



Accredited testing-laboratory

DAR registration number: DAT-P-176/94-D1

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

Recognized by the Federal Communications Commission

Anechoic chamber registration no.: 90462 (FCC)

Anechoic chamber registration no.: 3462C-1 (IC)

Certification ID: DE 0001

Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

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Test report no. : 1-1505-01-13/09
Type identification : RCN71UW
Applicant : Research In Motion Limited
FCC ID : L6ARCN70UW
IC Certification No : 2503A-RCN70UW
Test standards : 47 CFR Part 15

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

2009-08-13 Andreas Keller
Date Name


Signature

Technical responsibility for area of testing:

2009-08-13 Stefan Bös
Date Name


Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

e-mail: info@ICT.cetecom.de

Internet: <http://www.cetecom-ict.de>

State of accreditation: The test laboratory (area of testing) is accredited according to
DIN EN ISO/IEC 17025
DAR registration number: DAT-P-176/94-D1

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

Testing location, if different from CETECOM ICT Services GmbH:

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

1.3 Details of applicant

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

1.4 Application details

Date of receipt of order:	2009-07-23
Date of receipt of test item:	2009-07-20
Date of start test:	2009-07-22
Date of end test	2009-08-13
Persons(s) who have been present during the test:	-/-

2 Test standard/s

47 CFR Part 15	2008-07	Title 47 of the Code of Federal Regulations; Chapter I- Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
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3 Technical tests

3.1 Details of manufacturer

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

3.1.1 Test item

Kind of test item	:	GSM Phone
Type identification	:	RCN71UW
S/N serial number	:	Rad. FCC WIFI Sample32 ONYX RCN71UW CER-25287-001 Rev3
HW hardware status	:	-/-
SW software status	:	-/-
Frequency Band [MHz]	:	ISM 2.400 - 2.483,5
Type of Modulation	:	BPSK (DSSS) & 64-QAM (OFDM)
Number of channels	:	11
Antenna	:	Integrated antenna
Power Supply	:	3.70 V DC from Li-Polymer Battery or Power Supply
Temperature Range	:	-20 °C to +55 °C

FCC ID: L6ARCN70UW
IC: 2503A-RCN70UW

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	2503A-RCN70UW
Model Name:	RCN71UW
Manufacturer (complete Address):	Research In Motion Limited 305 Phillip Street Waterloo, ON N2L 3W8 Canada
Tested to Radio Standards Specification (RSS) No.:	RSS-210 Issue 7
Open Area Test Site Industry Canada Number:	IC 3462C-1
Frequency Range (or fixed frequency) [MHz]:	2400 – 2483.5 MHz
Antenna Type:	Integrated antenna
Type of Modulation:	BPSK (DSSS) & 64-QAM (OFDM)
Transmitter Spurious (worst case) [dBµV/m in 3m]:	35.22 (noise floor)
Receiver Spurious (worst case) [dBµV/m in 3m]:	41.52 (noise floor)

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Test engineer: Andreas Keller

Date: 2009-08-13

3.1.3 RF Technical Brief Cover Sheet acc. To RSS-102

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

Not Performed!

1. COMPANY NUMBER: 2305A
2. MODEL NUMBER: RCN71UW
3. MANUFACTURER: Research In Motion Limited
4. TYPE OF EVALUATION: N/A

- Evaluated against exposure limits: General Public Use ☐ Controlled Use ☐
- Duty cycle used in evaluation: N/P
- Standard used for evaluation: RSS-102 Issue 2 (2005-11)
- Measurement distance: 0.20 m
- RF value: N/P ☐ V/m ☐ A/m ☐ W/m² ☐

Measured ☐ Computed ☐ Calculated ☐

Declaration of RF Exposure Compliance

ATTESTATION:

I attest that the information provided in this test report are correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.



Name: Andreas Keller

Company: Cetecom ICT Services GmbH

3.1.4 EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
Op. 0	Normal mode	Normal temperature and power source conditions
Op. 1		low temperature, low power source conditions
Op. 2		low temperature, high power source conditions
Op. 3		high temperature, low power source conditions
Op. 4		high temperature, high power source conditions

*) EUT operating mode no. is used to simplify the test plan

3.1.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T _{nom}	°C	24
Nominal Humidity	H _{nom}	%	52
Nominal Power Source	V _{nom}	V	3.7

Type of power source: **from Li-Polymer Battery or Power Supply**

4 Summary of Measurement Results and list of all performed test cases

- ☒ No deviations from the technical specifications were ascertained
☐ There were deviations from the technical specifications ascertained

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.247 - CANADA RSS-210	PASSED	2009-08-13	-/-

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
None	Antenna Gain				X
§15.247 (e)	Peak power spectral density				X
§15.247(a)(2)	Spectrum Bandwidth of a DSSS System / 6dB BW				X
§15.247(a)(2)	Spectrum Bandwidth of a DSSS System / 20dB BW				X
§ 15.247 (b)(3)	Maximum output power (conducted)				X
§ 15.247 (b)(3)	Max. peak output power (radiated)				X
§15.247 (d)	Band-edge compliance of conducted emissions				X
§15.205	Band-edge compliance of radiated emissions	Yes			
§15.247 (d)	Spurious Emission - conducted (Transmitter)				X
§ 15.209	Spurious Emission -radiated (Transmitter)	Yes			
§ 15.109	Spurious Emissions-radiated (Receiver)	Yes			
§ 15.209	Spurious Emissions-radiated <30 MHz	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			

5 RF measurement testing

5.1 Description of test set-up

5.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 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 C63.4-2003 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 set-ups 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 C63.4-2003 clause 4.2.

Antennas are confirmed with ANSI C63.2-1996 item 15.

9 kHz - 150 MHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.

150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, biconical antenna

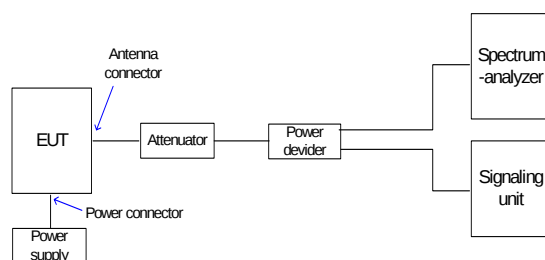
200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

5.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal path are first checked within a calibration. The measurement readings on the 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.



5.2 Referenced Documents

None

5.3 Additional comments

Tests performed according to test plan.

5.4 Antenna gain

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

Not performed!

	low channel	mid channel	high channel
Conducted power [dBm] (measured)			
Radiated power [dBm] (measured)			
Gain [dBi] (calculated)			

5.5 Peak Power Spectral density (digitally modulated systems) §15.247(e)

Not performed!

DSSS

Results: Plot 1: Power density: - dBm/Hz = - dBm / 3 kHz
Plot 2: Power density: - dBm/Hz = - dBm / 3 kHz
Plot 3: Power density: - dBm/Hz = - dBm / 3 kHz

Correction factor from dBm/Hz to dBm/3 kHz is +34,8 dB

OFDM

Results: Plot 1: Power density: - dBm/Hz = - dBm / 3 kHz
Plot 2: Power density: - dBm/Hz = - dBm / 3 kHz
Plot 3: Power density: - dBm/Hz = - dBm / 3 kHz

Correction factor from dBm/Hz to dBm/3 kHz is +34,8 dB

Limits:

Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission
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5.6 Spectrum Bandwidth of a DSSS System / 6 dB Bandwidth §15.247(a) (2)

Not performed!

DSSS

Results:

Test conditions		6 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}			
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

OFDM

Results:

Test conditions		6 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}			
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

Limits:

Under normal test conditions only	> 500 kHz
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5.7 Spectrum Bandwidth of a DSSS System / 20 dB Bandwidth

Not performed!

DSSS

Results:

Test conditions		20 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}			
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

OFDM

Results:

Test conditions		20 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}			
Measurement uncertainty		±1kHz		

RBW: 100 kHz / VBW 100 kHz

5.8 Maximum output power (conducted) §15.247 (b) (3)

Not performed!

DSSS

Results:

Test conditions		Max. peak output power [dBm]			
Frequency [MHz]		2412		2437	2462
T _{nom}	V _{nom}	PK			
		PK corrected			
De facto EIRP (Peak) [dBm]					
Antenna gain: [dBi]					
Measurement uncertainty		±3dB			

RBW / VBW: 10 MHz

OFDM

Results:

Test conditions		Max. peak output power [dBm]			
Frequency [MHz]		2412		2437	2462
T _{nom}	V _{nom}	PK			
		PK corrected			
De facto EIRP (Peak) [dBm]					
Antenna gain: [dBi]					
Measurement uncertainty		±3dB			

RBW / VBW: 10 MHz

The correction factor is calculated by $10 \times \log (\text{measured BW} / \text{used BW})$ [dB]

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt / 30 dBm
--	------------------------

MPE calculation**Not performed!**

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm²)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the centre of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation:

(Calculated for max. EIRP)

EIRP: dBm (mW)

calculated at distance of 20 cm:

power density = -- /4π20² = -- mW/ cm²

Limit:

1mW/ cm² is the reference level for general public exposure according to the OET Bulletin 65,
Edition 97-01 Table 1.

5.9 Max. peak output power (radiated) §15.247 (b) (3)

DSSS (1Mb)

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}	13.9	16.9	16.3
Measurement uncertainty		±3dB		

RBW: 50 MHz/ VBW: 30 MHz

Measured at a distance of 3m

OFDM (54Mb)

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}	15.3	16.1	15.7
Measurement uncertainty		±3dB		

RBW: 50 MHz/ VBW: 30 MHz

Measured at a distance of 3m

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
--	---------------

5.10 Band-edge compliance of conducted emissions §15.247 (d)

Not performed!

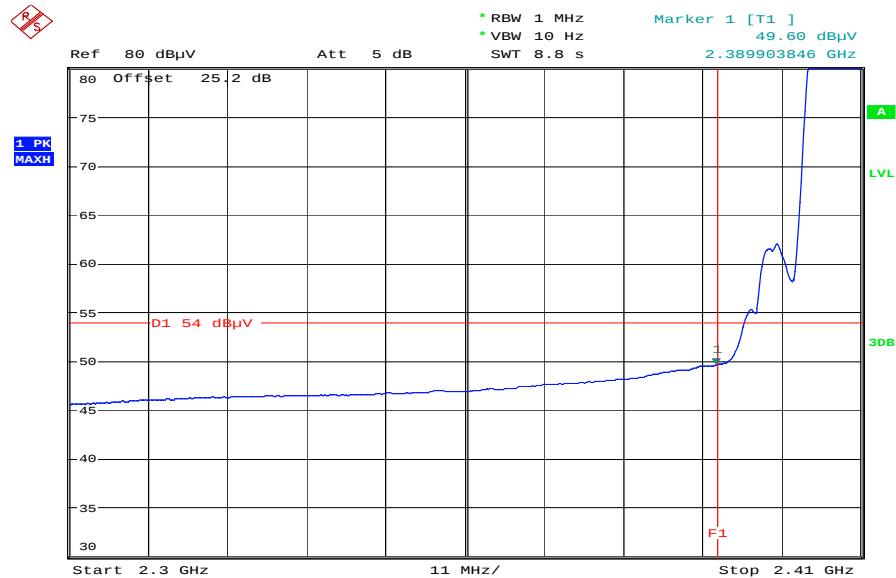
Limits:

Under normal test conditions only	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)).
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5.11 Band-edge compliance of radiated emissions §15.205

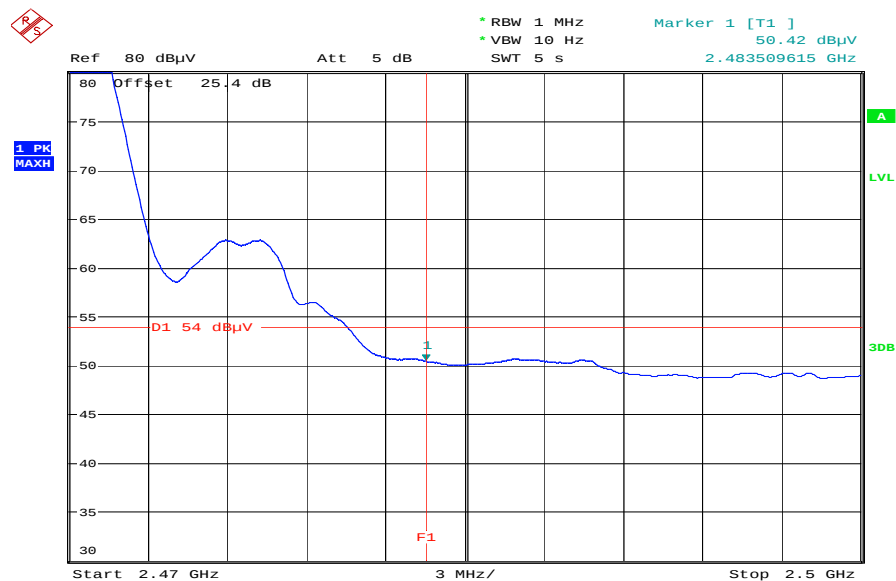
DSSS

Plot 1: Restricted Bands low (1M)



Date: 6.AUG.2009 12:09:12

Plot 2: Restricted Bands high (1M)

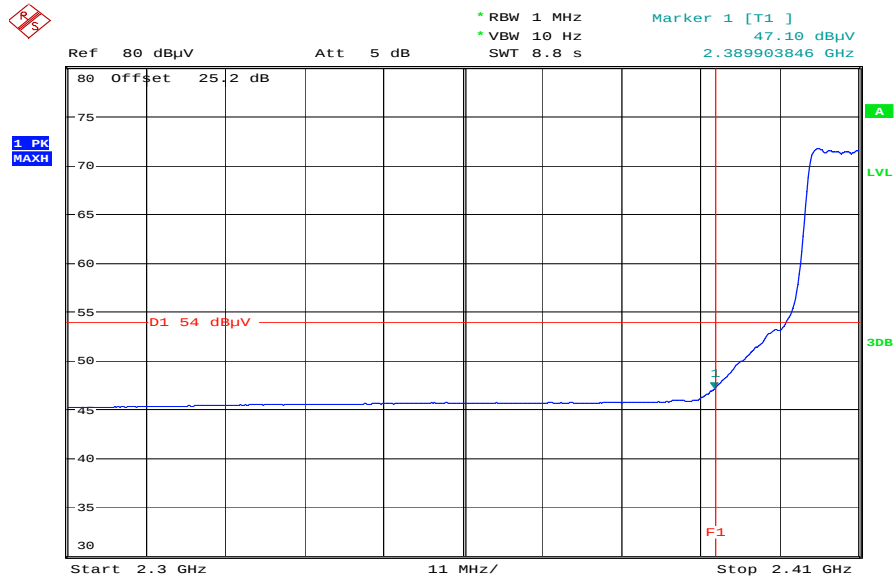


Date: 6.AUG.2009 12:13:32

The result of the measurement is passed.

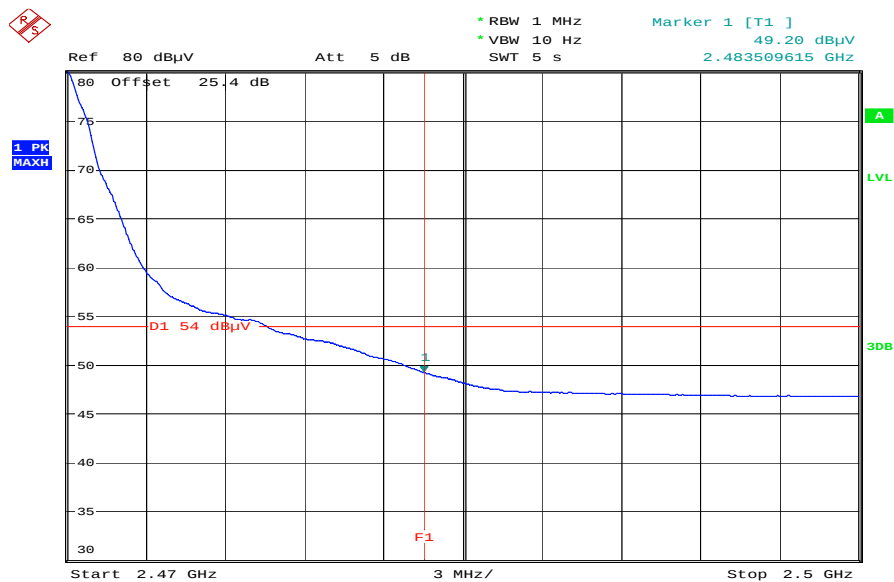
OFDM

Plot 1: Restricted Bands low (54M)



Date: 6.AUG.2009 12:10:37

Plot 2: Restricted Bands high (54M)



Date: 6.AUG.2009 12:15:22

The result of the measurement is passed.

5.12 Spurious Emissions - conducted (Transmitter) §15.247 (c)

Not performed!

DSSS, OFDM:

Plot 1: Lowest Channel

Plot 2: Middle Channel

Plot 3: Highest Channel

Result & Limits:

Emission Limitations					
Frequency [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412			30 dBm	-	Operating frequency
			-20 dBc		
2437			30 dBm		Operating frequency
			-20 dBc		
2462			30 dBm		Operating frequency
			-20 dBc		
Measurement uncertainty		± 3dB			

F < 1 GHz: RBW: 100 kHz VBW: 100 kHz
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).
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Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

5.13 Spurious Emissions - radiated (Transmitter) §15.209

DSSS:

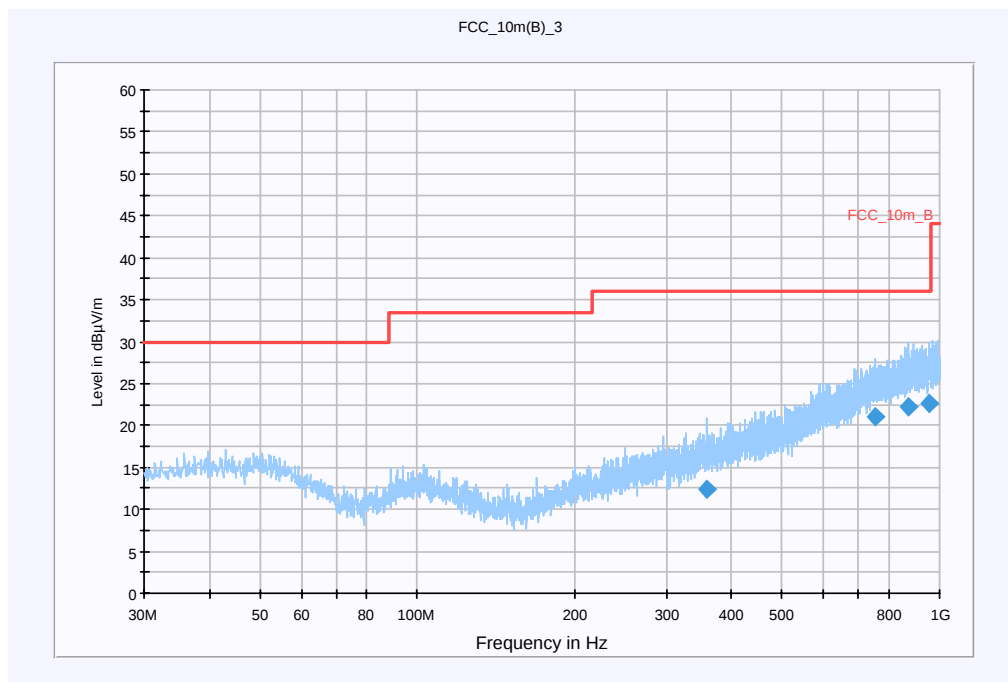
Plot 1: 0.03 - 1 GHz (lowest channel)

EUT:	RTS-1689-2.0 + HDW-15766-005 + HDW-17955-001 + HDW-24476-00
Serial Number:	
Test Description:	FCC Part 15 C @ 10m
Operating Conditions:	cont. TX CH:1 (2412 MHz)
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 - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

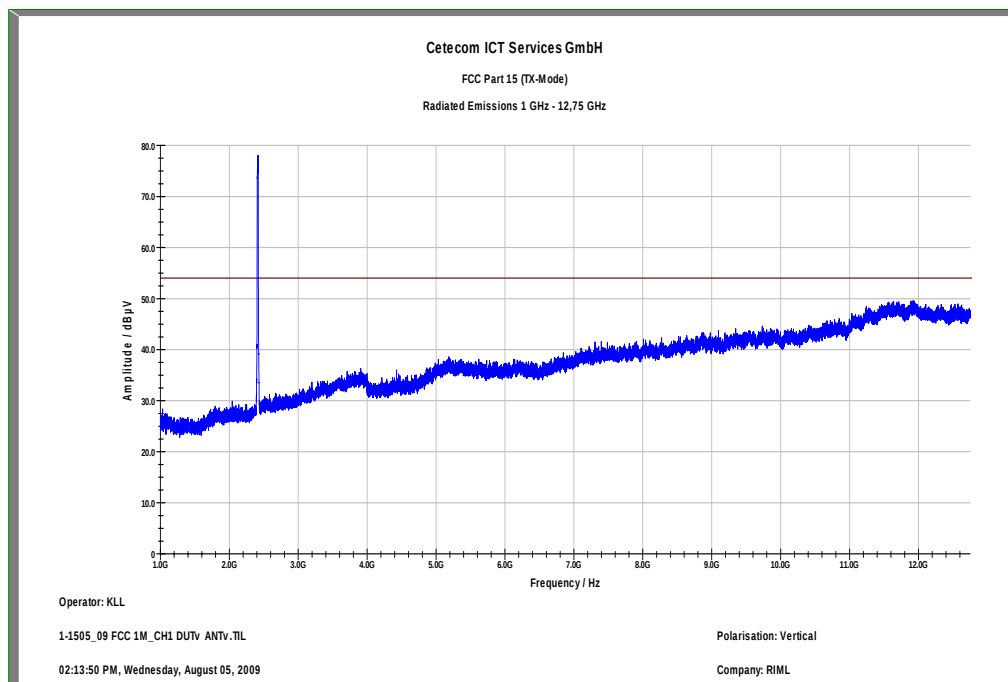


Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
358.659200	12.3	15000.000	120.000	104.0	H	138.0	16.6	23.7	36.0
752.279950	21.0	15000.000	120.000	220.0	H	265.0	24.2	15.0	36.0
873.967000	22.3	15000.000	120.000	197.0	H	285.0	25.4	13.7	36.0
956.078550	22.7	15000.000	120.000	147.0	V	240.0	25.9	13.3	36.0

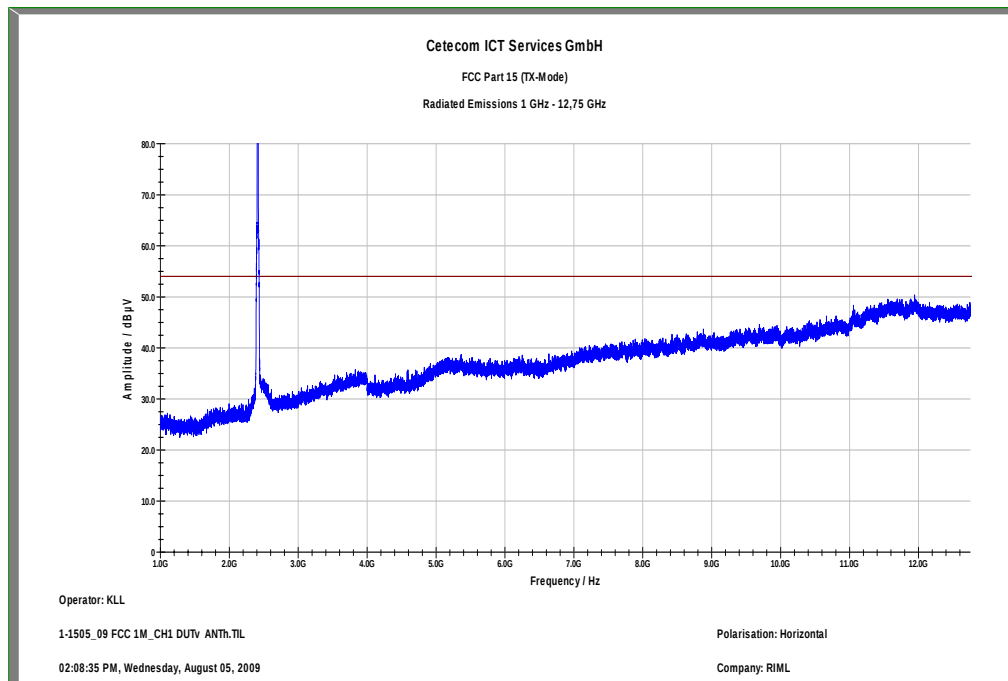
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1		
	Frequency Range:	30 MHz - 2 GHz
	Receiver:	Receiver [ESCI 3]
		@ GPIB0 (ADR 20), SN 100083/0033, 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 (0109)
	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	

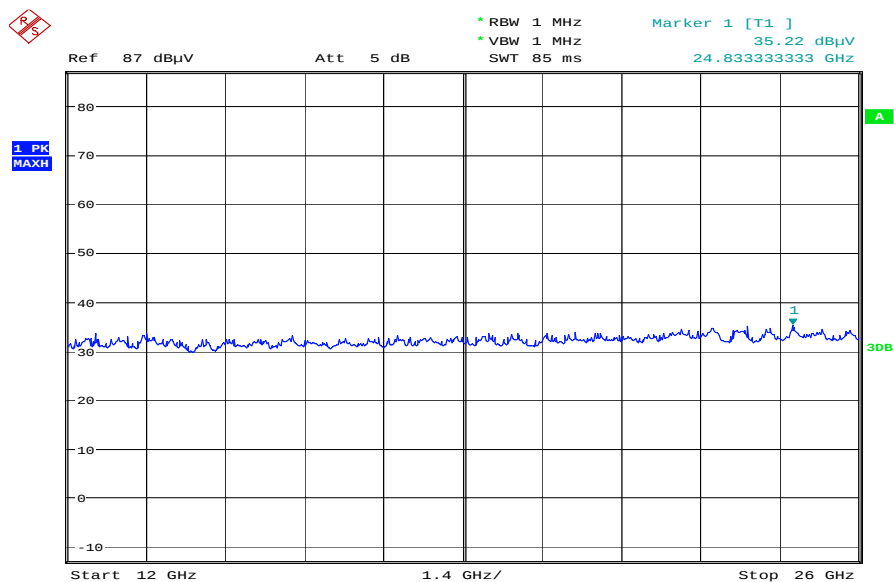
Plot 2: 1 - 13 GHz (lowest channel/1M) DUTv ANTv



Plot 3: 1 - 13 GHz (lowest channel/1M) DUTv ANTh



Plot 4: 12- 26 GHz (1M/valid for all channels)



Date: 6.AUG.2009 10:51:21

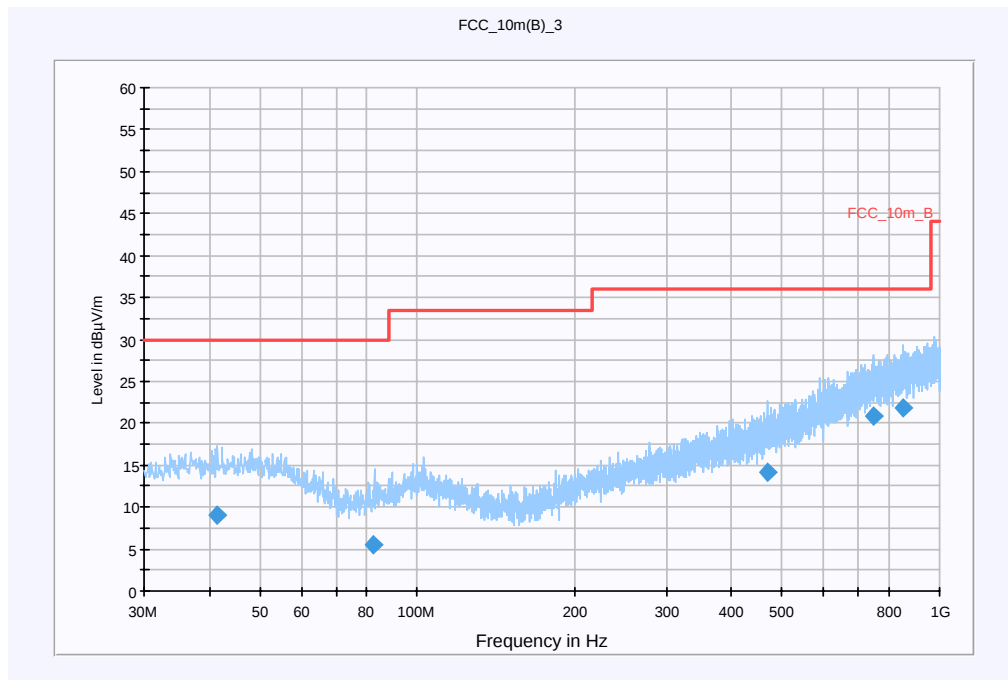
Plot 5: 0.03 - 1 GHz (middle channel)

EUT:	RTS-1689-2.0 + HDW-15766-005 + HDW-17955-001 + HDW-24476-00
Serial Number:	
Test Description:	FCC Part 15 C @ 10m
Operating Conditions:	cont. TX CH:6 (2437 MHz)
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 - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

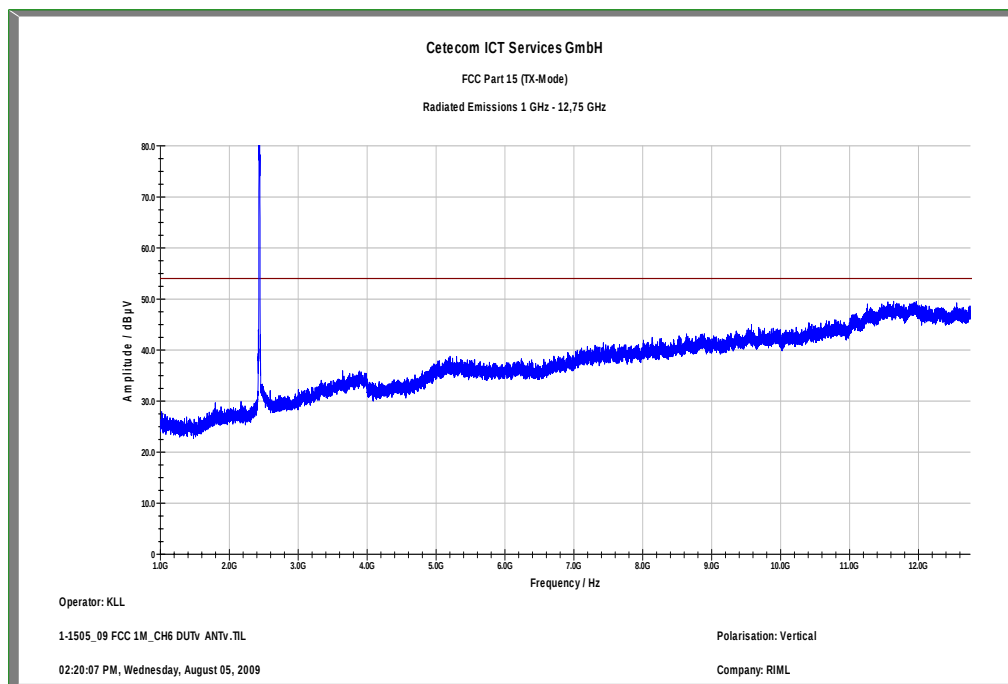


Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
41.463100	9.0	15000.000	120.000	220.0	H	257.0	13.5	21.0	30.0
82.167900	5.5	15000.000	120.000	120.0	H	273.0	9.7	24.5	30.0
469.816350	14.2	15000.000	120.000	220.0	H	48.0	18.5	21.8	36.0
750.044100	20.8	15000.000	120.000	220.0	V	47.0	24.2	15.2	36.0

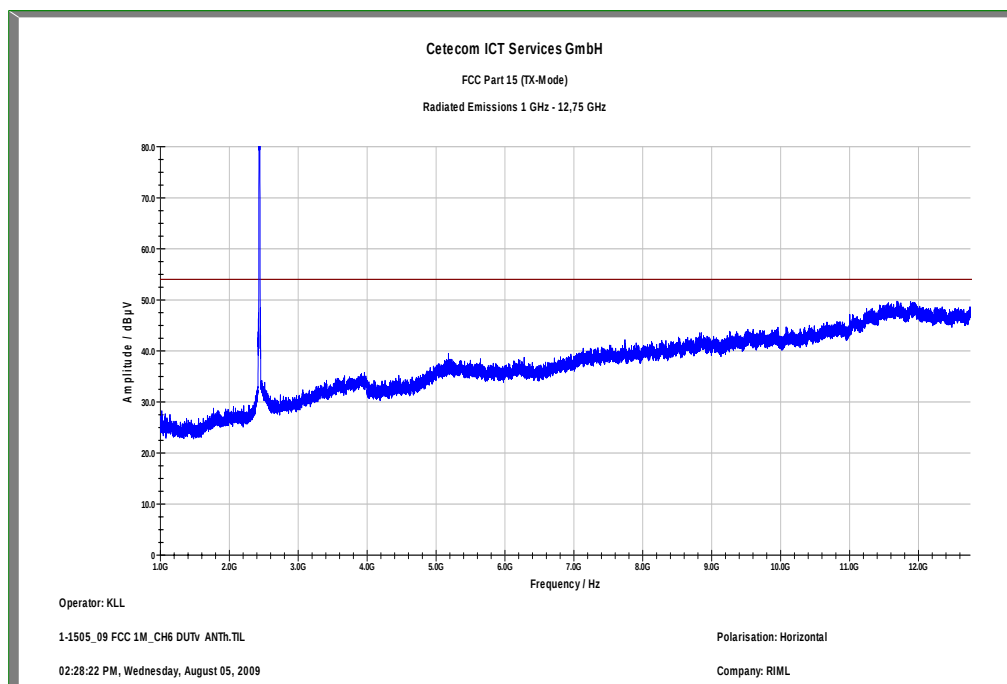
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1		
	Frequency Range:	30 MHz - 2 GHz
	Receiver:	Receiver [ESCI 3]
		@ GPIB0 (ADR 20), SN 100083/0033, 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 (0109)
	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 6: 1 - 13 GHz (middle channel/1M) DUTv ANTv



Plot 7: 1 - 13 GHz (middle channel/1M) DUTv ANTh



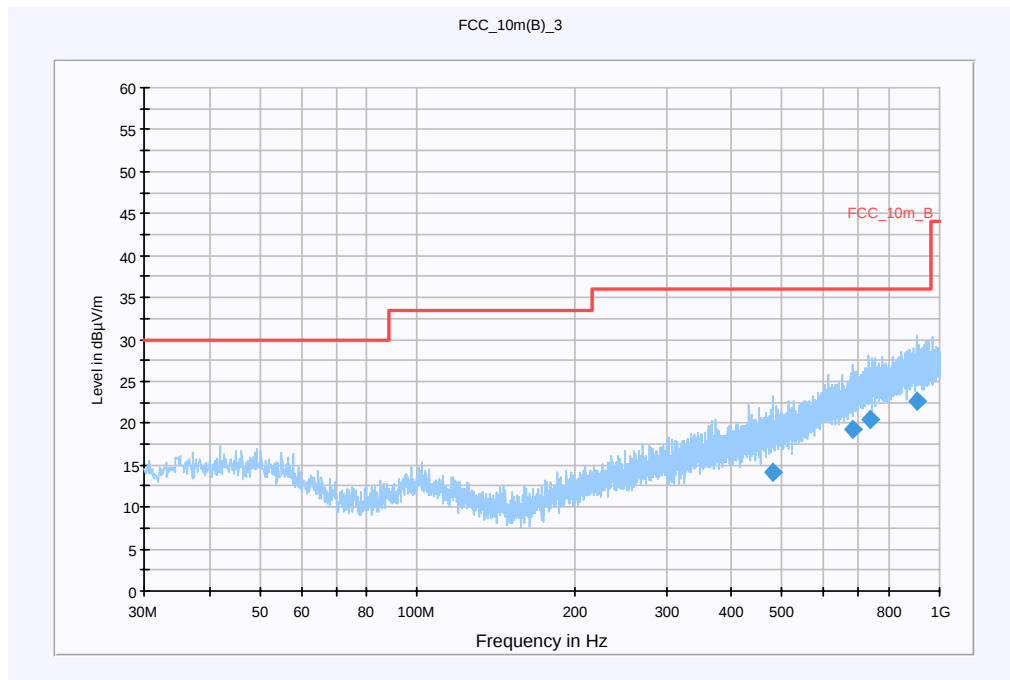
Plot 8: 0.03 - 1 GHz (highest channel)

EUT:	RTS-1689-2.0 + HDW-15766-005 + HDW-17955-001 + HDW-24476-00
Serial Number:	
Test Description:	FCC Part 15 C @ 10m
Operating Conditions:	cont. TX CH:11
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 - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

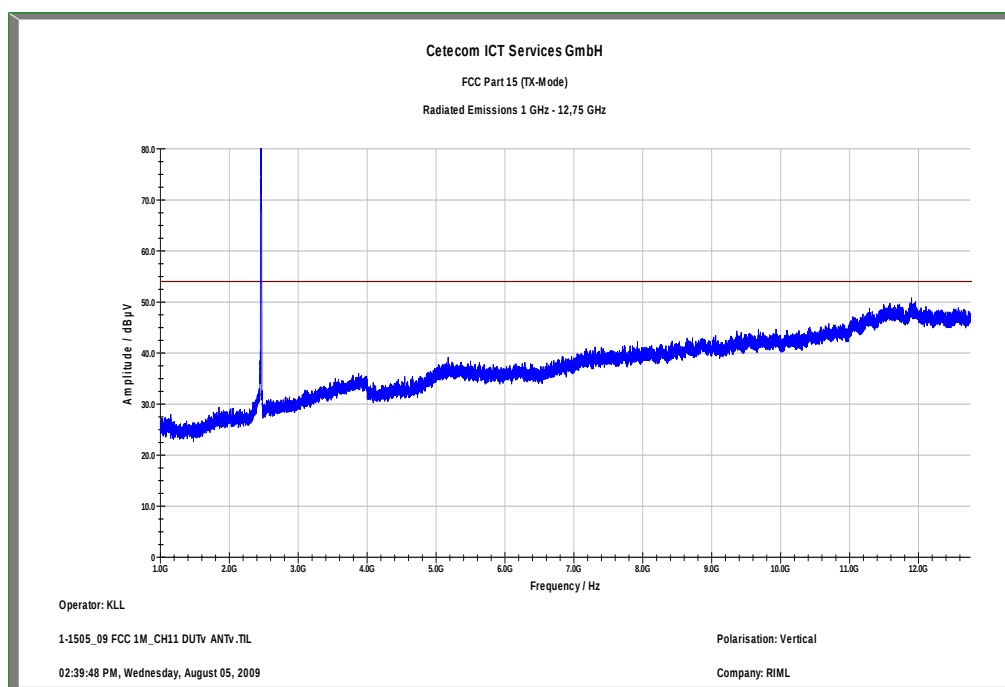


Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
479.136700	14.2	15000.000	120.000	220.0	V	133.0	18.7	21.8	36.0
683.730900	19.3	15000.000	120.000	120.0	V	176.0	22.6	16.7	36.0
733.420600	20.5	15000.000	120.000	120.0	H	22.0	23.8	15.5	36.0
901.803450	22.7	15000.000	120.000	105.0	V	185.0	25.7	13.3	36.0

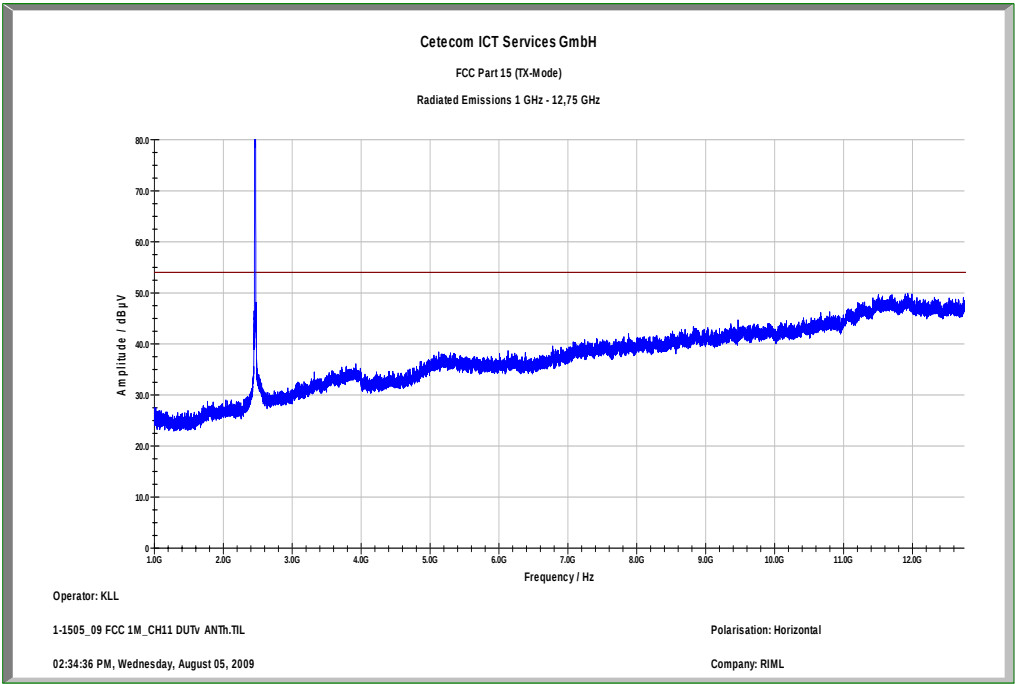
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/0033, 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 (0109)
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 9: 1 - 13 GHz (highest channel/1M) DUTv ANTv



Plot 10: 1 - 13 GHz (highest channel/1M) DUTv ANTh



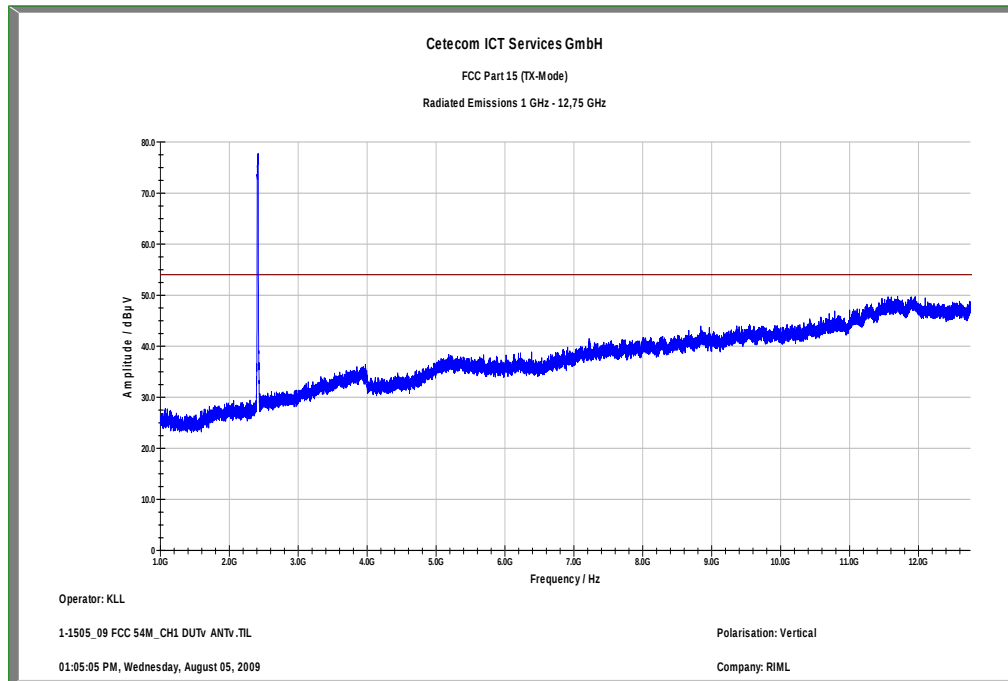
Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]
No critical peaks detected			No critical peaks detected			No critical peaks detected		
Measurement uncertainty			±3 dB					

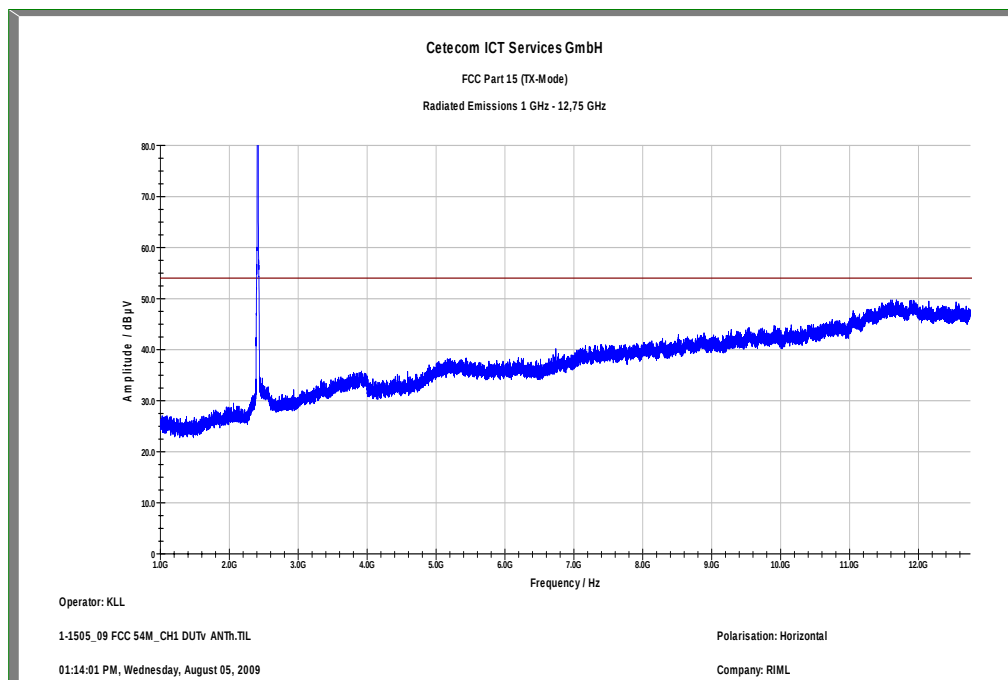
f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

OFDM:

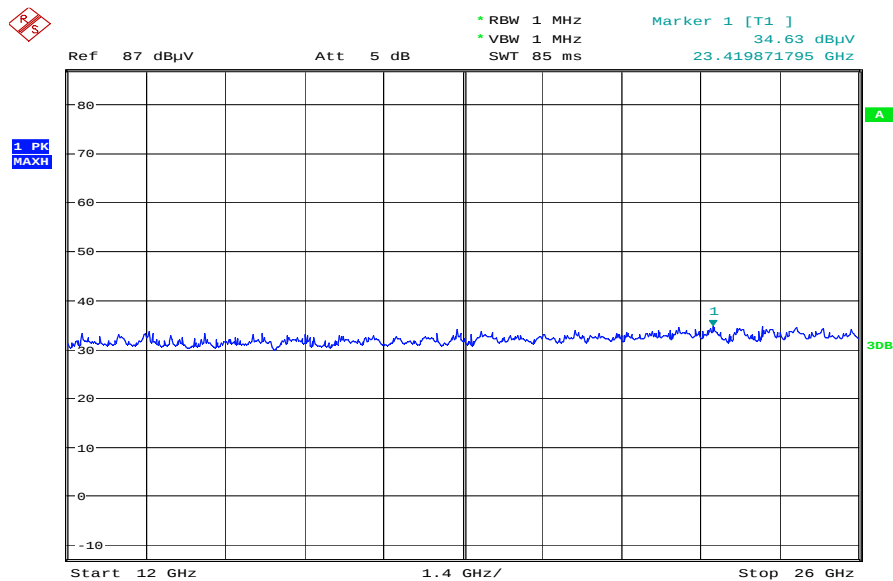
Plot 1: 1 - 13 GHz (lowest channel/54M) DUTv ANTv



Plot 2: 1 - 13 GHz (lowest channel/54M) DUTv ANTh

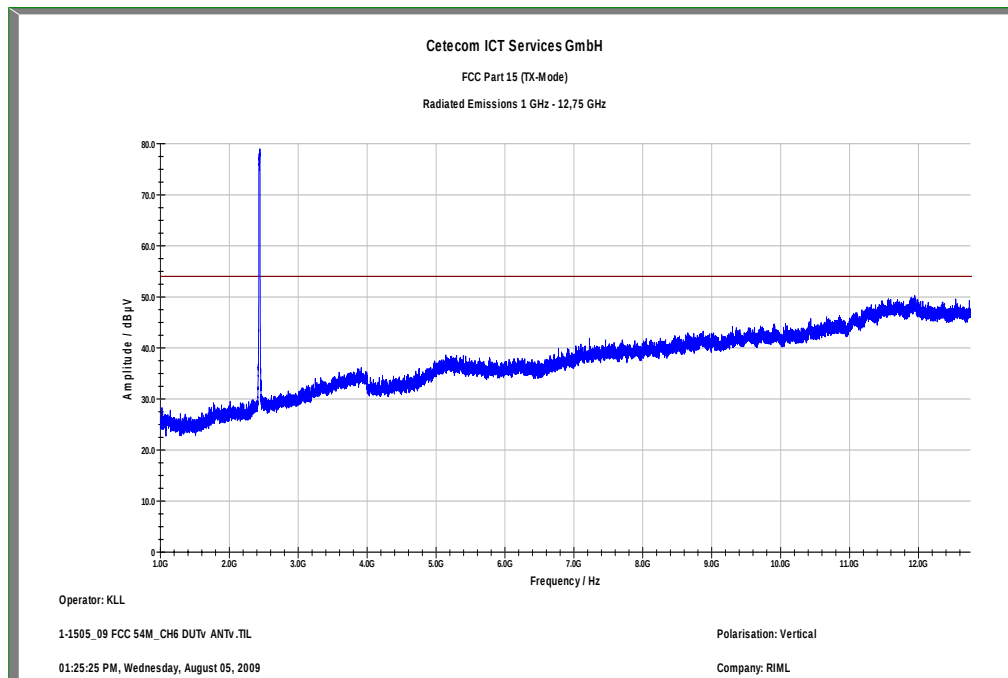


Plot 3: 12- 26 GHz (54M/valid for all channels)

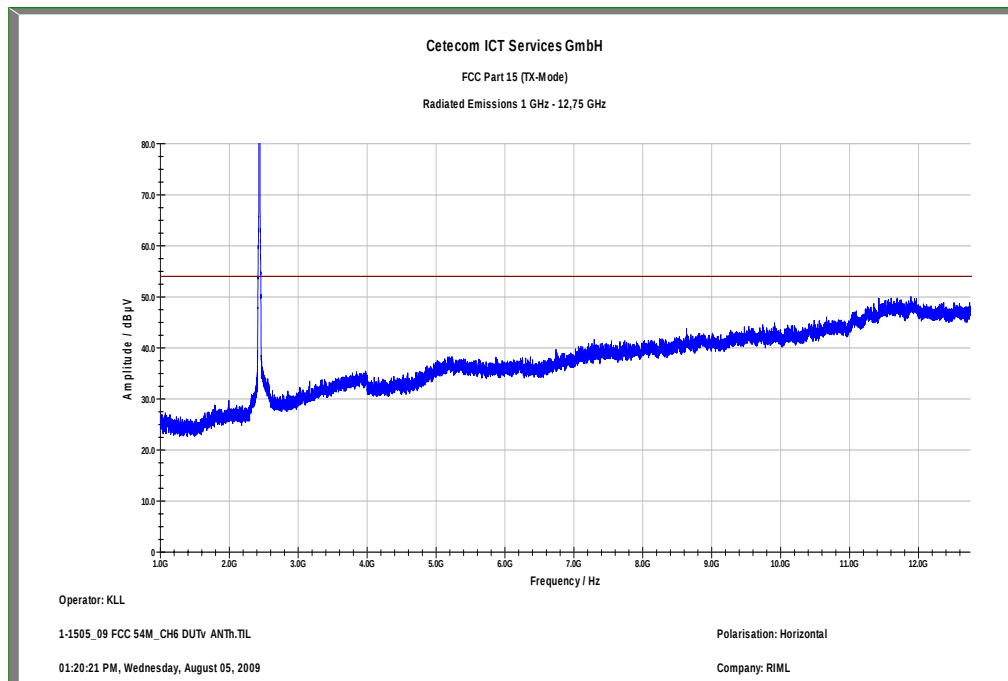


Date: 6.AUG.2009 10:52:30

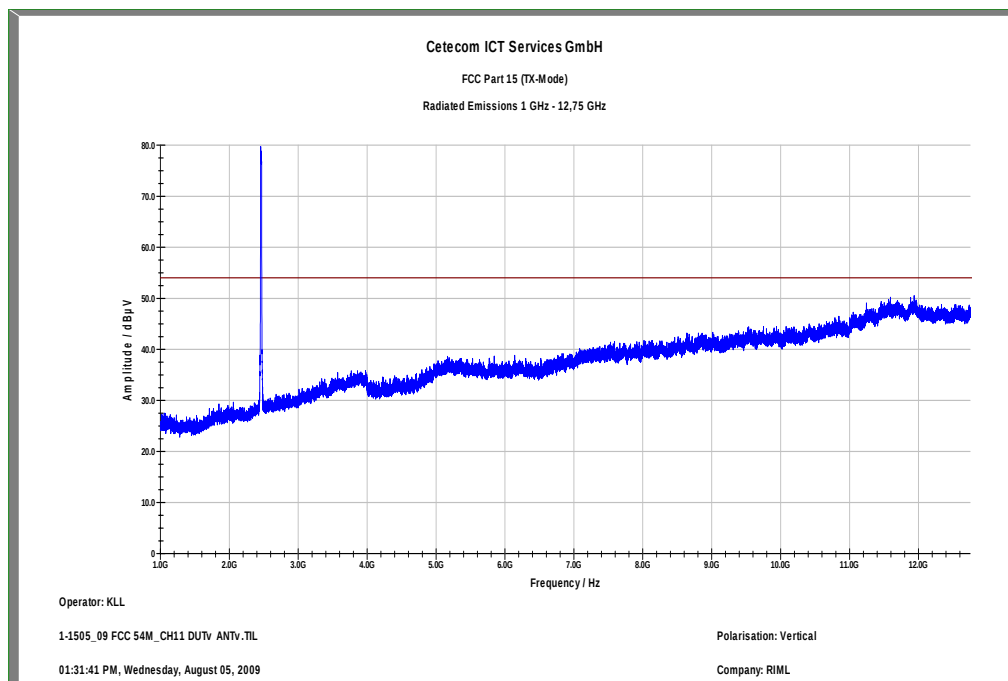
Plot 4: 1 - 13 GHz (middle channel/54M) DUTv ANTv



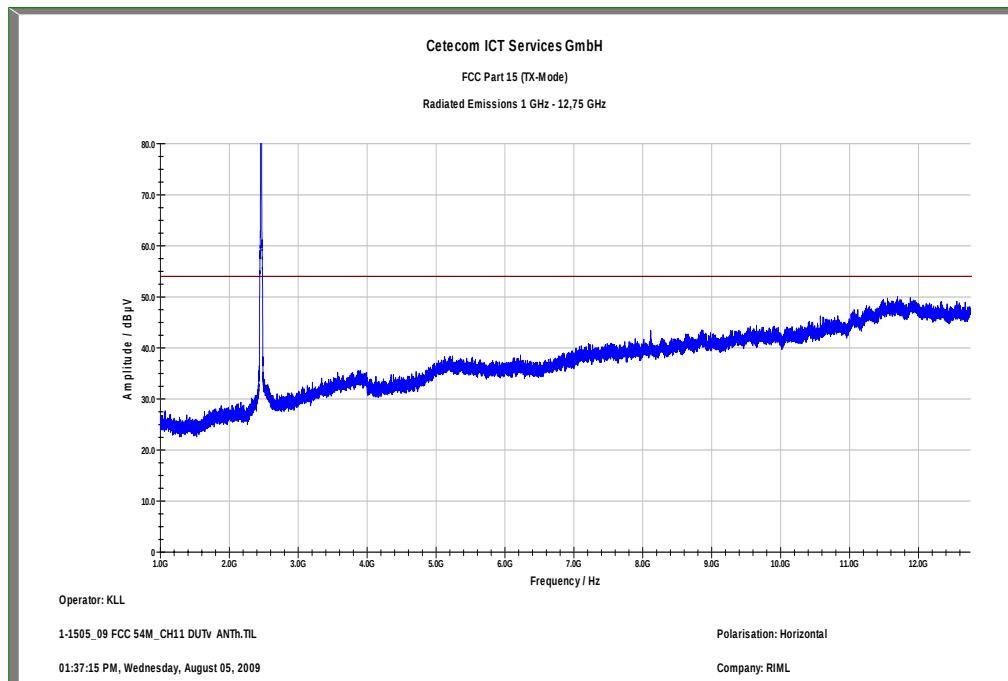
Plot 5: 1 - 13 GHz (middle channel/54M) DUTv ANTh



Plot 6: 1 - 13 GHz (highest channel/54M) DUTv ANTv



Plot 7: 1 - 13 GHz (highest channel/54M) DUTv ANTh



Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]
No critical peaks detected			No critical peaks detected			No critical peaks detected		
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

Limits:

§ 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

Limits:

§ 15.109

Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

5.14 Spurious Emissions - radiated (Receiver) §15.109 / 209

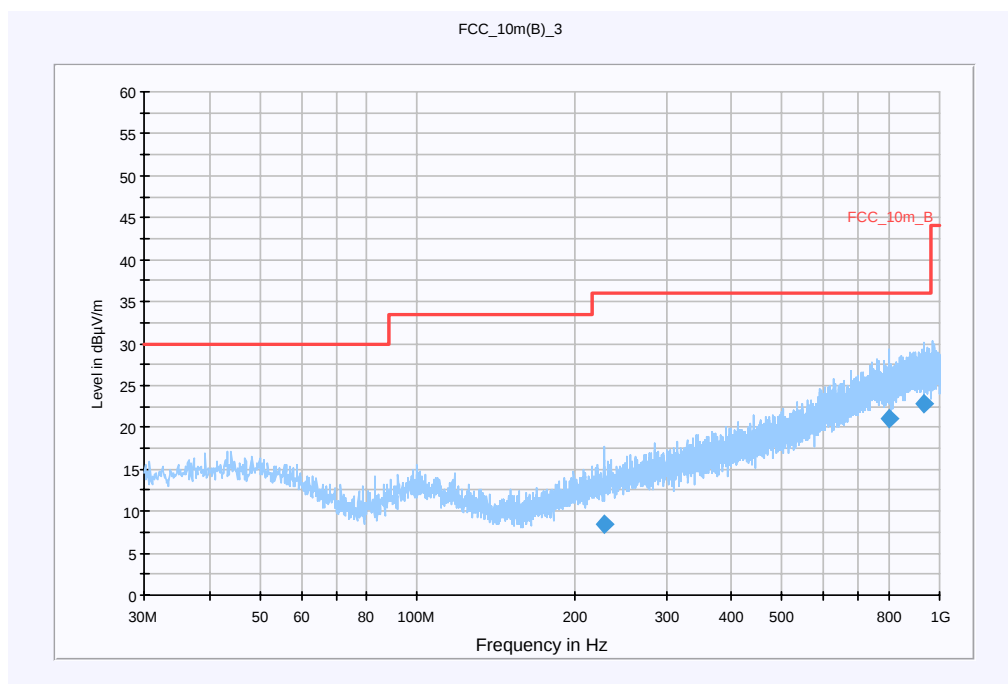
Plot 1: 0.03 - 1 GHz

EUT:	RTS-1689-2.0 + HDW-15766-005 + HDW-17955-001 + HDW-24476-00
Serial Number:	
Test Description:	FCC Part 15 C @ 10m
Operating Conditions:	RX
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 - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

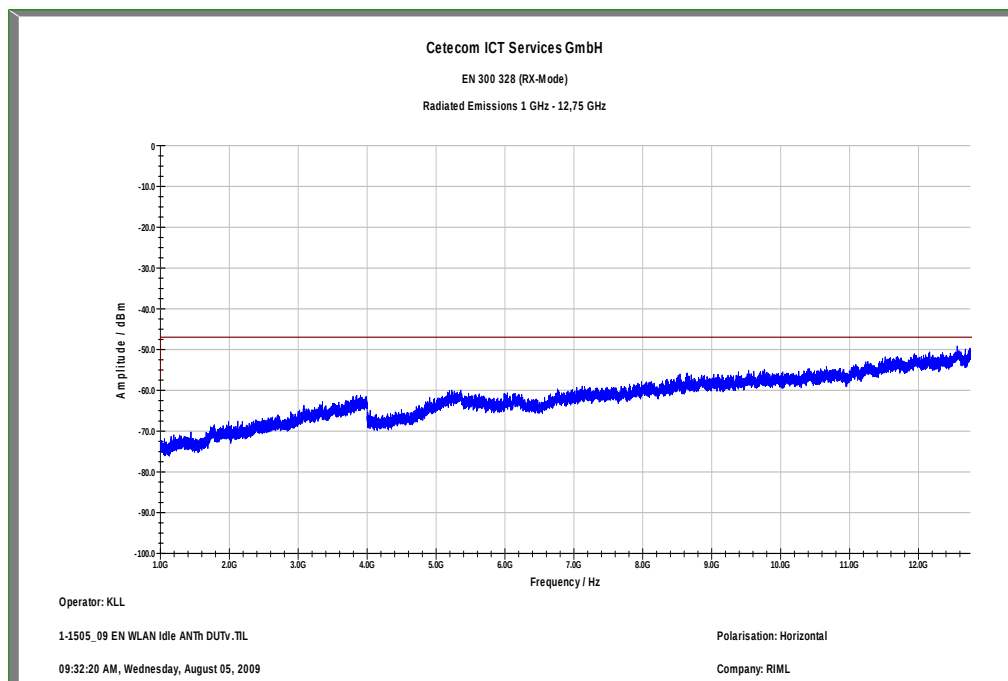


Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
228.842350	8.4	15000.000	120.000	120.0	H	262.0	13.0	27.6	36.0
803.254700	21.0	15000.000	120.000	98.0	H	267.0	24.4	15.0	36.0
931.029050	22.8	15000.000	120.000	220.0	H	30.0	25.8	13.2	36.0

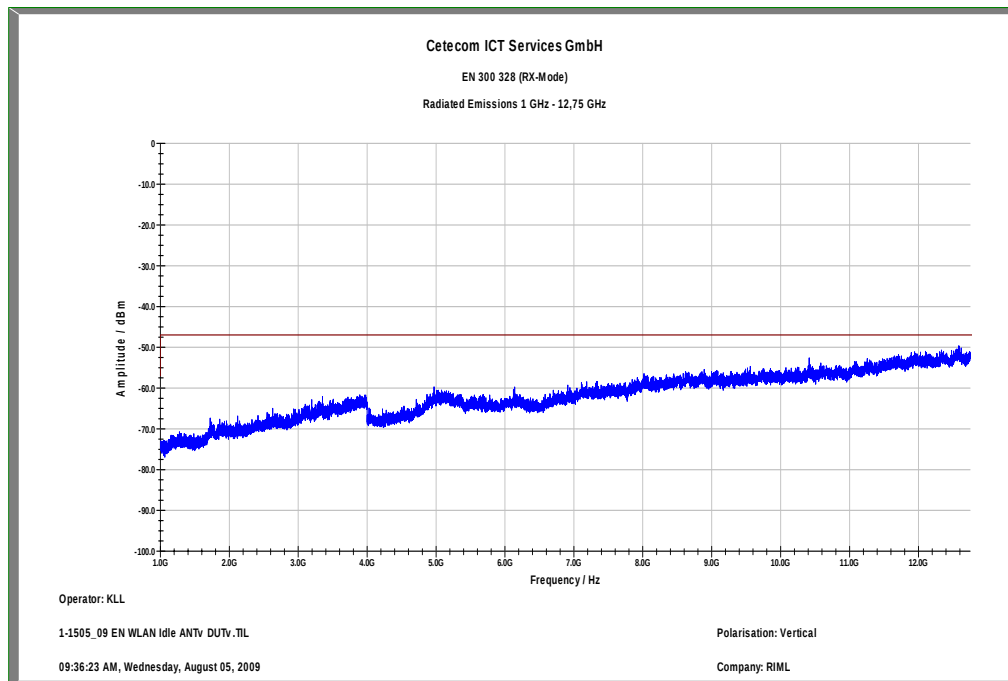
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1		
	Frequency Range:	30 MHz - 2 GHz
	Receiver:	Receiver [ESCI 3]
		@ GPIB0 (ADR 20), SN 100083/0033, 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 (0109)
	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	

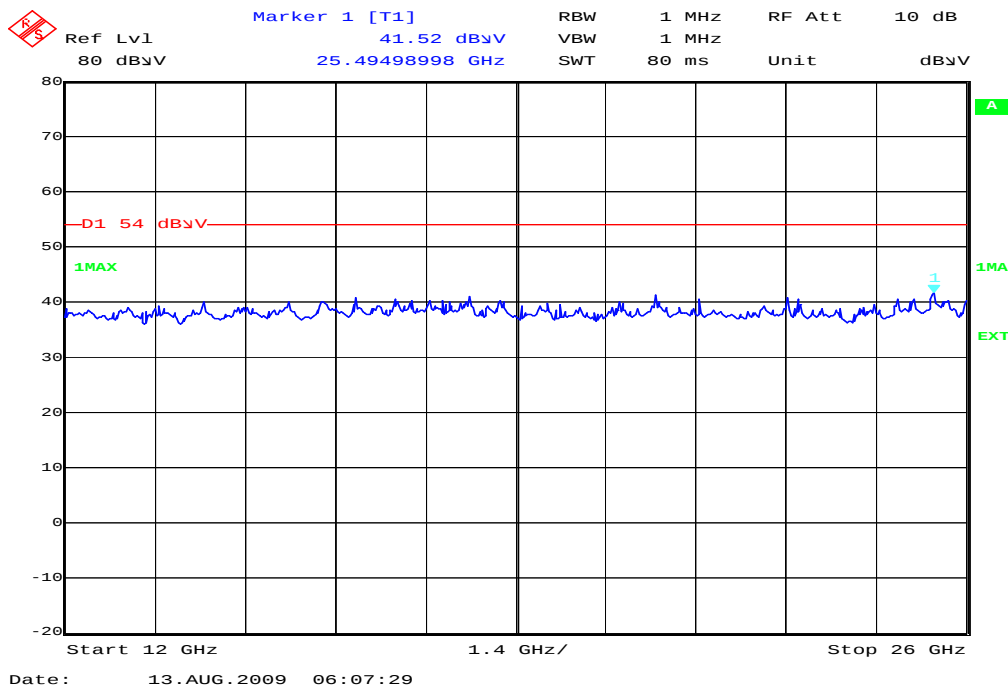
Plot 2: 1 - 13 GHz DUTh ANTv



Plot 3: 1 - 13 GHz DUTv ANTv



Plot 4: 12- 26 GHz (receiver)



Results:

Spurious Emissions level [dB μ V/m]		
Frequency [MHz]	Detector	Level [dB μ V/m]
No critical peaks detected		
Measurement uncertainty		± 3 dB

 $f < 1$ GHz : RBW/VBW: 100 kHz $f \geq 1$ GHz : RBW/VBW: 1 MHz

See above plots

Measurement distance see table

Limits:

§ 15.109

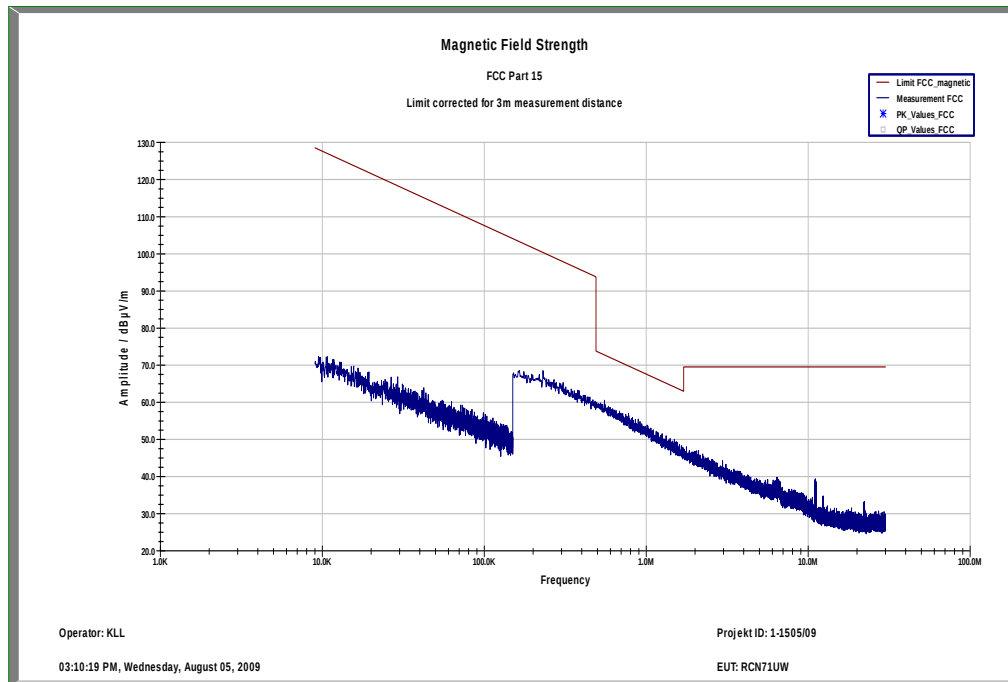
Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

5.15 Spurious Emissions - radiated <30 MHz §15.209

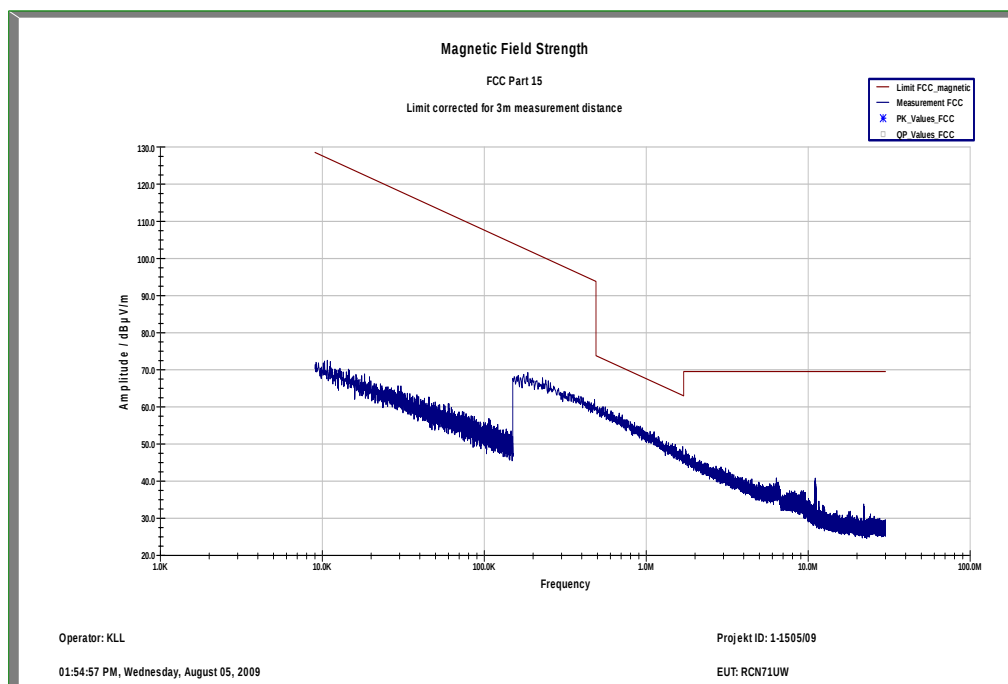
Measured at 3 m distance.

Values recalculated with 40 dB/decade according to FCC rules.

Plot 1: TX 1M



Plot 2: TX 54M



Limits:

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 – 30.0	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
above 960	54 dBµV/m	3

5.16 Conducted Emissions <30 MHz §15.107/207

Not performed!

Plot 1: CISPR 22

We measured in TX and RX mode, L1 and N floating and grounded, max value was hold.

Limits:

Under normal test conditions only	See plots
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6 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

Anechoic chamber C:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	PSA-Spektrumanalysator 3 Hz - 26.5 GHz (E4440A)	Agilent	MY48250080	300003812	05.08.2008	24	05.08.2010
5	EMI Preselector 9 kHz - 1 GHz (N9039A)	Agilent	MY48260003	300003825	19.08.2008	24	19.08.2010
6	Microwave Analog Signal Generator (N5183A)	Agilent	MY47420220	300003813	06.08.2008	24	06.08.2010
7	PC	F+W			n.a.		
8	TILE	TILE			n.a.		
9	TRILOG Super Broadband Antenna (VULB9163)	Schwarzbeck	371	300003854	Monthly verification (System cal.)		
10	Double Ridged Antenna 3115	EMCO	3088	300001032	Monthly verification (System cal.)		
11	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
12	Switch / Control Unit 3488A	HP	2719A15013	300001156	n.a.		
13	Power Supply 6032A	HP	2818A03450	300001040	08.01.2009	36	08.01.2012
14	Busisolator	Kontron		300001056	n.a.		
15	Leitungsteiler 11850C	HP		300000997	Monthly verification (System cal.)		
16	Power attenuator 8325	Byrd	1530	300001595	Monthly verification (System cal.)		
17	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verification (System cal.)		
18	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verification (System cal.)		
19	Hochpassfilter WHK1.1/15G-10SS	Wainwright	3	300003255	Monthly verification (System cal.)		
20	Hochpassfilter WHKX2.9/18G-12SS	Wainwright	1	300003492	Monthly verification (System cal.)		
21	Hochpassfilter WHKX7.0/18G-8SS	Wainwright	18	300003789	Monthly verification (System cal.)		
22	Switch / Control Unit 3488A	HP	2605e08770	300001443	n.a.		
23	Trenntrafo RT5A	Grundig	9242	300001263	n.a.		
24	Relais Matrix PSU	R&S	890167/024	300001168	n.a.		
25	Netznachbildung ESH3-Z5	R&S	828576/020	300001210	n.a.		

Signalling Units:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	CBT	R&S	100313	300003516	03.09.2008	24	03.09.2010
2	CBT	R&S	100185	300003416	27.08.2008	24	27.08.2010
3	CMU-200	R&S	106240	300003321	27.08.2008	24	27.08.2010
4	CMU-200	R&S	832221/0055	300002862	20.03.2008	24	20.03.2010

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No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	NRP Power Meter	R&S	100212	300003780	27.02.2008	24	27.02.2010

Anechoic chamber F:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna VULB 9163	Schwarzbeck	295	300003787	01.04.2008	24	01.04.2010
3	Amplifier - 0518C-138	Veritech Micro-wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2007	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-