



EMI TEST REPORT

Test report no. : ERI-FCC-0119

Type of equipment : Wireless Earset

Model no. : MTW-9000

Applicant. : Mazeltelecom, Co. Ltd.

Test standards : FCC Part15 Subpart B /Subpart C(Class B)

Test procedure and items

- AC Power line Conducted Emissions Measurement : ANSI C63.4-1992
- Radiated Emissions Measurement : ANSI C63.4-1992

Test result : PASS

This equipment has been tested to comply with the requirements of FCC Rules and Regulations Part 15 Subpart B/C intentional Radiators.

The results in this report apply only to the sample tested.

This test report shall not be reproduced except in full, Without the written approval of ERI Laboratory.

Date of test: 2002. 5. 28

Issued date: 2002. 6. 5

Tested by : 

SE-JIN, O

approved by: 

SANG-KYU, LEE

This laboratory is registered by KOLAS, KOREA.

This test report have been performed in accordance with Its terms of registration.

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1. Client information

Applicant : MazeTelecom Co., Ltd.
Address : Yusung Hanjin Resort Officetel 320 535-5 Bongmyong-Dong, Yusung-Gu, Daejeon, Korea.
Telephone Number : 82-42-822-2055
Facsimile Number : 82-42-822-2053

Manufacturer : MazeTelecom Co., Ltd.
Address : Yusung Hanjin Resort Officetel 320 535-5 Bongmyong-Dong, Yusung-Gu, Daejeon, Korea.
Telephone Number : 82-42-822-2055
Facsimile Number : 82-42-822-2053

2. Laboratory information

Address

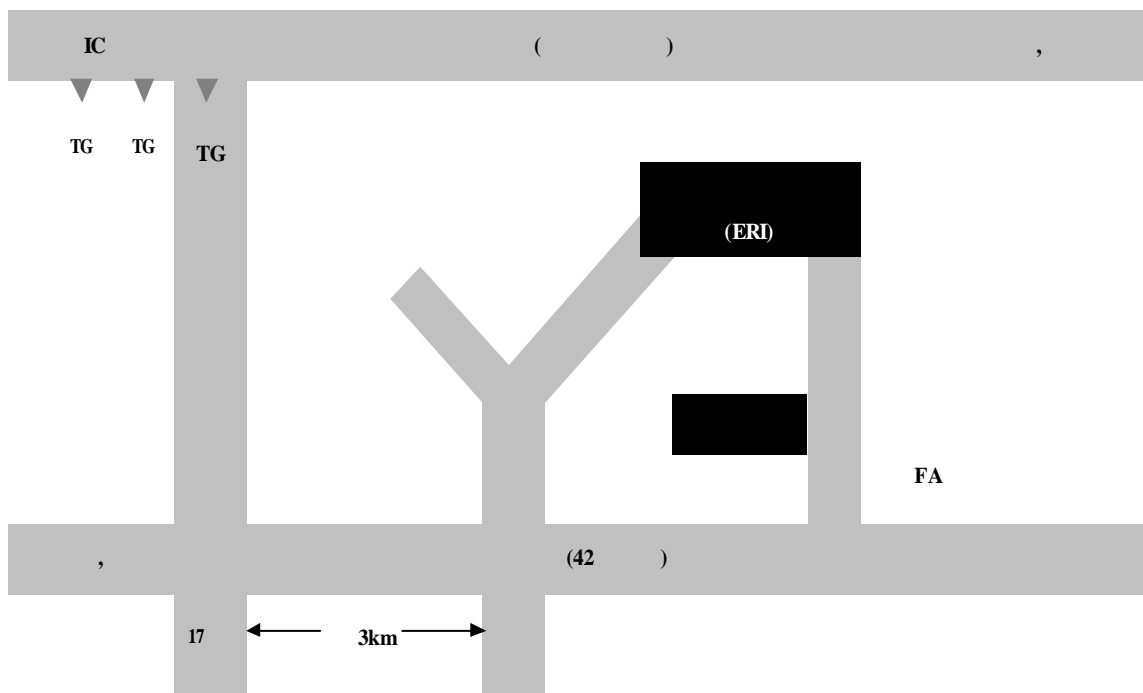
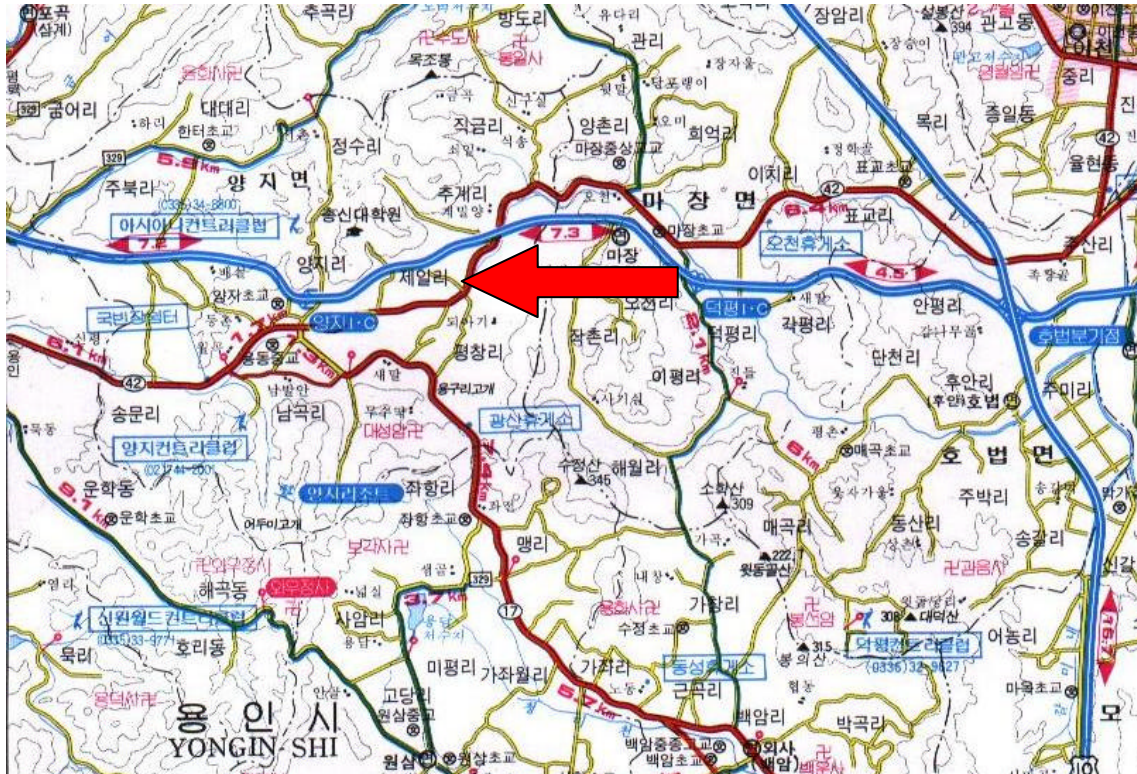
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All of the test facilities of ERI were accredited by KOLAS(ATS) / MIC of Korea, FCC.

KOLAS No. : 111
EK : J
MIC : KR0030
FCC Filing No. : 302567

MAP



3. TEST SYSTEM CONFIGURATION

3.1 Operation Environment

	Temperature	Humidity	Pressure
10m chamber :	19 ℃	48 %	990hPa
Shielded room :	22.8 ℃	58 %	990hPa

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, specially in field of EMC.

The factors contributing to uncertainties are test receiver, Cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna Frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability.

Based on NIS 80,81, The measurement uncertainty level with a 95% confidence level were applied.

3.3 Sample calculation

Radiated emission

The field strength is calculated by adding the antenna Factor, cable loss and, Antenna pad subtracting the amplifier gain from the measured reading.

The sample calculation is as follows :

$$FS = MR + AF + CL + AT - AG$$

MR = Meter Reading

AF = Antenna Factor

CL = Cable Loss

AT = Antenna Pad

AG=Amplifier Gain

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB

The result (MR) is

$$30 + 12 + 5 + 10 - 35 = 22\text{dBuV/m}$$

4. Description of e.u.t.

4.1 Product Description

Type of product :	WIRELESS EARSET
Model No. :	MTW-9000
Serial Number :	N/A
Electric rating :	DC 1.55V
General Description :	This EUT(Equipment Under Test) is the WIRELESS EARSET.

4.2 Peripherals

Description	Manufacturer	Model / Part #	Serial Number
-	-	-	-

4.3 Used cables

Cable Type	Shield	Length (meters)	Ferrite	Connector	Connection Point 1	Connection Point 2
Earphone plug	-	0.15	-	-	-	-

4.4 Operating condition

Operating : Running Mode

5. TEST RESULTS

5.1 Conducted emission

5.1.1 Measurement procedure

Mains

The measurements were performed in a shielded room.

EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.

The rear of tabletop was located 0.4m to the vertical conducted plane.

All other surfaces of tabletop was at least 0.8m from any other grounded conducting surface.

I/O cables and AC cables that were connected to the peripherals were bundled in center.

They were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the ground plane.

Each EUT power lead, except ground (safety) lead, were individually connected through a LISN to input power source.

Both lines of power cord, hot and neutral, were measured.

5.1.2 Used equipment

Equipment	Model	Serial No.	Makers	Next Cal.Date	Used
Test receiver	ESS	848588/006	R&S	2002. 6. 08	
	ESCS30	100022	R&S	2003. 3. 25	
L.I.S.N.	ESH3-Z5	827246/008	R&S	2003. 3. 12	
	ESH3-Z5	831887/018	R&S	2003. 3. 12	
Shield room	8 x 6 x 3.3m/H	-	Daehan shield Engineering	-	

5.1.3 Measurement uncertainty

Conducted Emission measurement : ± 2.4 (K=2)

5.1.4 Test data

Frequency	Tested	LISN	Meter	Total	Results	Margin	Limits
Range	Freq.	Pol.	Reading[A]	Loss	QP		
			QP	[B]	[A] + [B]	[C] - [A+B]	[C]
[MHz]	[MHz]		[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]
0.45-30	0.461	N	10.3	0.18	10.48	37.52	48
	0.526	N	12.5	0.18	12.68	35.32	48
	0.671	H	13.1	0.18	13.28	34.72	48
	0.756	H	15.6	0.18	15.78	32.22	48
	0.846	N	11.5	0.18	11.68	36.32	48
	29.2	H	2.1	1.48	3.58	44.42	48

5.1.5 Result

PASS

5.2 Radiated Emission

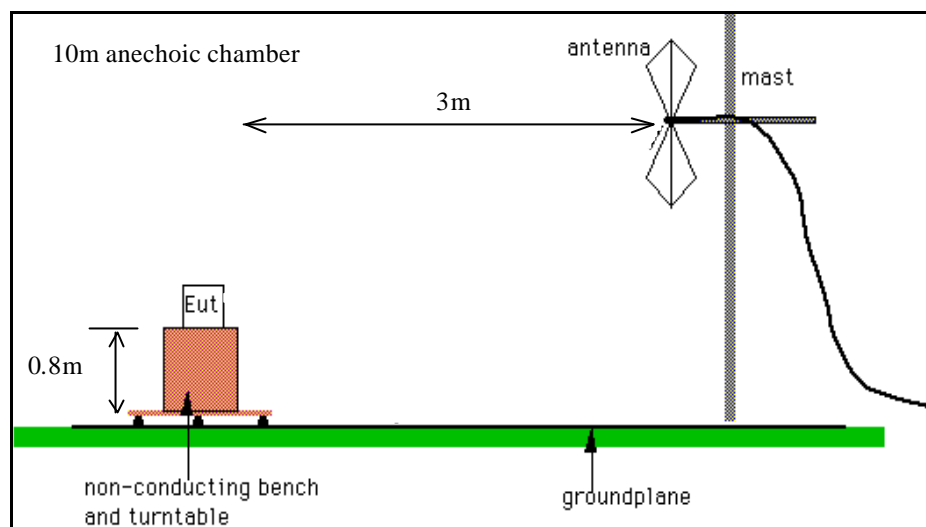
5.2.1 Measurement procedure

Mains

The frequency range investigated was 30 MHz to 1000 MHz and 30 MHz to 10 GHz. All readings are quasi-peak unless stated otherwise.

Judgment: Passed by ___ dBuV/m

The half-wave dipole antenna was tuned to the frequency found during Preliminary radiated measurements. The EUT, support equipment and Interconnecting cables were re-configured to the set-up to the producing the Maximum emission for the frequency and were placed on top of a 0.8 meter High non-metallic 1 X 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME 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. And this device(EUT) was tested in 3 orthogonal planes. The antenna measured both horizontal and vertical polarization.



<General test set-up for radiated emissions>

5.2.2 Used equipment

Equipment	Model	Makers	Serial No.	Next Cal.Date	Used
Test Receiver	ESMI	R&S	826210/007	2003.03.08	x
	ESCS30	R&S	830986/015	2003.03.18.	
Biconical Antenna	VHA9103	Schwarzbeck	1950	2003.04.17	
Log-Periodic Antenna	UHALP9108-A1	Schwarzbeck	0393	2003.04.17	
Horn Antenna	3115	EMCO	9811-5606	2002.11.13	x
Antenna Mast	MA240	HD	N/A	-	
Turn Table	DT430S	HD	N/A	-	

5.2.3 Measurement uncertainty

Radiated Emission measurement :

30-300MHz +3.96dB / -4.04dB

300-1000MHz +3.04dB / -3.00dB

5.2.4 Test data

Tested Frequency (MHz)	Reading [A] (dBuV/m)	ANT Pol.	Total Loss [B] (dB)	Result [A+B] (dBuV/m)	Limit [D] (dBuV/m)	Margin [D]-[A+B] (dBuV/m)
59.70	3.50	H	11.17	14.67	40.0	25.33
181.90	4.60	H	18.82	23.42	43.5	20.08
227.80	5.10	H	19.60	24.70	46.0	21.30
839.00	3.20	H	26.94	30.14	46.0	15.86
865.30	3.10	H	27.61	30.71	46.0	15.29

5.2.5 Fundamental frequency

Tested Frequency (MHz)	Reading [A] (dBuV/m)	ANT Pol.	Total Loss [B] (dB)	Result [A+B] (dBuV/m)	Limit [D] (dBuV/m)	Margin [D]-[A+B] (dBuV/m)
915	31	V	28.26	59.3	94	34.7
1830	2.1	H	35.8	37.9	54	13.0
2745	<5	-	-	-	54	-
3660	<5	-	-	-	54	-
4575	<5	-	-	-	54	-
5490	<5	-	-	-	54	-
6405	<5	-	-	-	54	-
7320	<5	-	-	-	54	-
8235	<5	-	-	-	54	-
9150	<5	-	-	-	54	-

* Receiving Antenna Mode : *Horizontal, Vertical*

* 3m chamber

* <5 : mean less than 5dB

5.2.5 Result

- PASS

6. TEST PHOTOGRAPHS

Conducted emission



Radiated emission



EUT (EARSET front)



EUT (EARSET rear)



EUT (BASE front)



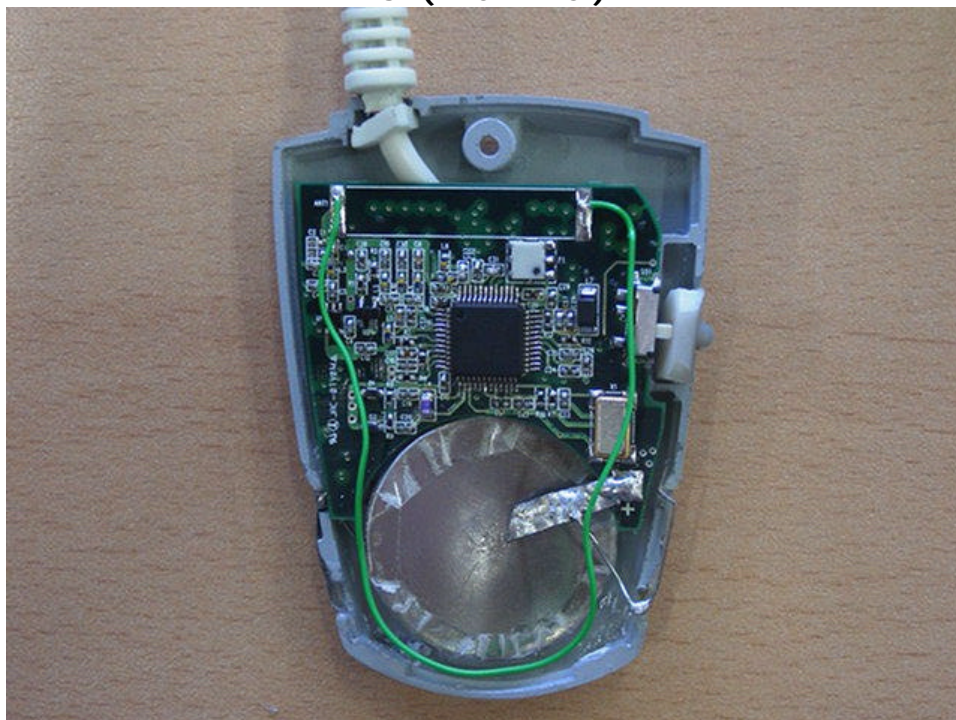
EUT (BASE rear)



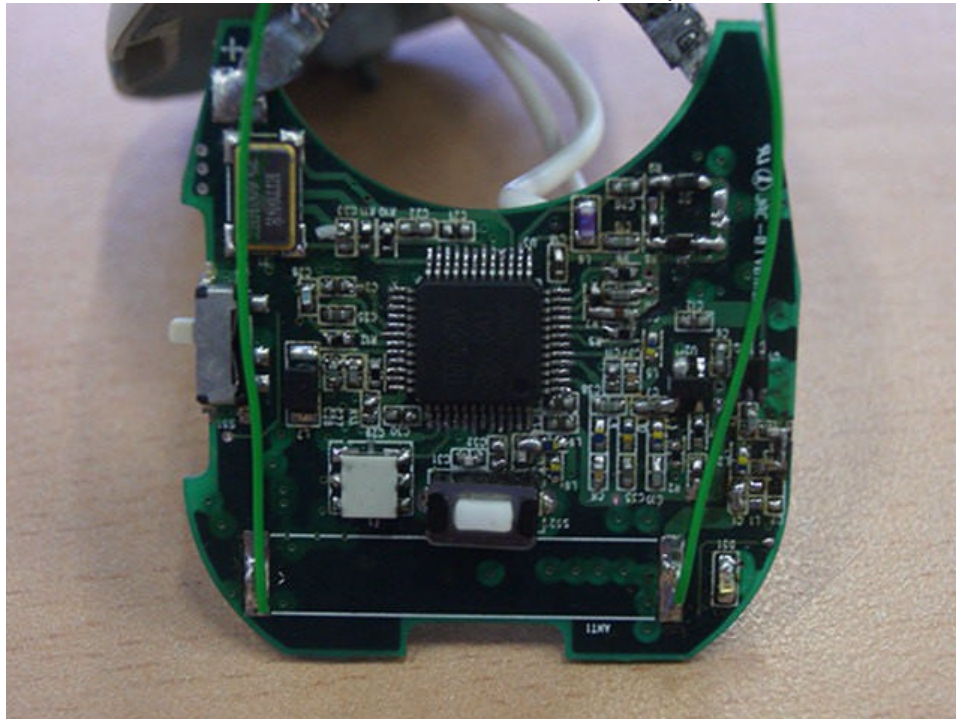
EUT (EARSET inner)



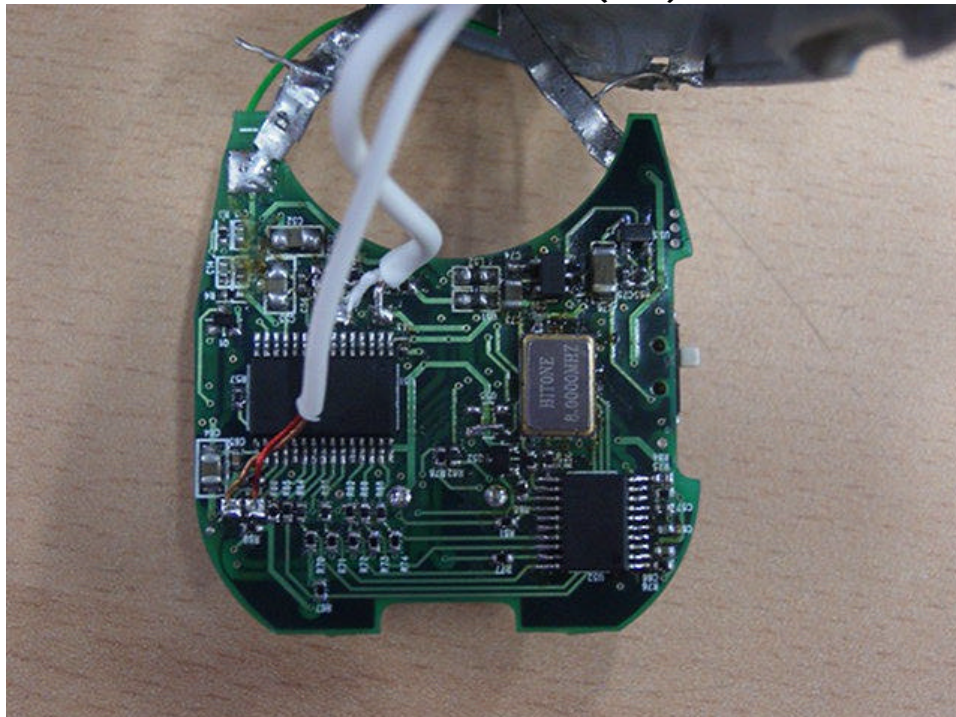
EUT (BASE inner)



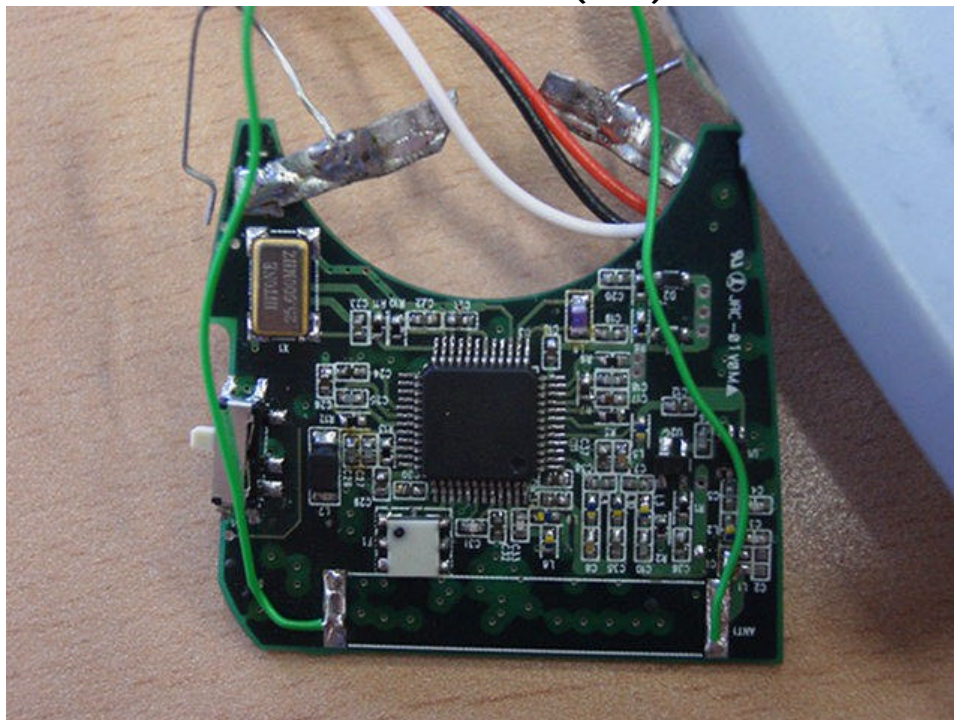
EARSET Main board (front)



EARSET Main board (rear)



BASE Main board (front)



BASE Main board (rear)

