

# Test Report

## TEST PROCEDURES AND TEST SITE DESCRIPTION

FCC ID: AMWUP094R

MODEL: EXP4541 (for HANDSET)

EQUIPMENT: 2.4 GHz ISM BAND ANALOG TRANSMITTER

DATE: October 26, 2006

Tested by: Mr. Y. Takahashi, Uniden Corporation

### MEASUREMENT ITEMS

### Section No.

5-1 Field Strength of Radiated Emissions

15.249(a)(b)  
15.205 / 15.209

5-2 Power Line Conducted Emissions

15.207

SUPPLEMENT DATA - BAND EDGE EMISSIONS

## 5-1 Field Strength of Radiated Emissions

15.249(a)(b)

15.205 / 15.209

The measurements were performed in accordance with the ANSI C63.4-2003. Field Strength measurements of radiated spurious emissions were made at the open test site of a 3 meter range maintained by Uniden Corporation in Japan. Complete description and measurement data of this test site have been placed on file with the Commission.

The radio frequency spectrum was scanned in the range of 30 MHz to the 10<sup>th</sup> harmonic in accordance with the section 15.33(a) of the FCC Rules. The frequency below 1 GHz, the measurement was carried out by using CISPR quasi-peak detector, AGILENT E7400A the Spectrum Analyzer in accordance with the sections 15.33(a) and 15.35(a). The frequency above 1 GHz, using the AGILENT E7400A Spectrum Analyzer in accordance with the section 15.35(b) carried out the measurement.

A bilog antenna CBL6112A was used to cover the range from 30 MHz to 1000 MHz. Narrowband tuned dipole antennas were used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna EMCO 3115 was used.

For each spurious or harmonic frequency, the antenna was raised and lowered to obtain a maximum reading on the Spectrum Analyzer with antenna horizontally polarized. Then the turntable, on which the equipment under test was placed, was rotated a minimum of 360 degrees to further increase the reading on the Spectrum Analyzer.

For testing small and/or handheld product, the measurement was performed in 3 orthogonal planes(X, Y, Z). This procedure was repeated with the antenna vertically polarized. The equipment under test was placed in its normal operating position on a turntable approximately 1 meter in height.

In order to convert the measured emission levels into field strength in dBuV/m, the actual field strength (Ef) is determined by algebraically adding the measured emission level (Em) and the antenna correction factor (ACF) including the cable loss at the appropriate frequency.  $E_f [\text{dBuV/m}] = E_m [\text{dBuV/m}] + \text{ACF} [\text{dB}]$

### FCC Limits:

- a) Fundamental emission: 94 dBuV/m (50,000 uV/m)
- b) Spurious emissions:

30 - 88 MHz	40 dBuV/m	(100 uV/m)
88 - 216 MHz	43.5 dBuV/m	(150 uV/m)
216 - 960 MHz	46 dBuV/m	(200 uV/m)
Above 960 MHz	54 dBuV/m	(500 uV/m)

Test Results: Refer to the attached test reports. All emissions not reported were more than 20 dB below the limits.

NOTE:

For measurement of the handset, all of the testing were made with the internal battery that is fully charged.

For measurement of base unit, all of the testing were made with the AC Adapter which connected to a standard voltage source.

5-2 Power Line Conducted Emissions

15.207

Test Procedure:

The measurements were performed in accordance with the ANSI C63.4-2003. During the measurements, a standard voltage source is fed into the unit under test through a power line impedance stabilization network.

FCC Limit:

The radio frequency voltage that is conducted back into the AC power line on any frequencies within the band from 150kHz to 30MHz shall not exceed the following limitation.

REQUIREMENTS:

FREQUENCY(MHz)	LEVEL (dBuV)	
0.150-0.50	66 to 56 QP	56 to 46 Ave
0.50-5.0	56 QP	46 Ave
5.0-30.0	60 QP	50 Ave

Test Results: Refer to the attached test reports. All emissions not reported were more than 20 dB below the limits.

NOTE:

Regarding the Handset, this FCC requirement is not applicable to it since the Handset is intended to use the battery only.

SUPPLEMENT DATA - BAND EDGE EMISSION

Attached data show the handset's transmission on lowest channel and base unit's transmission on highest channel.

At the outside of emission bands, those emissions are well reduced against the operational channel frequency of the units.

5-1 Field Strength of Radiated Emissions (Test Result)

## a) Handset: Fundamental Emissions

Emission (MHz)	Pol. (V/H)	FSM Reading (dBuV)	Cable Loss (dB)	Amplifier Gain (dB)	ACF (dB)	Field Strength (dBuV/m)	FCC Limit (dBuV/m)	Margin (dB)
2405.155942	H	51.6	12.3	0.0	27.7	91.6	94.0	2.4
2411.718441	H	51.3	12.3	0.0	27.7	91.3	94.0	2.7

## b) Handset: Spurious Emissions

Transmitting Frequency: 2409.630373MHz								
Emission (MHz)	Pol. (V/H)	FSM Reading (dBuV)	Cable Loss (dB)	Amplifier Gain (dB)	ACF (dB)	Field Strength (dBuV/m)	FCC Limit (dBuV/m)	Margin (dB)
401.6051	V	54.4	4.3	29.2	15.3	44.8	46.0	1.2
457.7343	V	48.7	4.5	29.2	16.3	40.3	46.0	5.7
803.2102	V	47.1	6.2	29.1	19.3	43.5	46.0	2.5
1204.8153	V	35.8	7.8	29.0	24.1	38.7	54.0	15.3
1606.4204	V	42.3	9.3	29.0	25.2	47.8	54.0	6.2
2811.2357	H	38.6	13.1	28.6	28.8	51.9	54.0	2.1
3212.8408	V	35.8	14.5	28.5	30.4	52.2	54.0	1.8
4016.0510	H	30.1	17.6	28.5	32.1	51.3	54.0	2.7
4417.6561	H	18.6	18.6	27.7	32.4	41.9	54.0	12.1
4819.2612	H	18.4	19.7	26.9	33.0	44.2	54.0	9.8
5220.8663	H	11.1	21.3	25.9	33.7	40.2	54.0	13.8
5622.4714	H	14.5	23.5	26.0	34.4	46.4	54.0	7.6
7228.8918	H	16.1	23.5	26.0	34.4	48.0	54.0	6.0

## NOTES:

- 1) All emissions not reported were more than 20 dB below the FCC limit.
- 2) The measurement above 4GHz, RBW was specially set for 100Hz due to non-modulated F3E emission."

5-2 Power Line Conducted Emissions

15.207

## Test Result

<u>Transmitting frequency</u>	<u>Emissions Frequency</u>	<u>Measured Level</u>
-------------------------------	----------------------------	-----------------------

## Handset:

The FCC requirement do not apply to the handset  
since the handset is designed to operate with internal battery only.

REF -8.7 dBm

MKR 2.40513 GHz

10dB/ A\_View Norm B\_View Norm -9.35 dBm

MARKER  
2.40513 GHz

Handset 1ch  
Band Edge Emissions  
Max dev. 1kHz  $\pm$  95kHz dev.

FCC LIMIT -50dBc

Marker

1

Normal

2

Delta

3

Peak  
Menu

4

Sig Track

ON

OFF

5

MKR Trace

A

B

6

Marker  
OFF

7

1/2, more

CENTER 2.40000 GHz

SPAN 15.00 MHz

\*RBW 10 kHz \*VBW 10 kHz

SWP 300 ms

ATT 10dB

MARKER  
2.4117 GHz

Handset 20ch  
Band Edge Emissions  
Max dev. 1kHz±95kHzdev.

FCC LIMIT -50dBc

Marker

1

Normal

2

Delta

3

Peak  
Menu

4

Sig Track

ON

OFF

5

MKR Trace

A

B

6

Marker  
OFF

7

1/2, more

LIST OF MEASUREMENT EQUIPMENTS

ENG-NO	TEST EQUIPMENT	TYPE	MFR	SERIAL NO.	Last Calibrtation
1287	AMPLIFIER	AFS30010040020	MITEQ	138315	N/A
2022	MICROWAVE PREAMPLIFIER	8349B	ADVANTEST	3205A04450	N/A
1294	ANTENNA(BILOG)	CBL6112A	CHASE	2350	N/A
1602	ANTENNA(DIPOLE)	3120-B1	EMCO	0075	21-Jun-06
1603	ANTENNA(DIPOLE)	3120-B2	EMCO	0076	21-Jun-06
1604	ANTENNA(DIPOLE)	3120-B3	EMCO	0076	21-Jun-06
1560	ANTENNA(HORN) (18GHz)	3115	EMCO	2167	N/A
N/A	ANTENNA(HORN) (24GHz)	94287.24	NIPPON KOSYUHA	60.1	N/A
1388	LISN	KNW407	KYOURITSU	8-833-21	11-Jul-06
0682	POWER SUPPLY	AA300	TAKASAGO	31783013	N/A
0857	SPECTRUM ANALYZER (13GHz)	E7400A	AGILENT	US40240145	03-Jul-06
0205	SPECTRUM ANALYZER (8.4GHz)	R3265	ADVANTEST	25060158	N/A