

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com



Test Report

Product Name: SCANNING RECEIVER

FCC ID: K6620175X20

Applicant:

**VERTEX STANDARD CO., LTD.
4 - 8 -8 NAKAMEGURO, MEGURO-KU
TOKYO, 153-8644
JAPAN**

Date Receipt: MAY 5, 2004

Date Tested: MAY 13, 2004

APPLICANT: VERTEX STANDARD CO., LTD.

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REPORT #: V\VERTEX\641AUT4\641AUT4TestRepord.doc

COVER SHEET

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EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
Biconnical Antenna	Electro- Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/15/03	4/15/05
Blue Tower RF	HP	85685A	2620A00294		out for Cal
Preselector Blue Tower Spectrum Analyzer Signal Generator	HP	8568B	2928A04729 2848A18049	CAL 4/15/03	4/15/05
Silver Tower Preamplifier	HP	8640B	2308A21464	CAL 2/15/02	2/15/04
Silver Tower Quasi-Peak Adapter	HP	8449B	3008A01075	CAL 3/22/04	3/22/06
Silver Tower RF	HP	85650A	3303A01844	CAL 3/22/04	3/22/06
Preselector Silver Tower Spectrum Analyzer	HP	85685A	2926A00983	CAL 3/22/04	3/22/06
Tan Tower Preamplifier	HP	8566B Opt 462	3552A22064 3638A08608	CAL 3/22/04	3/22/06
Tan Tower Quasi-Peak Adapter	HP	8449B-H02	3008A00372	CAL 9/23/03	9/23/05
Tan Tower RF Preselector	HP	85650A	3303A01690	CAL 9/23/03	9/23/05
Tan Tower Spectrum Analyzer	HP	85685A	3221A01400	CAL 9/23/03	9/23/05
	HP	8566B Opt 462	3138A07786 3144A20661	CAL 9/23/03	9/23/05

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TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz. The ambient temperature of the UUT was 80°C with a humidity of 76%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS
33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSIC63.4-1992 with the EUT 40 cm from the vertical ground wall.

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APPLICANT: VERTEX STANDARD CO., LTD.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.109

REQUIREMENTS:

30 to 80 MHz:	40.0 dBuV/M @ 3 METERS
88 to 216 MHz:	43.5 dBuV/M
216 to 960 MHz:	46.0 dBuV/M
ABOVE 960 MHz:	54.0 dBuV/M

TEST RESULTS: A search was made of the spectrum from 30 to 1000 MHz and the measurements indicate that the unit DOES meet the FCC requirements.

TEST DATA:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
108.0	156.30	4.3	V	1.79	17.93	24.02	19.48
150.0	197.35	5.3	V	2.08	17.31	24.69	18.81
200.0	247.25	7.2	V	2.34	12.34	21.88	21.62
203.0	250.05	6.6	V	2.35	12.50	21.45	22.05
250.0	297.25	2.4	V	2.59	13.66	18.65	27.35
300.0	347.05	2.9	V	2.84	14.67	20.41	25.59
300.0	347.25	8.0	V	2.84	14.67	25.51	20.49
350.0	397.35	9.9	V	3.09	15.90	28.89	17.11
400.0	447.35	8.0	V	3.29	18.00	29.29	16.71
400.0	451.98	11.1	V	3.31	18.20	32.61	13.39
450.0	497.25	3.4	V	3.49	17.90	24.79	21.21
520.0	567.35	7.0	V	3.70	18.75	29.45	16.55
700.0	747.25	3.7	V	4.59	21.00	29.29	16.71
850.0	897.25	2.2	V	4.90	22.82	29.92	16.08
1,000.0	1,047.25	4.1	V	1.22	25.36	30.68	23.32

SAMPLE CALCULATION: FSdBuV/m = MR (dBuV) + ACFdB.

TEST PROCEDURE: ANSI STANDARD C63.4-1992 using a Hewlett Packard Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Preselector, a Hewlett Packard Model 85650A Quasi-Peak adapter, an Electro-Metric Dipole Kit, and an Eaton Model 94455-1 Biconical Antenna. The bandwidth of spectrum analyzer was 100 kHz with an appropriate sweep speed. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The receiver was put into the coherent mode by placing an antenna driven by a signal generator off site. The UUT was tested in 3 orthogonal planes.

PERFORMED BY: SID SANDERS

DATE: MAY 13, 2004

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APPLICANT: VERTEX STANDARD CO., LTD.

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NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.107

REQUIREMENTS:	QUASI-PEAK	AVERAGE
.15 - 0.5 MHz	66-56 dBuV	56-46 dBuV
0.5 - 5.0	56	46
5.0 - 30.	60	50

TEST PROCEDURE: ANSI STANDARD C63.4-2001. The spectrum was scanned from .15 to 30 MHz.

TEST DATA:

THE GRAPHS ON THE FOLLOWING PAGE REPRESENT THE EMISSIONS TAKEN FOR POWER LINE CONDUCTED FOR THIS DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

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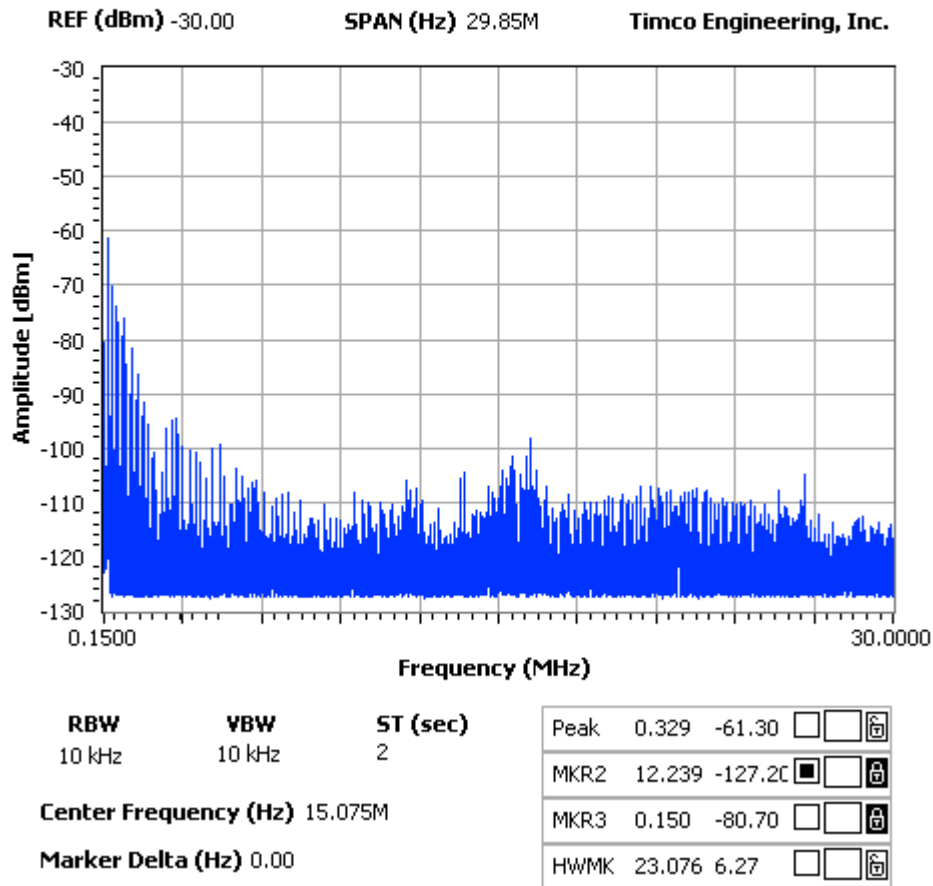
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POWER LINE CONDUCTED LINE 1

NOTES:



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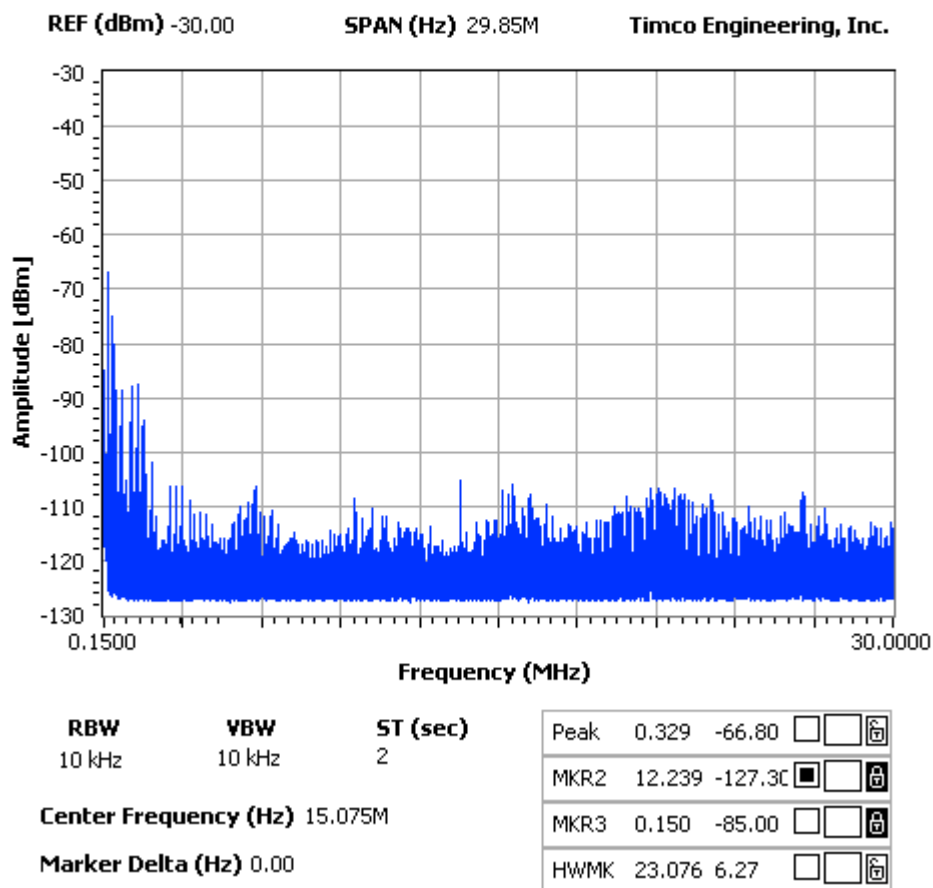
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POWER LINE CONDUCTED LINE 2

NOTES:



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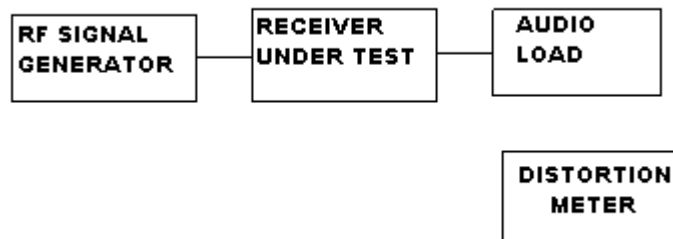
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APPLICANT: VERTEX STANDARD CO., LTD.
FCC ID: K6620175X20
NAME OF TEST: 38dB REJECTION RATIO
RULES PART NUMBER: 15.121(b)
REQUIREMENTS: 38dB REJECTION RATIO TO SENSITIVITY OF THE RECEIVER.
TEST SET-UP



TEST PROCEDURE: The reference sensitivity was measured in accordance with TIA/EIA-603;

- a. Equipment connected as illustrated
- b. A standard signal was applied to the receiver input terminals.
- c. Receiver output audio output was adjusted for rated output.
- d. The RF Signal generator was adjusted to the lowest level to produce a 12dB SINAD without the audio output dropping more than 3dB. Make note of sensitivity level.
- e. This was done across the different bands to establish a reference level. The reference taken was the worse case sensitivity.
- f. The output of the signal generator was then adjusted to a level of 60dB above the reference level at a frequency of 824.5MHz.
- g. With the level set 60dB above the level measured in step e.
- h. Set squelch on receiver to threshold, the signal level required to open the squelch must be lower than the level measured in step d.
- i. Cause the receiver to scan or step-it through its complete range of frequencies.
- j. If receiver stops or unsquelches on any frequency, record the frequency and then adjust the level until a 12dB SINAD is produced. This level must be greater than 38dB above the level in step e.
- k. Repeat steps f through j for frequencies 836.0, 848.5, 869.1, 881.0, & 893.5MHz.

TEST RESULTS: The UUT meets the 38dB REJECTION RATIO.

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