CETECOM ICT Services GmbH
Untertürkheimer Str. 6-10, 66117 Saarbruecken Phone: +49 (0) 681 598-0 Fax: -9075
RSC-Laboratory Phone: +49 (0) 681 598-0 Fax: -9075

Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: IC 3463A-1
TCB ID: DE 0001

Accredited by the
German Accreditation Council
DAR–Registration Number
DAT-P-176/94-D1

Independent ETSI
compliance test house

Accredited Bluetooth® Test Facility (BQTF)

Test report no.	**:**	**2-4503-03-02/06**
Applicant	**:**	**HBC-radiomatic GmbH**
Type	**:**	**TC64125**
Test Standard	**:**	**FCC Part 90** **RSS 119 Issue 9**
FCC ID	**:**	**NO9TC64125**
Certification No. IC	**:**	**2977A-TC64125**

Table of contents

1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Harro Ames Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

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Responsible for testing
(Stefan Bös)

1.1.2 Organizational items

Reference No.:	2-4503-03-02/06
Order No.:	
Receipt of EUT:	2007-01-22
Date(s) of test:	2007-01-22 to 2007-05-31
Date of report:	2007-06-04
Number of report pages:	45
Version of template: 1.8	

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Responsible for laboratory
(Harro Ames)

Note:
The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations 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.

During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.3 Applicant´s details

Applicant´s name:	HBC-radiomatic GmbH
Address:	Haller Strasse 47-53 74564 Crailsheim Germany
Contact person:	Mr. Hahn Phone: +49 (0) 7951-393725 Fax: +49 (0) 7951-393723 email: dhahn@radiomatic.com

1.2 Administrative data of manufacturer / member

Manufacturer´s name:	same as applicant
Address:	

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Product name	:	TC64125
Product ID	:	TC64125
Description	:	Transceiver module
S/N serial number	:	-
HW hardware status	:	-
SW software status	:	-
Frequency Band [MHz]	:	456.01875 MHz – 464.98125 MHz
Type of Modulation	:	9K12F1D
Number of channels	:	718/12.5kHz
Antenna	:	MMCX-Antennaconnector with Whip-antenna
Power Supply	:	6.4 V DC
Temperature Range	:	-20°C - +70°C

Max. power radiated:	+4.94 dBm
Max. power conducted:	+7.37 dBm

FCC ID:	NO9TC64125
IC:	2977A-TC64125

1.3.2 If RF component testing only, describtion of additional used HW/SW

	Product name	Product ID	Description	S/N serial number	HW hardware status	SW software status
1						
2						
3						
4						

1.3.3 Additional EUT information For IC Canada (appendix 2)

Company Number:	2977A
Model Name:	TC64125
Manufacturer (complete Adress):	HBC-radiomatic GmbH Haller Strasse 47-53 74564 Crailsheim Germany
Tested to Radio Standards Specification (RSS) No.:	RSS-119 Issue 9
Open Area Test Site Industry Canada Number:	IC 3463A-1
Frequency Range (or fixed frequency) [MHz]:	456.01875 MHz – 464.98125 MHz
RF: Power [W] (max):	Rad. ERP: 3.12 mW Conducted : 5.46 mW
Antenna Type:	MMCX-Antennaconnector with Whip-antenna
Type of Modulation:	9K12F1D
Emission Designator (TRC-43):	9K12F1D

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 the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:

Date: 2007-06-04

Testengineer: Stefan Bös

2. Teststandard & summary list of all performed test cases

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 90 - CANADA RSS 119 Issue 9	PASS	2007-06-04	

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
§ 90.203	Spectrum efficiency	Yes			
§ 90.205 / § 2.1046 RSS119 Issue 9 – 5.4	Maximum Peak Output Power (conducted)	Yes			
	Maximum Peak Output Power (radiated)	Yes			
§ 90.207 / § 2.1047 RSS119 Issue 9 – 5.2	Type of emissions	Yes			
§ 90.209 / § 2.1049 RSS119 Issue 9 – 5.5	Bandwidth limitations	Yes			
§ 90.210 RSS119 Issue 9 – 5.8	Emission mask	Yes			
§ 90.212	Scrambling			Yes	
§ 90.213 / § 2.1055 RSS119 Issue 9 – 5.3	Frequency Stability vs. Voltage	Yes			
§ 90.213 / § 2.1055 RSS119 Issue 9 – 5.3	Frequency Stability vs. Temperature	Yes			
§ 90.214 RSS119 Issue 9 – 5.9	Transient Frequency Behavior	Yes			
§ 2.1051 RSS119 Issue 9 – 5.8	Spurious Emissions - conducted	Yes			
§ 2.1053 RSS119 Issue 9 – 5.8	Spurious Emissions - radiated	Yes			

3. RF measurement testing

3.1 Description of test set-up

3.1.1 Radiated measurements

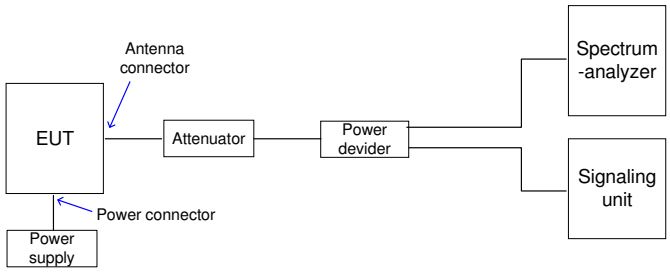
Description:

Measuring of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:
Center Frequency : equal to the signal source
Resolution BW: 10 kHz for f < 1 GHz, 1 MHz for f > 1 GHz
Video BW: 300 kHz for f < 1 GHz, 3 MHz for f > 1 GHz
Detector Mode : positive
Average : off
(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 antenna (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 it's 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 calculate 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.

3.1.2 Conducted measurements

The EUT´s RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is connected to the spectrum analyzer. The specific losses of the signal path is first checked within a calibration. The measuerment readings on the spectrum analyzer are corrected by the specific test set-up loss. The attenuator and the spectrum analyzer are impedance matched on 50 Ohm.



3.2 Spectrum efficiency § 90.203

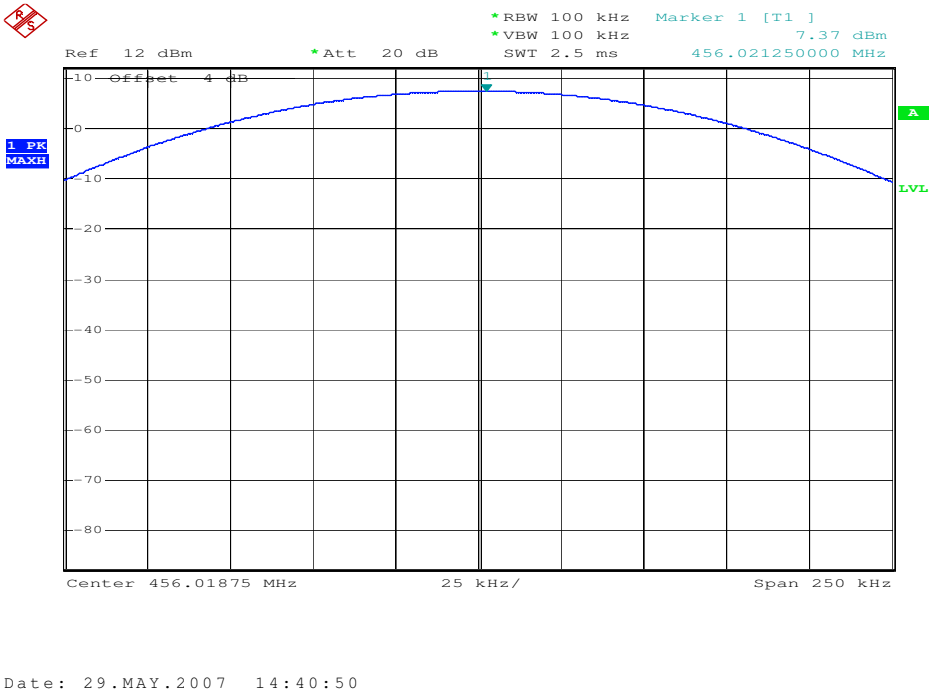
Multi-bandwidth mode equipment with a maximum channel bandwidth of 12.5 kHz with the capability of operating on channels of 6.25 kHz according to § 90.203 (4) (ii).	**Pass**

3.3 Maximum Peak Output Power (conducted) § 90.205 / 2.1046 / RSS119 - 5.4

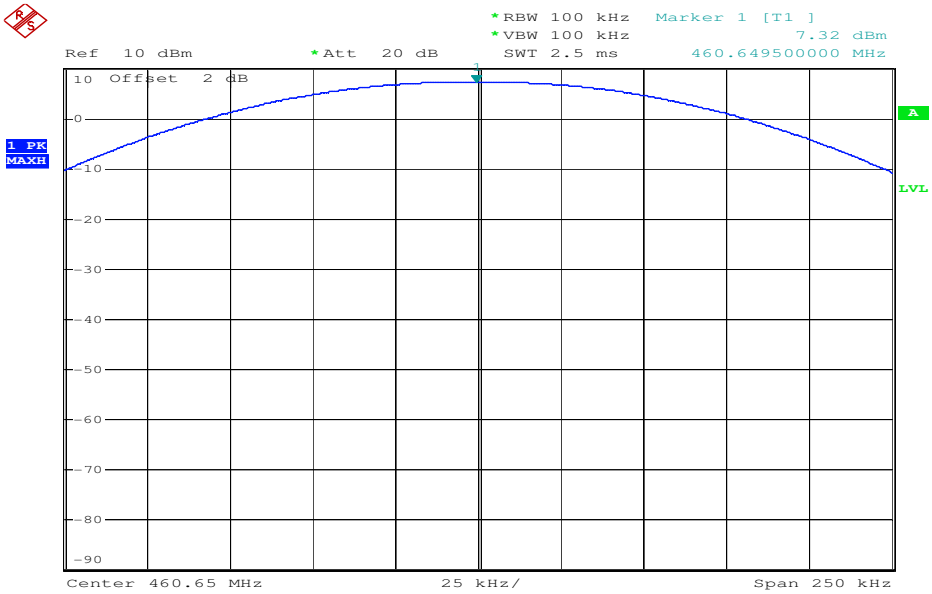
TEST CONDITIONS			**MAXIMUM PEAK OUTPUT POWER (mW)**		
Frequency (MHz)			**456.01875**	**460.65000**	**464.98125**
T_{nom}(23)°C	**V_{nom}(6.4)V**	**Max**	**5.46**	**5.40**	**4.04**
Measurement uncertainty			**±3dB**		

RBW / VBW : 100 kHz

Plot 1: Peak output power 456.01875 MHz (conducted)



Plot 2: Peak output power 460.65000 MHz (conducted)



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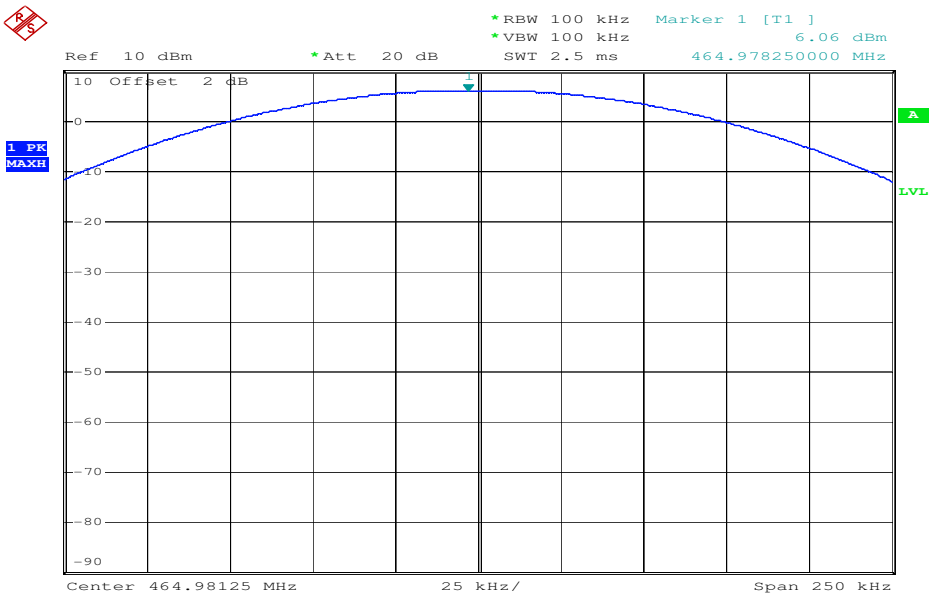
Plot 3: Peak output power 464.98125 MHz (conducted)



Date: 29.MAY.2007 14:44:02

LIMITS	SUBCLAUSE § 90.205
Maximum ERP for systems with a service area radius up to 3 km	2 W

3.4 Maximum Peak Output Power (radiated)

TEST CONDITIONS			MAXIMUM PEAK OUTPUT POWER (mW)		
Frequency (MHz)			456.01875	460.65000	464.98125
T_{nom}(23)°C	V_{nom}(6.4)V	Max	3.12	3.04	2.95
Measurement uncertainty			±3dB		

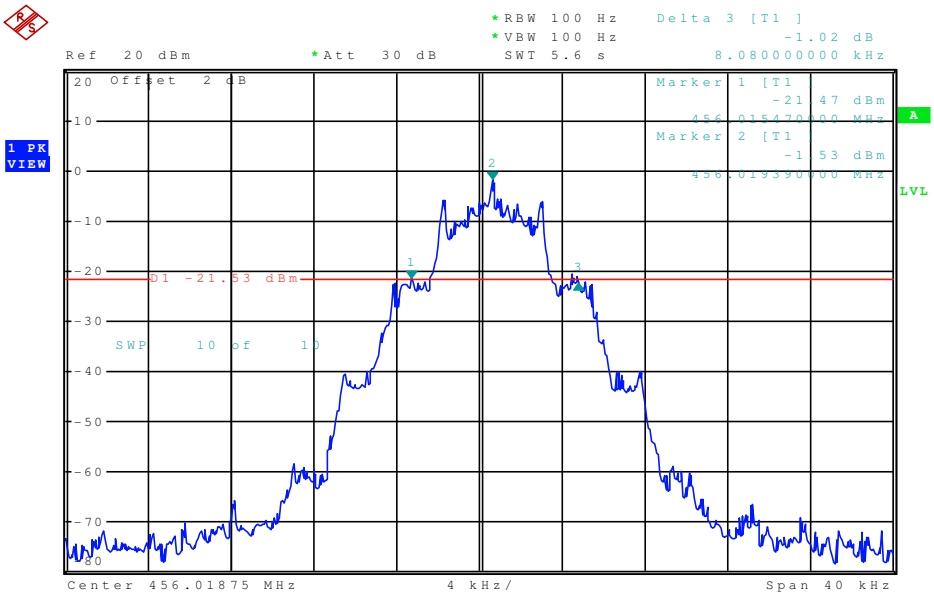
RBW / VBW : 100 kHz

3.5 Type of emissions § 90.207 / 2.1047/ RSS119 - 5.2

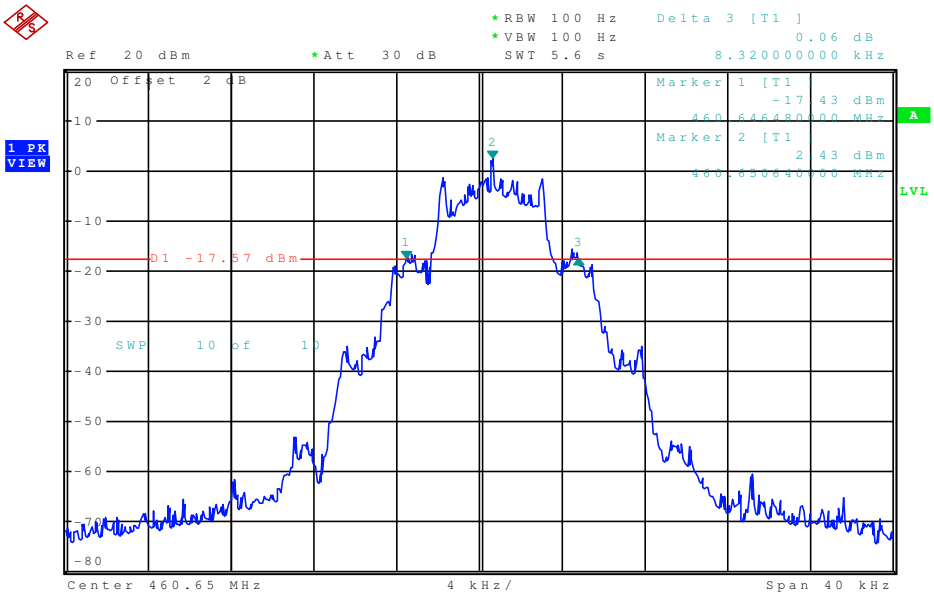
Used Type of modulation is Frequency Shift Keying F1D.

3.6 Bandwidth limitations § 90.209 / 2.1049 / RSS119 - 5.5

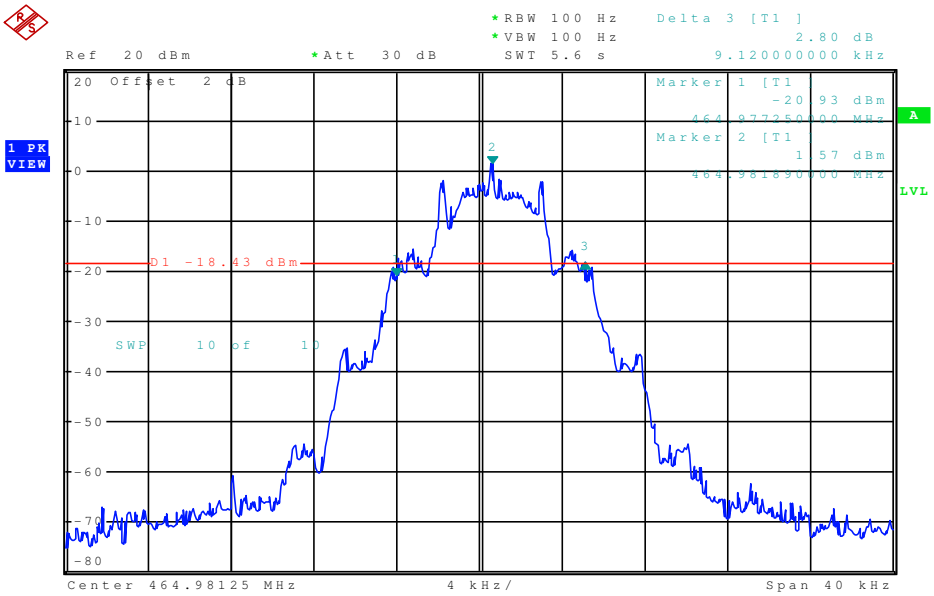
Plot 1: 456.01875 MHz (max. power), modulated with test modulation 12.5 kHz BW



Plot 2: 460.65000 MHz (max. power), modulated with test modulation 12.5 kHz BW



Plot 3: 464.98125 MHz (max. power), modulated with test modulation 12.5 kHz BW



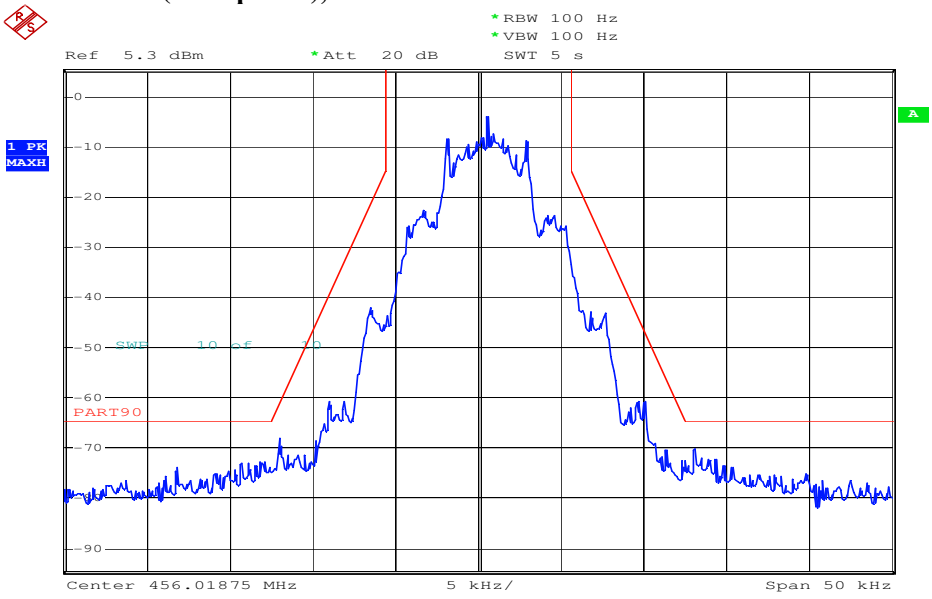
TEST CONDITIONS			OCCUPIED BANDWIDTH (kHz)		
Frequency (MHz)			456.01875	460.65000	464.98125
T_{nom}(23)°C	V_{nom}(6.4)V	Max	8.08	8.32	9.12
Measurement uncertainty			± 1 kHz		

LIMITS	SUBCLAUSE § 90.209 / RSS119 – 5.5
11.25 kHz / 12.5 kHz Channel-BW (-20 dBc)	Pass

3.7 Emission mask § 90.210 / RSS119 - 5.8

Measurement was done using the emission mask D for a signal with a 12.5 kHz channel bandwith:

Plot 1: 456.01875 MHz (max. power), modulated with test modulation 12.5 kHz BW



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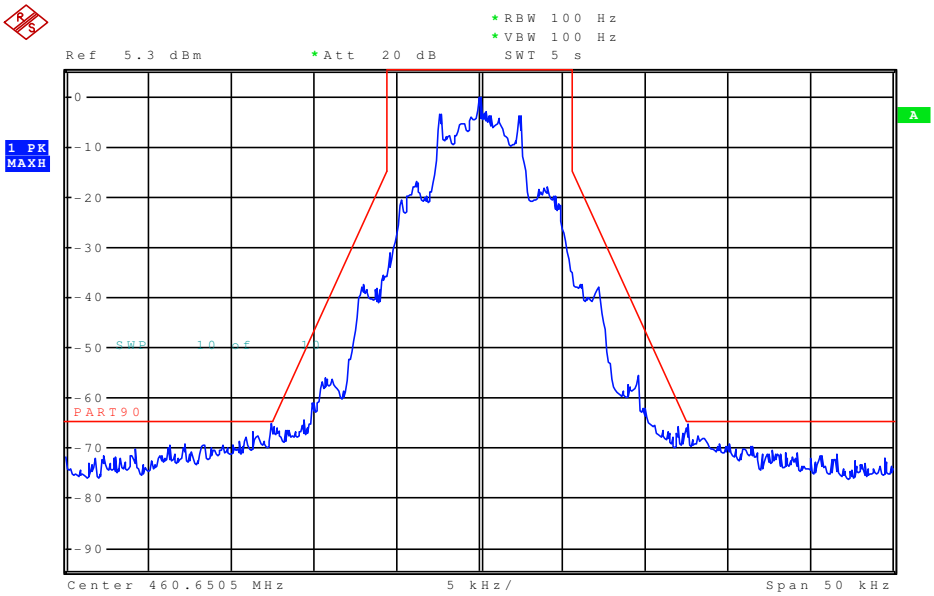
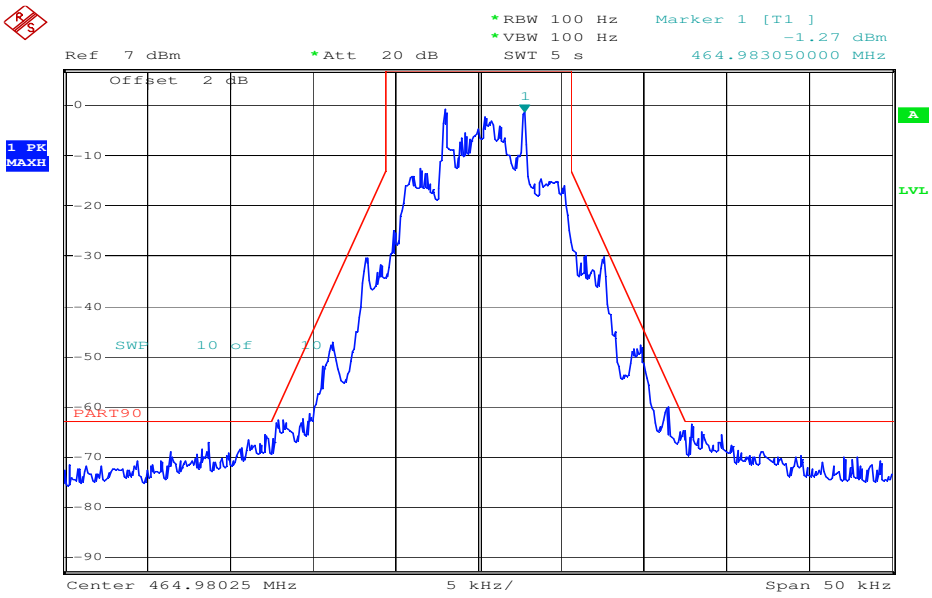
Plot 2: 460.65000 MHz (max. power), modulated with test modulation 12.5 kHz BW



Plot 3: 464.98125 MHz (max. power), modulated with test modulation 12.5 kHz BW



LIMITS	**SUBCLAUSE § 90.210 / RSS119 – 5.8**
Emission mask D: **For transmitters designed to operate with a 12.5 kHz channel bandwith, any emission must be attenuated below the Power (P) of the highest emission contained within the authorized bandwith as follows:** **(1) On any frequency from the center of the authorized bandwith f_0 to 5.625 kHz removed from f_0: Zero dB.** **(2) On any frequency removed from the center of the authorized bandwith by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(f_d-2.88 kHz) dB** **(3) On any frequency removed from the center of the authorized bandwith by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.**	**Pass**

3.8 Scrambling § 90.212

Not applicable. - No scrambling techniques implemented

3.9 Frequency Stability vs. Voltage § 90.213 / 2.1055 / RSS119 - 5.3

nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
6.4 V	5.7	+18	456.01875	0.0	0.04
6.4 V	5.8	+18	456.01875	0.0	0.04
6.4 V	5.9	+18	456.01875	0.0	0.04
6.4 V	6.0	+17	456.01875	0.0	0.04
6.4 V	6.1	+17	456.01875	0.0	0.04
6.4 V	6.2	+17	456.01875	0.0	0.04
6.4 V	6.3	+16	456.01875	0.0	0.03
6.4 V	6.4	+16	456.01875	0.0	0.03
6.4 V	6.5	+16	456.01875	0.0	0.03
6.4 V	6.6	+16	456.01875	0.0	0.03
6.4 V	6.7	+15	456.01875	0.0	0.03
6.4 V	6.8	+15	456.01875	0.0	0.03
6.4 V	6.9	+15	456.01875	0.0	0.03
6.4 V	7.0	+14	456.01875	0.0	0.03
6.4 V	7.1	+14	456.01875	0.0	0.03

nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
6.4 V	5.7	+19	460.65000	0.0	0.04
6.4 V	5.8	+19	460.65000	0.0	0.04
6.4 V	5.9	+18	460.65000	0.0	0.04
6.4 V	6.0	+18	460.65000	0.0	0.04
6.4 V	6.1	+18	460.65000	0.0	0.04
6.4 V	6.2	+18	460.65000	0.0	0.04
6.4 V	6.3	+17	460.65000	0.0	0.04
6.4 V	6.4	+17	460.65000	0.0	0.04
6.4 V	6.5	+17	460.65000	0.0	0.04
6.4 V	6.6	+16	460.65000	0.0	0.03
6.4 V	6.7	+16	460.65000	0.0	0.03
6.4 V	6.8	+16	460.65000	0.0	0.03
6.4 V	6.9	+15	460.65000	0.0	0.03
6.4 V	7.0	+15	460.65000	0.0	0.03
6.4 V	7.1	+15	460.65000	0.0	0.03

nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
6.4 V	5.7	+21	464.98125	0.0	0.05
6.4 V	5.8	+21	464.98125	0.0	0.05
6.4 V	5.9	+20	464.98125	0.0	0.04
6.4 V	6.0	+20	464.98125	0.0	0.04
6.4 V	6.1	+20	464.98125	0.0	0.04
6.4 V	6.2	+20	464.98125	0.0	0.04
6.4 V	6.3	+19	464.98125	0.0	0.04
6.4 V	6.4	+19	464.98125	0.0	0.04
6.4 V	6.5	+19	464.98125	0.0	0.04
6.4 V	6.6	+19	464.98125	0.0	0.04
6.4 V	6.7	+18	464.98125	0.0	0.04
6.4 V	6.8	+18	464.98125	0.0	0.04
6.4 V	6.9	+17	464.98125	0.0	0.04
6.4 V	7.0	+17	464.98125	0.0	0.04
6.4 V	7.1	+17	464.98125	0.0	0.04

LIMITS **SUBCLAUSE § 90.213**

Power Supply Voltage – Frequency Stability of 2.5 ppm from 90% to 110% of nominal voltage	**Pass**

RSS119 – 5.3

The carrier frequency shall not depart from the reference frequency in excess of the values given in the following table:

Frequency Band (MHz)	Authorized Bandwith (kHz)	Frequency Stability (ppm)		
		Base / Fixed	Mobile Station	
			> 2 W	≤ 2 W
406.1-430 and 450-470	20	2.5	5	5
	11.25	1.5	2.5	2.5
	6.25	0.5	1	1

Pass

3.10 Frequency Stability vs. Temperature § 90.213 / 2.1055 / RSS119 - 5.3

Teperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-20°	+638	456.01875	+0.00014	+1.39
-10°	+465	456.01875	+0.00010	+1.01
0,0°	+384	456.01875	+0.00008	+0.83
+10°	+206	456.01875	+0.00005	+0.45
+20°	+16	456.01875	+0.00000	+0.03
+30°	-159	456.01875	-0.00004	-0.35
+40°	-337	456.01875	-0.00007	-0.73
+50°	-511	456.01875	-0.00011	-1.11
+60°	-702	456.01875	-0.00015	-1.52
+70°	-944	456.01875	-0.00021	-2.05

Teperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-20°	+646	460.65000	+0.00014	+1.40
-10°	+468	460.65000	+0.00010	+1.01
0,0°	+387	460.65000	+0.00008	+0.84
+10°	+209	460.65000	+0.00005	+0.45
+20°	+19	460.65000	+0.00000	+0.04
+30°	-162	460.65000	-0.00004	-0.35
+40°	-339	460.65000	-0.00007	-0.73
+50°	-511	460.65000	-0.00011	-1.10
+60°	-708	460.65000	-0.00015	-1.53
+70°	-957	460.65000	-0.00021	-2.07

Teperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-20°	+650	464.98125	+0.00014	+1.40
-10°	+472	464.98125	+0.00010	+1,02
0,0°	+390	464.98125	+0.00008	+0.84
+10°	+211	464.98125	+0.00005	+0.46
+20°	+20	464.98125	+0.00000	+0.04
+30°	-164	464.98125	-0.00004	-0.35
+40°	-342	464.98125	-0.00007	-0.74
+50°	-515	464.98125	-0.00011	-1.11
+60°	-710	464.98125	-0.00015	-1.53
+70°	-960	464.98125	-0,00021	-2.07

LIMITS **SUBCLAUSE § 90.213**

Temperature – Frequency Stability of 2.5 ppm from -20°C to 70°C	**Pass**

RSS119 – 5.3

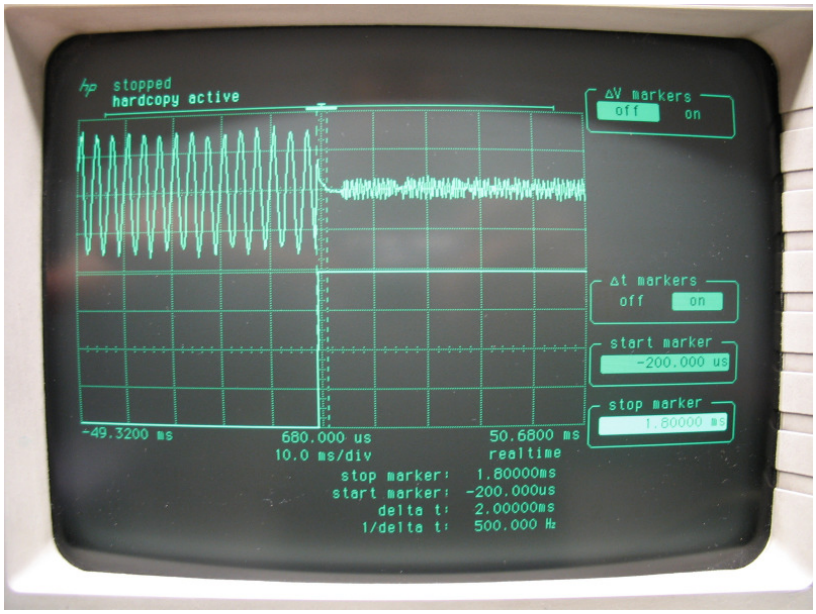
The carrier frequency shall not depart from the reference frequency in excess of the values given in the following table:

Frequency Band (MHz)	Authorized Bandwith (kHz)	Frequency Stability (ppm)		
		Base / Fixed	Mobile Station	
			> 2 W	≤ 2 W
406.1-430 and 450-470	20	2.5	5	5
	11.25	1.5	2.5	2.5
	6.25	0.5	1	1

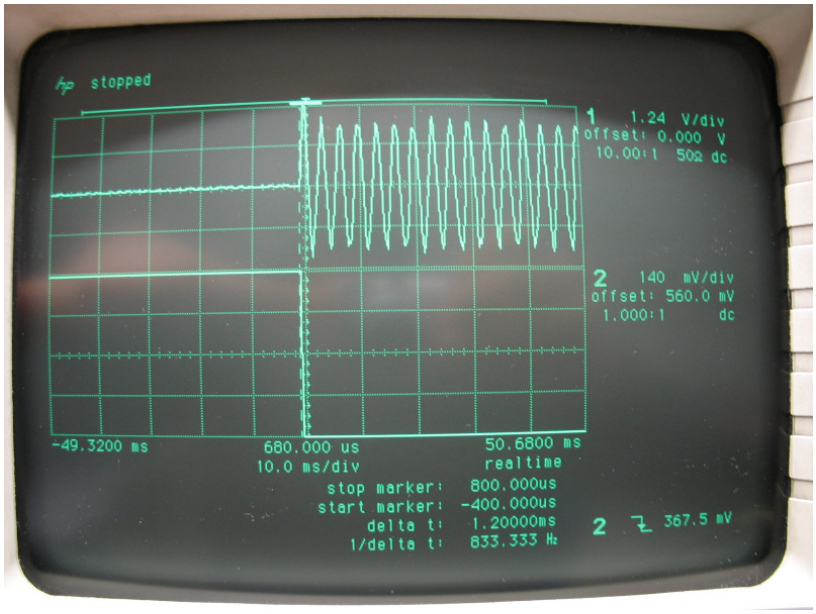
Pass

3.11 Transient Frequency Behavior §90.214 / RSS119 - 5.9

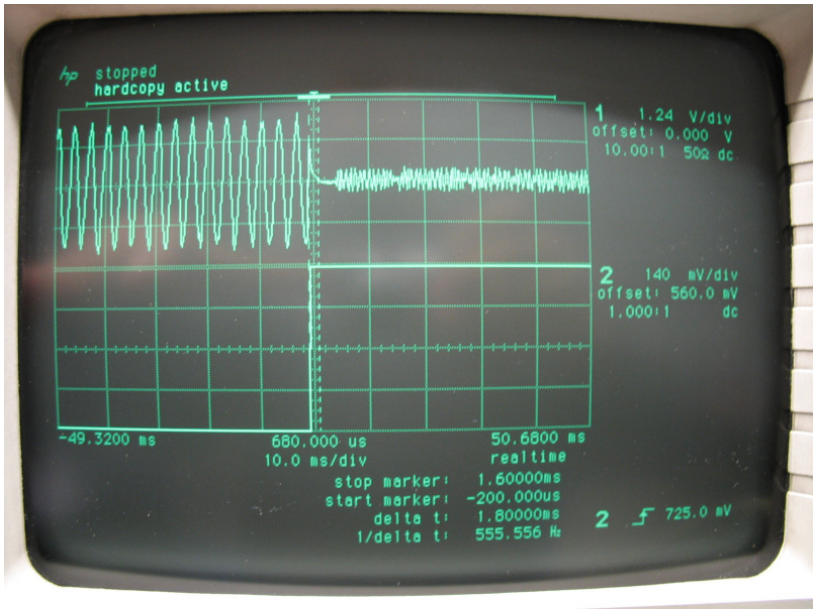
Plot 1: 456.01875 MHz (Switch on)



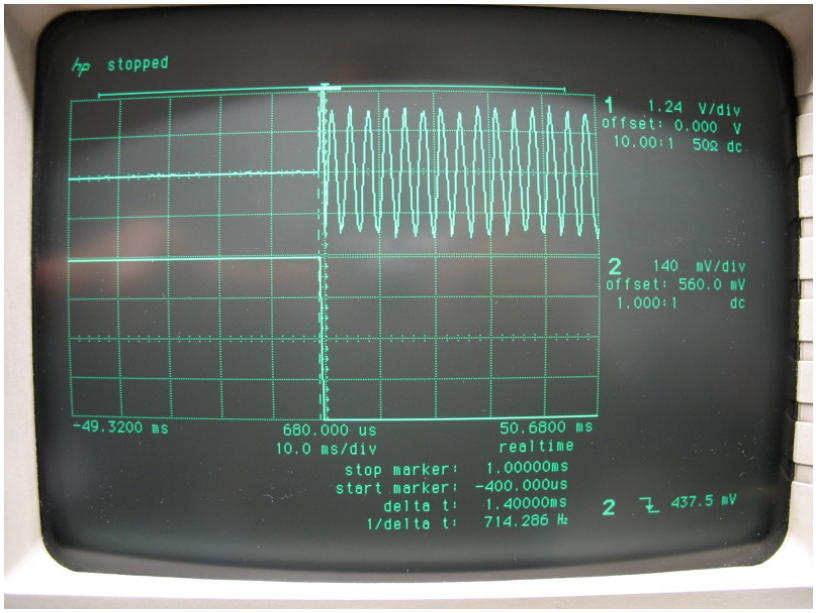
Plot 2: 456.01875 MHz (Switch off)



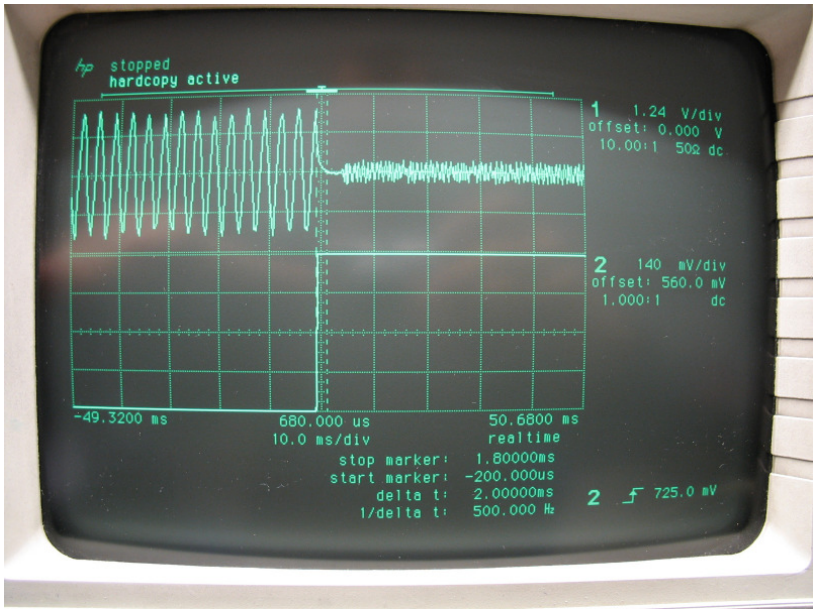
Plot 3: 460.65000 MHz (Switch on)



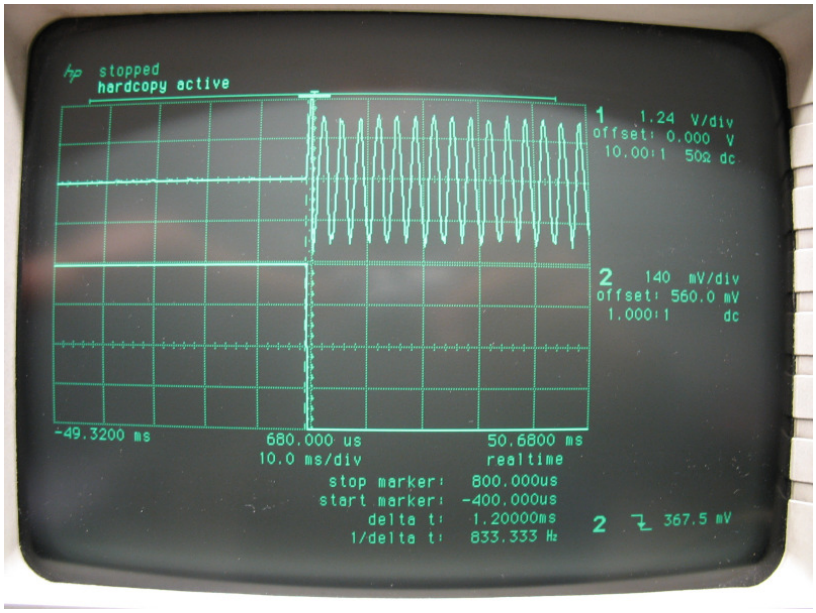
Plot 4: 460.65000 MHz (Switch off)



Plot 5: 464.98125 MHz (Switch on)



Plot 6: 464.98125 MHz (Switch off)



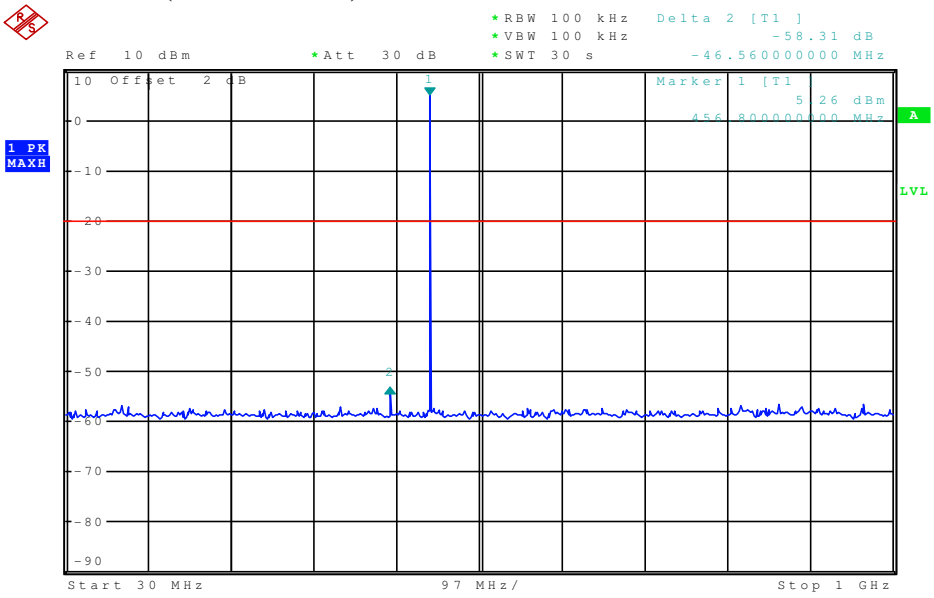
LIMITS **SUBCLAUSE § 90.214 / RSS119 – 5.9**

Requirements: Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

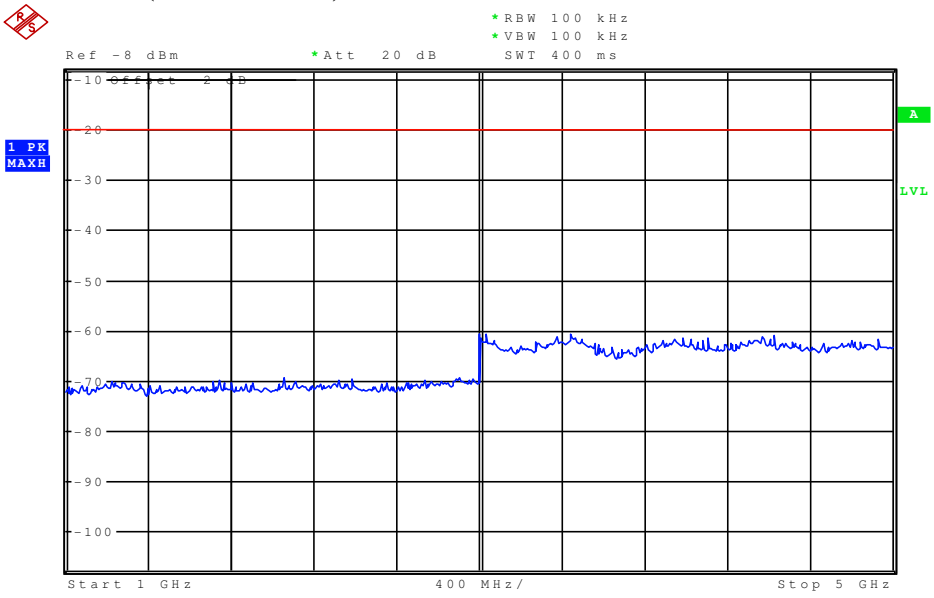
Time intervals	Maximum frequency difference	All equipment	
		150 to 174 MHz	412 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t_1 ……..	±25.0 kHz	5.0 ms	10.0 ms
t_2 ……..	±12.5 kHz	20.0 ms	25.0 ms
t_3 ……..	±25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t_1 ……..	±12.5 kHz	5.0 ms	10.0 ms
t_2 ……..	±6.25 kHz	20.0 ms	25.0 ms
t_3 ……..	±12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t_1 ……..	±6.25 kHz	5.0 ms	10.0 ms
t_2 ……..	±3.125 kHz	20.0 ms	25.0 ms
t_3 ……..	±6.25 kHz	5.0 ms	10.0 ms

3.12 Spurious Emissions - conducted § 2.1051/ RSS119 - 5.8

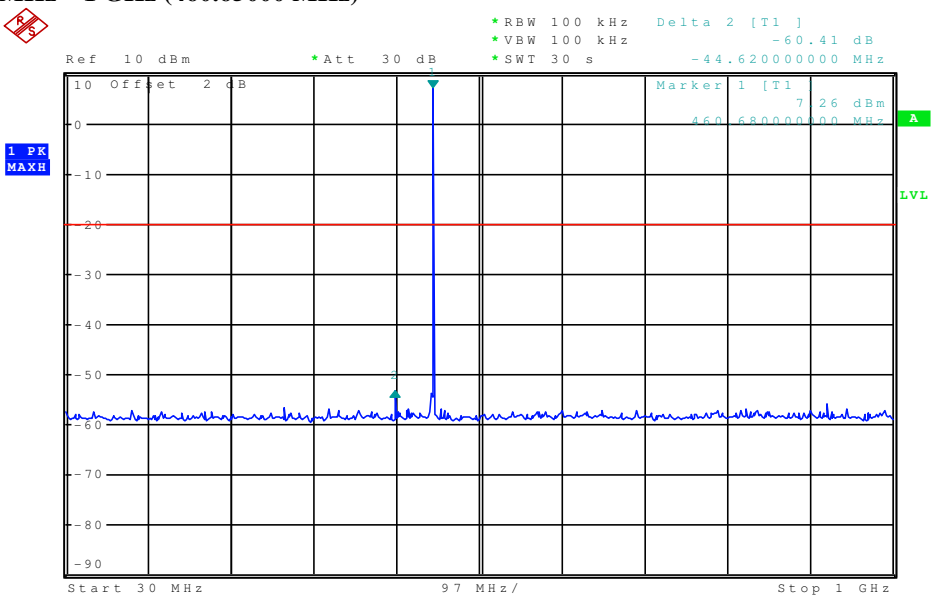
Plot 1: 30 MHz – 1 GHz (456.01875 MHz)



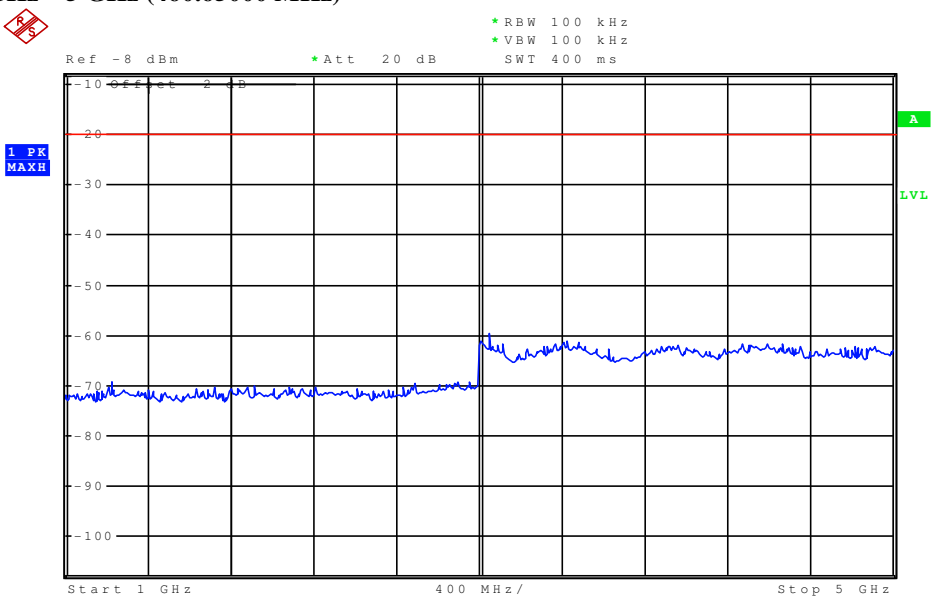
Plot 2: 1 GHz – 5 GHz (456.01875 MHz)



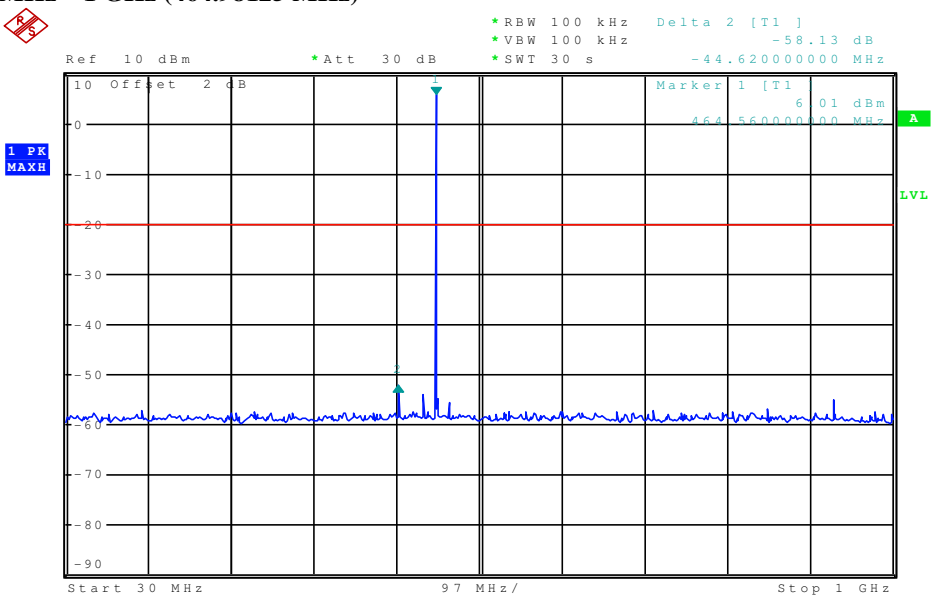
Plot 3: 30 MHz – 1 GHz (460.65000 MHz)



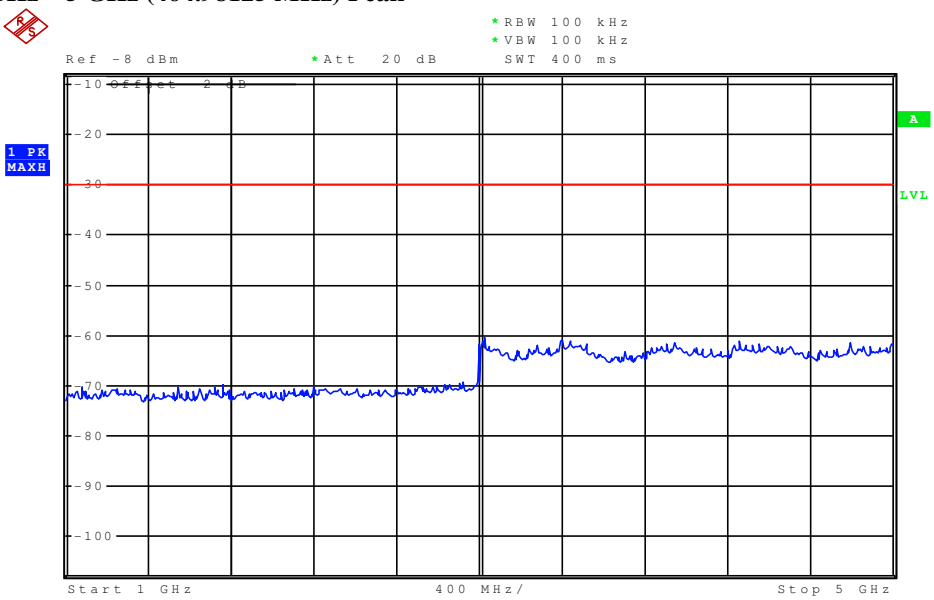
Plot 4: 1 GHz – 5 GHz (460.65000 MHz)



Plot 5: 30 MHz – 1 GHz (464.98125 MHz)



Plot 6: 1 GHz – 5 GHz (464.98125 MHz) Peak



Results:

SPURIOUS EMISSIONS LEVEL (dBµV/m)								
456.01875 MHz			460.65000 MHz			464.98125 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			±3 dB					

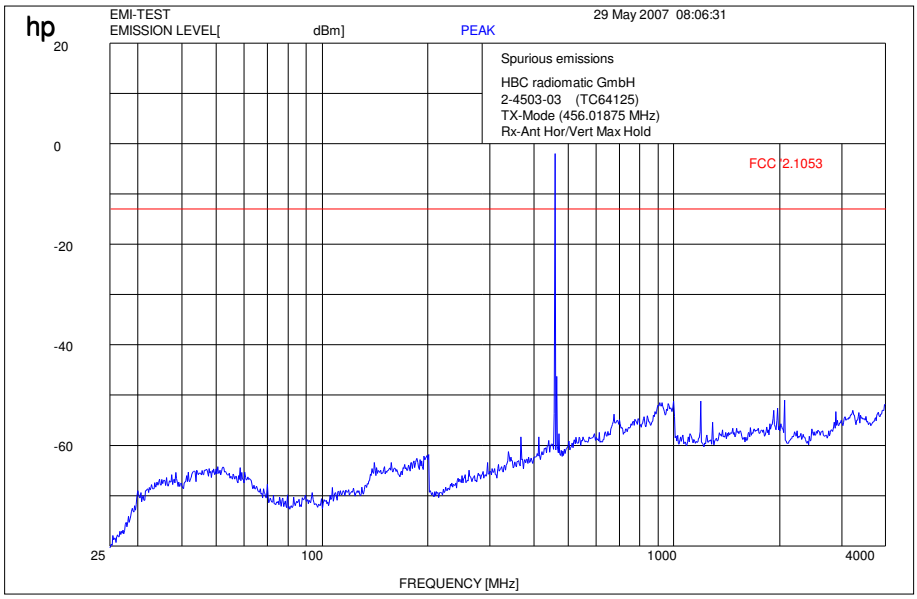
f < 1 GHz : RBW/VBW: 100 kHz **f ≥ 1GHz : RBW/VBW: 1 MHz**

LIMITS **SUBCLAUSE § 90.210 / RSS119 – 5.8**

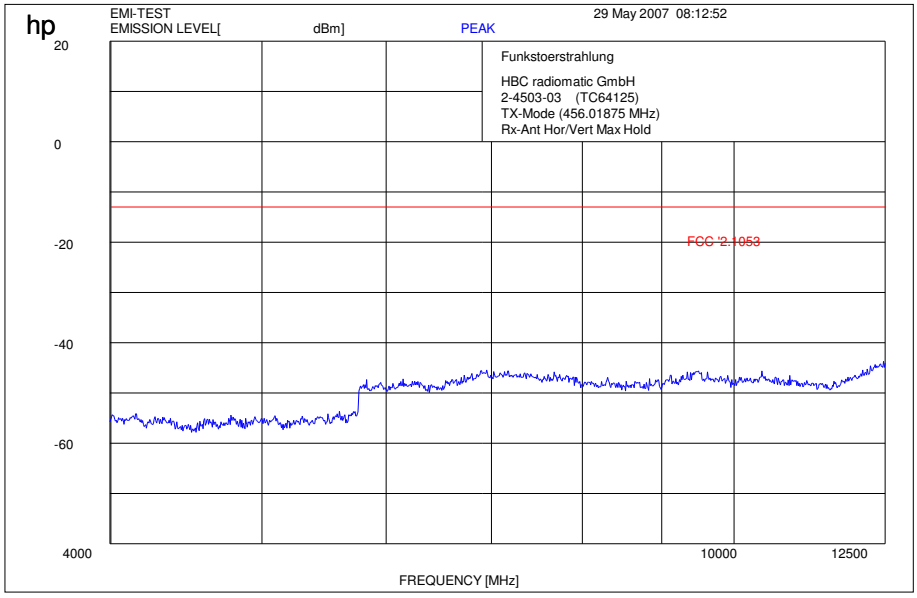
For Signals with a 12.5 kHz channel bandwith: **On any frequency removed from the center of the authorized bandwith by a displacement frequency (f_d in kHz) of more than 12.5 kHz:** **At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.**	**Pass**

3.13 Spurious Emissions - radiated § 2.1053 / RSS119 - 5.8

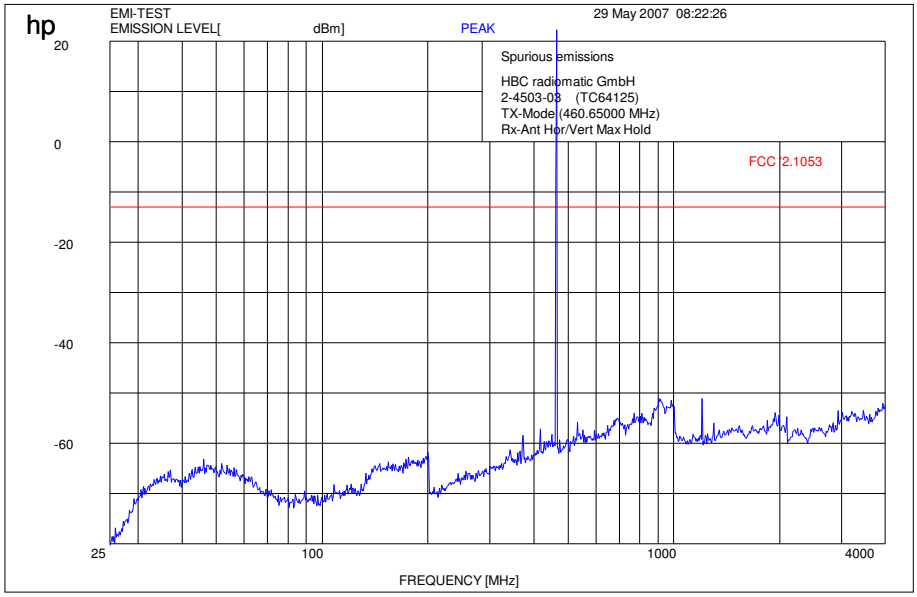
Plot 1: TX-Mode 456.01875 MHz (30 MHz – 4 GHz)



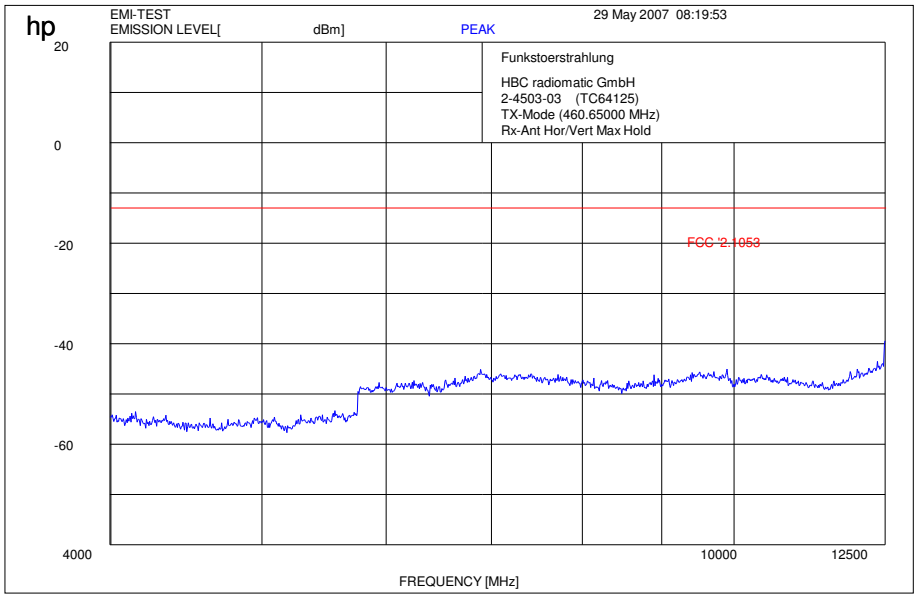
Plot 2: TX-Mode 456.01875 MHz (4 GHz – 12 GHz)



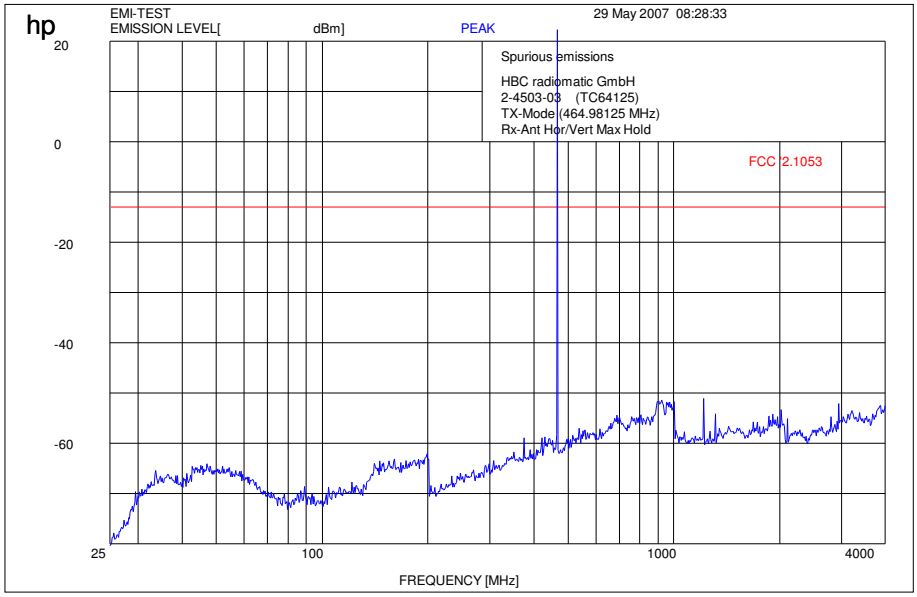
Plot 3: TX-Mode 460.65000 MHz (30 MHz – 4 GHz)



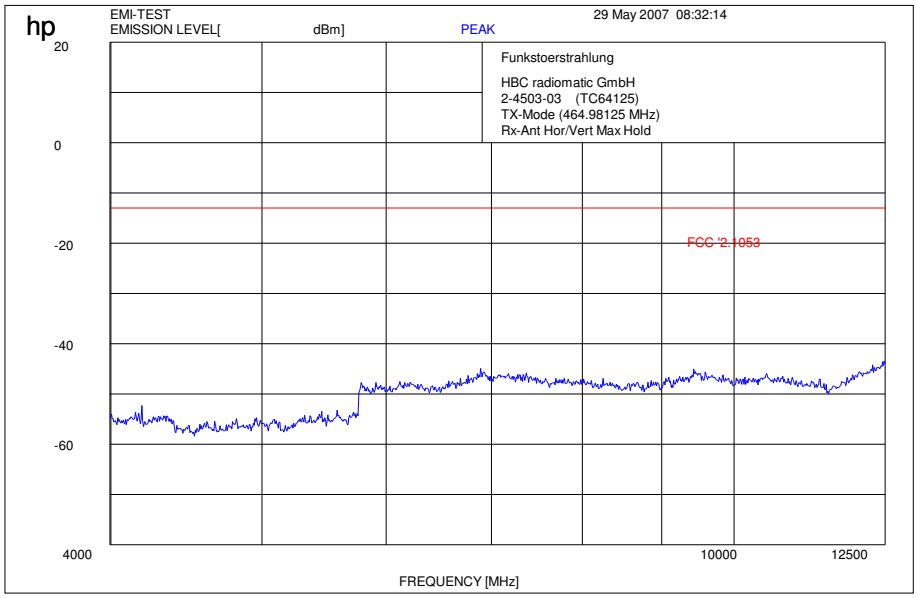
Plot 4: TX-Mode 460.65000 MHz (4 GHz – 12 GHz)



Plot 5: TX-Mode 464.98125 MHz (30 MHz – 4 GHz)



Plot 6: TX-Mode 464.98125 MHz (4 GHz – 12 GHz)



Results:

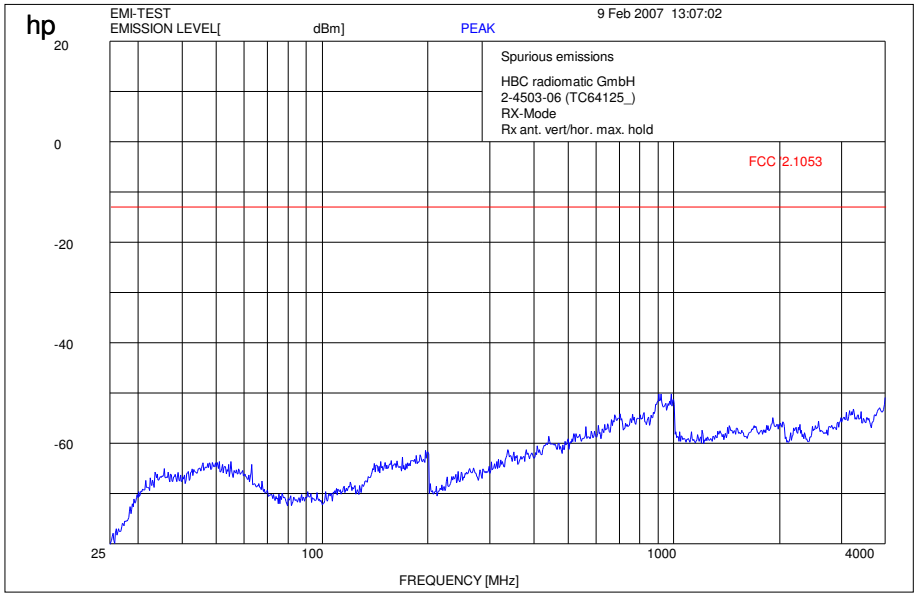
SPURIOUS EMISSIONS LEVEL (dBµV/m)								
456.01875 MHz			460.65000 MHz			464.98125 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			±3 dB					

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

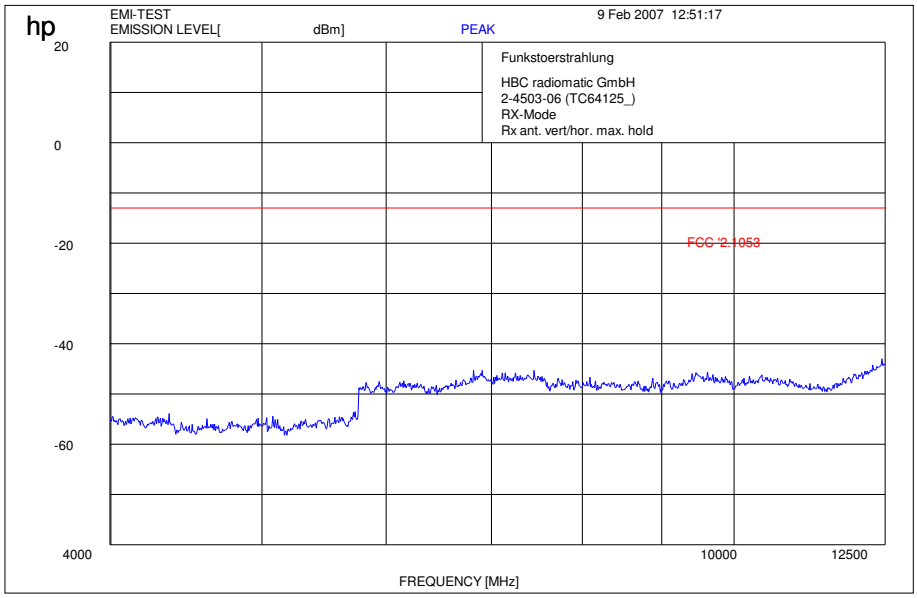
LIMITS **SUBCLAUSE § 90.210 / RSS119 – 5.8**

For Signals with a 12.5 kHz channel bandwith: **On any frequency removed from the center of the authorized bandwith by a displacement frequency (f_d in kHz) of more than 12.5 kHz:** **At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.**	**Pass**

Plot 7: RX-/Idle-Mode (30 MHz – 4 GHz) valid for all three channels



Plot 8: RX-/Idle-Mode (4 GHz – 12 GHz) valid for all three channels



Results:

SPURIOUS EMISSIONS LEVEL (dBµV/m)								
456.01875 MHz 460.65000 MHz 464.98125 MHz								
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found								
Measurement uncertainty			±3 dB					

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

LIMITS **SUBCLAUSE § 90.210 / RSS119 – 5.8**

For Signals with a 12.5 kHz channel bandwith: **On any frequency removed from the center of the authorized bandwith by a displacement frequency (f_d in kHz) of more than 12.5 kHz:** **At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.**	**Pass**

3.14 Used Testequipment

Anechoic chamber C:

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Spektrum Analyser	HP	8566B	2747A05306	300001000
Spektrum Analyser Display	HP	85662A	2816A16541	300002297
Quasi-Peak-Adapter	HP	85650A	2811A01131	300000999
Power Supply	HP	6032A	2818A03450	300001040
Power Attenuator	Byrd	8325	1530	300001595
Bikonical Antenna	EMCO	3104	3758	300001602
Log. Period. Antenna	EMCO	3146	2130	300001603
Double Ridged Antenna	EMCO	HP 3115P	3088	300001032
Active Loop Antenna	EMCO	6502	2210	300001015
Antenna VDE/FCC		HP11965B		300002298
SRM-Drive	HP	9144A	2823e46556	300001044
Software	HP	EMI		300000983
Busisolator	Kontron			300001056
Absorberhalle	MWB		87400/02	300000996
Salzsäule	Kontron			300001055
Antenna	R&S	HMO20	832211/003	300002243
Indukt.Tast Antenna	R&S	HFH 2 Z4	881468/026	300001464
System-Rack	HP I.V.	85900	*	300000222
Spectrum Analyzer	HP	8566B	2747A05275	300000219
Quasi-Peak-Adapter	HP	85650A	2811A01135	300000216
RF-Preselector	HP	85685A	2837A00779	300000218
Rahmen Antenne	R&S	HFH2-Z2	891847-35	300001169
Leitungsteiler	HP	11850C		300000997
Breitband-Hornantenne EMI	HP	35155P		300002300
PC	HP	Vectra VL		300001688
VHF Meßantenne	Schwarzbeck	VHA 9103		300001778
Spectrum Analyzer Display	HP	85662A	2816A16497	300001690
VHF Meßantenna	Schwarzbeck	VHA 9103		300001780
Biconical Antenna	EMCO	3104 C	9909-4868	300002590

SRD Laboratory: (Bluetooth System)

No	Equipment/Type	Manufact.	Serial Nr.	Inv. No. Cetecom
1	System Controller PSM 12	R&S	835259/007	3000002681
2	Memory Extension PSM-K10	R&S	To 1	3000002681
3	Operating Software PSM-B2	R&S	To 1	3000002681
4	19'' Monitor		22759020-ED	3000002681
5	Mouse		LZE 0095/6639	3000002681
6	Keyboard		G00013834L461	3000002681
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681
12	Data Generator SMIQ-B11	R&S	To 10	3000002681
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681
14	Fast CPU SM-B50	R&S	To 10	3000002681
15	FM Modulator SM-B5	R&S	835676/033	3000002681

16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681
18	Data Generator SMIQ-B11	R&S	To 16	3000002681
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681
20	Fast CPU SM-B50	R&S	To 16	3000002681
21	FM Modulator SM-B5	R&S	836061/022	3000002681
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681
23	Attenuator SMP-B15	R&S	835136/014	3000002681
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681
25	Power Meter NRVD	R&S	835430/044	3000002681
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681
28	Rubidium Standard RUB	R&S	6197	3000002681
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681
31	19'' Rack	R&S	11138363000004	3000002681
32	RF-cable set	R&S	N/A	3000002681
33	IEEE-cables	R&S	N/A	3000002681
34	Sampling System FSIQ-B70	R&S	835355/009	3000002681
35	RSP programmable attenuator	R&S	834500/010	3000002681
36	Signalling Unit	R&S	838312/011	3000002681
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681

SRD Laboratory:

Device	Manufacturer	Type	S/N Number	Inv. No. Cetecom
Climatic box	Heraeus Vötsch	VT 4002	--	300003019
Signaling Unit	R&S	CMU200	832221/0055	300002862
Power Splitter	Inmet Corp.	6005-3	none	300002841
SMA Cables	Insulated Wire	SPS-1151-985-SPS	different	different

4 Photographs of Test Set-up

Photo 1: Radiated Emissions

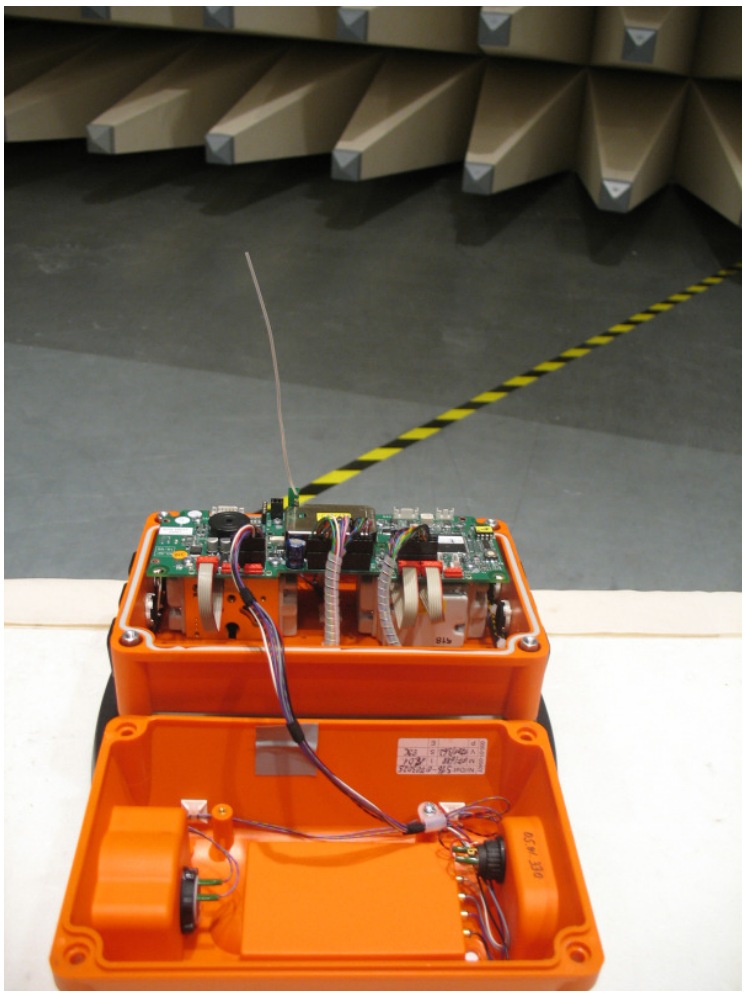
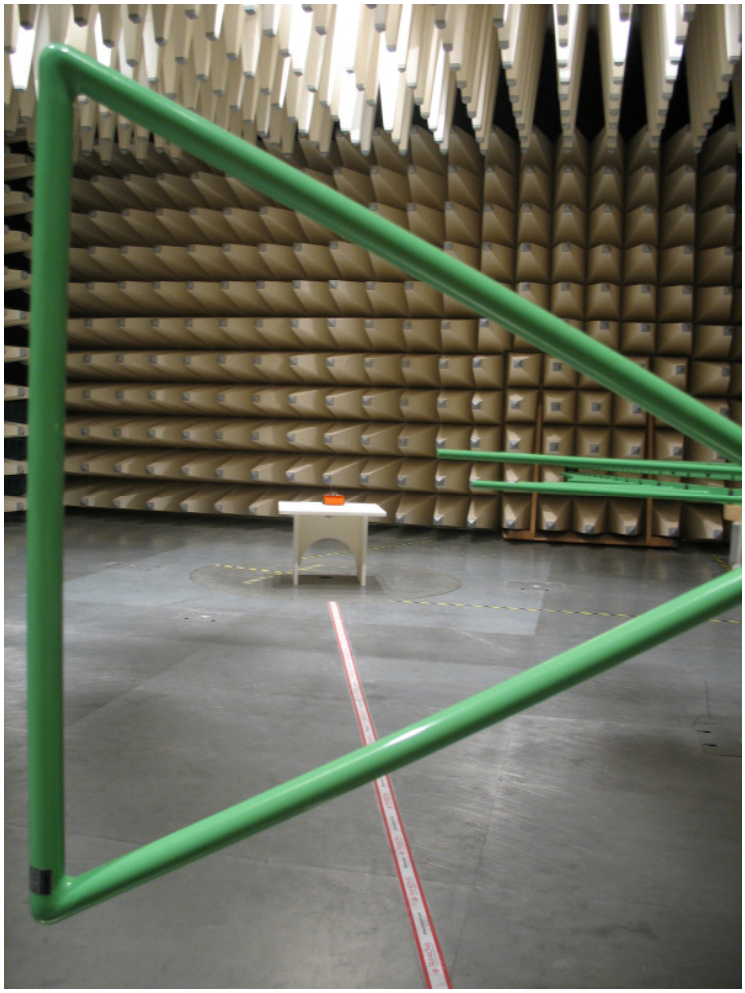


Photo 2: Radiated Emissions



5 Photographs of EUT

Photo 1:

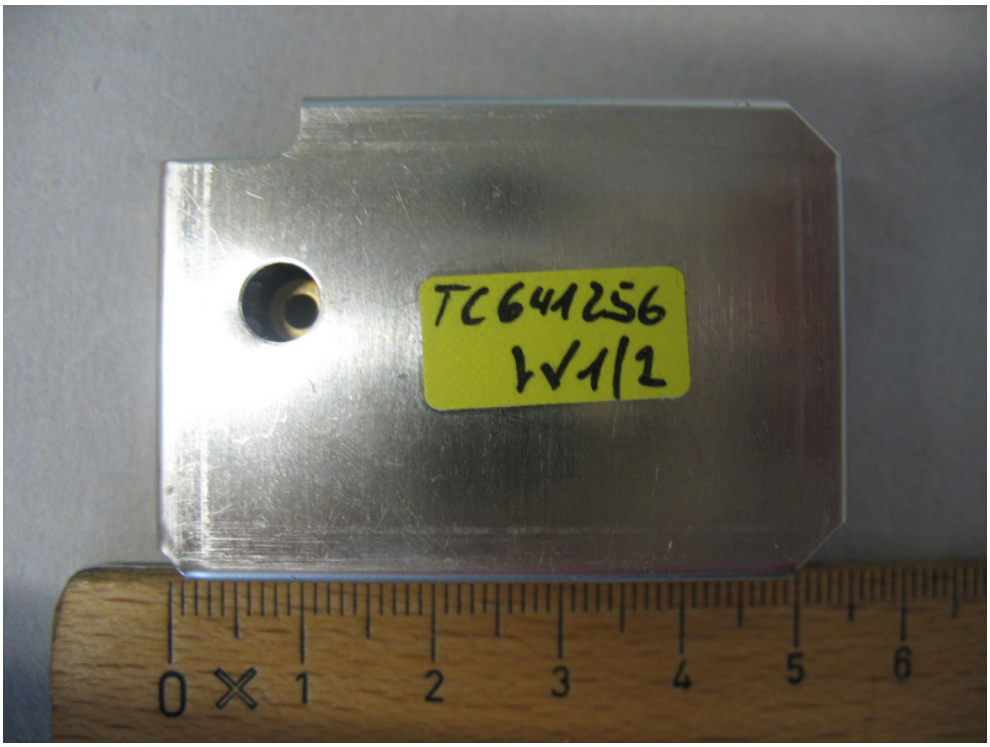


Photo 2:

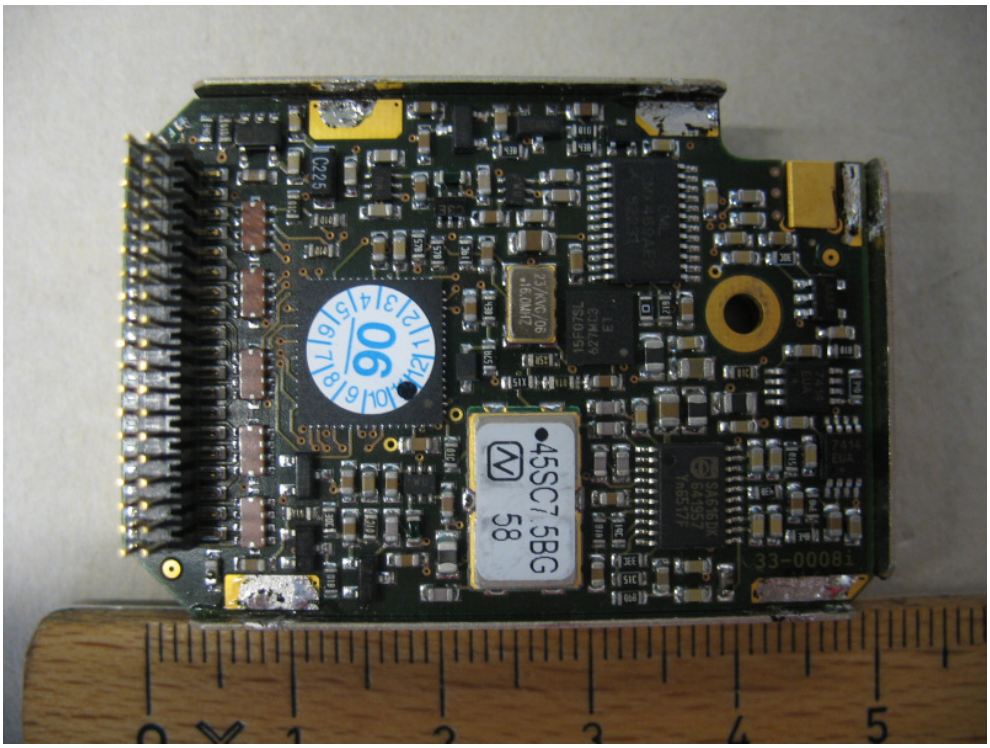


Photo 3:

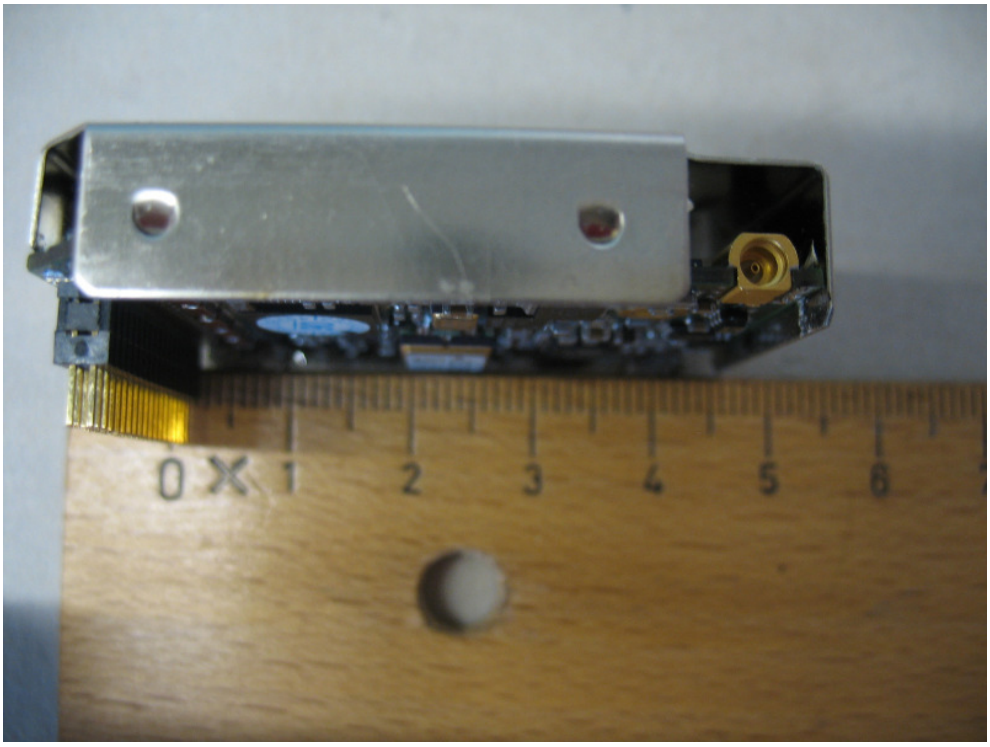


Photo 4:

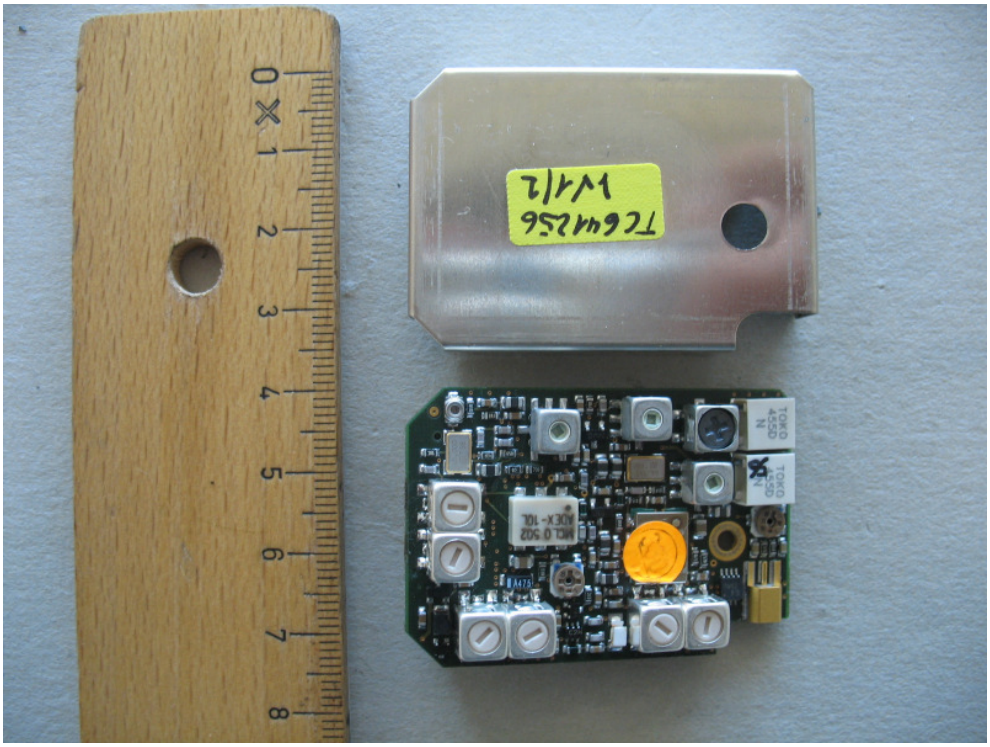


Photo 5:

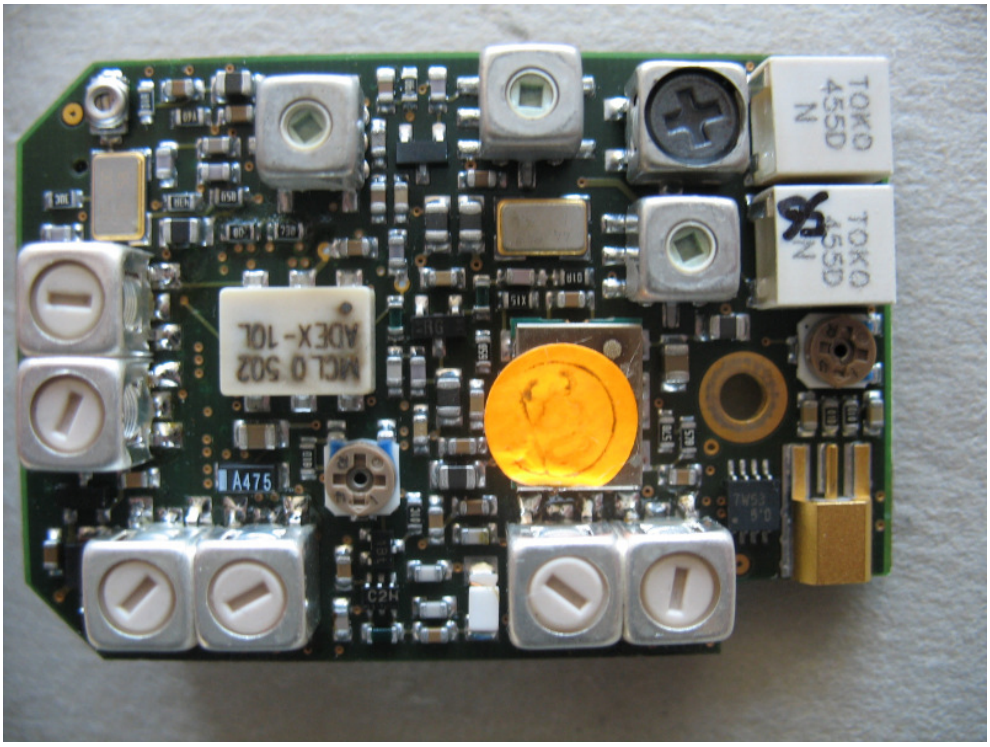


Photo 6: Antenna-connection

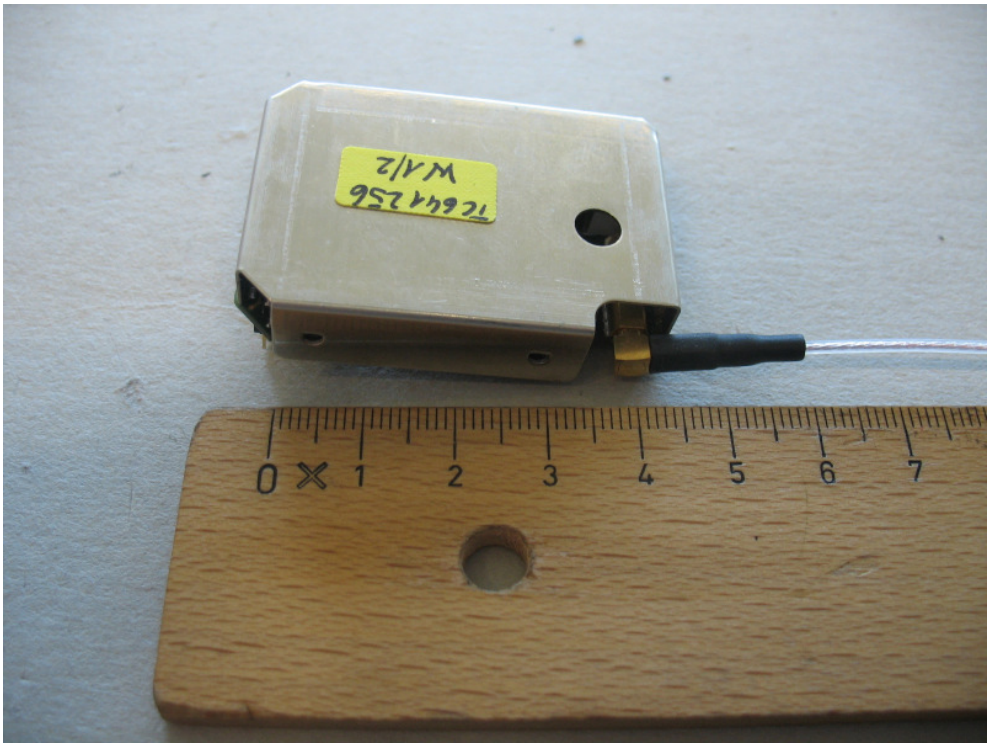


Photo 7: Whip antenna

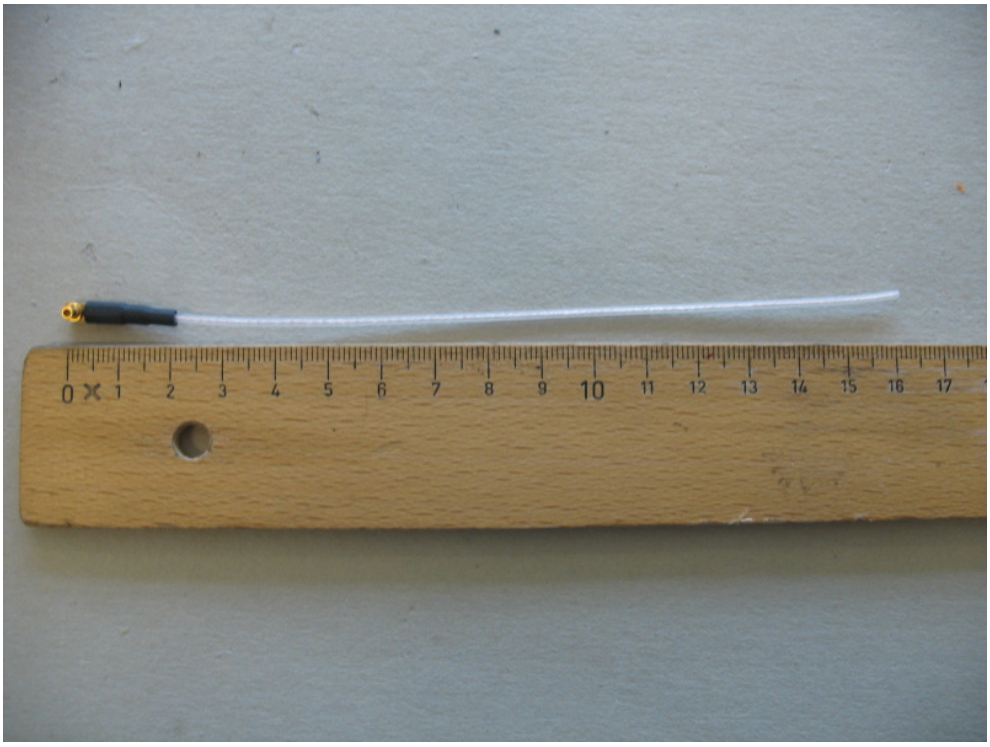


Photo 8: Antenna connector

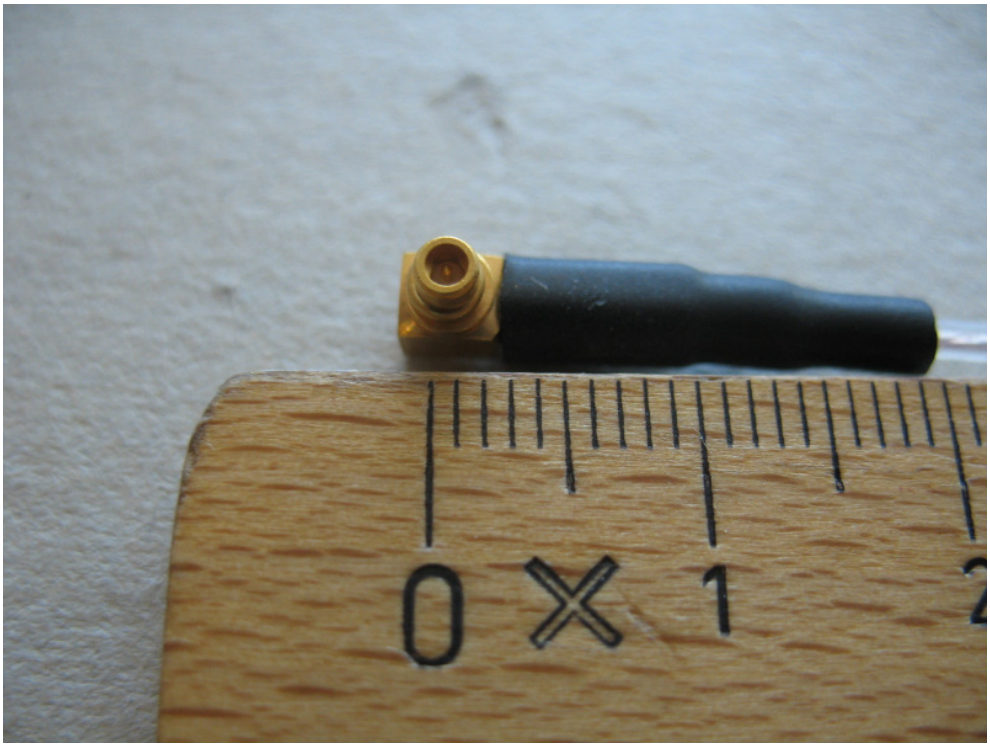
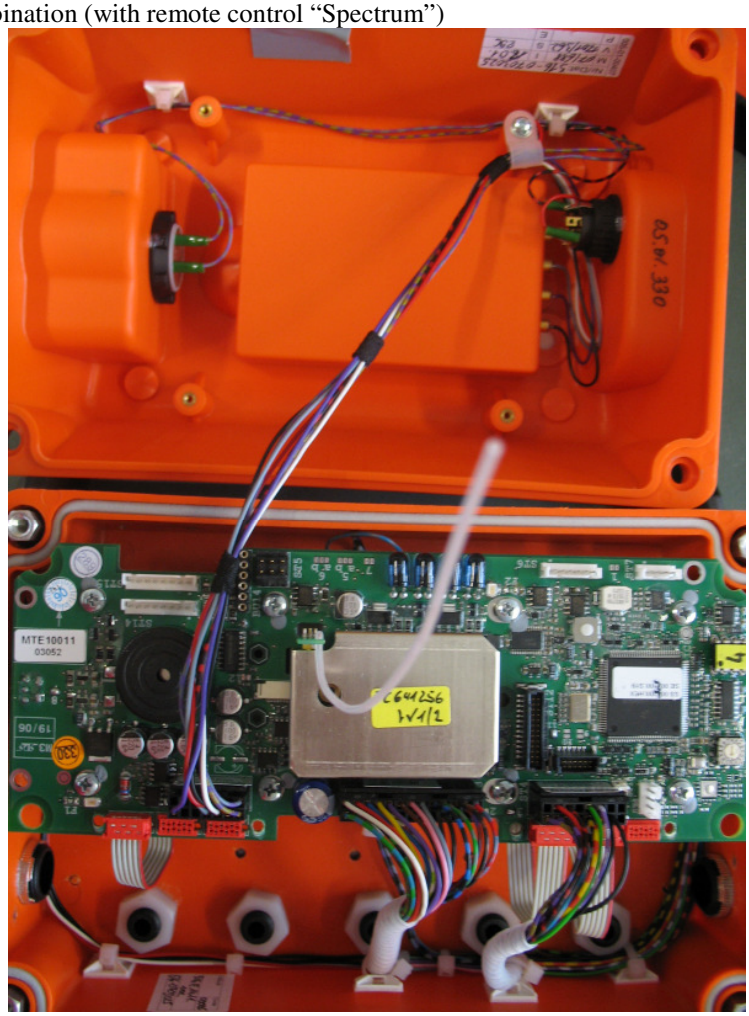


Photo 9: Measuring combination (with remote control “Spectrum”)



6 RF Exposure Estimation

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)
47CFR1.1310 / RSS-102 Issue 2 Item 4.2
(B) Limits for General Population/Uncontrolled Exposure
300–1500 MHz: f/1500 mW/cm²

EXEMPTION CLAUSES FROM ROUTINE EVALUATION
47CFR2.1091 / RSS-102 Issue 2 Item 2.5.2
No routine evaluation required when the device …operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.

MPE estimation

LIMIT:

Max. allowed Power density for **456 MHz** mobile operations @20cm according to § 1.1310 : **0.3 mW/cm²**

Measured maximum radiated output power: **3.12 mW ERP**

Formula: $P_{rad} = S \times 4 \times Pi \times R^2$

Estimated Power Density @ 20 cm distance from antenne:

$$S = P_{rad} / 4 \times Pi \times R^2$$

$$S = 3.12mW \times 1,64 / 4 \times PI \times 400cm^2$$

$$S = \mathbf{0.00102\ mW/cm^2}$$

Result:

Pass

7 RF Technical Brief Cover Sheet acc. to RSS-102

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

1. COMPANY NUMBER: 2977A

2. MODEL NUMBER: TC64125

3. MANUFACTURER: **HBC-radiomatic GmbH**
Haller Strasse 47-57
74564 Crailsheim
Germany

4. TYPE OF EVALUATION:

(a) RF Evaluation

- **Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐**
- **Duty cycle used in evaluation: 100 %**
- **Standard used for evaluation: RSS-102 Issue 2 (2005-11)**
- **Measurement distance: 0.2 m**
- **RF value: 0.0102 V/m ☐ A/m ☐ W/m² ☒**

Measured ☐ Computed ☐ Calculated ☒

Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in this Annex is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Date: 2007-06-04
Name: Stefan Bös
Title: Dipl. Ing (FH)
Company: Cetecom ICT Services GmbH