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Test report

305389-1TRFEMC

Date of issue: October 20, 2017

Applicant:

Sennheiser Communications A/S

Product:

DECT Base Station

Model:

SCDB3

Model variant:

SCDB4

FCC ID:

DMOSCDB3

IC Reg. Number:

2099A-SCDB3

Specifications:

- FCC 47 CFR Part 15, Subpart B

  Unintentional Radiators

- ICES-003, Issue 6, January 2016

  Information Technology Equipment (ITE) (Including Digital Apparatus)

Test location

Company name	Nemko Canada Inc.
Address	303 River Road
City	Ottawa
Province	Ontario
Postal code	K1V 1H2
Country	Canada
Telephone	+1 613 737 9680
Facsimile	+1 613 737 9691
Toll free	+1 800 563 6336
Website	www.nemko.com
Site number	FCC: CA2040; IC: 2040A-4 (3 m semi anechoic chamber)

Tested by	Frode Sveinsen, Senior Wireless Engineer
Reviewed by	Andrey Adelberg, Senior Wireless/EMC Specialist
Date	October 20, 2017
Signature of reviewer	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

CONTENTS

1 INFORMATION

1.1 Applicant information

Name :	Sennheiser Communications A/S
Address:	Industriparken 27, 2750 Ballerup Denmark

1.2 Tested Item

Name:	DECT Base Station
Additional information:	DECT 6.0
Model name:	SCDB3
Model variant:	SCDB4
FCC ID:	DMOSCDB3
Industry Canada Registration Number:	2099A-SCDB3
Serial number:	TA#1 (Radiated Sample)
Trademark:	SENNHEISER
Hardware identity and/or version:	Gamma 1 (IFB: 9C, WCB: 7B)
Software identity and/or version:	0.12.3
Tested to ISED Radio Standard (RSS):	RSS-213 Issue 3; RSS-Gen Issue 4
Frequency Band:	1920–1930 MHz
Frequency Range:	1921.536–1928.448 MHz
Number of Channels:	5 RF Channels, 5 × 12 = 60 TDMA Duplex Channels
Type of Modulation:	Digital (Gaussian Frequency Shift Keying)
Conducted Output Power:	94 mW (Peak)
Antenna Connector:	None
Number of Antennas:	2
Antenna Diversity Supported:	Yes
Power Supply:	AC Adaptor (Input: 100–240 V_{AC} 50 / 60 Hz 0.3 A, Output: 5.0 V_{DC} 2000 mA)
Interface:	MicroUSB, Phone connector
Companion Device:	Wireless DECT Headset SCDH1 (SDW 10 HS)

1.3 Testing dates

Tested in period:	September 12, 2017 to September 15, 2017

1.4 Description of Tested Device

The EUT is a DECT Base Station and is a responding device as described in ANSI C63.17 and is designed to operate together with a DECT Headset, which is the initiating device.

1.5 Test Conditions

Temperature:	**15–30 °C**
Relative humidity	**20–75 %**
Air pressure	**860–1060 mbar**
Normal test voltage	**120 V_{AC}**

All tests were performed with the EUT powered from the mains.

The values are the limit registered during the test period.

1.6 Test Engineer(s)

Frode Sveinsen

1.7 Other Comments

All tests were performed with all ports populated and operating.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

All tests were performed is accordance with ANSI C63.4-2014 where applicable.

Radiated emissions are made in a semi-anechoic chamber.

A description of the test facility is on file with the FCC and Industry Canada.

2.2 Test Summary

Name of test	**FCC CFR 47 Paragraph #**	**ICES-003 Paragraph #**	**Verdict**
Power Line Conducted Emission	15.107(a) 15.207(a)	5.2 / 5.3	Complies
Spurious Emissions (Radiated)	15.109(a)	5.4 / 5.5	Complies

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.107(a)

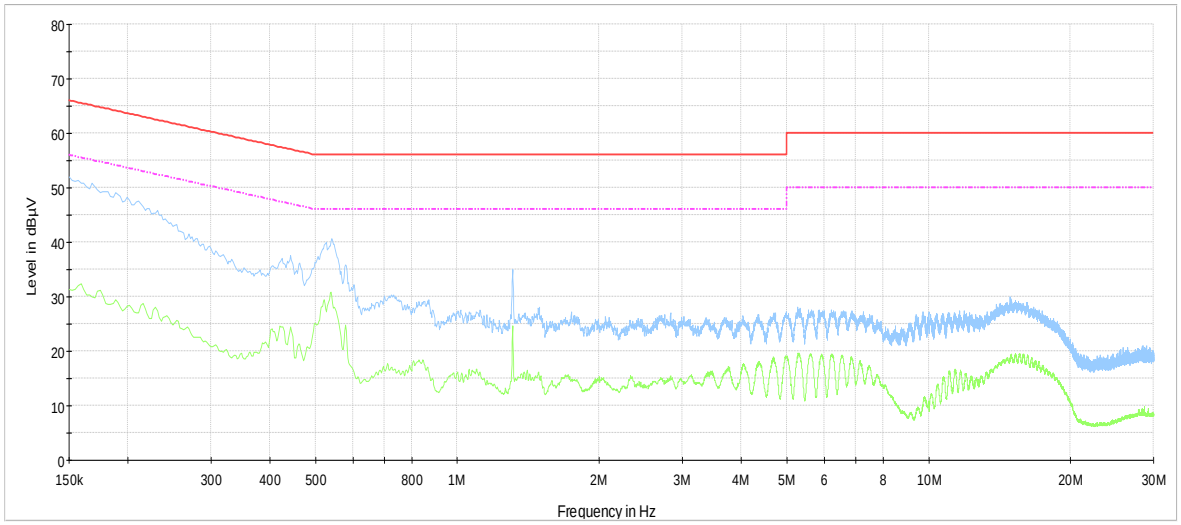
RSS-GEN Clause 8.8

Measurement procedure: **ANSI C63.4-2014 using 50 µH/50 ohms LISN.**

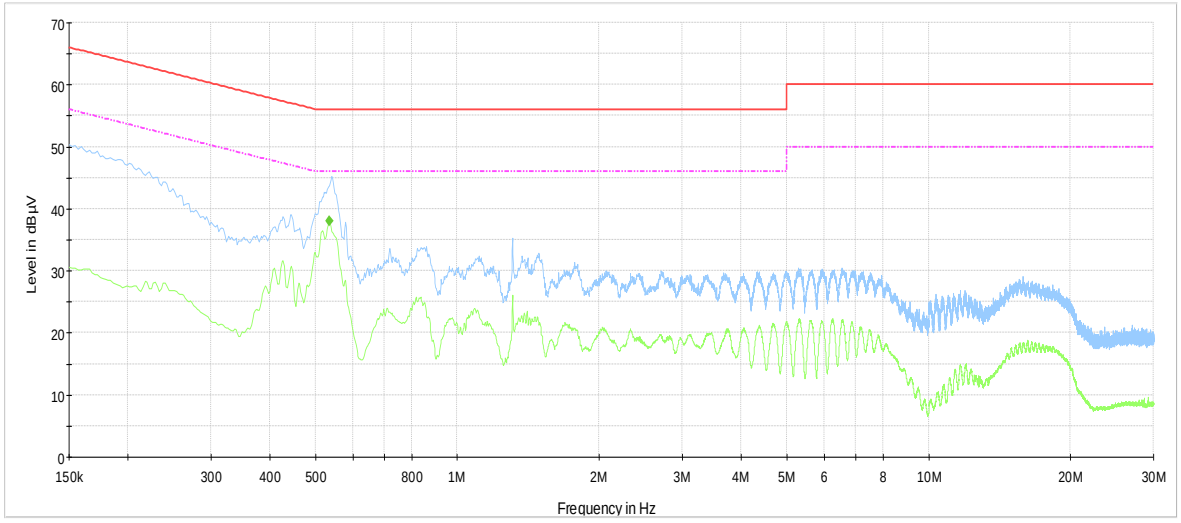
Test Results: **Complies**

Measurement Data: **See attached graph, (Peak detector).**

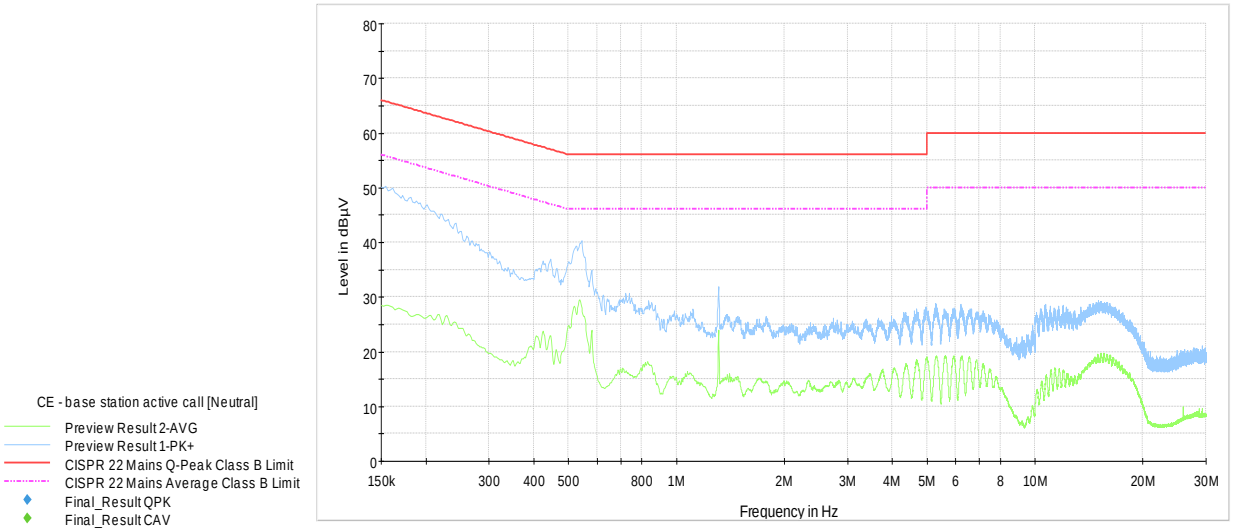
The Base station was connected with USB to a computer running Skype. The Base station was powered from the AC Adaptor.



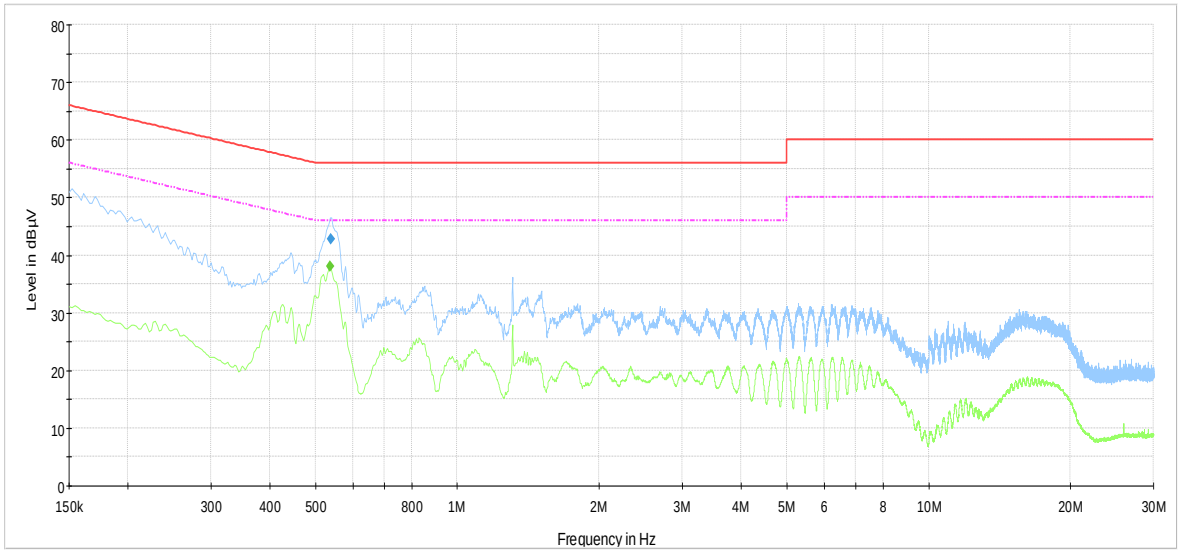
120V 60Hz, Headset Charging, Phase N



120V 60Hz, Headset Charging, Phase L1



120V 60Hz, Active Call, Phase N



120V 60Hz, Active Call, Phase L1

3.2 Spurious Emissions (Radiated)

Measurement Procedure:

FCC 15.109

Test Results: Complies

Measurement Data:

Radiated emission 30–1000 MHz.

Detector: Peak

Measuring distance 3 m

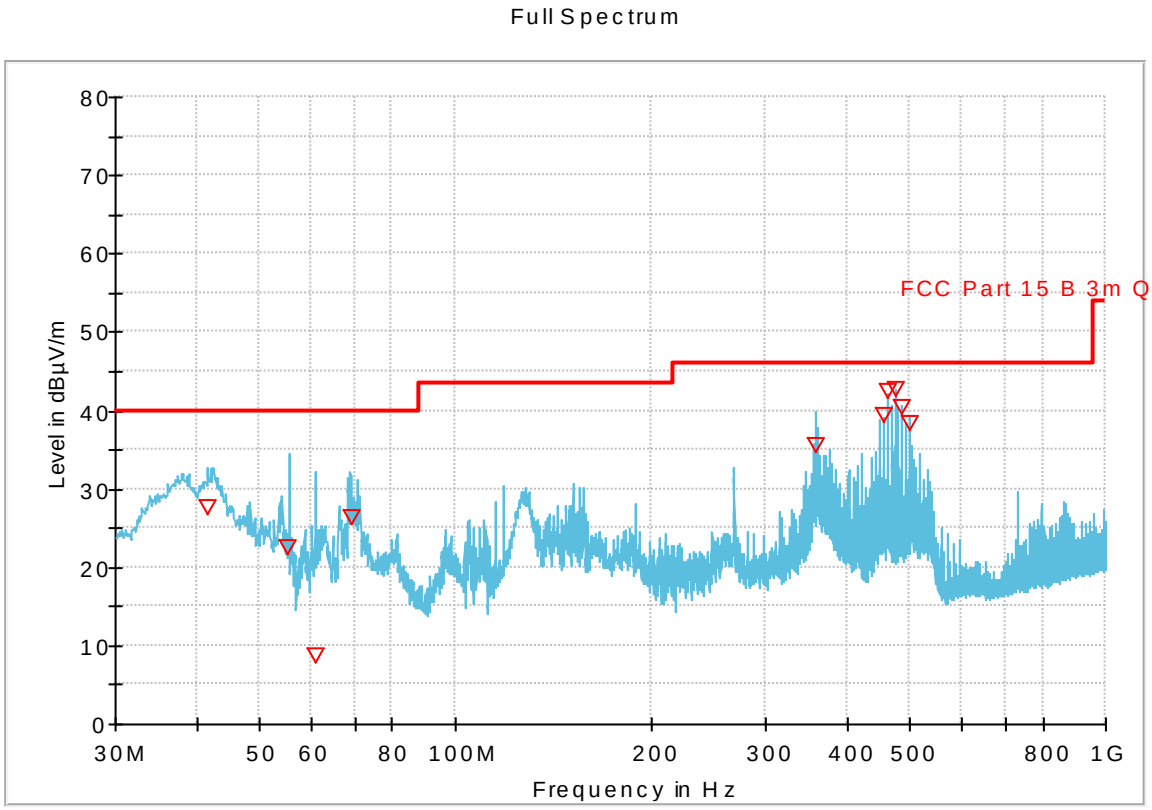
Tested with EUT active and transmitting

Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.631	27.52	40.00	12.48	1000	120	116.0	V	148	-22.6
55.278	22.62	40.00	17.38	1000	120	145.0	V	129	-22.9
60.805	8.77	40.00	31.23	1000	120	360.0	H	287	-23.3
69.110	26.28	40.00	13.72	1000	120	100.0	V	7	-25.8
359.099	35.49	46.00	10.51	1000	120	111.0	H	230	-21.0
455.427	39.40	46.00	6.60	1000	120	111.0	V	264	-19.1
461.573	42.41	46.00	3.59	1000	120	111.0	V	258	-19.0
473.861	42.57	46.00	3.43	1000	120	110.0	V	259	-18.8
486.150	40.35	46.00	5.65	1000	120	110.0	V	261	-18.5
498.419	38.24	46.00	7.76	1000	120	112.0	V	7	-18.3

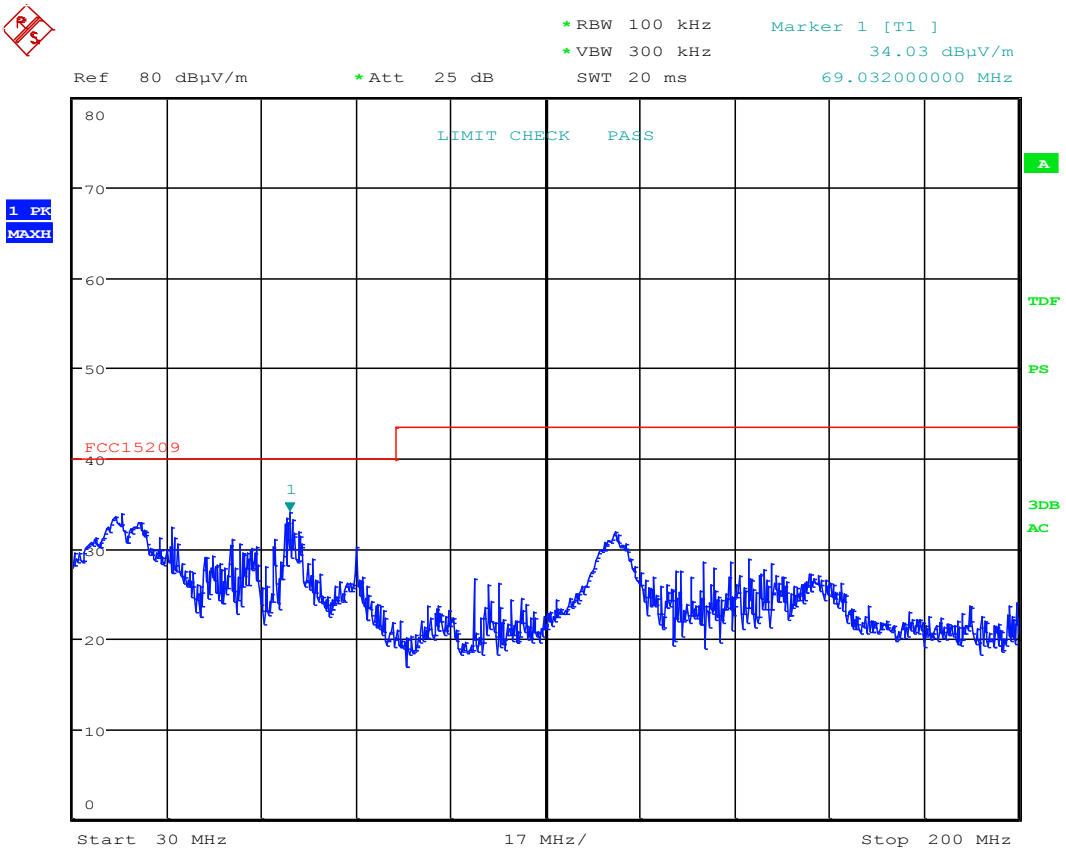
See attached plots.

Requirements/Limit

FCC:	Part 15.209 @ frequencies defined in §15.205	
ISED:	RSS-GEN Issue 4, Clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency (MHz)	Quasi Peak (µV/m)	Quasi Peak (dBµV/m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	54.0



Radiated Emissions, 30–1000 MHz, EUT V, Max VP/HP



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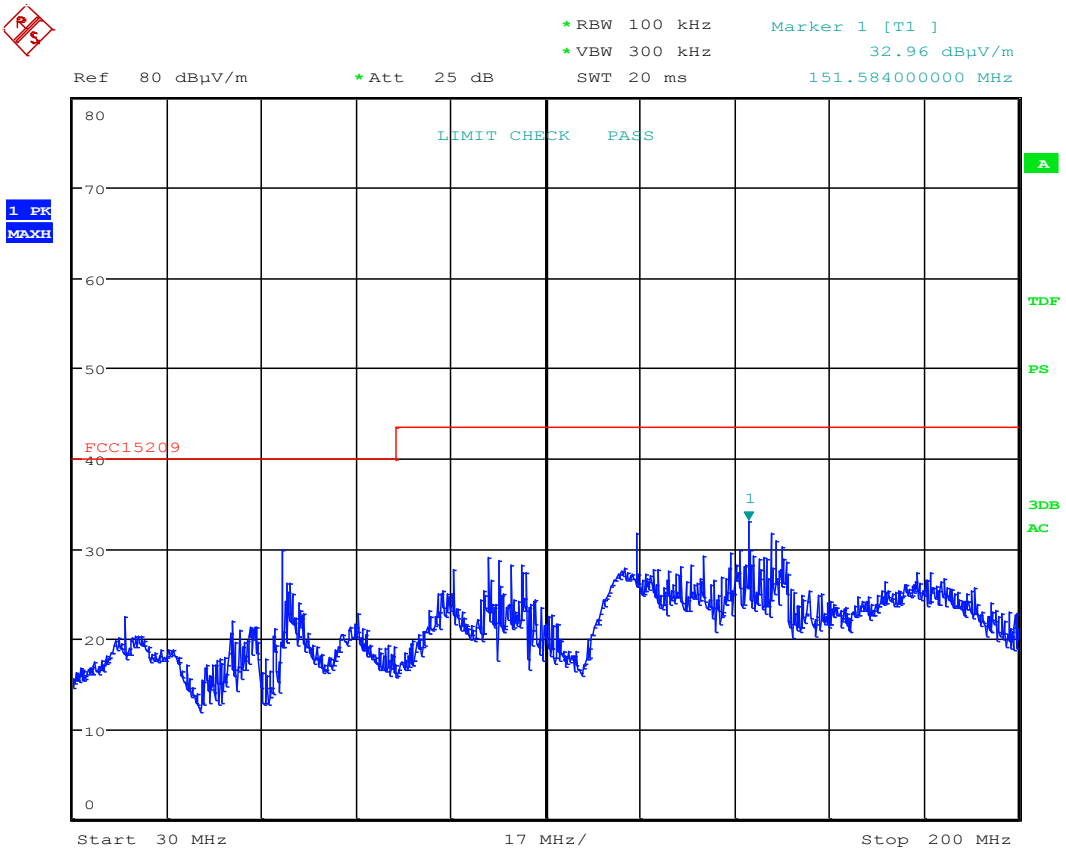
Radiated Emissions, 30–200 MHz, EUT V, VP



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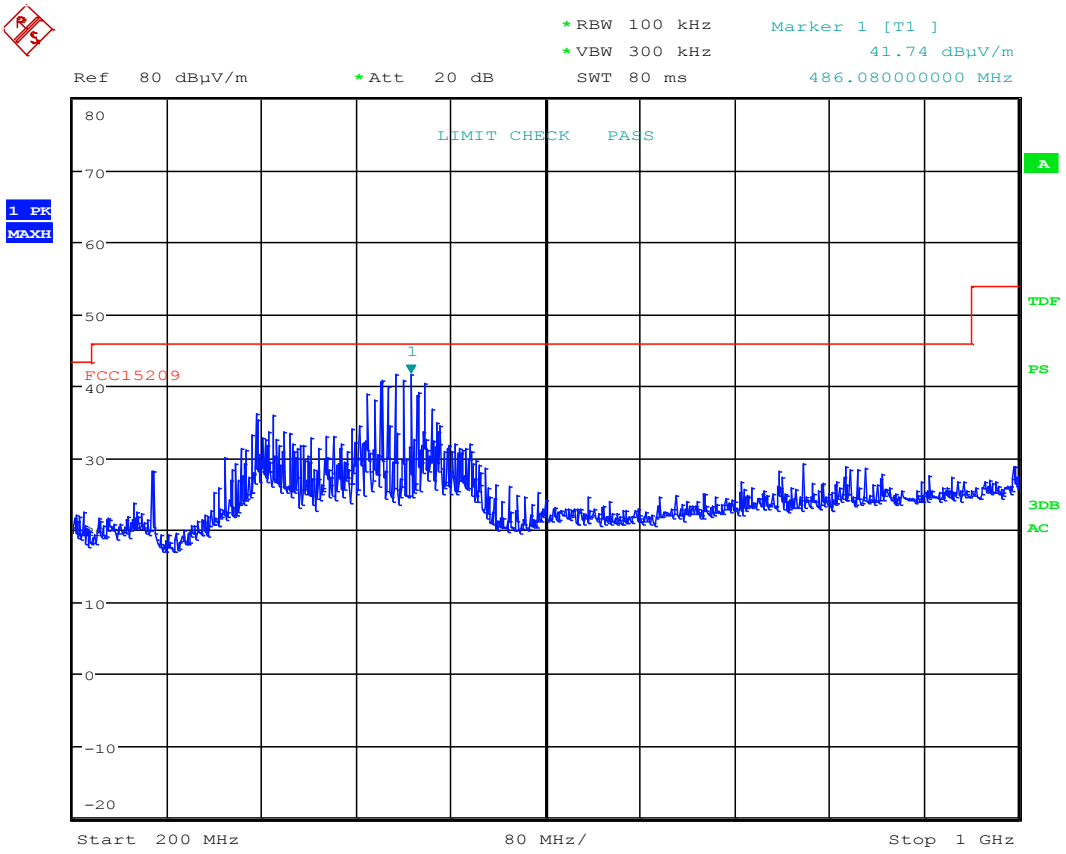
Radiated Emissions, 30–200 MHz, EUT V, HP



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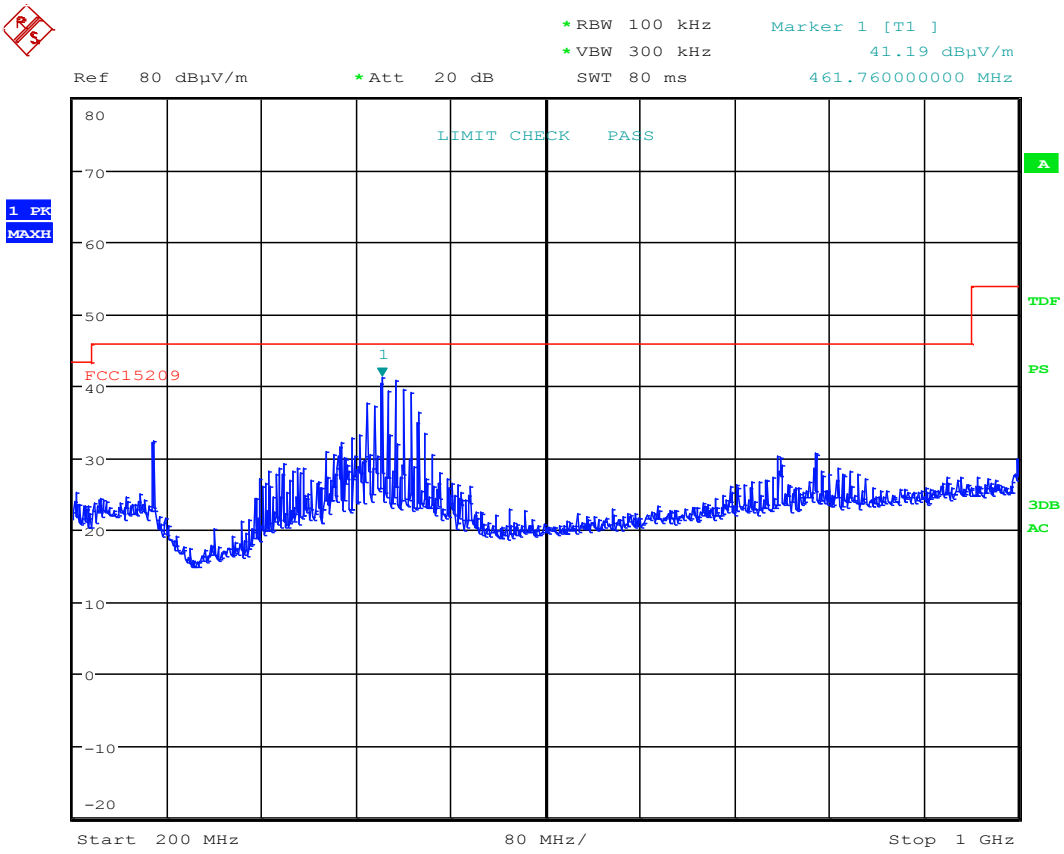
Radiated Emissions, 200–1000 MHz, EUT V, VP



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Radiated Emissions, 200–1000 MHz, EUT V, HP

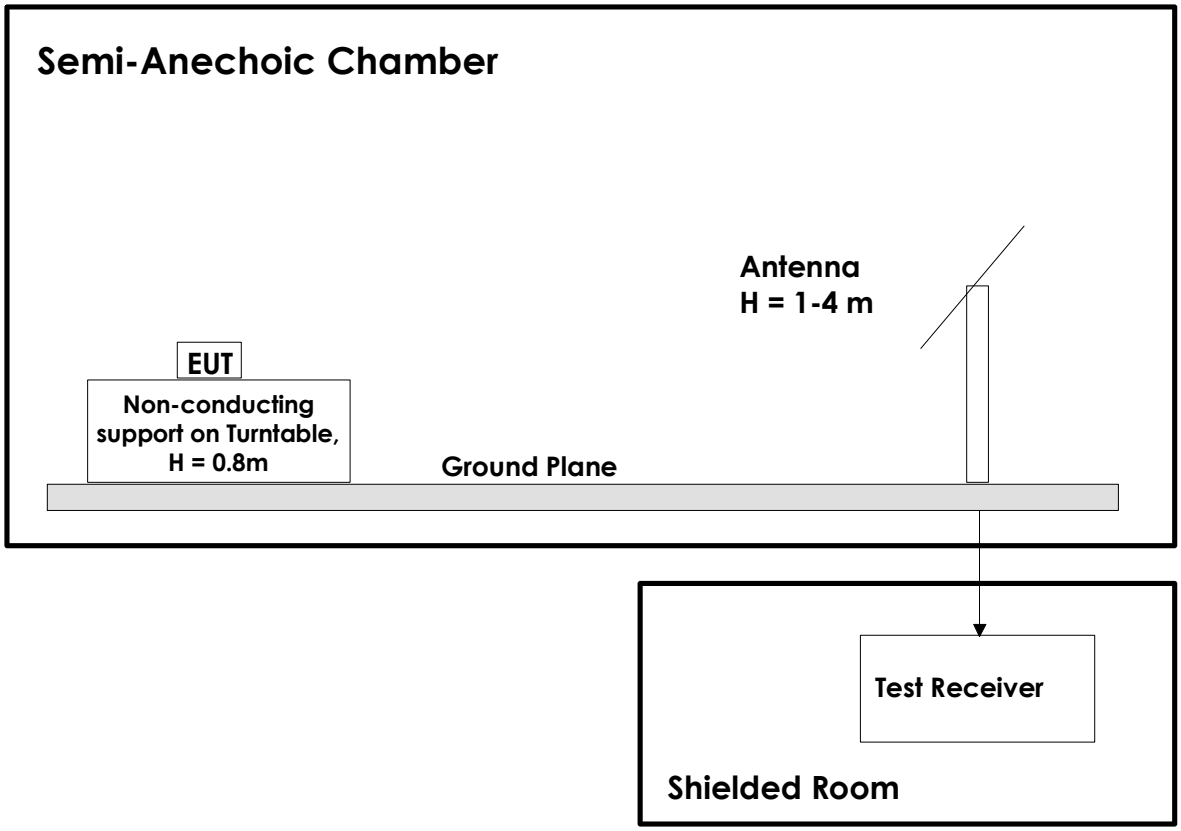
4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		**Uncertainty**
Spurious Emissions, Radiated	**< 1 GHz**	±2.5 dB
	> 1 GHz	±2.2 dB
Power Line Conducted Emissions		+2.9 / -4.1 dB
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

5 Test Setups

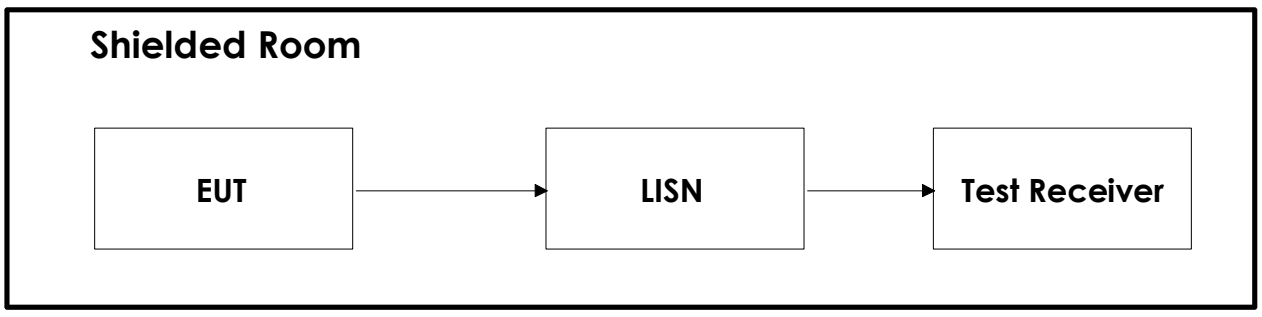
5.1 Radiated Emissions Test



Test Set-Up 1

This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10 m, for all other frequencies it is 3 m or 1 m. Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna and with the preamplifier after the antenna. For measurements above 18 GHz the test receiver is moved inside the anechoic chamber and located next to the antenna to minimize the cable loss.

5.2 Power Line Conducted Emissions Test



Test Set-Up 2

6 Test Equipment Used

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Testhouse.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	ESU 26	Receiver/spectrum analyzer	Rohde & Schwarz	FA002043	2017.01	2018.01
2	ENV216	LISN	Rohde & Schwarz	FA002023	2017.05	2018.05
3	ESU 40	Receiver/spectrum analyzer	Rohde & Schwarz	LR 1639	2016.12	2017.12
4	Model 317	Preamplifier	Sonoma	LR 1687	2017.08	2018.08
5	VULB 9163	BiLog Hybrid Antenna	Schwarzbeck	LR 1616	2017.03	2020.03
6	HL223	LogPeriod Antenna	Rohde & Schwarz	LR 1261	2013.12	2018.12
7	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2013.12	2018.12

Note: COU – calibrate on use; N/A – Not Applicable

The software listed below has been used for one or more tests.

No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC 32	9.26.01	Software for EMC Measurements of Power-Line Conducted Tests

Computer used as host during all tests: DELL Latitude E7440, S/N: B4TKJ12, with DELL 65W AC Adaptor

Revision history

Version	Date	Comment	Sign
1.0	2017.10.20	First edition	