THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

Test Report

Product Name: Wireless Mouse

FCC ID: WXH-MMF

Applicant:

Innovation a ten

PPW Ltd. B/D 4F, 126-5,
Cheongdam-Dong, Gangnam-Gu
Seoul, korea

Date Receipt:12/15/2008

Date Tested: 12/19/2008

Date Issued: 12/24/2008

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

TABLE OF CONTENTS

APPLICANT: Innovation a ten

FCC ID: WXH-MMF

TEST REPORT CONTAINING:

EXHIBIT ATTACHMENTS:

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

TEST EQUIPMENT LIST

No	Description	Manufacturer	Model No.	Serial No.	Due Cal.	Used
1	Test Receiver	Rohde & Schwarz	ESHS 10	862970/018	2009.05.13	☐
2	Test Receiver	Rohde & Schwarz	ESVS 10	826008/014	2009.06.20	☐
3	Spectrum Analyzer	Hewlett Packard	8566B	2311A02394	2009.06.10	☒
4	Spectrum Analyzer	Advantest Corp.	R3261C	61720208	2009.06.10	☐
	Spectrum Analyzer	Advantest Corp.	R3273	101003536	2009.09.05	☐
5	Modulation Analyzer	Hewlett Packard	8901B	3438A05094	2009.05.29	☐
6	Audio analyzer	Hewlett Packard	8903B	3011A12915	2009.05.29	☐
7	Preamplifer	Hewlett Packard	8447F	2805A02570	2009.05.26	☐
8	Preamplifer	A.H. Systems	PAM-0118	164	2009.04.27	☒
9	Signal Generator	Hewlett Packard	8673D	2708A00448	2009.06.10	☐
10	Power Meter	Hewlett Packard	437B	312U24787	2009.04.29	☐
11	Power Sensor	Hewlett Packard	8482B	3318A06943	2009.06.29	☐
12	Loop Antenna	Rohde & Schwarz	HFH2-Z2.335.4711.52	826532/006	2009.01.31	☐
13	Dipole Antenna	Rohde & Schwarz	VHAP	574	2010.07.07	☐
14	Dipole Antenna	Rohde & Schwarz	VHAP	575	2010.07.17	☐
15	Dipole Antenna	Rohde & Schwarz	UHAP	546	2010.07.07	☐
16	Dipole Antenna	Rohde & Schwarz	UHAP	547	2010.07.07	☐
17	Biconical Antenna	Eaton Corp.	94455-1	0977	2010.07.03	☐
18	Biconical Antenna	EMCO	3104C	9111-2468	2010.07.03	☒
19	Log Periodic Antenna	EMCO	3146	2051	2010.06.05	☒
20	Log Periodic Antenna	EMCO	3146	8901-2320	2010.07.03	☐
21	Horn Antenna	A.H. Systems	SAS-571	414	2009.03.17	☒
22	LISN	EMCO	3810/1	2228	2009.10.29	☐
23	LISN	Kyoritsu	KNW-242	8-923-2	2009.05.23	☐

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

24	Waveform Generator	Hewlett Packard	33120A	US34001190	2009.05.29	☐
25	Digital Oscilloscope	Tektronix	TDS 340A	B012287	2009.06.10	☐
26	Dummy Load	Bird Electronics	8251	11511	2009.02.02	☐

THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of Thru Lab & Engineering. The UUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 using a HEWLETT PACKARD spectrum analyzer with a preselector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the UUT was 23.2°C with a humidity of 85%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz)	METER READING + ACF = FS
33	20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 23°C with a humidity of 68%.

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The UUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSIC63.4-2003 with the EUT 40 cm from the vertical ground wall.

THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

APPLICANT: Innovation a ten

FCC ID: WXH-MMF

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.249, 15.205, 15.209

REQUIREMENTS:

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	§15.209
902-928 MHZ		30 - 88 MHz 40 dBuV/m
2.4-2.4835 GHz		88 -216 MHz 43.5
94 dBuV/m @3m	54 dBuV/m @3m	216 -960 MHz 46
		ABOVE 960 MHz 54dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

TEST DATA: See Next Page

THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net
TEST DATA:Horizantal

1ch

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	2402.00	47.6	H	27.8	3.3	78.7	-15.3	94.0
2	4804.00	Not Detectable						54.0
3	7206.00							54.0
4	9608.00							54.0
5	12010.00							54.0
6	14412.00							54.0
7	16814.00							54.0
8	19216.00							54.0
9	21618.00							54.0
10	24020.00							54.0

40ch

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	2441.00	48.7	H	27.9	3.3	79.9	-14.1	94.0
2	4882.00	Not Detectable						54.0
3	7323.00							54.0
4	9764.00							54.0
5	12205.00							54.0
6	14646.00							54.0
7	17087.00							54.0
8	19528.00							54.0
9	21969.00							54.0
10	24410.00							54.0

79ch

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	2480.00	49.3	H	27.9	3.3	80.5	-13.5	94.0
2	4960.00	Not Detectable						54.0
3	7440.00							54.0
4	9920.00							54.0
5	12400.00							54.0
6	14880.00							54.0
7	17360.00							54.0
8	19840.00							54.0
9	22320.00							54.0
10	24800.00							54.0

THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

TEST DATA: Vertical

1ch

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	2402.00	45.9	V	27.8	3.3	77.0	-17.0	94.0
2	4804.00	Not Detectable						54.0
3	7206.00							54.0
4	9608.00							54.0
5	12010.00							54.0
6	14412.00							54.0
7	16814.00							54.0
8	19216.00							54.0
9	21618.00							54.0
10	24020.00							54.0

40h

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	2441.00	47.5	V	27.9	3.3	78.7	-15.3	94.0
2	4882.00	Not Detectable						54.0
3	7323.00							54.0
4	9764.00							54.0
5	12205.00							54.0
6	14646.00							54.0
7	17087.00							54.0
8	19528.00							54.0
9	21969.00							54.0
10	24410.00							54.0

79ch

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	2480.00	49.0	V	27.9	3.3	80.2	-13.8	94.0
2	4882.00	Not Detectable						54.0
3	7323.00							54.0
4	9764.00							54.0
5	12205.00							54.0
6	14646.00							54.0
7	17087.00							54.0
8	19528.00							54.0
9	21969.00							54.0
10	24410.00							54.0

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

APPLICANT: Innovation a ten

FCC ID: WXH-MMF

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.209

REQUIREMENTS: §15.209

30 - 88 MHz	40 dBuV/m @3M
88 -216 MHz	43.5 dBuV/m
216 -960 MHz	46 dBuV/m
ABOVE 960 MHz	54 dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
1	66.20	14.9	H	6.2	1.2	22.3	-17.7	40.0
2	70.00	8.5	V	5.5	1.2	15.2	-24.8	40.0
3	131.80	5.0	V	13.1	1.9	20.1	-23.4	43.5
4	193.60	8.4	H	14.5	2.5	25.3	-18.2	43.5
5	221.20	9.5	H	10.7	2.8	23.0	-23.0	46.0
6	252.50	8.2	H	12.1	3.1	23.5	-22.5	46.0
7	360.20	8.5	H	14.9	3.9	27.3	-18.7	46.0
8	442.20	5.0	V	16.2	4.5	25.7	-20.3	46.0
9	511.40	7.0	H	17.9	5.0	29.9	-16.1	46.0
10	517.00	6.5	V	17.8	5.0	29.3	-16.7	46.0

TEST PROCEDURE: ANSI STANDARD C63.4-2003. The spectrum was scanned from 30 to 1000 MHz. The unit was measured at ThruLab & Engineering 477-6, Hager-Ri, Yoju-Up, Yoju-GunKyunggi-Do,469-803, Korea

TEST RESULTS: This unit DOES meet the FCC requirements.

PERFORMED BY: K.M.CHOI DATE: 12/19/2008

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

APPLICANT: Innovation a ten

FCC ID: WXH-MMF

NAME OF TEST: Band Egde

RULES PART NO.: 15.249

REQUIREMENTS: The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

THE PLOTS ON THE NEXT PAGE REPRESENTS THE EMISSIONS TAKEN FOR THIS DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to 10 dB per division. The horizontal scale is set to 1.5 MHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

Result :

1. Reading dBuV + Atten Value(10dB) – PAM-0118 Preamplifier Gain

2. 1 + ANT Factor + Cable Loss

1ch
PK : 53.7 + 10 – 45.0 = 18.7dBuV
AV : 45.2 + 10 – 45.0 = 10.2dBuV

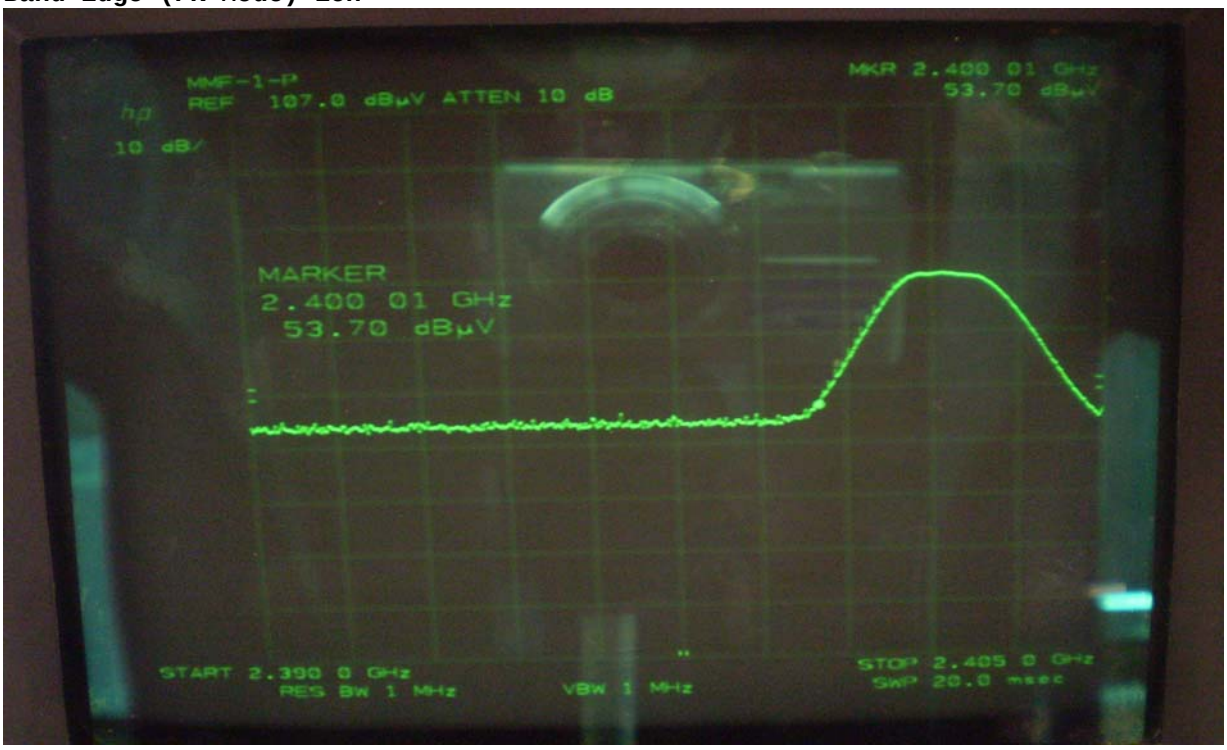
78ch
PK : 48.4 + 10 – 45.0 = 13.4dBuV
AV : 38.2 + 10 – 45.0 = 3.2dBuV

No	Emission Frequency (MHz)	Meter Reading dBuV	Ant. Polaritry	Correction Factor dB	Cable Loss dB	Field Strength (dBuv/m)	Margin (dBuv)	Limit (dBuv/m)
	1ch							
PK	2400.00	18.7	V	27.8	3.3	49.8	-4.2	54.0
AV	2400.00	10.2	V	27.8	3.3	41.3	-12.7	54.0
	78ch							
PK	2483.50	13.4	V	27.9	3.3	44.6	-9.4	54.0
AV	2483.50	3.2	V	27.9	3.3	34.4	-19.6	54.0

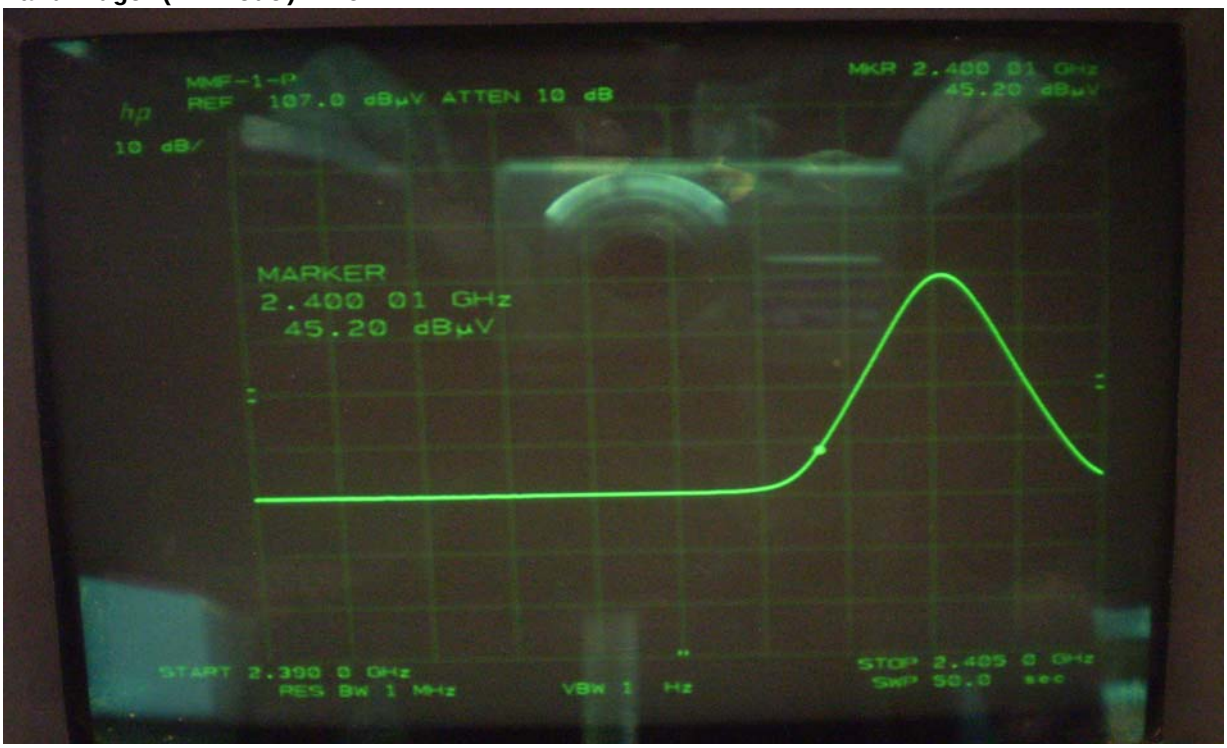
PERFORMED BY: K.M.CHOI **DATE**: 9/17/2007

THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

Band Edge (PK Mode) 1ch

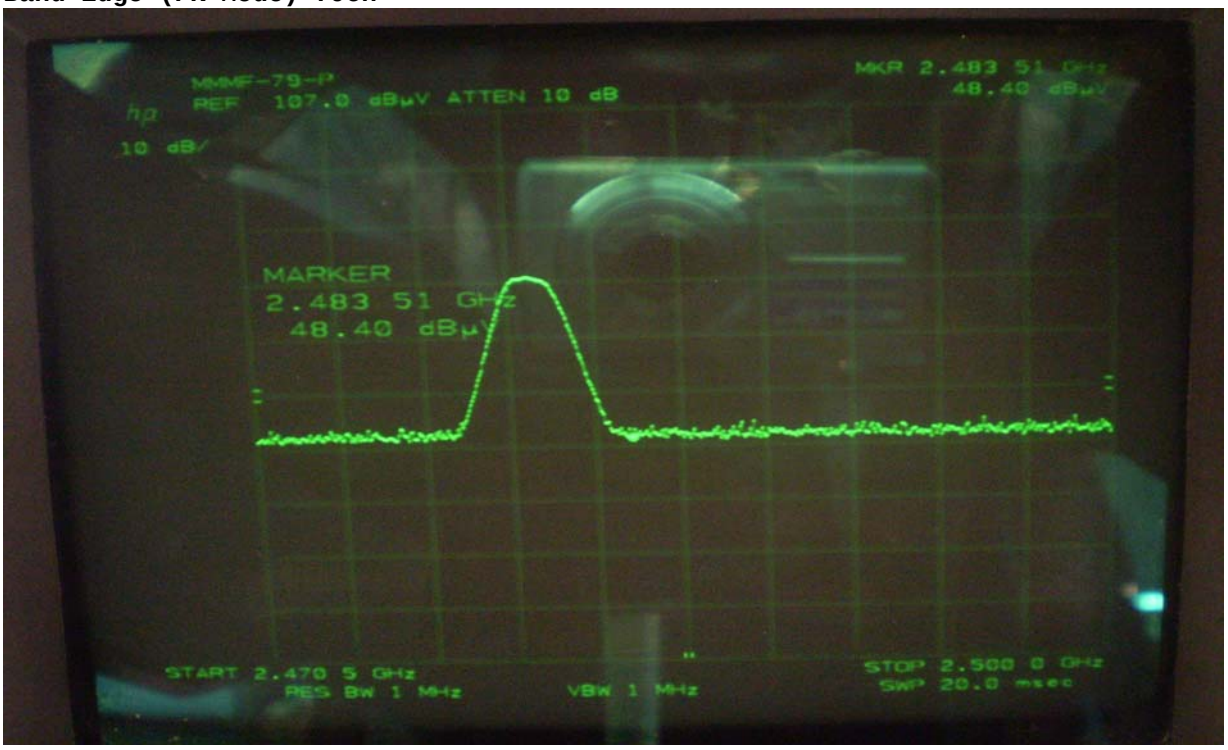


Band Edge (AV Mode) 1 ch



THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

Band Edge (PK Mode) 79ch



Band Edge (AV Mode) 79ch

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

APPLICANT: Innovation a ten

FCC ID: WXH-MMF

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.107

REQUIREMENTS:	**QUASI-PEAK**	**AVERAGE**
.15 – 0.5 MHz	66-56 dBuV	56-46 dBuV
0.5 – 5.0	56	46
5.0 – 30.	60	50

TEST PROCEDURE: ANSI STANDARD C63.4-2003. The spectrum was scanned from .15 to 30 MHz.

THE HIGHEST EMISSION READ FOR LINE 1 WAS 56.2 dBuV @ 0.186MHz

THE HIGHEST EMISSION READ FOR LINE 2 WAS 50.4 dBuV @ 0.192MHz

THE PLOTS ON THE NEXT PAGE REPRESENT THE EMISSIONS READ FOR POWERLINE CONDUCTED FOR THIS DEVICE.

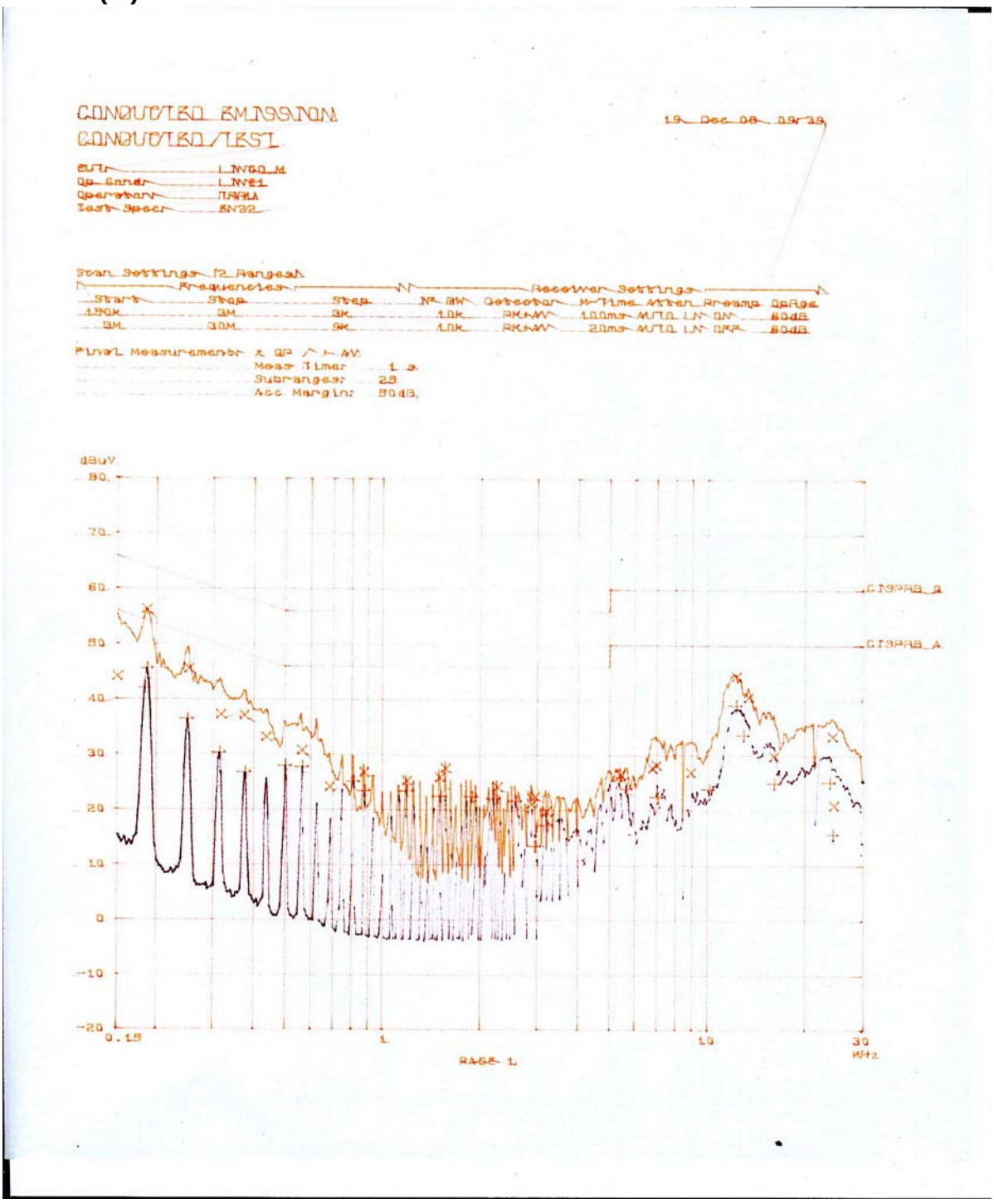
TEST RESULTS: Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

PERFORMED BY: K.M.CHOI **DATE**: 12/19/2008

THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

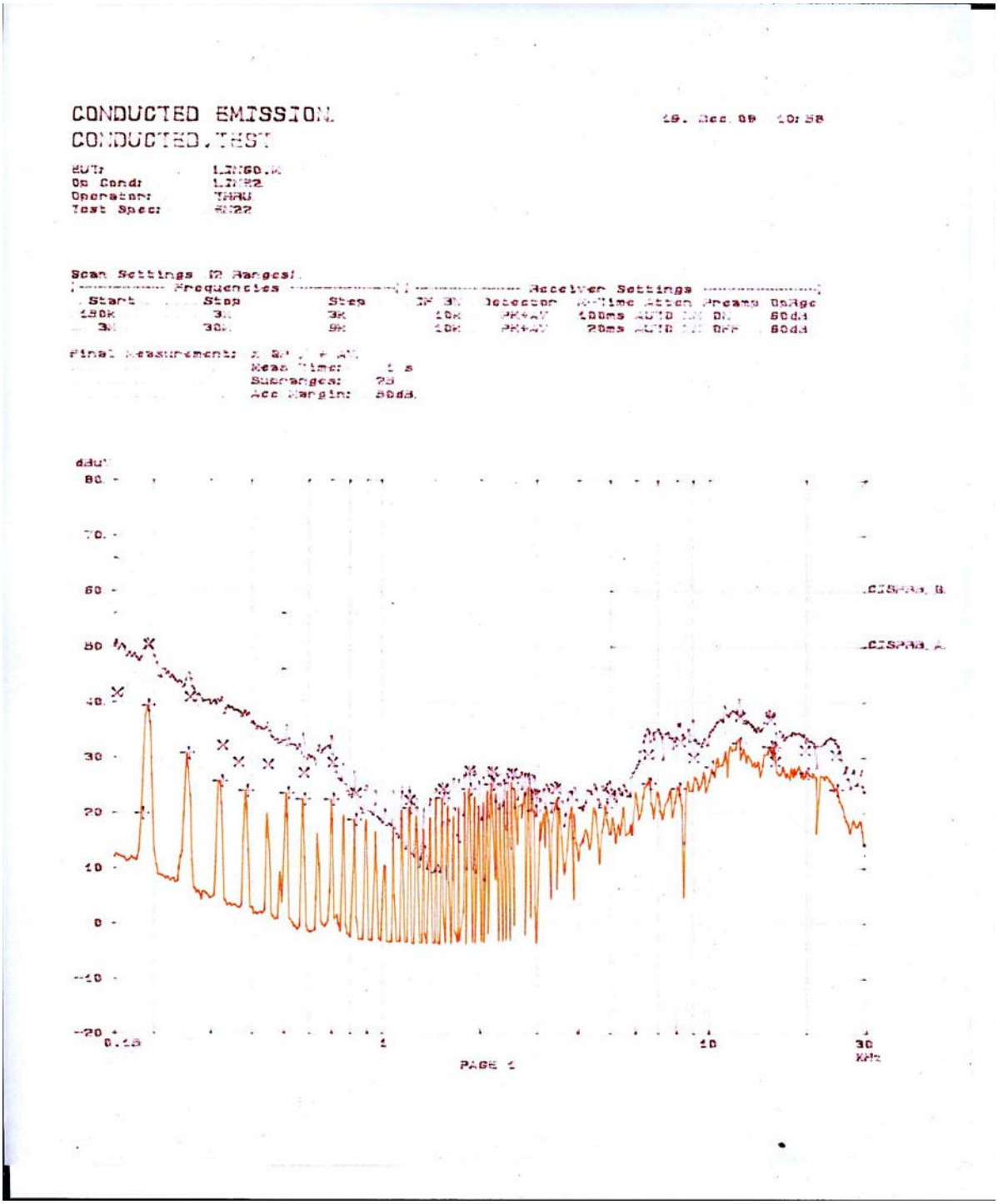
LINE 1(H)



THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

LINE 2(N)



THRU Lab & Engineering.
477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
T820318835092 F820318835169 email thrukang@kornet.net

APPLICANT: Innovation a ten
FCC ID: WXH-MMF
REPORT :TK-FR8007