



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003
TEST REPORT**

For

uController

Model : UC012A

Trade Name : UPRtek

Issued for

United Power Research Technology Corp.

No.66, You-Yi Road, Jhunan Township, Miao-Li County 350, Taiwan, R.O.C

Issued by

Compliance Certification Services Inc.

Hsinchu Lab.

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	08/13/2012	Initial Issue	All Page 26	Sunny Wang



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1. TEST REPORT CERTIFICATION

Applicant : United Power Research Technology Corp.
Address : No.66, You-Yi Road, Jhunan Township, Miao-Li County
350, Taiwan, R.O.C
Equipment Under Test : uController
Model : UC012A
Trade Name : **UPRtek**
Tested Date : July 05 ~ 25, 2012

APPLICABLE STANDARD	
Standard	Test Result
FCC Part 15 Subpart C AND ANSI C63.4:2003	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sb Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer



2. EUT DESCRIPTION

Product Name	uController
Model Number	UC012A
Identify Number	T120703S01
Received Date	July 05, 2012
Frequency Range	40.685MHz
Transmit Power	63.15 dB μ V/m
Channel Number	1 Channel
Type of Modulation	OOK
Antenna Type	Dipole Antenna, Antenna Gain : 0dBi
Power Rating	Battery : 3.7Vdc Charge : 5.0Vdc
Test Voltage	120Vac, 60Hz
I/O Port	Power Port x 1

Remark :

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. For more details, please refer to the User's manual of the EUT.
3. This submittal(s) (test report) is intended for FCC ID:P7S-UPR12AUC filing to comply with Section 15.207, 15.209 and 15.229 of the FCC Part 15, Subpart C Rules.



3. DESCRIPTION OF TEST MODES

The EUT(UC012A) had been tested under operating condition.

There are one channel have been tested as following :

Channel	Frequency (MHz)
1	40.685

Remark : *The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X, Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.*

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC 47 CFR Part 15.207, 15.209 and 15.229.



5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF
---------------	-----

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	INDUSTRY CANADA
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>



5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.5189
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 2.5164
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 2.4967
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 2.7655
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 1.5923

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.



6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	iPod	Apple	A1367	CCQG9TK9YDNQW	DoC

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

RF Mode

1. Set up all computers like the setup diagram.
2. iPod connected all equipment.
TX Mode: Frequency:40.685MHz.
3. Function of the normal operation.
4. Start test.



7. FCC PART 15.229 REQUIREMENTS

7.1 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST EQUIPMENT

966Chamber_B

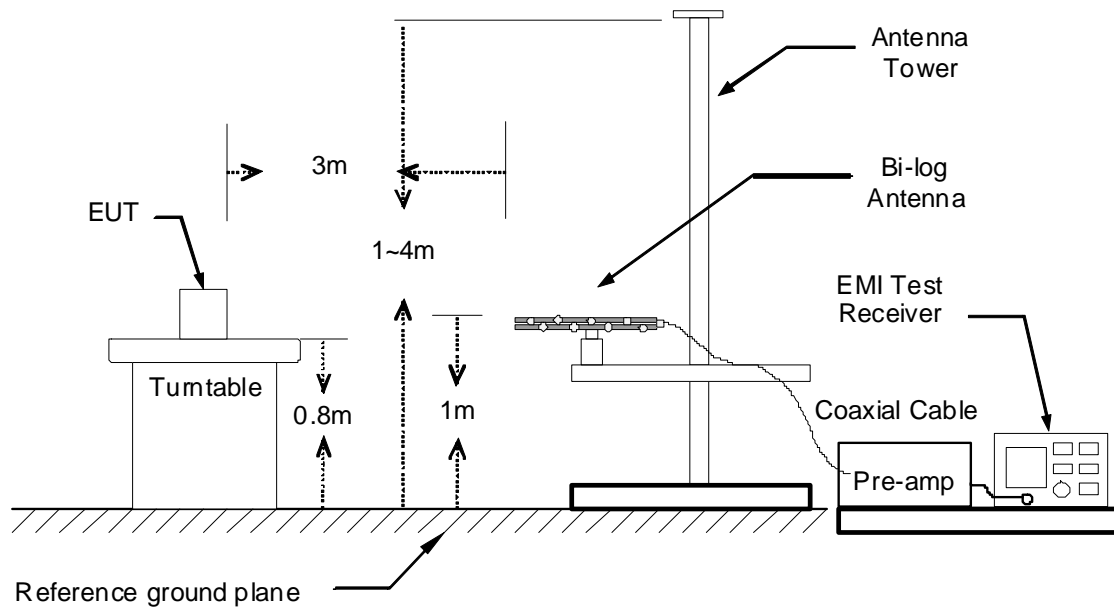
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/22/2013
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	826547/004	10/27/2012
Broadband Hybrid Bi-Log Antenna	Sunol Sciences	JB1	A100209-4	10/05/2012
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/06/2012
Horn Antenna	COM-POWER	AH-840	03077	12/06/2012
Pre-Amplifier	Agilent	8447D	2944A10052	07/17/2013
Pre-Amplifier	Agilent	8449B	3008A01916	07/17/2013
LOOP Antenna	EMCO	6502	8905-2356	06/10/2013
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

Remark: 1. Each piece of equipment is scheduled for calibration once a year.

2. N.C.R = No Calibration Request.



TEST SETUP



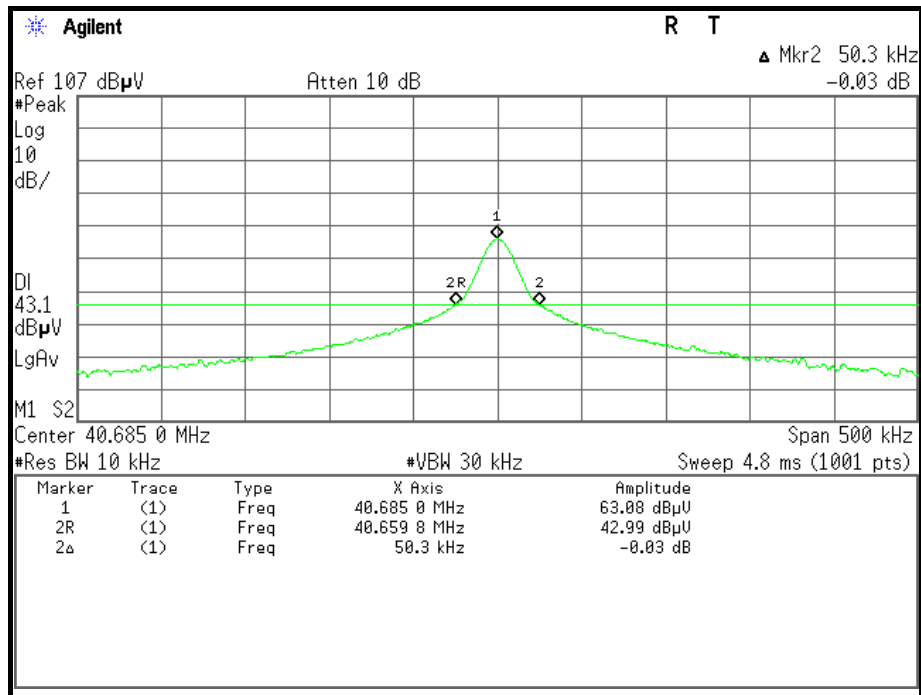
TEST PROCEDURE

The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.



TEST RESULTS

Channel Frequency (MHz)	20dB Bandwidth (kHz)
40.685	50.30



**7.2 RADIATED EMISSION****LIMITS**

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

Remark:

1. ¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. ² Above 38.6



- (2) According to § 15.229 (a) Unless operating pursuant to the provisions in Section 15.231, the field strength of any emissions within this band shall not exceed 1000 microvolts/meter at 3 meters.
- (3) According to § 15.209 (a) 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 (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

Remark: **Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

- (4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

966Chamber_B

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/22/2013
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	826547/004	10/27/2012
Broadband Hybrid Bi-Log Antenna	Sunol Sciences	JB1	A100209-4	10/05/2012
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/06/2012
Horn Antenna	COM-POWER	AH-840	03077	12/06/2012
Pre-Amplifier	Agilent	8447D	2944A10052	07/17/2013
Pre-Amplifier	Agilent	8449B	3008A01916	07/17/2013
LOOP Antenna	EMCO	6502	8905-2356	06/10/2013
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

Remark: 1. Each piece of equipment is scheduled for calibration once a year.

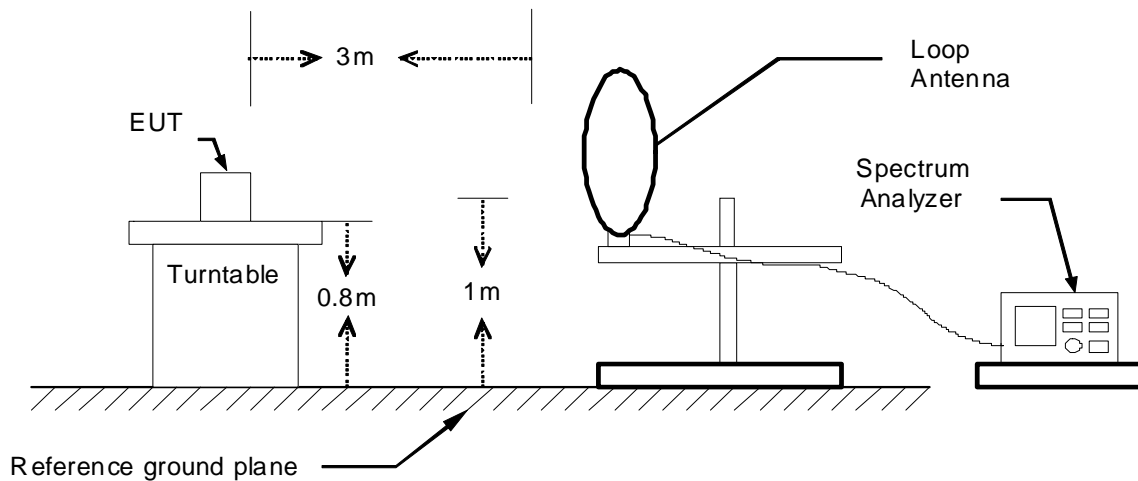
2. N.C.R = No Calibration Request.



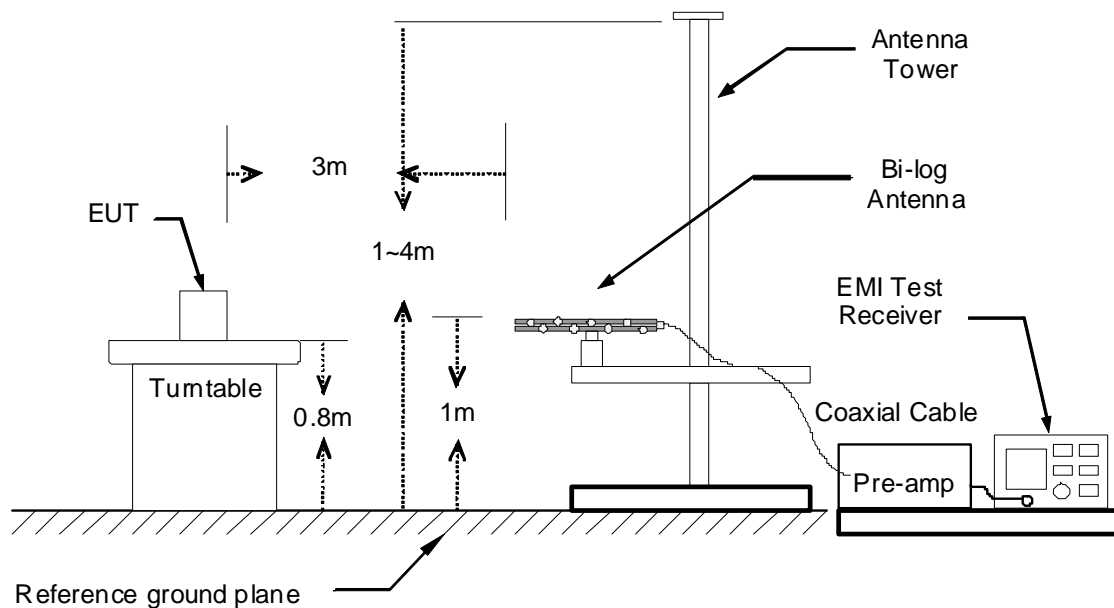
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

9kHz ~ 30MHz

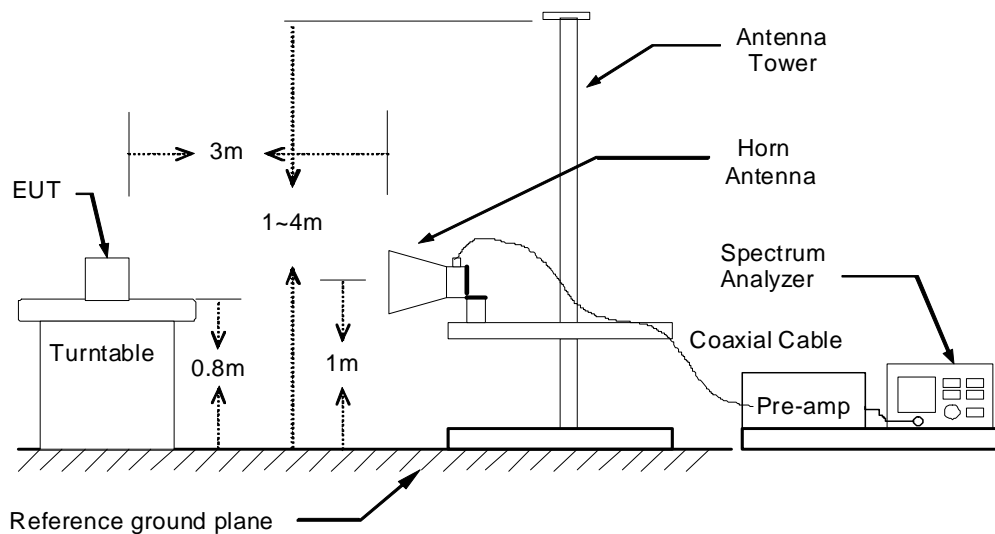


30MHz ~ 1GHz





The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

**TEST RESULTS****Below 1 GHz (9kHz ~ 30MHz)**

Product Name	uController	Test By	Waternil Guan
Test Model	UC012A	Test Date	2012/07/09
Test Mode	TX Mode	Temp. & Humidity	24°C, 55%

966 Chamber_B at 3Meter						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
0.02	41.80	15.16	56.96	120.89	-63.92	Peak
0.07	34.62	12.92	47.54	110.35	-62.81	Peak
0.12	31.19	12.82	44.00	105.94	-61.94	Peak
4.75	19.19	11.55	30.74	69.54	-38.80	Peak
6.72	16.78	11.36	28.14	69.54	-41.40	Peak
21.02	10.59	10.12	20.71	69.54	-48.83	Peak

Remark:

1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.
2. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB).
4. Result (dBμV/m) = Reading (dBμV) + Correction Factor (dB/m).
5. Margin (dB) = Remark result (dBμV/m) - limit (dBμV/m).



Below 1 GHz (30MHz ~ 1GHz)

Product Name	uController	Test By	Waternil Guan
Test Model	UC012A	Test Date	2012/07/17
Test Mode	TX Mode	Temp. & Humidity	26°C, 57%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
*40.685	68.21	-13.57	54.64	80.00	-25.36	Peak
*40.685	62.75	-13.57	49.18	60.00	-10.82	AVG
81.41	40.40	-19.64	20.76	40.00	-19.24	Peak
244.37	33.21	-13.78	19.44	46.00	-26.56	Peak
285.11	33.66	-11.94	21.72	46.00	-24.28	Peak
325.85	34.18	-11.33	22.86	46.00	-23.14	Peak
366.59	38.41	-10.55	27.86	46.00	-18.14	Peak
406.36	32.26	-9.88	22.38	46.00	-23.62	Peak
966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
*40.685	76.72	-13.57	63.15	80.00	-16.85	Peak
*40.685	71.88	-13.57	58.31	60.00	-1.69	AVG
70.74	35.88	-19.48	16.40	40.00	-23.60	Peak
81.41	37.20	-19.64	17.55	40.00	-22.45	Peak
120.21	30.35	-13.63	16.72	43.50	-26.78	Peak
159.98	29.47	-14.60	14.88	43.50	-28.62	Peak
199.75	28.64	-13.29	15.35	43.50	-28.15	Peak
366.59	29.64	-10.55	19.09	46.00	-26.91	Peak

Remark:

1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.
2. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)
4. Result (dBμV/m) = Reading (dBμV) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dBμV/m) - Quasi-peak limit (dBμV/m).
6. (*) Fundamental.



7.3 CONDUCTED EMISSION

LIMITS

According to § 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Conducted Limit (dB μ v)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

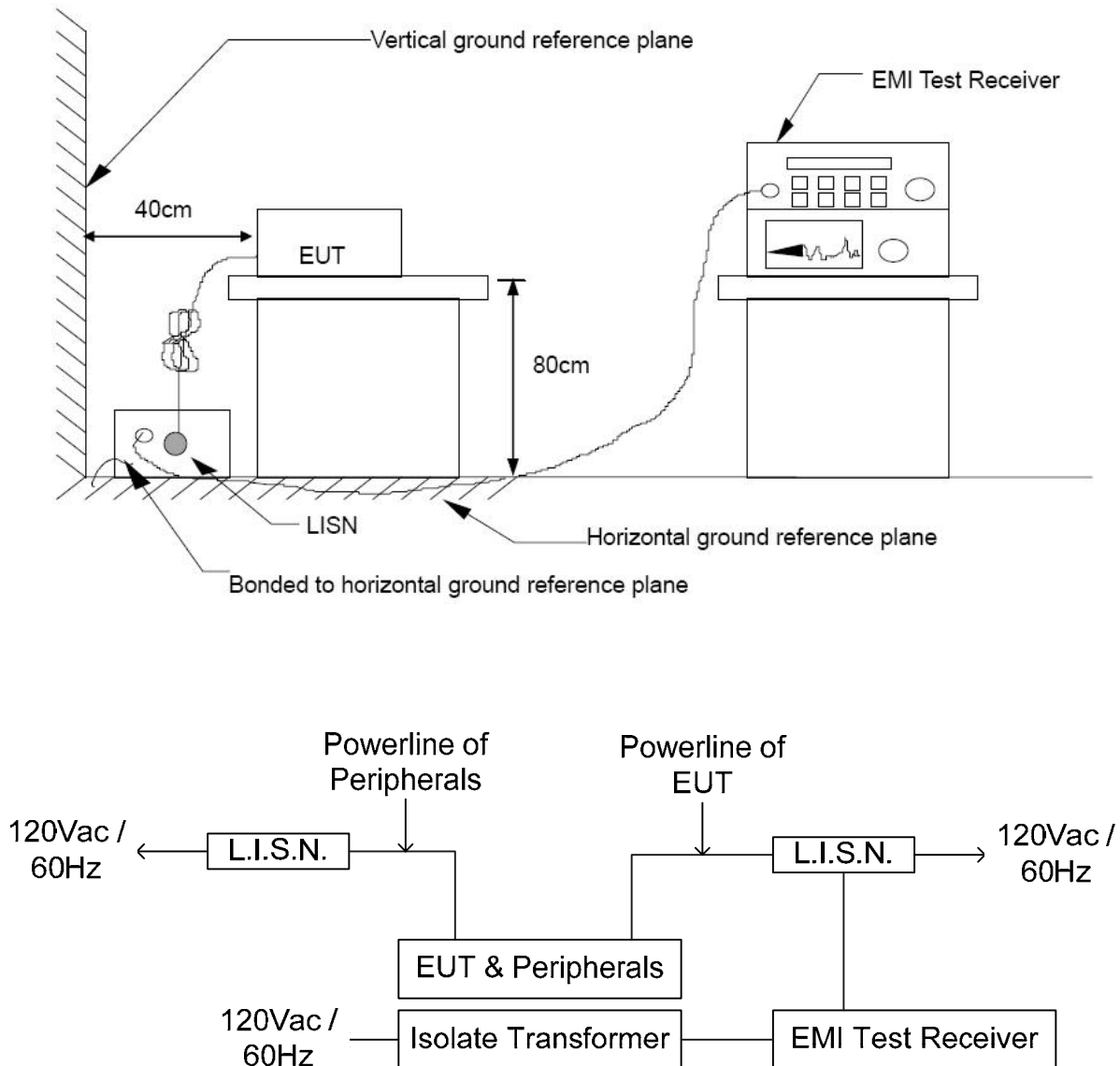
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/07/2013
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/12/2013
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/20/2012
Pulse Limit	ROHDE & SCHWARZ	ESH3-Z2	100117	07/03/2013

Remark: Each piece of equipment is scheduled for calibration once a year.



TEST SETUP





TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Since the BT won't work at charge mode, this is test item is not applicable.



7.4 FREQUENCY STABILITY

LIMIT

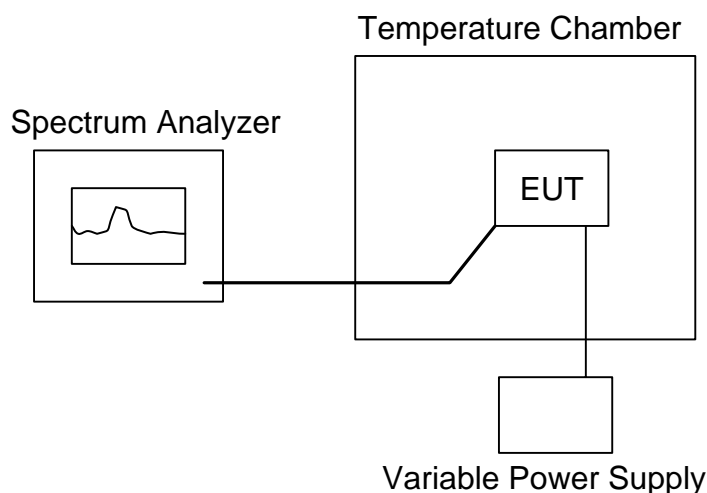
According to §15.229 (d) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/14/2013
Temp. & Humid. Chamber	TERCHY	MHC-120L	960424	09/13/2012

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the environment into appropriate environment.
4. Set the spectrum analyzer as RBW=1kHz, VBW = RBW, Span = 500kHz, Sweep = auto.
5. Mark the peak frequency and measure the frequency tolerance using frequency counter function.
6. Repeat until all the results are investigated.

**TEST RESULTS**

Product Name	uController	Test By	Waternil Guan
Test Model	UC012A	Test Date	2012/07/19
Test Mode	TX Mode	Temp. & Humidity	24.3°C, 48%

Frequency Error or Frequency Drift					
Temperature (°C)	Test Voltage (Vdc)		Frequency (MHz)	Error (kHz)	Limit (kHz)
20	Vmin	3.145	40.6816	-3.40	±4.068
	Vmax	4.255	40.6833	-1.70	
-20	Vnor	3.700	40.6850	0.00	
-10	Vnor	3.700	40.6857	0.70	
0	Vnor	3.700	40.6872	2.20	
10	Vnor	3.700	40.6874	2.40	
20	Vnor	3.700	40.6871	2.10	
30	Vnor	3.700	40.6855	0.50	
40	Vnor	3.700	40.6856	0.60	
50	Vnor	3.700	40.6859	0.90	