

TEST REPORT

Test report no.: 1-3314-01-04/11-A



Testing laboratory

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

Accredited test laboratory:

The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAR registration number: 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: RDD71UW
FCC ID: L6ARDD70UW
IC: 2503A-RDD70UW
Frequency: ISM – band 2400 MHz to 2483.5 MHz (lowest channel 2412 MHz; highest channel 2462 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:

Test report authorised:

Marco Bertolino

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:	2011-04-21
Start of test:	2011-04-22
End of test:	2011-04-26
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}	+24 °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	:	RDD71UW
S/N serial number	:	Sample 23 CER-39234-001 IMEI: 004402240593164 PIN: 27269C44
HW hardware status	:	Rev1
SW software status	:	8.0.0.167
Frequency band [MHz]	:	ISM – band 2400 MHz to 2483.5 MHz (lowest channel 2412 MHz; highest channel 2462 MHz)
Type of modulation	:	DSSS and OFDM technology with BPSK, QPSK, 16 – & 64 – QAM.
Number of channels	:	11
Antenna	:	Integrated PCB 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, Annex 8	Passed	2011-05-23	Delta tests according to customer test plan!

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Results (max.)
§15.205 RSS-210	Band edge compliance radiated	Nominal	Nominal	DSSS / b – mode OFDM / g – mode OFDM / n – mode	☒ ☒ ☒	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	complies
§15.247(d) RSS-210	TX spurious emissions radiated	Nominal	Nominal	DSSS / b – mode OFDM / g – mode OFDM / n – mode	☒ ☒ ☒	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	DSSS / b – mode OFDM / g – mode OFDM / n – mode	☒ ☒ ☒	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurement testing

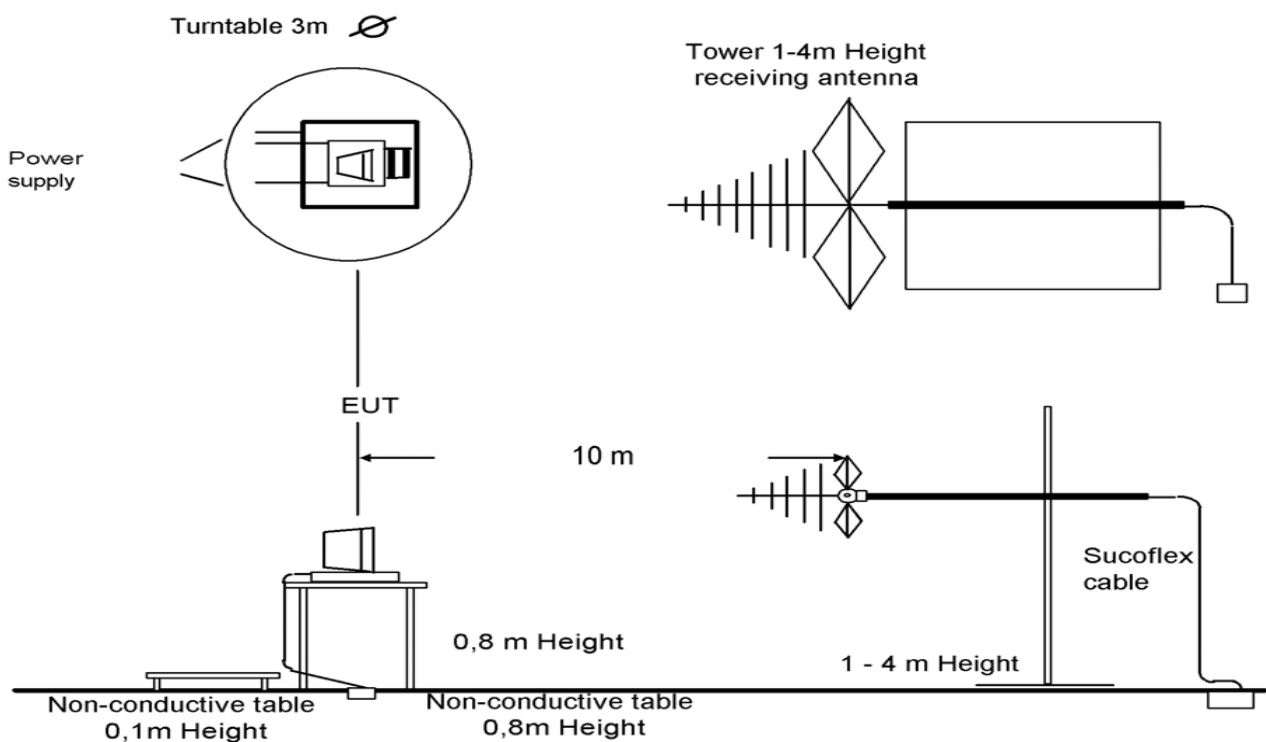
8.1 Description of test setup

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

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 – EUT settings:

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

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

 MCS0 and power level 18000 (OFDM / n – mode)

Configuration descriptions: None

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

9 Measurement results

9.1 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed.

Measurement:

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

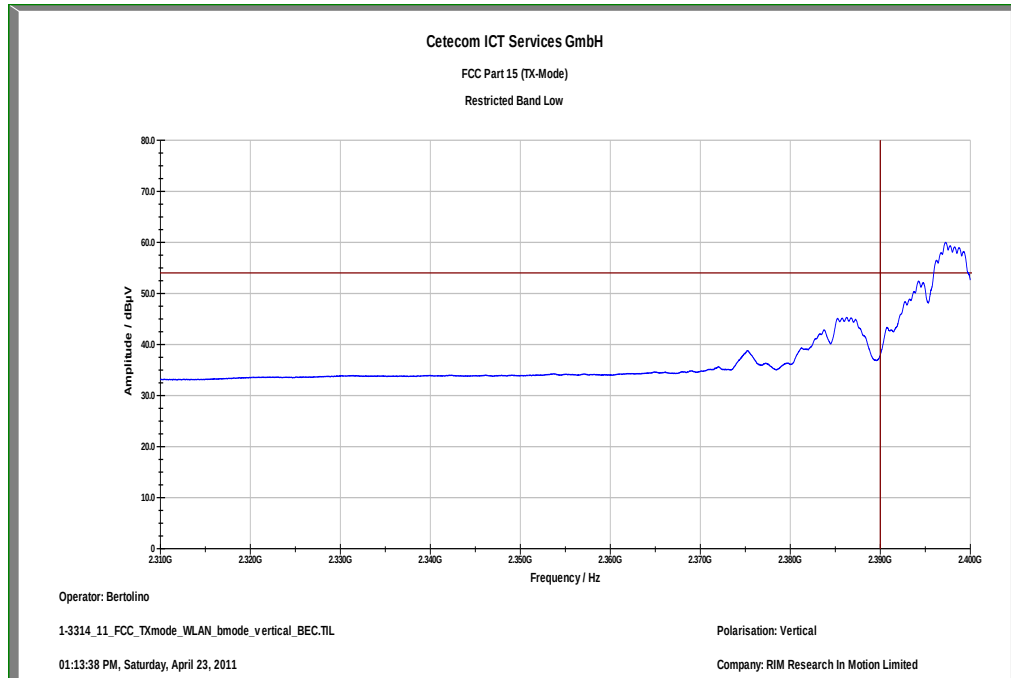
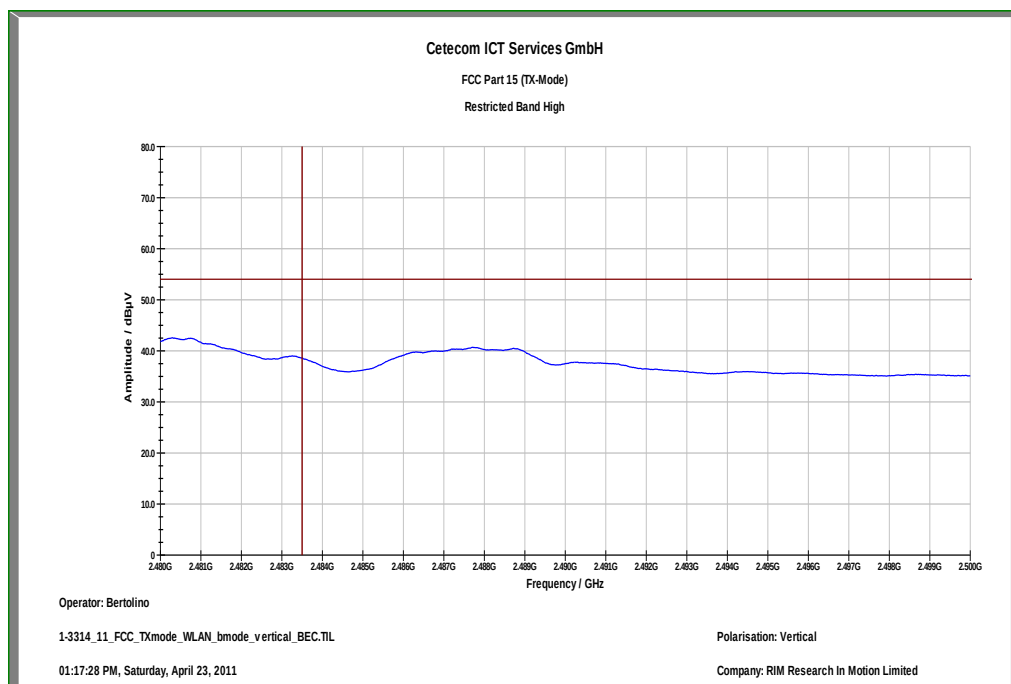
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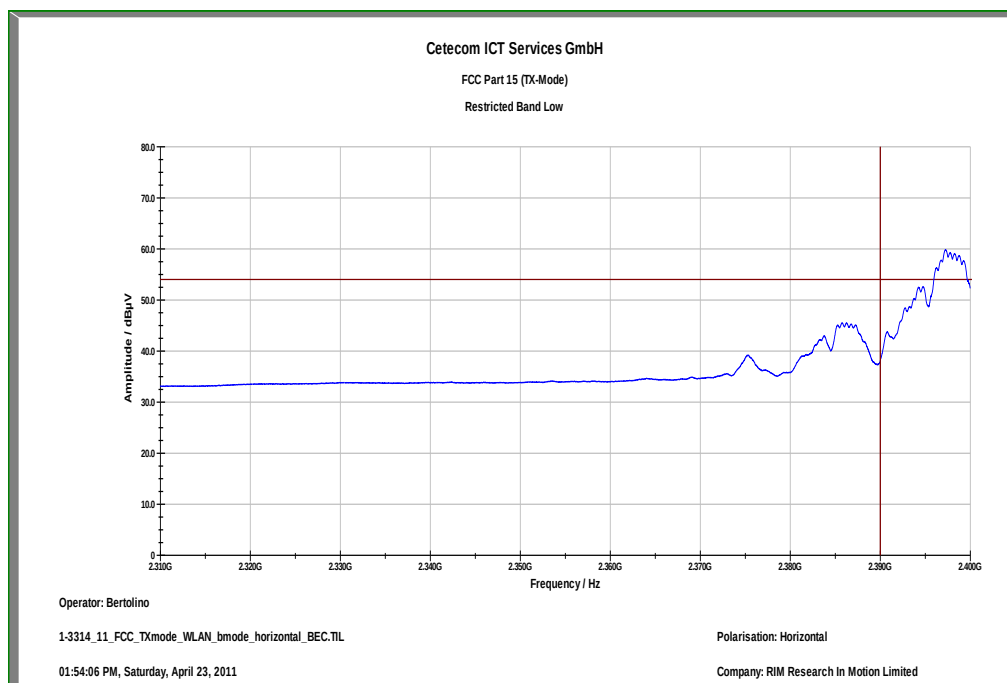
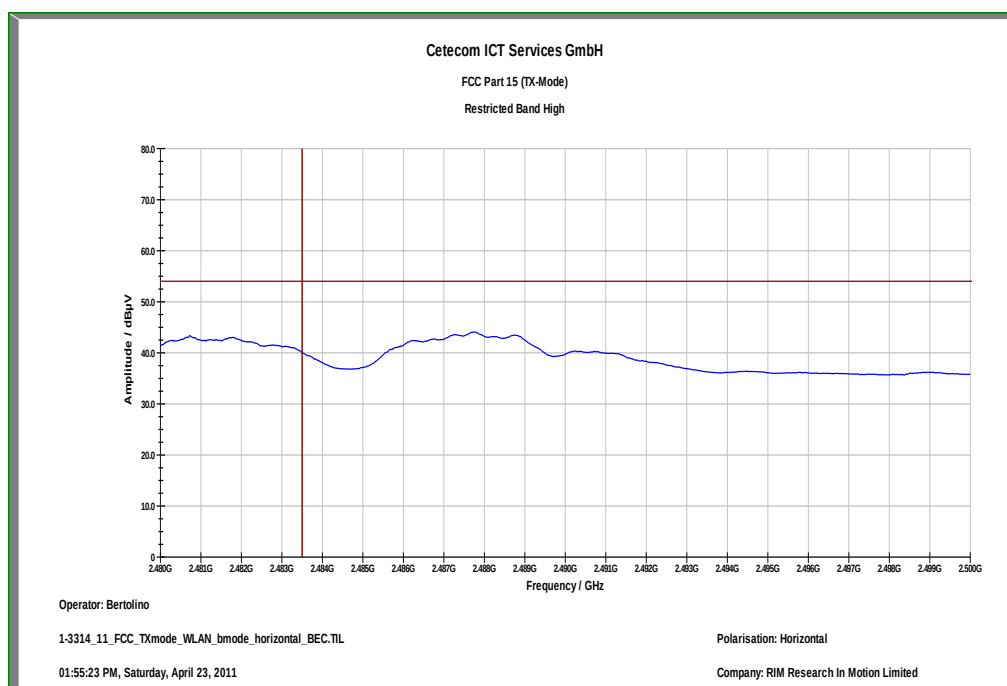
FCC	IC
CFR Part 15.205	RSS 210, Issue 8
Band edge compliance radiated	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).	
54 dB μ V/m AVG	

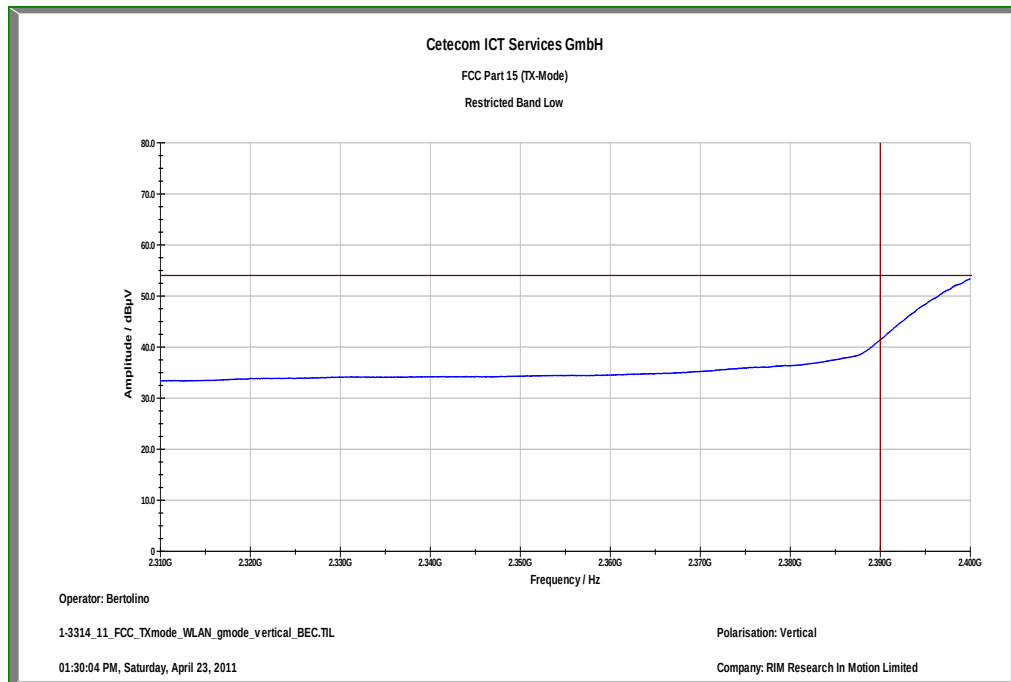
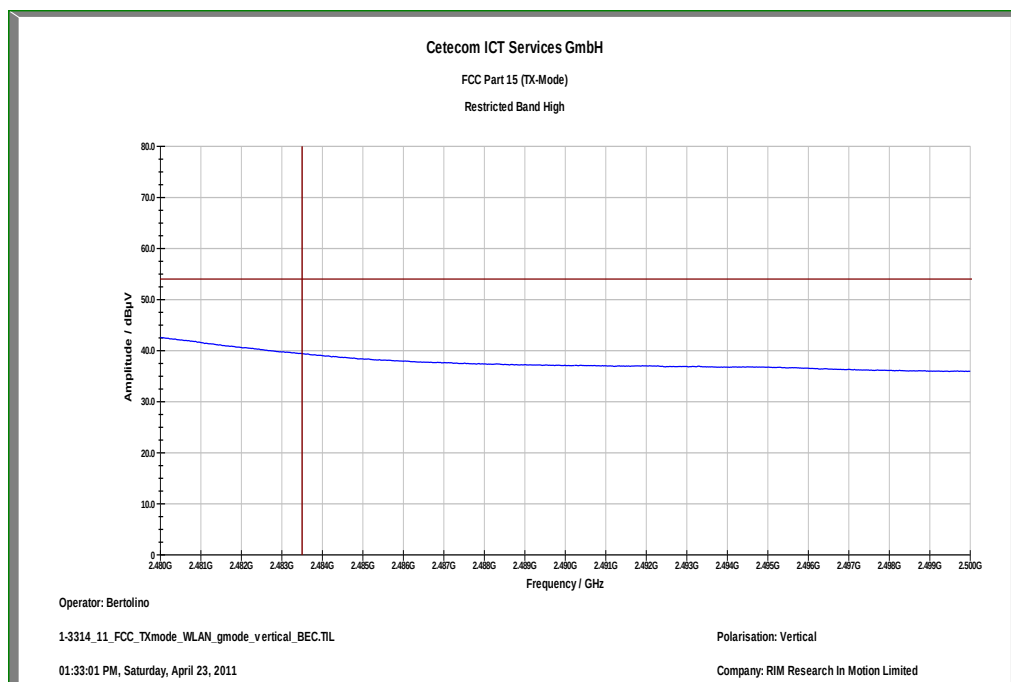
Results:

Szenario Modulation	Band edge compliance radiated [dB μ V/m]		
	b-mode	g-mode	n-mode
Lower restricted band	< 54	< 54	< 54
Upper restricted band	< 54	< 54	< 54
Measurement uncertainty	± 3 dB		

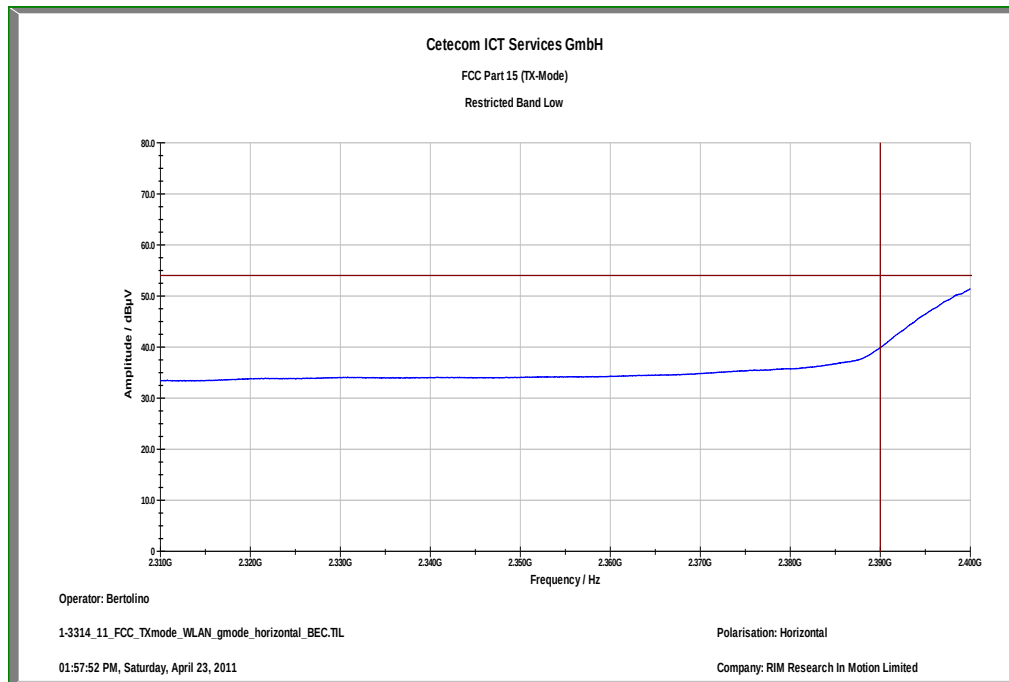
Result: The result of the measurement is passed.

Plots:**Plot 1:** Lower band edge, DSSS / b – mode, vertical polarization**Plot 2:** Upper band edge, DSSS / b – mode, vertical polarization

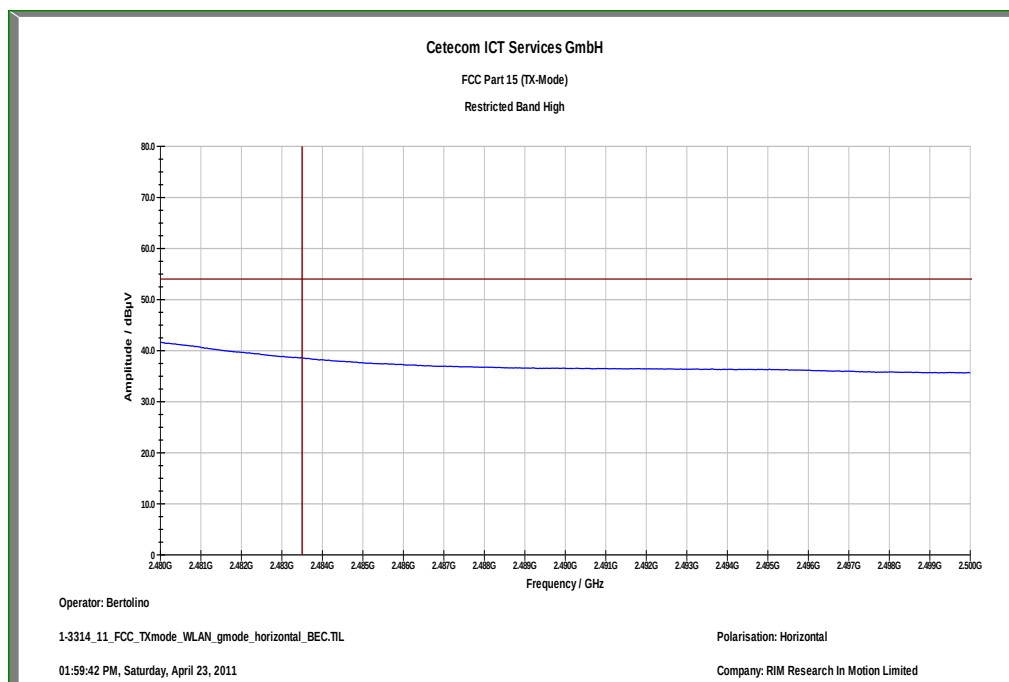
Plot 3: Lower band edge, DSSS / b – mode, horizontal polarization**Plot 4:** Upper band edge, DSSS / b – mode, horizontal polarization

Plot 5: Lower band edge, OFDM / g – mode, vertical polarization**Plot 6:** Upper band edge, OFDM / g – mode, vertical polarization

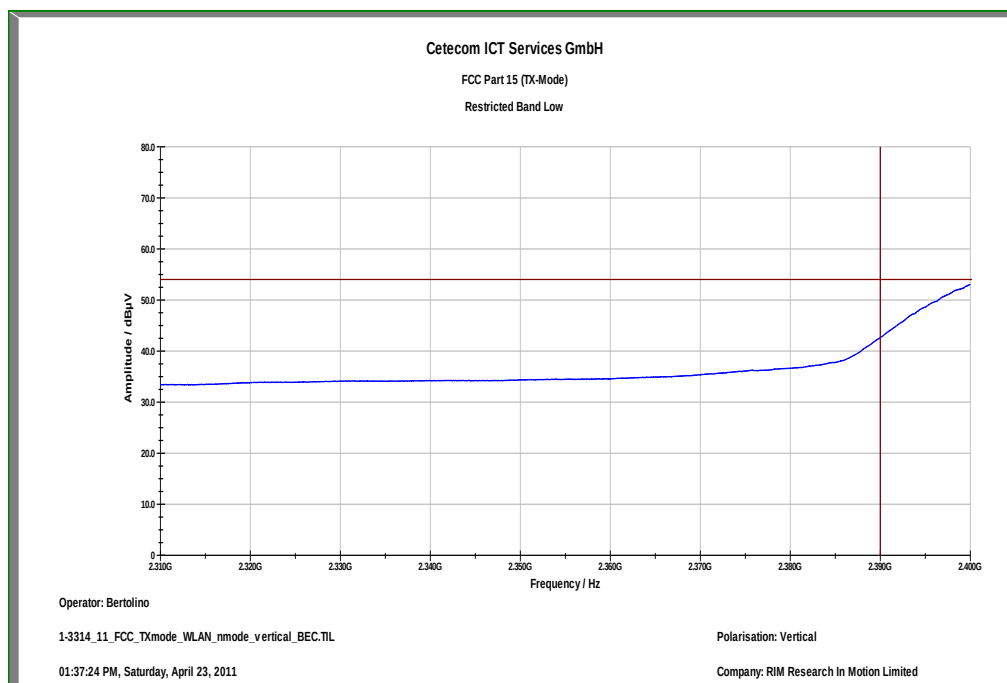
Plot 7: Lower band edge, OFDM / g – mode, horizontal polarization



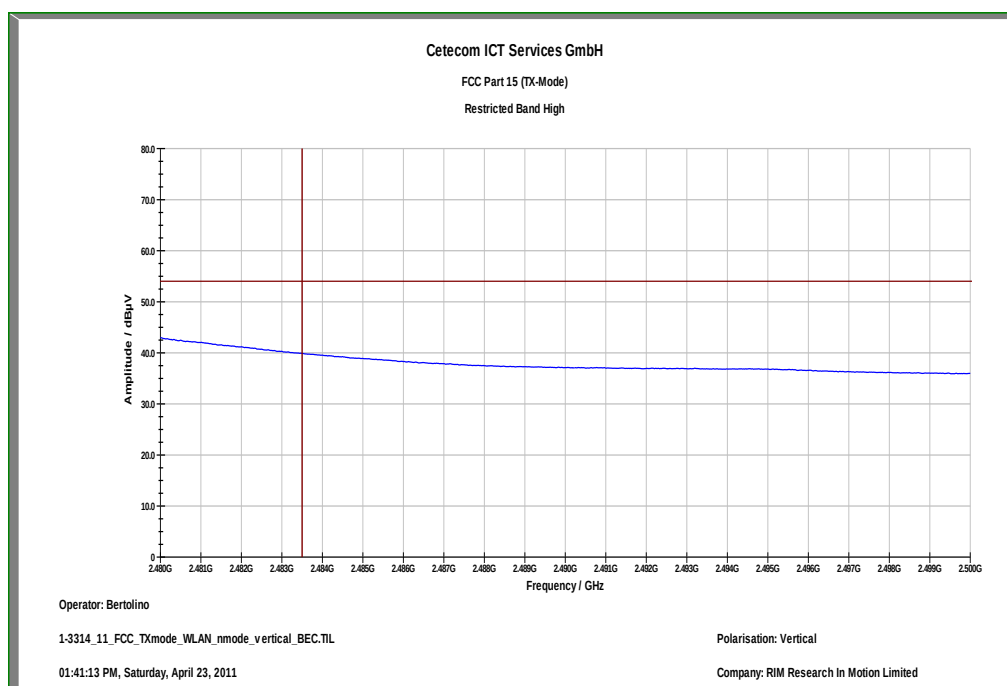
Plot 8: Upper band edge, OFDM / g – mode, horizontal polarization



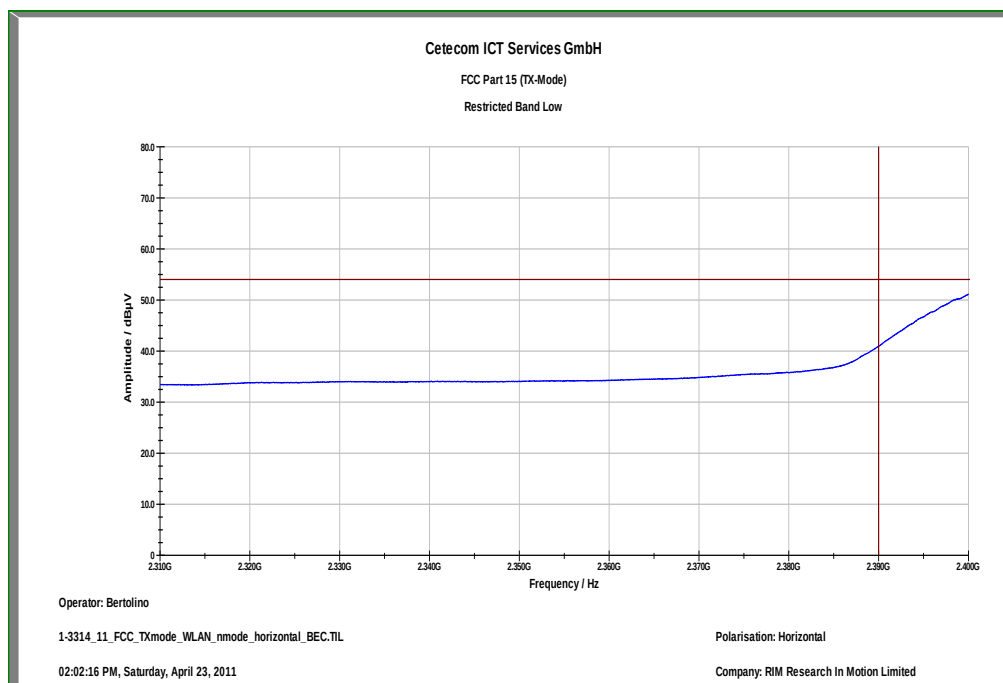
Plot 9: Lower band edge, OFDM / n – mode, vertical polarization



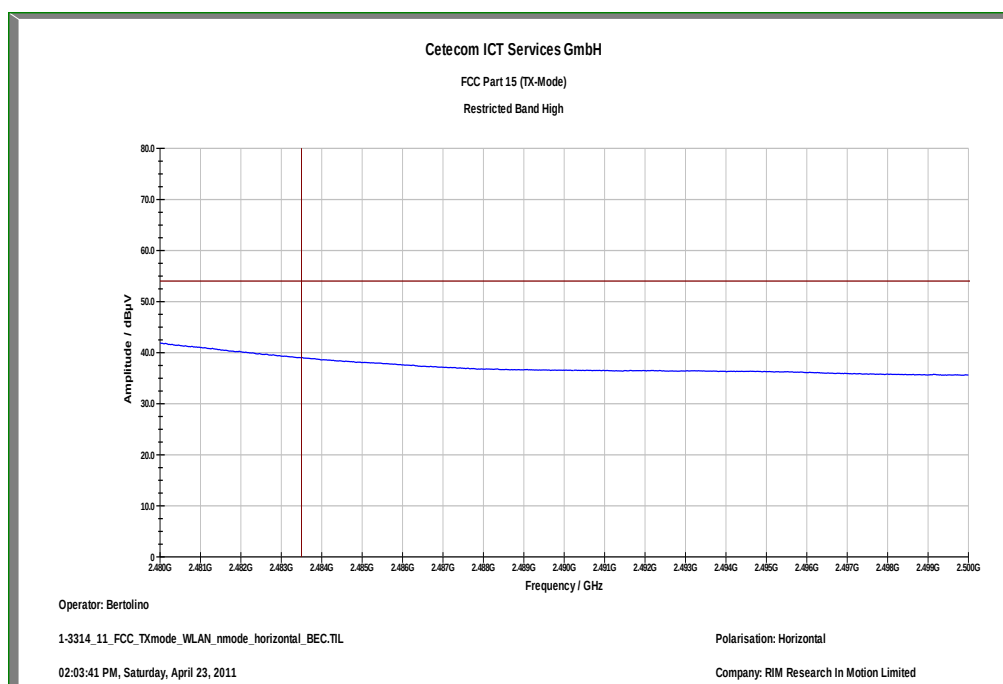
Plot 10: Upper band edge, OFDM / n – mode, vertical polarization



Plot 11: Lower band edge, OFDM / n – mode, horizontal polarization



Plot 12: Upper band edge, OFDM / n – mode, horizontal polarization



9.2 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:	☒ DSSS / b – mode ☒ OFDM / g – mode ☒ OFDM / n – mode

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: DSSS / b – mode

TX spurious emissions radiated [dBμV/m]								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
Several peaks detected between 2500 MHz and 2650 MHz. Emissions are not rated – no restricted band requirement.			Several peaks detected between 2500 MHz and 2650 MHz. Emissions are not rated – no restricted band requirement.			Several peaks detected between 2500 MHz and 2650 MHz. Emissions are not rated – no restricted band requirement.		
For emissions above 12.75 GHz, please take a look at the plots.			For emissions above 12.75 GHz, please take a look at the plots.			For emissions above 12.75 GHz, please take a look at the plots.		
Measurement uncertainty			± 3 dB					

Result: The result of the measurement is passed.**Results:** OFDM / g – mode

TX spurious emissions radiated [dBμV/m]								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]
Not measured			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			Not measured		
			Several peaks detected between 2500 MHz and 2650 MHz. Emissions are not rated – no restricted band requirement.					
			For emissions above 12.75 GHz, please take a look at the plots.					
Measurement uncertainty			± 3 dB					

Result: The result of the measurement is passed.**Results:** OFDM / n – mode

TX spurious emissions radiated [dBμV/m]								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]	F [MHz]	Detector	Level [dBμV/m]
Not measured			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			Not measured		
			Several peaks detected between 2500 MHz and 2650 MHz. Emissions are not rated – no restricted band requirement.					
			For emissions above 12.75 GHz, please take a look at the plots.					
Measurement uncertainty			± 3 dB					

Result: The result of the measurement is passed.

Plots: DSSS / b – mode

Note: Customer test plan – EUT settings: 1 Mbps and power level 18000

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

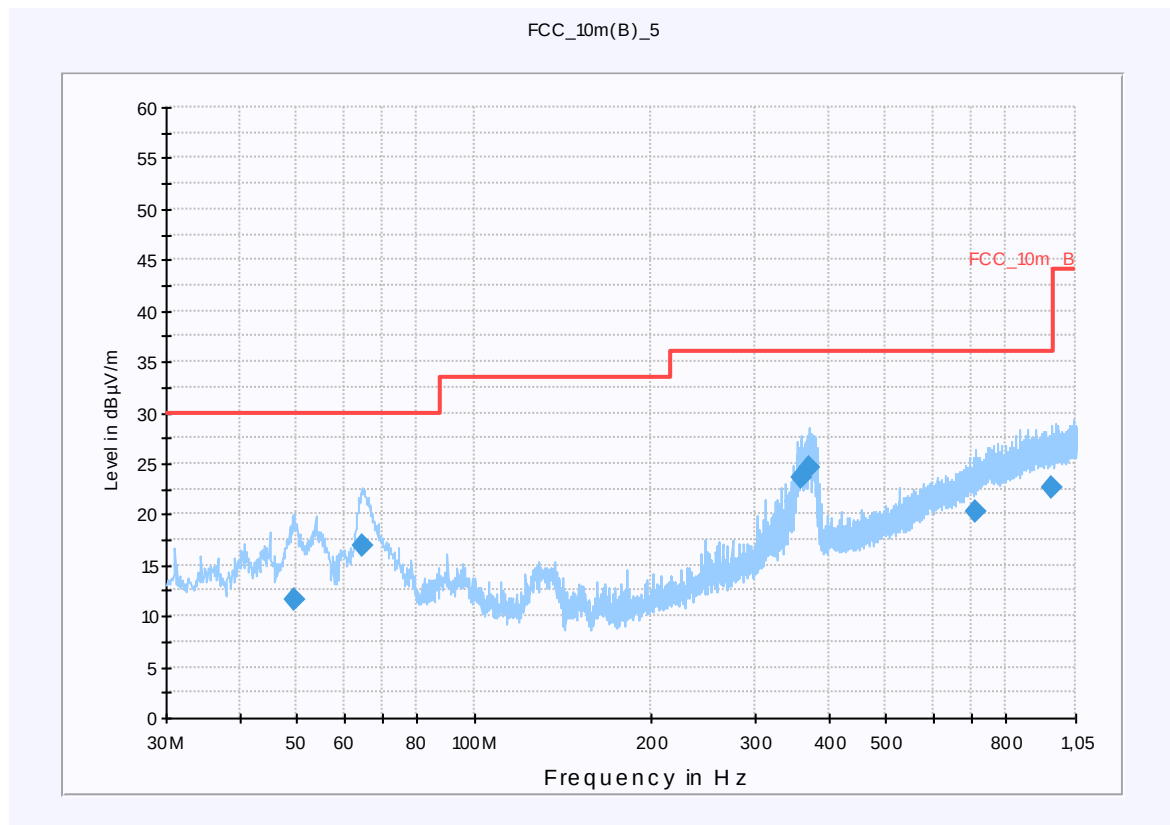
CETECOM ICT Services GmbH

Common Information

EUT: RDD71UW 148 + Captive cable charger Rev4.0
 Serial Number: CER-39234-001 Rev1 11-Apr-11(sample 23) + DW-17957-003
 Test Description: FCC Part 15 C
 Operating Conditions: WLAN b mode gain: 18000, Tx CH:1 1Mbps
 Operator Name: LANGER
 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



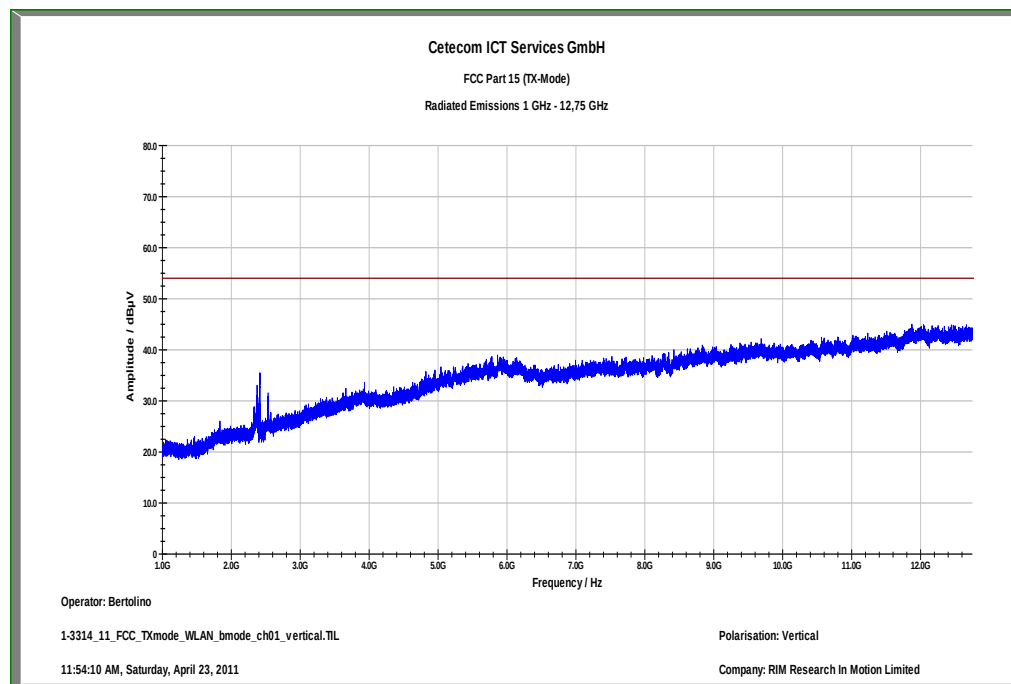
Final Result 1

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
49.440000	11.7	15000.000	120.000	270.0	V	342.0	13.4	18.3	30.0	
64.440000	16.9	15000.000	120.000	155.0	V	61.0	10.5	13.1	30.0	
359.160000	23.5	15000.000	120.000	120.0	V	-2.0	16.2	12.5	36.0	
369.480000	24.7	15000.000	120.000	98.0	V	-2.0	16.4	11.3	36.0	
710.040000	20.2	15000.000	120.000	98.0	H	187.0	22.7	15.8	36.0	
959.160000	22.6	15000.000	120.000	270.0	H	178.0	25.4	13.4	36.0	

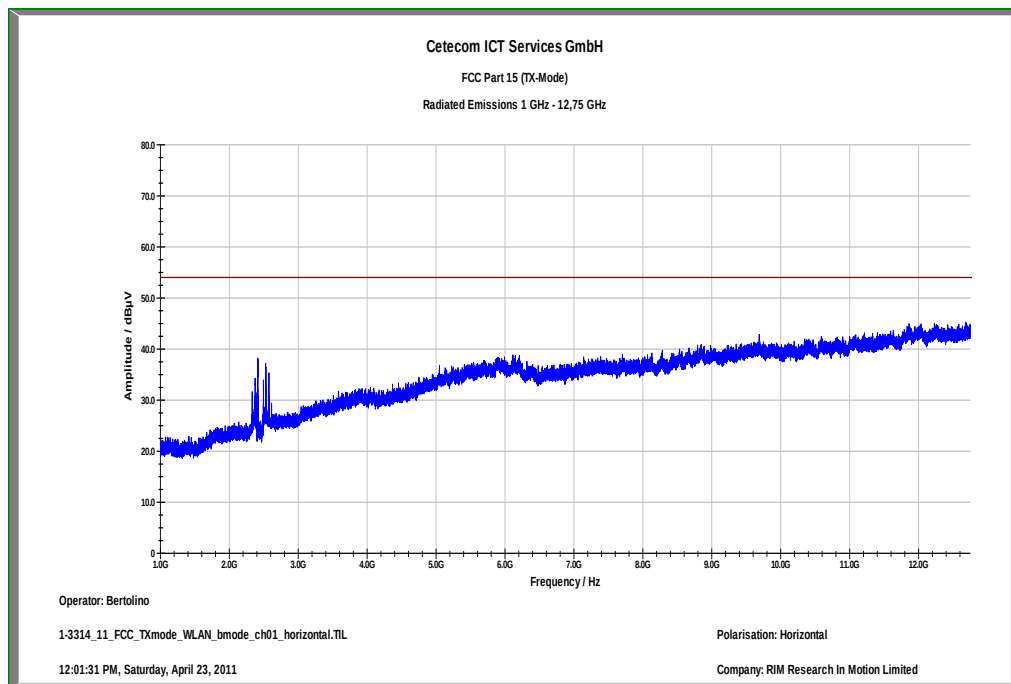
Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
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 (0909)
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

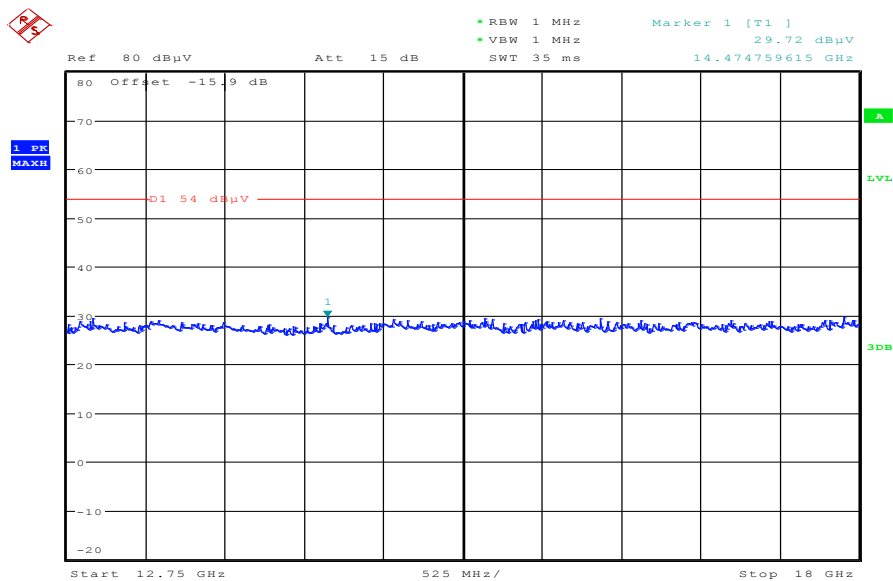
EMC 32 Version 8.10.00

Plot 2: 1 GHz to 12.75 GHz, lowest channel, vertical polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

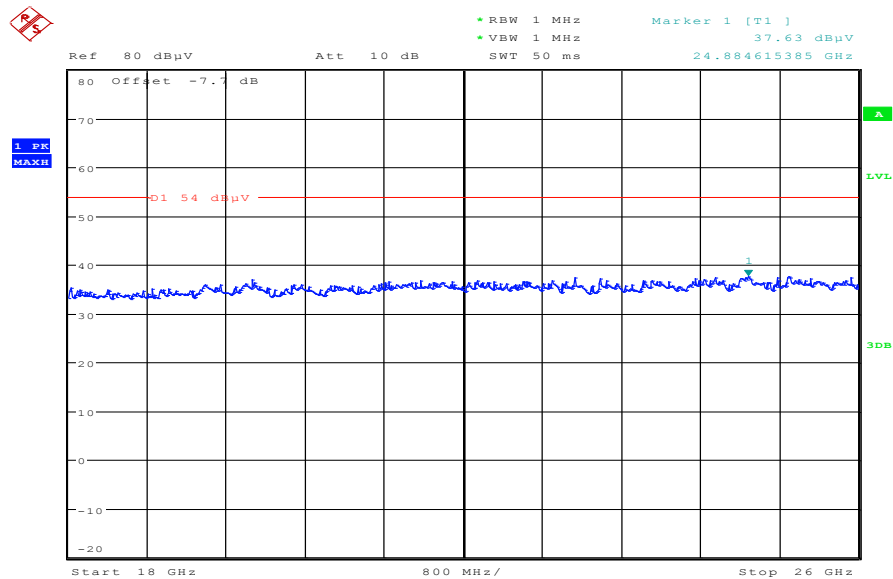
Plot 3: 1 GHz to 12.75 GHz, lowest channel, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 4: 12.75 GHz to 18 GHz, lowest channel, vertical & horizontal polarization

Date: 24.APR.2011 08:57:25

Plot 5: 18 GHz to 26 GHz, lowest channel, vertical & horizontal polarization



Date: 24.APR.2011 09:13:56

Plot 6: 30 MHz to 1 GHz, middle channel, vertical & horizontal polarization

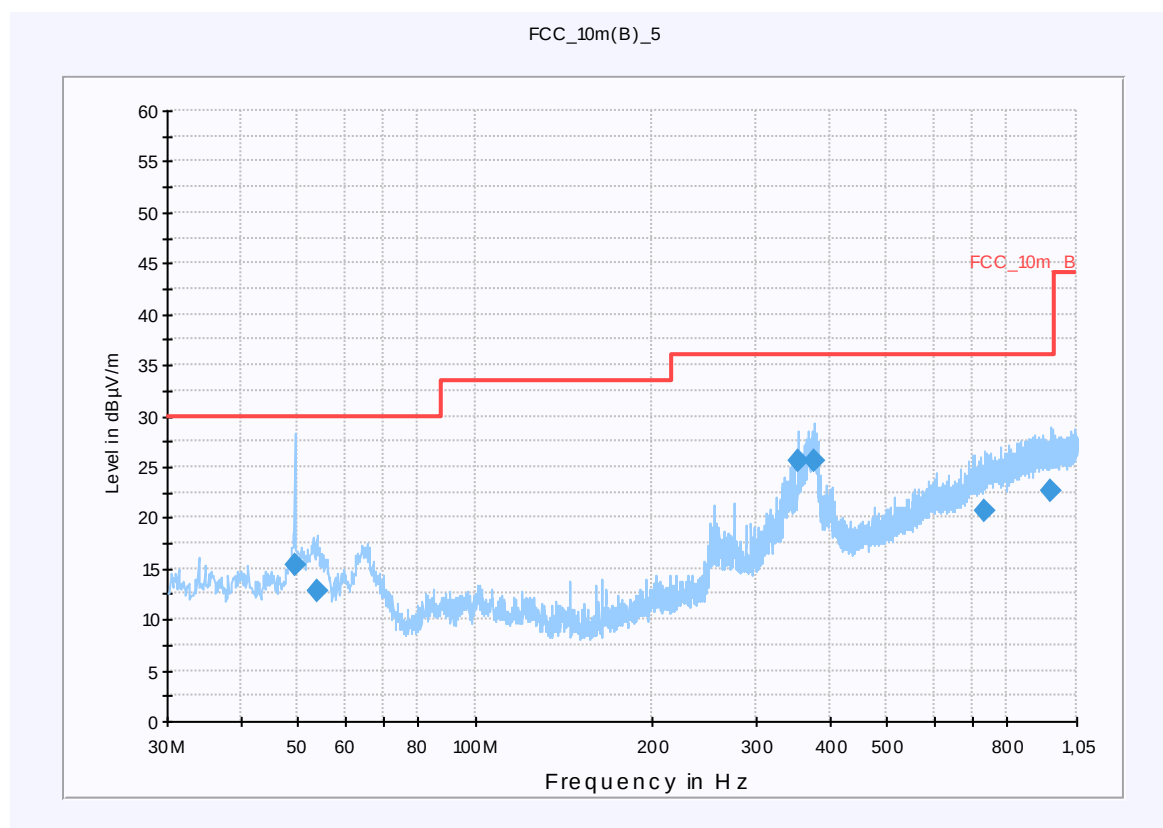
CETECOM ICT Services GmbH

Common Information

EUT: RDD71UW 148 + Captive cable charger Rev4.0
 Serial Number: CER-39234-001 Rev1 11-Apr-11(sample 23) + DW-17957-003
 Test Description: FCC Part 15 C
 Operating Conditions: WLAN b mode gain: 18000, Tx CH:6 1Mbps
 Operator Name: LANGER
 Comment: AC 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dBμV/m
Subrange **Detectors** **IF Bandwidth** **Meas. Time** **Receiver**
 30 MHz - 2 GHz QuasiPeak 120 kHz 15 s Receiver



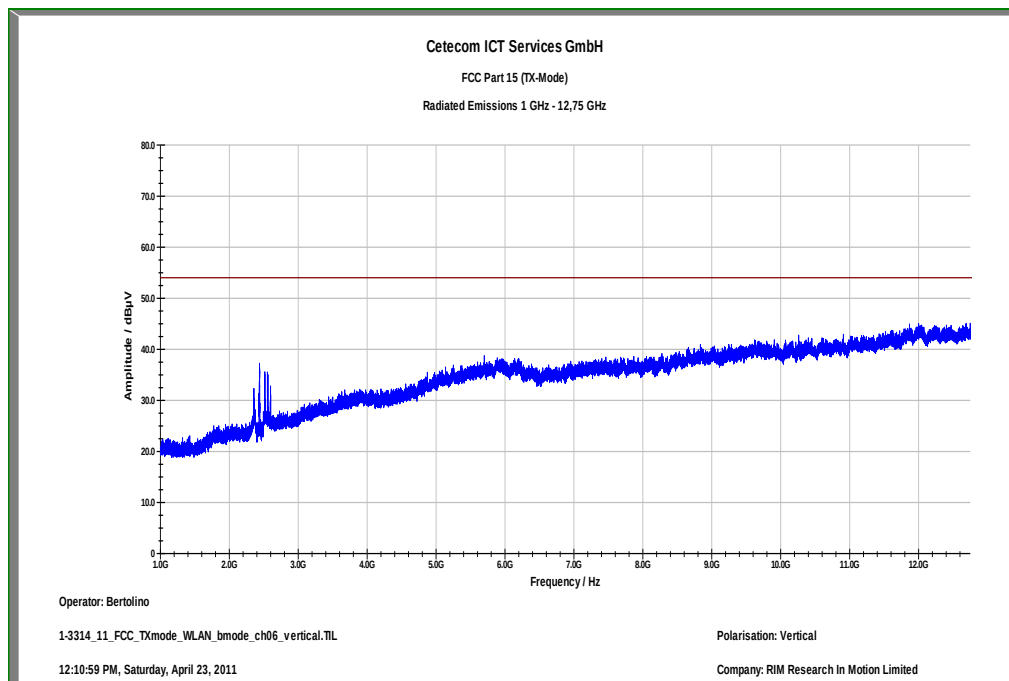
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
49.440000	15.3	15000.000	120.000	98.0	V	-2.0	13.4	14.7	30.0	
53.880000	12.7	15000.000	120.000	127.0	V	190.0	13.0	17.3	30.0	
354.600000	25.6	15000.000	120.000	105.0	V	286.0	16.1	10.4	36.0	
376.200000	25.6	15000.000	120.000	115.0	V	190.0	16.5	10.4	36.0	
729.720000	20.6	15000.000	120.000	270.0	V	243.0	23.2	15.4	36.0	
947.760000	22.5	15000.000	120.000	270.0	V	168.0	25.3	13.5	36.0	

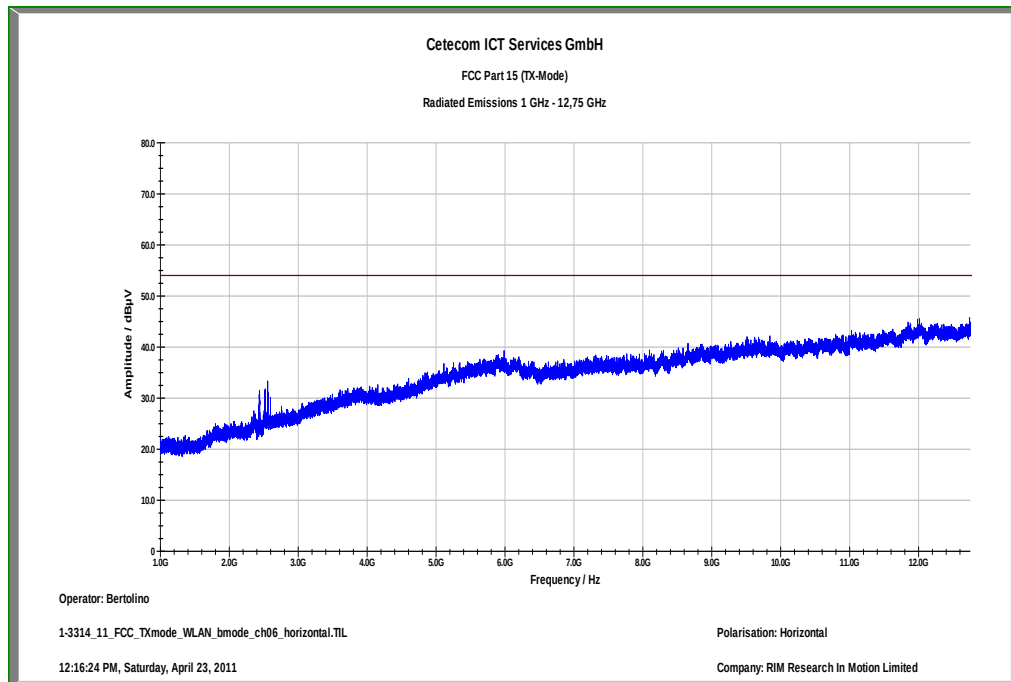
Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
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 (0909)
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

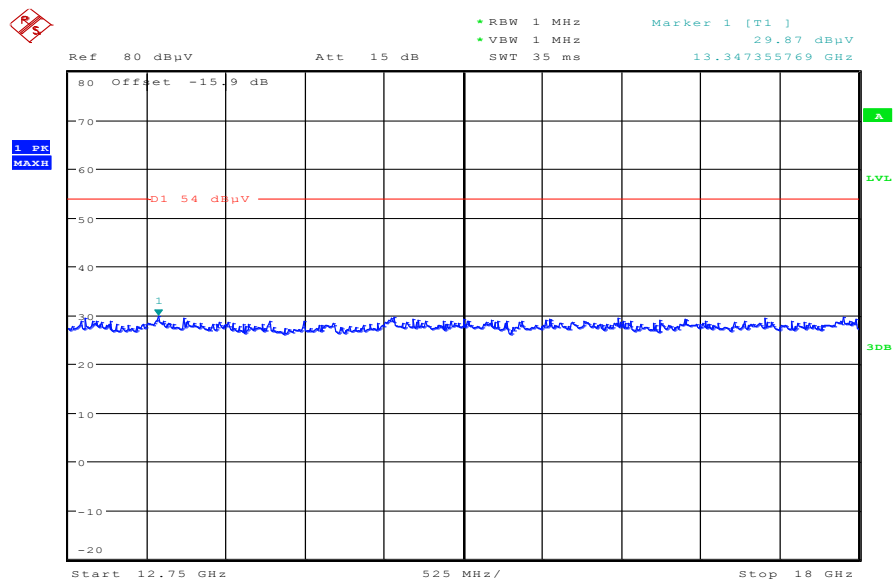
EMC 32 Version 8.10.00

Plot 7: 1 GHz to 12.75 GHz, middle channel, vertical polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

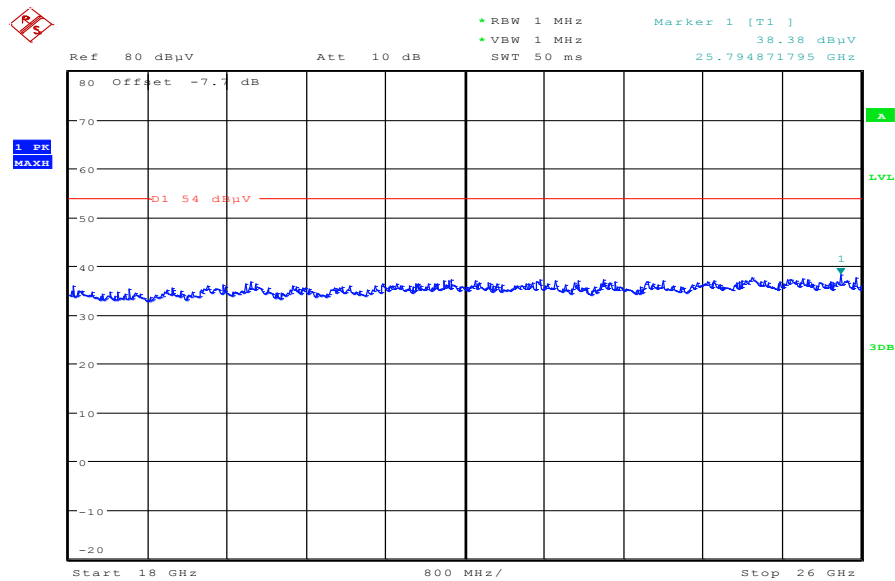
Plot 8: 1 GHz to 12.75 GHz, middle channel, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 9: 12.75 GHz to 18 GHz, middle channel, vertical & horizontal polarization

Date: 24.APR.2011 08:59:23

Plot 10: 18 GHz to 26 GHz, middle channel, vertical & horizontal polarization



Date: 24.APR.2011 09:15:18

Plot 11: 30 MHz to 1 GHz, highest channel, vertical & horizontal polarization

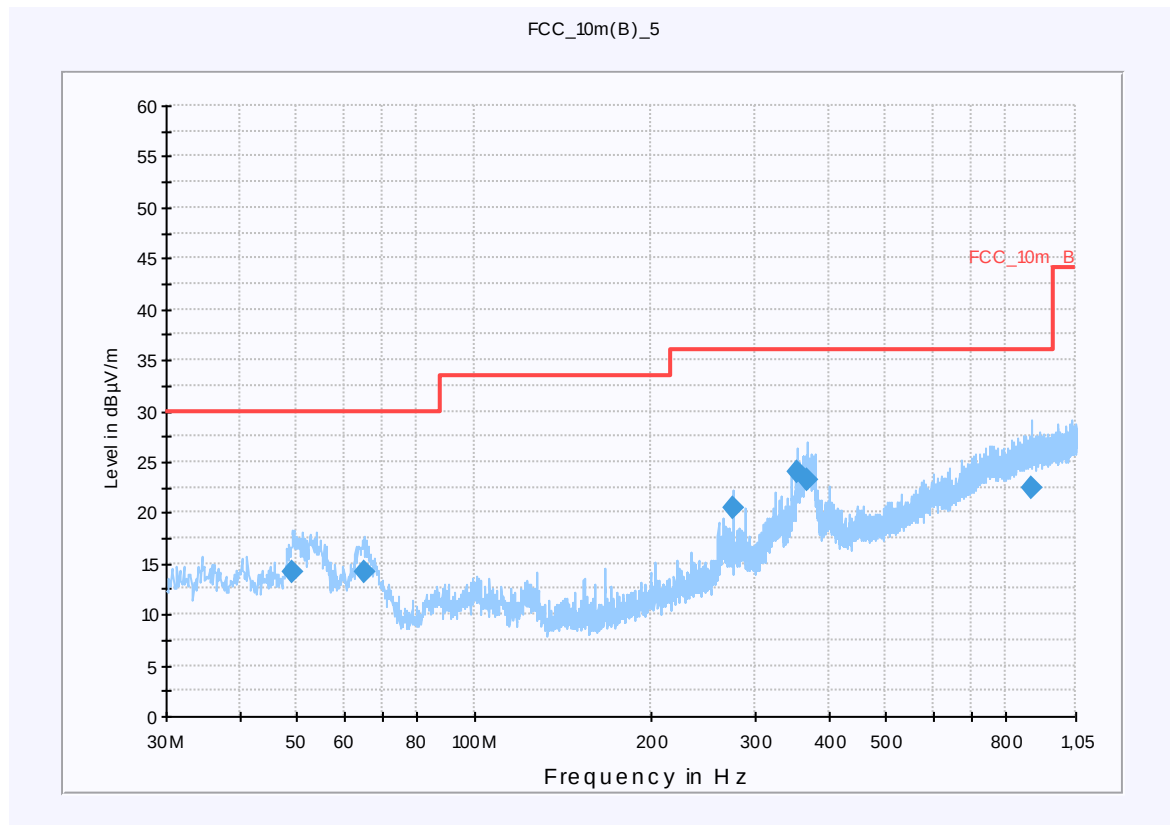
CETECOM ICT Services GmbH

Common Information

EUT: RDD71UW 148 + Captive cable charger Rev4.0
 Serial Number: CER-39234-001 Rev1 11-Apr-11(sample 23) + DW-17957-003
 Test Description: FCC Part 15 C
 Operating Conditions: WLAN b mode gain: 18000, Tx CH:11 1Mbps
 Operator Name: LANGER
 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



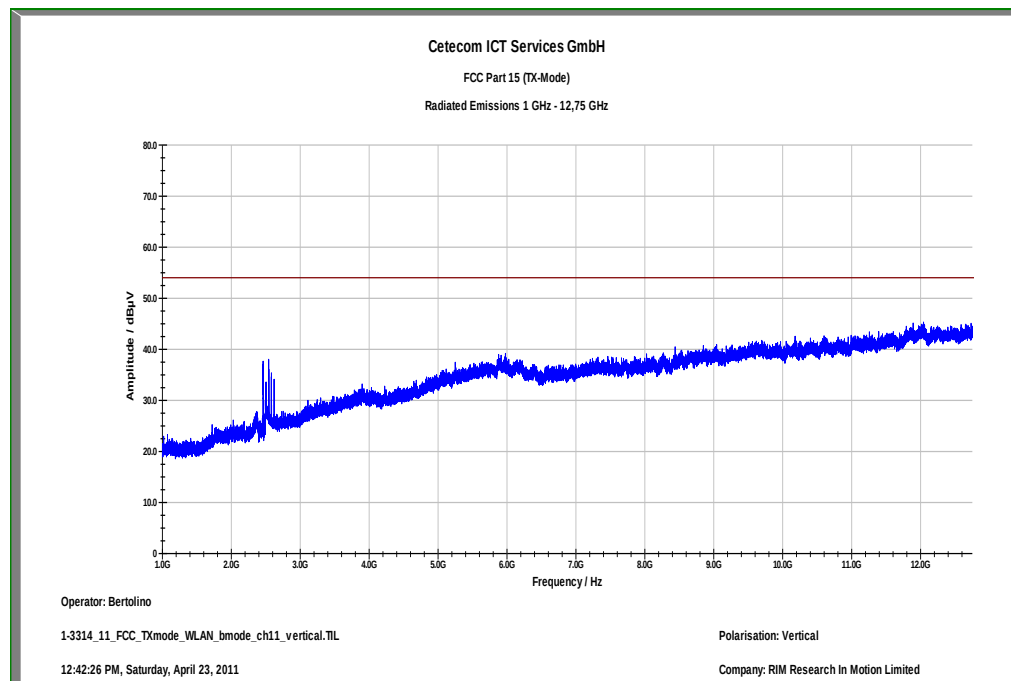
Final Result 1

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
49.080000	14.2	15000.000	120.000	98.0	V	318.0	13.4	15.8	30.0	
64.920000	14.2	15000.000	120.000	270.0	V	-2.0	10.4	15.8	30.0	
274.680000	20.4	15000.000	120.000	157.0	V	157.0	13.9	15.6	36.0	
354.600000	24.0	15000.000	120.000	114.0	V	299.0	16.1	12.0	36.0	
367.680000	23.3	15000.000	120.000	98.0	V	157.0	16.4	12.7	36.0	
882.000000	22.4	15000.000	120.000	270.0	H	-2.0	25.0	13.6	36.0	

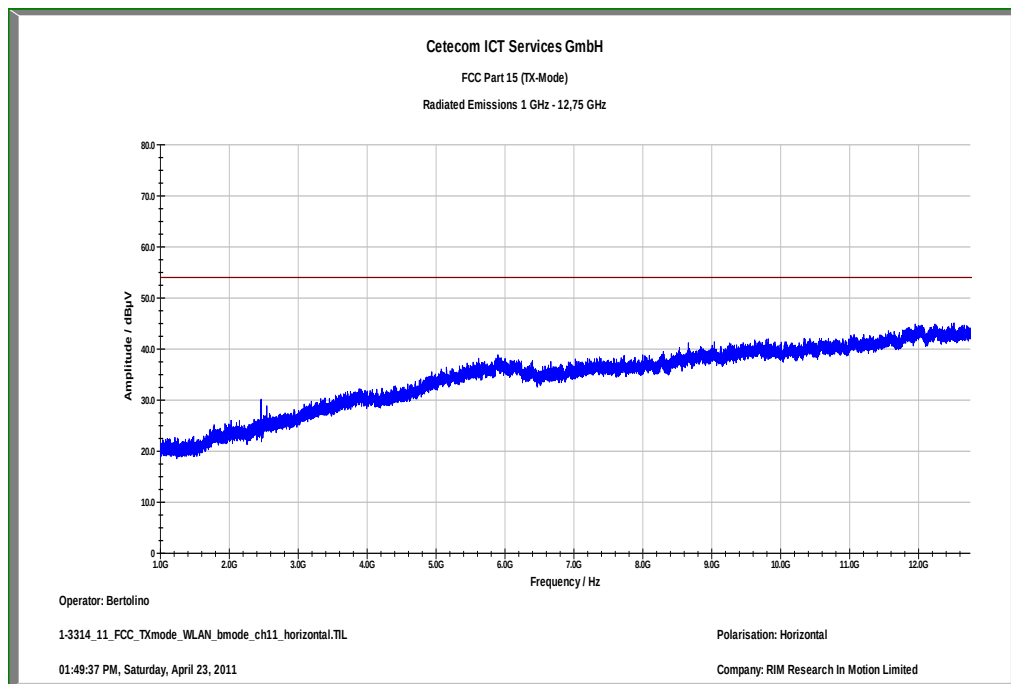
Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
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 (0909)
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

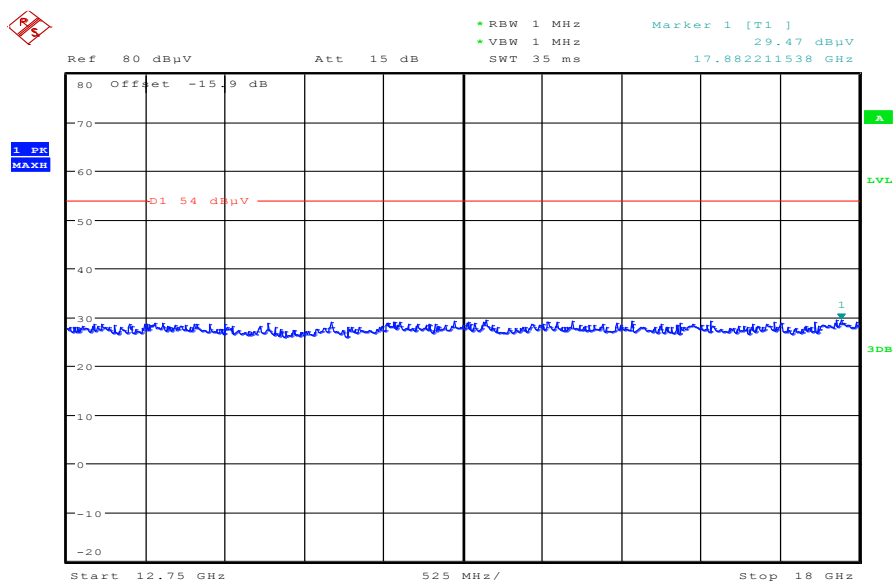
EMC 32 Version 8.10.00

Plot 12: 1 GHz to 12.75 GHz, highest channel, vertical polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

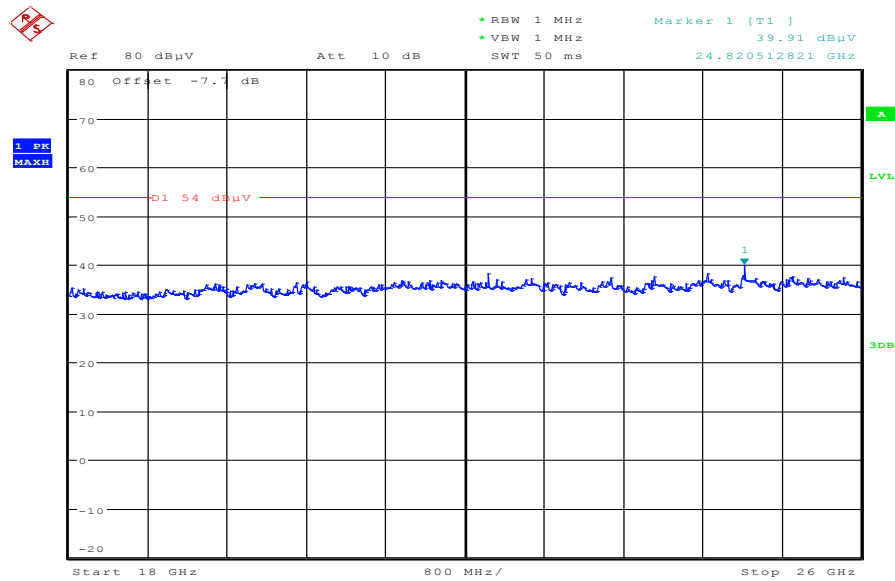
Plot 13: 1 GHz to 12.75 GHz, highest channel, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 14: 12.75 GHz to 18 GHz, highest channel, vertical & horizontal polarization

Date: 24.APR.2011 09:00:57

Plot 15: 18 GHz to 26 GHz, highest channel, vertical & horizontal polarization



Date: 24.APR.2011 09:17:00

Plots: OFDM / g – mode

Note: Customer test plan – EUT settings: 6 Mbps and power level 18000

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

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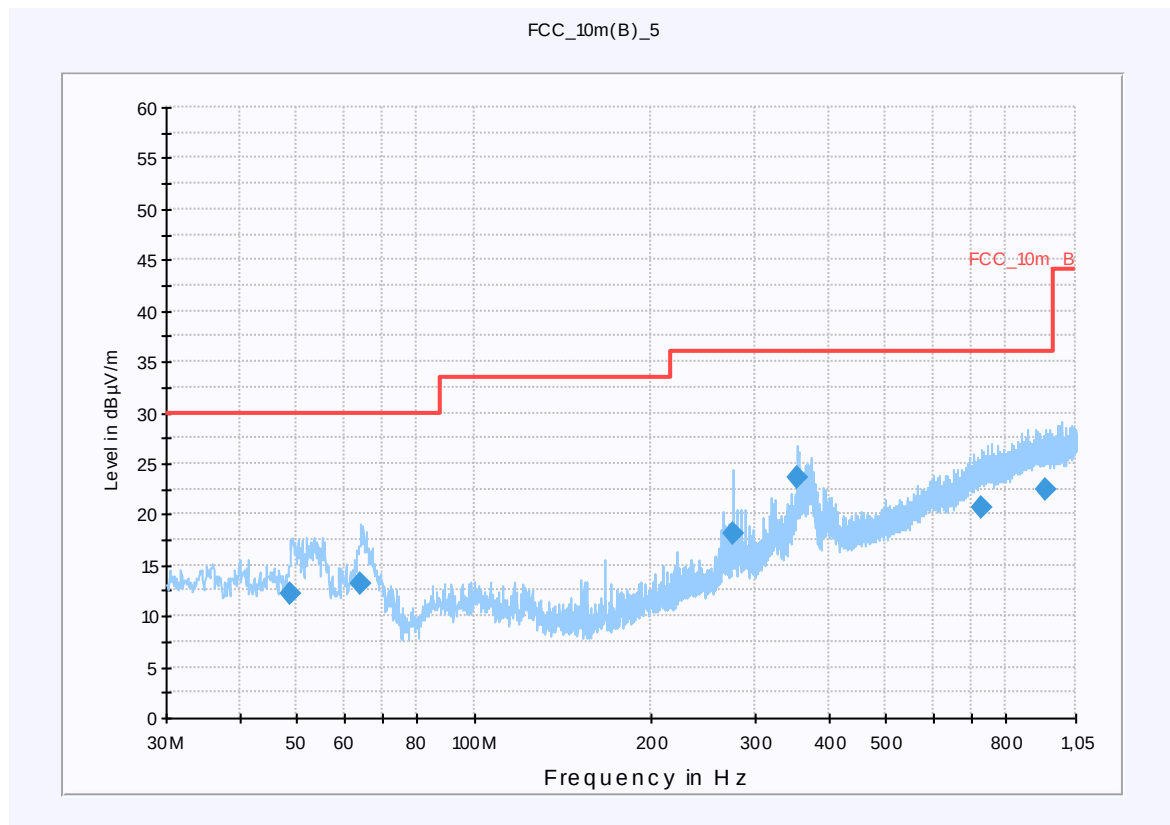
Common Information

EUT: RDD71UW 148 + Captive cable charger Rev4.0
 Serial Number: CER-39234-001 Rev1 11-Apr-11(sample 23) + DW-17957-003
 Test Description: FCC Part 15 C
 Operating Conditions: WLAN g mode gain: 18000, Tx CH:6 6Mbps
 Operator Name: LANGER
 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



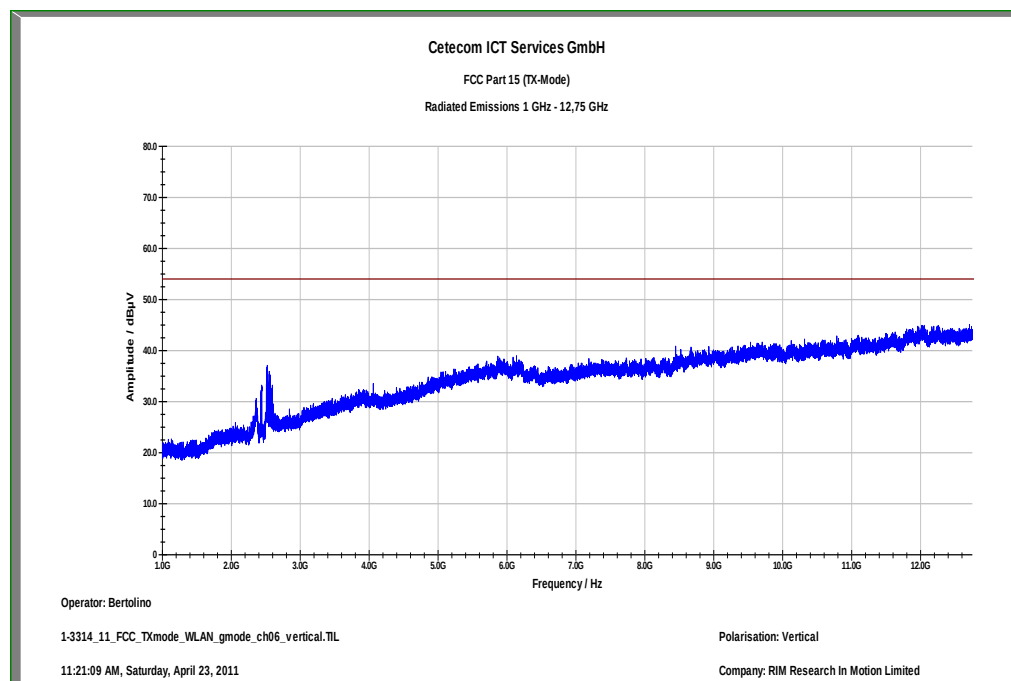
Final Result 1

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
48.720000	12.3	15000.000	120.000	98.0	V	-2.0	13.3	17.7	30.0	
64.320000	13.2	15000.000	120.000	263.0	V	64.0	10.6	16.8	30.0	
274.800000	18.2	15000.000	120.000	106.0	V	185.0	13.9	17.8	36.0	
354.720000	23.6	15000.000	120.000	98.0	V	20.0	16.1	12.4	36.0	
728.160000	20.6	15000.000	120.000	106.0	V	157.0	23.2	15.4	36.0	
930.360000	22.5	15000.000	120.000	270.0	V	91.0	25.3	13.5	36.0	

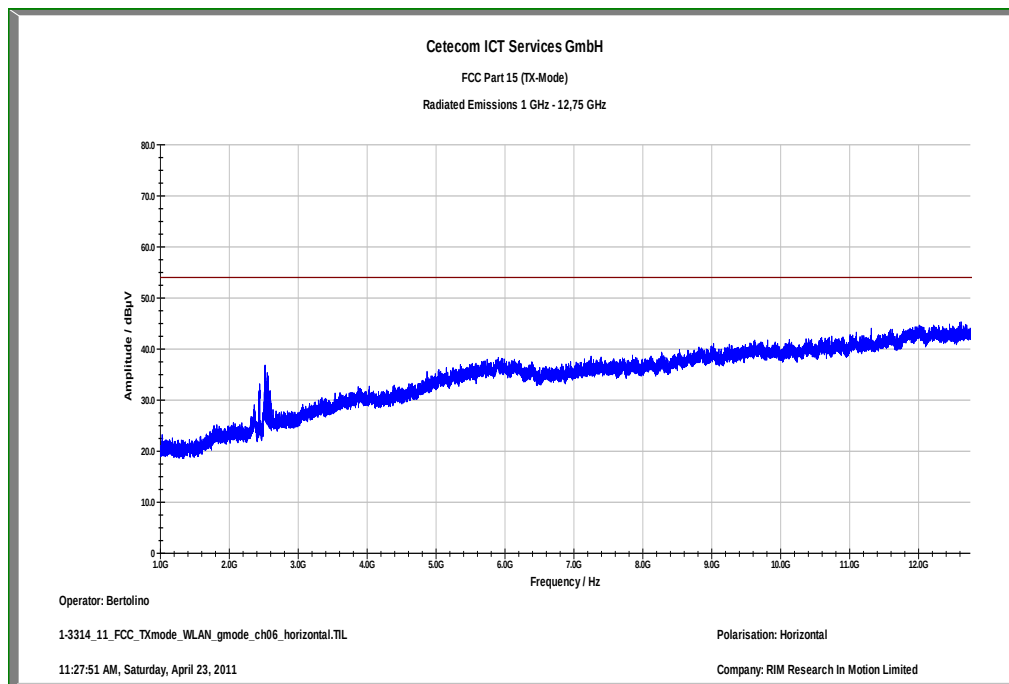
Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
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 (0909)
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

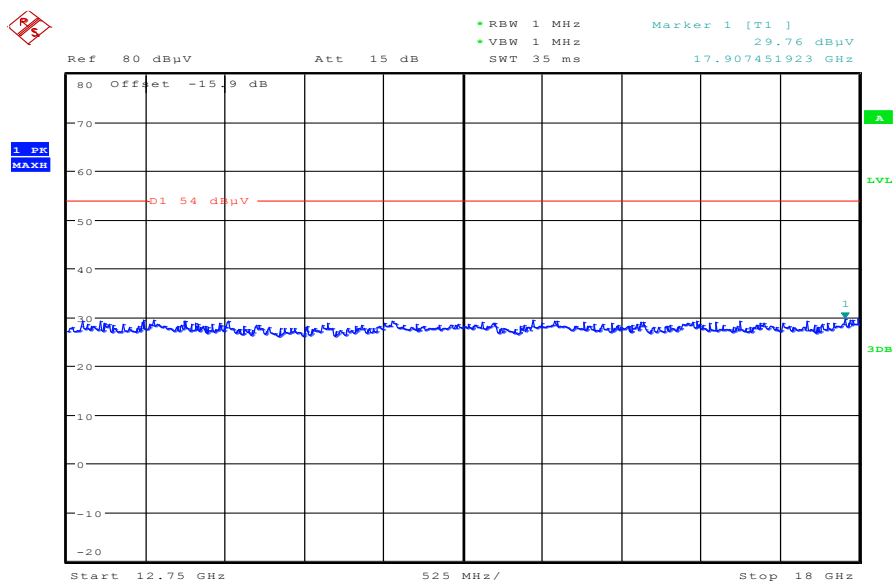
EMC 32 Version 8.10.00

Plot 2: 1 GHz to 12.75 GHz, middle channel, vertical polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

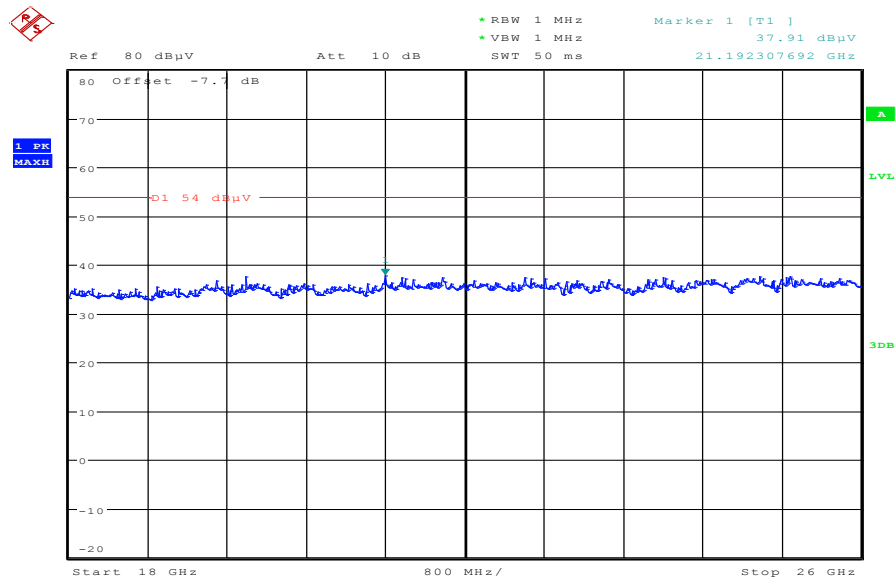
Plot 3: 1 GHz to 12.75 GHz, middle channel, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 4: 12.75 GHz to 18 GHz, middle channel, vertical & horizontal polarization

Date: 24.APR.2011 09:03:02

Plot 5: 18 GHz to 26 GHz, middle channel, vertical & horizontal polarization



Date: 24.APR.2011 09:12:10

Plots: OFDM / n – mode

Note: Customer test plan – EUT settings: MCS0 and power level 18000

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

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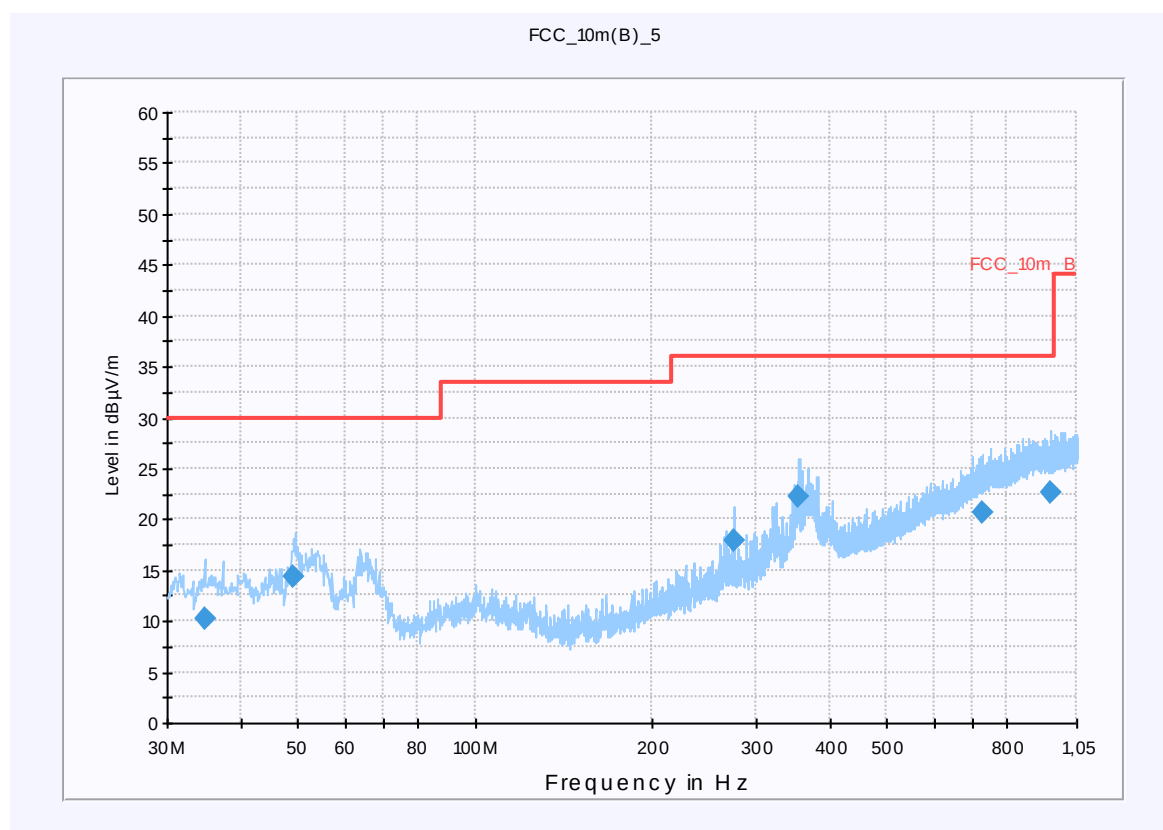
Common Information

EUT: RDD71UW 148 + Captive cable charger Rev4.0
 Serial Number: CER-39234-001 Rev1 11-Apr-11(sample 23) + DW-17957-003
 Test Description: FCC Part 15 C
 Operating Conditions: WLAN g mode gain: 18000, Tx CH:6 MCS0
 Operator Name: LANGER
 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



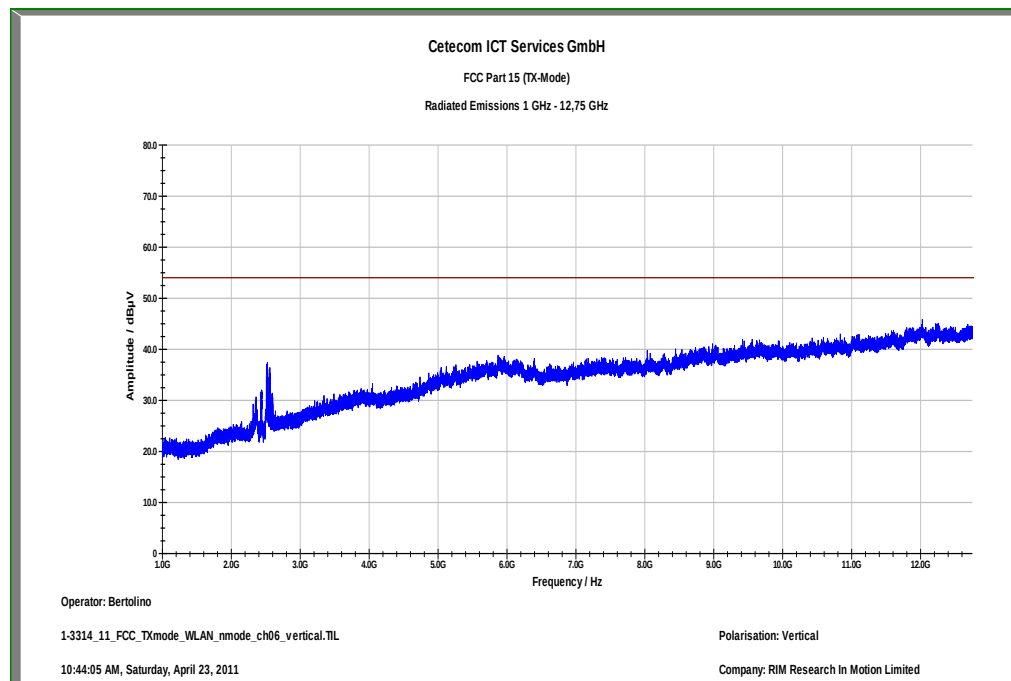
Final Result 1

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
34.680000	10.2	15000.000	120.000	137.0	V	268.0	13.0	19.8	30.0	
49.200000	14.4	15000.000	120.000	98.0	V	-2.0	13.4	15.6	30.0	
274.680000	17.8	15000.000	120.000	98.0	V	298.0	13.9	18.2	36.0	
354.720000	22.3	15000.000	120.000	114.0	V	335.0	16.1	13.7	36.0	
728.880000	20.6	15000.000	120.000	270.0	V	157.0	23.2	15.4	36.0	
946.800000	22.5	15000.000	120.000	270.0	V	335.0	25.3	13.5	36.0	

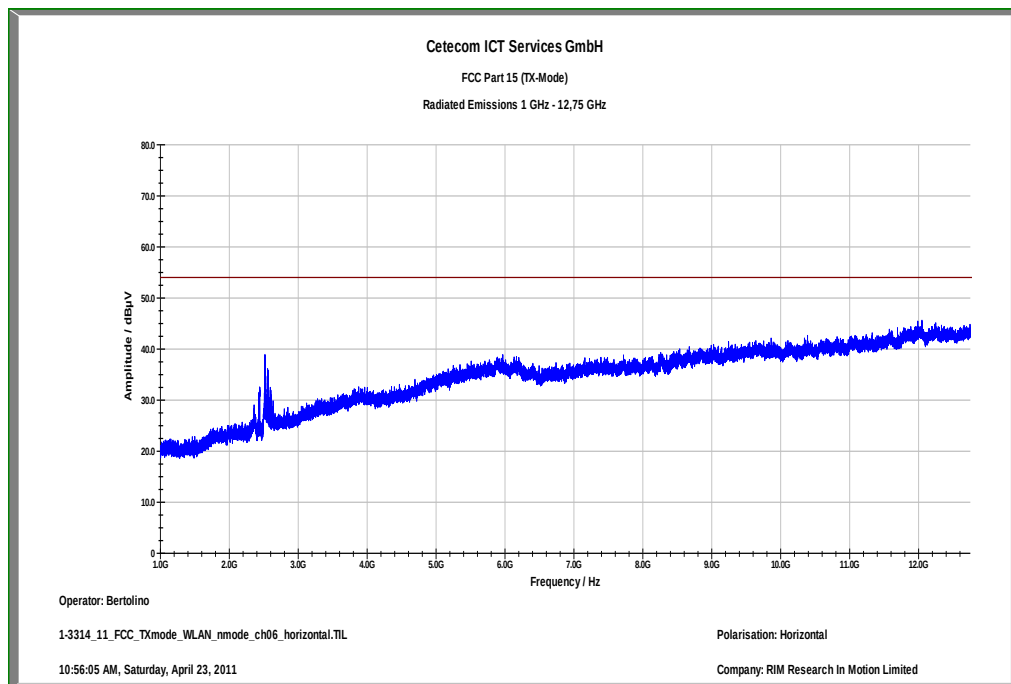
Hardware Setup: EMI radiated\Electric Field (NOS) – [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz – 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
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 (0909)
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

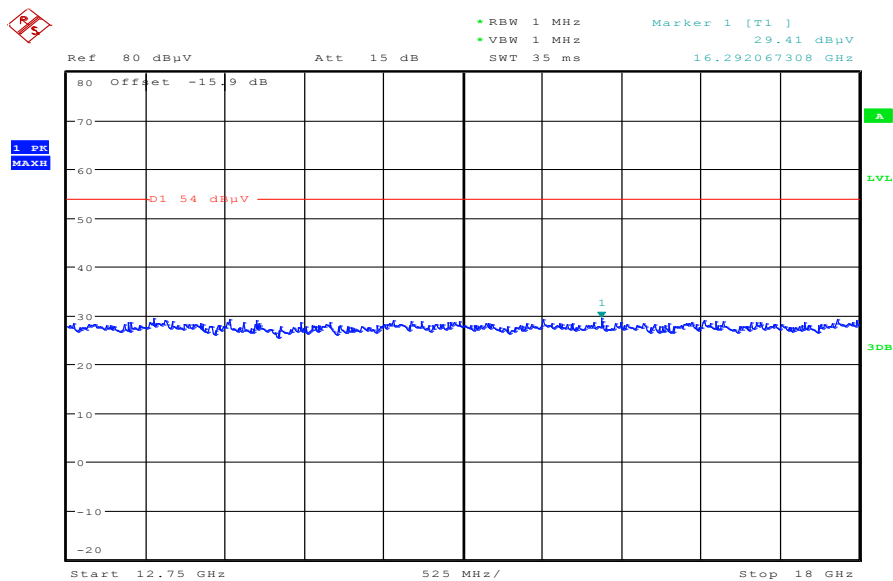
EMC 32 Version 8.10.00

Plot 2: 1 GHz to 12.75 GHz, middle channel, vertical polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

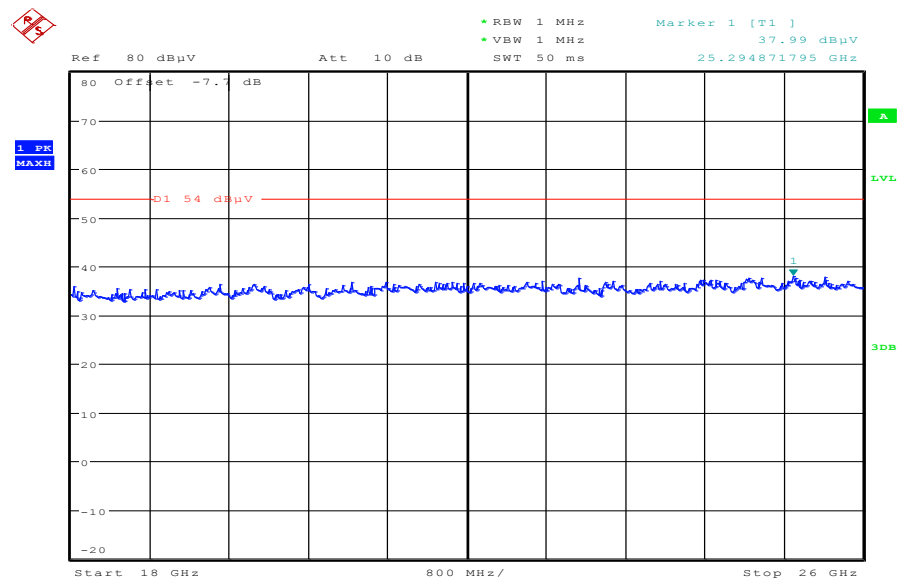
Plot 3: 1 GHz to 12.75 GHz, middle channel, horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 4: 12.75 GHz to 18 GHz, middle channel, vertical & horizontal polarization

Date: 24.APR.2011 09:04:49

Plot 5: 18 GHz to 26 GHz, middle channel, vertical & horizontal polarization



Date: 24.APR.2011 09:09:55

9.3 TX spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz.

Measurement:

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

Limits:

FCC		IC
CFR Part 15.209(a)		RSS 210, Issue 8
TX spurious emissions radiated < 30 MHz		
Frequency (MHz)	Field strength (dBμV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Result: DSSS / b – mode

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

Result: The result of the measurement is passed.

Result: OFDM / g – mode

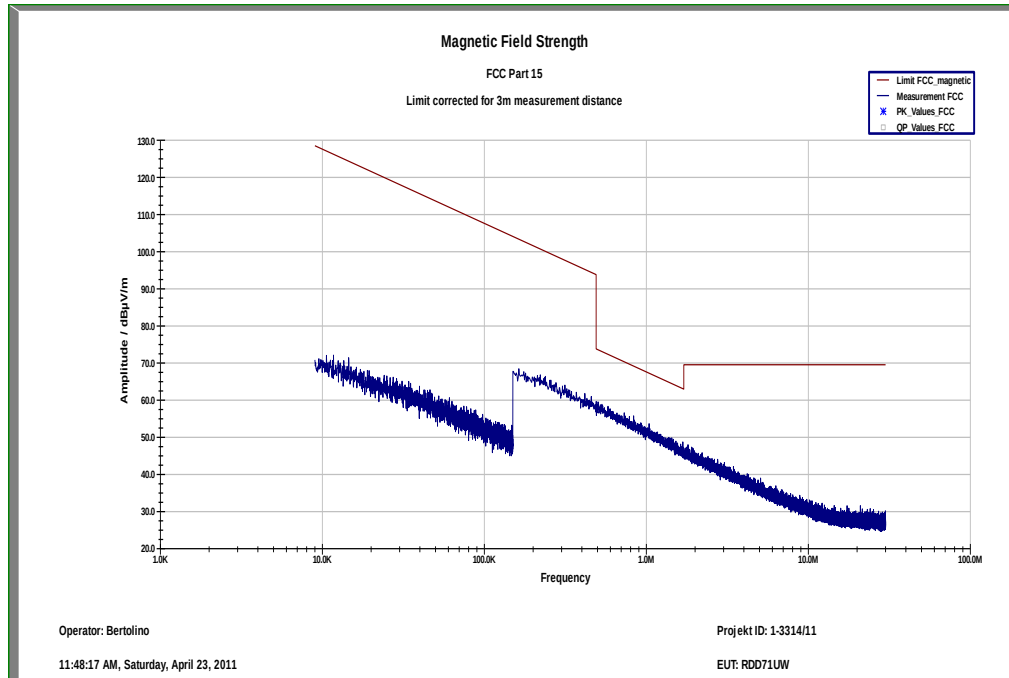
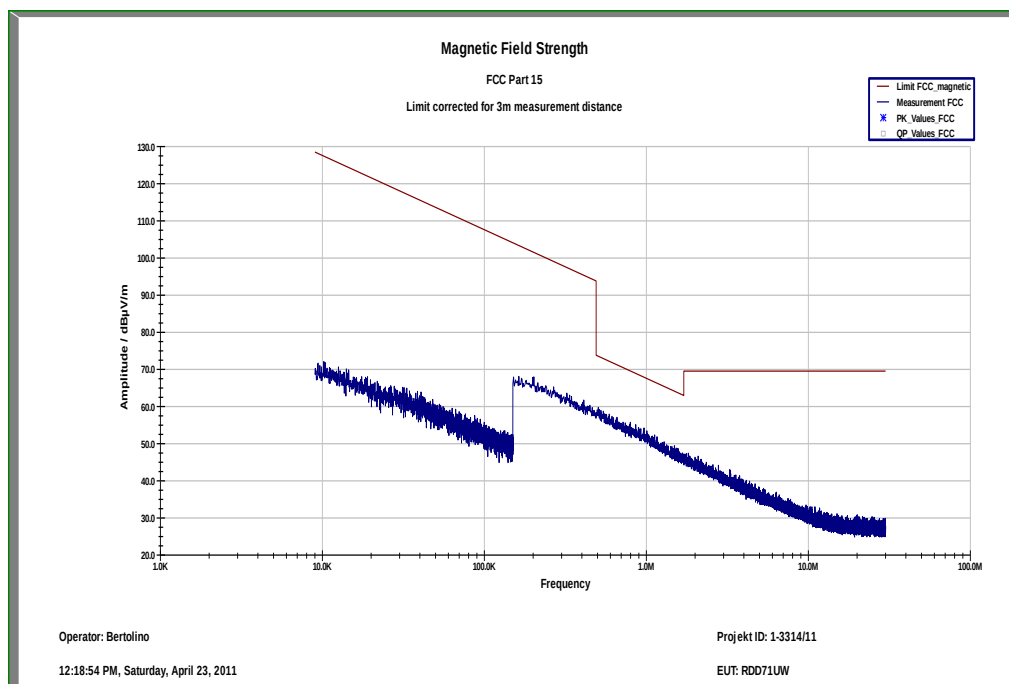
TX spurious emissions radiated < 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
No critical peaks found.		
Measurement uncertainty	± 3 dB	

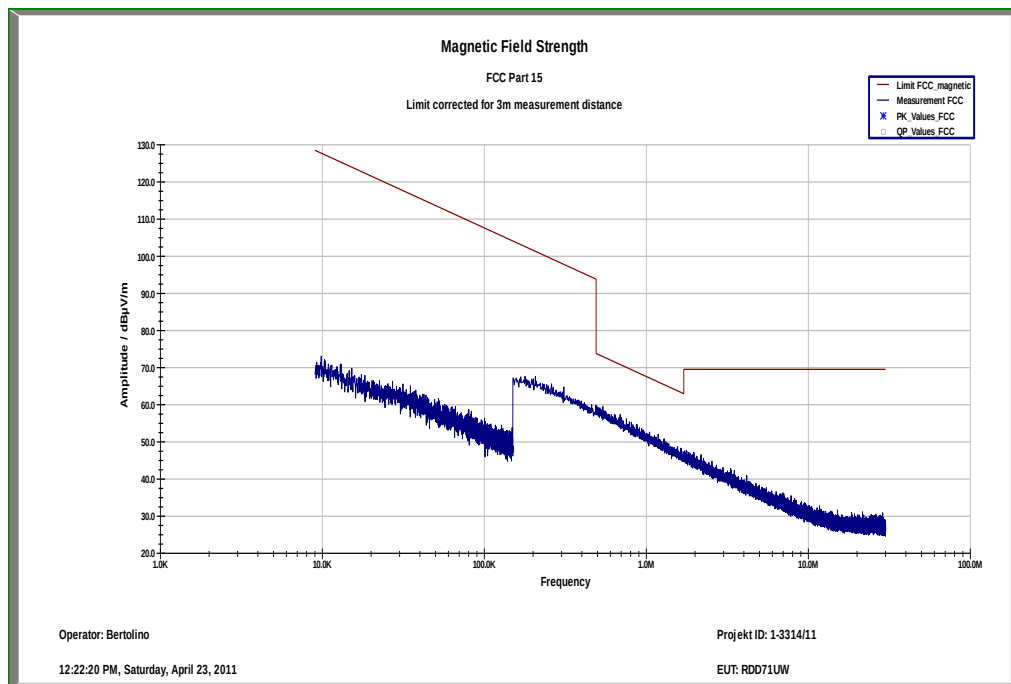
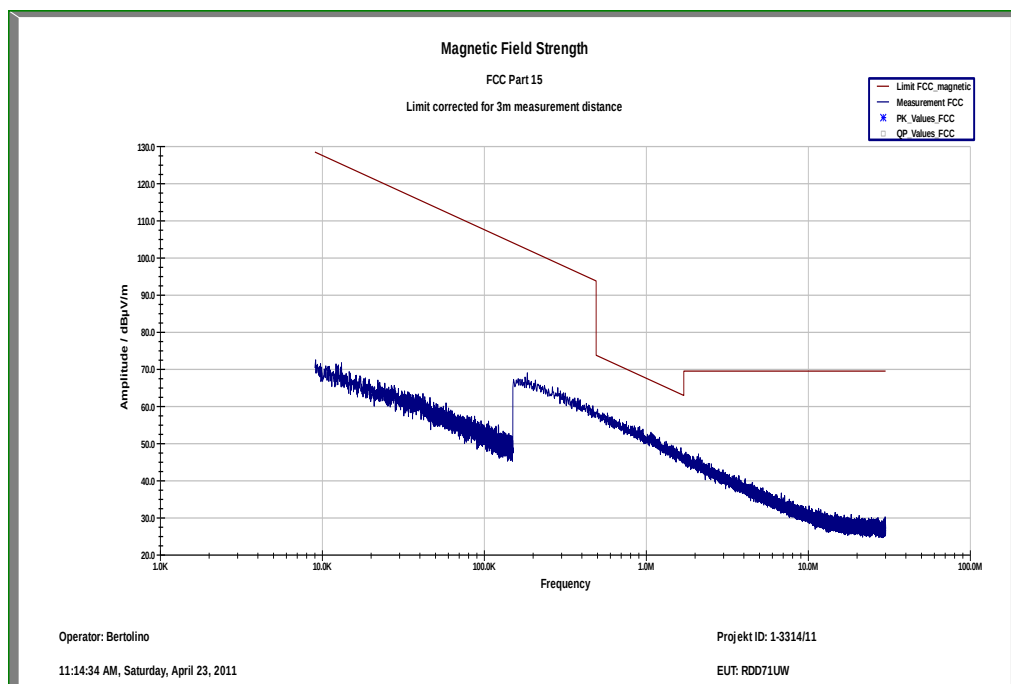
Result: The result of the measurement is passed.

Result: OFDM / n – mode

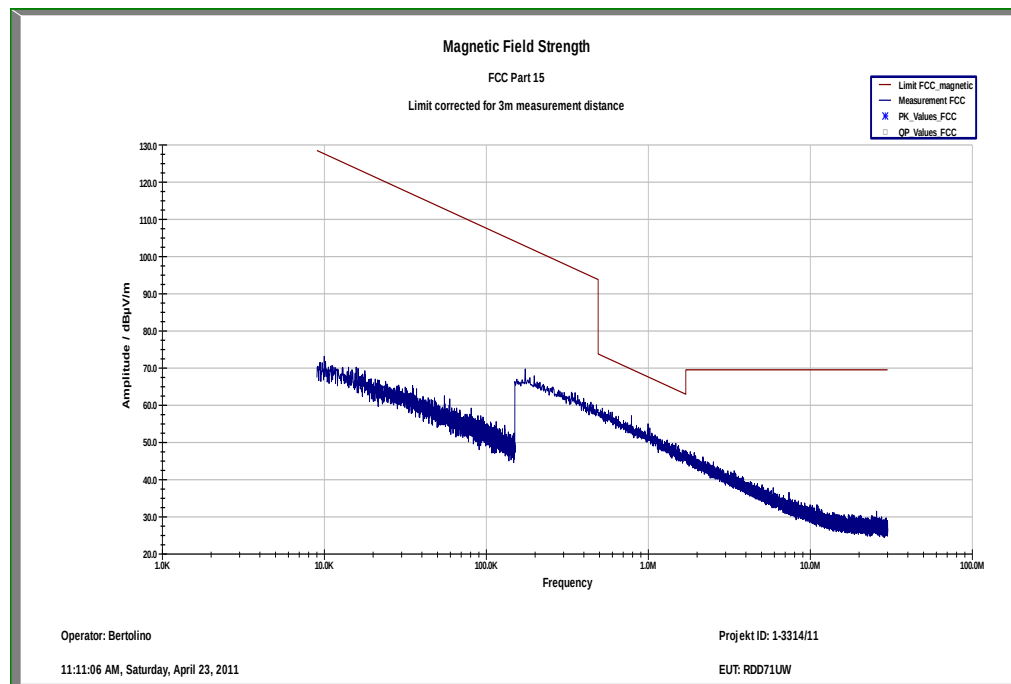
TX spurious emissions radiated < 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
No critical peaks found.		
Measurement uncertainty	± 3 dB	

Result: The result of the measurement is passed.

Plots:**Plot 1:** Lowest channel, DSSS / b – mode, 9 kHz to 30 MHz**Plot 2:** Middle channel, DSSS / b – mode, 9 kHz to 30 MHz

Plot 3: Highest channel, DSSS / b – mode, 9 kHz to 30 MHz**Plot 4:** Middle channel, OFDM / g – mode, 9 kHz to 30 MHz

Plot 5: Middle channel, OFDM / n – mode, 9 kHz to 30 MHz



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	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.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
12	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	05.03.2009	05.09.2011
13	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
14	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
15	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
16	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
17	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
18	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
19	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
20	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
21	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
22	n. a.	PSA Spectrum Analyzer 3 Hz – 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
23	n. a.	RF Filter Section 9kHz – 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vIKI!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband	VULB9163	Schwarzbeck	371	300003854	vIKI!	17.12.2008	17.12.2011

		Test-Antenna 30 MHz – 3 GHz							
25	11b	Microwave System Amplifier, 0.5- 26.5 GHz; 25 dB gain	83017A	HP Meßtechnik	00419	300002268	ev	10.03.2011	
26	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
27	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		
28	n. a.	Spectrum analyser 20 Hz – 50 GHz	FSU50	R&S	200012	300003443	k	2010-07-01	2012-07-01

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	2011-05-23

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