

Certification of Compliance

CFR 47 Part 15 Subpart C

Test Report File No. : 01-IST-169 Date of Issue : Dec 7, 2001

Model(s) : Megafree

Kind of Product : Hands Free Kit

Applicant : Ant Telecom Co., Ltd.

Address : Cheongwun B/D 6F, 990-198, Keomsa-dong, Dong-gu,
Daegu, 701-040 , Korea

Manufacturer : Ant Telecom Co., Ltd.

Address : Cheongwun B/D 6F, 990-198, Keomsa-dong, Dong-gu,
Daegu, 701-040 , Korea

Test Result **Positive** Negative

Reviewed By

Approved By



J.H. Lee / General Manager of EMC

G. Chung / Chief

- The test report with appendix consists of 9 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4 1992.



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INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd.

San 21-8, Goan-Ri, Baekam-Myun, Yongin-City

Kyonggi-Do, 449-860, Korea

TEL : +82 31 333 4093

FAX : +82 31 333 4094

ENVIRONMENTAL CONDITIONS

Temperature 12 degree

Humidity 43 percent

Atmospheric pressure 1002 mbar

POWER SUPPLY SYSTEM USED

Power supply system DC 3V (AAA Battery x 2)

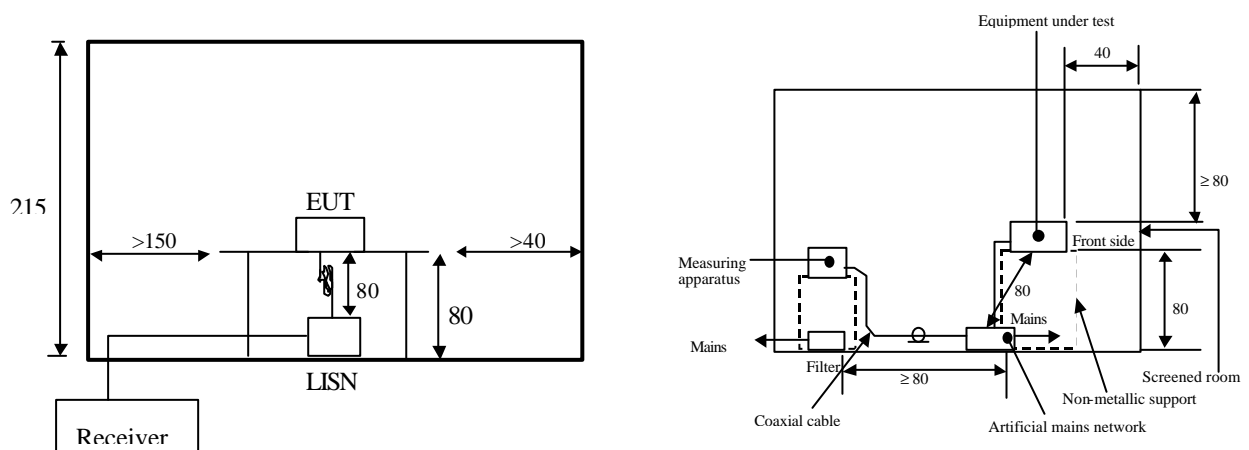
DESCRIPTIONS OF TEST

Conducted Emissions:

The measurement were performed over the frequency range of 0.45MHz to 30MHz using a 50 /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 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

- Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1m X 1.5m wooden table 80cm height is placed 40cm away from the vertical wall and 1.5m away from the other wall of the shielded room. The R/S ESH3-Z5 and EMCO 3825/2 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the EMCO LISN .The peripheral 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 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMCO LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.45 to 30MHz. The bandwidth of the receiver was set to 10kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



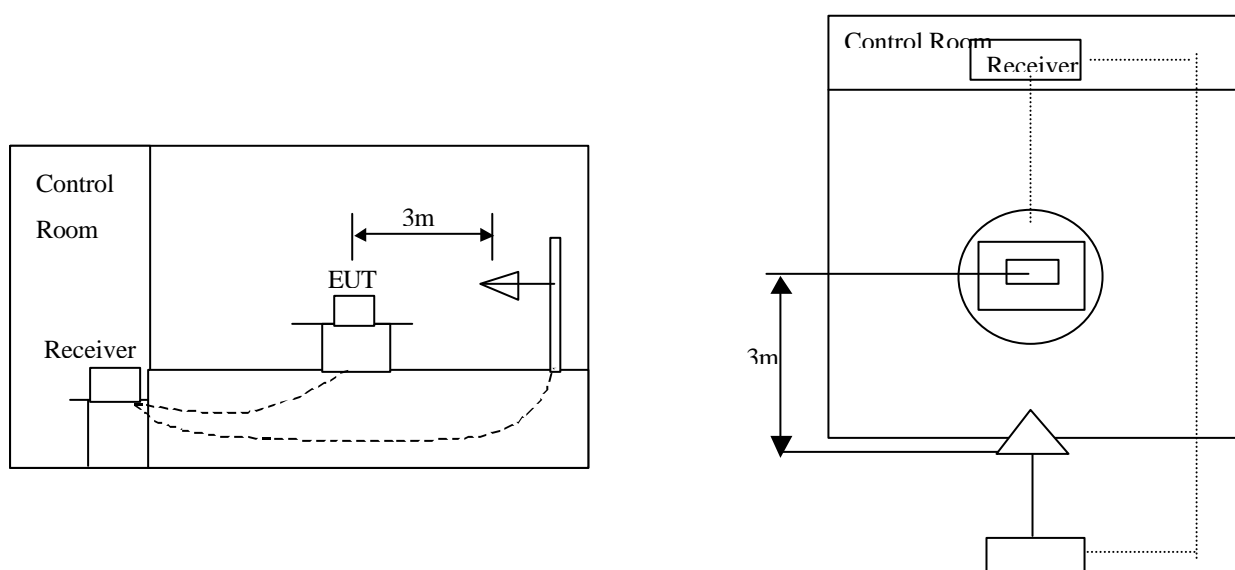
DESCRIPTION OF TEST

Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for the peak or the average detect mode with RBW of 1MHz for chamber and IF BW of 100kHz for OATS.

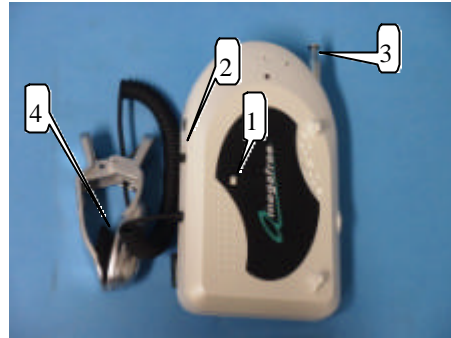
- Procedure of Test

Preliminary measurements were made at 3 meter using bi-conical and log-periodic antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 300MHz using S/B bi-conical antenna and 300 to 1000MHz using S/B log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using S/B bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral 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 the peak and the average mode with the bandwidth of the receiver was set to 100kHz depending on the frequency of type of signal. Sometimes the average detect function can be used for its appropriate measurement. The EUT, peripheral 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, peripheral 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 maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.



Test Setup Description

1. DUT alone operation
 It is possible to operating when button is pushed. There is magnetic material for temporary bonding of mobile phone inside of DUT.
2. Maximum Volume (Step-sliding type)
 The volume switch was adjusted to max location for worst case emissions.
3. Fully extended antenna
 The antenna was fully extended for its maximum transmitting. (Test Setup Photos)
4. Concerning microphone clip
 The specific audio input signal was not fed, since ;
 - 1) there is no input connector
 - 2) there are many kind of mobile phone
 - 3) various setting of mobile phone volume



SUMMARY

Conducted Emission

The requirements are	() MET	() Not MET
Minimum limit margin	dB at	MHz
Maximum limit exceeding		
Remarks :		

Radiated Emission

Section 15.239

The requirements are	(*) MET	() Not MET
Minimum limit margin	3.5 dB at	88.285 MHz
Maximum limit exceeding		
Remarks : With average detect mode		

Reported By

H.C. Kim / EMC Engineer

means the test is applicable, is not applicable.

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

Test Equipment Used

<u>Model Name</u>	<u>Manufacture</u>	<u>Description</u>	<u>Serial Number</u>	<u>Next Cal. Date</u>
ESVP	Rohde Schwarz	Receiver	861744/004	Jun. 12, 2002
VULB9160	Schwarzbeck	Antenna	3048	Jun. 04, 2002
EZM	Rohde Schwarz	Spectrum monitor	863183/008	
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

The equipment used is calibrated in regular for every year.

Test Program Transmitting

Test Date Dec. 5, 2001

Test Area Open Field Test Site #2

Note :

- Find the test data in following page.

Radiated Emissions

(Disturbance Radiation)

[Applicable]

Peak Detect Mode

Transmitting

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Azimuth [deg]	Height [cm]	Polar. [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
70.633	25.9	9.5	1.9	42	277	H	37.3	68.0	>20.0
88.285	35.8	8.4	2.2	46	227	H	46.4	68.0	>20.0
141.208	16.9	12.2	2.8	65	233	H	31.9	68.0	>20.0
158.889	20.7	12.9	2.9	58	170	H	36.5	68.0	>20.0
176.537	25.9	11.3	3.1	67	135	H	40.3	68.0	>20.0
194.162	29.1	9.6	3.3	66	205	H	42.0	68.0	>20.0

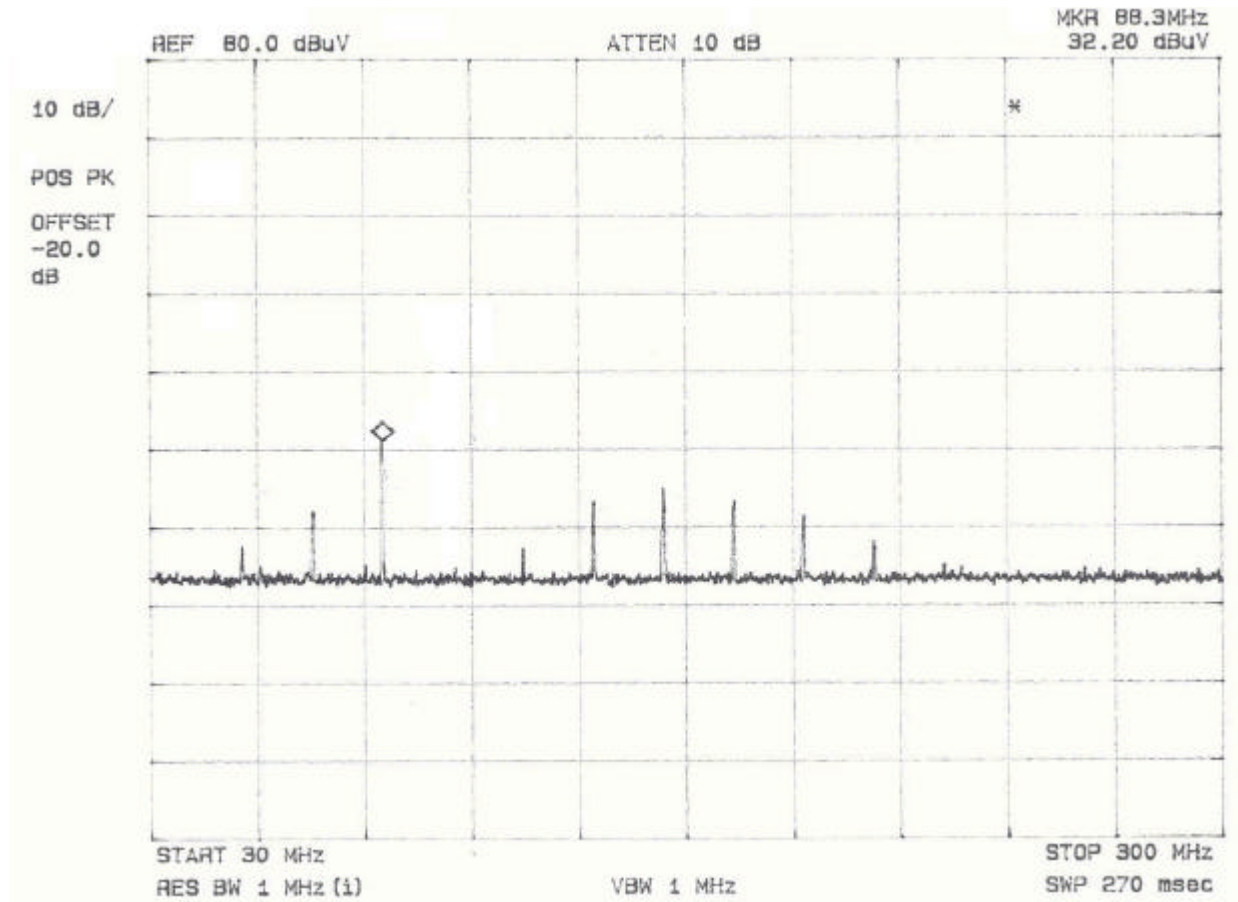
Average Detect Mode

Transmitting

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Azimuth [deg]	Height [cm]	Polar. [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
70.633	19.8	9.5	1.9	42	277	H	31.2	48.0	16.8
88.285	33.9	8.4	2.2	46	227	H	44.5	48.0	3.5
141.208	12.1	12.2	2.8	65	233	H	27.1	48.0	>20.0
158.889	19.6	12.9	2.9	58	170	H	34.5	48.0	13.5
176.537	23.0	11.3	3.1	67	135	H	37.4	48.0	10.6
194.162	14.7	9.6	3.3	66	205	H	27.6	48.0	>20.0

Note :

Spectrum Plot



The spectrum plot was obtained with peak detect mode and maximum hold mode. It was used for plot the HP8566B spectrum analyzer, Schwarzbeck BBA9106 bi-conical antenna and HP85685 RF preselector.

(Section 15.35)

The peak value evaluation is

$$32.2\text{dB}(\text{measured}) + 7.7\text{ dB}(\text{antenna factor}) + 0.6\text{dB}(\text{cable loss}) + 10.0\text{dB}(\text{internal attenuation}) \\ = 50.5\text{dB} (\text{Limit } 68.0\text{dB})$$

The value evaluated is only reference data on compact chamber.