



EMC Test Report

Product Name: HSPA+ USB Stick

Model Number: K4505

Report No: SYBHZ(R)E068102009EB-1

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Notice 2

Modification Information:

Table 1 Modification Information

Modification Information	1	
	2	
	3	<i>Not Applicable!</i>
	4	
	5	
	6	
	7	

REPORT ON	HSPA+ USB Stick
	M/N: K4505
REGULATION	FCC CFR47 Part 15: Subpart B; FCC CFR47 Part 22: Subpart H; FCC CFR47 Part 24: Subpart E;
START OF TEST	Oct.08, 2009
END OF TEST	Oct.10, 2009
Final Judgement:	Pass

Approver

2009-10-30

Date

张兴海

Name

Signature



Operator

2009-10-30

Date

张飞

Name

Signature

张 飞

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1 Status

1.1 Product Information

CLIENT: Huawei Technologies Co., Ltd.
ADDRESS: Bantian Longgang District Shenzhen, P.R. China
MANUFACTURING DESCRIPTION HSPA+ USB Stick
MANUFACTURERS MODEL NUMBER K4505

1.2 Applied Standard

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
-	15.107	Conducted Emission at Power Port	PASS
-	15.109	Radiated Emission of Enclosure in Idle Mode	PASS
2.1051	22.917&24.238	Radiated Spurious Emission	PASS

1.3 Test Site

Site 1:
RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD

1.4 Test environment condition

Ambient temperature	20~25°C
Relative humidity	40%~52%
Atmospheric pressure	101kPa

2 Summary of Results

Table 2 below shows a brief summary of the results obtained.

Table 2 Summary of results

EUT Classification: Wireless terminal				
Test Items	Test Configuration & Test Mode	Required Performance Criteria	Result	Site
<u>Radiated Emissions</u> Enclosure Port	TC1 (TM11~TM20)	N/A	Pass	Site1
<u>Conducted Emissions</u>	NT			Site1
<u>Radiated Spurious Emissions</u> Enclosure Port	NT			Site1

Note:
1, Measurement taken is within the measurement uncertainty of measurement system.
2, TC = Test configuration
3, NT=no test. Because of not containing devices susceptible to magnetic fields, the EUT has been exempt from immunity test of power frequency magnetic field.

3 Equipment Specification

3.1 General Description

K4505 HSDPA/WCDMA/EDGE/GPRS/GSM dual mode 8 bands USB Stick is subscriber equipment in the UMTS/GSM system. The WCDMA frequency is Band I , Band II , Band V and Band VIII. The GSM/GPRS/EDGE frequency bands include GSM850, EGSM900, DCS1800 and PCS1900, but only Band II , Band V , EGSM850 and DCS1900 test data is included in this report. K4505 implement such functions as RF signal receiving/transmitting, HSDPA/WCDMA and EDGE/GPRS/GSM protocol processing, data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface and Micro SD card interface. K4505 has an internal antenna as default.

The differences between the new K4505 and old K4505 are as follows:

1. Add an external DC/DC IC to power up the Baseband instead of the PMIC, which can decrease the thermal issue and will not affect the RF performance.
2. Add some 10uF capacitances near the Baseband power pin; which will not affect the RF performance
3. Some other component is changed, which will not affect the RF performance
4. RF performance is same as the old one

3.1.1 Main Equipment Technical Data

Description:	HSPA+ USB Stick
Models:	K4505
Input Rated Voltage:	--- 5V
Rated Consumption Power:	Max 3.5 W
Maximum Emission Power:	Max 33dBm
Dimensions:	77(length)× 28.5(width)× 12.4(height)(mm ³)
Weight:	25.8g

Table 3 Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
GSM	GSM850	824-849	869-894
	PCS1900	1850-1910	1930-1990
WCDMA	WCDMA1900	1850-1910	1930-1990
	WCDMA 850	824-849	869-894

3.2 Sub-Assembly Identity

Table 4 Sub-Assembly Identity

Board			
Model Name	Qty.	Serial Number	Description
CP12TCPU	1	ML4CAC1980400118	Main board of data card
Accessory			
Name	Qty.	Serials number	Description

4 System Configuration during EMC Test

The Equipment under Test (EUT) was functioning correctly during all tests. The EUT was installed within the test site and was configured to simulate a typical user installation.

4.1 Cables Used during Test

Table 5 Cable Used during Test

Port	Connector	Type of Cable
USB	USB	N/A

4.2 Associated Equipment Used during Test

Table 6 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date
Radio Communication Tester	CMU200	R&S	108522	2009-04-07
Notebook	HSTNN-I05C	HP	CNU5301HH0	NA
Notebook	T43	IBM	3106093834	N/A

4.3 Test Configurations and Test Mode

4.3.1 Test Configuration.

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

Table 7 Configuration table

Test configuration	Test mode
TC1	TM1~TM20

TC1: EUT was powered by USB port connected to the notebook.

4.3.2 Test Mode

There was 20 test Modes. TM1 to TM20 were shown below:

- TM1: operate in traffic mode GPRS 1900;
- TM2: operate in traffic mode EGPRS 1900;
- TM3: operate in traffic mode GPRS 850;
- TM4: operate in traffic mode EGPRS 850;
- TM5: operate in traffic WCDMA Band 1900;
- TM6: operate in traffic HADPA Band 1900;
- TM7: operate in traffic HAUPA Band 1900;
- TM8: operate in traffic WCDMA Band 850;
- TM9: operate in traffic HADPA Band 850;
- TM10: operate in traffic HAUPA Band 850;
- TM11: operate in idle mode GPRS 1900;
- TM12: operate in idle mode EGPRS 1900;
- TM13: operate in idle mode GPRS 850;
- TM14: operate in idle mode EGPRS 850;
- TM15: operate in idle WCDMA Band 1900;
- TM16: operate in idle HADPA Band 1900;
- TM17: operate in idle HAUPA Band 1900;
- TM18: operate in idle WCDMA Band 850;

TM19: operate in idle HADPA Band 850;
TM20: operate in idle HAUPA Band 850;

4.4 Test conditions and test Connections

4.4.1 Test Conditions

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

4.4.2 Test Connections

Traffic Mode:

The EUT is required to be in the traffic mode, a call is set up according to the generic call set up procedure and enter the EUT into loop back test mode.(GSM see ETSI TS 151.010).

For WCDMA, the following conditions shall also be met:

Logical Test Interface for details regarding generic call set-up procedure and BER, BLER test loop scenarios:

set and send continuously up power control commands to the UE;

The DTX shall be disabled;

Inner Loop Power Control shall be enabled;

transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbit / s.

The EUT shall be commanded to operate at maximum transmit power;

For GSM850 and PCS1900, the following conditions shall also be met:

The EUT shall be commanded to operate at maximum transmit power;

The downlink RXQUAL shall be monitored.

Assign channel frequency to an appropriate channel number. Here, set the ARFCN channel number to 661 for PCS1900, and 190 to GSM850, 9400 to WCDMA 1900, 9800 to WCDMA 850.

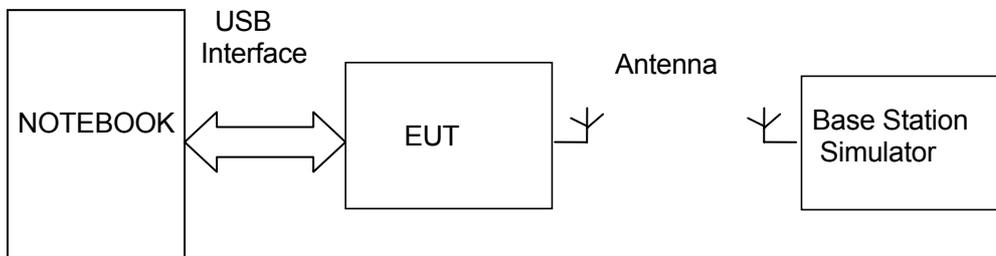


Figure 1.: TC1 (TM1-TM10)

Idle Mode:

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

The EUT is required to be in the idle mode.

For WCDMA, the following conditions shall be met:

UE shall be camped on a cell;

UE shall perform Location Registration (LR) before the test, but not during the test;

UE's neighbour cell list shall be empty;

Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval).

For GSM850 and PCS1900, the following conditions shall be met::

When the EUT is required to be in the idle mode, the test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages. Periodic Location Updating shall be disabled.

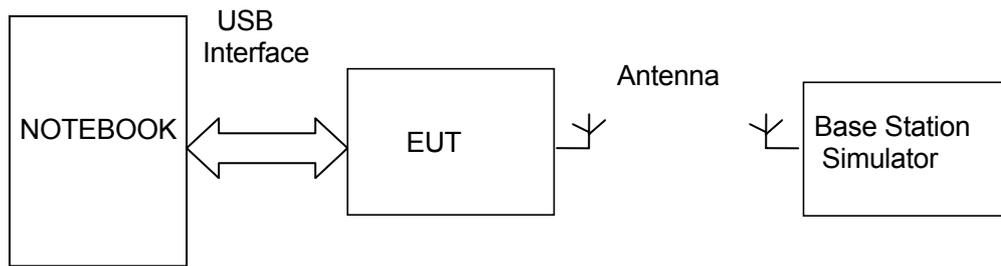


Figure 2. TC1 (TM11-TM20)

5 Electromagnetic Interference (EMI)

5.1 Radiated Disturbance 30MHz to 1000MHz

5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The test distance was 3m. The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were made using a Rohde and Schwarz ESMI Test Receiver and control software ES-K1.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using a Quasi-Peak Detector. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

Huawei Mobile Station was communicated with the BTS simulator through Air interface. The Mobile Station operated on the typical channel and the Mobile Station worked in idle mode, transmitter was not work in this test.

EUT was configured in idle mode and the test performed at worst emission state.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 k Hz

Test set up figure:

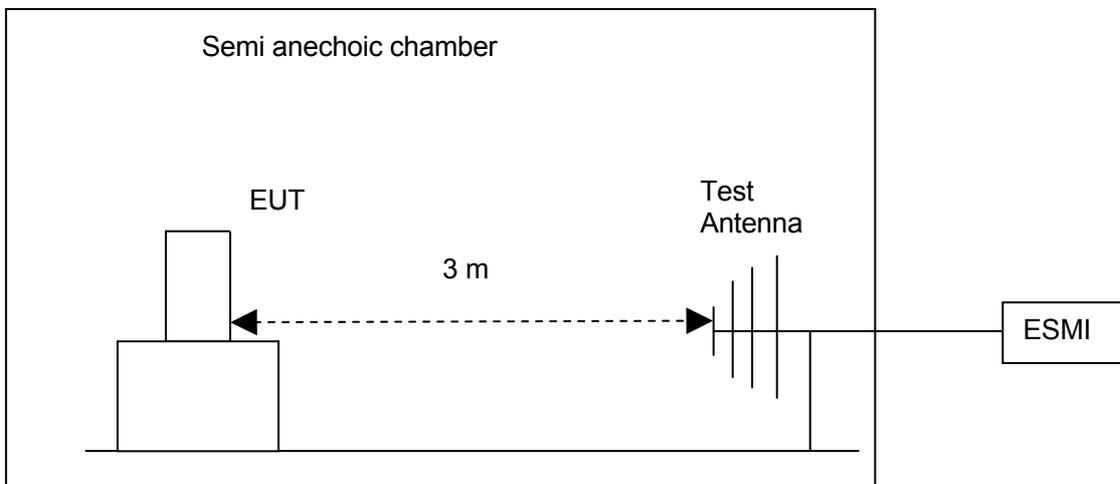


Figure 3. Test set-up

5.1.2 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.

Table 8 Test Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit($\mu\text{V}/\text{m}$)	Unit($\text{dB}\mu\text{V}/\text{m}$)
30-88	100	40
88-216	150	43.5
216-960	200	46
960-1000	500	54

6 Main Test Instruments

Table 9 Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE	EMI Test receiver	ESMI	R&S	April.22, 2009	12
	Broadband Antenna	CBL 6112B (2536)	SCHAFFNER	Jun.08, 2009	12
Software Information					
Test Item	Software Name	Manufacturer		Version	
RE	ES-K1	R&S		1.7.1	

7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

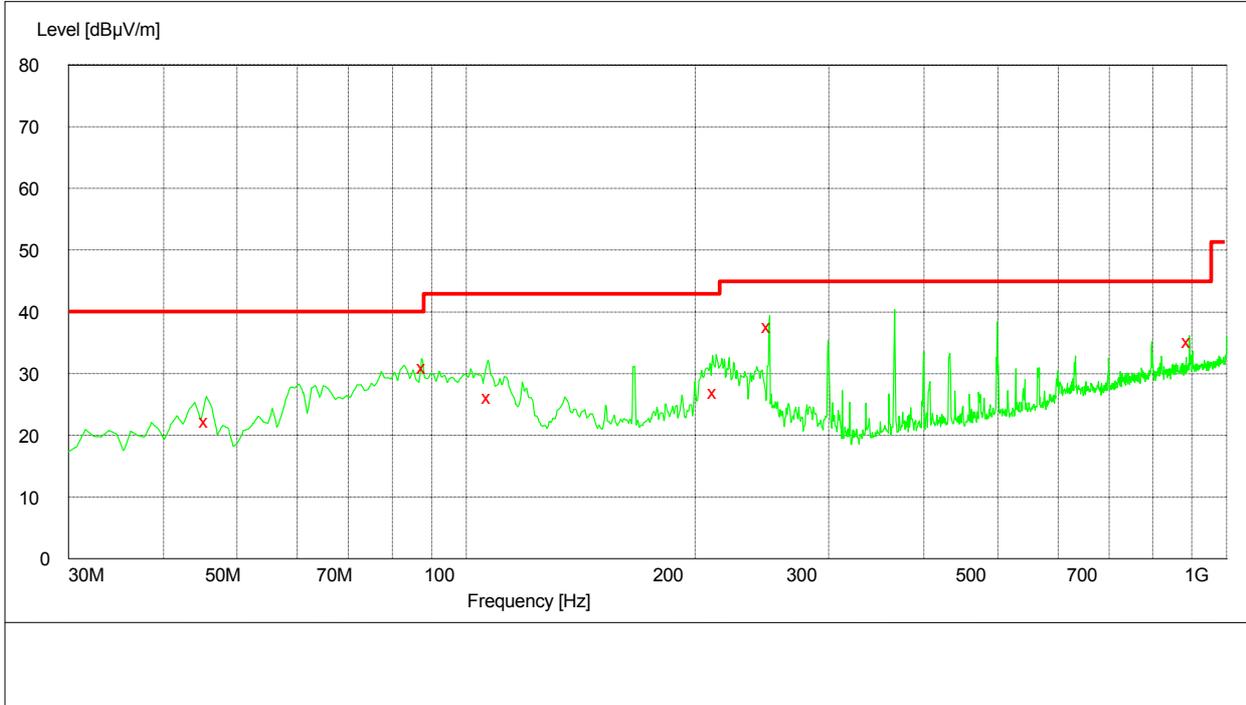
Table 10 System Measurement Uncertainty

	Items	Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.6dB; k=2(30MHz-1GHz)

8 Graph and Data of Emission Test

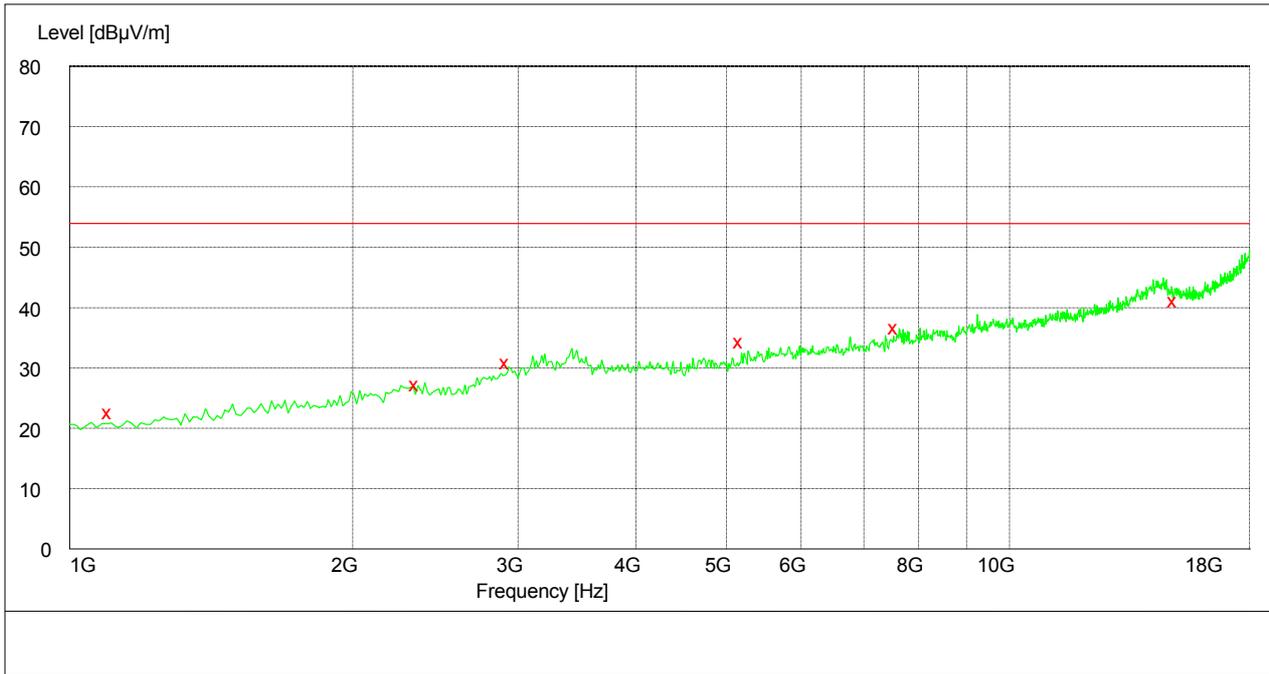
8.1 Radiated Disturbance

This test was carried out in all the test modes, but only the worst test result was shown below.



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
45.540000	22.40	13.1	40.0	17.6	100.0	352.00	VERTICAL
87.960000	31.10	11.1	40.0	8.9	100.0	146.00	VERTICAL
107.220000	26.30	12.5	43.5	17.2	100.0	146.00	VERTICAL
212.340000	27.00	12.5	43.5	16.5	112.0	190.00	HORIZONTAL
250.020000	37.70	14.2	46.0	8.3	115.0	136.00	HORIZONTAL
893.580000	35.20	26.2	46.0	10.8	168.0	205.00	VERTICAL



MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1108.500000	21.90	-15.9	54.0	32.1	129.0	90.00	HORIZONTAL
2379.000000	28.80	-10.0	54.0	25.2	150.0	273.00	HORIZONTAL
2909.500000	30.50	-7.6	54.0	23.5	148.0	13.00	HORIZONTAL
5061.500000	33.00	-1.4	54.0	21	148.0	170.00	HORIZONTAL
7510.000000	37.40	4.1	54.0	16.6	139.0	224.00	VERTICAL
15995.500000	40.20	17.3	54.0	13.8	100.0	110.00	HORIZONTAL