ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR SUPERHETERODYNE RECEIVER

Test Report No.	**: E054R-095**
Applicant	**: HUMAX Co., Ltd.**
Address	**: Humax Bldg., 212-1, Yubang-Dong, Yongin-Si, Gyeonggi-Do, 449-080, Korea**
Manufacturer	**: HUMAX Co., Ltd.**
Address	**: Humax Bldg., 212-1, Yubang-Dong, Yongin-Si, Gyeonggi-Do, 449-080, Korea**
Type of Equipment	**: DIRECTV SATELLITE RECEIVER**
FCC ID	**: O6ZR15**
Model Name	**: R15**
Serial number	**: N/A**
Total page of Report	**: 11 pages (including this page)**
Date of Incoming	**: April 11, 2005**
Date of issuing	**: April 28, 2005**

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART B §15.101**

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by: 

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ONETECH Corp.

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Y. K. Kwon / Director
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EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: HUMAX Co., Ltd.
ADDRESS	: Humax Bldg., 212-1, Yubang-Dong, Yongin-Si, Gyeonggi-Do, 449-080, Korea
CONTACT PERSON	: Mr. Jung-Jae, Choi / Engineering Manager
TELEPHONE NO	: 82-41-600-6362
FCC ID	: O6ZR15
MODEL NO/NAME	: R15
SERIAL NUMBER	: N/A
DATE	: April 28, 2005

EQUIPMENT CLASS	CYY – Communications Receiver with Part 15 Transmitter
E.U.T. DESCRIPTION	DIRECTV SATELLITE RECEIVER has receiving function for remote controller - UNINTENTIONAL RADIATOR
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2001
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 §15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

-. This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The HUMAX Co., Ltd.., Model R15 (referred to as the EUT in this report) is a DIRECTV SATELLITE RECEIVER and has a RF modulator for TV interfacing and communication receiver functions. The associated transmitter shall be using the EUT together and this transmitter was already approved by the FCC, FCC ID: MG32081, manufactured by Universal Electronics Inc. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	24 MHz, 27 MHz, 28.224, 10.111 MHz and 13.225625 MHz
POWER REQUIREMENT	AC 120V, 60Hz, 55W
NUMBER OF LAYERS	4 Layers
EXTERNAL TERMINALS	Satellite In, RF Remote Antenna, USB, Off-Air In, CH 3/4 Switch, TV Out, Digital Audio Out(Optical), S-Video Out, Video Out, Audio Out, Phone Jack, Power

2.2 Model Differences:

-. None

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

2.4 Test System Details

The EUT was tested with the following all equipment used in the tested systems are:

Model	Manufacturer	FCC ID	Description	Connected to
R15	HUMAX Co., Ltd.	O6ZR15	DIRECTV SATELLITE RECEIVER (EUT)	-
LI201TT	KTV	DoC	LCD TV	EUT
83650L	HP	N/A	CW Generator	EUT

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	N/A	RISE MAIN B/D	N/A
Front Board	N/A	RISE FRONT B/D	N/A
RF Module Board	N/A	N/A	N/A
HDD	Seagate	ST3160022ACE	N/A

3.2 EUT exercise Software

Set the signal generator to transmit at 433.92MHz and then the EUT receives the signal.

3.3 Equipment Modifications

None

3.4 Configuration of Test System

Line Conducted Emission Test:

The power of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2001 7.2.3 to determine the worse operating conditions.

Radiated Emission Test:

Preliminary radiated emissions tests were conducted using the procedure in ANSI C63.4: 2001, 8.3.1.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meters open area test site.

Coherent Test:

During Radiated Emission Tests, H.P. signal generator model no: 83650L was used to radiate an un-modulated CW signal to EUT at 433.92 MHz in order to cohere the individual components of the characteristic broadband emissions from EUT.

Antenna Power Conduction Test:

This equipment was only with a permanently attached antenna, so the radiated emission measurement was performed with the antenna attached.

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4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
RX mode	X

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
RX mode	X

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5. FINAL RESULT OF MEASURMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test

Humidity Level : 45 % Temperature: 21 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B

Type of Test : Receiver

Result : PASSED BY –3.29 dB at 3.17 MHz under average mode

EUT : DIRECTV SATELLITE RECEIVER Date: April 20, 2005

Operating Condition : RX Mode

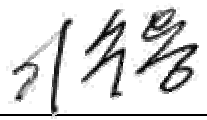
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
1.55	H	47.20	56.00	-8.80
2.13	N	46.83	56.00	-9.17
3.17	H	48.58	56.00	-7.42
3.36	N	48.30	56.00	-7.70
13.92	H	55.40	60.00	-4.60
14.05	N	56.36	60.00	-3.64
Frequency (MHz)	**Line**	**Average (dBuV)**		**Margin (dB)**
		Emission level	**Limits**	
1.55	H	41.09	46.00	-4.91
2.13	N	41.75	46.00	-4.25
3.17	H	42.71	46.00	-3.29
3.36	N	42.64	46.00	-3.36
13.92	H	44.60	50.00	-5.40
14.05	N	46.08	50.00	-3.92

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line

See next page for an overview sweep performed with peak and average detector.



Tested by: Sue-Yong, Lee / Test Engineer

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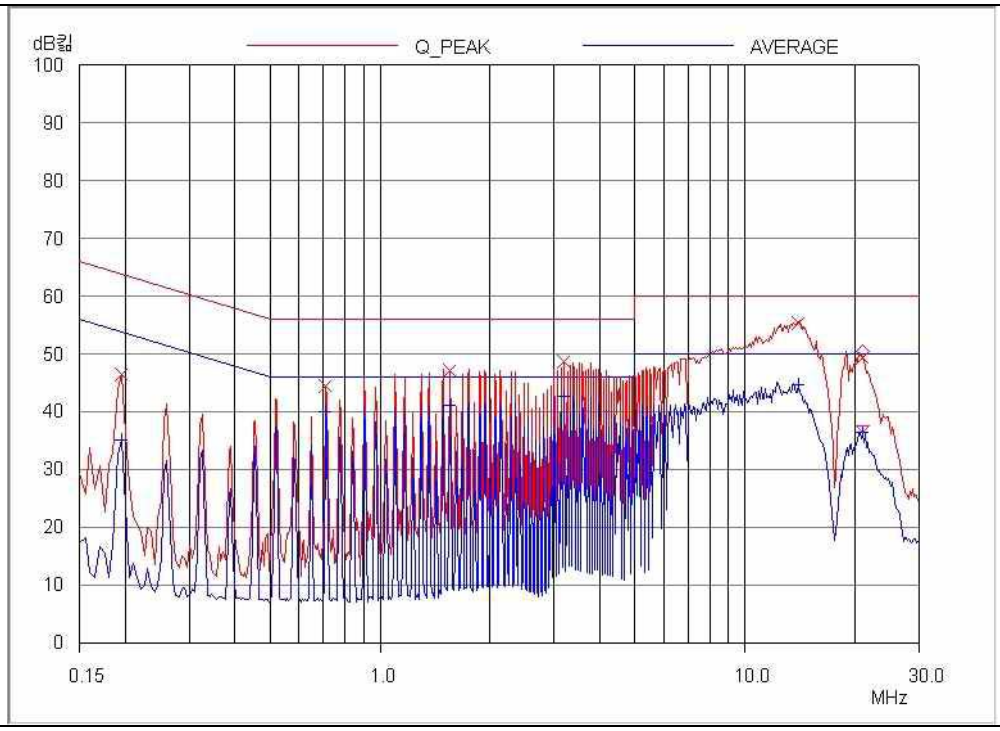
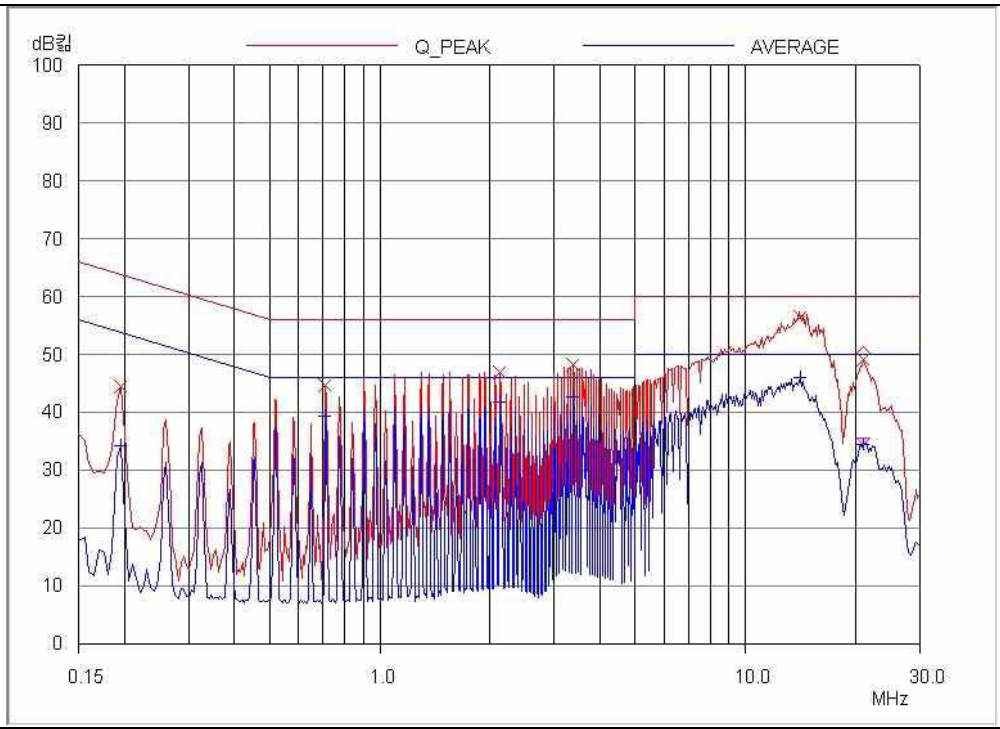


HOT LINE



NEUTRAL LINE

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5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 43 % Temperature : 21 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART B
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Type of Test : Receiver
Result : PASSED BY –5.52dB at 904.06MHz

EUT : DIRECTV SATELLITE RECEIVER Date: April 25, 2005
Operating Condition : RX Mode
Frequency range : 30MHz – 1000MHz
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
97.83	23.59	V	9.73	1.90	35.22	43.52	-8.30
221.87	6.32	V	16.53	2.97	25.82	46.02	-20.20
301.33	20.87	H	13.77	3.81	38.45	46.02	-7.57
391.45	15.68	H	15.27	4.37	35.32	46.02	-10.70
443.78	14.30	H	16.61	4.49	35.40	46.02	-10.62
490.29	8.94	H	17.12	5.31	31.37	46.02	-14.65
517.42	11.24	H	17.65	5.43	34.32	46.02	-11.70
588.16	10.87	H	18.61	5.30	34.78	46.02	-11.24
839.13	5.89	H	22.09	7.12	35.10	46.02	-10.92
904.06	10.40	H	22.91	7.19	40.50	46.02	-5.52
Other frequencies are more than 30dB below the limit up to 2GHz							

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Tested by: Sue-Yong, Lee / Test Engineer

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6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dBuV)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/meter)
=	Corrected Reading	(dBuV/meter)
-	Specification Limit	(dBuV/meter)
=	dB Relative to Spec	(+/- dB)

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7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS10	827864/005	DEC/04	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/04	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/04	12MONTH	■
4.	Spectrum analyzer	HP	8568B	3109A05456	JUL/04	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/05	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	JUL/04	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/05	12MONTH	■
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/04	12MONTH	■
		Schwarzbeck	VHA9103	91031852	JAN/05		
9.	Log Periodic antenna	EMCO	3146	9109-3213	FEB/05	12MONTH	■
				9109-3217	MAY/04		
		Schwarzbeck	9108-A(494)	62281001	JAN/05		
10.	LISN	EMCO	3825/2	9109-1867	JUL/04	12MONTH	■
				9109-1869	OCT/04		
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■

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