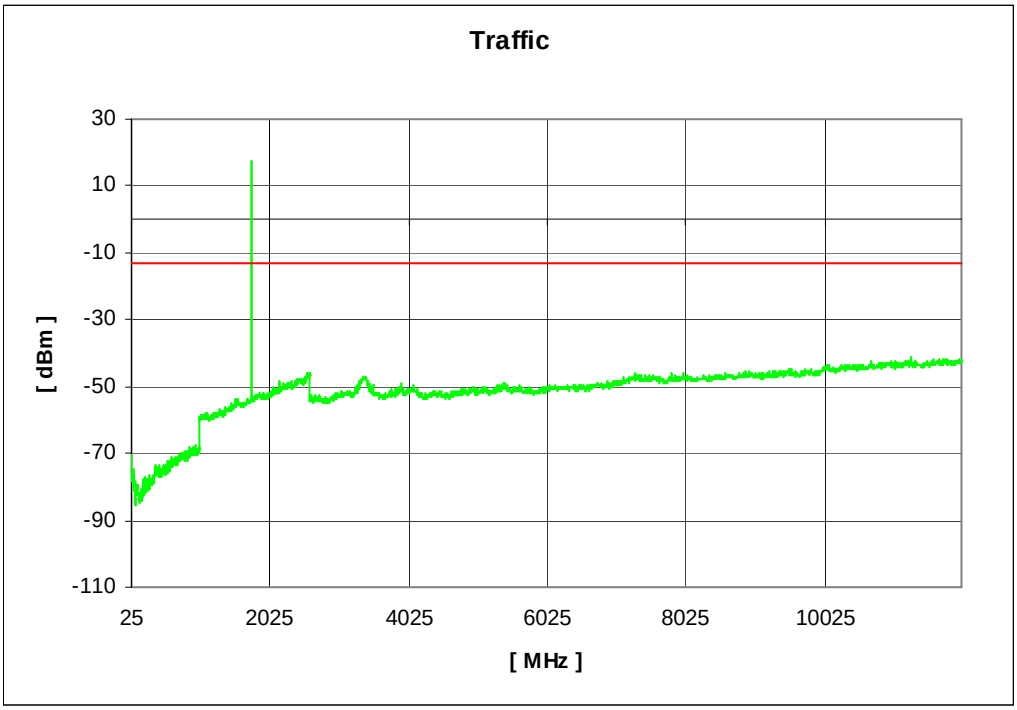
EUT:	RDB71UW	Polarisation:	horizontal, AC/DC power
Manufacturer:	RIM	Battery:	supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 13:29:33	Vmin:	
Standard:	FCC_27	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_27\Transducer_FCC_27.xls		



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 1513 (30 MHz – 12GHz) antenna vertical

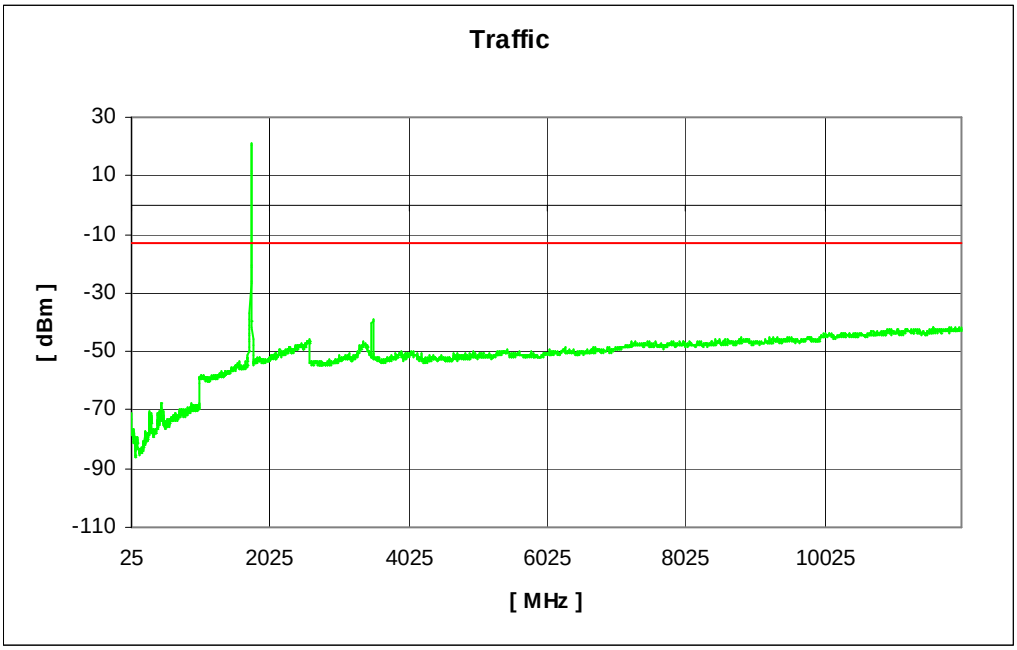
EUT:	RDB71UW	Polarisation:	vertical
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 13:26:33	Vmin:	
Standard:	FCC_27	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_27\Transducer_FCC_27.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

Channel 1513 (30 MHz – 12GHz) antenna horizontal

EUT:	RDB71UW	Polarisation:	horizontal
Manufacturer:	RIM	Battery:	AC/DC power supply
IMEI:	004401.13.624004.7	HW:	
Operator:	MUY	SW:	
Start of Test :	19.05.2010 13:23:32	Vmin:	
Standard:	FCC_27	Vnom:	3.3V
Signalling Unit:	CMU200	Vmax:	
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_27\Transducer_FCC_27.xls		
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000



f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW / VBW 1 MHz

5.3.4 Conducted Spurious Emissions

Not performed!

5.3.5 Block Edge Compliance

Not performed!

5.3.6 Occupied Bandwidth

Not performed!

6 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 Calib	Next Calib
1	n. a.	Horn Antenne 1-26.5GHz	3115	EMCO	9005-3440	300002190			
2	n. a.	Netztgerät 0-20V	6632A	HP Meßtechnik	2851A01814	300000924	k		
3	n. a.	Horn Antenne 1-26.5GHz	3115	EMCO Elektronik	9709-5290	300000212			
4	n. a.	Universal Communication Tester	CMU 200	R&S	106826	300003346	k	12.01.2010	12.01.2011
5	n. a.	Software Option für CMU 200	CMU-Kxx	R&S		300003345	k	12.01.2010	12.01.2011
6	n. a.	Ultra Stable Notch Filter	WRCD1887.82/1889.55-5EE		1	300000115	ne		
7	n. a.	Funkstörmessempfänger 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	08.01.2010	08.01.2011
8	n. a.	HF-Schaltmatrixgrundgerät	TS-RSP 1144.1500K03	R&S	100300	300003556	ev		
9	n. a.	Spiral Antenne	3102L	EMCO	51924	300003385	ne		
10	n. a.	Spiral Antenne	3102L	EMCO	51918	300003384	k		
11	n. a.	Signalgenerator 1-20 GHz	SMR20	R&S	101697/020	300003593	k	08.01.2010	08.01.2012
12	n. a.	Turnable Band Reject	WRCT1850/2170-5/40-10EEK	Wainwright	7	300003386	ev		
13	n. a.	Software Option für	CMU-K62	R&S	103288	300003600	k	12.01.2010	12.01.2011

		CMU 200							
14	n. a.	Software Option für CMU 200	CMU-K61	R&S	103354	300003612	k	12.01.2010	12.01.2011
15	n. a.	Software Option für CMU 200	CMU-K64	R&S	102017	300003613	k	12.01.2010	12.01.2011
16	n. a.	Software Option für CMU 200	CMU-K56	R&S	100251	300003614	k	12.01.2010	12.01.2011
17	n. a.	Breitbandantenne	VULB9163	Schwarzbeck	318	300003696	k		
18	n. a.	Tunable Band Reject	WRCT1850/2170-5/40-10EEK	Wainwright	40	300003872	ne		
19	n. a.	Tunable Band Reject	WRCT824/894-5/40-8EEK	Wainwright	27	300003873	ne		