

FCC Test Report

Equipment : LCD Signature Pad
Brand Name : Wacom
Model No. : STU-430
Reference number: RL-16204
FCC ID : HV4STU430
Standard : 47 CFR FCC Part 15.209
Operating Band : 531.25 ~ 593.75 kHz
Equipment Class : DCD
Applicant : Wacom Co., Ltd.
2-510-1, Toyonodai, Kazo-shi, Saitama,
349-1148 Japan

The product sample received on Sep. 20, 2013 and completely tested on Oct. 24, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Wayne Hsu / Assistant Manager





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APPENDIX A. TEST PHOTOS

APPENDIX B. PHOTOGRAPHS OF EUT



Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.3	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 0.1975810MHz 43.16 (Margin 10.55dB) - AV 52.69 (Margin 11.02dB) - QP	FCC 15.207	Complied
3.2	15.209	Transmitter Radiated Unwanted Emissions	[dBuV/m at 1m]: 0.5624100kHz 53.22 (Margin 28.92dB) - PK [dBuV/m at 3m]: 847.710MHz 33.64 (Margin 12.36dB) - PK	FCC 15.209	Complied



Revision History

Report No.	Version	Description	Issued Date
FR391125	Rev. 01	Initial issue of report	Oct. 25, 2013

1 General Description

1.1 Information

1.1.1 Manufacturer

Qisda Corporation

157 & 159, Shan-Ying Road, Gueishan, Taoyuan, Taiwan

Qisda (Suzhou) Co., Ltd.

169, Zhujiang Road, New District, Suzhou, Jiangsu Province, P.R. China

Qisda Optronics (Suzhou) Co., Ltd.

169, Zhujiang Road, New District, Suzhou, Jiangsu 215129, P.R. China

Qisda Mexicana S.A. De C.V.

Calzada Venustiano Carranza, No. 88 Col. Plutarco Elias Calles, Mexicali B.C. Mexico C.P 21376 Mexico

1.1.2 RF General Information

RF General Information				
Frequency Range	Modulation	Ch. Frequency (kHz)	Channel Number	Field Strength (dBuV/m)
531.25 ~ 593.75 kHz	Array Coil Pointing	531.25 / 562.5 / 593.75	3	53.22
Note 1: Field strength performed quasi peak level at 1m.				

1.1.3 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	External antenna (dedicated antennas)

1.1.4 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.2 Accessories and Support Equipment

Accessories Information				
Digital Pen	Brand Name	Wacom	Model Name	UP-610
3M USB cable	Brand Name	--	Model Name	STJ-A337
5M USB cable	Brand Name	--	Model Name	STJ-A338

Support Equipment				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	M1330	DoC

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2009

1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL : 886-3-327-3456	FAX : 886-3-327-0973	
Test Condition	Test Site No.	Test Engineer	Test Environment	
AC Conduction	CO04-HY	Zeus	24°C / 46%	
Radiated Emission	03CH03-HY	Vic	26°C / 58%	

1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth		±1.42 %	N/A
Unwanted emissions, conducted	9 – 150 kHz	±0.38 dB	N/A
	0.15 – 30 MHz	±0.42 dB	N/A
	30 – 1000 MHz	±0.51 dB	N/A
All emissions, radiated	9 – 150 kHz	±2.49 dB	N/A
	0.15 – 30 MHz	±2.28 dB	N/A
	30 – 1000 MHz	±2.56 dB	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Modulation Used for Conformance Testing	
Modulation Mode	Field Strength (dBuV/m at 1m)
Touch Panel-Array Coil Pointing	53.22

2.2 Test Channel Frequencies Configuration

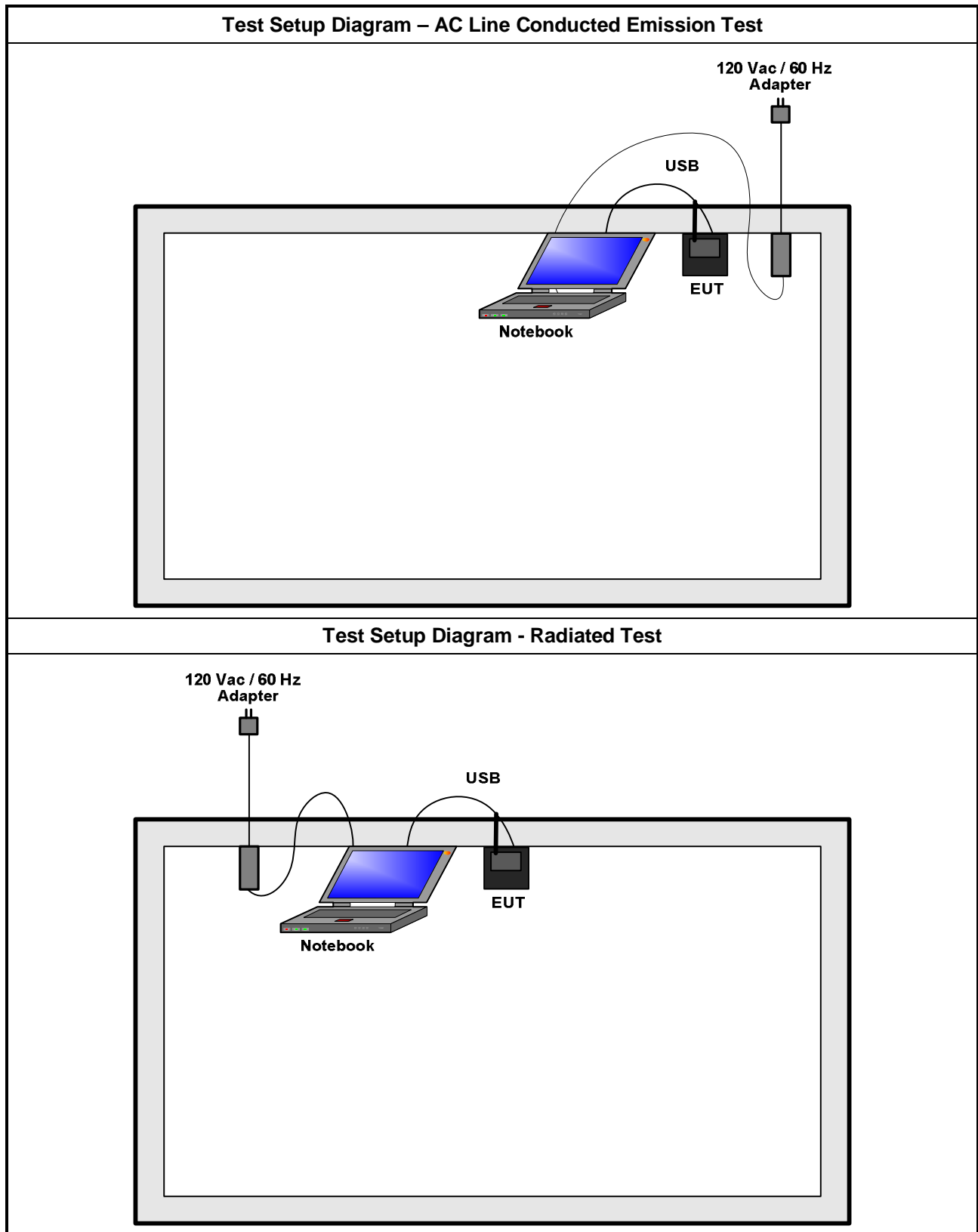
Test Channel Frequencies Configuration	
Modulation Mode	Test Channel Frequencies (kHz)
Touch Panel-Array Coil Pointing	562.5-(F1)

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Touch Panel-Array Coil Pointing

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth, Field Strength of Fundamental Emissions Spectrum Mask, Transmitter Radiated Unwanted Emissions Frequency Stability
Test Condition	Radiated measurement
User Position	<input type="checkbox"/> EUT will be placed in fixed position. <input checked="" type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.
Operating Mode <Below 30MHz>	<input checked="" type="checkbox"/> 1. Touch Panel-Array Coil Pointing
Operating Mode <Above 1GHz>	<input checked="" type="checkbox"/> 1. Touch Panel-Array Coil Pointing (3M USB cable) <input checked="" type="checkbox"/> 2. Touch Panel-Array Coil Pointing (5M USB cable) For operating mode 2 is the worst case and it was record in this test report.

2.4 Test Setup Diagram



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

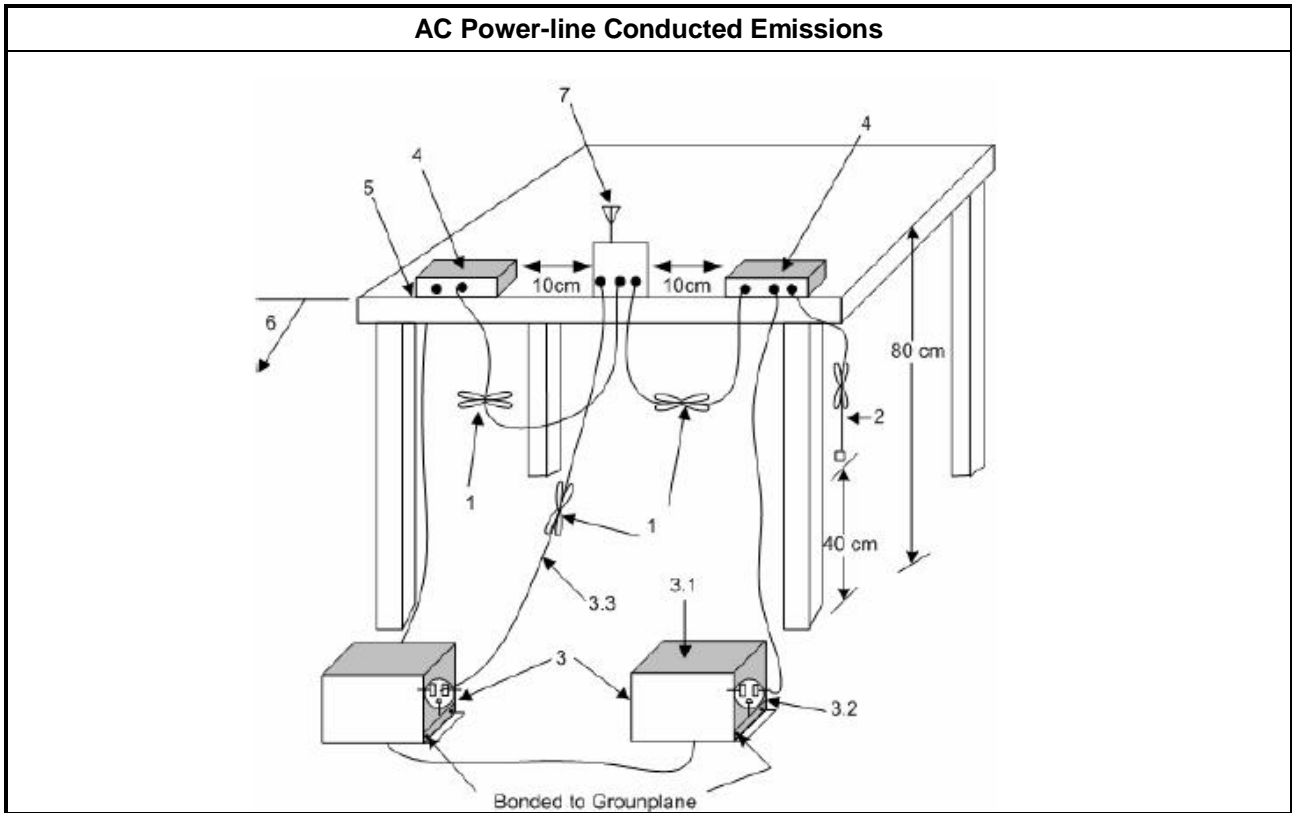
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.
<input checked="" type="checkbox"/>	If AC conducted emissions fall in operating band, then following below test method confirm final result.
<input type="checkbox"/>	Accept measurements done with a suitable dummy load replacing the antenna under the following conditions: (1) Perform the AC line conducted tests with the antenna connected to determine compliance with FCC 15.207 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load to determine compliance with FCC 15.207 limits within the transmitter's fundamental emission band.
<input checked="" type="checkbox"/>	For a device with a permanent antenna operating at or below 30 MHz, accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) Perform the AC line conducted tests with the permanent antenna to determine compliance with the FCC 15.207 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load in lieu of the permanent antenna to determine compliance with the FCC 15.207 limits within the transmitter's fundamental emission band.

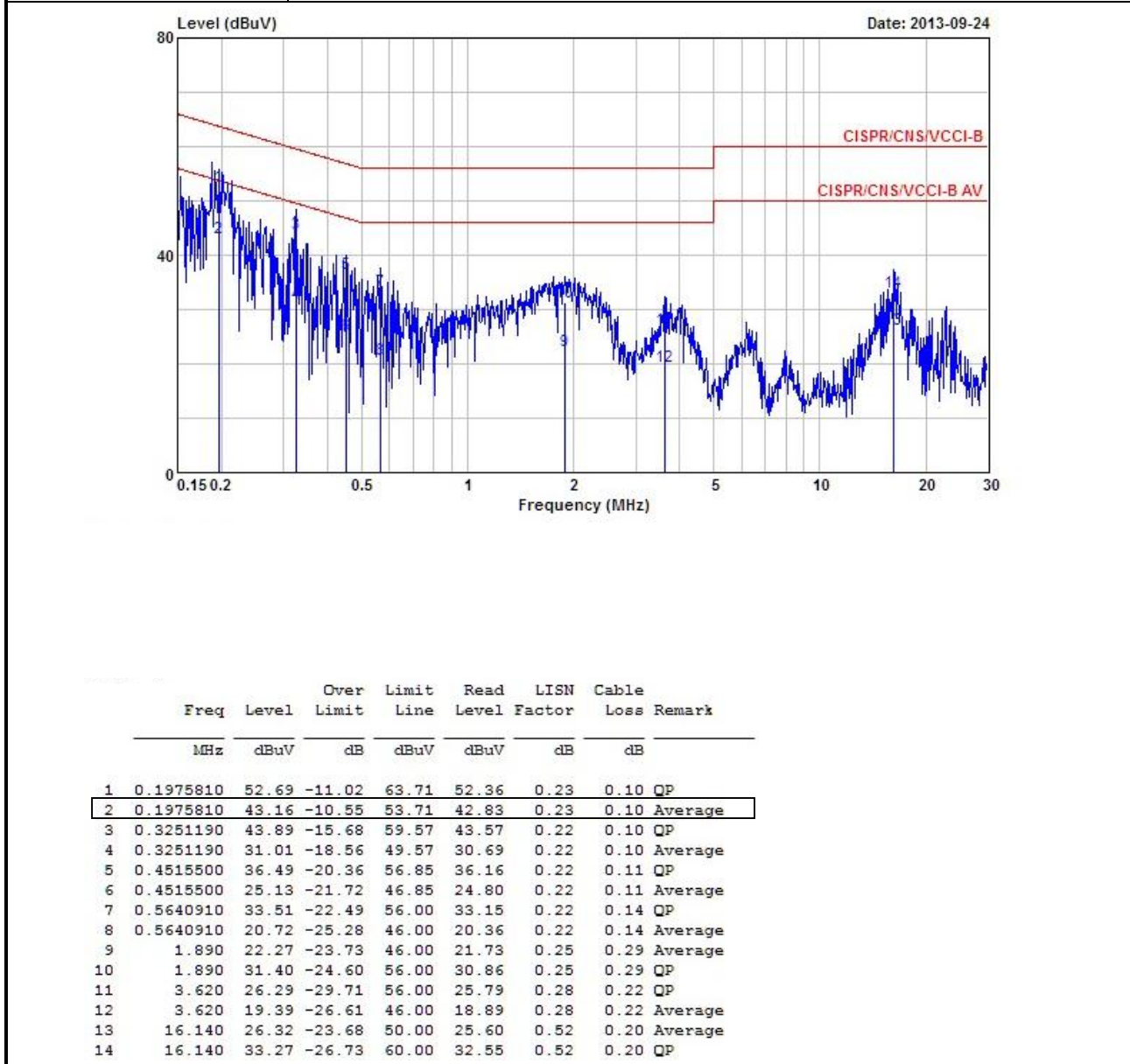
3.1.4 Test Setup





3.1.5 Test Result of AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Result			
Operating Mode	1	Power Phase	Neutral
Operating Function	Touch Panel-Array Coil Pointing		

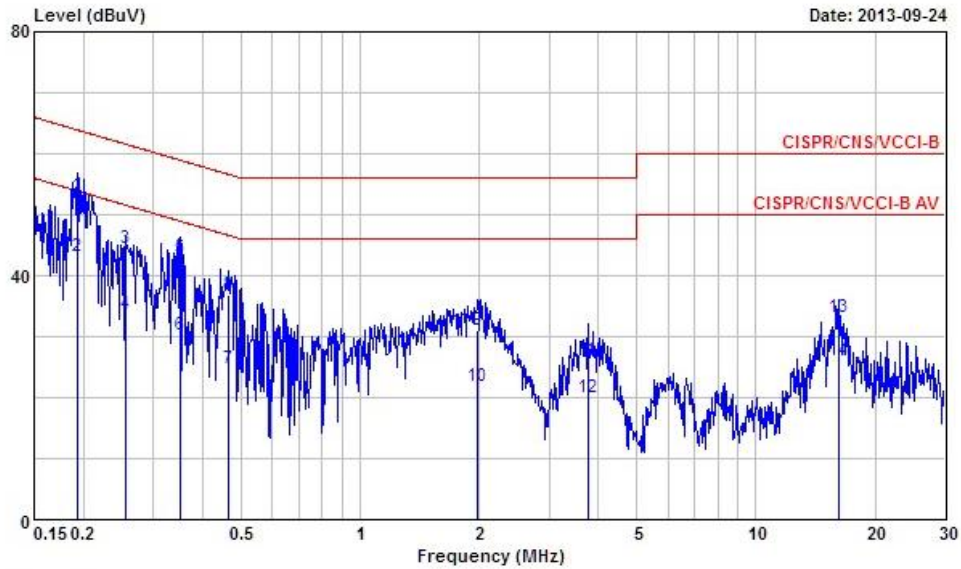


Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)
 Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Touch Panel-Array Coil Pointing		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1924150	53.17	-10.76	63.93	52.94	0.11	0.12	QP
2	0.1924150	43.25	-10.68	53.93	43.02	0.11	0.12	Average
3	0.2547970	44.54	-17.06	61.60	44.33	0.11	0.10	QP
4	0.2547970	33.58	-18.02	51.60	33.37	0.11	0.10	Average
5	0.3520120	42.84	-16.07	58.91	42.64	0.10	0.10	QP
6	0.3520120	30.38	-18.53	48.91	30.18	0.10	0.10	Average
7	0.4661350	24.62	-21.96	46.58	24.40	0.10	0.12	Average
8	0.4661350	36.81	-19.77	56.58	36.59	0.10	0.12	QP
9	1.980	31.05	-24.95	56.00	30.62	0.13	0.30	QP
10	1.980	21.88	-24.12	46.00	21.45	0.13	0.30	Average
11	3.760	26.12	-29.88	56.00	25.76	0.15	0.21	QP
12	3.760	19.97	-26.03	46.00	19.61	0.15	0.21	Average
13	16.140	33.04	-26.96	60.00	32.55	0.29	0.20	QP
14	16.140	26.03	-23.97	50.00	25.54	0.29	0.20	Average

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)
 Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

3.2 Transmitter Radiated Emissions

3.2.1 Transmitter Radiated Emissions Limit

Transmitter Radiated Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBUV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: the frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 1GHz measurements employing a CISPR quasi-peak detector.

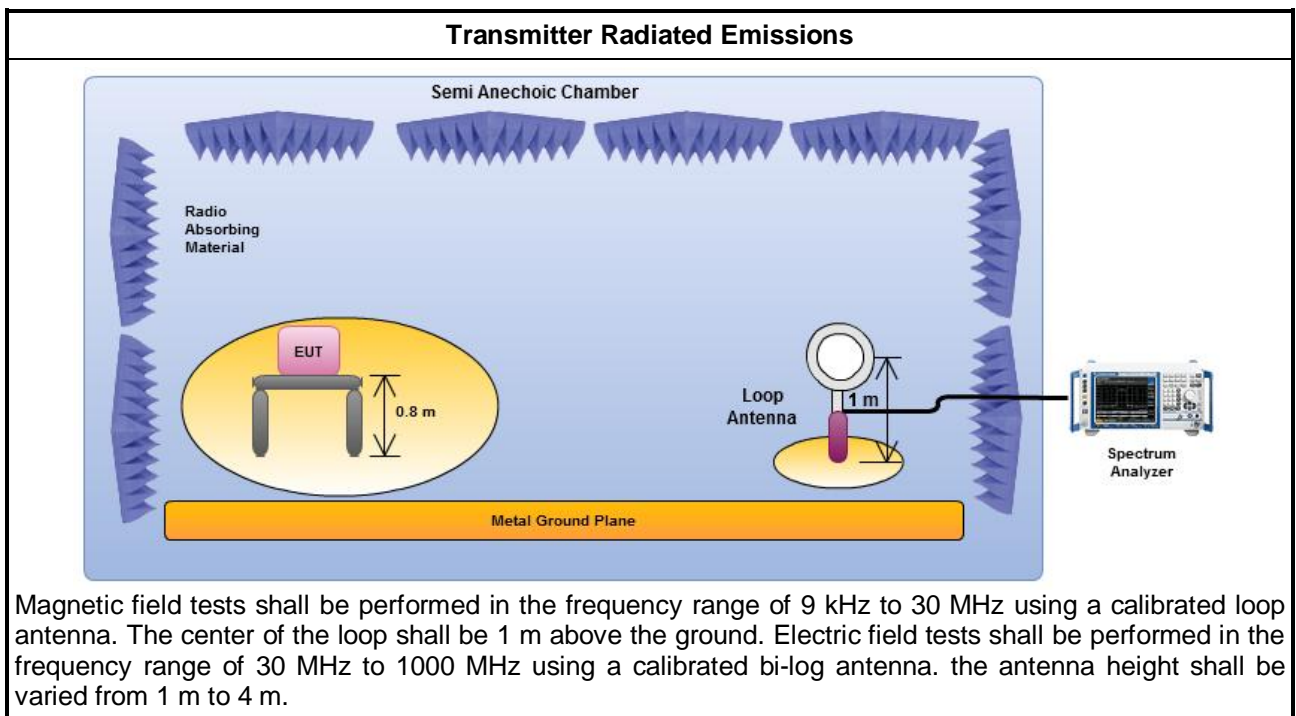
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz. The frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 30MHz measurements employing a CISPR quasi-peak detector.
<input checked="" type="checkbox"/>	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods.
<input type="checkbox"/>	The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
<input checked="" type="checkbox"/>	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
<input checked="" type="checkbox"/>	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.
<input checked="" type="checkbox"/>	The any unwanted emissions level shall not exceed the fundamental emission level.

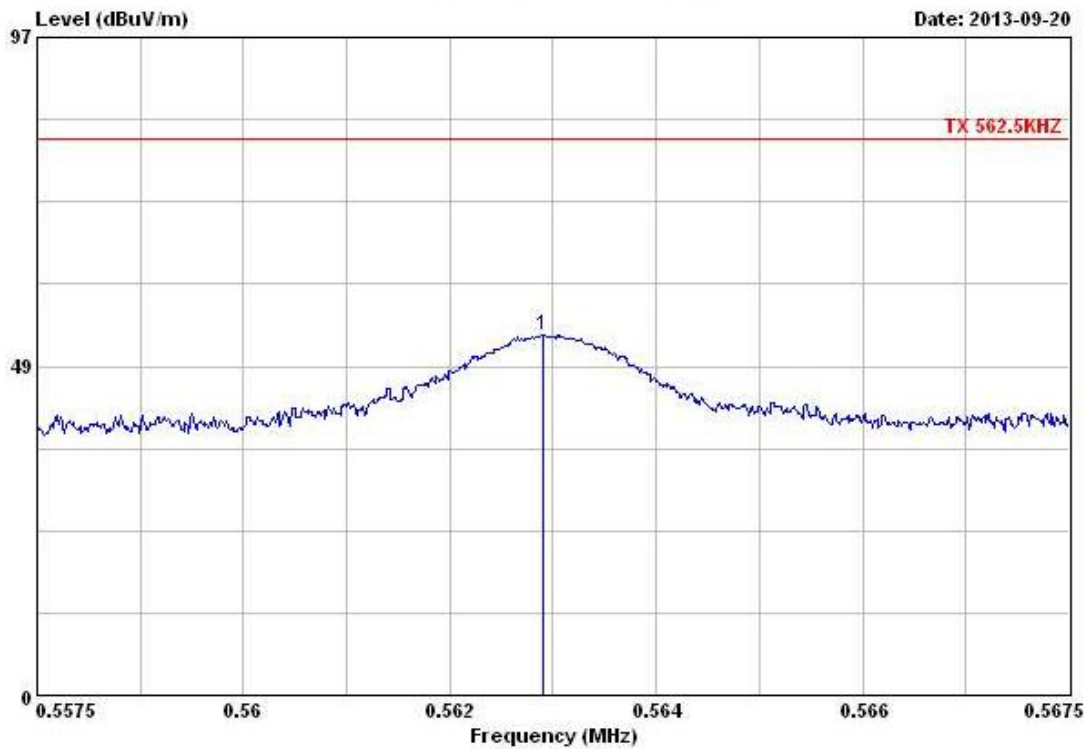
3.2.4 Test Setup





3.2.5 Transmitter Fundamental Radiated Emissions

Transmitter Fundamental Radiated Emissions			
Modulation Mode	Touch Panel-Array Coil Pointing	Polarization	V
Operating Mode	1	Operating	Touch Panel-Array Coil Pointing



Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @ 0.5624100	53.22	-28.92	82.14	33.31	20.00	-0.09	0.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).



3.2.6 Transmitter Radiated Emissions (Below 30MHz)

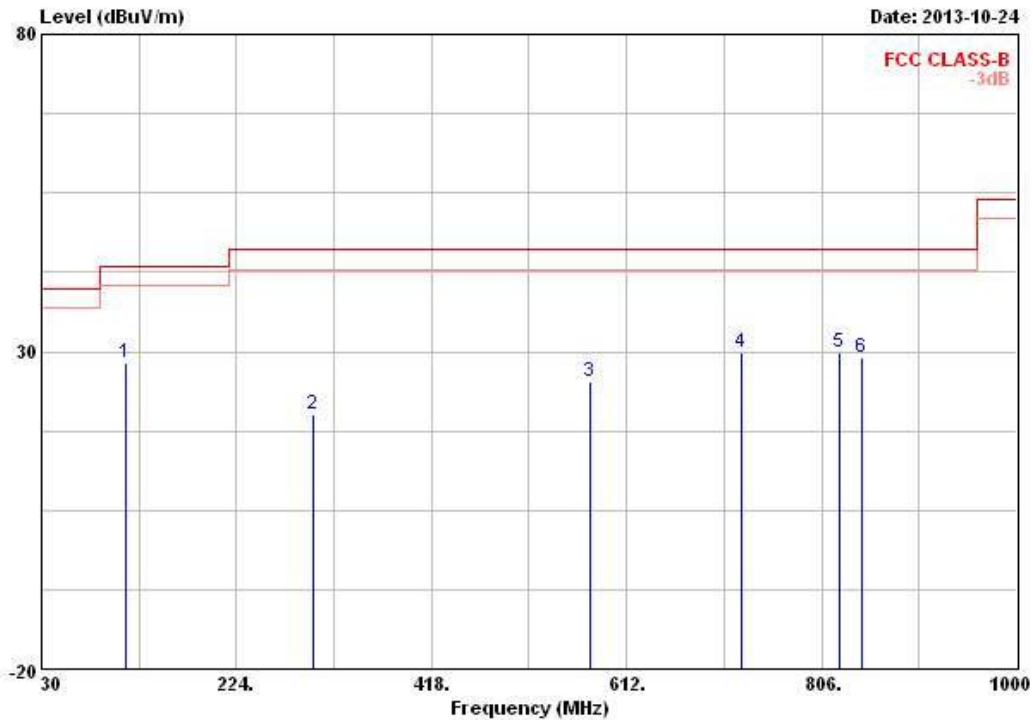
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.



3.2.7 Transmitter Radiated Emissions (Above 30MHz)

Transmitter Radiated Emissions (Above 30MHz)			
Modulation Mode	Touch Panel-Array Coil Pointing	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	V
Test Distance	3m		

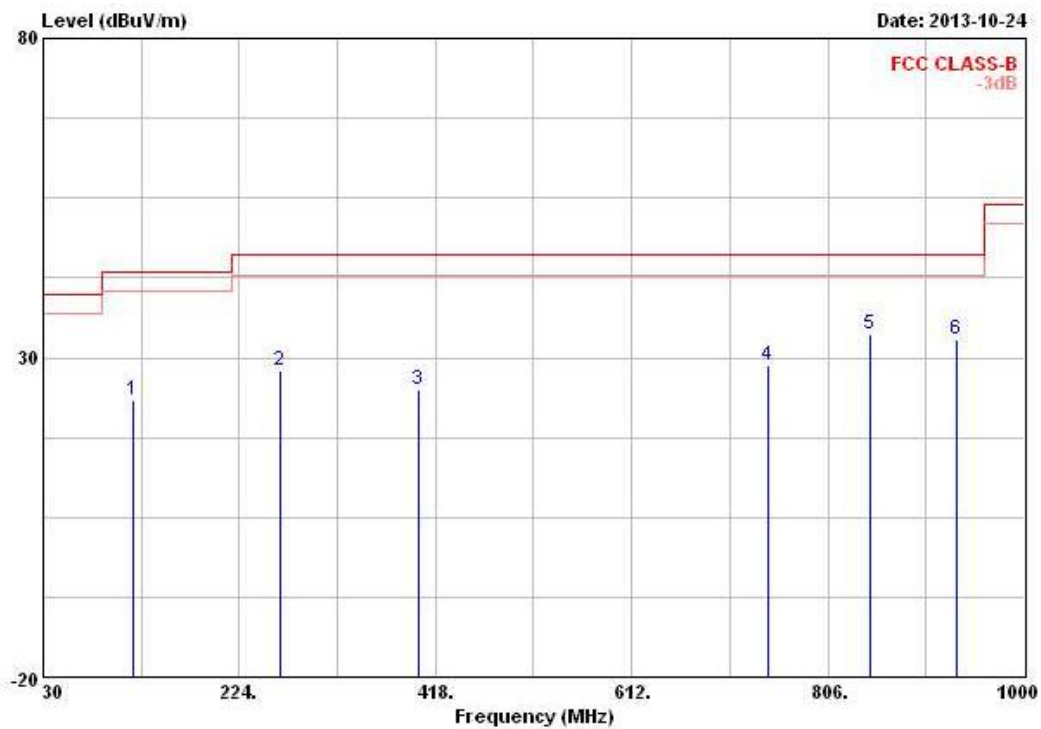


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	114.390	28.14	-15.36	43.50	41.81	12.08	1.58	27.33	Peak	---	---
2	299.660	19.99	-26.01	46.00	30.84	13.23	2.57	26.65	Peak	---	---
3	576.110	25.21	-20.79	46.00	31.35	18.20	3.62	27.96	Peak	---	---
4	726.460	29.97	-16.03	46.00	34.40	19.39	4.08	27.90	Peak	---	---
5	824.430	29.97	-16.03	46.00	33.26	20.07	4.38	27.74	Peak	---	---
6	846.740	29.03	-16.97	46.00	32.01	20.26	4.44	27.68	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



Transmitter Radiated Emissions (Above 30MHz)			
Modulation Mode	Touch Panel-Array Coil Pointing	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	H
Test Distance	3m		



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	118.270	23.40	-20.10	43.50	36.74	12.36	1.61	27.31	Peak	---	---
2	264.740	28.10	-17.90	46.00	39.07	13.41	2.39	26.77	Peak	---	---
3	400.540	25.01	-20.99	46.00	33.68	15.70	2.97	27.34	Peak	---	---
4	746.830	28.79	-17.21	46.00	32.95	19.55	4.16	27.87	Peak	---	---
5	847.710	33.64	-12.36	46.00	36.61	20.26	4.45	27.68	Peak	---	---
6	933.070	32.75	-13.25	46.00	34.75	20.74	4.72	27.46	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).
 Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 26, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Nov. 09, 2012	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Dec. 01, 2012	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May 03, 2013	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Jul. 20, 2013	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 21, 2013	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9MHz ~ 1GHz	Jan. 17, 2013	Radiation (03CH03-HY)
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation (03CH03-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	Dec. 02, 2012	Radiation (03CH03-HY)

Note: Calibration Interval of instruments listed above is one year.