FCC TEST REPORT (PART 22)

REPORT NO.: 060601FIA01
MODEL NO.: S198+
RECEIVED: Jun. 6, 2006
TESTED: Jun. 6 ~ Jun. 13, 2006
ISSUED: Jun. 14, 2006

APPLICANT: NINGBO BIRD CO., LTD
ADDRESS: No. 999 Dacheng East Road, Fenghua City, Zhejiang

ISSUED BY: ADT (Shanghai) Corporation
ADDRESS: 2F, Building C, No.1618, Yishan Rd., 201103, Shanghai, China

ADT (Shanghai) Corporation.

ACCREDITED
No.: 2343.01

TABLE OF CONTENTS

1 CERTIFICATION

PRODUCT :	Dual Band GSM Mobile Phone
MODEL NO. :	S198+
BRANDNAME:	bird
APPLICANT :	NINGBO BIRD CO., LTD
TESTED :	Jun. 6 ~ Jun. 13, 2006
TEST SAMPLE :	ENGINEERING SAMPLE
TEST STANDARDS :	FCC Part 22, Subpart H
	ANSI C 63.4-2003

The above equipment has been tested by **ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

TECHNICAL ACCEPTANCE : _____ **, DATE:** JUN. 14, 2006

Steven Qian
Engineering Supervisor

APPROVED BY : _____ **, DATE:** JUN. 14, 2006

Wallace Pan
Director of Operations

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2 / IC RSS-132			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1047 (d)	Modulation Characteristics	PASS	N/A
2.1046 22.913 (a)	Maximum Peak Output Power Limit: max. 7 watts e.r.p peak power	PASS	Meet the requirement of limit.
2.1055	Frequency Stability AFC Freq. Error vs. Voltage AFC Freq. Error vs. Temperature Limit: max. ±2.5ppm	PASS	Meet the requirement of limit.
2.1049 (h)	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	N/A
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is –31.29dB at 2548.00MHz.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is –15.62dB at 8488.00MHz.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.73 dB
	200MHz ~1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Dual Band GSM Mobile Phone
MODEL NO.	S198+
POWER SUPPLY	3.7Vdc from rechargeable lithium battery Brand: Bird Model: BD-LA
	5Vdc from power adapter Brand: Bird Model: MU03-M050045-A1 I/P: 100-240Vac, 0.15A, 50/60Hz O/P: 5.0Vdc, 450mA
MODULATION TYPE	GMSK, QPSK for GSM
FREQUENCY RANGE	Tx Frequency: 824 MHz ~ 849 MHz (GSM band) Rx Frequency: 869 MHz ~ 894 MHz (GSM band)
NUMBER OF CHANNEL	124
MAX. CONDUCTED PEAK OUTPUT POWER	GSM Mode: 32.48dBm (1.770Watts)
MAX. RADITED ERP PEAK OUTPUT POWER	GSM Mode: 26.29dBm (0.426Watts)
E AND I OF THE FINAL OUTPUT STAGE	E: 3.7Vdc I: 0.09A
ANTENNA TYPE	Fixed external antenna with 2dBi gain
DATA CABLE	1.26m non-shielded cable for earphone
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Earphone, cradle
EUT Extreme Vol. Range	3.3Vdc to 4.2Vdc

NOTE:

1. The EUT is a Dual Band GSM Mobile Phone. The protocol of this system is GSM850, and PCS1900.
2. IMEI Code: 010974000000145
3. Hardware version: V1.2
4. Software version: V1.00.50-1060508CN0
5. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

124 channels are provided to this EUT in the GSM850 band. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	128	824.2 MHz	GSM
MIDDLE	190	836.6 MHz	GSM
HIGH	251	848.8 MHz	GSM

NOTE:

1. Below 1 GHz, the channel 128, 190, and 251 were pre-tested in chamber. The channel 128 was chosen for final test.
2. Above 1 GHz, the channel 128, 190, and 251 were tested individually.
3. When the Power Control Level set 5, the worst case, was chosen for final test.
4. The channel space is 0.2MHz.
5. Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.
6. For the radiated emission measurement test below 1GHz, there are two test modes. Mode A is powered by battery, and mode B is charged by power adapter

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Dual Band GSM Mobile Phone. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

IC RSS-132

ANSI C63.4-2003

ANSI/TIA/EIA-603-A

NOTE: All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	CAL. DATE
1	Universal Radio Communication Tester	R&S	CMU200	109373	Nov. 20, 2006

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
A	N/A

NOTE: All power cords of the above support units are non shielded (1.8m).

4 TEST TYPES AND RESULTS

4.1 MODULATION CHARACTERISTICS

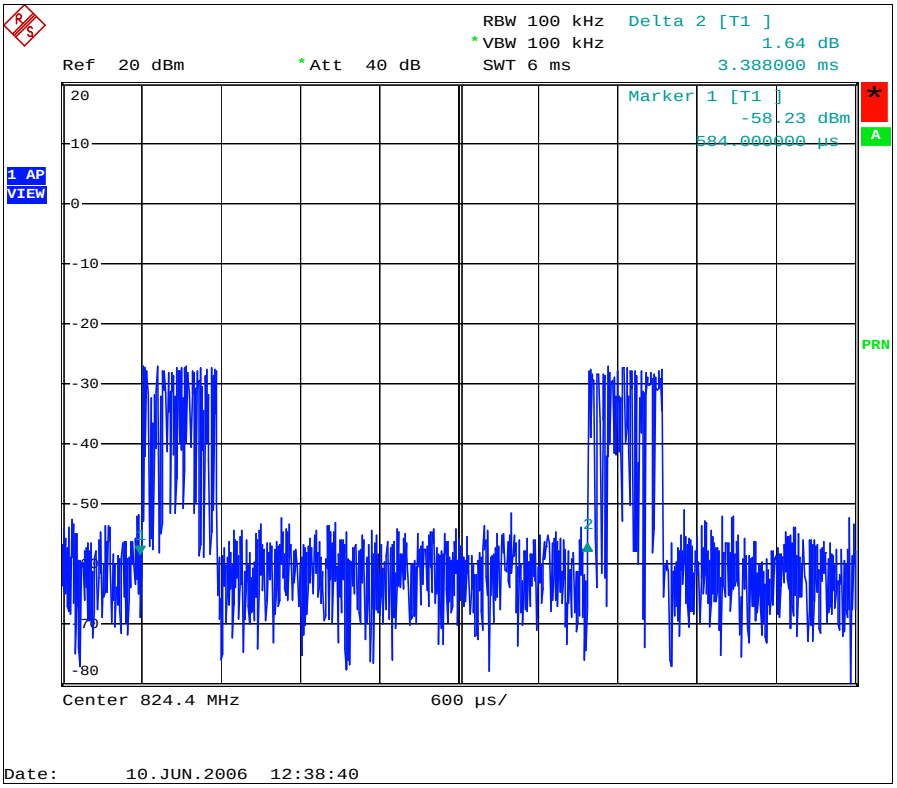
4.1.1 DESCRIPTION OF MODULATION TECHNIQUE

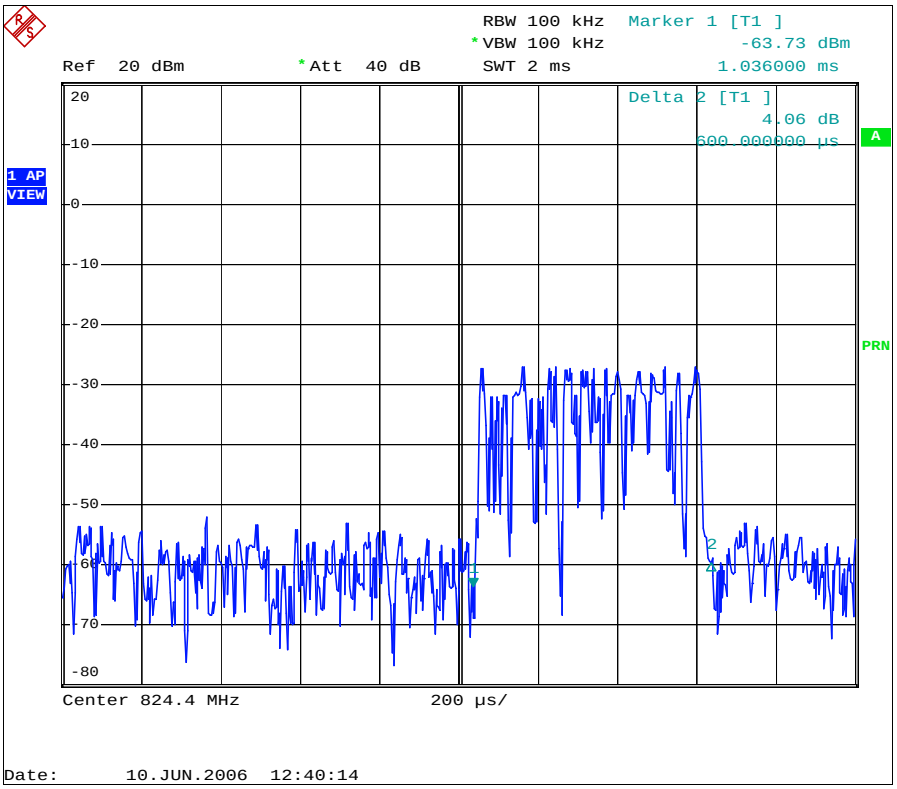
According to FCC 2.1047(d), the system is used the digital modulation and accomplished with the GSM requirement. It uses narrowband TDMA. Eight simultaneous calls can occupy the same radio frequency.

There are 124 channels and channel space is 200kHz.The frequency band 824.2 ~ 848.8MHz is allocated to the uplink and 869.2 ~ 893.8MHz to the downlink. The uplink and downlink channel space is 45MHz and is duplex at the same time.

4.1.2 THE ACTIVE TIME SLOT 8 MODULATED FRAME PLOT

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)





4.2 OUTPUT POWER MEASUREMENT

4.2.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 22.913 (a) that “Mobile / Portable station are limited to 7 watts e.r.p”.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Apr. 19, 2007
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sep. 26, 2006
Preamplifier Agilent	8447D	E1A2001	Jan. 27, 2007
Preamplifier Agilent	8449B	E1A2002	Jan. 27, 2007
Double Ridged Broadband Horn Antenna Schwarzbeck	BBHA 9120D	E1A1002	Feb.15, 2007
*Spectrum Analyzer Agilent	E4403B	E1S1001	Jan. 13, 2007
*Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May.15, 2007
RF signal cable Woken	RG-402	E1CBH01	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH02	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL02	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL04	May. 30, 2007
Software ADT	ADT_Radiated_V7.5	N/A	N/A
* Power Splitter Mini-Circuits	ZAPD-4	400005	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and Agilent preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The Spectrum Analyzer (model: FSP30) and RF signal cable (SERIAL: E1CBH05&E1CBH07) are used only for the measurement of emission frequency above 1GHz if tested.

4.2.3 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 190 and 251 (low, middle and high operational frequency range.)

b. The conducted peak output power used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. The path loss included the splitter loss, cable loss and 20dB pad loss. The spectrum set RB/VB 3MHz, then read peak power value and record to the test. (All transmitted path loss shall be considered in the test report data.)

c. E.I.R.P peak power measurement. In the fully anechoic chamber, EUT placed on the 1.5m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

d. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the calibration antenna. Rotated the Turn Table to find the maximum radiation power. “Raw” is the spectrum reading value, “SG” is signal generator export power, “TX Gain” is calibration antenna isotropic gain value, “TX cable” is the transmitted cable loss between the calibration antenna and signal generator. The “Factor” means that the transmission path loss is equal to “SG” - “TX cable” + “TX Gain” – “Raw”.

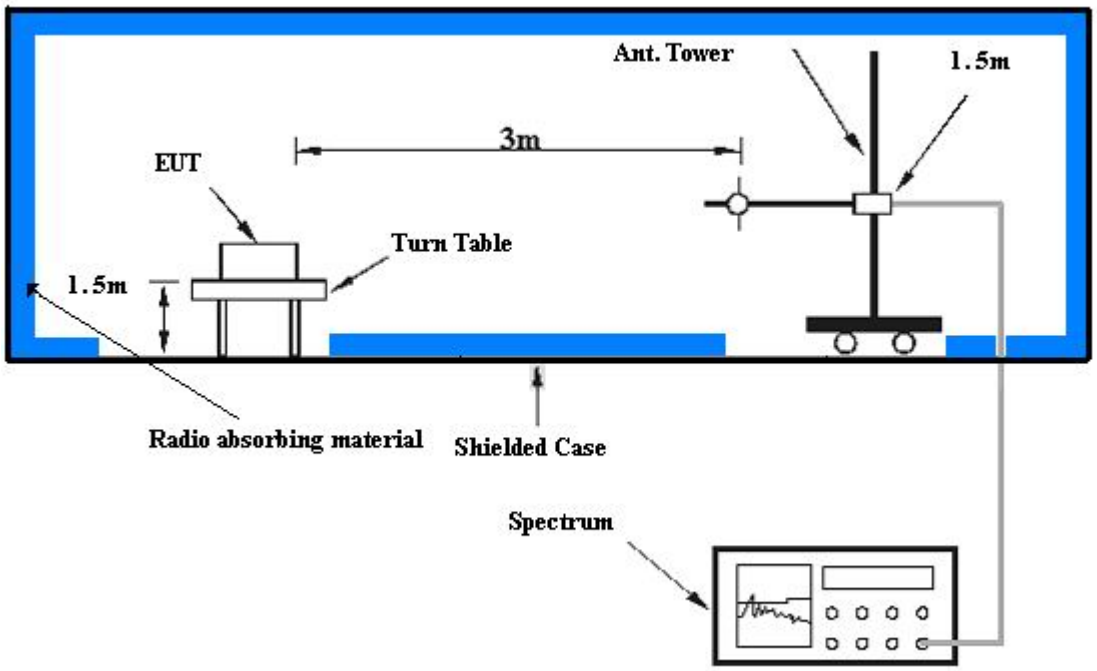
e. Actually the real E.I.R.P peak power is equal to “Read Value” + “Factor”

f. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power= E.I.P.R power-2.15dBi.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection (PK)

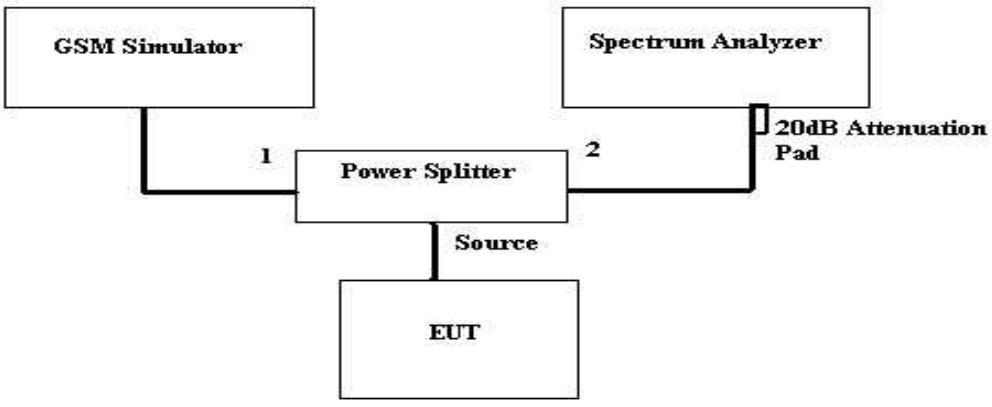
4.2.4 TEST SETUP

EIRP POWER MEASUREMENT:



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.5 EUT OPERATING CONDITIONS

a. The EUT makes a phone call to the GSM simulator.

b. The GSM simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

4.2.6 TEST RESULTS

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX connected	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 60%RH, 991hPa	**TESTED BY**	Bright

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

CONDUCTED PEAK OUTPUT POWER					
CHANNEL NO.	**FREQUENCY (MHz)**	**RAW VALUE (dBm)**	**CORRECTION FACTOR (dB)**	**PEAK OUTPUT POWER**	
				dBm	**Watt**
128	824.2	28.32	3.8	32.12	1.629
190	836.6	28.41	3.8	32.21	1.663
251	848.8	28.68	3.8	32.48	1.770

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX connected	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 60%RH, 991hPa	**TESTED BY**	Bright

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

RADIATED PEAK OUTPUT POWER					
CHANNEL NO.	**FREQUENCY (MHz)**	**RAW VALUE (dBm)**	**CORRECTION FACTOR (dB)**	**PEAK OUTPUT POWER**	
				dBm	**Watt**
128	824.2	-4.91	33.29	28.38	0.689
190	836.6	-5.16	33.57	28.41	0.693
251	848.8	-5.41	33.85	28.44	0.698

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Receiver Antenna Factor (dBi) + Cable Loss (dB) + Free Space Loss (dB).

4.3 FREQUENCY STABILITY MEASUREMENT

4.3.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

According to the FCC part 2.4235 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 2.5ppm of the received frequency from the base station. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) –30℃~50℃.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
UNIVERSAL RADIO COMMUNICATION TESTER	CMU 200	109373	Nov. 20, 2006

NOTE: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

a. Because of the measure the carrier frequency under the condition of the AFC lock, it shall be used the mobile station in the GSM link mode. This is accomplished with the use of the R&S CMU200 simulator station. The oven room could control the temperatures and humidity. The GSM link channel is the 251.

b. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.

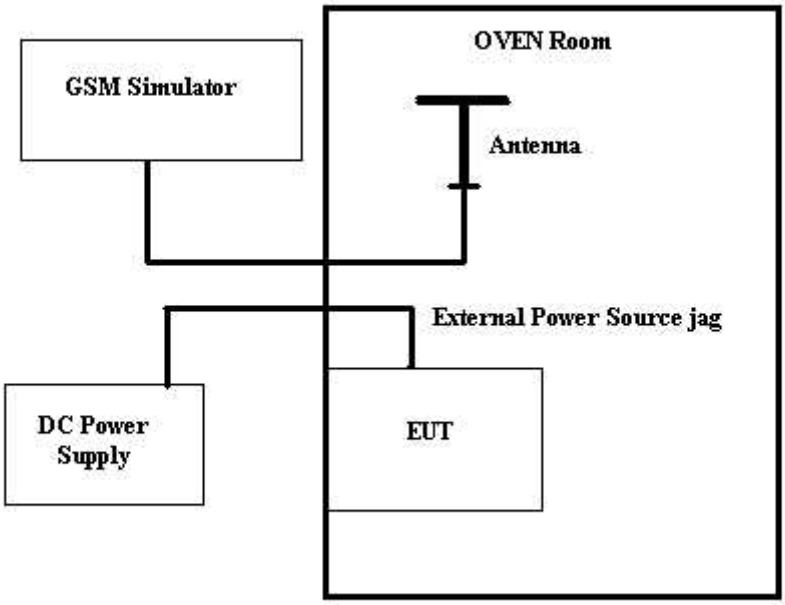
c. EUT is connected the external power supply to control the DC input power. The various Volts from the minimum 3.7 Volts to 4.2 Volts. Each step shall be record the frequency error rate.

d. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing.

e. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the GSM simulator.

4.3.4 TEST SETUP



4.3.5 TEST RESULTS

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 251	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	27deg. C, 60%RH, 991hPa
TESTED BY	Bright		

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

AFC FREQUENCY ERROR vs. VOLTAGE			
VOLTAGE (Volts)	**FREQUENCY ERROR (Hz)**	**FREQUENCY ERROR (ppm)**	**LIMIT (ppm)**
3.3	57	0.06715	2.5
3.4	53	0.06244	2.5
3.5	48	0.05655	2.5
3.6	51	0.06008	2.5
3.7	42	0.04948	2.5
3.8	50	0.05891	2.5
3.9	47	0.05537	2.5
4	52	0.06126	2.5
4.1	50	0.05891	2.5
4.2	53	0.06244	2.5

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 251	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	27deg. C, 60%RH, 991hPa
TESTED BY	Bright		

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

AFC FREQUENCY ERROR vs. TEMPERATURE			
Temp. (℃)	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
50	30	0.03534	2.5
40	24	0.02828	2.5
30	14	0.01649	2.5
20	-24	-0.02828	2.5
10	28	0.03299	2.5
0	27	0.03181	2.5
-10	-28	-0.03299	2.5
-20	-31	-0.03652	2.5
-30	37	0.04359	2.5

4.4 OCCUPIED BANDWIDTH MEASUREMENT

4.4.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

According to FCC 2.1049 (h) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* ROHDE & SCHWARZ Spectrum Analyzer	FSP30	E1S1002	May. 16, 2007
UNIVERSAL RADIO COMMUNICATION TESTER	CMU 200	109373	Nov. 20, 2006
Power Splitter *Mini-Circuits	ZX10-2-20	E2PS001	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

4.4.3 TEST SETUP

Same as Item 4.2.4 (Conducted Power Setup)

4.4.4 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 190 and 251 (low, middle and high operational frequency range.)

b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. FCC 2.1049 (h) required a measurement bandwidth is the fundamental emission below 26dB bandwidth.

4.4.5 EUT OPERATING CONDITION

a. The EUT makes a phone call to the GSM simulator.

b. The GSM simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

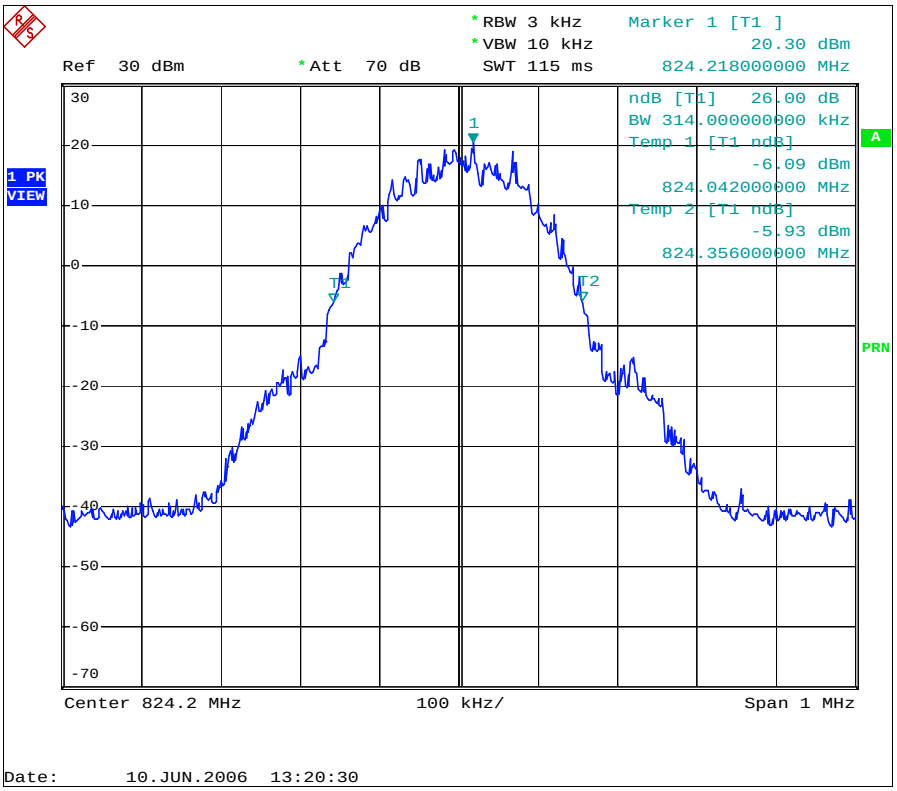
4.4.6 TEST RESULTS

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

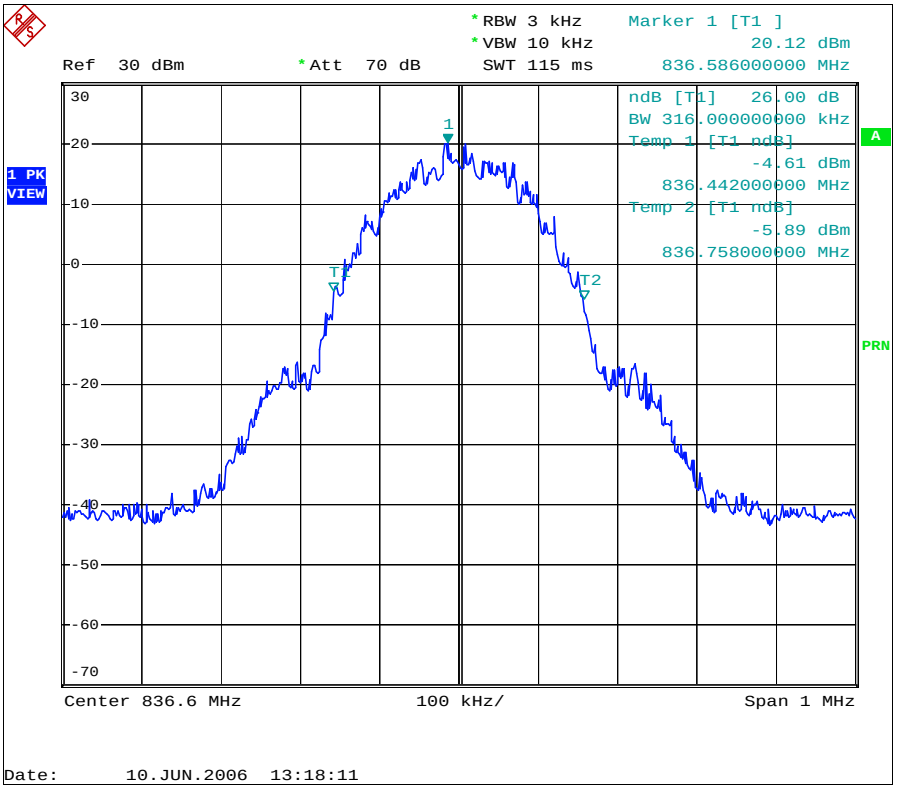
FREQUENCY (MHz)	MAX. OUTPUT POWER -26 dBc BANDWIDTH (kHz)
824.2	314
836.6	316
848.8	320

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

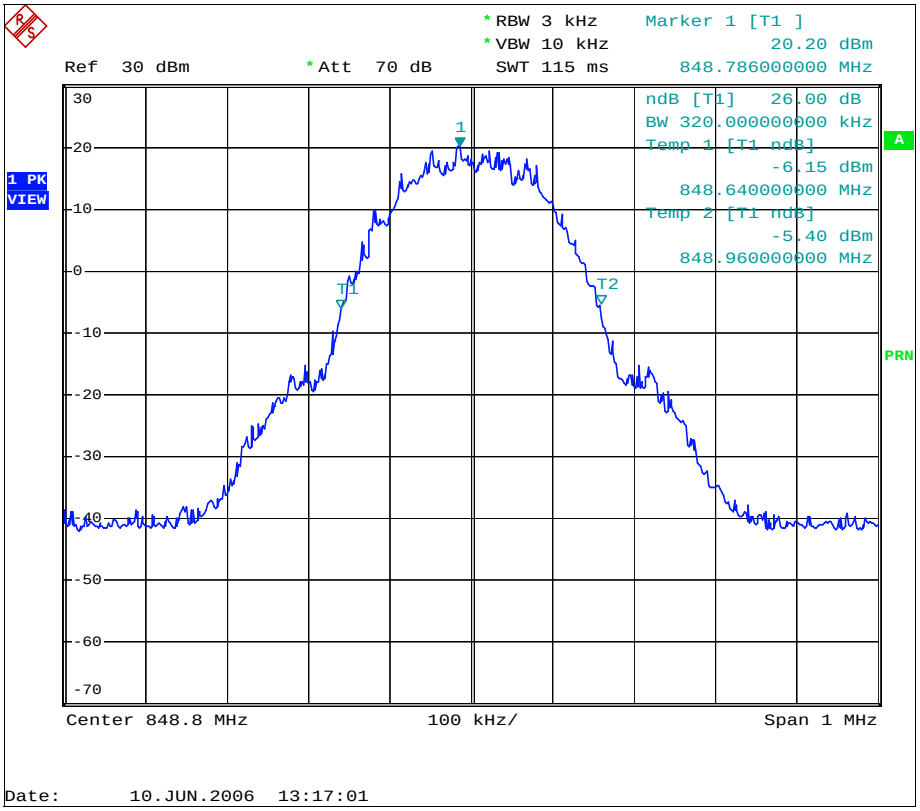
CH 128 MAX. POWER



CH 190 MAX. POWER



CH 251 MAX. POWER



4.5 BAND EDGE MEASUREMENT

4.5.1 LIMITS OF BAND EDGE MEASUREMENT

According to FCC 22.917 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. Then we measure that the bandwidth is about 300 kHz and the resolution bandwidth is 3 kHz.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
***** ROHDE & SCHWARZ Spectrum Analyzer	FSP30	E1S1002	May. 16, 2007
UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	109373	Nov. 20, 2006
Power Splitter *Mini-Circuits	ZX10-2-20	E2PS001	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

4.5.3 TEST SETUP

Same as Item 4.2.4 (Conducted Power Setup)

4.5.4 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels, 128 and 251 (low and high operational frequency range.)

b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The center frequency of spectrum is the band edge frequency and span is 2 MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10 KHz.

d. Record the max trace plot into the test report.

4.5.5 EUT OPERATING CONDITION

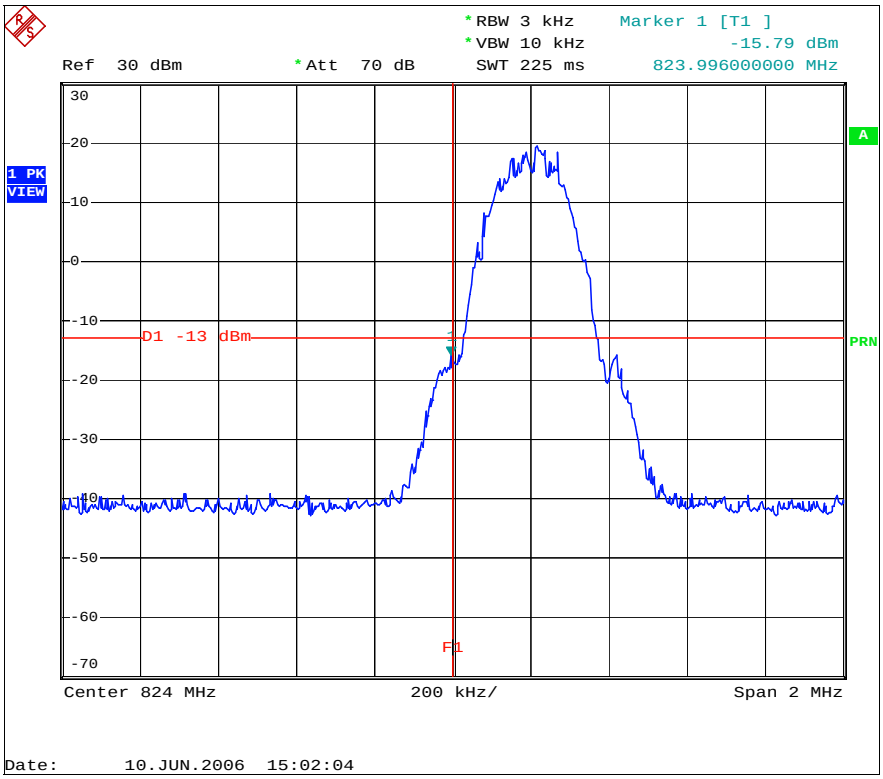
a. The EUT makes a phone call to the GSM simulator.

b. The GSM simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

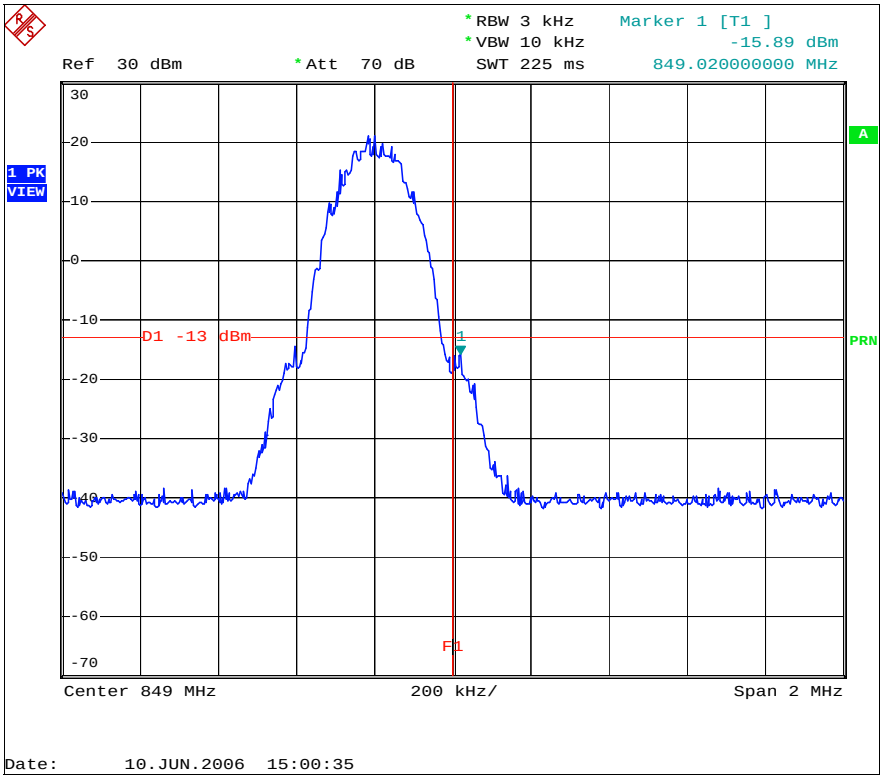
4.5.6 TEST RESULTS

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

LOWER BAND EDGE



HIGHER BAND EDGE



4.6 CONDUCTED SPURIOUS EMISSIONS

4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 22.917, on any frequency outside a licensee's frequency block within GSM spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The limit translates in the relevant power range (2 to 0.003W). At 2W (Power Control Level 3) the specified minimum attenuation becomes 43dB and the limit of emission equal to –13dBm.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* ROHDE & SCHWARZ Spectrum Analyzer	FSP30	E1S1002	May. 16, 2007
Universal Radio Communication Tester	CMU200	109373	Nov. 20, 2006
K & L Turnable Band Reject Filter	3TNF-00083	E1F4003	N/A
***** Wainwright Instruments High Pass Filter	WHK1.5/15G-10ST	E1F4001	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipments are used for the final measurement.

4.6.3 TEST PROCEDURE

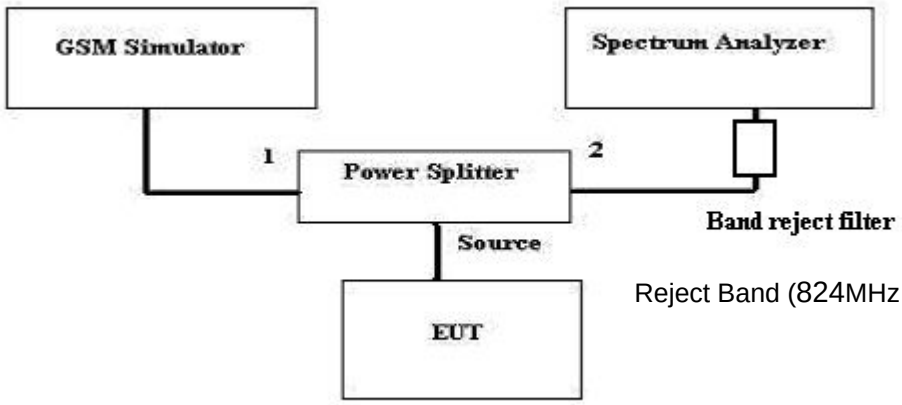
a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels, 128, 190 and 251 (low, middle and high operational frequency range.)

b. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. When the spectrum scanned from 9 kHz to 3GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB/VB 1MHz.

d. When the spectrum scanned from 3 kHz to 9GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB/VB 1MHz.

4.6.4 TEST SETUP



Reject Band (824MHz ~ 850MHz)

4.6.5 EUT OPERATING CONDITIONS

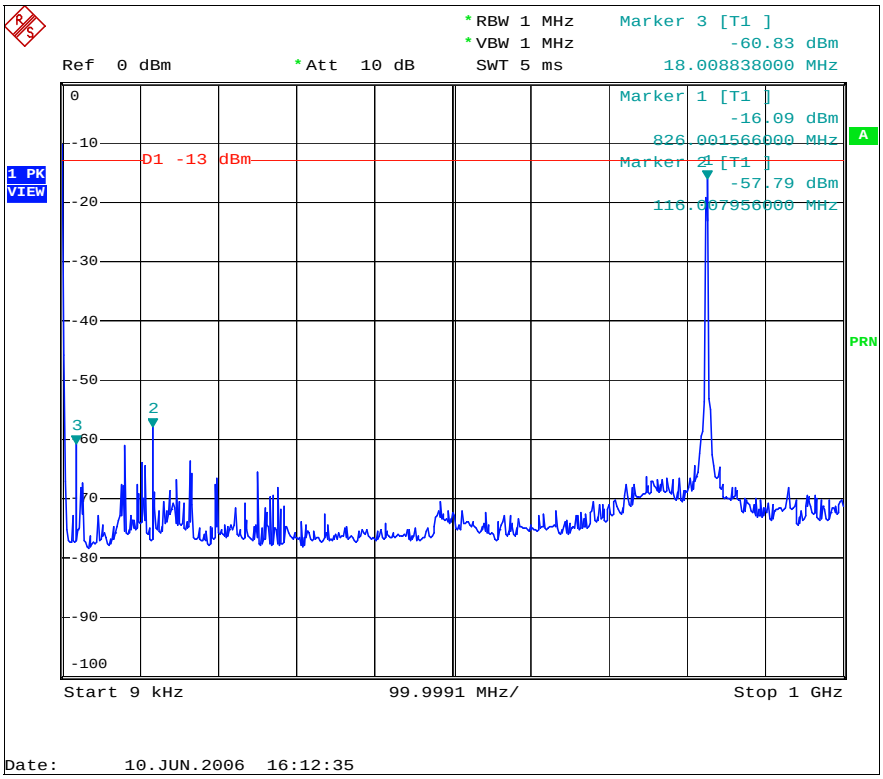
a. The EUT makes a phone call to the GSM simulator.

b. The GSM simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

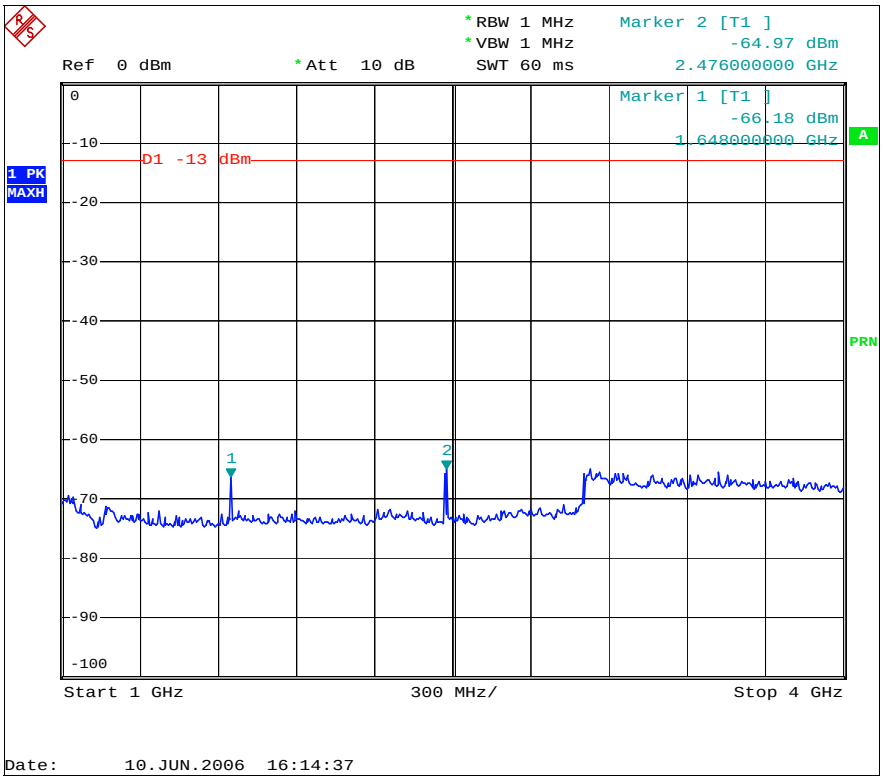
4.6.6 TEST RESULTS

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

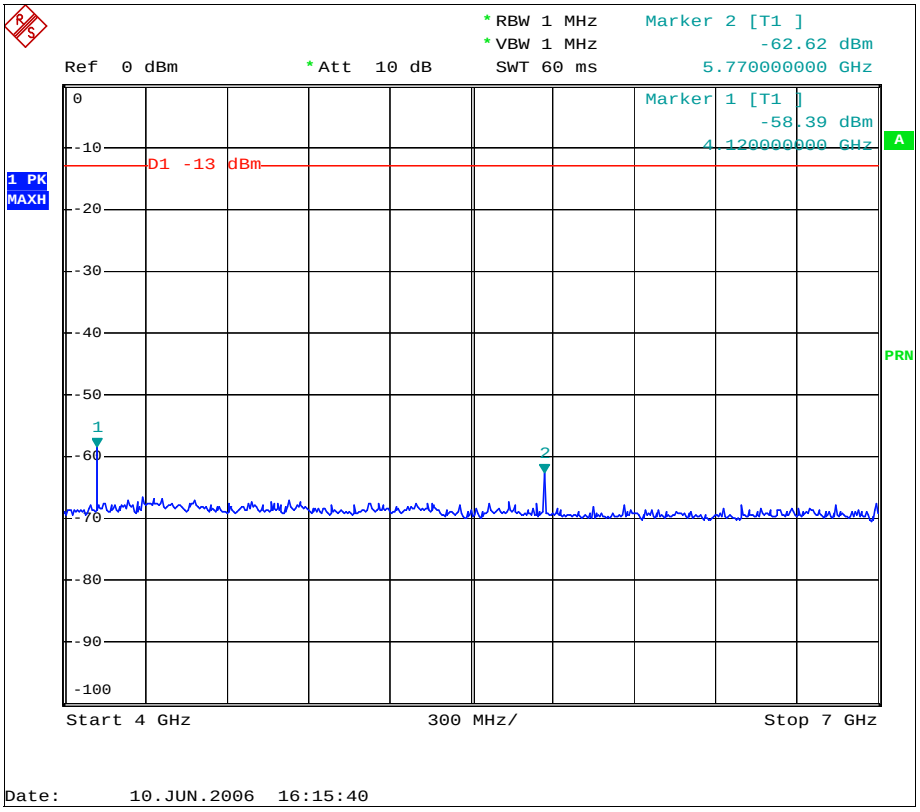
CH 128: 9kHz ~ 1GHz



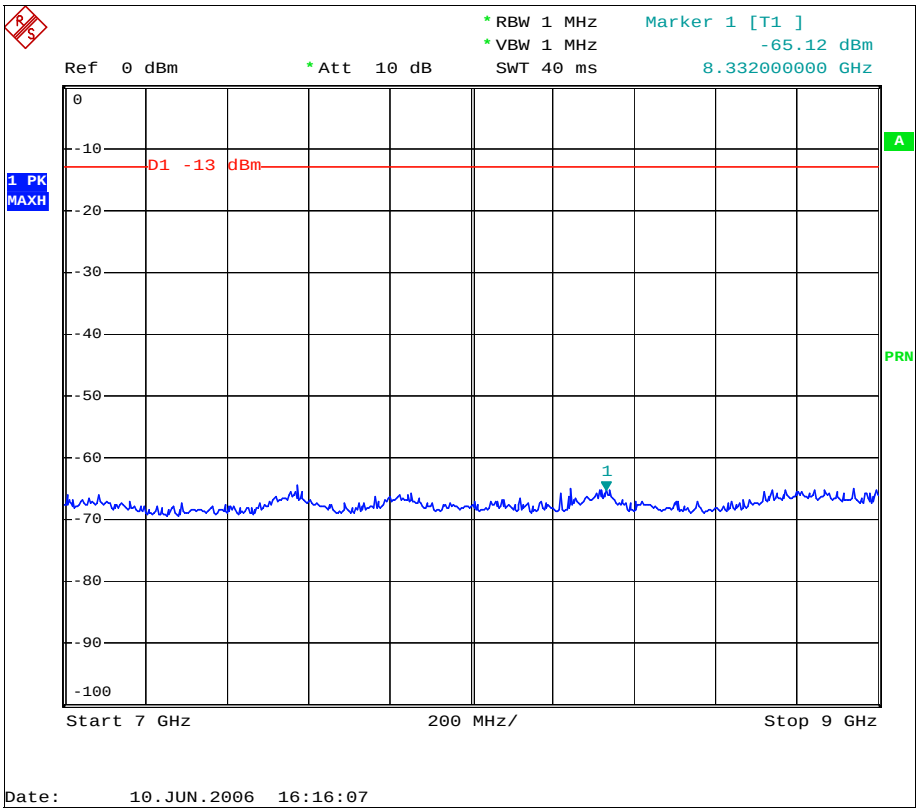
1GHz ~ 4GHz



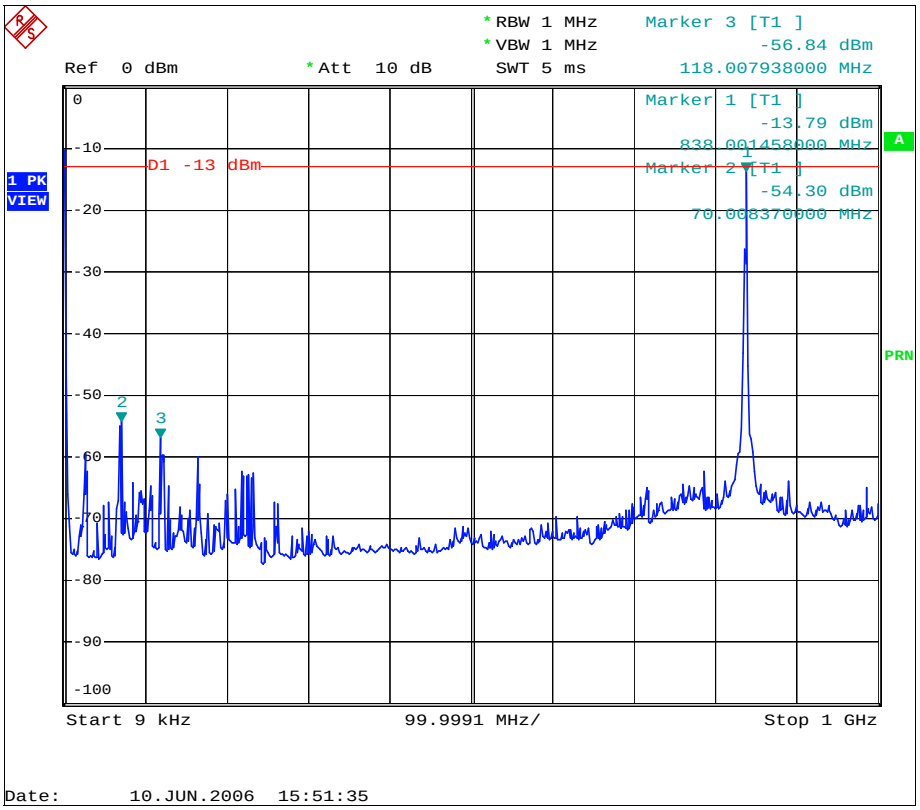
4GHz ~ 7GHz



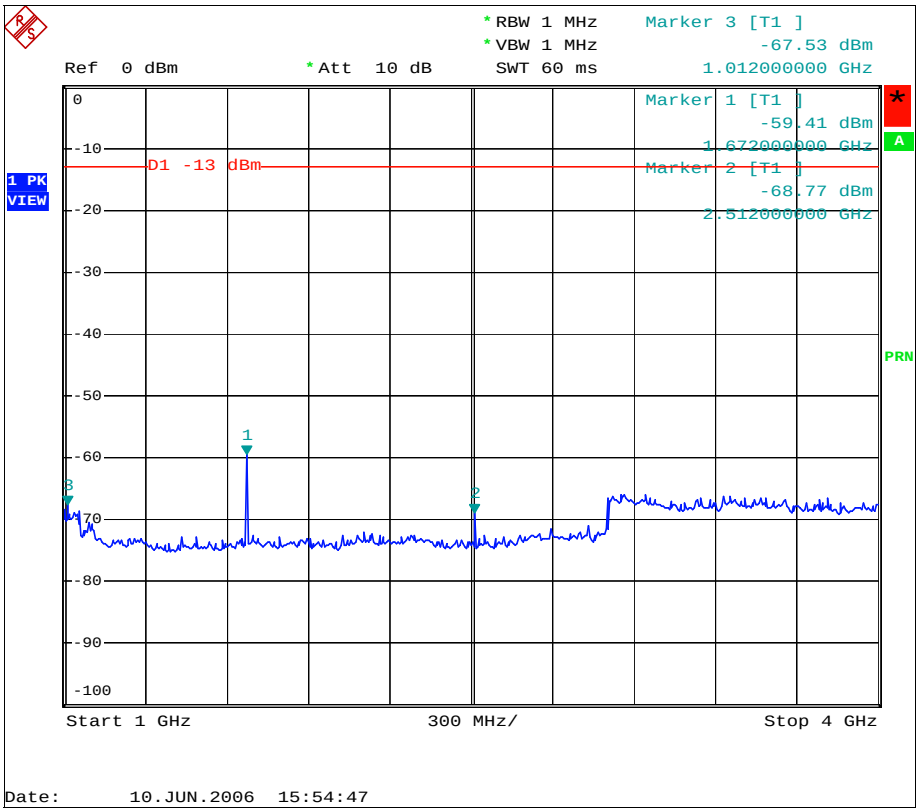
7GHz ~ 9GHz



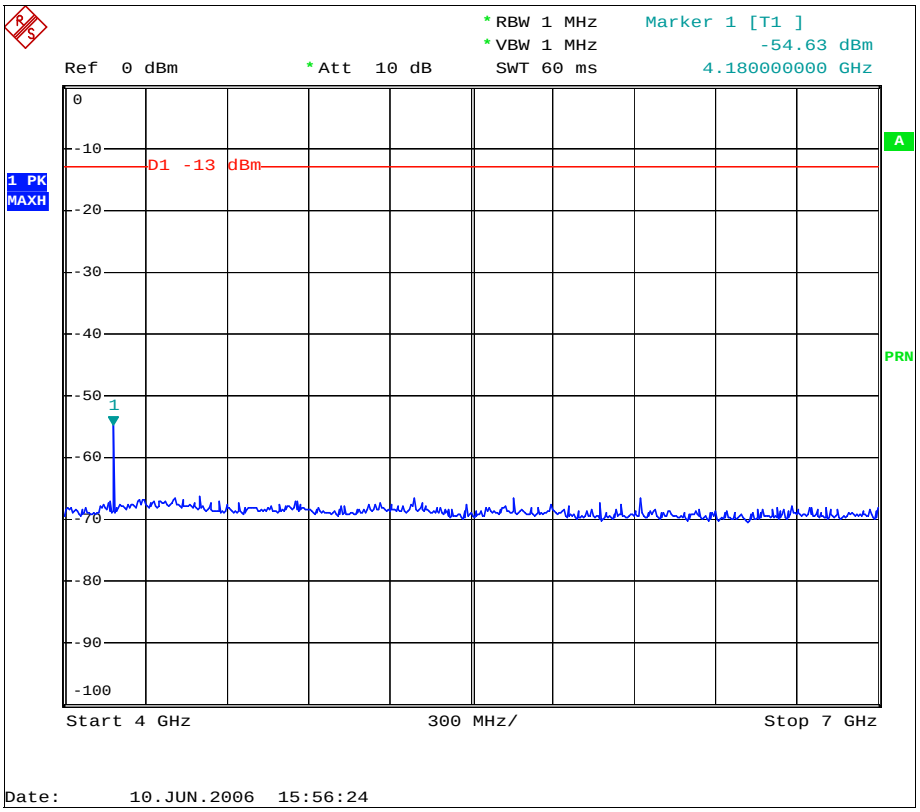
CH 190: 9kHz ~ 1GHz



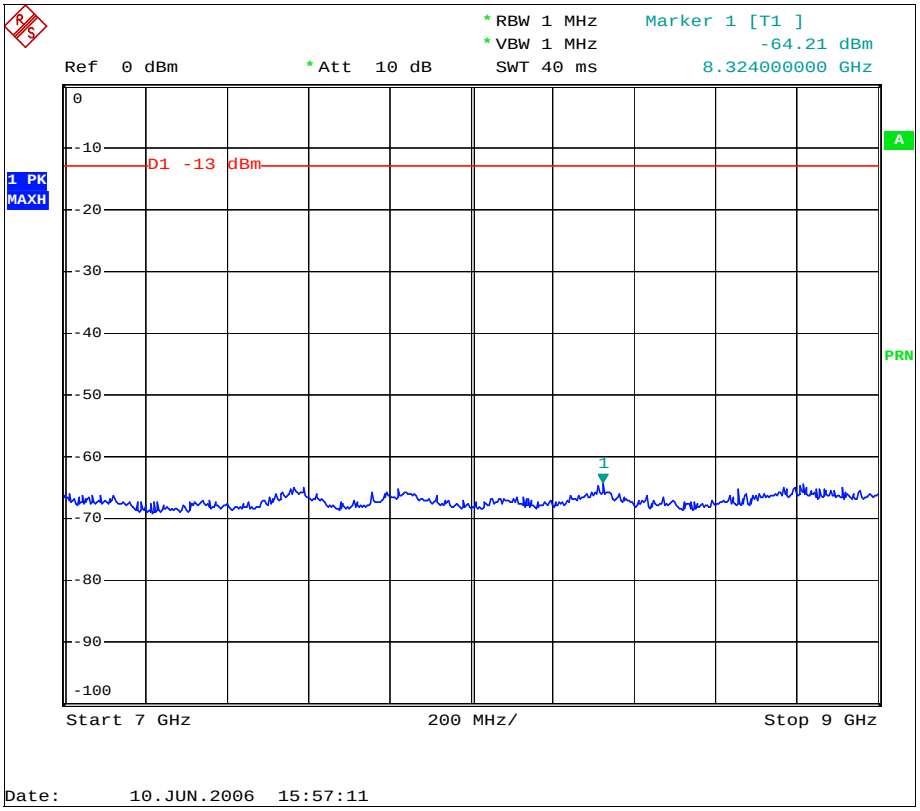
1GHz ~ 4GHz



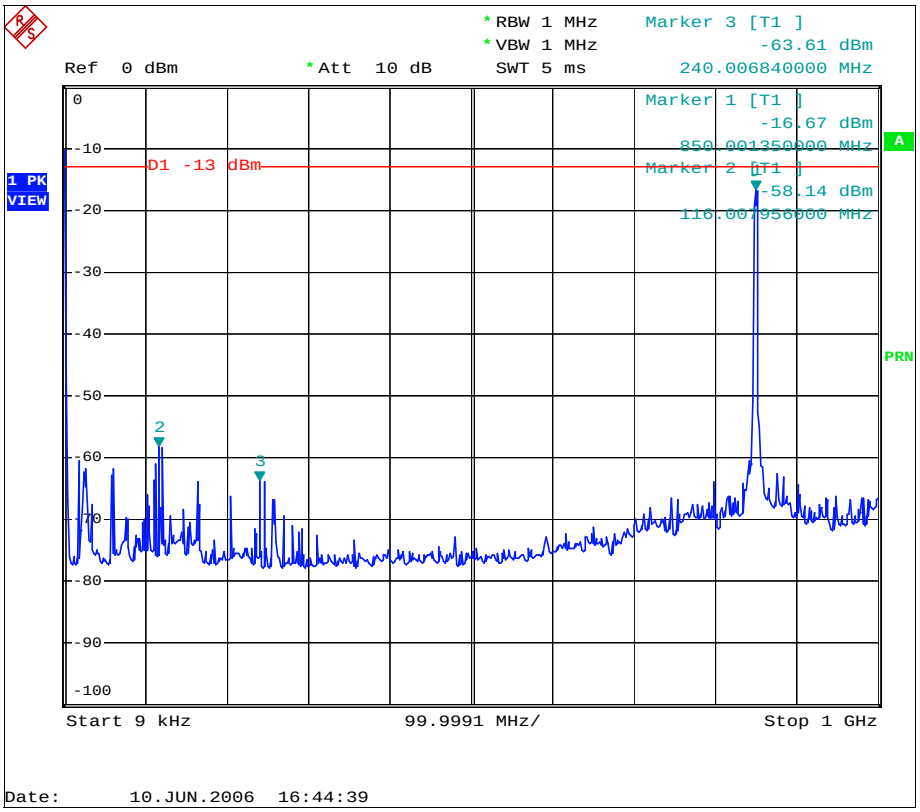
4GHz ~ 7GHz



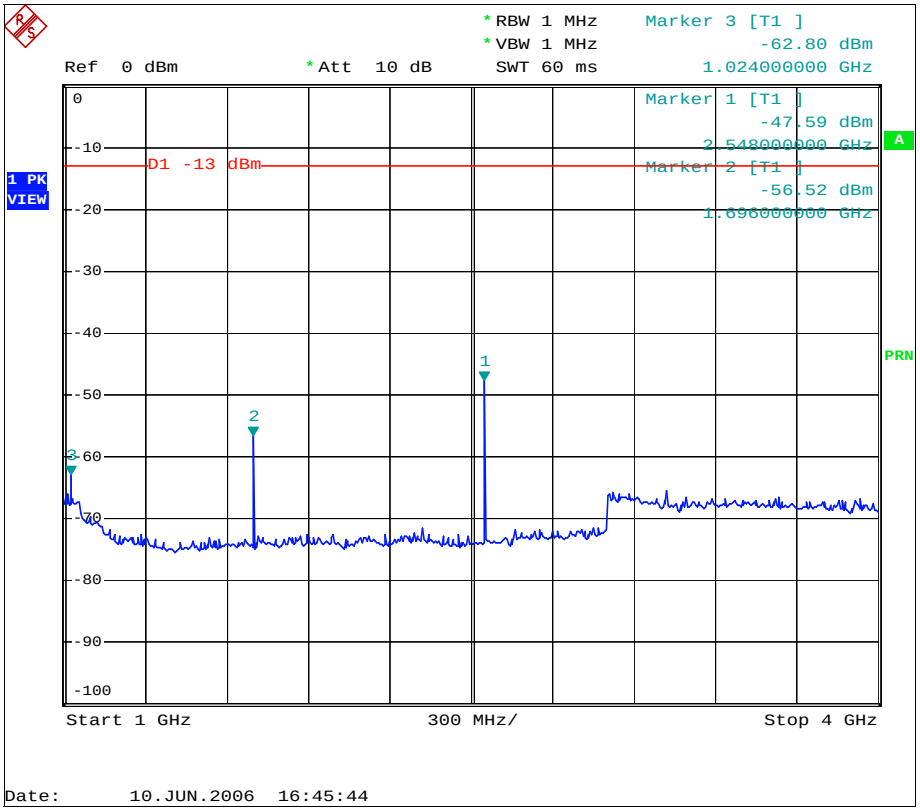
7GHz ~ 9GHz



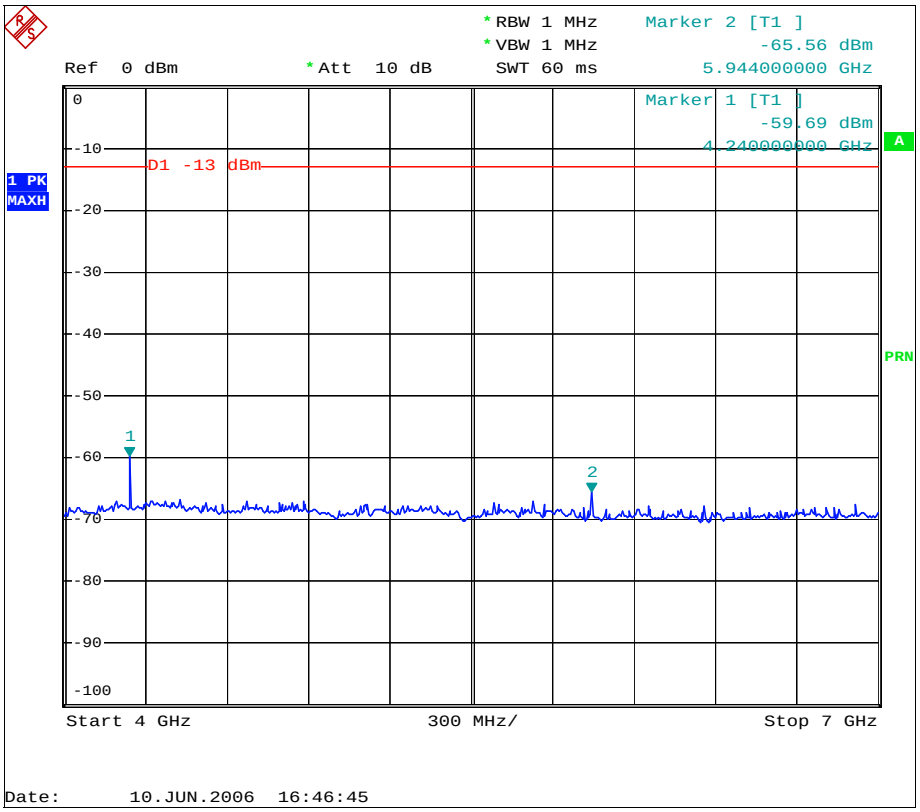
CH 251: 9kHz ~ 1GHz



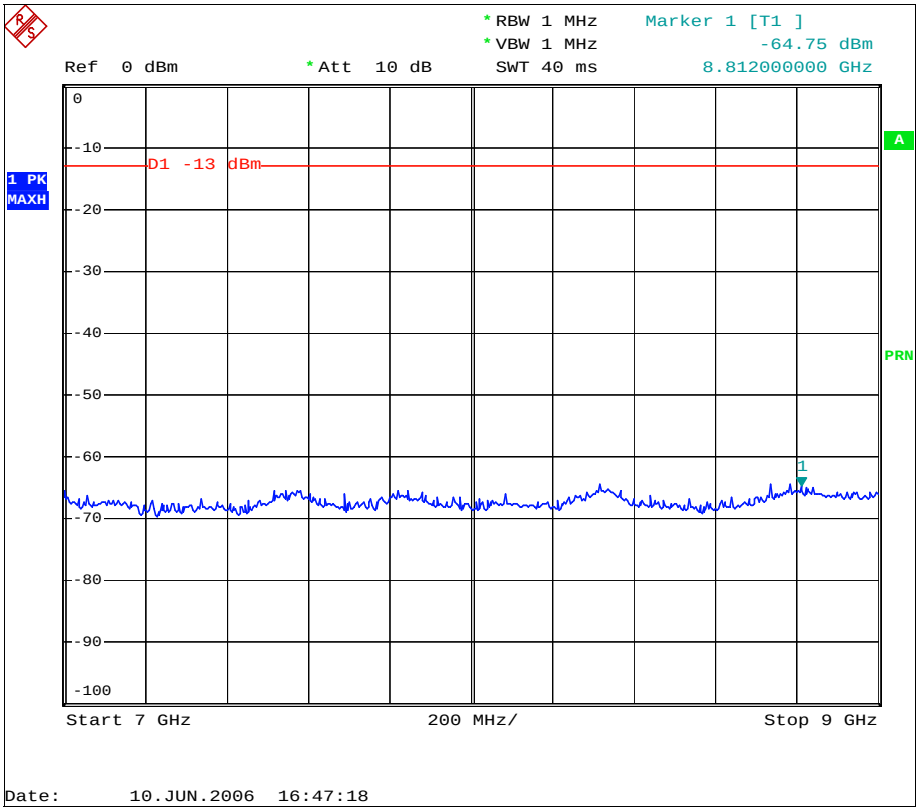
1GHz ~ 4GHz



4GHz ~ 7GHz



7GHz ~ 9GHz



FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 128	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 60%RH, 991hPa	**TESTED BY**	Bright

CONDUCTED SPURIOUS EMISSION					
FREQUENCY (MHz)	**CORRECTION FACTOR (dB)**	**S.A READING (dBm)**	**CONDUCTED LEVEL (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
18.01	0.5	-57.79	-57.29	-13	-44.79
116.01	1.1	-60.83	-59.73	-13	-47.83
1648	2.7	-66.18	-63.48	-13	-53.18
2476	3.2	-64.97	-61.77	-13	-51.97
4120	4.5	-58.39	-53.89	-13	-45.39
5770	5.2	-62.62	-57.42	-13	-49.62
8332	6.4	-65.12	-58.72	-13	-52.12

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 190	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 60%RH, 991hPa	**TESTED BY**	Bright

CONDUCTED SPURIOUS EMISSION					
FREQUENCY (MHz)	**CORRECTION FACTOR (dB)**	**S.A READING (dBm)**	**CONDUCTED LEVEL (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
70.01	0.8	-54.3	-53.5	-13	-40.5
118.01	1.1	-56.84	-55.74	-13	-42.74
1012	2.1	-67.53	-65.43	-13	-52.43
1672	2.7	-59.41	-56.71	-13	-43.71
2512	3.3	-68.77	-65.47	-13	-52.47
4180	4.5	-54.63	-50.13	-13	-37.13
8324	6.4	-64.21	-57.81	-13	-44.81

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 251	**POWER CONTROL LEVEL**	5
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 60%RH, 991hPa	**TESTED BY**	Bright

CONDUCTED SPURIOUS EMISSION					
FREQUENCY (MHz)	**CORRECTION FACTOR (dB)**	**S.A READING (dBm)**	**CONDUCTED LEVEL (dBm)**	**LIMIT (dBm)**	**MARGIN (dB)**
116.01	1.1	-58.14	-57.04	-13	-44.04
240.01	1.3	-63.61	-62.31	-13	-49.31
1024	2.1	-62.8	-60.7	-13	-47.7
1696	2.7	-56.52	-53.82	-13	-40.82
2548	**3.3**	**-47.59**	**-44.29**	**-13**	**-31.29**
4240	4.4	-59.69	-55.29	-13	-42.29
5944	5.3	-65.56	-60.26	-13	-47.26

REMARKS: 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).

4.7 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917, on any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The limit translates in the relevant power range (2 to 0.003W). At 2W (Power Control Level 3) the specified minimum attenuation becomes 43dB and the limit of emission equal to –13dBm.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Apr. 19, 2007
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sep. 26, 2006
Preamplifier Agilent	8447D	E1A2001	Jan. 27, 2007
Preamplifier Agilent	8449B	E1A2002	Jan. 27, 2007
Double Ridged Broadband Horn Antenna Schwarzbeck	BBHA 9120D	E1A1002	Feb.15, 2007
*Spectrum Analyzer Agilent	E4403B	E1S1001	Jan. 13, 2007
*Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May.15, 2007
RF signal cable Woken	RG-402	E1CBH01	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH02	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL02	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL04	May. 30, 2007
Software ADT	ADT_Radiated_V7.5	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and Agilent preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The Spectrum Analyzer (model: FSP30) and RF signal cable (SERIAL: E1CBH05&E1CBH07) are used only for the measurement of emission frequency above 1GHz if tested.

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.

c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.

d. Repeat step a ~ c for horizontal polarization.

NOTE: 1. The resolution bandwidth of spectrum analyzer is 10 kHz and the video bandwidth is 300 kHz for spurious emission below 1GHz.

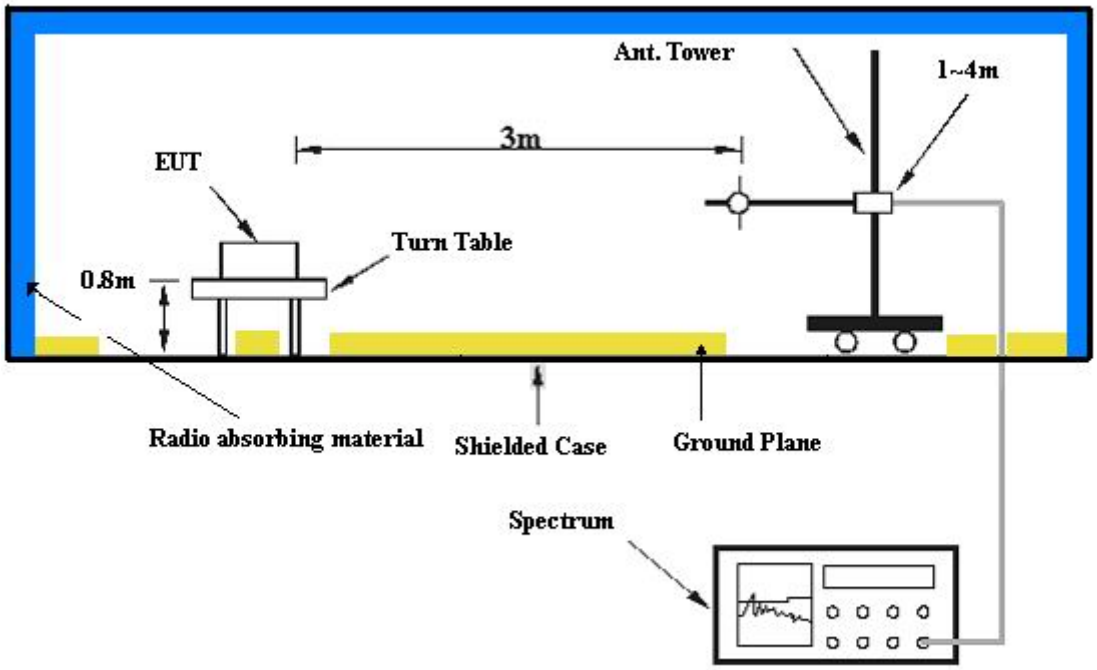
2. The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for spurious emission above 1GHz.

3. The resolution bandwidth of spectrum analyzer is 100 kHz and the video bandwidth is 100 kHz for the transmitter output measurement.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.7.6 EUT OPERATING CONDITIONS

a. The notebook system makes a phone call to the GSM simulator.

b. The GSM simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.

4.7.7 TEST RESULTS

FOR MODE A

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 128	**FREQUENCY RANGE**	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa	**TESTED BY**	Bright

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	44.55	15.55	5.18	20.73	81.46	-60.73	146	173
2	153.68	17.01	-3.25	13.76	81.46	-67.7	100	210
3	248.25	14.8	-2.92	11.88	81.46	-69.58	186	119
4	386.48	18.39	-3.15	15.24	81.46	-66.22	136	288
5	505.3	20.98	-0.77	20.21	81.46	-61.25	179	216
6	628.98	23.65	-1.54	22.11	81.46	-59.35	358	268

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	43	15.68	12.26	27.94	81.46	-53.52	100	80
2	131.85	15.52	-3.17	12.35	81.46	-69.11	100	192
3	236.12	14.66	-3.28	11.38	81.46	-70.08	100	348
4	347.68	17.44	-3.21	14.23	81.46	-67.23	100	218
5	442.25	19.92	-3.03	16.89	81.46	-64.57	100	84
6	546.52	21.97	-0.89	21.08	81.46	-60.38	100	34

NOTE:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. This is valid for all 3 channels.

FOR MODE B

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 128	**FREQUENCY RANGE**	Below 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa	**TESTED BY**	Bright

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	**Freq. (MHz)**	**Factor (dB/M)**	**Reading (dBuV/M)**	**Emission (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Ant. Height (cm)**	**Table Angle (Deg.)**
1	117.3	14.44	-3.16	11.28	81.46	-70.18	238	95
2	180.35	14.6	-3.28	11.32	81.46	-70.14	316	30
3	323.43	17.1	-2.99	14.11	81.46	-67.35	100	198
4	447.1	20.05	-3.16	16.89	81.46	-64.57	176	296
5	568.35	22.47	-1.14	21.33	81.46	-60.13	272	196
6	682.33	24.3	-1.64	22.66	81.46	-58.8	364	341

ANTENNA POLARITY & TEST DISTANCE: VERTICAL 3M								
No.	**Freq. (MHz)**	**Factor (dB/M)**	**Reading (dBuV/M)**	**Emission (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Ant. Height (cm)**	**Table Angle (Deg.)**
1	90.62	11.82	-2.98	8.84	81.46	-72.62	100	282
2	180.35	14.6	-3.26	11.34	81.46	-70.12	100	351
3	289.48	16.2	-3.19	13.01	81.46	-68.45	100	280
4	393.75	18.52	-3.26	15.26	81.46	-66.2	100	154
5	490.75	20.74	-3.03	17.71	81.46	-63.75	100	22
6	595.02	23.03	-1.25	21.78	81.46	-59.68	100	170

NOTE:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. This is valid for all 3 channels.

4.8 EFFECTIVE RADIATED POWER MEASUREMENT (ABOVE 1GHz)

4.8.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917 (a), on any frequency outside a licensee’s frequency block within GSM spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The limit translates in the relevant power range (2 to 0.003W). At 2W (Power Control Level 3) the specified minimum attenuation becomes 43dB and the limit of emission equal to –13dBm.

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Apr. 19, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May. 16, 2007
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sep. 26, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	E1A1002	Feb. 14, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	E1A1003	Feb. 14, 2007
Preamplifier Agilent	8447D	E1A2001	Jan. 26, 2007
Preamplifier Agilent	8449B	E1A2002	Jan. 26, 2007
Software ADT	ADT_Radiated_V7.5	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The horn antenna and Agilent preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4.8.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.

c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.

d. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission.

e. The signal generator level has to be adjusted to have the same emission nature.

f. The radiated power can be calculated via the factor and antenna gain.

g. Repeat step a ~ f for horizontal polarization.

NOTE: 1. The resolution bandwidth of spectrum analyzer is 10 kHz and the video bandwidth is 300 kHz for spurious emission below 1GHz.

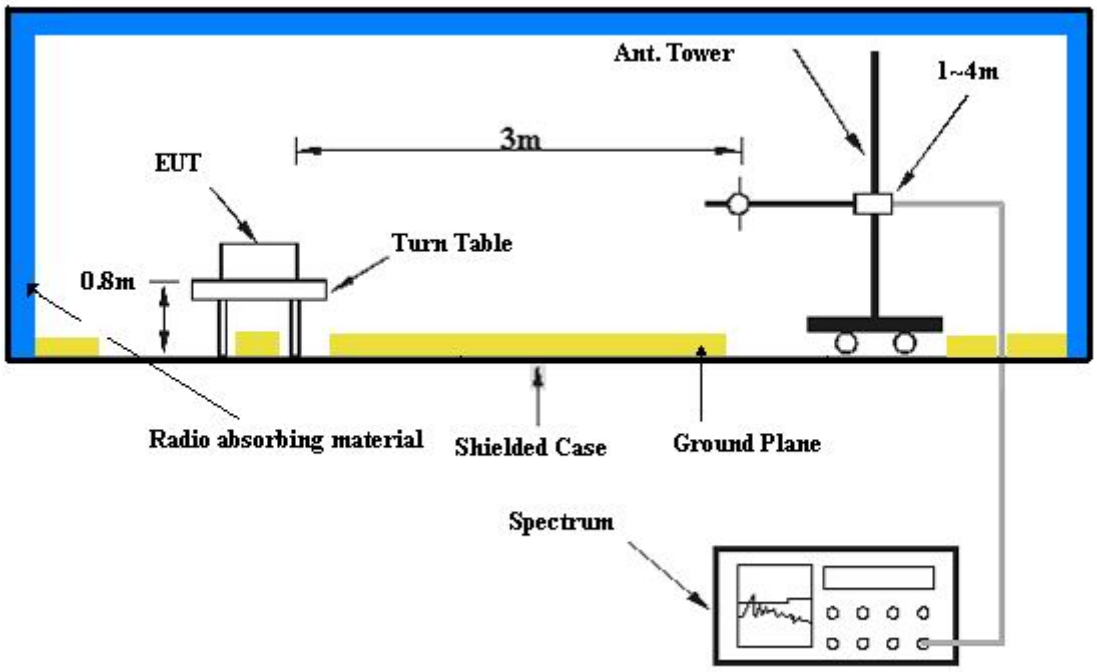
2. The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for spurious emission above 1GHz.

3. The resolution bandwidth of spectrum analyzer is 100 kHz and the video bandwidth is 100 kHz for the transmitter output measurement.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.8.6 EUT OPERATING CONDITIONS

a. The notebook system makes a phone call to the GSM simulator.

b. The GSM simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.

4.8.7 TEST RESULTS

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg. C, 62%RH, 991hPa
TESTED BY	Bright		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1648	50.72	-13	-53.37	8.7	-44.67
2	2472	50.88	-13	-53.28	8.9	-44.38
3	3297	51.59	-13	-52.17	9.1	-43.07
4	5769	54.8	-13	-49.44	9.9	-39.54
5	6594	60.43	-13	-43.57	10.7	-32.87
6	8242	61.64	-13	-42.36	11.3	-31.06

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1648	51.75	-13	-52.37	8.7	-43.67
2	2472	51.44	-13	-52.44	8.9	-43.54
3	3297	51.68	-13	-52.28	9.1	-43.18
4	5769	56.08	-13	-47.51	9.9	-37.61
5	6594	61.23	-13	-42.37	10.7	-31.67
6	8242	62.04	-13	-41.26	11.3	-29.96

NOTE: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 190	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg. C, 62%RH, 991hPa
TESTED BY	Bright		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1673	53.23	-13	-50.34	8.7	-41.64
2	2510	51.13	-13	-52.28	8.9	-43.38
3	3346	51.22	-13	-52.17	9.1	-43.07
4	5856	55.59	-13	-48.66	9.9	-38.76
5	6693	61.79	-13	-42.74	10.8	-31.94
6	8366	61.49	-13	-41.38	11.4	-29.98

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1673	53.96	-13	-50.33	8.7	-41.63
2	2510	51.18	-13	-52.71	8.9	-43.81
3	3346	52.52	-13	-51.46	9.1	-42.36
4	5856	56.25	-13	-47.37	9.9	-37.47
5	6693	61.13	-13	-41.46	10.8	-30.76
6	8366	62.77	-13	-41.07	11.4	-29.77

NOTE: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

EUT	Dual Band GSM Mobile Phone	**MODEL**	S198+
MODE	TX channel 251	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	**ENVIRONMENTAL CONDITIONS**	24deg. C, 62%RH, 991hPa
TESTED BY	Bight		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1698	62.75	-13	-41.11	8.7	-32.41
2	2546	50.66	-13	-53.24	8.9	-44.34
3	3395	52	-13	-52.33	9.1	-43.23
4	4245	53.36	-13	-50.43	9.4	-41.03
5	6790	62.37	-13	-41.02	10.8	-30.22
6	8488	62.77	-13	-40.58	11.4	-29.18

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	1663.92	54.04	-13	-49.37	8.7	-40.67
2	2546	50.97	-13	-53.47	8.9	-44.57
3	3395	52.88	-13	-51.25	9.1	-42.15
4	4245	51.83	-13	-52.33	9.4	-42.93
5	6790	61.97	-13	-40.97	10.8	-30.17
6	**8488**	**62.33**	**-13**	**-40.02**	**11.4**	**-28.62**

NOTE: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

5 INFORMATION ON THE TESTING LABORATORIES

We, ADT (Shanghai) Corp., were founded in 2003 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

JAPAN	VCCI
USA	FCC, A2LA
Norway	DNV

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.cnadt.com
If you have any comments, please feel free to contact us at the following:

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