



FCC Test Report

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

**Model Number: T-Mobile Pulse Mini/Pulse
Mini/Selina/HUAWEI U8110/U8110**

**Report No: SYBHZ(R)E028012010EB-4
FCC ID: QISU8110**

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REPORT ON FCC 47CFR part 15 subpart C Test of HUAWEI
 HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth

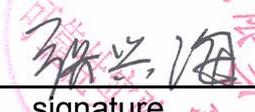
U8110/U8110 M/N: T-Mobile Pulse Mini/Pulse Mini/Selina/HUAWEI

Report No: SYBHZ(R)E028012010EB-4

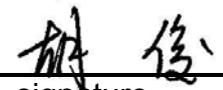
FCC ID: QISU8110

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 - T-Mobile Pulse Mini/Pulse Mini/Selina/HUAWEI U8110/U8110. 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

HUAWEI HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth-T-Mobile Pulse Mini/Pulse Mini/Selina/HUAWEI U8110/U8110 is subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band I and Band VIII. The GSM/GPRS/EDGE frequency band includes GSM900 and DCS1800 and PCS1900, but only PCS1900MHz band test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS 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.

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: $\pi/4$ -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***

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



and the accredited number is **2174.01** in June of 2006.

3.1 Testing Period

The test have been performed during the period of

Jan.10, 2010 to Feb.05, 2010

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: $\pi/4$ -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: | - |
|-----------------------|---|

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 | | |
| T-Mobile Pulse Mini/Pulse Mini/Selina/HUAWEI U8110/U8110 | | |
| Board and Module | | |
| Equipment Designation / Description | Serial Number | Remarks |
| MAINBOARD | F02AA109C2100120 | HD1U811M Ver.B |

4.2.2 Adapter Technical Data

| | | |
|--------------------|---|--|
| AC/DCAdapter Model | : | HS-050040E5 |
| Manufacturer | : | Huawei Technologies Co., Ltd. |
| Input Voltage | : | ~100-240V 50/60Hz 0.2A |
| Output Voltage | : | 5V  400mA |
| Rated Power | : | 2W |
| S/N | : | HKA9918965421 |

| | | |
|--------------------|---|--|
| AC/DCAdapter Model | : | HS-050040E7 |
| Manufacturer | : | Huawei Technologies Co., Ltd. |
| Input Voltage | : | ~100-240V 50/60Hz 0.2A |
| Output Voltage | : | 5V  400mA |
| Rated Power | : | 2W |
| S/N | : | BYA951515214 |

| | | |
|--------------------|---|--|
| AC/DCAdapter Model | : | HS-050040U6 |
| Manufacturer | : | Huawei Technologies Co., Ltd. |
| Input Voltage | : | ~100-240V 50/60Hz 0.2A |
| Output Voltage | : | 5V  400mA |
| Rated Power | : | 2W |
| S/N | : | HKA9B1451477 |

4.2.3 Battery Technical Data

| | |
|-------------------|---|
| Type: | Rechargeable Li-ion |
| Manufacturer: | Huawei Technologies Co., Ltd. |
| Battery Model: | HB5A2H |
| Rated capacity: | 1150mAh |
| Nominal Voltage: |  +3.7V |
| Charging Voltage: |  +4.2V |



4.2.4 FCC Identification

Grantee Code: QIS
Product Code: U8110
FCC Identification: QISU8110



5 Main Test Instruments

Table 12 Main Test Equipments

| No | Equipment/Type | Manuf. | Inv. No. Huawei | Last Calibration | Frequency (months) | Next Calibration |
|----|--|-----------------|-----------------|------------------|--------------------|------------------|
| 1 | EMI Test Receiver | R&S | SER: 100138 | | | 04.22.2010 |
| 2 | Broadband Antenna | SCHWARZB ECK | SER: 2747 | | | 11.29.2010 |
| 3 | Horn Antenna | R&S | SER: 3117 | | | 03.26.2010 |
| 4 | Universal Radio Communication Tester | R&S | SER: 105822 | | | 10.15.2010 |
| 5 | N4010A | Agilent | 3608101879 | 11.03.2009 | 12 | 11.03.2010 |
| 6 | CMU200 | R&S | 3607083037 | 08.04.2009 | 12 | 08.04.2010 |
| 7 | E4440A | Agilent | 3608083811 | 12.17.2009 | 12 | 12.17.2010 |
| 8 | 11667A | Agilent | SER: 54723 | | | |



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 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

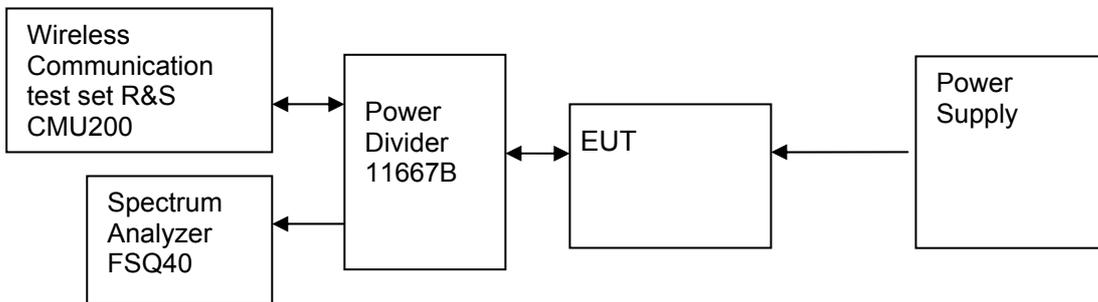


Figure 1. Test Set-up

6.1.4 Measurement Results

Table 15 Measurement Results (Modulation: $\pi/4$ -DQPSK)

| Bandwidth Type | Channel Position | Channel Number | Frequency [GHz] | Measured Bandwidth [MHz] | Result |
|----------------|------------------|----------------|-----------------|--------------------------|--------|
| 20dB | B | 0 | 2.402 | 1.294 | PASS |
| 20dB | M | 40 | 2.442 | 1.294 | PASS |
| 20dB | T | 78 | 2.480 | 1.315 | PASS |

Table 16 Measurement Results (Modulation: 8DPSK)

| Bandwidth Type | Channel Position | Channel Number | Frequency [GHz] | Measured Bandwidth [MHz] | Result |
|----------------|------------------|----------------|-----------------|--------------------------|--------|
| 20dB | B | 0 | 2.402 | 1.324 | PASS |
| 20dB | M | 40 | 2.442 | 1.284 | PASS |
| 20dB | T | 78 | 2.480 | 1.284 | 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 17 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 18 Supporting Standards:

| | |
|---------------------|---|
| ANSI/TIA-603-C:2004 | Land Mobile FM or PM Communications Equipment 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 19 Limits Measurement Results (Modulation: $\pi/4$ -DQPSK)

| | |
|-------------|--|
| Regulation: | ≥ 0.025 or $2/3$ of the 20 dB bandwidth |
| Limit: | $2/3 \times 1.315 = 0.88$ |

Table 20 Limits Measurement Results (Modulation: 8DPSK)

| | |
|-------------|--|
| Regulation: | ≥ 0.025 or $2/3$ of the 20 dB bandwidth |
| Limit: | $2/3 \times 1.324 = 0.88$ |

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

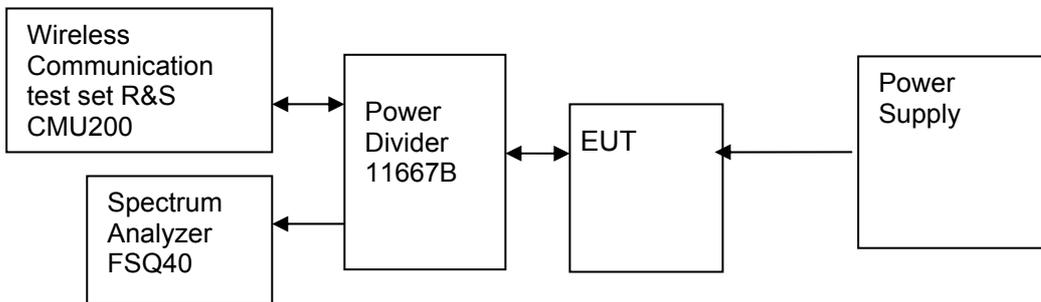


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 21 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 | 0.900 | 0.88 | PASS |
| 40 | 2.442 | 41 | 2.443 | 1.85 | 0.88 | PASS |

Table 22 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 | 1.000 | 0.88 | PASS |
| 40 | 2.442 | 41 | 2.443 | 0.950 | 0.88 | 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 23 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 24 Supporting Standards:

| | |
|----------------------|---|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment 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 25 Limits

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

6.3.3 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 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

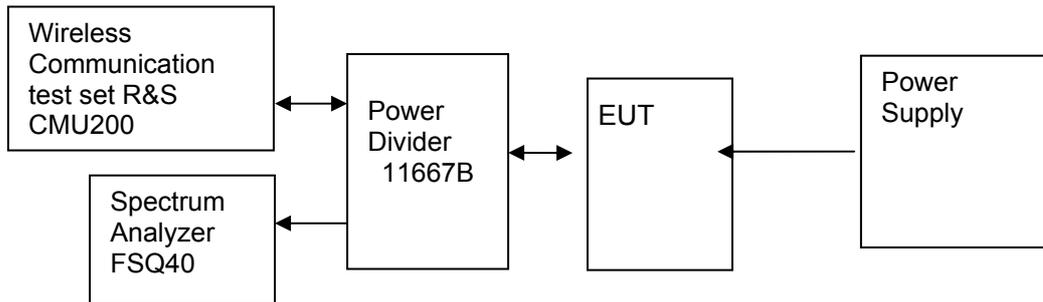


Figure 3. Test Set-up

6.3.4 Measurement Results

Table 26 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 27 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 28 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 29 Supporting Standards:

| | |
|----------------------|---|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment 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 30 Limits

| | |
|------------------------------|--------|
| Limits for time of occupancy | ≤ 0.4s |
|------------------------------|--------|

6.4.3 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 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

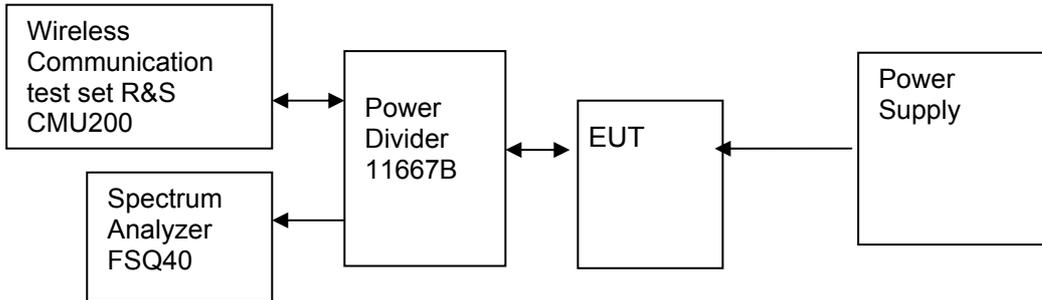


Figure 4. Test Set-up

6.4.4 Measurement Results π

Table 31 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 |
|--------------------------|------------------------------|----------------------------------|------------|--------|
| 2.95 | 106.7 | 0.32 | ≤ 0.4 | PASS |

Table 32 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 |
|--------------------------|------------------------------|----------------------------------|------------|--------|
| 2.95 | 106.7 | 0.32 | ≤ 0.4 | PASS |

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 33 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 34 Supporting Standards:

| | |
|----------------------|---|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment 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 35 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

- (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.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

Test setup

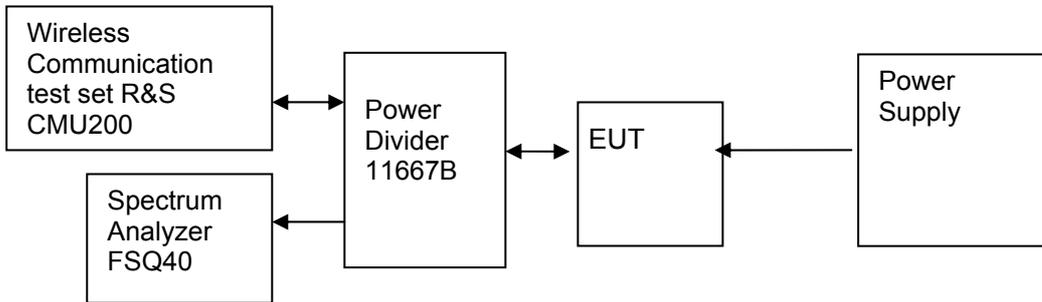


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 36 Measurement Results (Modulation: $\pi/4$ -DQPSK)

| Channel | Channel No. | Center Freq.[MHz] | Meas. Level (Cond.) [dBm] | Limit [dBm] | Result |
|---------|-------------|-------------------|---------------------------|-------------|--------|
| Bottom | 0 | 2402 | 7.27 | < 30 | PASS |
| Middle | 40 | 2442 | 7.41 | < 30 | PASS |
| Top | 78 | 2480 | 6.63 | < 30 | PASS |

Table 37 Measurement Results (Modulation: 8DPSK)

| Channel | Channel No. | Center Freq.[MHz] | Meas. Level (Cond.) [dBm] | Limit [dBm] | Result |
|---------|-------------|-------------------|---------------------------|-------------|--------|
| Bottom | 0 | 2402 | 7.30 | < 30 | PASS |
| Middle | 40 | 2442 | 7.42 | < 30 | PASS |
| Top | 78 | 2480 | 6.63 | < 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 38 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 39 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 40 Limits

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

6.6.3 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.
- (c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.
- (d) Switch on the frequency hopping function, and repeat above measurement.

Test setup

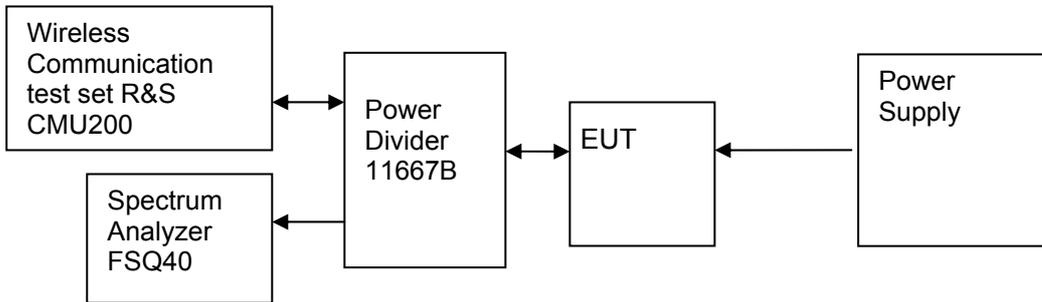


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 41 Measurement Results for Band Edge immediately outside the 2.4G 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 | 5.94 | Off | -49.34 | <-14.1 | PASS |
| | - | - | 5.86 | On | -52.26 | <-14.1 | PASS |
| High Edge | 78 | 2480 | 5.47 | Off | -53.35 | <-14.5 | PASS |
| | - | - | 4.25 | On | -54.31 | <-15.8 | PASS |

Table 42 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 | 5.88 | Off | -48.04 | <-14.1 | PASS |
| | - | - | 5.76 | On | -50.48 | <-14.2 | PASS |
| High Edge | 78 | 2480 | 5.47 | Off | -54.61 | <-14.5 | PASS |
| | - | - | 4.94 | On | -54.24 | <-15.1 | 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 43 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 44 Supporting Standards:

| | |
|----------------------|---|
| ANSI/TIA-603-C: 2004 | Land Mobile FM or PM Communications Equipment 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 45 Limits

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

6.7.3 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.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.
- (d) Switch on the frequency hopping function, and repeat above measurement.

Test setup

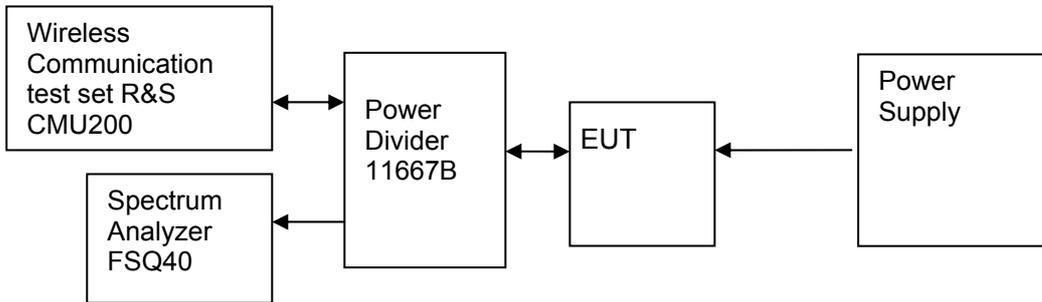


Figure 7. Test Set-up

6.7.4 Measurement Results

6.7.4.1 Measurement Results

Table 46 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 |
|----------------------|-------------|-------------------------|---------------------|-------------------|---------------------------|-------------|--------|
| 30kHz-25GHz | 0 | 2402 | 2.91 | Off | -46.53 | < -17.1 | PASS |
| 30kHz-25GHz | 40 | 2442 | 2.99 | Off | -46.73 | < -17.0 | PASS |
| 30kHz-25GHz | 78 | 2480 | 4.00 | Off | -46.59 | < -16.0 | PASS |

Table 47 Measurement Results (Modulation: 8DPSK)

| Test Frequency Range | Channel No. | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max. Spurious Level [dBm] | Limit [dBm] | Result |
|----------------------|-------------|-------------------------|---------------------|-------------------|---------------------------|-------------|--------|
| 30kHz-25GHz | 0 | 2402 | 3.07 | Off | -46.88 | < -16.9 | PASS |
| 30kHz-25GHz | 40 | 2442 | 2.35 | Off | -46.77 | < -17.6 | PASS |
| 30kHz-25GHz | 78 | 2480 | 2.11 | Off | -46.71 | < -17.9 | 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 48 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 49 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 50 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)(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 – 10th Carrier Frequency: 1 MHz

Test set up

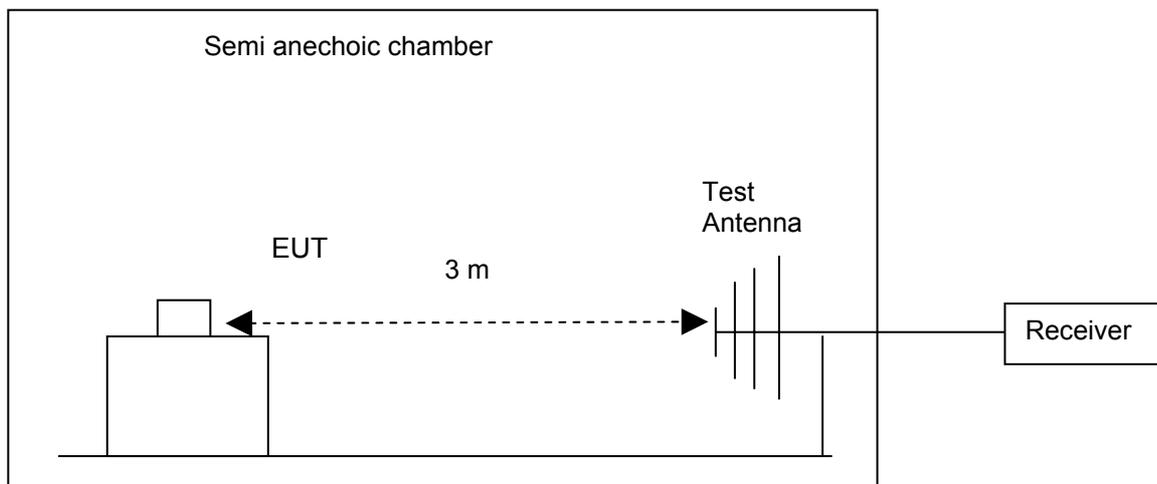


Figure 8. Test Set up

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 51 MEASUREMENT RESULT

| Frequency (MHz) | Level (dB μ V/m) | Transd (dB) | Limit (dB μ V/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|-----------------|----------------------|-------------|----------------------|-------------|-------------|---------------|--------------|
| 39.720000 | 22.70 | 13.1 | 40.0 | 17.3 | 170.0 | 126.00 | VERTICAL |
| 99.840000 | 20.20 | 13.1 | 43.5 | 23.3 | 206.0 | 195.00 | HORIZONTAL |
| 133.920000 | 16.40 | 9.0 | 43.5 | 27.1 | 180.0 | 47.00 | VERTICAL |
| 211.200000 | 20.50 | 12.4 | 43.5 | 23.0 | 183.0 | 95.00 | VERTICAL |
| 433.800000 | 27.40 | 18.8 | 46.0 | 18.6 | 282.0 | 325.00 | VERTICAL |
| 941.160000 | 36.20 | 26.5 | 46.0 | 9.8 | 117.0 | 117.00 | VERTICAL |
| 2989.000000 | 33.80 | -9.3 | 54.0 | 20.2 | 109.0 | 145.00 | HORIZONTAL |
| 4084.000000 | 37.40 | -5.7 | 54.0 | 16.8 | 140.0 | 275.00 | VERTICAL |
| 4903.000000 | 38.60 | -3.9 | 54.0 | 15.4 | 177.0 | 80.00 | VERTICAL |
| 7391.000000 | 39.60 | 1.0 | 54.0 | 14.4 | 146.0 | 311.00 | HORIZONTAL |
| 10759.500000 | 42.50 | 6.3 | 54.0 | 11.5 | 154.0 | 3.00 | HORIZONTAL |
| 14250.000000 | 47.10 | 11.6 | 54.0 | 6.9 | 112.0 | 239.00 | VERTICAL |
| 19005.500000 | 31.30 | 18.6 | 54.0 | 22.7 | 163.0 | 7.00 | VERTICAL |
| 19489.000000 | 30.10 | 18.9 | 54.0 | 23.9 | 148.0 | 13.00 | VERTICAL |
| 20899.000000 | 32.10 | 20.2 | 54.0 | 21.9 | 179.0 | 215.00 | HORIZONTAL |



| | | | | | | | |
|--------------|-------|-------|------|-------|-------|--------|------------|
| 22464.000000 | 33.20 | 20.3 | 54.0 | 20.8 | 198.0 | 244.00 | VERTICAL |
| 24586.000000 | 32.40 | 22.0 | 54.0 | 21.6 | 179.0 | 353.00 | VERTICAL |
| 26497.000000 | 34.20 | 27.9 | 54.0 | 19.8 | 131.0 | 242.00 | VERTICAL |
| 2310.000000 | 31.60 | -11.7 | 54.0 | 22.4 | 106.0 | 19.00 | VERTICAL |
| 2390.000000 | 32.10 | -11.5 | 54.0 | 21.9 | 178.0 | 125.00 | HORIZONTAL |
| 2402.000000 | 75.50 | -11.5 | 54.0 | -21.5 | 188.0 | 66.00 | HORIZONTAL |
| 2483.500000 | 32.70 | -11.3 | 54.0 | 21.3 | 121.0 | 166.00 | HORIZONTAL |
| 2500.000000 | 30.80 | -11.2 | 54.0 | 23.2 | 147.0 | 103.00 | HORIZONTAL |

Measured Result of channel: 40 (2442MHz)

Table 52 MEASUREMENT RESULT

| Frequency (MHz) | Level (dBμV/m) | Transd (dB) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|-----------------|----------------|-------------|----------------|-------------|-------------|---------------|--------------|
| 33.120000 | 23.20 | 11.7 | 40.0 | 16.8 | 149.0 | 101.00 | VERTICAL |
| 46.980000 | 20.10 | 13.0 | 40.0 | 19.9 | 211.0 | 312.00 | VERTICAL |
| 96.420000 | 20.10 | 12.9 | 43.5 | 23.4 | 172.0 | 310.00 | VERTICAL |
| 144.660000 | 16.80 | 8.8 | 43.5 | 26.7 | 178.0 | 44.00 | HORIZONTAL |
| 240.060000 | 21.30 | 14.0 | 46.0 | 24.7 | 127.0 | 241.00 | VERTICAL |
| 456.060000 | 27.20 | 19.0 | 46.0 | 18.8 | 135.0 | 104.00 | HORIZONTAL |
| 2892.500000 | 35.10 | -9.6 | 54.0 | 18.9 | 103.0 | 251.00 | VERTICAL |
| 4020.000000 | 37.70 | -5.7 | 54.0 | 16.3 | 121.0 | 333.00 | VERTICAL |
| 6743.000000 | 39.50 | -0.6 | 54.0 | 14.5 | 150.0 | 103.00 | VERTICAL |
| 9324.000000 | 41.50 | 4.7 | 54.0 | 12.5 | 153.0 | 214.00 | HORIZONTAL |
| 12714.000000 | 43.00 | 8.4 | 54.0 | 11.0 | 199.0 | 217.00 | VERTICAL |
| 17989.500000 | 49.60 | 17.2 | 54.0 | 4.4 | 194.0 | 99.00 | HORIZONTAL |
| 18778.000000 | 30.60 | 18.5 | 54.0 | 23.4 | 152.0 | 264.00 | HORIZONTAL |
| 19495.000000 | 30.00 | 18.9 | 54.0 | 24.0 | 121.0 | 152.00 | HORIZONTAL |
| 21789.000000 | 32.20 | 20.5 | 54.0 | 21.8 | 175.0 | 219.00 | VERTICAL |
| 24195.000000 | 30.70 | 21.5 | 54.0 | 23.3 | 194.0 | 70.00 | HORIZONTAL |
| 25387.000000 | 30.80 | 23.1 | 54.0 | 23.2 | 174.0 | 79.00 | VERTICAL |
| 26495.000000 | 38.40 | 27.9 | 54.0 | 15.6 | 109.0 | 244.00 | HORIZONTAL |

Measured Result of channel: 78 (2480MHz)

Table 53 MEASUREMENT RESULT

| Frequency (MHz) | Level (dBμV/m) | Transd (dB) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|-----------------|----------------|-------------|----------------|-------------|-------------|---------------|--------------|
| 33.360000 | 22.40 | 11.7 | 40.0 | 17.6 | 152.0 | 128.00 | HORIZONTAL |
| 99.720000 | 19.20 | 13.1 | 43.5 | 21.9 | 198.0 | 220.00 | HORIZONTAL |
| 134.400000 | 18.90 | 9.0 | 43.5 | 24.6 | 162.0 | 321.00 | VERTICAL |
| 319.980000 | 23.80 | 16.0 | 46.0 | 22.2 | 139.0 | 266.00 | HORIZONTAL |
| 633.420000 | 29.90 | 22.8 | 46.0 | 16.1 | 215.0 | 98.00 | HORIZONTAL |
| 956.400000 | 35.10 | 26.6 | 46.0 | 9.9 | 114.0 | 301.00 | VERTICAL |
| 3526.500000 | 37.30 | -7.3 | 54.0 | 16.7 | 128.0 | 148.00 | HORIZONTAL |
| 4611.000000 | 38.10 | -5.1 | 54.0 | 15.9 | 121.0 | 250.00 | VERTICAL |
| 5904.500000 | 39.20 | -1.7 | 54.0 | 14.8 | 177.0 | 137.00 | HORIZONTAL |
| 10656.500000 | 42.20 | 6.2 | 54.0 | 11.8 | 173.0 | 195.00 | HORIZONTAL |
| 14518.000000 | 47.30 | 12.3 | 54.0 | 6.7 | 141.0 | 199.00 | VERTICAL |
| 17962.000000 | 49.10 | 17.1 | 54.0 | 4.9 | 111.0 | 226.00 | HORIZONTAL |
| 19489.000000 | 30.10 | 18.9 | 54.0 | 23.9 | 169.0 | 201.00 | VERTICAL |
| 20481.000000 | 31.10 | 19.7 | 54.0 | 22.9 | 180.0 | 41.00 | VERTICAL |
| 21782.000000 | 31.30 | 20.5 | 54.0 | 22.7 | 129.0 | 331.00 | VERTICAL |
| 23537.000000 | 30.90 | 20.5 | 54.0 | 23.1 | 143.0 | 87.00 | VERTICAL |
| 24212.000000 | 33.80 | 21.5 | 54.0 | 21.2 | 137.0 | 200.00 | HORIZONTAL |
| 26495.000000 | 33.60 | 27.9 | 54.0 | 20.4 | 109.0 | 201.00 | VERTICAL |
| 2310.000000 | 31.6 | -11.7 | 54.0 | 21.4 | 163.0 | 334.00 | HORIZONTAL |



| | | | | | | | |
|-------------|------|-------|------|-------|-------|--------|------------|
| 2390.000000 | 32.1 | -11.5 | 54.0 | 21.9 | 104.0 | 100.00 | VERTICAL |
| 2480.000000 | 75.7 | -11.3 | 54.0 | -21.7 | 113.0 | 267.00 | HORIZONTAL |
| 2483.500000 | 45.2 | -11.3 | 54.0 | 8.8 | 118.0 | 110.00 | VERTICAL |
| 2500.000000 | 34.6 | -11.2 | 54.0 | 19.4 | 143.0 | 325.00 | HORIZONTAL |

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 54 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 55 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 56 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 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.

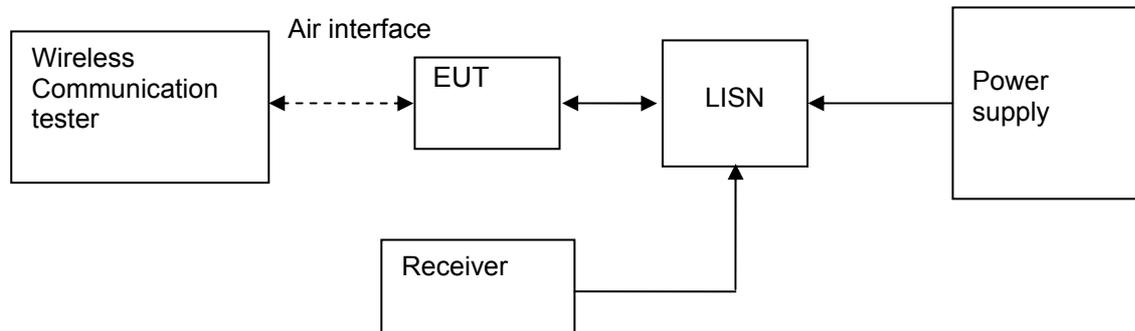


Figure 9. Test Set-up

6.9.4 Measurement Results

Table 57 MEASUREMENT RESULT:QP DECTER

| Frequency MHz | Level dB μ V | Transd dB | Limit dB μ V | Margin dB | Detector | Line | PE |
|---------------|------------------|-----------|------------------|-----------|----------|------|-----|
| 0.317160 | 39.80 | 10.0 | 60 | 20.2 | QP | L1 | FLO |
| 0.388800 | 39.30 | 10.0 | 58 | 18.7 | QP | L1 | FLO |
| 1.582800 | 34.00 | 10.1 | 56 | 22.0 | QP | L1 | FLO |
| 3.708120 | 36.30 | 10.2 | 56 | 19.7 | QP | L1 | FLO |
| 9.463200 | 39.60 | 10.3 | 60 | 20.4 | QP | L1 | FLO |
| 18.680880 | 36.40 | 10.3 | 60 | 23.6 | QP | L1 | FLO |

Table 58 MEASUREMENT RESULT:AV DECTER

| Frequency MHz | Level dB μ V | Transd dB | Limit dB μ V | Margin dB | Detector | Line | PE |
|---------------|------------------|-----------|------------------|-----------|----------|------|-----|
| 0.317160 | 24.10 | 10.0 | 50 | 25.9 | AV | L1 | FLO |
| 0.388800 | 31.90 | 10.0 | 48 | 16.1 | AV | L1 | FLO |
| 1.582800 | 24.20 | 10.1 | 46 | 21.8 | AV | L1 | FLO |
| 3.708120 | 26.10 | 10.2 | 46 | 19.9 | AV | L1 | FLO |
| 9.463200 | 28.50 | 10.3 | 50 | 21.5 | AV | L1 | FLO |
| 18.680880 | 27.20 | 10.3 | 50 | 22.8 | AV | 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 59 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=2.2dB; k=2 U=5dB; k=2 |
| Conducted emission test for power port | Disturbance Voltage(dB μ V) | U=3.3dB; k=2 |



8 Appendices

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(END OF REPORT)