FCC Test Report

Product Name: Wireless Gateway

Model Number: HUAWEI B933

Report No: SYBH(R)012112008EB -3
FCC ID: QISB933VERC

Reliability Laboratory of Huawei Technologies Co., Ltd.

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REPORT ON **FCC Test of HUAWEI B933 Wireless Gateway**
M/N: HUAWEI B933

Report No: SYBH(R) 012112008EB-3

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

FCC CFR47 Part 24: Subpart E;

Final Judgement: Pass

General Manager	**2008.10.23**	张兴海	
	Date	Name	signature
Technical Responsibility For Area of Testing	**2008.10.19**	余　辉	
	Date	Name	signature
Test Lab Engineer	**2008.10.17**	胡　俊	
	Date	Name	signature

Contents

1 Summary

The table below summarizes the measurements and results for the HUAWEI B933 Wireless Gateway. 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 B933 Wireless Gateway is subscriber equipment in the UMTS/GSM system, it also provides wireless Internet accessing function, routing function, and network address translation (NAT) function. The WCDMA frequency is Band I/II/V. The GSM/GPRS/EDGE frequency band includes GSM850, EGSM900, DCS1800 and PCS1900, the WLAN frequency is 2.4G , but only 850MHz & 1900MHz band and WCDMA Band II & V's test data are included in this report , Externally it provides one Power interface to adapter, one USIM card interface, one RJ11 interface (to connect to fixed telephone), one RJ45 interfaces (to connect to pc), and one external antenna interface for WCDMA. B933 implements such functions as RF signal receiving/transmitting, HSDPA/WCDMA and EDGE/GPRS/GSM protocol processing, data service, etc. One 10/100 M bit/s high-speed Ethernet interfaces are provided at the LAN side. The voice service by directly connecting a telephone is supported.

2.1.2 Support function and Service

The HUAWEI B933 Wireless Gateway support the function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
Voice and data	Modulation: GMSK	TM1	GPRS/GSM
Data	Modulation: 8PSK	TM2	EDGE
Data	Modulation: QPSK	TM3	WCDMA

Note: * The specified GPRS test conditions & settings are defined in 3GPP TS51.010 V5.4.0, the EDGE test conditions & settings are defined in 3GPP TS51.010 V5.4.0 and the WCDMA test conditions & settings are defined in 3GPP TS 34.121 V7.5.0:2007

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

3.1 Testing Period

The test have been performed during the period of

Oct. 06, 2008 – Oct. 16, 2008

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	WCDMA
Channel spacing	200 kHz	200 kHz
Channel separation:	200 kHz	5 MHz

4.1.3 Type of Emission

Table 6 Type of Emission

	GPRS/GSM	EDGE	WCDMA
Emission Designation:	300KGXW	300KG7W	5M00F9W

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:	+ 45 °C
Relative Humidity:	5%-95%RH

4.1.5 Power Source

Table 8 Power Source

AC voltage nominal:	~120V
AC voltage range	~100V-240V
AC current maximal:	0.5A

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 of RF IC in the final stage is:

Table 9 Applied RF module DC Voltages and Currents

Voltage:	⎓ 3.85V
Current:	2A 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

B933 Wireless Gateway			
B933			
Board and Module			
Equipment Designation / Description	Hardware Version	Serial Number	Remarks
MAINBOARD	WLB1TIPU	020MFD108A800219	B933

4.2.2 Adapter Technical Data

AC/DCAdapter Model	UE15W1-050200SPAV
Manufacturer	DONGGUAN SHILONGFUHUA CO.,LTD
Input Voltage	100-240V ~50/60Hz 0.5 A
Output Voltage	5V ⎓ 2A
Rated Power	<9W
S/N	UEP7328002672

4.2.3 FCC Identification

Grantee Code: **QIS**
Product Code: **B933VERC**
FCC Identification: **QISB933VERC**

5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	08.23.2009
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	08.23.2009
Receiver	R&S	ESIB 26	100318	05.29.2009
Receiver	R&S	ESCS30	830245/018	05.29.2009
Pre-Amplifier	Agilent	8447D	2944A10146	05.21.2009
Pre-Amplifier	Agilent	83017A	3950M00246	09.04.2009
Loop Antenna	Schwarzbeck	FMZB1516	1516115	07.20.2009
BiLog Antenna	Schaffner	CBL 6112B	2536	09.25.2009
Horn Antenna	ETS-Lindgren	3117	00062533	07.05.2009
Horn Antenna	ETS-Lindgren	3116	00031541	07.20.2009
Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	08.27.2009
Signal Generator	R&S	SMT06	830264/009	09.29.2009
Signal Generator	R&S	SMU200A	3605062516	10.08.2009
Signal Generator	R&S	SMR 40	100325	12.09.2009
Power Supply	Keithley	2306	1045337	07.20.2009
Climate Chamber	WEISS	ACS-1	3604040034	08.14.2009
Universal Radio Communication Tester	R&S	CMU200	108035	07.04.2009
Wireless communication test set	Agilent	8960	GB43461081	07.15.2009
Power Splitter	Agilent	11667B	3586M000159	07.20.2009
Spectrum Analyzer	Agilent	E4440A	N/A	09.26.2009

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/TM3 at frequency B,M,T

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 V6.1.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.1.2.3 Limits

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

Table 14 Limits

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

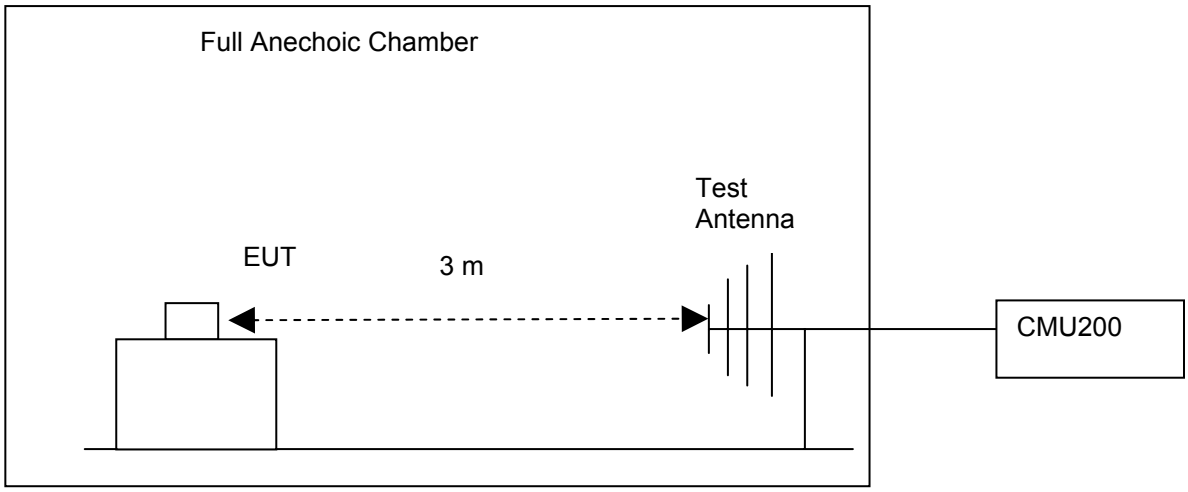
6.1.3 Test Method and Setup

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP 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 Wireless Gateway to the wireless communication tester R&S CMU200 via the air interface. The band class 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 CMU200, 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

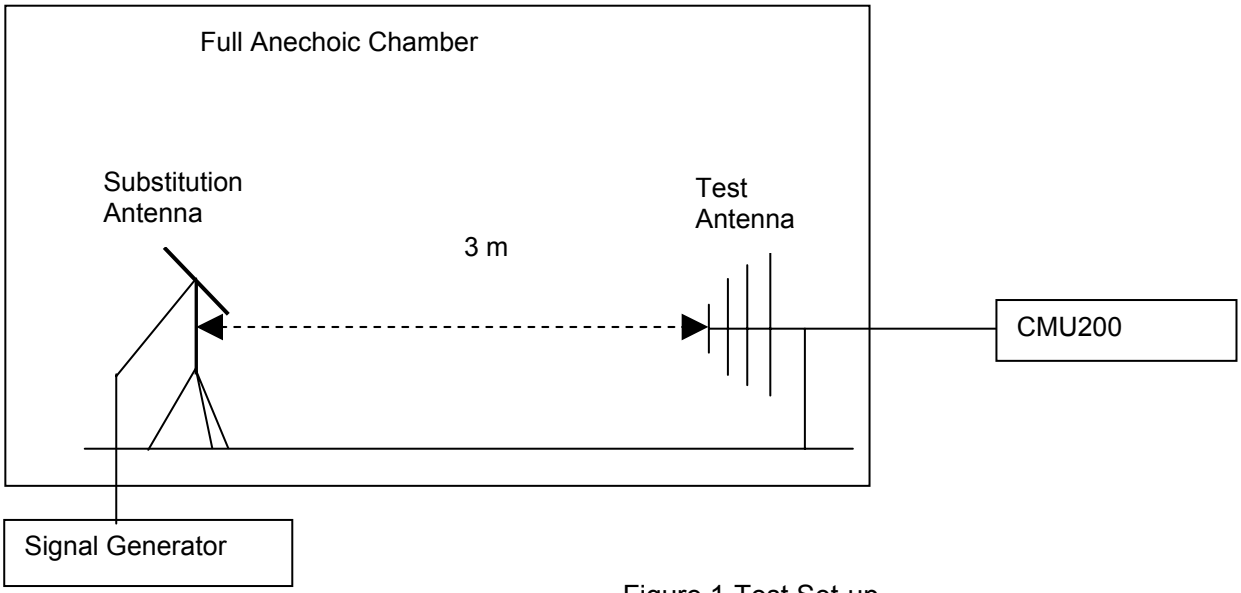


Figure 1.Test Set-up

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).

6.1.4 Measurement Results

6.1.4.1 Pre-test Results

Table 15 Measurement Results

		RF Output Power (EIRP)					
TEST CONDITIONS		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) V_{nom} (5V)	31.75	33	31.76	33	31.76	33
TM2	T_{nom} (25 °C) V_{nom} (5V)	27.95	33	27.57	33	27.65	33
TEST CONDITIONS		Channel9262(B) 1852.4MHz		Channel9400(M) 1880MHz		Channel9538(T) 1907.6MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM3	T_{nom} (25 °C) V_{nom} (5V)	23.13	33	22.87	33	22.96	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	1850.2	31.75	Dipole Ant.	28.18	4.6	1.0	31.78	33	Pass
TM1	1880.0	31.76	Dipole Ant.	28.15	4.6	1.0	31.75	33	Pass
TM1	1909.8	31.76	Dipole Ant.	27.97	4.8	1.0	31.77	33	Pass
TM2	1850.2	27.95	Dipole Ant.	24.24	4.6	1.0	27.84	33	Pass
TM2	1880.0	27.57	Dipole Ant.	23.87	4.6	1.0	27.47	33	Pass
TM2	1909.8	27.65	Dipole Ant.	23.33	4.8	1.0	27.13	33	Pass
TM3	1852.4	23.13	Dipole	19.66	4.6	1.0	23.26	33	Pass

			Ant.						
TM3	1880.0	22.87	Dipole Ant.	19.17	4.6	1.0	22.77	33	Pass
TM3	1907.6	22.96	Dipole Ant.	19.26	4.8	1.0	23.06	33	Pass

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

EIRP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBi]

NOTE: SGP- Signal Generator Level

b, A WCDMA signal with bandwidth of 5MHz and a GSM/GPRS/EDGE signal with bandwidth of 200kHz are created by the vector generator R&S SMU200A.

c, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 200kHz for TM1/TM2 and 5MHz for TM3.

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/TM3 at frequency B,M,T

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 V6.1.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

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*log ($EIRP_{in\ mW}$).

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 Watts（33dBm）
Antenna Gain(dBi):	2.5
Maximum Conducted Output Power (dBm)	< 30.5dBm

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 Wireless Gateway 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

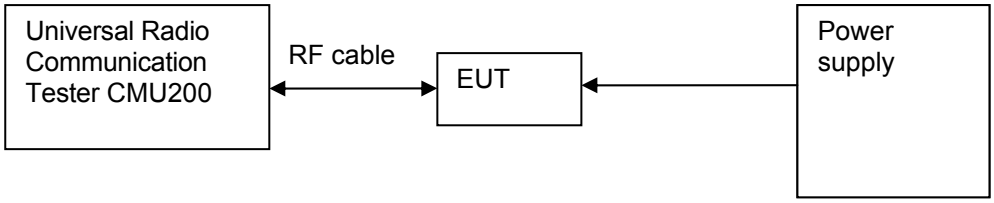


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 20 Measurement Results

		RF Output Power(Conducted)					
TEST CONDITIONS		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) V_{nom} (5V)	29.23	30.5	29.28	30.5	29.25	30.5
TM2	T_{nom} (25 °C) V_{nom} (5V)	25.45	30.5	25.22	30.5	25.41	30.5
TEST CONDITIONS		Channel9262(B) 1852.4MHz		Channel9400(M) 1880MHz		Channel9538(T) 1907.6MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM3	T_{nom} (25 °C) V_{nom} (5V)	22.01	30.5	22.04	30.5	22.02	30.5

6.2.5 Conclusion

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

6.3 Modulation Characteristics

6.3.1 Test Conditions

Table 21 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	52 %
Test Configurations:	TM1/TM2/TM3 at frequency M

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

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

6.3.2.2 Supporting Standards

Table 22 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V6.1.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.3.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and part 24 subpart E.

Table 23 Limits

Limits	Not applicable

6.3.3 Test Method and Setup

Connect the Wireless Gateway to Universal Radio Communication Tester CMU200 via the antenna connector. The frequency band is set as PCS; the Wireless Gateway's output is matched with 50 Ω load, test method was according to 3GPP TS 51.010 and TS 34.121. The waveform quality and constellation of the Wireless Gateway was tested.

Test setup

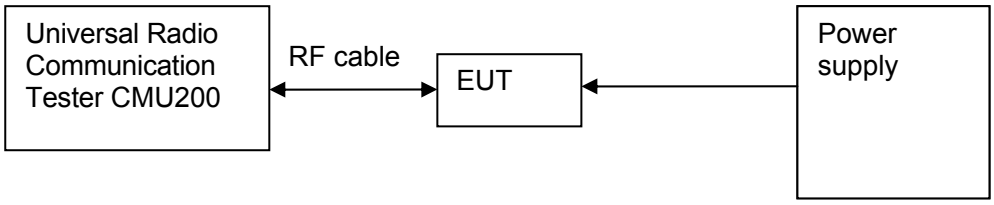


Figure 3.Test Set-up

6.3.4 Measurement Results

Table 24Measurement Results

		Modulation Characteristic	
TEST CONDITIONS		Channel661(M) 1880MHz	
		Measured	
		TM1	TM2
T_{nom} (25 °C)	V_{nom} (5V)	Refer to Appendix A	Refer to Appendix A
		Modulation Characteristic	
TEST CONDITIONS		Channel9400(M) 1880MHz	
		Measured	
		TM3	
T_{nom} (25 °C)	V_{nom} (5V)	Refer to Appendix A	

6.3.5 Conclusion

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

For the measurement results refer to appendix A.

6.4 Occupied Bandwidth

6.4.1 Test Conditions

Table 25 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency B, M, T

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 2.1049 and part 24 subpart E

6.4.2.2 Supporting Standards

Table 26 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V6.1.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.4.2.3 Limits

No specific occupied bandwidth requirement in part 24 subpart E, but the occupied bandwidth was defined in part 2.1049: the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

Table 27 Limits

Upper /lower frequency limits	0.5% of the mean power

6.4.3 Test Method and Setup

Wireless Gateway was connected to the Spectrum Analyzer AGILENT E4440A via the one RF connector. The band class is set as PCS; The EUT was controlled to transmit maximum power. Measure and record the occupied bandwidth of the EUT by the AGILENT E4440A.

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

Refer to 47CFR part2.1049 section (g)&(h).
(g) Transmitter in which the modulating base band comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The

level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.
(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudorandom generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

For TM1/TM2 following RBW and VBW are employed:
Measurement bandwidth (RBW): 3 kHz (Resolution bandwidth)
Video bandwidth (VBW): 10 kHz

For TM3 system following RBW and VBW are employed:
Measurement bandwidth (RBW): 51 kHz (Resolution bandwidth)
Video bandwidth (VBW): 510 kHz

Test Set-up

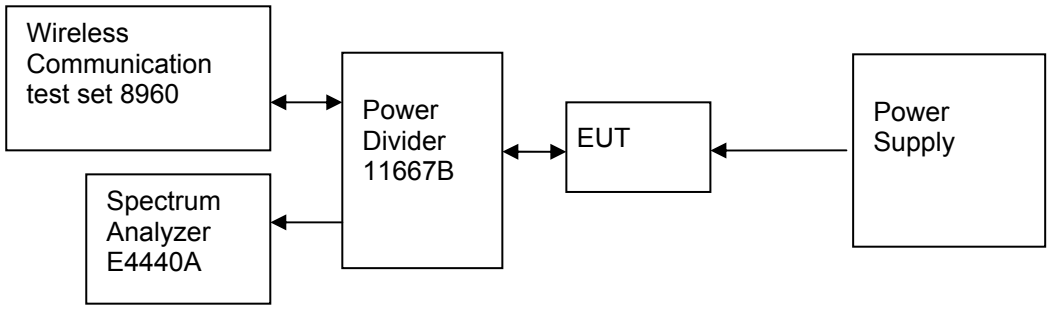


Figure 4.Test Set-up

6.4.4 Measurement Results

Table 28 Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel512 (B) 1850.2MHz		Channel661 (M) 1880MHz		Channel810 (T) 1909.8MHz	
		Measured (kHz)		Measured (kHz)		Measured (kHz)	
		TM1	TM2	TM1	TM2	TM1	TM2
T_{nom} (25 °C) V_{nom} (5V)	99%	244.29	253.02	245.55	244.46	247.72	240.57
TEST CONDITIONS		Occupied Bandwidth					
		Channel9262(B) 1852.4MHz		Channel9400(M) 1880MHz		Channel9538 (T) 1907.6MHz	
		Measured		Measured		Measured	

		(MHz)	(MHz)	(MHz)
		TM3	TM3	TM3
T_{nom} (25 °C) V_{nom} (5V)	99%	4.182	4.214	4.163

6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix B.

6.5 Band Edges Compliance

6.5.1 Test Conditions

Table 29 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency B,T

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.5.2.2 Supporting Standards

Table 30 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V6.1.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.5.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P（W）. (Whereas P is the rated power of the EUT).

Table 31 Limits for GPRS

	TM1	TM2	TM3
Rated Power:	30 dBm	26 dBm	24 dBm
Required attenuation:	43+10log (1) = 43 , 30 dBm - 43 dB	43+10log (0.4) = 39 , 26 dBm - 39 dB	43+10log (0.25) = 37 , 24 dBm - 37 dB
Absolute level	- 13 dBm	- 13 dBm	- 13 dBm

6.5.3 Test Method and Setup

The EUT was connected to the Spectrum Analyzer AGILENT E4440A via the one RF connector, the band class is set as PCS. The EUT was controlled to transmit maximum power. Measure and record band edges compliance of the EUT by the AGILENT E4440A.

The limit is -13dBm.

For TM1/TM2 following RBW and VBW are employed:
Measurement bandwidth (RBW): 3 kHz (Resolution bandwidth)
Video bandwidth (VBW): 10 kHz

For TM3 system following RBW and VBW are employed:
Measurement bandwidth (RBW): 51 kHz (Resolution bandwidth)
Video bandwidth (VBW): 200 kHz

Test Set-up

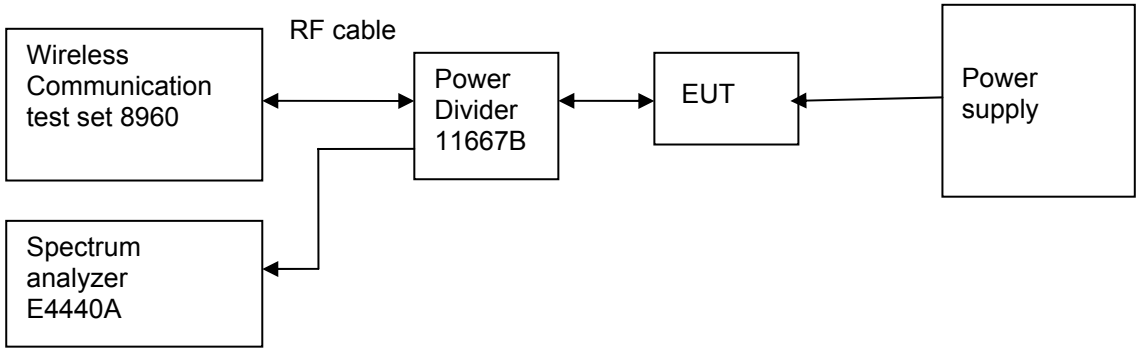


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 32 Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Spurious Level measured [dBm]	FCC limit	Result
PCS	T_{nom} (25 °C), V_{nom} (5V)					
	1850.2	512	TM1	<-13(See appendix C)	- 13 dBm	Pass
	1909.8	810	TM1	<-13(See appendix C)	- 13 dBm	Pass
	1850.2	512	TM2	<-13(See appendix C)	- 13 dBm	Pass
	1909.8	810	TM2	<-13(See appendix C)	- 13 dBm	Pass
	1852.4	9262	TM3	<-13(See appendix C)	- 13 dBm	Pass
	1907.6	9538	TM3	<-13(See appendix C)	- 13 dBm	Pass

6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix C.

6.6 Spurious Emission at Antenna Terminal

6.6.1 Test Conditions

Table 33 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	50 %
Test Configurations:	TM1/TM2/TM3 at frequency B, M ,T

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 24.238

6.6.2.2 Supporting Standards

Table 34 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V6.1.0:2005	Recommended GSM/EDGE MS conformance specification
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.6.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least 43 +10 $\log_{10}$ P. (Whereas P is the rated power of the EUT).

Table 35 Limits for GPRS Mode

	TM1	TM2	TM3
Rated Power:	30 dBm	26 dBm	24 dBm
Required attenuation:	43+10log (1) = 43 , 30 dBm - 43 dB	43+10log (0.4) = 39 , 26 dBm - 39 dB	43+10log (0.25) = 37 , 24 dBm - 37 dB
Absolute level	- 13 dBm	- 13 dBm	- 13 dBm

6.6.3 Test Method and Setup

The EUT was connected to the Spectrum analyzer AGILENT E4440A via the one RF connector, the band class is set as PCS. The EUT was controlled to transmit maximum power. Measure and record the Conducted Spurious Emission of the EUT by the AGILENT E4440A.

According to part 24.238, the defined measurement bandwidth as following:

24.238 (b) Measurement procedure: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz;
Measurement bandwidth (RBW) for 150 kHz up to 30MHz: 10 kHz;
Measurement bandwidth (RBW) for 30 MHz up to 20GHz: 1MHz;

Test Set-up

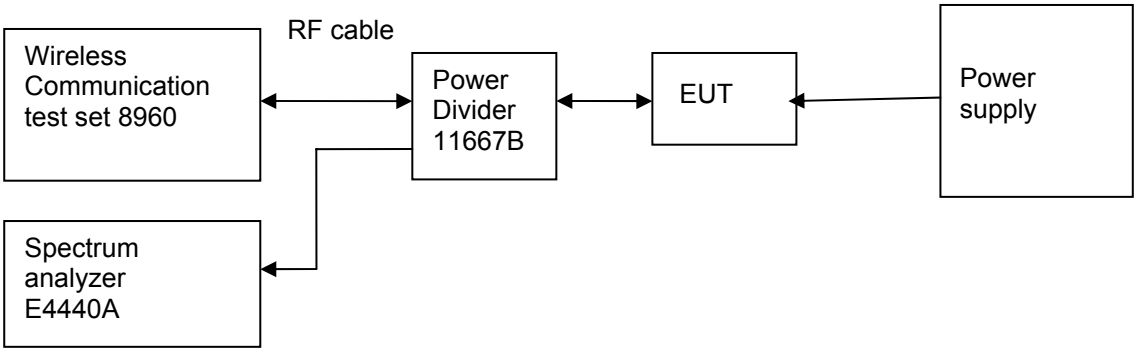


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 36 Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Output Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 512(B)	TM1	9 kHz~20GHz	30	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM2	9 kHz~20GHz	26	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 9262(B)	TM3	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 661(M)	TM1	9 kHz~20GHz	30	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM2	9 kHz~20GHz	26	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 9400(M)	TM3	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 810(T)	TM1	9 kHz~20GHz	30	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM2	9 kHz~20GHz	26	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel	TM3	9 kHz~20GHz	24	<- 13 dBm	- 13	Pass

9538(T)				(See appendix D)	dBm	

6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix D.

6.7 Frequency Stability

6.7.1 Test Conditions

Table 37 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 % at 25 °C
Test Configurations:	TM1/TM2/TM3 at frequency M

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 2.1055 and part 24.235

6.7.2.2 Supporting Standards

Table 38 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V6.1.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V7.5.0:2007	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

6.7.2.3 Limits

No specific frequency stability requirement in part 2.1055 and part 24.235.

6.7.3 Test Method and Setup

The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From -30 ° to +50 ° centigrade for all equipment except that specified in subparagraphs
(2) and (3) of paragraph 2.1055

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10^{o} centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter

keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.
(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)
The EUT can only work in such extreme voltage 4.75V and 5.6V，so here the EUT is tested in the 4.75V and 5.6V

Test Set up

Connect the EUT to the Wireless Communication test set 8960 via the connector. Then measure the frequency error by the Wireless Communication test set 8960. The EUT's output is matched with a 50 Ω load.

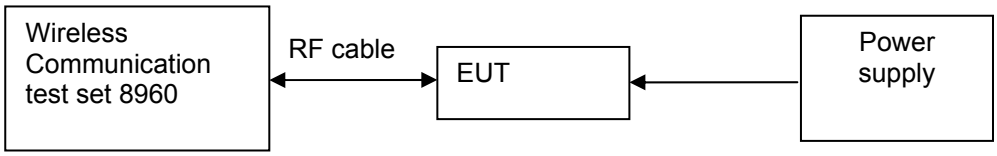


Figure 7. Test Set up

6.7.4 Measurement Results

6.7.4.1 Measurement Results vs. Variation of Temperature

- **TM1, 5V DC Channel No.661(1880.0MHz)**

Table 39 Measurement Results vs. Variation of Temperature

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	30	1880.0	8	Pass
-20 °C	30	1880.0	11	Pass
-10 °C	30	1880.0	15	Pass
0 °C	30	1880.0	7	Pass
+10 °C	30	1880.0	11	Pass
+20 °C	30	1880.0	7	Pass
+30 °C	30	1880.0	20	Pass
+40 °C	30	1880.0	5	Pass
+50 °C	30	1880.0	8	Pass

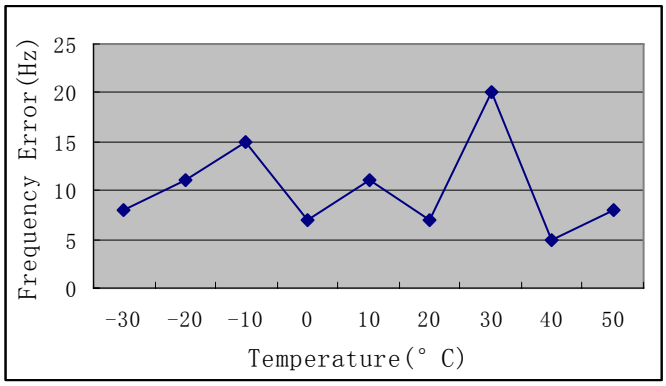


Figure 8. TM1 Test Graph

- **TM2, 5V DC Channel No.661(1880.0MHz)**

Table 40 Measurement Results vs. Variation of Temperature

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	26	1880.0	-3	Pass
-20 °C	26	1880.0	3	Pass
-10 °C	26	1880.0	9	Pass
0 °C	26	1880.0	11	Pass
+10 °C	26	1880.0	18	Pass
+20 °C	26	1880.0	16	Pass
+30 °C	26	1880.0	25	Pass
+40 °C	26	1880.0	11	Pass
+50 °C	26	1880.0	15	Pass

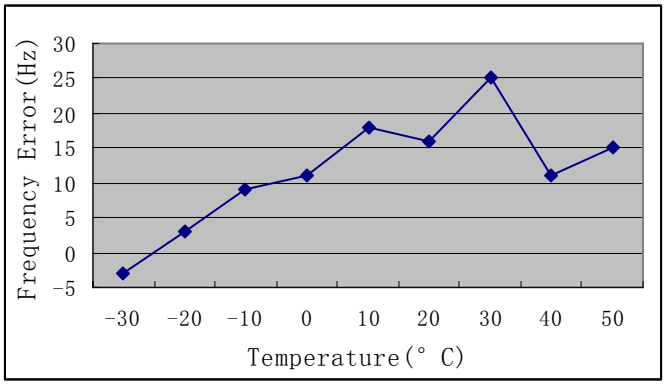


Figure 9. TM2 Test Graph

- **TM3, 5V DC Channel No.9400(1880.0MHz)**

Table 41 Measurement Results vs. Variation of Temperature

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	1880.0	-4	Pass

-20 °C	24	1880.0	6	Pass
-10 °C	24	1880.0	9	Pass
0 °C	24	1880.0	11	Pass
+10 °C	24	1880.0	8	Pass
+20 °C	24	1880.0	18	Pass
+30 °C	24	1880.0	7	Pass
+40 °C	24	1880.0	25	Pass
+50 °C	24	1880.0	13	Pass

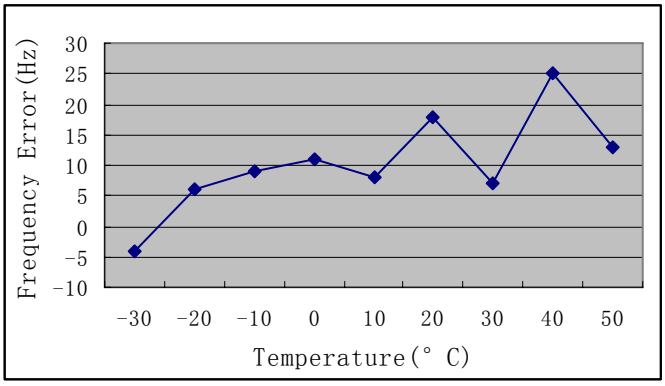


Figure 10. TM3 Test Graph

6.7.4.2 Measurement Results vs. Variation of Voltage

- **TM1, 25 °C ,Channel No. 661(1880.0MHz)**

Table 42 Measurement Results vs. Variation of Voltage

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
4.75	30	1880.0	7	Pass
5	30	1880.0	6	Pass
5.6	30	1880.0	9	Pass

- **TM2, 25 °C ,Channel No. 661(1880.0MHz)**

Table 43 Measurement Results vs. Variation of Voltage

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
4.75	26	1880.0	12	Pass
5	26	1880.0	11	Pass
5.6	26	1880.0	10	Pass

- **TM3, 25 °C ,Channel No. 9400(1880.0MHz)**

Table 44 Measurement Results vs. Variation of Voltage

Voltage	Power	Nominal	Measured Frequency	Result

	(dBm)	Frequency (MHz)	Error(Hz)	
4.75	24	1880.0	11	Pass
5	24	1880.0	13	Pass
5.6	24	1880.0	9	Pass

6.7.5 Conclusion

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

7 System Measurement Uncertainty

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

Table 45 System Measurement Uncertainty

Items		Extended Uncertainty
Effective Isotropically Radiated Power of Transmitter	EIRP (dBm)	U=3dB; k=2
Band Width	Magnitude (%)	U=0.2%; k=2
Band Edge Compliance	Disturbance Power（dBm）	U=2.0dB; k=2
Conducted Spurious Emission at Antenna Terminal	Disturbance Power（dBm）	U=2.0dB; k=2
Frequency Stability	Frequency Accuracy(ppm)	U=0.21ppm; k=2

8 Appendices

Appendix A	Measurement Results Modulation Characteristics	4 pages
Appendix B	Measurement Results Occupied Bandwidth	10 pages
Appendix C	Measurement Results Band Edges Compliance	7 pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	28 pages