CE

SPORTON LAB.

Certificate No: **EW832514**

CERTIFICATE

EQUIPMENT : **Neo FreeRunner**

TRADE NAME : **OPENMOKO**

MODEL NO. : **GTA02**

APPLICANT : **FIC (First International Computer, Inc.)**

1-9F., No. 300, Yang Guang, NeiHu, Taipei, Taiwan, 114

SPORTON LAB.

I HEREBY **CERTIFY THAT:**

THE EQUIPMENT WAS **PASSED** THE TEST PERFORMED ACCORDING TO **EN 301 489-1 V1.6.1 (2005-09), EN 301 489-7 V1.3.1 (2005-06), EN 301 489-17 V1.2.1 (2002-08), EN 55022:1998/A1:2000/A2:2003 and EN 55024:1998/A1:2001/A2:2003.** THE TEST WAS CARRIED OUT ON Apr. 07, 2008 AT **SPORTON INTERNATIONAL INC.** LAB.

Roy Wu
Manager

CE EMC Test Report

According to

EN 301 489-1 V1.6.1 (2005-09),
EN 301 489-7 V1.3.1 (2005-06),
EN 301 489-17 V1.2.1 (2002-08),
EN 55022:1998/A1:2000/A2:2003, and
EN 55024:1998/A1:2001/A2:2003

Equipment : Neo FreeRunner

Trade Name : OPENMOKO

Model Name : GTA02

Applicant : FIC (First International Computer, Inc.)

1-9F., No. 300, Yang Guang, NeiHu, Taipei, Taiwan, 114

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- This test report is only applicable to European Community.
- Report Version: Rev. 01.

SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

Table of Contents

History of this test report

Report Issue Date: Apr. 16, 2008

Report No.	Description

Certificate No. : EW832514

CERTIFICATE OF COMPLIANCE

According to

EN 301 489-1 V1.6.1 (2005-09),
EN 301 489-7 V1.3.1 (2005-06),
EN 301 489-17 V1.2.1 (2002-08),
EN 55022:1998/A1:2000/A2:2003, and
EN 55024:1998/A1:2001/A2:2003

Equipment : Neo FreeRunner

Trade Name : OPENMOKO

Model Name : GTA02

Applicant : FIC (First International Computer, Inc.)
1-9F., No. 300, Yang Guang, NeiHu, Taipei, Taiwan, 114

I **HEREBY** CERTIFY THAT:

The equipment was ***passed*** the test performed according to **EN 301 489-1 V1.6.1 (2005-09), EN 301 489-7 V1.3.1 (2005-06), EN 301 489-17 V1.2.1 (2002-08), EN 55022:1998/A1:2000/A2:2003 and EN 55024:1998/A1:2001/A2:2003.** The test was carried out on Apr. 07, 2008 at SPORTON International Inc. LAB.

Roy Wu
Manager

SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1 Applicant

FIC (First International Computer, Inc.)
1-9F., No. 300, Yang Guang, NeiHu, Taipei, Taiwan, 114

1.2 Manufacturer

First International Computer (Suzhou) Inc.
No. 200, Contral Suhong Road, SuZhou Industrial Park, China

1.3 Basic Description of Equipment under Test

Equipment		Neo FreeRunner
Trade Name		OPENMOKO
Model Name		GTA02
AC Adapter	**Manufacture**	AKII TECHNOLOGY CO., LTD.
	Brand Name	AKII Technology
	Model Name	A10P1-05MP
	Power Rating	I/P: 100-240Vac, 47-63Hz, 0.3A; O/P: 5Vdc, 2.0A
	AC Power Cord Type	1.49 meter non-shielded cable without ferrite core
Battery 1	**Manufacture**	WELLDONE COMPANY
	Brand Name	FIC
	Model Name	GTC-01 / GTA-01
	Power Rating	3.7Vdc, 1200mAh
	Type	Li-ion
Battery 2	**Brand Name**	FIC
	Model Name	GTA02
	Power Rating	3.7Vdc, 1200mAh
	Type	Li-ion
Earphone	**Brand Name**	Xport
	Model Name	Ko-11-1020a
	Signal line Type	1.42 meter non-shielded cable without ferrite core
USB Cable	**Brand Name**	Golden Bridge
	Model Name	AS52-0607007
	Signal Line Type	1.29 meter non-shielded cable without ferrite core

Remark: Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

1.4 Feature of Equipment under Test

Product Feature & Specification	
1. DUT Type	Neo FreeRunner
2. Trade Name	OPENMOKO
3. Model No.	GTA02
4. Modulation Type	GSM : GMSK Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK WLAN : DSSS / OFDM
5. Tx Frequency	GSM : 880 MHz ~ 915 MHz DCS : 1710 MHz ~ 1785 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz
6. Rx Frequency	GSM : 925 MHz ~ 960 MHz DCS : 1805 MHz ~ 1880 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz GPS : 1575.42 MHz
7. Antenna Type	GSM / DCS : Monopole Antenna GPS : Ceramic Antenna Bluetooth : Chip Antenna WLAN : Chip Antenna
8. Antenna Gain	GSM / DCS : 0.07 dBi Bluetooth : -4.84 dBi WLAN : -3 dBi
9. Type of Antenna Connector	N/A
10. HW Version	A5
11. SW Version	Moko5
12. Power Rating (DC/AC Voltage)	Battery : DC 3.7V Adapter : AC 100-240V
13. DUT Stage	Identical Prototype

2. Test Configuration of Equipment under Test

2.1 Test Manner

a. During testing, the cable and equipment positions were varied according to European Standard EN 301 489-7, EN 301 489-17, EN 55022:1998/A1:2000/A2:2003 and EN 55024:1998/A1:2001/A2:2003.
b. The complete test system included refers to section 2.2 for EMI and/or EMS test.
c. Test Modes:

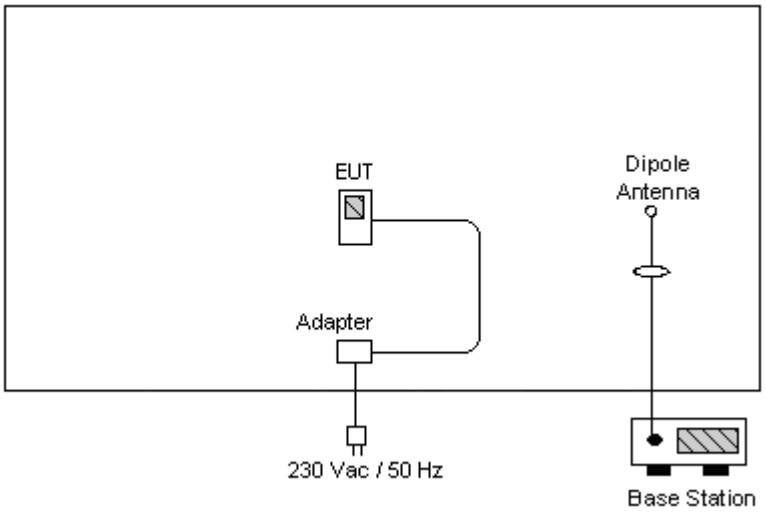
Test Item	Test Mode
Conducted Emission	Mode 1 : GSM Link + BT Link + GPS Rx + Adapter + Battery 1
	Mode 2 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 3 : WLAN Link + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 4 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 2
Radiated Emission	Mode 1 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 2 : WLAN Link + BT Link + GPS Rx + USB Link + MP3 + Battery 1
	Mode 3 : WLAN Link + BT Link + GPS Rx + Adapter + MP3 + Battery 2
Flicker Testing	Mode 1 : GSM Link + BT Link + GPS Rx + Adapter + Battery 1
	Mode 2 : WLAN Link + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 3 : GSM Link + BT Link + GPS Rx + Adapter + Battery 2
ESD Testing	Mode 1 : GSM Link + BT Link + GPS Rx + Battery 1
	Mode 2 : GSM Link + BT Link + GPS Rx + Adapter + Battery 1
	Mode 3 : WLAN Link + BT Link + GPS Rx + USB Link + MP3 + Battery 1
	Mode 4 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 5 : GSM Link + BT Link + GPS Rx + Battery 2
RS Testing	Mode 1 : GSM Link + Adapter + Battery 1
	Mode 2 : DCS Link + Adapter + Battery 1
	Mode 3 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 4 : WLAN Link + BT Link + GPS Rx + USB Link + MP3 + Battery 1
	Mode 5 : DCS Link + Adapter + Battery 2
CS Testing	Mode 1 : GSM Link + Adapter + Battery 1
	Mode 2 : DCS Link + Adapter + Battery 1
	Mode 3 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 4 : WLAN Link + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 5 : DCS Link + Adapter + Battery 2
PFMF Testing	Mode 1 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 2 : WLAN Link + BT Link + GPS Rx + USB Link + MP3 + Battery 1
EMS Testing (EFT、Surge、Dip)	Mode 1 : GSM Link + BT Link + GPS Rx + Adapter + Battery 1
	Mode 2 : WLAN Link + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 3 : GSM Idle + BT Link + GPS Rx + Adapter + MP3 + Battery 1
	Mode 4 : GSM Link + BT Link + GPS Rx + Adapter + Battery 2
Remark：The worst case for radiated emission is mode 2 and 3; only the test data of mode 2 and 3 was reported.	

2.2 Description of Test System

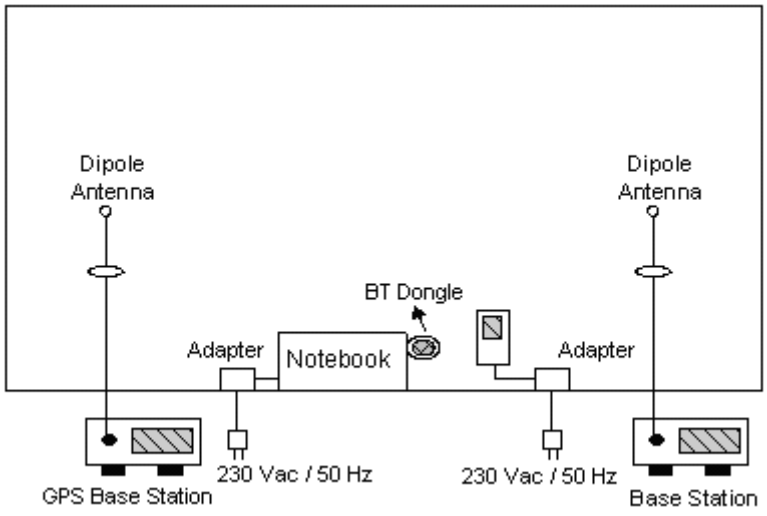
Item	Equipment	Trade Name	Model Name	Data Cable / Power Cord
1.	Base Station	R&S	CMU 200	Unshielded, 1.8m
2.	GPS Base Station	T&E	GS-50	N/A
3.	WLAN AP	SMC	SMC-100	N/A
4.	Notebook	LEO	WB-B55	AC I/P: Unshielded, 1.2m DC O/P: Shielded, 1.8m
5.	Bluetooth Dongle	Engotech	ET-BD201	N/A

2.3 Connection Diagram of Test System

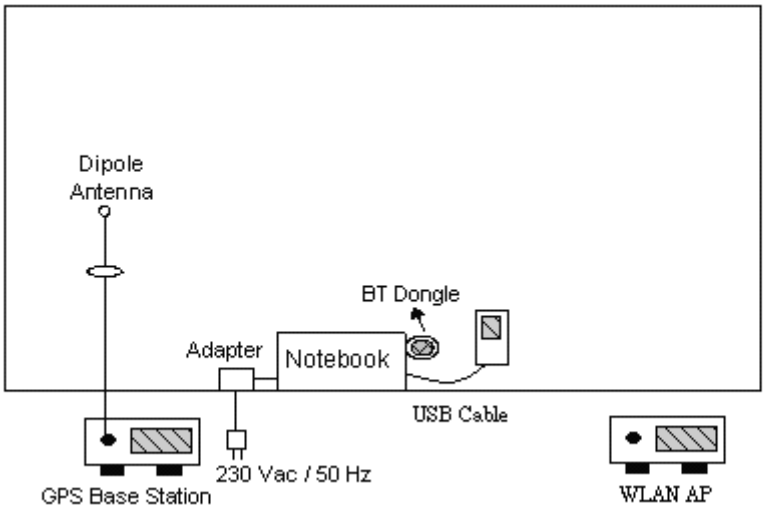
<EUT with Adapter Mode>



<EUT with Adapter and BT Link Mode>



<EUT with USB Link Mode>



3. Test Software

The equipment under test (EUT) is performed in a chamber and is coupled to the system simulator which is located outside the chamber.

GSM or DCS were in link mode or idle mode during EMI and EMS testing. Established communication with the EUT in link mode (dedicated mode) with system simulator and allocated a middle channel with following settings:

For GSM system:
- Maximum output power.
- DTX function off.

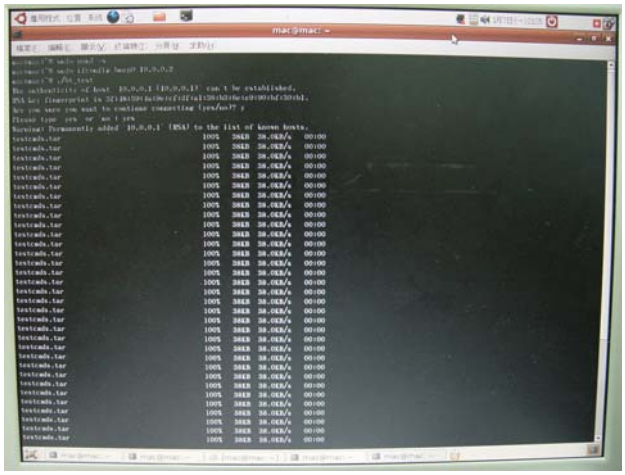
In idle mode, the EUT is synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

The function of Bluetooth in EUT was linked with Bluetooth Dongle.
- The Bluetooth function was linked with Bluetooth Dongle.

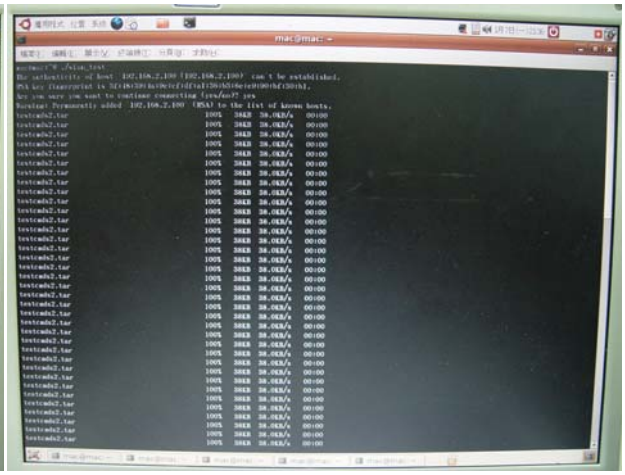
The function of GPS in EUT was received signal from GPS base station.
- The GPS function was received signal from GPS base station.

At the same time, the EUT was linked with Bluetooth Dongle and GPS function was in receive mode.

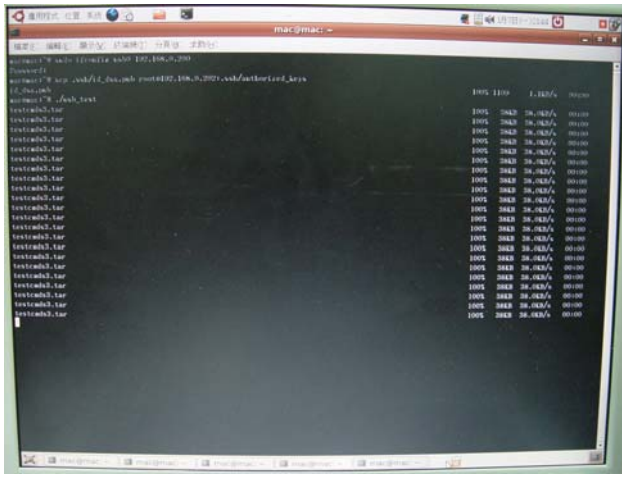
The EUT's Bluetooth, WLAN, GPS and USB data link function performance criterion was checked by using the application utility provided by the manufacturer as below figure. The application utility of Bluetooth installed in notebook provides EUT to link with USB dongle. The data rate in screen of notebook mean that EUT's Bluetooth function is activated. The GPS windows on the panel of EUT means that the EUT's GPS function is received signal from GPS base station. The application utility of USB installed in notebook provides EUT to link with notebook. The data rate in screen of notebook mean that EUT's data transmit function from USB port is activated. Before testing, during and after, they are under being monitored. The CT/CR and TT/TR in section 4.7 performance criterion was used for judgment.



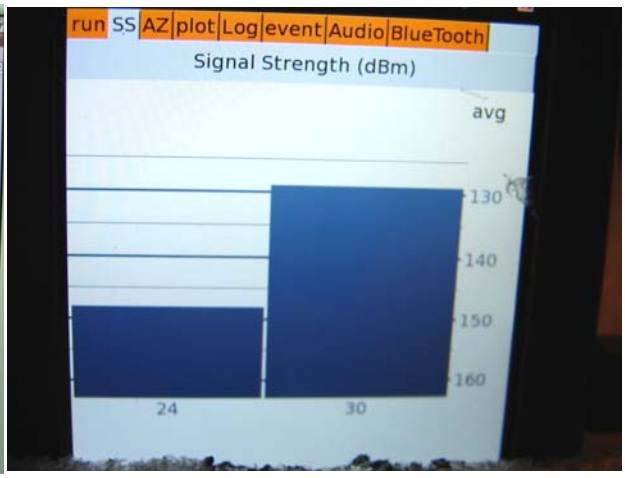
EUT with BT functions linkage



EUT with WLAN functions linkage



EUT with USB functions linkage



EUT with GPS functions linkage

4. General Information of Test

4.1 Test Facility

<EMI>

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-328-4978

Test Site No : CO04-HY, 10CH02-HY

<EMS>

Test Site Location : No. 52, Hwa Ya 1st Road, Hwa Ya Technology Park,
Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-328-4978

4.2 Test Voltage

AC 230V / 50Hz

4.3 Standard for Methods of Measurement

EMI Test	: European Standard EN 301 489-1 V1.6.1 (2005-09)
	: European Standard EN 301 489-7 V1.3.1 (2005-06)
	: European Standard EN 301 489-17 V1.2.1 (2002-08)
	: European Standard EN 55022 Class B
	: European Standard EN 61000-3-2
	: European Standard EN 61000-3-3
Voltage Fluctuations Test	: European Standard EN 61000-3-3
EMS Test	: European Standard EN 301 489-1 V1.6.1 (2005-09)
	: European Standard EN 301 489-7 V1.3.1 (2005-06)
	: European Standard EN 301 489-17 V1.2.1 (2002-08)
	: European Standard EN 55024 (ESD: EN 61000-4-2, RS: EN 61000-4-3, EFT: EN61000-4-4, SURGE: EN 61000-4-5, CS: EN 61000-4-6, Power Frequency Magnetic Field: EN 61000-4-8, DIPS: EN61000-4-11)

4.4 Test Compliance

EMI Test	: European Standard EN 301 489-1 V1.6.1 (2005-09)
	: European Standard EN 301 489-7 V1.3.1 (2005-06)
	: European Standard EN 301 489-17 V1.2.1 (2002-08)
	: European Standard EN 55022 Class B
	: European Standard EN 61000-3-2
	: European Standard EN 61000-3-3
Voltage Fluctuations Test	: European Standard EN 61000-3-3
EMS Test	: European Standard EN 301 489-1 V1.6.1 (2005-09)
	: European Standard EN 301 489-7 V1.3.1 (2005-06)
	: European Standard EN 301 489-17 V1.2.1 (2002-08)
	: European Standard EN 55024 (ESD: EN 61000-4-2, RS: EN 61000-4-3, EFT: EN61000-4-4, SURGE: EN 61000-4-5, CS: EN 61000-4-6, Power Frequency Magnetic Field: EN 61000-4-8, DIPS: EN61000-4-11)

4.5 Frequency Range

a. Conducted emission test: from 150 kHz to 30 MHz
b. Radiated emission test: from 30 MHz to 1000 MHz
c. Radio frequency electromagnetic field immunity test: 80-1000 MHz, 1400-2000 MHz.

4.6 Test Distance

a. The test distance of radiated emission test from antenna to EUT is 10 m.
b. The test distance of radio frequency electromagnetic field immunity test from antenna to EUT is 3 m.

4.7 Performance Criteria

4.7.1 The clause 6 of the EN301 489 –1

The performance criteria are used to take a decision on whether a radio equipment passes or fails immunity tests.

- Performance Criteria for Continuous Phenomena Applied to Transmitters and/or Receivers (CT/CR)

  During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended.

- Performance Criteria for Transient Phenomena Applied to Transmitters and/or Receivers (TT/TR)

  After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended.

4.7.2 The clause 7 of the EN55024

The performance criteria are used to take a decision on whether the information technology equipment passes or fails immunity tests.

- Performance Criteria A:

  The EUT shall operate without degradation of performance during and after the application of the disturbance.

- Performance Criteria B:

  After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer.

- Performance Criteria C:

  Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.8 Summary of Test Results

4.8.1 Emission Tests

Measurement	*Reference Clause(s)*	*Test Result*	*Reference Standard*
Radiated emission	8.2	PASSED	EN 55022 class B
Conducted emission	8.3/8.4	PASSED	EN 55022 class B
Harmonic current emissions	8.5	N/A	EN 61000-3-2
Voltage fluctuations and flicker	8.6	PASSED	EN 61000-3-3

4.8.2 Immunity Tests

Measurement	*Reference Clause(s)*	*Test Result*	*Reference Standard*
Electrostatic discharge	9.3	PASSED	EN 61000-4-2
RF electro-magnetic Field (80-1000 MHz, 1400-2000 MHz)	9.2	PASSED	EN 61000-4-3
Fast transients common mode	9.4	PASSED	EN 61000-4-4
Radio frequency, common mode	9.5	PASSED	EN 61000-4-6
Surge	9.8	PASSED	EN 61000-4-5
Magnetic Field Immunity	N/A	PASSED	EN61000-4-8
Voltage dips and interrupts	9.7	PASSED	EN 61000-4-11

Remark:

All the test modes listed in section 2.1 c can pass the related standards.

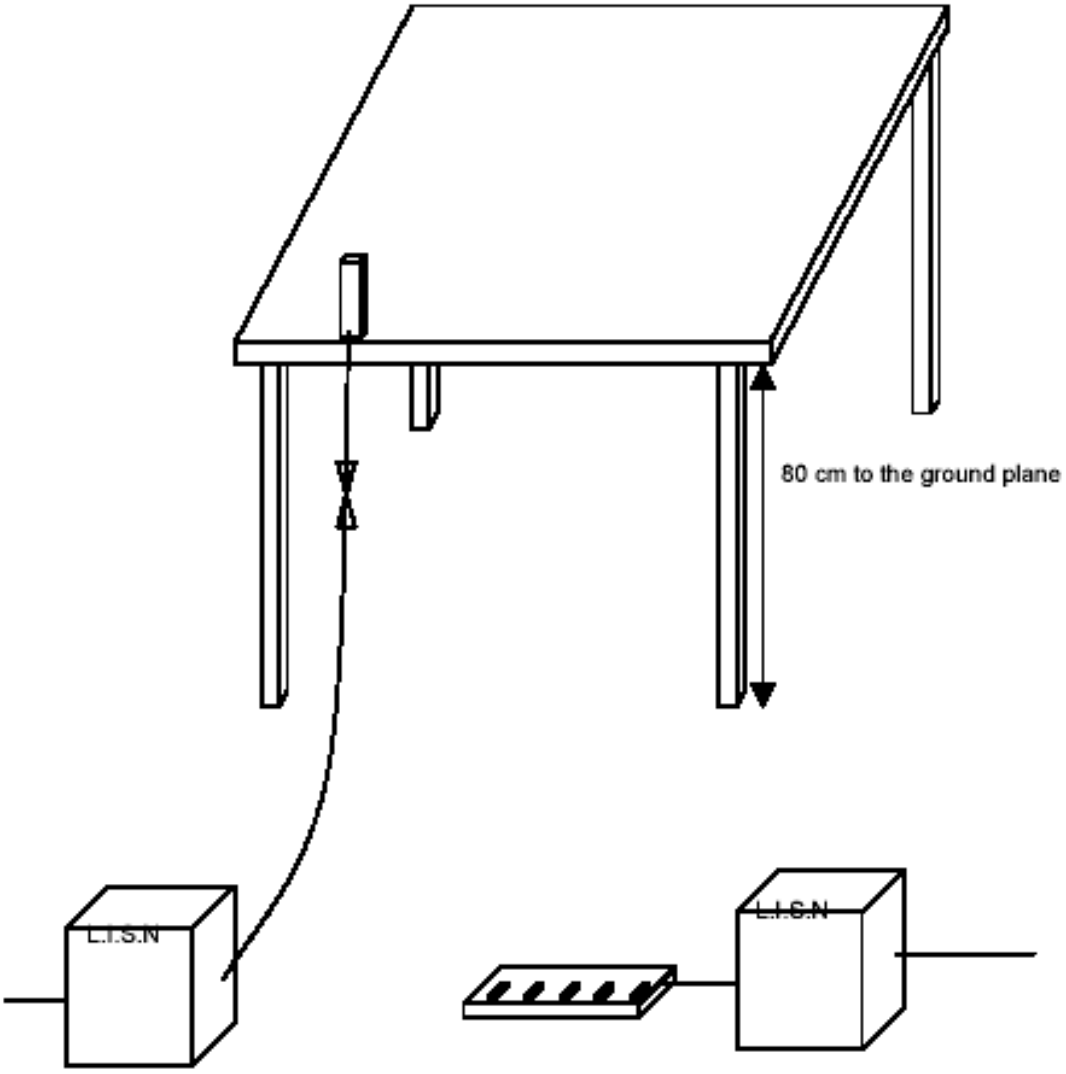
5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55022. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

5.1 Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was scanned.
h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

5.2 Typical Test Setup Layout of Conducted Powerline

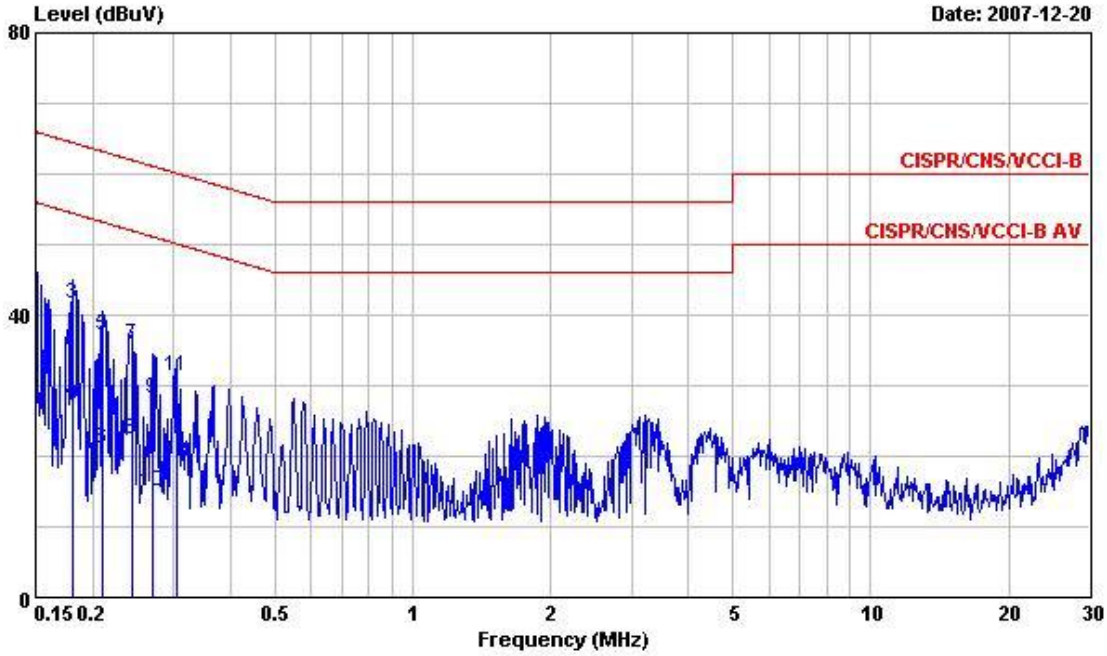


5.3 Test Result of AC Powerline Conducted Emission

5.3.1 Test Mode: Mode 1

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 24~26°C
Relative Humidity:49~52%
Test Engineer : Sun

■ The test that passed at the minimum margin was marked by the frame in the following table.

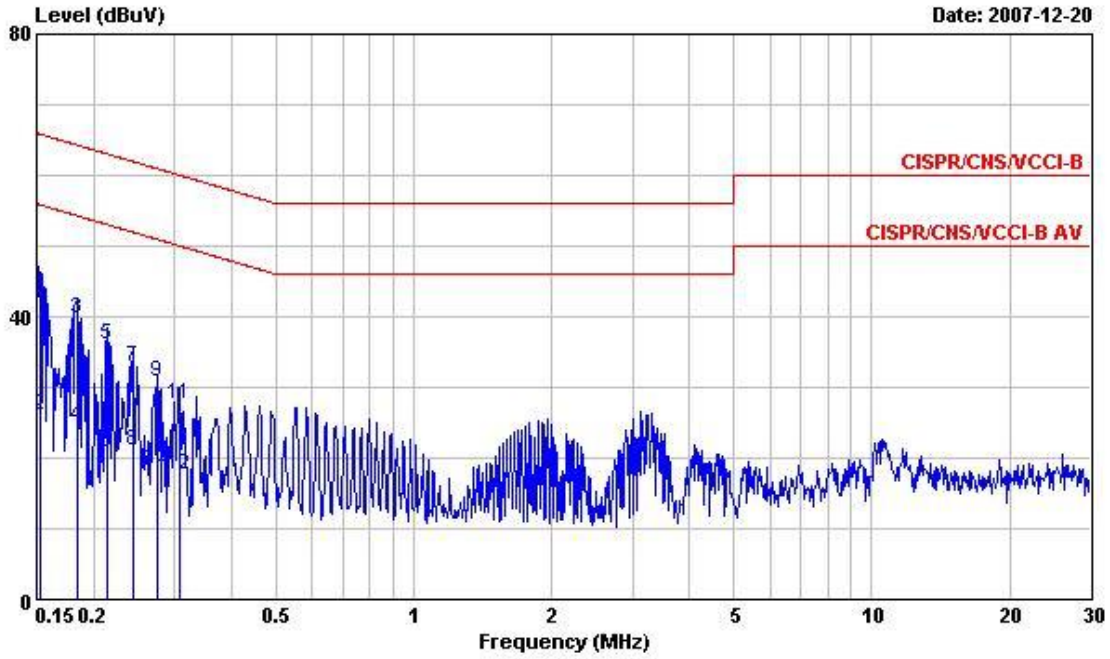


Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 LINE
EUT : Smart Phone
POWER: 230Vac/50Hz
Model : EW 7D1802
Memo : GSM Link + BT Link + GPS Rx
Memo : + Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1500000	45.95	-20.05	66.00	45.71	0.10	0.14	QP
2	0.1500000	27.50	-28.50	56.00	27.26	0.10	0.14	Average
3	0.1805620	41.64	-22.82	64.46	41.40	0.10	0.14	QP
4	0.1805620	27.69	-26.77	54.46	27.45	0.10	0.14	Average
5	0.2105510	37.08	-26.10	63.18	36.79	0.10	0.19	QP
6	0.2105510	21.09	-32.09	53.18	20.80	0.10	0.19	Average
7	0.2429320	35.67	-26.33	62.00	35.27	0.10	0.30	QP
8	0.2429320	22.29	-29.71	52.00	21.89	0.10	0.30	Average
9	0.2700880	28.24	-32.88	61.12	27.75	0.10	0.39	QP
10	0.2700880	15.05	-36.07	51.12	14.56	0.10	0.39	Average
11	0.3050910	31.27	-28.83	60.10	30.67	0.10	0.50	QP
12	0.3050910	19.09	-31.01	50.10	18.49	0.10	0.50	Average

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 24~26°C
Relative Humidity: 49~52%

■ **The test that passed at the minimum margin was marked by the frame in the following table.**



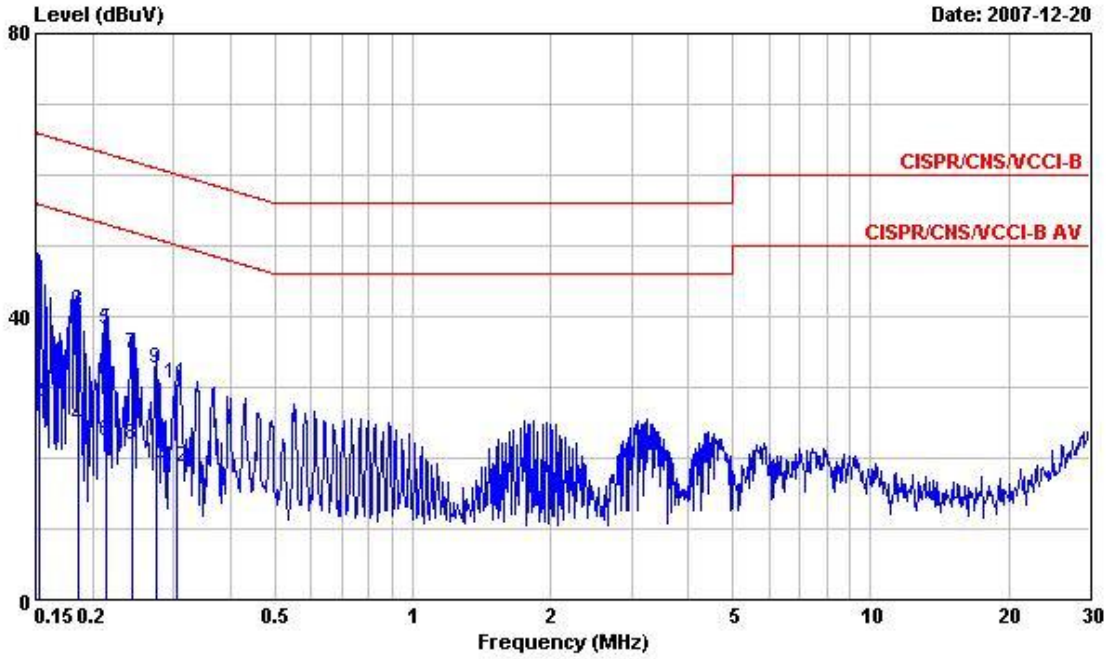
Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 NEUTRAL
EUT : Smart Phone
POWER: 230Vac/50Hz
Model : EW 7D1802
Memo : GSM Link + BT Link + GPS Rx
Memo : + Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1524030	44.15	-21.72	65.87	43.91	0.10	0.14	QP
2	0.1524030	26.15	-29.72	55.87	25.91	0.10	0.14	Average
3	0.1844300	39.66	-24.62	64.28	39.42	0.10	0.14	QP
4	0.1844300	24.40	-29.88	54.28	24.16	0.10	0.14	Average
5	0.2139240	36.16	-26.89	63.05	35.86	0.10	0.20	QP
6	0.2139240	20.73	-32.32	53.05	20.43	0.10	0.20	Average
7	0.2429320	32.81	-29.19	62.00	32.41	0.10	0.30	QP
8	0.2429320	20.95	-31.05	52.00	20.55	0.10	0.30	Average
9	0.2758730	30.90	-30.04	60.94	30.39	0.10	0.41	QP
10	0.2758730	18.57	-32.37	50.94	18.06	0.10	0.41	Average
11	0.3083410	27.66	-32.36	60.02	27.05	0.10	0.51	QP
12	0.3083410	17.65	-32.37	50.02	17.04	0.10	0.51	Average

5.3.2 Test Mode: Mode 2

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 24~26°C
Relative Humidity:49~52%
Test Engineer : Sun

■ The test that passed at the minimum margin was marked by the frame in the following table.

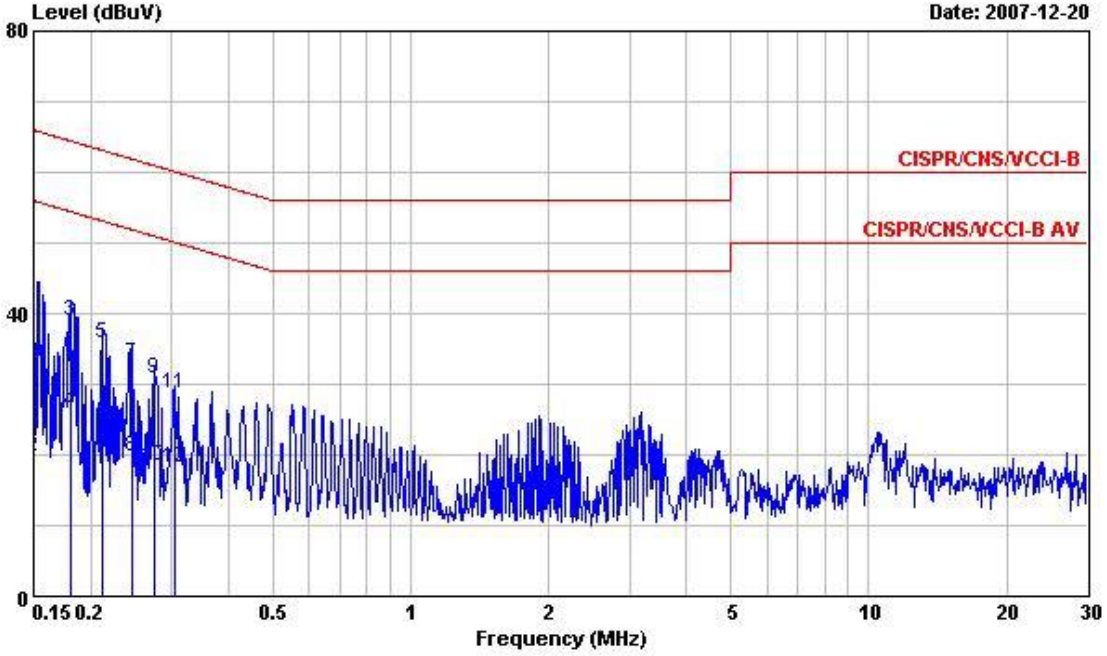


Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 LINE
EUT : Smart Phone
POWER: 230Vac/50Hz
Model : EW 7D1802
Memo : GSM Idle + BT Link + GPS Rx
Memo : + MP3 + Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1524030	46.17	-19.70	65.87	45.93	0.10	0.14	QP
2	0.1524030	27.88	-27.99	55.87	27.64	0.10	0.14	Average
3	0.1854100	40.72	-23.52	64.24	40.48	0.10	0.14	QP
4	0.1854100	24.60	-29.64	54.24	24.36	0.10	0.14	Average
5	0.2139240	38.12	-24.93	63.05	37.82	0.10	0.20	QP
6	0.2139240	22.49	-30.56	53.05	22.19	0.10	0.20	Average
7	0.2429320	34.73	-27.27	62.00	34.33	0.10	0.30	QP
8	0.2429320	21.79	-30.21	52.00	21.39	0.10	0.30	Average
9	0.2758730	32.58	-28.36	60.94	32.07	0.10	0.41	QP
10	0.2758730	19.19	-31.75	50.94	18.68	0.10	0.41	Average
11	0.3050910	30.50	-29.60	60.10	29.90	0.10	0.50	QP
12	0.3050910	18.73	-31.37	50.10	18.13	0.10	0.50	Average

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 24~26°C
Relative Humidity: 49~52%

■ **The test that passed at the minimum margin was marked by the frame in the following table.**



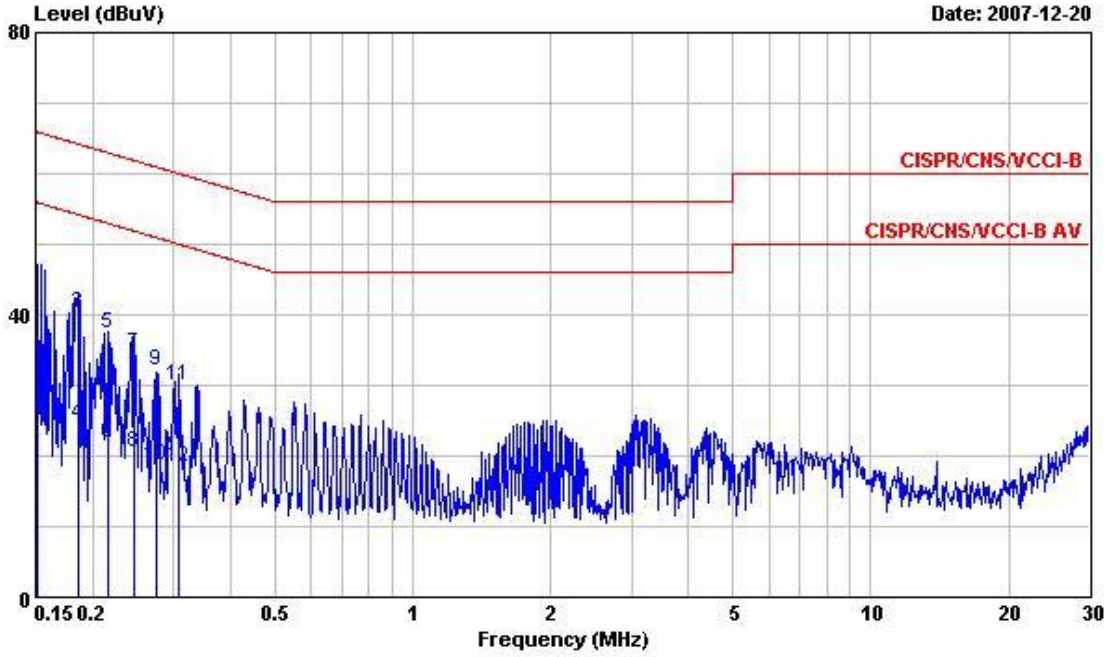
Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 NEUTRAL
EUT : Smart Phone
POWER: 230Vac/50Hz
Model : EW 7D1802
Memo : GSM Idle + BT Link + GPS Rx
Memo : + MP3 + Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1500000	42.24	-23.76	66.00	42.00	0.10	0.14	QP
2	0.1500000	19.72	-36.28	56.00	19.48	0.10	0.14	Average
3	0.1815220	39.00	-25.42	64.42	38.76	0.10	0.14	QP
4	0.1815220	26.15	-28.27	54.42	25.91	0.10	0.14	Average
5	0.2127940	35.66	-27.44	63.10	35.37	0.10	0.19	QP
6	0.2127940	20.30	-32.80	53.10	20.01	0.10	0.19	Average
7	0.2455200	33.01	-28.90	61.91	32.59	0.10	0.32	QP
8	0.2455200	19.62	-32.29	51.91	19.20	0.10	0.32	Average
9	0.2758730	30.68	-30.26	60.94	30.17	0.10	0.41	QP
10	0.2758730	18.43	-32.51	50.94	17.92	0.10	0.41	Average
11	0.3050910	28.60	-31.50	60.10	28.00	0.10	0.50	QP
12	0.3050910	18.28	-31.82	50.10	17.68	0.10	0.50	Average

5.3.3 Test Mode: Mode 3

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 24~26°C
Relative Humidity:49~52%
Test Engineer : Sun

■ The test that passed at the minimum margin was marked by the frame in the following table.

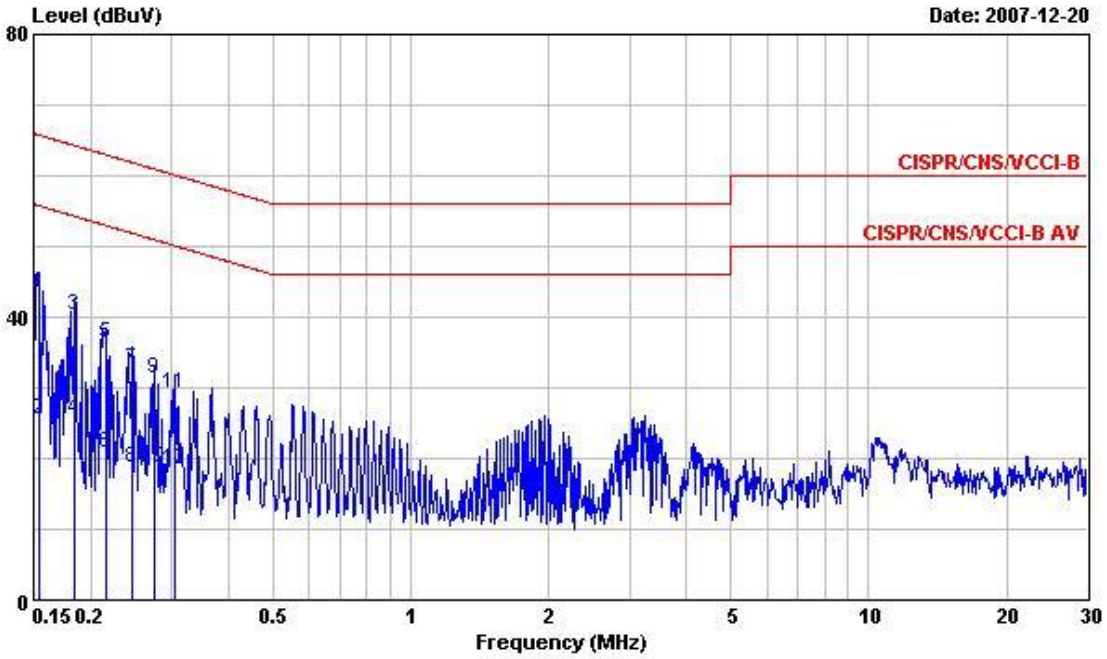


Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 LINE
EUT : Smart Phone
POWER: 230Vac/50Hz
Model : EW 7D1802
Memo : WLAN Link + BT Link + GPS Rx
Memo : + MP3 + Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1507970	44.87	-21.09	65.96	44.63	0.10	0.14	QP
2	0.1507970	26.74	-29.22	55.96	26.50	0.10	0.14	Average
3	0.1854100	40.29	-23.95	64.24	40.05	0.10	0.14	QP
4	0.1854100	24.40	-29.84	54.24	24.16	0.10	0.14	Average
5	0.2150610	37.36	-25.65	63.01	37.06	0.10	0.20	QP
6	0.2150610	21.96	-31.05	53.01	21.66	0.10	0.20	Average
7	0.2455200	34.55	-27.36	61.91	34.13	0.10	0.32	QP
8	0.2455200	20.49	-31.42	51.91	20.07	0.10	0.32	Average
9	0.2744160	32.06	-28.92	60.98	31.55	0.10	0.41	QP
10	0.2744160	18.79	-32.19	50.98	18.28	0.10	0.41	Average
11	0.3067120	29.98	-30.08	60.06	29.38	0.10	0.50	QP
12	0.3067120	18.45	-31.61	50.06	17.85	0.10	0.50	Average

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 24~26°C
Relative Humidity: 49~52%

■ **The test that passed at the minimum margin was marked by the frame in the following table.**



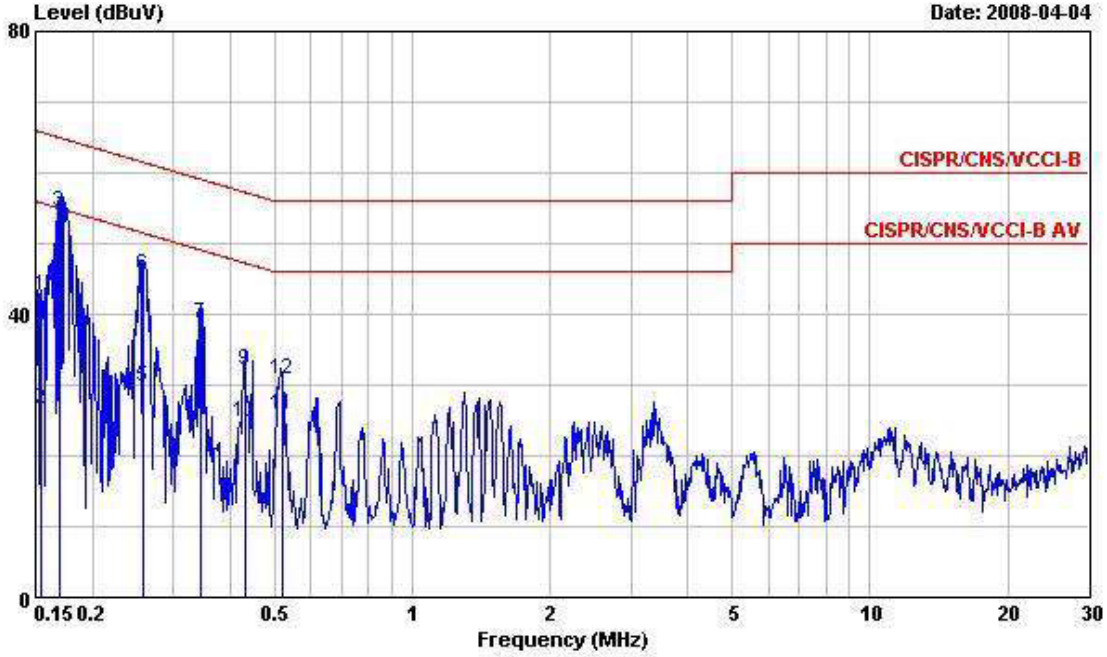
Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 NEUTRAL
EUT : Smart Phone
POWER: 230Vac/50Hz
Model : EW 7D1802
Memo : WLAN Link + BT Link + GPS Rx
Memo : + MP3 + Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1548450	43.37	-22.37	65.74	43.13	0.10	0.14	QP
2	0.1548450	25.49	-30.25	55.74	25.25	0.10	0.14	Average
3	0.1834550	40.25	-24.08	64.33	40.01	0.10	0.14	QP
4	0.1834550	25.43	-28.90	54.33	25.19	0.10	0.14	Average
5	0.2150610	36.26	-26.75	63.01	35.96	0.10	0.20	QP
6	0.2150610	20.68	-32.33	53.01	20.38	0.10	0.20	Average
7	0.2468240	32.52	-29.34	61.86	32.10	0.10	0.32	QP
8	0.2468240	18.76	-33.10	51.86	18.34	0.10	0.32	Average
9	0.2758730	31.22	-29.72	60.94	30.71	0.10	0.41	QP
10	0.2758730	18.71	-32.23	50.94	18.20	0.10	0.41	Average
11	0.3050910	29.18	-30.92	60.10	28.58	0.10	0.50	QP
12	0.3050910	18.37	-31.73	50.10	17.77	0.10	0.50	Average

5.3.4 Test Mode: Mode 4

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 21~24℃
Relative Humidity:50~55%
Test Engineer : Sun

■ The test that passed at the minimum margin was marked by the frame in the following table.

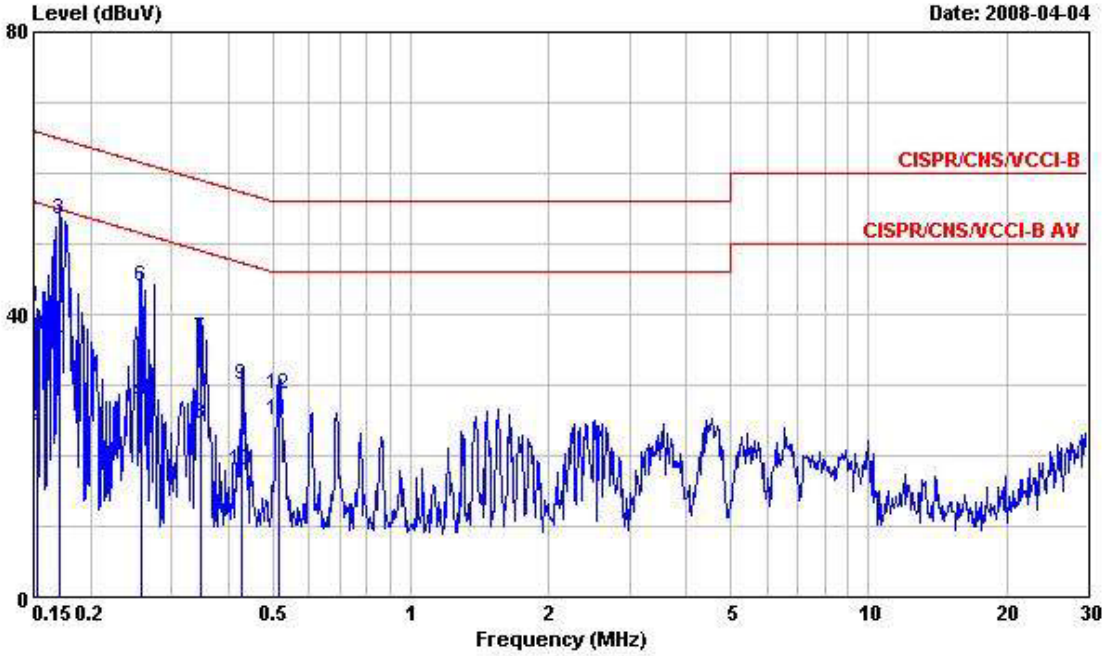


Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 LINE
EUT : Mobile Phone
POWER: 230Vac/50Hz
Model : EW 832514
Memo : GSM Idle +BT Link +GPS Rx +MP3
: +Adaptor

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1540270	42.74	-23.04	65.78	42.50	0.10	0.14	QP
2	0.1540270	26.67	-29.11	55.78	26.43	0.10	0.14	Average
3	@0.1694400	54.40	-10.59	64.99	54.16	0.10	0.14	QP
4	0.1694400	37.32	-17.67	54.99	37.08	0.10	0.14	Average
5	0.2588470	29.78	-21.69	51.47	29.32	0.10	0.36	Average
6	0.2588470	45.52	-15.95	61.47	45.06	0.10	0.36	QP
7	0.3446300	38.80	-20.29	59.09	38.10	0.10	0.60	QP
8	0.3446300	27.18	-21.91	49.09	26.48	0.10	0.60	Average
9	0.4316730	32.15	-25.07	57.22	31.34	0.10	0.71	QP
10	0.4316730	24.63	-22.59	47.22	23.82	0.10	0.71	Average
11	0.5179030	25.85	-20.15	46.00	25.10	0.10	0.65	Average
12	0.5179030	30.77	-25.23	56.00	30.02	0.10	0.65	QP

Frequency Range of Test: from 0.15 MHz to 30 MHz
Temperature: 21~24℃
Relative Humidity:50~55%

■ The test that passed at the minimum margin was marked by the frame in the following table.



Site : CO04-HY
Condition : CISPR/CNS/VCCI-B LISN 200704 99041 NEUTRAL
EUT : Mobile Phone
POWER: 230Vac/50Hz
Model : EW 832514
Memo : GSM Idle +BT Link +GPS Rx +MP3
: +Adaptor

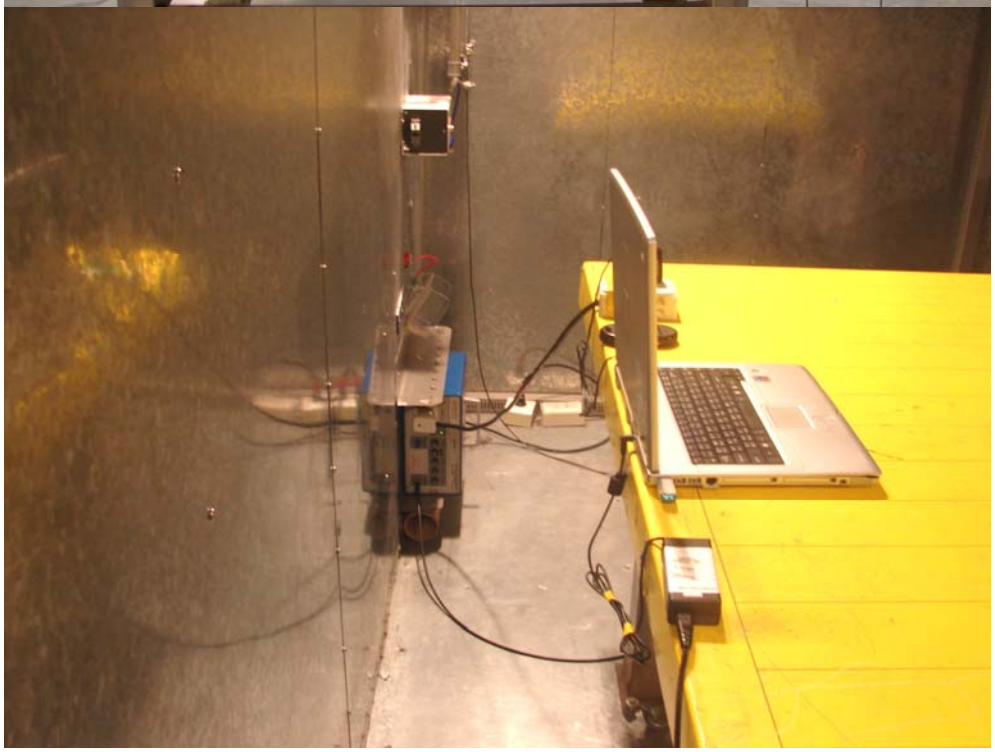
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1532130	41.02	-24.80	65.82	40.78	0.10	0.14	QP
2	0.1532130	24.20	-31.62	55.82	23.96	0.10	0.14	Average
3	@0.1703400	53.32	-11.62	64.94	53.08	0.10	0.14	QP
4	0.1703400	36.03	-18.91	54.94	35.79	0.10	0.14	Average
5	0.2588790	27.76	-23.71	51.47	27.30	0.10	0.36	Average
6	0.2588790	43.90	-17.57	61.47	43.44	0.10	0.36	QP
7	0.3466470	36.69	-22.35	59.04	35.98	0.10	0.61	QP
8	0.3466470	24.39	-24.65	49.04	23.68	0.10	0.61	Average
9	0.4282480	30.11	-27.18	57.29	29.30	0.10	0.71	QP
10	0.4282480	17.94	-29.35	47.29	17.13	0.10	0.71	Average
11	0.5149790	24.93	-21.07	46.00	24.18	0.10	0.65	Average
12	0.5149790	28.77	-27.23	56.00	28.02	0.10	0.65	QP

5.4 Photographs of Conducted Powerline Test Configuration

Mode 1, 2

Front View

Rear View

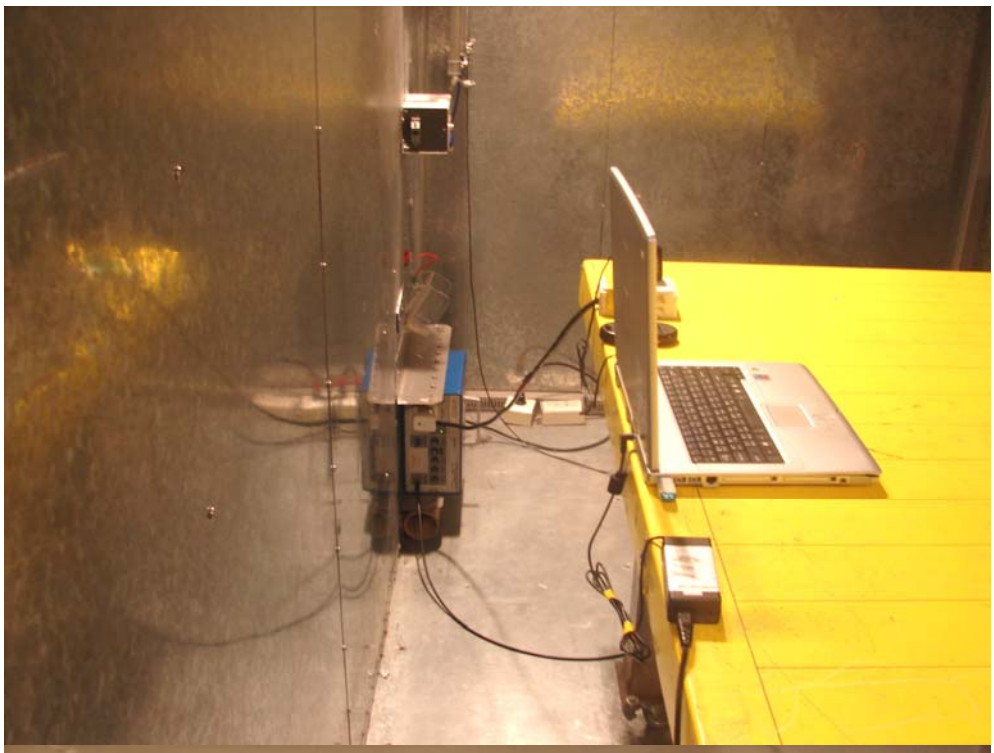


Side View

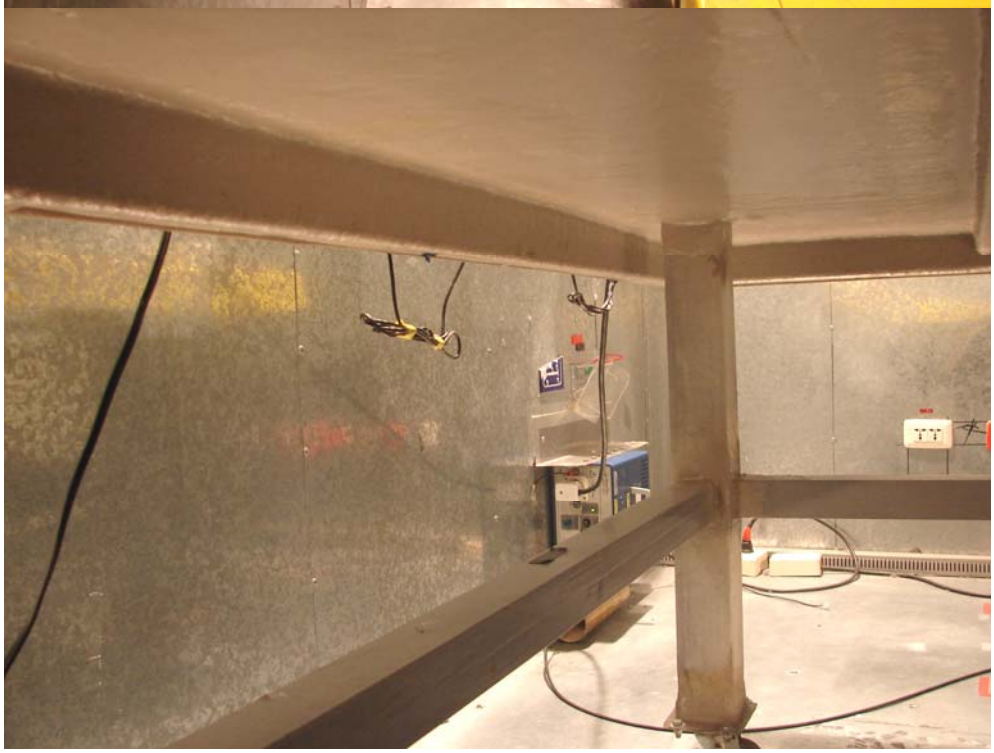
Mode 3

Front View

Rear View



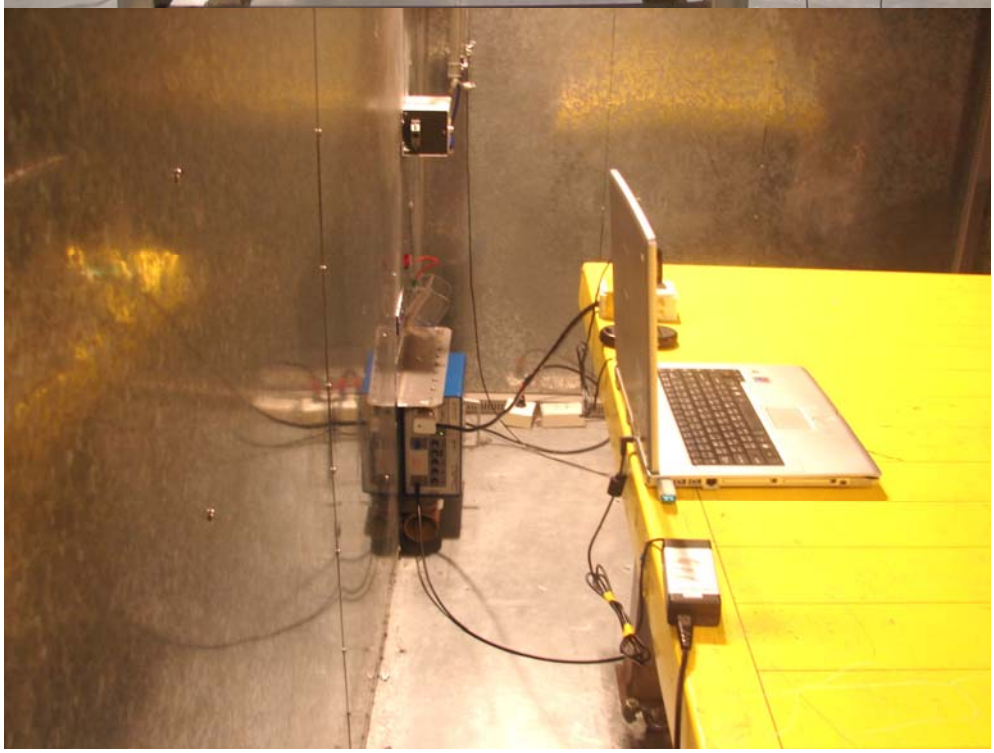
Side View



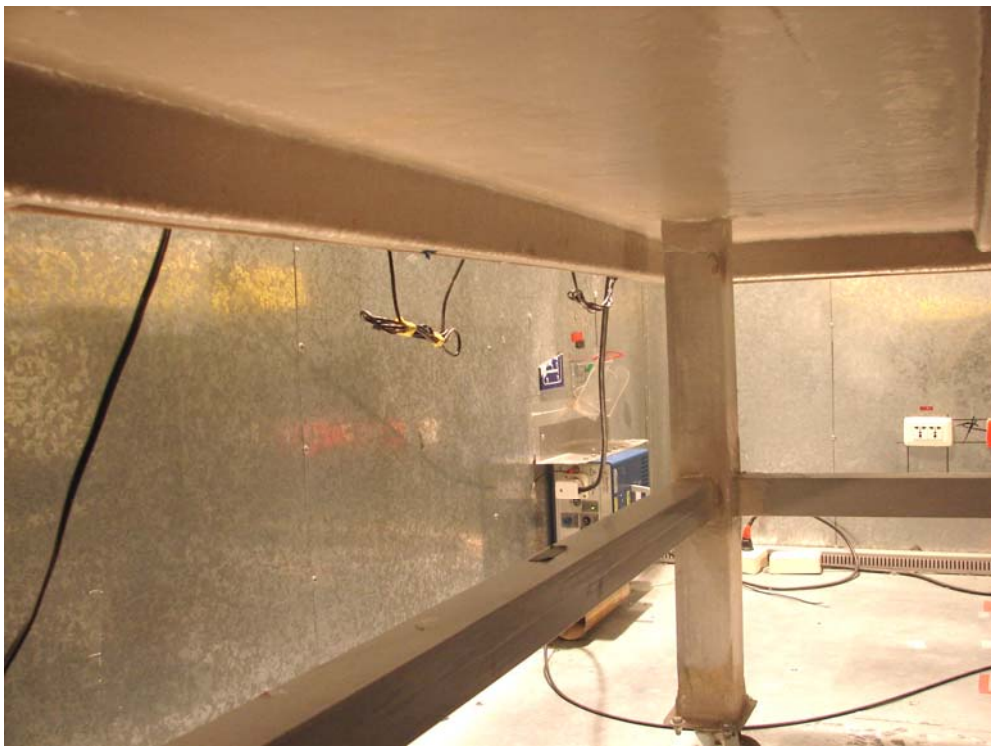
Mode 4

Front View

Rear View



Side View



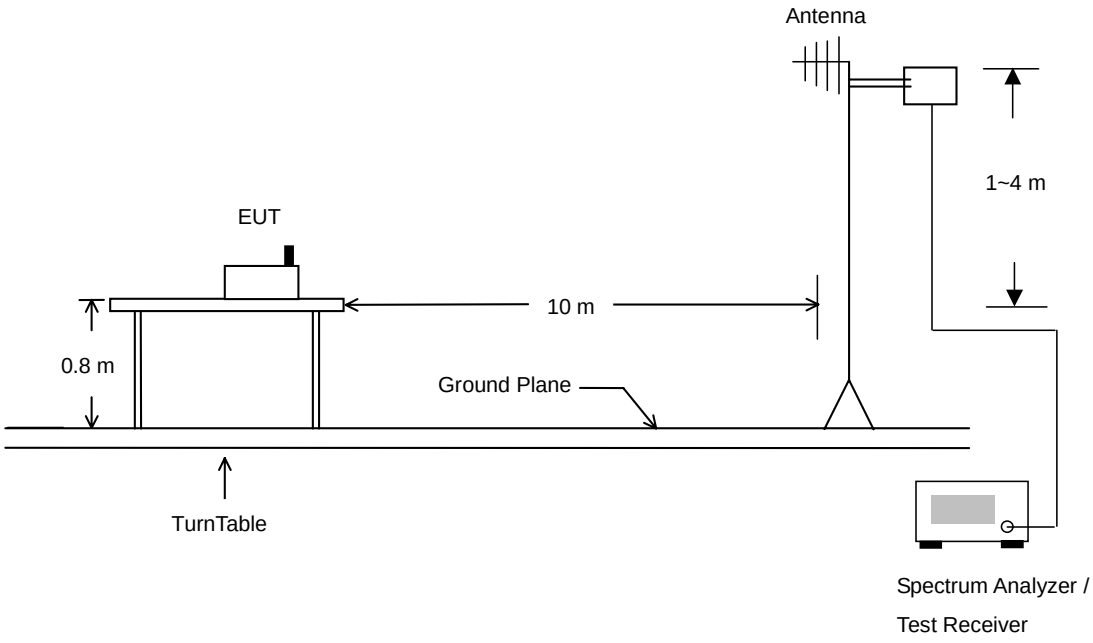
6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in European Standard EN 55022. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 6.2. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1 Test Procedures

a. The EUT was placed on a turntable with 0.8 meter above ground.
b. The EUT was set 10 meters from the receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The height of the antenna is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
e. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.

6.2 Typical Test Setup Layout of Radiated Emission

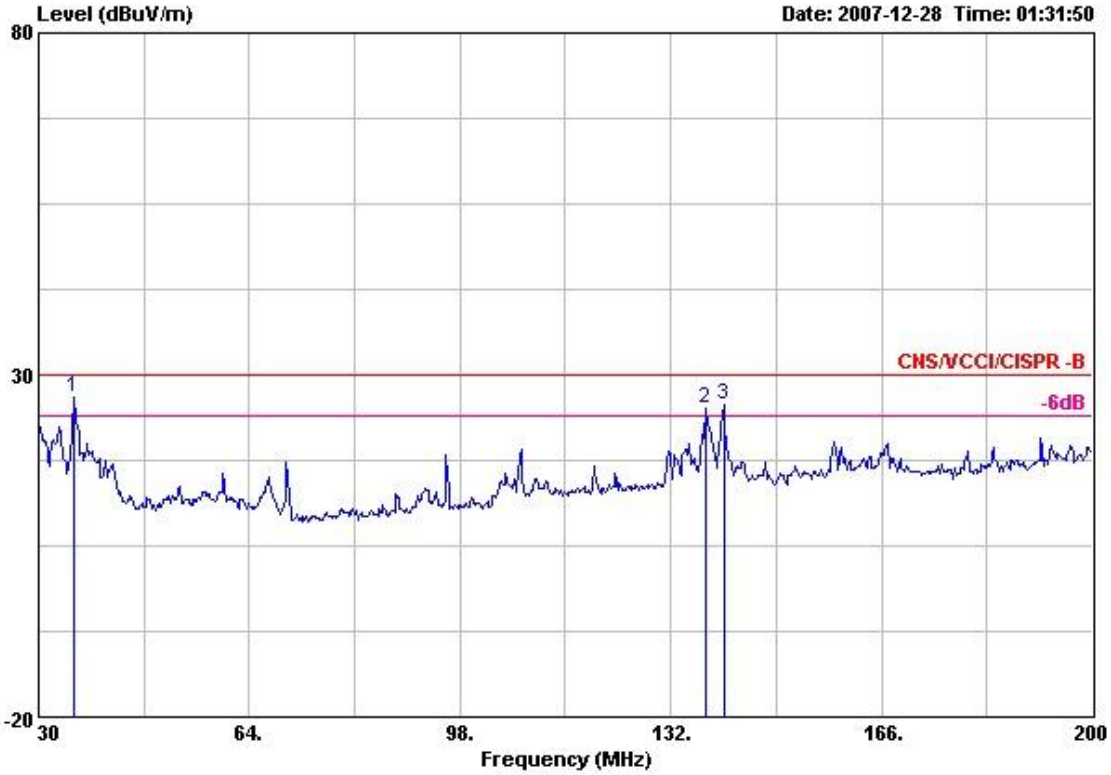


6.3 Test Result of Radiated Emission

6.3.1 Test Mode: Mode 2

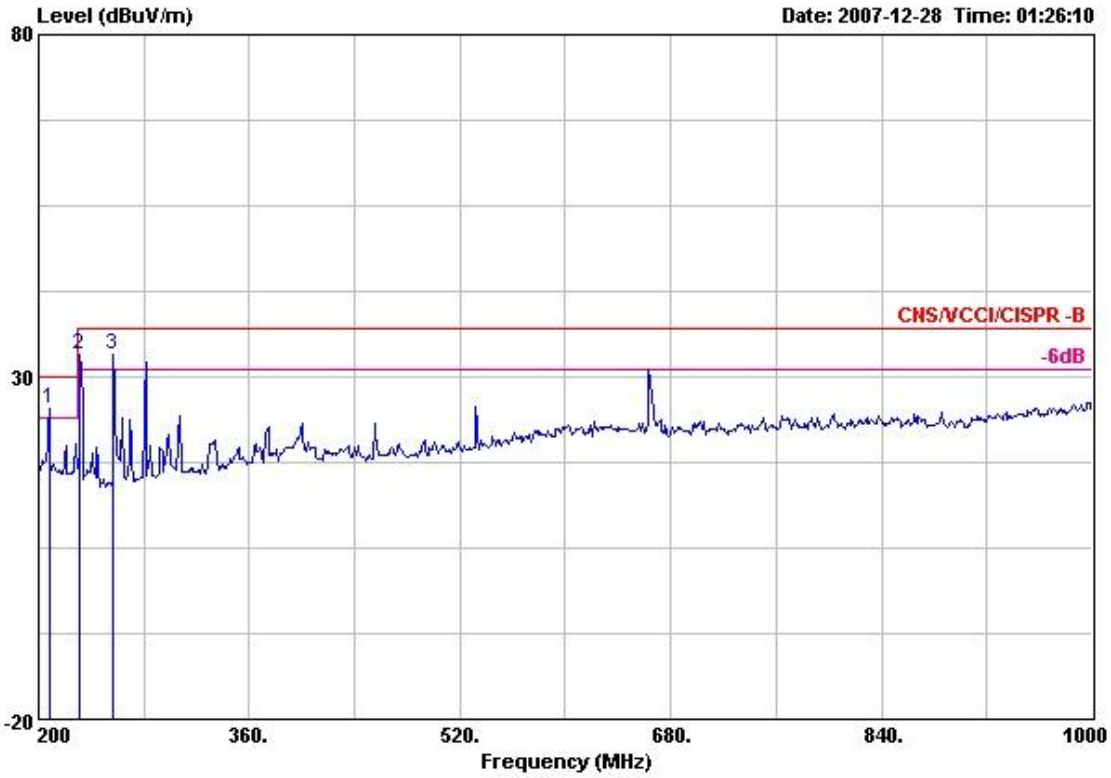
Test Distance: 10 m
Temperature: 23~27°C
Relative Humidity: 50~51%
Test Engineer : Sun
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading : Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at the minimum margin was marked by the frame in the following test record



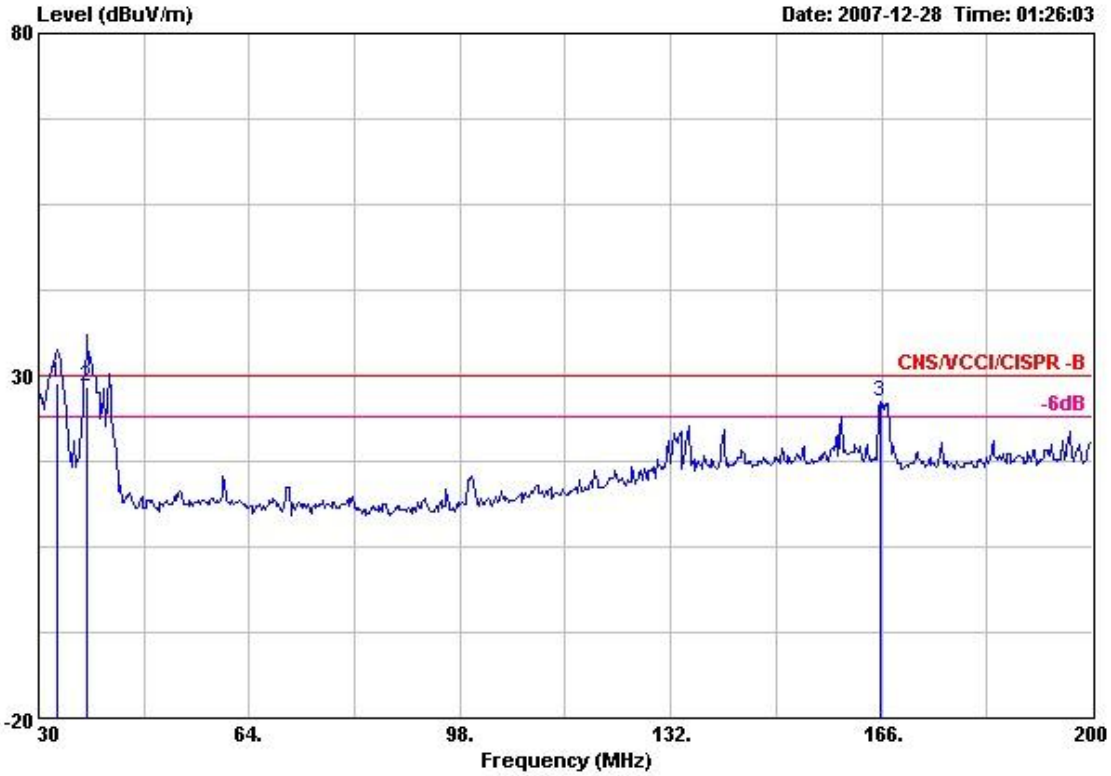
Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m BICO-VHBB9124 HORIZONTAL
EUT : Mobile Phone
POWER: From System
MODEL : EW 7D1802
MEMO : WLAN Link + BT Link + GPS Rx
MEMO : + MP3 + USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	35.780	26.76	-3.24	30.00	41.39	28.34	1.56	12.15	Peak	---	---
2 !	137.780	25.15	-4.85	30.00	38.17	28.01	2.82	12.17	Peak	---	---
3 !	140.500	25.52	-4.48	30.00	38.46	28.00	2.85	12.21	Peak	---	---



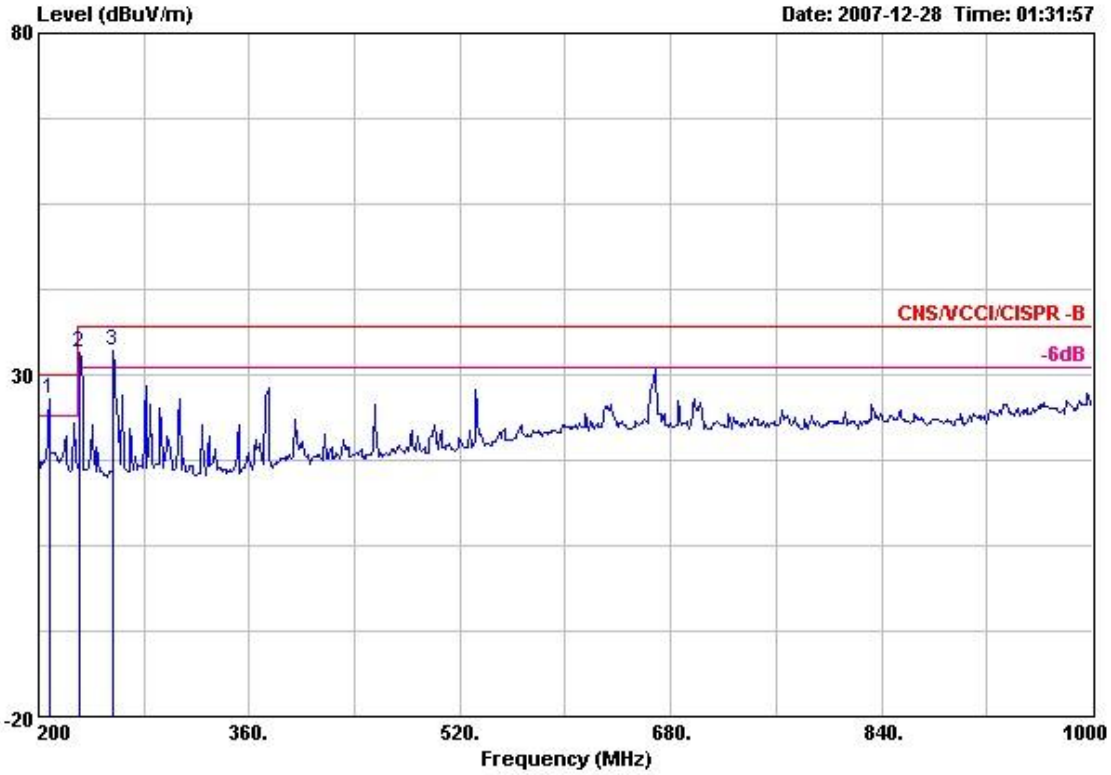
Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m LOG-9111-207 HORIZONTAL
EUT : Mobile Phone
POWER: From System
MODEL : EW 7D1802
MEMO : WLAN Link + BT Link + GPS Rx
MEMO : + MP3 + USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	208.000	25.36	-4.64	30.00	35.06	27.66	3.11	14.85	Peak	---	---
2 !	231.200	33.16	-3.84	37.00	43.78	27.55	3.27	13.66	Peak	---	---
3 !	256.800	33.35	-3.65	37.00	44.68	27.42	3.36	12.73	Peak	---	---



Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m BICO-VHBB9124 VERTICAL
EUT : Mobile Phone
POWER: From System
MODEL : EW 7D1802
MEMO : WLAN Link + BT Link + GPS Rx
MEMO : + MP3 + USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	33.060	28.86	-1.14	30.00	42.74	28.34	1.54	12.92	QP	100	150
2 !	37.820	28.31	-1.69	30.00	43.29	28.33	1.60	11.75	QP	100	170
3 !	165.830	26.24	-3.76	30.00	37.75	27.87	3.04	13.32	Peak	---	---



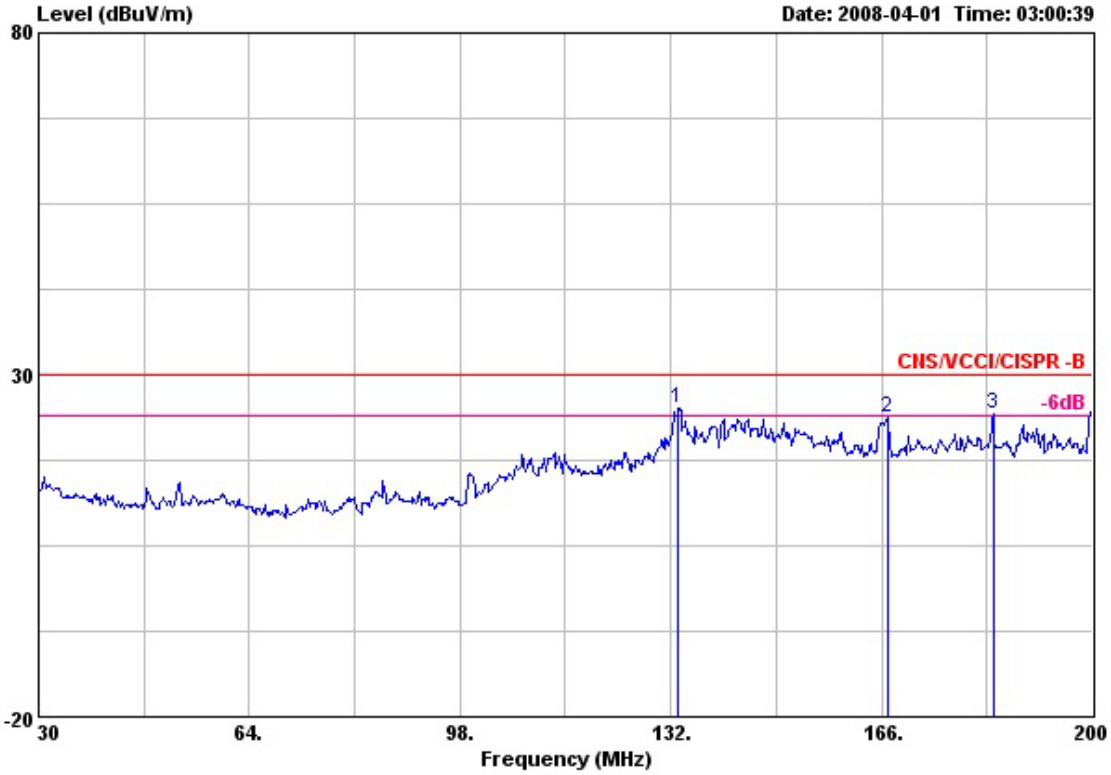
Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m LOG-9111-207 VERTICAL
EUT : Mobile Phone
POWER: From System
MODEL : EW 7D1802
MEMO : WLAN Link + BT Link + GPS Rx
MEMO : + MP3 + USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	208.000	26.40	-3.60	30.00	36.10	27.66	3.11	14.85	Peak	---	---
2 !	231.200	33.17	-3.83	37.00	43.79	27.55	3.27	13.66	Peak	---	---
3 !	256.800	33.46	-3.54	37.00	44.79	27.42	3.36	12.73	Peak	---	---

6.3.2 Test Mode: Mode 3

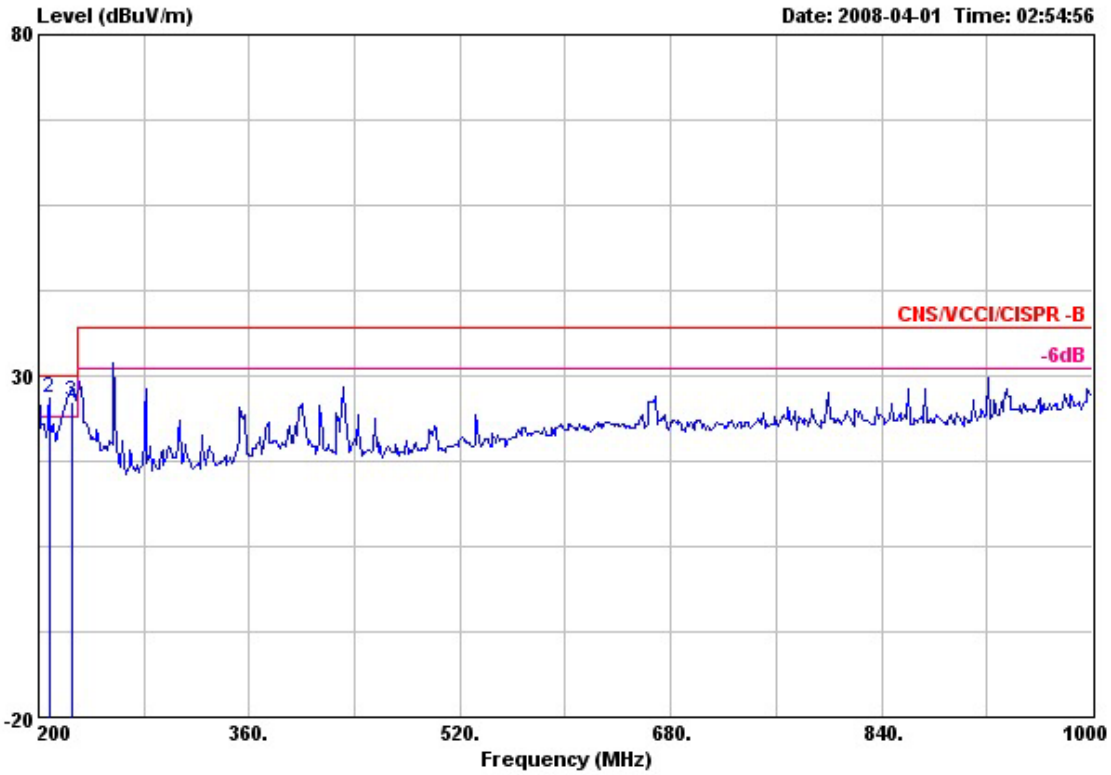
Test Distance: 10 m
Temperature: 25~26°C
Relative Humidity: 55~57%
Test Engineer : Sun
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading : Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at the minimum margin was marked by the frame in the following test record



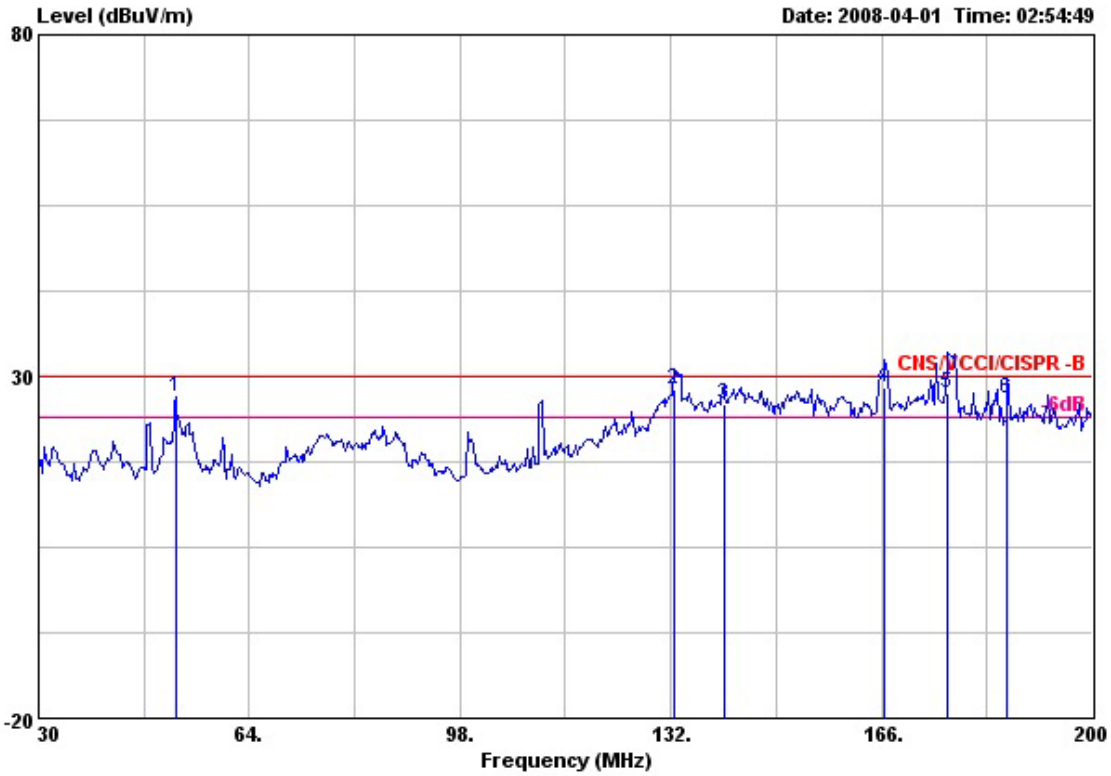
Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m BICO-VHBB9124 HORIZONTAL
EUT : Mobile Phone
POWER: From NoteBook
MODEL : EW832514
MEMO : WLAN Link+BT Link+GPS Rx+MP3+USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	133.190	25.16	-4.84	30.00	38.30	28.04	2.78	12.12	Peak	---	---
2	167.020	23.80	-6.20	30.00	35.28	27.86	3.06	13.32	Peak	---	---
3 !	184.020	24.21	-5.79	30.00	34.64	27.78	3.17	14.18	Peak	---	---



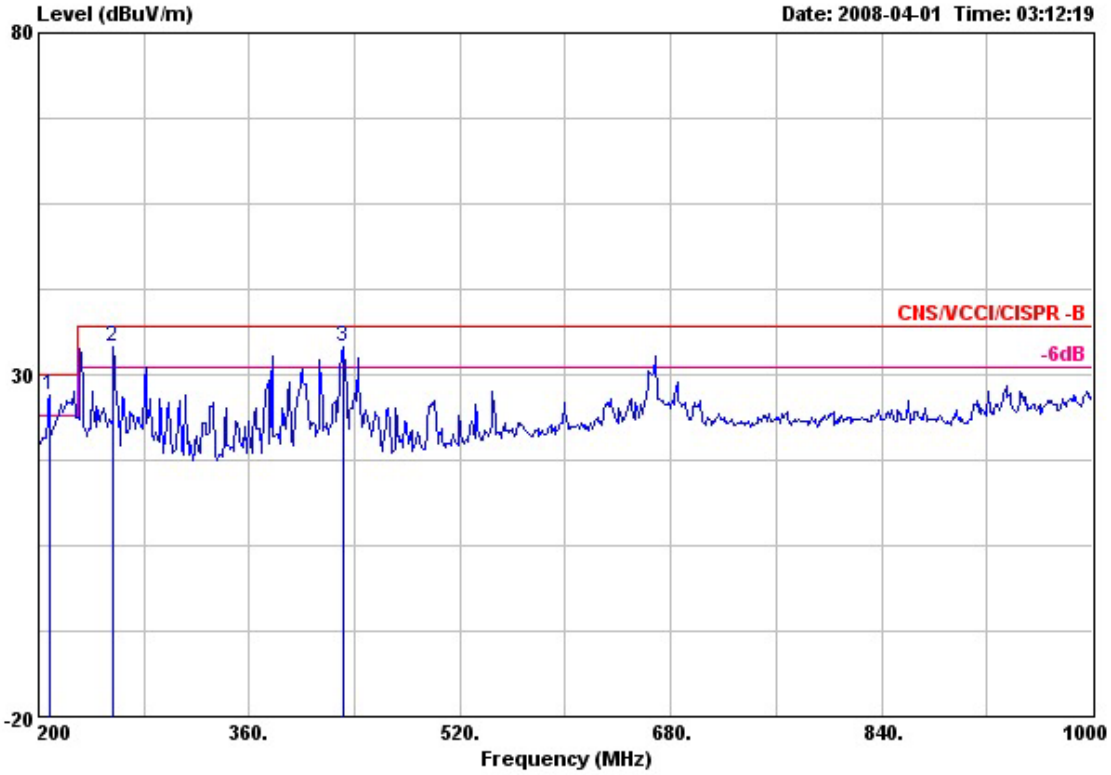
Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m LOG-9111-207 HORIZONTAL
EUT : Mobile Phone
POWER: From NoteBook
MODEL : EW832514
MEMO : WLAN Link+BT Link+GPS Rx+MP3+USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	200.000	26.86	-3.14	30.00	36.31	27.70	2.98	15.27	Peak	---	---
2 !	208.000	26.78	-3.22	30.00	36.48	27.66	3.11	14.85	Peak	---	---
3 !	224.800	26.06	-3.94	30.00	36.40	27.57	3.28	13.95	QP	400	52



Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m BICO-VHBB9124 VERTICAL
EUT : Mobile Phone
POWER: From NoteBook
MODEL : EW832514
MEMO : WLAN Link+BT Link+GPS Rx+MP3+USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	52.100	27.00	-3.00	30.00	42.95	28.29	1.85	10.49	Peak	---	---
2 !	132.510	28.13	-1.87	30.00	41.27	28.04	2.78	12.12	QP	100	65
3 !	140.500	25.90	-4.10	30.00	38.84	28.00	2.85	12.21	QP	100	257
4 !	166.510	28.36	-1.64	30.00	39.86	27.87	3.05	13.32	QP	100	120
5 !	176.710	27.46	-2.54	30.00	38.66	27.82	3.12	13.50	QP	100	154
6 !	186.230	26.82	-3.18	30.00	37.06	27.76	3.18	14.34	QP	100	114



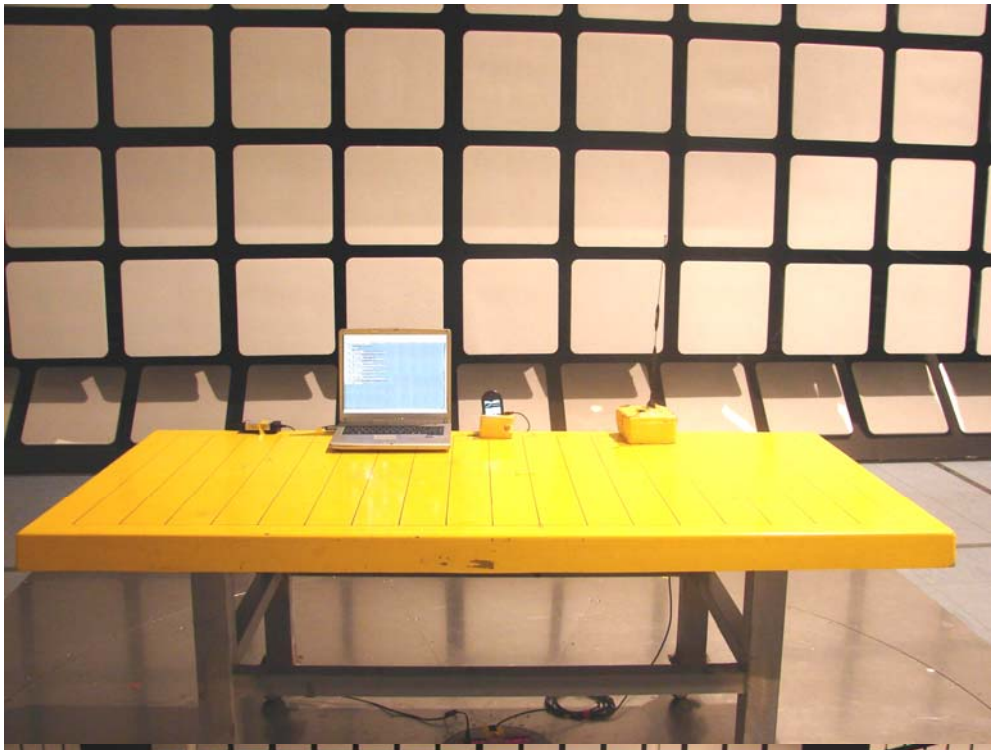
Site : 10CH02-HY
Condition : CNS/VCCI/CISPR -B 10m LOG-9111-207 VERTICAL
EUT : Mobile Phone
POWER: From NoteBook
MODEL : EW832514
MEMO : WLAN Link+BT Link+GPS Rx+MP3+USB Link

	Freq	Level	Over Limit	Limit Line	Read Level	Preamp Factor	Cable Loss	Antenna Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB/m		cm	deg
1 !	208.000	26.91	-3.09	30.00	36.61	27.66	3.11	14.85	Peak	---	---
2 !	256.800	34.00	-3.00	37.00	45.33	27.42	3.36	12.73	Peak	---	---
3 !	432.000	33.99	-3.01	37.00	41.67	28.26	4.15	16.43	Peak	---	---

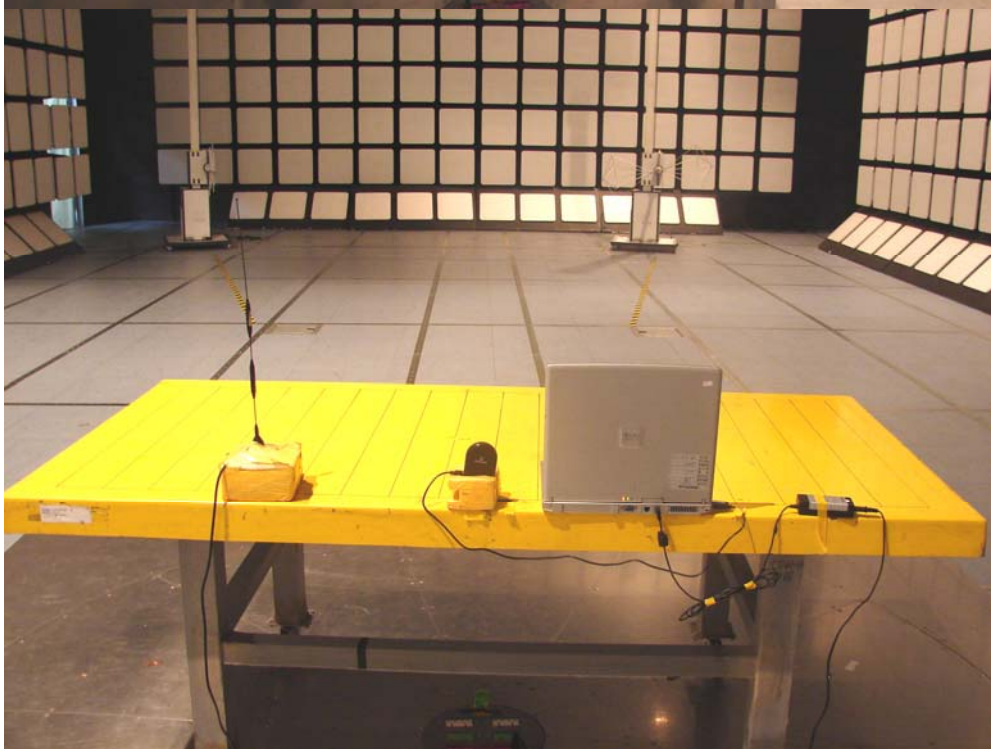
6.4 Photographs of Radiated Emission Test Configuration

Mode 2

Front View



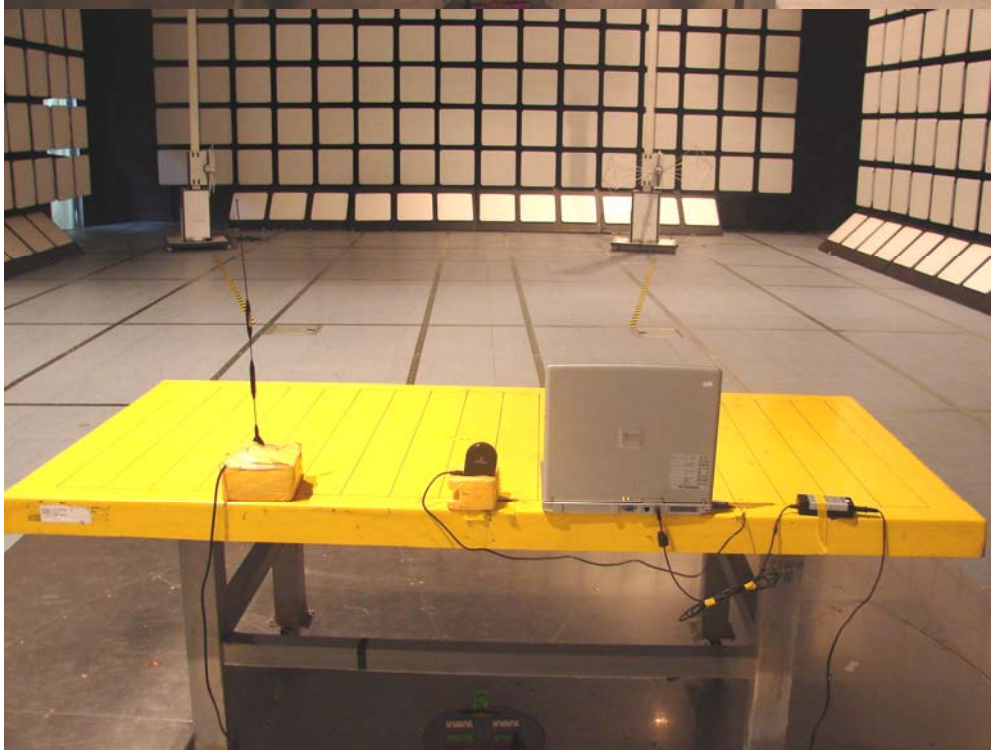
Rear View



Mode 3

Front View

Rear View

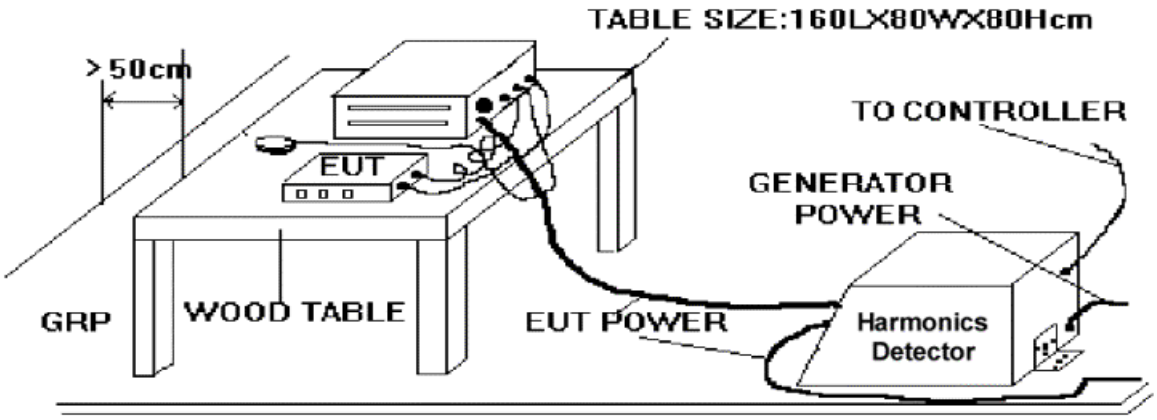


7. Harmonics Test

7.1 Standard

- EN 61000-3-2

7.2 Test Setup



7.3 Test Equipment Settings

- Line Voltage: 230 V
- Line Frequency: 50 Hz
- Test mode: 1
- Measurement Delay: 10.0 seconds
- Pst Integration Time: 10 minutes
- Pst Integration Periods: 1
- Test Duration: 00:10:00 minutes

7.4 Test Procedure

The equipment shall be tested under the conditions of section 7 and above figure.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of ±8% is achieved during the whole assessment procedure.

7.5 Test Result of Harmonic Test

As specified on section 7 and above figure of EN 61000-3-2, the limits are not specified for equipment with a rated power of 75W or less.

The EUT meets the above condition, so it conforms to EN 61000-3-2.

7.6 Photographs of Harmonic Test

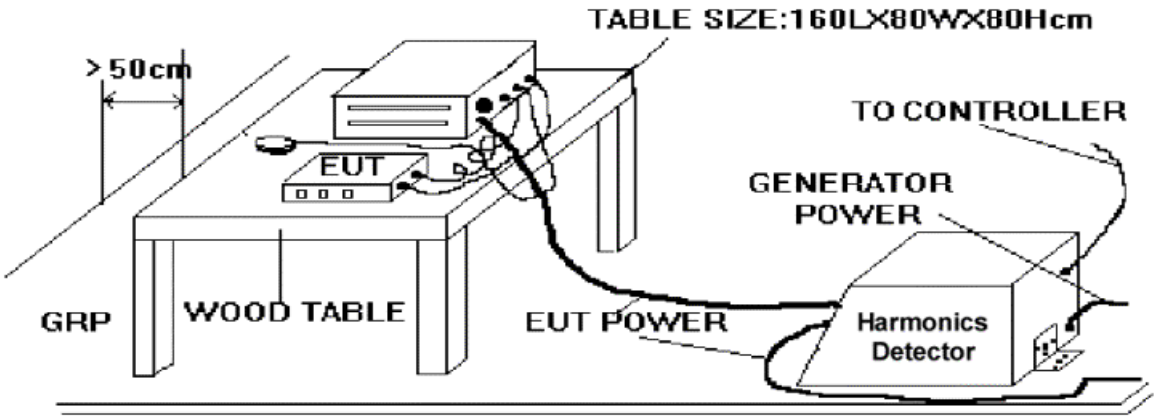
N/A

8. Voltage Fluctuations Test

8.1 Standard

- EN 61000-3-3

8.2 Test Setup



8.3 Test Equipment Settings

- Line Voltage: 230 V
- Line Frequency: 50 Hz
- Test mode: 1
- Measurement Delay: 10.0 seconds
- Pst Integration Time: 10 minutes
- Pst Integration Periods: 1
- Test Duration: 00:10:00 minutes

8.4 Test Procedure

The equipment shall be tested under the conditions of section 8 and above figure.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of ±8% is achieved during the whole assessment procedure.

8.5 Test Result of Voltage Fluctuation and Flicker Test

8.5.1 Test Data of Voltage Fluctuation and Flicker

- Final Test Result : **PASS**
- Basic Standard : EN 61000-3-3
- Product Standard : EN 301 489-7
- Temperature : 23~26°C and 21~22℃
- Relative Humidity : 49~52%RH and 41~42%
- Test Date : Dec. 21, 2007 and Apr. 07, 2008
- Test Engineer : Sun and Eric

<Mode 1>

Urms	= 230.1V	**Freq**	= 49.987	**Range**	: 0.25 A
Irms	= 0.016A	**Ipk**	= 0.086A	**cf**	= 5.364
P	= 1.565W	**Pap**	= 3.708VA	**pf**	= 0.422

Test - Time : 1 x 10min = 10min (100 %)
LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits	: Plt	: 0.65	Pst	: 1.00
	: dmax	: 4.00 %	dc	: 3.30 %
	: dtLim	: 3.30 %	dt>Lim	: 500ms

Test completed, Result: PASSED

	Test Data	Limit	**Pass/Fail**
Plt	0.072	0.65	Pass
Pst	0.072	1.00	Pass
dmax (%)	0 %	4.00 %	Pass
dc (%)	0 %	3.30 %	Pass
dtLim (%)	0 %	3.30 %	Pass

<Mode 2>

Urms	= 230.1V	**Freq**	= 49.987	**Range**	: 0.25 A
Irms	= 0.016A	**Ipk**	= 0.086A	**cf**	= 5.364
P	= 1.565W	**Pap**	= 3.708VA	**pf**	= 0.422

Test - Time : 1 x 10min = 10min (100 %)
LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits	: Plt	: 0.65	Pst	: 1.00	
	: dmax	: 4.00 %	dc	: 3.30 %	
	: dtLim	: 3.30 %	dt>Lim	: 500ms	

Test completed, Result: PASSED

	Test Data	Limit	**Pass/Fail**
Plt	0.072	0.65	Pass
Pst	0.072	1.00	Pass
dmax (%)	0 %	4.00 %	Pass
dc (%)	0 %	3.30 %	Pass
dtLim (%)	0 %	3.30 %	Pass

<Mode 3>

Urms	= 230.1V	**Freq**	= 49.987	**Range**	: 0.25 A
Irms	= 0.016A	**Ipk**	= 0.087A	**cf**	= 5.466
P	= 1.565W	**Pap**	= 3.680VA	**pf**	= 0.425

Test - Time : 1 x 10min = 10min (100 %)
LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits	: Plt	: 0.65	Pst	: 1.00	
	: dmax	: 4.00 %	dc	: 3.30 %	
	: dtLim	: 3.30 %	dt>Lim	: 500ms	

Test completed, Result: PASSED

	Test Data	Limit	**Pass/Fail**
Plt	0.072	0.65	Pass
Pst	0.072	1.00	Pass
dmax (%)	0 %	4.00 %	Pass
dc (%)	0.01 %	3.30 %	Pass
dtLim (%)	0 %	3.30 %	Pass

8.6 Photographs of Voltage Fluctuation and Flicker Test

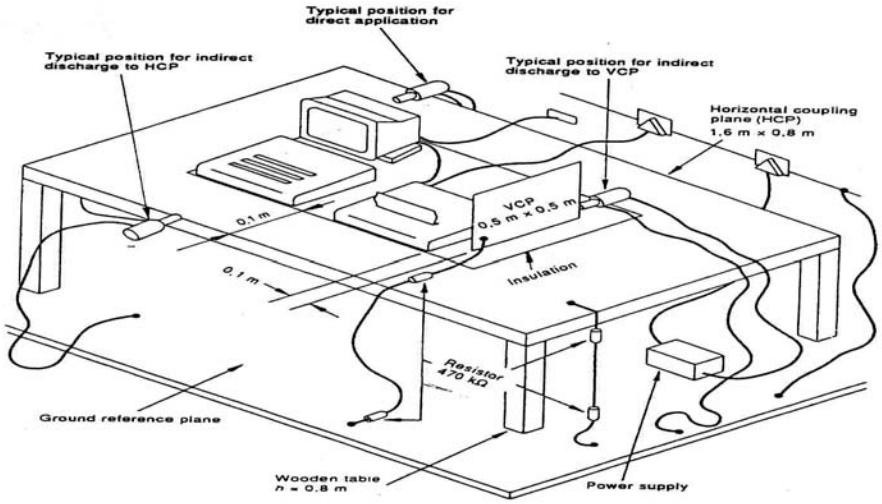
Refer to section 15.6

9. Electrostatic Discharge Immunity Test (ESD)

9.1 Standard

- EN 61000-4-2

9.2 Test setup



The test setup consists of the discharge generator, EUT and auxiliary instrument necessary to perform DIRECT and INDIRECT application of discharges to the EUT, in the following manner:

a. CONTACT DISCHARGE to the conductive surfaces and to the coupling plane;
b. AIR DISCHARGE at insulating surfaces.

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not be less than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resister located at each end, to prevent a build-up of charge. The test setup was consisted a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size is 0.5 m x 0.5 m.

9.3 ESD Test Procedure

a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
- ambient temperature: 15℃ to 35℃;
- relative humidity : 30% to 60%;
- atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).

b. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.

c. The test shall be performed with both air discharge and contact discharge. On pre-selected points, at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On pre-selected points, at least 10 single discharges (in the most sensitive polarity) shall be applied on contact discharge.

d. For the time interval between successive single discharges, an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

e. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

f. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
- If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
- Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
- The contact discharge test shall not be applied to such surfaces.

g. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

9.4 Test Severity Levels

9.4.1 Contact Discharge

Level	Test Voltage (kV) of Contact discharge
1	±2
2	±4
3	±6
4	±8
X	Specified

Remark: “X” is an open level.

9.4.2 Air Discharge

Level	Test Voltage (kV) of Air Discharge
1	±2
2	±4
3	±8
4	±15
X	Specified

Remark: “X” is an open level.

9.5 Test Conditions

9.5.1 Test Condition of Air Discharge

Test Point	Voltage	Tested No.
Please refer to the red arrow on the photo	±2 / ±4 / ±8 kV	BY 10

9.5.2 Test Condition of Contact Discharge

Test Point	Voltage	Tested No.
Vertical	±2 / ±4 kV	BY 25
Horizontal	±2 / ±4 kV	BY 25
Please refer to the blue arrow on the photo	±2 / ±4 kV	BY 25

9.5.3 Photo for Test Points


openmoko


neo

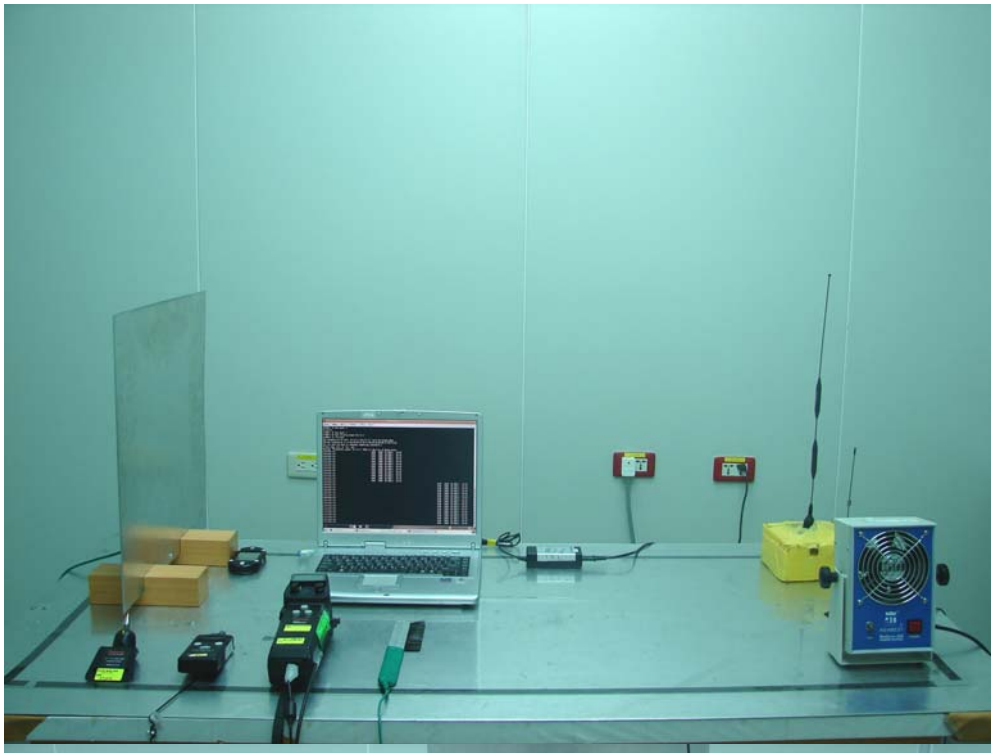
9.6 Test Result of Electrostatic Discharge Immunity Test (ESD)

- Final Test Result : **PASS**
- EUT Performance : CT/CR
- Required Performance Criteria : TT/TR
- Basic Standard : EN 61000-4-2
- Product Standard : EN 301 489-7, EN 301 489-17, EN 55024
- Level : 3 for air discharge,
  : 2 for contact discharge
- Tested voltage : ±2 / ±4 / ±8 kV for air discharge,
  : ±2 / ±4 kV for contact discharge
- Temperature : 25~26°C and 23~25°C
- Relative Humidity : 43~45% and 49~51%
- Atmospheric pressure : 98kPa
- Test Date : Jan. 18, 2008 and Apr. 04, 2008
- Test Engineer : Sun

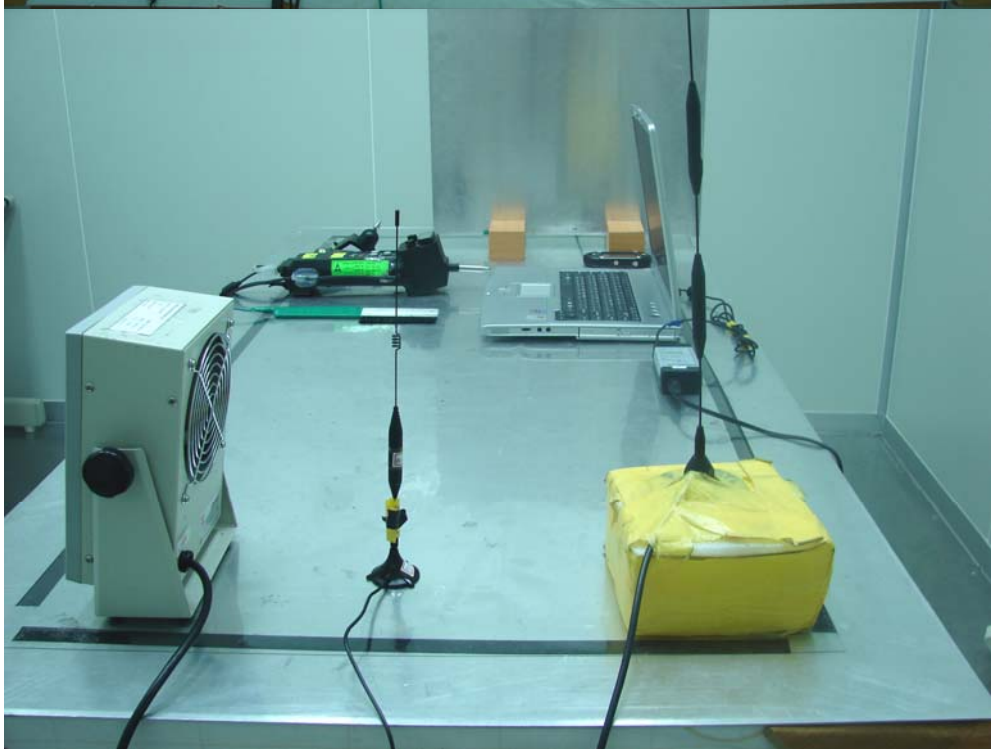
9.7 Photographs of Electrostatic Discharge Immunity Test

Mode 1 and 5

Front View

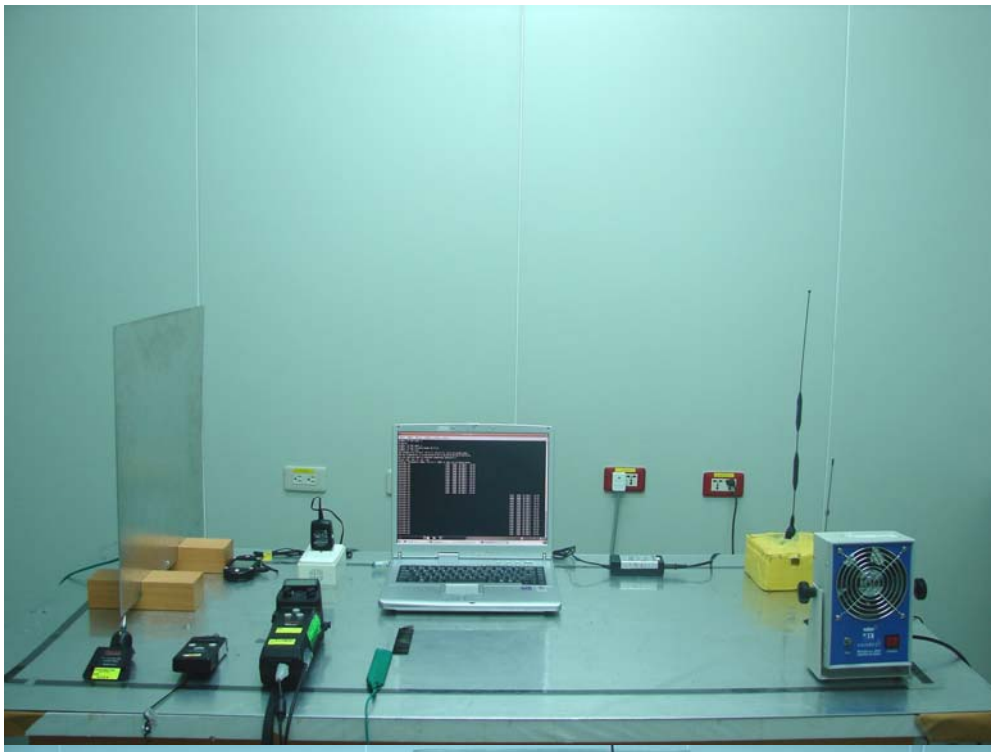


Rear View

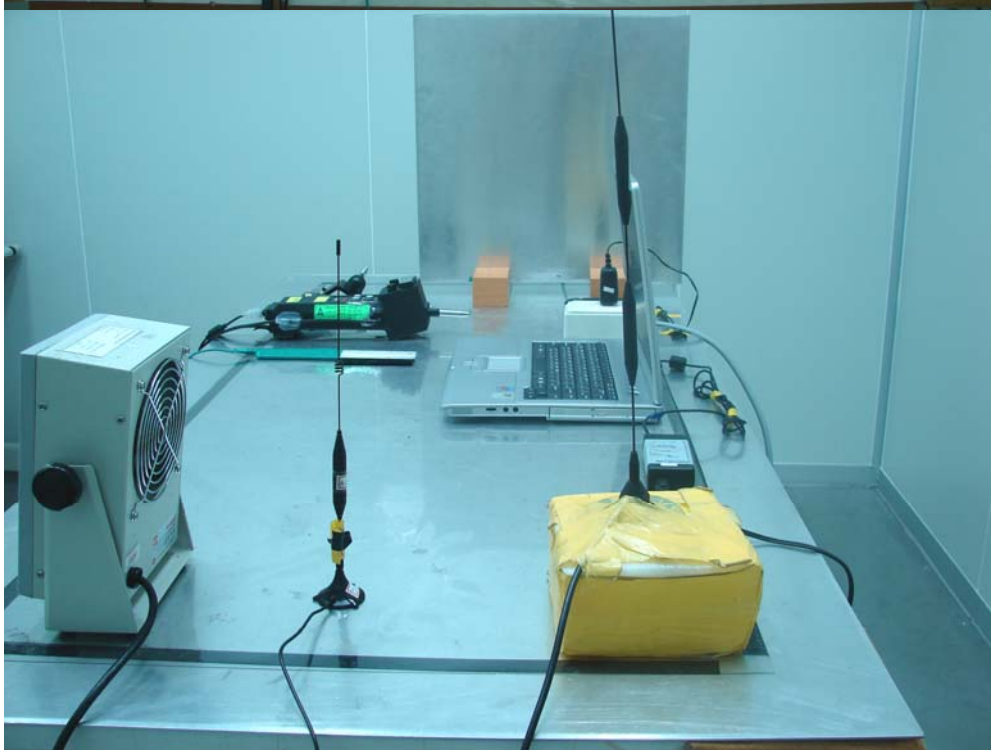


Mode 2 and 4

Front View

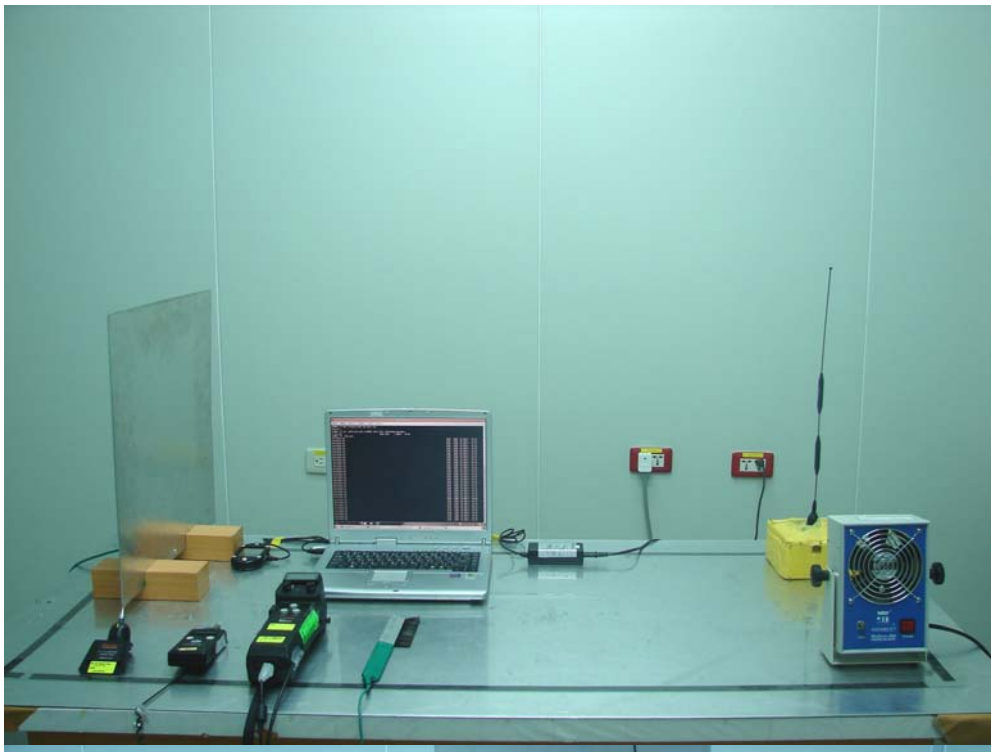


Rear View

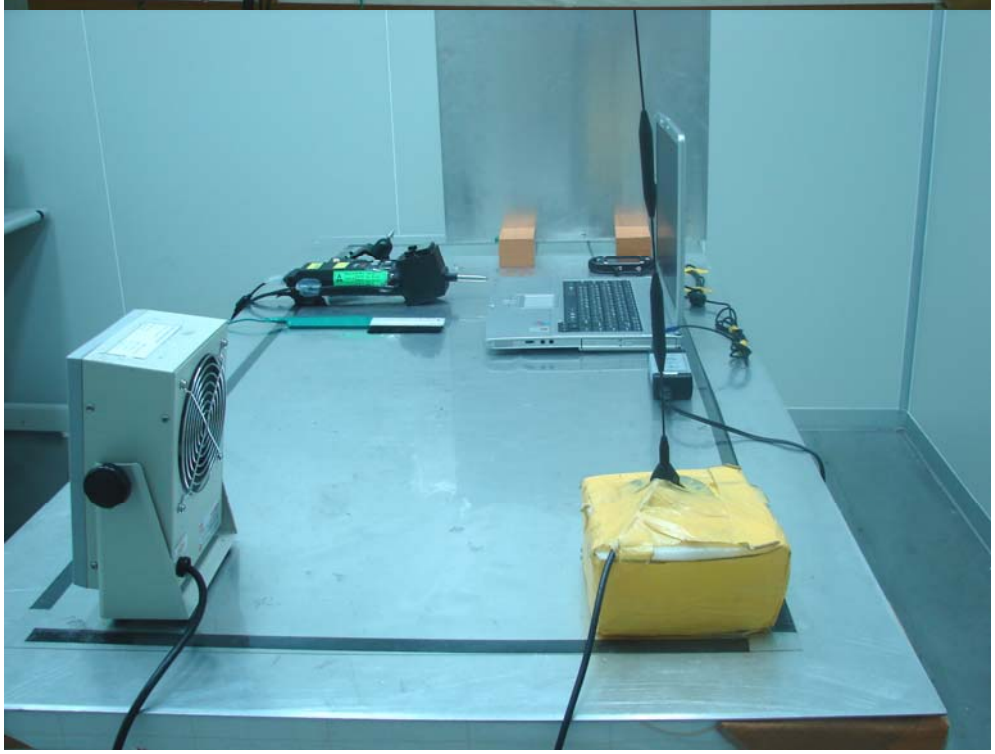


Mode 3

Front View

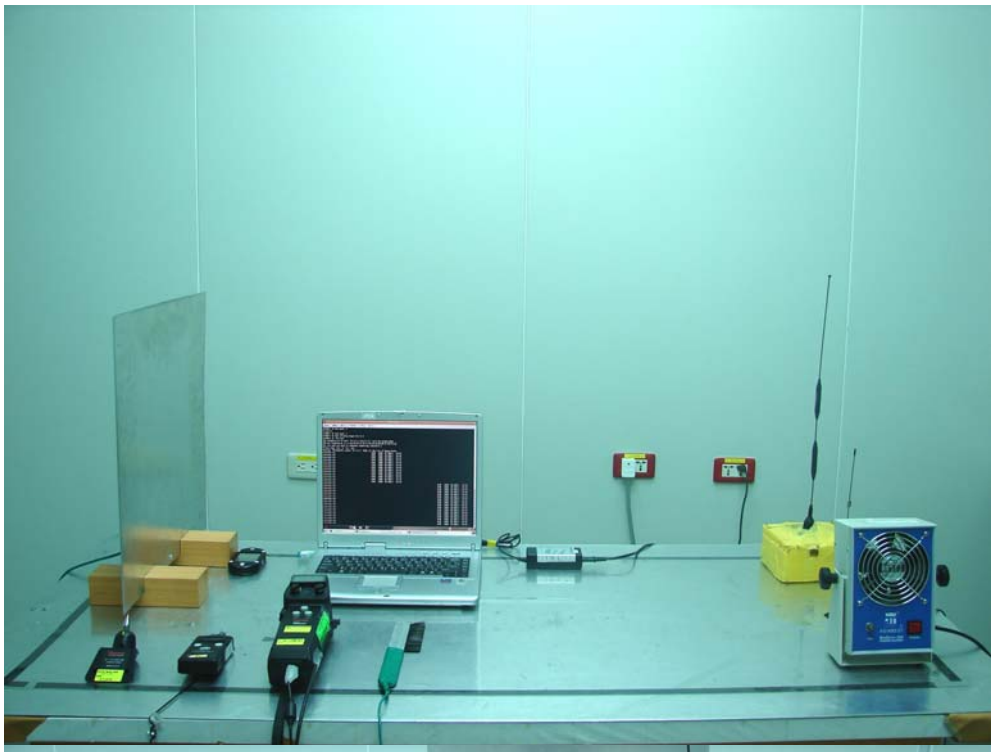


Rear View

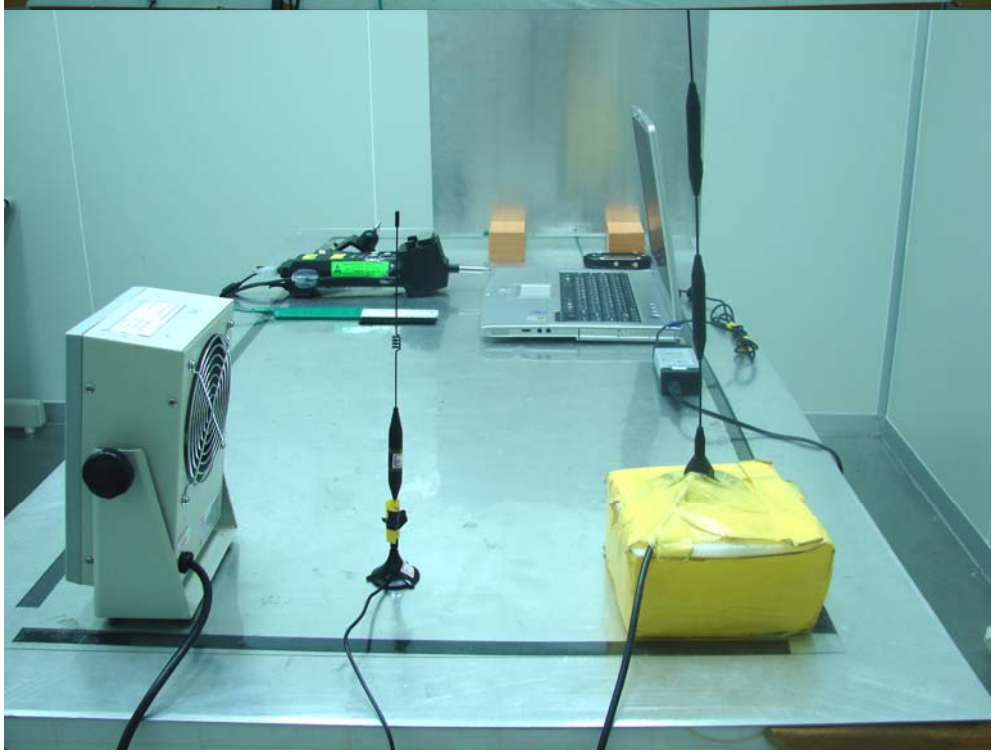


Mode 4

Front View



Rear View

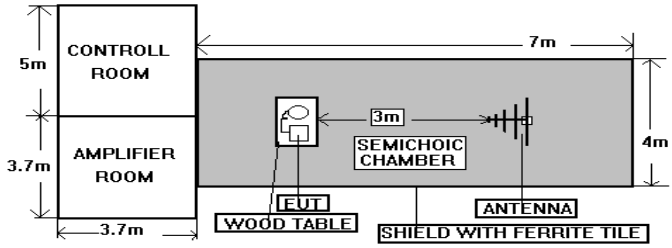


10. Radio Frequency Electromagnetic Field Immunity Test (RS)

10.1 Standard

- EN 61000-4-3

10.2 Test setup



NOTE: The SPORTON 7m x 4m x 4m semi-anechoic chamber is in compliance with the sixteen point's uniform field requirement as stated in IEC 61000-4-3 Section 6.2.

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

10.3 Test Procedure

The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.

a. The antenna which is enabling the complete frequency range of 80-1000 MHz, 1400-2000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.

b. The test is performed with the antenna facing the front and back sides of the EUT with or without the headset. Both vertical and horizontal polarizations from antenna are tested.

c. At each of the above conditions, the frequency range is swept at 80-1000 MHz and 1400-2000MHz. The activating time for each frequency step is 3 seconds.

d. The EM field test level is level 2.

e. The Limits of audio level is equal to calibrated level subtracting 35dB. The uplink calibrated level is the level which audio analyzer measured under the condition that a –5dBPa at 1 kHz single tone generates in MRP (Mouth Reference Point). (MS is linking to BS simulator). The downlink calibrated level is the level which audio analyzer measured under the condition that a 0dBPa at 1 kHz single tone generates in ERP (Ear Reference Point). (the calibration is independent of MS)

10.4 Test Severity Levels

Frequency Band: 80-1000 MHz, 1400-2000 MHz.

Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified

Remark: “X” is an open class.

10.5 Test Data of Radio Frequency Electromagnetic Field Immunity Test (RS)

10.5.1 GSM Link + Adapter + Battery 1 - Position 0°

GSM 900 80MHz-1GHz Horizontal

EUT Information: Monitor-H

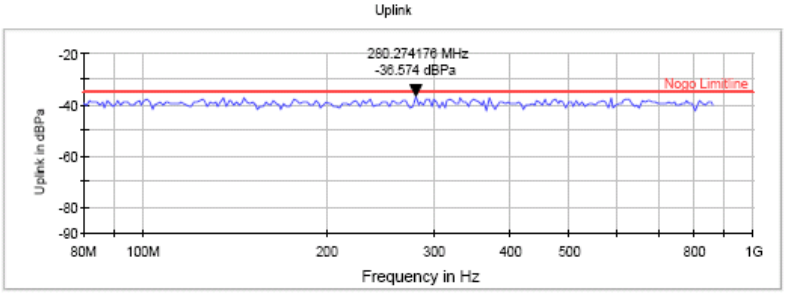
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Horizontal
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

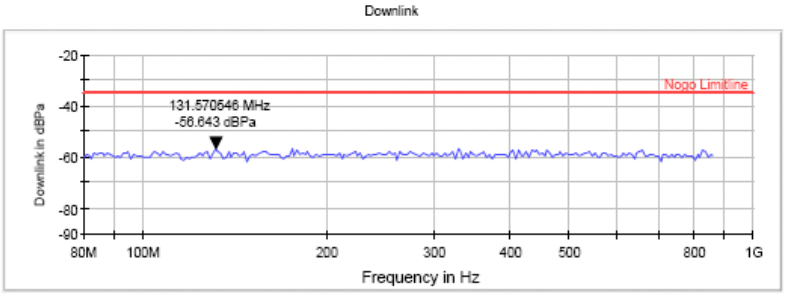
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

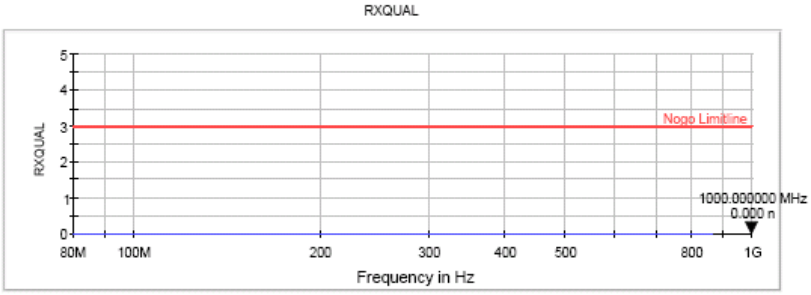
Uplink



Downlink



RXQUAL



GSM 900 80MHz-1GHz Vertical

EUT Information: Monitor-V

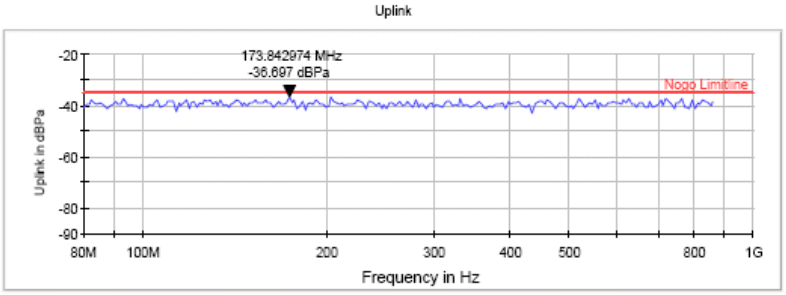
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Vertical
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

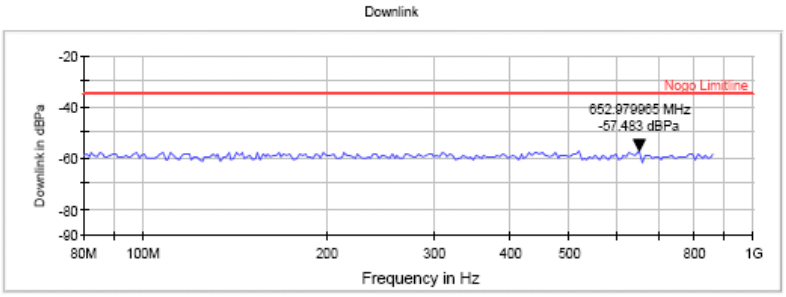
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

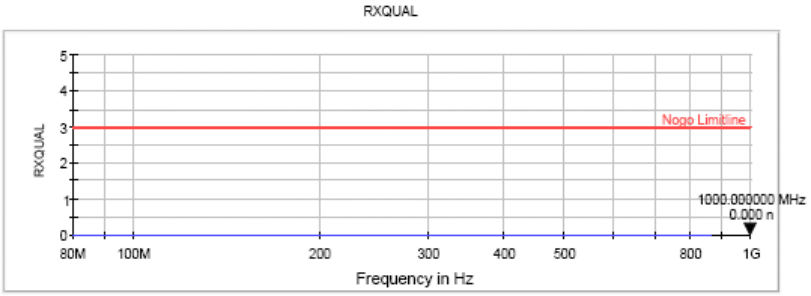
Uplink



Downlink



RXQUAL



GSM 900 1.4GHz-2GHz Horizontal

EUT Information: Monitor-H

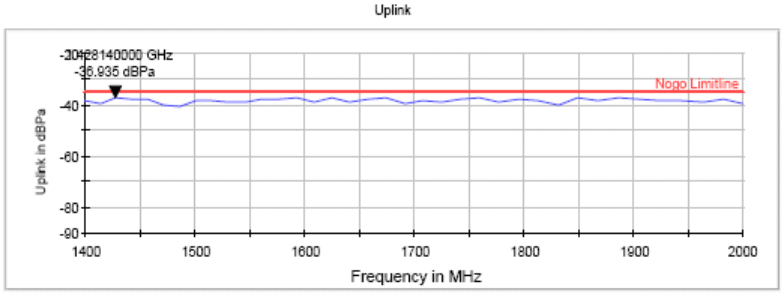
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Horizontal
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

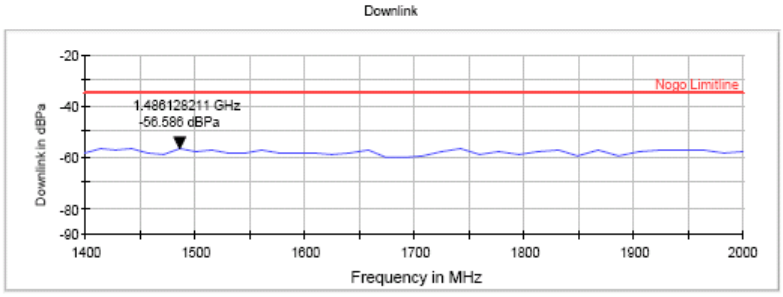
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

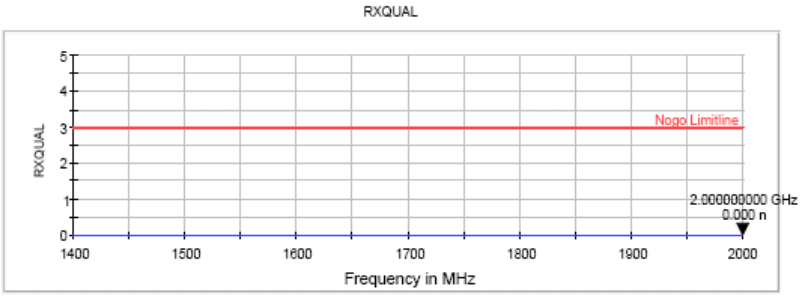
Uplink



Downlink



RXQUAL



GSM 900 1.4GHz-2GHz Vertical

EUT Information: Monitor-V

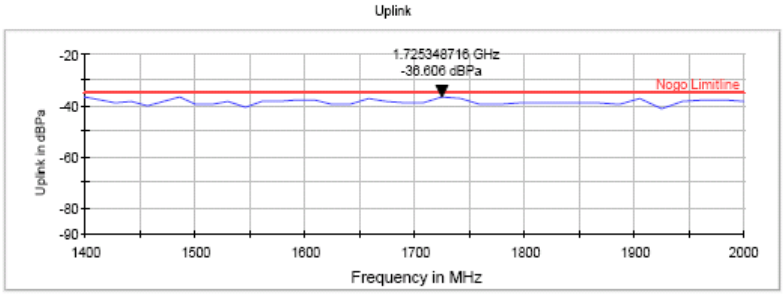
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Vertical
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

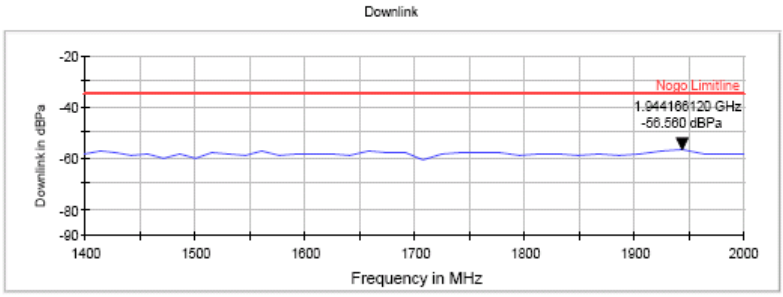
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

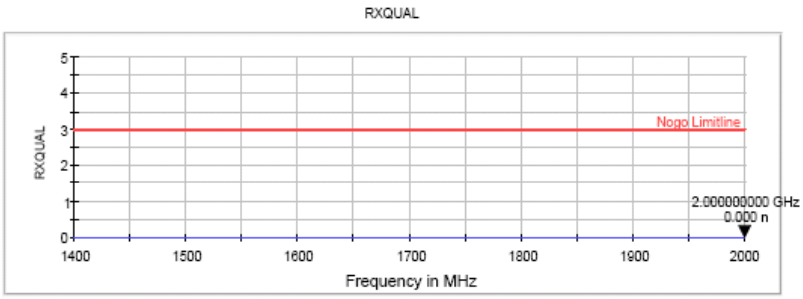
Uplink



Downlink



RXQUAL



GSM Link + Adapter + Battery 1 - Position 180°

GSM 900 80MHz-1GHz Horizontal

EUT Information: Monitor-H

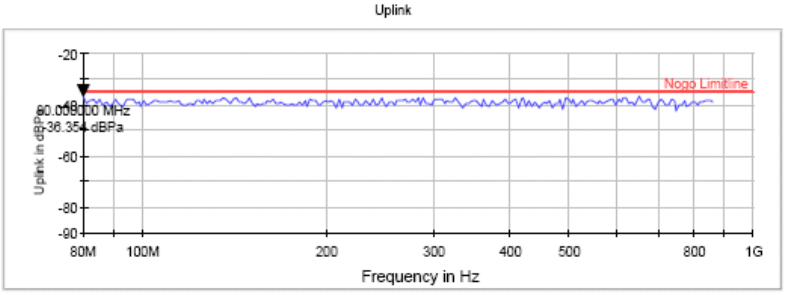
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Horizontal
Angle:	180
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

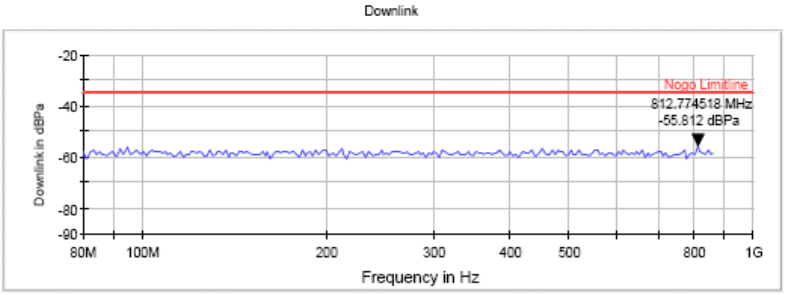
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

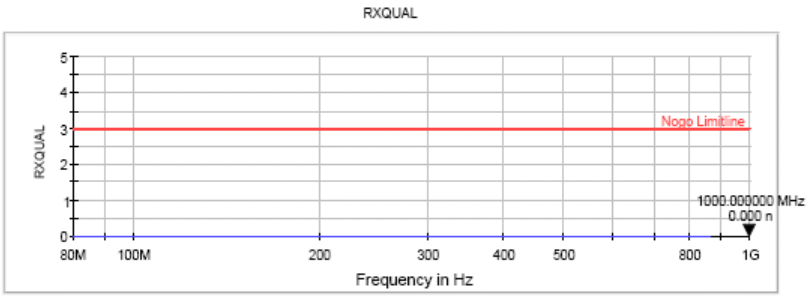
Uplink



Downlink



RXQUAL



GSM 900 80MHz-1GHz Vertical

EUT Information: Monitor-V

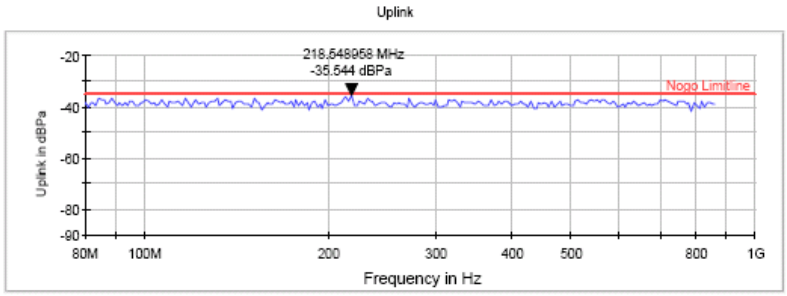
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Vertical
Angle:	180
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

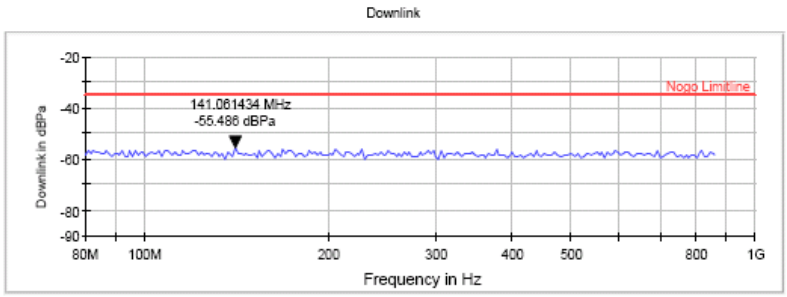
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

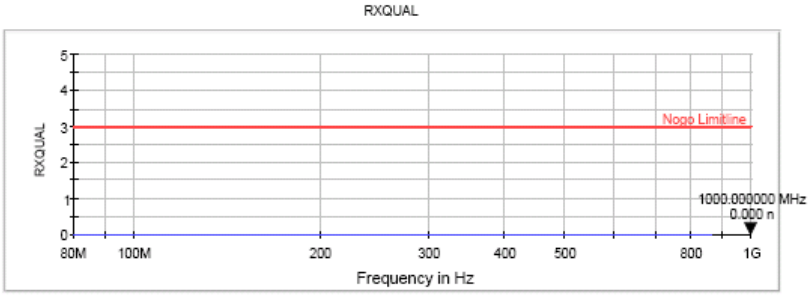
Uplink



Downlink



RXQUAL



GSM 900 1.4GHz-2GHz Horizontal

EUT Information: Monitor-H

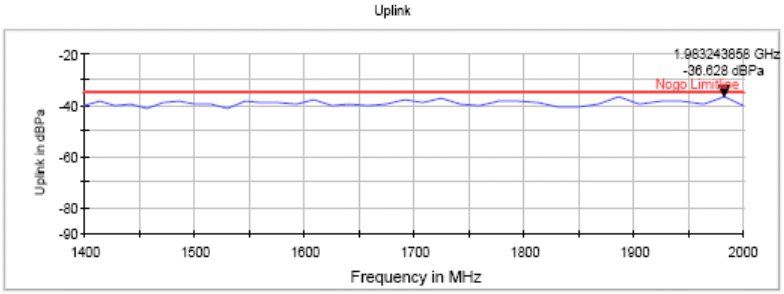
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Horizontal
Angle:	180
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

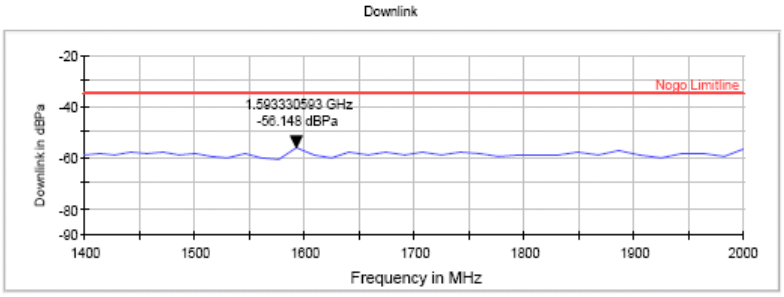
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

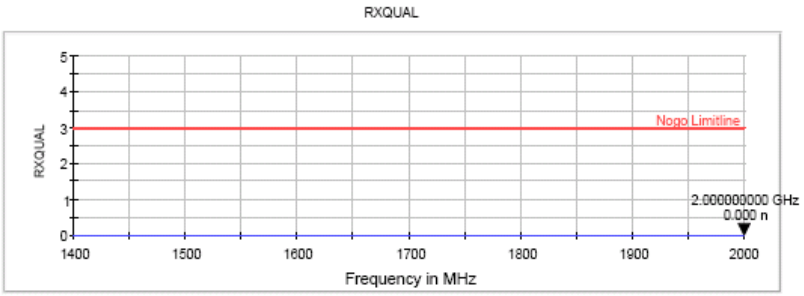
Uplink



Downlink



RXQUAL



GSM 900 1.4GHz-2GHz Vertical

EUT Information: Monitor-V

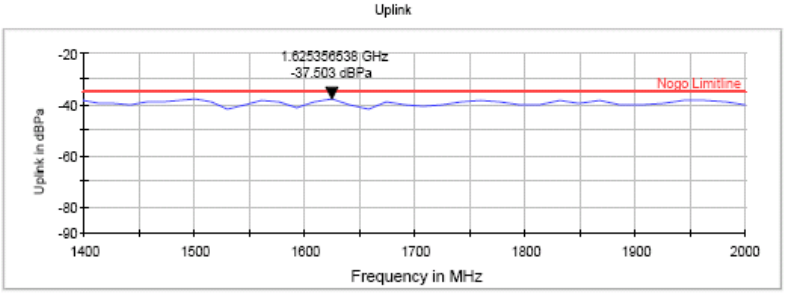
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	GSM900
Position:	Vertical
Angle:	180
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

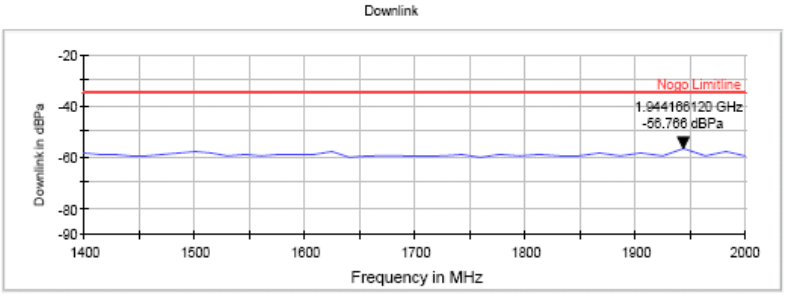
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

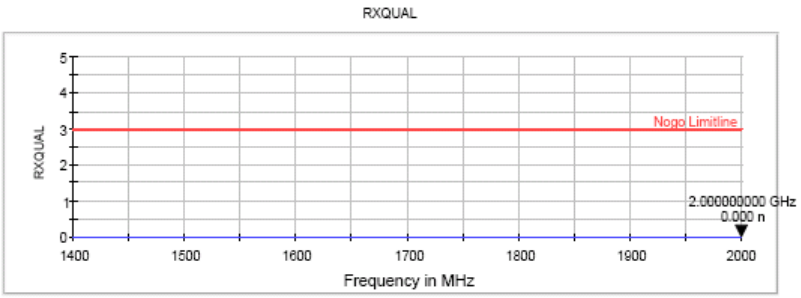
Uplink



Downlink



RXQUAL



10.5.2 DCS Link + Adapter + Battery 1

DCS1800 80MHz-1GHz Horizontal

EUT Information: Monitor-H

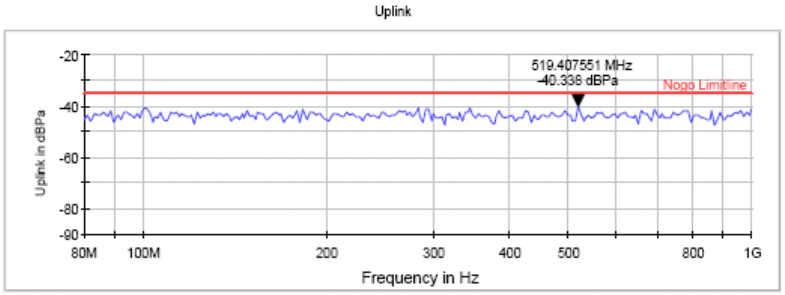
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	DCS1800
Position:	Horizontal
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

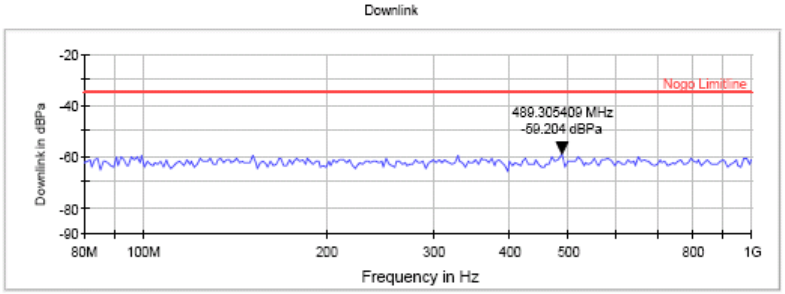
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

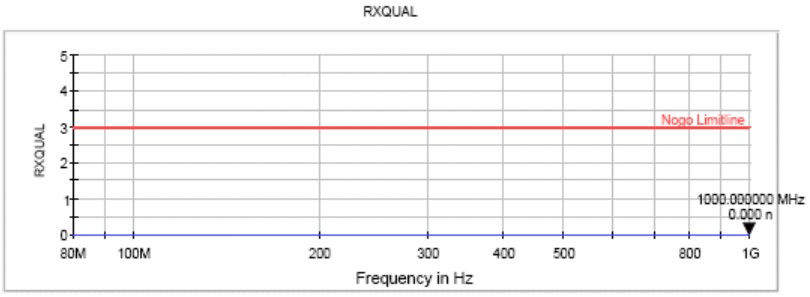
Uplink



Downlink



RXQUAL



DCS1800 80MHz-1GHz Vertical

EUT Information: Monitor-V

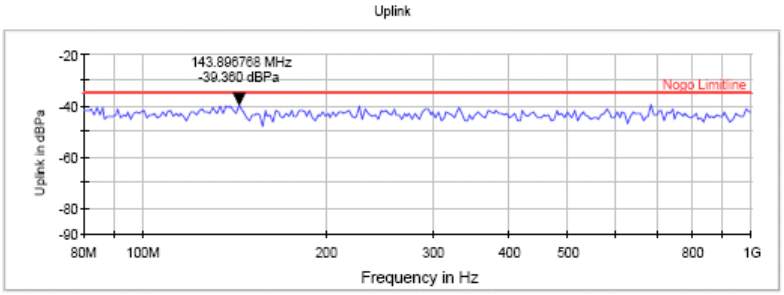
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	DCS1800
Position:	Vertical
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

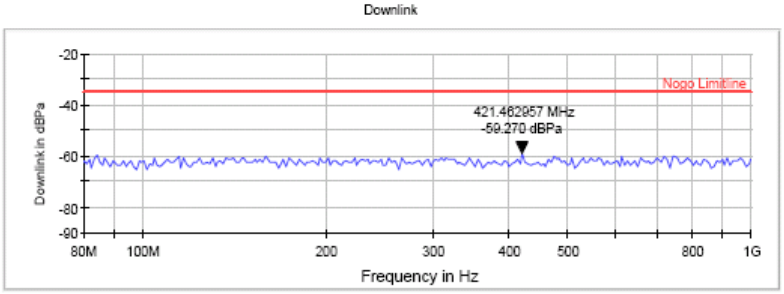
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

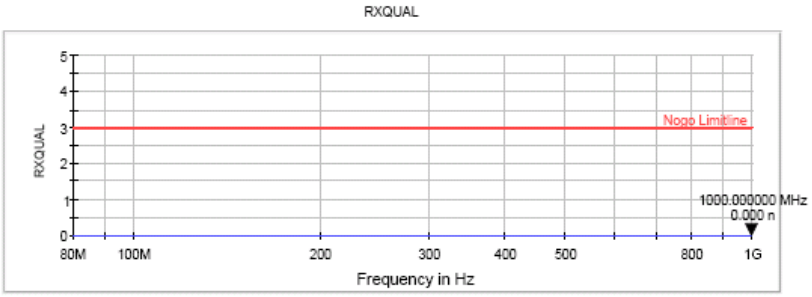
Uplink



Downlink



RXQUAL



DCS1800 1.4GHz-2GHz Horizontal

EUT Information: Monitor-H

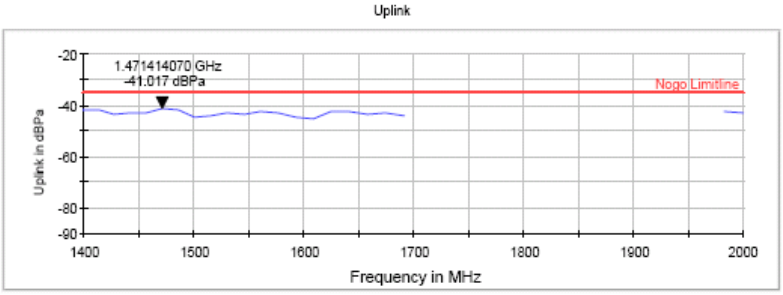
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	DCS1800
Position:	Horizontal
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

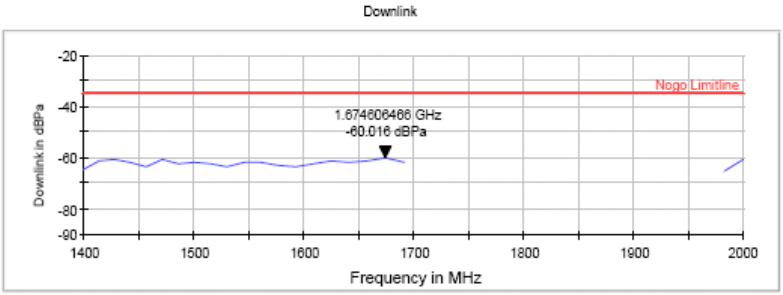
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

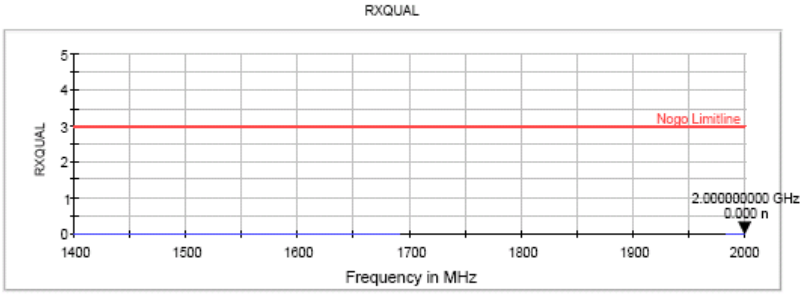
Uplink



Downlink



RXQUAL



DCS1800 1.4GHz-2GHz Vertical

EUT Information: Monitor-V

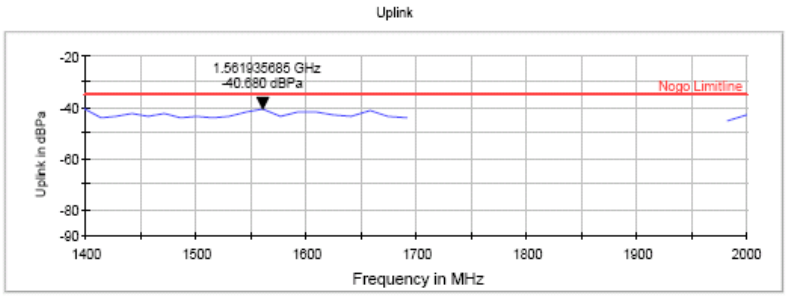
Description:

EUT Name:	Mobile Phone
Manufacturer:	FIC
Model Name:	GTA02
Band:	DCS1800
Position:	Vertical
Angle:	0
Memo:	EUT+Adaptor
Test Level:	3V/m
Note:	

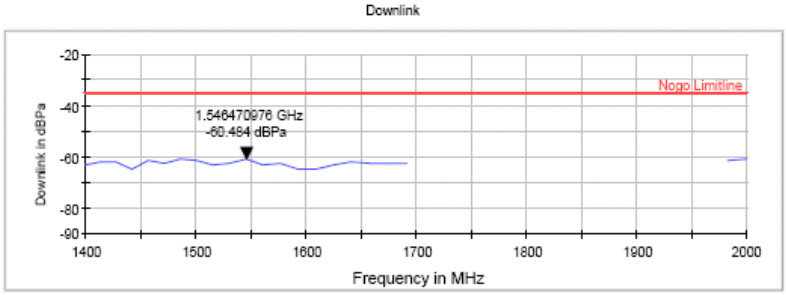
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 88.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

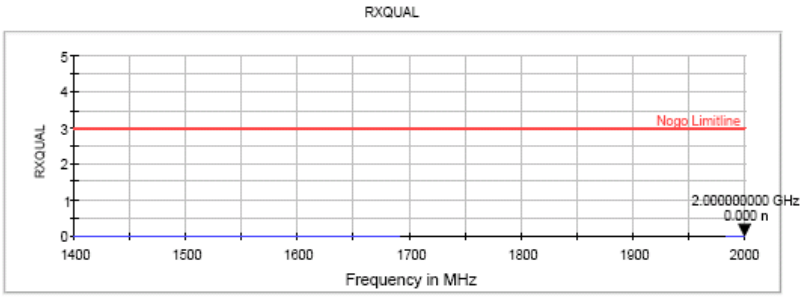
Uplink



Downlink



RXQUAL

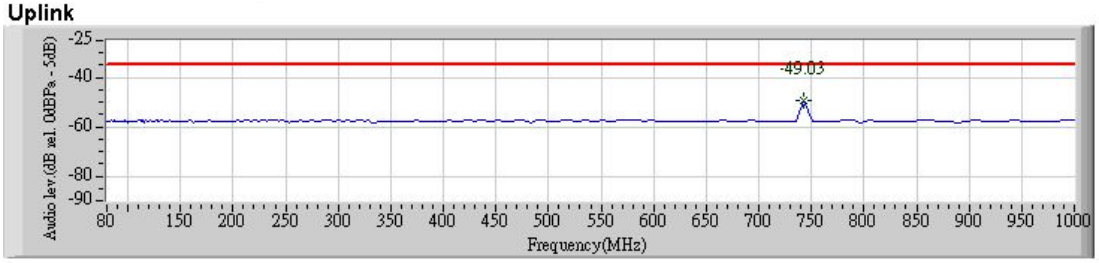


10.5.3 DCS Link + Adapter + Battery 2 - Position 0°

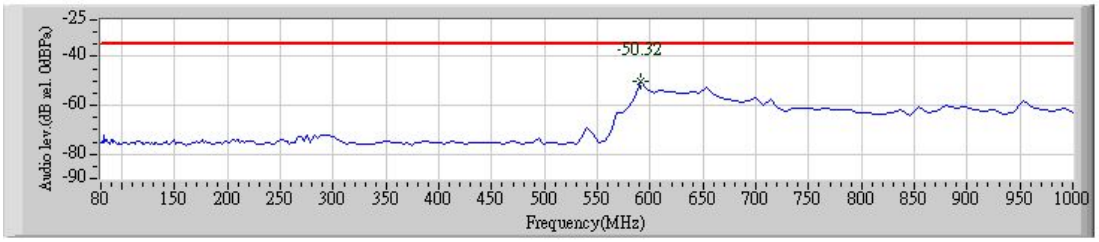
DCS1800 80MHz-1GHz Horizontal

RF Level	3V/m	Freq Range	80-1000 MHz	Product Number	PDA Phone
EUT	0	Field Polar.	Horizontal	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

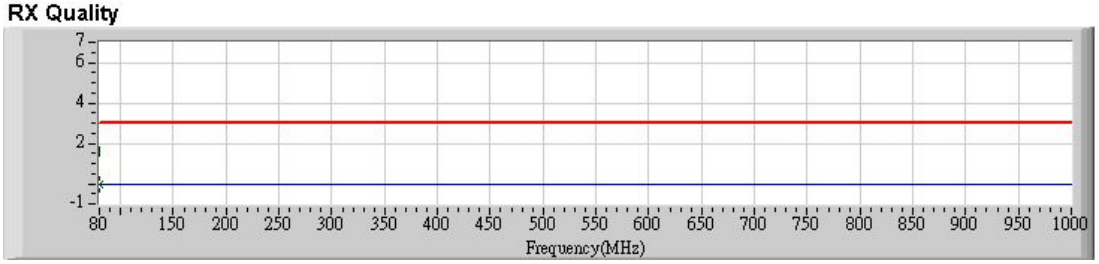
Uplink



Downlink



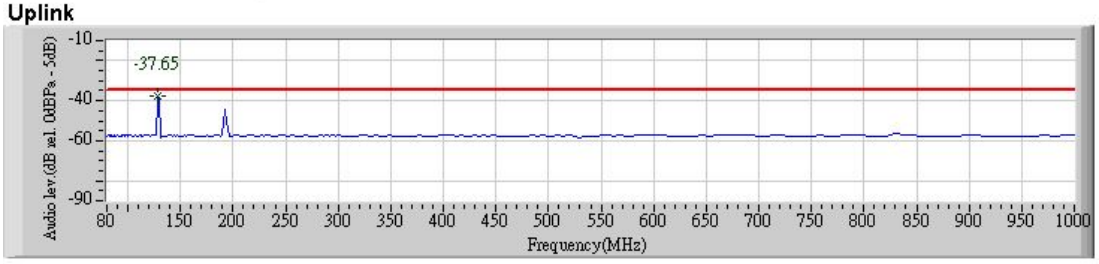
RX Quality



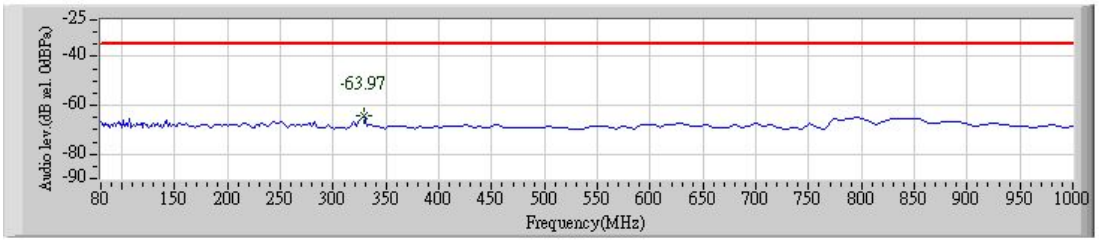
DCS1800 80MHz-1GHz Vertical

RF Level	3V/m	Freq Range	80-1000 MHz	Product Number	PDA Phone
EUT	0	Field Polar.	Vertical	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

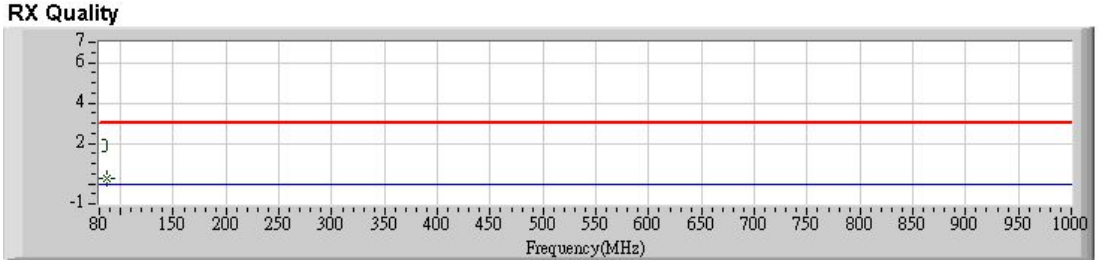
Uplink



Downlink



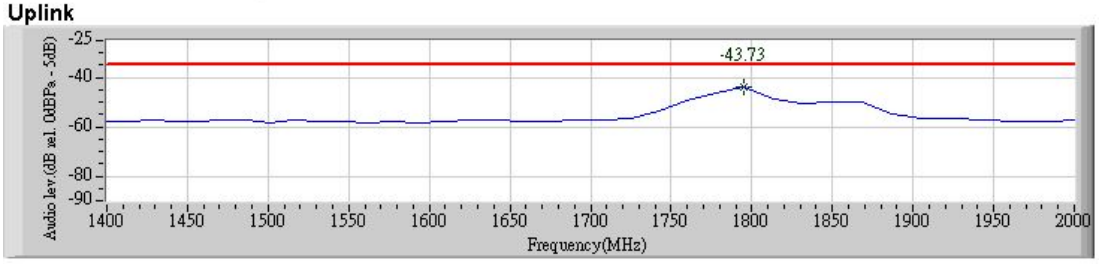
RX Quality



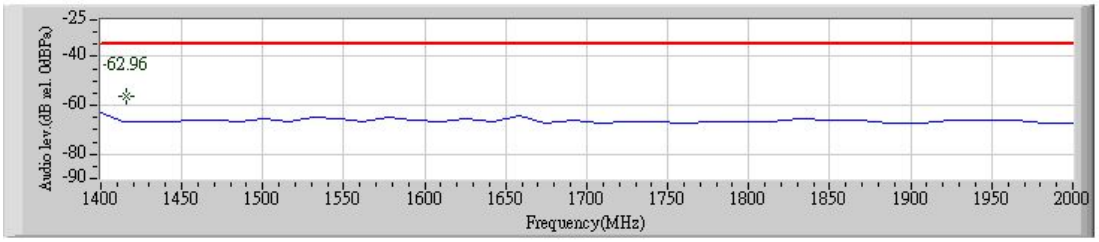
DCS1800 1.4GHz-2GHz Horizontal

RF Level	3V/m	Freq Range	1400-2000 MHz	Product Number	PDA Phone
EUT	0	Field Polar.	Horizontal	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

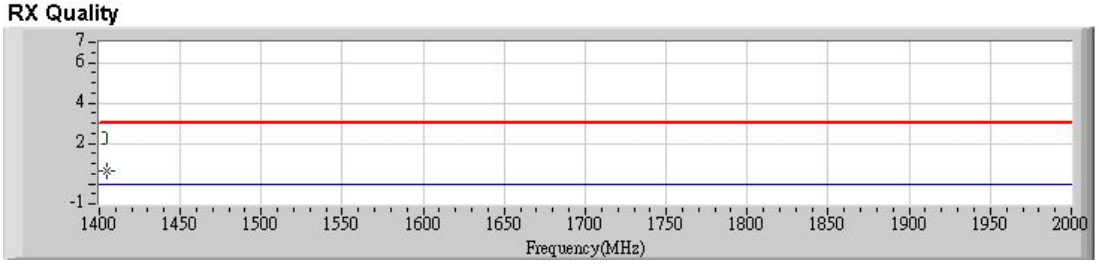
Uplink



Downlink



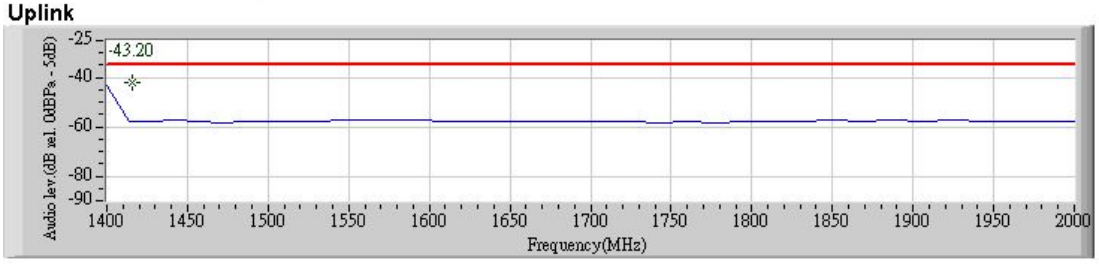
RX Quality



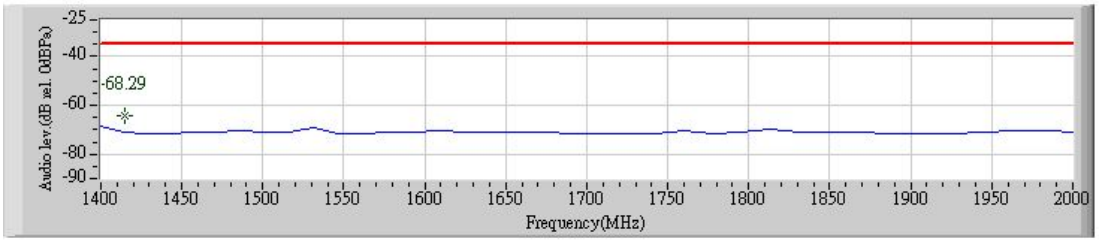
DCS1800 1.4GHz-2GHz Vertical

RF Level	3V/m	Freq Range	1400-2000 MHz	Product Number	PDA Phone
EUT	0	Field Polar.	Vertical	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

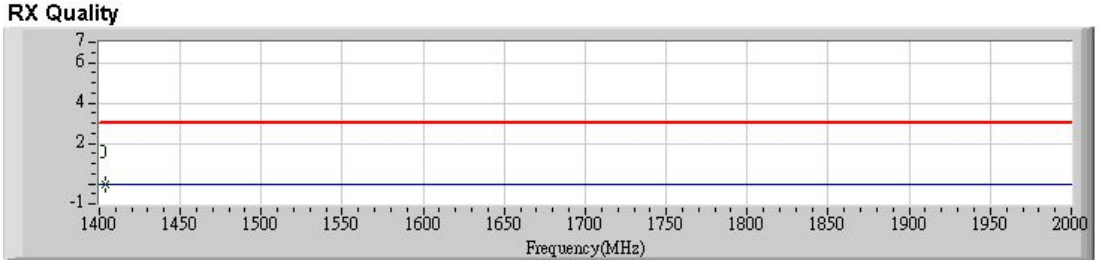
Uplink



Downlink



RX Quality

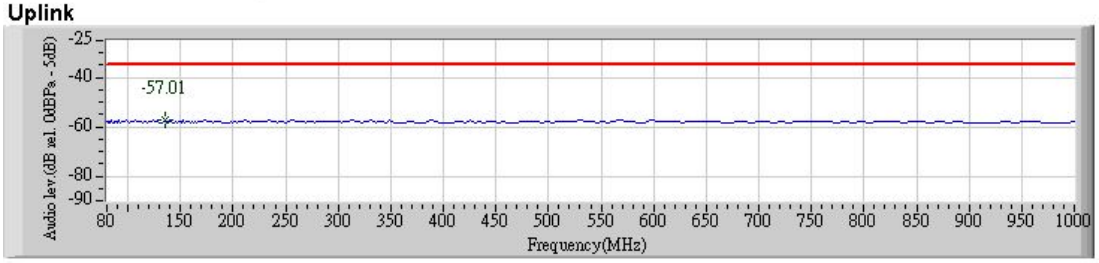


DCS Link + Adapter + Battery 2 - Position 180°

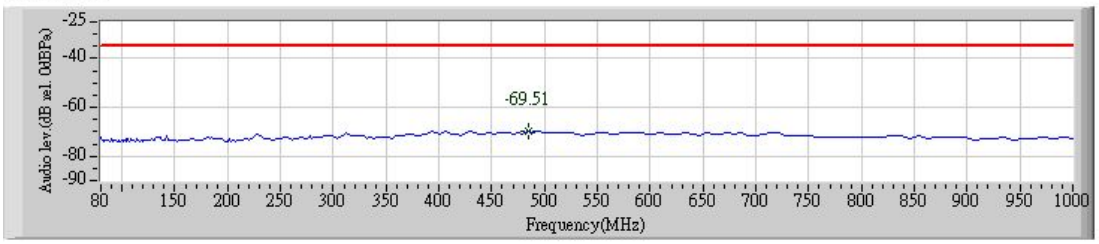
DCS1800 80MHz-1GHz Horizontal

RF Level	3V/m	Freq Range	80-1000 MHz	Product Number	PDA Phone
EUT	180	Field Polar.	Horizontal	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

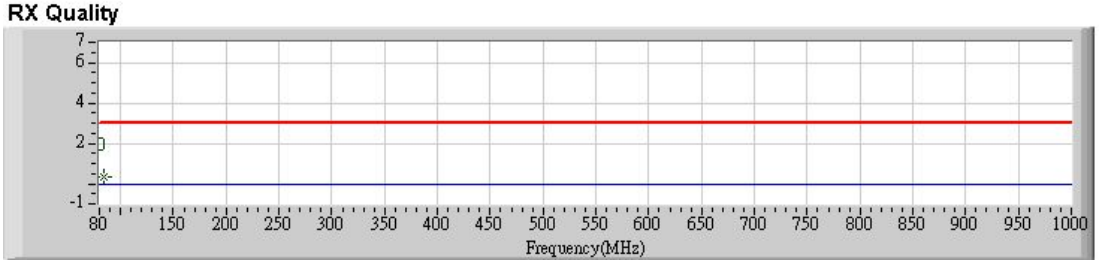
Uplink



Downlink



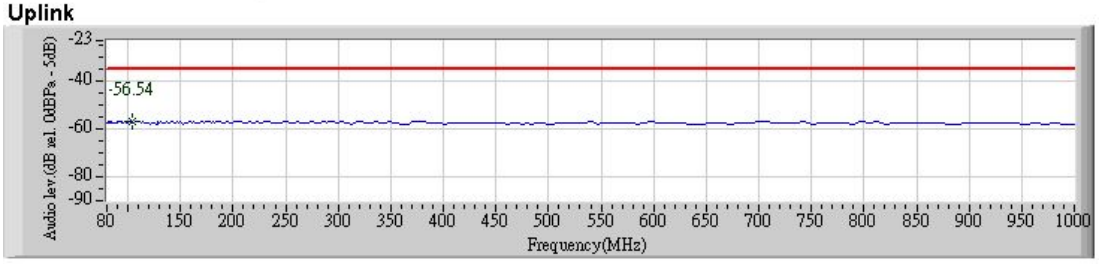
RX Quality



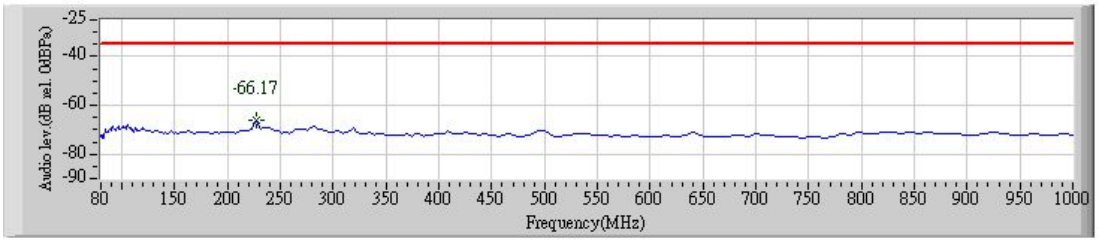
DCS1800 80MHz-1GHz Vertical

RF Level	3V/m	Freq Range	80-1000 MHz	Product Number	PDA Phone
EUT	180	Field Polar.	Vertical	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

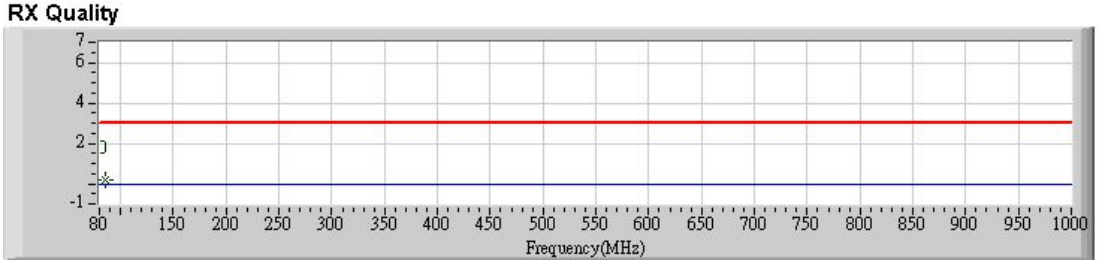
Uplink



Downlink



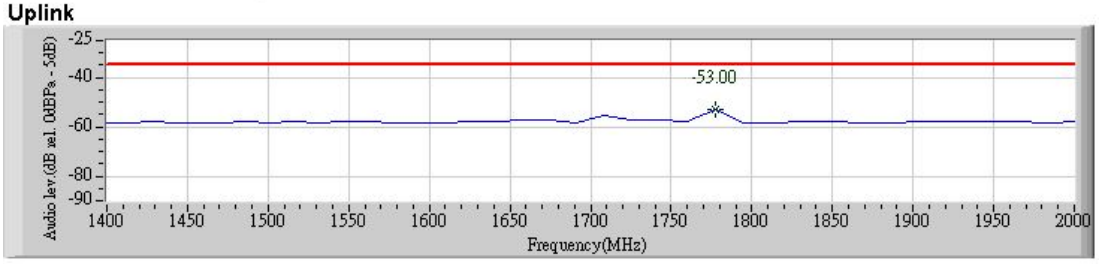
RX Quality



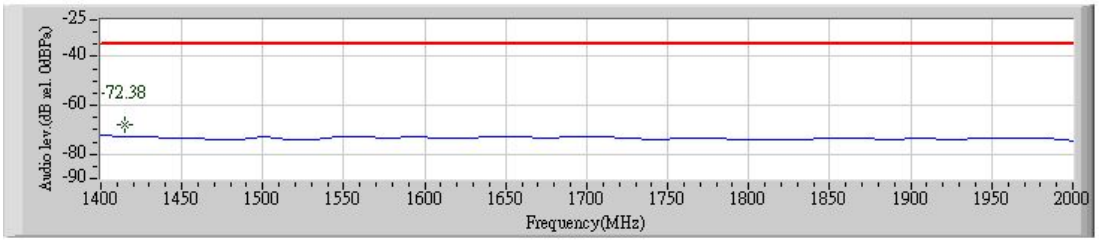
DCS1800 1.4GHz-2GHz Horizontal

RF Level	3V/m	Freq Range	1400-2000 MHz	Product Number	PDA Phone
EUT	180	Field Polar.	Horizontal	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

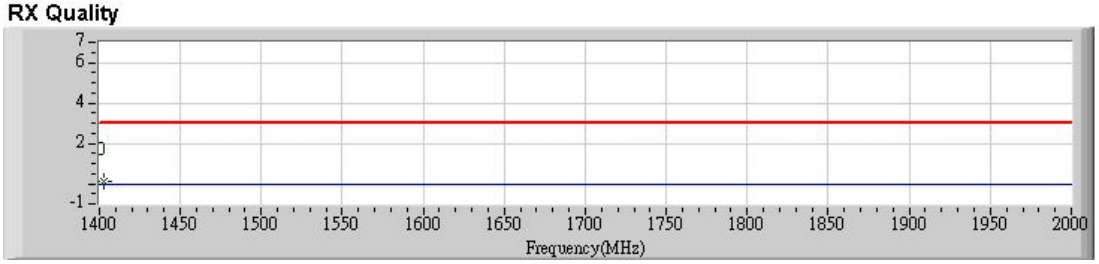
Uplink



Downlink



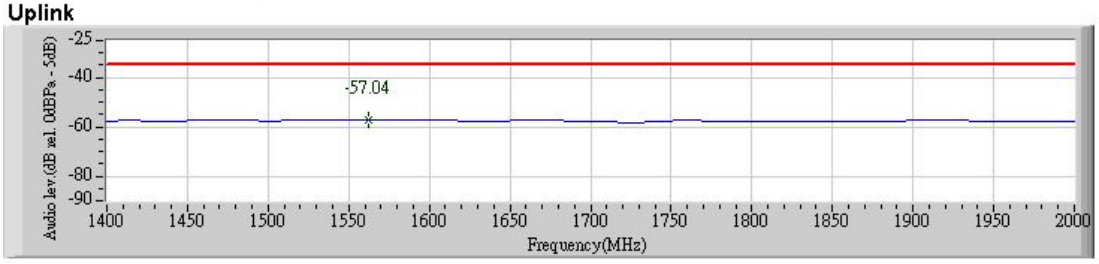
RX Quality



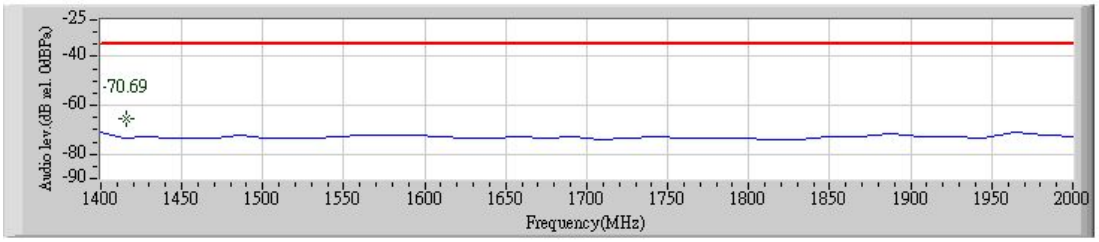
DCS1800 1.4GHz-2GHz Vertical

RF Level	3V/m	Freq Range	1400-2000 MHz	Product Number	PDA Phone
EUT	180	Field Polar.	Vertical	Customer	FIC
EUT Band	1800	Date	2008/04/11	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:105934 IMEI:0000000000000				

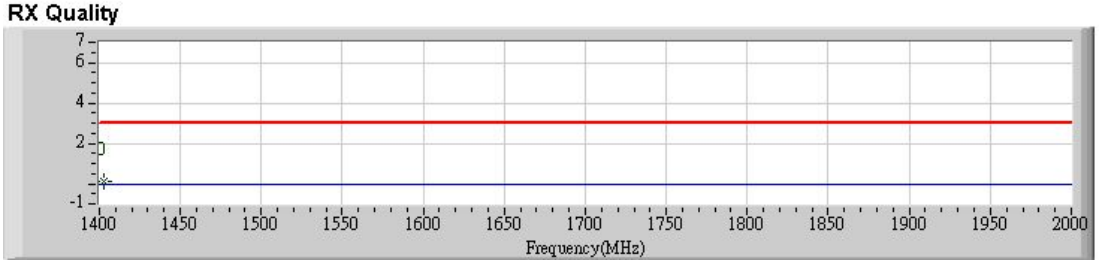
Uplink



Downlink



RX Quality



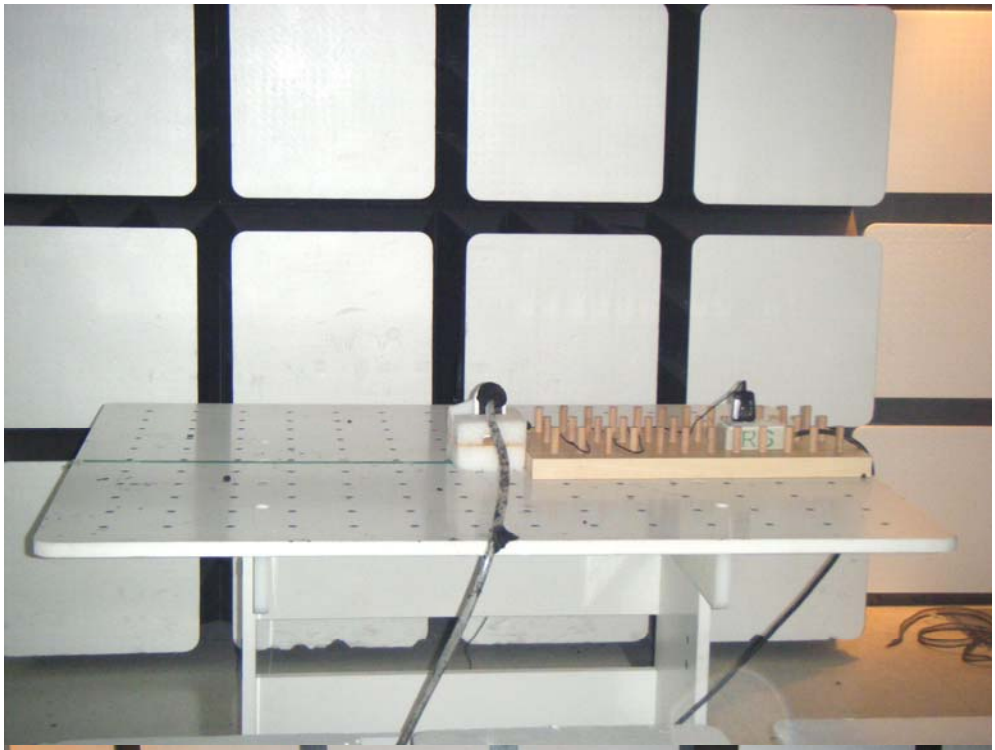
10.6 Test Result of Radio Frequency Electromagnetic Field Immunity Test (RS)

- Final Test Result : **PASS**
- EUT Performance Criteria : CT/CR
- Required Performance Criteria : CT/CR
- Basic Standard : EN 61000-4-3
- Product Standard : EN 301 489-7, EN 301 489-17, EN 55024
- Level : 2
- Frequency Range : 80-1000 MHz, 1400-2000 MHz.
- Field Strength : 3 V/m (Modulated 1kHz, 80% AM)
- Temperature : 24~25°C and 25~26°C
- Relative Humidity : 50~51% and 57~57%
- Atmospheric pressure : 98kPa
- Test Date : Jan. 23, 2008 and Apr. 11, 2008
- Observation : There is no unintentional operation during this testing.
- Test Engineer : Louis

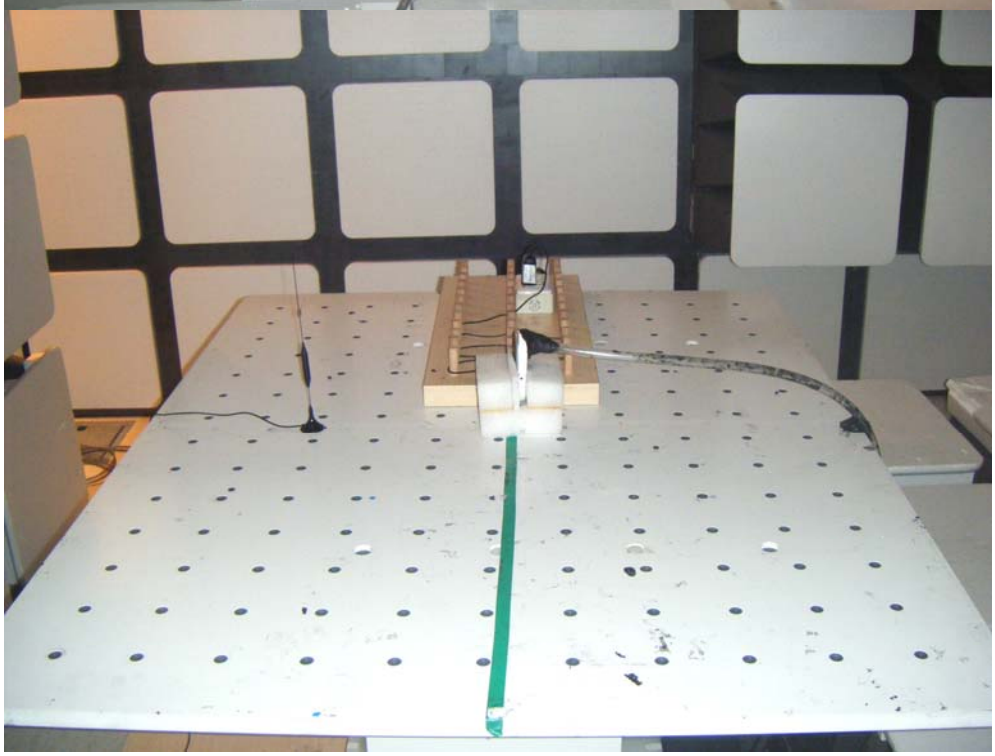
10.7 Photographs of Radio Frequency Electromagnetic Field Immunity Test

Mode 1~2
0°

Front View



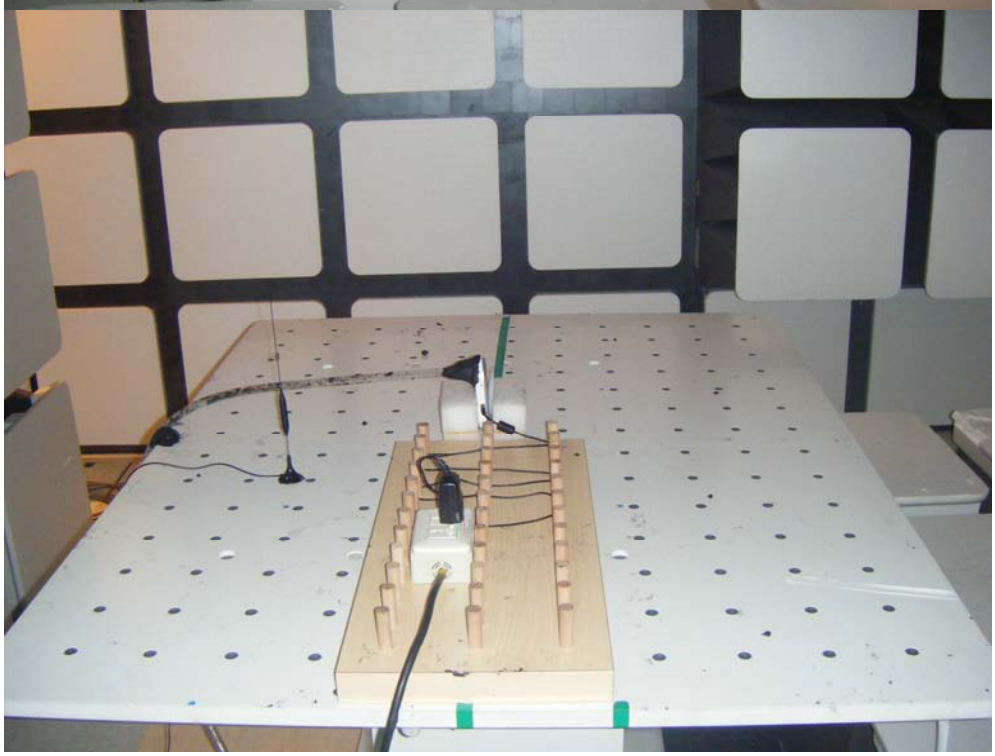
Rear View



Mode 1
180°

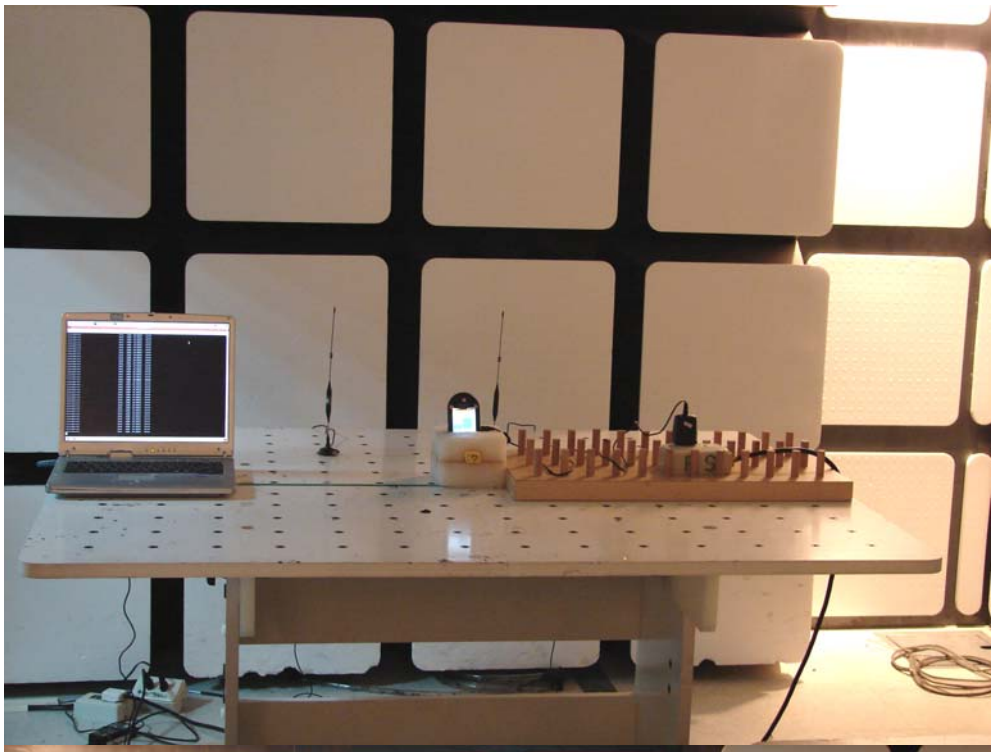
Front View

Rear View

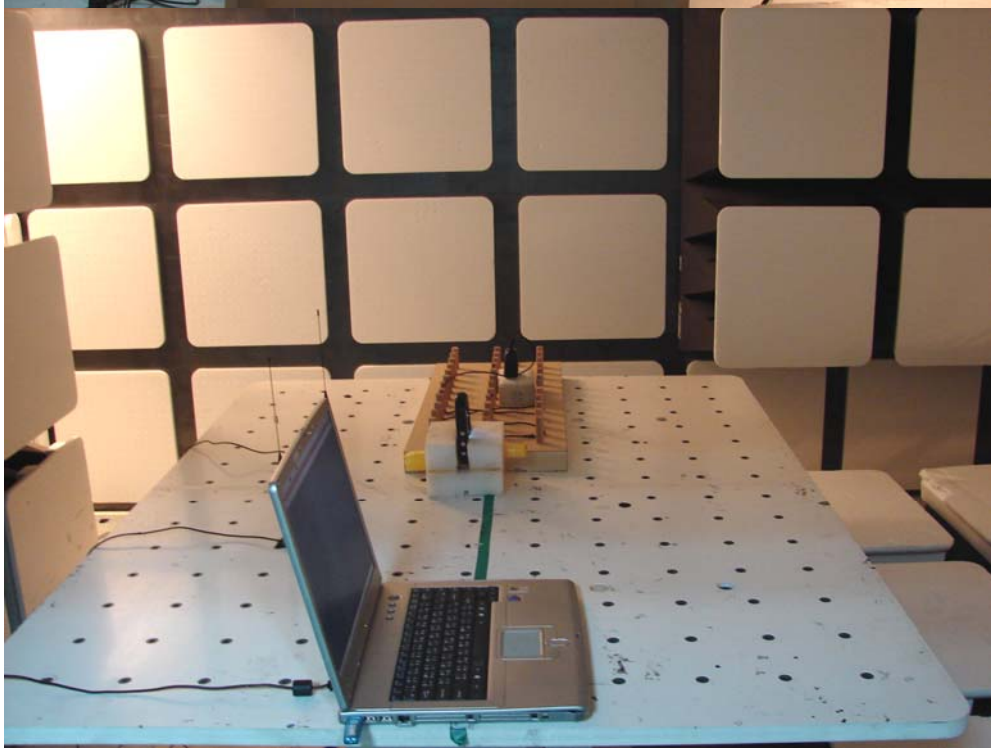


Mode 3

Front View



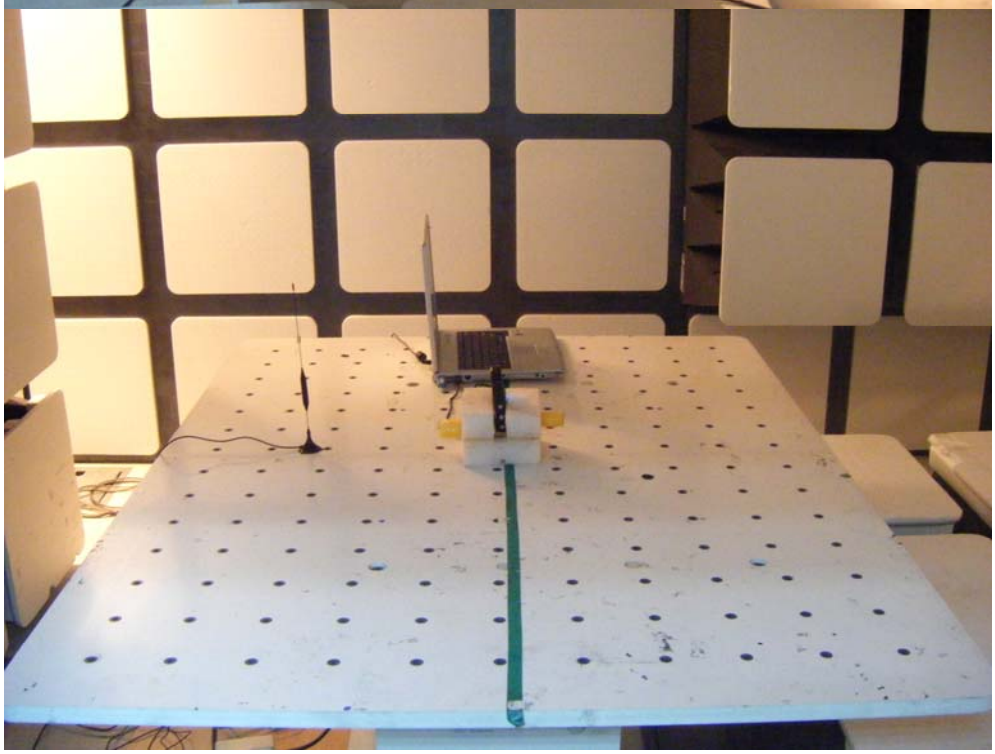
Rear View



Mode 4

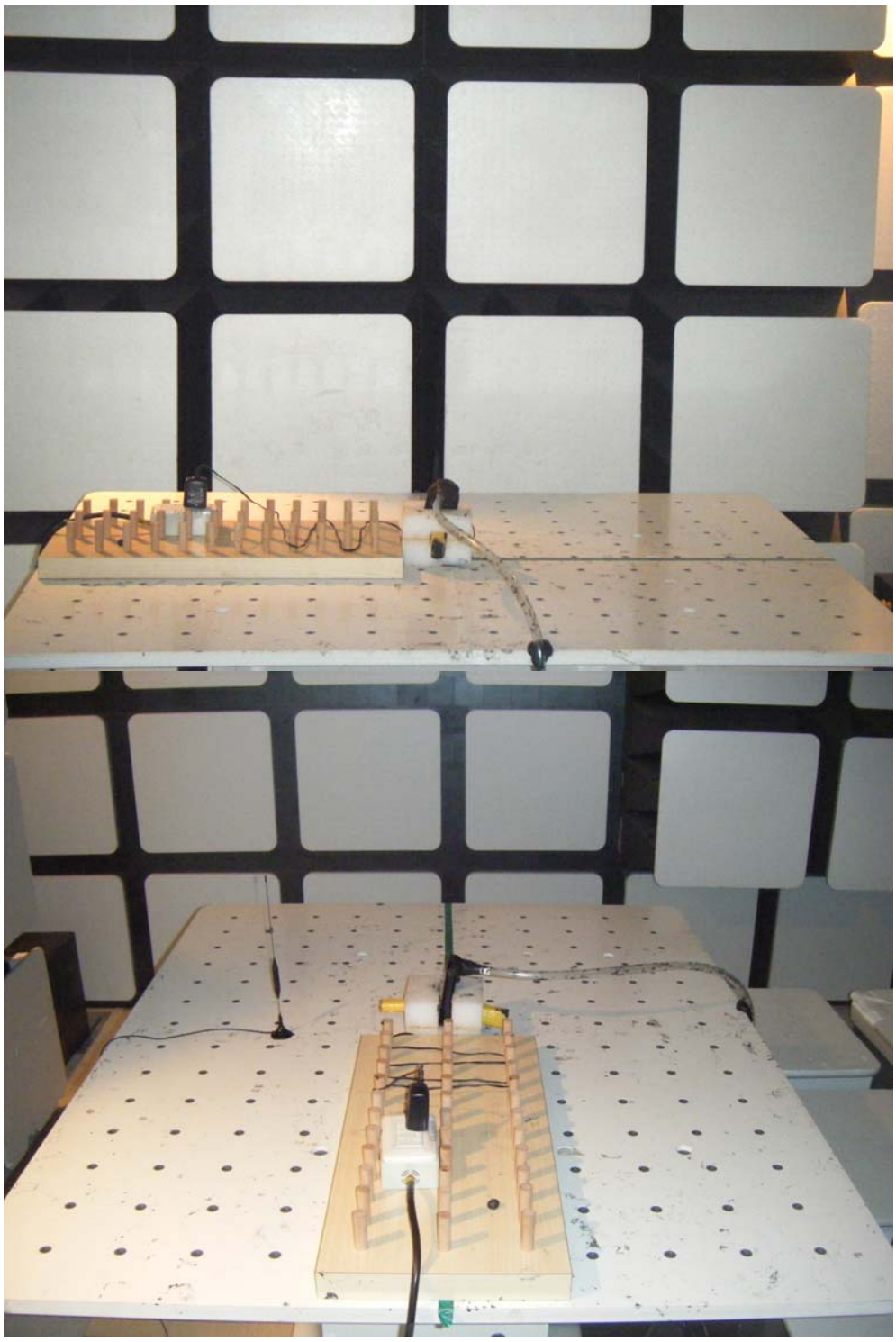
Front View

Rear View



Mode 5
0°

Front View

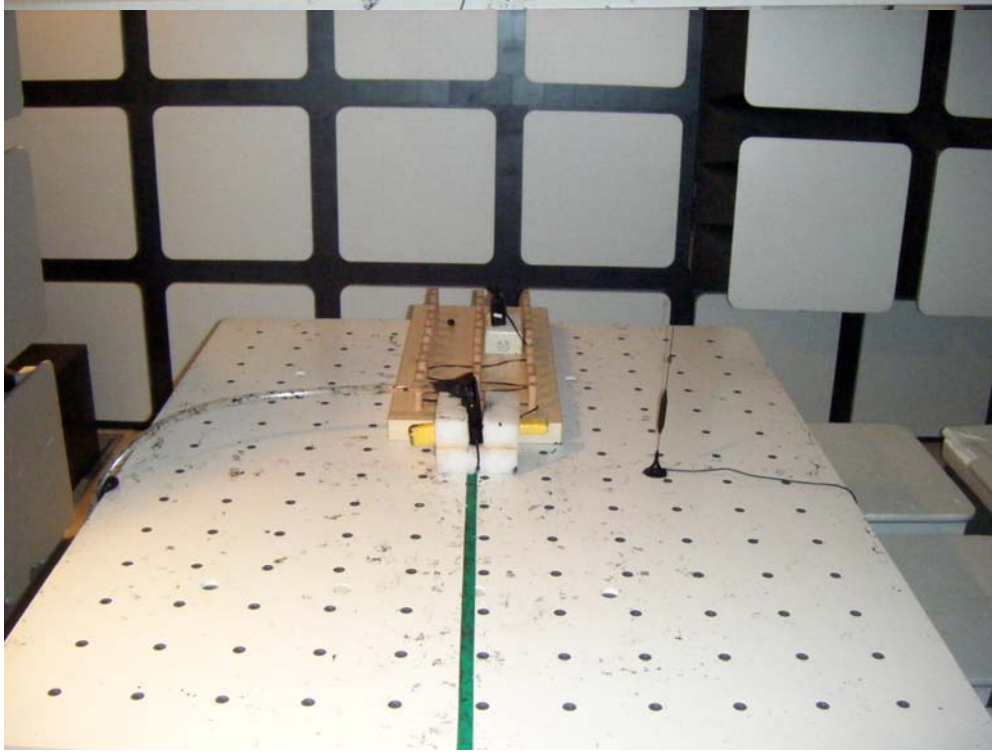


Rear View

Mode 5
180°

Front View

Rear View

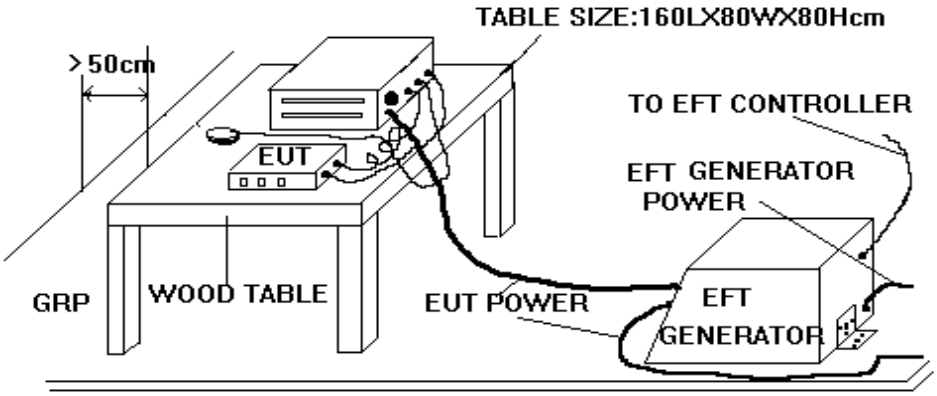


11. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

11.1 Standard

- EN 61000-4-4

11.2 Test setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8m above the GRP. The GRP was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1m on all sides and connected to the protective earth. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP beneath the EUT, was more than 0.5 m. Using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 1m or less.

11.3 Test on Power Line

a. The EFT/B-generator was located on the GRP. The length from the EFT/B-generator to the EUT does not exceed 1 m.
b. The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.

11.4 Test on Communication Lines

a. The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP.
b. The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.

11.5 Test Procedure

a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carried out shall comply with the following requirements:
   - ambient temperature: 15℃ to 35℃;
   - relative humidity : 45% to 75%;
   - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).

b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.

c. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
   - Normal performance within the specification limits.
   - Temporary degradation or loss of function or performance which is self-recoverable.
   - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
   - Degradation or loss of function which is not recoverable due to damage of equipment (components).

11.6 Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test:

Open circuit output test voltage ± 10%		
Level	**On Power Supply**	**On I/O signal, data and control line**
1	0.5 kV	0.25 kV
2	1.0 kV	0.50 kV
3	2.0 kV	1.00 kV
4	4.0 kV	2.00 kV
X	Specified	Specified

Remark: “X” is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

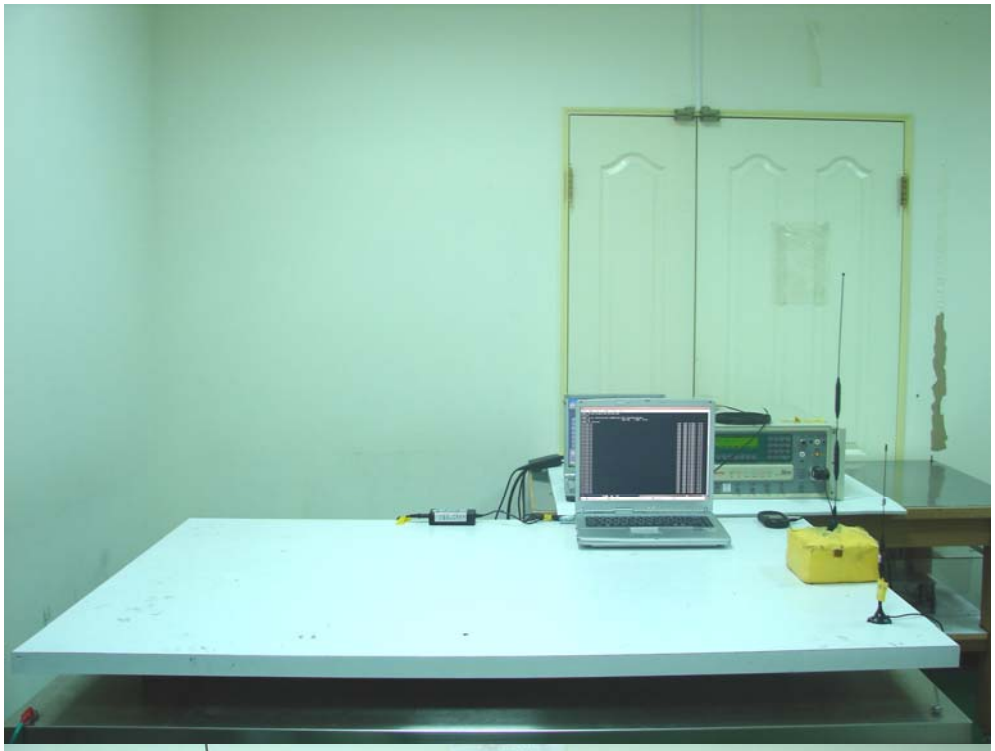
11.7 Test Result of Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

- Final Test Result : **PASS**
- EUT Performance : CT/CR
- Required Performance Criteria : TT/TR
- Basic Standard : EN 61000-4-4
- Product Standard : EN 301 489-7, EN 301 489-17, EN 55024
- Level : on Input AC Power Port -- 2
- Test Voltage : on Input AC Power Port -- ±1.0 kV
- Temperature : 24~26℃ and 21~22℃
- Relative Humidity : 49~51% and 41~42%
- Atmospheric Pressure : 98kPa
- Test Date : Dec. 21, 2007 and Apr. 01, 2008
- Test Engineer : Sun and Eric

11.8 Photographs of Electrical Fast Transient/BURST Immunity Test

Mode 1 and 4

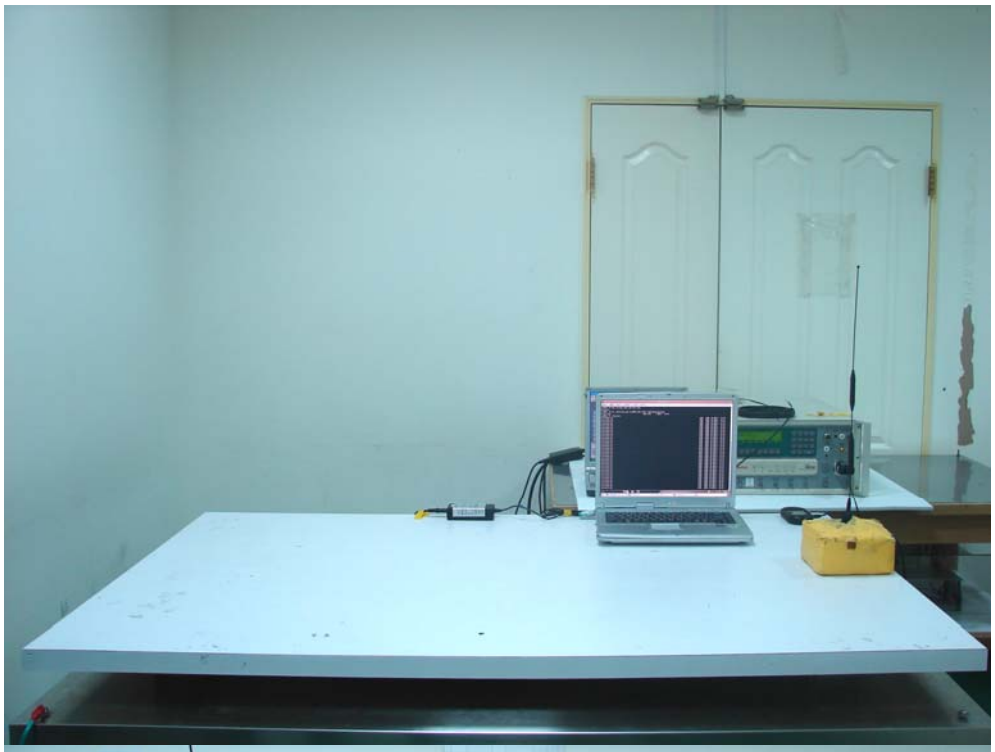
Front View



Rear View

Mode 2

Front View



Rear View

Mode 3

Front View

Rear View

12. Surge Immunity Test

12.1 Standard

- EN 61000-4-5

12.2 Test Procedure

a. Climatic conditions
The climatic conditions shall comply with the following requirements :
-- ambient temperature : 15 ℃ to 35 ℃
-- relative humidity : 10 % to 75 %
-- atmospheric pressure : 86 kPa to 106 kPa (860 mbar to 1060 mbar)

b. Electromagnetic conditions
The electromagnetic environment of the laboratory shall not influence the test results.

c. The test shall be performed according to the test plan that shall specify the test set-up with
-- generator and other equipment utilized;
-- test level (voltage/current);
-- generator source impedance;
-- internal or external generator trigger;
-- number of tests : at least five positive and five negative at the selected points;
-- repetition rate : maximum 1/min.
-- inputs and outputs to be tested;
-- representative operating conditions of the EUT;
-- sequence of application of the surge to the circuit;
-- phase angle in the case of a.c. power supply;
-- actual installation conditions, for example :
AC : neutral earthed,
DC : (+) or (-) earthed to simulated the actual earthing conditions.

d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.

f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.

g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level (let-through level) of the primary protection.

h. If the actual operating signal sources are not available, the may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according the test plan.

i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test previously unstressed equipment shall be used to the protection devices shall be replaced.

12.3 Test Level

Level	Open-circuit test voltage, ± 10%, kV
1	0.5
2	1.0
3	2.0
4	4.0
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

12.4 Test Record

Voltage (kV)	Test Location	Polarity	Phase Angle				Test Result
			0°	90°	180°	270°	
1 kV	L – N	+	CT/CR	CT/CR	CT/CR	CT/CR	***PASS***
		–	CT/CR	CT/CR	CT/CR	CT/CR	***PASS***

12.5 Test Result of Surge Immunity Test

- Final Test Result : **PASS**
- EUT Performance : CT/CR
- Required Performance Criteria : TT/TR
- Basic Standard : EN 61000-4-5
- Product Standard : EN 301 489-7, EN 301 489-17, EN 55024
- Surge wave form (Tr/Th) : 1, 2/50（8/20）μs
- Level : on Input AC Power Port – 2
- Test Voltage : on Input AC Power Port – ±1 kV
- Temperature : 24~26℃ and 21~22℃
- Relative Humidity : 49~51% and 41~42%
- Atmospheric Pressure : 98kPa
- Test Date : Dec. 21, 2007 and Apr. 01, 2008
- Test Engineer : Sun and Eric

12.6 Photographs of Surge Immunity Test

Refer to section 15.6

13. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (CS)

13.1 Standard

- EN 61000-4-6

13.2 Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.

b. This test method can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiate a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.

c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.

d. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5 x 10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.

e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.

f. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

g. The use of special exercising programs is recommended.

h. The Limits of audio level is equal to calibrated level subtracting 35dB. The uplink calibrated level is the level which audio analyzer measured under the condition that a –5dBPa at 1 kHz single tone generates in MRP (Mouth Reference Point). (MS is linking to BS simulator). The downlink calibrated level is the level which audio analyzer measured under the condition that a 0dBPa at 1 kHz single tone generates in ERP (Ear Reference Point). (the calibration is independent of MS)

i. Testing shall be performed according to a Test Plan, which shall be included in the test report.

j. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

13.3 Test Level

Level	Voltage Level (EMF)
1	1 V
2	3 V
3	10 V
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

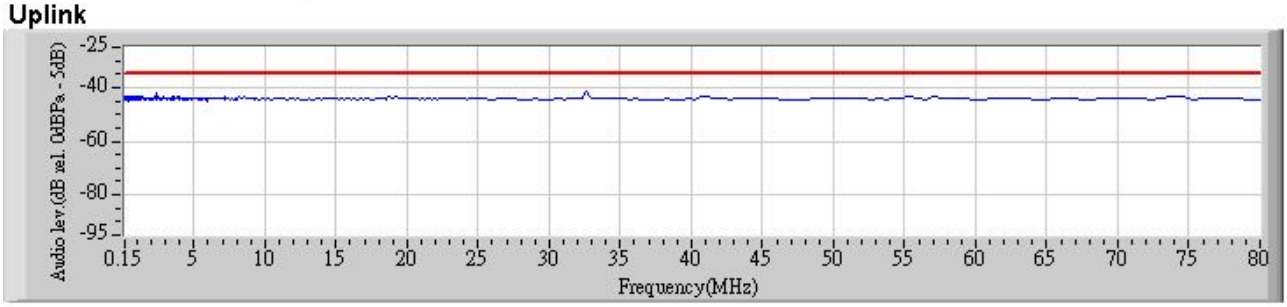
13.4 Test Data

13.4.1 GSM Link + Adapter + Battery 1

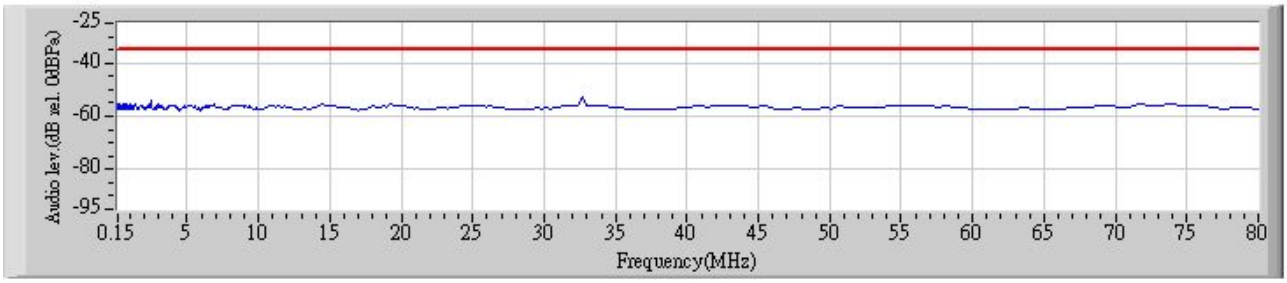
GSM 900_0.15~80 MHz

RF Level	3Vrms	Freq Range	0.15M-80MHz	Product Number	PDA Phone
EUT		Field Polar.		Customer	FIC
EUT Band	900	Date	2008/02/24	Model Name	GTA02
PCL	5			EUT Type	EUT+Adaptor
NOTE	CMU:103937;IMEI:N/A;Max Uplink -41.4184dBV;Max Downlink -53.0279dBV				

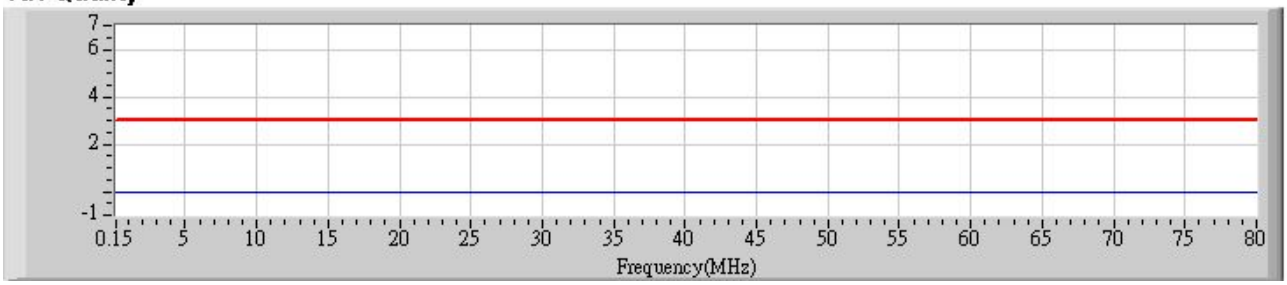
Uplink



Downlink



RX Quality

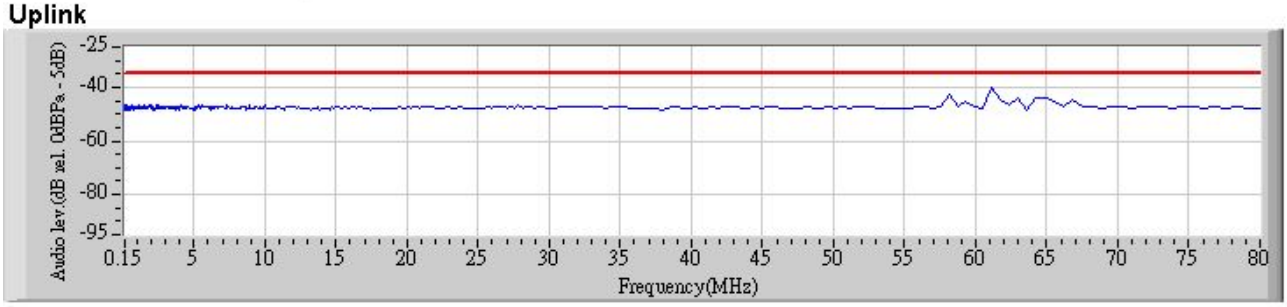


13.4.2 DCS Link + Adapter + Battery 1

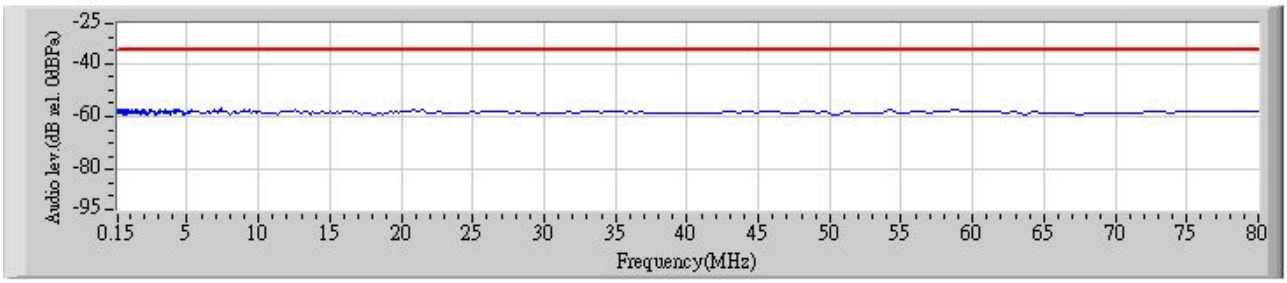
DCS 1800_0.15~80 MHz

RF Level	3Vrms	Freq Range	0.15M-80MHz	Product Number	PDA Phone
EUT		Field Polar.		Customer	FIC
EUT Band	1800	Date	2008/02/24	Model Name	GTA02
PCL	0			EUT Type	EUT+Adaptor
NOTE	CMU:103937;IMEI:N/A;Max Uplink -40.1544dBV;Max Downlink -56.8685dBV				

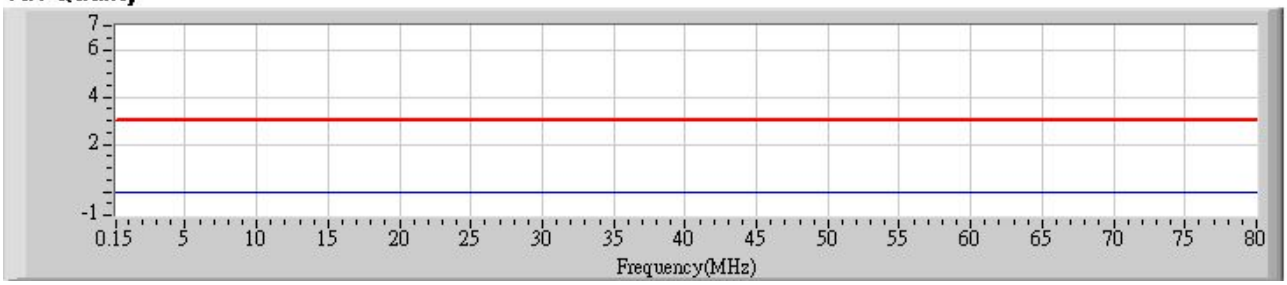
Uplink



Downlink



RX Quality



13.4.3 DCS Link + Adapter + Battery 2

DCS 1800_0.15~80 MHz

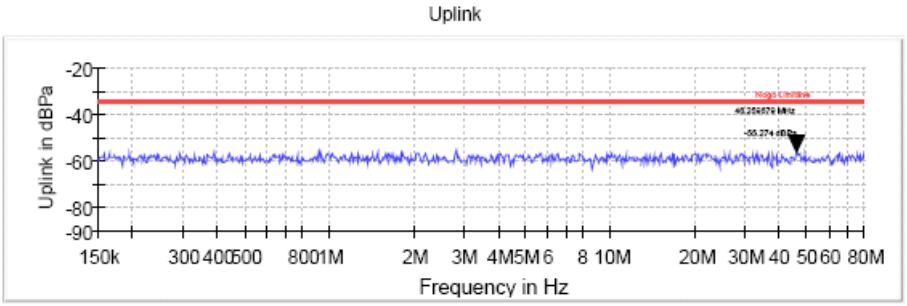
Description:

EUT Name:	PDA Phone
Manufacturer:	
Model Name:	GTA02/GTA02E
Band:	DCD 1800
Memo:	DCS 1800 Link+Adaptor
Test Level:	3Vrms
Note:	CMU200 106656 IMEI 0000000000000

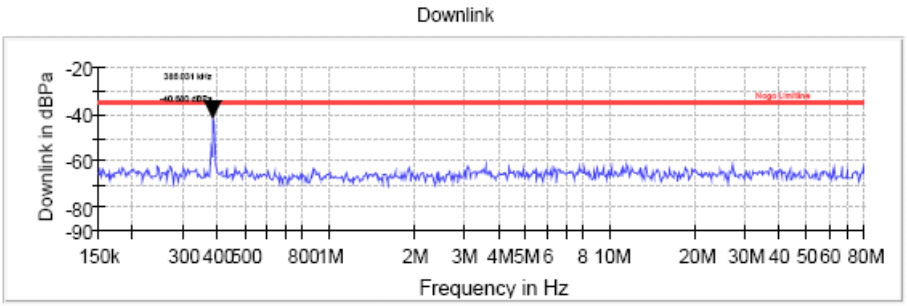
Mobile Phone Parameters:

Network Standard:	GSM
Audio Breakthrough:	Uplink Ref = 102.00 dBPa; Downlink Ref = 110.25 dBPa
NB/BB Shifts:	400.0 kHz / 500.0 kHz

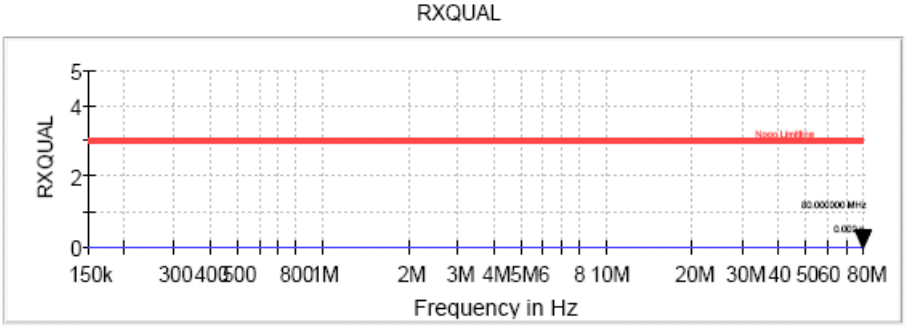
Uplink



Downlink



RXQUAL



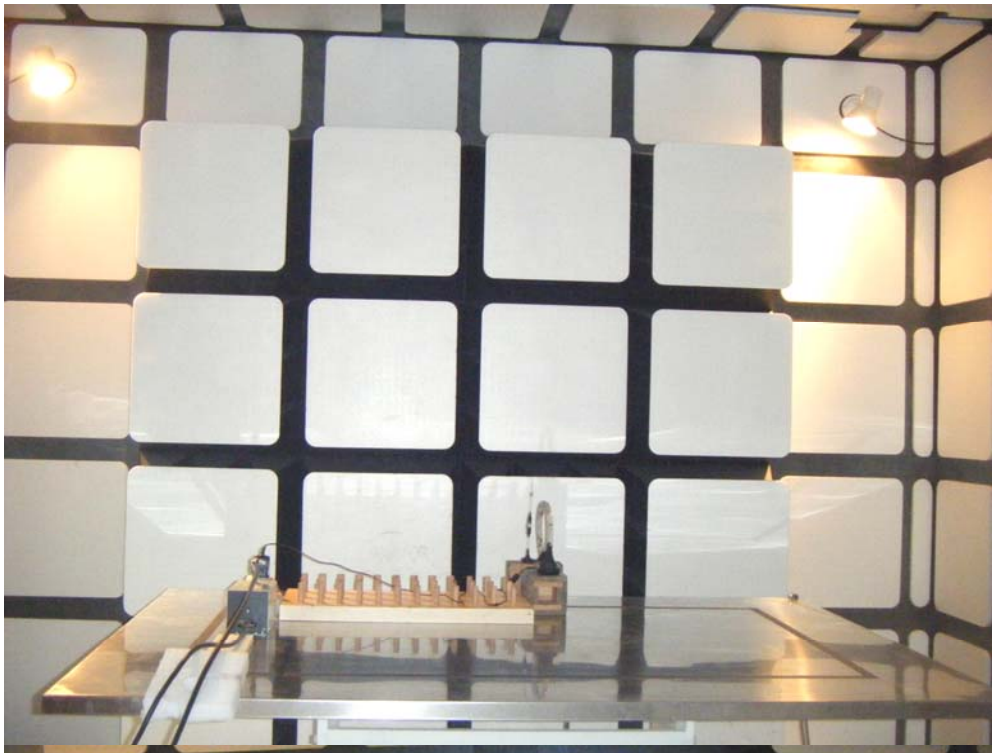
13.5 Test Result of Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (CS)

- Final Test Result : **PASS**
- EUT Performance : CT/CR
- Required Performance Criteria : CT/CR
- Basic Standard : EN 61000-4-6
- Product Standard : EN 301 489-7, EN 301 489-17, EN 55024
- Level : 2
- Test Voltage : 3 V rms (Modulated, 1kHz, 80%, AM)
- Frequency Range : 0.15 MHz to 80 MHz
- Dwell time : 2.9 seconds
- Frequency step size : 1% increment for 150kHz~80MHz
- Coupling mode : CDN-M2 for AC power ports
- Temperature : 23~25℃ and 24~25℃
- Relative Humidity : 54~55% and 55~56%
- Atmospheric Pressure : 98kPa
- Test Date : Jan. 23, 2008 and Apr. 11, 2008
- Test Engineer : Louis
- Observation : There is no unintentional operation during this testing.

13.6 Photographs of CS Test

Mode 1~2

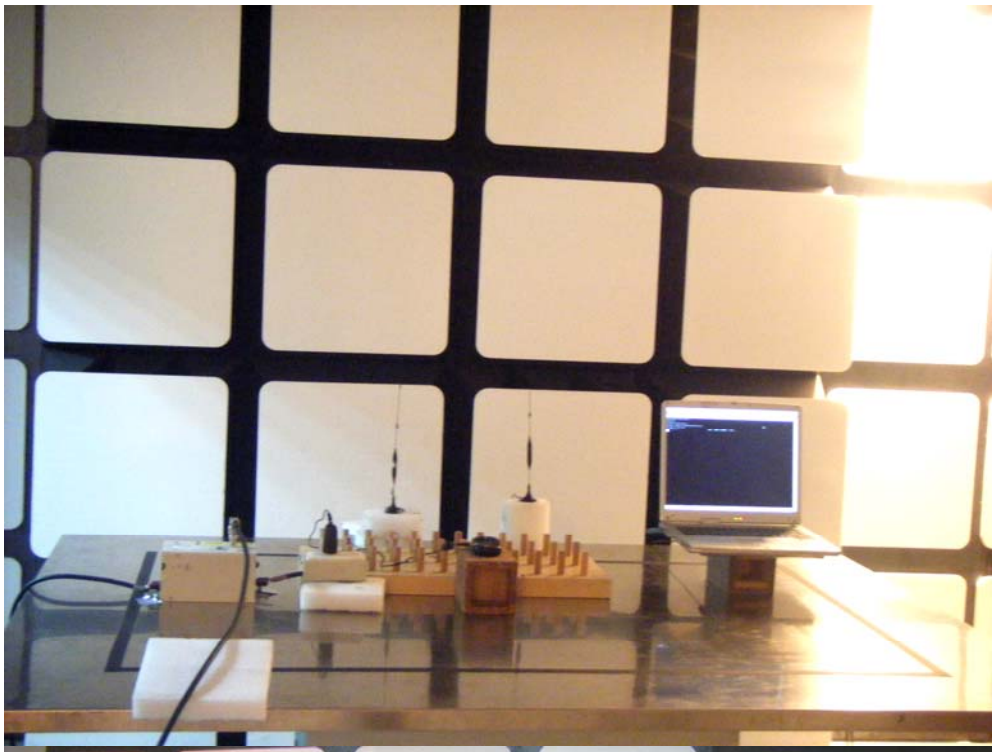
Front View



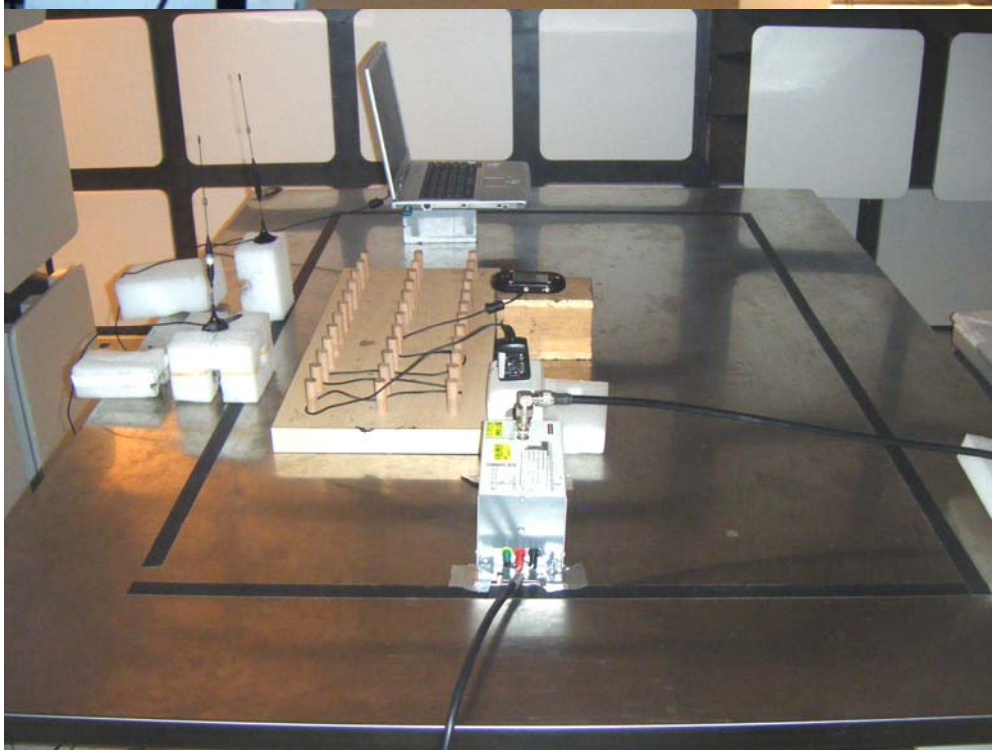
Rear View

Mode 3

Front View

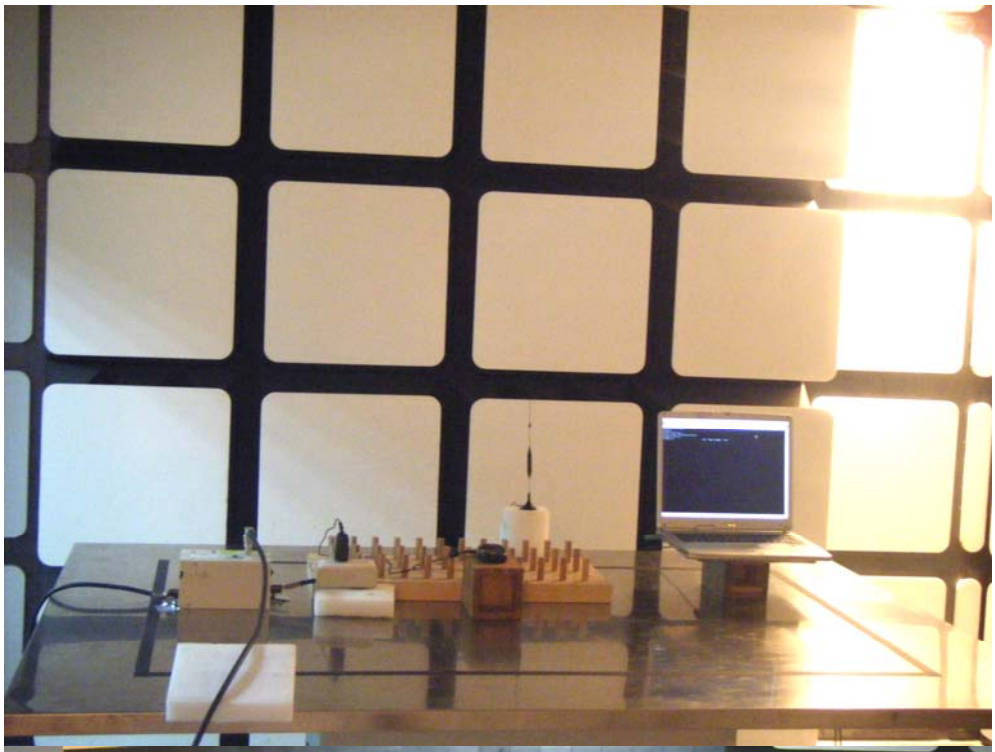


Rear View

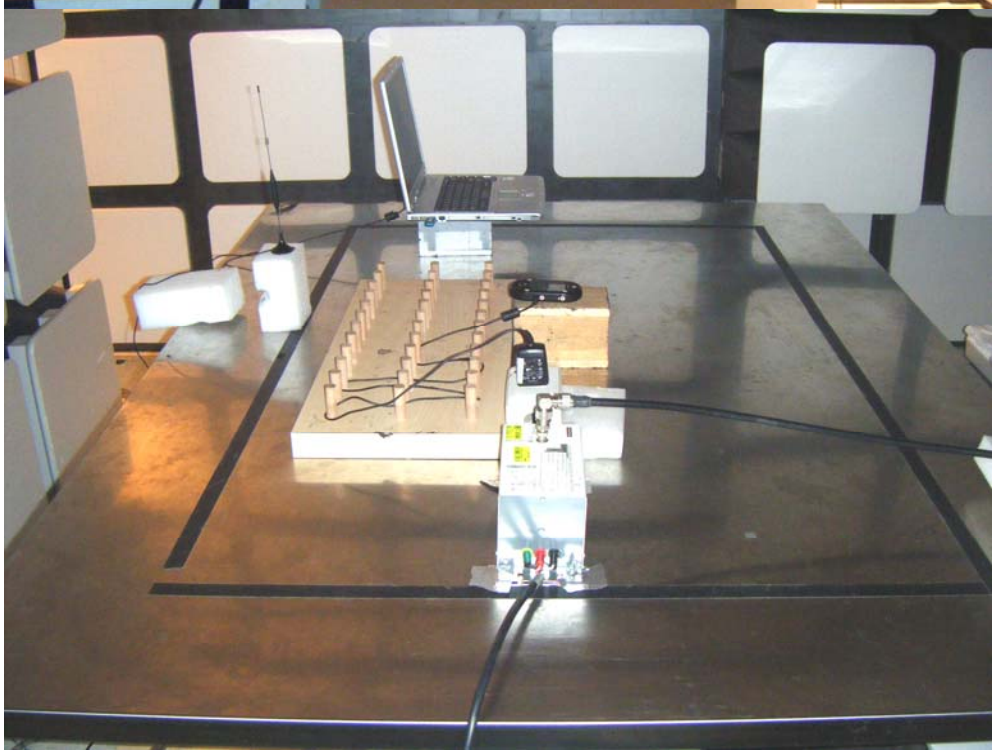


Mode 4

Front View

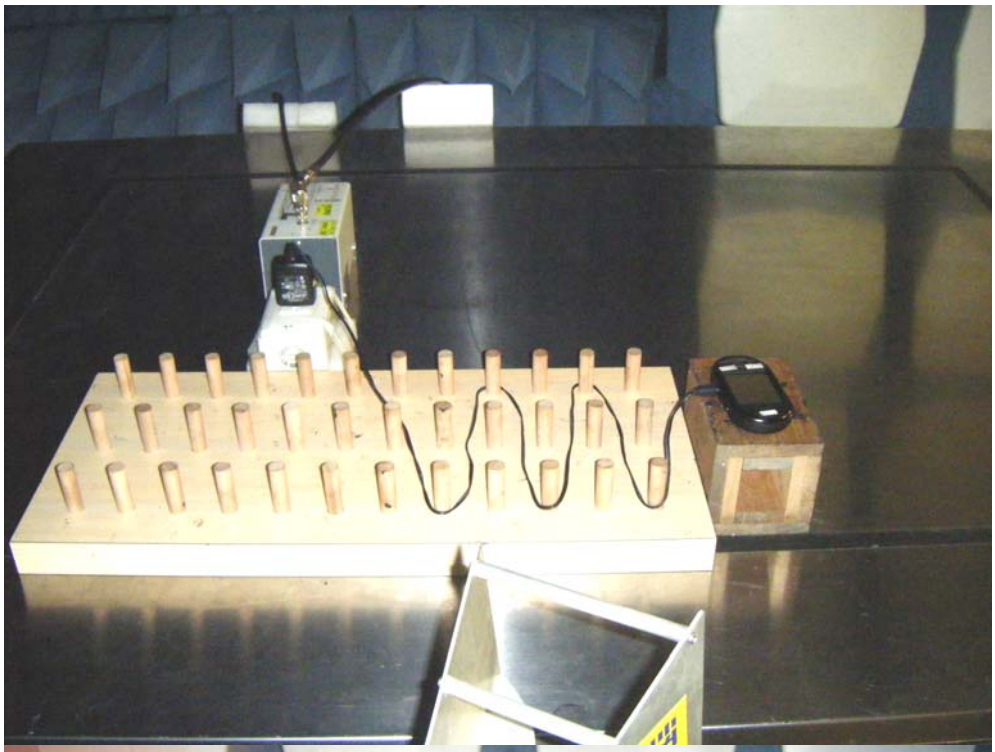


Rear View

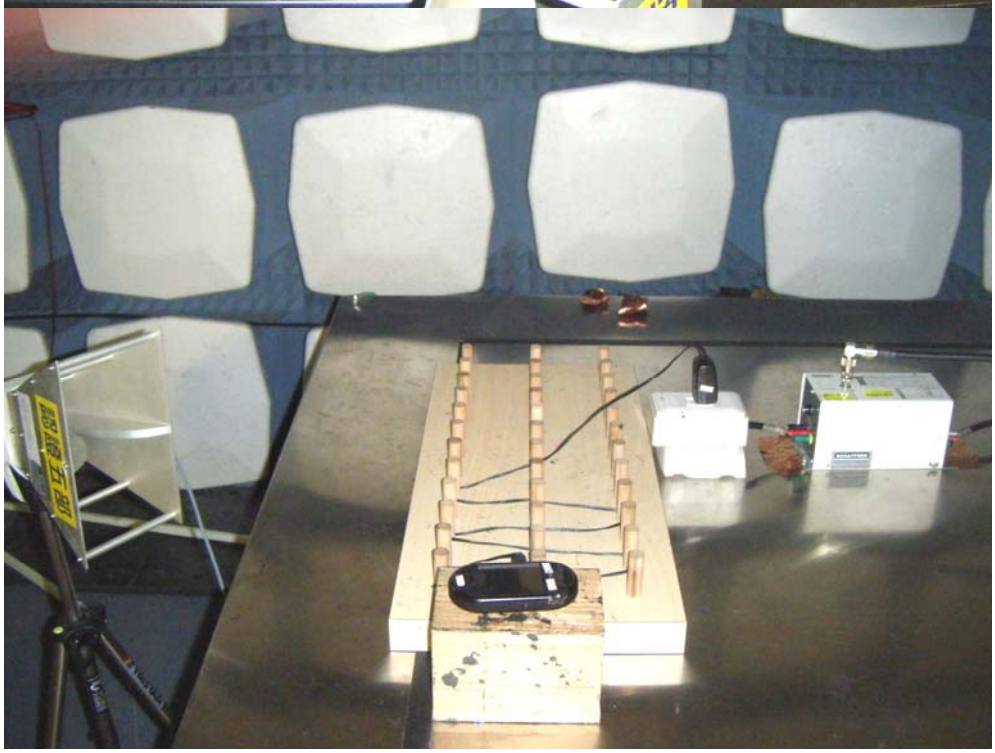


Mode 5

Front View



Rear View



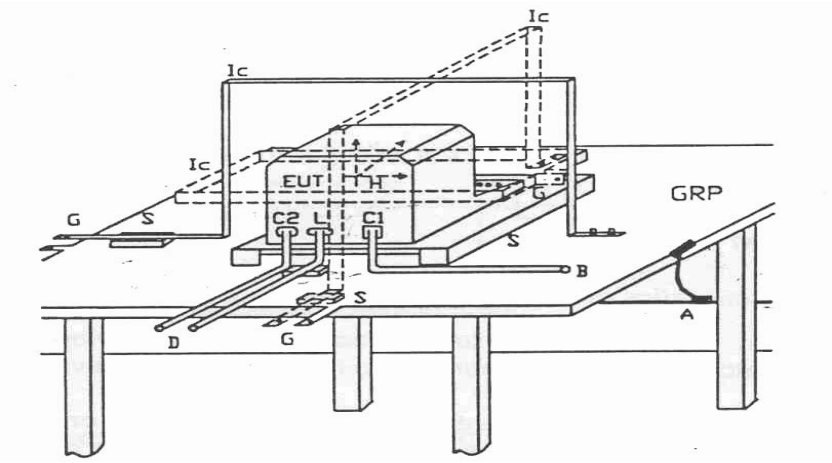
14. Power Frequency Magnetic Field Immunity Tests

- Final Test Result : **PASS**
- EUT Performance : A
- Required Performance Criteria : B
- Basic Standard : EN 61000-4-8
- Product Standard : EN 55024
- Power Frequency Magnetic Field : 50Hz, 1Am
- Temperature : 23~26℃
- Relative Humidity : 50~52%
- Atmospheric Pressure : 98kPa
- Test Date : Dec. 22, 2007
- Observation : Normal
- Test Engineer : Sun

14.1 Test Record

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Results
50Hz, 1A/m	1.0 Min	X-axis	Pass
50Hz, 1A/m	1.0 Min	Y-axis	Pass
50Hz, 1A/m	1.0 Min	Z-axis	Pass

14.2 Test Setup



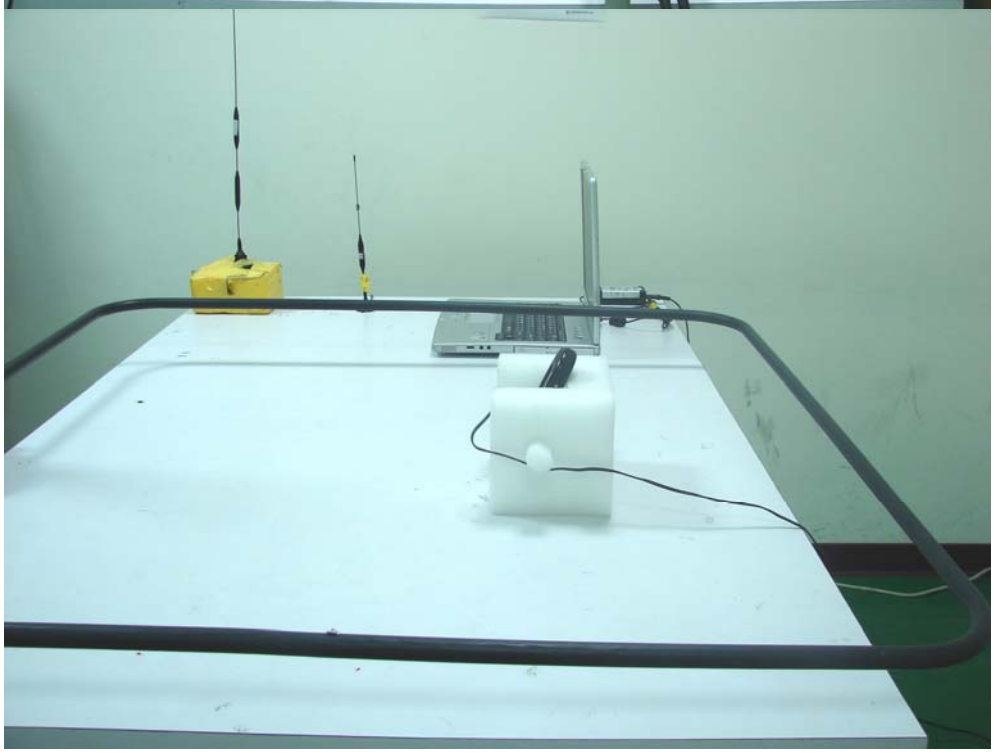
GRP:	Ground plane	C1:	Power supply circuit
A:	Safety earth	C2:	Signal circuit
S:	Insulating support	L:	Communication line
EUT:	Equipment under test	B:	To power supply source
Lc:	Induction coil	D:	To signal source, simulator
E:	Earth terminal	G:	To the test generator

14.3 Photographs of Power Frequency Magnetic Field Immunity Tests

Mode 1

Front View

Rear View



Mode 2

Front View

Rear View

15. Voltage Dips and Voltage Interruptions Immunity Tests

15.1 Standard

- EN 61000-4-11

15.2 Test Conditions

1. Source voltage and frequency : 230V / 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequence of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5 μs.
5. Test severity :

Voltage dip and Interrupt reduction (%)	Test Duration (ms)
30	500
60	100
100	10
100	80
100	5000

15.3 Testing Requirement and Procedure

The test was based on EN 61000-4-11 (1994)

15.4 Test Record

15.4.1Test Record of Voltage Interruption

Voltage (V)	Phase Angle								Reduction (%)	Duration (ms)
	0 °	45 °	90 °	135 °	180 °	225 °	270 °	315 °		
230	CT/CR								>95%	5000

15.4.2 Test Record of Voltage Dips

Voltage (V)	Phase Angle								Reduction (%)	Duration (ms)
	0 °	45 °	90 °	135 °	180 °	225 °	270 °	315 °		
230	CT/CR								30%	10
230	CT/CR								60%	100

15.5 Test Result of Voltage Dips and Voltage Interruptions Immunity Tests

- Final Test Result : **PASS**
- EUT Performance : CT/CR
- Required Performance Criteria : TT/TR
- Basic Standard : EN 61000-4-11
- Product Standard : EN 301 489-7, EN 301 489-17, EN 55024
- Temperature : 24~26℃ and 21~22℃
- Relative Humidity : 49~51% and 41~42%
- Atmospheric Pressure : 98kPa
- Test Date : Dec. 21, 2007 and Apr. 02, 2008
- Test Engineer : Sun

15.6 Photographs of Voltage Dips and Voltage Interruptions Immunity Tests

Mode 1 and 4

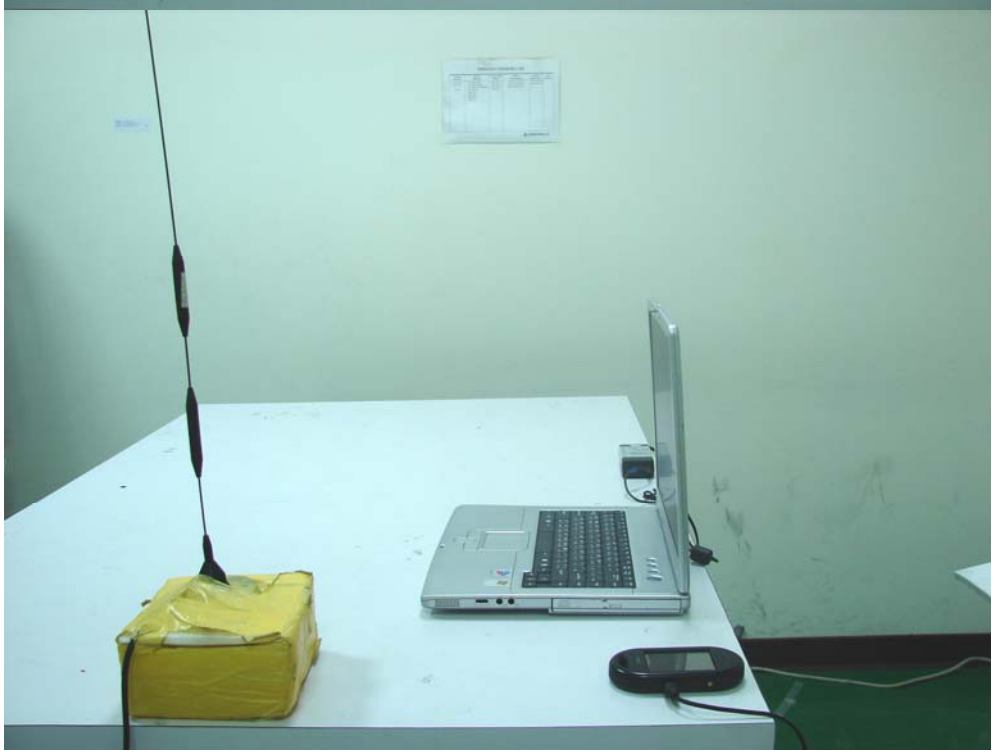
Front View

Rear View

Mode 2

Front View

Rear View



Mode 3

Front View

Rear View

16. Uncertainty Measurement

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
Combined standard uncertainty Uc(y)	**1.13**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.26**		

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.07	Normal(k=2)	0.04
Antenna factor calibration	0.92	Normal(k=2)	0.46
Cable loss calibration	0.19	Normal(k=2)	0.10
Pre Amplifier Gain calibration	0.21	Normal(k=2)	0.11
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.54	Rectangular	0.89
Mismatch	+0.24/-0.24	U-shaped	0.17
Combined standard uncertainty Uc(y)	**1.29**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.58**		

17. List of Measuring Equipment

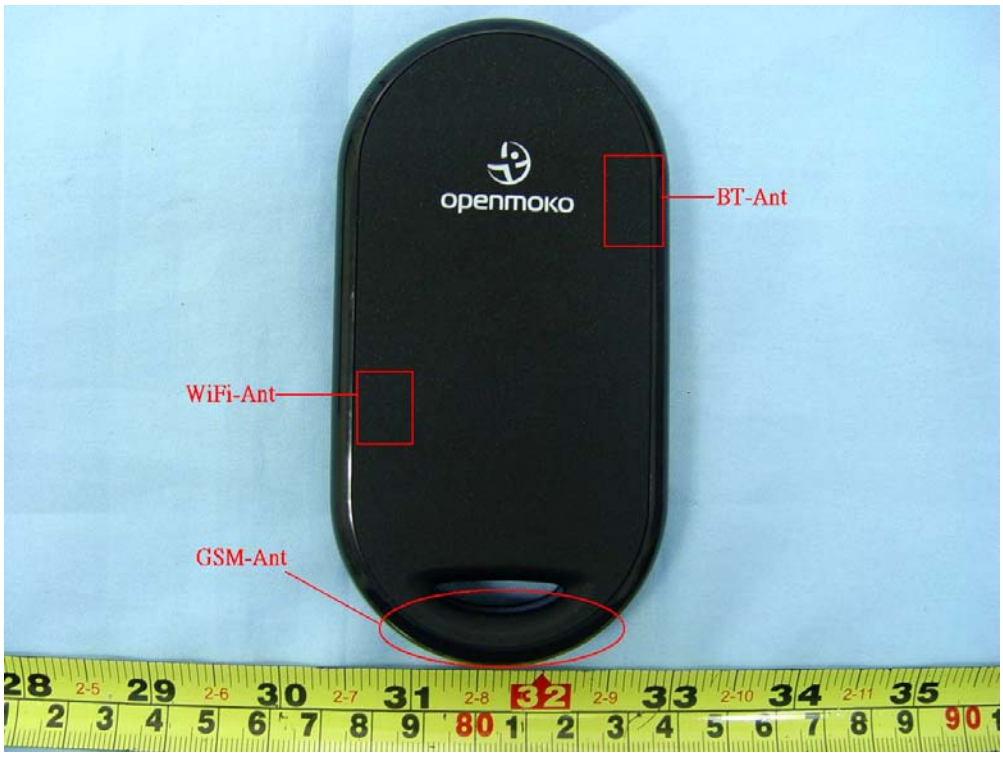
<EMI>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Mar. 03, 2008	Mar. 02, 2009	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2008	Mar. 30, 2009	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2008	Mar. 21, 2009	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2007	Apr. 19, 2008	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Mar. 27, 2008	Mar. 26, 2009	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	N/A	Conduction (CO04-HY)
Spectrum Analyzer	R&S	FSP7	100645	9KHz – 7GHz	Jun. 15, 2007	Jun. 14, 2008	Radiation (10CH02-HY)
Receiver	R&S	ESI	1008	20Hz - 7GHz	May 09, 2007	May 08, 2008	Radiation (10CH02-HY)
Amplifier	Agilent	8447D	2944A10827	100KHz – 1.3GHz	Jun. 28, 2007	Jun. 27, 2008	Radiation (10CH02-HY)
Amplifier	Agilent	8447D	2944A10828	100KHz – 1.3GHz	Jun. 28, 2007	Jun. 27, 2008	Radiation (10CH02-HY)
Biconical Antenna	Schwarzbeck	VHBB 9124	287	30MHz –200MHz	Dec. 22, 2007	Dec. 21, 2008	Radiation (10CH02-HY)
Log Antenna	Schwarzbeck	VUSLP 9111	207	200MHz -1GHz	Dec. 22, 2007	Dec. 21, 2008	Radiation (10CH02-HY)
Turn Table	HD	DS 430	430/360	0 ~ 360 degree	N/A	N/A	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/664	1 m - 4 m	N/A	N/A	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/667	1 m - 4 m	N/A	N/A	Radiation (10CH02-HY)
RF Cable-R10m	Jye Bao	RG142	CB027-INSIDE	30MHz~1GHz	Nov. 30, 2007	Nov. 29, 2008	Radiation (10CH02-HY)
RF Cable-R10m	Suhner Switzerland + BELDEN	RG223/U + RG8/U	CB026-DOOR	30MHz~1GHz	Nov. 30, 2007	Nov. 29, 2008	Radiation (10CH02-HY)
Spectrum Analyzer	R&S	FSP7	100645	9KHz – 7GHz	Jun. 15, 2007	Jun. 14, 2008	Radiation (10CH02-HY)

<EMS>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
ESD Simulator	KeyTek	MINIZAP	0406338	±0.5 KV ~ 15 KV	Jul. 25, 2007	Jul. 24, 2008	ESD
Audio Analyzer	R&S	UPL 16	1000171	N/A	Dec. 18, 2007	Dec. 17, 2008	CS
Conditioning Amplifier	B&K	26900052	2438527	N/A	Oct. 18, 2007	Oct. 17, 2008	CS
Coupling/Decoupling Network	Schaffner	CDN M016	20578	26MHz ~ 230MHz	Aug. 20, 2007	Aug. 19, 2008	CS
RF Generator	Schaffner	NSG 2070	N/A	N/A	Aug. 15, 2007	Aug. 14, 2008	CS
EM CLAMP	Schaffner	KEMZ 801	22048	0.15MHz ~ 1000MHz	Nov. 27, 2007	Nov. 26, 2009	CS
Attunator	Schaffner	CAL801	18805.1	N/A	Aug. 22, 2007	Aug. 21, 2008	CS
Acoustical Calibrator	B&K	4231	2402583	94 dB SPL-1000Hz	Jan. 18, 2008	Jan. 17, 2009	RS
Antenna	ETS-Lindgren	3142B	00022054	N/A	N/A	N/A	RS
Linear Power Amplifier	Milmega	AS0825-65	1004599	1MHz ~ 3GHz	N/A	N/A	RS
Mouth Simulator	B & K	4227	02390895	N/A	N/A	N/A	RS
RF Power Amplifier	Frankonia	FLH200/100	0014	80MHz ~ 1GHz	N/A	N/A	RS
Radiation Meter	Narda	EMR-20	AR-0188	100KHz~3GHz	Oct. 22, 2007	Oct. 21, 2008	RS
EAR SIMULATOR	B&K	4185	2387035	N/A	N/A	N/A	RS
EAR SIMULATOR	B&K	4195	2447515	N/A	N/A	N/A	RS
Signal Generator	R & S	SML-03	101137	N/A	Oct. 16, 2007	Oct. 15, 2008	RS
EMC Immunity Test System	KeyTek	EMC PRO	030194	0KV-4.4KV	Nov. 15, 2007	Nov. 14, 2008	EFT, SURGE, DIP
Magnetic Field Test Generator	KeyTek	F-1000-4-8-G-125A	04013	N/A	Oct. 18, 2007	Oct. 17, 2008	MF

Appendix A. Photographs of EUT

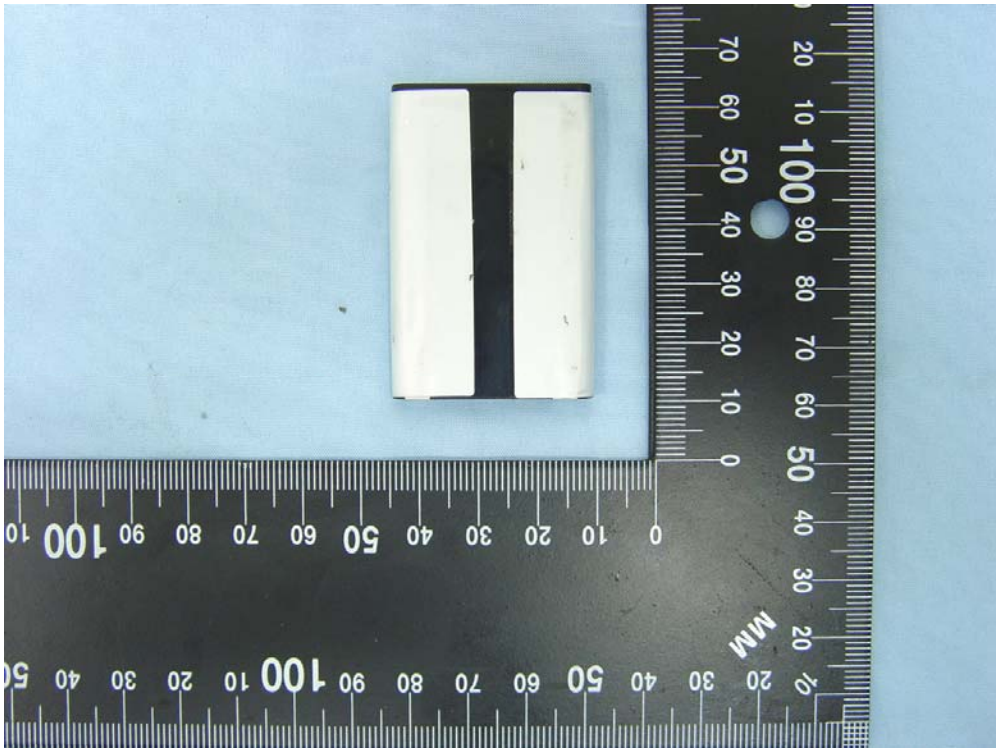


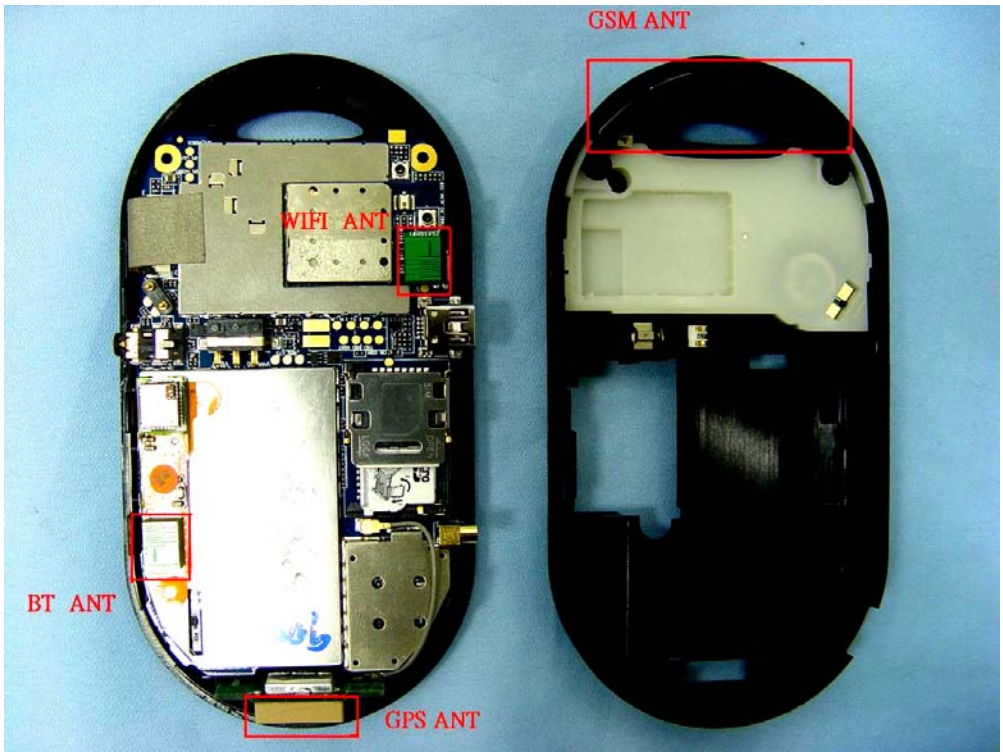

NEO1973

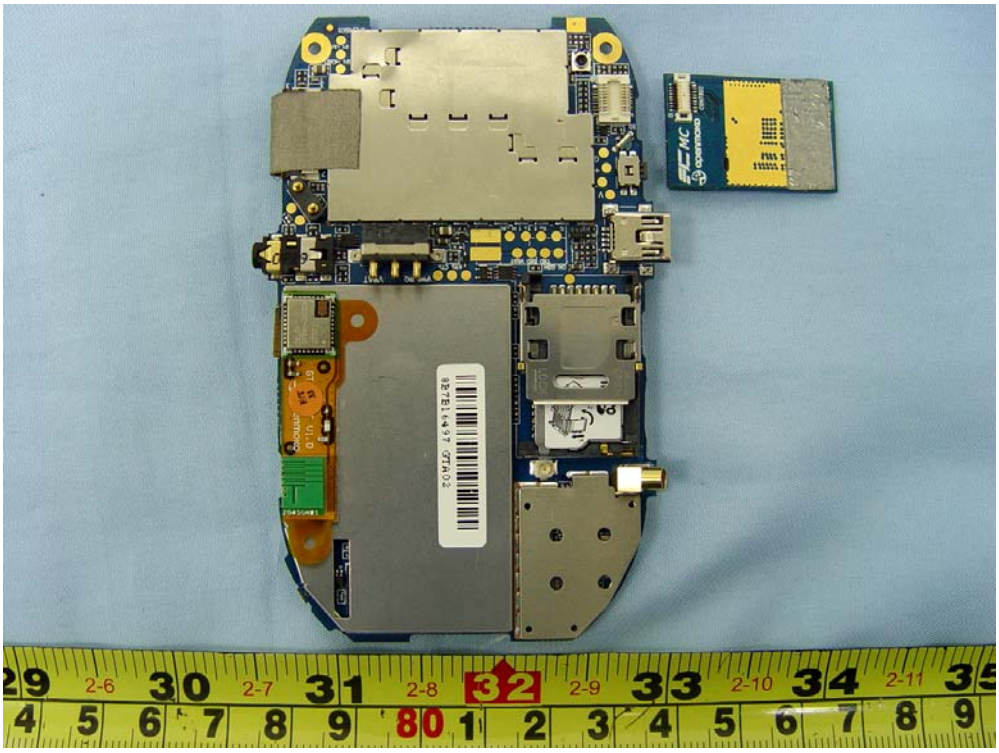

openmoko

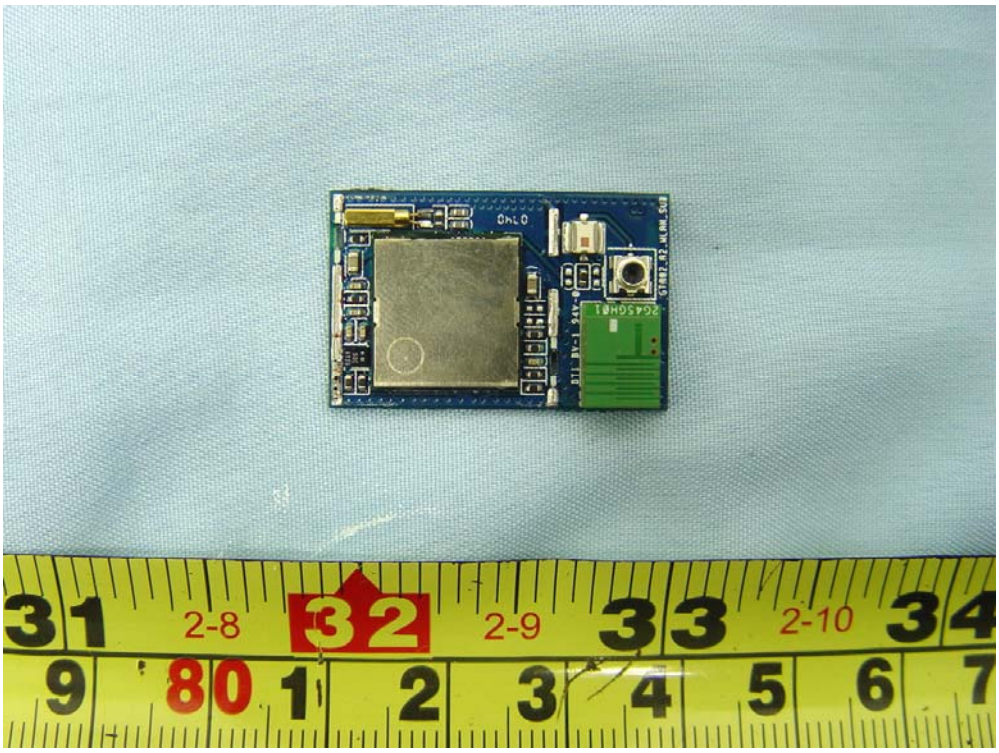

First International Computer, Inc.
Model: GTC-01/GTA-01
Standard Battery Pack
1200mAh Li-ion
Rechargeable Battery: 3.7V
Caution:
1. Do not incinerate.
2. Do not disassembly.
3. Do not short circuit.
4. Do not expose to high temperatures (140°F/60°C).
5. Dispose of properly.
6. Use specified charger only.
7. Battery must be fully charged before initial use.
WDMA070200260
Manufactured in Taiwan

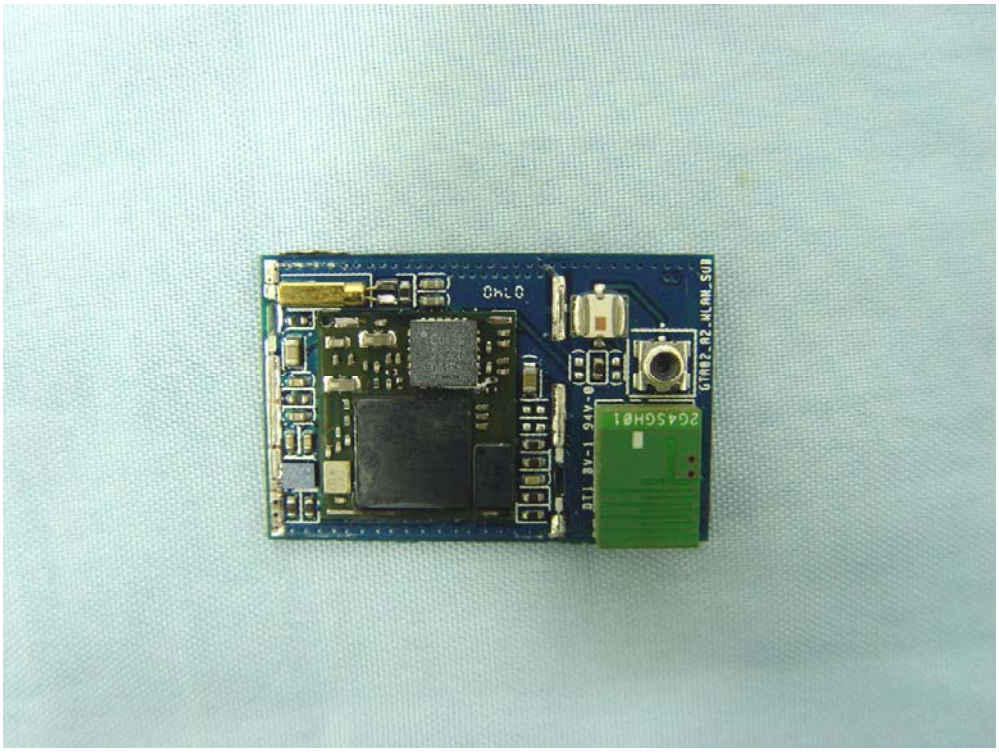

First International Computer, Inc.
Model: GTA02
Standard Battery Pack
1200mAh Li-ion
Rechargeable Battery: 3.7V
Caution:
1. Do not incinerate.
2. Do not disassembly.
3. Do not short circu
4. Do not expose to high temperatures(140 °F/60 °C).
5. Dispose of properly.
6. Use specified charger only.
7. Battery must be fully charged before initial use.
HF083
Manufactured in Taiwan




GSM ANT
WIFI ANT
BT ANT
GPS ANT



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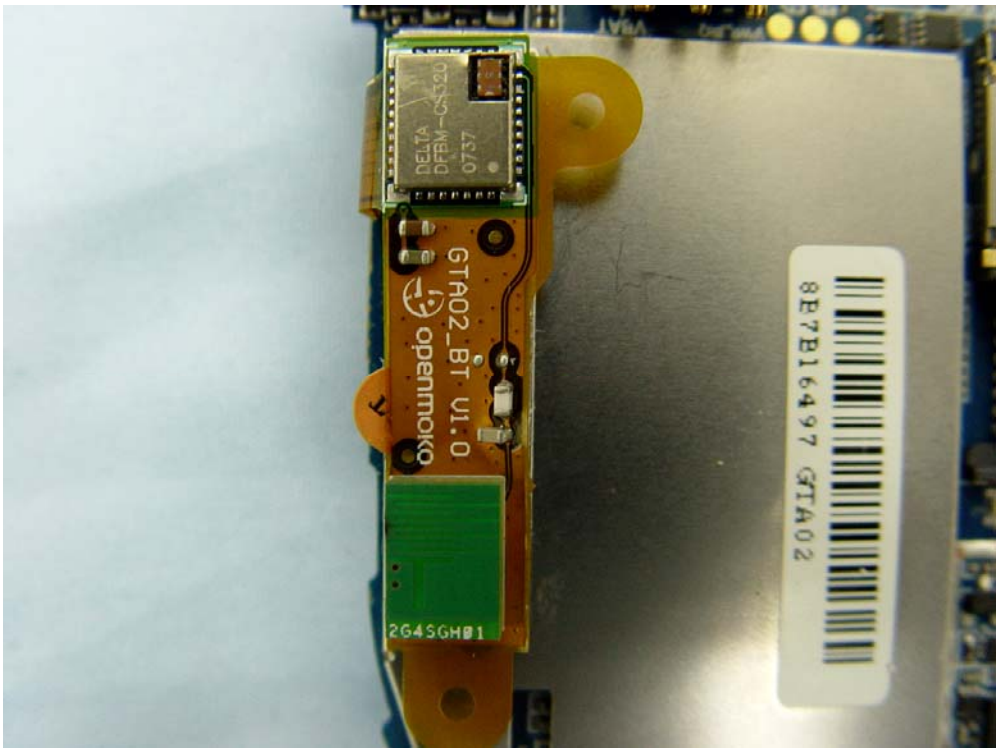
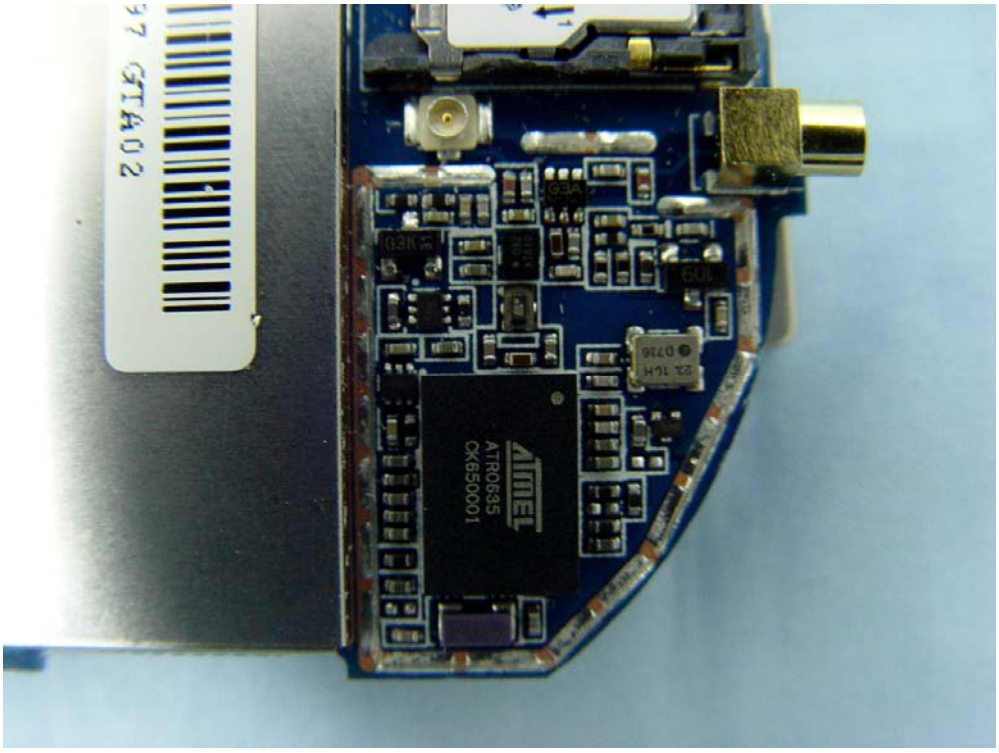
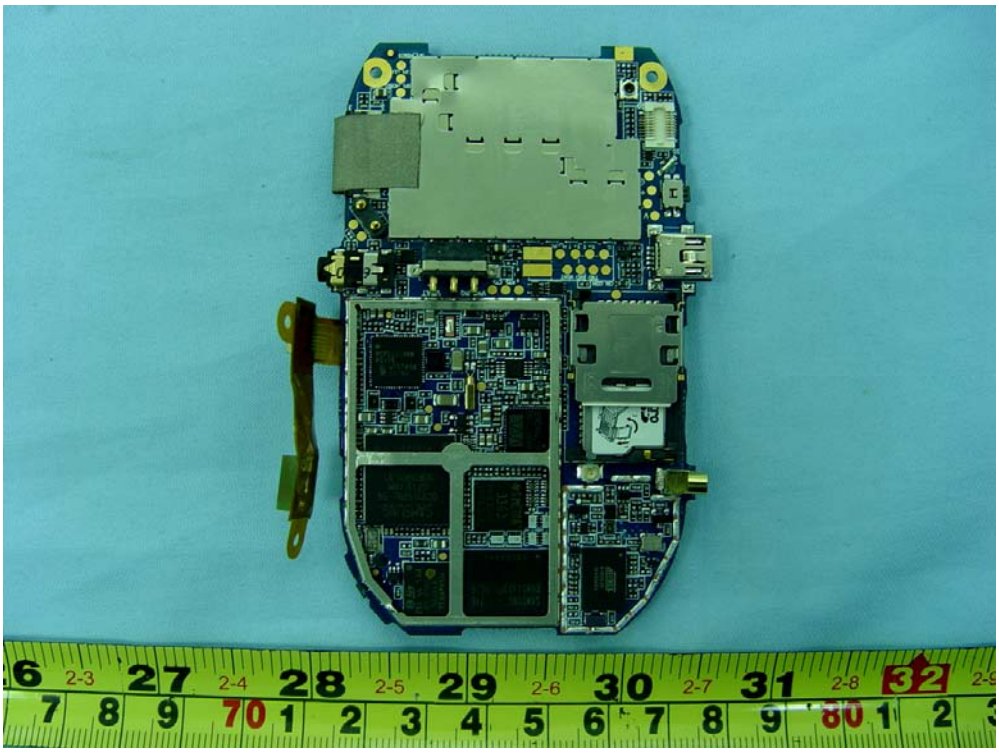
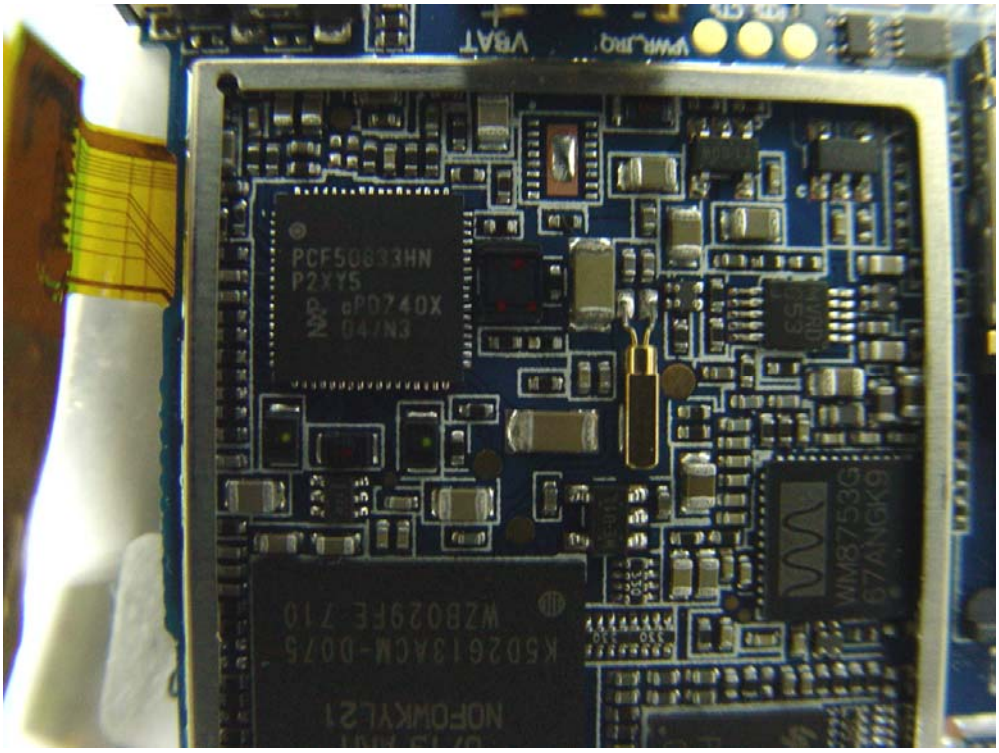
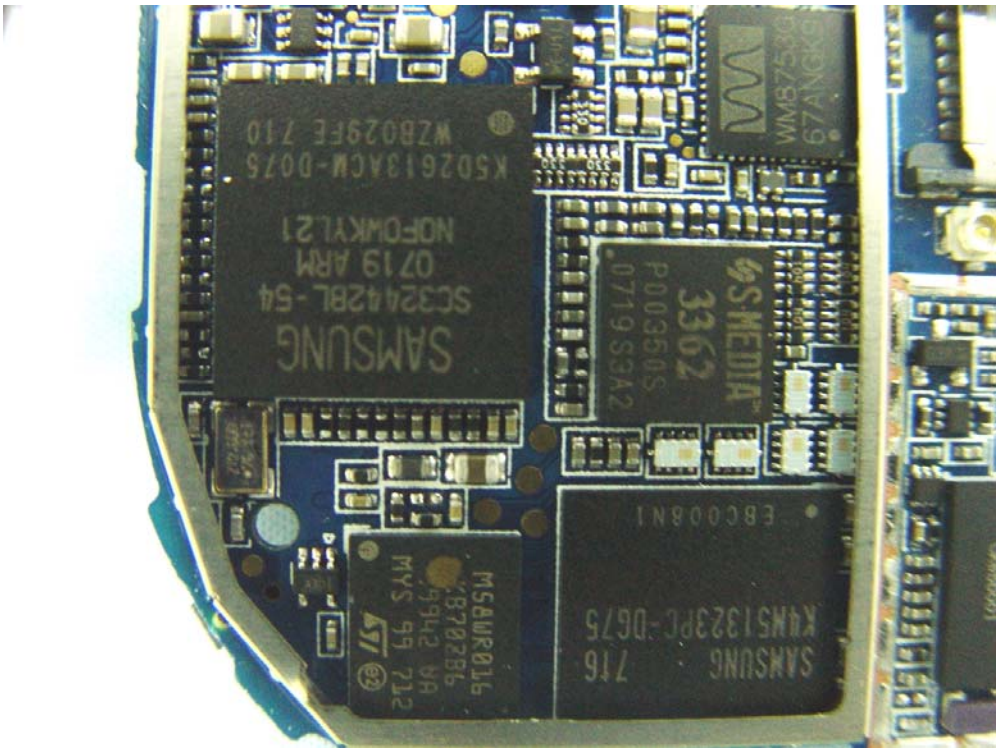
2G4SGH01

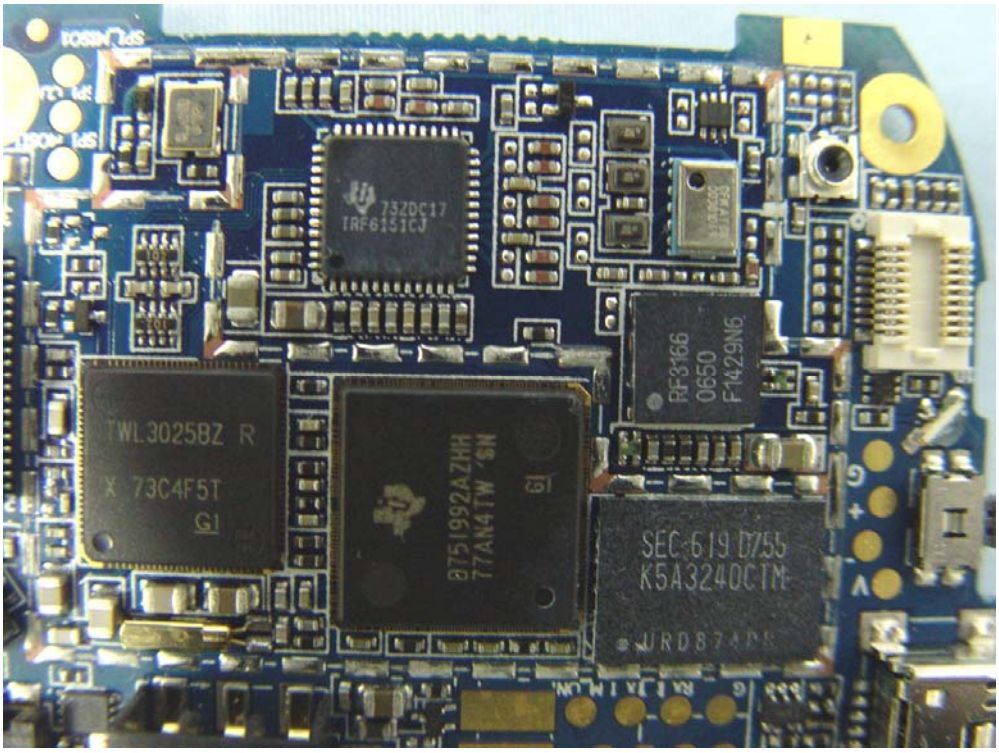

DELTA
DFBM-CS320
0737
GTA02_BT V1.0
openmoko
8E7B16497 GTA02
2G4SGH01


ATR0635
CK850001




PCF50833HN
P2XY5
WM8753G
67ANGK9


SAMSUNG
SC32442BL-54
0719 ARM
S3362
WM8753G
67ANGK9


TWL3025BZ R
X 73C4F5T
G1
SEC-619 D755
K5A3240CTM


openmoko
TECHNOLOGY
MODEL NO.:A10P1-05MP
INPUT:100-240V~ /0.3A,
47-63Hz
OUTPUT :+5V 2.0A
LISTED I.T.E
POWER SUPPLY
CLASS II
E123986
LPS
N136
EL
IV
Made In China
P1
P5


openmoko
MODEL NO.:A10P1-05MP
INPUT:100-240V~ /0.3A,
47-63Hz
OUTPUT :+5V 2.0A
LPS
EL
N136
Made In China
P1
P5


openmoko
MODEL NO.:A10P1-05MP
INPUT:100-240V~ /0.3A,
47-63Hz
OUTPUT : +5V 2.0A
LPS
EL
Made In China