ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H and PART 24 SUBPART E

OF

Product Name:	**Heavy Equipment Unit/Container Tracking System**
Brand Name:	**PORTMAN**
Model Name:	**CTS-100XT**
Model Differences:	**N/A**
FCC ID:	**TBQCTS-100XT**
Report No.:	**EH/2008/90001**
Issue Date:	**Nov. 12, 2008**
FCC Rule Part:	**2 , 22H & 24E**
Prepared for:	**PORTMAN ELECTRONICS(SHENZHEN)CO., LTD.** **9th Building, Tong Fuyu Industrial Park, Longhua, Baoan, Shenzhen 518109, China**
Prepared by:	**SGS Taiwan Ltd.** **Electronics & Communication Laboratory** **No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.**

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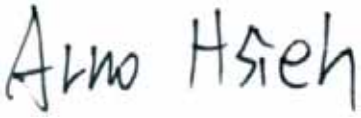
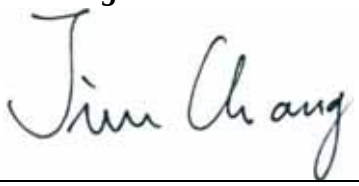
VERIFICATION OF COMPLIANCE

Applicant:	PORTMAN ELECTRONICS(SHENZHEN)CO., LTD. 9th Building, Tong Fuyu Industrial Park, Longhua, Baoan, Shenzhen 518109, China
Product Name:	Heavy Equipment Unit/Container Tracking System
Brand Name:	PORTMAN
FCC ID:	TBQCTS-100XT
Model No.:	CTS-100XT
Model Difference:	N/A
File Number:	EH/2008/90001
Date of test:	Sep. 03, 2008 ~ Nov. 11, 2008
Date of EUT Received:	Sep. 02, 2008

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 subpart H and FCC PART 24 subpart E.

The test results of this report relate only to the tested sample identified in this report.

Test By:		***Date:***	Nov. 12, 2008
	Arno Hsieh / Sr. Engineer		
Prepared By:		***Date:***	Nov. 12, 2008
	Gigi Yeh / Clerk		
Approved By		***Date:***	Nov. 12, 2008
	Jim Chang / Supervisor		

Version

Version No.	Date	Description
00	Nov. 12, 2008	Initial creation of document

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1. GENERAL INFORMATION

General:

Product Name:	Heavy Equipment Unit/Container Tracking System	
Brand Name:	PORTMAN	
Model Name:	CTS-100XT	
Model Difference:	N/A	
Data Cable (USB):	N/A	
Power Supply	3.7 Vdc re-chargeable battery or 5Vdc by AC/DC power adapter	
	Battery Model:	D2-LP-083465X2P, Supplier: D2 TECHNOLOGY CO., LTD
	Adapter Model:	GFP051U-0510 Supplier: GME

GSM:

Cellular Phone Standards Frequency Range and Power	GSM /GPRS 850, Class 10	824 MHz– 849MHz	33 dBm
	GSM / GPRS 1900, Class 10	1850MHz – 1910MHz	30 dBm
final amplifier voltage and current information		DC voltage (V)	DC current (mA)
	GSM 850	5Vdc	602
	GSM 1900	5Vdc	617
Type of Emission	GSM: 300KGXW		
Hardware Version	C7		
Software Version	1.00,CTS100-CTS100C4-PTM-5.1.5-1.00		
IMEI	352024020342774		

GPS:

Receiver Frequency	L1 Band, 1575.42MHz
Frequency Conversion oscillator	19.2MHz.
Antenna Designation	mono pole

This test report applies for GSM /GPRS 850 and GSM/ GPRS 1900

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **TBQCTS-100XT** filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4 (2003) and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

All equipment is calibrated externally and traceable to SI (International System of Unit).

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 AC Power Line Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI 63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Conducted Measurement at Antenna Port:

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to con- nect the antenna port of EUT to measurement equipment.

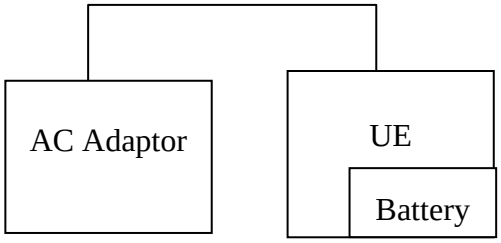
2.3.3 Radiated Emissions (ERP/EIRP):

According to measurement procured TIA/EIA 603C. The EUT is placed on a turn table which is 1.0 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements.

A standard antenna was used to replace the EUT and connect to the SG. Adjust the SG output level to reach the max emission level which were measured above.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel)



Remote Side

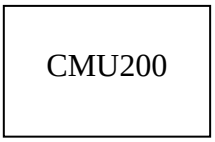


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Universal Radio Communication Tester	Anritsu	MT8820A	6200307563	N/A	Un-shielded

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a) §22.913(a) §24.232(a)	RF Power Output	Compliant
§2.1046(a) §22.913(a) §24.232(a)	ERP/ EIRP measurement	Compliant
§2.1049(h)	99% Occupied Bandwidth	N/A
§2.1051 §22.917(a) §24.238(a)	Out of Band Emissions at Antenna Terminals and Band Edge	N/A
§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	Compliant
§2.1055(a)(1)(b)	Frequency Stability vs. Temperature	N/A
§2.1055(d)(1)(2)	Frequency Stability vs. Voltage	N/A
§15.107;§15.207	AC Power Line Conducted Emission	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.

The field strength of spurious radiation emission was measured as lie down position (E2 mode) for GSM with power adaptor. The worst-case of E2 position for GSM 850 band, E2 position for PCS 1900 band were reported.

The GSM module was approved and the FCC ID number is **QIPMC55I**. Thus, the output power, ERP/EIRP, Field Strength of Spurious Radiation and AC Power Line Conducted Emission were tested at GSM modes.

5. RF POWER OUTPUT MEASUREMENT

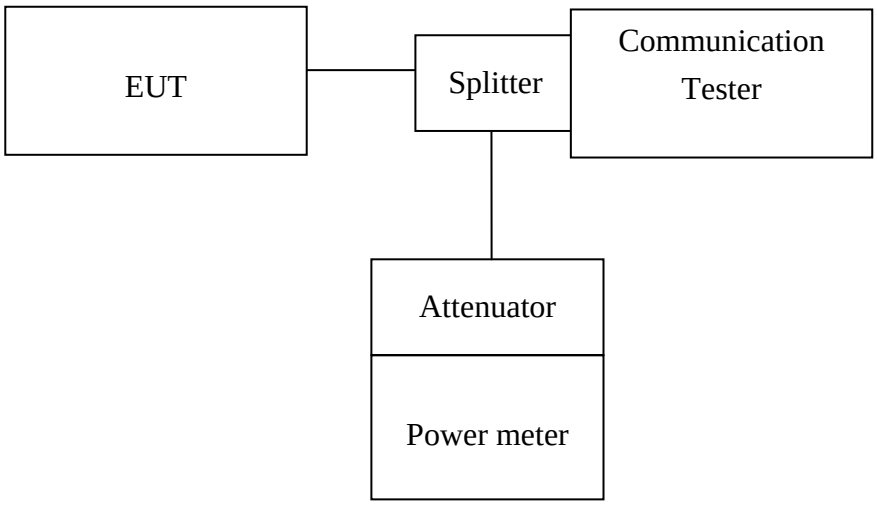
5.1 Standard Applicable

According to FCC §2.1046.

FCC 22.913(a) Mobile station are limited to 7W.

FCC 24.232(b) Mobile station are limited to 2W.

5.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

5.3 Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. was used for EUT and Base station setting.

5.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Spectrum Analyzer	Agilent	E4440A	US41160416	01/23/2008	01/22/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Radio Communication Analyzer	R&S	CMU200	102189	05/13/208	05/13/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2008	01/04/2009
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2008	01/04/2009
Power Sensor	Anritsu	MA2490A	31431	07/07/2007	07/06/2009
Power Meter	Anritsu	ML2487A	6K00002070	07/07/2007	07/06/2009
Temperature Chamber	TERCHY	MHG-120LF	911009	04/14/2008	04/13/2010
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/05/2008	02/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Splitter	Agilent	11636B	N/A	07/05/2008	07/04/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Diode Detector	Agilent	8471E	MY4224	N/A	N/A
DC Power Supply	HP	6038A	2929A-07548	06/27/2007	06/26/2009
DC Power Supply	Topward	3303D	981327	10/26/2007	10/25/2009

5.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	Power meter Reading (dBm)	Path Loss (dB)	Peak Power (dBm)
GSM 850	824.20	128	31.9	0.50	32.40
	836.60	190	32.1	0.50	32.60
	848.80	251	32.1	0.50	32.60

EUT Mode	Frequency (MHz)	CH	Power Meter Reading (dBm)	Path Loss (dB)	Peak Power (dBm)
PCS 1900	1850.20	512	29.4	0.50	29.90
	1880.00	661	29.2	0.50	29.70
	1909.80	810	29.2	0.50	29.70

6. ERP, EIRP MEASUREMENT

6.1 Standard Applicable

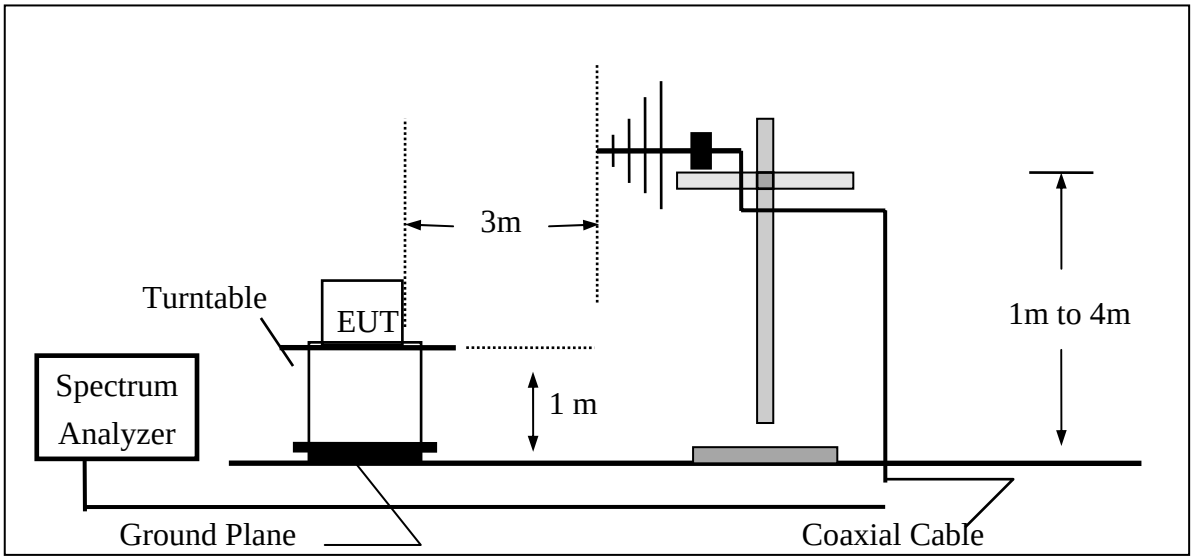
According to FCC §2.1046

FCC 22.913(a) Mobile station are limited to 7W ERP.

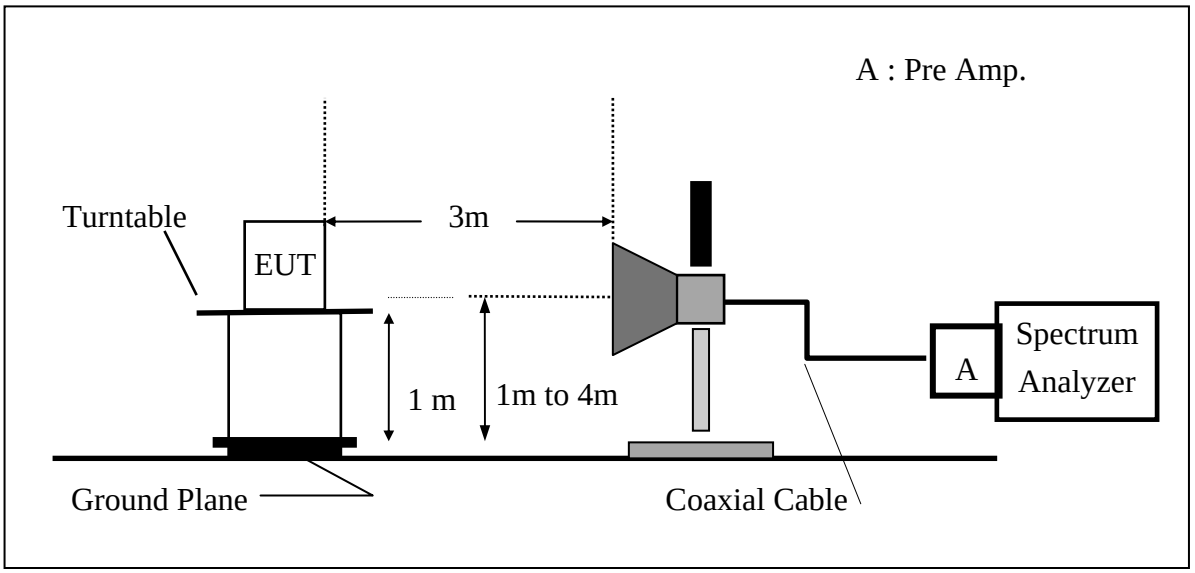
FCC 24.232(b) Mobile station are limited to 2W EIRP.

6.2 Test SET-UP (Block Diagram of Configuration)

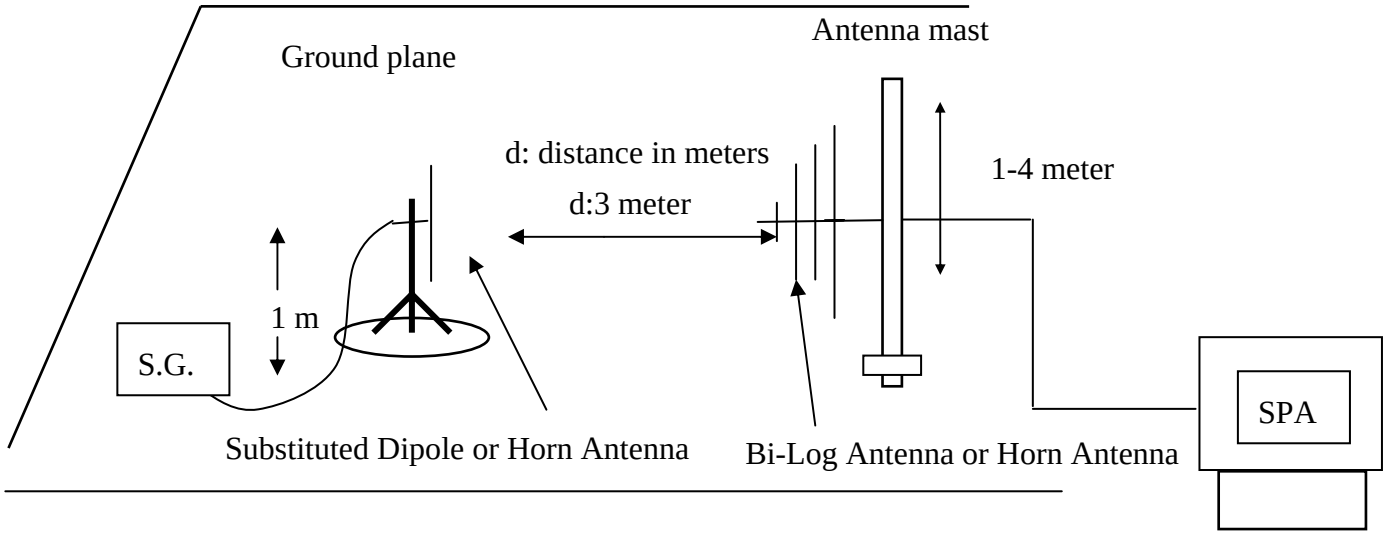
(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



6.3 Measurement Procedure

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)

6.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Signal Generator	Agilent	E4438C	MY45093613	05/22/2008	05/21/2009
Pre-Amplifier	HP	8447F	3113A06892	01/05/2008	01/04/2009
Pre-Amplifier	HP	8449B	3008A01973	01/05/2008	01/04/2009
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-13M	13m (TX)	01/05/2008	01/04/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-13M	13m (RX)	01/05/2008	01/04/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-0.5M	0.5m	01/05/2008	01/04/2009
Dipole Antenna	SCHWAZBECK	VHAP	908/909	07/10/2008	07/09/2010
Dipole Antenna	SCHWAZBECK	UHAP	891/892	07/10/2008	07/09/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	673	05/09/2008	05/10/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	05/09/2008	05/10/2010
Bi-log Antenna	SCHWAZBECK	VULB9160	9160-3158	11/29/2007	11/28/2008
3m Site	SGS	1166 chamber	N/A	10/09/2006	10/08/2009

6.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
GSM 850	824.20	128	H	V	126.51	40.12	-7.87	3.62	28.62	38.45
				H	126.58	40.31	-7.87	3.62	28.81	38.45
			E1	V	126.82	40.43	-7.87	3.62	28.93	38.45
				H	122.47	36.20	-7.87	3.62	24.70	38.45
			E2	V	124.92	38.53	-7.87	3.62	27.03	38.45
				H	127.01	40.74	-7.87	3.62	29.24	38.45
	836.60	190	H	V	125.60	39.35	-7.88	3.65	27.82	38.45
				H	125.64	39.41	-7.88	3.65	27.88	38.45
			E1	V	126.03	39.78	-7.88	3.65	28.25	38.45
				H	121.97	35.74	-7.88	3.65	24.21	38.45
			E2	V	124.13	37.88	-7.88	3.65	26.35	38.45
				H	125.86	39.63	-7.88	3.65	28.10	38.45
	848.80	251	H	V	123.90	37.78	-7.88	3.68	26.22	38.45
				H	124.72	38.53	-7.88	3.68	26.97	38.45
			E1	V	124.73	38.61	-7.88	3.68	27.05	38.45
				H	121.54	35.35	-7.88	3.68	23.79	38.45
			E2	V	123.59	37.47	-7.88	3.68	25.91	38.45
				H	124.83	38.64	-7.88	3.68	27.08	38.45

Remark：

(1) The RBW,VBW of SPA for frequency

Below 1GHz was RBW=300 KHz, VBW=1000KHz,

Above 1GHz was RBW= 1MHz , VBW= 3MHz

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
PCS 1900	1850.20	512	H	V	123.85	19.46	9.90	5.56	23.80	33.00
				H	123.79	19.61	9.90	5.56	23.95	33.00
			E1	V	123.35	18.96	9.90	5.56	23.30	33.00
				H	123.27	19.09	9.90	5.56	23.43	33.00
			E2	V	127.25	22.86	9.90	5.56	27.20	33.00
				H	124.30	20.12	9.90	5.84	24.18	33.00
	1880.00	661	H	V	123.28	18.92	9.99	5.61	23.30	33.00
				H	123.10	18.96	9.99	5.61	23.33	33.00
			E1	V	122.89	18.53	9.99	5.61	22.91	33.00
				H	123.90	19.76	9.99	5.61	24.13	33.00
			E2	V	127.06	22.70	9.99	5.61	27.08	33.00
				H	123.94	19.80	9.99	5.61	24.17	33.00
	1909.80	810	H	V	120.50	16.17	10.08	5.66	20.59	33.00
				H	119.23	15.12	10.08	5.66	19.54	33.00
			E1	V	121.04	16.71	10.08	5.66	21.13	33.00
				H	119.14	15.03	10.08	5.66	19.45	33.00
			E2	V	123.77	19.44	10.08	5.66	23.86	33.00
				H	121.06	16.95	10.08	5.66	21.37	33.00

Remark：

(1) The RBW,VBW of SPA for frequency

Below 1GHz was RBW=300 KHz, VBW=1000KHz,

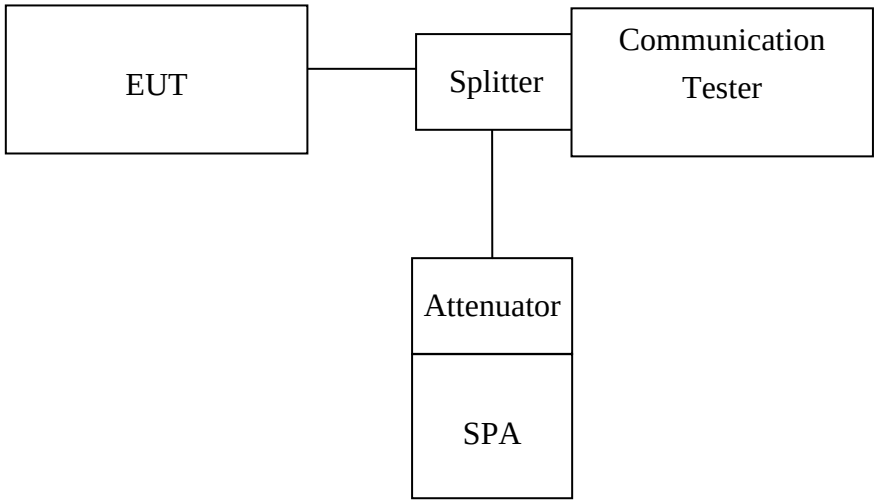
Above 1GHz was RBW= 1MHz , VBW= 3MHz

7. 99% OCCUPIED BANDWIDTH MEASUREMENT

7.1 Standard Applicable

According to §FCC 2.1049.

7.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

7.3 Measurement Procedure

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW (10/30KHz) was set to about 1% of emission BW, VBW= 3 times RBW(30/100KHz), -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

7.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Spectrum Analyzer	Agilent	E4440A	US41160416	01/23/2008	01/22/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Radio Communication Analyzer	R&S	CMU200	102189	05/13/208	05/13/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2008	01/04/2009
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2008	01/04/2009
Power Sensor	Anritsu	MA2490A	31431	07/07/2007	07/06/2009
Power Meter	Anritsu	ML2487A	6K00002070	07/07/2007	07/06/2009
Temperature Chamber	TERCHY	MHG-120LF	911009	04/14/2008	04/13/2010
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/05/2008	02/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Splitter	Agilent	11636B	N/A	07/05/2008	07/04/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Diode Detector	Agilent	8471E	MY4224	N/A	N/A
DC Power Supply	HP	6038A	2929A-07548	06/27/2007	06/26/2009
DC Power Supply	Topward	3303D	981327	10/26/2007	10/25/2009

7.5 Measurement Result:

Please refer to module test Report : 2-20722858c/07-C1

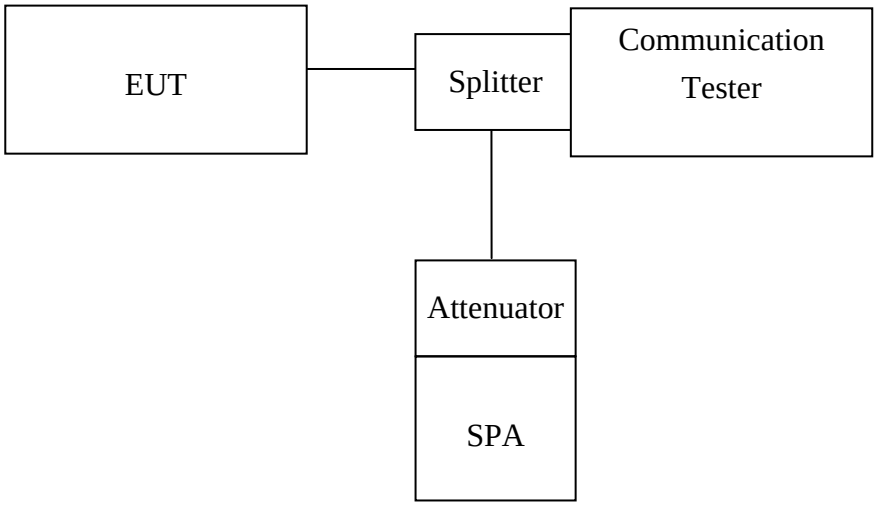
8. OUT OF BAND EMISSION AT ANTENNA TERMINALS

8.1 Standard Applicable

According to FCC §2.1051.

FCC §22.917(a),§24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

8.2 Test SET-UP



Note: *Measurement setup for testing on Antenna connector*

8.3 Measurement Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

8.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Spectrum Analyzer	Agilent	E4440A	US41160416	01/23/2008	01/22/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Radio Communication Analyzer	R&S	CMU200	102189	05/13/208	05/13/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2008	01/04/2009
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2008	01/04/2009
Power Sensor	Anritsu	MA2490A	31431	07/07/2007	07/06/2009
Power Meter	Anritsu	ML2487A	6K00002070	07/07/2007	07/06/2009
Temperature Chamber	TERCHY	MHG-120LF	911009	04/14/2008	04/13/2010
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/05/2008	02/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Splitter	Agilent	11636B	N/A	07/05/2008	07/04/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Diode Detector	Agilent	8471E	MY4224	N/A	N/A
DC Power Supply	HP	6038A	2929A-07548	06/27/2007	06/26/2009
DC Power Supply	Topward	3303D	981327	10/26/2007	10/25/2009

8.5 Measurement Result

Please refer to module test Report : 2-20722858c/07-C1

9. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

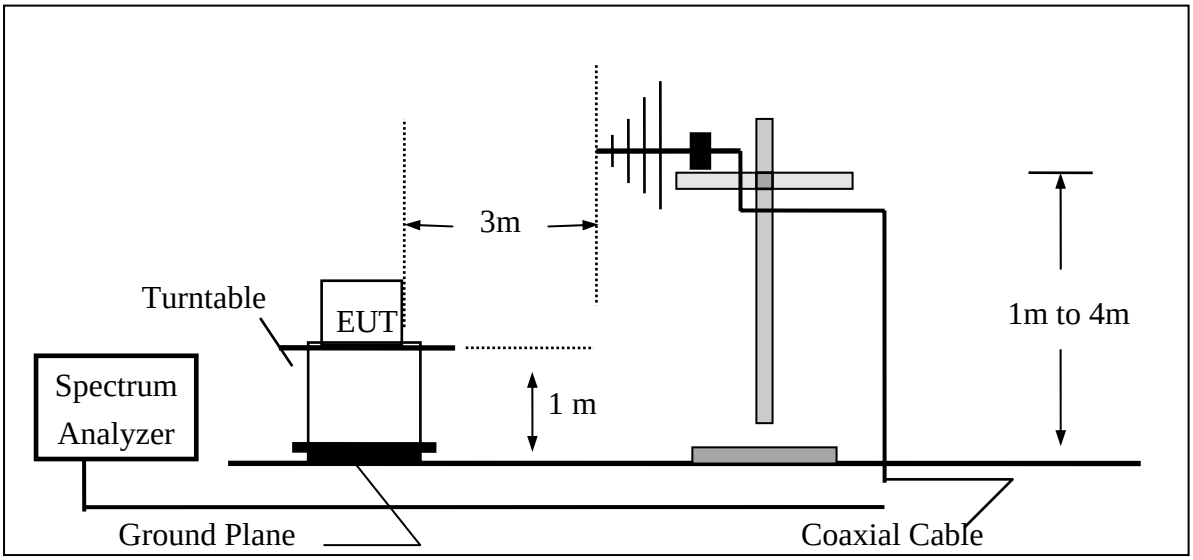
9.1 Standard Applicable

According to FCC §2.1053,

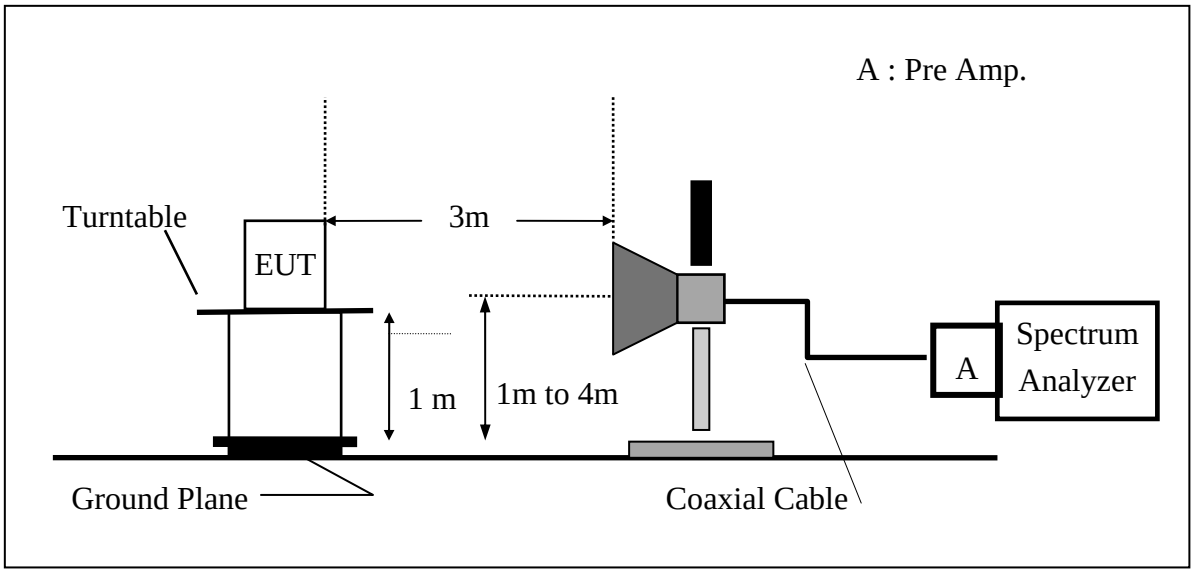
FCC §22.917(a),§24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

9.2 EUT Setup (Block Diagram of Configuration)

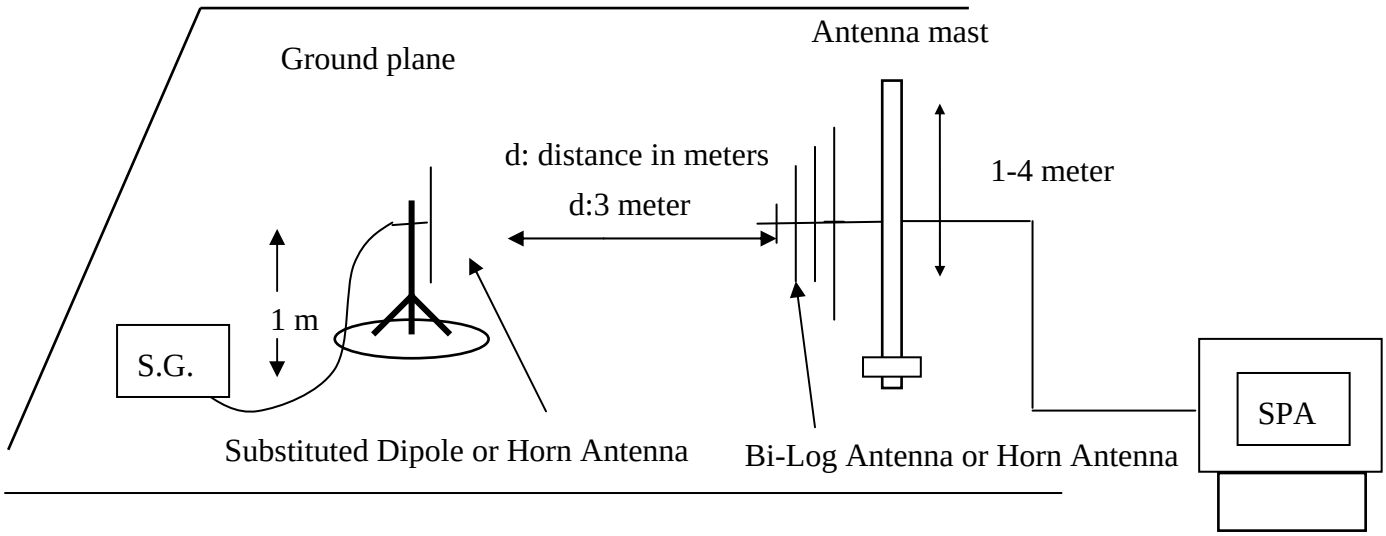
(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



9.3 Measurement Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

EIRP = S.G. output (dBm) + Antenna Gain(dBi) – Cable Loss (dB)

9.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Bi-log Antenna	SCHWAZBECK	VULB9160	9160-3158	11/29/2007	11/28/2009
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	05/09/2008	05/10/2010
Radio Communication Analyzer	R & S	CMU200	102189	05/13/208	05/13/2010
Radio Communication Analyzer	Anritsu	MT8820A	6200307563	04/16/2008	04/15/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2008	01/04/2009
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2008	01/04/2009
Band-reject Filter	K&L	3TNF-800/1000-N/N	137	01/05/2008	01/04/2009
Band-reject Filter	K&L	5TNF-1700/2000-0.1-N/N	232	01/05/2008	01/04/2009
Pre-Amplifier	HP	8447F	3113A06892	01/05/2008	01/04/2009
Pre-Amplifier	HP	8449B	3008A01973	01/05/2008	01/04/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2008	01/04/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-0.5M	0.5m	01/05/2008	01/04/2009
3m Site	SGS	1166 chamber	N/A	10/09/2006	10/08/2009
Site NSA	SGS	966 chamber	N/A	10/01/2008	09/30/2009
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Dipole Antenna	SCHWAZBECK	VHAP	908/909	07/10/2008	07/09/2010
Dipole Antenna	SCHWAZBECK	UHAP	891/892	07/10/2008	07/09/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	673	05/09/2008	05/10/2010

9.5 Measurement Result

Refer to attach tabular data sheets.

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode	: TX CH Low E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 824.20 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
72.68	58.76	V	-52.91	-1.45	1.18	-55.53	-13.00	-42.53
96.93	53.54	V	-48.77	-7.76	1.33	-57.86	-13.00	-44.86
155.13	46.62	V	-51.13	-7.80	1.60	-60.54	-13.00	-47.54
240.49	48.04	V	-52.21	-7.88	1.94	-62.03	-13.00	-49.03
264.74	47.07	V	-52.34	-7.90	2.04	-62.28	-13.00	-49.28
455.83	45.49	V	-48.46	-7.70	2.68	-58.84	-13.00	-45.84
824.00	74.47	V	-11.92	-7.87	3.62	-23.42	-13.00	-10.42
1648.40	71.07	V	-33.51	9.29	5.23	-29.45	-13.00	-16.45
2472.60	63.64	V	-37.37	10.08	6.53	-33.82	-13.00	-20.82
3296.80	58.01	V	-40.86	12.17	7.71	-36.41	-13.00	-23.41
4121.00	---	V		12.61	8.86		-13.00	
4945.20	---	V		12.65	9.74		-13.00	
5769.40	---	V		13.55	10.54		-13.00	
6593.60	---	V		12.05	11.30		-13.00	
7417.80	---	V		11.49	12.10		-13.00	
8242.00	---	V		11.48	12.71		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark”---“ means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode	: TX CH Low E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 824.20 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	51.82	H	-54.60	-0.92	1.09	-56.62	-13.00	-43.62
72.68	59.66	H	-52.67	-1.45	1.18	-55.29	-13.00	-42.29
96.93	51.87	H	-51.36	-7.76	1.33	-60.45	-13.00	-47.45
240.49	50.25	H	-49.43	-7.88	1.94	-59.25	-13.00	-46.25
264.74	48.46	H	-50.30	-7.90	2.04	-60.24	-13.00	-47.24
480.08	44.50	H	-49.13	-7.71	2.74	-59.58	-13.00	-46.58
824.00	75.82	H	-10.45	-7.87	3.62	-21.95	-13.00	-8.95
1648.40	81.24	H	-23.16	9.29	5.23	-19.10	-13.00	-6.10
2472.60	68.28	H	-32.63	10.08	6.53	-29.08	-13.00	-16.08
3296.80	58.65	H	-40.45	12.17	7.71	-35.99	-13.00	-22.99
4121.00	---	H		12.61	8.86		-13.00	
4945.20	---	H		12.65	9.74		-13.00	
5769.40	---	H		13.55	10.54		-13.00	
6593.60	---	H		12.05	11.30		-13.00	
7417.80	---	H		11.49	12.10		-13.00	
8242.00	---	H		11.48	12.71		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark”---“ means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode	: TX CH Mid E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 836.60 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	51.44	V	-54.74	-0.92	1.09	-56.76	-13.00	-43.76
72.68	57.56	V	-54.11	-1.45	1.18	-56.73	-13.00	-43.73
96.93	59.63	V	-42.68	-7.76	1.33	-51.77	-13.00	-38.77
240.49	47.76	V	-52.49	-7.88	1.94	-62.31	-13.00	-49.31
259.89	46.86	V	-52.71	-7.90	2.03	-62.63	-13.00	-49.63
455.83	45.68	V	-48.27	-7.70	2.68	-58.65	-13.00	-45.65
1673.20	68.88	V	-35.68	9.36	5.27	-31.58	-13.00	-18.58
2509.80	62.71	V	-38.07	10.09	6.58	-34.57	-13.00	-21.57
3346.40	54.19	V	-44.67	12.28	7.79	-40.19	-13.00	-27.19
4183.00	---	V		12.62	8.93		-13.00	
5019.60	---	V		12.67	9.81		-13.00	
5856.20	---	V		13.68	10.62		-13.00	
6692.80	---	V		11.95	11.39		-13.00	
7529.40	---	V		11.45	12.20		-13.00	
8366.00	---	V		11.59	12.81		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belongs to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode	: TX CH Mid E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 836.60 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
49.40	50.51	H	-56.33	-0.72	1.12	-58.17	-13.00	-45.17
72.68	58.88	H	-53.45	-1.45	1.18	-56.07	-13.00	-43.07
96.93	52.51	H	-50.72	-7.76	1.33	-59.81	-13.00	-46.81
240.49	49.38	H	-50.30	-7.88	1.94	-60.12	-13.00	-47.12
480.08	43.41	H	-50.22	-7.71	2.74	-60.67	-13.00	-47.67
623.64	43.37	H	-46.87	-7.80	3.09	-57.76	-13.00	-44.76
1673.20	78.85	H	-25.53	9.36	5.27	-21.43	-13.00	-8.43
2509.80	66.48	H	-34.22	10.09	6.58	-30.72	-13.00	-17.72
3346.40	54.23	H	-44.83	12.28	7.79	-40.35	-13.00	-27.35
4183.00	---	H		12.62	8.93		-13.00	
5019.60	---	H		12.67	9.81		-13.00	
5856.20	---	H		13.68	10.62		-13.00	
6692.80	---	H		11.95	11.39		-13.00	
7529.40	---	H		11.45	12.20		-13.00	
8366.00	---	H		11.59	12.81		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode	: TX CH High E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 848.80 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	51.25	V	-54.93	-0.92	1.09	-56.95	-13.00	-43.95
72.68	57.63	V	-54.04	-1.45	1.18	-56.66	-13.00	-43.66
96.93	59.11	V	-43.20	-7.76	1.33	-52.29	-13.00	-39.29
240.49	47.08	V	-53.17	-7.88	1.94	-62.99	-13.00	-49.99
324.88	44.58	V	-53.36	-7.78	2.26	-63.41	-13.00	-50.41
453.89	44.91	V	-49.04	-7.70	2.67	-59.41	-13.00	-46.41
850.00	68.33	V	-17.78	-7.88	3.68	-29.34	-13.00	-16.34
1697.60	65.89	V	-38.65	9.44	5.31	-34.52	-13.00	-21.52
2546.40	58.19	V	-42.45	10.20	6.63	-38.89	-13.00	-25.89
3395.20	---	V		12.38	7.87		-13.00	
4244.00	---	V		12.63	9.00		-13.00	
5092.80	---	V		12.74	9.88		-13.00	
5941.60	---	V		13.81	10.70		-13.00	
6790.40	---	V		11.86	11.48		-13.00	
7639.20	---	V		11.40	12.27		-13.00	
8488.00	---	V		11.70	12.91		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode	: TX CH High E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 848.80 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	53.73	H	-52.69	-0.92	1.09	-54.71	-13.00	-41.71
72.68	58.30	H	-54.03	-1.45	1.18	-56.65	-13.00	-43.65
96.93	51.66	H	-51.57	-7.76	1.33	-60.66	-13.00	-47.66
240.49	47.64	H	-52.04	-7.88	1.94	-61.86	-13.00	-48.86
480.08	44.37	H	-49.26	-7.71	2.74	-59.71	-13.00	-46.71
623.64	43.31	H	-46.93	-7.80	3.09	-57.82	-13.00	-44.82
850.00	70.19	H	-16.00	-7.88	3.68	-27.56	-13.00	-14.56
1697.60	75.44	H	-28.91	9.44	5.31	-24.78	-13.00	-11.78
2546.40	61.56	H	-39.04	10.20	6.63	-35.48	-13.00	-22.48
3395.20	---	H		12.38	7.87		-13.00	
4244.00	---	H		12.63	9.00		-13.00	
5092.80	---	H		12.74	9.88		-13.00	
5941.60	---	H		13.81	10.70		-13.00	
6790.40	---	H		11.86	11.48		-13.00	
7639.20	---	H		11.40	12.27		-13.00	
8488.00	---	H		11.70	12.91		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode	: TX CH Low E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 1850.20MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	51.08	V	-55.10	-0.92	1.09	-57.12	-13.00	-44.12
72.68	58.07	V	-53.60	-1.45	1.18	-56.22	-13.00	-43.22
96.93	59.66	V	-42.65	-7.76	1.33	-51.74	-13.00	-38.74
240.49	46.87	V	-53.38	-7.88	1.94	-63.20	-13.00	-50.20
264.74	45.61	V	-53.80	-7.90	2.04	-63.74	-13.00	-50.74
453.89	45.19	V	-48.76	-7.70	2.67	-59.13	-13.00	-46.13
1850.00	76.02	V	-28.37	9.90	5.56	-24.03	-13.00	-11.03
3700.40	67.11	V	-30.82	12.61	8.31	-26.52	-13.00	-13.52
5550.60	---	V		13.23	10.33		-13.00	
7400.80	---	V		11.50	12.08		-13.00	
9251.00	---	V		11.92	13.50		-13.00	
11101.20	---	V		11.66	15.11		-13.00	
12951.40	---	V		13.63	16.60		-13.00	
14801.60	---	V		12.76	17.95		-13.00	
16651.80	---	V		15.92	19.14		-13.00	
18502.00	---	V		18.75	10.40		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode	: TX CH Low E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 1850.20MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	54.23	H	-52.19	-0.92	1.09	-54.21	-13.00	-41.21
72.68	59.10	H	-53.23	-1.45	1.18	-55.85	-13.00	-42.85
96.93	52.49	H	-50.74	-7.76	1.33	-59.83	-13.00	-46.83
240.49	48.50	H	-51.18	-7.88	1.94	-61.00	-13.00	-48.00
300.63	47.11	H	-50.54	-7.92	2.17	-60.63	-13.00	-47.63
623.64	45.39	H	-44.85	-7.80	3.09	-55.74	-13.00	-42.74
1850.00	78.00	H	-26.18	9.90	5.56	-21.84	-13.00	-8.84
3700.40	63.74	H	-34.30	12.61	8.31	-30.00	-13.00	-17.00
5550.60	---	H		13.23	10.33		-13.00	
7400.80	---	H		11.50	12.08		-13.00	
9251.00	---	H		11.92	13.50		-13.00	
11101.20	---	H		11.66	15.11		-13.00	
12951.40	---	H		13.63	16.60		-13.00	
14801.60	---	H		12.76	17.95		-13.00	
16651.80	---	H		15.92	19.14		-13.00	
18502.00	---	H		18.75	10.40		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode	: TX CH Mid E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 1880MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	51.26	V	-54.92	-0.92	1.09	-56.94	-13.00	-43.94
72.68	58.06	V	-53.61	-1.45	1.18	-56.23	-13.00	-43.23
96.93	59.74	V	-42.57	-7.76	1.33	-51.66	-13.00	-38.66
240.49	47.08	V	-53.17	-7.88	1.94	-62.99	-13.00	-49.99
455.83	45.54	V	-48.41	-7.70	2.68	-58.79	-13.00	-45.79
3760.00	68.13	V	-29.53	12.60	8.39	-25.31	-13.00	-12.31
5640.00	---	V		13.36	10.41		-13.00	
7520.00	---	V		11.45	12.19		-13.00	
9400.00	---	V		11.93	13.61		-13.00	
11280.00	---	V		11.92	15.27		-13.00	
13160.00	---	V		13.33	16.71		-13.00	
15040.00	---	V		13.76	18.15		-13.00	
16920.00	---	V		15.27	19.32		-13.00	
18800.00	---	V		18.68	16.58		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark”---“ means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode	: TX CH Mid E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 1880MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	54.04	H	-52.38	-0.92	1.09	-54.40	-13.00	-41.40
72.68	58.93	H	-53.40	-1.45	1.18	-56.02	-13.00	-43.02
240.49	47.72	H	-51.96	-7.88	1.94	-61.78	-13.00	-48.78
300.63	46.77	H	-50.88	-7.92	2.17	-60.97	-13.00	-47.97
480.08	44.91	H	-48.72	-7.71	2.74	-59.17	-13.00	-46.17
623.64	44.09	H	-46.15	-7.80	3.09	-57.04	-13.00	-44.04
3760.00	64.76	H	-33.01	12.60	8.39	-28.80	-13.00	-15.80
5640.00	---	H		13.36	10.41		-13.00	
7520.00	---	H		11.45	12.19		-13.00	
9400.00	---	H		11.93	13.61		-13.00	
11280.00	---	H		11.92	15.27		-13.00	
13160.00	---	H		13.33	16.71		-13.00	
15040.00	---	H		13.76	18.15		-13.00	
16920.00	---	H		15.27	19.32		-13.00	
18800.00	---	H		18.68	16.58		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode	: TX CH High E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 1909.8 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
49.40	48.93	V	-57.76	-0.72	1.12	-59.60	-13.00	-46.60
72.68	58.27	V	-53.40	-1.45	1.18	-56.02	-13.00	-43.02
96.93	59.42	V	-42.89	-7.76	1.33	-51.98	-13.00	-38.98
130.88	43.72	V	-55.34	-7.78	1.50	-64.63	-13.00	-51.63
240.49	47.33	V	-52.92	-7.88	1.94	-62.74	-13.00	-49.74
455.83	45.60	V	-48.35	-7.70	2.68	-58.73	-13.00	-45.73
1910.00	72.57	V	-31.76	10.08	5.66	-27.34	-13.00	-14.34
3814.00	66.30	V	-31.12	12.60	8.46	-26.98	-13.00	-13.98
3981.60	---	V		12.60	8.69		-13.00	
5722.00	50.65	V	-39.69	13.48	10.49	-36.70	-13.00	-23.70
5972.40	---	V		13.86	10.73		-13.00	
7963.20	---	V		11.27	12.49		-13.00	
9954.00	---	V		12.08	14.24		-13.00	
11944.80	---	V		13.08	15.87		-13.00	
13935.60	---	V		11.82	17.21		-13.00	
15926.40	---	V		17.08	18.70		-13.00	
17917.20	---	V		9.63	19.97		-13.00	
19908.00	---	V		18.88	21.24		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode	: TX CH High E2 Mode	Test Date:	Nov. 06, 2008
Fundamental Frequency	: 1909.8 MHz	Test By:	Arno
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
48.43	54.26	H	-52.16	-0.92	1.09	-54.18	-13.00	-41.18
72.68	59.00	H	-53.33	-1.45	1.18	-55.95	-13.00	-42.95
96.93	52.60	H	-50.63	-7.76	1.33	-59.72	-13.00	-46.72
264.74	47.17	H	-51.59	-7.90	2.04	-61.53	-13.00	-48.53
298.69	46.92	H	-50.78	-7.92	2.17	-60.87	-13.00	-47.87
672.14	43.78	H	-45.01	-7.83	3.22	-56.06	-13.00	-43.06
1910.00	74.57	H	-29.54	10.08	5.66	-25.12	-13.00	-12.12
3814.00	59.50	H	-38.03	12.60	8.46	-33.89	-13.00	-20.89
3981.60	---	H		12.60	8.69		-13.00	
5972.40	---	H		13.86	10.73		-13.00	
7963.20	---	H		11.27	12.49		-13.00	
9954.00	---	H		12.08	14.24		-13.00	
11944.80	---	H		13.08	15.87		-13.00	
13935.60	---	H		11.82	17.21		-13.00	
15926.40	---	H		17.08	18.70		-13.00	
17917.20	---	H		9.63	19.97		-13.00	
19908.00	---	H		18.88	21.24		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark”---“ means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

10. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

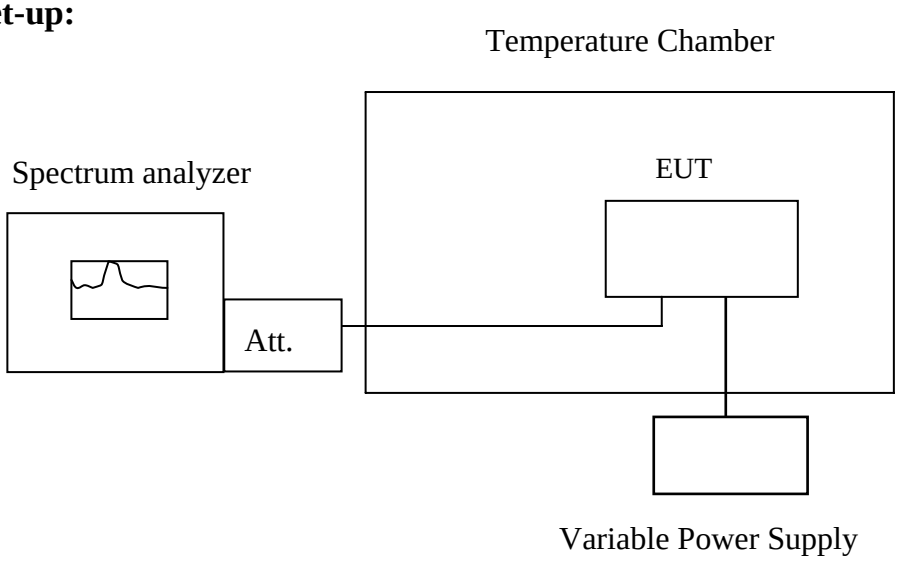
10.1 Standard Applicable

According to FCC §2.1055(d)(1)(2)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

10.2 Test Set-up:



Note : Measurement setup for testing on Antenna connector

10.3 Measurement Procedure

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25^{o}C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30^{o}C. After the temperature stabilized for approximately 30 minutes re-corded the frequency. Repeat step measure with 10^{o}C increased per stage until the highest temperature of +50^{o}C reached.

10.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Spectrum Analyzer	Agilent	E4440A	US41160416	01/23/2008	01/22/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Radio Communication Analyzer	R&S	CMU200	102189	05/13/208	05/13/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2008	01/04/2009
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2008	01/04/2009
Power Sensor	Anritsu	MA2490A	31431	07/07/2007	07/06/2009
Power Meter	Anritsu	ML2487A	6K00002070	07/07/2007	07/06/2009
Temperature Chamber	TERCHY	MHG-120LF	911009	04/14/2008	04/13/2010
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/05/2008	02/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Splitter	Agilent	11636B	N/A	07/05/2008	07/04/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Diode Detector	Agilent	8471E	MY4224	N/A	N/A
DC Power Supply	HP	6038A	2929A-07548	06/27/2007	06/26/2009
DC Power Supply	Topward	3303D	981327	10/26/2007	10/25/2009

10.5 Measurement Result

Please refer to module test Report : 2-20722858c/07-C1

11. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

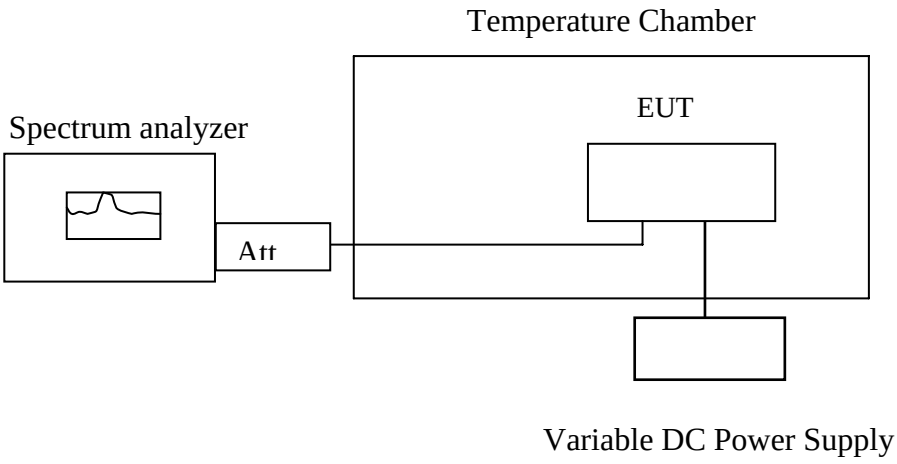
11.1 Standard Applicable

According to FCC §2.1055(d)(1)(2)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

11.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

11.3 Measurement Procedure

Set chamber temperature to 25℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

11.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2009
Spectrum Analyzer	Agilent	E4440A	US41160416	01/23/2008	01/22/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Radio Communication Analyzer	R&S	CMU200	102189	05/13/208	05/13/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2008	01/04/2009
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2008	01/04/2009
Power Sensor	Anritsu	MA2490A	31431	07/07/2007	07/06/2009
Power Meter	Anritsu	ML2487A	6K00002070	07/07/2007	07/06/2009
Temperature Chamber	TERCHY	MHG-120LF	911009	04/14/2008	04/13/2010
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/05/2008	02/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2008	07/04/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009
Splitter	Agilent	11636B	N/A	07/05/2008	07/04/2009
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Diode Detector	Agilent	8471E	MY4224	N/A	N/A
DC Power Supply	HP	6038A	2929A-07548	06/27/2007	06/26/2009
DC Power Supply	Topward	3303D	981327	10/26/2007	10/25/2009

11.5 Measurement Result

Please refer to module test Report : 2-20722858c/07-C1

12. AC POWER LINE CONDUCTED EMISSION TEST

12.1 Standard Applicable

According to §15.207. The emission value for frequency within 150KHz to 30MHz shall not exceed criteria of below chart.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

12.2 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2001.
2. The EUT was plug-in DC power adaptort and was placed on the center of the back edge on the test table. The peripherals like earphone was placed on the side of the EUT. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The Power adaptor was connected with 110Vac/60Hz power source.

12.3 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

12.4 Measurement Equipment Used:

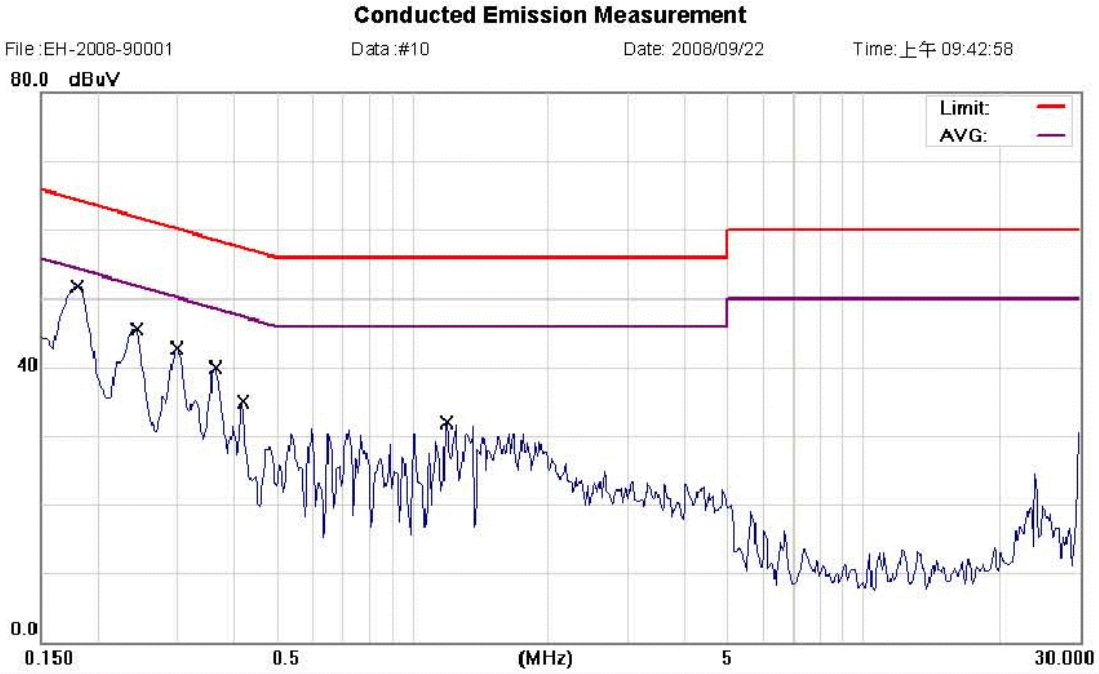
Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCS30	828985/004	09/16/2008	09/15/2009
LISN	Rolf-Heine	NNB-2/16Z	99012	02/18/2008	02/17/2009
LISN	Rolf-Heine	NNB-2/16Z	99013	04/28/2008	04/27/2009
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/18/2008	02/17/2009
LISN	MESSTEC	LN-KFZ/200	02/10163	09/15/2008	09/14/2009
Transient Limiter	R&S	ESH3Z2	357.8810.52	05/19/2008	05/18/2009
50Ohms terminator	N/A	EMC-049-1	N/A	06/04/2008	06/03/2009
Coaxial Cables	N/A	WK CE Cable	N/A	11/30/2007	11/29/2008

12.5 Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	GSM 850 LINK			Test Date:	Sep. 22, 2008
Temperature:	26 ℃	Humidity:	62 %	Test By:	Arno
Adapter model:	GFP051U-0510				



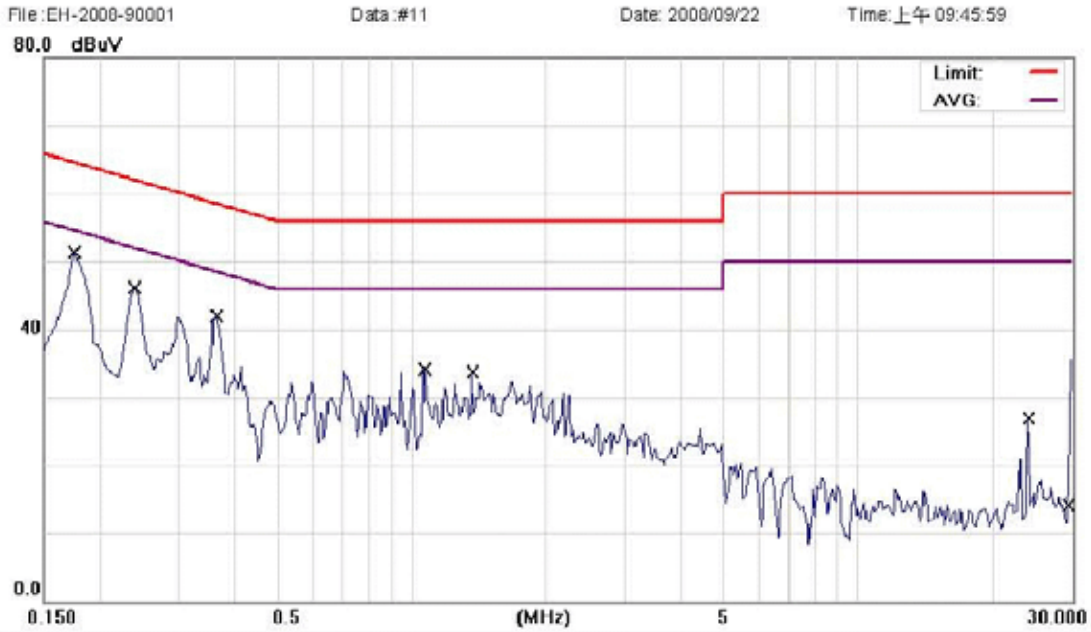
Site SGS CONDUCTED #1
Limit: CISPR22/11 Class B Conduction(QP)
EUT: TRCKING
M/N: CTS100XT
Note: GSM850

Phase: L1
Power: AC 120V/60Hz
Distance:

Temperature: 26 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1800	51.55	0.21	51.76	64.49	-12.73	QP	
2		0.2450	45.46	0.11	45.57	61.92	-16.35	QP	
3		0.3000	42.67	0.09	42.76	60.24	-17.48	QP	
4		0.3650	39.84	0.07	39.91	58.61	-18.70	QP	
5		0.4200	34.81	0.05	34.86	57.45	-22.59	QP	
6		1.1900	31.81	0.01	31.82	56.00	-24.18	QP	

Conducted Emission Measurement



Site SGS CONDUCTED #1
Limit: CISPR22/11 Class B Conduction(QP)
EUT: TRCKING
M/N: CTS100XT
Note: GSM850

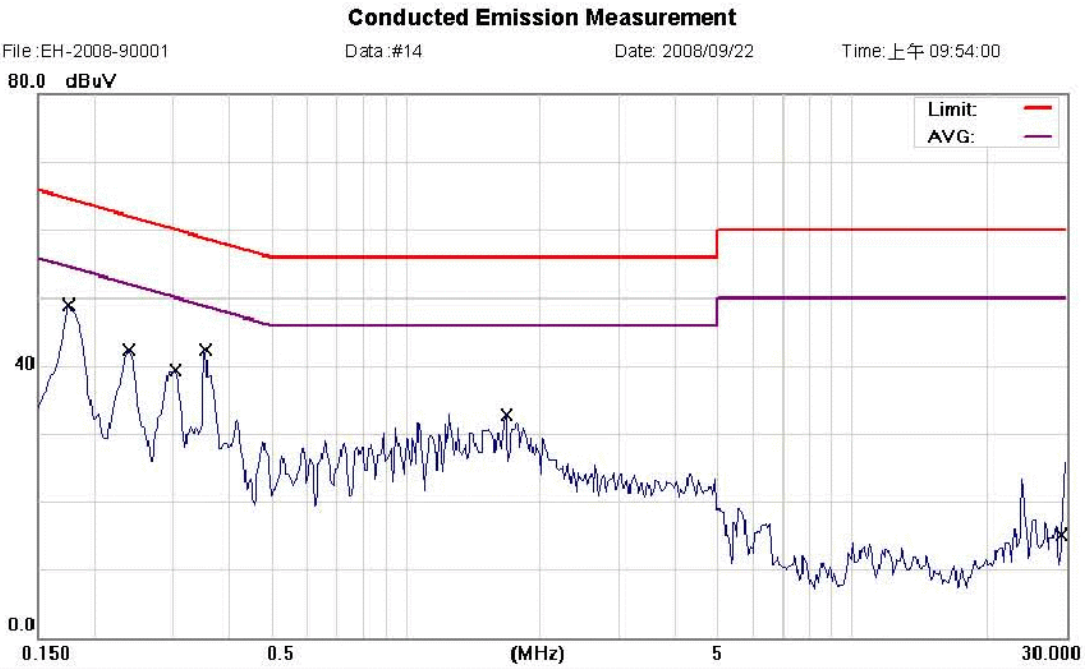
Phase: L2
Power: AC 120V/60Hz
Distance:

Temperature: 26 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1750	51.08	0.24	51.32	64.72	-13.40	QP	
2		0.2400	46.01	0.11	46.12	62.10	-15.98	QP	
3		0.3650	41.89	0.07	41.96	58.61	-16.65	QP	
4		1.0700	34.02	0.01	34.03	56.00	-21.97	QP	
5		1.3700	33.61	0.01	33.62	56.00	-22.38	QP	
6		24.0400	26.89	0.11	27.00	60.00	-33.00	QP	
7		30.0000	35.59	0.09	35.68	60.00	-24.32	QP	

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	PCS 1900 Link			Test Date:	Sep. 22, 2008
Temperature:	26 ℃	Humidity:	62 %	Test By:	Arno
Adapter model:	GFP051U-0510				



Site SGS CONDUCTED #1
Limit: CISPR22/11 Class B Conduction(QP)
EUT: TRCKING
M/N: CTS100XT
Note: GSM1900

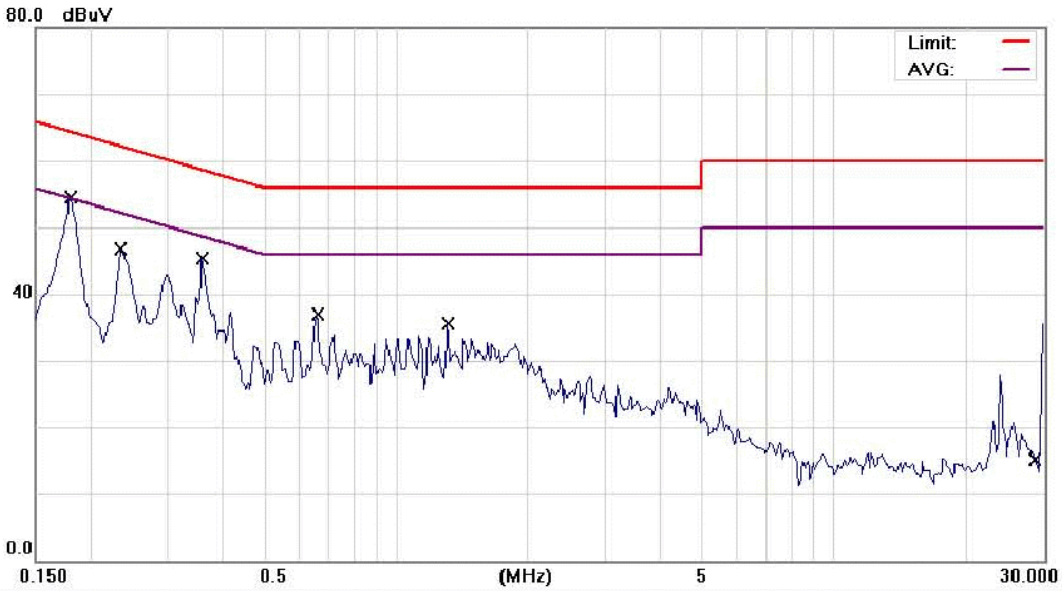
Phase: L1
Power: AC 120V/60Hz
Distance:

Temperature: 26 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1750	48.59	0.24	48.83	64.72	-15.89	QP	
2		0.2400	42.23	0.11	42.34	62.10	-19.76	QP	
3		0.3050	39.29	0.09	39.38	60.11	-20.73	QP	
4		0.3550	42.31	0.07	42.38	58.84	-16.46	QP	
5		1.6800	32.75	0.01	32.76	56.00	-23.24	QP	
6		30.0000	25.77	0.09	25.86	60.00	-34.14	QP	

Conducted Emission Measurement

File :EH-2008-90001 Data :#13 Date: 2008/09/22 Time: 上午 09:50:31



Site SGS CONDUCTED #1
Limit: CISPR22/11 Class B Conduction(QP)
EUT: TRCKING
M/N: CTS100XT
Note: GSM1900

Phase: L2
Power: AC 120V/60Hz
Distance:

Temperature: 26 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1805	45.34	0.21	45.55	64.46	-18.91	QP	
2		0.1805	33.58	0.21	33.79	54.46	-20.67	AVG	
3		0.2350	46.63	0.11	46.74	62.27	-15.53	QP	
4	*	0.3600	45.26	0.07	45.33	58.73	-13.40	QP	
5		0.6600	36.82	0.02	36.84	56.00	-19.16	QP	
6		1.3100	35.52	0.01	35.53	56.00	-20.47	QP	
7		30.0000	35.67	0.09	35.76	60.00	-24.24	QP	