



# FCC Test Report

**Product Name: HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone  
with Bluetooth**

**Model Number:  
HUAWEI U8500/U8500/HUAWEI U8500-9/U8500-9**

**Report No: SYBH(Z-RF)010012011-2004  
FCC ID: QISU8500-9  
IC:6369A-U85009**

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2. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-1.
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**REPORT ON**                      **FCC 47CFR part 15 subpart C Test of HUAWEI  
HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with  
Bluetooth**

**M/N: HUAWEI U8500/U8500/HUAWEI U8500-9/U8500-9**

**Report No: SYBH(Z-RF)010012011-2004**

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**IC:6369A-U85009**

**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 HUAWEI HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth - HUAWEI U8500/U8500/HUAWEI U8500-9/U8500-9. 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

HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth-HUAWEI U8500/U8500/HUAWEI U8500-9/U8500-9 is subscriber equipment in the WCDMA/GSM system. The HSDPA frequency bands are Band I and Band IV. The GSM/GPRS/EDGE frequency bands include GSM850 and GSM900 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

**Note: Only Bluetooth function was considered in this report.**

#### 2.1.2 Support function and Service

The EUT support the function and service as follows:

Table 2 Service and Test mode List

| Service Name   | Characteristic    | Corresponding Test Mode | Note |
|----------------|-------------------|-------------------------|------|
| Data and Voice | Modulation: GFSK, | 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

Jan.27, 2011 to Jan.27, 2011

#### **3.2 General Set up Description**

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

**Bluetooth MODE:**

**TM1:** GFSK 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: | - |
|-----------------------|---|

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): | 0.03 (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

|                     |            |
|---------------------|------------|
| AC voltage nominal: | ~120V      |
| AC voltage range    | ~100V-240V |
| AC current maximal: | 400mA      |

## 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: | 100mA 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

| HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth |                  |          |
|------------------------------------------------------|------------------|----------|
| HUAWEI U8500/U8500/HUAWEI U8500-9/U8500-9            |                  |          |
| Board and Module                                     |                  |          |
| Equipment Designation / Description                  | Serial Number    | Remarks  |
| MAINBOARD                                            | P5K7NA1111001617 | HD1U850M |

### 4.2.2 Adapter Technical Data

|                    |                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------|
| AC/DCAdapter Model | HW-050100U1W                                                                                  |
| Manufacturer       | Huawei Technologies Co., Ltd.                                                                 |
| Input Voltage      | ~100-240V 50/60Hz 0.2A                                                                        |
| Output Voltage     | 5V  1000mA |
| Rated Power        | 2W                                                                                            |
| S/N                | HKAA51556941                                                                                  |

### 4.2.3 Battery Technical Data

| Name                | Qty. | Manufacture                   | Serials number       | Description                                                                                                                                                                                                                                                                       |
|---------------------|------|-------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rechargeable Li-ion | 1    | Huawei Technologies Co., Ltd. | YACA501HI182169<br>4 | Battery Model: HB5A2H<br>Rated capacity: 1150mAh<br>Nominal Voltage:  +3.7V<br>Charging Voltage:  +4.2V |

### 4.2.4 FCC Identification

Grantee Code: QIS  
Product Code: U8500-9  
FCC Identification: QISU8500-9

### 4.2.5 IC Identification

Grantee Code: 6369A  
Product Code: U85009  
IC Identification: 6369A-U85009



## 5 Main Test Instruments

Table 12 Main Test Equipments

| Equipment Description                | Manufacturer | Model      | Serial Number | Calibrated until<br>(MM.DD.YYYY) |
|--------------------------------------|--------------|------------|---------------|----------------------------------|
| Receiver                             | R&S          | ESU26      | 100150        | 05.24.2011                       |
| Pre-Amplifier                        | R&S          | SCA-SCU 18 | 10003         | NA                               |
| Pre-Amplifier                        | R&S          | SCA-SCU 26 | 3357-3358     | NA                               |
| BiLog Antenna                        | SCHWARZBECK  | VULB 9163  | 9163-356      | 05.14.2011                       |
| Horn Antenna                         | R&S          | HF906      | 100683        | 05.14.2011                       |
| Horn Antenna                         | ETS-Lindgren | 3160       | 00091989      | 09.20.2011                       |
| LISN                                 | R&S          | ENV216     | 100382        | 07.24.2011                       |
| Universal Radio Communication Tester | R&S          | CBT        | 100548        | 02.21.2011                       |
| Signal Analyzer                      | Agilent      | E4440A     | 3608083811    | 12.17.2011                       |
| Power Divider                        | Agilent      | 11667A     | 54723         | NA                               |



## 6 Transmitter Measurements

### 6.1 20dB bandwidth measurement

#### 6.1.1 Test Conditions

Table 13 Test Conditions

|                      |                             |
|----------------------|-----------------------------|
| Preconditioning:     | 0.5 hour                    |
| Measured at:         | Antenna connector           |
| Ambient temperature: | 23.5 °C                     |
| Relative humidity:   | 55%                         |
| 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 14 Supporting Standards:

|                     |                                                                                        |
|---------------------|----------------------------------------------------------------------------------------|
| ANSI/TIA-603-C:2004 | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards |
|---------------------|----------------------------------------------------------------------------------------|

##### 6.1.2.3 Limits

Not Applicable.

#### 6.1.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT 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 spectrum analyzer.

## Test setup

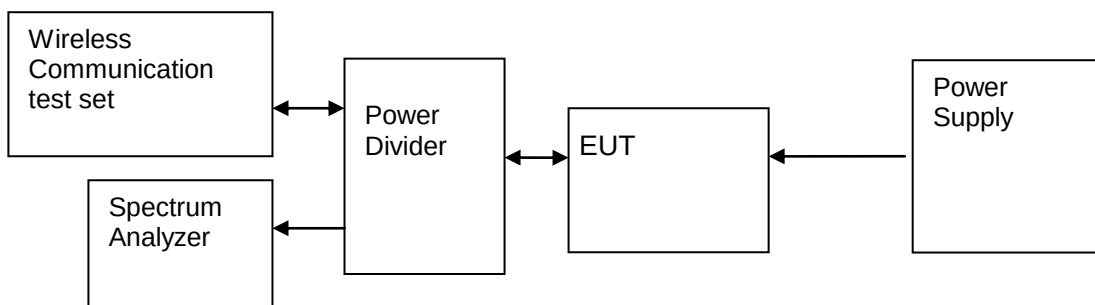


Figure 1. Test Set-up

## 6.1.4 Measurement Results

Table 15 Measurement Results

| Bandwidth Type | Channel Position | Channel Number | Frequency [GHz] | Measured Bandwidth [MHz] | Result |
|----------------|------------------|----------------|-----------------|--------------------------|--------|
| 20dB           | B                | 0              | 2.402           | 0.977                    | PASS   |
| 20dB           | M                | 40             | 2.442           | 0.980                    | PASS   |
| 20dB           | T                | 78             | 2.480           | 0.977                    | 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 16 Test Conditions

|                      |                              |
|----------------------|------------------------------|
| Preconditioning:     | 0.5 hour                     |
| Measured at:         | Antenna connector            |
| Ambient temperature: | 23.5 °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 17 Supporting Standards:

|                     |                                                                                        |
|---------------------|----------------------------------------------------------------------------------------|
| ANSI/TIA-603-C:2004 | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards |
|---------------------|----------------------------------------------------------------------------------------|

#### 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 18 Limits

|             |                                              |
|-------------|----------------------------------------------|
| Regulation: | $\geq 0.025$ or $2/3$ of the 20 dB bandwidth |
| Limit:      | $2/3 \times 0.980 = 0.65$                    |

### 6.2.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT 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

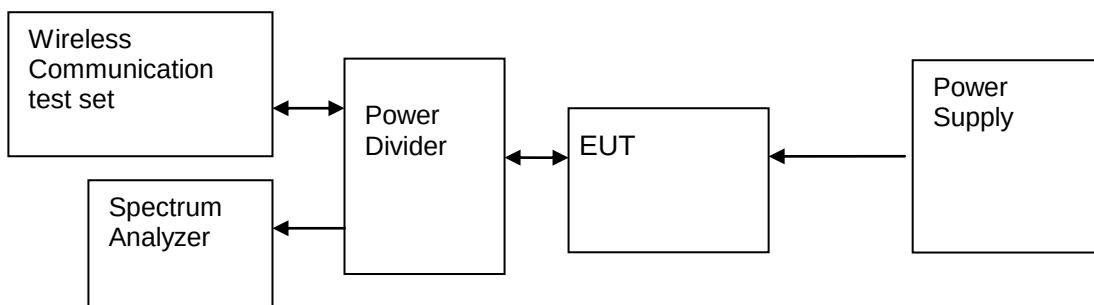


Figure 2. Test Set-up

## 6.2.4 Measurement Results

Table 19 Measurement Results

| Channel No. | Frequency [GHz] | Channel No. | Frequency [GHz] | Measured frequency separation [MHz] | Limit [MHz] | Result |
|-------------|-----------------|-------------|-----------------|-------------------------------------|-------------|--------|
| 40          | 2.442           | 39          | 2.441           | 1.008                               | 0.65        | PASS   |
| 40          | 2.442           | 41          | 2.443           | 1.000                               | 0.65        | 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 20 Test Conditions

|                      |                                |
|----------------------|--------------------------------|
| Preconditioning:     | 0.5 hour                       |
| Measured at:         | Antenna connector              |
| Ambient temperature: | 22 °C                          |
| Relative humidity:   | 52 %                           |
| 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 21 Supporting Standards:

|                      |                                                                                        |
|----------------------|----------------------------------------------------------------------------------------|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards |
|----------------------|----------------------------------------------------------------------------------------|

#### 6.3.2.3 Limits

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

Table 22 Limits

|        |                               |
|--------|-------------------------------|
| Limits | ≥15 hopping frequency channel |
|--------|-------------------------------|

### 6.3.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer and universal communication tester.
- Set the EUT 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.
- Count the quantity of peaks to get the number of hopping channels.



## Test setup

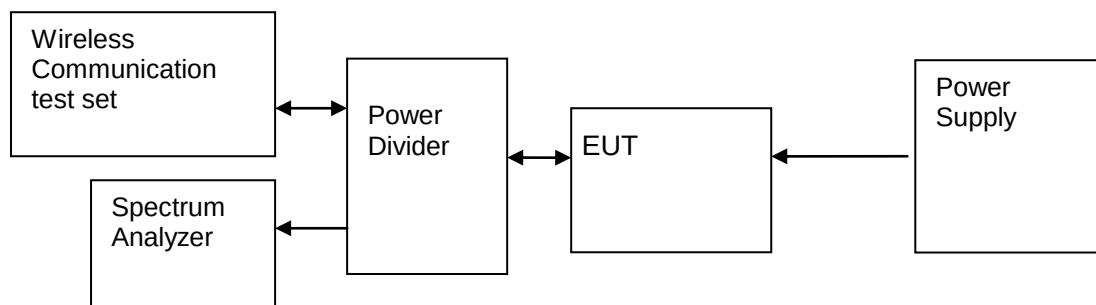


Figure 3. Test Set-up

## 6.3.4 Measurement Results

Table 23 Measurement Results

| 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 24 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 25 Supporting Standards:

|                      |                                                                                        |
|----------------------|----------------------------------------------------------------------------------------|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards |
|----------------------|----------------------------------------------------------------------------------------|

#### 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 26 Limits

|                              |             |
|------------------------------|-------------|
| Limits for time of occupancy | $\leq 0.4s$ |
|------------------------------|-------------|

### 6.4.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer and universal communication tester.
- Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
- 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.
- 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.
- Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts.

## Test setup

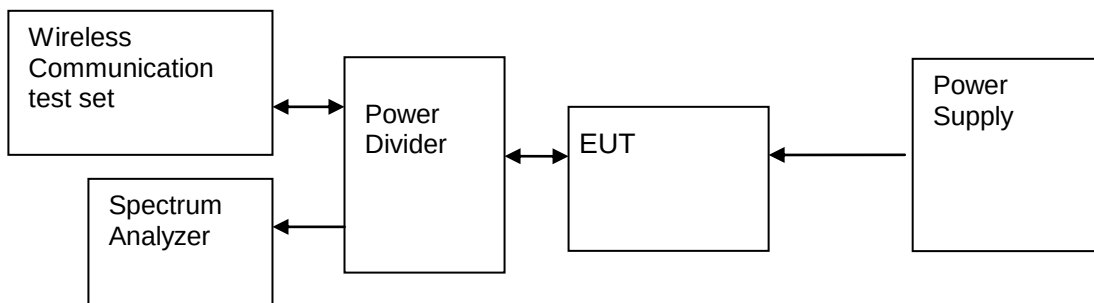


Figure 4. Test Set-up

## 6.4.4 Measurement Results

Table 27 Measurement Results

| Time of Single Slot [ms] | Numbers of slots in a period | Time of occupied in a period [s] | Limit [s]  | Result |
|--------------------------|------------------------------|----------------------------------|------------|--------|
| 2.95                     | 106.7                        | 0.32                             | $\leq 0.4$ | PASS   |

Note: The result is measured at DH5 mode in GFSK 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 28 Test Conditions

|                      |                             |
|----------------------|-----------------------------|
| Preconditioning:     | 0.5 hour                    |
| Measured at:         | Antenna connector           |
| Ambient temperature: | 23.5°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 29 Supporting Standards:

|                      |                                                                                        |
|----------------------|----------------------------------------------------------------------------------------|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards |
|----------------------|----------------------------------------------------------------------------------------|

#### 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 30 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 EUT to spectrum analyzer and universal communication tester.
- Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

## Test setup

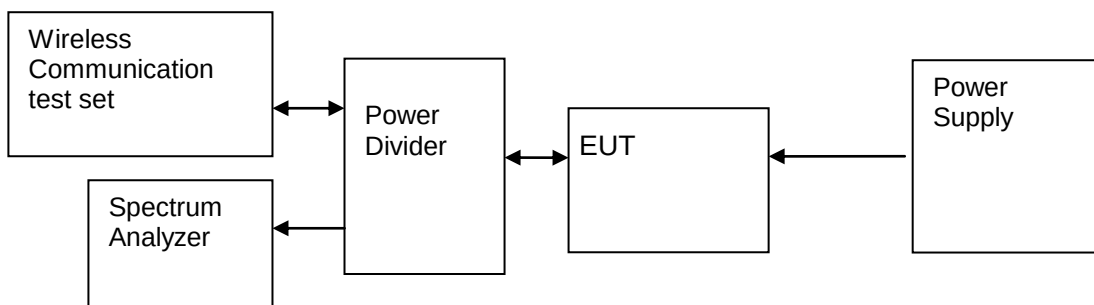


Figure 5. Test Set-up

## 6.5.4 Measurement Results

Table 31 Measurement Results

| Channel | Channel No. | Center Freq.[MHz] | Meas. Level (Cond.) [dBm] | Limit [dBm] | Result |
|---------|-------------|-------------------|---------------------------|-------------|--------|
| Bottom  | 0           | 2402              | 5.92                      | < 30        | PASS   |
| Middle  | 40          | 2442              | 7.07                      | < 30        | PASS   |
| Top     | 78          | 2480              | 6.97                      | < 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 32 Test Conditions

|                      |                                                      |
|----------------------|------------------------------------------------------|
| Preconditioning:     | 0.5 hour                                             |
| Measured at:         | Antenna connector                                    |
| Ambient temperature: | 20°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 33 Supporting Standards:

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

#### 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 34 Limits

|                     |               |
|---------------------|---------------|
| Band edge spurious: | 20 dBc/100kHz |
|---------------------|---------------|

### 6.6.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer and universal communication tester
- Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- Then set the EUT 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

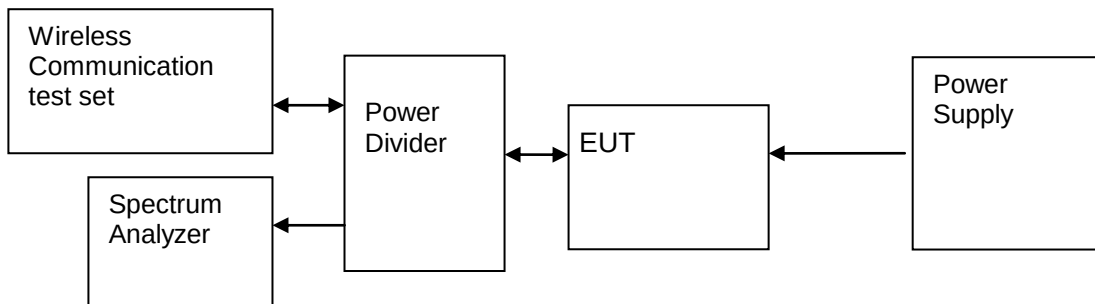


Figure 6. Test Set-up

## 6.6.4 Measurement Results

Table 35 Measurement Results

|           | Channel No. | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max. Spurious Level [dBm] | Limit [dBm] | Result |
|-----------|-------------|-------------------------|---------------------|-------------------|---------------------------|-------------|--------|
| Low Edge  | 0           | 2402                    | 5.91                | Off               | -51.33                    | < -14.09    | PASS   |
|           | -           | -                       | 5.91                | On                | -51.33                    | < -14.09    | PASS   |
| High Edge | 78          | 2480                    | 6.91                | Off               | -54.33                    | < -13.09    | PASS   |
|           | -           | -                       | 6.91                | On                | -54.33                    | < -13.09    | 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 36 Test Conditions

|                      |                             |
|----------------------|-----------------------------|
| Preconditioning:     | 0.5 hour                    |
| Measured at:         | Antenna Connector           |
| Ambient temperature: | 22 °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 37 Supporting Standards:

|                      |                                                                                        |
|----------------------|----------------------------------------------------------------------------------------|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment<br>Measurement and Performance Standards |
|----------------------|----------------------------------------------------------------------------------------|

#### 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 38 Limits

|                     |               |
|---------------------|---------------|
| Band edge spurious: | 20 dBc/100kHz |
|---------------------|---------------|

### 6.7.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer and universal communication tester
- Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- Then set the EUT 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

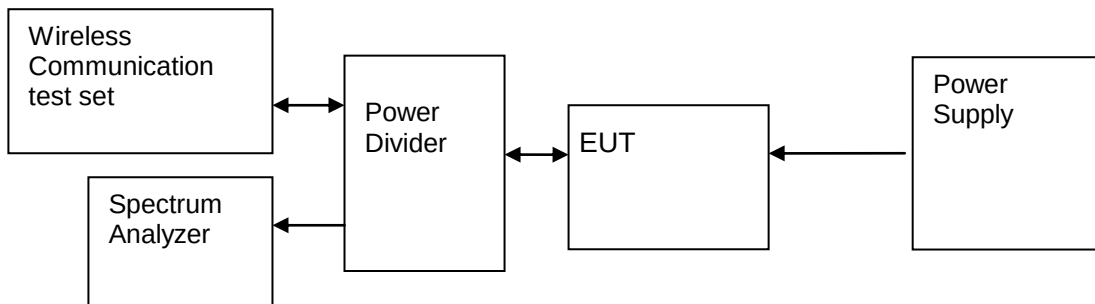


Figure 7. Test Set-up

## 6.7.4 Measurement Results

### 6.7.4.1 Measurement Results

Table 39 Measurement Results

| Test Frequency Range | Channel No. | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max. Spurious Level [dBm] | Limit [dBm] | Result |
|----------------------|-------------|-------------------------|---------------------|-------------------|---------------------------|-------------|--------|
| 30kHz-25GHz          | 0           | 2402                    | 5.84                | Off               | -47.43                    | < -14.16    | PASS   |
| 30kHz-25GHz          | 40          | 2442                    | 5.88                | Off               | -45.85                    | < -14.12    | PASS   |
| 30kHz-25GHz          | 78          | 2480                    | 5.64                | Off               | -46.82                    | < -14.36    | 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 40 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 41 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 10<sup>th</sup> harmonics of carrier frequency should be meet the requirement of following table.

Table 42 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                             | AV       |

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)(above table 42).

### 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 EUT operated on the typical channel.

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

Measurement bandwidth: 1000 MHz – 10<sup>th</sup> Carrier Frequency: 1 MHz

## Test set up

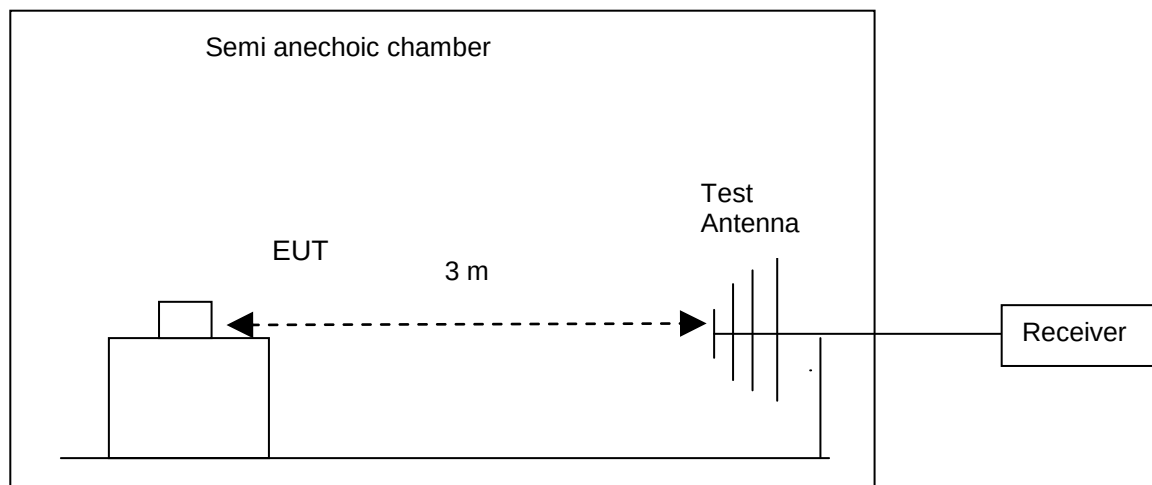


Figure 8. Test Set up

## 6.8.4 Measurement Results

### 6.8.4.1 Measurement Result

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

#### Measured Result of channel: 0 (2402MHz)

Table 43 MEASUREMENT RESULT

| Frequency (MHz) | Level (dBμV/m) | Transd (dB) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|-----------------|----------------|-------------|----------------|-------------|-------------|---------------|--------------|
| 40.020000       | 26.30          | 13.1        | 40.0           | 13.7        | 121.0       | 179.00        | HORIZONTAL   |
| 73.740000       | 18.80          | 7.8         | 40.0           | 21.2        | 100.0       | 179.00        | VERTICAL     |
| 159.840000      | 27.40          | 9.6         | 43.5           | 16.1        | 150.0       | 177.00        | VERTICAL     |
| 232.860000      | 20.40          | 13.7        | 46.0           | 25.6        | 132.0       | 244.00        | HORIZONTAL   |
| 389.220000      | 37.90          | 17.9        | 46.0           | 8.1         | 147.0       | 127.00        | VERTICAL     |
| 539.940000      | 32.20          | 21.2        | 46.0           | 13.8        | 125.0       | 144.00        | HORIZONTAL   |
| 3138.500000     | 22.70          | -8.5        | 54.0           | 31.3        | 165.0       | 182.00        | VERTICAL     |
| 5345.500000     | 26.40          | -2.5        | 54.0           | 27.6        | 185.0       | 196.00        | VERTICAL     |
| 7617.000000     | 28.10          | 1.7         | 54.0           | 25.9        | 143.0       | 17.00         | VERTICAL     |
| 9494.000000     | 29.50          | 4.9         | 54.0           | 24.5        | 172.0       | 241.00        | VERTICAL     |
| 14523.000000    | 34.30          | 12.3        | 54.0           | 19.7        | 161.0       | 217.00        | VERTICAL     |
| 17981.000000    | 37.50          | 17.2        | 54.0           | 16.5        | 176.0       | 321.00        | VERTICAL     |
| 2310.000000     | 38.00          | 33.3        | 54.0           | 16.0        | 120.0       | 44.00         | HORIZONTAL   |



|             |       |      |      |      |       |        |            |
|-------------|-------|------|------|------|-------|--------|------------|
| 2390.000000 | 38.20 | 33.5 | 54.0 | 15.8 | 147.0 | 321.00 | VERTICAL   |
| 2483.500000 | 38.30 | 33.7 | 54.0 | 15.7 | 140.0 | 154.00 | HORIZONTAL |
| 2500.000000 | 37.80 | 33.8 | 54.0 | 16.2 | 102.0 | 44.00  | VERTICAL   |

### Measured Result of channel: 40 (2442MHz)

Table 44 MEASUREMENT RESULT

| Frequency (MHz) | Level (dBμV/m) | Transd (dB) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|-----------------|----------------|-------------|----------------|-------------|-------------|---------------|--------------|
| 38.820000       | 25.00          | 11.9        | 40.0           | 15.0        | 132.0       | 229.00        | VERTICAL     |
| 78.820000       | 20.00          | 8.1         | 40.0           | 20.0        | 145.0       | 285.00        | VERTICAL     |
| 213.120000      | 21.00          | 12.7        | 43.5           | 22.5        | 100.0       | 226.00        | HORIZONTAL   |
| 345.600000      | 27.10          | 17.0        | 46.0           | 18.9        | 154.0       | 198.00        | VERTICAL     |
| 376.860000      | 29.10          | 17.6        | 46.0           | 16.9        | 100.0       | 127.00        | HORIZONTAL   |
| 405.860000      | 28.80          | 18.4        | 46.0           | 17.2        | 121.0       | 47.00         | HORIZONTAL   |
| 3114.500000     | 22.80          | -8.6        | 54.0           | 31.2        | 187.0       | 29.00         | VERTICAL     |
| 4090.500000     | 24.70          | -5.7        | 54.0           | 29.3        | 165.0       | 324.00        | HORIZONTAL   |
| 5346.000000     | 26.40          | -2.5        | 54.0           | 27.6        | 123.0       | 173.00        | HORIZONTAL   |
| 9572.500000     | 30.00          | 5.1         | 54.0           | 24.0        | 198.0       | 309.00        | HORIZONTAL   |
| 14654.000000    | 34.50          | 11.9        | 54.0           | 19.5        | 100.0       | 176.00        | VERTICAL     |
| 17925.500000    | 37.10          | 16.8        | 54.0           | 16.9        | 134.0       | 244.00        | HORIZONTAL   |

### Measured Result of channel: 78 (2480MHz)

Table 45 MEASUREMENT RESULT

| Frequency (MHz) | Level (dBμV/m) | Transd (dB) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|-----------------|----------------|-------------|----------------|-------------|-------------|---------------|--------------|
| 40.020000       | 25.90          | 13.1        | 40.0           | 14.1        | 100.0       | 32.00         | HORIZONTAL   |
| 80.320000       | 22.90          | 8.3         | 40.0           | 17.1        | 132.0       | 154.00        | VERTICAL     |
| 106.520000      | 21.90          | 13.1        | 43.5           | 21.6        | 145.0       | 325.00        | VERTICAL     |
| 380.140000      | 27.10          | 17.6        | 46.0           | 18.9        | 178.0       | 254.00        | HORIZONTAL   |
| 408.140000      | 27.00          | 18.2        | 46.0           | 19.0        | 154.0       | 37.00         | HORIZONTAL   |
| 628.140000      | 30.00          | 22.7        | 46.0           | 16.0        | 120.0       | 257.00        | VERTICAL     |
| 2247.000000     | 18.80          | -11.7       | 54.0           | 35.2        | 186.0       | 289.00        | HORIZONTAL   |
| 3177.000000     | 22.90          | -8.4        | 54.0           | 31.1        | 111.0       | 0.00          | VERTICAL     |
| 5406.500000     | 26.40          | -2.4        | 54.0           | 27.6        | 139.0       | 183.00        | HORIZONTAL   |
| 9737.500000     | 29.30          | 5.1         | 54.0           | 24.7        | 115.0       | 165.00        | VERTICAL     |
| 14337.000000    | 34.10          | 11.9        | 54.0           | 19.9        | 127.0       | 195.00        | HORIZONTAL   |
| 17994.000000    | 37.20          | 17.3        | 54.0           | 16.8        | 100.0       | 320.00        | VERTICAL     |
| 2310.000000     | 38.00          | 33.3        | 54.0           | 16.0        | 152.0       | 241.00        | VERTICAL     |
| 2390.000000     | 37.90          | 33.5        | 54.0           | 16.1        | 145.0       | 74.00         | HORIZONTAL   |
| 2483.500000     | 38.10          | 33.7        | 54.0           | 15.9        | 185.0       | 31.00         | HORIZONTAL   |
| 2500.000000     | 38.20          | 33.8        | 54.0           | 15.8        | 132.0       | 231.00        | 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 46 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 47 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 |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------|

#### 6.9.2.3 Limits

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

Table 48 Limits

| Frequency of Emission (MHz) | Conducted Limit (dBμV) |            |
|-----------------------------|------------------------|------------|
|                             | 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 EUT to transmitter the maximum power which defined in specification of product. The EUT operated on the typical channel.

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

## Test Set-up

The Mobile Phone was setup in the screened chamber and operated under nominal conditions.

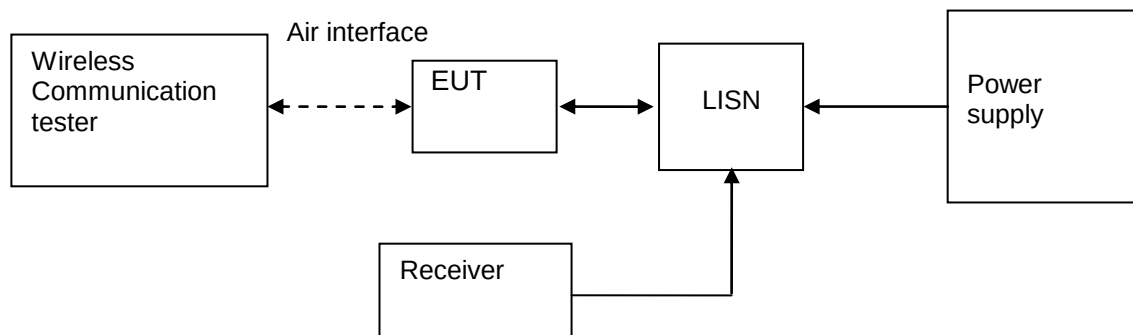


Figure 9. Test Set-up

## 6.9.4 Measurement Results

Table 49 MEASUREMENT RESULT:QP DECTER

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE  |
|---------------|------------|-----------|------------|-----------|----------|------|-----|
| 0.194000      | 51.90      | 10.1      | 64         | 12.1      | QP       | N    | FLO |
| 0.242000      | 49.00      | 10.0      | 62         | 13.0      | QP       | N    | FLO |
| 0.476000      | 38.70      | 10.1      | 56         | 17.3      | QP       | N    | FLO |
| 0.860000      | 34.80      | 10.1      | 56         | 21.2      | QP       | N    | FLO |
| 1.576000      | 31.30      | 10.1      | 56         | 24.7      | QP       | N    | FLO |
| 3.654000      | 27.30      | 10.2      | 56         | 28.7      | QP       | N    | FLO |

Table 50 MEASUREMENT RESULT:AV DECTER

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE  |
|---------------|------------|-----------|------------|-----------|----------|------|-----|
| 0.342000      | 26.70      | 10.0      | 49         | 22.3      | AV       | N    | FLO |
| 0.400000      | 27.40      | 10.0      | 48         | 20.6      | AV       | N    | FLO |
| 0.716000      | 23.50      | 10.1      | 46         | 22.5      | AV       | N    | FLO |
| 1.344000      | 21.60      | 10.1      | 46         | 24.4      | AV       | N    | FLO |
| 1.998000      | 21.10      | 10.1      | 46         | 24.9      | AV       | N    | FLO |
| 3.964000      | 17.60      | 10.2      | 46         | 28.4      | AV       | N    | 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 51 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 (dBμV/m)   | U=4.1dB; k=2         |
|                                                                   |                           | U=4.1dB; k=2         |
| Conducted emission test for power port                            | Disturbance Voltage(dBμV) | U=3.4dB; k=2         |



## 8 Appendices

|            |                                                              |    |
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(END OF REPORT)