



FCC Test Report

Product Name: IDEOS S7 Slim

Model Number: S7-202u

Report No: SYBH(Z-RF)027032011-2005

FCC ID: QISS7-202U

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Notice

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REPORT ON **FCC 47CFR part 15 subpart C Test of IDEOS S7 Slim**

M/N: S7-202U

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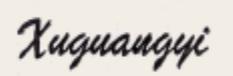
FCC ID: QISS7-202U

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

FCC CFR47 Part 15: Subpart C;

CONCLUSION **Pass**

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1 Summary

The table below summarizes the measurements and results for the EUT. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	Description	Result
15.247 (a) (1)	20dB bandwidth measurement	PASS
15.247 (a) (1)	Carrier frequency separation measurement	PASS
15.247 (a) (1) III	Number of hopping channel	PASS
15.247 (a) (1) III	Time of occupancy	PASS
15.247 (b) (1)	Peak output power	PASS
15.247 (d)	Band edge compliance measurement	PASS
15.247 (d)	Conducted RF spurious	PASS
15.247 (d) / 15.205 & 15.209	Radiated spurious emission & Radiated restricted band measurement	PASS
15.207	Conducted emission test for power port	PASS



2 Product Description

2.1 Production Information

2.1.1 General Description

The S7 supports wireless interfaces such as Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), Enhanced Data rates for GSM Evolution (EDGE), Universal Mobile Telecommunications System (UMTS), High-Speed Downlink Packet Access (HSDPA), and High-Speed Uplink Packet Access (HSUPA) interfaces and provides services such as Short Message Service (SMS), Multimedia Messaging Service (MMS), voice, and data transmission services. **Support function and Service**

The EUT support the Bluetooth's function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
Data and Voice	Modulation: $\pi/4$ -DQPSK, 8DPSK	TM1	/

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

Mar.01, 2011 to Mar.02, 2011

3.2 General Set up Description

The Bluetooth hopping frequency system of EUT can Support 2.4GHz Band. For compliance with FCC regulation 47CFR part15 subpart C, we set the mobile phone as following test mode to do all compliance tests.

Bluetooth MODE:

TM1: $\pi/4$ -DQPSK,8DPSK Modulation



4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	2400 to 2483.5 MHz	
Downlink band:	2400 to 2483.5 MHz	
Hop frequency support:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

Channel spacing:	1 MHz
Channel separation:	1 MHz

4.1.3 Type of Emission

Table 6 Type of Emission

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

4.1.4 Antenna Information

Table 7 Antenna Information

Type:	Integrated / Internal
Maximum Gain(dBi):	0.5 (from 2400MHz to 2500MHz)

4.1.5 Environmental Requirements

Table 8 Environmental Requirements

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

4.1.6 Power Source

Table 9 Power Source

DC voltage nominal:	 3.7V;
DC voltage range	 3.6-4.2V
DC current maximal:	2A

4.1.7 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.

4.1.8 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 10 Applied RF module DC Voltages and Currents

Voltage:	 +2.8V
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 11 Board Information

IDEOS S7 Slim		
S7-202u		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
S7-202u	S3J6TA1111200075	HIDS70IM

4.2.2 Battery Technical Data

Table 12 Battery Technical Data

Battery Model:	HB4G1H
Rated capacity:	3250mAh
Nominal Voltage:	≡≡≡ 3.7V
Charging Voltage:	≡≡≡ 4.2V

4.2.3 FCC Identification

Grantee Code: QIS
 Product Code: S7-202u
 FCC Identification: QISS7-202U



5 Main Test Instruments

Table 13 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2011
Universal Radio Communication Tester	R&S	CMU200	105822	Oct.24.2011
Wireless Communication Test set	Agilent	N4010A	MY49081592	Dec.14.2011
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug.04,2011
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.24,2011
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2011
Temperature Chamber	WEISS	WKL64	24600294	Jan.03,2012
Signal generator	Agilent	E8257D	MY49281095	Jul.9.2011
Vector Signal Generator	R&S	SMU200A	104162	Sep.07,2011
Test receiver	R&S	ESIB26	100318	May.04.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	919/1009	Dec.13.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	Dec.13.2011
Horn Antenna	R & S	HF906	359287/005	May.07, 2011
Horn Antenna	R & S	HF906	359287/006	April.27, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2536	Sep.21, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2941	Jun.11, 2011
Horn Antenna	ETS-LINDGREN	3160	60008	Sep.20.2011
Horn Antenna	ETS-LINDGREN	3160	60006	Oct.27.2011



6 Transmitter Measurements

6.1 20dB bandwidth measurement

6.1.1 Test Conditions

Table 14 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	76%
Test Configurations:	TM1 at channel No.0, 40, 78

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) and DA 00-705

6.1.2.2 Supporting Standards

Table 15 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.1.2.3 Limits

Not Applicable.

6.1.3 Test Method and Setup

- (a) Connect test port of mobile phone to universal communication tester.
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number and test the 20dB bandwidth with universal communication tester.

Test setup

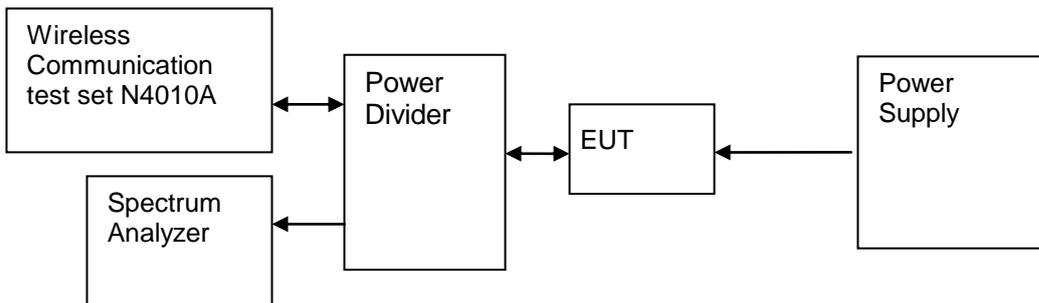


Figure 1. Test Set-up

6.1.4 Measurement Results

Table 16 Measurement Results(Modulation: $\pi/4$ -DQPSK)

Bandwidth Type	Channel Position	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
20dB	B	0	2.402	1.276	Pass
20dB	M	40	2.442	1.285	Pass
20dB	T	78	2.480	1.292	Pass

Table 17 Measurement Results (Modulation: 8DPSK)

Bandwidth Type	Channel Position	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
20dB	B	0	2.402	1.281	PASS
20dB	M	40	2.442	1.280	PASS
20dB	T	78	2.480	1.283	PASS

6.1.5 Conclusion

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

6.2 Carrier frequency separation measurement

6.2.1 Test Conditions

Table 18 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1 at channel No.39, 40, 41

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) and DA 00-705

6.2.2.2 Supporting Standards

Table 19 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.2.2.3 Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Table 20 Limits Measurement Results (Modulation: $\pi/4$ -DQPSK)

Regulation:	≥ 0.025 or $2/3$ of the 20 dB bandwidth
Limit:	$\geq 2/3 \times 1.293 = 0.86$

Table 21 Limits Measurement Results (Modulation: 8DPSK)

Regulation:	≥ 0.025 or $2/3$ of the 20 dB bandwidth
Limit:	$2/3 \times 1.297 = 0.86$

6.2.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number to two adjacent channels separately and test the carrier frequency separation with spectrum analyzer.

Test setup

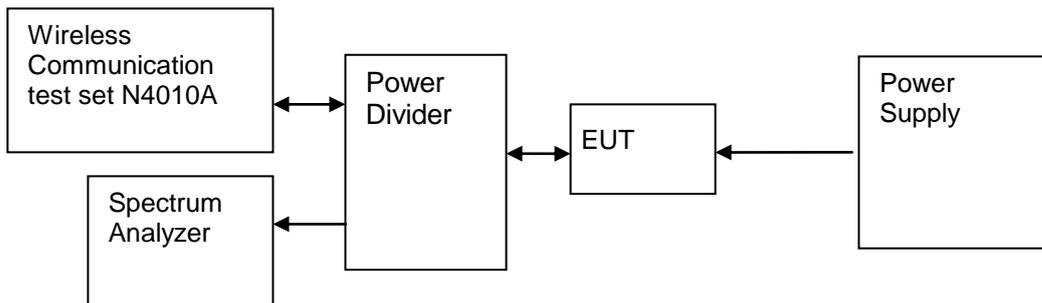


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 22 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Channel No.	Frequency [GHz]	Channel No.	Frequency [GHz]	Measured frequency separation [MHz]	Limit [MHz]	Result
40	2.442	39	2.441	0.95	≥ 0.86	Pass
40	2.442	41	2.443	1.05	≥ 0.86	Pass

Table 23 Measurement Results (Modulation: 8DPSK)

Channel No.	Frequency [GHz]	Channel No.	Frequency [GHz]	Measured frequency separation [MHz]	Limit [MHz]	Result
40	2.442	39	2.441	1.0	≥ 0.86	PASS
40	2.442	41	2.443	1.1	≥ 0.86	PASS

6.2.5 Conclusion

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

6.3 Number of hopping channel

6.3.1 Test Conditions

Table 24 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	22 °C
Relative humidity:	56%
Test Configurations:	TM1 at hopping frequency state

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) iii and DA 00-705

6.3.2.2 Supporting Standards

Table 25 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.3.2.3 Limits

Number of hopping channel should be compliance with the requirements in part15.247 (a) (1) iii.

Table 26 Limits

Limits	≥ 15 hopping frequency channel
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6.3.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch on frequency hopping function, then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.
- (c) Count the quantity of peaks to get the number of hopping channels.

Test setup

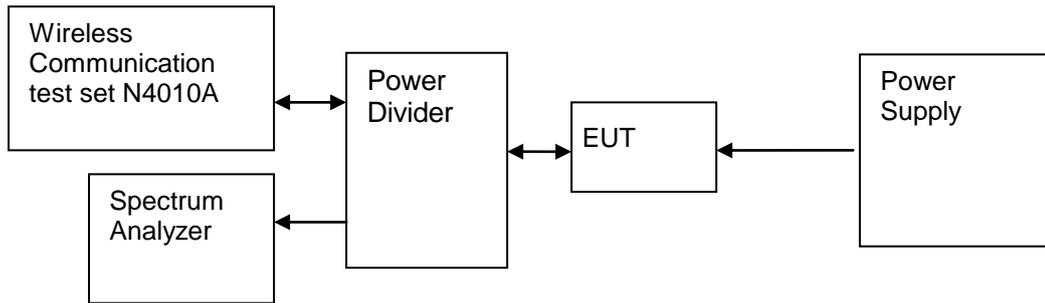


Figure 3. Test Set-up

6.3.4 Measurement Results

Table 27 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Measured frequency range [MHz]	Channel No. range	Measured Channel No.	Limit	Result
2400 to 2483.5	0-78	79	≥ 15	Pass

Table 28 Measurement Results (Modulation: 8DPSK)

Measured frequency range [MHz]	Channel No. range	Measured Channel No.	Limit	Result
2400 to 2483.5	0-78	79	≥ 15	Pass

6.3.5 Conclusion

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

6.4 Time of occupancy

6.4.1 Test Conditions

Table 29 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	TM1 at hopping frequency state

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) iii and DA 00-705

6.4.2.2 Supporting Standards

Table 30 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.4.2.3 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Table 31 Limits

Limits for time of occupancy	$\leq 0.4s$
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6.4.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
- (c) Set the span of spectrum analyzer to 0 Hz, and set the resolution bandwidth to 1 MHz and the video bandwidth to 1 MHz, then get the time domain measured diagram. and set sweep time to 2 times of one burst occupancy time, and measure the time of occupancy of one burst.
- (d) Set the resolution bandwidth to 1 MHz and the video bandwidth to 3 MHz, and set the sweep time to a period (0.4 seconds multiplied by the number of hopping channels employed), and count the number of the bursts.
- (e) Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts.

Test setup

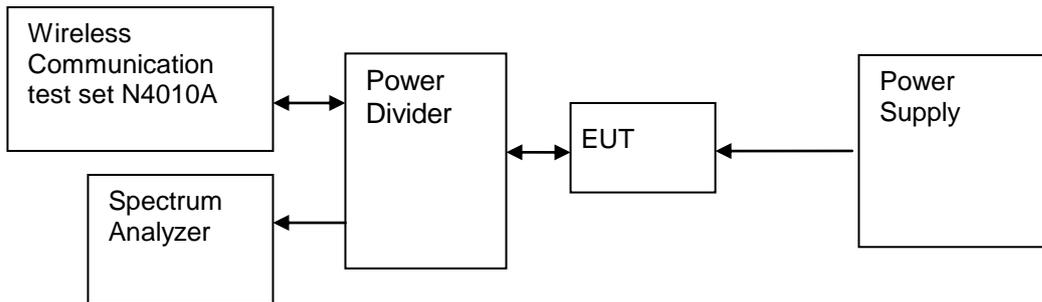


Figure 4. Test Set-up

6.4.4 Measurement Results

Table 32 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Time of Single Slot [ms]	Numbers of slots in a period	Time of occupied in a period [s]	Limit [s]	Result
3	106.7	0.3201	≤ 0.4	Pass

Table 33 Measurement Results (Modulation: 8DPSK)

Time of Single Slot [ms]	Numbers of slots in a period	Time of occupied in a period [s]	Limit [s]	Result
3	106.7	0.3201	≤ 0.4	Pass

Note: The result is measured at 2-DH5\3-DH5 mode in $\pi/4$ -DQPSK\8DPSK modulation, which has longest time in one transmission burst.

6.4.5 Conclusion

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

6.5 Peak output power

6.5.1 Test Conditions

Table 34 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1 at channel No.0, 40, 78

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 15.247 (b) (1) and DA 00-705

6.5.2.2 Supporting Standards

Table 35 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.5.2.3 Limits

Compliance with part 15.247 (b) (1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watt.

Table 36 Limits

2.4GHz and 5.8GHz hopping frequency system	1 Watt (=30 dBm)
Other frequency hopping systems	0.125 Watts / 21 dBm

6.5.3 Test Method and Setup

- Connect test port of mobile phone to universal communication tester.
- Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- Then set the mobile phone to transmit at high, middle and low frequency and measure the conducted output power separately.

Test setup

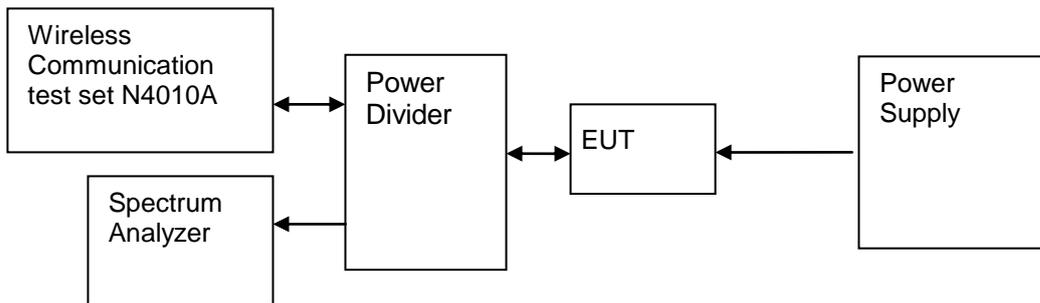


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 37 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Bottom	0	2402	4.27	< 30	Pass
Middle	40	2442	5.08	< 30	Pass
Top	78	2480	4.99	< 30	Pass

Table 38 Measurement Results (Modulation: 8DPSK)

Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Bottom	0	2402	4.28	< 30	Pass
Middle	40	2442	5.11	< 30	Pass
Top	78	2480	4.97	< 30	Pass

6.5.5 Conclusion

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

6.6 Band edge spurious emission

6.6.1 Test Conditions

Table 39 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	50%
Test Configurations:	TM1 at channel No. 0, 78 and frequency hopping state

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 15.247 (d) and DA 00-705

6.6.2.2 Supporting Standards

Table 40 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.6.2.3 Limits

Compliance with part 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

Table 41 Limits

Band edge spurious:	20 dBc/100kHz
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6.6.3 Test Method and Setup

- Connect test port of mobile phone to spectrum analyzer and universal communication tester
- Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- Then set the mobile phone to transmit at high, low frequency and measure the conducted band edge spurious separately.
- Switch on the frequency hopping function, and repeat above measurement.

Test setup

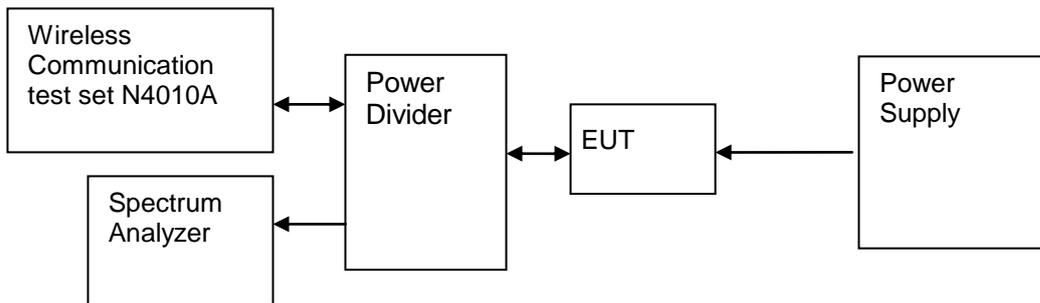


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 42 Measurement Results for Band Edge immediately outside the 2.4GHz Band
(Modulation: $\pi/4$ -DQPSK)

	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
Low Edge	0	2402	2.97	Off	-52.21	<-17.03	Pass
	-	-	2.98	On	-54.27	<-17.02	Pass
High Edge	78	2480	3.54	Off	-54.77	<-16.46	Pass
	-	-	3.15	On	-53.47	<-16.85	Pass

Table 43 Measurement Results for Band Edge immediately outside the 2.4G Band
(Modulation: 8DPSK)

	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
Low Edge	0	2402	2.96	Off	-52.48	<-17.04	Pass
	-	-	2.98	On	-54.56	<-17.02	Pass
High Edge	78	2480	3.56	Off	-54.46	<-16.44	Pass
	-	-	3.49	On	-53.82	<-16.51	Pass

6.6.5 Conclusion

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

6.7 Conducted RF spurious

6.7.1 Test Conditions

Table 44 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	53%
Test Configurations:	TM1 at channel No.0, 40, 78

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 15.247 (d) and DA 00-705

6.7.2.2 Supporting Standards

Table 45 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.7.2.3 Limits

Compliance with part 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

Table 46 Limits

Band edge spurious:	20 dBc/100kHz
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6.7.3 Test Method and Setup

- Connect test port of mobile phone to spectrum analyzer and universal communication tester
- Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- Then set the mobile phone to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.
- Switch on the frequency hopping function, and repeat above measurement.

Test setup

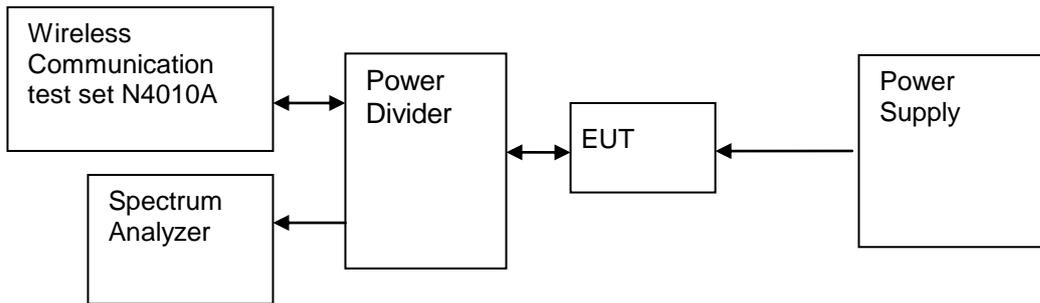


Figure 7. Test Set-up

6.7.4 Measurement Results

Table 47 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
9kHz-26GHz	0	2402	1.29	Off	-45.15	< -18.71	Pass
9kHz-26GHz	40	2442	0.5	Off	-46.16	< -19.5	Pass
9kHz-26GHz	78	2480	1.93	Off	-46.59	< -18.07	Pass

Table 48 Measurement Results (Modulation: 8DPSK)

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
9kHz-26GHz	0	2402	0.05	Off	-45.7	< -19.95	PASS
9kHz-26GHz	40	2442	1.72	Off	-46.3	< -18.28	PASS
9kHz-26GHz	78	2480	1.7	Off	-45.82	< -18.3	PASS

6.7.5 Conclusion

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

6.8 Radiated spurious emission & spurious in restricted band

6.8.1 Test Conditions

Table 49 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Enclosure
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1 at channel No.0, 40, 78

6.8.2 Test Specifications and Limits

6.8.2.1 Specification

CFR 47 (FCC) part 15.247 (d), 15.205 & 15.209 and DA 00-705

6.8.2.2 Supporting Standards

Table 50 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

6.8.2.3 Limits

According to part 15.247 (d) / 15.205 & 15.209, all spurious emission in the frequency range from 30MHz to 10th harmonics of carrier frequency should be meet the requirement of following table.

Table 51 Limits

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (meters)	Detector
30 - 88	100	40	3	QP
88 - 216	150	43.5	3	QP
216 - 960	200	46	3	QP
960 -1000	500	54	3	QP
Above 1000	500	54	3	PK

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a) (see above table).

6.8.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). 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 Test Receiver and control software.

A preliminary scan and a final scan of the emissions were made by using test script of software; the emissions were measured using a Quasi-Peak Detector below 1GHz, and AV detector above 1GHz. 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.

The EUT was communicated with the BTS simulator through Air interface. The HSPA/UMTS/GPRS/GSM/EDGE Mobile Phonetransmits maximum output power at 2.4GHz and switch off frequency hopping function.

Measurement bandwidth: 30 MHz - 1000 MHz: 120 kHz

Measurement bandwidth: 1000 MHz - 10th Carrier Frequency: 1 MHz

Test set up

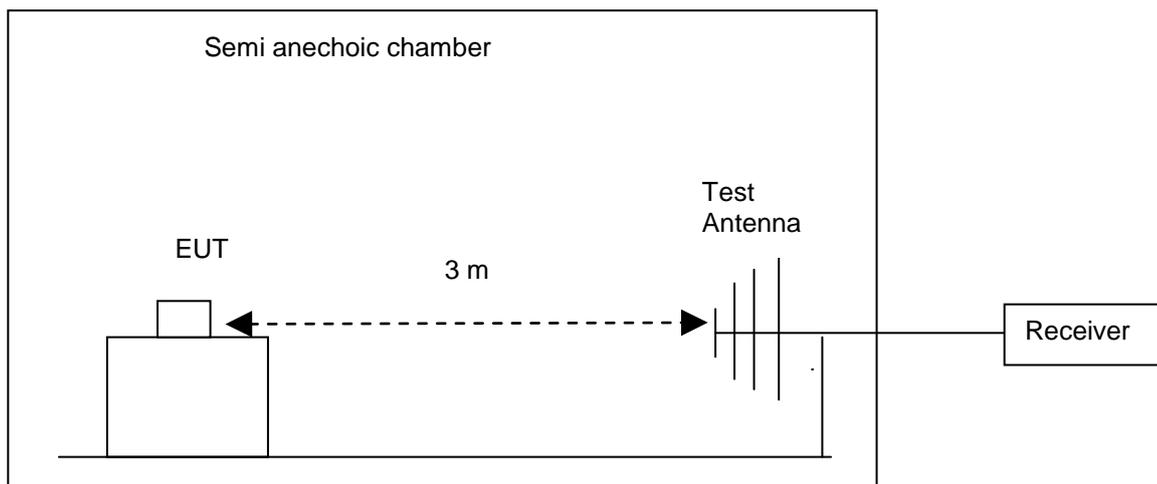


Figure 8. Test Set up



6.8.4 Measurement Results

Note: The following measurement results exceed the limit line is the carrier frequency.

Measured Result of channel: 0 (2402MHz)

Table 52 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
33.644000	18.70	11.7	40.0	21.3	150.0	343.00	VERTICAL
122.884000	29.10	10.1	43.5	14.4	118.0	78.00	VERTICAL
307.212000	34.00	15.7	46.0	12.0	100.0	47.00	HORIZONTAL
399.376000	33.90	18.2	46.0	12.1	122.0	168.00	VERTICAL
491.540000	35.60	20.0	46.0	10.4	106.0	166.00	VERTICAL
583.644000	32.80	22.2	46.0	13.2	100.0	204.00	VERTICAL
2335.000000	19.70	-11.7	54.0	34.3	150.0	47.00	VERTICAL
3868.000000	24.60	-6.5	54.0	29.4	200.0	154.00	HORIZONTAL
4796.000000	25.00	-4.1	54.0	29.0	120.0	236.00	HORIZONTAL
8503.000000	28.70	3.0	54.0	25.3	135.0	105.00	VERTICAL
9607.300000	34.80	5.1	54.0	19.2	101.0	227.00	VERTICAL
17995.000000	37.50	17.3	54.0	16.5	143.0	119.00	VERTICAL
2310.000000	38.30	33.3	54.0	15.7	148.0	82.00	VERTICAL
2390.000000	38.50	33.5	54.0	15.5	117.0	221.00	HORIZONTAL
2483.500000	38.50	33.7	54.0	15.5	110.0	76.00	HORIZONTAL
2500.000000	38.40	33.8	54.0	15.6	188.0	41.00	VERTICAL

Measured Result of channel: 40 (2442MHz)

Table 53 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
35.256000	18.60	11.8	40.0	21.4	154.0	225.00	VERTICAL
276.468000	34.30	14.9	46.0	11.7	100.0	136.00	HORIZONTAL
307.212000	32.70	15.7	46.0	13.3	100.0	128.00	HORIZONTAL
368.632000	34.30	17.4	46.0	11.7	100.0	143.00	HORIZONTAL
430.056000	33.60	18.8	46.0	12.4	101.0	181.00	VERTICAL
491.540000	35.80	20.0	46.0	10.2	101.0	149.00	VERTICAL
3189.000000	23.20	-8.2	54.0	30.8	113.0	86.00	HORIZONTAL
4887.000000	27.80	-3.7	54.0	26.2	141.0	44.00	HORIZONTAL
7012.500000	27.30	0.0	54.0	26.7	125.0	321.00	HORIZONTAL
9769.000000	32.40	5.1	54.0	21.6	107.0	57.00	VERTICAL
14710.000000	34.50	11.7	54.0	19.5	122.0	243.00	VERTICAL
17987.500000	37.30	17.2	54.0	16.7	168.0	197.00	VERTICAL
2310.000000	38.00	33.3	54.0	16.0	112.0	47.00	VERTICAL
2390.000000	38.40	33.5	54.0	15.6	92.0	182.00	HORIZONTAL



							L
2483.500000	38.50	33.7	54.0	15.5	102.0	261.00	HORIZONTAL
2500.000000	38.40	33.8	54.0	15.6	155.0	59.00	VERTICAL



Measured Result of channel: 78 (2480MHz)

Table 54 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
32.452000	20.00	11.7	40.0	20.0	100.0	105.00	VERTICAL
122.884000	27.90	10.1	40.0	12.1	126.0	125.00	VERTICAL
307.212000	34.00	15.7	47.0	13.0	100.0	47.00	HORIZONTAL
368.636000	33.20	17.4	47.0	13.8	100.0	127.00	HORIZONTAL
430.056000	33.40	18.8	47.0	13.6	108.0	175.00	VERTICAL
491.540000	35.10	20.0	47.0	11.9	100.0	164.00	VERTICAL
3157.000000	23.50	-8.5	54.0	30.5	109.0	278.00	HORIZONTAL
4960.000000	34.80	-3.8	54.0	19.2	127.0	170.00	HORIZONTAL
7437.500000	28.20	1.2	54.0	25.8	172.0	60.00	VERTICAL
9976.000000	30.30	5.3	54.0	23.7	182.0	300.00	HORIZONTAL
14820.000000	34.10	12.3	54.0	19.9	113.0	211.00	VERTICAL
17932.000000	37.20	16.7	54.0	16.8	102.0	223.00	VERTICAL
2310.000000	38.10	33.3	54.0	15.9	106.0	196.00	VERTICAL
2390.000000	38.50	33.5	54.0	15.5	164.0	221.00	HORIZONTAL
2483.500000	38.40	33.7	54.0	15.6	200.0	153.00	HORIZONTAL
2500.000000	38.50	33.8	54.0	15.5	101.0	116.00	VERTICAL

6.8.5 Conclusion

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

6.9 Conducted Emission at Power Port

6.9.1 Test Conditions

Table 55 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	23.5°C
Relative humidity:	55 %
Test Configurations:	TM1 at channel No. 40

6.9.2 Test Specifications and Limits

6.9.2.1 Specification

CFR 47 (FCC) part 15.207 and DA 00-705

6.9.2.2 Supporting Standards

Table 56 Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
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6.9.2.3 Limits

Compliance with part15.207, conducted emission must meet the requirement of following table.

Table 57 Limits

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: * Decreases with the logarithm of the frequency.

6.9.3 Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The EUT was communicated with the BTS simulator through Air interface, the BTS simulator controls the HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone to transmitter the maximum power which defined in specification of product. The HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

Test Set-up

The HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone was setup in the screened chamber and operated under nominal conditions.

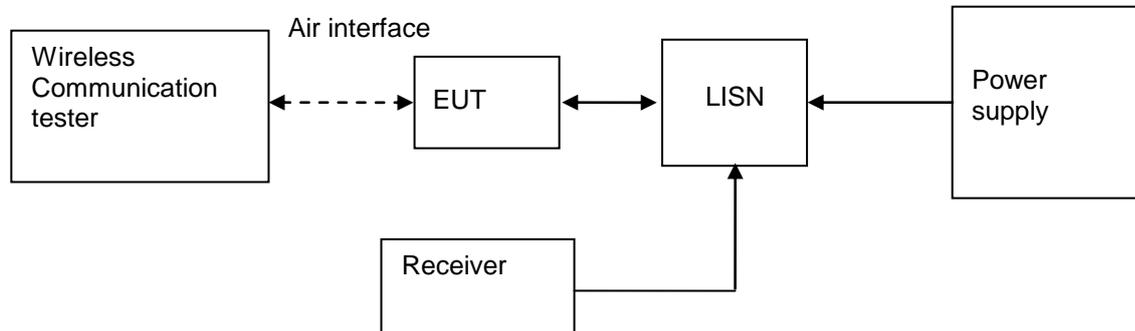


Figure 9. Test Set-up

6.9.4 Measurement Results

Table 58 MEASUREMENT RESULT:QP DECTER

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.166000	56.60	10.1	65	8.4	L1	FLO
0.168000	56.30	10.1	65	8.7	L1	FLO
0.210000	50.80	10.0	63	12.2	L1	FLO
0.248000	47.30	10.0	62	14.7	L1	FLO
1.944000	36.60	10.1	56	19.4	L1	FLO
3.422000	33.20	10.2	56	22.8	L1	FLO

Table 59 MEASUREMENT RESULT:AV DECTER

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.164000	40.10	10.1	55	14.9	N	FLO
0.166000	41.50	10.1	55	13.5	L1	FLO
0.210000	36.20	10.0	53	16.8	L1	FLO
0.252000	31.30	10.0	52	20.7	L1	FLO
1.926000	28.60	10.1	46	17.4	N	FLO
3.894000	25.00	10.2	46	21.0	L1	FLO

6.9.5 Conclusion

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

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 60 System Measurement Uncertainty

Items		Extended Uncertainty
20dB bandwidth measurement	Magnitude (%)	U=0.2%; k=2
Carrier frequency separation measurement	Magnitude (%)	U=0.2%; k=2
Time of occupancy	Magnitude (%)	U=0.2%; k=2
Peak output power	Power(dBm)	U=0.39dB; k=2
Band edge compliance measurement	Disturbance Power(dBm)	U=2.0dB; k=2
Conducted RF spurious	Disturbance Power(dBm)	U=2.0dB; k=2
Radiated spurious emission & Radiated restricted band measurement	Field strength (dB μ V/m)	U=4.1dB; k=2 U=4.1dB; k=2
Conducted emission test for power port	Disturbance Voltage(dB μ V)	U=3.4dB; k=2



8 Appendices List

Appendix A	Measurement Results 20dB bandwidth measurement	4 pages
Appendix B	Measurement Results Carrier frequency separation measurement	2 pages
Appendix C	Measurement Results Number of hopping channel	2 pages
Appendix D	Measurement Results Time of occupancy	3 pages
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----- End of Report -----