

# FCC Part 15

## Subpart D Test Report

### of

E.U.T. : DECT 6.0 Cordless Handset  
with Caller ID (Handset PP)

MODEL : H5401

FCC ID. : G9H-H5401A

### for

APPLICANT : Thomson Inc.

ADDRESS : 10330 North Meridian Street Indianapolis, IN  
46290

Test Performed by

**ELECTRONICS TESTING CENTER, TAIWAN**

NO. 34. LIN 5. DINGFU TSUEN, LINKOU SHIANG  
TAIPEI COUNTY, TAIWAN, 24442, R.O.C.

TEL : (02)26023052 FAX: (02)26010910

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Report Number : 07-05-RBF-124-02

# TEST REPORT CERTIFICATION

Applicant : Thomson Inc.  
10330 North Meridian Street Indianapolis, IN 46290

Manufacturer : Telefield Co., Ltd.  
No. 1 Industrial Area, Zhuliao, Guangzhou Baiyun Area, Gangdong  
Province, P.R.China

## Description of EUT

- a) Type of EUT : DECT 6.0 Cordless Handset with Caller ID (Base Station FP)
- b) Trade Name : GE
- c) Model No. : H5401
- d) Power Supply : Battery for Handset: DC 2.4V/700mAh  
Charger for Handset: AC120V/60Hz, 2.5W; DC7.5V, 150mA
- e) Frequency Range : 1921.536~1928.448MHz

Regulation Applied : FCC Rules and Regulations Part 15 Subpart D (2006)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.17-2006/ ANSI C63.4-2003, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.  
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : Jun. 26, 2007

Test Engineer :   
(Falcon Shi)

Approve & Authorized Signer :   
Will Yauo, Manager  
EMC Dept. II of ELECTRONICS  
TESTING CENTER, TAIWAN

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## 1 GENERAL INFORMATION

### 1.1 Testing Laboratory

Name : Electronics Testing Center, Taiwan  
Address : No. 34, Lin 5, Dingfu Tsuen, Linkou Shiang, Taipei County,  
Taiwan, 24442, R.O.C.  
Telephone : 886-2-26023052  
Fax : 886-2-26010910  
NVLAP lab registration# : 200133-0  
IC OATS registration# : IC 2949A-1

### 1.2 Client Information

Name : Thomson Inc.  
Address : 10330 North Meridian Street Indianapolis, IN 46290  
Telephone : 317-587-3095  
Contact person : Roger Hunt

### 1.3 Manufacturer

Name : Telefield Co., Ltd.  
Address : No. 1 Industrial Area, Zhuliao, Guangzhou Baiyun Area,  
Gangdong Province, P.R.China

## 2 TEST INFORMATION

### 2.1 Descriptino of Tested Device(s)

The tested equipment is a DECT base station which complies with ETSI EN 300175. The frequencies have been reprogrammed to comply with the FCC requirements to an Isochronous UPCS device after FCC Part 15D.

The EUT is a responding device as described in ANSI C63.17 and is designed to operate togerter with a DECT handset, which is then the initiating device.

| Frequency Channel | Frequency    | Test Frequency |
|-------------------|--------------|----------------|
| CH4               | 1928.448 MHz | F <sub>L</sub> |
| CH3               | 1926.720 MHz | -              |
| CH2               | 1924.992 MHz | -              |
| CH1               | 1923.264 MHz | -              |
| CH0               | 1921.536 MHz | F <sub>H</sub> |

### 2.2 Test Environment

#### Normal test condition

|                   |            |
|-------------------|------------|
| Temperature:      | 20 – 25 °C |
| Relative humidty: | 55 – 75%   |

#### Extreme test condition (declared by manufacture)

Please see the manufacturer declaration form.

### 3 TEST REPORT SUMMARY

#### 3.1 Test Summary

| Requirement                               | FCC Paragraph #         | Required                            | Customer Declaration                | Test Pass                           |
|---|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Coordination with fixed microwave         | 15.307(b)               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Cross Reference                           | 15.309(b)               | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Labeling requirements                     | 15.311 ,<br>15.19(a)(3) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Power line Conducted Emission             | 15.315 , 15.207         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Antenna Requirement                       | 15.315, 15.203          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Digital Modulation Techniques             | 15.319(b)               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Peak transmit Power                       | 15.319(c)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Power spectral Density                    | 15.319(d)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Antenna gain                              | 15.319(e)               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Automatic discontinuation of transmission | 15.319(f)               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Safety exposure levels                    | 15.319(i)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Emission Bandwidth                        | 15.323(a)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Emissions inside and outside the subband  | 15.323(d)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Frame period and jitter                   | 15.323(e)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Carrier frequency stability               | 15.323(f)               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

## **3.2 Devices for Tested System**

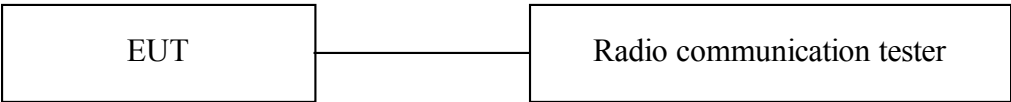
All measurements are traceable to national standards.

The tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47 Part 15, Paragraph 15.232 for Isochronous UPCS Devices and Industry Canada RSS-213 Issue 2.

The conducted test methods have been in accordance with ANSI C63.17-2006 Draft where applicable. Radiated tests were conducted in accordance with ANSI C63.4-2003.

4 TEST SETUP

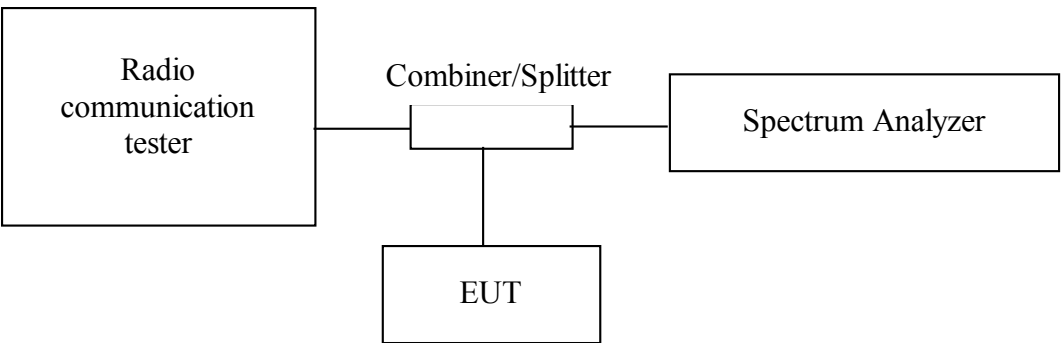
4.1 Frequency and Timing Measurements



Test Set-up 1

This setup is used for measuring Frame stability, Jitter, Carrier frequency stability at normal and extremet temperatures.

4.2 Conducted Emission Tests

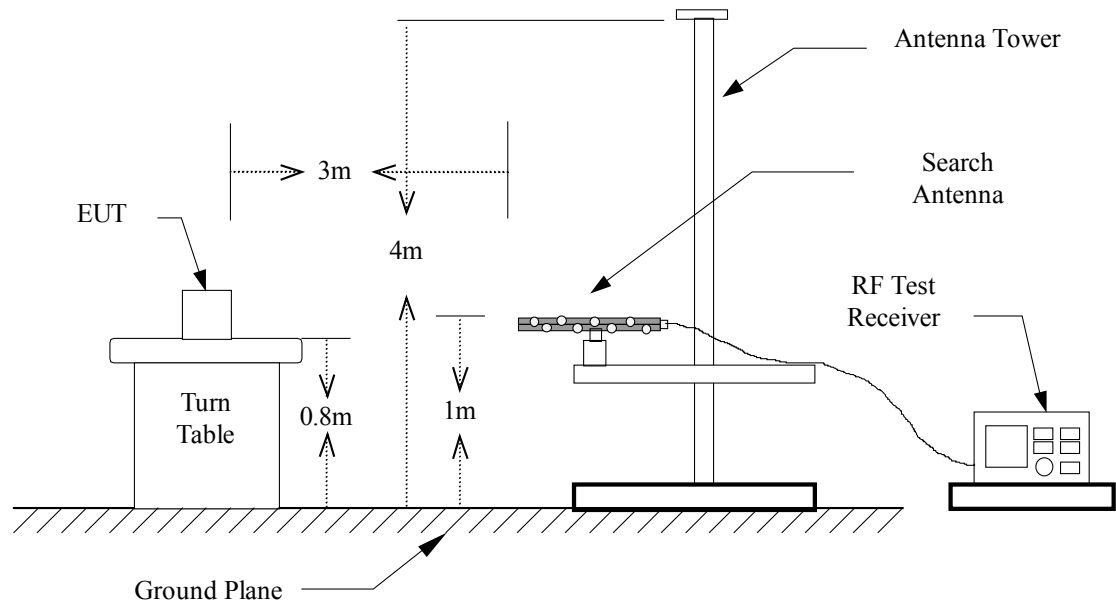


Test Set-up 2

This setup is used for all conducted emission tests.



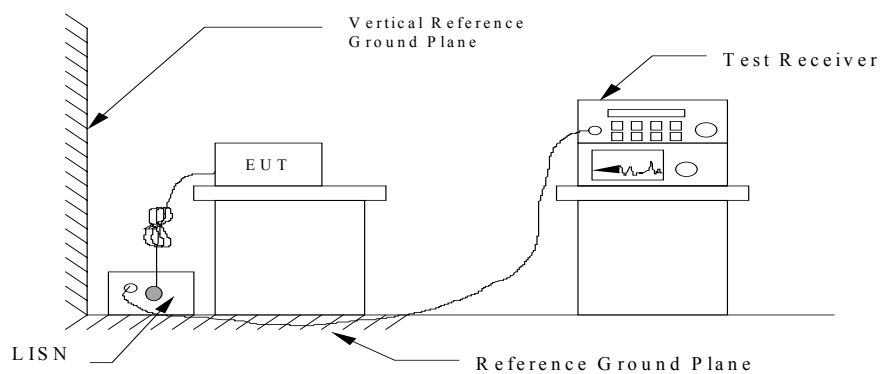
### 4.3 Radiated Emission Tests



#### Test Set-up 3

This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10 m, for all toher frequencies it is 3m. Emissions above 1 GHz were measured with the Spectrum Analyzer, Horn Antenna and the preamplifier after the antenna.

### 4.4 Power Line Conducted Tests



#### Test Set-up 4

## 5 TEST EQUIPMENT LIST

To facilitate inclusion on each page of the test equipment used for related test, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

| <b>Equipment</b>                        | <b>Manufacturer</b> | <b>Model No.</b> | <b>Next Cal. Due</b> |
|---|---------------------|------------------|----------------------|
| Test Receiver                           | Rohde & Schwarz     | ESCS 30          | 2008/01/29           |
| Amplifier                               | HP                  | 8447D            | 2007/10/08           |
| Bi-Log Antenna                          | Schaffner           | CBL 6111C(1318)  | 2007/12/21           |
| Log-periodic Antenna                    | EMCO                | 3146(1851)       | 2007/10/12           |
| Biconical Antenna                       | EMCO                | 3110B            | 2008/01/31           |
| EMI Test Receiver                       | Rohde & Schwarz     | ESCI             | 2007/12/24           |
| Spectrum                                | R&S                 | FSP3             | 2007/11/21           |
| Signal generator                        | HP                  | 8656B            | 2007/11/20           |
| Double Ridged Antenna                   | EMCO                | 3115             | 2008/04/26           |
| Amplifier                               | HP                  | 8449B            | 2007/10/08           |
| Amplifier                               | HP                  | 83051A           | 2008/05/05           |
| Spectrum                                | R&S                 | FSP40            | 2007/08/07           |
| CTS60 DIGITAL<br>RADIO TEST             | R&S                 | CTS60            | 2007/10/03           |
| Line Impedance<br>Stabilization network | EMCO                | 3825/2           | 2007/10/08           |
| Line Impedance<br>Stabilization network | Rohde & Schwarz     | ESH2-Z5          | 2007/09/12           |
| Monitor                                 | IBM                 | E54              | N.C.R.               |
| Printer                                 | HP                  | LaserJet 1000    | N.C.R.               |
| Shielded Room                           | Riken               | ----             | N.C.R.               |
| Computer                                | Acer                | Veriton          | N.C.R.               |

## 6 TEST RESULT

### 6.1 Corrdination with fixed microwave

#### 6.1.1 Standard Applicable: FCC 15.307 (b)

Each application for certification of equipment operating under the provisions of this Subpart must be accompanied by an affidavit from UTAM, Inc. certifying that the applicant is a participating member of UTAM, Inc. In the event a grantee fails to fulfill the obligations attendant to participation in UTAM, Inc., the Commission may invoke administrative sanctions as necessary to preclude continued marketing and installation of devices covered by the grant of certification, including but not limited to revoking certification.

#### Result

The affidavit from UTAM, Inc. is included in the documentation supplied by the applicant:

☒ Yes

☐ No

## 6.2 Cross Reference

### 6.2.1 Standard Applicable

#### 15.309(b)

The requirements of Subpart D apply only to the radio transmitter contained in the PCS device. Other aspects of the operation of a PCS device may be subject to requirements contained elsewhere in this Chapter. In particular, a PCS device that includes digital circuitry not directly associated with the radio transmitter also is subject to the requirements for unintentional radiators in Subpart B.

#### 15.109(a)

For unintentional device, according to FCC §15.109(a), the field strength of radiated emissions from unintentional except for class A digital device radiators at a distance of 3 meters shall not exceed the following values:

| Frequency<br>MHz | Distance<br>Meters | Radiated<br>$\mu$ V/m | Radiated<br>dB $\mu$ V/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                     |

### 6.2.2 Test Results

|  |                                     |
|--|-------------------------------------|
| This requirement is not applicable because test sample do not included digital circuitry which is not directly associated with the radio transmitter | <input checked="" type="checkbox"/> |
| For test results according to FCC 15 subpart B, see the EMC report as attached   | <input type="checkbox"/>            |
| For test results according to FCC 15 subpart B, see the measurement data as follow   | <input type="checkbox"/>            |
| This requirement is covered by results of power line conducted emission test according to FCC 15.315   | <input type="checkbox"/>            |

## 6.3 Labeling Requirements

### 6.3.1 Standard Applicable: FCC 15.19

The FCC Identifier shall be displayed on the label, and the device(s) shall bear the following statement in a conspicuous location on the device or in the user manual if the device is too small:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

The label itself shall be of a permanent type, not a paper label, and shall last the lifetime of the equipments.

### 6.3.2 Result

See separate documents showing the label design and the placement of the label on the EUT.

## 6.4 Power Line Conducted Emissions

### 6.4.1 Standard Applicable

#### 15.315

An unlicensed PCS device that is designed to be connected to the public utility (AC) power line must meet the limits specified in Section 15.207.

#### 15.207(a)

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency<br>MHz | Quasi Peak<br>dB $\mu$ V | Average<br>dB $\mu$ V |
|------------------|--------------------------|-----------------------|
| 0.15 - 0.5       | 66-56*                   | 56-46*                |
| 0.5 - 5.0        | 56                       | 46                    |
| 5.0 - 30.0       | 60                       | 50                    |

\* Decreases with the logarithm of the frequency

### 6.4.2 Measurement procedure

ANSI C63.4-2003 using 50  $\mu$ H/50 ohms LISN.

### 6.4.3 Test Results: Complies

**Measurement Data: See attached graph, (Peak detector)**

Highest measured value (L1 and L2):

All emissions were below the QP and Average limits when measured with Peak detector.

Operation Mode : Handset ChargingNeutralTest Date : Jun. 20, 2007Temperature : 23 °CHumidity : 58 %

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) |      | Factor<br>(dB) | Result<br>(dB $\mu$ V) |      | Limit<br>(dB $\mu$ V) |      | Margin<br>(dB $\mu$ V) |      |
|--------------------|-------------------------------|------|----------------|------------------------|------|-----------------------|------|------------------------|------|
|                    | Q.P                           | AVG  |                | Q.P                    | AVG  | Q.P                   | AVG  | Q.P                    | AVG  |
| 0.157              | 19.1                          | ---- | 0.2            | 19.3                   | ---- | 65.6                  | 55.6 | -46.3                  | ---- |
| 0.173              | 18.9                          | ---- | 0.2            | 19.1                   | ---- | 64.8                  | 54.8 | -45.7                  | ---- |
| 0.204              | 17.8                          | ---- | 0.2            | 18.0                   | ---- | 63.4                  | 53.4 | -45.4                  | ---- |
| 0.278              | 14.2                          | ---- | 0.2            | 14.4                   | ---- | 60.9                  | 50.9 | -46.4                  | ---- |
| 0.294              | 14.1                          | ---- | 0.2            | 14.3                   | ---- | 60.4                  | 50.4 | -46.1                  | ---- |
| 28.070             | 16.2                          | ---- | 1.9            | 18.1                   | ---- | 60.0                  | 50.0 | -41.9                  | ---- |

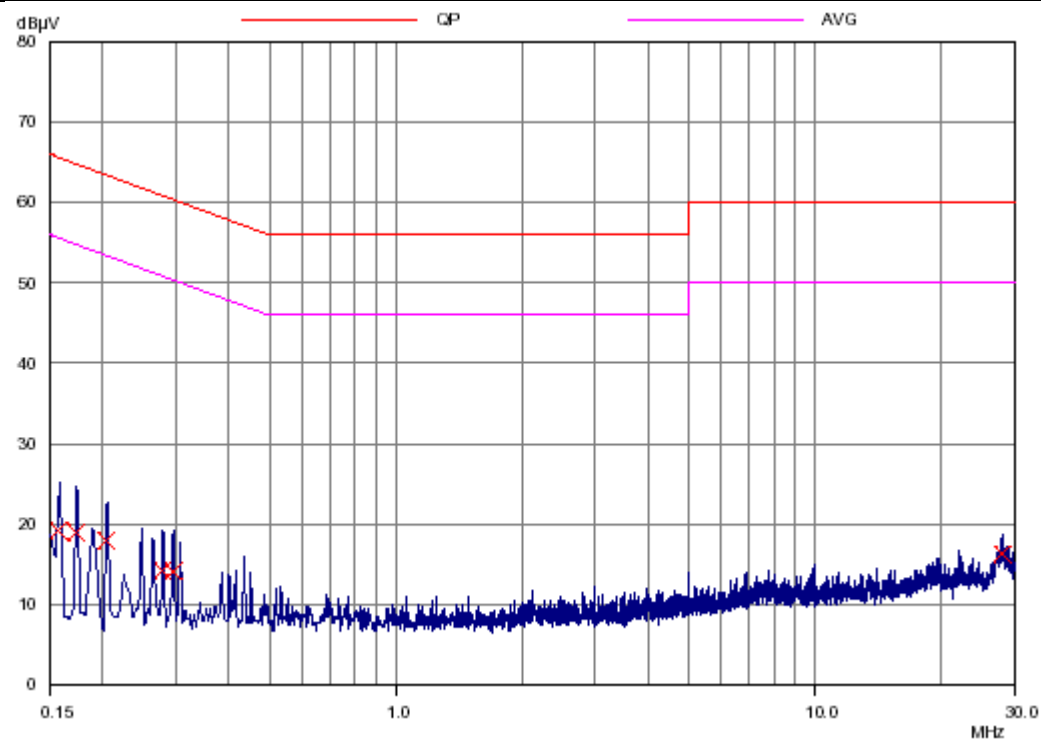
Operation Mode : Handset ChargingLineTest Date : Jun. 20, 2007Temperature : 23 °CHumidity : 58 %

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) |      | Factor<br>(dB) | Result<br>(dB $\mu$ V) |      | Limit<br>(dB $\mu$ V) |      | Margin<br>(dB $\mu$ V) |      |
|--------------------|-------------------------------|------|----------------|------------------------|------|-----------------------|------|------------------------|------|
|                    | Q.P                           | AVG  |                | Q.P                    | AVG  | Q.P                   | AVG  | Q.P                    | AVG  |
| 0.189              | 19.7                          | ---- | 0.2            | 19.9                   | ---- | 64.1                  | 54.1 | -44.2                  | ---- |
| 0.204              | 18.2                          | ---- | 0.2            | 18.4                   | ---- | 63.4                  | 53.4 | -45.0                  | ---- |
| 0.220              | 17.8                          | ---- | 0.2            | 18.0                   | ---- | 62.8                  | 52.8 | -44.8                  | ---- |
| 0.306              | 14.1                          | ---- | 0.3            | 14.4                   | ---- | 60.1                  | 50.1 | -45.7                  | ---- |
| 0.321              | 13.5                          | ---- | 0.3            | 13.8                   | ---- | 59.7                  | 49.7 | -45.9                  | ---- |
| 27.996             | 21.0                          | ---- | 1.9            | 22.9                   | ---- | 60.0                  | 50.0 | -37.1                  | ---- |

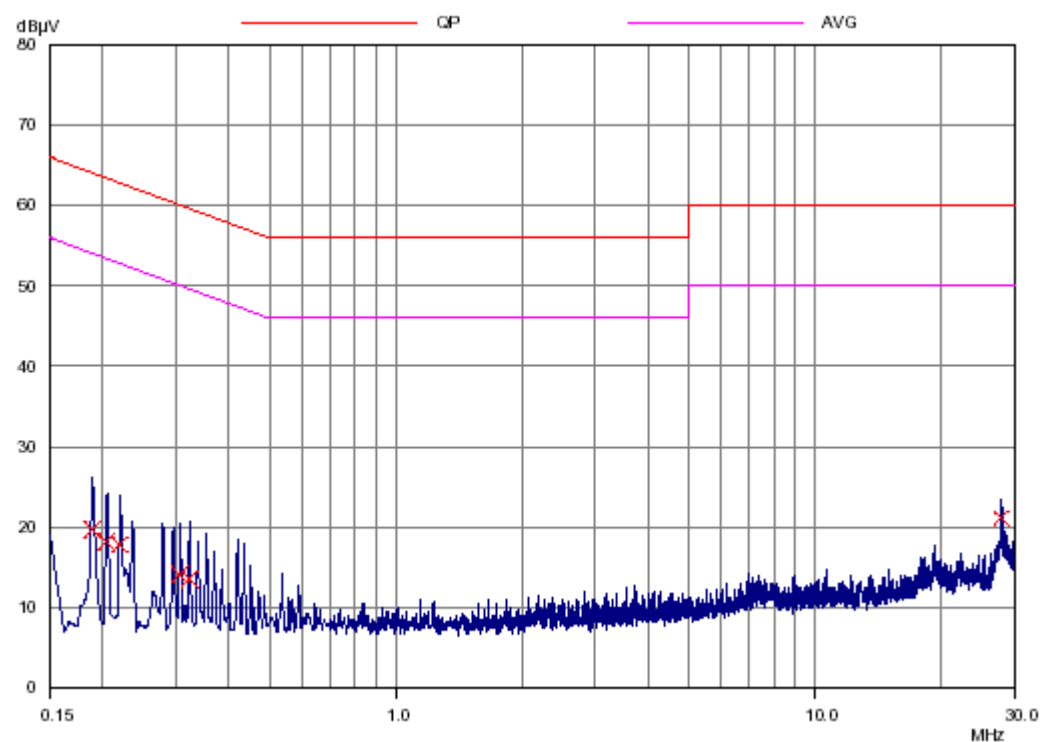
Note :

1. “\*\*\*” means the value was too low to be measured.
2. If the data table appeared symbol of “----“ means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is  $\pm 2.5$  dB.

Mode: Handset Charging Neutral



Mode: Handset Charging Line





#### 6.4.4 Photos of Conduction Measuring Setup



## 6.5 Antenna Requirement

### 6.5.1 Standard Applicable: FCC 15.317, 15.203

Does the EUT have detachable antenna?

☐ Yes

☒ No

If detachable, is the antenna connector non-standard?

☐ Yes

☐ No

The tested equipment has only integral antennas. The conducted tests were performed on a sample with a temporary antenna connects.

## 6.6 digital Modulation Techniques

### 6.6.1 Standard Applicable: FCC 15.319(b)

All transmissions must use only digital modulation techniques.

### 6.6.2 Result: Meets the requirement

Please see the declaration provided by applicant

## 6.7 Peak Power Output

### 6.7.1 Standard Applicable: FCC 15.319(c)(f)

Peak transmit power shall not exceed 100 microwatts multiplie by the square root of the emission bandwidth in Hz.

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

### 6.7.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 6.1.2

### 6.7.3 Test Results: Complies

#### Measurement Data:

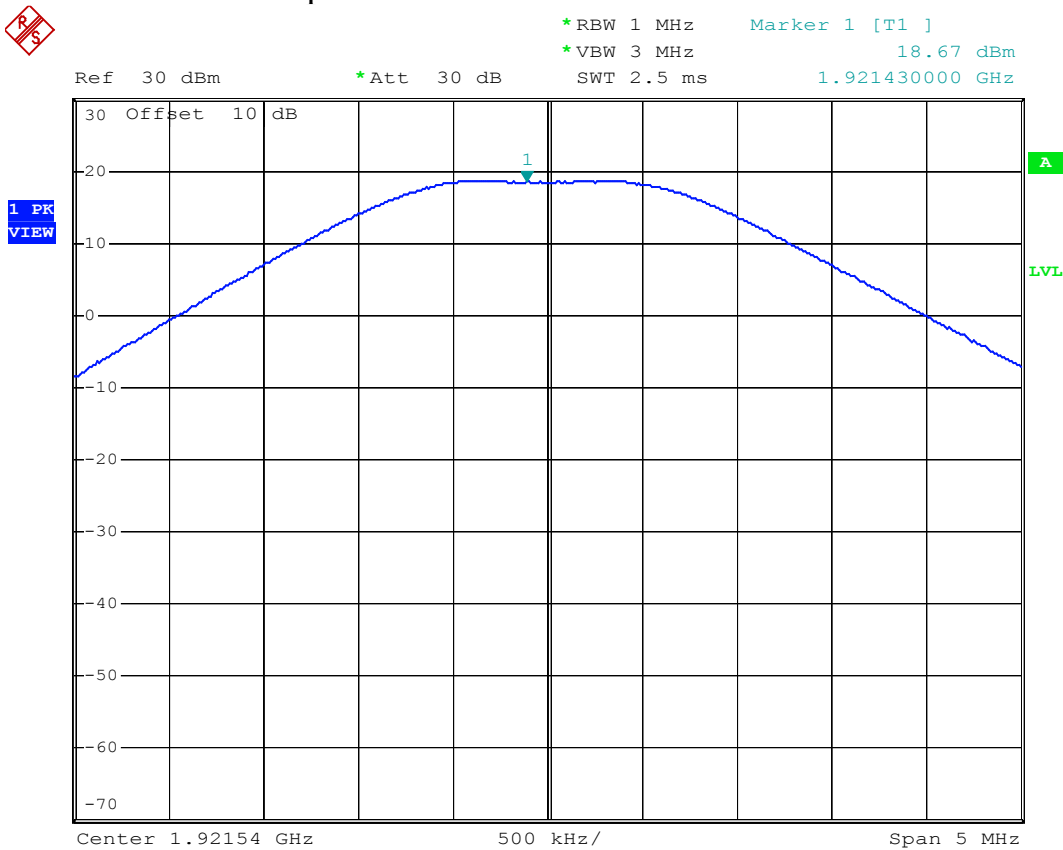
| Channel        | Frequency (MHz) | Maximum Peak Output Power (dBm) | Maximum Peak Output Power (mw) | FCC Limit (dBm) |
|----------------|-----------------|---------------------------------|--------------------------------|-----------------|
| F <sub>L</sub> | 1921.430        | 18.67                           | 73.621                         | 20.79           |
| F <sub>H</sub> | 1928.380        | 18.72                           | 74.473                         | 20.79           |

#### Limit:

Peak Transmit Power = 100 uW x  $\sqrt{\text{BW}}$

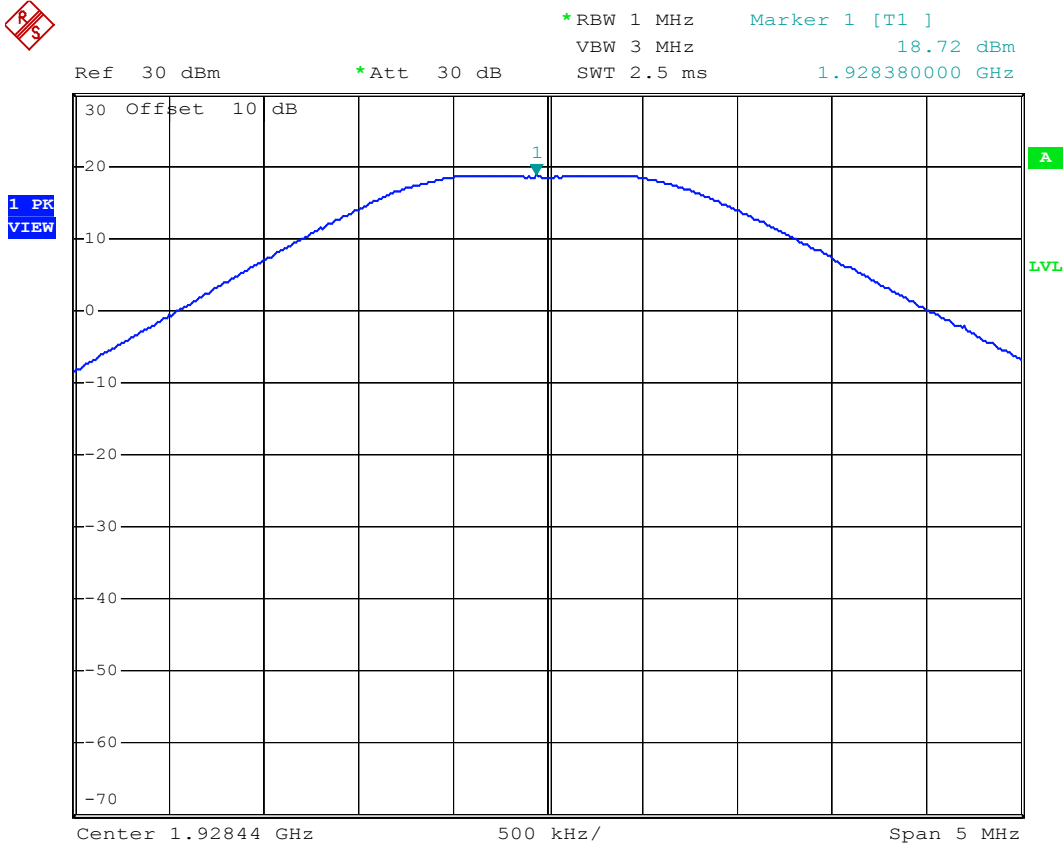
BW = Emission Bandwidth in Hz.

Maximum Peak Output Power: CH FL



Date: 12.JUN.2007 13:53:22

Maximum Peak Output Power: CH F<sub>H</sub>



Date: 12.JUN.2007    13:45:11

## 6.8 Power Spectral Density

### 6.8.1 Standard Applicable: FCC 15.319(d)

Power spectral density shall not exceed 3 milliwatts in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

### 6.8.2 Measurement procedure

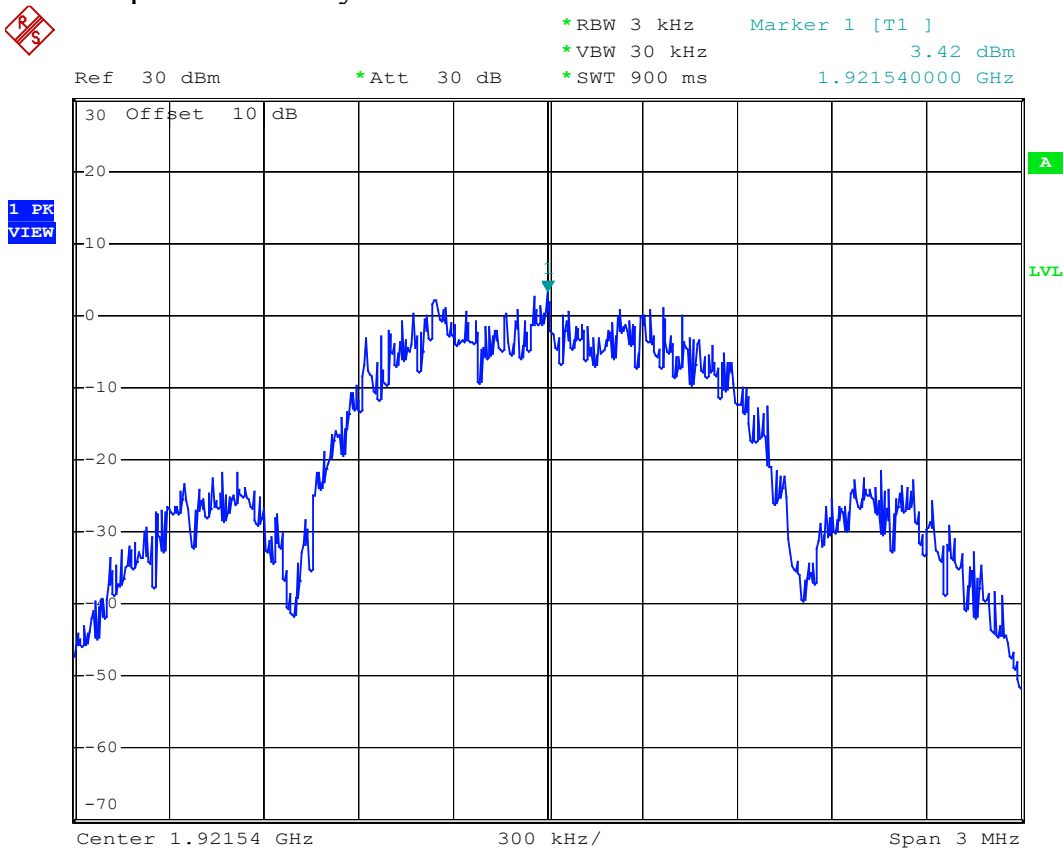
Measurement method according to ANSI C63.17 2006 paragraph 6.1.5

### 6.8.3 Test Results: Complies

#### Measurement Data:

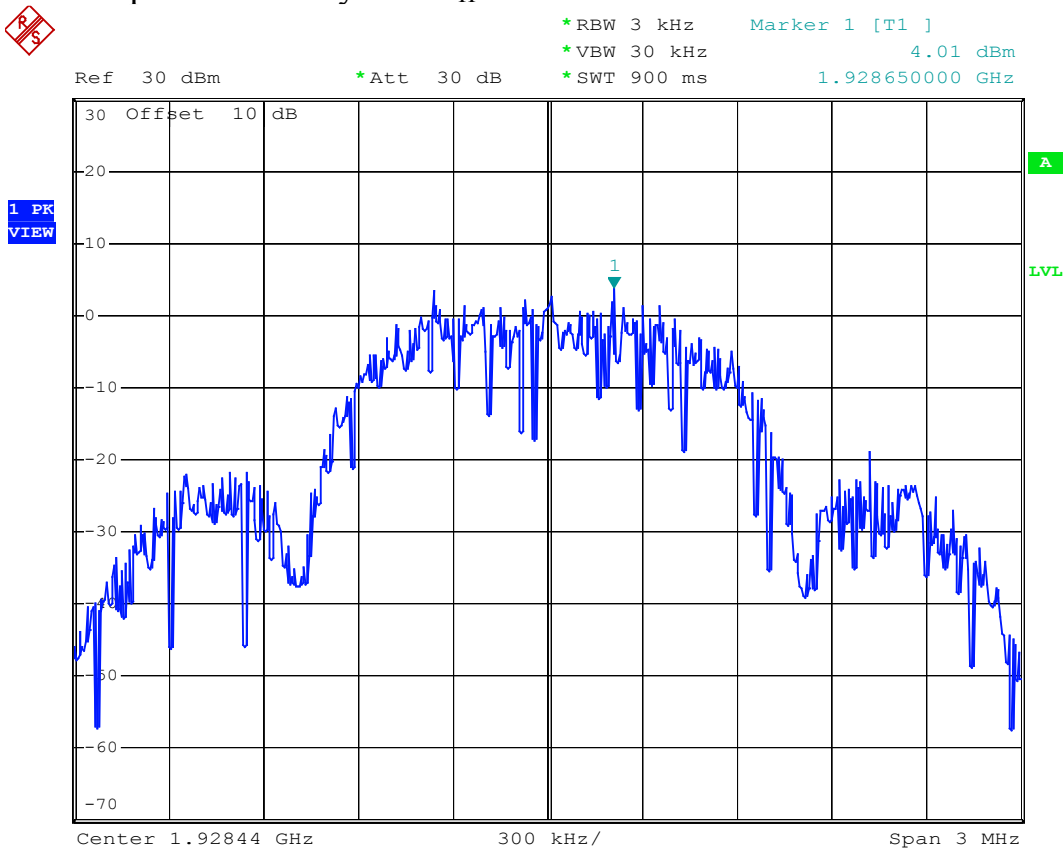
| Channel        | Frequency (MHz) | Power spectral Density (dBm) | FCC Limit (dBm) |
|----------------|-----------------|------------------------------|-----------------|
| F <sub>L</sub> | 1921.540        | 3.42                         | 4.77            |
| F <sub>H</sub> | 1928.650        | 4.01                         | 4.77            |

Power Spectral Density: CH FL



Date: 12.JUN.2007 13:54:32

Power Spectral Density: CH F<sub>H</sub>



Date: 12.JUN.2007    13:46:19



## **6.9 Antenna Gain**

### **6.9.1 Standard Applicable: FCC 15.323(e)**

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

### **6.9.2 Results: Meets the requirement**

The antenna gain value provided by manufacturer is 0 dBi.

## **6.10 Automatic discontinuation of transmission**

### **6.10.1 Standard Applicable: FCC 15.319(f)**

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

### **6.10.2 Procedure**

Please see the declaration provided by applicant.

### **6.10.3 Results: Meets the requirement**

## 6.11 Safety exposure levels

### 6.11.1 Standard Applicable: FCC 15.319(i)

UPCS devices are subject to the radio frequency radiation exposure requirements specified in FCC parts 1.1307 (b), 2.1091 and 2.1093, as appropriate. All equipment shall be considered to operate in a “general population / uncontrolled environment. For portable devices tests according to IEEE 1528 are requested, applicable.

### 6.11.2 Measurement procedure

Consideration of radio frequency radiation exposure for EUT is done as

|   |                                     |
|---|-------------------------------------|
| SAR test according IEEE 1528 (for PP)       | <input checked="" type="checkbox"/> |
| MPE calculation as below (for FP, Repeater) | <input type="checkbox"/>            |

SAR test results: See SAR test report.

### 6.11.3 Results: Complies

## 6.12 Emission Bandwidth B

### 6.12.1 Standard Applicable: FCC 15.323(a)

The 26 dB Bandwidth B shall be larger than 50 kHz and less than 2.5 MHz.

### 6.12.2 Measurement procedure

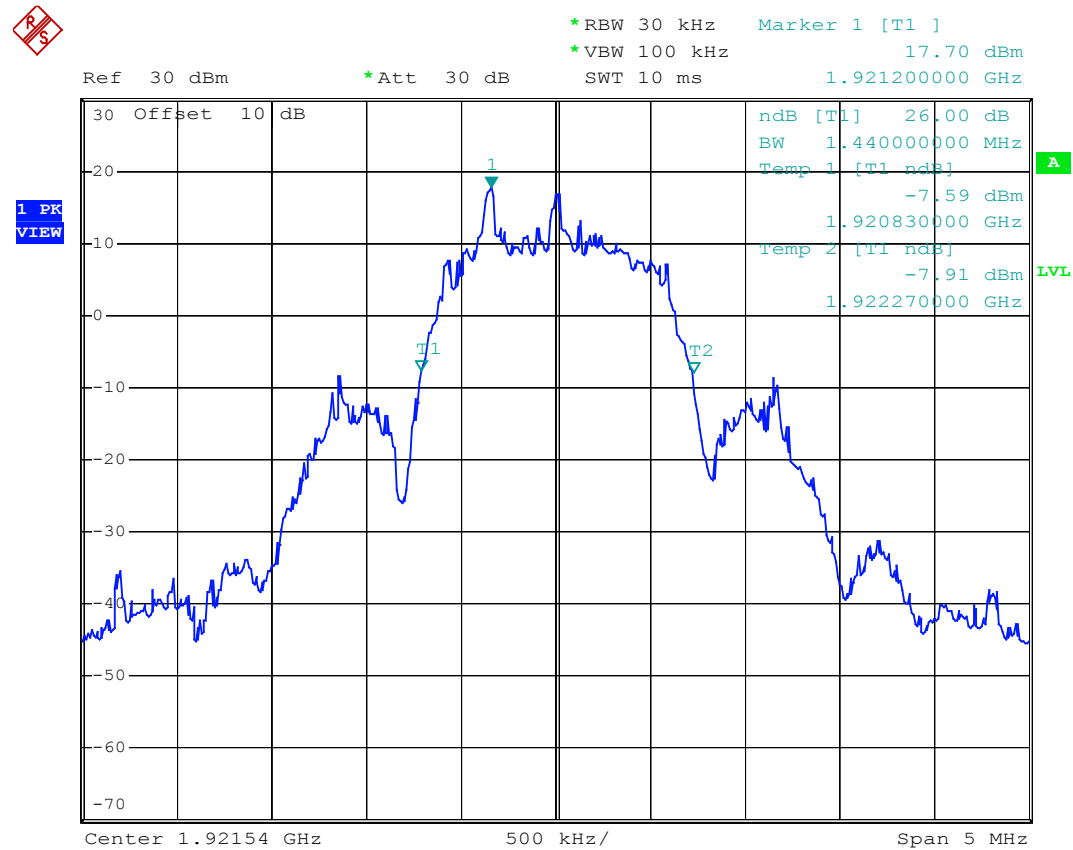
Measurement method according to ANSI C63.17 2006 paragraph 6.1.3

### 6.12.3 Test Results: Complies

#### Measurement Data:

| Channel        | Frequency<br>(MHz) | 26 dB Bandwidth<br>(MHz) |
|----------------|--------------------|--------------------------|
| F <sub>L</sub> | 1921.200           | 1.44                     |
| F <sub>H</sub> | 1928.450           | 1.44                     |

## 26 dB Bandwidth B: CH FL



Date: 12.JUN.2007 13:52:54

26 dB Bandwidth B: CH F<sub>H</sub>



Date: 12.JUN.2007 13:44:36

## 6.13 Emissions inside and outside the subband

### 6.13.1 Standard Applicable: FCC 15.323(d)

#### Emissions inside the subband

$B < f \leq 2B$ : less than or equal to 30dB below max. permitted peak power level

$2B < f \leq 3B$ : less than or equal to 50 dB below max. permitted peak power level

$3B < f \leq \text{UPCs Band Edge}$ : less than or equal to 60 dB below max. permitted peak power level

#### Emissions outside the subband

$f \leq 1.25\text{MHz}$  outside UPCS band:  $\leq -9.5\text{dBm}$

$1.25\text{MHz} \leq f \leq 2.5\text{MHz}$  outside UPCS band:  $\leq -29.5\text{dBm}$

$f \geq 2.5\text{MHz}$  outside UPCS band: The EUT shall pass the test either a) or b) as follow:

|  |                                     |
|--|-------------------------------------|
| a) In the region at 2.5 MHz or greater below and above the lower and upper band edges respectively, the measured emission level shall not exceed $-39.5\text{ dBm}$  | <input type="checkbox"/>            |
| b) In the region at 2.5MHz or greater below and above the lower and upper band edges respectively, the measured emission level shall not exceed the limits of 47CFR15.209. Measurement shall be made as a radiated test. | <input checked="" type="checkbox"/> |

### 6.13.2 Measurement procedure

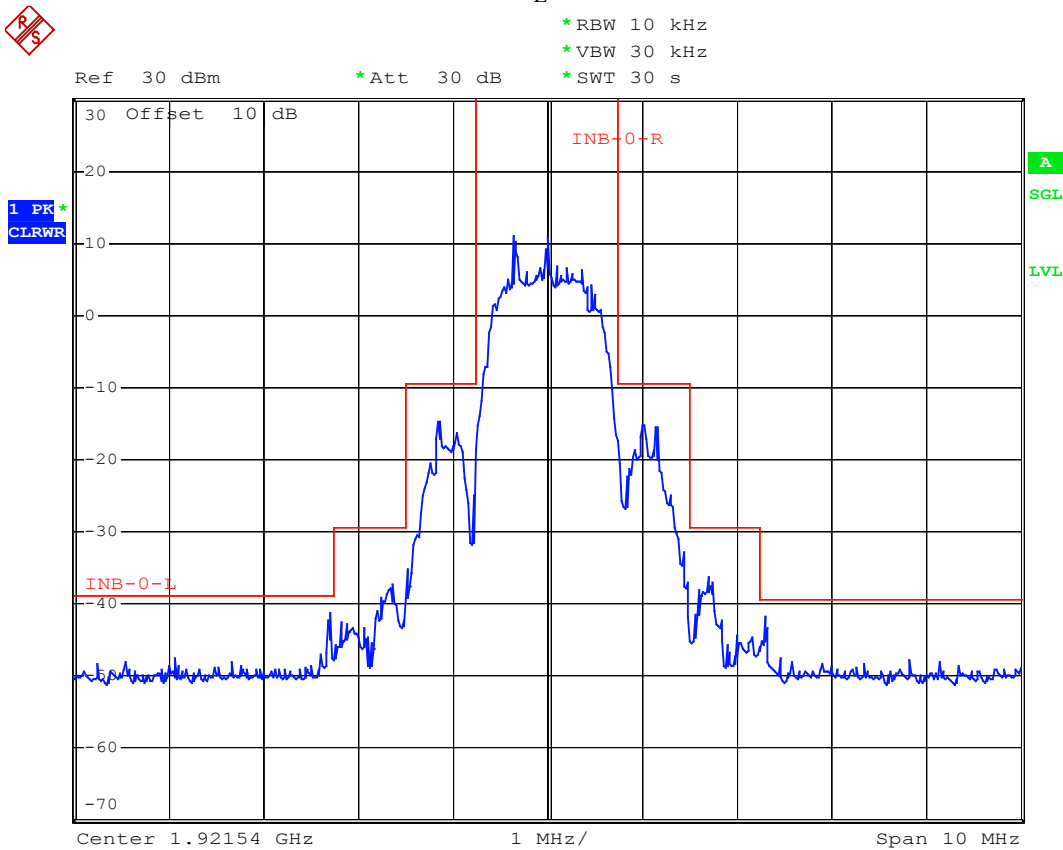
Measurement method according to ANSI C63.17 2006 paragraph 6.1.6

### 6.13.3 Results: Complies

#### Measurement Data:

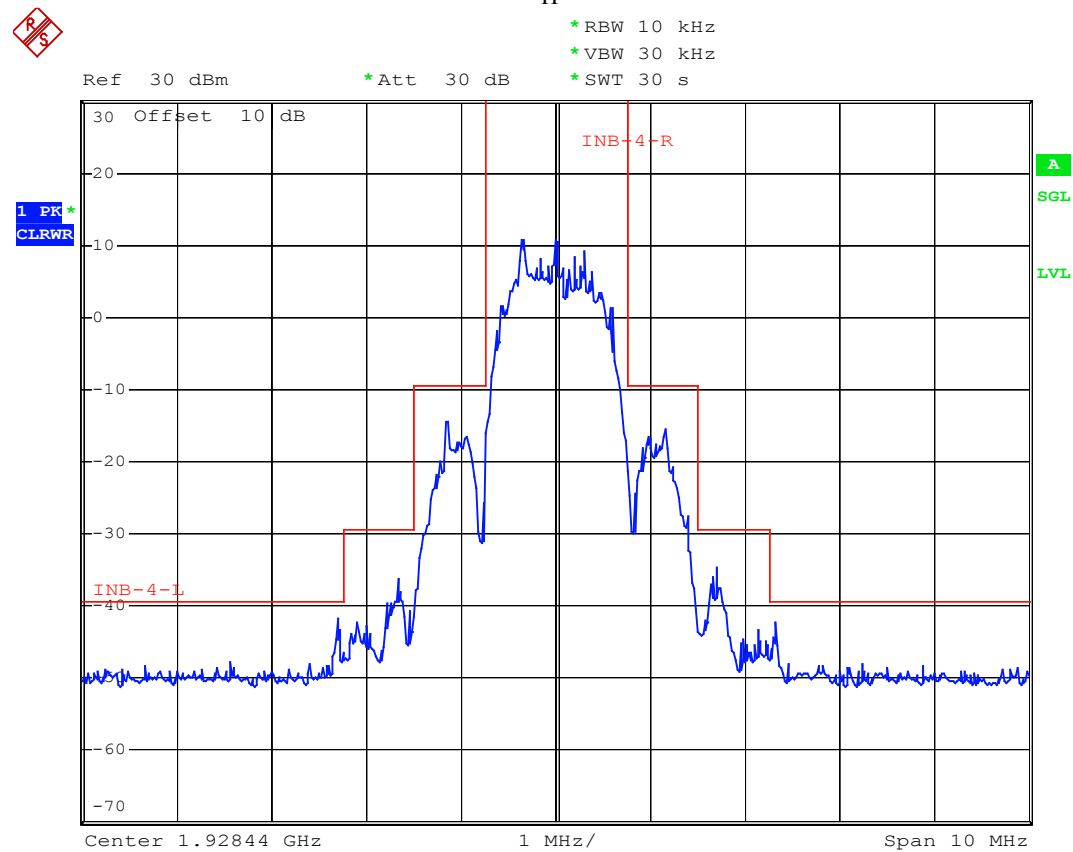
See plots.

In-band Unwanted Emission: CH F<sub>L</sub>



Date: 12.JUN.2007 13:57:00

### In-band Unwanted Emission: CH F<sub>H</sub>



Date: 12.JUN.2007 13:48:40



## Out-of -band Unwanted Emission:

## Out-of -band Unwanted Emission (below 1GHz)

a)

Operation Mode : Handset ChargingTest Date : Jun. 20, 2007 Temperature : 23 °C Humidity : 58 %

| Frequency<br>(MHz) | Ant-Pol<br>H/V | Meter<br>Reading<br>(dBuV) | Corrected<br>Factor<br>(dB) | Result<br>@3m<br>(dBuV/m) | Limit<br>@3m<br>(dBuV/m) | Margin<br>(dB) | Table<br>Degree<br>(Deg.) | Ant.<br>High<br>(m) |
|--------------------|----------------|----------------------------|-----------------------------|---------------------------|--------------------------|----------------|---------------------------|---------------------|
| 124.500            | H              | 33.4                       | -11.1                       | 22.3                      | 43.5                     | -21.2          | 257                       | 1.4                 |
| 138.540            | V              | 36.3                       | -10.9                       | 25.4                      | 43.5                     | -18.1          | 194                       | 1.2                 |
| 151.770            | V              | 36.2                       | -9.9                        | 26.3                      | 43.5                     | -17.2          | 224                       | 1.0                 |
| 165.810            | V              | 34.4                       | -9.2                        | 25.2                      | 43.5                     | -18.3          | 94                        | 1.4                 |
| 187.140            | H              | 32.6                       | -8.6                        | 24.0                      | 43.5                     | -19.5          | 116                       | 1.4                 |
| 193.620            | H              | 33.0                       | -7.9                        | 25.1                      | 43.5                     | -18.4          | 132                       | 2.1                 |

b)

Operation Mode : Handset On LineTest Date : Jun. 20, 2007 Temperature : 23 °C Humidity : 58 %

| Frequency<br>(MHz) | Ant-Pol<br>H/V | Meter<br>Reading<br>(dBuV) | Corrected<br>Factor<br>(dB) | Result<br>@3m<br>(dBuV/m) | Limit<br>@3m<br>(dBuV/m) | Margin<br>(dB) | Table<br>Degree<br>(Deg.) | Ant.<br>High<br>(m) |
|--------------------|----------------|----------------------------|-----------------------------|---------------------------|--------------------------|----------------|---------------------------|---------------------|
| 39.180             | V              | 45.0                       | -11.6                       | 33.4                      | 40.0                     | -6.6           | 128                       | 1.2                 |
| 73.740             | V              | 40.7                       | -15.9                       | 24.8                      | 40.0                     | -15.2          | 156                       | 1.7                 |
| 85.890             | V              | 37.5                       | -14.4                       | 23.1                      | 40.0                     | -16.9          | 268                       | 1.6                 |
| 118.020            | V              | 33.4                       | -11.0                       | 22.4                      | 43.5                     | -21.1          | 214                       | 1.8                 |
| 138.540            | V              | 34.8                       | -10.9                       | 23.9                      | 43.5                     | -19.6          | 233                       | 1.5                 |
| 147.450            | V              | 36.7                       | -10.2                       | 26.5                      | 43.5                     | -17.0          | 212                       | 2.1                 |

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

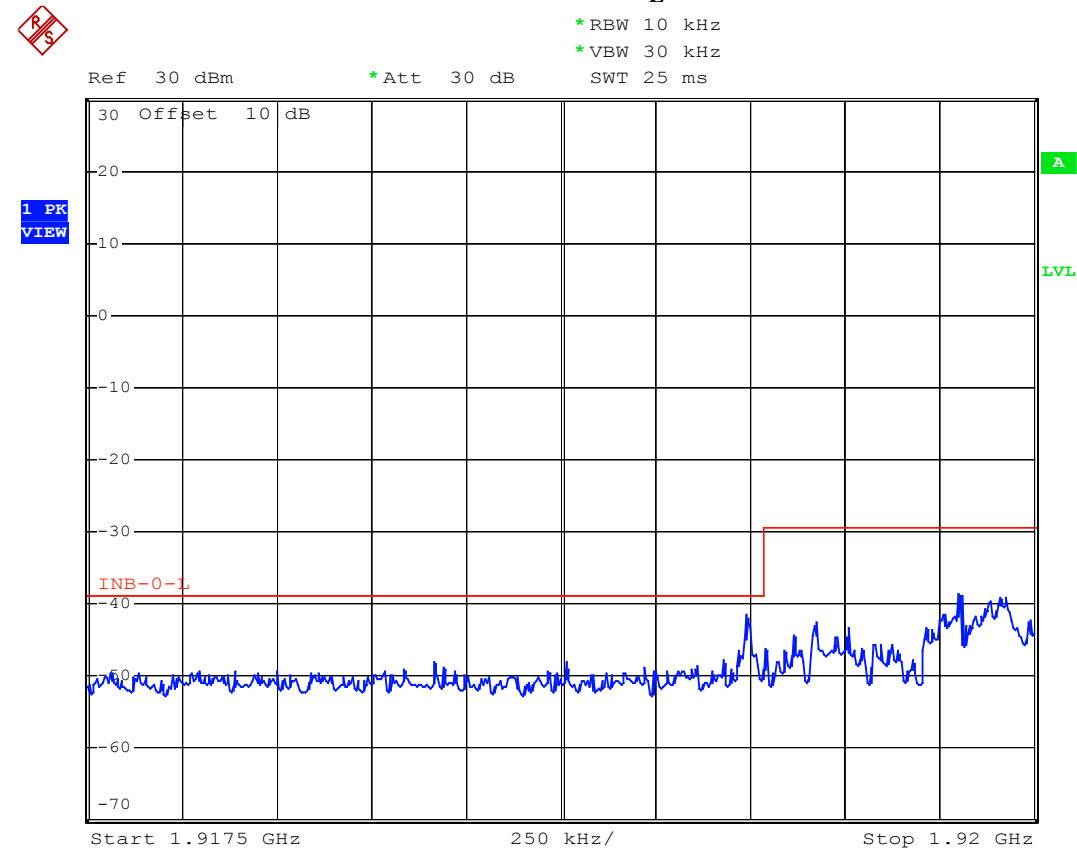
a) CH F<sub>L</sub>Out-of -band Unwanted Emission (above 1GHz): CH F<sub>L</sub>Operation Mode : TransmittingFundamental Frequency : 1921.536 MHzTest Date : Jun. 12, 2007 Temperature : 22 °C Humidity : 55 %

| Frequency<br>(MHz) | Reading (dBuV) |      |      |      | Factor<br>(dB)<br>Corr. | Result @3m<br>(dBuV/m) |      | Limit @3m<br>(dBuV/m) |      | Margin<br>(dB) | Table<br>Deg.<br>(Deg.) | Ant.<br>High<br>(m) |
|--------------------|----------------|------|------|------|-------------------------|------------------------|------|-----------------------|------|----------------|-------------------------|---------------------|
|                    | Peak           | Ave  | Peak | Ave  |                         | Peak                   | Ave  | Peak                  | Ave  |                |                         |                     |
| 3843.200           | 65.3           | 35.0 | 61.9 | 35.4 | -2.6                    | 62.7                   | 32.8 | 74.0                  | 54.0 | -11.3          | 0                       | 1.5                 |
| 5763.620           | 61.2           | 33.1 | 60.3 | 33.0 | 0.7                     | 61.9                   | 33.8 | 74.0                  | 54.0 | -12.1          | 232                     | 1.1                 |
| 7686.640           | 63.8           | 32.8 | 61.2 | 32.9 | 3.3                     | 67.1                   | 36.2 | 74.0                  | 54.0 | -6.9           | 245                     | 1.5                 |
| 9607.320           | 54.8           | 32.6 | 52.8 | 32.8 | 4.1                     | 58.9                   | 36.9 | 74.0                  | 54.0 | -15.1          | 313                     | 1.6                 |
| 11526.840          | 55.1           | 32.5 | 49.4 | 32.6 | 7.2                     | 62.3                   | 39.8 | 74.0                  | 54.0 | -11.7          | 159                     | 1.4                 |

Note :

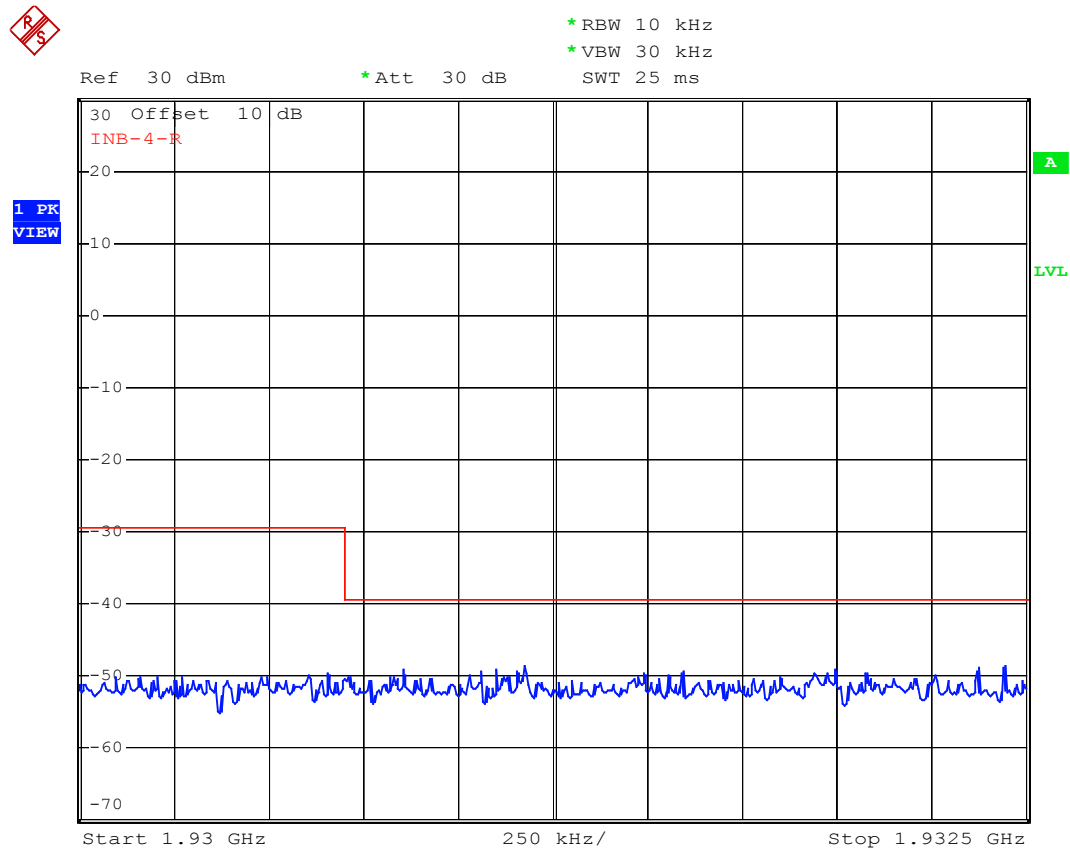
1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Out-of-band Unwanted Emission: CH F<sub>L</sub>



Date: 12.JUN.2007 13:57:43

## Out-of -band Unwanted Emission: CH FL



Date: 12.JUN.2007 13:58:19

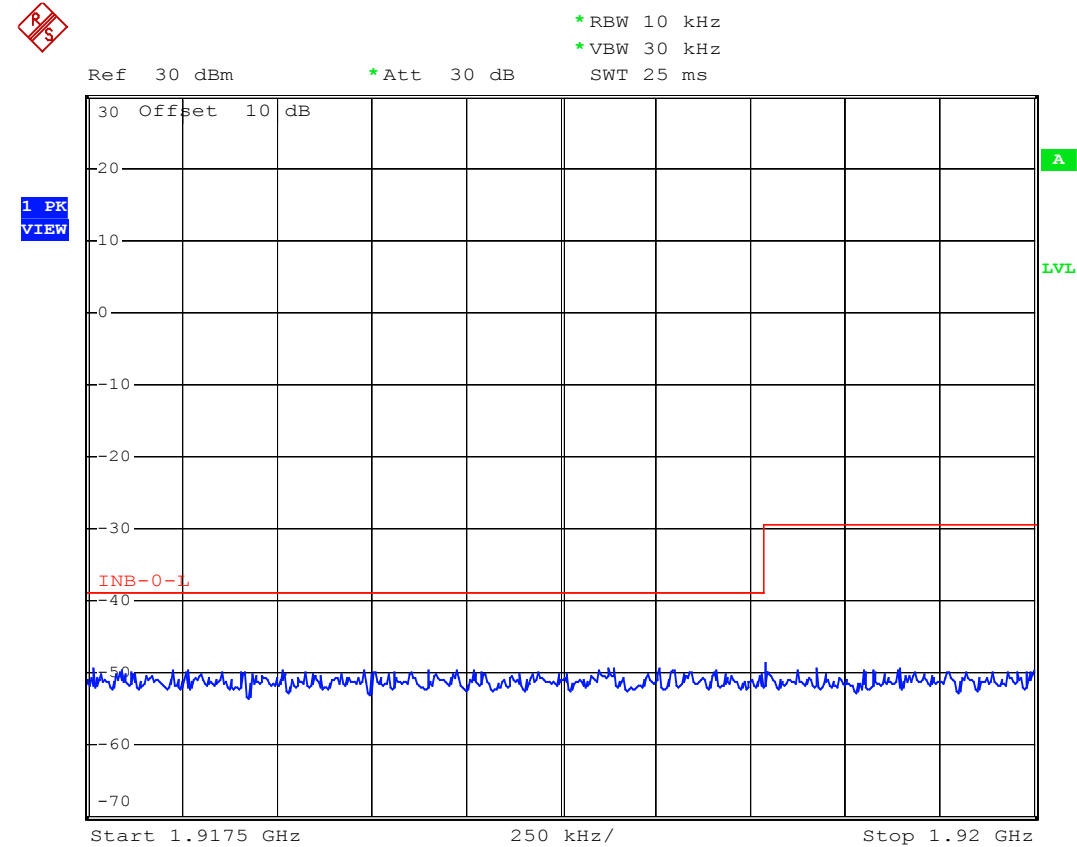
b) CH F<sub>H</sub>Out-of -band Unwanted Emission (above 1GHz): CH F<sub>H</sub>Operation Mode : TransmittingFundamental Frequency : 1928.448 MHzTest Date : Jun. 12, 2007Temperature : 22 °CHumidity : 55 %

| Frequency<br>(MHz) | Reading (dBuV) |      |      |      | Factor<br>(dB)<br>Corr. | Result @3m<br>(dBuV/m) |      | Limit @3m<br>(dBuV/m) |      | Margin<br>(dB) | Table<br>Deg.<br>(Deg.) | Ant.<br>High<br>(m) |
|--------------------|----------------|------|------|------|-------------------------|------------------------|------|-----------------------|------|----------------|-------------------------|---------------------|
|                    | Peak           | Ave  | Peak | Ave  |                         | Peak                   | Ave  | Peak                  | Ave  |                |                         |                     |
| 3857.460           | 64.9           | 35.1 | 62.6 | 35.3 | -2.6                    | 62.3                   | 32.7 | 74.0                  | 54.0 | -11.7          | 21                      | 1.4                 |
| 5784.380           | 60.1           | 32.8 | 59.8 | 33.1 | 0.7                     | 60.8                   | 33.8 | 74.0                  | 54.0 | -13.2          | 264                     | 1.1                 |
| 7712.240           | 63.6           | 32.6 | 61.7 | 32.6 | 3.3                     | 66.9                   | 35.9 | 74.0                  | 54.0 | -7.1           | 247                     | 1.4                 |
| 9640.380           | 56.6           | 32.7 | 52.6 | 32.6 | 4.1                     | 60.7                   | 36.8 | 74.0                  | 54.0 | -13.3          | 147                     | 1.3                 |
| 11568.620          | 56.1           | 32.7 | 49.6 | 32.4 | 7.2                     | 63.3                   | 39.9 | 74.0                  | 54.0 | -10.7          | 48                      | 1.5                 |

Note :

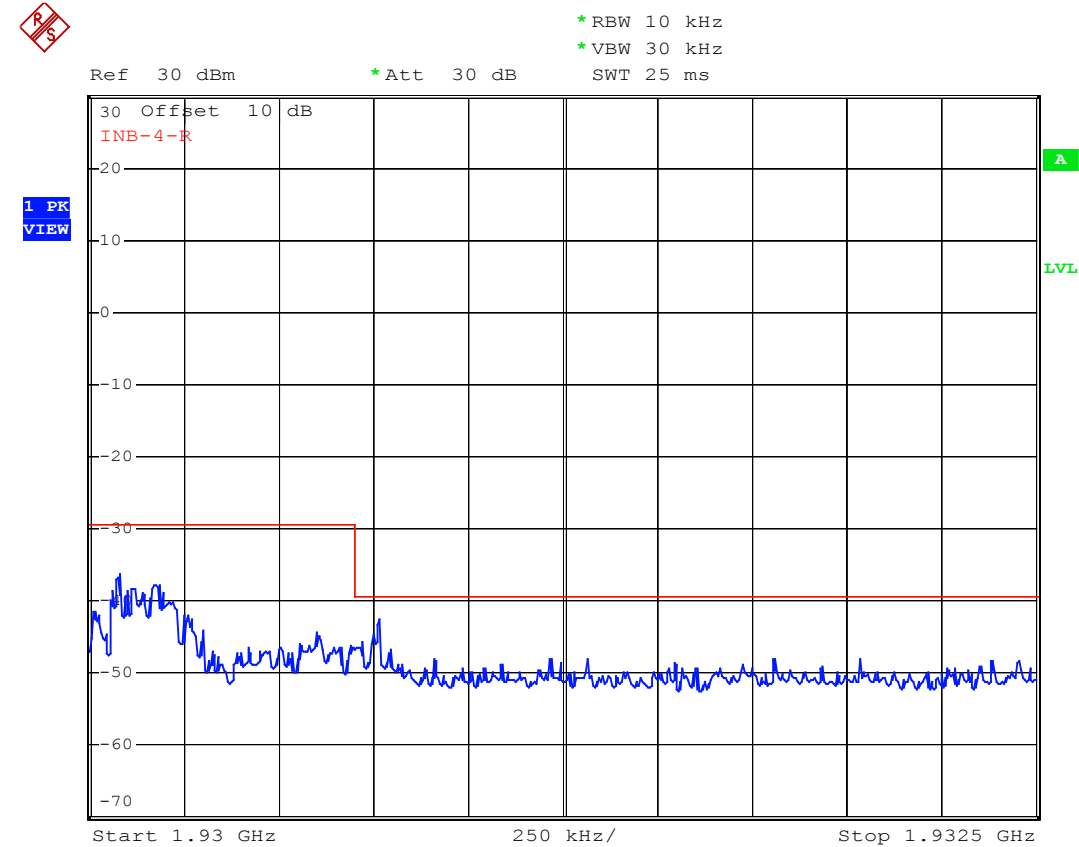
1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Out-of-band Unwanted Emission: CH FH



Date: 12.JUN.2007 13:49:31

Out-of-band Unwanted Emission: CH FH



Date: 12.JUN.2007 13:50:07

#### 6.13.4 Photos of Radiation Measuring Setup







## 6.14 Frame period and jitter

### 6.14.1 Standard Applicable: FCC 15.323(e)

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these subbands shall be 20 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

### 6.14.2 Measurement procedure

- Frame frequency stability  $\leq 50$  ppm
- TDMA frame frequency stability  $\leq 10$  ppm (That translates to frequency drift of 19.2 kHz/slot for 1920 MHz carrier)
- Frame jitter  $\leq 25\mu\text{s}$

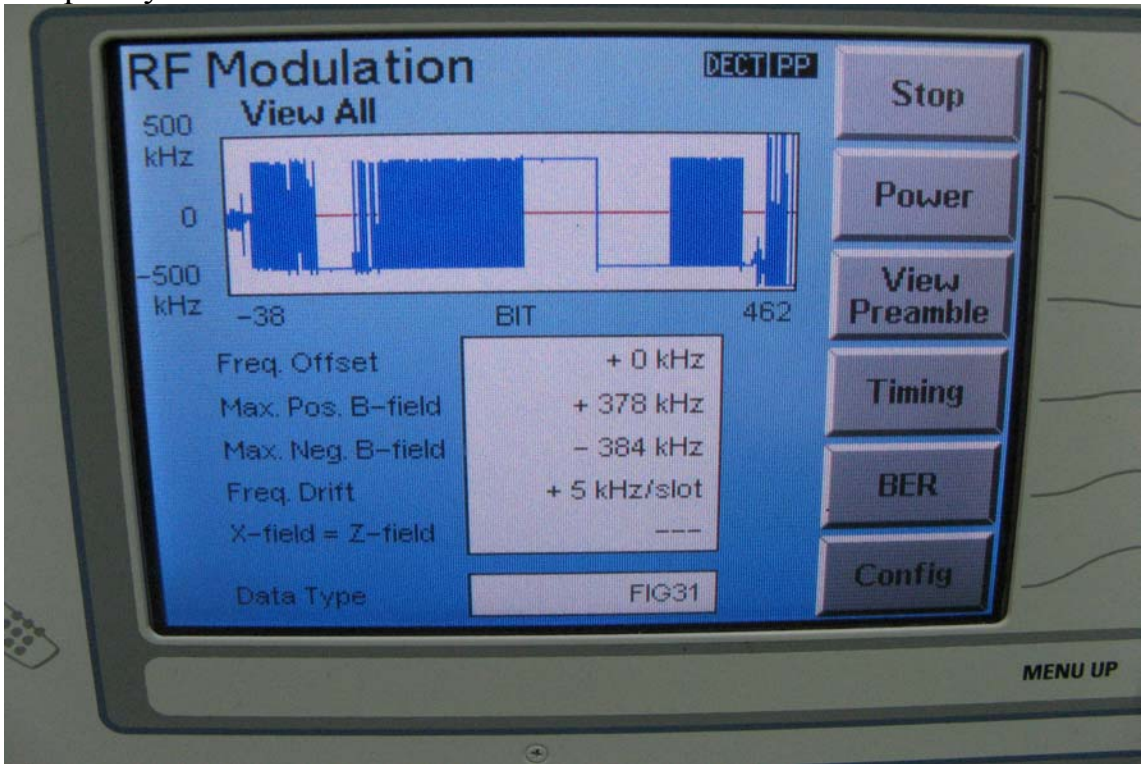
6.14.3 Test Results: Complies

Measurement Data

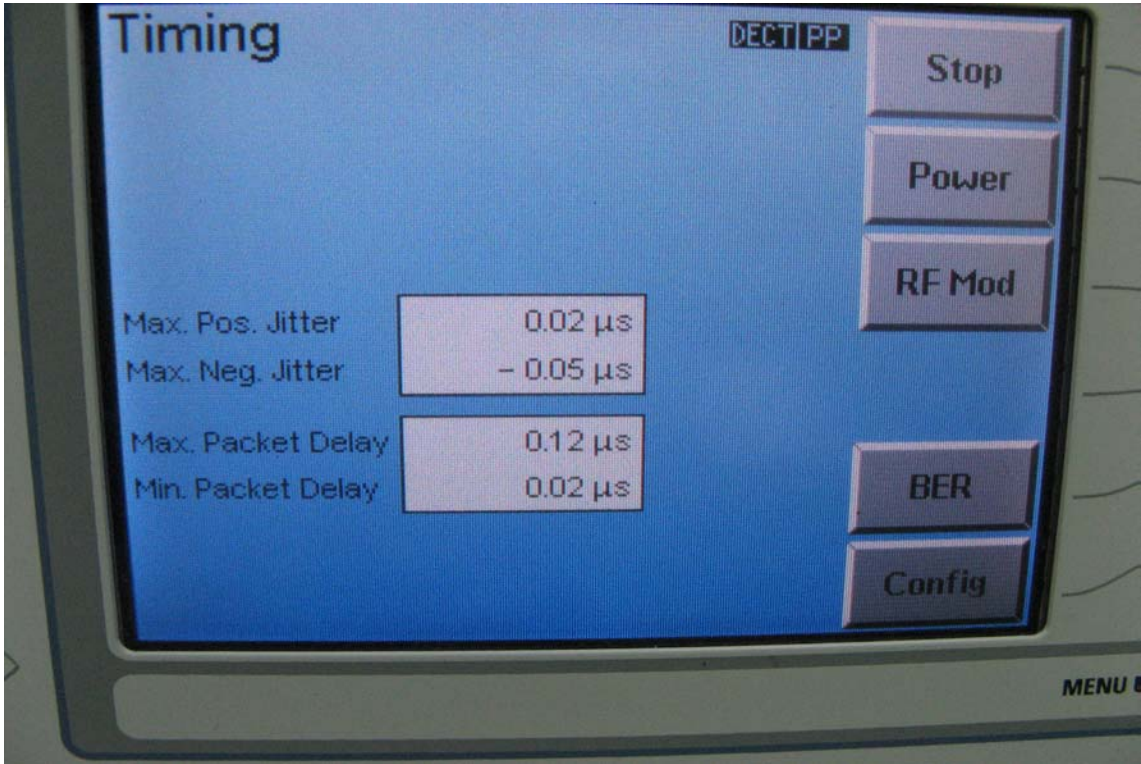
| Channel No.    | Frequency<br>(KHz/slot) |       | Jitter<br>(us) |       |
|----------------|-------------------------|-------|----------------|-------|
|                | Drift                   | Limit | Result         | Limit |
| F <sub>L</sub> | 5                       | 19.2  | -0.05          | 25    |
| F <sub>H</sub> | 4                       | 19.2  | 0.10           | 25    |

Photos of worst-case disply follow:

Frequency Drift



TDMA Frame Jitter

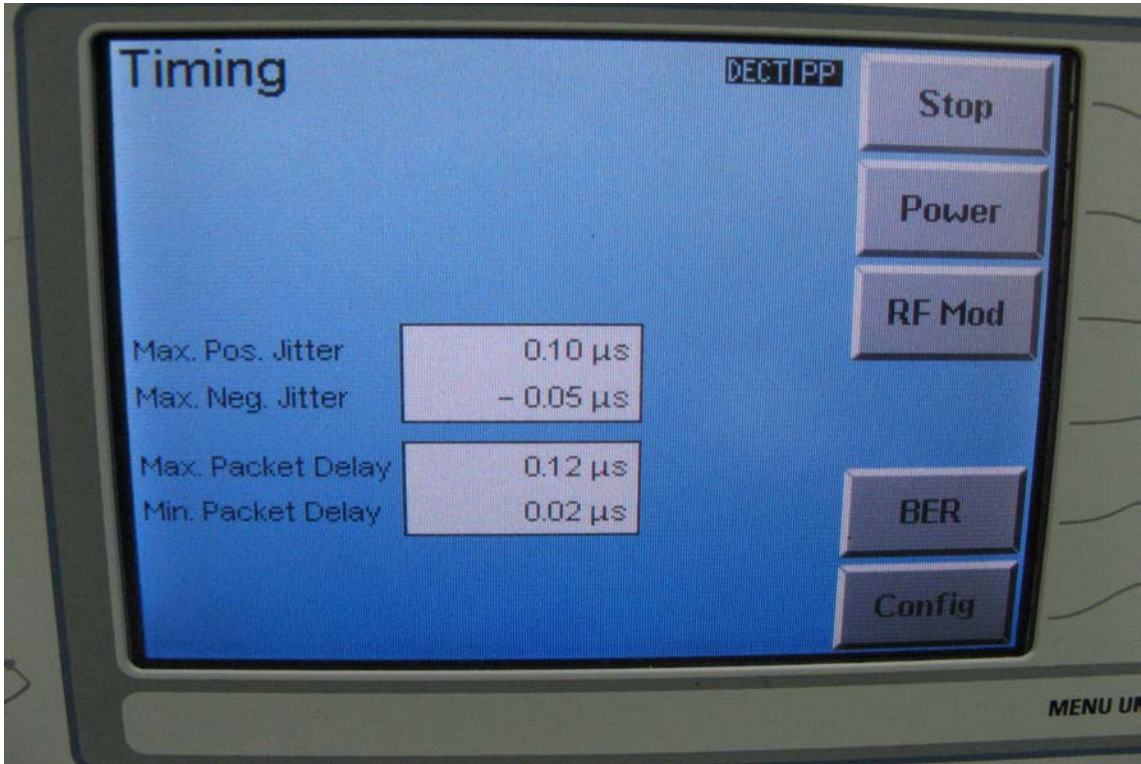




Frequency Drift



TDMA Frame Jitter



## 6.15 Carrier frequency stability

### 6.15.1 Standard Applicable: FCC 15.323(f)

The frequency stability of the carrier frequency of the intentional radiator shall be maintained within  $\pm 10$  ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  degrees C at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of  $20^{\circ}\text{C}$ . For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

### 6.15.2 Measurement Requirement

- Carrier frequency stability  $\leq 10$  ppm over 1 hour or interval between channel access monitoring, whichever is shorter (That translates to frequency drift of 19.2 kHz for 1920 MHz carrier)
- Carrier frequency stability over  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at normal supply voltage, and over 85% to 115% of rated supply voltage (voltage variation not required for battery operated device)

**6.15.3 Test Results: Complies****Measurement Data****a) Carrier Frequency Stability with Supply Voltage**

| Channel No.    | Frequency Offset<br>(KHz) |               |              | Limit<br>(KHz) |
|----------------|---------------------------|---------------|--------------|----------------|
|                | 3.06V (85%)               | 3.6V (Normal) | 4.14V (115%) |                |
| F <sub>L</sub> | 5                         | 5             | 4            | ±19.2          |
| F <sub>H</sub> | 5                         | 5             | 5            | ±19.2          |

**b) Carrier Frequency Stability with Temperature and Time**

| Channel No.    | Frequency Offset<br>(KHz) |       |       | Limit<br>(KHz) |
|----------------|---------------------------|-------|-------|----------------|
|                | 0 °C                      | 20 °C | 45 °C |                |
| F <sub>L</sub> | 4                         | 4     | 4     | ±19.2          |
| F <sub>H</sub> | 4                         | 3     | 4     | ±19.2          |

Test was conducted for duration longer than 1 hour. Photo of worst-case display follows:

