



RADIO TEST REPORT

Test Report No. : 28JE0212-HO-02-B-R1

Applicant : Sony Corporation
Type of Equipment : Hard Disk Drive
Model No. : VGP-UHDM25
Test regulation : FCC Part 15 Subpart C : 2008
Section 15.207 and 15.225
FCC ID : AK8VGPUHDM25
Test Result : Complied

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6. Original test report number of this report is 28JE0212-HO-02-B.

Date of test:

June 30 to July 18, 2008

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MF060b (09.01.08)

CONTENTS	PAGE
SECTION 1: Customer information	3
SECTION 2: Equipment under test (E.U.T.)	3
SECTION 3: Test specification, procedures & results	4
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Conducted emission	10
SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)	11
SECTION 7: 20dB Bandwidth.....	12
SECTION 8: Frequency Tolerance	12
SECTION 9: 99% Occupied Bandwidth	12
APPENDIX 1: Photographs of test setup.....	13
Conducted emission.....	13
Radiated emission.....	14
APPENDIX 2: Data of EMI test	15
Conducted emission.....	15
Radiated emission(Fundamental emission and Spectrum Mask).....	17
Radiated emission (Spurious emission: below 30MHz)	18
Radiated emission (Spurious emission: above 30MHz)	19
20dB Bandwidth	20
99% Occupied Bandwidth.....	21
Frequency Tolerance.....	22
APPENDIX 3: Test instruments	23

SECTION 1: Customer information

Company Name : Sony Corporation
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Facsimile Number : +81-263-72-9755
Contact Person : Michio Kobayashi

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Hard Disk Drive
Model No. : VGP-UHDM25
Serial No. : 28267310 1000054
Receipt Date of Sample : June 6, 2008
Country of Mass-production : Japan
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model No: VGP-UHDM25 (referred to as the EUT in this report) is the Hard Disk Drive.
The clock frequency of EUT is 6MHz (CPU), 12MHz (IF IC) and 13.5MHz (Inductive Reader/Writer IC).

Equipment Type : Transceiver
Frequency of operation : 13.56MHz
Type of modulation : ASK
Antenna Type : Loop Antenna
Antenna connector Type : Wire solder
Method of Frequency Generation : Crystal
Operating voltage (Inner) : DC5.0V

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C: 2008, final revised on May 19, 2008

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.225 : Operation within the band 13.110-14.010MHz

FCC 15.31 (e)

The EUT is constantly provided with the voltage (DC5.0V) from USB I/F port of Host PC to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC>RSS-Gen 7.2.2	Section 15.207 <IC>RSS-Gen 7.2.2	-	N/A	<QP> 14.3dB 0.34569MHz, N <AV> 8.4dB 0.34500MHz, L	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	Section 15.225(a) <IC>RSS-210 A2.6	Radiated	N/A	74.0dB 13.56MHz, 0 deg., QP (With Tag)	Complied
3	Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section 15.225(b)(c) <IC> RSS-210 A2.6	Radiated	N/A	37.2dB 14.02MHz, 0deg., QP	Complied
4	20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	Section15.215(c) <IC> -	Radiated	N/A	N/A	N/A
5	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section15.209, Section 15.225 (d) <IC>RSS-210 A2.6	Radiated	N/A	4.8dB, 54.240MHz, Vertical, QP	Complied
6	Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7	Section15.225(e) <IC> RSS-210 A2.6	Radiated	N/A	See data	Complied

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A

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3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room	Conducted emission	Radiated emission (10m*)			Radiated emission (3m*)			Radiated emission (3m*)	
		150kHz-30MHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz
No.1 semi-anechoic chamber (±)	3.7dB	3.1dB	4.4dB	4.2dB	3.2dB	3.8dB	3.9dB	5.9dB	6.1dB
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.4dB	4.0dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.6dB	4.0dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	3.9dB	3.9dB	5.9dB	6.1dB

*10m/3m = Measurement distance

Conducted emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test (3m)

The data listed in this test report has enough margin, more than the site margin.

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty for this test is ±3.0dB.

The data listed in this test report has enough margin, more than the site margin.

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3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

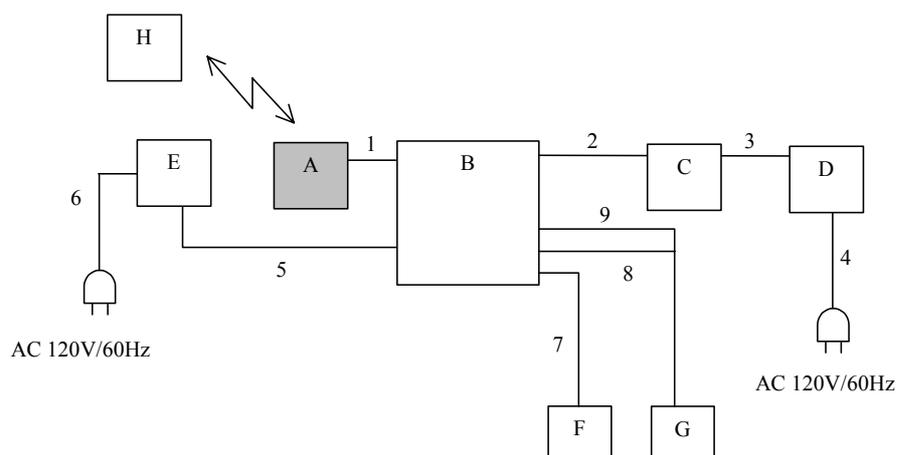
The mode(s) : 1) Transmitting 13.56MHz *1) With Tag + HDD R/W
*1) The Transmitting data signals ("1" and "0" pulse) are converted to MANCHESTER code.
These signals are modulated to ASK and continuously transmitted.

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

Frequency Tolerance:

Temperature for the extreme tests : -20 deg.C.(minimum) to + 50deg.C.(maximum)
Voltage for the extreme tests : Vnom:AC120V, Vmin:AC102V, Vmax:AC138V : AC mains voltage
*This EUT is constantly provided with the voltage (DC5.0V) from USB I/F port of Host PC to RF Module regardless of input voltage.
However, the tests were performed with changing the voltage of AC Mains.

4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Name	Model No.	Serial No.	Manufacturer	Remark
A	Hard Disk Drive	VGP-UHDM25	28267310 1000054	Sony Corporation	EUT
B	Note PC	M721PVT JCS-W-001	28272011 1000001	Sony Corporation	-
C	DVD+RW Drive	VGP-DDRW4	28235310 1100057	Sony Corporation	-
D	AC Adapter (for DVD)	VGP-AC10V1	147913411 0010126	Sony Corporation	-
E	AC Adapter (for Note PC)	VGP-AC19V27	148041411 0000973	Sony Corporation	-
F	USB Mouse	1049	X803801 004	Microsoft	-
G	Headset	HST601-BL	-	Arvel	-
H	Wireless key	RC-S890	001	Sony Corporation	*1)

*1) This Wireless key is a passive type (Electromagnetic induction type).

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List of cables used

No.	Name	Length (m)	Cable		Remark
			Cable	Connector	
1	USB Cable	1.0	Shielded	Shielded	-
2	i-link Cable	0.9	Shielded	Shielded	-
3	DC Cable	1.8	Unshielded	Unshielded	-
4	AC Cable	0.7	Unshielded	Unshielded	-
5	DC Cable	1.8	Unshielded	Unshielded	-
6	AC Cable	0.7	Unshielded	Unshielded	-
7	USB Cable	0.8	Shielded	Shielded	-
8	Earphone Cable	1.8	Unshielded	Unshielded	-
9	Microphone Cable	1.8	Unshielded	Unshielded	-

SECTION 5: Conducted emission

5.1 Operating environment

Test place : No.1 and No.2 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT and its peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN/AMN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/ an AMN to the input power source. All unused 50ohm connectors of the LISN/ AMN were resistively terminated in 50ohm when not connected to the measuring equipment. The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a horizontal conducting plane 4.0 x 4.0m and a vertical conducting plane 2.0 x 2.0m in a semi Anechoic Chamber. Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 0.15MHz-30MHz
EUT position : Table top
EUT operation mode : See Clause 4.1

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in the semi Anechoic Chamber. The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains Network (AMN). An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, with an average detector. The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : QP and AV
IF Bandwidth : 9kHz

5.5 Test result

Summary of the test results : Pass

SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)

6.1 Operating environment

Test place : No.1 semi Anechoic Chamber
Temperature : See data
Humidity : See data

6.2 Test Procedure

The Radiated Electric Field Strength intensity has been measured in a semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency: From 9kHz to 30MHz at distance 3m, Used antenna: Loop
The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for each antenna angle 0deg. , 45deg. and 90deg.

Frequency: From 30MHz to 1GHz at distance 3m, Used antenna: Biconical (30-300MHz), Logperiodic (300-1000MHz)
The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with a QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

*The test was made on EUT at the normal use position.

* FCC Part 15 Section 15.31 (f)(2) / IC RSS-Gen 4.11 (9kHz-30MHz)
9kHz – 490kHz [Limit at 3m]=[Limit at 300m]-40log (3[m]/300[m])
490kHz – 30MHz[Limit at 3m]=[Limit at 30m]-40log (3[m]/30[m])

6.3 Test result

Summary of the test results : Pass

SECTION 7: 20dB Bandwidth

Test Procedure

The measurement was performed under the condition which has the maximum Electric field strength.

Test data : APPENDIX 2
Test result : Pass

SECTION 8: Frequency Tolerance

Test Procedure

The measurement was performed with Electric field strength using a spectrum analyzer.

Test data : APPENDIX 2
Test result : Pass

SECTION 9: 99% Occupied Bandwidth

Test Procedure

The measurement was performed under the condition which has the maximum Electric field strength.

Test data : APPENDIX 2
Test result : Pass