ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Per

FCC PART 15 TECHNICAL REQUIREMENT

HANDS FREE CAR KIT

MODEL NAME: SHF-400R

FCC ID: QJ8SHF-400R

Prepared For

SAMSIN INNOTEC CO., LTD.
1016 UNI-TECH VIL, 1141-2 BAEKSEOK-DONG
ILSAN-GU, KOYANG-CITY
KYOUNGGI-DO 411-722
KOREA

Prepared by

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Report No: 02U1454-1
Revision No: A
Date: 8/23/02

[Total number of pages: 19]

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- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
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ATTACHMENT

- EUT Photographs

1. VERIFICATION OF COMPLIANCE

COMPANY NAME:	SAMSIN INNOTEC CO., LTD. 1016 UNI-TECH VIL, 1141-2 BAEKSEOK-DONG ILSAN-GU, KOYANG-CITY KYOUNGGI-DO 411-722, KOREA
EUT DESCRIPTION:	HANDS FREE CAR KIT
MODEL NAME/NUMBER:	SHF-400R
FCC ID:	QJ8SHF-400R
DATE TESTED:	August 13, 2002
REPORT NUMBER:	02U1454-1

TYPE OF EQUIPMENT	HANDS FREE CAR KIT
EQUIPMENT TYPE	434 MHz CAR TRANSMITTER
MEASUREMENT PROCEDURE	ANSI C63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15. 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. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.

Tested By:

CHIN PANG
EMC TECNICIAN
COMPLIANCE CERTIFICATION SERVICES

Approved & Released By:

THU CHAN
SENIOR EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. PRODUCT DESCRIPTION

Fundamental Frequency	**434 MHz**
Power Source	**LR44 1.5VX2**
Transmitting Time	**Periodic ≤ 5 seconds**
Associated Receiver	**NA**

3. TEST FACILITY

The 3/10/30 meter open area test site and conducted measurement facility used to collect the radiated data is located at 561F Monterey Road, Morgan Hill, California, U.S.A. A detailed description of the test facility was submitted to the Commission on May 27,1994.

4. MEASUREMENT STANDARD

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

5. TEST METHODOLOGY

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

6. MEASUREMENT EQUIPMENT USED

TEST EQUIPMENTS LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Quasi Peak Adapter	**HP9K - 1GHz**	**85650A**	**2811A01155**	**5/16/03**
Spectrum Display	**HP**	**85662A**	**2816A16696**	**5/16/03**
Spectrum Analyzer	**HP 0.1K - 1.5GHz**	**8568B**	**2732A03661**	**5/16/03**
Pre-Amplifier,25 dB	**HP0.1 - 1300MHz**	**8447D (P8)**	**2944A06589**	**8/10/02**
Antenna, Bilog	**Schaffner-Chase30M-2GHz**	**CBL6112B**	**2586**	**3/30/03**
Quasi-Peak Detector	**HP9K - 1GHz**	**85650A**	**2811A01335**	**5/23/03**
Spectrum Display	**HP**	**85662A**	**3026A19146**	**5/23/03**
Spectrum Analyzer	**HP100Hz - 22GHz**	**8566B**	**2140A01296**	**5/23/03**
Horn	**Emco**	**3115**	**6717**	**1/31/03**
Pre-Amplifier	**MITEQ1-26GHz**	**NSP2600-44**	**646456**	**4/17/03**

7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 KHzTO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NOT REQUIRED

8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 - 40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231

9. SYSTEM TEST CONFIGURATION

Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.

Radiated Open Site Test Set-up

10. TEST PROCEDURE

Radiated Emissions, 15.231(4)(b)

Test Set-up for frequency range 30 – 1000 MHz

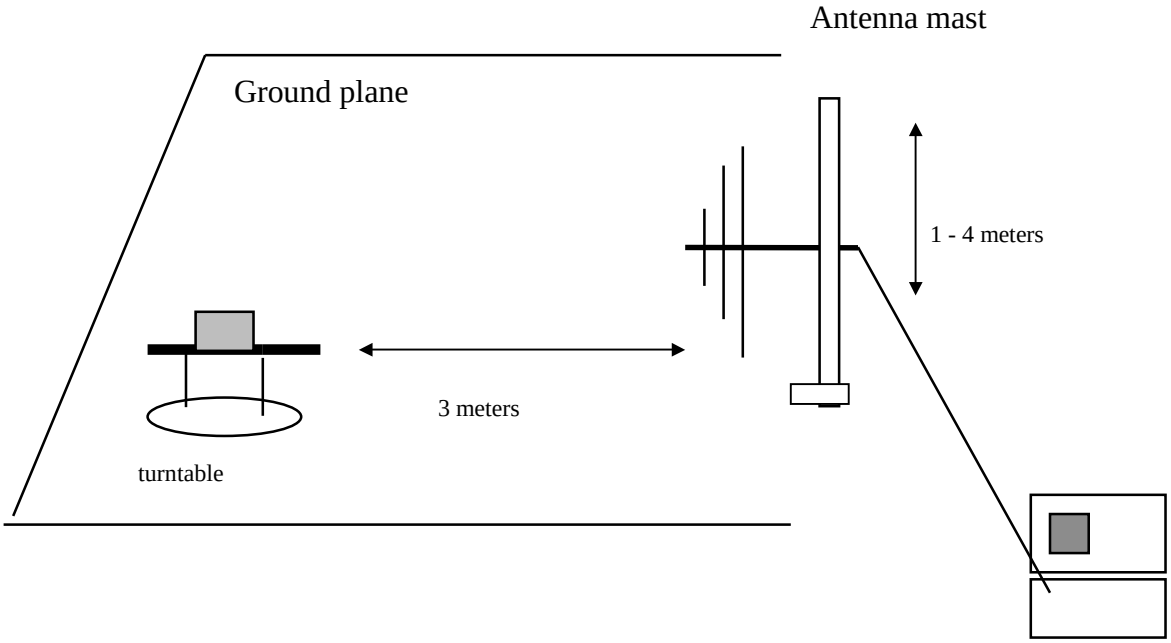


Fig. 1

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test set-up for measurements above 1GHz

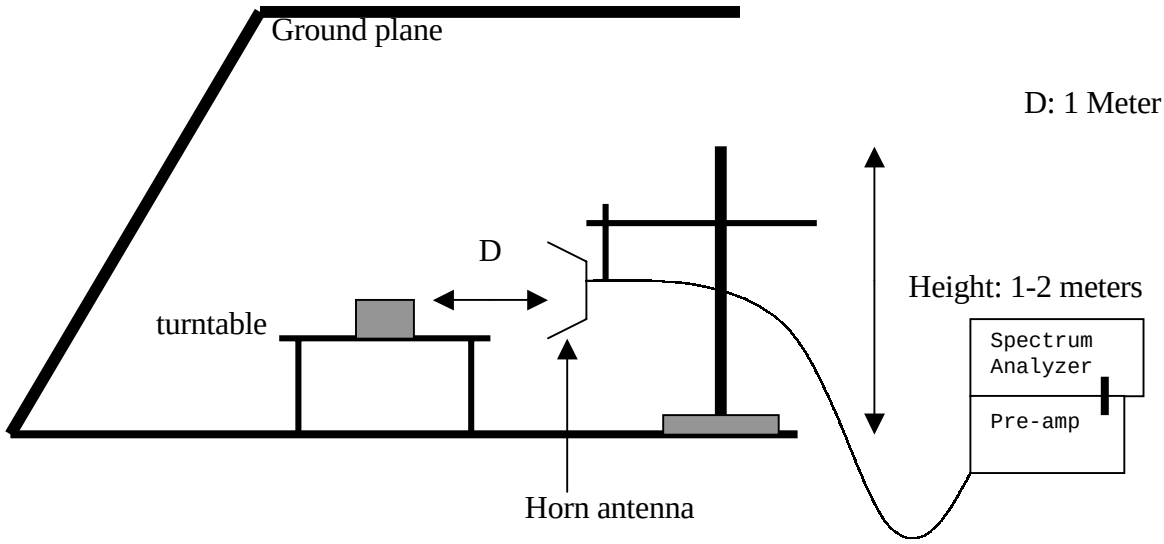


FIG. 2

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

11. EQUIPMENT MODIFICATIONS

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

No changes were required in order to achieve compliance to Section 15.231 levels.

12. TEST RESULT

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	X
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	X
BATTERY POWER	X	SECTION 15.231 (b)	X
		SECTION 15.231 (e)	

12.1 MAXIMUM MODULATION PERCENTAGE (M%)

CALCULATION:

Average Reading = Peak Reading (dBuV/m)+ 20log (Duty Cycle)

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

WHERE
1 Period = 100 mS
Long pulse = 0.72 mS
Short pulse = 0.36 mS
No of Long pulse = 35
No of Short pulse = 13

Duty Cycle = (N1L1+N2L2+…+Nn-1Ln-1+NnLn)/100 or T

Duty Cycle = ((35x0.72)+(13x0.36))/64=0.4668=46.68%

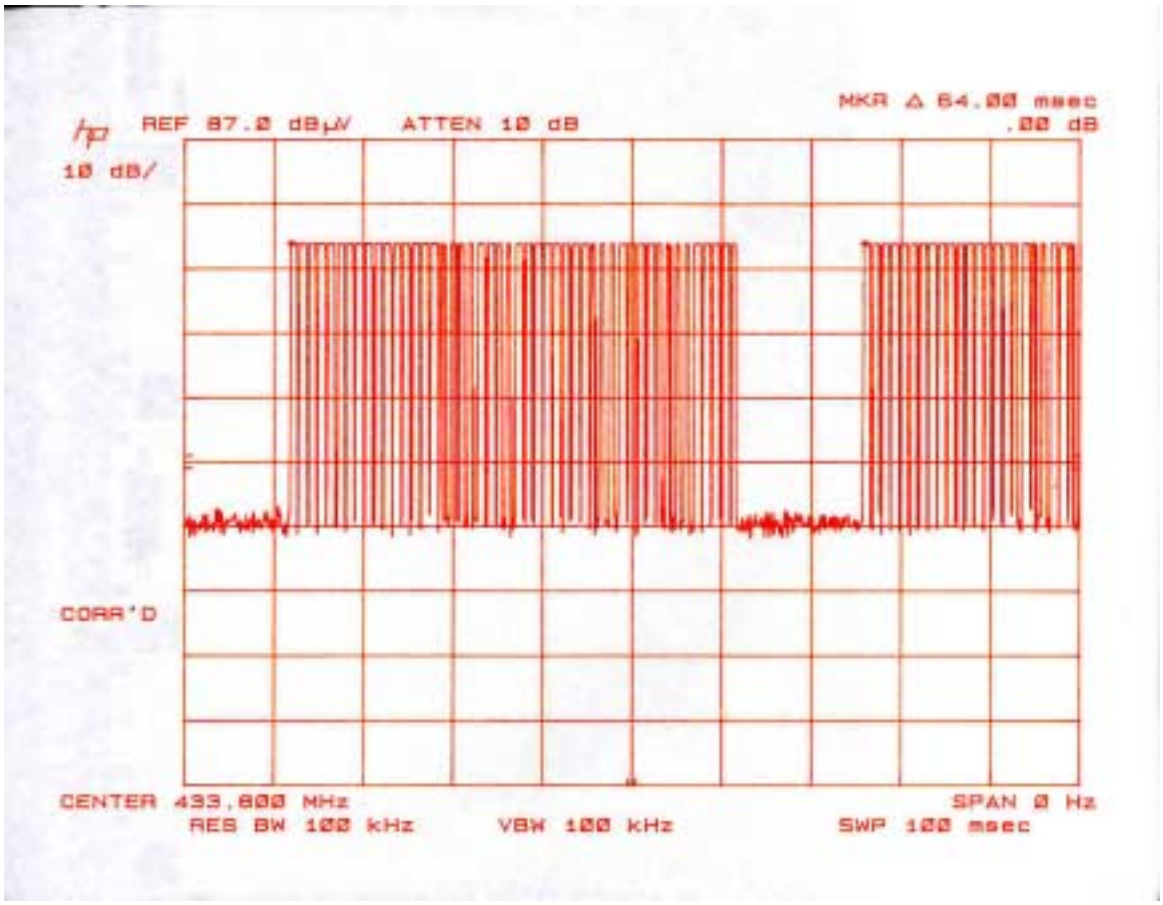
For duty cycle refer to plot #1, 2, 3,4.

12.2 EMISSION BANDWIDTH

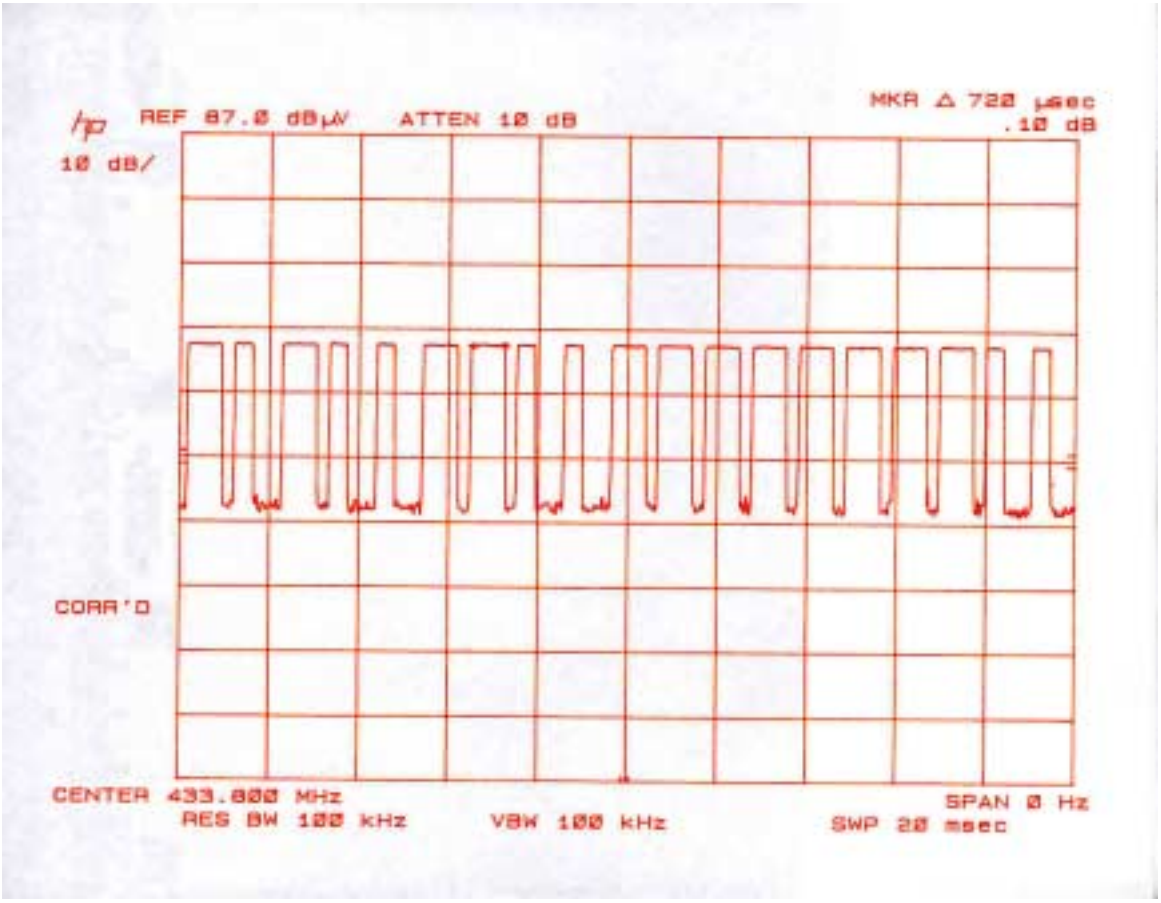
The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
434 MHz	**641 KHz (refer to plot)**	**434 x 0.25%= 1.085 MHz**

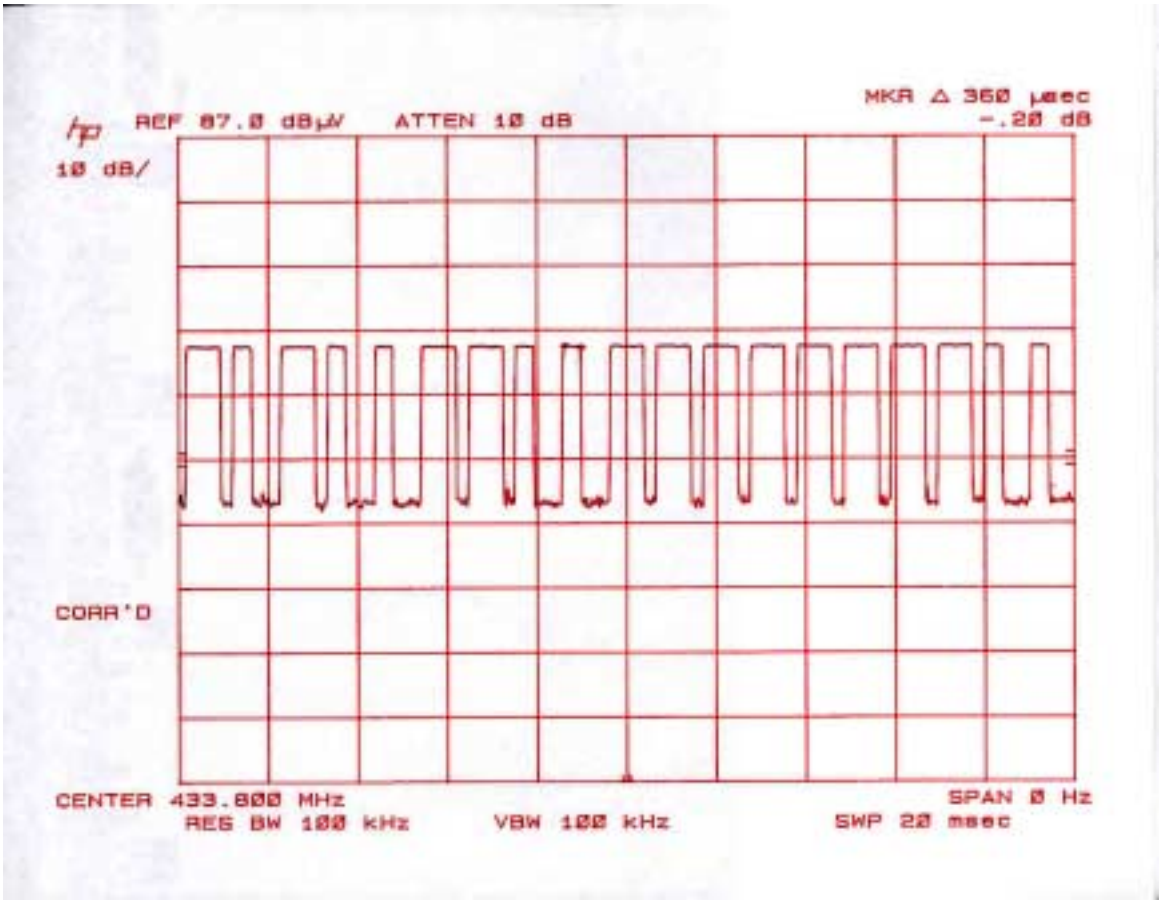
DUTY CYCLE 1



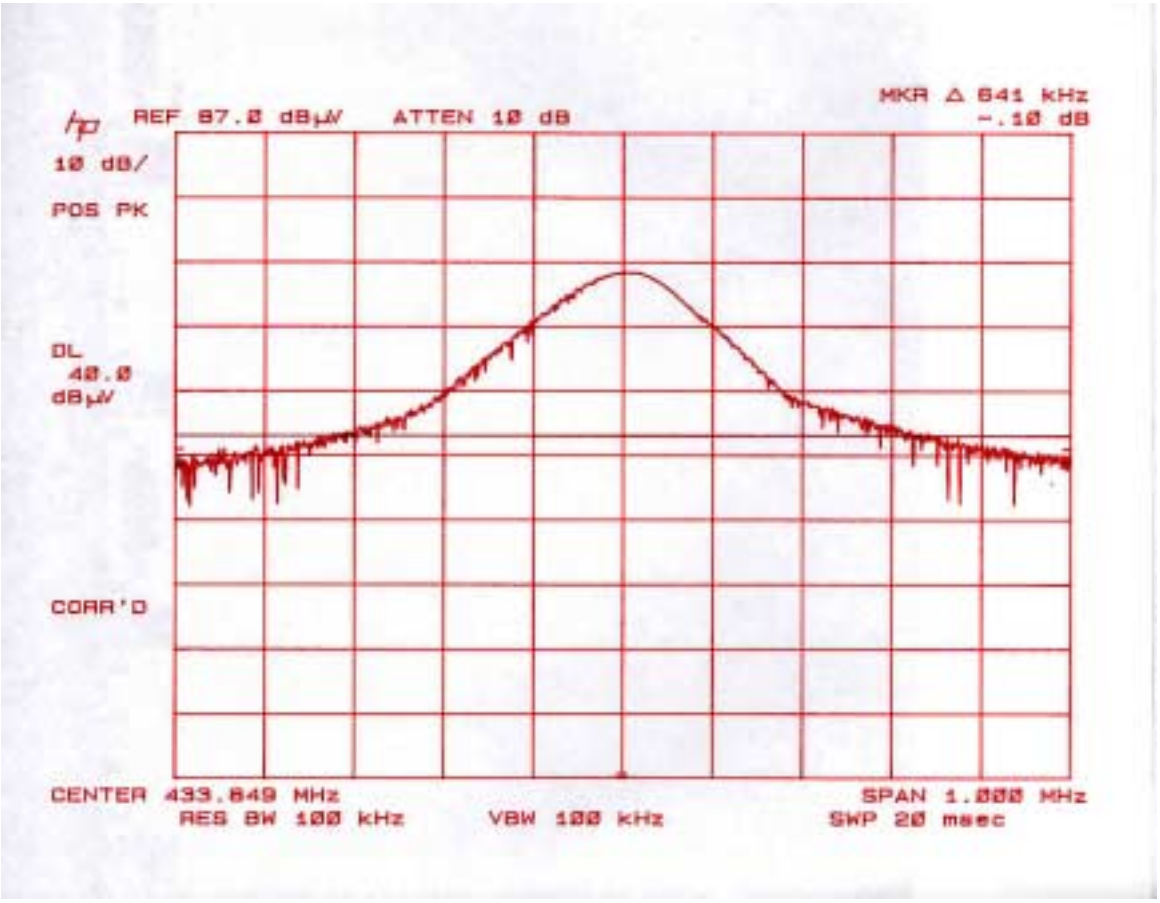
DUTY CYCLE 2



DUTY CYCLE 3



EMISSION BANDWIDTH



RADIATED DATA

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP
561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #:	02U1454-1
Report #:	020813B1
Date& Time:	08/13/02
Test Engr:	Chin Pang
Company:	Samsin Innotec Co., Ltd.
EUT Description:	Hands Free Car Kit (SHF-400R)
Test Configuration :	EUT only
Type of Test:	FCC 15.231
Mode of Operation:	Transmitting

M% = ((t1+t2+t3+…)/T)= 46.67%

Av Reading = Pk Reading + 20*log(M%)
20*log(M%) = -6.62

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
433.92Mhz Fundamental frequency												
X-Position (stand Up)												
433.80	69.30	62.68	16.35	4.79	29.48	54.34	80.10	-25.76	3mV	0.00	2.00	P
433.80	77.30	70.68	16.35	4.79	29.48	62.34	80.10	-17.76	3mH	0.00	1.00	P
Y-Position (Side Lay Down)												
433.80	65.80	59.18	16.35	4.79	29.48	50.84	80.10	-29.26	3mV	0.00	1.50	P
433.80	71.20	64.58	16.35	4.79	29.48	56.24	80.10	-23.86	3mH	0.00	1.00	P
Z-Position (Lay Down)												
433.80	71.00	64.38	16.35	4.79	29.48	56.04	80.10	-24.06	3mV	0.00	1.50	P
433.80	79.30	72.68	16.35	4.79	29.48	64.34	80.10	-15.76	3mH	0.00	1.00	P
The Data show Z-Position is the worst case												
867.60	62.70	56.08	20.11	7.44	29.03	54.60	60.10	-5.50	3mV	0.00	1.00	P
867.60	58.70	52.08	20.11	7.44	29.03	50.60	60.10	-9.50	3mH	0.00	1.40	P

		FCC Measurement												
Compliance Certification Services, Morgan Hill Open Field Site														
Customer: Samsin Innotec Co., Ltd.					08/13/02									
EUT: Hands Free Car Kit														
Model: SHF-400R														
Tested by: Chin Pang														
	Cable length													
		12.0		feet										
	Distance to Antenna													
		3.3		feet										
Average Measurements:						Peak Measurements:								
	1 MHz Resolution Bandwidth					1MHz Resolution Bandwidth								
	10Hz Video Bandwidth					1MHz Video Bandwidth								

f	Peak R.	Avg. R.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Pk Lim	Avg Lim	Peak Mar	Avg Mar	Notes
GHz	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
1.301	90.6	64.3	23.9	2.2	-36.5	-9.5	0.0	70.8	44.5	74.0	54.0	-3.2	-9.5	V
1.735	70.2	55.6	25.8	2.6	-36.5	-9.5	0.0	52.6	38.0	74.0	54.0	-21.4	-16.0	V
2.168	60.2	48.0	27.5	3.0	-36.4	-9.5	1.0	45.7	33.5	74.0	54.0	-28.3	-20.5	V
2.602	58.8	45.0	28.4	3.2	-36.4	-9.5	1.0	45.5	31.7	74.0	54.0	-28.5	-22.3	V
3.036	54.0	43.0	32.5	3.4	-36.3	-9.5	1.0	45.1	34.1	74.0	54.0	-28.9	-19.9	V
3.470	67.4	51.8	31.5	3.7	-36.3	-9.5	1.0	57.8	42.2	74.0	54.0	-16.2	-11.8	V
3.904	69.7	49.2	32.5	4.0	-36.2	-9.5	1.0	61.5	41.0	74.0	54.0	-12.5	-13.0	V
4.338	62.9	49.3	32.2	4.3	-36.0	-9.5	1.0	54.9	41.3	74.0	54.0	-19.1	-12.7	V
1.301	88.4	63.9	23.9	2.2	-36.5	-9.5	0.0	68.6	44.1	74.0	54.0	-5.4	-9.9	H
1.735	73.3	54.9	25.8	2.6	-36.5	-9.5	0.0	55.7	37.3	74.0	54.0	-18.3	-16.7	H
2.168	69.0	53.0	27.5	3.0	-36.4	-9.5	1.0	54.5	38.5	74.0	54.0	-19.5	-15.5	H
2.602	59.0	50.0	28.4	3.2	-36.4	-9.5	1.0	45.7	36.7	74.0	54.0	-28.3	-17.3	H
3.036	57.0	45.0	30.2	3.4	-36.3	-9.5	1.0	45.8	33.8	74.0	54.0	-28.2	-20.2	H
3.470	67.7	58.8	31.5	3.7	-36.3	-9.5	1.0	58.1	49.2	74.0	54.0	-15.9	-4.8	H
3.904	69.9	52.0	32.4	4.0	-36.2	-9.5	1.0	61.6	43.7	74.0	54.0	-12.4	-10.3	H
4.338	65.8	50.0	32.2	4.3	-36.2	-9.5	1.0	57.6	41.8	74.0	54.0	-16.4	-12.2	H

Note: Measured EUT foundamental frequency(433.8MHZ) up to 10th Harmonic

f	Measurement Frequency	HPF	High Pass filter
Peak R.	Analyzer Peak Reading	Peak	Calculated peak field Strength
Avg. R.	Analyzer Avg.Reading	Avg	Calculated average field Strength
AF	Antenna Factor	Pk Lim	Peak Field Strength Limit
CL	Cable Loss	Avg Lim	Average Field Strength Limit
Amp	Pre amp gain	Pk Mar	Margin vs. Peak Limit
D Corr	Discorrections to 3 meter	Avg Mar	Margin vs. Average Limit

ATTACHMENT - EUT PHOTOGRAPHS