

分享 交流 发展

汉斯出版社 (Hans Publishers, www.hanspub.org) 聚焦于国际开源 (Open Access) 中文期刊的出版发行, 覆盖以下领域: 数学物理、生命科学、化学材料、地球环境、医药卫生、工程技术、信息通讯、人文社科、经济管理等。

首页 >> 信息通讯 >> 天线学报 >>

JA >> Vol. 3 No. 2 (June 2014)

基于边界阵列的多输入多输出无线终端的在空中无线测试方法

MIMO Wireless Terminals OTA Performance Test Based on Boundary Array Methodology

全文免费下载:(1303KB) PP.15-23 DOI: 10.12677/JA.2014.32003

作者:

肖疆:ETS-Lindgren Inc., 中国区;
唐毓隆:ETS-Lindgren Inc., 亚太区

关键词:

多输入多输出; 边界阵列; 在空中; 信道验证; 性能测试; MIMO; Boundary Array; OTA; Channel Validation; Performance Test

摘要:

多输入多输出(Multiple Input Multiple Output: MIMO)天线技术在当前高速无线通信领域(LTE, WIFI, WIMAX), 高性能雷达技术(MIMO radar)等得到了飞速发展趋势。市面上越来越多无线终端设备中具有MIMO天线技术, 但如何评估这种技术的测试方法却没有达到标准化。国际两大组织3GPP[1], CTIA[2]以及国内中国通信学会CCSA [3], 都在进行测试方法的标准化工作; 信道模型概念引入给系统带来复杂性使得进展较慢。其中基于边界阵列的多输入多输出无线终端在空中(Over The Air: OTA)测试方法是一种非常重要的评估方法。本文利用实际的测试系统为背景, 通过对边界阵列的方法概念引入, 测试链路和系统的校准方法, 多方面系统性能验证, 以及最终产品性能的测试, 希望能够较全面的给出此方法的介绍。同时展望此方法的发展前景和给出相对于其他方法的比较。

MIMO antenna technology is commonly used in high speed wireless communication (LTE, WIFI, WIMAX) as well as in high performance radar (MIMO radar). There are more and more wireless terminals with MIMO antenna around the current market. However, there are no current standardized measurement methodologies to evaluate the new technology. The main international standardization organizations, including 3GPP, CTIA and the national organization of China (CCSA), are working to standardize the test methodology. Part of the difficulty in completing a standard of the test method is due to the fact that channel models of multi-path environments complicate the test system to a large degree. Such complexity can be taken into account by the methodology based on boundary array OTA method that makes it a very important evaluation candidate for MIMO OTA performance test. The paper presents a real MIMO OTA test system. After the introduction of boundary array concept, the system calibration is described, including input and output calibration of the entire system. Subsequently, the system validation is examined from several aspects, such as power validation, filed mapping, temporal correlation and so on. Finally, the measurement results of an actual wireless product, with three different antennas, are provided to further elaborate the test methodology. At the end, the current status of the MIMO OTA test methodology standardization is provided to conclude the paper.

推荐给个人

推荐给图书馆

分享到:

更多

加入审稿人 创办特刊

☆ 当前期刊访问量 19,745

当前期刊下载量 3,916

推荐文章

- 基于CSRR的三陷波单极子超宽带天线的设计
- 一种新型具有多陷波特性的超宽带天线
- 运动平台上时差变化率的相差检测
- 枝节状多频段微带天线的谐振机制与设计方法研究
- 基于传感网的水环境监测系统研究现状及趋势

友情链接

- 尔湾阅读
- 科研出版社
- 开发图书馆
- 千人杂志
- 教育杂志

- [1] 3GPP, LTE, Technical Report, 2010. <http://www.3gpp.org/LTE>
- [2] CTIA (2014) CTIA Official Website, Washington DC. <http://www.ctia.org/>
- [3] CCSA China (2014) <http://www.CCSA.org.cn>
- [4] Kyösti, P., Jämsä, T. and Nuutinen, J.-P. (2012) Channel modelling for multiprobe over-the-Air MIMO testing. *International Journal of Antennas and Propagation*, 2012, Article ID: 615954.
- [5] Szini, I., Foegelle, M., Reed, D., Brown, T. and Pedersen, G.F. (2014) On antenna polarization discrimination, validating MIMO OTA test methodologies. *IEEE Antennas and Wireless Propagation Letters*, 13, 265-268.
- [6] Foegelle, M. (2008) Systems and methods for over the air performance testing of wireless devices with multiple antennas. US Patent No. 20080056340 A1.
- [7] Fan, W., Sun, F., Kyösti, P., Nielsen, J., Carreño, X., Knudsenand, M. and Pedersen, G. (2013) 3D channel emulation in a multi-probe setup. *Electronics Letters*, 49, 623-625.
- [8] Jing, Y., Zhao, X., Kong, H.W., Duffy, S. and Rumney, M. (2012) Two-stage over-the-air (OTA) test method for LTEMIMO device performance evaluation. *International Journal of Antennas and Propagation*, 2012, Article ID: 572419.
- [9] Kildal, P.-S., Chen, X., Orlenius, C., Franzén, M. and LötböckPatané, C. (2012) Characterization of reverberation chambers for OTA measurements of wireless devices: Physical formulations of channel matrix and new uncertainty formula. *IEEE Transactions on Antennas and Propagation*, 60, 3875-3891.
- [10] Chen, X., Kildal, P.-S. and Gustafsson, M. (2013) Characterization of implemented algorithm for MIMO spatial multiplexing in reverberation chamber. *IEEE Transactions on Antennas and Propagation*, 61, 4400-4404.