www.etl.re.kr

Electromagnetic Emission

F C C M E A S U R E M E N T R E P O R T

CERTIFICATION OF COMPLIANCE

FCC Part 15 Certification Measurement

PRODUCT	:	RF Remote Control
MODEL/TYPE NO	:	LRC-122 RF
FCC ID	:	VNH-LRC-122RF
APPLICANT	:	Inkel Corporation 345-50 Gasan-dong, Geumcheon, Seoul, 153-802, Korea. Attn.: Eun-Hwan, Shim/ Principal Reseach Engineer
MANUFACTURE	:	Same as applicant
FCC CLASSIFICATION	:	Part 15 Low Power Communication Device Transmitter
FCC RULE PART(S)	:	FCC Part 15 Subpart C Section 15.249
FCC PROCEDURE	:	Certification
TRADE NAME	:	Sherwood
TEST REPORT No.	:	ETLE070822.576
DATES OF TEST	:	October 08, 2007 – October 10, 2007
DATES OF ISSUE	:	October 15, 2007
TEST LABORATORY	:	ETL Inc. (FCC Registration Number : 95422) #584 Sangwhal-ri, Kanam-myon, Yoju-kun, Kyounggi-do, 469-885, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788

This is RF Remote Control; Model LRC-122 RF has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 at the ETL/EMC Test Laboratory and has been show to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part15 Subpart C section 15.249.
I attest to the accuracy of data. All measurement herein was performed by me or was made under my supervision and is correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

H.S, Lee / Chief Engineer

ETL Inc.

#584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

Tel : 82-2-858-0786 Fax : 82-2-858-0788

Table of Contents

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

FCC MEASUREMENT REPORT

Scope – *Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

General Information

Applicant Name : Inkel Corporation

Address : 345-50 Gasan-dong, Geumcheon, Seoul, 153-802, Korea.

Attention : Eun-Hwan, Shim/ Principal Reseach Engineer

- **EUT Type :** RF Remote Control
- **Model Number :** LRC-122 RF
- **FCC ID :** VNH-LRC-122RF
- **S/N :** N/A
- **FCC Rule Part(s) :** FCC Part 15 Subpart C Section 15.249
- **Test Procedure :** ANSI C63.4-2003
- **FCC Classification :** Part 15 Low Power Communication Device Transmitter
- **Dates of Tests :** October 08, 2007 – October 10, 2007
- **Place of Tests :** ETL Inc.
  EMC Testing Lab (FCC Registration Number : 95422)
  584, Sangwhal-Ri, Kanam-Myun, Yoju-Kun,
  Kyounggi-Do, Korea
  Tel : 82-2-858-0786 Fax : 82-2-858-0788
- **Test Report No. :** ETLE070822.576

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

1. INTRODUCTION

The measurement test for radiated and conducted emission test were conducted at the ETL Inc facility located at 584, Sangwhal-ri, Ganam-myun, Youju-kun, Kyoungki-do, Korea. The open area test site is constructed in conformance with the requirements of the ANSI C63.4-2003 and CISPR Publication 16. The ETL has site descriptions on file with the FCC for 3 and 10 meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission(Registration Number : 95422).

The measurement procedure described in American national standard for method of measurement of radio-noise emission from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz (ANSI C.63.4-2003) was used in determining radiated and conducted emissions from the Inkel Corporation. Model: LRC-122 RF

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

2. PRODUCT INFORMATION

2.1 General Remark

2.2 Equipment Description

This remote controller can operate not only this receiver but also most popular brands of audio and video components such as CD players, tape decks, TVs, cable boxes, VCRs, DVD players, satellite receivers, etc.
To operate 7 components other than this receiver, you should enter the setup code for each component.
The numbered buttons on the remote control have different functions in different device modes. For details, refer to" FUNCTION TABLE of the NUMBERED BUTTONS" on the next page.
About the transmission signal this remote control can emit not only the infrared beams which the conventional remote control (including the ROOM 2remote control) uses but also the RF (Radio Frequency) beams which are stronger than those. To operate this receiver and other components, this remote control should emit the infrared beams. To operate this receiver only from longer distance even if there are obstacles such as walls, furniture, etc. in the way, this remote control should emit the RF beams. Therefore, depending on how to use this remote control, you should set the transmission signal mode to "IR"(default value) or "RF."

2.3 General Specification

Specification

No.	ELECTRICAL DATA	SPECIFICATIONS
1. 1	FREQUENCY RANGE	2 433 MHz
1. 2	IMPEDANCE	50 Ω NOMINAL
1. 3	V . S . W . R	LESS THAN 1:2.0
1. 4	GAIN	UNITY
1. 5	RADIATION PATTERN	OMNI - DIRECTIONAL
1. 6	POLARIZATION	VERTICAL
1. 7	POWER	Lithium battery (AAA 4 EA)

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

3. DESCRIPTION OF TESTS

3.1 Restricted bands of operation

Fundamental emissions from the intentional radiators were not located within any of frequency bands described in section §15.205(a) listed below;

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.25
0.495 - 0.505**	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	Above 38.6
13.36 - 13.41			

Remark **: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

3.2 Conducted Emission Measurement

Conducted emissions measurements were made in accordance with § 13 in ANSI C63.4-2003 "measurement of intentional radiators ". The measurement were performed over the frequency range of 0.15 MHz to 30 MHz using a 50Ω/50uH LISN as the input transducer to a spectrum analyzer or a field intensity meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10 kHz or for "quasi-peak" within a bandwidth of 9 kHz.

- Procedure of Test

The line-conducted emission test is conducted inside a shielded anechoic chamber room with 1 m x 1,5 m x 0,8 m wooden table which is placed 0,4 m away from the vertical wall and 1,5 m away from the side wall of the chamber room. Two LISN are bonded to the shielded room. The EUT is powered from the LISN and the support equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1,2 cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the LISN. Non-inductive bundling to a 1 m length shortened all interconnecting cables more than 1 m. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the EMI Test Receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using to set Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0,15 MHz to 30 MHz. The bandwidth of the spectrum analyzer was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was maximized by switching power lines, varying the mode of operation or resolution, clock or data exchange speed, if applicable, whichever determined the worst-case emission. Each emission reported was calibrated using self-calibrating mode.

Photographs of the worst-case emission can be seen in photographs of conducted emission test setup.

3.2.1 Limitation

(1) According to §15.207 Conducted limits

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

Frequency MHz	Quasi Peak dB uV	Average dB uV
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

3.3 Radiated Emission Measurement

Radiated emission measurements were in accordance with § 13 in ANSI C63.4-2003 "Measurement of Intentional radiators" The measurements were performed over the frequency range of 30 MHz to 24 GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak, Quasi-peak, Average" within a bandwidth of 120 kHz and above 1GHz is 1 MHz.

- Procedure of Test

Preliminary measurements were made at 3 meter using broadband antennas, and spectrum analyzer to determined the frequency producing the max. Emission in shielded room. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 kHz to 24 GHz using Log-Bicon antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used. Final measurements were made open site at 3-meters. The test equipment was placed on a wooden turntable. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR Peak, Quasi-peak, Average mode and the bandwidth of the receiver was set to 120 kHz or 1 MHz depending on the frequency of type of signal. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the max. Emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the max. Emission. Each emission was maximized by: varying the mode of operation to the EUT and/or support equipment and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Photographs of the worst-case emission test setup can be seen in Appendix B.

3.3.1 Radiated Emission Limits

(1) According to §15.209 Radiated emission limits, general requirements and §15.249(d) 50 dB below of the fundamental limits

(a) 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:

Frequencies (MHz)	15.209 Limits and General Radiated Limits (dBuV/m@3 m)	15.249(d) 50 dB below of the fundamental (dBuV/m@3 m)
30 – 88	40	40
88 – 216	43.5	43.5
216 – 960	46	44
Above 960	54	44

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

3.4 According to §15.249 fundament and harmonics emission limits

Frequencies (MHz)	Field Strength of Fundamental Limits (dBuV/m@3 m)	Field Strength of Harmonics Limits (dBuV/m@3 m)
2400-2483.5	114(Peak)	74(Peak)
	94(Average)	54(Average)

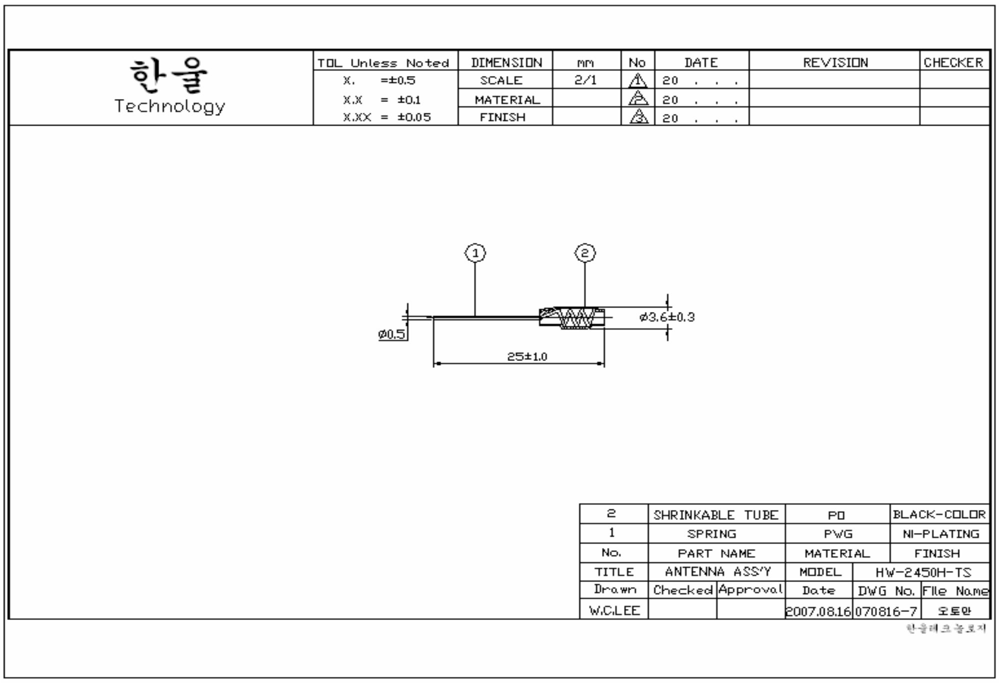
3.5 According to §15.231(c) Occupied bandwidth measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

3.6 Antenna requirement

(1) According to §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.



Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

4. TEST CONDITION

4.1 Test Configuration

T The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner and which tends to maximize its emission level in a typical application.

4.2 EUT operation

Operating Mode	The worst operating condition
Stand-By Mode	X
Continue Transmitting(2443 MHz)	◎

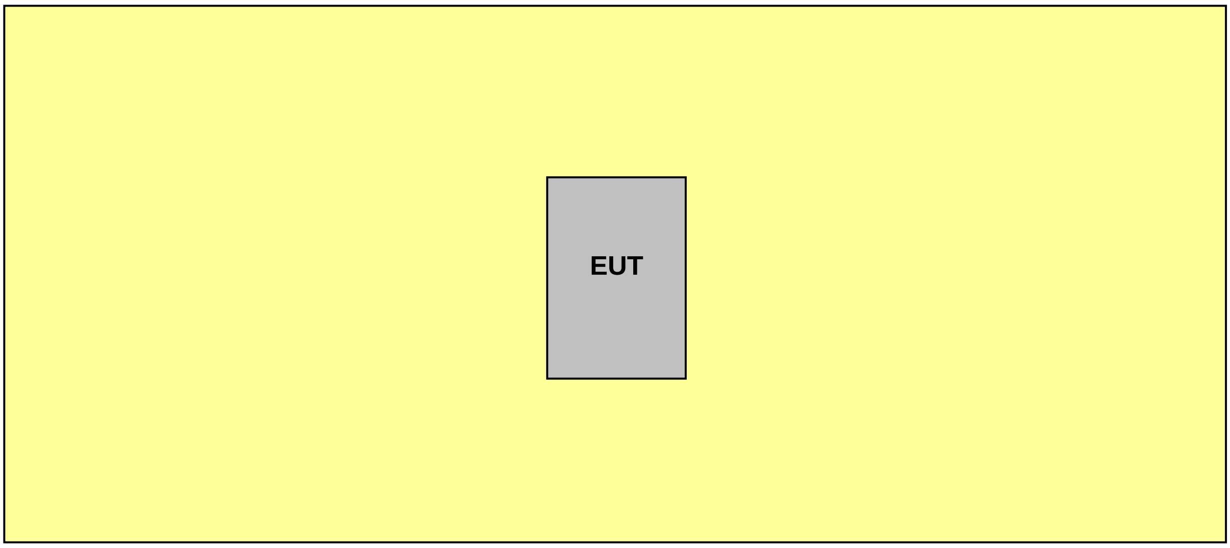
◎: Worst case investigated during the test.

4.3 Support Equipment Used

Description	Model Name	Serial No.	Manufacturer
RF Remote Controller	LRC-122 RF	N/A	Inkel Corporation

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

4.4 The setup drawing(s)



4.5 Type of Cables Used

Device from	Device to	Type of Cable	Length(m)	Type of shield
EUT	NONE	NONE	0	-

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

5. TEST RESULTS

5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

Test Rule Parts	Measurement Required	Result
15.207	Conducted emissions measurement	**N/A***
15.205, 15.209, 15.249	Radiated emissions measurement and fundamental and harmonics emission limits	**Passed**
15.231	Occupied Bandwidth measurement	**Passed**

N/A* this test was not performed because the EUT operates on 6 Vdc only and will not be plugged into the AC public mains.

The equipment is not modified anything, mechanical or circuits to improve EMI status during a measurement.
No EMI suppression device(s) was added and/or modified during testing.

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

5. TEST RESULTS

5.2 Radiated Emissions Measurement

EUT	RF Remote Control / LRC-122 RF (SN: N/A)
Limit apply to	FCC Part 15.209
Test Date	October 08, 2007
Operating Condition	Continue Transmitting(2443 MHz)
Environment Condition	Humidity Level: 50 %RH, Temperature: 20 ℃
Result	Passed

Radiated Emission Test Data

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.
Detector mode: CISPR Quasi-Peak mode (6dB Bandwidth: 120 kHz)

Frequency [MHz]	Reading [dBμV]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dBμV]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]
31,36	26,36	V	8,71	1,43	36,50	40,0	3,50
47,72	24,21	V	9,63	2,05	35,90		4,10
50,45	20,27	V	9,63	2,10	32,00		8,00
55,22	25,40	V	9,10	2,10	36,60		3,40
63,40	26,26	V	8,51	2,13	36,90		3,10
134,30	18,58	H	11,10	3,31	33,00	43,5	10,50
146,57	17,24	H	11,36	3,50	32,10		11,40
166,35	20,10	H	10,94	3,76	34,80		8,70
182,03	20,65	H	10,04	3,91	34,60		8,90
386,60	21,49	H	14,14	6,47	42,10	46,0	3,90
478,51	9,53	H	16,44	7,43	33,40		12,60
487,35	11,44	H	16,66	7,50	35,60		10,40

NOTES :* **H : Horizontal polarization , ** V : Vertical polarization**

1. **Result = Reading + Antenna factor + Cable loss**
2. **Margin value = Limit - Result**
3. **The measurement was performed for the frequency range 9 kHz ~ 1000 MHz according to the FCC Part 15. 209**

Test Engineer: K. K. Yoon

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

5. TEST RESULTS

5.3 Fundamental Radiated Emissions Measurement

EUT	RF Remote Control / LRC-122 RF (SN: N/A)
Limit apply to	FCC Part 15.249
Test Date	October 09, 2007
Operating Condition	Continue Transmitting(2443 MHz)
Environment Condition	Humidity Level: 52 %RH, Temperature: 21 ℃
Result	Passed

Radiated Emission Test Data

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

Detector mode: Peak mode.

Frequency [MHz]	Reading [dBµV]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dBµV]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2433,00	49,15	H	29,10	12,31	90,56	114,00	23,44
2433,00	48,89	V	29,10	12,31	90,30	114,00	23,70

Detector mode: Average mode.

Frequency [MHz]	Reading [dBµV]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dBµV]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2433,00	49,00	H	29,10	12,31	90,41	94,00	3,59
2433,00	48,65	V	29,10	12,31	90,06	94,00	3,94

NOTES :* **H : Horizontal polarization , ** V : Vertical polarization**

1. **Result = Reading + Antenna factor + Cable loss**
2. **Margin value = Limit - Result**
3. **The measurement was performed for the according to the FCC Part 15. 249**
4. **ALL reading below 1 GHz are Quasi-Peak, above are average value.**

Test Engineer: K. K. Yoon

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

5. TEST RESULTS

5.4 Harmonic Radiated Emissions Measurement

EUT	RF Remote Control / LRC-122 RF (SN: N/A)
Limit apply to	FCC Part 15.249
Test Date	October 09, 2007
Operating Condition	Continue Transmitting(2443 MHz)
Environment Condition	Humidity Level: 51 %RH, Temperature: 23 ℃
Result	Passed

Radiated Emission Test Data

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

Detector mode: Peak mode

Frequency [MHz]	Reading [dB㎶]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dB㎶]	Result [dB㎶/m]	Limit [dB㎶/m]	Margin [dB]
4866,00	4,65	H	33,40	14,60	52,65	74,00	21,35
4866,00	4,72	V	33,40	14,60	52,72	74,00	21,28

Detector mode: Average mode

Frequency [MHz]	Reading [dB㎶]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dB㎶]	Result [dB㎶/m]	Limit [dB㎶/m]	Margin [dB]
4866,00	3,51	H	33,40	14,60	51,51	54,00	2,49
4866,00	3,78	V	33,40	14,60	51,78	54,00	2,22

NOTES :*** H : Horizontal polarization , ** V : Vertical polarization**

1. **Result = Reading + Antenna factor + Cable loss**
2. **Margin value = Limit - Result**
3. **The measurement was performed for the according to the FCC Part 15. 249**
4. **ALL reading below 1 GHz are Quasi-Peak, above are average value.**
5. **Above 3rd harmonics signal are not detected.**

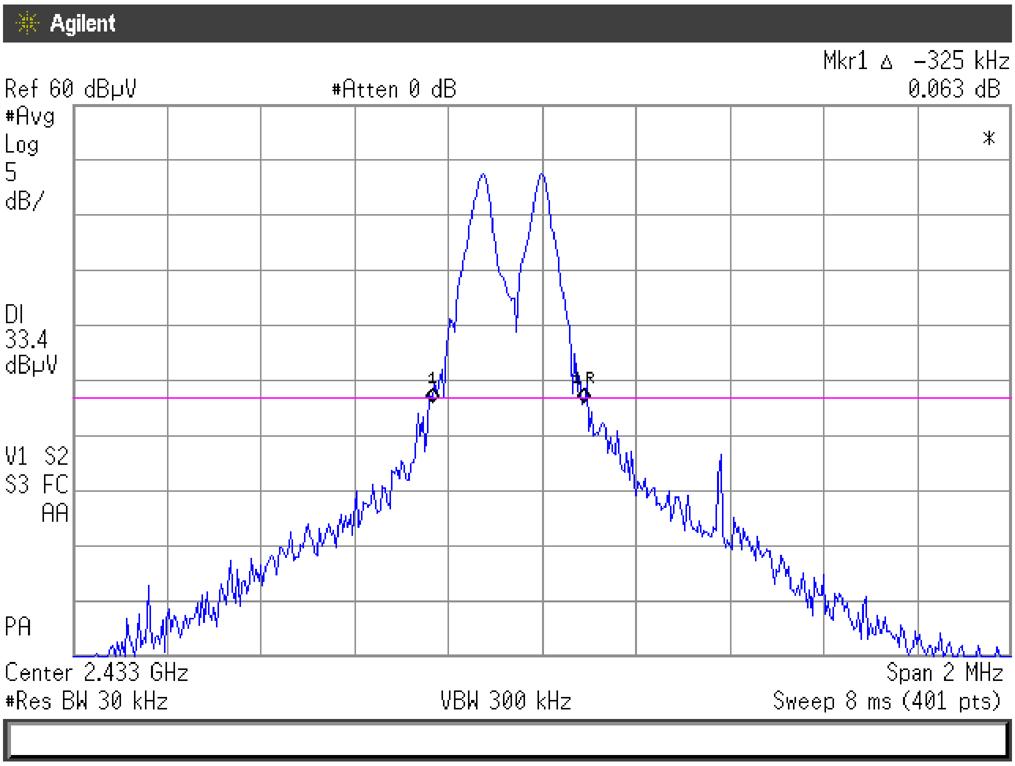
Test Engineer: K. K. Yoon

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

5. TEST RESULTS

5.5 OBW Measurement

EUT	RF Remote Control / LRC-122 RF (SN: N/A)
Limit apply to	FCC Part 15.231
Test Date	October 10, 2007
Operating Condition	Continue Transmitting(2443 MHz)
Environment Condition	Humidity Level: 52 %RH, Temperature: 20 ℃
Result	Passed



According to FCC Part 15.231, the bandwidth of the emission shall not be wider than 0.5 % of the center frequency for the devices operating above 900 MHz. The limit is 12.16 MHz for the transmitter working at 2.433 GHz.
It presses the button and it tests from the maximum modulation condition.

Test Engineer: K. K. Yoon

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

6. SAMPLE CALCULATION

Sample Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.
The basic equation with a sample calculation is as follows:

FS = RA + AF + CF

where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor

$dB(\mu V/m) = 20 \log_{10} (\mu V/m)$: Equation 1
$dB\mu V = dBm + 107$: Equation 2

Example : @ 63.40 MHz

Class B Limit = 40.00 dB ㎶/m

Reading = 26.26 dB ㎶

Antenna Factor + Cable Loss = 8.51 + 2.13 = 10.64 dB/m

Total = 36.90 dB ㎶/m

Margin = 40.00 – 36.90 = 3.10 dB

= 3.10 dB below Limit

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

7. List of test equipments used for measurements

Test Equipment		Model	Mfg.	Serial No.	Cal. Due Date
■	EMI TEST Receiver	ESVS 10	R & S	835165/001	08-05-03
■	EMI TEST Receiver	ESPI3	R & S	100478	08-10-17
■	Spectrum Analyzer	E7405A	H.P	US41160290	08-10-17
■	Preamplifier	8447D	H.P	3307A02865	08-10-17
□	LISN	3816-2	EMCO	1001	08-10-17
□	LISN	3816-2	EMCO	1002	08-10-17
■	LogBicon Antenna	VULB9165	Schwarz Beck	2023	08-07-23
■	Broad band Horn antenna	BBHA 9120D	Schwarz Beck	227	08-03-15
■	Turn-Table	DETT-03	Daeil EMC	-	N/A
■	Antenna Master	DEAM-03	Daeil EMC	-	N/A

End of Test Report

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea