



**FCC LISTED,
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NUMBER: 905266**

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TEST REPORT

Report No.: 25995RET.101

TEST NAME: FCC PART 15.227 RADIO TESTING FOR 27 MHz BAND CORDLESS DEVICE

Product : CORDLESS KEYBOARD
Trade Mark : LOGITECH
Model/type Ref. : Y-UU87
Manufacturer : LOGITECH TECHNOLOGY Co., LTD
Requested by : LOGITECH Inc.
Other identification of the product : FCC ID: DZLYUU87
Prototype
Standard(s) : USA FCC Part 15.227, 15.205, 15.209

This test report includes 2 annexes and therefore the total number of pages is 26.

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Date: 2007-06-21	Test operator A. Llamas 	 Centro de Tecnología de las Comunicaciones, S.A.	Approved by: Date: 2007-06-21 J. C. Soler Consultant 	Page: 1 of 8 AGY-700-001127.001
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1. COMPETENCE AND GUARANTEES

Centro de Tecnología de las Comunicaciones (AT4 WIRELESS), S.A. is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

In order to assure the traceability to other national and international laboratories, AT4 WIRELESS has a calibration and maintenance programme for its measuring equipment.

AT4 WIRELESS guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at AT4 WIRELESS at the time of execution of the test.

AT4 WIRELESS is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

2. GENERAL CONDITIONS

1. This report only refers to the item that has undergone the test.
2. This report does not constitute or imply by its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without written approval of AT4 WIRELESS.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of AT4 WIRELESS and the Accreditation Bodies.

3. CHARACTERISTICS OF THE TEST

3.1 TEST REQUESTED

1. Measurements for cordless equipment operating in the 27 MHz band, according to FCC Part 15.227.

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3.2 REQUIREMENTS AND METHOD

1. FCC parts 15.33, 15.35, 15.227, 15.205, 15.209.

The testing was performed according to the procedure in ANSI C63.4: 2003. Radiated testing was performed in AT4 WIRELESS's semi-anechoic chamber. This site has been fully described in a report submitted to the FCC and was accepted in a letter dated July 25, 2002.

The instrumentation used to perform the testing is listed below:

1. Semianechoic Absorber Lined Chamber IR 11. BS.
2. Control Chamber IR 12.BC.
3. Antenna mast EM 1072 NMT.
4. Rotating table EM 1084-4. ON.
5. Multi device controller ETS 2090.
6. Bilog antenna CHASE CBL6111.
7. Antenna tripod EMCO 11968C.
8. Loop antenna HP 1196 A.
9. Semianechoic Absorber Lined Chamber IR 11. BS.
10. Spectrum analyzer R&S ESIB 26.
11. Spectrum analyzer Agilent E4440A.
12. RF pre-amplifier Schaffner CPA 9231.
13. DC power supply R&S NGPE 40/40.

4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT

Identification data in this section has been supplied by the client.

4.1 APPLICANT

Name / Company: Logitech Inc.

V.A.T.: Not provided

Address: 6505 Kaiser Drive **P.C.:** CA 94555 **City:** Fremont

Country: USA

Telephone: +1-510-795 85 00

Fax: +1-510-792 89 01

4.2 REPRESENTATIVE

Name: Bharat Shah

4.3 TEST SAMPLES SUPPLIER

Name or Company: Logitech Europe, S.A.

V.A.T.: 203037

Address: Z.I. Moulin du Choc D

City: Romanel Sur Morges

Postal code: 1122

Country: Switzerland

Telephone: +41 21 863 50 67

Fax: +41 21 863 53 11

Samples undergoing test have been selected by: [the client](#)

4.4 IDENTIFICATION OF ITEM/ITEMS TESTED

Product: Cordless keyboard

Trade mark: Logitech

Model: Y-UU87

Manufacturer: LOGITECH TECHNOLOGY Co., LTD

Country of manufacture: China

Manufacture site: No. 3, Songshan Road, Suzhou New District

Description: Cordless keyboard for PC, Laptop etc, with operating frequencies of 27.095 MHz and 27.145 MHz.

5. USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS

5.1 USAGE OF SAMPLES

Sample M/01 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
25995/02	Cordless keyboard with integral antenna	Y-UU87	----	30/05/07

Sample M/02 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
25995/06	Cordless keyboard with antenna connector	Y-UU87	----	08/06/07

1. Sample M/01 has undergone following test(s).
Radiated tests indicated in annex A.
2. Sample M/02 has undergone following test(s).
All tests indicated in annex A, except radiated tests.

5.2 PERIOD OF TESTING

The performed test started on 2007-06-01 and finished on 2007-06-11.

The tests as detailed in this report have been performed at AT4 WIRELESS.

5.3 ENVIROMENTAL CONDITIONS

In the control chamber the following limits were not exceeded during the test:

Temperature	Min. = 26 °C Max. = 26 °C
Relative humidity	Min. = 51 % Max. = 51 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

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In the semianechoic chamber (21 meters x 11 meters x 8 meters) the following limits were not exceeded during the test.

Temperature	Min. = 25 °C Max. = 25 °C
Relative humidity	Min. = 52 % Max. = 52 %
Air pressure	Min. = 1023 mbar Max. = 1023 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements the following limits were not exceeded during the test:

Temperature	Min. = 23 °C Max. = 23 °C
Relative humidity	Min. = 47 % Max. = 47 %
Air pressure	Min. = 1020 mbar Max. = 1020 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

6. TEST RESULTS

Abbreviations used in the VERDICT column of the following tables are:

- P** Pass
- F** Fail
- NA** not applicable
- NM** not measured

FCC PART 15 PARAGRAPH	VERDICT			
	NA	P	F	NM
15.227 Subclause (a). Field strength of emissions		P		
15.227 Subclause (b). Emissions radiated outside of the specific frequency bands		P		

7. REMARKS AND COMMENTS

None.

8. SUMMARY

Based on the results of the performed test, stated in annex A the item under test is **IN COMPLIANCE** with the specifications listed in section 3.1 “TEST REQUESTED”.

NOTE: The results presented in this Test Report apply only to the particular item under test declared in section 4.4 “IDENTIFICATION OF ITEM/ITEMS TESTED” of this document, as presented for test on the date(s) declared in section 5, “USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS”.

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ANNEX A
TEST RESULTS

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TEST CONDITIONS

Power supply (V):

$$V_{\text{nominal}} = 3.0 \text{ Vdc}$$

Type of power supply = DC voltage supplied by 2 x type AAA batteries

Type of antenna = Integral antenna

Operating Temperature Range (°C):

$$T_n = +15 \text{ to } +35$$

TEST FREQUENCIES:

Channel 2: 27.145 MHz

The test set-up was made in accordance to the general provisions of ANSI C63.4: 2003.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to the spectrum analyser.

RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-500 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 10 m for the frequency range 9 kHz-30 MHz (9 kHz-30 MHz loop antenna).

For spurious radiated emissions in the range 9 kHz–30 MHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 40 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive (wooden) platform one meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization when using the 30 MHz-1000 MHz Bilog antenna and with different orientation (parallel, normal and horizontal) when using the 9 kHz-30 MHz loop antenna.

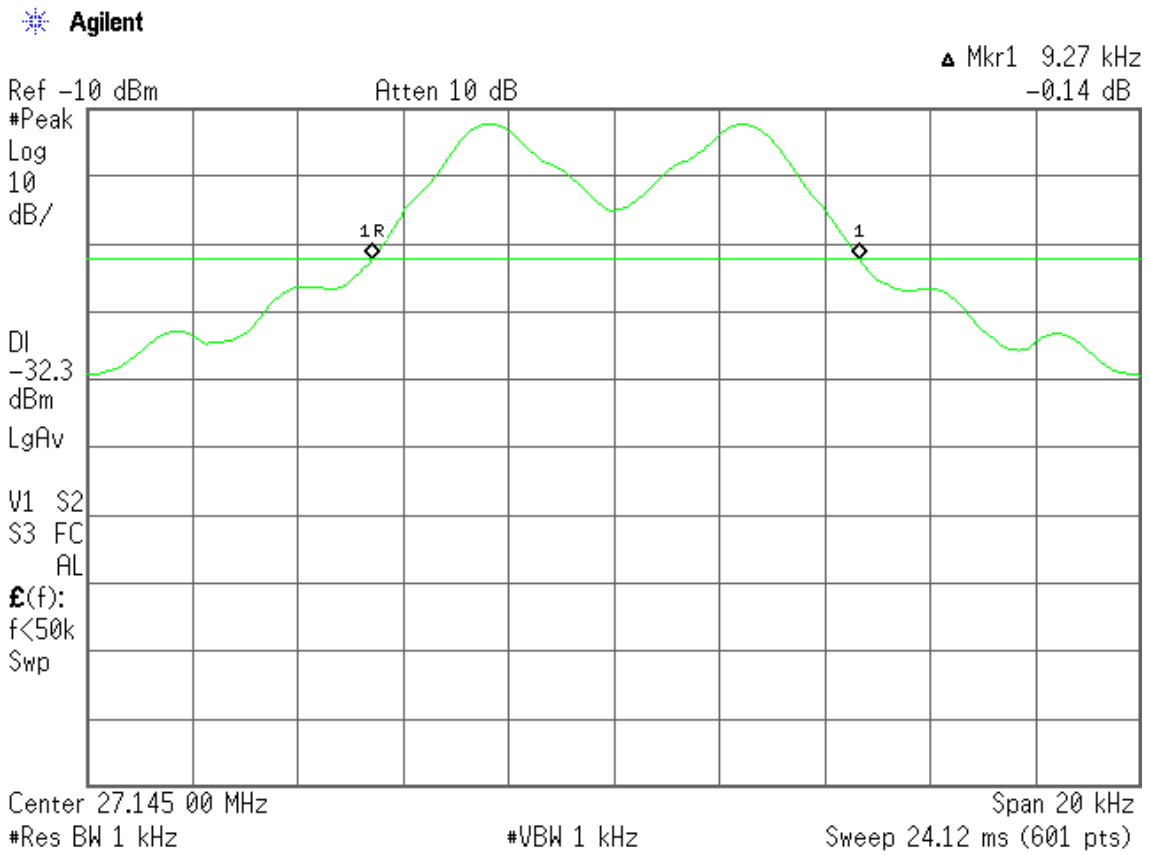
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Section 15.215 Subclause (c) (1). 20 dB Bandwidth

RESULTS

20 dB Bandwidth (see next plot).

20 dB Spectrum bandwidth (kHz)	9.27
Measurement uncertainty (kHz)	±11



Section 15.227 Subclause (a). Field strength of Fundamental

SPECIFICATION

The field strength of any emissions within the band 26.96 – 27.28 MHz shall not exceed 10,000 microvolts/meter (80 dB μ V/m) at 3 meters.


The field strength limit is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

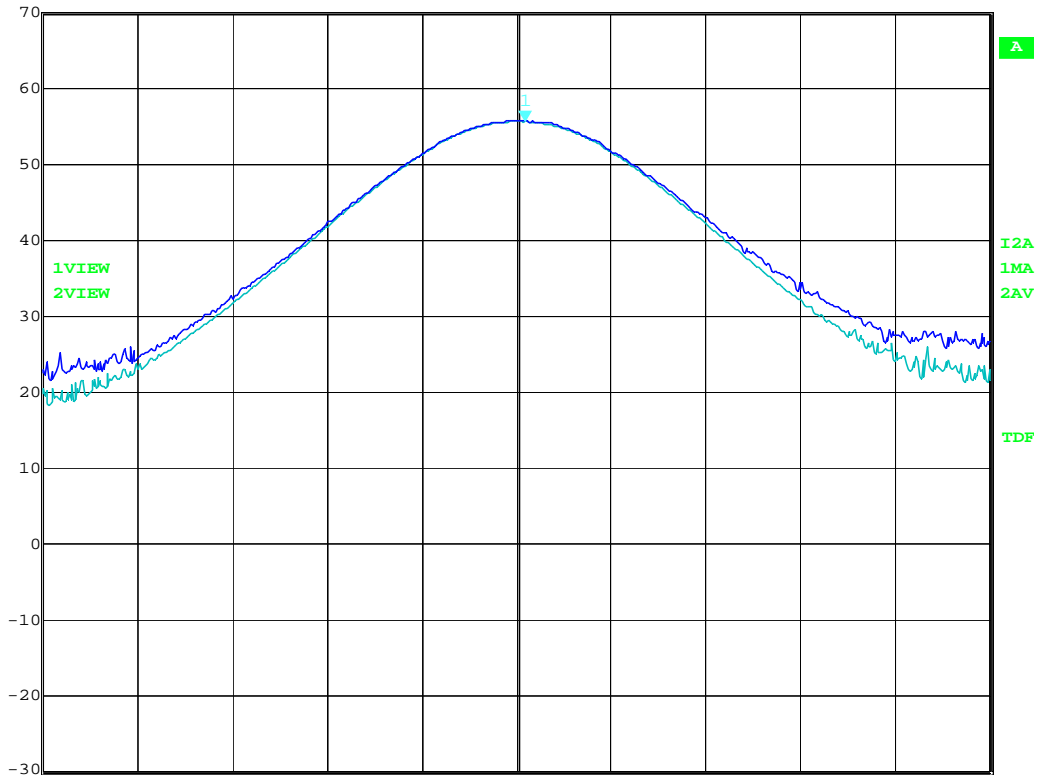
RESULTS

Field strength (dB μ V/m) average	55.50
Field strength (dB μ V/m) peak	55.65
Measurement uncertainty (dB)	± 3.8

Verdict: PASS

FIELD STRENGTH

	Marker 1 [T1]	RBW	100 kHz	RF Att	10 dB	
	Ref Lvl	55.65 dBV/m	VBW	100 kHz		
	70 dB*	27.13748497 MHz	SWT	5 ms	Unit	dBV/m



Center 27.1318487 MHz 62.5 kHz/ Span 625 kHz

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Section 15.227 Subclause (b). Radiated emissions (Transmitter)

SPECIFICATION

The field strength of any emissions which appear outside of the 26.96 – 27.28 MHz band shall not exceed the general radiated emissions in Section 15.209:

Frequency Range (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

RESULTS:

The field strength is calculated by adding correction factor to the measured level from the spectrum analyser. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Frequency range 9 kHz -150 kHz.

No spurious signals were detected in all the range.

Frequency range 150 kHz-30 MHz

No spurious signals were detected in all the range.

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Frequency range 30 MHz-1000 MHz

Spurious levels operating (radiated) closest to limit.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
43.18637	H	Peak	34.09	± 3.8
43.18637	H	Average	18.26	± 3.8
94.9999	H	Peak	32.54	± 3.8
94.9999	H	Average	18.03	± 3.8
108.1763	H	Peak	36.36	± 3.8
108.1763	H	Average	21.31	± 3.8
122.3046	H	Peak	36.77	± 3.8
122.3046	H	Average	19.15	± 3.8
135.4910	H	Peak	36.55	± 3.8
135.4910	H	Average	21.63	± 3.8
148.6773	H	Peak	32.08	± 3.8
148.6773	H	Average	15.71	± 3.8
162.8056	H	Peak	32.23	± 3.8
162.8056	H	Average	14.98	± 3.8
175.9920	H	Peak	32.49	± 3.8
175.9920	H	Average	15.57	± 3.8
257.9360	H	Peak	31.64	± 3.8
257.9360	H	Average	22.08	± 3.8
271.1222	H	Peak	38.69	± 3.8
271.1222	H	Average	25.56	± 3.8
285.2505	H	Peak	34.25	± 3.8
285.2505	H	Average	23.75	± 3.8
298.4369	H	Peak	33.52	± 3.8
298.4369	H	Average	20.66	± 3.8
312.5651	H	Peak	32.15	± 3.8
312.5651	H	Average	19.12	± 3.8
325.7515	H	Peak	30.54	± 3.8
325.7515	H	Average	16.14	± 3.8

Verdict: PASS

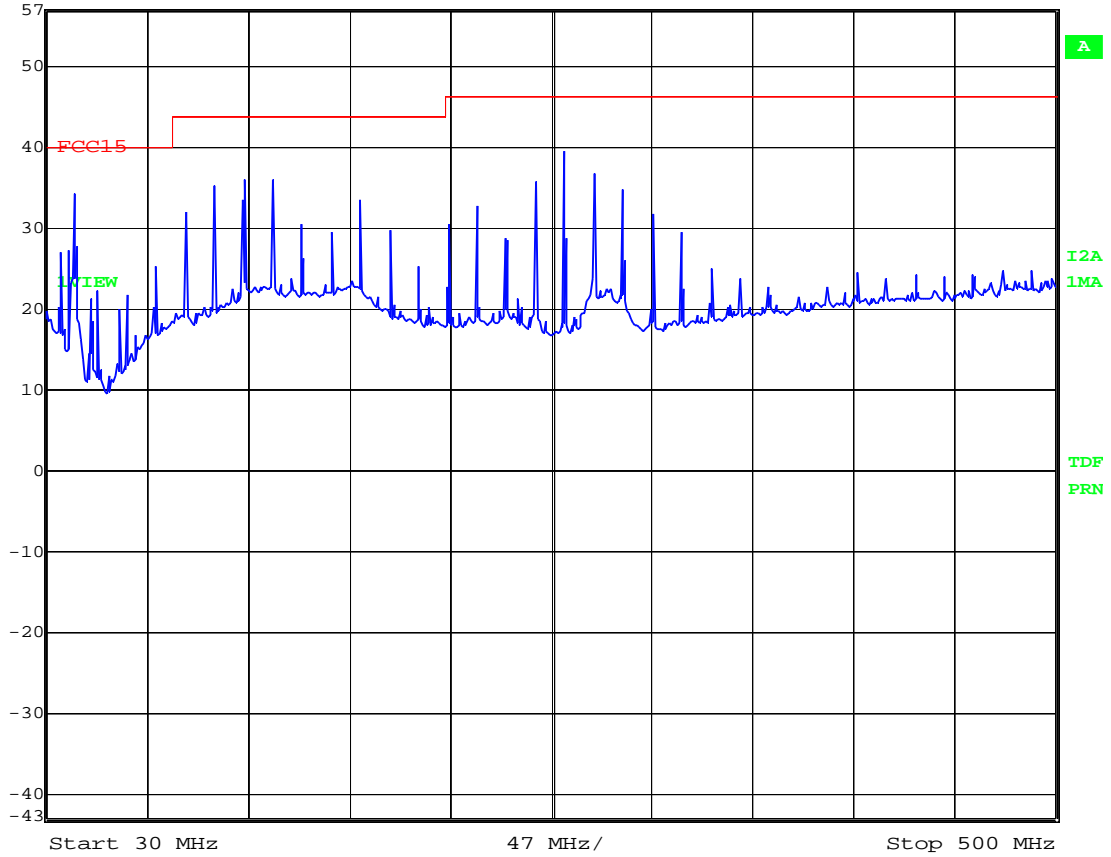
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FREQUENCY RANGE 30 MHz to 500 MHz.



Ref Lvl
57 dB*

RBW 100 kHz RF Att 10 dB
VBW 100 kHz
SWT 120 ms Unit dBµV/m



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Annex A
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ANNEX B

PHOTOGRAPHS **(Number of photographs: 6)**

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