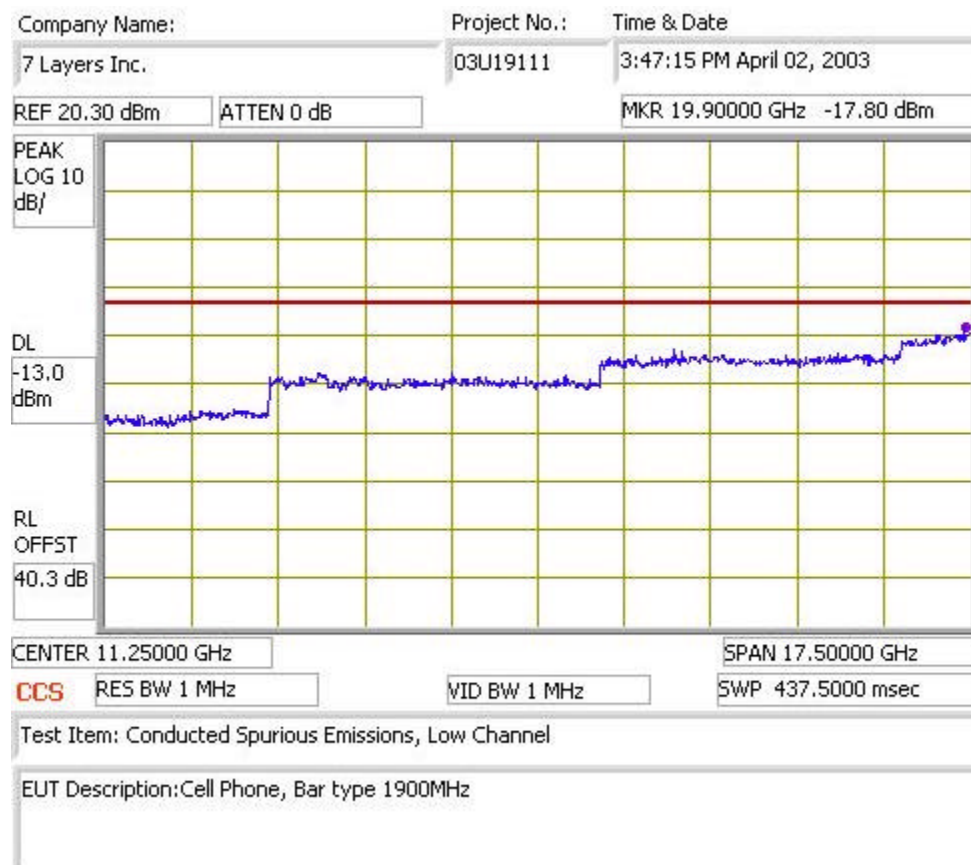
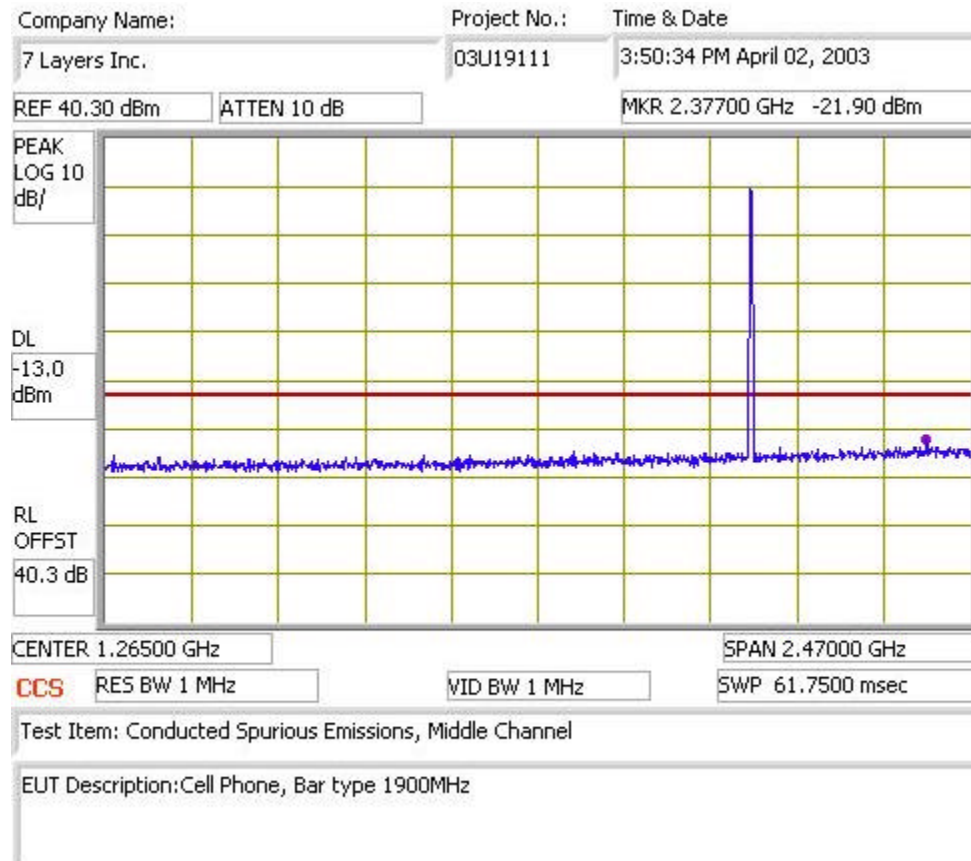


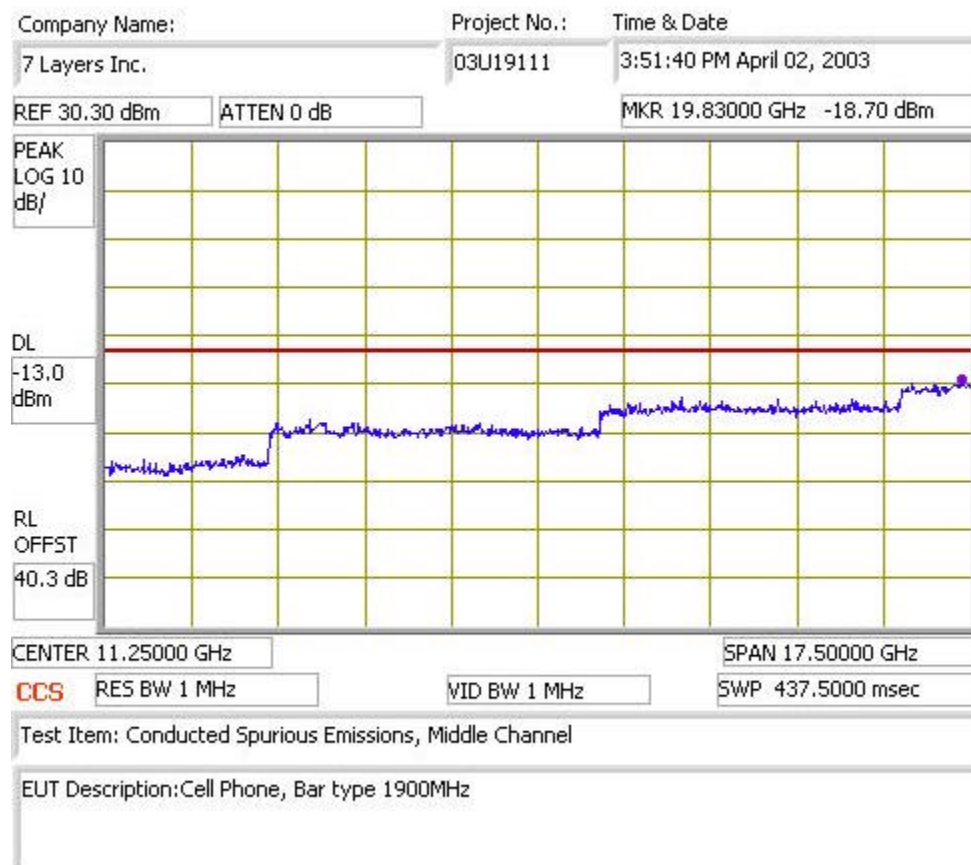


NOTE: Frequency
START = 2.5 GHz
STOP = 20 GHz

MIDDLE CHANNEL

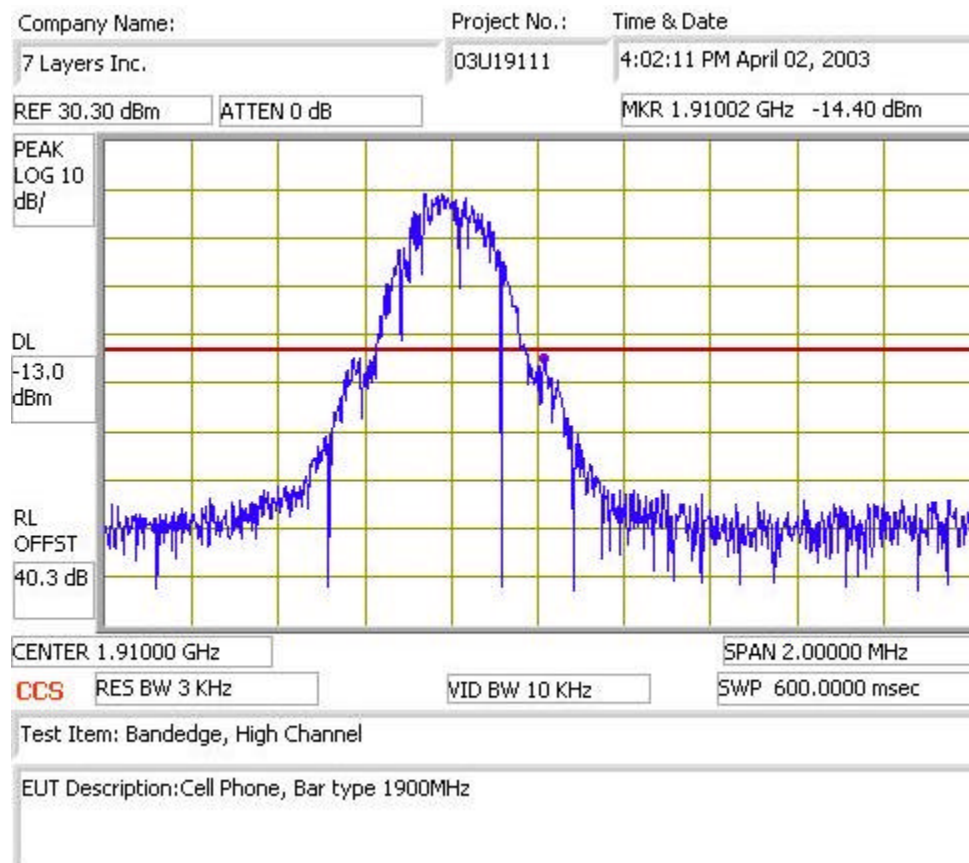


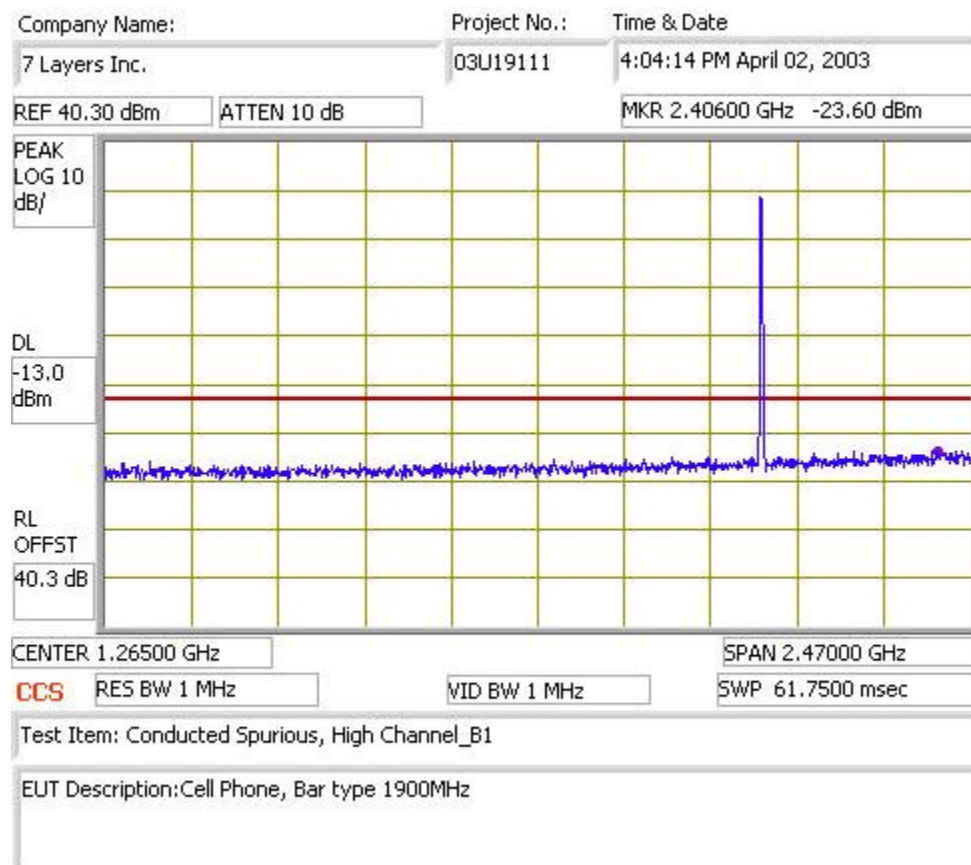
NOTE: Frequency
START = 30 MHz
STOP = 2.5 GHz



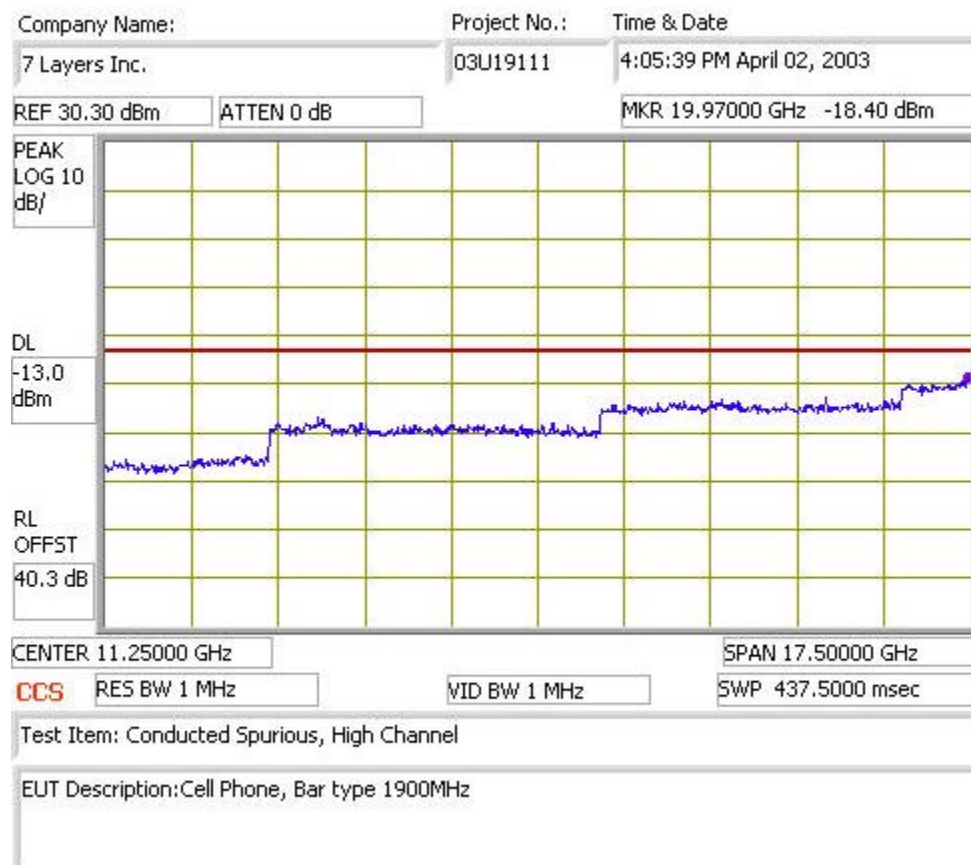
NOTE: Frequency
START = 2.5 GHz
STOP = 20 GHz

HIGH CHANNEL





NOTE: Frequency
START = 30 MHz
STOP = 2.5 GHz



NOTE: Frequency
START = 2.5 GHz
STOP = 20 GHz

6.4. FIELD STRENGTH OF SPURIOUS RADIATION

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak ☐ Average	☒ 1 MHz ☐ 1 MHz	☒ 1 MHz ☐ 10 Hz

TEST SETUP

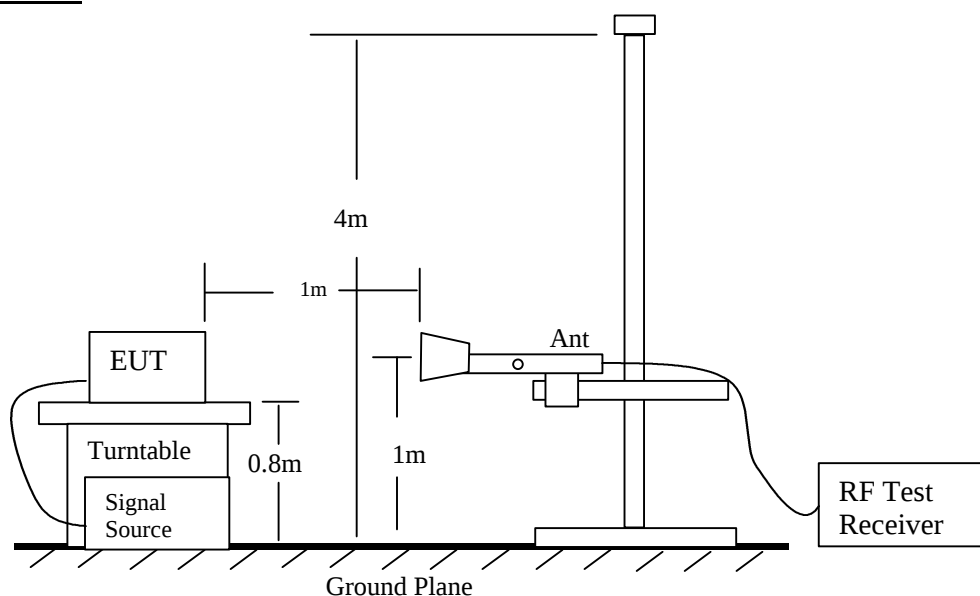


Fig 1: Radiated Emission Measurement

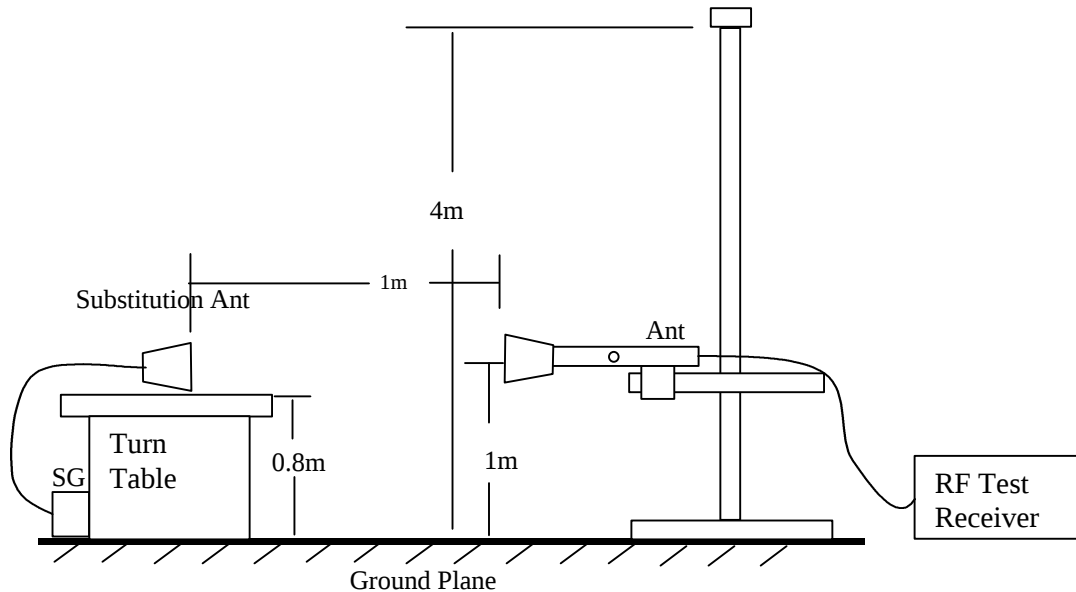


Fig 2: Radiated Emission – Substitution Method set-up

TEST 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 1m 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 average 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 substitution antenna.
- 10). The substitution antenna shall be oriented for vertical polarization.
- 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.

RESULT

No non-compliance noted:

LOW CHANNEL

4/3/2003 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: 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)	
3.700	50.50	-39.40	1.2	8.50	-32.10	-13.00	-19.10	V, Y orientation
5.551	72.70	-36.80	1.5	10.40	-27.90	-13.00	-14.90	V, Y orientation
7.401	72.50	-34.70	1.8	10.40	-26.10	-13.00	-13.10	V, Y orientation
9.251	75.00	-28.30	2.2	10.30	-20.20	-13.00	-7.20	V, Y orientation
11.101	72.00	-49.50	2.4	12.20	-39.70	-13.00	-26.70	V, Y orientation
12.951	58.90	-50.20	2.6	12.40	-40.40	-13.00	-27.40	V, Y orientation
14.802	63.60	-45.70	2.8	13.70	-34.80	-13.00	-21.80	V, Y orientation
16.652	60.00	-47.40	3.0	13.70	-36.70	-13.00	-23.70	V, Y orientation
18.502	55.60	-49.80	3.3	8.53	-44.57	-13.00	-31.57	V, Y orientation
3.700	54.00	-31.20	1.2	8.50	-23.90	-13.00	-10.90	H, Z orientation
5.551	70.90	-42.10	1.5	10.40	-33.20	-13.00	-20.20	H, Z orientation
7.401	72.00	-38.50	1.8	10.40	-29.90	-13.00	-16.90	H, Z orientation
9.251	68.60	-38.40	2.2	10.30	-30.30	-13.00	-17.30	H, Z orientation
11.101	72.40	-31.20	2.4	12.20	-21.40	-13.00	-8.40	H, Z orientation
12.951	59.60	-50.60	2.6	12.40	-40.80	-13.00	-27.80	H, Z orientation
14.802	59.80	-54.70	2.8	13.70	-43.80	-13.00	-30.80	H, Z orientation
16.652	59.00	-55.70	3.0	13.70	-45.00	-13.00	-32.00	H, Z orientation
18.502	60.00	-54.20	3.3	8.53	-48.97	-13.00	-35.97	H, Z orientation
RBW=VBW=1MHz EIPR = SG reading - CL + Gain (dBi) Margin = EIPR - Limit SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A0020 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

4/3/2003 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: Test Target: FCC PART24 Mode Oper: TX ON at Mid Channel								
Frequency	SA reading	SG reading	CL	Gain	EIRP	Limit	Margin	Notes
(GHz)	(dBuV)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
3.760	52.70	-31.80	1.2	8.50	-24.50	-13.00	-11.50	V, Y orientation
5.640	74.20	-37.60	1.5	10.40	-28.70	-13.00	-15.70	V, Y orientation
7.520	72.30	-35.50	1.8	10.40	-26.90	-13.00	-13.90	V, Y orientation
9.400	75.30	-29.50	2.2	10.30	-21.40	-13.00	-8.40	V, Y orientation
11.280	72.30	-31.80	2.4	12.20	-22.00	-13.00	-9.00	V, Y orientation
13.160	62.80	-39.00	2.6	12.40	-29.20	-13.00	-16.20	V, Y orientation
15.040	65.30	-43.30	2.8	13.70	-32.40	-13.00	-19.40	V, Y orientation
16.920	63.00	-42.50	3.0	13.70	-31.80	-13.00	-18.80	V, Y orientation
18.800	65.00	-40.30	3.3	8.53	-35.07	-13.00	-22.07	V, Y orientation
3.760	54.50	-28.10	1.2	8.50	-20.80	-13.00	-7.80	H, Z orientation
5.640	81.60	-35.20	1.5	10.40	-26.30	-13.00	-13.30	H, Z orientation
7.520	74.40	-37.70	1.8	10.40	-29.10	-13.00	-16.10	H, Z orientation
9.400	72.90	-34.90	2.2	10.30	-26.80	-13.00	-13.80	H, Z orientation
11.280	75.60	-31.30	2.4	12.20	-21.50	-13.00	-8.50	H, Z orientation
13.160	65.30	-37.80	2.6	12.40	-28.00	-13.00	-15.00	H, Z orientation
15.040	63.10	-46.10	2.8	13.70	-35.20	-13.00	-22.20	H, Z orientation
16.920	62.80	-47.20	3.0	13.70	-36.50	-13.00	-23.50	H, Z orientation
18.800	66.00	-43.00	3.3	8.53	-37.77	-13.00	-24.77	H, Z orientation
RBW=VBW=1MHz EIPR = SG reading - CL + Gain (dBi) Margin = EIPR - Limit SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A0020 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

4/3/2003 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: 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)	
3.820	49.30	-39.50	1.2	8.50	-32.20	-13.00	-19.20	V, Y orientation
5.729	73.90	-37.30	1.5	10.40	-28.40	-13.00	-15.40	V, Y orientation
7.639	73.90	-35.00	1.8	10.40	-26.40	-13.00	-13.40	V, Y orientation
9.549	76.00	-27.70	2.2	10.30	-19.60	-13.00	-6.60	V, Y orientation
11.458	71.50	-32.50	2.4	12.20	-22.70	-13.00	-9.70	V, Y orientation
13.369	57.80	-50.00	2.6	12.40	-40.20	-13.00	-27.20	V, Y orientation
15.278	64.50	-46.50	2.8	13.70	-35.60	-13.00	-22.60	V, Y orientation
17.188	59.00	-47.70	3.0	13.70	-37.00	-13.00	-24.00	V, Y orientation
19.098	56.80	-49.00	3.3	8.53	-43.77	-13.00	-30.77	V, Y orientation
3.820	53.20	-30.60	1.2	8.50	-23.30	-13.00	-10.30	H, Z orientation
5.729	71.60	-41.10	1.5	10.40	-32.20	-13.00	-19.20	H, Z orientation
7.639	71.80	-37.60	1.8	10.40	-29.00	-13.00	-16.00	H, Z orientation
9.549	67.70	-37.20	2.2	10.30	-29.10	-13.00	-16.10	H, Z orientation
11.458	73.60	-31.20	2.4	12.20	-21.40	-13.00	-8.40	H, Z orientation
13.369	58.50	-50.00	2.6	12.40	-40.20	-13.00	-27.20	H, Z orientation
15.278	59.70	-54.50	2.8	13.70	-43.60	-13.00	-30.60	H, Z orientation
17.188	58.40	-55.00	3.0	13.70	-44.30	-13.00	-31.30	H, Z orientation
19.098	59.90	-53.50	3.3	8.53	-48.27	-13.00	-35.27	H, Z orientation
RBW=VBW=1MHz EIPR = SG reading - CL + Gain (dBi) Margin = EIPR - Limit SA: Spectrum Analyzer, HP 8593EM, S/N: 3710A0020 CL: cable loss (3ft), FLEXCO SG: Signal Generator, HP 83732B, S/N: US34490599 RX Antenna: TX Antenna: Horn, EMCO 3115, S/N: 6717								

6.5. FREQUENCY STABILITY

TEST SETUP

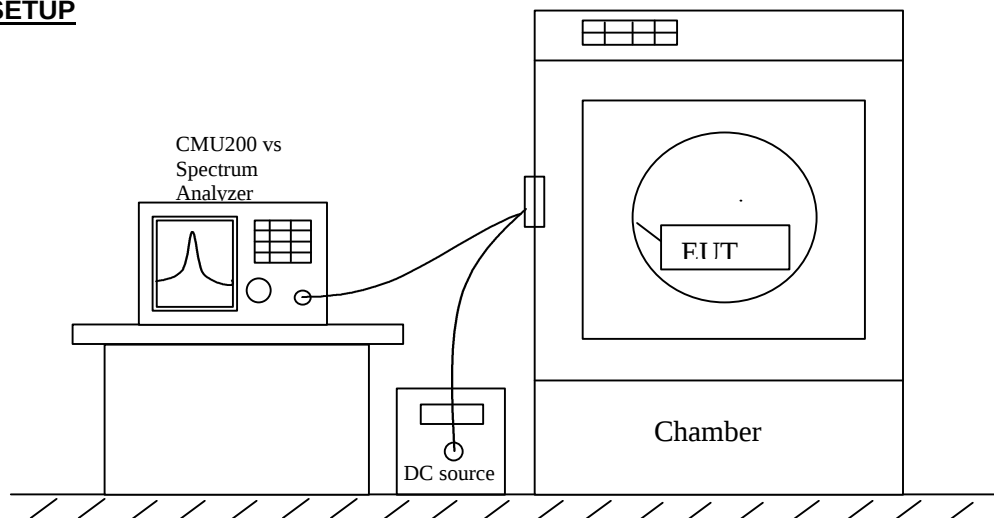


Fig. 3: Frequency Stability Setup

TEST PROCEDURE

- **Frequency stability versus environmental temperature**

- 1). Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 20°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 20°C operating frequency as reference frequency.
- 2). Turn EUT off and set Chamber temperature to -30°C.
- 3). Allow sufficient time (approximately 20 to 30 min after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
- 4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

- **Frequency stability Ac Voltage**

- 1). Setup the configuration per figure 6 and set chamber temperature to 20°C. Use a variable DC power supply to power the EUT and set DC output voltage to EUT nominal input DC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 20°C operating frequency as reference frequency.
- 2). Slowly reduce the EUT input voltage to specified extreme voltage variation and record the maximum frequency change.

RESULT

No non-compliance noted.



Reference Frequency: GSM Mid Channel 1880.000000MHz @ 20°C				
Limit: to stay ± 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	1880.00036	-0.177	± 2.5
3.70	40	1879.99960	0.227	± 2.5
3.70	30	1879.99985	0.094	± 2.5
3.70	25	1879.99967	0.190	± 2.5
3.70	20	1880.00003	0	± 2.5
3.70	10	1880.00030	-0.145	± 2.5
3.70	0	1879.99978	0.131	± 2.5
3.70	-10	1880.00033	-0.161	± 2.5
3.70	-20	1880.00036	-0.177	± 2.5
3.70	-30	1880.00039	-0.193	± 2.5
3.08 (end point)	20	1880.00005	-0.013	± 2.5
3.15	20	1880.00002	0.004	± 2.5
4.26	20	1880.00002	0.002	± 2.5

6.6. RADIATED EMISSION

Detector Setting of Spectrum Analyzer

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak	☒ 100 KHz	☒ 100 KHz
	☒ Quasi Peak	☒ 1 MHz	☒ 1 MHz

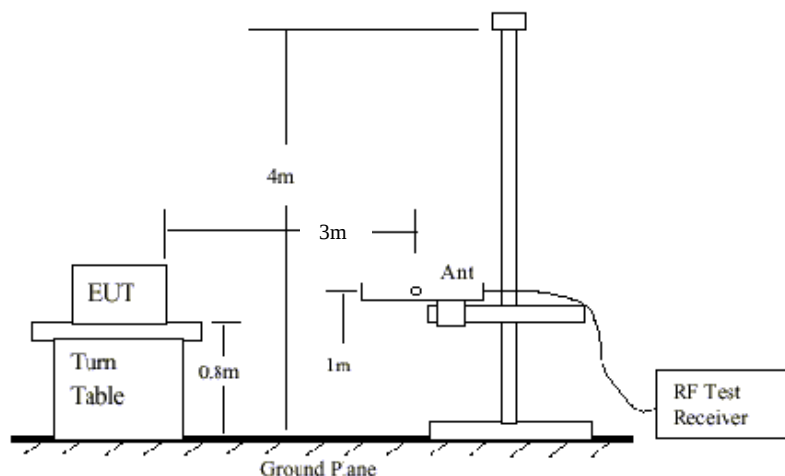


Fig 1: Radiated Emission Measurement 30 to 1000 MHz

TEST SETUP & PROCEDURE

1. The EUT was placed on the turn table 0.8 meter above ground in 3 meter semi-anechoic chamber.
2. Set the resolution bandwidth to 120KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turn table and stop at the angle where the measurement device has maximum reading
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak
7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures (3)~(6). If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.

RESULT

No non-compliance noted, as shown below.

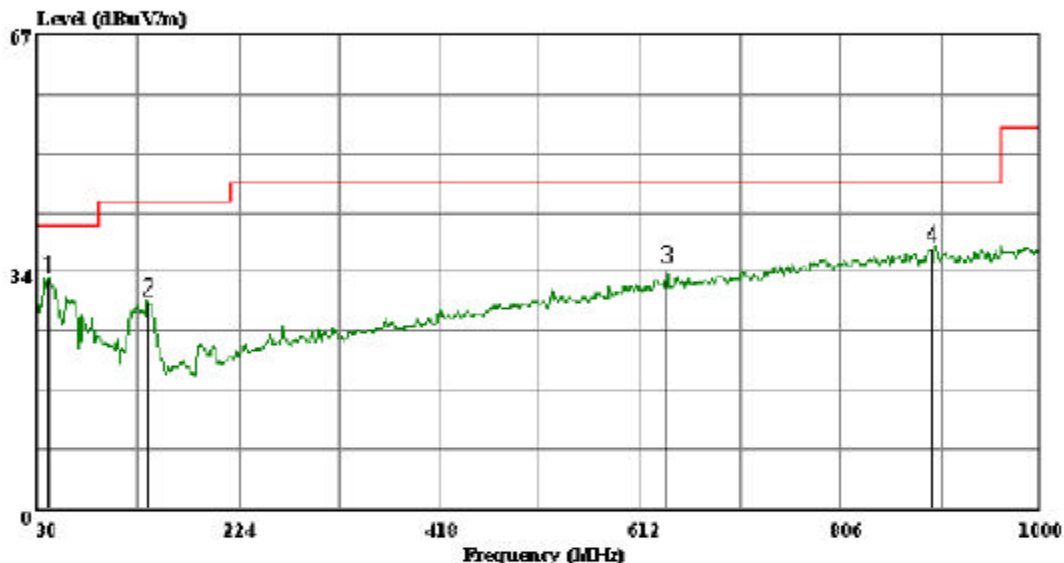
Vertical Polarization



561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 8 File#: test1.EMI

Date: 04-03-2003 Time: 21:56:39



(Appendix A/C)

Trace: 7

Ref Trace:

Condition: FCC CLASS-B 3m CHAMBER 030117 1185 VERTICAL
Company : 7Layers, Inc
EUT Description : Cell Phone Bar Type 1900 MHz
Model Number : TBA
Test Configuration: EUT/Headphone
Test Target : FCC Class B
Mode of Operation: Tx/Rcv

Page: 1

	Preq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	40.670	14.02	17.73	0.61	0.00	32.35	40.00	-7.65	Peak
2	136.700	18.48	9.82	1.11	0.00	29.41	43.50	-14.09	Peak
3	637.220	12.41	18.80	2.65	0.00	33.86	46.00	-12.14	Peak
4	893.300	11.57	21.99	3.26	0.00	36.82	46.00	-9.18	Peak

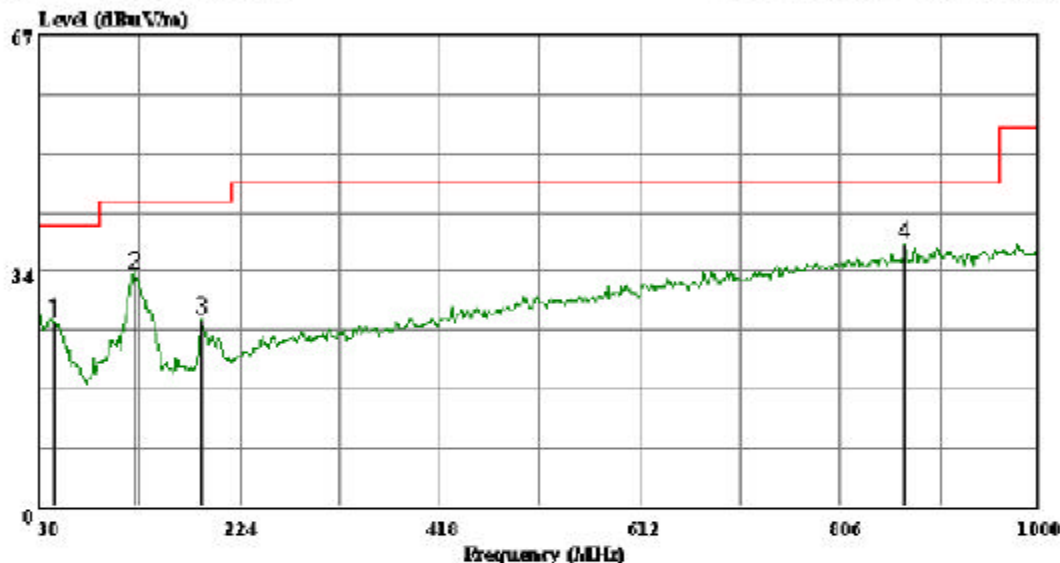
Horizontal Polarization



561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax: (408) 463-0888

Date#: 5 File#: test1.EMI

Date: 04-03-2003 Time: 21:52:08



(Auxiliary ATC)

Trace: 5

Ref Trace:

Condition: FCC CLASS-B 3m CHAMBER 010117 1185 HORIZONTAL
Company : 7Layers, Inc
EUT Description : Cell Phone Bar Type 1900 MHz
Model Number : TBA
Test Configuration: EUT/Micophone
Test Target : FCC Class B
Mode of Operation: Tx/Rcv

Page: 1

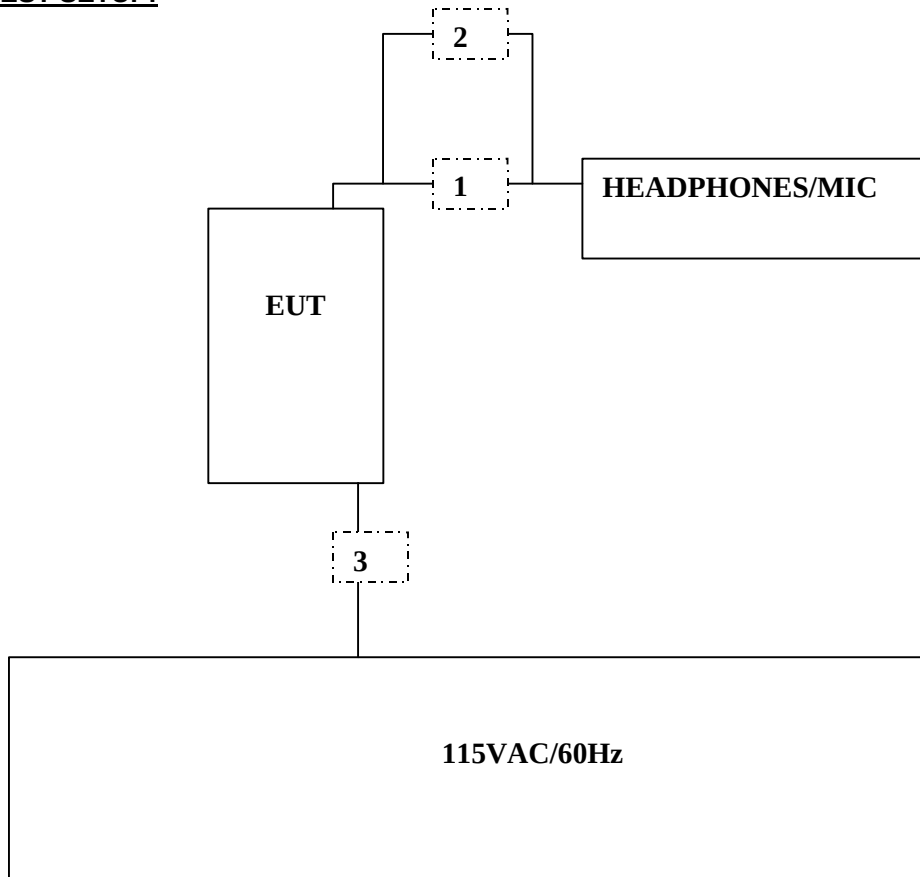
	Read	Probe	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB
1	44.550	7.99	17.75	0.65	0.00	26.39	40.00 -13.61 Peak
2	122.150	21.07	11.01	1.04	0.00	33.13	43.50 -10.37 Peak
3	187.140	15.98	9.39	1.36	0.00	26.73	43.50 -16.77 Peak
4	868.080	12.72	21.72	3.12	0.00	37.56	46.00 -8.44 Peak

6.7. POWER LINE CONDUCTED EMISSION

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
150 KHz to 30 MHz	☒ Peak ☐ CISPR Quasi Peak	☒ 9 KHz	☒ 9 KHz

TEST SETUP:



TEST I / O CABLES								
Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	HEADPHONES/MIC	1	1/4" STEREO	UNSHIELDED	0.62M	YES	NO	N/A
2	HEADPHONES/MIC	1	HARDWIRED	UNSHIELDED	0.31M	YES	NO	N/A
3	PWR	1	8 PIN	UNSHIELDED	1.86M	NO	NO	N/A

TEST PROCEDURE

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a continuous mode.
2. Line conducted data was recorded for both NEUTRAL and HOT lines.

RESULT

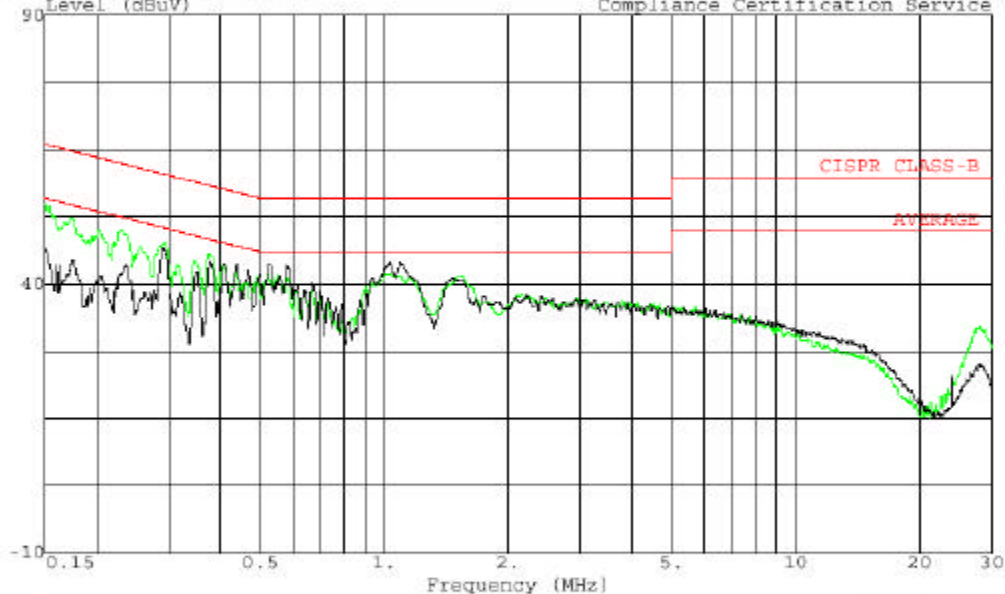
No non-compliance noted.

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	53.60	--	--	0.00	65.94	55.94	-12.34	-2.34	L1
0.21	47.78	--	--	0.00	64.23	54.23	-16.45	-6.45	L1
1.54	41.41	--	--	0.00	56.00	46.00	-14.59	-4.59	L1
0.29	46.80	--	--	0.00	62.03	52.03	-15.23	-5.23	L2
0.52	43.70	--	--	0.00	56.00	46.00	-12.30	-2.30	L2
1.10	43.84	--	--	0.00	56.00	46.00	-12.16	-2.16	L2
6 Worst Data									



561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 7 File#: 1911LC.EMI Date: 04-03-2003 Time: 19:37:43
Level (dBuV) Compliance Certification Service



Trace: 3
Project # : 03U1911-1
Test Engineer : Chin Pang
Company : 7Layers, Inc.
EUT : Cell Phone Bar Type 1900 MHz
Model : TBA
Test Config. : Tx/Rcv
Test of Target: EN55022 Class B
: L1: Peak (Green), L2: Peak (Black)
: 115Vac, 60Hz

Ref Trace: