



Test Report

Product Name : BLUE WHALE
Model No. : SST-900X
FCC ID. : NYLSST900X

Applicant : RACEWOOD TECHNOLOGY CO., LTD.
Address : 5F, No. 116, Hou-Kang St, Shih-Lin, Taipei,
Taiwan, R.O.C.

Date of Receipt : June 29, 2001

Date of Test : July 06, 2001

Report No. : 017L004FI

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date : July 06, 2001

Report No. : 017L004FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : BLUE WHALE

Applicant : RACEWOOD TECHNOLOGY CO., LTD.

Address : 5F, No. 116, Hou-Kang St, Shih-Lin, Taipei,
Taiwan, R.O.C.

Manufacturer : RACEWOOD TECHNOLOGY CO., LTD.

Model No. : SST-900X

FCC ID. : NYLSST900X

Rated Voltage : DC 3.6V

Trade Name : AON

Measurement Standard : FCC Part 15 Subpart C Paragraph 15.249

Measurement Procedure : ANSI C63.4:1992

Test Result : Complied

The Test Results relate only to the samples tested.

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Documented By : Chialin Chen
(Chialin Chen)

Tested By : Wallace Pan
(Wallace Pan)

Approved By : Gene Chang
(Gene Chang)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name : BLUE WHALE
 Trade Name : AON
 FCC ID. : NYLSST900X
 Model No. : SST-900X
 Frequency Range : 921MHz to 928MHz
 Channel Number : 8
 Earphone Cable : 10cm
 Type of Modulation : BPSK
 Adapter : ELEC, YAD-0900300T, Non-Shielded, 1.5m
 Operation Voltage : DC 3.6V

Frequency channel	Frequency (MHz)
1	921.6
2	922.2
3	922.8
4	923.4
5	924.0
6	924.6
7	925.2
8	925.8

Note:

- These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249 for non-spread spectrum devices.
- This device is a composite device in accordance with Part 15 regulations. The function for the receiver was, measured and made a test report that the report number is 017L004F, certified under verification.
- Quietek had verified the construction and function in typical operation, then shown in this test report.

1.2. Operation Description

The EUT is wireless hand-free device for cellular phone. 8 channels were selected automatically from 921MHz to 928MHz. BP5K modulation was adopted for the transmission. 3.6V rechargeable battery was built in for the EUT. The antenna of EUT was printed on the PCB directly.

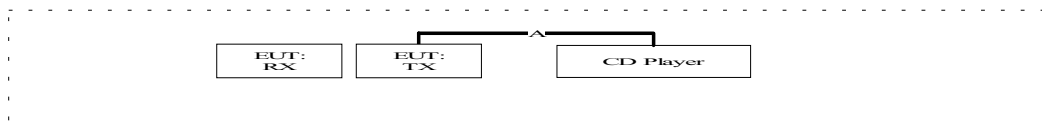
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	CD Player	Pioneer	PCD-008	SGAS000429TA	Non-shielded, 1.5m
(2)	EUT: BLUE WHALE (TX)				
(3)	EUT :BLUE WHALE (RX)				

	Signal Cable Type	Signal Cable Description
A.	CD Player Cable	Non-shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

- 1.4.1 Setup the EUT and simulators as shown on 1.3.
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 The EUT will receive the radio signal form transmitter.
- 1.4.4 Repeat the above procedure 1.4.2 to 1.4.3

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

September 30, 1998 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

Site Name: Quietek Corporation
Site Address: N0.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwa, R.O.C.



2. Conducted Emission

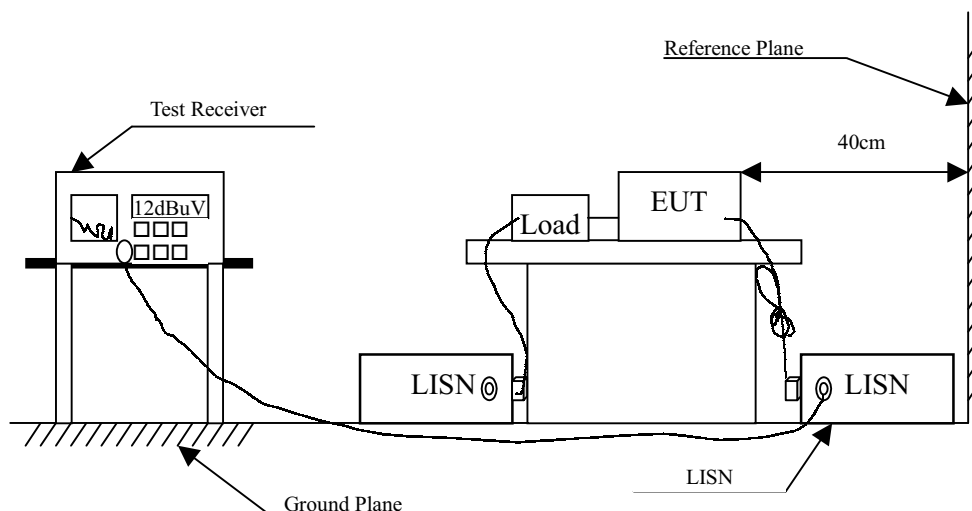
2.1. Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2001	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2001	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency MHz	Limits	
	uV	dBuV
0.45 - 30	250	48.0

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:1992 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result of Conducted Emission

Product : BLUE WHALE
 Test Item : Conducted Emission Test

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	dBuV	dBuV	dBuV
	dB	dB			

Line 1

Quasi-Peak:

*	0.562	0.21	0.10	25.29	25.60	48.00
	0.716	0.16	0.10	15.95	16.21	48.00
	1.161	0.16	0.11	14.43	14.70	48.00
	17.973	0.36	0.41	14.65	15.42	48.00
	20.454	0.39	0.46	24.23	25.08	48.00
	23.278	0.23	0.51	24.50	25.23	48.00

Average:

--

Line 2

Quasi-Peak:

	0.595	0.21	0.10	32.20	32.51	48.00
	0.778	0.16	0.10	26.97	27.23	48.00
	1.126	0.16	0.11	21.61	21.88	48.00
	16.930	0.41	0.39	29.20	30.01	48.00
*	21.161	0.26	0.47	35.56	36.29	48.00
	25.388	0.26	0.54	28.51	29.31	48.00

Average:

--

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ” means this data is the worst emission level.
3. Measurement Level = Reading Level + LISN Factor + Cable loss.
4. “ - - ”, means the average measurement was not performed when the peak measured data under the limit of average detection.

3. Radiated Emission

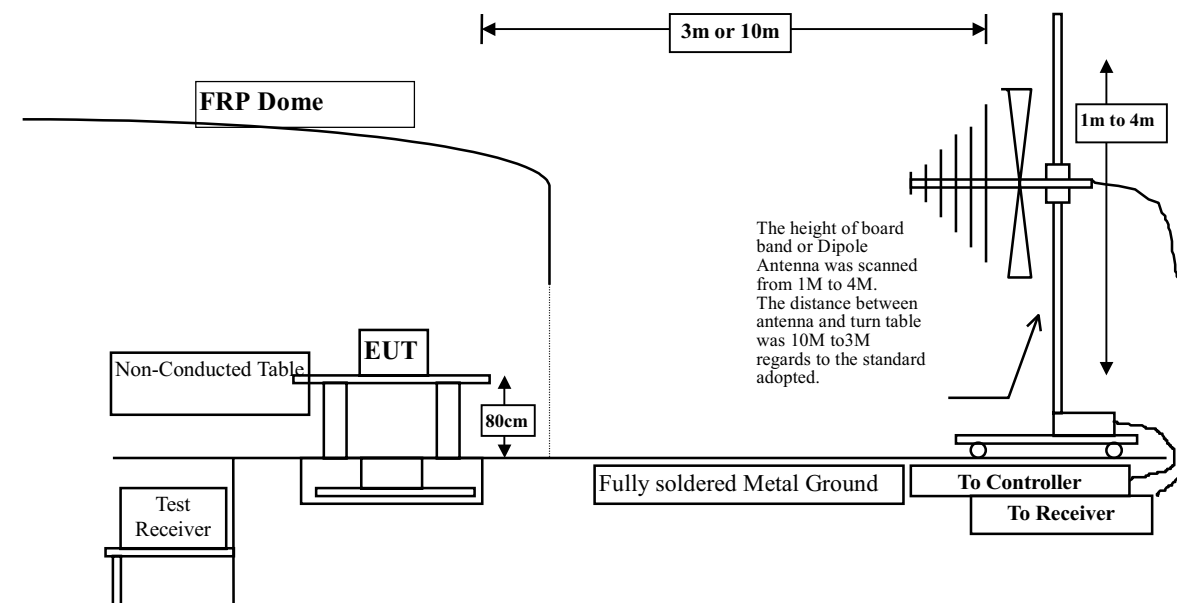
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
		Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
		Pre-Amplifier	HP	8447D/3307A01814	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001

- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

Frequency MHz	Field Strength of Fundamental (mV/m @3m)	Field Strength of Harmonics (dBuV/m @3m)	Field Strength of Harmonics (uV/m @3m)	Field Strength of Harmonics (dBuV/m @3m)
902-928	50	94 (Average) 114 (Peak)	500	54 (Average) 74 (Peak)

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	50dB below of the fundamental (dBuV/m @3m)	15.209 Limits (dBuV/m @3m)	General Radiated Limits (dBuV/m @3m)
30-88	40	40	40
88-216	43.5	43.5	43.5
216-960	44	46	46
Above 960	44	54	54

Remarks :

1. RF Line Voltage (dBuV) = 20 log RF Line Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

3.5. Test Result of Radiated Emission

Product : BLUE WHALE
 Test Item : Fundamental Radiated Emission Data
 Test Site : No.2 Open Test Site
 Test Mode : Channel: 921MHz

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit
	Loss	Factor		Level			
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

921.540	7.46	13.83	0.00	55.42	76.71	37.29	114.00
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Peak Detector (Vertical)

921.540	7.46	13.18	0.00	45.66	66.30	47.7	114.00
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Note:

1. All Readings are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Measurement = Reading Level + Probe Factor + Cable loss – Preamp.
4. “ - ”, means the average measurement was not performed when the peak measured data under the limit of average detection.

Product : BLUE WHALE
Test Item : Fundamental Radiated Emission Data
Test Site : No.2 Open Test Site
Test Mode : Channel: 925MHz

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit
	Loss	Factor		Level			
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

925.890	7.58	13.97	0.00	52.82	74.37	39.63	114.00
---------	------	-------	------	-------	-------	-------	--------

Peak Detector (Vertical)

925.890	7.58	13.05	0.00	43.57	64.20	49.80	114.00
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Note:

1. All Readings are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Measurement = Reading Level + Probe Factor + Cable loss – Preamp.
4. “ - ”, means the average measurement was not performed when the peak measured data under the limit of average detection.

Product : BLUE WHALE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.2 Open Test Site
 Test Mode : Channel: 921MHz

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit
MHz	Loss	Factor		Level			
	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

1846.920	6.19	27.21	20.80	46.30	58.90	15.10	74.00
2765.070	7.23	29.72	20.66	30.89	47.19	26.81	74.00
3686.920	8.18	32.27	20.57	20.34	40.22	33.78	74.00
4609.020	9.07	33.09	20.62	13.14	34.67	39.33	74.00
5530.820	9.89	34.71	20.08	9.63	34.14	39.86	74.00
6452.240	10.68	35.08	19.55	7.41	33.63	40.37	74.00
7373.720	11.43	37.02	18.47	4.81	34.79	39.21	74.00
8295.600	12.15	37.75	16.73	2.08	35.25	38.75	74.00
9217.060	12.85	38.04	16.18	1.30	36.01	37.99	74.00
10138.21	13.55	38.47	15.10	0.54	37.46	36.54	74.00

Average Detector (Horizontal)

1842.980	3.39	27.21	18.12	30.02	42.50	11.50	54.00
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Peak Detector (Vertical)

1846.720	6.19	27.21	20.80	49.00	61.60	12.40	74.00
2765.220	7.23	29.72	20.66	32.42	48.72	25.28	74.00
3686.930	8.18	32.27	20.57	21.39	41.27	32.73	74.00
4609.020	9.07	33.09	20.62	13.23	34.76	39.24	74.00
5530.840	9.89	34.71	20.08	9.92	34.43	39.57	74.00
6452.010	10.68	35.08	19.55	7.78	34.00	40.00	74.00
7373.740	11.43	37.02	18.47	5.02	35.00	39.00	74.00
8295.610	12.15	37.75	16.73	2.21	35.38	38.62	74.00
9217.060	12.85	38.04	16.18	1.21	35.92	38.08	74.00
10138.25	13.55	38.47	15.10	0.58	37.50	36.50	74.00

Average Detector (Vertical)

1842.980	3.39	27.21	18.12	34.89	47.37	6.63	54.00
----------	------	-------	-------	-------	-------	------	-------

Note:

1. All Readings are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss – Preamp.
4. “ - ”, means the average measurement was not performed when the peak measured data under the limit of average detection.

Product : BLUE WHALE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.2 Open Test Site
 Test Mode : Channel: 925MHz

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit
	Loss	Factor		Level			
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

1852.860	6.19	27.21	20.80	46.58	59.18	14.82	74.00
2797.410	7.27	29.84	20.65	31.29	47.76	26.24	74.00
3723.240	8.21	32.34	20.55	20.11	40.11	33.89	74.00
4659.560	9.11	33.23	20.61	13.21	34.94	39.06	74.00
5564.800	9.93	34.73	20.04	10.58	35.20	38.80	74.00
6499.620	10.73	35.10	19.54	8.31	34.60	39.40	74.00
7446.420	11.49	37.17	18.41	4.19	34.44	39.56	74.00
8352.200	12.19	37.81	16.63	2.58	35.95	38.05	74.00
9268.200	12.90	38.05	16.06	1.12	36.01	37.99	74.00
10214.80	13.60	38.46	15.06	0.59	37.59	36.41	74.00

Average Detector (Horizontal)

1852.810	3.39	27.21	18.12	29.70	42.18	11.82	54.00
----------	------	-------	-------	-------	-------	-------	-------

Peak Detector (Vertical)

1852.854	6.19	27.21	20.80	48.90	61.50	12.50	74.00
2796.450	7.27	29.84	20.65	32.98	49.45	24.55	74.00
3723.690	8.21	32.34	20.55	22.69	42.69	31.31	74.00
4659.950	9.11	33.23	20.61	14.51	36.24	37.76	74.00
5564.860	9.93	34.73	20.04	12.19	36.81	37.19	74.00
6498.630	10.73	35.10	19.54	10.01	36.30	37.70	74.00
7446.120	11.49	37.17	18.41	8.67	38.92	35.08	74.00
8352.250	12.19	37.81	16.63	3.61	36.98	37.02	74.00
9268.780	12.90	38.05	16.06	1.42	36.31	37.69	74.00
10214.01	13.60	38.46	15.06	0.85	37.85	36.15	74.00

Average Detector (Vertical)

1842.820	3.39	27.21	18.12	35.14	47.62	6.38	54.00
----------	------	-------	-------	-------	-------	------	-------

Note:

1. All Readings are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss – Preamp.
4. “ - ”, means the average measurement was not performed when the peak measured data

under the limit of average detection.

Product : BLUE WHALE
Test Item : General Radiated Emission Data
Test Site : No.1 OATS

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit
	Loss	Factor		Level			
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

129.597	2.45	9.43	0.00	18.47	30.35	13.15	43.50
158.397	2.70	6.19	0.00	19.15	28.03	15.47	43.50
* 167.996	2.84	6.25	0.00	22.12	31.20	12.30	43.50
177.595	2.90	6.12	0.00	18.42	27.43	16.07	43.50
235.201	3.39	8.72	0.00	15.24	27.35	18.65	46.00
359.998	4.34	9.92	0.00	12.38	26.64	19.36	46.00
441.595	4.91	12.67	0.00	11.53	29.11	16.89	46.00
918.240	7.51	14.30	0.00	6.20	28.01	17.99	46.00
925.410	7.58	13.97	0.00	6.30	27.85	18.15	46.00

Vertical:

220.080	3.25	8.46	0.00	14.02	25.73	20.27	46.00
270.868	3.64	9.03	0.00	7.54	20.21	25.79	46.00
338.588	4.23	8.50	0.00	4.69	17.41	28.59	46.00
383.999	4.60	13.95	0.00	5.90	24.45	21.55	46.00
412.795	4.72	14.82	0.00	9.22	28.76	17.24	46.00
* 451.194	5.02	13.55	0.00	13.53	32.11	13.89	46.00
918.620	7.51	14.30	0.00	5.90	27.71	18.29	46.00
925.330	7.58	13.97	0.00	6.00	27.55	18.45	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

4. Bandedge

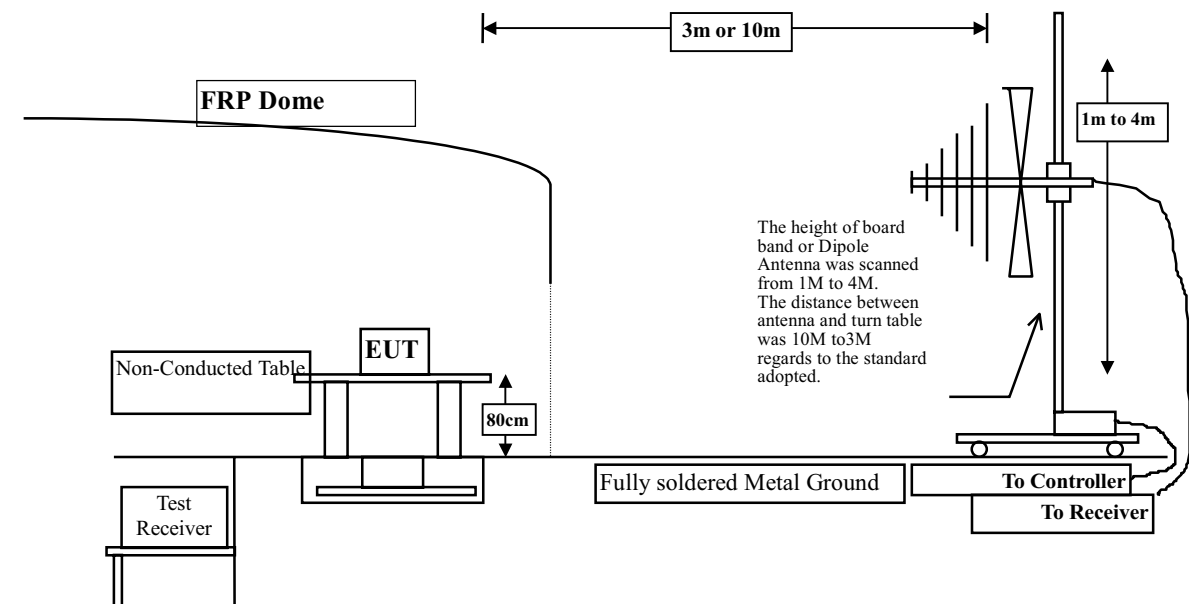
4.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
		Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
		Pre-Amplifier	HP	8447D/3307A01814	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001

- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

4.2. Test Setup



4.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

4.4. Standard Requirement

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or t the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

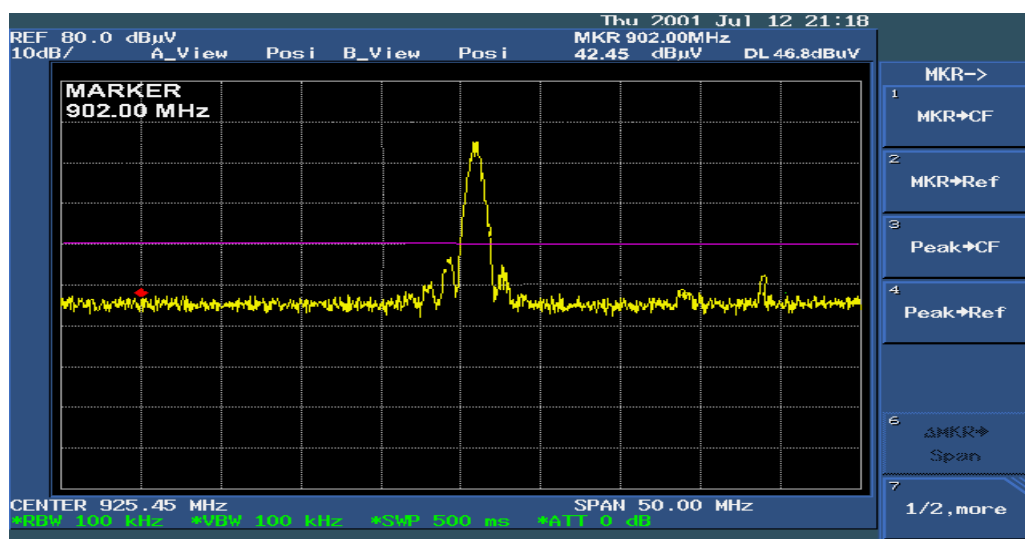
4.5. Test Result of Bandedge

Product : BLUE WHALE
 Test Item : Bandedge data
 Test Site : No.2 OATS
 Test Mode : Normal Operation

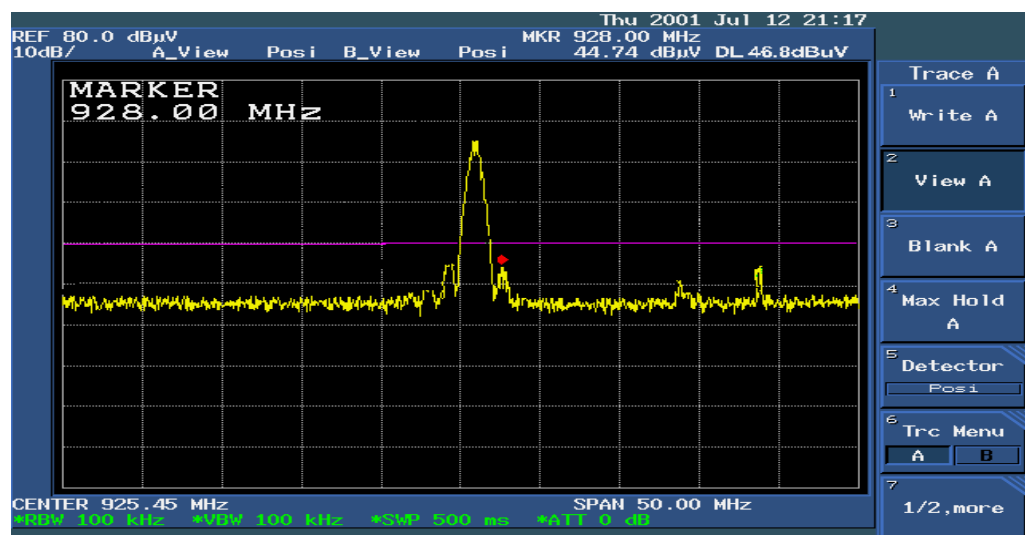
Channel No.	Frequency (MHz)	Reading (dBuV)	Measurement Level (dBuV/m)	Limit	Result
1 (Horizontal)	902	2.43	19.74	46	Pass
8 (Horizontal))	928	21.28	39.59	46	Pass

Figure Channel :

Channel 1: Horizontal



Channel 8: Horizontal



5. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 2 : EUT Detailed Photographs