



TEST REPORT

Test Report No.: 1-6234/13-01-06-B



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
 Internet: <http://www.cetecom.com>
 e-mail: ict@cetecom.com

Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkKS). The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Applicant

Research In Motion Limited
 305 Phillip Street
 Waterloo, ON N2L 3W8
 Canada
 Phone: +1 51 98 88 74 65
 Fax: +1 51 98 88 69 06
 Contact: Masud Attayi
 email: mattayi@rim.com

Manufacturer

Same as Applicant

Test Standard/s

47CFR15	2012-10	Subpart B - Unintentional Radiators
ICES-003, Issue 4	2012-08	Interference-Causing Equipment Standard Digital Apparatus

Test Item

Kind of test item: Blackberry GSM Phones
Model name: RFU81UW
FCC ID: L6ARFU80UW
IC: 2503A-RFU80UW
S/N serial number: IMEI: 004402242283665
 IMEI: 004402242346702
HW hardware status: CER-56900-001 Rev1-x03-00 (903)
 CER-56900-001 Rev3-x04-01
SW software status: 7.1.0.980, P 9.105.0.4(b2678)
 7.1.0.1014
Power Supply: AC 115V/60Hz

This test report is electronically signed and valid without handwritten signature. The public keys can be requested at the test laboratory to verify the electronic signatures.

Test performed:

Test Report authorised:

Joachim Wolsdorfer
 Testing Manager

Jens Hennemann
 Testing Manager

1 Table of contents

1 Table of contents 2

2 General information 3

 2.1 Notes and disclaimer 3

 2.2 Application details 4

3 Test standard/s: 4

4 Test Environment..... 4

5 Test Laboratories sub-contracted..... 4

6 Information about Test Conditions 5

 6.1 Test Item 5

 6.2 EUT: Type, S/N etc. and Short Descriptions Used in this Test Report..... 5

 6.3 Auxiliary Equipment (AE): Type, S/N etc. and Short Descriptions 6

 6.4 EUT Set-up(s) and operation modes..... 7

7 Summary of Test Results 8

 7.1 Emission 8

 7.2 Measurement and Test Set-up 9

 7.3 Measurement uncertainty..... 9

8 Detailed test results - Emission..... 10

 8.1 Conducted Emission 10

 8.2 Electromagnetic Radiated Emissions (Distance 10 m) 22

 8.3 Electromagnetic Radiated Emissions (Distance 5 m) 34

 8.4 Hardware Set-up (set 12 and set 13 – 1 to 26GHz) 48

 8.5 Radiated measurements 12.75 GHz to 25 GHz 49

9 Test equipment and ancillaries used for tests..... 50

10 Observations 53

Annex A: Photographs of the EUT 54

Annex D: Photographs of the Test setup..... 54

Annex B: Document history 55

Annex C: Further information..... 55

2 General information

2.1 Notes and disclaimer

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 generalizations 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.

The testing service provided by CETECOM ICT Services GmbH has been rendered under the current "General Terms and Conditions for CETECOM ICT Services GmbH".

CETECOM ICT Services GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.

Under no circumstances does the CETECOM ICT Services GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided.

Under no circumstances does the CETECOM ICT Services GmbH test report include or imply any product or service warranties from CETECOM ICT Services GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CETECOM ICT Services GmbH.

All rights and remedies regarding vendor's products and services for which CETECOM ICT Services GmbH has prepared this test report shall be provided by the party offering such products or services and not by CETECOM ICT Services GmbH.

In no case this test report can be considered as a Letter of Approval.

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

This test report replaces the test report with the number 1-6234/13-01-06-A and dated 2013-06-28

2.2 Application details

Date of receipt of order: 2013-05-10
Date of receipt of test item: 2013-05-15
Start of test: 2013-05-16
End of test: 2013-06-12
Person(s) present during the test: -/-

3 Test standard/s:

Test Standard	Version	Test Standard Description
47CFR15	2012-10	Subpart B - Unintentional Radiators
ICES-003, Issue 5	2012-08	Interference-Causing Equipment Standard Digital Aparatus

4 Test Environment

Temperature: 20°C – 25°C
Relative humidity content: 30 % - 50 %
Air pressure: 1020 hPa
Power supply: 230 V / 50 Hz

5 Test Laboratories sub-contracted

6 Information about Test Conditions

6.1 Test Item

Kind of test item :	Smartphone		
Type identification :	RFU81UW		
Equipment classification:	Equipment for portable use		
Environment classification:	Residential, commercial and light industry		
Supply voltage :	AC 115 V/ 60 Hz		
Ports : (maximum cable lengths declared by manufacturer)	Description	Direction	Length
	AC power port	Input	> 3m
	Signal/control port: Headset In/output	In / output	< 3m
Is mounting position / usual operating position defined?			hand held
Additional information:			
tests have been performed according to customers test plan the radio parts of the device are already tested and not part of this test report			

6.2 EUT: Type, S/N etc. and Short Descriptions Used in this Test Report

short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	Smartphone	RFU81UW	IMEI: 004402242283665	CER-56900-001 Rev1-x03-00 (903)	7.1.0.980, P9.105.0.4
EUT B	Smartphone	RFU81UW	IMEI: 004402242346702	CER-56900-001 Rev3-x04-01	7.1.0.1014

*) EUT short description is used to simplify the identification of the EUT in this test report.

6.3 Auxiliary Equipment (AE): Type, S/N etc. and Short Descriptions

AE description*)	Auxiliary equipment	Type	S/N serial number	HW hardware status	SW software status
AE A	wired headset (HS1)	Cresyn; HDW-44306-003	- / -	- / -	- / -
AE B	wired headset (HS2)	Hosiden; HDW-44306-003	- / -	- / -	- / -
AE C	wired headset (HS3)	Black Bird; HDW-49299-001	- / -	- / -	- / -
AE D	wired headset (HS4)	Black Bird, 3 button; HDW-53005-001	- / -	- / -	- / -
AE E	AC charger (CH1)	NA Cobra OMTP (850 mA) Charger (Flextronics) (Model RIM-C-0004ADUUS);HDW-47725-001	- / -	- / -	- / -
AE F	AC charger (CH2)	Scarlet NA 850mA Charger, usb-A - Black ;HDW-46445-00x	- / -	- / -	- / -
AE G	AC charger (CH3)	NAFB 1.8A with captive cable ;HDW-34724-001	- / -	- / -	- / -
AE H	AC charger (CH4)	WWTC 2.0A (Playbook R-036 Std);HDW-34725-002	- / -	- / -	- / -
AE I	AC charger (CH5)	WWTC 2.0A (Playbook R-053 Mod);HDW-34725-002	- / -	- / -	- / -
AE P	data cable (USB1)	1.2m USB Cable – Pihong;HDW-50071-00x	- / -	- / -	- / -
AE Q	data cable (USB2)	1.2m USB Cable – HL; HDW-50071-00x	- / -	- / -	- / -
AE R	data cable (USB3)	0.9m USB Cable – Pihong;HDW-51800-00x	- / -	- / -	- / -
AE S	data cable (USB4)	0.9m USB Cable - HL ; HDW-51800-00x	- / -	- / -	- / -
AE T	usb Y-cable (USB5)	HDW-19137-002	- / -	- / -	- / -
AE U	EBC	Samoa, J-Series EBC, Rev. C; HDW-24478-001	- / -	- / -	- / -

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report.

6.4 EUT Set-up(s) and operation modes

EUT Set-ups for conducted emission

EUT set-up no.*)	Combination of EUT and AE	operation mode
set 1	EUT A + AE A + AE E + AE P	GSM 850 idle + charging
set 2	EUT A + AE B + AE F + AE Q	PCS 1900 idle + charging
set 3	EUT A + AE C + AE G	UMTS FDD2 idle + charging
set 4	EUT A + AE D + AE H	UMTS FDD5 idle + charging
set 5	EUT A + AE C + AE I + AE T + AE U	GSM 850 idle + charging

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

EUT Set-ups for radiated emission

EUT set-up no.*)	Combination of EUT and AE	operation mode
set 6	EUT A + AE A + AE E + AE P	GSM 850 idle + charging
set 7	EUT A + AE B + AE F + AE Q	PCS 1900 idle + charging
set 8	EUT A + AE C + AE G	UMTS FDD2 idle + charging
set 9	EUT A + AE D + AE H	UMTS FDD5 idle + charging
set 10	EUT A + AE A + AE I	GSM 850 idle + charging
set 11	EUT B + AE A + AE I	UMTS FDD2 idle + charging
set 12	EUT A + AE A + AE E + AE R	Bluetooth (DH5)
set 13	EUT A + AE B + AE F + AE S	802.11b (CH6)

7 Summary of Test Results

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

7.1 Emission

7.1.1 Enclosure

EMI Phenomenon	Frequency range	Basic standard	Result
Radiated Interference Field Strength	30 - 1000 MHz	FCC Part 15 Class B	passed
Radiated Interference Field Strength	> 1 GHz	FCC Part 15 Class B	passed

7.1.2 AC Mains Power Input/Output Ports

EMI Phenomenon	Frequency range	Basic standard	Result
Conducted interference voltage	0,15– 30 MHz	FCC Part 15 Class B	passed

Remarks:

NA1	Not tested because not required by used standard
NA2	Test not applicable because port does not exists
NA3	Test not applicable because port only for services
NA4	Test not applicable because port lengths not longer than 3m
NA5	Not tested because not required by customer
NA6	Not tested because used frequency < 108 MHz

7.2 Measurement and Test Set-up

Note: The test configuration is in accordance with the requirements given in the standards in point 3

7.3 Measurement uncertainty

The uncertainty of the measurement equipment fulfils CISPR 16 and the related European and national standards.

The semi anechoic chamber fulfils the requirements of CISPR 16-1 (ANSI C63.4) for a test volume of 3m Ø.

The uncertainty of the measurement equipment fulfils CISPR 16 and the related European and national standards.

The semi anechoic chamber fulfils the requirements of CISPR 16-1 (ANSI C63.4) for a test volume of 3m Ø.

The table below shows the measurement uncertainties for each measurement method. The expanded uncertainty (k=2 or 95%) was calculated with worst case values.

Measurement Method	Frequency area Impulse duration time	Description	Expanded uncertainty (k=2 or 95%)
Radiated Emission FCC part 15 B, ANSI C63.4	30 MHz – 18 GHz	- / -	± 4.28 dB
Conducted Emission FCC part 15 B, ANSI C63.4	9 kHz – 30 MHz	- / -	± 3.49 dB

8 Detailed test results - Emission

8.1 Conducted Emission

8.1.1 Instrumentation for Test (see equipment list)

G 1	G 2	F 21								
-----	-----	------	--	--	--	--	--	--	--	--

8.1.2 Test Plan

EUT set-up	see test details		
Operating mode	Port / Line	Limit	Result
see test details	AC power line	FCC part 15 B Class B	passed

Remark : Powered by external power supply (115V / 60Hz)

8.1.3 Conducted Limits (Power-Line)

Frequency- range	FCC part 15 B Class B		FCC part 15 B Class A	
	Quasi-Peak (dB μ V)	Average (dB μ V)	Quasi-Peak (dB μ V)	Average (dB μ V)
0,15 MHz – 0,5 MHz	66-56	56-46	79	66
0,5 MHz -5 MHz	56	46	73	60
5 MHz -30 MHz	60	50	73	60

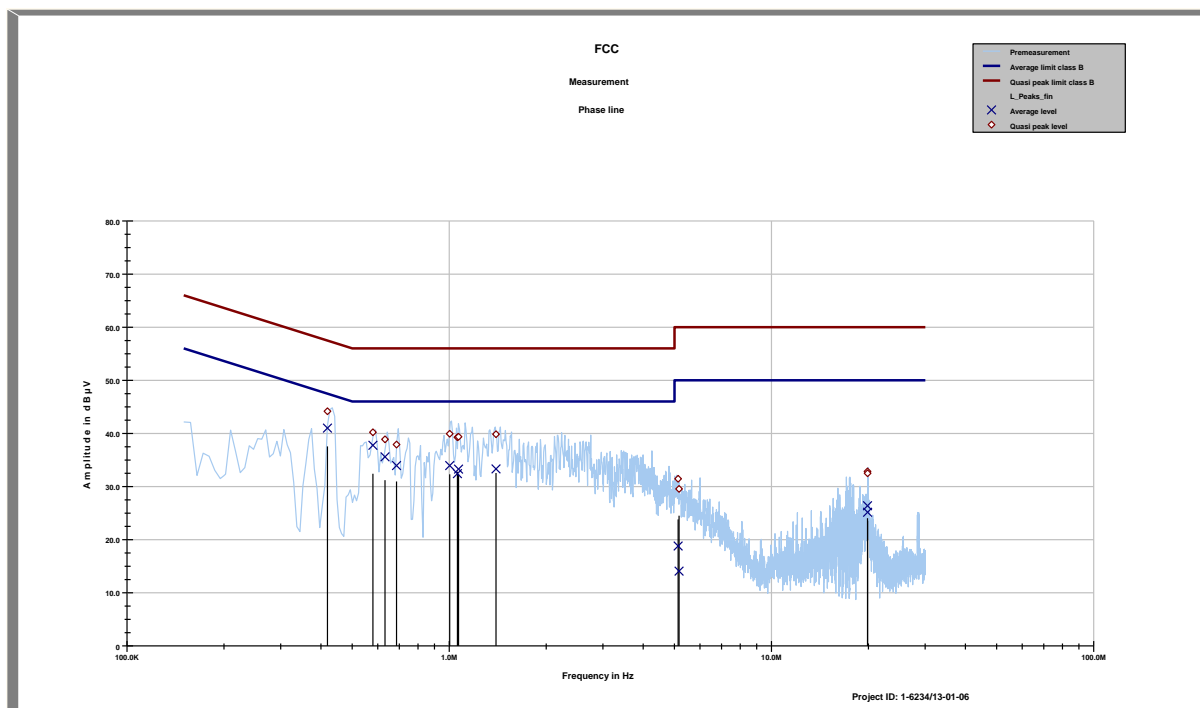
8.1.4 Calibration Information

Device	Serial number	ICT Number	Calibration valid until	Calibration interval
HP 8542 EMI Receiver with RF Filter Unit	3617A00170	300000568	01 / 2014	12 month
ESCI	100083	3000003312	01 / 2014	12 month
VISN ESH 3-Z5	892475/017	300002209	01 / 2014	24 month

Remarks: All emission components and the shielded room were checked weekly
Cable loss: 0.6 to 2.4 dB (150kHz to 30 MHz)

8.1.5 Test Results of Main

set 1:



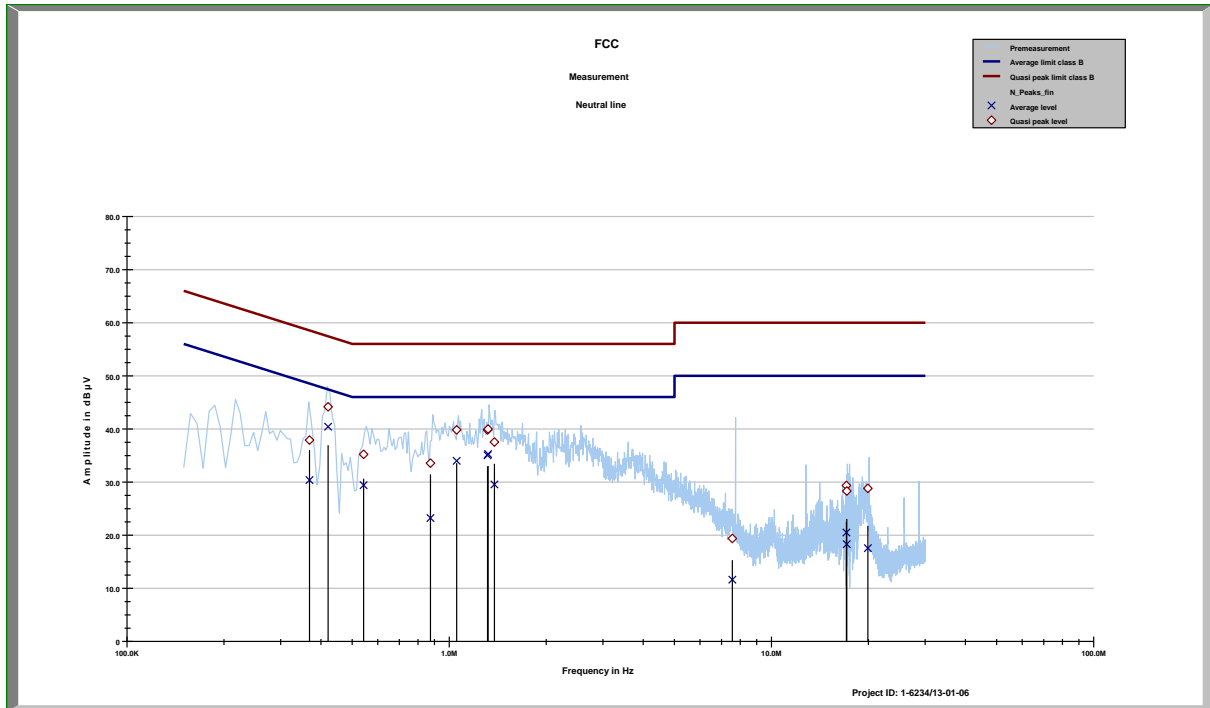
FCC
Phase line tbl

Project ID: 1-6234/13-01-06

09:08:37 AM, Thursday, May 23, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.41887	44.17	13.30	40.99	7.33
0.57954	40.21	15.79	37.76	8.24
0.63175	38.88	17.12	35.59	10.41
0.68601	37.89	18.11	33.95	12.05
1.00302	39.93	16.07	33.94	12.06
1.06018	39.26	16.74	32.42	13.58
1.06878	39.37	16.63	33.28	12.72
1.3962	39.84	16.16	33.32	12.68
5.1302	31.45	28.55	18.79	31.21
5.1629	29.55	30.45	14.07	35.93
19.854	32.84	27.16	26.38	23.62
19.857	32.50	27.50	25.15	24.85

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS1 + CH1 + USB1
 Serial Number - imei:004402242283665
 Operating mode - GSM 850 idle + charging



FCC
Neutral line tbl

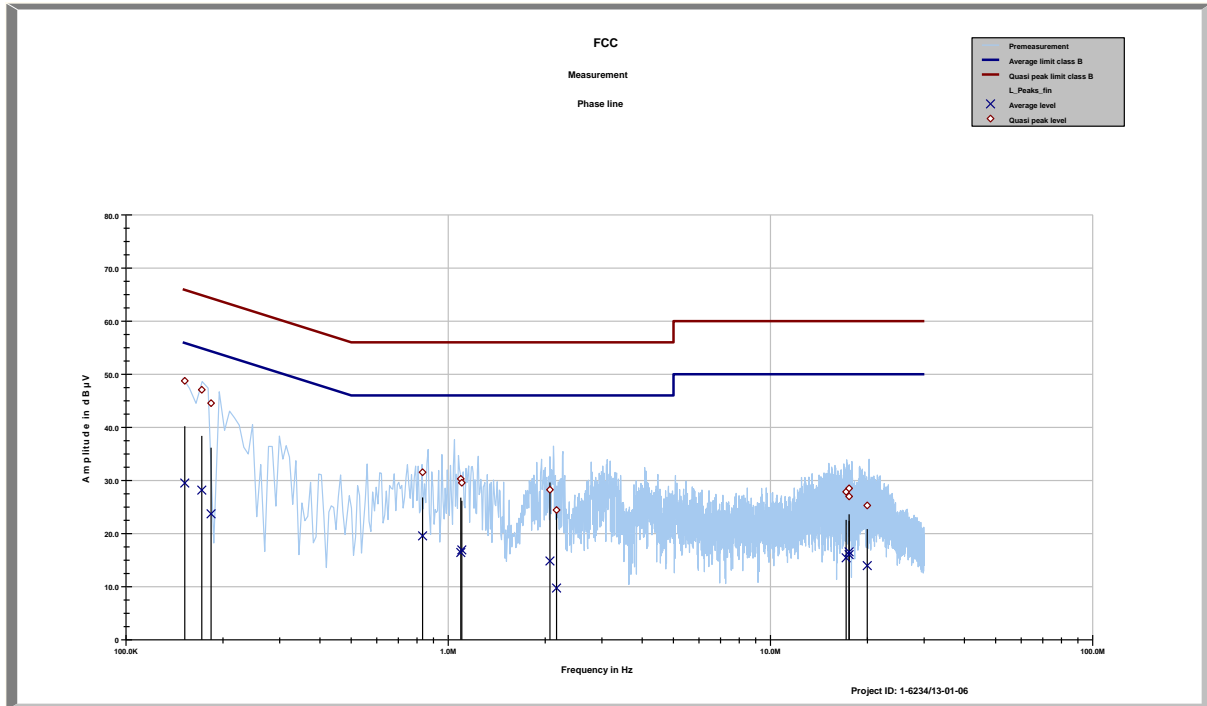
Project ID: 1-6234/13-01-06

09:08:37 AM, Thursday, May 23, 2013

MHz	dBµV	dBµV	dBµV	dBµV
0.36839	37.89	20.64	30.36	19.40
0.42075	44.17	13.27	40.42	7.84
0.54245	35.22	20.78	29.40	16.60
0.87409	33.56	22.44	23.22	22.78
1.05424	39.82	16.18	33.99	12.01
1.3145	39.81	16.19	35.02	10.98
1.3197	39.98	16.02	35.28	10.72
1.3805	37.54	18.46	29.54	16.46
7.5555	19.37	40.63	11.62	38.38
17.068	29.35	30.65	20.50	29.50
17.119	28.30	31.70	18.30	31.70
19.906	28.82	31.18	17.55	32.45

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS1 + CH1 + USB1
 Serial Number - imei:004402242283665
 Operating mode - GSM 850 idle + charging

set 2:



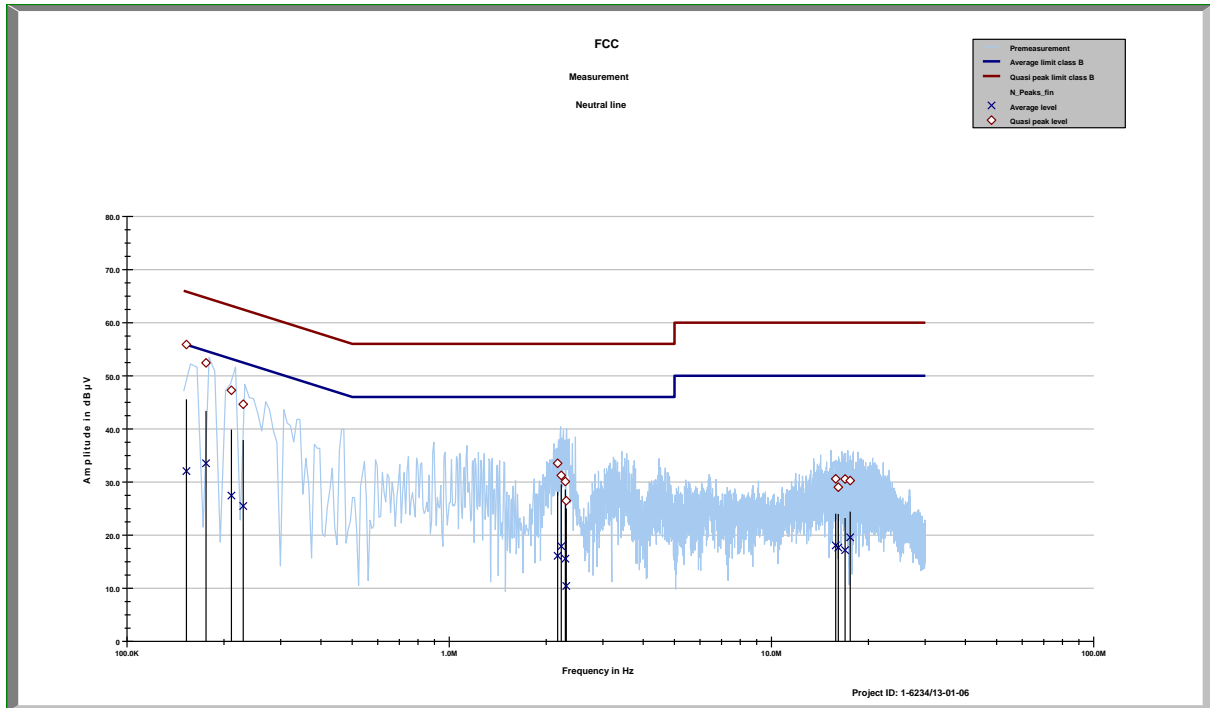
FCC
Phase line tbl

Project ID: 1-6234/13-01-06

09:27:59 AM, Thursday, May 23, 2013

MHz	dBµV	dBµV	dBµV	dBµV
0.15219	48.75	17.13	29.50	26.43
0.1719	47.07	17.80	28.19	27.19
0.18363	44.55	19.77	23.71	31.33
0.83222	31.55	24.45	19.56	26.44
1.09387	30.29	25.71	16.43	29.57
1.10135	29.57	26.43	16.93	29.07
2.0685	28.25	27.75	14.85	31.15
2.1682	24.44	31.56	9.74	36.26
17.166	27.86	32.14	15.43	34.57
17.528	28.52	31.48	16.55	33.45
17.53	27.00	33.00	16.03	33.97
19.956	25.29	34.71	13.97	36.03

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS2 + CH2 + USB2
 Serial Number - imei:004402242283665
 Operating mode - PCS1900 idle + charging



FCC
Neutral line tbl

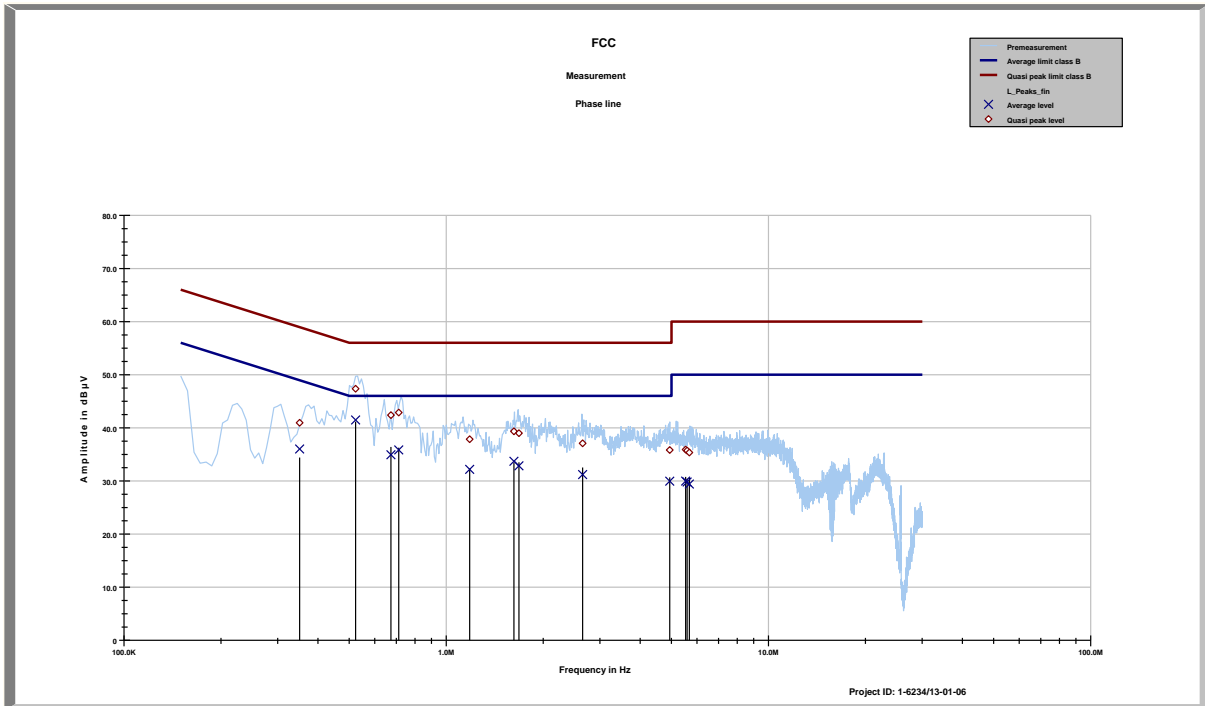
Project ID: 1-6234/13-01-06

09:27:59 AM, Thursday, May 23, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.15293	55.89	9.95	32.06	23.86
0.1759	52.43	12.24	33.51	21.75
0.21094	47.27	15.90	27.44	26.82
0.22954	44.64	17.83	25.49	28.24
2.1697	33.52	22.48	16.09	29.91
2.2258	31.24	24.76	17.90	28.10
2.2924	30.08	25.92	15.55	30.45
2.3077	26.49	29.51	10.43	35.57
15.82	30.60	29.40	18.05	31.95
16.112	29.02	30.98	17.66	32.34
16.909	30.56	29.44	17.16	32.84
17.544	30.27	29.73	19.59	30.41

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS2 + CH2 + USB2
 Serial Number - imei:004402242283665
 Operating mode - PCS1900 idle + charging

set 3:



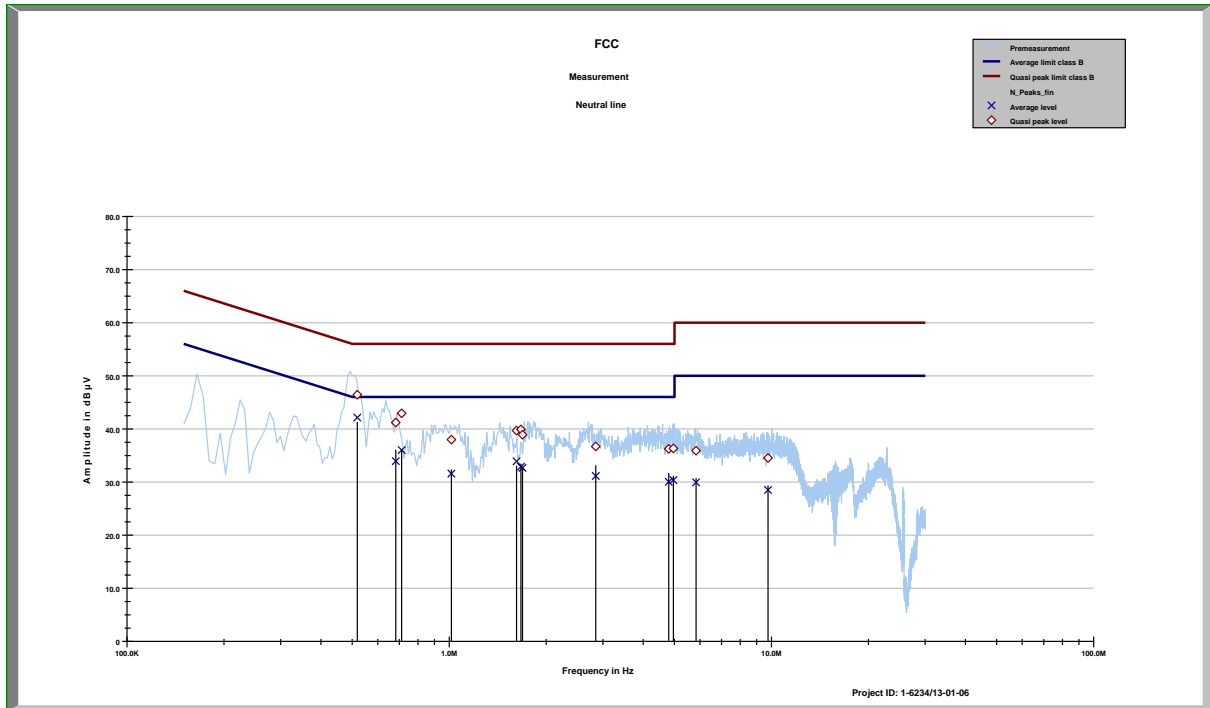
FCC
Phase line tbl

Project ID: 1-6234/13-01-06

09:51:01 AM, Thursday, May 23, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.35077	40.94	18.00	36.00	14.26
0.52334	47.36	8.64	41.47	4.53
0.67346	42.38	13.62	34.92	11.08
0.71202	42.88	13.12	35.82	10.18
1.18209	37.85	18.15	32.18	13.82
1.6215	39.33	16.67	33.70	12.30
1.6804	38.99	17.01	32.84	13.16
2.6492	37.07	18.93	31.19	14.81
4.9363	35.82	20.18	29.95	16.05
5.5287	35.91	24.09	29.97	20.03
5.5878	35.71	24.29	29.80	20.20
5.6779	35.35	24.65	29.41	20.59

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS3 + CH3
 Serial Number - imei:004402242283665
 Operating mode - UMTS FDD2 idle + charging



FCC
Neutral line tbl

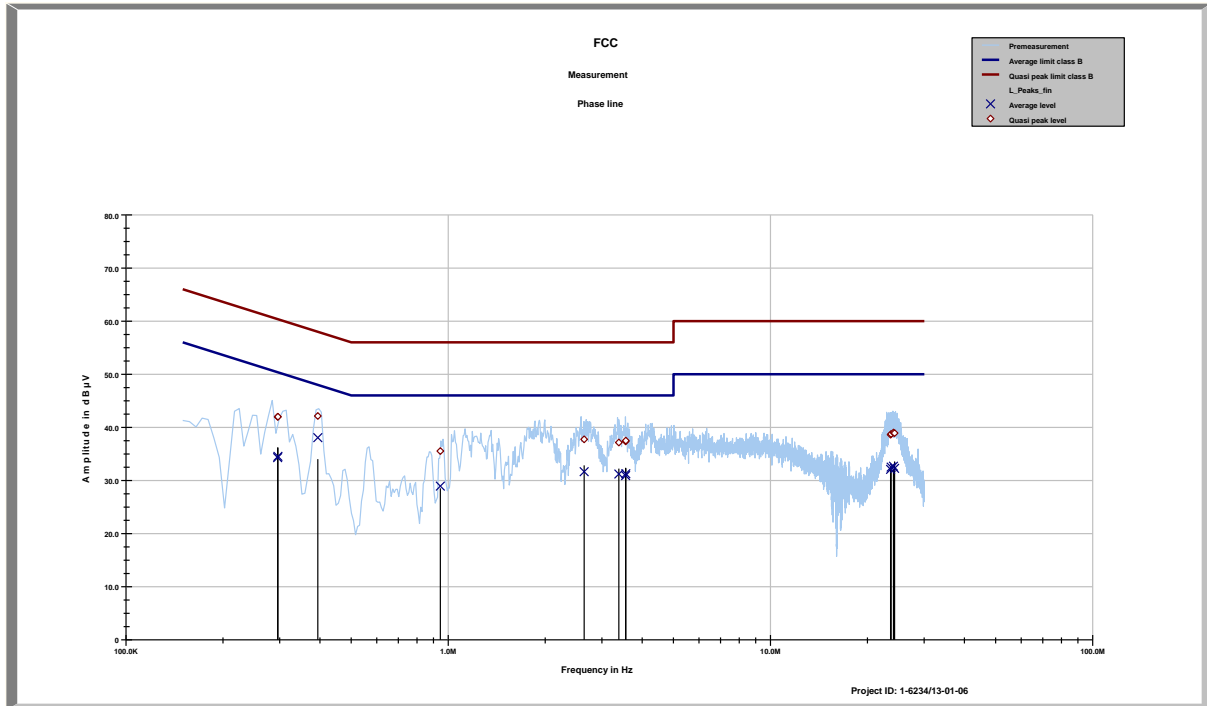
Project ID: 1-6234/13-01-06

09:51:01 AM, Thursday, May 23, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.51856	46.42	9.58	42.14	3.86
0.68226	41.19	14.81	33.92	12.08
0.71141	42.95	13.05	36.01	9.99
1.01543	37.99	18.01	31.57	14.43
1.6176	39.68	16.32	33.88	12.12
1.6691	39.89	16.11	32.89	13.11
1.6871	38.89	17.11	32.66	13.34
2.8484	36.69	19.31	31.14	14.86
4.7976	36.24	19.76	30.03	15.97
4.9602	36.33	19.67	30.36	15.64
5.8327	35.90	24.10	29.94	20.06
9.7518	34.52	25.48	28.49	21.51

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS3 + CH3
 Serial Number - imei:004402242283665
 Operating mode - UMTS FDD2 idle + charging

set 4:



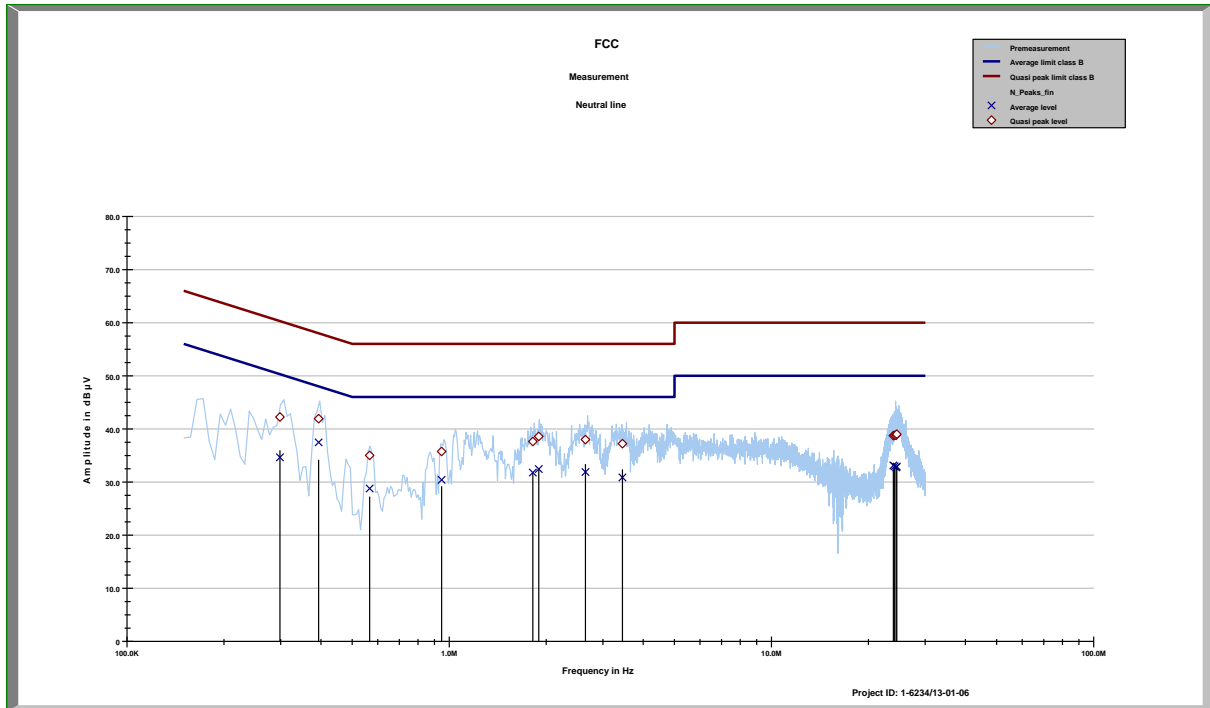
FCC
Phase line tbl

Project ID: 1-6234/13-01-06

09:55:54 AM, Tuesday, May 28, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.29561	41.97	18.39	34.28	17.55
0.29604	42.00	18.35	34.54	17.29
0.39365	42.13	15.85	38.06	10.98
0.9452	35.53	20.47	28.93	17.07
2.6411	37.74	18.26	31.65	14.35
3.3838	37.15	18.85	31.22	14.78
3.5504	37.35	18.65	30.91	15.09
3.5552	37.49	18.51	31.26	14.74
23.579	38.61	21.39	32.08	17.92
23.663	38.74	21.26	32.50	17.50
24.07	39.02	20.98	32.69	17.31
24.261	38.92	21.08	32.28	17.72

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS4 + CH4
 Serial Number - imei:004402242283665
 Operating mode - UMTS FDD 5 idle + charging



FCC
Neutral line tbl

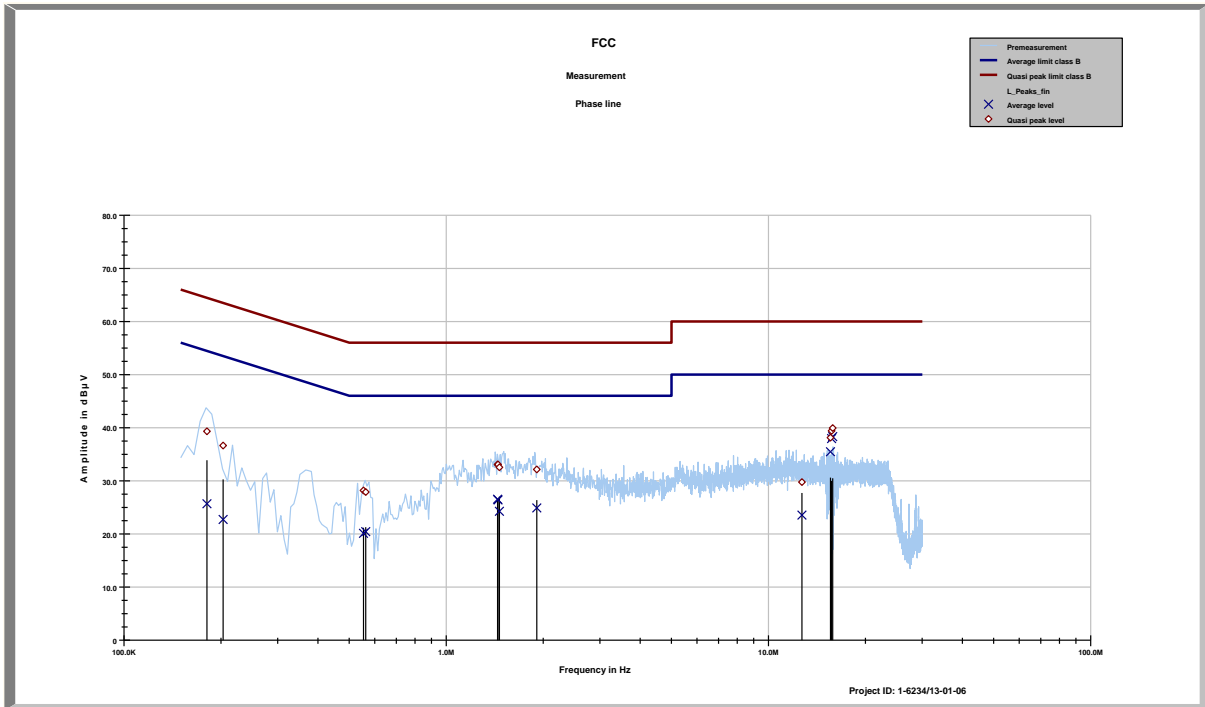
Project ID: 1-6234/13-01-06

09:55:54 AM, Tuesday, May 28, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.29827	42.25	18.04	34.64	17.12
0.39321	41.93	16.06	37.45	11.60
0.56635	35.01	20.99	28.78	17.22
0.94678	35.75	20.25	30.41	15.59
1.8166	37.63	18.37	31.78	14.22
1.896	38.57	17.43	32.44	13.56
2.6452	37.98	18.02	31.87	14.13
3.4467	37.21	18.79	30.86	15.14
23.867	38.72	21.28	33.11	16.89
24.098	38.78	21.22	32.96	17.04
24.363	38.80	21.20	32.76	17.24
24.475	39.01	20.99	32.89	17.11

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS4 + CH4
 Serial Number - imei:004402242283665
 Operating mode - UMTS FDD 5 idle + charging

set 5:



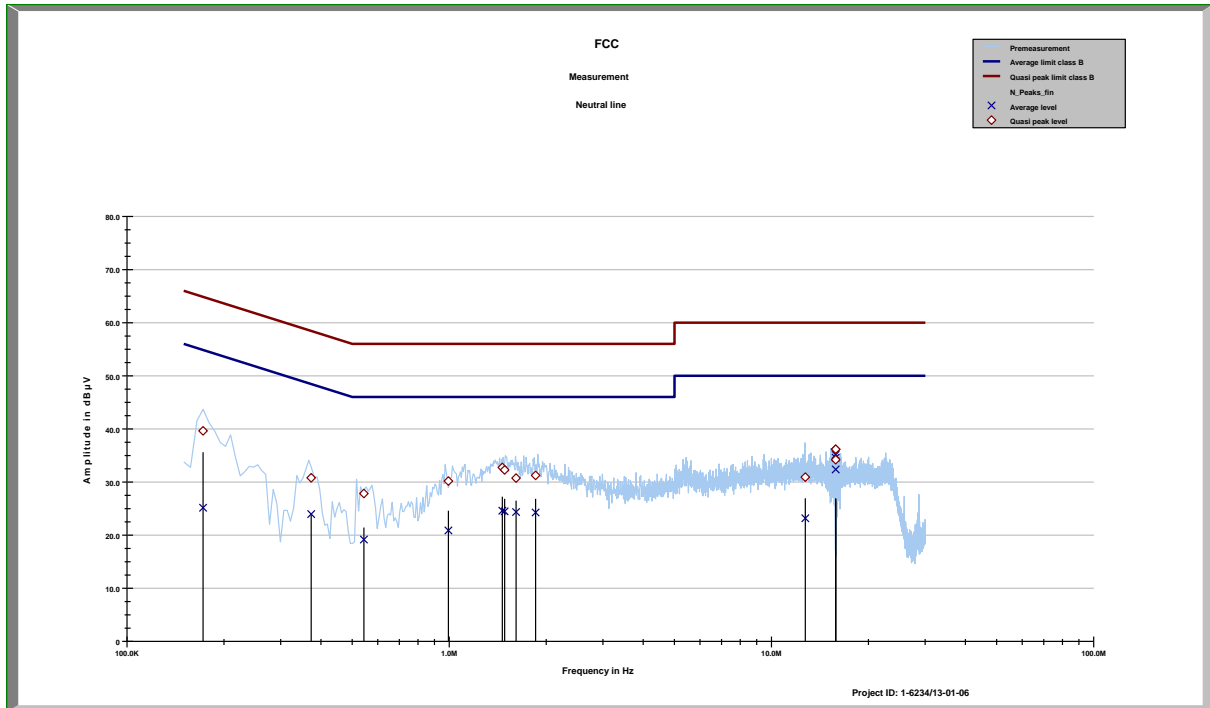
FCC
Phase line tbl

Project ID: 1-6234/13-01-06

08:45:39 AM, Thursday, June 13, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.18092	39.31	25.13	25.67	29.44
0.20311	36.64	26.84	22.72	31.76
0.55373	28.19	27.81	20.11	25.89
0.56267	27.89	28.11	20.42	25.58
1.4426	33.06	22.94	26.53	19.47
1.4471	33.07	22.93	26.39	19.61
1.4625	32.53	23.47	24.26	21.74
1.9096	32.14	23.86	24.88	21.12
12.6969	29.76	30.24	23.53	26.47
15.566	38.12	21.88	35.47	14.53
15.686	39.40	20.60	37.95	12.05
15.811	39.93	20.07	38.32	11.68

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS3 + CH5 + USB5 + EBC
 Serial Number - imei:004402242283665
 Operating mode - GSM 850 idle + charging 2x



FCC
Neutral line tbl

Project ID: 1-6234/13-01-06

08:45:39 AM, Thursday, June 13, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.17223	39.64	25.21	25.16	30.21
0.37287	30.79	27.65	23.96	25.67
0.54343	27.84	28.16	19.17	26.83
0.9942	30.18	25.82	20.89	25.11
1.4614	32.73	23.27	24.59	21.41
1.4857	32.28	23.72	24.47	21.53
1.6118	30.73	25.27	24.34	21.66
1.853	31.24	24.76	24.26	21.74
12.7288	30.92	29.08	23.18	26.82
15.808	36.14	23.86	35.11	14.89
15.811	36.16	23.84	34.57	15.43
15.812	34.21	25.79	32.37	17.63

Project ID - 1-6234/13-01-06
 EUT - RFU81UW (EUT A) + HS3 + CH5 + USB5 + EBC
 Serial Number - imei:004402242283665
 Operating mode - GSM 850 idle + charging 2x

8.1.6 Signal strength calculation

Calculation formula:

$$SS = UR + CF + VC$$

List of abbreviations:

- SS ▶ signal strength
- UR ▶ voltage at the receiver
- CF ▶ loss of the cable and filter (passband filter 130 kHz – 30 MHz)
- VC ▶ correction factor of the ISN (ESH3-Z5)

List with correction factors:

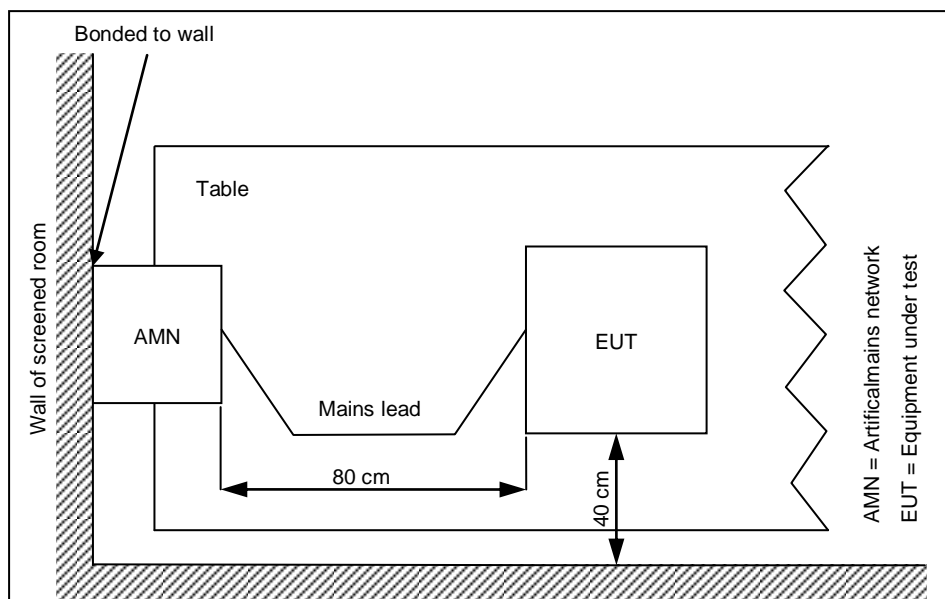
Frequency [MHz]	CF [dB]	VC [dB]
0,150	9,80	1,42
1,000	9,80	0,41
5,000	9,90	0,32
10,000	9,90	0,23
15,000	10,00	0,39
20,000	10,00	1,19
25,000	10,20	1,55
30,000	10,30	1,31

Example calculation:

For example at 10,000 000 MHz the measured Voltage (UR) is 37,62 dB μ V, the loss of the cable and filter (CF) is 9,90 dB and the correction factor of the ISN (VC) is 0,23 dB the final result will be calculated:
 $SS [dB\mu V] = 37,62 [dB\mu V] + 9,90 [dB] + 0,23 [dB] = \underline{47,75 [dB\mu V]} (244,06 \mu V)$

8.1.7 Test Set-up

According to EMC basic standard **ANSI 63.4**



8.2 Electromagnetic Radiated Emissions (Distance 10 m)

8.2.1 Instrumentation for Test (see equipment list)

F 1	F 2	F 4b	F 5	F 6	F 7	F 8	F 21				
-----	-----	------	-----	-----	-----	-----	------	--	--	--	--

8.2.2 Test Plan

EUT set-up	see test details		
Operating mode	Application	Limit	Result
see test details	Enclosure	FCC part 15 B Class B	passed

Remarks: Powered by external power supply (115V / 60Hz)

8.2.3 Radiated Limits

Frequency- range	FCC part 15 B Class B	FCC part 15 B Class A
30 MHz – 88 MHz	30 dB μ V/m	39,1 dB μ V/m
88 MHz – 216 MHz	33,5 dB μ V/m	43,5 dB μ V/m
216 MHz – 960 MHz	36 dB μ V/m	46,4 dB μ V/m
960 MHz – 40000 MHz	44 dB μ V/m	49,5 dB μ V/m
	* This values are recalculated from the class B limits at 3 m antenna distance in §15.109 (g 2) of the FCC rules	

8.2.4 Calibration Information

Device	Serial number	ICT Number	Calibration valid until	Calibration interval
ESCI 3 Receiver	100083/003	300003312	01/2014	12 month
Trilog Antenna	9163-295	300003787	05/2014	24 month

Remarks:
System check of all relevant devices and the chamber (weekly)

8.2.5 Test Results

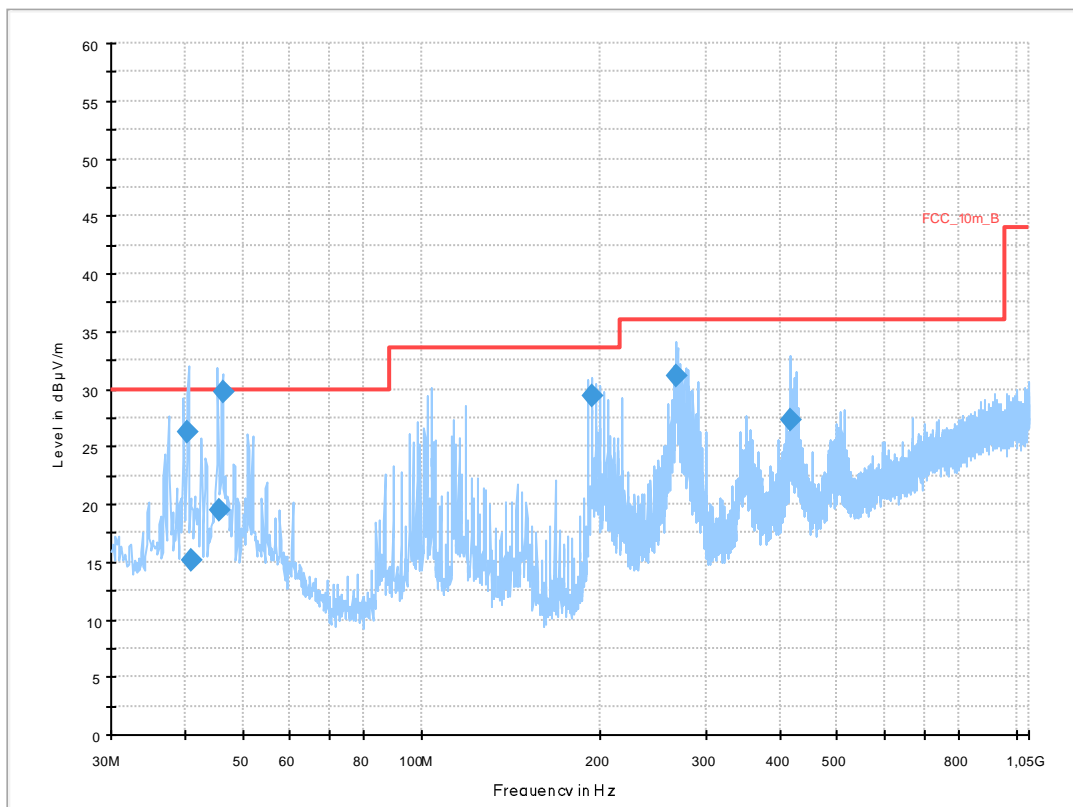
set 6:

Common Information

EUT: RFU81UW (EUT A) + HS1 + CH1 + USB1
 Serial Number: 004402242283665
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: GSM850 idle + charging
 Operator Name: Medrow
 Comment: 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Receiver: [ESCI 3]
 Level Unit: dB μ V/m
Subrange **Step Size** **Detectors** **IF BW** **Meas. Time** **Preamp**
 30 MHz - 2 GHz 60 kHz QPK 120 kHz 1 s 20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
0.375650	26.3	1000.0	120.000	170.0	V	93.0	13.4	3.7	30.0	
40.870650	15.1	1000.0	120.000	98.0	V	10.0	13.4	14.9	30.0	
4.657000	19.5	1000.0	120.000	98.0	V	93.0	13.3	10.5	30.0	
46.196100	29.8	1000.0	120.000	106.0	V	190.0	13.3	0.2	30.0	
193.681350	29.4	1000.0	120.000	98.0	V	10.0	11.3	4.1	33.5	
268.623000	31.1	1000.0	120.000	170.0	V	-10.0	13.8	4.9	36.0	

set 7

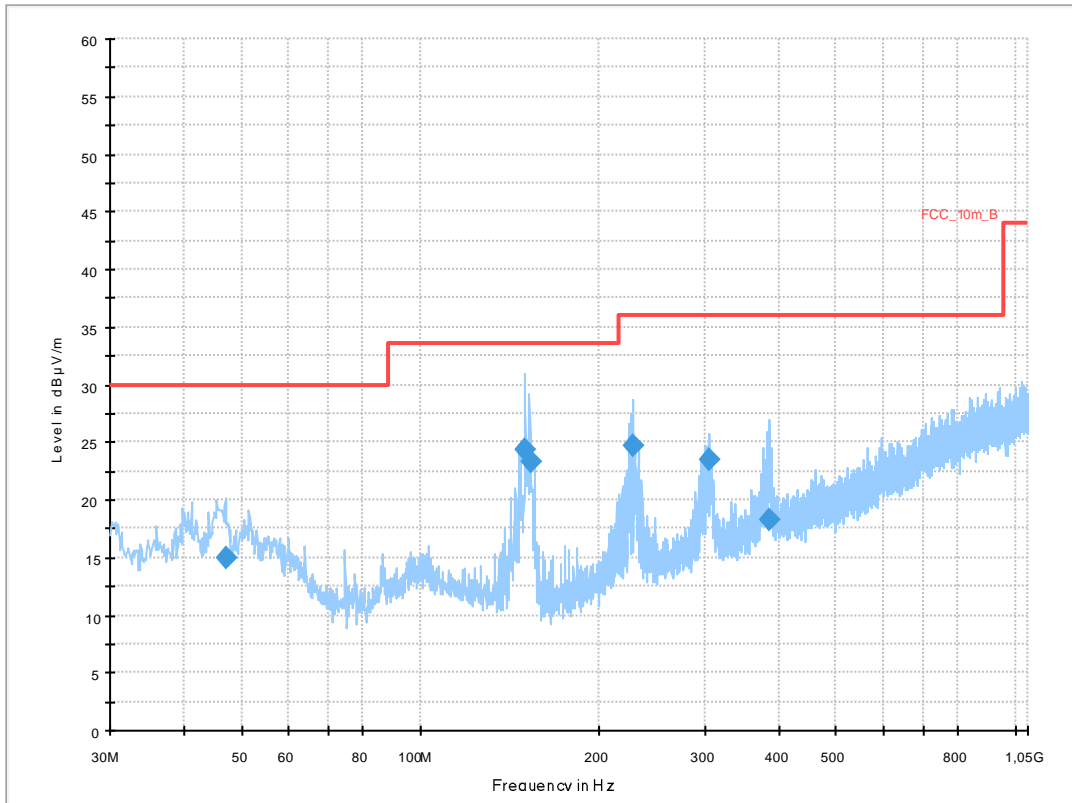
Common Information

EUT: RFU81UW (EUT A) + HS2 + CH2 + USB2
 Serial Number: 004402242283665
 Test Description: FCC part 15 B
 Operating Conditions: PCS1900 idle + charging
 Operator Name: Medrow
 Comment: 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth h (kHz)	Height (cm)	Polarization	Azimuth h (deg)	Corr. (dB)	Margi n (dB)	Limit (dBµV/m)	Comment
6.908750	15.0	1000.0	120.000	98.0	V	0.0	13.3	15.0	30.0	
150.053250	24.4	1000.0	120.000	122.0	V	0.0	8.9	9.1	33.5	
15.991900	23.4	1000.0	120.000	98.0	V	-10.0	9.0	10.1	33.5	
226.990350	24.7	1000.0	120.000	98.0	V	-4.0	12.6	11.3	36.0	
305.987400	23.5	1000.0	120.000	98.0	V	280.0	14.7	12.5	36.0	
385.447200	18.2	1000.0	120.000	144.0	V	-4.0	16.7	17.8	36.0	

set 8:

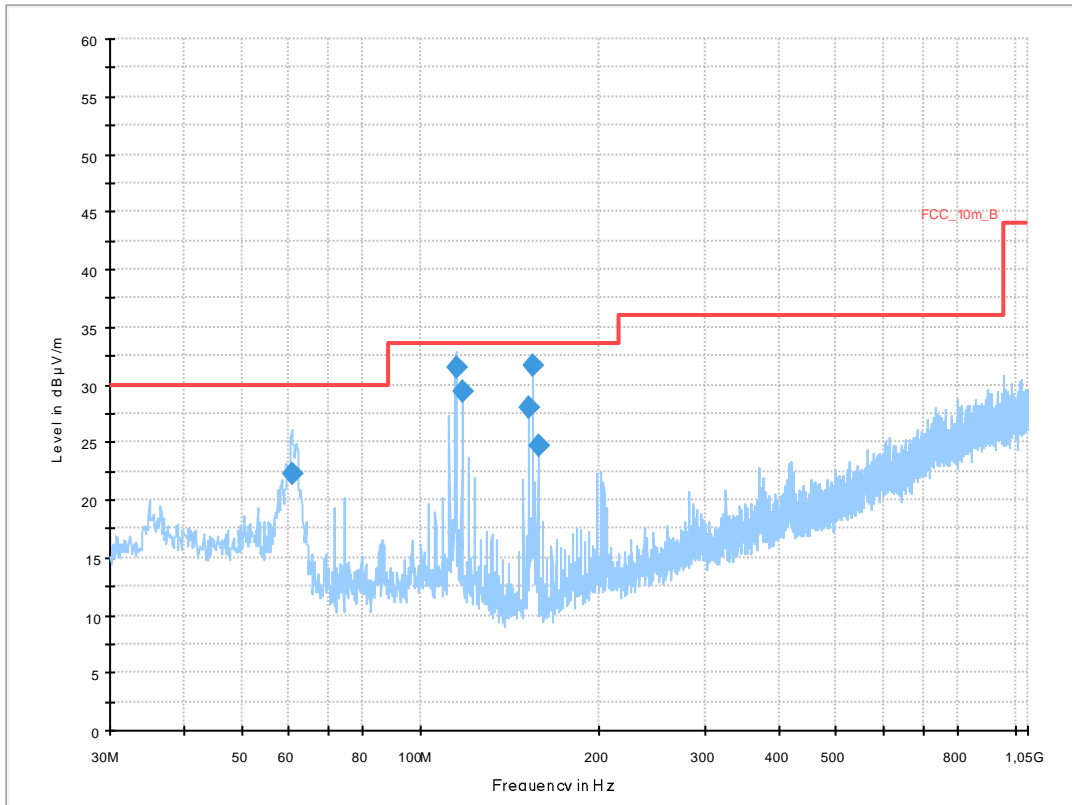
Common Information

EUT: RFU81UW (EUT A) + HS3 + CH3
 Serial Number: 004402242283665
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: UMTS FDD 2 idle + charging
 Operator Name: Medrow
 Comment: 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth h (kHz)	Height (cm)	Polarization	Azimuth h (deg)	Corr. (dB)	Margi n (dB)	Limit (dBµV/m)	Comment
60.770550	22.3	1000.0	120.000	170.0	V	280.0	11.4	7.7	30.0	
114.531000	31.5	1000.0	120.000	98.0	V	261.0	10.7	2.0	33.5	
117.408450	29.4	1000.0	120.000	122.0	V	100.0	10.4	4.1	33.5	
151.730700	28.0	1000.0	120.000	98.0	V	100.0	9.0	5.5	33.5	
154.624350	31.7	1000.0	120.000	98.0	V	88.0	9.0	1.8	33.5	
157.505400	24.7	1000.0	120.000	122.0	V	100.0	9.1	8.8	33.5	

set 9:

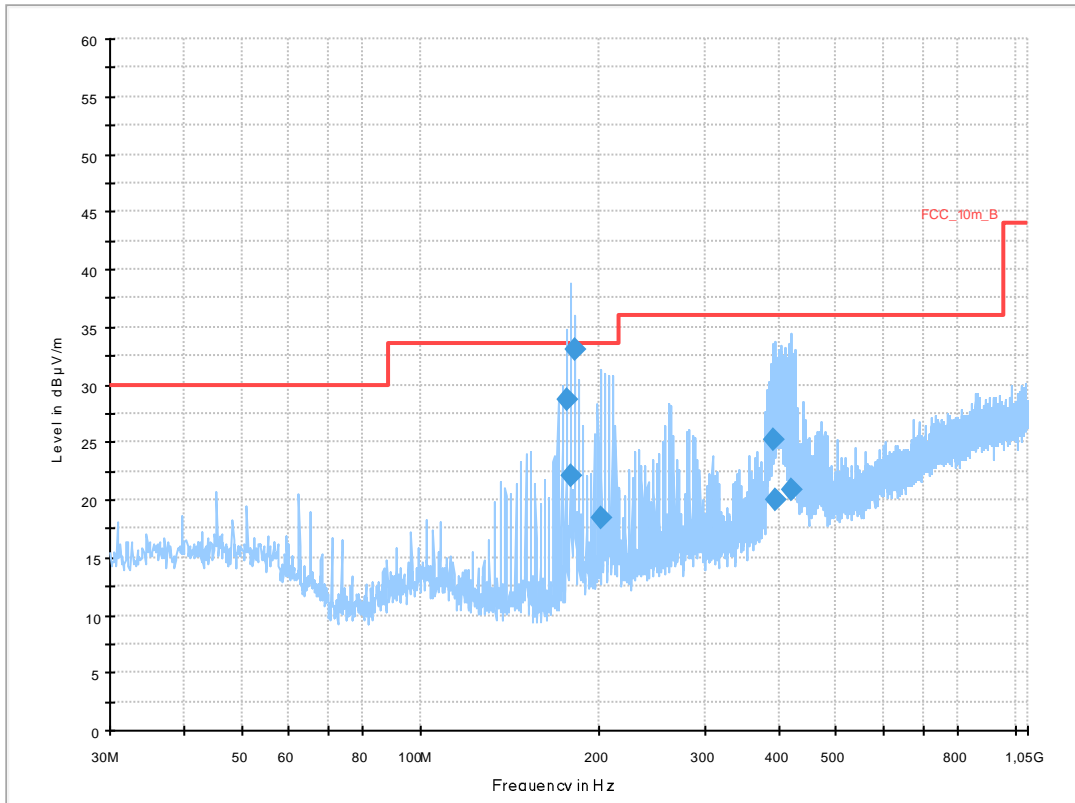
Common Information

EUT: RFU81UW (EUT A) + HS4 + CH4
 Serial Number: 004402242283665
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: UMTS FDD 5 + charging
 Operator Name: Medrow
 Comment: 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz		QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
175.762650	28.7	1000.0	10.000	170.0	V	-9.0	10.2	4.8	33.5	
178.795350	22.0	1000.0	120.000	161.0	V	-3.0	10.4	11.5	33.5	
181.033200	33.1	1000.0	120.000	98.0	V	280.0	10.5	0.4	33.5	
201.337650	18.5	1000.0	120.000	170.0	V	10.0	11.7	15.0	33.5	
391.021500	25.2	1000.0	120.000	161.0	H	88.0	16.8	10.8	36.0	
393.805500	19.9	1000.0	120.000	98.0	V	-10.0	16.8	16.1	36.0	

set 10:

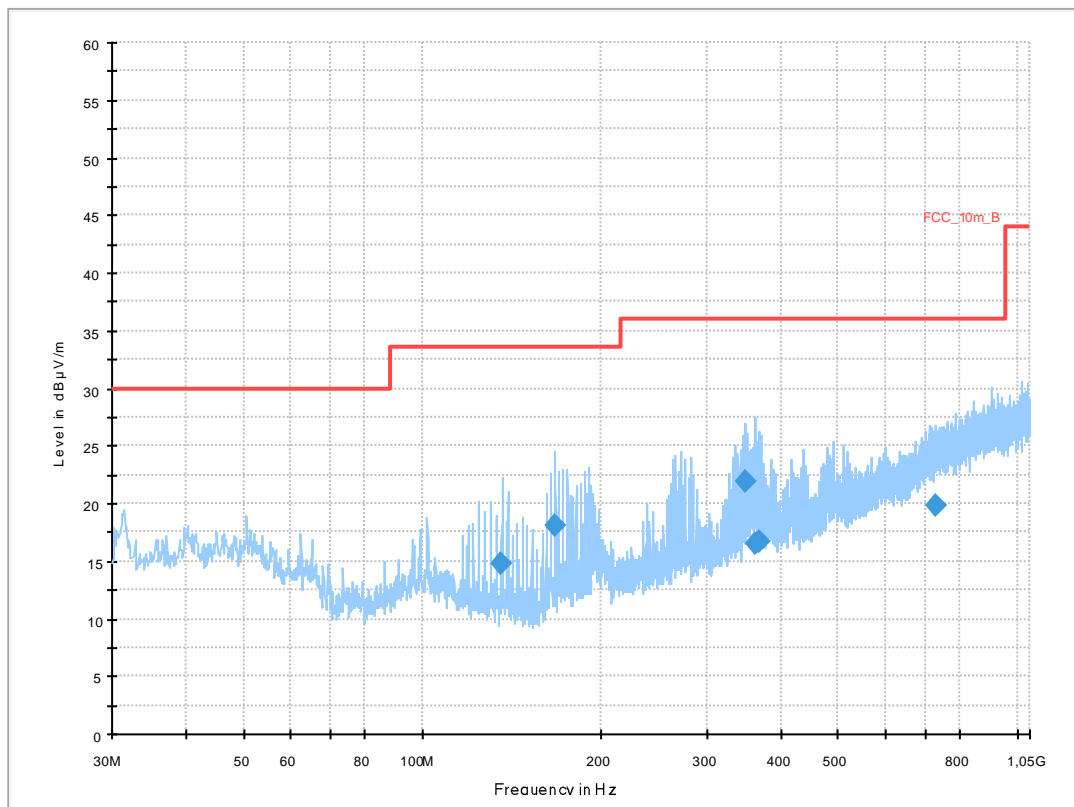
Common Information

EUT: RFU81UW (EUT A) + HS1 + CH5
 Serial Number: imei: 004402242283665
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: GSM 850 idle + charging
 Operator Name: Wolsdorfer
 Comment: AC: 115 V / 60 Hz;

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth h (kHz)	Height (cm)	Polarization	Azimuth h (deg)	Corr. (dB)	Margi n (dB)	Limit (dBµV/m)	Comment
135.743550	14.8	1000.0	120.000	98.0	V	10.0	9.0	18.7	33.5	
166.843650	18.1	1000.0	120.000	105.0	V	92.0	9.6	15.4	33.5	
348.358350	21.8	1000.0	120.000	104.0	V	10.0	16.0	14.2	36.0	
361.925850	16.6	1000.0	120.000	104.0	V	280.0	16.3	19.4	36.0	
367.653300	16.7	1000.0	120.000	170.0	V	177.0	16.4	19.3	36.0	
729.449550	19.8	1000.0	120.000	170.0	H	100.0	23.2	16.2	36.0	

set 11:

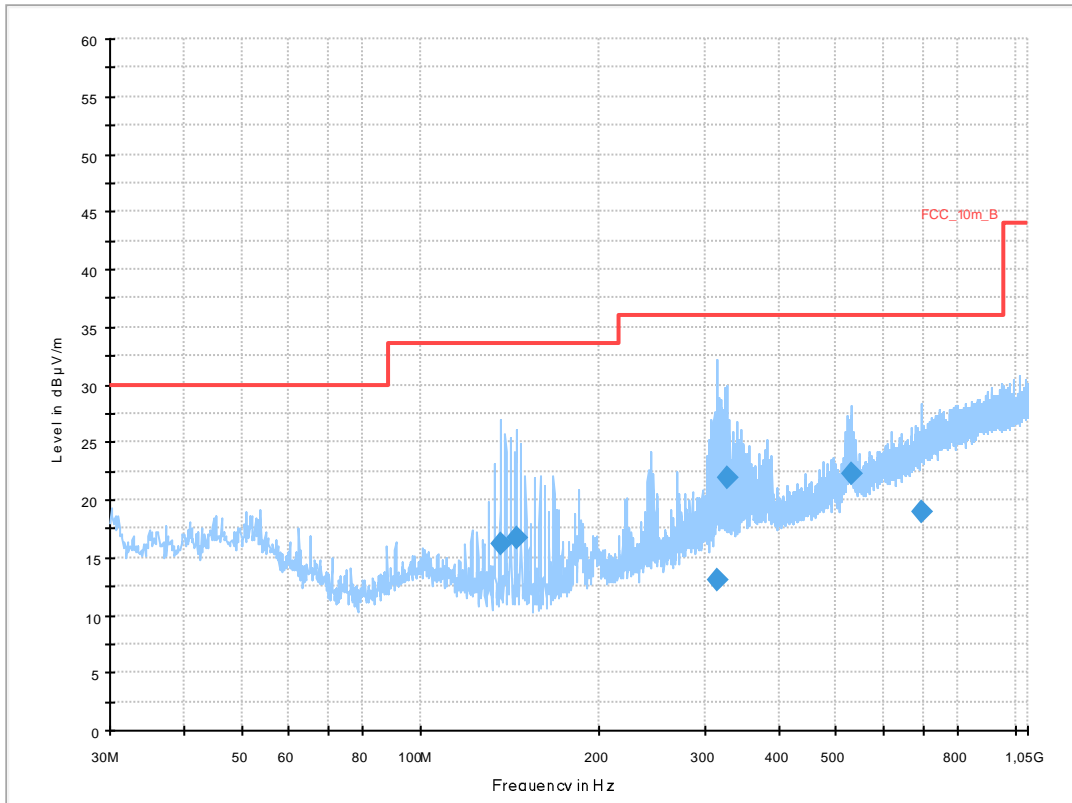
Common Information

EUT: RFU81UW (EUT B) + HS1 + CH5
 Serial Number: imei: 004402242346702
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: UMTS FDD2 idle + charging
 Operator Name: Wolsdorfer
 Comment: AC: 115 V / 60 Hz;

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth h (kHz)	Height (cm)	Polarization	Azimuth h (deg)	Corr. (dB)	Margi n (dB)	Limit (dBµV/m)	Comment
136.223700	16.2	1000.0	120.000	200.0	V	53.0	8.9	17.3	33.5	
144.697800	16.8	1000.0	120.000	100.0	V	19.0	8.8	16.7	33.5	
315.103500	13.1	1000.0	120.000	200.0	V	27.0	15.0	22.9	36.0	
328.435950	22.0	1000.0	120.000	200.0	V	-33.0	15.4	14.0	36.0	
529.838550	22.3	1000.0	120.000	200.0	H	347.0	19.1	13.7	36.0	
696.952500	19.0	1000.0	120.000	400.0	V	213.0	22.4	17.0	36.0	

set 12:

Plot 1: 30 MHz to 1 GHz, RX mode, vertical & horizontal polarization

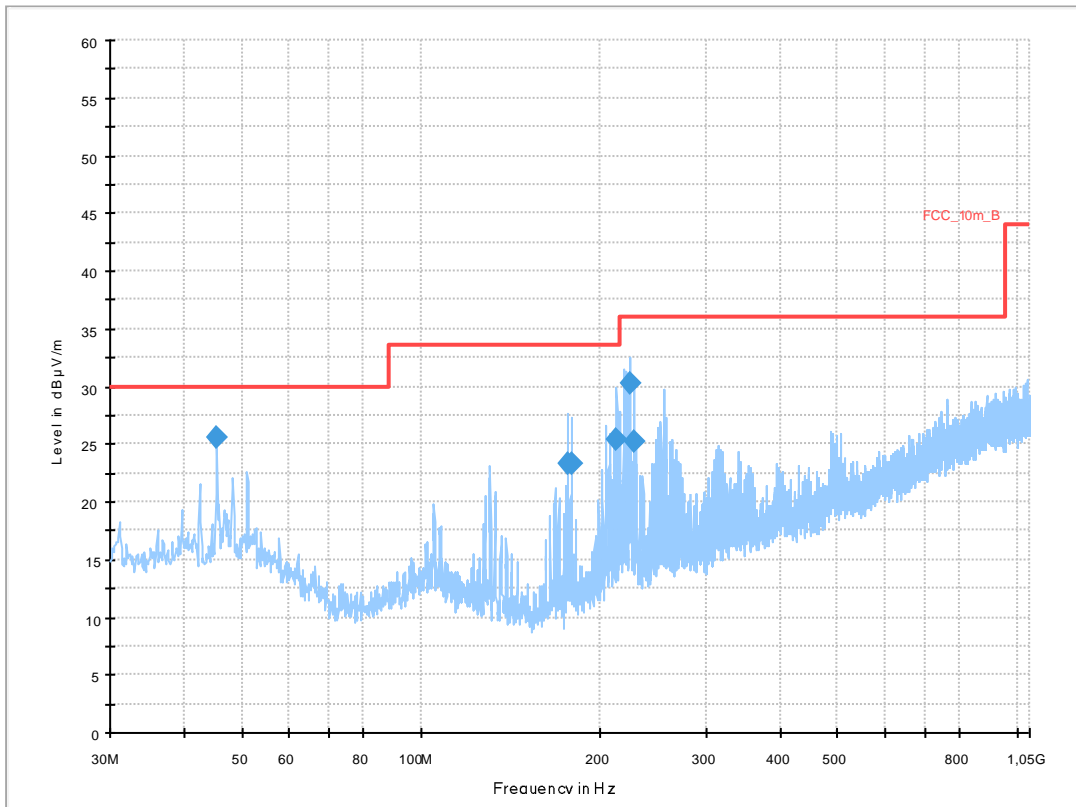
Common Information

EUT: RFU81UW (EUT A) + HS1 + CH1 + USB3
 Serial Number: imei:004402242283665
 Test Description: FCC part 15 C class B @ 10 m
 Operating Conditions: BT DH5 testmode + charging
 Operator Name: Wolsdorfer
 Comment: AC 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
45.435150	25.5	1000.0	120.000	121.0	V	-9.0	13.3	4.5	30.0	
175.892400	23.2	1000.0	120.000	170.0	V	92.0	10.2	10.3	33.5	
178.744350	23.4	1000.0	120.000	104.0	V	100.0	10.4	10.1	33.5	
212.858100	25.3	1000.0	120.000	121.0	V	0.0	12.1	8.2	33.5	
224.185500	30.2	1000.0	120.000	104.0	V	190.0	12.5	5.8	36.0	
226.976250	25.1	1000.0	120.000	170.0	V	10.0	12.6	10.9	36.0	

set 13:

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

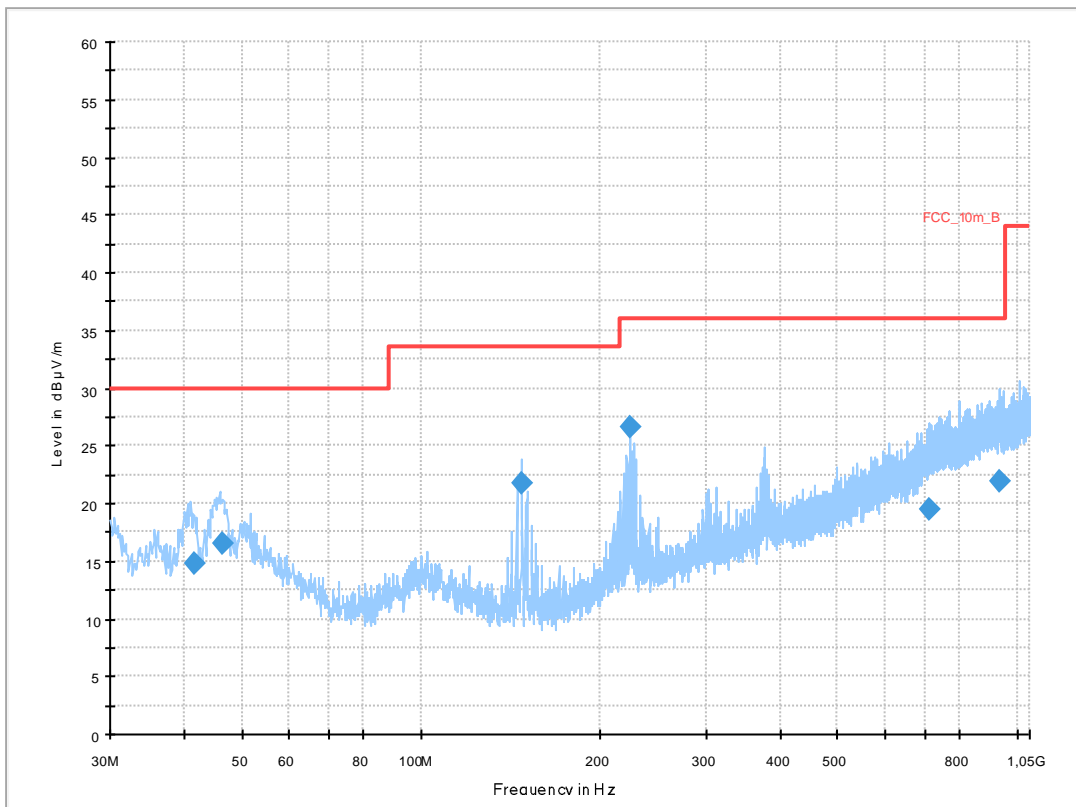
Common Information

EUT: RFU81UW (EUT A)+ HS2 + CH2 + USB4
 Test Description: FCC part 15 C class B @ 10 m
 Operating Conditions: WLAN ch. 6 + charging
 Operator Name: Wolsdorfer
 Comment: AC 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
41.426250	14.7	1000.0	120.000	111.0	V	280.0	13.4	15.3	30.0	
46.288800	16.6	1000.0	120.000	98.0	V	100.0	13.3	13.4	30.0	
147.735900	21.7	1000.0	120.000	98.0	V	171.0	8.9	11.8	33.5	
224.376300	26.6	1000.0	120.000	105.0	V	10.0	12.5	9.4	36.0	
711.468600	19.5	1000.0	120.000	170.0	V	178.0	22.8	16.5	36.0	
935.845650	21.9	1000.0	120.000	98.0	V	170.0	25.3	14.1	36.0	

8.2.6 Hardware Set-up

Subrange 1
Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch
FW 1.0

Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

8.2.7 Signal strength calculation

Calculation formula:

$$SS = U_R + CL + AF$$

List of abbreviations:

SS	▶	signal strength
U_R	▶	voltage at the receiver
CL	▶	loss of the cable
AF	▶	antenna factor

List with correction factors:

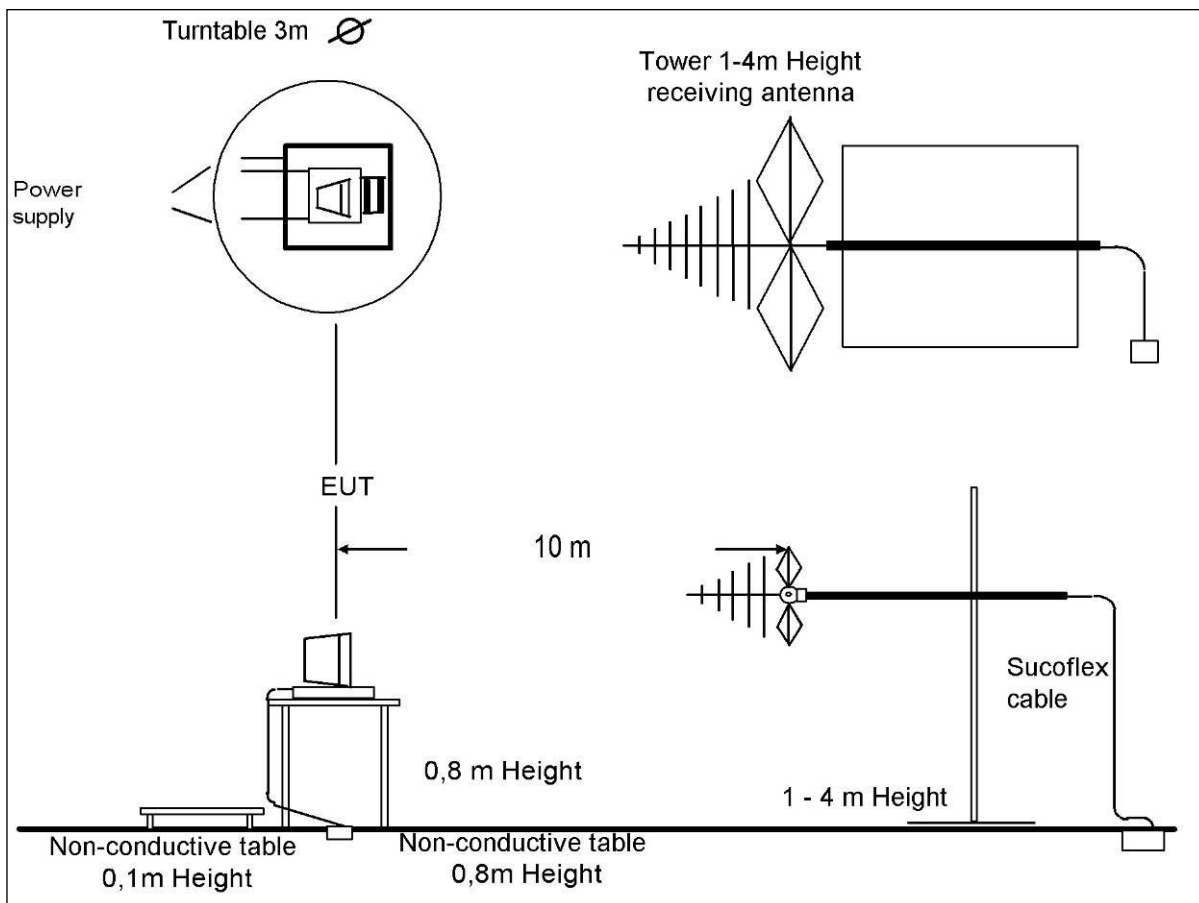
Frequency [MHz]	CL [dB]	AF [dB μ V/m]
30,000	0,20	12,30
100,000	0,60	11,30
200,000	1,10	10,60
300,000	1,30	13,20
400,000	1,60	15,30
500,000	1,90	16,80
600,000	2,00	18,80
700,000	2,20	20,30
800,000	2,30	21,50
900,000	2,40	22,80
1000,000	2,50	23,30

Example calculation:

For example at 500,000 000 MHz the measured Voltage (U_R) is 12,35 dB μ V/m, the loss of the cable (CL) is 1,90 dB and the antenna factor (AF) is 16,80 dB μ V/m the final result will be calculated:

$$SS \text{ [dB}\mu\text{V]} = 12,35 \text{ [dB}\mu\text{V/m]} + 1,90 \text{ [dB]} + 16,80 \text{ [dB}\mu\text{V/m]} = \underline{\underline{31,05 \text{ [dB}\mu\text{V/m]} (35,69 \mu\text{V/m)}}$$

8.2.8 Test Set-up



8.3 Electromagnetic Radiated Emissions (Distance 5 m)

8.3.1 Instrumentation for Test (see equipment list)

F 1	F 6	F 21	F 29	F 30	F 33						
-----	-----	------	------	------	------	--	--	--	--	--	--

8.3.2 Test Plan

EUT set-up	see test details		
Operating mode	Application	Limit	Result
see test details	Enclosure	FCC part15 B class B	passed

Remarks:	The measured values are recalculated from 5m to 3m distance Powered by external power supply (115V / 60Hz)
-----------------	---

8.3.3 Radiated Limits

Frequency- range	47CFR15: (FCC part 15 B) Class B	47CFR15: (FCC part 15 B) Class A *
30 MHz – 88 MHz	40 dBµV/m	49,1 dBµV/m
88 MHz – 216 MHz	43,5 dBµV/m	53,5 dBµV/m
216 MHz – 960 MHz	46 dBµV/m	56,4 dBµV/m
960 MHz – 18000 MHz	54 dBµV/m	59,5 dBµV/m
		* This values are recalculated from the class A limits at 10 m antenna distance in §15.109 (g 2) of the FCC rules.

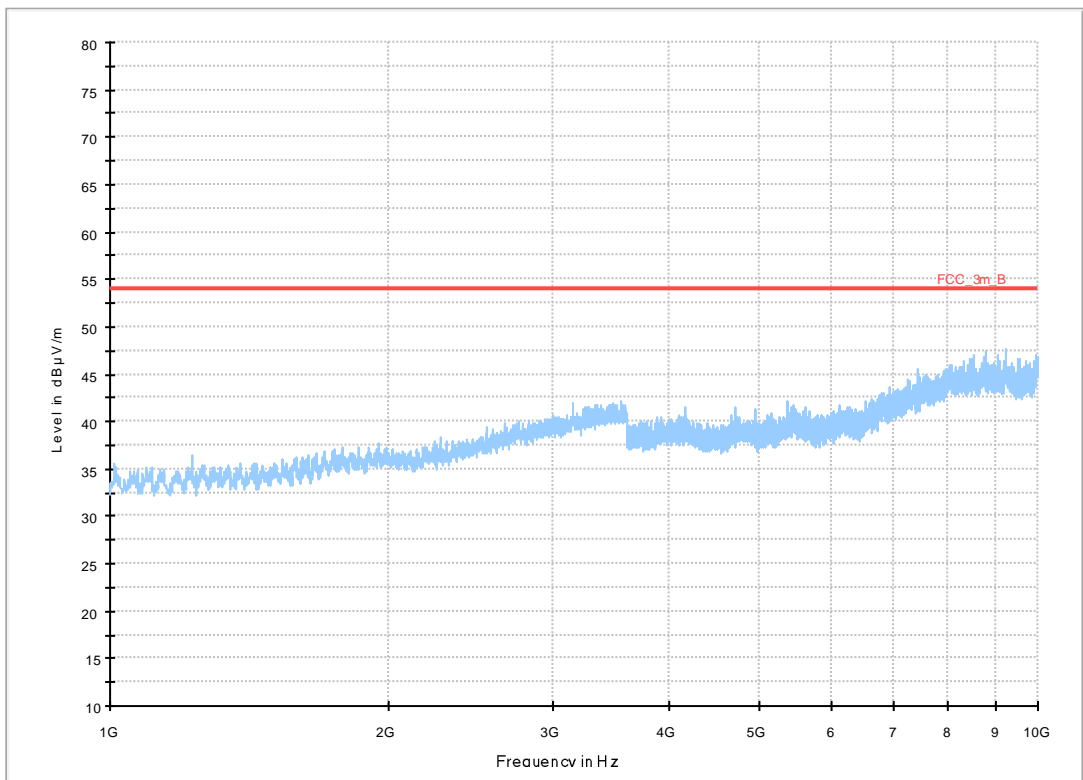
8.3.4 Test Results

set 6:

Common Information

EUT:	RFU81UW (EUT A) + HS1 + CH1 + USB1
Serial Number:	004402242283665
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	GSM850 idle + charging
Operator Name:	Medrow

FCC 1 10 B 5m

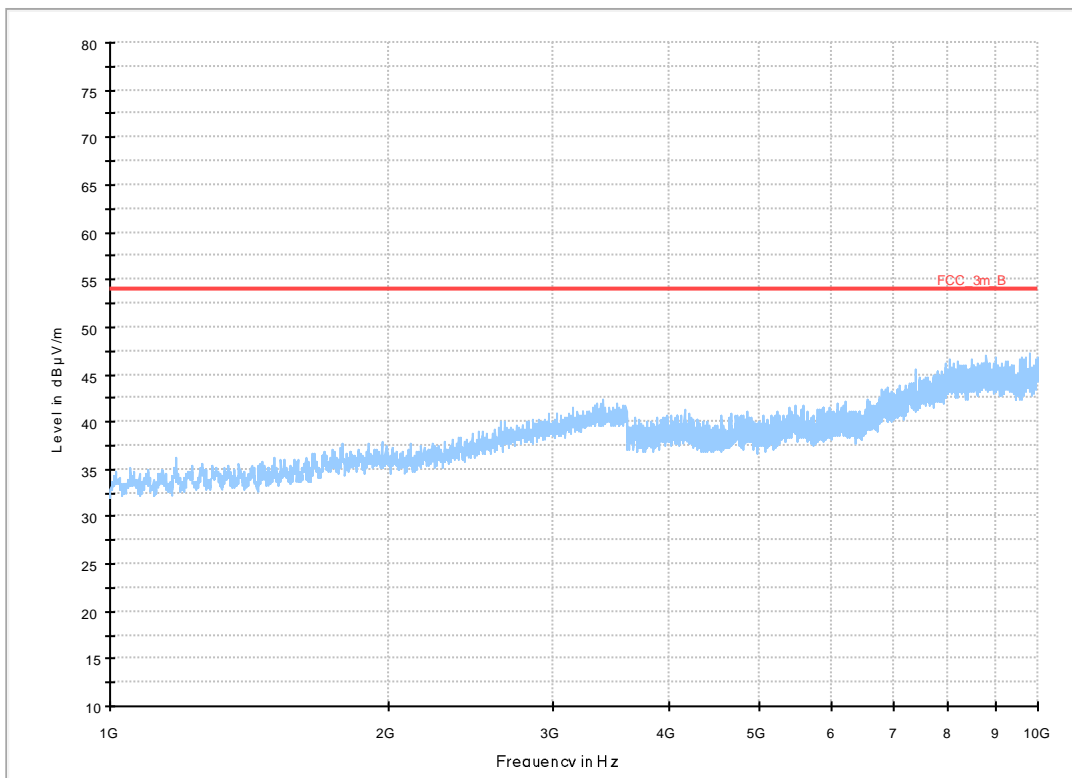


set 7:

Common Information

EUT:	RFU81UW (EUT A) + HS2 + CH2 + USB2
Serial Number:	004402242283665
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	PCS1900 idle + charging
Operator Name:	Medrow

FCC 1 10 B 5m

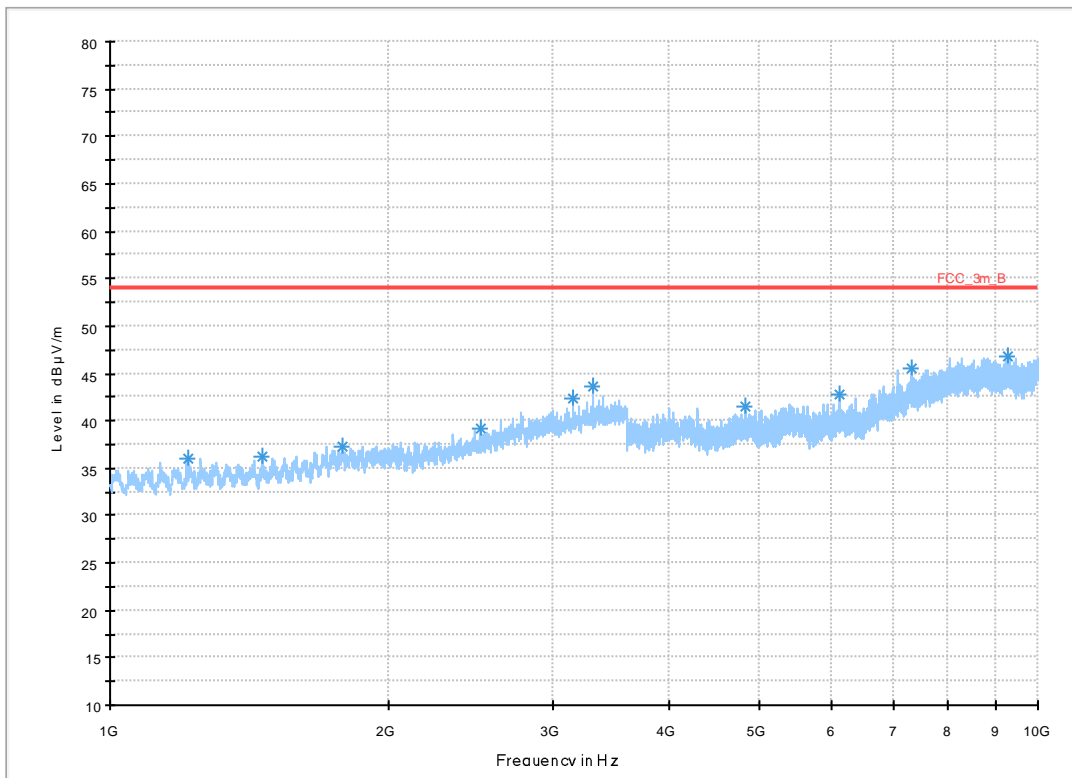


set 8

Common Information

EUT:	RFU81UW (EUT A) + HS3 + CH3
Serial Number:	004402242283665
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	UMTS FDD 2 idle + charging
Operator Name:	Medrow

FCC 1 10 B 5m

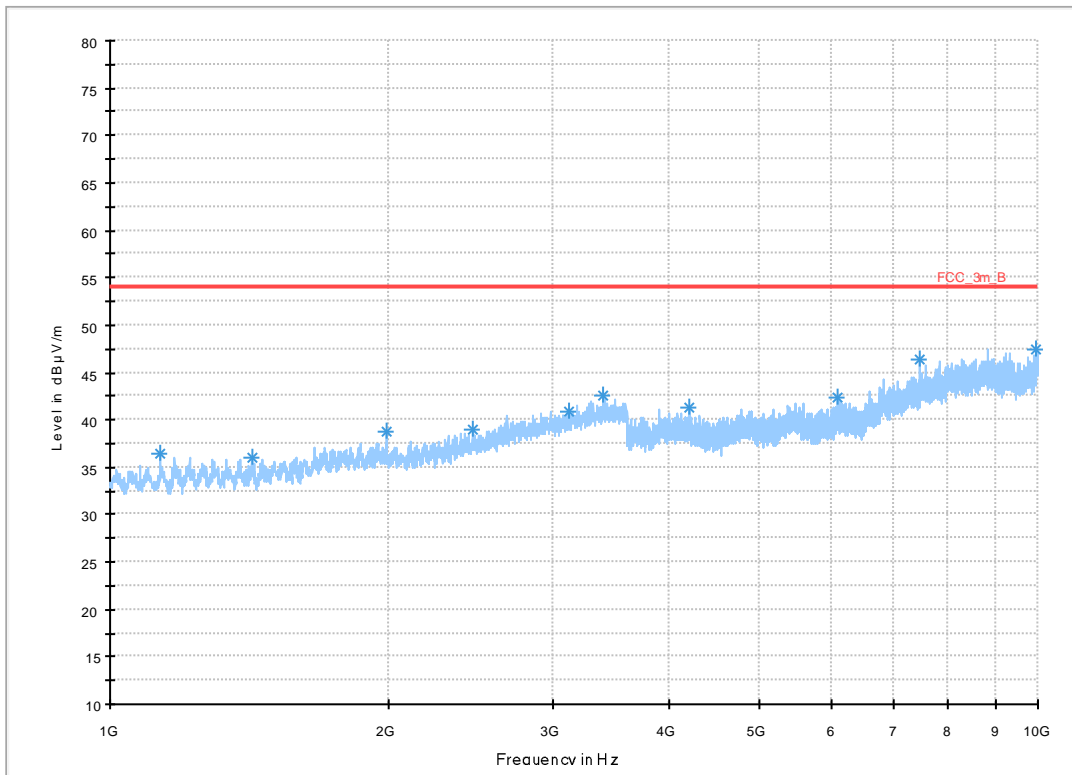


set 9:

Common Information

EUT:	RFU81UW (EUT A) + HS4 + CH4
Serial Number:	004402242283665
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	UMTS FDD 5 + charging
Operator Name:	Medrow
Comment:	115V / 60Hz

FCC 1 10 B 5m

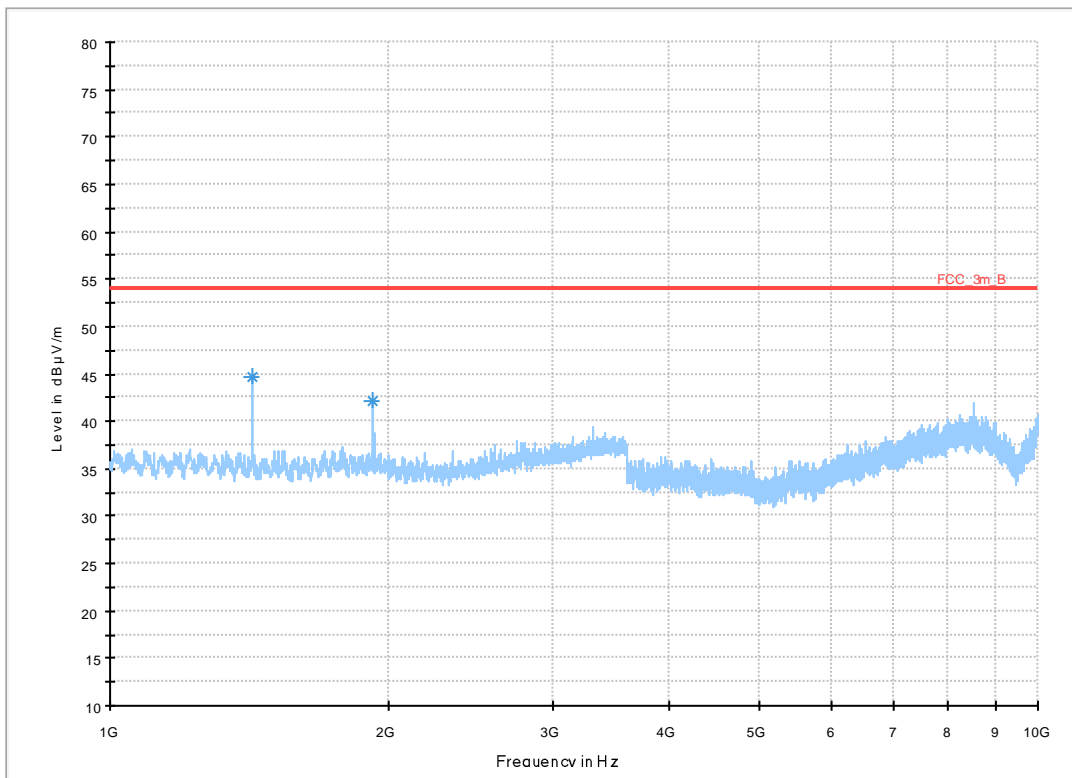


set 10:

Common Information

EUT:	RFU81UW (EUT A) + HS1 + CH5
Serial Number:	imei:004402242283665
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	GSM 850 idle + charging
Operator Name:	Wolsdorfer
Comment:	AC: 115 V / 60 Hz;

FCC 1 10 B 5m



Data Reduction Result 1 [1]

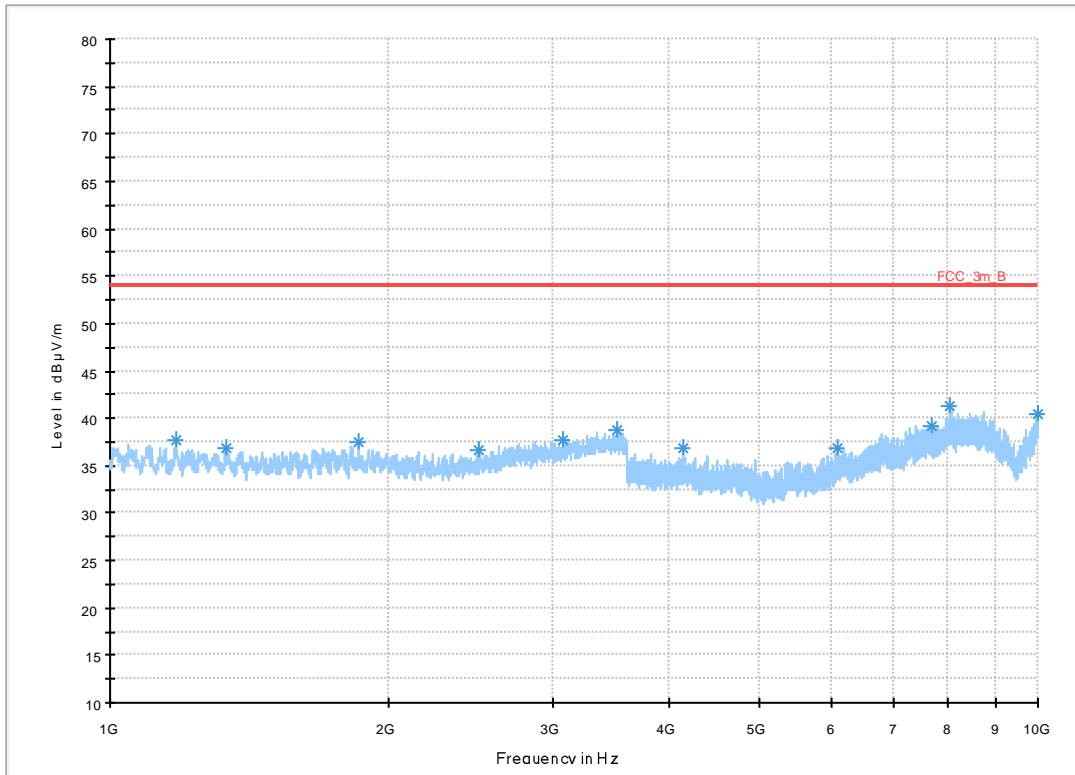
Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth	Corr. (dB)	Comment
1422.100000	44.7	100.0	V	195.0	-4.8	
1919.800000	42.2	100.0	V	352.0	-4.2	

set 11: EUT B

Common Information

EUT:	RFU81UW (EUT B) + CH5 + HS1
Serial Number:	imei: 004402242346702
Test Description:	FCC part 15 B class B
Operating Conditions:	UMTS FDD2 idle + charging
Operator Name:	Wolsdorfer
Comment:	AC 115 V / 60 Hz

FCC 1 10 B 5m

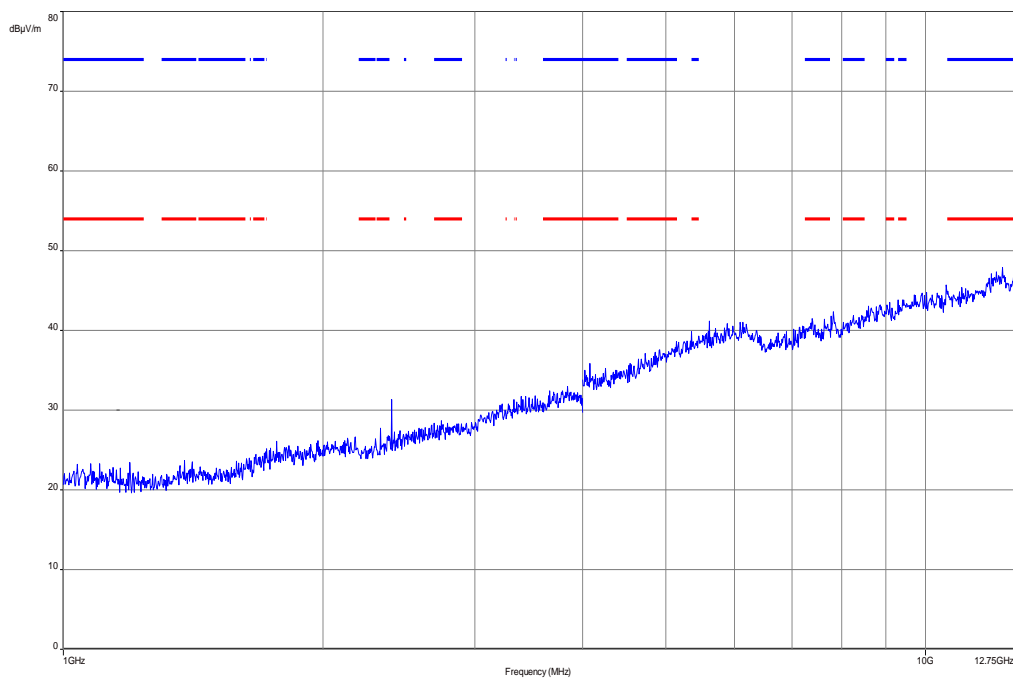


set 12:

Common Information

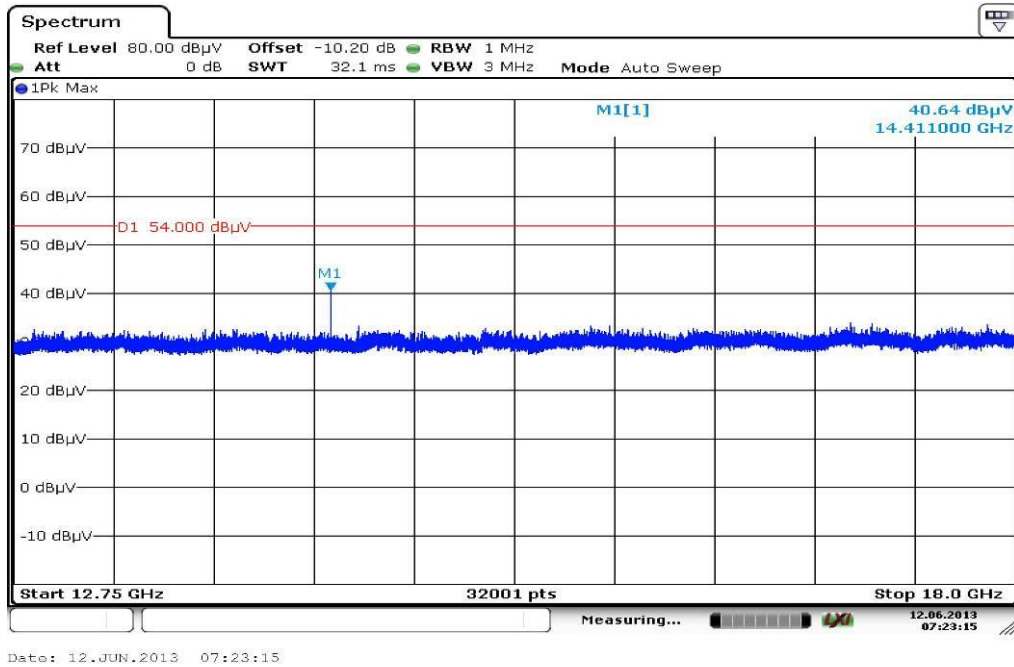
EUT:	RFU81UW (EUT A) + HS1 + CH1 + USB3
Serial Number:	imei:004402242283665
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	BT DH5 testmode + charging
Operator Name:	Wolsdorfer
Comment:	AC 115V / 60Hz

Plot 2: 1 GHz to 12.75 GHz, RX mode, vertical & horizontal polarization

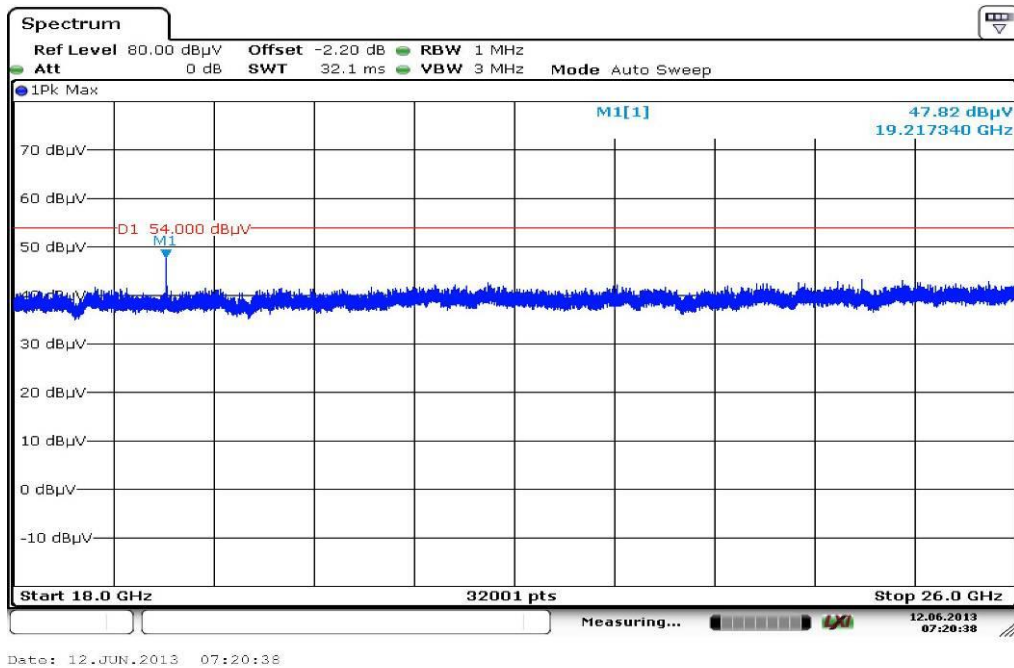


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 3: 12.75 GHz to 18 GHz, RX mode, vertical & horizontal polarization



Plot 4: 18 GHz to 26 GHz, RX mode, vertical & horizontal polarization

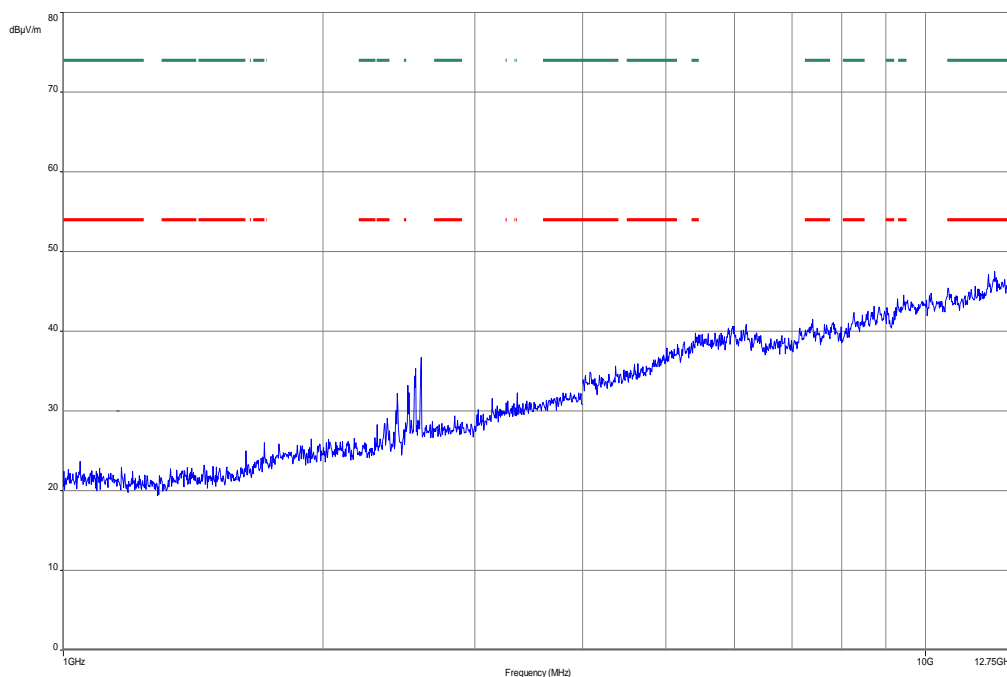


set 13:

Common Information

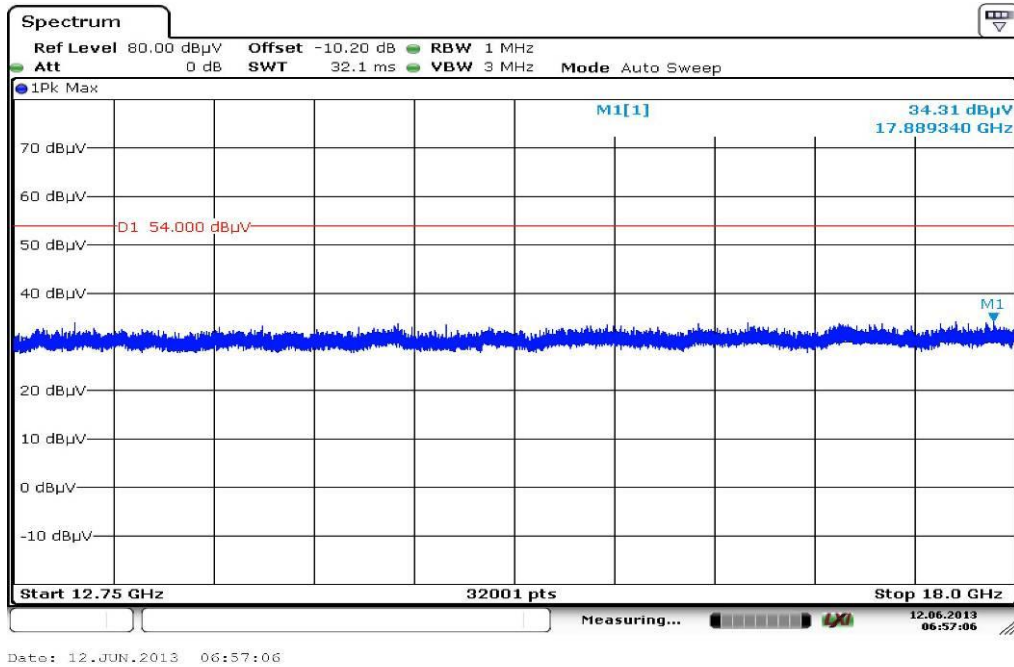
EUT:	RFU81UW (EUT A) + HS2 + CH2 + USB4
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	WLAN ch. 6 + charging
Operator Name:	Wolsdorfer
Comment:	AC 115V / 60Hz

Plot 2: 1 GHz to 12.75 GHz, vertical & horizontal polarization

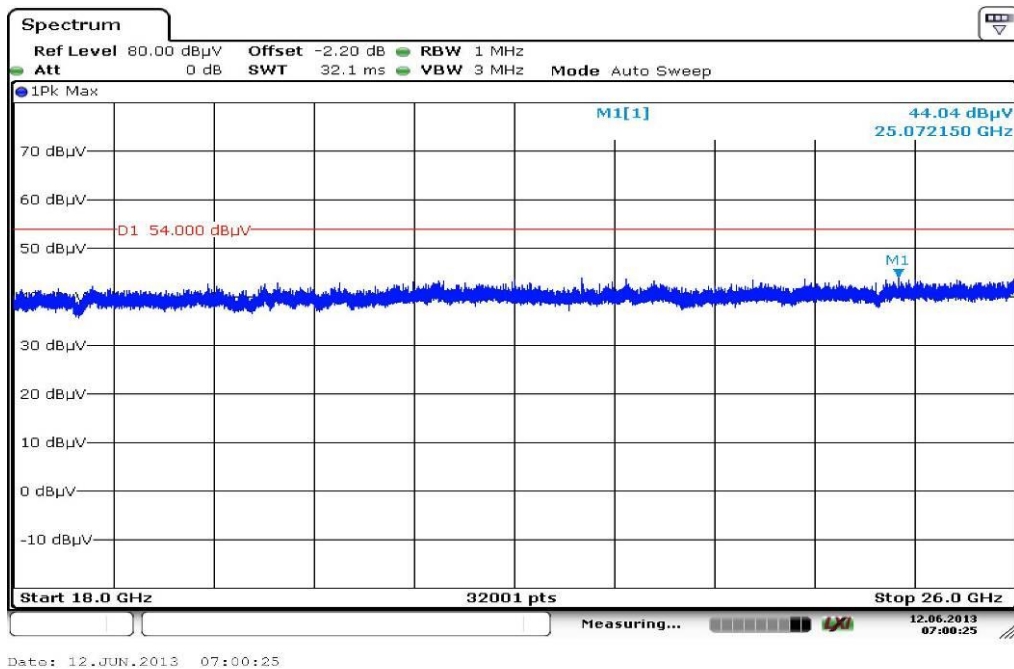


The carrier signal is notched with a 2.4 GHz band rejection filter!

Plot 3: 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 4: 18 GHz to 26 GHz, vertical & horizontal polarization



8.3.5 Hardware Set-up (set 6-11)

Subrange 1
Frequency Range: 1 GHz - 10 GHz

Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: 1_6_EN
FW 1.0
Correction Table: 3_5m
Correction Table: LNA_EN (matix)

Antenna: BBHA 9120 B

Correction Table (horizontal): BBHA9120
Correction Table (vertical): Cable_Horn_EN (1103)
Correction Table (horizontal): Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

8.3.6 Signal strength calculation

Calculation formula:

$$SS = U_R + CL + AF + PA + DC$$

List of abbreviations:

SS	▶	signal strength
U_R	▶	voltage at the receiver
CL	▶	loss of the cable and gain of the preamp
AF	▶	antenna factor
DC	▶	distance correction (results measured on 5 m calculated to 3 m)

List with correction factors:

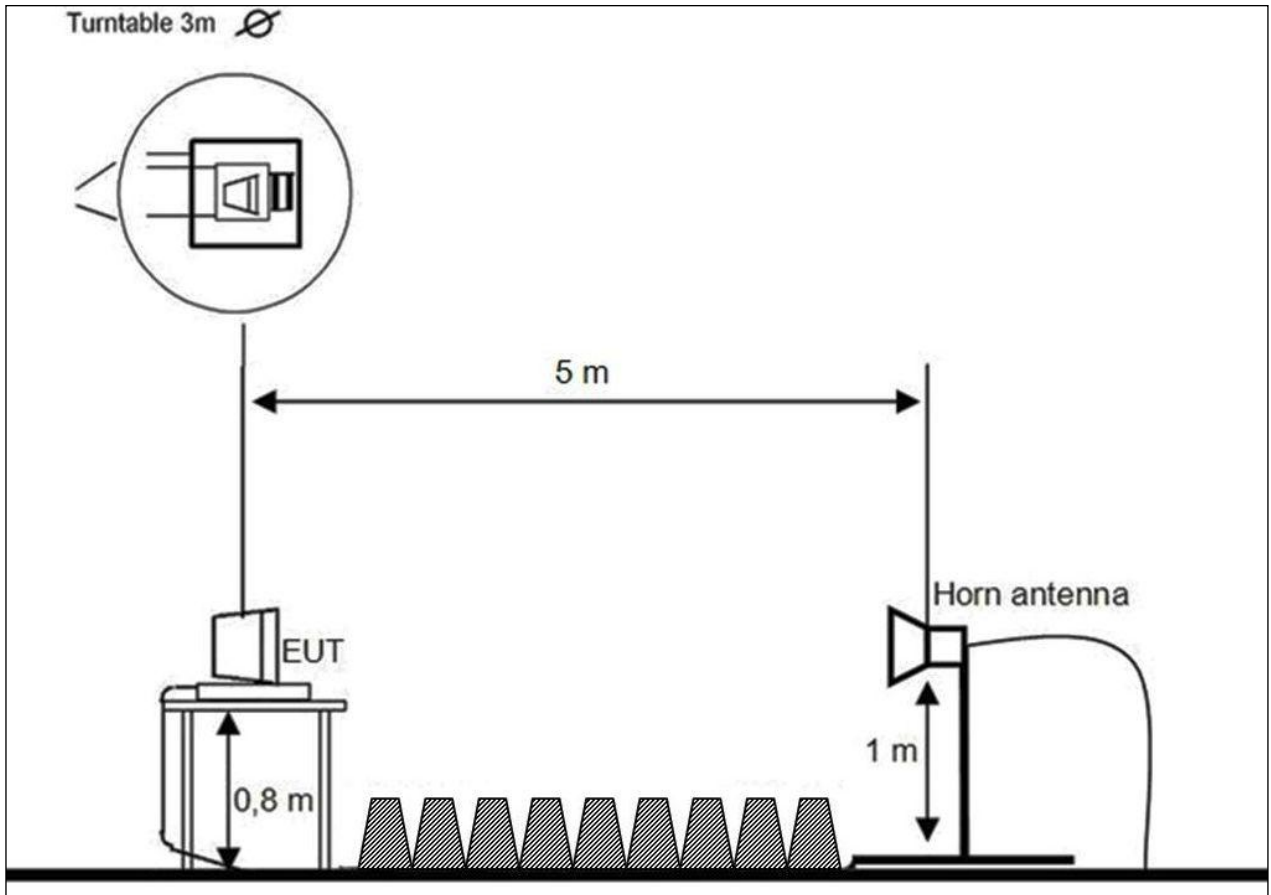
Frequency [GHz]	CL [dB]	AF [dB μ V/m]	DC [dB]
1,000	-35,50	26,20	4,40
1,500	-35,20	26,10	4,40
2,000	-35,10	26,70	4,40
2,500	-35,00	26,50	4,40
3,000	-34,70	27,60	4,40
3,500	-34,80	28,40	4,40
4,000	-35,00	28,60	4,40
4,500	-34,90	28,90	4,40
5,000	-34,80	29,30	4,40
5,500	-34,35	29,80	4,40
6,000	-34,00	30,30	4,40
6,500	-33,50	31,20	4,40
7,000	-33,10	31,20	4,40
7,500	-33,40	31,70	4,40
8,000	-33,80	32,10	4,40
8,500	-33,75	32,30	4,40
9,000	-33,70	31,70	4,40
9,500	-33,50	29,40	4,40
10,000	-33,40	33,00	4,40

Example calculation:

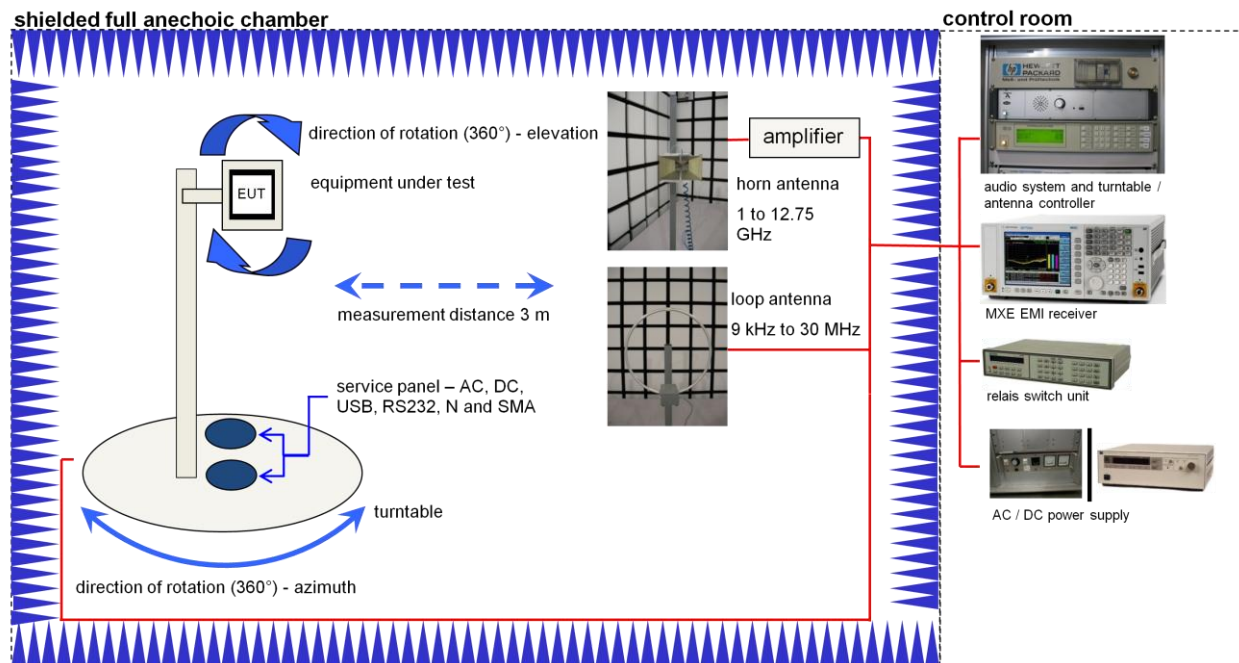
For example at 4,000 000 000 GHz the measured Voltage (U_R) is 46,13 dB μ V/m, the loss of the cable (CL) is -35,00 dB, the antenna factor (AF) is 28,60 dB μ V/m and the distance correction (DC) is 4,40 dB the final result will be calculated:

$$SS \text{ [dB}\mu\text{V]} = 46,13 \text{ [dB}\mu\text{V/m]} + (-35,00) \text{ [dB]} + 28,60 \text{ [dB}\mu\text{V/m]} + 4,4 \text{ [dB]} = \underline{\underline{44,13 \text{ [dB}\mu\text{V/m]} (160,88 \mu\text{V/m)}}$$

8.3.7 Test Set-up



8.4 Hardware Set-up (set 12 and set 13 – 1 to 26GHz)



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405
Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351
Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789
Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032
Active Loop Antenna	6502	EMCO	2210	300001015
Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996
Switch / Control Unit	3488A	HP Meßtechnik	*	300000199
Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156
Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155
Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997
Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143

8.5 Radiated measurements 12.75 GHz to 25 GHz



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786
Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517

9 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
<u>Radiated emission in chamber F</u>					
F-1	Control Computer	F+W		FW0502032	300003303
F-2	Trilog-Antenna	Schwarzbeck	VULB 9163	9163-295	---
F-3a	Amplifier	Veritech Microwave Inc.	0518C-138	- / -	- / -
F-4b	Switch	HP	3488A	- / -	300000368
F-5	EMI Test receiver	R&S	ESCI	100083	300003312
F-6	Turntable Interface-Box	EMCO / ETS-LINDGREN	Model 105637	44583	300003747
F-7	Tower/Turntable Controller	EMCO / ETS-LINDGREN	Model 2090	64672	300003746
F-8	Tower	EMCO / ETS-LINDGREN	Model 2175	64762	300003745
F-9	Ultra Notch-Filter Rejected band Ch. 62	WRCD		9	
<u>Radiated immunity in chamber F</u>					
F-10	Control Computer	F+W		FW0502032	300003303
F-11	Signal Generator	HP	8665A	2833A00112	300001373
F-13	RF-Amplifier	ar	100W1000M1	13161	300003410
F-14	Stacked Logper Antenna	Schwarzbeck	STLP9128 E	9128 E 013	300003408
F-15	RF-Amplifier	BONN	BLWA 0810-250	129100	300004536
F-16	Directional Coupler	ar	DC7144A	312786	300003411
F-17	Horn Antenna	ar	AT 4002	19739	300000633
F-18	Power Meter	R&S	NRV	860327/024	F033
F-19	Power sensor	R&S	URV5-Z2	839080/005	300002844.02
F-20	Power sensor	R&S	URV5-Z2	830755/057	F032
<u>Harmonics and flicker in front of chamber F</u>					
F-21	Flicker and Harmonics Test System	Spitzenberger & Spies	PHE4500/B I PHE4500/B II	B5983 B5984	300000210
F-28	Power Supply	Hewlett Packard	6032 A	2920 A 04466	300000580
<u>Radiated emission in chamber F > 1GHz</u>					
F-29	Horn antenna	Schwarzbeck	BBHA 9120 B	188	300003896
F-30	Amplifier	ProNova	0518C-138	005	F 024
F-31	Amplifier	Miteq	42-00502650-28-5A	1103782	300003379
F-32	Horn antenna	Emco	3115	9709-5289	300000213
F-33	Spectrum Analyzer	R&S	ESU26	100037	300003555
F-34	Loop antenna	EMCO	6502	8905-2342	300000256

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
Conducted emission in chamber G					
G-1	EMI Receiver	Hewlett Packard	8542 E	3617A00170	300000568
G-2	V-ISN	Rohde & Schwarz	ESH 3-Z5	892475/017	300002209
G-2a	V-ISN	Rohde & Schwarz	ESH 2-Z5	892602/024	300000587
G-3	2-Wire ISN	Schaffner	ISN T200	19075	300003422
G-4	4-Wire ISN	Schaffner	ISN T400	22325	300003423
G-5	Shielded wire ISN	Schaffner	ISN ST08	22583	300003433
G-6	Unshielded 8 wire ISN	Teseq	ISN T800	26113	300003833
G-7	Unshielded 8 wire ISN	Teseq	ISN T8-Cat. 6	26374	300003851
G-8	RF Current probe	FCC	F-33-4	46	300003257
G-9	V-ISN	Schaffner	ISN PLC-150	21579	300003318
G-10	V-ISN	Schaffner	ISN PLC-25-30	21584	300003319
G-10a	PLC Filter	TESEQ	Filter PLC	23436	300003598
G-10b	Coupling unit 75 Ohm	Fiedler	AC	----	300003272.04
Conducted immunity in chamber G					
G-11	Signal generator	R&S	SMG	8610647025	300000204.01
G-12	RF-Amplifier	BONN	BSA 0125-75	066502-01	300003545
G-13	Power Meter	R&S	URV 5	837723/025	300002844.01
G-14	Power Sensor	R&S	URV 5-Z2	832874/021	300002239
G-15	Directional coupler	emv	DC 2000	9401-1677	300000592
G-16	Attenuator 6dB	Alan	50HP6-100 N	121048 0348	300003148
G-17	EM-Injection Clamp	FCC	203i	232	300000626
G-18	CDN	FCC	FCC-801-M3-16	237	300000627
G-19	CDN	FCC	FCC-801-T2	78	300000629
G-20	CDN	FCC	FCC-801-AF 2	62	300000630
G-21	CDN	FCC	FCC-801-AF 4	61	300000631
G-22	CDN	FCC	FCC-801-M1	2027	300002761
G-23	CDN	Lüthi	CDN 801-M2/M3	9350105	300000534
G-24	Transformator for 50Hz Loop Antenna	EM-Test	MC2630	0200-10	300002659.01
G-25	50Hz Loop Antenna	EM-Test	MS 100	none	300002659
Surge, Burst, Dips and Interruptions in chamber G					
G-26	Hybrid-Generator	EM-Test	UCS 500N5	V112711033	300004257
G-27	Motor Variac	EM-Test	MV 2616	0600-01	300002658
G-28	Capacitive Coupling Clamp	MWB	KKS 100	---	300000589
G-29a	Coupling Decoupling Network	EMC-Partner	CDN-2000-06-32	158	300004108
G-29	Coupling Decoupling Network	EMC-Partner	CDN-UTP	00014	300003226
ESD in chamber G					
G-30	ESD generator	Schaffner	NSG 435	308	300002249
Emission on bench in chamber G					
G-31	Absorbing Clamp	R&S	MDS-21	832 231/006	300000527
generic in chamber G					
G-32	power supply	Hewlett Packard	6038A	2848A06673	300001512

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
11	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
2	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
3	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B597 9	300000210	ne		
4	n. a.	EMI Test Receiver	ESC1 3	R&S	100083	300003312	k	09.01.2013	09.01.2014
5	n. a.	Analyzer- Reference- System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
6	n. a.	Amplifier	JS42- 00502650- 28-5A	MITEQ	1084532	300003379	ev		
7	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
8	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
9	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
10	n. a.	Spectrum- Analyzer	FSU26	R&S	200809	300003874	k	16.01.2013	16.01.2014
11	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vKI!	08.05.2013	08.05.2015
12	n. a.	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO	2210	300001015	ne		
13	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
14	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
15	n. a.	Amplifier	js42- 00502650- 28-5a	Parzich GMBH	928979	300003143	ne		
16	n. a.	Band Reject filter	WRCG240 0/2483- 2375/2505- 50/10SS	Wainwright	11	300003351	ev		
17	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologi es	MY51210197	300004405	k	21.02.2013	21.02.2014
18	11b	Microwave System Amplifier, 0.5- 26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
19	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
20	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		
21	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
22	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		

10 Observations

No observations, exceeding those reported with the single test cases, have been made.

Annex A: Photographs of the EUT

see external document:

1-6234-13-01-06_AnnexA.pdf

Annex D: Photographs of the Test setup

see external document:

1-6234-13-01-06_AnnexD.pdf

and

1-6234-13-01-01_AnnexD.pdf

Annex B: Document history

Version	Applied changes	Date of release
-/-	Initial release	2013-06-24
-A	EUT B added	2013-06-28
-B	Hardware Revision from EUT B changed	2013-07-01

Annex C: 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