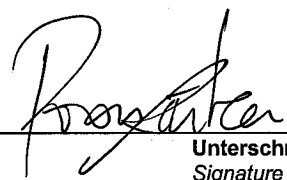


Prüfbericht - Nr.:		14005578 001		Seite 1 von 13 Page 1 of 13	
<i>Test Report No.</i>					
Auftraggeber: <i>Client:</i>		Lucky Plastic Factory Ltd. Suite 907-908 Chinachem Golden Plaza 77 Mody Road T.S.T. East, Kowloon Hong Kong			
Gegenstand der Prüfung: <i>Test item:</i>		Lower Power Transmitter			
Bezeichnung: <i>Identification:</i>		Refer to section 3.1		Serien-Nr.: <i>Serial No.</i>	
				Engineering Sample	
Wareneingangs-Nr.: <i>Receipt No.:</i>		040127026		Eingangsdatum: <i>Date of receipt:</i>	
				27.01.2004	
Prüfort: <i>Testing location:</i>		Refer to section 2.1			
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15, Subpart C			
Prüfergebnis: <i>Test Result</i>		Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. The a. m. test item passed.			
geprüft / tested by: P.Poon		kontrolliert / reviewed by T.Berns			
15.05.2004 <i>Datum</i> Date  <i>Unterschrift</i> Signature		15.05.2004 <i>Datum</i> Date  <i>Unterschrift</i> Signature			
Sonstiges / Other Aspects: FCC ID: NEX-9405-49					
Abkürzungen: OK, Pass = entspricht Prüfgrundlage Fail = entspricht nicht Prüfgrundlage N/A = nicht anwendbar Abbreviations: OK, Pass = passed Fail = failed N/A = not applicable					
Dieser Prüfbericht bezieht sich nur auf den o.g. Prüfgegenstand und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products.					
Authorized format 16.12.1996, R.M.					

Prüfbericht - Nr.:

14005578 001

Test Report No.

Seite 2 von 13

Page 2 of 13

TEST SUMMARY

7.1.1 RADIATED EMISSION OF CARRIER FREQUENCY

Result: Pass

7.1.2 SPURIOUS RADIATED EMISSIONS

Result: Pass

7.1.3 BANDWIDTH MEASUREMENT

Result: Pass

Contents

1	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS.....	4
2	TEST SITES	4
2.1	TEST FACILITIES.....	4
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	5
3	GENERAL PRODUCT INFORMATION	6
3.1	PRODUCT FUNCTION AND INTENDED USE	6
3.2	CIRCUIT DESCRIPTION	6
3.3	RATINGS AND SYSTEM DETAILS.....	6
3.4	INDEPENDENT OPERATION MODES.....	7
3.5	SUBMITTED DOCUMENTS.....	7
3.6	RELATED SUBMITTAL(S) GRANTS.....	7
4	TEST SET-UP AND OPERATION MODE	8
4.1	PRINCIPLE OF CONFIGURATION SELECTION	8
4.2	TEST OPERATION AND TEST SOFTWARE	8
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	8
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	8
5	TEST METHODOLOGY.....	9
6	FIELD STRENGTH CALCULATION	9
7	TEST RESULTS.....	10
7.1.1	<i>Radiated Emission of Carrier Frequency</i>	<i>10</i>
7.1.2	<i>Spurious Radiated Emissions</i>	<i>11</i>
7.1.3	<i>Bandwidth Measurement</i>	<i>13</i>

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Results

Appendix 2: Test Setup

Appendix 3: External Photographs of EUT

Appendix 4: Internal Photographs of EUT

Appendix 5: FCCID Label, Block Diagram, Schematics and User Manual

2 Test Sites

2.1 Test Facilities

TÜV Rheinland Hong Kong Ltd.
Unit 8, 25th Floor, Skyline Tower
39 Wang Kwong Road,
Kowloon Bay
Hong Kong

Hong Kong Productivity Council
HKPC Building
78 Tat Chee Avenue
Kowloon
Hong Kong

Prüfbericht - Nr.:

14005578 001

Test Report No.

Seite 5 von 13
Page 5 of 13

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

	Kind of Equipment	Manufacturer	Type	S/N
☐	Test Receiver	Rohde & Schwarz	ESH-3	890173/033
☐	L/I/S/N	Rohde & Schwarz	ESH 3-Z5	849876/026
☐	Oscilloscope	HP	54713B	US34510455
☐	Test Receiver	Rohde & Schwarz	ESVP	882402/033
☐	Absorbing Clamp	Rohde & Schwarz	MDS-21	979 3/4
☒	Test Receiver	Rohde & Schwarz	ESVS30	842807/009
☒	Biconical Antenna	Rohde & Schwarz	HK116	841489/015
☒	Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
☐	Universal Power Analyzer	Voltech	PM3000A	9915
☐	Reference Impedance Network	Voltech	IEC 555 Standard	9946
☐	AC Power Source	California Instr.	4500L	HK51895
☐	Trip-Loop Antenna	Chase	LLA6142	1019
☐	Double Ridge Horn Antenna	EMCO	3115	9002-3351
☐	Double Ridge Horn Antenna	EMCO	3116	9002-3347
☐	RF Comms Test Set	HP	8920B	US36492628
☐	Spectrum Analyser + Tracking Gen.	HP	8596E	3639A00758
☐	Signal Generator	Rohde & Schwarz	SMY 01	844146/024
☐	Signal Generator	Rohde & Schwarz	SMY 01	844146/023
☐	BiLog Antenna	EMCO	3143	9607-1287
☐	Isotropic Field Probe	Holladay	HI-4422	90956
☐	Power Amplifier	Kalmus	757-LC	7620-1
☐	Power Amplifier	Kalmus	122-FC	7620-2
☐	Coupling Clamp	Schaffner	CDN 126	312
☐	Couple Device Network	Fischer	CDN-M2	9604
☒	Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30
☐	Temperature Chamber	Binder	MK 240	9020-0028
☐	EFT,ESD,SURGE, DIPS tester	Schaffner	Best 96	IN3796-011

3 General Product Information

3.1 Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy car operating at 49.860MHz. The EUT has two control rods for commanding the forward, backward, left and right movement of the associated receiver.

After construction checking and declaration from the manufacturer, it is deemed that that 9389, 9406, 9407 and 9408 are same in circuit design and PCB layout as 9405, they only differ in the cosmetic design. Hence, all testing was conducted on the representative model: 9405.

FCCID: NEX-9405-49

Model	Product description
9389	3" R/C Smart
9405	Micro Subaru
9406	Micro Mitsubishi
9407	3" R/C Roadster
9408	Micro Citroen

3.2 Circuit Description

IC1 and the associated circuit act as AF-Modulator. Q2 and the associated circuit act as a RF-amplifier. Q1 together with 49.860MHz crystal acts as an oscillator to drive the base of Q2, signal from Q1 and the modulation provided by IC1 are then summed into Q2. The matching network at output of Q1 is to limit the harmonic content and provide the proper coupling to antenna output.

3.3 Ratings and System Details

	Transmitter
Frequency range	: 49.860MHz
Number of channels	: 1
Type of antenna	: Integral antenna
Power supply	: Battery operated 3x1.5V "AAA" size batteries.
Ports	: none
Protection Class	: III

3.4 Independent Operation Modes

The basic operation modes are:

- Power: On and Off
- Two control rods for commanding the left and right, forward and backward movement of the associated receiver.

For further information refer to User Manual

3.5 Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- Rating label
- User manual

3.6 Related Submittal(s) Grants

This is a single application for certification of the transmitter, the receiver for this transmitter is authorized by the Certification procedure.

4 Test Set-up and Operation Mode

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation should refer to Section 5 and 7.

- There was no special software to exercise the device.

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

-none

4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the Circuit Diagram or the Technical Construction File. No additional measures were employed to achieve compliance.

5 Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2001.

The equipment under test (EUT) was placed at the middle of the 80cm height turntable, and the turntable is 3 meters far from the measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360° , the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

The frequency range scanned is from the lowest radio frequency signal generated in the device which greater than 9 KHz to the tenth harmonic of the highest fundamental frequency or 40GHz, whichever is lower.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in section 7.1.1 and 7.1.2 of this test report.

6 Field Strength Calculation

The field strength at 3m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

7 Test Results

7.1.1 Radiated Emission of Carrier Frequency

RESULT:

Pass

Test Specification : FCC Part 15 section 15.235(a)
 Test Method : ANSI 63.4-2001
 Measurement Location: Semi Anechoic Chamber
 Measurement Distance: 3m
 Detector Function : Peak and average
 Measurement BW : 100KHz
 Supply Voltage : DC 4.5V

Polarization: Vertical

Detector function	Frequency	Reading	Antenna Factor	Attenuation of cable	Measured Field strength at 3m	Delta to Limit
	(MHz)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	(dB)
Peak	49.860	42.60	12.9	0.5	56.0	44.0
Average	49.860	41.40	12.9	0.5	54.8	25.2

Polarization: Horizontal

Detector function	Frequency	Reading	Antenna Factor	Attenuation of cable	Measured Field strength at 3m	Delta to Limit
	(MHz)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	(dB)
Peak	49.860	35.10	12.9	0.5	48.5	51.5
Average	49.860	34.20	12.9	0.5	47.6	52.4

Limit

Section 15.235 (a)

Frequency within the band	Peak Emission		Average Emission	
	(microvolts / meter)	dB μ V/m	(microvolts / meter)	dB μ V/m
49.82-49.94MHz	100,000	80.0	10,000	100.0

According to section 15.35(b), When average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

Prüfbericht - Nr.:

14005578 001

Test Report No.

Seite 11 von 13
Page 11 of 13

7.1.2 Spurious Radiated Emissions

RESULT:

Pass

Test Specification : FCC Part 15 section 15.209
Test Method : ANSI 63.4-2001
Measurement Location : Semi Anechoic Chamber
Measurement Distance : 3m
Detector Function : Quasi Peak
Measurement BW : 100KHz
Supply Voltage : DC 4.5V
Measuring Frequency Range : 30-1000MHz

Polarization: Vertical

Frequency	Reading	Antenna Factor	Attenuation of cable	Field strength at 3m	Limit at 3m	Delta to Limit
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
99.72	7.50	10.70	0.70	18.90	43.50	-24.60
177.08	0.55	15.35	1.00	16.90	43.50	-26.60
186.08	0.30	15.80	1.00	17.10	43.50	-26.40
199.70	0.50	16.30	1.10	17.90	43.50	-25.60
299.17	4.10	13.00	1.30	18.40	46.00	-27.60
359.00	2.30	14.80	1.50	18.60	46.00	-27.40
418.84	1.70	16.10	1.70	19.50	46.00	-26.50
478.67	1.10	17.30	2.00	20.40	46.00	-25.60
615.43	3.20	19.30	2.10	24.60	46.00	-21.40

Polarization: Horizontal

Frequency	Reading	Antenna Factor	Attenuation of cable	Field strength at 3m	Limit at 3m	Delta to Limit
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
99.72	7.40	10.70	0.70	18.80	43.50	-24.70
149.16	1.60	14.30	0.90	16.80	43.50	-26.70
198.68	0.00	16.30	1.10	17.40	43.50	-26.10
249.31	3.55	11.65	1.20	16.40	46.00	-29.60
299.17	0.70	13.00	1.30	15.00	46.00	-31.00
359.00	0.10	14.80	1.50	16.40	46.00	-29.60
418.84	0.10	16.10	1.70	17.90	46.00	-28.10
478.67	0.10	17.30	2.00	19.40	46.00	-26.60
615.43	2.80	19.30	2.10	24.20	46.00	-21.80

For test results refer to Appendix 1, page 3-6

Limit

Section 15.209

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

Field strength limits within the restricted bands using average detector:

Frequency (MHz)	Field strength (microvolts/meter)	Field strength (dBμV/m)	Measurement distance (meters)
30-88	100	$20 \cdot \log(100) = 40.0$	3
88-216	150	$20 \cdot \log(150) = 43.5$	3
216-960	200	$20 \cdot \log(200) = 46.0$	3
Above 960	500	$20 \cdot \log(500) = 54.0$	3

According to section 15.35(b), on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurements are specified in this part, including emission measurements below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated.

Prüfbericht - Nr.:

14005578 001

Test Report No.

Seite 13 von 13

Page 13 of 13

7.1.3 Bandwidth Measurement

RESULT:

Pass

Test Specification : FCC Part 15 section 235(b)
Port of Testing : Antenna port
Detector Function : Peak
Supply Voltage : DC 4.5V
Temperature : 22°C
Humidity : 50%

The field strength of any emissions appearing between the band edges and up to 10KHz above and below the band edges is at least 26dB below the carrier. At the lower edge 49.81MHz and upper edge 49.91 MHz are 36.36dB and 36.22dB below the carrier respectively.

For test results refer to Appendix 1, page 1-2

Limit

Section 15.235(b)

The field strength of any emissions appearing between the band edges and up to 10KHz above and below the band edges shall be attenuated at least 26dB below the level of the unmodulated carrier or to the general limits in Section 15.209, whichever permits the higher emission levels.

Prüfbericht - Nr.:
 Test Report No.

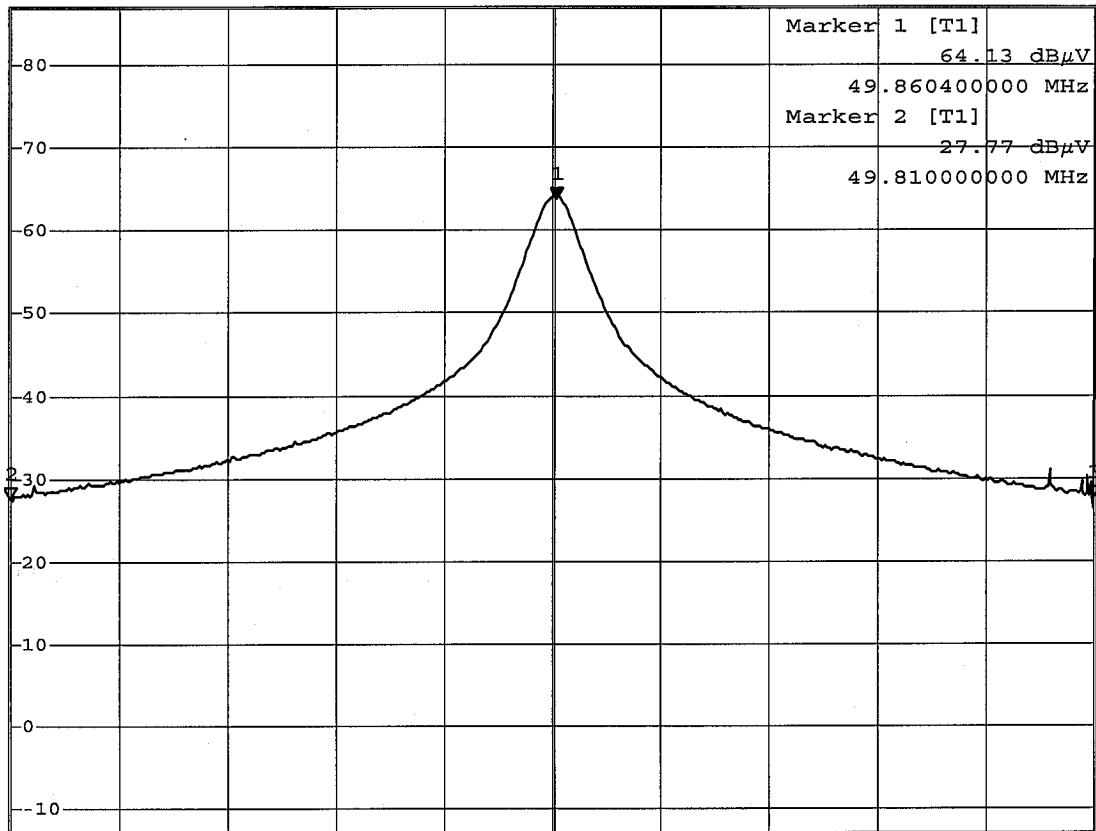
14005578 001

Seite 1 von 6
 Page 1 of 6



Ref 87 dB μ V Att 10 dB *RBW 3 kHz Marker 3 [T1] 27.91 dB μ V
 *VBW 1 MHz 49.910000000 MHz
 *SWT 500 ms

1 PK
 MAXH



Center 49.86 MHz

10 kHz/

Span 100 kHz

Date: 15.MAY.2004 12:04:19

Prüfbericht - Nr.:

Test Report No.

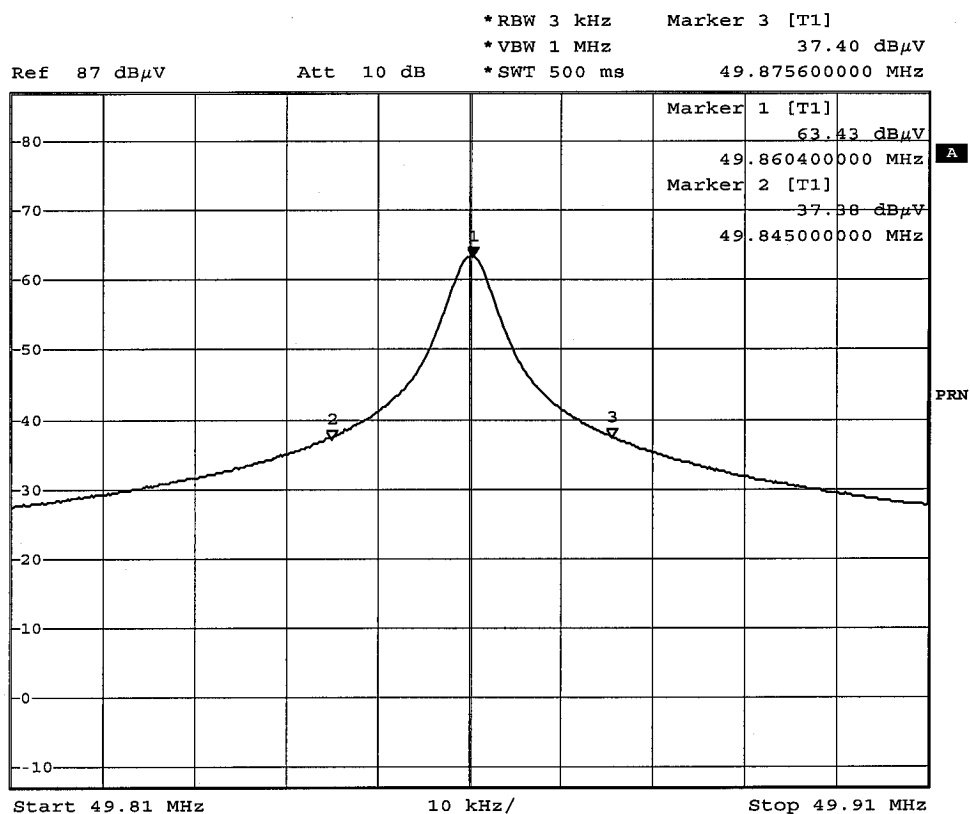
14005578 001

Seite 2 von 6

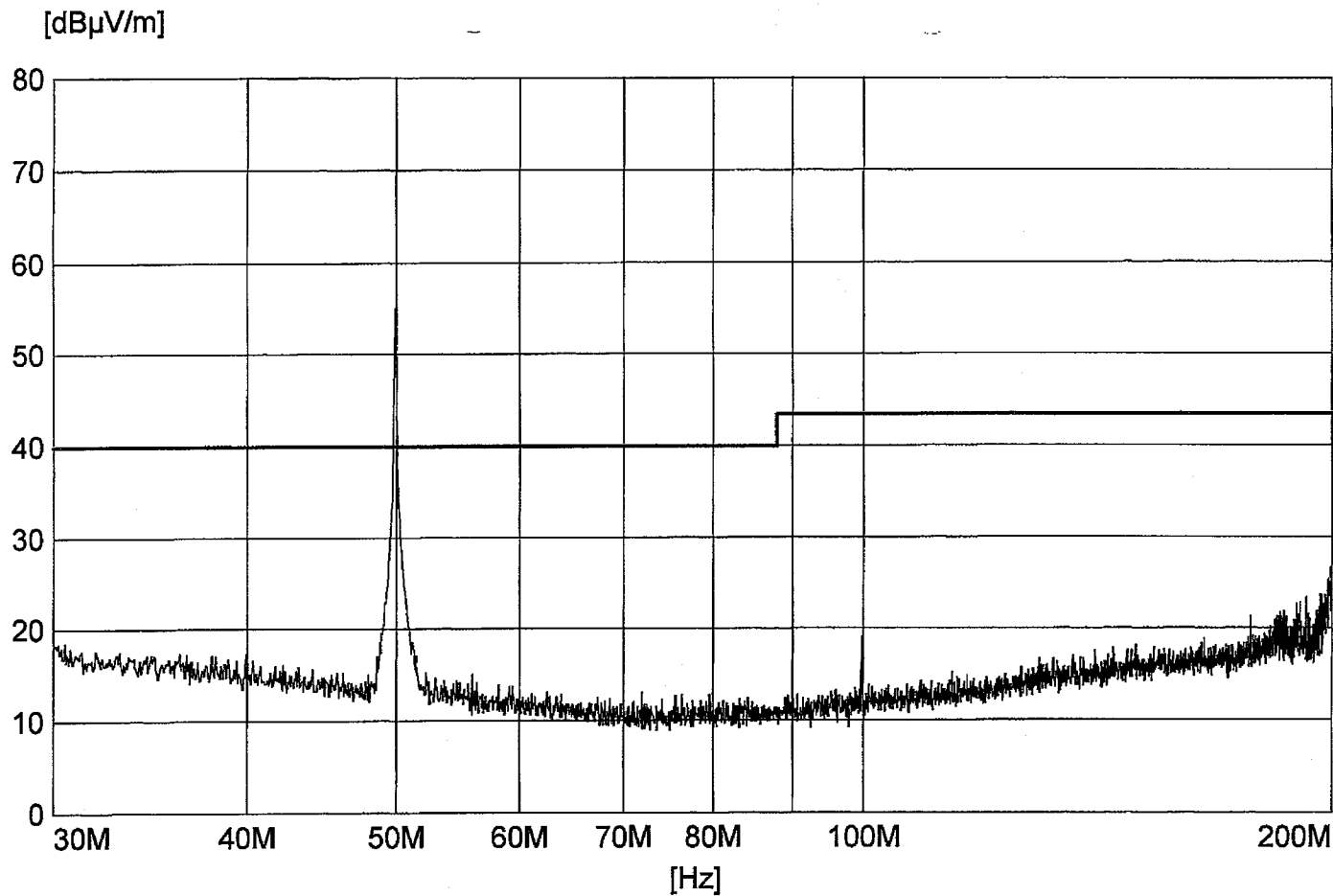
Page 2 of 6



1 PK
MAXH



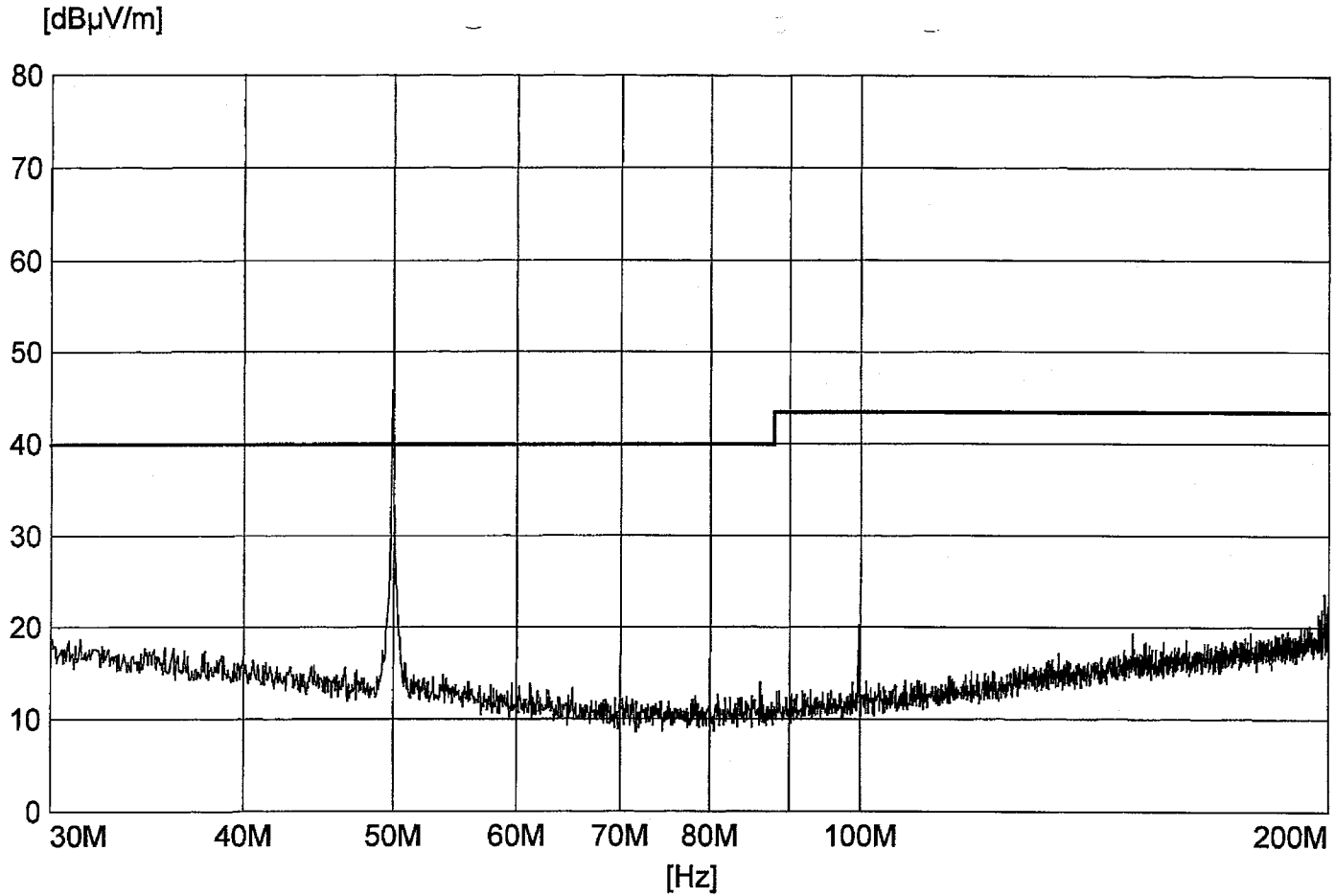
Date: 15.MAY.2004 11:48:10



— MES TUV120304B11.PK
— LIM FCC P15.109 Class B

Freq	PK	AV	AP
49.860	56.0	56.8	—
99.720	—	—	18.8
177.08	—	—	16.8
186.08	—	—	17.1

FCC
4PMHz Tx
operating
Cent.



Model: 9405

— MES TUV120304B12.PK
— LIM FCC P15.109 Class B

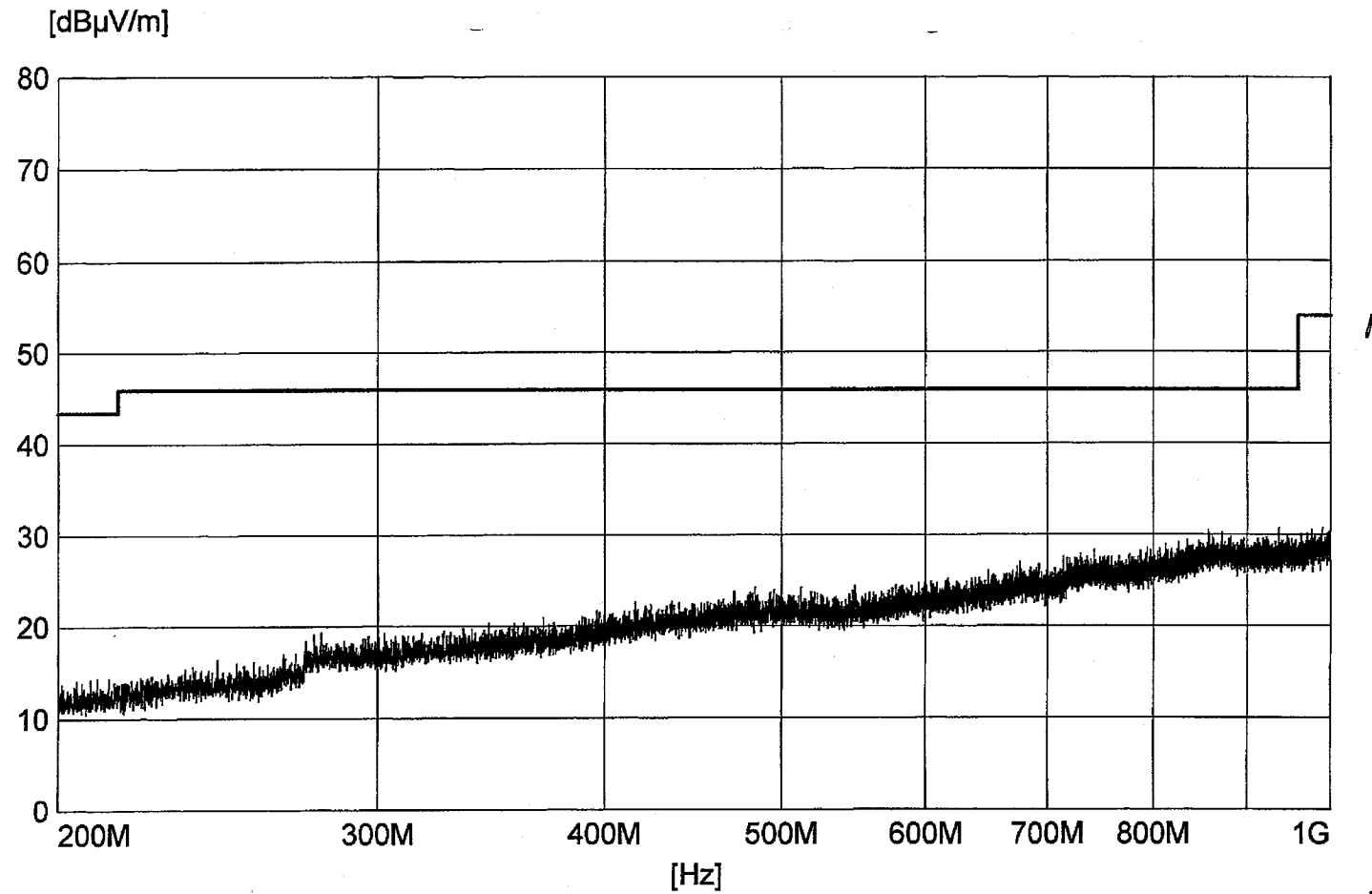
Freq	PK	Av	QP
49.86	48.5	47.6	—
99.72	—	—	18.8
149.16	—	—	16.8
198.68	—	—	17.4

FCC
49MHz Tx
(operating)

Prüfbericht - Nr.:
Test Report No.

14005578 001

Seite 5 von 6
Page 5 of 6



— MES TUV120304B09.PK
— LIM FCC P15.109 Class B

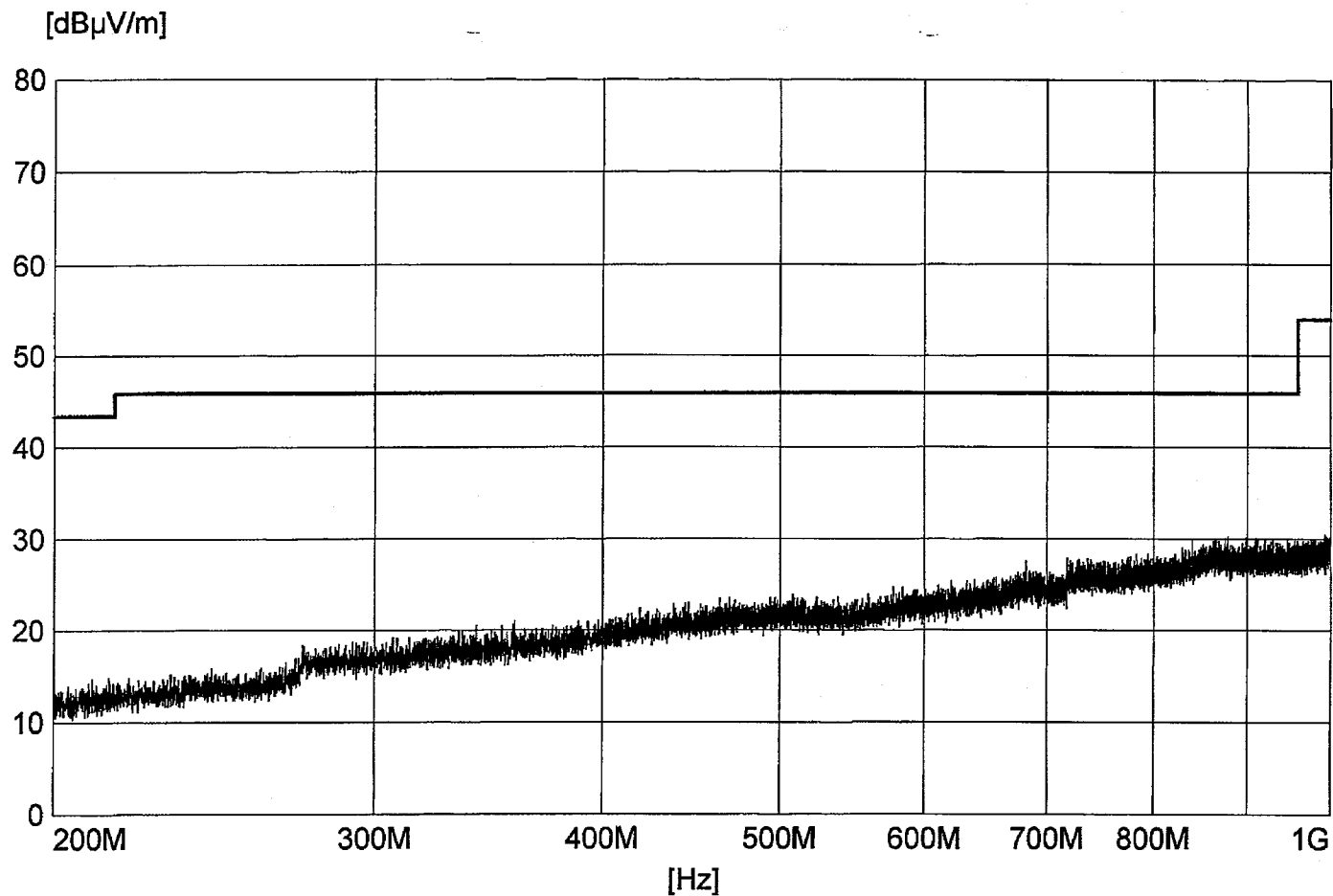
Freq	QP
299.17	18.4
359.00	18.6
418.84	19.5
478.67	20.4
115.11	1.1

fcc
49MHz
vert.
(operating)

Prüfbericht - Nr.:
Test Report No.

14005578 001

Seite 6 von 6
Page 6 of 6



Model: 9405

— MES TUV120304B10.PK
— LIM FCC P15.109 Class B

Freq	QP	Freq	QP
249.31	16.4	418.84	17.9
299.17	15.0	478.67	19.4
359.00	16.4	615.43	24.2

PCC
QPM4
De. (toni)
(operating)