DAT-P-002/91-02

Center for Quality Engineering

Test Report No.: B12J0003

Order No.: B12J	**Pages:** 35	**Munich,** Apr 03, 2009

Client:	R&DRohde & Schwarz GmbH & Co. KG
Equipment Under Test:	NV8612V TV Transmitter MediaFlo 6400W
Manufacturer:	Rohde & Schwarz GmbH & Co. KG
Task:	Conformance test according to the test specifications mentioned below
Test Specifications: [covered by accreditation]	• FCC 47 CFR Ch.1, Part 2 • EN 301 489, Part 1 & 11
Result:	Requirements of the before mentioned Specification(s) are fulfilled.

The results relate only to the items tested as described in this test report.

edited by:	**Date**	**Signature**
Huber Qualification Engineer	Apr 03, 2009	

approved by:	**Date**	**Signature**
Bauer Manager EMC	Apr 04, 2009	

This document was signed electronically.

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

November 12, 2008

Registration Number: 90932

SGS Germany GmbH
Centr for Quality Engineering,
Hofmannstrasse 50,
81379 Munich
Germany

Attention: Josef Bauer,

Re: Measurement facility located at Munich
Anechoic chamber No. 1 (10 m)
Date of Renewal: November 12, 2008

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Phyllis Parrish
Industry Analyst

CONTENTS

1 Summary

A summary of the measurements results will be found in the following tables. The results refer only to the EUT as described in chapter 4.

1.1 Tables of Results

1.1.1 Enclosure Port

Radiated emission tests Configuration A and B				
Chapter	**Test**	**Specification**	**Limits**	**Result**
6.1.1	Radiated 30 MHz-1 GHz Test Distance: 3 meters	FCC Part 2 §2.1053, §2.1057	43+10log(P)	**passed**
6.1.2	Radiated 1 GHz-10 GHz Test Distance: 3 meters	FCC Part 2 §2.1053, §2.1057	43+10log(P)	**passed**

1.1.2 Antenna terminals

Conducted emission tests Configuration A and B				
Chapter	**Test**	**Specification**	**Limits**	**Result**
6.2.1	Spurious Emissions	FCC Part 2 §2.1051 / 2.1057	43+10log(P)	**passed**
6.2.2	Occupied Bandwidth	FCC Part 2 §2.1047 / 2.1049	Limit of FCC Part 27.53: 6 MHz	**passed**
6.2.3	Transmitter Output Power	FCC Part 2 § 2.1046 (a) (c)	--	**6.40kW** (5.62kW after BPF)

2 References

2.1 Specifications

- 47 CFR Code of Federal Regulations Title 47 – Telecommunication
- FCC Part 2, § 2.1049
- FCC Part 2, §2.1051, §2.1053, §2.1055, §2.1057 Field strength of spurious radiation, Frequency spectrum to be investigated
  Customer selected tests acc.
- EN 301 489, Part 1 & 11

2.2 Glossary of Terms

EMC specific Abbreviations

AC	Alternating Current
AM	Amplitude Modulation
CBN	Combined Bonding Network
CE	CE-Conformity
CM	Common Mode Coupling
CO+No.	Conditional Objective Requirement No. of GR-1089-CORE
CR	Customer requirement
DC	Direct Current
DM	Differential Mode coupling
EFT	Electrical Fast Transient
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EN	European Standard
ES	ETSI Standard
ESD	Electro Static Discharge
ETS	European Telecommunication Standard
EUT	Equipment Under Test
FW	Firmware
HW	Hardware
IBN	Isolated Bonding Network
IEC	International Electrotechnical Commission
ITU-T	International Telecommunication Union- Telecommunications sector
L > XX m	Line Length > XX m (Test applicable for lines with length > XX m)
LFC	Loss of Function Customer reset (performance criterion)
LFO	Loss of Function Operator reset (performance criterion)
LFS	Loss of Function Self recovery (performance criterion)
LISN	Line Impedance Stabilization Network
Loc	Location of the EUT, can be TC or OTC
LtG	Line to Ground coupling
LtL	Line to Line coupling
LVDS	Low Voltage Differential Signal
NP	Normal Performance (performance criterion)
O+No.	Objective Requirement No. of GR-1089-CORE
OTC	Other than Telecommunication Center
PC	Power Contact
PF	Power Fault
PIL	Power Induction Long term
PIS	Power Induction Short term
PP	External Port to external Port test as defined in ITU-T K.44
propOJEC	proposed to publish in the Official Journal of the European Communities for CE Marking
R	Ring
R+No.	Requirement No. of GR-1089-CORE
RP	Reduced Performance (performance criterion)
SC	Short-Circuit
SW	Software
T	Tip
TC / ITC	Telecommunication Center
UL	Underwriter Laboratories
with p	with primary protection
without p	without primary protection

3 General Information

3.1 Identification of Client

R&DRohde & Schwarz GmbH & Co. KG
Mühldorfstraße 15
81671 München
Uwe Dalisda

3.2 Test Laboratory

Center for Quality Engineering
SGS Germany GmbH
Hofmannstraße 50
81379 München

3.3 Time Schedule

Delivery of EUT: Feb 11, 2009
Start of test: Feb 16, 2009
End of test: Feb 25, 2009

3.4 Participants

Name	Function	Phone	E-Mail
Jan Huber	Accredited testing, Editor	+49 89 722 25434	jan.huber@sgs.com
Michael Steinmüller	Accredited testing	+49 89 722 25262	michael.steinmueller@sgs.com

4 Equipment Under Test

4.1 Picture of EUT

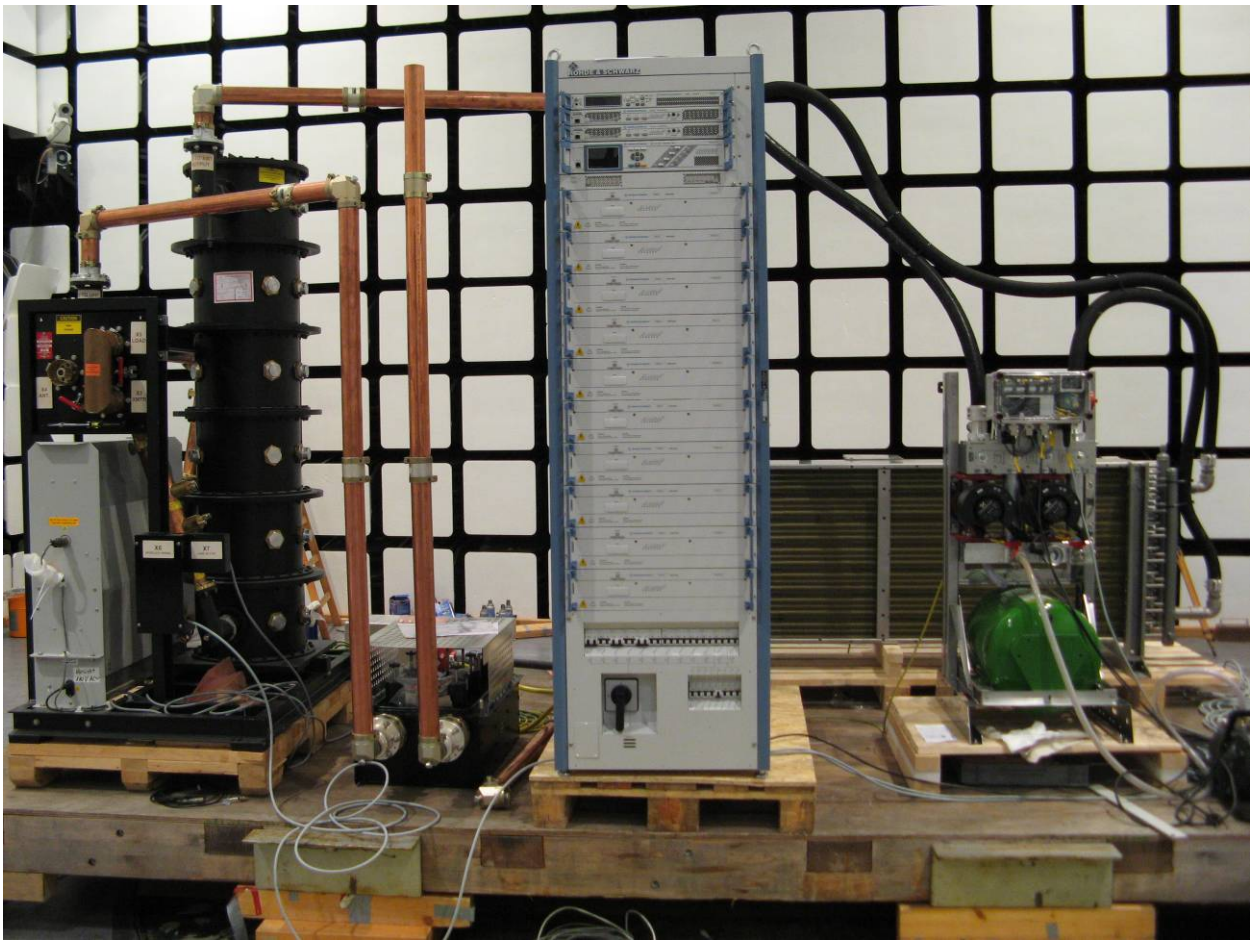

Figure 4-1: NV8610V TV Transmitter in chamber No. 1

4.2 Configuration of EUT

A listing of all hardware components including serial numbers and software release is shown in Table 4-1 and Table 4-2. This set up is the maximum stage of extension for this transmitter acc. to FCC 2.1033 (c), (6), (7), (9).

Description	Code number	Serial No.
GG NV8610V DTV-Transmitter 6.1KW	2076.9276.22	100919
GG VH8600A1 UHF-amplifier	2100.6002.03	100454
GG VH8600A1 UHF-amplifier	2100.6002.03	100455
GG VH8600A1 UHF-amplifier	2100.6002.03	100456
GG VH8600A1 UHF-amplifier	2100.6002.03	100457
GG VH8600A1 UHF-amplifier	2100.6002.03	100458
GG VH8600A1 UHF-amplifier	2100.6002.03	100459
GG VH8600A1 UHF-amplifier	2100.6002.03	100461
GG VH8600A1 UHF-amplifier	2100.6002.03	100462
GG VH8600A1 UHF-amplifier	2100.6002.03	100464
GG VH8600A1 UHF-amplifier	2100.6002.03	100465
GG ZR810-Z HP - accessory NX86XX	2099.5102.00	
GG NETCCU 800 CONTROL UNIT	2095.8007.02	102612
ZM KG860H1 rack high-power	2096.0800.02	
GS ZR800Z4 TS - distributor	2099.3300.10	
GS ZR800F1 PAR. I/O	3562.4210.02	
GS ZR800Z2 power socket	2099.3100.14	100847
GG SX800 TV EXCITER DTV2 DTMB	2095.1502.81	100423
GG SX800 TV EXCITER DTV2 DTMB	2095.1502.81	100424
GG NV8610X DTV-transmitter	2101.4503.50	100001
GS ZR810S1 HP - power kit NX8600	2098.5109.30	100078
GS ZR800T1 exciter inst. Kit	2099.1007.23	100558

Table 4-1: Hardware Configuration A MediaFlo with Exciter SX800

Description	Code number	Serial No.
GG NV8610V DTV-Transmitter 6.1KW	2076.9276.22	100919
GG VH8600A1 UHF-amplifier	2100.6002.03	100454
GG VH8600A1 UHF-amplifier	2100.6002.03	100455
GG VH8600A1 UHF-amplifier	2100.6002.03	100456
GG VH8600A1 UHF-amplifier	2100.6002.03	100457
GG VH8600A1 UHF-amplifier	2100.6002.03	100458
GG VH8600A1 UHF-amplifier	2100.6002.03	100459
GG VH8600A1 UHF-amplifier	2100.6002.03	100461
GG VH8600A1 UHF-amplifier	2100.6002.03	100462
GG VH8600A1 UHF-amplifier	2100.6002.03	100464
GG VH8600A1 UHF-amplifier	2100.6002.03	100465
GG ZR810-Z HP - accessory NX86XX	2099.5102.00	
GG NETCCU 800 CONTROL UNIT	2095.8007.02	102612
ZM KG860H1 rack high-power	2096.0800.02	
GS ZR800Z4 TS - distributor	2099.3300.10	
GS ZR800F1 PAR. I/O	3562.4210.02	
GS ZR800Z2 power socket	2099.3100.14	100847
GG SX800 TV EXCITER DTV2 DTMB	2095.1502.81	100423
GG SX800 TV EXCITER DTV2 DTMB	2095.1502.81	100424
GG SX801 TV EXCITER wit SW MediaFlo	2104.4504.K02	100942
GG NV8610X DTV-transmitter	2101.4503.50	100001
GS ZR810S1 HP - power kit NX8600	2098.5109.30	100078
GS ZR800T1 exciter inst. Kit	2099.1007.23	100558

Table 4-2: Hardware Configuration B MediaFlo with Exciter SX801

Description	Code number	Serial No.
Bandpass Filter W/O-2916060	P/N-005A76501	S/N 3038
Heat exchanger	2103.0728.26	100049
ZK810K1 pump unit	2103.1001.24	100541

Table 4-3: Accessory of NV8610V

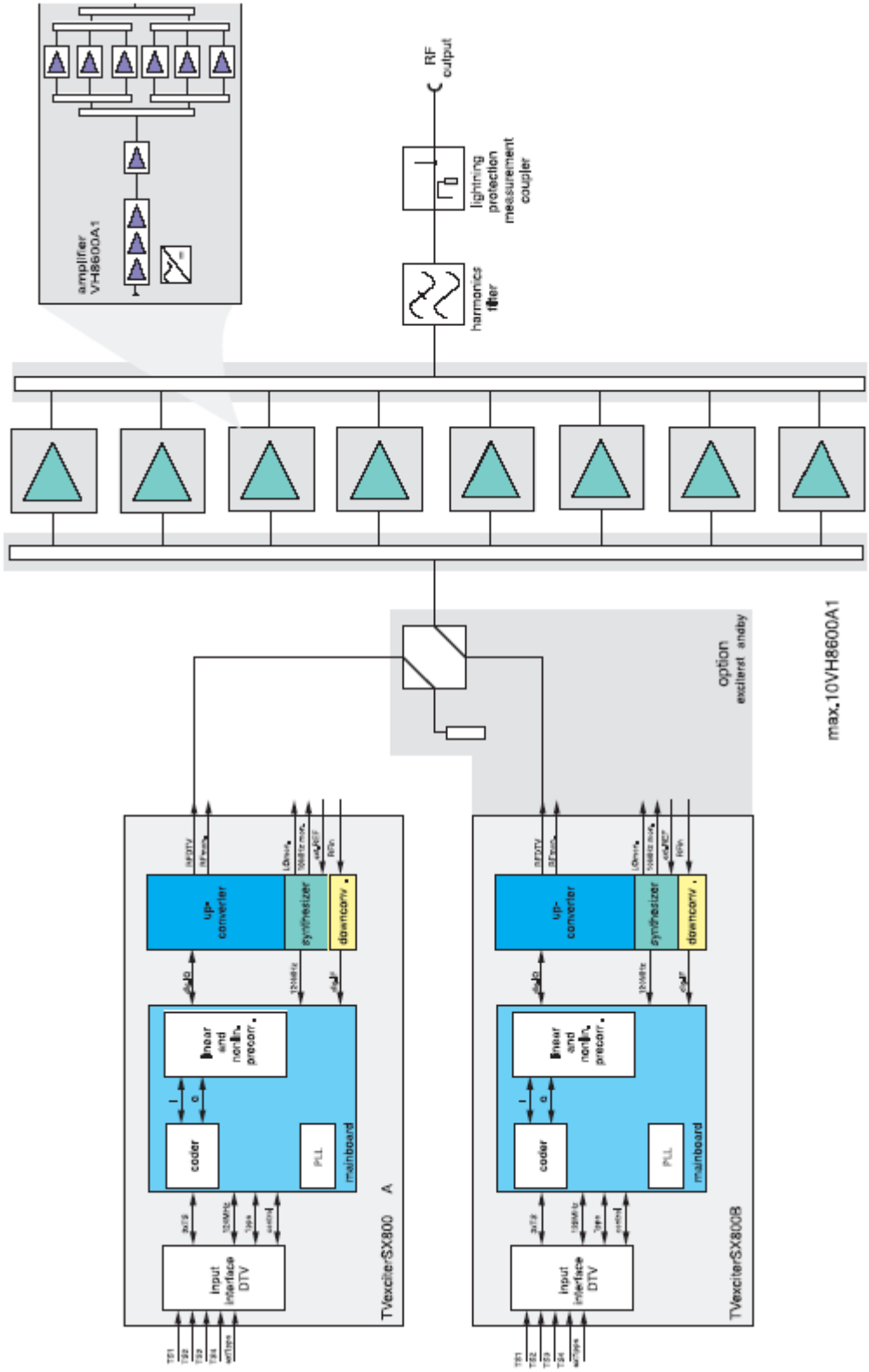

Figure 4-1: Block diagram of DTV transmitter: This example: R&S NV8610E/V

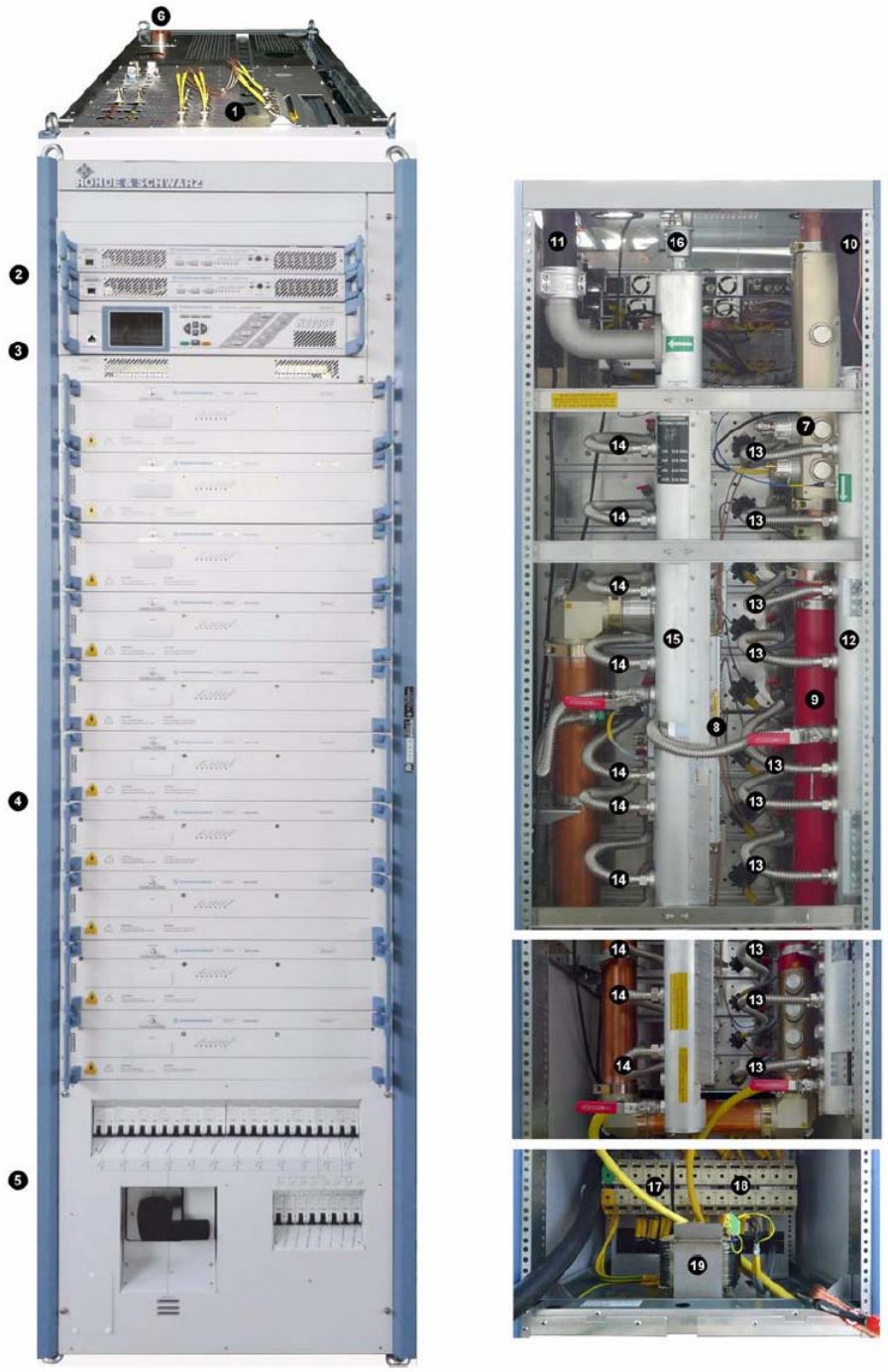

Figure 4-2: Transmitter R&S NV8610 – modules

1) Connection panel
2) Exciter
3) Transmitter control unit
4) Output stage
5) Power distribution
6) RF connector
7) Directional coupler lightning protection system
8) Combiner unit
9) Harmonics filter
10) Coolant inlet
11) Coolant outlet
12) Coolant distributor
13) Amplifier coolant inlet
14) Amplifier coolant outlet
15) Coolant collector
16) Breather unit
17) mains input terminal
18) mains configuration terminals
19) transformer for 240V units (pump, etc)

The R&S NV8610 transmitter consists of the following units and modules:

- Power distribution
  - Main switch
  - Motor protection switch
  - Automatic line fuse
  - Power distribution board
  - Auxiliary power supply
  - Optional socket
  - Grounding bolt
- Transmitter control unit components
  - R&S NetCCU800
  - Rack controller
- Connection panel
- Exciter unit
  - Exciters (1 or 2)
  - Exciter switch (in the case of exciter standby)
- Output stage unit
  - Amplifiers
  - Multiple combiner unit consisting of:
    Splitter function module
    Multiple combiner function module
    Power absorber function module
- Harmonics filter
- Directional coupler lightning protection system
  - Lightning protection
  - Directional coupler
  - Unassigned test point
- RF connector
- Cooling system
  - Coolant inlet/outlet
  - Coolant distributor
  - Amplifier coolant inlet and coolant outlet
  - Coolant collector
  - Temperature sensors (2)
  - Ventilation unit
- Transformer (optional)

4.3 Transmitter System in General

Frequency range	470 MHz to 862 MHz
Standards	DVB-T (EN 300 744) and ATSC (FCC Doc. A/53)
Transmission bandwidth	DVB-T (5, 6, 7 or 8 MHz) ATSC (6 MHz)
SFN/DTx function	DVB-T (SFN) ATSC on request
EMC	to EN302296
Voltage supply	• **single phase, 240V 1x 240VAC-15 +10% 47 - 63 Hz protection class II EN 60950-1** • **three phase, 208V 3x 208VAC -15 +10% 47 - 63 Hz protection class II EN 60950-1**
Maximum installation altitude	2000 m above sea level (higher than 2000 m on request)
Operating temperature range	+1 °C to +45 °C
Max. permissible humidity	95%, non-condensing
Cooling system	Liquid-cooled, Antifrogen N/water mixture (39%/61%)
VSWR	s ≤ 1.3
Inputs (DVB-T/-H)	4 x ASI

Synchronization

Reference frequency	10 MHz, 0.1 V to 5 V (pp) or TTL, BNC
Reference pulse	1 Hz, TTL, BNC

Supported modulation parameters

Length of transport packet	188 or 204 bytes
TPS and TX automatic	to TS101191 (MIP) with MFN and SFN
Coding and modulation	to EN 300744, EN 302304 (optional)
Modulation	QPSK, 16QAM or 64QAM
Guard interval	1/4, 1/8, 1/16 or 1/32 of useful symbol period
IFFT mode	2 k and 8 k, 4 k (optional)
Inner code rate	1/2, 2/3, 3/4, 5/6 or 7/8
Useful symbol period	224 µs (2 k) or 896 µs (8 k), 448 µs (4 k, optional)

Operation

Local

Color display and keys	Front-panel operation via graphical user interface (GUI)
RJ45	Operation via PC with standard web browser

Remote

RJ45	IEC 864-2 via Ethernet (standard)
RJ45	Network management interface (web server and/or SNMP agent, optional)
Parallel remote-control interface	Floating contacts for messages and commands (optional)
BIT bus	Bus interface to IEC 864-2 (optional)

4.4 Transmitter System – Specifically R&S NV8610

Number of amplifiers 10

Output power at transmitter output (without bandpass filter)

P_{out} MER >35 dB ..... 5200 W

P_{out} MER >33 dB

from channel 21 to 25 ..... 5500 W

from channel 26 to 44 ..... 6100 W

from channel 45 to 69 ..... 6400 W

Power consumption of transmitter ..... 25 kW to 35 kW
(depending on power and frequency)

Power consumption of cooling system

Pump unit ..... approx. 370 W

Cooler ..... approx. 600 W

Recommended fuse protection for transmitter

three phase, 3 x 208V 150A

single phase, 240V 200A

Recommended supply cable

three phase, 3 x 208V ..... AWG 0; 1/0

single phase, 240V ..... AWG 000; 3/0

Coolant flow rate ..... approx. 67 l/min

Heat dissipation

to surrounding air ..... approx. 1000 W

fed to outside ..... approx. 26.5 kW

Dimensions (W x H x D) ..... 600 mm x 2000 mm x 1100 mm

Total weight (approx.) ..... 625 kg (without transport packaging and cooling system)

RF output connector ..... $3^1/_8$ EIA

RF test-point connector ..... N

4.5 Operating Conditions

The emission tests were executed in an anechoic test chamber equipped with RF absorbers. The measurement, simulation and control equipment was located outside of the chamber. The EUT was placed on a metallic turntable in order to test radiated emission automatically around 360°.
During the measurement the EUT was grounded to the groundplane via a 1-wire cable with a length of 3 m. The EUT was powered via a fixed installed powerline cable.

The EUT was configured with ten amplifiers and adjusted in accordance with the tune up procedures of the NV8610E/V system manual

The EUT was operated with 1x 240V AC for the radiated tests and 3x 208V AC and 1x 240V AC for the conducted test and activated with it´s rated output power.

4.6 Failure Criteria

No entry, because only emission tests were performed.

5 Test Equipment

5.1 Test Facility

The EMC-tests are carried out in the shielded rooms of the Center for Quality Engineering, Hofmannstraße 50, 81379 München, Germany.

Chamber	1	2	3	4 / 5	6
Dimensions (net)	17.7 * 10.8 * 6.8m	9.6 * 8.5 * 5.3m	7.4 * 6.6 * 5.2m	4.1 * 3.5 * 3.5m	6.4 * 4.3 * 4.3m
Max. Door Exit	5.0 * 3.86m	3.9 * 4.0m	2.0 * 2.7m	0.9 * 2.25m	1.8 * 3.0mm
Shielding material	Sheet steel (Thickness:1.5mm on floor, 1.0mm on walls and ceiling)	Sheet steel	Sheet steel	Sheet steel	Sheet steel
Absorbers	• hybrid absorbers on walls and ceiling (TDK), length 1m	• hybrid absorbers on walls and ceiling (E+C), length 0.5m	• hybrid absorbers on walls and ceiling (E+C), length 0.3m	• without absorbers	• without absorbers
Floor	• metallic ground plane • floor load: 12 t/m²	• metallic ground plane • floor load: 1.5 t/m²	• metallic ground plane • floor load: 1 t/m²		
Specials	• measuring distance of max. 10m • turntable ∅ 4m / 6t **Test chamber no. 1 complies with:** ***Emission*** (10m distance and frequency range 30-1000MHz) - EN 55022 / 2006 - ANSI C63.4 / 2003 - NSA 30 – 1000 MHz & Site VSWR 1 – 18GHz acc. CISPR 16-1-4 (2007) - FCC-listed until June 2009, Reg. Nr.: 90932 ***Immunity*** (field uniformity in the frequency range 27-3000MHz) - EN 61000-4-3:2006	• measuring distance of 3m (max 5m) • turntable ∅ 3.2m / 1.5t **Test chamber no. 2 complies with:** ***Emission*** (3m distance and frequency range 30-1000MHz) - EN 55022 / 2006 - ANSI C63.4 / 2003 - FCC-listed until March 2009, Reg. Nr.: 97242 - NSA 30 – 1000 MHz & Site VSWR 1 – 18GHz acc. CISPR 16-1-4 (2007) - VCCI-listed until Oct. 2010, Reg. No. R-2623 ***Immunity*** (field uniformity in the frequency range 80-3000MHz) - EN 61000-4-3:2006	• measuring distance of max. 3m • turntable ∅ 2.0m / 1t **Test chamber no. 3 complies with:** ***Emission*** (3m distance and frequency range 30-1000MHz) - EN 55022 / 2006 - ANSI C63.4 / 2003 - NSA 30 – 1000 MHz & Site VSWR 1 – 18GHz acc. CISPR 16-1-4 (2007) - FCC-listed until March 2010, Reg. Nr.: 299569 ***Immunity*** (field uniformity in the frequency range 80-3000MHz) - EN 61000-4-3:2006		- VCCI-listed until Oct. 2010, Reg. No. C-2866 & No. T-326

Table 5-1: Anechoic chamber No. 1

5.2 Environmental conditions

42 % rel. humidity, 26°C temperature

5.3 Measuring Equipment

ID. No.	Equipment	(Type)	Manufacturer	(Specification)	Status	Last Cal.	Next Cal.
P0336	test chamber 1		Siemens	20.3 x 13.2 x 8.0 m; 1 m pyramid absorbers + ferrite tiles	chk	Jan 29, 2009	Jan 31, 2010
P1192	EMI receiver	ESIB26	R&S	20 Hz - 26.5 GHz	cal	Mar 14, 2007	Mar 31, 2009
P1139	Mast	MA 4000	innco GmbH	1 - 4m, hor./vert.	cnn		
P1140	Controller	CO 2000	innco GmbH		cnn		
P1352	antenna, Ultralog	HL562	R&S	30 MHz - 3000 MHz	cal	Jan 17, 2009	Jan 31, 2010
P0940	antenna (MZ1)	3115	Emco	1 - 18 GHz	chk	Jun 16, 2008	Jun 30, 2010
P1314	Mast	MA 4000	innco GmbH	1 - 4m, hor./vert.	cnn		
P1272	coax cable	FB311AF040005050	Rosenberger Micro-Coax	DC - 18 GHz, 2.61dB@18GHz	cnn		
P1162	LISN	AN40200	messtec (formerly Fa.Heine)	4 x 200 A; 700 V; 0 - 63 Hz	cal	Mar 08, 2007	Mar 31, 2009
P0567	signal generator	SMR 20	R&S	10 MHz - 20 GHz	chk	Apr 16, 2007	Apr 30, 2009
P0030	antenna (MZ3)	96001	Ailtech	1 - 18 GHz	cal	Mar 14, 2007	Mar 31, 2009
P1327	EMI receiver	ESU40	R&S	20Hz - 40GHz, FFT-Scan, Preamplifier 100kHz - 40GHz, 30dB	cal	Sep 04, 2007	Sep 30, 2009
P0776	attenuator 30dB	46-30-34	Weinschel	30dB	chk	Apr 08, 2008	Apr 30, 2009
P1271	coax cable	FB311AF040005050	Rosenberger Micro-Coax	DC - 18 GHz, 2.61dB@18GHz	cnn		

cal = Calibration, car = Calibration restricted use, chk = Check, chr = Check restricted use, cpu = Check prior to use, cnn = Calibration not necessary, ind = for indication only

Table 5-2: Measuring Equipment for EMC tests

5.4 Measurement Uncertainty

As far as the underlying standards include requirements concerning the uncertainty of measuring instruments or measuring methods, they are met.

The expanded measurement uncertainty of the measuring chain was calculated for all tests according to the “ISO Guide to the expression of uncertainty in measurement (GUM)”. The results are documented in an “internal controlled document” at CQE archives.

The measuring accuracy for all measuring devices is provided in their technical description. The measuring instruments, including any accessories, are calibrated correspondingly and verified to ensure the necessary accuracy. Depending on the kind of measuring equipment it is checked within regular intervals or directly before the measurement is performed. Adjustments are made and correction factors applied to measured data in accordance with the specifications of the corresponding instrument.

The expanded measurement instrumentation uncertainty of our Test Laboratory meets the requirements of IEC CISPR 16-4-2 (2003-11) “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements” for all listed Tests.

6 Test Specifications and Results

6.1 Radiated Emission Tests

The test results in the report refer exclusively to the test object described in section 4 and the test period in section 3.3.

6.1.1 Radiated Emission FCC Part 2, Range 30 – 1000 MHz

The purpose of this test is to evaluate the electrical component of the electromagnetic field radiated by the EUT between 30MHz and 1000MHz.
The EUT was placed on a turntable in order to determine the direction of maximum field strength for each predominant emission around 360 degrees (continuous sweeps). At each azimuth step, the antenna was raised from the height of 1 to 4m (step = 1m) with both, horizontal and vertical planes of polarisation. This measurement was made with an automatic test set. Pre-Scans were made with peak and average detection with variation of turntable angle, antenna height and polarisation. The measuring distance was 10 m. The test set-up of Figure 6-1 was used.

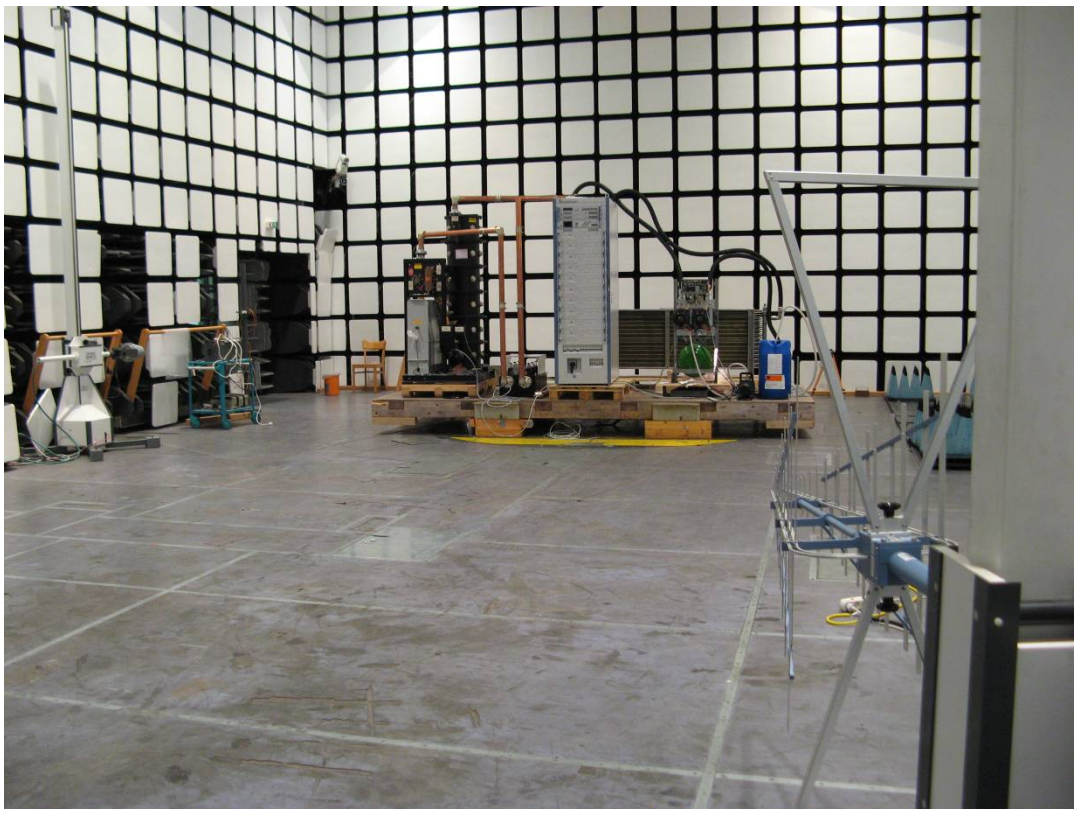

Figure 6-1: Test setup for radiated emissions measurement

Frequency Band	BW
30 MHz to 716 MHz	100 kHz
716 MHz to 722 MHz	licensee frequency block
722 MHz to 1000 MHz	100 kHz

Table 6-1: Resolution bandwidth in the range 30 MHz to 1 GHz

Result for Configuration A:

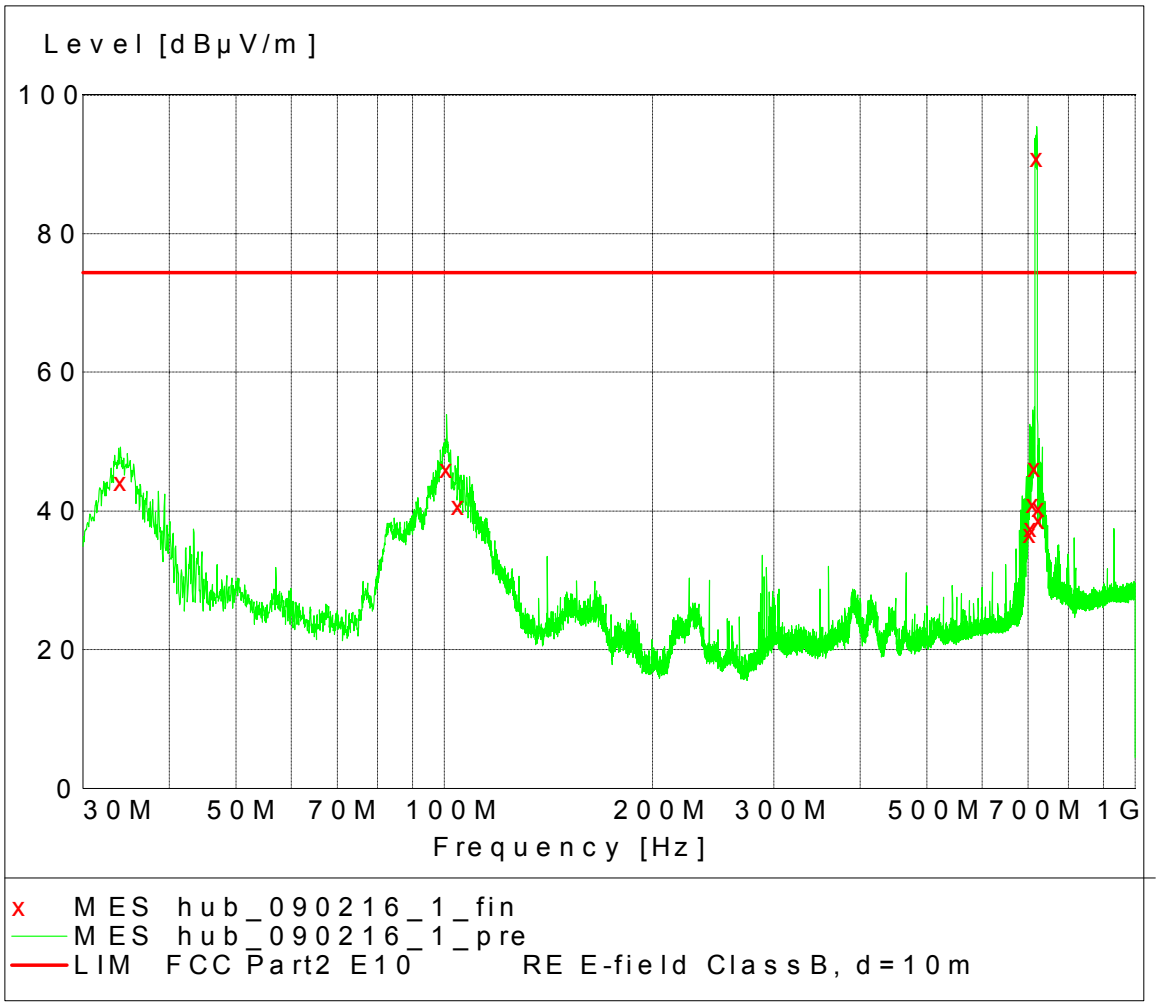

Figure 6-2: Radiated emission, 30 MHz - 1 GHz

Result for Configuration B:

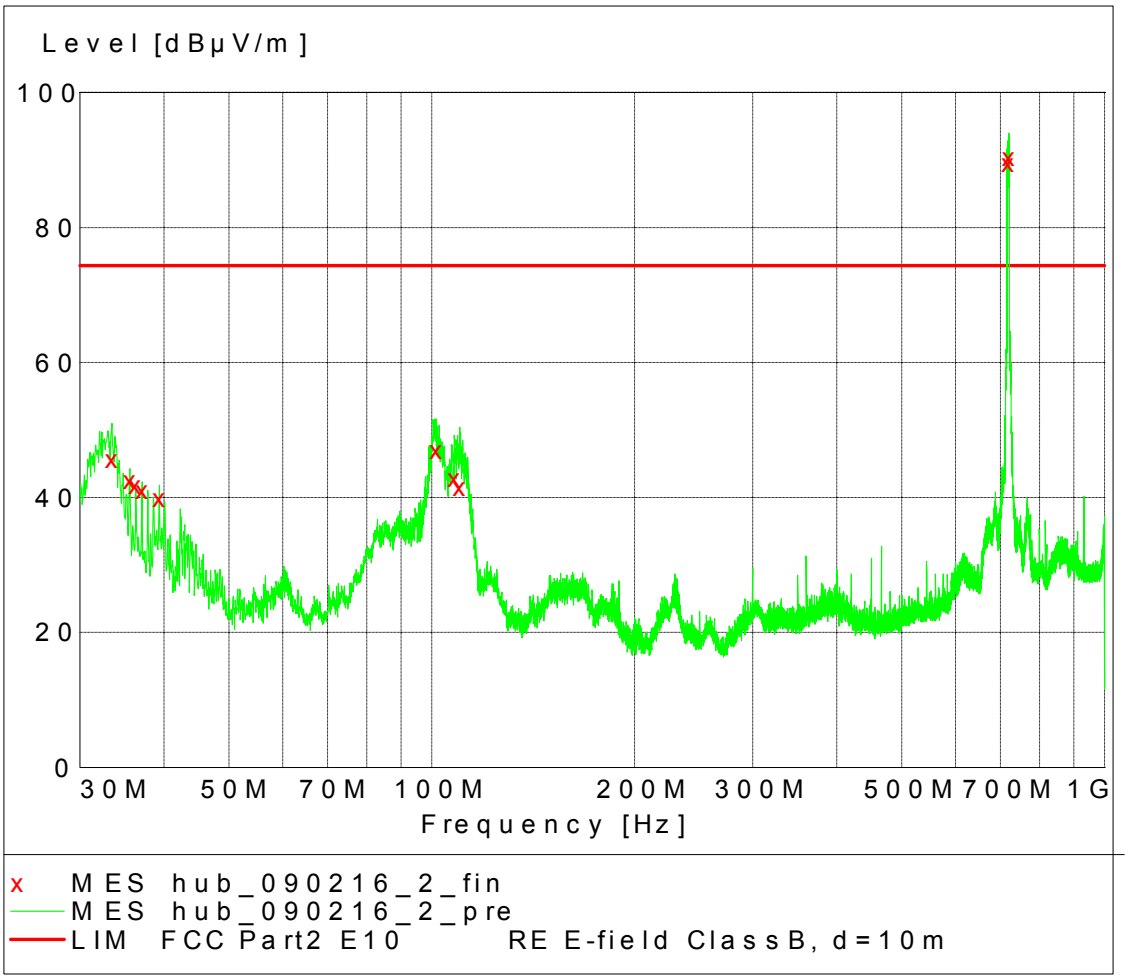

Figure 6-3: Radiated emission, 30 MHz - 1 GHz

6.1.2 Radiated Emission FCC Part 2, Range 1 GHz – 10 GHz

The electric field strength was measured in the frequency range 1 GHz to 10 GHz using a horn antenna and a test receiver. The test was performed using a computer-controlled testset, controlling the test receivers, the turntable (0-360°) and the polarization (hor/vert) of the antenna (h=1-4m). The measuring distance was 3 m.

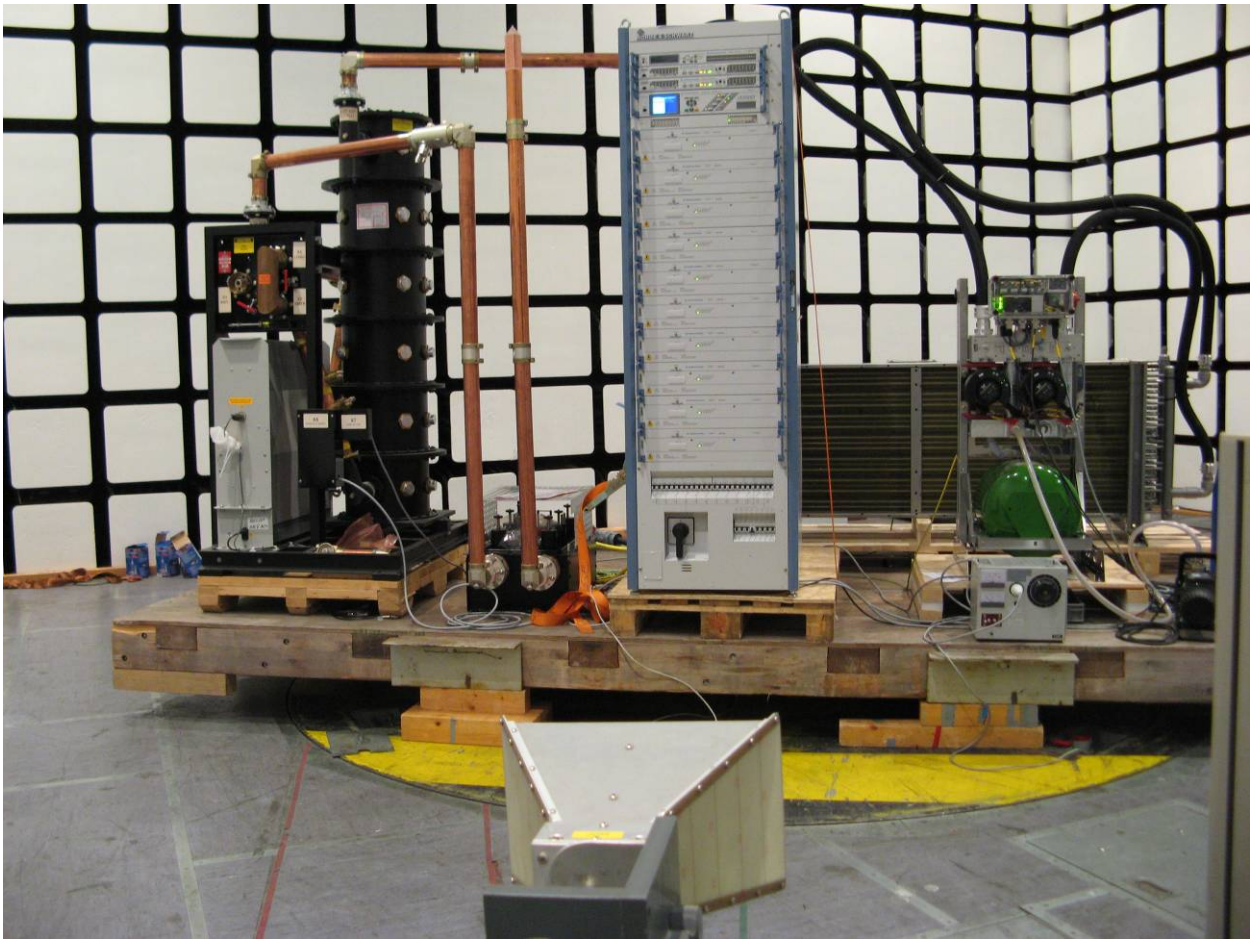

Figure 6-4: Test setup for radiated emission measurement, 1 - 10GHz

The detector function was set to peak, the measuring bandwidth was selected according to the following table:

Frequency Band	BW required
1000 MHz to 10000 MHz	100 kHz

Table 6-2: Resolution bandwidth in the range 1 GHz to 10 GHz

Result Configuration A:

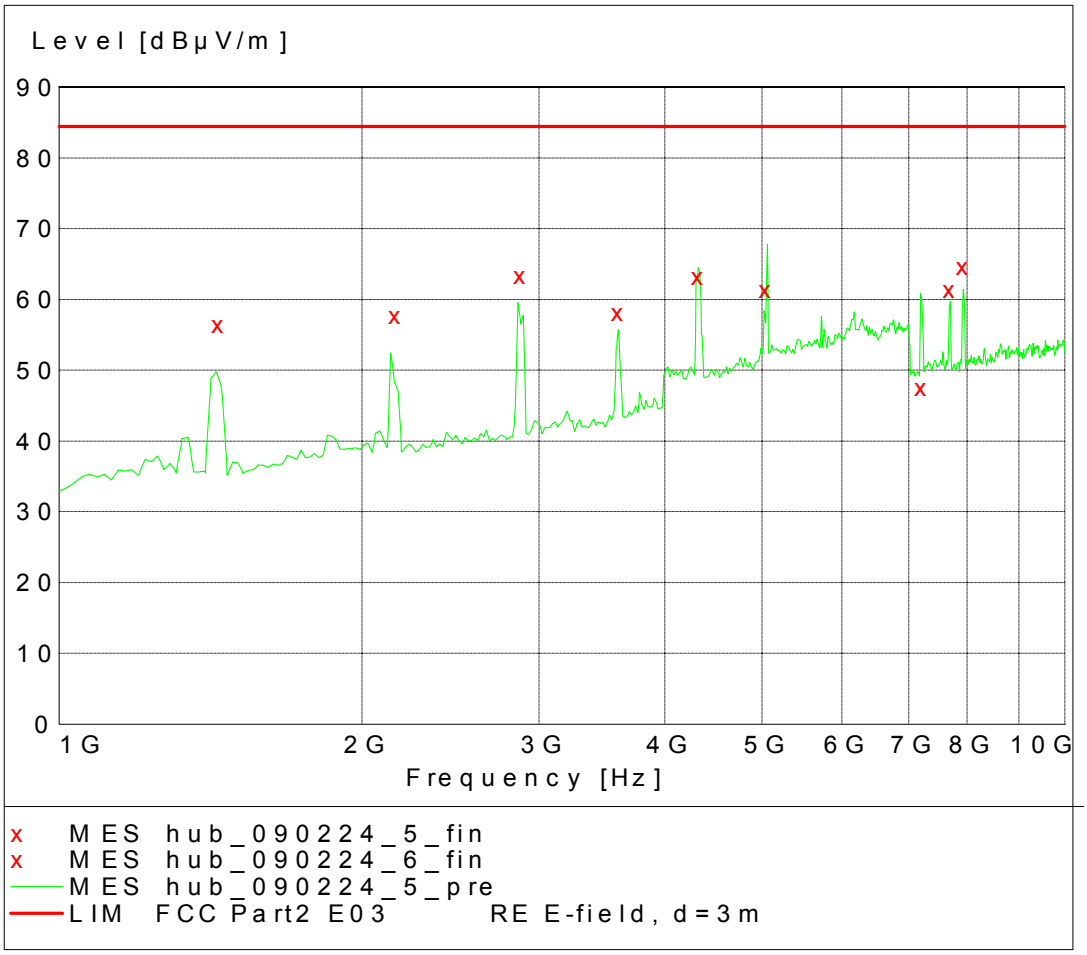

Figure 6-5: Radiated emission, 1 GHz - 10 GHz

Frequency	Level	Transd	Limit	Margin	Det.	Height	Azimuth	Polarization
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg	
1439.000000	56.40	26.00	84.40	28.00	PK	100.0	264.00	HORIZONTAL
2157.000000	57.70	28.80	84.40	26.70	PK	300.0	224.00	VERTICAL
2873.000000	63.40	30.50	84.40	21.00	PK	127.0	260.00	VERTICAL
3596.000000	58.20	32.60	84.40	26.20	PK	151.0	45.00	VERTICAL
4317.500000	63.30	33.50	84.40	21.10	PK	209.0	222.00	VERTICAL
5033.500000	61.50	34.90	84.40	22.90	PK	200.0	266.00	HORIZONTAL
7202.500000	47.60	37.90	84.40	36.80	PK	299.0	192.00	HORIZONTAL
7680.000000	61.50	38.50	84.40	22.90	PK	175.0	45.00	VERTICAL
7917.000000	64.70	38.90	84.40	19.70	PK	179.0	68.00	HORIZONTAL

Table 6-3: Highest values, PK detection

Result Configuration B:

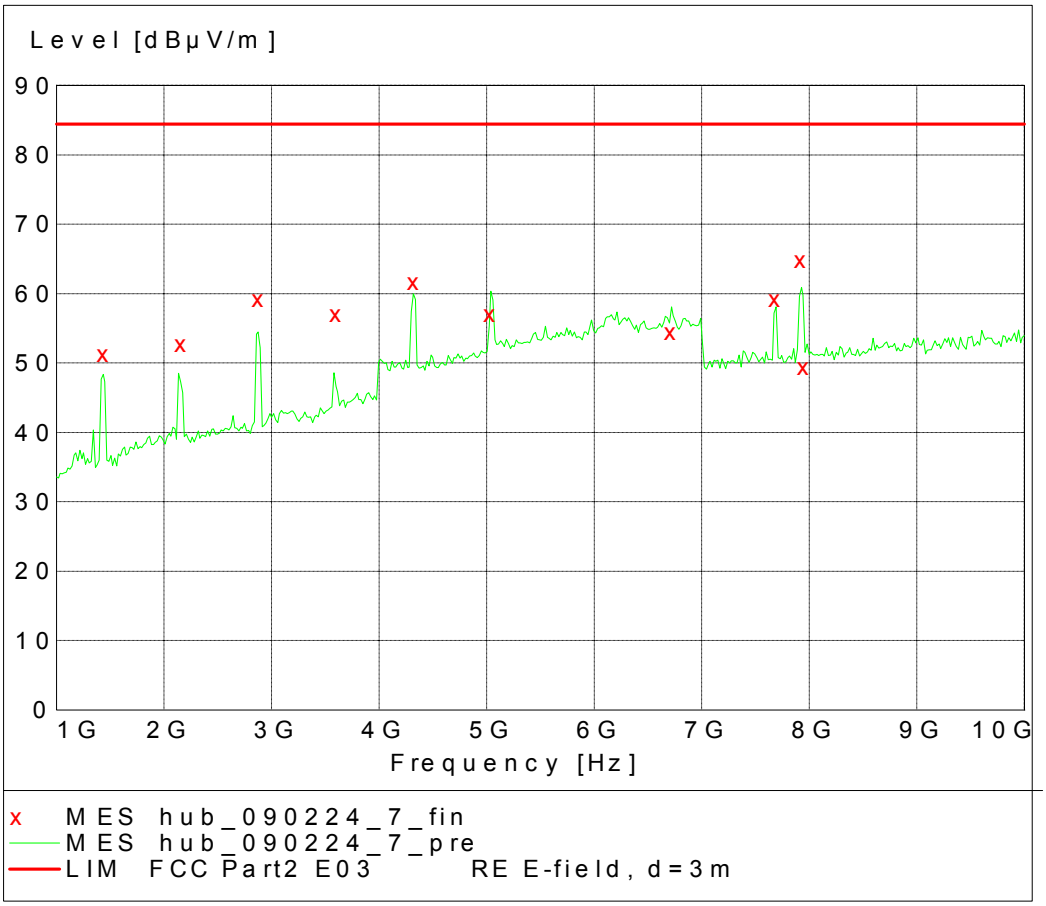

Figure 6-6: Radiated emission, 1 GHz - 10 GHz

Frequency	Level	Transd	Limit	Margin	Det.	Height	Azimuth	Polarization
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg	
1436.000000	51.30	26.00	84.40	33.10	PK	294.0	212.00	HORIZONTAL
2157.000000	52.80	28.80	84.40	31.60	PK	182.0	56.00	VERTICAL
2874.500000	59.20	30.60	84.40	25.20	PK	222.0	225.00	HORIZONTAL
3598.000000	57.10	32.60	84.40	27.30	PK	144.0	34.00	VERTICAL
4316.500000	61.70	33.50	84.40	22.70	PK	209.0	181.00	HORIZONTAL
5030.000000	57.00	34.90	84.40	27.40	PK	175.0	255.00	HORIZONTAL
6711.000000	54.50	36.90	84.40	29.90	PK	257.0	68.00	VERTICAL
7680.000000	59.30	38.50	84.40	25.10	PK	171.0	91.00	HORIZONTAL
7917.000000	64.80	38.90	84.40	19.60	PK	187.0	68.00	HORIZONTAL
7947.000000	49.50	38.90	84.40	34.90	PK	208.0	106.00	HORIZONTAL

Table 6-4: Highest values, PK detection

Dipole substitution

Specification:
- ANSI / TIA / EIA-603-A-2001 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

The EUT was removed, and replaced by a horn antenna. Afterwards the performance at the antenna was increased with a signal generator, until the same field strength was achieved, as with the preceding measurements. The measuring distance was 3 m.

Figure 6-7: Test set-up for the Dipole substitution

For ideal half wave dipole the power can be calculated by:

P_d(dBm) = P_g(dBm) - cable loss (dB) + antenna gain (dB)

P_d is the dipole equivalent power
P_g is the generator output power into the substitution antenna

Result for the dipole substitution Configuration A:

Spurious Emission Frequency	Spurious Emission Reference Field Strength	Signal Generator Output	Cable loss	Antenna Gain	Calc. Result	Limit	Result
[MHz]	[dBµV/m]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	
1439.000000	56.40	-44	1.8	5.6	**-40.2**	-13	passed
2157.000000	57.70	-43	2.1	6.5	**-38.5**	-13	passed
2873.000000	63.40	-39	2.5	7.3	**-34.2**	-13	passed
3596.000000	58.20	-42	2.7	7.2	**-37.5**	-13	passed
4317.500000	63.30	-37	3.0	7.9	**-32.2**	-13	passed
5033.500000	61.50	-40	3.3	7.2	**-36.2**	-13	passed
7202.500000	47.60	-55	4.0	8.3	**-50.7**	-13	passed
7680.000000	61.50	-41	4.1	8.6	**-36.5**	-13	passed
7917.000000	64.70	-40	4.2	8.7	**-35.5**	-13	passed

Table 6-5: Results for the dipole substitution

According to FCC Part 2 §2.1053, §2.1057 this measurement is **passed**.

Result for the dipole substitution Configuration B:

Spurious Emission Frequency	Spurious Emission Reference Field Strength	Signal Generator Output	Cable loss	Antenna Gain	Calc. Result	Limit	Result
[MHz]	[dBµV/m]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	
1436.000000	51.30	-50	1.8	5.6	**-46.2**	-13	passed
2157.000000	52.80	-49	2.0	6.5	**-44.5**	-13	passed
2874.500000	59.20	-42	2.5	7.3	**-37.2**	-13	passed
3598.000000	57.10	-43	2.7	7.2	**-38.5**	-13	passed
4316.500000	61.70	-39	3.0	7.8	**-34.2**	-13	passed
5030.000000	57.00	-45	3.3	7.1	**-41.2**	-13	passed
6711.000000	54.50	-47	3.7	8.7	**-42.0**	-13	passed
7680.000000	59.30	-44	4.1	8.6	**-39.5**	-13	passed
7917.000000	64.80	-40	4.2	8.7	**-35.5**	-13	passed
7947.000000	49.50	-57	4.2	8.7	**-52.5**	-13	passed

Table 6-6: Results for the dipole substitution

According to FCC Part 2 §2.1053, §2.1057 this measurement is **passed**.

6.2 Conducted Emission

6.2.1 Spurious Emission to FCC Part 2 on the antenna terminals

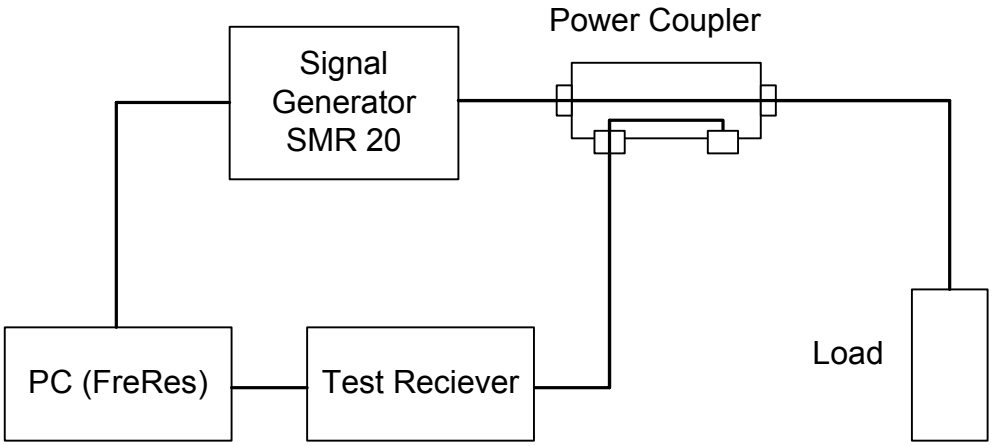

Figure 6-8: Test setup for conducted emissions measurement

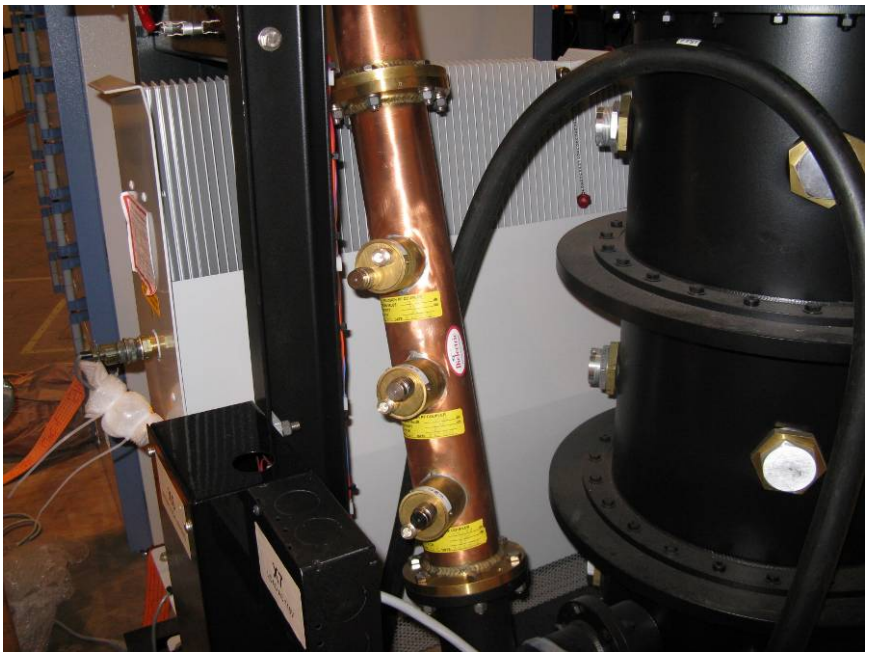

Figure 6-9: Picture of Power Coupler

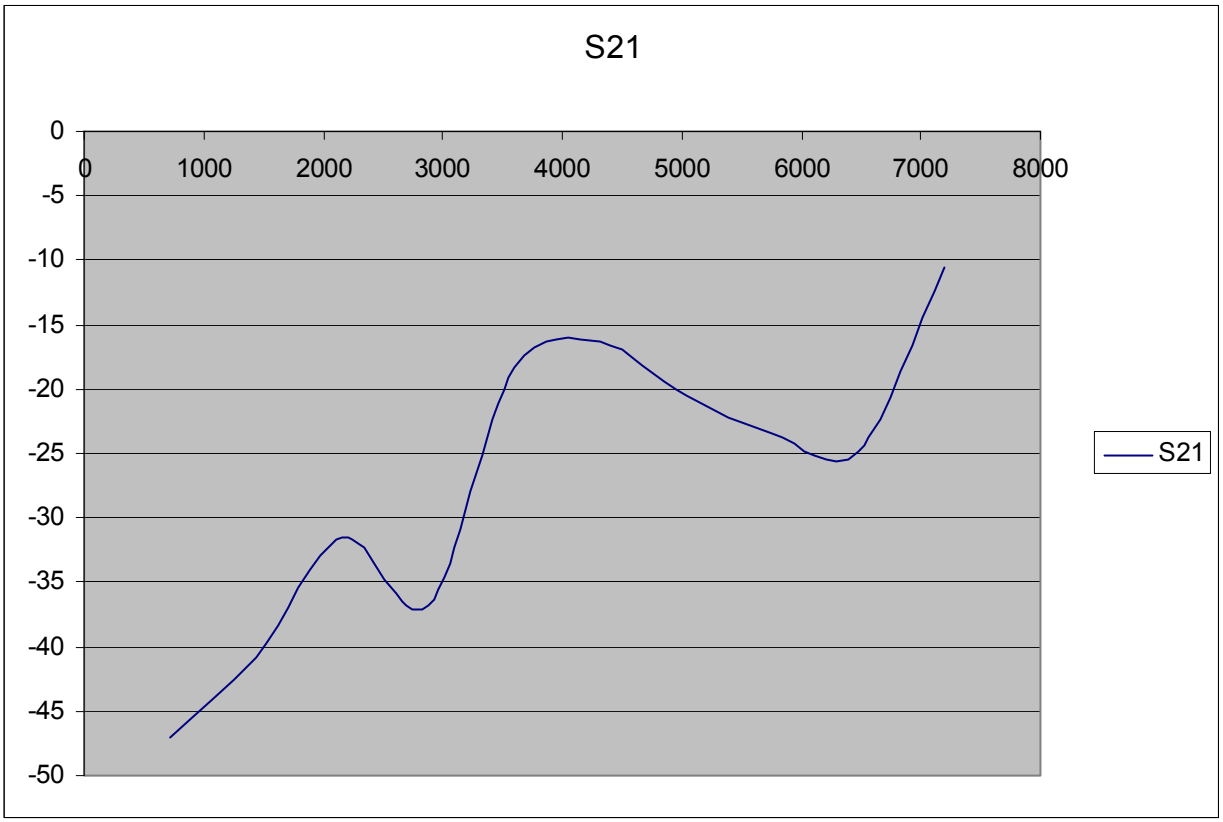

Figure 6-10: Coupling Factor of the Power Coupler

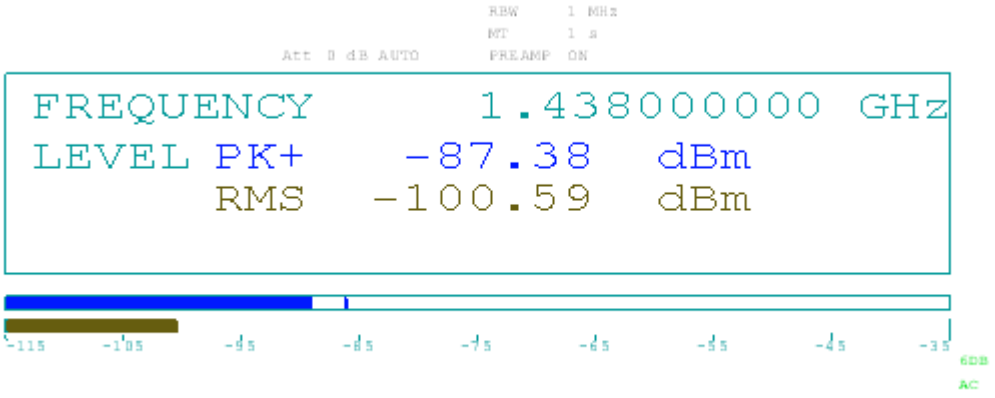

Figure 6-11: Surious emission measurement example 1st harmonic

Result for the conducted spurious emission Configuration A:

Limit: 43+10log(P) = 43+10log(6400W) ≈ 81 dB

freq	S21 coupler	rec. Level	att.	corr. BW	P	Result
MHz	dB	dBm	dB	dB	dBm	dBc
719	47	-16,95	30,15	7,32	67,52	0
1438	40,8	-100,6	30,2	10,4	-19,2	86,7
2157	31,5	-101,7	30,3	12,2	-27,7	95,2
2876	36,8	-100,9	30,5	13,4	-20,2	87,7
3595	18,4	-100	30,5	14,4	-36,7	104,2
4314	16,3	-96,8	30,7	15,2	-34,6	102,1
5033	20,5	-97,1	30,5	15,9	-30,2	97,7
5752	23,4	-96,2	30,5	15,5	-26,8	94,3
6471	24,8	-96,6	30,7	17	-24,1	91,6
7190	10,5	-96,6	30,8	17,4	-37,9	105,4

Table 6-7: Spurious Emissions

According to FCC Part 2 §2.1051 / 2.1057 this measurement is **passed**.

Result for the conducted spurious emission Configuration B:

Limit: 43+10log(P) = 43+10log(6400W) ≈ 81 dB

freq	S21	rec. Level	corr. BW	att.	P	Result
MHz	dB	dBm	dB	dB	dBm	dBc
719	47	-16,98	7,34	30,14	67,5	0
1438	40,8	-100,9	10,4	30,2	-19,5	87
2157	31,5	-101,8	12,2	30,3	-27,8	95,3
2876	36,8	-100,9	13,4	30,5	-20,2	87,7
3595	18,4	-100,1	14,4	30,5	-36,8	104,3
4314	16,3	-96,9	15,2	30,7	-34,7	102,2
5033	20,5	-97,3	15,9	30,5	-30,4	97,9
5752	23,4	-96,3	15,5	30,5	-26,9	94,4
6471	24,8	-96,7	17	30,7	-24,2	91,7
7190	10,5	-96,7	17,4	30,8	-38	105,5

Table 6-8: Spurious Emissions

According to FCC Part 2 §2.1051 / 2.1057 this measurement is **passed**.

6.2.2 Occupied bandwidth

Transmitter Frequency:	719 MHz
Receiver Setting:	RSB 10 kHz, detector RMS
Result:	5.4 MHz
Limit:	6.0 MHz

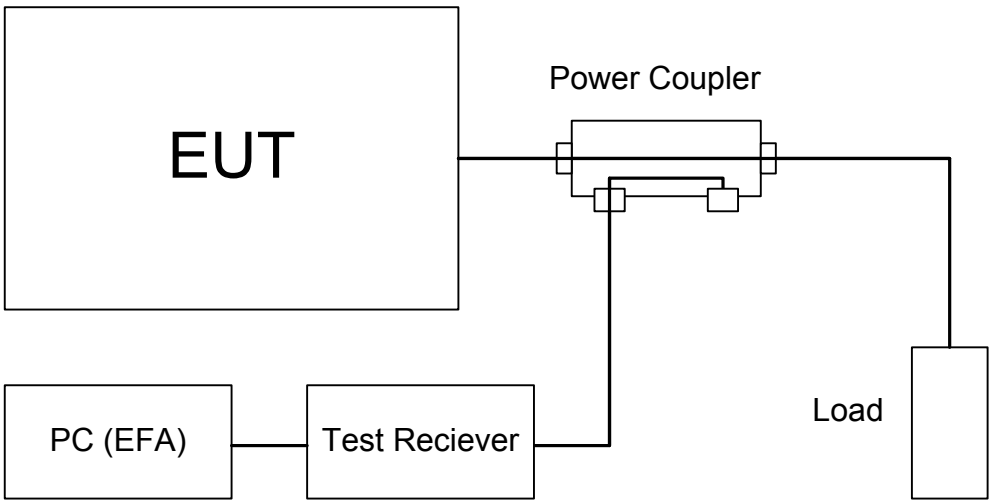

Figure 6-12: Test setup for occupied bandwidth measurement

Result for the Occupied bandwidth Configuration A:

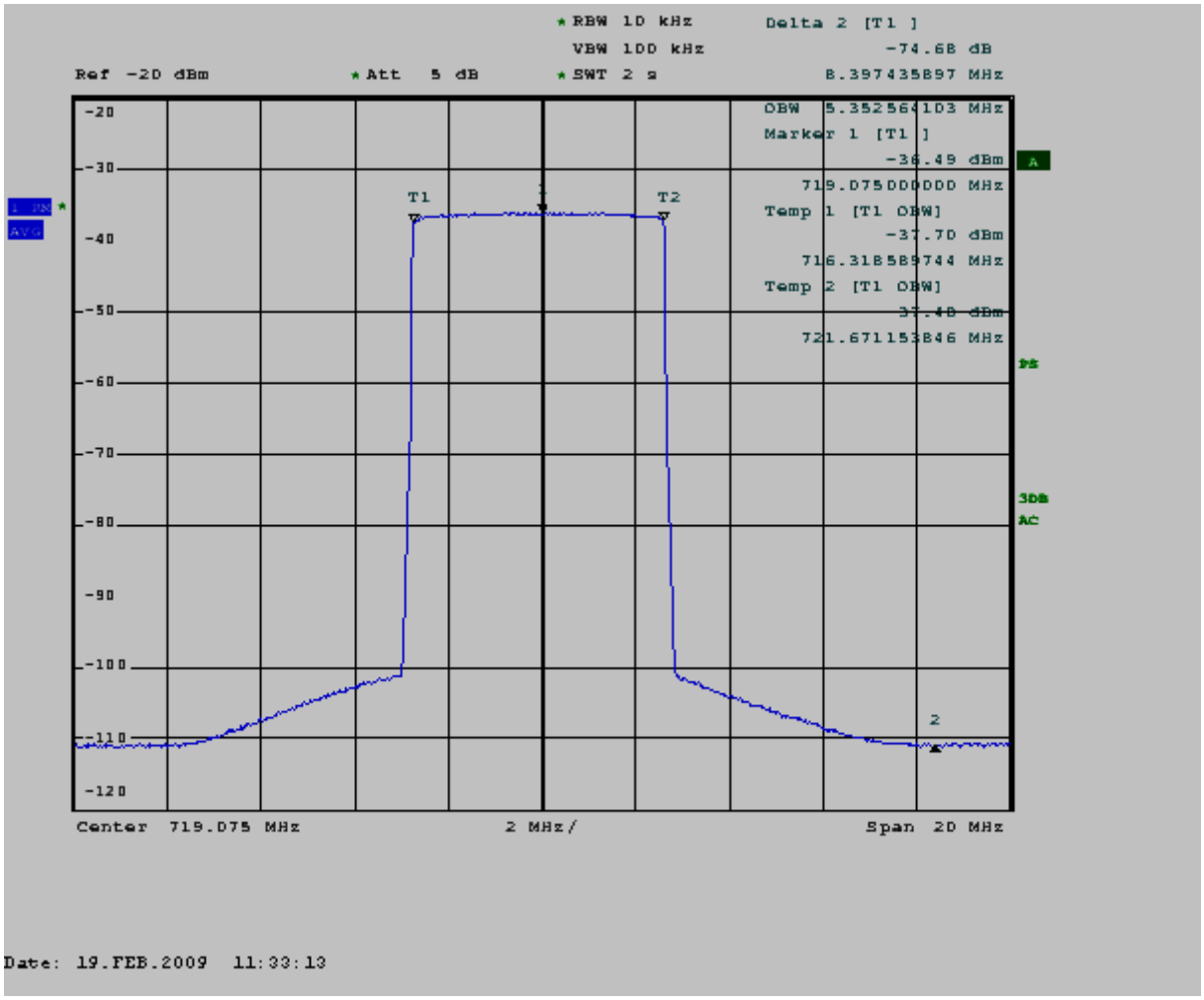

Figure 6-13 Bandwidth of the MediaFlo transmitter

Result: Occupied BW [MHz] = 5.4 MHz

According to FCC Part 2 §2.1049 / 2.1047 this measurement is **passed**.

Result for the Occupied bandwidth Configuration B:

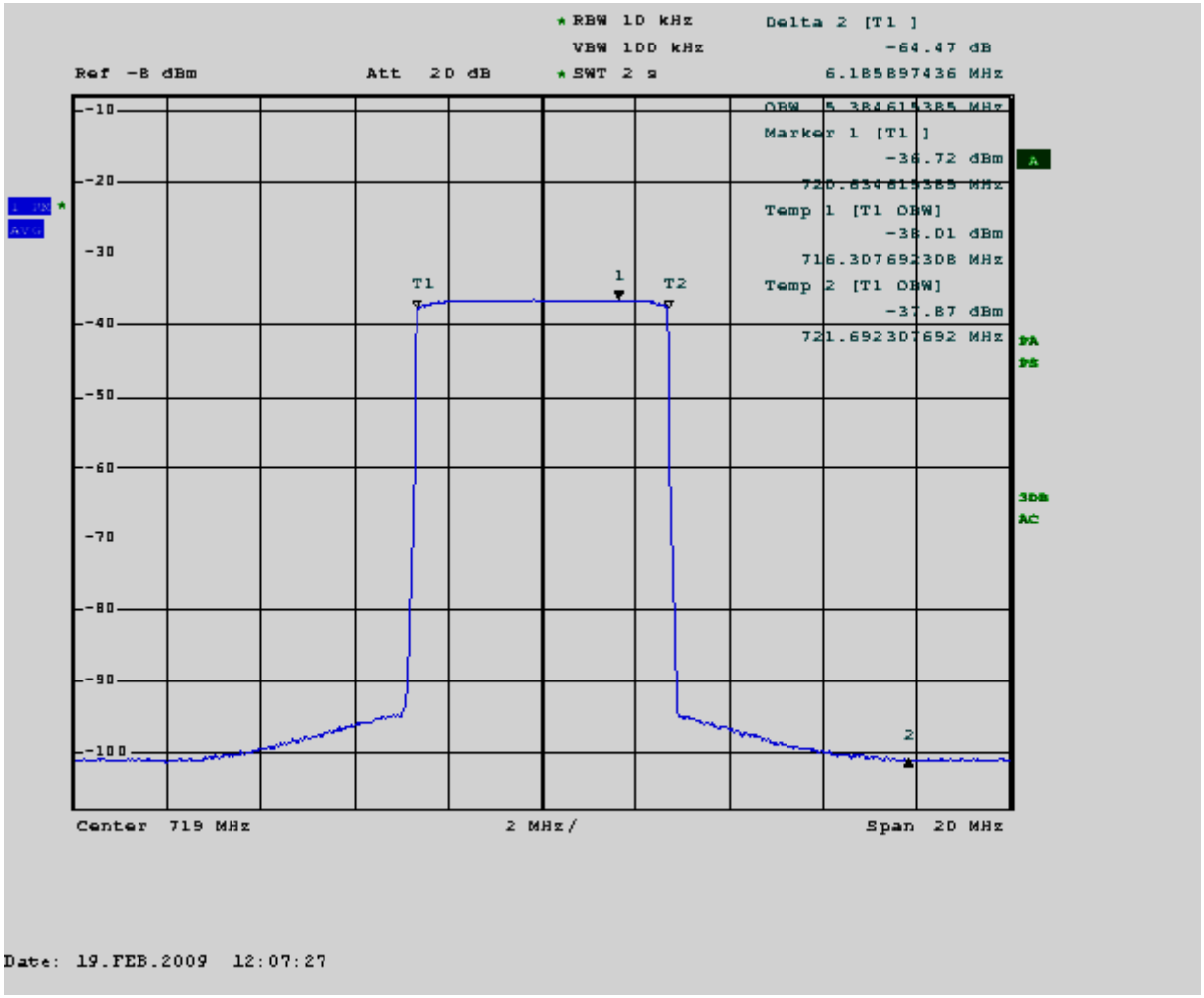

Figure 6-14 Bandwidth of the MediaFlo transmitter

Result: Occupied BW [MHz] = 5.4 MHz

According to FCC Part 2 §2.1049 / 2.1047 this measurement is **passed**.

6.2.3 Average Output Power acc. FCC 2.1046 (a) (C)

Measured Average Output Power: **6400 W+/-5%** (5650W after the BPF)

Transmitter Frequency: 719 MHz

Receiver Setting: RSB 10 kHz/1MHz, detector RMS

Result for the average output power (config. A and B):

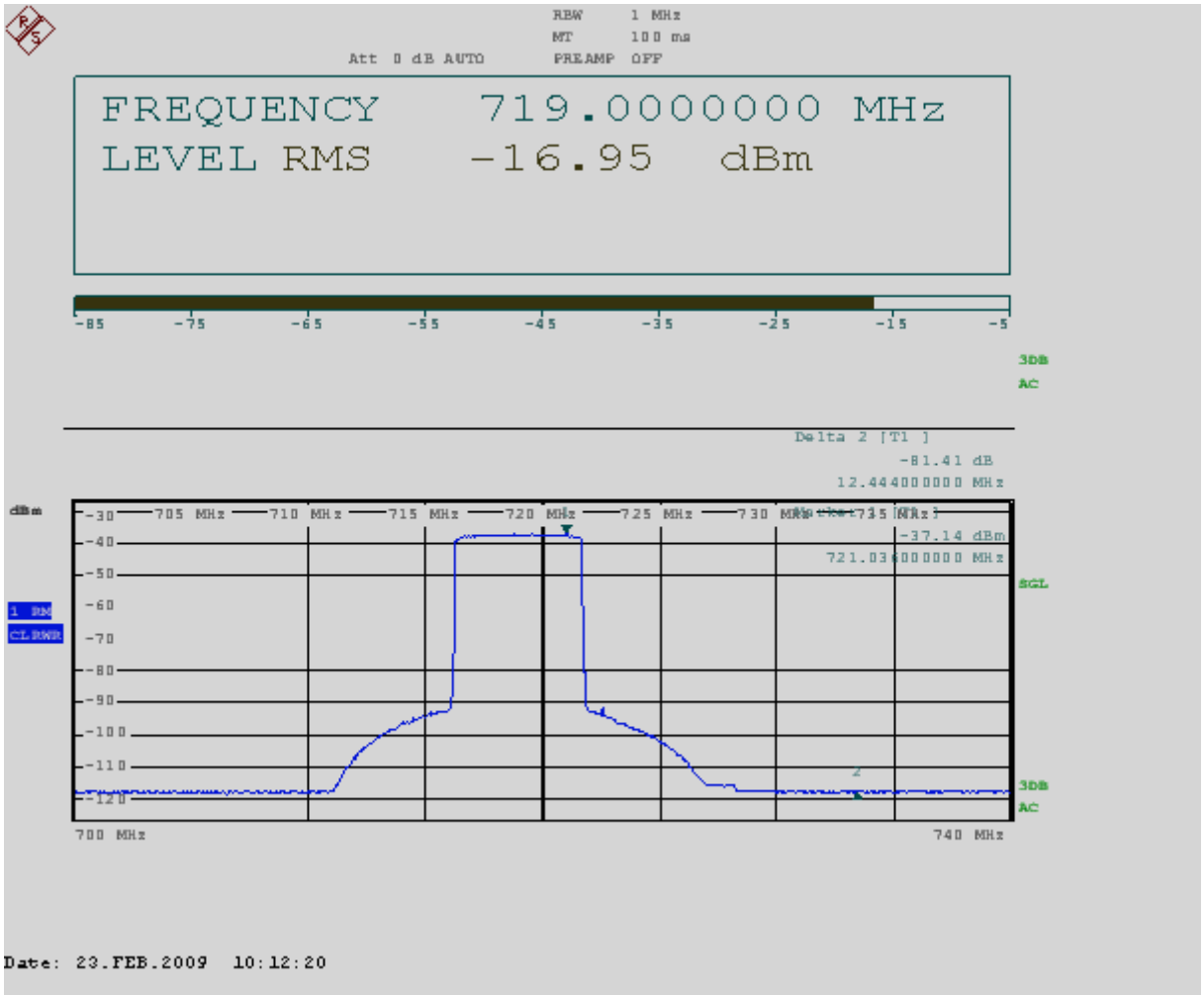

Figure 6-15: Power of the MediaFlo transmitter

The power of any emission outside the occupied bandwidth is below the noisefloor. The level is 81dB below the carrier power. So the limit of 47CFR27.53 f is fulfilled.

Result of the output power calculation:

$$P_{Messure} = -16.95 + 47(coupler) + 30{,}15dB(attenuator) = 60.2dBm$$

$$P_{Messure} = 60.2dBm$$

$$A_{BW} = 10 * \log(\frac{P_{BW}}{P_{RBW}}) \hat{=} 10 * \log(\frac{BW}{RBW})$$

$$A_{BW} = 10 * \log(\frac{5400kHz}{1000kHz}) = 7.32dB$$

$$P = A_{BW} + P_{Messure}$$

$P = 7.32dB + 60.2dBm = 67.52dBm$ ≈ 5.65 kW (output power after bandpass filter)

With 0.47dB attenuation of the filter and 0.10dB attenuation of the coaxial power line
the max. transmitter output power is 6.40kW+/-5%