

TEST REPORT

For

Mobile Phone

In conformity with

FCC Part22 (Oct 01,2007)

FCC Part15 (Oct 01,2007)

IC RSS-132 Issue2

Model: F-02A

Test Item: Mobile Phone

Report No: RY0810P03R1

Issue Date: Oct. 03, 2008

Prepared for

Fujitsu Limited.
1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588,
Japan

Prepared by

RF Technologies Ltd.
472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan
Telephone: +81+(0)45- 534-0645
FAX: +81+(0)45- 534-0646

This report shall not be reproduced, except in full, without the written permission of RF Technologies Ltd. The test results in this report apply only to the sample(s) tested. RF Technologies Ltd. is managed to ISO17025 and has the necessary knowledge and test facilities for testing according to the referenced standards.

Table of Contents

| | | |
|----------|---|-----------|
| 1 | General information | 3 |
| 1.1 | Product description | 3 |
| 1.2 | Test(s) performed/ Summary of test result | 3 |
| 1.3 | Test facility | 4 |
| 1.4 | Measurement uncertainty | 4 |
| 1.5 | Description of essential requirements and test results..... | 5 |
| 1.5.1 | Transmitter requirements | 5 |
| 1.5.2 | Receiver requirements..... | 5 |
| 1.5.3 | AC Power Line Parameters..... | 5 |
| 1.5.4 | Normal test conditions | 5 |
| 1.5.5 | Extreme test conditions | 5 |
| 1.6 | Setup of equipment under test (EUT) | 6 |
| 1.6.1 | Test configuration of EUT | 6 |
| 1.6.2 | Operating condition: | 6 |
| 1.6.3 | Setup diagram of tested system:..... | 7 |
| 1.7 | Equipment modifications | 7 |
| 1.8 | Deviation from the standard..... | 7 |
| 2 | Test procedure and result..... | 8 |
| 2.1 | Transmitter requirements | 8 |
| 2.1.1 | Carrier Output Power (Conducted) | 8 |
| 2.1.2 | Carrier Output Power (Radiated) | 10 |
| 2.1.3 | Frequency Stability (Temperature) | 13 |
| 2.1.4 | Frequency Stability (Voltage)..... | 15 |
| 2.1.5 | Occupied Bandwidth..... | 17 |
| 2.1.6 | Transmitter Out of Band Spurious Emissions (Conducted)..... | 22 |
| 2.1.7 | Transmitter Out of Band Spurious Emissions (Radiated)..... | 28 |
| 2.1.8 | Band Edge Emissions..... | 32 |
| 2.1.9 | Transmitter AC Power Line Emission requirement..... | 35 |
| 2.2 | Receiver requirement | 37 |
| 2.2.1 | Receiver Spurious Emissions (Radiated)..... | 37 |
| 2.2.2 | Receiver AC Power Line Emission requirement | 40 |
| 3 | Test setup photographs..... | 42 |

1 General information

1.1 Product description

x

Test item : Mobile phone
Manufacturer : Fujitsu Limited
Address : 1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki
211-8588, Japan
Model : F-02A
FCC ID : VQK-F-02A
IC Certification No. : 337E-F02A
Operating frequency range : TX 826.4-846.6 MHz (WCDMA850)
: RX 871.4-891.6 MHz (WCDMA850)
Type of Modulation : QPSK
Receipt date of EUT : Sep.12, 2008
Nominal power voltages : 3.7VDC (Lithium-ion battery)
Power Class : 3 (Maximum power 24dBm nominal)
Antenna Type : integral antenna
Serial numbers : 3573 0802 0002 300 (for Radiated test)
3573 0802 0002 292 (for Conducted test)

1.2 Test(s) performed/ Summary of test result

Applicable Standard(s) : FCC Part22(Oct 01,2007), Part15(Oct 01,2007)
RSS-132 Issue2
Test(s) started : Sep.16, 2008
Test(s) completed : Oct.05, 2008
Purpose of test(s) : Grant for Certification of FCC / IC
Summary of test result : Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result. The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory. Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer : 
T. Kato (EMC Testing Department)

Reviewer : 
T. Ikegami (Manager, EMC Testing Department)

1.3 Test facility

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at RF Technologies Ltd., located in 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948, per October 01, 2007.

The description of the test facilities has been filed under registration number 879401 at the Office of the Federal Communications Commission. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The list of all public test facilities is available on the Internet at <http://www.fcc.gov>.

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI).

Each registered facility number is as follows;

Test site (Semi-anechoic chamber 3m) R-2393

Test site (Shielded room) C-2617

Registered by Industry Canada (IC). The registered facility number is as follows;

Test site No.1(Semi-anechoic chamber 3m) : 6974A-1

1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in “Guide to the expression of uncertainty in measurement (GUM)” published by ISO. The Lab’s uncertainty is determined by referring UKAS Publication LAB34: 2002 “The Expression of Uncertainty in EMC Testing” and CISPR16-4-2: 2003 “Uncertainty in EMC Measurements”.

The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

RF frequency : $\pm 1 \times 10^{-7}$

RF conducted level : ± 1.0 dB

AC Power line emission : ± 1.9 dB

Radiated emission (30MHz - 1000MHz) : ± 5.7 dB

Radiated emission (above 1000MHz) : ± 5.8 dB

Temperature : ± 1 degree

Humidity : ± 5 %

1.5 Description of essential requirements and test results

An overview of radio requirements, as laid out in FCC Part22/15, RSS-132 are given below.

1.5.1 Transmitter requirements

| Test Description | Section in this report | Applicable | Result |
|---|---------------------------|------------|--------|
| Carrier Output Power (Conducted) | 2.1.1 | Yes | Passed |
| Carrier Output Power (Radiated) | 2.1.2 | Yes | Passed |
| Frequency Stability (Temperature Variation) | 2.1.3 | Yes | Passed |
| Frequency Stability (Voltage Variation) | 2.1.4 | Yes | Passed |
| Occupied Bandwidth | 2.1.5 | Yes | Passed |
| Out of Band Emissions (Conducted) | 2.1.6 | Yes | Passed |
| Out of Band Emissions (Radiated) | 2.1.7 | Yes | Passed |
| Band Edge Emissions | 2.1.8 | Yes | Passed |

1.5.2 Receiver requirements

| Test Description | Section in this report | Applicable | Result |
|-----------------------------|---------------------------|------------|--------|
| Radiated Spurious Emissions | 2.2.1 | Yes | Passed |

1.5.3 AC Power Line Parameters

| Test Description | Section in this report | Applicable | Result |
|---|---------------------------|------------|--------|
| AC power line Spurious Emissions (Idle mode) | 2.3.1 | Yes | Passed |
| AC power line Spurious Emissions (Traffic mode) | 2.3.2 | Yes | Passed |

1.5.4 Normal test conditions

Temperature(*) : +15 degC to +35 degC
Relative humidity(*) : 20 % to 75 %
Supply voltage : 3.7 VDC (Nominal)
Measurement Frequency : 826.4 MHz(4132ch), 836.4 MHz(4182ch), 846.6 MHz(4233ch)

* When it is impracticable to carry out tests under these conditions, a note to this effect, stating the ambient temperature and relative humidity during the tests, must be stated separately.

1.5.5 Extreme test conditions

Temperature : -30 °C (min) to +50 °C (max)
Supply voltage : 3.33 VDC (min) to 4.07 VDC (max)

The equipment has a function that it is automatically turned off when min. battery voltage (3.33 V) is detected.

1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

Equipment(s) under test:

| | Item | Manufacturer | Model No. | Serial No. | FCC ID/ IC Certification No. |
|---|--------------|-----------------|--|-----------------|------------------------------------|
| A | Mobile phone | Fujitsu Limited | F-02A | 357308020002300 | VQK-F-02A / 337E-F02A |
| B | Mobile phone | Fujitsu Limited | F-02A (RF cable is attached instead of integral antenna) | 357308020002292 | VQK-F-02A / 337E-F02A |
| C | Battery pack | Fujitsu Limited | CA54310-0005 | None | N/A |
| D | AC Adaptor | NEC Corp. | MAS-BH0008-A002 | None | N/A |

Connected cable(s):

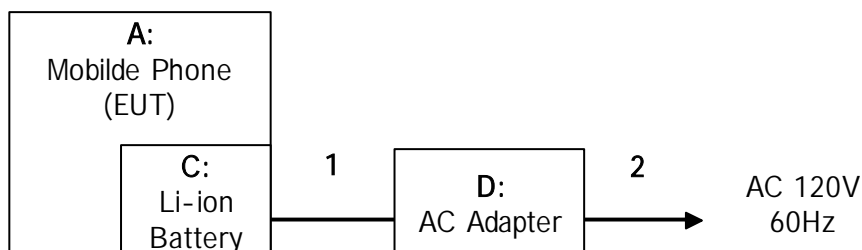
| No. | Item | Identification (Manu.e.t.c) | Shielded YES / NO | Ferrite Core YES / NO | Connector Type Shielded YES / NO | Length (m) |
|-----|----------------|--------------------------------|----------------------|--------------------------------|---|---------------|
| 1 | DC power cable | - | No | No | No | 1.5 |
| 2 | AC power cable | HEWTECH | No | No | No | 0.6 |

1.6.2 Operating condition:

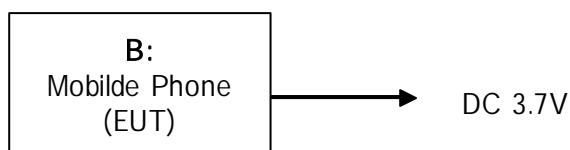
Traffic mode : EUT is connected with RF tester in Max power level.
Idle mode : EUT is under idle mode, no output power is transmitted.

1.6.3 Setup diagram of tested system:

[Configuration I]



[Configuration II]



1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

2 Test procedure and result

2.1 *Transmitter requirements*

2.1.1 Carrier Output Power (Conducted)

Reference Standard

FCC : Part22.913, 2.0146

IC : RSS132 Issue2 Sec4.4, SRSP-503 Issue6 Sec5.1.3

Test Conditions

Date: 2008/09/17

Ambient Temperature: 25 degC

Relative humidity: 65 %

Test Voltage: 3.7 V

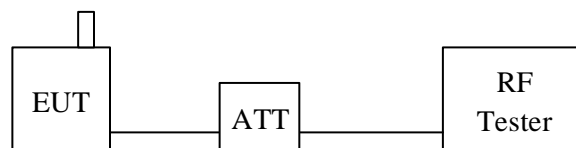
Test Sample

Configuration II

Test Method

- a) EUT is connected to RF tester with pseudo random data modulation and set to maximum output power level.
- b) The output power is measured with RF tester (CMU200 etc.).

Test Setup



Test Results

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Result |
|-----------------|--------------------|-----------------------|----------------|--------|
| Bottom (4132ch) | 826.4 | 22.5 | 38.4 | Pass |
| Middle (4182ch) | 836.4 | 22.6 | 38.4 | Pass |
| Top (4233ch) | 846.6 | 22.7 | 38.4 | Pass |

Test Equipment Used

| | |
|----------------|------------|
| Equipment name | RFT ID No. |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test.

2.1.2 Carrier Output Power (Radiated)

Reference Standard

FCC : Part22.913, 2.0146

IC : RSS132 Issue2 Sec4.4, SRSP-503 Issue6 Sec5.1.3

Test Conditions

Date: 2008/09/18
Ambient Temperature: 23 degC
Relative humidity: 68 %
Test Voltage: 3.7 V

Test Sample

Configuration I

Test Method

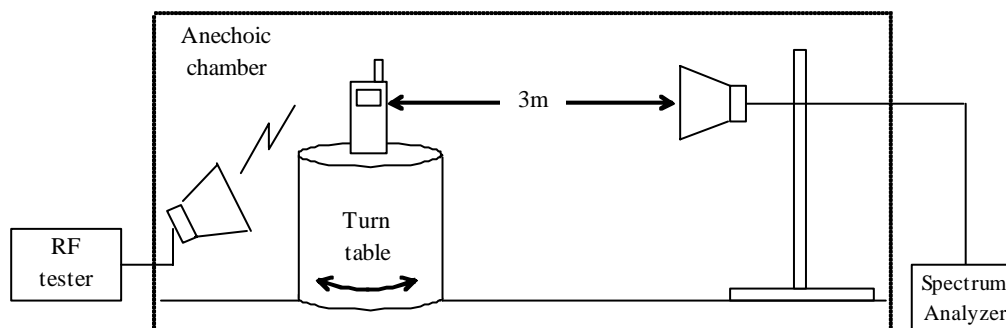
Substitution method is used for this test.

- a) EUT is set on non-conducting turntable and the output power is set to the maximum level.
- b) As a receive antenna, Horn antenna is used for high frequency range (above 1GHz), and Bilogical antenna is used for low frequency range (30MHz to 1GHz).
- c) Maximum power is measured by a spectrum analyzer(SA) in below conditions.
 - Turntable is rotated 360 degrees.
 - The height of receive antenna is changed from 1m to 4m.
 - Receive antenna polarization is set to vertical and horizontal.
 - This maximum power is recorded.
 - During this measurement, receive antenna is adjusted the direction to keep the EUT within the beamwidth of receive antenna.
- d) Reference antenna is replaced with EUT, and connected with signal generator(SG).
 - SG output power is adjusted to get same level as the recorded maximum radiated EUT power by SA.
- e) Radiated output power (Pout) is calculated with adjusted SG output (Psg) [dBm], reference antenna gain (Gref) [dBd] and cable loss between SG and reference antenna (Lcab) [dB].

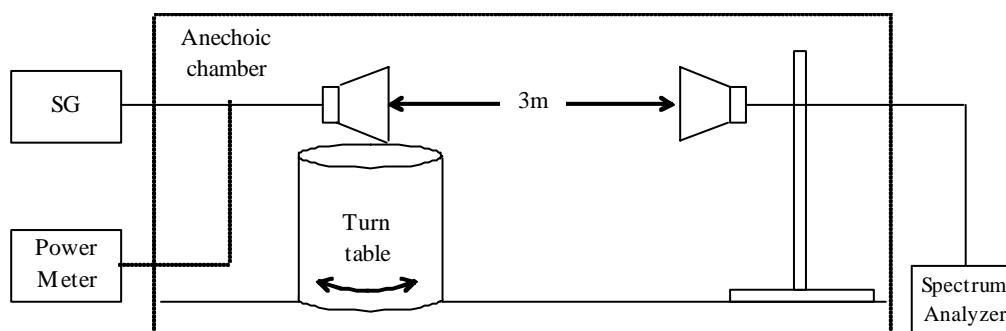
$$P_{out} [dBm \text{ e.r.p}] = P_{sg} - G_{ref} + L_{cab}$$

Test Setup

[Measurement]



[Substitution]



Test Results

| Channel | Frequency (MHz) | Output Power (dBm e.r.p) | Limit (dBm e.r.p) | Result |
|-----------------|-----------------|--------------------------|-------------------|--------|
| Bottom (4132ch) | 826.4 | 24.2 | 38.4 | Pass |
| Middle (4182ch) | 836.4 | 23.4 | 38.4 | Pass |
| Top (4233ch) | 846.6 | 24.2 | 38.4 | Pass |

Test Equipment Used

| Equipment name | RFT ID No. |
|-------------------|------------|
| Spectrum Analyzer | SA06 |
| Receive Antenna | DH02 |
| Reference Antenna | LA02 |
| Signal Generator | SG05 |
| Power Meter | PM03 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test.

2.1.3 Frequency Stability (Temperature)

Reference Standard

FCC : Part22.355, 2.1055

IC : RSS132 Issue2 Sec4.3

Test Conditions

Date: 2008/09/16

Ambient Temperature: 27 degC

Relative humidity: 68 %

Test Voltage: 3.7 V

Test Sample

Configuration II

Test Method

To measure the carrier frequency, "Frequency error measurement" function of RF tester is used.

a) EUT is hold about 30 minutes under measurement temperature condition.

b) EUT is powered on with nominal voltage.

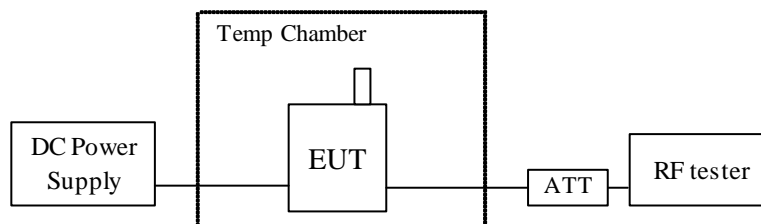
c) EUT is connected to RF tester with Max transmit power level.

d) Frequency error is measured by RF tester.

Process b) to d) must be finished within 2 minutes to prevent EUT warming.

e) Process a) to d) is repeated at 10deg increments from -30 to +50degC.

Test Setup



Test Results**Bottom Channel (4132ch, Nominal Freq.:826.4MHz)**

| Temperature (deg C) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Result |
|------------------------|-------------------------|--------------------------|-------------|--------|
| -30 | 18 | 0.02 | ± 2.5 | Passed |
| -20 | 14 | 0.02 | ± 2.5 | Passed |
| -10 | -7 | -0.01 | ± 2.5 | Passed |
| 0 | 17 | 0.02 | ± 2.5 | Passed |
| 10 | 17 | 0.02 | ± 2.5 | Passed |
| 20 | -13 | -0.02 | ± 2.5 | Passed |
| 30 | -26 | -0.03 | ± 2.5 | Passed |
| 40 | -27 | -0.03 | ± 2.5 | Passed |
| 50 | -26 | -0.03 | ± 2.5 | Passed |

Test Equipment Used

| | |
|----------------|------------|
| Equipment name | RFT ID No. |
| RF tester | RC03 |
| Temp Chamber | TC01 |

Final Result

The EUT met the requirements of the standard for this test

2.1.4 Frequency Stability (Voltage)

Reference Standard

FCC : Part22.355, 2.1055

IC : RSS132 Issue2 Sec4.3

Test Conditions

Date: 2008/09/16
Ambient Temperature: 27 degC
Relative humidity: 68 %
Test Voltage: 3.33 V to 4.07 V

Test Sample

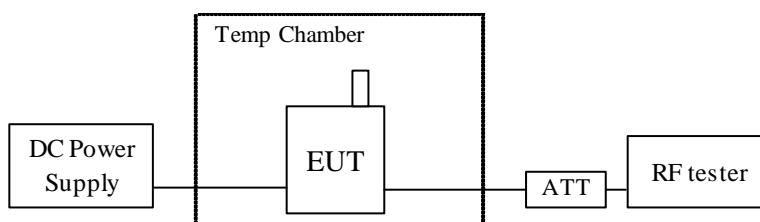
Configuration II

Test Method

To measure the carrier frequency, "Frequency error measurement" function of RF tester is used.

- EUT is powered on with nominal voltage. Temperature is 20degC.
- EUT is connected to RF tester with Max transmitter power level.
- Frequency error is measured by RF tester.
- Process a) to c) is repeated at minimum and maximum voltage condition.

Test Setup



Test Results**Bottom Channel (4132ch, Nominal Freq.:826.4MHz)**

| Voltage (V) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Result |
|-------------|----------------------|-----------------------|-------------|--------|
| 3.33 | -10 | -0.01 | ± 2.5 | Passed |
| 3.7 | -13 | -0.02 | ± 2.5 | Passed |
| 4.07 | -13 | -0.02 | ± 2.5 | Passed |

Test Equipment Used

| Equipment name | RFT ID No. |
|----------------|------------|
| RF tester | RC03 |
| Temp chamber | TC01 |

Final Result

The EUT met the requirements of the standard for this test

2.1.5 Occupied Bandwidth

Reference Standard

FCC : Part2.1049

IC : RSS-Gen Issue2 Sec4.6.1

Test Conditions

Date: 2008/09/19

Ambient Temperature: 25 degC

Relative humidity: 64 %

Test Voltage: 3.7 V

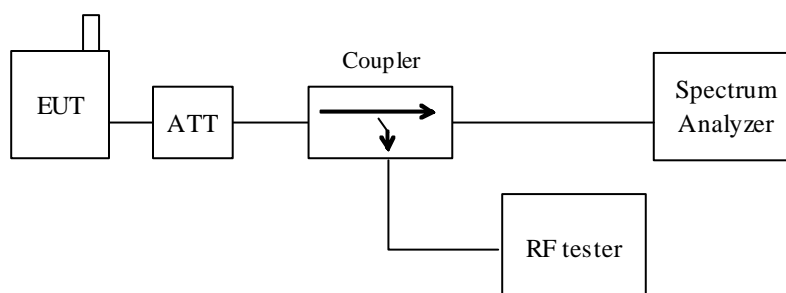
Test Sample

Configuration II

Test Method

- EUT is connected to RF tester with Max transmitter power level.
- 26dB bandwidth is measured by Spectrum Analyzer.
- 99% occupied bandwidth of transmitter spectrum is measured by Spectrum Analyzer.

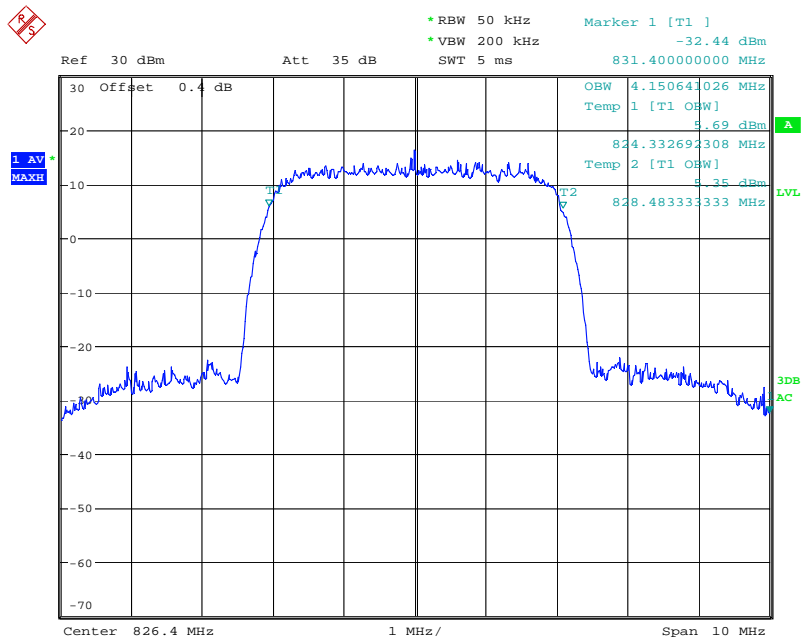
Test Setup



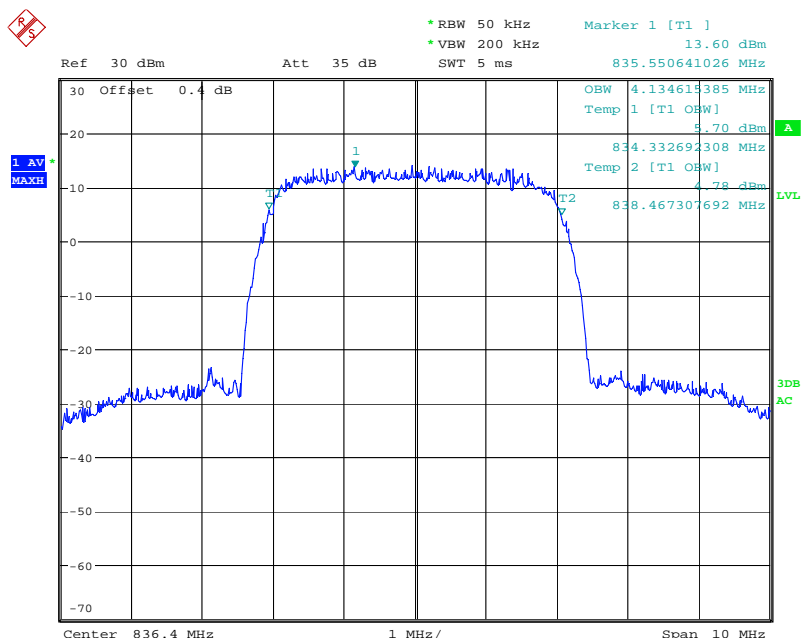
Test Results

| Channel | Frequency (MHz) | Resolution Bandwidth (kHz) | Video Bandwidth (kHz) | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|-----------------|-----------------|----------------------------|-----------------------|--------------------------|----------------------|
| Bottom (4132ch) | 826.4 | 50kHz | 200kHz | 4.151 | 4.679 |
| Middle (4182ch) | 836.4 | 50kHz | 200kHz | 4.135 | 4.679 |
| Top (4233ch) | 846.6 | 50kHz | 200kHz | 4.135 | 4.746 |

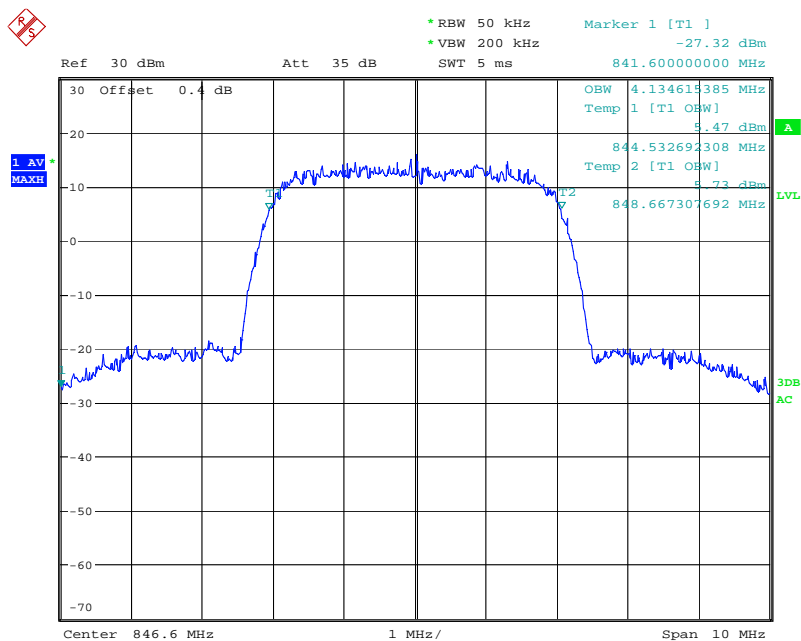
Graphical Data



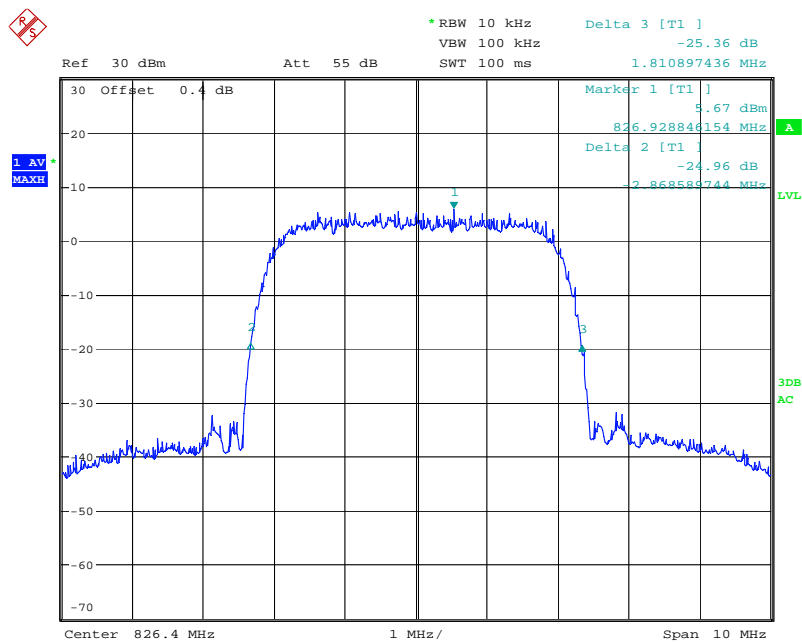
4132ch Occupied Bandwidth



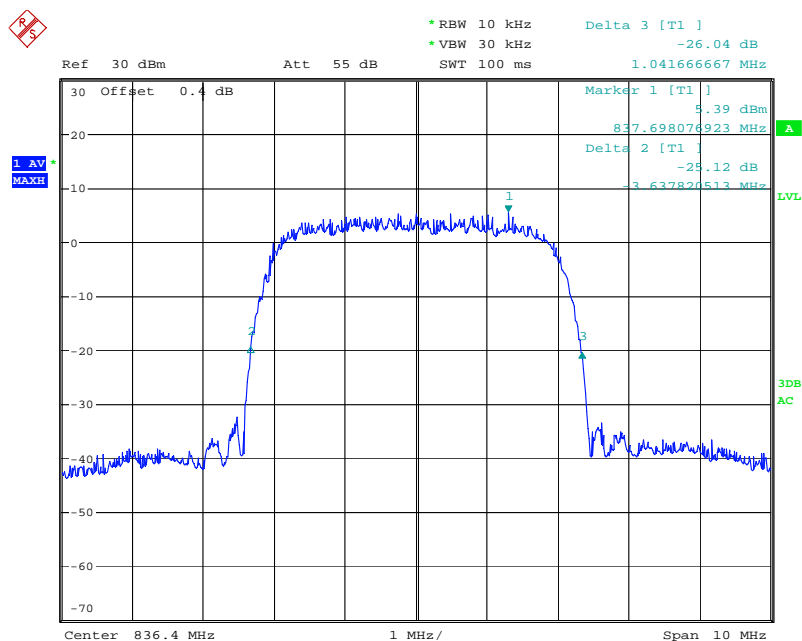
4182ch Occupied Bandwidth



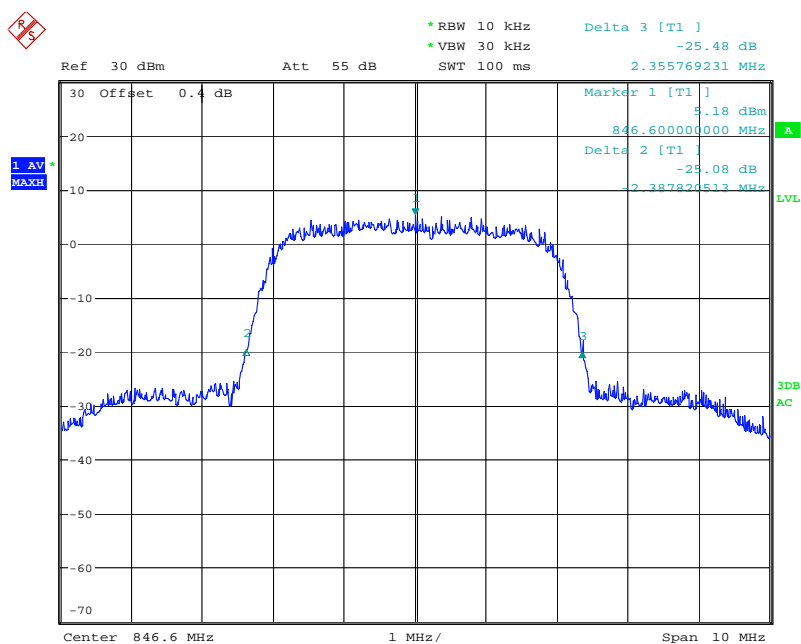
4233ch Occupied Bandwidth



4132ch 26dB Bandwidth



4182ch 26dB Bandwidth



4233ch 26dB Bandwidth

Test Equipment Used

| Equipment name | RFT ID No. |
|-------------------|------------|
| Spectrum Analyzer | TR06 |
| RF tester | RC03 |

2.1.6 Transmitter Out of Band Spurious Emissions (Conducted)

Reference Standard

FCC : Part22.917

IC : RSS132 Issue2 Sec4.5

Test Conditions

Date: 2008/09/17

Ambient Temperature: 25 degC

Relative humidity: 66 %

Test Voltage: 3.7 V

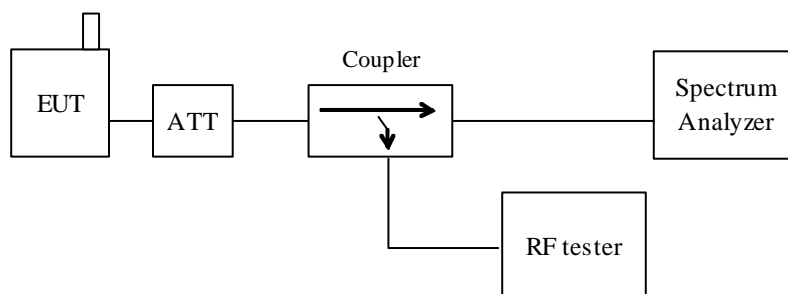
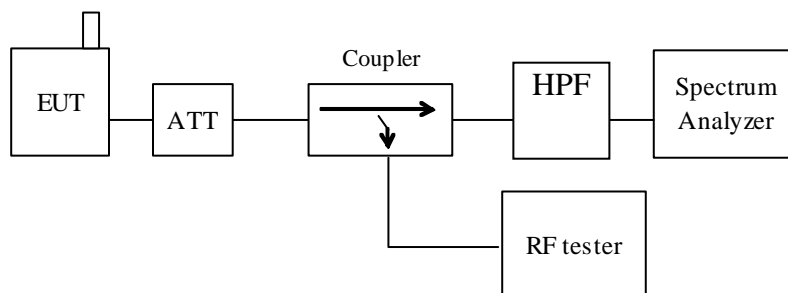
Test Sample

Configuration II

Test Method

- a) EUT is connected to RF tester with Max transmitter power level.
- b) Out of band Spurious is measured by Spectrum Analyzer.
- c) Resolution band width of spectrum analyzer is set to 1MHz (above 1GHz) or 100kHz (below 1GHz).

Test Setup

30MHz to 1500MHzabove 1500MHz

Test Results

Bottom Channel (4132ch, Nominal Freq.:826.4MHz)

| Measurement Frequency (MHz) | Measurement Bandwidth (MHz) | Emission Level (dBm) | Limit (dBm) | Result Pass/Fail |
|-----------------------------|-----------------------------|----------------------|-------------|------------------|
| 1652.8 | 1 | -49.5 | -13.0 | Pass |
| 2479.2 | 1 | -56.9 | -13.0 | Pass |
| 3305.6 | 1 | -53.1 | -13.0 | Pass |
| 4132.0 | 1 | -48.2 | -13.0 | Pass |
| 4958.4 | 1 | -59.3 | -13.0 | Pass |
| 5784.8 | 1 | < -60.0 | -13.0 | Pass |
| 6611.2 | 1 | < -60.0 | -13.0 | Pass |
| 7437.6 | 1 | < -60.0 | -13.0 | Pass |
| 8264.0 | 1 | < -60.0 | -13.0 | Pass |
| others | | none | -13.0 | Pass |

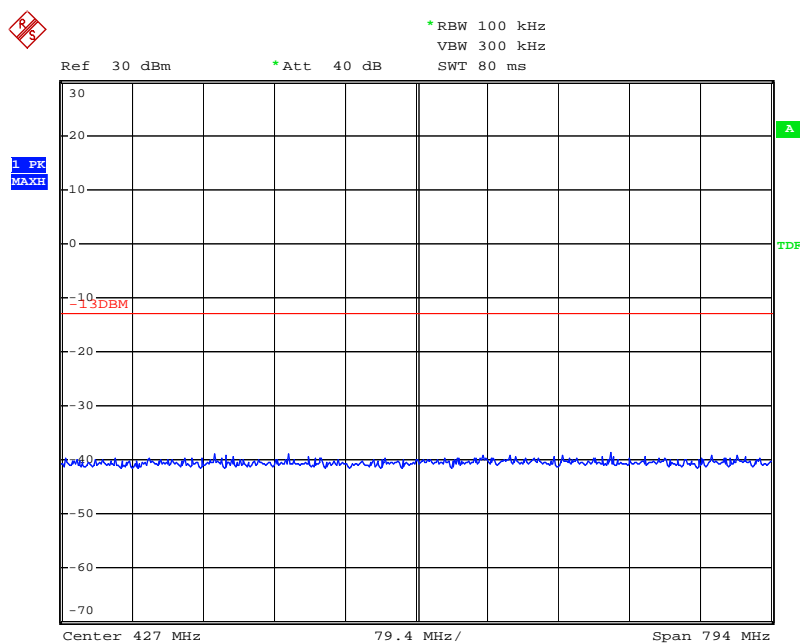
Middle Channel (4182ch, Nominal Freq.:836.4MHz)

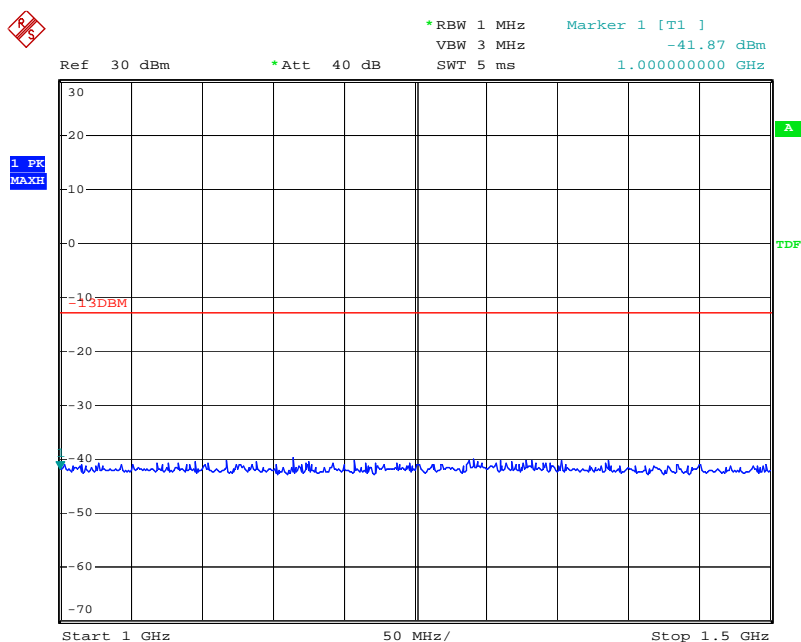
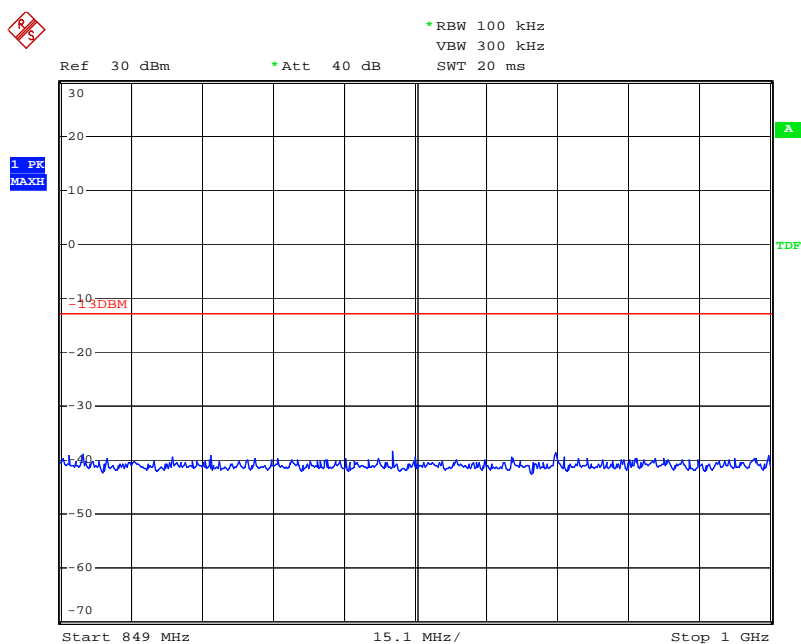
| Measurement Frequency (MHz) | Measurement Bandwidth (MHz) | Emission Level (dBm) | Limit (dBm) | Result Pass/Fail |
|-----------------------------|-----------------------------|----------------------|-------------|------------------|
| 1672.8 | 1 | -49.2 | -13.0 | Pass |
| 2509.2 | 1 | -55.5 | -13.0 | Pass |
| 3345.6 | 1 | -50.3 | -13.0 | Pass |
| 4182.0 | 1 | -46.8 | -13.0 | Pass |
| 5018.4 | 1 | -58.2 | -13.0 | Pass |
| 5854.8 | 1 | < -60.0 | -13.0 | Pass |
| 6691.2 | 1 | < -60.0 | -13.0 | Pass |
| 7527.6 | 1 | < -60.0 | -13.0 | Pass |
| 8364.0 | 1 | < -60.0 | -13.0 | Pass |
| others | | none | -13.0 | Pass |

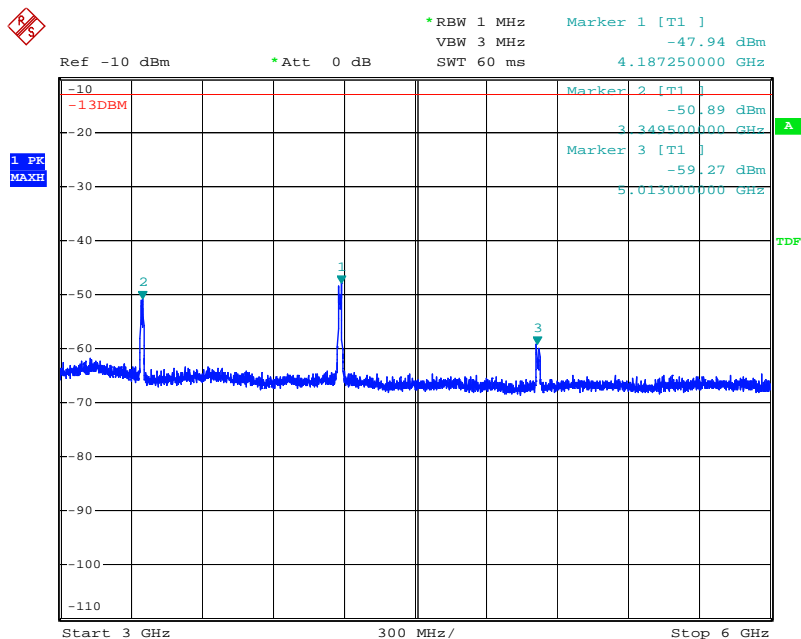
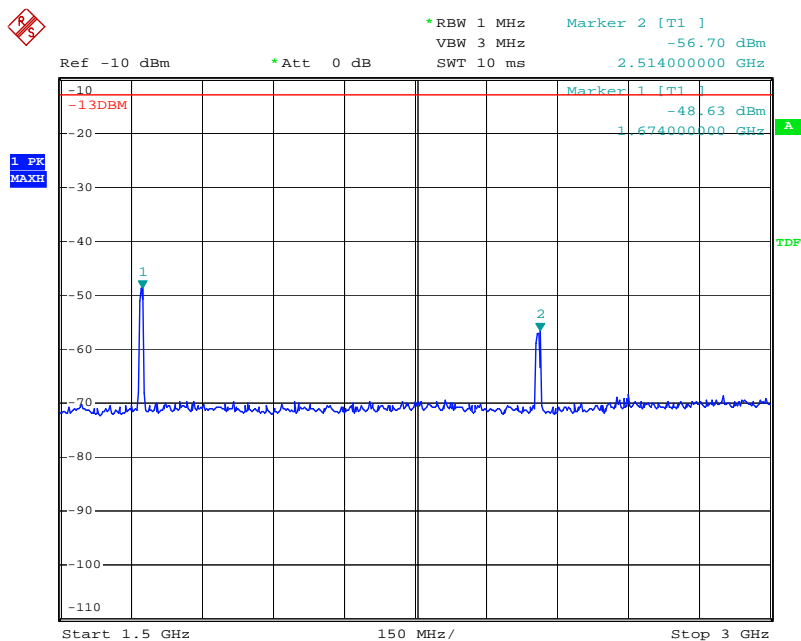
Top Channel (4233ch, Nominal Freq.:846.6MHz)

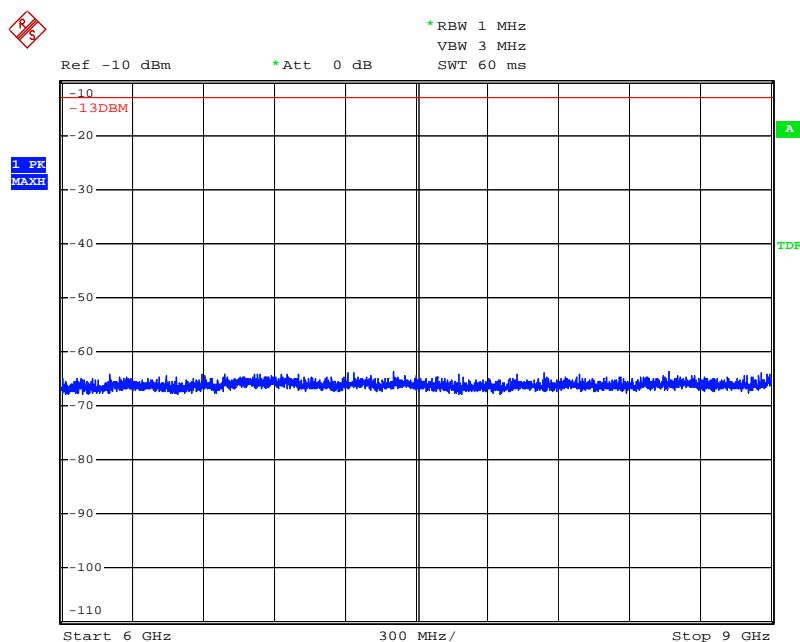
| Measurement Frequency (MHz) | Measurement Bandwidth (MHz) | Emission Level (dBm) | Limit (dBm) | Result Pass/Fail |
|-----------------------------|-----------------------------|----------------------|-------------|------------------|
| 1693.2 | 1 | -54.5 | -13.0 | Pass |
| 2539.8 | 1 | -57.4 | -13.0 | Pass |
| 3386.4 | 1 | -48.3 | -13.0 | Pass |
| 4233.0 | 1 | -45.5 | -13.0 | Pass |
| 5079.6 | 1 | -58.0 | -13.0 | Pass |
| 5926.2 | 1 | < -60.0 | -13.0 | Pass |
| 6772.8 | 1 | < -60.0 | -13.0 | Pass |
| 7619.4 | 1 | < -60.0 | -13.0 | Pass |
| 8466.0 | 1 | < -60.0 | -13.0 | Pass |
| others | | none | -13.0 | Pass |

Graphical Data (4182ch)









Test Equipment Used

| Equipment name | RFT ID No. |
|-------------------|------------|
| Spectrum Analyzer | SA06 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test.

2.1.7 Transmitter Out of Band Spurious Emissions (Radiated)

Reference Standard

FCC : Part22.917

IC : RSS132 Issue2 Sec4.5

Test Conditions

Date: 2008/09/18

Ambient Temperature: 23 degC

Relative humidity: 68 %

Test Voltage: 3.7 V

Test Sample

Configuration I

Test Method

Substitution method is used for this test.

a) EUT is set on non-conducting turntable and the output power is set to the maximum level.

b) As a receive antenna, Horn antenna is used for high frequency range (above 1GHz),
and Biological antenna is used for low frequency range (30MHz to 1GHz).

c) The maximum level of each spurious emission is measured by a spectrum analyzer(SA) in
below conditions.

Turntable is rotated 360 degrees.

The height of receive antenna is changed from 1m to 4m.

Receive antenna polarization is set to vertical and horizontal.

EUT was placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.

This emission level is recorded.

During this measurement, receive antenna is adjusted the direction to keep the EUT within the
beamwidth of receive antenna.

d) Reference antenna is replaced with EUT, and connected with signal generator(SG).

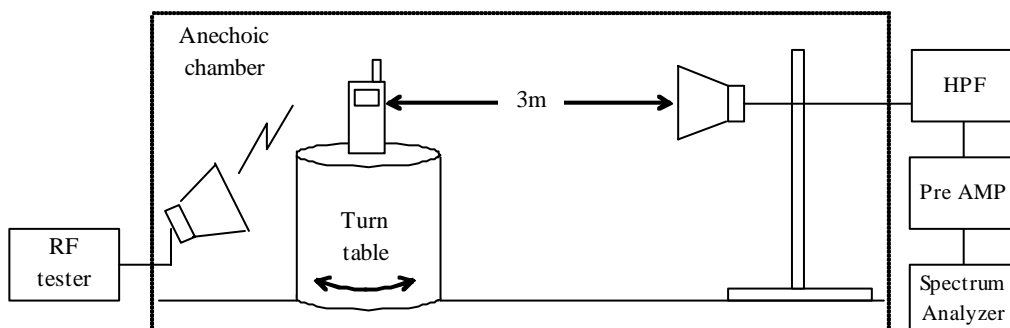
SG output power is adjusted to get same level as the recorded maximum radiated EUT
power by SA.

e) Radiated output power (Pout) is calculated with adjusted SG output (Psg) [dBm],
reference antenna gain (Gref) [dBi] and cable loss between SG and reference antenna
(Lcab) [dB].

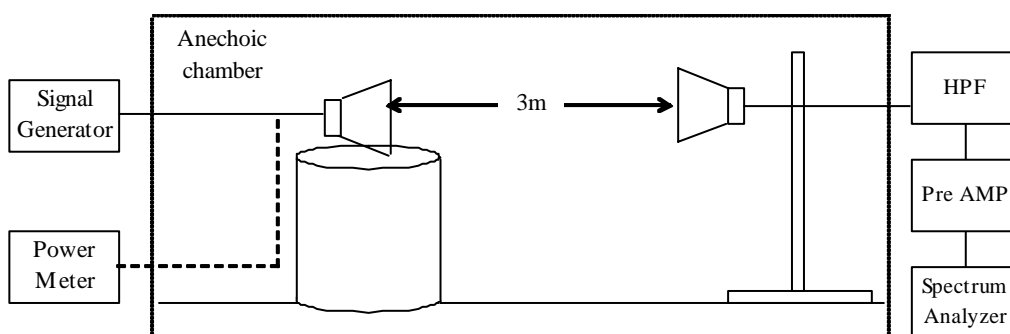
$$P_{out} [\text{dBm e.r.p}] = P_{sg} - (G_{ref} - 2.15) + L_{cab}$$

Test Setup

[Measurement]



[Substitution]



Test Results

Bottom Channel (4132ch, Nominal Freq.:826.4MHz)

| Measurement Frequency (MHz) | Measurement Bandwidth (MHz) | Emission Level(dBm) | | Limit (dBm) | Result Pass/Fail |
|-----------------------------|-----------------------------|---------------------|------------|-------------|------------------|
| | | Vertical | Horizontal | | |
| 1652.8 | 1 | -46.5 | -48.4 | -13.0 | Pass |
| 2479.2 | 1 | -45.9 | -43.3 | -13.0 | Pass |
| 3305.6 | 1 | -46.5 | -46.9 | -13.0 | Pass |
| 4132.0 | 1 | -44.2 | -42.7 | -13.0 | Pass |
| 4958.4 | 1 | -46.2 | -44.1 | -13.0 | Pass |
| 5784.8 | 1 | < -48.9 | < -47.4 | -13.0 | Pass |
| 6611.2 | 1 | < -44.7 | < -44.5 | -13.0 | Pass |
| 7437.6 | 1 | < -46.0 | < -46.0 | -13.0 | Pass |
| 8264.0 | 1 | < -46.1 | < -46.2 | -13.0 | Pass |
| others | | none | none | -13.0 | Pass |

Middle Channel (4182ch, Nominal Freq.:836.4MHz)

| Measurement Frequency (MHz) | Measurement Bandwidth (MHz) | Emission Level(dBm) | | Limit (dBm) | Result Pass/Fail |
|-----------------------------|-----------------------------|---------------------|------------|-------------|------------------|
| | | Vertical | Horizontal | | |
| 1672.8 | 1 | -50.7 | -48.6 | -13.0 | Pass |
| 2509.2 | 1 | -46.3 | -45.9 | -13.0 | Pass |
| 3345.6 | 1 | -45.1 | -46.5 | -13.0 | Pass |
| 4182.0 | 1 | -44.1 | -43.0 | -13.0 | Pass |
| 5018.4 | 1 | -44.7 | -45.7 | -13.0 | Pass |
| 5854.8 | 1 | < -47.9 | < -48.1 | -13.0 | Pass |
| 6691.2 | 1 | < -44.0 | < -43.9 | -13.0 | Pass |
| 7527.6 | 1 | < -46.0 | < -46.0 | -13.0 | Pass |
| 8364.0 | 1 | < -46.0 | < -46.0 | -13.0 | Pass |
| others | | none | none | -13.0 | Pass |

Top Channel (4233ch, Nominal Freq.:846.6MHz)

| Measurement Frequency (MHz) | Measurement Bandwidth (MHz) | Emission Level(dBm) | | Limit (dBm) | Result Pass/Fail |
|-----------------------------|-----------------------------|---------------------|------------|-------------|------------------|
| | | Vertical | Horizontal | | |
| 1693.2 | 1 | -48.1 | -44.4 | -13.0 | Pass |
| 2539.8 | 1 | -48.7 | -46.3 | -13.0 | Pass |
| 3386.4 | 1 | -45.5 | -46.6 | -13.0 | Pass |
| 4233.0 | 1 | -43.4 | -42.9 | -13.0 | Pass |
| 5079.6 | 1 | -43.6 | -45.8 | -13.0 | Pass |
| 5926.2 | 1 | < -47.1 | < -47.3 | -13.0 | Pass |
| 6772.8 | 1 | < -44.2 | < -44.0 | -13.0 | Pass |
| 7619.4 | 1 | < -46.5 | < -45.9 | -13.0 | Pass |
| 8466.0 | 1 | < -45.9 | < -45.5 | -13.0 | Pass |
| others | | none | none | -13.0 | Pass |

Test Equipment Used

| Equipment name | RFT ID No. |
|-------------------|------------|
| Spectrum Analyzer | SA06 |
| Receive Antenna | DH02 |
| Reference Antenna | DH01 |
| Signal Generator | SG05 |
| Power Meter | PM03 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test.

2.1.8 Band Edge Emissions

Reference Standard

FCC : Part22.917

IC : RSS132 Issue2 Sec4.5

Test Conditions

Date: 2008/09/19

Ambient Temperature: 25 degC

Relative humidity: 64 %

Test Voltage: 3.7 V

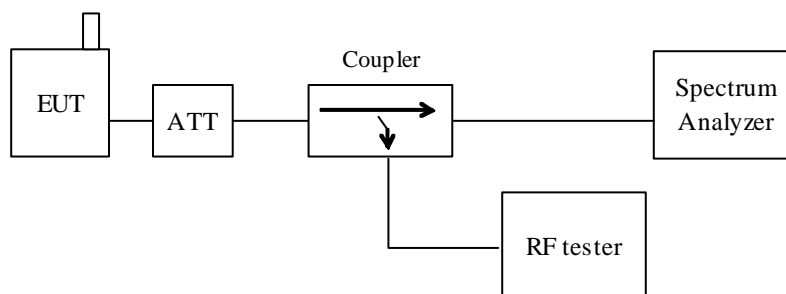
Test Sample

Configuration II

Test Method

- EUT is connected to RF tester with Max transmitter power level.
- Lower band edge level is measured in bottom channel transmission.
- Higher band edge level is measured in top channel transmission.
- 1% of band width is used for resolution band width for spectrum analyzer.

Test Setup



Test Results

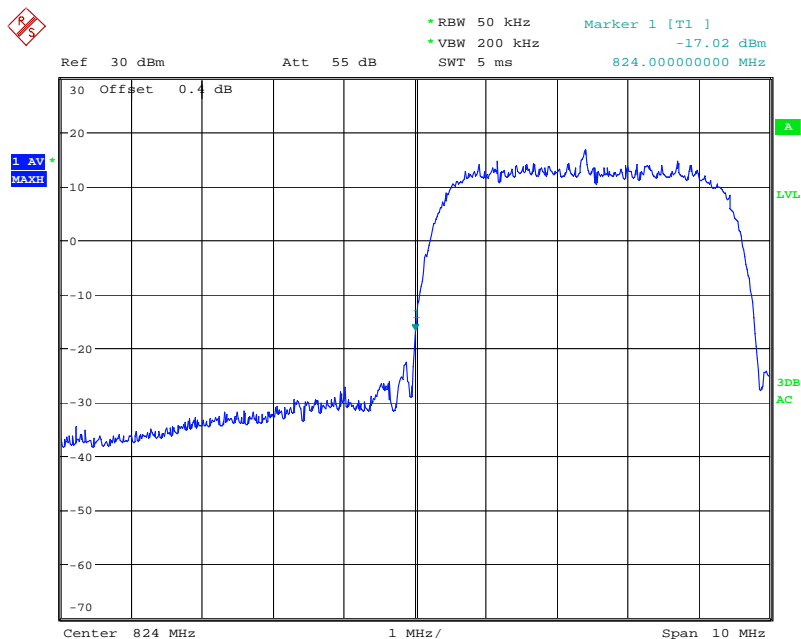
Bottom Band Edge

| Measured Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Result |
|-----------------------------|---------------------|----------------|--------|
| 824.0 | -17.0 | -13 | Passed |

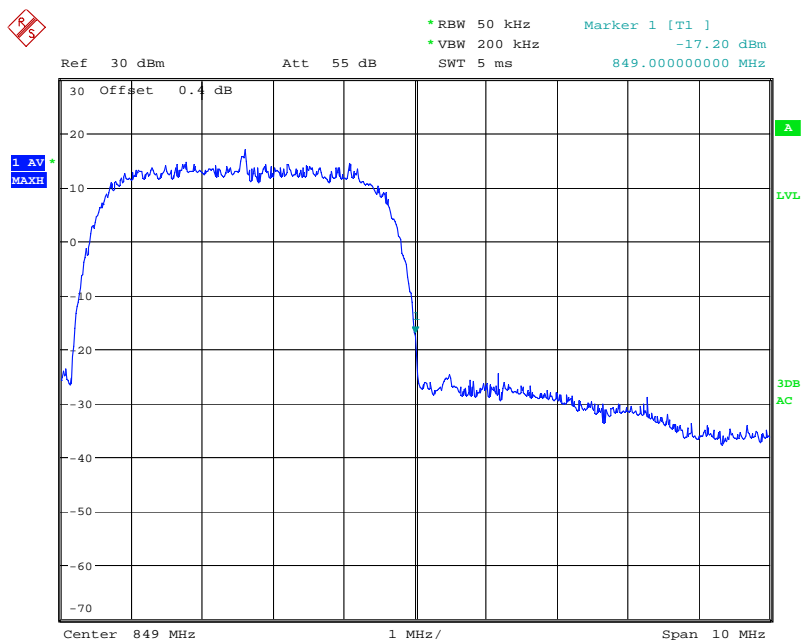
Top Band Edge

| Measured Frequency (MHz) | Peak Level | Limit | Result |
|-----------------------------|------------|-------|--------|
| 849.0 | -17.2 | -13 | Passed |

Graphical Data



Bottom band edge



Top band edge

Test Equipment Used

| Equipment name | RFT ID No. |
|-------------------|------------|
| Spectrum Analyzer | TR06 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test.

2.1.9 Transmitter AC Power Line Emission requirement

Reference Standard

FCC : Part15.207

IC : RSS-Gen Issue1 Sec7.2

Test Conditions

Date: 2008/10/01
Ambient Temperature: 20 degC
Relative humidity: 65 %
Test Voltage: 3.7 V

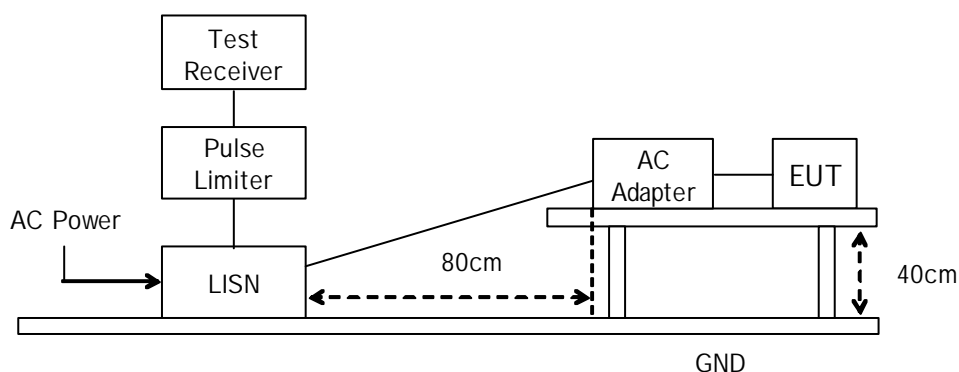
Test Sample

Configuration I

Test Method

- EUT is connected to RF tester with Max transmitter power level.
 - AC power is supplied to AC charger through LISN.
 - AC charger is connected to EUT.
 - AC Power Line emission is measured by EMI receiver.
- Both Live/Neutral is measured emission level.

Test Setup



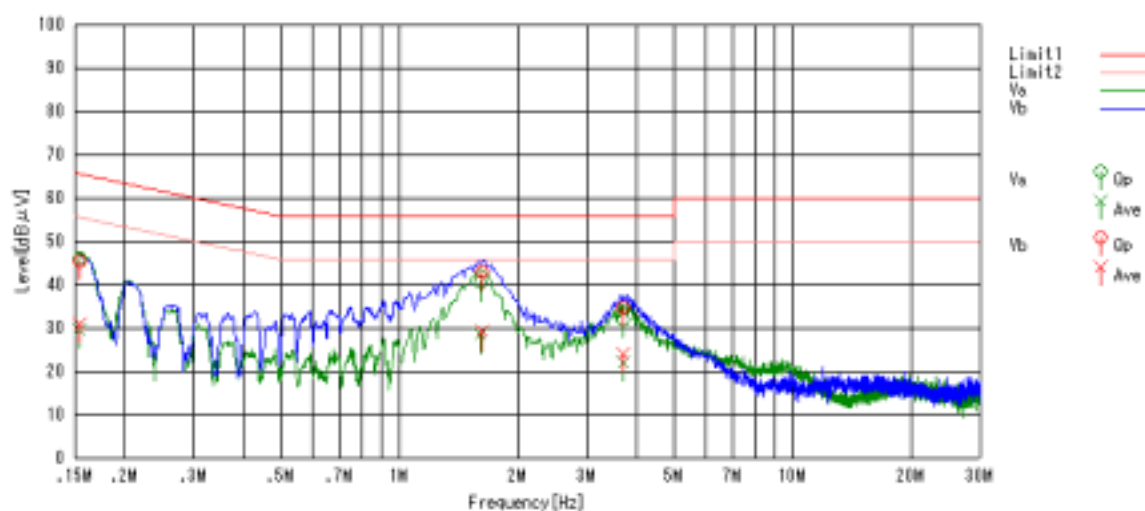
Limit

| Frequency (MHz) | Limit QP (dBuV) | Limit AV (dBuV) |
|-----------------|-----------------|-----------------|
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

Test Results

| Frequency (MHz) | Line (Live/Neutral) | QP Level (dBuV) | AVE Level (dBuV) | QP Limit (dBuV) | AVE Limit (dBuV) | Result |
|-----------------|---------------------|-----------------|------------------|-----------------|------------------|--------|
| 0.153 | Live | 46.3 | 29.6 | 65.8 | 55.8 | Passed |
| 1.606 | Live | 40.5 | 28.4 | 56.0 | 46.0 | Passed |
| 3.705 | Live | 32.1 | 22.0 | 56.0 | 46.0 | Passed |
| 0.153 | Neutral | 45.6 | 31.1 | 65.8 | 55.8 | Passed |
| 1.614 | Neutral | 43.0 | 29.2 | 56.0 | 46.0 | Passed |
| 3.709 | Neutral | 34.8 | 24.2 | 56.0 | 46.0 | Passed |

Graphical Data



Test Equipment Used

| Equipment name | RFT ID No. |
|----------------|------------|
| EMI Receiver | TR06 |
| LISN | LN05 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test

2.2 Receiver requirement

2.2.1 Receiver Spurious Emissions (Radiated)

Reference Standard

FCC : Part15.109

IC : RSS132 Issue2 Sec4.6

Test Conditions

Date: 2008/09/18

Ambient Temperature: 23 degC

Relative humidity: 68 %

Test Voltage: 3.7 V

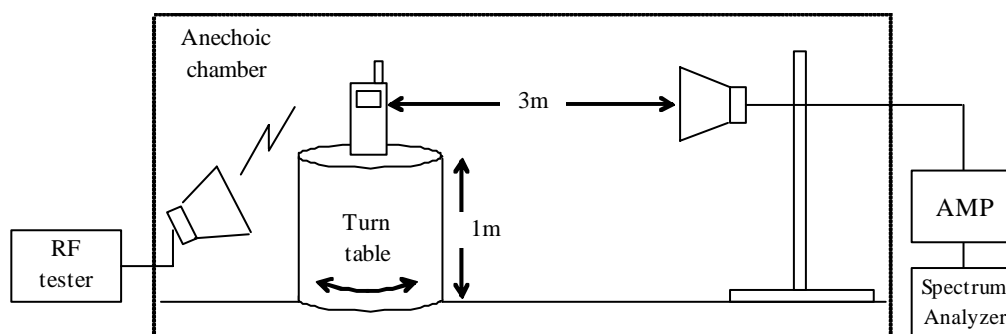
Test Sample

Configuration I

Test Method

- EUT is connected to RF tester with idle mode.
- Radiated receiver spurious emission is received by receive antenna.
- Turn table is rotated 360deg.
- Maximum level of each spurious is measured by spectrum analyzer.
- RBW of spectrum analyzer is set to 100kHz for 30 - 1000MHz, 1MHz for above 1GHz.
- Level is measured with QP detect for 30 - 1000MHz, Average detect for above 1GHz.
- EUT was placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.

Test Setup



Limit

| Frequency (MHz) | Distance (m) | Field strength (uV/m) | Field strength (dBuV/m) |
|-----------------|--------------|-----------------------|-------------------------|
| 30 - 88 | 3 | 100 | 40.0 |
| 88 - 216 | 3 | 150 | 43.5 |
| 216 - 960 | 3 | 200 | 46.0 |
| above 960 | 3 | 500 | 54.0 |

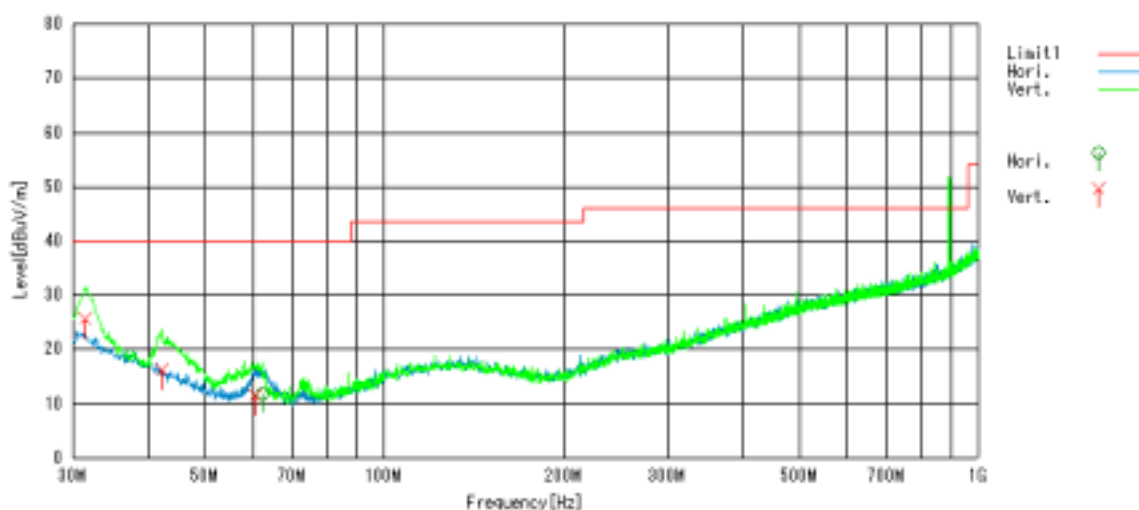
Test Results

| Frequency (MHz) | Antenna | Field strength (dBuV/m) | Limit (dBuV/m) | Result |
|-----------------|---------|-------------------------|----------------|--------|
| 31.45 | Vert | 25.5 | 40.0 | Passed |
| 42.24 | Vert | 16.1 | 40.0 | Passed |
| 60.66 | Vert | 11.4 | 40.0 | Passed |
| 62.43 | Hori | 11.8 | 40.0 | Passed |

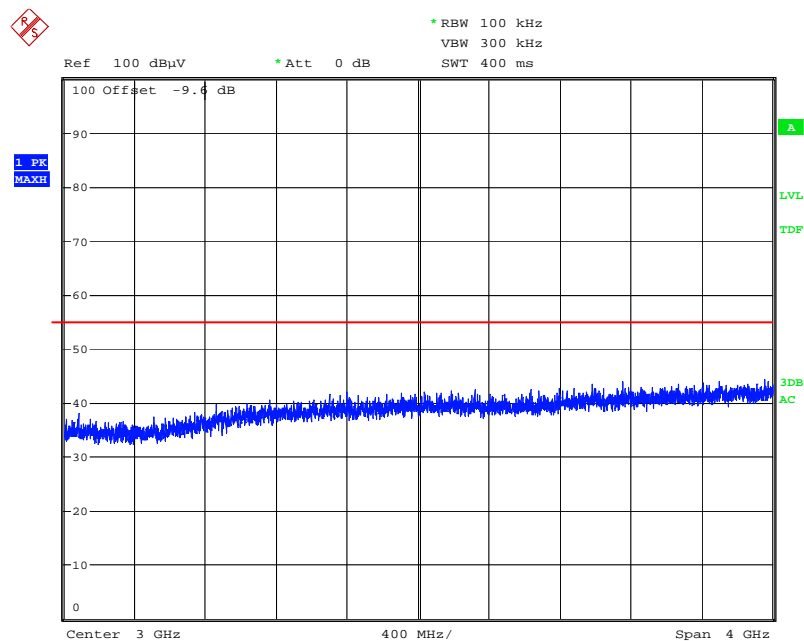
There is no other spurious.

The EUT could not achieved continuous receiving mode, therefore the measurement was carried out under idle mode. The EUT is registered to the RF tester.

Graphical Data



Note : A spectrum @881MHz is downlink signal from RF tester. This is used to set EUT in idle mode. This is not a spurious emission from EUT.



Test Equipment Used

| | |
|-------------------|------------|
| Equipment name | RFT ID No. |
| Spectrum Analyzer | SA06, TR04 |
| Receive Antenna | DH01, BA03 |
| Pre-AMP | PR04, PR03 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test.

2.2.2 Receiver AC Power Line Emission requirement

Reference Standard

FCC : Part15.107

IC : RSS-Gen Issue1 Sec7.2

Test Conditions

Date: 2008/10/01

Ambient Temperature: 20 degC

Relative humidity: 65 %

Test Voltage: 3.7 V

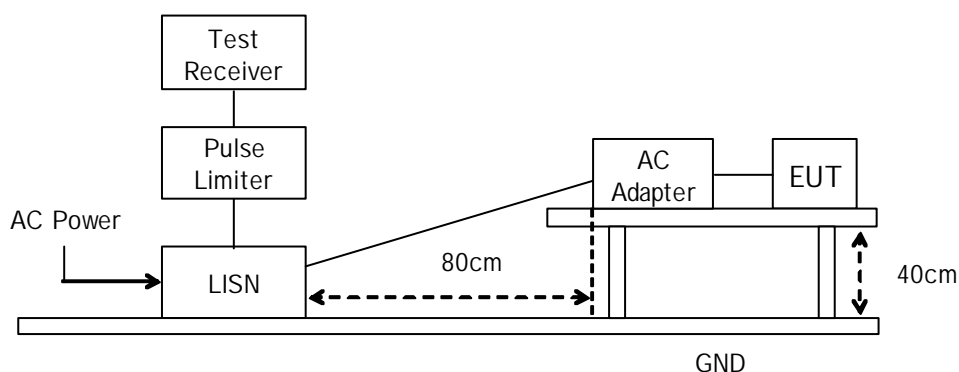
Test Sample

Configuration I

Test Method

- EUT is connected to RF tester with idle mode.
- AC power is supplied to AC charger through LISN.
- AC charger is connected to EUT.
- AC Power Line emission is measured by EMI receiver.
Both Live/Neutral is measured emission level.

Test Setup



Limit

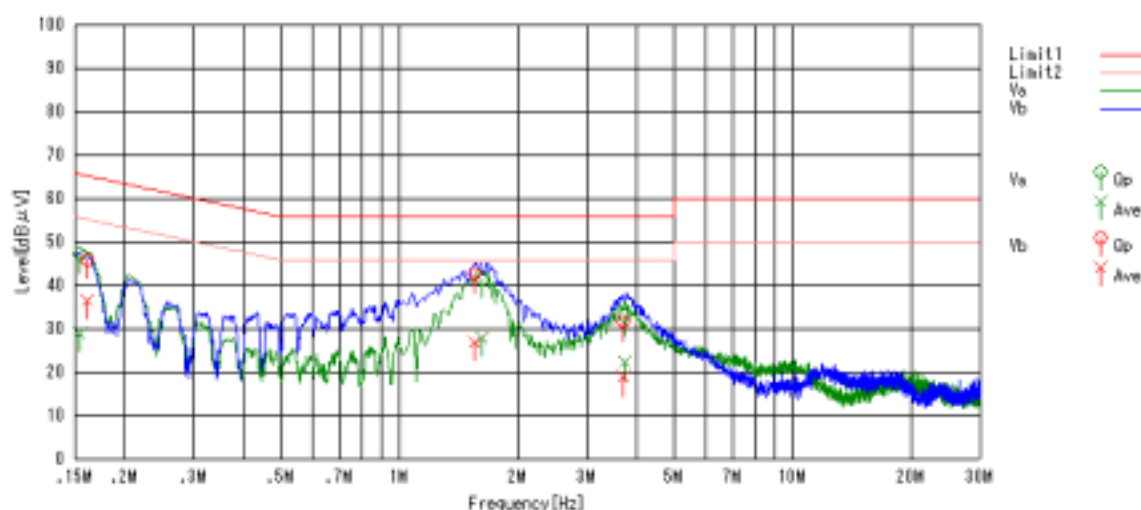
| Frequency (MHz) | Limit QP (dBuV) | Limit AV (dBuV) |
|-----------------|-----------------|-----------------|
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

Test Results

The EUT could not achieved continuous receiving mode, therefore the measurement was carried out under receiving ready condition of the EUT. The EUT is registered to the RF tester.

| Frequency (MHz) | Line (Live/Neutral) | QP Level (dBuV) | AVE Level (dBuV) | QP Limit (dBuV) | AVE Limit (dBuV) | Result |
|-----------------|---------------------|-----------------|------------------|-----------------|------------------|--------|
| 0.153 | Live | 47.1 | 29.0 | 65.8 | 55.8 | Passed |
| 1.621 | Live | 41.5 | 28.0 | 56.0 | 46.0 | Passed |
| 3.731 | Live | 32.9 | 22.4 | 56.0 | 46.0 | Passed |
| 0.160 | Neutral | 45.9 | 36.6 | 65.5 | 55.5 | Passed |
| 1.549 | Neutral | 42.6 | 26.8 | 56.0 | 46.0 | Passed |
| 3.693 | Neutral | 31.6 | 18.8 | 56.0 | 46.0 | Passed |

Graphical Data



Test Equipment Used

| Equipment name | RFT ID No. |
|----------------|------------|
| EMI Receiver | TR06 |
| LISN | LN05 |
| RF tester | RC03 |

Final Result

The EUT met the requirements of the standard for this test

List of utilized test equipment/ calibration

| RFT ID No. | Kind of Equipment and Precision | Manufacturer | Model No. | Serial Number | Calibration Date | Calibrated until |
|------------|----------------------------------|---------------|-----------------|---------------|------------------|------------------|
| AC01 | Anechoic Chamber (1st test room) | JSE | 203397C | - | 2008/7/4 | 2009/7/3 |
| AC03 | Anechoic Chamber (3rd test room) | JSE | - | - | 2008/4/8 | 2009/4/7 |
| BA03 | Biological Antenna | CHASE | CBL6111 | 1309 | 2008/5/7 | 2009/5/6 |
| BA04 | Biological Antenna | SCHAFFNER | CA2855 | 2903 | 2008/1/4 | 2009/1/2 |
| BI01 | Biconical Antenna | SCHWARZBECK | VHA9103 | 2359 | 2008/7/1 | 2009/6/30 |
| BI02 | Biconical Antenna | SCHWARZBECK | VHA9103 | 2387 | 2008/7/1 | 2009/6/30 |
| BRF1 | Band Reject Filter (WCDMA2000) | M-City | BRF2000-06 | VT0001 | 2008/4/1 | 2009/3/31 |
| BRF2 | Band Reject Filter (Bluetooth) | MICRO TRONICS | BRM50701 | 024 | 2008/4/1 | 2009/3/31 |
| BRF3 | Band Reject Filter (GSM900) | M-City | BRF0897-03 | RF0005 | 2008/4/1 | 2009/3/31 |
| BRF4 | Band Reject Filter (WCDMA850) | M-City | BRF0835-01 | RF0004 | 2008/4/1 | 2009/3/31 |
| BRF5 | Band Reject Filter (GSM1800) | M-City | BRF1750-01 | RF0006-01 | 2008/9/8 | 2009/9/7 |
| BRF6 | Band Reject Filter (GSM1900) | M-City | BRF1880-02 | RF0006-02 | 2008/9/8 | 2009/9/7 |
| CL11 | Antenna Cable | RFT | - | - | 2008/6/11 | 2009/6/10 |
| CL21 | RF Cable 0.5m | SUCOFLEX | SF104PE | 48772/4PE | 2008/6/10 | 2009/6/9 |
| CL22 | RF Cable 2.0m | SUCOFLEX | SF104 | 274755/4 | 2008/6/10 | 2009/6/9 |
| CL23 | RF Cable 0.5m | SUCOFLEX | SF104PE | 48773/4PE | 2008/6/10 | 2009/6/9 |
| CL24 | RF Cable 5.0m | SUCOFLEX | SF104PE | 48775/4PE | 2008/6/10 | 2009/6/9 |
| CL25 | RF Cable 10m | SUCOFLEX | SF104E | 20752/4E | 2008/5/9 | 2009/5/8 |
| DC01 | Directional Coupler | KRYTAR | 1850 | 77202 | 2008/5/9 | 2009/5/8 |
| HC01 | Harmonic Current Analysis system | NF | ES4153 | 9075640 | 2008/5/20 | 2009/5/19 |
| HPF1 | High Pass Filter (3500MHz) | TOKIMEC | TF323DCA | 603 | 2008/6/9 | 2009/6/8 |
| HPF2 | High Pass Filter (900MHz) | M-City | HPF0900-01 | RF0003-01 | 2008/6/9 | 2009/6/8 |
| HPF3 | High Pass Filter (2500MHz) | M-City | HPF2500-01 | RF0006-03 | 2008/9/8 | 2009/9/7 |
| LA01 | Logperiodic Antenna | SCHWARZBECK | USLP 9143 | 338 | 2008/7/1 | 2009/6/30 |
| LA02 | Logperiodic Antenna | SCHWARZBECK | USLP 9143 | 339 | 2008/7/1 | 2009/6/30 |
| LN02 | LISN (3ph 32A) | SCHWARZBECK | NSLK8128 | 8128-212 | 2008/1/29 | 2009/1/27 |
| LN05 | LISN | Kyoritsu | KNW-407 | 8-1773-2 | 2008/5/21 | 2009/5/20 |
| LN06 | LISN | Kyoritsu | KNW-407 | 8-1773-3 | 2008/5/12 | 2009/5/11 |
| LN11 | LISN (for communication line) | FCC | FCC-TLISN-T4-02 | 20330 | 2008/1/10 | 2009/1/8 |
| LN13 | LISN | Kyoritsu | KNW-407F | 8-2003-3 | 2008/7/14 | 2009/7/13 |
| LP01 | Loop Antenna | EMCO | 6502 | 3436 | 2008/6/10 | 2009/6/9 |
| PL06 | Pulse Limiter | PMM | PL-01 | 0000J10109 | 2008/1/17 | 2009/1/15 |

| RFT ID No. | Kind of Equipment and Precision | Manufacturer | Model No. | Serial Number | Calibration Date | Calibrated until |
|------------|---|----------------------|-------------|---------------|------------------|------------------|
| PL07 | Transient Limiter | Agilent Technologies | 11947A | 3107A04000 | 2007/11/21 | 2008/11/19 |
| PM03 | Power Meter | Anritsu | ML2438A | 99070001 | 2008/7/24 | 2009/7/23 |
| PR03 | Pre. Amplifier | Anritsu | MH648A | M41984 | 2008/5/12 | 2009/5/11 |
| PR04 | Pre. Amplifier (1-26G) | RFT | LNP126 | 060208-01 | 2008/6/10 | 2009/6/9 |
| PR08 | Pre. Amplifier | Sonoma Instrument | 315 | 263504 | 2008/1/10 | 2009/1/9 |
| PR09 | Pre. Amplifier (1-13G) | RFT | AMF4D | 001 | 2007/9/18 | 2008/9/16 |
| PU03 | Power Sensor | Anritsu | MA2472A | 990103 | 2008/7/24 | 2009/7/23 |
| SA06 | Spectrum Analyzer (F/W: 3.60 SP1) | Rohde & Schwarz | FSP40 | 100071 | 2007/10/25 | 2008/10/23 |
| TR04 | Test Receiver (F/W : 3.82 SP1) | Rohde & Schwarz | ESCI | 100447 | 2008/9/16 | 2009/9/15 |
| TR06 | Test Receiver (F/W : 3.93 SP2) | Rohde & Schwarz | ESU26 | 100002 | 2008/9/2 | 2009/9/1 |
| DH01 | DRG Horn Antenna | A.H. Systems | SAS-571 | 785 | 2008/1/31 | 2010/1/29 |
| DH02 | DRG Horn Antenna | A.H. Systems | SAS-200/571 | 239 | 2007/4/20 | 2009/4/18 |
| DH04 | DRB Horn Antenna | Schwarzbeck | BBHA9120B | 2C-005 | 2008/2/13 | 2010/2/11 |
| PM01 | Power Meter | Rohde & Schwarz | NRVS | 100055 | 2008/1/30 | 2009/1/28 |
| PU01 | Power Meter Insertion Unit | Rohde & Schwarz | URV5-Z4 | 100055 | 2008/1/30 | 2009/1/28 |
| RC02 | Radio communication tester (F/W : V5.00) | Rohde & Schwarz | CMU200 | 105097 | 2008/9/17 | 2009/9/16 |
| RC03 | Radio communication tester (F/W : 10.20 #005) | Anritsu | MT8820B | 6200636657 | 2008/6/3 | 2009/6/2 |
| SG04 | Signal Generator | Rohde & Schwarz | SMG | 51400285 | 2008/3/26 | 2009/3/25 |
| SG05 | Signal Generator | Rohde & Schwarz | SMR20 | 100905 | 2008/6/10 | 2009/6/9 |
| SG07 | Signal Generator | Agilent Technologies | N5181A | MY47070251 | 2008/5/12 | 2009/5/11 |
| TC01 | Temperature Chamber | ESPEC | SH-641 | 92000964 | 2008/5/7 | 2009/5/6 |

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.