



Report No: SYBH(E) 147102007EB -3
FCC ID: QISE170

**FCC TEST REPORT OF
HUAWEI E170 USB Stick
M/N: E170**

Nov.20, 2007

Reliability Laboratory of Huawei Technologies Co., Ltd.

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REPORT ON **FCC Test of HUAWEI E170 USB STICK**

M/N: E170

Report No: SYBH(E)147102007EB -2

REGULATION **FCC CFR47 Part 2: Subpart J;**

FCC CFR47 Part 24: Subpart E;

CONCLUSION There are 8 items need to be tested, 8 items have been tested. The sample of the model completely meets the requirements

Final Judgement: Pass

General Manager

2007.11.23

张兴海

Date

Name

signature



Technical Responsibility

For Area of Testing

2007.11.23

余辉

Date

Name

signature

Test Lab Engineer

2007.11.22

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Date

Name

signature

Contents

1	<u>Summary</u>	5
2	<u>Product Description</u>	6
2.1	PRODUCTION INFORMATION	6
2.2	MODIFICATION INFORMATION.....	6
3	<u>Test Site Description</u>	7
3.1	TESTING PERIOD	7
3.2	GENERAL SET UP DESCRIPTION	7
4	<u>Product Description</u>	8
4.1	TECHNICAL CHARACTERISTICS	8
4.2	EUT IDENTIFICATION LIST	10
5	<u>Main Test Instruments</u>	11
6	<u>Transmitter Measurements</u>	12
6.1	EFFECTIVE RADIATED POWER OF TRANSMITTER (EIRP).....	12
6.2	CONDUCTED POWER OF TRANSMITTER.....	17

1 Summary

The table below summarizes the measurements and results for the HUAWEI E170 USB STICK. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	24.232	Effective Radiated Power of Transmitter	PASS
2.1046	24.232	Conducted Power of Transmitter	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	24.238	Band Edges Compliance	PASS
2.1051	24.238	Spurious Emission at Antenna Terminal	PASS
2.1055	24.235	Frequency Stability	PASS
2.1053	24.238	Radiated Spurious Emissions	PASS

Note : The Radiated Spurious Emissions' test results are shown in the EMC report.

2 Product Description

2.1 Production Information

2.1.1 General Description

HUAWEI E170 USB Stick is subscriber equipment in the GSM system. The frequency band is 1900M. The E170 implements such functions as RF signal receiving / Transmitting, EDGE/GPRS/GSM protocol processing and data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface. It has an internal antenna. E170 uses Qualcomm MSM7200 chipset and Zero-IF technologies.

2.1.2 Support function and Service

The HUAWEI E170 USB STICK support the function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
data	Modulation: GMSK	TM1	
data	Modulation: 8PSK	TM2	

Note: * The specified GPRS test conditions & settings are defined in 3GPP TS51.010 V5.4.0 and the EDGE test conditions & settings are defined in 3GPP TS51.010 V5.4.0.

2.2 Modification Information

For original equipment, following table is not application.

Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable				

3 Test Site Description

The test site of:

***Huawei Technologies Co. Ltd.
P.O. Box 518129
Huawei base, bantian,
Longgang District, Shenzhen, China***

The test site description has been submitted to  and registration granted under the registration number **97456** on Aug 20, 2006. The test site has been accredited by



and the accredited number is **2714.01** in Jan of 2006.

3.1 Testing Period

The test have been performed during the period of

Nov.18 , 2007 –Nov. 20, 2007

3.2 General Set up Description

HUAWEI E170 USB STICK can support GPRS/EDGE mode and PCS Band. During this measurement, the HUAWEI E170 USB STICK just works in GPRS/EDGE mode and PCS Band.

TM1: GPRS/GSM Mode with GMSK Modulation

TM2: EDGE Mode with 8PSK Modulation

4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	1850 to 1910 MHz
Downlink band:	1930 to 1990 MHz

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

	EDGE/GPRS/GSM
Channel spacing	200k Hz
Channel separation:	200k Hz

4.1.3 Type of Emission

Table 6 Type of Emission

	EDGE/GPRS/GSM
Emission Designation:	300kG7W /300kGXW

According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Environmental Requirements

Table 7 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%RH

4.1.5 Power Source

Table 8 Power Source

DC voltage nominal:	 5.0V; Supplied by USB port of notebook
DC voltage range	 4.75-5.25V
DC current maximal:	500mA

4.1.6 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

4.1.7 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Table 9 Applied RF Module Voltages and Currents

Voltage:	 2.85V
Current:	150mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)

4.2 EUT Identification List

4.2.1 Board Information

Table 10 Board Information

1900MHz HUAWEI E170 USB STICK		
E170		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
MAINBOARD	EV01AA1792800010	CD96TCPU .A

4.2.2 Adapter Technical Data

Not Applicable.

4.2.3 Battery Technical Data

Not Applicable.

4.2.4 FCC Identification

Grantee Code: QIS
Product Code: E170
FCC Identification: QISE170

5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Signal Analyzer	R&S	FSQ 26	100266	07.18.2008
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	04.22.2008
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	04.22.2008
Receiver	R&S	ESIB 26	100318	05.29.2008
Receiver	R&S	ESCS30	830245/018	05.29.2008
Pre-Amplifier	Agilent	8447D	2944A10146	07.30.2008
Pre-Amplifier	Agilent	83017A	3950M00246	08.03.2008
Loop Antenna	Schwarzbeck	FMZB1516	1516115	02.15.2008
BiLog Antenna	Schaffner	CBL 6112B	2747	06.07.2008
BiLog Antenna	Schaffner	CBL 6112B	2536	05.19.2008
Horn Antenna	ETS-Lindgren	3117	006006	05.19.2008
Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	05.19.2008
Signal Generator	R&S	SMT06	830264/009	09.28.2008
Signal Generator	R&S	SMR 40	100325	07.15.2008
Power Supply	Keithley	2306	1045337	08.28.2008
Climate Chamber	WEISS	ACS-1	105025	07.20.2008
Universal Radio Communication Tester	R&S	CMU200	108035	07.20.2008
Wireless communication test set	Agilent	8960	GB43461081	08.24.2008

6 Transmitter Measurements

6.1 Effective Radiated Power of Transmitter (EIRP)

6.1.1 Test Conditions

Table 12 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25□
Relative humidity:	55%
Test Configurations:	TM1/TM2 at frequency Bottom、 Middle、 Top

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24.232

6.1.2.2 Supporting Standards

Table 13 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V5.4.0.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;

6.1.2.3 Limits

Compliance with part 24.232, mobile/portable stations are limited to 2 watts EIRP peak power.
 $W(\text{dBm}) = 10 \cdot \log(W_{\text{In mWatts}})$.

Table 14 Limits

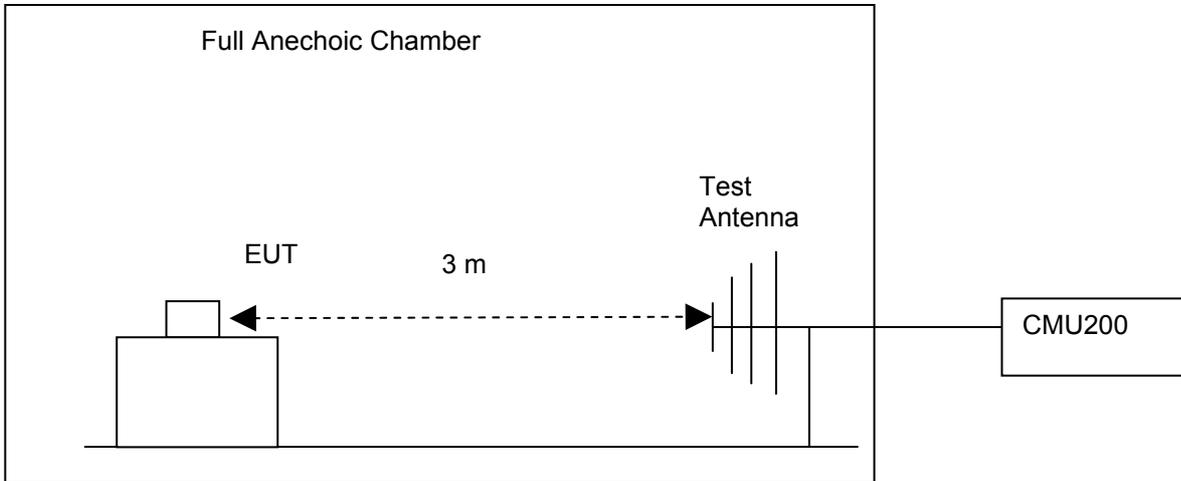
Maximum Output Power (Watts)	< 2 Watts
Maximum Output Power (dBm)	< 33 dBm

6.1.3 Test Method and Setup

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, ERP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the HUAWEI E170 USB STICK to the wireless communication tester CMU200 via the air interface. The band is set as PCS.
- (b) Test the Radiated maximum output power by the CMU200 received from test antenna.
- (c) Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step (b) on Agilent 8960, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

Test setup

Step 1: Pre-test



Step 2: Substitution method to verify the maximum EIRP

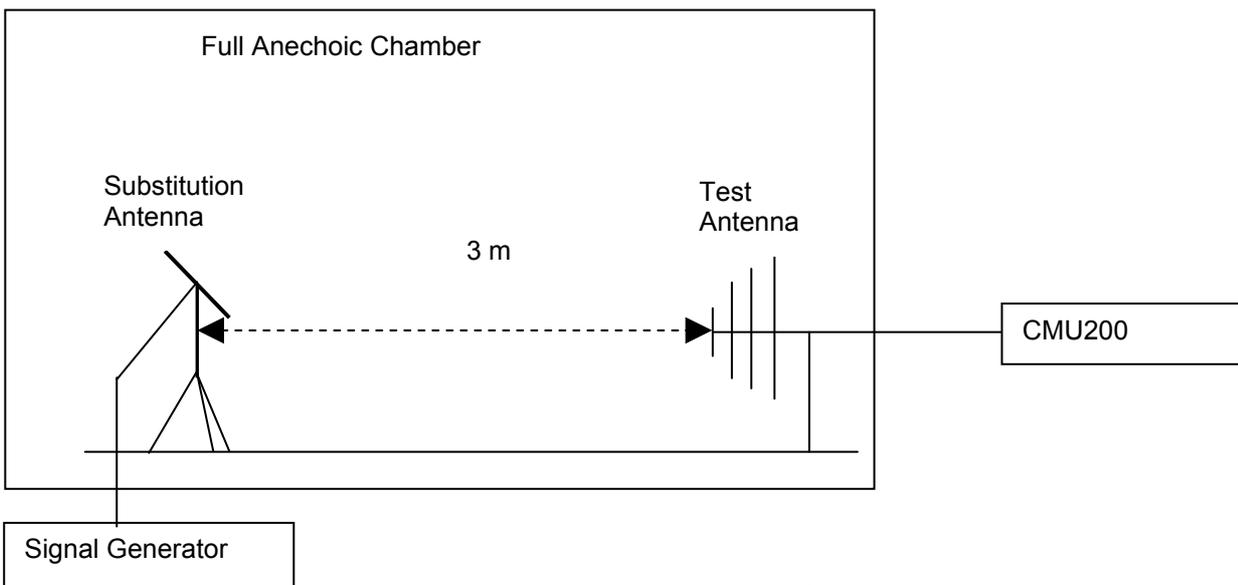


Figure 1. Test Set-up

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

There is a constant difference of 2.15 dB between EIRP and ERP.

$EIRP (dBm) = ERP (dBm) + 2.15$ (ITU-R Recommendation SM.329-10).

EIRP was measured using 3 hosts.

Host 1: BenQ Joy book S72

Host 2: BenQ R55V

Host 3: Acer ZH1

6.1.4 Measurement Results

6.1.4.1 Pre-test Results

Table 15 Measurement Results

TEST CONDITIONS		RF Output Power (EIRP)					
		Channel512(B) 1850.2MHz		Channel661 (M) 1880MHz		Channel810(T) 1909.8MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1 (Host 1)	Tnom (25 °C) Vnom (5.0V)	31.5	33	31.3	33	31.4	33
TM2 (Host 1)	Tnom (25 °C) Vnom (5.0V)	27.1	33	27.1	33	27.2	33
TM1 (Host 2)	Tnom (25 °C) Vnom (5.0V)	31.3	33	31.3	33	31.2	33
TM2 (Host 2)	Tnom (25 °C) Vnom (5.0V)	27.0	33	26.8	33	27.0	33
TM1 (Host 3)	Tnom (25 °C) Vnom (5.0V)	31.1	33	31.0	33	31.0	33
TM2 (Host 3)	Tnom (25 °C) Vnom (5.0V)	26.4	33	26.5	33	26.5	33

6.1.4.2 Substitution Results

Table 16 Substitution Results

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP) [dBm]	Limit [dBm]	Result
TM1(Host 1)	1850.2	31.5	Dipole Ant.	27.7	4.6	1.0	31.3	33	Pass
TM1(Host 1)	1880	31.3	Dipole Ant.	27.5	4.6	1.0	31.1	33	Pass
TM1(Host 1)	1909.8	31.4	Dipole Ant.	27.4	4.8	1.0	31.2	33	Pass

TM2(Host 1)	1850.2	27.1	Dipole Ant.	23.2	4.6	1.0	26.8	33	Pass
TM2(Host 1)	1880	27.1	Dipole Ant.	23.3	4.6	1.0	26.9	33	Pass
TM2(Host 1)	1909.8	27.2	Dipole Ant.	23.1	4.8	1.0	26.9	33	Pass
TM1(Host 2)	1850.2	31.3	Dipole Ant.	27.5	4.6	1.0	31.1	33	Pass
TM1(Host 2)	1880	31.3	Dipole Ant.	27.6	4.6	1.0	31.2	33	Pass
TM1(Host 2)	1909.8	31.2	Dipole Ant.	27.3	4.8	1.0	31.1	33	Pass
TM2(Host 2)	1850.2	27.0	Dipole Ant.	23.1	4.6	1.0	26.7	33	Pass
TM2(Host 2)	1880	26.8	Dipole Ant.	26.9	4.6	1.0	26.5	33	Pass
TM2(Host 2)	1909.8	27.0	Dipole Ant.	22.8	4.8	1.0	26.6	33	Pass
TM1(Host 3)	1850.2	31.1	Dipole Ant.	27.2	4.6	1.0	30.8	33	Pass
TM1(Host 3)	1880	31.0	Dipole Ant.	27.2	4.6	1.0	30.8	33	Pass
TM1(Host 3)	1909.8	31.0	Dipole Ant.	26.9	4.8	1.0	30.7	33	Pass
TM2(Host 3)	1850.2	26.4	Dipole Ant.	22.6	4.6	1.0	26.2	33	Pass
TM2(Host 3)	1880	26.5	Dipole Ant.	22.7	4.6	1.0	26.3	33	Pass
TM2(Host 3)	1909.8	26.5	Dipole Ant.	22.6	4.8	1.0	26.4	33	Pass

Note: a, For get the EIRP (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

NOTE: SGP- Signal Generator Level

b, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 200kHz for TM1 and TM2..

6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.

6.2 Conducted Power of Transmitter

6.2.1 Test Conditions

Table 17 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	52 %
Test Configurations:	TM1/TM2 at frequency Bottom、 Middle、 Top

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 2.1047 and part 24 subpart E

6.2.2.2 Supporting Standards

Table 18 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V5.4.0.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;

6.2.2.3 Limits

Compliance with part 24.232, in no any case may the peak power of a mobile station transmitter exceed 2 W. The calculated longitude EIRP by following formula:

$$EIRP(dBm) = 10 \cdot \log(EIRP_{in\ mWts}).$$

And for conducted power, we can use Antenna Gain to calculate the limit. So the conducted power:

$$P_{cod.}(dBm) = EIRP(dBm) - Gain(dBi).$$

and $Gain(dBi) = Gain(dBd) + 2.15dB$

Table 19 Limits

Maximum Output Power (Watts)	< 2
Antenna Gain(dBi):	3
Maximum Conducted Output Power (dBm)	<30

6.2.3 Test Method and Setup

(a)For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, Conducted maximum power shall be measured when the transmitter is adjusted in

accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the HUAWEI E170 USB STICK to the wireless communication tester CMU200 via the antenna connector. The band class is set as US Cellular.
 (b)Test the Conducted maximum output power by the CMU200.

Test setup

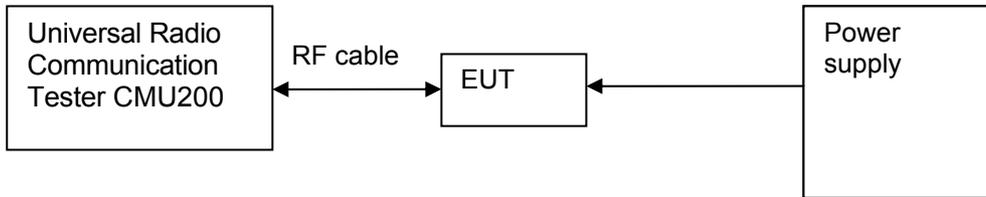


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 20 Measurement Results

TEST CONDITIONS		RF Output Power(Conducted)					
		Channel512(B) 1850.2MHz		Channel661 (M) 1880MHz		Channel810(T) 1909.8MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T _{nom} (25 °C)	28.9	30	28.6	30	28.7	30
	V _{nom} (5.0V)						
TM2	T _{nom} (25 °C)	24.7	30	24.8	30	24.8	30
	V _{nom} (5.0V)						

6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.

