



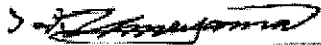
EMI TEST REPORT

Test Report No. : 24EE0050-HO-1

Applicant : SHARP CORPORATION
Type of Equipment : GSM Mobile Phone
Model No. : TM100
Test standard : FCC Part 24
FCC ID : APYNAR0055
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : January 5, 6 and 11, 2004

Tested by : 
Hiroka Umeyama
EMC Service

Approved by : 
Hironobu Shimoji
Group Leader of EMC Service

UL Apex Co., Ltd.

Head Office EMC Lab.

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SECTION 1: Client information

Company Name : SHARP CORPORATION
Address : 2-13-1 Iida Hachihonmatsu Higashihiroshima-city Hiroshima, 739-0192
Japan
Telephone Number : +81-824-20-1863
Facsimile Number : +81-824-20-1864
Contact Person : Hiroyuki Uwatoko

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : GSM Mobile Phone
Model No. : TM100
Serial No. : 187
Rating : AC120V/60Hz (AC Charger), DC12/24V(DC Charger)
DC3.7V (DC Battery)
Country of Manufacture : JAPAN
Receipt Date of Sample : December 25, 2003
Condition of EUT : Engineering prototype

2.2 Product Description

SHARP CORPORATION, Model No.: TM100(referred to as the EUT in this report) is the GSM Mobile Phone.

Equipment Type : Transceiver
Frequency of operation : 1850.2-1909.8MHz for PCS1900
Type of modulation : GMSK
Bandwidth & channel spacing : 60MHz & 200kHz
Channel number : 299 for PCS1900
Antenna Type : Internal antenna
Antenna Gain : -6 dB
Mode of Operation : Duplex
Intermediate frequency : 640MHz
Other Clock Frequency : 26MHz, 32.768kHz
Method of Frequency Generation : Synthesizer
Power Supply : DC2.7V – 3.0V (Inner)
Temperature of operation : -10 deg. C. to + 55 deg. C.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 24
Title : FCC 47CFR Part 24
Personal Communications Services

3.2 Procedures and results

Item	Test Method	FCC Regulations	Remarks	Deviation	Worst margin	Results
Peak Output Power	Section 2.1046	Section 24.232(b)	Conducted/ Radiated	N/A	-	Complied
Emission Bandwidth, 99% Occupied Bandwidth	Section 2.1049	Section 24.238(b)	Conducted	N/A	-	Complied
Band-Edge	Section 2.1049	Section 24.238(b)	Conducted/ Radiated	N/A	7.1dB 1910MHz	Complied
Spurious Emission	Section 2.1051	Section 24.238(a)	Conducted	N/A	-	Complied
Spurious Radiation	Section 2.1053	Section 24.238(a)	Radiated	N/A	12.1dB 15040MHz Horizontal	Complied
Frequency Stability (Temperature Variation)	Section 2.1055(a) (1) and (b)	Section 24.235	Conducted	N/A	-	Complied
Frequency Stability (Voltage Variation)	Section 2.1055(d)(1) and (2)	Section 24.235	Conducted	N/A	-	Complied

Note: UL Apex's EMI Work Procedures No. QPM05

*These tests were also referred to TIA-603-B "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards."

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3.3 Additions to standards

No addition, deviation or exclusion has been made from standards.

3.4 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 24.

3.5 Uncertainty

Radiated

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is $\pm 4.5\text{dB}$.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is $\pm 5.2\text{dB}$.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is $\pm 6.6\text{dB}$.

The data listed in this test report has enough margin.

Conducted

The measurement uncertainty (with a 95% confidence level) for this test is $\pm 3.0\text{dB}$.

The data listed in this test report has enough margin.

3.6 Test Location

UL Apex Co., Ltd. Head Office EMC Lab.

No.1 semi anechoic chamber and No.3 measurement room.

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This semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002.

(Registration number: No.2 :846015 Industry Canada: No.2 : IC4247-2)

*NVLAP Lab. code: 200572-0

3.7 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

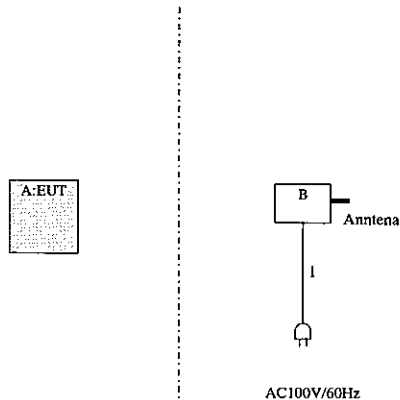
The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The sequence is used :
Transmitting mode (GSM, GMSK)
Low Channel : 1850.2MHz(Ch512)
Mid Channel : 1880.0MHz(Ch661)
High channel : 1909.8MHz(Ch810)

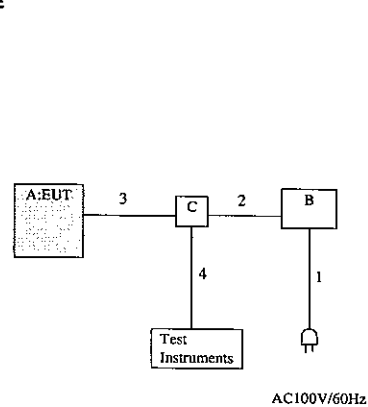
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Radiated



Conducted



* Cabling was taken into consideration and test data was taken under worse case conditions.

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Test report No. : 24EE0050-HO-1
Page : 7 of 32
Issued date : January 19, 2004
FCC ID : APYNAR0055

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	GSM Mobile Phone	TM100	187	SHARP	APYNAR0055
B	Universal Radio Communication Tester	CMU200	130900897	ROHDE& SCHWARZ	N/A
C	Power Divider	11636A	05284	Hewlett Packard	N/A

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	AC Power Cable	2.4	N	Polyvinyl chloride
2	Coaxial Cable	1.0	Y	Polyvinyl chloride
3	Coaxial Cable	1.5	Y	Polyvinyl chloride
4	Coaxial Cable	2.0	Y	Polyvinyl chloride

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SECTION 5: Peak Output Power(Conducted/Radiated)

[Conducted]

Test Procedure

The peak output power (conducted) was measured with a power meter and an attenuator at the antenna port.

Test data : APPENDIX 3
Test result : Pass

[Radiated]

Test Procedure

- 1) EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in No.1 semi anechoic chamber (19.2x11.2x7.7m) with a ground plane and at a distance of 3m.
The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.
- 2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1m as the EUT. The frequency below 1GHz of the Substitution Antenna was used as the Half wave dipole Antenna, which is harmonized with the measured frequency in 1).
The frequency above 1GHz of the Substitution Antenna was used with Horn Antenna.
The Substitution Antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1).
The measuring antenna height was varied between 1 to 4m to obtain the maximum receiving level.
Its Output power of Signal Generator was recorded.
- 3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna (Horn Antenna) except for the Half wave dipole Antenna (2.14dBi) for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.

Test data : APPENDIX 3
Test result : Pass

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SECTION 6: Bandwidth and Band-Edge (Conducted)

Test Procedure

The Emission Bandwidth, 99% Occupied Bandwidth and Band-Edge was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 7: Spurious Emission (Conducted)

Test Procedure

The Spurious Emission was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 8: Spurious Radiation and Band-Edge (Radiated)

Test Procedure

- 1) EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in No.1 semi anechoic chamber (19.2x11.2x7.7m) with a ground plane and at a distance of 3m.
The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.
- 2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1m as the EUT. The frequency below 1GHz of the Substitution Antenna was used as the Half wave dipole Antenna, which is harmonized with the measured frequency in 1).
The frequency above 1GHz of the Substitution Antenna was used with Horn Antenna.
The Substitution Antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1).
The measuring antenna height was varied between 1 to 4m to obtain the maximum receiving level.
Its Output power of Signal Generator was recorded.
- 3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna (Horn Antenna) except for the Half wave dipole Antenna (2.14dBi) for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.

Test data : APPENDIX 3
Test result : Pass

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SECTION 9: Frequency Stability

Test Procedure

The Frequency Stability was measured with a frequency counter and attenuator connected to the antenna port. The Frequency Drift was measured with the 10 deg. C. steps from -30 deg.C. to 50 deg.C., and it is presented as the ppm unit. The Frequency Drift was measured with the normal temperature(20 deg.C.) and Voltage tolerance (0 %, +15%, -15%), and it is presented as the ppm unit.

Test data : APPENDIX 3
Test result : Pass

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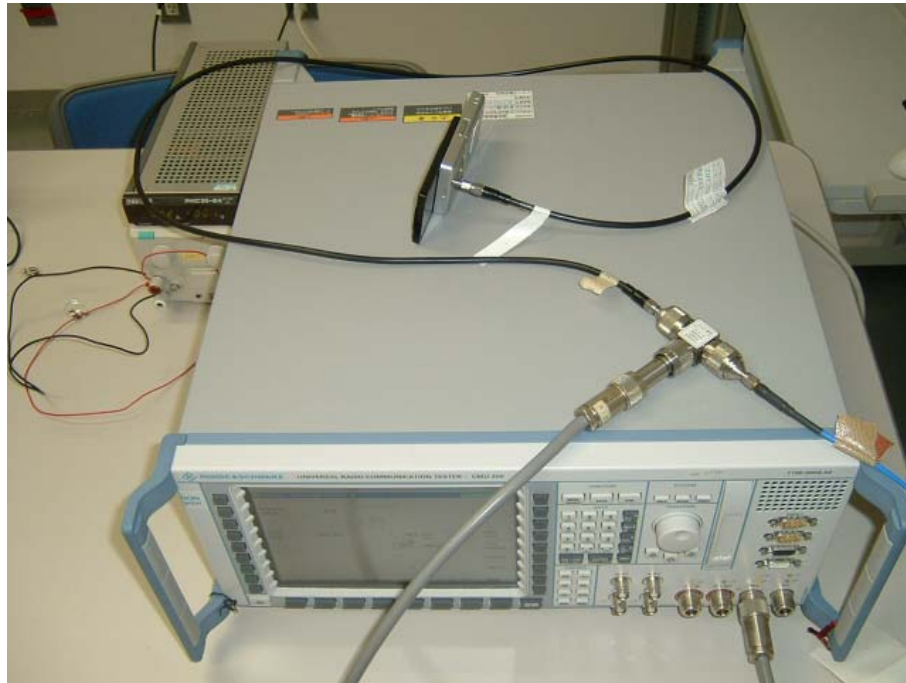
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APPENDIX 1: Photographs of test setup

Conducted Emission

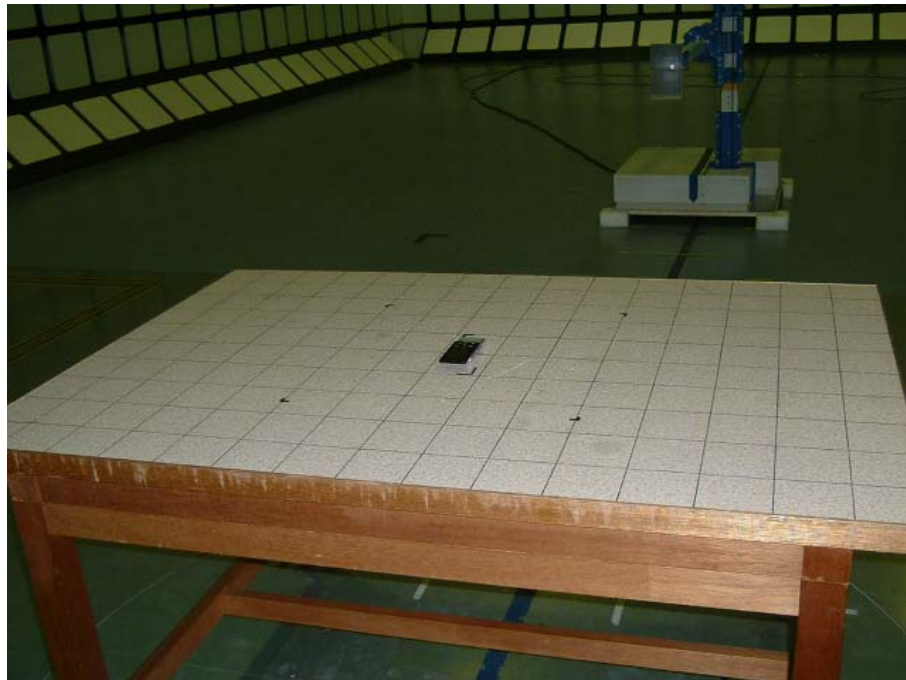


Spurious Radiation

Front



Rear



Worst Case Position (Z-axis:Horizontal / X-axis:Vertical)

X-axis



Y-axis



Z-axis



APPENDIX 2: Test instruments

EMI test equipment

Control No	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2003/12/27 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE,PO(Rad) BE(Rad.)	2003/11/12 * 12
MCC-01	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	RE	2003/12/19 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/10/15 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/10/15 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2003/03/13 * 12
MPSE-04	Power sensor	Agilent	E9327A	PO(Con.)	2003/03/18 * 12
MPM-04	Power Meter	Agilent	E4416A	PO(Con.)	2003/03/13 * 12
KFL-06	Band Reject Filter	MICRO-TRONICS	BRC13276	RE	2003/09/14 * 12
MAT-21	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-120	PO(Con.) EX	2003/02/03 * 12
MAT-23	Attenuator	Orient Microwave	BX10-0476-00	PO(Con.) EX,RE	2003/03/31 * 12
MCC-06	Microwave Cable	Storm	421-011	RE,PO(Rad) BE(Rad.)	2003/01/14 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE,PO(Rad) BE(Rad.)	2003/01/11 * 12
MCC-05	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2003/02/08 * 12
KFL-06	Band Reject Filter	MICRO-TRONICS	BRC13276	RE	2003/09/14 * 12
MCC-22	Microwave Cable	Storm	-	EX	2004/04/29 * 12
MRENT-07	Spectrum Analyzer	Advantest	R3273	EX	2003/10/31 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item :

RE: Radiated emission

PO(Rad.): Power Output Power(Radiated)

BE(Rad.): Band Edge(Radiated)

PO(Con.): Power Output Power(Conducted)

EX: Except for RE,PO(Rad.),PO(Con.) and BE(Rad.)

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APPENDIX 3: Data of EMI test

Peak Output Power (Conducted)

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Head Office EMC Lab. Semi Anechoic Chamber : No.1

COMPANY	SHARP CORPORATION	REPORT NO	24EE0050-HO
EQUIPMENT	GSM Mobile Phone	REGULATION	FCC Part24 Section 24.232(b)
MODEL	TM100	TEST METHOD	FCC Part2 Section 2.1046
S/N	187	TEST DISTANCE	-
POWER	DC3.7V	DATE	05/01/2004
MODE	Tx	TEMPERATURE	21°C
		HUMIDITY	35%
		ENGINEER	Hiroka Umeyama

Ch	Frequency [MHz]	P/M Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
Low	1850.2	-2.8	30.0	0.2	27.4	33.0	5.6
Mid	1880.0	-2.8	30.0	0.2	27.4	33.0	5.6
High	1909.8	-3.1	30.0	0.2	27.2	33.0	5.9

Sample Calculation : Result = Reading + Atten. + Cable Loss

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Peak Output Power (Radiated)

UL Apex Co., Ltd.

Head Office EMC Lab. Semi Anechoic Chamber : No.1

COMPANY SHARP CORPORATION
EQUIPMENT GSM Mobile Phone
MODEL TM100
S/N 187
POWER DC3.7V
MODE Tx
POSITION H:Z-axis / V:X-axis

REPORT NO 24EE0050-HO
REGULATION FCC Part24 Section 24.232(b)
TEST METHOD FCC Part2 Section 2.1046
TEST DISTANCE 3m
DATE 06/01/2004
TEMPERATURE 20°C
HUMIDITY 36%
CALIBRATION OK
ENGINEER Hiroka Umeyama

No.	FREQUENCY [MHz]	Electric Field Strength (After Factor Calculation) [dBuV/m]		RESULT [dBm] (dBm)		LIMIT [dBm] (EIRP)	MARGIN [dB]		Mode
		HOR	VER	HOR	VER		HOR	VER	
1	1850.40	124.3	128.4	21.5	25.7	33.0	11.5	7.3	Operating
2	1880.00	122.1	129.6	19.0	26.6	33.0	14.0	6.4	Operating
3	1909.80	124.6	129.4	21.1	26.1	33.0	11.9	6.9	Operating

Rx-ANTENNA : Biconical Antenna(30-300MHz), Logperiodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)

Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Antenna(1-19GHz)

The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise.

With the result above, the effective radiated power was calculated on the basis of the reference value

- for the calibration data on the substitution measurement.

S/A PK (RBW: 3MHz, VBW:3MHz)

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Emission Bandwidth

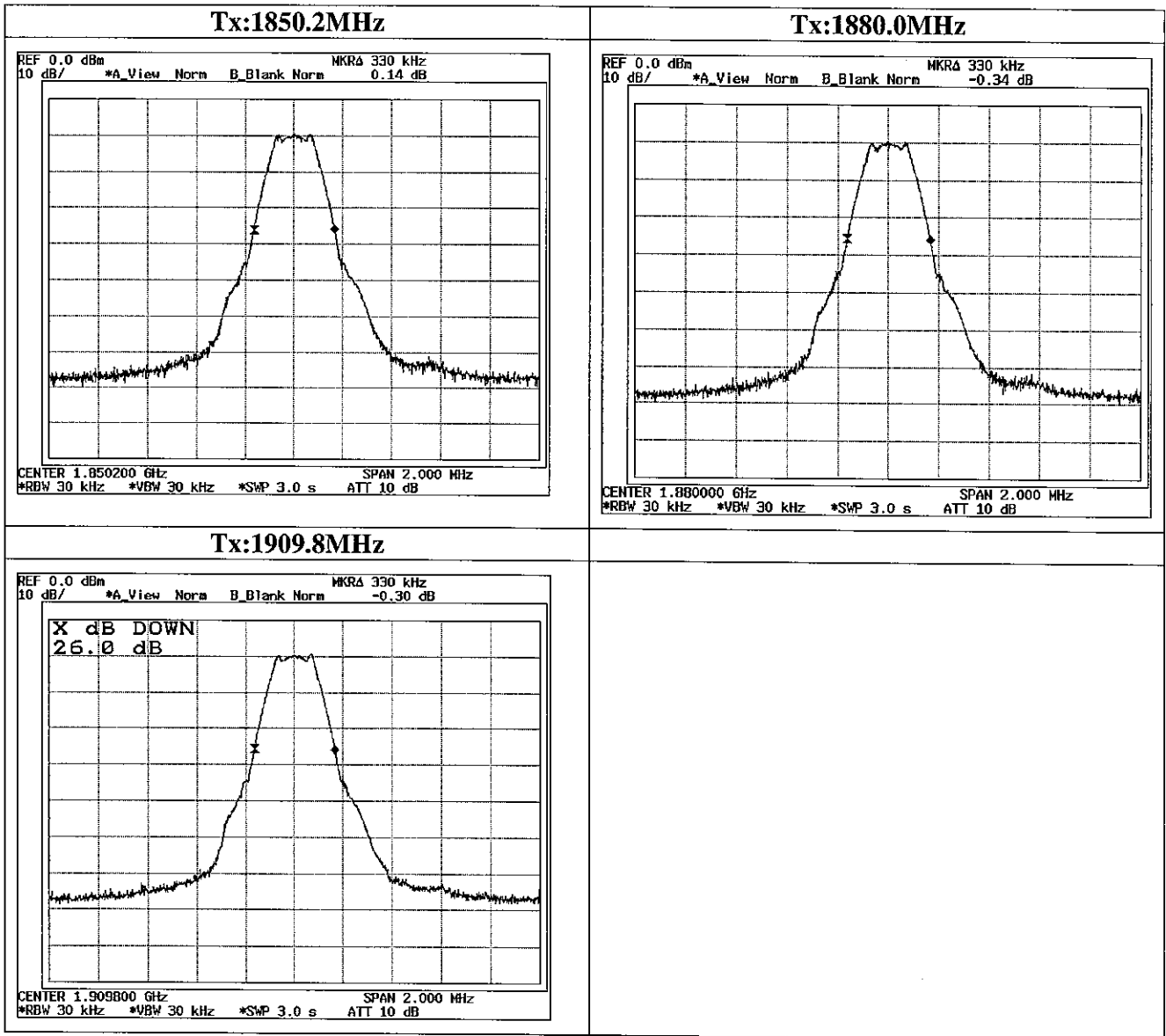
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Head Office EMC Lab. Measurement Room : No.3

COMPANY	SHARP CORPORATION	REPORT NO	24EE0050-HO
EQUIPMENT	GSM Mobile Phone	REGULATION	FCC Part24 Section 24.238(b)
MODEL	TM100	TEST METHOD	FCC Part2 Section 2.1049
S/N	187	TEST DISTANCE	-
POWER	DC3.7V	DATE	11/01/2004
MODE	Tx	TEMPERATURE	20°C
		HUMIDITY	30%
		ENGINEER	Hiroka Umeyama

PK DETECT(S/A: span 2MHz, RBW 30kHz, VBW 30kHz, sweep time 3sec)

CH	FREQ	Bandwidth	Limit
	[MHz]	[kHz]	[kHz]
Low	1850.2	330.0	-
Mid	1880.0	330.0	-
High	1909.8	330.0	-

Emission Bandwidth



99% Occupied Bandwidth

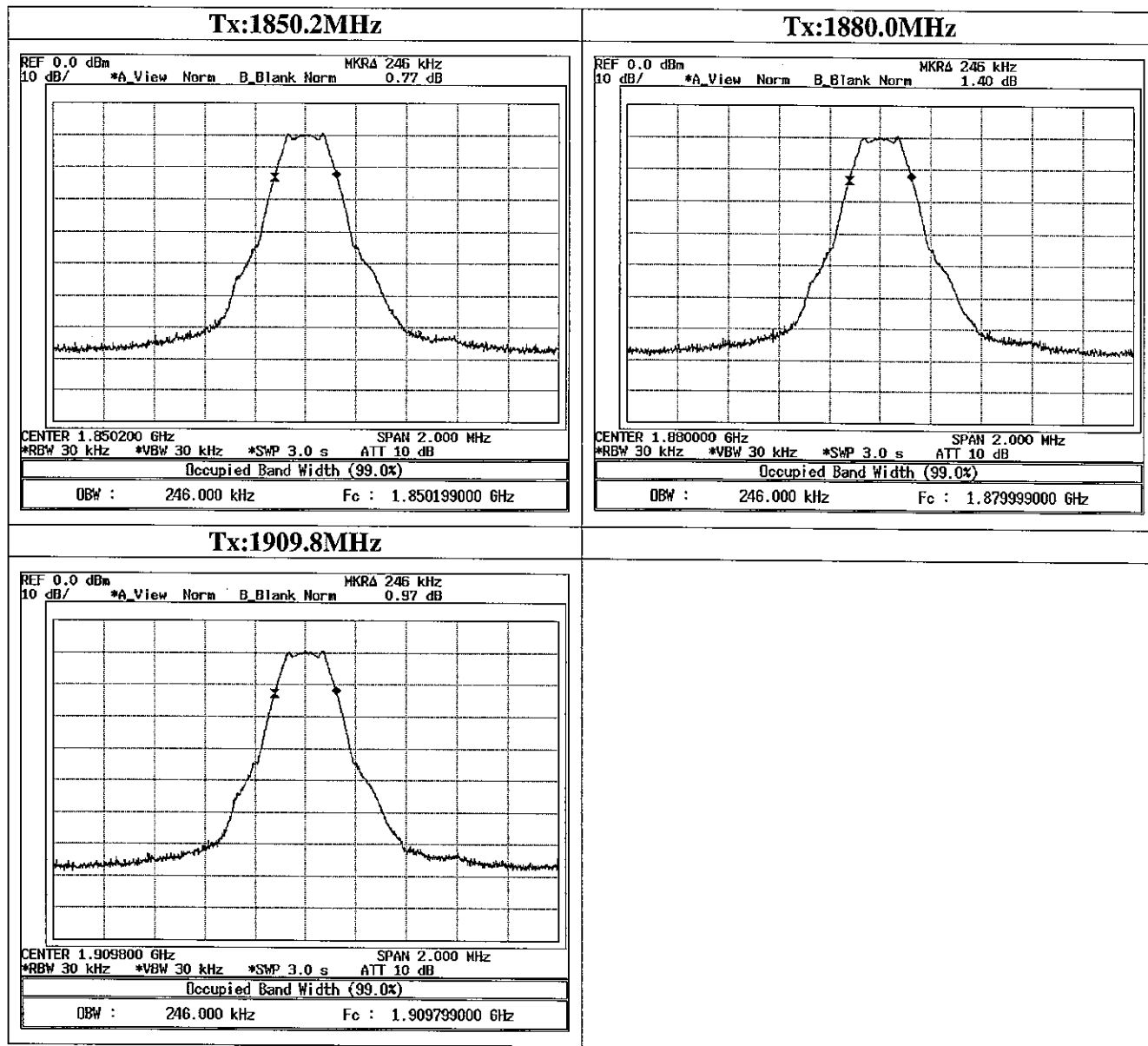
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COMPANY	SHARP CORPORATION	REPORT NO	24EE0050-HO
EQUIPMENT	GSM Mobile Phone	REGULATION	FCC Part24 Section 24.238(b)
MODEL	TM100	TEST METHOD	FCC Part2 Section 2.1049
S/N	187	TEST DISTANCE	-
POWER	DC3.7V	DATE	11/01/2004
MODE	Tx	TEMPERATURE	20℃
		HUMIDITY	30%
		ENGINEER	Hiroka Umeyama

PK DETECT(S/A: span 2MHz, RBW 30kHz, VBW 30kHz, sweep time 3sec)

CH	FREQ	Bandwidth	Limit
	[MHz]	[kHz]	[kHz]
Low	1850.2	246.0	-
Mid	1880.0	246.0	-
High	1908.8	246.0	-

99% Occupied Bandwidth



Band Edge(Conducted)

UL Apex Co., Ltd.
Head Office EMC Lab. Measurement Room : No.3

COMPANY SHARP CORPORATION
EQUIPMENT GSM Mobile Phone
MODEL TM100
S/N 187
POWER DC3.7V
MODE Tx

REPORT NO 24EE0050-HO
REGULATION FCC Part24 Section 24.238(b)
TEST METHOD FCC Part2 Section 2.1049
TEST DISTANCE -
DATE 11/01/2004
TEMPERATURE 20°C
HUMIDITY 30%
ENGINEER Hiroka Umeyama

VIDEO AV 30time(S/A :Span 3MHz, RBW 30kHz, VBW 30kHz, sweep time 200msec)

Block A

Frequency	Reading	Atten.	Cable Loss	Result	Limit
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]
1850.0	-60.5	30.0	8.0	-22.5	-13.0
1865.0	-63.0	30.0	8.0	-25.0	-13.0

Block D

Frequency	Reading	Atten.	Cable Loss	Result	Limit
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]
1865.0	-63.7	30.0	8.0	-25.7	-13.0
1870.0	-63.1	30.0	8.0	-25.1	-13.0

Block B

Frequency	Reading	Atten.	Cable Loss	Result	Limit
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]
1870.0	-62.8	30.0	8.0	-24.8	-13.0
1885.0	-59.3	30.0	8.0	-21.3	-13.0

Block E

Frequency	Reading	Atten.	Cable Loss	Result	Limit
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]
1885.0	-61.0	30.0	8.0	-23.0	-13.0
1890.0	-60.8	30.0	8.0	-22.8	-13.0

Block F

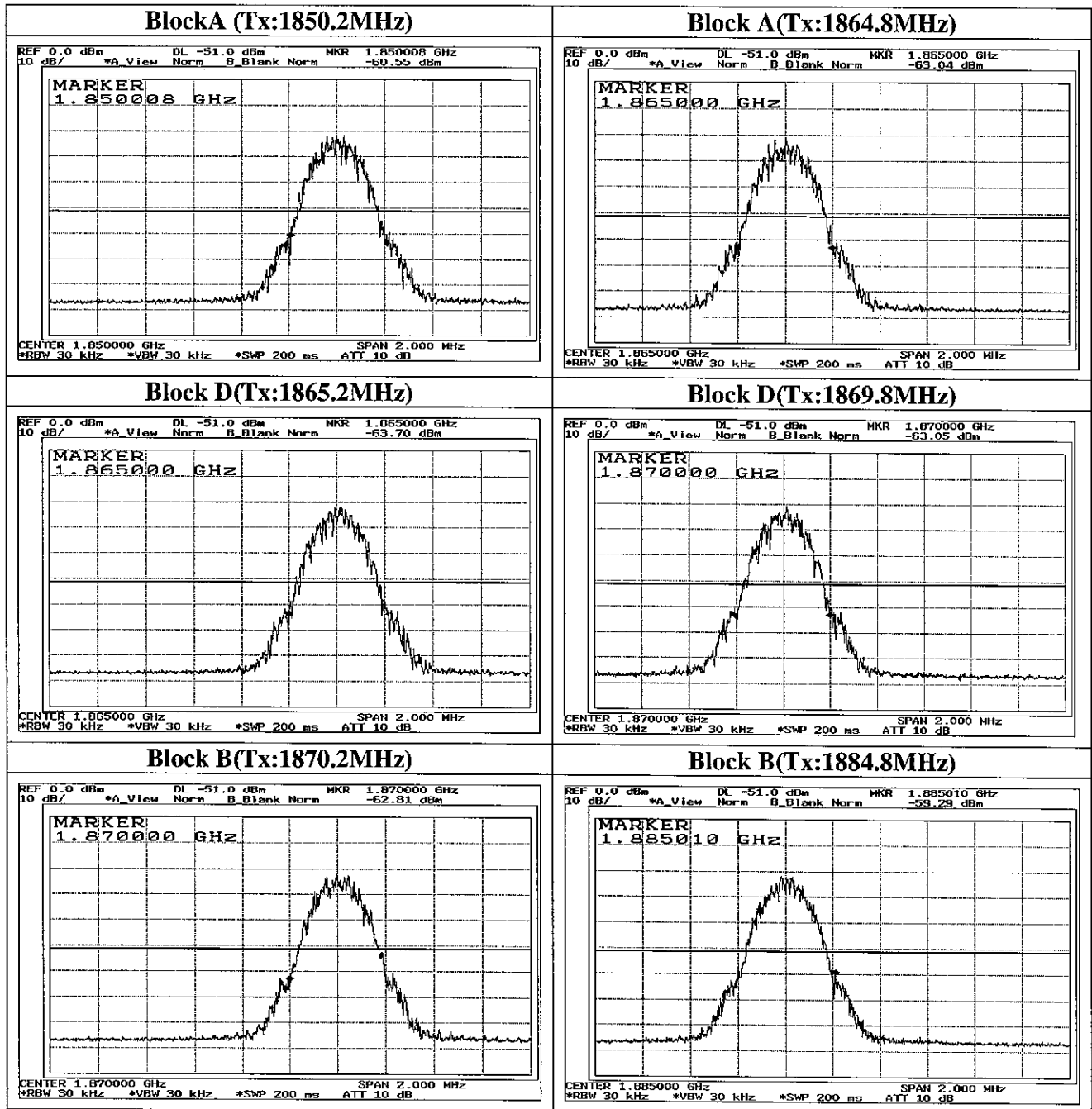
Frequency	Reading	Atten.	Cable Loss	Result	Limit
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]
1890.0	-60.3	30.0	8.0	-22.3	-13.0
1895.0	-61.7	30.0	8.0	-23.7	-13.0

Block C

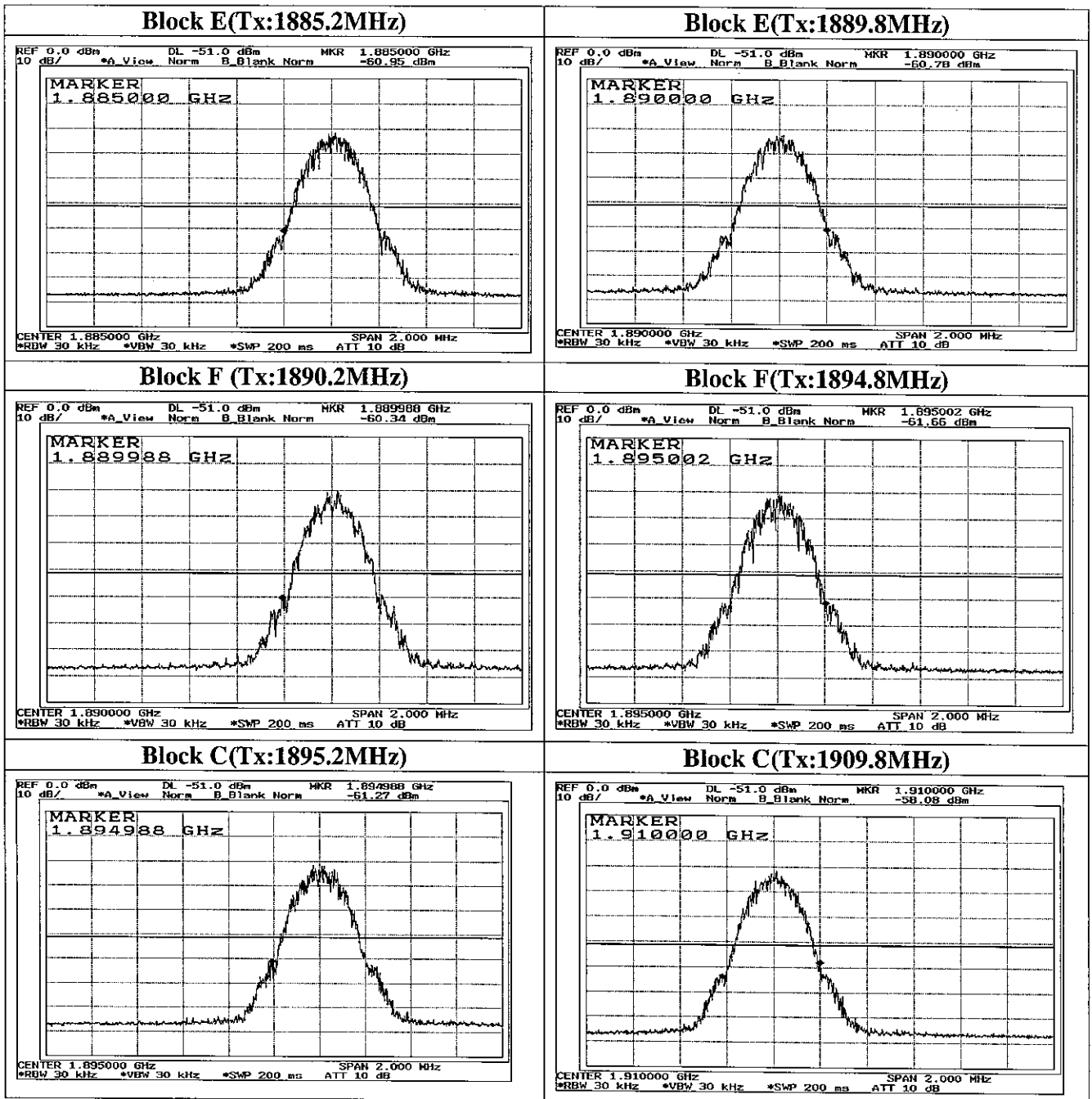
Frequency	Reading	Atten.	Cable Loss	Result	Limit
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]
1895.0	-61.3	30.0	8.0	-23.3	-13.0
1910.0	-58.1	30.0	8.0	-20.1	-13.0

Sample Calculation : Result = Reading + Atten. + Cable Loss

Band Edge(Conducted)



Band Edge(Conducted)



Band Edge (Radiated)

UL Apex Co., Ltd.
Head Office EMC Lab. Semi Anechoic Chamber : No.1

COMPANY SHARP CORPORATION
EQUIPMENT GSM Mobile Phone
MODEL TM100
S/N 187
POWER DC3.7V
MODE Tx
POSITION H:Z-axis / V:X-axis

REPORT NO 24EE0050-HO
REGULATION FCC Part24 Section 24.238(b)
TEST METHOD FCC Part2 Section 2.1049
TEST DISTANCE 3m
DATE 06/01/2004
TEMPERATURE 20°C
HUMIDITY 36%
CALIBRATION OK
ENGINEER Hiroka Umeyama

No.	FREQUENCY [MHz]	Electric Field Strength (After Factor Calculation) [dBuV/m]		RESULT [dBm] (dBm)		LIMIT [dBm] (EIRP)	MARGIN [dB]		Mode
		HOR	VER	HOR	VER		HOR	VER	
1	1850.00	61.7	66.8	-41.1	-35.9	-13.0	28.1	22.9	Operating
2	1910.00	61.6	64.9	-41.9	-38.4	-13.0	28.9	25.4	Operating

Rx-ANTENNA : Biconical Antenna(30-300MHz), Logperiodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)

Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Antenna(1-19GHz)

The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise.

With the result above, the effective radiated power was calculated on the basis of the reference value

- for the calibration data on the substitution measurement.

S/A PK (RBW: 30kHz, VBW:30kHz)

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b(10.04.03)

Spurious Emission (Conducted)

UL Apex Co., Ltd.
Head Office EMC Lab. Measurement Room : No.3

COMPANY SHARP CORPORATION
EQUIPMENT GSM Mobile Phone
MODEL TM100
S/N 187
POWER DC3.7V
MODE Tx

REPORT NO 24EE0050-HO
REGULATION Fcc Part 24 Section 24.238(a)
TEST METHOD Fcc Part 2 Section 2.1051
TEST DISTANCE -
DATE 11/01/2004
TEMPERATURE 20°C
HUMIDITY 30%
ENGINEER Hiroka Umeyama

PK DETECT(S/A : RBW 1MHz ,VBW 1MHz, sweep time AUTO)

Limit Line

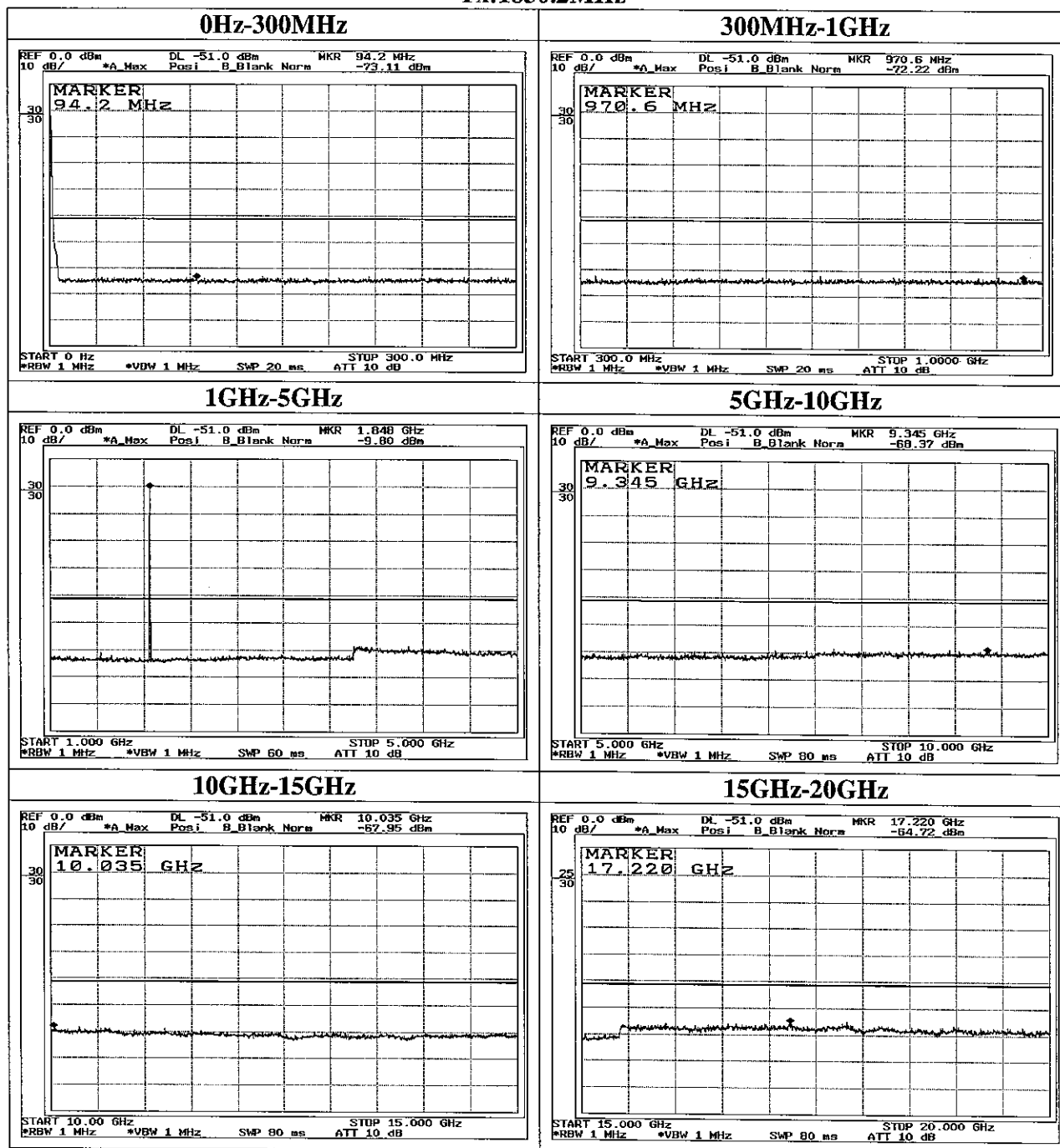
Limit	Atten.	Cable	Limit Line
[dBm]	[dB]	Loss [dB]	[dBm]
-13.0	30.0	8.0	-51.0

Sample Calculation : Limit Line = Limit - Atten. - Cable Loss

Result OK

Spurious Emission (Conducted)

Tx:1850.2MHz



UL Apex Co., Ltd.

Head Office EMC Lab.

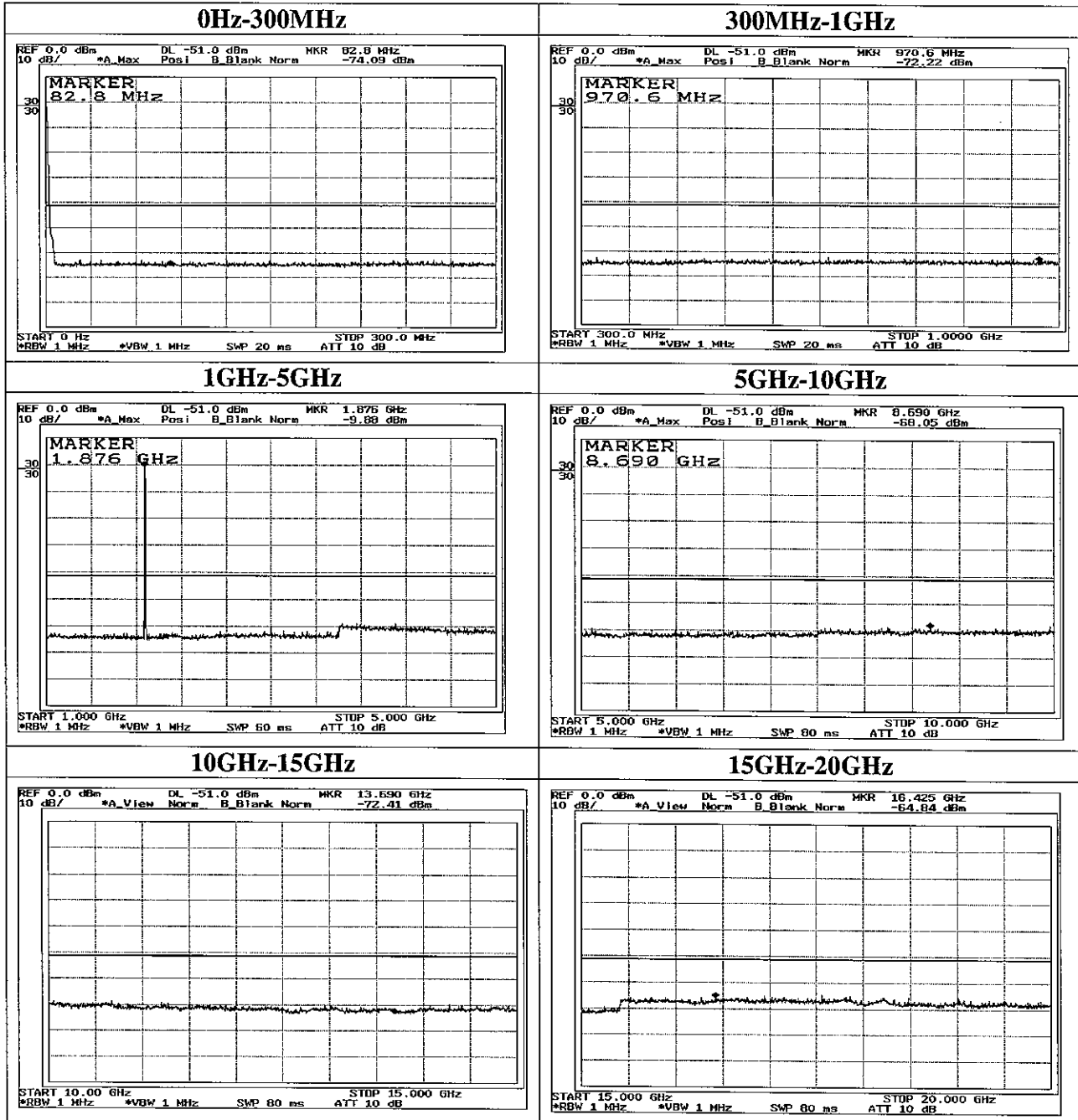
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

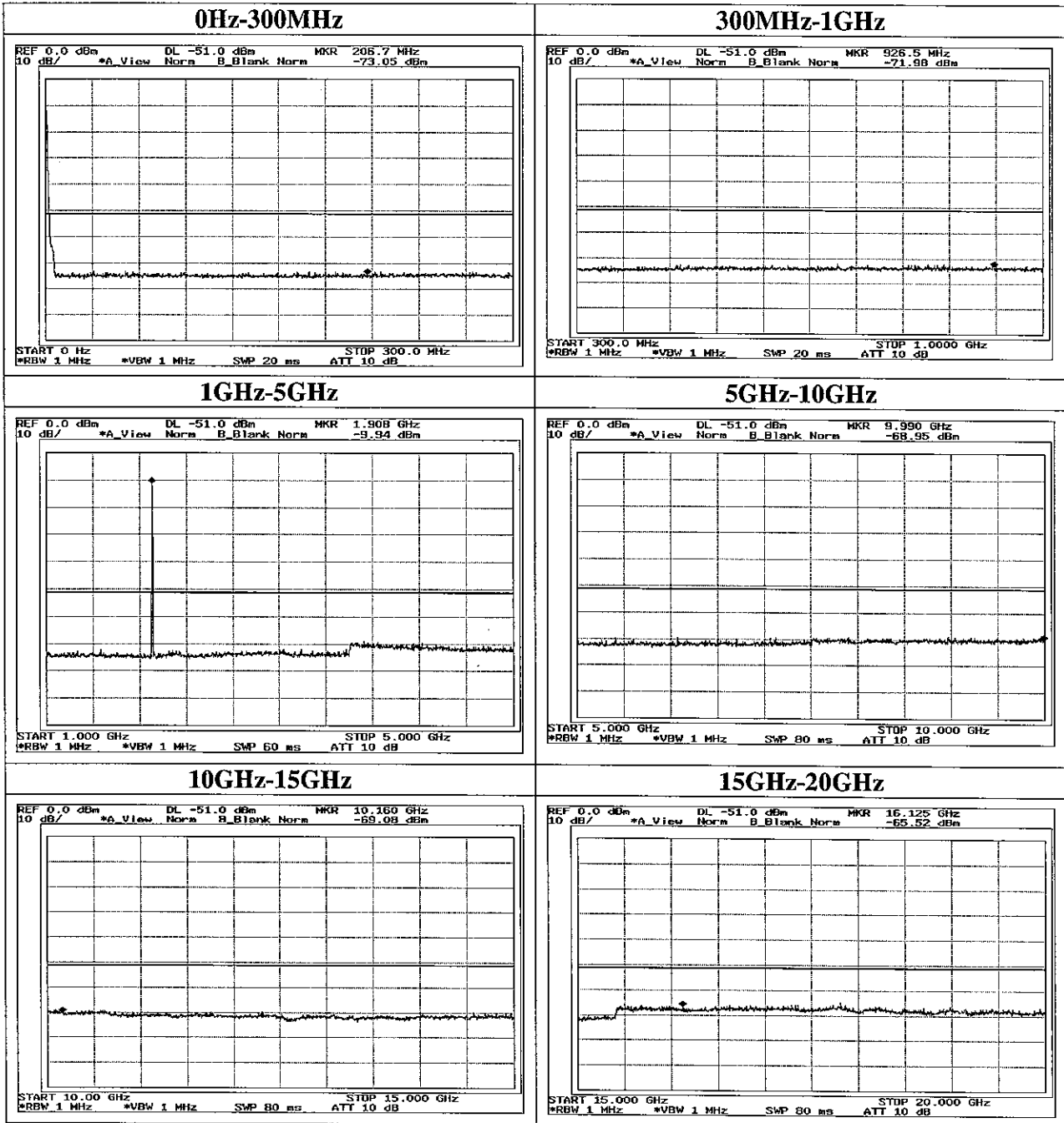
Facsimile : +81 596 24 8124

MF060b(10.04.03)

Spurious Emission (Conducted)
Tx:1880.0MHz



Spurious Emission (Conducted)
Tx:1909.8MHz



Spurious Radiation

UL Apex Co., Ltd.									
Head Office EMC Lab. Semi Anechoic Chamber : No.1									
COMPANY	SHARP CORPORATION				REPORT NO	24EE0050-HO			
EQUIPMENT	GSM Mobile Phone				REGULATION	FCC Part24 Section 24.238(a)			
MODEL	TM100				TEST METHOD	FCC Part2 Section 2.1053			
S/N	187				TEST DISTANCE	3m			
POWER	DC3.7V				DATE	05/01/2004 06/01/2004			
MODE	Tx 1850.2 MHz				TEMPERATURE	21℃ 20℃			
POSITION	H:X-axis / V:X-axis (below 1GHz)				HUMIDITY	35% 36%			
	H:Z-axis / V:X-axis (above 1GHz)				CALIBRATION	OK			
					ENGINEER	Hiroka Uneyama			

No.	FREQUENCY [MHz]	Electric Field Strength (After Factor Calculation) [dBuV/m]		RESULT [dBm] (dBm)		LIMIT [dBm] (EIRP)	MARGIN [dB]		Mode
		HOR	VER	HOR	VER		HOR	VER	
1	63.44	-	45.8	-	-50.2	-13.0	-	37.2	Operating
2	66.01	39.7	-	-57.4	-	-13.0	44.4	-	Operating
3	102.00	43.8	46.3	-57.1	-49.0	-13.0	44.1	36.0	Operating
4	362.99	40.2	-	-58.2	-	-13.0	45.2	-	Operating
5	395.99	-	41.2	-	-56.9	-13.0	-	43.9	Operating
6	857.99	44.5	43.2	-51.9	-53.3	-13.0	38.9	40.3	Operating
7	1690.20	54.2	54.7	-46.7	-46.3	-13.0	33.7	33.3	Operating
8	3700.40	58.0	58.9	-44.8	-44.0	-13.0	31.8	31.0	Operating
9	5550.60	60.7	61.6	-43.8	-42.9	-13.0	30.8	29.9	Operating
10	7400.80	64.9	64.8	-34.8	-33.7	-13.0	21.8	20.7	Operating
11	9251.00	65.3	65.1	-30.6	-32.2	-13.0	17.6	19.2	Operating
12	11101.20	68.0	67.4	-29.5	-30.4	-13.0	16.5	17.4	Operating
13	12951.40	72.9	72.6	-28.3	-29.1	-13.0	15.3	16.1	Operating
14	14801.60	75.7	76.0	-25.5	-25.6	-13.0	12.5	12.6	Operating
15	16651.80	*	*	-	-	-13.0	-	-	Operating
16	18502.00	*	*	-	-	-13.0	-	-	Operating

Rx-ANTENNA : Biconical Antena(30-300MHz), Logperiodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)
Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Antenna(1-19GHz)
All other emissions were at least 20dB below the specification limit.
*The noise level was too low to detect.
The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise.
With the result above, the effective radiated power was calculated on the basis of the reference value
- for the calibration data on the substitution measurement.

S/A PK (RBW: 1MHz , VBW:1MHz)

Spurious Radiation

UL Apex Co., Ltd.									
Head Office EMC Lab. Semi Anechoic Chamber : No.1									
COMPANY	SHARP CORPORATION				REPORT NO	24EE0050-HO			
EQUIPMENT	GSM Mobile Phone				REGULATION	FCC Part 24 Section 24.238(a)			
MODEL	TM100				TEST METHOD	FCC Part2 Section 2.1053			
S/N	187				TEST DISTANCE	3m			
POWER	DC3.7V				DATE	05/01/2004	06/01/2004		
MODE	Tx 1880.0 MHz				TEMPERATURE	21℃	20℃		
POSITION	H:X-axis / V:X-axis (below 1GHz)				HUMIDITY	35%	36%		
	H:Z-axis / V:X-axis (above 1GHz)				CALIBRATION	OK			
					ENGINEER	Hiroka Umeyama			

No.	FREQUENCY [MHz]	Electric Field Strength (After Factor Calculation) [dBuV/m]		RESULT [dBm] (dBm)		LIMIT [dBm] (EIRP)	MARGIN [dB]		Mode
		HOR	VER	HOR	VER		HOR	VER	
1	63.44	-	46.3	-	-49.7	-13.0	-	36.7	Operating
2	66.01	40.2	-	-56.9	-	-13.0	43.9	-	Operating
3	102.00	46.5	47.2	-54.4	-48.1	-13.0	41.4	35.1	Operating
4	362.99	40.6	-	-57.8	-	-13.0	44.8	-	Operating
5	395.99	-	41.4	-	-56.7	-13.0	-	43.7	Operating
6	857.99	44.7	43.5	-51.7	-53.0	-13.0	38.7	40.0	Operating
7	1720.00	56.2	54.6	-45.1	-46.7	-13.0	32.1	33.7	Operating
8	3760.00	58.2	55.2	-44.6	-47.7	-13.0	31.6	34.7	Operating
9	5640.00	62.4	61.0	-42.1	-43.5	-13.0	29.1	30.5	Operating
10	7520.00	65.5	64.8	-33.5	-33.0	-13.0	20.5	20.0	Operating
11	9400.00	64.8	65.1	-30.6	-31.7	-13.0	17.6	18.7	Operating
12	11280.00	67.7	68.3	-30.6	-30.3	-13.0	17.6	17.3	Operating
13	13160.00	72.7	73.3	-28.5	-28.3	-13.0	15.5	15.3	Operating
14	15040.00	76.1	76.1	-25.1	-25.5	-13.0	12.1	12.5	Operating
15	16920.00	*	*	-	-	-13.0	-	-	Operating
16	18800.00	*	*	-	-	-13.0	-	-	Operating

Rx-ANTENNA : Biconical Antena(30-300MHz), Logperiodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)

Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Antenna(1-19GHz)

All other emissions were at least 20dB below the specification limit.

*The noise level was too low to detect.

The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise.

With the result above, the effective radiated power was calculated on the basis of the reference value

- for the calibration data on the substitution measurement.

S/A PK (RBW: 1MHz , VBW:1MHz)

Spurious Radiation

UL Apex Co., Ltd.

Head Office EMC Lab. Semi Anechoic Chamber : No.1

COMPANY	SHARP CORPORATION	REPORT NO	24EE0050-HO
EQUIPMENT	GSM Mobile Phone	REGULATION	FCC Part 24 Section 24.238(a)
MODEL	TM100	TEST METHOD	FCC Part2 Section 2.1053
S/N	187	TEST DISTANCE	3m
POWER	DC3.7V	DATE	05/01/2004 06/01/2004
MODE	Tx 1909.8 MHz	TEMPERATURE	21°C 20°C
POSITION	H:X-axis / V:X-axis (below 1GHz)	HUMIDITY	35% 36%
	H:Z-axis / V:X-axis (above 1GHz)	CALIBRATION	OK
		ENGINEER	Hiroka Umeyama

No.	FREQUENCY [MHz]	Electric Field Strength (After Factor Calculation) [dBuV/m]		RESULT [dBm] (dBm)		LIMIT [dBm] (EIRP)	MARGIN [dB]		Mode
		HOR	VER	HOR	VER		HOR	VER	
1	63.44	-	46.4	-	-49.6	-13.0	-	36.6	Operating
2	66.01	41.0	-	-56.1	-	-13.0	43.1	-	Operating
3	102.00	46.2	46.0	-54.7	-49.3	-13.0	41.7	36.3	Operating
4	362.99	40.8	-	-57.6	-	-13.0	44.6	-	Operating
5	395.99	-	41.9	-	-56.2	-13.0	-	43.2	Operating
6	857.99	45.7	43.7	-50.7	-52.8	-13.0	37.7	39.8	Operating
7	1750.00	54.4	54.9	-47.2	-46.8	-13.0	34.2	33.8	Operating
8	3819.60	56.8	63.3	-46.1	-39.6	-13.0	33.1	26.6	Operating
9	5729.40	65.4	61.3	-39.1	-43.2	-13.0	26.1	30.2	Operating
10	7639.20	64.5	64.3	-33.8	-32.8	-13.0	20.8	19.8	Operating
11	9549.00	64.2	65.4	-30.6	-30.9	-13.0	17.6	17.9	Operating
12	11458.80	66.9	68.1	-32.2	-31.3	-13.0	19.2	18.3	Operating
13	13368.60	72.3	72.8	-28.9	-28.8	-13.0	15.9	15.8	Operating
14	15278.40	74.5	73.3	-26.7	-28.3	-13.0	13.7	15.3	Operating
15	17188.20	*	*	-	-	-13.0	-	-	Operating
16	19098.00	*	*	-	-	-13.0	-	-	Operating

Rx-ANTENNA : Biconical Antenna(30-300MHz), Logperiodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)

Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Antenna(1-19GHz)

All other emissions were at least 20dB below the specification limit.

*The noise level was too low to detect.

The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise.

With the result above, the effective radiated power was calculated on the basis of the reference value

- for the calibration data on the substitution measurement.

S/A PK (RBW: 1MHz, VBW:1MHz)

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

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MF060b(10.04.03)

Frequency Stability(Temperature/Voltage Variation)

UL Apex Co., Ltd.
Head Office EMC Lab. Measurement Room : No.3

COMPANY SHARP CORPORATION
EQUIPMENT GSM Mobile Phone
MODEL TM100
S/N 187
POWER DC 3.7 V
MODE Tx 1880.0 MHz

REPORT NO 24EE0050-HO
REGULATION FCC Part24 Section 24.235
TEST METHOD FCC Part2 Section 2.1055(a)(1) and(b)
FCC Part2 Section 2.1055(d)(1) and(2)
TEST DISTANCE -
DATE 11/01/2004
TEMPERATURE 20°C
HUMIDITY 30%
ENGINEER Hiroka Umeyama

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
-30.0	3.7	1879.999400	1400.0	0.7	-
-20.0	3.7	1880.001200	400.0	0.2	-
-10.0	3.7	1880.002400	1600.0	0.9	-
0.0	3.7	1880.002200	1400.0	0.7	-
10.0	3.7	1880.000600	200.0	0.1	-
20.0	3.7	1880.000800	0.0	0.0	-
30.0	3.7	1880.004200	3400.0	1.8	-
40.0	3.7	1879.999000	1800.0	1.0	-
50.0	3.7	1880.002500	1700.0	0.9	-

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
20.0	3.15	1880.001400	600.0	0.3	-
20.0	3.70	1880.000800	0.0	0.0	-
20.0	4.26	1880.001200	400.0	0.2	-