

# Automotive Antenna Design and Applications



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国外经典著作

# 汽车天线设计 与应用

视频课程介绍

主讲：李长勇 博士

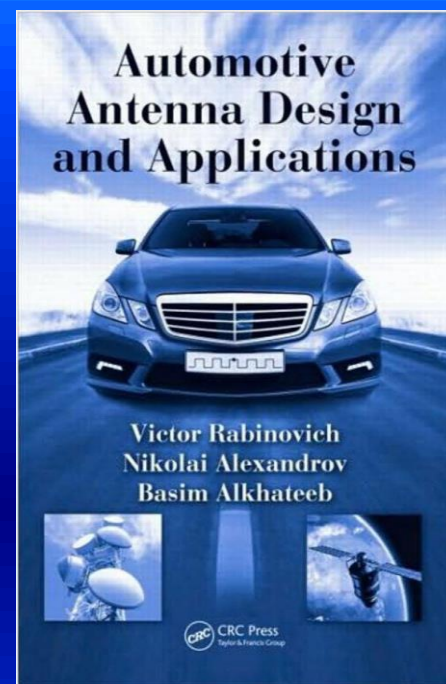
（重庆利龙汽车智能技术研究院）

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# 内容介绍

本著作讨论了应用在汽车通信、接收广播、雷达等方面的各种天线设计研究成果以及产品，频率范围从500KHz的调幅（AM）广播到77GHz的汽车雷达。

本著作对了解汽车天线产品的技术现状及发展趋势很有意义。适合从事汽车天线设计的开发人员 and 高校师生学习。

## Contents

1. Automotive Antennas Overview: Patents, Papers, and Products.....	1
2. Basic Antenna Parameters and Definitions .....	27
3. Active and Diversity Receiving Antenna Systems.....	43
4. Audio Broadcasting Antennas.....	63
5. Cellular Antennas .....	107
6 TV Antennas for Cars.....	151
7 Satellite Radio Antennas .....	175
8 GPS Antennas .....	213
9 Antennas for Short Range Communication.....	249

**全书9章**  
**共332页**

- 1、汽车天线概述：专利、文献产品
- 2、基本天线参数和定义
- 3、有源与分集接收天线系统
- 4、音频广播天线
- 5、移动电话天线
- 6、汽车电视天线
- 7、卫星数字音频天线
- 8、GPS 天线
- 9、短程通信天线

1. Automotive Antennas Overview: Patents, Papers, and Products.....	1
1.1 Introduction .....	1
1.2 AM/FM Antenna Systems.....	3
1.2.1 AM/FM Broadcasting Frequency Range .....	3
1.2.2 Printed-on-Glass Antennas .....	3
1.2.3 Short Mast Helical Roof Antennas .....	5
1.3 Cellular Phone Antennas .....	6
1.4 Car TV Antennas .....	8
1.4.1 Terrestrial Systems.....	8
1.4.2 Satellite TV Antennas.....	8
1.4.3 Internet TV in Vehicles.....	9
1.5 Satellite Radio Antennas.....	10
1.6 GPS Antenna Systems .....	11
1.7 Antennas for Short Range Communications .....	12
1.7.1 Introduction.....	12
1.7.2 Remote Start Engine and Remote Keyless Entry Antennas .....	13
1.7.3 Tire Pressure Sensors .....	15
1.7.4 Electronic Toll Collection Systems .....	16
1.8 Thin Film Antennas.....	18
1.9 Digital Audio Broadcasting Design .....	19
1.10 Automotive Radar Antenna Systems .....	20
1.11 Antenna Packaging Issues.....	21
1.12 Summary .....	22
References .....	23

本章描述了在不同频段下工作的不同应用天线，讨论了在众多专利和论文中引用的天线设计的最新成果和未来趋势，介绍了许多商用汽车天线的设计。

本章目录各节内容概述了后面各章的内容。

<b>2. Basic Antenna Parameters and Definitions .....</b>	<b>27</b>
2.1 Introduction .....	27
2.2 Far Zone and Radiation Pattern.....	27
2.3 Polarization and Radiation Pattern Measurements .....	29
2.4 Directivity, Gain, Average Gain, and Antenna Beamwidth .....	31
2.5 Impedance, Voltage Standing Wave Ratio, Bandwidth, and Quality Factor .....	34
2.6 Impedance Matching Between Antenna and Car Receiver.....	36
2.7 Electrically Small Antennas .....	36
2.8 Radio Frequency Cables and Connectors.....	37
2.9 Notes on Decibels.....	39
2.10 Converting Field Strength to Power.....	40
References .....	41

本章介绍天线主要参数的含义及设计考虑：包括天线方向图、波束宽度、天线增益、天线带宽、输入阻抗、极化特性、连接线及阻抗匹配等，

此外，本章还分析了安装在车辆上和车内天线的测量技术。

3. Active and Diversity Receiving Antenna Systems.....	43
3.1 Introduction.....	43
3.2 Signal and Noise Analysis of Active Antenna.....	44
3.2.1 Signal-to-Noise Ratio.....	44
3.2.2 Antenna Noise Temperature.....	47
3.3 Low Noise Amplifier Parameters.....	48
3.3.1 Introduction.....	48
3.3.2 S Parameters.....	48
3.3.3 Stability Analysis.....	49
3.3.4 Amplifier Gain.....	49
3.3.5 Matching for Maximum Amplifier Gain.....	51
3.3.6 Noise Matching Design.....	52
3.3.7 Output Gain Matching for Noise Matched LNA.....	53
3.3.8 Low Noise Amplifier Distortion Parameters.....	53
3.3.9 Measurement Set-Up to Estimate Third-Order Intermodulation Distortions.....	54
3.4 Active Antenna Gain.....	55
3.5 Low Noise Amplifiers for Electrically Small Antennas.....	56
3.6 Diversity Techniques.....	56
References.....	60

本章介绍了在汽车上应用的有源天线和分集接收天线。

有源天线是通过在天线输入端增加低噪声放大器（LNA），从而增加接收系统的接收灵敏度和动态范围，所以本章讨论了LNA的参数考虑及电路设计。

分集天线系统是指一部接收机使用两副或多副空间上分开放置的天线，以改善接收质量。在本章也进行了讨论。

4. Audio Broadcasting Antennas .....	63
4.1 AM/FM Whip Antenna .....	63
4.2 Printed-on-Glass AM/FM Antennas .....	64
4.2.1 Introduction .....	64
4.2.1.1 Rear Glass Systems .....	65
4.2.1.2 Side Glass Systems .....	65
4.2.1.3 Front (Windshield) Systems .....	65
4.2.1.4 Diversity Window Antennas .....	65
4.2.2 Passive Windshield Antennas .....	66
4.2.2.1 FM Frequency Range .....	66
4.2.2.2 AM Frequency Range .....	69
4.2.3 Simulation Results .....	73
4.2.4 Side Glass Antenna Pattern Example .....	75
4.2.5 Amplifier Circuit for AM/FM Antenna System .....	76
4.2.6 Amplifier with High Input Impedance .....	83
4.3 Short Roof AM/FM Antenna .....	84
4.3.1 Helix Antenna Radiation Modes .....	84
4.3.2 Helix Antenna for FM Frequency Band .....	86
4.4 Short Meander Antenna .....	87
4.5 Diversity FM Antennas .....	89
4.5.1 Two Antenna Diversity Elements .....	89
4.5.2 Single Reconfigurable Antenna Element for Space Diversity Applications .....	91
4.5.3 Correlation Signal Analysis for Car Roof Spaced Antennas .....	92
4.6 Antennas for Digital Audio Broadcasting .....	93
4.6.1 L Band Antenna Geometry .....	93
4.6.2 Radiation Pattern Measurements for L Band Antenna .....	97
4.6.3 Antennas for Band III .....	99
References .....	103

本章介绍了用于接收模拟AM/FM信号的各类天线设计。

鞭状AM/F天线在汽车工业中使用的历史超过50年。

此外，本章还介绍了印刷在玻璃上的AM/FM天线，螺旋天线，弯折线印刷天线，以及用于FM的分集接收天线、数字音频广播天线。



5. Cellular Antennas .....	107
5.1 Single Band Monopole on Roof.....	107
5.2 Glass Mounted Monopole.....	113
5.3 Dual-Band Monopole .....	114
5.4 Helix.....	116
5.4.1 Single Band Simulation Results .....	116
5.4.2 Dual-Band Helix .....	118
5.5 Compact Printed Circuit Board Antennas .....	120
5.5.1 Single Band Meander Line Design.....	120
5.5.2 Dual-Band Combined Design.....	123
5.5.3 Tri-Band Design .....	124
5.5.4 CPW-Fed Multiband Design .....	124
5.5.5 Planar Inverted F Antenna.....	128
5.5.6 Hidden Printed Dipole.....	131
5.5.7 Printed-on-Glass Design.....	131
5.5.8 Antenova Series.....	131
5.6 Dual-Band Inverted F Design .....	134
5.7 Rear View Mirror Mount .....	135
5.8 Bumper Installation .....	137
5.9 Combined FM/PCS Design.....	138
5.10 Integrated AM/FM/AMPS/PCS Design .....	140
5.11 Integrated PCS/RKE Design .....	140
5.12 Cellular Diversity Systems.....	142
5.12.1 Spatial, Polarization, and Pattern Diversity .....	142
5.12.2 Monopoles for Diversity Reception.....	145
5.12.3 Switched Parasitic Elements for Diversity Design .....	146
References .....	148

本章主要讨论了车载蜂窝移动电话天线：主要针对移动电话2G系统的电话天线设计，如基于码分多址接入 (CDMA) 或全球移动通信系统 (GSM) 的天线设计。

还介绍了电话天线与AM、FM、车上无钥匙进入系统等天线组合设计。

<b>6</b>	<b>TV Antennas for Cars</b> .....	151
6.1	Satellite TV Antennas.....	151
6.1.1	Satellite TV System Requirements.....	151
6.1.2	Ridged Waveguide Antenna Array.....	152
6.1.3	Electronic Beam-Controlled Phase Array .....	153
6.1.4	G/T Estimation.....	155
6.2	Antennas for Digital Terrestrial TV .....	157
6.2.1	Introduction.....	157
6.2.2	H-Shaped Glass Configuration.....	158
6.2.3	Simple Meander Window Glass Design.....	164
6.3	Printed-on-Glass Patent Examples .....	166
6.4	Bumper Diversity System .....	169
6.5	Compact Mast Monopole.....	171
	References .....	172

本章介绍卫星TV天线系统，包括数字直播卫星系统接收天线和陆地数字电视接收天线。

<b>7</b>	<b>Satellite Radio Antennas</b> .....	175
7.1	Basic Passive Antenna Requirements .....	175
7.1.1	Parameters for Sirius Service (2320 to 2332.5 MHz).....	175
7.1.2	Parameters for XM Service (2332.5 to 2345 MHz) .....	175
7.2	System With Two Antenna Elements.....	175
7.3	System With Single Patch Antenna Element.....	177
7.4	Simplified Engineering Formulas for Rectangular Passive Patch Parameters .....	178
7.4.1	Geometry Dimensions for Linear Polarization .....	178
7.4.2	Circular Polarization Geometry .....	179
7.4.3	Performances of Passive Antenna Elements.....	181
7.4.4	Circular Polarization Design Guidelines .....	182
7.5	Simulated Example of SDARS Patch .....	183
7.6	Commercially Available Passive Elements.....	185
7.7	Vertical Polarization Gain of Patch Antenna at Horizon Angle Direction .....	186
7.8	Ground Size Effects .....	187
7.9	On-Vehicle Antenna Location .....	189
7.10	Compact Dual-Polarized Antenna .....	191
7.11	Low Profile Cross Slot Antenna for SDARS Application .....	196
7.12	Glass Mount System .....	197
7.13	XM Truck Antenna .....	199
7.14	Active Design.....	199
7.14.1	Antenna Amplifier Requirements.....	199
7.14.2	Amplifier Simulation Results .....	202
7.15	Commercially Available Modules .....	203
7.16	SDARS Parameter Measurements .....	204
7.16.1	Gain and Radiation Pattern Measurements in Anechoic Chamber.....	204
7.16.2	Gain and Radiation Pattern Measurements of Antenna Mounted on Car .....	205
7.16.3	SDARS Antenna Noise Temperature .....	206
7.17	Diversity Circuits .....	207
	References .....	210

这章介绍了卫星数字音频广播（SDARS）接收天线设计。

涉及两大卫星服务系统：  
天狼星服务（2320～  
2332.5MHz）和XM服务  
（2332.5～2345MHz），

8	GPS Antennas .....	213
8.1	Typical GPS Antenna Parameters.....	213
8.2	Patch Parameters and Ground Plane Size .....	214
8.3	On-Vehicle GPS Antenna Measurements.....	216
8.4	Circular Annular Ring Microstrip Antenna.....	218
8.5	Dual-Band GPS Antenna .....	220
8.6	Tri-Band Applications .....	224
8.7	Amplifier Circuit for Active Design.....	226
8.8	Combined GPS and Cellular Phone Systems.....	227
8.8.1	Typical Antenna System .....	227
8.8.2	Isolation of Collocated Cellular and GPS Antennas.....	228
8.8.3	Gain Measurements of Passive Cell/GPS Elements .....	229
8.8.4	Active Antenna and Filter Topology.....	232
8.9	Combined GPS and SDARS Antenna System.....	233
8.9.1	Stacked Patch Design .....	233
8.9.2	Two Antennas in One Package .....	237
8.10	Microstrip Antenna for GPS and DCS Applications .....	238
8.11	Integrated GPS/PCS/RKES System.....	241
8.12	Car Location Options .....	242
8.13	Diversity Antennas for GPS Applications.....	245
	References .....	247

本章介绍GPS天线设计。

现代GPS系统使用三个载波频段：

1. 575 GHz (L1频段)、
1. 227 GHz (L2频段)和
1. 176 GHz (L5频段)。

所以GPS天线设计有单频段工作，双频段工作或三频段工作。GPS天线采用用右圆极化波。

本章还讨论了GPS天线与其它天线组合设计。

9	Antennas for Short Range Communication.....	249
9.1	Introduction .....	249
9.2	Compact Planar Passive Antenna.....	251
9.2.1	Geometries.....	251
9.2.2	Simulation Results .....	252
9.2.2.1	Impedance, Efficiency, and Directivity .....	252
9.2.2.2	Parameters for Matching Circuits.....	252
9.3	Symmetrical and Asymmetrical 315 MHz Meander Line Printed on Dielectric Board .....	254
9.3.1	Introduction.....	254
9.3.2	Antenna Geometry .....	256
9.3.3	Numerical Results.....	256
9.3.4	Measurement Results .....	260
9.4	Considerations for Small Antennas .....	262
9.5	Active Meander Line Antenna Implementation for 315 MHz....	264
9.5.1	Antenna and Amplifier Parameters.....	264
9.5.2	Meander Line Antenna in Plastic Case .....	267
9.5.3	On-Vehicle Radiation Pattern Measurements.....	267
9.6	Example of 433.9 MHz Antenna .....	272
9.7	Alternative Antenna Systems for Short Range Communication.....	273
9.7.1	Splitter Antenna for 315 MHz Frequency Band .....	274
9.7.2	Combined Roof AM/FM/RKE System .....	275
9.7.3	Combined RKE/PCS/GPS Design .....	276
9.7.4	Printed-on-Glass RKE Antenna Design.....	277
9.7.5	Comparison of 433.9 MHz Antennas.....	278
9.8	Maximum Detection Range of RKE/RSE System .....	281
9.9	Effects of Auto Electronic Components on Communication Range .....	284
9.10	Signal and Noise Measurements for Antenna/Receiver Combination .....	285
9.10.1	Measurement Results .....	286
9.10.2	Electromagnetic Emission Interference.....	288
9.11	Compact Diversity Antenna System for Remote Control Applications.....	290
9.12	Compact Antennas: Literature and Patent Review .....	294
9.13	Meander Line Antennas for Multifrequency Applications .....	296
	References .....	300

本章介绍了汽车短程通信天线。

典型的短程汽车通信系统：包括遥控钥匙进入 (RKE)、遥控启动发动机 (RSE)、轮胎压力监测系统 (TPS)、电子收费 (ETC)、射频识别 (RFID)、远距雷达 (LRR) 和近距雷达 (SRR) 天线。

本章只对遥控钥匙进入 (RKE) 的天线设计问题进行了讨论。

在原著基础上的补充内容：

## 汽车天线最新发展趋势

汽车集成智能天线

LTE-V2X车联网汽车天线设计

5G-V2X车联网汽车天线设计

# 后续课程学习方法

## 1、原著内容串讲

用二次课时间（60分钟），详细介绍各类天线设计思想

## 2、提供中文翻译稿自学

学员自己阅读原著，老师提供全书中文翻译对照阅读

## 3、汽车天线最新发展及天线设计

用一次课时间（30分钟），介绍汽车天线发展新设计

## 4、建立汽车天线设计学习交流群

老师及时解答天线设计中的疑问，学员相互学习讨论。

传统汽车正在向电动化、智能化、共享化发展，智能网联汽车的天线设计必将迎来新挑战和机遇，欢迎大家踊跃参与汽车天线设计课程的学习，不断提升自己的技术水平，为汽车产业的发展作贡献。



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