

Date: ESPOO 28.10.2004Page: 1 (16)Appendices -Number:
No. 1 / 1**1032467**Date of handing in: 12.10.2004

Tested by:

**T017 (EN ISO/IEC 17025)**
Risto Hietanen, Test Engineer

Reviewed by:


Aarni Roth, Application Manager

SORT OF EQUIPMENT:

Radio modem module

MARKETING NAME:

SATEL

TYPE:

SATELLINE-3AS/TC/250

MANUFACTURER:

SATEL OY

SERIAL NUMBER:

044400162 and 044400161

CLIENT:

Satel Oy

ADDRESS:

Meriniitynkatu 17, FIN-24100 Salo, Finland

TELEPHONE:

+358 2 777 884 / Matti Hildén

TEST SPECIFICATION

EN 300 113-2 V1.3.1 (2003-12)

REMARKS:

The test results are valid for the tested unit only. Without a written permission of Nemko Oy it is allowed to copy this report as a whole, but not partially.

Type: **SATELLINE-3AS/TC/250**
Alignment range: **380,000 - 470,000 MHz**
Switching range: **One channel**

Measurement	Equipment 1 and 2	Equipment	Equipment
Frequencies Tx/Rx:	Serial no. 044400162 and 044400161 1) 380 MHz 2) 470 MHz	Serial no. 3)	Serial no. 4)

	Normal	Minimum	Maximum
Voltages:	9.0 VDC		
Temperatures:	21,8 to 22,0 °C		
Humidity:	29,2 to 30,0 %		

Rated carrier power:	1 W / 10 mW (*)	Antenna:	50 ohm (-connector)
Class of emission:	F1D	Production model:	Yes
Number of channels:	1		
Channel separation:	kHz		

Mode of data

The following measurements according to ETS EN 300 113-1 standard have been performed:

Eq. 3 Ch. 3)	Eq. 1 and 2 Channels 1) 2)	Eq. 4 Ch. 4)	
			Transmitter
			5.1.1 Frequency error
			5.1.2 Carrier power (conducted)
			5.1.4 Adjacent channel power
			5.1.5 Spurious emissions (conducted)
	x	x	5.1.5 Spurious emissions (radiated)
			5.1.6 Intermodulation attenuation
			5.1.7 Transmitter attack time
			5.1.8 Transmitter release time
			5.1.9.1 Time domain analysis of power and frequency
			5.1.9.2 Adjacent channel power transient
			Receiver
			5.2.1 Maximum useable sensitivity
			5.2.3 Error behaviour at high input levels
			5.2.4 Co-channel rejection
			5.2.5 Adjacent channel selectivity
			5.2.6 Spurious response rejection
			5.2.7 Intermodulation response rejection
			5.2.8 Blocking or desensitization
			5.2.9 Spurious radiations (conducted)
	x	x	5.2.9 Spurious radiations (radiated)
			Duplex operation
			5.3.1 Receiver desensitization and maximum useable sensitivity
			5.3.2 Receiver spurious response rejection

REMARKS: **The customer has ordered the measurements mentioned above only.**

Ambient temperature: 21,8 °C Relative humidity: 29,2 % Date: 12.10.2004 (Channel 2)
Ambient temperature: 22,0 °C Relative humidity: 30,0 % Date: 25.10.2004 (Channel 1)

TRANSMITTER SPURIOUS EMISSIONS (RADIATED) CLAUSE 8.6

Rated output power: 1 W.

Frequency (MHz)	Channel 1	Frequency (MHz)	Channel 2	Remarks
Tx operating		Tx operating		
760,00	-51,8	940,0	-36,3	
1140,00	-47,4	1410,0	-46,2	
1520,00	<-50,0	1880,0	-31,3	
1900,00	-31,2	2350,0	<-40,0	
2280,00	-31,0	2820,0	<-40,0	
2660,00	-36,7	3290,0	<-40,0	
3040,00	-32,2	3760,0	<-40,0	
3420,00	<-40,0			
3800,00	<-40,0			
Tx on standby		Tx on standby		
				See receiver spurious
				emissions on page 5
Measurement uncertainty	+ 3,4 dB - 4,4 dB			

LIMITS: CLAUSE 5.1.5 TABLE 3

Frequency range	30MHz to 1 GHz	above 1 to 4GHz
Tx operating	0.25 µW (-36,0 dBm)	1.00 µW (-30,0 dBm)
Tx standby	2.0 nW (-57,0 dBm)	20.0 nW (-47,0 dBm)

TEST EQUIPMENT USED: 42, 201, 89, 176, 185, 417, 75, 403

Ambient temperature: 21,8 °C Relative humidity: 29,2 % Date: 12.10.2004 (Channel 2)
Ambient temperature: 22,0 °C Relative humidity: 30,0 % Date: 25.10.2004 (Channel 1)

TRANSMITTER SPURIOUS EMISSIONS (RADIATED) CLAUSE 8.6

Rated output power: 10 mW.

Frequency (MHz)	Channel 1	Frequency (MHz)	Channel 2	Remarks
Tx operating		Tx operating		
760,00	-55,9	940,0	-48,0	
1900,00	-39,8	All 1 GHz – 4 GHz	<-40,0	
Others 1 GHz – 4 GHz	<-40,0			
Tx on standby		Tx on standby		
				See receiver spurious
				emissions on page 5
Measurement uncertainty	+ 3,4 dB - 4,4 dB			

LIMITS: CLAUSE 5.1.5 TABLE 3

Frequency range	30MHz to 1 GHz	above 1 to 4GHz
Tx operating	0.25 µW (-36,0 dBm)	1.00 µW (-30,0 dBm)
Tx standby	2.0 nW (-57,0 dBm)	20.0 nW (-47,0 dBm)

TEST EQUIPMENT USED: 42, 201, 89, 176, 185, 417, 75, 403

Ambient temperature: 22,0 °C Relative humidity: 30,0 % Date: 25.10.2004

RECEIVER SPURIOUS EMISSIONS (RADIATED) CLAUSE 9.10

Channel 1		Channel 2		Remarks
Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	
302,45	-72,9	392,45	-78,6	
604,90	-77,7	784,90	-70,8	
907,35	-76,7	1177,35	-76,4	
1209,80	-77,9	1569,80	-69,4	
1512,25	-73,2	1962,25	-67,5	
1814,70	-65,7	2354,70	-67,8	
2117,15	-57,0	2747,15	-65,4	
2419,60	-66,2	3139,60	-66,9	
2722,05	-57,0	3532,05	-65,7	
3024,50	-61,6	3924,50	-64,0	
3326,95	-59,5			
3629,40	-60,5			
3931,85	-57,3			
Measurement Uncertainty (U95)	- 4.4 dB / +3.4 dB			

LIMITS: Clause 5.2.9

The limits are applicable to all receiver classes.

2 nW (- 56 dBm) below 1000 MHz

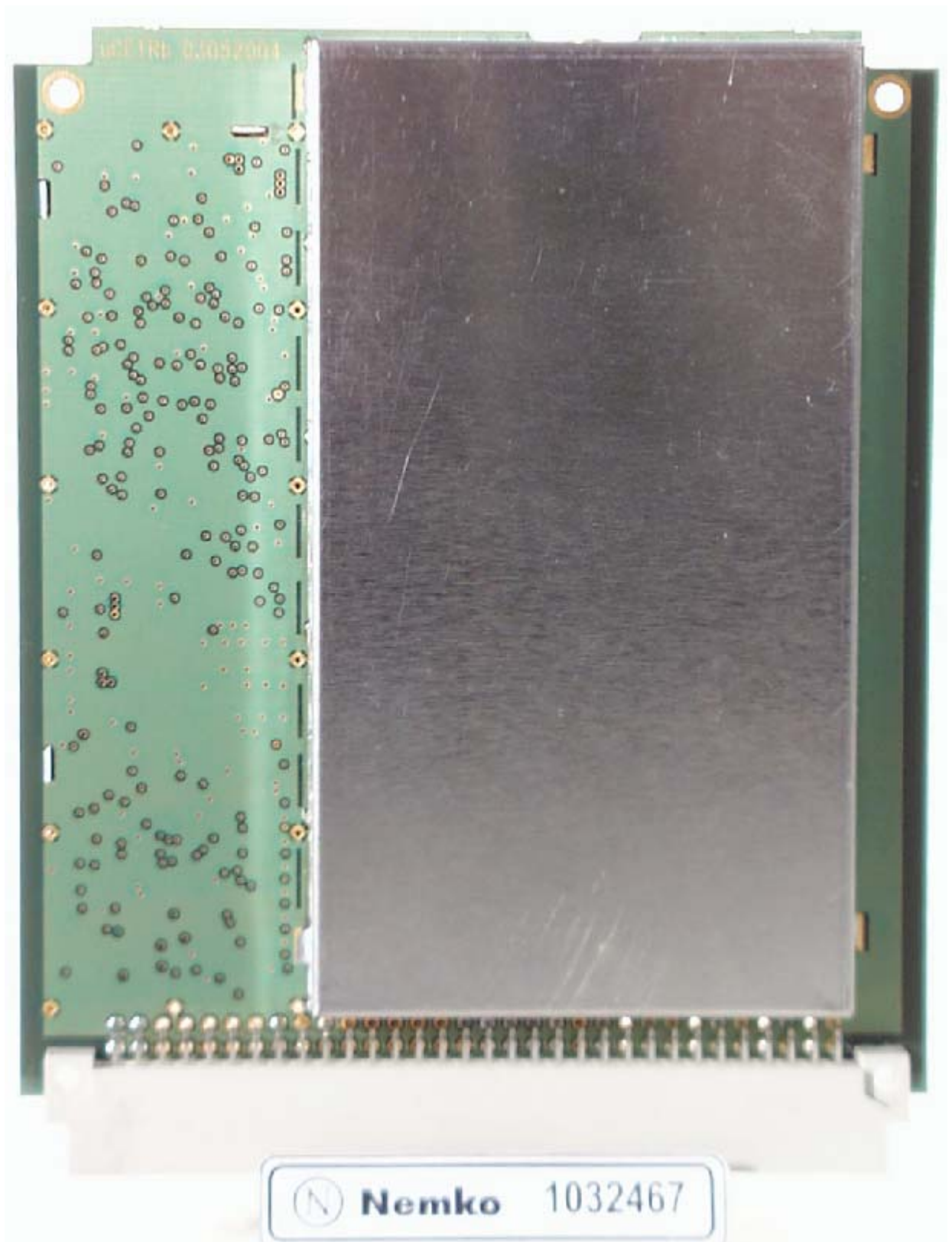
20 nW (- 47 dBm) above 1000 MHz

TEST EQUIPMENT USED: 42, 205, 176, 89, 185, 417, 201, 75, 403

(380 MHz)



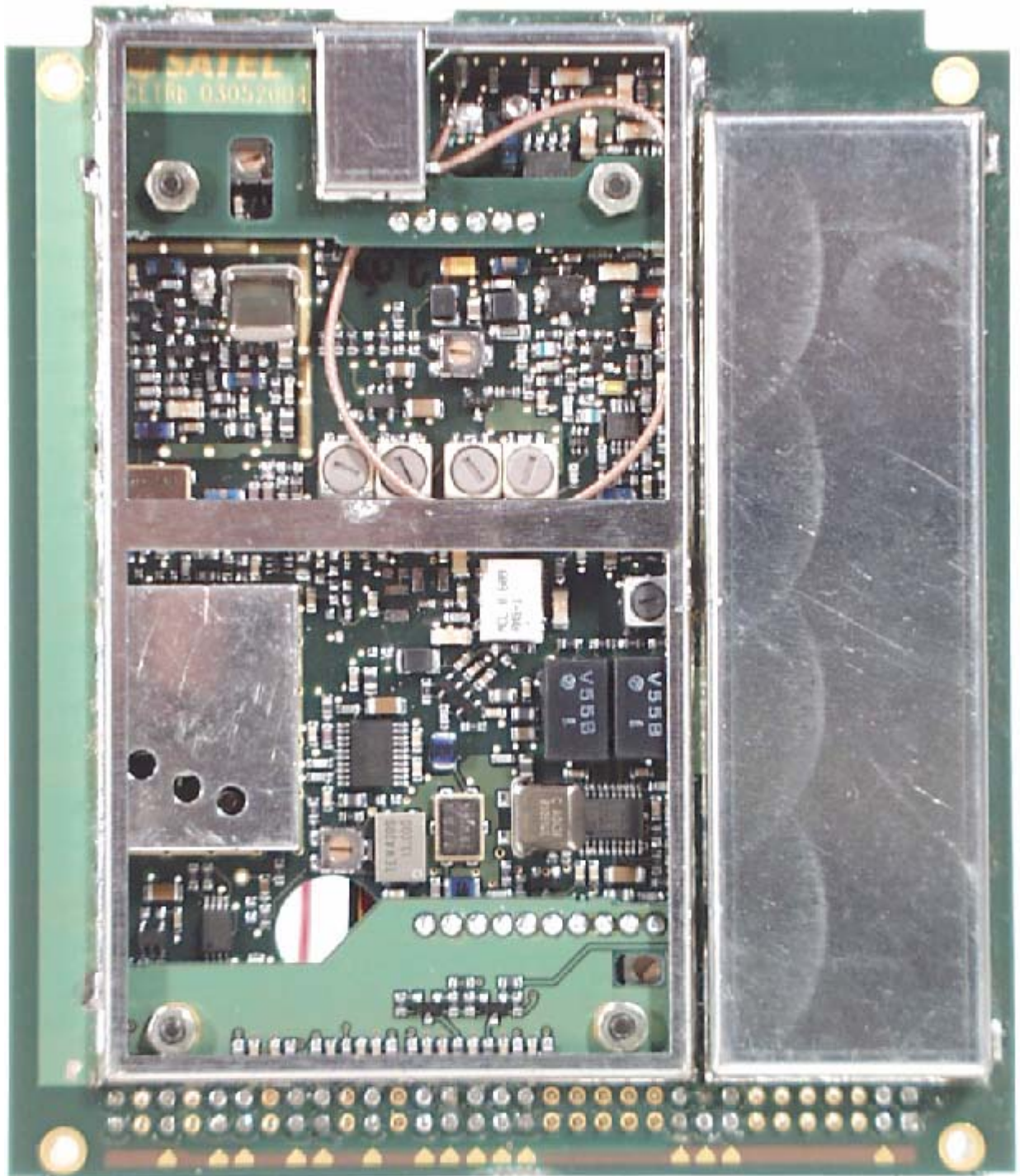
(380 MHz)



(380 MHz)



(380 MHz)



Nemko 1032467

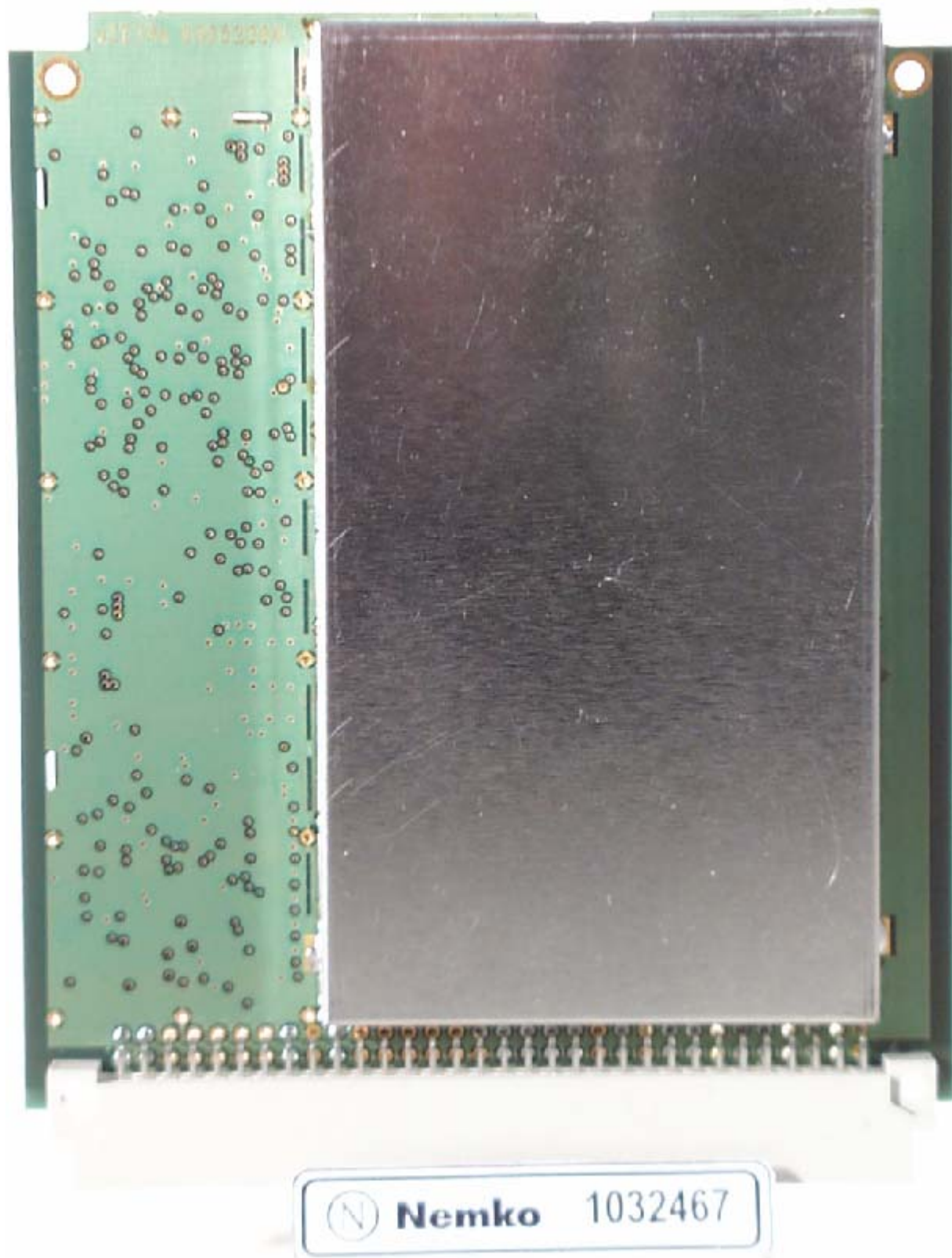
(380 MHz)



(470 MHz)



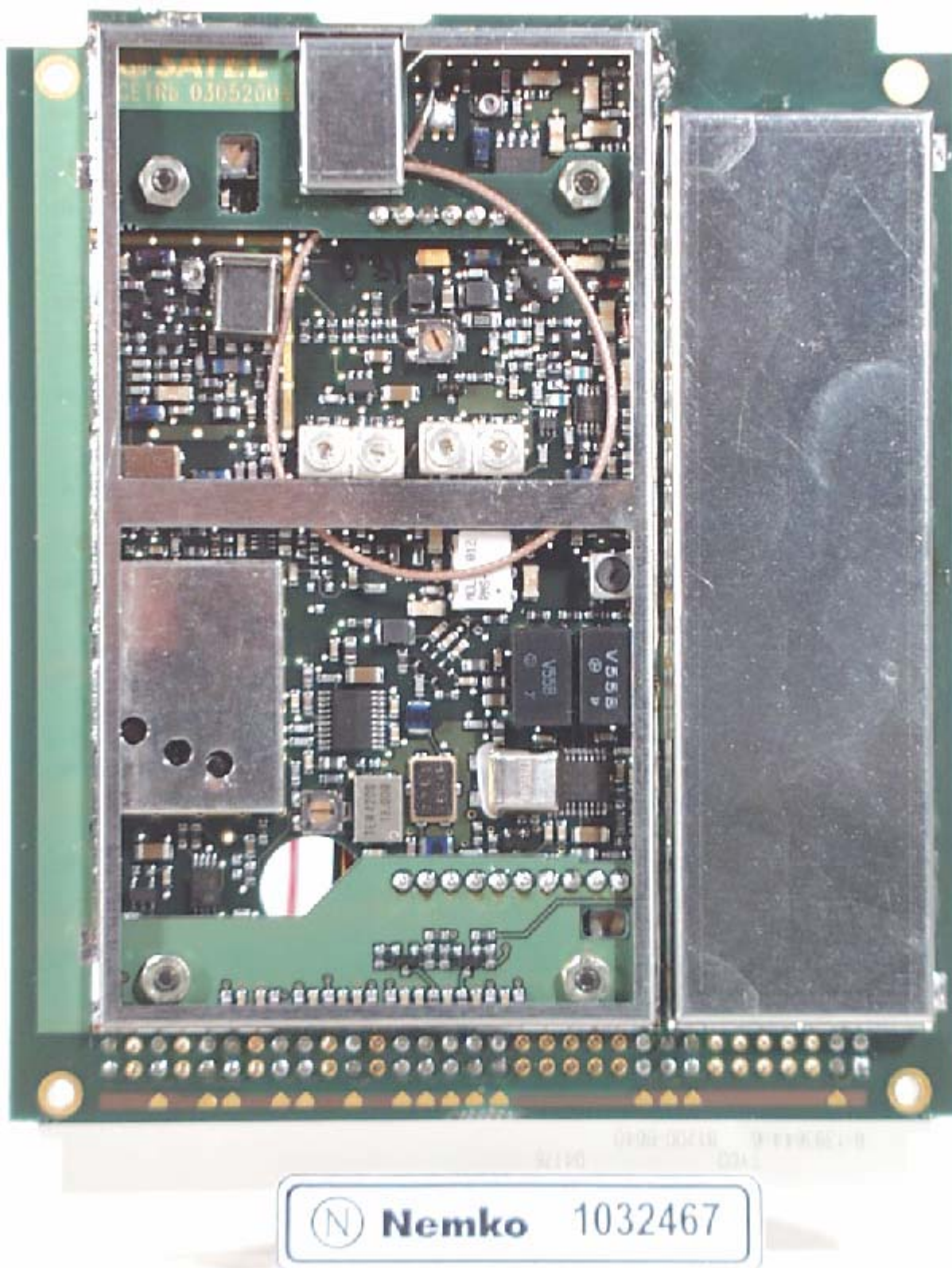
(470 MHz)



(470 MHz)



(470 MHz)



(470 MHz)



List of measuring equipment:

No.	Equipment	Type	Manufacturer	Serial Number
42	Spectrum analyzer	8566B	Hewlett Packard	2637A04102
75	Power supply	PRL 722B	Self made	
89	Antenna	3147	EMCO	9202-1078
133	Termination 50 Ω	370 BNM	Narda	
176	Anechoic chamber	888 cm x 585 cm x 416 cm	length of absorber 66 cm	
185	Antenna	PRL LogPer	Self made	1A93
201	RF-Generator	2042	Marconi	119571/062
205	RF-Amplifier	ZHL-1042J	Mini-Circuits	012288-11
403	Processmeter	787	Fluke	6975028
417	Antenna, bilog	CBL 6141	Chase	4028