

Test Report

TEST PROCEDURES AND TEST SITE DESCRIPTION

MEASUREMENT ITEMS

- 5-1 Field Strength of Spurious Radiated Emission
- 5-2 Power Line Conducted Emissions

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 C63.4-1992. 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 4 GHz in accordance with the section 15.33(b) of the FCC Rules. The frequency below 1 GHz, the measurement was carried out by using CISPR quasi-peak detector, Advantest R3365A the Spectrum Analyzer in accordance with the sections 15.33(a) and 15.35(a). The frequency above 1 GHz, the measurement was carried out by using the Hewlett Packard 8566B Spectrum Analyzer in accordance with the section 15.35(b).

A bilog antenna CBL6111 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 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. This procedure was repeated with the antenna vertically polarized. The unit under test was placed in its normal operating position on a turntable approximately 1 meter in height, with a normal power lead.

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.

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

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 C63.4-1992. 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 450kHz to 30MHz shall not exceed 250uV (48 dBuV).

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

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)									
30.0500	369.8000	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	410.7000	43.1	35.1	8.0	V	21.1	29.1	46.0	16.9
	739.6000	46.1	35.1	11.0	V	26.1	37.1	46.0	8.9
	821.4000	39.4	35.1	4.3	V	27.0	31.3	46.0	14.7
	1,109.4000	47.7	35.1	12.6	V	32.1	44.7	54.0	9.3
	1,232.1000	44.6	35.1	9.5	V	33.1	42.6	54.0	11.4
	1,479.2000	40.6	35.1	5.5	H	35.2	40.7	54.0	13.3
	1,642.8000	37.7	35.1	2.6	V	37.0	39.6	54.0	14.4
40.8400	369.8100	54.2	35.1	19.1	V	19.8	38.9	46.0	7.1
	421.5000	42.3	35.1	7.2	V	21.3	28.5	46.0	17.5
	739.6200	46.5	35.1	11.4	V	26.1	37.5	46.0	8.5
	843.0000	38.9	35.1	3.8	V	27.1	30.9	46.0	15.1
	1,109.4000	47.7	35.1	12.6	V	32.1	44.7	54.0	9.3
	1,264.5000	45.0	35.1	9.9	V	33.4	43.3	54.0	10.7
	1,479.2400	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,686.0000	39.8	35.1	4.7	H	37.5	42.2	54.0	11.8
49.9000	369.9500	54.4	35.1	19.3	V	19.8	39.1	46.0	6.9
	430.6000	42.3	35.1	7.2	V	21.4	28.6	46.0	17.4
	739.9000	46.3	35.1	11.2	V	26.1	37.3	46.0	8.7
	861.2000	37.7	35.1	2.6	V	27.3	29.9	46.0	16.1
	1,109.8500	47.7	35.1	12.6	V	32.1	44.7	54.0	9.3
	1,291.8000	43.5	35.1	8.4	V	33.7	42.1	54.0	11.9
	1,479.8000	40.5	35.1	5.4	H	35.2	40.6	54.0	13.4
	1,722.4000	41.0	35.1	5.9	H	37.9	43.8	54.0	10.2
(2) Test Results (108.000 - 137.000 MHz Band)									
108.5000	369.8500	56.1	35.1	21.0	V	19.8	40.8	46.0	5.2
	489.2000	41.9	35.1	6.8	V	23.0	29.8	46.0	16.2
	739.7000	51.6	35.1	16.5	V	26.1	42.6	46.0	3.4
	978.4000	40.0	35.1	4.9	V	30.7	35.6	54.0	18.4

	1,109.5500	47.7	35.1	12.6	V	32.1	44.7	54.0	9.3
	1,467.6000	46.8	35.1	11.7	V	35.1	46.8	54.0	7.2
	1,479.4000	40.0	35.1	4.9	H	35.1	40.0	54.0	14.0
	1,956.8000	38.7	35.1	3.6	H	40.5	44.1	54.0	9.9
118.8000	369.8500	56.1	35.1	21.0	V	19.8	40.8	46.0	5.2
	499.5000	41.6	35.1	6.5	V	23.3	29.8	46.0	16.2
	739.7000	51.6	35.1	16.5	V	26.1	42.6	46.0	3.4
	999.0000	39.0	35.1	3.9	V	31.2	35.1	54.0	18.9
	1,109.5500	47.4	35.1	12.3	V	32.1	44.4	54.0	9.6
	1,479.4000	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,498.5000	44.5	35.1	9.4	V	35.4	44.8	54.0	9.2
127.1750	369.7750	56.1	35.1	21.0	V	19.8	40.8	46.0	5.2
	507.8000	40.0	35.1	4.9	V	23.5	28.4	46.0	17.6
	739.5500	51.6	35.1	16.5	V	26.1	42.6	46.0	3.4
	1,015.6000	39.7	35.1	4.6	V	31.3	35.9	54.0	18.1
	1,109.3250	47.1	35.1	12.0	V	32.1	44.1	54.0	9.9
	1,479.1000	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,523.4000	41.0	35.1	5.9	V	35.7	41.6	54.0	12.4
135.5000	369.8500	56.1	35.1	21.0	V	19.8	40.8	46.0	5.2
	516.2000	38.6	35.1	3.5	V	23.8	27.3	46.0	18.7
	739.7000	50.2	35.1	15.1	V	26.1	41.2	46.0	4.8
	1,032.4000	41.8	35.1	6.7	V	31.5	38.2	54.0	15.8
	1,109.5500	47.1	35.1	12.0	V	32.1	44.1	54.0	9.9
	1,479.4000	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,548.6000	38.8	35.1	3.7	V	35.9	39.6	54.0	14.4
(3) Test Results (137.000 - 174.000 MHz Band)									
138.1500	369.8000	55.7	35.1	20.6	V	19.8	40.4	46.0	5.6
	518.8000	37.9	35.1	2.8	V	23.8	26.6	46.0	19.4
	739.6000	47.7	35.1	12.6	V	26.4	39.0	46.0	7.0
	1,037.6000	43.9	35.1	8.8	V	31.5	40.3	54.0	13.7
	1,109.4000	47.0	35.1	11.9	V	32.1	44.0	54.0	10.0
	1,479.2000	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,556.4000	38.6	35.1	3.5	V	36.0	39.5	54.0	14.5
162.4000	369.8500	55.3	35.1	20.2	V	19.8	40.0	46.0	6.0
	543.1000	37.3	35.1	2.2	V	24.6	26.8	46.0	19.2

	739.7000	47.7	35.1	12.6	V	26.1	38.7	46.0	7.3
	1,086.2000	47.6	35.1	12.5	V	31.9	44.4	54.0	9.6
	1,109.5500	47.0	35.1	11.9	V	32.1	44.0	54.0	10.0
	1,479.4000	40.0	35.1	4.9	H	35.1	40.0	54.0	14.0
	1,629.3000	37.6	35.1	2.5	H	36.8	39.3	54.0	14.7
173.2250	369.8250	54.8	35.1	19.7	V	19.8	39.5	46.0	6.5
	553.9000	37.4	35.1	2.3	V	24.9	27.2	46.0	18.8
	739.6500	47.7	35.1	12.6	V	26.1	38.7	46.0	7.3
	1,107.8000	43.7	35.1	8.6	V	32.1	40.7	54.0	13.3
	1,109.4750	47.1	35.1	12.0	V	32.1	44.1	54.0	9.9
	1,479.3000	40.6	35.1	5.5	H	35.1	40.6	54.0	13.4
	1,661.7000	38.3	35.1	3.2	H	37.2	40.4	54.0	13.6
(4) Test Results (406.000 - 512.000 MHz Band)									
406.8750	369.7750	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	739.5500	50.0	35.1	14.9	V	26.4	41.3	46.0	4.7
	787.5000	49.0	35.1	13.9	V	26.7	40.6	46.0	5.4
	1,109.3250	47.2	35.1	12.1	V	32.1	44.2	54.0	9.8
	1,479.1000	39.9	35.1	4.8	H	35.2	40.0	54.0	14.0
	1,575.0000	46.4	35.1	11.3	V	36.2	47.5	54.0	6.5
453.2500	369.8000	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	739.6000	50.0	35.1	14.9	V	26.4	41.3	46.0	4.7
	833.9000	42.5	35.1	7.4	V	27.2	34.6	46.0	11.4
	1,109.4000	47.1	35.1	12.0	V	32.1	44.1	54.0	9.9
	1,479.2000	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,667.8000	44.6	35.1	9.5	V	37.3	46.8	54.0	7.2
511.9125	369.8375	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	739.6750	51.3	35.1	16.2	V	26.4	42.6	46.0	3.4
	892.6000	46.3	35.1	11.2	V	27.7	38.9	46.0	7.1
	1,109.5125	47.4	35.1	12.3	V	32.1	44.4	54.0	9.6
	1,479.3500	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,785.2000	45.7	35.1	10.6	V	39.1	49.7	54.0	4.3
(5) Test Results (806.000 - 956.000 MHz Band)									
806.0000	369.8500	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	425.3000	42.6	35.1	7.5	V	21.4	28.9	46.0	17.1
	739.7000	46.1	35.1	11.0	V	26.4	37.4	46.0	8.6

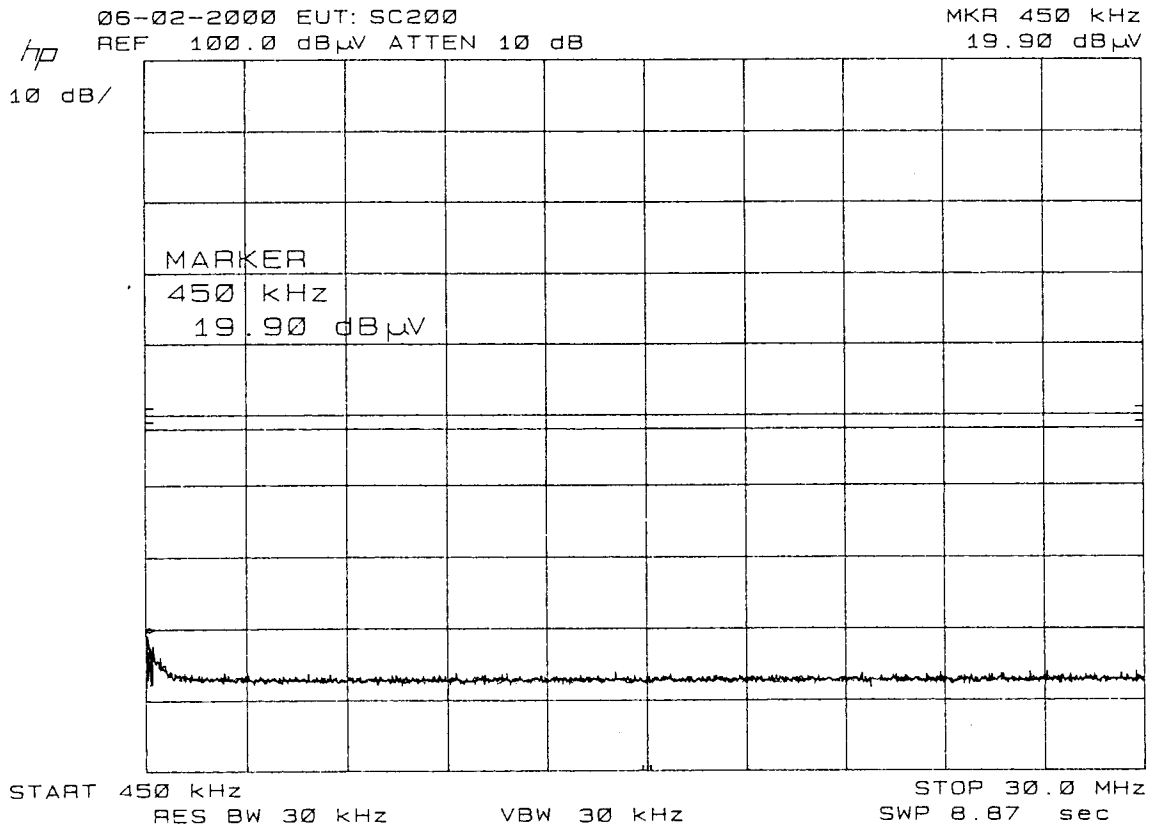
	850.6000	38.4	35.1	3.3	V	27.3	30.6	46.0	15.4
	1,109.5500	47.1	35.1	12.0	V	32.1	44.1	54.0	9.9
	1,275.9000	44.2	35.1	9.1	V	33.5	42.6	54.0	11.4
	1,479.4000	40.5	35.1	5.4	H	35.2	40.6	54.0	13.4
	1,701.2000	40.5	35.1	5.4	H	37.7	43.1	54.0	10.9
857.2000	369.8500	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	476.5000	38.4	35.1	3.3	V	22.7	26.0	46.0	20.0
	739.7000	45.8	35.1	10.7	V	26.4	37.1	46.0	8.9
	953.0000	39.8	35.1	4.7	V	29.6	34.3	46.0	11.7
	1,109.5500	47.2	35.1	12.1	V	32.1	44.2	54.0	9.8
	1,429.5000	47.0	35.1	11.9	V	34.8	46.7	54.0	7.3
	1,479.4000	39.9	35.1	4.8	H	35.2	40.0	54.0	14.0
	1,906.0000	41.8	35.1	6.7	H	39.9	46.6	54.0	7.4
954.9125	369.8625	54.5	35.1	19.4	V	19.8	39.2	46.0	6.8
	574.2000	37.1	35.1	2.0	H	25.5	27.5	46.0	18.5
	739.7250	45.8	35.1	10.7	V	26.4	37.1	46.0	8.9
	1,109.5875	47.1	35.1	12.0	V	32.1	44.1	54.0	9.9
	1,148.4000	40.5	35.1	5.4	V	32.4	37.8	54.0	16.2
	1,479.4500	40.0	35.1	4.9	H	35.2	40.1	54.0	13.9
	1,722.6000	39.8	35.1	4.7	H	37.9	42.6	54.0	11.4

Note: Other emissions not reported were more than 20dB below the FCC limits.

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.	
406.8750	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	
857.2000	NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT.	

All emissions not reported were more than 20 dB below the limit.
 (See attached example for 40.8400MHz reception.)

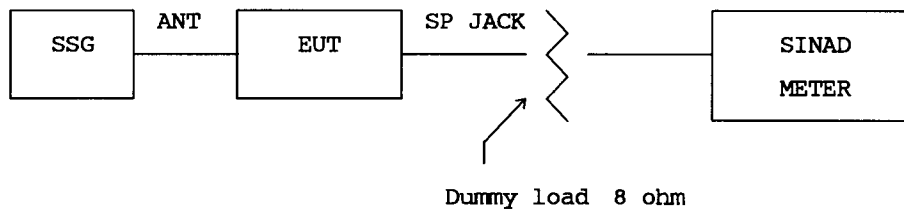


5-3 Test Result: Cellular image rejection

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.

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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

UB-303Z (SC200)

Cellular Frequency (MHz)	Image/spurious (Frequency stopped on EUT) (MHz)	Image Rjection Ratio (dB)
824.01	None	-
836.52	858.2125	56.2
	858.2250	55.8
849.00	819.8000	61.4
	849.9000	55.6
869.01	910.4750	69.0
	910.4875	69.2
881.52	120.2875	57.8
	903.2125	57.2
	903.2250	57.0
894.00	849.8000	60.0
	894.9000	55.6
	915.7000	51.8