EMI TEST REPORT

Test Report No. : 24JE0153-HO-1

Applicant	:	**SHARP CORPORATION**
Type of Equipment	:	**Tri-Band Mobile Cellular Phone**
Model No.	:	**TM150**
Test standard	:	**FCC Part 24 2003**
FCC ID	:	**APYNAR0057**
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.

Date of test : May 27, 29 and 31, 2004

Tested by :

Naoki Sakamoto
EMC Service

Hiroka Umeyama
EMC Service

Approved by :

Hironobu Shimoji
Group Leader of EMC Service

UL Apex Co., Ltd.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
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SECTION 1: Client information

Company Name	:	SHARP CORPORATION
Address	:	2-13-1 Iida Hachihonmatsu Higashihiroshima-city Hirosima, 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	:	Tri-Band Mobile Cellular Phone
Model No.	:	TM150
Serial No.	:	CS-268
Rating	:	AC120V/60Hz (AC Charger), DC12/24V(DC Charger) DC3.7V (DC Battery)
Country of Manufacture	:	JAPAN
Receipt Date of Sample	:	May 26, 2004
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

SHARP CORPORATION, Model No.: TM150(referred to as the EUT in this report) is the Tri-Band Mobile Cellular Phone.

Equipment Type	: Transceiver
Frequency of operation	: 1850.2-1909.8MHz
Type of modulation	: GSMK
Bandwidth & channel spacing	: 60MHz & 200kHz
Channel number	: 299
Antenna Type	: Fixed Antenna
Antenna Gain	: 2 dBi
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.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 24 2003

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	4.24dB 1880MHz (Conducted)	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	1.0dB 1850MHz Vertical	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	13.7dB 17188.2MHz 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."

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 2003.

3.5 Uncertainty

Radiated

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Conducted

The measurement uncertainty (with a 95% confidence level) for this test is ±3.0dB.
The data listed in this test report has enough margin.

3.6 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	Listed date (for NVLAP)	Registration number (for NVLAP)	IC Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	February 01, 2002	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	June 05, 2002	846015	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 shielded room	-	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 measurement room.

3.7 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

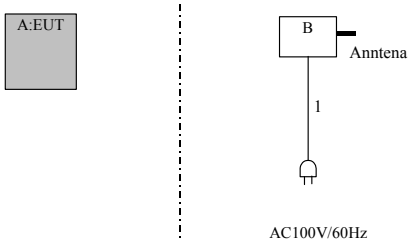
4.1 Operating Modes

The EUT was set with the mode in a manner similar to typical use during the tests.
The sequence is used : Transmitting mode (GSM, GSMK)
Low Channel :1850.2MHz(Ch512)
Mid Channel :1880.0MHz(Ch661)
High channel :1909.8MHz(Ch810)

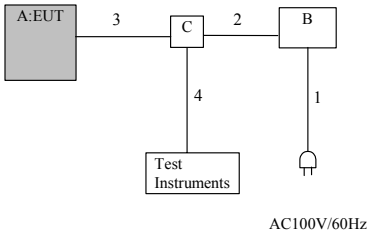
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Radiated



Conducted



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Tri-Band Mobile Cellular Phone	TM150	CS-268	SHARP	APYNAR0057
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

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 (for the Peak Output Power for the Radiated). The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table. 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 varied between 1 and 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 (2.15dBi) 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

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 varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table. 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 varied between 1 and 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 (2.15dBi) 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

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

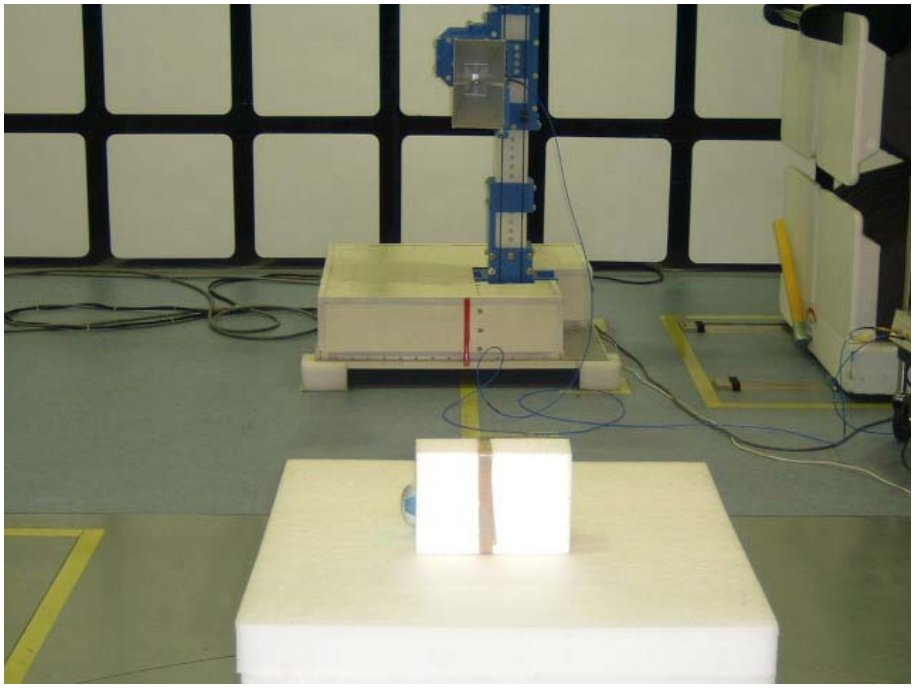
APPENDIX 1: Photographs of test setup

Conducted Emission

Spurious Radiation

Front

Rear

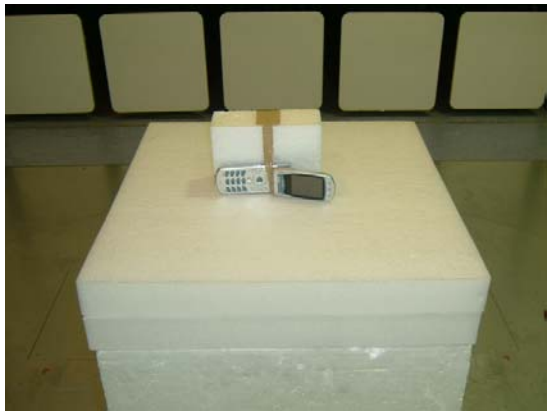


Worst Case Position (X-axis:Horizontal / Y-axis:Vertical)

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-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE,PO(Rad) BE(Rad.)	2004/04/12 * 12
MRENT-06	Spectrum Analyzer	Advantest	R3273	RE,PO(Rad) BE(Rad.)	2003/10/31 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2004/02/24 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/10/15 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/10/15 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2004/04/16 * 12
MPSE-04	Power sensor	Agilent	E9327A	PO(Con.)	2004/03/11 * 12
MPM-04	Power Meter	Agilent	E4416A	PO(Con.)	2004/03/03 * 12
MHF-02	High Pass Filter	Tokimec	TF323DCA	RE	2003/09/19 * 12
MAT-21	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-120	PO(Con.) EX	2004/01/28 * 12
MAT-23	Attenuator	Orient Microwave	BX10-0476-00	PO(Con.) EX,RE	2004/03/30 * 12
MCC-04	Microwave Cable	Storm	421-011	RE,PO(Rad) BE(Rad.)	2004/01/06 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE,PO(Rad) BE(Rad.)	2003/01/11 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2004/02/06 * 12
MCC-24	Microwave Cable	Storm	-	RE,PO(Rad) BE(Rad.)	2004/05/01 * 12
MRENT-09	Spectrum Analyzer	Advantest	R3273	EX,FR	2004/02/18 * 12
MSG-01	Signal Generator	Rohde & Schwarz	SMR40	RE,PO(Rad) BE(Rad.)	2003/11/26 * 12
MSG-02	Signal Generator	Rohde & Schwarz	SML03	RE	2003/08/26 * 12
MCC-22	Microwave Cable	Storm	-	EX,FR	2004/05/01 * 12
MCH-01	Temp.&Humid. Chamber	Tabai Espec	PL-2KP	FR	2003/08/26 * 12
MHA-02	Horn Antenna	EMCO	3160-09	RE	2004/01/10 * 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)
FR: Frequency Stability
EX: Except for RE,PO(Rad.),PO(Con.), BE(Rad.) and FR

APPENDIX 3: Data of EMI test

Peak Output Power (Conducted)

UL Apex Co., Ltd.
Head Office EMC Lab. Semi Anechoic Chamber : No.3

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.232(b)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1046
S/N	CS-268	TEST DISTANCE	-
POWER	DC3.7V(AC120V/60Hz)	DATE	May 27, 2004
MODE	Tx	TEMPERATURE	23℃
		HUMIDITY	63%
		ENGINEER	Hiroka Umeyama

Ch	Frequency [MHz]	P/M Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]	Convert [mW]
Low	1850.2	-2.69	30.00	1.36	28.67	33.00	4.33	736.21
Mid	1880.0	-2.67	30.00	1.36	28.69	33.00	4.31	751.62
High	1909.8	-2.99	30.00	1.36	28.37	33.00	4.63	693.43

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

Peak Output Power (Radiated)

UL Apex Co., Ltd.
Head Office EMC Lab. Semi Anechoic Chamber : No.2

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.232(b)
MODEL	TM150	TEST METHOD	FCC Part2 Sectiom 2.1046
S/N	CS-268	TEST DISTANCE	3m
POWER	DC3.7V(AC120V/60Hz)	DATE	May 29, 2004
MODE	Tx	TEMPERATURE	23℃
POSITION	H:X-axis / V:Y-axis	HUMIDITY	54%
		CALIBRATION	OK
		ENGINEER	Naoki Sakamoto

No.	FREQ	SG READING		CABLE	ANT	ATTEN	RESULT		LIMITS	MARGIN	
		HOR	VER	LOSS	GAIN		HOR	VER	(EIRP)	HOR	VER
	[MHz]	[dBm]		[dB]	[dBi]	[dB]	[dBm]		[dBm]	[dB]	
1	1850.36	21.4	19.4	2.6	9.4	0.0	28.2	26.2	33.0	4.8	6.8
2	1880.05	19.6	18.4	2.6	9.6	0.0	26.6	25.4	33.0	6.4	7.6
3	1909.89	18.4	17.8	2.6	9.7	0.0	25.5	24.9	33.0	7.5	8.1

CALCULATION:READING(SG)-LOSS(CABLE)+ANT.GAIN-ATTEN
Rx-ANTENNA : Biconical Antena(30-300MHz), Logperriodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)
Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Anrenna(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)

Emission Bandwidth

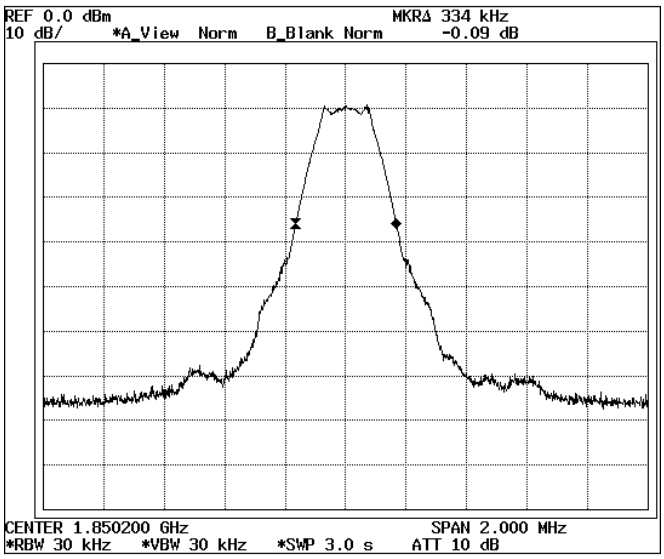
UL Apex Co., Ltd.
Head Office EMC Lab. Measurement Room : No.3

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(b)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1049
S/N	CS-268	TEST DISTANCE	-
POWER	DC3.7V (AC120V/60Hz)	DATE	May 31, 2004
MODE	Tx	TEMPERATURE	23℃
		HUMIDITY	63%
		ENGINEER	Hiroka Umeyama

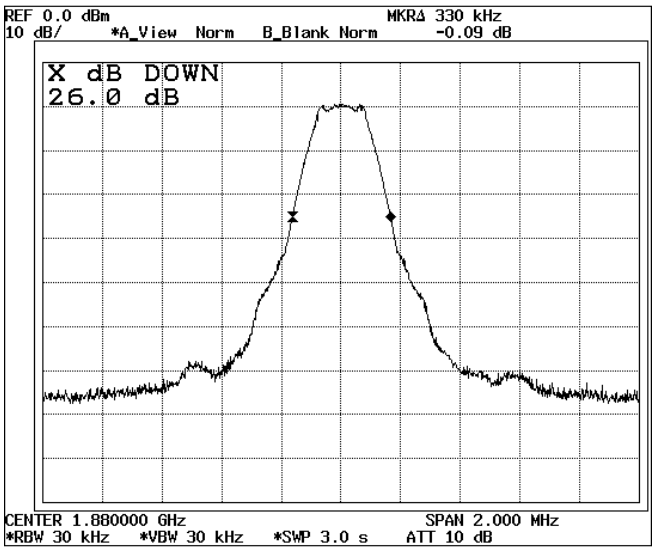
CH	FREQ [MHz]	Bandwidth [kHz]	Limit [kHz]
Low	1850.2	334.0	-
Mid	1880.0	330.0	-
High	1909.8	330.0	-

Emission Bandwidth

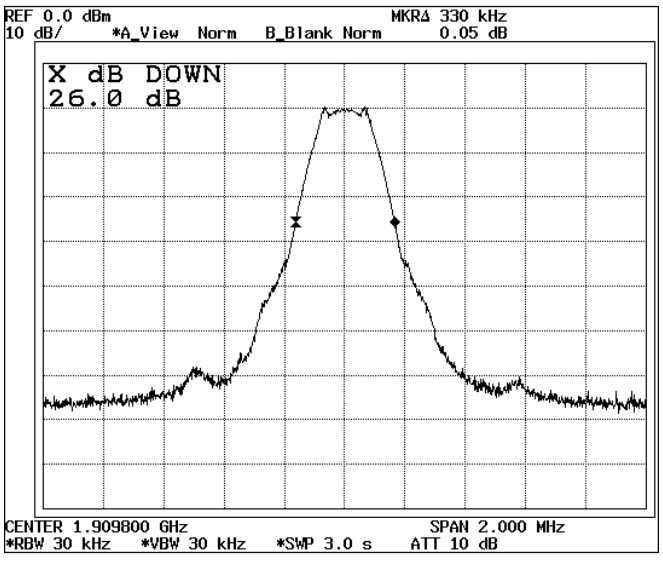
Tx:1850.2MHz



Tx:1880.0MHz



Tx:1909.8MHz



99%Occupied Bandwidth

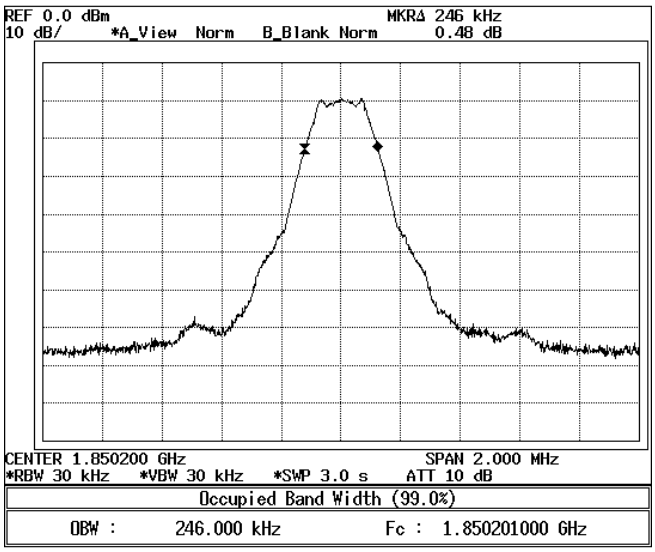
UL Apex Co., Ltd.
Head Office EMC Lab. Measurement Room : No.3

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(b)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1049
S/N	CS-268	TEST DISTANCE	-
POWER	DC3.7V (AC120V/60Hz)	DATE	May 31, 2004
MODE	Tx	TEMPERATURE	23℃
		HUMIDITY	63%
		ENGINEER	Hiroka Umeyama

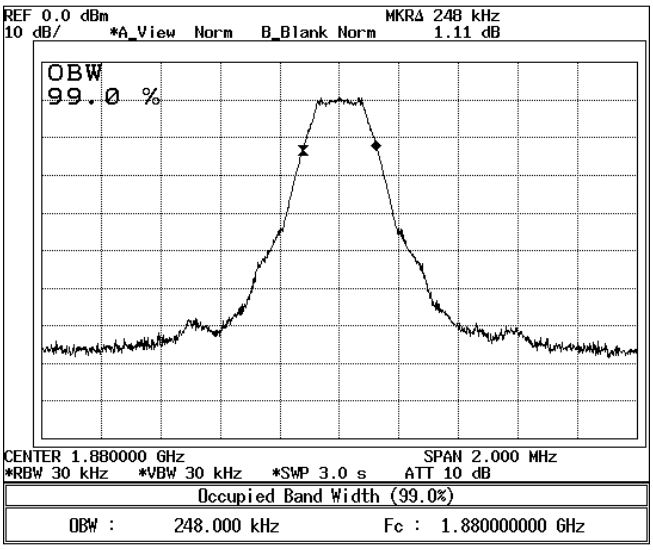
CH	FREQ [MHz]	Bandwidth [kHz]	Limit [kHz]
Low	1850.2	246.0	-
Mid	1880.0	248.0	-
High	1908.8	246.0	-

99%Occupied Bandwidth

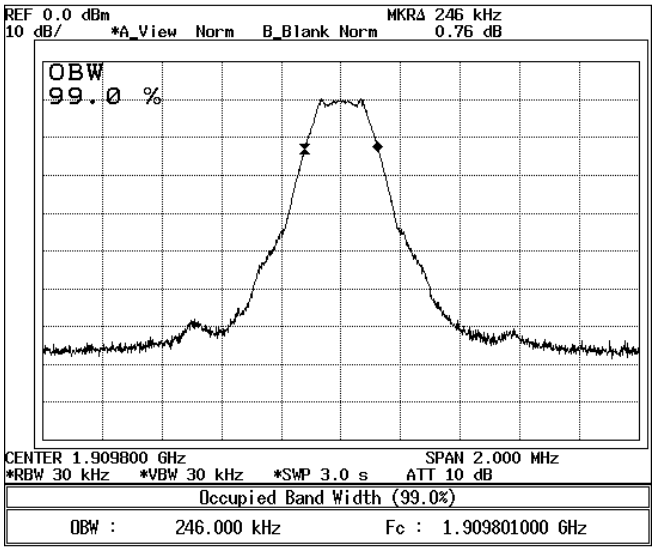
Tx:1850.2MHz



Tx:1880.0MHz



Tx:1909.8MHz



Band Edge(Conducted)

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

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(b)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1049
S/N	CS-268	TEST DISTANCE	-
POWER	DC3.7V (AC120V/60Hz)	DATE	May 31, 2004
MODE	Tx	TEMPERATURE	23℃
		HUMIDITY	63%
		ENGINEER	Hiroka Umeyama

VIDEO AV 30 times

Block A

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
1850.0	-61.8	30.0	8.0	-23.8	-13.0
1865.0	-63.2	30.0	8.0	-25.2	-13.0

Block D

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
1865.0	-59.7	30.0	8.0	-21.7	-13.0
1870.0	-59.6	30.0	8.0	-21.6	-13.0

Block B

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
1870.0	-60.3	30.0	8.0	-22.3	-13.0
1885.0	-61.3	30.0	8.0	-23.3	-13.0

Block E

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
1885.0	-62.5	30.0	8.0	-24.5	-13.0
1890.0	-61.4	30.0	8.0	-23.4	-13.0

Block F

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
1890.0	-60.2	30.0	8.0	-22.2	-13.0
1895.0	-61.9	30.0	8.0	-23.9	-13.0

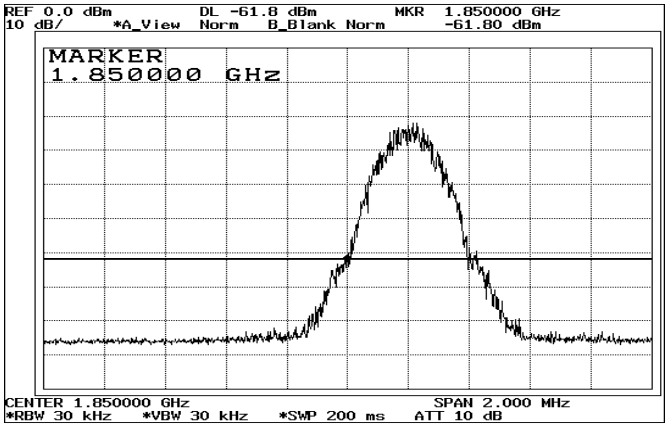
Block C

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]
1895.0	-60.0	30.0	8.0	-22.0	-13.0
1910.0	-61.1	30.0	8.0	-23.1	-13.0

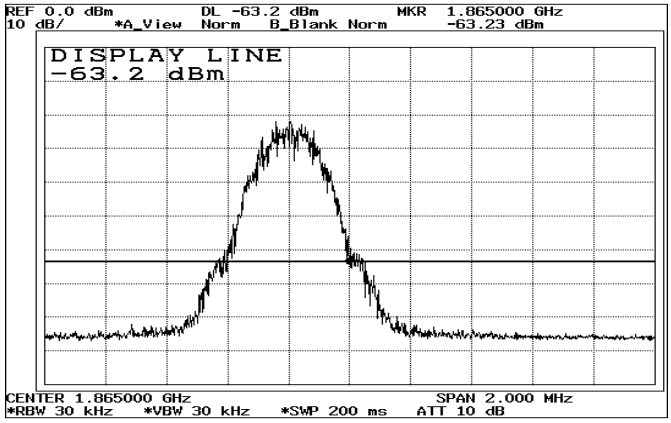
Sample Calculation : Result = Reading + Atten. + Cable Loss

Band Edge(Conducted)

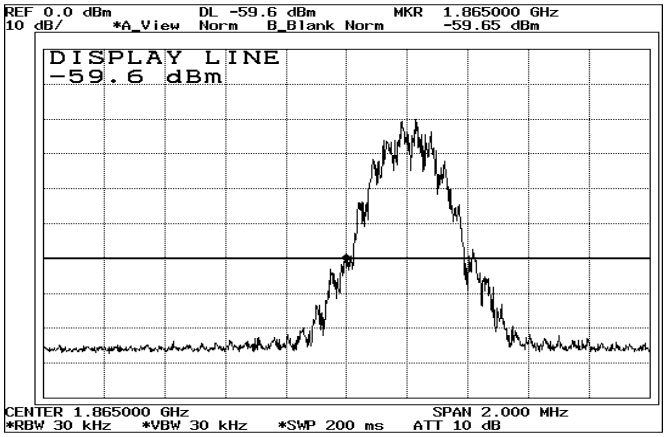
BlockA (Tx:1850.2MHz)



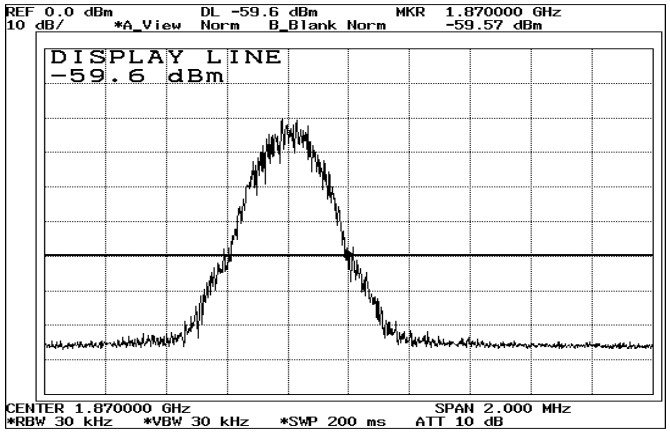
Block A(Tx:1864.8MHz)



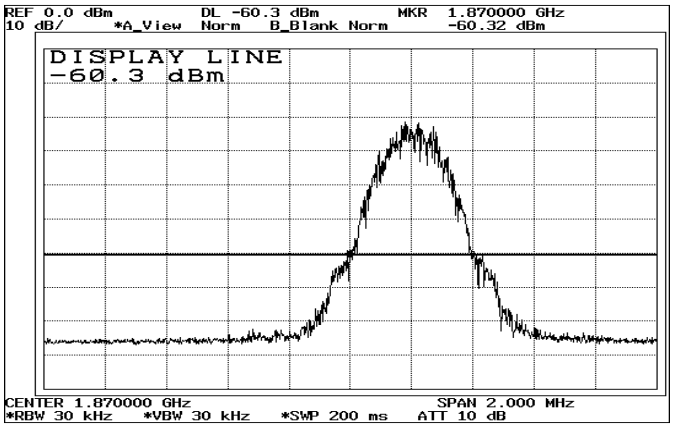
Block D(Tx:1865.2MHz)



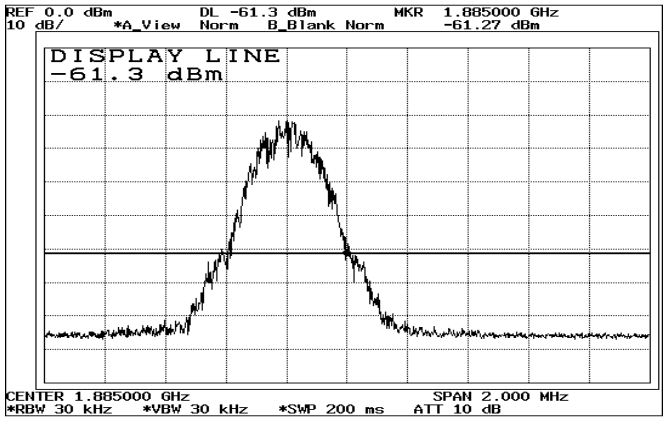
Block D(Tx:1869.8MHz)



Block B(Tx:1870.2MHz)

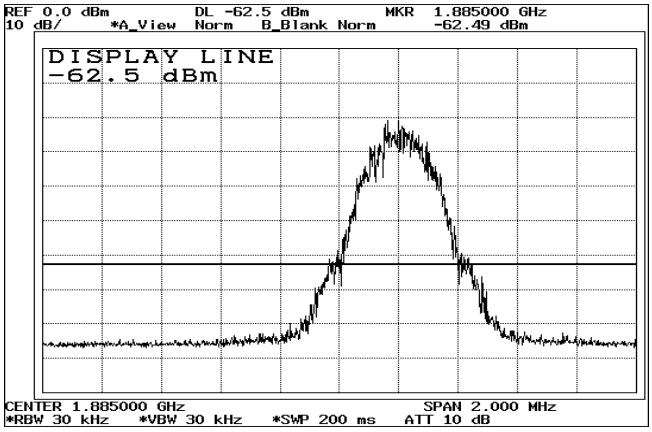


Block B(Tx:1884.8MHz)

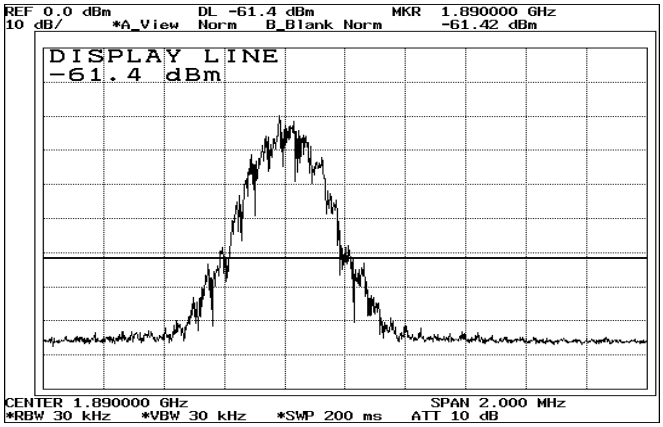


Band Edge(Conducted)

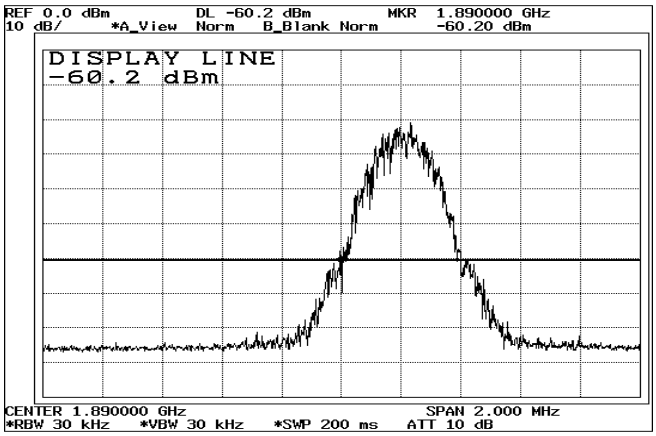
Block E(Tx:1885.2MHz)



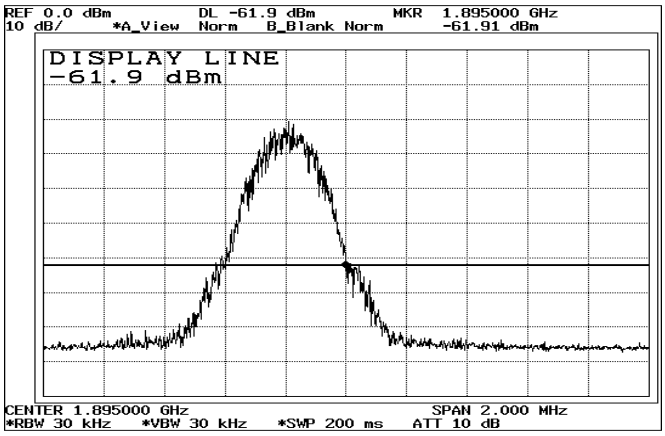
Block E(Tx:1889.8MHz)



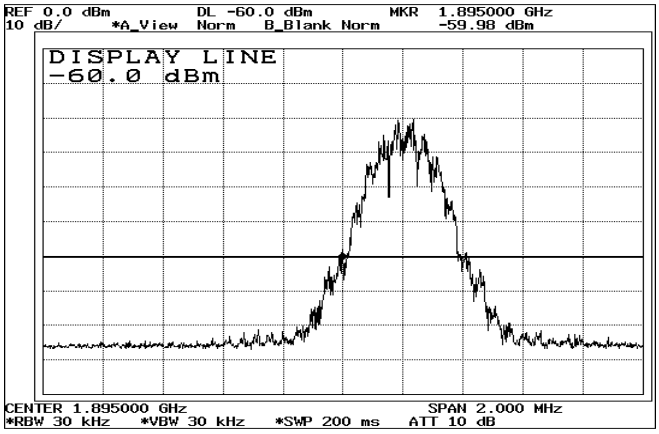
Block F (Tx:1890.2MHz)



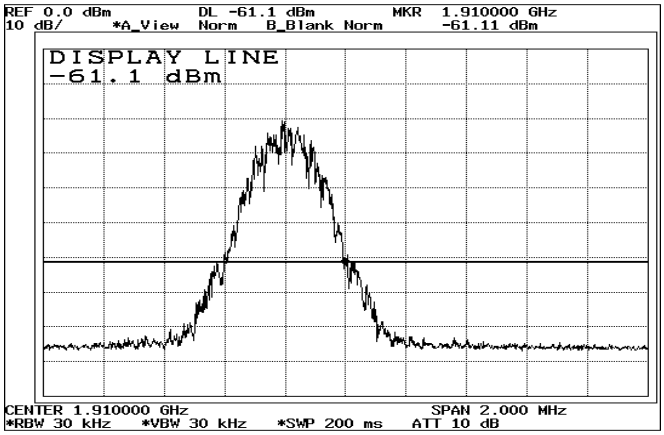
Block F(Tx:1894.8MHz)



Block C(Tx:1895.2MHz)



Block C(Tx:1909.8MHz)



Band Edge (Radiated)

UL Apex Co., Ltd.
Head Office EMC Lab. Semi Anechoic Chamber : No.2

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(b)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1049
S/N	CS-268	TEST DISTANCE	3m
POWER	DC3.7V(AC120V/60Hz)	DATE	May 29, 2004
MODE	Tx	TEMPERATURE	23℃
POSITION	H:X-axis / V:Y-axis	HUMIDITY	54%
		CALIBRATION	OK
		ENGINEER	Naoki Sakamoto

No.	FREQ	SG READING HOR [dBm]	SG READING VER [dBm]	CABLE LOSS [dB]	ANT GAIN [dBi]	ATTEN [dB]	RESULT HOR [dBm]	RESULT VER [dBm]	LIMITS (EIRP) [dBm]	MARGIN HOR [dB]	MARGIN VER [dB]
1	1850.00	-18.5	-16.5	2.6	9.4	0.0	-14.9	-14.0	-13.0	1.9	1.0
2	1910.00	-17.2	-19.2	2.6	9.7	0.0	-14.3	-16.3	-13.0	1.3	3.3

Rx-ANTENNA : Biconical Antena(30-300MHz), Logperriodic Antenna(300-1000MHz), Horn Antenna(1-19GHz)
Tx-ANTENNA : Dipole Antenna(30-1000MHz), Horn Anrenna(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)

Spurious Emission (Conducted)

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

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	Fcc Part 24 Section 24.238(a)
MODEL	TM150	TEST METHOD	Fcc Part 2 Section 2.1051
S/N	CS-268	TEST DISTANCE	-
POWER	DC3.7V (AC120V/60Hz)	DATE	May 31, 2004
MODE	Tx	TEMPERATURE	23℃
		HUMIDITY	63%
		ENGINEER	Hiroka Umeyama

Limit Line

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

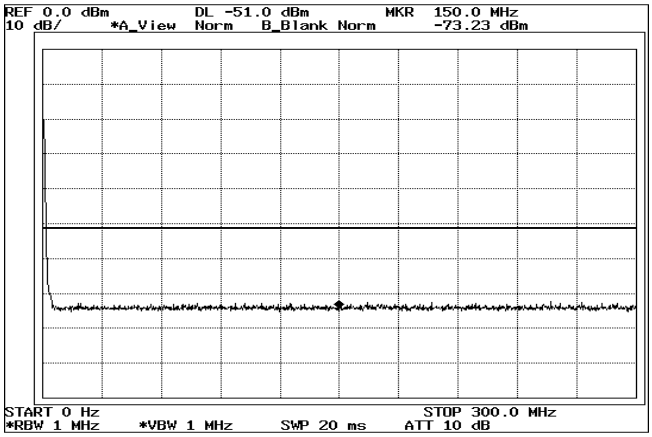
Sample Calculation : Limit Line = Limit - Atten. - Cable Loss

Result OK

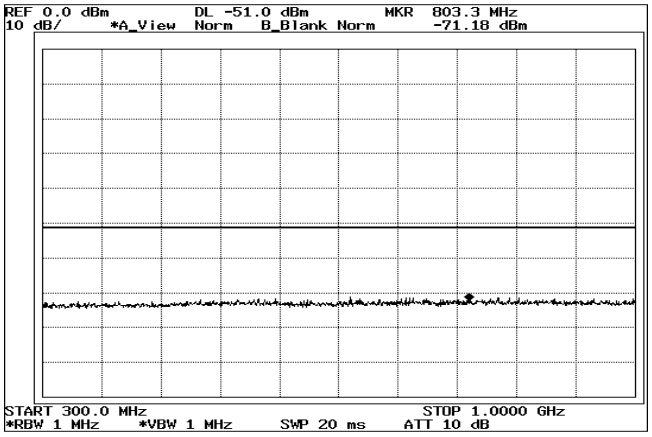
Spurious Emission (Conducted)

Tx:1850.2MHz

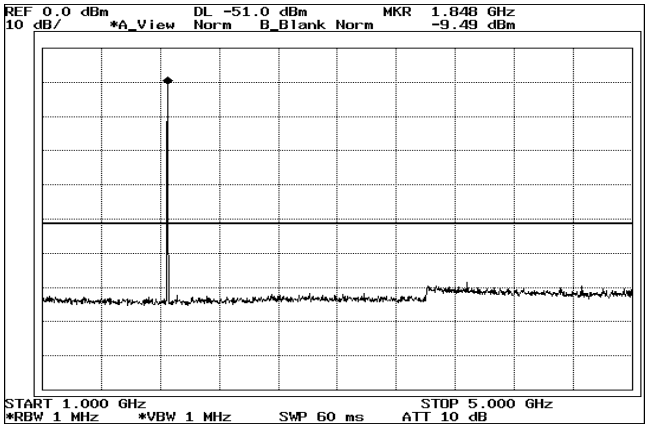
0Hz-300MHz



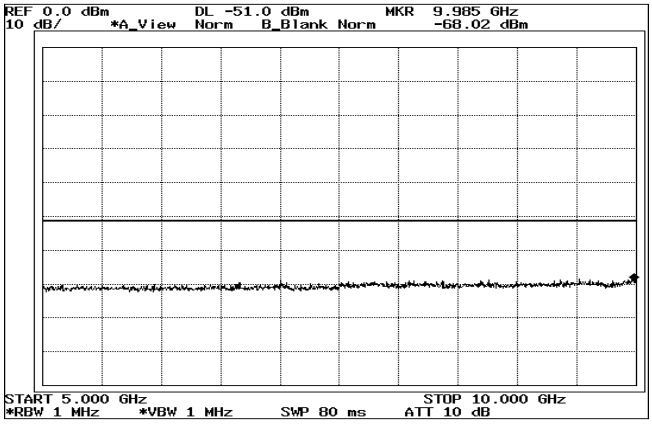
300MHz-1GHz



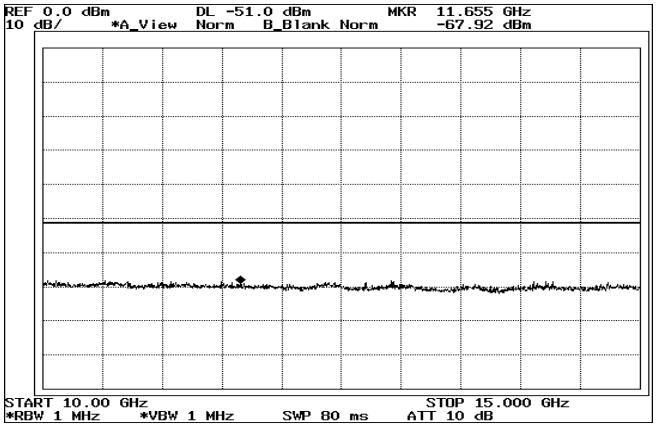
1GHz-5GHz



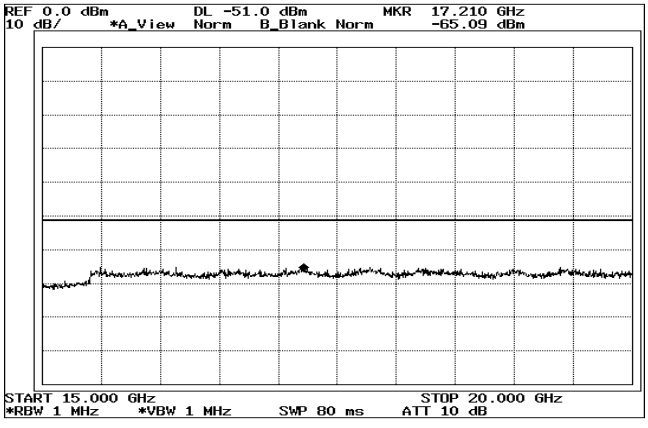
5GHz-10GHz



10GHz-15GHz



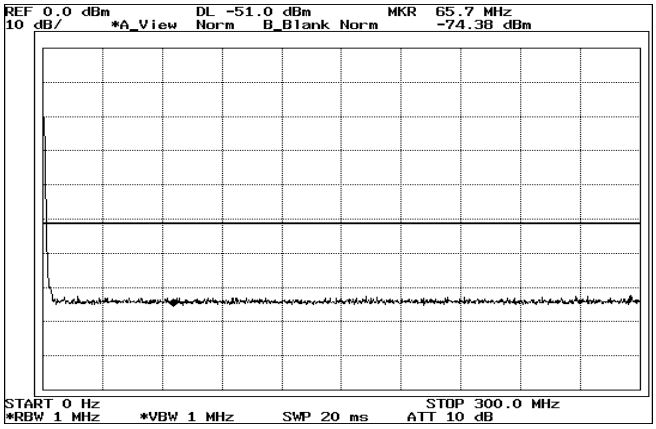
15GHz-20GHz



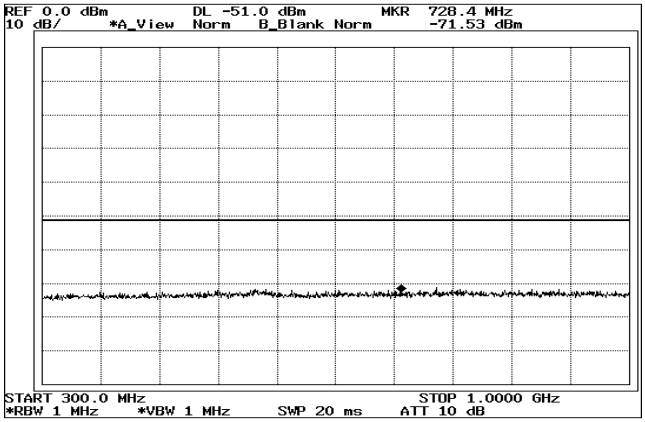
Spurious Emission (Conducted)

Tx:1880.0MHz

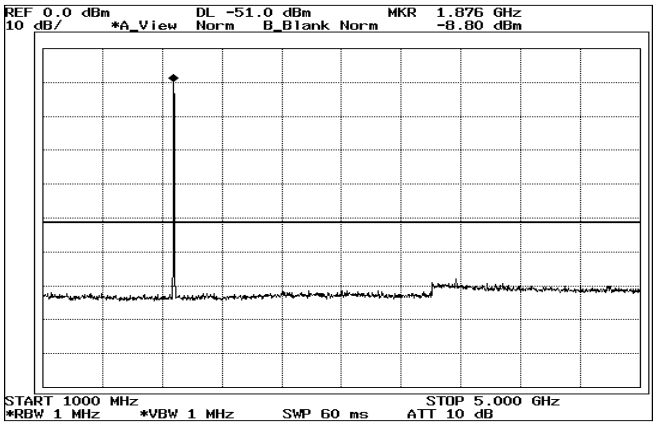
0Hz-300MHz



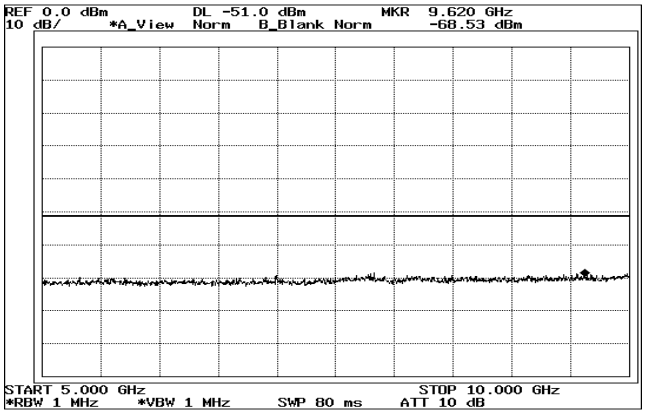
300MHz-1GHz



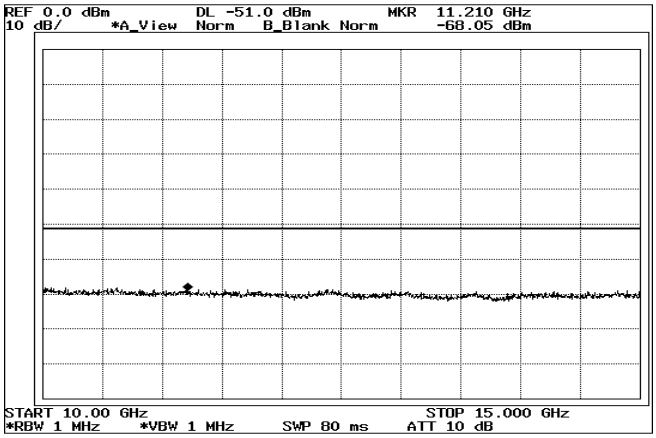
1GHz-5GHz



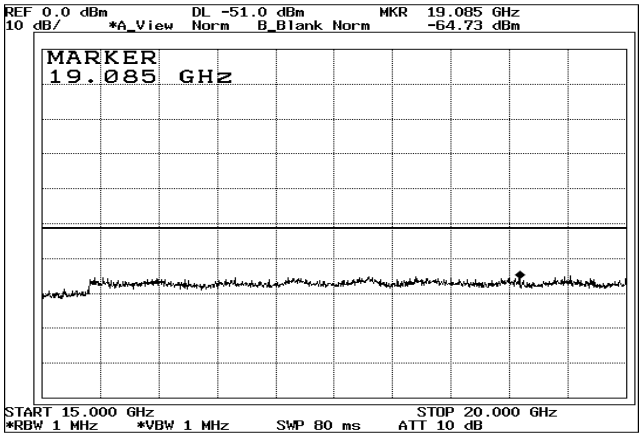
5GHz-10GHz



10GHz-15GHz



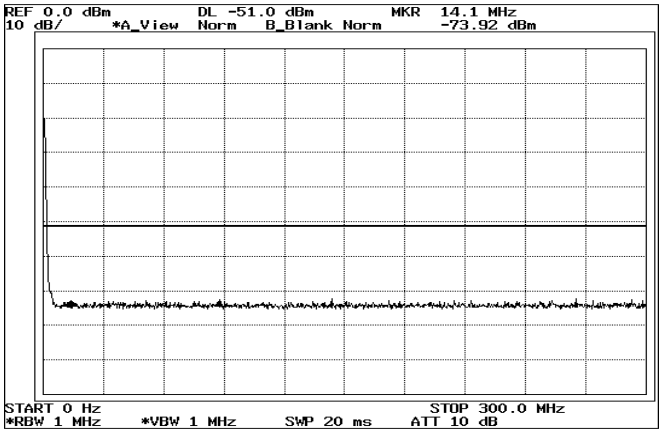
15GHz-20GHz



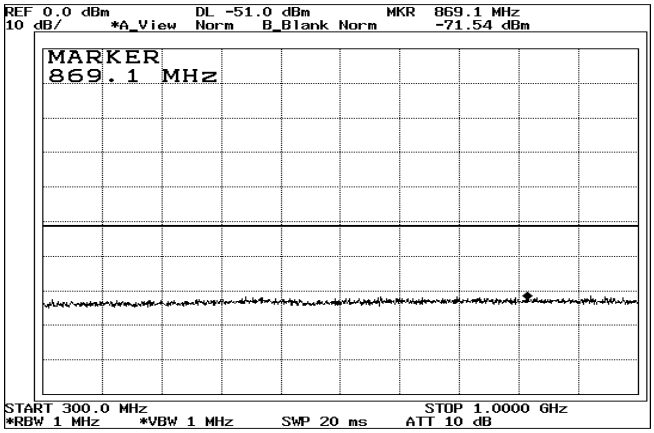
Spurious Emission (Conducted)

Tx:1909.8MHz

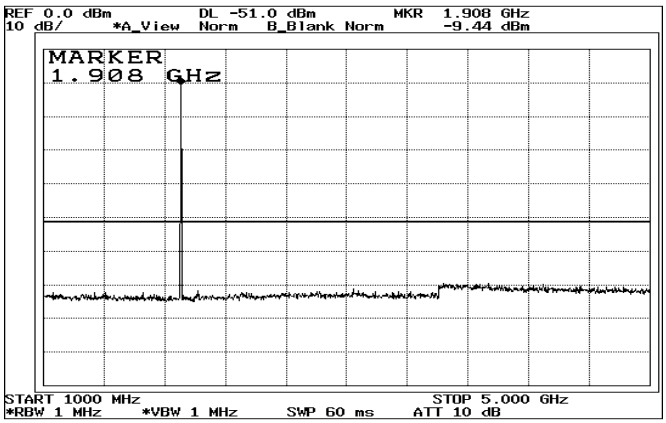
0Hz-300MHz



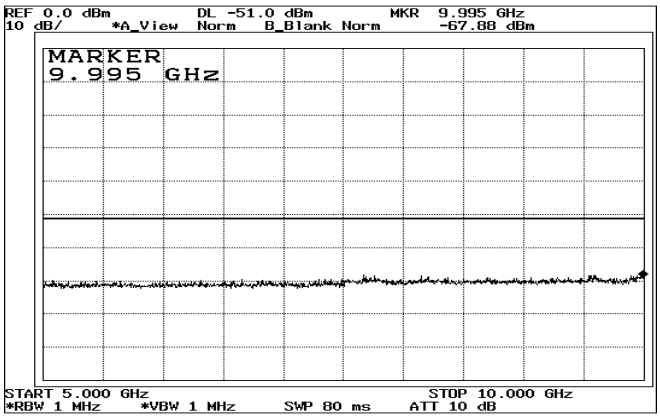
300MHz-1GHz



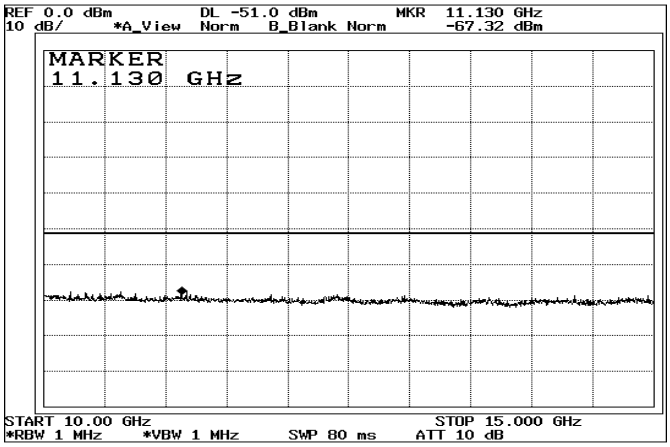
1GHz-5GHz



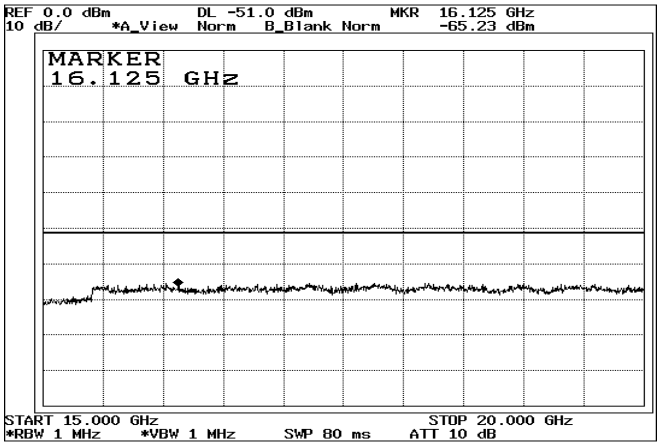
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz



Spurious Radiation

UL Apex Co., Ltd.
Head Office EMC Lab. Semi Anechoic Chamber : No.2

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(a)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1053
S/N	CS-268	TEST DISTANCE	3m
POWER	DC3.7V(AC120V/60Hz)	DATE	May 29, 2004
MODE	Tx 1850.2 MHz	TEMPERATURE	23℃
POSITION	H:X-axis / V:X-axis (Below 1GHz)	HUMIDITY	54%
	H:Z-axis / V:Y-axis (above 1GHz)	CALIBRATION	OK
		ENGINEER	Naoki Sakamoto

No.	FREQ	SG READING		CABLE	ANT	ATTEN	RESULT		LIMITS	MARGIN	
		HOR	VER	LOSS	GAIN		HOR	VER	(EIRP)	HOR	VER
	[MHz]	[dBm]		[dB]	[dBi]	[dB]	[dBm]		[dBm]	[dB]	
1	35.24	-17.3	-27.6	0.3	-26.6	9.9	-54.1	-64.4	-13.0	41.1	51.4
2	60.01	-54.5	-52.9	0.4	-14.6	9.9	-79.4	-77.8	-13.0	66.4	64.8
3	79.93	-53.2	-48.1	0.5	-7.9	9.9	-71.5	-66.4	-13.0	58.5	53.4
4	97.49	-58.8	-55.9	0.6	-3.0	9.9	-72.2	-69.4	-13.0	59.2	56.4
5	131.33	-53.8	-45.4	0.7	2.2	9.9	-62.2	-53.9	-13.0	49.2	40.9
6	659.60	-28.7	-43.5	1.8	2.2	10.0	-38.3	-53.1	-13.0	25.3	40.1
7	832.02	-48.4	-47.6	1.9	2.2	10.0	-58.2	-57.3	-13.0	45.2	44.3
8	3700.40	-52.4	-50.9	3.8	12.5	0.0	-43.7	-42.2	-13.0	30.7	29.2
9	5550.60	-53.0	-58.1	4.3	13.3	0.0	-44.0	-49.1	-13.0	31.0	36.1
10	7400.80	-45.9	-44.9	5.7	11.7	0.0	-39.9	-38.9	-13.0	26.9	25.9
11	9251.00	-45.1	-47.1	6.1	11.0	0.0	-40.2	-42.2	-13.0	27.2	29.2
12	11101.20	-39.1	-38.4	7.8	9.8	0.0	-37.1	-36.4	-13.0	24.1	23.4
13	12951.40	-41.4	-44.1	8.5	15.1	0.0	-34.8	-37.5	-13.0	21.8	24.5
14	14801.60	-37.9	-38.0	9.3	11.7	0.0	-35.5	-35.6	-13.0	22.5	22.6
15	16651.80	-32.0	-32.8	9.3	13.6	0.0	-27.7	-28.5	-13.0	14.7	15.5
16	18502.00	-37.7	-38.8	9.6	15.4	0.0	-31.9	-33.0	-13.0	18.9	20.0

CALCULATION:READING(SG)-LOSS(CABLE)+ANT.GAIN-ATTEN
Rx-ANTENNA : Biconical Antenna(30-300MHz), Logperriodic 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.2

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(a)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1053
S/N	CS-268	TEST DISTANCE	3m
POWER	DC3.7V(AC120V/60Hz)	DATE	May 29, 2004
MODE	Tx 1880.0 MHz	TEMPERATURE	23℃
POSITION	H:X-axis / V:X-axis (below 1GHz)	HUMIDITY	54%
	H:Z-axis / V:Y-axis (above 1GHz)	CALIBRATION	OK
		ENGINEER	Naoki Sakamoto

No.	FREQ	SG READING		CABLE	ANT	ATTEN	RESULT		LIMITS	MARGIN	
		HOR	VER	LOSS	GAIN		HOR	VER	(EIRP)	HOR	VER
	[MHz]	[dBm]		[dB]	[dBi]	[dB]	[dBm]		[dBm]	[dB]	
1	35.24	-14.2	-27.5	0.3	-26.6	9.9	-51.0	-64.3	-13.0	38.0	51.3
2	60.01	-47.6	-47.1	0.4	-14.6	9.9	-72.5	-72.0	-13.0	59.5	59.0
3	79.93	-55.4	-46.8	0.5	-7.9	9.9	-73.7	-65.1	-13.0	60.7	52.1
4	97.49	-58.7	-51.4	0.6	-3.0	9.9	-72.1	-64.9	-13.0	59.1	51.9
5	131.33	-51.5	-44.6	0.7	2.2	9.9	-59.9	-53.1	-13.0	46.9	40.1
6	659.60	-31.4	-44.9	1.8	2.2	10.0	-41.0	-54.5	-13.0	28.0	41.5
7	832.02	-45.7	-44.6	1.9	2.2	10.0	-55.5	-54.3	-13.0	42.5	41.3
8	3760.00	-42.2	-42.5	3.8	12.5	0.0	-33.5	-33.8	-13.0	20.5	20.8
9	5640.00	-59.1	-59.7	4.4	13.4	0.0	-50.1	-50.7	-13.0	37.1	37.7
10	7520.00	-43.9	-40.7	5.7	11.7	0.0	-37.9	-34.7	-13.0	24.9	21.7
11	9400.00	-42.5	-45.3	6.2	10.8	0.0	-37.9	-40.7	-13.0	24.9	27.7
12	11280.00	-39.0	-40.1	7.9	10.3	0.0	-36.6	-37.7	-13.0	23.6	24.7
13	13160.00	-42.4	-43.9	8.5	14.4	0.0	-36.5	-38.0	-13.0	23.5	25.0
14	15040.00	-37.2	-37.8	9.4	12.8	0.0	-33.8	-34.4	-13.0	20.8	21.4
15	16920.00	-31.8	-32.4	9.1	13.5	0.0	-27.4	-28.0	-13.0	14.4	15.0
16	18800.00	-37.2	-38.6	9.6	15.5	0.0	-31.3	-32.7	-13.0	18.3	19.7

CALCULATION:READING(SG)-LOSS(CABLE)+ANT.GAIN-ATTEN
Rx-ANTENNA : Biconical Antenna(30-300MHz), Logperriodic 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.2

COMPANY	SHARP CORPORATION	REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone	REGULATION	FCC Part24 Section 24.238(a)
MODEL	TM150	TEST METHOD	FCC Part2 Section 2.1053
S/N	CS-268	TEST DISTANCE	3m
POWER	DC3.7V(AC120V/60Hz)	DATE	May 29, 2004
MODE	Tx 1909.8 MHz	TEMPERATURE	23℃
POSITION	H:X-axis / V:X-axis (below 1GHz)	HUMIDITY	54%
	H:Z-axis / V:Y-axis (above 1GHz)	CALIBRATION	OK
		ENGINEER	Naoki Sakamoto

No.	FREQ	SG READING		CABLE	ANT	ATTEN	RESULT		LIMITS	MARGIN	
		HOR	VER	LOSS	GAIN		HOR	VER	(EIRP)	HOR	VER
	[MHz]	[dBm]		[dB]	[dBi]	[dB]	[dBm]		[dBm]	[dB]	
1	35.24	-22.3	-28.2	0.3	-26.6	9.9	-59.1	-65.0	-13.0	46.1	52.0
2	60.01	-44.2	-44.4	0.4	-14.6	9.9	-69.1	-69.3	-13.0	56.1	56.3
3	79.93	-55.2	-47.1	0.5	-7.9	9.9	-73.5	-65.4	-13.0	60.5	52.4
4	97.49	-57.3	-52.7	0.6	-3.0	9.9	-70.7	-66.2	-13.0	57.7	53.2
5	131.33	-50.0	-44.1	0.7	2.2	9.9	-58.4	-52.6	-13.0	45.4	39.6
6	659.60	-32.6	-44.7	1.8	2.2	10.0	-42.2	-54.3	-13.0	29.2	41.3
7	832.02	-46.2	-44.6	1.9	2.2	10.0	-56.0	-54.3	-13.0	43.0	41.3
8	3819.60	-44.5	-45.9	3.8	12.5	0.0	-35.8	-37.2	-13.0	22.8	24.2
9	5729.40	-59.4	-59.7	4.4	13.4	0.0	-50.4	-50.7	-13.0	37.4	37.7
10	7639.20	-46.5	-45.8	5.8	11.7	0.0	-40.6	-39.9	-13.0	27.6	26.9
11	9549.00	-41.7	-43.6	6.3	10.5	0.0	-37.5	-39.4	-13.0	24.5	26.4
12	11458.80	-40.9	-40.3	8.0	10.9	0.0	-38.0	-37.4	-13.0	25.0	24.4
13	13368.60	-40.5	-39.1	8.6	13.3	0.0	-35.8	-34.4	-13.0	22.8	21.4
14	15278.40	-37.9	-38.5	9.5	13.9	0.0	-33.5	-34.1	-13.0	20.5	21.1
15	17188.20	-30.8	-31.6	9.1	13.2	0.0	-26.7	-27.5	-13.0	13.7	14.5
16	19098.00	-36.6	-36.9	9.6	15.2	0.0	-31.0	-31.3	-13.0	18.0	18.3

CALCULATION:READING(SG)-LOSS(CABLE)+ANT.GAIN-ATTEN
Rx-ANTENNA : Biconical Antenna(30-300MHz), Logperriodic 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)

Frequency Stability(Temperature/Voltage Variation)

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

COMPANY	SHARP CORPORATION			REPORT NO	24JE0153-HO
EQUIPMENT	Tri-Band Mobile Cellular Phone			REGULATION	FCC Part24 Section 24.235
MODEL	TM150			TEST METHOD	FCC Part2 Section 2.1055(a)(1) and(b)
S/N	CS-268				FCC Part2 Section 2.1055(d)(1) and(2)
POWER	DC3.7V (AC120V/60Hz)			TEST DISTANCE	-
MODE	Tx	1880.0	MHz	DATE	May 31, 2004
				TEMPERATURE	23℃
				HUMIDITY	63%
				ENGINEER	Hiroka Umeyama

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
-30.0	0.0	1880.796103	6071.0	3.2	-
-20.0	0.0	1880.793155	9019.0	4.8	-
-10.0	0.0	1880.800522	1652.0	0.9	-
0.0	0.0	1880.791895	10279.0	5.5	-
10.0	0.0	1880.797982	4192.0	2.2	-
20.0	0.0	1880.802174	0.0	0.0	-
30.0	0.0	1880.807877	5703.0	3.0	-
40.0	0.0	1880.805540	3366.0	1.8	-
50.0	0.0	1880.811731	9557.0	5.1	-

Temp. [deg.C]	Volt. [V]	Frequency Reading [MHz]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]
20.0	3.145	1880.940507	149020.0	79.2	-
20.0	3.700	1880.791487	0.0	0.0	-
20.0	4.255	1880.808149	16662.0	8.9	-