Deutscher Akkreditierungs Rat DAR

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)

Test report no.	**:**	**1-1127-01-03/09-A**
Type identification	**:**	**SR2000 IEM / SR2000XP IEM**
Applicant	**:**	**Sennheiser electronic GmbH & Co. KG**
FCC ID	**:**	**DMOSR2000**
Test standards	**:**	**47 CFR Part 74**

Table of contents

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:

2009-05-20	**Meheza K. Walla**	
Date	Name	Signature

Technical responsibility for area of testing:

2009-05-20	**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:	**Sennheiser electronic GmbH & Co. KG**
Street:	**Am Labor 1**
Town:	**30900 Wedemark**
Country:	**Germany**
Telephone:	**+49 (0) 5130 600 - 0**
Fax:	**+49 (0) 5130 600 - 330**
Contact:	**Herrn Volker Bartsch**
E-mail:	**bartschv@sennheiser.com**
Telephone:	**+49 (0) 5130 600 465**

1.4 Application details

Date of receipt of order:	**2009-02-09**
Date of receipt of test item:	**2009-02-09**
Date of start test:	**2009-02-12**
Date of end test	**2009-05-20**
Persons(s) who have been present during the test:	**-/-**

2 Test standard/s

47 CFR Part 74	**2006-10**	**Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission** **Experimental radio, auxiliary, special broadcast and other program distribution services**

3 Technical tests

3.1 Details of manufacturer

Name:	**Sennheiser electronic GmbH & Co. KG**
Street:	**Am Labor 1**
Town:	**30900 Wedemark**
Country:	**Germany**

3.1.1 Test item and Additional EUT information

Kind of test item:	**stat. Stereo Sender**
Type identification:	**SR2000 IEM (10 mW, 30 mW, 50 mW) / SR2000XP IEM (100 mW)**
S/N serial number:	**[486 MHz - 558 MHz] – 2518100054 [558 MHz - 626 MHz] – 2518100062 [626 MHz - 698 MHz] – 2518100021**
HW hardware status:	**-/-**
SW software status:	**-/-**
Frequency Band [MHz]:	**470 MHz – 608 MHz & 614 MHz – 698 MHz (USA)**
Number of Channels:	**1680**
Measured Channels	
Channel 1:	**486 MHz – 80.89 mW**
Channel 2:	**558 MHz – 80.29 mW**
Channel 3:	**662 MHz – 78.64 mW**
Type of Modulation:	**FM**
Emission Designator:	**<u>486 MHz</u> 120KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 67K2F3E (measured Bandwidth) <u>558 MHz</u> 120KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 64K2F3E (measured Bandwidth) <u>662 MHz</u> 120KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 67K2F3E (measured Bandwidth)**
Antenna Type:	**External antenna**
Power Supply:	**115 V AC**
Temperature Range:	**-30 °C to +50 °C**
Occupied Bandwidth (99% BW) [kHz]:	**max. 200 kHz**
Transmitter Spurious (worst case) [dBm]:	**-44 (noise floor)**
Receiver Spurious (worst case) [dBµV/m @ 3m]:	**-/-**
FCC ID:	**DMOSR2000**

3.1.2 Description of the test

In this report we tested only the radiated emissions of the sample.

All tests were done in accordance with the EIA/TIA 603.
The substitution method (TIA/EIA 603) was used.

For each device the transmit power level were evaluated at the lower, middle and upper frequency.
The frequencies with the highest power level were retained for the full measurement.

3.1.3 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

3.1.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T_{nom}	°C	**23**
Nominal Humidity	H_{nom}	%	**50**
Nominal Power Source	V_{nom}	V	**115**

Type of power source: **115 V AC from Power Supply**

Deviations from these values are reported in chapter 2

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

Section in this Report	Test Name	Verdict
5.1	RF Power Output	pass
5.2	Frequency Stability	pass
5.3	Frequency Error	pass
5.4	Characteristics of the Audio Modulation	pass
5.5	Occupied Bandwidth	pass
5.6	Emission Mask	pass
5.7	Radiated Emissions	pass
5.8	Conducted Emissions	pass

5 Measurements and results

5.1 Output Power (radiated) FCC Rule Part 74.861 (e) (1) (ii)

Method of measurement:

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method
(a) The measurements were performed with full rf output power and modulation.
(b) Test was performed at listed 3m test site (listed with FCC, IC).
(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)
(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.
(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor.
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m).
(f) Set the EMI Receiver and #2 as follows:

Centre Frequency: test frequency
Resolution BW: 100 kHz
Video BW: same
Detector Mode: positive
Average: off
Span: 3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.
(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.
(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.
(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.
(l) Repeat for all different test signal frequencies.

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:

Centre Frequency	: equal to the signal source
Resolution BW	: 10 kHz
Video BW	: same
Detector Mode	: positive
Average	: off
Span	: 3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)
(c) Select the frequency and E-field levels for ERP/EIRP measurements.
(d) Substitute the EUT by a signal generator and one of the following transmitting antennas (substitution antenna):
.DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz}.

(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.
(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.
(g) If the DIPOLE antenna is used, tune its elements to the frequency as specified in the calibration manual.
(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.
(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.
(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.
(n) Record the power level read from the Average Power Meter and calculates the ERP/EIRP as follows:
P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB
Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1
Where: P: Actual RF Power fed into the substitution antenna port after corrected.
P1: Power output from the signal generator
P2: Power measured at attenuator A input
P3: Power reading on the Average Power Meter
EIRP: EIRP after correction
ERP: ERP after correction
(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)
(p) Repeat step (d) to (o) for different test frequency
(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.
(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Results:

TEST CONDITIONS		TRANSMITTER ERP [mW]					
Frequency [MHz]		**486 MHz**	**558 MHz**	**662 MHz**	**--**	**--**	**--**
T_{nom} °C	V_{nom} V	80.89	80.29	78.64	--	--	--
antenna gain [dBi]		-1.37	-1.38	-1.40	--	--	--
Maximum deviation from output power under extreme test conditions [dBc]		±0.04 dB					
Measurement uncertainty		±3.0dB					

Sample calculation:

Frequency	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERP Result	ERP Result	
MHz	dBµV	dBm	dBi	dBd	dB	dBm	mW	
758.0	108.5	13.9	-	0.0	2.9	11.0	12.6	

ERP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBd)

LIMIT **FCC Rule Part 74.861**

Frequency range MHz	**Power level mW**
54-72, 76-88, 174-216	50
470-608, 614-806	250

5.2 AFC Frequency Error vs. Voltage FCC Rule Part 74.861

Method of measurement:

The EUT was fixed in test fixture to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by means of a spectrum analyzer.
The input voltage was varied in a range from 80 V AC to 115 V AC and the maximum change in frequency was noted within one minute.
The temperature tests were performed for each frequency range on one channel

486 MHz SR2000XP IEM (100 mW)

Voltage [V]	Frequency Error [Hz]	Frequency Error [%]	Frequency Error [ppm]
80	1300	0.00026	2.67
90	1200	0.00024	2.46
100	1200	0.00024	2.46
110	1200	0.00024	2.46
115	1200	0.00024	2.46

558 MHz SR2000XP IEM (100 mW)

Voltage [V]	Frequency Error [Hz]	Frequency Error [%]	Frequency Error [ppm]
80	1000	0.00018	1.80
90	1100	0.00019	1.98
100	1100	0.00019	1.98
110	1000	0.00018	1.80
115	1000	0.00018	1.80

662 MHz SR2000XP IEM (100 mW)

Voltage [V]	Frequency Error [Hz]	Frequency Error [%]	Frequency Error [ppm]
80	1100	0.00016	1.66
90	1100	0.00016	1.66
100	1200	0.00018	1.81
110	1200	0.00018	1.81
115	1200	0.00018	1.81

LIMIT **FCC Rule Part 74.861(4)**

The frequency tolerance of the transmitter shall be 0.005 percent

5.3 AFC Frequency Error vs. Temperature FCC Rule Part 74.861

Method of measurement:

The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by means of a spectrum analyzer. With all power removed, the temperature was decreased to –30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency error was noted within one minute. The temperature tests were performed for each frequency range on one channel.

486 MHz SR2000XP IEM (100 mW)

TEMPERATURE [°C]	Frequency Error [Hz]	Frequency Error [%]	Frequency Error [ppm]
-30	-1000	-0.00020	-2.05
-20	-1000	-0.00020	-2.05
-10	-1000	-0.00020	-2.05
±0.0	-900	-0.00018	-1.85
+10	-800	-0.00016	-1.64
+20	-800	-0.00016	-1.64
+30	-800	-0.00016	-1.64
+40	-900	-0.00018	-1.85
+50	-1000	-0.00020	-2.05

558 MHz SR2000XP IEM (100 mW)

TEMPERATURE [°C]	Frequency Error [Hz]	Frequency Error [%]	Frequency Error [ppm]
-30	1200	0.00021	2.15
-20	1200	0.00021	2.15
-10	1100	0.00019	1.97
±0.0	1100	0.00019	1.97
+10	1100	0.00019	1.97
+20	1100	0.00019	1.97
+30	1100	0.00019	1.97
+40	1100	0.00019	1.97
+50	1100	0.00019	1.97

662 MHz SR2000XP IEM (100 mW)

TEMPERATURE [°C]	Frequency Error [Hz]	Frequency Error [%]	Frequency Error [ppm]
-30	2400	0.00036	3.62
-20	2400	0.00036	3.62
-10	2200	0.00033	3.32
±0.0	2200	0.00033	3.32
+10	2200	0.00033	3.32
+20	2200	0.00033	3.32
+30	2300	0.00034	3.47
+40	2200	0.00033	3.32
+50	2200	0.00033	3.32

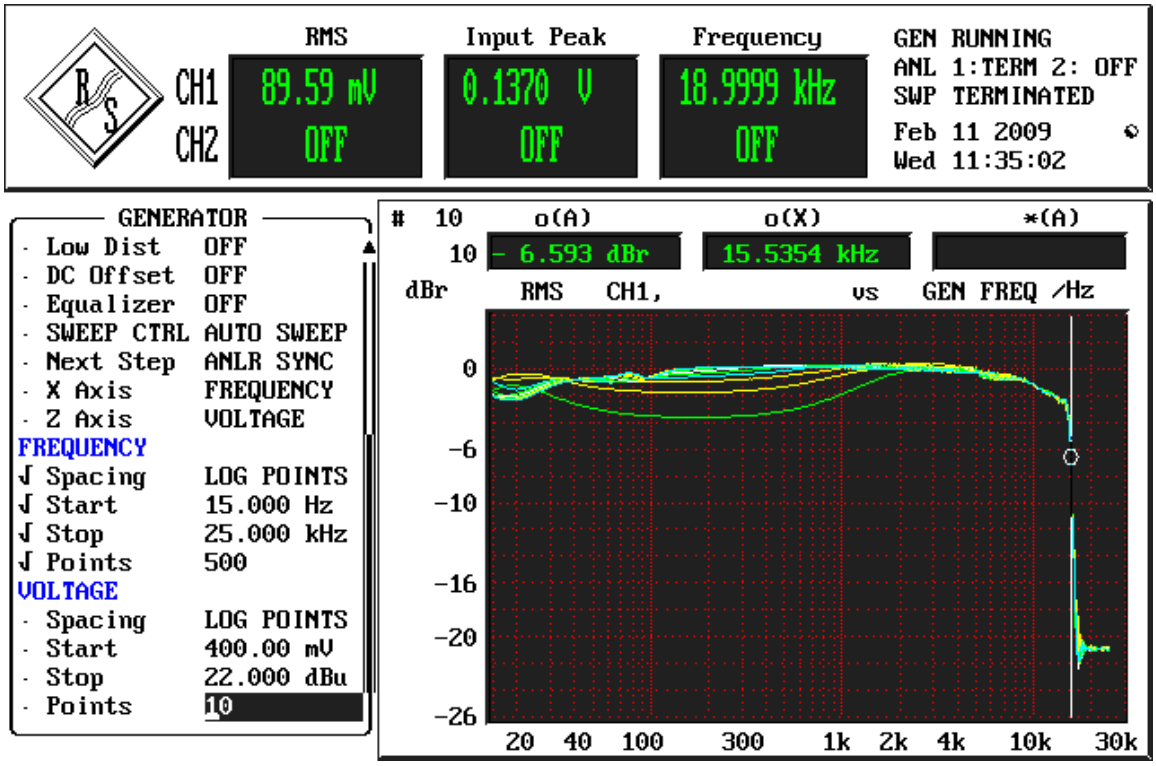
LIMIT **FCC Rule Part 74.861**

The frequency tolerance of the transmitter shall be 0.005 percent

5.4 Characteristics of the Audio Modulation Circuitry FCC Rule Part 74 .861(e3)

Method of measurement:

The audio frequency responds was measured in accordance with EIA/TIA 603.
The plots shows 10 curves with different modulation levels, starting from 3.0mV to 1000 mV (30%+20 dB Modulation), the frequency is varied from 20 Hz to 25 kHz.



Max. measured frequency deviation : 34 kHz

This measurement is valid for all channels

Limit: max Deviation ± 75 kHz

5.5 Occupied Bandwidth FCC Rule Part 74.861(e) (3), (5)/ Sec. 2.1049

Test method:

The audio frequency responds was measured in accordance with EIA/TIA 603.

Data in the plots show that all sidebands between 50 & 100% for the authorized bandwidth are attenuated by at least 25dB. From 100 to 250% of the authorized bandwidth they are attenuated by at least 35dB and beyond 250% 43 log(Po) dB. The plot shows the transmitter modulated with 15000 Hz (the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the un-modulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plots follow.

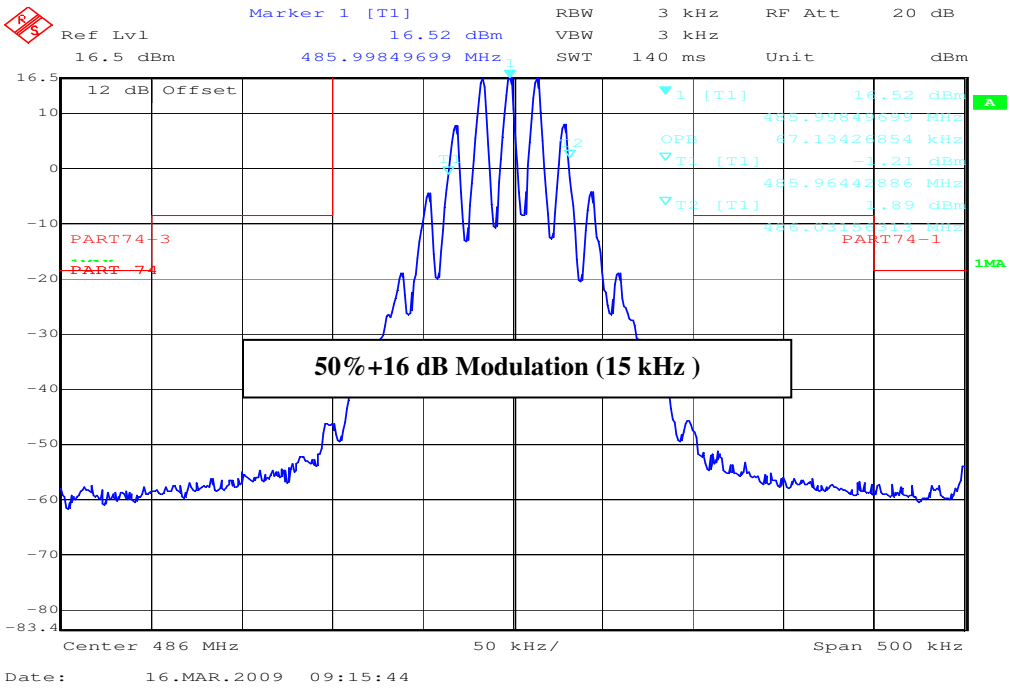
TEST CONDITIONS		OCCUPIED BANDWIDTH [kHz]					
Frequencies [MHz]		**486 MHz**	**558 MHz**	**662 MHz**	**--**	**--**	**--**
T_{nom} °C	V_{nom} V	67.13	64.12	67.13	--	--	--
max. Deviation (FM)		34 kHz					
Measurement uncertainty		±0.5%					

Limits **FCC Rule Part 74.861(e) (5)**

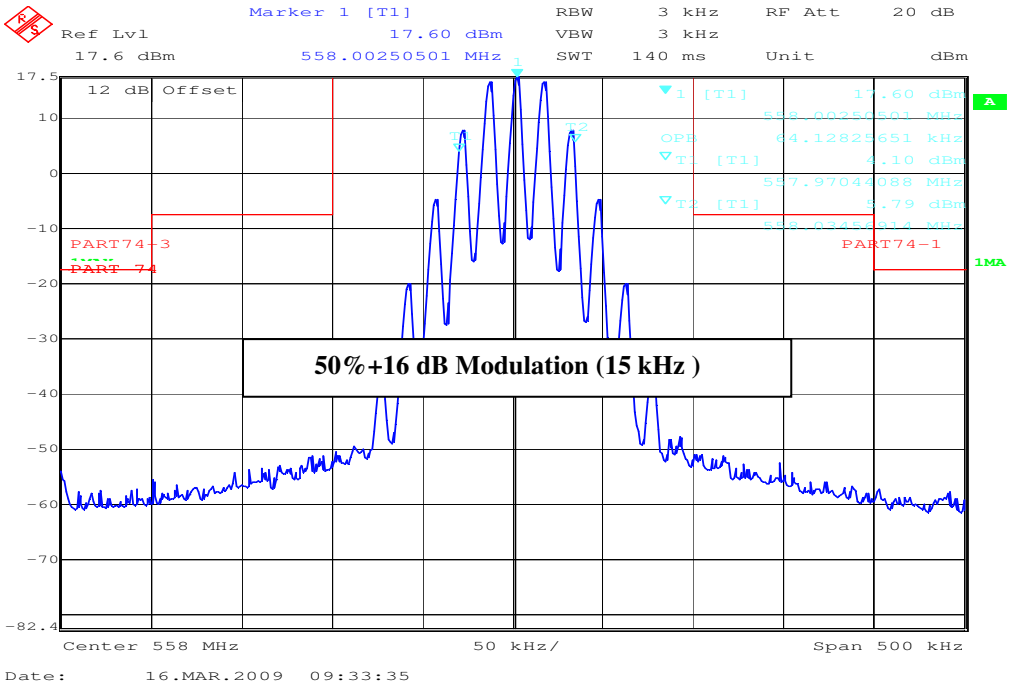
The operating bandwidth shall not exceed 200 kHz

OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e) (3), (5)/ Sec. 2.989**

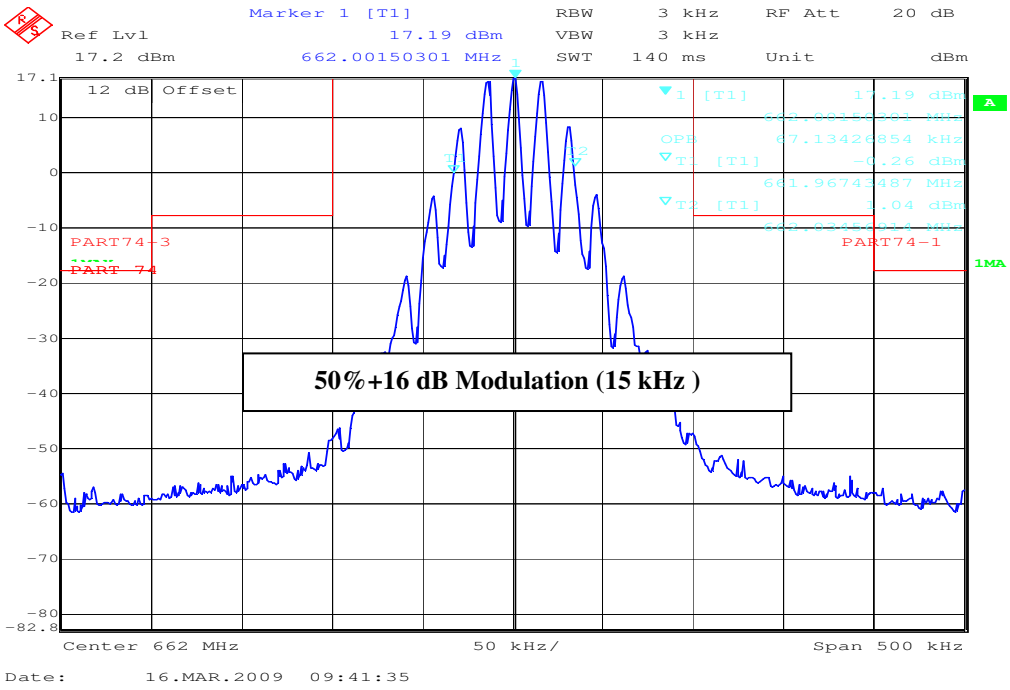
Frequency: 486 MHz / max. Deviation: ± 34 kHz (Limit ± 75 kHz)



Frequency: 558 MHz / max. Deviation: ± 34 kHz (Limit ± 75 kHz)

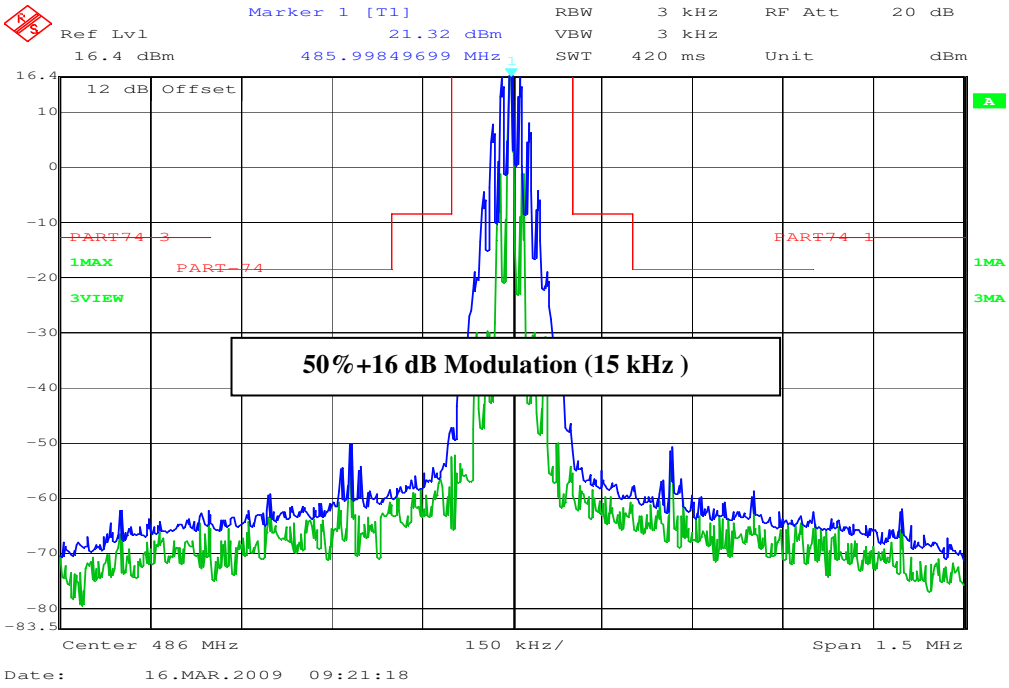


Frequency: 662 MHz / max. deviation: ± 34 kHz (Limit ± 75 kHz)

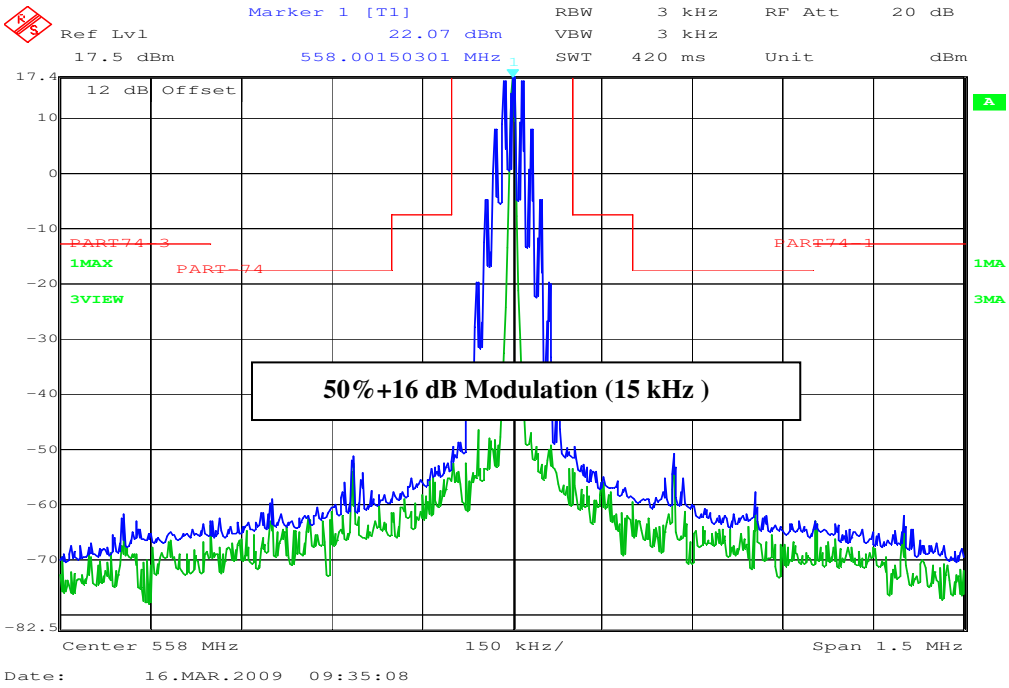


5.6 Emission mask FCC 74 861(e)(6)

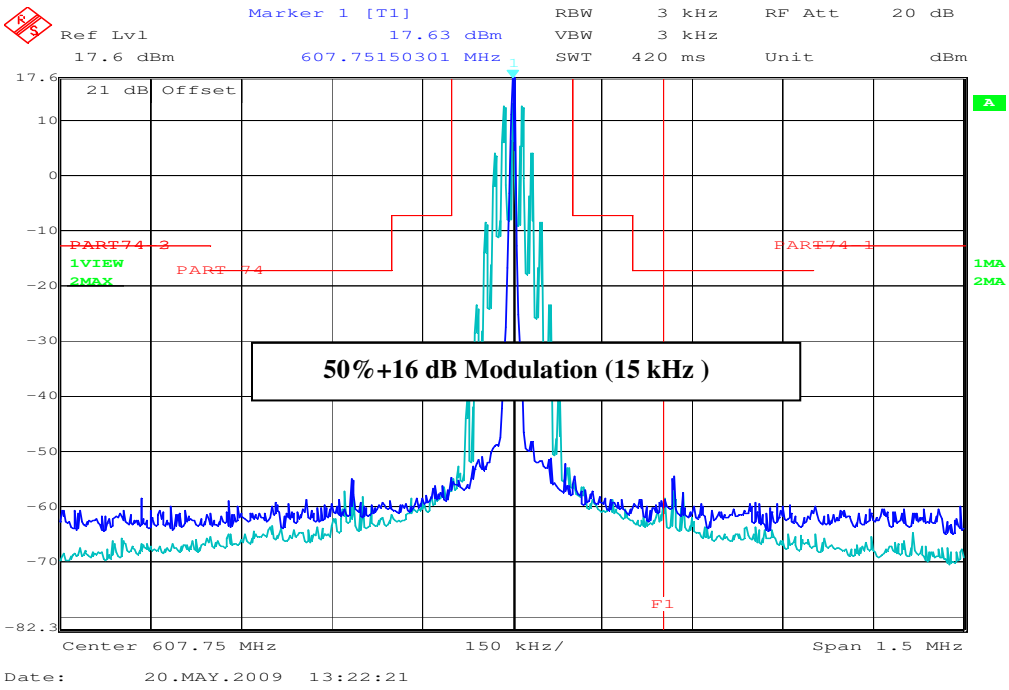
Frequency: 486 MHz



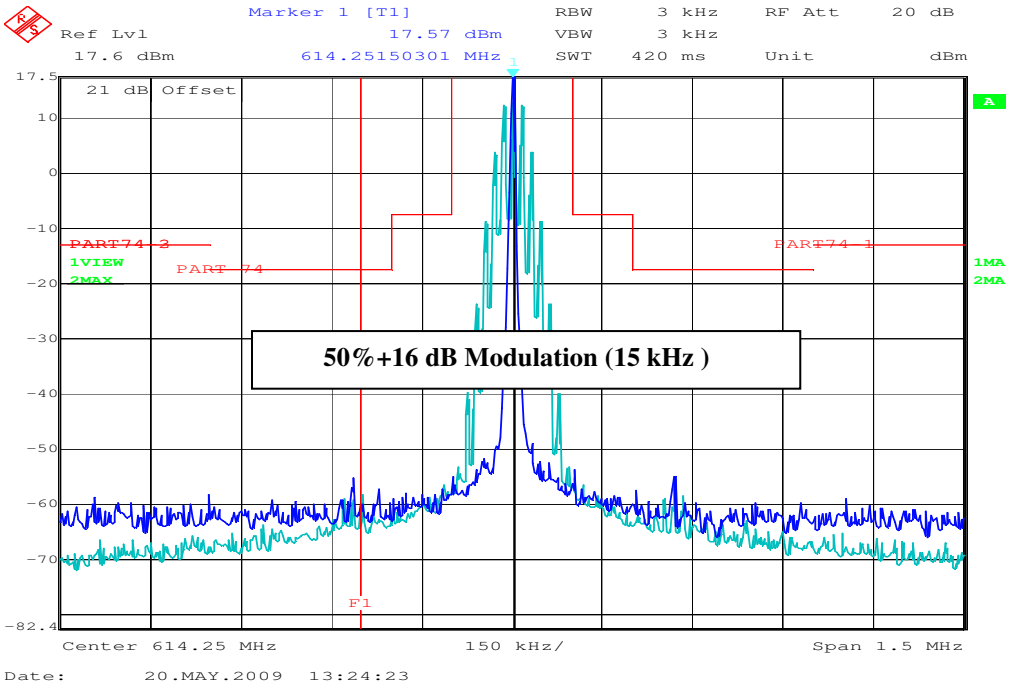
Frequency: 558 MHz



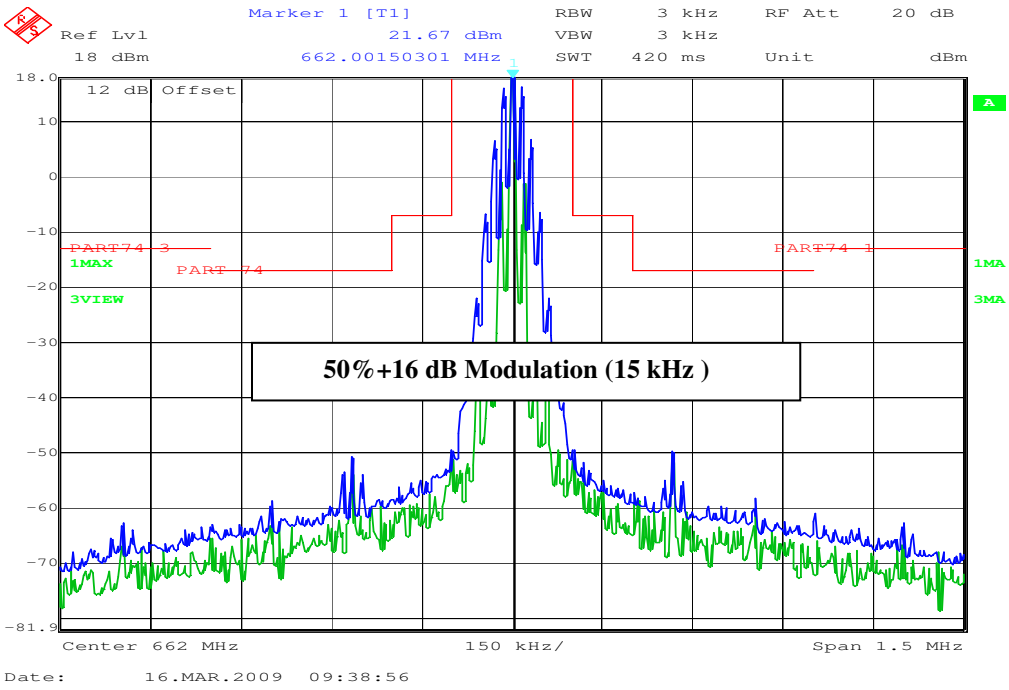
Frequency: 607.750 MHz



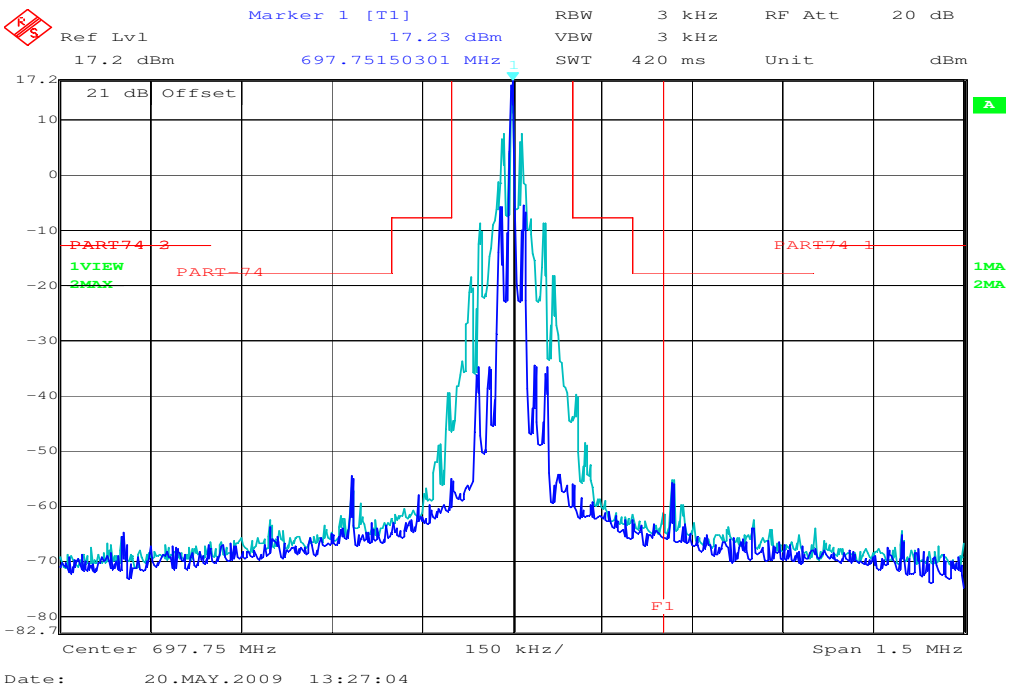
Frequency: 614.250 MHz



Frequency: 662 MHz



Frequency: 697.750 MHz



Limits **FCC Rule Part 74.861(e) (6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$ (mean output power in watts) dB below the mean output power

5.7 Radiated Emissions FCC Rule Part 74 subpart H

Test procedure

1). on a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
2). the test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.
3). the output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
4). the transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
5). the test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6). the transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7). the test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8). the maximum signal level detected by the measuring receiver shall be noted.
9). the transmitter shall be replaced by a substitution antenna (tuned dipole for f less than 1GHz and horn for frequency higher than 1GHz).
10). the substitution antenna shall be oriented for vertical polarization and the length (if a dipole antenna is used) of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11). the substitution antenna shall be connected to a calibrated signal generator.
12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13). the test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
14). the input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
15). the input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16). the measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17). the measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.
18). Repeat above substitution measurement procedure for fundamental and all harmonica emissions.

5.7.1 Results of the measurements

SR2000XP IEM:

Frequency	SA Reading	SG Setting	Ant. gain	Dipole gain	Cable loss	ERP Result	Limit	Margin	Pol
MHz	dBµV	dBm	dBi	dBd	dB	dBm	dBm	dBm	H/V
486 MHz									
No critical peak detected!									
558 MHz									
No critical peak detected!									
662 MHz									
No critical peak detected!									

All results worst case

Limits **FCC Rule Part 74.861(e) (6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$ (mean output power in watts) dB below the mean output power

5.7.2 Plots of the measurements

SR2000XP IEM:

RADIATED EMISSIONS **FCC Rule Part 74 subpart H**

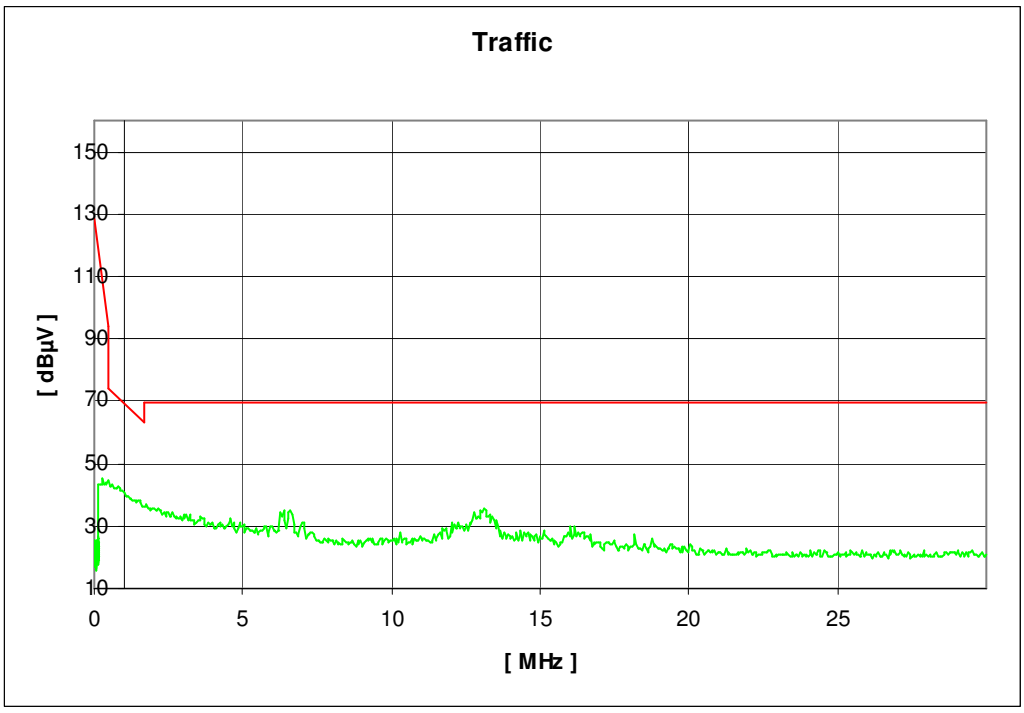
Part 15.209 Magnetics

(This plot is valid for all channels)

CETECOM ICT Services GmbH

Projekt- Nr.:1-1127-01-03_09

EUT:	SR2000 IEM	Polarisation:	Vertikal
Manufacturer:	Sennheiser	Battery:	AC/DC Power Supply
IMEI:	Traffic mode	HW:	-/-
Operator:	WAL	SW:	-/-
Start of Test :	23.02.2009 17:07:11	Vmin:	-/-
Standard:	FCC_15_209	Vnom:	115 V AC
Signalling Unit:	CMU200	Vmax:	-/-
Start Freq. [MHz]:	0.009	Stop Freq. [MHz]	30
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_15_209\Transducer_FCC_15_209.xls		



f < 0.15 MHz: RBW/VBW: 200 Hz **f ≥ 0.15 MHz: RBW/VBW: 9 kHz**

RADIATED EMISSIONS (25 MHz to 12 GHz) **FCC Rule Part 74 subpart H**

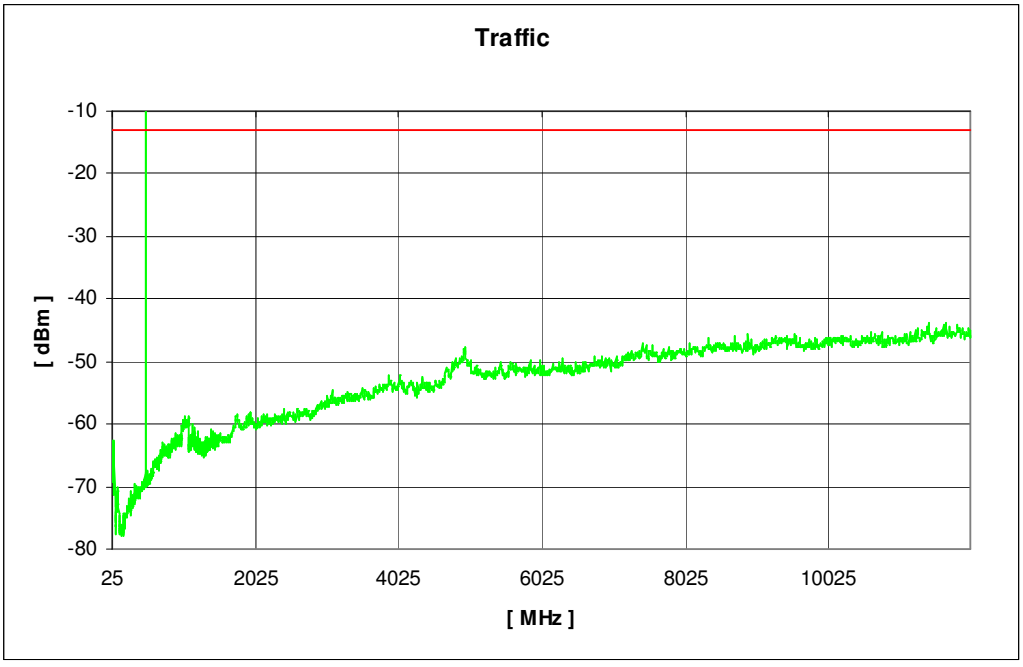
486 MHz (SR2000XP IEM)

Plot1: 25 MHz – 12 GHz

CETECOM ICT Services GmbH

Projekt- Nr.:1-1127-01-03_09

EUT:	SR2000 IEM	Polarisation:	Vertikal
Manufacturer:	Sennheiser	Battery:	AC/DC Power Supply
IMEI:	486 MHz	HW:	-/-
Operator:	MUY	SW:	-/-
Start of Test :	18.02.2009 10:55:02	Vmin:	-/-
Standard:	FCC_74	Vnom:	115 V AC
Signalling Unit:	CMU200	Vmax:	-/-
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_74\Transducer_FCC_74.xls		



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

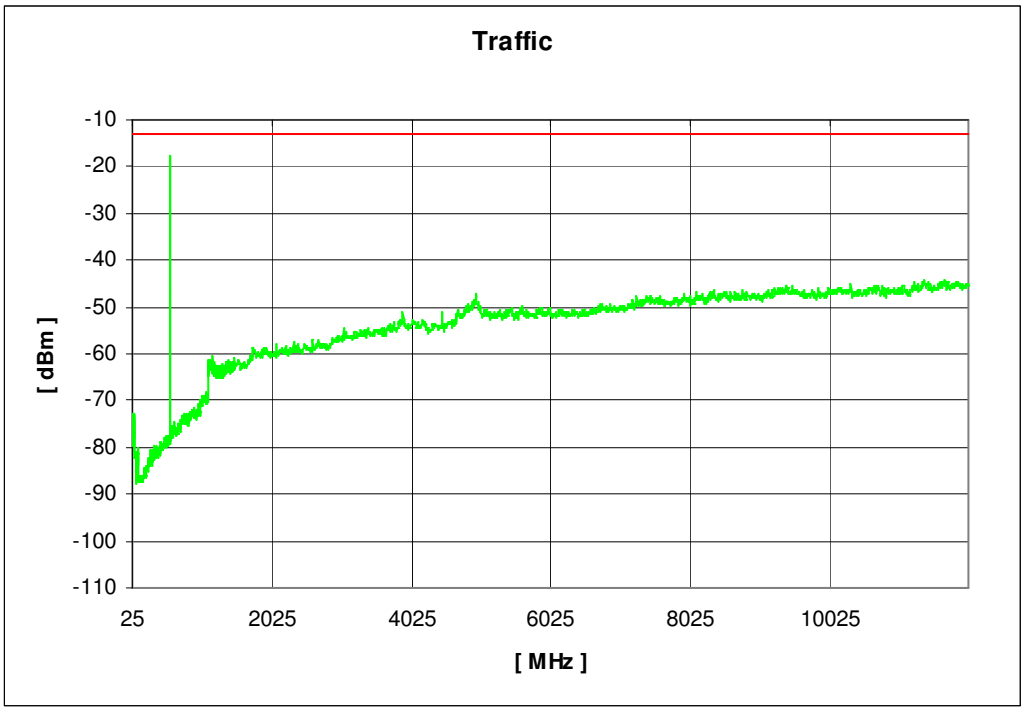
558 MHz (SR2000XP IEM):

Plot2: 25 MHz – 12 GHz

CETECOM ICT Services GmbH

Projekt- Nr.:1-1127-01-03_09

EUT:	SR2000 IEM	Polarisation:	Vertikal
Manufacturer:	Sennheiser	Battery:	AC/DC Power Supply
IMEI:	558 MHz	HW:	-/-
Operator:	MUY	SW:	-/-
Start of Test :	18.02.2009 12:30:34	Vmin:	-/-
Standard:	FCC_74	Vnom:	115 V AC
Signalling Unit:	CMU200	Vmax:	-/-
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_74\Transducer_FCC_74.xls		



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

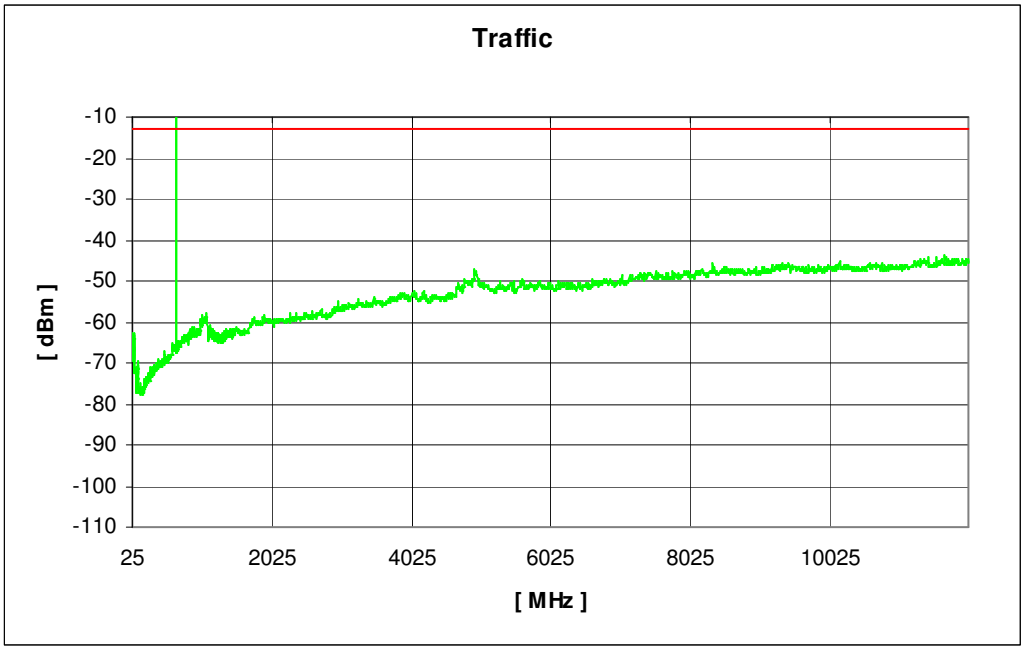
662 MHz (SR2000XP IEM)

Plot3: 25 MHz – 12 GHz

CETECOM ICT Services GmbH

Projekt- Nr.:1-1127-01-03_09

EUT:	SR2050 IEM	Polarisation:	Vertikal
Manufacturer:	Sennheiser	Battery:	AC/DC Power Supply
IMEI:	662 MHz	HW:	-/-
Operator:	MUY	SW:	-/-
Start of Test :	18.02.2009 11:10:51	Vmin:	-/-
Standard:	FCC_74	Vnom:	115 V AC
Signalling Unit:	CMU200	Vmax:	-/-
Start Freq. [MHz]:	25	Stop Freq. [MHz]	12000
Transducer-File:	C:\Spurious_neu\Messparameter\FCC_74\Transducer_FCC_74.xls		

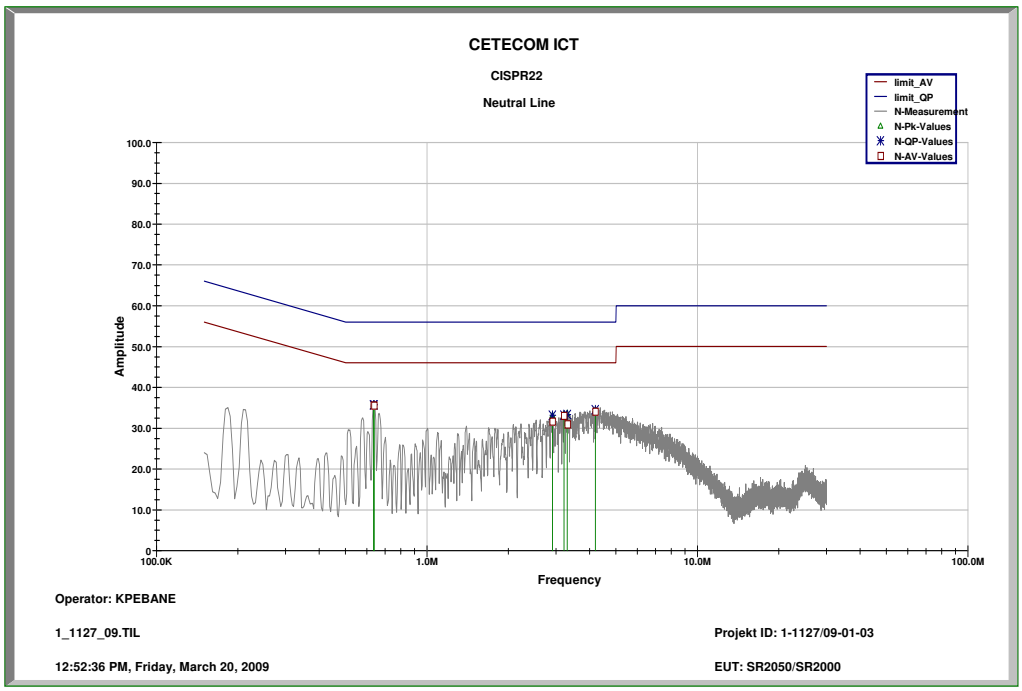


f < 1 GHz: RBW/VBW: 100 kHz **f ≥ 1GHz: RBW/VBW: 1 MHz**

5.8 Conducted Emissions <30 MHz

(This plot is valid for all channels)

Neutral line: **TX-Mode**



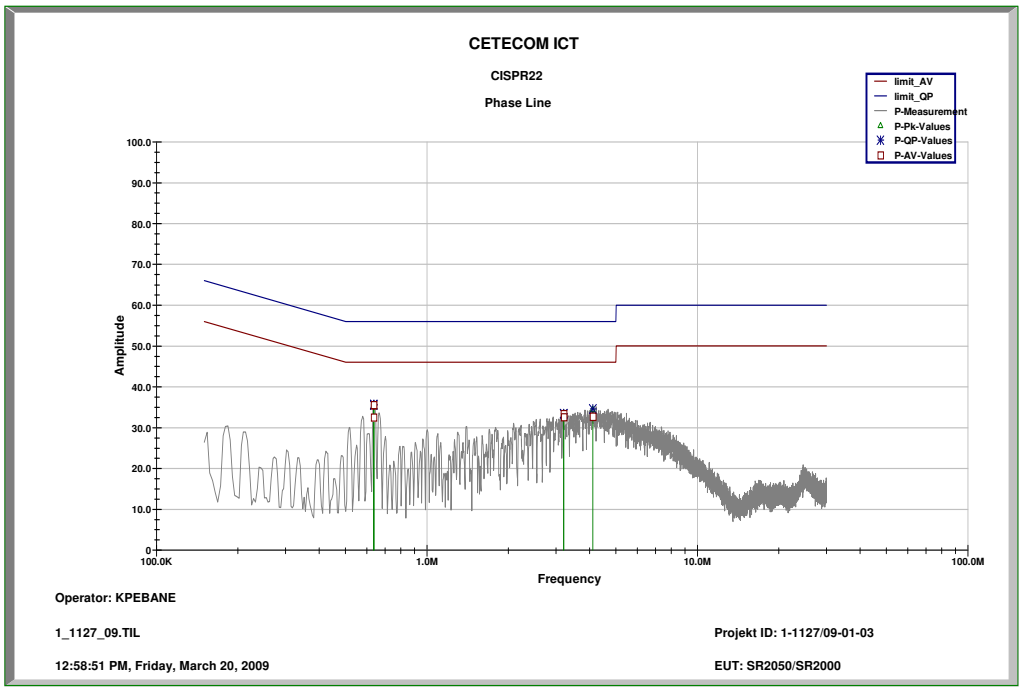
Frequency	Margin AV	Margin QP	Average	Quasi Peak	Peak (remeasurement)
MHz	dBµV	dBµV	dBµV	dBµV	dBµV
0.6374	-10.371	-20.268	35.629	35.732	35.874
2.9070	-14.277	-22.836	31.723	33.164	33.199
3.2070	-12.848	-22.799	33.152	33.201	33.418
3.3010	-14.943	-22.649	31.057	33.351	33.641
4.1890	-11.874	-21.447	34.126	34.553	34.490

Limits :

Under normal test conditions only	See plots

(This plot is valid for all channels)

Phase line: **TX-Mode**



Frequency	Margin AV	Margin QP	Average	Quasi Peak	Peak (remeasurement)
MHz	dBµV	dBµV	dBµV	dBµV	dBµV
0.6352	-13.424	-20.453	32.576	35.547	35.663
0.6358	-10.354	-20.288	35.646	35.712	35.781
3.2020	-12.536	-22.533	33.464	33.467	33.568
3.2060	-13.335	-22.628	32.665	33.372	33.618
4.1010	-13.219	-21.427	32.781	34.573	34.525

Limits :

Under normal test conditions only	See plots

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 A:

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
	Radiated emission in chamber A				
A-1	Spectrum Analyzer	Rohde & Schwarz	ESU26	100037	300003555
A-2	Signal Generator	Rohde & Schwarz	SMR20B11	1104.0002.20	300003593
A-3	RF System Panel	Rohde & Schwarz	TS RSP	---	300003556
A-4	Relais Matrix	Rohde & Schwarz	PSN	860673/009	300001385
A-5	Horn Antenna	EMCO	3115	9709-5290	300000212
A-6	Bilog.-Log. Antenna	Schwarzbeck	VULB 9163	02/00	300003696
A-7	Notch Filter GSM 900	Wainwright	WRCD 901.9/903.1EE	9	---
A-8	Notch Filter GSM 1800	Wainwright	WRCD 1747/1748-5EE	1	---
A-9	Notch Filter GSM 1900	Wainwright	WRCB 1879.5/1880.5EE	9	---
A-10	Notch Filter GSM 850	Wainwright	WRCT 837-0.2/50-8EE	1	---
A-11	Notch Filter UMTS	Wainwright	WRCD 1800/2000-0.2/40-5EEK	2	---
A-12	Notch Filter ISM 2400	Wainwright	WRCG 2400/ 2483-2375/ 2505-50/10SS	26	---
A-13	High Pass Filter 1.1 GHz	Wainwright	WHK 1.1/15G-10SS	---	---
A-14	High Pass Filter 2.6 GHz	Wainwright	WHKX 2.6/18G-12SS	---	---
A-15	High Pass Filter 7 GHz	Wainwright	WHKX 7.0/18G-8SS	---	---
A-14	Amplifier	Miteq	AFS4-00201800-15-10P-6	US42-0050 2650-28-5A	300003204
A-16	Controller	Inn co	CO 2000	2020507	---
A-17	DC Power Supply	Hewlet Packard	HP6632A	---	300000924
A-18	Computer	F+W	---	---	300003303

Climatic Box:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Climatic box VT 4002	Heraeus Vötsch	58566046820010	300003019	11.05.2007	24	11.05.2009
2	Climatic box CTS T-40/50	CTS	064023	300003540	03.01.2009	24	03.01.2011

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	3000002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	3000002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	3000002681	n.a.		
4	19'' Monitor		22759020-ED	3000002681	n.a.		
5	Mouse		LZE 0095/6639	3000002681	n.a.		
6	Keyboard		G00013834L461	3000002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681-0005	10.01.2008	24	10.01.2010
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681-0002	26.08.2008	36	26.08.2011
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	3000002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681	s.No.10		
14	Fast CPU SM-B50	R&S	To 10	3000002681	s.No.10		
15	FM Modulator SM-B5	R&S	835676/033	3000002681	s.No.10		
16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681-0001	25.08.2008	36	25.08.2011
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681	s.No.16		
18	Data Generator SMIQ-B11	R&S	To 16	3000002681	s.No.16		
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681	s.No.16		
20	Fast CPU SM-B50	R&S	To 16	3000002681	s.No.16		
21	FM Modulator SM-B5	R&S	836061/022	3000002681	s.No.16		
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681-0003	26.08.2008	36	26.08.2011
23	Attenuator SMP-B15	R&S	835136/014	3000002681	S.No.22		
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681	S.No.22		
25	Power Meter NRVD	R&S	835430/044	3000002681-0004	26.08.2008	24	26.08.2010
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681-0013	26.08.2008	24	26.08.2010
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681-0010	26.08.2008	24	26.08.2010
28	Rubidium Standard RUB	R&S		3000002681-0009	27.08.2008	24	27.08.2010
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681-0006	01.08.2008	24	01.08.2010
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681-0011	n.a.		
31	19'' Rack	R&S	11138363000004	3000002681	n.a.		
32	RF-cable set	R&S	N/A	3000002681	n.a.		
33	IEEE-cables	R&S	N/A	3000002681	n.a.		
34	Sampling System FSIQ-B70	R&S	835355/009	3000002681	s.No.7		
35	RSP programmable attenuator	R&S	834500/010	3000002681-0007	26.08.2008	24	26.08.2010
36	Signalling Unit	R&S	838312/011	3000002681	n.a.		
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681			
39	Power Splitter 6005-3	Inmet Corp.	none	300002841	23.12.2008	24	23.12.2010
40	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
41	CBT32 with EDR Signaling Unit	R&S					
42	Coupling unit	Narda	N/A	--	n.a.		
43	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
44	RF-cable set	R&S	N/A	different	n.a.		
45	IEEE-cables	R&S	N/A	--	n.a.		

Note: 3000002681-00xx inventoried as a system

7 Photographs of the Test Set-up

Photo documentation

Photo 1:

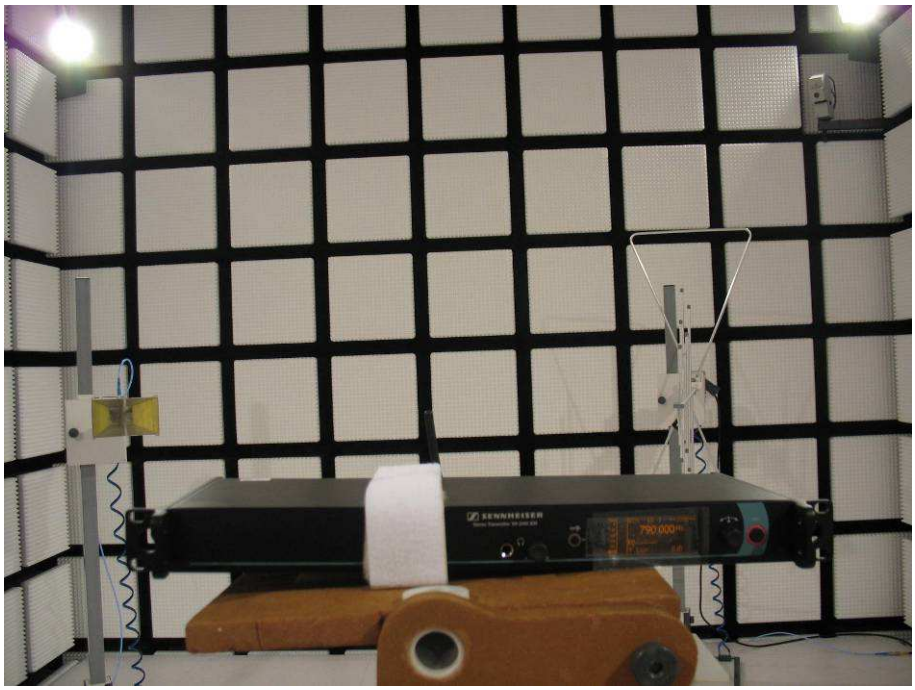


Photo 2:

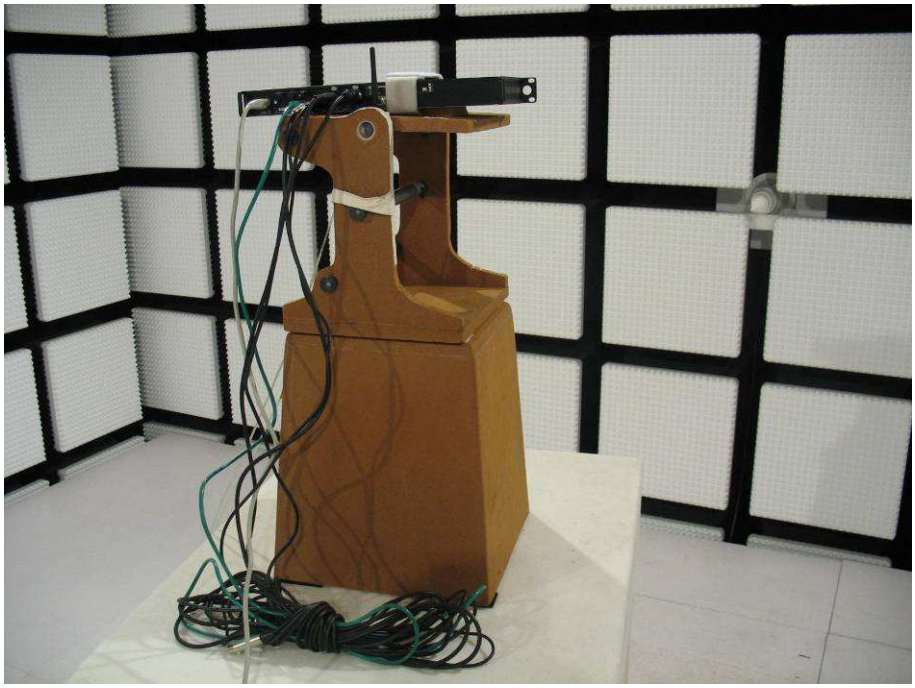
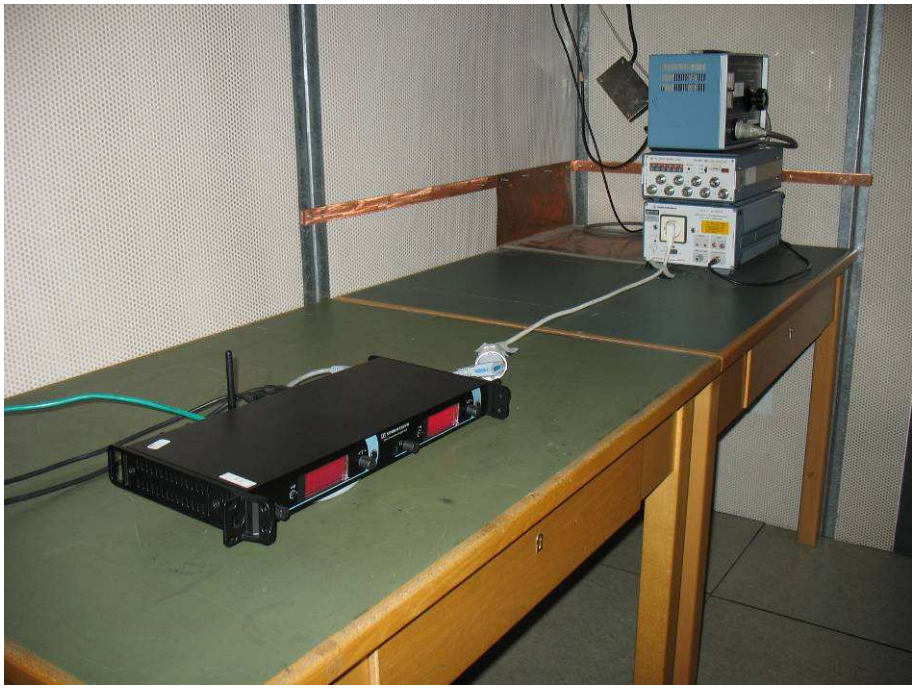


Photo 3:



8 Photographs of the EUT

Photo documentation

Photo 4:

Photo 5:

Photo 6:

Photo 7:

Photo 8:

Photo 9:

Photo 10:

Photo 11:

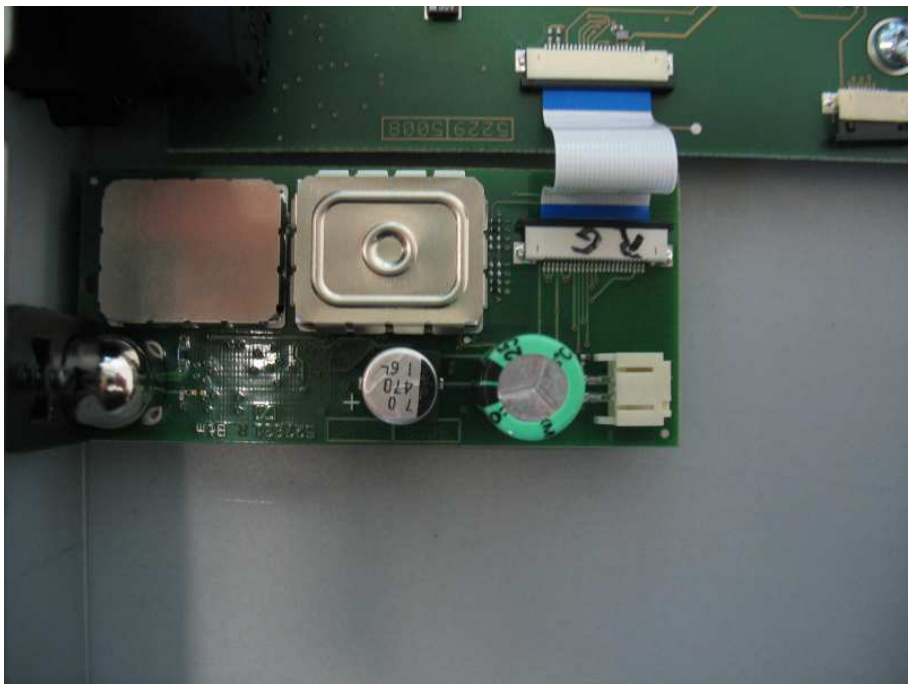


Photo 12:

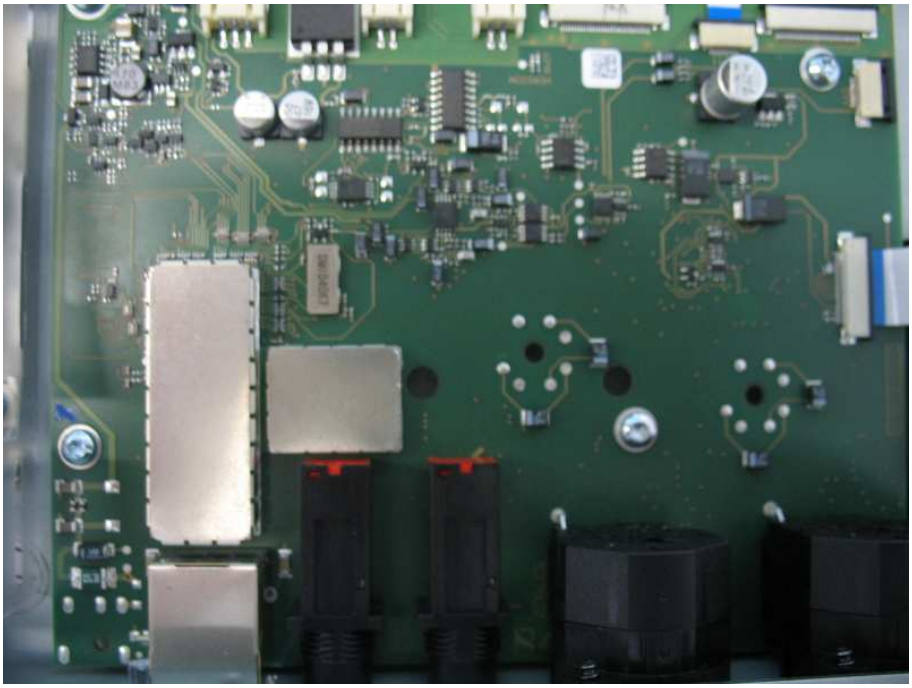


Photo 13:

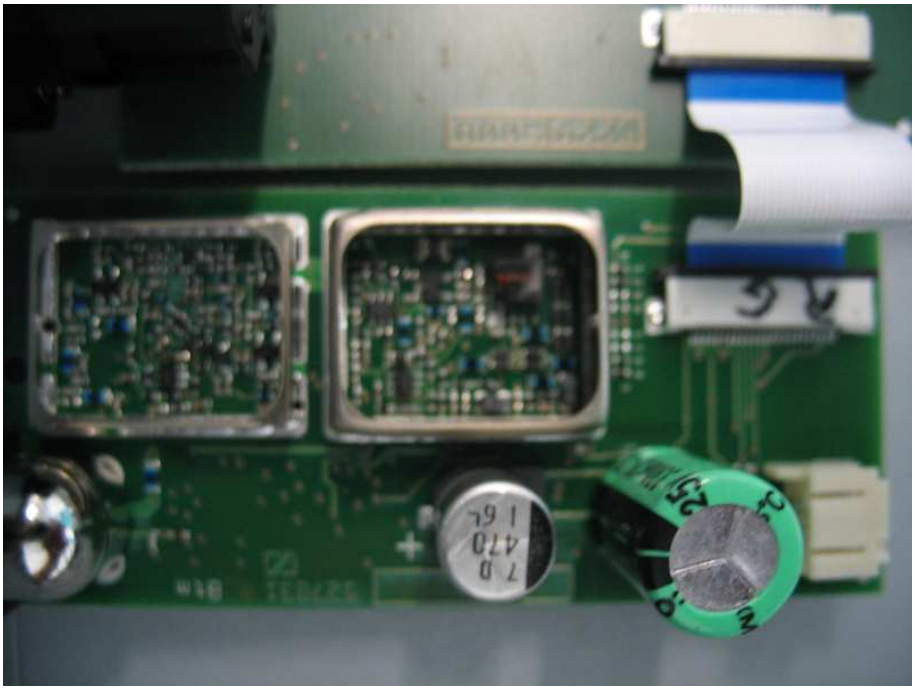


Photo 14:

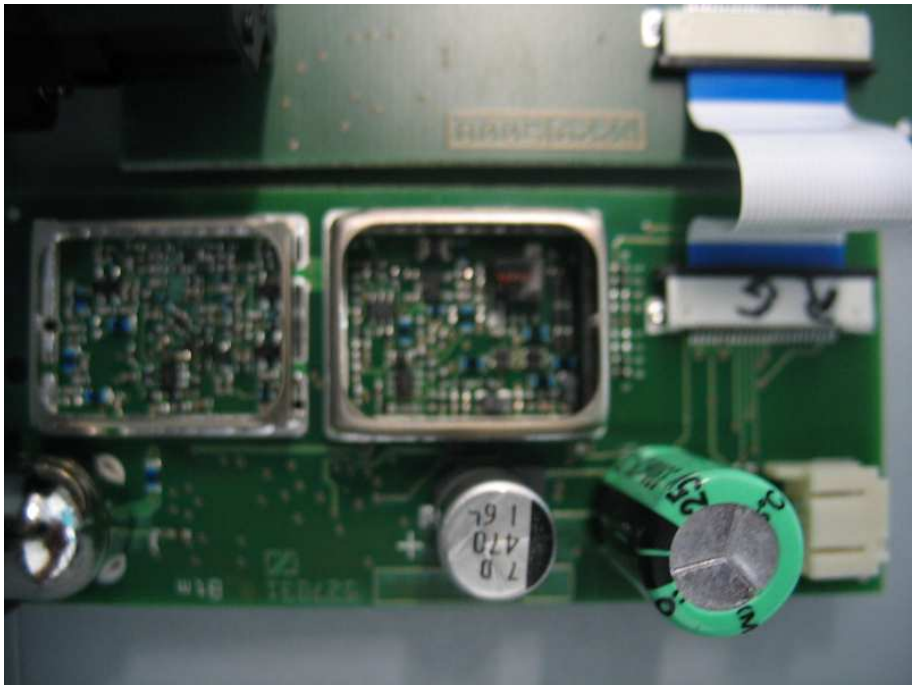


Photo 15:

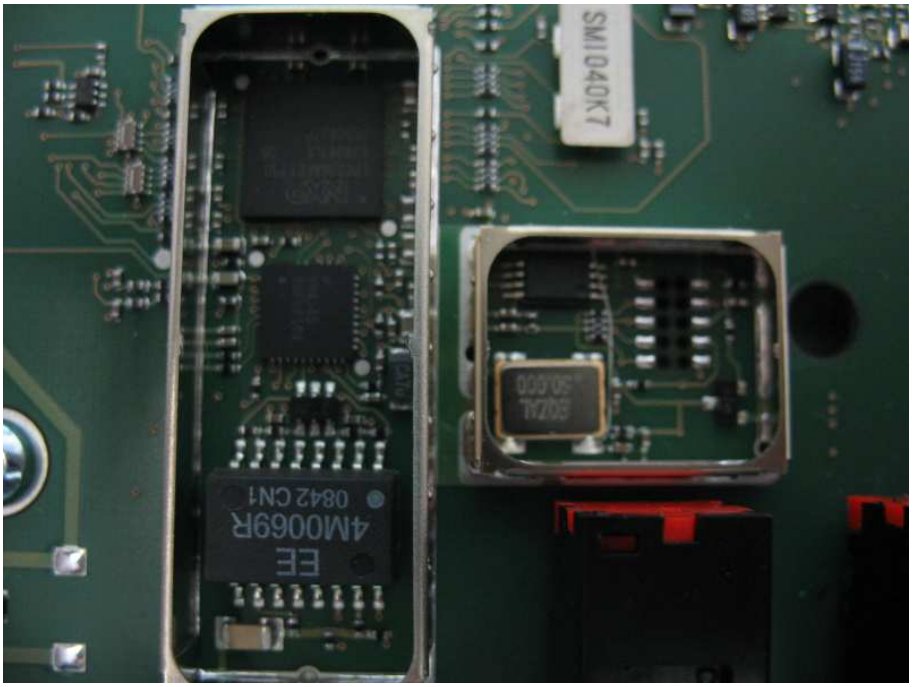


Photo 16:

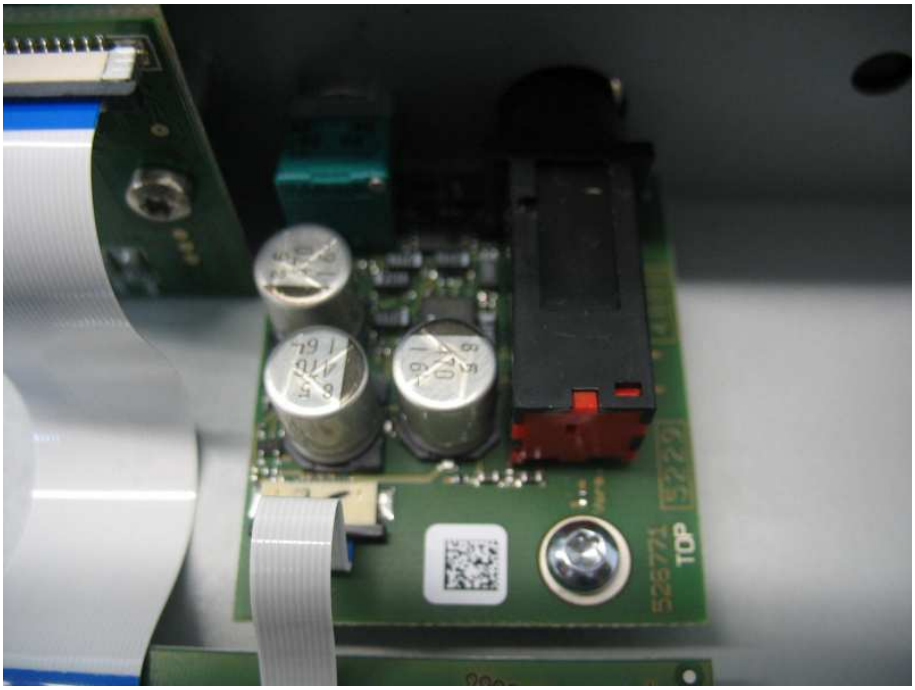


Photo 17:

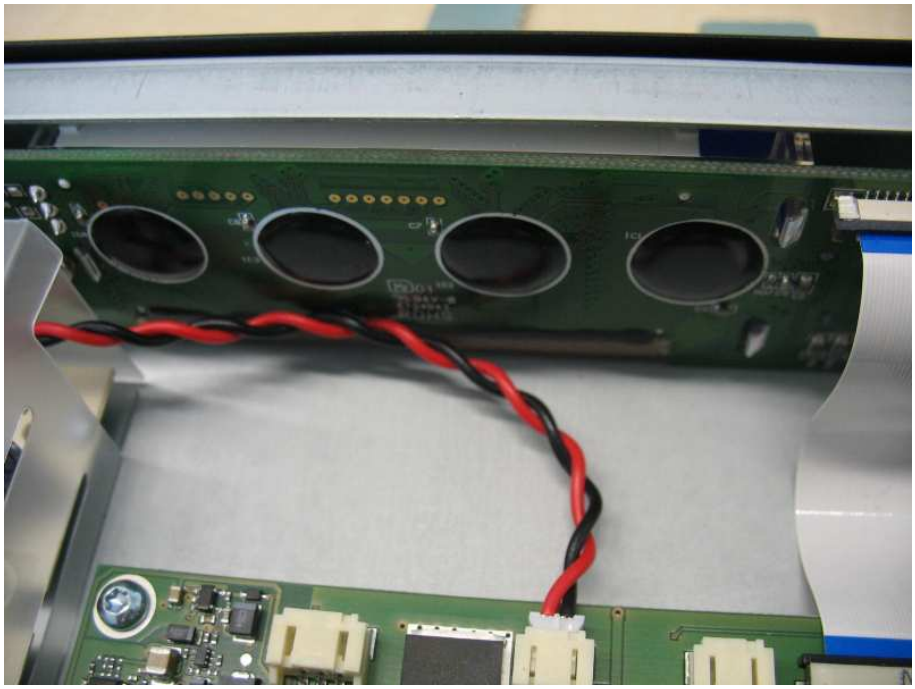


Photo 18: