

TEST REPORT

Test report no.: 1-3016-01-25/11



Testing laboratory

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Accredited test laboratory:

The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAkkS 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
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Phone: +1-519-888-7465

Manufacturer

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

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

Test item

Kind of test item: Blackberry GSM Phones
Model name: RDU71CW Rev 1 (until 2011-02-23)
RDU71CW Rev 2 (after 2011-02-23)
Frequency: 5150 – 5350 MHz
5470 – 5825 MHz
Power supply: 3.7V DC by Lithium battery
Temperature range: +22 °C

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test performed:

Stefan Bös

Test report authorised:

Marco Bertolino

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

3 Test standard/s

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

4 Test environment

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

5 Test item

Kind of test item	:	Blackberry GSM Phones
Type identification	:	RDU71CW Rev 1 (until 2011-02-23) RDU71CW Rev 2 (after 2011-02-23)
S/N serial number	:	MEID-HEX A000002587BB8C
HW/ SW hardware status:		PRD- 39474-703 CPR 14791 ASY-39471-001 Rev H POP-39387-003 Rev A
Frequency band [MHz]	:	5150 – 5350 MHz 5470 – 5825 MHz
Type of modulation	:	OFDM technology with QPSK, 16 - & 64 - QAM modulation.
Antenna	:	Integrated antenna
Power supply	:	3.7 V DC by Lithium battery
Temperature range	:	-/-

6 Test laboratories sub-contracted

None

7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2011-07-04	Tests according customer demand

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Results (max.)
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	a-mode / n-mode	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.407(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	a-mode / n-mode	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurement testing

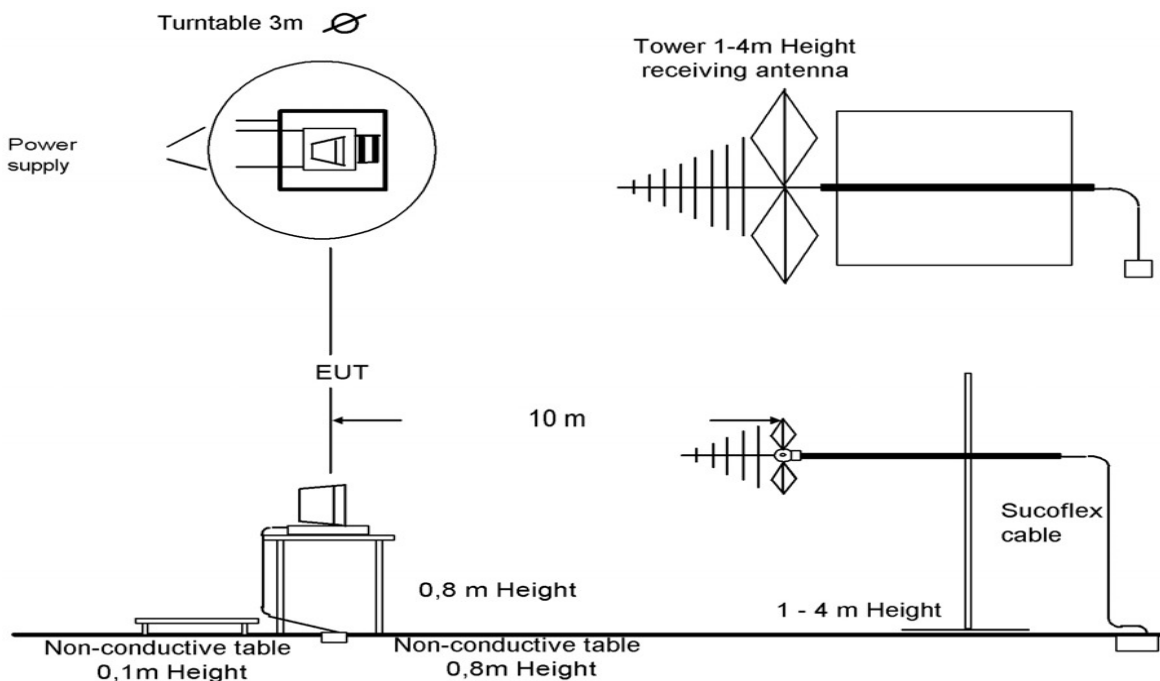
8.1 Description of test setup

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

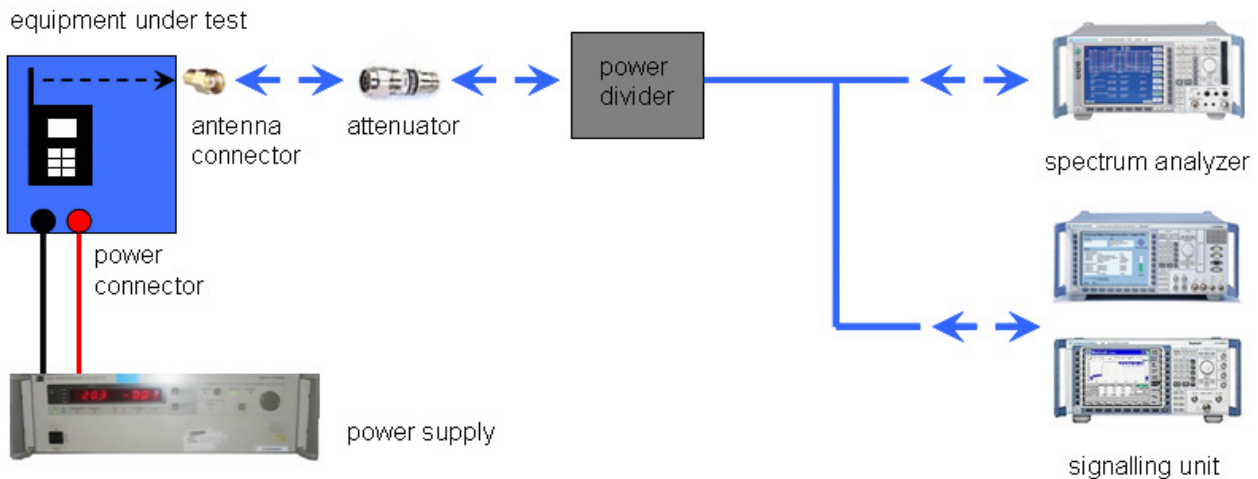


Picture 1: Diagram radiated measurements

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

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: None

Configuration descriptions: TX tests: were performed with a Testmode provided by manufacturer.
RX/Standby tests: Scan enabled, TX Idle

Test mode:

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

9 Measurement results

9.1 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit channel is channel 36, channel 48 and channel 100. The measurement is repeated for all modes. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	10 Hz
Resolution bandwidth:	1 MHz
Span:	4500 – 5180 MHz (channel 36) 5320 – 5460 MHz (channel 64) 5320 – 5500 MHz (channel 100)
Trace-Mode:	Max Hold

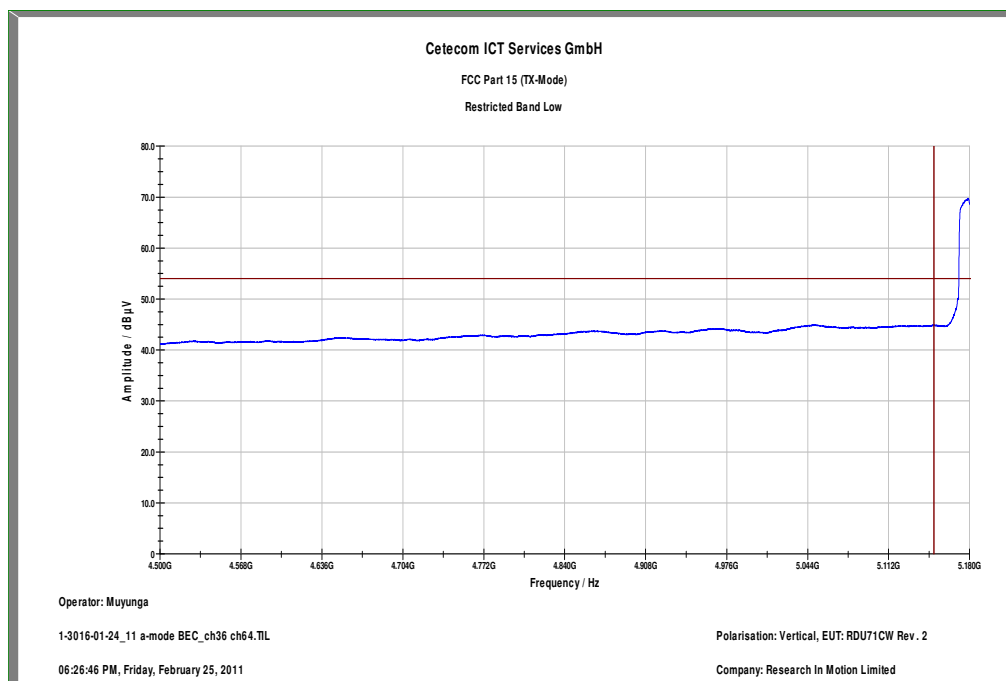
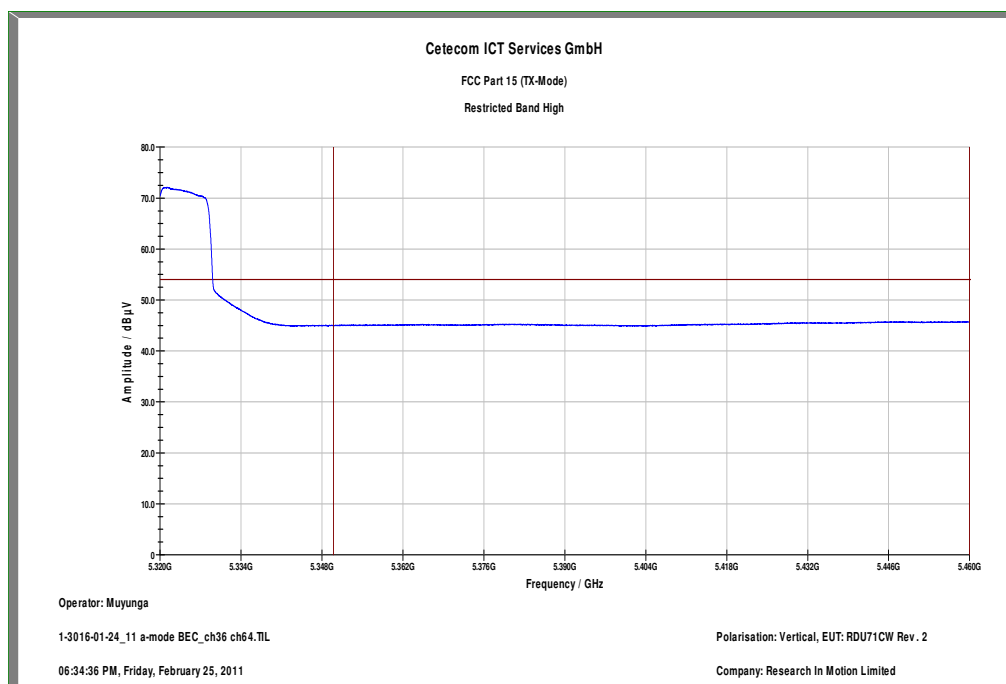
Limits:

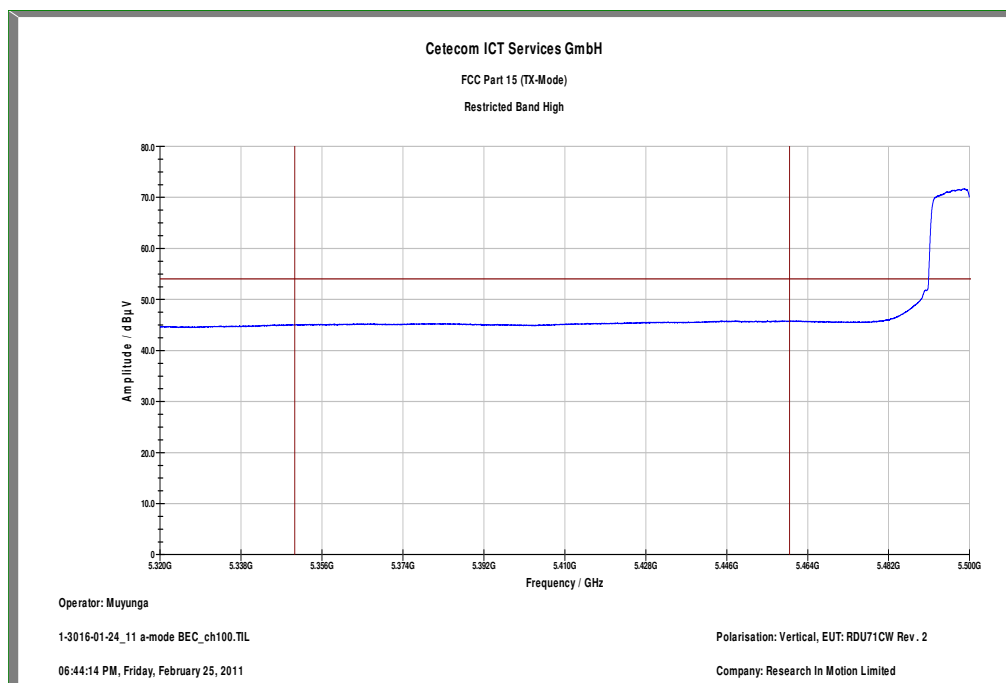
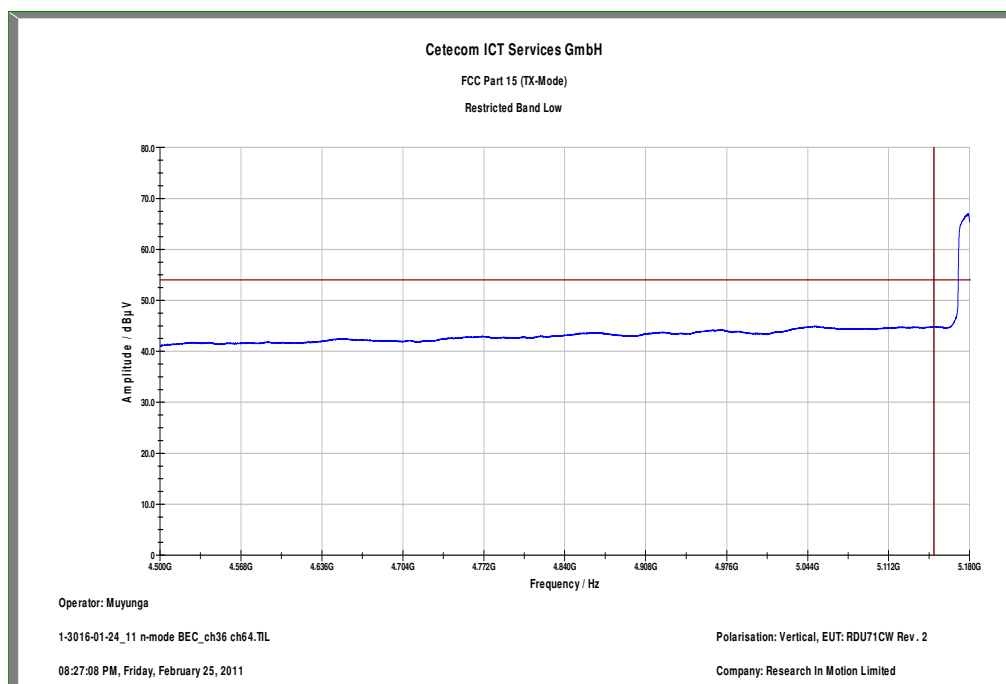
FCC	IC
CFR Part 15.205	RSS 210, Issue 8, A 8.5
Band edge compliance radiated	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 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:

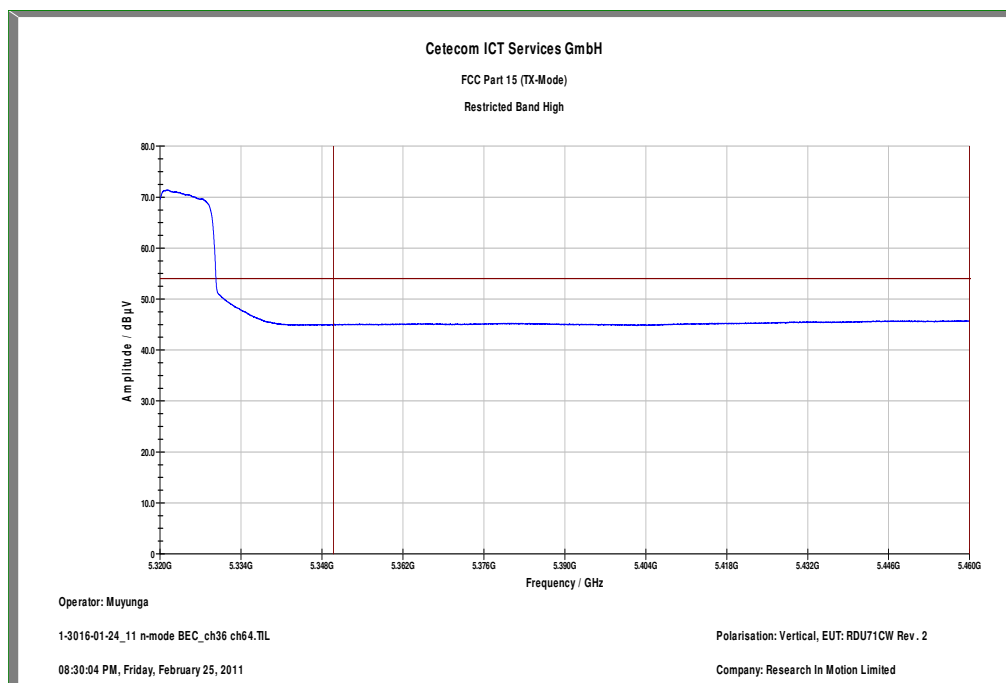
Szenario	Band edge compliance radiated [dB μ V/m]	
	a-mode	n-mode
Modulation		
5150 MHz	< 54 (see plot 1)	< 54 (see plot 4)
5350 MHz	< 54 (see plot 2)	< 54 (see plot 5)
5470 MHz	< 54 (see plot 3)	< 54 (see plot 6)
Measurement uncertainty	± 3 dB	

Result: The result of the measurement is passed.

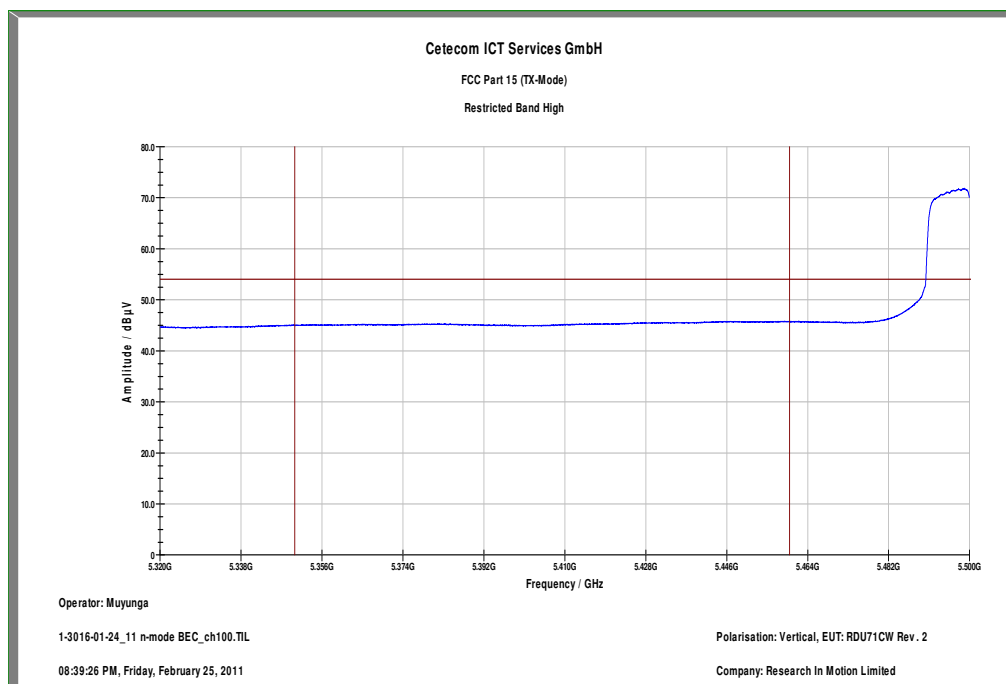
Plot 1: 5150 MHz / a-mode (radiated)**Plot 2: 5350 MHz / a-mode (radiated)**

Plot 3: 5470 MHz / a-mode (radiated)**Plot 4: 5150 MHz / n-mode (radiated)**

Plot 5: 5350 MHz / n-mode (radiated)



Plot 6: 5470 MHz / n-mode (radiated)



9.2 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	9 kHz to 40 GHz
Trace-Mode:	Max Hold
Measured Modulation:	☒ a-mode ☒ n-mode

Limits:

FCC	IC
CFR Part 15.407(d) CFR Part 15.209	RSS 210, Issue 8, A 8.5
TX spurious emissions radiated	
For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. For frequencies below 1 GHz and frequencies which fall in the restricted bands according to §15.209 the limit is 54 dBμV/m.	

The limit of §15.209 is the most strictly limit for spurious emissions. Therefore the measurements show also compliance to the limit of §15.407 if no critical peaks were found.

Result: Also see plots

TX spurious emissions radiated [dB μ V/m]								
Channel 36 / a-mode			Channel 48 / a-mode			Channel 64 / a-mode		
F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			± 3 dB					

TX spurious emissions radiated [dB μ V/m]								
Channel 100 / a-mode			Channel 120 / a-mode			Channel 140 / a-mode		
F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			Measurement uncertainty					

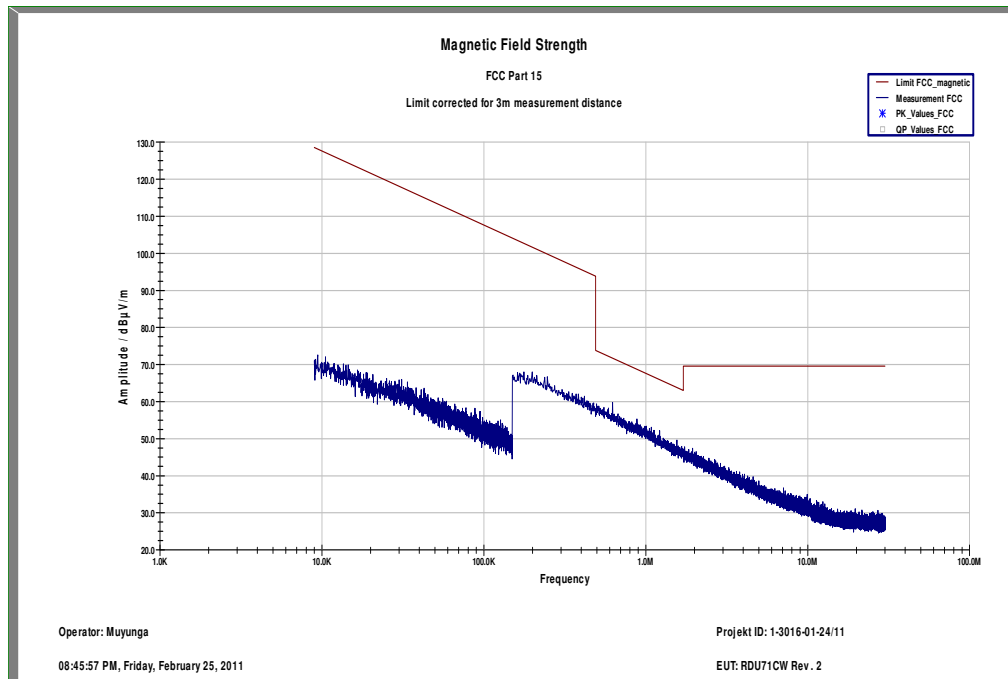
TX spurious emissions radiated [dB μ V/m]								
Channel 149 / a-mode			Channel 157 / a-mode			Channel 48 / n-mode		
F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]
5.28	1000	47.6 (PK)	5.31	1000	48.2 (PK)	No critical peaks found		
Measurement uncertainty			Measurement uncertainty					

TX spurious emissions radiated [dB μ V/m]								
Channel 52 / n-mode			Channel 120 / n-mode			Channel 157 / n-mode		
F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]	F [MHz]	BW [kHz]	Level [dB μ V]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			Measurement uncertainty					

The limit of §15.209 is the most strictly limit for spurious emissions. Therefore the measurements show also compliance to the limit of §15.407 if no critical peaks were found.

Result: The result of the measurement is passed.

Plot 1: 9 kHz to 30 MHz / channel 64 (vertical /horizontal), a-mode (valid for all channels)



Plot 2: 30 MHz to 1 GHz / channel 36 (vertical /horizontal), a-mode**Common Information**

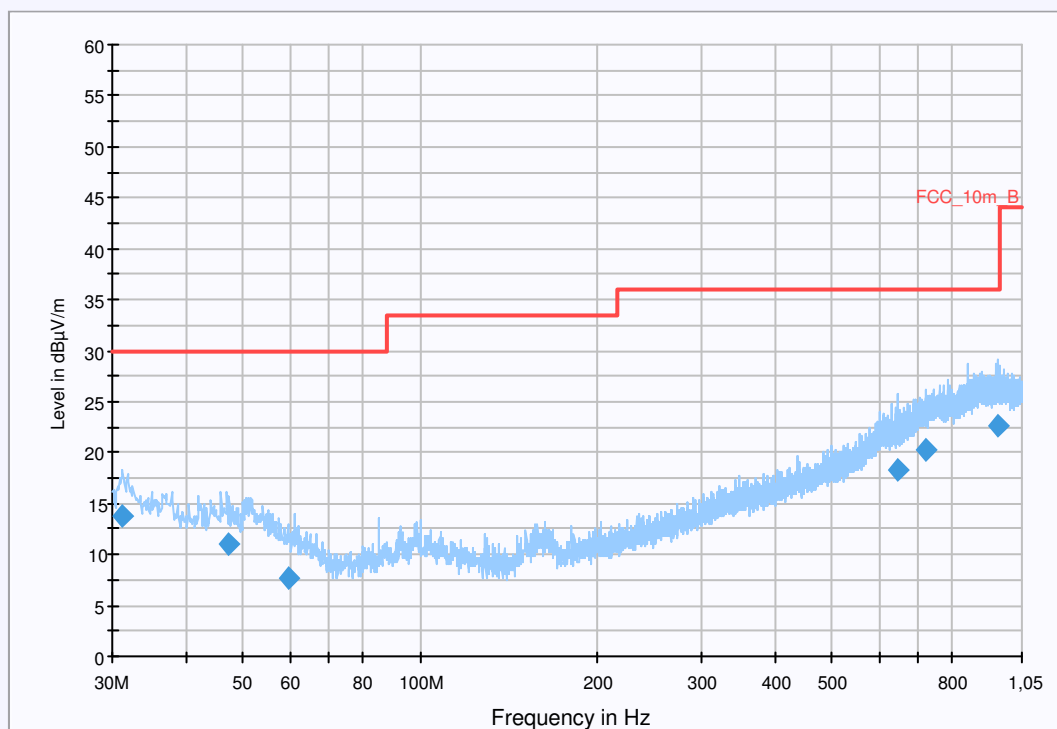
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 36 a ; charging
 Operator Name: Kraus
 Comment: Power 115V/ 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

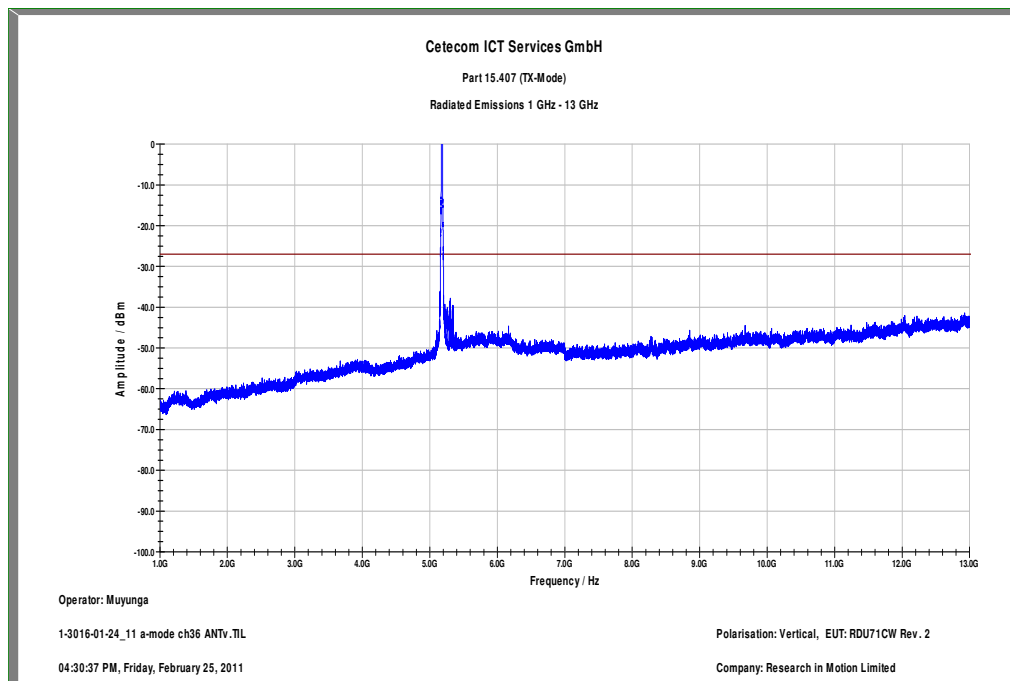
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

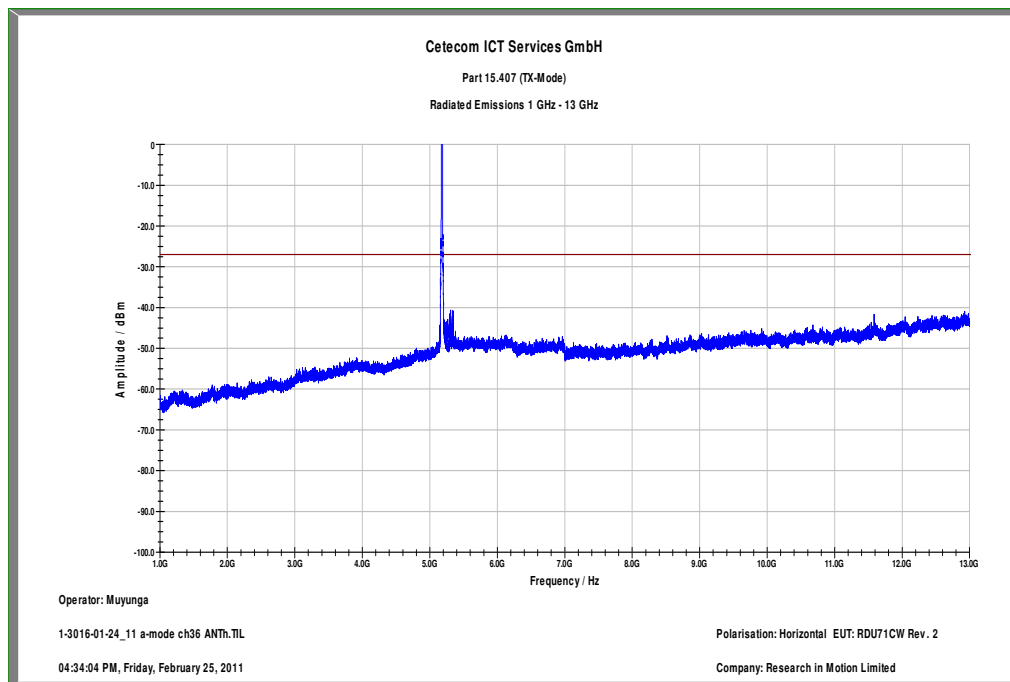
**Final Result 1**

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
31.320000	13.8	15000.000	120.000	98.0	V	-2.0	12.6	16.2	30.0	
47.400000	11.0	15000.000	120.000	98.0	V	302.0	13.3	19.0	30.0	
59.640000	7.8	15000.000	120.000	116.0	V	327.0	11.7	22.2	30.0	
647.160000	18.4	15000.000	120.000	270.0	H	240.0	21.1	17.6	36.0	
719.400000	20.3	15000.000	120.000	260.0	H	75.0	23.0	15.7	36.0	
954.960000	22.6	15000.000	120.000	270.0	H	302.0	25.4	13.4	36.0	

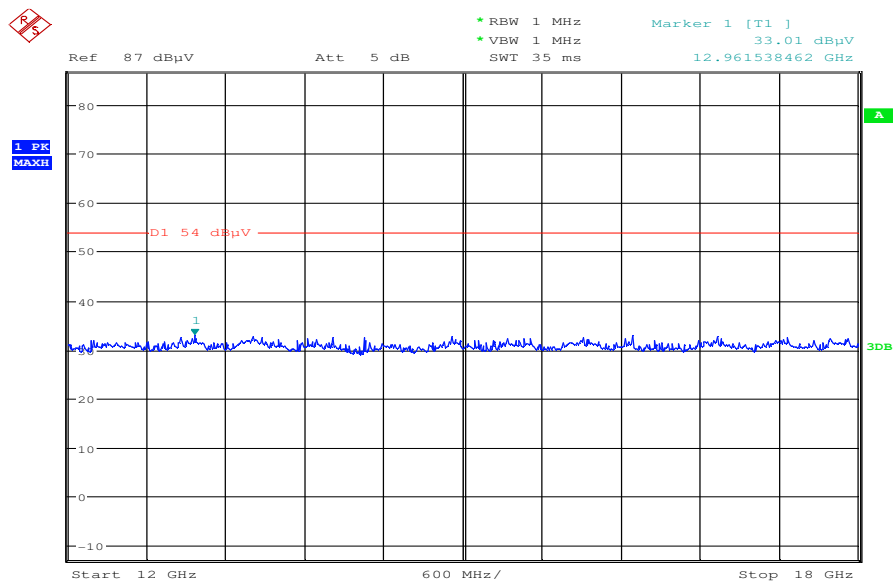
Plot 3: 1 GHz to 12.75 GHz / channel 36 (vertical), a-mode



Plot 4: 1 GHz to 12.75 GHz / channel 36 (horizontal), a-mode

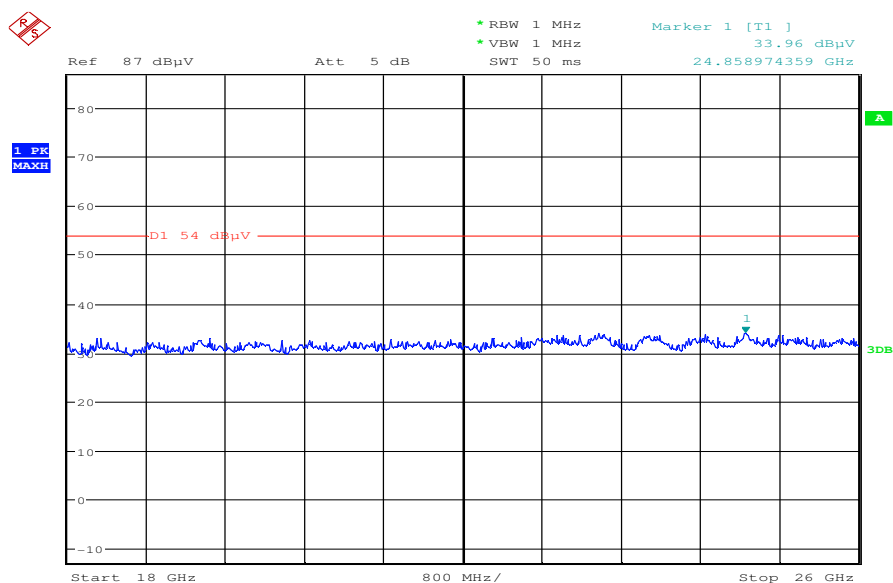


Plot 5: 12 GHz to 18 GHz / channel 36 (horizontal/vertical), a-mode



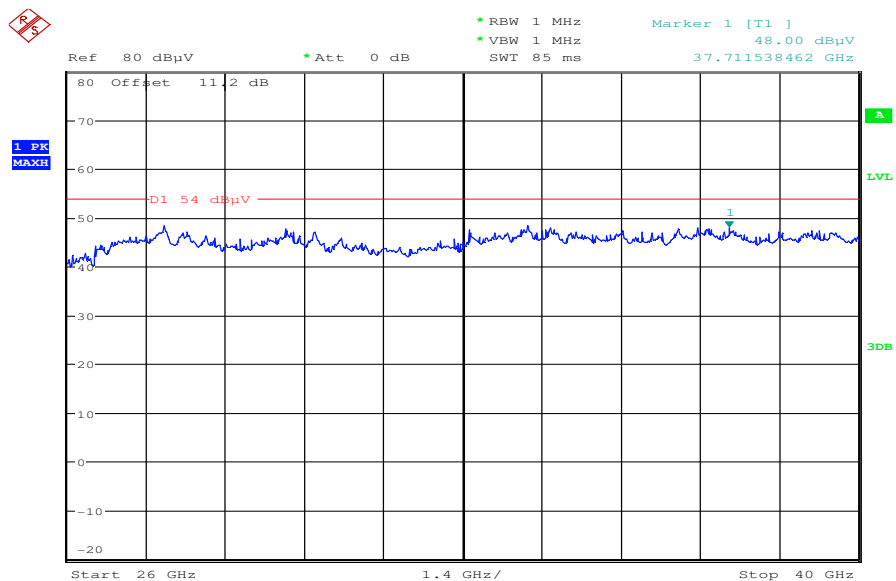
Date: 2.MAR.2011 17:38:13

Plot 6: 18 GHz to 26 GHz / channel 36 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:49:42

Plot 7: 26 GHz to 40 GHz / channel 36 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:59:57

Plot 8: 30 MHz to 1 GHz / channel 48 (vertical/ horizontal), a-mode**Common Information**

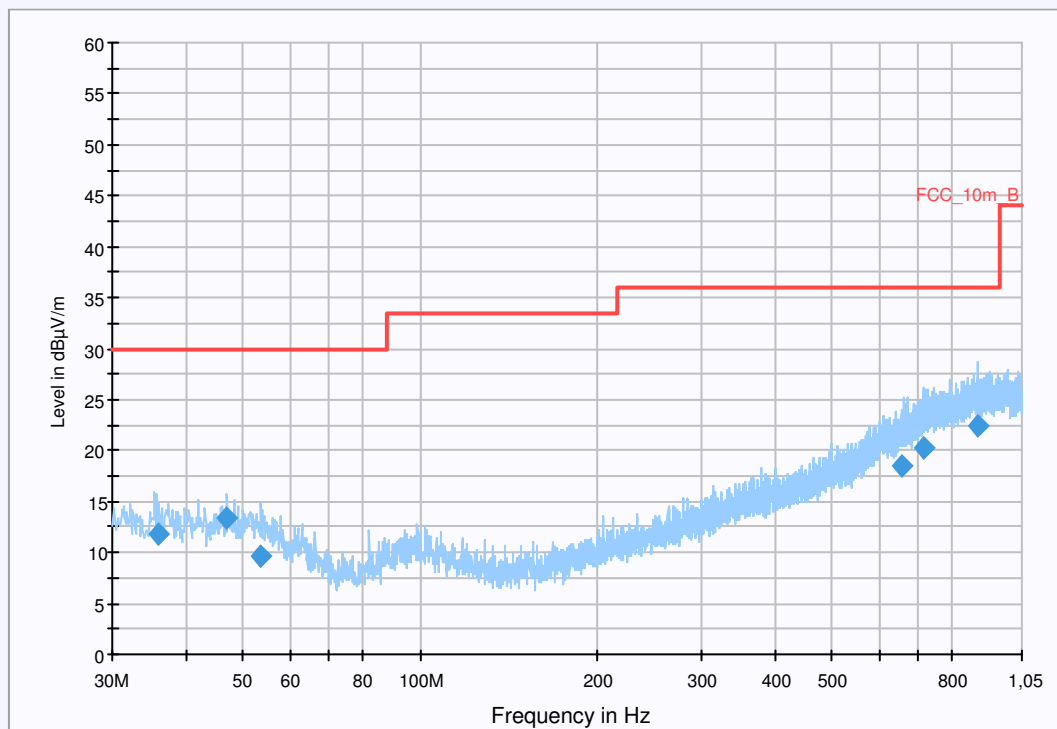
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 48 a ; charging
 Operator Name: Kraus
 Comment: Power 115V/ 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

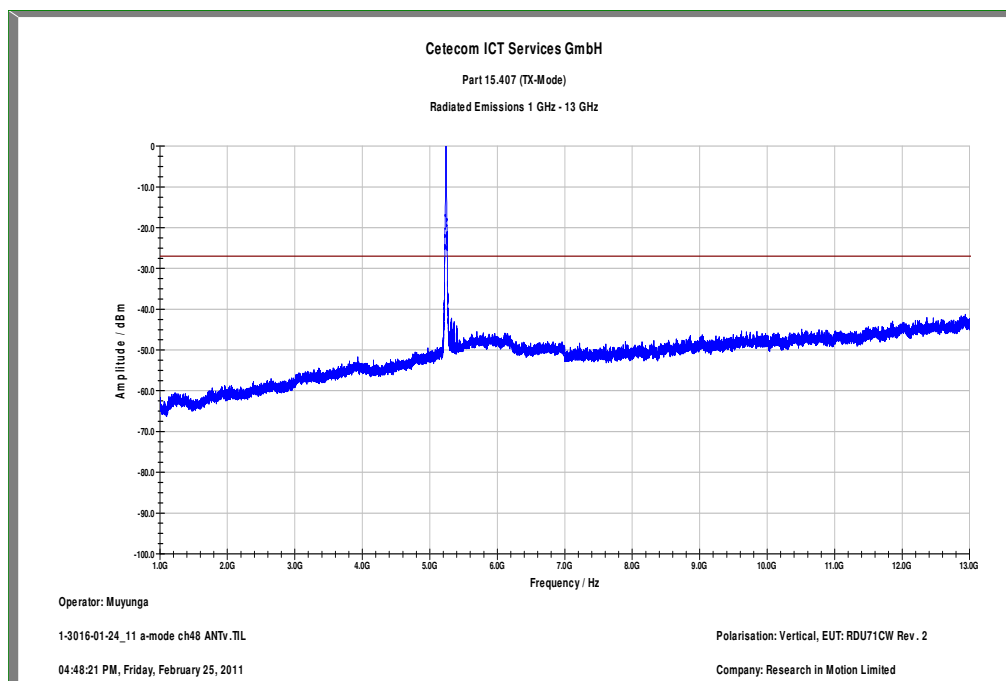
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

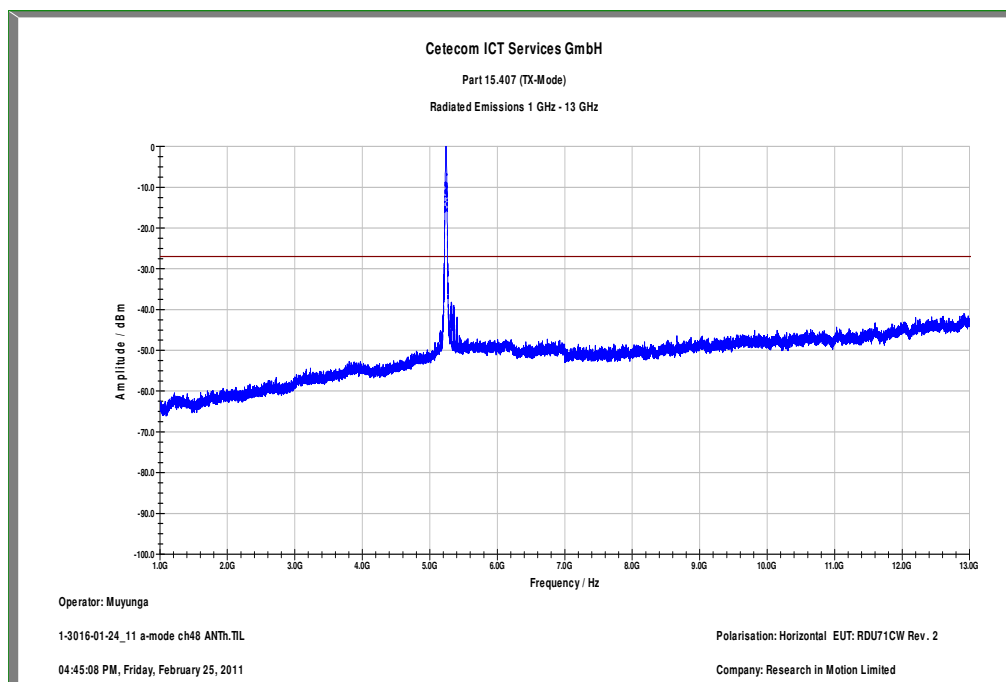
**Final Result 1**

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
36.000000	11.8	15000.000	120.000	234.0	V	185.0	13.1	18.2	30.0	
47.040000	13.5	15000.000	120.000	134.0	V	14.0	13.3	16.5	30.0	
53.640000	9.6	15000.000	120.000	270.0	V	318.0	13.0	20.4	30.0	
654.360000	18.5	15000.000	120.000	270.0	H	69.0	21.2	17.5	36.0	
713.880000	20.3	15000.000	120.000	270.0	V	335.0	22.8	15.7	36.0	
887.160000	22.4	15000.000	120.000	270.0	H	59.0	25.0	13.6	36.0	

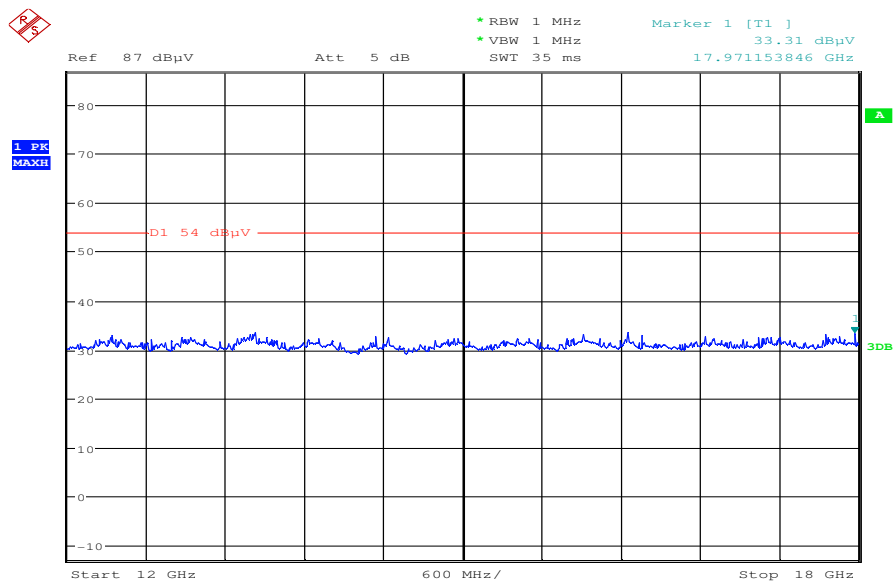
Plot 9: 1 GHz to 12.75 GHz / channel 48 (vertical), a-mode



Plot 10: 1 GHz to 12.75 GHz / channel 48 (horizontal), a-mode

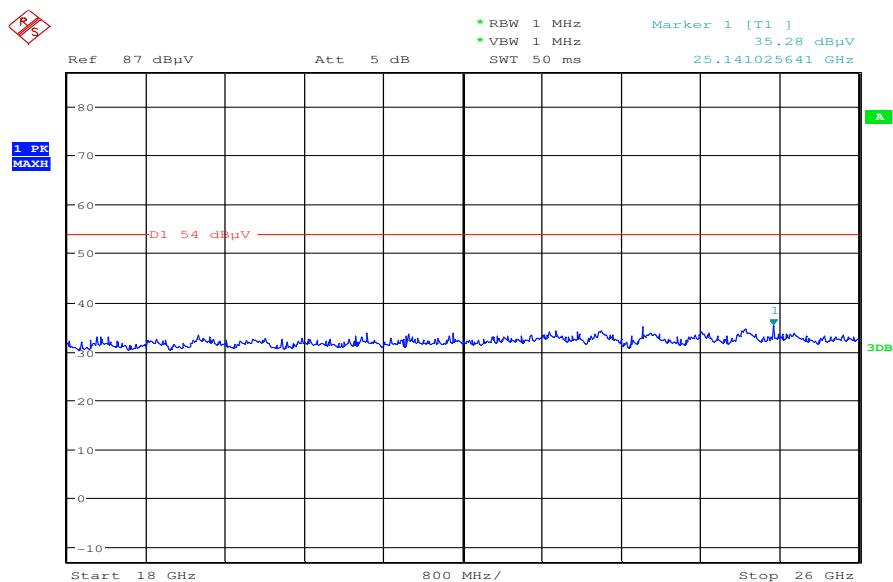


Plot 11: 12 GHz to 18 GHz / channel 48 (horizontal/vertical), a-mode



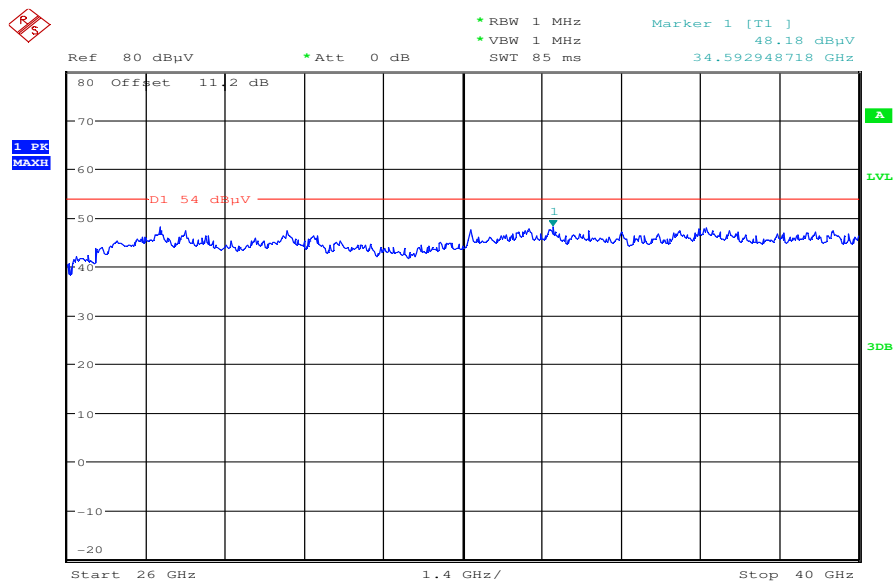
Date: 2.MAR.2011 17:40:20

Plot 12: 18 GHz to 26 GHz / channel 48 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:50:25

Plot 13: 26 GHz to 40 GHz / channel 48 (horizontal/vertical), a-mode



Date: 2.MAR.2011 18:00:48

Plot 14: 30 MHz to 1 GHz / channel 64 (vertical/horizontal), a-mode**Common Information**

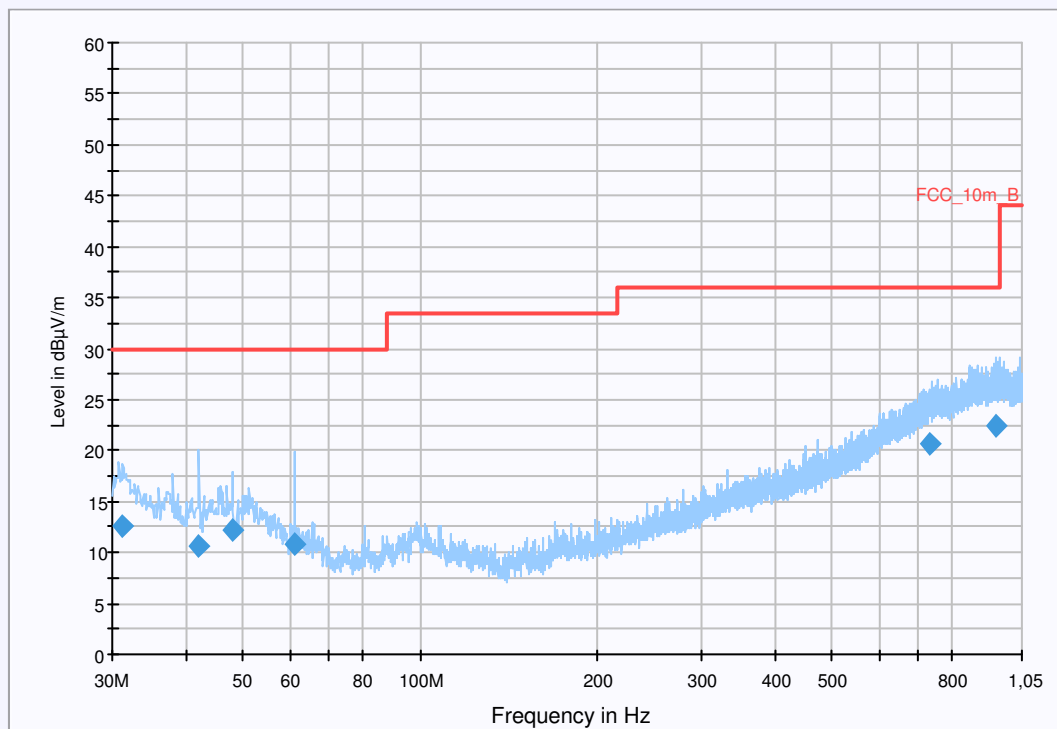
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 64 a ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

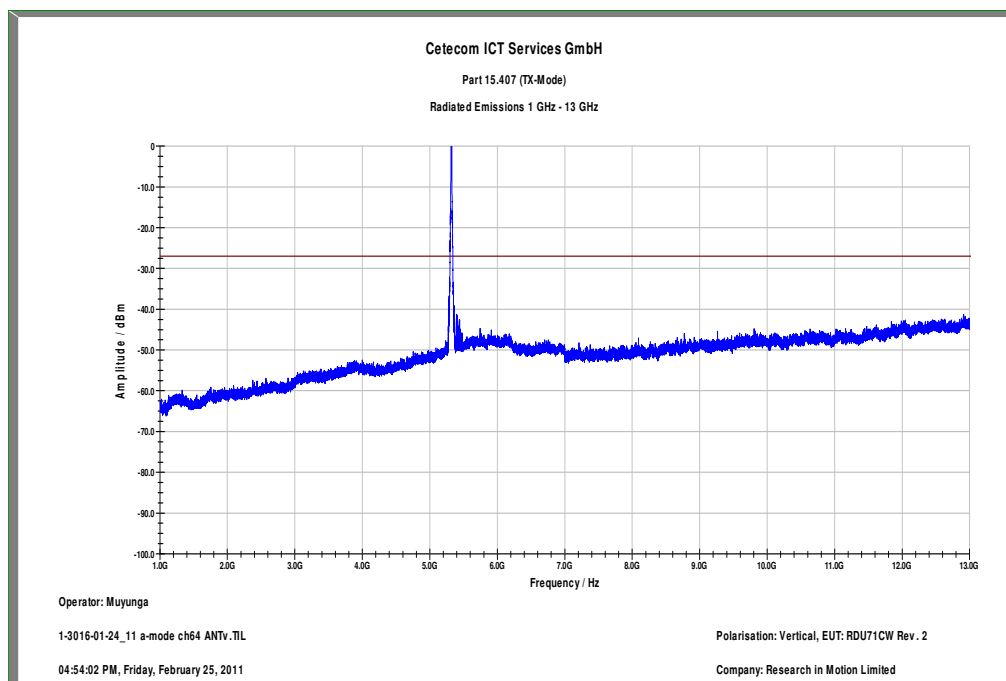
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

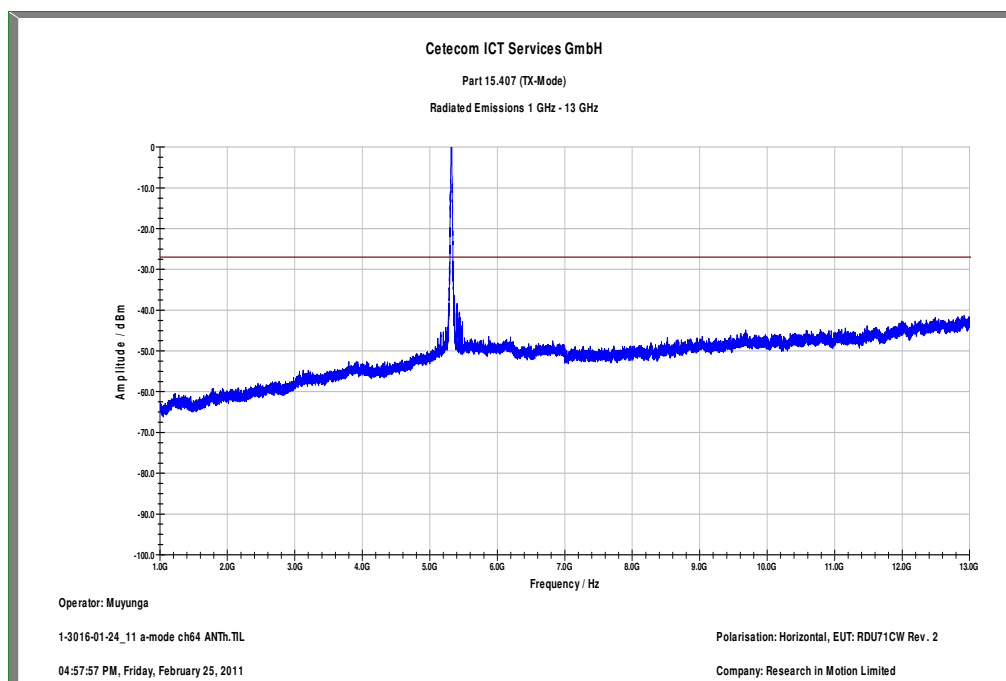
**Final Result 1**

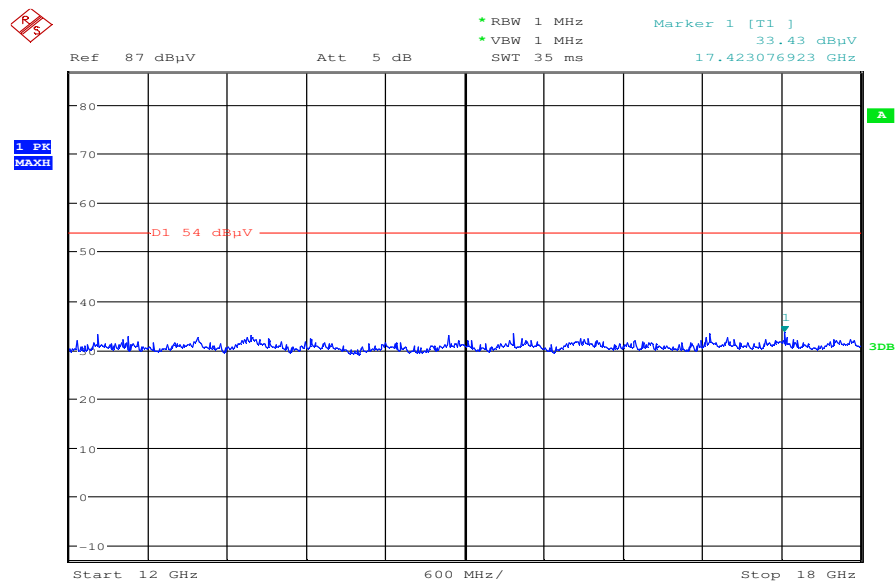
Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
31.320000	12.5	15000.000	120.000	230.0	V	159.0	12.6	17.5	30.0	
42.120000	10.6	15000.000	120.000	140.0	V	159.0	13.4	19.4	30.0	
48.000000	12.2	15000.000	120.000	269.0	V	287.0	13.3	17.8	30.0	
61.200000	10.9	15000.000	120.000	98.0	V	178.0	11.3	19.1	30.0	
732.480000	20.7	15000.000	120.000	119.0	V	-2.0	23.3	15.3	36.0	
949.080000	22.5	15000.000	120.000	269.0	H	81.0	25.3	13.5	36.0	

Plot 15: 1 GHz to 12.75 GHz / channel 64 (vertical), a-mode

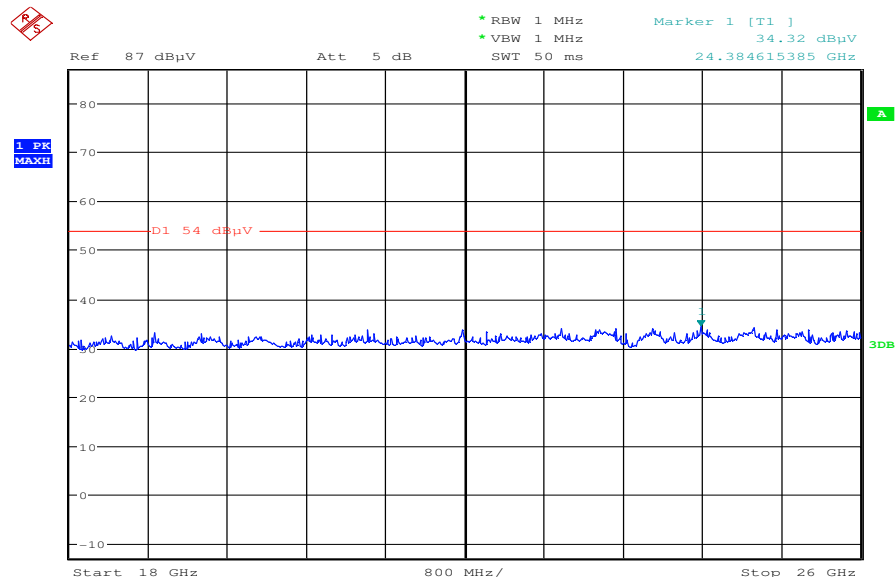


Plot 16: 1 GHz to 12.75 GHz / channel 64 (horizontal), a-mode



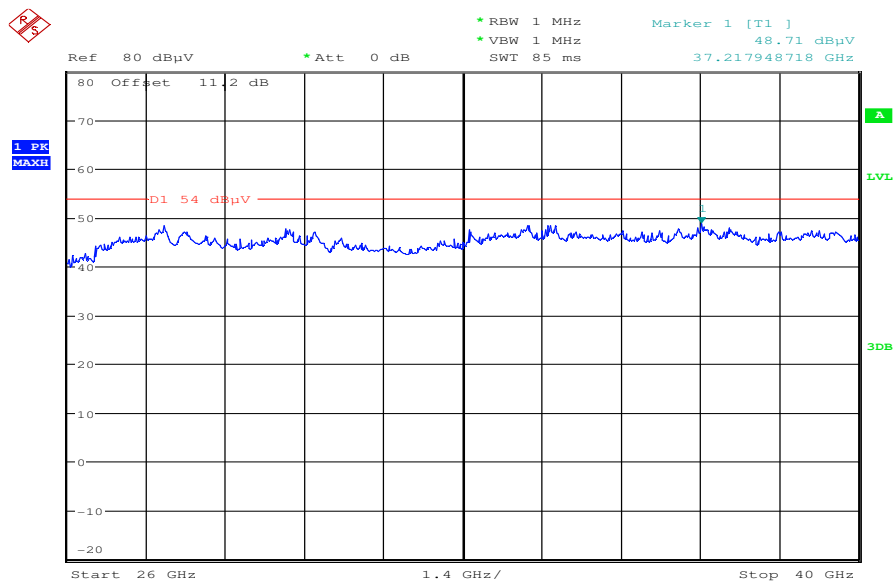
Plot 17: 12 GHz to 18 GHz / channel 64 (horizontal/vertical), a-mode

Date: 2.MAR.2011 17:41:23

Plot 18: 18 GHz to 26 GHz / channel 64 (horizontal/vertical), a-mode

Date: 2.MAR.2011 17:50:54

Plot 19: 26 GHz to 40 GHz / channel 64 (horizontal/vertical), a-mode



Date: 2.MAR.2011 18:00:18

Plot 20: 30 MHz to 1 GHz / channel 100 (vertical/ horizontal), a-mode**Common Information**

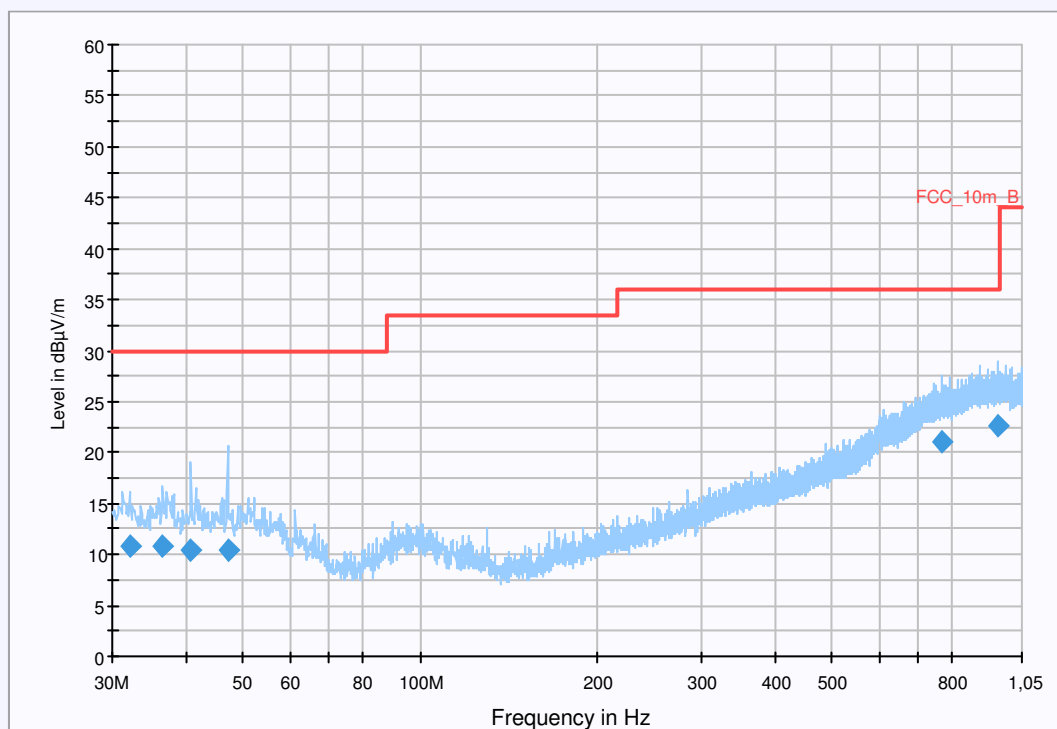
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 100 a ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

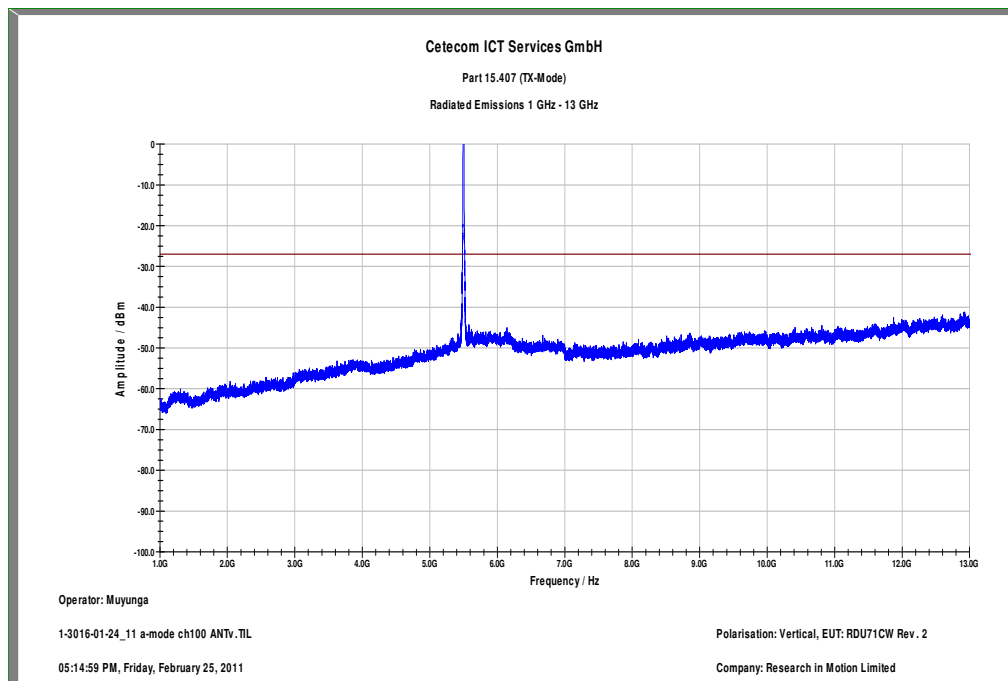
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

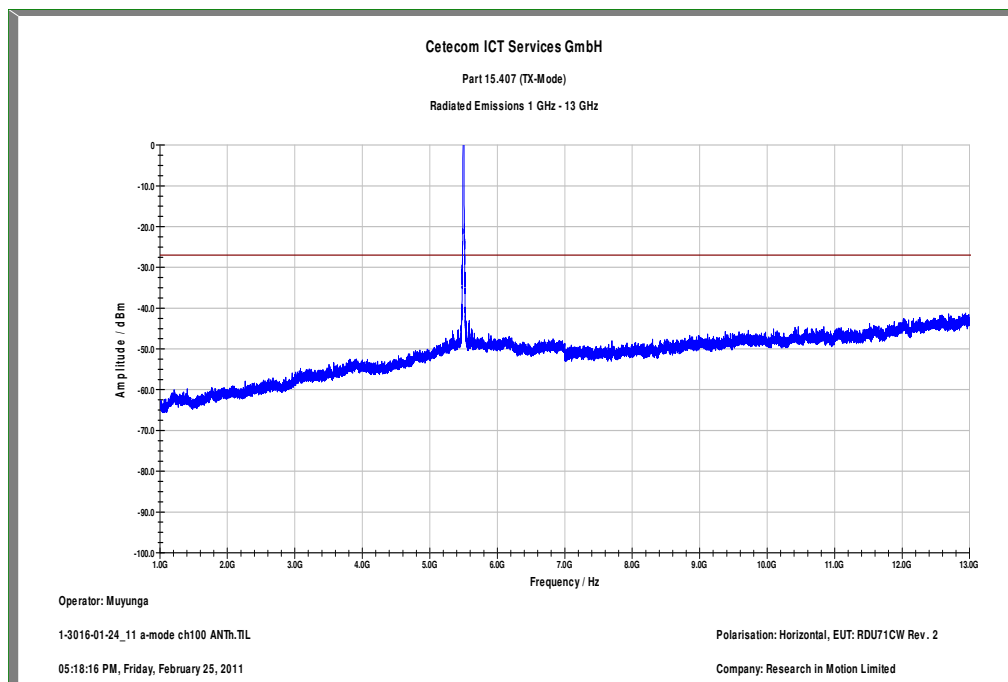
**Final Result 1**

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
32.160000	10.9	15000.000	120.000	124.0	V	109.0	12.7	19.2	30.0	
36.600000	10.8	15000.000	120.000	98.0	V	325.0	13.2	19.2	30.0	
40.800000	10.3	15000.000	120.000	238.0	V	176.0	13.4	19.7	30.0	
47.160000	10.5	15000.000	120.000	270.0	V	225.0	13.3	19.5	30.0	
765.000000	21.0	15000.000	120.000	270.0	V	184.0	23.7	15.0	36.0	
958.440000	22.7	15000.000	120.000	261.0	H	342.0	25.4	13.3	36.0	

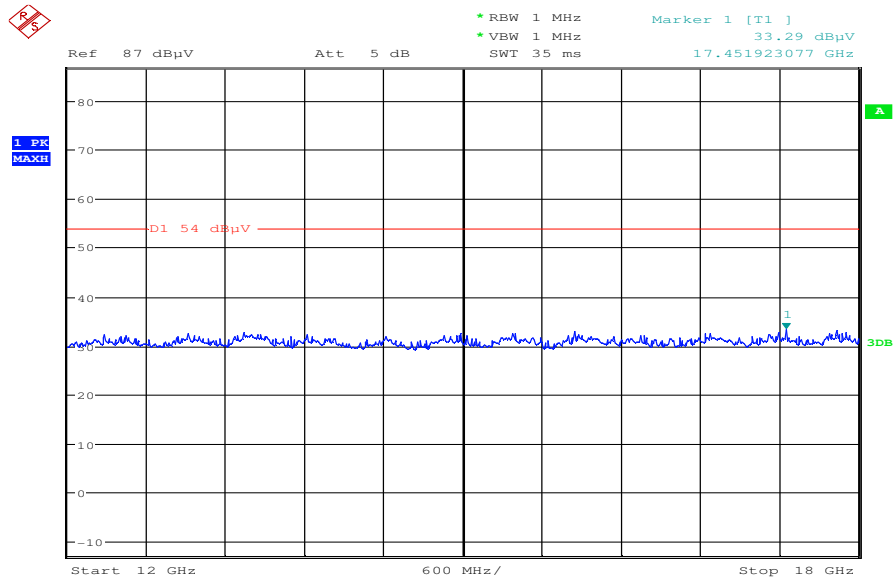
Plot 21: 1 GHz to 12.75 GHz / channel 100 (vertical), a-mode



Plot 22: 1 GHz to 12.75 GHz / channel 100 (horizontal), a-mode

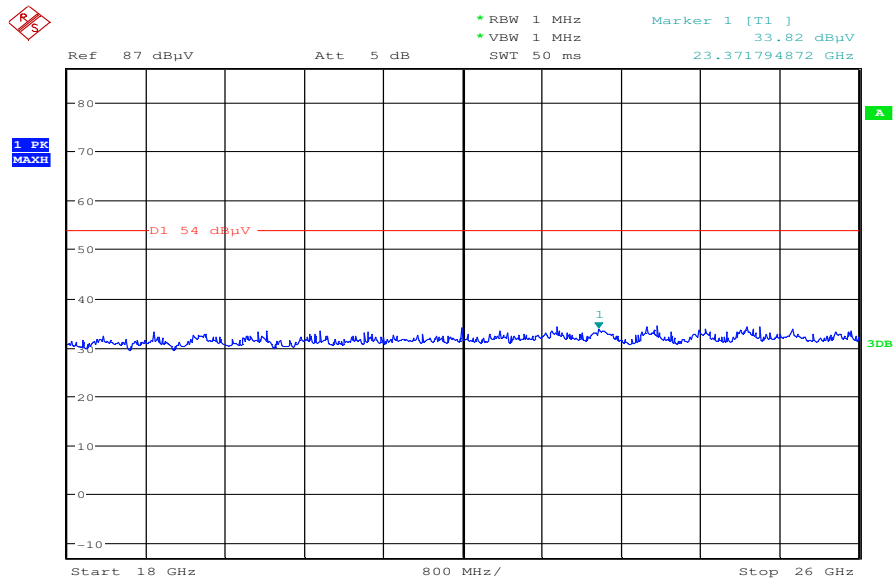


Plot 23: 12 GHz to 18 GHz / channel 100 (horizontal/vertical), a-mode



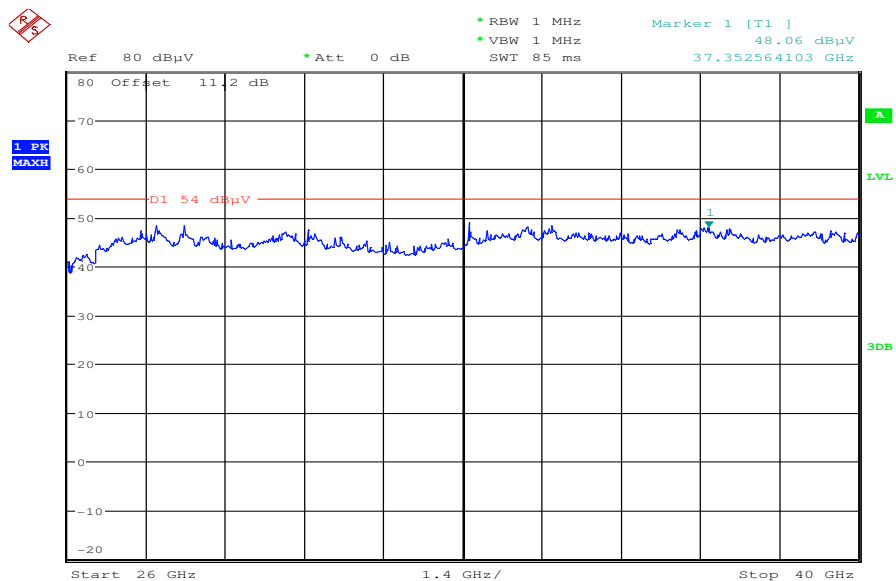
Date: 2.MAR.2011 17:42:35

Plot 24: 18 GHz to 26 GHz / channel 100 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:46:30

Plot 25: 26 GHz to 40 GHz / channel 100 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:55:28

Plot 26: 30 MHz to 1 GHz / channel 120 (vertical/ horizontal), a-mode**Common Information**

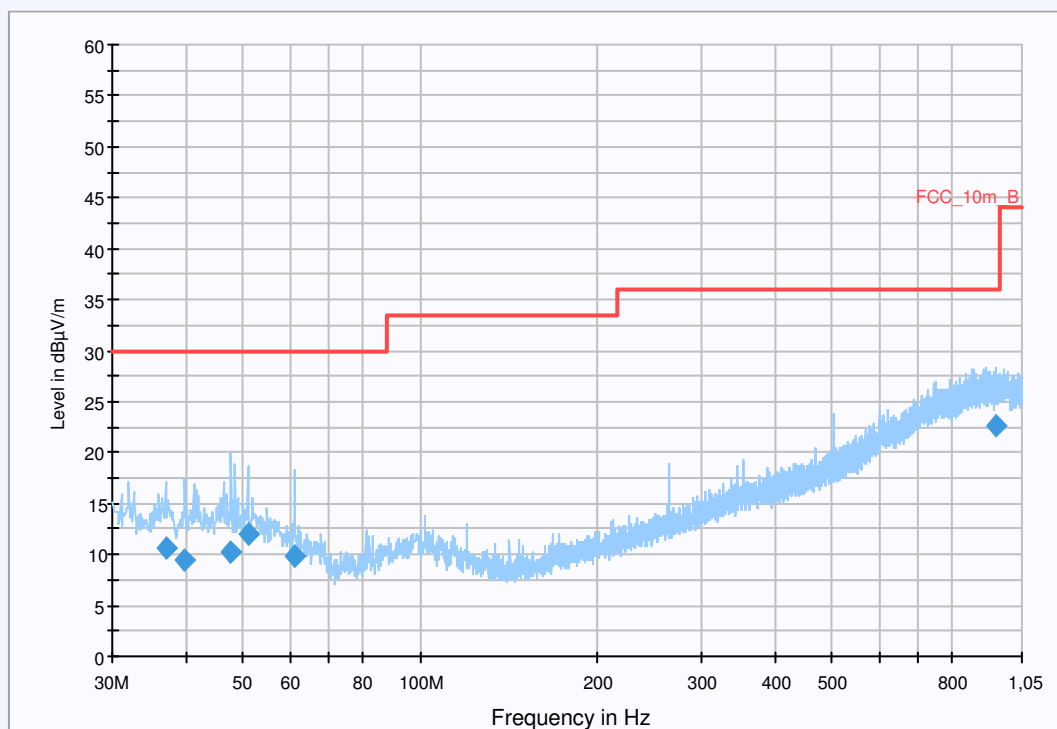
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 120 a ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

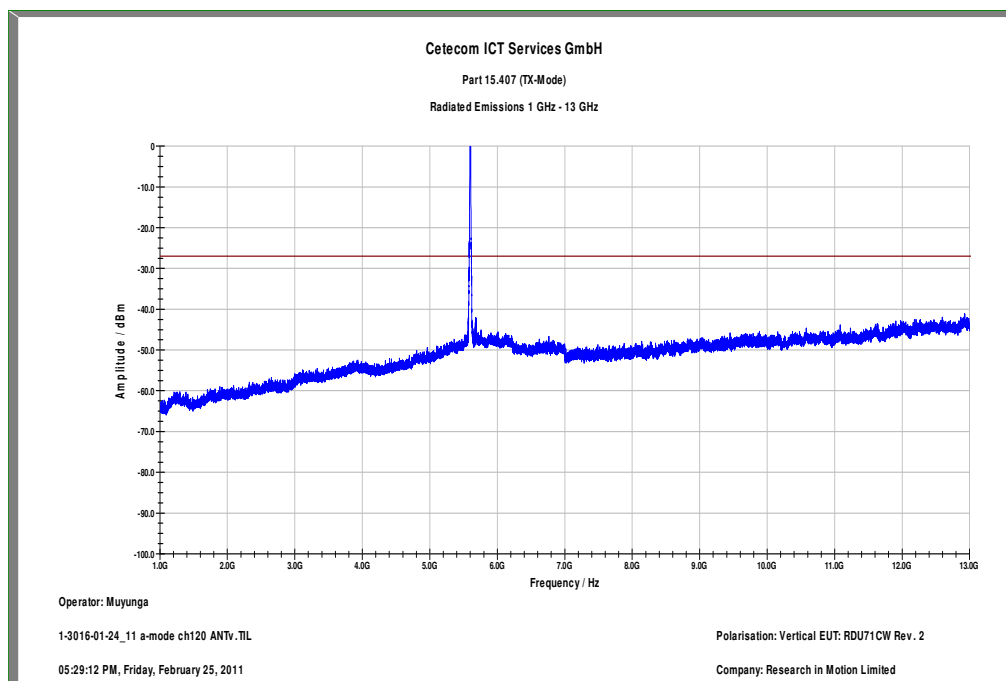
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

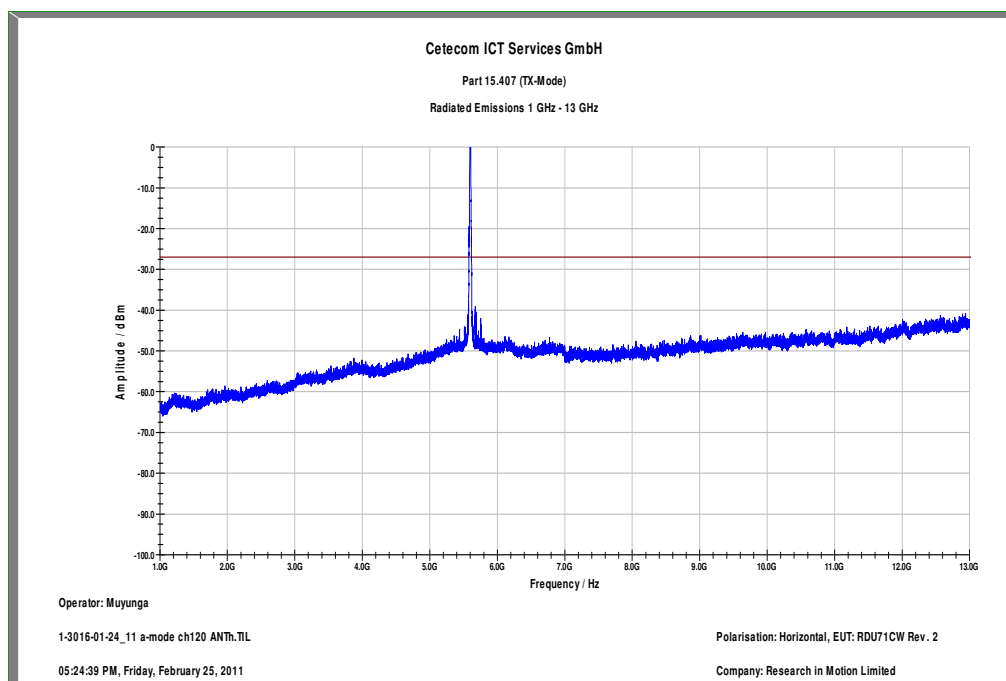
**Final Result 1**

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
36.960000	10.7	15000.000	120.000	244.0	V	93.0	13.2	19.3	30.0	
39.840000	9.5	15000.000	120.000	243.0	V	298.0	13.4	20.5	30.0	
47.760000	10.3	15000.000	120.000	190.0	V	141.0	13.3	19.7	30.0	
51.000000	12.0	15000.000	120.000	270.0	V	204.0	13.3	18.0	30.0	
61.200000	9.8	15000.000	120.000	270.0	V	254.0	11.3	20.2	30.0	
950.040000	22.5	15000.000	120.000	181.0	H	277.0	25.4	13.5	36.0	

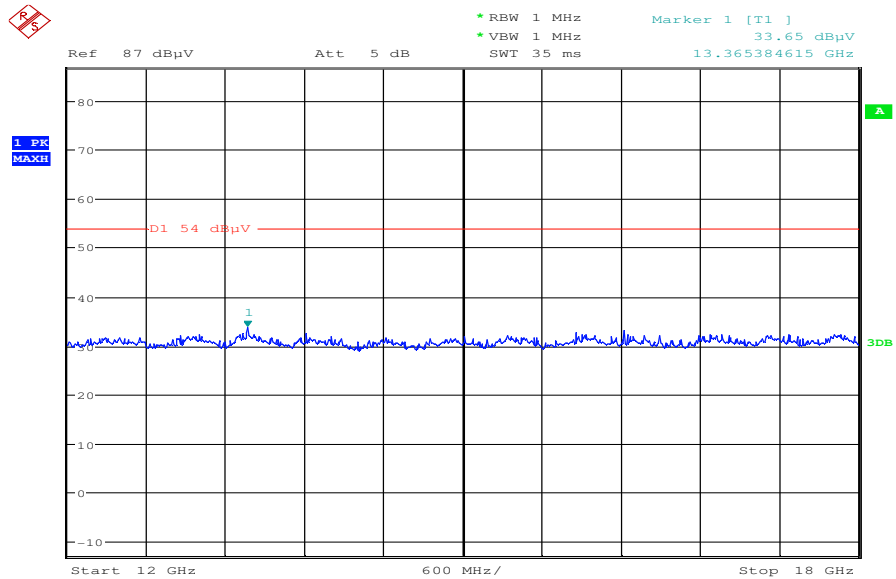
Plot 27: 1 GHz to 12.75 GHz / channel 120 (vertical), a-mode



Plot 28: 1 GHz to 12.75 GHz / channel 120 (horizontal), a-mode

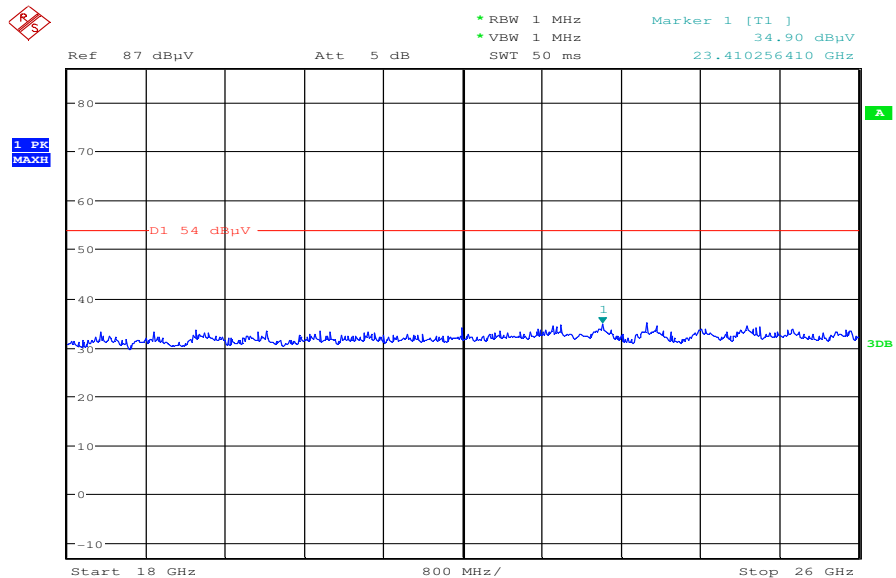


Plot 29: 12 GHz to 18 GHz / channel 120 (horizontal/vertical), a-mode



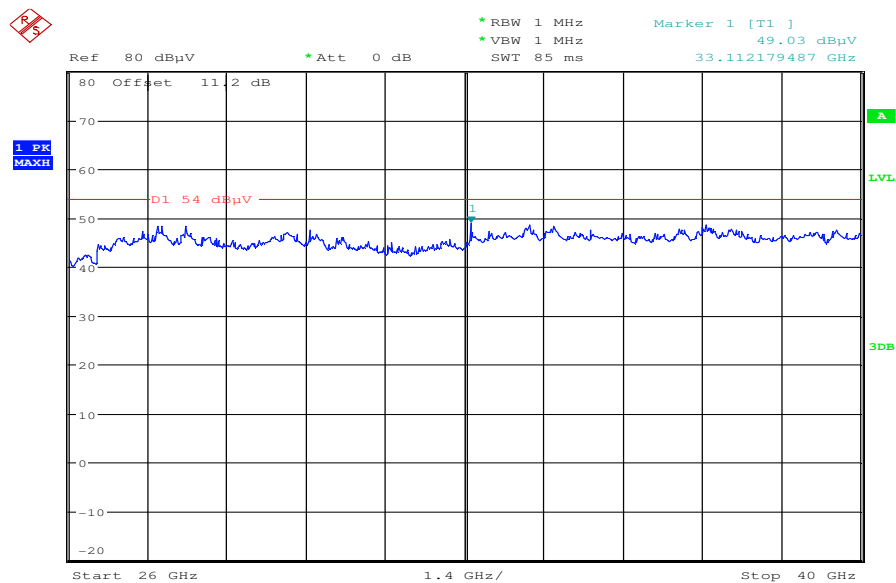
Date: 2.MAR.2011 17:43:37

Plot 30: 18 GHz to 26 GHz / channel 120 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:46:52

Plot 31: 26 GHz to 40 GHz / channel 120 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:55:50

Plot 32: 30 MHz to 1 GHz / channel 140 (vertical /horizontal), a-mode**Common Information**

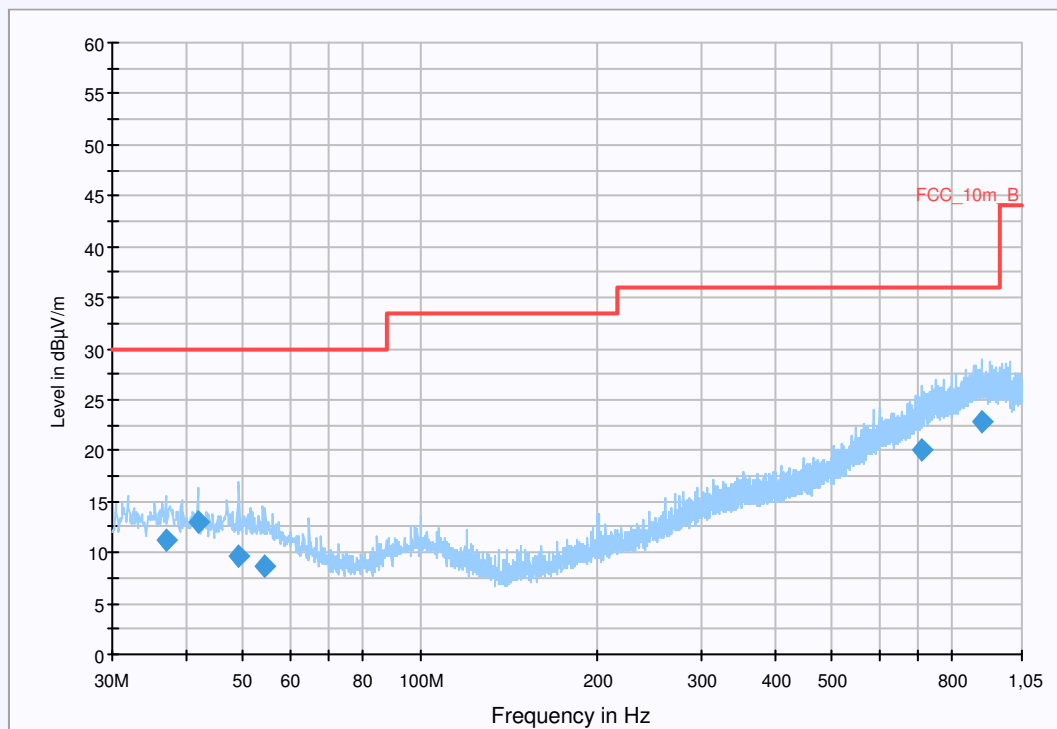
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 140 a ; charging
 Operator Name: LANGER
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

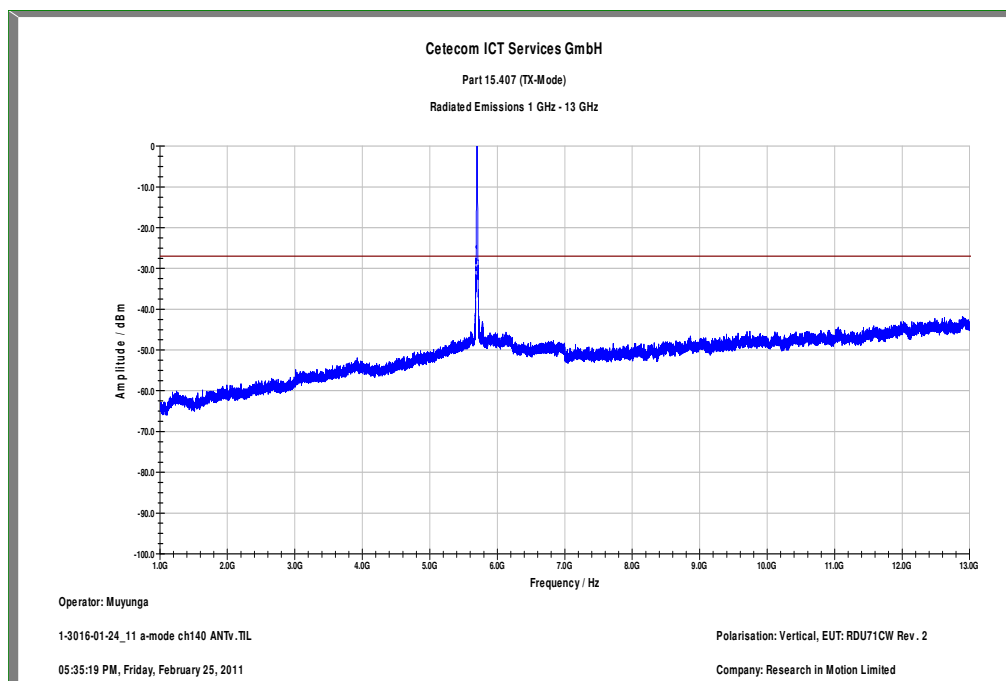
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

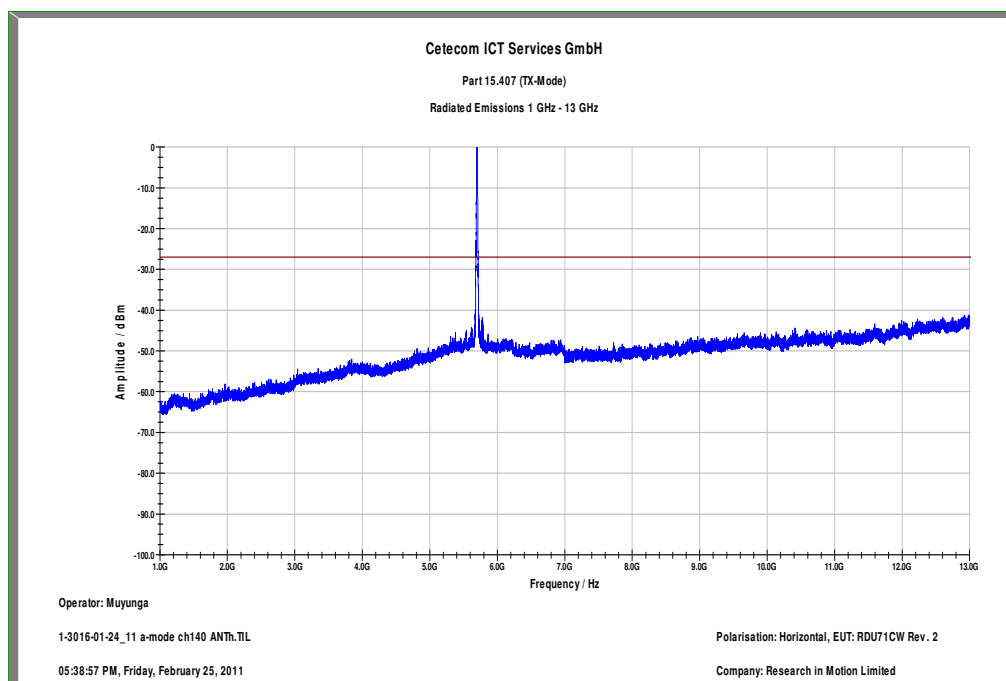
**Final Result 1**

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
36.960000	11.3	15000.000	120.000	98.0	V	147.0	13.2	18.7	30.0	
42.000000	13.0	15000.000	120.000	98.0	V	330.0	13.4	17.0	30.0	
49.320000	9.5	15000.000	120.000	270.0	V	156.0	13.4	20.5	30.0	
54.600000	8.6	15000.000	120.000	270.0	V	99.0	12.9	21.4	30.0	
709.080000	20.0	15000.000	120.000	270.0	H	317.0	22.7	16.0	36.0	
894.720000	22.9	15000.000	120.000	270.0	V	99.0	25.1	13.1	36.0	

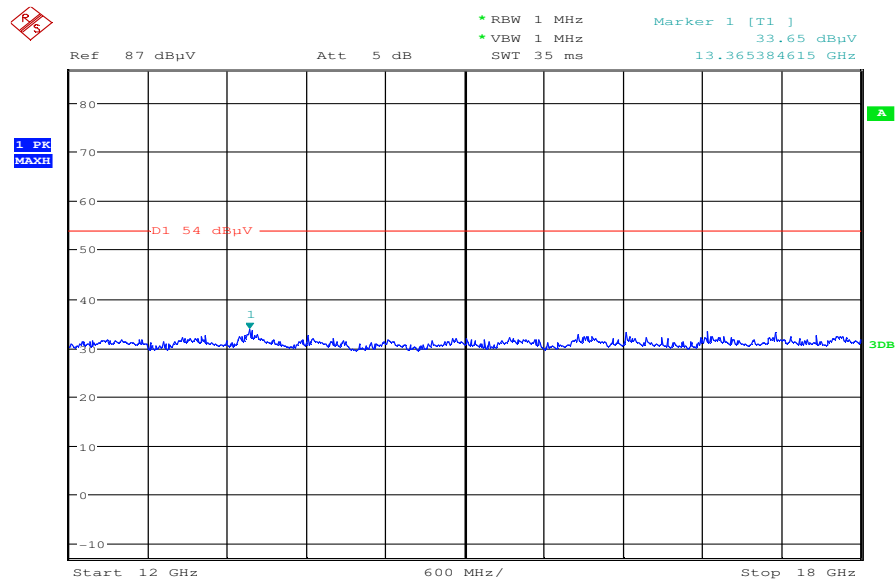
Plot 33: 1 GHz to 12.75 GHz / channel 140 (vertical), a-mode



Plot 34: 1 GHz to 12.75 GHz / channel 140 (horizontal), a-mode

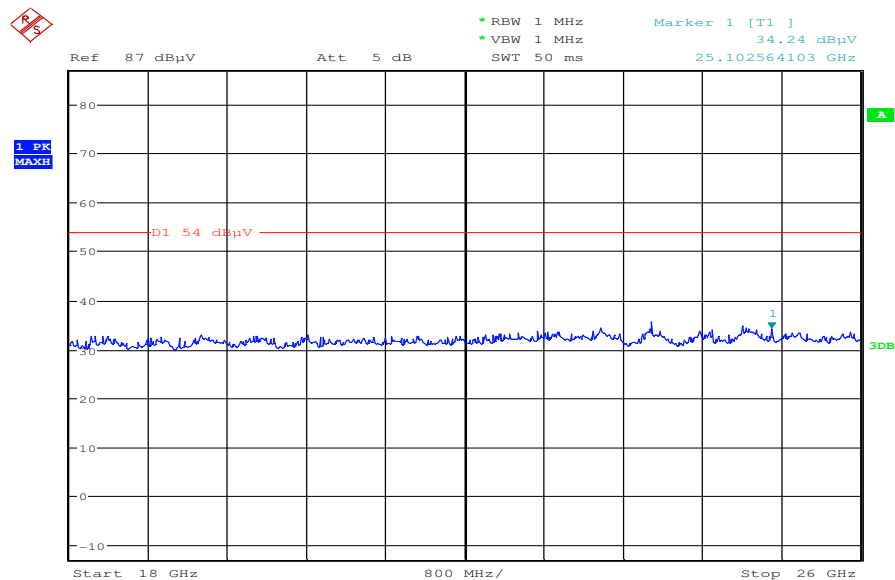


Plot 35: 12 GHz to 18 GHz / channel 140 (horizontal/vertical), a-mode



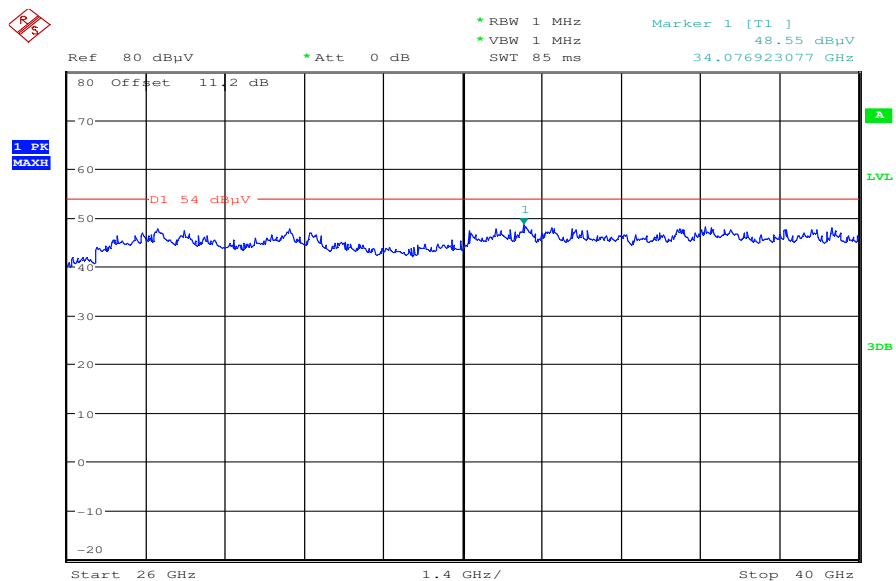
Date: 2.MAR.2011 17:44:17

Plot 36: 18 GHz to 26 GHz / channel 140 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:47:33

Plot 37: 26 GHz to 40 GHz / channel 140 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:56:40

Plot 38: 30 MHz to 1 GHz / channel 149 (vertical/ horizontal), a-mode**Common Information**

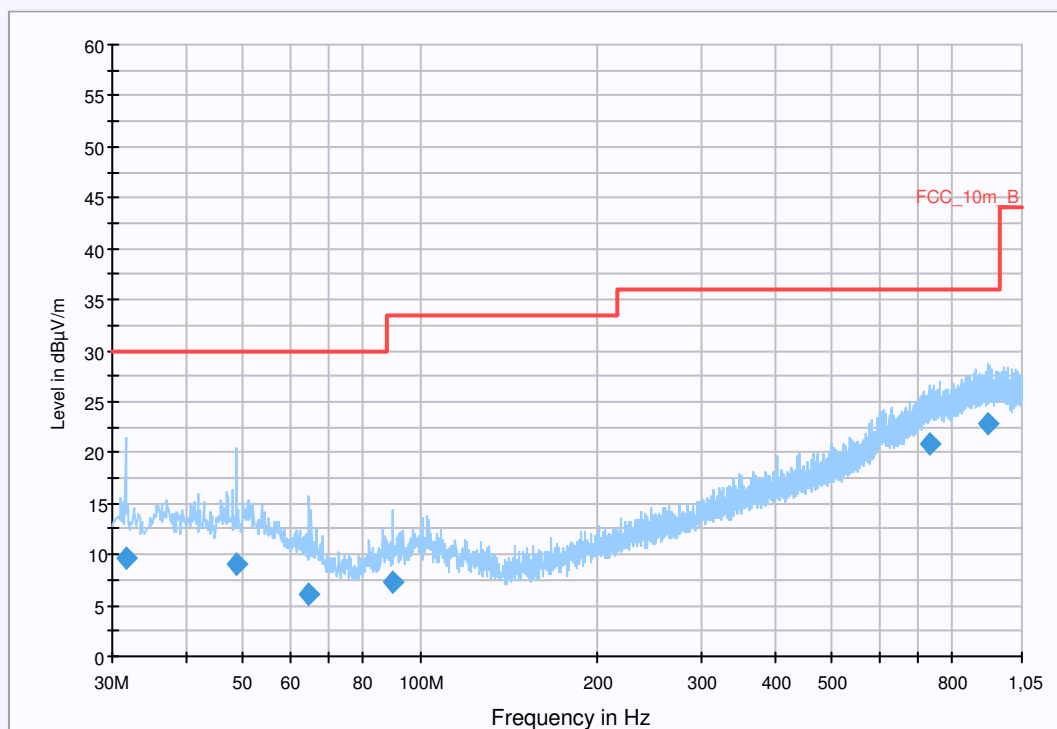
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 149 a ; charging
 Operator Name: LANGER
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dBμV/m

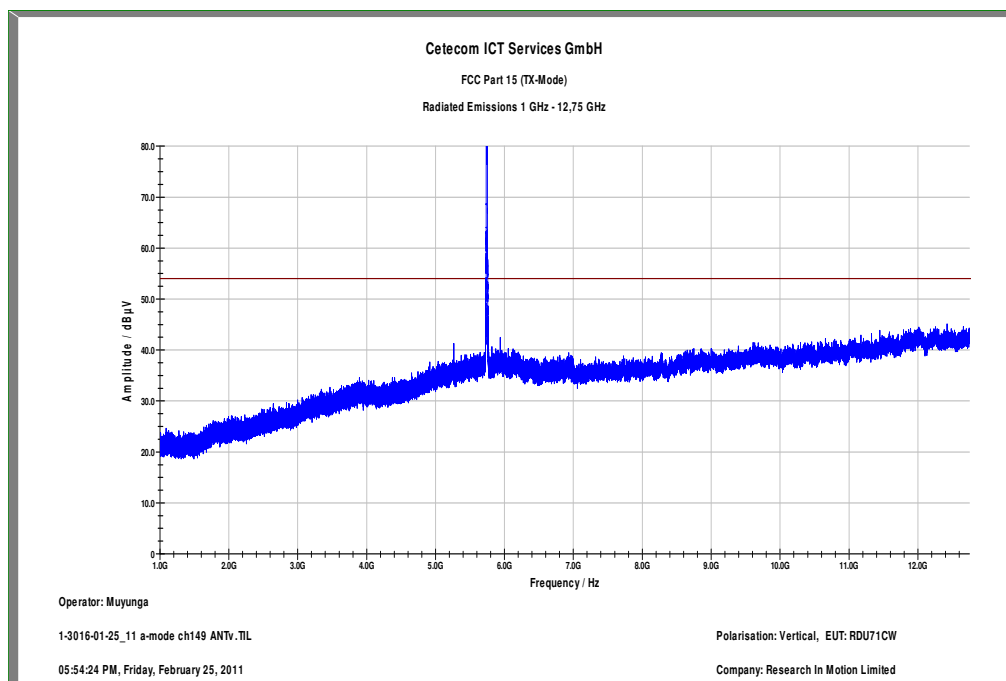
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

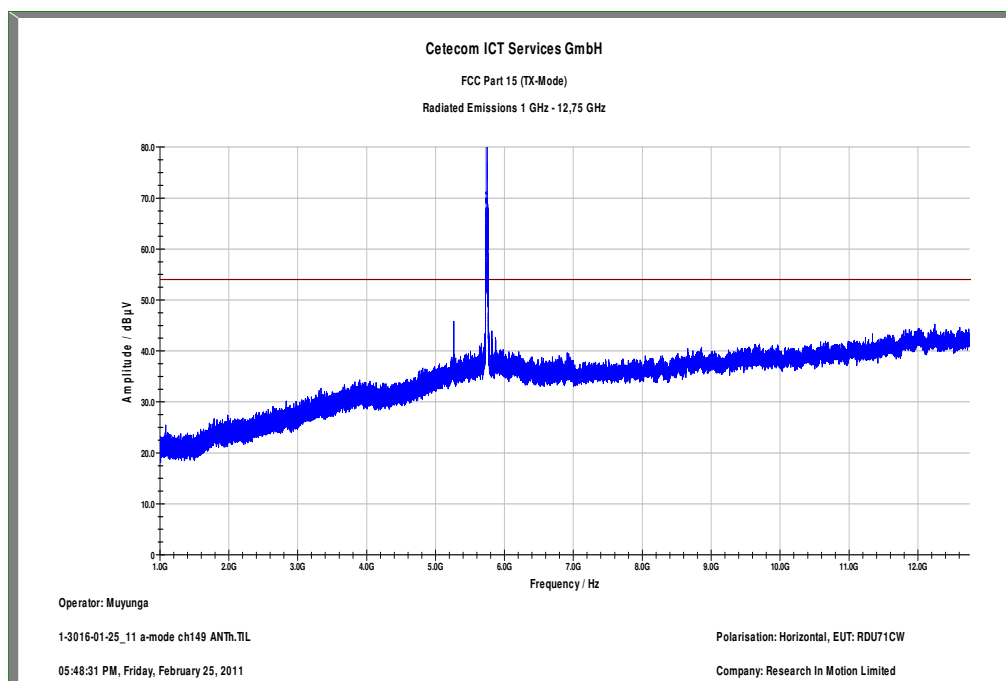
**Final Result 1**

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
31.680000	9.6	15000.000	120.000	134.0	H	269.0	12.7	20.4	30.0	
48.720000	9.0	15000.000	120.000	239.0	V	91.0	13.3	21.0	30.0	
64.800000	6.1	15000.000	120.000	98.0	V	-2.0	10.5	23.9	30.0	
90.000000	7.2	15000.000	120.000	270.0	V	233.0	10.5	26.3	33.5	
734.880000	20.8	15000.000	120.000	270.0	V	162.0	23.3	15.2	36.0	
920.520000	22.9	15000.000	120.000	270.0	V	112.0	25.3	13.1	36.0	

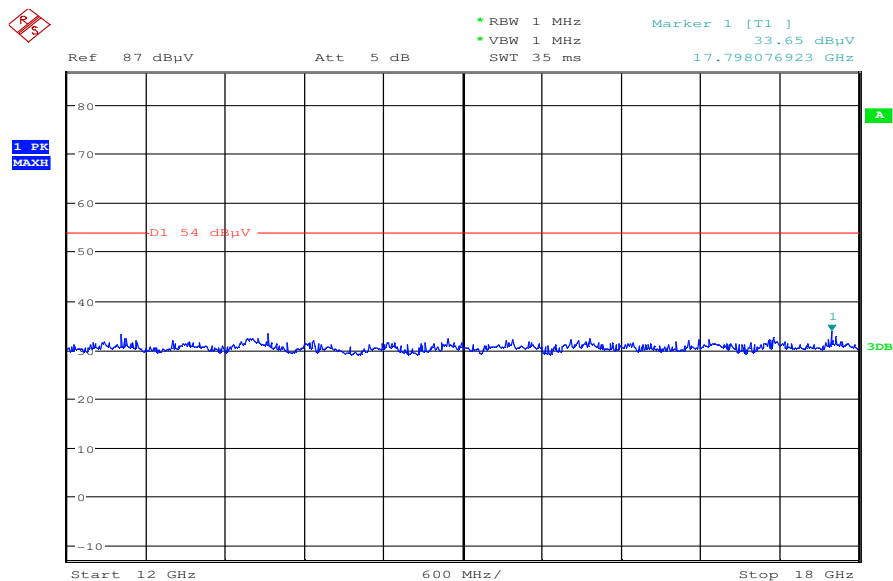
Plot 39: 1 GHz to 12.75 GHz / channel 149 (vertical), a-mode



Plot 40: 1 GHz to 12.75 GHz / channel 149 (horizontal), a-mode

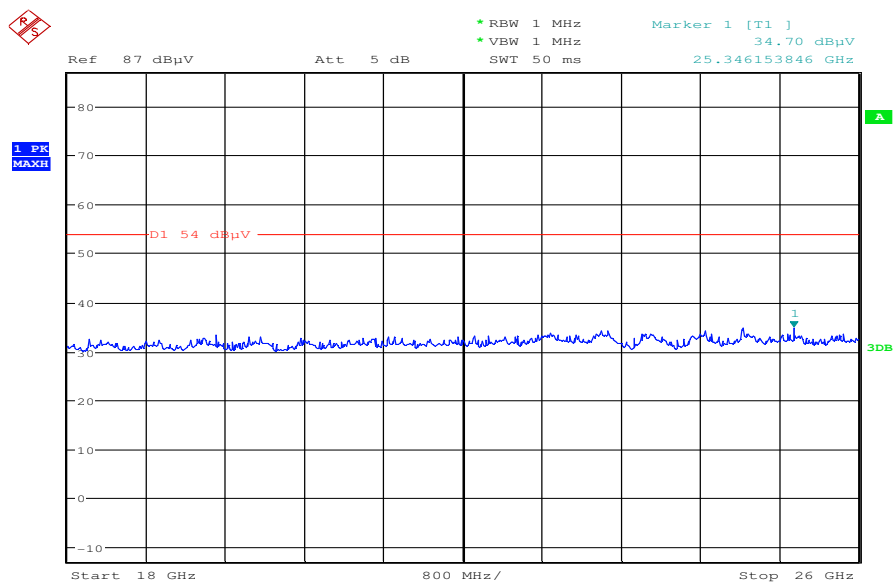


Plot 41: 12 GHz to 18 GHz / channel 149 (horizontal/vertical), a-mode



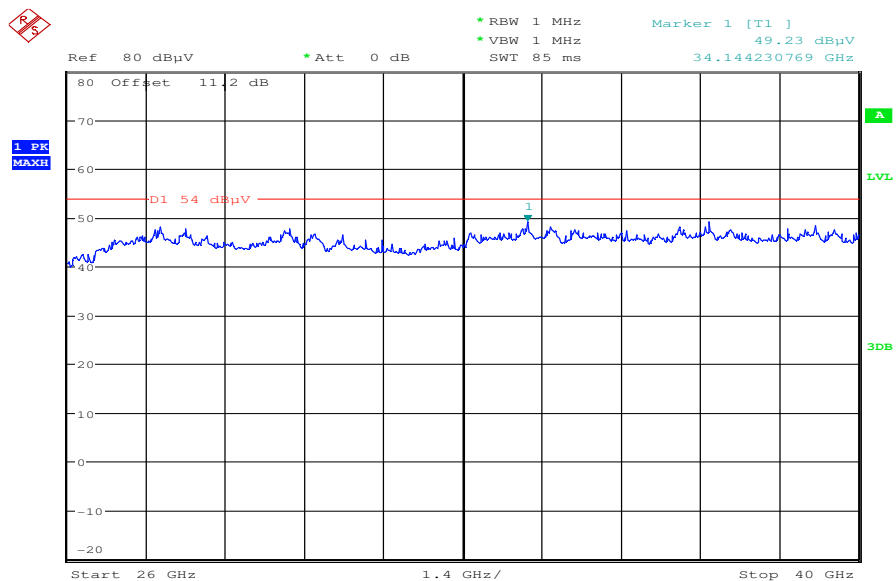
Date: 2.MAR.2011 17:44:54

Plot 42: 18 GHz to 26 GHz / channel 149 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:48:26

Plot 43: 26 GHz to 40 GHz / channel 149 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:57:29

Plot 44: 30 MHz to 1 GHz / channel 157 (vertical/horizontal), a-mode**Common Information**

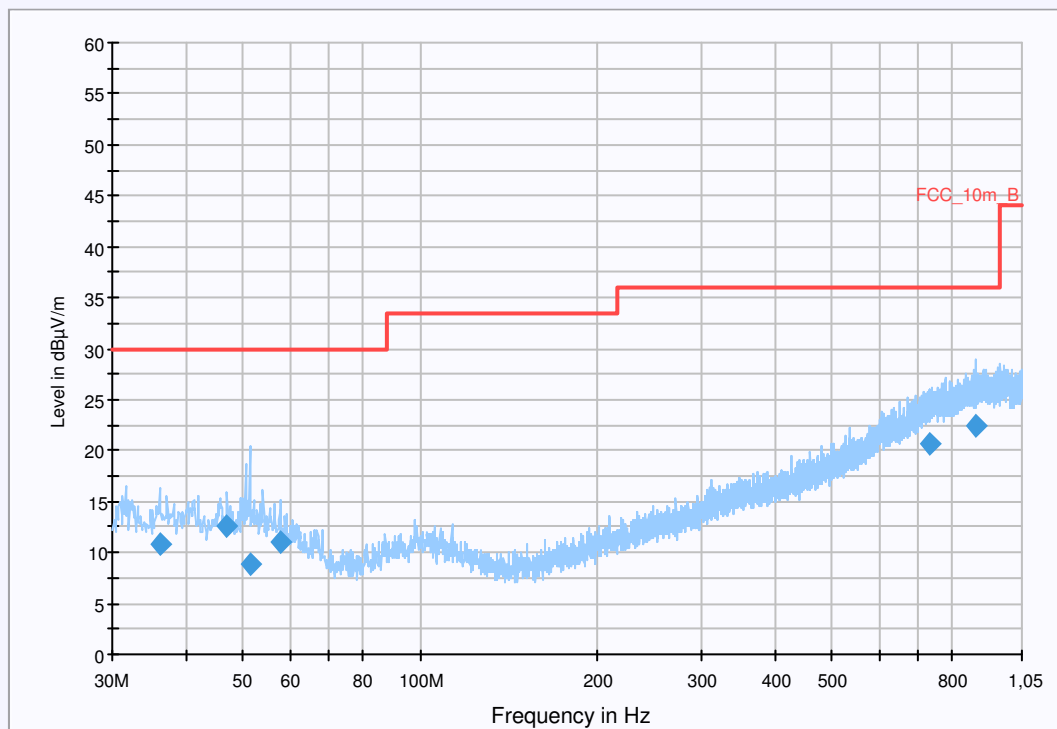
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 157 a ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

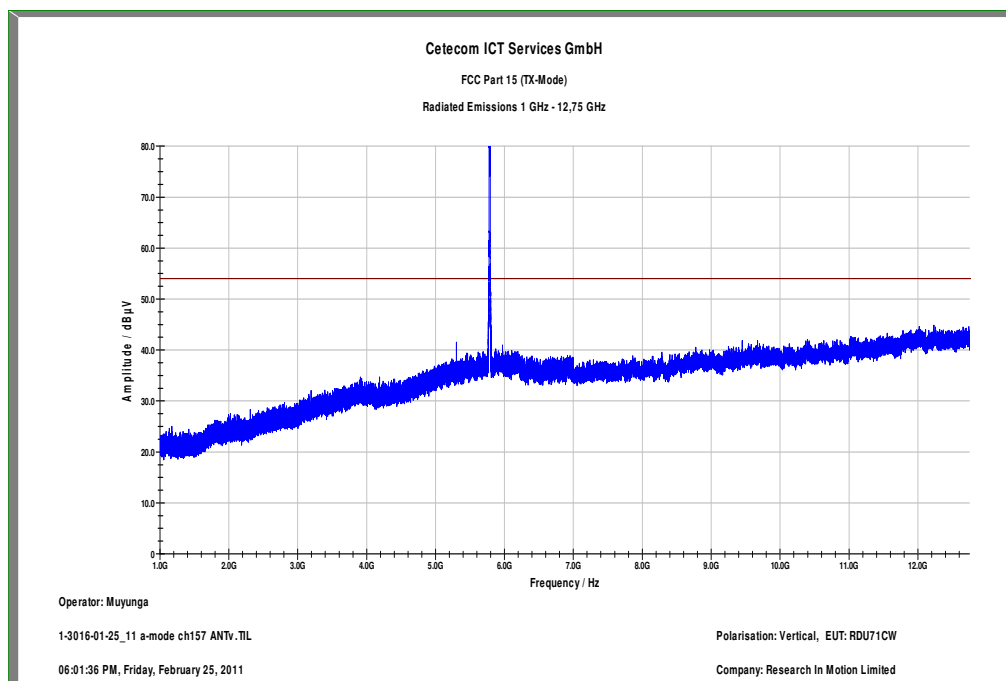
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

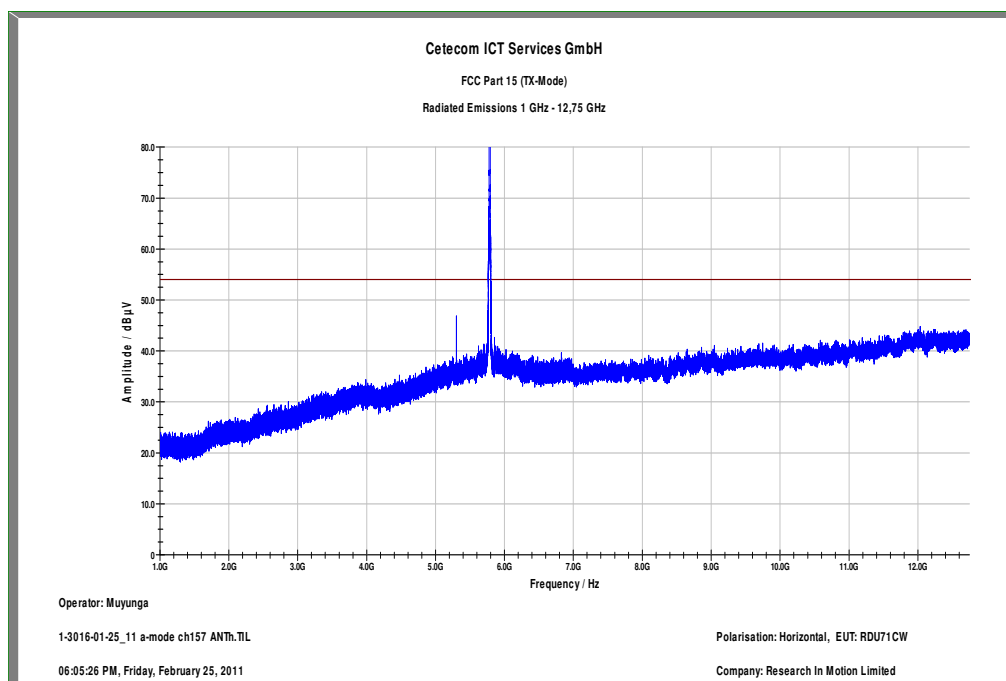
**Final Result 1**

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
36.120000	10.9	15000.000	120.000	98.0	V	25.0	13.1	19.1	30.0	
47.040000	12.6	15000.000	120.000	98.0	V	294.0	13.3	17.4	30.0	
51.360000	8.9	15000.000	120.000	274.0	V	270.0	13.2	21.1	30.0	
57.960000	11.0	15000.000	120.000	98.0	V	235.0	12.1	19.0	30.0	
732.120000	20.7	15000.000	120.000	208.0	H	-2.0	23.2	15.3	36.0	
879.120000	22.3	15000.000	120.000	274.0	H	294.0	24.9	13.7	36.0	

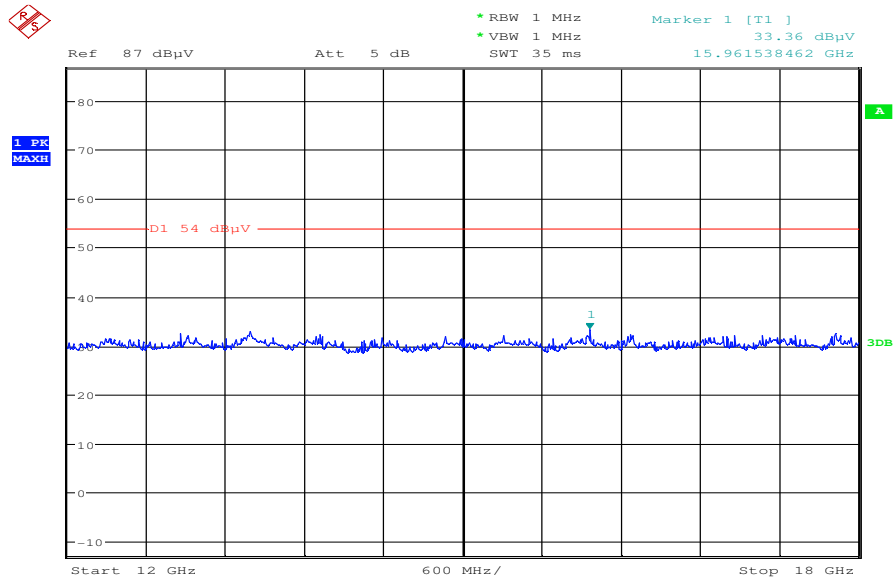
Plot 45: 1 GHz to 12.75 GHz / channel 157 (vertical), a-mode



Plot 46: 1 GHz to 12.75 GHz / channel 157 (horizontal), a-mode

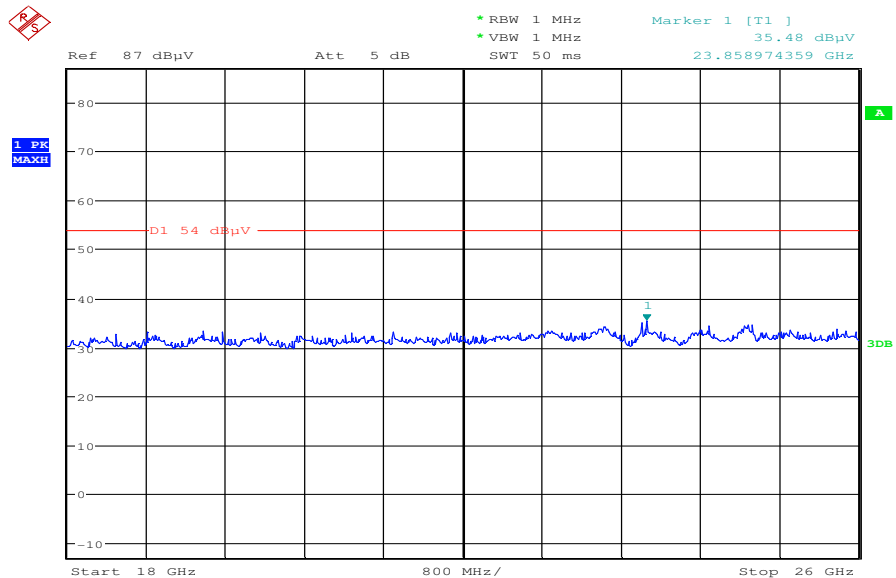


Plot 47: 12 GHz to 18 GHz / channel 157 (horizontal/vertical), a-mode



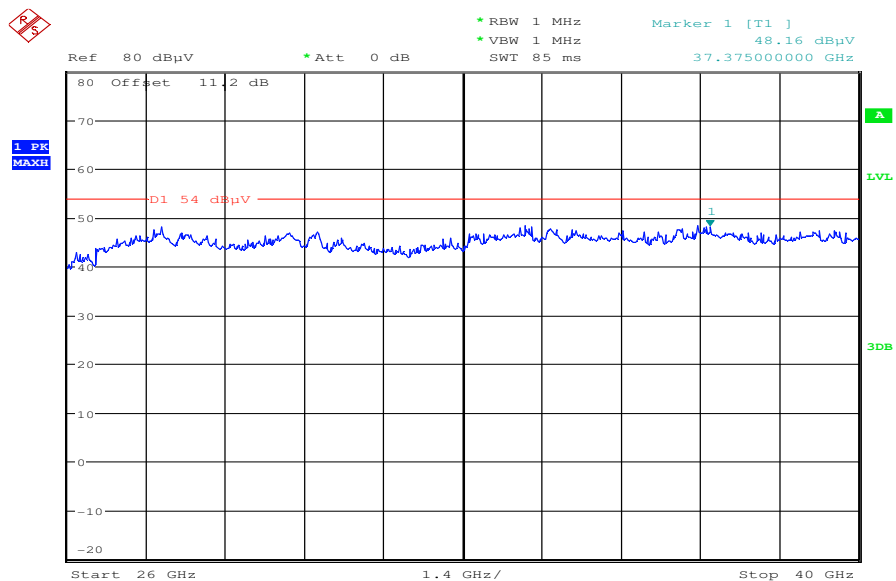
Date: 2.MAR.2011 17:45:19

Plot 48: 18 GHz to 26 GHz / channel 157 (horizontal/vertical), a-mode



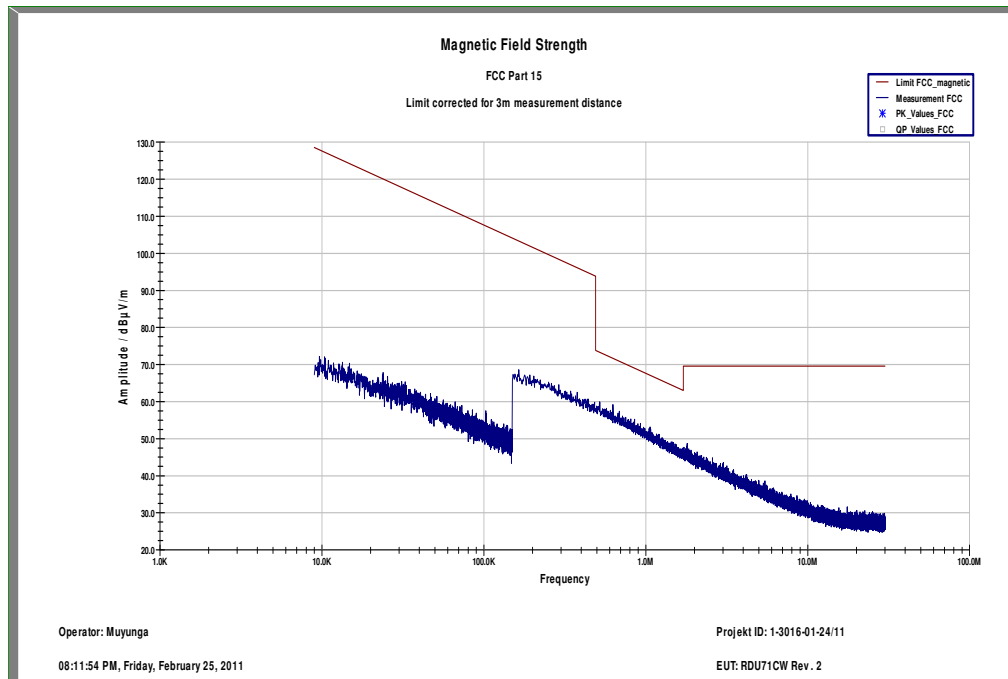
Date: 2.MAR.2011 17:49:16

Plot 49: 26 GHz to 40 GHz / channel 157 (horizontal/vertical), a-mode



Date: 2.MAR.2011 17:58:38

Plot 50: 9 kHz to 30 MHz / channel 64 (vertical /horizontal), n-mode (valid for all channels)



Plot 51: 30 MHz to 1 GHz / channel 48 (vertical /horizontal), n-mode**Common Information**

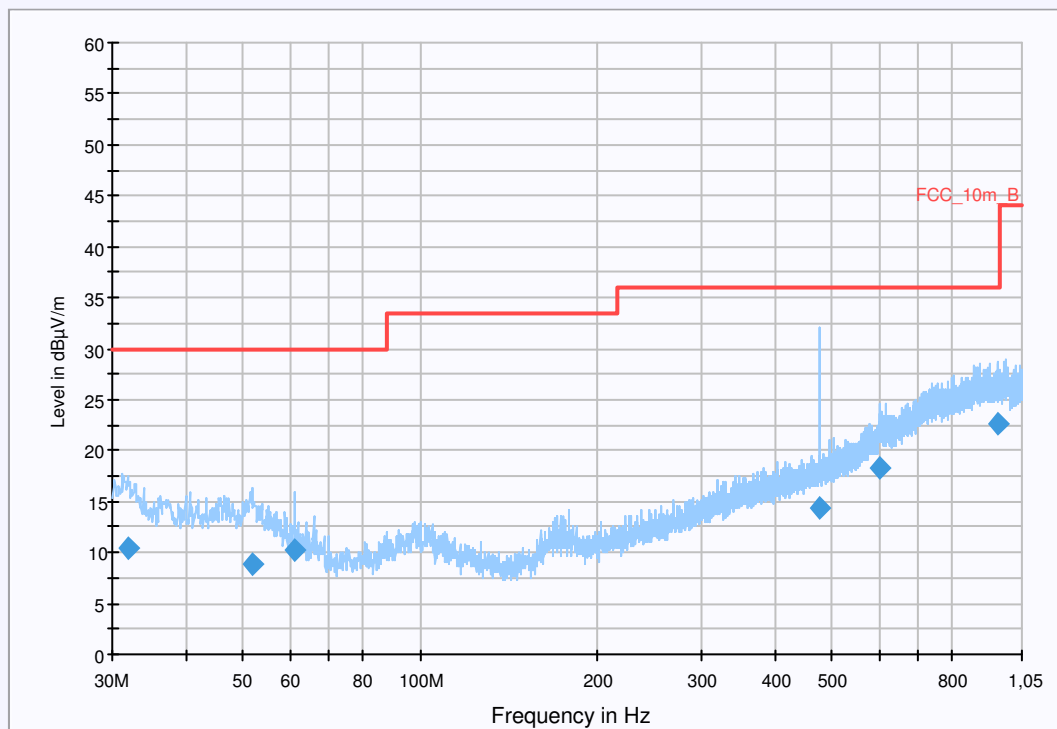
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 48 n ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

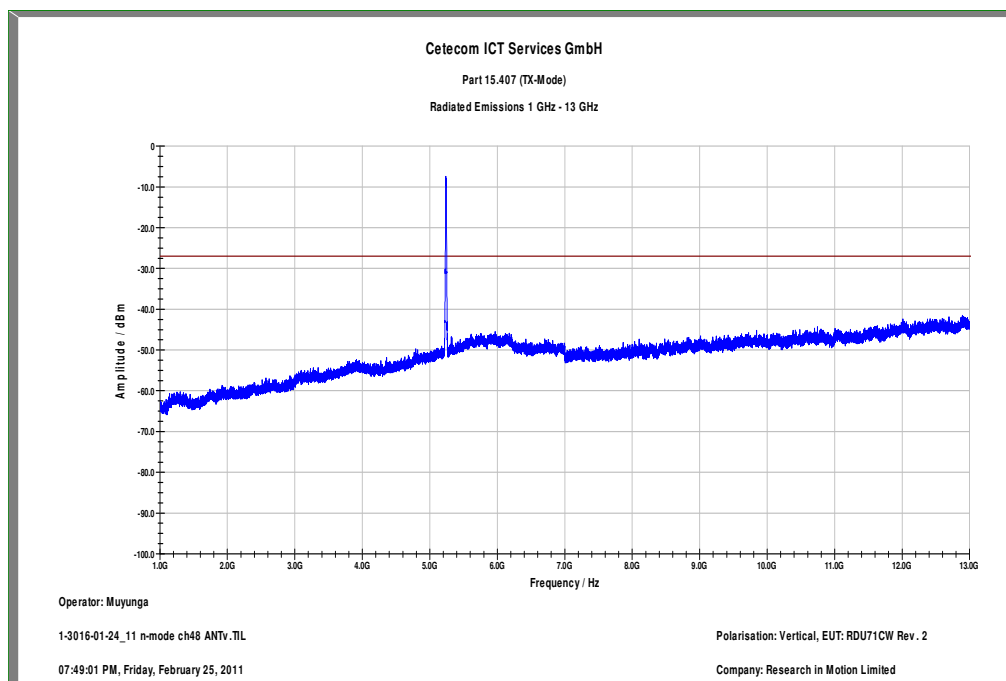
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

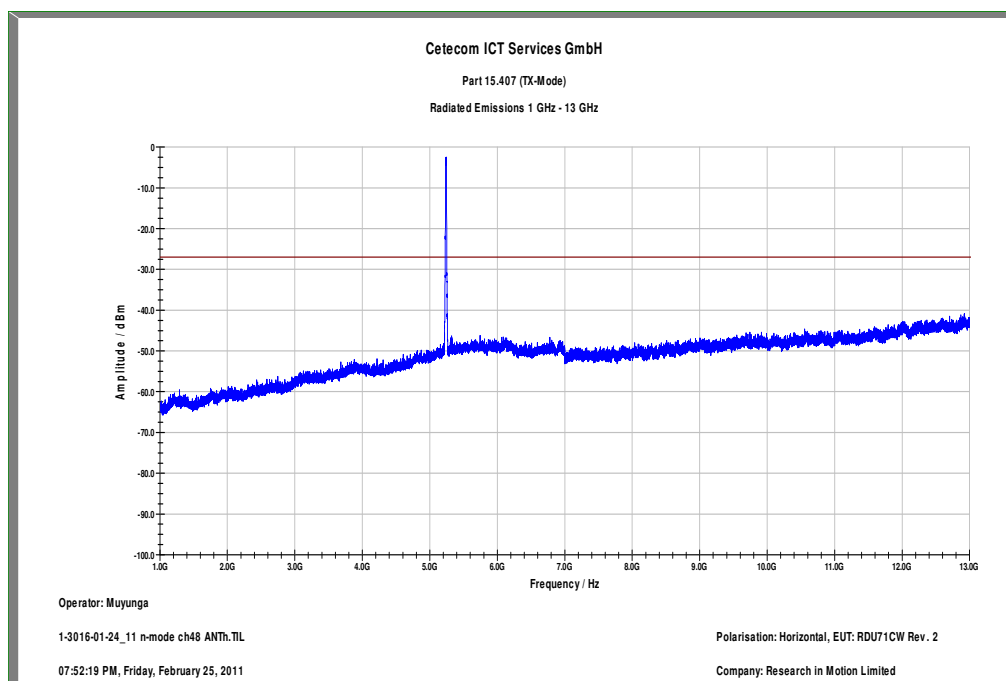
**Final Result 1**

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
31.920000	10.4	15000.000	120.000	270.0	V	144.0	12.7	19.6	30.0	
51.840000	8.9	15000.000	120.000	270.0	V	-2.0	13.2	21.1	30.0	
61.200000	10.2	15000.000	120.000	270.0	V	186.0	11.3	19.8	30.0	
474.480000	14.4	15000.000	120.000	130.0	V	359.0	18.2	21.6	36.0	
602.760000	18.3	15000.000	120.000	155.0	V	198.0	20.8	17.7	36.0	
957.120000	22.7	15000.000	120.000	270.0	V	29.0	25.4	13.3	36.0	

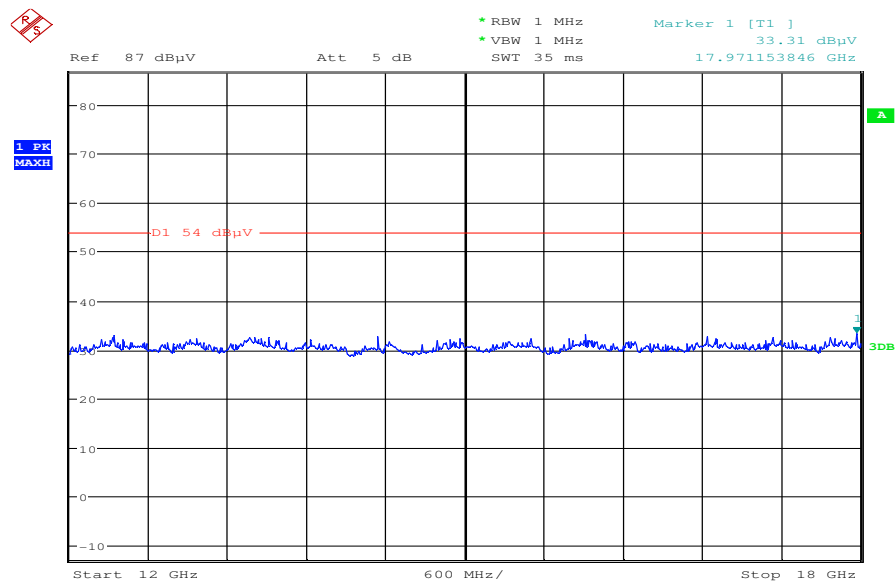
Plot 52: 1 GHz to 12.75 GHz / channel 48 (vertical), n-mode



Plot 53: 1 GHz to 12.75 GHz / channel 48 (horizontal), n-mode

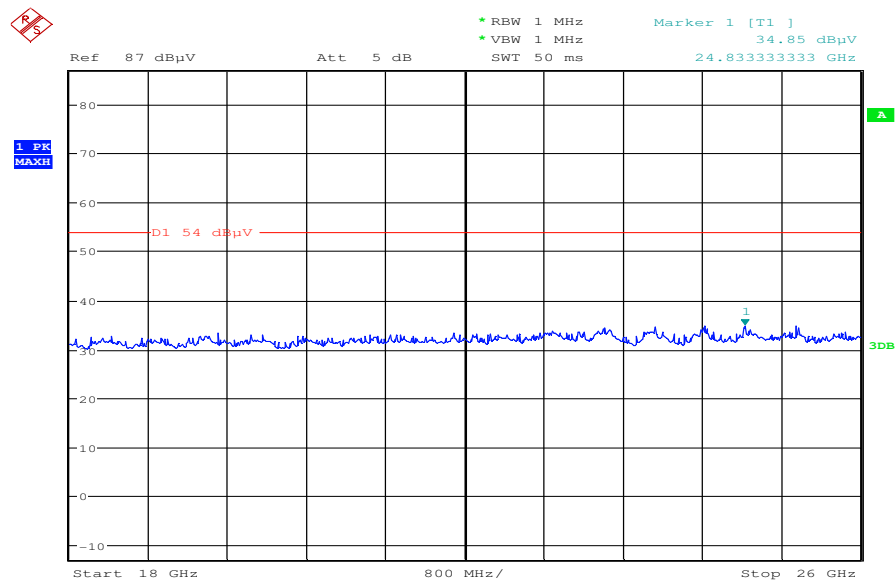


Plot 54: 12 GHz to 18 GHz / channel 48 (horizontal/vertical), n-mode



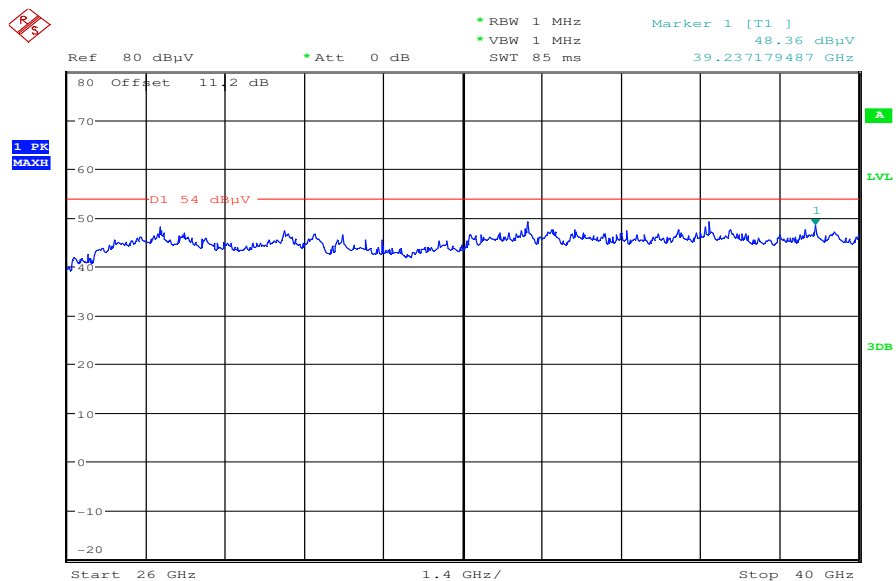
Date: 2.MAR.2011 17:39:10

Plot 55: 18 GHz to 26 GHz / channel 48 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:48:45

Plot 56: 26 GHz to 40 GHz / channel 48 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:57:09

Plot 57: 30 MHz to 1 GHz / channel 52 (vertical/ horizontal), n-mode**Common Information**

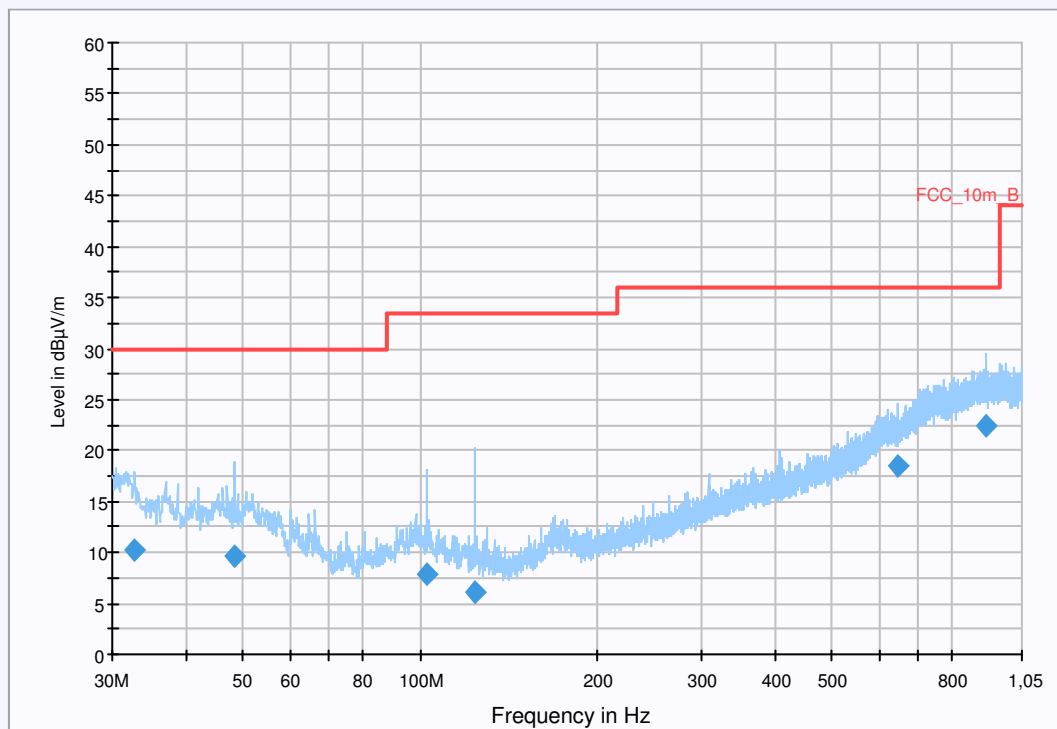
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 52 n ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

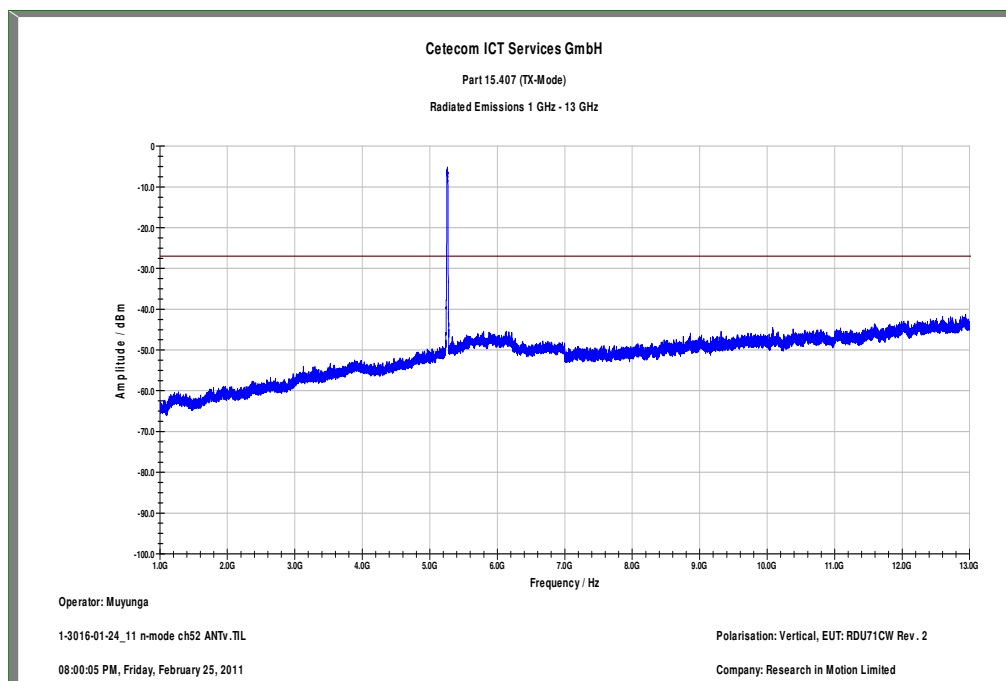
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

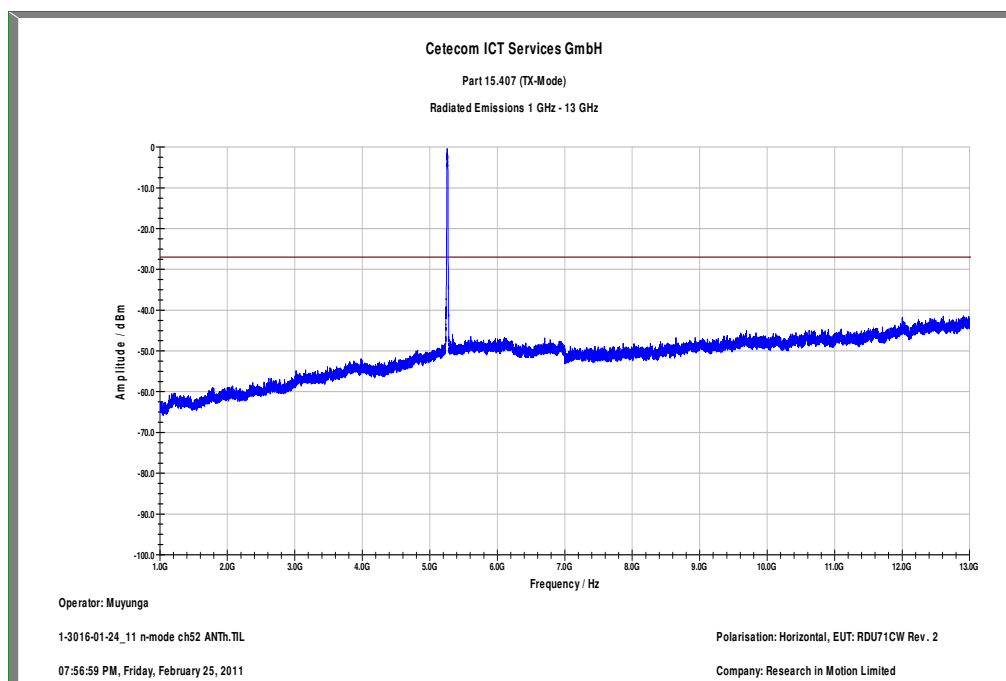
**Final Result 1**

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
32.760000	10.2	15000.000	120.000	231.0	V	271.0	12.8	19.8	30.0	
48.360000	9.7	15000.000	120.000	150.0	V	328.0	13.3	20.3	30.0	
102.840000	7.8	15000.000	120.000	203.0	H	-2.0	11.6	25.7	33.5	
123.840000	6.0	15000.000	120.000	155.0	V	107.0	9.9	27.5	33.5	
645.960000	18.5	15000.000	120.000	124.0	V	153.0	21.1	17.5	36.0	
913.680000	22.4	15000.000	120.000	242.0	H	131.0	25.2	13.6	36.0	

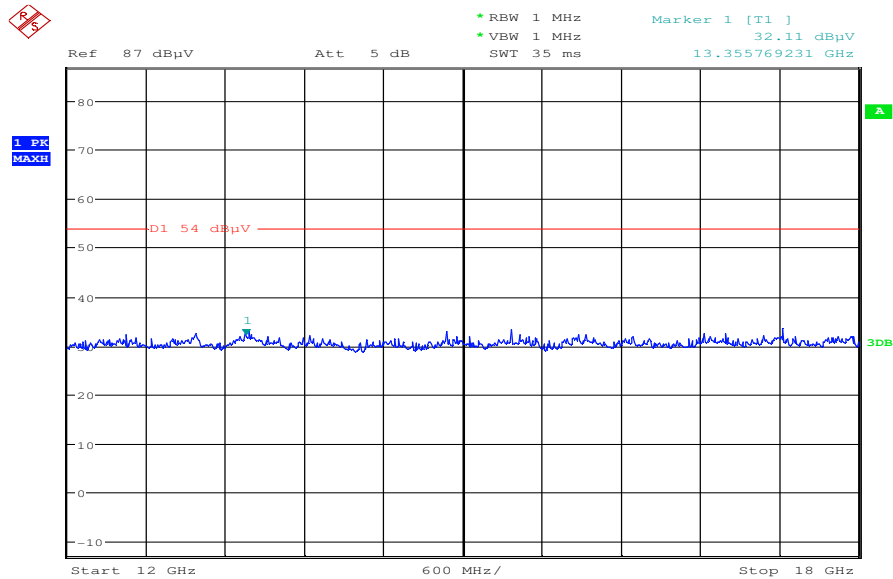
Plot 58: 1 GHz to 12.75 GHz / channel 52 (vertical), n-mode



Plot 59: 1 GHz to 12.75 GHz / channel 52 (horizontal), n-mode

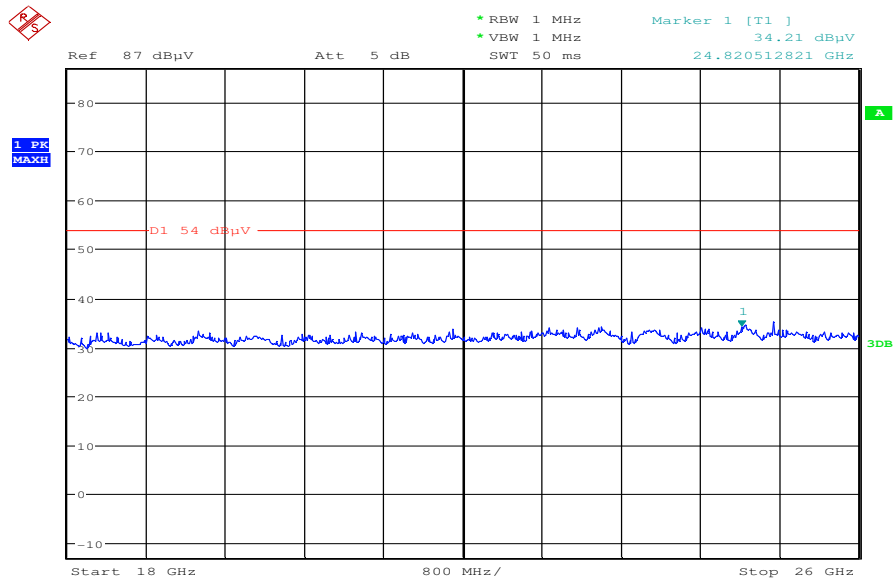


Plot 60: 12 GHz to 18 GHz / channel 52 (horizontal/vertical), n-mode



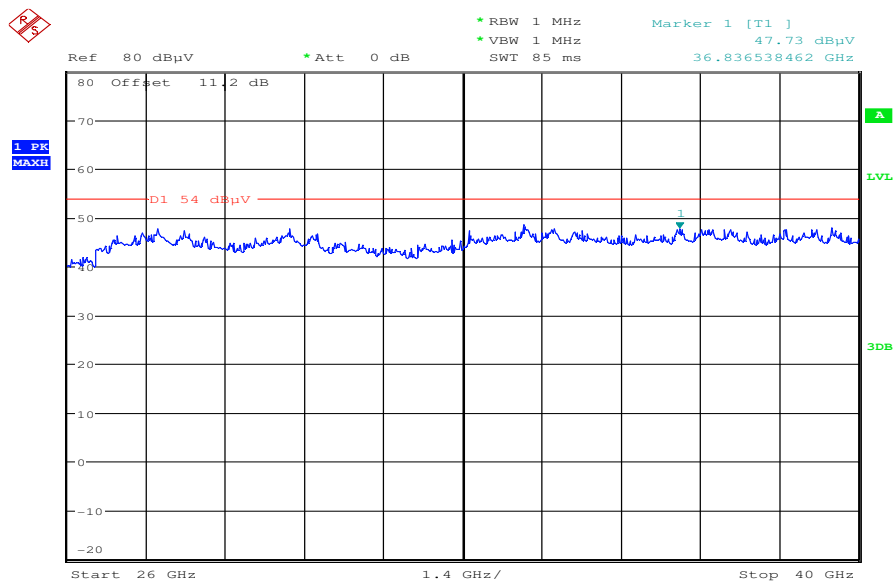
Date: 2.MAR.2011 17:41:00

Plot 61: 18 GHz to 26 GHz / channel 52 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:50:05

Plot 62: 26 GHz to 40 GHz / channel 52 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:56:21

Plot 63: 30 MHz to 1 GHz / channel 120 (vertical/horizontal), n-mode**Common Information**

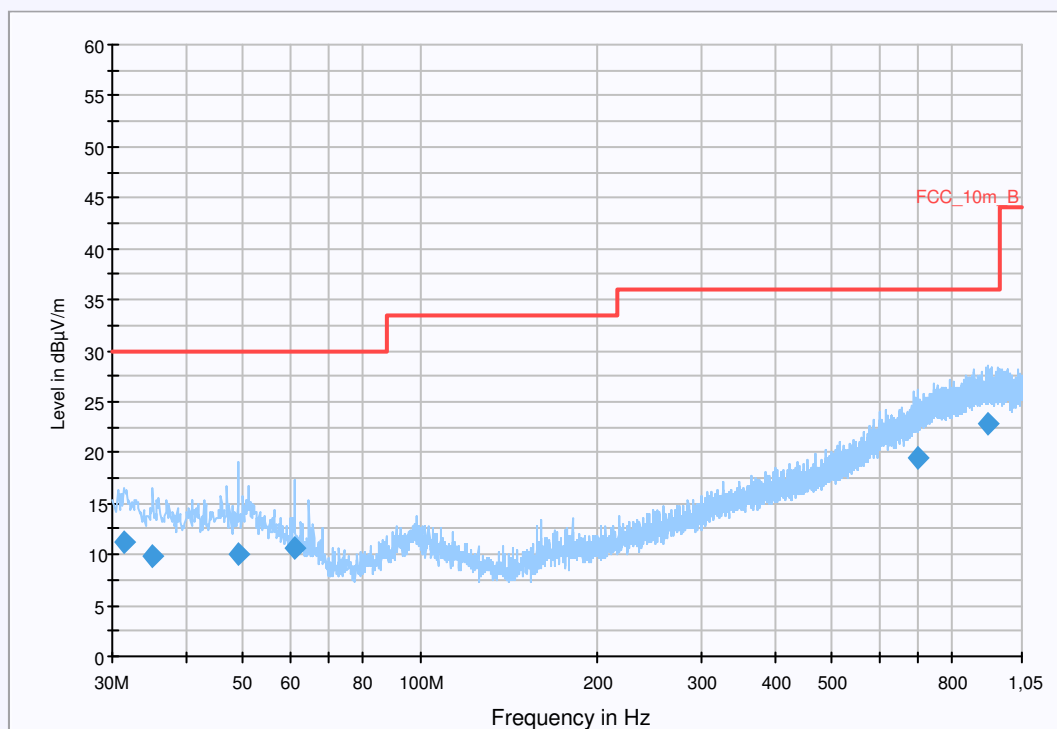
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 120 n ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

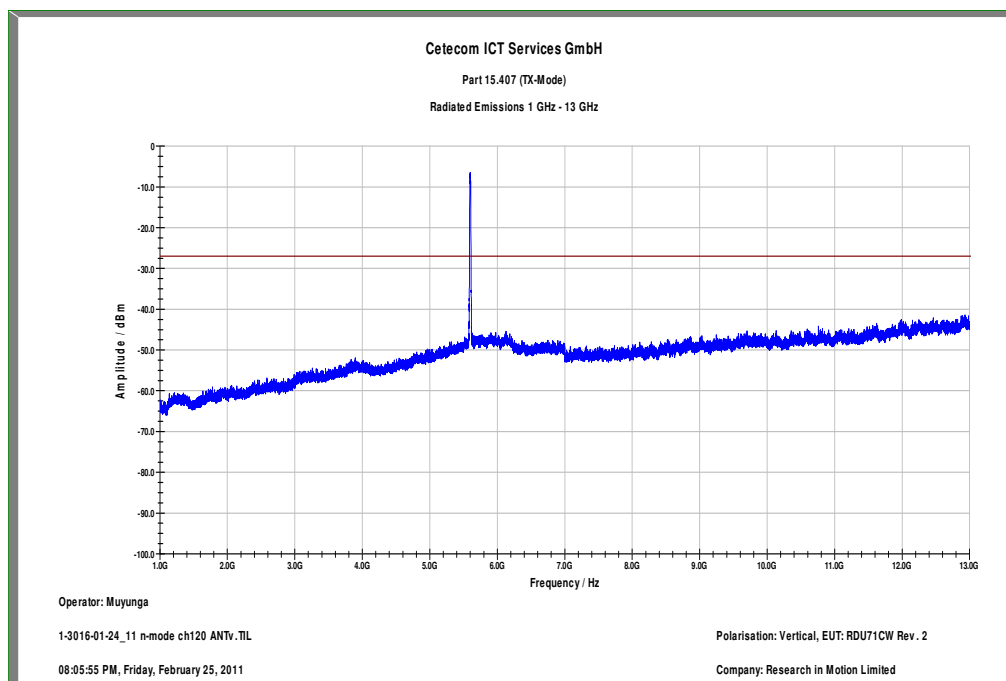
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

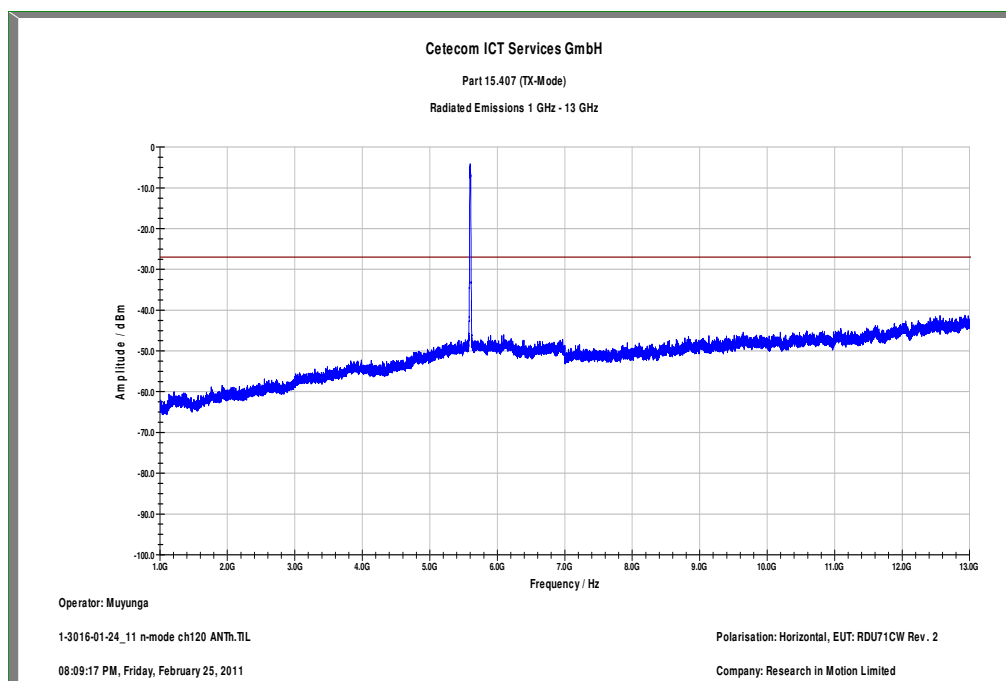
**Final Result 1**

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
31.440000	11.3	15000.000	120.000	242.0	V	203.0	12.7	18.7	30.0	
35.160000	9.8	15000.000	120.000	251.0	V	111.0	13.0	20.2	30.0	
49.080000	10.0	15000.000	120.000	157.0	V	103.0	13.4	20.0	30.0	
61.200000	10.7	15000.000	120.000	270.0	V	124.0	11.3	19.3	30.0	
697.320000	19.5	15000.000	120.000	270.0	H	315.0	22.4	16.5	36.0	
917.400000	22.9	15000.000	120.000	270.0	H	111.0	25.3	13.1	36.0	

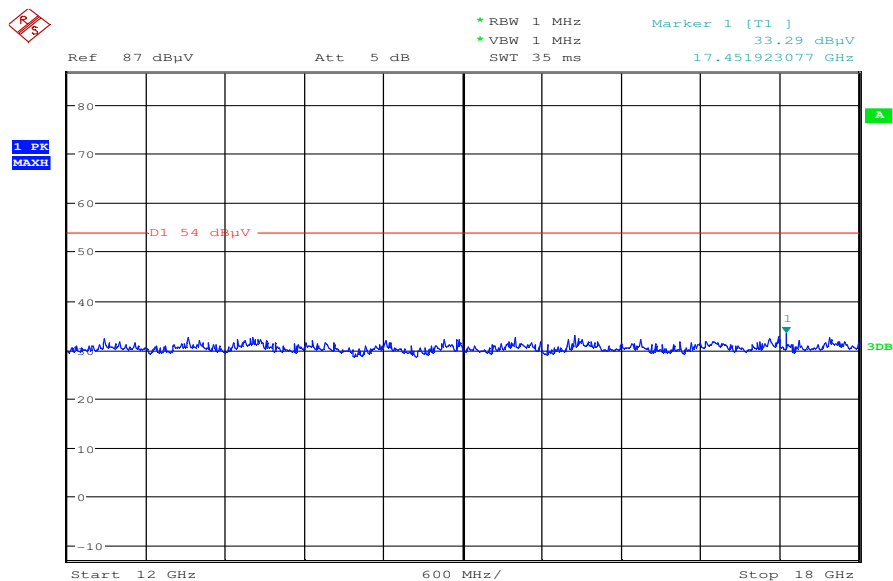
Plot 64: 1 GHz to 12.75 GHz / channel 120 (vertical), n-mode



Plot 65: 1 GHz to 12.75 GHz / channel 120 (horizontal), n-mode

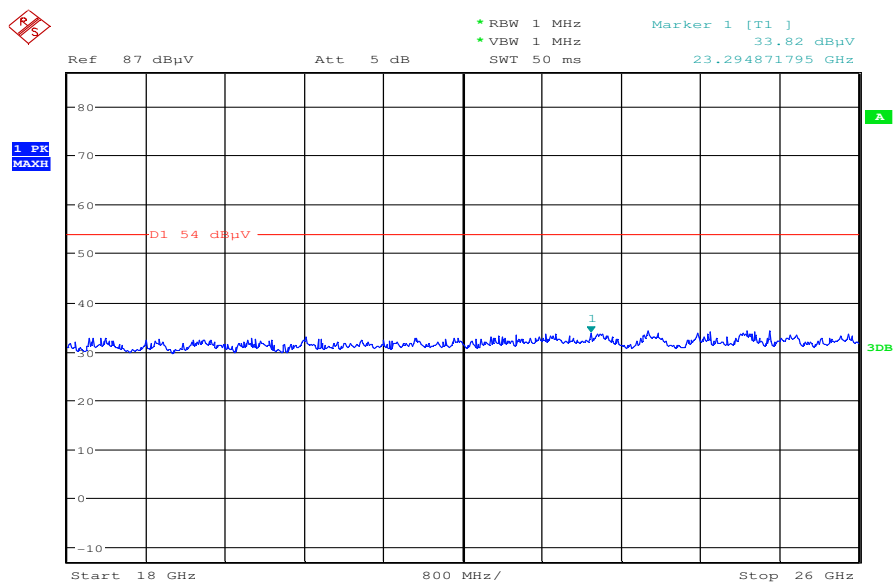


Plot 66: 12 GHz to 18 GHz / channel 120 (horizontal/vertical), n-mode



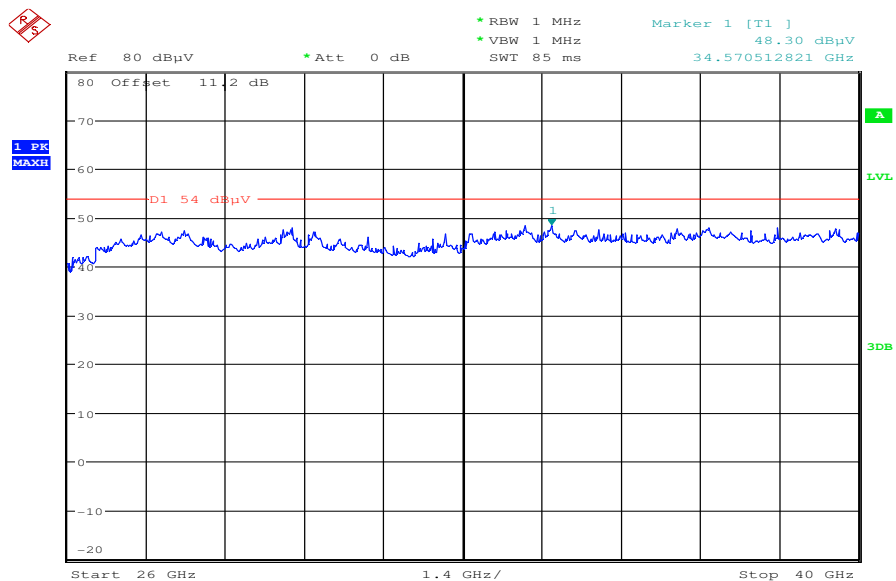
Date: 2.MAR.2011 17:41:56

Plot 67: 18 GHz to 26 GHz / channel 120 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:47:19

Plot 68: 26 GHz to 40 GHz / channel 120 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:59:18

Plot 69: 30 MHz to 1 GHz / channel 157 (vertical/ horizontal), n-mode
Common Information

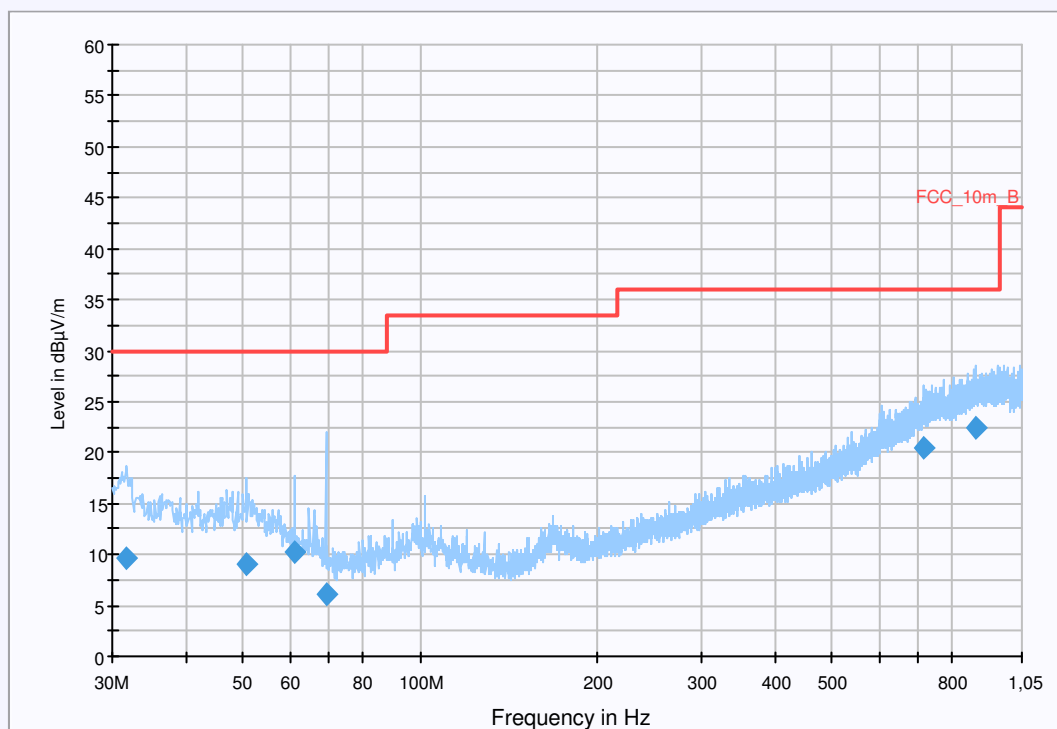
EUT: RDU71CW
 Serial Number: FCC Sample 2
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode channel 157 n ; charging
 Operator Name: Hennemann
 Comment: Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

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

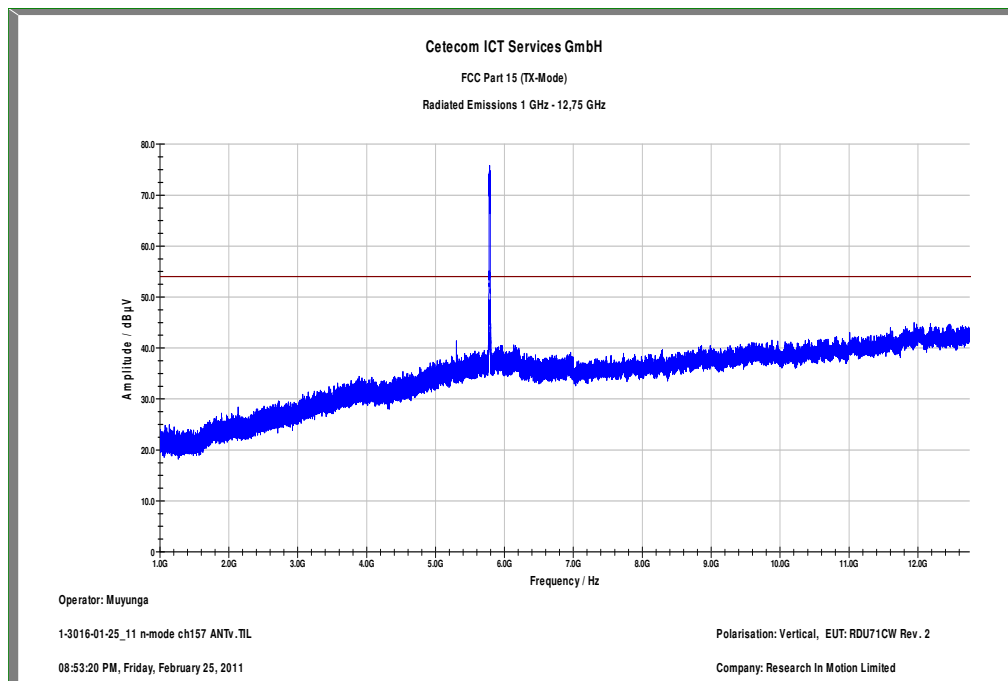
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

FCC_10m(B)_5

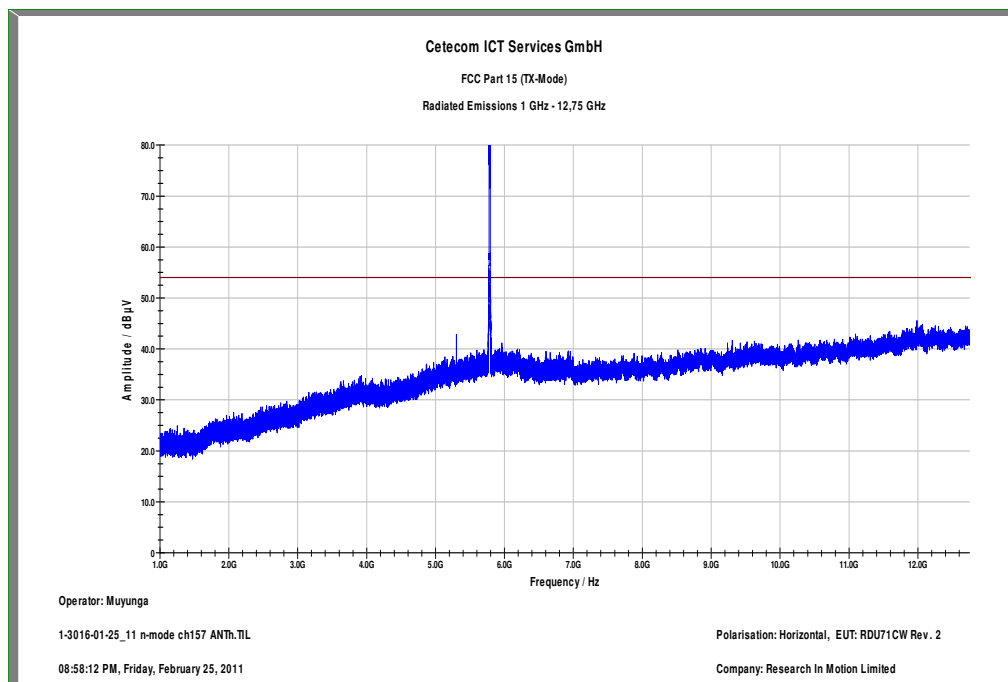

Final Result 1

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
31.800000	9.6	15000.000	120.000	98.0	V	254.0	12.7	20.4	30.0	
50.760000	9.0	15000.000	120.000	270.0	V	161.0	13.3	21.0	30.0	
61.200000	10.3	15000.000	120.000	125.0	V	329.0	11.3	19.7	30.0	
69.120000	6.2	15000.000	120.000	126.0	V	95.0	9.5	23.8	30.0	
716.040000	20.4	15000.000	120.000	270.0	H	95.0	22.9	15.6	36.0	
875.040000	22.4	15000.000	120.000	270.0	H	303.0	24.9	13.6	36.0	

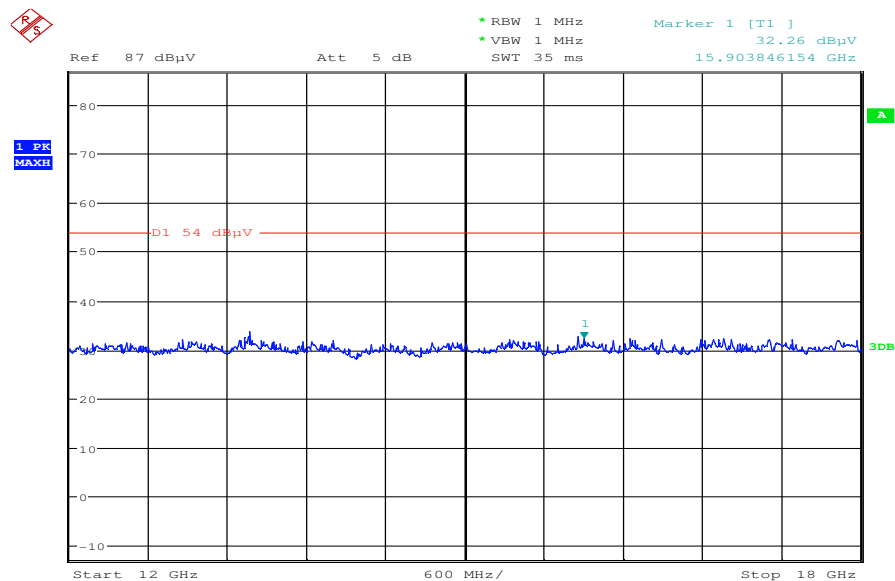
Plot 70: 1 GHz to 12.75 GHz / channel 157 (vertical), n-mode



Plot 71: 1 GHz to 12.75 GHz / channel 157 (horizontal), n-mode

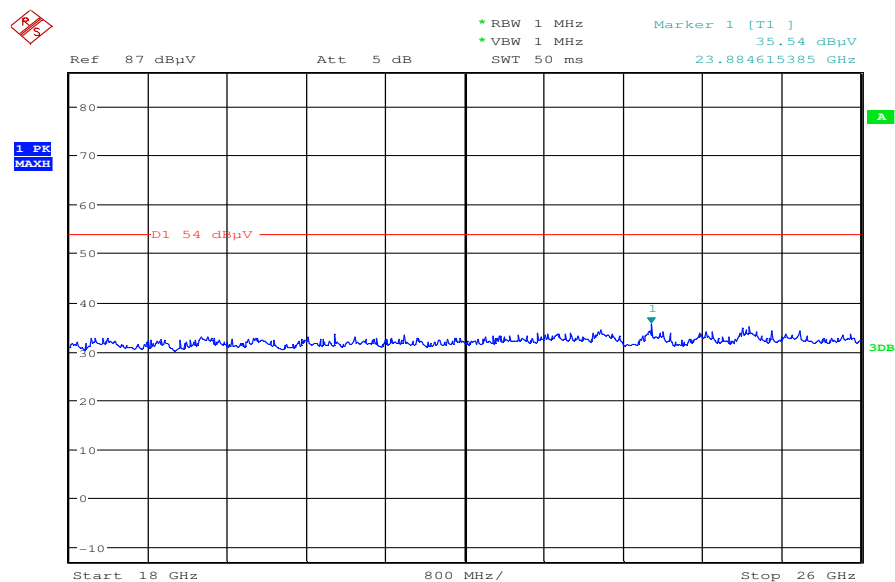


Plot 72: 12 GHz to 18 GHz / channel 157 (horizontal/vertical), n-mode



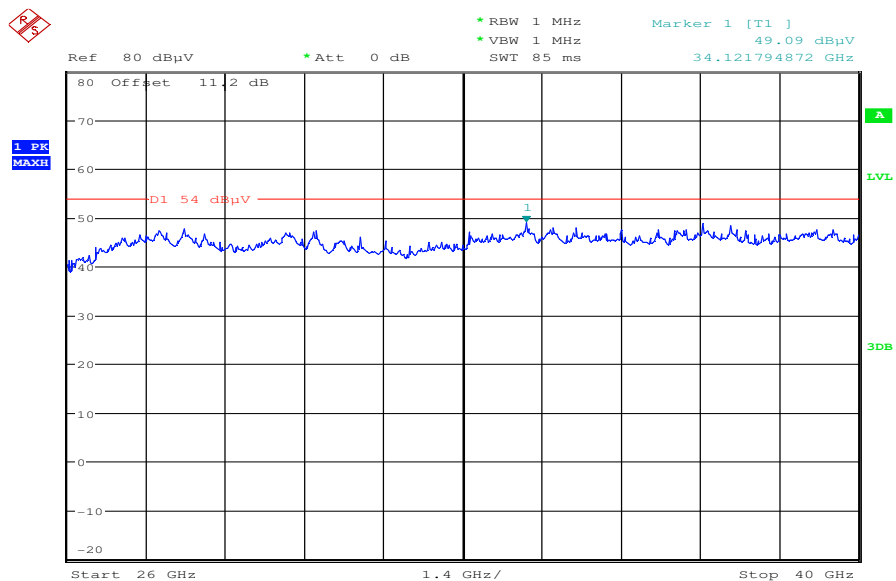
Date: 2.MAR.2011 17:43:01

Plot 73: 18 GHz to 26 GHz / channel 157 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:47:50

Plot 74: 26 GHz to 40 GHz / channel 157 (horizontal/vertical), n-mode



Date: 2.MAR.2011 17:57:59

10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
2	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
3	n. a.	Coaxial Attenuator 30dB/500W	8325	Bird	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	05.03.2009	05.09.2011
5	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
6	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
7	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
8	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
9	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
10	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
11	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
12	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
13	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
14	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
16	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
17	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
18	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
19	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
20	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
21	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
22	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012
23	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlKI!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKI!	17.12.2008	17.12.2011

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
vkl! 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	2011-07-04

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