

FCC CERTIFICATION
On Behalf of
Lamko Group International Limited

Wireless Hands-Free Car Kit
Model No.: LK-168A

FCC ID: TGH76168A

Prepared for : Lamko Group International Limited
Address : Room 36A, 36th Floor, Towers 2, Richard Tower, No.288
Hengfu Rd., Guangzhou City, Guangdong, P.R.China
Prepared by : ACCURATE TECHNOLOGY CO. LTD
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Report Number : ATE20051070
Date of Test : July 4-8, 2005
Date of Report : July 11, 2005

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Test Report Certification

Applicant : Lamko Group International Limited
 Manufacturer : Lamko Group International Limited
 EUT Description : Wireless Hands-Free Car Kit
 (A) MODEL NO.: LK-168A
 (B) SERIAL NO.: N/A
 (C) POWER SUPPLY: DC 12V (Power by battery)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.239: 2004
 & ANSI C63.4: 2003

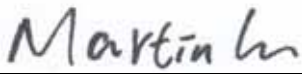
The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.239 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : July 4-8, 2005

Prepared by : 
 (Engineer)

Reviewer : 
 (Quality Manager)

Approved & Authorized Signer : 
 (Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Wireless Hands-Free Car Kit

Model Number : LK-168A

Power Supply : DC 12V (Power by battery)

Applicant : Lamko Group International Limited
 Address : Room 36A, 36th Floor, Towers 2, Richard Tower, No.288
 Hengfu Rd., Guangzhou City, Guangdong, P.R.China

Manufacturer : Lamko Group International Limited
 Address : Room 36A, 36th Floor, Towers 2, Richard Tower, No.288
 Hengfu Rd., Guangzhou City, Guangdong, P.R.China

Date of sample received : July 1, 2005
 Date of Test : July 4-8, 2005

1.2. Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen, May 10, 2004
 Accredited by FCC, May 10, 2004
 The Certificate Registration Number is 253065

Accredited by Industry Canada, May 18, 2004
 The Certificate Registration Number is IC 5077

Name of Firm : ACCURATE TECHNOLOGY CO. LTD
 Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.
 Science & Industry Park, Nanshan, Shenzhen, Guangdong
 P.R. China

1.3. Measurement Uncertainty

Conducted Emission Uncertainty = $\pm 2.66\text{dB}$

Radiated Emission Uncertainty = $\pm 4.26\text{dB}$

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	01.02.2006
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.02.2006
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	01.02.2006
Horn Antenna	Rohde&Schwarz	HF906	100013	01.02.2006
Spectrum Analyzer	Anritsu	MS2651B	6200238856	01.02.2006
Pre-Amplifier	Agilent	8447D	2944A10619	01.02.2006
Signal Generator	GW	GAG-810	0913317	01.02.2006

3. RADIATED EMISSION FOR FCC PART 15 SECTION 15.239(C)

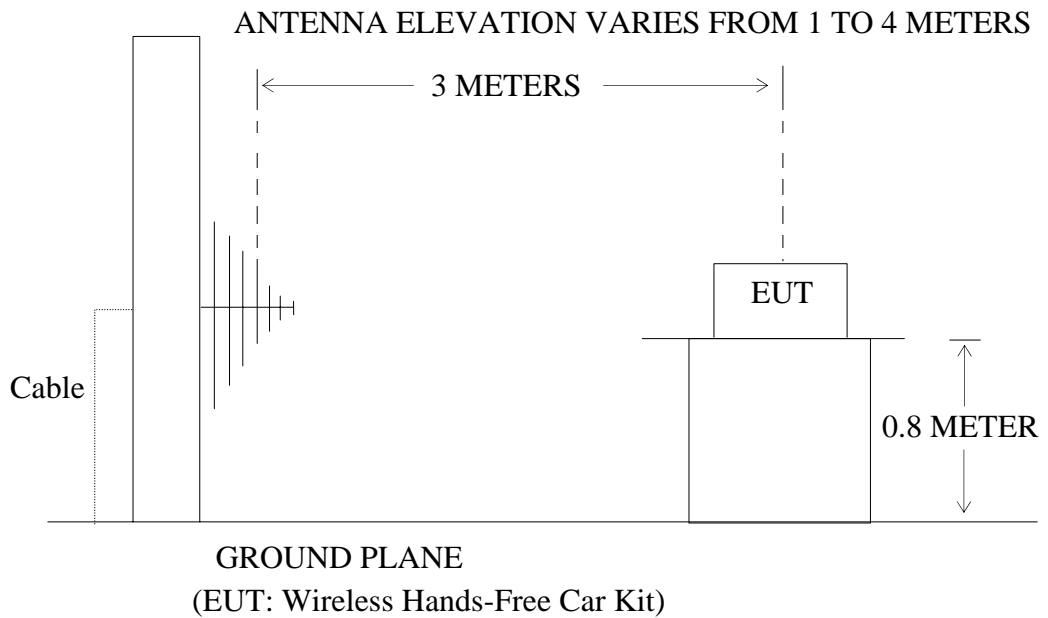
3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Hands-Free Car Kit)

3.1.2. Anechoic Chamber Test Setup Diagram



3.2. The Emission Limit for section 15.239(c)

3.2.1 The field strength of any emissions radiated on any frequency outside of the specified 200kHz band shall not exceed the general radiated emission limits in section 15.209

Radiation Emission Measurement Limits According to Section 15.209

Frequency (MHz)	Limit,		The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBμV/m)	
30 - 88	100	40	
88 - 216	150	43.5	

216 - 960	200	46	frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
Above 960	500	54	

3.3.Configuration of EUT on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.3.1. Wireless Hands-Free Car Kit (EUT)

Model Number : LK-168A
 Serial Number : N/A
 Manufacturer : Lamko Group International Limited

3.4.Operating Condition of EUT

3.4.1. Setup the EUT and simulator as shown as Section 3.1.

3.4.2. Turn on the power of all equipment.

3.4.3. Let the EUT work in TX modes (On with signal input) measure it. The transmit frequency are 88.1, 107.1, 107.9MHz.

Mode A: Phone port input signal

3.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 120KHz in 30-1000MHz. The frequency range from 30MHz to 1000MHz is checked.

The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

3.6.The Field Strength of Radiation Emission Measurement Results

PASS.

Date of Test:	July 4-8, 2005	Temperature:	22°C
EUT:	Wireless Hands-Free Car Kit	Humidity:	50%
Model No.:	LK-168A	Power Supply:	12V DC
Test Mode:	TX 88.1MHz Mode: A	Test Engineer:	Andy

Polarization	Frequency MHz	Emission Level dBµV/m QP	Limits dBµV/m	Margin dBµV/m
Horizontal	176.2	39.9	43.5	3.6
Horizontal	264.3	42.6	46	3.4
Horizontal	352.4	41.4	46	4.6
Horizontal	440.5	38.7	46	7.3
Horizontal	528.6	36.3	46	9.7
Horizontal	616.7	37.8	46	8.2
Horizontal	704.8	39.8	46	6.2
Horizontal	792.9	35.5	46	10.5
Horizontal	881.0	31.3	46	14.7
Vertical	176.2	39.9	43.5	3.6
Vertical	264.3	42.8	46	3.2
Vertical	352.4	40.5	46	5.5
Vertical	440.5	33.9	46	12.1
Vertical	528.6	39.9	46	6.1
Vertical	616.7	35.4	46	10.6
Vertical	704.8	41.8	46	4.2
Vertical	792.9	39.1	46	6.9
Vertical	881.0	32.1	46	13.9

The spectral diagrams in appendix I display the measurement of un-weighted peak values.

Date of Test:	July 4-8, 2005	Temperature:	22°C
EUT:	Wireless Hands-Free Car Kit	Humidity:	50%
Model No.:	LK-168A	Power Supply:	12V DC
Test Mode:	TX 107.1MHz Mode: A	Test Engineer:	Andy

Polarization	Frequency MHz	Emission Level dBµV/m QP	Limits dBµV/m	Margin dBµV/m
Horizontal	214.2	40.1	43.5	3.4
Horizontal	321.3	42.4	46	3.6
Horizontal	428.4	31.9	46	14.1
Horizontal	535.5	38.3	46	7.7
Horizontal	642.6	39.2	46	6.8
Horizontal	749.7	39.3	46	6.7
Horizontal	856.8	31.3	46	14.7
Horizontal	963.9	*	54	*
Horizontal	1071.0	*	54	*
Vertical	214.2	39.5	43.5	4.0
Vertical	321.3	38.6	46	7.4
Vertical	428.4	31.5	46	14.5
Vertical	535.5	41.2	46	4.8
Vertical	642.6	39.5	46	6.5
Vertical	749.7	38.8	46	7.2
Vertical	856.8	31.7	46	14.3
Vertical	963.9	*	54	*
Vertical	1071.0	*	54	*

*** Disturbances are small or not detectable.**

The spectral diagrams in appendix I display the measurement of un-weighted peak values.

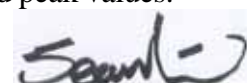
Date of Test:	July 4-8, 2005	Temperature:	22°C
EUT:	Wireless Hands-Free Car Kit	Humidity:	50%
Model No.:	LK-168A	Power Supply:	12V DC
Test Mode:	TX 107.9MHz Mode: A	Test Engineer:	Andy

Polarization	Frequency MHz	Emission Level dBμV/m QP	Limits dBμV/m	Margin dBμV/m
Horizontal	215.8	39.5	43.5	4.0
Horizontal	323.7	33.2	46	12.8
Horizontal	431.6	28.7	46	17.3
Horizontal	539.5	33.1	46	12.9
Horizontal	647.4	33.2	46	12.8
Horizontal	755.3	32.2	46	13.8
Horizontal	863.2	30.1	46	15.9
Horizontal	971.1	*	54	*
Horizontal	1079.0	*	54	*
Vertical	215.8	39.3	43.5	4.2
Vertical	323.7	40.0	46	6.0
Vertical	431.6	34.6	46	11.4
Vertical	539.5	41.9	46	4.1
Vertical	647.4	40.5	46	5.5
Vertical	755.3	35.1	46	10.9
Vertical	863.2	31.0	46	15.0
Vertical	971.1	*	54	*
Vertical	1079.0	*	54	*

*** Disturbances are small or not detectable.**

The spectral diagrams in appendix I display the measurement of un-weighted peak values.

Reviewer :



4. FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15

SECTION 15.239(B)

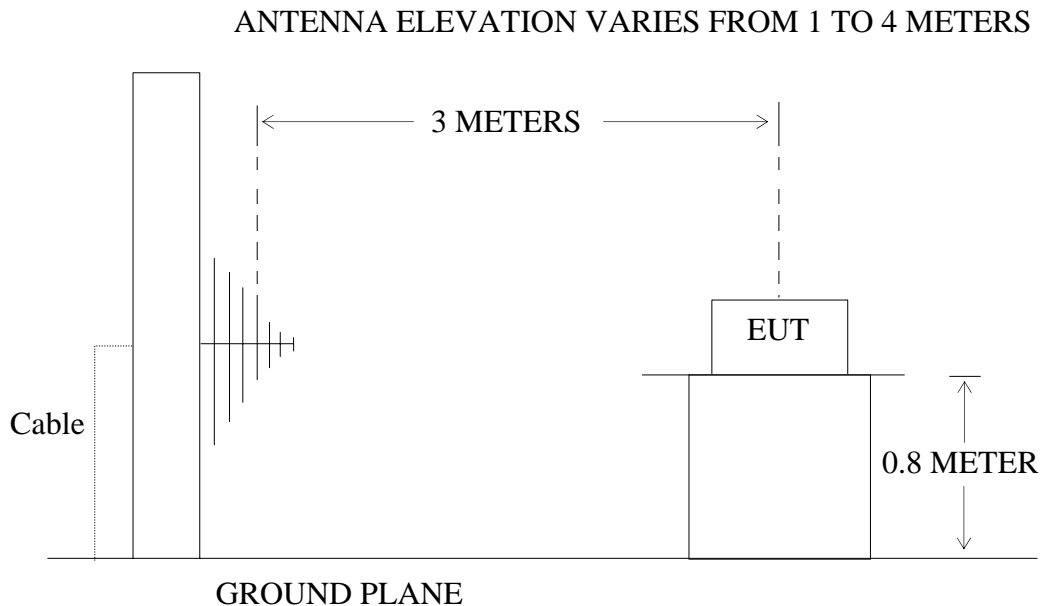
4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Hands-Free Car Kit)

4.1.2. Anechoic Chamber Test Setup Diagram



(EUT: Wireless Hands-Free Car Kit)

4.2. The Emission Limit For Section 15.239(b)

4.2.1 The field strength of any emission within the permitted 200kHz band shall not exceed 250microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

4.3.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.3.1. Wireless Hands-Free Car Kit (EUT)

Model Number : LK-168A
Serial Number : N/A
Manufacturer : Lamko Group International Limited

4.4.Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1.

4.4.2.Turn on the power of all equipment.

4.4.3. Let the EUT work in TX mode (On with signal input) measure it. The transmit frequency are 88.1, 107.1, 107.9MHz.

Mode A: Phone port input signal

4.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

4.6. The Emission Measurement Result

PASS.

Date of Test:	July 4-8, 2005	Temperature:	22°C
EUT:	Wireless Hands-Free Car Kit	Humidity:	50%
Model No.:	LK-168A	Power Supply:	12V DC
Test Mode:	TX Mode: A	Test Engineer:	Andy

Fundamental Radiated Emissions

Test conditions		Fundamental Frequency	
		88.1MHz	
T _{nom} (22°C)	Unit	(dBμV/m)/ (μ V/m) AV	(dBμV/m)/(μ V/m) PEAK
	Horizontal	41.8/123	44.6/170
	Vertical	42.6/135	46.1/159
limit		48/250	68/2500
Note: Measurement was performed with modulated signal with average detector and peak detector.			

Test conditions		Fundamental Frequency	
		107.1MHz	
T _{nom} (22°C)	Unit	(dBμV/m)/ (μ V/m) AV	(dBμV/m)/(μ V/m) PEAK
	Horizontal	40.8/110	44.5/168
	Vertical	41.9/124	44.9/176
limit		48/250	68/2500
Note: Measurement was performed with modulated signal with average detector and peak detector.			

Test conditions		Fundamental Frequency	
		107.9MHz	
T _{nom} (22°C)	Unit	(dBμV/m)/ (μ V/m) AV	(dBμV/m)/(μ V/m) PEAK
	Horizontal	40.1/101	44.0/159
	Vertical	42.5/133	44.5/168
limit		48/250	68/2500
Note: Measurement was performed with modulated signal with average detector and peak detector.			

Reviewer :



5. OCCUPIED BANDWIDTH FOR FCC PART 15 SECTION

15.239(A)

5.1.The Requirement For Section 15.239(a)

- 5.1.1. Emission from the device shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.

5.2.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.2.1. Wireless Hands-Free Car Kit (EUT)

Model Number : LK-168A
Serial Number : N/A
Manufacturer : Lamko Group International Limited

5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 4.1.

5.3.2.Turn on the power of all equipment.

5.3.3. Let the EUT work in TX mode (On with signal input) measure it. The transmit frequency are 88.1, 107.1, 107.9MHz.

Mode A: Phone port input signal

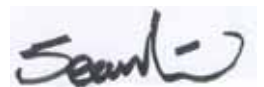
5.4.Test Procedure

The zero level was set without modulation. A small sample of the transmitter output was fed into the spectrum analyzer and above photo was taken. The vertical scale is set to 10dB per division; the horizontal scale is set to 20kHz per division.

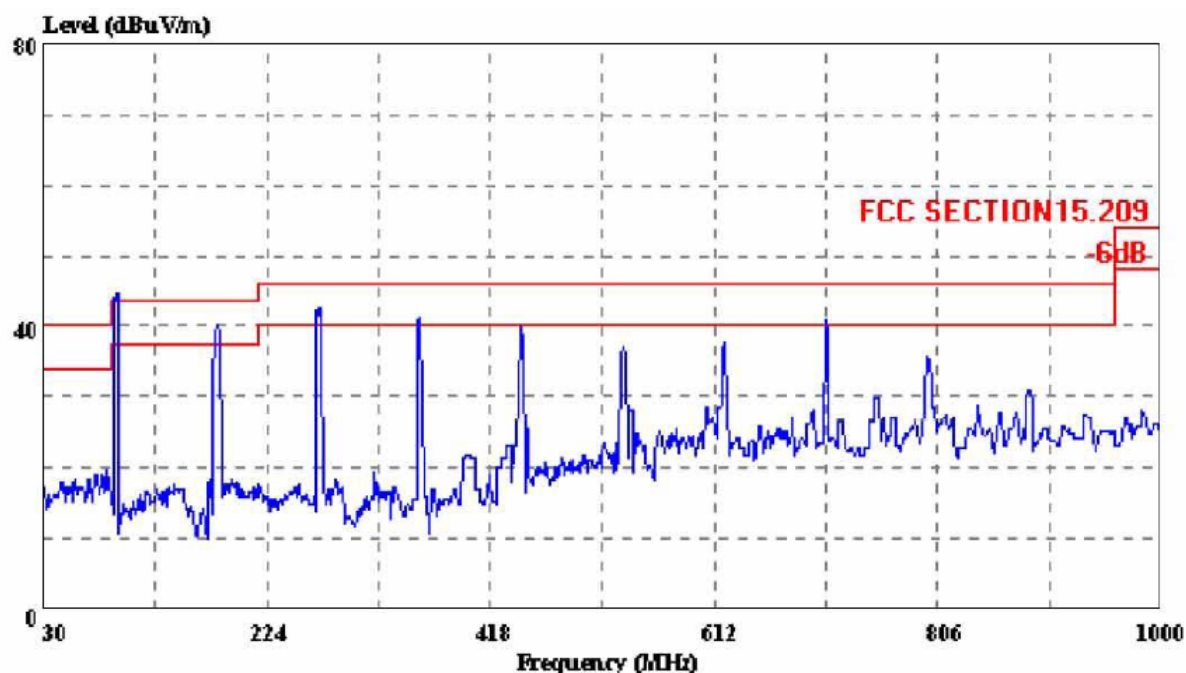
5.5. Test Result

The EUT does meet the FCC requirement.

Reviewer :

A handwritten signature in black ink, appearing to read "Sean", is written over a light blue rectangular background. The signature is stylized with a large 'S' and a cursive 'e'.

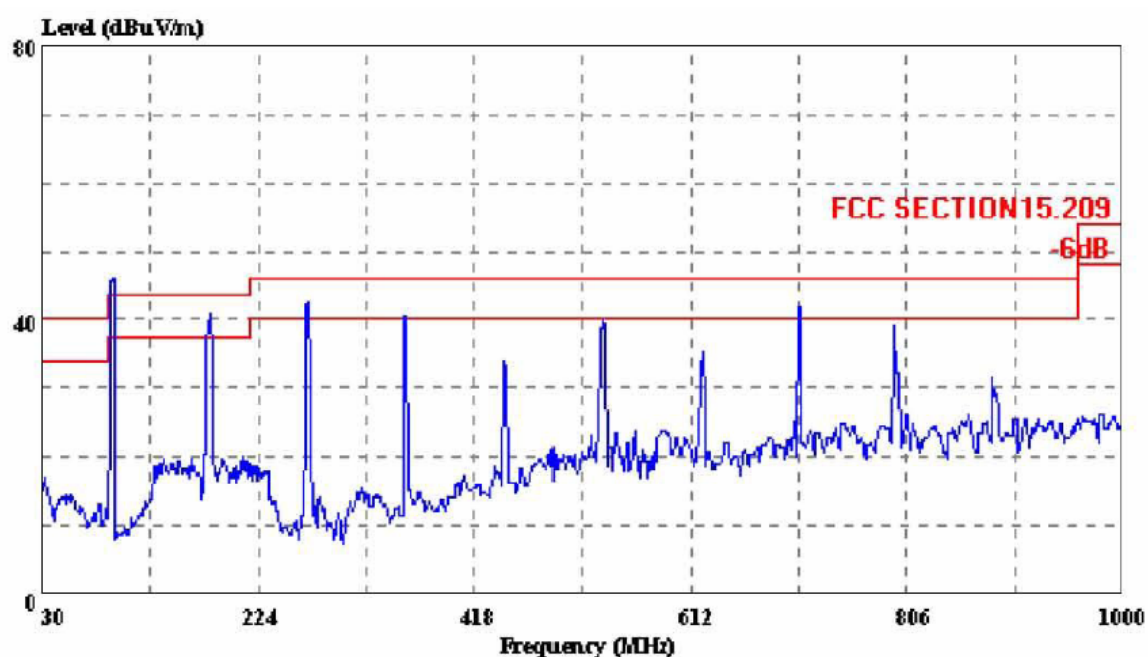
APPENDIX I (Test Curves)



Trace:

Ref Trace:

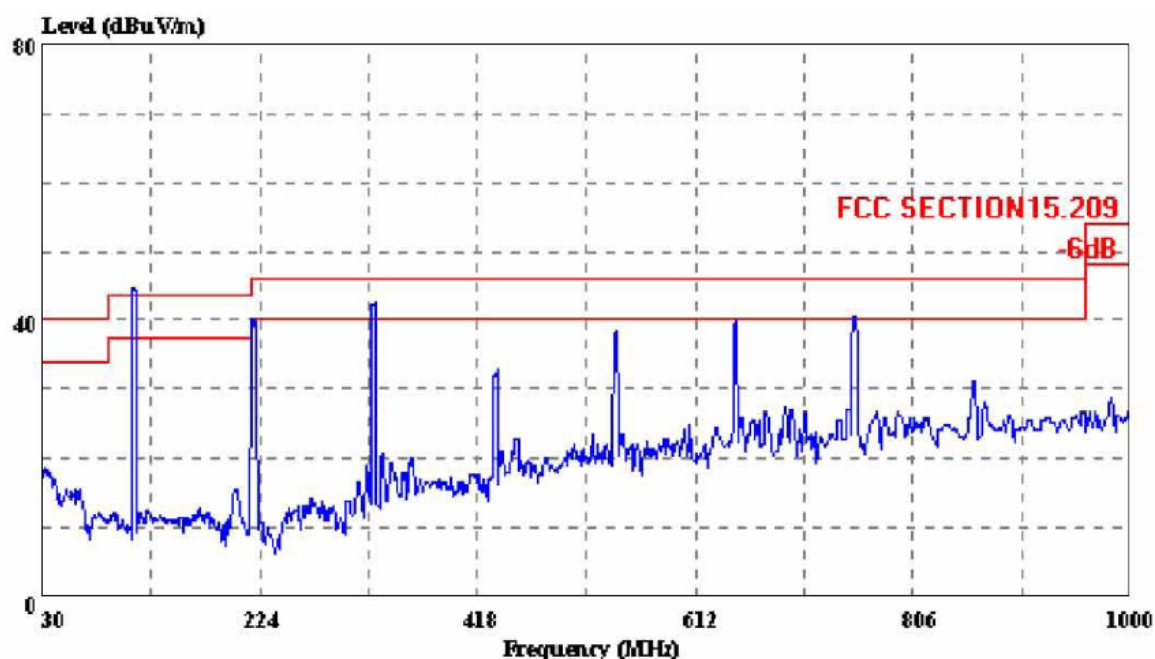
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 eut : Wireless Handsfree Car Kit M/N:LK-168A
 power: DC 12V
 memo : TX (88.1MHz)
 manuf: Lamko
 : PHONE port



Trace:

Ref Trace:

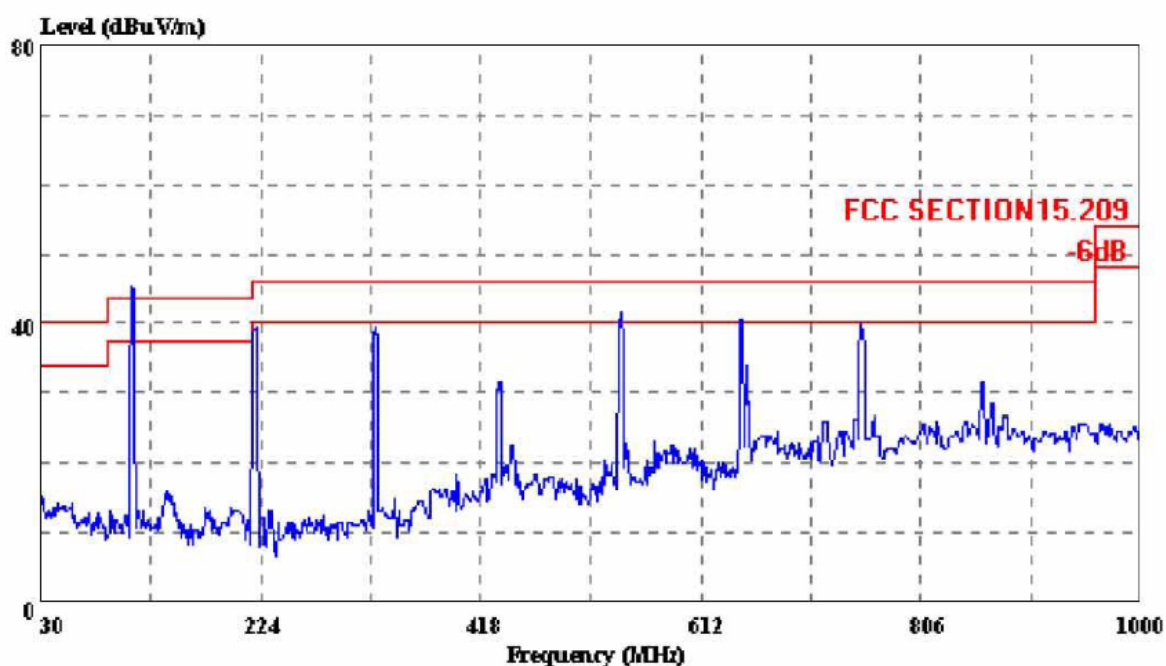
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 power: DC 12V
 memo : TX (88.1MHz)
 manuf: Lamko
 : PHONE port



Trace:

Ref Trace:

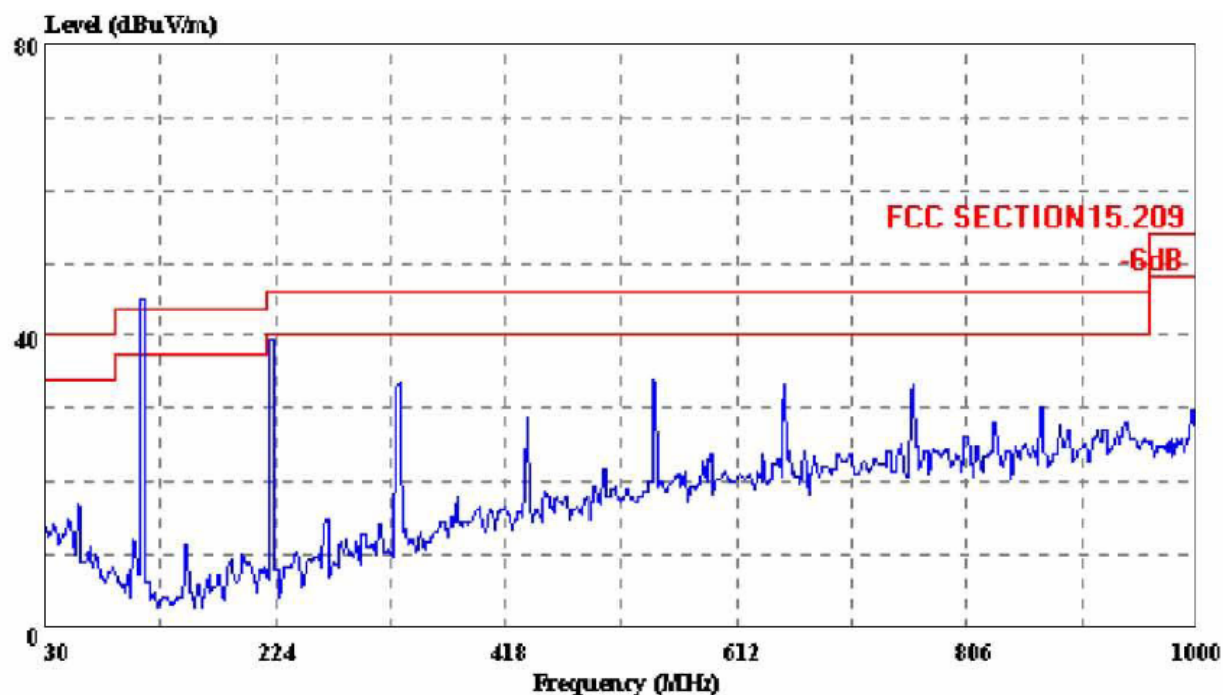
Condition: FCC SECTION 15.209 3m ATC VULB9163 (NEW) HORIZONTAL
 eut : Wireless Handsfree Car Kit M/N:LK-168A
 power: DC 12V
 memo : TX (107.1MHz)
 manu: Lamko
 : phone port



Trace:

Ref Trace:

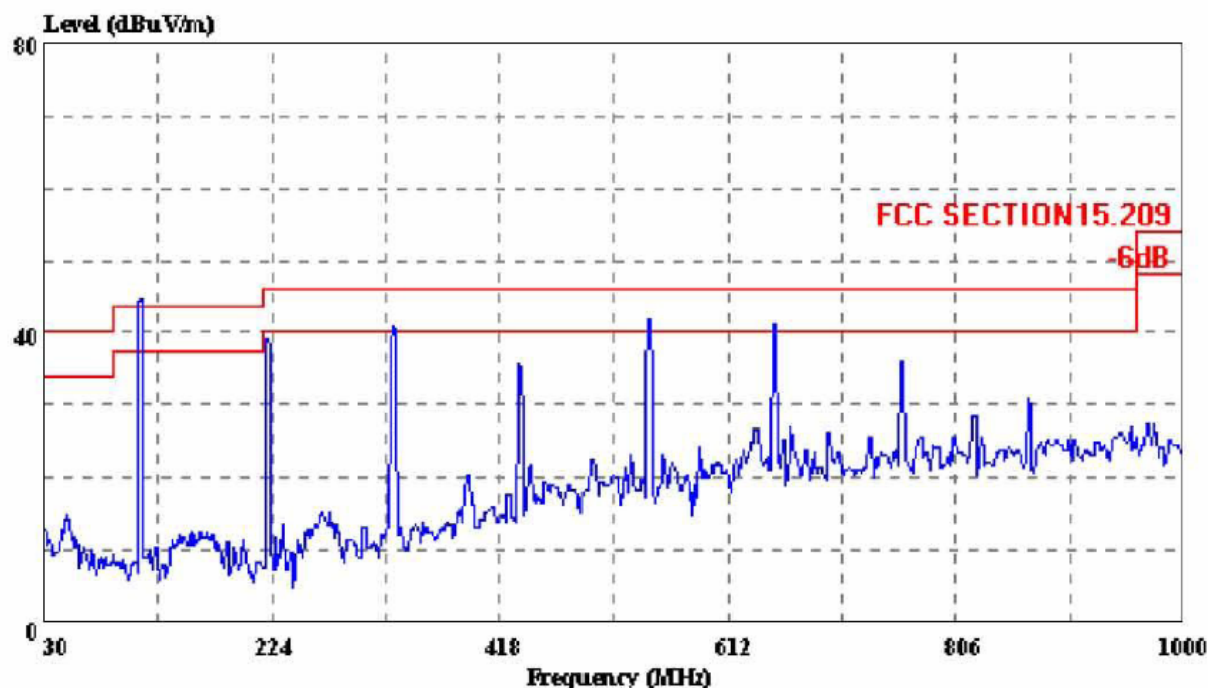
Condition: FCC SECTION 15.209 3m ATC VULB9163 (NEW) VERTICAL
 eut : Wireless Handsfree Car Kit M/N:LK-168A
 power: DC 12V
 memo : TX (107.1MHz)
 manu: Lamko
 : phone port



Trace:

Ref Trace:

Condition: FCC SECTION 15.209 3m ATC VULB9163 (NEW) HORIZONTAL
 eut : Wireless Handsfree Car Kit M/N:LK-168A
 power: DC 12V
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Trace:

Ref Trace:

Condition: FCC SECTION 15.209 3m ATC VULB9163 (NEW) VERTICAL
 eut : Wireless Handsfree Car Kit M/N:LK-168A
 power: DC 12V
 memo : TX(107.9MHz)
 manuf: Lamko

