MEASUREMENT/TECHNICAL REPORT

Greatsino Limited - MODEL: MH9913 FCC ID: NQL9820

This report concerns (check one:) Origi	nal Grant <u>X</u> C	Class II Change
Equipment Type: Low Power Transceiver (6	example: computer, mod	em, transmitter, etc.)
Deferred grant requested per 47 CFR 0.457	(d)(1)(ii)? Yes	No_X_
	·	r until :date
Company Name agrees to notify the Commi	ssion by: date	
of the intended date of announcement of th	ne product so that the g	rant can be issued on
that date.		
	Yes	No_X_
Transition Rules Request per 15.37? If no, assumed Part 15, Subpart C for integration provision.		

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3. FREQENCY CHANNEL CHART

* CHANNEL SPACE : 30KHz

* 1'ST I.F : 10.7MHz

• 2'ND I.F : 450KHz

* TCXO(X-TAL) : 11.15MHz

	BASE	E(MHZ)	PORTABLE(MHZ)			
CH	TX	LOCAL(10.7)	TX	LOCAL(10.7)		
1 1	902.12	936.82	926.12	891.42		
2	902.15	936.85	926.15	891.45		
3	902.18	936.88	926.18	891.48		
4 i	902.21	936.91	926.21	891.51		
5	902.24	936.94	926.24	891.54		
6	902.27	936.97	926.27	891.57		
7	902.30	937.00	926.30	891.60		
8	902.33	937.03	926.33	891.63		
9	902.36	937.06	926.36	891.66		
10	902.39	937.09	926.39	891.69		
11	902.42	937.12	926.42	891.72		
12	902.45	937.15	926.45	891.75		
13	902.48	937.18	926.48	891.78		
14	902.51	937.21	926.51	891.81		
15	902.54	937.24	926.54	891.84		
16	902.57	937,27	926.57	891.87		
17	902.60	937.30	926.60	891.90		
18	902.63	937.33	926.63	891.93		
19	902.66	937.36	926.66	891.96		
20	902.69	937.39	926.69	891.99		
21	902.72	937.42	926.72	892.02		
22	902.75	937.45	926.75	892.05		
23	902.78	937.48	926.78	892.08		
24	902.81	937.51	926.81	892.11		
25	902.84	937.54	926.84	892.14		
26	902.87	937.57	926.87	892.17		
27	902.90	937.60	926.90	892.20		
28	902.93	937.63	926.93	892.23		
29	902.96	937.66	926.96	892.26		
30	903.99	937.69	926.99	892.29		
31	903.02	937.72	927.02	892.32		
32	903.05	937.75	927.05	892.35		
33	903.08	937.78	927.08	892.38		
34	903.11	937.81	927.11	892.41		
35	903.14	937.84	927.14	892.44		
36	903.17	937.87	927.17	892.47		
37	903.20	93790	927.20	892.50		
38	903.23	937.93	927,23	892.53		
39	903.26	937.96	927.26	892.56		
40	903.29	937.99	927.29	892.59		

1.2 Related Submittal(s) Grants

This is an Application for Certification of a cordless telephone system. Two transmitters are included in this Application. This specific report details the emission characteristics of each transmitter. The receivers are subject to the verification authorization process, in accordance with 15.101(b). A verification report has been prepared for the receiver sections of each device. The device is also subject to Part 68 Registration.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification Section" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 2 SYSTEM TEST CONFIGURATION

2.0 System Test Configuration

2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions. The handset was powered by a fully charged battery.

For the measurements, the EUT is attached to a cardboard box and placed on the wooden turntable. If the base unit attaches to peripherals, they are connected and operational (as typical as possible). The handset is remotely located as far from the antenna and the base as possible to ensure full power transmission from the base. Else, the base is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater. All emissions greater than 20 dB μ V/m are recorded.

Radiated emission measurement were performed from 30 MHz to tenth harmonics.

2.2 EUT Exercising Software

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

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

2.3 Support Equipment List and Description

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system (included inserted cards, which have grants) are:

HARDWARE:

The unit was operated standalone. An AC adapter (provided with the unit) was used to power the device. Its description is listed below.

(1) AC adapter with two meter unshielded power cord permanently affixed.

CABLES:

(1) Telecommunication cable with RJ11C connectors (1m, unshielded), terminated

OTHERS:

There are no special accessories necessary for compliance of this product.

2.4 Equipment Modification

Any modifications installed previous to testing by Greatsino Limited will be incorporated in each production model sold/leased in the United States.

No modifications were installed by ETL Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

C. K. Lam Assistant Manager Intertek Testing Services

Agent for Greatsino Limited

Jan (22, 1998

_Signature

Date

EXHIBIT 3 EMISSION RESULTS

3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where

 $FS = Field Strength in dB\mu V/m$

RA = Receiver Amplitude (including preamplifier) in dBμV

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

$$FS = RR + LF$$

where

 $FS = Field Strength in dB\mu V/m$

 $RR = RA - AG \text{ in } dB\mu V$

LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

 $RA = 52.0 \, dB\mu V/m$

AF = 7.4 dB

 $RR = 23.0 \, dB\mu V$

CF = 1.6 dB

LF = 9.0 dB

AG = 29.0 dB

FS = RR + LF

 $FS = 23 + 9 = 32 \, dB\mu V/m$

Level in $\mu V/m$ = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m

3.3 Radiated Emission Data - Base Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement: Passed by 10.5 dB

TEST PERSONNEL:

Town Cionature

Tester Signature

Tommy W. L. Leung, Engineer Typed/Printed Name

Date

Company: Greatsino Limited

Date of Test: April 17, 1998

Model: MH9913 Mode: TX-Channel 1

Table 1. Base unit

Radiated Emissions

	Frequency	Reading	Antenna	Pre-Amp	Net	Limit	Margin
Polarity		_	Factor	Gain	at 3m		
	(MHz)	$(dB\mu V)$	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
V	902.120	67.1	32.0	16	83.1	94	-10.9
Н	1804.240	34.9	26.5	34	27.4	54	-26.6
V	*2706.362	37.0	29.1	34	32.1	54	-21.9
Н	*3608.485	31.8	32.8	34	30.6	54	-23.4

NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Company: Greatsino Limited Date of Test: April 17, 1998

Model: MH9913

Mode: TX-Channel 20

Table 2. Base unit

Radiated Emissions

	Frequency	Reading	Antenna	Pre-Amp	Net	Limit	Margin
Polarity	, ,		Factor	Gain	at 3m		
	(MHz)	$(dB\mu V)$	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
V	902.690	67.5	32.0	16	83.5	94	-10.5
Н	1805.381	35.8	26.5	34	28.3	54	-25.7
Н	*2708.073	36.4	29.1	34	31.5	54	-22.5
Н	*3610.764	34.1	32.8	34	32.9	54	-21.1

NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Company: Greatsino Limited

Model: MH9913

Mode: TX-Channel 40

Date of Test: April 17, 1998

Table 3. Base unit

Radiated Emissions

	Frequency	Reading	Antenna	Pre-Amp	Net	Limit	Margin
Polarity			Factor	Gain	at 3m		
	(MHz)	(dBµV)	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
V	903.290	66.9	32.0	16	82.9	94	-11.1
Н	1806.581	37.6	26.5	34	30.1	54	-23.9
Н	*2709.874	35.7	29.1	34	30.8	54	-23.2
Н	*3613.162	32.6	32.8	34	31.4	54	-22.6

NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Company: Greatsino Limited

Date of Test: April 17, 1998

Model: MH9913

Mode: Caller ID & Charging

Table 4, Base unit

Radiated Emissions

	Frequency	Reading	Pre-	Antenna	Net	Class B	Margin
Polarity			Amp	Factor	at 3m	Limit	
•	(MHz)	$(dB\mu V)$	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
V	57.320	28.0	16	11	23.0	40.0	-17.0
V	60.903	31.7	16	10	25.7	40.0	-14.3
V	64.485	35.7	16	9	28.7	40.0	-11.3
V	75.233	37.8	16	6	27.8	40.0	-12.2
V	78.815	30.4	16	6	20.4	40.0	-19.6
Н	82.398	36.7	16	7	27.7	40.0	-12.3
H	85.981	36.4	16	9	29.4	40.0	-10.6
Н	93.146	31.1	16	10	25.1	43.5	-18.4
Н	136.136	32.6	16	13	29.6	43.5	-13.9
Н	139.718	31.7	16	13	28.7	43.5	-14.8
Н	179.126	28.2	16	16	28.2	43.5	-15.3

NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Tommy W. L. Leung

Radiated Emission Data - Handset 3.5

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement: Passed by 13.7 dB

TEST PERSONNEL:

Tester Signature

Tommy W. L. Leung, Engineer Typed/Printed Name

2711 12 1490, Date

Company: Greatsino Limited Date of Test: April 17, 1998

Model: MH9913 Mode: TX-Channel 1

Table 5. Handset

Radiated Emissions

	Frequency	Reading	Antenna	Pre-Amp	Net	Limit	Margin
Polarity	-	_	Factor	Gain	at 3m		
	(MHz)	$(dB\mu V)$	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
H	926.120	59.4	33.0	16	76.4	94	-17.6
Н	*2778.360	44.5	29.1	34	39.6	54	-14.4
Н	*3704.480	35.4	32.8	34	34.2	54	-19.8
Н	*4630.602	32.7	34.0	34	32.7	54	-21.3

NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Company: Greatsino Limited Date of Test: April 17, 1998

Model: MH9913

Mode: TX-Channel 20

Table 6. Handset

Radiated Emissions

	Frequency	Reading	Antenna	Pre-Amp	Net	Limit	Margin
Polarity			Factor	Gain	at 3m		
	(MHz)	$(dB\mu V)$	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
Н	926.691	57.2	33.0	16	74.2	94	-19.8
Н	*2780.073	45.2	29.1	34	40.3	54	-13.7
Н	*3706.764	35.7	32.8	34	34.5	54	-19.5
Н	*4633.455	30.7	34.0	34	30.7	54	-23.3

NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Company: Greatsino Limited Date of Test: April 17, 1998

Model: MH9913

Mode: TX-Channel 40

Table 7. Handset

Radiated Emissions

	Frequency	Reading	Antenna	Pre-Amp	Net	Limit	Margin
Polarity	_		Factor	Gain	at 3m		
	(MHz)	$(dB\mu V)$	(dB)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
Н	927.291	57.0	33.0	16	74.0	94	-20.0
Н	*2781.872	43.4	29.1	34	38.5	54	-15.5
Н	*3709.164	35.2	32.8	34	34.0	54	-20.0
Н	*4636.455	31.6	34.0	34	31.6	54	-22.4

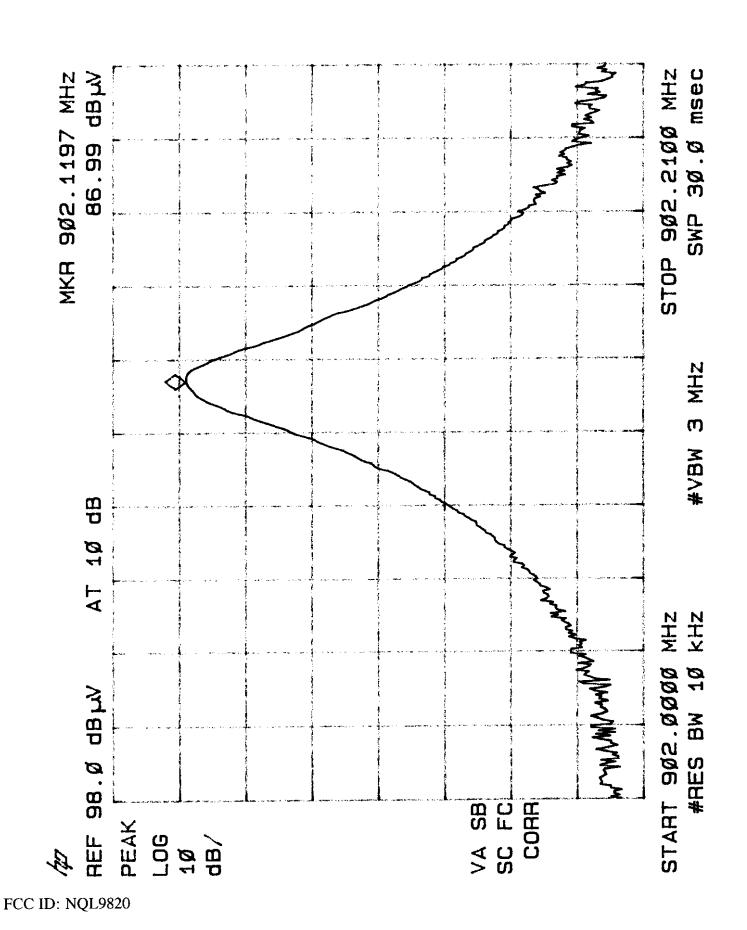
NOTES: 1. Peak Detector data

- 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
- 3. Negative value in the margin column shows emission below limit.
- 4. Horn antenna and average detector are used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

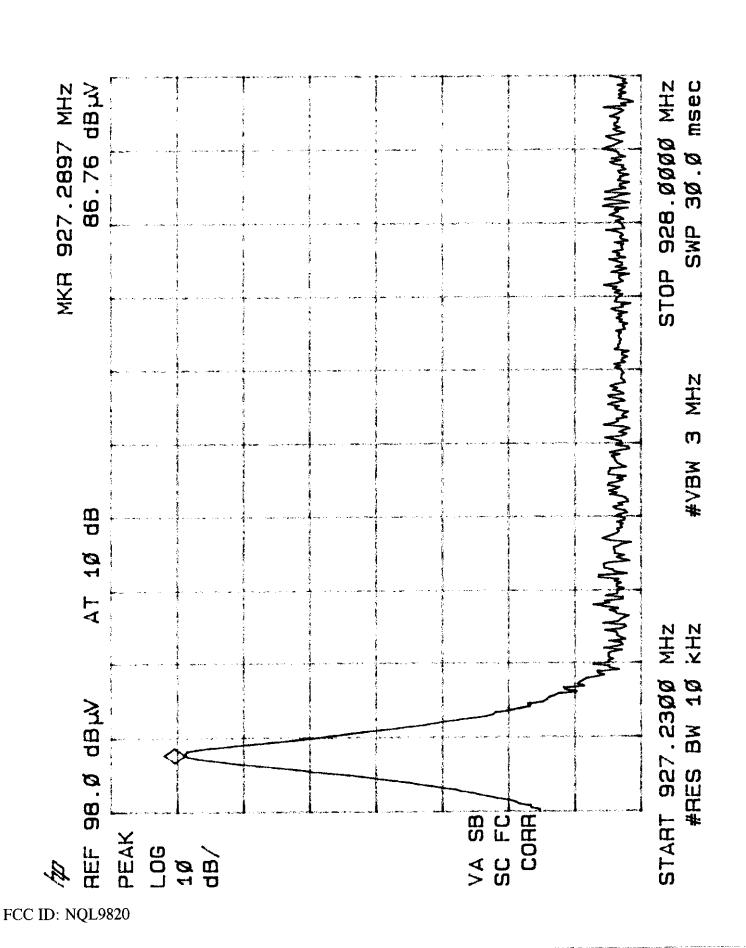
3.6 Radiated Emission on the bandedge

From the following plot, it shows that the fundamental emission is confined in the specified band. And there are shows that the emissions are at least 60 dB below the carrier level at band edge (902 and 928 MHz). It meet the requirement of section 15.249(c).

Emission Plot -Base



Emission Plot - Handset



3.8 Line Conducted Emission Configuration Data

The data on the following pages list the significant emission frequencies, the limit, and the margin of compliance.

Judgement: Passed by more than 30 dB margin

TEST PERSONNEL:

Tester Signature

Tommy W. L. Leung, Engineer Typed/Printed Name

Dra 17, 1996

Date

Company: Greatsino Limited Date of Test: April 17, 1998

Model: MH9913

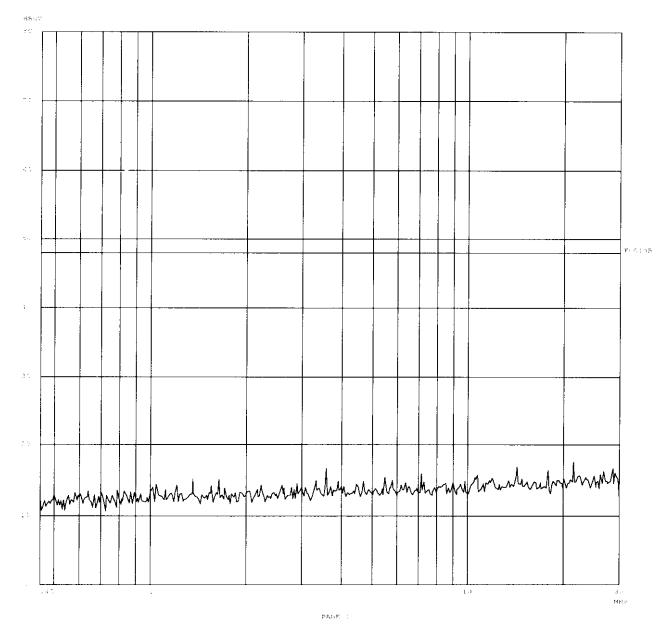
Mode: TX

Graph 1, Base Unit

Conducted Emissions

Mode: TX

Report No.: 98027421



Ctrl. No.: N/A

Company: Greatsino Limited Date of Test: April 17, 1998

Model: MH9913

Mode: TX

Table 8, Base Unit

Conducted Emissions

Mole: TX

Report No.: 98027421

Tested By:Hong, Report No.:98027421

Scan Settings (1 Range)

|----- Frequencies -----|

Start. Stop Step IF BW Detector M-Time Atten Preamp OpRge 450k 30M 5k 10k PK 20ms AUTO LN OFF 60dB

Final Measurement Results:

no Results

Ctrl. No.: N/A

Company: Greatsino Limited

Model: MH9913 Mode: Charging Date of Test: April 17, 1998

Graph 2, Base Unit

Conducted Emissions

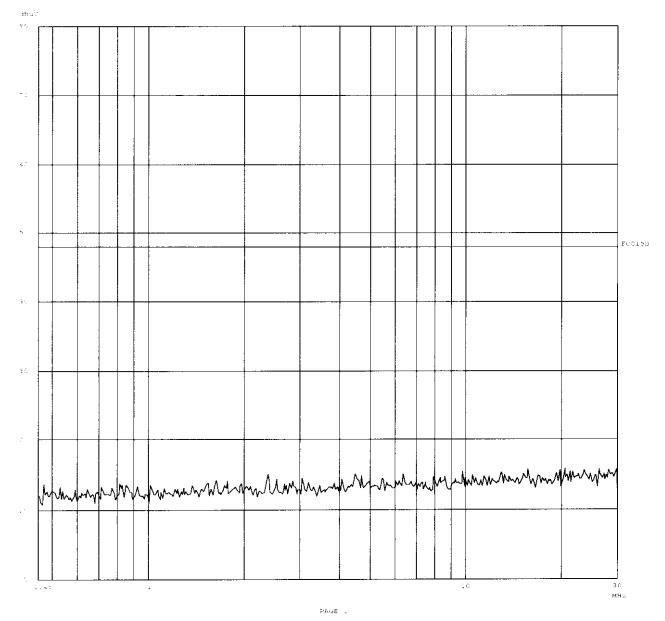
ITS Intertek Testing Services ETL Testing Laboratories

Mole: Charging

Report No.: 98027421

Tested By:Heng, Pepart Malack ISSAM.

Transdores No. Start. Step Hame 3 9k 36M E1378 Final Measurement: x 1;
Meas Time: 1 s.
Subtranges: 16
A: Margin: 1-65



Ctrl. No.: N/A

Company: Greatsino Limited

Model: MH9913 Mode: Charging Date of Test: April 17, 1998

Table 9, Base Unit

Conducted Emissions

Mode: Charging

Report No.: 98027421

Tested By:Hong, Report No.:98027421

Scan Settings (1 Range)

Start Stop Step IF BW Detector M-Time Atten Preamp OpRge 450k 30M 5k 10k PK 20ms AUTO LN OFF 60dB Final Measurement Results:

Final Measurement Results:

no Results

Ctrl. No.: NA

Company: Greatsino Limited Model: MH9913

Model: MH9913 Mode: Stand-by Date of Test: April 17, 1998

Graph 3, Base Unit

Conducted Emissions

Mode: Stand by

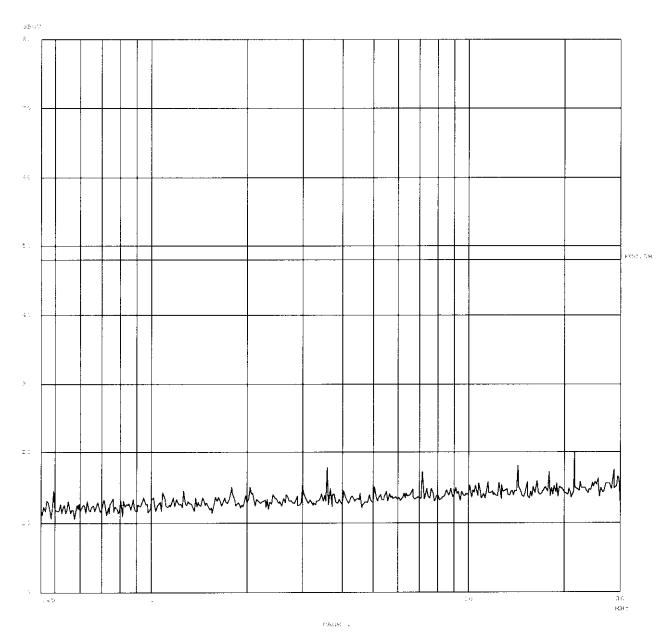
Report No.: 98027421

Twated By:Hong, Report No. Food will come detrings of Hange.

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Ctrl. No.: N/A

Company: Greatsino Limited

Model: MH9913 Mode: Stand-by Date of Test: April 17, 1998

Table 10, Base Unit

Conducted Emissions

Mode = Stand by

Report No.: 93027421

Tested By: Hong, Report No.: 98027421

Scan Settings (1 Range)

|----- Frequencies ------||------ Receiver Settings ------|

Start Stop Step IF BW Detector M-Time Atten Preamp OpRge 450k 30M 5k 10k PK 20ms AUTO LN OFF 60dB

Final Measurement Results:

no Results

Ctrl. No.: N/A

EXHIBIT 4 EQUIPMENT PHOTOGRAPHS

4.0 **Equipment Photographs**

Photographs of the tested EUT are attached.