TTI-P-G166/98

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2_2971-01-01/02
FCC Part 2, 15, 90
LTK-1000
FCC ID: QBTLTK-1000

CETECOM – ICT Services GmbH
Untertürkheimerstr. 6-10
66117 Saarbrücken, Germany

Telephone: + 49 (0) 681 / 598-0
Fax: + 49 (0) 681 / 9075

Table of Contents

1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. 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.

1.2 Testing laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Telefone : + 49 681 598 - 9100
Telefax : + 49 681 598 - 9075
E-mail : Michael.Berg@ict.cetecom.de
Internet : www.cetecom.de

Accredited testing laboratory:
The Test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025.
DAR registration number: TTI-P-G-166/98
Accredited Bluetooth™ Test Facility (BQTF)

1.3 Details of applicant

Name : Leetek Co., Ltd.
Street : 24-2 Samjeong-dong, Ojeong-gu
City : Puchon-city, Kyunggi-do
Country : Korea
Telephone : +82 32 678 8605-6
Telefax : +82 32 682 8605
Contact : Mr. Sung Sao Lee
Telephone : +82 32 678 8605-6

1.4 Application details

Date of receipt of application : 2002-07-11
Date of receipt of test item : 2002-07-30
Date of test : 2002-08-21/26

1.5 Test item

Type of equipment	:	**Pager Transmitter**
Type designation	:	**LTK-1000**
Manufacturer	:	applicant
Street	:	
City	:	
Country	:	
Serial number	:	1950A260055
Additional informations:	**:**	
Frequency	:	457.5750 MHz
Type of modulation	:	10K2F1D
FM-Deviation	:	4.5 KHz
Number of channels	:	1
Antenna	:	Helical antenna LTK-1000
Power supply	:	115V AC / 12V DC Adapter (AW-120910)
Output power	:	169.82 mW ERP
FCC ID	:	QBTLTK-1000
Temperature range	:	-30°C - +50°C

1.6 Test standards: FCC Part 2, 15, 90

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

Final verdict : PASS

Technical responsibility for area of testing :

05.09.02	RSC 8411	Berg M.	
Date	**Section**	**Name**	**Signature**

Technical responsibility for area of testing :

05.09.02	RSC8414	Ames H.	
Date	**Section**	**Name**	**Signature**

2.2 Testreport

TEST REPORT

Testreport no. : 2_2971-01-01/02

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

§90.205- POWER LIMIT

According to 90.205(g) 450–470 MHz. The maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 2. (I.e. 2W for service area less than 3 km.)

Table 2-450-470 MHz-Maximum ERP/Reference HAAT for a Specific Service Area Radius

	Service area radius (km)									
	3	8	13	16	24	32	40	48	64	80
Max. ERP(W)[1]	2	100	500	500	500	500	500	500	500	500
Up to reference HAAT (m)[3]	15	15	15	27	63	125	250	410	950	2700

[1] Maximum ERP indicated provides for a 39 dBu signal strength at the edge of the service area per FCC Report R-6602, Fig. 29 (See Sec. 73.699, Fig. 10 b).

[3] When the actual antenna HAAT is greater than the reference HAAT, the allowable ERP will be reduced in accordance with the following equation:

ERP allow = ER_{Pmax} X (HAA_{Tref} / $HAA_{Tactual}$)

.

Specification Limit: 2 Watts

MAXIMUM PEAK OUTPUT POWER (RADIATED)

TEST CONDITIONS		**MAXIMUM PEAK OUTPUT POWER (mW) ERP**	
Frequency (MHz)		**457.575 MHz**	
T_{nom}(25.7)°C	**V_{nom}(115)V**	**169.82 (22.3 dBm) (363.08mW / 25.6 dBm conducted)**	
Measurement uncertainty		**±3dB**	

RBW/VBW : 1 MHz
Measured at a distance of 3m

§90.207- TYPE OF EMISSION

According to 90.207(e) for non-voice paging operations, only A1A, A1D, A2B, A2D, F1B, F1D, F2B, F2D, G1B, G1D, G2B, or G2D emissions will be authorized.

LTK-1000 : F1D

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 – 24, 64

§90.209- BANDDWIDTH LIMITATION

According to 90.200(3) For all other types of emissions, the maximum authorized bandwidth shall not be more than that normally authorized for voice operations.
According to 90.200(5), unless specified elsewhere, channel spacings and bandwidths that will be authorized in the following frequency bands are given in the following "STANDARD CHANNEL SPACING/BANDWIDTH" table.

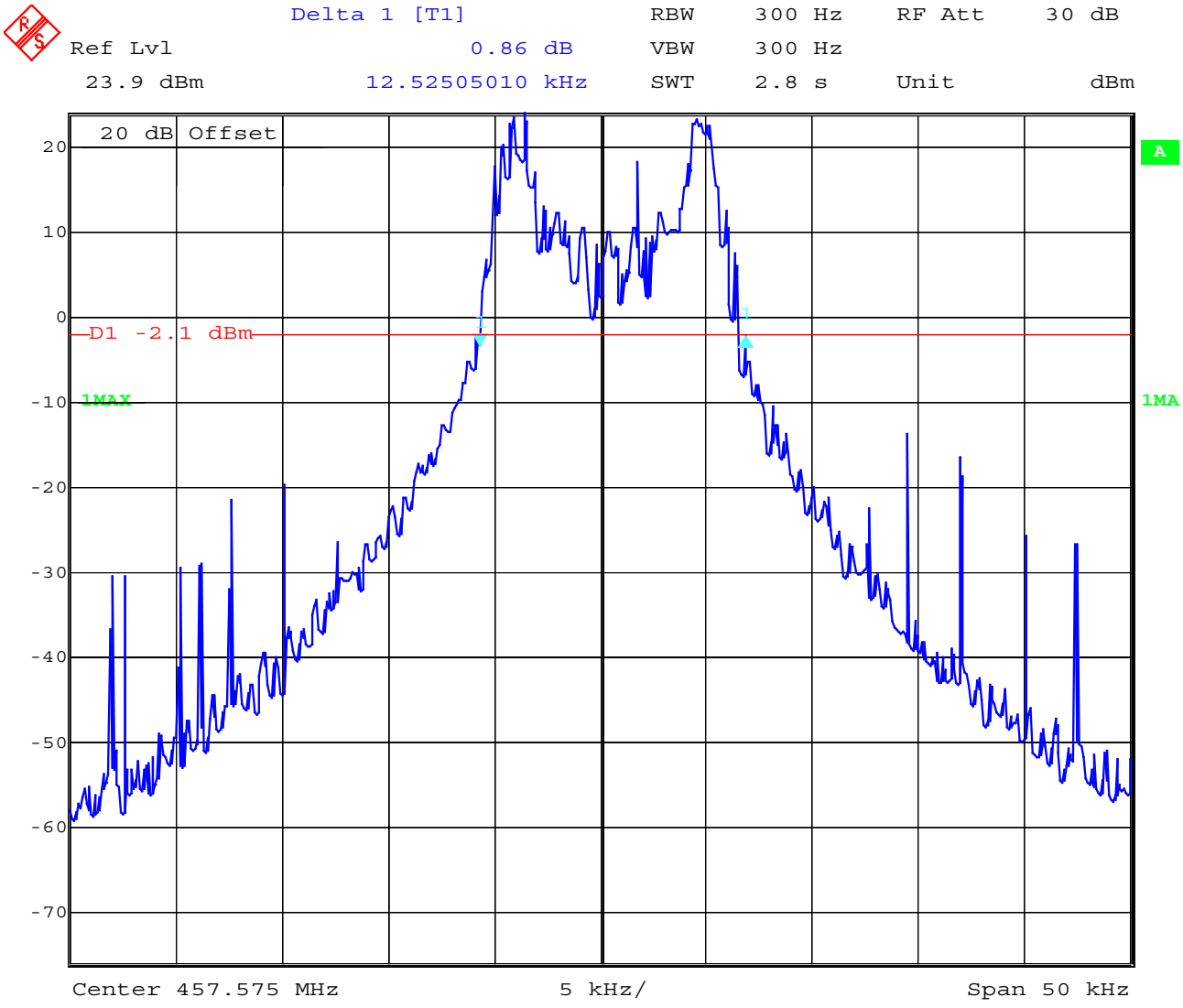
Standard Channel Spacing/Bandwidth

Frequency band (MHz)	Channel spacing (kHz)	Authorized bandwidth (kHz)
Below 25		
25-50.	20	20
72-76	20	20
150-174	[1]7.5	[1,3]20/11.25/6
220-222	5	4
421-512	[1]6.25	[1,3]20/11.25/6
806-821/851-866	25	20
821-824/866-869	12.5	20
896-901/935-940	12.5	13.6
902-928		
929-930	25	20
1427-1435 .....….		
2450-2483.52.....		
Above 2500.....		

1) For stations authorized on or after August 18, 1995.
3) Operations using equipment designed to operate with a 25 kHz channel bandwidth will be authorized a 20 kHz bandwidth. Operations using equipment designed to operate with a 12.5 kHz channel bandwidth will be authorized an 11.25 kHz bandwidth. Operations using equipment designed to operate with a 6.25 kHz channel bandwidth will be authorized a 6 kHz bandwidth.

Specification Limit: 20kHz

§90.209- BANDDWIDTH LIMITATION



<u>the –26 db Bandwidth is : 12.525 kHz</u>

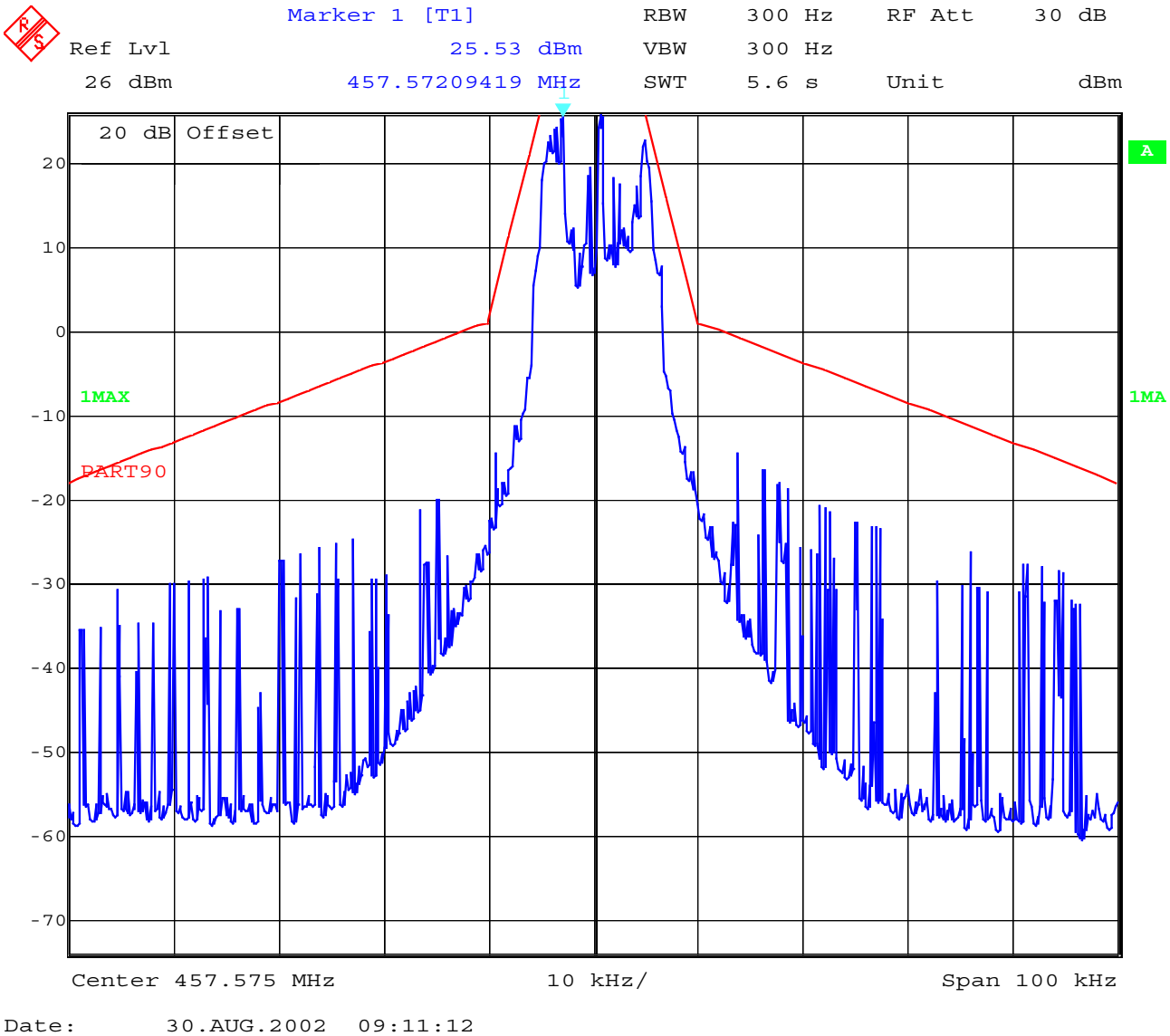
Bandwidth according § 2.202 rules: B_n = 2M + 2DK = 2(1200bps/2)+2(4.5kHz) =10K2

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

EMISSIONS MASK §90.210

LIMITS **SUBCLAUSE § 90.210**

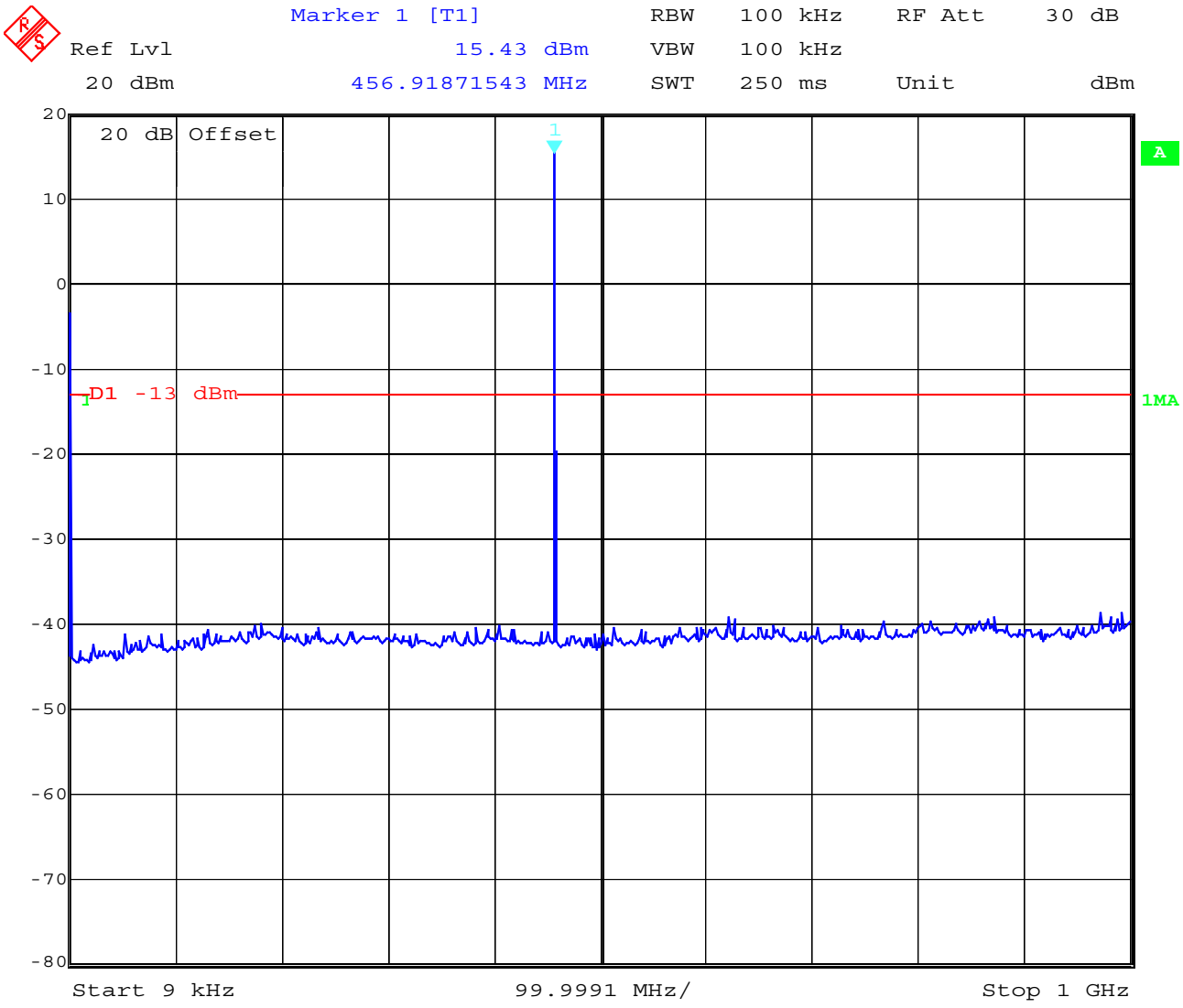
(c) Emission Mask C. For transmitters that are not equipped with an audio low-pass filter pursuant to Sec. 90.211(b), the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:
(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 5 kHz, but not more than 10 kHz: At least 83 log (fd/5) dB;
(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least 29 log (fd 2 /11) dB or 50 dB, whichever is the lesser attenuation;
(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

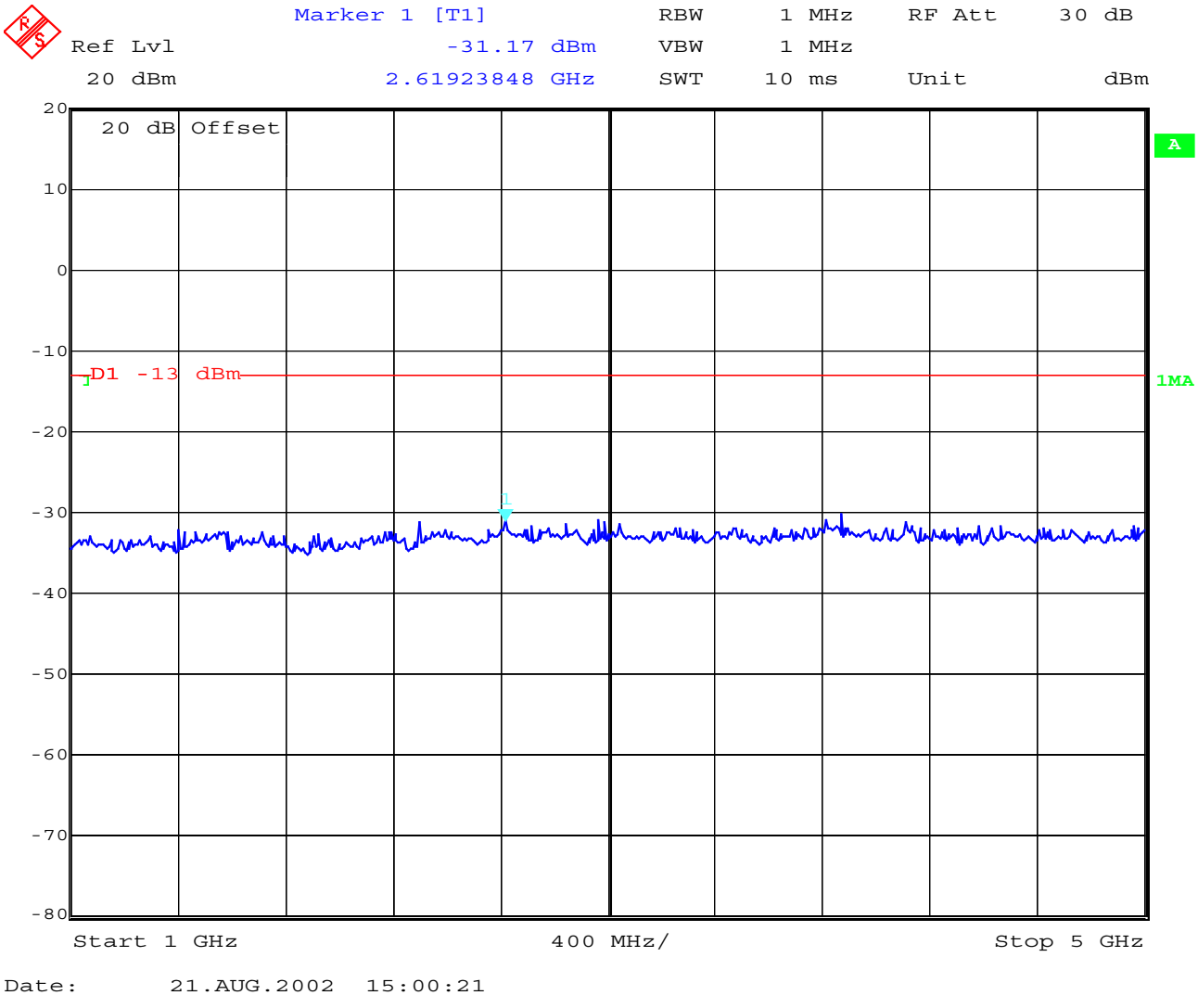
OUT-OF-BAND EMISSIONS

Conducted : 9 kHz – 1 GHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

OUT-OF-BAND EMISSIONS
Conducted : 1GHz- 5 GHz



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

SPURIOUS EMISSIONS

§2.1057- SPECTRUM RANGE TO BE INVESTIGATED

Lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(2) If the equipment operates at or above 10 GHz and below 30 GHz:
to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.
(b) Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency.
Radiation at the frequencies of multiplier stages should also be checked.
(c) The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be reported.
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

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 than 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.

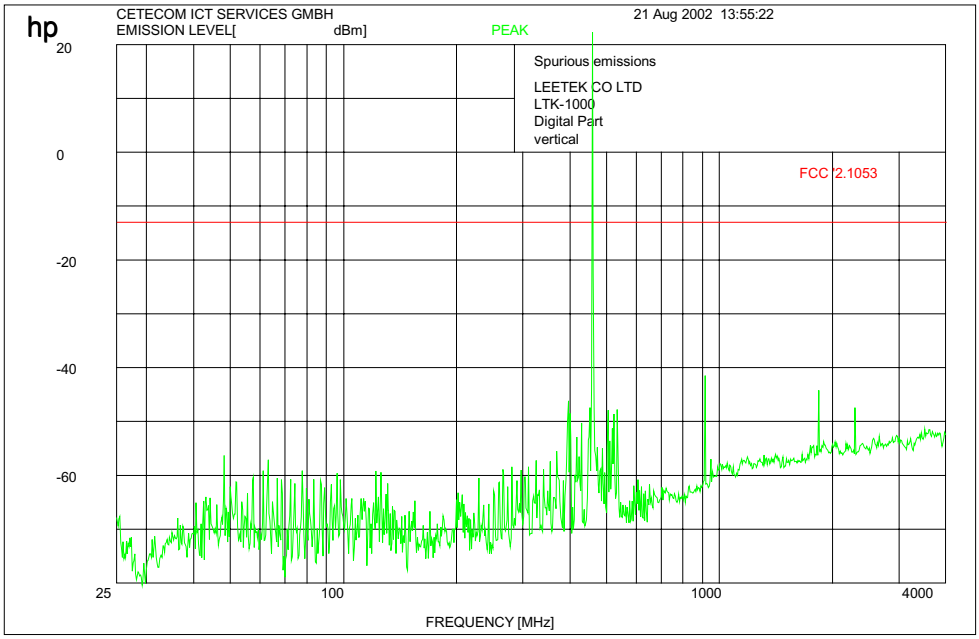
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 – 24

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 attenuation 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.

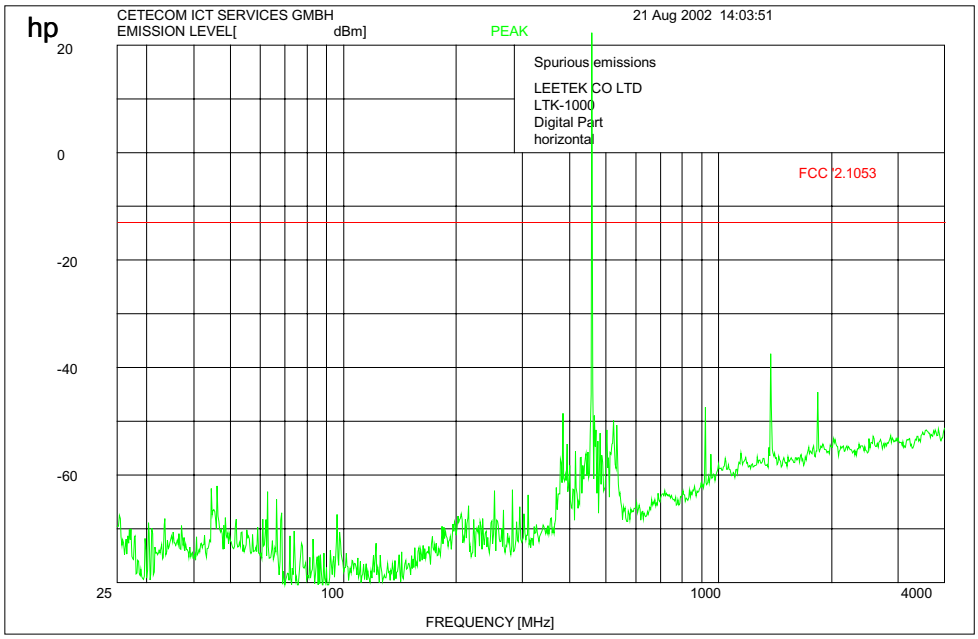
RESULT

Freg	SA Reading	SG Setting	Ant. gain	Dipole gain	Cable loss	ERP Result	Limit	Margin	Pol
MHz	dBµV	dBm	dBi	dBd	dB	dBm	dBm	dBm	H/V
457.575	96.3	25.9	0.0	0.0	2.6	22.3			V
457.575	95.9	23.9	0.0	0.0	2.6	21.3			H
915.15	24.1	-27.9	-7.85	2.15	3.9	-41.8	-13	-28.8	V
1830.03	57.6	-45.8	+10.55	2.15	6.2	-43.6	-13		V
2287.875	46.8	-48.8	+10.85	2.15	7.2	-47.3	-13		V
915.15	24.2	-33.3	-7.85	2.15	3.9	-47.2	-13		H
1830.03	52.2	-40.5	+10.55	2.15	6.2	-38.3	-13		H
2287.875	51.0	-44.6	+10.85	2.15	7.2	-43.1	-13		H

As shown below:
25 – 1000 MHz vertical

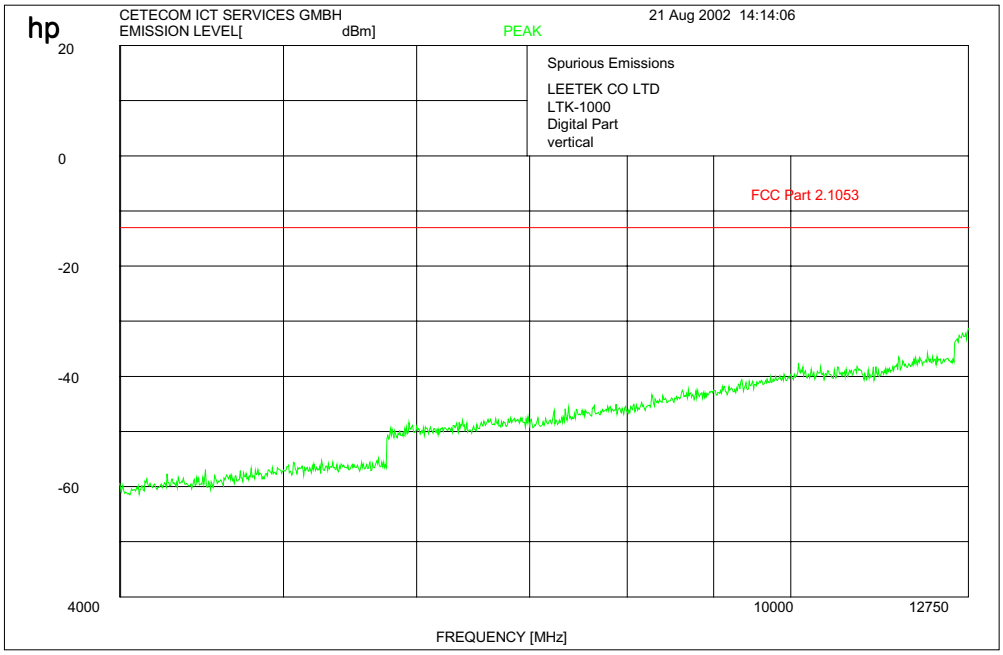


25 – 1000 MHz horizontal

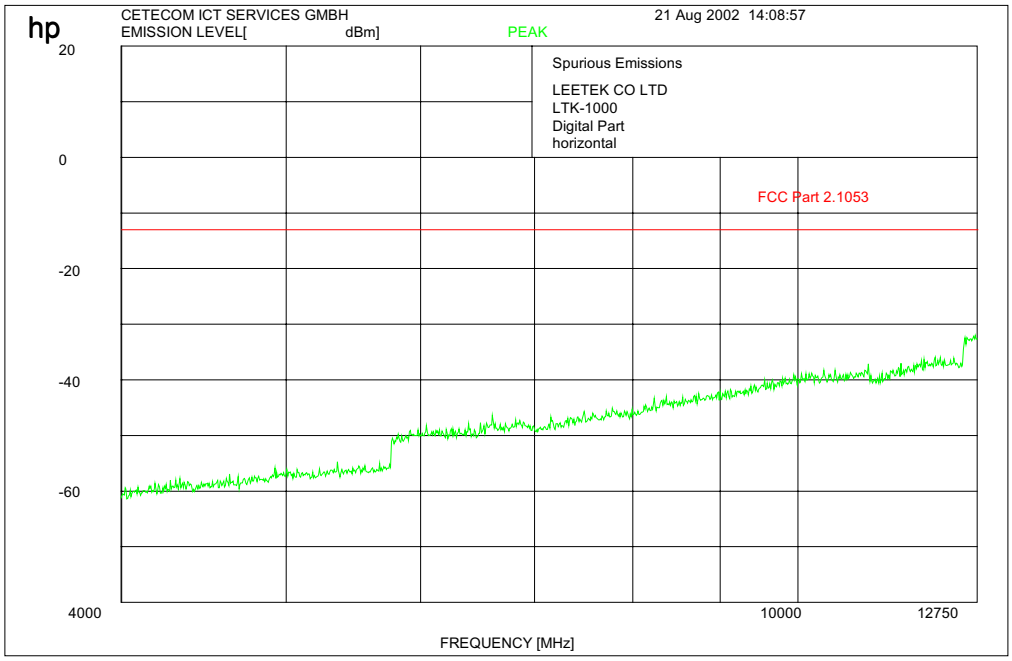


REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 – 24

1 GHz –12.750 GHz vertical



1 GHz –12.750 GHz horizontal



As you can see from the plots, all spurious are >>20 dB below the limit

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 – 24

§90.213- FREQUENCY STABILITY

Minimum Frequency Stability[Parts per million (ppm)]

Frequency range (MHz)	Fixed and base Stations	Mobile Stations	
		Over 2W output power	2 watts or less output power
Below 25	[1.2.3.]100	100	100
25-50	20	20	50
72-76	5	-	50
150-174	[5.11.] 5	[6.] 5	[4.6.]50
220-222	0.1	1.5	1.5
421-512	[7.11..14.]2.5	[8.]5	[8.]5
806-821	[14.]1.5	2.5	2.5
821-824	[14.]1.0	1.5	1.5
851-866	1.5	2.5	2.5
866-869	1.0	1.5	1.5
896-901	[14.]0.1	1.5	1.5
902-928	2.5	2.5	2.5
902-928	2.5	2.5	2.5
929-930	1.5	-	-
935-940	0.1	1.5	1.5
1427-1435	[9]300	300	300
Above 2450	-	-	-

1 Fixed and base stations with over 200 watts transmitter power must have a frequency stability of 50 ppm except for equipment used in the Public Safety Pool where the frequency stability is 100 ppm.

2 For single sideband operations below 25 MHz, the carrier frequency must be maintained within 50 Hz of the authorized carrier frequency.

3 Travelers information station transmitters operating from 530–1700 kHz and transmitters exceeding 200 watts peak envelope power used for disaster communications and long distance circuit operations pursuant to §§ 90.242 and 90.264 must maintain the carrier frequency to within 20 Hz of the authorized frequency.

4 Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.

5 In the 150–174 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

6 In the 150–174 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequency stability of 5.0 ppm. Mobile stations de-signed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 2.0 ppm.

7 In the 421–512 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 1.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 0.5 ppm.

8 In the 421–512 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

9 Fixed stations with output powers above 120 watts and necessary bandwidth less than 3 kHz must operate with a frequency stability of 100 ppm. Fixed stations with output powers less than 120 watts and using time-division multiplex, must operate with a frequency stability of 500 ppm.

10 Frequency stability to be specified in the station authorization.

11 Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150–174 MHz band and 2.5 ppm in the 421–512 MHz band.
12 Mobile units may utilize synchronizing signals from associated base stations to achieve the specified carrier stability.
13 Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge, intermittently operated hand-held readers, and mobile transponders are not subject to frequency tolerance restrictions.
14 Control stations may operate with the frequency tolerance specified for associated mobile frequencies.

(a) Unless noted elsewhere, transmitters used in the services governed by this part must have minimum frequency stability as specified in the following table.
[8]In the 421-512 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 kHz channel
bandwidth must have a frequency stability of 1.0 ppm.
(b) For the purpose of determining the frequency stability limits, the power of a transmitter is considered to be the maximum rated output power as specified by the manufacturer.

Specification Limit: 1.5 ppm

FREQ STABILITY vs. INPUT VOLTAGE

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
97.75	+370	0.81
100.05	+370	0.81
103.50	+370	0.81
105.80	+370	0.81
109.25	+370	0.81
111.55	+370	0.81
115.00	+370	0.81
117.30	+370	0.81
120.75	+370	0.81
123.05	+360	0.79
126.50	+360	0.79
132.25	+360	0.79

FREQ STABILITY vs. ENVIREMENTAL TEMPERATURE

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	+641	1.40
-20	+637	1.39
-10	+622	1.36
±0.0	+622	1.36
+10	+341	0.75
+20	+360	0.79
+30	+261	0.57
+40	+161	0.35
+50	+181	0.40

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
64

§90.214- TRANSIENT FREQUENCY BEHAVIOR

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 174MHz	421 to 512MHz
Transient frequency Behavior for Equipment Designed to Operate on 25kHz Channels			
t_1[4]	**±25.0 kHz**	**5.0 ms**	**10.0 ms**
t_2	**±12.5 kHz**	**20.0 ms**	**25.0 ms**
t_3[4]	**±25.0 kHz**	**5.0 ms**	**10.0 ms**
Transient frequency Behavior for Equipment Designed to Operate on 12.5kHz Channels			
t_1[4]	**±12.5 kHz**	**5.0 ms**	**10.0 ms**
t_2	**±6.25 kHz**	**20.0 ms**	**25.0 ms**
t_3[4]	**±12.5 kHz**	**5.0 ms**	**10.0 ms**
Transient frequency Behavior for Equipment Designed to Operate on 6.25kHz Channels			
t_1[4]	**±6.25 kHz**	**5.0 ms**	**10.0 ms**
t_2	**±3.125 kHz**	**20.0 ms**	**25.0 ms**
t_3[4]	**±6.25 kHz**	**5.0 ms**	**10.0 ms**

[1] t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.

[4] If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

t_1 is the time period immediately following t_{on}

t_2 is the time period immediately following t_1

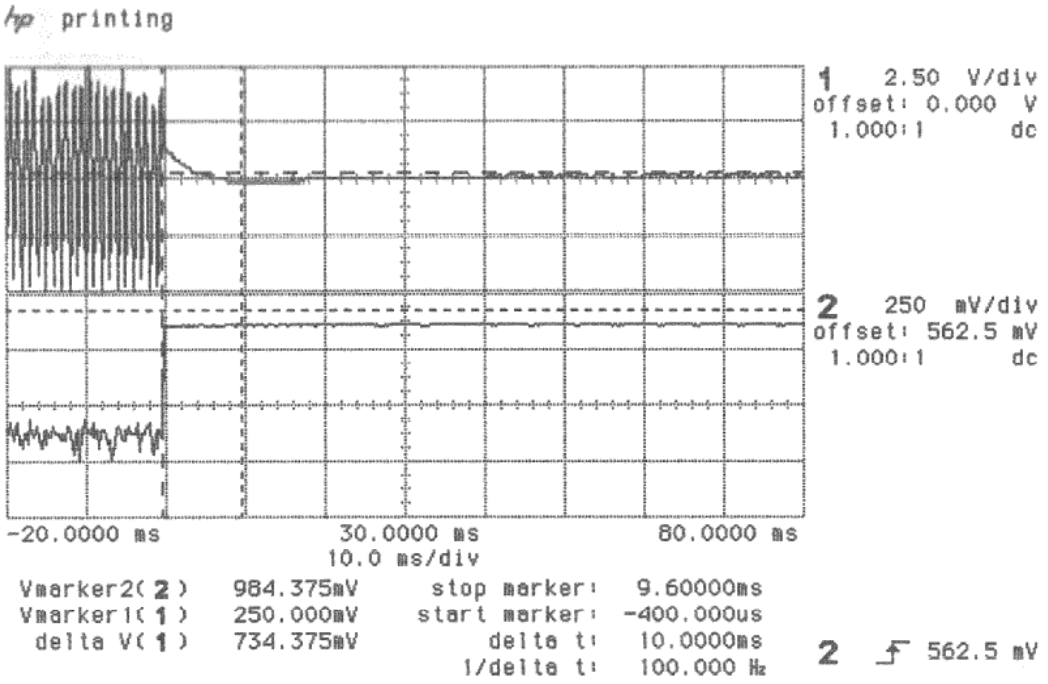
t_3 is the time period immediately before t_{off}

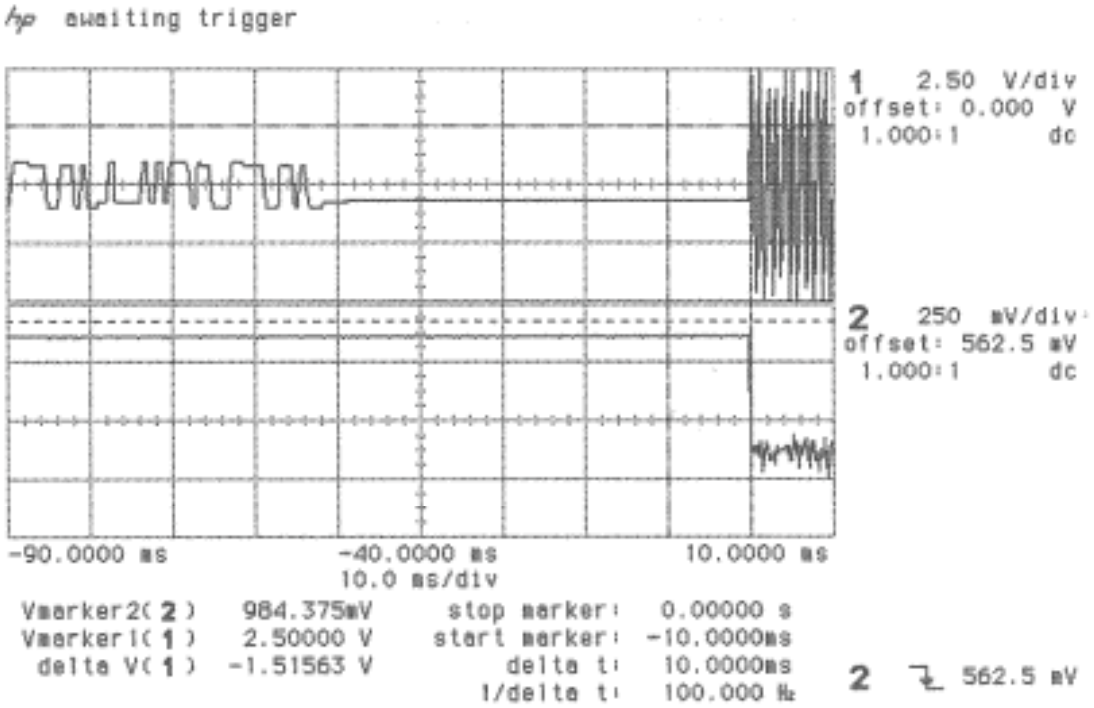
Specification Limit:

t_2= 25ms; during time interval t_2 the maximum frequency different = ±12.5 KHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
06, 67 , 68

TRANSIENT FREQUENCY BEHAVIOR





REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
06, 67 , 68

§PART 15 RADIATED AND CONDUCTED EMISSION

The EUT is a digital device as defined by §15.3 (k), therefore Part 15 requirements does apply.

The radiated measurements were performed vertical andhorizontal over the whole frequency range. We start at 1 m high with vertical receiving antenna and rotate the dish continuously. During rotation we use the antenna lift system to vary the high from 1 to 4 m. So we find maximum radiation output. At this points we do manual remeasurements. After this we do the same measurements in horizontal position of the receiving antenna. This (horizontal and vertical) is made for all the three planes of the test sample. We use the maximum received results.

The detector function and selection of bandwidth are according ANSI C63.2-1996 item 8.2.1 and ANSI C63.4-1992 Item 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

1GHz: Average, RBW 1MHz, VBW 10 MHz, wave guide horn

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 - 24

SPURIOUS RADIATION **§ 15.209**

Radiated

SPURIOUS EMISSIONS LEVEL (µV/m)								
457.575 MHz								
f (MHz)	Detector Polarisation	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
32.44	QP/H	28.8						
51.36	QP/V	34.7						
70.57	QP/V	29.0						
103.32	QP/H	28.7						
133.22	QP/V	37.4						
193.16	QP/H	27.6						
295.53	QP/V	38.4						
359.74	QP/V	35.4						
493.74	QP/H	38.7						
988.40	QP/H	32.4						
Measurement uncertainty			±3 dB					

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

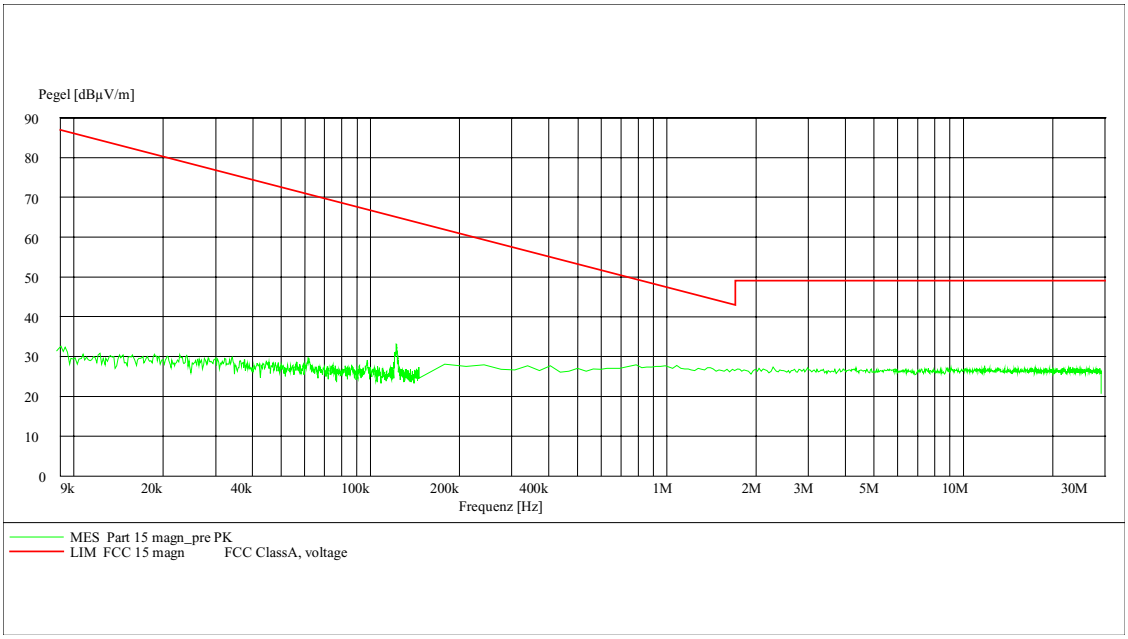
The test setups for transmitter spurious radiated ANSI C63.4 Clause 11 .

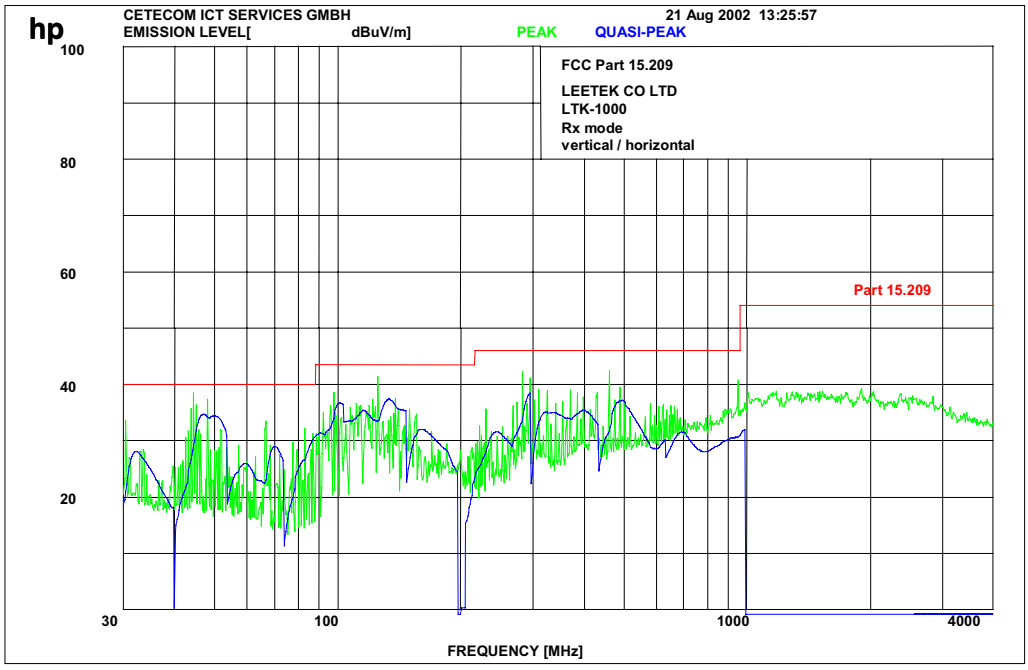
Limits **SUBCLAUSE § 15.209**

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 24

SPURIOUS RADIATION





above 4 GHz no spurious found

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
17 - 24

Equipment under test : LTK-1000
Ambient temperature : 23°C
Relative humidity : 41%

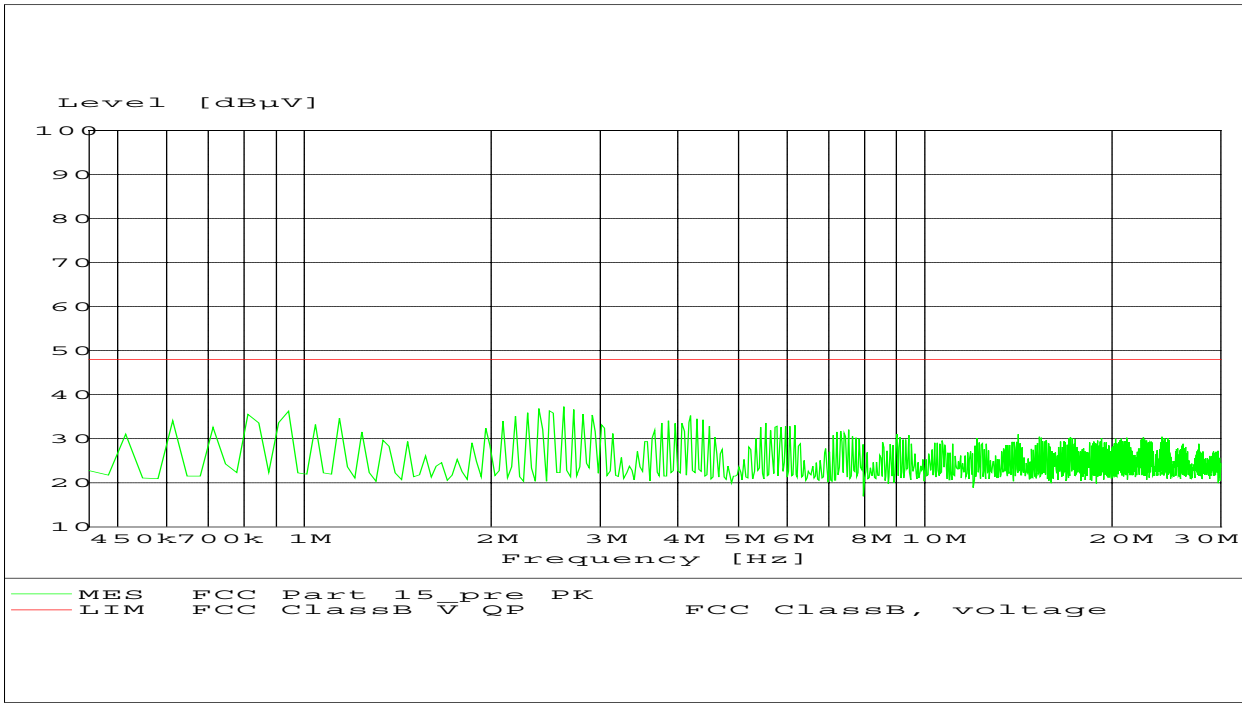
Conducted emissions **§ 15.107/207**

```
EUT:                  LTK-1000
Applicant:            Leetek Co., Ltd.
Operating condition:  Transmit mode / Standby
Test Site:            CETECOM ICT Services GmbH Saarbrücken, Room 006
Operator:             Berg

Power Supply:         115V/L/N
Start of Test:        02.09.02 / 11:09:52
```

SCANTABELLE: "FCC Part 15 AC"

```
  Kurzbeschreibung:              Voltage Mains 1.60
  Start-     Stop-      Schritt-   Detektor  Meß-      ZF-      Transducer
  Frequenz   Frequenz   weite                zeit      Bandbr.
  450.0 kHz  30.0 MHz   6.0 kHz    MaxPeak   100.0 ms  10 kHz   ESH3-Z5 L1 2209
```



max. peaks of the measurements (L/N/GND) reported

Limits **SUBCLAUSE § 15.107 / 207**

Frequency (MHz)	Conducted Limits (µV)
0.45 – 1.705	1000 / 60 dBµV (Class A)
1.705 – 30.0	3000 / 69.5 dBµV (Class A)
0.45 – 30.0	250 / 48 dBµV (Class B)

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)
52 – 63

Equipment under test : LTK-1000
Ambient temperature : 23°C
Relative humidity : 41%

RF Exposure calculation **SUBCLAUSE § 2.1091**

The maximal power density at 20cm distance is calculated as: $Pd = (P_{out} * G)/(4\pi*r^2)$

$169.82mW /4\pi 400cm^2 = 0.135 mW/cm^2$
The Limit for general population/uncontrolled exposures according §1.1307(b) is $1mW/cm^2$

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED
(for reference numbers see test equipment listing)

TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Reciever	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

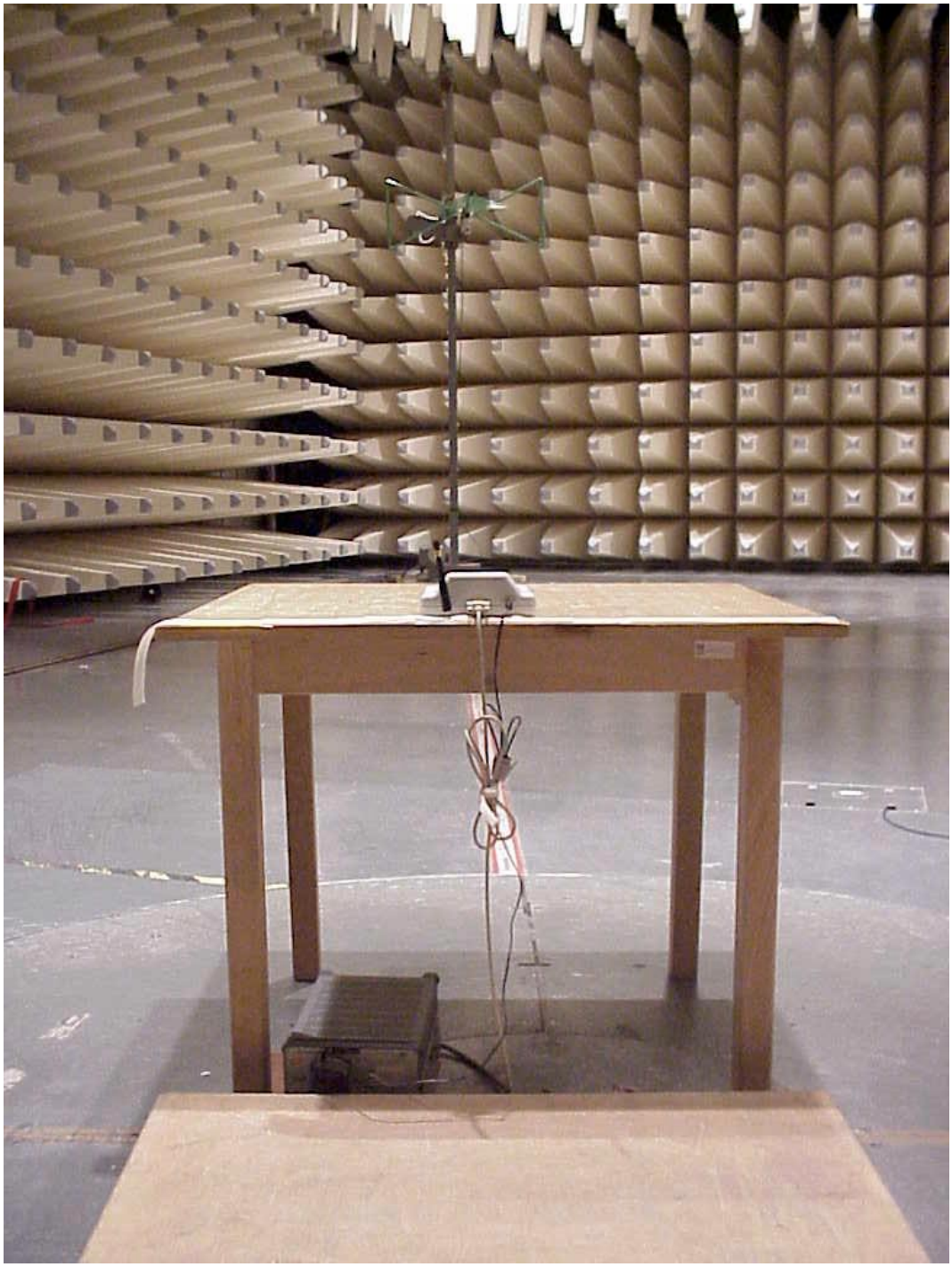
TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
52	Steuerrechner	PSM 7	Rohde & Schwarz	883 086/026
53	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	861 406/005
54	DC V-Netzwerk	ESH3-Z6	Rohde & Schwarz	893 689/012
55	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	861 189/014
56	AC 2 Phasen V-Netzwerk	ESH3-Z5	Rohde & Schwarz	894 981/019
57	AC-3 Phasen V-Netzwerk	ESH2-Z5	Rohde & Schwarz	882 394/007
58	Stromversorgung	6032A	Rohde & Schwarz	2933A05441
59	HF-Test Empfänger	ESVP.52	Rohde & Schwarz	881 487/021
60	Spectrum Monitor	EZM	Rohde & Schwarz	883 086/026
61	HF-Test Empfänger	ESH3	Rohde & Schwarz	881 515/002
62	Relais Matrix	PSU	Rohde & Schwarz	882 943/029
63	Relais Matrix	PSU	Rohde & Schwarz	828 628/007
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Spectrum Analyzer	HP 8565E	Hewlett Packard	3473A00773
66	Bidirektionalkoppler	DC 3010	Amplifier res.	12306
67	Oscilloscope	54502A	HP	2934A01917
68	Radiocommunic.Analyz.	4040	Schlumberger	1725117

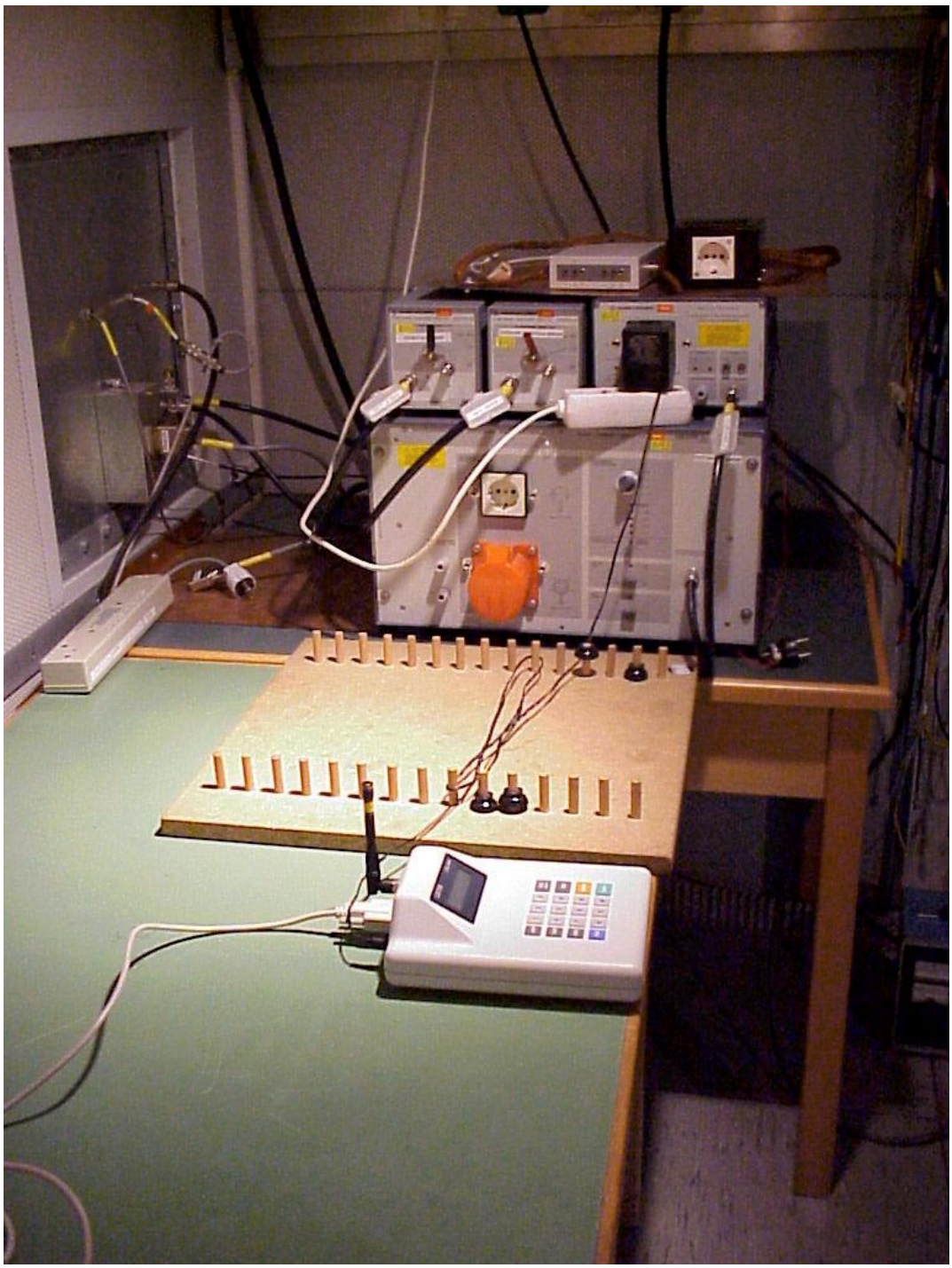
Photographs of the equipment

Test site



Test site

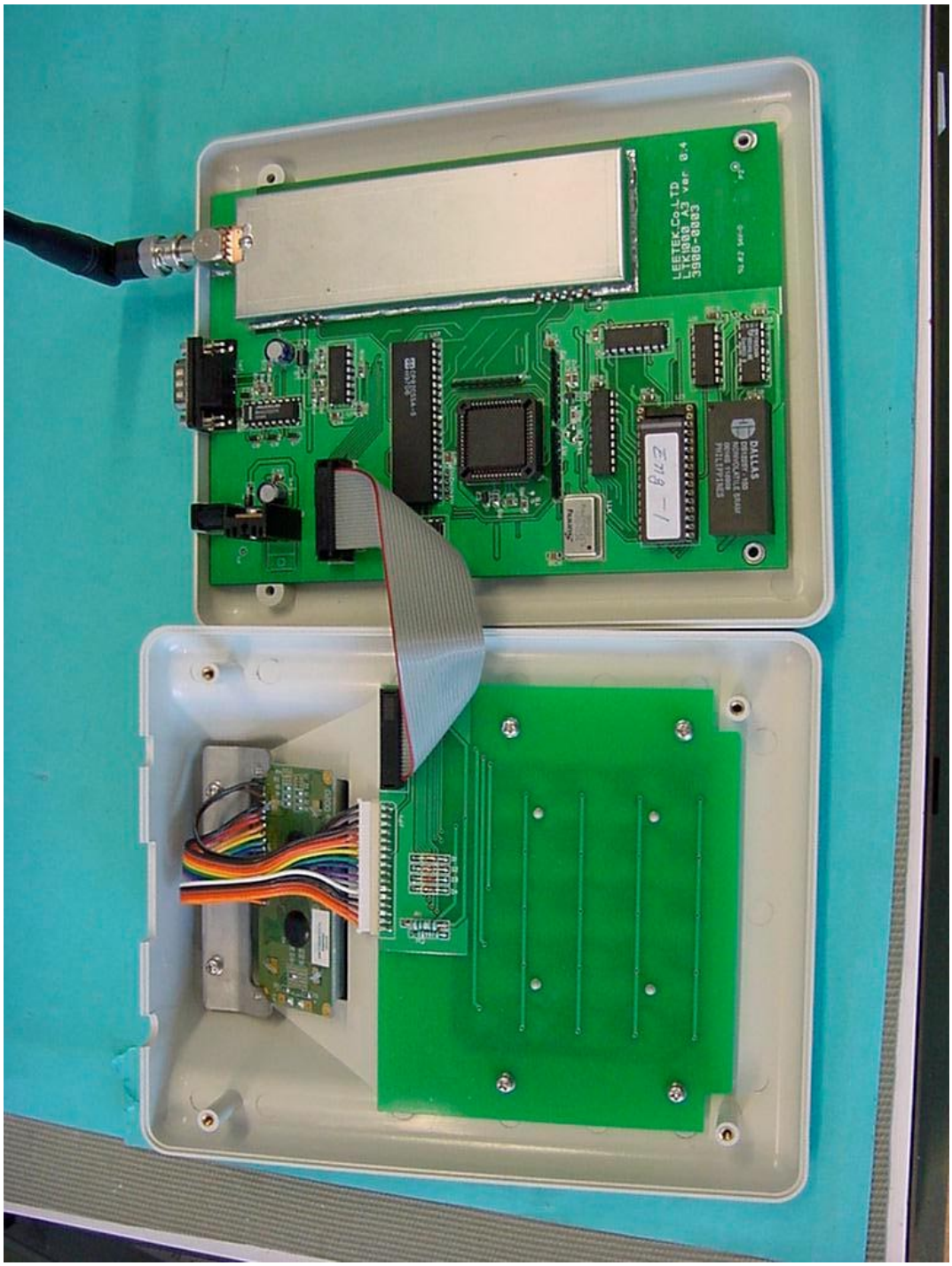
Test site



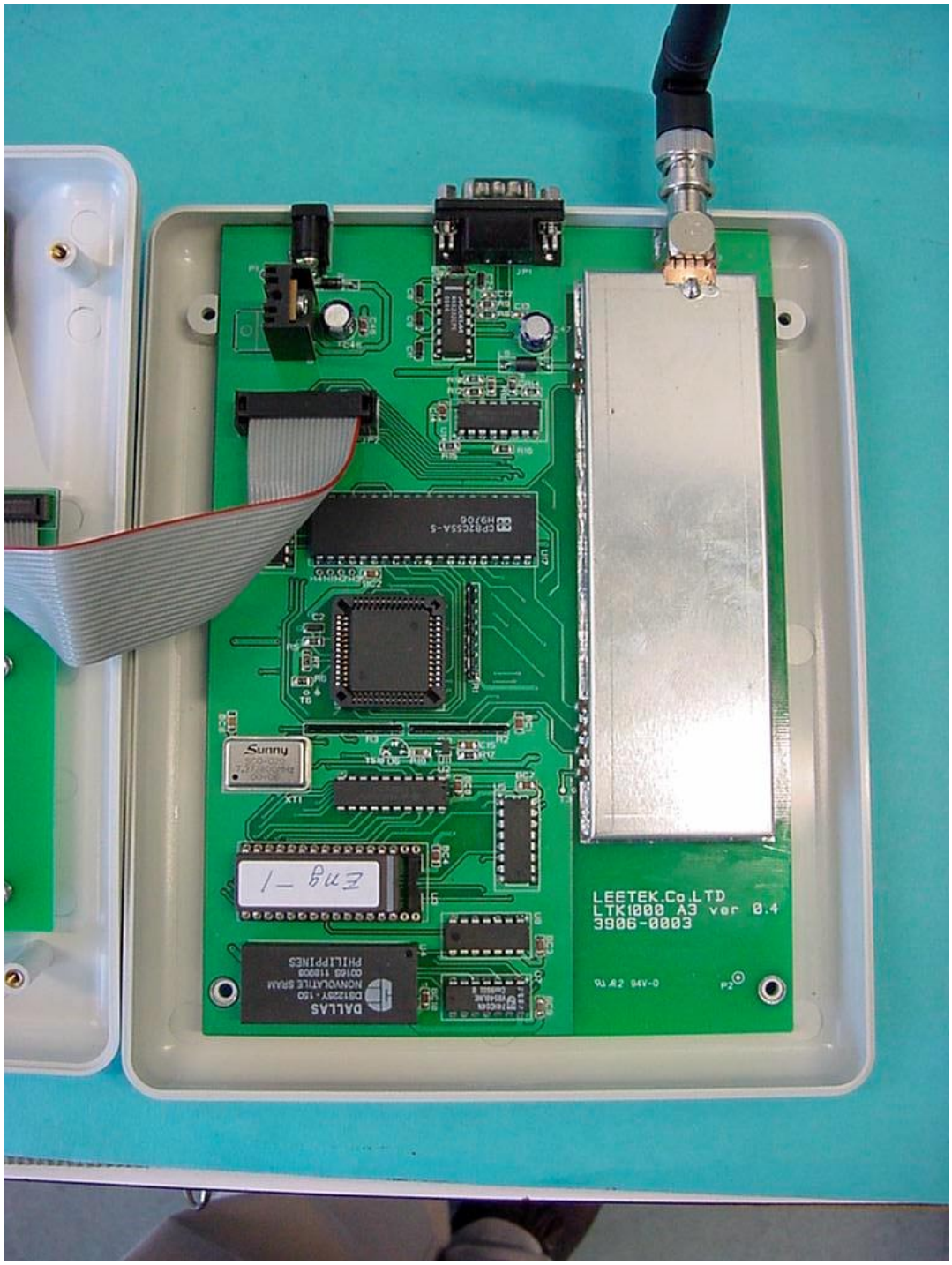
Photographs of the equipment

Photographs of the equipment

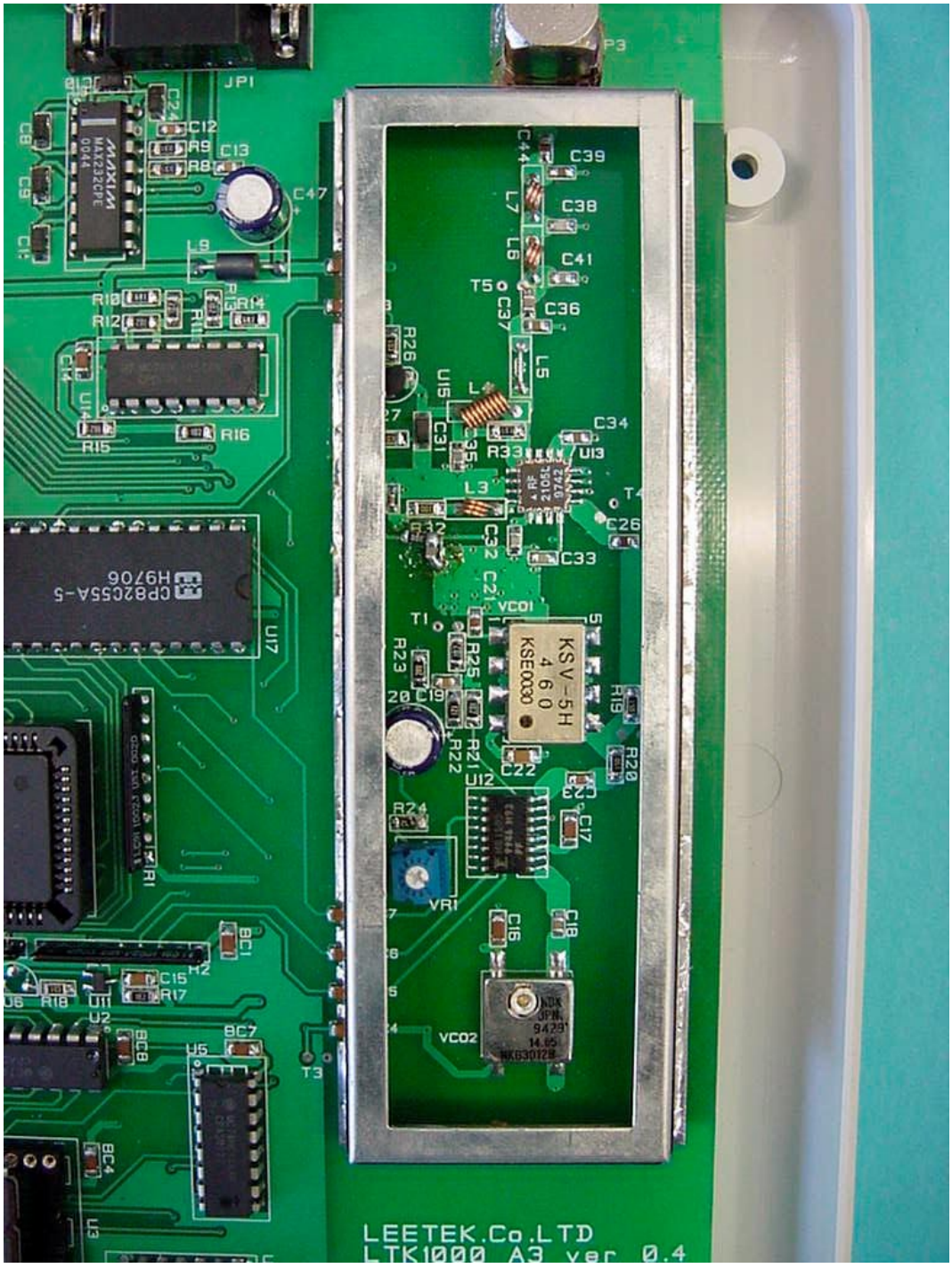
Photographs of the equipment



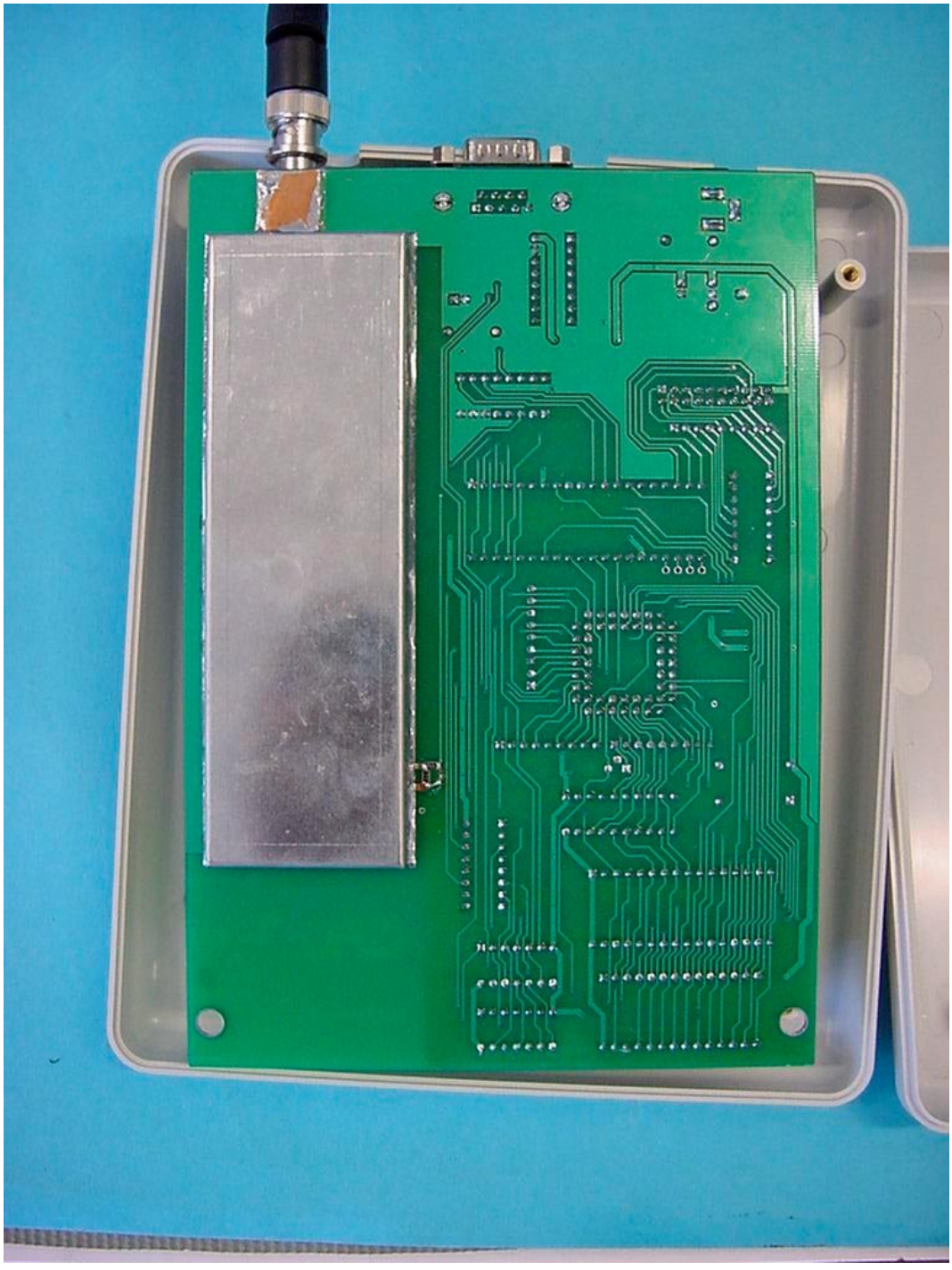
Photographs of the equipment



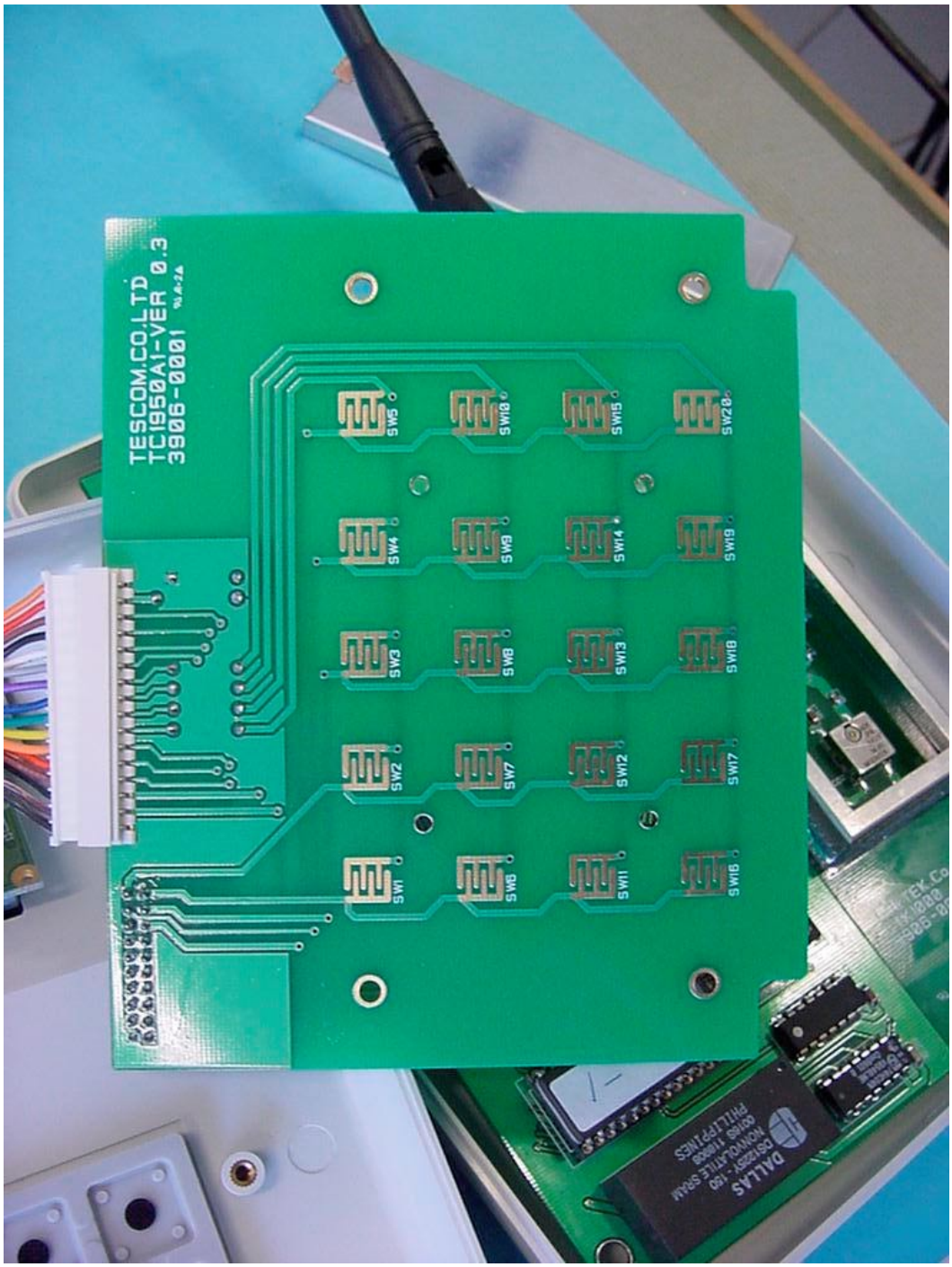
Photographs of the equipment



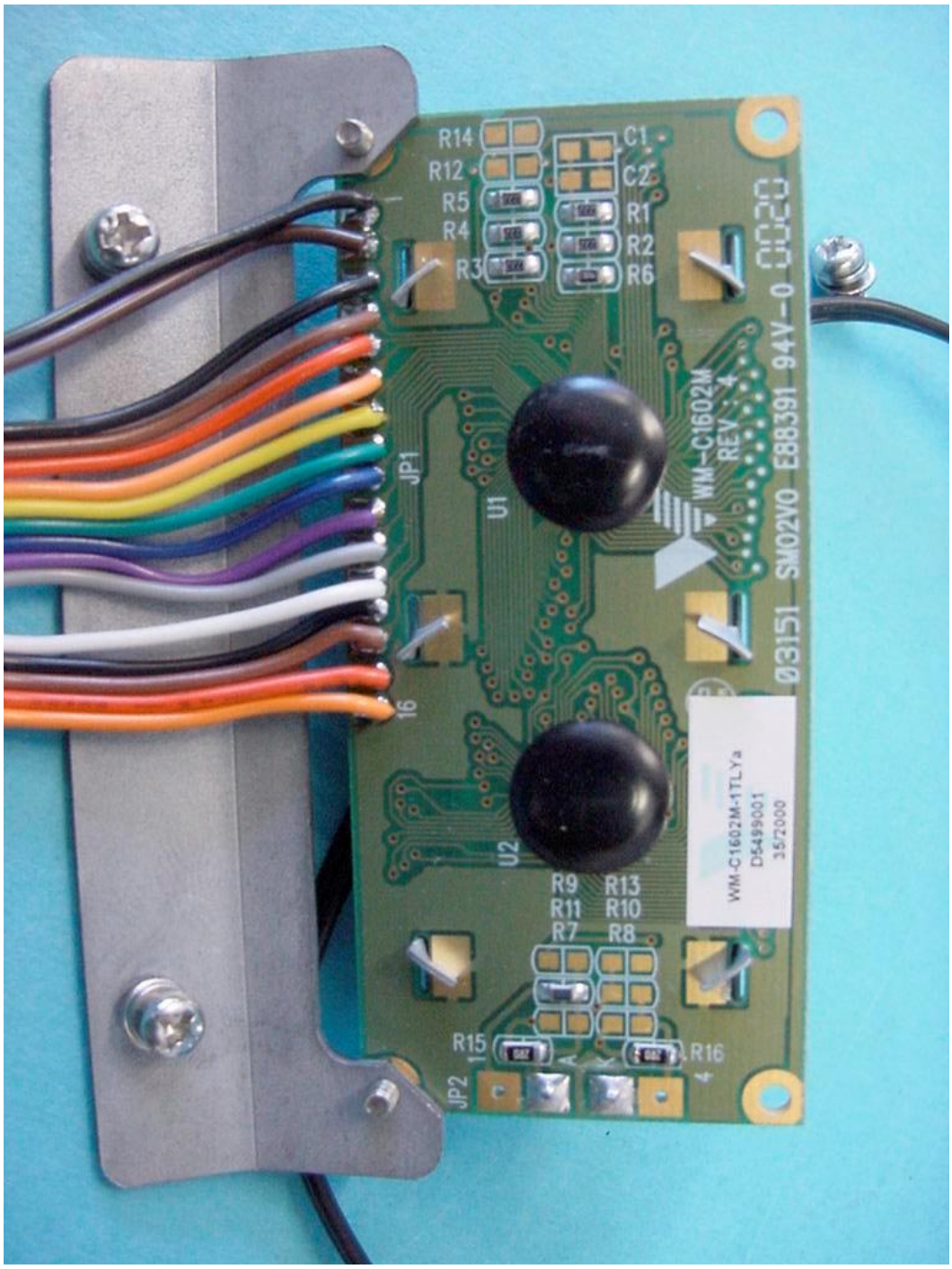
Photographs of the equipment



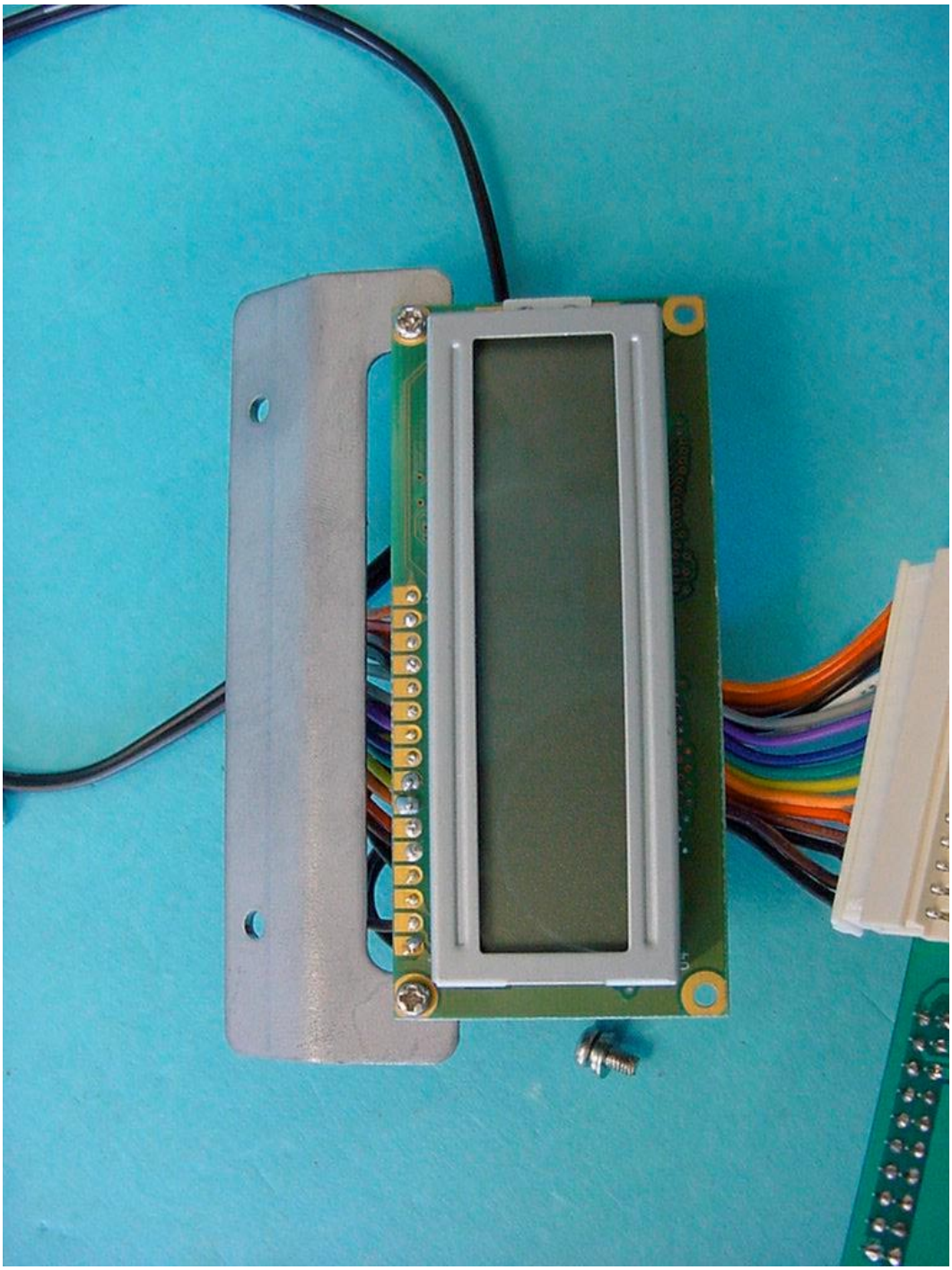
Photographs of the equipment



Photographs of the equipment



Photographs of the equipment



Photographs of the equipment