

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 10 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, Rohde Schwartz EUS-2 Test Receiver or 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 25 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.

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

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)	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)							
29.000	-	-	-	-	-	-	>20
40.840	-	-	-	-	-	-	>20
54.000	150.800	7.3	H	13.3	20.6	40.0	19.4
	226.200	12.8	H	13.5	26.3	46.0	19.7
(2) Test Results (108.000 - 136.975 MHz Band)							
108.000	129.400	16.7	V	12.5	29.2	46.0	16.8
	258.800	18.2	H	16.5	34.7	46.0	11.3
	388.200	10.7	H	20.5	31.2	46.0	14.8
	517.600	7.0	H	23.5	30.5	46.0	15.5
	647.000	11.6	H	26.0	37.6	46.0	8.4
	776.400	4.9	H	26.3	31.2	46.0	14.8
127.175	148.575	20.5	V	13.3	33.8	43.5	9.7
	297.150	18.2	V	17.5	35.7	46.0	10.3
	445.725	11.7	H	22.0	33.7	46.0	12.3
	594.300	12.1	H	26.2	38.3	46.0	7.7
	742.875	17.5	V	17.5	35.0	46.0	11.0
	891.450	7.5	H	27.5	35.0	46.0	11.0
135.975	158.375	26.8	V	13.5	40.3	43.5	3.2
	316.750	16.4	V	18.0	34.4	46.0	11.6
	475.125	12.4	H	22.0	34.4	46.0	11.6
	633.500	13.0	V	25.3	38.3	46.0	7.7
	791.875	8.2	H	26.8	35.0	46.0	11.0
	950.250	7.5	H	29.5	37.0	46.0	9.0
(3) Test Results (137.000 - 174.000 MHz Band)							
137.000	231.200	13.7	H	15.5	29.2	46.0	16.8
	346.800	11.2	V	18.7	29.9	46.0	16.1
	462.400	4.6	H	22.7	27.3	46.0	18.7
	578.000	15.3	H	25.5	40.8	46.0	5.2
	693.600	7.5	V	25.6	33.1	46.0	12.9
	809.200	5.8	H	26.7	32.5	46.0	13.5
162.400	141.000	18.6	V	13.3	31.9	43.5	11.6
	282.000	19.8	V	16.5	36.3	46.0	9.7
	423.000	10.1	H	22.0	32.1	46.0	13.9
	564.000	14.5	H	25.7	40.2	46.0	5.8

174.000	705.000	13.8	V	25.7	39.5	46.0	6.5
	846.000	10.3	H	27.3	37.6	46.0	8.4
	152.600	21.2	V	13.3	34.5	43.5	9.0
	305.200	17.9	V	17.5	35.4	46.0	10.6
	457.800	10.5	H	22.0	32.5	46.0	13.5
	610.400	11.1	H	26.5	37.6	46.0	8.4
	763.000	8.5	V	26.0	34.5	46.0	11.5
	915.600	10.3	H	28.0	38.3	46.0	7.7
(4) Test Results (406.000 - 512.000 MHz Band)							
406.000	256.400	22.6	H	15.7	38.3	46.0	7.7
	384.600	18.3	V	19.3	37.6	46.0	8.4
	512.800	5.7	H	23.5	29.2	46.0	16.8
	641.000	8.4	H	25.3	33.7	46.0	12.3
	769.200	5.5	V	26.3	31.8	46.0	14.2
	879.400	4.2	H	27.0	31.2	46.0	14.8
453.250	143.950	17.3	V	13.3	30.6	43.5	12.9
	287.900	19.0	H	16.7	35.7	46.0	10.3
	431.850	14.7	V	22.3	37.0	46.0	9.0
	575.800	10.6	H	25.7	36.3	46.0	9.7
	719.750	10.4	V	25.3	35.7	46.0	10.3
	863.700	11.6	H	26.0	37.6	46.0	8.4
512.000	163.533	27.1	V	12.5	39.6	43.5	3.9
	327.067	15.9	V	18.5	34.4	46.0	11.6
	490.600	9.5	V	23.0	32.5	46.0	13.5
	654.133	9.7	V	25.3	35.0	46.0	11.0
	817.667	12.3	H	27.0	39.3	46.0	6.7
	981.200	0.9	V	30.3	31.2	46.0	14.8

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)
NO EMISSIONS EXCEED 20dB BELOW THE FCC LIMIT. (See attached example for 29MHz reception.)		

All emissions not reported were more than 20 dB below the limit.

LIST OF MEASUREMENT EQUIPMENTS

ENG-NO	TEST EQUIPMENT	TYPE	MFR	SERIAL NO.	CATEGORY	CODE
0271	SPECTRUM ANALYZER	R3361A	ADVANTEST	91730373	2171	5
1388	LISN	KNW407	KYOURITSU	8-833-21		4
1287	AMPLIFIER	AFS30010040020	MITEQ	138315	2171	D
1294	ANTENNA (B I LOG)	CBL6111	CHASE	1057	2121	D
1305	SPECTRUM ANALYZER	8566B	HP	2504A01433	2171	D
1306	SPECTRUM ANALYZER DISPLAY	85662A	HP	2403A09044	2171	D
1602	ANTENNA (DIPOLE)	3120-B1	EMCO	0075		D
1603	ANTENNA (DIPOLE)	3120-B2	EMCO	0076		D
1604	ANTENNA (DIPOLE)	3120-B3	EMCO	0076		D