



FCC CFR47 CERTIFICATION

PART 24E

TEST REPORT

FOR

LG ELECTRONICS, INC.

DESCRIPTION: 1900MHZ GSM MOBILE

MODEL: W3000S

FCC ID: BEJW3000S

REPORT NUMBER: 03U1911-1

ISSUE DATE: APRIL 7, 2003

Prepared for

LG ELECTRONICS, INC.

EMERALD BD 1042 HOGYE-DONG DONGAN-GU

ANYANG, KYUNGGI-DO 431-080

KOREA

Prepared by

COMPLIANCE CERTIFICATION SERVICES

561F MONTEREY ROAD, ROUTE 2

MORGAN HILL, CA 95037, USA

TEL: (408) 463-0885

FAX: (408) 463-0888

TABLE OF CONTENT

1. TEST RESULT CERTIFICATION	3
2. EUT DESCRIPTION	4
3. FACILITIES, LABORATORY AND ACCREDITATION	4
3.1. FACILITIES	4
3.2. LABORATORY ACCREDITATION	4
3.3. LIST OF ACCREDITATIONS	5
4. CALIBRATION, METHODOLOGY AND UNCERTAINTY	6
4.1. EQUIPMENT CALIBRATION	6
4.2. TEST METHODOLOGY	6
4.3. MEASUREMENT UNCERTAINTY	6
4.4. TEST AND MEASUREMENT EQUIPMENT	7
5. APPLICABLE RULES	8
5.1. RF POWER OUTPUT §2.1046.....	8
5.2. MODULATION CHARACTERISTICS §2.1047.....	8
5.3. OCCUPIED BANDWIDTH §2.1049.....	8
5.4. SPURIOUS EMISSIONS AT ANTENNA TERMINALS §2.1051	9
5.5. FIELD STRENGTH OF SPURIOUS RADIATION §2.1053	9
5.6. FREQUENCY STABILITY §2.1055.....	9
5.7. FREQUENCY RANGE TO BE INVESTIGATED §2.1057	10
6. TEST SETUP, PROCEDURE AND RESULT	11
6.1. SECTION 2.1046: RF POWER OUTPUT.....	11
6.2. OCCUPIED BANDWIDTH.....	16
6.3. SPURIOUS EMISSION AT ANTENNA TERMINAL.....	20
6.4. FIELD STRENGTH OF SPURIOUS RADIATION	29
6.5. FREQUENCY STABILITY.....	35
6.6. RADIATED EMISSION	38
6.7. POWER LINE CONDUCTED EMISSION.....	42
7. APENDIX.....	47
7.1. EXTERNAL & INTERNAL PHOTOS	47

1. TEST RESULT CERTIFICATION

COMPANY NAME: LG ELECTRONICS, INC.
EMERALD BD 1042 HOGYE-DONG DONGAN-GU.
ANYANG, KYUNGGI-DO 431-080
KOREA

CONTACT PERSON: KEVIN LEE

EUT DESCRIPTION: 1900MHz GSM MOBILE

MODEL NAME: W3000S

DATE TESTED: APRIL 04, 2003

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	LICENSED TX MODULE IN MOBILE APPLICATION
MEASUREMENT PROCEDURE	ANSI 63.4 / 2001, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 24 Subpart E

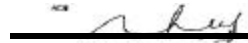
Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 24 Subpart E-Broadband PCS. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

Note : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Tested By:

Released For CCS By:


FRANK IBRAHIM
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES


THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is a single mode portable mobile station of which the frequency range is 1850 – 1910 MHz. The EUT has an output power of 27.64 dBm / 580.76 mW (EIRP) and has an internal antenna with a gain of –1 dBi.

3. FACILITIES, LABORATORY AND ACCREDITATION

3.1. Facilities

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 16.

3.2. Laboratory Accreditation

The laboratory and associated test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2)).

No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

3.3. List of Accreditations

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	 ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	 ELA-171
Taiwan	BSMI	CNS 13438	 SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	 IC2324 A,B,C, and F

*No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

4. CALIBRATION, METHODOLOGY AND UNCERTAINTY

4.1. Equipment Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2. Test Methodology

Conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

4.3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

4.4. Test and Measurement Equipment

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
SA Display Section 4	HP	85662A	2152A03066	6/1/2003
SA RF Section, 22 GHz	HP	85660B	3014A06685	6/1/2003
Quasi-Peak Adaptor	HP	85650A	3145A01654	6/1/2003
Universal Radio Communication Tester	R&S	CMU200	838114/032	11/14/2003
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6739	2/4/2004
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2004
SA RF Section, 22 GHz	HP	85660B	2140A01296	5/23/2003
Quasi-Peak Adaptor	HP	85650A	2811A01335	5/23/2003
SA Display Section 1	HP	85662A	3026A19146	5/23/2003
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/26/2003
Signal Generator	R&S	SMP04	DE34210	5/2/2005
High Pass Filter (4.57GHz)	FSY Microwave	FM-4570-9SS	3	N.C.R
EMI Test Receiver	R & S	ESHS 20	827129/006	4/17/2003
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/2003
Bilog Antenna	AR	LPB-25201A	1185	3/28/2004
EMI Receiver	HP	8542E	3942A00280	11/20/2003
RF Filter Section	HP	8542E	3705A00256	11/20/2003
DC Power Supply	HP	6235	2450A-08312	N.C.R
Multimeter	Fluke	26111	74380619	N.C.R
Environmental Chamber	Thermotron	SE-600-10-10	29800	4/26/2003
Directional Coupler, 0.8~4.2GHz, 40db, 40W	AR	DC7144A	305089	CNR
Spectrum Analyzer 3Hz-44GHz	Aglient	E4446A	US42070220	1/14/2004

5. APPLICABLE RULES

5.1. RF POWER OUTPUT §2.1046

§ 24.232- POWER LIMIT

§24.232(a) Maximum Peak output power for base station transmitters should not exceed 100 Watts EIRP (equivalent isotropically radiated power).

§24.232(b) Mobile stations are limited to 2 Watts EIRP.

5.2. MODULATION CHARACTERISTICS §2.1047

Not applicable.

5.3. OCCUPIED BANDWIDTH §2.1049

§2.1049(i) Transmitters designed for other types of modulation – when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

5.4. SPURIOUS EMISSIONS AT ANTENNA TERMINALS §2.1051

§ 24.238- EMISSION LIMITS

§24.238(a) The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under 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 licensee's frequency block (-13dBm).

5.5. FIELD STRENGTH OF SPURIOUS RADIATION §2.1053

§ 24.238- EMISSION LIMITS

§24.238(a) The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under 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 licensee's frequency block (-13dBm).

5.6. FREQUENCY STABILITY §2.1055

§24.235 The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.7. FREQUENCY RANGE TO BE INVESTIGATED §2.1057

§2.1057(a) In all of the measurements set forth in §2.1051 and §2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the equipment operates at or above 10 GHz and below 30 GHz:
to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.

§2.1057(b) Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

§2.1057(c) The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be reported.

§2.1057(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

Spec limit: Frequency investigation range from 10 MHz to 20 GHz.

6. TEST SETUP, PROCEDURE AND RESULT

6.1. SECTION 2.1046: RF POWER OUTPUT

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	HP	8593EM	6/11/03
Amplifier	MITEQ	NSP2600-44	4/26/03
Horn Antenna	EMCO	3115 SN: 6739	02/04/04
Horn Antenna	EMCO	3115 SN: 6717	02/04/04
Universal Radio Communication Tester	R&S	CMU200	11/14/2003

MEASUREMENT PROCEDURE

- 1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- 2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.
- 3). The output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- 4). The transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- 5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 6). The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- 7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- 8). The maximum signal level detected by the measuring receiver shall be noted.
- 9). The transmitter shall be replaced by a tuned dipole (substitution antenna).

- 10). The substitution antenna shall be oriented for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- 11). The substitution antenna shall be connected to a calibrated signal generator.
- 12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- 13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- 14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- 15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- 16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
- 17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

Test result:

<i>Modulation</i>	<i>Max Output Power(dBm)</i>	<i>Max Output Power(mW)</i>
<i>PCS 1900MHz</i>	<i>27.64 (EIRP)</i>	<i>580.76</i>



GSM 1900MHz Output Power (EIRP)

LOW CHANNEL

4/3/03 FCC Measurement Compliance Certification Services, Morgan Hill Open Field Site								
Test Engr:		Frank Ibrahim						
Project #:		03U1911-1						
Company:		7Layers, Inc.						
EUT Descrip.:		Cell Phone, Bar Type 1900MHz						
EUT M/N:		W3000S						
Test Target:		FCC PART24						
Mode Oper:		TX ON at Low Channel						
Frequency	SA reading	SG reading	CL	Gain	EIRP	Limit	Margin	Notes
(GHz)	(dBuV)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
1.850	107.90	20.30	0.7	7.54	27.14	33.00	-5.86	V, Y orientation
1.850	107.80	20.40	0.7	7.54	27.24	33.00	-5.76	H, Z orientation
RBW=VBW=1MHz EIPR = SG reading - CL + Gain (dBi) Margin = EIPR - Limit SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A00205 CL: cable loss (3ft), FLEXCO SG: Signal Generator, HP 83732B, S/N: US34490599 RX Antenna: TX Antenna: Horn, EMCO 3115, S/N: 6717								

MIDDLE CHANNEL

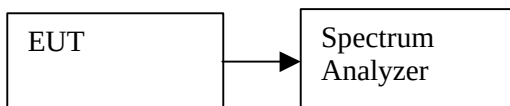
4/3/03 FCC Measurement Compliance Certification Services, Morgan Hill Open Field Site								
Test Engr: Project #: Company: EUT Descrip.: EUT M/N: Test Target: Mode Oper: Frank Ibrahim 03U1911-1 7Layers, Inc. Cell Phone, Bar Type 1900MHz W3000S FCC PART24 TX ON at Mid Channel								
Frequency	SA reading	SG reading	CL	Gain	EIRP	Limit	Margin	Notes
(GHz)	(dBuV)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
1.880	108.10	20.50	0.7	7.54	27.34	33.00	-5.66	V, Y orientation
1.880	108.50	20.80	0.7	7.54	27.64	33.00	-5.36	H, Z orientation
RBW=VBW=1MHz EIPR = SG reading - CL + Gain (dBi) Margin = EIPR - Limit SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A00205 CL: cable loss (3ft), FLEXCO SG: Signal Generator, HP 83732B, S/N: US34490599 RX Antenna: TX Antenna: Horn, EMCO 3115, S/N: 6717								

HIGH CHANNEL

4/3/03 FCC Measurement								
Compliance Certification Services, Morgan Hill Open Field Site								
Test Engr:		Frank Ibrahim						
Project #:		03U1911-1						
Company:		7Layers, Inc.						
EUT Descrip.:		Cell Phone, Bar Type 1900MHz						
EUT M/N:		W3000S						
Test Target:		FCC PART24						
Mode Oper:		TX ON at High Channel						
Frequency	SA reading	SG reading	CL	Gain	EIRP	Limit	Margin	Notes
(GHz)	(dBuV)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
1.910	107.70	20.20	0.7	7.54	27.04	33.00	-5.96	V, Y orientation
1.910	107.80	20.25	0.7	7.54	27.09	33.00	-5.91	H, Z orientation
RBW=VBW=1MHz								
EIPR = SG reading - CL + Gain (dBi)								
Margin = EIPR - Limit								
SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A00205 CL: cable loss (3ft), FLEXCO								
SG: Signal Generator, HP 83732B, S/N: US34490599 RX Antenna:								
TX Antenna: Horn, EMCO 3115, S/N: 6717								

6.2. OCCUPIED BANDWIDTH

TEST SETUP



TEST PROCEDURE

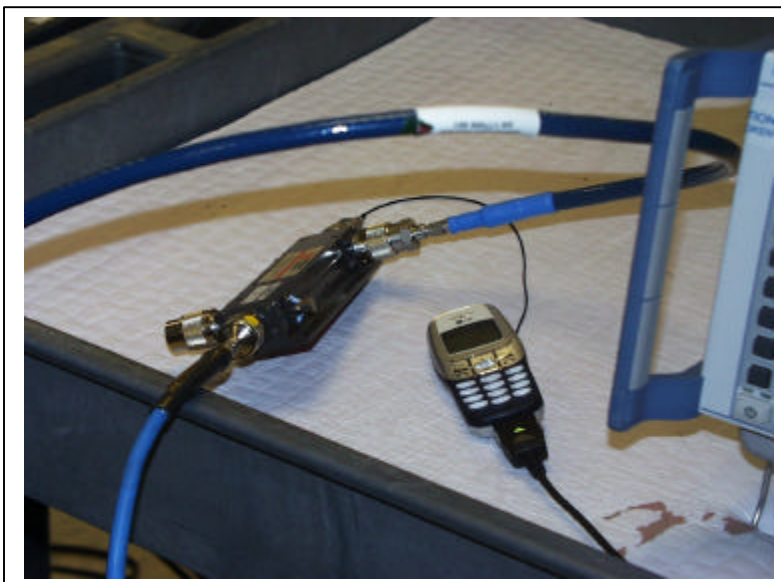
The EUT's output RF connector (made solely for the purpose of the test) was connected with a short cable to the spectrum analyzer, RES BW was set to about 1% of 99 %emission BW , the occupied BW is the delta frequency between the two points.

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	AGLIENT	E4446A	01/13/04
Amplifier	MITEQ	NSP2600-44	4/26/03
Horn Antenna	EMCO	3115 SN: 6739	02/04/04
Horn Antenna	EMCO	3115 SN: 6717	02/04/04
Universal Radio Communication Tester	R&S	CMU200	11/14/2003
Directional Coupler, 0.8~4.2GHz, 40db, 40W	AR	DC7144A	CNR

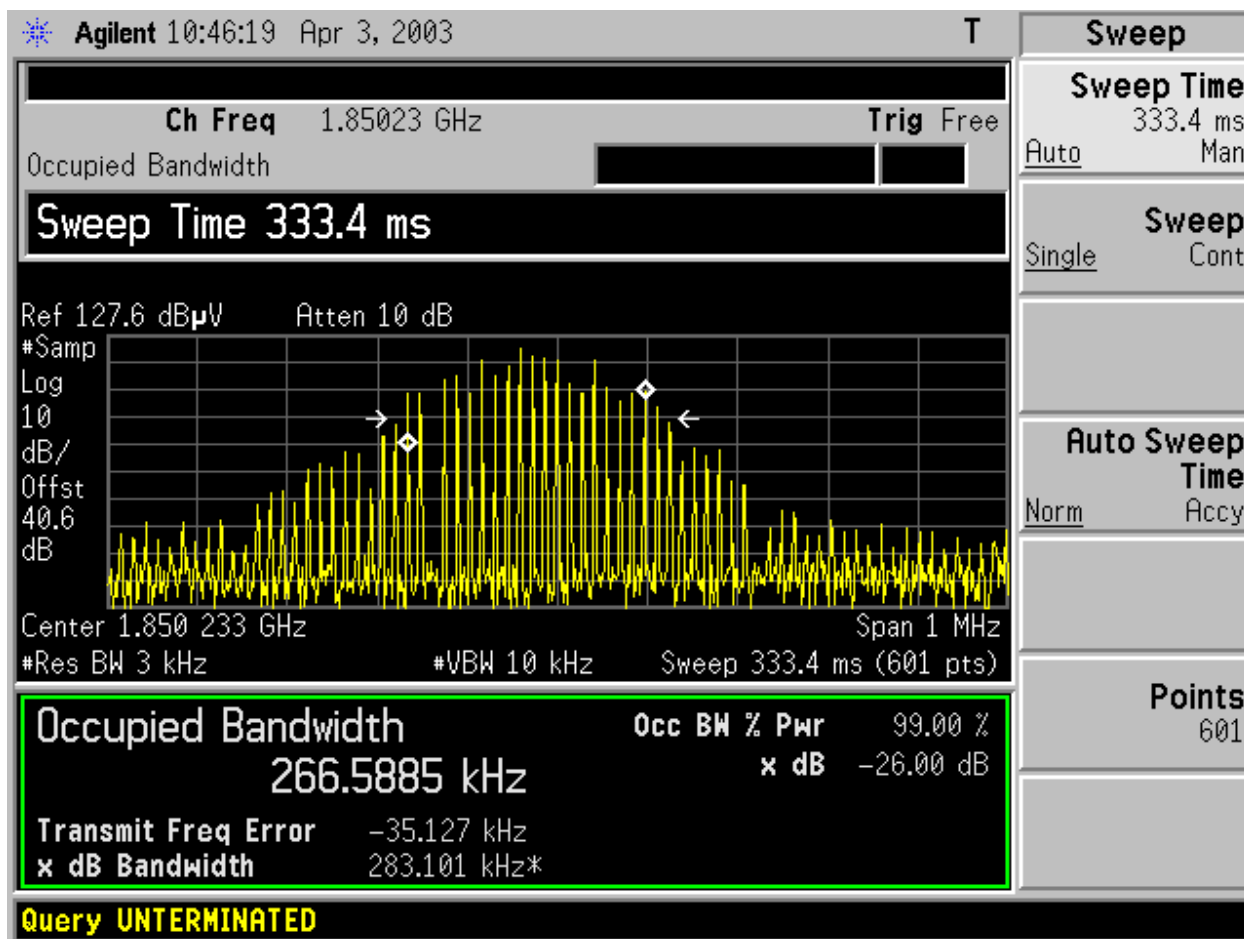
RESULT

No non-compliance noted.

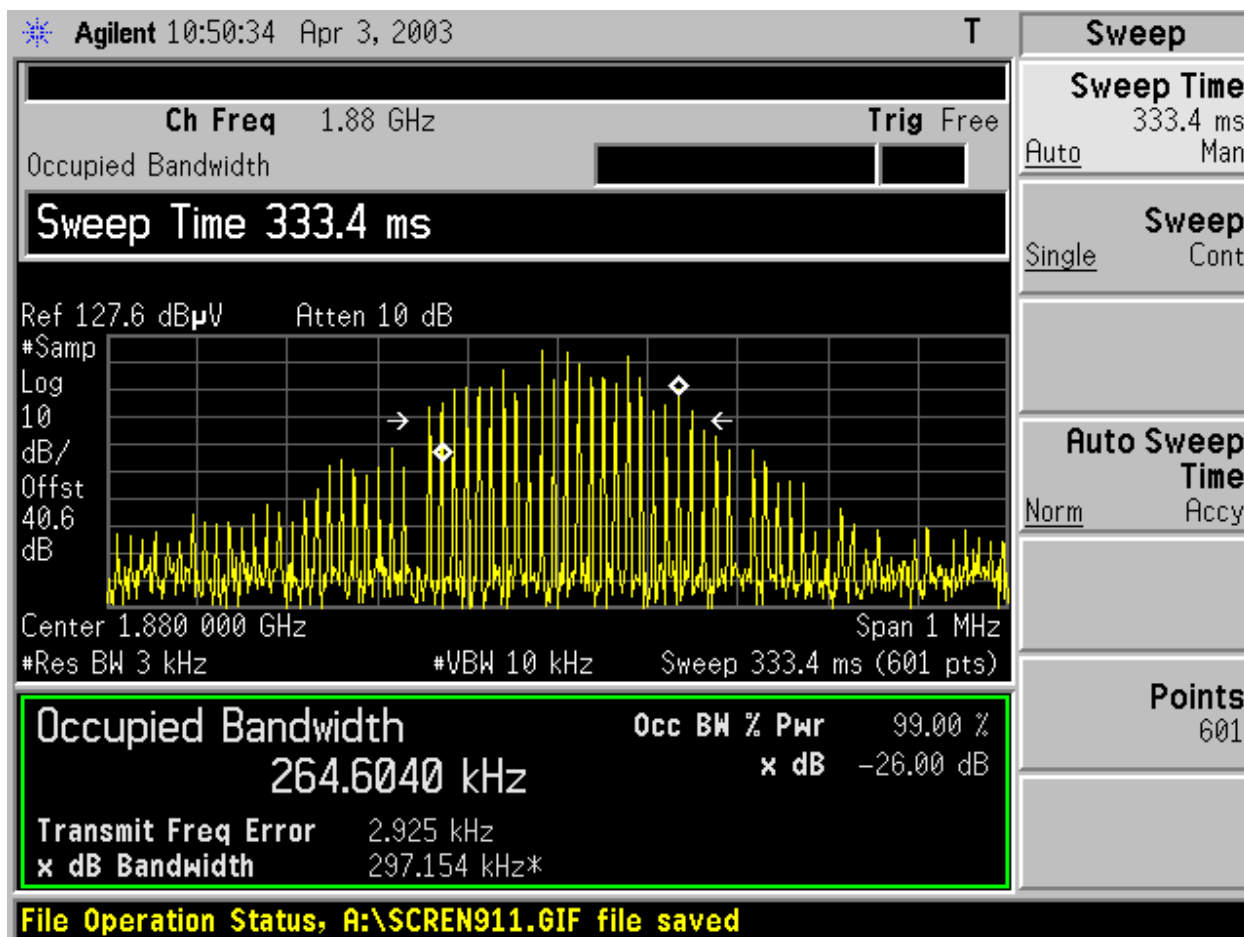
CHANNEL	BW (KHz)
LOW	266.59
MIDDLE	264.60
HIGH	265.71



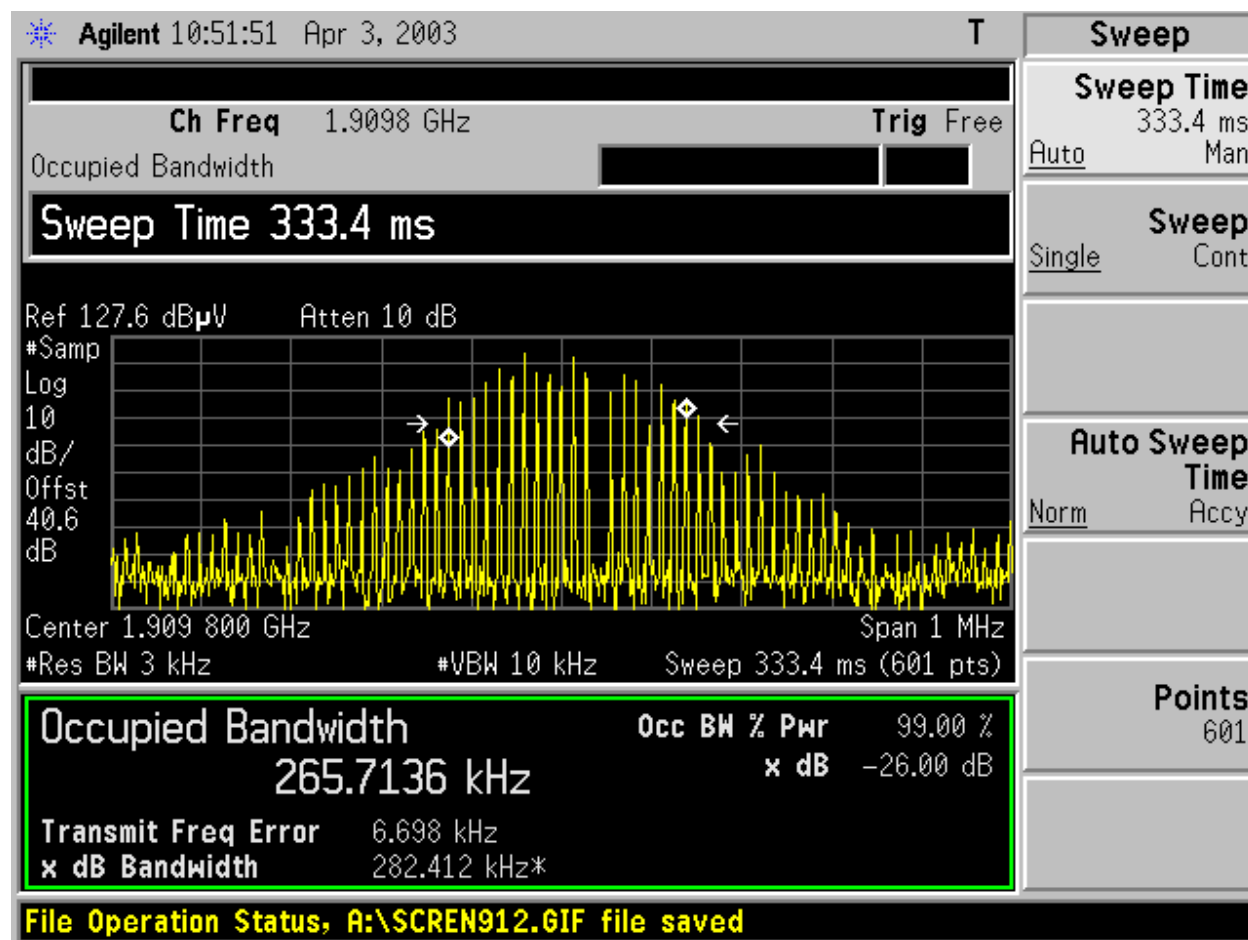
LOW CHANNEL



MIDDLE CHANNEL

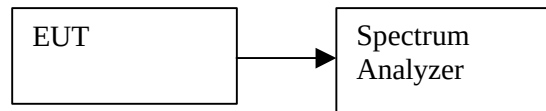


HIGH CHANNEL



6.3. SPURIOUS EMISSION AT ANTENNA TERMINAL

TEST SETUP



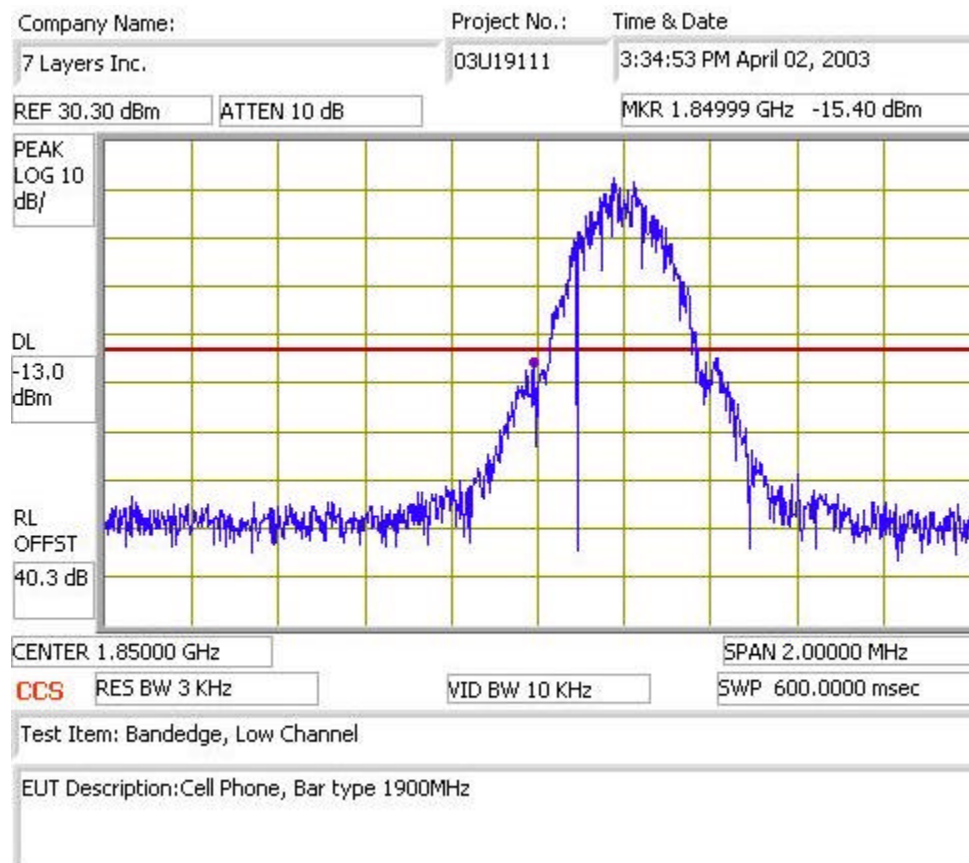
TEST PROCEDURE

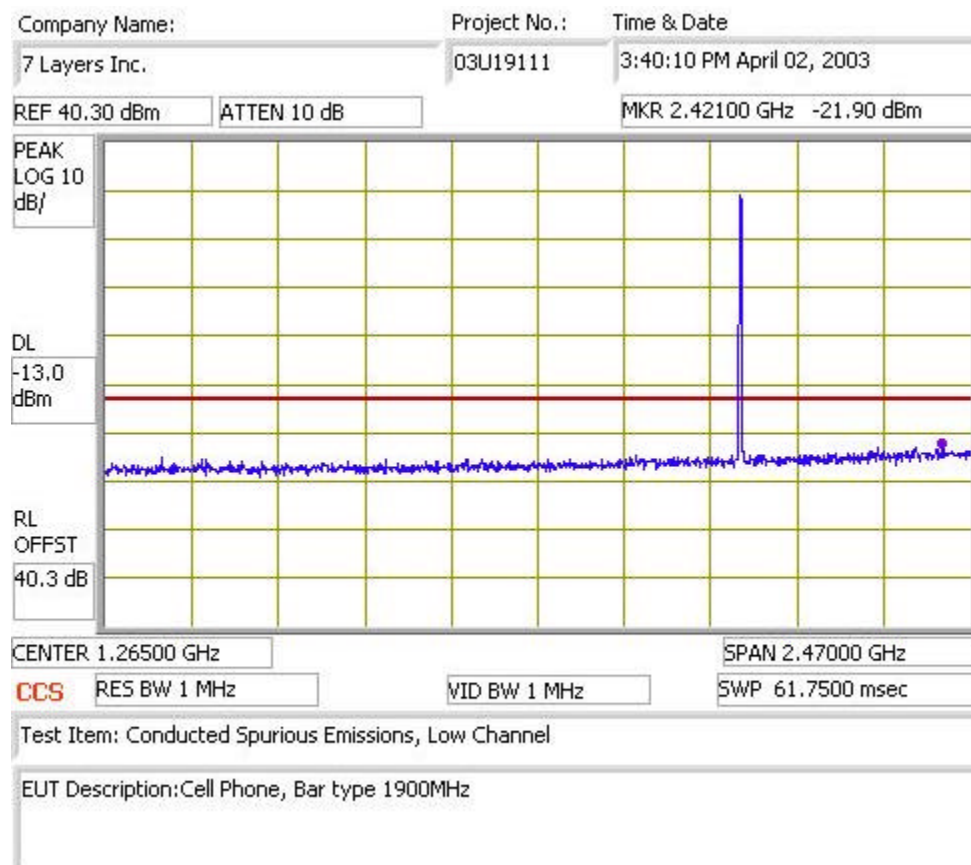
- 1) EUT's RF output connector (made solely for the purpose of the test) is connected to the spectrum analyzer, RBW was set to 1MHz and VBW to 1MHz, the spectrum of 10MHz to 20GHz was investigated for any spurious emissions, a close up investigation for band edges for the low and high channels was also investigated with RBW and VBW of 3kHz.

RESULT

No non-compliance noted.

LOW CHANNEL





NOTE: Frequency
START = 30 MHz
STOP = 2.5 GHz