

# FCC 47 CFR PART 15 SUBPART B **TEST REPORT**

For

**Applicant: Speed Dragon Multimedia Limited** 

Rm 1312, Vanta Industrial Centre, 21-33 Tai Lin Pai Rd, Kwai Address:

Chung, N.T. Hong Kong

Product Name: PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out

Cable)

SD-EMT02A, FG-EMT02A-1, FG-EMT02B-1, FG-EMT02A-2, **Model Number** 

FG-EMT02B-2, FG-EMT02A-3, FG-EMT02B-3

**Brand Name: N/A** 

FCC ID: U3P-SD-EMT02A

Report No.: MTE/CLY/D12101432

Date of Issue: Oct, 16, 2012

Issued by: Most Technology Service Co., Ltd.

No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan, Address:

Shenzhen, Guangdong, China

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# Report No.: MTE/CLY/D12101432

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#### 1. VERIFICATION OF CONFORMITY

**Equipment Under Test:** PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out Cable)

Brand Name: N/A

Model Number: SD-EMT02A

Series Number: FG-EMT02A-1, FG-EMT02B-1, FG-EMT02A-2, FG-EMT02B-2,

FG-EMT02A-3, FG-EMT02B-3

FCC ID: U3P-SD-EMT02A

Applicant: Speed Dragon Multimedia Limited

Rm 1312, Vanta Industrial Centre, 21-33 Tai Lin Pai Rd, Kwai Chung, N.T,

Hong Kong

Manufacturer: Speed Dragon Multimedia Limited

Rm 1312, Vanta Industrial Centre, 21-33 Tai Lin Pai Rd, Kwai Chung, N.T,

Hong Kong

**Technical Standards:** FCC Part 15 B

File Number: MTE/CLY/D12101432

**Date of test:** Oct. 08, 2012

**Deviation:** None **Condition of Test Sample:** Normal

The above equipment was tested by MOST for compliance with the requirements set forth in FCC Part 15 and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature):

Carol Yin

Oct. 13, 2012

Elva Wong

Oct. 15, 2012

Approved by (+ signature):

Yvette Zhou(Manager)

Oct. 16, 2012

# 2. GENERAL INFORMATION

# 2.1 PRODUCT INFORMATION

Description:	PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out Cable)
Model Name:	SD-EMT02A
Series Number:	FG-EMT02A-1, FG-EMT02B-1, FG-EMT02A-2, FG-EMT02B-2, FG-EMT02A-3, FG-EMT02B-3
Model Difference description:	N/A
Antenna Type:	Internal Fixed
Antenna Gain:	N/A
Power Supply:	DC 3.3V From PC System
Temperature Range:	-20°C ~ 55°C

# NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

#### 2.2 OBJECTIVE

Perform FCC Part 15 Subpart B tests for FCC Marking.

#### 2.3 TEST STANDARDS AND RESULTS

Test items and the results are as bellow:

EMISSION							
Standard Item Result Remarks							
FCC 47 CFR Part 15 Subpart B	Conducted	PASS	Meet Class B limit				
1 CC 47 CI K Fait 19 Subpart B	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.

#### 2.4 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C - Humidity: 30-60 %

- Atmospheric pressure: 86-106 kPa

#### 2.5 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

The report uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2,Providing a level of confidence of approximately 95%

- Uncertainty of Conducted Emission, Uc = ±1.8dB
- Uncertainty of Radiated Emission, Uc = ±3.2dB

#### 3. TEST METHODOLOGY

#### 3. 1TEST FACILITY

Test Site: Most Technology Service Co., Ltd.

Location: No.5, Langshan 2nd Rd, North Hi-Tech Industrial park, Nanshan, Shenzhen,

Guangdong, China

Description: There is one 3m semi-anechoic an area test sites and two line conducted labs for final

test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009 and CISPR

16 requirements. The FCC Registration Number is 490827.

The CNAS Registration Number is CNAS L3573.

Site Filing: The site description is on file with the Federal Communications

Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Instrument Tolerance: All measuring equipment is in accord with ANSI C63.4:2009 and CISPR 16

requirements that meet industry regulatory agency and accreditation agency

requirement.

Ground Plane: Two conductive reference ground planes were used during the Line Conducted

Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal

dimensions larger than one-tenth of a wavelength at the highest frequency of

measurement up to 1GHz.

#### 3.2 GENERAL TEST PROCEDURES

#### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2009, Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

#### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2009.

#### 3.3 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

<sup>&</sup>lt;sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

(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.

<sup>&</sup>lt;sup>2</sup> Above 38.6

# 4 SETUP OF EQUIPMENT UNDER TEST 4.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

# **4.2 SUPPORT EQUIPMENT**

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Monitor	Philips	220EW8FB/93	CJ2A0727038455	1.6m Un-shielded	1.8m Un-shielded
Mouse	Lenovo	M-UAE96	E-C011-05-3735(B)	1.6M Un-Shielded	
Keyboard	HP	SK-2880	BC34C0CJ6UZ888	1.5M Un-Shielded	

#### Remark:

All the equipment/cables were placed in the worst-case [-configuration to maximize the emission during the test.

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

# 4. 3 TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at MOST for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2013/03/14
2	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2013/03/14
3	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2013/03/14
4	Terminator	Hubersuhner	50Ω	No.1	2013/03/14
5	RF Cable	SchwarzBeck	N/A	No.1	2013/03/14
6	Test Receiver	Rohde & Schwarz	ESPI	101202	2013/03/14
7	Bilog Antenna	Sunol	JB3	A121206	2013/03/14
8	Test Antenna - Horn	Schwarzbeck	BBHA 9120C		2013/03/14
9	Test Antenna - Bi-Log	Schwarzbeck	VULB 9163		2013/03/14
10	Cable	Resenberger	N/A	NO.1	2013/03/14
11	Cable	SchwarzBeck	N/A	NO.2	2013/03/14
12	Cable	SchwarzBeck	N/A	NO.3	2013/03/14
13	DC Power Filter	DuoJi	DL2×30B	N/A	2013/03/14
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2013/03/14
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2013/03/14
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2013/03/14
17	Absorbing Clamp	Luthi	MDS21	3635	2013/03/14
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2013/03/14
19	AC Power Source	Kikusui	AC40MA	LM003232	2013/03/14
20	Test Analyzer	Test Analyzer Kikusui KHA1000		LM003720	2013/03/14
21	Line Impendence Network	Kikusui	LIN40MA- PCR-L	LM002352	2013/03/14
22	ESD Tester	Kikusui	KES4021	LM003537	2013/03/14
23	EMCPRO System	EMCPRO System EM Test UCS-500-N		V0648102026	2013/03/14
24	Signal Generator	IFR	2032	203002/100	2013/03/14
25	Amplifier	A&R	150W1000	301584	2013/03/14
26	CDN	FCC	FCC-801-M2-25	47	2013/03/14
27	CDN	FCC	FCC-801-M3-25	107	2013/03/14
28	EM Injection Clamp	FCC	F-203I-23mm	403	2013/03/14
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2013/03/14
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2013/03/14
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2013/03/14

NOTE: Equipments listed above have been calibrated and are in the period of validation.

# 5. 47 CFR PART 15B REQUIREMENTS

# **5.1 GENERAL INFORMATION**

The EUT has been tested under normal operating (TX) and standby (RX) condition.

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

# Mode 1: Running Mode

During the test, the EUT was plugged into the PC connect to Notebook through Network link cable.

The EUT configuration of the emission test was **Monitor + EUT+PC**.

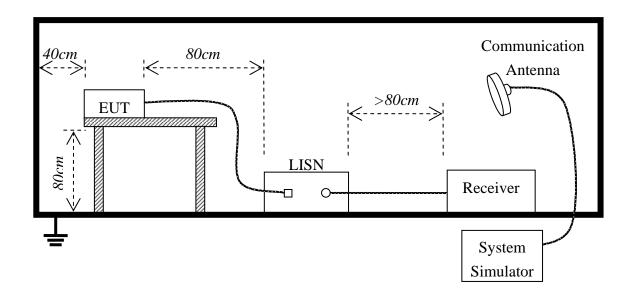
# 6. LINE CONDUCTED EMISSION TEST

# **6.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Fraguency	Maximum RF Line Voltage					
Frequency	Q.P.( dBuV)	Average( dBuV)				
150kHz-500kHz	66-56	56-46				
500kHz-5MHz	56	46				
5MHz-30MHz	60	50				

<sup>\*\*</sup>Note: 1. the lower limit shall apply at the transition frequency.

# 6.2. BLOCK DIAGRAM OF TEST SETUP



<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

#### 6.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual 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 FCC Part 15 (see Test Facility for the dimensions of the ground plane used). When the EUT is 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.
- 2) Support equipment, if needed, was placed as per FCC Part 15.
- 3) All I/O cables were positioned to simulate typical actual usage as per FCC Part 15.
- 4) The EUT through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5) All support equipments received power from a second LISN supplying power of AC 120V/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Preliminary Conducted Emission Test								
Frequency Range Investigated 150KHz TO 30 MHz								
Mode of operation	Date	Report No.	Data#	Worst Mode				
Running Mode	2012-10-08	MTE/CLY/D12101432	SD-EMT02A_1 _(L, N)					

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 6.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

EUT and support equipment was set up on the test bench as per step 9 of 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. If EUT emission level was less –20dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

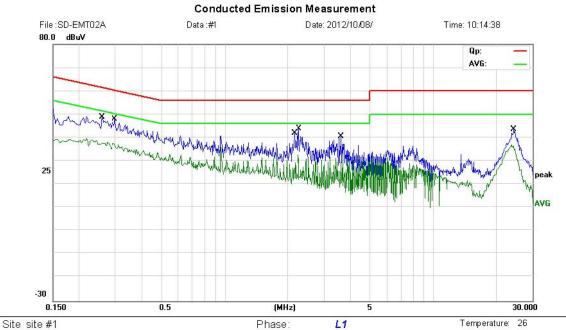
The test modes were carried out for all operation modes, The worst data was shown as the follow.

# 6.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST



Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park Guangdong ,China

Tel: 0755-86170306 Fax: 0755-86170310



Limit: FCC Part15 B Class B QP

Power: DC 3.3V From PC System

Hamilton CO M

Humidity: 60 %

EUT: PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out Cable)

M/N: SD-EMT02A Mode: Running

Note:

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∨	dB	dBu∀	dBu∀	dB	Detector	Comment
1	0.2580	37.04	11.61	48.65	61.50	-12.85	QР	
2	0.2980	36.73	11.35	48.08	60.30	-12.22	QР	
3	2.1580	32.69	9.16	41.85	56.00	-14.15	QP	
4 *	2.2620	34.65	9.26	43.91	56.00	-12.09	QP	
5	3.6260	29.79	10.63	40.42	56.00	-15.58	QР	
6	24.4180	34.56	9.00	43.56	60.00	-16.44	QР	

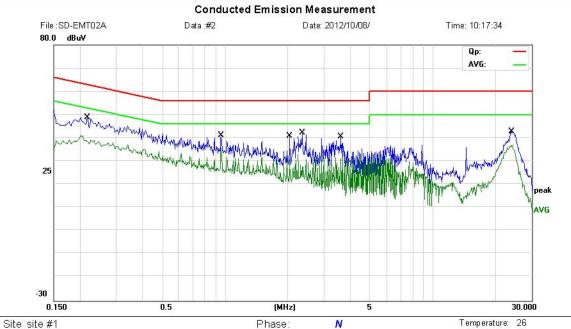
Engineer Signature: Allen

<sup>\*:</sup>Maximum data x:Over limit !:over margin



Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park Guangdong ,China

Tel: 0755-86170306 Fax: 0755-86170310



Limit: FCC Part15 B Class B QP

Power: DC 3.3V From PC System

Humidity: 60 %

EUT: PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out Cable)

M/N: SD-EMT02A Mode: Running

Note:

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∨	dB	dBu∀	dBu√	dB	Detector	Comment
1	0.2162	35.80	11.89	47.69	62.96	-15.27	QР	
2	0.9620	31.18	10.00	41.18	56.00	-14.82	QР	
3	2.0500	31.74	9.05	40.79	56.00	-15.21	QP	
4 *	2.3620	32.75	9.36	42.11	56.00	-13.89	QP	
5	3.6260	29.97	10.63	40.60	56.00	-15.40	QP	
6	24.0820	33.69	9.00	42.69	60.00	-17.31	QP	

Engineer Signature: Allen

<sup>\*:</sup>Maximum data x:Over limit !:over margin

#### 7. RADIATED EMISSION TEST

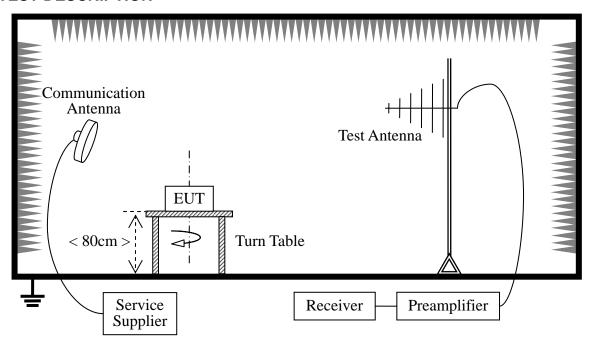
#### 7.1. LIMITS OF RADIATED DISTURBANCES AT 3M DISTANCES FOR CLASS B

According to FCC section 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 (µV/m)	Measurement Distance (m)
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

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

#### 7.2 TEST DESCRIPTION



- (1) The EUT was palced on a turntable with 0.8 meter above ground.
- (2) The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- (3) The table was rotated 360 degrees to determine the position of the highest radiation.
- (4) The antenna is a Bi-Log antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
- (5) For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1m to 4m) and turntable(from 0 degree to 360 degrees) to find the maximum reading.
- (6) Set the test-receiver system to Peak Detect Function and specified bandwidth with maximum hold mode.
- (7) If the emission level of the EUT in peak mode was 3dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.
- (8) Emission level(dBuV/m)=20 log Emission level(uv/m).
- (9) Corrected reading: Antenna Factor + cable loss + read level Preamp Factor = level

# 7.3 TEST RESULT

Preliminary Radiated Emission Test								
Frequency Range Investigated 30 MHz TO 1000 MHz								
Mode of operation Date Report No. Data# Wors								
Running Mode	2012-10-08	MTE/CLY/D12101432	SD-EMT02A _1_(L, N)	$\boxtimes$				

# Note:

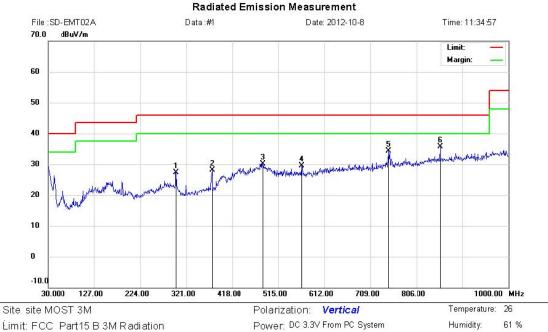
The test modes were carried out for all operation modes, The worst data was shown as the follow.

#### **Below 1GHz**



Address:No.5,Langshan 2nd Rd., North Hi-Tech Industrial park Guangdong, China

Tel: 0755-86170306 Fax: 0755-86170310



Limit: FCC Part15 B 3M Radiation

EUT: PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out Cable)

Distance:

M/N: SD-EMT02A Mode: Running

Note:

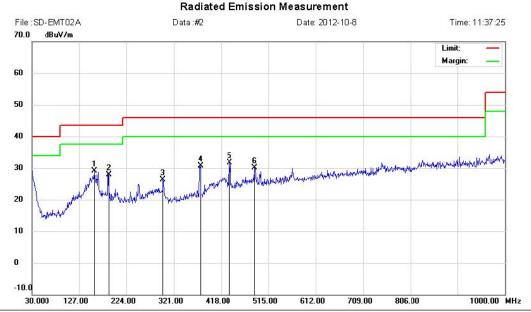
No.	MŁ	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		299.6600	8.09	19.30	27.39	46.00	-18.61	QP			
2		375.3200	9.92	18.24	28.16	46.00	-17.84	QP			
3		482.9900	8.35	21.76	30.11	46.00	-15.89	QΡ			
4		564.4700	6.75	22.74	29.49	46.00	-16.51	QΡ			
5		746.8300	8.53	25.80	34.33	46.00	-11.67	QΡ			
6	*	856.4400	8.51	27.11	35.62	46.00	-10.38	QP			

Engineer Signature: Allen

<sup>\*:</sup>Maximum data x:Over limit l:over margin



Tel: 0755-86170306 Fax: 0755-86170310



Site site MOST 3M

Polarization: Horizontal

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: DC 3.3V From PC System

Humidity: 61 %

EUT: PCI-Express I/O Card (2 Serial RS232+ 1 Parallel Ports Fan-Out Cable)

Distance:

M/N: SD-EMT02A Mode: Running

Note:

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBu∨	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		158.0400	12.01	17.10	29.11	43.50	-14.39	QP			
2		187.1400	11.27	16.60	27.87	43.50	-15.63	QP			
3		298.6900	7.07	19.30	26.37	46.00	-19.63	QP			
4		375.3200	12.43	18.24	30.67	46.00	-15.33	QP			
5	*	435.4600	11.30	20.34	31.64	46.00	-14.36	QΡ			
6		486.8700	8.32	21.76	30.08	46.00	-15.92	QΡ			

\*:Maximum data x:Over limit !:over margin

Engineer Signature: Allen

# APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

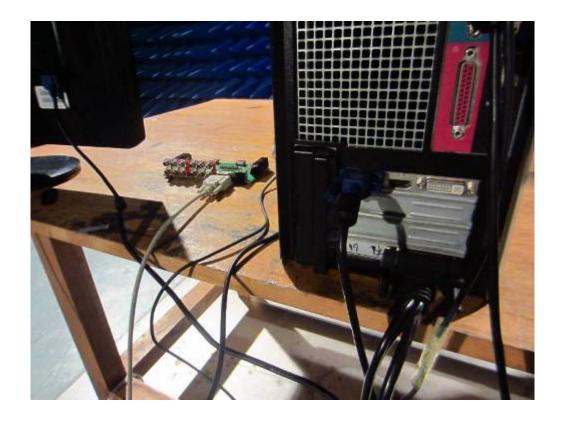
# CE TEST SETUP





# RE TEST SETUP





-----END OF REPORT-----