

Verification of Conformity

CFR 47 Part 15 Subpart B

Test Report File No. :	10-IST-0037	Date of Issue :	January 18, 2010
Model(s) :	CT1721C		
Kind of Product :	TOUCH CONTROLLER		
Applicant :	Comfile Technology Inc.		
Address :	104-5, Guro5-Dong, Guro-Gu, Seoul, Korea		
Manufacturer :	Comfile Technology Inc.		
Address :	104-5, Guro5-Dong, Guro-Gu, Seoul, Korea		

Test Result

Positive

Negative

Reviewed By

Approved By




S.K.Lee / EMC Group Manager

B. S. Kim / Chief

Comment (s)

- Investigations requested : Measurement to the relevant clauses of FCC rules and regulations Part 15 Subpart B - Unintentional Radiators, Class A.
- The test report with appendix consists of 13 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4 2003.



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■ **Test Conditions and Data - Emissions**

◇ Conducted Emissions	0.15 MHz - 30 MHz	Not applicable
Test Conditions / Data and Plots		
◆ Radiated Emissions	30 MHz - 1 GHz	Applicable
Test Conditions / Data and Plots		9-10

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Note:

INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd. (*FCC Filing Lab.*)

400-19, Singal-dong, Giheung-gu, Yongin-si,

Kyonggi-Do, 446-599, Korea

TEL : +82 31 326 6700 FAX : +82 31 326 6797

KCC Registration No. : KR0018

FCC Registration No. : 400603

FCC MRA Registration No. : 801060

VCCI Registration No. : 1739

KOLAS Registration No. : KT118



POWER SUPPLY SYSTEM USED

Power supply system

Input : 24 VDC

(Refer to the product information)

PRODUCT INFORMATION

Name	TOUCH CONTROLLER
Model	CT1721C
LCD	5.7 inch STN (320 x 240)
	LTBHBND57S23CKS (NAN YA PLASTICS CORPORATION)
Touch	4 Line Film resistor type
CPU Module	CB290
RS232/485	1 Channel
MODBUS	SLAVE, ASCII Mode
Power	DC 24 V
Weight	583 g
Size	(187 x 127 x 43.5) mm

- EMC suppression device is not used during the test.
- Please refer to user's manual.

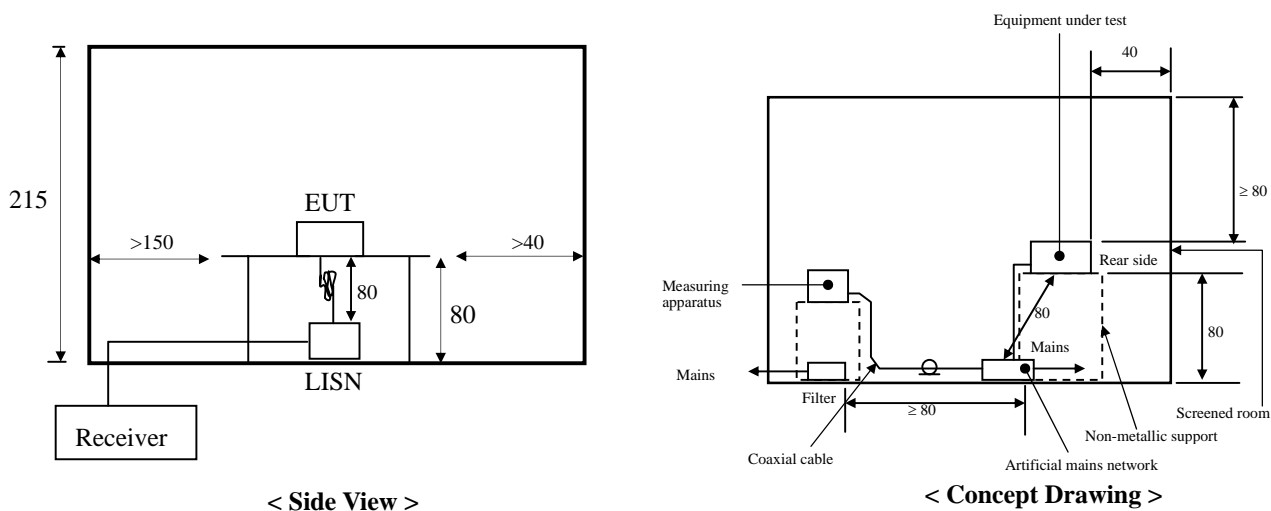
DESCRIPTIONS OF TEST

Conducted Emissions:

The measurement were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50 uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10KHz or for "quasi-peak" & "Average" within a bandwidth of 9 KHz.

-Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1 m X 1.5 m wooden table 80 cm height is placed 40 cm away from the vertical wall and 1.5 m away from the other wall of the shielded room. The R/S ESH3-Z2 pulse limiter and ESH3-Z5 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the EMCO LISN. The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2 cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMCO LISN. All interconnecting cables more than 1 m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.15 to 30 MHz. The bandwidth of the receiver was set to 10 kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



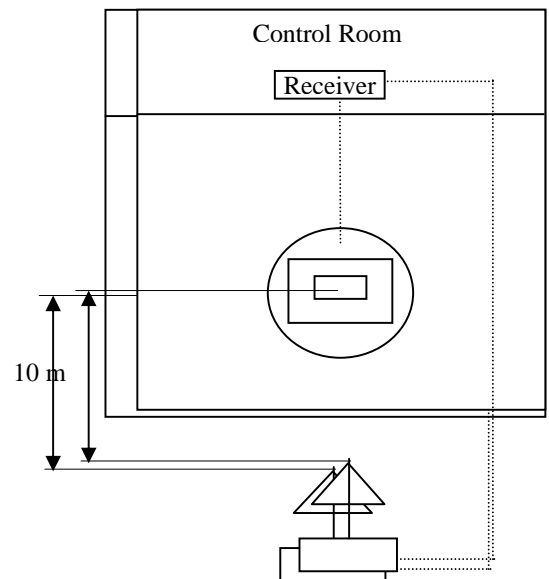
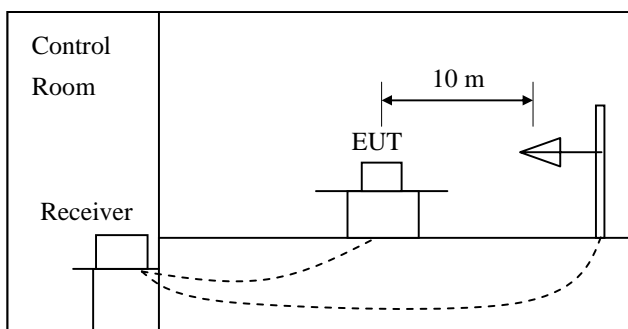
DESCRIPTION OF TEST

Radiated Emissions:

The measurement was performed over the frequency range of 30 MHz to 1 GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120 KHz.

-Procedure of Test

Preliminary measurements were made at 3 meter using bi-log antenna, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 MHz to 1000 MHz using bi-log antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 10-meters test distance using S/B bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120 kHz or 1 MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case



Equipment Under Test

EUT Type :

- Table-Top. Floor-Standing.
- Table-Top and Floor-Standing(Combination).

Operation - mode of the E.U.T. :

The equipment under test was operated during the measurement under following conditions :

- Standby Mode
- Operational Condition : Normal operation mode

Configuration of the equipment under test :

Following peripheral devices and interface cables were connected during the measurement :

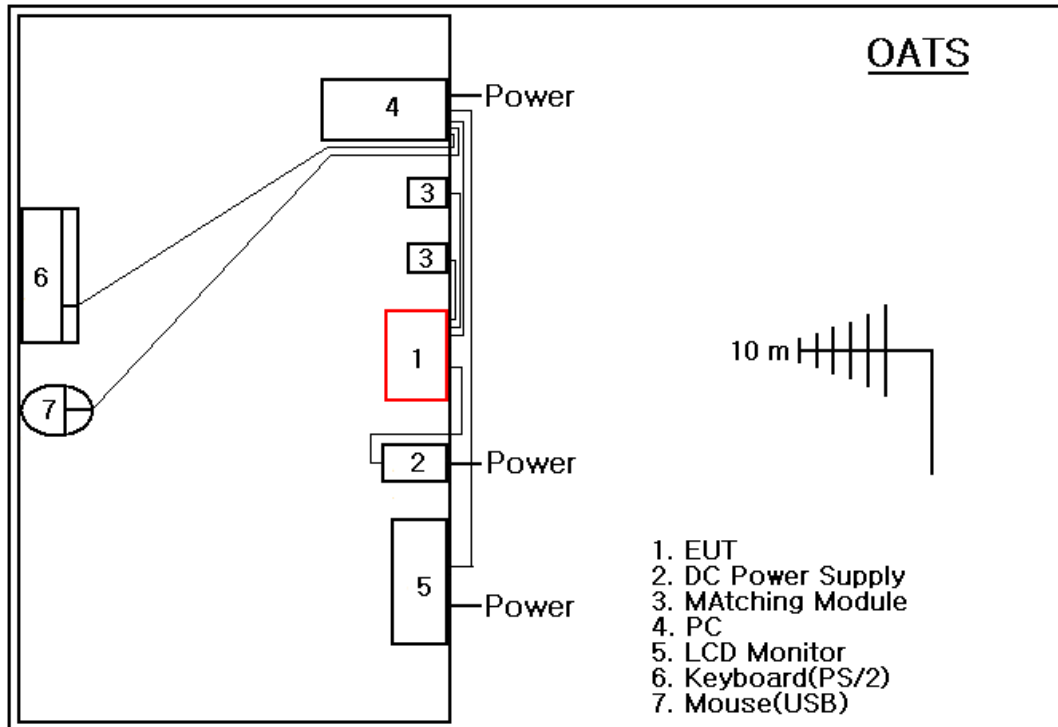
Equipment	Type	Brand	Serial No.
PC	dx7200MT	HP	CNG60809T1
LCD Monitor	1707FPt	Dell Inc.	-
Keyboard(PS/2)	RT-2300	MICROSOFT CORPORATION	7668200551835
Mouse(USB)	INTELLIMOUSE 1.3A	MICROSOFT CORPORATION	-
	PS/2 COMPATIBLE		
DC Power Supply	PA7011	YOKOGAWA	23HM5018
Matching Module	-	Comfile Technology Inc.	N/A

Connecting Interface Cables :

- Unshielded DC Power cable : 1.0 m
- Unshielded RS232 cable : 1.6 m
- Unshielded data(Matching Module) cable : 1.1 m

Note :

Test Set-Up



Radiated Emissions

SUMMARY

Emissions

Conducted Emission

The requirements are
Minimum limit margin
Maximum limit exceeding

MET Not MET
dB at MHz

Remarks :

Radiated Emission

The requirements are
Minimum limit margin
Maximum limit exceeding

MET Not MET
4.13 dB at 36.792 MHz

Remarks : Limits are kept with more 3dB margin.

Find the test data in following page 9 to 10.

test Date

Begin of testing : December 15, 2009

End of testing : December 15, 2009

Note :

Prepared By



J.H. Park / EMC Engineer

- means the test is applicable,
- is not applicable.

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

◆ Test Equipment Used

Name	Type	Manufacturer	Due Calibration	Serial Number
ESCS30	Test Receiver	Rohde & Schwarz	Sep. 17, 2010	100171
VULB9160	Antenna	Schwarzbeck	Aug. 06, 2011	3048

◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Environmental Conditions

Temperature	6.3 °C
Humidity	49 % R.H.
Atmospheric pressure	1016 hPa

◆ Test Program Normal Mode

◆ Test Date January 15, 2010

◆ Test Area Open site No.2

Note :

Radiated Emissions

Applicable]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Limit [dBuV/m]	Result dBuV/m]	Margin [dB]
36.792	22.10	12.17	0.70	V	39.10	34.97	4.13
73.655	23.10	9.36	0.83	V	39.10	33.29	5.81
147.370	21.40	12.54	1.77	H	43.50	35.71	7.79
184.230	25.50	10.70	2.10	V	43.50	38.30	5.20
221.097	25.50	10.14	2.14	H	46.40	37.78	8.62
239.520	25.00	10.77	2.17	H	46.40	37.94	8.46
257.954	24.10	11.38	2.31	H	46.40	37.79	8.61
276.383	22.20	11.99	2.56	H	46.40	36.75	9.65
313.241	21.70	13.04	2.90	H	46.40	37.64	8.76
685.715	14.40	20.42	3.87	H	46.40	38.69	7.71

Note : Normal operation mode

Appendix A. The Photos of Test Setup



Radiated Emissions -Front View



Radiated Emissions -Rear View

Appendix B. The Photos of Equipment Under Test



Front View



Rear View

Appendix B. The Photos of Equipment Under Test



Inner View