SK TECH CO., LTD.

FCC-Certificate of Compliance

Test Report No.:	**SKTFCE-070711-095**		
NVLAP CODE :	**200220-0**		
Applicant:	**Sysmate, Inc**		
Applicant Address:	6, Dunjimi 2 street, Dunsan-Dong, Seo-Gu, Daejeon, Korea		
Manufacturer :	**Sysmate, Inc**		
Manufacturer Address:	6, Dunjimi 2 street, Dunsan-Dong, Seo-Gu, Daejeon, Korea		
Product:	**1Gbps GBE x 2 PNET PCI-X CARD**		
FCC ID:	**VHGIS2122**	**Model No.:**	IS2122
Buyer Model/ Multi Model No.:	N/A		
Receipt No.:	SKTEU07-0608	**Date of receipt:**	Jun.21, 2007
Date of Issue:	Jul. 11, 2007		
Testing location:	**SK TECH CO., LTD.** 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
Test Standards:	**ANSI C63.4 / 2003**		
Rule Parts:	**FCC part 15 Subpart B**		
Equipment Class :	**Class B Digital Device Peripheral**		
Test Result:	The above mentioned product has been tested and passed.		

Prepared by: *S.Y.Ye* **Tested by**:*K.H.Choi/Engineer* **Approved by**: *D.H.Kang /Manager& Chief Engineer*

Signature	*Date*	*Signature*	*Date*	*Signature*	*Date*

Other Aspects :	
Abbreviations :	**· OK, Pass = passed · Fail = failed · N/A = not applicable**

- **This test report is not permitted to copy partly without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of one sample of the above mentioned.**
- **This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.**
- **We certify that this test report has been based on the measurement standards that is traceable to the national or International standards.**
- **This test report is the accredited testing items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.**

NVLAP®

NVLAP Lab. Code: 200220-0

》》 Contents 《《

》List of Tables

》List of Figures

1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by SK TECH Co., Ltd. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

SK TECH Co., Ltd.

2.1 Location

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

The test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.
This laboratory is recognized as a Conformity Assessment Body(CAB) for CAB's, Designation Number: **KR0007** by FCC, is accredited by NVLAP for NVLAP Lab. Code : : **200220-0** and DATech for DAR-Registration No.**DAT-P-076/97-01** and KOLAS for Accreditation No.:**KT191.**

2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

- **Conducted Disturbance**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESHS10	862970/019	09.2007
Artificial Mains Network	ESH2-Z5	834549/011	07.2007

- **Radiated Disturbance**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS10	834468/008	09.2007
Amplifier	8447F	3113A05153	07.2007
Trilog-Broadband Antenna	VULB9168	9168-230	07.2007
Antenna Turntable Driver	5907	91X518	N/A
Antenna Turntable controller	5906	91X519	N/A
Spectrum Analyzer	R3361A	11730187	09.2007

2.3 Test Date

Date of Application : Jun. 21, 2007

Date of Test : Jul. 06, 2007 ~ Jul. 10, 2007

2.4 Test Environment

See each test item's description.

3. Description of the tested samples

The EUT provides pocket transmission/ reception and Monitoring for 1G-SFP.
It can be installed in system which supports the standard PCI-X 64-bit 100/133 MHz interface.

3.1 Rating and Physical Characteristics

Monitoring Interface Specifications	
Feature	**Specification**
Interface	10/100/1000 BASE-T * 2 EA or 1000BASE-SX* 2EA
Media type	10/100/1000BASE-T User-Network Interface or GbE User-Network Interface operating at 1250 Mbps
Connector	10/100/1000BASE-T Copper SFP(Small From Factor Pluggable) or 1.25Gbps MMF 850nm SFP LCD-Duplex
Monitoring Network Specifications	
Supports Ethernet 2.0, IEEE 802.3 LLCD and IEEE 802.3 SNAP/LLC encoding formats and VLAN Tagged frames	
Verifies frame integrity (i.e. FCS and length checks).	
Automatic base page Auto_Negotiation.	
Provides port statistic counters needed to support the standards 802.3-1998,SNMP, and RMON Management Information Base(MIB) implementations.	
PCI Bus Specifications	
Feature	**Specification**
PCI-X clock	100/133 MHz (max)
PCI Data/ Address	64 bit and 32 bit
PCI modes	Master/slave
Hardware Packet Processor Specifications	
Full 1Gbps line speed packet processing engine Packet reception/transmission statistics	

Physical Characteristics	
Dimension	**Measurement**
Length	64.41 mm
Width	167.64mm
Power Requirements	
Specification	**Measurement**
Operating Voltage	+3.3V
Power consumption	Less than 8 Watts
Environmental Specifications	
Condition	**Operating Specifications**
Temperature	0℃ to 55℃
Relative humidity	5% to 85%

3.2 Submitted Documents

N/A

4. Measurement Conditions

Operating voltage of the EUT is supplied from AC Line.

The rating is AC 120V/ 60Hz at input.

4.1 Modes of Operation

Fiber optic cable was connected between EUT and the outside server and Data was transferred between them.

The Data rate displayed on the server was observed.

4.2 List of Peripherals

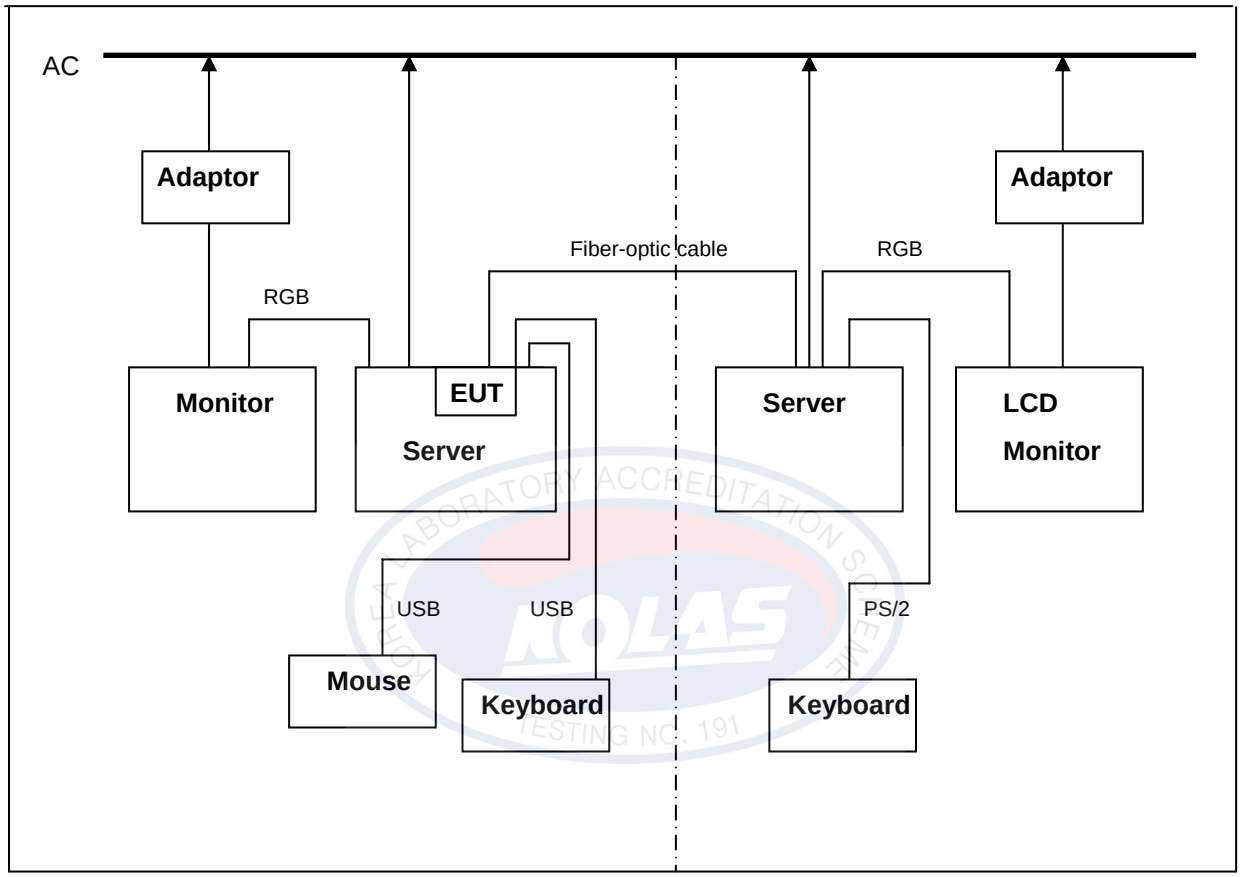
Equipment	Manufacturer	Model Name	Serial No.
Keyboard(PS2)	YET FOUNDATE LTD.	SK-1688	C0509035687
Mouse (USB)	ZUZHOU LOGITECH ELECTRONICS CO., LTD.	M-BJ58	HCA54718471
LCD Monitor (For EUT)	TOP VICTORY ELECTRONICS(FUJIAN) CO., LTD.	ELM-728	2925BJA021104 (For EUT)
Adaptor	TPV Electronics Co., Ltd.	ADPC12416BB	12416BG54738591
LCD Monitor	TOP VICTORY ELECTRONICS(FUJIAN) CO., LTD.	ELM-728	2925CJA021461
Adaptor	TPV Electronics Co., Ltd.	ADPC12416BB	12416BG54737993
Server (For EUT)	Super Micro	MR5400	N/A
Server	Intel	IR7036b	N/A
Keyboard (For EUT)	CHICONY ELECTRONICS CO. LTD.	KU-0225	0000106

4.3 Type of Used Cables

#	START		END		Cable	
	Name	I/O Port	Name	Name	Length	Shielded
1	Server (For EUT)	USB	Keyboard		1.8	Shielded
2		USB	USB		1.8	Shielded
3		RGB	LCD Monitor		1.5	Shielded
4		Fiber-optic cable	Server		1.0	Unshielded
5		Power	AC Line		1.5	Unshielded
6	Server	RGB	LCD Monitor		1.5	Shielded
7		PS/2	Keyboard		1.3	Unshielded
8		Power	AC Line		1.5	Unshielded
9	LCD Monitor	Power	AC Line		1.5	Unshielded

4.4 Test Setup

The test setup photographs showed the external supply connections and interfaces.



[System Block Diagram of Test Configuration]

4.5 Uncertainty

1) Radiated disturbances from 30 MHz to 1000 MHz at a distance of 3m and 10 m

Expanded Uncertainty

U = k * Uc(xi) = 2 * 2.3 = 4.60dB

The coverage factor k =2 yields approximately a 95% level of confidence.

2) Conducted disturbance from 150 KHz to 30 MHz using a 50 Ω/50 uH AMN

Expanded uncertainty

U= k * Uc(xi) = 2 * 1.96 = 3.92dB

The coverage factor k =2 yields approximately a 95% level of confidence.

※ When the measured emission is positioned within the range of the uncertainty of measurement from the emission limit, the uncertainty of measurement shall be concerned as follow.

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If Ulab is less than or equal to Ucispr

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If Ulab is greater than Ucispr

- compliance is deemed to occur if no measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by (Ulab - Ucispr), exceeds the disturbance limit.

※ If the measurement value is lower or equal to the limit, the EUT is considered to pass the test.

5. EMISSION Test

5.1 Conducted Emissions

Result: **PASS**

The line-conducted facility is located inside a 2.6M x 3.6M x 7.0M shielded enclosure.
The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 604-05.
A 1 m x 1.5 m wooden table 80 cm high is placed 40 cm. away from the vertical wall and 1.5 m away from the side wall of the shielded room. ROHDE & SCHWARZ Model ESH3-Z5 (10 kHz-30 MHz) 50 ohm/50 uH Line-Impedance Stabilization Networks(LISNs) are bonded to the shielded room.
The EUT is powered from the ROHDE & SCHWARZ LISN and the support equipment is powered from the ROHDE & SCHWARZ LISN. Power to the LISNs are filtered by a high-current high-insertion loss Lindgren enclosures power line filters (100dB 14 kHz-10 GHz).
The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.
All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2".
If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the ROHDE & SCHWARZ LISN.
All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 150 kHz to 30 MHz with 100msec. sweep time.
The frequency producing the maximum level was reexamined using EMI/field Intensity Meter (ESHS 10) and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode.
The bandwidth of the receiver was set to 10 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by: switching power lines; varying the mode of operation or resolution;clock or data exchange speed; if applicable; whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of conducted test.
Each EME reported was calibrated using self-calibrating mode.

Table 2: Test Data, Conducted Disturbance

<Quasi-Peak>

Frequency (MHz)	Reading (dBuV)	Line	C/F (dB)	C/L (dB)	Actual (dBuV)	Limit (dBuV)	Margin (dB)
0.205	39.44	N	0.13	0.02	39.59	63.41	23.82
0.275	39.74	N	0.13	0.02	39.89	60.97	21.08
0.345	37.96	L	0.11	0.02	38.09	59.08	20.99
9.405	34.81	N	0.32	0.18	35.31	60.00	24.69
9.465	34.73	L	0.29	0.18	35.20	60.00	24.80
15.050	36.39	L	0.43	0.31	37.13	60.00	22.87

<Average>

Frequency (MHz)	Reading (dBuV)	Line	C/F (dB)	C/L (dB)	Actual (dBuV)	Limit (dBuV)	Margin (dB)
0.200	37.75	N	0.13	0.02	37.90	53.41	15.51
0.275	38.30	N	0.13	0.02	38.45	50.97	12.52
0.345	35.75	L	0.11	0.02	35.88	49.08	13.20
0.410	28.98	N	0.13	0.02	29.13	47.65	18.52
0.480	26.26	L	0.11	0.02	26.39	46.34	19.95
15.050	31.50	L	0.43	0.31	32.24	50.00	17.76

▶ NOTE

*** C/F = Correction Factor**

*** C/L = Cable Loss**

*** LINE : L = Line-PE, N = Neutral-PE**

*** Margin Calculation**
Margin(Q.P) = Limit - Actual
[Actual(Q.P)= Reading(Q.P) + C/F + C/L]

Figure 1: Spectral Diagram, LINE – PE

SK TECH Co., Ltd. 06 Jul 2007 20:53

CONDUCTED DISTURBANCE

EUT: IS2122
Manuf:
Op Cond:
Operator:
Test Spec: FCC Part15 SubpartB
Comment: LINE-PE

Result File: IS2122_L.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 35 dB

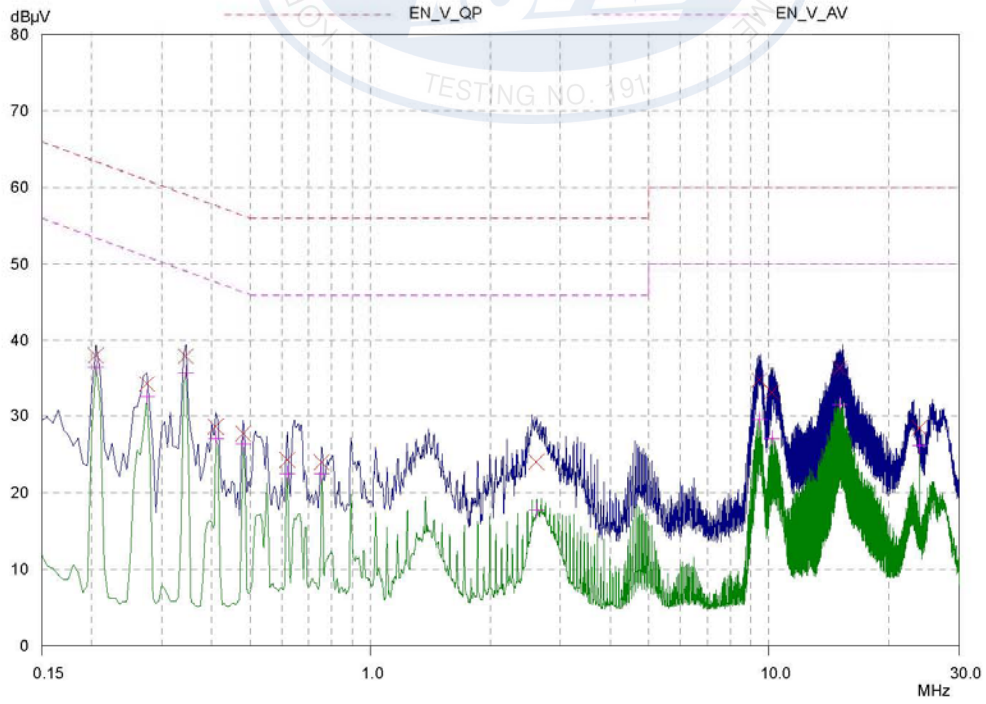


Figure 2: Spectral Diagram, NEUTRAL – PE

SK TECH Co., Ltd. 06 Jul 2007 20:24

CONDUCTED DISTURBANCE

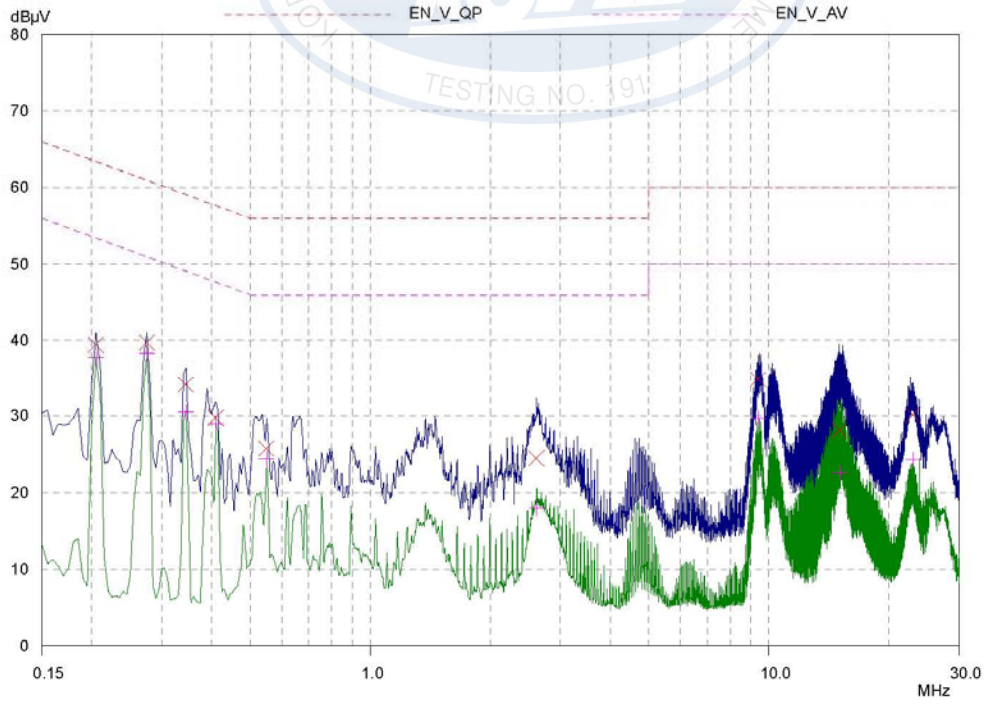
EUT: IS2122
Manuf:
Op Cond:
Operator:
Test Spec: FCC Part15 SubpartB
Comment: NEUTRAL-PE

Result File: IS2122_N.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	20msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Peaks: 8
Acc Margin: 35 dB



5.2 Radiated Emissions

Result : **PASS**

Preliminary measurements were made indoors at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME.
Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found.
The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.
Final measurements were made outdoors at 3-meter test range using Trilog-Broadband Antenna.

The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with FRP.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter(ESVS 10) and Quasi-Peak Adapter.
The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100 kHz or 1 MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non- metallic 1 x 1.5 meter table.
The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.
Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.
Photographs of the worst-case emission can be seen in photograph of radiated emission test.
Each EME reported was calibrated using self-calibrating mode.

Table 3 : Test Data, Radiated Emissions

Frequency [MHz]	Pol.	Height [m]	Real Reading	Correction Factor		T-Fact [dB]	Data [dBuV/m]	Limits [dBuV/m]	Margin [dB]
				Antenna	Cable				
98.02	V	1.0	9.3	7.9	1.0	8.9	18.2	30.0	11.8
143.74	H	4.0	6.4	12.6	1.2	13.8	20.2	30.0	9.8
216.29	V	1.0	5.4	9.3	1.3	10.6	16.0	30.0	14.0
339.24	V	1.2	10.5	12.9	1.7	14.6	25.1	37.0	11.9
699.35	V	1.8	4.2	20.2	2.5	22.7	26.9	37.0	10.1
799.99	V	1.3	6.3	22.3	2.8	25.1	31.4	37.0	5.6

Table. Radiated Measurements at 3-meters

NOTES:

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emission are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR Quasi-Peak mode.
5. H = Horizontal, V = Vertical Polarization
6. Data = Real Reading + T – Fact (Antenna+Cable)
7. Margin = Limits – Data