SENTON

■ EMV-Prüfzentrum ■ EMI/EMC-Testcenter ■

Straubing, April 11, 2005

T E S T - R E P O R T

No. 56502-050025

for

400T5
Remote Control Transmitter Module

Applicant:	Akerströms Björbo AB
Purpose of testing:	To show compliance with
	FCC Code of Federal Regulations, CFR 47, Part 90, Section 90.217
	FCC Code of Federal Regulations, CFR 47, Part 2, Subpart J

Table of Contents

1. Administrative Data

Equipment Under Test (EUT):	400T5
Serial number(s):	---
Type of equipment:	Remote Control Transmitter Module
Type of emission:	9K80F1D
Parts/accessories:	---
FCC-ID:	OG4400T5

Applicant: (full address)	Akerströms Björbo AB 78045 Björbo, SWEDEN
Contract identification:	---
Contact person:	Mr. Bernt Eriksson
Manufacturer:	Akerströms Björbo AB

Receipt of EUT:	February 2005
Dates of test:	February 2005
Note:	---

Responsible for testing:	Thomas Eberl
Responsible for test report:	Thomas Eberl

2. Identification of Test Laboratory

Test Laboratory: (full address):	Senton GmbH EMI/EMC Test Center Aeussere Fruehlingstrasse 45 D-94315 Straubing Germany	
Contact person:	Mr. Johann Roidt	
Communication:	Telephone Fax eMail:	(+49) 0 94 21 / 55 22-0 (+49) 0 94 21 / 55 22-99 Office@senton.de
FCC registration number:	90926	

3. Summary of Test Results

The tested sample complies with the requirements set forth in the

The Code of Federal Regulations 47, Part 90, Section 90.217
and
The Code of Federal Regulations 47 Part 2, Subpart J.

of the Federal Communication Commission (FCC)

Johann Roidt
Laboratory Manager

Thomas Eberl
Test Engineer

4. Operation Mode of EUT

- transmitting continuously[1]
- with battery supply nominal 7.5 V DC[2]
- operating with f = 406 MHz - 469 MHz

Tested positions of EUT:

P1: EUT in vertical position - antenna right up

[1] Modulation as indicated on appropriate test record
[2] For conducted measurements replaced by external DC supply

5. Configuration of EUT and Peripheral Devices

EUT is configured as stand-alone device

Configuration of cables of EUT

Not applicable

Configuration of peripheral devices connected to EUT

Not applicable

6. Measuring Methods

6.1. Maximum Transmitter Power (CFR47 §90.217, §2.1046)

The maximum transmitter power was measured radiated and, if applicable, conducted at antenna connector.

6.1.1. Radiated Maximum Transmitter Power

Radiated Maximum Transmitter Power was measured with detector-function of the spectrum analyzer set to positive peak and trace mode max hold:
RBW = 100 kHz, VBW = 100 kHz, span = 1 MHz, sweep = 15 s

For measurement setup and procedure see section "Unwanted Emission " on Page 13.

6.2. Frequency tolerance (CFR47 §90.217, §2.1055)

6.2.1. Frequency stability vs. temperature

The frequency stability vs. temperature was measured with a spectrum analyzer connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode using the assigned frequency.

The trace mode of the spectrum analyzer was set to write with frequency count mode activated:
RBW = 100 Hz, VBW = 100 Hz, span = 20 kHz, sweep = 1.5 s (auto mode)

See figure 1 for the measurement setup.

Test equipment used (see equipment list for details):
02, 18, 51, 54, 69

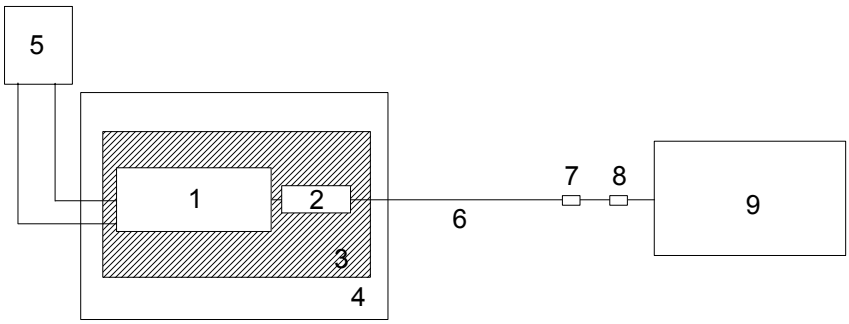


Figure 1: Measurement setup for testing within temperature test chamber

1 Transmitter (EUT)
2 Dummy load (if applicable)
3 Wooden support
4 Temperature test chamber
5 DC power supply
6 Test cable
7 DC-block
8 Attenuator (if applicable)
9 Spectrum analyzer

6.2.2. Frequency stability vs. supply voltage

The frequency stability vs. supply voltage was measured with a spectrum analyzer connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode using the assigned frequency.

The trace mode of the spectrum analyzer was set to write with frequency count mode activated:
RBW = 100 Hz, VBW = 100 Hz, span = 20 kHz, sweep = 1.5 s (auto mode)

See figure 1 for the measurement setup.

Test equipment used (see equipment list for details):
02, 18, 51, 69, 70, 71

6.3. Occupied Bandwidth (CFR47 §90.217, §2.1049)

The emission bandwidth was measured as occupied bandwidth with a spectrum analyzer connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode using the assigned frequency.

The occupied bandwidth measurement was performed referring to 99% of total power:
The trace mode of the spectrum analyzer was set to max hold with
RBW = 100 Hz, VBW = 100 Hz, span = 40 kHz, sweep = 3 s (auto mode)

See figure 2 for the measurement setup.

Test equipment used (see equipment list for details):
02, 18, 51, 69, 70, 71

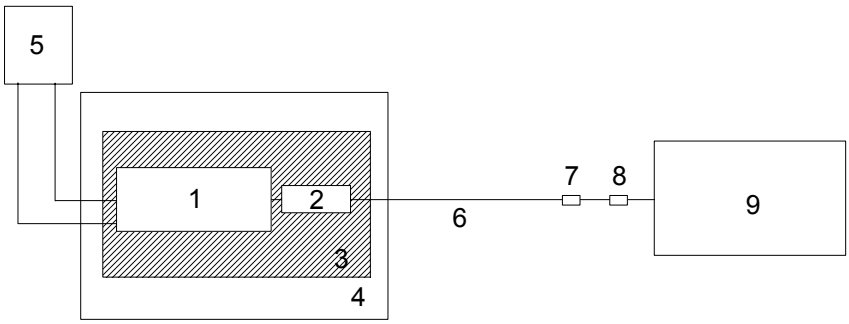


Figure 2: Measurement setup for testing within temperature test chamber

1 Transmitter (EUT)
2 Probe antenna
3 Wooden support
4 Temperature test chamber
5 DC power supply
6 Test cable
7 DC-block
8 Attenuator (if applicable)
9 Spectrum analyzer

6.4. Unwanted Emission (CFR47 §90.217, §2.1051)

Unwanted emission was measured radiated and, if applcable, conducted at antenna connector.

6.4.1. Radiated Unwanted Emission

Radiated emissions were measured over the frequency range from 30 MHz to 6 GHz. For final testing the detector-function of the spectrum analyzer was set to positive peak and trace mode max hold:
f < 1 GHz: RBW = 30 kHz, VBW = 30 kHz, span as required, sweep = auto mode
f ≥ 1 GHz: RBW = 1 MHz, VBW = 1 MHz, span as required, sweep = auto mode

Measurements were made in both the horizontal and vertical planes of polarization. The scans were taken in a fully-anechoic room using a spectrum analyzer with the detector function set to peak and resolution bandwidth set to 30 kHz. All tests were performed at a test-distance of 3 meters. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. During the tests the EUT was rotated all around to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions.

Final testing was performed referring to substitution method as described in TIA/EIA-603, section 2.2.12 ("Radiated Spurious Emissions").

For recording the emission mask the detector-function of the spectrum analyzer was set to positive peak and trace mode max hold with the following settings:
RBW = 300 Hz, VBW = 300 Hz, span as required, sweep = auto mode

See figure 3 for the measurement setup.

Test equipment used (see equipment list for details):
01, 06, 12, 15, 38, 39, 40, 41, 55, 58, 61, 64, 66

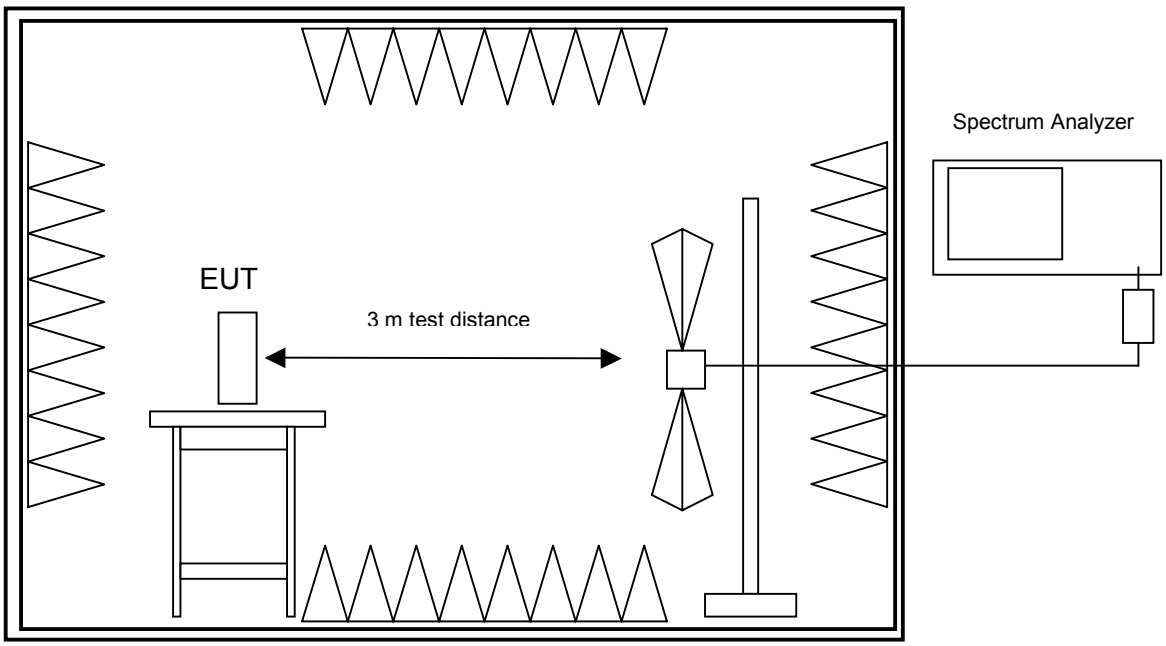
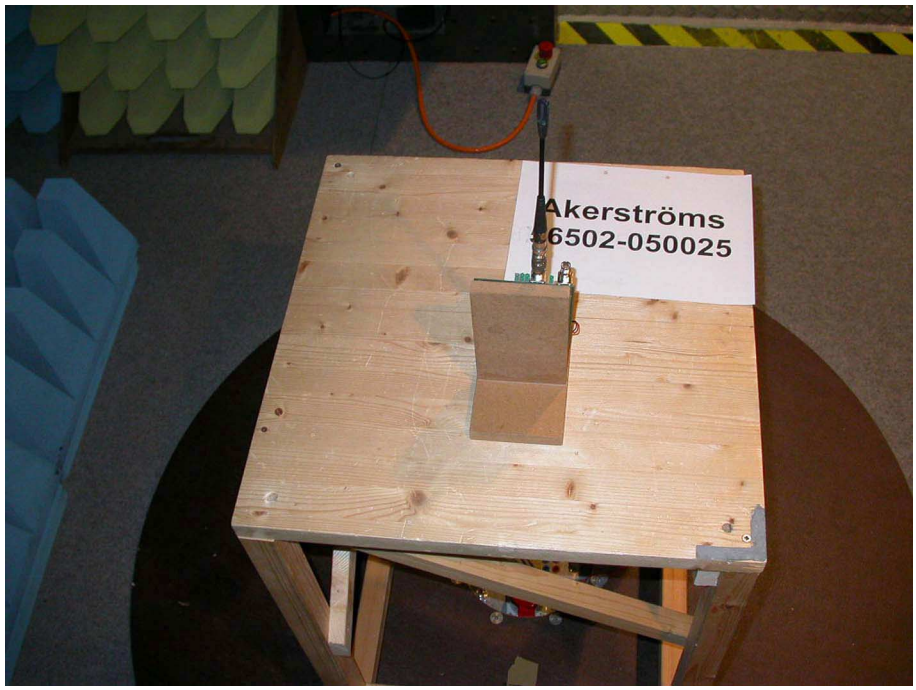


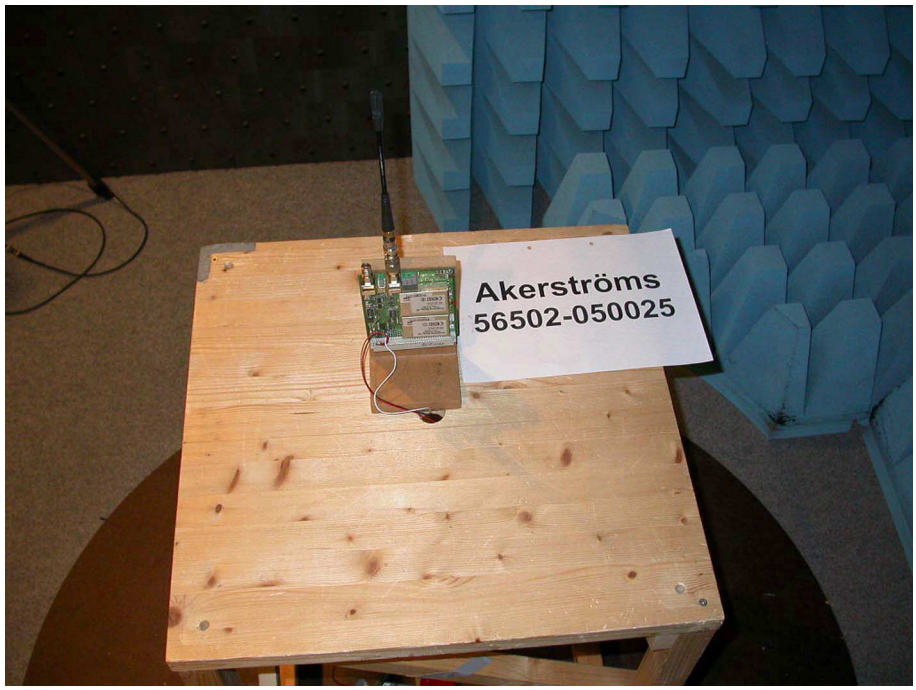
Figure 3: Measurement setup for radiated emission test

7. Photographs of Test Setups

Test setup for radiated unwanted radiation 30 MHz - 5 GHz



Test setup for radiated unwanted radiation 30 MHz - 5 GHz



8. Equipment List

To facilitate reference to test equipment used for related tests, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory.

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	R 3271	05050023	Advantest
02	EMI Test Receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
03	Test Receiver	ESH 3	880112/032	Rohde & Schwarz
04	Test Receiver	ESHS 10	860043/016	Rohde & Schwarz
05	Test Receiver	ESV	881414/009	Rohde & Schwarz
06	Test Receiver	ESVP	881120/024	Rohde & Schwarz
07	Audio Analyzer	UPA	862954	Rohde & Schwarz
08	Power Meter	NRVS	836856/015	Rohde & Schwarz
09	Power Sensor	NRV-Z52	837901/030	Rohde & Schwarz
10	Power Sensor	NRV-Z4	863828/015	Rohde & Schwarz
11	Preamplifier	ESV-Z3	860907/004	Rohde & Schwarz
12	Preamplifier	R14601		Advantest
13	Preamplifier	ACX/080-3030	32640	CTT
14	Preamplifier	ACO/180-3530	32641	CTT
15	Signal generator	SMY 01	830694/001	Rohde & Schwarz
16	Signal Generator	HP 8673 D	2930A00966	Hewlett Packard
17	Waveform Generator	HP 33120 A	US34005375	Hewlett Packard
18	Attenuator 20 dB	4776-20	9503	Narda
19	Attenuator 10 dB	4776-10	9412	Narda
20	Pulse Limiter	ESH 3-Z2	1144	Rohde & Schwarz
21	Pulse Limiter	11947 A	3107A00566	Hewlett Packard
22	V-Network	ESH 3-Z5	862770/018	Rohde & Schwarz
23	V-Network	ESH 3-Z5	894785/005	Rohde & Schwarz
24	V-Network	ESH 3-Z5	830952/025	Rohde & Schwarz
25	V-Network	ESH 3-Z6	830722/010	Rohde & Schwarz
26	V-Network	NSLK 8127	8127152	Schwarzbeck
27	V-Network	NNLA 8119	8119148	Schwarzbeck
28	V-Network	SE 01	01	Senton
29	T-Network	ESH 3-Z4	890602/011	Rohde & Schwarz
30	T-Network	ESH 3-Z4	890602/012	Rohde & Schwarz
31	High Impedance Probe	TK 9416	01	Schwarzbeck
32	High Impedance Probe	TK 9416	02	Schwarzbeck
33	Current Probe	ESH 2-Z1	863366/18	Rohde & Schwarz
34	Current Probe	ESV-Z1	862553/3	Rohde & Schwarz

No.	Type	Model	Serial Number	Manufacturer
35	Absorbing Clamp	MDS 21	80911	Lüthi
36	Absorbing Clamp	MDS 21	79690	Lüthi
37	Loop Antenna	HFH2-Z2	882964/1	Rohde & Schwarz
38	Biconical Antenna	HK 116	842204/001	Rohde & Schwarz
39	Biconical Antenna	HK 116	836239/02	Rohde & Schwarz
40	Log. Periodic Antenna	HL 223	841516/023	Rohde & Schwarz
41	Log. Periodic Antenna	HL 223	834408/12	Rohde & Schwarz
42	Horn Antenna	3115	9508-4553	Emco
43	Horn Antenna	3160-03	9112-1003	Emco
44	Horn Antenna	3160-04	9112-1001	Emco
45	Horn Antenna	3160-05	9112-1001	Emco
46	Horn Antenna	3160-06	9112-1001	Emco
47	Horn Antenna	3160-07	9112-1008	Emco
48	Horn Antenna	3160-08	9112-1002	Emco
49	Horn Antenna	3160-09	9403-1025	Emco
50	Digital multimeter	199	463386	Keithley
51	DC Power Supply	NGSM 32/10	203	Rohde & Schwarz
52	DC Power Supply	NGB	2455	Rohde & Schwarz
53	DC Power Supply	NGA	386	Rohde & Schwarz
54	Temperature Test Chamber	HT4010	07065550	Heraeus
55	Cable	RG214	1309	Senton
56	Cable	200CM_001	1357	Rosenberger
57	Cable	150CM_001	1479	Rosenberger
58	Cable Set EG1	RG214	1189 - 1191	Senton
59	Cable Set Cabine 1	RG214		Senton
60	Cable Set Cabine 2	RG214		Senton
61	Cable Set Cabine 3	RG214		Senton
62	Shielded Room	No. 1	1451	Senton
63	Shielded Room	No. 2	1452	Senton
64	Semi-anechoic Chamber	No. 3	1453	Siemens
65	Shielded Room	No. 4	1454	Euroshield
66	Open Area Test Site	EG 1		Senton
67	Cable for Antenna Connector			Lucent Technologies
68	DC Block 0.01-18GHz		8037	Inmet Corp.
69	DC Block	7006	A2798	Weinschel Corp.
70	Cable for Antenna Connector			Senton
71	Dummy load			Futaba Corporation

9. Referenced Regulations

All tests were performed with reference to the following regulations and standards:

☒	FCC Part 2	Code of Federal Regulations Part 2 Frequency allocation and radio treaty matters; General rules and regulations	October 01, 2001
☐	FCC Part 15 Subpart A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)	July 12, 2004
☐	FCC Part 15 Subpart B	Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)	July 12, 2004
☐	FCC Part 15 Subpart C	Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC)	July 12, 2004
☐	FCC Part 74 Subpart H	Code of Regulations Part 15 (Radio Frequency Devices), Subpart H (Low Power Auxiliary Stations) of the Federal Communication Commission (FCC)	July 12, 2004
☒	CFR 47 Part 90	Code of Federal Regulations Part 90 (Private Land Mobile Radio Services) of the Federal Communication Commission (FCC)	October, 2002
☐	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	December 11, 2003 (published January 30, 2004)
☐	RSS-210	Radio Standards Specification RSS-210 Issue 5 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) of Industry Canada	November 2001
☐	CISPR 22	Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, “Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement”	1997
☒	TIA/EIA-603	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	February 1993
☒	TIA/EIA-603-1	Addendum to TIA/EIA-603	March 4, 1998

10. List of Measurements

CFR 47 Part 90 CFR 47 Part 2 Subpart J			
Section(s):	**Test**	**Page**	**Result**
90.217, 2.1046	Maximum transmitter power	23	Passed
90.217, 2.1055	Frequency tolerance	24 - 29	Passed
90.217, 2.1049	Occupied bandwidth	30 - 31	Passed
90.217, 2.1051	Unwanted emission 30 MHz - 5 GHz	36 - 44	Passed

11. Test Results

MAXIMUM TRANSMITTER POWER - RADIATED SECTIONS 90.217, 2.1046

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- operating with f = 406.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Test conditions:

Temperature: +20°C
Voltage supply: (7.5 V DC nominal)

Note 1:

Limit of +20.8 dBm corresponds to 120 mW.

Note 2:

For calculation of correction factors see tables "Test Site Calibration Data Sheets" (supplied as additional information summarized on page 46).

Position of EUT	Antenna polarization	Frequency (MHz)	Reading value (dBm)	Correction factor (dB)	E(I)RP (dBm)	Limit (dBm)	Margin to limit (dB)
vertical, antenna vertical	vertical	406,700	-11,6	28,7	17,2	20,8	+3,7
vertical, antenna vertical	vertical	439,325	-11,0	28,2	17,2	20,8	+3,6
vertical, antenna vertical	vertical	468,700	-12,9	28,1	15,1	20,8	+5,7

Result: Test passed

FREQUENCY STABILITY VS. TEMPERATURE Sections 90.217, 2.1055

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- without modulation
- operating with f = 406.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

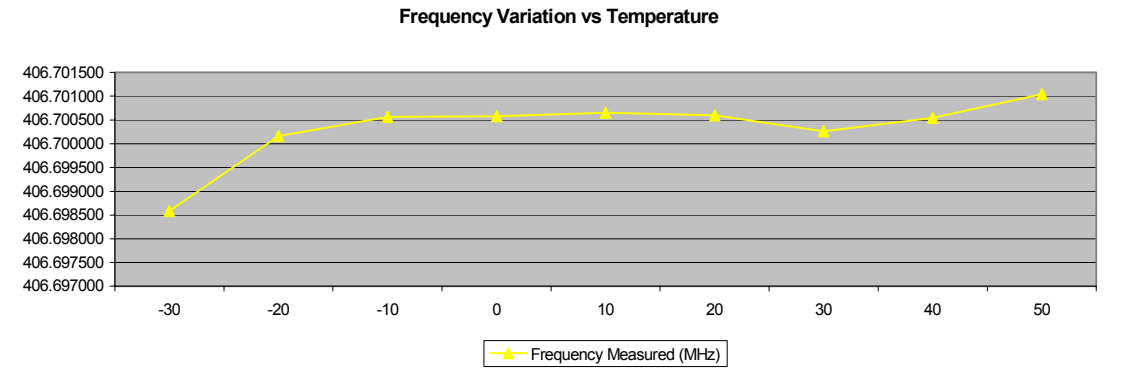
Test conditions:

Temperature range: -30 to +50°C
Supply voltage: 7.5 V DC

Specifications:

Frequency tolerance: No requirement specified for transmitters with output power less than 120 mW according to section 90.217. However, results are referred to in order to demonstrate compliance with section 90.217b (spectrum mask).

Temperature (°C)	Nominal Frequency (MHz)	Frequency Measured (MHz)	Frequency Tolerance (kHz)	(ppm)	Limit (ppm)
-30	406.700600	406.698580	-2.020	-4.97	
-20	406.700600	406.700160	-0.440	-1.08	
-10	406.700600	406.700570	-0.030	-0.07	
0	406.700600	406.700580	-0.020	-0.05	
10	406.700600	406.700650	0.050	0.12	
20	406.700600	406.700600	0.000	0.00	
30	406.700600	406.700260	-0.340	-0.84	
40	406.700600	406.700540	-0.060	-0.15	
50	406.700600	406.701040	0.440	1.08	



Result: Test passed

FREQUENCY STABILITY VS. TEMPERATURE Sections 90.217, 2.1055

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- without modulation
- operating with f = 439.325 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

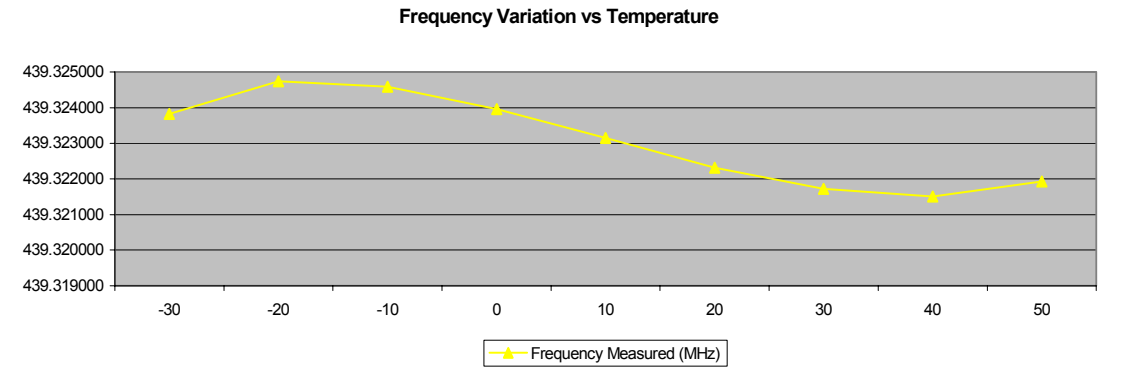
Test conditions:

Temperature range: -30 to +50°C
Supply voltage: 7.5 V DC

Specifications:

Frequency tolerance: No requirement specified for transmitters with output power less than 120 mW according to section 90.217. However, results are referred to in order to demonstrate compliance with section 90.217b (spectrum mask).

Temperature (°C)	Nominal Frequency (MHz)	Frequency Measured (MHz)	Frequency Tolerance (kHz)	(ppm)	Limit (ppm)
-30	439.322319	439.323829	1.510	3.44	
-20	439.322319	439.324737	2.418	5.50	
-10	439.322319	439.324587	2.268	5.16	
0	439.322319	439.323954	1.635	3.72	
10	439.322319	439.323150	0.831	1.89	
20	439.322319	439.322319	0.000	0.00	
30	439.322319	439.321721	-0.598	-1.36	
40	439.322319	439.321507	-0.812	-1.85	
50	439.322319	439.321929	-0.389	-0.89	



Result: Test passed

FREQUENCY STABILITY VS. TEMPERATURE Sections 90.217, 2.1055

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- without modulation
- operating with f = 468.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

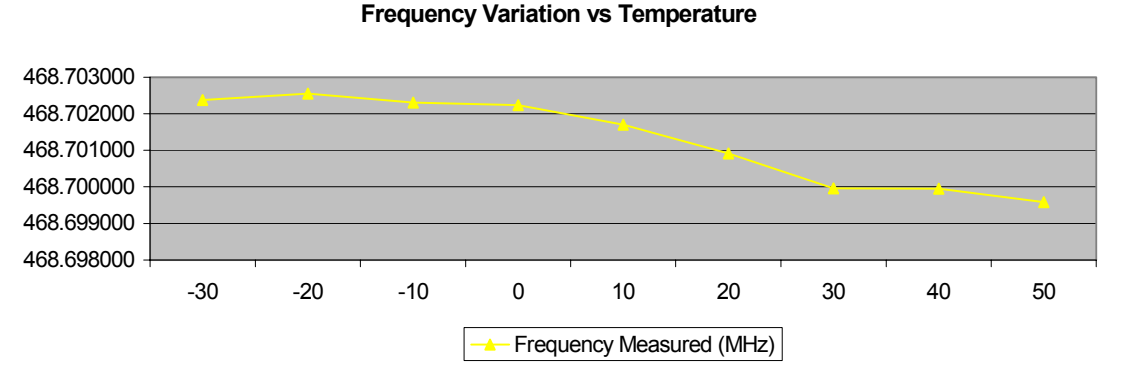
Test conditions:

Temperature range: -30 to +50°C
Supply voltage: 7.5 V DC

Specifications:

Frequency tolerance: No requirement specified for transmitters with output power less than 120 mW according to section 90.217. However, results are referred to in order to demonstrate compliance with section 90.217b (spectrum mask).

Temperature (°C)	Nominal Frequency (MHz)	Frequency Measured (MHz)	Frequency Tolerance (kHz)	(ppm)	Limit (ppm)
-30	468.700911	468.702376	1.465	3.13	
-20	468.700911	468.702554	1.643	3.51	
-10	468.700911	468.702311	1.399	2.99	
0	468.700911	468.702235	1.324	2.82	
10	468.700911	468.701703	0.792	1.69	
20	468.700911	468.700911	0.000	0.00	
30	468.700911	468.699958	-0.953	-2.03	
40	468.700911	468.699945	-0.966	-2.06	
50	468.700911	468.699580	-1.331	-2.84	



Result: Test passed

FREQUENCY STABILITY VS. SUPPLY VOLTAGE Sections 90.217, 2.1055

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- without modulation
- operating with f = 406.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Test conditions:

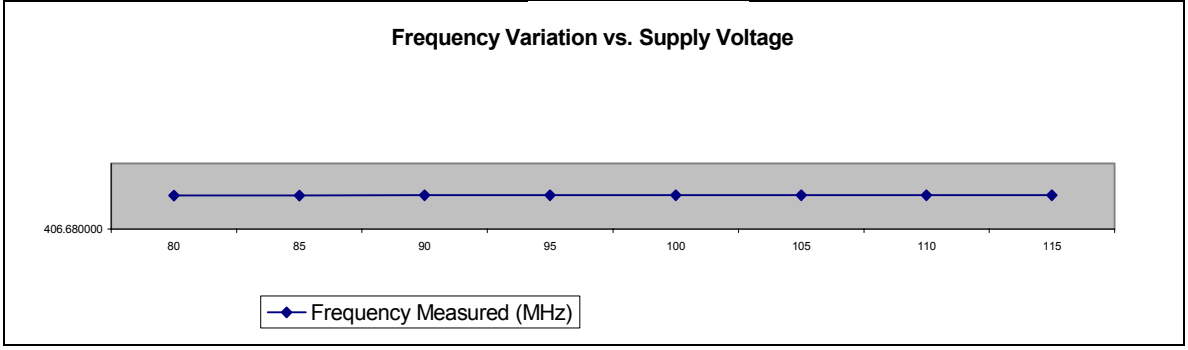
Temperature: +20°C
Nominal supply voltage: 7.5 V DC

Specifications:

Frequency tolerance: No requirement specified for transmitters with output power less than 120 mW according to section 90.217. However, results are referred to in order to demonstrate compliance with section 90.217b (spectrum mask).

Voltage range: ±15 % of nominal supply voltage (5 % steps)

Supply Voltage (%)	Supply Voltage (V)	Nominal Frequency (MHz)	Frequency Measured (MHz)	Frequency Tolerance (kHz)	Frequency Tolerance (ppm)	Limit (ppm)
80	5.76	406.700600	406.700580	-0.020	-0.05	
85	6.12	406.700600	406.700580	-0.020	-0.05	
90	6.48	406.700600	406.700590	-0.010	-0.02	
95	6.84	406.700600	406.700600	0.000	0.00	
100	7.20	406.700600	406.700600	0.000	0.00	
105	7.56	406.700600	406.700600	0.000	0.00	
110	7.92	406.700600	406.700600	0.000	0.00	
115	8.28	406.700600	406.700600	0.000	0.00	



Result: Test passed

FREQUENCY STABILITY VS. SUPPLY VOLTAGE Sections 90.217, 2.1055

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- without modulation
- operating with f = 439.325 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Test conditions:

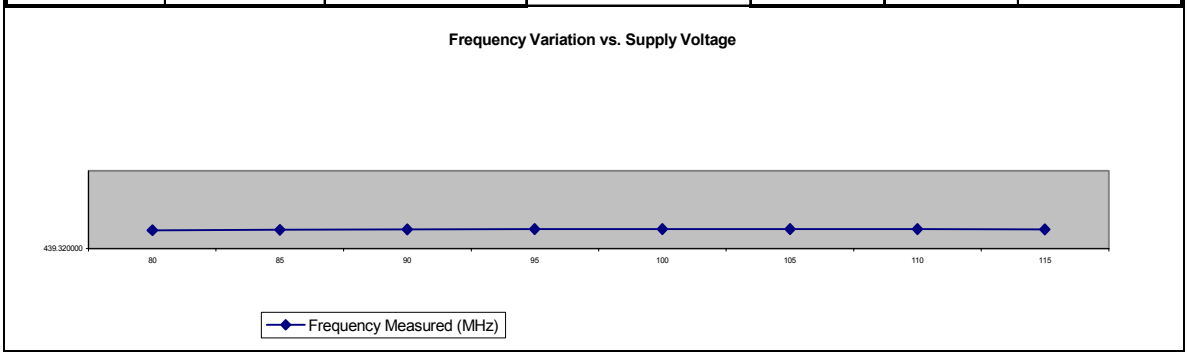
Temperature: +20°C
Nominal supply voltage: 7.5 V DC

Specifications:

Frequency tolerance: No requirement specified for transmitters with output power less than 120 mW according to section 90.217. However, results are referred to in order to demonstrate compliance with section 90.217b (spectrum mask).

Voltage range: ±15 % of nominal supply voltage (5 % steps)

Supply Voltage (%)	Supply Voltage (V)	Nominal Frequency (MHz)	Frequency Measured (MHz)	Frequency Tolerance (kHz)	Frequency Tolerance (ppm)	Limit (ppm)
80	5.76	439.322520	439.322370	-0.150	-0.34	
85	6.12	439.322520	439.322430	-0.090	-0.20	
90	6.48	439.322520	439.322480	-0.040	-0.09	
95	6.84	439.322520	439.322510	-0.010	-0.02	
100	7.20	439.322520	439.322520	0.000	0.00	
105	7.56	439.322520	439.322520	0.000	0.00	
110	7.92	439.322520	439.322510	-0.010	-0.02	
115	8.28	439.322520	439.322490	-0.030	-0.07	



Result: Test passed

FREQUENCY STABILITY VS. SUPPLY VOLTAGE Sections 90.217, 2.1055

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- without modulation
- operating with f = 468.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Test conditions:

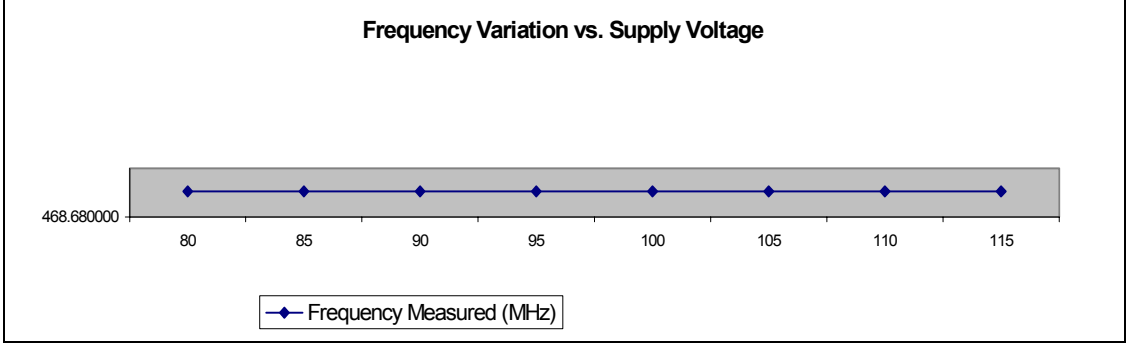
Temperature: +20°C
Nominal supply voltage: 7.5 V DC

Specifications:

Frequency tolerance: No requirement specified for transmitters with output power less than 120 mW according to section 90.217. However, results are referred to in order to demonstrate compliance with section 90.217b (spectrum mask).

Voltage range: ±15 % of nominal supply voltage (5 % steps)

Supply Voltage (%)	Supply Voltage (V)	Nominal Frequency (MHz)	Frequency Measured (MHz)	Frequency Tolerance (kHz)	Frequency Tolerance (ppm)	Limit (ppm)
80	5.76	468.701099	468.701034	-0.065	-0.14	
85	6.12	468.701099	468.701069	-0.030	-0.06	
90	6.48	468.701099	468.701088	-0.011	-0.02	
95	6.84	468.701099	468.701098	-0.001	0.00	
100	7.20	468.701099	468.701099	0.000	0.00	
105	7.56	468.701099	468.701092	-0.007	-0.01	
110	7.92	468.701099	468.701081	-0.018	-0.04	
115	8.28	468.701099	468.701065	-0.034	-0.07	



Result: Test passed

OCCUPIED BANDWIDTH — Sections 90.217, 2.1049

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode: - transmitting continuously (TX mode)
- with modulation
- operating with f = 406.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Test conditions:

Temperature: +20°C
Supply voltage: 7.5 V DC

Specifications:

Tested on: Antenna connector
Authorized bandwidth: Not specified
Test procedure: TIA/EIA-603 (99% of total power with RBW as close to, but not less than 1% of the 99% power bandwidth)

Test procedure	Measured occupied bandwidth (kHz)	Limit (kHz)
TIA/EI-603	5.000	N/A

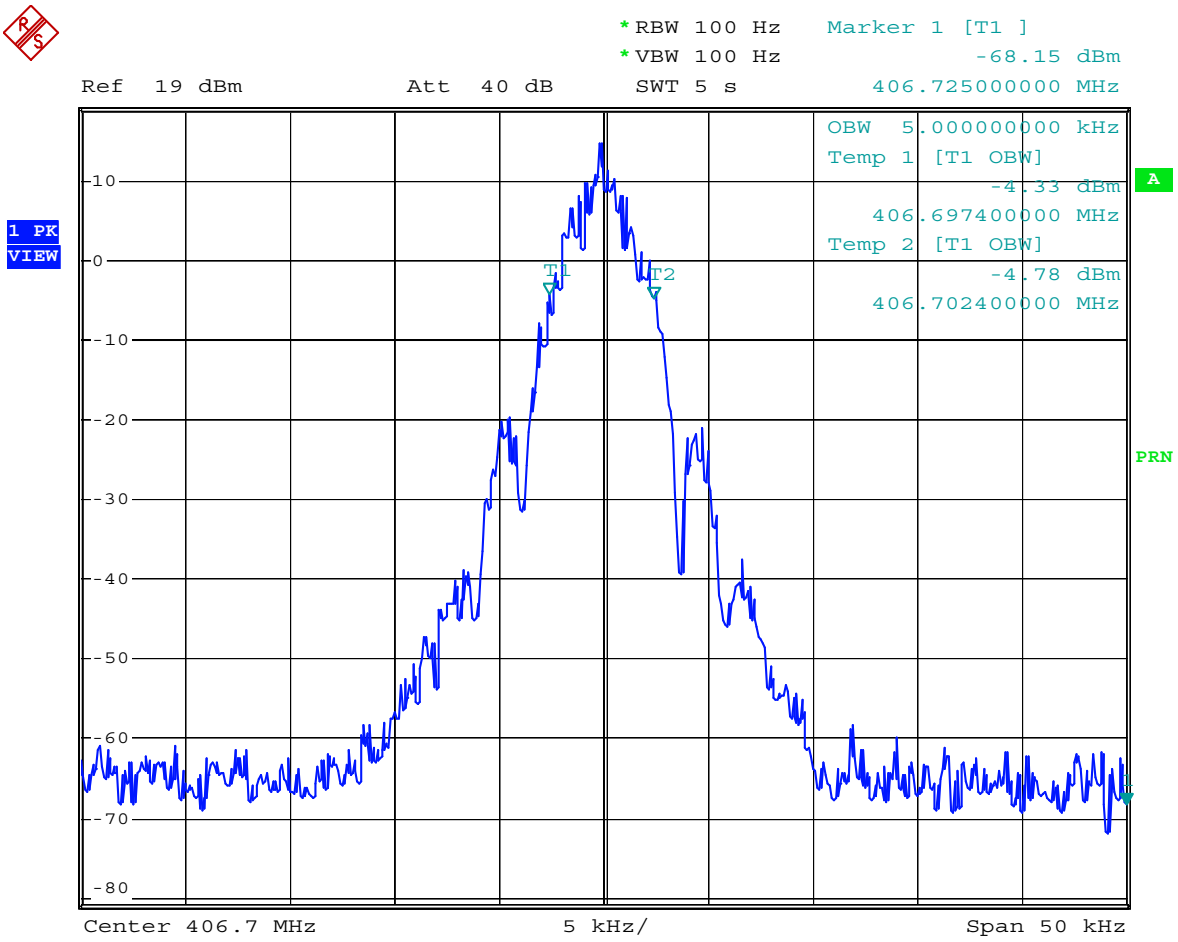
Note:

For details on occupied bandwidth see plot on following page.

Result: Test passed

OCCUPIED BANDWIDTH
- CONTINUED -

Sections 90.217, 2.1049



Comment: AK050025 OBW LOW Band
Date: 8.APR.2005 11:03:33

OCCUPIED BANDWIDTH — Sections 90.217, 2.1049

EUT:	400T5
Serial number:	---
Applicant:	Akerströms Björbo AB
Mode:	- transmitting continuously (TX mode) - with modulation - operating with f = 439.325 MHz
Date of test:	08 April 2005
Operator:	Thomas Eberl

Test conditions:

Temperature:	+20°C
Supply voltage:	7.5 V DC

Specifications:

Tested on:	Antenna connector
Authorized bandwidth:	Not specified
Test procedure:	TIA/EIA-603 (99% of total power with RBW as close to, but not less than 1% of the 99% power bandwidth)

Test procedure	Measured occupied bandwidth (kHz)	Limit (kHz)
TIA/EI-603	5.000	N/A

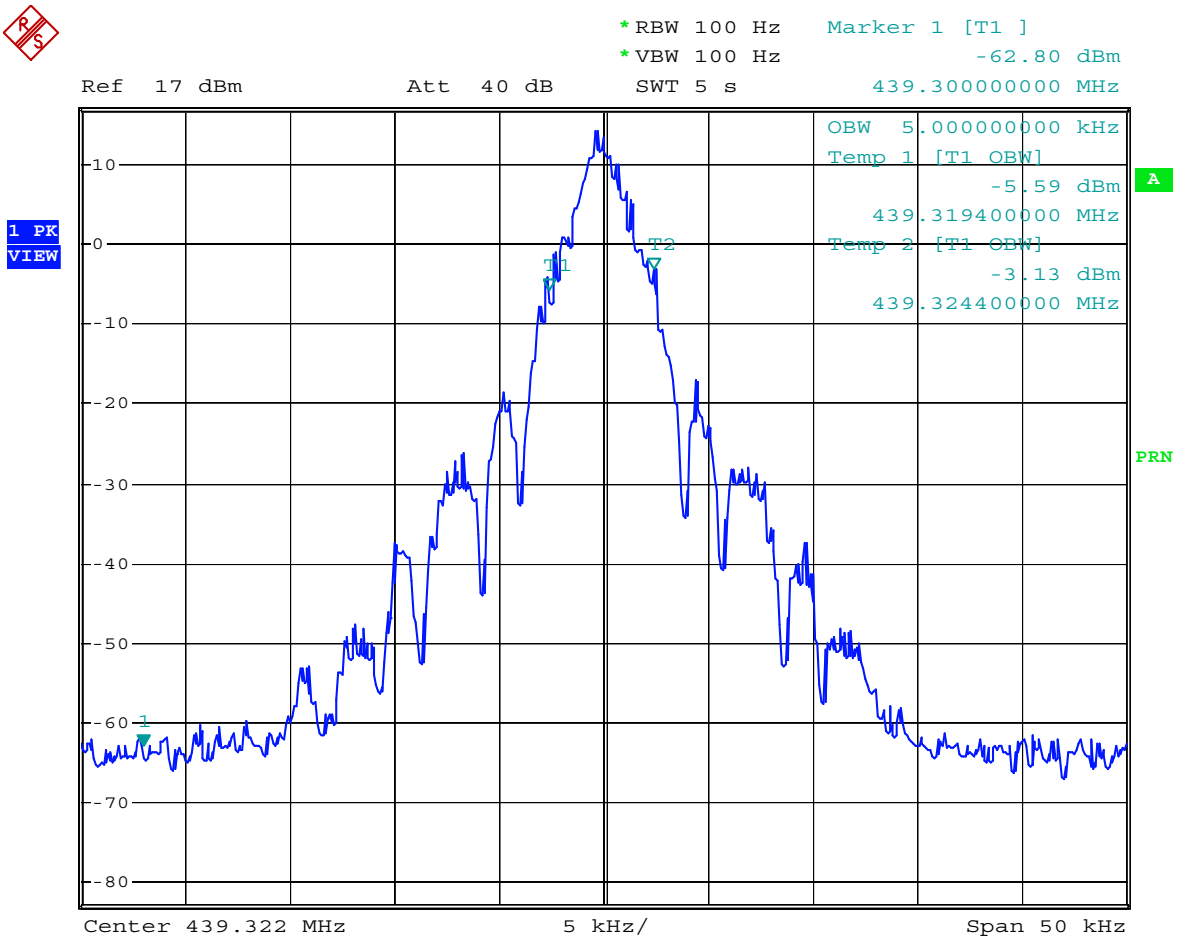
Note:

For details on occupied bandwidth see plot on following page.

Result: Test passed

OCCUPIED BANDWIDTH
- CONTINUED -

Sections 90.217, 2.1049



Comment: AK050025 OBW Med Band
Date: 8.APR.2005 10:47:52

OCCUPIED BANDWIDTH — Sections 90.217, 2.1049

EUT:	400T5
Serial number:	---
Applicant:	Akerströms Björbo AB
Mode:	- transmitting continuously (TX mode) - with modulation - operating with f = 468.700 MHz
Date of test:	08 April 2005
Operator:	Thomas Eberl

Test conditions:

Temperature:	+20°C
Supply voltage:	7.5 V DC

Specifications:

Tested on:	Antenna connector
Authorized bandwidth:	Not specified
Test procedure:	TIA/EIA-603 (99% of total power with RBW as close to, but not less than 1% of the 99% power bandwidth)

Test procedure	Measured occupied bandwidth (kHz)	Limit (kHz)
TIA/EI-603	5.000	N/A

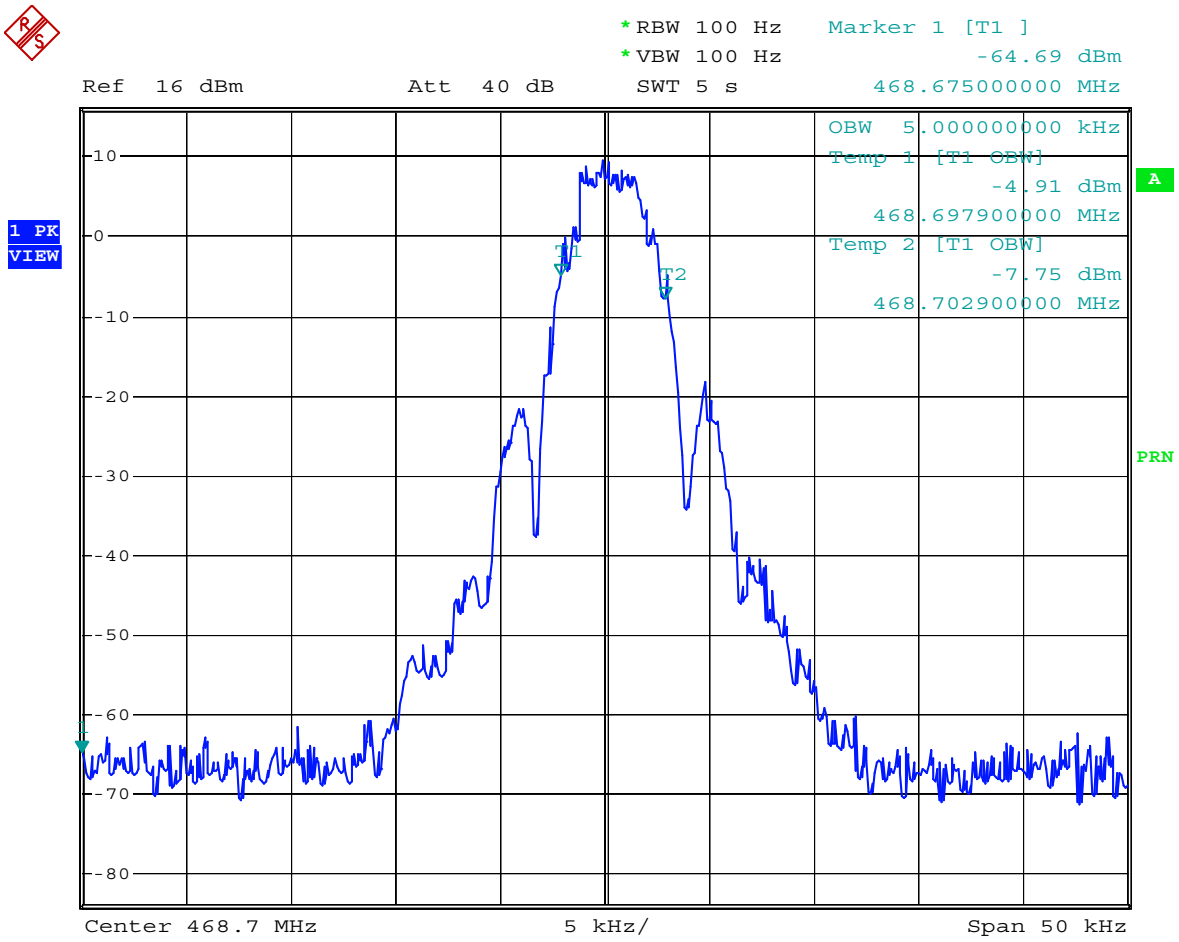
Note:

For details on occupied bandwidth see plot on following page.

Result: Test passed

OCCUPIED BANDWIDTH
- CONTINUED -

Sections 90.217, 2.1049



Comment: AK050025 OBW HIGH Band
Date: 8.APR.2005 11:08:07

RADIATED UNWANTED EMISSION 30 MHZ - 1 GHZ (EMISSION MASK) — Section 90.217b

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- operating with f = 406.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Specifications:

Test-distance: 3 meters
Channel bandwidth: 12.5 kHz
Assigned Frequency: 406.700 MHz
Limit: Minimum attenuation in dB relative to the unmodulated carrier power with $f_{assigned}$ as the assigned frequency:

Frequency range	Minimum attenuation (dB)
$f > f_{assigned}$ - 25 kHz and $f < f_{assigned}$ + 25 kHz:	0
$f \leq f_{assigned}$ - 25 kHz or $f \geq f_{assigned}$ + 25 kHz:	30

Note:

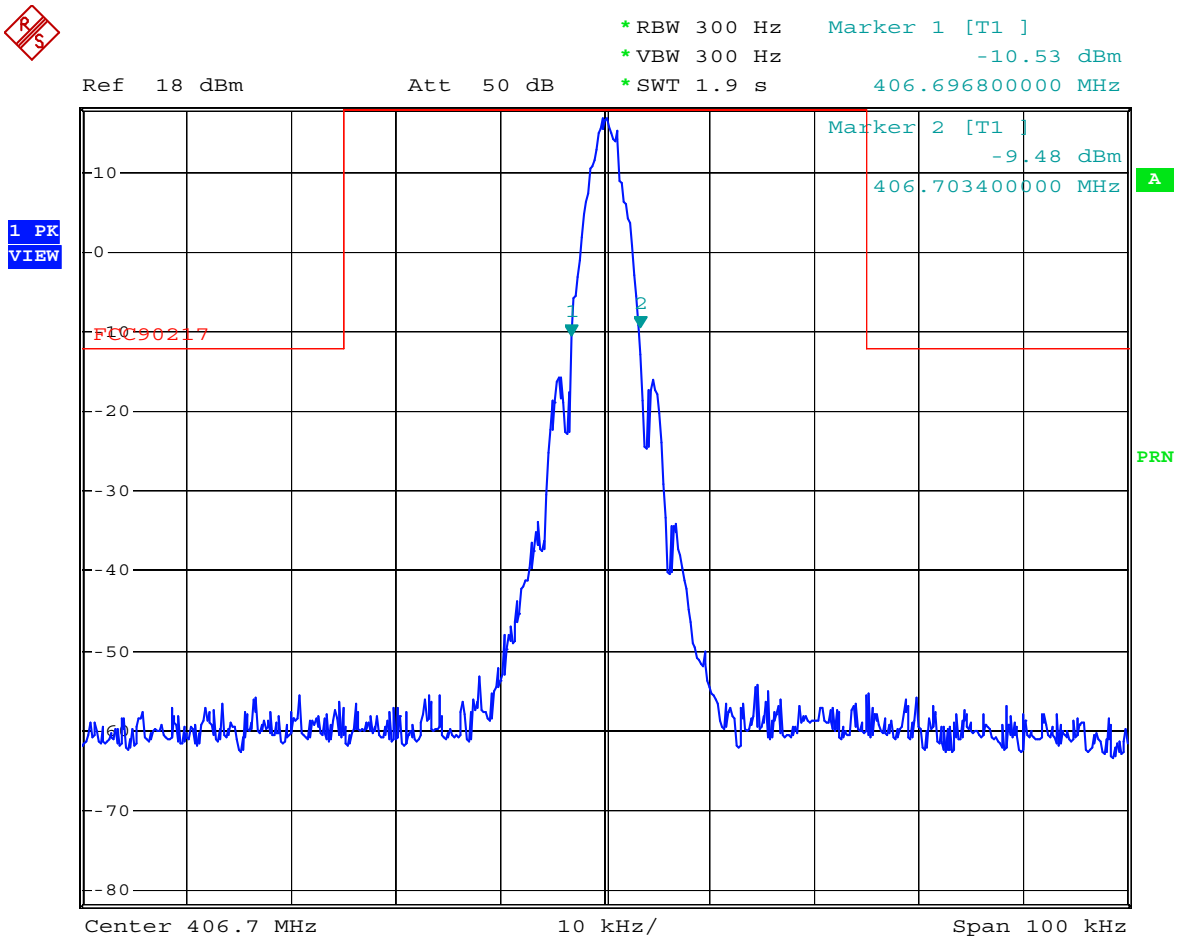
For details on occupied bandwidth see plot on following page. To demonstrate compliance with the emission mask the bandwidth required for frequency stability has to be included into the calculations.

	Frequency (MHz)	Attenuation (dB)	Frequency tolerance (kHz)	Calculated frequency (MHz)	Assigned frequency (MHz)	Frequency mask (kHz)	Limit (MHz)
Minimum	406.69680	30	-2.00	406.69480	406.7	25	406.67500
Maximum	406.70340	30	0.44	406.70384	406.7	25	406.72500

Result: Test passed

RADIATED UNWANTED EMISSION 30 MHZ - 1 GHZ (EMISSION MASK) - CONTINUED -

Section 90.217b



Comment: AK050025 Emission Mask LOW Band
Date: 8.APR.2005 11:32:52

RADIATED UNWANTED EMISSION 30 MHZ - 1 GHZ (EMISSION MASK) — Section 90.217b

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- operating with f = 439.325 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Specifications:

Test-distance: 3 meters
Channel bandwidth: 12.5 kHz
Assigned Frequency: 439.325 MHz
Limit: Minimum attenuation in dB relative to the unmodulated carrier power with $f_{assigned}$ as the assigned frequency:

Frequency range	Minimum attenuation (dB)
$f > f_{assigned}$ - 25 kHz and $f < f_{assigned}$ + 25 kHz:	0
$f \leq f_{assigned}$ - 25 kHz or $f \geq f_{assigned}$ + 25 kHz:	30

Note:

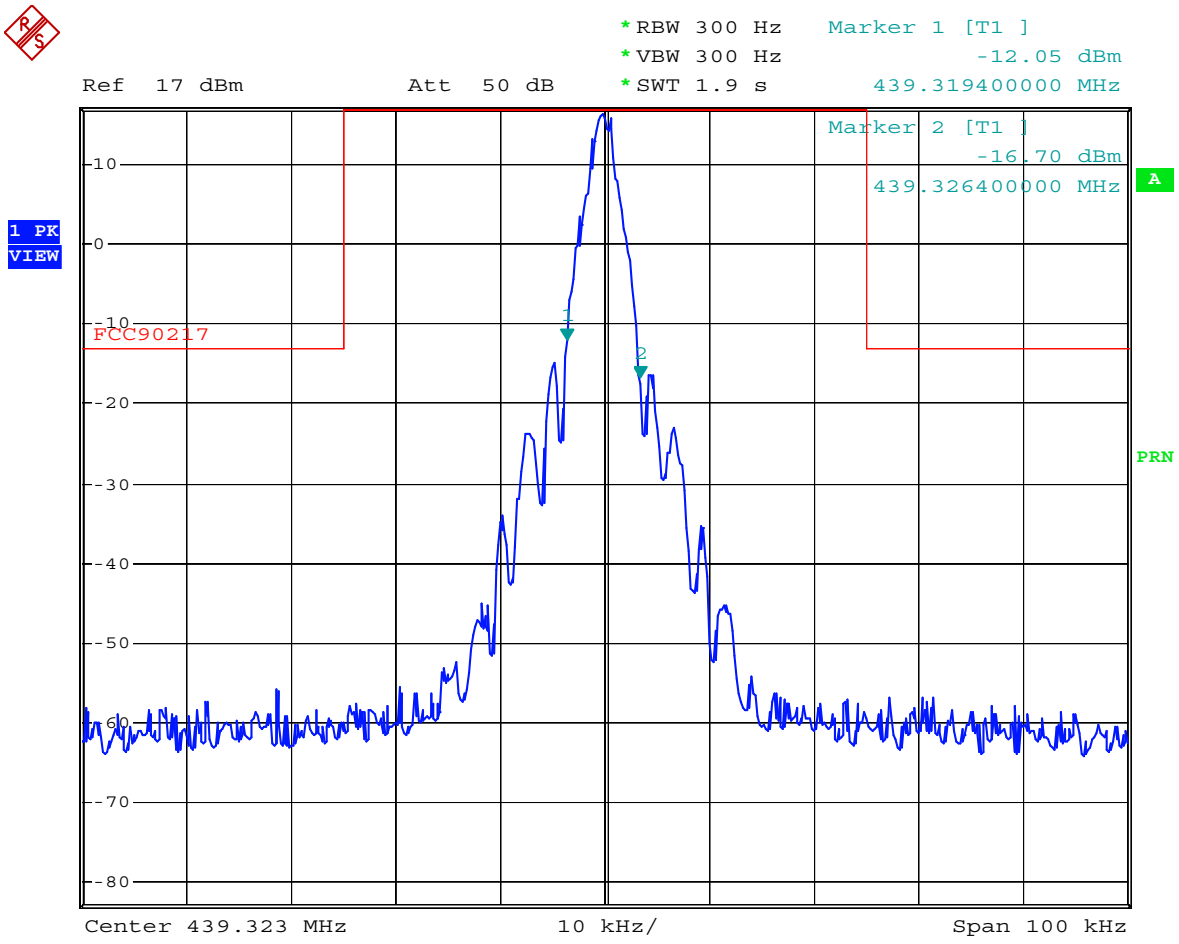
For details on occupied bandwidth see plot on following page. To demonstrate compliance with the emission mask the bandwidth required for frequency stability has to be included into the calculations.

	Frequency (MHz)	Attenuation (dB)	Frequency tolerance (kHz)	Calculated frequency (MHz)	Assigned frequency (MHz)	Frequency mask (kHz)	Limit (MHz)
Minimum	439.31940	30	-0.80	439.31860	439.325	25	439.30000
Maximum	439.32640	30	2.40	439.32880	439.325	25	439.35000

Result: Test passed

RADIATED UNWANTED EMISSION 30 MHZ - 1 GHZ (EMISSION MASK) - CONTINUED -

Section 90.217b



Comment: AK050025 Emission Mask MED Band
Date: 8.APR.2005 11:29:11

RADIATED UNWANTED EMISSION 30 MHZ - 1 GHZ (EMISSION MASK) — Section 90.217b

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- operating with f = 468.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Specifications:

Test-distance: 3 meters
Channel bandwidth: 12.5 kHz
Assigned Frequency: 468.700 MHz
Limit: Minimum attenuation in dB relative to the unmodulated carrier power with $f_{assigned}$ as the assigned frequency:

Frequency range	Minimum attenuation (dB)
$f > f_{assigned}$ - 25 kHz and $f < f_{assigned}$ + 25 kHz:	0
$f \leq f_{assigned}$ - 25 kHz or $f \geq f_{assigned}$ + 25 kHz:	30

Note:

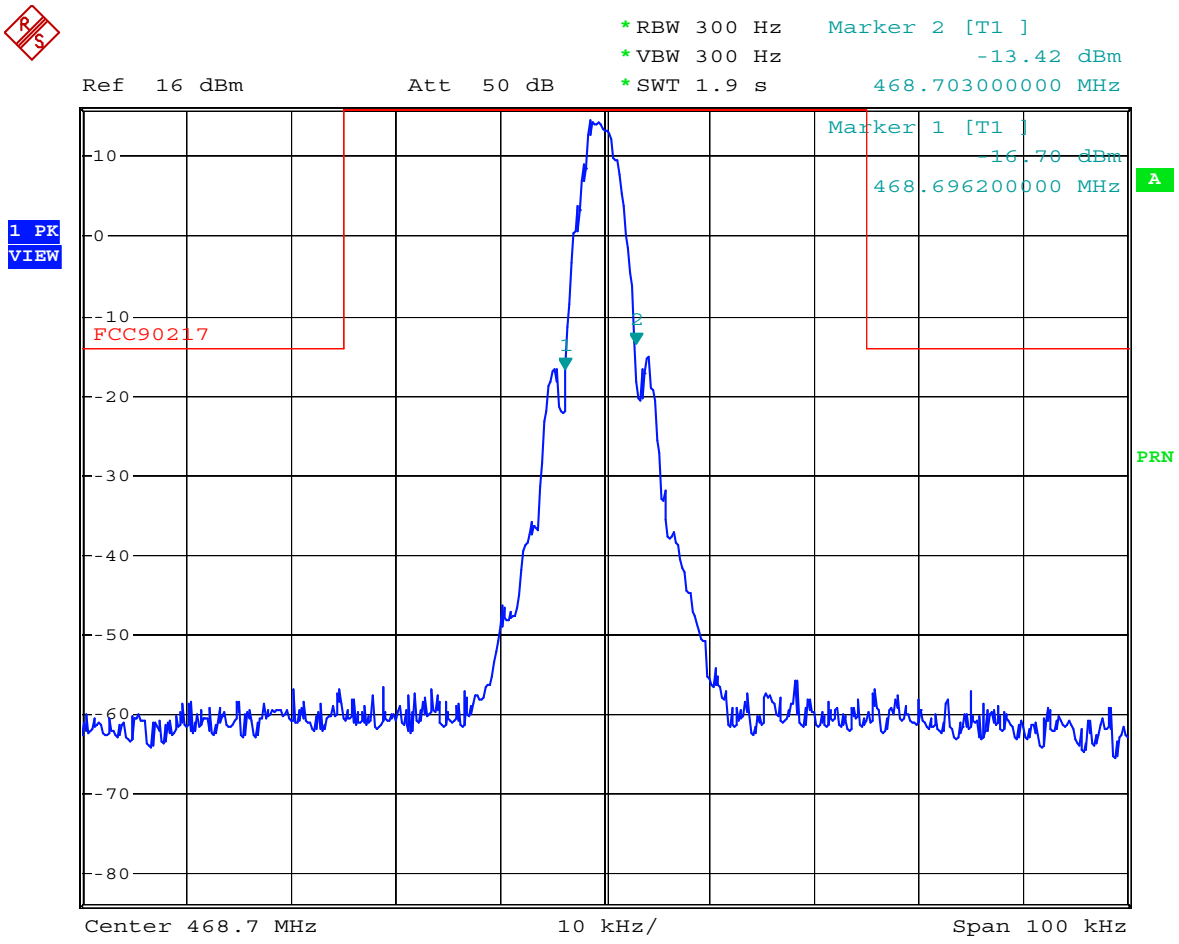
For details on occupied bandwidth see plot on following page. To demonstrate compliance with the emission mask the bandwidth required for frequency stability has to be included into the calculations.

	Frequency (MHz)	Attenuation (dB)	Frequency tolerance (kHz)	Calculated frequency (MHz)	Assigned frequency (MHz)	Frequency mask (kHz)	Limit (MHz)
Minimum	468.69620	30	-1.30	468.69490	468.7	25	468.67500
Maximum	468.70300	30	1.42	468.70442	468.7	25	468.72500

Result: Test passed

RADIATED UNWANTED EMISSION 30 MHZ - 1 GHZ (EMISSION MASK) - CONTINUED -

Section 90.217b



Comment: AK050025 Emission Mask HIGH Band
Date: 8.APR.2005 11:17:09

RADIATED UNWANTED EMISSION 30 MHZ - 5 GHZ Sections 90.217, 2.1051

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- TX mode
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- Low band frequency : 406.700 MHz

Date of test: 08 April 2005

Operator: Thomas Eberl

Specifications:

Test-distance: 3 meters
Limit: -20 dBm
derived from a required attenuation in dB of 50 + 10 log(P) relative to the unmodulated carrier with P as the carrier power in W.

Maximum transmitter power (conducted) :	N.A.	N.A.
Maximum carrier power (radiated) :	4 dBm	0.00251 Watt
Limit:	-20 dBm	0.00001 Watt

Frequency [MHz]	Polarization	Position	Reading Value [dBm]	Correction factor [dB]	E(I)RP [dBm]	Limit [dBm]	Margin to limit [dB]
2848.000	vertical	P1	-84.81	47.02	-37.79	-20.0	+17.8
4068.000	vertical	P1	-88.91	50.48	-38.43	-20.0	+18.4
4476.000	horizontal	P1	-86.85	50.63	-36.22	-20.0	+16.2
4884.000	horizontal	P1	-86.84	51.64	-35.20	-20.0	+15.2

Result: Test passed

RADIATED UNWANTED EMISSION 30 MHZ - 5 GHZ Sections 90.217, 2.1051

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- TX mode
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- Med band frequency : 439.325 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Specifications:

Test-distance: 3 meters
Limit: -20 dBm
derived from a required attenuation in dB of 50 + 10 log(P) relative to the unmodulated carrier with P as the carrier power in W.

Maximum transmitter power (conducted) :	N.A.	N.A.
Maximum carrier power (radiated) :	9.2 dBm	0.00831 Watt
Limit:	-20 dBm	0.00001 Watt

Frequency [MHz]	Polarization	Position	Reading Value [dBm]	Correction factor [dB]	E(I)RP [dBm]	Limit [dBm]	Margin to limit [dB]
2196.000	horizontal	P1	-84.04	44.71	-39.33	-20.00	+19.3
2636.000	horizontal	P1	-70.72	46.25	-24.47	-20.00	+4.5
3076.000	vertical	P1	-81.25	47.78	-33.47	-20.00	+13.5
3548.000	vertical	P1	-88.69	49.22	-39.47	-20.00	+19.5
4396.000	horizontal	P1	-89.20	50.60	-38.60	-20.00	+18.6

Result: Test passed

RADIATED UNWANTED EMISSION 30 MHZ - 6 GHZ Sections 90.217, 2.1051

EUT: 400T5
Serial number: ---
Applicant: Akerströms Björbo AB

Mode:
- TX mode
- transmitting continuously (TX mode)
- with modulation
- with supply voltage 7.5 V DC
- Highband frequency : 468.700 MHz

Date of test: 08 April 2005
Operator: Thomas Eberl

Specifications:

Test-distance: 3 meters
Limit: -20 dBm
derived from a required attenuation in dB of 50 + 10 log(P) relative to the unmodulated carrier with P as the carrier power in W.

Maximum transmitter power (conducted) :	N.A.	N.A.
Maximum carrier power (radiated) :	4.4dBm	0.00275 Watt
Limit:	-20 dBm	0.00001 Watt

Frequency [MHz]	Polarization	Position	Reading Value [dBm]	Correction factor [dB]	E(I)RP [dBm]	Limit [dBm]	Margin to limit [dB]
1172.000	vertical	P1	-79.34	40.49	-38.85	-20.00	18.85
1876.000	horizontal	P1	-75.69	43.39	-32.30	-20.00	12.30
2344.000	horizontal	P1	-69.01	45.22	-23.78	-20.00	3.78
2816.000	vertical	P1	-77.60	46.91	-30.69	-20.00	10.69
3044.000	vertical	P1	-85.98	47.68	-38.30	-20.00	18.30
3280.000	vertical	P1	-77.83	48.43	-29.40	-20.00	9.40
3752.000	horizontal	P1	-87.07	49.79	-37.28	-20.00	17.28
4688.000	horizontal	P1	-90.02	51.14	-38.88	-20.00	18.88

Result: Test passed

12. Additional Information supplementary to the Test Report

12.1. Calculation of the necessary bandwidth (Section 2.202b)

Calculation	$B_n = 2DK + B$
B = Modulation rate	B = 4.8 kHz
D = Peak deviation	D = 2.5 kHz
K = Overall numerical factor	K = 1
	$B_n = 2 \cdot (2.5\ kHz) \cdot 1 + 4.8\ kHz = 9.8\ kHz$
Type of Emission	**9K80F1D**

12.2. Additional Information

Item	Description	No. of Pages
1	Test Site Calibration Data Sheets	4

Test Site Calibration 25 MHz - 5 GHz
for ERP Measurements (Substitution Method)

Test site:	Semi-anechoic room, cabin no. 2
Test distance:	Standard position [m]: 3
Date:	07/15/2002
Operator:	R. Heller
Transmit antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. A-1261 Log.-per. antenna HL 223, Rohde & Schwarz, inv.-no. A-1262 Horn antenna EMCO 3115, EMCO, inv.-no. B-1516
Receiving antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. C-1560 Log.-per. antenna 3147, EMCO, inv.-no. A-1009
Signal source:	Tracking generator of ESMI, Rohde & Schwarz, inv.-no. A-1569, connected to transmit antenna via cables inv.-no. 1683, port 2 of AP 1 and 1592, nominal power at signal generator set to 0 dBm
Receiving cables:	Inv.-no. 1657, 1681 and 1592
Test receiver:	ESMI, Rohde & Schwarz, inv.-no. A-1569
Antenna heights:	TX antenna (h1): 1.5 metre RX antenna (h2): 1.5 metre
Antenna position:	TX antenna: center of turn table
Polarization:	horizontal

Frequency [MHz]	Transmit signal P tx [dBm]	TX antenna gain (isotropic) [dBi]	TX antenna gain (dipole) [dBd]	True transmit signal P true [dBm]	Analyzer reading P site [dBm]	Correction for reading in "dBm" [dB]
25.0	-1.1	-17.0	-19.2	-20.3	-44.9	25.3
30.0	-1.4	-13.8	-16.0	-17.3	-40.0	23.3
35.0	-1.5	-11.1	-13.3	-14.7	-36.1	22.0
40.0	-1.5	-8.8	-11.0	-12.5	-38.8	27.0
45.0	-1.6	-6.7	-8.9	-10.5	-35.7	25.9
50.0	-1.6	-5.1	-7.3	-8.9	-34.3	26.1
55.0	-1.7	-3.8	-6.0	-7.6	-32.9	25.9
60.0	-1.7	-2.8	-5.0	-6.7	-32.2	26.2
65.0	-1.7	-2.0	-4.2	-5.9	-31.4	26.2
70.0	-1.7	-1.3	-3.5	-5.2	-30.6	26.1
75.0	-1.8	-0.7	-2.9	-4.7	-30.4	26.4
80.0	-1.9	-0.1	-2.3	-4.1	-30.4	26.9
85.0	-1.9	0.2	-2.0	-3.9	-30.3	27.1
90.0	-2.0	0.5	-1.7	-3.6	-29.6	26.6
95.0	-2.0	0.6	-1.6	-3.6	-28.9	26.0
100.0	-2.0	0.7	-1.5	-3.5	-28.2	25.3
110.0	-2.1	0.9	-1.3	-3.3	-27.9	25.2
120.0	-2.1	1.0	-1.2	-3.3	-27.4	24.8
130.0	-2.2	1.1	-1.1	-3.3	-27.2	24.6
140.0	-2.3	1.4	-0.8	-3.0	-26.3	23.9
150.0	-2.3	1.8	-0.4	-2.7	-25.6	23.6
160.0	-2.4	1.9	-0.3	-2.6	-25.4	23.4
170.0	-2.4	2.0	-0.2	-2.6	-25.3	23.4
180.0	-2.5	2.1	0.0	-2.5	-25.6	23.7
190.0	-2.6	2.3	0.2	-2.4	-26.4	24.6
200.0	-2.6	2.3	0.2	-2.4	-27.8	26.0
200.1	-2.3	6.5	4.4	2.0	-19.4	22.0
220.0	-2.6	6.9	4.8	2.1	-19.6	22.4
240.0	-2.7	7.0	4.9	2.1	-20.5	23.3
260.0	-2.8	7.1	5.0	2.2	-21.5	24.4
280.0	-2.9	7.3	5.1	2.2	-22.9	25.7

Test Site Calibration 25 MHz - 5 GHz
for ERP Measurements (Substitution Method)

Test site:	Semi-anechoic room, cabin no. 2	
Test distance:	Standard position [m]:	3
Date:	07/15/2002	
Operator:	R. Heller	
Transmit antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. A-1261 Log.-per. antenna HL 223, Rohde & Schwarz, inv.-no. A-1262 Horn antenna EMCO 3115, EMCO, inv.-no. B-1516	
Receiving antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. C-1560 Log.-per. antenna 3147, EMCO, inv.-no. A-1009	
Signal source:	Tracking generator of ESMI, Rohde & Schwarz, inv.-no. A-1569, connected to transmit antenna via cables inv.-no. 1683, port 2 of AP 1 and 1592, nominal power at signal generator set to 0 dBm	
Receiving cables:	Inv.-no. 1657, 1681 and 1592	
Test receiver:	ESMI, Rohde & Schwarz, inv.-no. A-1569	
Antenna heights:	TX antenna (h1):	1.5 metre
	RX antenna (h2):	1.5 metre
Antenna position:	TX antenna:	center of turn table
Polarization:	horizontal	

Frequency [MHz]	Transmit signal P tx [dBm]	TX antenna gain (isotropic) [dBi]	TX antenna gain (dipole) [dBd]	True transmit signal P true [dBm]	Analyzer reading P site [dBm]	Correction for reading in "dBm" [dB]
300.0	-3.0	7.2	5.1	2.1	-23.0	25.7
325.0	-3.0	7.2	5.1	2.0	-23.9	26.6
350.0	-3.2	7.1	5.0	1.8	-25.7	28.2
375.0	-3.2	7.2	5.1	1.8	-26.2	28.7
400.0	-3.1	6.8	4.7	1.6	-27.8	30.0
425.0	-3.4	6.7	4.6	1.1	-29.1	30.9
433.9	-3.4	6.8	4.7	1.3	-29.8	31.7
450.0	-3.4	7.0	4.9	1.4	-30.6	32.6
475.0	-3.6	6.9	4.8	1.2	-30.1	32.0
500.0	-3.7	7.0	4.9	1.2	-30.2	32.1
550.0	-3.8	7.5	5.4	1.6	-29.3	31.6
600.0	-3.7	7.0	4.9	1.1	-28.9	30.7
650.0	-4.0	6.9	4.8	0.8	-30.3	31.7
700.0	-4.2	6.5	4.4	0.2	-33.0	33.9
750.0	-4.2	7.2	5.1	0.8	-34.6	36.1
800.0	-4.3	7.1	5.0	0.7	-34.3	35.7
850.0	-4.6	6.7	4.6	0.0	-33.2	33.8
867.8	-4.4	6.6	4.5	0.0	-32.9	33.7
900.0	-4.6	7.0	4.9	0.3	-33.1	34.1
950.0	-4.6	7.7	5.6	0.9	-34.4	36.0
1000.0	-4.7	7.0	4.9	0.2	-36.9	37.8
1000.1	-4.6	4.3		-0.3	-36.8	37.2
1500.0	-5.6	6.9		1.3	-41.1	43.2
2000.0	-6.2	7.1		0.9	-42.7	44.4
2500.0	-6.6	7.6		1.0	-46.0	47.8
3000.0	-6.8	7.7		0.9	-47.9	49.7
3500.0	-7.6	7.8		0.2	-49.4	50.5
4000.0	-8.2	7.9		-0.3	-53.7	54.3
4500.0	-9.0	9.0		0.0	-55.3	56.4
5000.0	-9.5	8.9		-0.6	-55.5	55.9

Test Site Calibration 25 MHz - 5 GHz
for ERP Measurements (Substitution Method)

Test site:	Semi-anechoic room, cabin no. 2	
Test distance:	Standard position [m]:	3
Date:	07/15/2002	
Operator:	R. Heller	
Transmit antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. A-1261 Log.-per. antenna HL 223, Rohde & Schwarz, inv.-no. A-1262 Horn antenna EMCO 3115, EMCO, inv.-no. B-1516	
Receiving antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. C-1560 Log.-per. antenna 3147, EMCO, inv.-no. A-1009	
Signal source:	Tracking generator of ESMI, Rohde & Schwarz, inv.-no. A-1569, connected to transmit antenna via cables inv.-no. 1683, port 2 of AP 1 and 1592, nominal power at signal generator set to 0 dBm	
Receiving cables:	Inv.-no. 1657, 1681 and 1592	
Test receiver:	ESMI, Rohde & Schwarz, inv.-no. A-1569	
Antenna heights:	TX antenna (h1):	1.5 metre
	RX antenna (h2):	1.5 metre
Antenna position:	TX antenna:	center of turn table
Polarization:	vertical	

Frequency [MHz]	Transmit signal[1] P tx [dBm]	TX antenna gain (isotropic) [dBi]	TX antenna gain (dipole) [dBd]	True transmit signal P true [dBm]	Analyzer reading P site [dBm]	Correction for reading in "dBm" [dB]
25.0	-1.1	-17.0	-19.2	-20.3	-43.4	23.8
30.0	-1.4	-13.8	-16.0	-17.3	-38.6	21.9
35.0	-1.5	-11.1	-13.3	-14.7	-34.9	20.8
40.0	-1.5	-8.8	-11.0	-12.5	-34.3	22.5
45.0	-1.6	-6.7	-8.9	-10.5	-37.0	27.1
50.0	-1.6	-5.1	-7.3	-8.9	-34.3	26.1
55.0	-1.7	-3.8	-6.0	-7.6	-32.7	25.7
60.0	-1.7	-2.8	-5.0	-6.7	-32.5	26.4
65.0	-1.7	-2.0	-4.2	-5.9	-31.3	26.1
70.0	-1.7	-1.3	-3.5	-5.2	-30.6	26.1
75.0	-1.8	-0.7	-2.9	-4.7	-29.9	25.9
80.0	-1.9	-0.1	-2.3	-4.1	-29.9	26.5
85.0	-1.9	0.2	-2.0	-3.9	-30.5	27.2
90.0	-2.0	0.5	-1.7	-3.6	-30.3	27.3
95.0	-2.0	0.6	-1.6	-3.6	-29.0	26.1
100.0	-2.0	0.7	-1.5	-3.5	-28.3	25.5
110.0	-2.1	0.9	-1.3	-3.3	-27.9	25.2
120.0	-2.1	1.0	-1.2	-3.3	-28.2	25.5
130.0	-2.2	1.1	-1.1	-3.3	-27.0	24.3
140.0	-2.3	1.4	-0.8	-3.0	-25.8	23.4
150.0	-2.3	1.8	-0.4	-2.7	-25.1	23.1
160.0	-2.4	1.9	-0.3	-2.6	-25.1	23.1
170.0	-2.4	2.0	-0.2	-2.6	-25.0	23.1
180.0	-2.5	2.1	0.0	-2.5	-25.1	23.2
190.0	-2.6	2.3	0.2	-2.4	-25.5	23.7
200.0	-2.6	2.3	0.2	-2.4	-26.9	25.2
200.1	-2.3	6.5	4.4	2.0	-18.4	21.1
220.0	-2.6	6.9	4.8	2.1	-18.7	21.5
240.0	-2.7	7.0	4.9	2.1	-20.0	22.8
260.0	-2.8	7.1	5.0	2.2	-21.4	24.3
280.0	-2.9	7.3	5.1	2.2	-23.7	26.6

Test Site Calibration 25 MHz - 5 GHz
for ERP Measurements (Substitution Method)

Test site:	Semi-anechoic room, cabin no. 2	
Test distance:	Standard position [m]:	3
Date:	07/15/2002	
Operator:	R. Heller	
Transmit antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. A-1261 Log.-per. antenna HL 223, Rohde & Schwarz, inv.-no. A-1262 Horn antenna EMCO 3115, EMCO, inv.-no. B-1516	
Receiving antennae:	Biconical antenna HK 116, Rohde & Schwarz, inv.-no. C-1560 Log.-per. antenna 3147, EMCO, inv.-no. A-1009	
Signal source:	Tracking generator of ESMI, Rohde & Schwarz, inv.-no. A-1569, connected to transmit antenna via cables inv.-no. 1683, port 2 of AP 1 and 1592, nominal power at signal generator set to 0 dBm	
Receiving cables:	Inv.-no. 1657, 1681 and 1592	
Test receiver:	ESMI, Rohde & Schwarz, inv.-no. A-1569	
Antenna heights:	TX antenna (h1):	1.5 metre
	RX antenna (h2):	1.5 metre
Antenna position:	TX antenna:	center of turn table
Polarization:	vertical	

Frequency [MHz]	Transmit signal[1] P tx [dBm]	TX antenna gain (isotropic) [dBi]	TX antenna gain (dipole) [dBd]	True transmit signal P true [dBm]	Analyzer reading P site [dBm]	Correction for reading in "dBm" [dB]
300.0	-3.0	7.2	5.1	2.1	-25.3	28.0
325.0	-3.0	7.2	5.1	2.0	-26.7	29.3
350.0	-3.2	7.1	5.0	1.8	-28.2	30.7
375.0	-3.2	7.2	5.1	1.8	-27.9	30.4
400.0	-3.1	6.8	4.7	1.6	-28.3	30.5
425.0	-3.4	6.7	4.6	1.1	-28.2	30.0
433.9	-3.4	6.8	4.7	1.3	-28.6	30.6
450.0	-3.4	7.0	4.9	1.4	-28.8	30.9
475.0	-3.6	6.9	4.8	1.2	-28.1	30.0
500.0	-3.7	7.0	4.9	1.2	-28.2	30.0
550.0	-3.8	7.5	5.4	1.6	-29.5	31.7
600.0	-3.7	7.0	4.9	1.1	-31.6	33.4
650.0	-4.0	6.9	4.8	0.8	-32.4	33.8
700.0	-4.2	6.5	4.4	0.2	-32.2	33.1
750.0	-4.2	7.2	5.1	0.8	-31.3	32.8
800.0	-4.3	7.1	5.0	0.7	-34.4	35.7
850.0	-4.6	6.7	4.6	0.0	-36.3	36.9
867.8	-4.4	6.6	4.5	0.0	-36.3	37.1
900.0	-4.6	7.0	4.9	0.3	-35.7	36.6
950.0	-4.6	7.7	5.6	0.9	-34.9	36.5
1000.0	-4.7	7.0	4.9	0.2	-34.7	35.6
1000.1	-4.6	4.3		-0.3	-36.3	36.7
1500.0	-5.6	6.9		1.3	-39.1	41.2
2000.0	-6.2	7.1		0.9	-44.3	46.1
2500.0	-6.6	7.6		1.0	-45.1	46.9
3000.0	-6.8	7.7		0.9	-46.5	48.3
3500.0	-7.6	7.8		0.2	-50.3	51.4
4000.0	-8.2	7.9		-0.3	-52.8	53.4
4500.0	-9.0	9.0		0.0	-55.9	57.0
5000.0	-9.5	8.9		-0.6	-54.7	55.1