



Test Report

Product Name: Receiver

Model No.: C-BG17-DUAL, C-BG17-KBD

FCC ID. : JNZ201598

Applicant : Logitech Far East Ltd.

Address : #2 Creation Rd., 4, Science-Based Ind. Park, Hsinchu, Taiwan,
R.O.C.

Date of Receipt : Sep. 19, 2002

Date of Test : Sep. 26, 2002

Report No. : 036H053F

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date : Sep. 26, 2002

Report No. : 036H053F



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : Receiver
Applicant : Logitech Far East Ltd.
Address : #2 Creation Rd., 4, Science-Based Ind. Park, Hsinchu, Taiwan,
R.O.C.
Manufacturer : Logitech Far East Ltd.
Model No. : C-BG17-DUAL, C-BG17-KBD
FCC ID. : JNZ201598
Rated Voltage : DC 5V (Power by PC)
Trade Name : Logitech, DELL
Measurement Standard : FCC Part 15 Subpart B: 2002
Measurement Procedure : ANSI C63.4: 1992
Classification : Class B
Test Result : Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name : Receiver
Trade Name : Logitech, DELL
Model No. : C-BG17-DUAL, C-BG17-KBD
Signal Cable : Shielded, 1.5m
PS/2 adaptor : 1 Set

Note:

1. This EUT is a Receiver.
2. The variation of model is for different trade. The circuit of each model is identical.
3. QuieTek has verified both construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

EMI Mode: Mode 1: Receiver PS2 Mode
Mode 2: Receiver USB Mode

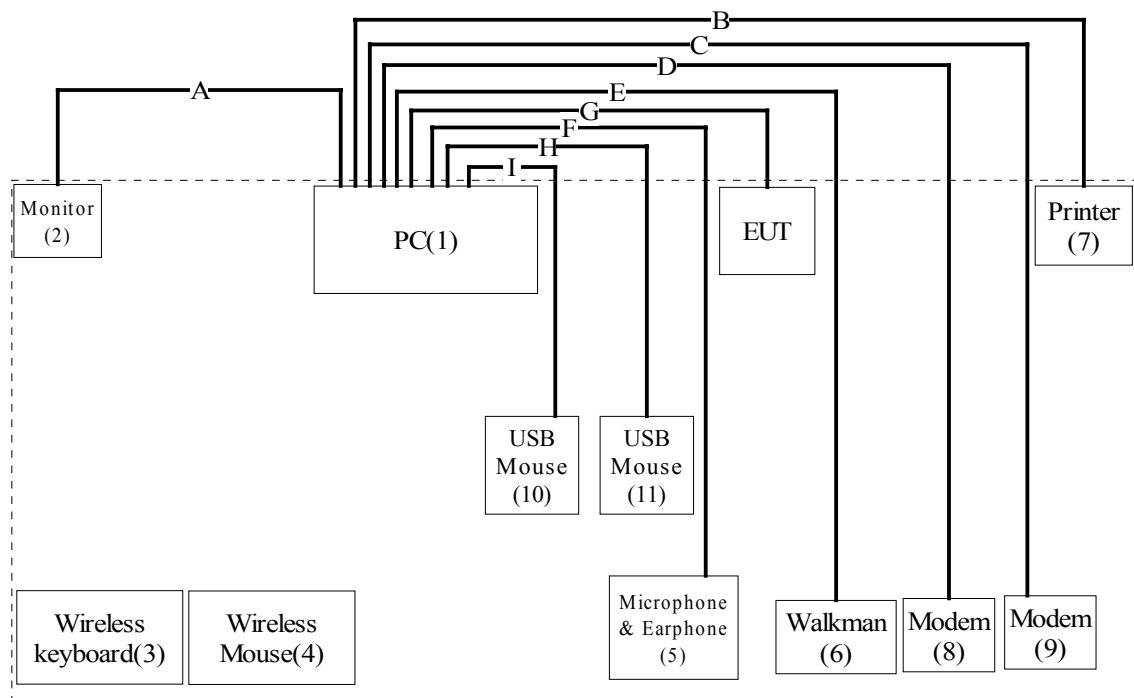
1.2. Tested System Details

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.	Power Cord
(1)	PC	HP	DTPC27	SG21200950	Non-shielded, 1.8m
(2)	Monitor	VIEWSONIC	VCDTS21490-1P	ER0150850	Non-shielded, 1.8m
(3)	Wireless keyboard	Logitech	Y-RH35	N/A	--
(4)	Wireless Mouse	Logitech	M-RP67	N/A	--
(5)	Microphone & Earphone	TOKTO	SX-MI	N/A	--
(6)	Walkman	TOBISHI	TB-21984	N/A	--
(7)	Printer	HP	C5884A	SG86G1N186	Non-shielded, 0.7m
(8)	Modem	ACEEX	1414	960018054	Non-shielded, 1.6m
(9)	Modem	ACEEX	1414	980033032	Non-shielded, 1.6m
(10)	USB Mouse	Logitech	M-BE58	LZE11405011	--
(11)	USB Mouse	Logitech	M-BE58	LZE11403949	--
(12)	Keyboard(Modek2)	ACER	6311-TW4C/6	916590764C/488/552S00000	--

	Signal Cable Type	Signal cable Description
A.	VGA Cable	Shielded, 1.5m, a ferrite core bonded.
B.	Printer Cable	Shielded, 1.2m
C.	Modem Cable	Shielded, 1.5m
D.	Modem Cable	Shielded, 1.5m
E.	Walkman Cable	Non-shielded, 1.6m
F.	Microphone & Earphone Cable	Non-shielded, 1.7m
G.	PS2 Cable (Mode 1) USB Cable (Mode 2)	Shielded, 1.5m
H.	USB Mouse Cable	Shielded, 1.0m
I.	USB Mouse Cable	Shielded, 1.0m
J.	Keyboard Cable	Shielded, 1.8m

1.3. Configuration of tested System



1.4. EUT Exercise Software

- 1.4.1 Setup the EUT and simulators as shown on 1.3.
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 Boot the PC from Hard Disk.
- 1.4.4 The PC will check data through PC to EUT.
- 1.4.5 The personal computer's monitor will show the transmitting and receiving characteristics when the communication is success.
- 1.4.6 Repeat the above procedure 1.4.4 to 1.4.5

1.5. 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: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

August 30, 2001 Accreditation on NVLAP
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2. Conducted Emission

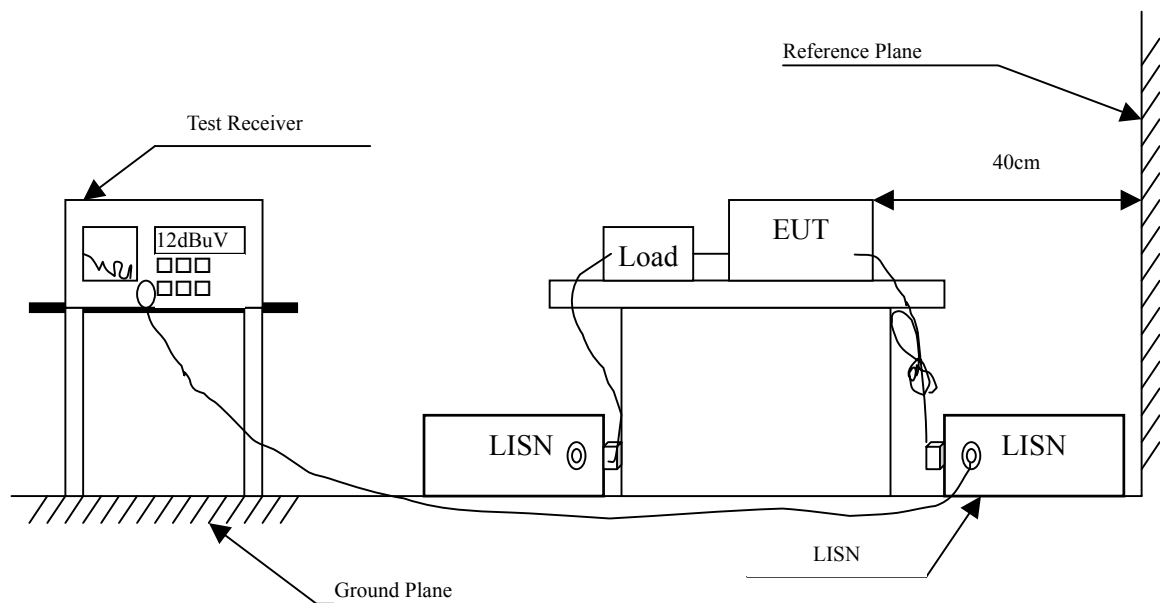
2.1. Test Equipment

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, 2002	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2002	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2002	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	No.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart B Limits (dBuV)				
Frequency MHz	Class A		Class B	
	QP	AV	QP	AV
0.15 - 0.50	79	66	66-56	56-46
0.50-5.0	73	60	56	46
5.0 - 30	73	60	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and the entire interface cables must be changed according to ANSI C63.4: 1992 on conducted measurement.

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

2.5. Test Result

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 5. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

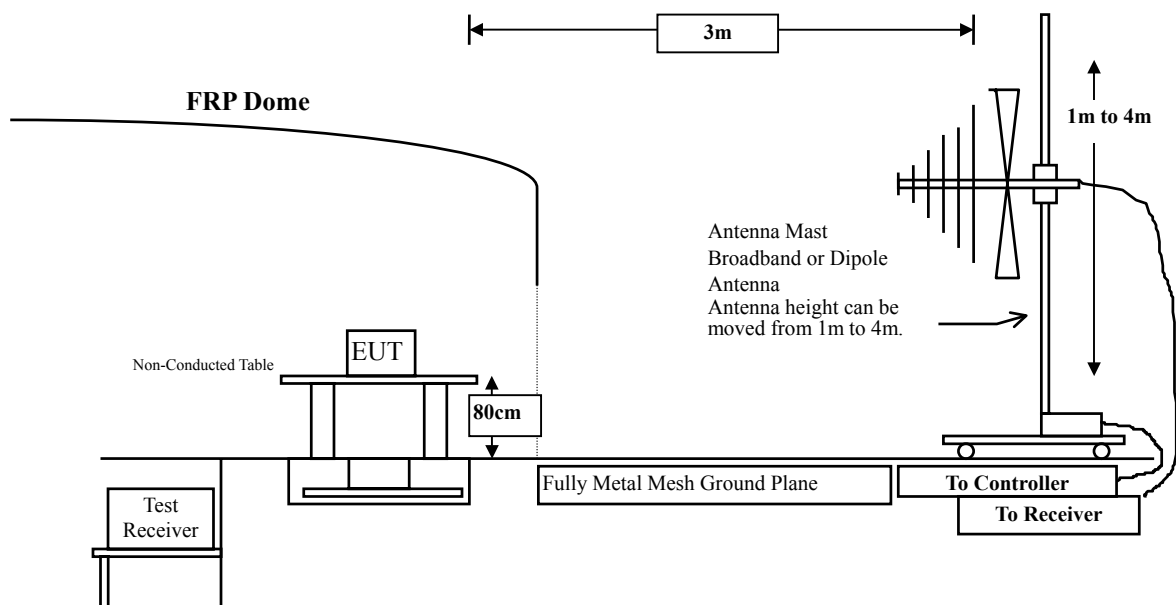
3.1. Test Equipment

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

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1		Test Receiver	R & S	ESCS 30 / 825442/14	May, 2002
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2002
		Pre-Amplifier	HP	8447D/3307A01812	May, 2002
		Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2002
		Horn Antenna	EM	EM6917 / 103325	May, 2002
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2002
	X	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2002
	X	Pre-Amplifier	HP	8447D/3307A01814	May, 2002
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2002
		Horn Antenna	EM	EM6917 / 103325	May, 2002

- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup



3.3. Limits

FCC Part 15 Subpart B Paragraph 15.109 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 :
1. RF Voltage (dBuV/m) = $20 \log$ RF Voltage (uV/m)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

3.5. Test Result

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 5. The acceptance criterion was met and the EUT passed the test.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.

5. Summary of Test Datas

The test results in the emission was performed according to the requirements of measurement standard and process. Quietek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission is listed as below.

All the tests were carried out with the EUT in normal operation, which was defined as:

EMI Mode: Mode 1: Receiver PS2 Mode

Mode 2: Receiver USB Mode

5.1. Test Data of conducted Emission

Product : Receiver
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Receiver PS2 Mode

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
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Quasi-Peak

*	0.181	0.01	0.12	43.71	43.84	64.43
	0.272	0.03	0.16	33.57	33.76	61.04
	1.090	0.11	0.29	31.88	32.27	56.00
	2.092	0.15	0.35	33.54	34.03	56.00
	2.547	0.16	0.37	33.06	33.59	56.00
	13.831	0.31	0.53	32.66	33.50	60.00

Average:

	0.181	0.01	0.12	43.30	43.43	54.44
	0.272	0.03	0.16	32.80	32.99	51.06
	1.090	0.11	0.29	30.90	31.29	46.00
	2.092	0.15	0.35	32.70	33.19	46.00
	2.547	0.16	0.37	31.60	32.13	46.00
	13.831	0.31	0.53	30.80	31.64	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

Product : Receiver
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Receiver PS2 Mode

Frequency	Cable	LISN	Reading	Emission	Limits
MHz	Loss	Factor	Level	Level	
	dB	dB	dBuV	dBuV	dBuV

Quasi-Peak

*	0.182	0.01	0.12	44.09	44.22	64.39
	0.273	0.03	0.16	34.54	34.73	61.04
	0.364	0.05	0.18	34.70	34.93	58.63
	0.455	0.06	0.20	33.57	33.83	56.79
	0.710	0.08	0.25	28.09	28.42	56.00
	26.739	0.39	0.59	26.24	27.22	60.00

Average:

	0.182	0.01	0.12	43.70	43.83	54.39
	0.273	0.03	0.16	33.70	33.89	51.03
	0.364	0.05	0.18	33.70	33.93	48.64
	0.455	0.06	0.20	32.60	32.86	46.78
	0.710	0.08	0.25	27.80	28.13	46.00
	26.739	0.39	0.59	25.60	26.58	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

Product : Receiver
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Receiver USB Mode

Frequency	Cable	LISN	Reading	Emission	Limit s
MHz	Loss	Factor	Level	Level	
	dB	dB	dBuV	dBuV	dBuV

Quasi-Peak

*	0.181	0.01	0.12	43.70	43.83	64.42
	0.273	0.03	0.16	33.13	33.32	61.01
	1.093	0.11	0.29	32.91	33.30	56.00
	1.454	0.12	0.31	32.43	32.87	56.00
	2.457	0.16	0.36	34.06	34.58	56.00
	13.922	0.31	0.53	32.66	33.50	60.00

Average:

	0.181	0.01	0.12	43.20	43.33	54.44
	0.273	0.03	0.16	32.10	32.29	51.03
	1.053	0.10	0.28	32.10	32.49	46.00
	1.454	0.12	0.31	31.90	32.34	46.00
	2.457	0.16	0.36	32.90	33.42	46.00
	13.922	0.31	0.53	31.20	32.04	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

Product : Receiver
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Receiver USB Mode

Frequency	Cable	LISN	Reading	Emission	Limits
MHz	Loss	Factor	Level	Level	
	dB	dB	dBuV	dBuV	dBuV

Quasi-Peak

*	0.181	0.01	0.12	43.97	44.10	64.42
	0.365	0.05	0.18	34.88	35.11	58.62
	0.455	0.06	0.20	33.53	33.79	56.78
	0.728	0.08	0.25	31.39	31.72	56.00
	6.369	0.23	0.45	27.42	28.10	60.00
	26.739	0.39	0.59	26.24	27.22	60.00

Average:

	0.181	0.01	0.12	43.60	43.73	54.44
	0.365	0.05	0.18	33.90	34.13	48.61
	0.455	0.06	0.20	32.70	32.96	46.78
	0.728	0.08	0.25	25.70	26.03	46.00
	6.369	0.23	0.45	25.40	26.08	50.00
	26.739	0.39	0.59	25.60	26.58	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

5.2 Test Data of Radiated Emission

Product : Receiver
Test Item : Radiated Emission
Test Site : No.2 OATS
Test Mode : Mode 1: Receiver PS2 Mode

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

81.410	1.23	14.98	26.87	37.40	26.74	13.26	40.00
146.400	1.50	16.73	26.89	37.00	28.33	15.17	43.50
*186.170	1.66	14.37	26.91	45.35	34.47	9.03	43.50
240.490	1.88	17.30	26.93	37.40	29.66	16.34	46.00
424.790	2.64	20.02	26.75	40.00	35.90	10.10	46.00
583.870	3.29	21.92	26.50	35.80	34.50	11.50	46.00

Vertical

*54.250	1.12	21.04	26.86	37.80	33.09	6.91	40.00
119.240	1.38	17.60	26.88	38.20	30.30	13.20	43.50
186.170	1.66	14.37	26.91	47.20	36.32	7.18	43.50
318.090	2.20	19.20	26.92	37.60	32.08	13.92	46.00
345.250	2.31	19.22	26.88	37.60	32.26	13.74	46.00
559.620	3.19	21.79	26.54	35.20	33.64	12.36	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP.

Product : Receiver
 Test Item : Radiated Emission
 Test Site : No.2 OATS
 Test Mode : Mode 2: Receiver USB Mode

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

81.410	1.23	14.98	26.87	37.40	26.74	13.26	40.00
150.280	1.51	16.86	26.89	38.00	29.48	14.02	43.50
*186.170	1.66	14.37	26.91	46.90	36.02	7.48	43.50
240.490	1.88	17.30	26.93	40.00	32.26	13.74	46.00
400.540	2.54	19.84	26.79	37.80	33.39	12.61	46.00
452.920	2.75	20.15	26.71	38.80	34.99	11.01	46.00

Vertical

48.430	1.09	20.14	26.86	39.40	33.78	6.22	40.00
*67.830	1.17	20.56	26.86	40.50	35.37	4.63	40.00
186.170	1.66	14.37	26.91	48.20	37.32	6.18	43.50
372.410	2.42	19.30	26.84	37.60	32.49	13.51	46.00
450.980	2.74	20.12	26.71	36.00	32.16	13.84	46.00
558.650	3.19	21.79	26.54	35.60	34.04	11.96	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss-PreAMP.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs