

Test Report

TEST PROCEDURES AND TEST SITE DESCRIPTION

FCC ID: AMWUB344

MODEL: 20-528

DATE: May 19, 2006

Tested by: Yasuhiro Hoshi, Uniden Corporation

MEASUREMENT ITEMS

5-1 Field Strength of Spurious Radiated Emission

5-2 Power Line Conducted Emissions

5-3 Cellular image rejection

NOTE: Measurements in Scan Mode vs. Non-Scan Mode

The measurement data reported in the original file represented a non-scan mode for both of power line conducted emission and spurious radiated emission because no emission level exceeded that of the levels in the scan mode.

In scan mode, the receiver only stays at a particular frequency for as short as 20 ms in certain channels as the scanning interval may change depending on the number of the memorized channels. This means that true emission levels may change along with the number of the memorized channels in the scanning mode due to changes in the duty cycle of the emission level.

Therefore, we measured the device where each memorized channel was scanned for 3 different points of frequencies in each receiver coverage range as shown in the original file and we confirm that no emission level exceeds the level reported from the ones measured in the non-scan mode.

5-1 Field Strength of Spurious Radiated Emission

Test procedure:

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 10th 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 connected with all of placed in its normal operating position on a turntable approximately 0.8 meter in height.

During the measurement, full-featured accessory cables were connected with the equipment under test.

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

$$E_f \text{ [dBuV/m]} = E_m \text{ [dBuV/m]} + \text{ACF [dB]}$$

FCC Limits:

Frequency	Field Strength at 3 meter	
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.

5-2 Power Line Conducted Emissions

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.

5-3 Cellular image rejection

See test result.

5-1 Test Result: Field Strength of Radiated Emissions

Tuned Frequency (MHz)	Emission Frequency (MHz)	FSM Reading (dBuV)	Amplifier Gain (dB)	Measured Level (dBuV)	Pol.	ACF (dB)	Field Strength (dBuV/m)	FCC Limit (dBuV/m)	MARGIN (dB)
(1) Test Results (29.000 - 54.000 MHz Band)									
30.050	1232.1000	48.1	29.1	19.0	V	23.7	42.7	54.0	11.3
	1479.2000	50.0	29.0	21.0	H	24.9	45.9	54.0	8.1
40.840	1264.5000	48.4	29.1	19.3	V	23.8	43.1	54.0	10.9
	1479.2400	50.8	29.0	21.8	H	24.9	46.7	54.0	7.3
	1849.0500	45.1	28.9	16.2	V	27.2	43.4	54.0	10.6
49.900	430.6000	45.0	29.2	15.8	V	15.9	31.7	46.0	14.3
	1291.8000	47.0	29.1	17.9	H	24.0	41.9	54.0	12.1
	1479.4000	50.7	29.0	21.7	H	24.9	46.6	54.0	7.4
	2153.0000	47.0	28.9	18.1	V	27.1	45.2	54.0	8.8
(2) Test Results (108.000 - 137.000 MHz Band)									
118.800	499.5000	46.6	29.2	17.4	V	17.3	34.7	46.0	11.3
	1479.4000	51.0	29.0	22.0	H	24.9	46.9	54.0	7.1
127.175	507.8000	47.6	29.2	18.4	V	17.5	35.9	46.0	10.1
	1479.1000	50.6	29.0	21.6	H	24.9	46.5	54.0	7.5
135.500	516.2000	45.0	29.2	15.8	V	17.7	33.5	46.0	12.5
	739.7000	44.9	29.1	15.8	V	18.8	34.6	46.0	11.4
	1479.4000	50.6	29.0	21.6	H	24.9	46.5	54.0	7.5
	1849.2500	50.4	28.9	21.5	H	27.2	48.7	54.0	5.3
(3) Test Results (137.000 - 174.000 MHz Band)									
138.150	518.8000	46.6	29.2	17.4	H	17.8	35.2	46.0	10.8
	739.6000	44.2	29.1	15.1	V	18.8	33.9	46.0	12.1
	1479.2000	50.1	29.0	21.1	H	24.9	46.0	54.0	8.0
162.400	1479.4000	50.2	29.0	21.2	H	24.9	46.1	54.0	7.9
173.225	1479.3000	50.0	29.0	21.0	H	24.9	45.9	54.0	8.1
	1849.1250	49.6	28.9	20.7	V	27.2	47.9	54.0	6.1
(4) Test Results (216.000 - 224.995 MHz Band)									
216.050	1479.3800	49.3	29.0	20.3	H	24.9	45.2	54.0	8.8
	1849.2250	49.3	28.9	20.4	H	27.2	47.6	54.0	6.4
(5) Test Results (400.000 - 512.000 MHz Band)									
406.8750	787.5000	46.1	29.1	17.0	V	19.2	36.2	46.0	9.8
	1479.1000	48.0	29.0	19.0	H	24.9	43.9	54.0	10.1
	1848.8750	49.2	28.9	20.3	H	27.2	47.5	54.0	6.5
453.2500	1479.2000	48.6	29.0	19.6	H	24.9	44.5	54.0	9.5
	1849.0000	49.4	28.9	20.5	H	27.2	47.7	54.0	6.3
511.9125	892.6000	47.9	29.0	18.9	H	19.3	38.2	46.0	7.8
	1479.3500	50.3	29.0	21.3	H	24.9	46.2	54.0	7.8
	2677.8000	49.4	28.6	20.8	V	28.3	49.1	54.0	4.9
(6) Test Results (806.000 - 956.000 MHz Band)									
806.0000	1275.9000	48.6	29.1	19.5	V	23.9	43.4	54.0	10.6
	1479.4000	50.3	29.0	21.3	H	24.9	46.2	54.0	7.8
	1849.2500	49.9	28.9	21.0	H	27.2	48.2	54.0	5.8
	2126.5000	47.2	28.9	18.3	V	27.1	45.4	54.0	8.6

857.2000	476.5000	48.9	29.2	19.7	V	16.8	36.5	46.0	9.5
	1479.4000	50.0	29.0	21.0	H	24.9	45.9	54.0	8.1
	1849.2500	50.8	28.9	21.9	H	27.2	49.1	54.0	4.9
954.9125	1479.4500	49.7	29.0	20.7	H	24.9	45.6	54.0	8.4
	1849.3125	49.9	28.9	21	H	27.2	48.2	54.0	5.8
(7) Test Results (1240.000 - 1300.000 MHz Band)									
1240.000	859.3000	77.2	59.0	18.2	H	19.3	37.5	46.0	8.5
	1479.4000	49.1	29.0	20.1	H	24.9	45.0	54.0	9.0
	1849.2500	49.4	28.9	20.5	H	27.2	47.7	54.0	6.3
1299.9125	919.2000	48.8	29.0	19.8	H	19.9	39.7	46.0	6.3
	1479.4500	49.0	29.0	20.0	H	24.9	44.9	54.0	9.1
	1849.3125	50.2	28.9	21.3	H	27.2	48.5	54.0	5.5
	2757.6000	49.0	28.7	20.3	H	28.6	48.9	54.0	5.1

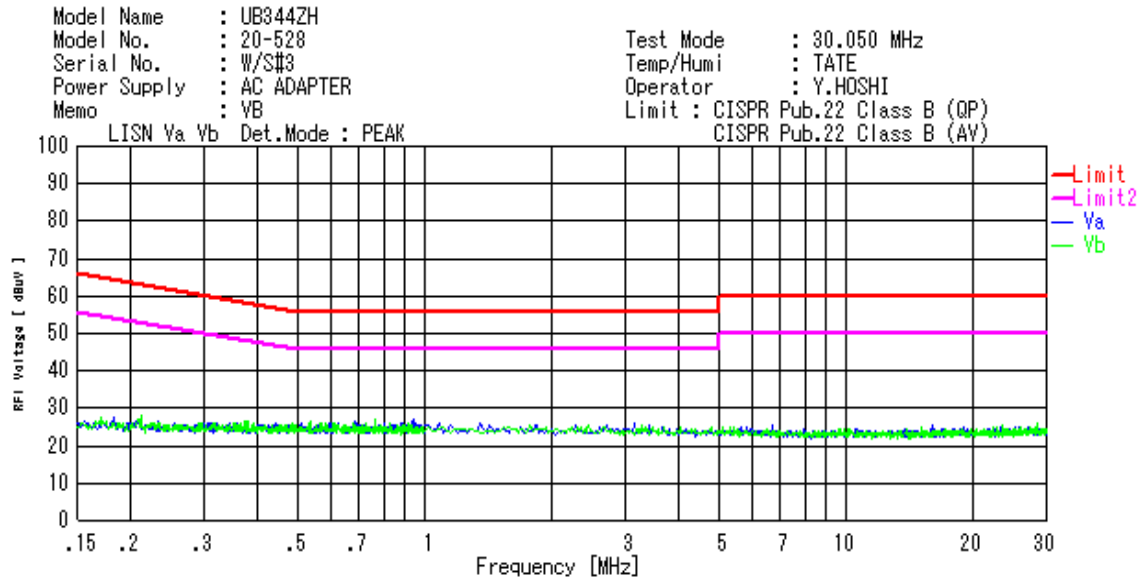
Note:

- 1) Other emissions not reported were more than 20dB below the FCC limits.
- 2) During the measurement, full-featured accessory cables (PC/IF Cable, Earphone and AC adapter) were connected with the equipment under test.

5-2 Test Result: Power Line Conducted Emissions

Tuned Frequency (MHz)	Emission Frequency (MHz)	Measured Level (dBuV)
40.8400	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
127.1750	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
162.4000	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
216.0050	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
453.2500	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
857.2000	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
1299.9125	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	

All emissions not reported were more than 20 dB below the limit.
(See attached example for 30.0500MHz reception.)

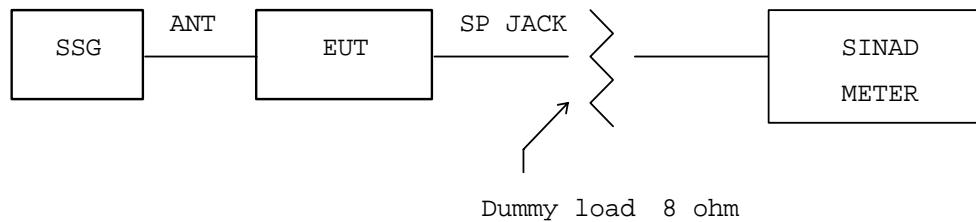


5-3 Test Result: Cellular image rejection

15.121(b)

Rationale:

In order for measuring image(spurious) rejection ratio on scanning receiver, use of one SSG method would be suitable rather than two or three SSG method since cellular image reception would be considered as unwanted reception solely at outside of cellular band.

Test set-up:

Conditions: AF Signal : 1 kHz
 Deviation : +/- 3kHz (for frequency modulation)
 Modulation : 60 % (for amplitude modulation)

Test frequencies: 824.01MHz, 836.52MHz, 849.00MHz
 869.01MHz, 881.52MHz, 894.00MHz

A) Initial screening

- A-1) Disable the output signal of SSG. Disconnect dummy load and enable the EUT to confirm the presence of audio noise on speaker.
- A-2) Set the EUT with "Squelched Threshold" to prevent audio signal.
- A-3) Set the frequency of SSG to cellular band, and apply 60dBuV of RF output to EUT. Note that 60dBuV signal level corresponds approx. 66dB above the "Squelched Threshold" sensitivity of -6dBuV (not, receiving sensitivity). This is approx. 28dB (= 66 - 38) above the FCC limit.
- A-4) Enable EUT and search the cellular frequencies on the all of receiving range.
- A-5) List the all of detected frequencies if EUT detects them, and the following steps shall be taken to determine the actual image rejection ratio individually.
- A-6) Repeat the above procedure for remaining frequencies.
- A-7) Go to Part B of the test.

B) Measuring the image rejection ratio

- B-1) Based on Initial screening, both of EUT and SSG shall be set to the frequency at which obtained in A-5) in the above. Connect the dummy load and set the squelch volume of EUT to unsquelched for obtaining the audio signal.
- B-2) Adjust and record the RF output of SSG to obtain 12dB SINAD on EUT. SSG level at which obtaining the 12dB SINAD is receiving sensitivity of EUT (not, tight squelch sensitivity).
- B-3) Adjust the frequency of SSG to the corresponded cellular frequency associated with A-5. Adjust and record the RF output of SSG to obtain 12dB SINAD on EUT.
- B-4) Image rejection ratio is obtained as differences between B-2) and B-3).

C) Test Data

Spec. : At least 38dB

UB344Z (20-528)

Cellular Frequency (MHz)	Image/spurious (Frequency stopped on EUT) (MHz)	Image Rejection Ratio (dB)
824.01	Non	
836.52	858.2250	48.5
849.00	819.8000	55.6
	849.9000	55.6
	854.4250	60.5
	906.7750	62.7
	913.9250	63.7
	1256.1000	60.8
	1276.5000	57.6
869.01	910.4750	61.2
	910.4875	68.8
881.52	903.2250	49.9
894.00	849.8000	55.6
	894.9000	57.0
	899.4250	62.0
	915.7000	47.2
	921.7750	63.8
	928.9250	64.8
	948.3000	59.5
	955.3125	58.9
	955.4375	59.2
	955.5625	58.8
	955.6875	58.6
	1291.5000	57.9

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	11-Jul-03
1603	ANTENNA(DIPOLE)	3120-B2	EMCO	0076	11-Jul-03
1604	ANTENNA(DIPOLE)	3120-B3	EMCO	0076	11-Jul-03
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	N/A
0682	POWER SUPPLY	AA300	TAKASAGO	31783013	N/A
0857	SPECTRUM ANALYZER (13GHz)	E7400A	AGILENT	US40240145	20-Jun-05
0205	SPECTRUM ANALYZER (8.4GHz)	R3265	ADVANTEST	25060158	N/A