

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 24 SUBPART E REQUIREMENT

OF

Product Name: Track Star

Model Name: G19B

FCC ID: RUU-G19041000

GSM Modular ID: QIPMC45

Report No.: ER/2004/90007

Issue Date: Sep. 23, 2004

FCC Rule Part: 2 & 24E

Prepared for SAN JOSE NAVIGATION, INC.
9F, No. 105, Shi-Cheng Rd., Pan-Chiao
City, Taipei Hsien, Taiwan, R.O.C.

Prepared by SGS Taiwan Ltd.
No. 134, Wu Kung Rd., Wuku Industrial
Zone, Taipei County, Taiwan.

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VERIFICATION OF COMPLIANCE

Applicant: SAN JOSE NAVIGATION, INC.
9F, No. 105, Shi-Cheng Rd., Pan-Chiao City, Taipei Hsien, Taiwan, R.O.C.

Equipment Under Test: Track Star

FCC ID Number: RUU-G19041000

GSM Modular ID: QIPMC45

Model Number: G19B

Model Difference: N/A

File Number: ER/2004/90007

Date of test: Sep, 10 ~ Sep, 21, 2004

Date of EUT Received: Sep, 10, 2004

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 24 subpart E.

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

Test By:

Willis Chen

Date

Sep. 23, 2004

Willis Chen

Approved By

Vincent Su

Date

Sep. 23, 2004

Vincent Su

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Version

Version No.	Date
00	Sep. 23, 2004
01	Nov. 15, 2004

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1. GENERAL INFORMATION

1.1 Product Description

Product	Track Star	
Model Number:	G19B	
Model Difference:	N/A	
Model Difference:	N/A	
SGM Modular	QIPMC45	
Frequency Range and Power	TX: 1850 MHz – 1910 MHz, RX: 1930 MHz – 1990 MHz	1W
Cellular Phone Standards	PCS 1900MHz	
Type of Emission	300KGXW	
Power Supply	12Vdc Car Battery	

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **RUU-G19041000** filing to comply with Section 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 (2001) 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: 2001 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 C63.4-2001. 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 C63.4-2001.

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2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

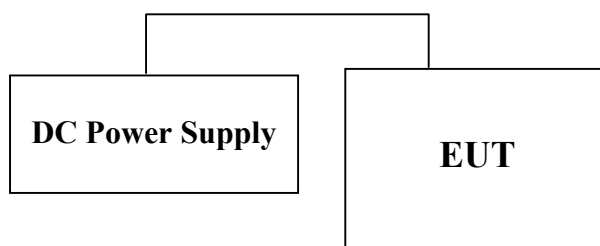


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	DC Power Supply	Topward	3303A	N/A	715844	N/A	Unshielded, 1.8m

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046	RF Power Output	Compliant
§2.1046 §24.232(a)	EIRP measurement	Compliant
§2.1053 §24.238(a)	Field Strength of Spurious Radiation	Compliant
§15.107;§15.207	AC Power Line Conducted Emission	N/A
§1.1310 & §2.1093	RF Exposure	Compliant

4. DESCRIPTION OF TEST MODES

The EUT (GSM Mobile Phone) has been tested under operating condition.

EUT staying in continuous transmitting mode. Channel low, Mid and High for 1900MHz band with rated data rate are chosen for conducted output power, ERP, field strength of spurious radiation emission testing.

The ERP and field strength of spurious radiation emission were 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 E2 mode for channel Low, Mid and High at GSM mode was reported.

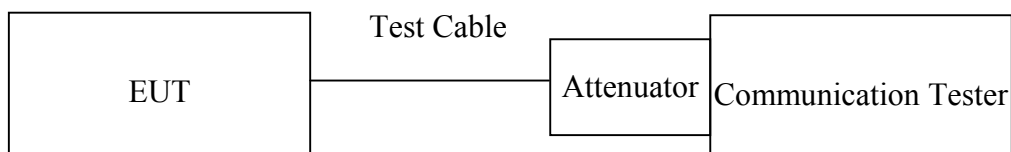
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5. RF POWER OUTPUT MEASUREMENT

5.1 Standard Applicable

According to FCC §2.1046.

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.
Communication Tester	R&S	CMU200	102189	11/28/2003	11/27/2004
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	10/07/2004	10/06/2005
Power Meter	Anritsu	ML2487A	6K00002070	8/20/2004	8/19/2005

5.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	CMU200 Reading	Attenuator (dB)	Power (dBm)
PCS 1900	1850.20	512	19.23	10	29.23
	1880.00	661	19.11	10	29.11
	1909.80	810	19.07	10	29.07

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6. EIRP MEASUREMENT

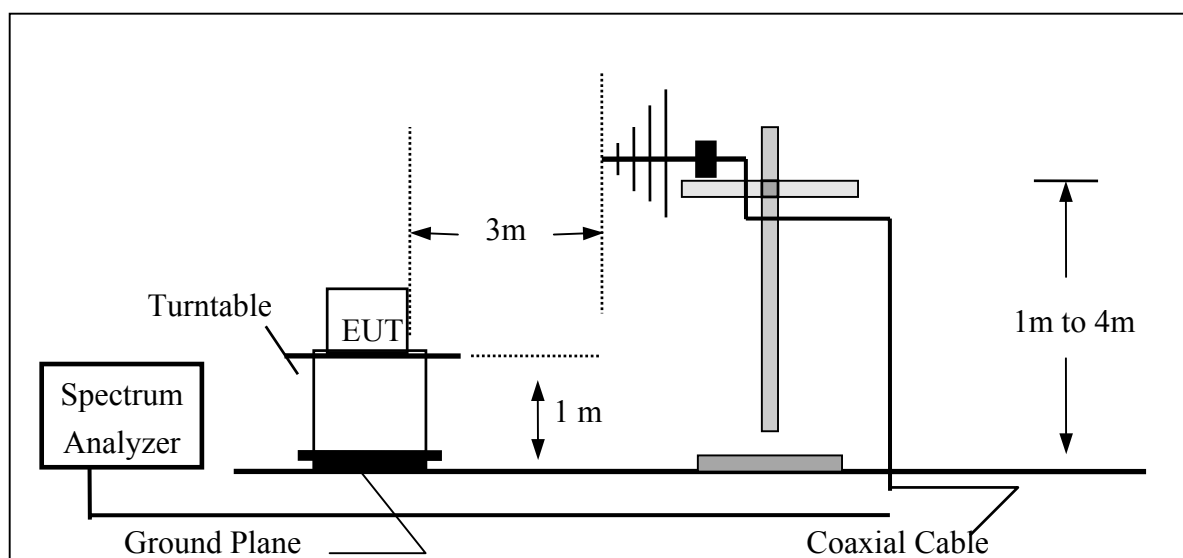
6.1 Standard Applicable

According to FCC §2.1046

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

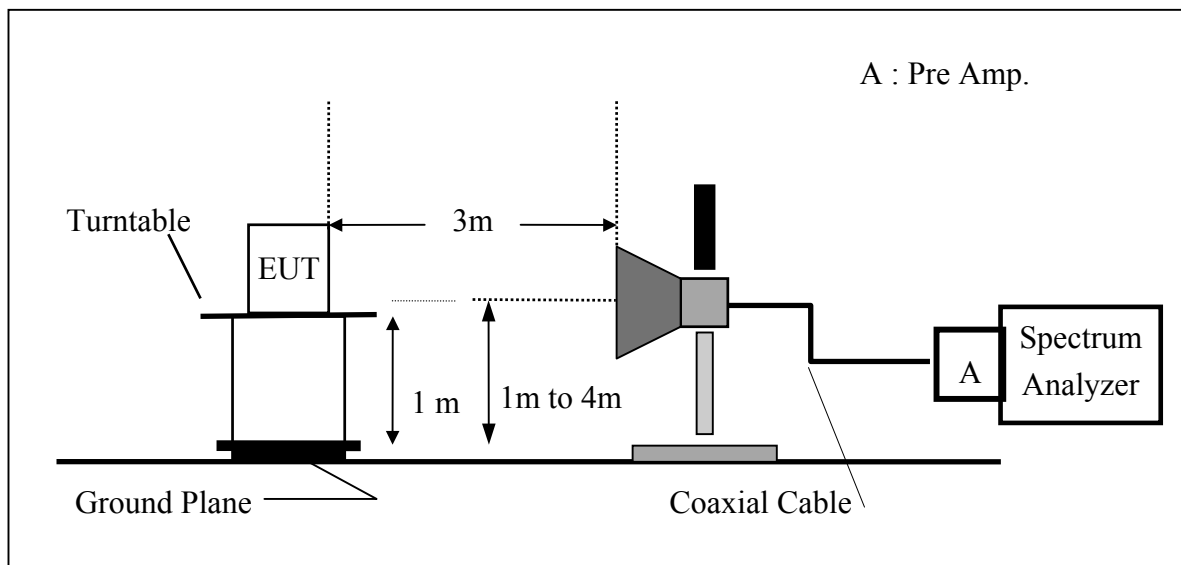
6.2 Test SET-UP (Block Diagram of Configuration)

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

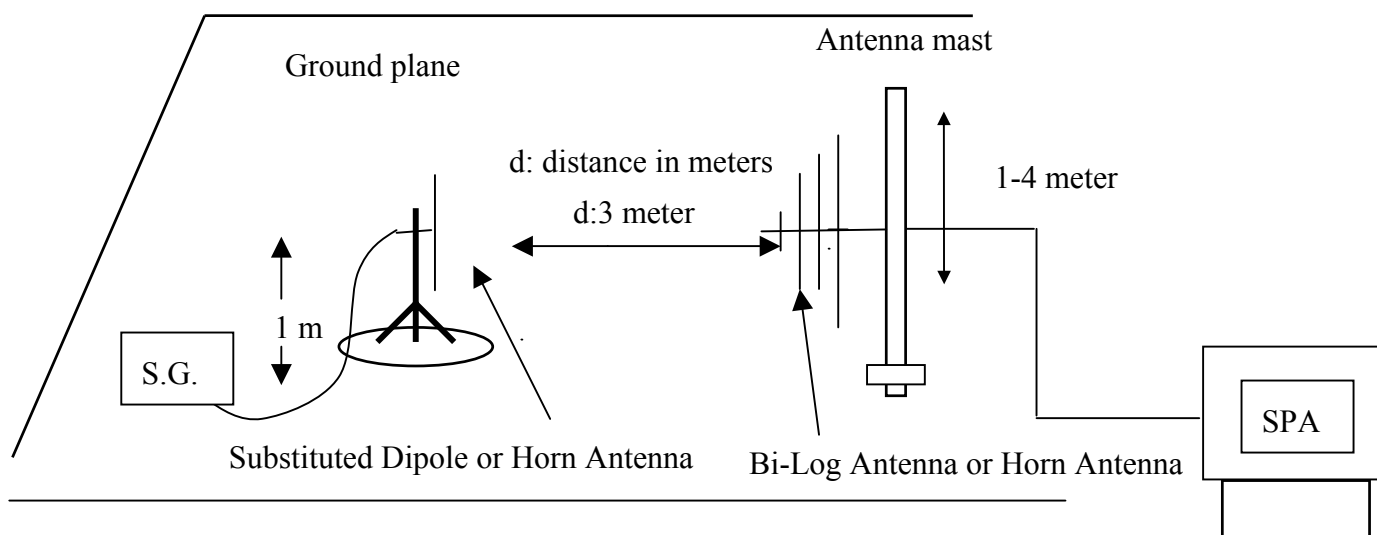


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(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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6.3 Measurement Procedure

The EUT was placed on a 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 of the EUT, the resolution bandwidth was set to 1MHz and the average bandwidth was set to 1MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

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

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

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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	05/27/2004	05/26/2005
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2004	08/26/2005
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2004	06/02/2005
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	02/26/2004	02/25/2005
Signal Generator	R&S	SMR40	100210	02/09/2004	02/10/2005
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	11/17/2003	11/16/2004
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	06/10/2004	06/11/2005
Dipole Antenna	Schwarzbeck	UHAP	891/892	06/10/2004	06/11/2005
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 (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
PCS 1900	1850.20	512	V	119.25	12.29	9.90	5.84	16.35	33.00
			H	132.92	26.03	9.90	5.84	30.09	33.00
	1880.00	661	V	117.66	10.71	9.96	5.87	14.80	33.00
			H	131.62	24.75	9.96	5.87	28.84	33.00
	1909.80	810	V	117.57	10.63	10.08	5.93	14.78	33.00
			H	130.94	24.09	10.08	5.93	28.24	33.00

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7. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

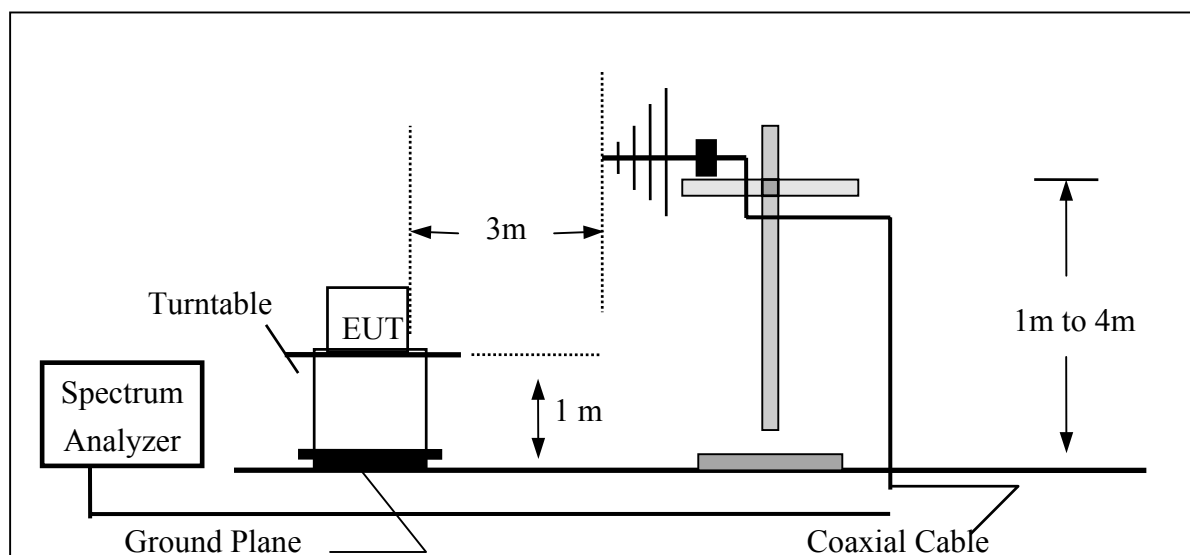
7.1 Standard Applicable

According to FCC §2.1053,

FCC §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)

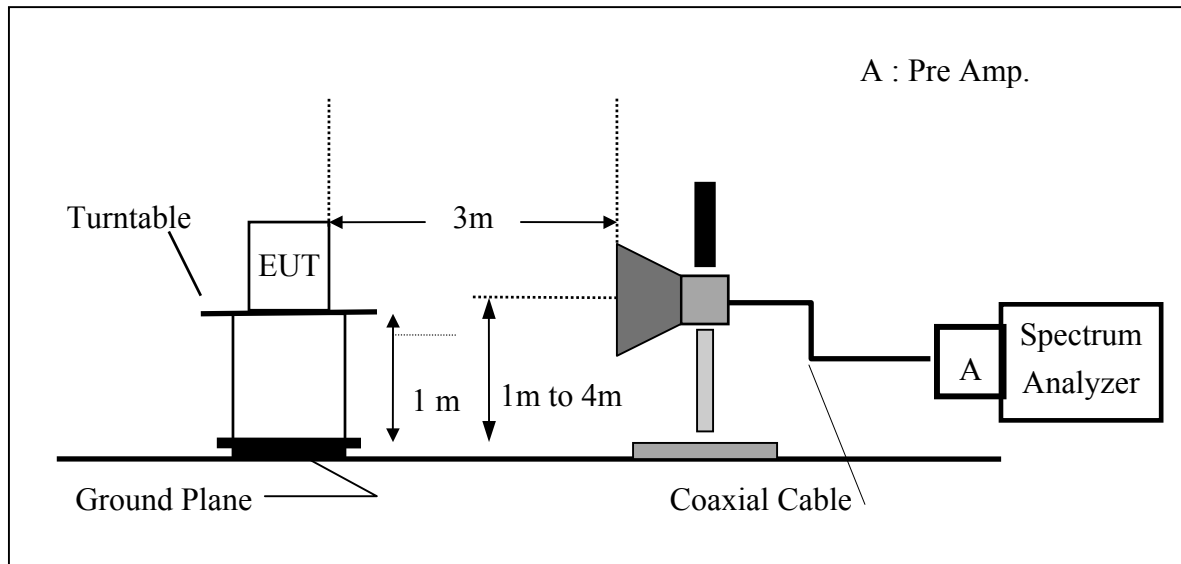
7.2 EUT Setup (Block Diagram of Configuration)

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

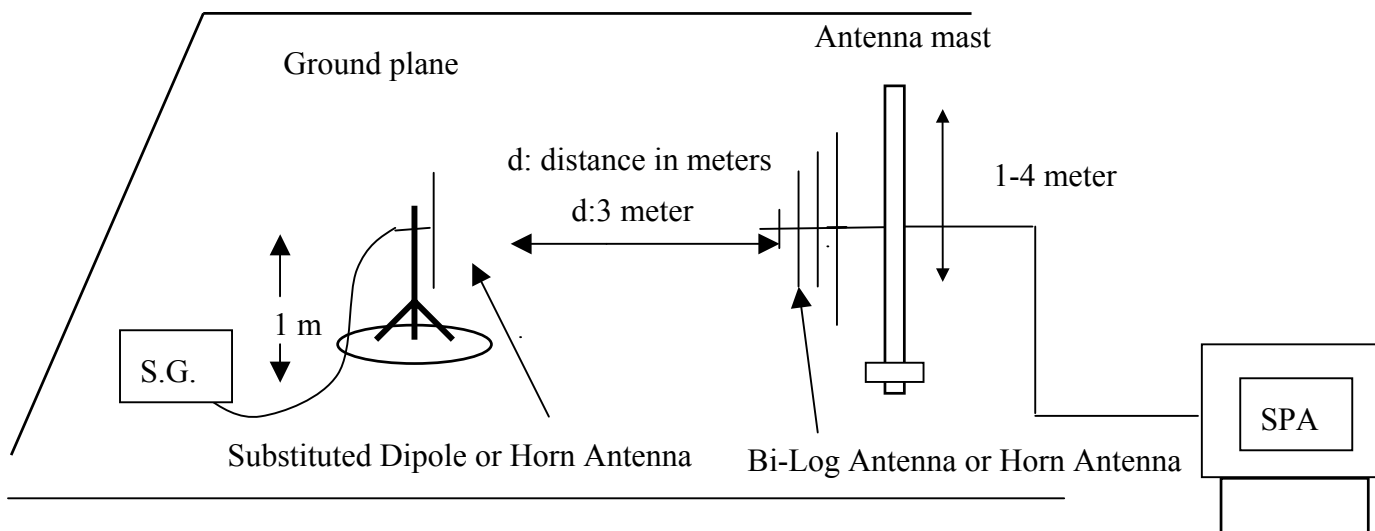


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(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(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.

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$$

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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	05/27/2004	05/26/2005
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2004	08/26/2005
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2004	06/02/2005
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	02/26/2004	02/25/2005
Signal Generator	R&S	SMR40	100210	02/09/2004	02/10/2005
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	11/17/2003	11/16/2004
Site NSA	SGS	10m Open-Site	N/A	10/02/2004	10/01/2005
Attenuator	Mini-Circuit	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	06/10/2004	06/11/2005
Dipole Antenna	Schwarzbeck	UHAP	891/892	06/10/2004	06/11/2005
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

Operation Mode : TX CH Low E2 Mode
Fundamental Frequency : 1850.20MHz
Temperature : 25°C
Humidity : 65%

Test Date : Sep. 20, 2004
Test By : Willis
Pol : Ver

Freq. (MHz)	Ant. Pol.	EUT Pol.	SPA Reading (dBuV)	S.G Output (dBm)	Antenna (dBi)	Cable (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3704.00	V	E2	53.76	-47.80	12.61	7.73	-42.92	-13.00	-29.92
5543.50	V	E2	46.18	-49.03	13.23	9.68	-45.48	-13.00	-32.48
3704.00	V	E2	53.76	-47.80	12.61	7.73	-42.92	-13.00	-29.92
5543.50	V	E2	46.18	-49.03	13.23	9.68	-45.48	-13.00	-32.48
3704.00	V	E2	53.76	-47.80	12.61	7.73	-42.92	-13.00	-29.92
5543.50	V	E2	46.18	-49.03	13.23	9.68	-45.48	-13.00	-32.48
3704.00	V	E2	53.76	-47.80	12.61	7.73	-42.92	-13.00	-29.92
5543.50	V	E2	46.18	-49.03	13.23	9.68	-45.48	-13.00	-32.48
5553.75	V	E2	--	--	--	--	--	-13.00	
7405.00	V	E2	--	--	--	--	--	-13.00	
9256.25	V	E2	--	--	--	--	--	-13.00	
11107.50	V	E2	--	--	--	--	--	-13.00	
12958.75	V	E2	--	--	--	--	--	-13.00	
14810.00	V	E2	--	--	--	--	--	-13.00	
16661.25	V	E2	--	--	--	--	--	-13.00	
18512.50	V	E2	--	--	--	--	--	-13.00	

Remark :

- (1) Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Spectrum Setting :
30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
- (4) H Mode means the EUT in stand-up position; E1, E2Mode means the EUT in lie-on position

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Radiated Spurious Emission Measurement Result

Operation Mode : TX CH Low E2 Mode
 Fundamental Frequency : 1850.20MHz
 Temperature : 25°C
 Humidity : 65%

Test Date : Sep. 20, 2004
 Test By : Willis
 Pol : Hor

Freq. (MHz)	Ant. Pol.	EUT Pol.	SPA Reading (dBuV)	S.G Output (dBm)	Antenna (dBi)	Cable (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3697.50	H	E2	55.40	-46.19	12.61	7.72	-41.30	-13.00	-28.30
5550.00	H	E2	48.30	-46.91	13.23	9.68	-43.36	-13.00	-30.36
5553.75	H	E2	--	--	--	--	--	-13.00	
7405.00	H	E2	--	--	--	--	--	-13.00	
9256.25	H	E2	--	--	--	--	--	-13.00	
11107.50	H	E2	--	--	--	--	--	-13.00	
12958.75	H	E2	--	--	--	--	--	-13.00	
14810.00	H	E2	--	--	--	--	--	-13.00	
16661.25	H	E2	--	--	--	--	--	-13.00	
18512.50	H	E2	--	--	--	--	--	-13.00	

Remark :

- (1) Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Spectrum Setting :
 30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
- (4) H Mode means the EUT in stand-up position; E1, E2Mode means the EUT in lie-on position

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Radiated Spurious Emission Measurement Result

Operation Mode : TX CH Mid E2 Mode
 Fundamental Frequency : 1880MHz
 Temperature : 25°C
 Humidity : 65%

Test Date : Sep. 20, 2004
 Test By : Willis
 Pol : Ver

Freq. (MHz)	Ant. Pol.	EUT Pol.	SPA Reading (dBuV)	S.G Output (dBm)	Antenna (dBi)	Cable (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3762.50	V	E2	51.47	-49.82	12.60	7.83	-45.05	-13.00	-32.05
5640.00	V	E2	45.37	-49.58	13.36	9.73	-45.95	-13.00	-32.95
7520.00	V	E2	--	--	--	--	--	-13.00	
9400.00	V	E2	--	--	--	--	--	-13.00	
11280.00	V	E2	--	--	--	--	--	-13.00	
13160.00	V	E2	--	--	--	--	--	-13.00	
15040.00	V	E2	--	--	--	--	--	-13.00	
16920.00	V	E2	--	--	--	--	--	-13.00	
18800.00	V	E2	--	--	--	--	--	-13.00	

Remark :

- (1) Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Spectrum Setting :
 30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
- (4) H Mode means the EUT in stand-up position; E1, E2Mode means the EUT in lie-on position

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Radiated Spurious Emission Measurement Result

Operation Mode : TX CH Mid E2 Mode
 Fundamental Frequency : 1880MHz
 Temperature : 25°C
 Humidity : 65%

Test Date : Sep. 20, 2004
 Test By : Willis
 Pol : Hor

Freq. (MHz)	Ant. Pol.	EUT Pol.	SPA Reading (dBuV)	S.G Output (dBm)	Antenna (dBi)	Cable (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3762.50	H	E2	55.12	-46.17	12.60	7.83	-41.40	-13.00	-28.40
5640.00	H	E2	49.06	-45.89	13.36	9.73	-42.26	-13.00	-29.26
5640.00	H	E2	--	--	--	--	--	-13.00	
7520.00	H	E2	--	--	--	--	--	-13.00	
9400.00	H	E2	--	--	--	--	--	-13.00	
11280.00	H	E2	--	--	--	--	--	-13.00	
13160.00	H	E2	--	--	--	--	--	-13.00	
15040.00	H	E2	--	--	--	--	--	-13.00	
16920.00	H	E2	--	--	--	--	--	-13.00	
18800.00	H	E2	--	--	--	--	--	-13.00	

Remark :

- (1) Measuring frequencies from 0 MHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Spectrum Setting :
 30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
- (4) H Mode means the EUT in stand-up position; E1, E2Mode means the EUT in lie-on position

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Radiated Spurious Emission Measurement Result

Operation Mode : TX CH High E2 Mode
Fundamental Frequency : 1909.8 MHz
Temperature : 25°C
Humidity : 65%

Test Date : Sep. 20, 2004
Test By : Willis
Pol : Ver

Freq. (MHz)	Ant. Pol.	EUT Pol.	SPA Reading (dBuV)	S.G Output (dBm)	Antenna (dBi)	Cable (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3821.00	V	E2	52.01	-49.01	12.60	7.92	-44.33	-13.00	-31.33
5732.00	V	E2	46.48	-48.22	13.50	9.78	-44.50	-13.00	-31.50
7639.20	V	E2	--	--	--	--	--	-13.00	
9549.00	V	E2	--	--	--	--	--	-13.00	
11458.80	V	E2	--	--	--	--	--	-13.00	
13368.60	V	E2	--	--	--	--	--	-13.00	
15278.40	V	E2	--	--	--	--	--	-13.00	
17188.20	V	E2	--	--	--	--	--	-13.00	
19098.00	V	E2	--	--	--	--	--	-13.00	

Remark :

- (1) Measuring frequencies from 30 MHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Spectrum Setting :
30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
- (4) H Mode means the EUT in stand-up position; E1, E2Mode means the EUT in lie-on position

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Radiated Spurious Emission Measurement Result

Operation Mode : TX CH High E2 Mode
 Fundamental Frequency : 1909.8 MHz
 Temperature : 25°C
 Humidity : 65%

Test Date : Sep. 20, 2004
 Test By : Willis
 Pol : Hor

Freq. (MHz)	Ant. Pol.	EUT Pol.	SPA Reading (dBuV)	S.G Output (dBm)	Antenna (dBi)	Cable (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
3821.00	V	E2	55.86	-45.16	12.60	7.92	-40.48	-13.00	-27.48
5729.40	H	E2	49.27	-45.43	13.50	9.78	-41.71	-13.00	-28.71
7639.20	H	E2	--	--	--	--	--	-13.00	
9549.00	H	E2	--	--	--	--	--	-13.00	
11458.80	H	E2	--	--	--	--	--	-13.00	
13368.60	H	E2	--	--	--	--	--	-13.00	
15278.40	H	E2	--	--	--	--	--	-13.00	
17188.20	H	E2	--	--	--	--	--	-13.00	
19098.00	H	E2	--	--	--	--	--	-13.00	

Remark :

- (1) Measuring frequencies from 0 MHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Spectrum Setting :
 30MHz- 1GHz, RBW= 100KHz, VBW= 100kHz, Sweep time= 200 ms.
 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
- (4) H Mode means the EUT in stand-up position; E1, E2Mode means the EUT in lie-on position

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8. AC POWER LINE CONDUCTED EMISSION TEST

8.1 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.		

8.2 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 adaptor 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.

8.3 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.

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8.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMC Analyzer	HP	8594EM	3624A00203	12/31/2003	12/30/2004
EMI Test Receiver	R&S	ESCS30	828985/004	1/15/2004	1/14/2005
LISN	Rolf-Heine	NNB-2/16Z	99012	12/30/2003	12/29/2004
LISN	Rolf-Heine	NNB-2/16Z	99013	11/06/2003	11/05/2004

8.5 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.

N/A, the EUT was powered from car battery

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9. RF EXPOSURE

9.1 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:	29.23	(dBm)
Maximum peak output power at antenna input terminal:	837.5293	(mW)
Antenna gain (typical):	3	(dBi)
Maximum antenna gain:	1.995262	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	1850.2	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.332622	(mW/cm ²)
Measurement Result:		
The predicted power density level at 20 cm is	0.332622	(mW/cm ²)
This is below the uncontrolled exposure limit of 1 mW/cm	1850.2	MHz

9.2 Measurement Result

The predicted power density level at 20 cm is 0.332622 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 1850.2MHz.

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