

APPLICATION FOR CERTIFICATION
On Behalf of
ANT Telecom Co., Ltd.
Wireless Hands Free Kit

Model : ANT-HFM

FCC ID : O6KANTWHFGTC90001

Prepared for : ANT Telecom Co., Ltd.
Cheong Woon B/D 6F, 990-198 Keomsa-Dong,
Dong-Gu, Daegu, 701-040 Korea.

Prepared By : Taiwan Tokin EMC Eng. Corp.
No. 53-11, Tin-Fu Tsun, Lin-Kou,
Taipei Hsien, Taiwan, R.O.C.

Tel: (02) 2609-9301 / 2609-2133

File Number : ATM-G00642
Report Number : TTEMC-F20088
Date of Test : Aug. 01, 2000
Date of Report : Aug. 21, 2000

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TEST REPORT CERTIFICATION

Applicant : ANT Telecom Co., Ltd.
 Manufacturer : ANT Telecom Co., Ltd.
 FCC ID : O6KANTWHFGTC90001
 EUT Description : Wireless Hands Free Kit
 (A) MODEL NO. : ANT-HFM
 (B) SERIAL NO. : N/A
 (C) POWER SUPPLY : DC 12V

Measurement Procedure Used:


FCC RULES AND REGULATIONS:
 Part 15 Subpart C: October 1998 And FCC / ANSI C63.4-1992


The device described above was tested by TAIWAN TOKIN EMC ENG. CORP. to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits both radiated and conducted emissions.


The measurement results are contained in this test report and TAIWAN TOKIN EMC ENG. CORP. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Taiwan Tokin EMC Eng. corp.

Date of Test : Aug. 01, 2000

Prepared by : 
 (CHERRY WANG)

Test Engineer : 
 (ALLEN WANG)

Approve & Authorized Signer : 
 (JACKIE DENG)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Wireless Hands Free Kit
Model Number	:	ANT-HFM
FCC ID	:	O6KANTWHFGTC90001
Applicant	:	ANT Telecom Co., Ltd. Cheong Woon B/D 6F, 990-198 Keomsa-Dong, Dong-Gu, Daegu, 701-040 Korea.
Manufacturer	:	Inventec Besta Co., Ltd. Cheong Woon B/D 6F, 990-198 Keomsa-Dong, Dong-Gu, Daegu, 701-040 Korea.
Fundamental Frequency	:	88.7MHz
Signal Cable	:	Non-Shielded, Undetachable, 0.4m
Date of Receipt of Sample	:	Jul. 04, 2000
Date of Test	:	Aug. 01, 2000

Remark:

The EUT is a wireless hands free kit of mobile phone. It is configure FM frequency on car radio.

1.2. Tested Supporting System Details

1.2.1. CAR BATTERY

Model Number	:	N50L 12V 50AH
Serial Number	:	N/A
Manufacturer	:	Global & Yuasa Battery Co., Ltd.
DC Wire (+, -)	:	Non-Shielded, Detachable, 0.4m

1.3. Description of Test Facility

Site Description (No. 5 Open Site)	:	Feb. 13, 1998 File on Federal Communication Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, U.S.A.
Name of Firm	:	Taiwan Tokin EMC Eng. Corp.
Site Location #1	:	No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
Site Location #2	:	No. 67-4, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
NVLAP lab. Code	:	200077-0

2. POWERLINE CONDUCTED TEST

【This EUT input voltage is DC power operated, so no conductive emissions were performed according to FCC Part 15 section § 15.207】

3. RADIATED EMISSION TEST

3.1. Test Equipment

The following test equipment are used during the radiated emission tests :

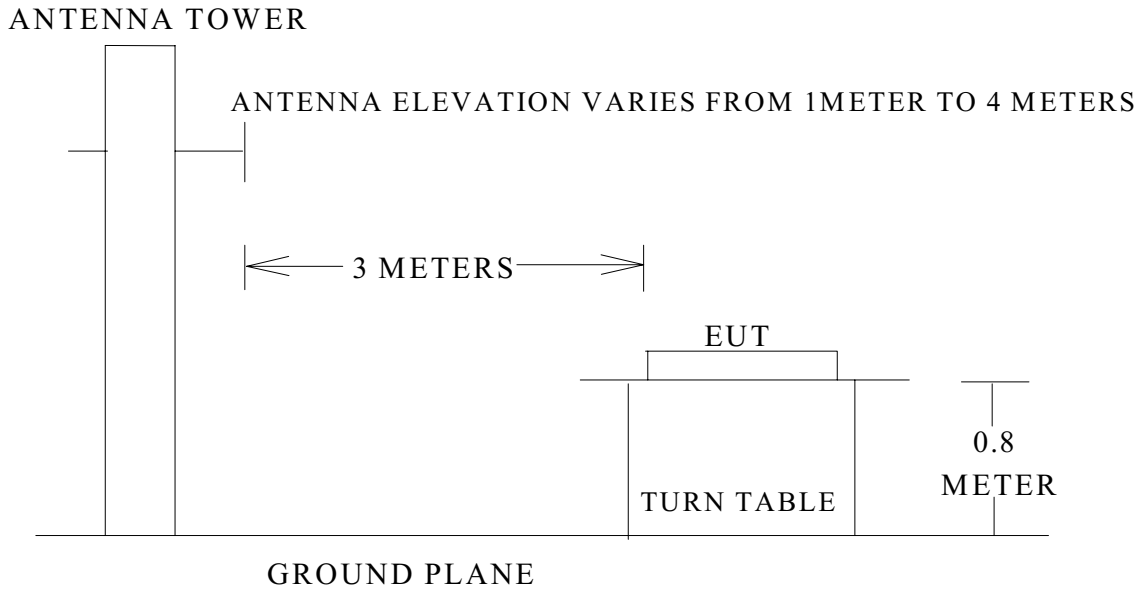
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	R&S	ESVS10	849231/017	Dec. 03, 99'	1 Year
2.	Computer	TOKIN	586PC	N/A	N/A	NA
3.	Biconical Antenna	Chase	VBA6106A	1264	Jun. 03, 00'	1 Year
4.	Log Periodic Antenna	Chase	UPA6109	1035	Jun. 03, 00'	1 Year

3.2. Test Setup

3.2.1. Block Diagram of connection between EUT and simulators



3.2.2. Open Field Test Site Setup Diagram (3m)



3.3. Radiation Limit (§15.239 & §15.109)

3.3.1. §15.239 Radiated Emission Limits (For Fundamental Frequency)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		μV/M	dBμV/M
Fundamental Freq.	3	250	47.95

Remark: Emission level (dBμV/M) = 20 log Emission level (μV/M)

3.3.2. §15.209 Radiated Emission Limits (For Harmonic Frequency)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		μV/M	dBμV/M
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

- Remark :
- (1) Emission level (dBμV/M) = 20 log Emission level (μV/M)
 - (2) The tighter limit applies at the edge between two frequency bands.
 - (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. EUT's Configuration during Compliance Measurement

The following equipment were installed on RF field measurement to meet the commission requirement and operating in a manner which tended to maximize its emission characteristics in a normal application.

3.4.1. Wireless Hands Free Kit (EUT)

Model Number	:	ANT-HFM
Serial Number	:	N/A
FCC ID.	:	O6KANTWHFGTC90001
Manufacturer	:	ANT Telecom Co., Ltd.
Signal Cable	:	Non-Shielded, Undetachable, 0.4m

3.4.2. Supporting System : As in Section 1.2

3.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown on 3.2

3.5.2. Turn on the power of all equipment.

3.5.3. The Wireless Hands Free Kit (EUT) power on with linked Car Battery, then the EUT on transmitting mode during all testing.

3.5.4. Repeat above procedure 3.5.3.

3.6. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. For 30MHz to 1000MHz frequency range, EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters for 30MHz to 1000MHz frequency range to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-1992 regulation.

The bandwidth of R&S Test Receiver ESVS10 was set at 10KHz.
The frequency range from 30MHz to 1000MHz was checked.

EUT with 3 kinds of positions (Stand、Side、Lie) were done during radiated measurement and all the test results are listed in section 3.8.

3.7. Test Results

PASSED. Please refer to the following pages.

3.8. Radiated Emission Noise Measurement Results

The frequency spectrum from 30 MHz to 1000MHz is investigated. All the emissions not reported below are too low against the FCC part 15 subpart C limit.

Date of Test : Aug. 01, 2000 Temperature : 26°C
 EUT : Wireless Hands Free Kit Humidity : 69%
 Test Mode : EUT on Stand

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Horizontal dB μ V	Horizontal dB μ V/m	Limits dB μ V/m		
-----							(A.V)
Fundamental Freq. 88.645	15.80	1.66	27.48	44.94	47.95	3.01	
-----							(Q.P)
Harmonic Freq. 177.290	21.17	2.40	0.08	23.65	43.50	19.85	
265.936	23.61	3.00	- 0.05	26.56	46.00	19.44	
354.582	16.56	3.52	0.43	20.51	46.00	25.49	
443.228	17.83	3.93	0.18	21.94	46.00	24.06	
531.875	19.50	4.42	- 1.05	22.87	46.00	23.13	
620.521	20.49	4.74	- 0.16	25.07	46.00	20.93	
709.167	21.08	5.18	- 0.95	25.31	46.00	20.69	
797.813	21.97	5.54	- 0.18	27.33	46.00	18.67	
886.458	22.47	5.91	- 0.19	28.19	46.00	17.81	
975.104	24.26	6.31	- 0.29	30.28	54.00	23.72	

- Remark :
1. The Reading of fundamental Frequency is employing an Average detector.
 2. Harmonic and spurious frequency is employing a Quasi-Peak detector and measurement up to 10th harmonic.

Date of Test : Aug. 01, 2000 Temperature : 26°C
 EUT : Wireless Hands Free Kit Humidity : 69%
 Test Mode : EUT on Stand

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Vertical dB μ V	Vertical dB μ V/m	Vertical dB μ V/m	Limits dB μ V/m	
Fundamental Freq.							(A.V)
88.646	16.06	1.66	25.22	42.94	47.95	5.01	
Harmonic Freq.							(Q.P)
177.292	19.36	2.40	- 0.59	21.17	43.50	22.33	
265.938	24.45	3.00	- 0.58	26.87	46.00	19.13	
354.582	15.05	3.52	0.55	19.12	46.00	26.88	
443.228	17.46	3.93	- 0.66	20.73	46.00	25.27	
531.875	19.26	4.42	- 0.11	23.57	46.00	22.43	
620.521	20.25	4.74	- 1.20	23.79	46.00	22.21	
709.167	20.85	5.18	0.05	26.08	46.00	19.92	
797.813	22.95	5.54	- 0.18	28.31	46.00	17.69	
886.458	23.35	5.91	0.77	30.03	46.00	15.97	
975.104	24.35	6.31	- 0.38	30.28	54.00	23.72	

- Remark :
1. The Reading of fundamental Frequency is employing an Average detector.
 2. Harmonic and spurious frequency is employing a Quasi-Peak detector and measurement up to 10th harmonic.

Date of Test : Aug. 01, 2000 Temperature : 26°C
 EUT : Wireless Hands Free Kit Humidity : 69%
 Test Mode : EUT on Side

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Horizontal dB μ V	Horizontal dB μ V/m	Horizontal dB μ V/m	Limits dB μ V/m	

Fundamental Freq.							(A.V)
88.645	15.80	1.66	23.83	41.29	47.95	6.66	
Harmonic Freq.							(Q.P)
177.290	21.17	2.40	- 0.99	22.58	43.50	20.92	
265.936	23.61	3.00	- 1.25	25.36	46.00	20.64	
354.582	16.56	3.52	- 0.20	19.88	46.00	26.12	
443.228	17.83	3.93	- 1.17	20.59	46.00	25.41	
531.875	19.50	4.42	- 2.10	21.82	46.00	24.18	
620.521	20.49	4.74	- 1.35	23.88	46.00	22.12	
709.167	21.08	5.18	- 1.14	25.12	46.00	20.88	
797.813	21.97	5.54	- 0.33	27.18	46.00	18.82	
886.458	22.47	5.91	- 0.12	28.26	46.00	17.74	
975.104	24.26	6.31	- 0.50	30.07	54.00	23.93	

- Remark :
1. The Reading of fundamental Frequency is employing an Average detector.
 2. Harmonic and spurious frequency is employing a Quasi-Peak detector and measurement up to 10th harmonic.

Date of Test : Aug. 01, 2000 Temperature : 26°C
 EUT : Wireless Hands Free Kit Humidity : 69%
 Test Mode : EUT on Side

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Vertical dB μ V	Vertical dB μ V/m	Vertical dB μ V/m	Limits dB μ V/m	
Fundamental Freq.							(A.V)
88.646	16.06	1.66	24.51	42.23	47.95	5.72	
Harmonic Freq.							(Q.P)
177.292	19.36	2.40	- 0.83	20.93	43.50	22.57	
265.938	24.45	3.00	- 1.42	26.03	46.00	19.97	
354.582	15.05	3.52	1.50	20.07	46.00	25.93	
443.228	17.46	3.93	- 1.87	19.52	46.00	26.48	
531.875	19.26	4.42	- 0.20	23.48	46.00	22.52	
620.521	20.25	4.74	- 0.98	24.01	46.00	21.99	
709.167	20.85	5.18	- 0.12	25.91	46.00	20.09	
797.813	22.95	5.54	- 0.55	27.94	46.00	18.06	
886.458	23.35	5.91	0.57	29.83	46.00	16.17	
975.104	24.35	6.31	- 0.34	30.32	54.00	23.68	

- Remark :
1. The Reading of fundamental Frequency is employing an Average detector.
 2. Harmonic and spurious frequency is employing a Quasi-Peak detector and measurement up to 10th harmonic.

Date of Test : Aug. 01, 2000 Temperature : 26°C
 EUT : Wireless Hands Free Kit Humidity : 69%
 Test Mode : EUT on Lie

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Horizontal dB μ V	Horizontal dB μ V/m	Limits dB μ V/m		
Fundamental Freq.							(A.V)
88.645	15.80	1.66	28.40	45.86	47.95	2.09	
Harmonic Freq.							(Q.P)
177.290	21.17	2.40	- 0.88	22.69	43.50	20.81	
265.936	23.61	3.00	- 1.28	25.33	46.00	20.67	
354.582	16.56	3.52	0.28	20.36	46.00	25.64	
443.228	17.83	3.93	- 0.64	21.12	46.00	24.88	
531.875	19.50	4.42	- 0.89	23.03	46.00	22.97	
620.521	20.49	4.74	- 0.80	24.43	46.00	21.57	
709.167	21.08	5.18	- 0.97	25.29	46.00	20.71	
797.813	21.97	5.54	- 0.35	27.16	46.00	18.84	
886.458	22.47	5.91	0.16	28.54	46.00	17.46	
975.104	24.26	6.31	0.24	30.81	54.00	23.19	

- Remark :
1. The Reading of fundamental Frequency is employing an Average detector.
 2. Harmonic and spurious frequency is employing a Quasi-Peak detector and measurement up to 10th harmonic.

Date of Test : Aug. 01, 2000 Temperature : 26°C
 EUT : Wireless Hands Free Kit Humidity : 69%
 Test Mode : EUT on Lie

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Vertical dBμV	Vertical dBμV/m	Vertical dBμV/m	Limits dBμV/m	
-----							(A.V)
Fundamental Freq. 88.646	16.06	1.66	25.94	43.66	47.95		4.29
-----							(Q.P)
Harmonic Freq. 177.292	19.36	2.40	1.11	22.87	43.50		20.63
265.938	24.45	3.00	- 1.47	25.98	46.00		20.02
354.582	15.05	3.52	3.42	21.99	46.00		24.01
443.228	17.46	3.93	- 0.08	21.31	46.00		24.69
531.875	19.26	4.42	- 0.70	22.98	46.00		23.02
620.521	20.25	4.74	- 1.18	23.81	46.00		22.19
709.167	20.85	5.18	1.79	27.82	46.00		18.18
797.813	22.95	5.54	- 0.28	28.21	46.00		17.79
886.458	23.35	5.91	0.89	30.15	46.00		15.85
975.104	24.35	6.31	- 0.48	30.18	54.00		23.82

- Remark :
1. The Reading of fundamental Frequency is employing an Average detector.
 2. Harmonic and spurious frequency is employing a Quasi-Peak detector, measurement up to 10th harmonic.

4. DEVIATIONS TO TEST SPECIFICATIONS

【NONE】