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FCC ID: KNZ-48452

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TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 85650A, & HP 8449B - OPT H02 Cal. 6/26/98
2. Signal Generator, Hewlett Packard 8640B, cal. 10/1/98
3. Eaton Biconical Antenna Model 94455-1
20-200 MHz Serial No. 0997 Cal. 10/30/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/15/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 10/30/98
6. Electro-Metric Antennas Model TDA-30/1-4, Cal. 10/15/98
7. Electro-Metric Line Impedance Stabilization Network Model No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. Cal. 11/19/98
8. Electro-Metric Line Impedance Stabilization Network Model No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. Cal. 11/19/98
9. Special low loss cable was used above 1 GHz
10. Tenney Temperature Chamber

TEST PROCEDURE

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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 &temp& with a humidity of &humr&.

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.

TEST PROCEDURES CONTINUED

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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 ANSI C63.4-1992 with the EUT 40 cm from the vertical ground wall.

CIRCUIT DESCRIPTION:

When Unit A is turned on it transmits on 72.11MHz. This frequency is generated by oscillator Q3. From Q3 the signal is coupled through C30 to Q4. The transmitted signal is amplitude modulated by varying the supply voltage. The audio is picked up by the microphone MIC1 and fed to Q5 and Q6 the audio preamplifiers. From Q6 the audio is fed into the output amplifier KA2209 which drives the audio output transformer T4 which modulates the supply voltage of Q4. From Q4 the modulated RF signal goes to T3 and T2 the double tuned circuits and to the low pass filter T1 and L2 to the antenna.

In the receive mode that signal comes in on the antenna mixer Q1 which converts the signal down to a 810KHz IF. From Q1 the signal is coupled through the double tuned circuit B1 to IC LA7368P. The detected signal comes out Pin 9 to the volume control VR2 and then to the audio amplifier TA7368P which is connected to the speaker SP1.

When Unit B is turned on it transmits on 72.92MHz. This frequency again serves as both the transmitter carrier and the receiver Local Oscillator. This signal provides low side injection to produce a 810 kHz IF from an incoming 72.11 MHz. signal.

ANTENNA_AND_GROUND_CIRCUITRY

This unit makes use of a short, helical antenna. The antenna is inductively coupled. The antenna is self contained, no provision is made for an external antenna. This unit is powered from a 9.0V battery.

No ground connection is provided. The unit relies on the ground track of the printed circuit board.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.237

REQUIREMENTS: THE FIELD STRENGTH OF ANY EMISSION WITHIN THE 200 kHz BAND SHALL NOT EXCEED 98.06 dBuV/M AT 3 METERS.

THE FIELD STRENGTH OF ANY EMISSION OUTSIDE THE SPECIFIED 200 kHz BAND SHALL NOT EXCEED 63.52 dBuV/M AT 3 METERS.

**HARMONICS MUST BE LOWER THAN FUNDAMENTAL

TEST DATA:

EMISSION FREQUENCY MHz	METER READING AT 3 METERS dBuV	COAX LOSS dB	ANTENNA CORRECTION FACTOR	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT. POL.
72.11	20.90	0.80	7.86	29.56	68.50	H
144.22	2.30	0.80	16.90	20.00	43.52	H
216.33	3.60	1.20	12.40	17.20	46.32	H
288.44	3.00	1.40	14.96	19.36	44.16	H
360.55	3.50	1.40	15.86	20.76	42.76	H
432.66	3.80	1.60	17.75	23.15	40.37	H
504.77	2.90	1.60	19.34	23.84	39.68	H
576.88	2.70	1.60	19.92	24.22	39.30	H
648.99	3.70	1.60	21.18	26.48	37.04	H
721.10	3.30	2.00	21.96	27.26	36.26	H

SAMPLE CALCULATION:

$$FSdBuV/m = MR(dBuV) + ACFdB.$$

WITH THE TRANSMITTER SECTIONS OF THIS UNIT DISABLED BY REMOVING R11, THE SPECTRUM WAS SCANNED FROM 30 TO 1000 MHz. NO SIGNIFICANT EMISSIONS WERE NOTED.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. 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.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: S. S. SANDERS _____ DATE: March 29, 1999

APPLICANT: DSI (HK) LTD.

FCC ID: KNZ-48452

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.237

REQUIREMENTS: THE FIELD STRENGTH OF ANY EMISSION WITHIN THE 200 kHz BAND SHALL NOT EXCEED 98.06 dBuV/M AT 3 METERS.

THE FIELD STRENGTH OF ANY EMISSION OUTSIDE THE SPECIFIED 200 kHz BAND SHALL NOT EXCEED 63.52 dBuV/M AT 3 METERS.

TEST DATA:

EMISSION FREQUENCY MHz	METER READING AT 3 METERS dBuV	COAX LOSS dB	ANTENNA CORRECTION FACTOR	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT. POL.
72.92	26.30	0.80	8.28	35.38	62.68	H
145.84	2.80	0.80	16.90	20.50	43.02	H
218.76	3.80	1.20	12.47	17.47	28.53	H
291.68	3.60	1.40	15.17	20.17	25.83	H
364.60	4.10	1.40	15.97	21.47	24.53	H
437.52	3.70	1.60	17.86	23.16	22.84	H
510.44	4.10	1.60	19.38	25.08	20.92	H
583.66	2.60	1.60	19.97	24.17	21.83	H
656.28	3.00	2.00	21.34	26.34	19.66	H
729.20	2.30	2.00	21.73	26.03	19.97	H

SAMPLE CALCULATION:

$$FSdBuV/m = MR(dBuV) + ACFdB.$$

WITH THE TRANSMITTER SECTIONS OF THIS UNIT DISABLED BY REMOVING R11, THE SPECTRUM WAS SCANNED FROM 30 TO 1000 MHz. NO SIGNIFICANT EMISSIONS WERE NOTED.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. 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.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: S. S. SANDERS DATE: March 29, 1999

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APPLICANT: DSI (HK) LTD.

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NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.235

REQUIREMENTS: The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits of 15.209, whichever permits the higher emission levels.

THE GRAPHS IN EXHIBITS 14 AND 15 REPRESENT THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the above photo was taken. The vertical scale is set to -10 dBm per division. The horizontal scale is set to 5 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: S. S. SANDERS March 29, 1999

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