ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

Product Name:	**StarFinder AVL**
Brand Name:	**StarFinder AVL**
Model Name:	**StarFinder AVL 105**
FCC ID:	**TET-SFAVL105106**
GSM Module ID:	**O9EQ2426-SK**
Report No.:	**ER/2005/50010**
Issue Date:	**Jun. 20, 2005**
FCC Rule Part:	**2 & 24E& 22H**
Prepared for	**Laipac Technology Inc.** **55 West Beaver Creek Rd., Unit 1, Richmond Hill, Ontario, L4B 1K5, Canada**
Prepared by	**SGS Taiwan Ltd.** **No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.**

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VERIFICATION OF COMPLIANCE

Applicant:	Laipac Technology Inc. 55 West Beaver Creek Rd., Unit 1, Richmond Hill, Ontario, L4B 1K5, Canada
Equipment Under Test:	StarFinder AVL
FCC ID Number:	TET-SFAVL105106
Brand Name:	StarFinder AVL
Model No.:	StarFinder AVL 105
Model Difference:	N/A
File Number:	ER/2005/50010
Date of test:	May 14, 2005 ~ May 23, 2005
Date of EUT Received:	May 12, 2005

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. 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-603-1-1998 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:	Willis Chen	***Date***	Jun. 20, 2005
	Willis Chen		
Prepared By:	Elisa Chen	***Date***	Jun. 20, 2005
	Elisa Chen		
Approved By	Vincent Su	***Date***	Jun. 20, 2005
	Vincent Su		

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Version

Version No.	Date
00	Jun. 20, 2005
01	Jun. 23, 2005
02	Jun. 30, 2005

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1. GENERAL INFORMATION

1.1 Product Description

Product	StarFinder AVL	
Model Name	StarFinder AVL 105	
Model Difference:	N/A	
Trade Name	StarFinder AVL	
Frequency Range and Power	TX: 824.2 MHz – 848.8 MHz	32.38 dBm
	TX: 1850.2MHz –1909.8MHz	29.98 dBm
Antenna Designation	Frequency Band: 800/1900MHz Tri-Band Patch Car Antenna, 2 dBi, Non-User Replaceable	
Type of Emission	300KGXW	
Power Supply	12V DC by Car Battery	

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID:**TET-SFAVL105106** filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

1.3 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.

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1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1993 and CISPR 22/EN 55022 requirements. Site No. 1(3 &10 meters) Registration Number: 94644, Anechoic chamber (3 meters) Registration Number: 573967

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

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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 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.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 Radiated Emissions

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 in Section 13.1.4.1 of ANSI C63.4-2003.

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2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

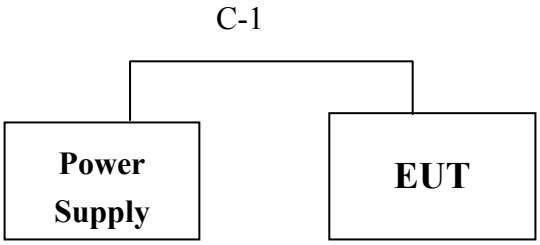

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	Power supply	N/A	3303A	N/A	N/A	Non-shielded	Non-shielded

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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	N/A

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 and band with rated data rate are chosen for full testing.

The GSM module was approved and the FCC ID number is **O9EQ2426-SK**. Thus, the output power, ERP/EIRP and Field Strength of Spurious Radiation were tested.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for both GSM and GPRS six modes. The worst-case E1 mode for channel Low, Mid and High at GSM mode was reported.

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5. RF POWER OUTPUT MEASUREMENT

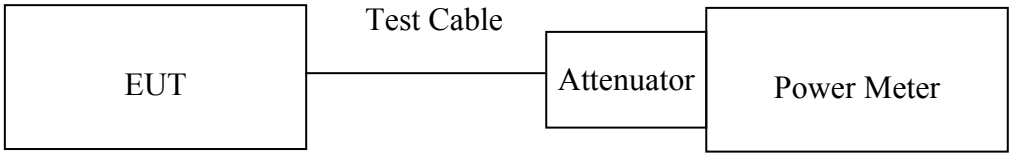
5.1 Standard Applicable

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.

5.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	ANRITSU	ML2487A	6K00002070	07/27/2004	07/26/2005
Power Sensor	ANRITSU	MA2490A	31431	06/18/2005	06/17/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S20	N/A	10/07/2004	10/06/2005

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5.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	Power Meter Reading (dBm)	Offset (dB)	Power (dBm)	Limit
GSM 850	824.20	128	9.08	23.30	32.38	38.45
	836.60	190	8.73	23.30	32.03	38.45
	848.80	251	8.30	23.30	31.60	38.45

EUT Mode	Frequency (MHz)	CH	Power Meter Reading (dBm)	Offset (dB)	Average Power (dBm)	Limit
PCS 1900	1850.20	512	5.14	24.82	29.96	33.00
	1880.00	661	5.16	24.82	29.98	33.00
	1909.80	810	4.73	24.82	29.55	33.00

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6. ERP, EIRP MEASUREMENT

6.1 Standard Applicable

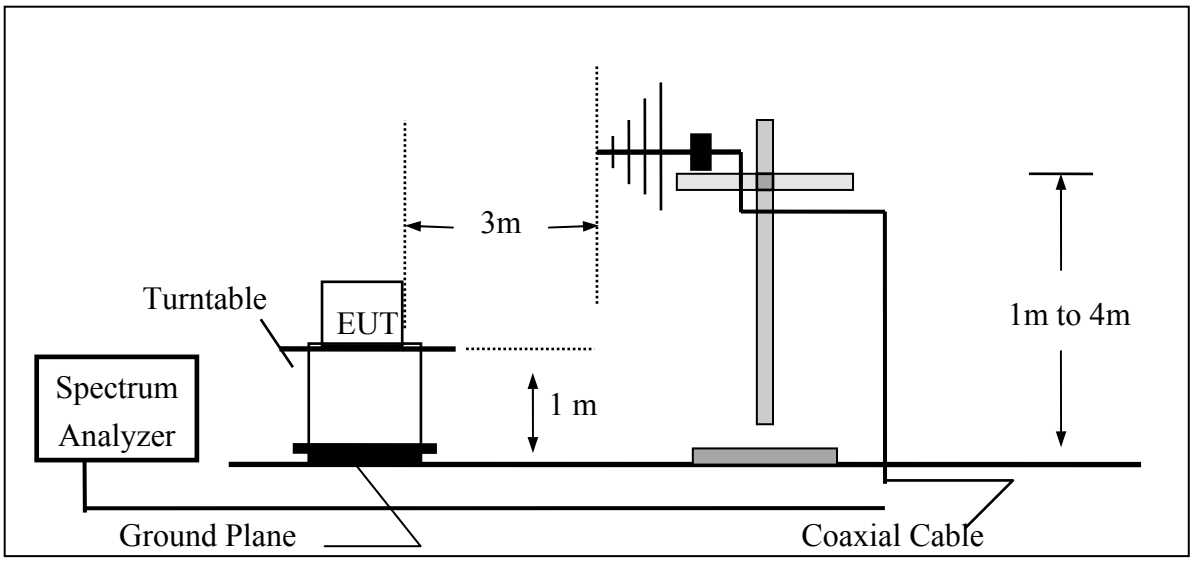
According to FCC §2.1046

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



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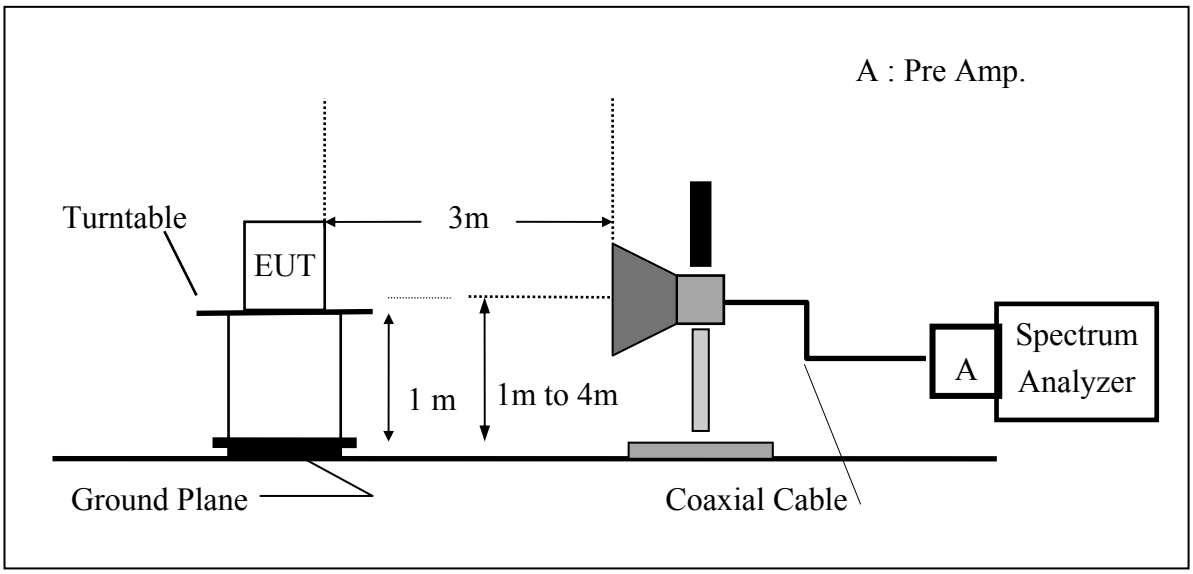
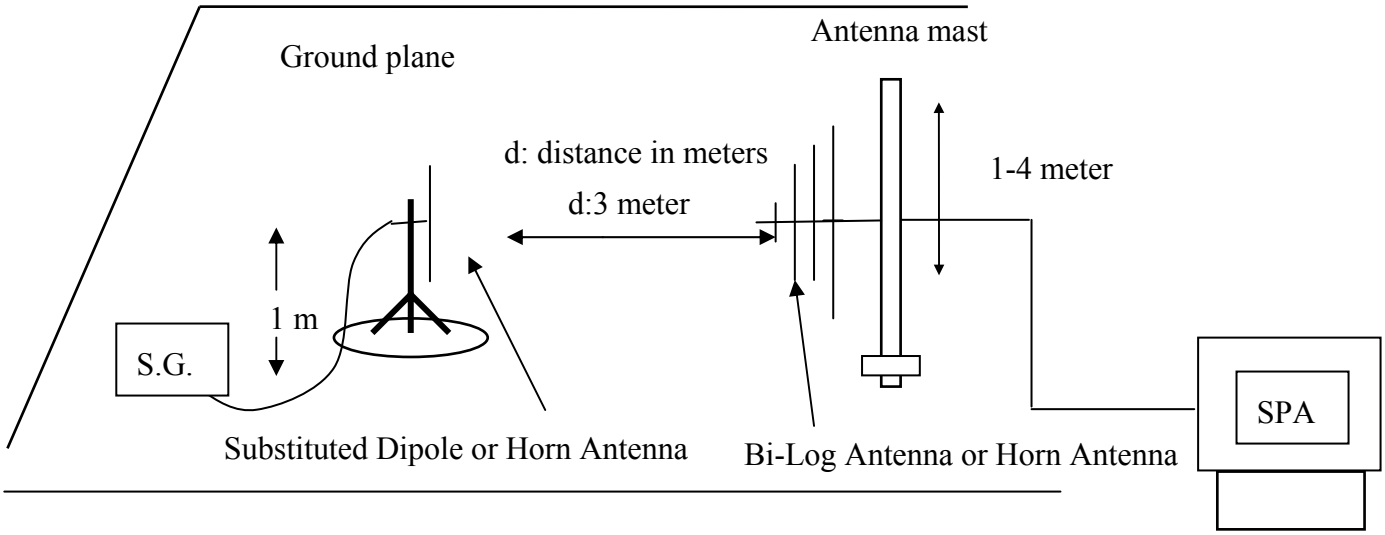
(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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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 –848.80.8MHz 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)

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6.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2004	08/26/2005
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2005	06/02/2006
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	08/16/2004	08/15/2005
Pre-Amplifier	HP	8447D	2944A09469	07/19/2004	07/18/2005
Pre-Amplifier	HP	8494B	3008A00578	02/26/2005	02/25/2006
Signal Generator	R&S	SMR40	100210	02/09/2005	02/10/2006
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	10/09/2004	10/08/2005
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2004	10/08/2005
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-0.5M	0.5m	10/09/2004	10/08/2005
Site NSA	SGS	966 chamber	N/A	11/17/2004	11/16/2005
Site NSA	SGS	10m Open-Site	N/A	10/02/2004	10/01/2005
Attenuator	Mini-Circult	BW-S10W5	N/A	10/07/2004	10/06/2005
Temperature Chamber	TERCHY	MHG-120LF	911009	10/14/2004	10/13/2005
Dipole Antenna	Schwarzbeck	VHAP	908/909	06/10/2005	06/11/2006
Dipole Antenna	Schwarzbeck	UHAP	891/892	06/10/2005	06/11/2006
Horn antenna	Schwarzbeck	BBHA 9120D	N/A	08/16/2004	08/15/2005

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6.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBd)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
GSM 850	824.20	128	V	131.18	43.85	-7.87	3.64	32.34	38.45
			H	122.41	34.75	-7.87	3.64	23.23	38.45
	836.60	190	V	126.34	39.31	-7.88	3.70	27.74	38.45
			H	123.47	36.13	-7.88	3.70	24.56	38.45
	848.80	251	V	126.37	39.63	-7.88	3.75	28.00	38.45
			H	124.22	37.20	-7.88	3.75	25.57	38.45

EUT Mode	Frequency (MHz)	CH	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
PCS 1900	1850.22	512	V	120.98	14.02	9.90	5.41	18.51	33.00
			H	128.32	21.43	9.90	5.41	25.92	33.00
	1880.00	661	V	121.21	14.26	9.99	5.46	18.79	33.00
			H	128.82	21.95	9.99	5.46	26.48	33.00
	1909.80	810	V	120.54	13.60	10.08	5.51	18.17	33.00
			H	127.74	20.89	10.08	5.51	25.45	33.00

Remark：	
(1)	The RBW,VBW of SPA for frequency Below 1GHz was RBW=100 KHz, VBW=300KHz, Above 1GHz was RBW= 1MHz , VBW= 3MHz

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7. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

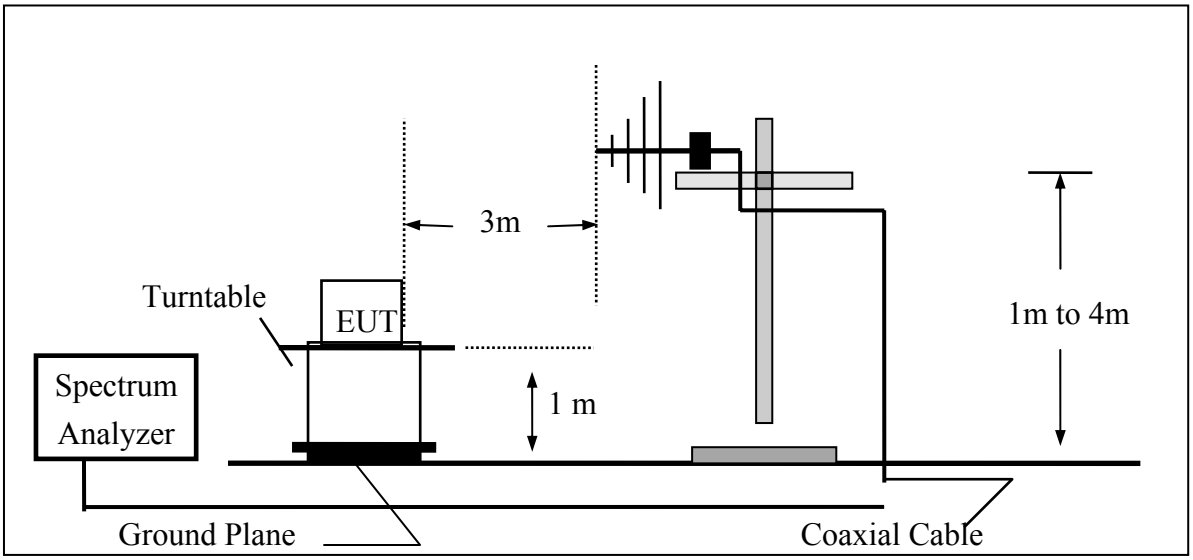
7.1 Standard Applicable

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)

7.2 EUT Setup (Block Diagram of Configuration)

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



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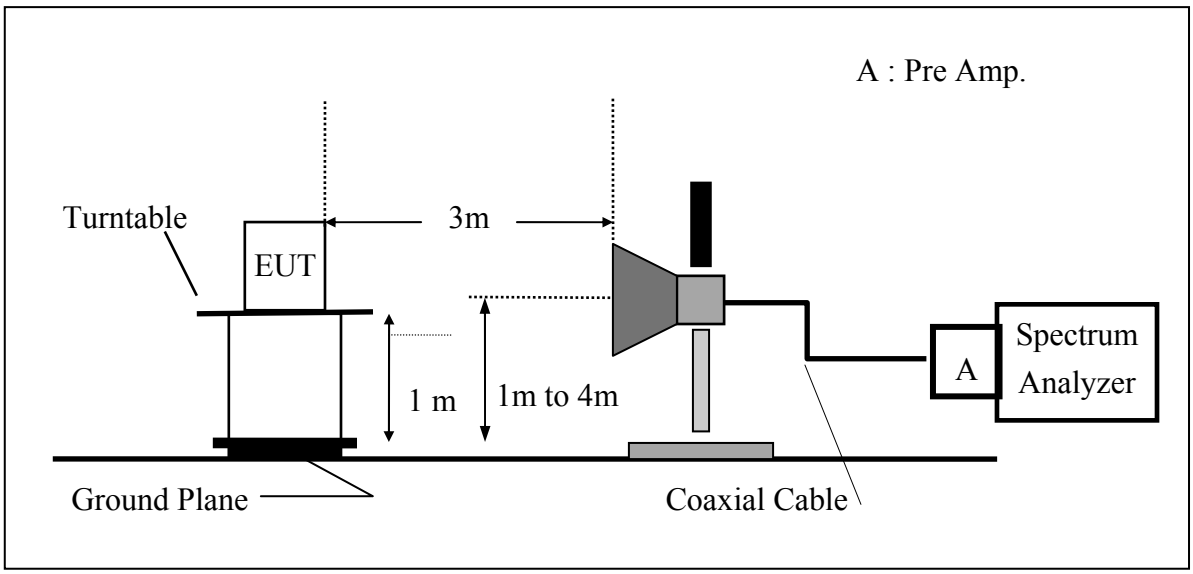
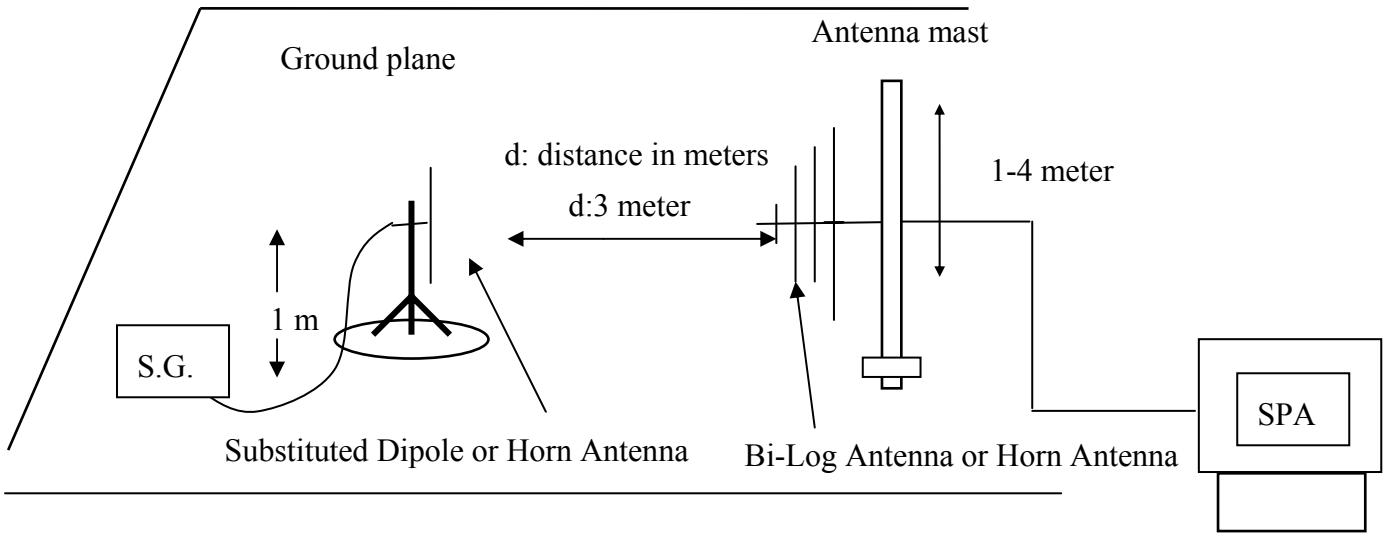
(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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7.3 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)

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7.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2004	08/26/2005
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2005	06/02/2006
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	08/16/2004	08/15/2005
Pre-Amplifier	HP	8447D	2944A09469	07/19/2004	07/18/2005
Pre-Amplifier	HP	8494B	3008A00578	02/26/2005	02/25/2006
Signal Generator	R&S	SMR40	100210	02/09/2005	02/10/2006
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	10/09/2004	10/08/2005
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2004	10/08/2005
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-0.5M	0.5m	10/09/2004	10/08/2005
Site NSA	SGS	966 chamber	N/A	11/17/2004	11/16/2005
Site NSA	SGS	10m Open-Site	N/A	10/02/2004	10/01/2005
Attenuator	Mini-Circult	BW-S10W5	N/A	10/07/2004	10/06/2005
Temperature Chamber	TERCHY	MHG-120LF	911009	10/14/2004	10/13/2005
Dipole Antenna	Schwarzbeck	VHAP	908/909	06/10/2005	06/11/2006
Dipole Antenna	Schwarzbeck	UHAP	891/892	06/10/2005	06/11/2006
Horn antenna	Schwarzbeck	BBHA 9120D	N/A	08/16/2004	08/15/2005

7.5 Measurement Result

Refer to attach tabular data sheets.

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode : TX CH Low
Fundamental Frequency : 824.20 MHz
Temperature : 25℃
Humidity : 65%

Test Date: May 16, 2005
Test By: Willis
Pol: Ver / Hor

Freq.	SPA. Reading	Ant.Pol.	S.G Output	Antenna Gain	Cable Loss	ERP/ EIRP	Limit	Safe Margin
(MHz)	(dBuV)	H/V	(dBm)	(dB/dBi)	(dB)	(dBm)	(dBm)	(dBm)
824.00	73.31	V	-14.02	-7.87	3.64	-25.54	-13.00	-12.54
1652.50	78.50	V	-28.54	9.30	5.06	-24.30	-13.00	-11.30
2477.50	64.80	V	-39.24	10.07	6.30	-35.47	-13.00	-22.47
3302.50	47.97	V	-54.61	12.18	7.26	-49.69	-13.00	-36.69
4121.35	---	V	---	---	---	---	-13.00	---
5769.89	---	V	---	---	---	---	-13.00	---
6594.16	---	V	---	---	---	---	-13.00	---
7418.43	---	V	---	---	---	---	-13.00	---
8242.70	---	V	---	---	---	---	-13.00	---
824.00	81.51	H	-6.15	-7.87	3.64	-17.67	-13.00	-4.67
1652.50	73.31	H	-33.70	9.30	5.06	-29.46	-13.00	-16.46
2477.50	62.17	H	-41.86	10.07	6.30	-38.09	-13.00	-25.09
3302.50	48.59	H	-53.77	12.18	7.26	-48.85	-13.00	-35.85
4121.35	---	H	---	---	---	---	-13.00	---
5769.89	---	H	---	---	---	---	-13.00	---
6594.16	---	H	---	---	---	---	-13.00	---
7418.43	---	H	---	---	---	---	-13.00	---
8242.70	---	H	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode : TX CH Mid
Fundamental Frequency : 836.60 MHz
Temperature : 25℃
Humidity : 65%

Test Date: May 16, 2005
Test By: Willis
Pol: Ver / Hor

Freq.	SPA. Reading	Ant.Pol.	S.G Output	Antenna Gain	Cable Loss	ERP/ EIRP	Limit	Safe Margin
(MHz)	(dBuV)	H/V	(dBm)	(dB/dBi)	(dB)	(dBm)	(dBm)	(dBm)
1667.50	78.28	V	-28.75	9.35	5.09	-24.50	-13.00	-11.50
2515.00	64.58	V	-39.28	10.10	6.35	-35.54	-13.00	-22.54
3340.00	47.43	V	-55.13	12.26	7.29	-50.16	-13.00	-37.16
4182.60	---	V	---	---	---	---	-13.00	---
5019.12	---	V	---	---	---	---	-13.00	---
5855.64	---	V	---	---	---	---	-13.00	---
6692.16	---	V	---	---	---	---	-13.00	---
7528.68	---	V	---	---	---	---	-13.00	---
8365.20	---	V	---	---	---	---	-13.00	---
1667.50	71.12	H	-35.88	9.35	5.09	-31.62	-13.00	-18.62
2515.00	62.38	H	-41.48	10.10	6.35	-37.73	-13.00	-24.73
3340.00	45.89	H	-56.44	12.26	7.29	-51.47	-13.00	-38.47
4182.60	---	H	---	---	---	---	-13.00	---
5019.12	---	H	---	---	---	---	-13.00	---
5855.64	---	H	---	---	---	---	-13.00	---
6692.16	---	H	---	---	---	---	-13.00	---
7528.68	---	H	---	---	---	---	-13.00	---
8365.20	---	H	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode : TX CH High
Fundamental Frequency : 848.80 MHz
Temperature : 25℃
Humidity : 65%

Test Date: May 16, 2005
Test By: Willis
Pol: Ver / Hor

Freq.	SPA. Reading	Ant.Pol.	S.G Output	Antenna Gain	Cable Loss	ERP/ EIRP	Limit	Safe Margin
(MHz)	(dBuV)	H/V	(dBm)	(dB/dBi)	(dB)	(dBm)	(dBm)	(dBm)
849.02	74.91	V	-11.82	-7.88	3.75	-23.45	-13.00	-10.45
1705.00	75.70	V	-31.32	9.46	5.15	-27.01	-13.00	-14.01
2552.50	64.68	V	-39.09	10.21	6.41	-35.29	-13.00	-22.29
3640.00	42.11	V	-59.75	12.61	7.63	-54.77	-13.00	-41.77
4244.35	---	V	---	---	---	---	-13.00	---
5093.22	---	V	---	---	---	---	-13.00	---
5942.09	---	V	---	---	---	---	-13.00	---
6790.96	---	V	---	---	---	---	-13.00	---
7639.83	---	V	---	---	---	---	-13.00	---
8488.70	---	V	---	---	---	---	-13.00	---
849.02	84.14	H	-2.88	-7.88	3.75	-14.50	-13.00	-1.50
1705.00	68.37	H	-38.61	9.46	5.15	-34.30	-13.00	-21.30
2552.50	60.04	H	-43.72	10.21	6.41	-39.92	-13.00	-26.92
3395.48	---	H	---	---	---	---	-13.00	---
4244.35	---	H	---	---	---	---	-13.00	---
5093.22	---	H	---	---	---	---	-13.00	---
5942.09	---	H	---	---	---	---	-13.00	---
6790.96	---	H	---	---	---	---	-13.00	---
7639.83	---	H	---	---	---	---	-13.00	---
8488.70	---	H	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode : TX CH Low
Fundamental Frequency : 1850.20MHz
Temperature : 25℃
Humidity : 65%

Test Date : May. 20, 2005
Test By: : Willis
Pol: : Ver

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Output (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
1850.00	74.42	V	-32.54	9.90	5.41	-28.05	-13.00	-15.05
3691.00	48.47	V	-53.15	12.61	7.71	-48.26	-13.00	-35.26
5536.00	48.18	V	-47.07	13.20	9.68	-43.54	-13.00	-30.54
7408.00	48.74	V	-37.23	11.49	11.28	-37.02	-13.00	-24.02
9251.00	---	V	---	---	---	---	-13.00	---
11101.20	---	V	---	---	---	---	-13.00	---
12951.40	---	V	---	---	---	---	-13.00	---
14801.60	---	V	---	---	---	---	-13.00	---
16651.80	---	V	---	---	---	---	-13.00	---
18502.00	---	V	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode : TX CH Low
Fundamental Frequency : 1850.20MHz
Temperature : 25℃
Humidity : 65%

Test Date : May. 20, 2005
Test By : Willis
Pol : Hor

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Output (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
1850.00	82.77	H	-24.12	9.90	5.41	-19.63	-13.00	-6.63
3691.00	47.96	H	-53.44	12.61	7.71	-48.54	-13.00	-35.54
5563.00	43.56	H	-51.53	13.24	9.69	-47.98	-13.00	-34.98
7408.00	47.45	H	-38.59	11.49	11.28	-38.37	-13.00	-25.37
9251.00	---	H	---	---	---	---	-13.00	---
11101.20	---	H	---	---	---	---	-13.00	---
12951.40	---	H	---	---	---	---	-13.00	---
14801.60	---	H	---	---	---	---	-13.00	---
16651.80	---	H	---	---	---	---	-13.00	---
18502.00	---	H	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result : PCS 1900 Mode

Operation Mode : TX CH Mid
Fundamental Frequency : 1880MHz
Temperature : 25℃
Humidity : 65%

Test Date : May. 20, 2005
Test By : Willis
Pol : Ver

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Output (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
3763.00	47.61	V	-53.68	12.60	7.83	-48.90	-13.00	-35.90
5653.00	45.52	V	-49.40	13.38	9.74	-45.76	-13.00	-32.76
7516.00	51.69	V	-33.94	11.45	11.33	-33.82	-13.00	-20.82
9400.00	---	V	---	---	---	---	-13.00	---
11280.00	---	V	---	---	---	---	-13.00	---
13160.00	---	V	---	---	---	---	-13.00	---
15040.00	---	V	---	---	---	---	-13.00	---
16920.00	---	V	---	---	---	---	-13.00	---
18800.00	---	V	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result : PCS 1900 Mode

Operation Mode : TX CH Mid
Fundamental Frequency : 1880MHz
Temperature : 25℃
Humidity : 65%

Test Date : May. 20, 2005
Test By : Willis
Pol : Hor

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Output (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
3763.00	47.15	H	-53.95	12.60	7.83	-49.17	-13.00	-36.17
5653.00	45.77	H	-49.09	13.38	9.74	-45.44	-13.00	-32.44
7516.00	49.84	H	-35.87	11.45	11.33	-35.74	-13.00	-22.74
9400.00	---	H	---	---	---	---	-13.00	---
11280.00	---	H	---	---	---	---	-13.00	---
13160.00	---	H	---	---	---	---	-13.00	---
15040.00	---	H	---	---	---	---	-13.00	---
16920.00	---	H	---	---	---	---	-13.00	---
18800.00	---	H	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result : PCS 1900 Mode

Operation Mode : TX CH High
Fundamental Frequency : 1909.8 MHz
Temperature : 25℃
Humidity : 65%

Test Date : May. 20, 2005
Test By : Willis
Pol : Ver

Freq.	SPA. Reading	Ant.Pol.	S.G Output	Antenna Gain	Cable Loss	ERP/ EIRP	Limit	Safe Margin
(MHz)	(dBuV)	H/V	(dBm)	(dB/dBi)	(dB)	(dBm)	(dBm)	(dBm)
1910.04	74.74	V	-32.20	10.08	5.51	-27.63	-13.00	-14.63
3826.00	42.47	V	-58.53	12.60	7.93	-53.85	-13.00	-40.85
5743.00	43.86	V	-50.80	13.51	9.79	-47.08	-13.00	-34.08
7633.00	47.96	V	-37.23	11.41	11.47	-37.30	-13.00	-24.30
9549.00	---	V	---	---	---	---	-13.00	---
11458.80	---	V	---	---	---	---	-13.00	---
13368.60	---	V	---	---	---	---	-13.00	---
15278.40	---	V	---	---	---	---	-13.00	---
17188.20	---	V	---	---	---	---	-13.00	---
19098.00	---	V	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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Radiated Spurious Emission Measurement Result: PCS 1900 Mode

Operation Mode : TX CH High
Fundamental Frequency : 1909.8 MHz
Temperature : 25℃
Humidity : 65%

Test Date : May. 20, 2005
Test By : Willis
Pol : Hor

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Output (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
1910.00	76.21	H	-30.64	10.08	5.51	-26.08	-13.00	-13.08
3826.00	47.50	H	-53.33	12.60	7.93	-48.65	-13.00	-35.65
5968.00	41.19	H	-52.83	13.85	9.91	-48.89	-13.00	-35.89
7633.00	45.19	H	-40.12	11.41	11.47	-40.19	-13.00	-27.19
9549.00	---	H	---	---	---	---	-13.00	---
11458.80	---	H	---	---	---	---	-13.00	---
13368.60	---	H	---	---	---	---	-13.00	---
15278.40	---	H	---	---	---	---	-13.00	---
17188.20	---	H	---	---	---	---	-13.00	---
19098.00	---	H	---	---	---	---	-13.00	---

Remark：

1 The emission behaviour 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 (dBd/dBi) – Cable loss (dB)

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8. RF EXPOSURE

8.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

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MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	29.98	(dBm)
Maximum peak output power at antenna input terminal:	995.4054	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	1880	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.314015	(mW/cm^2)
Measurement Result:		
The predicted power density level at 20 cm is	0.314015	(mW/cm^2)
This is below the uncontrolled exposure limit of 1 mW/cm	1880	MHz

8.2 Measurement Result

No MPE test is required for the 1900MHz band, because devices with an ERP less than 3W are categorically excluded from RF exposure evaluation. The predicted power density level at 20 cm is 0.314015 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 1880.00MHz.

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