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ENUSTECH

Dates of Tests: Jan. 15 ~ 24 2008
Test Report S/N: LR500190801D
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

TT2BHF700

APPLICANT

ENUSTECH.,INC.

FCC Classification	:	Low Power Communication Device Transmitter
Manufacturing Description	:	Wireless Handsfree Carkit
Manufacturer	:	ENUSTECH.,INC.
Model name	:	BHF-700
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.239 Subpart C; ANSI C-63.4-2003
Frequency Range	:	88.2 ~ 107.9MHz
Data of issue	:	January 24, 2008

This test report is issued under the authority of:

The test was supervised by:

Dong -Min JUNG, Technical Manager

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

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1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
Web site : <http://www.ltalab.com>
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competent of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2008-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2009-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

2. Information's about test item

2-1 Applicant & Manufacturer

Company name : ENUSTECH.,INC.
 Address : JnJ Bldg., 5 Yeoksam 2(i)-dong,785-12,Gangnam-gu,
 : Seoul 135-515,Korea
 Telephone / Facsimile : +82-2-565-0785 / +82-2-565-0785

2-2 Equipment Under Test (EUT)

Trade name : Wireless Handsfree Carkit
 FCC ID : TT2BHF700
 Model name : BHF-700
 Serial number : Identical prototype
 Date of receipt : January 15, 2008
 EUT condition : Pre-production, not damaged
 Antenna type : Pattern Antenna,
 Frequency Range : 88.2 ~ 107.9MHz
 Operator Selection of Operating Frequency: Manual Switch
 Power Source : 1100mAh rechargeable Lithium Polymer

2-3 Tested frequency & signal

	LOW	MID	HIGH
1 Frequency (MHz)	88.2	98.0	107.9
2 Audio signal:	We tested only under the module of audio input. The device audio input source from maximum audio input for the tested. Test report is recorded the worst mode data.		

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
DC Power Supply	E3615A	KR72705061	HP
-	-	-	-

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Status (note 1)
15.239	Field Strength of Fundamental and Emissions within permitted band.	< 250 uV @ 3m	C
15.239	Occupied channel bandwidth	< 200kHz	C
15.209	Radiated Emission	< FCC 15.209 limits	C
15.207	AC Conducted Emissions	< FCC 15.207 limits	NA / Note2
15.203	Antenna Requirement	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: It is not need to test this requirement, because the EUT shall be operated by car battery

Note 3: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.239; ANSI C-63.4-2003

→ Antenna Requirement

The ENUSTECH.,INC. BHF700 unit complies with the requirement of §15.203.

The antenna is PCB Pattern antenna.

3.2 Transmitter requirements

3.2.1 Field Strength of Fundamental and Emissions within permitted band.

Procedure:

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part §15.239. The test set-up was made according to ANSI C 63.4:2003.

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in an OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Span = 1 MHz

RBW = 120 kHz

VBW = 300 kHz

Trace = max hold

Sweep = auto

Detector function = Peak & Average

Measurement Data: Complies

→ For Spurious emission of the fundamental, refer to the item '3.2.2 radiated emission'

Operating Condition: Transmit the audio signal (modulated signal)

Frequency (MHz)	Pol. (H/V)	Read Level (dBuV/m)		C.F (dB)	Result Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
88.2	H	58.84	58.05	-16.98	41.86	41.07	68	48	26.14	6.93
88.2	V	59.67	58.73	-16.98	42.69	41.75	68	48	25.31	6.25
98.0	H	61.3	60.68	-15.93	45.37	44.75	68	48	22.63	3.25
98.0	V	58.56	57.88	-15.93	42.63	41.95	68	48	25.37	6.05
107.9	H	61.1	60.25	-14.96	46.14	45.29	68	48	21.86	2.71
107.9	V	58.55	57.46	-14.96	43.59	42.5	68	48	24.41	5.5

Note 1: Field Strength Calculation

C.F = Antenna Factor + Cable Loss - Preamp Factor

Margin = Limit - Level

Minimum Standard: FCC Part 15.239

The maximum Field Strength authorized within 200kHz is 250 uV/m@3m

3.2.2 Radiated Emissions

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)

VBW \geq RBW

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

Detector function = peak

Trace = max hold

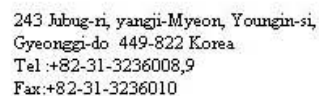
Sweep = auto

Measurement Data: Complies

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

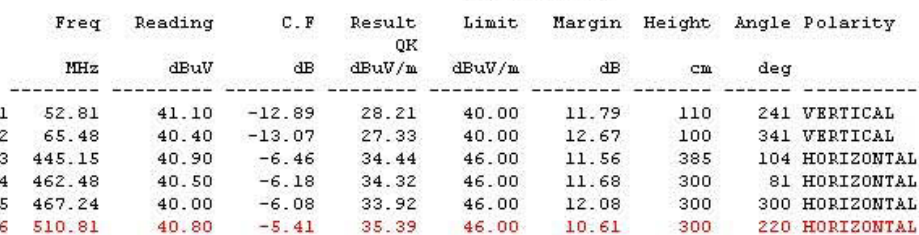
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.



TEST MODE: BT +FMT(low) mode

Tested by: B.S.KIM

Date: 2008-01-24



Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

→ No other emissions were detected at a level greater than 20dB below limit.

3.2.3 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: **Complies**

- Refer to the next page.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

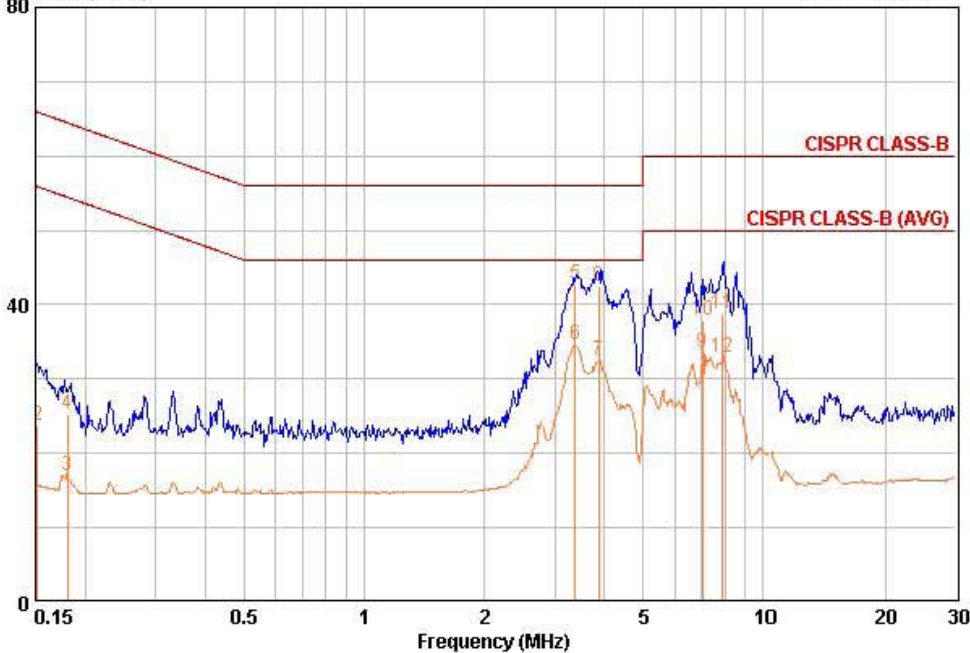
LINE - HIGH



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EUT / Model No. :	BHF700	Phase	: LINE
Test Mode	: BT + FMT(high) mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 22	Test Engineer	: B.S.KIM

Data: 552 File: E:\00_e3 EMI DATA\2008\LTA_Conduction_0801_2.EMI (552) Date: 2008-01-24



Freq	PD	PD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.152	23.10	15.26	0.57	23.67	15.83	65.91	55.91	42.24	40.08
0.181	25.00	16.60	0.34	25.34	16.94	64.46	54.46	39.12	37.52
3.381	42.20	34.16	0.57	42.77	34.73	56.00	46.00	13.23	11.27
3.860	42.00	31.94	0.45	42.45	32.39	56.00	46.00	13.55	13.61
7.025	37.30	32.97	0.54	37.84	33.51	60.00	50.00	22.16	16.49
7.893	38.10	32.21	0.65	38.75	32.85	60.00	50.00	21.25	17.15

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

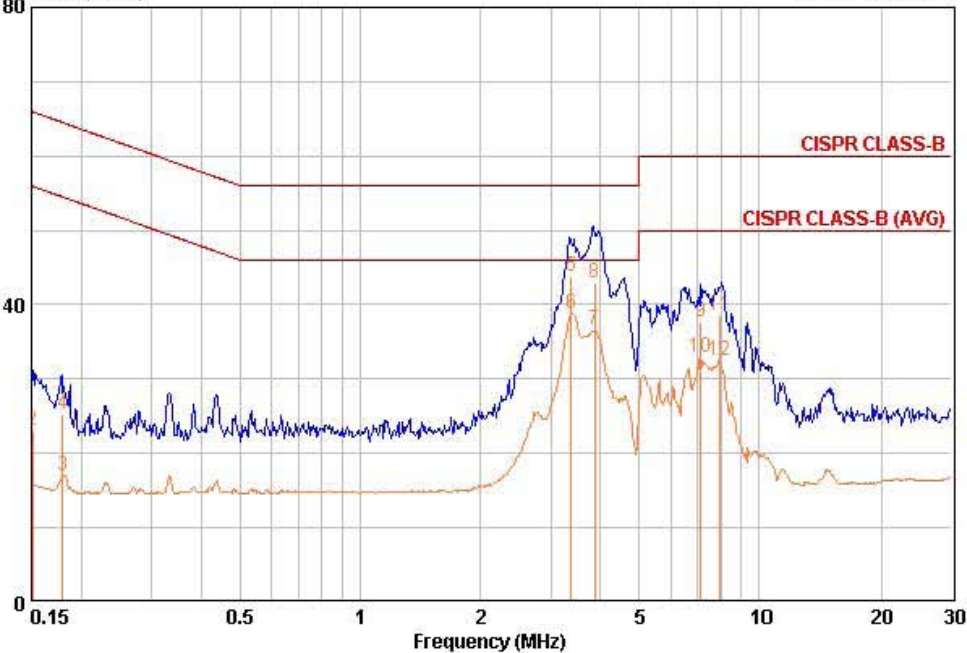
NEUTRAL - HIGH



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EUT / Model No. :	BHF700	Phase	: NEUTRAL
Test Mode	: BT + FMT (high) mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 22	Test Engineer	: B.S.KIM

Data: 554 File: E:\00_e3 EMI DATA\2008\LTA_Conduction_0801_2.EMI (554) Date: 2008-01-24
Level (dBuV)



Freq MHz	PD QP dBuV	PD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.151	22.50	15.26	0.58	23.08	15.84	65.96	55.96	42.88	40.12
0.180	25.00	16.66	0.35	25.35	17.01	64.50	54.50	39.16	37.50
3.381	43.20	38.18	0.57	43.77	38.75	56.00	46.00	12.23	7.25
3.860	42.50	36.22	0.45	42.95	36.67	56.00	46.00	13.05	9.33
7.137	37.20	32.45	0.55	37.76	33.01	60.00	50.00	22.25	17.00
7.935	38.00	31.79	0.65	38.65	32.44	60.00	50.00	21.35	17.56

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

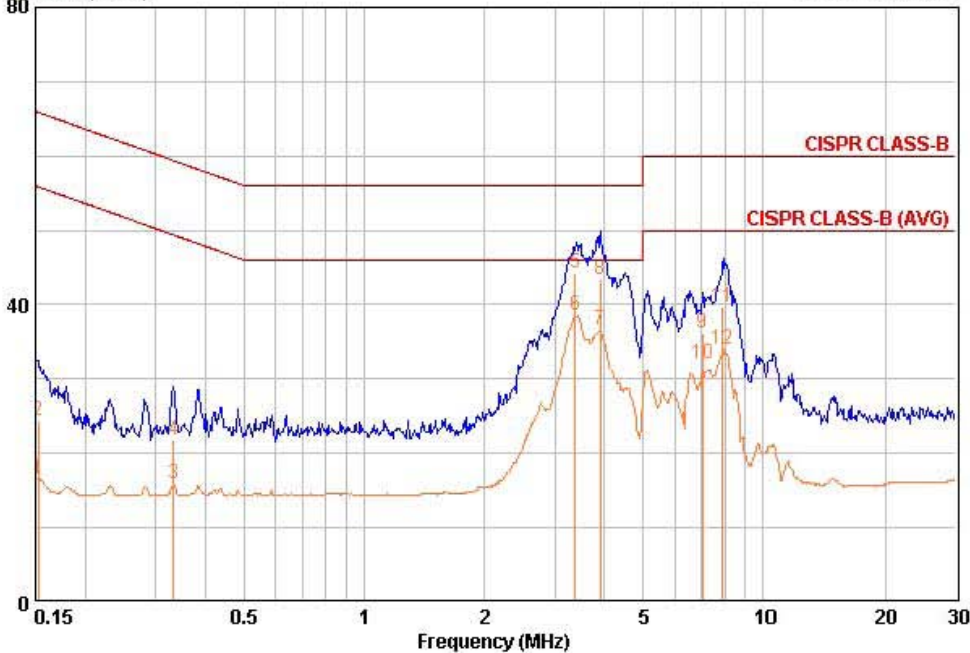
LINE - MID



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EUT / Model No. :	BHF700	Phase	: LINE
Test Mode	: BT + FMT(mid) mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 22	Test Engineer	: B.S.KIM

Data: 538 File: E:\00_e3 EMI DATA\2008\LTA_Conduction_0801_2.EMI (538) Date: 2008-01-24
Level (dBuV)



Freq MHz	PD QP dBuV	PD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.152	23.80	16.07	0.57	24.37	16.64	65.87	55.87	41.50	39.23
0.332	21.50	15.63	0.32	21.82	15.95	59.40	49.40	37.58	33.45
3.381	43.60	38.02	0.57	44.17	38.59	56.00	46.00	11.83	7.41
3.901	42.90	36.11	0.44	43.34	36.55	56.00	46.00	12.66	9.45
7.025	35.60	31.59	0.54	36.14	32.13	60.00	50.00	23.86	17.87
7.893	39.10	33.31	0.65	39.75	33.96	60.00	50.00	20.25	16.04

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

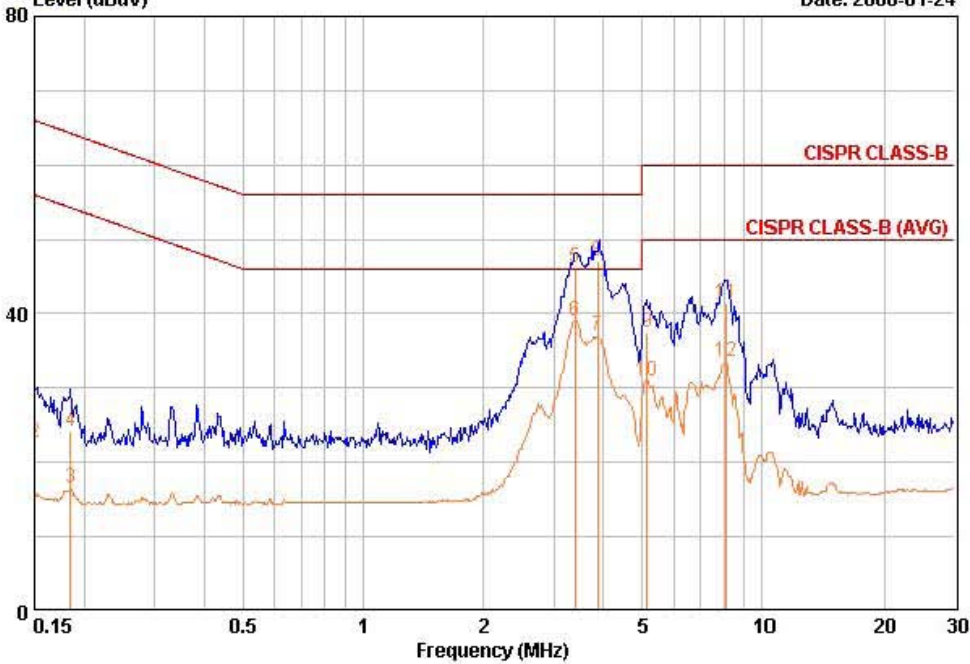
NEUTRAL - MID



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EUT / Model No. : BHF700	Phase : NEUTRAL
Test Mode : BT + FMT(mid) mode	Test Power : 120 / 60
Temp./Humi. : 25 / 22	Test Engineer : B.S.KIM

Data: 542 File: E:\00_e3 EMI DATA\2008\LTA_Conduction_0801_2.EMI (542) Date: 2008-01-24



Freq MHz	PD QP dBuV	PD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.150	22.00	15.05	0.59	22.59	15.64	66.00	56.00	43.41	40.36
0.184	23.80	16.31	0.31	24.11	16.62	64.28	54.28	40.18	37.67
3.399	45.60	38.44	0.57	46.17	39.01	56.00	46.00	9.83	6.99
3.860	46.60	36.71	0.45	47.05	37.16	56.00	46.00	8.95	8.84
5.139	37.00	30.50	0.56	37.56	31.06	60.00	50.00	22.44	18.94
8.105	40.80	32.93	0.65	41.45	33.58	60.00	50.00	18.55	16.42

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

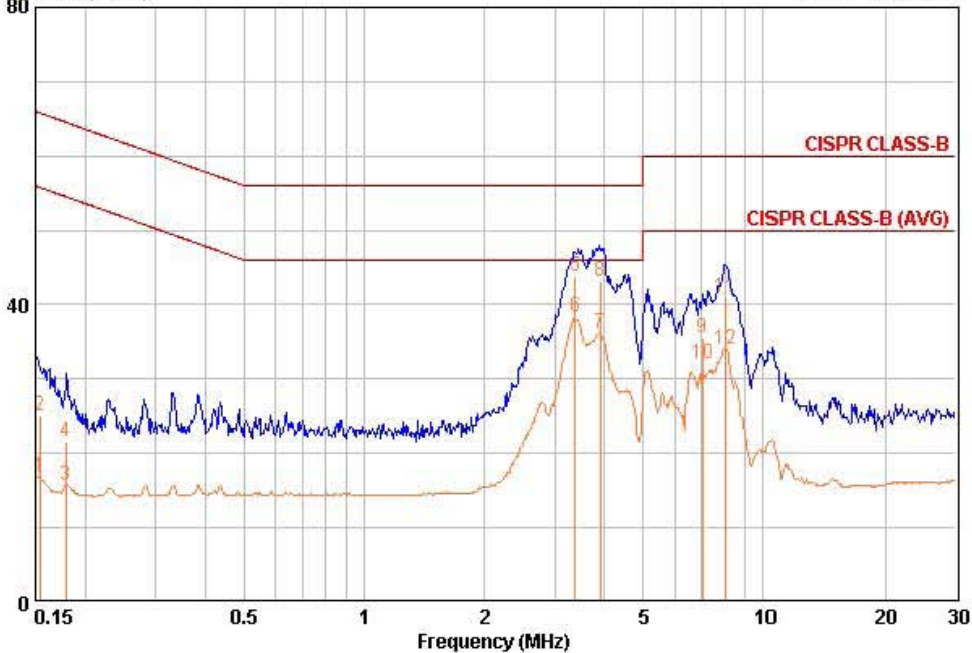
LINE - LOW



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EUT / Model No. :	BHF700	Phase	: LINE
Test Mode	: BT + FMT(low) mode	Test Power	: 120 / 60
Temp./Humi.	: 25 / 22	Test Engineer	: B.S.KIM

Data: 536 File: E:\00_e3 EMI DATA\2008\LTA_Conduction_0801_2.EMI (536) Date: 2008-01-24



Freq	PD	PD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.154	24.50	16.13	0.55	25.05	16.68	65.78	55.78	40.73	39.10
0.179	21.30	15.45	0.35	21.65	15.80	64.55	54.55	42.89	38.74
3.381	43.30	37.80	0.57	43.87	38.37	56.00	46.00	12.13	7.63
3.901	42.80	35.83	0.44	43.24	36.27	56.00	46.00	12.76	9.73
7.025	34.90	31.52	0.54	35.44	32.06	60.00	50.00	24.56	17.94
8.062	40.40	33.38	0.65	41.05	34.03	60.00	50.00	18.95	15.97

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

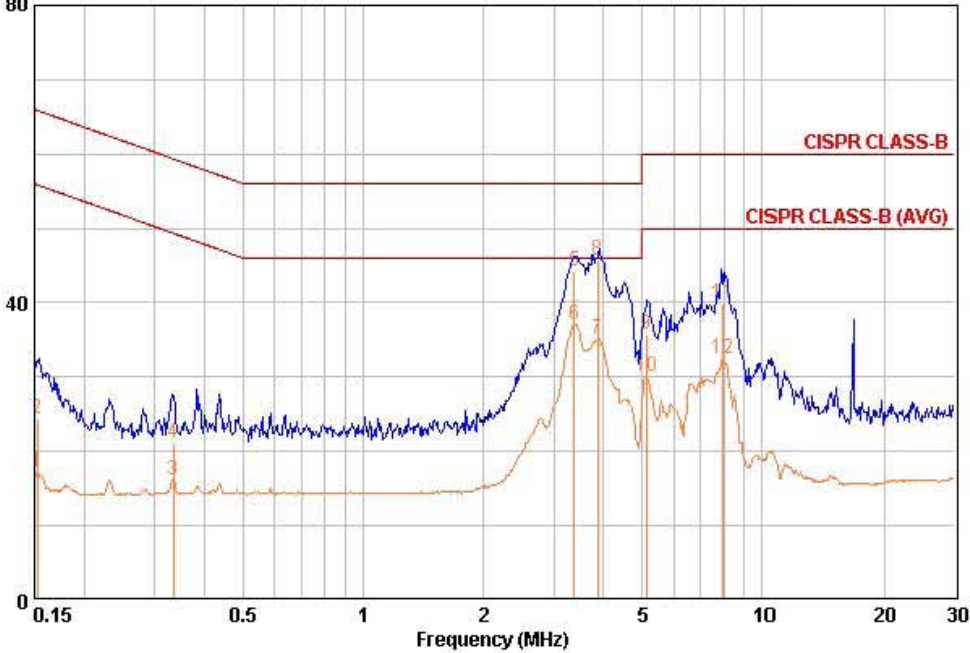
NEUTRAL - LOW



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EUT / Model No. : BHF700	Phase : NEUTRAL
Test Mode : BT + FMT(low) mode	Test Power : 120 / 60
Temp./Humi. : 25 / 22	Test Engineer : B.S.KIM

Data: 534 File: E:\00_e3 EMI DATA\2008\LTA_Conduction_0801_2.EMI (534) Date: 2008-01-24



Freq	PD	PD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
0.152	23.80	16.66	0.57	24.37	17.23	65.87	55.87	41.50	38.64
0.334	20.80	15.92	0.32	21.12	16.23	59.35	49.35	38.24	33.12
3.381	43.70	36.52	0.57	44.27	37.09	56.00	46.00	11.73	8.91
3.860	45.40	34.54	0.45	45.85	34.99	56.00	46.00	10.15	11.01
5.112	35.10	29.53	0.56	35.66	30.09	60.00	50.00	24.34	19.91
7.935	39.30	31.85	0.65	39.95	32.50	60.00	50.00	20.05	17.50

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

3.2.4 20dB Bandwidth

Procedure:

The channel Bandwidth is defined as the minimum declared bandwidth within which the transmitter's necessary bandwidth can be contained. The transmitter was adjusted to work at the selected channels. The Channel BW was measured at an amplitude level reduced from the reference level by the 20dB.

Occupied Bandwidth was measured as shown in the below.

The EUT was placed on a 0.8m high wooden table. An antenna was placed near the EUT and measurements of frequencies were recorded for reference during final measurements. Measurements were performed with the EUT rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Frequency Range = 88 ~ 108MHz

RBW = 10 kHz

VBW = 30 kHz

Trace = max hold

Detector function = Peak

Sweep = auto

Span = 300 kHz

Operating Condition: Transmit the maximum audio signal (modulation)

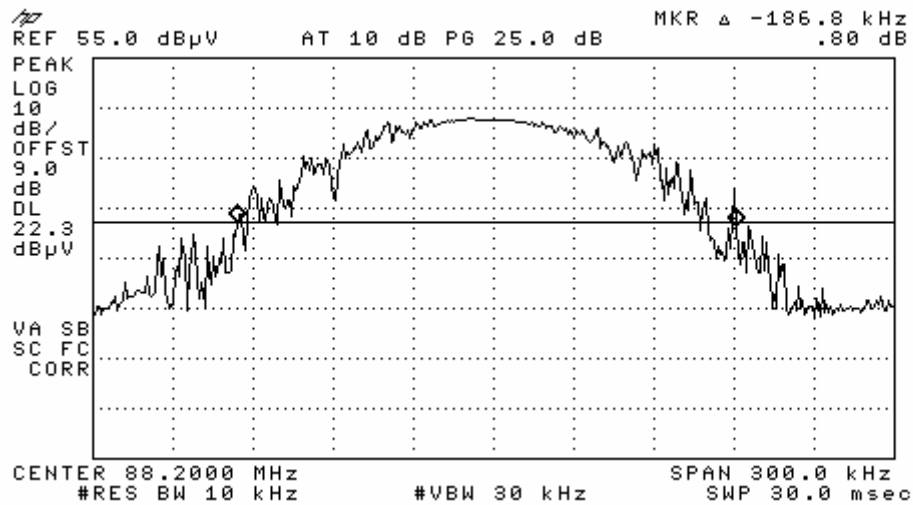
Measurement Data: **Complies**

Refer to the next page.

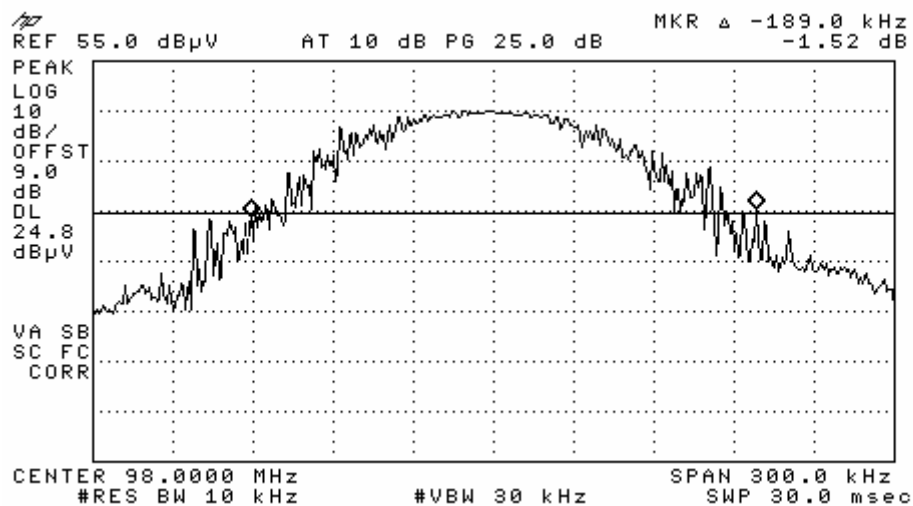
Minimum Standard:

Occupied Bandwidth < 200kHz.

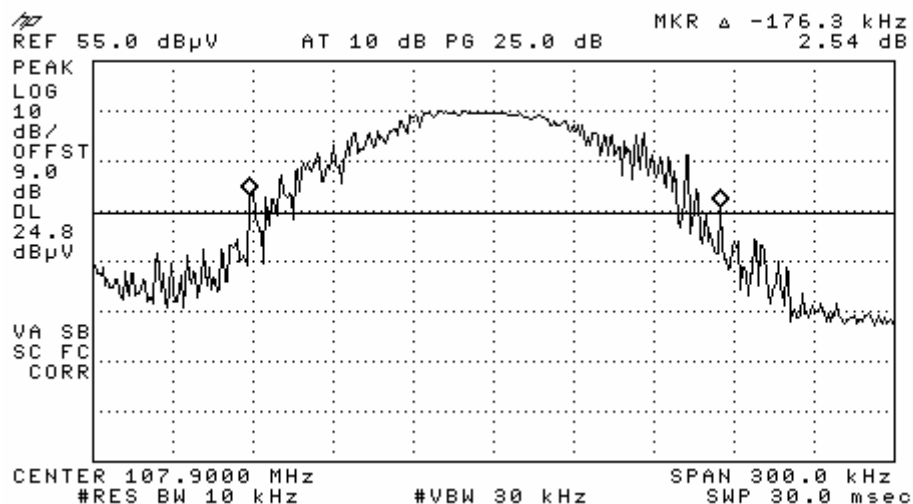
20 dB Occupied Bandwidth



L



L



L

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Apr-08
2	Signal Generator	8648C	3623A02597	HP	Apr-08
3	Attenuator (3dB)	8491A	37822	HP	Oct-08
4	Attenuator (10dB)	8491A	63196	HP	Oct-08
5	EMI Test Receiver	ESVD	843748/001	R&S	Aug-08
6	LISN	KNW-407	8-1430-1	Kyoritsu	Oct-08
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Oct-08
8	RF Amplifier	8447D	2949A02670	HP	Jan-08
9	RF Amplifier	8447D	2439A09058	HP	Oct-08
10	RF Amplifier	8449B	3008A02126	HP	Apr-09
11	Test Receiver	ESHS10	828404009	R&S	Aug-08
12	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Jul-08
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-09
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-09
15	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-09
16	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-08
17	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-08
18	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-08
19	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-08
20	Spectrum Analyzer	8591E	3649A05888	HP	Oct-08
21	Spectrum Analyzer	8563E	3425A02505	HP	Apr-08
22	Hygro-Thermograph	THB-36	0041557-01	ISUZU	May-08
23	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-08
24	RF Switch	MP59B	6200414971	ANRITSU	Jun-08
25	RF Switch	MP59B	6200438565	ANRITSU	Jun-08
26	Power Divider	11636A	6243	HP	Oct-08
27	DC Power Supply	6622A	3448A03079	HP	Oct-08
28	Attenuator (30dB)	11636A	6243	HP	Oct-08
29	Frequency Counter	5342A	2826A12411	HP	Apr-08
30	Power Meter	EPM-441A	GB32481702	HP	Apr-08
31	Power Sensor	8481A	2702A64048	HP	Apr-08
32	Audio Analyzer	8903B	3729A18901	HP	Oct-08
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-08
34	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	Oct-08
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-09