APPLICANT: ALTOTECH CO., LTD.

FCC ID: OS2AT-9100

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SECURITY CODING INFORMATION

15.214(d) - THIS DEVICE COMPLIES WITH THE SECURITY CODE REQUIREMENTS OF 15.214(d)(1)(2) AND (3) BY MEANS OF THE FOLLOWING:

THIS PHONE IS EQUIPPED WITH A DIGITAL SECURITY SYSTEM WITH OVER 1 MILLION CODE COMBINATIONS. SEE EXHIBIT 1A.

WHEN MAKING A CALL, THE TELEPHONE SEARCHES THROUGH ITS 60 AVAILABLE CHANNELS AUTO CHANNEL SCAN TO FIND THE CLEAEREST ONE.

THE RECEIVER PORTION OF THIS TELEPHONE, FCC ID: OS2AT-9100, WAS TESTED WITH PASSING RESULTS. A VERIFICATION REPORT HAS BEEN ISSUED PER FCC RULES PART 15.109.

TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 8565OA, & HP 8449B - OPT H02 Cal. 10/17/99
2. Signal Generator, Hewlett Packard 8640B, cal. 9/23/99
3. Signal Generator, HP 8614A Serial No.2015A07428 cal. 5/27/99
4. EMCO Model No. 6512 Passive Loop 9KHz to 30MHz
5. Eaton Biconnical Antenna Model 94455-1 20-200 MHz Serial No. 0997 Cal. 9/30/99
6. Electro-Metric Log-Periodic Model No. EM-6950 Ser#632 9/18/99
7. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/31/98
8. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 4/27/99
9. Systron Donner Horn 18-26.3GHz Model DBE-520-20 7/14/99
10. Systron Donner Horn 26.5-40.2GHz Model DBD-520-20 7/14/99
11. ATM Horn 40-60GHz Part #19-443-6R 9/15/99
12. Electro-Metric Antennas Model TDA-30/1-4,Cal. 10/15/98
13. Electro-Metric Line Impedance Stabilization Network Model No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. Cal.11/19/98
14. Electro-Metric Line Impedance Stabilization Network Model No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. Cal. 11/19/98
15. Special low loss cable was used above 1 GHz
16. Tenney Temperature Chamber
17. AC Voltmeter, HP 400FL, Serial No 2213A14499. Cal. 9/21/99
18. Digital Multimeter, Fluke 8010A/12A, Serial No. 4810047. Cal 9/21/99
19. Digital Multimeter, Fluke 77, Serial No. 43850817. Cal 9/21/99
20. Oscilloscope, Tektronix 2230, Serial No. 300572. Cal 9/23/99
21. Frequency Counter, HP 5385A, Serial No. 3242A07460. Cal 10/6/99

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 71oF with a humidity of 70%.

ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The UUT was placed flush with the back of the table (1.5m side). 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.

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

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 71oF with a humidity of 70%.

CIRCUIT DESCRIPTIONS:

BASE UNIT

The incoming signal comes in on the antenna and is fed through the duplexer to the LNA, Q500 and then to a SAW bandpass filter,FL501. The frequency rang of the base receiver is 926-928MHz. From the bandpass filter the signal is fed to the mixer, Q501 which converts the signal down to 26.05MHz. From Q501 the signal is fed to the IF filter FL502 and then to the intergrated circuit U500. In the U500 the signal is converted down to 450KHz and then to the detector for FM signal. From the detector the audio is fed to a low pass filter and to the Channel Detector Indicator. From the low pass filter the audio is fed into another low pass filter and shaper and then to the CPU, U311. From the CPU, U311, the audio is fed to a speaker amplifier and the telephone line depending which is selected. From the CPU the line audio is fed to U305A and then to U305B then to the telephone coupling transformer, T301. The CPU also comparies the SECURTY CODES and provides the outgoing SECURITY CODE.

On the transmitting side, when a ring signal is detected the transmitter is turned on by photo complier integrated circuit U301 and the ring detect signal is fed into the CPU, U306, which in turn triggers the transmitter and send a ring signal to the handset. The base transmit frequency range is 902-904MHz. When the handset answers the base unit connects to the phone line and telephone line audio is fed into the speech network and then to an audio amplifier, Q304. The audio is then fed into the compressor U311. From U311 the audio is fed into the VCO, VT which modulated the outgoing carrier. From the VCO the signal is fed through a series of amplifiers, Q508 & Q509. From Q508 the signal is fed to the antenna.

CIRCUIT DESCRIPTIONS CONTD.

HANDSET

The incoming signal comes in on the antenna and is fed through the duplexer to the LNA, Q100 and then to a SAW 903MHz bandpass filter. The frequency range of the handset receiver is 902-904MHz. From the bandpass filter the signal is fed to the mixer, Q101 which converts the signal down to 26.05MHz. From Q101 the signal is fed to the IF filter FL102 and then to the intergrated circuit U100. In the U100 the signal is converted down to 450KHz and then to the detector for FM signal. From the detector, p/o U100 the audio is fed to a low pass filter and to the RING Detector Indicator. From the low pass filter the audio is fed simoltiously to the earphone element and to the CPU, U101. The earphone audio is fed into U2 and the to U4 then to the receiver element, RC1. The CPU uses the data to continueously monitor the securioty code.

The transmitter frequency range is 926-928MHz. The outgoing audio is picked up by the microphone and fed to the audio integrated circuit U2. This audio intergrated circuit feeds a low pass filter then feed the signal to the VCO, VT. From the VCO the signal is fed in to the amplifier Q107 and Q108 to the duplexer and then to the antenna.

ANTENNA AND GROUND CIRCUITRY

This unit makes use of a short, antenna. The antenna is inductively coupled. The antenna is self contained, no provision is made for an external antenna.

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

APPLICANT: ALTOTECH CO., LTD.

FCC ID: OS2AT-9100 (BASE)

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.249

REQUIREMENTS: Carrier frequency will not exceed 94.0 dBuV/m

FREQUENCY MHz		LEVEL dBuV/M
902- 928	MHz:	54.0 dBuV/M
ABOVE 960	MHz:	54.0 dBuV/M

TEST DATA:

EMISSION FREQUENCY MHz	METER READING AT 3 METERS dBuV	COAX LOSS dB	ANTENNA CORRECTION FACTOR dB	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT. POL.
BASE TUNED FREQUENCY 902.80MHz						
902.80	60.40	2.90	24.19	87.49	6.51	H
1805.70	13.70	1.00	27.22	41.92	12.08	V
2708.56	6.60	1.14	29.77	37.51	16.49	V
4514.16	-2.30	1.41	33.58	32.69	21.31	H
5417.02	-4.60	1.54	34.59	31.54	22.46	H
BASE TUNED FREQUENCY 905.09MHz						
904.40	60.20	2.90	24.18	87.28	6.72	H
1808.80	14.90	1.00	27.24	43.14	10.86	V
2713.20	9.00	1.14	29.78	39.92	14.08	V
3617.60	2.50	1.27	32.04	35.82	18.18	V

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

METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD. Measurements were made at Timco Engineering, Inc. 6051 N.W. 19th Lane, Gainesville, FL 32605.

TEST RESULTS: The unit DOES NOT meet the FCC requirements.

PERFORMED BY: S. S. SANDERS DATE: NOVEMBER 15, 1999

APPLICANT: ALTOTECH CO., LTD.

FCC ID: OS2AT-9100 (HANDSET)

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.249

REQUIREMENTS: Carrier frequency will not exceed 94.0 dBuV/m

FREQUENCY MHz		LEVEL dBuV/M
902- 928	MHz:	54.0 dBuV/M
ABOVE 960	MHz:	54.0 dBuV/M

TEST DATA:

EMISSION FREQUENCY MHz	METER READING AT 3 METERS dBuV	COAX LOSS dB	ANTENNA CORRECTION FACTOR dB	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT. POL.
HANDSET TUNED FREQUENCY 926.40MHz						
926.40	56.30	2.90	24.11	83.31	10.69	V
1852.96	5.80	1.01	27.41	34.22	19.78	V
2779.37	10.10	1.15	29.95	41.20	12.80	V
3705.83	-3.20	1.29	32.26	30.35	23.65	V
HANDSET TUNED FREQUENCY 927.20MHz						
927.20	56.40	2.90	24.12	83.42	10.58	V
1854.42	6.40	1.01	27.42	34.83	19.17	V
2781.60	8.70	1.15	29.95	39.80	14.20	V
3708.80	2.40	1.29	32.27	35.96	18.04	H
6490.40	-1.00	1.70	35.80	36.51	17.49	V

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

METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-1992 with the following exception: the unit was operated into its own antenna with the antenna at a height of four feet. Measurements were made at Timco Engineering, Inc. 6051 N.W. 19th Lane, Gainesville, FL 32605.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: S. S. SANDERS DATE: NOVEMBER 15, 1999

APPLICANT: ALTOTECH CO., LTD.

FCC ID: OS2AT-9100

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.233

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 15-16 REPRESENT THE EMISSIONS TAKEN FOR THIS 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 NOVEMBER 15, 1999

APPLICANT: ALTOTECH CO., LTD.

FCC ID: OS2AT-9100

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NUMBER: 15.207

MINIMUM REQUIREMENTS:

FREQUENCY MHz	LEVEL uV
0.450-30	250

TEST PROCEDURE: ANSI STANDARD C63.4-1992

THE HIGHEST EMISSION READ FOR LINE 1 WAS 4.022 uV @ 10.85 MHz.

THE HIGHEST EMISSION READ FOR LINE 2 WAS 3.841 uV @ 15.17 MHz.

THE GRAPHS IN EXHIBITS 14A-14B REPRESENT THE EMISSIONS READ FOR POWERLINE 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.

PERFORMED BY: S. S. SANDERS DATE: NOVEMBER 15, 1999