



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

For

QTRAC REMOTE

Model : 95-QT3003

Data Applies To : 95-QT3001

Trade Name :  Lavi Industries

Issued for

Lavi Industries

27810 Avenue Hopkins, Valencia, CA 91355-3409

Issued by

Compliance Certification Services Inc.

Hsinchu Lab.

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

TEL: +886-3-5921698

FAX: +886-3-5921108

<http://www.ccsrf.com>

E-Mail : service@ccsrf.com

Issued Date: January 03, 2012



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	07/14/2011	Initial Issue	All Page 25	Winnie Chen
01	01/03/2012	Revised the Model Number.	Page 1, 4, 5, 6, 14, 15, 20, 21	Winnie Chen

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1. TEST REPORT CERTIFICATION

Applicant : Lavi Industries
Address : 27810 Avenue Hopkins, Valencia, CA 91355-3409
Equipment Under Test : QTRAC REMOTE
Model : 95-QT3003
Data Applies To : 95-QT3001
Trade Name :  Lavi Industries
Tested Date : October 29, 2010 ~ July 13, 2011

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

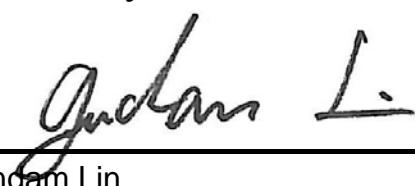
WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar 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	QTRAC REMOTE
Model Number	95-QT3003
Data Applies To	95-QT3001
Identify Number	T101029201
Received Date	October 29, 2010
Frequency Range	908.42MHz
Transmit Power	92.56 dB μ V/m
Channel Number	1 Channel
Transmit Data Rate	9.6 kbps, 40 kbps
Type of Modulation	BFSK, +/- 20kHz modulation on carrier
Antenna Type	PCB Antenna, Antenna Gain -8.26 dBi
Power Source	5Vdc (From Power Adapter) 6Vdc (From Battery)
I/O Port	Power Port x 1

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	DVE	DSC-6PFA-05 FUS 050100	100-240Vac, 50/60Hz, 0.2A	5Vdc, 1A

The difference of the series model

Mode Number	Difference
95-QT3003	Six function buttons
95-QT3001	Single function button

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: ZTI95QT filing to comply with Section 15.207, 15.209 and 15.249 of the FCC Part 15, Subpart C Rules.
4. Client consigns only one sample to test (model number: 95-QT3003). Therefore, the testing Lab. just guarantees the unit, which has been tested.



3. DESCRIPTION OF TEST MODES

The EUT (95-QT3003) had been tested under operating condition.

There are one channels have been tested as following :

Channel	Frequency (MHz)
1	908.42

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only, and powerline conducted emission below 30MHz, which worst case was in normal link mode.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47, 15.207, 15.209 and 15.249.

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

N/A

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. Power on all equipments.

TX Mode: Frequency: 908.42MHz.

3. All of the functions are under run.
4. Start test.

Normal Mode

1. Setup whole system for test as shown on diagram.
2. Power on all equipments.
3. All of the functions are under run.
4. Start test.



7. FCC PART 15.249 REQUIREMENTS

7.1 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 § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



(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.

(5) According to § 15.249 (a) Except as provided in paragraph (b) of this section, the field strength of emission from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (millivolts/meter)	Measurement Distance of Harmonics (microvolts/meter)
902 - 928	50	500
2400 - 2483.5	50	500
5725 - 5875	50	500
24000 - 24250	250	2500

**TEST EQUIPMENT****966Chamber_B**

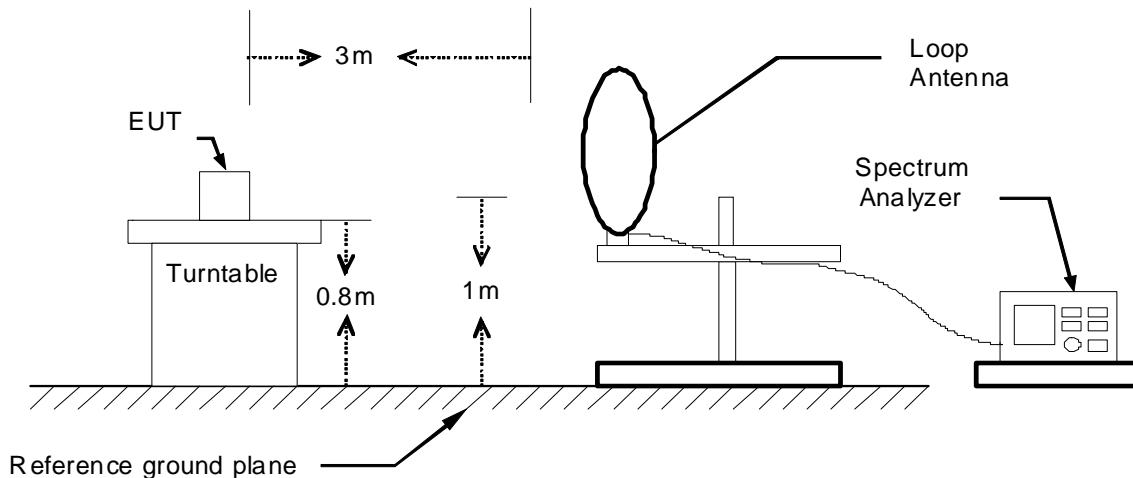
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/19/2012
EMI Receiver	ROHDE & SCHWARZ	ESCI	101131	01/13/2012
Broadband Hybrid Bi-Log Antenna	Sunol Sciences	JB1	A100209-4	10/07/2011
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078732	07/03/2012
Pre-Amplifier	Agilent	8447D	2944A10052	07/26/2011
Pre-Amplifier	Agilent	8449B	3008A01916	09/21/2011
LOOP Antenna	EMCO	6502	8905-2356	06/10/2012
Band Reject Filter	Micro-Tronics	BRM50706	001	N.C.R.

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

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

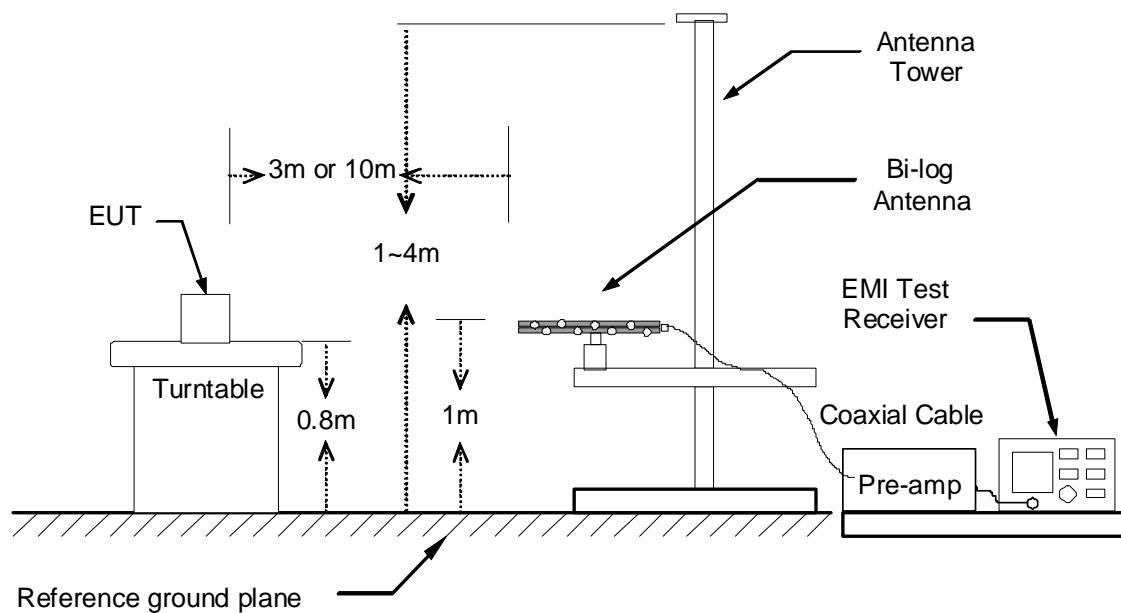
TEST SETUP

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

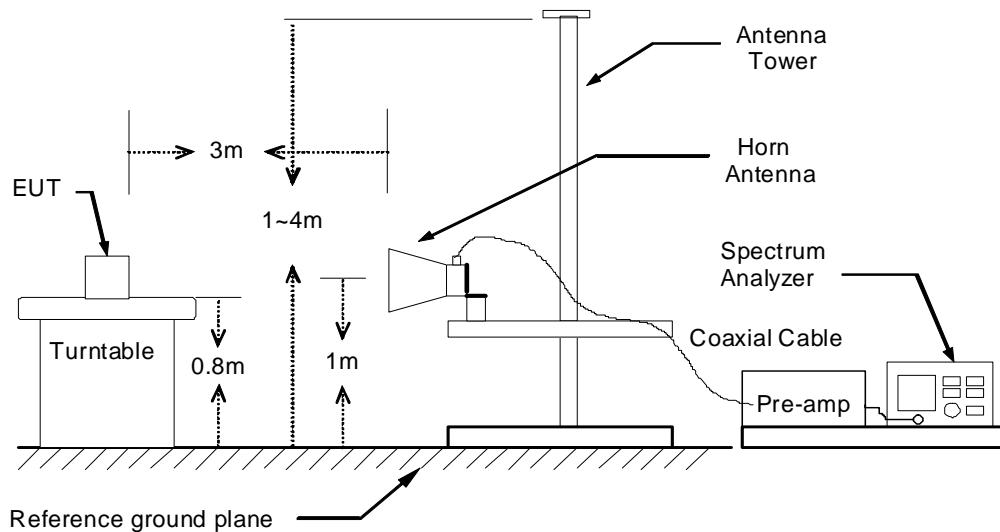
9kHz ~ 30MHz



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 at a 10 meter open area test site. 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)**

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Product Name	QTRAC REMOTE	Test By	Waternal Guan
Test Model	95-QT3003	Test Date	2011/04/28
Test Mode	Normal operating	TEMP & Humidity	24°C, 60%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dB μ V)	Correction Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
30.97	30.42	-7.30	23.12	40.00	-16.88	Peak
66.86	45.98	-19.58	26.40	40.00	-13.60	Peak
243.40	41.46	-12.42	29.04	46.00	-16.96	Peak
256.01	35.09	-11.68	23.42	46.00	-22.58	Peak
288.02	35.02	-10.33	24.69	46.00	-21.31	Peak
309.36	37.19	-9.49	27.70	46.00	-18.30	Peak
353.98	30.92	-7.17	23.75	46.00	-22.25	Peak
376.29	31.61	-7.01	24.60	46.00	-21.40	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dB μ V)	Correction Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
30.00	42.10	-6.58	35.52	40.00	-4.48	QP
38.73	43.90	-12.95	30.95	40.00	-9.05	QP
66.86	50.08	-19.58	30.49	40.00	-9.51	Peak
134.76	33.48	-12.89	20.58	43.50	-22.92	Peak
134.76	33.48	-12.89	20.58	43.50	-22.92	Peak
243.40	37.16	-12.42	24.74	46.00	-21.26	Peak
288.02	33.63	-10.33	23.30	46.00	-22.70	Peak
309.36	33.63	-9.49	24.14	46.00	-21.86	Peak
376.29	30.92	-7.01	23.91	46.00	-22.09	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 (dB μ V/m) = Reading (dB μ V) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dB μ V/m) - Quasi-peak limit (dB μ V/m).



Above 1 GHz

Product Name	QTRAC REMOTE		Test By	Waternal Guan
Test Model	95-QT3003		Test Date	2011/01/12
Test Mode	TX Mode		TEMP & Humidity	18°C, 59%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
* 908.41	107.30	104.42	-14.74	92.56	89.68	114.00	94.00	-4.32	AVG
1108.00	47.34	---	-5.05	42.28	---	74.00	54.00	-11.72	Peak
1954.00	43.80	---	0.69	44.50	---	74.00	54.00	-9.50	Peak
2422.00	43.52	---	2.12	45.64	---	74.00	54.00	-8.36	Peak
2962.00	42.58	---	4.43	47.02	---	74.00	54.00	-6.98	Peak
3241.00	42.15	---	4.50	46.66	---	74.00	54.00	-7.34	Peak
3592.00	42.39	---	4.60	46.99	---	74.00	54.00	-7.01	Peak

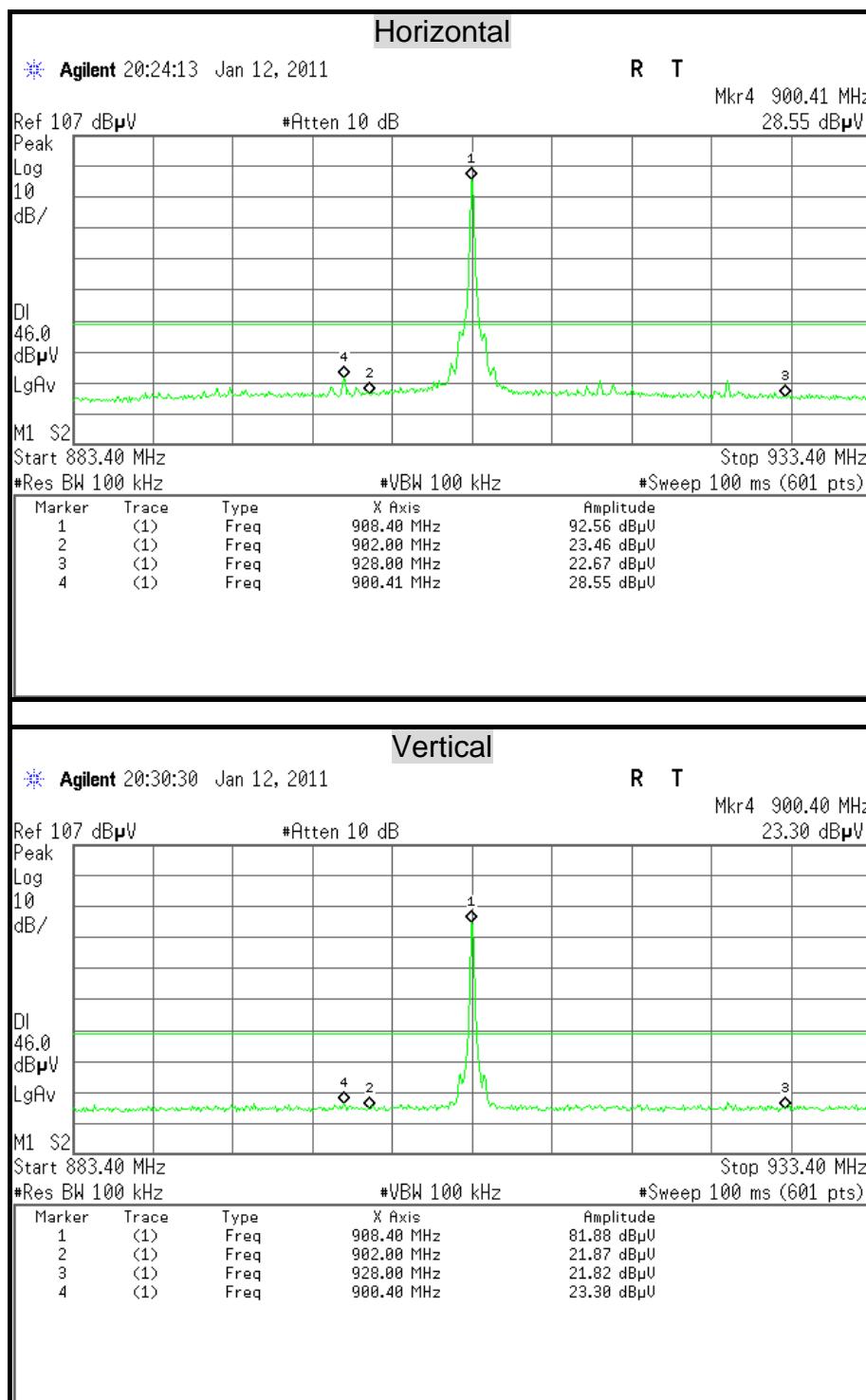
966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
* 908.42	96.35	93.35	-14.74	81.86	78.61	114.00	94.00	-15.39	AVG
1099.00	47.20	---	-5.09	42.11	---	74.00	54.00	-11.89	Peak
2071.00	43.84	---	1.30	45.13	---	74.00	54.00	-8.87	Peak
2467.00	44.32	---	2.22	46.54	---	74.00	54.00	-7.46	Peak
2953.00	42.98	---	4.39	47.38	---	74.00	54.00	-6.62	Peak
3322.00	42.28	---	4.47	46.75	---	74.00	54.00	-7.25	Peak
3637.00	41.53	---	4.70	46.23	---	74.00	54.00	-7.77	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. 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.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)
7. (*) Fundamental



Restricted Band Edges





7.2 CONDUCTED EMISSION

LIMITS

§ 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

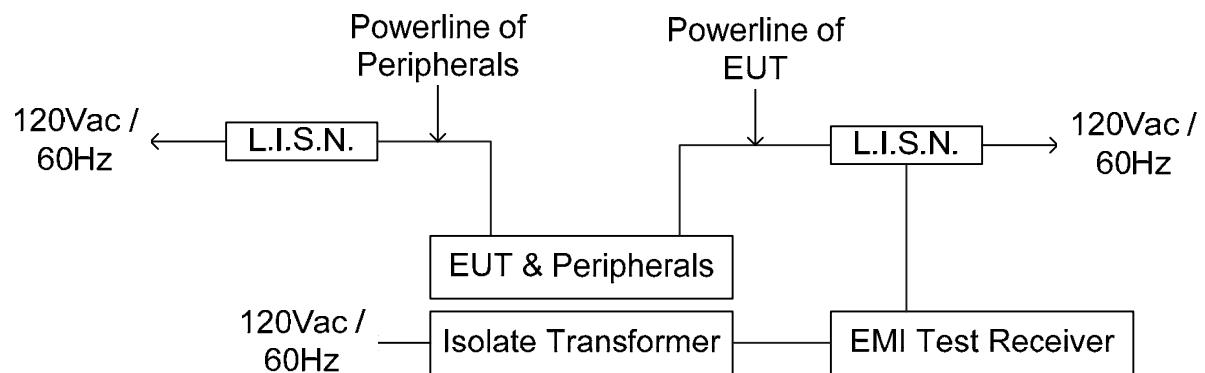
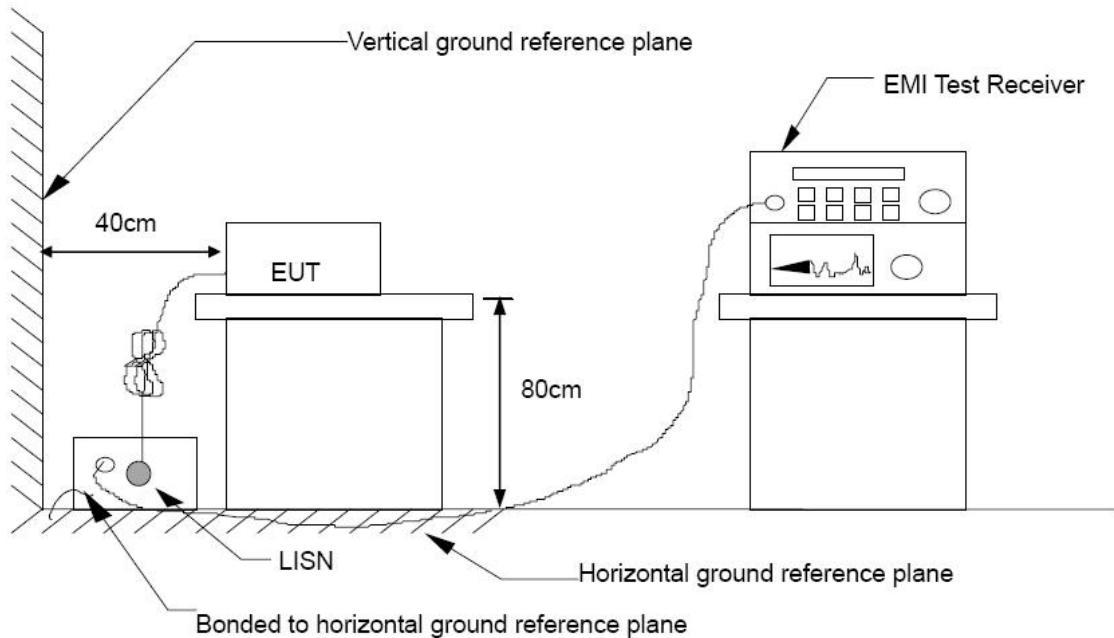
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/08/2011
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/14/2012
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/24/2011
Pulse Limit	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2011

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 x 3m x 2.4m (LxWxH) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) x 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.

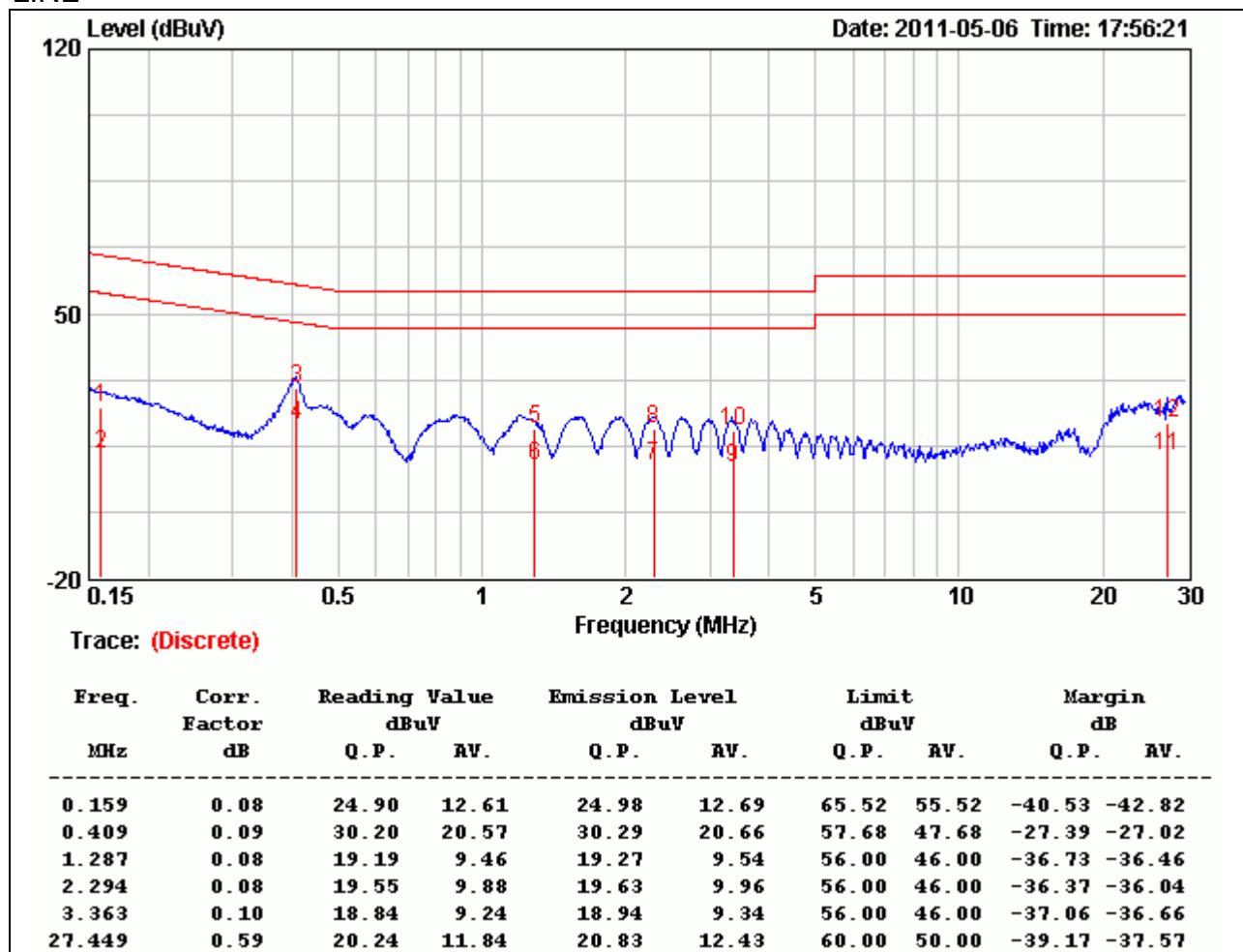
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis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

Product Name	QTRAC REMOTE	Test By	Waternil Guan
Test Model	95-QT3003	Test Date	2011/05/06
Test Mode	Normal operating	TEMP & Humidity	23°C, 59%

LINE



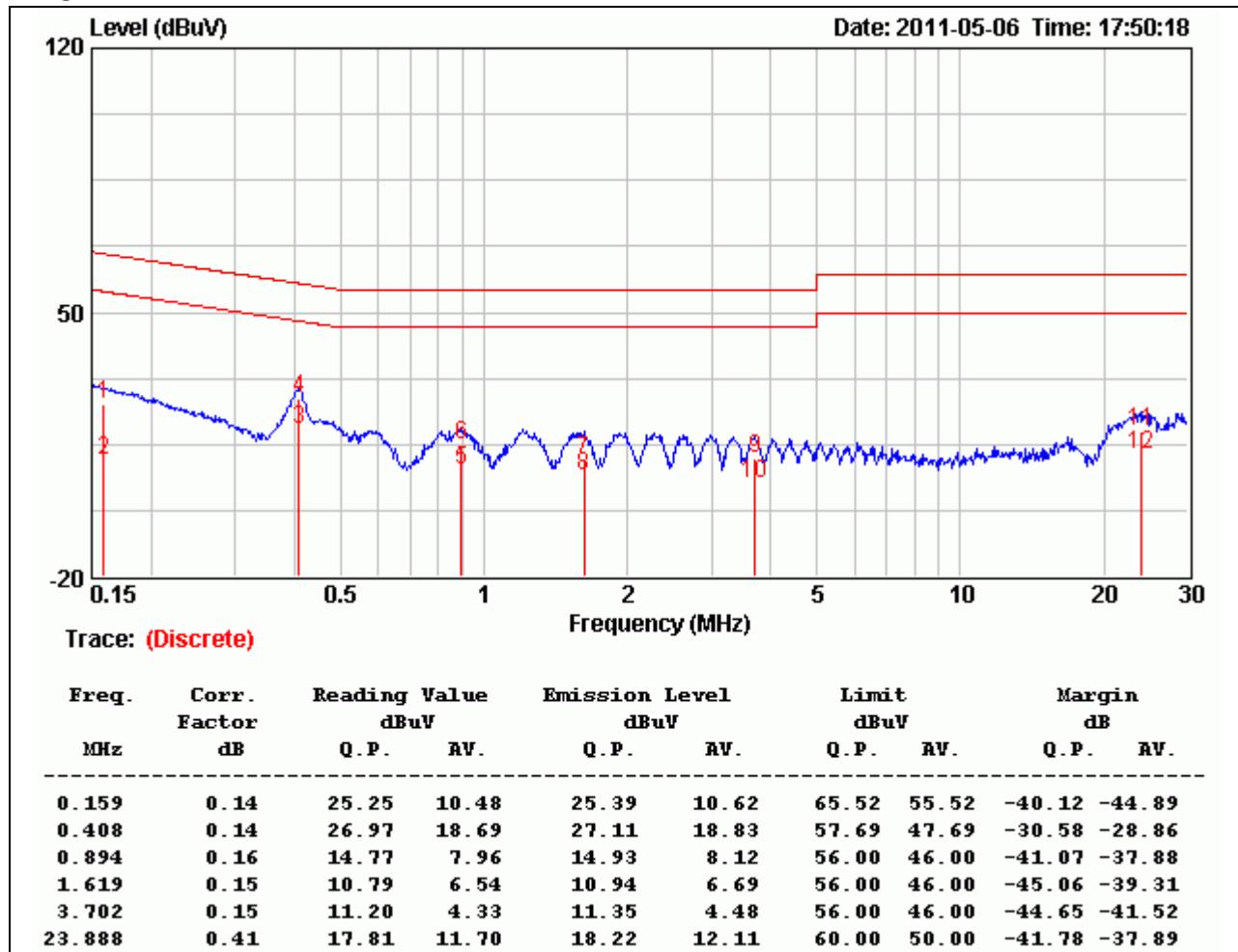
Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level - Limit value



Product Name	QTRAC REMOTE	Test By	Waternal Guan
Test Model	95-QT3003	Test Date	2011/05/06
Test Mode	Normal operating	TEMP & Humidity	23°C, 59%

NEUTRAL



Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value