



UL International EMC Services
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17 January 2006

Robert Bosch Tool Corp
Attn: Mr. Adrian Perry
1800 W. Central Rd
Mt. Prospect, IL 60646

UL Reference: File MC1439, Project 06NK02135

Subject: EMC Test and Measurement Report for
Model 2610941264 REMOTE CONTROL TRANSMITTER

Dear Mr. Perry:

We have provided with this letter your EMC Test Report for the above referenced model. The product was determined to comply with the requirements noted in the report.

Please review the attached report and direct any questions or comments to me.

We appreciate your interest in UL's EMC Services, and encourage you to contact us in the future should you need EMC test services. This closes Project 06NK02135.

Best regards,

A handwritten signature in black ink that reads 'Bart Mucha'.

Bart Mucha (Ext 41216)
Project Engineer
International EMC Services

Reviewed by:

A handwritten signature in black ink that reads 'Jack Steiner'.

Jack Steiner
Section Manager
International EMC Services

EMC – TEST REPORT

Issue Date: 17 January 2006

Ö EMISSIONS IMMUNITY

Test Report File No. : MC1439
Project No. : 06NK02135

Model / Type : 2610941264
Kind of Product : REMOTE CONTROL TRANSMITTER

Applicant : Robert Bosch Tool Corp
License Holder : Robert Bosch Tool Corp
Address : 1800 W. Central Rd
: Mt. Prospect, IL 60646
:
Manufacturer : Same as Applicant
:
:
:

Test Result : COMPLIANT

This report without appendices consists of 10 pages. Appendix A contains test photos, and Appendix B contains original test data. The data contained in this report reflects only the items tested in the configurations and mode of operations described. An attempt has been made to arrange the EUT, with the equipment provided, into a test configuration which maximizes the observed emissions of the EUT while simulating, as close as practical, a typical end-use installation.

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**Underwriters Laboratories Inc. 333 Pfingsten Rd. Northbrook, IL 60062
Fax: (847) 272-8864**

REPORT DIRECTORY

SECTION TITLE

GENERAL

- 1.0 General Product Description
- 1.1 Model Differences
- 1.2 Environmental Conditions in Test Lab
- 1.3 Calibration Details of Equipment Used for Measurement
- 1.4 EUT (Equipment Under Test) Configuration
- 1.5 EUT Operating Mode
- 1.6 Device Modifications

EMISSIONS

- 2.0 Emissions Test Regulations
 - Fundamental Frequency Radiated Electric Field Emissions
 - Spurious Radiated Electric Field Emissions
 - Occupied Bandwidth Measurement

IMMUNITY

- 3.0 Immunity Test Regulations

CONCLUSION

- 4.0 General Remarks
- 4.1 Summary

APPENDICIES

- A Test Setups (Photos, Diagrams and Drawings)
- B Test Data

1.0 GENERAL PRODUCT DESCRIPTION

The Equipment Under Test (EUT) was a 27.12MHz transmitter used for remote controlling of a toy car.

1.0.1 Equipment Mobility:

Portable

1.0.2 Test Voltage and Frequency:

<u>Voltage (V)</u>	<u>Frequency (Hz)</u>
9V	DC

1.1 MODEL DIFFERENCES

Any other model(s) represented by the models tested in this investigation will be documented by the manufacturer.

1.2 ENVIRONMENTAL CONDITIONS IN TEST LAB

Temperature:	20-25 °C
Relative Humidity:	30-60% RH
Atmospheric Pressure:	860-1060 mbar

1.3 CALIBRATION OF EQUIPMENT USED FOR MEASUREMENT

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST), therefore, all test data recorded in this report is traceable to NIST.

1.4 EUT CONFIGURATION(s)

See Appendix A for individual set-up configuration(s). In addition to the EUT, the following peripheral devices and/or cables were connected during the measurement:

Device	Manufacturer	Model	FCC ID
EUT	Bosch	2610941264	TXT41264

Cable	Manufacturer	Length	Type	Shield Type	Shield Termination
None					

1.5 EUT OPERATING MODE(s)

The equipment under test was operated during the measurements under the following conditions:

Continuously Transmitting

1.6 DEVICE MODIFICATIONS

The following modifications were necessary for compliance:

No modifications were required.

2.0 EMISSIONS TEST REGULATIONS

Emissions testing was performed according to the following regulations:

47 CFR Part 15 Subpart C: 2005 + ANSI C63.4 - 2000

47 CFR Part 15.227

47 CFR Part 15.35

47 CFR Part 15.209

FUNDAMENTAL FREQUENCY RADIATED ELECTRIC FIELD EMISSIONS

Test Location

10 Meter Semi-Anechoic Chamber

Test Instruments

Instrument	Serial Number	EMC Number	Last Cal	Next Cal
HP Spectrum Analyzer	-	EMC4085	06JAN2006	06JAN2007
HP QP Adapter	-	EMC4016	06JAN2006	06JAN2007
EMCO 1089 Loop Antenna	6502/1	EMC4026	09JAN2006	09JAN2007

Frequency Range of Measurement

20MHz – 30MHz

Measurement Distance

3 meters

Test Results

The requirements are:

MET

Remarks

- Bandwidths used for measurements: RBW=9kHz VBW=10kHz
- All pre-scans and final measurements were conducted by scanning the unit 360° around.
- Pre-scans with the loop antenna were conducted in both Horizontal and Vertical Polarization.
- The pre-scans were conducted with the transmitter placed in three axis and for final measurement the worst case axis were measured.

See Appendix B for complete test results.

SPURIOUS RADIATED ELECTRIC FIELD EMISSIONS

Test Location

10 Meter Semi-Anechoic Chamber

Test Instruments

Instrument	Serial Number	EMC Number	Last Cal	Next Cal
HP Spectrum Analyzer	-	EMC4085	06JAN2006	06JAN2007
HP QP Adapter	-	EMC4016	06JAN2006	06JAN2007
Chase BiCon Antenna VBA6106B	1246	EMC4078	22JUL2005	22JUL2006
Chase Log-P Antenna UPA6109	1060	EMC4258	23FEB2005	23FEB2006
Miteq AM-3A-000110-N Preamp	-	EMC4151	06JAN2006	06JAN2007

Frequency Range of Measurement

30MHz – 1000MHz

Measurement Distance

10 meters

Test Results

The requirements are:

MET

Remarks

- Bandwidths used for measurements: RBW=120kHz VBW=1MHz
- All pre-scans and final measurements were conducted by scanning the unit 360° around.
- Pre-scans were conducted in both Horizontal and Vertical Polarization.
- The pre-scans were conducted with the transmitter placed in three axis and for final measurement the worst case axis were chosen.

See Appendix B for complete test results.

OCCUPIED BANDWIDTH MEASUREMENT

Test Location

Open Lab Area

Test Instruments

Instrument	Serial Number	EMC Number	Last Cal	Next Cal
HP Spectrum Analyzer	-	EMC4085	06JAN2006	06JAN2007
HP QP Adapter	-	EMC4016	06JAN2006	06JAN2007
Near Field Probe	-	-	N/A	N/A

Frequency Range of Measurement

27.1MHz

Measurement Distance

1cm

Test Results

The requirements are:

MET

Remarks

See Appendix B for complete test results.

3.0 IMMUNITY TEST REGULATIONS

Immunity testing was not performed, nor required.

4.0 GENERAL REMARKS

Sample Receipt Date : 22 December 2005

Test Dates

Start : 13 January 2006

End : 13 January 2006

4.1 SUMMARY

The requirements according to the technical regulations are:

MET

Underwriters Laboratories Inc.
333 Pfingsten Road
Northbrook, IL 60062 USA

Test Engineer:



Bart Mucha (Ext 41216)
Project Engineer
International EMC Services

Reviewed by:



Jack Steiner
Section Manager
International EMC Services

APPENDIX A

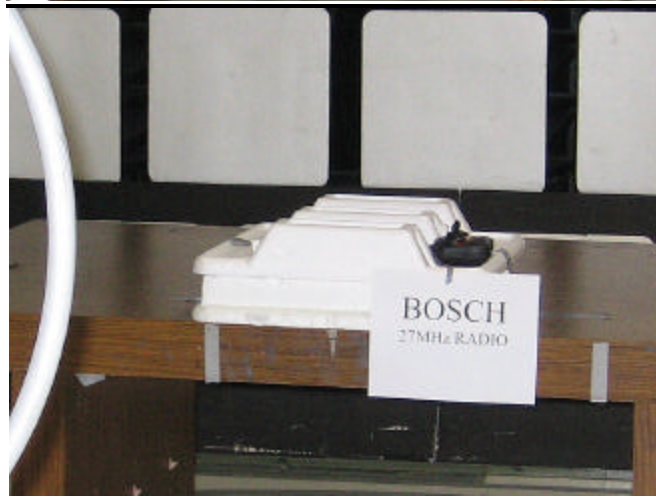
PHOTOS



**Radiated Emissions
Transmitter Location
X-Axis**



**Radiated Emissions
Y-Axis**



**Radiated Emissions
Z-Axis**

APPENDIX B

TEST DATA

EMISSIONS

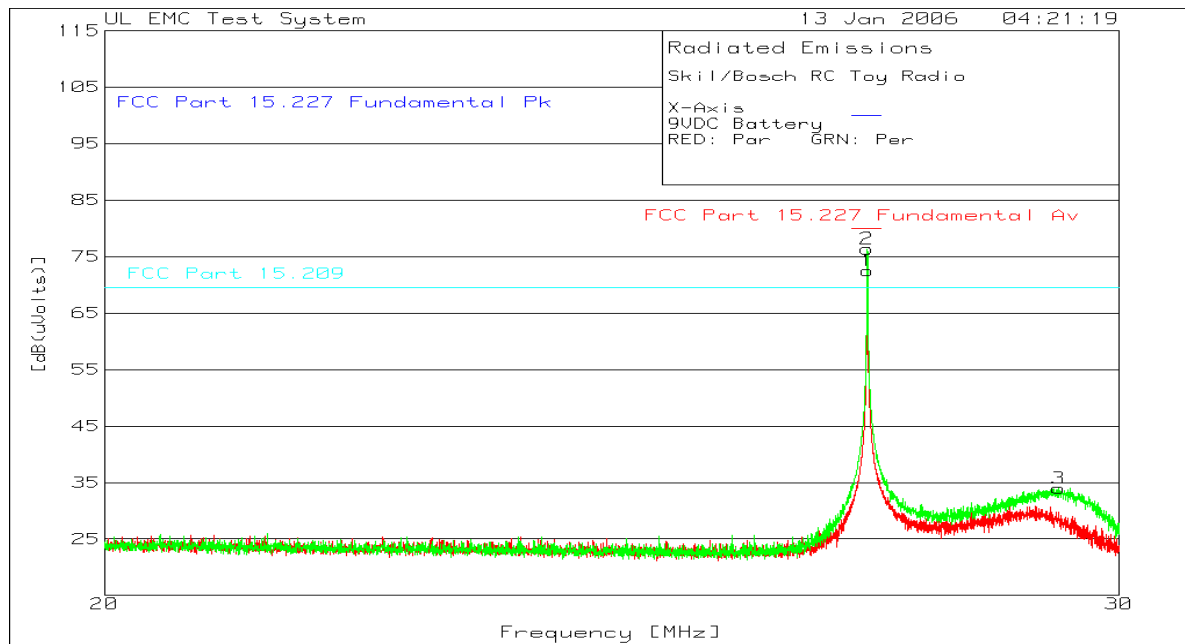
Fundamental Frequency Radiated Electric Field Emissions
Spurious Radiated Electric Field Emissions
Occupied Bandwidth Measurement

UNDERWRITERS LABORATORIES INC.
Fundamental Frequency Radiated Electric Field Emissions

Date Tested: 13 JAN 2006

Manufacturer : Robert Bosch Tool Corp
Equipment Under Test : 2610941264 REMOTE CONTROL TRANSMITTER
Requirement : 47 CFR Part 15.227
Detection Mode : Peak
Bandwidth : 9kHz
Measurement Distance : 3 Meter
Antenna Type : 20MHz – 30MHz, Loop

X-Axis Pre-scan and data

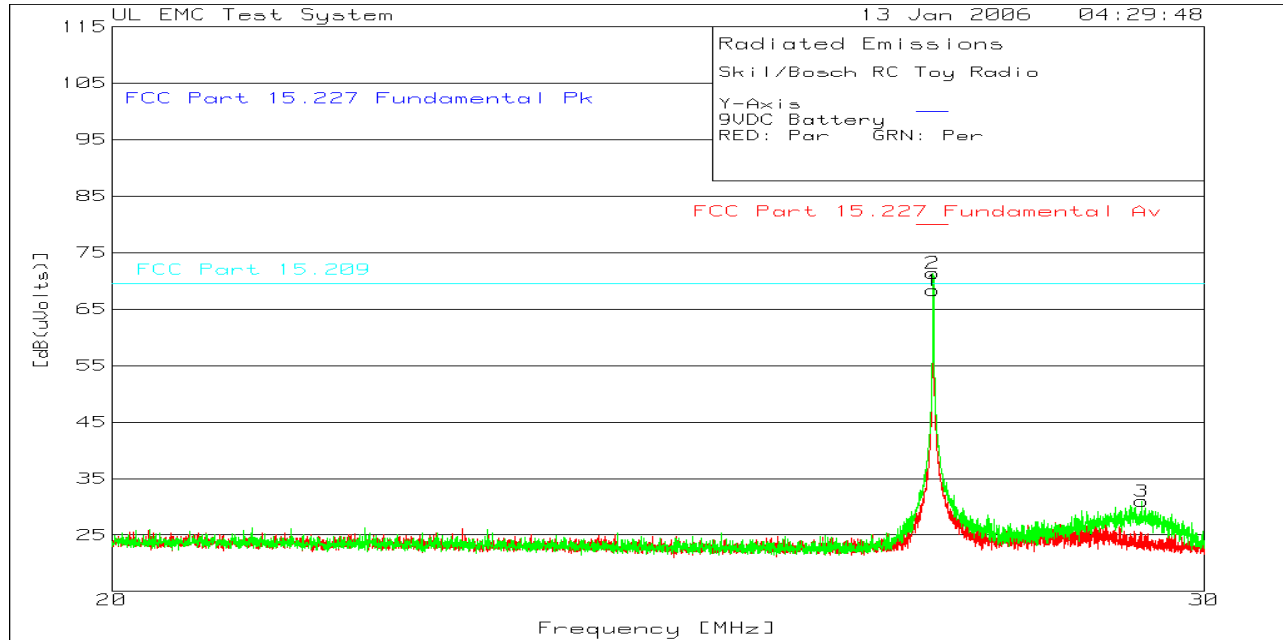


Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
1	27.12833	62.6 pk	.6	9.3	72.5	80	100	69.5	-	-	-
	Azimuth:105	Height:100	Horz	Margin [dB]	-7.5	-27.5	3	-	-	-	-
2	27.12708	66.5 pk	.6	9.3	76.4	80	100	69.5	-	-	-
	Azimuth:145	Height:100	Horz	Margin [dB]	-3.6	-23.6	6.9	-	-	-	-
3	29.28294	24.2 pk	.6	9.2	34	0	0	69.5	-	-	-
	Azimuth:82	Height:100	Horz	Margin [dB]	34	34	-35.5	-	-	-	-

LIMIT 1: FCC Part 15.227 Fundamental Av
 LIMIT 2: FCC Part 15.227 Fundamental Pk
 LIMIT 3: FCC Part 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Y-Axis Pre-scan and Data

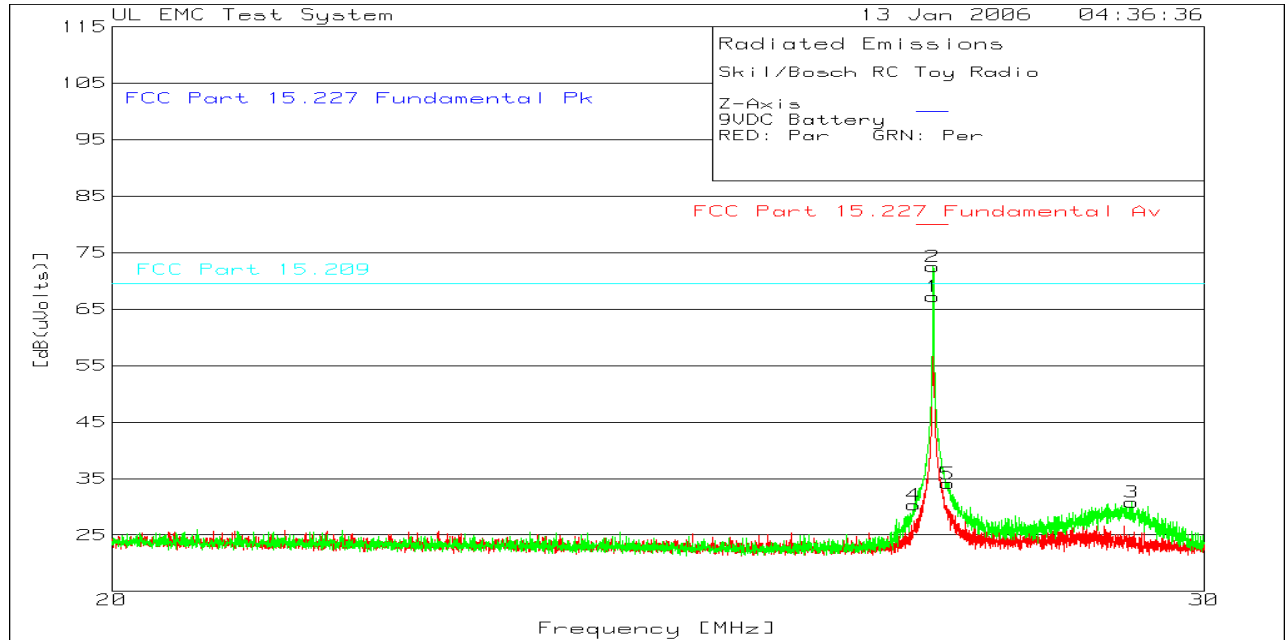


Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
1	27.12708	58.4 pk	.6	9.3	68.3	80	100	69.5	-	-	-
	Azimuth:64	Height:100	Horz	Margin [dB]		-11.7	-31.7	-1.2	-	-	-
2	27.12708	61.5 pk	.6	9.3	71.4	80	100	69.5	-	-	-
	Azimuth:64	Height:100	Horz	Margin [dB]		-8.6	-28.6	1.9	-	-	-
3	29.31292	21.2 pk	.6	9.2	31	0	0	69.5	-	-	-
	Azimuth:30	Height:100	Horz	Margin [dB]		31	31	-38.5	-	-	-

LIMIT 1: FCC Part 15.227 Fundamental Av
 LIMIT 2: FCC Part 15.227 Fundamental Pk
 LIMIT 3: FCC Part 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Z-Axis Pre-scan and Data



Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
1	27.12708	57.3 pk	.6	9.3	67.2	80	100	69.5	-	-	-
	Azimuth:224	Height:100	Horz	Margin [dB]		-12.8	-32.8	-2.3	-	-	-
2	27.12708	62.6 pk	.6	9.3	72.5	80	100	69.5	-	-	-
	Azimuth:223	Height:100	Horz	Margin [dB]		-7.5	-27.5	3	-	-	-
3	29.2055	21 pk	.6	9.2	30.8	0	0	69.5	-	-	-
	Azimuth:171	Height:100	Horz	Margin [dB]		30.8	30.8	-38.7	-	-	-
4	26.92973	20.4 pk	.6	9.3	30.3	0	0	69.5	-	-	-
	Azimuth:237	Height:100	Horz	Margin [dB]		30.3	30.3	-39.2	-	-	-
5	27.27447	24.2 pk	.6	9.3	34.1	80	100	69.5	-	-	-
	Azimuth:223	Height:100	Horz	Margin [dB]		-45.9	-65.9	-35.4	-	-	-

LIMIT 1: FCC Part 15.227 Fundamental Av
 LIMIT 2: FCC Part 15.227 Fundamental Pk
 LIMIT 3: FCC Part 15.209

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Final Measurements

The worst case emissions recorded on the pre-scan were when the unit was positioned in X-Axis.

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
=====										
Horizontal Polarization (Parallel)										
27.1306	63.24 qp	.6	9.3	73.14	80	100	69.5	-	-	-
Azimuth: 189 Height:100 Horz					Margin [dB]:	-6.86	-26.86	3.64	-	-
27.1306	63.58 pk	.6	9.3	73.48	80	100	69.5	-	-	-
Azimuth: 189 Height:100 Horz					Margin [dB]:	-6.52	-26.52	3.98	-	-
Vertical Polarization (Perpendicular)										
27.1306	64.94 qp	.6	9.3	74.84	80	100	69.5	-	-	-
Azimuth: 229 Height:100 Vert					Margin [dB]:	-5.16	-25.16	5.34	-	-
27.1306	65.27 pk	.6	9.3	75.17	80	100	69.5	-	-	-
Azimuth: 229 Height:100 Vert					Margin [dB]:	-4.83	-24.83	5.67	-	-

LIMIT 1: FCC Part 15.227 Fundamental Av
 LIMIT 2: FCC Part 15.227 Fundamental Pk
 LIMIT 3: FCC Part 15.209

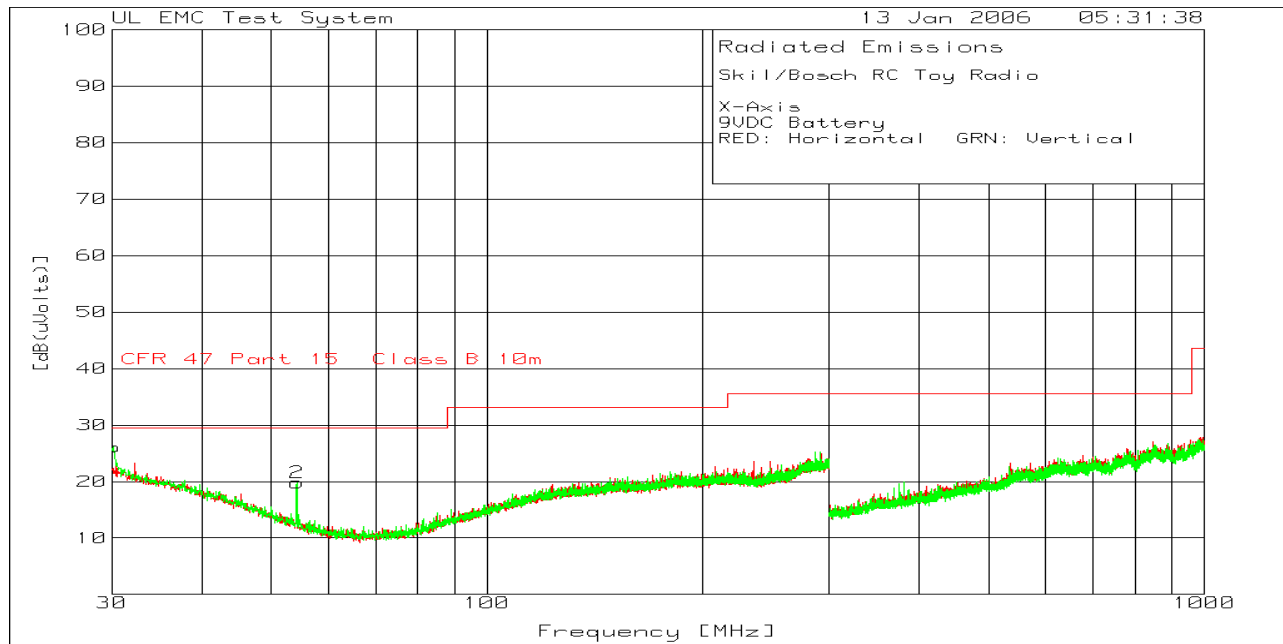
pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

UNDERWRITERS LABORATORIES INC.
Spurious Radiated Electric Field Emissions

Date Tested: 13 JAN 2006

Manufacturer : Robert Bosch Tool Corp
Equipment Under Test : 2610941264 REMOTE CONTROL TRANSMITTER
Requirement : 47 CFR Part 15.209
Detection Mode : Quasi-peak (qp)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic

X-Axis Pre-scan and Data

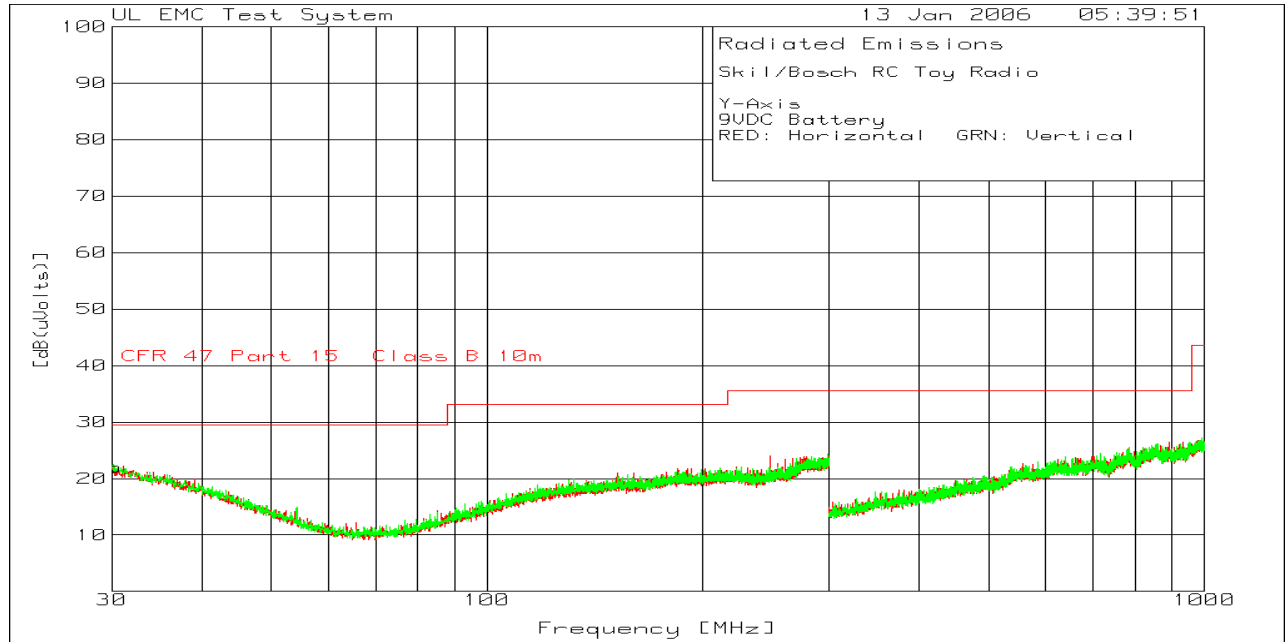


Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB(uVolts)]	2	3	4	5	6
1	30.0674	38.9 pk	-30.8	18	26.1	29.6	-	-	-	-
	Azimuth:150	Height:100	Vert	Margin [dB]	-3.5	-	-	-	-	-
2	54.2818	41.9 pk	-30.6	8.5	19.8	29.6	-	-	-	-
	Azimuth:324	Height:199	Vert	Margin [dB]	-9.8	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 10m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Y-Axis Pre-scan and Data

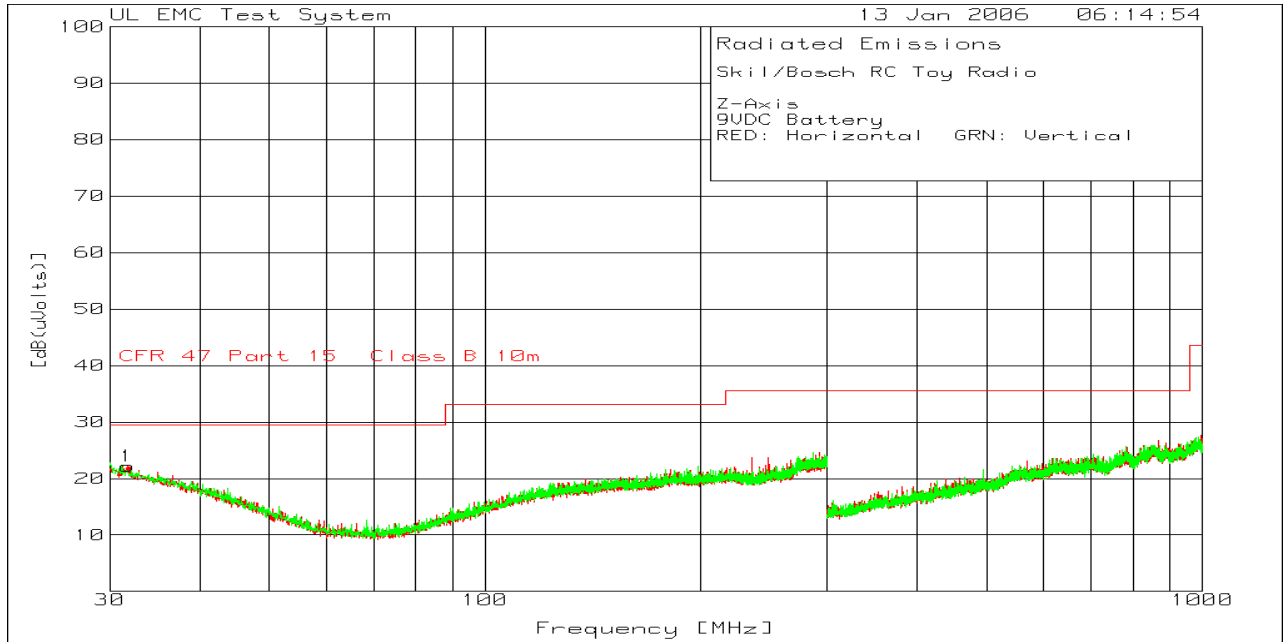


No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB(uVolts)]	2	3	4	5	6
1	30.2023	34.8 pk	-30.8	18	22	29.6	-	-	-	-
	Azimuth:113	Height:200	Vert	Margin [dB]	-7.6	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 10m

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector

Z-Axis Pre-scan and Data



Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
1	31.6862	35.5 pk	-30.7	17.4	22.2	29.6	-	-	-	-	-
	Azimuth:97	Height:100	Horz	Margin [dB]		-7.4	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 10m

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

Final Measurements

The only emission recorded was when the product was in X-Axis and the receive antenna was set to vertical polarization.

Skil/Bosch RC Toy Radio
 X-Axis
 9VDC Battery
 RED: Horizontal GRN: Vertical

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
54.2433	40.6 qp	-30.6	8.5	18.5	29.6	-	-	-	-	-
Azimuth: 214 Height:100 Vert					Margin [dB]: -11.1	-	-	-	-	-
54.2433	43.51 pk	-30.6	8.5	21.41	29.6	-	-	-	-	-
Azimuth: 214 Height:100 Vert					Margin [dB]: -8.19	-	-	-	-	-
30.0017	32.93 qp	-30.8	18	20.13	29.6	-	-	-	-	-
Azimuth: 251 Height:101 Vert					Margin [dB]: -9.47	-	-	-	-	-
30.0017	41.75 pk	-30.8	18	28.95	29.6	-	-	-	-	-
Azimuth: 251 Height:101 Vert					Margin [dB]: -.65	-	-	-	-	-

LIMIT 1: CFR 47 Part 15 Class B 10m

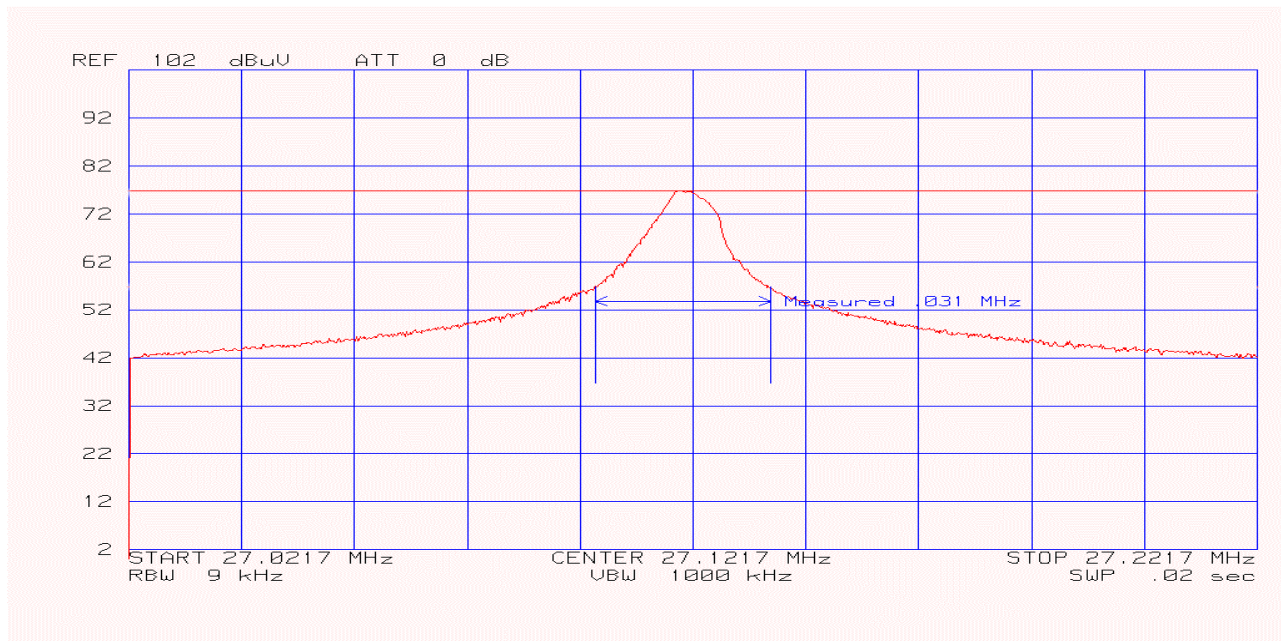
pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector

UNDERWRITERS LABORATORIES INC.
Occupied Bandwidth Measurements

Date Tested: 13 JAN 2006

Manufacturer : Robert Bosch Tool Corp
Equipment Under Test : 2610941264 REMOTE CONTROL TRANSMITTER
Requirement : 47 CFR Part 15.ISPR Class B
Detection Mode : Peak
Bandwidth : 9 kHz
Measurement Distance : 1cm
Antenna Type : Near Field Loop

Occupied Bandwidth Plot



Center Frequency: 27.1217MHz
Left Band Edge: 27.1062MHz
Right Band Edge: 27.1372MHz
Total Bandwidth: 31kHz