

TEST REPORT

Test report no.: 1-3314-01-32/11-A



Testing laboratory

CETECOM ICT Services GmbH
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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: 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/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 – Radio frequency devices
RSS – 210 Issue 8	Spectrum Management and Telecommunications – Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

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

Test item

Kind of test item:	Mobile phone with GSM / GPRS / Edge, WCDMA / HSDPA, Bluetooth® 2.1 EDR, WLAN b / g / n – HT20, NFC, GPS
Model name:	RDX71UW
FCC ID:	L6ARDX70UW
IC:	2503A-RDX70UW
Frequency:	13.56 MHz
Power supply:	3.7 V DC by battery EM1 + charger PSM04R-050CHW2
Temperature range:	-/-

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:

Marco Bertolino

Test report authorised:

Stefan BöS

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

2.2 Application details

Date of receipt of order:	2011-04-15
Date of receipt of test item:	2011-04-22
Start of test:	2011-05-04
End of test:	2011-05-04
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
RSS – 210 Issue 8	2010-12	Spectrum Management and Telecommunications – Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test environment

Temperature:	T_{nom}	22	°C during room temperature tests
	T_{max}	-/-	°C during high temperature test
	T_{min}	-/-	°C during low temperature test
Relative humidity content:		40	%
Air pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	3.7	V DC by battery EM1 + charger PSM04R-050CHW2
	V_{max}	-/-	V
	V_{min}	-/-	V

5 Test item

Kind of test item	:	Mobile phone with GSM / GPRS / Edge, WCDMA / HSDPA, Bluetooth® 2.1 EDR, WLAN b / g / n – HT20, NFC, GPS
Type identification	:	RDX71UW
S/N serial number	:	CER-30954-001
IMEI		004401137868200
HW hardware status	:	Rev 1 11-Apr-11
SW software status	:	8.0.0.167
Frequency band [MHz]	:	13.56 MHz
Type of modulation	:	A1D
Number of channels	:	1
Antenna	:	Integrated antenna
Power supply	:	3.7 V DC by battery EM1 + charger PSM04R-050CHW2
Temperature range	:	No information available!

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	Passed	2011-05-20	Delta test according to customer test plan.

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	Pass	Fail	NA	NP	Results (max.)
§ 15.225 (a)/ RSS-210 Issue 8	Fieldstrength of Fundamental	Nominal	Nominal	☒	☐	☐	☐	complies
§ 15.209/ RSS-210 Issue 8	Fieldstrength of harmonics and spurious	Nominal	Nominal	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurement testing

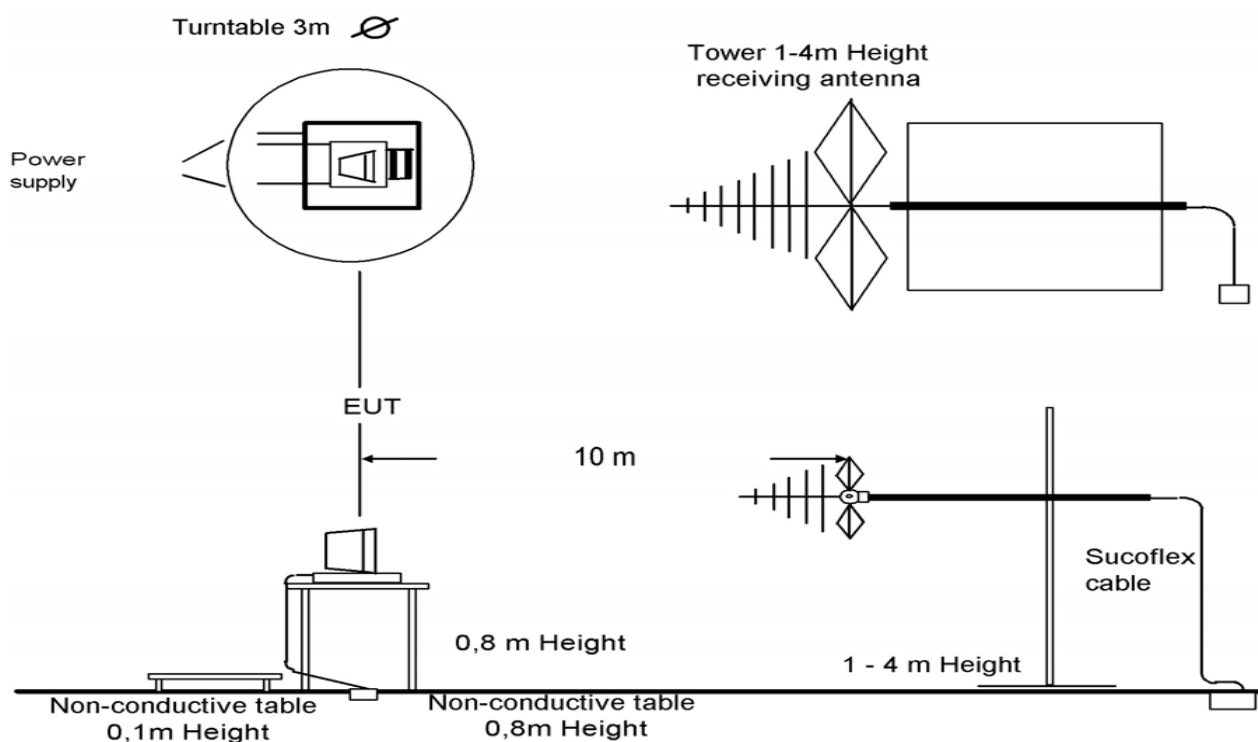
8.1 Description of test setup

8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2009 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



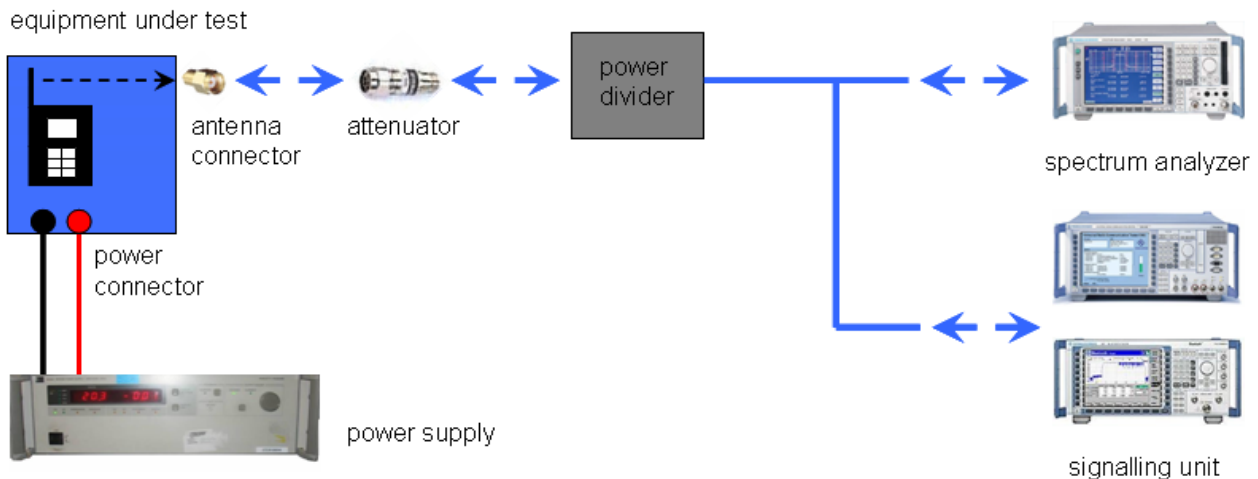
Picture 1: Diagram radiated measurements

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

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.

8.1.2 Conducted measurements

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



Picture 2: Diagram conducted measurements

8.2 Additional comments

Reference documents:	None
Special test descriptions:	The measurements are performed with a clean carrier and with a modulated carrier.
Configuration descriptions:	None

9 Measurement results

9.1 Field strength of the fundamental

Measurement:

Measurement parameter	
Detector:	Quai Peak
Sweep time:	-/-
Resolution bandwidth:	10 kHz
Video bandwidth:	≥ RBW
Span:	-/-
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part SUBCLAUSE § 15.231 (b)		RSS-210 Issue 8
Fundamental Frequency (MHz)	Field strength of Fundamental (μV/m)	Measurement distance (m)
13.553 to 13.567	15848 μV/m (84 dBμV/m)	30
	158489 μV/m (104 dBμV/m)	10 (Recalculated acc. To FCC part15.31 (f2))

Result:

TEST CONDITIONS		MAXIMUM POWER (dBμV/m) Modulated	
Frequency		13.56 MHz	13.56 MHz
Mode		at 3 m distance	at 30 m distance
T _{nom}	V _{nom}	50.5	10.5*
Measurement uncertainty		±3dB	

TEST CONDITIONS		MAXIMUM POWER (dBμV/m) CW	
Frequency		13.56 MHz	13.56 MHz
Mode		at 3 m distance	at 30 m distance
T _{nom}	V _{nom}	55.5	15.5*
Measurement uncertainty		±3dB	

*re-calculated with 40dB/dec according to FCC 15.31 (f2)

Result: The result of the measurement is passed.

9.2 Field strength of the harmonics and spurious

Measurement:

Measurement parameter	
Detector:	Average / Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	200 Hz up to 150 kHz, 10 kHz up to 30 MHz, 120 kHz up to 1 GHz
Video bandwidth:	≥ RBW
Span:	100 kHz Steps
Trace-Mode:	Max Hold

Limits:

FCC		IC
SUBCLAUSE § 15.209		RSS-210 Issue 8
Field strength of the harmonics and spurious.		
Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30 (29.5 dBμV/m)	30
30 – 88	100 (40 dBμV/m)	3
88 – 216	150 (43.5 dBμV/m)	3
216 – 960	200 (46 dBμV/m)	3

Result:

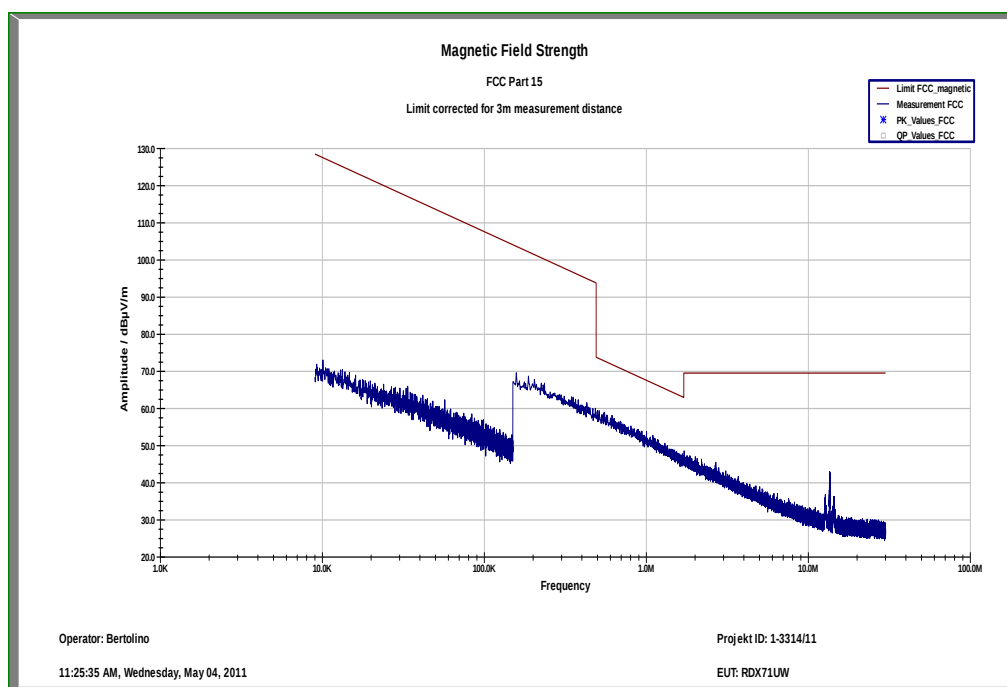
EMISSION LIMITATIONS				
f [MHz]	Detector	Limit max. Allowed [dBμV/m]	Amplitude of emission [dBμV/m]	Results
No peaks found				

Result: The result of the measurement is passed.

Plots of the measurements**Modulated Carrier**

Plot 1: 9 kHz – 30 MHz;
Part 15.209 Magnetics, Measurement distance 3 m

Transmit frequency 13.56 MHz



Plot 2: 30 MHz – 1000 MHz

Transmit frequency 13.56 MHz

Common Information

EUT: RDX71UW 125 + Captive cable charger Rev4.0
 Serial Number: CER-30954-001 Rev1 11-Apr-11(sample 23)

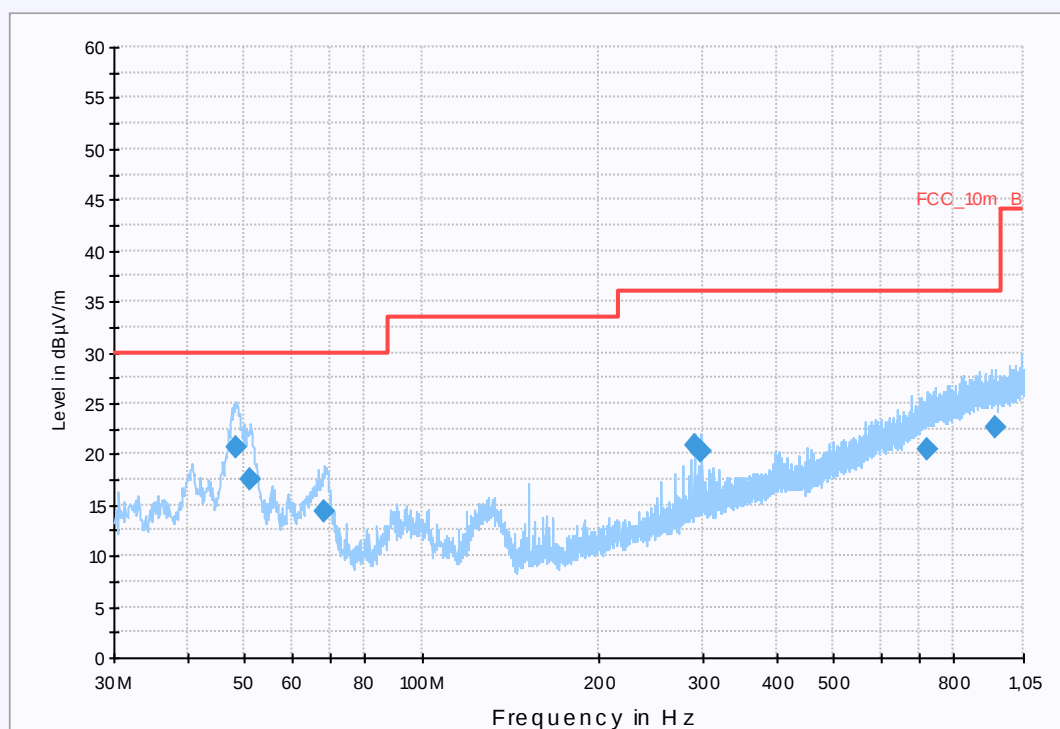
Test Description: FCC part 15 C
 Operating Conditions: TX 13,56 MHz NFC (modulated)
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dB μ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
48.480000	20.6	15000.000	120.000	98.0	V	15.0	13.3	9.4	30.0	
51.240000	17.4	15000.000	120.000	98.0	V	15.0	13.2	12.6	30.0	
68.280000	14.3	15000.000	120.000	159.0	V	91.0	9.7	15.7	30.0	
289.800000	20.8	15000.000	120.000	124.0	V	148.0	14.3	15.2	36.0	
298.440000	20.3	15000.000	120.000	98.0	V	265.0	14.5	15.7	36.0	
720.960000	20.4	15000.000	120.000	270.0	V	345.0	23.0	15.6	36.0	
942.360000	22.5	15000.000	120.000	270.0	V	183.0	25.3	13.5	36.0	

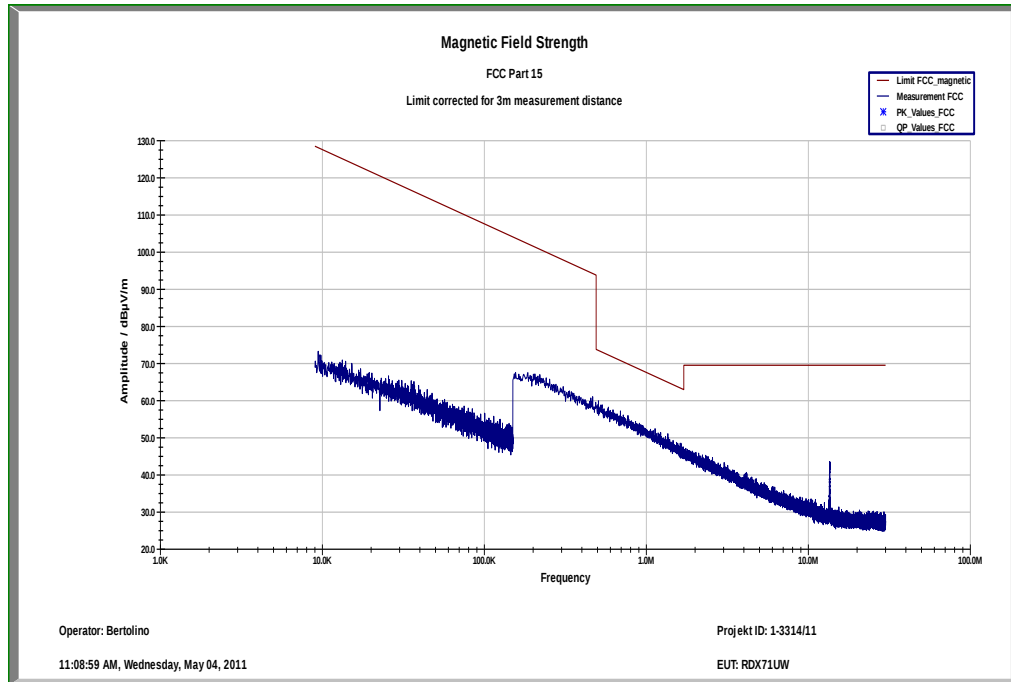
Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Clean Carrier

Plot 1: 9 kHz – 30 MHz;
Part 15.209 Magnetics, Measurement distance 3m

Transmit frequency 13.56 MHz



Plot 2: 30 MHz – 1000 MHz

Transmit frequency 13.56 MHz

Common Information

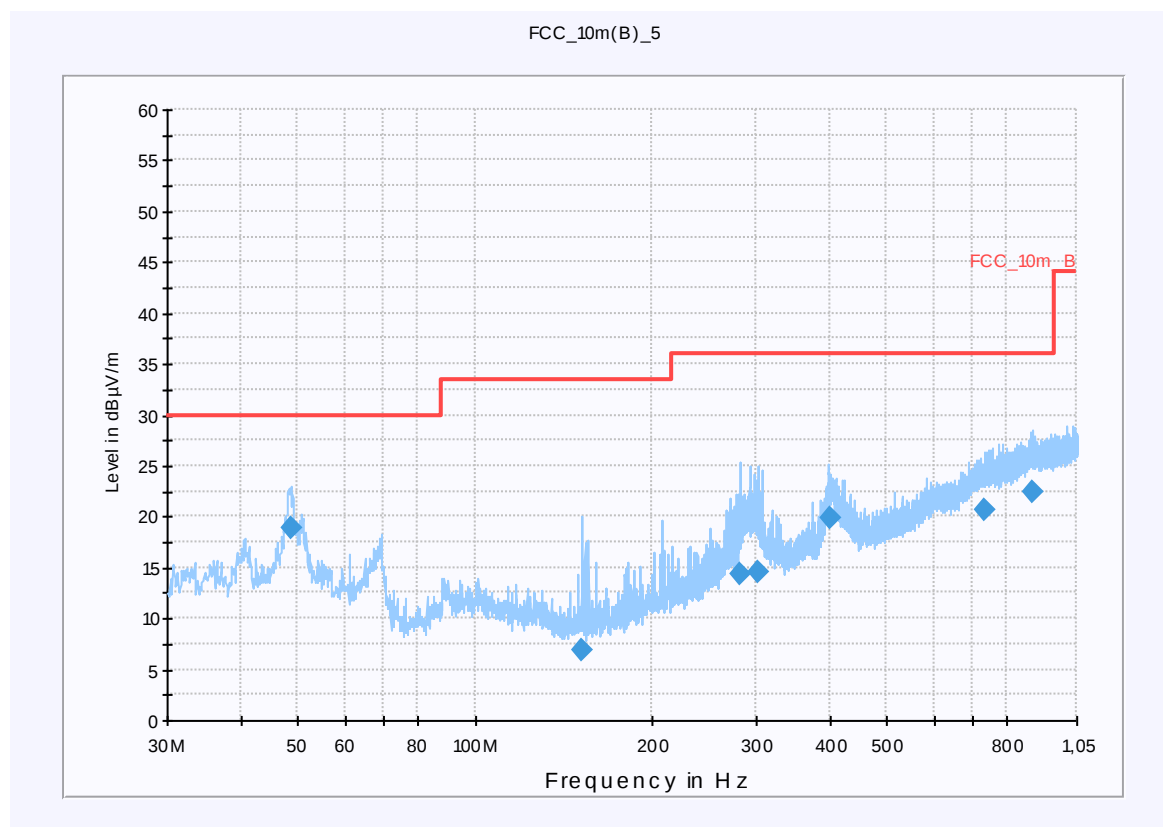
EUT: RDX71UW 125 + Captive cable charger Rev4.0
 Serial Number: CER-30954-001 Rev1 11-Apr-11(sample 23)

Test Description: FCC part 15 C
 Operating Conditions: TX 13,56 MHz NFC (CW)
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dB μ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver

**Final Result 1**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
48.600000	18.9	15000.000	120.000	98.0	V	310.0	13.3	11.1	30.0	
151.440000	6.8	15000.000	120.000	137.0	V	293.0	9.0	26.7	33.5	
281.160000	14.3	15000.000	120.000	106.0	V	190.0	14.1	21.7	36.0	
302.760000	14.5	15000.000	120.000	98.0	V	264.0	14.6	21.5	36.0	
402.000000	19.9	15000.000	120.000	98.0	V	-2.0	16.9	16.1	36.0	
730.200000	20.6	15000.000	120.000	188.0	H	264.0	23.2	15.4	36.0	
881.640000	22.4	15000.000	120.000	270.0	V	-2.0	25.0	13.6	36.0	

Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

11 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	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
2	n. a.	Software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081; B5979	300000210	ne		
3	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	05.01.2011	05.01.2013
4	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	01.06.2009	01.06.2011
5	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
6	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
7	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
8	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
9	n. a.	TRILOG Broadband Test-Antenna 30 MHz – 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
10	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	10.01.2011	10.01.2013
11	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
12	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
13	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
14	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
15	n. a.	PSA Spectrum Analyzer 3 Hz – 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
16	n. a.	RF Filter Section 9kHz – 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vkI!	08.09.2010	08.09.2012
17	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
18	n. a.	Loop Antenna 9 KHz – 30 MHz	HFH2-Z2	R&S	891847-35	300001169	ne		

Agenda: Kind of Calibration

k calibration / calibrated
 ne not required (k, ev, izw, zw not required)
 ev periodic self verification
 Ve long-term stability recognized
 vkI! Attention: extended calibration interval
 NK! Attention: not calibrated

EK limited calibration
 zw cyclical maintenance (external cyclical maintenance)
 izw internal cyclical maintenance
 g blocked for accredited testing
 *) next calibration ordered / currently in progress

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2011-05-05
-A	General EUT information	2011-05-20

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