

**CCT R&D Ltd.**

Application  
For  
Certification

900MHz/2.4GHz 40 Channel Analog Modulation Cordless Phone with  
Caller ID and Digital Answering Machine - Handset

**(FCC ID: NC8MA361SH)**

05202872  
TL/ Ann Choy  
October 19, 2005

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# INTERTEK TESTING SERVICES

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### List of attached file

Exhibit type	File Description	filename
Cover Page	Confidentiality Request	request.pdf
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission for Handset	config photos.doc
Test Report	Emission Plot	emission.pdf
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
User Manual	FCC Information	fcc information.pdf

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## **EXHIBIT 1 GENERAL DESCRIPTION**

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### 1.0 General Description

#### 1.1 Product Description

The MA361sys is a 900MHz/2.4GHz 40 Channel Analog Modulation Cordless Phone with Caller ID and Digital Answering Machine. Base Unit and handset operate at frequency of 924.045MHz to 926.219MHz and 2402.484MHz to 2409.004MHz respectively. The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The handset unit consists of a keypad with twelve standard keys (0,...9,\*,#), nine function keys (frmt, C, CID up, CID down, mute, mem, redial, transfer, flash), and one channel switch key. A Talk key is provided to control pick/release telephone line in a toggle base.

The base unit has a page key, which is used to page the handset unit.

The antennas used in base unit and handset are integral, and the tested sample is a prototype.

The Model: MA361sys is one of the Model: MA36Xsys series, and the letter "X" of the model numbers is in term of number from "0" to "9" with different color. The Model: MA300sys is an additional identical handset with a charger for selling a handset standalone. The difference in model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

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### 1.2 Related Submittal(s) Grants

This is an Application for Certification of Handset of a cordless telephone system. The FCC ID of the associated Base Unit is NC8MA361S and has been filed at the same time as this application. This specific report details the emission characteristics of each transmitter. 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

Radiated emission measurements was performed according to the procedures in ANSI C63.4 (2003). 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. 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 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.



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### **EXHIBIT 2 SYSTEM TEST CONFIGURATION**

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### 2.0 System Test Configuration

#### 2.1 Justification

For emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. 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 plastic stand if necessary and placed on the wooden turntable. If the base unit attaches to peripherals, they are connected and operational (as typical as possible). The base unit is remotely located as far from the antenna and the handset as possible to ensure full power transmission from the handset. Else, the handset 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. 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. The spurious emissions more than 20 dB below the permissible value are not reported.

#### 2.2 EUT Exercising Software

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

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### 2.3 Support Equipment List and Description

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system are:

#### *HARDWARE:*

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

- (1) Handset: A "Ni-Cd" type rechargeable battery (3.6V 600mAh, Model: 3SN-AA60-S-J1)

#### *CABLES:*

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

#### *OTHERS:*

- (1) A headset for telephone use with 1.2m unshielded cable permanently affixed. (Supplied by Intertek)

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### 2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty test has been considered.

### 2.5 Equipment Modification

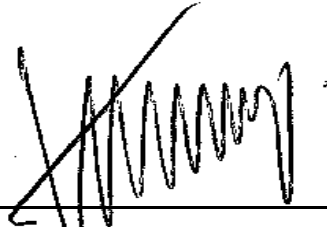
Any modifications installed previous to testing by CCT R&D Ltd. will be incorporated in each production model sold/leased in the United States.

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:*

*Tommy Leung  
Assistant Manager  
Intertek Testing Services  
Agent for CCT R&D Ltd.*



\_\_\_\_\_  
Signature

\_\_\_\_\_  
Oct 25, 2005

\_\_\_\_\_  
Date

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### **EXHIBIT 3 EMISSION RESULTS**

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### 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.

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### 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  $\text{dB}\mu\text{V}/\text{m}$   
               $RA$  = Receiver Amplitude (including preamplifier) in  $\text{dB}\mu\text{V}$   
               $CF$  = Cable Attenuation Factor in  $\text{dB}$   
               $AF$  = Antenna Factor in  $\text{dB}$   
               $AG$  = Amplifier Gain in  $\text{dB}$

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  $\text{dB}\mu\text{V}/\text{m}$   
               $RR = RA - AG$  in  $\text{dB}\mu\text{V}$   
               $LF = CF + AF$  in  $\text{dB}$

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

$RA = 52.0 \text{ dB}\mu\text{V}$	
$AF = 7.4 \text{ dB}$	$RR = 23.0 \text{ dB}\mu\text{V}$
$CF = 1.6 \text{ dB}$	$LF = 9.0 \text{ dB}$
$AG = 29.0 \text{ dB}$	
$FS = RR + LF$	
$FS = 23 + 9 = 32 \text{ dB}\mu\text{V}/\text{m}$	

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

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### 3.2 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission

at 12045.021 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc



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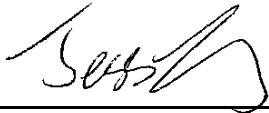
### 3.3 Radiated Emission Data - Handset

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

Judgement : Passed by 7.8 dB margin

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#### **TEST PERSONNEL:**



\_\_\_\_\_  
*Tester Signature*

Jess Tang, Lead Engineer

*Typed/Printed Name*

Oct 25, 2005

*Date*

## INTERTEK TESTING SERVICES

Company: CCT R&D Ltd.  
Model: MA361sys  
Mode : TX-Channel 1

Date of Test: September 26-October 12, 2005

Table 1, Handset

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	2402.484	88.7	34	29.4	84.1	94	-9.9
V	*4804.968	41.2	34	34.9	42.1	54	-11.9
V	7207.452	39.1	34	37.9	43.0	54	-11.0
V	9609.936	38.3	34	40.4	44.7	54	-9.3
V	*12012.420	39.1	34	40.5	45.6	54	-8.4
V	14414.904	37.8	34	41.7	45.5	54	-8.5

- NOTES:
1. Peak detector is used for the emission measurement.
  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 is used for the emission over 1000MHz.
  5. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 25GHz.
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

## INTERTEK TESTING SERVICES

Company: CCT R&D Ltd.  
Model: MA361sys  
Mode : TX-Channel 40

Date of Test: September 26-October 12, 2005

Table 2, Handset

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	2409.004	88.2	34	29.4	83.6	94	-10.4
V	*4818.008	41.4	34	34.9	42.3	54	-11.7
V	7227.013	39.2	34	37.9	43.1	54	-10.9
V	9636.017	38.5	34	40.4	44.9	54	-9.1
V	*12045.021	39.7	34	40.5	46.2	54	-7.8
V	14454.025	37.9	34	41.7	45.6	54	-8.4

- NOTES:
1. Peak detector is used for the emission measurement.
  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 is used for the emission over 1000MHz.
  5. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 25GHz.
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

## INTERTEK TESTING SERVICES

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### 3.4 Radiated Emission on the bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band and they are at least 50dB below the carrier level at band edge (2400.0MHz and 2483.5MHz). It meets the requirement of section 15.249(d).

Please refer to the following plots for radiated emission on the bandedge:

Plot H1A: Handset - Low Channel Emissions

Plot H1B: Handset - High Channel Emissions

For electronic filing, the above plots are saved with filename: emission.pdf

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### **EXHIBIT 4 EQUIPMENT PHOTOGRAPHS**

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### 4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.doc

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### **EXHIBIT 5 PRODUCT LABELLING**

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### 5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and location is saved with filename:  
label.pdf



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### **EXHIBIT 6 TECHNICAL SPECIFICATIONS**

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### 6.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

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### **EXHIBIT 7 INSTRUCTION MANUAL**

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### 7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

Please note that the required FCC Information to the User is saved with filename: fcc information.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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### **EXHIBIT 8 SECURITY CODE INFORMATION**

### 8.0 Security code information

The telephone has an internal security code with 65,536 possible combinations. When the handset firstly places on the charging cradle of the base, both handset and base unit will exchange a random  $2^{16}$  bits digital security code which is generated by the Base station. This code will not been changed even another handset doing the same action unless the power adaptor of the base switches off for long time.

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### **EXHIBIT 9 CONFIDENTIALITY REQUEST**

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### 9.0 **Confidentiality Request**

For electronic filing, a confidentiality request is saved with filename: request.pdf