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Measurement Method for Radiated RF Power and Receiver Performance of Wireless Device - Part 6: LTE Wireless Device

无线终端空间射频辐射功率和接收机性能测量方法

第 6 部分：LTE 无线终端

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Foreword

YD/T 1484, *Measurement Method for Radiated RF Power and Receiver Performance of Wireless Device*, includes the following parts:

-- *Part 1: General Requirements;*

-- *Part 2: GSM Wireless Device;*

-- *Part 3: 800MHz/2GHz CDMA2000 Wireless Device;*

-- *Part 4: 2GHz WCDMA Wireless Device;*

-- *Part 5: 2GHz TD-SCDMA Wireless Device;*

-- *Part 6: LTE Wireless Device.*

This Part is part 6 of YD/T 1484.

This Part was drafted in accordance with the rules given in GB/T 1.1-2009.

This Part was drafted mainly by reference to 3GPP TR 25.914, TS 25.144, TS 34.114, TR37.902 etc.

This Part was proposed by and shall be under the jurisdiction of China Communication Standard Association.

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Measurement Method for Radiated RF Power and Receiver Performance of Wireless Device - Part 6: LTE Wireless Device

1 Scope

This Part specifies the measurement method for radiated RF power and receiver performance of LTE wireless device, including the frequency range and limiting values of two systems, namely FDD LTE and TD-LTE.

This Standard applies to portable and vehicular wireless device, wireless device used at fixed positions and data device connected with portable computers through USB interface, Express interface, PCMCIA interface and other interfaces.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this Standard.

YD/T 1484.1, *Measurement Method for Radiated RF Power and Receiver Performance of Wireless Device – Part 1: General Requirements*

3GPP TS 34.114, *User Equipment (UE)/Mobile Station (MS) Over The Air (OTA) Antenna Performance Conformance Testing*

3GPP TS 36.521-1, *User Equipment (UE) Conformance Specification – Part 1: Conformance Testing*

3GPP TS 36.523-1, *User Equipment (UE) Conformance Specification – Part 1: Protocol Conformance Specification*

3GPP TS 36.508, *Common Test Environments for User Equipment (UE) – Conformance Testing*

3GPP TS 36.509, *User Equipment (UE) Logical Test Interface – Special Conformance Testing*

3GPP TR 37.902, Measurements of User Equipment (UE) Radio Performance for LTE/UMTS Terminal; Total Radiated Power (TRP) and Total Radiated Sensitivity (TRS) Test Methodology

3 Terms, Definitions and Abbreviations

Unless specified otherwise, the terms, definitions and abbreviations specified in YD/T 1484.1 apply to this document.

4 Test Conditions

Unless specified otherwise, the test conditions specified in YD/T 1484.1 applies to this Part.

5 Radiated RF Power Measurement

Unless specified otherwise, the radiated RF power measurement specified in YD/T 1484.1 applies to this Part.

5.1 FDD LTE radiated RF power measurement

5.1.1 Test procedure

Adjust the settings of LTE base station simulator in accordance with the parameters defined in 3GPP TS 36.521-1, Section 6.2.2 (maximum output power measurement); use the wireless device defined in 3GPP TS 36.509, Section 5.4 to build a loopback test mode with base station simulator. During the measurement, system simulator launches power-control commands to EUT as defined in 3GPP TS 36.521-1, Section 6.2.2.4.2 to ensure EUT is launched with maximum power during the whole measurement process, irrespective of the effects of the configurations of MPR and A-MPR.

Select high, middle and low channels within the frequency bands supported by EUT for testing. Table 1 gives the details of selection of three channels -- high, middle and low, on part of FDD LTE frequency bands; other permissible frequency bands can be selected in accordance with the same principles.

antenna pullout state of retractable antenna EUT). See Table 4 for specific requirements, including the types of equipment as specified in YD/T 1484.1.

Table 4 – TD-LTE Radiated Power Requirements

	Frequency band 38 TIRP (dBm)							
Power level	Free space		Only human head model		Human head and hand model		Only human hand model	
	AVG	MIN	AVG	MIN	AVG	MIN	AVG	MIN
Max power Categories A, B, C, E (tablet PCs[5])	16.5	15.5	Pending	Pending	Pending	Pending	Pending	Pending
Max Power Categories D, E (except tablet PCs)	18	17	NA	NA	NA	NA	NA	NA
	Frequency band 39 TIRP (dBm)							
Power level	Free space		Only human head model		Human head and hand model		Only human hand model	
	AVG	MIN	AVG	MIN	AVG	MIN	AVG	MIN
Max power Categories A, B, C, E (tablet PCs)	16.5	15.5	Pending	Pending	Pending	Pending	Pending	Pending
Max Power Categories D, E (except tablet PCs)	18	17	NA	NA	NA	NA	NA	NA
	Frequency band 40 TIRP (dBm)							
Power level	Free space		Only human head model		Human head and hand model		Only human hand model	
	AVG	MIN	AVG	MIN	AVG	MIN	AVG	MIN
Max power Categories A, B, C, E (tablet PCs)	16.5	15.5	Pending	Pending	Pending	Pending	Pending	Pending
Max Power Categories D, E (except tablet PCs)	18	17	NA	NA	NA	NA	NA	NA
	Frequency band 41 TIRP (dBm)							
Power level	Free space		Only human head model		Human head and hand model		Only human hand model	
	AVG	MIN	AVG	MIN	AVG	MIN	AVG	MIN

[5] A type of personal computers which are convenient for carrying and have touch screen as the input device.

1575	19575	10	1842.5	1747.5	50	0	50	0
1900	19900	10	1875	1780	50	0	50	0

Adjust the settings of LTE base station simulator in accordance with 3GPP TS 36.521-1, Section 7.3 (reference sensitivity measurement) and the default parameters in TS 36.508; establish a lookback test mode between wireless device and base station simulator. Attention shall be paid to that the initial value of forward link power shall ensure that the BLER of EUT is zero when initial test is carried out at all points of 3-D space; meanwhile, it shall also ensure that each RB has equal power.

If connection is not established at some test point, the forward link power can be increased to establish or maintain connection. Establish connection on specified test channels; base station simulator sends power-control commands to wireless device to make wireless device launched with maximum power all through the test; start the BLER for measurement on at least 20,000 transmission blocks; when the forward link power approaches FDD LTE sensitivity level, the power decline step of base station simulator shall not be greater than 0.5 dB; reduce the output power of base station simulator until the throughput capacity declines to 95% of maximum throughput; record the minimum forward link power value at that time (cell power) as the EIS value of that point; after all test points of the 3-D space are measured for sensitivity test, integrate into total isotropic radiated sensitivity (TIRS) as defined in YD/T 1484.1.

6.1.2 Limiting value – FDD LTE receiving sensitivity

Complete radiated RF power measurement shall include the measurement of all channels in all possible actual application scenarios of EUT (such as free space and human head model) and in the main mechanical mode supported by EUT (such as the flipping open state of flip-type-EUT, the sliding open state of slide-type-EUT and the antenna pullout state of retractable antenna EUT). See Table 6 for specific requirements, including the types of equipment as specified in YD/T 1484.1.

Table 6 – FDD LTE Receiving Sensitivity Requirements[7]

	Frequency band 1 TIRP (dBm)							
Power level	Free space		Only human head model		Human head and hand model		Only human hand model	
	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
Max power Categories A, B, C, E (tablet PCs[8])	-88	-87	Pending	Pending	Pending	Pending	Pending	Pending

[7] Other FDD frequency bands undefined can be dealt with by reference to the limit requirements of this table.

[8] A type of personal computers which are convenient for carrying and have touch screen as the input device.

38450	38450	20	1900	1900	100	0	100	0
38550	38550	20	1910	1910	100	0	100	0
Frequency band 40								
38750	38750	20	2310	2310	100	0	100	0
39150	39150	20	2350	2350	100	0	100	0
39550	39550	20	2390	2390	100	0	100	0
Frequency band 41								
39750	39750	20	2506	2506	100	0	100	0
40620	40620	20	2593	2593	100	0	100	0
41490	41490	20	2680	2680	100	0	100	0

Adjust the settings of LTE base station simulator in accordance with 3GPP TS 36.521-1, Section 7.3 (reference sensitivity measurement) and the default parameters in TS 36.508 (refer to TS 36.521-1, Annex A.2.3, Table A.2.3.1.1-1 for the configuration of uplink reference measurement channels; refer to TS 36.521-1, Annex A.3.2, Table A.3.2-2 for the configuration of downlink reference measurement channels); establish a loopback test mode between wireless device and base station simulator. Attention shall be paid to that the initial value of forward link power shall ensure that the BLER of EUT is zero when initial test is carried out at all points of 3-D space; meanwhile, it shall also ensure that each RB has equal power.

If connection is not established at some test point, the forward link power can be increased to establish or maintain connection. Establish connection on specified test channels; base station simulator sends power-control commands to wireless device to make wireless device launched with maximum power all through the test; start the BLER for measurement on at least 20,000 transmission blocks; when the forward link power approaches FDD LTE sensitivity level, the power decline step of base station simulator shall not be greater than 0.5 dB; reduce the output power of base station simulator until the throughput capacity declines to 95% of maximum throughput; record the minimum forward link power value at that time (cell power) as the EIS value of that point; after all test points of the 3-D space are measured for sensitivity test, integrate them into total isotropic radiated sensitivity (TIRS) as defined in YD/T 1484.1.

6.4 Limiting value – TD-LTE receiving sensitivity

Complete radiated RF power measurement shall include the measurement of all channels in all possible actual application scenarios of EUT (such as free space and human head model) and in the main mechanical mode supported by EUT (such as the flipping open state of flip-type-EUT, the sliding open state of slide-type-EUT and the antenna pullout state of retractable antenna EUT). See Table 8 for specific requirements, including the types of equipment as specified in YD/T 1484.1.