



Issue Date : March 4, 2004
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***EMC* EMISSION - TEST REPORT**

JQA APPLICATION No. : KL80030711

Name of Product : GSM-WCDMA Dual Cellular Phone

Model/Type No. : V801SH

FCC ID : APYHRO00032

Applicant : Sharp Corporation, Communication Systems Group

Address : 2-13-1, Iida Hachihonmatsu, Higashihiroshima-city,
: Hiroshima 739-0192, JAPAN

Manufacturer : Sharp Corporation, Communication Systems Group

Address : 2-13-1, Iida Hachihonmatsu, Higashihiroshima-city,
: Hiroshima 739-0192, JAPAN

Receive date of EUT : February 9, 2004

Final Judgement : **passed**

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) under METI Japan and Communications Research Lab. (CRL) under MPHPT Japan.

THE TEST RESULTS only responds to the test sample. This test report shall not be reproduced except in full.

Authorized by:

Takashi Yamanaka, Director
JQA KITA-KANSAI Testing Center

DIRECTORY

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- PCS1900 -	
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TEST REGULATION

FCC Rules and Regulations Part 24 (October 1, 2002)

1900 MHz systems (Part 24)

- Narrowband PCS
- Broadband PCS

Test procedure:

The tests were performed according to FCC Rules and Regulations Part 2 (October 1, 2002), and ANSI C63.4 (2001).

GENERAL INFORMATION

Test facility:

- 1) Test Facility located at Kita-Kansai : 1st Open Site (3 m Site)
Test Facility located at Kameoka : 1st Open Site (3, 10 and 30 m, on common plane)
: 2nd Open Site (3 and 10 m, on common plane)

FCC filing No. : 31040/SIT 1300F2

- 2) KITA-KANSAI TESTING CENTER is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance established in Title 15, Part 285 Code of Federal Regulations.
NVLAP Lab Code: 200191-0

Definitions for symbols used in this test report:

- Black box indicates that the listed condition, standard or equipment is applicable for this Report.
- Blank box indicates that the listed condition, standard or equipment is not applicable for this Report.

Description of the Equipment Under Test (EUT):

- 1) Name : GSM-WCDMA Dual Cellular Phone
- 2) Model/Type No. : V801SH
- 3) Product Type : Pre-Production(Serial No.: 350228/00/004002/5)
- 4) Category : Broadband PCS
- 5) EUT Authorization : - Verification - Certification - D.o.C.
- 6) Transmitting Frequency : 1850.2 MHz (512 ch) - 1909.8 MHz (810 ch)(PCS1900)
- 7) Receiving Frequency : 1930.2 MHz (512 ch) - 1989.8 MHz (810 ch) (PCS1900)
- 8) Integrated Antenna : Shortened Mono-pole Antenna
- 9) Emission Designations : 253KGXW(PCS1900)
- 10) Maximum RF Output Power : 1.300W(EIRP)(PCS1900)
- 11) Power Rating : 4.0VDC
- 12) Channel Numbers and Frequencies :

PCS1900

The carrier spacing is 200 kHz.

The carrier frequency is designated by the absolute frequency channel number (ARFCN).

The carrier frequency is expressed in the equation shown as follows:

$$\text{TX frequency (in MHz)} = 1850.2 + 0.2 \times (n - 512)$$

$$\text{RX frequency (in MHz)} = 1930.2 + 0.2 \times (n - 512)$$

Where n : Channel Number ($512 \leq n \leq 810$)

- 13) Modulation Type : GMSK
- 14) Type of Communication System : GSM

TEST CONDITIONS

Transmitter Power (TP) Measurement (§2.1046(a))

Test Procedure :

The Transmitter Power was measured with a power meter, one 10 dB attenuator and a short, low loss cable.

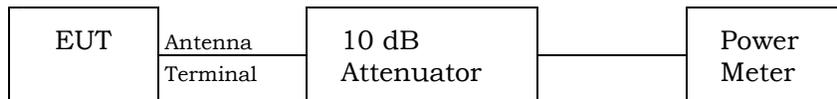


Fig.1 Transmitter Power Measurement

Test location :

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

○ - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

● - Shielded room

Used test instruments and sites :

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - E4417A	B - 51	August, 2003	1 Year
● - E9321A	B - 52	May, 2003	1 Year
○ - 6-20	D - 27		
○ - 4T-10	D - 73		
○ - 4T-10	D - 74		
○ - 2-10	D - 79		
○ - 2-10	D - 80		
● - 54-10	D - 82	November, 2003	1 Year
○ - 54-10	D - 83		

Environmental conditions :

Temperature: 19 °C Humidity: 39 %

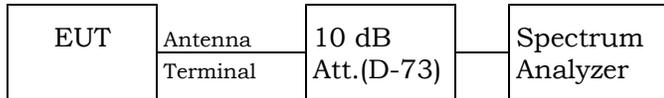
Antenna Conducted Spurious Emission Measurement (§2.1051,§24.238)

Test Procedure :

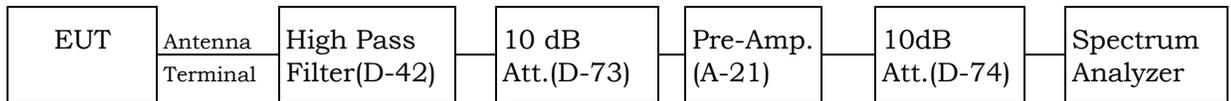
The Antenna Conducted Emission was measured with a spectrum analyzer. The test system is shown as follows:

PCS1900

- 1) Frequency Range : 9kHz - 2.2GHz



- 2) Frequency Range : 2.2GHz -5.8GHz



- 3) Frequency Range : 5.8GHz - 20GHz

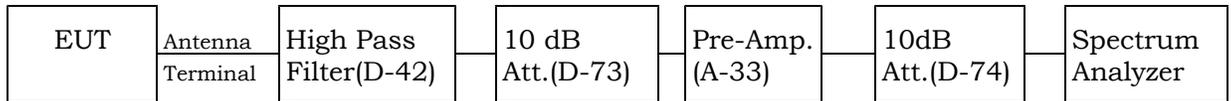


Fig.2 Antenna Conducted Spurious Emission Measurement

JQA Application No.: KL80030711
Model No. : V801SH
FCC ID : APYHRO00032

Regulation : CFR 47 FCC Rules Part 24
Issue Date : March 4, 2004

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Test location :

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - 8566B	A - 13	February, 2003	1 Year
○ - 8593A	A - 15		
○ - MP721C	D - 65		
● - 4T-10	D - 73	May, 2003	1 Year
● - 4T-10	D - 74	May, 2003	1 Year
○ - 2-10	D - 79		
○ - 2-10	D - 80		
○ - WJ-6611-513	A - 23		
● - WJ-6882-824	A - 21	May, 2003	1 Year
● - DBL-0618N515	A - 33	May, 2003	1 Year
● - UHP-127	D - 42	May, 2003	1 Year
○ - UHP-128	D - 43		

Environmental conditions:

Temperature: 20 °C Humidity: 40 %

Transmitter Power (EIRP) Measurement (§24.232)

Test Procedure :

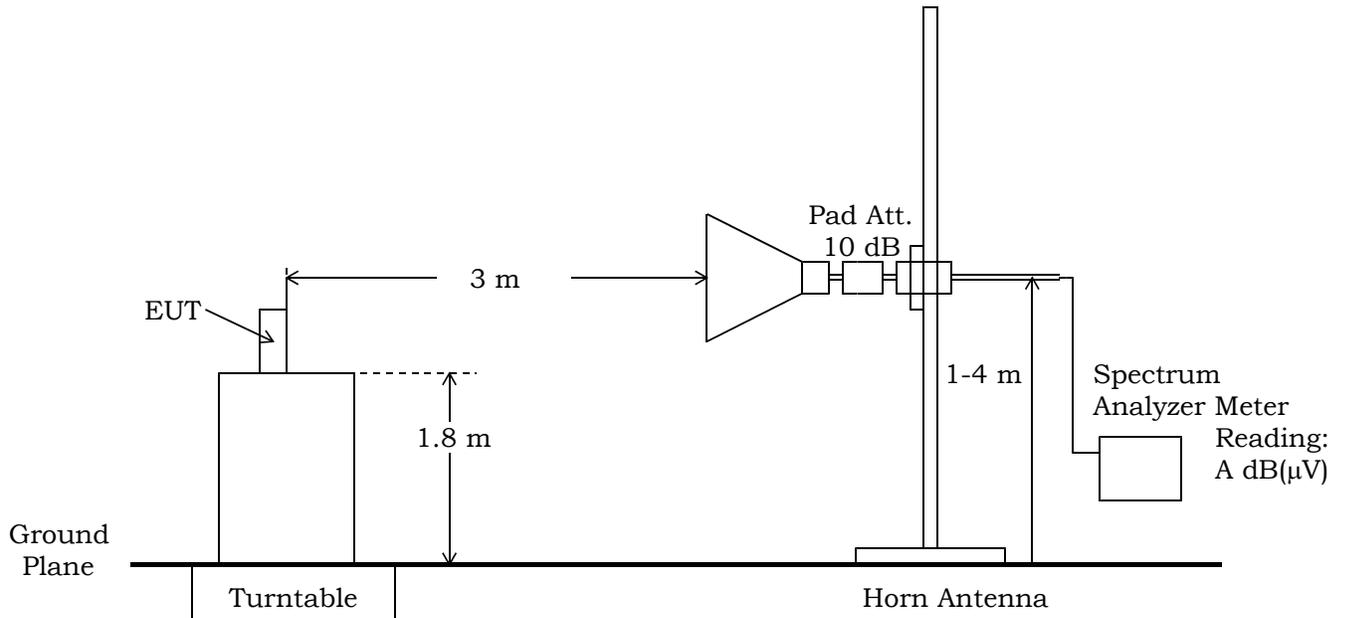
Step 1) The test was set-up shown as Fig.3 (a). In order to obtain the maximum emission, the EUT is placed at the height 1.8m on the non-conducted support, at the distance 3m from the receiving antenna (Horn Antenna) and rotated around 360 degrees. The receiving antenna height was varied from 1 m to 4 m. The EUT on the table was placed to be maximum emission against the receiving antenna polarized (Vertical and Horizontal). Then the meter reading of the spectrum analyzer at the maximum emission was A dB(μ V).

Step 2) The test was set-up shown as Fig.3 (b). The EUT was replaced to Horn antenna at the same polarized under the same condition as step 1. The RF power was fed to the transmitting Antenna (Horn Antenna) through the RF amplifier from the signal generator. In order to obtain the maximum emission level, the height of the receiving antenna is varied from 1 m to 4 m. The level of the signal generator was adjusted so that the meter reading of the spectrum analyzer at the maximum emission was A dB(μ V), same as the recorded level in step 1. Then the RF power into the substitution horn antenna was P(dBm).

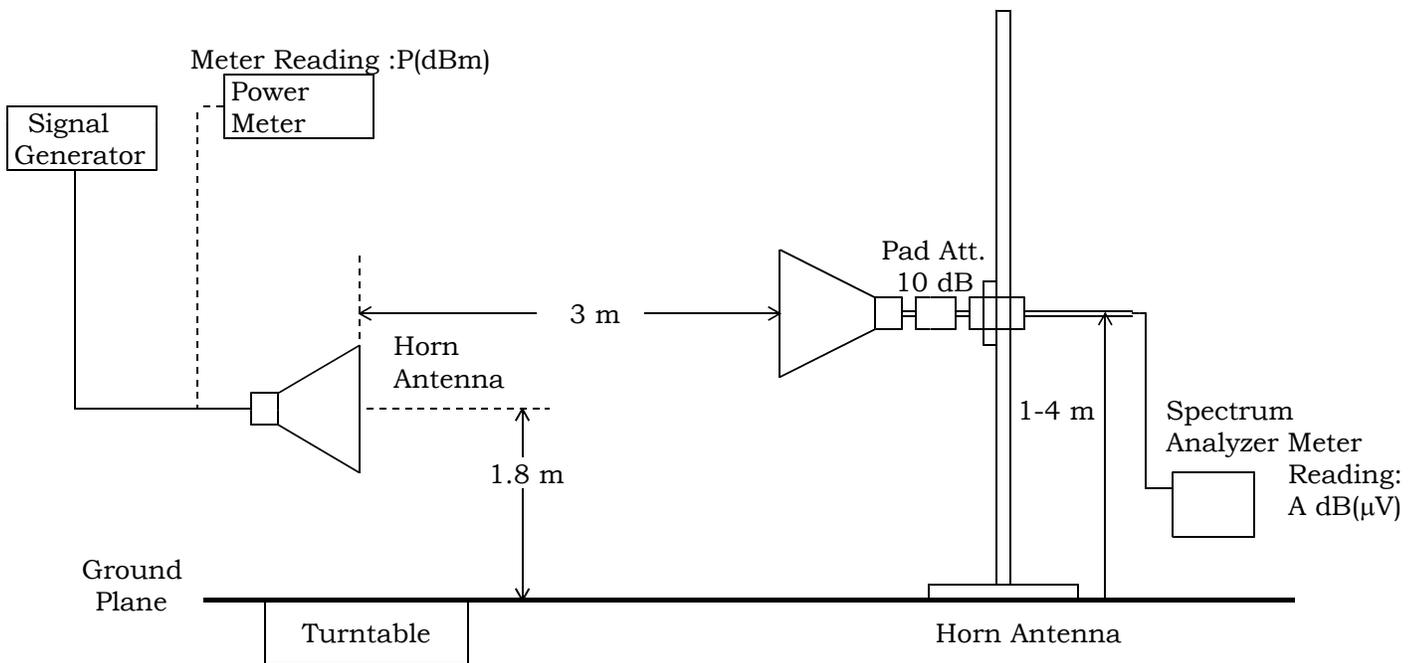
The EIRP is calculated in the following equation.

$$\text{EIRP (dBm)} = P \text{ (dBm)} + G_h \text{ (dBi)}$$

Where, G_h (dBi) : Gain of the substitution horn antenna



(a) EUT



(b) Substitution Horn Antenna

Fig.3 Maximum Transmitter Power (EIRP) Measurement

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - 1st open test site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - 1st open test site ○ - 3 m ○ - 10 m ○ - 30 m

○ - 2nd open test site ○ - 3 m ○ - 10 m

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
○ - ESCS 30	A - 1		
○ - ESCS 30	A - 9		
● - 8566B	A - 13	February, 2003	1 Year
○ - 8593A	A - 15		
○ - ESV	A - 6		
● - 4T-10	D - 73	May, 2003	1 Year
○ - 4T-10	D - 74		
○ - 2-10	D - 79		
○ - 2-10	D - 80		
○ - WJ-6611-513	A - 23		
○ - WJ-6882-824	A - 21		
○ - DBL-0618N515	A - 33		
● - 91888-2	C - 40 - 1	May, 2003	1 Year
● - 91888-2	C - 41 - 1	May, 2003	1 Year
○ - 91889-2	C - 41 - 2		
○ - 94613-1	C - 41 - 3		
○ - 91891-2	C - 41 - 4		
○ - 94614-1	C - 41 - 5		
○ - 3160-09	C - 48		
○ - 355C	D - 22		
○ - 355D	D - 23		
○ - MZ5010C	D - 81		
● - Cable	C - 40 - 11	May, 2003	1 Year
● - Cable	C - 40 - 12	May, 2003	1 Year
● - E4417A	B - 51	August, 2003	1 Year
● - E9321A	B - 52	May, 2003	1 Year
○ - MG3681A	B - 3		
● - 6062A	B - 44	May, 2003	1 Year

Temperature: 20 °C Humidity: 37 %

Unwanted Radiation Measurement (§2.1053,§22.917,§24.238) - ERP method -

Test Procedure :

Step 1) The spurious radiation for transmitter were measured at the distance 3 m away from the EUT which was placed on a non-conducted support 1.0 m in height and was varying at three orthogonal axes. The receiving antenna was oriented for vertical polarization and varied from 1 m to 4 m until the maximum emission level was detected on the measuring instrument. The EUT was rotated 360 degrees until the maximum emission was received. The measurement was also repeated with the receiving antenna in the horizontal polarization. This test was carried out using the loop antenna for up to 30 MHz, using the half-wave dipole antenna for up to 1GHz and using the horn antenna for above 1 GHz.

Step 2) The ERP measurement was carried out with according to Step 2 in page 9. Then the RF power in the substitution antenna half-wave dipole antenna for up to 1 GHz and the substitution horn antenna for above 1 GHz.

The EIRP is calculated in the following equation.

A) Up to 1 GHz

$$ERP(dBm) = P (dBm) - (\text{Balun Loss of the half-wave dipole Ant. (dB)}) + \text{Cable Loss}(dB)$$

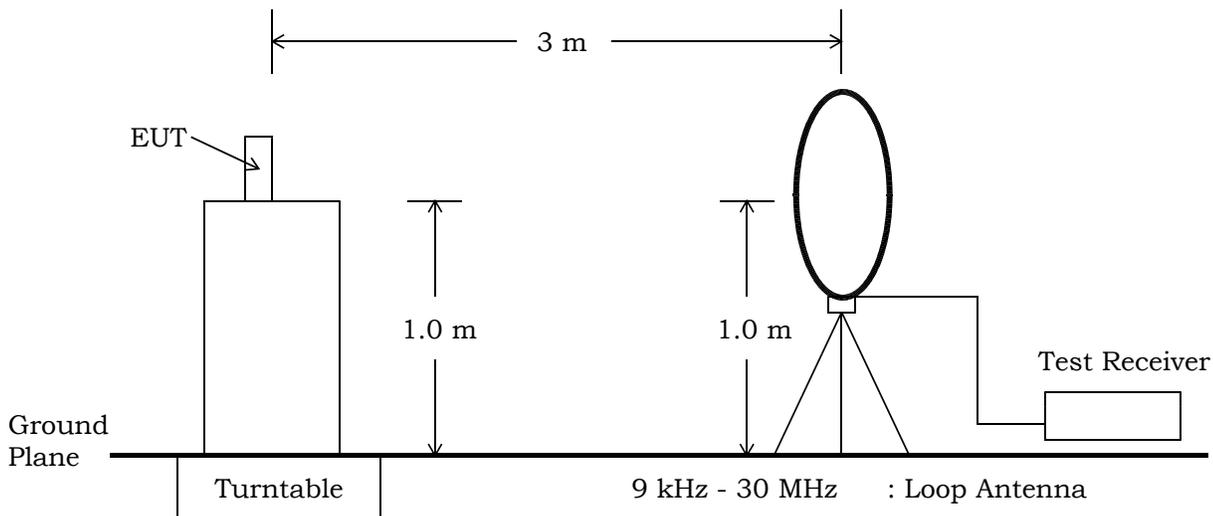
B) Above 1 GHz

$$ERP(dBm) = P (dBm) + Gh(dBi) - Gd(dBi)$$

Where, Gh(dBi) : Gain of the substitution horn antenna

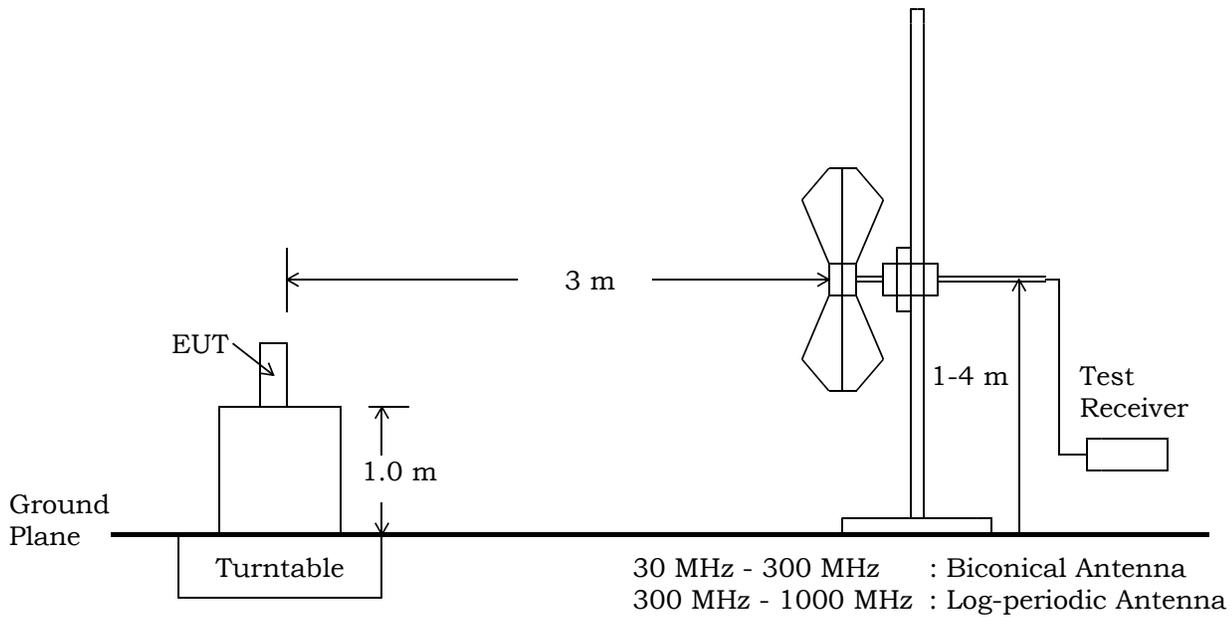
Gd(dBi) : Gain of the substitution half-wave dipole antenna

The respective calculated ERP of the spurious and harmonics were compared with the EIRP and ERP of fundamental frequency by specified attenuation limits, $43+10\log_{10}(TP \text{ in watt})[dB]$. Where, TP = Transmitter power at the ANT OUT under test configuration as the hands free unit used.

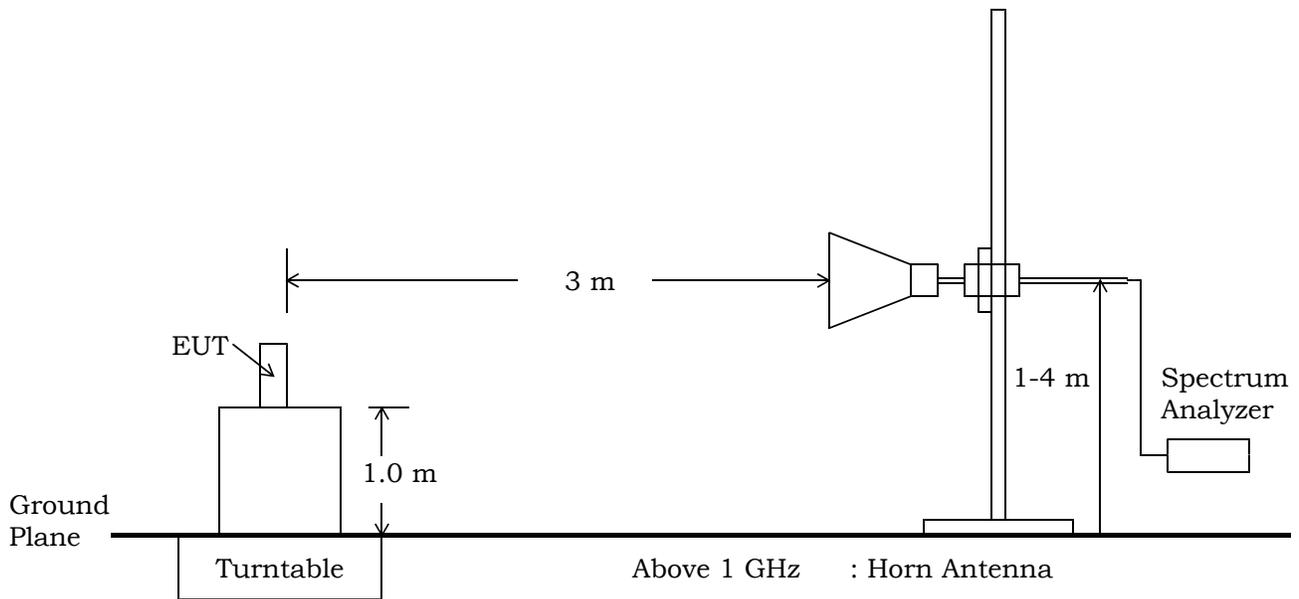


(a) Measurement set up for up to 30 MHz

Fig.4 Unwanted Radiation Measurement



(b) Measurement set up for up to 1 GHz



(c) Measurement set up for above 1GHz

Fig.4 Unwanted Radiation Measurement

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - 1st open test site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - 1st open test site ○ - 3 m ○ - 10 m ○ - 30 m

○ - 2nd open test site ○ - 3 m ○ - 10 m

Validation of Site Attenuation:

1) Last Confirmed Date : October 9, 2003

2) Interval : 1 Year

Used test instruments :

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - ESCS 30	A - 1	August, 2003	1 Year
○ - ESCS 30	A - 9		
○ - ESH 2	A - 2		
○ - ESH 2	A - 3		
● - HFH2-Z2	C - 2	July, 2003	1 Year
○ - HFH2-Z2	C - 3		
● - Cable	H - 28	July, 2003	1 Year
○ - ESV/ESV-Z3	A - 7 / A - 17		
○ - ESV/ESV-Z3	A - 6 / A - 18		
○ - ESV/ESV-Z3	A - 4 / A - 20		
○ - ESV/ESV-Z3	A - 8 / A - 19		
○ - ESVS 10	A - 5		
● - VHA9103/BBA9106	C - 43	August, 2003	1 Year
● - UHALP9107	C - 42	August, 2003	1 Year
○ - VHA9103/FBAB9177	C - 27		
○ - UHALP9108-A1	C - 26		
● - KBA-511	C - 12	August, 2003	1 Year
● - KBA-611	C - 22	August, 2003	1 Year
● - Cable	H - 5	August, 2003	1 Year

- continue -

Used test instruments :

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - 8566B	A - 13	February, 2003	1 Year
○ - 8593A	A - 15		
● - 4T-10	D - 73	May, 2003	1 Year
○ - 4T-10	D - 74		
● - WJ-6611-513	A - 23	May, 2003	1 Year
● - WJ-6882-824	A - 21	May, 2003	1 Year
● - DBL-0618N515	A - 33	May, 2003	1 Year
● - 91888-2	C - 40 - 1	May, 2003	1 Year
● - 91889-2	C - 40 - 2	May, 2003	1 Year
● - 94613-1	C - 40 - 3	May, 2003	1 Year
● - 91891-2	C - 40 - 4	May, 2003	1 Year
● - 94614-1	C - 40 - 5	May, 2003	1 Year
● - 91888-2	C - 41 - 1	May, 2003	1 Year
● - 91889-2	C - 41 - 2	May, 2003	1 Year
● - 94613-1	C - 41 - 3	May, 2003	1 Year
● - 91891-2	C - 41 - 4	May, 2003	1 Year
● - 94614-1	C - 41 - 5	May, 2003	1 Year
● - 3160-09	C - 48	December, 2003	1 Year
○ - 355C	D - 22		
○ - 355D	D - 23		
● - MZ5010C	D - 81	December, 2003	1 Year
● - 8673D	B - 2	April, 2003	1 Year
● - Cable	C - 40 - 11	May, 2003	1 Year
● - Cable	C - 40 - 12	May, 2003	1 Year
● - UHP-127	D - 42	May, 2003	1 Year
○ - UHP-128	D - 43		

Environmental conditions :

Temperature: 20 °C Humidity: 37 %

Occupied Bandwidth Measurement (§2.1049, §24.238)

Test Procedure :

The measurement test-setup is shown in Fig.5.



Fig.5 Occupied Bandwidth Measurement

The setting of the spectrum analyzer are shown as follows :

Res. Bandwidth : 10 kHz
Video Bandwidth : 30 kHz
Span : 1 MHz
Sweep Time : AUTO
Trace : Maxhold

Test location :

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - 8566B	A - 13	February, 2003	1 Year
○ - 8593A	A - 15		
● - 4T-10	D - 73	May, 2003	1 Year
○ - 4T-10	D - 74		
○ - 2-10	D - 79		
○ - 2-10	D - 80		

Environmental conditions:

Temperature: 20 °C Humidity: 40 %

Band-Edge Emission Measurement (§2.1049, §22.917, §24.238)

Test Procedure :

The measurement test-setup is shown in Fig.6.



Fig.6 Band-Edge Emission Measurement

The setting of the spectrum analyzer are shown as follows :

	PCS 1900
TX Frequency	1850.20 MHz / 1909.8 MHz
Band-edge Frequency	1850.00 MHz / 1910.0 MHz
Res. Bandwidth	3 kHz
Video Bandwidth	10 kHz
Span	1 MHz
Sweep Time	AUTO
Trace	Maxhold

Test location :

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

Used test instruments:

- | | | | |
|-----------|--------|----------------|--------|
| ● - 8566B | A - 13 | February, 2003 | 1 Year |
| ○ - 8593A | A - 15 | | |
| ● - 4T-10 | D - 73 | May, 2003 | 1 Year |
| ○ - 4T-10 | D - 74 | | |
| ○ - 2-10 | D - 79 | | |
| ○ - 2-10 | D - 80 | | |

Environmental conditions:

Temperature: 20 °C Humidity: 40 %

Frequency Stability Measurement (§2.1055, §24.235)

Test Procedure :

a) Frequency Stability Measurement versus Temperature

The EUT was placed in an environmental chamber and was tested in the range from -30 to +50 degrees Celsius. The EUT was stabilized at each temperature. The power (4.0VDC) supplied was applied to the transmitter and allowed to stabilize for 10 minutes. The transmitting frequency was measured at startup and 2 minutes, 5 minutes and 10 minutes after startup. This procedure was repeated from -30 to +50 degrees Celsius at the interval of 10 degrees.

b) Frequency Stability Measurement versus Power Supply Voltage

The EUT was placed in an environmental chamber and was tested at the temperature of +20 degrees Celsius. The EUT was stabilized at the temperature. The power (4.0VDC) and the power (3.7VDC, the Ending Voltage) was applied to the EUT allowed to stabilize for 10 minutes. The transmitting frequency was measured at startup and 2 minutes, 5 minutes and 10 minutes after startup.

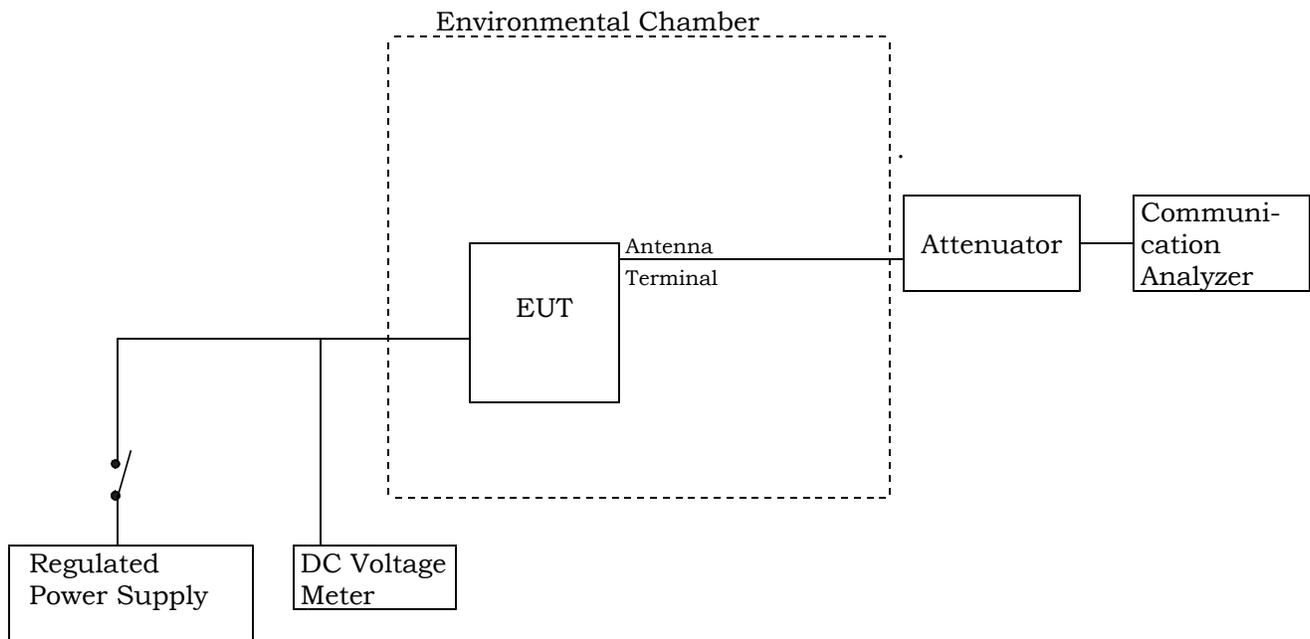


Fig.7 Frequency Stability Measurement

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

○ - Shielded room

● - Environment Testing Room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

Used test instruments and sites :

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - PL-3G	02304009	July, 2003	1 Year
● - EL100-06T4	14201089	July, 2003	1 Year
● - 2011-39	B - 33	April, 2003	1 Year
● - 6032A	F - 5	April, 2003	1 Year
○ - TR5212	B - 30		
● - CMU200	B - 21	April, 2003	1 Year

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of :

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
GSM-WCDMA Dual Cellular Phone	Sharp Corporation (Sharp Corporation)	V801SH (350228/00/ 004002/5)	APYHRO00032
Lithium-ION Battery	Sharp Corporation (Sharp Corporation)	SHBR01 (---)	N/A
AC ADAPTER	Sharp Corporation (Sharp Corporation)	SHCR01	N/A
Stereo Headphone	Sharp Corporation (Sharp Corporation)	--- (---)	N/A

The measurement was carried out with the following equipment connected :

Description	Grantee/Distributor	Model No. (Serial No.)	FCC ID
None			

Type of Interface Cable(s) and the AC Power Cord used with the EUT :

	Description	Port	Shielded Cable	Shell Material	Ferrite Core	Cable Length
1	EUT ----- DC Power Cord(AC Adaptor)	USB ----- ---	NO	-- ----- --	NO	1.6 m
2	AC Power Cord (AC ADAPTER) 1φ 2-Pin Plug	--	NO	--	NO	1.3 m
3	EUT ----- Stereo Headphone	Head Set ----- ---	NO	-- ----- --	NO	1.4 m

Test Configuration:

Operation - mode of the EUT:

The tests were carried out under one modulation type shown as follows :
Modulation Burst Signal : DATA TSC 5 in accordance with GSM 05.02.

The Radiated Emission tests were carried under 3 test configurations in page 26 shown as follows:

	Test Configuration	The condition of the transmitting antenna
1	Single Unit	Integrated antenna
2	AC Adaptor used	Integrated antenna
3	HeadPhone used	Integrated antenna

The test configuration on the worst data at the unwanted radiation measurement is Single Unit.

Test system:

The EUT has 2 ports shown as follows :

- 1) Head Set port : is connected to the Stereo Headphone.
- 2) USB port : is connected to the AC ADAPTER or the personal computer.

Special accessories:

None

Detailed Transmitter portion:

PCS1900
Transmitting frequency : 1850.2 MHz(512ch) - 1909.8 MHz(810ch)
Local frequency : 1850.2 MHz(512ch) - 1909.8 MHz(810ch)

Detailed Receiver portion:

PCS1900
Receiving frequency : 1930.2 MHz(512ch) - 1989.8 MHz(810ch)
Local frequency : 3860.4 MHz(512ch) - 3979.6 MHz(810ch)

Other Clock Frequency:

RTC : 32.768 kHz
Reference frequency : 13.0 MHz

TEST RESULTS
PCS1900

Transmitter Power(TP)

The transmitter power is 859.0 mW at 1880.00 MHz
Uncertainty of measurement results +0.6 dB(2σ) -0.6 dB(2σ)

Remarks: _____

Antenna Conducted Spurious Emission

The requirements are **● - Passed** **○ - Not Passed**
Min. limit margin 23.3 dB at 3819.600 MHz
Max. limit exceeding _____ dB at _____ MHz
Uncertainty of measurement results +2.4 dB(2σ) -2.4 dB(2σ)

Remarks: _____

Transmitter Power(EIRP)

The requirements are **● - Passed** **○ - Not Passed**
The Maximum EIRP is 1.300 W at 1909.80 MHz
Min. limit margin 1.9 dB at 1909.80 MHz
Max. limit exceeding _____ dB at _____ MHz
Uncertainty of measurement results +1.3 dB(2σ) -1.3 dB(2σ)

Remarks: _____

Unwanted Radiation (9 kHz - 20 GHz)

The requirements are	● - Passed	○ - Not Passed
Min. limit margin	<u>2.0</u> dB at <u>17188.200</u> MHz	
Max. limit exceeding	<u> </u> dB at <u> </u> MHz	
Uncertainty of measurement results	9 kHz - 30 MHz <u>+2.5</u> dB(2σ)	<u>-2.5</u> dB(2σ)
	30 MHz - 1 GHz <u>+4.1</u> dB(2σ)	<u>-4.2</u> dB(2σ)
	1 GHz - 20 GHz <u>+3.1</u> dB(2σ)	<u>-3.2</u> dB(2σ)

Remarks : The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance with the specification limit.

Occupied Bandwidth

The requirements are	● - Passed	○ - Not Passed
The 26dB Bandwidth is	<u>324</u> kHz at <u>1880.00</u> MHz	
The 99% Bandwidth is	<u>253</u> kHz at <u>1880.00</u> MHz	
The results(Occupied Bandwidth)	Refer to pages* 2 - 4	
Uncertainty of measurement results at Frequency	<u>±0.05</u> ppm(2σ)	
Uncertainty of measurement results at Amplitude	<u>±0.6</u> dB(2σ)	

Remarks: *: The Page is one in the Attachment A.

Band-Edge Emission

The requirements are	● - Passed	○ - Not Passed
The Band-Edge level is	<u>-38.4</u> dBc at <u>1910.00</u> MHz	
The results(Band-edge Emission)	Refer to pages* 6 - 7	
Uncertainty of measurement results at Frequency	<u>±0.05</u> ppm(2σ)	
Uncertainty of measurement results at Amplitude	<u>±0.6</u> dB(2σ)	

Remarks: *: The Page is one in the Attachment A.

JQA Application No.: KL80030711
Model No. : V801SH
FCC ID : APYHRO00032

Regulation : CFR 47 FCC Rules Part 24
Issue Date : March 4, 2004

Frequency Stability

Frequency Stability : -0.11 ppm at 1880.000 MHz

Uncertainty of measurement results ±0.05 ppm

Remarks:

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 24 (October 1, 2002) under the test configuration, as shown in page 26.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgement.

FINAL JUDGEMENT :

The "as received" sample;

- - fulfill the test requirements of the regulation mentioned on page 3.
- - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.
- - doesn't fulfill the test regulation mentioned on page 3.

Begin of testing : February 10, 2004

End of testing : March 1, 2004

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by :



Akio Hosoda
Manager
EMC Div.
JQA KITA-KANSAI Testing Center

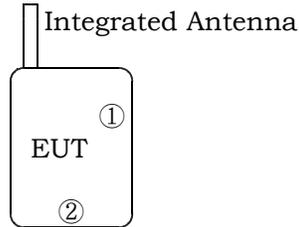
Issued by :



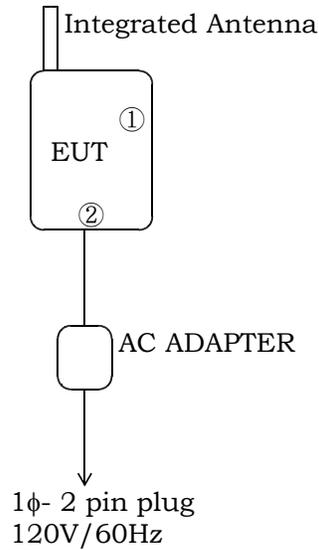
Shigeru Kinoshita
Deputy Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Test System-Arrangement (Drawings)

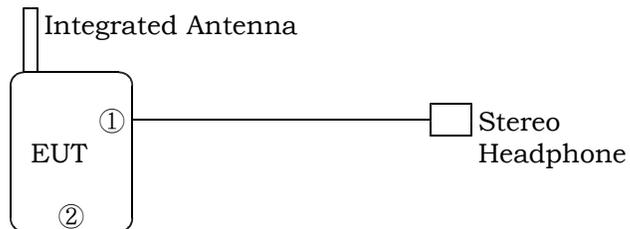
1) Single Unit



2) AC Adaptor used



3) Headphone used

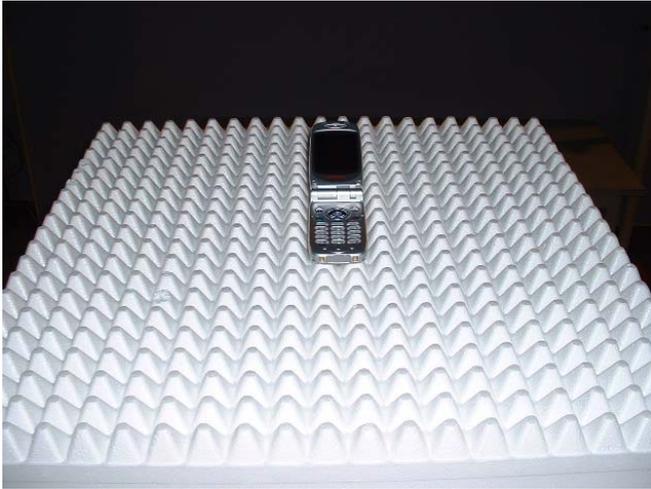


Note:

- ① : Head Set
- ② : USB

Test-Setup (Photographs) at worst case

Radiated Emission



Horizontal Polarization



Vertical Polarization

Transmitter Power (TP) Measurement PCS 1900

Test Date: March 1, 2004
Temp.: 19 °C, Humi: 39 %

Transmitting Frequency		Correction Factor [dB]	Meter Reading (Peak) [dBm]	Results (Peak)	
CH	[MHz]			[dBm]	[mW]
512	1850.200	10.00	19.27	29.27	845.3
661	1880.000	10.00	19.34	29.34	859.0
810	1909.800	10.00	19.33	29.33	857.0

Sample of calculated result at 1880.000 MHz, as the Maximum Level point:

Correction Factor	=	10.00 dBm
+) Meter Reading	=	19.34 dB
Result	=	29.34 dBm = 859.0 mW

The point shown on “ ____ ” is the Maximum Level Point.

Note: The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Tester: Yasuhisa Sakai

Antenna-Conducted Spurious Emission Measurement PCS 1900

Test Date: February 10, 2004
Temp.: 20 °C, Humi: 40 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
512	1850.200	3700.400	-19.4	-17.9	-13.0	-37.3	+24.3	C
		5550.600	-20.7	-30.1	-13.0	-50.8	+37.8	C
		7400.800	-9.7	-47.6	-13.0	-57.3	+44.3	C
		9251.000	-10.0	-27.5	-13.0	-37.5	+24.5	C
		11101.200	-10.5	-57.1	-13.0	-67.6	+54.6	C
		12951.400	-10.3	-52.9	-13.0	-63.2	+50.2	C
		14801.600	-10.7	-47.1	-13.0	-57.8	+44.8	C
		16651.800	-10.4	-41.4	-13.0	-51.8	+38.8	C
661	1880.000	3760.000	-19.9	-16.6	-13.0	-36.5	+23.5	C
		5640.000	-20.2	-29.4	-13.0	-49.6	+36.6	C
		7520.000	-9.7	-39.2	-13.0	-48.9	+35.9	C
		9400.000	-10.1	-31.4	-13.0	-41.5	+28.5	C
		11280.000	-10.0	-52.0	-13.0	-62.0	+49.0	C
		15040.000	-10.6	-38.1	-13.0	-48.7	+35.7	C
		16920.000	-10.1	-41.3	-13.0	-51.4	+38.4	C
810	1909.800	3819.600	-19.4	-16.9	-13.0	-36.3	+23.3	C
		5729.400	-19.7	-29.5	-13.0	-49.2	+36.2	C
		7639.200	-10.2	-36.1	-13.0	-46.3	+33.3	C
		9549.000	-10.3	-32.7	-13.0	-43.0	+30.0	C
		11458.800	-10.5	-49.4	-13.0	-59.9	+46.9	C
		15278.400	-10.5	-38.5	-13.0	-49.0	+36.0	C
		17188.200	-10.5	-44.6	-13.0	-55.1	+42.1	C

Sample of calculated result at 3819.6 MHz, as the Minimum Margin point:

Corr. Factor = -19.4 dB
 +) Meter Reading = -16.9 dB(μ V)
 Result = -36.3 dB(μ V)

Minimum Margin: -13.0 - (-36.3) = 23.3 (dB)

The point shown on “ ____ ” is the Minimum Margin Point.

Applied Limits:

$$-13.0 \text{ [dBm]} = 10\log(\text{TP[mW]}) - (43 + 10\log(\text{tp[W]})) = 10\log(\text{TP[mW]}) - (43 + (10 \log(\text{TP[mW]}) - 30))$$

where $\text{tp[W]} = \text{TP[mW]} / 1000$: Transmitter power at antenna terminal

$$10\log(\text{tp[W]}) = 10\log(\text{TP[mW]}) - 30$$

Correction factor details:

Cable Loss + 10dB Pad Att. [dB] (9 kHz - 2.2 GHz)

Cable Loss + 20dB Pad Att. + High Pass Filter Loss (D-42) - Pre-Amp. Gain [dB] (over 5.8 GHz)

- Note: 1) The spectrum was scanned 9 kHz to 20 GHz and all emissions not reported were more than 20 dB below the applied limits.
 2) The spectrum analyzer displays were printed out in Attachment B.

Remarks:

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

Tester : Shigeru Kinoshita

Transmitter Power (EIRP) Measurement PCS 1900

Test Date: February 29, 2004
Temp.: 20 °C, Humi: 37 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(μV)]		Substitution Measurement [dB(μV)]		Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dB]
		Hori. (Mh)	Vert. (Mv)	Hori. (Msh)	Vert. (Msv)		
512	1850.200	94.3	94.2	77.8	77.8	0.0	14.1
661	1880.000	94.8	94.4	77.9	78.0	0.0	14.2
810	1909.800	94.8	94.9	77.8	78.0	- 0.2	14.3

2. Calculation Results

CH	Transmitting Frequency [MHz]	Peak EIRP [dBm]		Maximum Peak EIRP [W]	Limits [dBm]	Margin [dB]
		(EIRPh)	Vert. (EIRPv)			
512	1850.200	30.6	30.5	1.139	33.0	+ 2.4
661	1880.000	31.1	30.6	1.289	33.0	+ 1.9
810	1909.800	31.1	31.0	1.300	33.0	+ 1.9

Sample of calculated result at 1909.800 MHz, as the Minimum Margin point:

Emission Measurement Mh	=	94.8 dB(μV)
Substitution Measurement Msh	=	-77.8 dB(μV)
Supplied Power to Substitution Antenna	=	-0.2 dBm
+) Gain of Substitution Antenna	=	14.3 dB
Result	=	31.1 dBm = 1.300 W

EIRPh = Mh - Msh + Ps + Gs

EIRPv = Mv - Msv + Ps + Gs

Minimum Margin: 33.0 - 31.1 = 1.9 (dB)

The point shown on “ ____ ” is the Minimum Margin Point.

Remarks:

Detector Function	Resolution B.W.	V.B.W.	Sweep Time
Peak	1 MHz	1 MHz	20 msec.

Tester: _____ Akio Hosoda

Unwanted Radiation Measurement PCS 1900

Test Date: February 15, 2004
Temp.: 20 °C, Humi: 37 %

Test Configuration : Single Unit

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm]		Limits [dBm]	Margin [dB]	Remarks
			Hori.	Vert.			
512	1850.200	3700.400	-36.3	-35.3	-13.0	+22.3	C
		5550.600	-28.3	-28.2	-13.0	+15.2	C
		7400.800	-21.6	-22.4	-13.0	+ 8.6	C
		9251.000	-26.1	-26.3	-13.0	+13.1	C
		11101.200	-25.5	-25.3	-13.0	+12.3	C
		12951.400	-18.3	-18.1	-13.0	+ 5.1	C
		14801.600	-17.5	-17.6	-13.0	+ 4.5	C
		16651.800	-20.9	-20.6	-13.0	+ 7.6	C
	18502.000	< -26.1	< -26.1	-13.0	> +13.1	C	
661	1880.000	3760.000	-35.1	-35.6	-13.0	+22.1	C
		5640.000	-30.1	-28.2	-13.0	+15.2	C
		7520.000	-21.9	-21.5	-13.0	+ 8.5	C
		9400.000	-27.1	-25.7	-13.0	+12.7	C
		11280.000	-25.1	-24.9	-13.0	+11.9	C
		13160.000	-17.2	-17.1	-13.0	+ 4.1	C
		15040.000	-16.9	-17.2	-13.0	+ 3.9	C
		16920.000	-20.3	-20.4	-13.0	+ 7.3	C
	18800.000	< -25.8	< -25.8	-13.0	> +12.8	C	
810	1909.800	3819.600	-34.6	-34.8	-13.0	+21.6	C
		5729.400	-97.3	-97.3	-13.0	+84.3	C
		7639.200	-34.6	-34.8	-13.0	+21.6	C
		9549.000	-29.4	-29.0	-13.0	+16.0	C
		11458.800	-18.3	-17.0	-13.0	+ 4.0	C
		13368.600	-25.0	-23.4	-13.0	+10.4	C
		15278.400	-24.9	-24.0	-13.0	+11.0	C
		17188.200	-15.9	-15.0	-13.0	+ 2.0	C
	19098.000	-17.4	-16.8	-13.0	+ 3.8	C	

Occupied Bandwidth Measurement
PCS1900

Test Date: February 10, 2004
Temp.: 20 °C ; Humi.: 40 %

CH No.	Transmitting Frequency(MHz)	26dB Bandwidth	99% Bandwidth	Data Page*
512	1850.200	321 kHz	251 kHz	Page 2
661	1880.000	324 kHz	253 kHz	Page 3
810	1909.800	319 kHz	250 kHz	Page 4

- Note) 1. *: The Data Page is one in Attachment A.
2. The point shown on " _____ " is the Maximum Margin Point.

Tester : Shigeru Kinoshita

Band-Edge Emission Measurement
PCS1900

Test Date: February 10, 2004
Temp.: 20 °C ; Humi.: 40 %

1) Low Band-Edge Measurement

CH	Transmitting Frequency(MHz)	Band-Edge Frequency(MHz)	Band-Edge Level[dBc]	Data Page*
512	1850.200	1850.000	-41.4	Page 6

2) High Band-Edge Measurement

CH	Transmitting Frequency(MHz)	Band-Edge Frequency(MHz)	Band-Edge Level[dBc]	Data Page*
810	1909.800	1910.000	-38.4	Page 7

- Note) 1. *: The Data Page is one in Attachment A.
2. The point shown on " _____ " is the Minimum Point.

Tester : Shigeru Kinoshita

Frequency Stability Measurement PCS 1900

Test Date: February 18, 2004

1. Frequency Stability Measurement versus Temperature

Transmitting Frequency : 1880.000 MHz (661 ch)
 DC Supply Voltage : 4.0 VDC

Ambient Temperature [°C]	Startup	Deviation [ppm]			Limits [ppm]	Margin [ppm]
		2 minutes	5 minutes	10 minutes		
-30	+ 0.06	+ 0.03	- 0.01	- 0.04	N/A	N/A
-20	+ 0.05	+ 0.03	+ 0.02	+ 0.03	N/A	N/A
-10	+ 0.04	+ 0.04	+ 0.02	+ 0.03	N/A	N/A
0	- 0.02	- 0.03	- 0.05	- 0.03	N/A	N/A
10	+ 0.07	+ 0.06	+ 0.05	+ 0.05	N/A	N/A
20	- 0.11	- 0.11	- 0.09	- 0.10	N/A	N/A
30	- 0.06	- 0.06	- 0.05	- 0.05	N/A	N/A
40	- 0.06	- 0.06	- 0.06	- 0.06	N/A	N/A
50	- 0.06	- 0.06	- 0.06	- 0.04	N/A	N/A

2. Frequency Stability Measurement versus Power Supply Voltage

Transmitting Frequency : 1880.000 MHz (661 ch)
 DC Supply Voltage : 20 °C

Ambient Temperature [°C]	Startup	Deviation [ppm]			Limits [ppm]	Margin [ppm]
		2 minutes	5 minutes	10 minutes		
4.0	+ 0.07	+ 0.06	+ 0.05	+ 0.05	N/A	N/A
3.7 (Ending)	- 0.06	- 0.05	- 0.03	+ 0.01	N/A	N/A

Test condition example as the Maximum Deviation point:

Ambient Temperature : 20 °C / Startup

DC Supply Voltage : 4 VDC

The Maximum Deviation Point is shown on a red print.

Note: The measurement were made after all of components of the oscillator sufficiently stabilized at each temperature.

Tester: Akio Hosoda