FCC 47 CFR PART 15 SUBPART B TEST REPORT

for

Mobile Data Acquisition

MODEL: W618e

Test Report Number:

90511003-D

Issued for

Infowave Pte Ltd
600 Sin Ming Avenue 4th Floor CityCab Building
Singapore 575733

Issued By:

Compliance Certification Services Inc.
Wugu Laboratory
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Issued Date: September 28, 2009

Testing Laboratory
1309

ACCREDITED
TESTING CERT #0824.01

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 28, 2009	Initial Issue	ALL	Eunice Shen

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1 TEST RESULT CERTIFICATION

Product:	Mobile Data Acquisition
Model:	W618e
Brand:	Waveon
Applicant:	**Infowave Pte Ltd** 600 Sin Ming Avenue 4th Floor CityCab Building Singapore 575733
Manufacturer:	**OSI Electronics** Cammo Industrial Park Blok F No. 3A Batam Centre, Batam – Indonesia
Tested:	June 5, 2009
Test Voltage:	DC 12V

EMISSION			
Standard	**Item**	**Result**	**Remarks**
FCC 47 CFR Part 15 Subpart B (May 4, 2007), ICES-003 Issue 4 ANSI C63.4-2003	Conducted (Main Port)	N/A	Not applicable, because EUT does not connect to AC Main Source direct.
	Radiated	PASS	Meet Class B limit

Note: 1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.

Deviation from Applicable Standard
None

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:

Rex Lai
Section Manager

Reviewed by:

Gina Lo
Section Manager

2 EUT DESCRIPTION

Product	Mobile Data Acquisition
Brand Name	Waveon
Model	W618e
Applicant	Infowave Pte Ltd
Housing material	Plastic
Serial Number	90511003
Received Date	May 11, 2009
EUT Power Rating	Powered from host device (DC 12V)
GPS antenna Cable Type	Unshielded, 5m (Non-detachable)
GSM antenna Cable Type	Unshielded, 2.85m (Non-detachable)
5-pin connector Cable Type	Unshielded, 1.5m (Non-detachable)

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
1. Signal Port	1	1

3 TEST METHODOLOGY

3.1. DECISION OF FINAL TEST MODE

1. The following test mode was scanned during the preliminary test:

Pre-Test Mode
Mode 1 - Operating (ETU + Notebook + Monitor + Mouse + HDD + GSM-Antenna + GPRS-Antenna)

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Conducted Emission	**Mode 1**
	Radiated Emission	**Mode 1**

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

3.2. EUT SYSTEM OPERATION

1	Setup the EUT and simulators.
2	Turn on the power of all equipment.
3	EMI test program was loaded and executed with GPS antenna、GPRS antenna and remote AP in Windows XP mode.
4	Data was sent to the Panel of EUT and monitor and filling the screens with upper case of “H” patterns.
5	Test program sequentially exercised all related I/O’s of EUT and sent “H” patterns to all applicable output ports of EUT.
6	Repeat 2 to 5.
7	Start to the tests and record.

Note: Test program is self-repeating throughout the test.

4 SETUP OF EQUIPMENT UNDER TEST

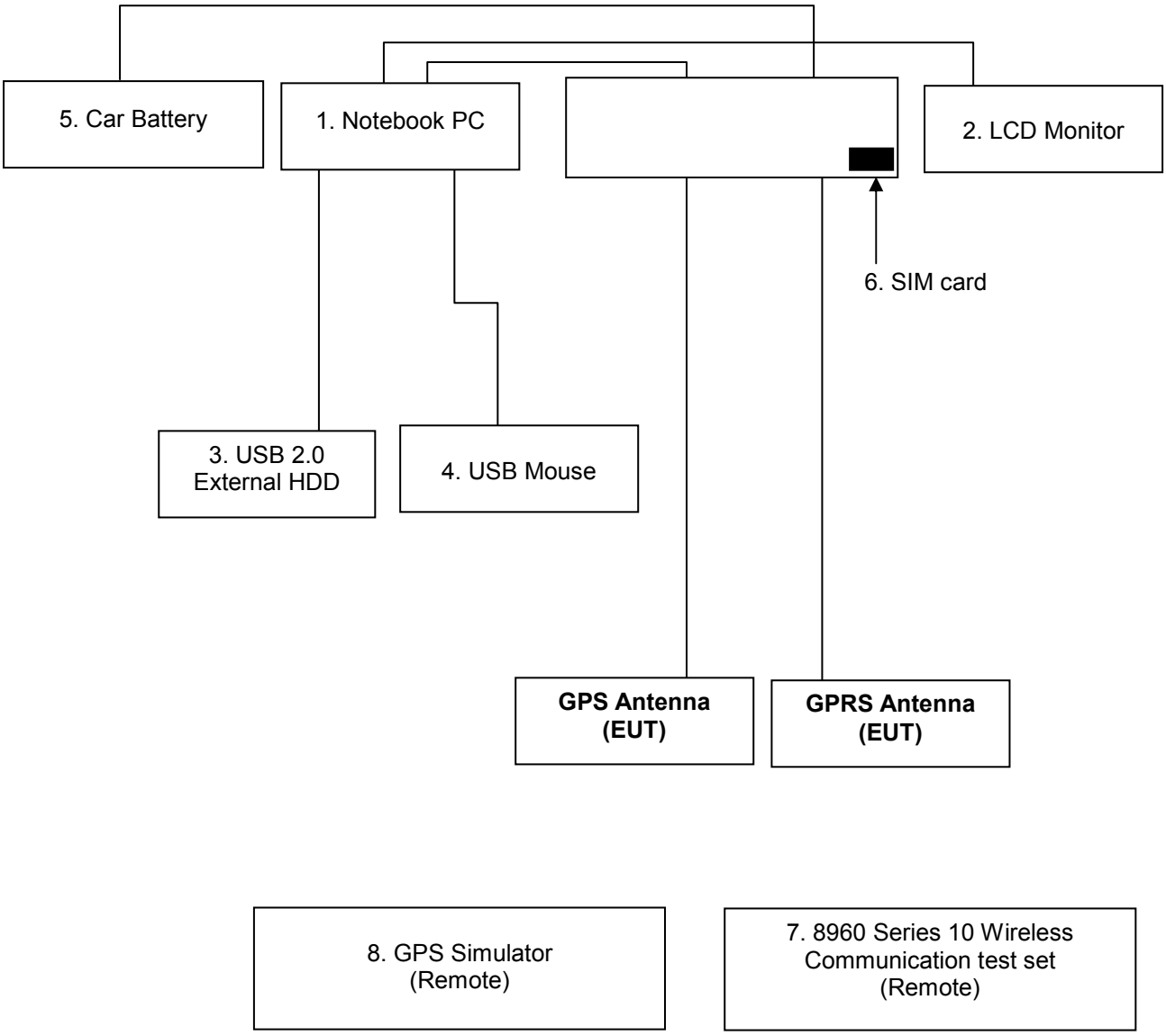
4.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	Notebook PC	PP19L	GK102 A00	QDS-BRCM1021	DELL	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	LCD Monitor	959NF	AQ19H2RT706126P	FCC DoC	SAMSUNG	Shielded, 1.8m with 2 cores	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	USB 2.0 External HDD	F12-U	A0100214-43b0001	FCC DoC	TeraSys	Unshielded, 1.8m	N/A
4	USB Mouse	MO19UCA	20440964	FCC DoC	HP	Shielded, 1.8m	N/A
5	Car Battery	55D23L	N/A	N/A	Toplite	N/A	N/A
6	SIM card	N/A	N/A	N/A	N/A	N/A	N/A
7	8960 Series 10 Wireless Communication test set (Remote)	E5515C	GB44051665	N/A	Agilent	N/A	Unshielded, 1.8m
8	GPS Simulator (Remote)	GPS-101	EN001	N/A	HWAJEAT	N/A	N/A

Note: Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2. CONFIGURATION OF SYSTEM UNDER TEST



5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

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

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

The sites are constructed in conformance with the requirements of ANSI C63.4 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
USA	A2LA

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

USA	FCC
Canada	INDUSTRY CANADA
Taiwan	NCC

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

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Radiated emissions # 966 A	30 ~ 1000MHz	+/- 3.70 dB

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 CONDUCTED EMISSION MEASUREMENT

6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	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 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2. TEST INSTRUMENTS

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

6.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-031)

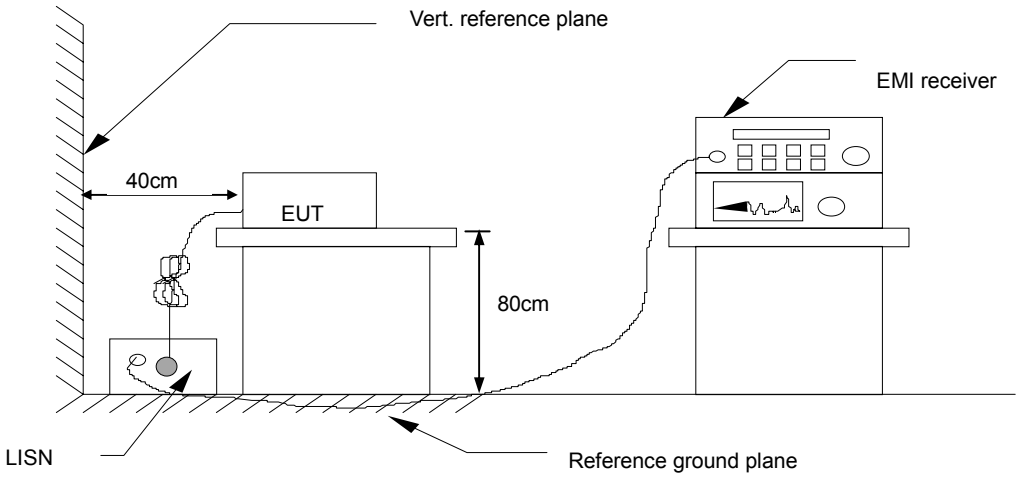
Procedure of Preliminary Test

- The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed by AC main power, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.
- All support equipment power by from a second LISN.
- The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

6.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.5. DATA SAMPLE

Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correctrion factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak. limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
x.xx	43.95	33.00	10.00	53.95	43.00	56.00	46.00	-2.05	-3.00	Pass

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB
Correction Factor (dB) = LISN Factor + Cable loss
Result (dBuV) = Raw reading converted to dBuV and CF added
Limit (dBuV) = Limit stated in standard
Margin (dB) = Result (dBuV) – Limit (dBuV)

6.6. TEST RESULTS

Not applicable, because EUT does not connect to AC Main Source direct.

7 RADIATED EMISSION MEASUREMENT

7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

Maximum permissible level of Radiated Emission measured at 3 meter

Frequency (MHz)	Field Strength (μV/m at 3-meter) Average	Field Strength (dBμV/m at 3-meter) Average
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Frequency (MHz)	Class A (dBuV/m)		Class B (dBuV/m)	
	Average	Peak	Average	Peak
Above 1000	59.3	79.3	54	74

Remark: *The lower limit shall apply at the transition frequency.*

7.2. TEST INSTRUMENTS

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510252	09/09/2010
Test Receiver	Rohde&Schwarz	ESCI	100064	11/29/2009
Switch Controller	TRC	Switch Controller	SC94050010	05/02/2010
4 Port Switch	TRC	4 Port Switch	SC94050020	05/02/2010
Horn-Antenna	TRC	HA-0502	06	06/02/2010
Horn-Antenna	TRC	HA-0801	04	06/18/2010
Horn-Antenna	TRC	HA-1201A	01	08/10/2010
Horn-Antenna	TRC	HA-1301A	01	08/10/2010
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/27/2010
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC: 965860 IC: IC 6106	09/23/2010
Test S/W	LABVIEW (V 6.1)			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.

7.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-031)

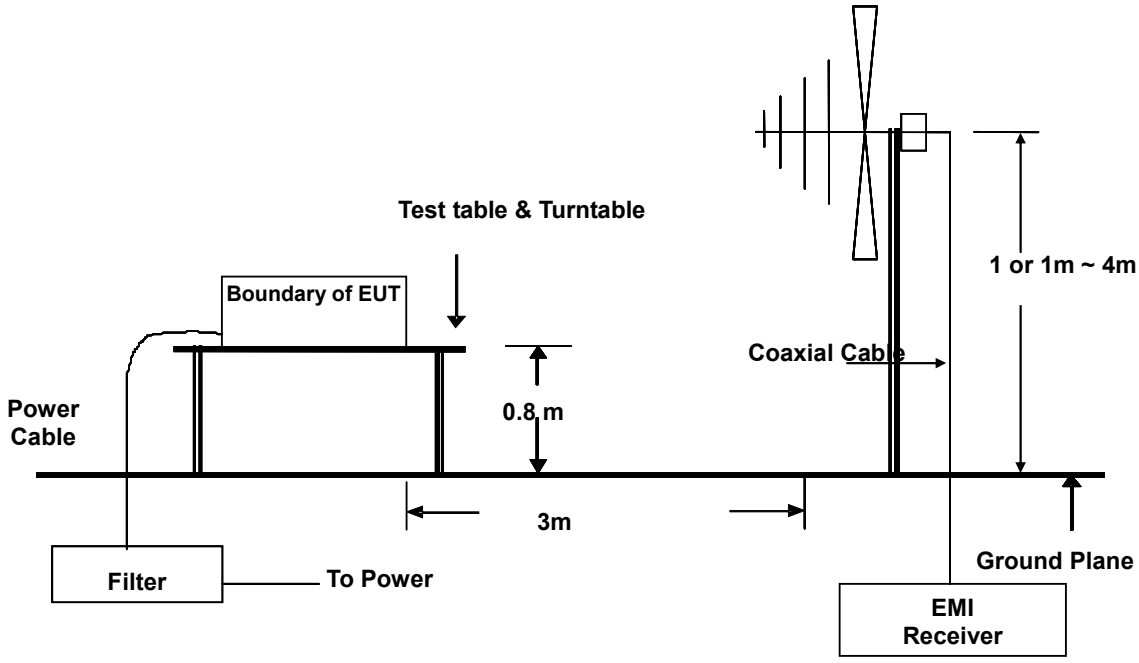
Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 or 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- The test data of the worst-case condition(s) was recorded.

7.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.5. DATA SAMPLE

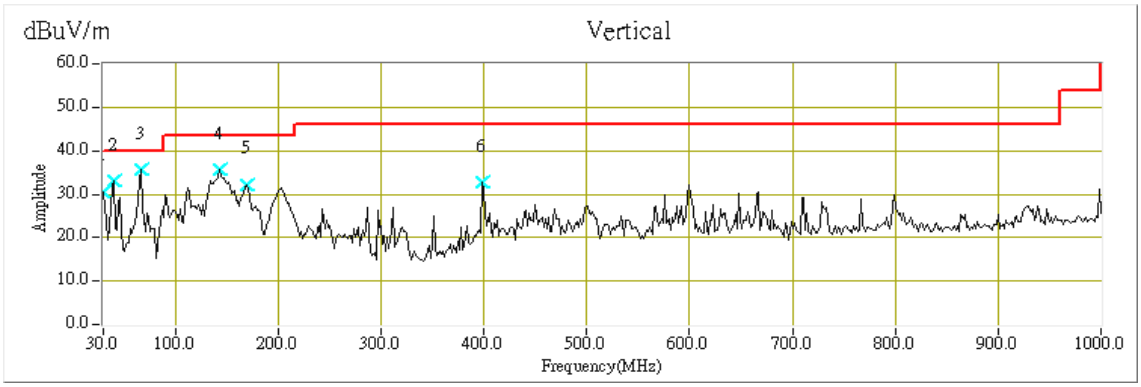
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (◦)	Height (cm)	Remark
xx.xx	16.49	9.86	26.35	30.00	-3.65	116.00	101.00	QP

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-Peak

7.6. TEST RESULTS

WUGU 966 Chamber A

Job No.:	90511003	**Ant. Polar.:**	Ver.
Standard:	FCC Class B	**Tested Distance:**	3m
Test Item:	Radiated Emission	**Date:**	200/06/05
Temp.(°C)/Hum.(%RH):	23°C/53%RH	**Time:**	PM 01:51
Company:	Infowave Pte Ltd	**Tested By:**	Mimic Yang
Model:	W618e	**Test Mode:**	Mode 1

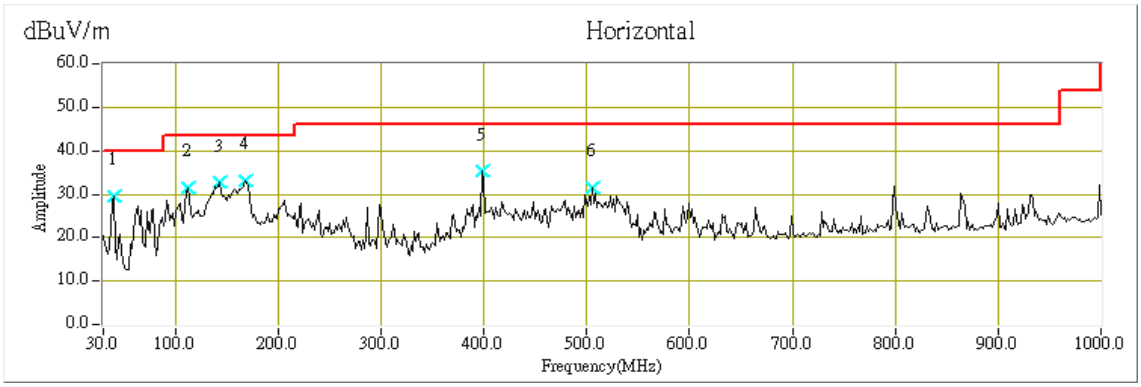


No.	Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	31.88	-1.33	30.55	40.00	-9.45	Peak
2	39.70	40.68	-7.67	33.00	40.00	-7.00	Peak
3	67.18	50.41	-14.81	35.59	40.00	-4.41	Peak
4	143.17	44.80	-9.28	35.52	43.50	-7.98	Peak
5	169.03	42.81	-10.72	32.09	43.50	-11.41	Peak
6	398.60	38.74	-6.11	32.63	46.00	-13.37	Peak

REMARKS: The other emission levels were very low against the limit.

WUGU 966 Chamber A

Job No.:	90511003	**Ant. Polar.:**	Hor.
Standard:	FCC Class B	**Tested Distance:**	3m
Test Item:	Radiated Emission	**Date:**	2009/06/05
Temp.(°C)/Hum.(%RH):	23°C/53%RH	**Time:**	PM 01:56
Company:	Infowave Pte Ltd	**Tested By:**	Mimic Yang
Model:	W618e	**Test Mode:**	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	39.70	37.18	-7.67	29.51	40.00	-10.49	Peak
2	112.45	42.17	-10.57	31.60	43.50	-11.90	Peak
3	143.17	41.91	-9.28	32.63	43.50	-10.87	Peak
4	167.42	43.72	-10.67	33.06	43.50	-10.44	Peak
5	398.60	41.34	-6.11	35.23	46.00	-10.77	Peak
6	505.30	35.48	-3.87	31.60	46.00	-14.40	Peak

REMARKS: The other emission levels were very low against the limit.

8 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST