

TEST REPORT

of

FCC Part 15 Subpart C §15.209 IC RSS-210, Issue 7 : 2007

Equipment Under Test : Fob Holder
Model Name : HUF-GH09MYKRFH
Serial No. : N/A
Applicant : HUF KOREA LIMITED
Manufacturer : HUF KOREA LIMITED
Date of Test(s) : 2008-06-23 ~ 2008-07-03
Date of Issue : 2008-07-03

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date

2008-07-03

Geoffrey Do

Approved By



Date

2008-07-03

Jim Kim

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**Appendix A. Photo of Field Strength fundamental, Spurious Emission Test and
Receiver Spurious Emission Test****Appendix B. Photos of the EUT**

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1. General Information

1.1. Testing Laboratory

SGS Testing Korea Co., Ltd.

Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

www.electrolab.kr.sgs.ccom

Telephone : +82 +31 428 5700

FAX : +82 +31 427 2371

1.2. Details of Applicant

Applicant : HUF KOREA LIMITED
Address : 710 Baeksuk-dong, Chonan city, Chungnam, Korea
Contact Person : Taewoo Kim
Phone No. : +82 +41 559 6534
Fax No. : +82 +41 621 4953

1.3. Description of EUT

Kind of Product	Fob Holder
Model Name	HUF-GH09MYKRFH
Serial Number	N/A
Power Supply	DC 12 V
Frequency Range	125 kHz(Tx/Rx)
Modulation Technique	ASK
Frequency Generation	X-Tal
Number of Channels	1 CH
Operating Conditions	-20 °C ~ 60 °C
Antenna Type	Fixed Type(Loop Coil Antenna)

1.4. Details of Modification

-N/A

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1.5. Test Equipment List

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum Analyzer	H.P.	8565E	Dec. 31. 2008
Test Receiver	Rohde & Schwarz	ESHS10	Sep. 04 2009
DC Power Supply	Agilent	E3631A	May 09 2009
Preamplifier	H.P.	8447F	Sep. 17. 2008
Loop Antenna	Rohde & Schwarz	100118	Sep. 18 2009
Turn table	Deail EMC	DI-1500	N.C.R
Anechoic Chamber	SY Corporation	L x W x H 9.6 x 6.4 x 6.4	Feb. 15. 2009

1.6 Test Report Revision

Revision	Report number	Description
0	F690501/RF-RTL002148	Initial

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1.6. Summary of Test Result

The EUT has been tested according to the following specifications:

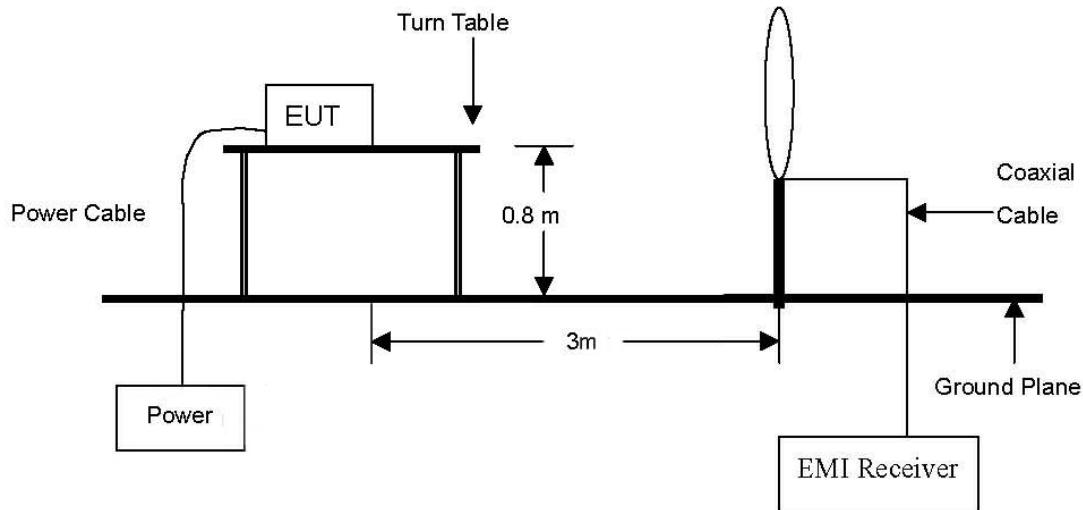
APPLIED STANDARD : FCC Part15, RSS-210, RSS-Gen			
Standard Section - FCC	Standard Section - IC	Test Item	Result
15.209(a)	RSS-210, Issue 7, Table 3	Spurious Emission Field Strength of Fundamental	complied
15.109(a)	RSS-Gen, Issue 2, 7.2.3	Receiver Spurious Emission(Radiated)	complied

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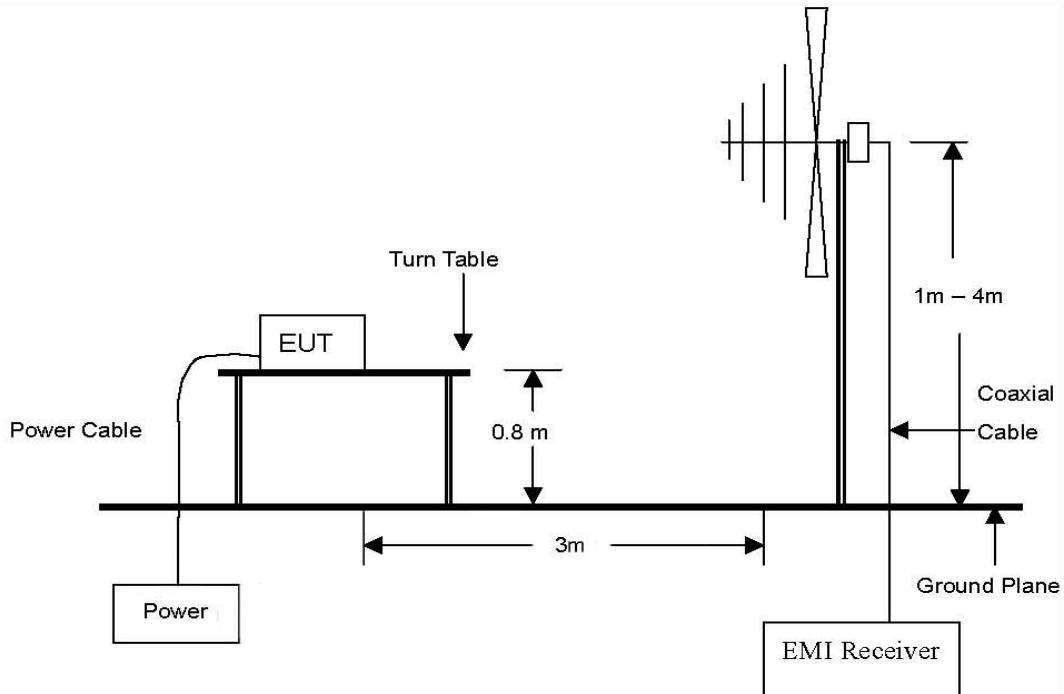
2. Field Strength of Fundamental

2.1. Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



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2.2. Limit

2.2.1. Radiated emission limits, general requirements

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	2400/F(kHz)	30
1.705 – 30.0	30	30
30 -88	100**	3
88 -216	150**	3
216 - 960	200**	3
Above 960	500	3

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

2.2.2. Periodic operation in the band 40.66-40.70 MHz and above 70 MHz

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 – 47.70	2,250	225
70 - 130	1,250	125
130 – 174	1,250 to 3,750 **	125 to 375 **
174 – 260	3,750	375
260 – 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** linear interpolations

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows : for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)-7083.333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

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2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

2.3.1. Test Procedures for emission from 9 kHz to 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
- c. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

2.3.2. Test Procedures for emission from 30 MHz to 1000 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 meter away from the interference-receiving antenna.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

2.4. Test Result

Ambient temperature : 23 °C Relative humidity : 45 %

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

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
0.125	59.40	Q.P.	H	18.93	0.01	78.34	105.67	27.33

Remark:

To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.

Note:

1. A Peak limit is 20 dB above the average limit.
2. 3m Limit(dBuV/m) = $20\log(2400/F_{(kHz)})+40\log(300/3)$
= $20\log(2400/125)+40\log(300/3)$
= $25.67+80$
= 105.67

3. Spurious Emission

3.1. Test Setup

Same as section 2.1 of this report

3.2. Limit

Same as section 2.2 of this report

3.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

3.3.1. Test Procedures for emission from 9 kHz to 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
- c. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

3.3.2. Test Procedures for emission from 30 MHz to 1000 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 meter away from the interference-receiving antenna.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

3.4. Test Result

Ambient temperature : 23°C Relative humidity : 45 %

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

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF+CL (dB/m)+(dB)	Amp Gain (dB)	Actual (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
0.375	28.39	Q.P.	H	18.88	-	47.27	96.12	48.85
0.626	11.85	Q.P.	H	18.86	-	30.71	51.67	20.94
Above 0.70	Not Detected							

Remark:

To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.

Note:

1. A Peak limit is 20 dB above the average limit.

4. Receiver Spurious Emission (Radiated)

4.1. Test Setup

Same as section 3.1 of this report

4.2. Limit

See below for references

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 meters)
30 – 88	100
88 – 216	150
216 -960	200
Above 960	500

4.3. Test Procedures

Same as section 3.3 of this report

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4.4. Test Result

Ambient temperature : 23 °C Relative humidity : 45 %

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

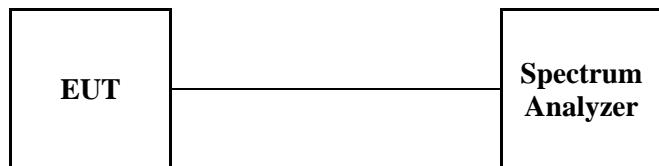
Radiated Emissions			Ant	Correction Factors		Total	IC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant./CL (dB/m)/ (dB)	Amp Gain (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Above 30	Not Detected							

Note:

1. A Peak limit is 20 dB above the average limit.
2. Other Spurious Frequencies were not detected up to 1000 MHz.

5. Occupied Bandwidth (99 % BW)

5.1. Test Setup



5.2. Limit

None

5.3. Test Procedure

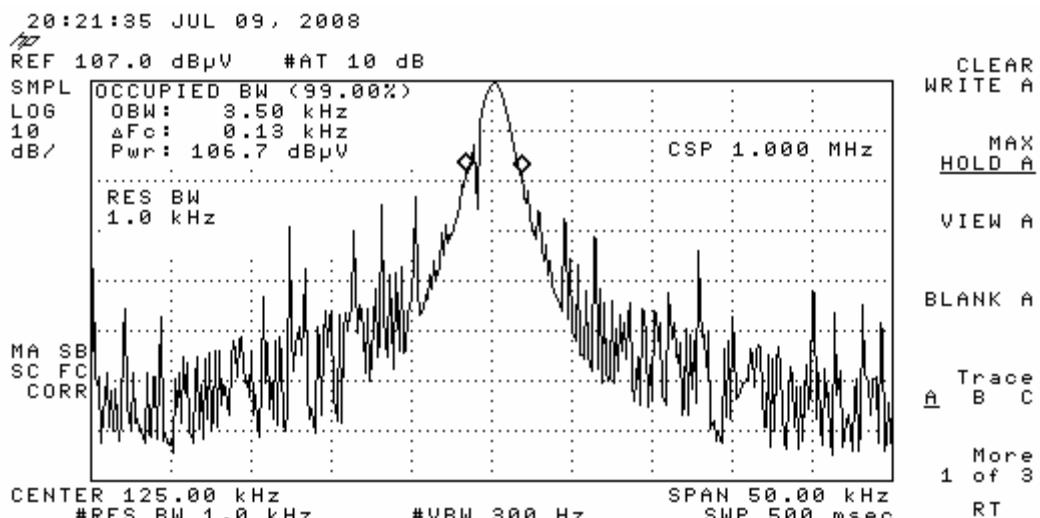
The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

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5.4. Test Result

Ambient temperature : 23 °C Relative humidity : 45 %

Carrier Frequency (kHz)	Bandwidth of the emission (kHz)	Limit (kHz)	Remark
125	3.50	-	-



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