



Accredited testing-laboratory

DAR registration number: DGA-PL-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)

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Test report no. : 1-1748-01-02/09
Type identification : S 600
Applicant : Beyerdynamic GmbH & Co. KG
FCC ID : OSDS600
IC Certification No : 3628A-S600
Test standards : 47 CFR Part 74
RSS - 123 Issue 1 Rev. 2

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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.

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

Test laboratory manager:

2010-06-17	Meheza K. Walla	
Date	Name	Signature

Technical responsibility for area of testing:

2010-06-17	Jakob Reschke	
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: DGA-PL-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:	Beyerdynamic GmbH & Co. KG
Street:	Theresienstraße 8
Town:	74072 Heilbronn
Country:	GERMANY
Telephone:	+49 (0) 7131 61 71-0
Fax:	+49 (0) 7131 617 215
Contact:	Ulrich Roth
E-mail:	roth@beyerdynamic.de
Telephone:	+49 (0) 7131 617 155

1.4 Application details

Date of receipt of order:	2010-04-19
Date of receipt of test item:	2010-05-31
Date of start test:	2010-05-31
Date of end test:	2010-06-17
Persons(s) who have been present during the test:	Mr. Ernst

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
RSS - 123 Issue 1 Rev. 2	2000-03	Spectrum Management and Telecommunications Policy - Radio Standards Specification Low Power Licensed Radiocommunication Devices

3 Technical tests

3.1 Details of manufacturer

Name:	Beyerdynamic GmbH & Co. KG
Street:	Theresienstraße 8
Town:	74072 Heilbronn
Country:	GERMANY

3.1.1 Test item and Additional EUT information For IC Canada (appendix 2)

Kind of test item:	Wireless Microphone System
Type identification:	S 600
Open Area Test Site Industry Canada Number:	IC 3462C-1
S/N serial number:	898147722A
HW hardware status:	Not specified
SW software status:	Not specified
Frequency Band [MHz]:	Used frequencies in USA and Canada 470 MHz – 608 MHz 614 MHz – 698 MHz Frequency band used by the equipment 598 MHz – 622 MHz
Number of Channels:	960 channels
Measured Channels	
Channel 1 – Output power [mW]	598.000 MHz – Rad. ERP: 3.00 mW
Channel 2 – Output power [mW]	607.975 MHz – Rad. ERP: 6.30 mW
Channel 3 – Output power [mW]	614.025 MHz – Rad. ERP: 7.10 mW
Channel 4 – Output power [mW]	622.000 MHz – Rad. ERP: 9.00 mW
Type of Modulation:	FM
Emission Designator:	<u>598.000 MHz</u> 150KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 169K2F3E (measured Bandwidth) <u>607.975 MHz</u> 150KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 177K2F3E (measured Bandwidth) <u>614.025 MHz</u> 150KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 178K2F3E (measured Bandwidth) <u>622.000 MHz</u> 150KF3E (2x max. Audio Frequency + 2x max. FM Deviation) 178K2F3E (measured Bandwidth)

Antenna Type:	Integrated antenna
Power Supply:	2*1.5 V DC from AA LR6N Alkaline Battery
Temperature Range:	-30 °C to 50 °C
Occupied Bandwidth (99% BW) [kHz]:	178.3
Transmitter Spurious (worst case) [dBm]:	-38.35
IC Registration Number:	3628A-S600
FCC ID:	OSDS600
IC Standards:	RSS-123 Issue 1, Rev. 2 November 6, 1999

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:

Date: 2010-06-15

Test engineer: Meheza K. Walla

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.

This products fulfils also the requirements for CANADA RSS-123

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	3.00

Type of power source: **DC**

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
3.1.1	RF Power Output	pass
3.1.2	Frequency Stability	pass
3.1.3	Radiated Emissions	pass
3.1.4	Receiver Radiated Emissions	pass
3.1.6	Block Edge Compliance	pass
3.1.7	Occupied Bandwidth	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 was 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

$E \text{ (dBuV/m)} = \text{Reading (dBuV)} + \text{Total Correction Factor (dB/m)}$

(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

$E \text{ (dBuV/m)} = \text{Reading (dBuV)} + \text{Total Correction Factor (dB/m)}$

(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:
 $P = P1 - L1 = (P2 + L2) - L1 = P3 + A + L2 - L1$
 $EIRP = P + G1 = P3 + L2 - L1 + A + G1$
 $ERP = EIRP - 2.15 \text{ dB}$
 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)		598.000 MHz	607.975 MHz	614.025 MHz	622.000 MHz
T _{nom}	V _{nom}	3.00	6.30	7.10	9.00
Maximum deviation from output power under extreme test conditions (dBc)		±2.0 dB			
Measurement uncertainty		±3.0 dB			

Sample calculation:

Freq	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERP Result	ERP Result	
MHz	dBμV	dBm	dBi	dBd	dB	dBm	mW	
620.0	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, 614-698	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 2.2V to 3.1V and the maximum change in frequency was noted within one minute.

The temperature tests were performed for each frequency range on one channel.

598.000 MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
2.20	-200	-0,00003	-0,33445
2.40	-240	-0,00004	-0,40134
2.60	-180	-0,00003	-0,30100
2.80	-220	-0,00004	-0,36789
3.00	-210	-0,00004	-0,35117
3.10	-223	-0,00004	-0,37291

607.975 MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
2.20	120	0,00002	0,19836
2.40	240	0,00004	0,39671
2.60	185	0,00003	0,30580
2.80	200	0,00003	0,33059
3.00	220	0,00004	0,36365
3.10	240	0,00004	0,39671

614.025 MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
2.20	225	0,00004	0,36643
2.40	230	0,00004	0,37458
2.60	200	0,00003	0,32572
2.80	245	0,00004	0,39901
3.00	198	0,00003	0,32246
3.10	178	0,00003	0,28989

622.000 MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
2.20	-250	-0,00004	-0,40193
2.40	-155	-0,00002	-0,24920
2.60	-139	-0,00002	-0,22347
2.80	-175	-0,00003	-0,28135
3.00	-188	-0,00003	-0,30225
3.10	-202	-0,00003	-0,32476

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

598.000 MHz

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	355	0,00006	0,59365
-20	323	0,00005	0,54013
-10	300	0,00005	0,50167
±0,0	255	0,00004	0,42642
+10	244	0,00004	0,40803
+20	228	0,00004	0,38127
+30	222	0,00004	0,37124
+40	240	0,00004	0,40134
+50	220	0,00004	0,36789

607.975 MHz

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	359	0,00006	0,59048
-20	320	0,00005	0,52634
-10	255	0,00004	0,41943
±0,0	235	0,00004	0,38653
+10	222	0,00004	0,36515
+20	189	0,00003	0,31087
+30	180	0,00003	0,29606
+40	165	0,00003	0,27139
+50	159	0,00003	0,26152

614.025 MHz

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	260	0,00004	0,42344
-20	265	0,00004	0,43158
-10	285	0,00005	0,46415
±0,0	190	0,00003	0,30943
+10	248	0,00004	0,40389
+20	224	0,00004	0,36481
+30	218	0,00004	0,35503
+40	216	0,00004	0,35178
+50	230	0,00004	0,37458

622.000 MHz

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (%)	Frequency Error (ppm)
-30	550	0,00009	0,88424
-20	478	0,00008	0,76849
-10	387	0,00006	0,62219
±0.0	400	0,00006	0,64309
+10	422	0,00007	0,67846
+20	298	0,00005	0,47910
+30	258	0,00004	0,41479
+40	254	0,00004	0,40836
+50	244	0,00004	0,39228

LIMIT

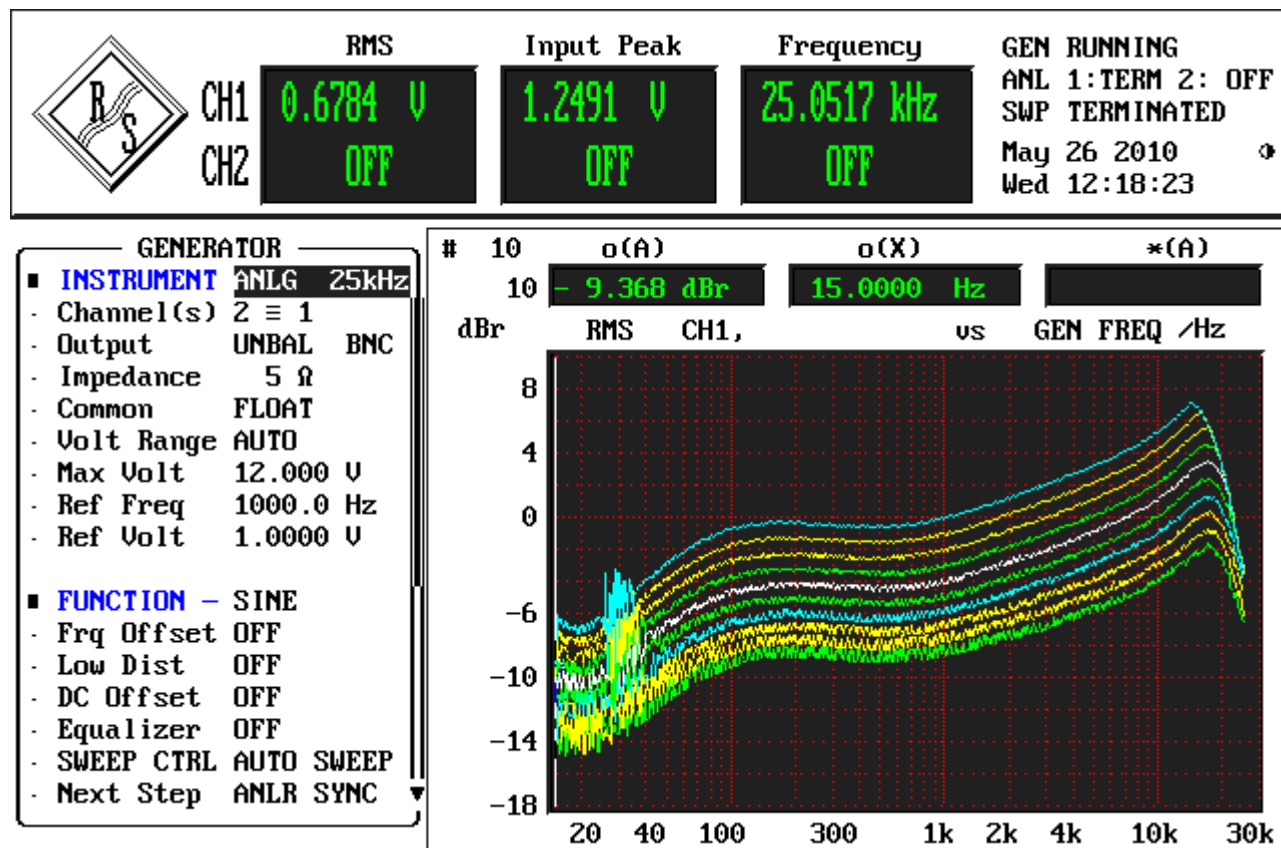
FCC Rule Part 74.861

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 : 60 kHz

This measurement is valid for all channels

Limit: max Deviation \pm 75kHz

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)			
		598.000 MHz	607.975 MHz	614.025 MHz	622.000 MHz
Frequency (MHz)		598.000 MHz	607.975 MHz	614.025 MHz	622.000 MHz
T _{nom}	V _{nom}	169.3	177.3	178.3	178.3
max. Deviation (FM)		60 kHz			
Measurement uncertainty		±0.5%			

Limits

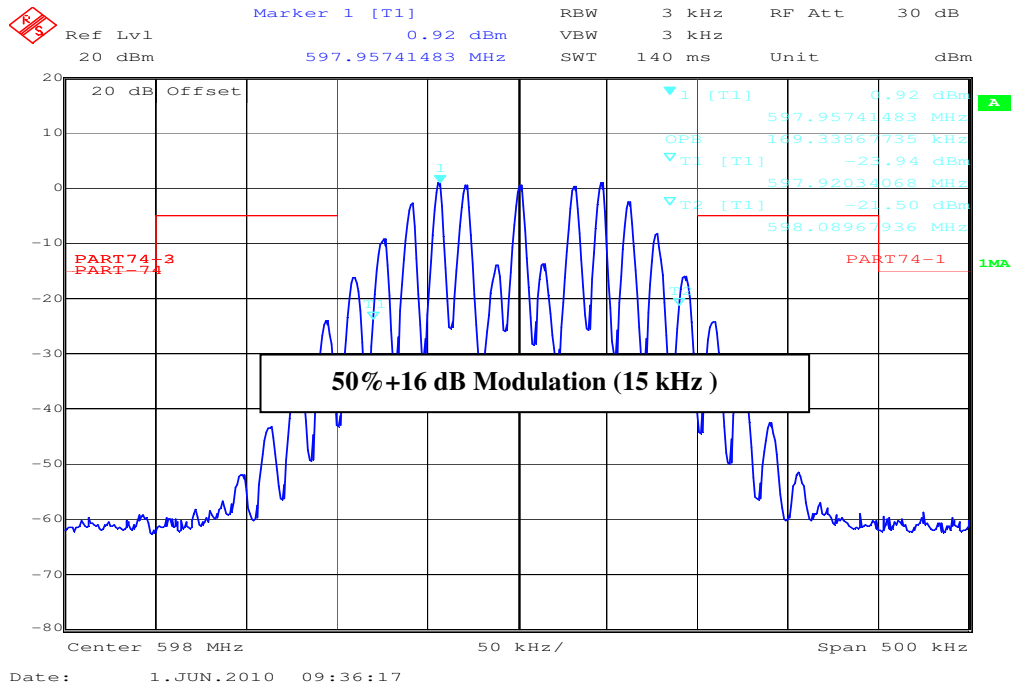
FCC Rule Part 74.861(e) (5)

The operating bandwidth shall not exceed 200 kHz

OCCUPIED BANDWIDTH

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

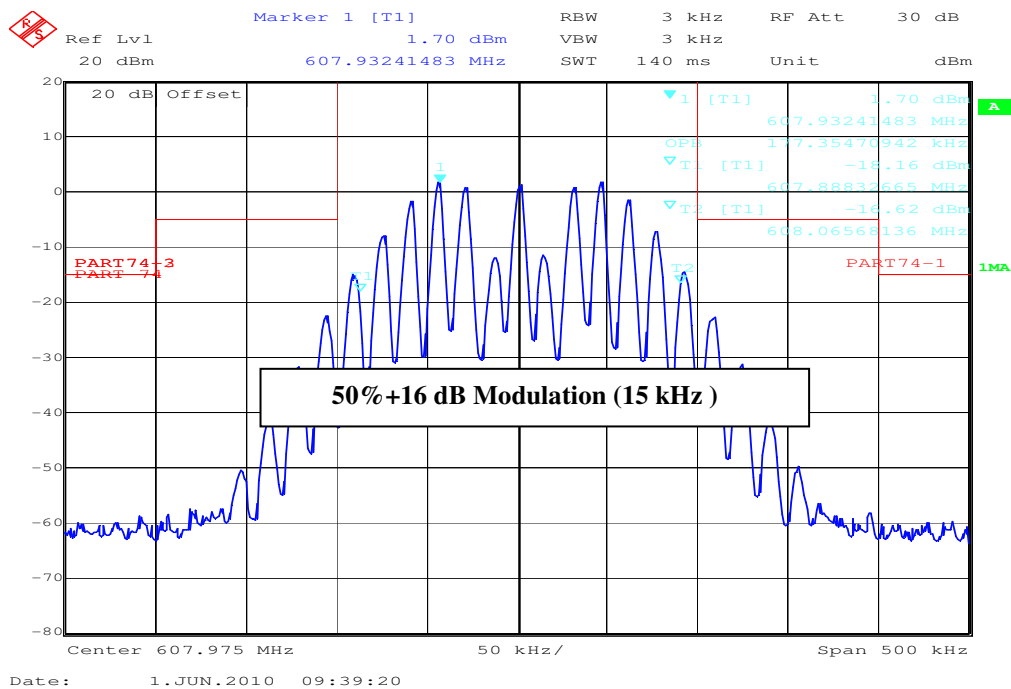
Frequency: 598.000 MHz / max. deviation: ± 60 kHz (Limit ± 75 kHz)



OCCUPIED BANDWIDTH

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

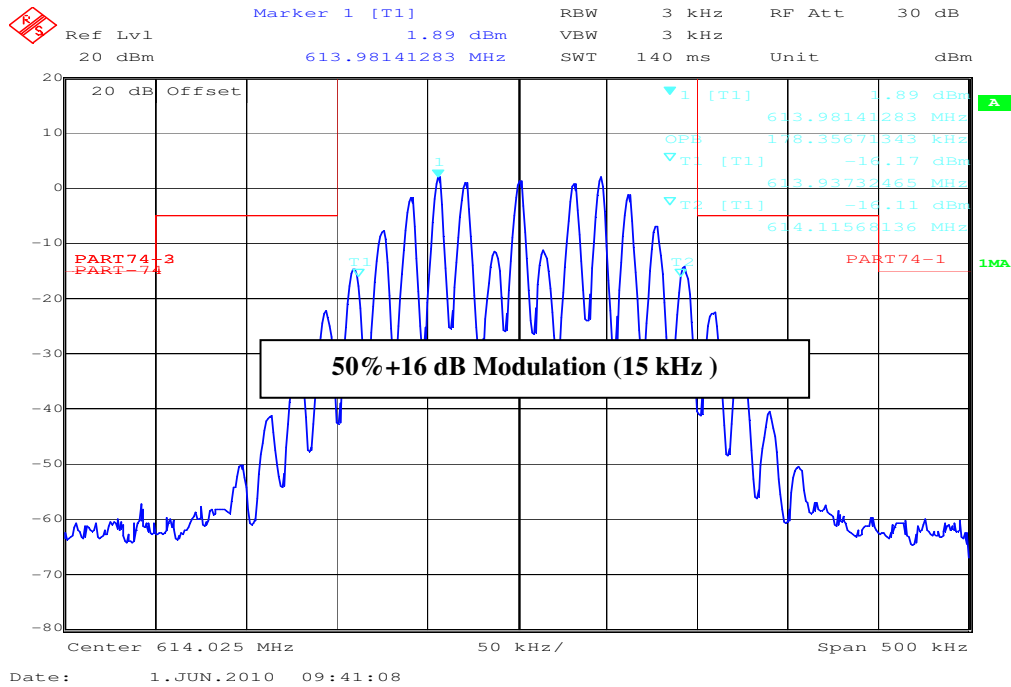
Frequency: 607.975 MHz / max. deviation : ± 60 kHz (Limit ± 75 kHz)



OCCUPIED BANDWIDTH

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

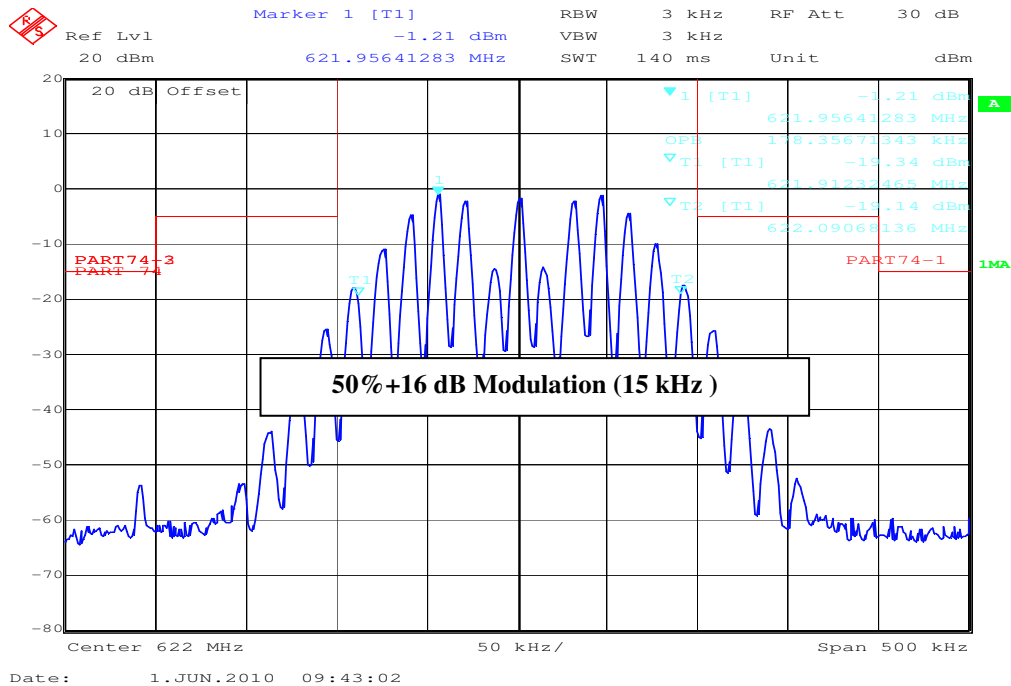
Frequency: 614.025 MHz / max. deviation : ± 60 kHz (Limit ± 75 kHz)



OCCUPIED BANDWIDTH

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

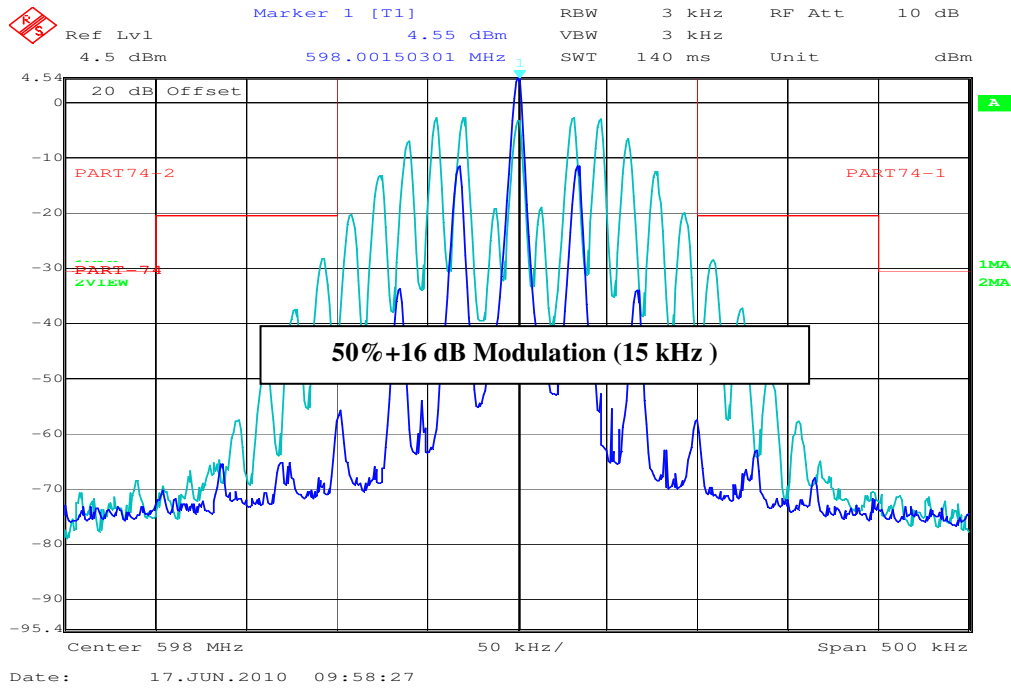
Frequency: 622.000 MHz / max. deviation : ± 60 kHz (Limit ± 75 kHz)



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

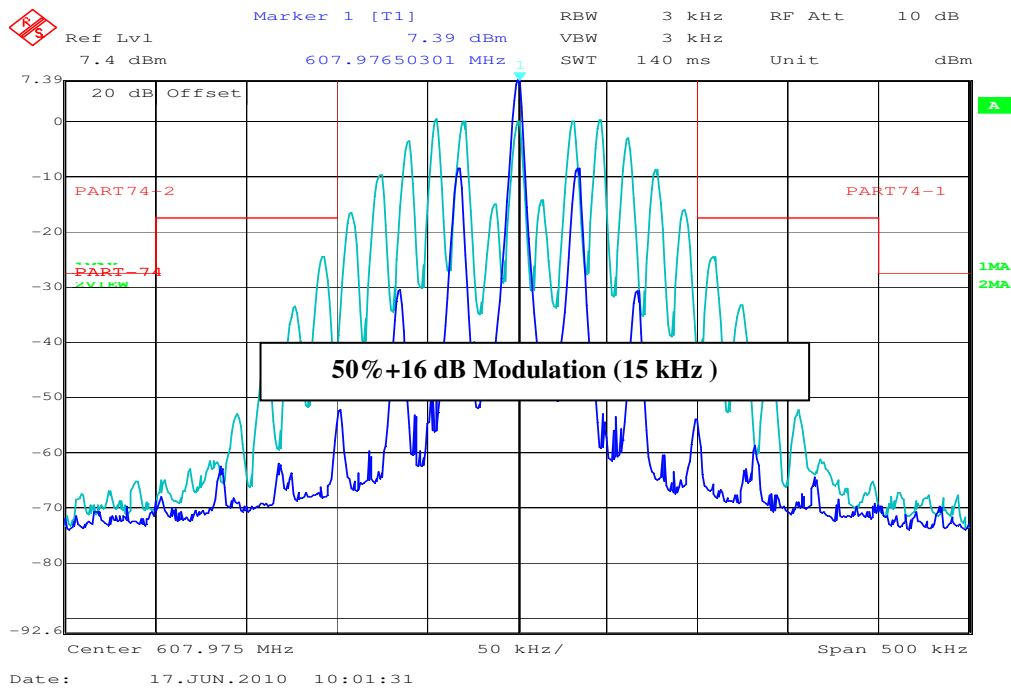
Emission mask
Frequency: 598.000 MHz

FCC 74 861(e)(6)



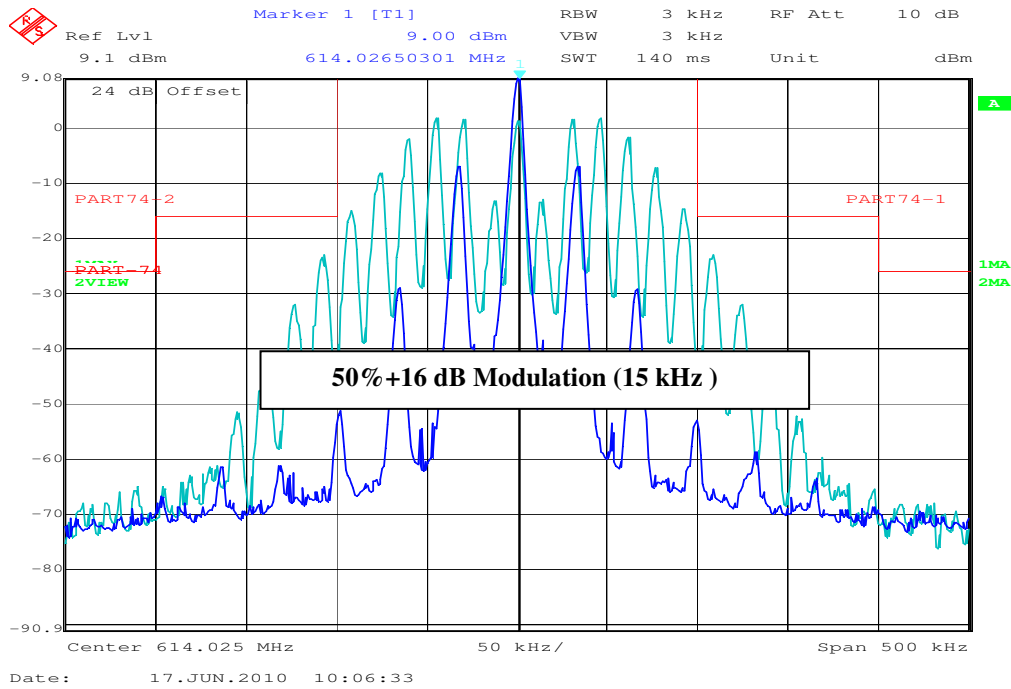
Emission mask
Frequency: 607.975 MHz

FCC 74 861(e)(6)



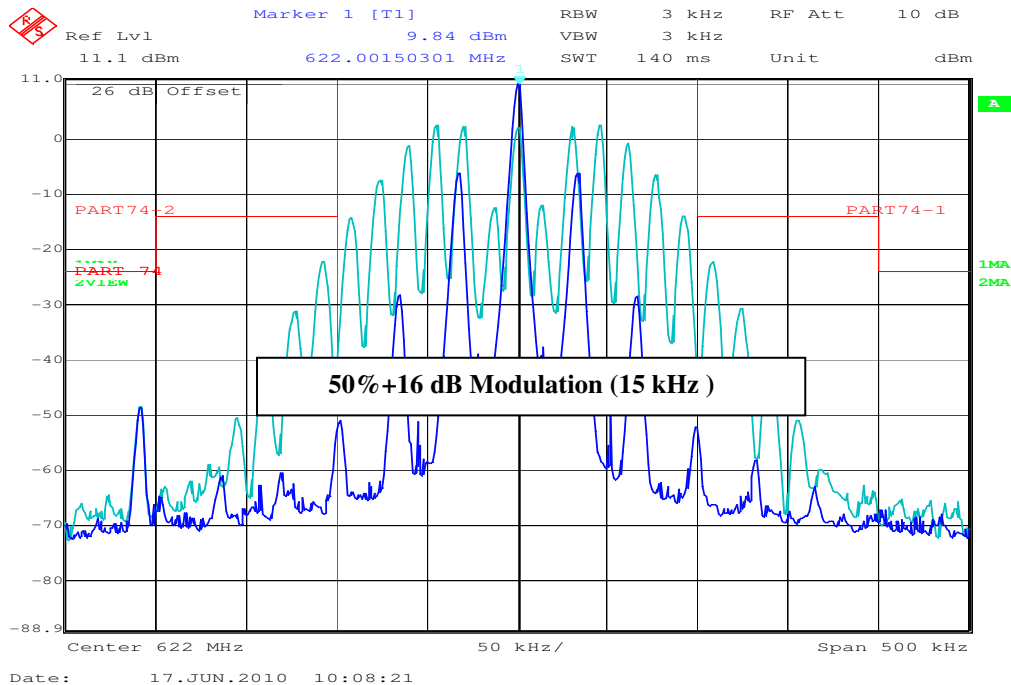
Emission mask
Frequency: 614.025 MHz

FCC 74 861(e)(6)



Emission mask
Frequency: 622.000 MHz

FCC 74 861(e)(6)



Limits

FCC Rule Part 74.861(e)(6)

$f \pm 100 \text{ kHz}$ to $f \pm 200 \text{ kHz}$	$f \pm 200 \text{ kHz}$ to $f \pm 500 \text{ kHz}$	$f \pm 500 \text{ kHz}$
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 then 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 attenuator 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

Frequency	SA Reading	SG Setting	Ant. gain	Dipole gain	Cable loss	ERP Result	Limit	Margin	Pol
MHz	dB μ V	dBm	dBi	dBd	dB	dBm	dBm	dBm	H/V
No critical peaks found!									
All results worst case									

Limits

FCC Rule Part 74.861(e)(6)

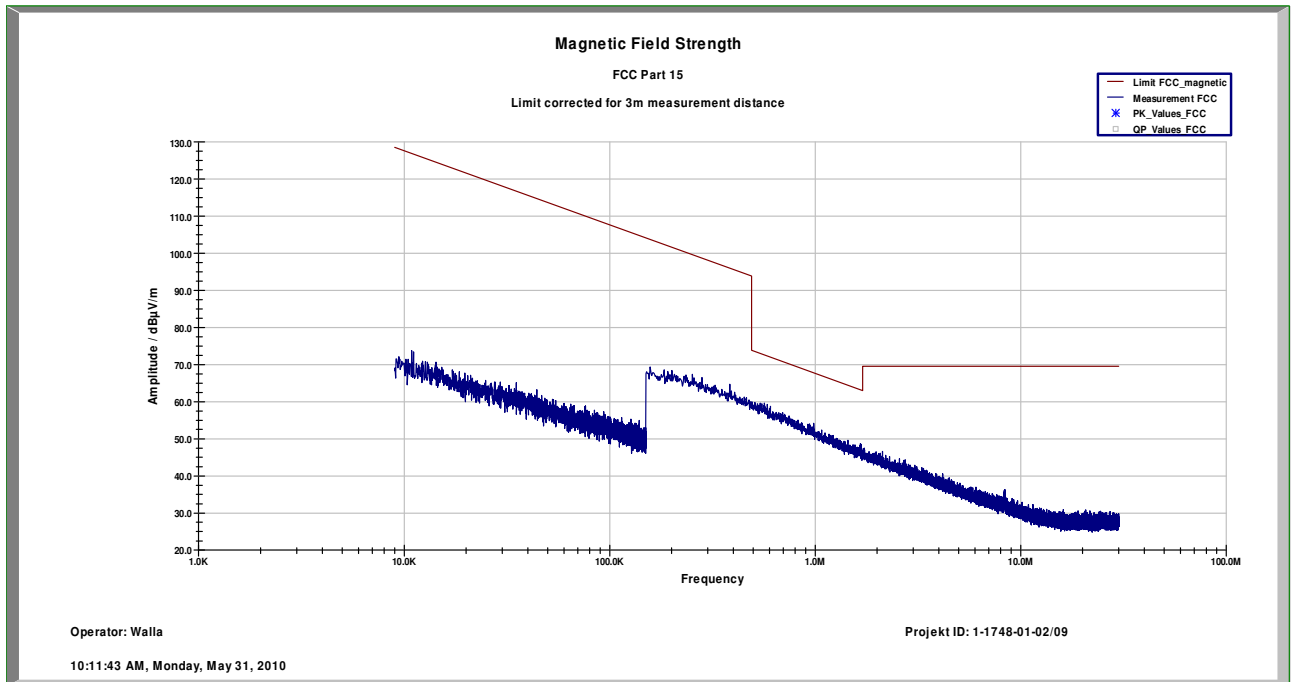
$f \pm 100$ kHz to $f \pm 200$ kHz	$f \pm 200$ kHz to $f \pm 500$ kHz	$f \pm 500$ kHz
25 dBc	35 dBc	-43 +10 log ₁₀ (mean output power in watts) dB below the mean output power

5.7.2 Plots of the measurements

RADIATED EMISSIONS (*Part 15.209 Magnetics*)

FCC Rule Part 74 subpart H

Plot 1: < 30 MHz (This plot is valid for all channels)

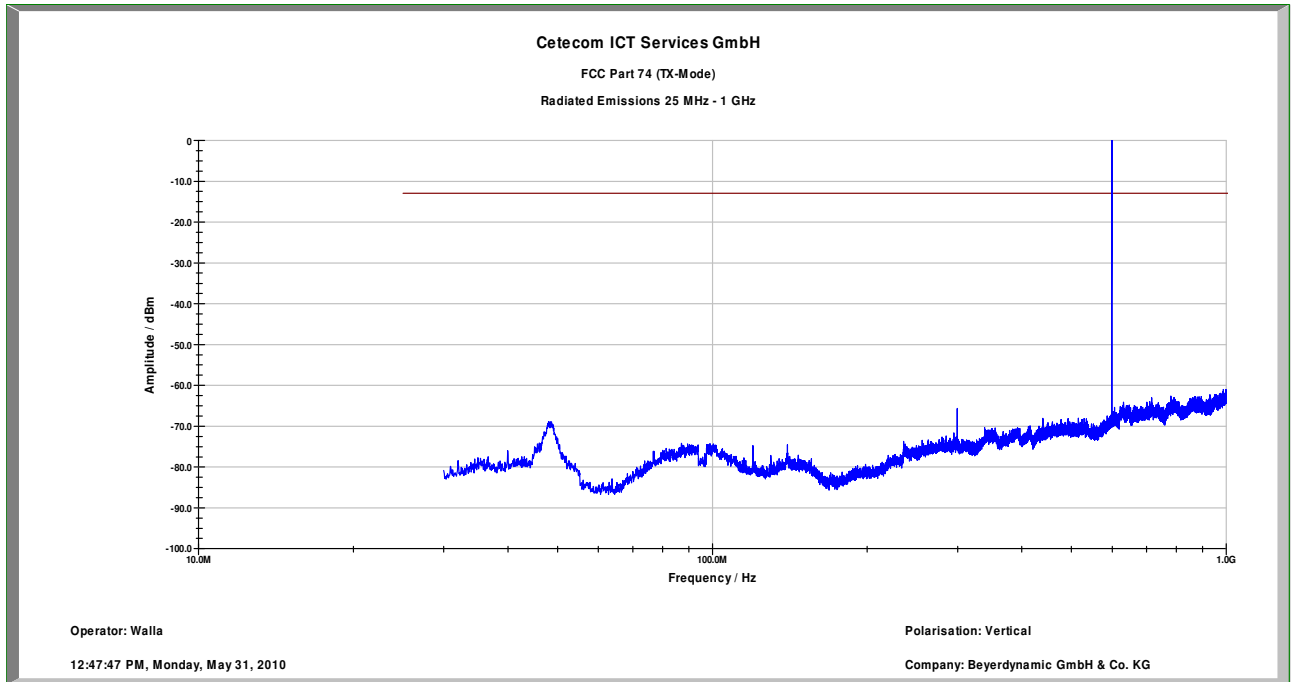


RADIATED EMISSIONS (30 MHz – 12 GHz)

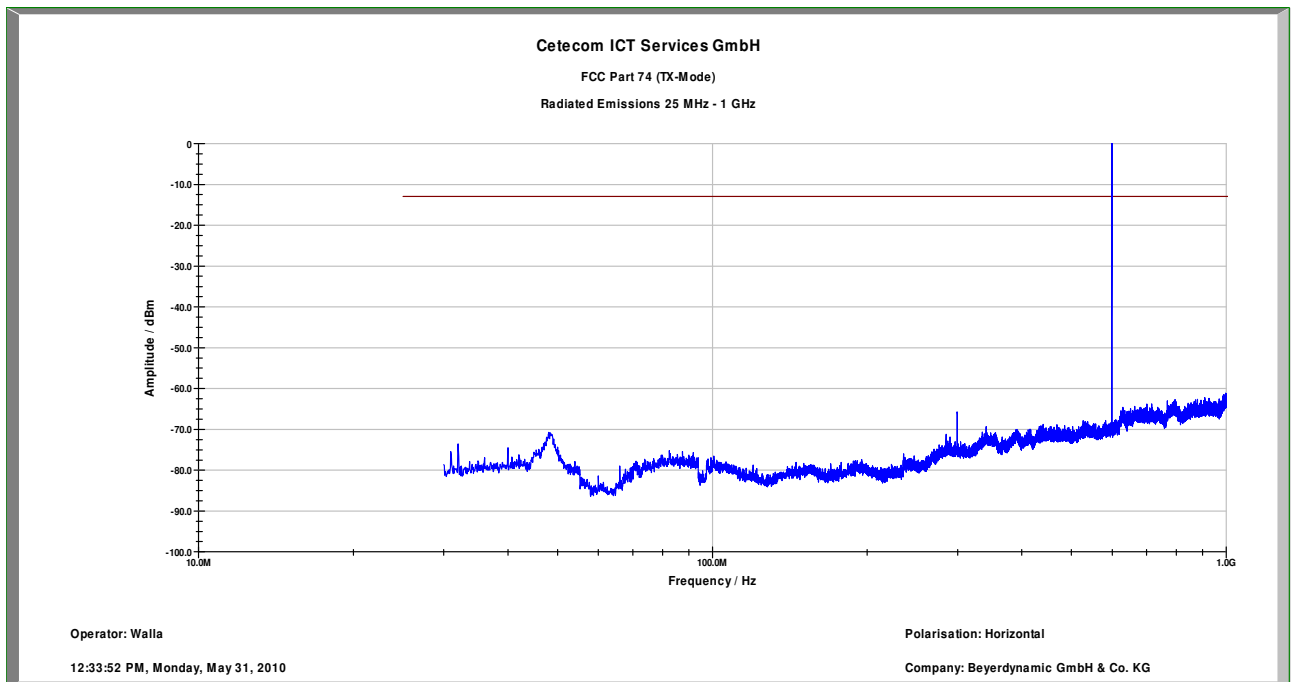
FCC Rule Part 74 subpart H

598 MHz:

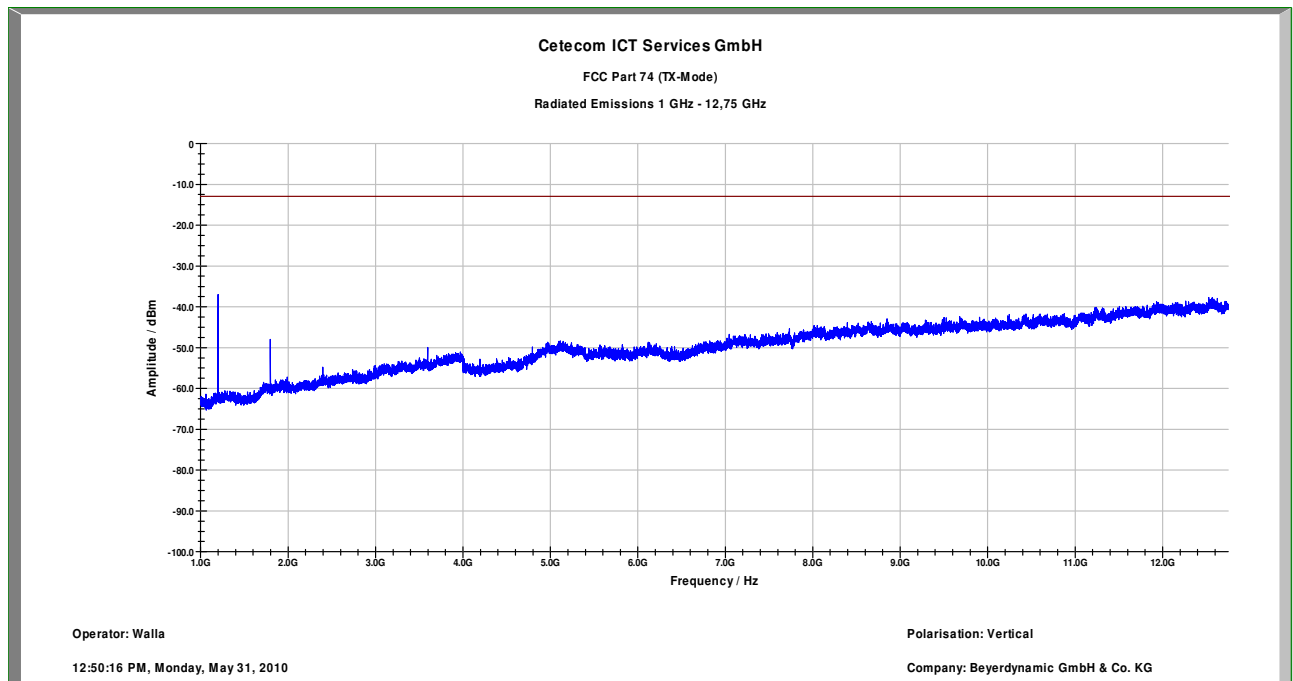
Plot 2: 0.03 – 1 GHz, antenna vertical



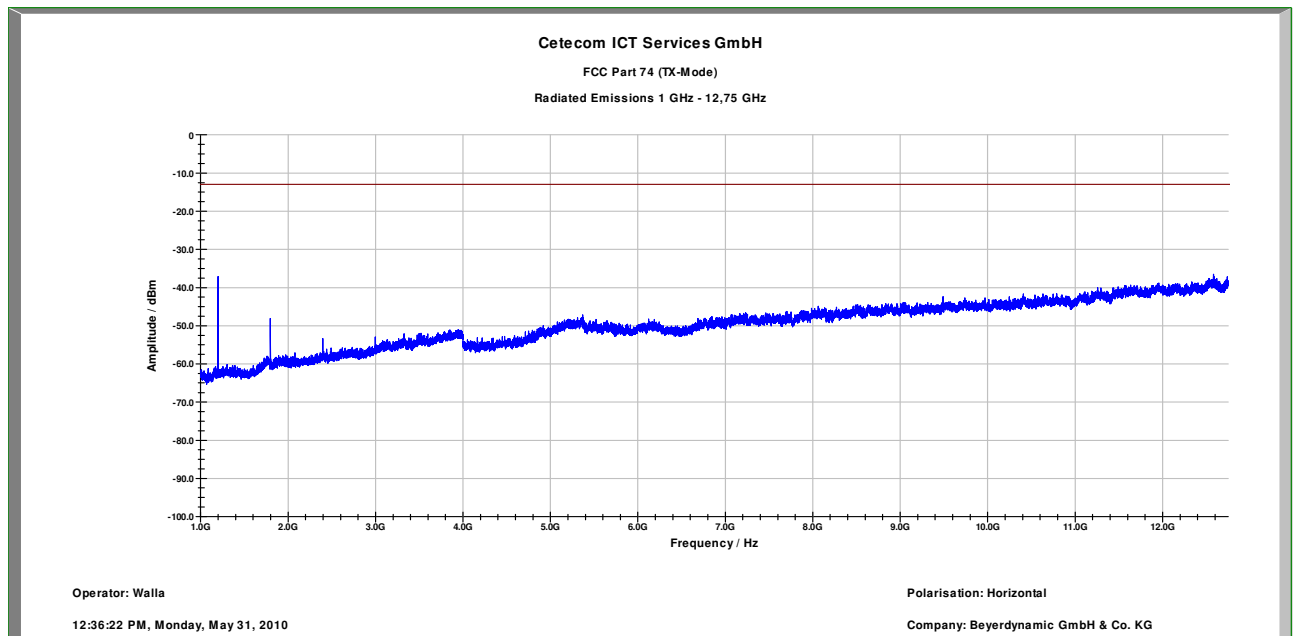
Plot 3: 0.03 – 1 GHz, antenna horizontal



Plot 4: 1 – 12 GHz, antenna vertical

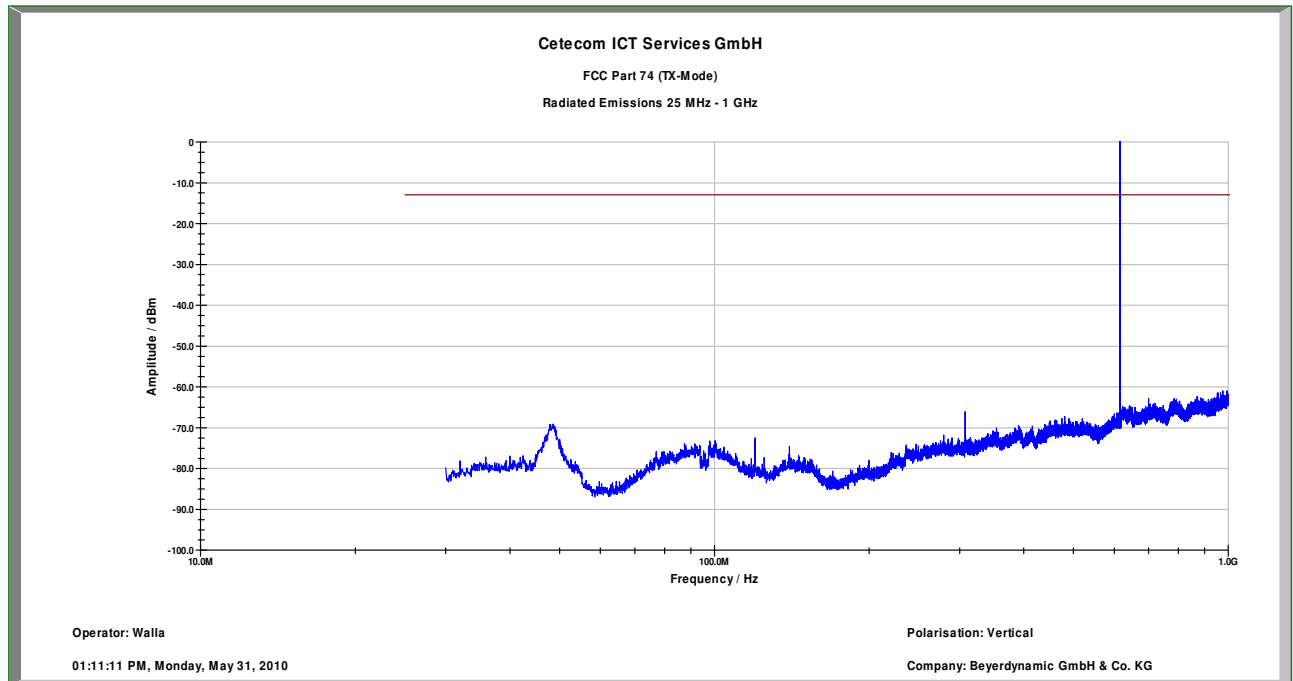


Plot 5: 1 – 12 GHz, antenna horizontal

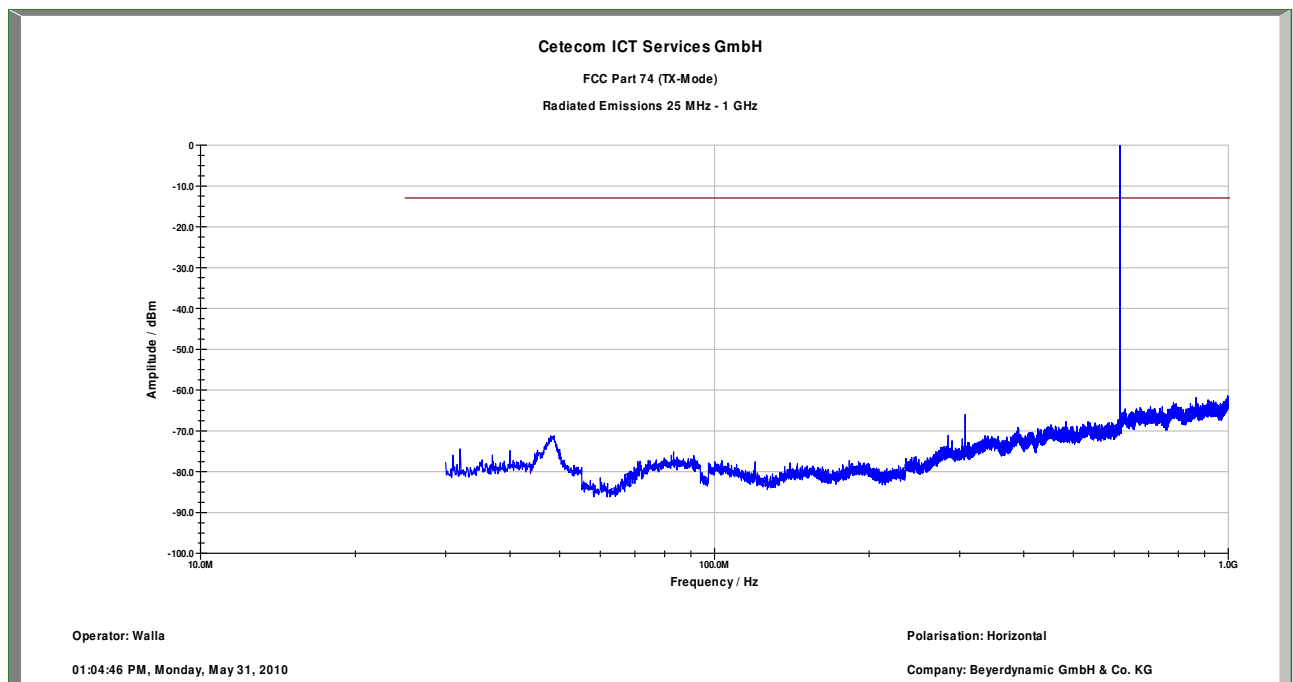


615 MHz:

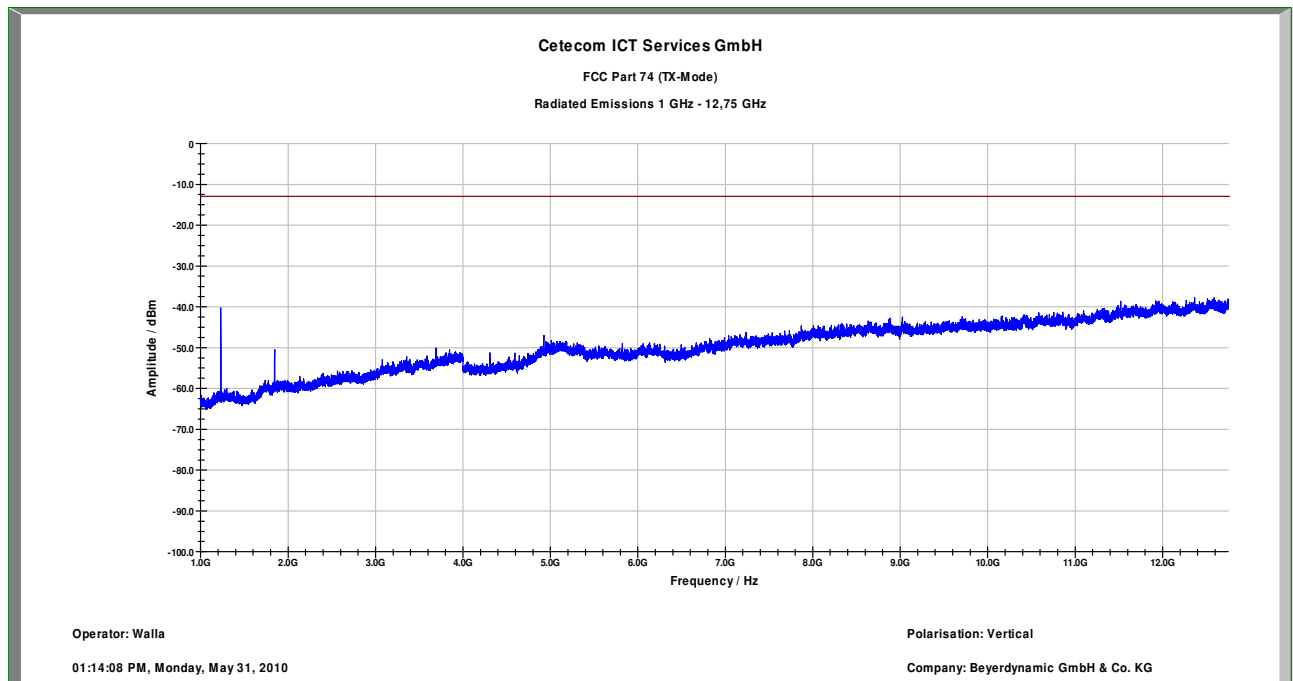
Plot 6: 0.03 – 1 GHz, antenna vertical



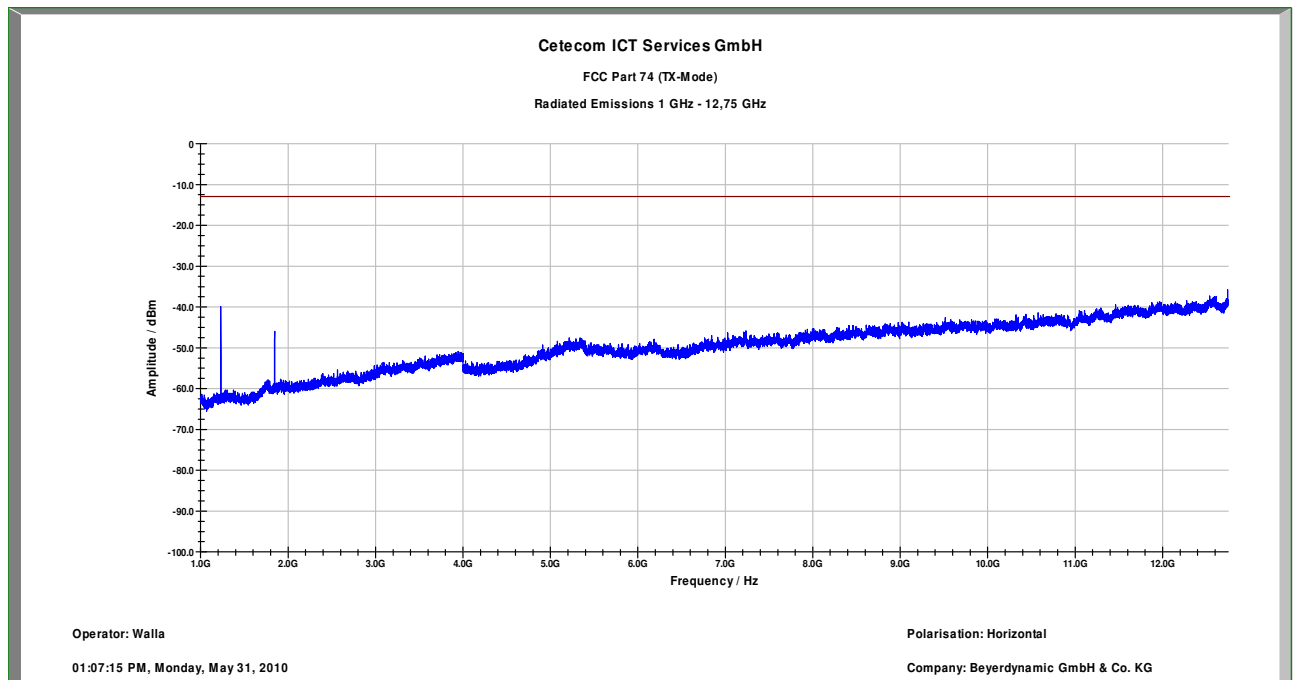
Plot 7: 0.03 – 1 GHz, antenna horizontal



Plot 8: 1 – 12 GHz, antenna vertical

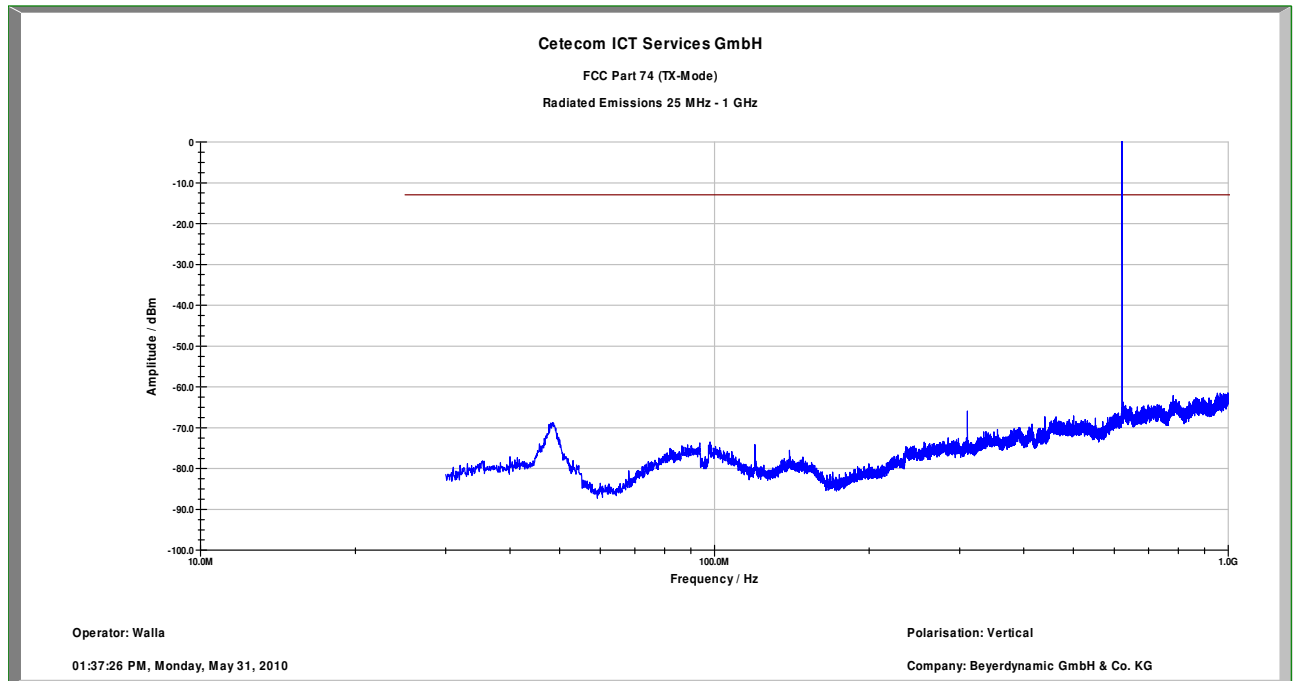


Plot 9: 1 – 12 GHz, antenna horizontal

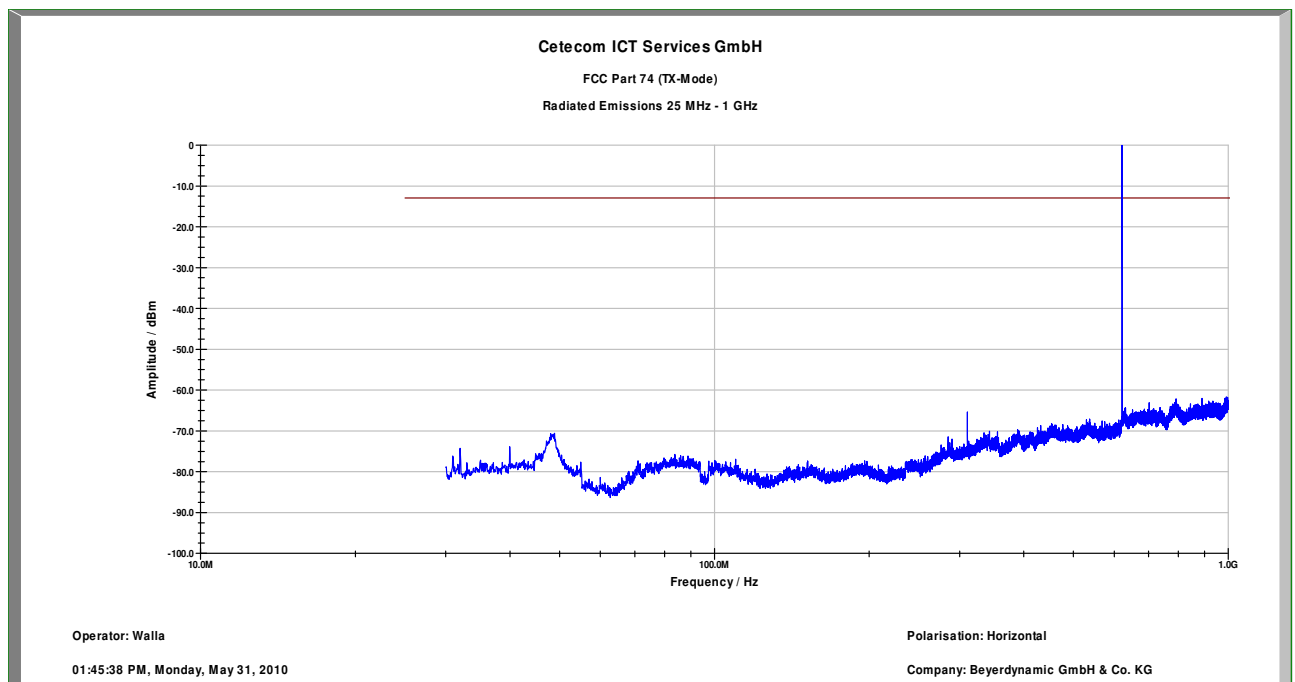


622 MHz:

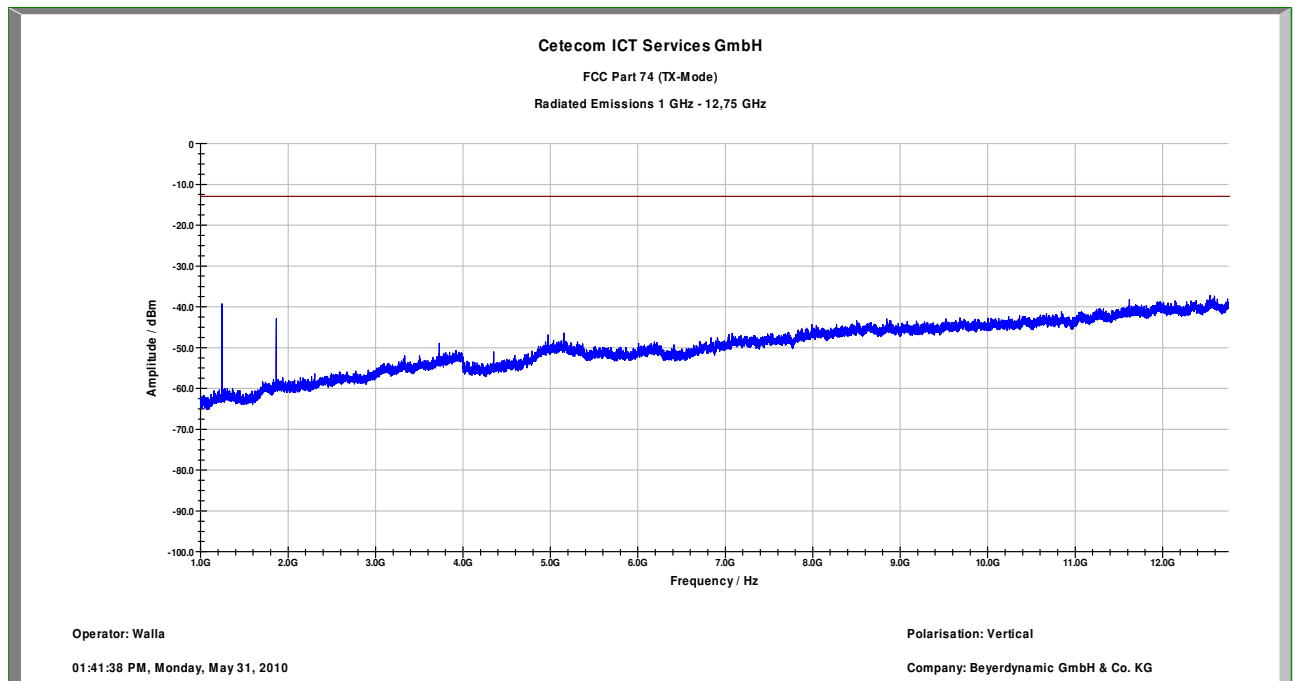
Plot 10: 0.03 – 1 GHz, antenna vertical



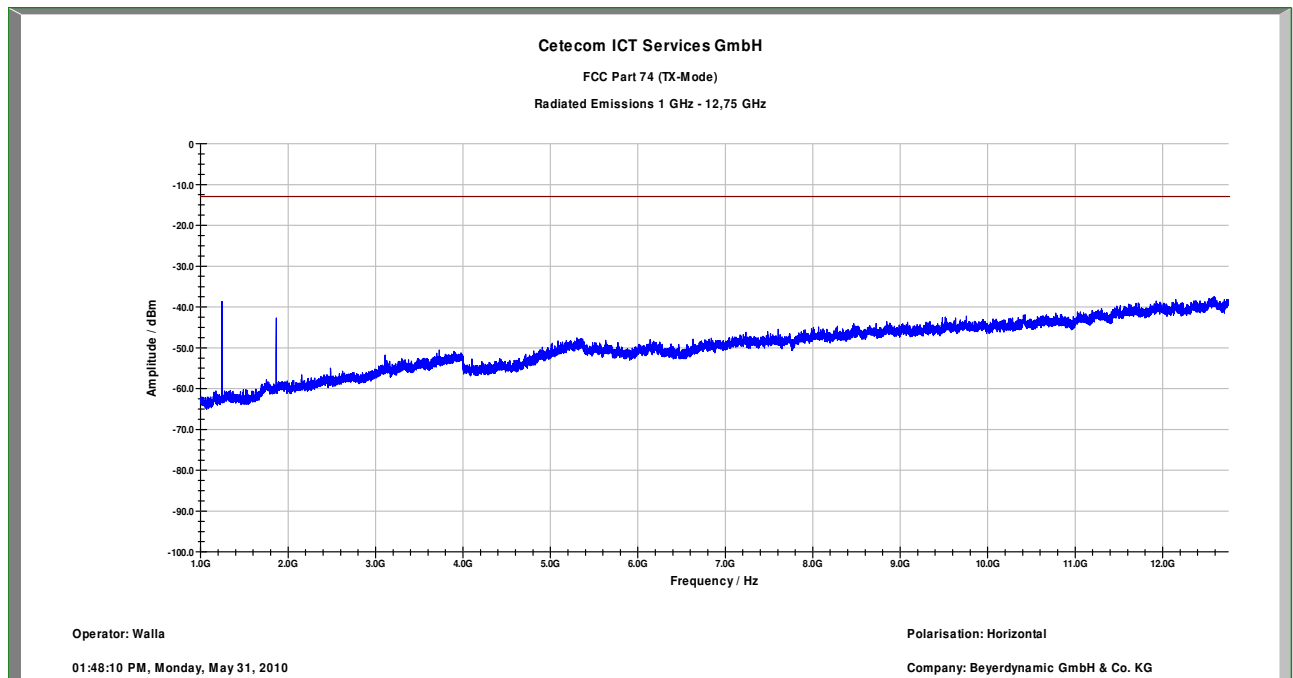
Plot 11: 0.03 – 1 GHz, antenna horizontal



Plot 12: 1 – 12 GHz, antenna vertical



Plot 13: 1 – 12 GHz, antenna horizontal



6 Test equipment and ancillaries used for tests

In order to simplify the identification of the equipment used at each specific test, each item of test equipment and ancillaries are provided with an identifier or number in the equipment list below.

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

No.	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Last Calibration	Next Calibration
1	PowerAttenuator	8325	Byrd	1530	300001595		
2	Double-Ridged Waveguide Horn Antenna 1-26.5GHz	3115	EMCO	8812-3088	300001032	05.03.2009	05.03.2011
3	Active Loop Antenna	6502	EMCO	2210	300001015		
4	Anechoic chamber		MWB	87400/02	300000996		
5	System rack for EMI measurement solution	85900	HP I.V.	*	300000222		
6	Artificial Mains 9 kHz to 30 MHz, 4 x 25 Ampere	ESH3-Z5	R&S	828576/020	300001210	06.01.2010	06.01.2012
7	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156		
8	Relais Matrix	PSU	R&S	890167/024	300001168		
9	Isolating Transformer	RT5A	Grundig	9242	300001263		
10	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997		
11	Switch / Control Unit	3488A	HP	2605e08770	300001443		
12	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350		
13	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351		
14	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451		
15	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492		
16	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255		
17	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789		
18	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	05.08.2008	05.08.2010
19	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	06.08.2008	06.08.2010
20	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	19.08.2008	19.08.2010
21	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	17.12.2008	17.12.2010
22	Radiocom. Analyzer	CMTA 54	R&S	894043/010	300001175	06.06.2007	

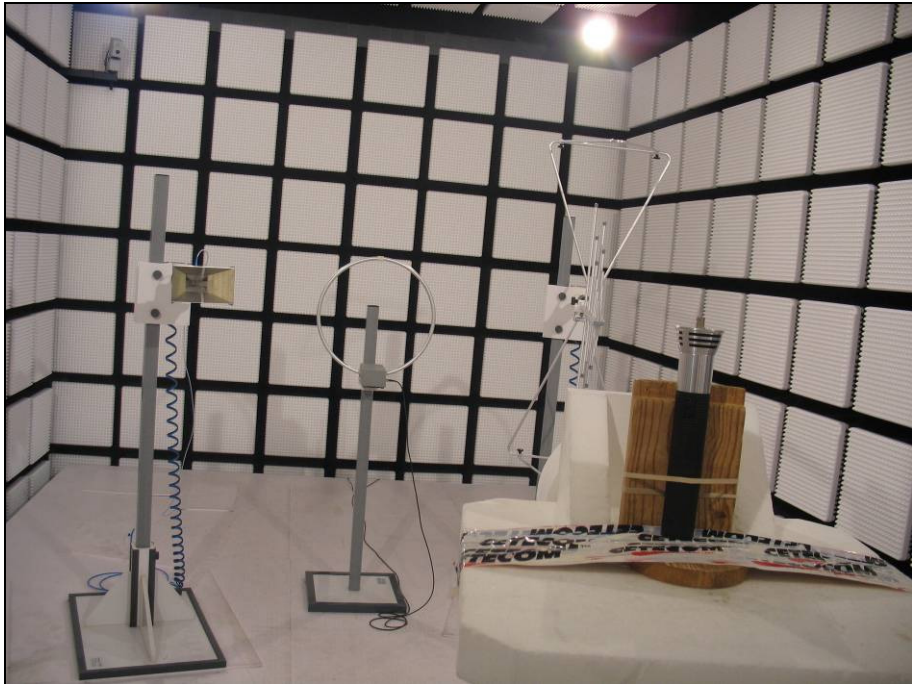
23	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04590	300001041	08.01.2009	08.01.2012
24	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	28.05.2009	28.05.2011
25	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	08.01.2010	08.01.2012
26	Signal Analyzer 20Hz-26,5GHz- 150 to + 30 DBM	FSiQ26	R&S	835111/0004	300002678	06.01.2009	06.01.2011

7 Photographs of the Test Set-up

Photo 1:



Photo 2:



8 Photographs of the EUT

Photo 3:



Photo 4:



Photo 5:



Photo 6:

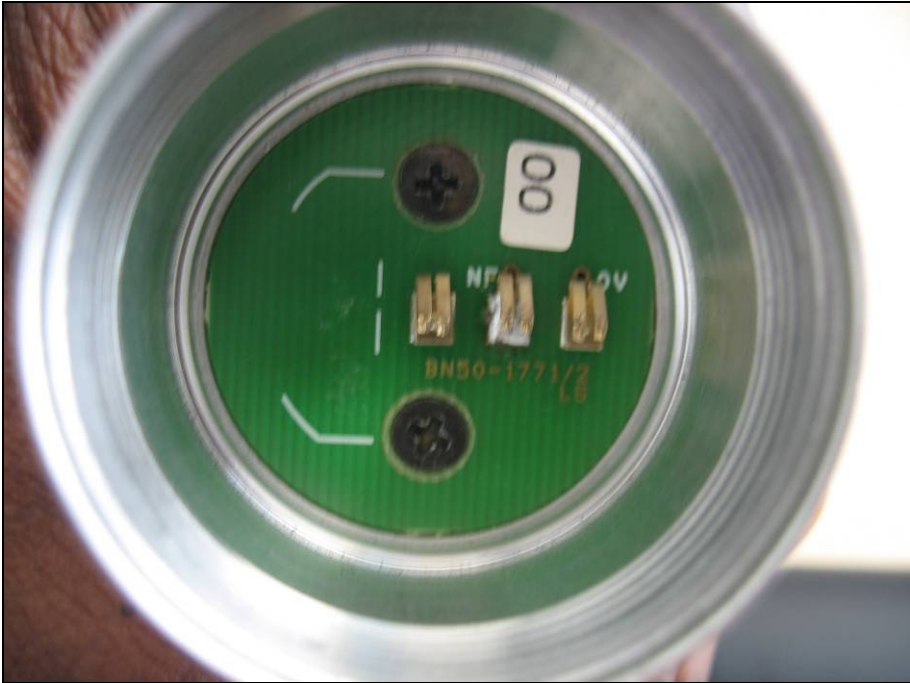


Photo 9:

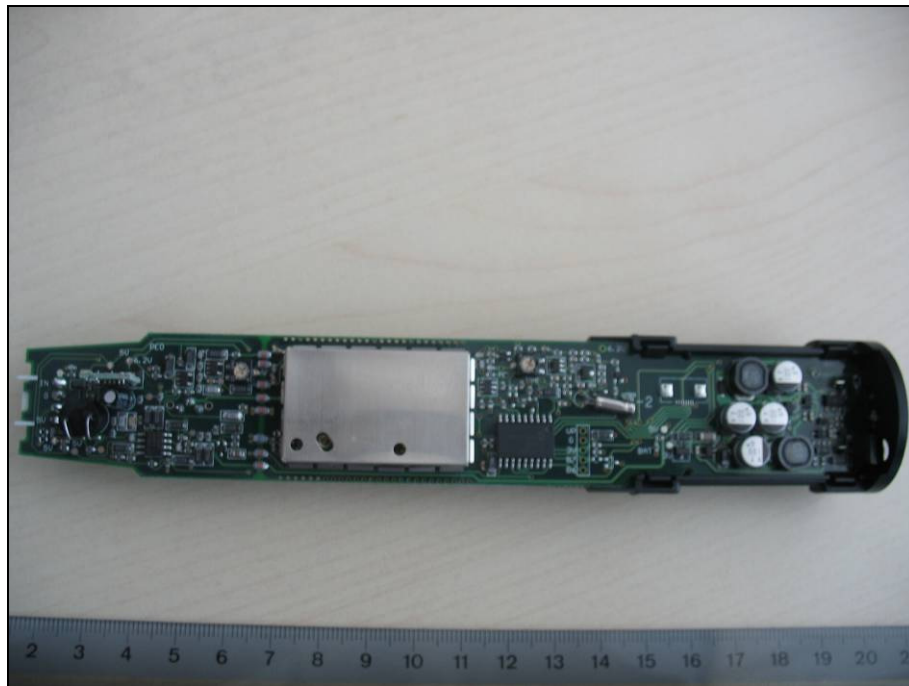


Photo 10:

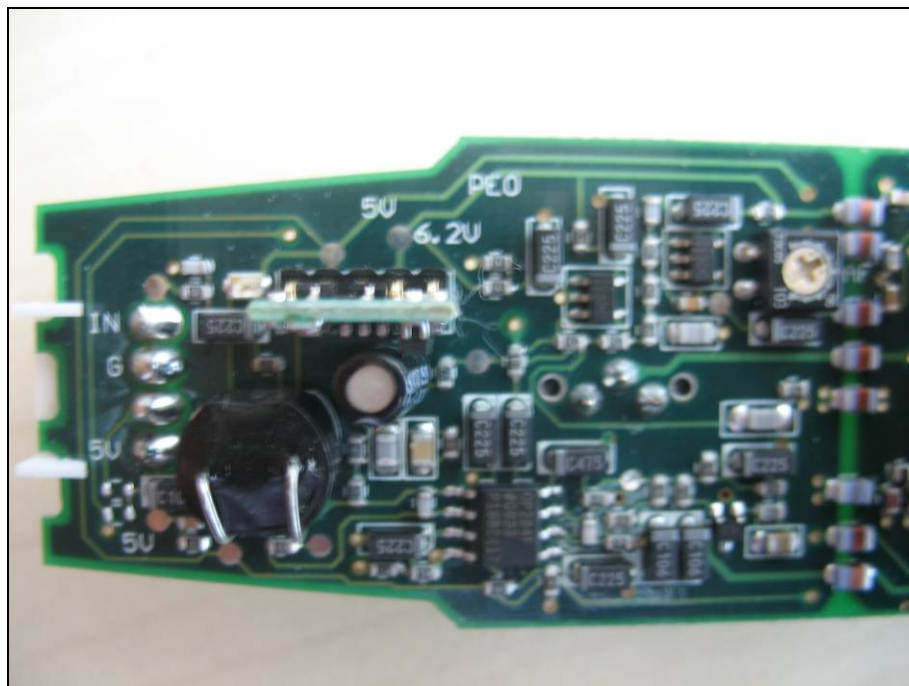


Photo 11:

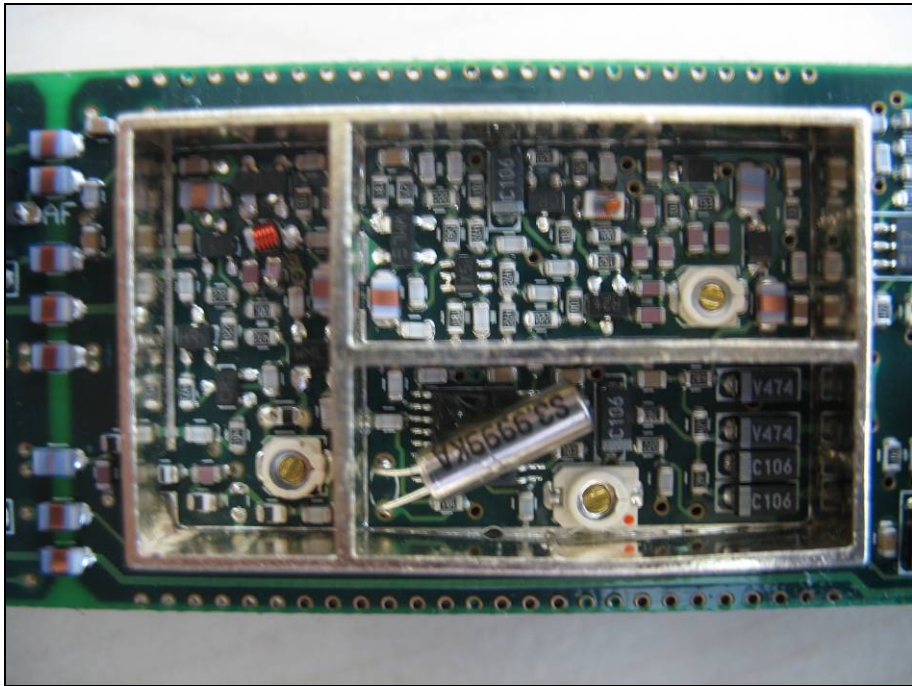


Photo 12:

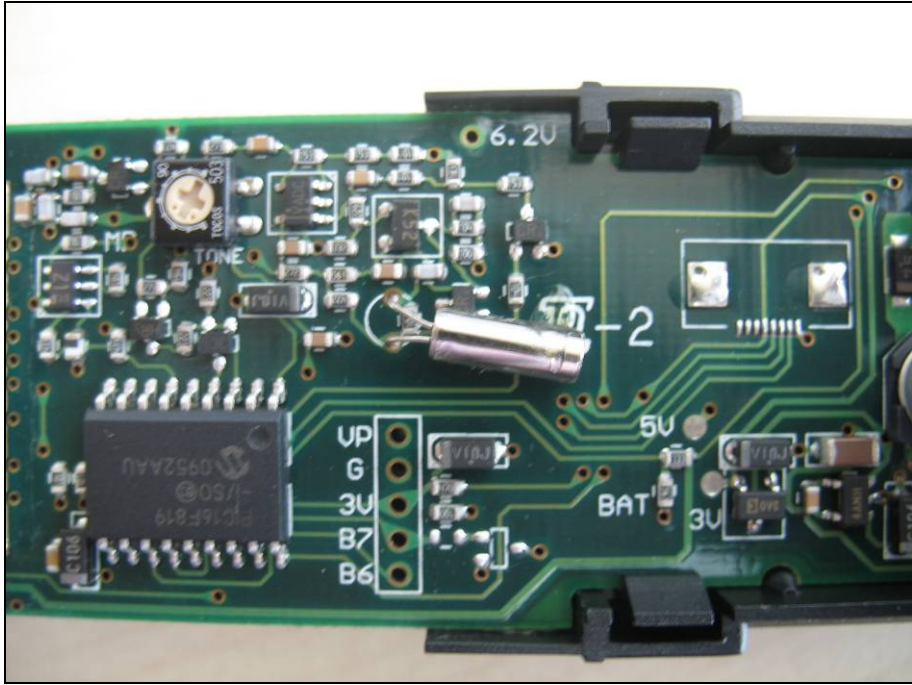


Photo 13:

