**HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.**

PRODUCT COMPLIANCE DIVISION
SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
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# CERTIFICATE OF COMPLIANCE

## FCC Part 15C Certification

**PANTECH&CURITEL COMMUNICATIONS, INC.**

110-1, ONGJEONG-RI, TONGJIN-EUP, GIMPO-SI,
GYOUNGGI-DO, 415-865, KOREA

Date of Issue: October 27, 2006
Test Report No.: HCT-SAR06-1006
Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD.

| | | |
|---|---|---|
| **FCC ID** | : | **PP4PN-810** |
| **APPLICANT** | : | PANTECH&CURITEL COMMUNICATIONS, INC. |

| | |
|---|---|
| **EUT:** | Dual-Band CDMA phone with Bluetooth- Prototype |
| **Trade Name:** | PANTECH&CURITEL |
| **Model:** | PN-810 |
| **Frequency Range:** | 2402 — 2480 MHz (Bluetooth) |
| **Max. RF Output Power:** | 0.00153 W Bluetooth (1.84 dBm) |
| **FCC Classification:** | FCC Part 15 Frequency Hopping Spread Spectrum Transceiver (DSS) |
| **FCC Rule Part(s):** | Part 15 subpart C (15.247) |
| **Application Type:** | Certification |

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in § 2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech Co., Ltd. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti- Drug Abuse Act of 1998, 21 U.S. C. 853(a)

Ki Soo Kim

**Report prepared by: Ki-Soo Kim**

**Manager of Product Compliance Team**

# Table of Contents

# 1. TEST RESULT CERTIFICATION

| | |
|---|---|
| Applicant: | PANTECH&CURITEL COMMUNICATION, INC.<br>110-1, ONGJEONG-RI, TONGJIN-EUP, GIMPO-SI,<br>GYOUNGGI-DO, 415-865, KOREA |
| EUT: | Dual-Band CDMA phone with Bluetooth- Prototype |
| Trade Name: | PANTECH&CURITEL |
| Model: | PN-810 |
| Date of Test: | October 17, 2006 - October 18, 2006 |

# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product** | Dual-Band CDMA phone with Bluetooth- Prototype |
| **Trade Name** | PANTECH&CURITEL |
| **Model** | PN-810 |
| **Power Supply** | DCV power from the battery |
| **Frequency Range** | 2402 ~ 2480 MHz |
| **Transmit Power** | 0.00153 W Bluetooth (1.84 dBm) |
| **Modulation Technique** | FHSS(GMSK) |
| **Number of Channels** | 79 Channels |
| **Antenna Specification** | Manufacturer: AMOTECH CO., LTD.<br>Antenna type: Built in Antenna/ MODEL: PN810 |

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4. (Version :2003) Radiated testing was performed at an antenna to EUT distance 3 meters.

## 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

## 3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

## 3.3 GENERAL TEST PROCEDURES

**Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

**Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

## 3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

# 4. INSTRUMENT CALIBRATION

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.

# 5. FACILITIES AND ACCREDITATIONS

## 5.1 FACILITIES

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

## 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

# 6. SETUP OF EQUIPMENT UNDER TEST

## 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

# 7. FCC PART 15.247 REQUIREMENTS

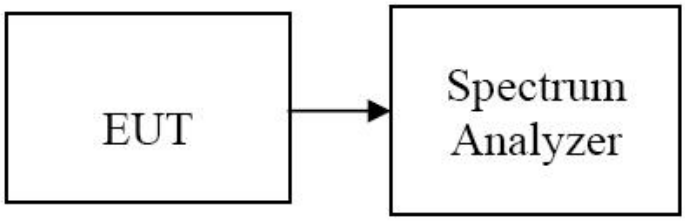
## 7.1 PEAK POWER

**LIMIT**

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Test Configuration**




**TEST PROCEDURE**

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

**TEST RESULTS**

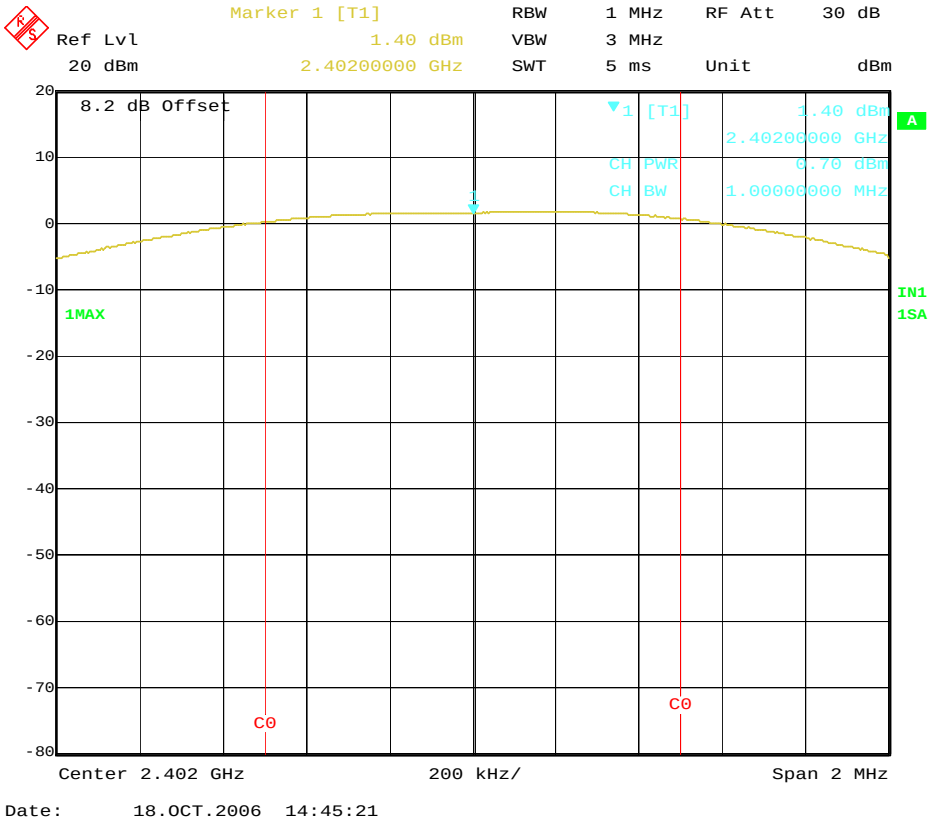
*No non-compliance noted*

**Test Data**

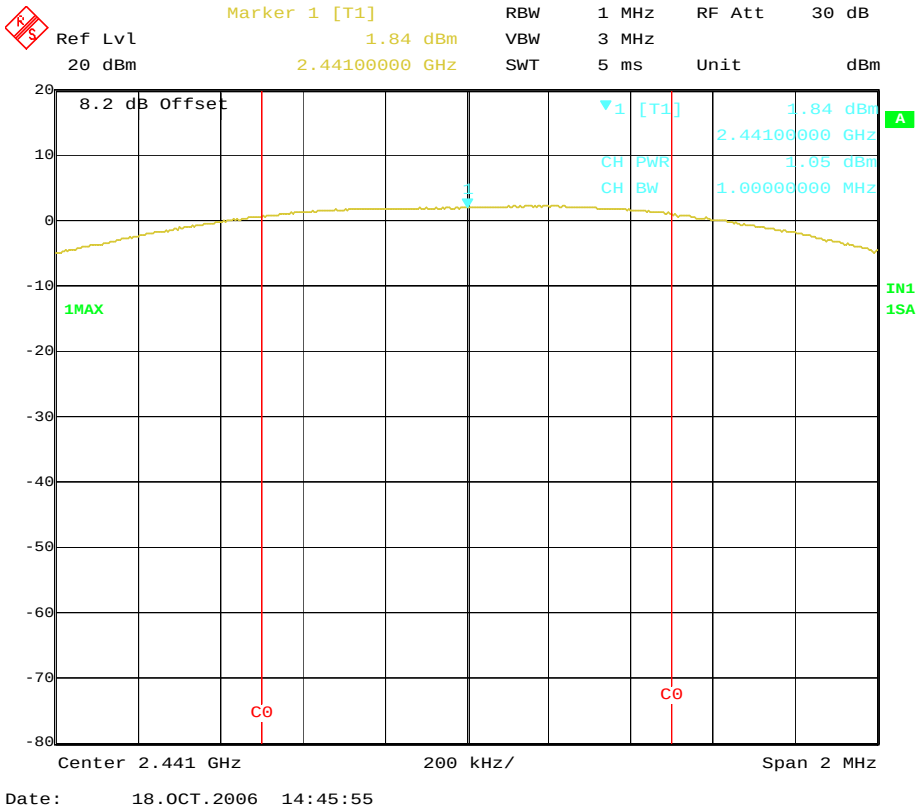
| Channel | Frequency (MHz) | Reading Power (dBm) | Factor (dB) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|---|---|
| Low | 2402 | -6.80 | 8.2 | 1.40 | 0.00138 | 1 | PASS |
| Mid | 2440 | -6.36 | 8.2 | 1.84 | 0.00153 | | PASS |
| High | 2480 | -6.69 | 8.2 | 1.51 | 0.00142 | | PASS |

## Test Plot

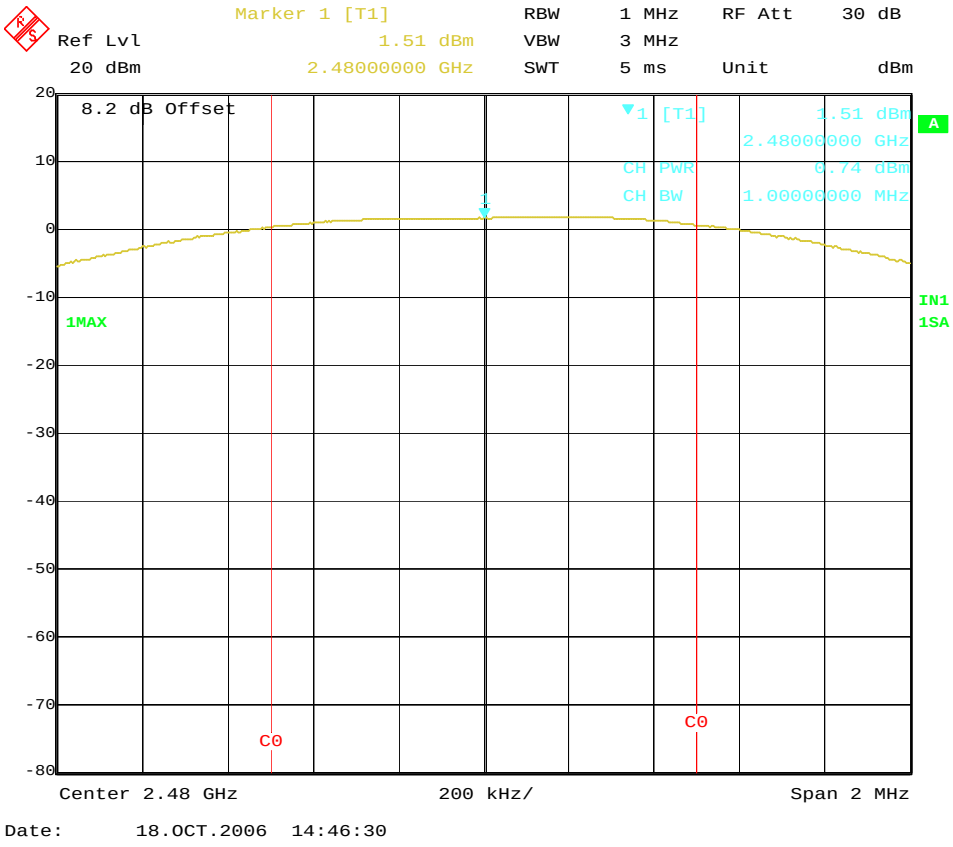
### Peak Power (CH Low)




### Peak Power (CH Mid)



## Peak Power (CH High)

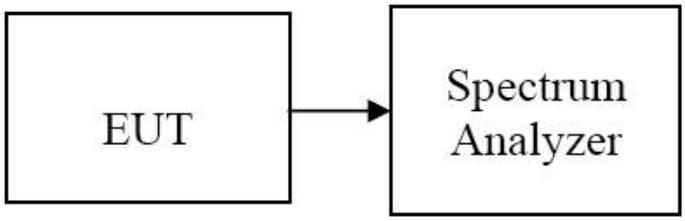


## 7.2 PEAK POWER SPECTRAL DENSITY

**LIMIT**

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

**Test Configuration**




**TEST PROCEDURE**

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed.

**TEST RESULTS**

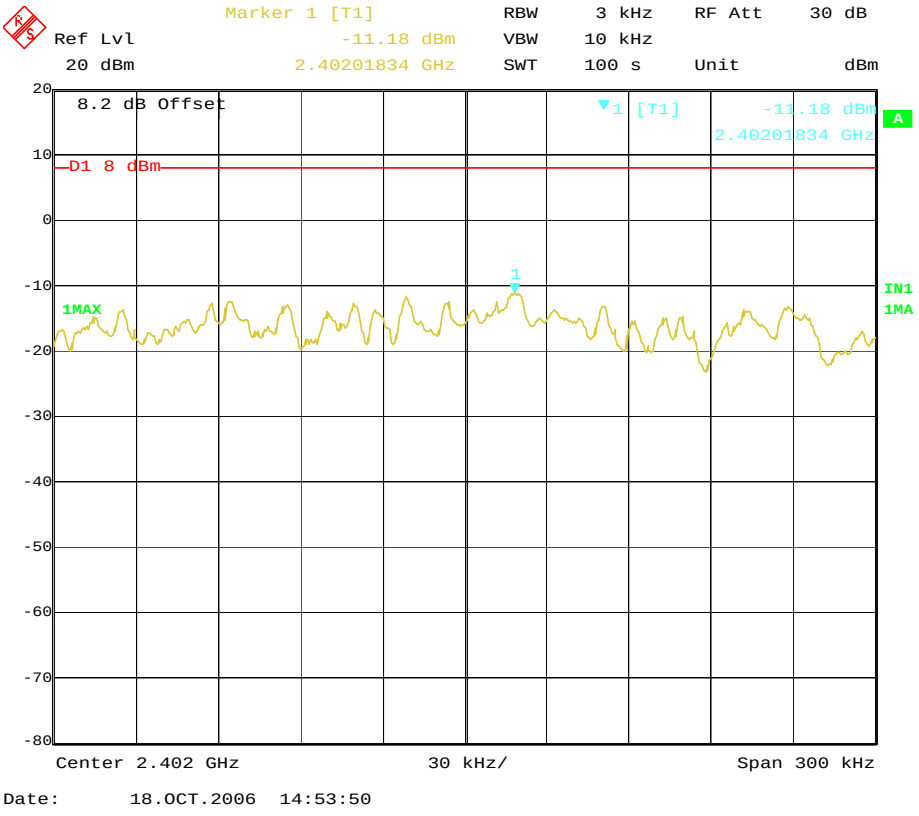
*No non-compliance noted*

**Test Data**

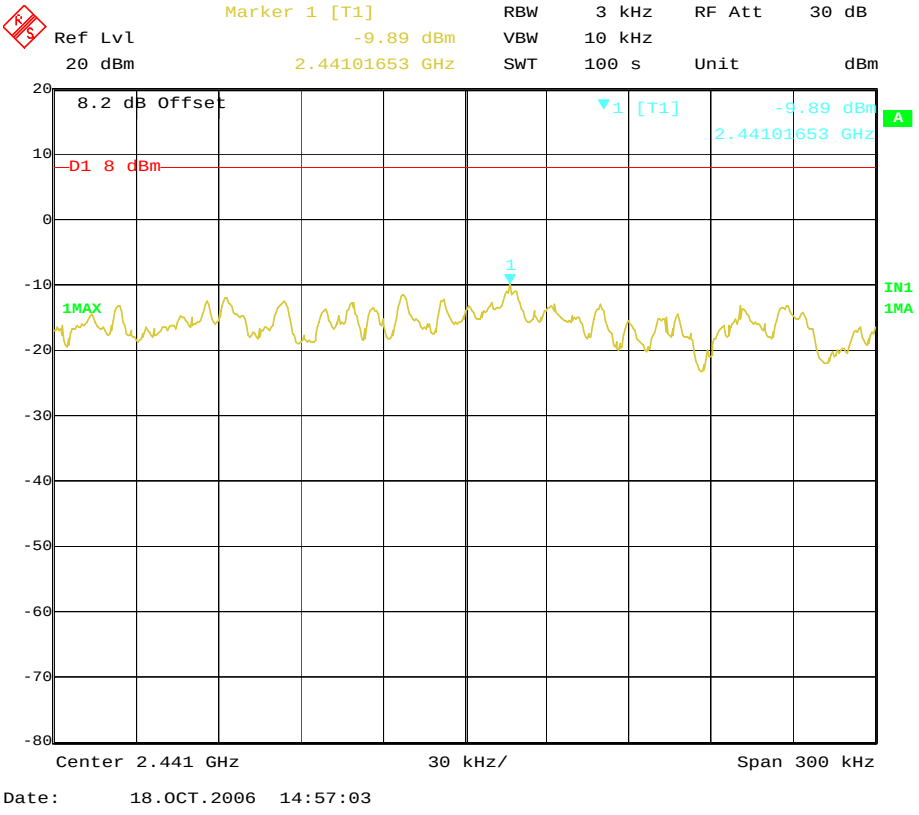
| Channel | Frequency (MHz) | Reading Power (dBm) | Factor (dB) | Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| Low | 2402 | -19.38 | 8.2 | -11.18 | 8.0 | PASS |
| Mid | 2440 | -18.09 | 8.2 | -9.89 | | PASS |
| High | 2480 | -18.84 | 8.2 | -10.64 | | PASS |

## Test Plot

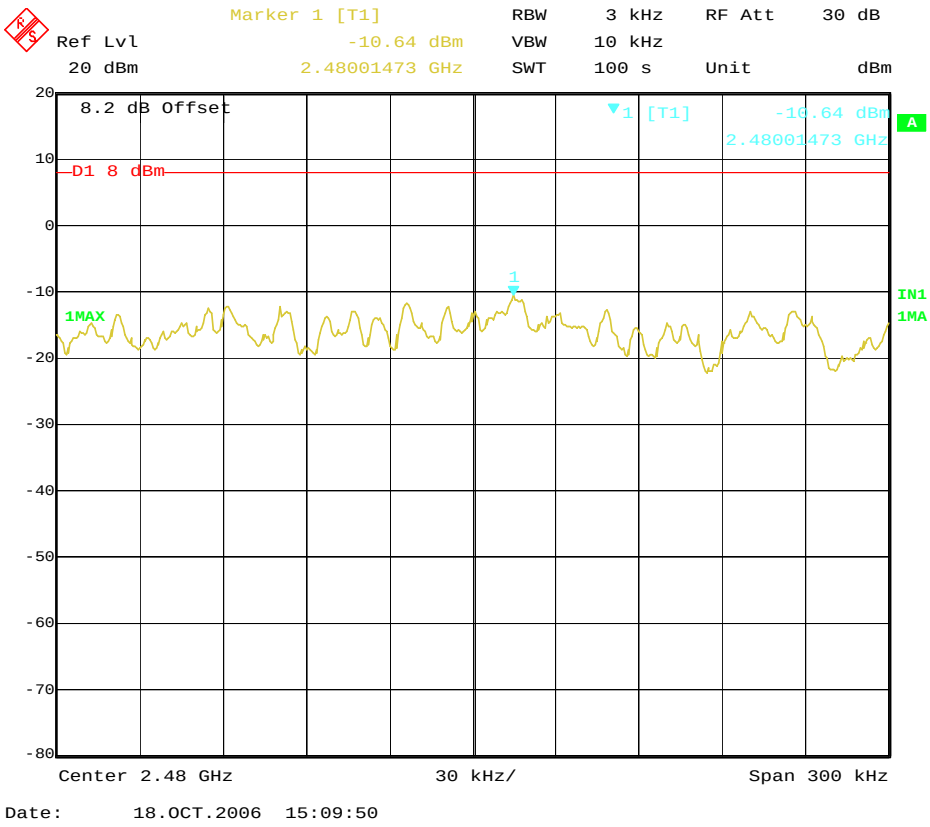
### PPSD (CH Low)




### PPSD (CH Mid)



## PPSD (CH High)

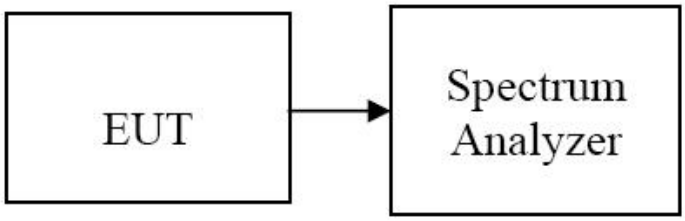

Marker 1 [T1]
RBW 3 kHz
RF Att 30 dB
Ref Lvl
-10.64 dBm
VBW 10 kHz
20 dBm
2.48001473 GHz
SWT 100 s
Unit dBm
8.2 dB Offset
1 [T1]
-10.64 dBm
2.48001473 GHz
A
D1 8 dBm
1MAX
IN1
1MA
Center 2.48 GHz
30 kHz/
Span 300 kHz
Date: 18.OCT.2006 15:09:50

## 7.3 BAND EDGES MEASUREMENT

### LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated inten-tional 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 con-tains the highest level of the desired power, based on either an RF con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits.

### Test Configuration




### TEST PROCEDURE

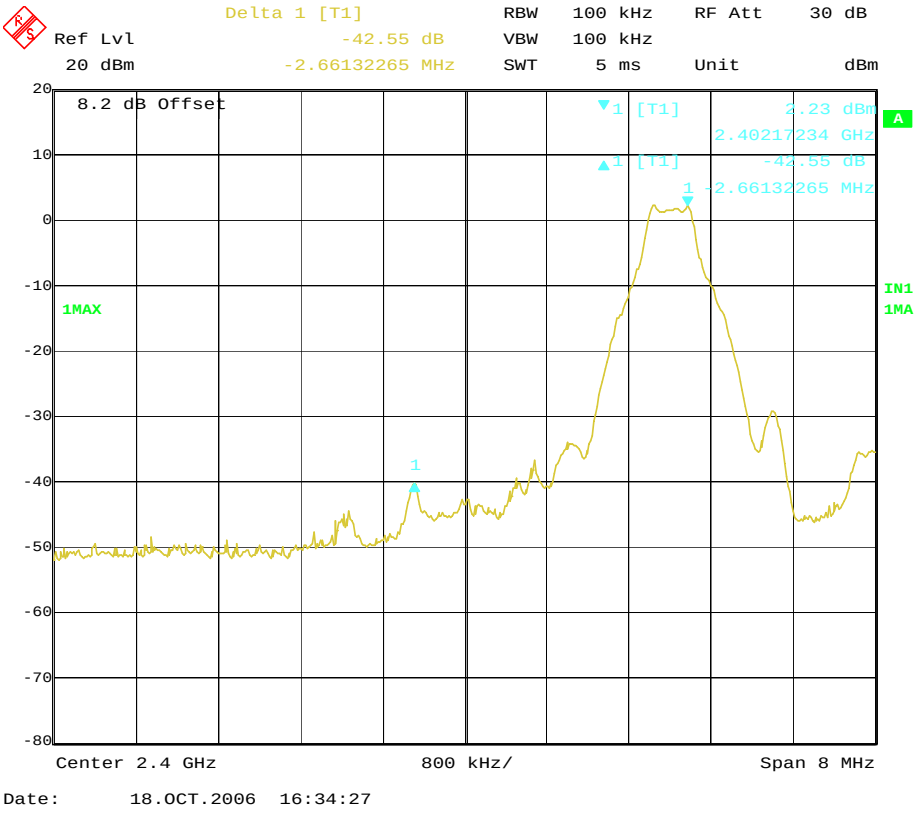
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 100kHz, Span = 8MHz, Sweep=5ms
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

### TEST RESULTS

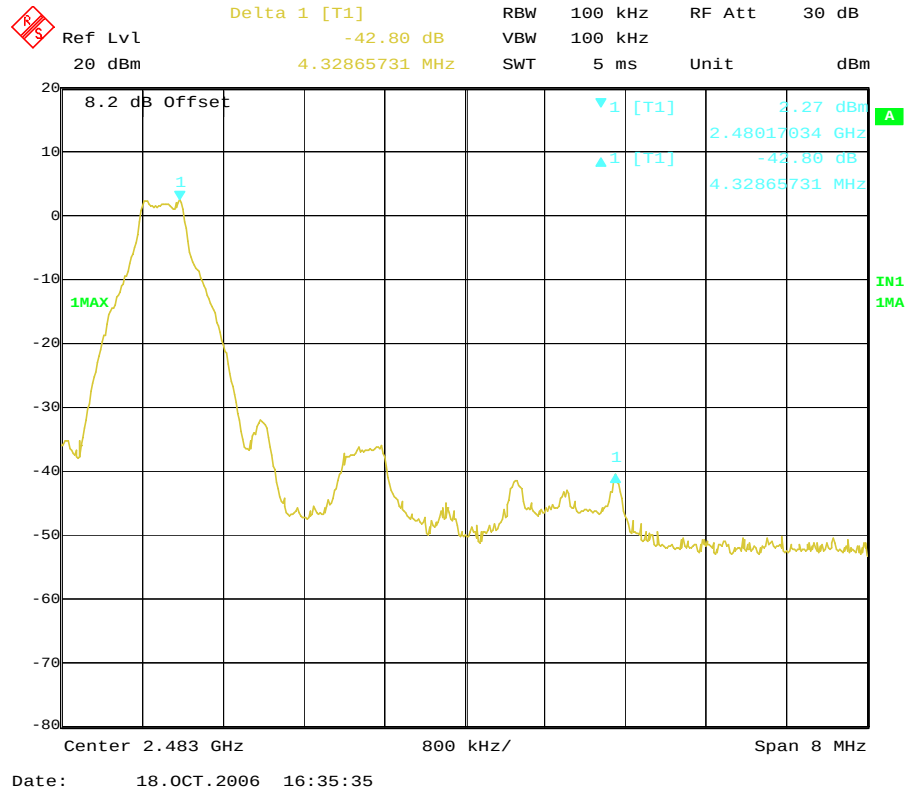
Refer to attach spectrum analyzer data chart.

## Test Data

### Band Edges (CH-Low)




### Band Edges (CH-Low)

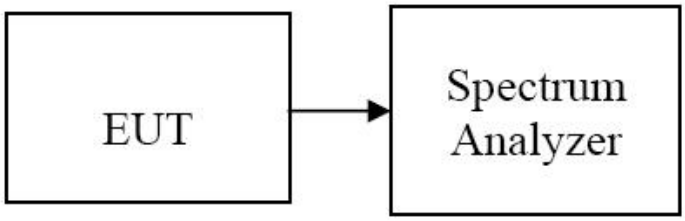


## 7.4 FREQUENCY SEPARATION

**LIMIT**

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

**Test Configuration**




**TEST PROCEDURE**

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW, VBW=100kHz, Adjust Span to 5 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

**TEST RESULTS**

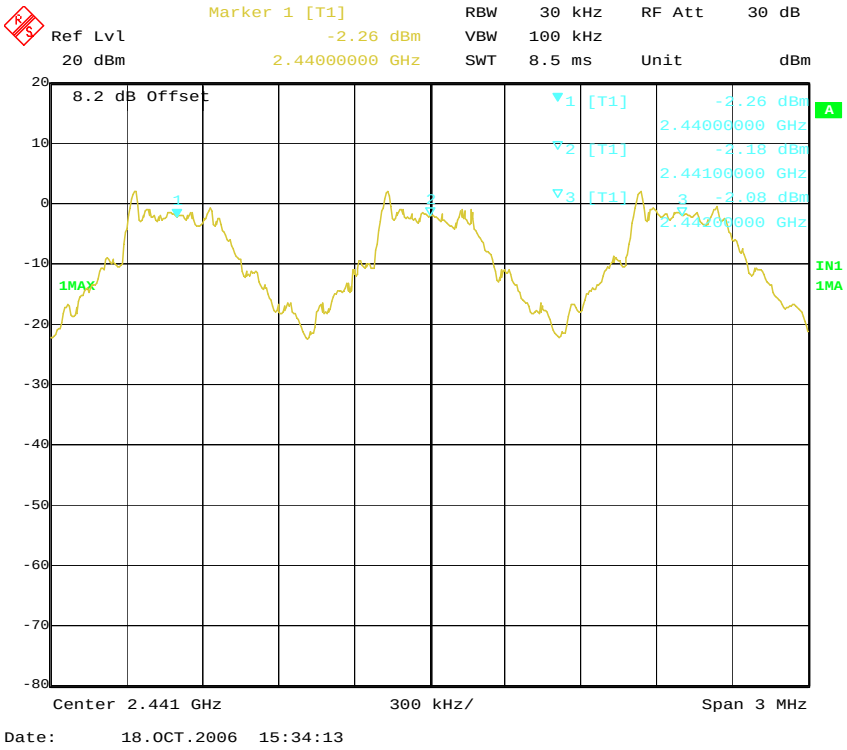
*No non-compliance noted*

**Test Data**

| Channel Separation (MHz) | 20dB Bandwith (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 1.00 | 878 | >25 | Pass |

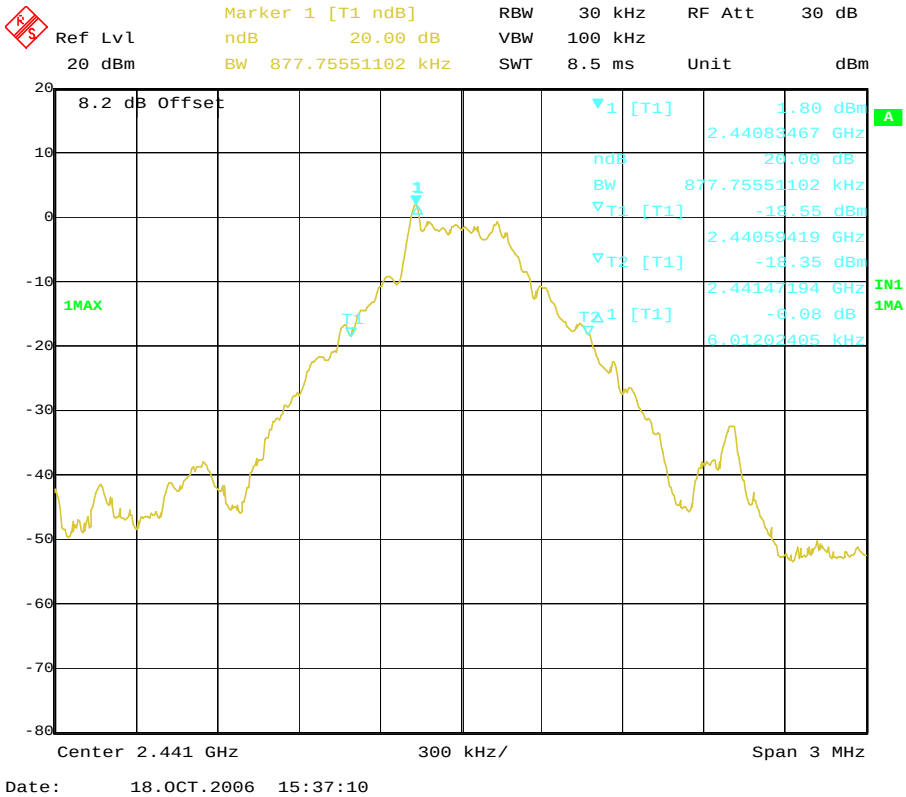
## Test Plot

## Measurement of Channel Separation




## Test Plot

## 20 dB bandwidth

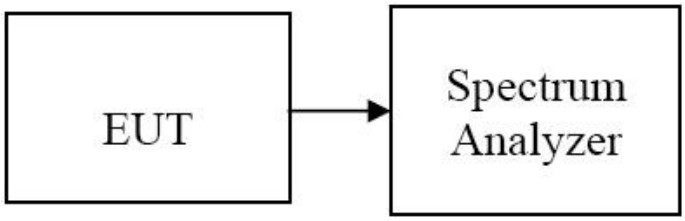


## 7.5 NUMBER OF HOPPING FREQUENCY

**LIMIT**

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

**Test Configuration**




**TEST PROCEDURE**

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2441.5MHz, Sweep = 250s and Start=2441.5MHz,
   Stop = 2483.5MHz, Sweep = 250s.
4. Set the spectrum analyzer as RBW, VBW=100kHz,
5. Max hold, view and count how many channel in the band.

**TEST RESULTS**

*No non-compliance noted*

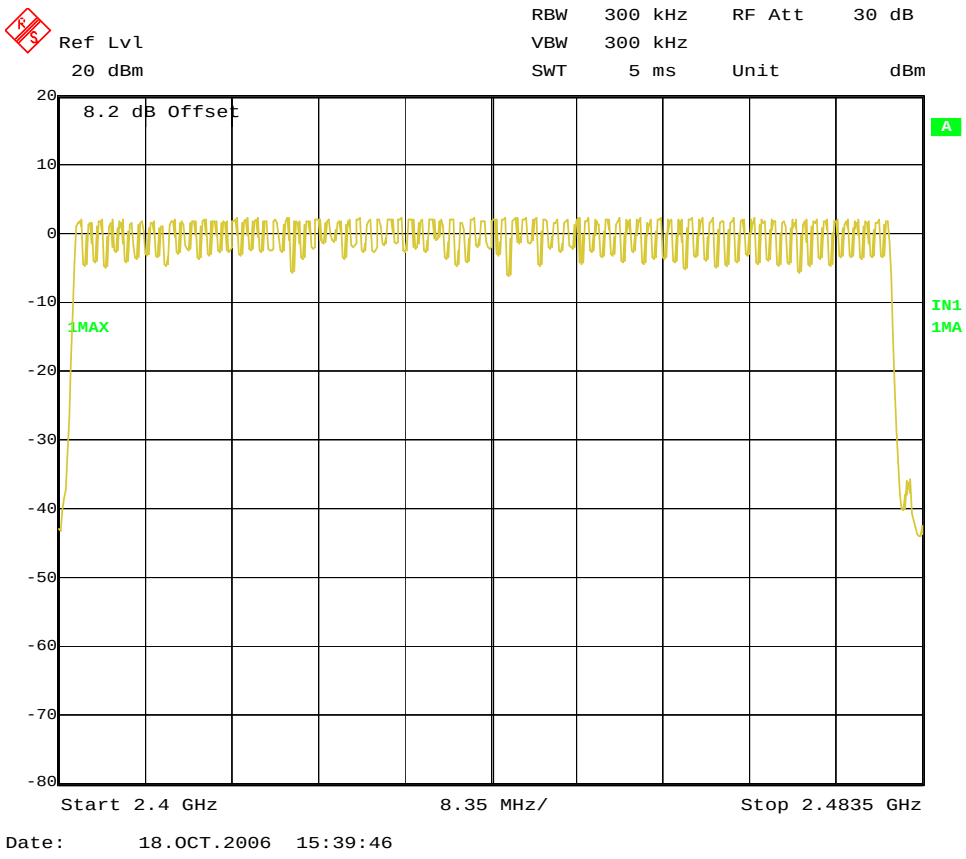
**Test Data**

| Result (No. of CH) | Limit (No. of CH) | Result |
|---|---|---|
| 79 | >75 | Pass |

## Test Plot

## Channel Number

## 2.4 GHz – 2.4835 GHz

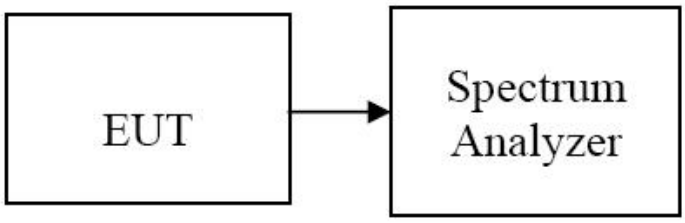


## 7.6TIME OF OCCUPANCY (DWELL TIME)

### LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

### Test Configuration




### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5. Repeat above procedures until all frequency measured were complete.

### TEST RESULTS

*No non-compliance noted*

**Test Data**

**DH 1**

CH Low: 0.411 * (1600/2)/79 * 31.6 = 131.5 (ms)

CH Mid: 0.391 * (1600/2)/79 * 31.6 = 125.12 (ms)

CH High: 0.401 * (1600/2)/79 * 31.6 = 128.32 (ms)

| Channel | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|---|---|---|---|---|---|
| Low | 0.411 | 131.5 | 31.6 | 400 | PASS |
| Mid | 0.391 | 125.12 | 31.6 | | PASS |
| High | 0.401 | 128.32 | 31.6 | | PASS |

**DH 3**

CH Low: 1.67 * (1600/4)/79 * 31.6 = 267 (ms)

CH Mid: 1.67 * (1600/4)/79 * 31.6 = 267 (ms)

CH High: 1.67 * (1600/4)/79 * 31.6 = 267 (ms)

| Channel | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|---|---|---|---|---|---|
| Low | 1.67 | 267 | 31.6 | 400 | PASS |
| Mid | 1.67 | 267 | 31.6 | | PASS |
| High | 1.67 | 267 | 31.6 | | PASS |

**DH 5**

CH Low: 2.90 * (1600/6)/79 * 31.6 = 309 (ms)

CH Mid: 2.93 * (1600/6)/79 * 31.6 = 313 (ms)

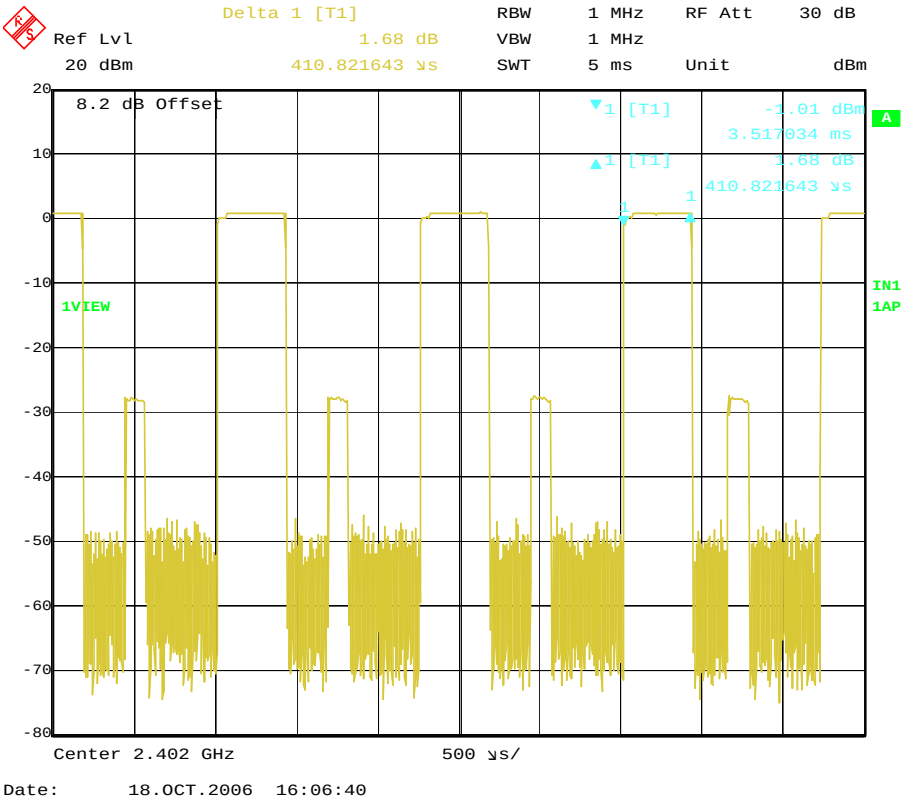
CH High: 2.93 * (1600/6)/79 * 31.6 = 313 (ms)

| Channel | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|---|---|---|---|---|---|
| Low | 2.90 | 309 | 31.6 | 400 | PASS |
| Mid | 2.93 | 313 | 31.6 | | PASS |
| High | 2.93 | 313 | 31.6 | | PASS |

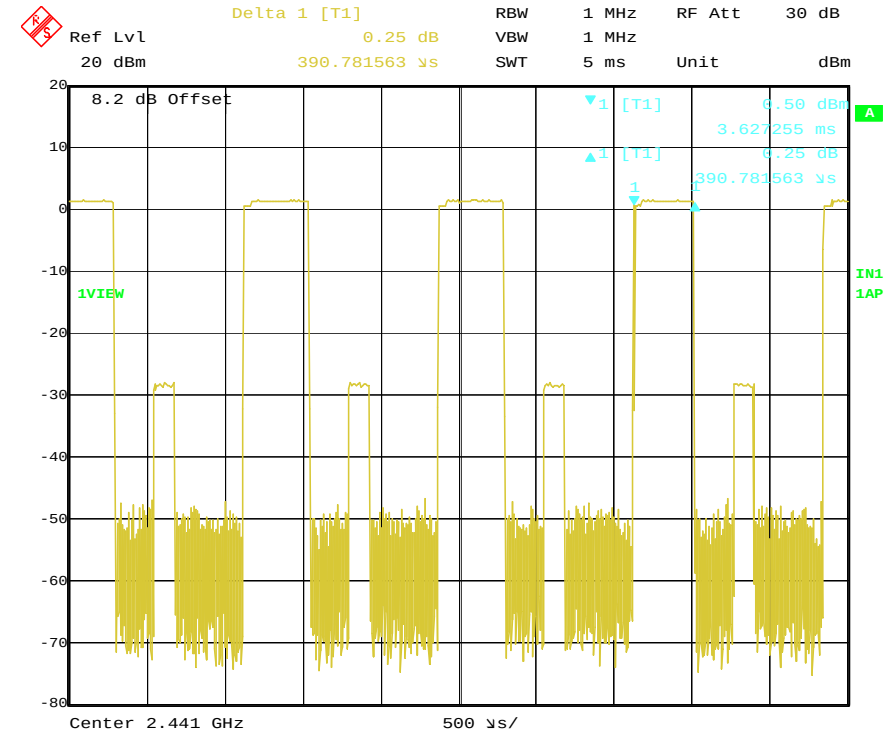
## Test Plot

## DH 1

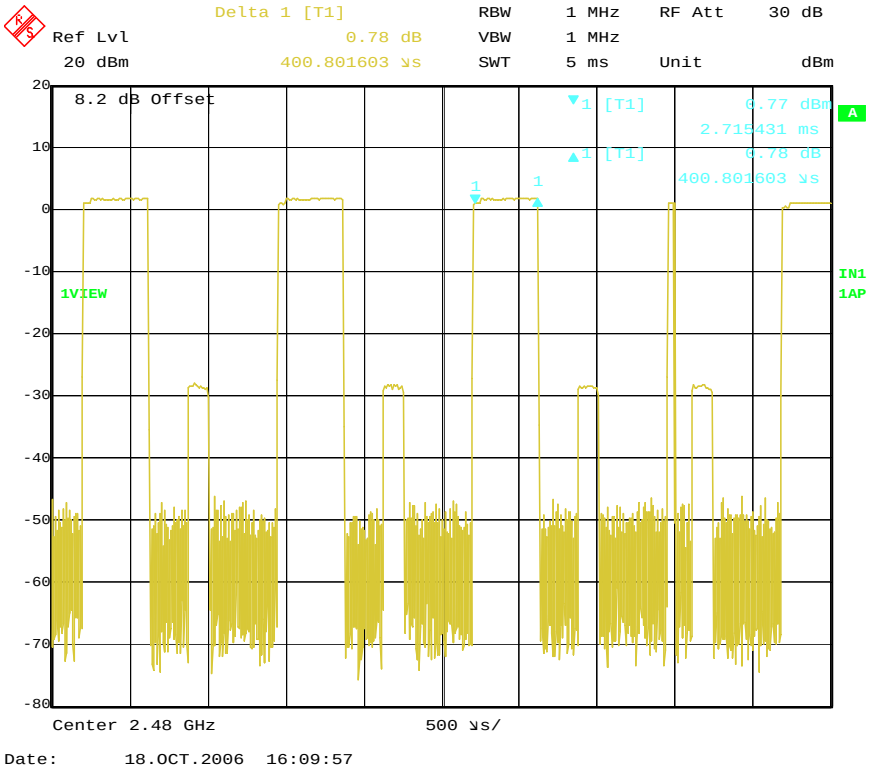
### (CH Low)




### (CH Mid)

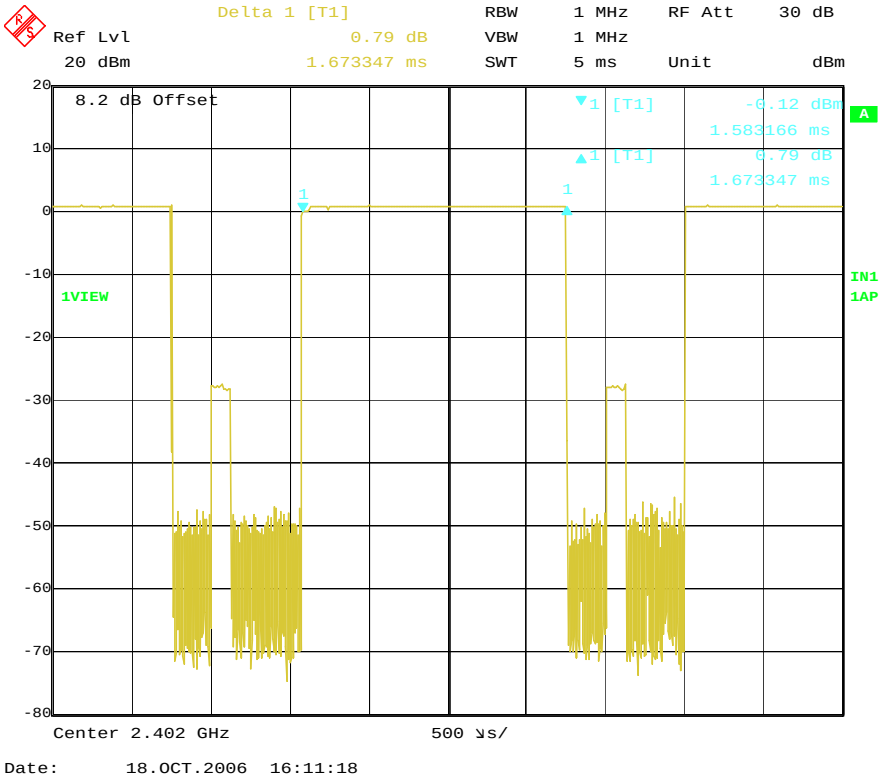


**(CH High)**

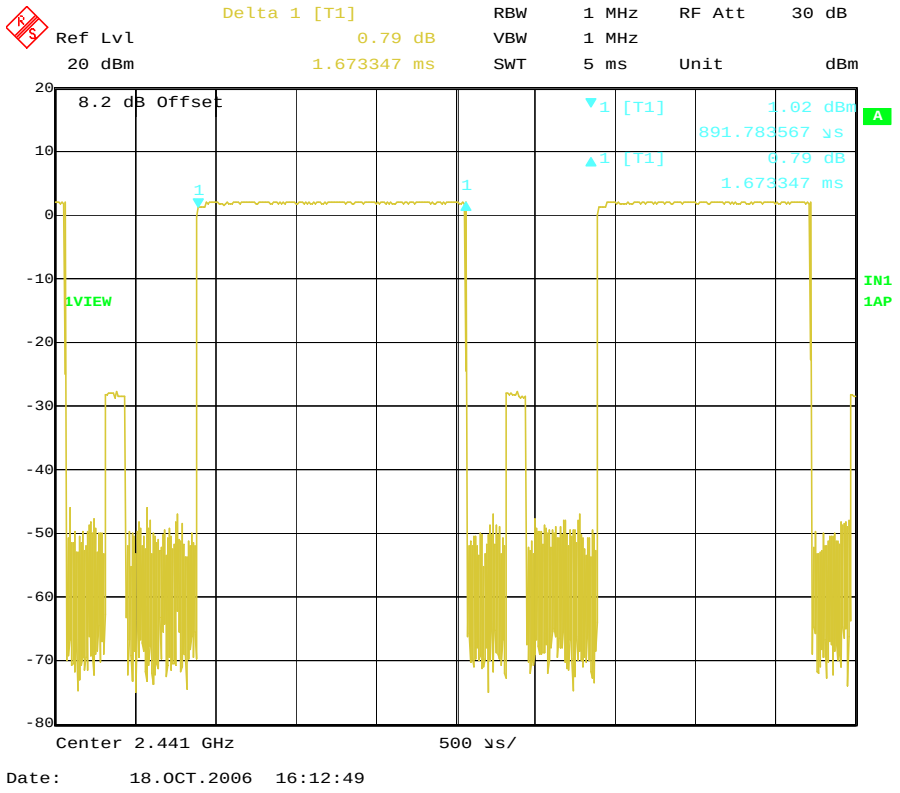



**DH 3**

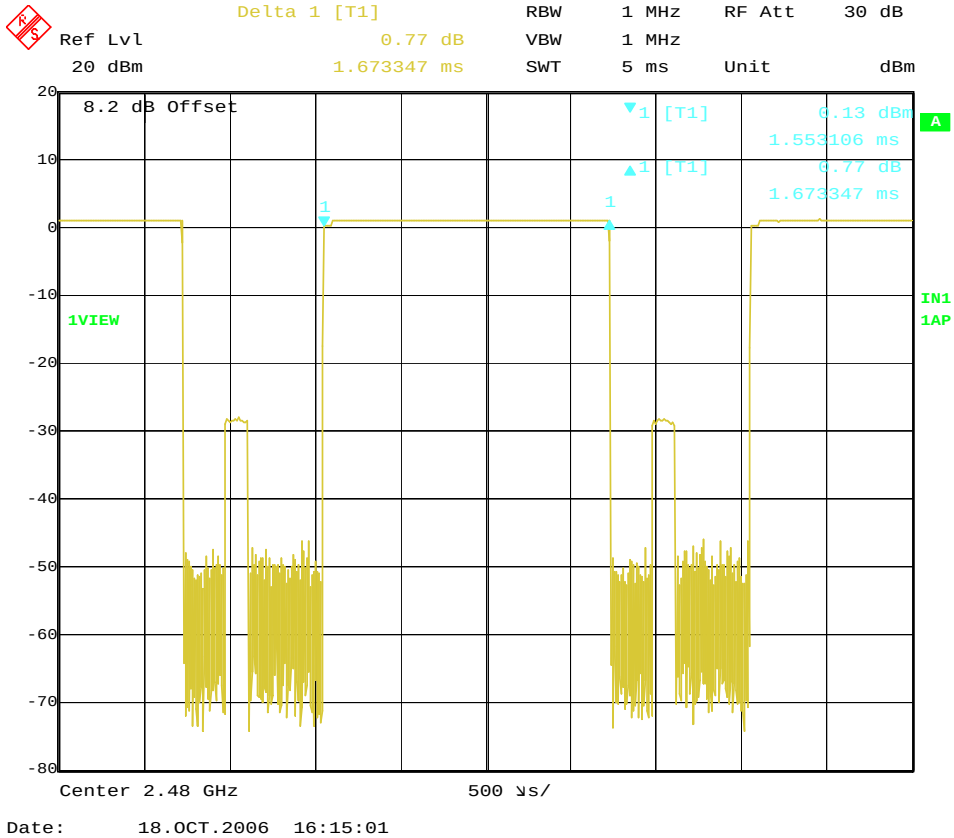
**(CH Low)**



**(CH Mid)**

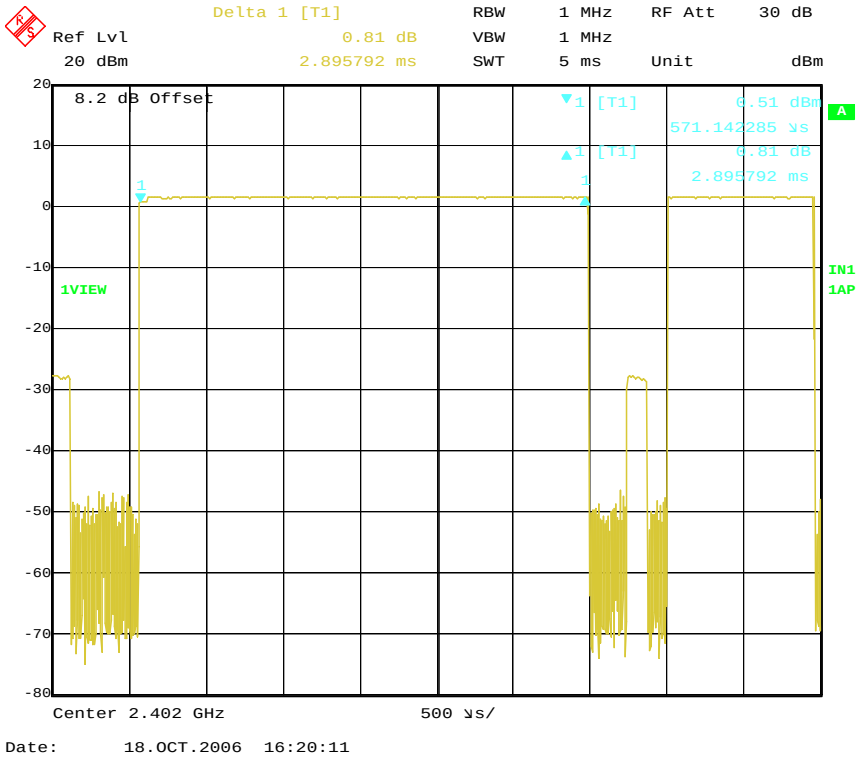



**(CH High)**

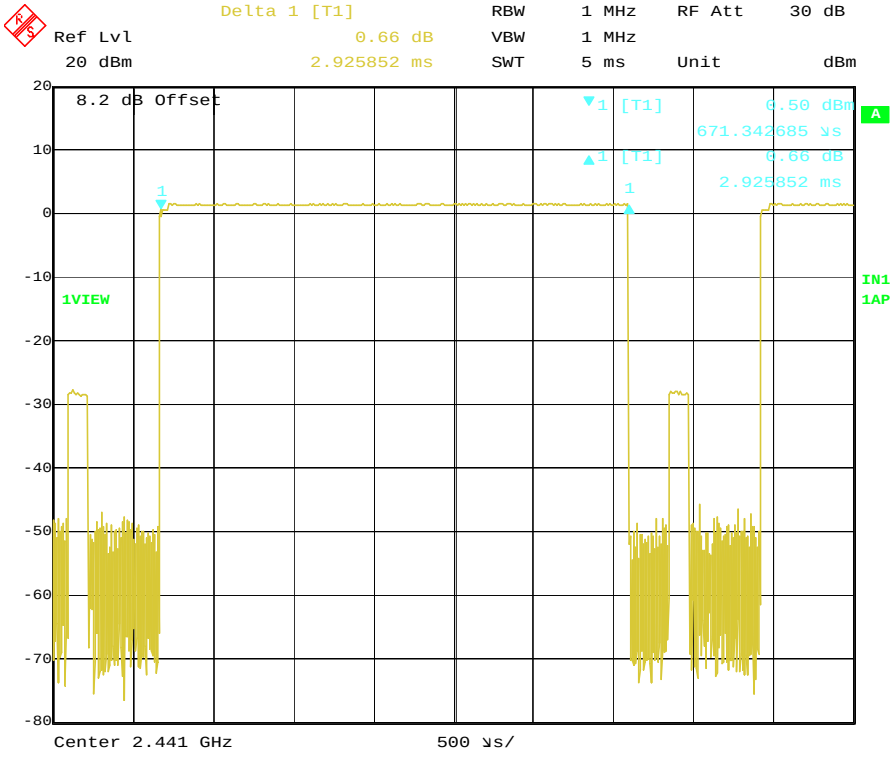


## DH 5

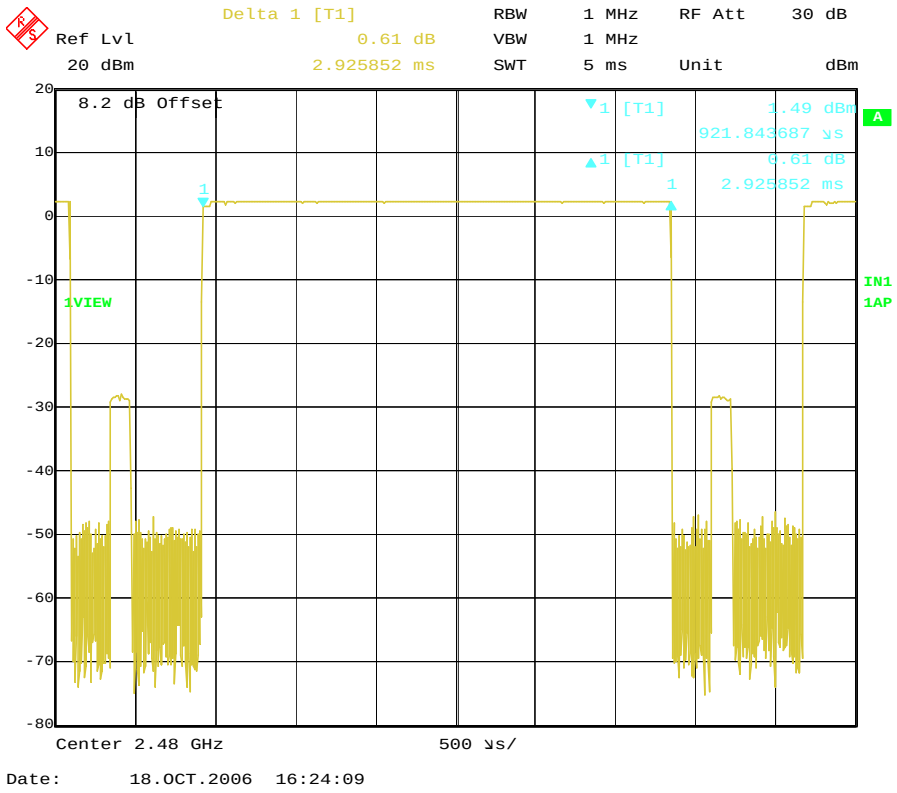
## (CH Low)




## (CH Mid)



**(CH High)**


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
0.61 dB
VBW 1 MHz
20 dBm
2.925852 ms
SWT 5 ms
Unit dBm
8.2 dB Offset
1 [T1] 1.49 dBm
921.843687 µs
1 [T1] 0.61 dB
2.925852 ms
1VIEW
IN1
1AP
Center 2.48 GHz
500 µs/
Date: 18.OCT.2006 16:24:09

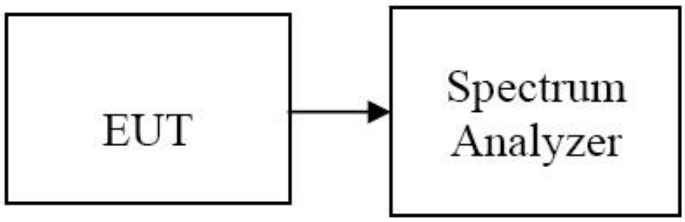
**SPURIOUS EMISSIONS**

## 7.7 Conducted Measurement

**LIMIT**

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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

**Test Configuration**




**TEST PROCEDURE**

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 100 KHz.

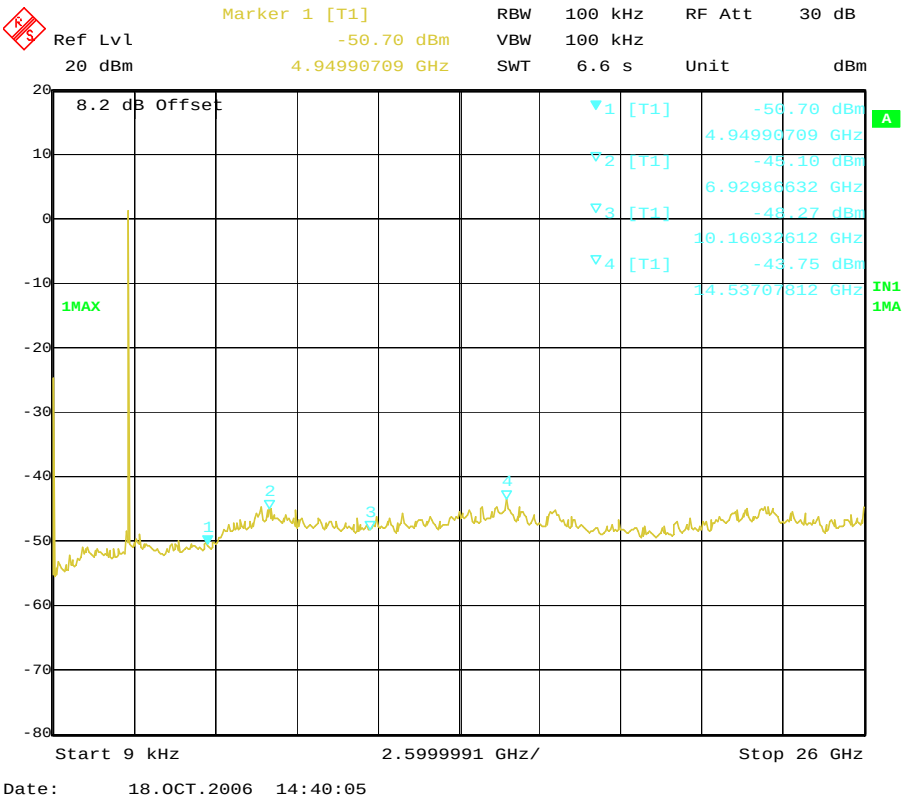
Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

**TEST RESULTS**

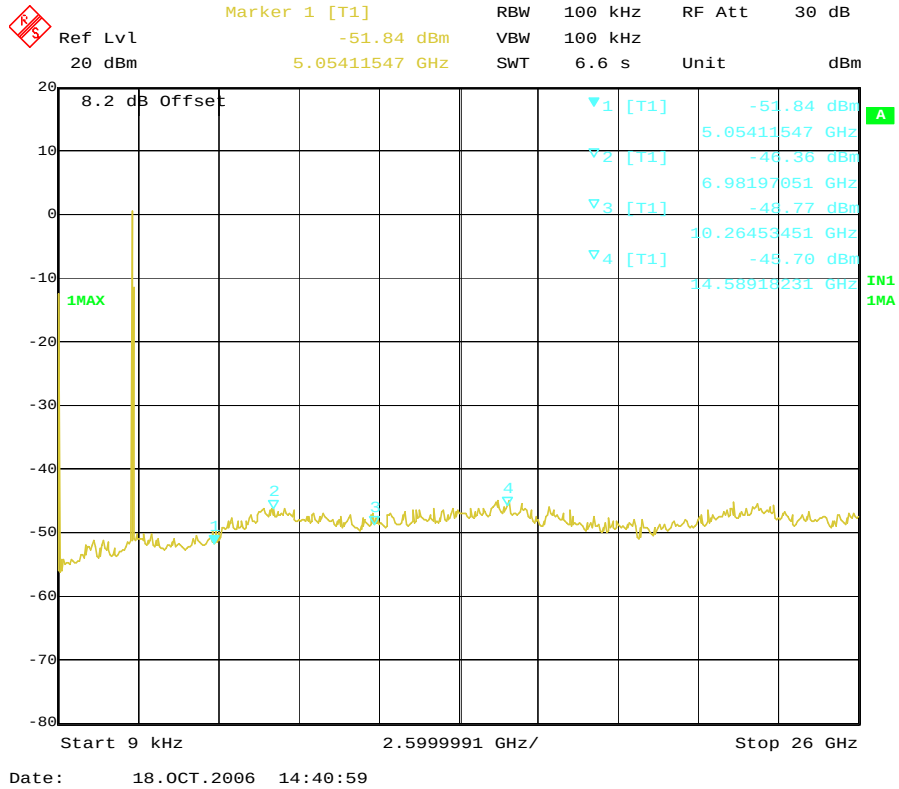
*No non-compliance noted*

## Test Plot

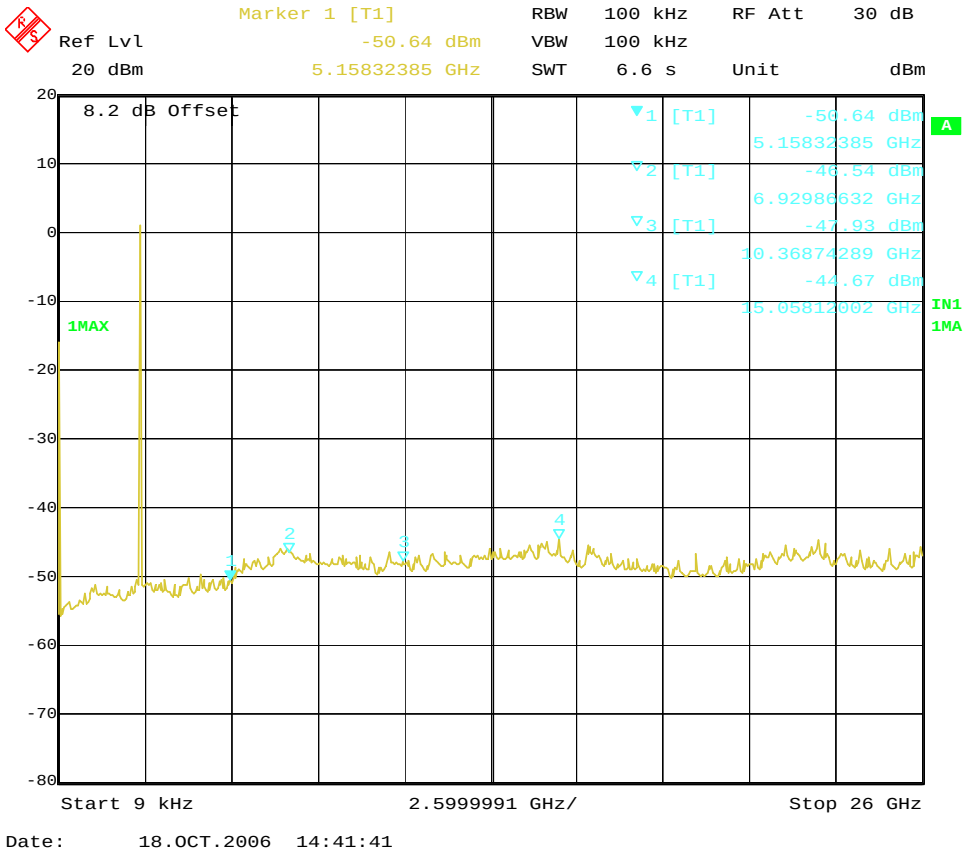
### CH Low




### CH Mid



## CH High


Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-50.64 dBm
VBW 100 kHz
20 dBm
5.15832385 GHz
SWT 6.6 s
Unit dBm
8.2 dB Offset
1 [T1] -50.64 dBm
5.15832385 GHz
2 [T1] -46.54 dBm
6.92986632 GHz
3 [T1] -47.93 dBm
10.36874289 GHz
4 [T1] -44.67 dBm
15.05812002 GHz
A
IN1
1MA
1MAX
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 9 kHz
2.5999991 GHz/
Stop 26 GHz
Date: 18.OCT.2006 14:41:41

### 7.7.2 Radiated Emissions

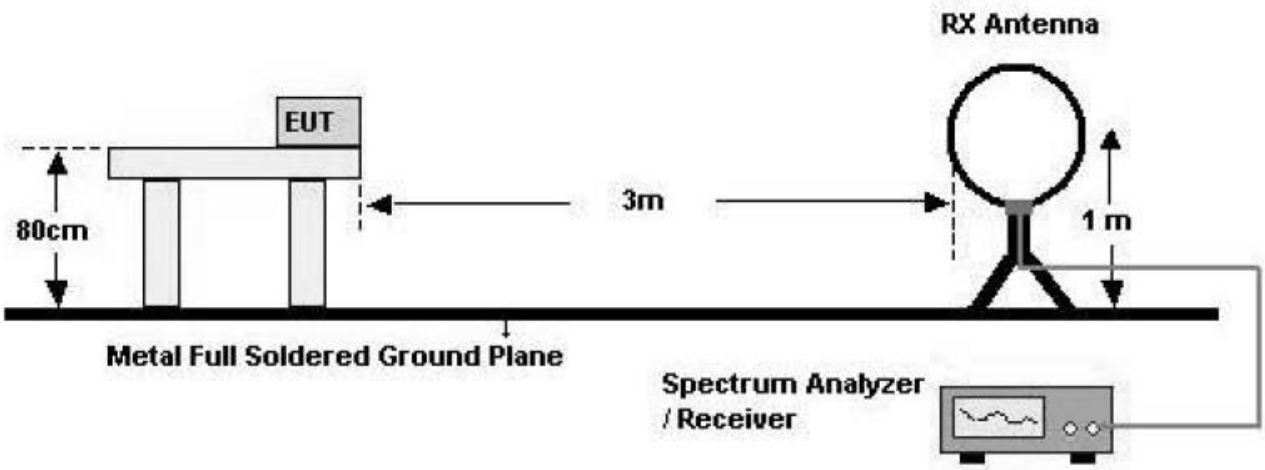
**LIMIT**

1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed

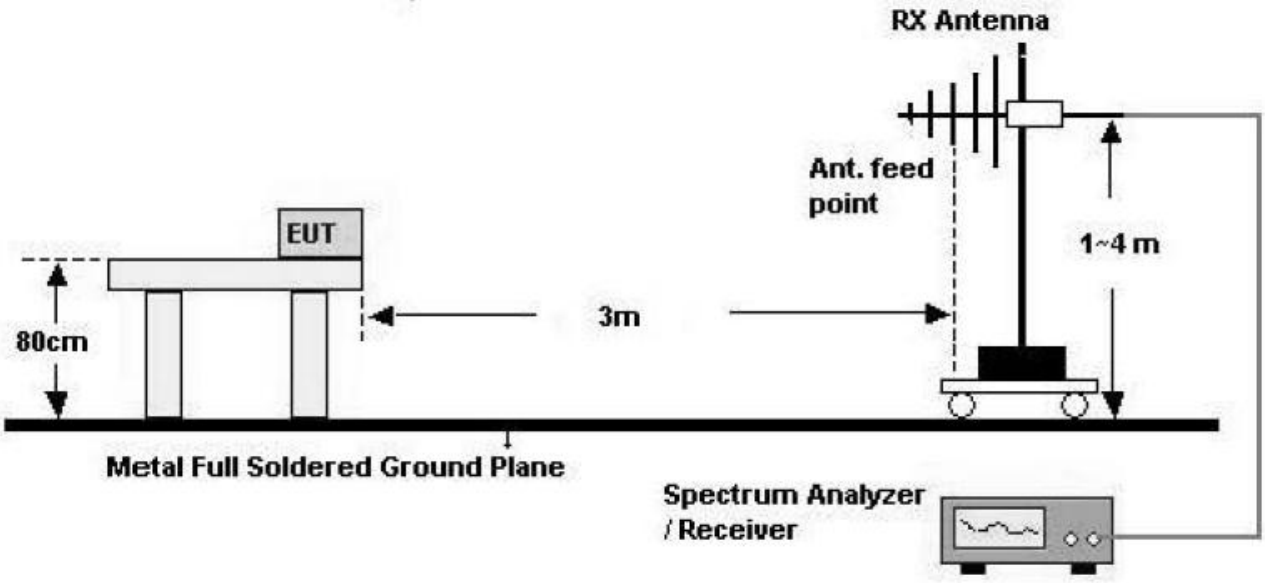
| Frequency (MHz) | Field Strength (mV/m) | Measurement Distance (m) |
|---|---|---|
| 0.009 – 0.490 | 2400/F(KHz) | 300 |
| 0.490 – 1.705 | 24000/F(KHz) | 30 |
| 1.705 – 30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

## Test Configuration

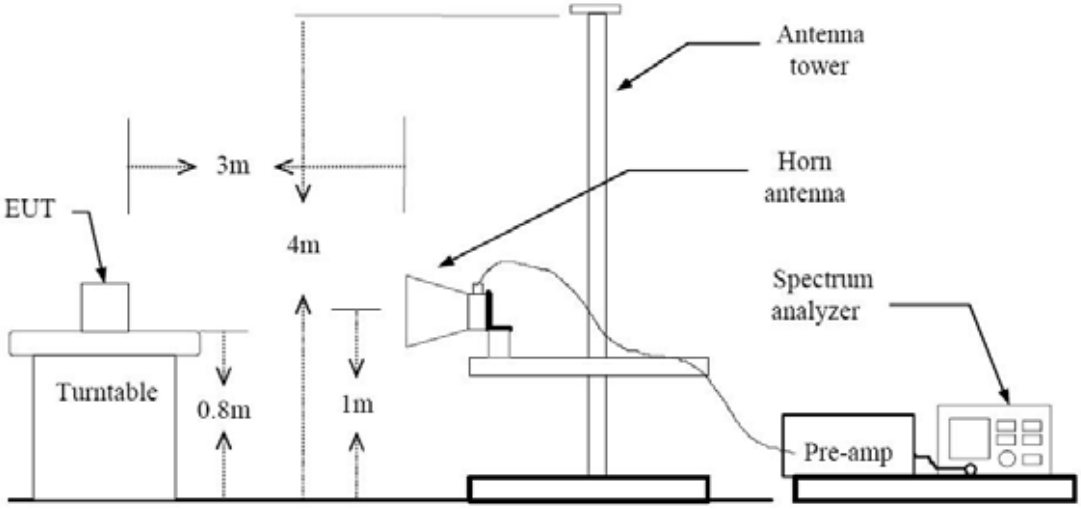
### Below 30 MHz




### 30 MHz - 1 GHz



**Above 1 GHz**




**TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

**TEST RESULTS**

**9 kHz – 30MHz**

**Operation Mode:** Normal Link

| Frequency MHz | Reading dBuV | Ant. Factor dB | Cable Loss dB | Total dBuV/m | Limit dBuV/m | Margin dB | Remark dB |
|---|---|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- | --- | See Note |
| --- | --- | --- | --- | --- | --- | --- | See Note |
| --- | --- | --- | --- | --- | --- | --- | See Note |
| --- | --- | --- | --- | --- | --- | --- | See Note |

***Notes:***

*1. Measuring frequencies from 9 kHz to the 30MHz.*

*2. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*

*3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)*

*4. Limit line = specific Limits (dBuV) + Distance extrapolation factor*

## TEST RESULTS

### Below 1 GHz

**Operation Mode:** Normal Link

| Frequency MHz | Reading dBuV | Ant. Factor dB | Cable Loss dB | ANT POL (H/V) | Total dBuV/m | Limit dBuV/m | Margin dB |
|---|---|---|---|---|---|---|---|
| 84.70 | 22.6 | 7.8 | 2.0 | V | 32.5 | 40 | -7.5 |
| 97.00 | 22.7 | 9.7 | 2.2 | V | 34.6 | 43.5 | -8.9 |
| 263.10 | 14.1 | 17.8 | 3.7 | V | 35.6 | 46 | -10.4 |
| 352.40 | 20.0 | 16.5 | 4.3 | V | 40.8 | 46 | -5.2 |
| 419.60 | 15.3 | 17.5 | 4.7 | V | 37.5 | 46 | -8.5 |
| 453.20 | 13.2 | 18.5 | 4.9 | V | 36.5 | 46 | -9.5 |
| 326.50 | 14.0 | 16.3 | 4.2 | H | 34.5 | 46 | -11.5 |
| 395.60 | 14.3 | 16.9 | 4.6 | H | 35.8 | 46 | -10.2 |
| 436.70 | 11.3 | 18.0 | 4.8 | H | 34.1 | 46 | -11.9 |
| 485.20 | 8.7 | 18.9 | 5.0 | H | 32.6 | 46 | -13.4 |
| 546.30 | 9.9 | 20.1 | 5.3 | H | 35.4 | 46 | -10.6 |
| 614.80 | 8.7 | 21.6 | 5.7 | H | 35.9 | 46 | -10.1 |

***Notes:***

*1. Measuring frequencies from 30 MHz to the 1GHz.*

*2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*

*3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*

*4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

**Above 1 GHz**

**Operation Mode:** CH Low

| Frequency [MHz] | Level [dBuV] | AN. CL. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|
| 4804.00 | 4.8 | 36.7 | V | 41.5 | 54 | -12.5 |
| 4804.00 | 6.1 | 36.7 | H | 42.8 | 54 | -11.2 |
| 7206.00 | -2.1 | 40.5 | V | 38.4 | 54 | -15.6 |
| 7206.00 | -3.3 | 40.5 | H | 37.2 | 54 | -16.8 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

***Notes:***

*1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

*2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

*3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.*

*4. Spectrum setting:*

*a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.*

*b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.*

**Operation Mode:** CH Mid

| Frequency [MHz] | Level [dBuV] | AN. CL. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|
| 4882.00 | 3.8 | 36.9 | V | 40.7 | 54 | -13.3 |
| 4882.00 | 4.9 | 36.9 | H | 41.8 | 54 | -12.2 |
| 7323.00 | -4.0 | 40.7 | V | 36.7 | 54 | -17.3 |
| 7323.00 | -5.3 | 40.7 | H | 35.4 | 54 | -18.6 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

***Notes:***

*1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

*2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

*3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.*

*4. Spectrum setting:*

*a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.*

*b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.*

**Operation Mode:** CH High

| Frequency [MHz] | Level [dBuV] | AN. CL. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|
| 4960.00 | 5.5 | 37.1 | V | 42.6 | 54 | -11.4 |
| 4960.00 | 6.4 | 37.1 | H | 43.5 | 54 | -10.5 |
| 7440.00 | -4.3 | 41.0 | V | 36.7 | 54 | -17.3 |
| 7440.00 | -1.9 | 41.0 | H | 39.1 | 54 | -14.9 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

***Notes:***

*1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*

*2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

*3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.*

*4. Spectrum setting:*

*a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.*

*b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.*

## 7.8 POWERLINE CONDUCTED EMISSIONS

### LIMIT

For an intentional radiator which 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 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

| Frequency Range (MHz) | Limits (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 60 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

## TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

| Power Line Conducted Emissions | | | FCC Class B | | |
|---|---|---|---|---|---|
| Frequency (MHz) | Amplitude (dBuV) | Conductor | Result | Limit (dBuv) | Margin (dB) |
| 0.530 | 47.2 | HOT | Quasi-Peak | 56 | -8.8 |
| 0.605 | 30.7 | HOT | Average | 46 | -15.3 |
| 0.565 | 45.0 | NEUTRAL | Quasi-Peak | 56 | -11.0 |
| 0.565 | 32.5 | NEUTRAL | Average | 46 | -13.5 |

Line Conducted Emissions Tabulated Data

## Test Plot

## Conducted emissions (Line 1)

*HCT*

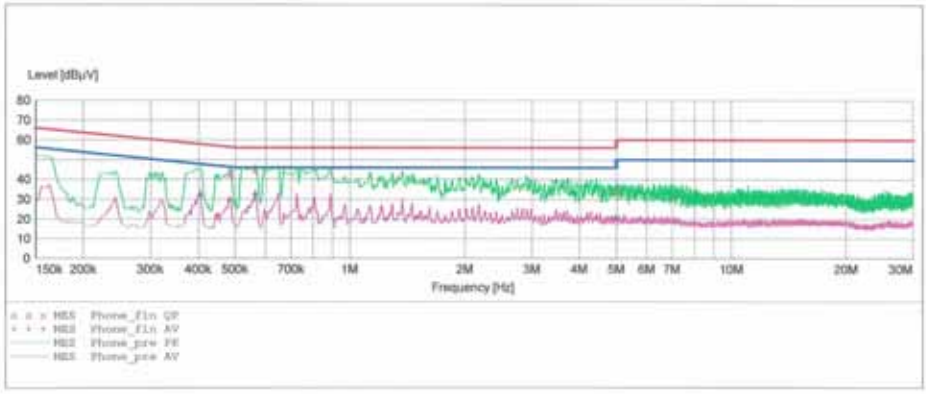
*EMC TEST LAB.*

```
EUT:                  PN-810
Manufacturer:         PANTECH@CURITEL
Operating Condition:  Charging mode
Test Site:            SHIELD ROOM
Operator:             KEUN-HO PARK
Test Specification:   CISPR 22 CLASS B
Comment:              N
```

***SCAN TABLE: "CISPR 22 Voltage"***

Short Description: CISPR 22 Voltage

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.1 kHz | 500.0 kHz | 2.5 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | None |
| 500.0 kHz | 5.0 MHz | 5.0 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | None |
| 5.0 MHz | 30.0 MHz | 5.0 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | None |




***MEASUREMENT RESULT: "Phone_fin QP"***

10/19/2006 8:57AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.485100 | 43.00 | 10.1 | 56 | 13.2 | --- | --- |
| 0.565000 | 45.00 | 10.1 | 56 | 11.0 | --- | --- |
| 5.000000 | 34.50 | 10.3 | 56 | 21.5 | --- | --- |

***MEASUREMENT RESULT: "Phone_fin AV"***

10/19/2006 8:57AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.405100 | 32.20 | 10.1 | 48 | 15.6 | --- | --- |
| 0.565000 | 32.50 | 10.1 | 46 | 13.5 | --- | --- |
| 5.000000 | 21.10 | 10.3 | 46 | 24.9 | --- | --- |

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## Conducted emissions (Line 2)

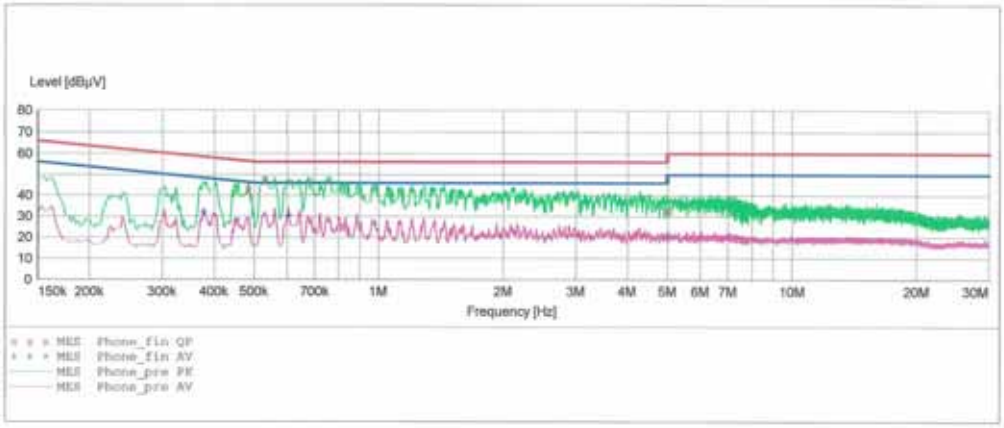
*HCT*

*EMC TEST LAB.*

```
EUT:                  PN-810
Manufacturer:         PANTECH@CURITEL
Operating Condition:  Charging mode
Test Site:            SHIELD ROOM
Operator:             KEUN-HO PARK
Test Specification:   CISPR 22 CLASS B
Comment:              H
```

*SCAN TABLE: "CISPR 22 Voltage"*

| Short Description: | | | CISPR 22 Voltage | | | |
|---|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
| 150.1 kHz | 500.0 kHz | 2.5 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | None |
| 500.0 kHz | 5.0 MHz | 5.0 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | None |
| 5.0 MHz | 30.0 MHz | 5.0 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | None |




*MEASUREMENT RESULT: "Phone_fin QP"*

10/19/2006 9:01AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.482600 | 42.70 | 10.1 | 56 | 13.6 | --- | --- |
| 0.530000 | 47.20 | 10.1 | 56 | 8.8 | --- | --- |
| 5.000000 | 32.80 | 10.3 | 56 | 23.2 | --- | --- |

*MEASUREMENT RESULT: "Phone_fin AV"*

10/19/2006 9:01AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.377600 | 32.00 | 10.1 | 48 | 16.3 | --- | --- |
| 0.605000 | 30.70 | 10.2 | 46 | 15.3 | --- | --- |
| 5.000000 | 19.90 | 10.3 | 46 | 26.1 | --- | --- |

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# 8. LIST OF TEST EQUIPMENT

| Type / Model | Calib. Date | S/N |
|---|---|---|
| Spectrum Analyzer (20Hz~40GHz) R&S ESI40 | Dec. 05 | 1088.7410 |
| Spectrum Analyzer (100Hz~26.5GHz) R3273 | April 06 | J04821 |
| Signal Generator HP8373ED (10MHz ~ 20GHz) | July 06 | US8710152 |
| Power Meter E4416A | Jan. 06 | GB41291412 |
| Power Sensor E9327A | Jan. 06 | US40440910 |
| Network Analyzer 8753ES (30KHz ~ 6GHz) | April06 | JP39240221 |
| Modulation Analyzer HP8901A | June 06 | 3438A05231 |
| Audio Analyzer HP 8903A | Feb.06 | 2433A04322 |
| Function Generator HP 8116A | Feb.06 | 3001A08285 |
| Base Station CMU200 | March 06 | 110740 |
| Base Station E5515C | May 06 | US41070189 |
| Base Station NJZ-2000 | May 06 | ET00117 |
| Bluetooth Simulator TC-3000 | Jan 06 | 3000A490112 |
| AMF-4D-001180-26-10P (0.1~18GHz) | Feb.06 | 671009 |
| AMF-4D-001180-26-10P (18~26.5GHz) | Feb.06 | 667624 |
| AMF-4D-001180-26-10P (26~40GHz) | Feb.06 | 671314 |
| High Pass Filter WHK1.2/15G | June 06 | 62079 |
| High Pass Filter WHK3.3/18G | June 06 | 62079 |
| High Pass Filter H18G26G1 | June 06 | 3407 |
| Power Divider 1506A | Jan. 06 | MD793 |
| Power Supply EP-3010 | Dec. 06 | 3110117 |
| Dipole Antenna UHAP | June 06 | 557 |
| Dipole Antenna UHAP | June 06 | 558 |
| TRILOG Antenna VULB9160 (25MHz~1800MHz) | May 06 | 3125 |
| TRILOG Antenna VULB9160 (25MHz~1800MHz) | April 06 | 4150 |
| Horn Antenna BBHA 9120D (1~18GHz) | June 06 | 1099 |
| Horn Antenna BBHA 9120D (1~18GHz) | March 06 | 1201 |
| Horn Antenna BBHA 9170 (15~40GHz) | Feb.06 | BBHA9170124 |
| Receiver ESCI (9KHz~3GHz) | Aug. 06 | 1166.5950k03 |
| LISN EMCO 3825/2 | July 06 | 9706-1070 |
| LISN Rohde & Schwarz ESH2-Z5 | July 06 | 9706-1071 |
| Amplifier Hewlett-Packard 8447E | March 06 | 2805A03141 |
| Antenna Position Tower HD240 | N.A | 3241 |
| Turn Table EMCO 1060-06 | N.A | 1253A |
| AC Power Source PACIFIC Magnetic Module | N.A | 45321 |
| AC Power Source PACIFIC 360AMX | N.A | 22B87 |

# APPENDIX 1
# PHOTOGRPHS OF TEST SETUP

## Conducted Radiated Emission

## Radiated Emission