

## OPERATIONAL DESCRIPTION

### 1.1. Product description of EtherSound ES8 in & ES8 OUT

EtherSound ES220 and ES220-L are Digigram products incorporating the EtherSound technology. They allow insert or extract two digital audio channels (2 + 2 in the case of ES220) from an EtherSound network using standard Ethernet components (cables CAT5 and switches).

ES220 transforms two analog audio signals into two EtherSound channels and two EtherSound channels in analog audio signals, while ES220-L is configurable via jumpers: it either converts two analog audio channels into digital audio and inserts them into an EtherSound network, or it extracts two digital channels from the network to convert them into analog audio signals. Both feature GPIOs and take advantage of EtherSound's simple, nearly instant set-up.

EtherSound ES220 and ES220-L allow audio distribution with a flexibility going well beyond the possibilities of analog audio installations.

See §1.6 for more detail.

### 1.2. Related Submittal(s) / Grant(s)

All host equipment used in the test configuration are FCC granted, when relevant.

### 1.3. Tested System Details

The FCC IDs for all equipment, plus description of all cables used in the tested system are:

Trade Mark – Model Number (Serial number)	FCC ID	Description	Cable description
DIGIGRAM ES220* (sn: none)	IGTES220	Ethernet Audio bridges	Standard power cable unshielded, Ethernet FTP cables CAT5+ Analog audio IN/OUT lines, shielded. GPIO cables, shielded
Analogvision PMIC050 (sn: 0100512)		Power supply of EUT	Standard power cable unshielded,
DIGIGRAM ES220-L* (sn: 150 00000050)	IGTES220	Ethernet Audio bridges	Standard power cable unshielded, Ethernet FTP cables CAT5+
Analogvision PMIC050 (sn: proto)		Power supply of ES220-L	Standard power cable unshielded,
DIGIGRAM ES220* (sn: 0051)	IGTES220	Ethernet Audio bridges	Standard power cable unshielded, Ethernet FTP cables CAT5+
DIGIGRAM (sn: none)	None	I/O Load box	Standard power cable (only for earth connection)

\* : Equipment under test

### 1.4. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-1992, FCC Part 15 Subpart B.

Radiated testing was performed at an antenna to EUT distance of 10 meters. During testing, all equipment's and cables were moved relative to each other in order to identify the worst case set-up.

## 1.5. Test facility

Tests have been performed on May 10<sup>th</sup>, 2004.



The test facility used to collect all the test data is the SMEE **Actions Mesures** facility, located ZI des Blanchisseries, 38500 VOIRON, France.

This test facility has been fully described in a report and accepted by FCC as compliant with the radiated and AC line conducted test site criteria in ANSI C63.4-2000 in a letter dated July 19, 2002 (registration number 94821).

This test facility has also been accredited by COFRAC (French accreditation authority for European union test lab accreditation organization) according to NF EN ISO/IEC 17025, accreditation number 1-0844 as compliant with test site criteria and competence in 47 CFR Part 15/ANSI C63.4 and EN55022/CISPR22 norms for 89/336/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.

## 1.6. Data sheets

### Configuration

Size	1/3 U 19" rack : 42 x 146.5 x 210 mm
Power supply (optional)	100 – 240 VAC, 47-63 Hz 5 V / 3 A  <i>WARNING Do not open the power supply module. It contains hazardous voltages. There are no user-serviceable parts inside.</i>
 	
Temp / humidity (non-condensing) Operating : Storage :	0 °C – 50 °C / 0% - 95% -5 °C – 70 °C / 0% - 95%
Power consumption	2 A max.
Net weight	0.93 kg (~2.06 lbs)

### Parameters

Selection of audio channels	Manually by rotary switches or by Windows 2000/XP compatible software
EtherSound System Configuration Software 'EScontrol'	Software application allowing the detection of the EtherSound network, remote channel assignment, control of GPIO inputs/outputs

## Inputs/Outputs

	<b>ES220</b>	<b>ES220-L</b>
Analog audio	2 balanced analog mono line inputs* AND 2 servo-balanced analog mono line inputs**	2 balanced analog mono line inputs* OR 2 servo-balanced analog mono line inputs**
Impedance	22.2 k $\Omega$	
Nominal input level	+4 dBu or -10 dBV (selectable)	
Maximum input level	+22 dBu or +10 dBV (selectable)	
Nominal output level	+4 dBu (software adjustable)	
Maximum output level	+22 dBu (software adjustable)	
Analog output gain	from -72 dBu to 0 dB (software adjustable)	

## Connectivity

Analog audio	1 15-pin Sub-D
EtherSound	2 EtherCon female RJ45 compatible (connections "IN"/"OUT")
GPIO	4 inputs and 4 outputs on 15-pin Sub-D

## Audio specifications

### ES220 & ES220-L

Sampling frequencies available	48 kHz or 44.1 kHz
A/D and D/A converter resolution	24 bits
Frequency response at 48 kHz	20 Hz -20 kHz: $\pm 0.2$ dB
Dynamic range –60dBfs with $F_s=48$ kHz (20 Hz/20 kHz, unweighted)	> 102 dB
Distortion + noise at 1 kHz (-1 dBfs with $F_s=48$ kHz)	<-95 dB (0.0018%)
Phase difference between channels: 20 Hz/20 kHz	$0.5^\circ / 2^\circ$
Diaphonie: à 1 kHz à 15 kHz (0 dBfs with $F_s=48$ kHz)	<-115 dB <-110 dB

## Synchronization

Clock source	Either internal (if first EtherSound device in a network) or external, locked on EtherSound upstream
--------------	--