



Spectrum Research & Testing Lab., Inc.
No.167, Ln. 780, Shan-Tong
Rd., Ling 8, Shan-Tong Li,
Chung-Li City, Taoyuan County
320, Taiwan (R.O.C.)

TEST REPORT

Reference No.: A11060401-03
Report No.: FCCA11060401-03
FCC ID : WQJ-IDCA-12X1
Page : 1 of 46
Date : Oct. 24, 2013

Product Name: Xpress CM200
Model No.: IDCA-2221, IDCA-2221-V1, IDCA-2261
Applicant: ID TECH.
10721 Walker Street, Cypress, CA 90630, USA
Date of Receipt: Sep. 07, 2012
Finished date of Test: Oct. 22, 2013
Applicable Standards: 47 CFR Part 15, Subpart C
47 CFR Part 15, Subpart B
ANSI C63.4: 2003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

This report variation to original Report No. : FCCA11060401 issued on Jul. 29, 2011 differs in class II change support unit (IDCA-1261, IDCA-1221, FCC ID is WQJ-IDCA-12X1).

Tested By : Richard Lin , Date: 10/24/2013
(Richard Lin)

Approved By : JH , Date: 10/24/2013
(Johnson Ho, Director)



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Revisions History

Report No.	Issue Date	Revisions
FCCA11060401-03	Oct. 24, 2013	Initial issue
FCCA11060401-03	Nov. 04, 2013	P27, 33~38 Receiver Detector change



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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source from PC : 5Vdc/0.35A (from USB port) or RS232 external power adapter which has Input: AC 100V ~ 240V, 50/60Hz, 0.2A Output: DC +5V, 1A

1.3 EUT MODIFICATION

- No modification in SRT Lab.



2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

RS232-1 :

PRODUCT	Xpress CM200
MODEL NO.	IDCA-2221
POWER SUPPLY	DC power source from RS232 external power adapter : DC +5V, 1A
CABLE	NA
FREQUENCY BAND	13.553MHz ~ 13.567MHz
CARRIER FREQUENCY	13.56MHz
NUMBER OF CHANNEL	1
MODULATION TYPE	ASK
ANTENNA TYPE	PCB Printed
ANTENNA GAIN	3 dBi
OPERATING TEMPERATURE RANGE	-20 ~ 50°C

RS232-2 (series product) :

PRODUCT	Xpress CM200
MODEL NO.	IDCA-2221-V1
POWER SUPPLY	DC power source from RS232 external power adapter : DC +5V, 1A
CABLE	NA
FREQUENCY BAND	13.553MHz ~ 13.567MHz
CARRIER FREQUENCY	13.56MHz
NUMBER OF CHANNEL	1
MODULATION TYPE	ASK
ANTENNA TYPE	PCB Printed
ANTENNA GAIN	3 dBi
OPERATING TEMPERATURE RANGE	-20 ~ 50°C



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USB (series product) :

PRODUCT	Xpress CM200
MODEL NO.	IDCA-2261
POWER SUPPLY	DC power source from PC : 5Vdc/0.35A
CABLE	NA
FREQUENCY BAND	13.553MHz ~ 13.567MHz
CARRIER FREQUENCY	13.56MHz
NUMBER OF CHANNEL	1
MODULATION TYPE	ASK
ANTENNA TYPE	PCB Printed
ANTENNA GAIN	3 dBi
OPERATING TEMPERATURE RANGE	-20 ~ 50°C

NOTE : For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID / DOC	REMARK
Adapter	DVE	DSC-6PFA-05	DOC	External power adapter, output 5V for RS232 model IDCA-1221 used.

2.3 DESCRIPTION OF TEST MODE

Mode		MODEL	
1	TX	RS232-1	IDCA-2221
2		RS232-2	IDCA-2221-V1
3		USB	IDCA-2261
4		Standby-1	IDCA-2221
5		Standby-2	IDCA-2221-V1
6		Standby-3	IDCA-2261

NOTE : The axis X, Y and Z we evaluate in chamber, the X axis is worst case.

X axis:

Y axis:

Z axis:





2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:2003. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	PC	ACER	Aspire SA85	DoC	1.5m unshielded power cable
2	CRT Monitor	SAMSUNG	PG17IS	DoC	1.8m unshielded power cord 1.5m shielded data cable. with one core.
3	Keyboard	WinTEK	WM530	DoC	1.8m unshielded data cable.
4	Mouse	WinTEK	WSS30	DoC	1.5m unshielded data cable.
5	Modem	ACEEX	DM-1414	DoC	1.5m unshielded power cord 1.5m shielded data cable.
6	Printer	EPSON	STYLUS C20SX	N/A	1.5m unshielded power cord 1.2m shielded data cable.
7	VISA MSD TEST CARD	VIVO	510-1017-00	N/A	N/A

NOTE : For the actual test configuration, please refer to the photos of testing.

2.5 EUT OPERATING CONDITION

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. Set the EUT under continuous transmission condition or standby.
4. The EUT was set to the highest available power level.



2.6 DESCRIPTION OF MODEL DIFFERENCE

Project	Model	IDCA-1261	IDCA-1221
RF Module		○	○
Lay out		○	○
Antenna		○	○
I/O Port		○	○
Software		○	○
Power supply		× USB DC +5V	× External power adapter : DC +5V for RS232 model used
Main Board		○	○
Packing		○	○
Color		○	○

NOTE : ○ is same , × is different



TEST REPORT

The new model IDCA-2261, IDCA-2221, IDCA-2221-V1 was FCCID : WQJ-IDCA-12X1 Class II change application model.

Project	Model	IDCA-1261 (Original)	IDCA-2261 (Class II)
RF Module		○	○
Lay out		○	○
Antenna		○	○
I/O Port		○	○
Software		○	○
Power supply		○	○
Main Board		×	× (Add circuit of credit card machine)
Shell		×	×
Color		○	○

Project	Model	IDCA-1221 (Original)	IDCA-2221 (Class II)	IDCA-2221-V1 (Class II)
RF Module		○	○	○
Lay out		○	○	○
Antenna		○	○	○
I/O Port		○	○	○
Software		○	○	○
Power supply		○	○	○
Main Board		×	× (Add circuit of credit card machine)	× (Add circuit of credit card machine)
Shell		×	×	×
Color		○	○	○

NOTE : ○ is same , × is different

The new model shell was different from the Original model (IDCA-1261, IDCA-1221).

IDCA-2261 and IDCA-1261 Power supply was the same.

IDCA-2221 and IDCA-2221-V1 and IDCA-1221 Power supply was the same.



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3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

47 CFR Part 15, Subpart B

ANSI C63.4: 2003

All tests have been performed and recorded as the above standards.

3.1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT RESULTS	RESULTS
15.207	AC Power Conducted Emission	Pass
15.225(a)(b)(c)(d)	Radiated Emission (9kHz ~ 30MHz)	Pass
15.225(d), 15.209	Radiated Emission (30MHz ~ 1GHz)	Pass
15.225(e)	Frequency stability	Pass



4. FREQUENCY TOLERANCE

4.1 PROCEDURE

The frequency stability of the transmitter is measured by:

- (a) Temperature: The temperature is varied from -20°C to +50°C using an environmental chamber.
- (b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally input to the device or at the power supply terminals if cables are not normally supplied.

The frequency tolerance of the carrier shall be maintained within $\pm 0.01\%$ of the operating frequency.

4.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
TEMPERATURE & HUMIDITY CHAMBER	-40 to 150°C 20 to 95%	KSON	THS-D4C-180-LN2 3324	OCT. 2012 ETC
POWER SENSOR	DC-18GHz 0.3 μ W-100mW 50 Ω	BOOTON	51011-EMC/ 31184	NOV. 2012 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 12, 2014 ETC

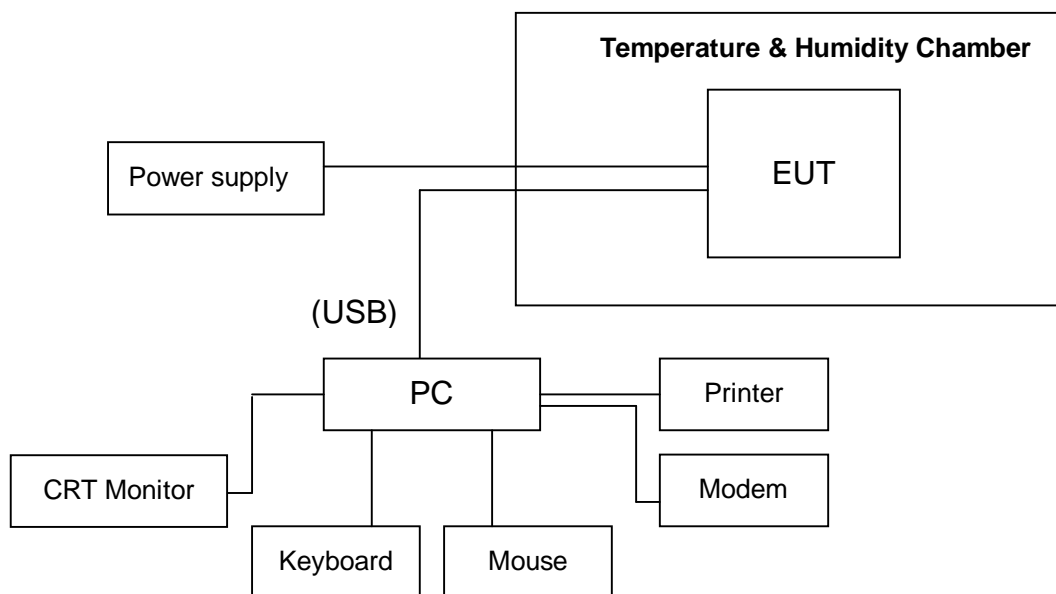
NOTE : The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



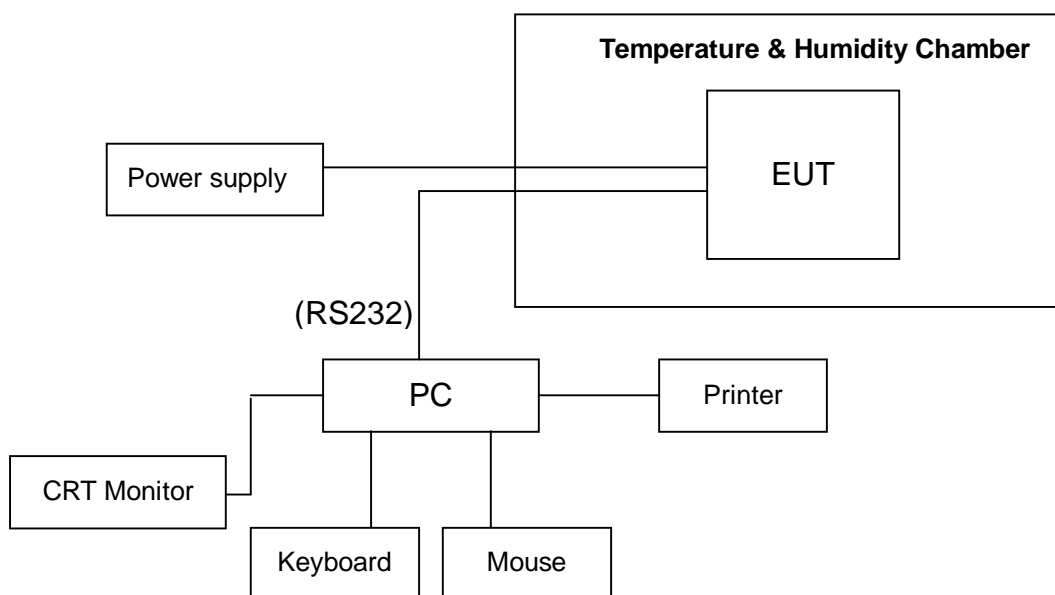
4.3 TEST SETUP

The tested unit was stayed in a Temperature & Humidity chamber and supplied with a power source for extreme condition (see configure below). It was adjusted to the maximum output power during the test.

USB (IDCA-2261) :



RS232 (IDCA-2221, IDCA-2221-V1) :





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4.4 TEST RESULT

Operating Frequency : 13.56 MHz

Reference Voltage : 5Vdc

Deviation Limit : ±0.01%

Temperature:	<u>23°C</u>	Humidity:	<u>57 %RH</u>
Test Mode:	<u>RS232-1</u>	Tested By:	<u>Richard Lin</u>
Test result:	<u>Pass</u>	Tested Date:	<u>Oct. 22, 2013</u>

Voltage (%)	Power (VDC)	Temperature (°C)	Frequency (MHz)	Deviation (%)
100	5	+20°C (Ref)	13.55992	0.00059
100		-20	13.55988	0.00088
100		-10	13.56008	-0.00059
100		0	13.55992	0.00059
100		10	13.56004	-0.00029
100		25	13.55988	0.00088
100		30	13.55996	0.00029
100		40	13.56008	-0.00059
100		50	13.56004	-0.00029
85		4.25	20	13.55988
115	5.75	20	13.55992	0.00059



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Temperature: 23°C Humidity: 57 %RH
 Test Mode: RS232-2 Tested By: Richard Lin
 Test result: Pass Tested Date: Oct. 22, 2013

Voltage (%)	Power (VDC)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	5	+20°C (Ref)	13.55980	0.00147
100		-20	13.55988	0.00088
100		-10	13.55984	0.00118
100		0	13.55996	0.00029
100		10	13.55984	0.00118
100		25	13.56004	-0.00029
100		30	13.56008	-0.00059
100		40	13.55996	0.00029
100		50	13.55988	0.00088
85		4.25	20	13.55984
115	5.75	20	13.55992	0.00059

Temperature: 23°C Humidity: 57 %RH
 Test Mode: USB Tested By: Richard Lin
 Test result: Pass Tested Date: Oct. 22, 2013

Voltage (%)	Power (VDC)	Temperature (°C)	Frequency (Hz)	Deviation (%)
100	5	+20°C (Ref)	13.55984	0.00118
100		-20	13.55984	0.00118
100		-10	13.56004	-0.00029
100		0	13.55996	0.00029
100		10	13.55996	0.00029
100		25	13.55996	0.00029
100		30	13.55988	0.00088
100		40	13.55992	0.00059
100		50	13.55996	0.00029
85		4.25	20	13.55984
115	5.75	20	13.55988	0.00088



5. TECHNICAL CHARACTERISTICS TEST

5.1 CONDUCTED EMISSION TEST

5.1.1 LIMIT

Frequency (MHz)	Class A (dB μ V)		Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE :

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

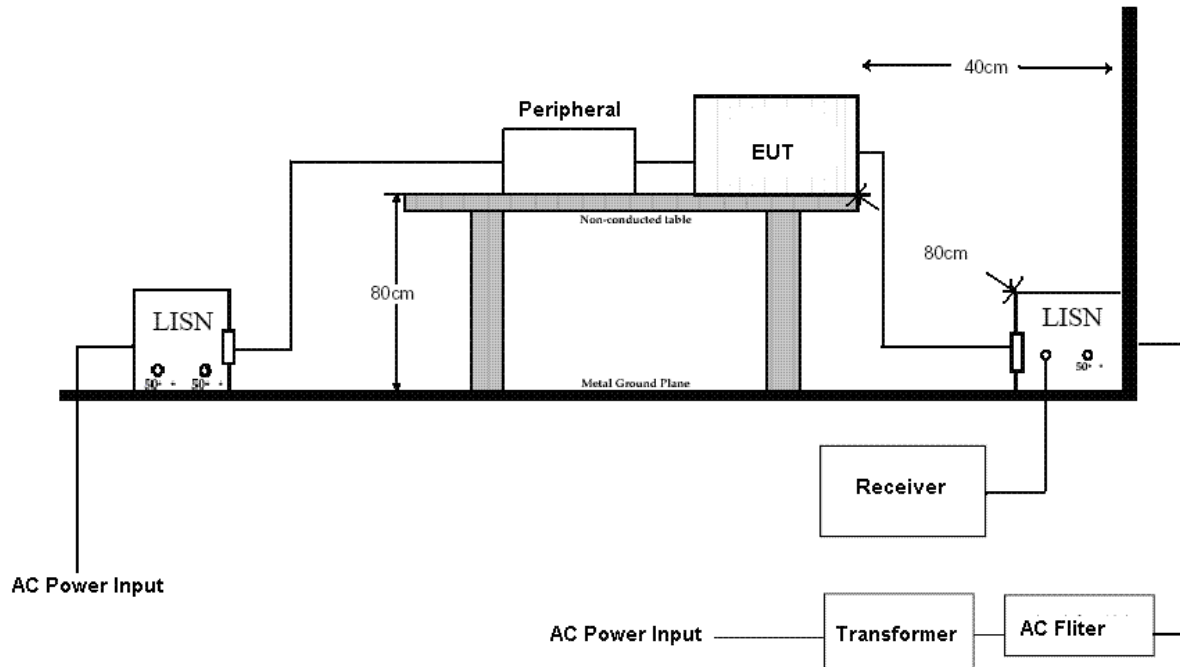
5.1.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	DEC. 16, 2013 ETC
EMI TEST RECEIVER	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	JAN. 22, 2014 ETC
LISN	50 μ H, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	JUN. 16, 2014 ETC
LISN	50 μ H, 50 ohm	SOLAR	9252-50-R-24-BNC/ 951315	OCT. 21, 2013 ETC
LISN	50 μ H, 50 ohm	EMCO	3825/2/ 9204-1952	MAY 30, 2014 ETC
50 Ω BNC TYPE TERMINATOR	50 ohm	N/A	11593A/ L1TEQU005	DEC. 24, 2013 ETC
50 Ω BNC TYPE TERMINATOR	50 ohm	N/A	B00-CD-357/ L1TEQU009	JUN. 17, 2014 ETC
COAXIAL CABLE	5 m	HUBER+SUHNER	RG214/U / #5M(L1TCAB013)	MAY. 21, 2014 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2 m (H) x 3 m (W)	SRT	N/A	NCR
GROUND PLANE	2.5 m (H) x 3 m (W)	SRT	N/A	NCR
PULSE LIMITER	9 kHz ~ 30 MHz Insertion Loss= 10dB \pm 0.3dB	ROHDE & SCHWARZ	ESH3Z2/ L1TTES010	JAN. 07, 2014 ETC

NOTE : The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

5.1.3 TEST SETUP



NOTE :

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.
3. With a 50ohm resistor to replace the antenna on the EUT.

5.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50μH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.



5.1.5 TEST RESULT

Temperature:	24 °C	Humidity:	64 %RH
Tested By:	Richard Lin	Tested Mode:	RS232-1
Receiver Detector:	Q.P. and AV.	Modulation Type:	ASK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Oct. 18, 2013

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.396	-0.01	41.91	32.64	41.90	32.63	57.94	47.94	-16.04	-15.31
0.399	-0.01	42.86	33.65	42.85	33.64	57.88	47.88	-15.03	-14.24
0.630	-0.05	40.40	33.19	40.35	33.14	56.00	46.00	-15.65	-12.86
1.923	-0.02	36.19	27.55	36.17	27.53	56.00	46.00	-19.83	-18.47
1.972	-0.02	36.56	28.17	36.54	28.15	56.00	46.00	-19.46	-17.85
24.071	0.40	41.08	37.70	41.48	38.10	60.00	50.00	-18.52	-11.90

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.390	0.02	40.56	30.60	40.58	30.62	58.07	48.07	-17.49	-17.45
0.399	0.02	42.19	33.49	42.21	33.51	57.88	47.88	-15.67	-14.37
0.634	-0.01	41.81	34.38	41.80	34.37	56.00	46.00	-14.20	-11.63
1.962	0.01	36.82	28.79	36.83	28.80	56.00	46.00	-19.17	-17.20
13.556	0.26	39.17	36.40	39.43	36.66	60.00	50.00	-20.57	-13.34
24.071	0.49	41.08	37.78	41.57	38.27	60.00	50.00	-18.43	-11.73

NOTE :

1. Measurement uncertainty is 3.61dB
2. Emission level = Reading value + Correction factor
3. Correct. Factor = Cable loss + Insertion loss of LISN + difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



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Temperature:	24 °C	Humidity:	64 %RH
Tested By:	Richard Lin	Tested Mode:	Standby-1
Receiver Detector:	Q.P. and AV.	Modulation Type:	ASK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Oct. 18, 2013

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.432	-0.05	39.45	33.78	39.40	33.73	57.22	47.22	-17.82	-13.49
0.462	-0.05	38.08	31.39	38.03	31.34	56.66	46.66	-18.63	-15.32
0.634	-0.05	40.88	33.90	40.83	33.85	56.00	46.00	-15.17	-12.15
1.457	-0.03	36.05	24.59	36.02	24.56	56.00	46.00	-19.98	-21.44
1.923	-0.02	36.07	27.64	36.05	27.62	56.00	46.00	-19.95	-18.38
24.071	0.40	38.08	34.40	38.48	34.80	60.00	50.00	-21.52	-15.20

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.432	-0.01	39.03	33.06	39.02	33.05	57.22	47.22	-18.20	-14.17
0.465	-0.01	37.37	28.35	37.36	28.34	56.61	46.61	-19.25	-18.27
0.634	-0.01	41.24	34.03	41.23	34.02	56.00	46.00	-14.77	-11.98
1.913	0.01	35.87	27.04	35.88	27.05	56.00	46.00	-20.12	-18.95
1.972	0.01	36.84	28.59	36.85	28.60	56.00	46.00	-19.15	-17.40
24.071	0.49	38.18	34.62	38.67	35.11	60.00	50.00	-21.33	-14.89

NOTE :

1. Measurement uncertainty is 3.61dB
2. Emission level = Reading value + Correction factor
3. Correct. Factor = Cable loss + Insertion loss of LISN + difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



TEST REPORT

Temperature:	24 °C	Humidity:	64 %RH
Tested By:	Richard Lin	Tested Mode:	RS232-2
Receiver Detector:	Q.P. and AV.	Modulation Type:	ASK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Oct. 18, 2013

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.396	-0.01	42.94	34.89	42.93	34.88	57.94	47.94	-15.01	-13.06
0.399	-0.01	42.98	34.40	42.97	34.39	57.88	47.88	-14.91	-13.49
0.634	-0.05	40.66	33.17	40.61	33.12	56.00	46.00	-15.39	-12.88
1.428	-0.03	36.05	24.92	36.02	24.89	56.00	46.00	-19.98	-21.11
11.811	0.18	38.59	34.21	38.77	34.39	60.00	50.00	-21.23	-15.61
11.821	0.18	39.32	30.99	39.50	31.17	60.00	50.00	-20.50	-18.83

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.396	0.02	42.75	34.24	42.77	34.26	57.94	47.94	-15.17	-13.68
0.399	0.02	42.96	34.57	42.98	34.59	57.88	47.88	-14.90	-13.29
0.634	-0.01	40.84	33.13	40.83	33.12	56.00	46.00	-15.17	-12.88
1.230	-0.01	34.40	23.20	34.39	23.19	56.00	46.00	-21.61	-22.81
1.269	-0.01	34.66	26.92	34.65	26.91	56.00	46.00	-21.35	-19.09
11.811	0.23	38.69	32.95	38.92	33.18	60.00	50.00	-21.08	-16.82

NOTE :

1. Measurement uncertainty is 3.61dB
2. Emission level = Reading value + Correction factor
3. Correct. Factor = Cable loss + Insertion loss of LISN + difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



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TEST REPORT

Reference No.: A11060401-03
 Report No.: FCCA11060401-03
 FCC ID : WQJ-IDCA-12X1
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 Date : Oct. 24, 2013

Temperature:	24 °C	Humidity:	64 %RH
Tested By:	Richard Lin	Tested Mode:	Standby-2
Receiver Detector:	Q.P. and AV.	Modulation Type:	ASK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Oct. 18, 2013

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.345	-0.01	42.24	36.81	42.23	36.80	59.09	49.09	-16.86	-12.29
0.348	-0.01	43.17	36.50	43.16	36.49	59.01	49.01	-15.85	-12.52
0.634	-0.05	40.90	34.11	40.85	34.06	56.00	46.00	-15.15	-11.94
1.903	-0.02	41.60	23.97	41.58	23.95	56.00	46.00	-14.42	-22.05
11.811	0.18	42.66	33.73	42.84	33.91	60.00	50.00	-17.16	-16.09
24.071	0.40	38.90	35.09	39.30	35.49	60.00	50.00	-20.70	-14.51

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.348	0.02	42.60	34.83	42.62	34.85	59.01	49.01	-16.39	-14.16
0.429	-0.01	37.59	31.03	37.58	31.02	57.28	47.28	-19.70	-16.26
0.634	-0.01	41.34	34.24	41.33	34.23	56.00	46.00	-14.67	-11.77
1.398	0.00	33.25	21.95	33.25	21.95	56.00	46.00	-22.75	-24.05
1.962	0.01	35.12	26.35	35.13	26.36	56.00	46.00	-20.87	-19.64
24.071	0.49	38.99	35.22	39.48	35.71	60.00	50.00	-20.52	-14.29

NOTE :

1. Measurement uncertainty is 3.61dB
2. Emission level = Reading value + Correction factor
3. Correct. Factor = Cable loss + Insertion loss of LISN + difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



TEST REPORT

Temperature:	24 °C	Humidity:	64 %RH
Tested By:	Richard Lin	Tested Mode:	USB
Receiver Detector:	Q.P. and AV.	Modulation Type:	ASK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Oct. 18, 2013

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.153	0.12	45.69	43.11	45.81	43.23	65.84	55.84	-20.03	-12.61
0.456	-0.05	33.32	30.64	33.27	30.59	56.77	46.77	-23.50	-16.18
0.534	-0.05	33.74	32.41	33.69	32.36	56.00	46.00	-22.31	-13.64
4.507	0.02	30.09	26.58	30.11	26.60	56.00	46.00	-25.89	-19.40
13.556	0.21	47.75	47.07	47.96	47.28	60.00	50.00	-12.04	-2.72
17.255	0.27	37.21	29.22	37.48	29.49	60.00	50.00	-22.52	-20.51

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.12	38.33	35.31	38.45	35.43	66.00	56.00	-27.55	-20.57
0.153	0.12	39.76	37.87	39.88	37.99	65.84	55.84	-25.96	-17.85
3.200	0.03	30.32	28.33	30.35	28.36	56.00	46.00	-25.65	-17.64
3.239	0.03	28.24	23.69	28.27	23.72	56.00	46.00	-27.73	-22.28
13.556	0.26	45.17	44.52	45.43	44.78	60.00	50.00	-14.57	-5.22
17.153	0.34	31.63	23.80	31.97	24.14	60.00	50.00	-28.03	-25.86

NOTE :

1. Measurement uncertainty is 3.61dB
2. Emission level = Reading value + Correction factor
3. Correct. Factor = Cable loss + Insertion loss of LISN + difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



TEST REPORT

Temperature:	24 °C	Humidity:	64 %RH
Tested By:	Richard Lin	Tested Mode:	Standby-3
Receiver Detector:	Q.P. and AV.	Modulation Type:	ASK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Oct. 18, 2013

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.12	47.76	45.12	47.88	45.24	66.00	56.00	-18.12	-10.76
0.153	0.12	49.28	46.68	49.40	46.80	65.84	55.84	-16.44	-9.04
0.534	-0.05	36.10	32.23	36.05	32.18	56.00	46.00	-19.95	-13.82
3.279	0.00	34.25	29.89	34.25	29.89	56.00	46.00	-21.75	-16.11
11.811	0.18	37.48	34.41	37.66	34.59	60.00	50.00	-22.34	-15.41
13.790	0.21	36.87	35.34	37.08	35.55	60.00	50.00	-22.92	-14.45

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBmV)		Emission Level (dBmV)		Limit (dBmV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.12	47.96	45.39	48.08	45.51	66.00	56.00	-17.92	-10.49
0.153	0.12	49.56	46.88	49.68	47.00	65.84	55.84	-16.16	-8.84
0.534	-0.01	36.49	32.24	36.48	32.23	56.00	46.00	-19.52	-13.77
3.279	0.03	33.74	29.81	33.77	29.84	56.00	46.00	-22.23	-16.16
3.309	0.03	31.59	27.89	31.62	27.92	56.00	46.00	-24.38	-18.08
18.331	0.36	36.74	28.46	37.10	28.82	60.00	50.00	-22.90	-21.18

NOTE :

1. Measurement uncertainty is 3.61dB
2. Emission level = Reading value + Correction factor
3. Correct. Factor = Cable loss + Insertion loss of LISN + difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



5.2 RADIATED EMISSION TEST

5.2.1 LIMIT

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength @30m (uV/m)	Field strength @30m (dBuV/m)	Field strength @3m (dBuV/m)
Below 13.110	30	29.5	69.5
13.110 ~13.410	106	40.5	80.5
13.410~13.553	334	50.5	90.5
13.553~13.567	15,848	84	124
13.567~13.710	334	50.5	90.5
13.710~14.010	106	40.5	80.5
Above 14.010	30	29.5	69.5

NOTE :

1. BuV/m=20*log(uV/m)
2. Distance factor=40dB / decade(15.31(f))

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	FIELD STRENGTH (microvolts/meter)	DISTANCE (m)	FIELD STRENGTH (dBμV/m)
0.009 - 0.490	2400/F(kHz)	300	67.6-20log(kHz)
0.490 - 1.705	24000/F(kHz)	30	87.6-20log(kHz)
1.705 - 30	30	30	30
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
Above 960	500	3	54.0

NOTE:

1. 30 dBuV (in 30m) = 70 dBuV (in 3m).
2. Transmitters that require Crystal Controlled Oscillators with values below 30 MHz requires the Test Report to show "Spurious Radiated Emissions" results below 30 MHz per FCC Part 15.33(a).



5.2.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

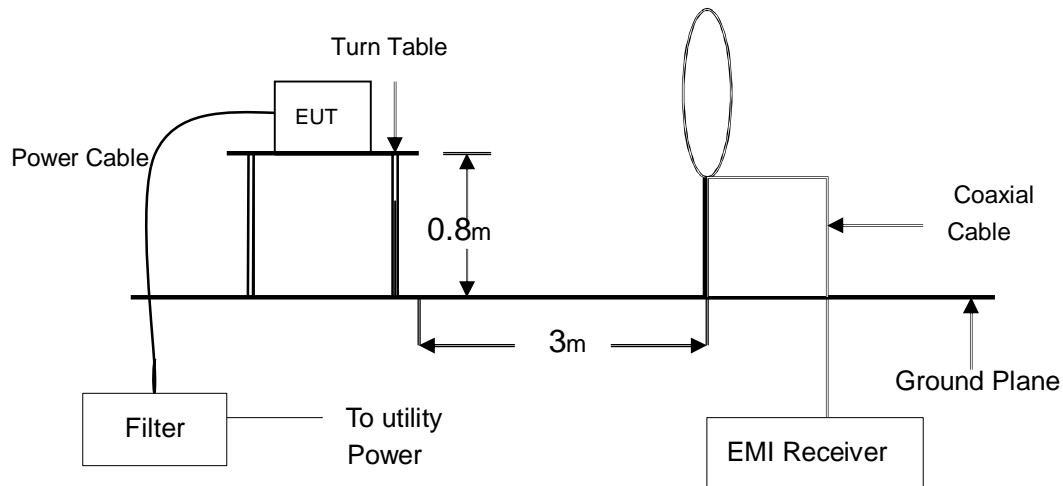
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	DEC. 16, 2013 ETC
EMI TEST RECEIVER	20 MHz ~ 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 02, 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 12, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC 12, 2013 ETC
LOOP ANTENNA	9 kHz ~ 30 MHz	ETS.LINDGREN	HFH2-Z2/ 860605/002 (1162 1/2)	MAR. 06, 2014 ETC
BI-LOG ANTENNA	30 MHz ~ 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN. 25, 2014 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 21, 2013 ETC
HORN ANTENNA	18 ~ 40 GHZ	ETS-LINDGREN	3116 /00032255	JAN. 07, 2014 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 18, 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2014 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY 13, 2014 SRT
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 19, 2013 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 19, 2013 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK 252 /MY2611/2	MAR. 07, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF 102-40/2*11 /23934/2	OCT. 24, 2013 ETC
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M(L1TCAB014)	MAY. 21, 2014 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 869	NCR
CDN	0.15 MHz ~ 300 MHz	LUTHI	CDN L-801 M2/M3 / 2790	MAY. 24, 2014 ETC

NOTE : The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

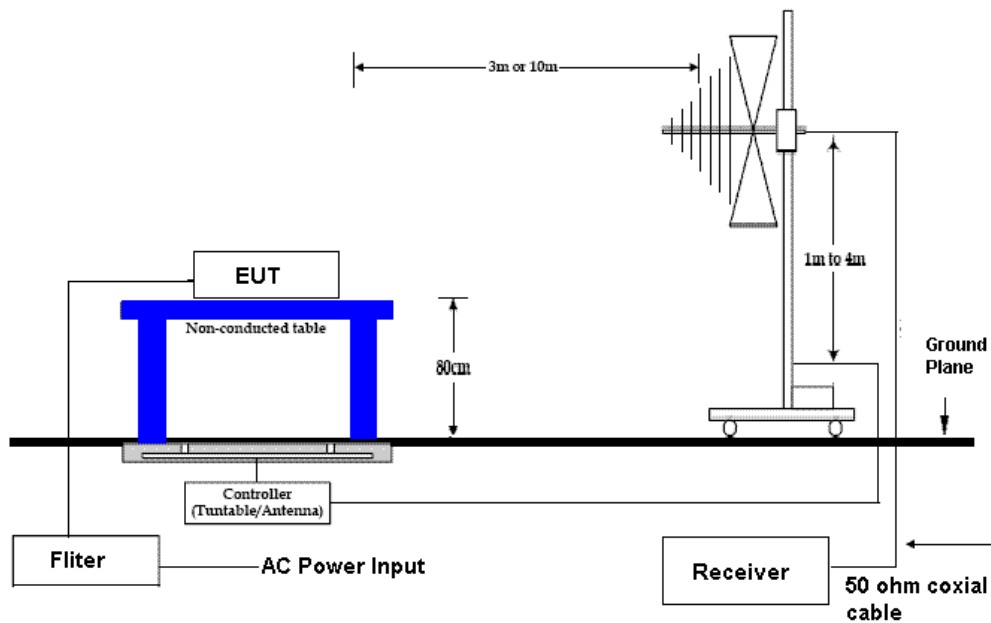


5.2.3 TEST SET-UP

9KHz ~ 30MHz



Below 1GHz



NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.



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Chung-Li City, Taoyuan County
320, Taiwan (R.O.C.)

TEST REPORT

Reference No.: A11060401-03
Report No.: FCCA11060401-03
FCC ID : WQJ-IDCA-12X1
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5.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR 22:2003.

When the frequency spectrum measured started from 9 KHz to 30 MHz, then use antenna is a loop antenna.

Under 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver.

The EUT system was operated in all typical methods by users.

The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data.

The procedure is referred on the test procedure of SRT LAB.



5.2.5 TEST RESULT

Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	9K – 30MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	RS232-1
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2013

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
13.56 (F)	0.64	20.68	42.37	63.69	124.00	-60.31
3.91	0.35	20.25	30.59	51.18	70.00	-18.82
4.39	0.37	20.27	27.25	47.89	70.00	-22.11
5.48	0.42	20.32	25.52	46.25	70.00	-23.75
19.05	0.75	20.95	19.22	40.92	70.00	-29.08
19.81	0.77	20.99	19.13	40.88	70.00	-29.12
27.55	0.89	21.38	19.74	42.01	70.00	-27.99

NOTE :

1. Below 30Mhz was applied Average Detector.
2. There was no detected Restricted bands and Radiated suprious emission below 30MHz.
3. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;
 $3\text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(15848) + 40\log(30/3) = 124\text{dBuV}$

**Spectrum Research & Testing Lab., Inc.**

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Date : Oct. 24, 2013

Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	9K – 30MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Standby-1
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2013

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2.80	0.29	20.20	31.32	51.81	70.00	-18.19
3.13	0.31	20.21	31.65	52.16	70.00	-17.84
4.64	0.38	20.28	27.57	48.23	70.00	-21.77
19.60	0.76	20.98	20.25	41.99	70.00	-28.01
27.37	0.89	21.37	18.09	40.35	70.00	-29.65
28.22	0.90	21.41	15.17	37.48	70.00	-32.52

NOTE :

1. Below 30Mhz was applied Average Detector.
2. There was no detected Restricted bands and Radiated suprious emission below 30MHz.
3. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;
 $3\text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(15848) + 40\log(30/3) = 124\text{dBuV}$



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TEST REPORT

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 Date : Oct. 24, 2013

Temperature:	<u>24 °C</u>	Humidity:	<u>60 %RH</u>
Frequency Range:	<u>9K – 30MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>AV.</u>	Tested Mode:	<u>RS232-2</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Oct. 17, 2013</u>

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
13.56 (F)	0.64	20.68	41.99	63.31	124.00	-60.69
3.46	0.32	20.22	32.12	52.66	70.00	-17.34
4.73	0.39	20.29	27.46	48.13	70.00	-21.87
19.17	0.75	20.95	20.23	41.94	70.00	-28.06
25.58	0.86	21.28	11.74	33.88	70.00	-36.12
27.70	0.89	21.38	18.93	41.21	70.00	-28.79
27.83	0.90	21.39	17.55	39.84	70.00	-30.16

NOTE :

1. Below 30Mhz was applied Average Detector.
2. There was no detected Restricted bands and Radiated suprious emission below 30MHz.
3. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;
 $3\text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(15848) + 40\log(30/3) = 124\text{dBuV}$



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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	9K – 30MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Standby-2
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2013

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
3.16	0.31	20.21	30.23	50.75	70.00	-19.25
4.38	0.37	20.27	27.37	48.01	70.00	-21.99
19.50	0.76	20.97	19.78	41.51	70.00	-28.49
26.08	0.87	21.30	17.91	40.08	70.00	-29.92
27.55	0.89	21.38	19.74	42.01	70.00	-27.99
27.91	0.90	21.39	19.05	41.34	70.00	-28.66

NOTE :

1. Below 30Mhz was applied Average Detector.
2. There was no detected Restricted bands and Radiated suprious emission below 30MHz.
3. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;
$$3\text{ m Limit(dBuV/m)} = 20\log(X)+40\log(30/3)= 20\log(15848)+40\log(30/3) = 124\text{dBuV}$$



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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	9K – 30MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	USB
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2013

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
13.56 (F)	0.64	20.68	42.38	63.70	124.00	-60.30
3.14	0.31	20.21	30.61	51.12	70.00	-18.88
4.82	0.39	20.29	28.65	49.33	70.00	-20.67
7.25	0.47	20.39	11.02	31.88	70.00	-38.12
19.70	0.76	20.98	18.94	40.69	70.00	-29.31
27.21	0.89	21.36	18.64	40.89	70.00	-29.11
28.31	0.90	21.42	15.52	37.84	70.00	-32.16

NOTE :

- Below 30Mhz was applied Average Detector.
- There was no detected Restricted bands and Radiated suprious emission below 30MHz.
- The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;
 $3\text{ m Limit(dBuV/m)} = 20\log(X) + 40\log(30/3) = 20\log(15848) + 40\log(30/3) = 124\text{dBuV}$



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TEST REPORT

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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	9K – 30MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Standby-3
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2013

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2.34	0.27	20.20	30.07	50.54	70.00	-19.46
3.48	0.32	20.22	29.64	50.19	70.00	-19.81
4.69	0.38	20.28	27.78	48.45	70.00	-21.55
19.78	0.77	20.99	19.37	41.12	70.00	-28.88
27.06	0.88	21.35	19.13	41.37	70.00	-28.63
28.83	0.91	21.44	13.02	35.37	70.00	-34.63

NOTE :

1. Below 30Mhz was applied Average Detector.
2. There was no detected Restricted bands and Radiated suprious emission below 30MHz.
3. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows;

$$3\text{ m Limit(dBuV/m)} = 20\log(X)+40\log(30/3)= 20\log(15848)+40\log(30/3) = 124\text{dBuV}$$



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Reference No.: A11060401-03
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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	30M – 1GHz	Tested Mode:	RS232-1
Receiver Detector:	Q.P.	Modulation Type:	ASK
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2011

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
66.31	1.30	9.10	17.38	27.78	40.0	-12.22	51	3.53
201.79	2.26	11.88	21.07	35.21	43.5	-8.29	96	3.37
283.16	2.77	13.33	16.51	32.61	46.0	-13.39	155	3.25
310.99	2.92	14.24	23.09	40.25	46.0	-5.75	305	3.17
337.41	3.08	14.89	19.80	37.77	46.0	-8.23	274	3.04
378.59	3.32	15.87	15.33	34.52	46.0	-11.48	89	2.90

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
39.12	1.04	19.63	12.94	33.61	40.0	-6.39	192	1.18
78.41	1.40	8.26	18.27	27.93	40.0	-12.07	227	1.16
310.94	2.92	14.24	22.67	39.83	46.0	-6.17	68	1.84
337.47	3.08	14.89	18.41	36.38	46.0	-9.62	204	1.93
352.62	3.17	15.25	16.19	34.61	46.0	-11.39	313	2.03
868.70	5.68	23.04	6.96	35.68	46.0	-10.32	79	3.42

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "**": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



TEST REPORT

Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	30M – 1GHz	Tested Mode:	Standby-1
Receiver Detector:	Q.P.	Modulation Type:	ASK
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2011

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
69.25	1.33	8.35	12.84	22.52	40.0	-17.48	315	3.58
602.78	4.45	19.64	4.92	29.01	46.0	-16.99	107	2.45
647.59	4.67	20.45	3.15	28.26	46.0	-17.74	224	2.08
749.12	5.15	21.88	5.57	32.59	46.0	-13.41	88	1.72
839.67	5.55	22.78	3.60	31.93	46.0	-14.07	192	1.53
924.99	5.94	23.82	7.75	37.51	46.0	-8.49	70	1.27

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.53	1.34	8.10	18.73	28.17	40.0	-11.83	238	1.15
184.79	2.15	10.62	10.54	23.31	43.5	-20.19	69	1.49
602.73	4.45	19.64	3.79	27.88	46.0	-18.12	304	2.76
749.16	5.15	21.88	4.07	31.09	46.0	-14.91	277	3.05
874.80	5.71	23.05	3.39	32.14	46.0	-13.86	84	3.38
935.92	6.00	24.15	3.68	33.83	46.0	-12.18	215	3.50

NOTE :

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2. "**": Measurement does not apply for this frequency.
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4. The field strength of other emission frequencies were very low against the limit.



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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	30M – 1GHz	Tested Mode:	RS232-2
Receiver Detector:	Q.P.	Modulation Type:	ASK
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2011

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
66.27	1.30	9.10	20.12	30.52	40.0	-9.48	69	3.62
189.51	2.18	10.77	23.53	36.48	43.5	-7.02	255	3.38
201.12	2.26	11.88	23.37	37.51	43.5	-5.99	108	3.11
364.99	3.24	15.54	17.45	36.22	46.0	-9.78	94	2.85
636.86	4.61	20.25	10.29	35.15	46.0	-10.85	324	2.11
663.05	4.74	20.58	9.51	34.83	46.0	-11.17	179	2.03

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
80.31	1.42	8.30	21.93	31.65	40.0	-8.35	64	1.19
161.48	2.00	11.91	22.55	36.46	43.5	-7.04	275	1.42
189.54	2.18	10.77	26.68	39.63	43.5	-3.87	39	1.57
215.98	2.35	13.00	20.69	36.04	43.5	-7.46	180	1.68
352.20	3.17	15.25	20.81	39.23	46.0	-6.77	241	2.03
364.93	3.24	15.54	20.35	39.12	46.0	-6.88	159	2.27

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	30M – 1GHz	Tested Mode:	Standby-2
Receiver Detector:	Q.P.	Modulation Type:	ASK
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2011

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.57	1.34	8.10	13.20	22.64	40.0	-17.36	281	3.54
378.26	3.32	15.87	10.08	29.27	46.0	-16.73	337	2.94
602.77	4.45	19.64	5.83	29.92	46.0	-16.08	116	2.27
749.38	5.15	21.88	6.13	33.15	46.0	-12.85	71	1.79
839.23	5.55	22.78	3.67	32.00	46.0	-14.00	99	1.51
874.12	5.71	23.05	3.72	32.47	46.0	-13.53	169	1.37

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
79.03	1.41	8.28	17.83	27.52	40.0	-12.48	124	1.15
183.71	2.15	10.59	10.35	23.09	43.5	-20.41	305	1.49
454.91	3.72	17.36	4.46	25.54	46.0	-20.46	240	2.33
602.79	4.45	19.64	3.69	27.78	46.0	-18.22	277	2.71
839.25	5.55	22.78	3.62	31.95	46.0	-14.05	138	3.46
874.14	5.71	23.05	4.05	32.80	46.0	-13.20	233	3.52

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



TEST REPORT

Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	30M – 1GHz	Tested Mode:	USB
Receiver Detector:	Q.P.	Modulation Type:	ASK
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2011

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
198.32	2.24	11.60	24.18	38.02	43.5	-5.48	148	3.44
364.55	3.24	15.54	17.74	36.51	46.0	-9.49	252	2.95
432.10	3.61	16.98	14.78	35.36	46.0	-10.64	38	2.71
499.82	3.95	17.99	13.27	35.21	46.0	-10.79	167	2.54
532.27	4.15	18.45	16.91	39.50	46.0	-6.50	270	2.43
600.37	4.44	19.60	12.97	37.01	46.0	-8.99	303	2.27

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
82.10	1.44	8.38	21.64	31.46	40.0	-8.54	179	1.19
331.47	3.05	14.74	20.05	37.84	46.0	-8.16	82	1.88
365.21	3.24	15.56	22.72	41.52	46.0	-4.48	97	2.03
392.53	3.40	16.21	15.97	35.57	46.0	-10.43	151	2.15
533.77	4.15	18.46	16.45	39.06	46.0	-6.94	236	2.57
597.04	4.43	19.55	11.80	35.77	46.0	-10.23	201	2.79

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "**": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



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Temperature:	24 °C	Humidity:	60 %RH
Frequency Range:	30M – 1GHz	Tested Mode:	Standby-3
Receiver Detector:	Q.P.	Modulation Type:	ASK
Tested By:	Richard Lin	Tested Date:	Oct. 17, 2011

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.43	1.34	8.10	23.87	33.31	40.0	-6.69	313	3.51
198.12	2.24	11.60	20.63	34.47	43.5	-9.03	245	3.38
221.86	2.39	13.29	22.49	38.17	46.0	-7.83	100	3.17
499.29	3.95	17.99	12.81	34.75	46.0	-11.25	67	2.69
532.18	4.15	18.45	18.29	40.88	46.0	-5.12	174	2.45
598.67	4.43	19.56	12.54	36.54	46.0	-9.46	89	2.21

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.47	1.34	8.10	25.62	35.06	40.0	-4.94	141	1.17
198.17	2.24	11.60	17.56	31.40	43.5	-12.10	258	1.53
332.85	3.05	14.77	15.09	32.91	46.0	-13.09	332	1.97
364.24	3.24	15.54	17.00	35.77	46.0	-10.23	193	2.01
532.13	4.15	18.45	11.29	33.88	46.0	-12.12	261	2.58
600.92	4.44	19.60	12.44	36.48	46.0	-9.52	71	2.74

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "**": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



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6. Antenna application

6.1 Antenna requirement

The EUT's antenna is met the requirement of FCC part15C section15.203 and 15.204.

6.2 Result

The EUT's antenna used a PCB printed. Gain of antenna types is 3dBi that meet the requirement.



7. PHOTOS OF TESTING

- Radiated test (below 3M , IDCA-2221)





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- Radiated test (below 1G , IDCA-2221)





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- Radiated test (below 30M , IDCA-2221-V1)





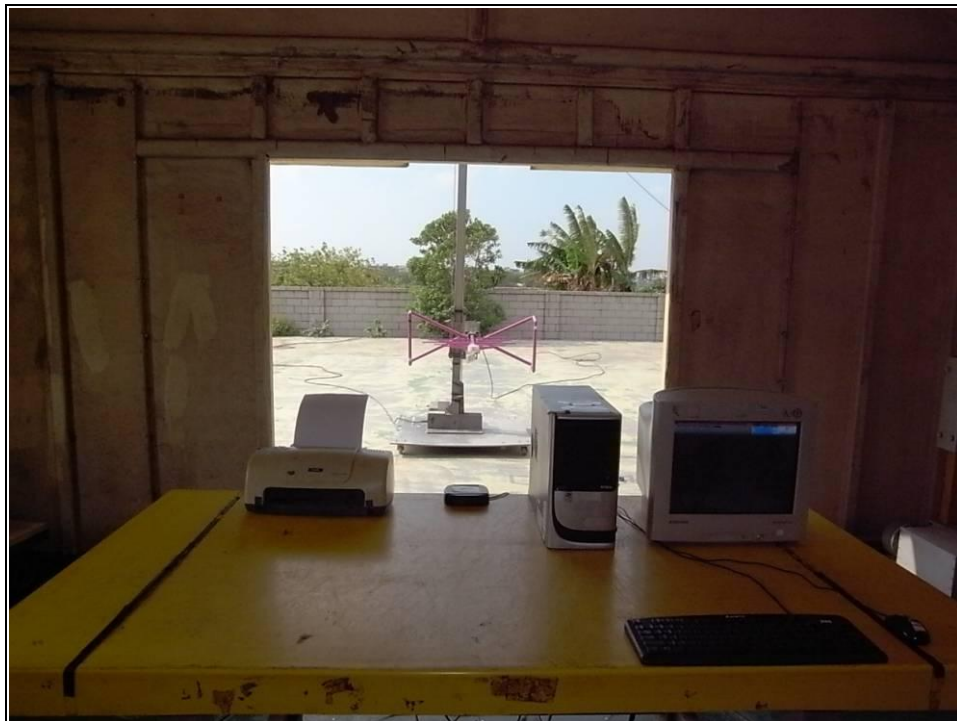
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- Radiated test (below 1G , IDCA-2221-V1)





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- Radiated test (below 30M , IDCA-2261)





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- Radiated test (below 1G , IDCA-2261)





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8. TERMS OF ABBREVIATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction