ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW POWER AUXILIARY STATIONS

Test report file number	**: E05NR-061**
Applicant	**: TJ Media Co., Ltd.**
Address	**: 640-8 Deungchon-dong, Gangseo-gu, Seoul 157-030 Korea**
Manufacturer	**: TJ Media Co., Ltd.**
Address	**: 640-8 Deungchon-dong, Gangseo-gu, Seoul 157-030 Korea**
Type of Equipment	**: Wireless Microphone**
FCC ID.	**: TO8-TJ-JI-200C**
Model Name	**: JI-200C**
Serial number	**: None**
Total page of Report	**: 27 pages (including this page)**
Date of Incoming	**: September 19, 2005**
Date of issue	**: November 18, 2005**

SUMMARY

The equipment complies with the regulation; **FCC Part 74 Subpart H.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by: Young-Min, Choi / Senior Engineer
EMC Div.
ONETECH Corp.

Reviewed by: Y. K. Kwon / Director
EMC Div.
ONETECH Corp.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

CONTENTS

PAGE

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

1. VERIFICATION OF COMPLIANCE

APPLICANT	: TJ Media Co., Ltd.
ADDRESS	: 640-8 Deungchon-dong, Gangseo-gu, Seoul 157-030 Korea
CONTACT PERSON	: Mr. Young-hun Kwon / Research Engineer
TELEPHONE NO	: +82-2-3663-4770
FCC ID	: TO8-TJ-JI-200C
MODEL NO/NAME	: JI-200C
SERIAL NUMBER	: N/A
DATE	: November 18, 2005

EQUIPMENT CLASS	***TBT –Licensed Broadcast Transmitter Worn on Body***
KIND OF EQUIPMENT	Low Power Auxiliary Station - Wireless Microphone
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4 / 2003, EIA/TIA 603
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 74 SUBPART H
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METERS OPEN AREA TEST SITE

-. 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.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
74.861 (e)(1)	Output Power	Met the Limit / PASS
74.861 (e)(3)	Modulation Characteristics	Met the Limit / PASS
74.861 (e)(4) 2.1055 (a)(1) and (d)(2)	Frequency Tolerance Versus Temperature and Voltage	Met the Limit / PASS
74.861 (e)(5) 2.1049 (c)(1)	Operating Bandwidth	Met the Limit / PASS
74.861 (e)(6)	Emission Mask	Met the Limit / PASS
74.861 (e)(6)(iii)	Radiated Emission	Met the Limit / PASS
74.861 (f)	Antenna Requirement	Met the Limit / PASS
15.207	Conducted Limits	Not Applicable (See Note)

Note: The Equipment under Test shall be operated by battery.

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The Electromagnetic compatibility measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myeon, Gwangju-Si, Gyeonggi-Do 464-080 Korea. Description details of test facilities were submitted to the Federal Communications Commission on January 18, 2002 (Registration Number: 92819 and 340658), accredited by KOLAS (Korea Laboratory Accreditation Scheme, No: 85) and approved by TUV, DNV, SEMKO and MIC (Ministry of Information and Communications in Korea) according to the requirement of ISO17025.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

3. GENERAL INFORMATION

3.1 Product Description

The TJ Media Co., Ltd., Model: JI-200C (referred to as the EUT in this report) is a licensed Wireless Microphone shall be used with the receiver, Model: JI-200M, FCC ID: TO8-TJ-JI-200M, which was manufactured by TJ Media Co., Ltd. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Portable Device
OPERATING FREQUENCY	802.875MHz ~ 805.625MHz (250kHz Step)
OUTPUT POWER	Typ. 9.5dBm
EMISSION DESIGNATOR	162KF3E (2X Max. Modulation + 2 X Max. FM Deviation)
ANTENNA	Inserted into the main board
ANTENNA TYPE AND GAIN	Helical Type, 0 dBi
CHANNEL	8 Channels
TYPE OF MODULATION	FM
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	4MHz, 12MHz
USED BOARD NAME	MIC Board, TX Board
NUMBER OF LAYER	MIC Board: 2 Layers, TX Board: 2 Layers
POWER REQUIREMENT	DC 3V Standard 2 AA Type Battery
EXTERNAL CONNECTOR	None

3.2 Alternative type(s)/model(s); also covered by this test report.

No other model differences have been mentioned.

4. EUT MODIFICATIONS

None

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

5. SYSTEM TEST CONFIGURATION

5.1 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	TJ Media Co., Ltd.	N/A	N/A
IR BOARD	TJ Media Co., Ltd.	TKR-200 IR-01	N/A
TX Module BOARD	TJ Media Co., Ltd.	WM800TXM	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

5.3 Mode of operation during the test

The EUT was set to low channel, 802.875MHz and high channel, 805.625MHz and then transmitted max. power during the testing. For getting maximum emission from the EUT, the EUT was moved through XY, XZ, and YZ planes.

6. Antenna Requirement

According to §74.861(f), unusual transmitting antennas or antenna elevations shall not be used to deliberately extend the range of low power auxiliary stations beyond the limited areas defined in §74.831.

Antenna Construction:

The transmitting antenna of the EUT is internal type, so no consideration of replacement or elevation by the user.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

7. OUTPUT POWER

7. FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS RADIATION

7.1 Operating environment

Temperature : 26°C
Relative humidity : 43 %

7.2 Test set-up

The radiated emissions measurements were on the 3 meters, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30MHz to up to 10^{th} harmonic of the fundamental frequency was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. The test was performed by placing the EUT on 3-orthogonal axis. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

The maximum radiated emission was recorded and used as reference for the effective radiated power measurement. The EUT was then replaced by a tuned dipole antenna or Horn antenna and was oriented for vertical polarization and then the length was adjusted to correspond to the frequency of the transmitter. The substitution antenna was connected to a signal generator with a coaxial cable. The receiving antenna height was raised and lowered again through the specified range of height until maximum signal level is detected by the measuring receiver. The signal to the substitution antenna was adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the EUT radiated power measured, corrected for the change of input attenuation setting of the measuring receiver. The signal generator level was recorded and corrected by the power loss in the cable between the signal generator and substitution antenna and further corrected for the gain of the dipole antenna or horn antenna used relative to an ideal tuned dipole antenna. The measurement was repeated with the test antenna and the substitution antenna oriented for horizontal polarization. The measure of the effective radiated power is the larger of the two levels recorded.

7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Nov. 01, 2005
■ -	85650A	Hewlett Packard	Quasi-Peak Adapter	3107A01542	July 10, 2005
■ -	8568B	Hewlett-Packard	Spectrum Analyzer	3109A05456	July 10, 2005
■ -	85685A	Hewlett-Packard	RF Preselector	3107A01264	July 10, 2005
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 19, 2006
□ -	8449B	Hewlett-Packard	Preamplifier	3008A00833	June 19, 2006
■ -	83650L	Hewlett-Packard	Signal Generator	3844A00415	June 10, 2005
■ -	3104C	EMCO	Biconical Antenna	9109-4441	July 11, 2005
■ -	3146	EMCO	Log Periodic Antenna	9109-3214	July 11, 2005
■-	3121C	EMCO	Dipole Antenna	9002-530	June 28, 2005
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	294	June 6, 2006
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	295	June 6, 2006
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

7.4. Test data for radiated emission

-. Test Date : October 6, 2005
-. Resolution bandwidth : 100 kHz/1MHz -. Video bandwidth: 300 kHz/1MHz
-. Frequency range : 30 MHz ~ 9 GHz
-. Operating Condition : Unmodulated Max Power Transmitting -. Measurement Distance: 3m
-. Result : PASSED BY –13.54 dB at High Channel

Frequency (GHz)	Spectrum Reading (dBuV)	Generator Reading (dBm)	Ant. Gain (dBi)	Ant. Pol. (H/V)	Dipole Gain (dB)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
Test Data for Low Channel									
802.63	81.70	9.50	-	H	0	0.34	9.84	23.98	-14.14
	76.60	3.80		V			4.14		-19.84
1605.75	41.83	-39.75	9.49	H	2.15	0.67	-31.74	-13.0	-18.74
	36.00	-44.50		V			-36.49	-13.0	-23.49
2408.66	33.50	-40.10	10.21	H	2.15	1.00	-31.04	-13.0	-18.04
	24.70	-46.30		V			-37.24	-13.0	-24.24
3211.57	10.33	-61.62	12.12	H	2.15	1.16	-50.49	-13.0	-37.49
	21.90	-50.24		V			-39.11	-13.0	-26.11
Test Data for High Channel									
805.63	82.30	10.10	-	H	0	0.34	10.44	23.98	-13.54
	77.40	4.20		V			4.54		-19.44
1611.25	45.50	-37.50	9.51	H	2.15	0.67	-29.47	-13.0	-16.47
	38.33	-46.82		V			-38.79	-13.0	-15.79
2416.88	38.83	-38.90	10.22	H	2.15	1.00	-29.83	-13.0	-16.83
	28.33	-43.30		V			-34.23	-13.0	-21.23
3222.50	14.83	-56.50	12.25	H	2.15	1.16	-45.24	-13.0	-32.24
	27.50	-44.80		V			-33.54	-13.0	-20.54

Tabulated test data for Restricted Band

Remark. The Limit for this device is 250mW = 23.98 dBm
Result calculation is as following :
Total □ Generator Reading □ Cable Loss □Antenna Gain Corrected

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

8. OCCUPIED BANDWIDTH, EMISSION MASKS

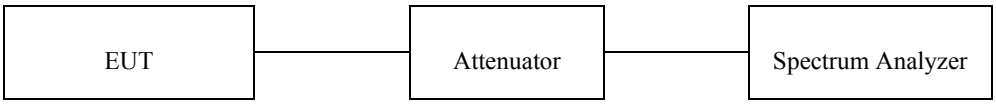
8.1 Operating environment

Temperature : 19°C

Relative humidity : 42 %

8.2 Test set-up

The RF output port of the EUT was connected to the input of the spectrum analyzer through sufficient attenuation. The resolution bandwidth and video bandwidth of the spectrum anaalyzer was set at 300 Hz for emission mask, 1 kHz for 99% occupied bandwidth and the spectrum was recorded in the frequency band ±25 kHz from the carrier frequency.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number
■ -	8564E	HP	Spectrum Analyzer	3650A00756
■ -	N/A	HP	30dB Attenuator Assembly	2350A3133
■ -	3033B	B&J TMI	DC Power Supply	2056036

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

8.4 Test data

-. Test Date : March 15, 2005

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	802.875	122.5	200	-77.5
High	805.625	119.2		

8.5 Calculation of necessary bandwidth

The formula for necessary bandwidth (Bn) is as following.

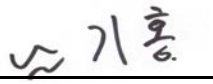
Bn = 2*M + 2*D*K

Where, M means Max. Modulation Frequency, 15 kHz

D means Max. Frequency Deviation, 65.80 kHz (Please refer to test result, clause 13.4)

K means Constant Factor, 1

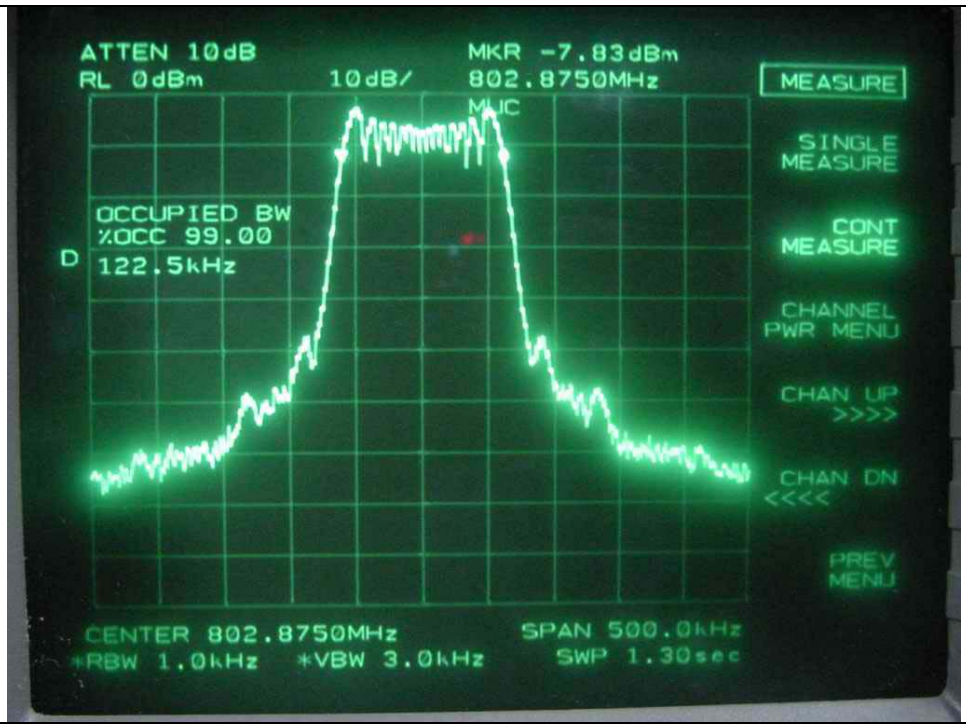
So, the calculated necessary bandwidth is 161.6 kHz.



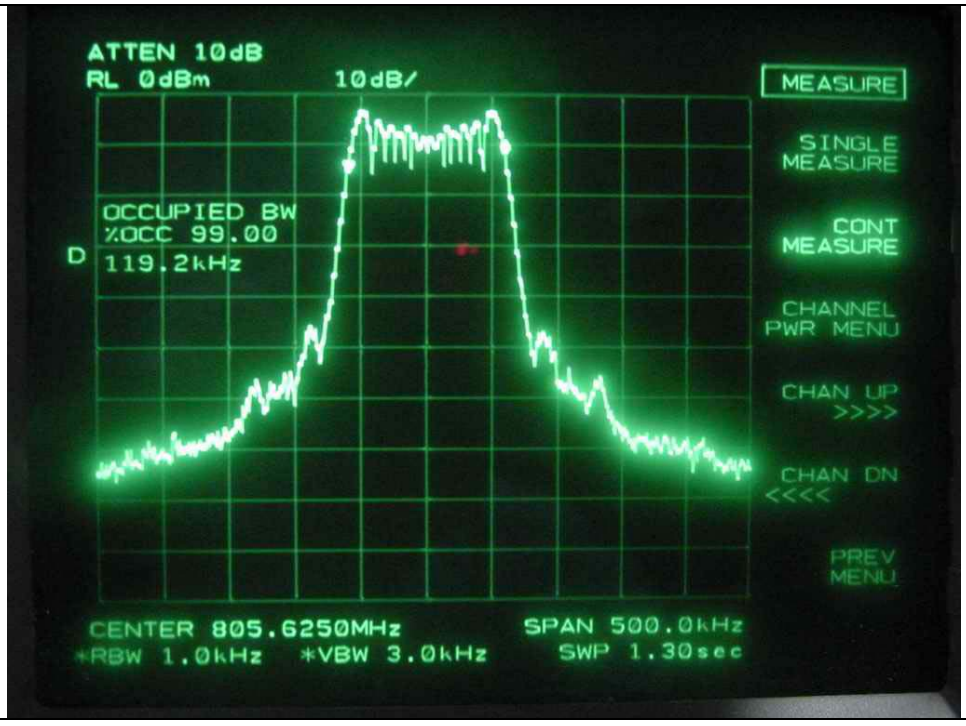
Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



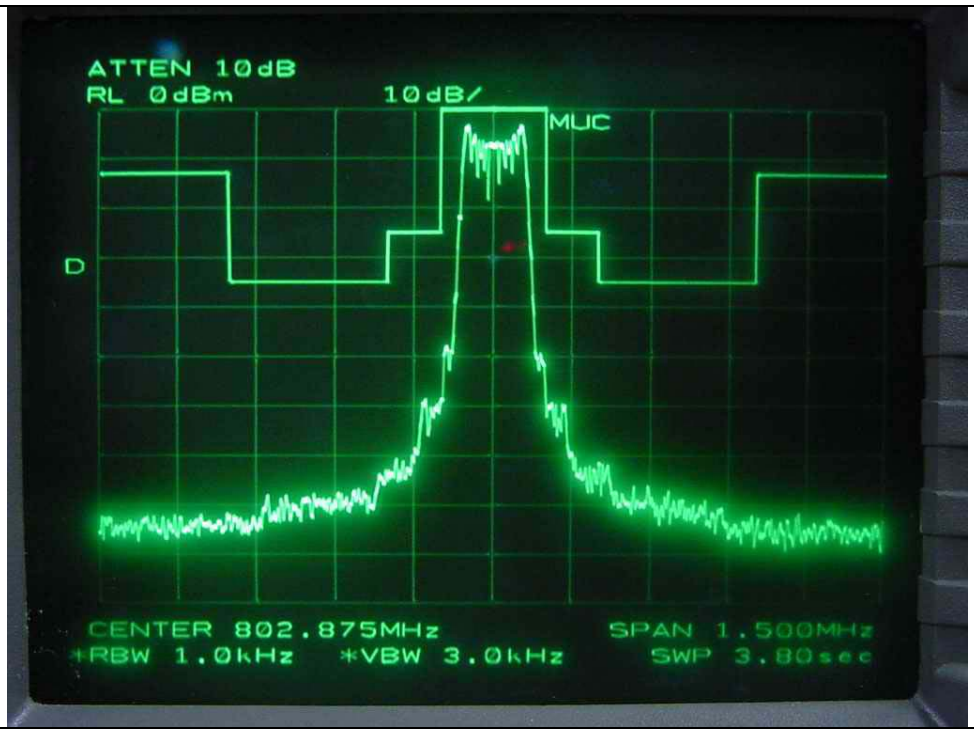
Low Channel



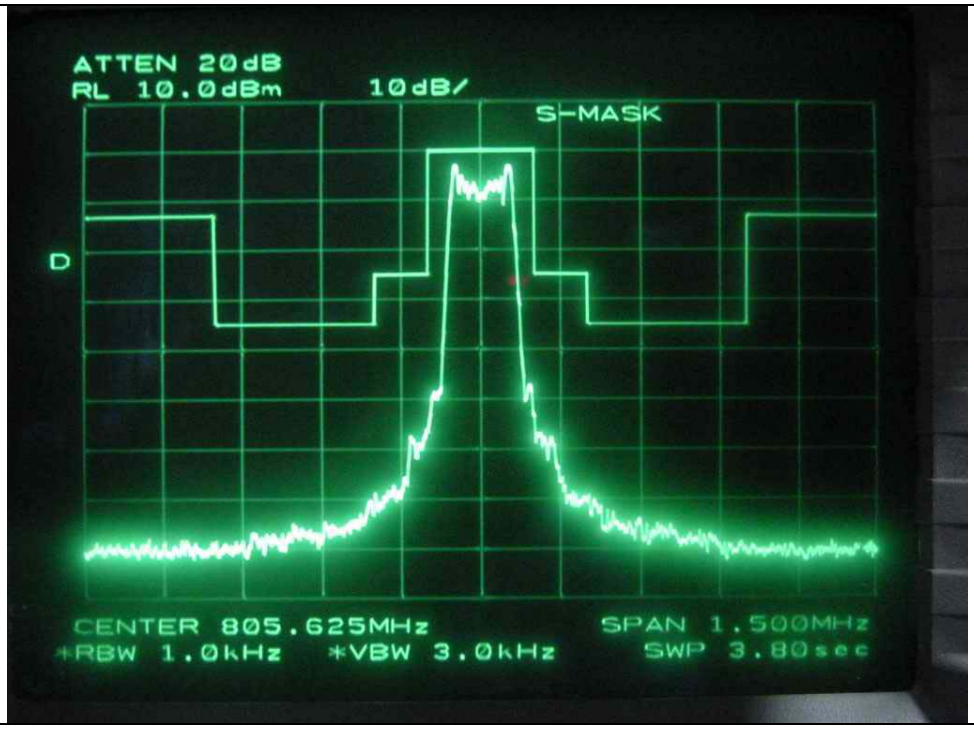
High Channel

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



Low Channel



High Channel

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

9. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

9.1 Operating environment

Temperature : 23°C

Relative humidity : 51 %

9.2 Test set-up

The EUT was fixed in test fixture to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by the spectrum analyzer.

Turn EUT off and set chamber temperature to -30°C and then allow sufficient time (approximately 20 to 30 minutes after chamber reach the assigned temperature) for EUT to stabilize. Turn ON EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10°C step from -30°C to +50°C. Repeat above method for frequency measurements every 10°C step and then record all measured frequencies on each temperature step.

9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number
■ -	8564E	HP	Spectrum Analyzer	3650A00756
■ -	53152A	HP	Frequency Counter	US39270295
■ -	EY-101	Tabai ESPEC Corp.	Chamber	5104390

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

9.4 Test data

-. Test Date : September 22, 2005

-. Result : PASSED

Temperature (˚C)	Tx Freq. (MHz)	Measured Freq. (MHz)	Result (PPM)	Limit
-30	802.8750	802.867037	0.000992	0.005%
-20		802.869571	0.000676	
-10		802.871083	0.000488	
0		802.872156	0.000354	
10		802.873942	0.000132	
20		802.874051	0.000118	
30		802.874250	0.000093	
40		802.875351	0.000044	
50		802.875826	0.000103	
-30	805.6250	805.617430	0.000940	0.005%
-20		805.622330	0.000331	
-10		805.622950	0.000254	
0		805.624600	0.000050	
10		805.624508	0.000061	
20		805.624858	0.000018	
30		805.624817	0.000023	
40		805.625200	0.000025	
50		805.625475	0.000059	

Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

10. FREQUENCY STABILITY WITH VOLTAGE VARIATION

10.1 Operating environment

Temperature : 20°C

Relative humidity : 34 %

10.2 Test set-up

The EUT was fixed in test fixture to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by the spectrum analyzer.

The voltage of EUT was varied in a range from 2.0V to 3.0V and the maximum change in frequency was recorded at each step. The temperature tests were performed on lowest and highest channel.

10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number
■ -	8564E	HP	Spectrum Analyzer	3650A00756
■ -	53152A	HP	Frequency Counter	US39270295
■ -	N/A	HP	30 dB Attenuator Assembly	2350A03133
■ -	3033B	B&J TMI	DC Power Supply	2056036

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

10.4 Test data

-. Test Date : September 22, 2005

-. Rated Supply Voltage : 3 Vdc

-. Result : PASSED

Voltage (Vdc)	Tx. Freq. (MHz)	Measured Freq. (MHz)	Result (PPM)	Limit
3.0	802.8750	802.874186	0.000101	0.005%
2.5		802.874175	0.000103	
2.0		802.874170	0.000103	
3.0	805.6250	805.624500	0.000062	0.005%
2.5		805.625502	0.000062	
2.0		805.624506	0.000061	

Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

11. MODULATION CHARACTERISTICS

11.1 Operating environment

Temperature : 19°C

Relative humidity : 42 %

11.2 Test set-up

The EUT was connected to the audio generator and RF input of the modulation analyzer. A 1 kHz test signal was applied to the audio input of the EUT. The level of the audio signal was varied from 30% modulation to at least 20dB higher than the saturation point. The variation in FM deviation was recorded.

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number
■ -	8564E	HP	Spectrum Analyzer	3650A00756
■ -	N/A	HP	30dB Attenuator Assembly	2350A3133
■ -	8903B	HP	Audio Analyzer	2836A05161
■ -	8901B	HP	Modulation Analyzer	3028A02930
■ -	3033B	B&J TMI	DC Power Supply	2056036

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

11.4 Test data

-. Test Date : September 22, 2005

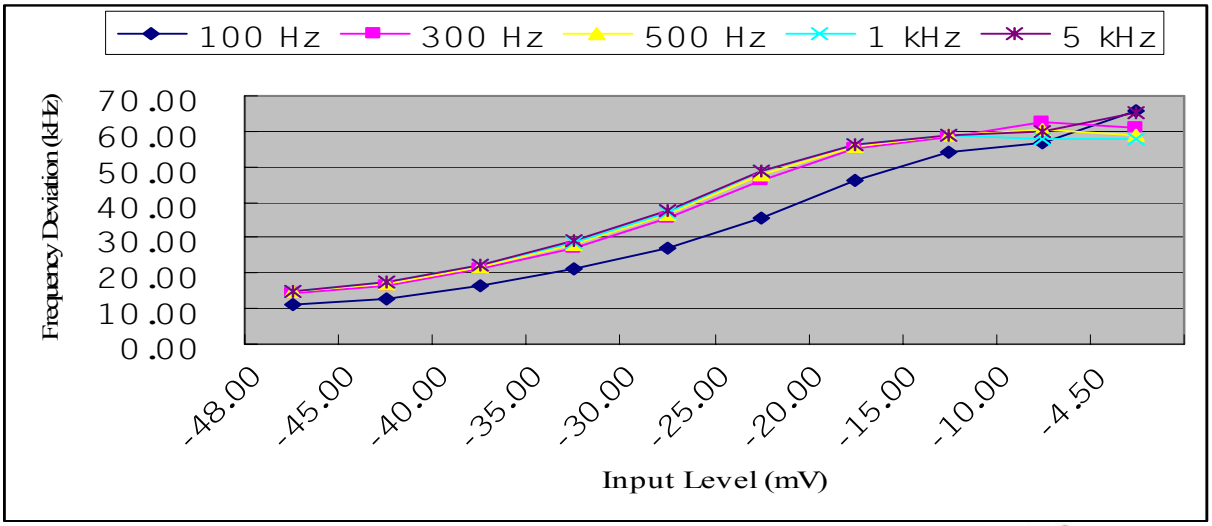
-. Rated Supply Voltage : 3 Vdc

-. Limit : ±75 kHz

-. Result : PASSED

-. Reference Level : 0 dB @ 1 kHz.

Input Level (mV)	Frequency Deviation Response				
	100 Hz	300 Hz	500 Hz	1 kHz	5 kHz
-48.00	11.04	14.17	14.78	15.00	15.01
-45.00	12.75	16.45	17.12	17.32	17.41
-40.00	16.43	21.26	21.97	22.30	22.40
-35.00	21.02	27.30	28.35	28.85	28.92
-30.00	27.18	35.40	36.70	37.37	37.60
-25.00	35.50	46.00	47.90	48.70	48.80
-20.00	46.40	55.40	55.90	56.10	56.00
-15.00	54.10	58.10	58.70	59.00	59.10
-10.00	56.90	62.50	60.50	58.00	60.00
-4.50	65.80	60.90	58.60	57.70	65.10



Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

12. AUDIO FREQUENCY RESPONSE

12.1 Operating environment

Temperature : 19°C

Relative humidity : 42 %

12.2 Test set-up

The EUT was connected to the audio generator and RF input of the modulation analyzer. A 1 kHz test signal was applied to the audio input of the EUT. The level of the audio signal was increased to obtain 20% modulation and this point was taken as the 0dB reference level. The level of the audio input was then kept constant and frequency varied from 100Hz to 15 kHz. The response in dB relative to 1 kHz was taken measured.

12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number
■ -	8564E	HP	Spectrum Analyzer	3650A00756
■ -	N/A	HP	30dB Attenuator Assembly	2350A3133
■ -	8903B	HP	Audio Analyzer	2836A05161
■ -	8901B	HP	Modulation Analyzer	3028A02930
■ -	3033B	B&J TMI	DC Power Supply	2056036

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

12.4 Test data

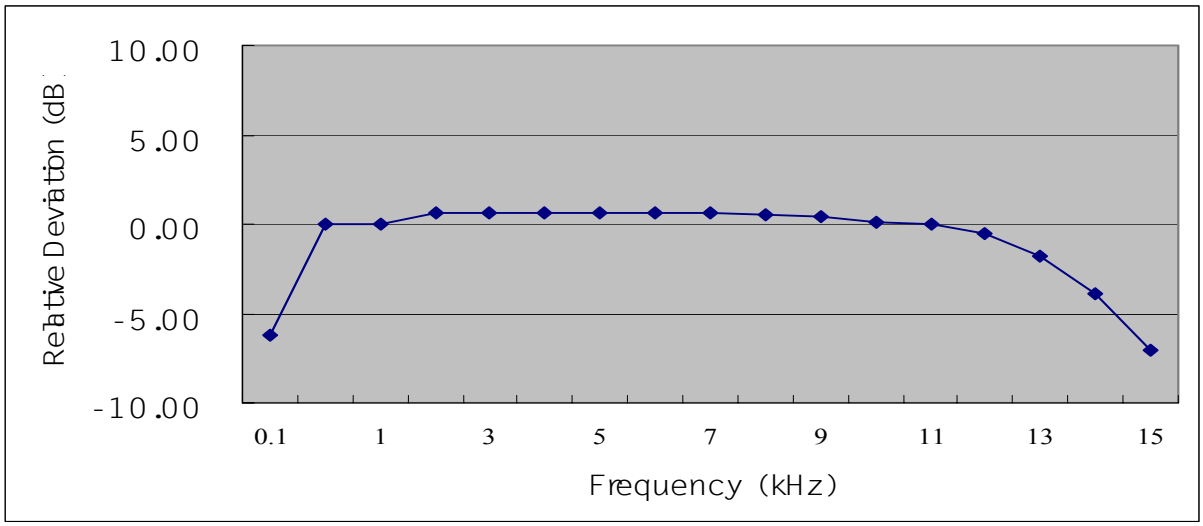
-. Test Date : September 22, 2005

-. Rated Supply Voltage : 3 Vdc

-. Result : PASSED

-. Reference Level : 0 dB @ 1 kHz.

Frequency (kHz)	Relative Deviation (dB)	Frequency (kHz)	Relative Deviation (dB)
0.1	-6.20	8	0.52
0.5	0.00	9	0.41
1	0.00	10	0.10
2	0.64	11	-0.03
3	0.64	12	-0.54
4	0.64	13	-1.77
5	0.60	14	-3.87
6	0.62	15	-7.05
7	0.58		



Tested by: Ki-Hong, Nam / Test Engineer

13. MODULATION CHARACTERISTICS

13.1 Operating environment

Temperature : 19°C

Relative humidity : 42 %

13.2 Test set-up

The EUT was connected to the audio generator and RF input of the modulation analyzer. A 1 kHz test signal was applied to the audio input of the EUT. The level of the audio signal was increased until the FM deviation became ±20kHz. The level of the audio input was then kept constant and frequency varied from 50Hz to 15 kHz. The variation in FM deviation was recorded.

13.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number
■ -	8564E	HP	Spectrum Analyzer	3650A00756
■ -	N/A	HP	30dB Attenuator Assembly	2350A3133
■ -	8903B	HP	Audio Analyzer	2836A05161
■ -	8901B	HP	Modulation Analyzer	3028A02930
■ -	3033B	B&J TMI	DC Power Supply	2056036

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

13.4 Test data

-. Test Date : September 22, 2005

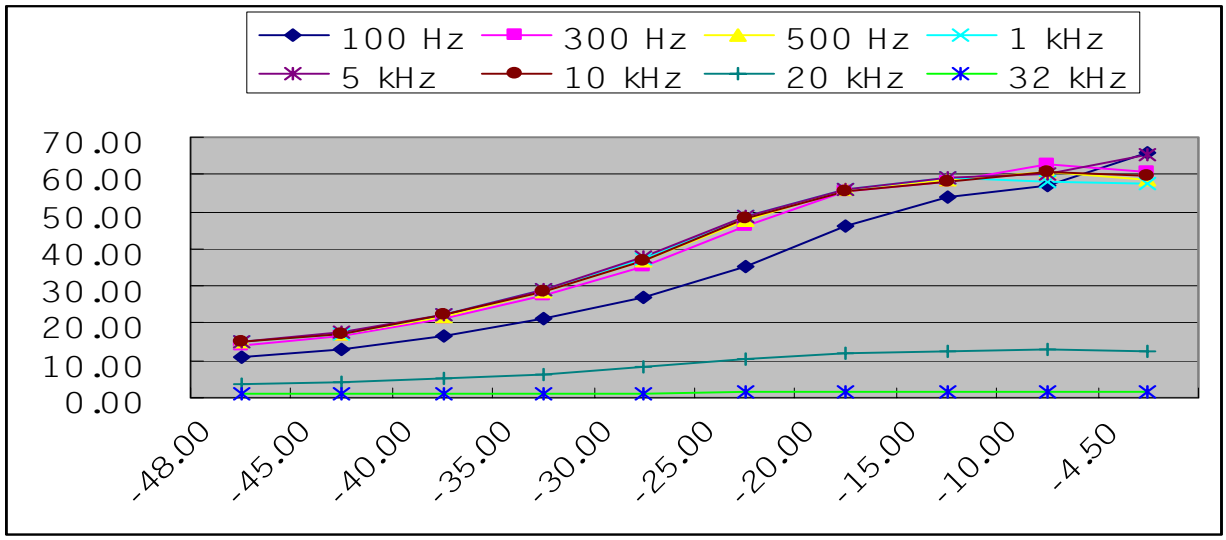
-. Rated Supply Voltage : 3 Vdc

-. Limit : ±75 kHz

-. Result : PASSED

-. Reference Level : 0 dB @ 1 kHz.

Input Level(mV)	100 Hz	300 Hz	500 Hz	1 kHz	5 kHz	10 kHz	20 kHz	32 kHz
-48.00	11.04	14.17	14.78	15.00	15.01	14.81	3.64	1.02
-45.00	12.75	16.45	17.12	17.32	17.41	17.14	4.04	1.19
-40.00	16.43	21.26	21.97	22.30	22.40	22.05	5.03	1.01
-35.00	21.02	27.30	28.35	28.85	28.92	28.47	6.27	1.07
-30.00	27.18	35.40	36.70	37.37	37.60	36.85	8.05	1.20
-25.00	35.50	46.00	47.90	48.70	48.80	48.00	10.27	1.34
-20.00	46.40	55.40	55.90	56.10	56.00	55.30	11.70	1.49
-15.00	54.10	58.10	58.70	59.00	59.10	58.10	12.34	1.53
-10.00	56.90	62.50	60.50	58.00	60.00	60.70	12.83	1.63
-4.50	65.80	60.90	58.60	57.70	65.10	59.70	12.20	1.56



Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

14. RADIATED EMISSION TEST, GENERAL REQUIREMENT

14.1 Operating environment

Temperature : 23°C

Relative humidity : 42 %

14.2 Test set-up

The radiated emissions measurements were on the 3 meters, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30MHz to 1000MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

Test set-up photos are included in appendix VI.

14.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 200 MHz : ±4.3 dB

Radiated emission electric field intensity, 200 MHz ~ 1000 MHz : ±4.1 dB

12.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Nov. 01, 2005
■ -	85650A	Hewlett Packard	Quasi-Peak Adapter	3107A01542	July 10, 2005
■ -	8568B	Hewlett-Packard	Spectrum Analyzer	3109A05456	July 10, 2005
■ -	85685A	Hewlett-Packard	RF Preselector	3107A01264	July 10, 2005
□ -	8449B	Hewlett-Packard	RF Amplifier	3008A00833	June 10, 2005
□-	8447F	Hewlett-Packard	RF Amplifier	3113A04554	June 10, 2005
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	3104C	EMCO	Biconical Antenna	9109-4441	July 11, 2005
■ -	3146	EMCO	Log Periodic Antenna	9109-3214	July 11, 2005
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

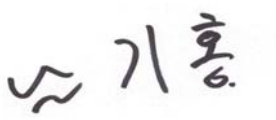
14.5 Test data

-. Test Date : September 27, 2005
-. Resolution bandwidth : 120 kHz
-. Frequency range : 30MHz ~ 1000MHz
-. Measurement distance : 3m
-. Operating Condition : Max Transmitting Mode at Low / Middle / High Channel
-. Result : PASSED BY –6.11 dB at 330.36 MHz

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
147.36	17.70	V	14.97	1.20	35.00	43.50	-8.50
152.65	16.36	V	15.11	1.50	33.80	43.50	-9.70
213.12	15.49	H	16.26	1.60	34.65	43.50	-8.85
289.64	13.97	H	20.04	1.30	37.69	46.00	-8.31
330.36	21.74	V	14.11	2.00	39.89	46.00	-6.11
538.46	14.91	H	18.18	2.10	38.44	46.00	-7.56

Tabulated test data for Radiated Electromagnetic Field

Remark: “H”: Horizontal, “V”: Vertical



Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

15. RADIO FREQUENCY EXPOSURE

15.1 RF Exposure Limit

According to the FCC rule §1.1310, the limit for General Population/Uncontrolled exposure is f (MHz)/1500 = 0.535mW/cm² for the device operating 300~1,500 MHz.

15.2 EUT Description

Kind of EUT	Wireless Microphone
Operating Frequency Band	■ Wireless Microphone: 802.875 ~ 805.625 MHz ☐ WLAN: 2412 ~ 2462 MHz ☐ WLAN: 5180 ~ 5320 MHz / 5500 ~ 5700 MHz ☐ WLAN: 5745 ~ 5825 MHz ☐ Bluetooth: 2402 ~ 2480MHz
Device Category	■ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Max. Output Power	9.5 dBm (8.9mW) @805.625MHz
Used Antenna	Single Antenna
Used Antenna Gain	0 dBi
Exposure Evaluation Applied	☐ MPE ☐ SAR ■ N/A

15.3 Test Result

SAR evaluation is not required for the PORTABLE Device while its maximum output power is lower than threshold: 60/f (GHz) = 60/0.806 = 74.44mW.

SO, THE DEVICE MEETS THE RF EXPOSURE REQUIREMENT.

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
EMC / RF Dept : 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)