

# Test Report

Product Name	Octiv <sup>TM</sup> Networked Music System
Model No.	HX8020
FCC ID	VUIHX8020

Applicant	PEGATRON CORPORATION
Address	5F., NO.76, LIGONG ST., BEITOU DISTRICT, TAIPEI
	CITY 112, TAIWAN (R.O.C.)

Date of Receipt	Jan. 24, 2008
Issued Date	Apr. 07, 2008
Report No.	081303R-RFUSP05V01
Version	V1.0

The test results relate only to the samples tested.

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# Test Report Certification

Issued Date: Apr. 07, 2008 Report No.: 081303R-RFUSP05V01



Accredited by NIST (NVLAP) NVLAP Lab Code: 200533-0

Product Name	Octiv <sup>TM</sup> Networked Music System	
Applicant	PEGATRON CORPORATION	
Address	5F., NO.76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY 112,	
	TAIWAN (R.O.C.)	
Manufacturer	PEGATRON CORPORATION	
Model No.	HX8020	
Rated Voltage	AC 120V/60Hz	
Working Voltage	AC 120V/60Hz	
Trade Name	ALTEC LANSING	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2007	
	ANSI C63.4: 2003	
Test Result	Complied	

Test results relate only to the samples tested.

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

# 1. GENERAL INFORMATION

# **1.1. EUT Description**

Product Name	Octiv <sup>™</sup> Networked Music System	
Trade Name	ALTEC LANSING	
Model No.	HX8020	
FCC ID	VUIHX8020	
Frequency Range	802.11b/g: 2412-2462MHz	
Channel Number	802.11b/g: 11	
Data Speed	IEEE 802.11b – 1, 2, 5.5, 11Mbps	
	IEEE 802.11g – 6, 9, 12, 18, 24, 36 48, 54Mbps	
Type of Modulation	802.11b:DSSS	
	DBPSK, DQPSK, CCK	
	802.11g: OFDM	
	BPSK, QPSK, 16QAM, 64QAM	
Antenna Type	PIFA	
Antenna Gain	Refer to the table "Antenna List"	
Channel Control	Auto	
Power Adapter	UMEC, UP0902-01	
	Input: 100-240V, 50-60Hz 2.5A	
	Output: 26V-0.3A	
	Cable out: Non-Shielded, 1.6m	
	Power cord: Non-Shielded, 1.8m	

	Antenna List		
No.	Manufacturer	Part No.	Peak Gain
1	SmartAnt	AWM-6000	2.82dBi in 2.4 GHz

# **1.2.** Operational Description

The EUT is an Octiv<sup>™</sup> Networked Music System with 11 channels. This device provides four kinds of transmitting speed 1, 2, 5.5 and 11Mbps. The modulation of device is BPSK, QPSK and CCK (IEEE 802.11b) and eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps are provided. The technology of this device used is OFDM (IEEE 802.11g).

The device adapts direct sequence spread spectrum modulation. The antenna provides diversity function to improve the receiving function.

This Octiv<sup>™</sup> Networked Music System, compliant with IEEE 802.11b and IEEE 802.11g, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direst Sequence Spread Spectrum (DSSS) radio transmission, the Octiv<sup>™</sup> Networked Music System Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11g network.

Test Mode	Mode 1: Transmitter 802.11b
	Mode 2: Transmitter 802.11g

# **1.3.** Tested System Datails

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1.	Notebook PC	DELL	PP04X	C8YYM1S	DoC	Non-Shielded, 0.8m
2.	Test fixture	N/A	N/A	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A.	RS-232 Cable	Shielded, 5.0m

# **1.4.** Configuration of Test System



### **1.5.** EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute "DutAPiAP Dual Band.EXE" on the EUT.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous transmission.
- (5) Verify that the EUT works properly.

# 1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description:	File on
	Federal Communications Commission
	FCC Engineering Laboratory
	7435 Oakland Mills Road
	Columbia, MD 21046
	Registration Number: 92195
	Accreditation on NVLAP
	NVLAP Lab Code: 200533-0
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	E-Mail : <u>service@quietek.com</u>

FCC Accreditation Number: TW1014



# 2. Conducted Emission

### 2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2007	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2007	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2007	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2007	
5	No.1 Shielded Room	n		N/A	

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

# 2.2. Test Setup



# 2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit						
Frequency	Limits					
MHz	uV	dBuV				
0.15 - 0.50	66-56 <sub>(注)</sub>	56-46 <sub>(21)</sub>				
0.50-5.0	56	46				
5.0 - 30	60	50				

# 2.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 2.5. Uncertainty

± 2.26 dB

### 2.6. Test Result of Conducted Emission

Product	:	Octiv <sup>TM</sup> Networked Music System
Test Item	:	Conducted Emission Test
Power Line	:	Line 1
Test Mode	:	Mode 1: Transmitter 802.11b (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.188	0.732	52.160	52.892	-12.022	64.914
0.248	0.351	46.250	46.601	-16.599	63.200
0.310	0.300	41.140	41.440	-19.989	61.429
0.374	0.300	37.730	38.030	-21.570	59.600
0.434	0.300	32.870	33.170	-24.716	57.886
13.273	0.923	38.620	39.543	-20.457	60.000
Average					
0.188	0.732	43.440	44.172	-10.742	54.914
0.248	0.351	37.720	38.071	-15.129	53.200
0.310	0.300	34.480	34.780	-16.649	51.429
0.374	0.300	30.960	31.260	-18.340	49.600
0.434	0.300	25.200	25.500	-22.386	47.886
13.273	0.923	38.190	39.113	-10.887	50.000

### Note:

1. All Reading Levels are Quasi-Peak and average value.

2. "means the worst emission level.

3. Measurement Level = Reading Level + Correct Factor

Product	: Octiv <sup>TM</sup> Networked Music System							
Test Item	: Conducted Emission Test							
Power Line	: Line 2							
Test Mode	: Mode 1: T	ransmitter 802.1	1b (2437MHz)					
			× ,					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV	dB	dBuV			
LINE 2								
Quasi-Peak								
0.161	0.300	40.190	40.490	-25.196	65.686			
0.185	0.300	52.600	52.900	-12.100	65.000			
0.254	0.300	41.180	41.480	-21.549	63.029			
0.310	0.300	40.720	41.020	-20.409	61.429			
0.374	0.310	37.390	37.700	-21.900	59.600			
0.438	0.310	32.610	32.920	-24.851	57.771			
Average								
0.161	0.300	34.950	35.250	-20.436	55.686			
0.185	0.300	43.730	44.030	-10.970	55.000			
0.254	0.300	33.410	33.710	-19.319	53.029			
0.310	0.300	34.030	34.330	-17.099	51.429			
0.374	0.310	30.800	31.110	-18.490	49.600			
0.438	0.310	26.760	27.070	-20.701	47.771			

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

Product	: Octiv <sup>™</sup> Networked Music System							
Test Item	: Conducted Emission Test							
Power Line	: Line 1							
Test Mode	: Mode 2: Tr	ansmitter 802.1	1g (2437MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV	dB	dBuV			
LINE 1								
Quasi-Peak								
0.185	0.753	52.140	52.893	-12.107	65.000			
0.251	0.343	45.340	45.683	-17.431	63.114			
0.313	0.300	40.880	41.180	-20.163	61.343			
0.377	0.300	36.270	36.570	-22.944	59.514			
0.441	0.300	30.470	30.770	-26.916	57.686			
12.737	0.854	38.860	39.714	-20.286	60.000			
Average								
0.185	0.753	43.660	44.413	-10.587	55.000			
0.251	0.343	37.100	37.443	-15.671	53.114			
0.313	0.300	34.310	34.610	-16.733	51.343			
0.377	0.300	29.580	29.880	-19.634	49.514			
0.441	0.300	23.600	23.900	-23.786	47.686			
12.737	0.854	35.440	36.294	-13.706	50.000			

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " " means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

Product	: Octiv <sup>™</sup> Networked Music System						
Test Item	: Conducted Emission Test						
Power Line	: Line 2						
Test Mode	: Mode 2: Tr	ransmitter 802.1	1g (2437MHz)				
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV	dB	dBuV		
LINE 2							
Quasi-Peak							
0.163	0.300	39.900	40.200	-25.429	65.629		
0.186	0.300	53.120	53.420	-11.551	64.971		
0.250	0.300	46.070	46.370	-16.773	63.143		
0.308	0.300	37.200	37.500	-23.986	61.486		
0.378	0.310	34.510	34.820	-24.666	59.486		
0.436	0.310	33.760	34.070	-23.759	57.829		
Average							
0.163	0.300	33.790	34.090	-21.539	55.629		
0.186	0.300	44.230	44.530	-10.441	54.971		
0.250	0.300	37.490	37.790	-15.353	53.143		
0.308	0.300	31.380	31.680	-19.806	51.486		
0.378	0.310	28.030	28.340	-21.146	49.486		
0.436	0.310	27.830	28.140	-19.689	47.829		

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

# **3.** Peak Power Output

### **3.1.** Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2007
Х	Power Sensor	Anritsu	MA2491A/034457	May, 2007

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

### 3.2. Test Setup

Conducted Measurement



### **3.3.** Test procedures

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

### 3.4. Limits

The maximum peak power shall be less 1 Watt.

### 3.5. Uncertainty

± 1.27 dB

# **3.6.** Test Result of Peak Power Output

Product	:	Octiv <sup>™</sup> Networked Music System
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

Cable loss=0.	5dB	Peak Power Output Value (dBm)					
			Data Rate				
Channel No.	Frequency (MHZ)	1 Mbps	2Mbps	5.5Mbps	11Mbps	Required Limit	
1	2412.00	16.11				1Watt= 30 dBm	
6	2437.00	16.18	16.12	15.87	15.79	1Watt= 30 dBm	
11	2462.00	16.15				1Watt= 30 dBm	

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Product	:	Octiv <sup>™</sup> Networked Music System
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

Cable				Peak P	ower O	utput Va	alue (dB	m)		
		Data Rate (Mbps)								
Channel No.	Frequency (MHz)	6	9	12	18	24	36	48	54	Required Limit
		Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	
1	2412.00	13.04								1Watt= 30 dBm
6	2437.00	13.81	13.64	13.22	13.04	13.76	13.68	13.46	13.42	1Watt= 30 dBm
11	2462.00	13.68								1Watt= 30 dBm

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

# 4. Radiated Emission

### 4.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2007
	Х	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2007
	Х	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2007
	Х	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2007
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2008
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All instruments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

# 4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



# 4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits						
Frequency MHz	uV/m @3m	dBuV/m@3m				
30-88	100	40				
88-216	150	43.5				
216-960	200	46				
Above 960	500	54				

Remarks: E field strength  $(dBuV/m) = 20 \log E$  field strength (uV/m)

# 4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement. The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement. The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna. The worst radiated emission is measured in the Open Area Test Site on the Final Measurement. The frequency range from 30MHz to 10th harminics is checked.

# QuieTer

#### Report No. 081303R-RFUSP05V01

# 4.5. Uncertainty

- ± 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

# 4.6. Test Result of Radiated Emission

Product	:	Octiv <sup>TM</sup> Networked Music System
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.723	43.720	47.443	-26.527	74.000
7236.000	9.439	41.780	51.219	-22.751	74.000
9648.000	11.829	40.380	52.209	-21.761	74.000
Average					
<b>Detector:</b>					
Vertical					
Peak Detector:					
4824.000	3.723	44.030	47.753	-26.217	74.000
7236.000	9.439	42.590	52.029	-21.941	74.000
9648.000	11.829	41.740	53.569	-20.401	74.000
Average					
-					

Detector:

--

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System						
Test Item	: Harmon	: Harmonic Radiated Emission Data					
Test Site	: No.3 OA	: No.3 OATS					
Test Mode	: Mode 1:	Transmitter 802.	11b (2437 MHz)				
Fraquanay	Corroct	Dooding	Magguramant	Morgin	Limit		
requency	Easter	Laval	Laval	Wargin	Linnt		
	Factor	Level		ID			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4874.000	3.893	44.620	48.512	-25.458	74.000		
7311.000	9.624	41.460	51.084	-22.886	74.000		
9748.000	11.805	41.090	52.896	-21.074	74.000		
A.v.040.000							
Average							
Detector:							
Vertical							
Peak Detector:							
4874.000	3.893	45.460	49.352	-24.618	74.000		
7311.000	9.624	41.690	51.314	-22.656	74.000		
9748.000	11.805	41.150	52.956	-21.014	74.000		
Average							
Detector:							

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System					
Test Item	: Harmon	ic Radiated Emiss	sion Data			
Test Site	: No.3 OA	ATS				
Test Mode	: Mode 1:	Transmitter 802.	11b (2462 MHz)			
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
Peak Detector:						
4924.000	4.075	44.990	49.065	-24.905	74.000	
7386.000	9.812	42.030	51.842	-22.128	74.000	
9848.000	11.819	41.480	53.299	-20.671	74.000	
Average						
Detectory						
Detector:						
Vertical						
Peak Detector:						
4924.000	4.075	44.310	48.385	-25.585	74.000	
7386.000	9.812	40.980	50.792	-23.178	74.000	
9848.000	11.819	41.130	52.949	-21.021	74.000	
Average						
Detector:						

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OA	TS					
Test Mode	: Mode 2:	Transmitter 802.	11g (2412MHz)				
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4824.000	3.723	42.650	46.373	-27.597	74.000		
7236.000	9.439	42.210	51.649	-22.321	74.000		
9648.000	11.829	41.290	53.119	-20.851	74.000		
Avorago							
Avei age							
Detector:							
Vertical							
Peak Detector:							
4824.000	3.723	43.420	47.143	-26.827	74.000		
7236.000	9.439	42.510	51.949	-22.021	74.000		
9648.000	11.829	41.640	53.469	-20.501	74.000		
Average							
Detector:							

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System						
Test Item	: Harmon	: Harmonic Radiated Emission Data					
Test Site	: No.3 OATS						
Test Mode	: Mode 2:	Transmitter 802.	11g (2437 MHz)				
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4874.000	3.893	44.000	47.892	-26.078	74.000		
7311.000	9.624	42.220	51.844	-22.126	74.000		
9748.000	11.805	40.830	52.636	-21.334	74.000		
Average							
<b>Detector:</b>							
Vartical							
Peak Detector:							
4874.000	3.893	43.480	47.372	-26.598	74.000		
7311.000	9.624	41.980	51.604	-22.366	74.000		
9748.000	11.805	40.780	52.586	-21.384	74.000		
Average							
Detector:							

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System							
Test Item	: Harmonic Radiated Emission Data							
Test Site	: No.3 OA	: No.3 OATS						
Test Mode	: Mode 2:	Transmitter 802.	11g (2462 MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
Peak Detector:								
4924.000	4.075	41.980	46.055	-27.915	74.000			
7386.000	9.812	39.550	49.362	-24.608	74.000			
9848.000	11.819	40.110	51.929	-22.041	74.000			
Average								
<b>Detector:</b>								
Vertical								
Peak Detector:								
4924.000	4.075	42.160	46.235	-27.735	74.000			
7386.000	9.812	41.710	51.522	-22.448	74.000			
9848.000	11.819	41.970	53.789	-20.181	74.000			
Average								
Detector:								

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- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System					
Test Item	: General Radiated Emission Data					
Test Site	: No.3 OATS					
Test Mode	: Mode 1:	Transmitter 802.	11b (2437 MHz)			
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
57.100	8.332	17.900	26.233	-13.767	40.000	
61.040	8.021	16.130	24.151	-15.849	40.000	
120.000	12.032	25.100	37.132	-6.368	43.500	
138.600	11.278	23.100	34.378	-9.122	43.500	
200.100	11.062	19.200	30.262	-13.238	43.500	
528.900	22.864	16.300	39.164	-6.836	46.000	
Vertical						
146.300	15.445	22.300	37.745	-5.755	43.500	
262.300	13.922	21.300	35.221	-10.779	46.000	
528.300	20.560	20.300	40.860	-5.140	46.000	
681.300	22.145	16.300	38.445	-7.555	46.000	
726.300	20.521	18.300	38.822	-7.178	46.000	
968.300	28.872	13.300	42.172	-11.828	54.000	

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	: Octiv <sup>TM</sup> Networked Music System							
Test Item	: General	General Radiated Emission Data						
Test Site	: No.3 OA	No.3 OATS						
Test Mode	: Mode 2:	Transmitter 802.	11g (2437 MHz)					
Frequency	Correct	Reading	Measurement	Margin	Limit			
	Factor	Level	Level					
MHz	dB	dBuV	dBuV/m	dB	dBuV/m			
Horizontal								
123.300	11.880	20.396	32.275	-11.225	43.500			
128.900	11.666	18.360	30.025	-13.475	43.500			
171.300	11.339	13.560	24.899	-18.601	43.500			
200.300	11.056	19.300	30.356	-13.144	43.500			
334.300	17.386	20.900	38.286	-7.714	46.000			
968.300	27.690	13.890	41.579	-12.421	54.000			
Vertical								
136.300	16.697	17.300	33.997	-9.503	43.500			
253.100	13.869	18.300	32.169	-13.831	46.000			
377.300	19.469	12.200	31.669	-14.331	46.000			
528.300	20.560	16.300	36.860	-9.140	46.000			
630.100	16.992	11.690	28.682	-17.318	46.000			
792.300	23.504	13.300	36.805	-9.195	46.000			

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

### 5. **RF** antenna conducted test

### 5.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007
Nota	1 All aquinmonts of	a colibrated with	tracable colibrations East	h colibration is traces

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

### 5.2. Test Setup

### **RF antenna Conducted Measurement:**



### 5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### 5.4. Test Procedure

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

# 5.5. Uncertainty

The measurement uncertainty Conducted is defined as  $\pm 1.27$ dB

### 5.6. Test Result of RF antenna conducted test

	Octiv <sup>TM</sup> Networked Music System
:	RF antenna conducted test
	No.3 OATS
	Mode 1: Transmitter 802.11b

### Channel 01 (2412MHz) 30-1GHz



Channel 01 (2412MHz) 1-25GHz



Channel 06 (2437MHz) 30-1GHz



### Channel 06 (2437MHz) 1-25GHz





Channel 11 (24612MHz) 30-1GHz





Product	:	Octiv <sup>IM</sup> Networked Music System
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

### Channel 01 (2412MHz) 30-1GHz



### Channel 01 (2412MHz) 1-25GHz



Channel 06 (2437MHz) 30-1GHz



### Channel 06 (2437MHz) 1-25GHz



🔆 Agilent									L	Peak Search
							Mk	r1 614	.4 MHz	
Ref 20.4 d	Bm	#Atten	30 dB					-44.4	7 dBm	
Peak Ma	rker									Meas Tools
Log C4										
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Start 30 M	Hz							Stop	1 GHz	More 1 of 2
#Res BW 10	00 kHz		#V	BW 1 M	Hz	Sweep	97.32	ms (40	l pts)	1 07 2

Channel 11 (24612MHz) 30-1GHz

### Channel 11 (2462MHz) 1-25GHz



# 6. Radiated Emission Band Edge

### 6.1. Test Equipment

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Х	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007
Х	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
Х	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
Х	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
Х	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
Х	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2007
Х	Pre-Amplifier	HP	8449B / 3008A01123	July, 2007

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

# 6.2. Test Setup

### **RF Radiated Measurement:**



# 6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

# 6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

# 6.5. Uncertainty

± 3.9 dB above 1GHz

# 6.6. Test Result of Band Edge

Product	:	Octiv <sup>™</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

### **RF Radiated Measurement (Horizontal):**

Channel	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
	(MHz)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Kesult
1 (Peak)	2389.500	-2.379	55.046	52.666	74.00	54.00	Pass

### Figure Channel 1:

### Horizontal (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Octiv <sup>1M</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

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### **RF Radiated Measurement (Vertical):**

Channel	Frequency (MHz)	Correct Fcator (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
1 (Peak)	2389.500	-2.379	56.739	54.359	74.00	54.00	Pass
1 (Average)	2389.500	-2.379	46.364	43.984	74.00	54.00	Pass

### Figure Channel 1:

### Vertical (Peak)





Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Product	:	Octiv <sup>IM</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

### **RF Radiated Measurement (Horizontal):**

Channel	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Dogult
	(MHz)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Result
11(Peak)	2483.500	-1.937	52.616	50.679	74.00	54.00	Pass

### Figure Channel 11:

### Horizontal (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Octiv <sup>1M</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

### **RF Radiated Measurement (Vertical):**

Channal	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
Channel	(MHz)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Kesult
11(Peak)	2483.500	-1.937	51.524	49.587	74.00	54.00	Pass

### **Figure Channel 11:**

### (Vertical) (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Octiv <sup>IM</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

m ( - -

### **RF Radiated Measurement (Horizontal):**

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
1 (Peak)	2375.500	-2.445	49.541	47.096	74.00	54.00	Pass

### Figure Channel 1:

#### Horizontal (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Octiv <sup>IM</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

### **RF Radiated Measurement (Vertical):**

Channel	Frequency	Correct Fcator	Reading Level	Emission Level	Peak Limit	Arerage Limit	Docult
	(MHz)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Kesult
1 (Peak)	2389.900	-2.378	50.458	48.080	74.00	54.00	Pass

### Figure Channel 1:

### Vertical (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Octiv <sup>1M</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

#### **RF Radiated Measurement (Horizontal):**

Channel	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Result
Channel	(MHz)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Result
11(Peak)	2483.700	-1.936	55.392	53.456	74.00	54.00	Pass

### Figure Channel 11:

### Horizontal (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Octiv <sup>1M</sup> Networked Music System
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

### **RF Radiated Measurement (Vertical):**

Channel	Frequency	Correct Factor	Reading Level	Emission Level	Peak Limit	Arerage Limit	Posult
	(MHz)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Kesult
11(Peak)	2483.900	-1.936	51.323	49.387	74.00	54.00	Pass

### Figure Channel 11:

### (Vertical) (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "\*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

# 7. Occupied Bandwidth

### 7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

### 7.2. Test Setup



# 7.3. Test Procedures

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Span greater than RBW.

### 7.4. Limits

The 6 dB bandwidth must be greater than 500 kHz.

### 7.5. Uncertainty

 $\pm$  150Hz

# 7.6. Test Result of Occupied Bandwidth

Product	:	Octiv <sup>TM</sup> Networked Music System
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (1Mbps)	2412.00	10000	>500	Pass
6 (1Mbps)	2437.00	10000	>500	Pass
11 (1Mbps)	2462.00	10000	>500	Pass

### Channel 1: (2412MHz)





Channel 6: (2437MHz)





Product	:	Octiv <sup>™</sup> Networked Music System
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (6Mbps)	2412.00	16500	>500	Pass
6 (6Mbps)	2437.00	16500	>500	Pass
11 (6Mbps)	2462.00	16500	>500	Pass



### Channel 1: (2412MHz)



Channel 6: (2437MHz)

Channel 11: (2462MHz)



# 8. Power Density

### 8.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
Х	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

### 8.2. Test Setup



### 8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

### 8.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements. Set RBW= 3 kHz, VBW=10KHz, Sweep time=(SPAN/3KHz), detector=Peak detector

### 8.5. Uncertainty

± 1.27 dB

### 8.6. Test Result of Power Density

Product	:	Octiv <sup>TM</sup> Networked Music System
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter 802.11b

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (1Mbps)	2412.00	-10.53	< 10dBm	Pass
6 (1Mbps)	2437.00	-10.45	< 10dBm	Pass
11 (1Mbps)	2462.00	-10.04	< 10dBm	Pass

### Channel 1: (2412MHz)





Channel 6: (2437MHz)

Channel 11: (2462MHz)



Product	:	Octiv <sup>™</sup> Networked Music System
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter 802.11g

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (6Mbps)	2412.00	-23.94	< 10dBm	Pass
6 (6Mbps)	2437.00	-22.08	< 10dBm	Pass
11 (6Mbps)	2462.00	-21.90	< 10dBm	Pass

### Channel 1: (2412MHz)







Channel 6: (2437MHz)

Channel 11: (2462MHz)



# 9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs