RADIO TEST REPORT

No. 1307119-3 Ed. 4

RF performance

EQUIPMENT UNDER TEST

Equipment :	Radio base station
Product name :	RBS 6401 B25, LTE
Product number :	KRD 901 043/* * denotes 0 - 6 depending on different HW and SW configurations
Product configuration:	Single-RAT LTE + Wi-Fi + CPE V4, B25
Manufacturer :	Oy LM Ericsson AB
Tested by request of :	Oy LM Ericsson AB

SUMMARY

All selected test cases specified in this report comply with the requirements according to the following standards:
47 CFR part 2 (2009)
47 CFR Part 24 (2012), Subpart E
47 CFR Part 15 (2012), Subpart B
RSS-133, Issue 6 (2012)
RSS-Gen, Issue 3 (2010)
ICES-003, Issue 5 (2012)

Date of issue: 2013-11-20

Tested by: Matti Virkki

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Revision History

Edition	Date	Description
1	2013-09-13	First release
2	2013-09-17	Product configuration corrected
3	2013-11-19	EIRP measurements added
4	2013-11-20	Editorial and product configuration corrections

CONTENTS

1 CLIENT INFORMATION

The EUT has been tested by request of

Company:	Oy LM Ericsson AB Elektroniikkatie 10 FI-90590 Oulu FINLAND
Name of contact:	Mika Savilakso LMF/TX Phone +358 9 299 3714
Client observer :	Mika Savilakso and Jarno Seppänen

2 EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT according to the manufacturer/client declaration

Equipment:	Radio base station	
Product name:	RBS 6401 B25, LTE	
Product number:	KRD 901 043/* * denotes 0 - 6 depending on different HW and SW configurations	
Product configuration:	Single-RAT LTE + Wi-Fi + CPE V4, B25	
Brand name:	Ericsson	
Manufacturer:	Oy LM Ericsson AB	
Rating/Supplying voltage:	120 V AC, 2.0 A, 60 Hz	
Rating RF output power:	2x1W	
Frequency range:	1900 MHz band 2	1930 – 1995 MHz
External antenna connector:	Yes	
Modulation characteristics:	LTE (QPSK, 16QAM, 64QAM)	

2.2 Description of the EUT

The object for test, RBS 6401 B25 is a Pico Base Station for indoor use. RBS 6401 has a maximum output power of 2x1 W (+30 dBm) and has two integrated antennas, alternatively two external antennas. The base station is designed to provide mobile users with a connection to a mobile network.

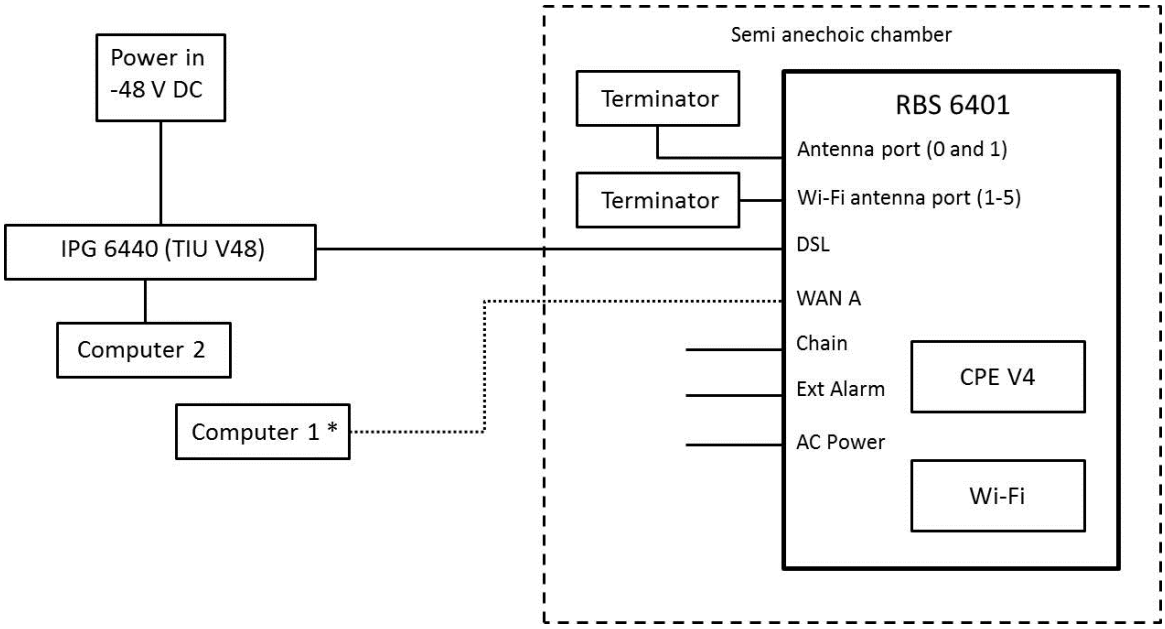
The highest internal frequency of RBS 6401 is FeedBack-LO which is running at 4604.4 MHz.

Also two additional modules are available for RBS 6401. CPE V4 and Wi-Fi modules are options and can be ordered with the RBS 6401 when they are ready assembled by the manufacturer.

The Wi-Fi modules are tested and certified by its manufacturer. The FCC model of Wi-Fi is used in these tests.

CPE V4 is connected to TIU (IPG 6440) and will be tested and certified by its manufacturer. The connection between CPE V4 and TIU is a copper-pair cable, with 1 to 4 pairs. During the performed tests a four-pair connection was used.

2.3 Test setup block diagram



*Used only for starting the EUT. Not connected during the test.

Figure 1: Block diagram of EUT during emission tests

The tests have been carried out with the EUT arranged according to the alternatives below.

The EUT was supplied with 120 V AC.
Communication: VDSL2 traffic 150 Mbit/s (emission tests),
HW Configuration: See clause 2.6

2.4 External cables connected to the EUT:

Port	Type of port	No. of cables	Specifications	Length [m]
AC port	AC power input port	1	Three-core	10
Antenna, port 0	Antenna	1	Coaxial, QMA connector	1
Antenna, port 1	Antenna	1	Coaxial, QMA connector	1
Wi-Fi, Ports	Antenna	5	Coaxial, IPEX connector	0.1
DSL	Signal	1	Unshielded signal cable CAT 6, RJ45	10
CHAIN	Signal	1	Unshielded signal cable CAT 6, RJ45	10
WAN A	Signal	1	Unshielded signal cable CAT 6, RJ45	10
Ext Alarm	Signal	1	Unshielded signal cable 12 wires	15

2.5 Auxiliary equipment

Auxiliary equipment is defined as equipment needed for correct operation of the EUT, but not included as part of testing and evaluation of the EUT.

Equipment	Type / Model	Manufacturer	Serial number
Laptop	Compaq nc6120	HP	CNU6101426
Laptop	Compaq 6710b	HP	CNU80332JF
Laptop	Dell Latitude	Dell	CN-OkODNP-12961-21M-02DE-A02
IPG		Ericsson	
SUP	1/BFL 901 009/1	Ericsson	BR81900666
TIU V48	KDU 127 185/1	Ericsson	CU70002515
TCU 02 01	KDU 137 739/1	Ericsson	CD36068566
PSU (for IPG)	ACE650F / AC6-OKKKK-00	Cosel	A091891083672030 00A
2 x Terminators	Termaline, Coaxial resistor 25 W, 50 Ohm / 8080	Bird	34409, 28240

External cables connected outside the chamber

Port	Type of Port	No of cables	Specifications	Length [m]
DSL	Telecommunication	1	RJ 45, shielded CAT5	15
TN A (TIU)	Telecommunication	1	RJ 45, shielded CAT5	1
WAN A *	Telecommunication	1	RJ 45, unshielded (clamped with Ferrite clamp)	3

* Used only for starting the RBS 6401 in emission tests.

2.6 EUT hardware list

The EUT consists of the following units:

Product name	Product No.	R-State	Serial No.
RBS 6401 B25	KRD 901 043/4	R1B/A	C827268549
PSU – AC	BML 901 304/1	R1A	BR82738017
CPE V4	KDU 127 184/1	R3A	CU70004193
WIFI AP 01 FCC	KRC 161 393/2	R1A	TD3N000013
WIFI AP 01 FCC	KRC 161 393/2	R1A	TD3N000026*

*In EIRP test setup

2.7 EUT software

During the tests the EUT supported the following software:

LTE: lte_arago_prod_build 82 2013-08-13_02-58-30 13th of August 2013

2.8 Modification during the tests

No modifications have been made during the tests.

3 TEST SPECIFICATIONS

3.1 Standards

47 CFR Part 2 (2009)
47 CFR Part 24 (2012), Subpart E
47 CFR Part 15 (2012), Subpart B
RSS-133, Issue 6 (2012)
RSS-Gen, Issue 3 (2010)
ICES-003, Issue 5 (2012)

Test methods in: ANSI/TIA 603-C-2004 and ANSI C63.4-2009

3.2 Additions, deviations and exclusions from standards and accreditation

By request of the client only the radiated spurious emission part of the 47 CFR Parts 2, 24 and RSS-Gen and RSS-133 standards are measured. Other demanded tests are performed by the client in another test house and reported in the corresponding documents.

No other additions, deviations or exclusions have been made from standards and accreditation.

3.3 Test site

Measurements were performed at:

Intertek Semko AB.
Torshamnsgatan 43,
P.O. Box 1103
SE-164 22 Kista

Intertek Semko AB is a FCC listed test site with site registration number 90913
Intertek Semko AB is a Industry Canada listed test facility with IC assigned code 2042G

Measurement chamber

Measurement Chamber	Type of chamber	IC Site filing #
BJÖRKHALLEN	Semi-anechoic 3m	2042G-1
STORA HALLEN	Semi-anechoic 10m	2042G-2

3.4 Test conditions

If not additionally specified, the tests were performed under the following environmental conditions:

Supplying voltage	120 V
Air temperature	23-24°C
Relative humidity	39-46 %

4 TEST SUMMARY

The results in this report apply only to the sample tested.

Reference	Test	Result	Note
CFR 47, Part 2.1046, Part 24.232 RSS-Gen section 4.8 RSS-133 section 6.4	RF output power	Pass	
CFR 47, Part 2.1049 and RSS-Gen section 4.6	Occupied bandwidth	NT	
CFR 47, Part 2.1051, Part 24.238	Intermodulation	NT	
CFR 47, Part 2.1051, Part 24.238. RSS-Gen section 4.9 RSS-133 section 6.5	Out of band spurious emissions, conducted	NT	
CFR 47, Part 2.1053, Part 24.238 RSS-Gen section 4.9 RSS-133 section 6.5	Transmitter out of band spurious emissions, radiated	PASS	
CFR 47, Part 2.1055 RSS-Gen section 4.7 RSS-133 section 6.3	Frequency stability	NT	
CRF 47, Part 15.109, RSS-Gen section 6.1 ICES-003 section 6.2	Receiver out of band spurious emissions, radiated	PASS	
CRF 47, Part 15.107 and ICES-003 section 6.1	Conducted spurious emissions from AC-Mains	PASS	

NT = Not Tested, by request of the client. These tests are performed by the client in another test house and reported in the corresponding documents.

5 TRANSMITTER EQUIVALENT ISOTROPIC RADIATED POWER

Date of test: 2013-11-15 – 2013-11-16

5.1 Test specifications

Reference:
47 CFR 2.1046 and 24.232
RSS-133 6.5

5.2 Operation mode

The RBS was activated for maximum transmit power 2x1 W.

Antenna No.	RF power	Channel BW	U(E)ARFCN / Frequency [MHz]		Test model
			Downlink	Uplink	
0	1 W (30.0 dBm)	5 MHz	8665/1992.5	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM
1	1 W (30.0 dBm)	5 MHz	8365/1962.5	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM
1	1 W (30.0 dBm)	5 MHz	8065/1932.5	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM

Antenna No.	RF power	Channel BW	U(E)ARFCN / Frequency [MHz]		Test model
			Downlink	Uplink	
0	1 W (30.0 dBm)	10 MHz	8590/1985.0	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM
1	1 W (30.0 dBm)	10 MHz	8365/1962.5	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM
1	1 W (30.0 dBm)	10 MHz	8090/1935	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM

Antenna No.	RF power	Channel BW	U(E)ARFCN / Frequency [MHz]		Test model
			Downlink	Uplink	
0	1 W (30.0 dBm)	20 MHz	8540/1980	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM
1	1 W (30.0 dBm)	20 MHz	8365/1962.5	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM
1	1 W (30.0 dBm)	20 MHz	8140/1940	18900/1880.0	E-TM1.1 QPSK, E-TM 3.1 16QAM, E-TM3.2 64QAM

5.3 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
10m semianechoic chamber “Stora hallen”	Euroshield	-	30300	--
Measurement software	Rohde & Schwarz	EMC 32	--	--
EMI receiver	Rohde & Schwarz	ESU40	13178	07-2014
Horn antenna	Rohde & Schwarz	HF907	31245	06-2015
Signal generator	Rohde & Schwarz	SMIQ	12792	07-2014
Double ridge horn antenna	EMCO	3115	4936	02-2014

5.4 Measurement set-up

Test site: “Stora hallen” Semi-anechoic shielded chamber (30 MHz– 40 GHz)

The radiated output power was measured in a semi-anechoic chamber at a distance of 3 m and the EUT was placed on a non-metallic stand, 0.8 m above the reference ground plane. The specified test mode was enabled. Test set-up photos are given below.

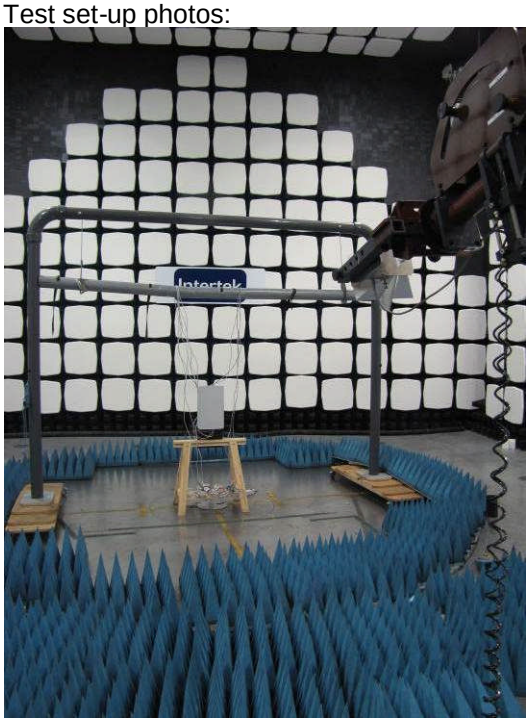
Overview sweeps with peak and average detection of the electric field intensity were performed with the measurement receiver in max-hold. The antenna was tilting towards the EUT.
Both horizontal and vertical polarizations were measured. The measurements were made with the EUT rotating 0-360º and antenna height scanning between 1-4m.

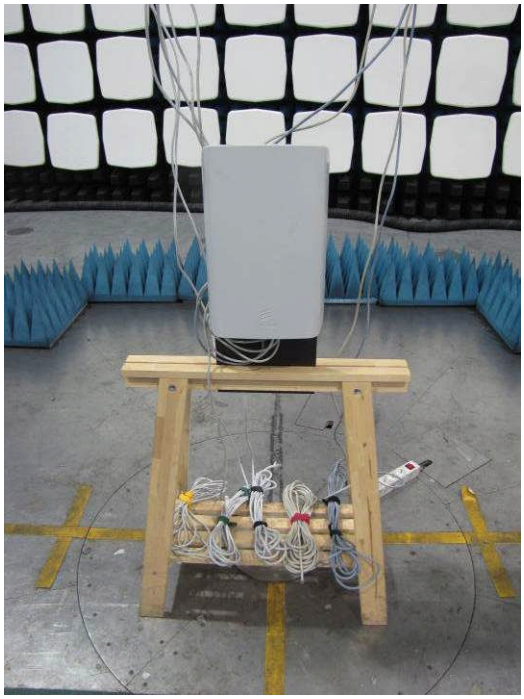
When maximum value was found EUT was replaced with calibrated signal source and signal source output was adjusted until maximum reading was reached again. Signal generator output value was recorded and corrected with cable loss and antenna gain to get EIRP.

EIRP = $P_{signal\ gen}$-cable loss + Antenna gain

The EUT was supplied with 120 V AC (60 Hz) during the test.

Test set-up photos:





5.5 Data summary

E-TM1.1 5MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1932.5	36,39	4,35	H	50	100	97,35
1932.5	33,55	2,26	V	50	100	98,62
1962.5	35,60	3,63	V	50	100	97,79
1962.5	36,00	3,98	H	50	100	97,57
1992.5	36,94	4,5	V	50	100	95,05
1992.5	33,43	2,21	H	50	100	97,79

E-TM1.1 10 MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1935	34,11	2,57	V	50	100	98,43
1935	35,76	3,76	H	50	100	97,70
1962.5	35,8	3,80	V	50	100	97,68
1962.5	35,76	3,76	H	50	100	97,82
1990	32,48	1,77	H	50	100	98,92
1990	35,31	3,39	V	50	100	97,93

E-TM1.1 20MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1940	34,05	2,54	V	50	100	98,45
1940	35,2	3,31	H	50	100	97,98
1962.5	35,71	3,72	V	50	100	97,73
1962.5	35,52	3,56	H	50	100	97,83
1985	33,24	2,11	H	50	100	97,89
1985	35,91	3,89	V	50	100	96,11

E-TM3.2 5MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	mW	V/H	dBm	W	W
1932.5	36,32	4,35	H	50	100	96,19
1932.5	35,81	3,48	V	50	100	95,71
1962.5	35,72	3,63	V	50	100	96,37
1962.5	35,52	3,48	H	50	100	96,02
1992,5	34,09	2,56	H	50	100	97,43
1992,5	34,23	2,64	V	50	100	97,35

E-TM3.2 10 MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1935	35,64	3,66	V	50	100	96,34
1935	36,15	4,12	H	50	100	95,88
1962.5	36,18	4,15	V	50	100	95,85
1962.5	34,17	2,61	H	50	100	97,39
1990	34,52	2,83	H	50	100	97,17
1990	37,30	5,37	V	50	100	94,63

E-TM3.2 20MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1940	34,85	3,03	V	50	100	96,97
1940	35,7	3,71	H	50	100	96,28
1962.5	35,79	3,79	V	50	100	96,20
1962.5	36,8	4,79	H	50	100	95,21
1985	34,38	2,74	H	50	100	97,26
1985	36,04	4,01	V	50	100	95,98

E-TM3.1 5MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1932.5	34,11	2,57	V	50	100	97,42
1932.5	35,61	3,64	H	50	100	96,36
1962.5	35,19	3,30	V	50	100	96,69
1962.5	35,90	3,89	H	50	100	96,11
1992,5	34,03	2,52	H	50	100	97,47
1992,5	35,60	3,63	V	50	100	96,37

E-TM3.1 10 MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1935	35,43	3,49	V	50	100	96,51
1935	35,88	3,87	H	50	100	96,12
1962.5	35,29	3,38	V	50	100	96,62
1962.5	35,67	3,68	H	50	100	96,31
1990	33,87	2,44	H	50	100	97,56
1990	36,11	4,09	V	50	100	95,91

E-TM3.1 20MHz

Frequency	Output power	Output power	Pol.	Limit (RMS)	Limit (RMS)	Margin
MHz	dBm	W	V/H	dBm	W	W
1940	35,14	3,26	V	50	100	96,73
1940	35,37	3,44	H	50	100	96,55
1962.5	35,70	3,71	V	50	100	96,29
1962.5	35,41	3,47	H	50	100	96,53
1985	34,79	3,01	H	50	100	96,99
1985	36,94	4,94	V	50	100	95,06

6 TRANSMITTER RADIATED SPURIOUS EMISSIONS

Date of test: 2013-08-26 – 2013-08-28

6.1 Test specifications

Reference:
47 CFR 2.1051 and 24.238
RSS-133 6.5

Spurious emissions should be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P)

This gives a limit at -13 dBm.

The frequency range to be inspected is up to the tenth harmonics of the highest fundamental frequency according to 47 CFR 2.1057.

The field strength limit is calculated using the plane wave relation.

$GP/4\pi R^2 = E^2 / 120\pi$

G: antenna gain
P: power (W)
R: measurement distance (m)

-13 dBm EIRP gives a field strength limit of 84.4 dBμV/m at a 3m measurement distance in an anechoic chamber.

6.2 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
3m semianechoic chamber “Björkhallen”	Siepel	Hermes 3	30900	--
Measurement software	Rohde & Schwarz	EMC 32	--	--
EMI receiver	Rohde & Schwarz	ESI26	32291	07-2014
EMI receiver	Rohde & Schwarz	ESU40	13178	07-2014
Ultra-Log antenna	Rohde & Schwarz	HL562	30711	12-2014
Horn antenna + Pre-amplifier	Bonn Elektronik	BLMA 1826-5A	31247	12-2013
Horn antenna	Rohde & Schwarz	HF907	32307	06-2015
Pre-amplifier	Rohde & Schwarz	TS-PRE1	32306	07-2014
Switching & Control unit	Rohde & Schwarz	OSP130	32300	07-2014
Shielded filter unit	Rohde & Schwarz	OSP-F	32301	07-2014
Turntable & antenna controller	Maturo	NCD	32390	--
Tilting antenna mast	Maturo	TAM 4.0-E	32376	--

6.3 Operation mode

Preview sweeps were made with different modulations and channel band widths (see Appendix A). Since no significant difference is seen in the results the final measurement are made with the RBS configured as below.

The RBS was activated for maximum transmit power 2x1 W.

Top – Bottom carrier

Antenna No.	RF power	Channel BW	EARFCN / Frequency [MHz]		Test model
			Downlink	Uplink	
0	1 W (30.0 dBm)	5 MHz	8665/1992.5	18900/1880.0	FRCA13
1	1 W (30.0 dBm)	5 MHz	8065/1932.5	18900/1880.0	FRCA13

Wi-Fi (FCC 2.4 GHz and 5.7 GHz)

The Wi-Fi module was running at maximum power level according to FCC standards. For the EMC measurements the worst case is when 2412 MHz and 5745 MHz radios are running at full power, so those were used in the tests. Power levels are stated at the following table.

			Wi-Fi power level / Frequency (MHz)				
3GPP Band	**Wi-Fi**		**2412**	**5180**	**5260**	**5500**	**5745**
Band 25	FCC	KRC 161 393/2	36	30	30	30	36

6.4 Measurement set-up

Test site: “Björkhallen” Semi-anechoic shielded chamber (30 MHz– 26 GHz)

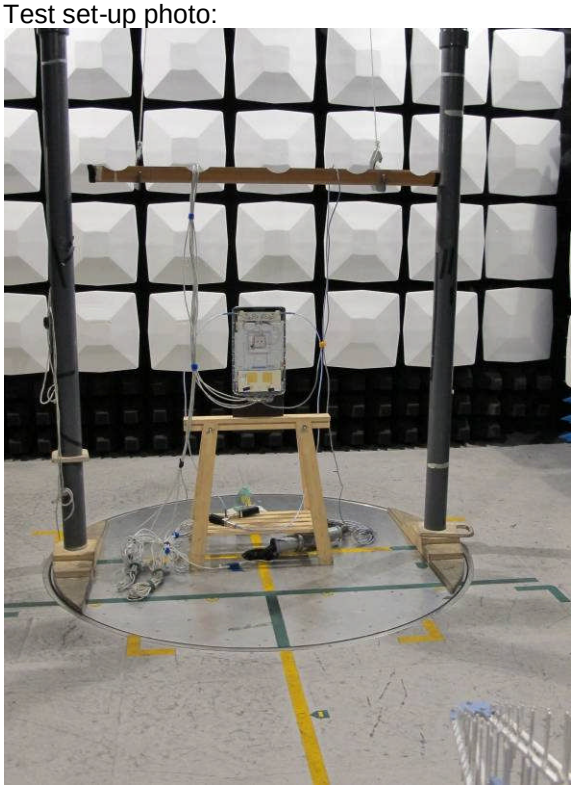
The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 3 m and the EUT was placed on a non-metallic stand, 0.8 m above the reference ground plane. The specified test mode was enabled. Test set-up photos are given below.

Overview sweeps with peak and at frequencies above 1 GHz also average detection of the electric field intensity were performed with the measurement receiver in max-hold. The antenna was placed 1.5 m and 3 m above the floor for 30 - 1000 MHz and 1.25 m and 2 m above the floor for 1 - 26 GHz. The antenna was tilting towards the EUT when measured frequencies above 1 GHz. Both horizontal and vertical polarizations were measured. The measurements were repeated with the EUT rotated in 90-degree steps for 30 - 1000 MHz, 45-degree steps for 1 - 18 GHz and 15-degree steps for 18 - 26 GHz.

At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out with quasi-peak detector for 30 – 1000 MHz and peak and average detection for 1 – 26 GHz.

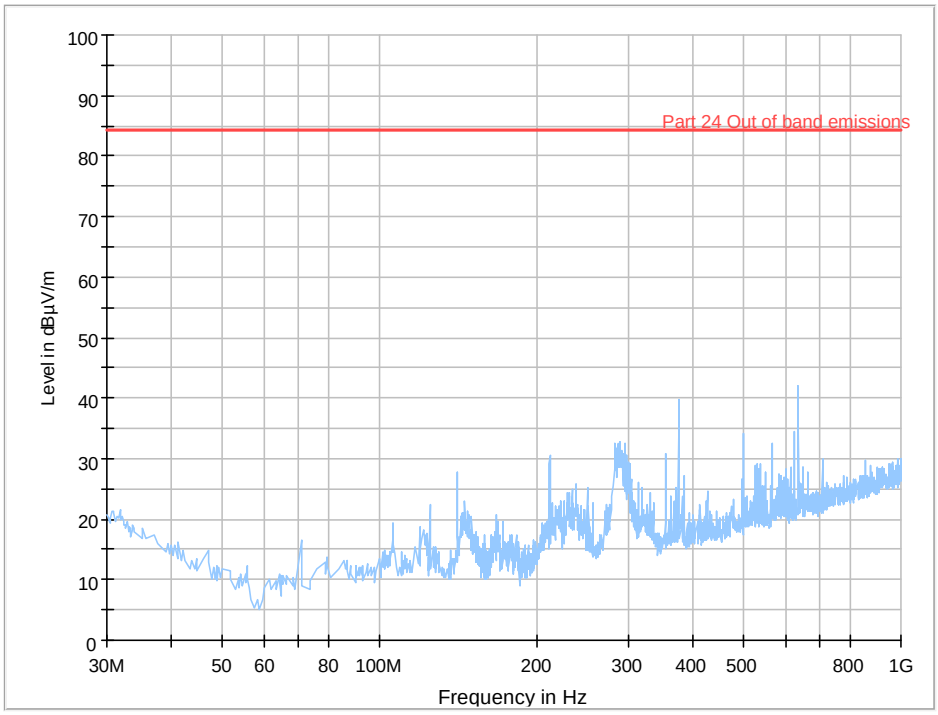
The EUT was supplied with 120 V AC (60 Hz) during the test.

Test set-up photo:

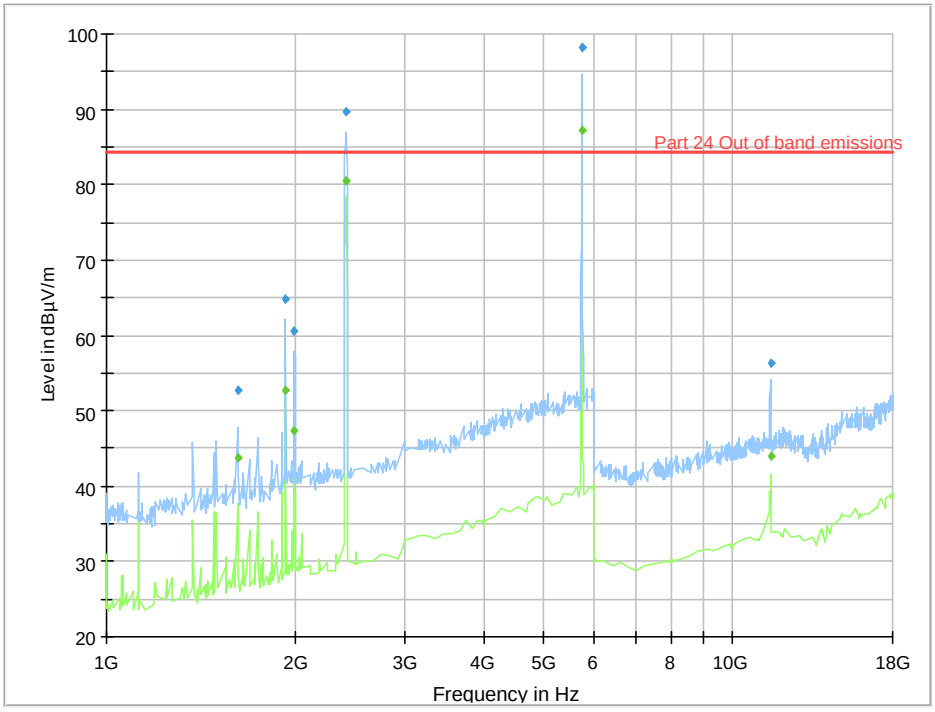


6.5 Preview sweeps

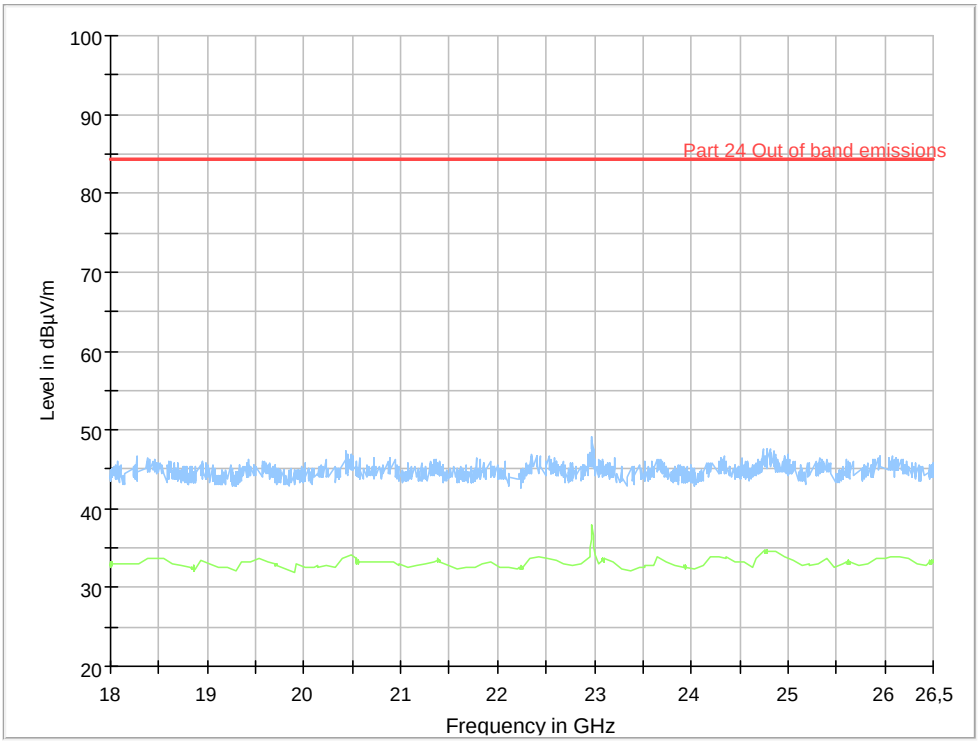
30 – 1000 MHz, max peak at a distance of 3 m, top – bottom carrier.



1-18 GHz, max and average peak at a distance of 3 m, top – bottom carrier.



18-26 GHz, max and average peak at a distance of 3 m, top – bottom carrier.



6.6 Data summary

Frequency	Disturbance level	Detector	RBW	Antenna height	Pol.	Azimuth	Limit (RMS)	Margin
MHz	dBµV/m	QP / AVG /Peak	kHz	cm	V/H	deg	dBµV/m	dB
1625.05	43.8	AVG	1000	245	H	141	84.4	40.6
1625.05	52.7	Peak	1000	254	H	145	84.4	31.7
1931.87*	52.8	AVG	1000	218	V	11	84.4	31.6
1933.87*	64.8	Peak	1000	128	V	350	84.4	19.6
1991.99*	47.4	AVG	1000	205	V	42	84.4	37
1994.19*	60.6	Peak	1000	122	V	37	84.4	23.8
2408.41**	80.4	AVG	1000	225	H	46	84.4	4.0
2418.24**	89.6	Peak	1000	147	V	46	84.4	-5.2
5747.29**	98.2	Peak	1000	119	H	280	84.4	-13.8
5748.30**	87.1	AVG	1000	102	H	265	84.4	-2.7
11496.19***	44.1	AVG	1000	138	H	69	84.4	40.3
11497.79***	56.4	AVG	1000	132	H	39	84.4	28

* RBS carrier
** Wi-Fi carrier
*** 2nd harmonic of Wi-Fi carrier

Note: The spurious emissions levels are measured with peak or average detector and the limit is stated with RMS detection. Substitution method is not used because all measured field strength levels are >20 dB below RMS limit.

Example calculation: Measured level [dBµV/m] = Analyser reading [dBµV] + cable loss [dB] – preamplifier gain [dB] + antenna factor [1/m]

Fulfil requirements: YES

7 RECEIVER RADIATED SPURIOUS EMISSIONS

7.1 Test specifications

Reference:
47 CFR 15.109
IC RSS-GEN Table 2
ICES-003 Table 5, Table 7

Frequency (MHz)	Field strength (dBμV/m)	Measurement distance (m)
30 – 88	40.0	3
88 – 216	43.5	3
216 – 960	46.0	3
960 –	54.0	3

7.2 Test equipment

See section 6.2.

7.3 Operation mode

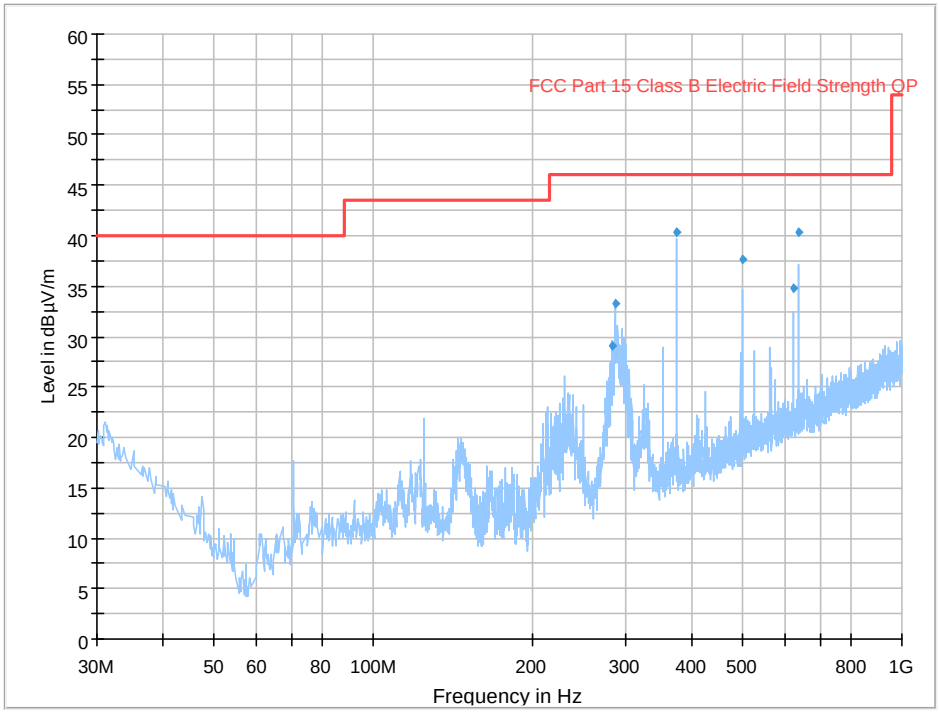
The RBS was in receive mode and Wi-Fi and CPE V4 modules were in idle mode.

7.4 Measurement set-up

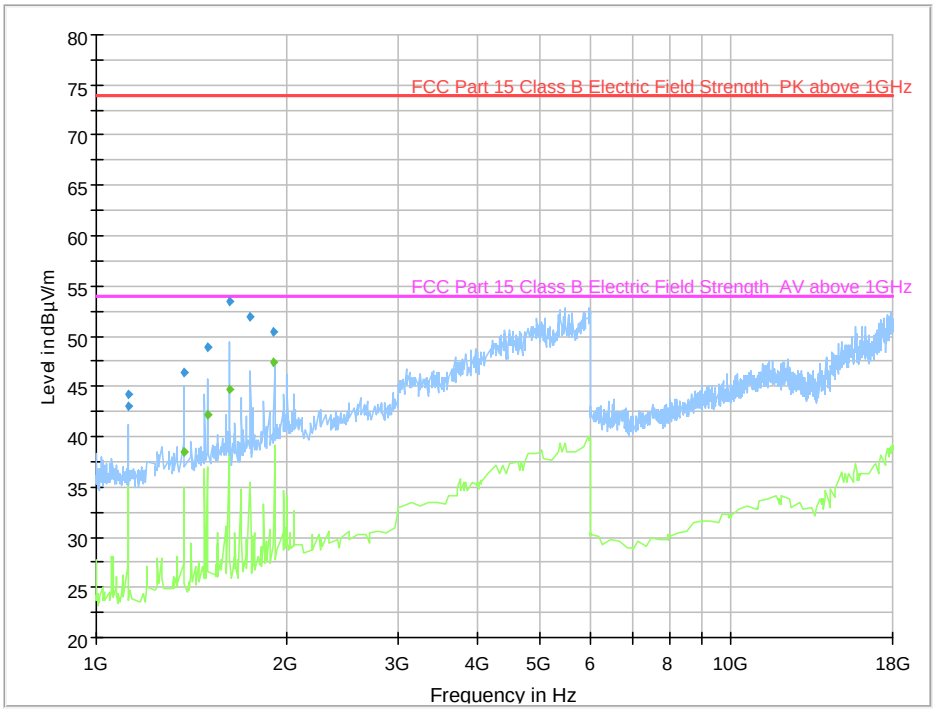
See section 6.4.

7.5 Preview sweeps

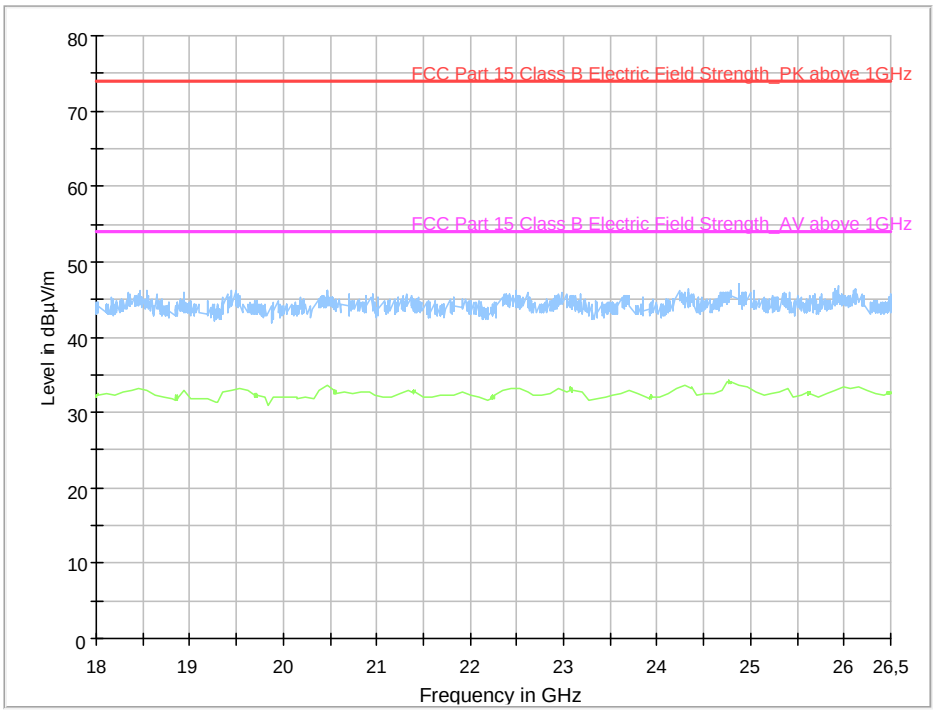
30-1000 MHz, max peak at distance of 3 m.



1-18 GHz, max and average peak at a distance of 3 m.



18-26 GHz, max and average peak at a distance of 3 m.



7.6 Data summary

Frequency	Disturbance level	Detector	RBW	Antenna height	Pol.	Azimuth	Limit	Margin
MHz	dBµV/m	QP / AVG /Peak	kHz	cm	V/H	deg	dBµV/m	dB
284.03	29.1	QP	120	129.0	H	309.0	46.0	16.9
286.41	33.3	QP	120	100.0	H	0.0	46.0	12.7
374.99	40.3	QP	120	162.0	V	131.0	46.0	5.7
499.98	37.7	QP	120	168.0	H	217.0	46.0	8.3
624.99	34.9	QP	120	159.0	V	172.0	46.0	11.1
635.89	40.3	QP	120	128.0	V	172.0	46.0	5.7
1125.05	44.3	Peak	1000	201.0	H	159.0	73.9	29.6
1125.05	43.0	Peak	1000	118.0	V	303.0	73.9	30.9
1374.95	38.5	AVG	1000	125.0	V	181.0	53.9	15.4
1374.95	46.4	Peak	1000	117.0	V	179.0	73.9	27.5
1500.00	42.1	AVG	1000	216.0	H	122.0	53.9	11.8
1500.00	48.9	Peak	1000	214.0	H	122.0	73.9	25.0
1625.05	53.4	Peak	1000	252.0	H	143.0	73.9	20.5
1625.05	44.6	AVG	1000	246.0	H	141.0	53.9	9.3
1749.90	51.9	Peak	1000	128.0	H	209.0	73.9	22.0
1907.62	47.4	AVG	1000	170.0	V	26.0	53.9	6.5
1907.82	50.4	Peak	1000	221.0	V	26.0	73.9	23.5

Example calculation:
Measured level [dBµV/m] = Analyser reading [dBµV] + cable loss [dB] – preamplifier gain [dB] + antenna factor [1/m]

Fulfil requirements: YES

8 AC LINE CONDUCTED EMISSION, 150 KHZ TO 30 MHZ

Date of test: 2013-08-28

8.1 Test specifications

Reference:
47 CFR 15.107, Class B limit
IC RSS-GEN, Table 4
ICES-003, Table 2

Frequency MHz	Quasi-peak Limit dBµV	Average Limit dBµV
0.15 – 0.5	66 – 56	56 – 46
0.5 – 1.6	56	46
1.6 – 30	60	50

8.2 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
Measurement software	Rohde & Schwarz	EMC 32	--	--
EMI Receiver	Rohde & Schwarz	ESI26	32291	07-2014
LISN	Rohde & Schwarz	ESH3-Z5	2727	07-2014
Pulse limiter	Rohde & Schwarz	ESH3-Z2	32456	07-2014

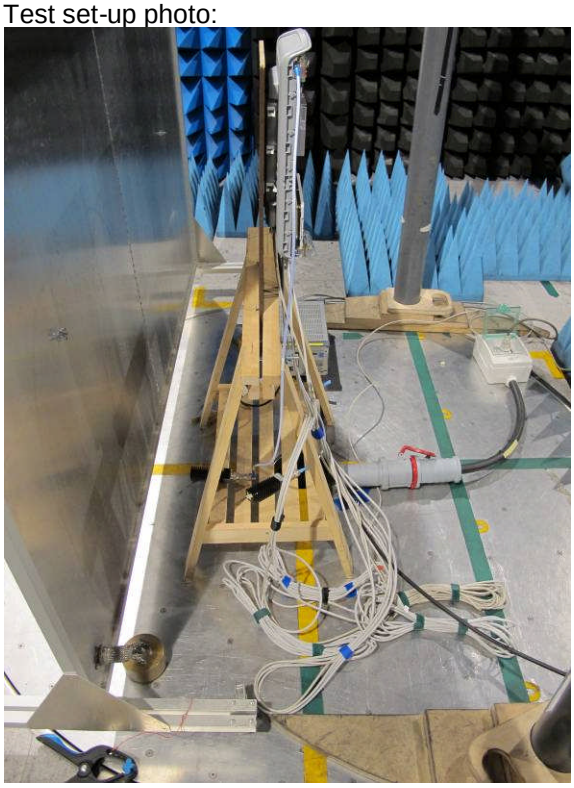
8.3 Operation mode

The RBS was in receive mode and Wi-Fi and CPE V4 modules were in idle mode.

8.4 Measurement set-up

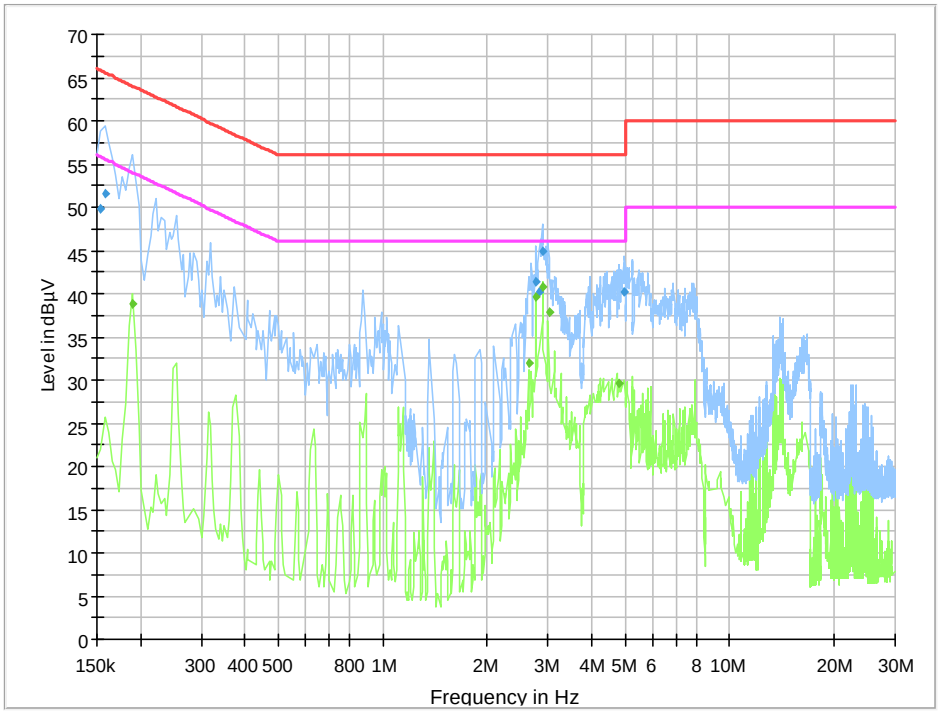
The mains terminal disturbance voltage was measured with the EUT located 0.8 m above the ground plane and 0.4 m from the vertical ground plane. The EUT was connected to an artificial mains network (AMN). The AMN was placed on the ground plane. Amplitude measurements were performed with quasi-peak and average detectors. The EUT was supplied by 120 VAC (60 Hz) during the test.

Test set-up photo:



8.5 Preview sweeps

Preview sweeps performed with peak and average detectors.



8.6 Data summary

Quasi-Peak				Average			
Frequency MHz	Disturbance level dBµV	Limit dBµV	Margin dB	Frequency MHz	Disturbance level dBµV	Limit dBµV	Margin dB
0.15	49.8	65.8	16.0	0.19	38.8	54.0	15.2
0.16	51.7	65.6	13.9	2.63	32.0	46.0	14.0
2.76	41.3	56.0	14.7	2.76	39.6	46.0	6.4
2.83	40.2	56.0	15.8	2.88	40.8	46.0	5.2
2.88	44.8	56.0	11.2	3.01	37.8	46.0	8.2
4.98	40.1	56.0	15.9	4.81	29.7	46.0	16.3

Measured level [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

Fulfil requirements: YES

9 UNCERTAINTIES SUMMARY

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.
Measurement uncertainty is calculated in accordance with EA-4/02-1997.
The measurement uncertainty is given with a confidence of 95% (k=2).

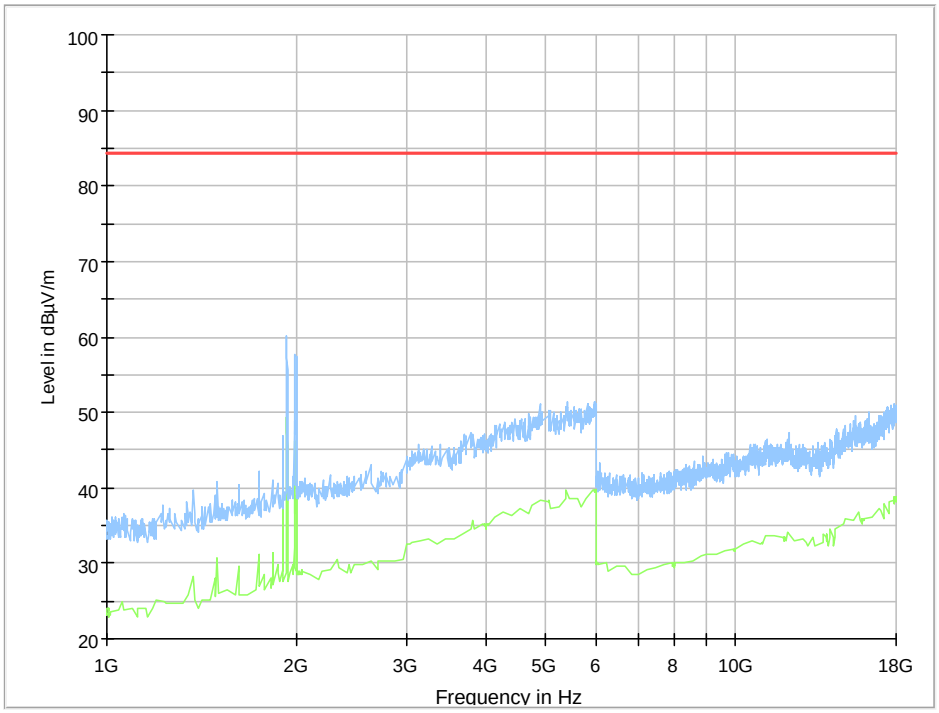
Radiated disturbance, field strength, 30 MHz - 1000 MHz	
30 to 300 MHz at 3 m	± 4.7 dB
200 to 1000 MHz at 3 m	± 4.8 dB
Radiated disturbance, field strength, 1 to 40 GHz in Semi Anechoic Chambers "Stora Hallen"and "Björkhallen"	
1 to 18 GHz with filter or attenuator	± 5.4 dB
1 to 18 GHz without filter or attenuator	± 5.2 dB
18 to 26 GHz without filter or attenuator	± 5.5 dB
26 to 40 GHz without filter or attenuator	± 5.6 dB
Continuous conducted disturbances with AMN , 9 kHz to 30 MHz	± 3.6 dB

10 PHOTO OF THE EUT

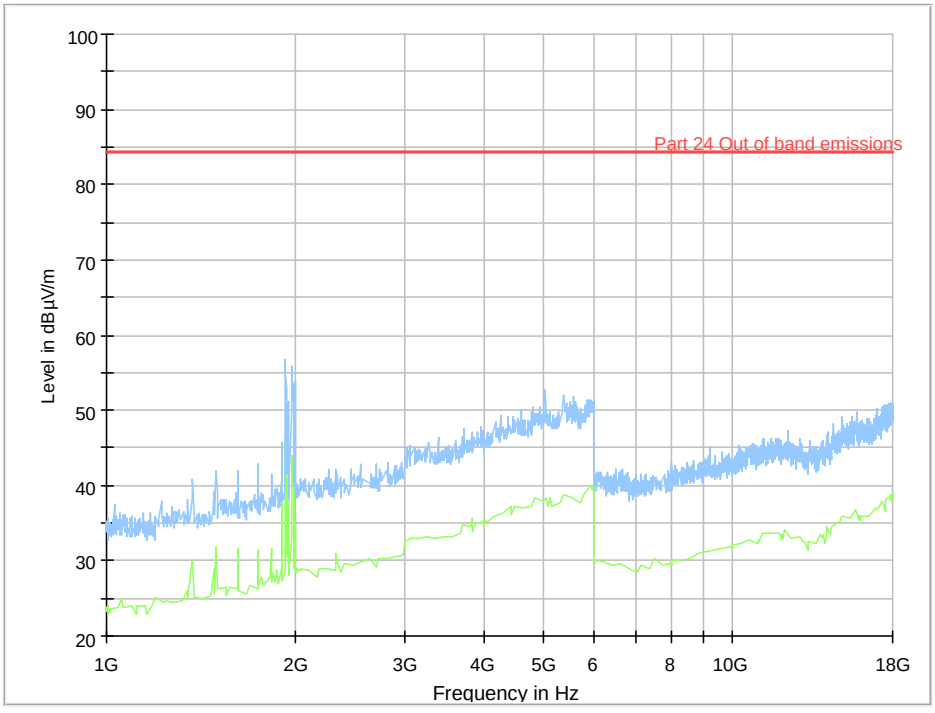
APPENDIX A

Preview sweeps with different configurations of the RBS.

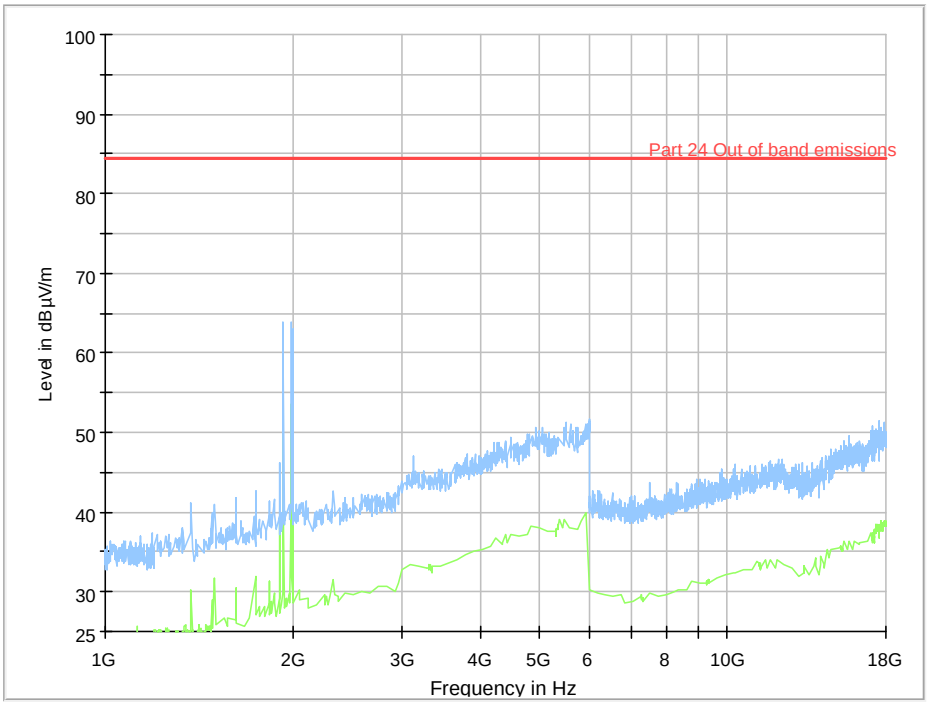
QPSK modulation, 10 MHz Channel BW



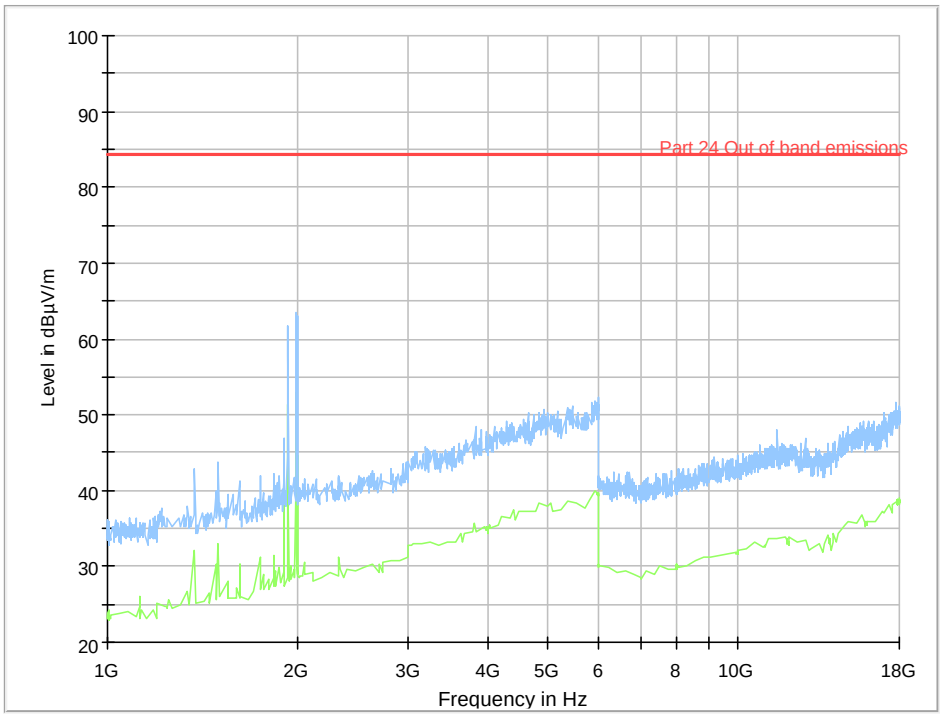
QPSK modulation, 20 MHz Channel BW



16QAM modulation, 5 MHz Channel BW



64QAM modulation, 5 MHz Channel BW



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