JAPAN QUALITY ASSURANCE ORGANIZATION
KITA-KANSAI TESTING CENTER
7-7, Ishimaru 1-Chome, Minoh-shi, Osaka 562-0027 Japan. Phone. +81-727-29-2243/Facsimile. +81-727-28-6848

EMC EMISSION - TEST REPORT

JQA APPLICATION No. : KL80040153R

Name of Product : GSM Cellular-Phone

Model/Type No. : GX25

FCC ID : APYHRO00036

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 : July 20, 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 National Institute of Information and Communications Technology(NICT) under MPHPT Japan.

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

Authorized by:

T. Yamanaka

Takashi Yamanaka, Director
JQA KITA-KANSAI Testing Center

DIRECTORY

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TEST REGULATION

FCC Rules and Regulations Part 24 (October 1, 2003)

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, 2003), 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 Cellular-Phone
2) Model/Type No. : GX25
3) Product Type : Pre-production(Serial No.: TA-256)
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 : Inverted F type antenna
9) Emission Designations : 243KGXW(PCS1900)
10) Maximum RF Output Power : 1.319W(EIRP)(PCS1900)
11) Power Rating : 3.9VDC
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:

TX frequency (in MHz) = 1850.2 + 0.2 × (n -512)
RX frequency (in MHz) = 1930.2 + 0.2 × (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, two 10 dB attenuators and a short, low loss cable.

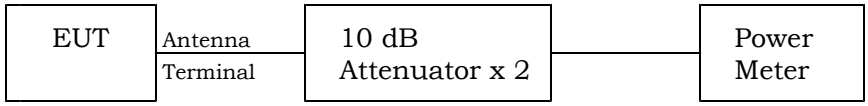


Fig.1 Transmitter Power Measurement

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, 2004	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	November, 2003	1 Year

Environmental conditions :

Temperature: 23 °C Humidity: 58 %

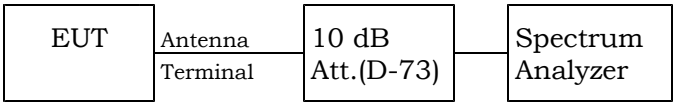
Antenna Conducted Spurious Emission Measurement (§2.1051,§24.238)

Test Procedure :

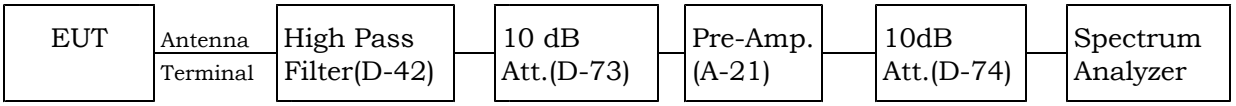
The Antenna Conducted Emission was measured with a spectrum analyzer. The test system is shown as follows:

PCS1900

1) Frequency Range : 9kHz - 2.2GHz



2) Frequency Range : 2.2GHz -5.8GHz



3) Frequency Range : 5.8GHz - 20GHz

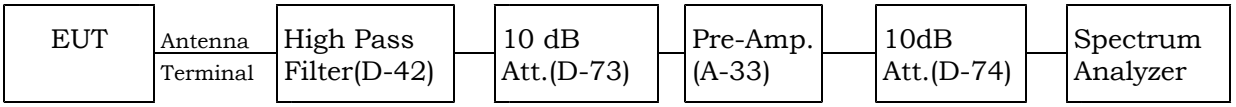


Fig.2 Antenna Conducted Spurious Emission Measurement

The setting of the spectrum analyzer are shown as follows :

Frequency Range	9 kHz - 30 MHz	30 MHz - 20 GHz
Res. Bandwidth	10 kHz	1 MHz
Video Bandwidth	30 kHz	3 MHz
Sweep Time	AUTO	AUTO
Trace	Maxhold	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	March, 2004	1 Year
○ - 8593A	A - 15		
○ - MP721C	D - 65		
● - 4T-10	D - 73	May, 2004	1 Year
● - 4T-10	D - 74	May, 2004	1 Year
○ - 2-10	D - 79		
○ - 2-10	D - 80		
○ - WJ-6611-513	A - 23		
● - WJ-6882-824	A - 21	May, 2004	1 Year
● - DBL-0618N515	A - 33	May, 2004	1 Year
● - UHP-127	D - 42	May, 2004	1 Year
○ - UHP-128	D - 43		

Environmental conditions:

Temperature: 23 °C Humidity: 58 %

Transmitter Power (EIRP) Measurement (§24.232)

Test Procedure :

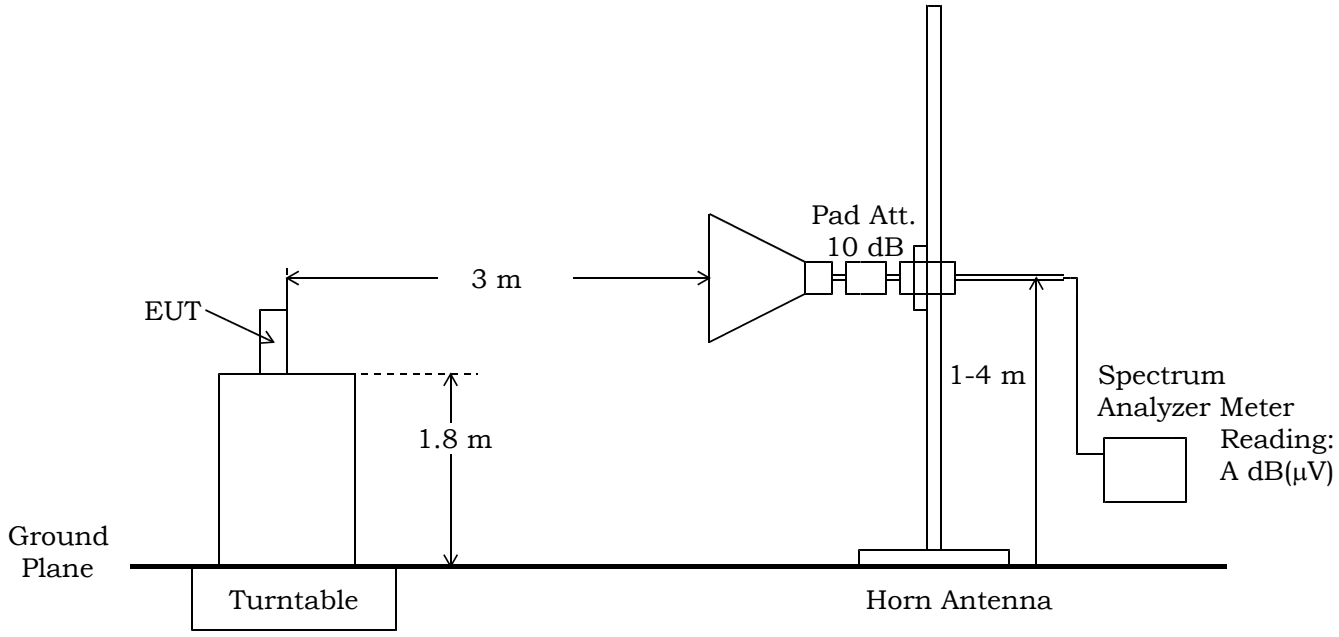
Step 1) The test was set-up shown as Fig.3 (a). In order to obtain the maximum emission, the EUT is placed at the height 1.8m on the non-conducted support, at the distance 3m from the receiving antenna (Horn Antenna) and rotated around 360 degrees. The receiving antenna height was varied from 1 m to 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(μV).

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(μV), same as the recorded level in step 1. Then the RF power into the substitution horn antenna was P(dBm).

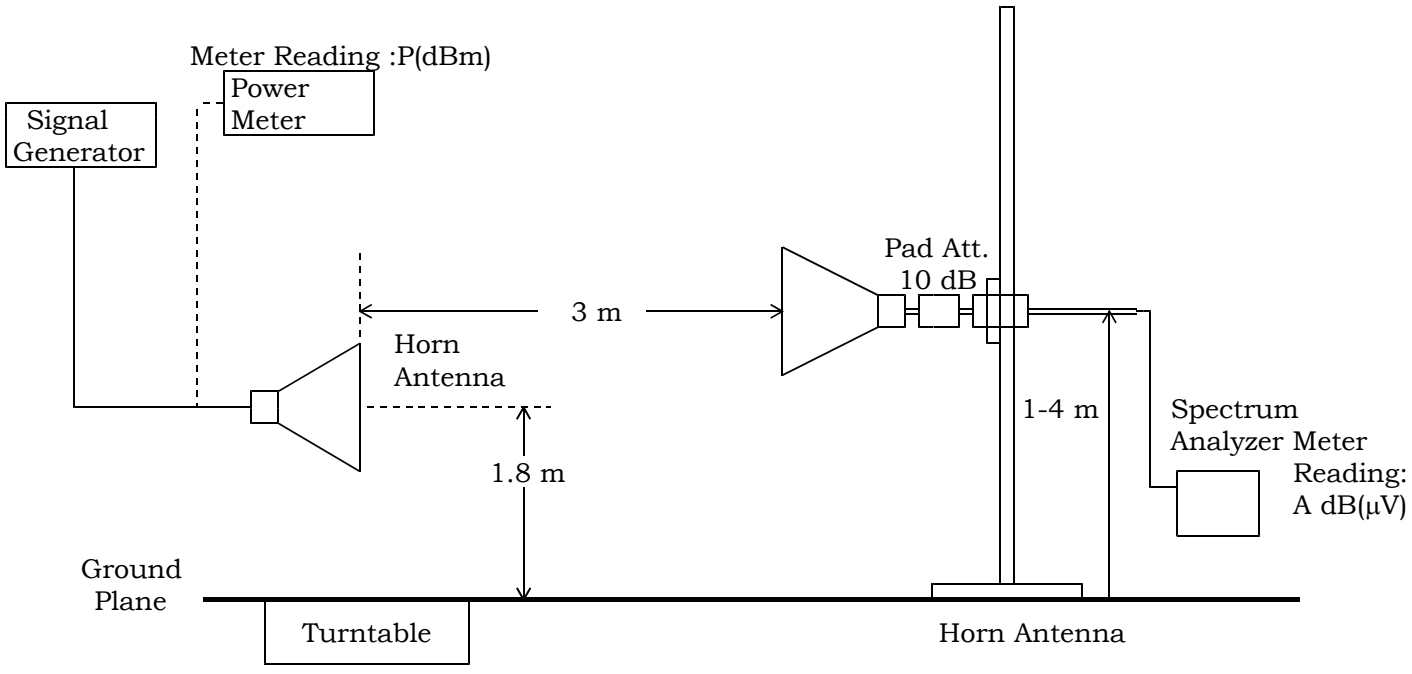
The EIRP is calculated in the following equation.

$$EIRP\ (dBm) = P\ (dBm) + Gh\ (dBi)$$

Where, Gh (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	March, 2004	1 Year
○ - 8593A	A - 15		
○ - ESV	A - 6		
● - 4T-10	D - 73	May, 2004	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, 2004	1 Year
● - 91888-2	C - 41 - 1	May, 2004	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, 2004	1 Year
● - Cable	C - 40 - 12	May, 2004	1 Year
● - E4417A	B - 51	August, 2003	1 Year
● - E9321A	B - 52	May, 2004	1 Year
○ - MG3681A	B - 3		
● - 6062A	B - 44	May, 2004	1 Year

Temperature: 24 °C Humidity: 65 %

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.

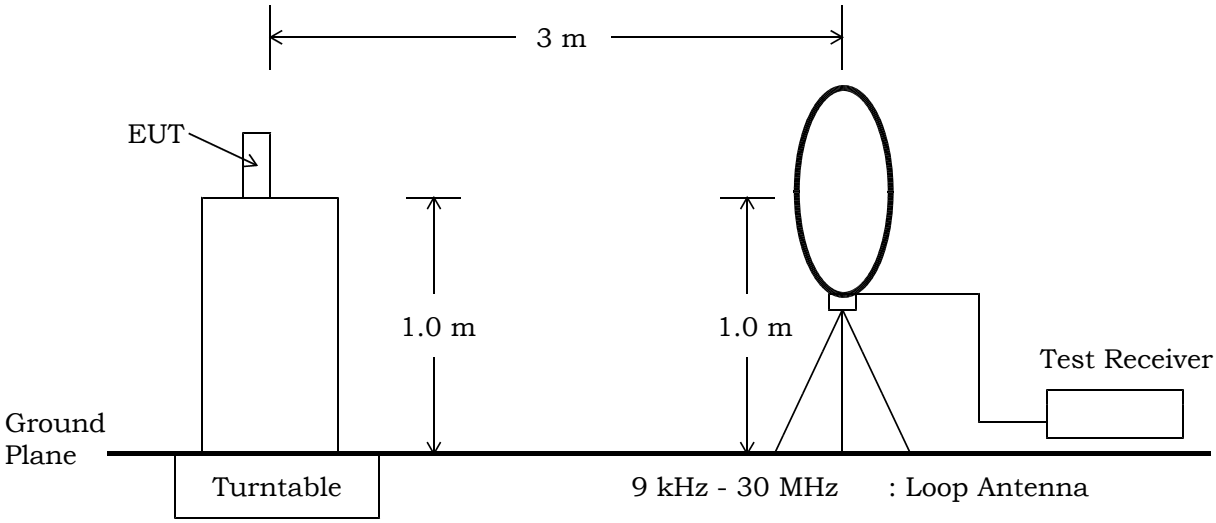
Step 2) The ERP measurement was carried out with according to Step 2 in page 9. Then the RF power in the substitution antenna half-wave dipole antenna for up to 1 GHz and the substitution horn antenna for above 1 GHz.

The EIRP is calculated in the following equation.

A) Up to 1 GHz
ERP(dBm) = P (dBm) - (Balun Loss of the half-wave dipole Ant. (dB)) + Cable Loss(dB)

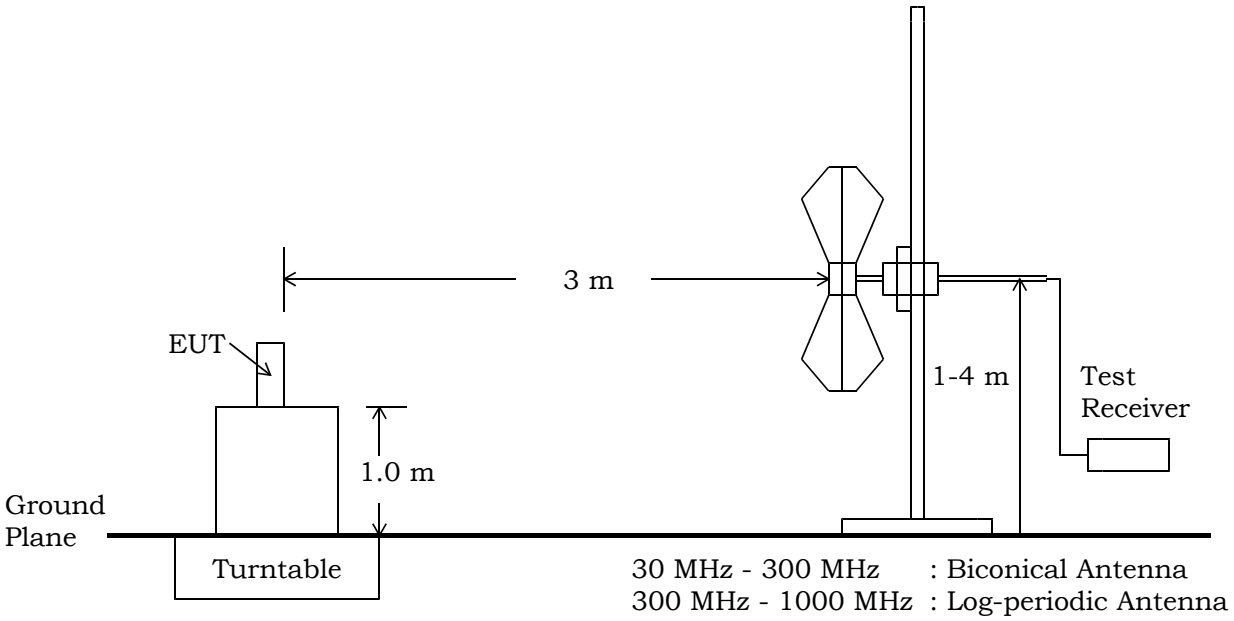
B) Above 1 GHz
ERP(dBm) = P (dBm) + Gh(dBi)- Gd(dBi)
Where, Gh(dBi) : Gain of the substitution horn antenna
Gd(dBi) : Gain of the substitution half-wave dipole antenna

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 in watt)[dB]. Where, TP = Transmitter power at the ANT OUT under test configuration as the hands free unit used.

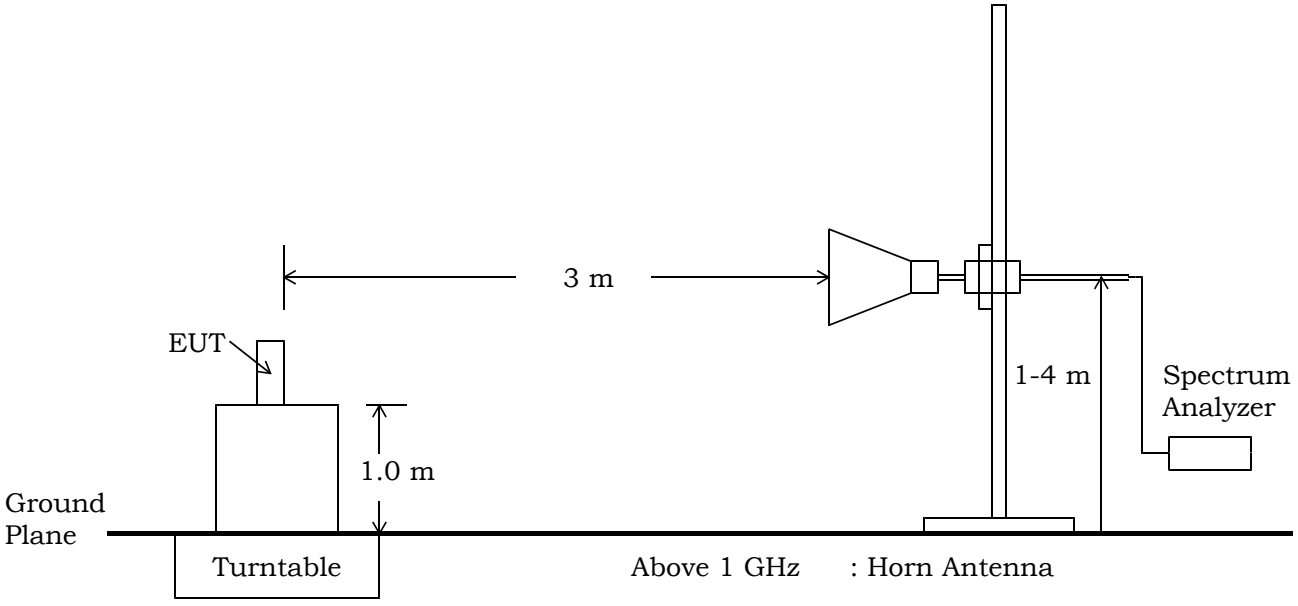


(a) Measurement set up for up to 30 MHz

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, 2004	1 Year
○ - HFH2-Z2	C - 3		
● - Cable	H - 28	July, 2004	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	March, 2004	1 Year
○ - 8593A	A - 15		
● - 4T-10	D - 73	May, 2004	1 Year
○ - 4T-10	D - 74		
● - WJ-6611-513	A - 23	May, 2004	1 Year
● - WJ-6882-824	A - 21	May, 2004	1 Year
● - DBL-0618N515	A - 33	May, 2004	1 Year
● - 91888-2	C - 40 - 1	May, 2004	1 Year
● - 91889-2	C - 40 - 2	May, 2004	1 Year
● - 94613-1	C - 40 - 3	May, 2004	1 Year
● - 91891-2	C - 40 - 4	May, 2004	1 Year
● - 94614-1	C - 40 - 5	May, 2004	1 Year
● - 91888-2	C - 41 - 1	May, 2004	1 Year
● - 91889-2	C - 41 - 2	May, 2004	1 Year
● - 94613-1	C - 41 - 3	May, 2004	1 Year
● - 91891-2	C - 41 - 4	May, 2004	1 Year
● - 94614-1	C - 41 - 5	May, 2004	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, 2004	1 Year
● - Cable	C - 40 - 12	May, 2004	1 Year
● - UHP-127	D - 42	May, 2004	1 Year
○ - UHP-128	D - 43		

Environmental conditions :

Temperature: 24 °C Humidity: 65 %

Occupied Bandwidth Measurement (§2.1049, §24.238)

Test Procedure :

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

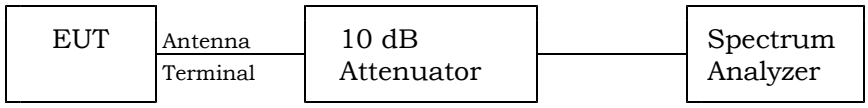


Fig.5 Occupied Bandwidth Measurement

The setting of the spectrum analyzer are shown as follows :

	PCS 1900
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	March, 2004	1 Year
○ - 8593A	A - 15		
● - 4T-10	D - 73	May, 2004	1 Year
○ - 4T-10	D - 74		
○ - 2-10	D - 79		
○ - 2-10	D - 80		

Environmental conditions:

Temperature: 23 °C Humidity: 58 %

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

Test Procedure :

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

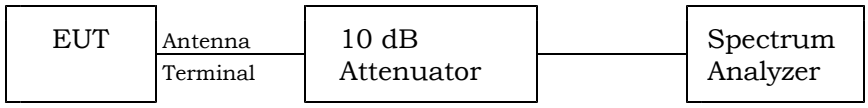


Fig.6 Band-Edge Emission Measurement

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	March, 2004	1 Year
○ - 8593A	A - 15		
● - 4T-10	D - 73	May, 2004	1 Year
○ - 4T-10	D - 74		
○ - 2-10	D - 79		
○ - 2-10	D - 80		

Environmental conditions:

Temperature: 23 °C Humidity: 58 %

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.

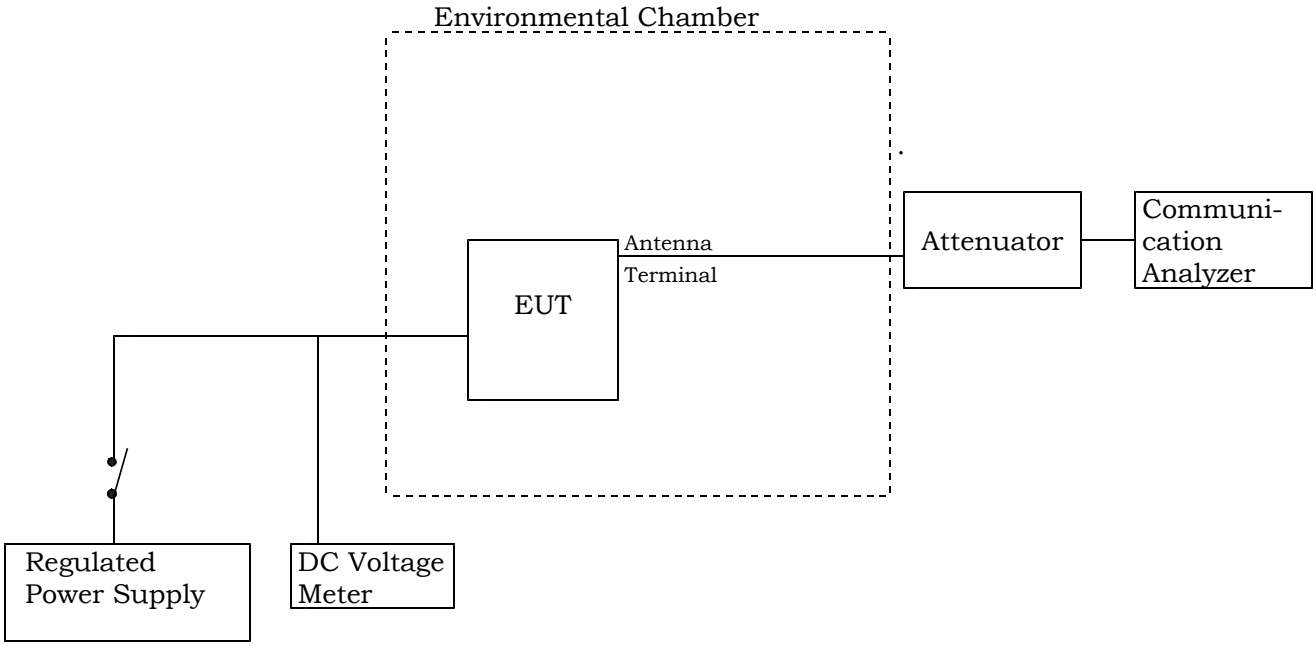


Fig.7 Frequency Stability Measurement

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, 2004	1 Year
● - EL100-06T4	14201089	July, 2004	1 Year
● - 2011-39	B - 33	April, 2004	1 Year
● - 6032A	F - 5	April, 2004	1 Year
○ - TR5212	B - 30		
● - CMU200	B - 21	April, 2004	1 Year

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of :

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
GSM Cellular-Phone	Sharp Corporation (Sharp Corporation)	GX25 (TA-256)	APYHRO00036
Lithium-ION Battery	Sharp Corporation (Sharp Corporation)	XN-1BT30 (---)	N/A
AC Charger	Sharp Corporation (Sharp Corporation)	XN-1QC08 (---)	N/A
Head Set	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 Interference Cable(s) and the AC Power Cord used with the EUT :

	Description	Port	Shielded Cable	Shell Material	Ferrite Core	Cable Length
1	EUT	USB	NO	Nonmetal	NO	1.8 m
	AC Charger	---		Nonmetal		
2	EUT	Head Set	NO	Nonmetal	NO	1.2 m
	Head Set	---		Nonmetal		

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 Charger 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 Head Set.
2) USB port : is connected to the AC Charger or the personal computer.

Special accessories:

None

Detailed Transmitter portion:

PCS1900
Transmitting frequency : 1850.2 MHz(512ch) - 1909.8 MHz(810ch)
Local frequency : 3860.4 MHz(512ch) - 3979.6 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 : 26.0 MHz

EUT Modification

● - No modifications were conducted by JQA to achieve compliance to applied levels.

○ - To achieve compliance to applied levels, the following change(s) were made by JQA during the compliance test.

The modification(s) will be implemented in all production models of this equipment.

Applicant : N/A Date : N/A

Typed Name : N/A Position : N/A

Responsible Party

Responsible Party of Test Item(Product)

Responsible party :

Contact Person :

Signatory

Deviation from Standard

● - No deviations from the standard described in page 3.

○ - The following deviations were employed from the standard described in page 3.

TEST RESULTS
PCS1900

Transmitter Power(TP)

The transmitter power is 933.3 mW at 1850.20 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 36.1 dB at 5729.400 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 1.319 W at 1880.00 MHz

Min. limit margin 1.8 dB at 1880.00 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 16.8 dB at 9549.00 MHz

Max. limit exceeding _____ dB at _____ MHz

Uncertainty of measurement results			
9 kHz - 30 MHz	+2.5 dB(2σ)	-2.5 dB(2σ)
30 MHz - 1 GHz	+4.1 dB(2σ)	-4.2 dB(2σ)
1 GHz - 20 GHz	+3.1 dB(2σ)	-3.2 dB(2σ)

Remarks:

Occupied Bandwidth

The requirements are ● - Passed ○ - Not Passed

The 26dB Bandwidth is 309 kHz at 1880.00 MHz
The 99% Bandwidth is 243 kHz at 1880.00 MHz
The results(Occupied Bandwidth) Refer to pages* 2 - 4

Uncertainty of measurement results at Frequency ±5.0 kHz(2σ)
Uncertainty of measurement results at Amplitude ±0.6 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 -42.3 dBc at 1850.00 MHz

The results(Band-edge Emission) Refer to pages* 6 - 7

Uncertainty of measurement results at Frequency ±5.0 kHz(2σ)
Uncertainty of measurement results at Amplitude ±0.6 dB(2σ)

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

Frequency Stability

Frequency Stability : -0.06 ppm at 1880.000 MHz

Uncertainty of measurement results ±10 Hz

Remarks:

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 24 (October 1, 2003) 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 : July 24, 2004

End of testing : August 2, 2004

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by :

A. Hosoda

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

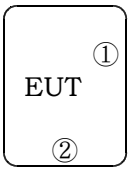
Issued by :

S. Kino

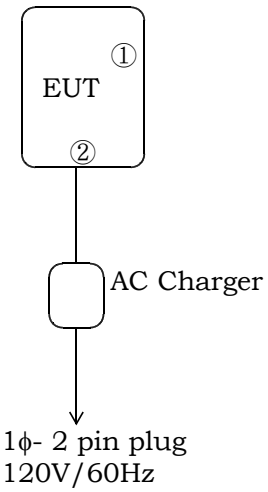
Shigeru Kinoshita
Deputy Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Test System-Arrangement (Drawings)

1) Single Unit



2) AC Charger used



3) Head Set used

Note:

① : Head Set
② : USB

Transmitter Power (TP) Measurement
(PCS 1900 MHz Band)

Test Date: July 23, 2004
Temp.: 23 °C, Humi: 58 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Peak) [dBm]	Results (Peak) [dBm]	[mW]
512	1850.200	20.00	9.70	29.70	933.3
661	1880.000	20.00	9.54	29.54	899.5
810	1909.800	20.00	9.44	29.44	879.0

Sample of calculated result at 1850.200 MHz, as the Maximum Level point:

	Correction Factor	=	20.00 dBm
+)	Meter Reading	=	9.70 dB
	Result	=	29.70 dBm = 933.3 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: Shigeru Kinoshita

Antenna-Conducted Spurious Emission Measurement
(PCS 1900 MHz Band)

Test Date: July 23, 2004
Temp.: 23 °C, Humi: 58 %

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	-20.0	-41.8	-13.0	-61.8	+48.8	C
		3855.100	-20.0	-42.9	-13.0	-62.9	+49.9	C
		5550.600	-20.1	-31.9	-13.0	-52.0	+39.0	C
		7400.800	-17.7	-54.9	-13.0	-72.6	+59.6	C
		9251.000	-17.4	-43.7	-13.0	-61.1	+48.1	C
		11101.200	-16.0	-43.0	-13.0	-59.0	+46.0	C
		12951.400	-15.9	-42.1	-13.0	-58.0	+45.0	C
		14801.600	-16.1	-49.9	-13.0	-66.0	+53.0	C
661	1880.000	3760.000	-19.8	-38.1	-13.0	-57.9	+44.9	C
		3919.400	-19.8	-43.7	-13.0	-63.5	+50.5	C
		5640.000	-19.9	-29.5	-13.0	-49.4	+36.4	C
		7520.000	-17.1	-53.9	-13.0	-71.0	+58.0	C
		9400.000	-17.4	-43.8	-13.0	-61.2	+48.2	C
		11280.000	-15.1	-43.3	-13.0	-58.4	+45.4	C
		13160.000	-15.1	-43.5	-13.0	-58.6	+45.6	C
		15040.000	-16.1	-46.7	-13.0	-62.8	+49.8	C
810	1909.800	3819.600	-20.0	-30.9	-13.0	-50.9	+37.9	C
		3976.100	-20.0	-43.4	-13.0	-63.4	+50.4	C
		5729.400	-19.9	-29.2	-13.0	-49.1	+36.1	C
		7639.200	-17.0	-56.0	-13.0	-73.0	+60.0	C
		9549.000	-16.7	-47.8	-13.0	-64.5	+51.5	C
		11458.800	-16.2	-42.5	-13.0	-58.7	+45.7	C
		13368.600	-15.2	-47.1	-13.0	-62.3	+49.3	C
		15278.400	-15.9	-49.2	-13.0	-65.1	+52.1	C

Sample of calculated result at 5729.4 MHz, as the Minimum Margin point:

	Corr. Factor	=	-19.9 dB
+)	Meter Reading	=	-29.2 dB(μV)
	Result	=	-49.1 dB(μV)

Minimum Margin: -13.0 - (-49.1) = 36.1 (dB)
The point shown on " _____ " is the Minimum Margin Point.

Applied Limits:
-13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
where tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
10log(tp[W]) = 10log(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 MHz Band)

Test Date: August 1, 2004
Temp.: 24 °C, Humi: 65 %

1. Measurement Results

Transmitting Frequency		Emission Measurement [dB(μV)]		Substitution Measurement [dB(μV)]		Supplied Power to Substitution Antenna	Gain of Substitution Antenna
CH	[MHz]	Hori. (Mh)	Vert. (Mv)	Hori. (Msh)	Vert. (Msv)	[dBm]	[dB]
512	1850.200	94.4	94.6	77.0	77.1	- 0.6	13.9
661	1880.000	94.4	94.8	77.1	77.1	- 0.6	14.1
810	1909.800	94.0	94.8	77.3	77.3	- 0.6	14.2

2. Calculation Results

Transmitting Frequency		Peak EIRP [dBm]		Maximum Peak EIRP	Limits	Margin
CH	[MHz]	(EIRPh)	Vert. (EIRPv)	[W]	[dBm]	[dB]
512	1850.200	30.7	30.8	1.192	33.0	+ 2.2
661	1880.000	30.8	31.2	1.319	33.0	+ 1.8
810	1909.800	30.3	31.1	1.300	33.0	+ 1.9

Sample of calculated result at 1880.000 MHz, as the Minimum Margin point:

	Emission Measurment Mv	=	94.8	dB(μV)
	Substitution Measurement Msv	=	-77.1	dB(μV)
	Supplied Power to Substitution Antenna	=	-0.6	dBm
+)	Gain of Substitution Antenna	=	14.1	dB
	Result	=	31.2	dBm = 1.319 W

EIRPh = Mh - Msh + Ps + Gs
EIRPv = Mv - Msv + Ps + Gs

Minimum Margin: 33.0 - 31.2 = 1.8 (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 MHz Band)

Test Date: August 1, 2004
Temp.: 24 °C, Humi: 65 %

Test Configuration : Single Unit

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
512	1850.200	3700.400	-41.3	-42.3	-13.0	+28.3	C
		5550.600	-34.0	-34.2	-13.0	+21.0	C
		7400.800	-33.3	-34.8	-13.0	+20.3	C
		9251.000	-34.8	-35.4	-13.0	+21.8	C
		11101.200	-33.8	-33.8	-13.0	+20.8	C
		12951.400	< -32.7	< -32.7	-13.0	> +19.7	C
		14801.600	< -32.1	< -32.1	-13.0	> +19.1	C
		16651.800	< -33.7	< -33.7	-13.0	> +20.7	C
		18502.000	< -32.7	< -32.7	-13.0	> +19.7	C
661	1880.000	3760.000	-39.6	-40.6	-13.0	+26.6	C
		5640.000	-33.9	-35.5	-13.0	+20.9	C
		7520.000	-32.4	-32.1	-13.0	+19.1	C
		9400.000	< -41.9	< -41.9	-13.0	> +28.9	C
		11280.000	-32.8	-32.4	-13.0	+19.4	C
		13160.000	< -31.8	< -31.8	-13.0	> +18.8	C
		15040.000	< -31.9	< -31.9	-13.0	> +18.9	C
		16920.000	< -33.7	< -33.7	-13.0	> +20.7	C
		18800.000	< -32.4	< -32.4	-13.0	> +19.4	C
810	1909.800	3819.600	-38.0	-37.5	-13.0	+24.5	C
		5729.400	-97.3	-97.3	-13.0	+84.3	C
		7639.200	-38.0	-37.5	-13.0	+24.5	C
		9549.000	-29.8	-29.8	-13.0	+16.8	C
		11458.800	-42.8	-43.1	-13.0	+29.8	C
		13368.600	-34.4	-35.4	-13.0	+21.4	C
		15278.400	-36.1	-35.0	-13.0	+22.0	C
		17188.200	< -31.1	< -31.1	-13.0	> +18.1	C
		19098.000	< -32.8	< -32.8	-13.0	> +19.8	C

Sample of calculated result at 9549.0 MHz, as the Minimum Margin point:
Minimum Margin: -13.0 - (-29.8) = 16.8 (dB)
The point shown on " _____" is the Minimum Margin Point.

Applied Limits:
-13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
where tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
10log(tp[W]) = 10log(TP[mW]) - 30

Test system connection setup:
Cable (9 kHz - 1 GHz)
Cable + 20dB Pad Att. + High Pass Filter (D-43) - Pre-Amplifier (1.0 GHz - 3.6 GHz)
Cable + 20dB Pad Att. + High Pass Filter (D-42) - Pre-Amplifier (3.6 GHz - 7.6 GHz)
Cable + 10dB Pad Att. + High Pass Filter (D-42) - Pre-Amplifier (7.6 GHz - 18 GHz)
Cable + 10dB Pad Att. + High Pass Filter (D-42) - Pre-Amplifier + Frequency Mixer (over 18 GHz)

Note: The spectrum was scanned 9 kHz to 20 GHz and all emissions not reported were more than 20 dB below the applied limits.

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: Akio Hosoda

Occupied Bandwidth Measurement
PCS1900

Test Date: July 23, 2004
Temp.: 23 °C ; Humi.: 58 %

CH No.	Transmitting Frequency(MHz)	26dB Bandwidth	99% Bandwidth	Data Page*
512	1850.200	309 kHz	242 kHz	Page 2
661	1880.000	309 kHz	243 kHz	Page 3
810	1909.800	309 kHz	241 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: July 23, 2004
Temp.: 23 °C ; Humi.: 58 %

1) Low Band-Edge Measurement

CH	Transmitting Frequency(MHz)	Band-Edge Frequency(MHz)	Band-Edge Level[dBc]	Data Page*
512	1850.200	1850.000	-43.1	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	-45.0	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 MHz Band)

Test Date: August 2, 2004

1. Frequency Stability Measurement versus Temperature

Transmitting Frequency : 1880.000 MHz (661 ch)
DC Supply Voltage : 3.9 VDC

Ambient Temperature [°C]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
-30	**- 0.06**	- 0.05	- 0.03	- 0.03	N/A	N/A
-20	**- 0.06**	- 0.02	- 0.02	+ 0.01	N/A	N/A
-10	- 0.04	+ 0.02	+ 0.03	+ 0.02	N/A	N/A
0	- 0.02	+ 0.02	+ 0.02	+ 0.02	N/A	N/A
10	+ 0.02	+ 0.02	+ 0.02	- 0.01	N/A	N/A
20	+ 0.01	+ 0.01	- 0.01	- 0.01	N/A	N/A
30	+ 0.00	- 0.03	+ 0.00	+ 0.00	N/A	N/A
40	- 0.05	- 0.01	- 0.01	- 0.01	N/A	N/A
50	- 0.03	- 0.02	- 0.01	- 0.01	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]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
3.9	+ 0.01	+ 0.01	- 0.01	- 0.01	N/A	N/A
3.7(Ending)	- 0.01	+ 0.01	- 0.02	- 0.02	N/A	N/A

Test condition example as the Maximum Deviation point:
Ambient Temperature : -30 °C / Startup
DC Supply Voltage : 3.9 VDC
The Maximum Deviation Point is shown on a thick letter.

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

Tester: Akio Hosoda