FCC PART 15 SUBPART C CERTIFICATION REPORT

FOR LOW POWER TRANSMITTER

TEST REPORT No.: HM107949

Equipment Under Test [EUT]:	Digital Scale
Model Number:	WCS20
Applicant:	Crystal Field Ltd.
FCC ID :	NLHWCS20

CONTENT:

Appendix A

Appendix B

CONCLUSION

The submitted product was deemed to have COMPLIED after modification by customer with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Verify by

Patrick Wong
for Chief Executive

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Applicant Details

Applicant

CRYSTAL FIELD LTD.
Unit 23, 16/F., Goldfield Ind. Ctr.,
1 Sui Wo Road, Fotan, Shatin, N.T., Hong Kong.

Telephone: 852 2601 9282
Fax: 852 2692 3197

HKSTC Code Number for Applicant **CRF001**

Manufacturer

CRYSTAL FIELD LTD.
Unit 23, 16/F., Goldfield Ind. Ctr.,
1 Sui Wo Road, Fotan, Shatin, N.T., Hong Kong.

Telephone: 852 2601 9282
Fax: 852 2692 3197

1.3 Equipment Under Test [EUT]

Description of Sample

Product:	Digital Scale
Manufacturer:	Crystal Field Ltd.
Brand Name:	CONTEK
Model Number:	WCS-20
Input Voltage:	9Vd.c (“6F22” size battery x 1)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Crystal Field Ltd., Digital Scale. The EUT is to transmit RF signal while each button is being, Modulation by Data Code tape is pulses modulation.

1.4 Date of Order

2002-05-31

1.5 Submitted Sample(s):

2 Samples per model

1.6 Test Duration

2002-08-29

1.7 Country of Origin

China

1.8 Additional Information of EUT

	Submitted	Not Available
User Manual	☒	☐
Part List	☒	☐
Circuit Diagram	☒	☐
Printed Circuit Board [PCB] Layout	☒	☐
Block diagram	☒	☐
FCC ID Label	☒	☐

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4:2000 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.249	ANSI C63.4:2000	N/A	☒	☐	☐
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2000	Class B	☒	☐	☐
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2000	Class B	☐	☐	☒

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

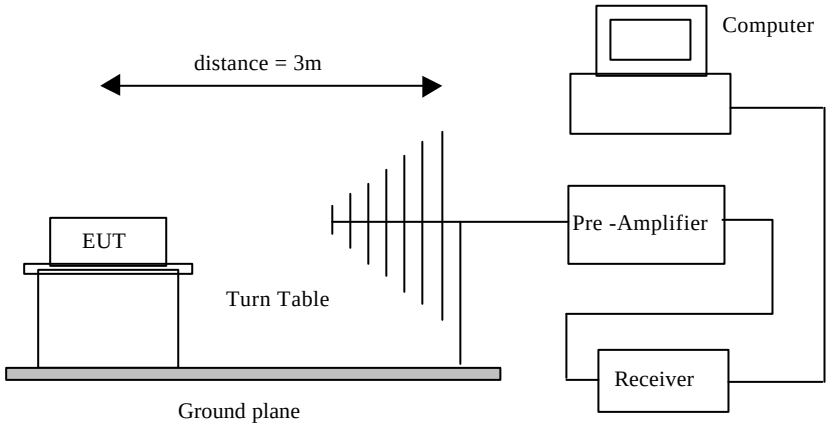
Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2000
Test Date:	2002-08-29
Mode of Operation:	On mode

Test Method:

The sample was placed 0.8m above the ground plane on the OATS *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigate all operating modes, rotated about all 3 axis (X, Y & Z) to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarization. The emissions worst-case are shown in Test Results of the following pages.

*: OATS [Open Area Test Site] located at HKSTC with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 90657.

Test Setup:



Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [millivolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-22500	250	2500

** Linear interpolations

Results:

Field Strength of Fundamental and 10th Harmonics Emissions Qusai-Peak						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit ** @3m µV/m	Antenna Polarity
914.70	32.7	29.9	62.6	1349.0	50,000.0	Horizontal
1829.40	< 1	58.5	< 24.5	16.8	500.0	Horizontal
2744.10	< 1	57.5	< 23.6	15.1	500.0	Horizontal
3658.80	< 1	58.6	< 24.9	17.6	500.0	Horizontal
4573.50	< 1	59.7	< 25.6	19.1	500.0	Horizontal
5488.20	< 1	57.6	< 24.3	16.4	500.0	Horizontal
6402.90	< 1	58.3	< 25.1	18.0	500.0	Horizontal
7317.60	< 1	66.9	< 33.6	47.9	500.0	Horizontal
8232.30	< 1	67.9	< 34.1	50.7	500.0	Horizontal
9147.00	< 1	67.1	< 33.2	45.7	500.0	Horizontal

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz ±3.7dB
300MHz to 1GHz +3.0dB / -2.7dB

Limited for Radiated Emissions [FCC 47 CFR 15.209 Class B]:
(30MHz to 1000MHz)

Frequency Range [MHz]	Quasi-Peak Limits [µV/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results :

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	Antenna Polarity	Level .@3m dBµV/m	Limit .@3m dBµV/m	Level @3m .@3m µV/m	Limit .@3m µV/m
142.612	Horizontal	21.2	43.5	11.5	150.0
146.798	Horizontal	24	43.5	15.8	150.0
155.191	Horizontal	23.9	43.5	15.7	150.0
163.568	Horizontal	24	43.5	15.8	150.0
205.513	Horizontal	24.3	43.5	16.4	150.0

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	Antenna Polarity	Level .@3m dBµV/m	Limit .@3m dBµV/m	Level @3m .@3m µV/m	Limit .@3m µV/m
142.615	Vertical	17.1	43.5	7.2	150.0
146.880	Vertical	21.2	43.5	11.5	150.0
155.191	Vertical	24.9	43.5	17.6	150.0
163.568	Vertical	27.8	43.5	24.5	150.0
205.513	Vertical	24.3	43.5	16.4	150.0

Remarks:

*: Linear interpolations

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz ±3.7dB

	300MHz to 1GHz	+3.0dB / -2.7dB

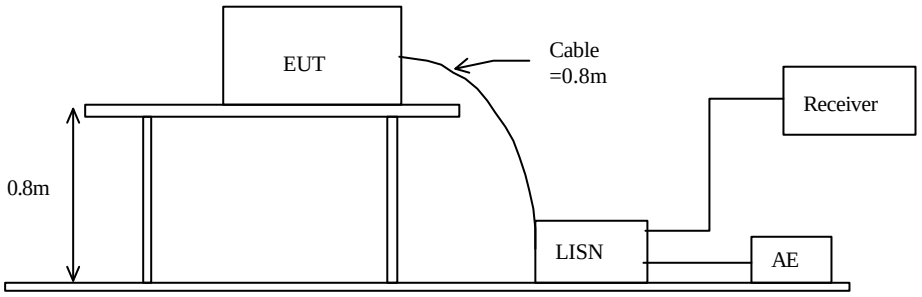
3.1.1 Conducted Emissions (0.45MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2000
Test Date:	2002-08-22
Mode of Operation:	On mode

Test Method:

The test was performed in accordance with ANSI C63.4:2000, with the following: an initial measurement was performed in peak and average detection mode on the live line. Any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV/m]	Average Limits [dBµV/m]
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram labelled as (QP and AV).

Results: N/A

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.

Remarks:

Calculated measurement uncertainty = ±2.3dB

Appendix A

Test Equipment Audit

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL.
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	07/09/01
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	07/09/01
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	07/09/01
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	07/09/01
EM011	ATTENNUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	07/09/01
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	07/09/01
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM020	HORN ANTENNA	EMCO	3115	4032	19/07/00
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	04/08/00
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	14/02/02
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	18/12/01
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	22/07/02
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	14/05/02
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A

Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A	CM
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A	04/10/01
EM002	LISN	EMCO	3825-2	9005-1657	22/08/01
EM119	LISN	R & S	ESH3-Z5	0831.5518.52	31/08/00
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	CM
EM142	PULES LIMITER	R & S	ESH3Z2	357.8810.52	04/07/01
EM181	EMI TEST RECEIVER	R & S	ESIB7	100072	28/11/01
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057-99A	02/01/02

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

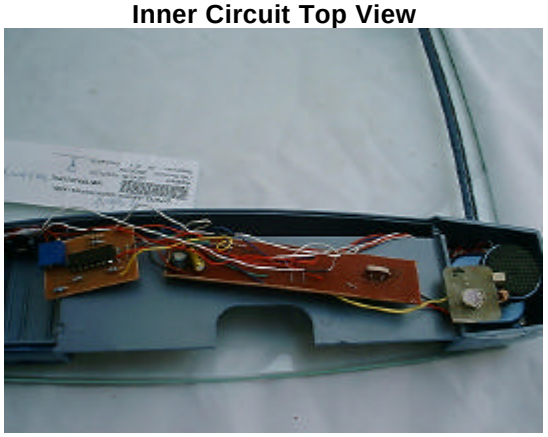
Appendix B

Photographs of EUT

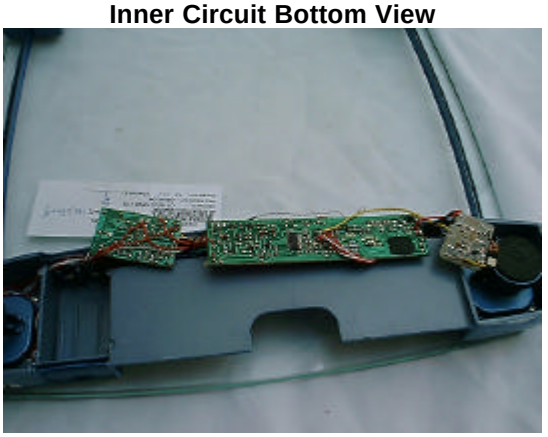
Front View of the product

Rear View of the product

Inner Circuit Top View



Inner Circuit Bottom View



TEST REPORT

Photographs of EUT

Measurement of Radiated Emission Test Set Up

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