HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

PRODUCT COMPLIANCE DIVISION
SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
TEL : +82 31 639 8518 FAX : +82 31 639 8525 www.hctec.co.kr

CERTIFICATE OF COMPLIANCE

FCC Part 15C Certification

Genex Telecom Co., Ltd.
6F Farmax B/D 796-27 Bangbae-Dong, Seocho-Gu
Seoul, Korea (137-830)

FRN: 0008-8745-05

Date of Issue : May 2, 2003
Test Report No.: HCT-RF03-0501
Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD.
FRN: 0005-8642- 21

FCC ID : **PM3GCT-430**

APPLICANT : **Genex Telecom Co., Ltd.**

EUT Type:	Cordless Telephone Equipment
Tx Frequency:	2408.8 MHz — 2475.0 MHz
Rx Frequency:	2408.8 MHz — 2475.0 MHz
Max. RF Output Power: (Conducted)	Base : 10.06 mW (10.03 dBm) Handy: 2.03 mW (3.08 dBm)
Trade Name:	GENEX
Model No.:	GCT-430 (Base / Handy)
FCC Classification:	Part 15 Spread Spectrum Transmitter
Application Type:	Certification
FCC Rule Part(s):	FCC Part 15 Subpart C Section 15.247

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in 2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results in this report apply only to the sample tested.

Hyundai C-Tech Co., Ltd. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti- Drug Abuse Act of 1998, 21 U.S. C. 853(a)

Ki Soo Kim

Report prepared by : Ki-Soo Kim

Manager of Product Compliance Team

Table of Contents

SECTION 1: Client information

Company name :	Genex Telecom Co., Ltd.
Trade name :	Genex
Address :	6F Farmax B/D 796-27 Bangbae-Dong, Seocho-Gu Seoul, Korea (137-830)
Telephone Number :	+82-2-803-9002(115)
Facsimile Number :	+82-2-591-1801
Contact Person :	John Ryu ,Overseas Department

SECTION 2: Equipment under test (E.U.T.)

Type of Equipment :	Cordless Telephone Equipment
Model No. :	GCT-430 (Cordless Telephone Equipment)
	GCT-430 (Cordless Handset)
Serial No. :	200304001 (Cordless Telephone Equipment)
	200304002 (Cordless Handset)
Rating :	DC 3.6V DC 230mAh Battery (Cordless Handset)
	AC120V/60Hz (AC Adaptor with Cordless Telephone Equipment)
Other Clock Frequency :	9.6 MHz (Cordless Telephone Equipment, Cordless Handset)
Country of Manufacture :	Rui hua Electronics Factory (China)
	Tel: +86-769-530-9048 , Fax: +86-769-530-1649
Receipt Date of Sample :	April 25, 2003

2.2 Product Description

Model: GCT-430 are a Cordless Telephone Equipment / Cordless Handset.

They are referred to as the EUT in this report.

Frequency Characteristics :	2404.8MHz-2475.0MHz (Cordless Telephone Equipment and Cordless Handset)
Channel Characteristics :	40channels selectable by 1.8MHz spacing.
Modulation :	DBPSK (Differential Binary Phase Shift Keyed)
Spread Method :	DSSS (Direct Sequence Spread Spectrum)

SECTION 3: Test specification, methods & procedures

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C

Title : FCC 47CFR Part15 Radio Frequency Device
Subpart C Intentional Radiators
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz

3.2 Methods & Procedures

No.	Item	Test Procedure	Specification	Remarks
1	Antenna and ground system	ANSI C63.4:1992	Section 2.1033(b)	-
2	Conducted Emission	ANSI C63.4:1992	Section 15.207	AC Mains only
3	6dB Bandwidth	ANSI C63.4:1992	Section 15.247(a)(2)	Conducted
4	Maximum Peak Output Power	ANSI C63.4:1992	Section 15.247(b) Section 15.205	Conducted
5	Out of Band Emissions	ANSI C63.4:1992	Section 15.209 Section 15.247(c)	Conducted / Radiated
6	Power Density	ANSI C63.4:1992	Section 15.247(d)	Conducted
7	Complies with the security code requirements	ANSI C63.4:1992	Section 15.214(d)	-
8	Processing Gain	ANSI C63.4:1992	Section 15.247(e)	-

*These tests were also referred to FCC 97-114 “Guidance on Measurement for Direct Sequence Spread Spectrum Systems.”

*These tests were performed without any deviations from test procedure except for the following exclusions.

3.3 Exclusion from standard

No.	Item	Test Procedure	Specification	Remarks
1	Processing Gain	ANSI C63.4:1992	Section 15.247(e)	-

The test was not performed since it had been measured at another laboratory.

This gain is supplied by the manufacturer of the EUT.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The operating mode/system were as follows:

Operation mode is as follows;

Cordless Telephone Equipment

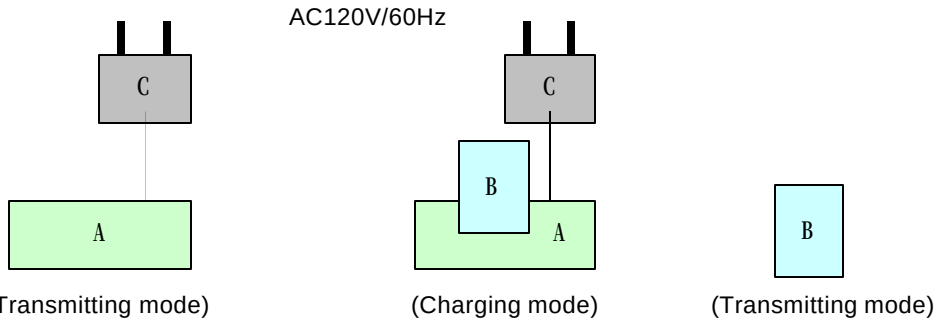
- Transmitting mode (ch1: 2404.8MHz, ch20: 2439MHz, ch40: 2475MHz)
- Charging mode (Conducted emission only)

Cordless Handset

- Transmitting mode (ch1: 2404.8MHz, ch20: 2439MHz, ch40: 2475MHz / Except for Conducted emission test)
- Charging mode (Conducted emission only)

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



(Transmitting mode) (Charging mode) (Transmitting mode)

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Cordless Telephone Equipment	GCT-430	200304001	Genex Telecom Co., Ltd.	PM3GCT-430
B	Cordless Handset	GCT-430	200304002	Genex Telecom Co., Ltd.	PM3GCT-430
C	AC Adaptor	CSD0900300U-22	-	Chon Sen Electronics Co., Ltd.	-

*C is intended to be supplied with the products.

List of cables used

No.	Name	Length (m)	Shield	Remark
1	DC Power Cable	1.9	N	-

4.3 Verification of the frequency and channel

The following table verifies the frequency pairs.

Channel	Base (GHz)	Handset (GHz)	Channel	Base (GHz)	Handset (GHz)	Channel	Base (GHz)	Handset (GHz)
*1	2.4048	2.4048	16	2.4318	2.4318	31	2.4588	2.4588
2	2.4066	2.4066	17	2.4366	2.4366	32	2.4606	2.4606
3	2.4084	2.4084	18	2.4354	2.4354	33	2.4624	2.4624
4	2.4102	2.4102	19	2.4372	2.4372	34	2.4642	2.4642
5	2.4120	2.4120	20	2.4390	2.4390	35	2.4660	2.4660
6	2.4138	2.4138	21	2.4408	2.4408	36	2.4678	2.4678
7	2.4156	2.4156	22	2.4426	2.4426	37	2.4696	2.4696
8	2.4174	2.4174	23	2.4444	2.4444	38	2.4714	2.4714
9	2.4192	2.4192	24	2.4462	2.4462	39	2.4732	2.4732
10	2.4210	2.4210	25	2.4480	2.4480	40	2.4750	2.4750
11	2.4228	2.4228	26	2.4498	2.4498			
12	2.4246	2.4246	27	2.4516	2.4516			
13	2.4264	2.4264	28	2.4534	2.4534			
14	2.4282	2.4282	29	2.4552	2.4552			
15	2.4300	2.4300	30	2.4570	2.4570			

*Tested channel

Note 1: This is for sure that all frequencies are in 2.4048GHz to 2.4750GHz.

Note 2: Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10MHz. (The locations of these frequencies one near the top, one near the middle and one near the bottom.)

Note 3: After test, the EUT operating frequencies are in 2.4048GHz to 2.4750GHz. So all the items as followed in testing report are needed to test these three frequencies: top: channel 1, middle: channel 20, bottom: channel 40.

SECTION 5: Summary of test results

5.1 Test results

No.	Item	Test Procedure	Specification	Remarks	Result
1	Conducted Emission	ANSI C63.4:1992	Section 15.207	AC Mains only	Complied
2	6dB Bandwidth	ANSI C63.4:1992	Section 15.247(a)(2)	Conducted	Complied
3	Maximum Peak Output	Power ANSI 63.4:1992	Section 15.247(b)	Conducted	Complied
4	Out of Band Emissions	ANSI C63.4:1992	Section 15.205 Section 15.209 Section 15.247(c)	Conducted / Radiated	Complied
5	Power Density	ANSI C63.4:1992	Section 15.247(d)	Conducted	Complied
6	Processing Gain	ANSI C63.4:1992	Section 15.247(e)	Conducted	Complied

5.2 Uncertainty

Conducted Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ±3.08dB.

The data listed in this test report has enough margin, more than site margin.

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.66dB.

The measurement uncertainty (with a 95% confidence level) for this test using Log periodic antenna is ±4.30dB.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±5.8dB.

The data listed in this test report has enough margin.

5.3 Test Location

Hyundai C-Tech. EMC Lab. / Icheon, Kyounki-Do, KOREA

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 24,2000(Confirmation Number: EA90661)

5.4 Test instruments

Refer to Appendix 1.

5.5 Data of EMI Test

Refer to Appendix 2.

5.6 FCC Label & Location

Refer to Appendix 3.

5.7 Test Setup Photographs

Refer to Appendix 4.

5.8 External Photographs

Refer to Appendix 5.

5.9 Internal Photographs

Refer to Appendix 6.

5.10 Block Diagram

Refer to Appendix 7.

5.11 Circuit Diagram

Refer to Appendix 8.

5.12 Part list

Refer to Appendix 9.

5.13 Operational Description

Refer to Appendix 10.

5.14 User's Manual

Refer to Appendix 11.

SECTION 6: Conducted Emissions (AC Mains), Section 15.207

Test Procedure

EUT was placed on a platform of nominal size, 1.0m by 1.0m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT was aligned and flushed with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. AC cables and DC cables were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a shielded room.
The EUT was connected to a Line Impedance Stabilization Network (LISN).
The facsimile equipment was tested under transmitting mode and intercom mode.
The cordless handset was tested under intercom mode and charging mode. It was not operated under transmitting mode since it was not possible to transmit with the handset put on the charger.
An overview sweep with peak detection has been performed.
The measurements have been performed with a CISPR quasi-peak detector(IF BW 10kHz) .
The frequency range measured is 450kHz to 30MHz.

Test data :	**Page A1 to A3 (APPENDIX 2)**
Photographs of test setup :	**Page 8 (APPENDIX 4)**
Test result :	**Pass**
Test instruments :	**SA-01, HA-01**

SECTION 7: 6dB Bandwidth (Conducted), Section 15.247(a)(2)

Test Procedure

The minimum 6dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data :	**Page A5 to A10 (APPENDIX 2)**
Test result :	**Pass**
Test instruments :	**SA-01**

SECTION 8: Maximum Peak Output Power (Conducted), 15.247(b)

Test Procedure

The Maximum Peak Output power was measured with a power meter connected to the antenna port.

The maximum peak output power shall not exceed 1 watt (30 dBm). If directional transmitting antennas with a gain of more than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Both the base and handset have a maximum power output of less than +30 dBm. Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a HP peak power meter Model E4410A. The antennas are non directional and do not exceed 6 dBi gain. The power output was measured at three places in the band highest is reported below.

POWER OUTPUT LIMIT: +30 dBm or 1 Watt.

Test data :	**Page A11 (APPENDIX 2)**
Test result :	**Pass**
Test instruments :	**PM-01**

SECTION 9: Out of Band Emissions (Radiated), Section 15.247(c)

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1m, raised 80cm above the conducting ground plane.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

For the facsimile equipment, Pre-check was performed at the each antenna angle of 0 degrees, 90 degrees and 180 degrees to compare and detect the maximum noise level. The cordless handset was also previously checked at each position of three axes X, Y and Z to find the worst position.. The position in which the maximum noise occurred was chosen to put into measurement. Worst cases are referred to following page.
It was operated under transmitting mode.

Radiated Spurious emissions

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement. The result was also satisfied the general limits specified in Sec.15.209(a).
Measurement range : 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz
: 1GHz to 26GHz PK and AV Detector

Test data :	**Page A12 to A13 (APPENDIX 2)**
Photographs of test setup :	**Page 2~7 (APPENDIX 4)**
Test result :	**Pass**
Test instruments :	**SA-01, HA-01**

SECTION 10: Out of Band Emissions (Conducted), Section 15.247(c)

Test Procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

At 100kHz(RBW and VBW 100kHz), spurious emission in the frequency range 30MHz-26GHz which was out of 2400-2483.5MHz was lower 20 dB than radio frequency power.

It was operated under transmitting mode.

Test data :	**Page A22 to A27 (APPENDIX 2)**
Test result :	**Pass**
Test instruments :	**SA-01**

SECTION 11: Power Density (Conducted), Section 15.247(d)

Test Procedure

The Power Density was measured with a spectrum analyzer connected to the antenna port.

It was operated under transmitting mode.

Test data :	**Page A28 to A33 (APPENDIX 2)**
Test result :	**Pass**
Test instruments :	**SA-01**

SECTION 12: Processing Gain (Conducted), Section 15.247(e)

Test Procedure

This gain is supplied by the manufacturer of the EUT.

Test data :	**Page A34 to A35 (APPENDIX 2)**
Test result :	**Pass**
Test instruments :	**HP8663A**

APPENDIX 1: Test instruments

Control No.	Instrument	Manufacture	Model No.	Test	Calibration date
SA-01	Spectrum Analyzer	R&S	ESI40	R/E, C/E	Dec. 2002
SA-02	Spectrum Analyzer	R&S	8561E	R/E	Oct. 2002
SG-01	Signal Generator	R&S	HP8373ED	R/E	July 2002
PM-01	Power Meter	H/P	E4410A	C/E	July 2002
PA-01	Power Amp	H/P	A0825-4343-R	R/E	Set. 2002
BA-01	Biconical Antenna	Schwarzbeck	BBA-9106	R/E	June 2002
LA-01	Log-Periodic Antenna	Schwarzbeck	UHALP-9107	R/E	June 2002
HA-01	Horn Antenna	Schwarzbeck	BBHA 9120D	R/E	June 2002
HA-02	Horn Antenna	Schwarzbeck	BBHA 9120D	R/E	March 2003
HA-03	Horn Antenna	Schwarzbeck	BBHA 9170	R/E	Feb. 2003
TR-01	Test Receiver	R&S	ESH3	C/E	June 2002
TR-02	Test Receiver	R&S	ESVP	R/E	Feb. 2003
TR-03	Test Receiver	R&S	ESVS30	R/E	June 2002
LS-01	LISN	EMCO	3825/2	C/E	July 2002
LS-02	LISN	R&S	ESH2-Z5	C/E	July 2002
HCT-01	Open Test Site	HCT	10m	R/E	-
HCT-02	Turn Table	EMCO	1060-06	R/E	-

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

C/E: Conducted Emission

R/E: Radiated Emission

APPENDIX 2: Data of EMI test