UL International EMC Services
333 Pfingsten Road
Northbrook, Illinois 60062-2096
(800) 873-8536
Fax No. (847) 272-8864
http://www.ul.com/emc/

October 18, 2002

Motorola CDMA Wireless Products
Customer Integration Engineering
Attn: Mr. Terry Schwenk
IL75-Room F520
1455 Shure Dr.
Arlington Heights, IL 60004

UL Reference: File MC1281, Project 02NK40683

Subject: EMC Test and Measurement Report for
SC4812ETL 1X @ 800MHz CDMA BTS Cellular Phone Base Station

Dear Mr. Schwenk:

We have provided with this letter your EMC Test Report for the above referenced model. The product was determined to comply with the requirements noted in the report.

Please review the attached report and direct any questions or comments to me. Samples were returned following testing. This closes Project No. 02NK40683.

We appreciate your interest in UL's EMC Services, and encourage you to contact us in the future should you need EMC test services.

Best regards,

Lou Madjarov (Ext 43957)
EMC Sr. Project Engineer
International EMC Services

Reviewed by:

Jack Steiner
Engineering Group Leader
International EMC Services

EMC – TEST REPORT

Issue Date: October 18, 2002

√ **EMISSIONS**

IMMUNITY

Test Report File No.	:	**MC1281**
Project No.	:	**02NK40683**
Model / Type	:	**SC4812ETL 1X @ 800MHz CDMA BTS**
Kind of Product	:	**Cellular Phone Base Station**
Applicant	:	**Motorola CDMA Wireless Products Customer Integration Engineering**
License Holder	:	**Motorola CDMA Wireless Products Customer Integration Engineering**
Address	:	**IL75-Room F520**
	:	**1455 Shure Dr.**
	:	**Arlington Heights, IL 60004**
Manufacturer	:	**Same as Applicant**
	:	
Test Result	:	**COMPLIANT**

This report without appendices consists of 14 pages. Appendix A contains test photos, and Appendix B contains original test data, Appendix C contains sample calculations and Appendix D contains Transmit Power, Occupied Bandwidth or RHO and Conducted Spurious and Harmonic Emissions test set-up.
The data contained in this report reflects only the items tested in the configurations and mode of operations described. An attempt has been made to arrange the EUT, with the equipment provided, into a test configuration which maximizes the observed emissions of the EUT while simulating, as close as practical, a typical end-use installation.

Underwriters Laboratories Inc. 333 Pfingsten Rd. Northbrook, IL 60062
Fax: (847) 272-8864

REPORT DIRECTORY

1.0 REVISION HISTORY

Revision	Changes	Date
1.0	Initial Release	October 10, 2002

1.1 GENERAL PRODUCT DESCRIPTION

The rated maximum average power out of the SC4812ETL 1X @ 800MHz unit is 60W (47.78dBm)

1.1.1 Equipment Mobility:

Floor standing

1.1.2 Test Voltage and Frequency:

Voltage (V)	Frequency (Hz)
240V	AC

1.2 MODEL DIFFERENCES

Any other model(s) represented by the models tested in this investigation will be documented by the manufacturer.

1.3 ENVIRONMENTAL CONDITIONS IN TEST LAB

Temperature: **20-25 °C**
Relative Humidity: **30-60% RH**
Atmospheric Pressure: **860-1060 mbar**

1.4 CALIBRATION OF EQUIPMENT USED FOR MEASUREMENT

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST), therefore, all test data recorded in this report is traceable to NIST.

The test laboratory facilities used for the collection of test data reported herein are accredited to comply with ISO Guide 25 quality measurements by the NVLAP. The test procedures and techniques for radiated emissions up to 2000MHz and AC Mains conducted emissions up to 30MHz are also NVLAP accredited, as applicable.

1.5 EUT CONFIGURATION(s)

See Appendix A for individual set-up configuration(s). In addition to the EUT, the following peripheral devices and/or cables were connected during the measurement:

Device	Manufacturer	Model	Serial #	FCC ID
SC4812ETL 1X @ 800MHz CDMA BTS	Motorola	SG1489	T89DAU0386	IHET5CS1

1.6 EUT OPERATING MODE(s)

The equipment under test was operated during the measurements under the following conditions:

Base station set at High Power 60W (47.78dBm) and Low Power 400mW (26dBm) operation at Low Channel 1013 (869.7 MHz) and at High Channel 777 (893.3 MHz). Refer to Appendix D for more information.

1.7 DEVICE MODIFICATIONS

The following modifications were necessary for compliance:

None.

2.0 EMISSIONS TEST REGULATIONS

The EUT was considered to be a Class B device.

Emissions testing was performed according to the following regulations:

47 CFR Part 15 Subpart B: 2000 + ANSI C63.4 – 1992

47 CFR Part 22/24: 2001

Per manufacturer's specifications the following test were conducted:

- Conducted Voltage: 150KHz – 30MHz
- Conducted Spurious Emissions: 30MHz – 10GHz
- Radiated Electric Field Emissions: 30MHz – 1000MHz
- Radiated Electric Field Spurious Emissions: 1GHz – 10GHz
- Substitution Method - Radiated Spurious Harmonics Emissions
- Occupied Bandwidth
- Rho

Radiated Spurious Emissions - Substitution Method was performed per ANSI/TIAEIA-603-1992, Section 2.2.12

CONDUCTED VOLTAGE EMISSIONS

Test Location

Ground Plane (Test Station 3)

UL Procedure

3014ANBK-LPG-001

Test Instruments

Spectrum Analyzer / Quasi-peak Adapter

Advantest Model 3261A Spectrum Analyzer No. EMC4084
Model R3551 Preselector No. EMC4088

Line Impedance Stabilization Networks (LISNs)

SOLAR Model 8610-50-TS-100-N No. EMC4048
SOLAR Model 8610-50-TS-100-N No. EMC4049
SOLAR Model 8610-50-TS-100-N No. EMC4050

Transient Limiter

Hewlett Packard Model 11947A No. EMC4019

Frequency Range on each line

150 kHz to 30MHz

Test Results

The requirements are:
MET

Remarks

See App. B for complete test results.

CONDUCTED SPURIOUS EMISSIONS

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-001CSE

Test Instruments

Spectrum Analyzer

Rhode & Schwarz, Spectrum Analyzer, 9KHz-40GHz, EMC 4182

Motorola Measurement Equipment

30dB attenuator, NARDA High Power Attenuator, Model 769-30 S/N 04405
Bidirectional coaxial coupler, model #3022, NARDA
Band pass filter, Filtronix
High power 50ohm load, (58883464-R01)

Frequency Range on each line

30MHz – 10GHz

Test Results

The requirements are:
MET

Remarks

See App. B for complete test results.

RADIATED ELECTRIC FIELD EMISSIONS, 30 TO 1000MHz

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-002

Test Instruments

Spectrum Analyzer / Quasi-peak Adapter / Preamplifier / Preselector

Hewlett Packard Model 8566B Spectrum Analyzer
Model 85650A Quasi-peak Adapter
Miteq AM-3A-000110-N Preamp No. FCA4003, EMC4016, EMC4151
Model 85685A RF Preselector No. EMC4015

Antennas

Chase EMC Ltd., Biconical Antenna Model VBA6106A	S/N 1237
Chase EMC Ltd., Log Periodic Antenna Model UPA6108	S/N 1120

Frequency Range of Measurement

30-1000MHz

Measurement Distance

10 meters

Test Results

The requirements are:
MET

Remarks
See App. B for complete test results.

RADIATED ELECTRIC FIELD EMISSIONS, 1 TO 10 GHz

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-002A

Test Instruments

Spectrum Analyzer
Hewlett Packard Model 8566B Spectrum Analyzer
Hewlett Packard Preamplifier Model 8449A, EMC4201

Antennas
EMCO, Model 3115, EMC No. 4033

Frequency Range of Measurement

1 to 10 GHz

Measurement Distance

3 meters

Test Results

The requirements are:
MET

Remarks
See App. B for complete test results.

RADIATED SPURIOUS EMISSIONS – SUBSTITUTION METHOD

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-002SM

Test Instruments

Spectrum Analyzer

Rhode & Schwarz, Spectrum Analyzer, 9KHz-40GHz, EMC 4182

Signal Generator

Anritsu, Model 68369B 10MHz – 40GHz,

Antennas

EMCO, Horn Model 3115, S/N 8812-3032
EMCO, Horn Model 3115, S/N 3012

Frequency Range on each line

30MHz – 10GHz

Measurement Distance

3 meters

Test Results

The requirements are:
MET

Remarks

See App. B for complete test results.

OCCUPIED BANDWIDTH MEASUREMENTS

Test Location

10 Meter Semi-Anechoic Chamber

Test Instruments

Power Meter
Hewlett Packard, Model 437B, S/N 3125U15845,
Last Cal. 6-13-02, Next Cal. 6-13-03
(Motorola equipment)

HEWLETT PACKARD POWER SENSOR
MODEL: 8481A
LAST CAL: 12/5/01
CAL DUE: 12/5/02
S/N: 2702A57644
(Motorola equipment)

HEWLETT PACKARD VSA SERIES TRANSMIT TESTER
MODEL: E4406A
LAST CAL: 11/1/01
CAL DUE: 11/1/02
S/N: US38450220
(Motorola equipment)

Test Results

The requirements are: MET

Remarks

See App. B for complete test results.

RHO MEASUREMENTS

Test Location

10 Meter Semi-Anechoic Chamber

Test Instruments

Power Meter
Hewlett Packard, Model 437B, S/N 3125U15845,
Last Cal. 6-13-02, Next Cal. 6-13-03
(Motorola equipment)

HEWLETT PACKARD POWER SENSOR
MODEL: 8481A
LAST CAL: 12/5/01
CAL DUE: 12/5/02
S/N: 2702A57644
(Motorola equipment)

HEWLETT PACKARD VSA SERIES TRANSMIT TESTER
MODEL: E4406A
LAST CAL: 11/1/01
CAL DUE: 11/1/02
S/N: US38450220
(Motorola equipment)

Test Results

The requirements are: MET

Remarks

See App. B for complete test results.

3.0 IMMUNITY TEST REGULATIONS

Immunity testing was not performed.

4.0 GENERAL REMARKS

Sample Receipt Date : September 10, 2002

Test Dates

Start : September 10, 2002
End : October 4, 2002

4.1 SUMMARY

The requirements according to the technical regulations are:

MET

Underwriters Laboratories Inc.
333 Pfingsten Road
Northbrook, IL 60062 USA

Test Engineer,

Lou Madjarov (Ext 43957)
EMC Sr. Project Engineer
International EMC Services

Reviewed by:

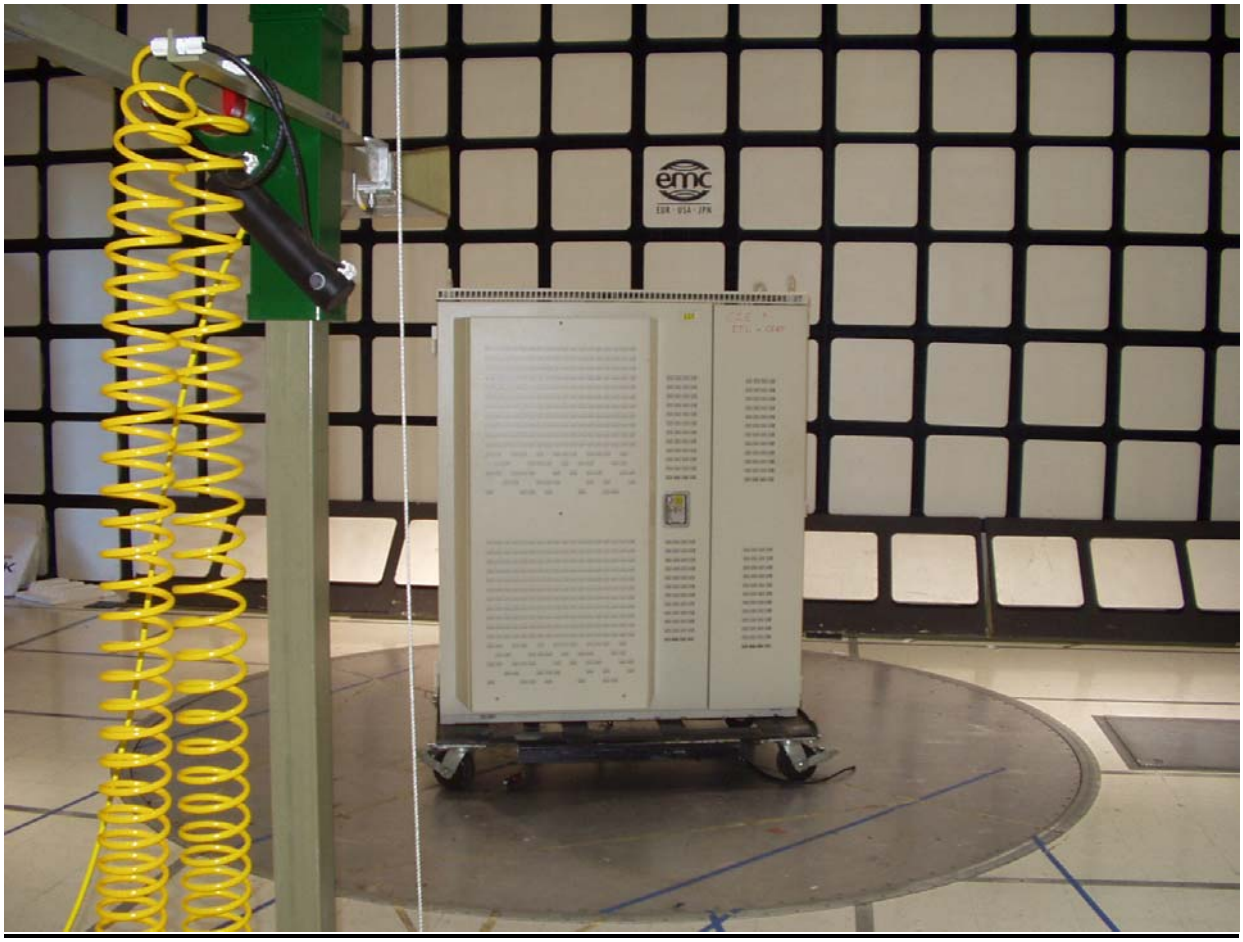
Jack Steiner
Engineering Group Leader
International EMC Services

APPENDIX A

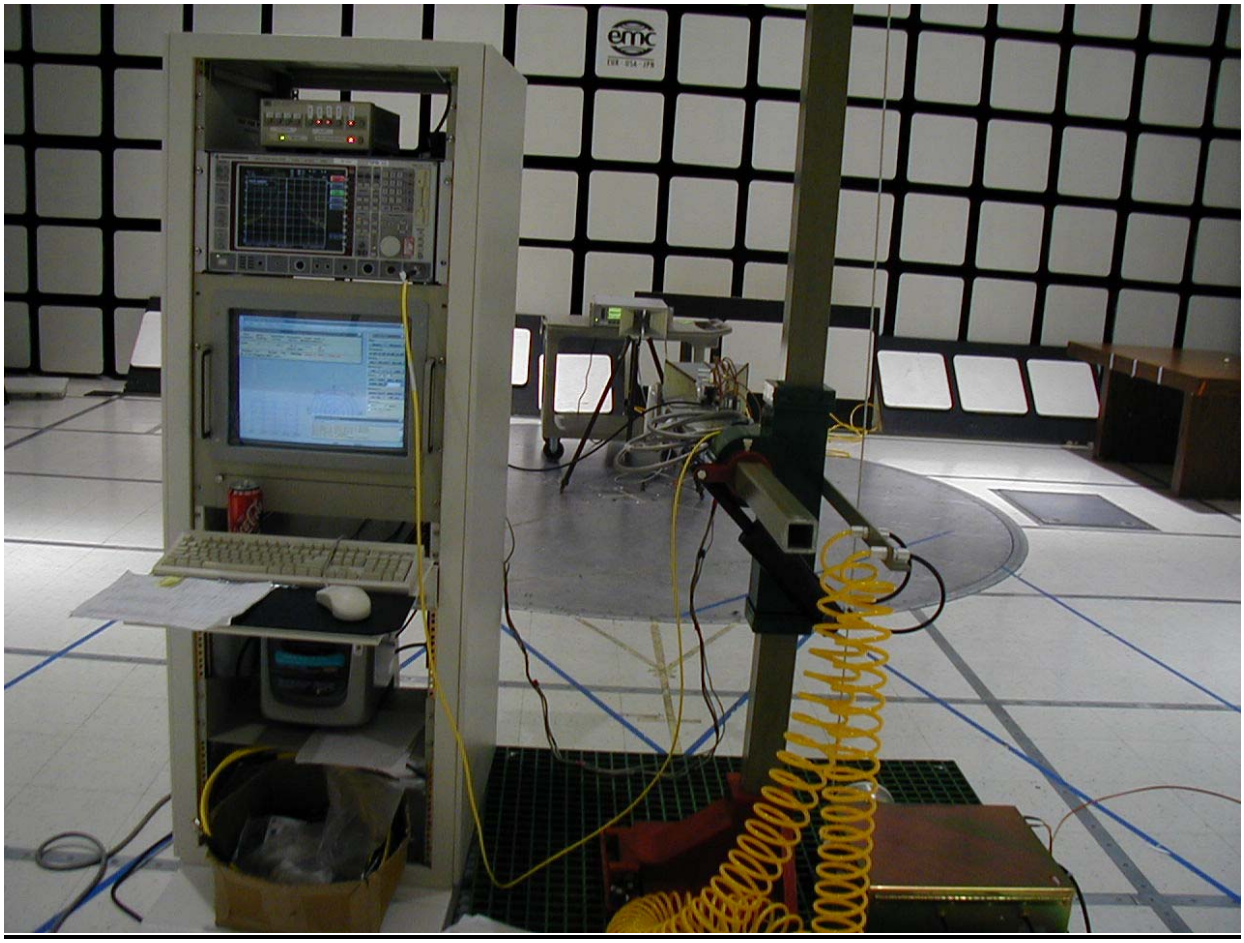
PHOTOS

Conducted Emissions

Conducted Spurious Emissions



Radiated Emissions



Substitution Method - Radiated Emissions

APPENDIX B

TEST DATA

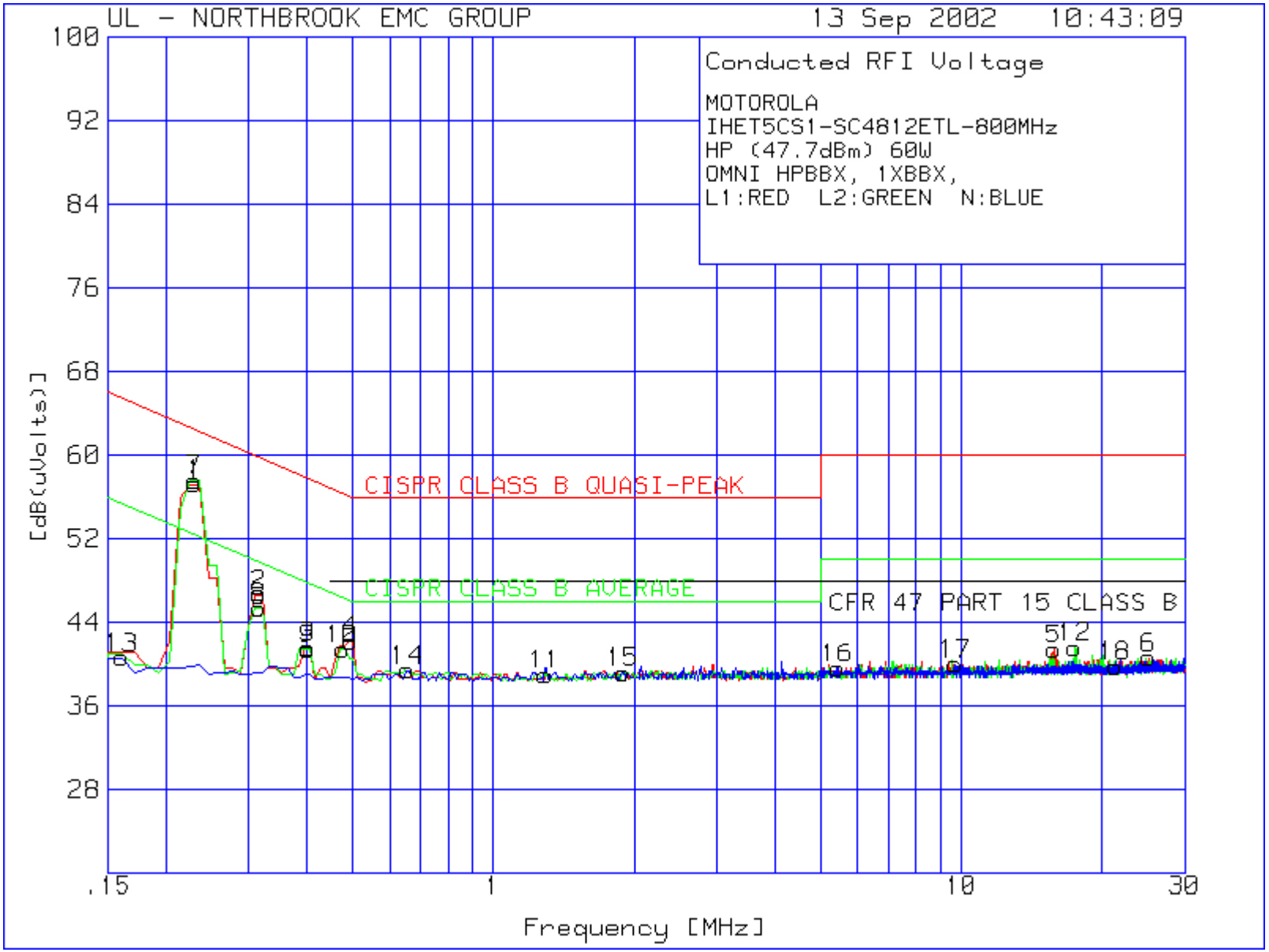
EMISSIONS

Conducted Emissions 150KHz – 30MHz
Radiated Electric Field Emissions 30MHz - 1000MHz
Radiated Electric Field Emissions 1GHz - 10GHz
Conducted Spurious Emissions 30MHz – 10GHz
Substitution Method - Radiated Emissions
Occupied Bandwidth
Rho

UNDERWRITERS LABORATORIES INC.
Conducted Emissions

Date Tested: 9-13-2002

Manufacturer	**:**	Motorola CDMA Wireless Products Customer Integration Engineering
Equipment Under Test	**:**	SC4812ETL 1X 800MHz Cellular Phone Base Station HP
Requirement	**:**	CFR 47 PART 15 B Class B
Detection Mode	**:**	Quasi-peak (qp) or Peak (pk) or Average (ave)
Bandwidth	**:**	200 Hz for measurements 9 kHz to 150 kHz 9 kHz for measurements 150 kHz to 30 MHz
Line	**:**	L1 and L2


UL – NORTHBROOK EMC GROUP
13 Sep 2002 10:43:09
Conducted RFI Voltage
MOTOROLA
IHET5CS1-SC4812ETL-800MHz
HP (47.7dBm) 60W
OMNI HPBBX, 1XBBX,
L1:RED L2:GREEN N:BLUE
CISPR CLASS B QUASI-PEAK
CISPR CLASS B AVERAGE
CFR 47 PART 15 CLASS B
100
92
84
76
68
60
52
44
36
28
[dB(uVolts)]
.15
1
10
30
Frequency [MHz]

MOTOROLA
IHET5CS1-SC4812ETL-800MHz
HP (47.7dBm) 60W
OMNI HPBBX, 1XBBX,
L1:RED L2:GREEN N:BLUE

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2
Line - L1 .15 - 30MHz						
.2594	45.82qp	9.5	0	55.32	61.5	51.5
			Margin [dB]:		-6.18	3.82
.2575	45.77qp	9.5	0	55.27	61.5	51.5
			Margin [dB]:		-6.23	3.77
.3446	32.82qp	9.6	0	42.42	59.1	49.1
			Margin [dB]:		-16.68	-6.68
.4328	27.6qp	9.7	0	37.3	57.2	47.2
			Margin [dB]:		-19.9	-9.9
Line - L2 .15 - 30MHz						
.1916	26.82qp	9.4	0	36.22	64	54
			Margin [dB]:		-27.78	-17.78
.2645	22.97qp	9.5	0	32.47	61.3	51.3
			Margin [dB]:		-28.83	-18.83
.3139	21.62qp	9.6	0	31.22	59.9	49.9
			Margin [dB]:		-28.68	-18.68
.3667	22.55qp	9.6	0	32.15	58.6	48.6
			Margin [dB]:		-26.45	-16.45

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: CISPR CLASS B QUASI-PEAK
LIMIT 2: CISPR CLASS B AVERAGE
LIMIT 3: CFR 47 PART 15 CLASS B
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

MOTOROLA
IHET5CS1-SC4812ETL-800MHz
HP (47.7dBm) 60W
OMNI HPBBX, 1XBBX,
L1:RED L2:GREEN N:BLUE

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3
Line - L1 .15 - 30MHz							
.26194	37.36av	9.6	0	46.96	61.4	51.4	
			Margin [dB]:		-14.44	-4.44	
.31506	16.37av	9.6	0	25.97	59.8	49.8	
			Margin [dB]:		-33.83	-23.83	
.40026	18.31av	9.6	0	27.91	57.8	47.8	
			Margin [dB]:		-29.89	-19.89	
.4961	14.12av	9.7	0	23.82	56.1	46.1	48
			Margin [dB]:		-32.28	-22.28	-24.18
Line - L2 .15 - 30MHz							
.26194	16.72av	9.5	0	26.22	61.4	51.4	
			Margin [dB]:		-35.18	-25.18	
.31506	17.08av	9.6	0	26.68	59.8	49.8	
			Margin [dB]:		-33.12	-23.12	
.40026	15.12av	9.6	0	24.72	57.8	47.8	
			Margin [dB]:		-33.08	-23.08	
.4748	14.01av	9.7	0	23.71	56.4	46.4	48
			Margin [dB]:		-32.69	-22.69	-24.29

NOTE: "+" - Indicates an emission level in excess of the
applicable limit (s).

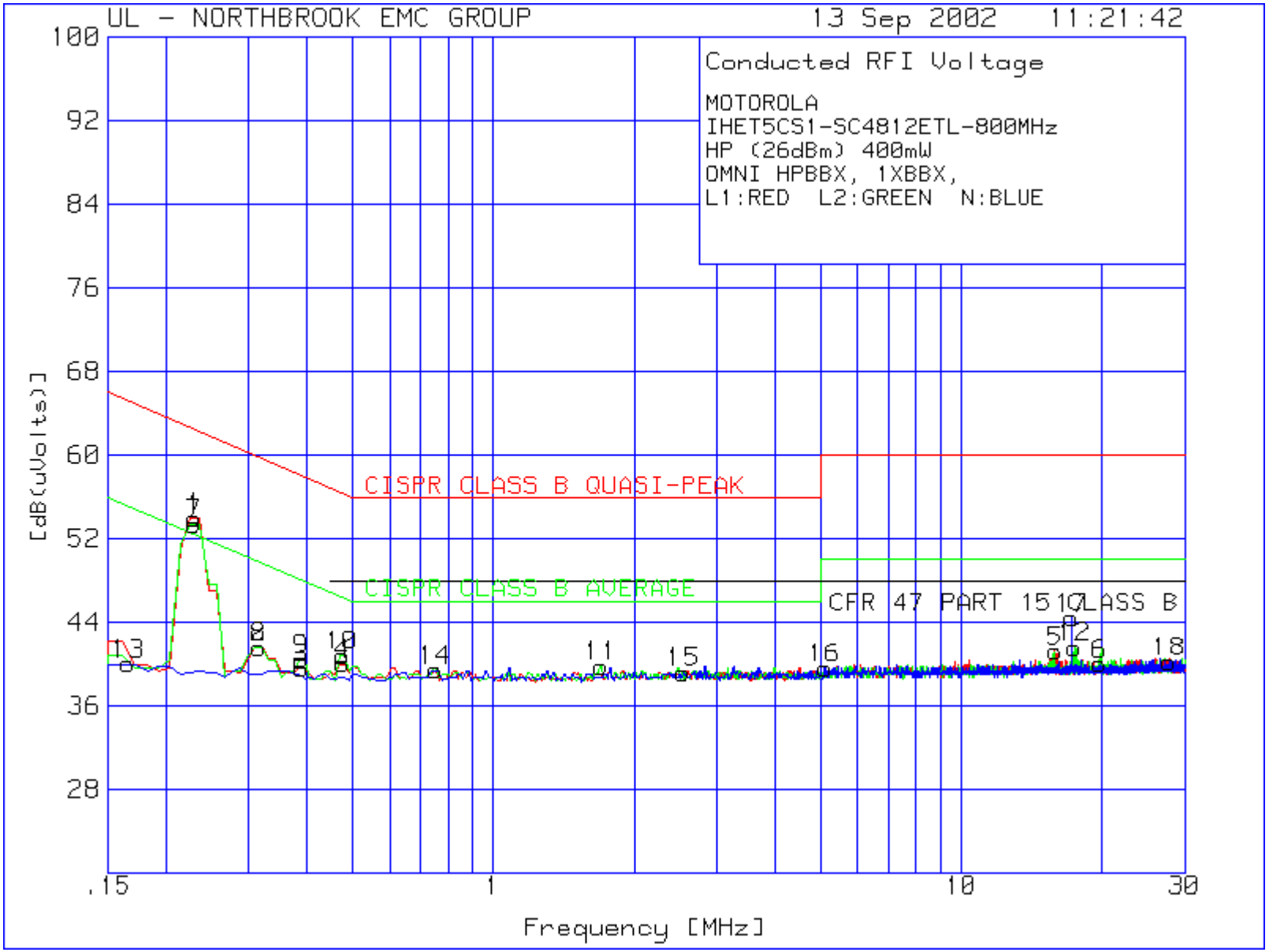
pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: CISPR CLASS B QUASI-PEAK
LIMIT 2: CISPR CLASS B AVERAGE
LIMIT 3: CFR 47 PART 15 CLASS B
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

UNDERWRITERS LABORATORIES INC.
Conducted Emissions

Date Tested: 9-13-2002

Manufacturer	**:**	Motorola CDMA Wireless Products Customer Integration Engineering
Equipment Under Test	**:**	SC4812ETL 1X 800MHz Cellular Phone Base Station LP
Requirement	**:**	CFR 47 PART 15 B Class B
Detection Mode	**:**	Quasi-peak (qp) or Peak (pk) or Average (ave)
Bandwidth	**:**	200 Hz for measurements 9 kHz to 150 kHz 9 kHz for measurements 150 kHz to 30 MHz
Line	**:**	L1 and L2


UL - NORTHBROOK EMC GROUP
13 Sep 2002 11:21:42
Conducted RFI Voltage
MOTOROLA
IHET5CS1-SC4812ETL-800MHz
HP (26dBm) 400mW
OMNI HPBBX, 1XBBX,
L1:RED L2:GREEN N:BLUE
CISPR CLASS B QUASI-PEAK
CISPR CLASS B AVERAGE
CFR 47 PART 15 CLASS B
dB(uVolts)
Frequency [MHz]
100
92
84
76
68
60
52
44
36
28
.15
1
10
30

MOTOROLA
IHET5CS1-SC4812ETL-800MHz
HP (26dBm) 400mW
OMNI HPBBX, 1XBBX,
L1:RED L2:GREEN N:BLUE

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2
Line - L1 .15 - 30MHz						
.26	41.67qp	9.6	0	51.27	61.4	51.4
			Margin [dB]:		-10.13	-.13
Line - L2 .15 - 30MHz						
.1634	27.8qp	9.4	0	37.2	65.3	55.3
			Margin [dB]:		-28.1	-18.1

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2
Line - L1 .15 - 30MHz						
.26194	34.29av	9.6	0	43.89	61.4	51.4
			Margin [dB]:		-17.51	-7.51
			Margin [dB]:			
Line - L2 .15 - 30MHz						
.26194	19.4av	9.5	0	28.9	61.4	51.4
			Margin [dB]:		-32.5	-22.5

NOTE: "+" - Indicates an emission level in excess of the
applicable limit (s).

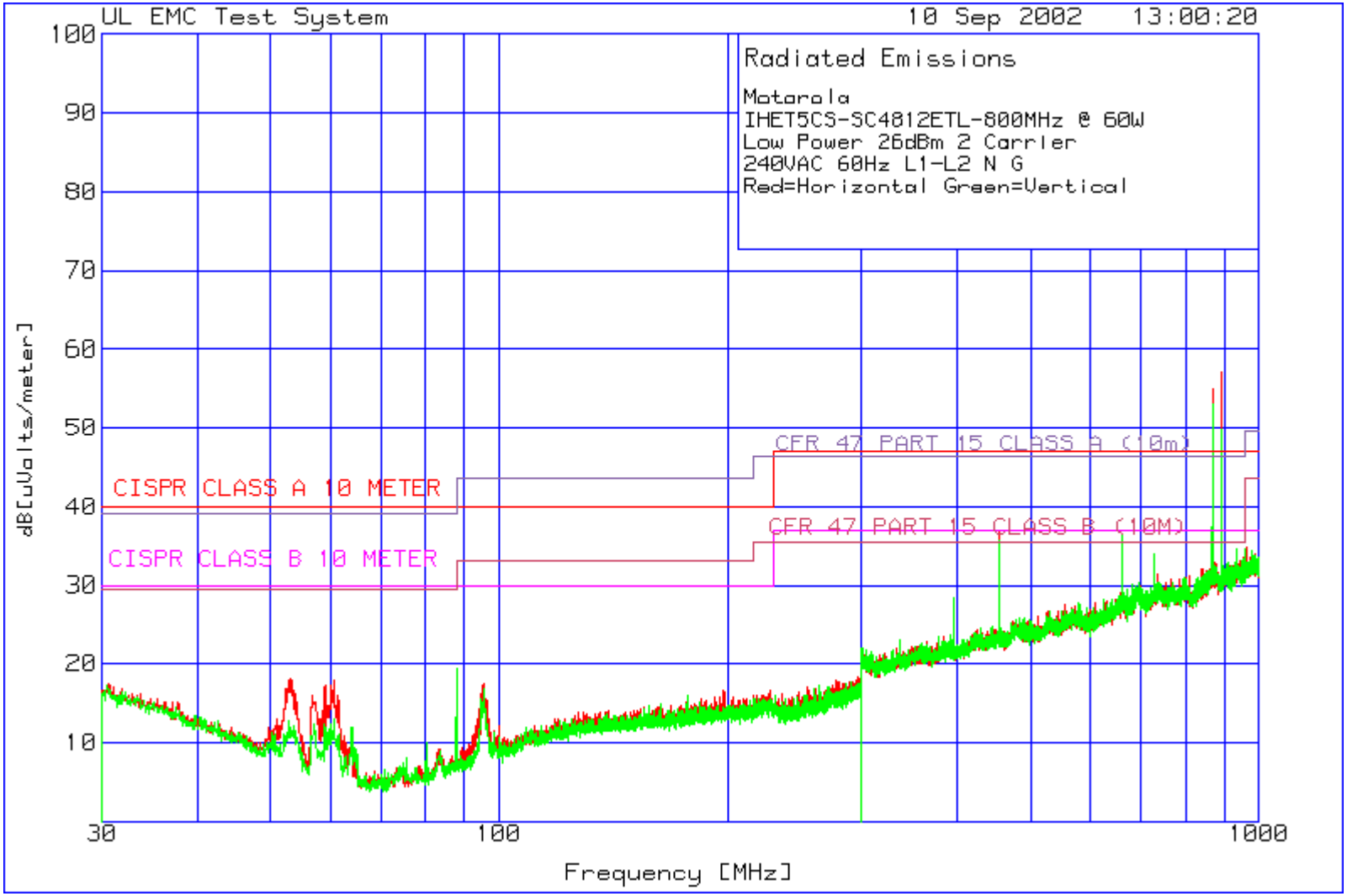
pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

LIMIT 1: CISPR CLASS B QUASI-PEAK
LIMIT 2: CISPR CLASS B AVERAGE
LIMIT 3: CFR 47 PART 15 CLASS B
LIMIT 4: NONE

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 9-10-2002

Manufacturer	**:**	Motorola CDMA Wireless Products Customer Integration Engineering
Equipment Under Test	**:**	SC4812ETL 800MHz 1X Cellular Phone Base Station
Requirement	**:**	CFR 47 PART 15 B Class B
Detection Mode	**:**	Quasi-peak (qp)
Bandwidth	**:**	120 kHz, 30-1000MHz
Measurement Distance	**:**	10 meter
Antenna Type	**:**	30 - 300MHz, Biconical 300 - 1000MHz, Log-Periodic

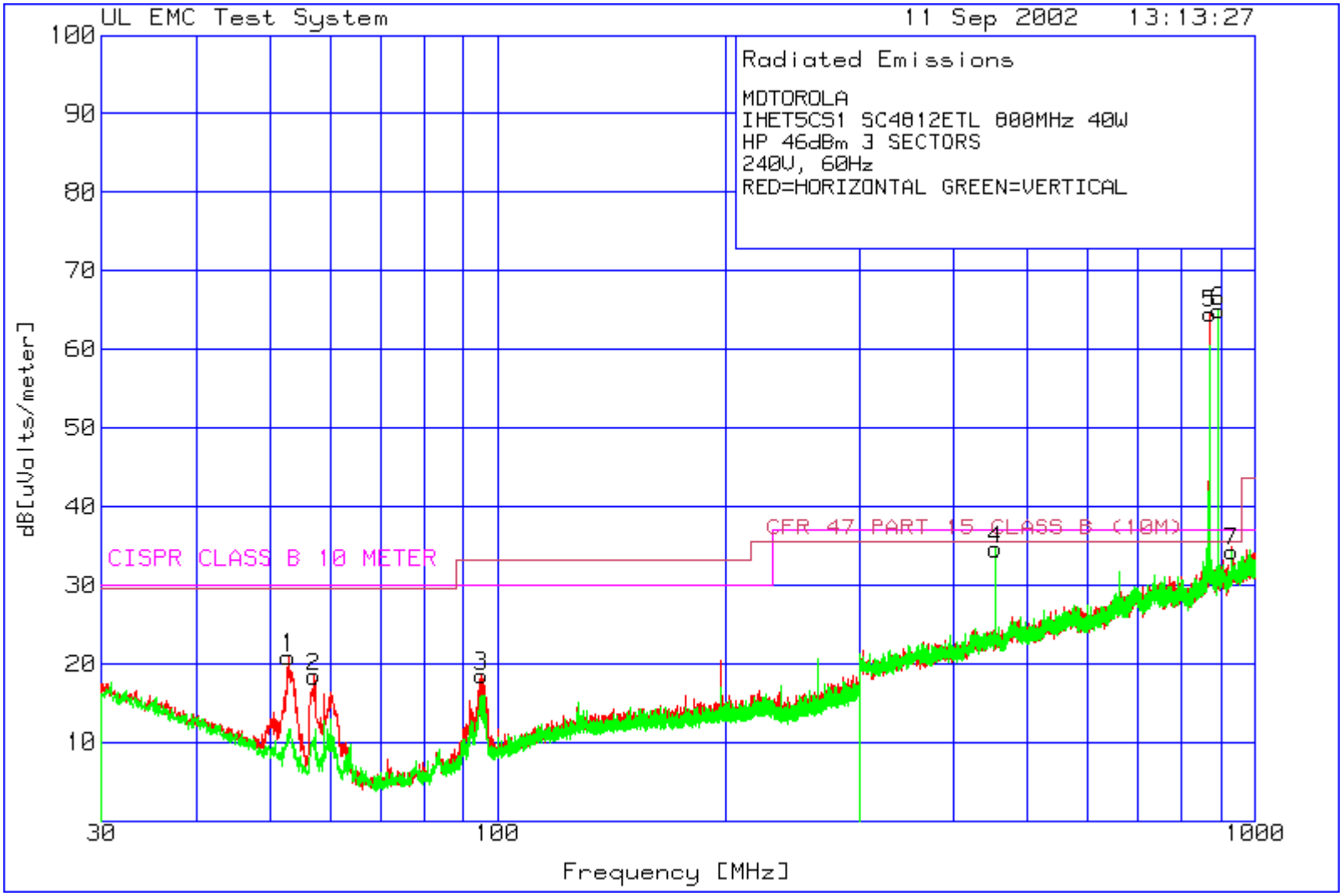

UL EMC Test System
10 Sep 2002 13:00:20
Radiated Emissions
Motorola
IHET5CS-SC4812ETL-800MHz @ 60W
Low Power 26dBm 2 Carrier
240VAC 60Hz L1-L2 N G
Red=Horizontal Green=Vertical
CISPR CLASS A 10 METER
CISPR CLASS B 10 METER
CFR 47 PART 15 CLASS A (10m)
CFR 47 PART 15 CLASS B (10M)
dB[uVolts/meter]
100
90
80
70
60
50
40
30
20
10
30
100
1000
Frequency [MHz]

Motorola
IHET5CS-SC4812ETL-800MHz @ 60W
Low Power 26dBm 2 Carrier
240VAC 60Hz L1-L2 N G
Red=Horizontal Green=Vertical

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Azimuth Factor [dB]	Level [degs]	Limit 1 Height [cm]	Margin 1[dB]	Limit 2	Margin 2[dB]	Limit 3	Margin 3[dB]	Limit 4	Margin 4[dB]	Polarity
Horizontal 300 - 1000MHz					dB[uVolts/meter]									
660.0087	11.65	qp	2.9	20.5	35.05	47	-11.95	37	-1.95	46.4	-11.35	35.6	-.55	59	120	Vert
726.0109	8.46	qp	3.2	21.1	32.76	47	-14.24	37	-4.24	46.4	-13.64	35.6	-2.84	208	101	Vert
935.2572	.89	qp	3.8	24.2	28.89	47	-18.11	37	-8.11	46.4	-17.51	35.6	-6.71	2	119	Vert
958.8344	1.19	qp	3.7	24.2	29.09	47	-17.91	37	-7.91	46.4	-17.31	35.6	-6.51	55	175	Vert

LIMIT 1: CISPR CLASS A 10 METER
LIMIT 2: CISPR CLASS B 10 METER
LIMIT 3: CFR 47 PART 15 CLASS A (10m)
LIMIT 4: CFR 47 PART 15 CLASS B (10M)
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

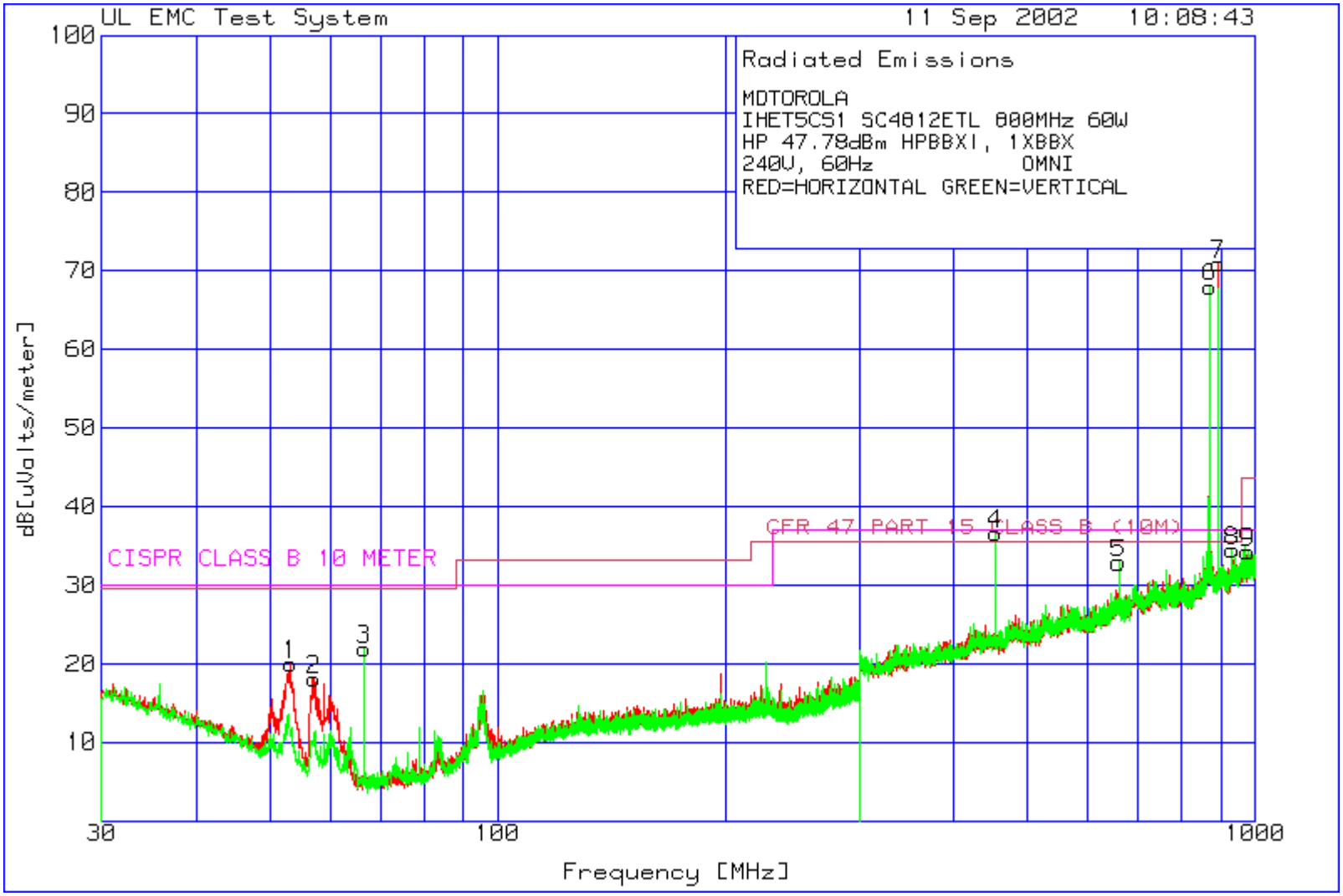

UL EMC Test System
11 Sep 2002 13:13:27
Radiated Emissions
MOTOROLA
IHET5CS1 SC4812ETL 800MHz 40W
HP 46dBm 3 SECTORS
240V, 60Hz
RED=HORIZONTAL GREEN=VERTICAL
CISPR CLASS B 10 METER
CFR 47 PART 15 CLASS B (10M)
dB[uVolts/meter]
Frequency [MHz]
100
90
80
70
60
50
40
30
20
10
30
100
1000

MOTOROLA
IHET5CS1 SC4812ETL 800MHz 40W
HP 46dBm 3 SECTORS
240V, 60Hz
RED=HORIZONTAL GREEN=VERTICAL

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Azimuth Factor [dB]	Transducer [degs] Height [cm] dB[uVolts/meter]	Level	Limit 1 Polarity	Margin 1[dB]	Limit 2	Margin 2[dB]	Limit 3	Margin 3[dB]	Limit 4	Margin 4[dB]
Vertical 300 - 1000MHz														
454.1827	2.08	qp	2.3	16.9	21.28	37	-15.72	35.6	-14.32	0	330	Vert		
929.9823	.47	qp	3.8	24	28.27	37	-8.73	35.6	-7.33	282	172	Vert		

LIMIT 1: NONE
LIMIT 2: CISPR CLASS B 10 METER
LIMIT 3: NONE
LIMIT 4: CFR 47 PART 15 CLASS B (10M)
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector


UL EMC Test System
11 Sep 2002 10:08:43
Radiated Emissions
MOTOROLA
IHET5CS1 SC4812ETL 800MHz 60W
HP 47.78dBm HPBBXI, 1XBBX
240V, 60Hz OMNI
RED=HORIZONTAL GREEN=VERTICAL
CISPR CLASS B 10 METER
CFR 47 PART 15 CLASS B (10M)
dB[uVolts/meter]
Frequency [MHz]
100
90
80
70
60
50
40
30
20
10
30
100
1000

MOTOROLA
IHET5CS1 SC4812ETL 800MHz 60W
HP 47.78dBm HPBBX1, 1XBBX
240V, 60Hz OMNI
RED=HORIZONTAL GREEN=VERTICAL

Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Azimuth Factor [dB]	Transducer [degs] Height [cm] dB[uVolts/meter]	Level	Limit 1 Polarity	Margin 1[dB]	Limit 2	Margin 2[dB]	Limit 3	Margin 3[dB]
Limit 4	Margin 4[dB]											
Vertical 300 - 1000MHz												
454.0899	.52	qp	2.3	16.9	19.72	37	-17.28	35.6	-15.88	3	263	Vert
658.3161	.48	qp	2.9	20.5	23.88	37	-13.12	35.6	-11.72	56	200	Vert
931.3722	.48	qp	3.8	24.1	28.38	37	-8.62	35.6	-7.22	327	151	Vert

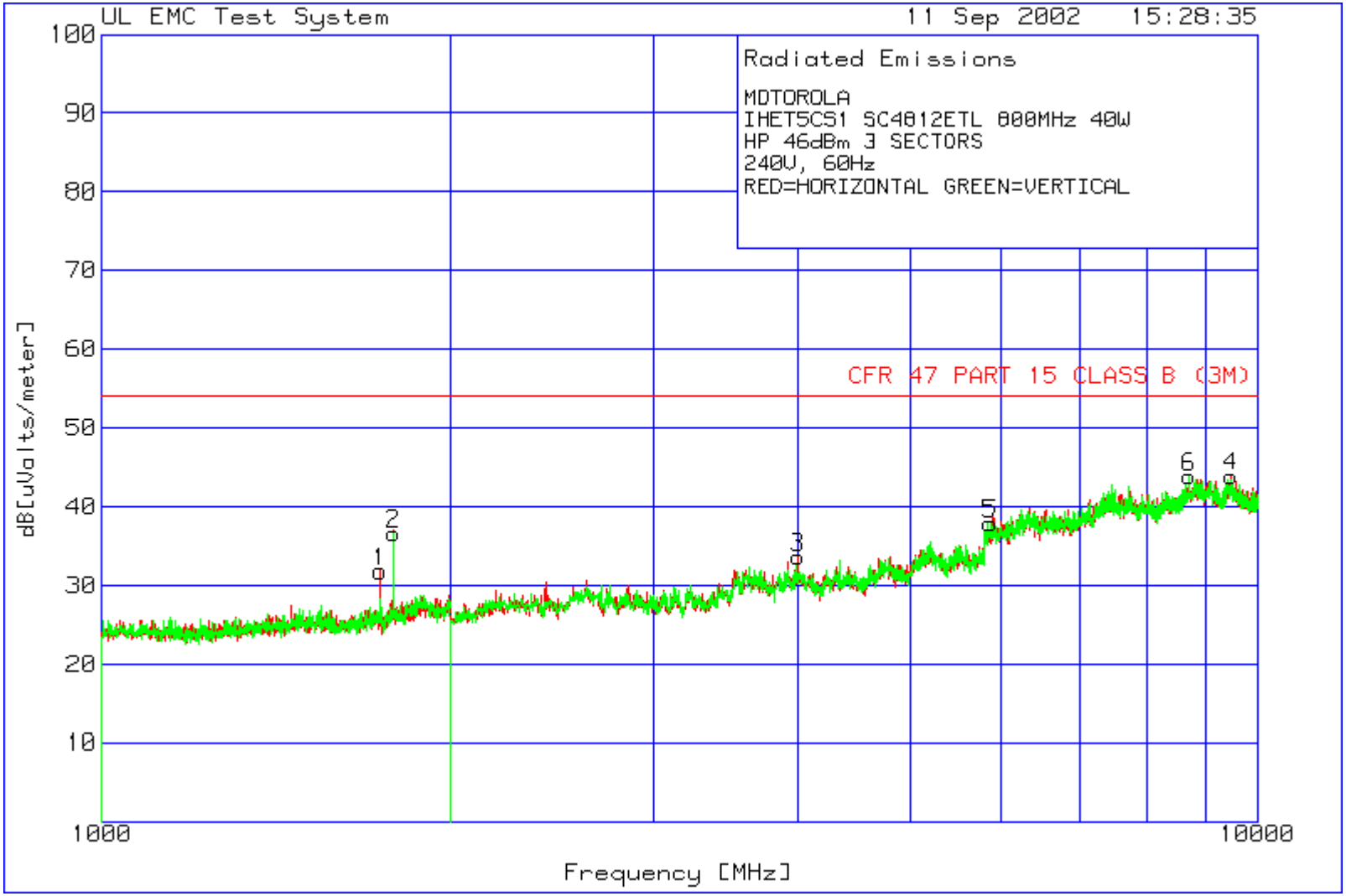
LIMIT 1: NONE
LIMIT 2: CISPR CLASS B 10 METER
LIMIT 3: NONE
LIMIT 4: CFR 47 PART 15 CLASS B (10M)
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 9-11-2002

Manufacturer	**:**	Motorola CDMA Wireless Products Customer Integration Engineering
Equipment Under Test	**:**	SC4812ETL 1X 800MHz Cellular Phone Base Station
Requirement	**:**	CFR 47 PART 15 B Class B
Detection Mode	**:**	Average (av)
Bandwidth	**:**	100KHz, 1-10GHz
Measurement Distance	**:**	3 meter
Antenna Type	**:**	1-10GHz, Horn

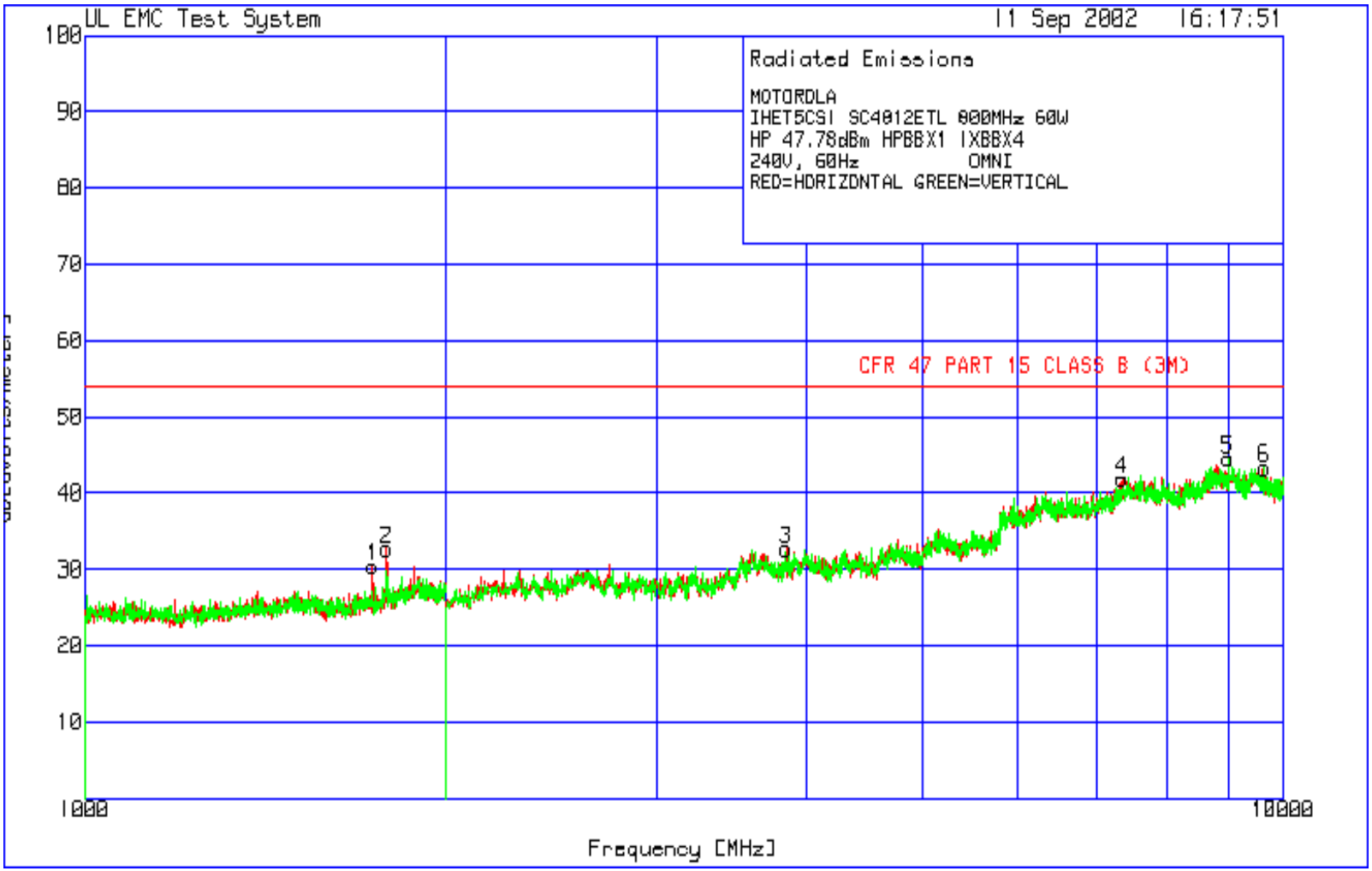

UL EMC Test System
11 Sep 2002 15:28:35
Radiated Emissions
MOTOROLA
IHET5CS1 SC4812ETL 800MHz 40W
HP 46dBm 3 SECTORS
240V, 60Hz
RED=HORIZONTAL GREEN=VERTICAL
CFR 47 PART 15 CLASS B (3M)
dB[uVolts/meter]
Frequency [MHz]
100
90
80
70
60
50
40
30
20
10
1000
10000

MOTOROLA
IHET5CS1 SC4812ETL 800MHz 40W
HP 46dBm 3 SECTORS
240V, 60Hz
RED=HORIZONTAL GREEN=VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Horizontal 1000 - 2000MHz											
1	1739	34	pk	-30	27.8	31.8	54	-22.2	63	200	Horz
Horizontal 1000 - 2000MHz											
2	1786	38.3	pk	-29.8	28.1	36.6	54	-17.4	2	100	Vert
Horizontal 2000 - 10000MHz											
3	3998.668	27.1	pk	-28	34.5	33.6	54	-20.4	337	199	Horz
4	9472.352	26.1	pk	-20.8	38.6	43.9	54	-10.1	337	199	Horz
Horizontal 2000 - 10000MHz											
5	5864.091	26.3	pk	-25.1	36.7	37.9	54	-16.1	358	199	Vert
6	8704.863	26.2	pk	-21.4	39	43.8	54	-10.2	352	199	Vert

LIMIT 1: CFR 47 PART 15 CLASS B (3M)
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

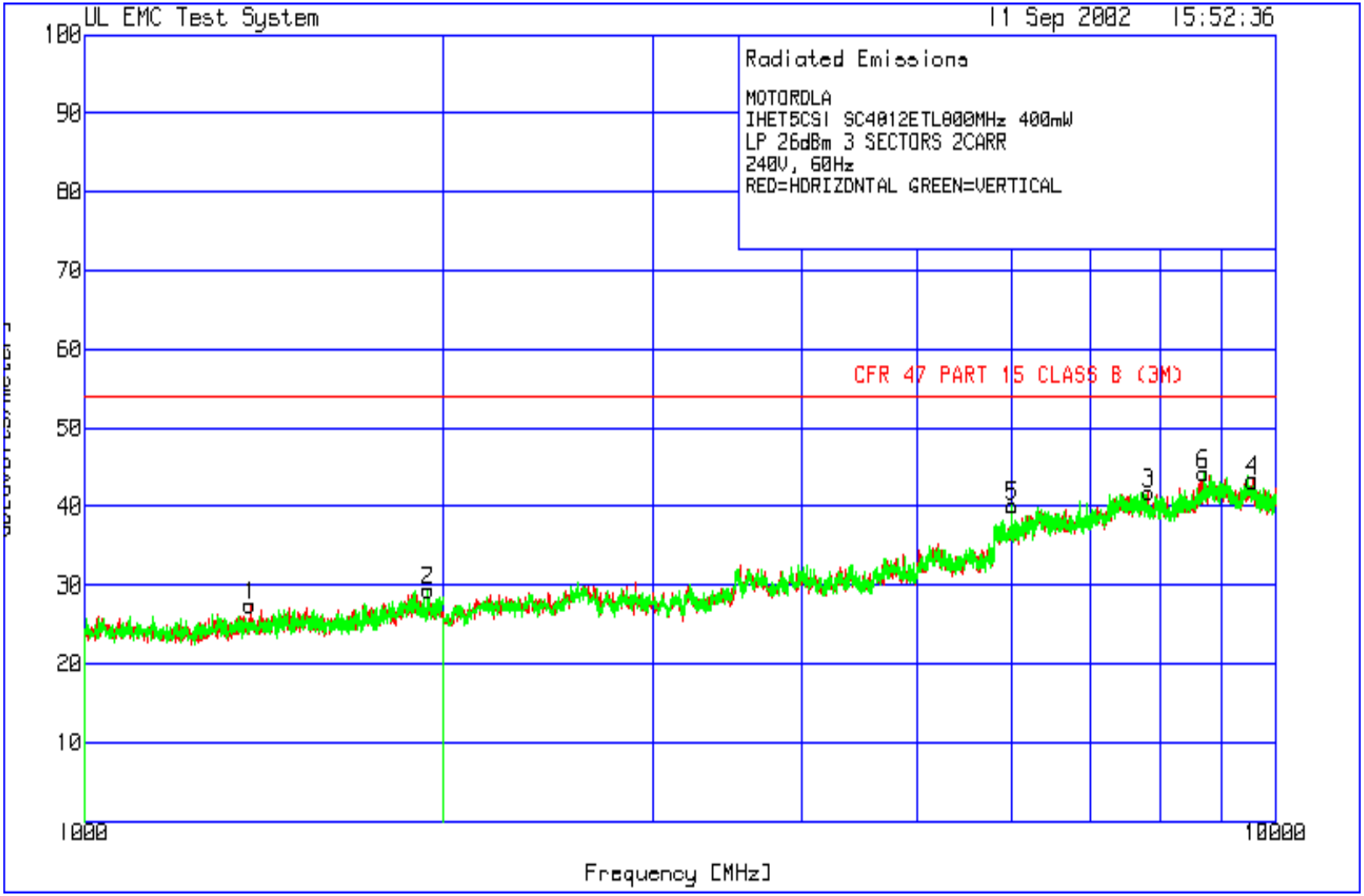

UL EMC Test System
11 Sep 2002 16:17:51
Radiated Emissions
MOTORDLA
IHET5CSI SC4012ETL 800MHz 60W
HP 47.78dBm HPBBX1 IXBBX4
240V, 60Hz OMNI
RED=HORIZONTAL GREEN=VERTICAL
CFR 47 PART 15 CLASS B (3M)
100
90
80
70
60
50
40
30
20
10
1000
10000
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL 800MHz 60W
HP 47.78dBm HPBBX1 1XBBX4
240V, 60Hz OMNI
RED=HORIZONTAL GREEN=VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Horizontal 1000 - 2000MHz											
1	1739	32.6	pk	-30	27.8	30.4	54	-23.6	82	199	Horz
2	1786	34.4	pk	-29.8	28.1	32.7	54	-21.3	22	199	Horz
Horizontal 2000 - 10000MHz											
3	3849.434	27.3	pk	-28.6	34	32.7	54	-21.3	337	199	Horz
4	7340.44	25.7	pk	-21.7	37.9	41.9	54	-12.1	6	199	Horz
Horizontal 2000 - 10000MHz											
5	8998.001	27	pk	-22.4	39.9	44.5	54	-9.5	337	199	Vert
6	9637.575	26.9	pk	-22.2	38.6	43.3	54	-10.7	124	199	Vert

LIMIT 1: CFR 47 PART 15 CLASS B (3M)
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector


UL EMC Test System
11 Sep 2002 15:52:36
Radiated Emissions
MOTORDLA
IHET5CSI SC4812ETL800MHz 400mW
LP 26dBm 3 SECTORS 2CARR
240V, 60Hz
RED=HORIZONTAL GREEN=VERTICAL
CFR 47 PART 15 CLASS B (3M)
100
90
80
70
60
50
40
30
20
10
1000
10000
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL800MHz 400mW
LP 26dBm 3 SECTORS 2CARR
240V, 60Hz
RED=HORIZONTAL GREEN=VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Polarity	Gain/Loss Type	Gain/Loss Factor [dB]	Transducer Factor	Level [dB[uVolts/meter]]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	
Horizontal 1000 - 2000MHz												
1	1378	30.7	pk	-29.5	26.3	27.5	54	-26.5	263	199	Horz	
Horizontal 1000 - 2000MHz												
2	1944	30.2	pk	-29.6	28.8	29.4	54	-24.6	243	199	Vert	
Horizontal 2000 - 10000MHz												
3	7822.785	26.3	pk	-22.3	37.8	41.8	54	-12.2	6	199	Horz	
4	9562.958	26	pk	-21.2	38.5	43.3	54	-10.7	11	199	Horz	
Horizontal 2000 - 10000MHz												
5	6007.995	28.2	pk	-25	36.9	40.1	54	-13.9	326	199	Vert	
6	8699.534	26.8	pk	-21.5	38.9	44.2	54	-9.8	352	199	Vert	

LIMIT 1: CFR 47 PART 15 CLASS B (3M)
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

UNDERWRITERS LABORATORIES INC.
Radiated Emissions Substitution Method

Date Tested: 10-4-2002

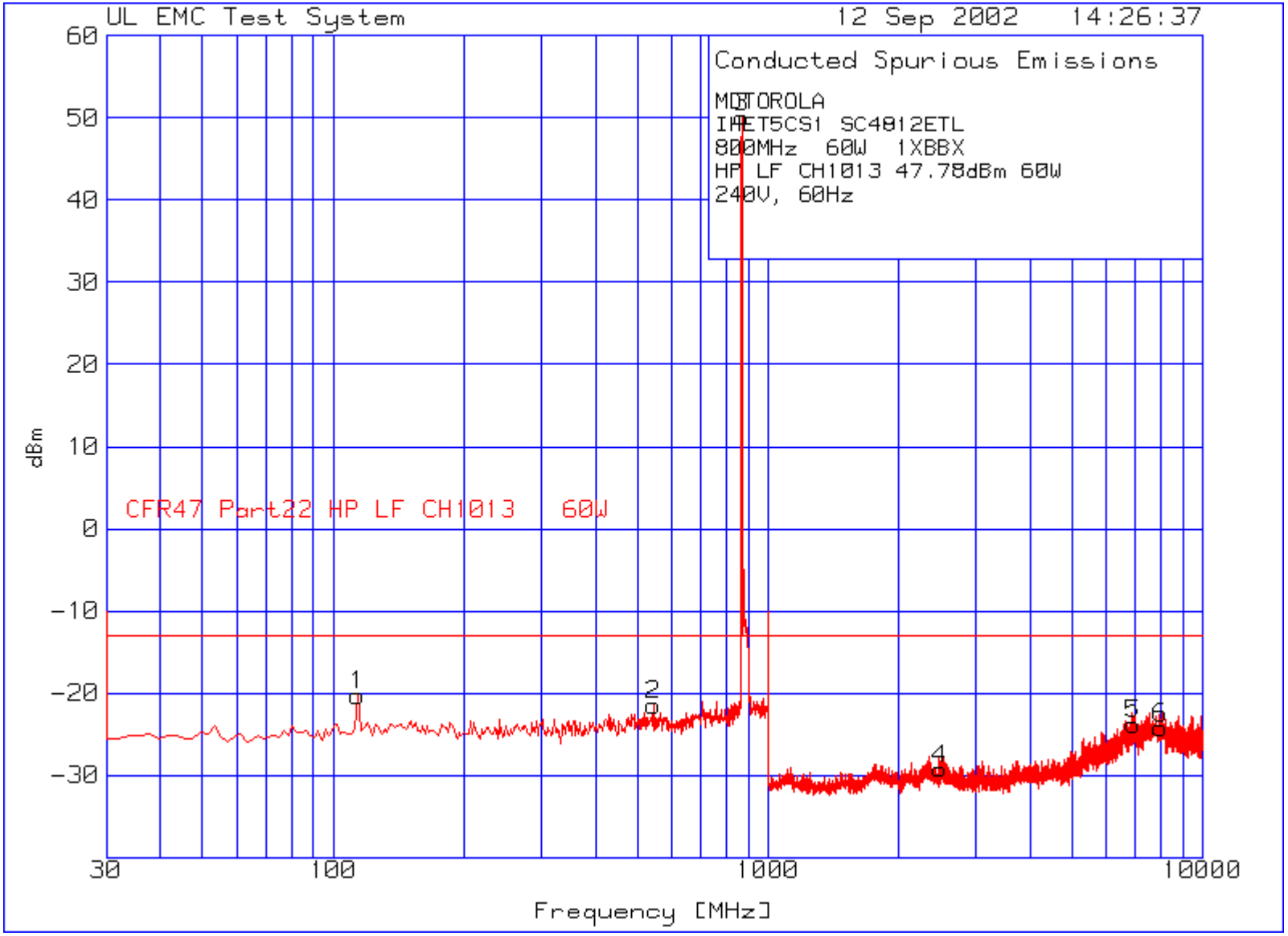
Manufacturer : MOTOROLA
Equipment Under Test : IHET5CS1 SC4812ETL 1X 800MHz 40W
: HP 46dBm 3 sectors
Requirement : FCC Part 22/24 : Substitution Method–TIA/EIA–603 :1992, : Section 2.2.12*
Detection Mode : Pick
Measurement Distance : 3 meter

Radiated			Substituted Power					
Spurious Fr. (MHz) **channel** **mode of operation**	**Antenna Polarity**	**Measured Radiated Field Strength (dBuV/m)**	**Signal Generator Output Level (dBm)**	**Tx Antenna Terminal Voltage (dBm)**	**Substitution Antenna Gain (dBi)**	**Calculated EIRP (dBm)**	**EDRP (EIRP -2.15) (dBm)**	FCC Part 22/24 MAX LIMIT (dBm)
1739	**H**	**31.8**	**-66.8**	**-68.3**	**7**	**-61.3**	**-63.45**	**- 13**
1786	**V**	**36.6**	**-62.3**	**-63.8**	**7**	**-56.8**	**-58.95**	**- 13**

UNDERWRITERS LABORATORIES INC.
Conducted Spurious Emissions

Date Tested: 9-12-2002

Manufacturer	**:**	Motorola CDMA Wireless products Customer Integration Engineering
Equipment Under Test	**:**	SC4812ETL 1X 800MHz Cellular Phone Base Station
Requirement	**:**	CFR47 Part 22/24 , ANSI/TIAEIA-603-1992, Section 2.2.12
Detection Mode	**:**	Quasi-peak (qp) or Peak (pk) or Average (ave)

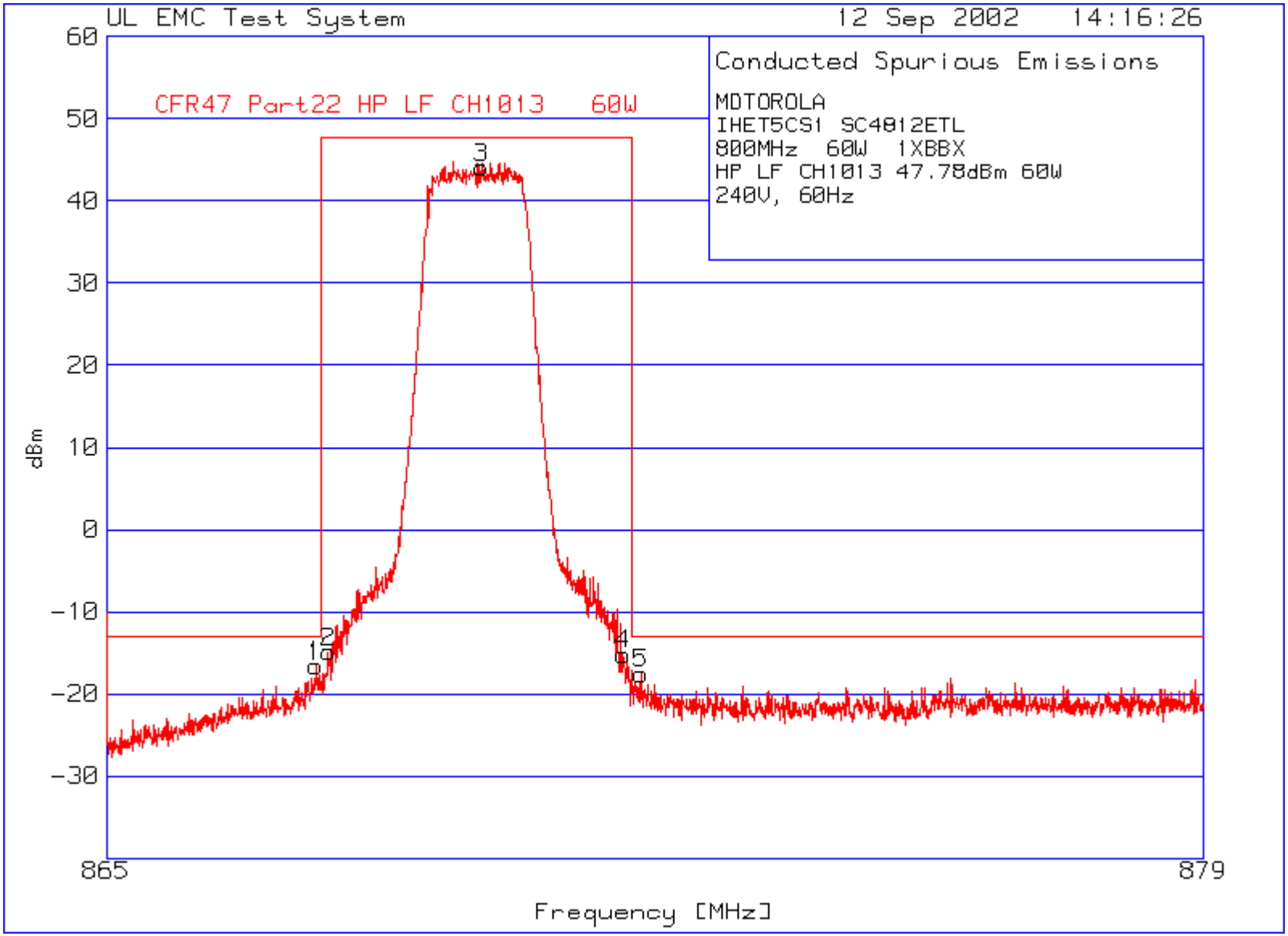

UL EMC Test System
12 Sep 2002 14:26:37
Conducted Spurious Emissions
MOTOROLA
IMET5CS1 SC4812ETL
800MHz 60W 1XBBX
HP LF CH1013 47.78dBm 60W
240V, 60Hz
CFR47 Part22 HP LF CH1013 60W
dBm
60
50
40
30
20
10
0
-10
-20
-30
30
100
1000
10000
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
HP LF CH1013 47.78dBm 60W
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor		Level dBm	Limit 1 dBm	Margin 1[dB]
Range: 1 30 - 1000MHz									
1	113.5872	36.66	pk	50.1	-107	-20.24		-13	-7.24
2	545.1303	34.95	pk	50.6	-107	-21.45		-13	-8.45
	carrier frequency								
3	869.7595	106.1	pk	51	-107	50.1	47.8	2.3	
Range: 2 1000 - 10000MHz									
4	2485.297	25.87	pk	51.9	-107	-29.23		-13	-16.23
5	6917.784	29.62	pk	53.6	-107	-23.78		-13	-10.78
6	7994.399	28.68	pk	54.1	-107	-24.22		-13	-11.22

LIMIT 1: CFR47 Part22 HP LF CH1013 60W
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

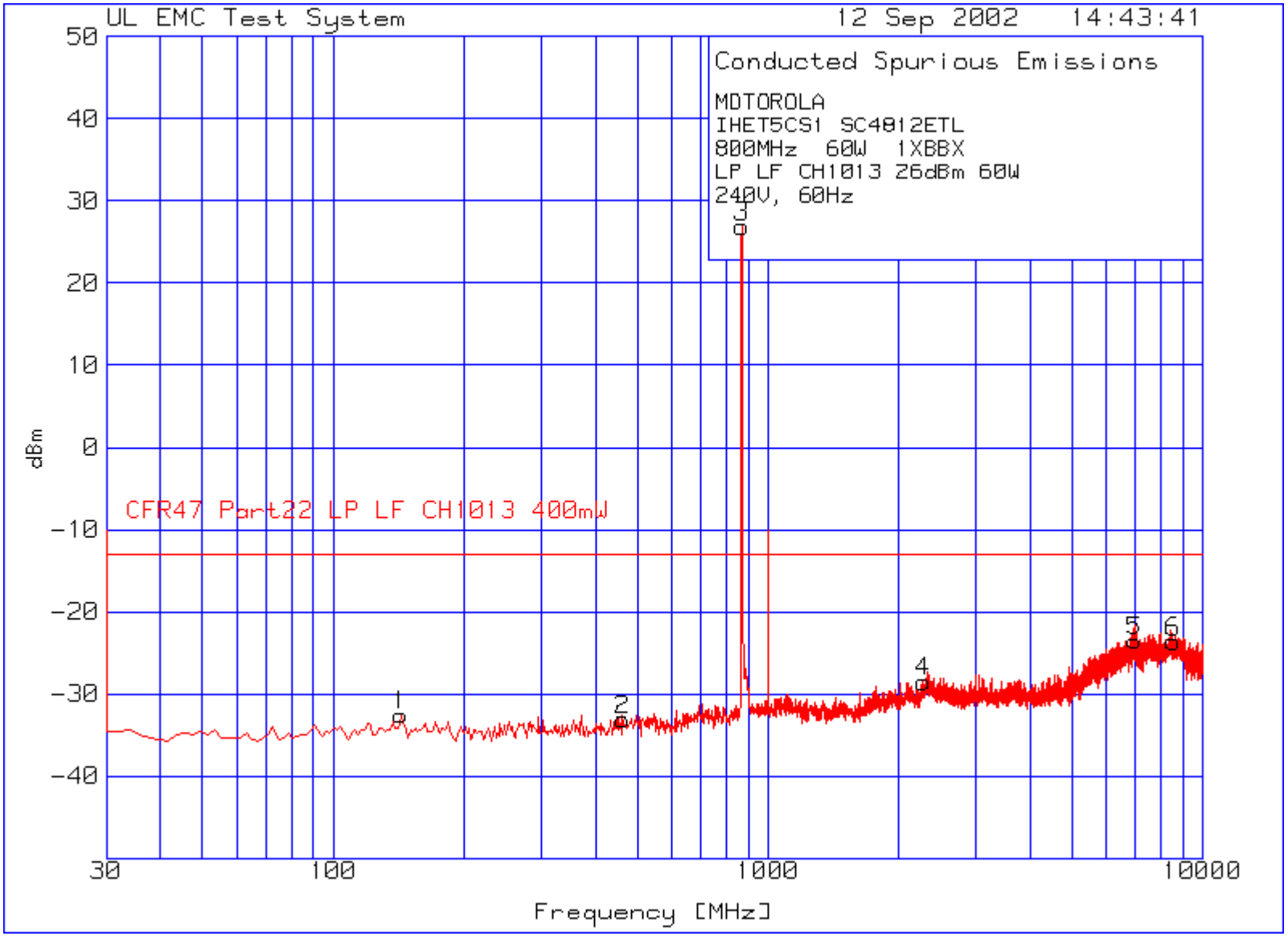

UL EMC Test System
12 Sep 2002 14:16:26
Conducted Spurious Emissions
MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
HP LF CH1013 47.78dBm 60W
240V, 60Hz
CFR47 Part22 HP LF CH1013 60W
60
50
40
30
20
10
0
-10
-20
-30
dBm
865
879
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
HP LF CH1013 47.78dBm 60W
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level	Limit 1 dBm	Margin 1[dB]
Range: 1 865 - 879MHz								
1	867.6543	39.42	pk	51	-107 -16.58		-13	-3.58
2	867.8154	41.12	pk	51	-107 -14.88		47.8	-62.68
3	869.7624	100.07	pk	51	-107 44.07	47.8	-3.73	
4	871.5623	40.86	pk	51	-107 -15.14		47.8	-62.94
5	871.7934	38.51	pk	51	-107 -17.49		-13	-4.49

LIMIT 1: CFR47 Part22 HP LF CH1013 60W
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

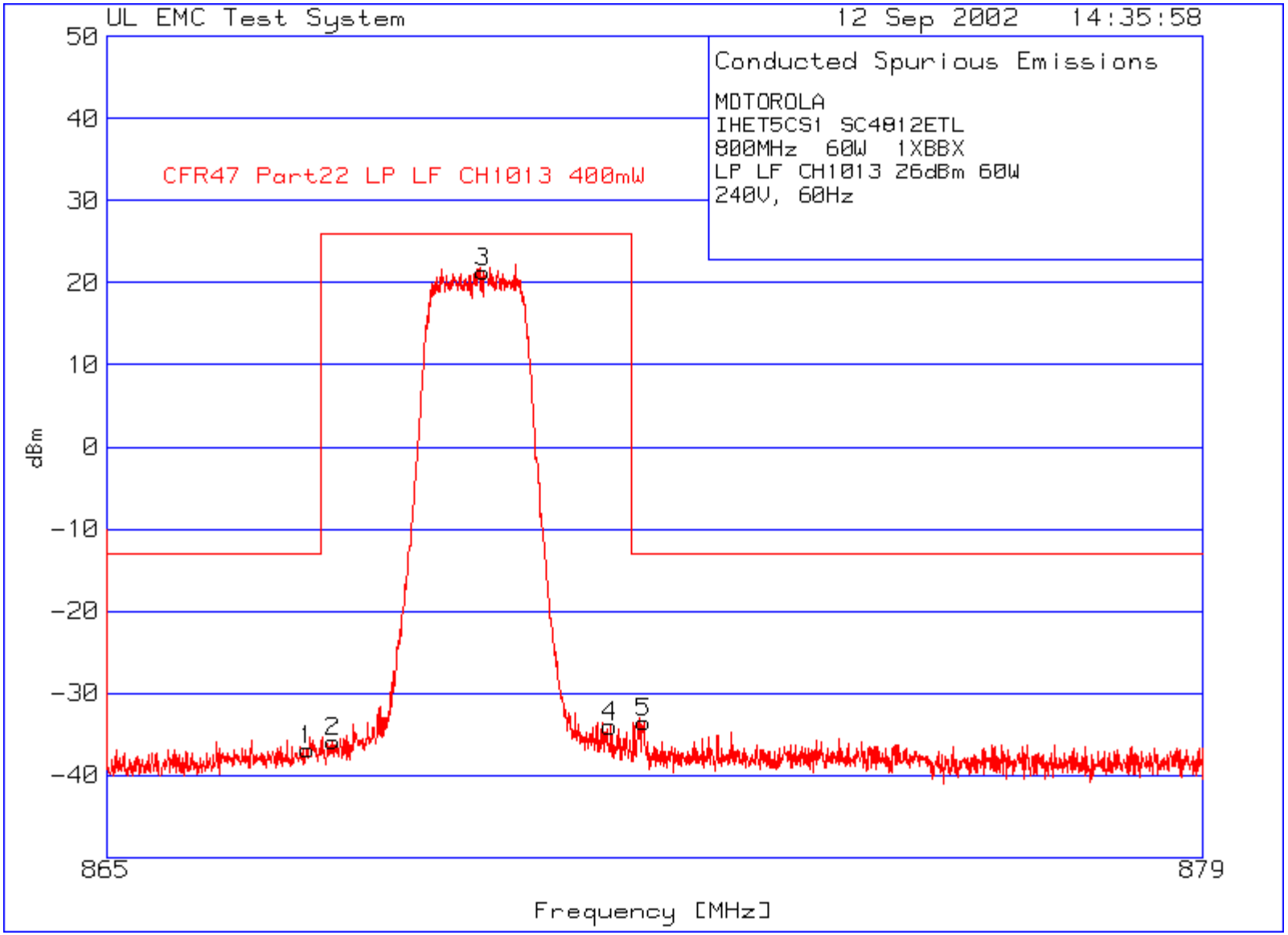

UL EMC Test System
12 Sep 2002 14:43:41
Conducted Spurious Emissions
MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
LP LF CH1013 26dBm 60W
240V, 60Hz
CFR47 Part22 LP LF CH1013 400mW
dBm
50
40
30
20
10
0
-10
-20
-30
-40
30
100
1000
10000
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
LP LF CH1013 26dBm 60W
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level dBm	Limit 1 dBm	Margin 1[dB]
Range: 1 30 - 1000MHz								
1	142.7455	24.36	pk	50.1	-107 -32.54		-13	-19.54
2	463.487 carrier frequency	23.4	pk	50.5	-107 -33.1	-13	-20.1	
3	869.7595	82.9	pk	51	-107 26.9	26	.9	
Range: 2 1000 - 10000MHz								
4	2271.054	26.69	pk	51.8	-107 -28.51		-13	-15.51
5	6975.395	29.64	pk	53.8	-107 -23.56		-13	-10.56
6	8559.712	29.53	pk	53.8	-107 -23.67		-13	-10.67

LIMIT 1: CFR47 Part22 LP LF CH1013 400mW
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

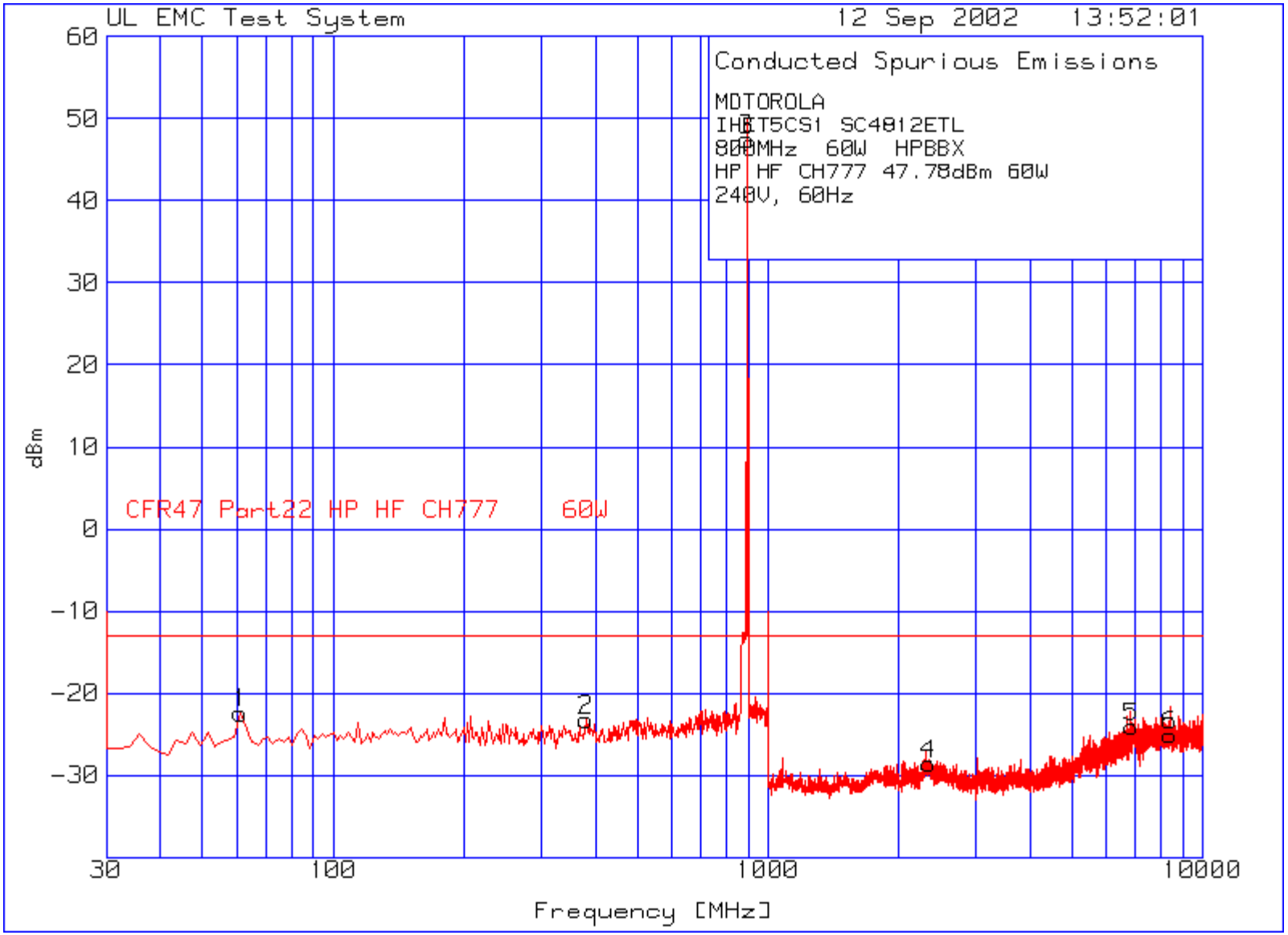

UL EMC Test System
12 Sep 2002 14:35:58
Conducted Spurious Emissions
MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
LP LF CH1013 26dBm 60W
240V, 60Hz
CFR47 Part22 LP LF CH1013 400mW
50
40
30
20
10
0
-10
-20
-30
-40
dBm
865
879
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W 1XBBX
LP LF CH1013 26dBm 60W
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level dBm	Limit 1	Margin 1[dB]
Range: 1 865 - 879MHz								
1	867.5493	19.14	pk	51	-107	-36.86	-13	-23.86
2	867.8714	20.12	pk	51	-107	-35.88	26	-61.88
3	869.7904	77.3	pk	51	-107	21.3	26	-4.7
4	871.4082	21.99	pk	51	-107	-34.01	26	-60.01
5	871.8354	22.46	pk	51	-107	-33.54	-13	-20.54

LIMIT 1: CFR47 Part22 LP LF CH1013 400mW
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

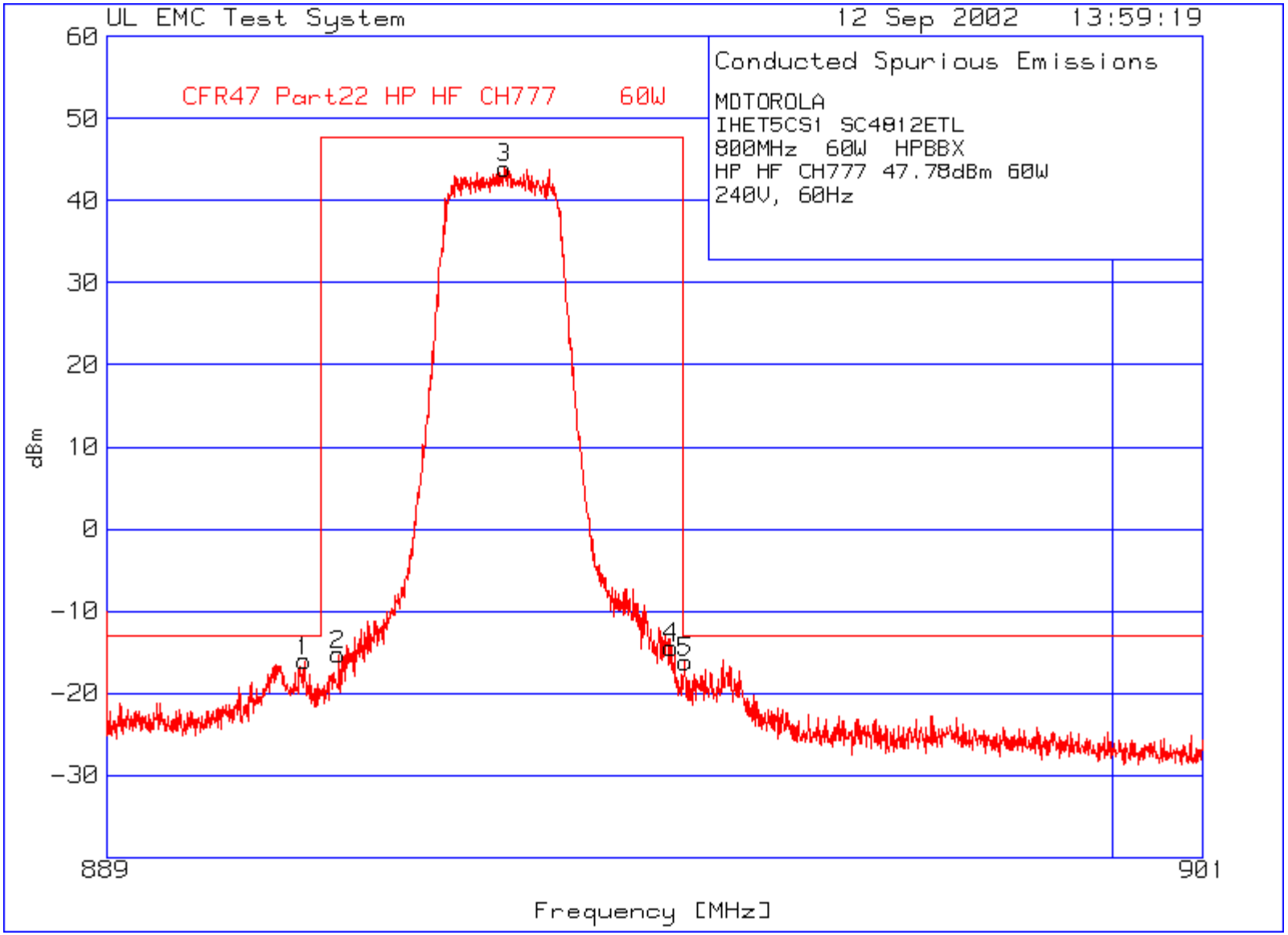

UL EMC Test System
12 Sep 2002 13:52:01
Conducted Spurious Emissions
MOTOROLA
IH[illegible]T5CS1 SC4812ETL
800MHz 60W HPBBX
HP HF CH777 47.78dBm 60W
240V, 60Hz
CFR47 Part22 HP HF CH777 60W
dBm
60
50
40
30
20
10
0
-10
-20
-30
30
100
1000
10000
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W HPBBX
HP HF CH777 47.78dBm 60W
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level dBm	Limit 1	Margin 1[dB]
Range: 1 30 - 1000MHz								
1	61.1022	34.61	pk	50	-107	-22.39	-13	-9.39
2	381.8437	33.38	pk	50.4	-107	-23.22	-13	-10.22
	carrier frequency							
3	893.0862	103.41	pk	51	-107	47.41	47.8	-.39
Range: 2 1000 - 10000MHz								
4	2344.869	26.52	pk	51.9	-107	-28.58	-13	-15.58
5	6858.372	29.4	pk	53.5	-107	-24.1	-13	-11.1
6	8410.282	27.48	pk	54.4	-107	-25.12	-13	-12.12

LIMIT 1: CFR47 Part22 HP HF CH777 60W
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

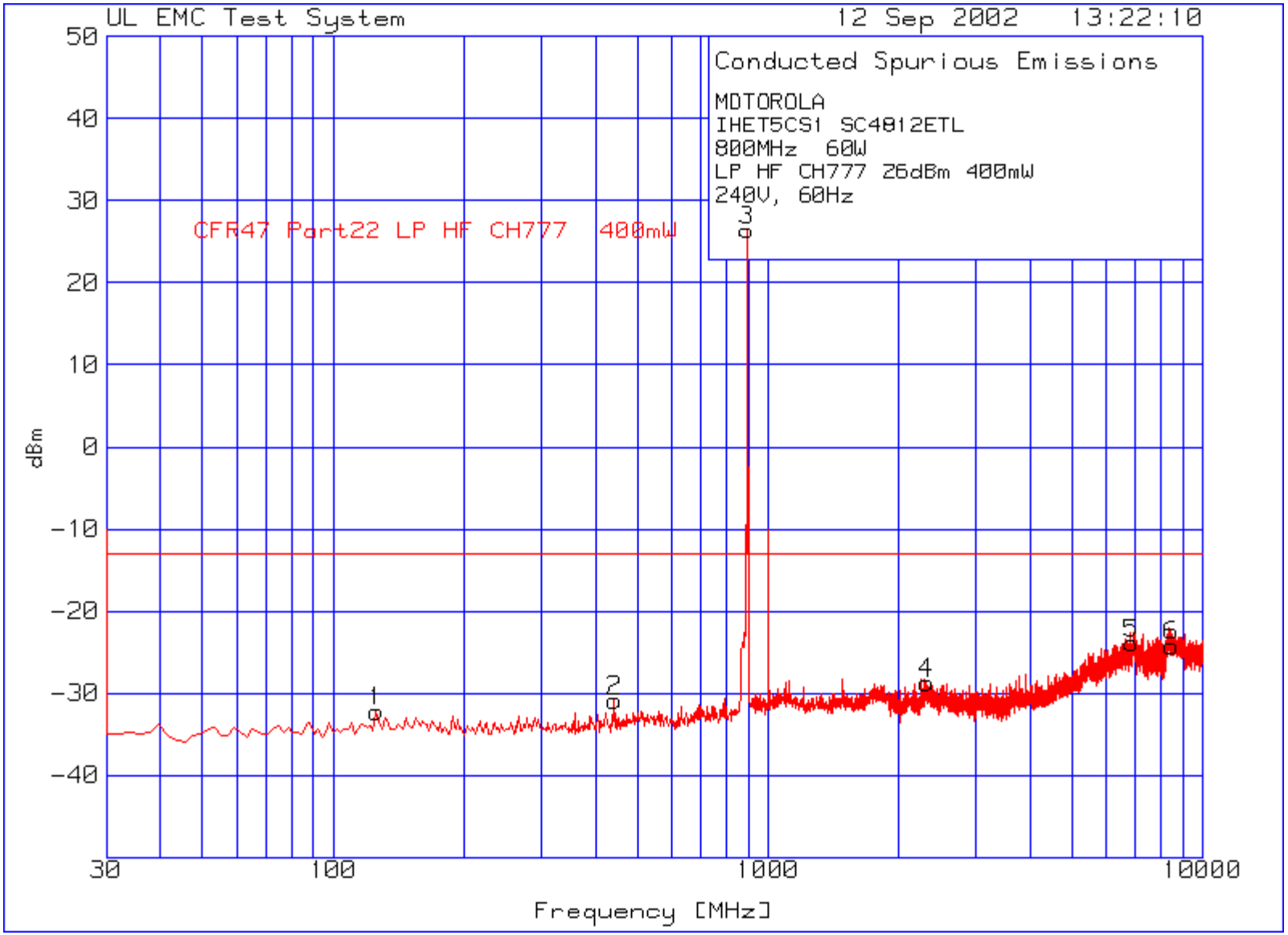

UL EMC Test System
12 Sep 2002 13:59:19
Conducted Spurious Emissions
MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W HPBBX
HP HF CH777 47.78dBm 60W
240V, 60Hz
CFR47 Part22 HP HF CH777 60W
60
50
40
30
20
10
0
-10
-20
-30
dBm
889
901
Frequency [MHz]
1
2
3
4
5

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W HPBBX
HP HF CH777 47.78dBm 60W
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level dBm	Limit 1	Margin 1[dB]
Range: 1 889 - 901MHz								
1	891.1551	39.95	pk	51	-107	-16.05	-13	-3.05
2	891.5273	40.72	pk	51	-107	-15.28	47.8	-63.08
3	893.3402	100	pk	51	-107	44	47.8	-3.8
4	895.1651	41.55	pk	51	-107	-14.45	47.8	-62.25
5	895.3122	39.83	pk	51	-107	-16.17	-13	-3.17

LIMIT 1: CFR47 Part22 HP HF CH777 60W
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

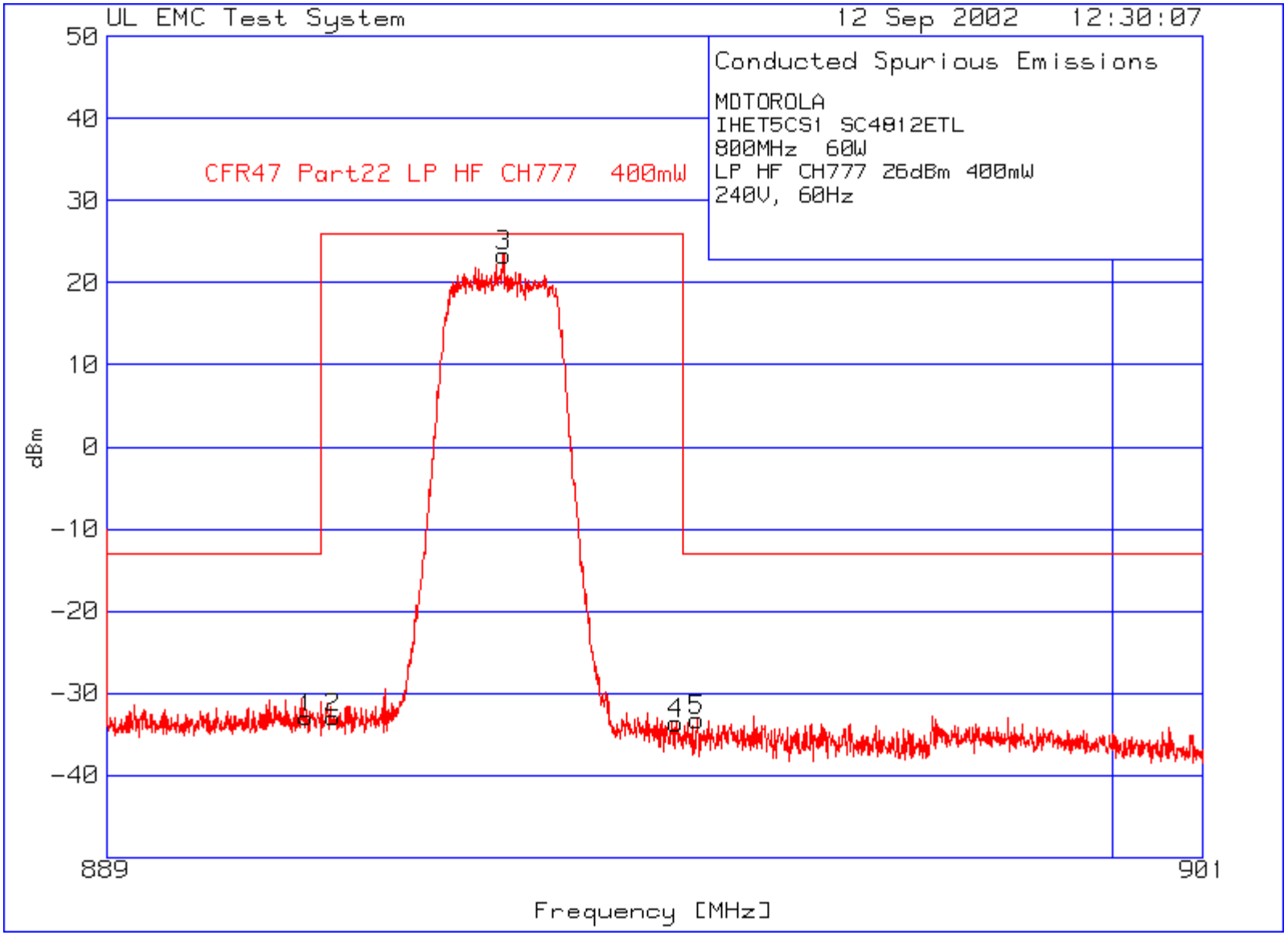

UL EMC Test System
12 Sep 2002 13:22:10
Conducted Spurious Emissions
MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W
LP HF CH777 26dBm 400mW
240V, 60Hz
CFR47 Part22 LP HF CH777 400mW
dBm
50
40
30
20
10
0
-10
-20
-30
-40
30
100
1000
10000
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W
LP HF CH777 26dBm 400mW
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level dBm	Limit 1	Margin 1[dB]
Range: 1 30 - 1000MHz								
1	125.2505	24.69	pk	50.1	-107	-32.21	-13	-19.21
2	442.1042	25.61	pk	50.5	-107	-30.89	-13	-17.89
	carrier frequency							
3	895.0301	82.38	pk	51	-107	26.38	26	.38
Range: 2 1000 - 10000MHz								
4	2308.862	26.35	pk	51.9	-107	-28.75	-13	-15.75
5	6858.372	29.61	pk	53.5	-107	-23.89	-13	-10.89
6	8482.296	29.01	pk	53.8	-107	-24.19	-13	-11.19

LIMIT 1: CFR47 Part22 LP HF CH777 400mW
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector


UL EMC Test System
12 Sep 2002 12:30:07
Conducted Spurious Emissions
MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W
LP HF CH777 26dBm 400mW
240V, 60Hz
CFR47 Part22 LP HF CH777 400mW
50
40
30
20
10
0
-10
-20
-30
-40
dBm
889
901
Frequency [MHz]

MOTOROLA
IHET5CS1 SC4812ETL
800MHz 60W
LP HF CH777 26dBm 400mW
240V, 60Hz

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor	Level dBm	Limit 1	Margin 1[dB]
Range: 1 889 - 901MHz								
1	891.1791	23.05	pk	51	-107	-32.95	-13	-19.95
2	891.4732	23.03	pk	51	-107	-32.97	26	-58.97
3	893.3342	79.34	pk	51	-107	23.34	26	-2.66
4	895.2131	22.36	pk	51	-107	-33.64	26	-59.64
5	895.4412	22.76	pk	51	-107	-33.24	-13	-20.24

LIMIT 1: CFR47 Part22 LP HF CH777 400mW
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector

UNDERWRITERS LABORATORIES INC.
Occupied Bandwidth

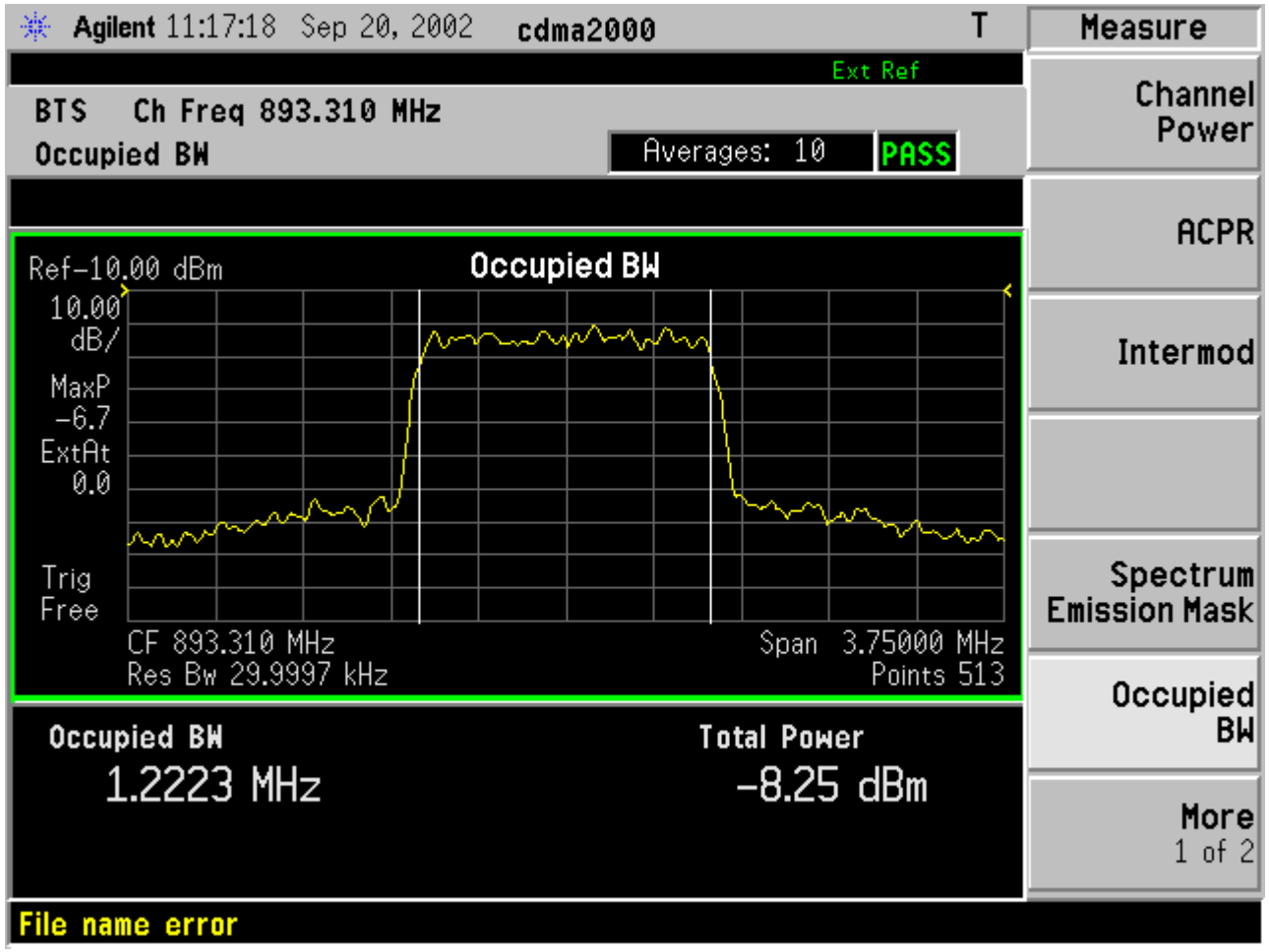
Date Tested: 9-20-2002
10-01-2002

Manufacturer	**:**	Motorola CDMA Wireless products Customer Integration Engineering
Equipment Under Test	**:**	SC4812ETL 800MHz Cellular Phone Base Station
Requirement	**:**	CFR47 Part 22/24

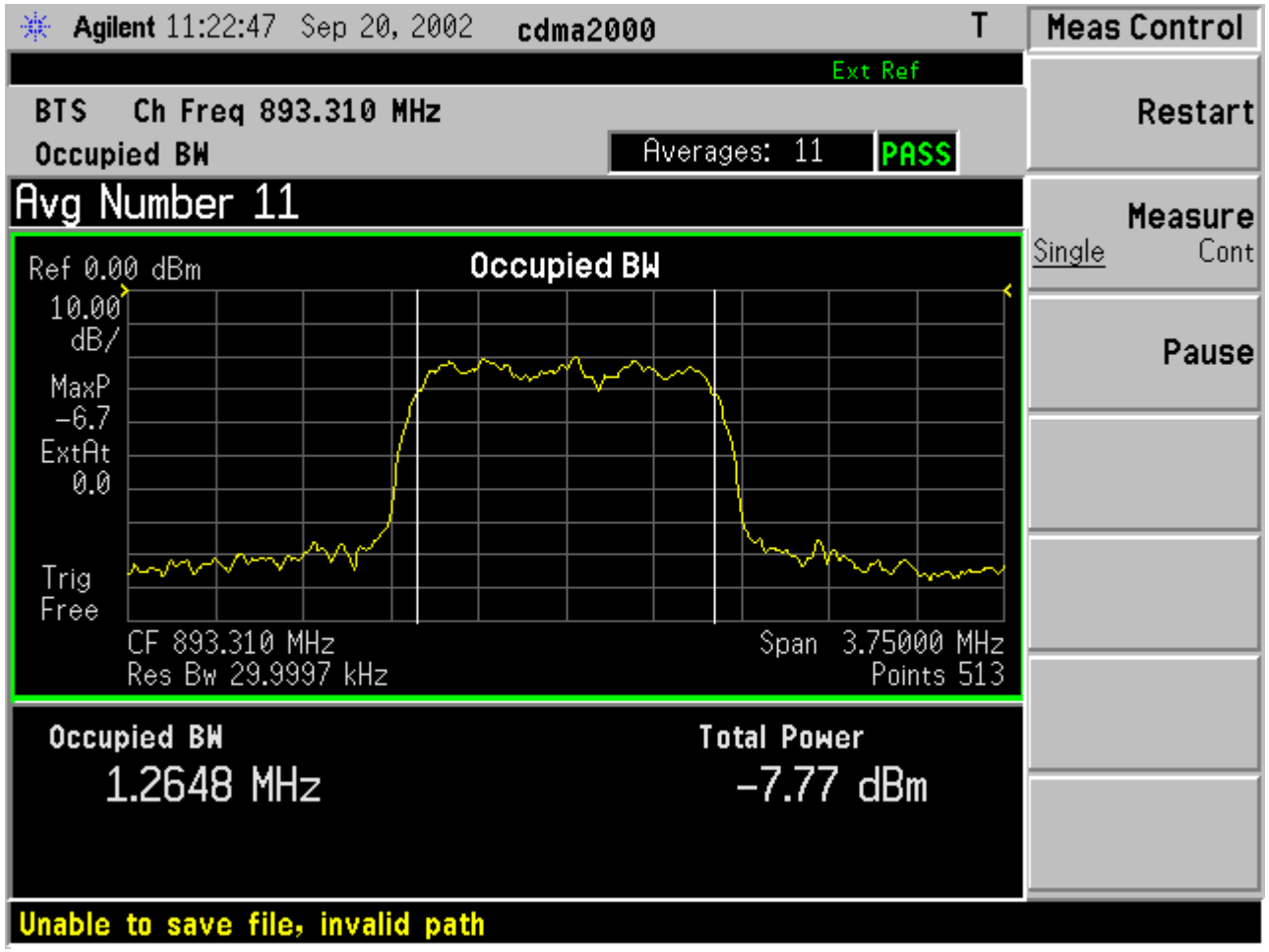
Section 2.1047 Measurement Required: **Occupied Bandwidth**

DEFINITION
The measured spectral width of an emission. The measurement determines occupied bandwidth as the difference between upper and lower frequencies where 0.5% of the emission power is above the upper frequency and 0.5% of the emission power is below the lower frequency at rated power, with Pilot, Page, Sync, and Traffic Channel modulation.
Data to show the bandwidth occupied by this transmitter and output power is presented in the form of Channel Power Measurement plots from a spectrum analyzer. The Channel Power Measurement divides the Channel Power Bandwidth into increments (defined by the Resolution Bandwidth Setting selected), then sums the energy contained in each of those increments to provide an integrated measurement of the power in the Channel Power Bandwidth.

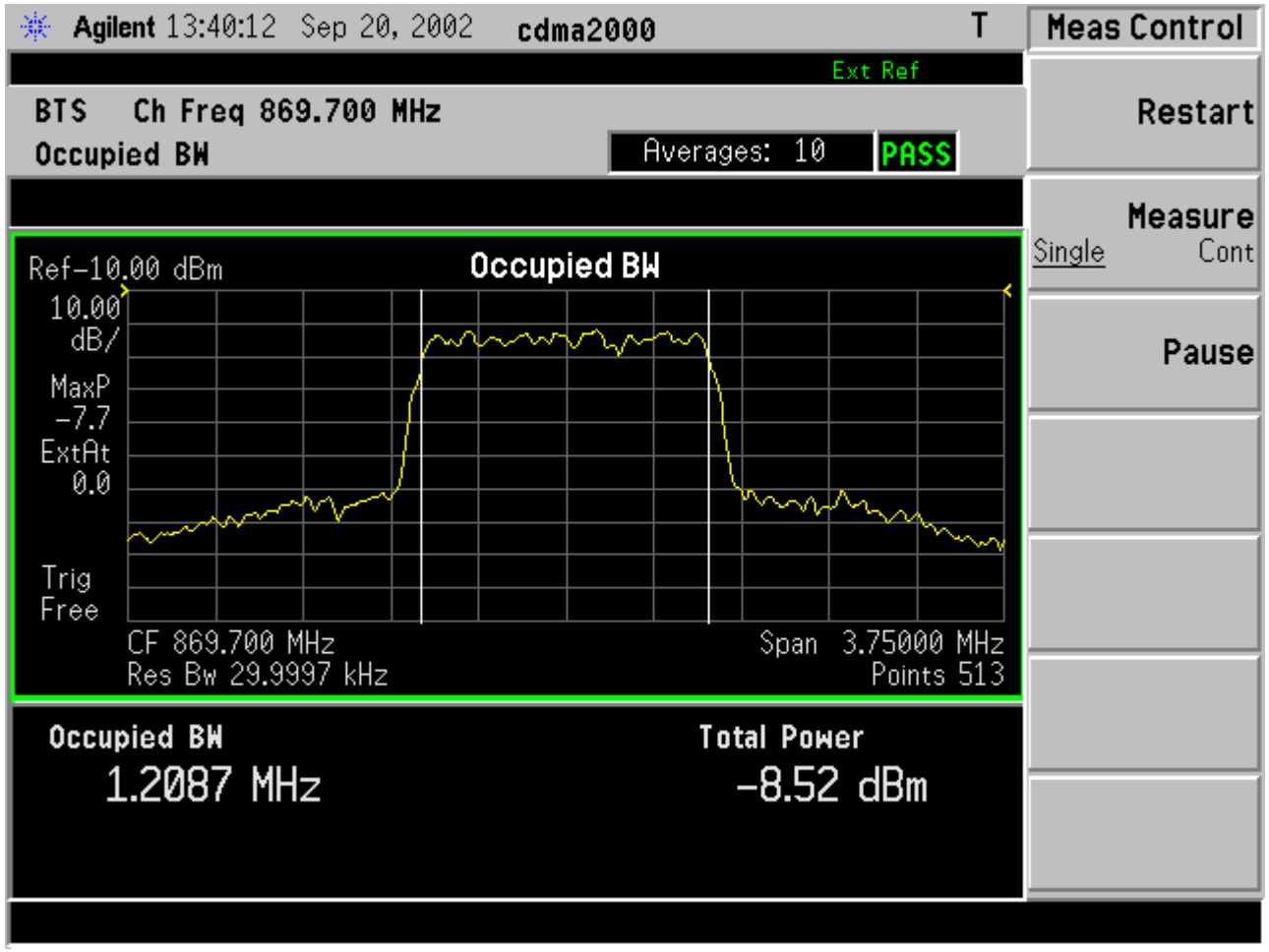
METHOD OF MEASUREMENT
Connect a spectrum analyzer to the BTS RF Transmit Port. Set the CDMA signal power to maximum. Setup the spectrum analyzer to make the following integrated Channel Power Measurements:
1. Channel Power Measurement of the CDMA Carrier Centered at 869.70 (Ch. 1013).
Channel Power Bandwidth: 1.30 MHz
Resolution Bandwidth: 30 KHz
2. Channel Power Measurement of the CDMA Carrier Centered at 893.31 (Ch. 777).
Channel Power Bandwidth: 1.30 MHz
Resolution Bandwidth: 30 KHz
Record the Channel Power Measurements.
Repeat the procedure with the CDMA signal power set to Minimum level.
Measurements conducted with both long filter (LF) and short filter (SF).



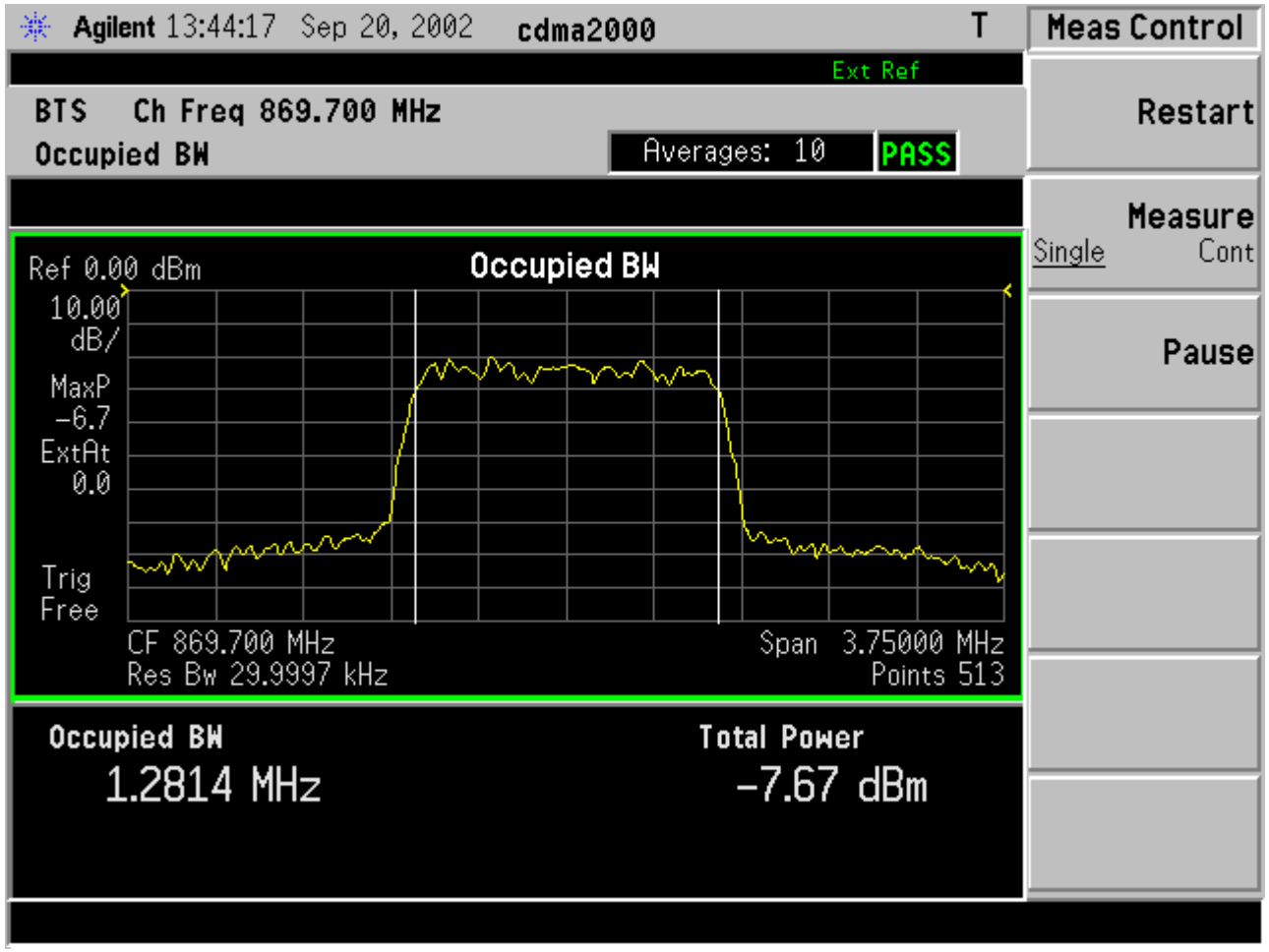
OBW 777 60W LF



OBW 777 60W SF



OBW 1013 60W LF



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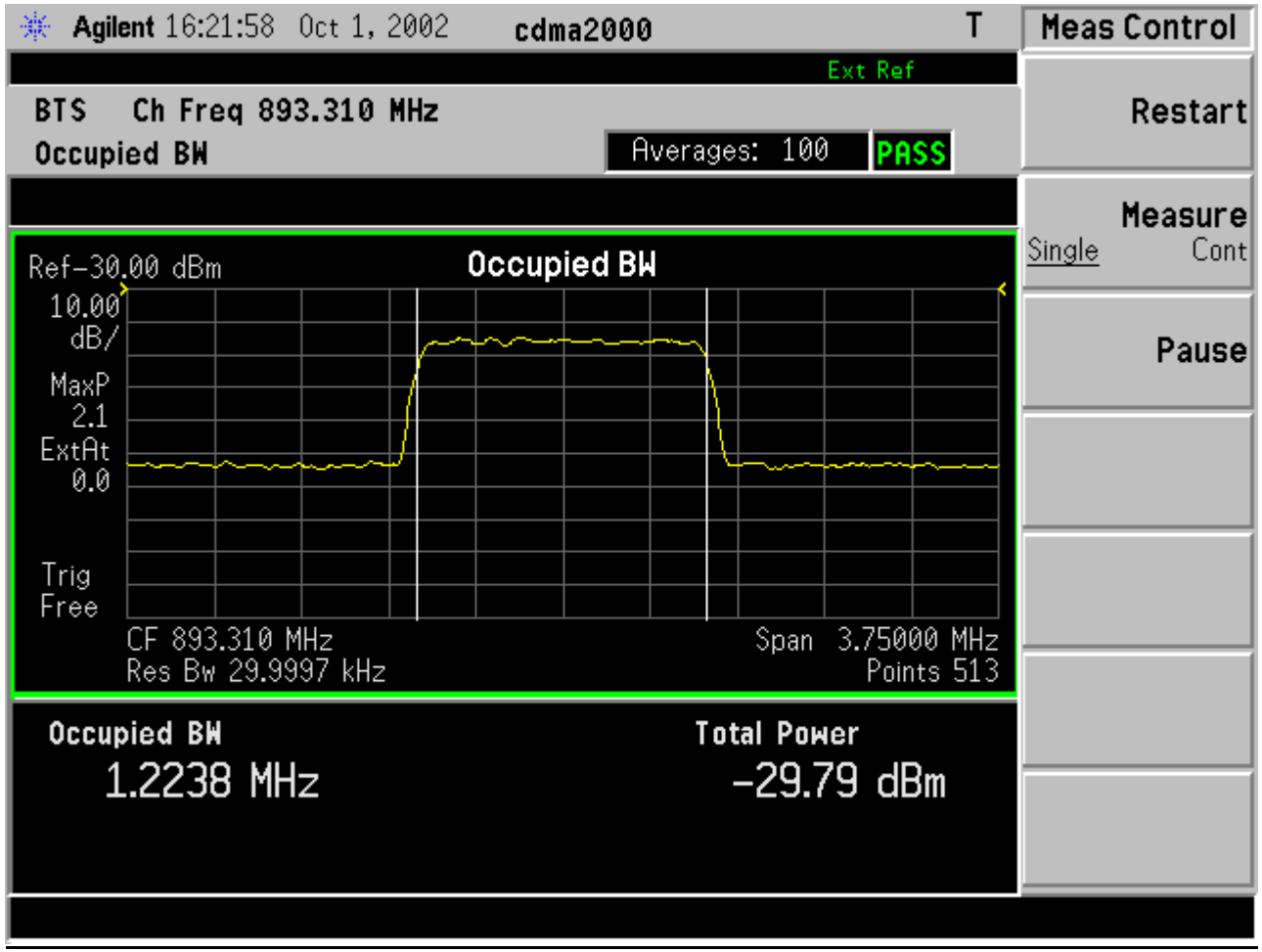
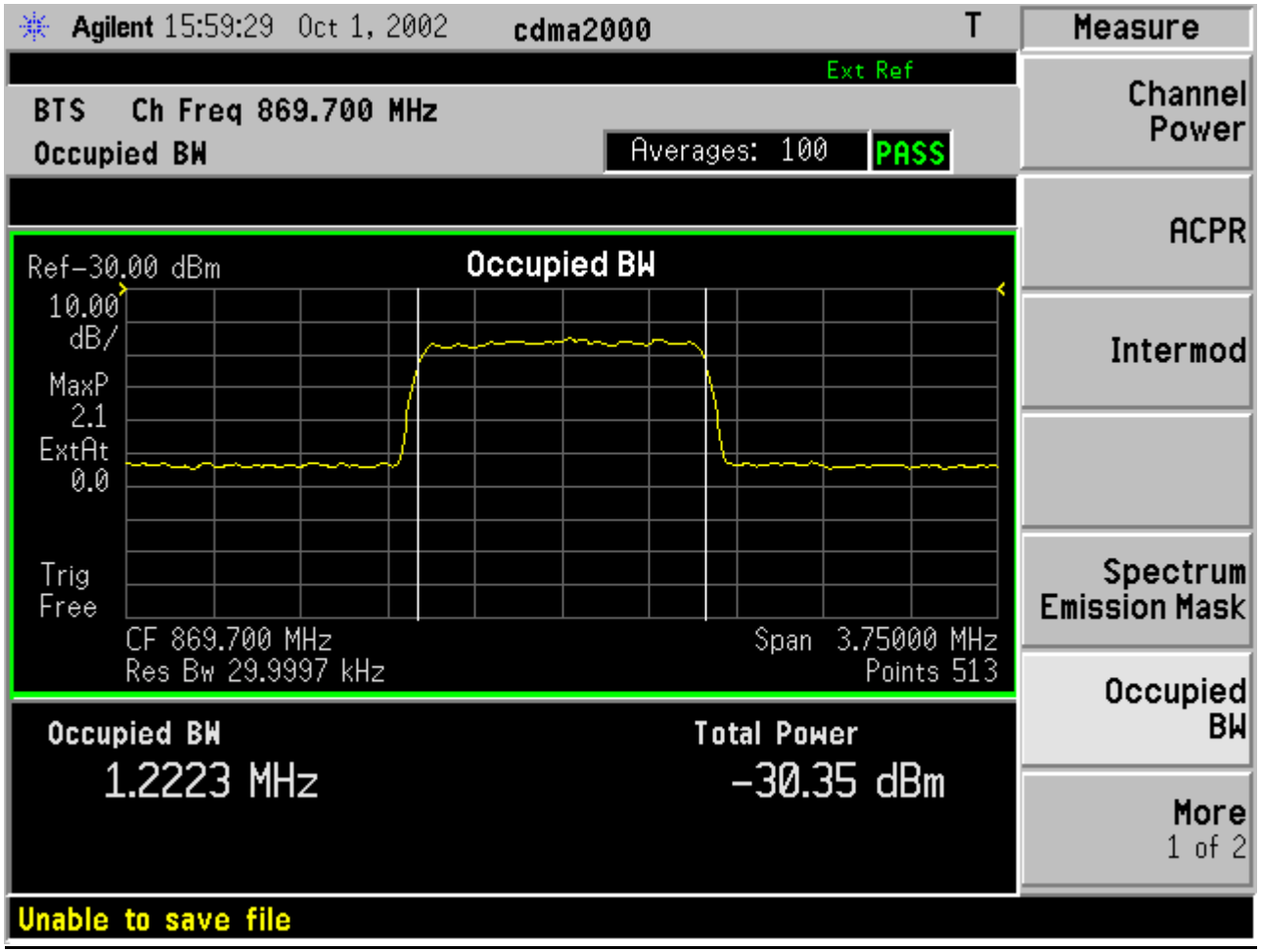


OBW 777 400mW LF



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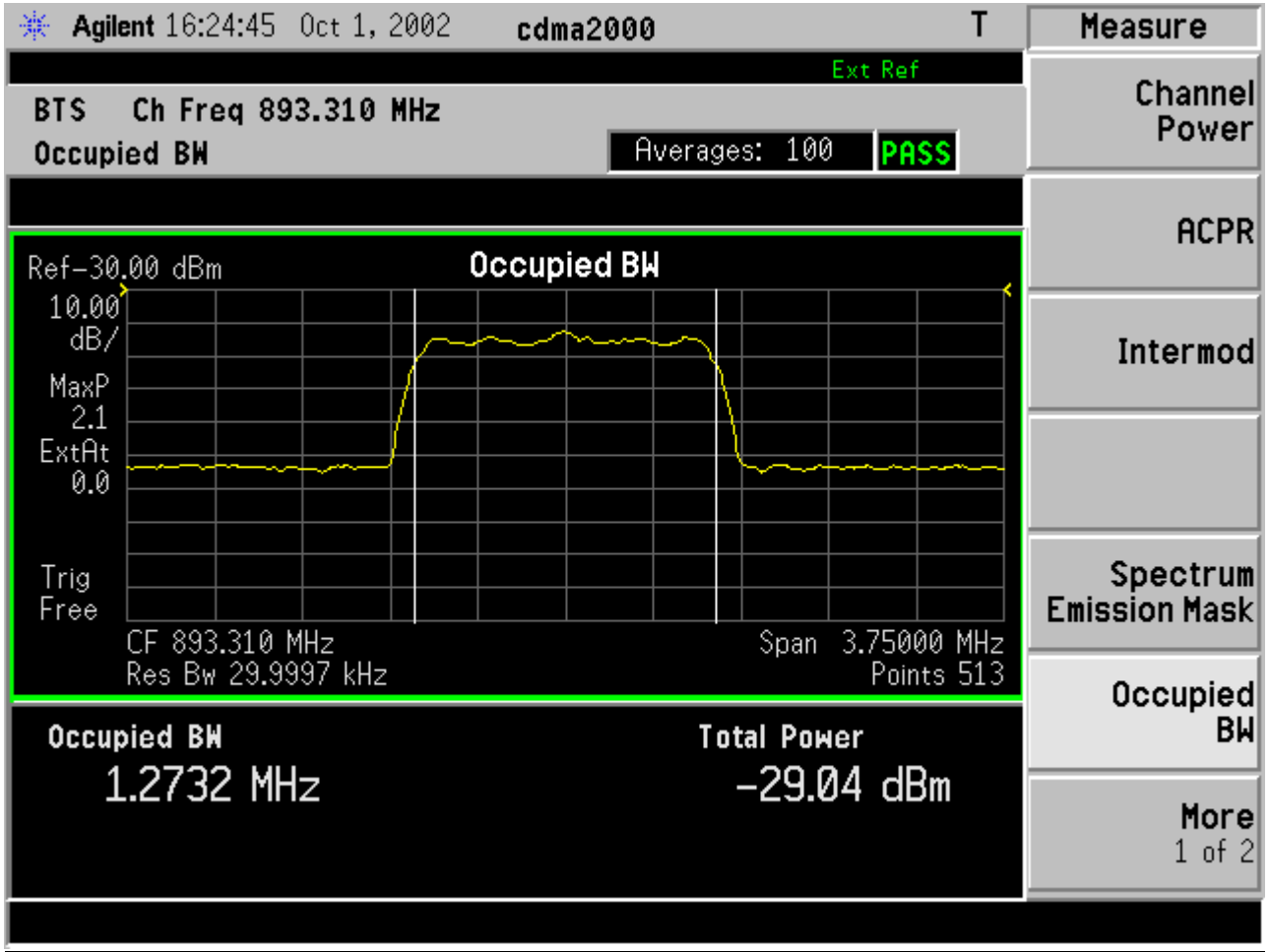
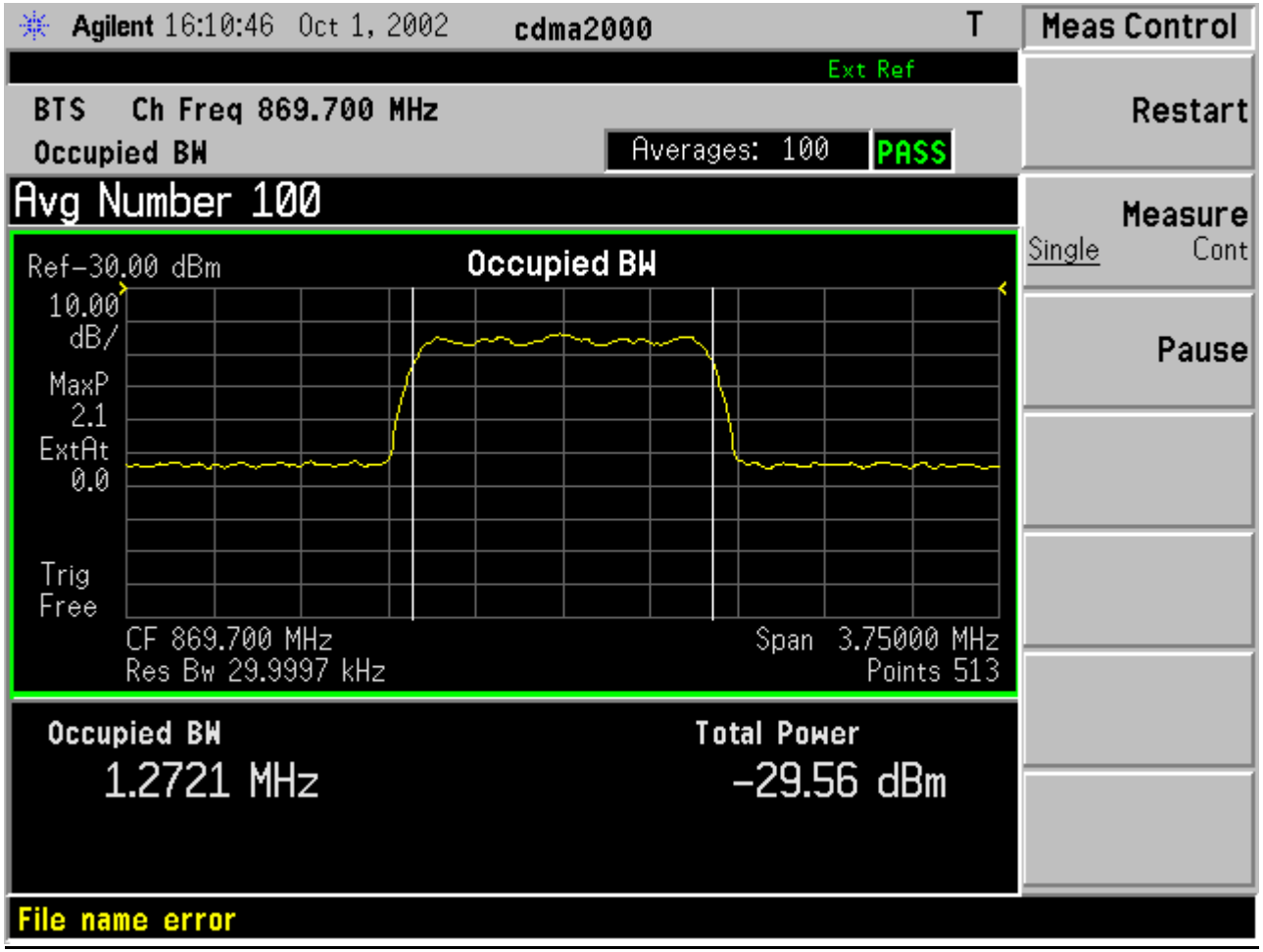


OBW 777 400mW SF



OBW 1013 400mW SF

UNDERWRITERS LABORATORIES INC.

Rho

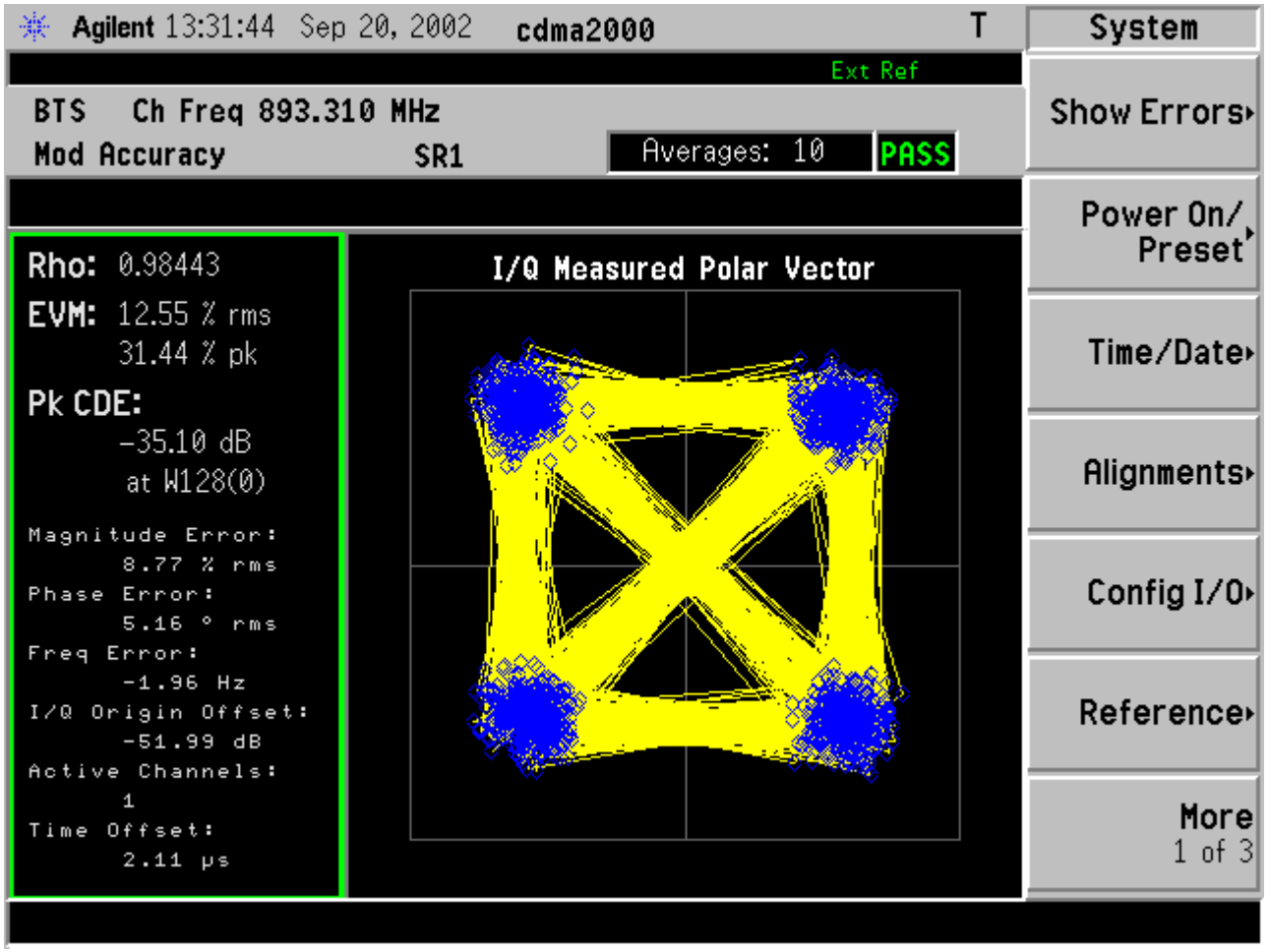
Date Tested: 9-20-2002
10-1, 4-2002

Manufacturer : Motorola CDMA Wireless products Customer Integration Engineering
Equipment Under Test : SC4812ETL 800MHz Cellular Phone Base Station
Requirement : CFR47 Part 22/24

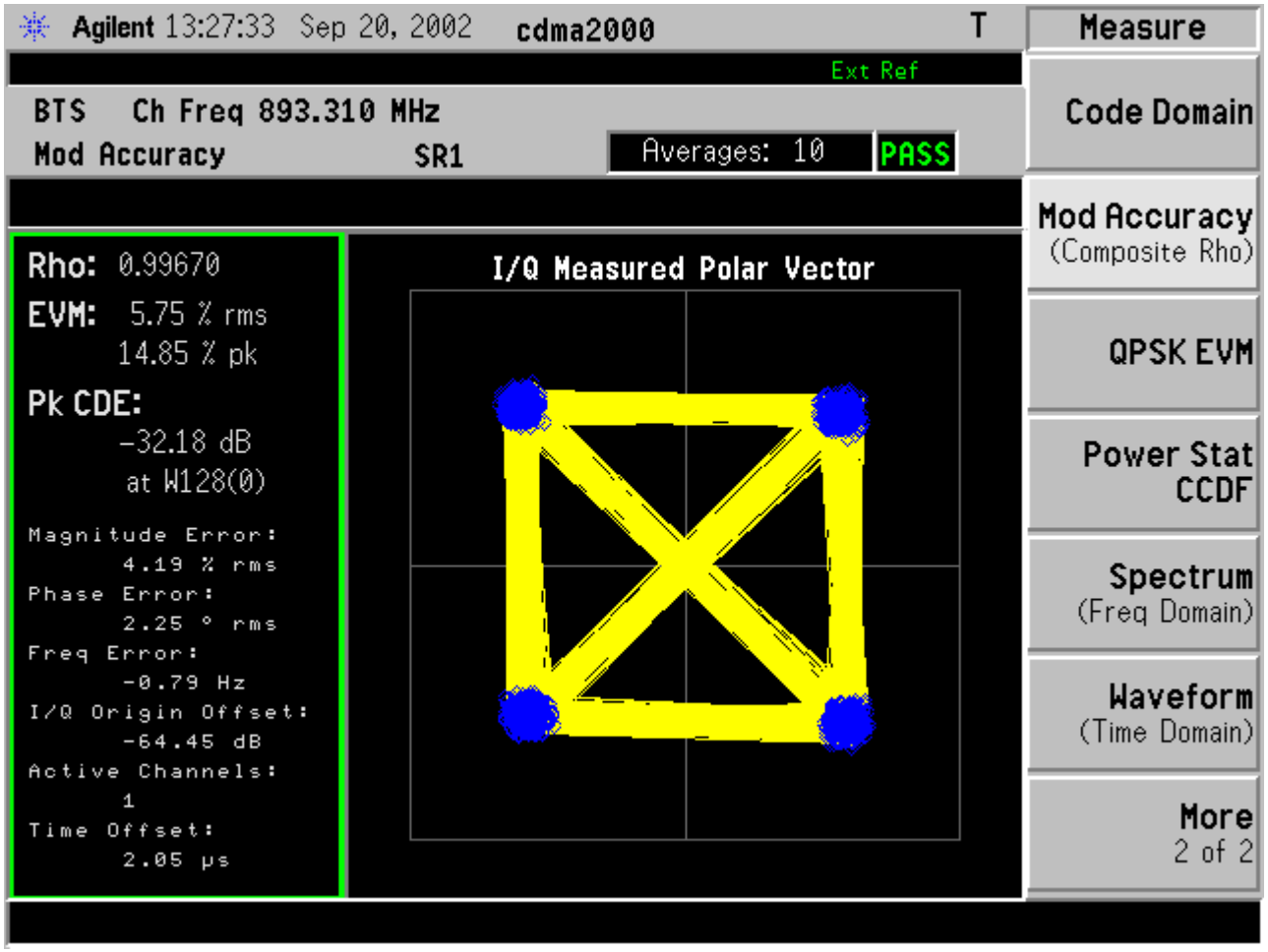
Section 2.987(d) Measurements Required: **Modulation Characteristics**
Waveform Quality (ρ)

DEFINITION
Transmit waveform quality is the normalized correlated power between the actual waveform and the ideal waveform. The range of values for the transmit waveform quality is from 1.0, a perfect CDMA waveform, to 0.0, a non-CDMA signal. As an example, a base station with a -0.4 dB degradation in its transmit waveform would have a quality (ρ) of 10^(-0.4/10) = 0.912.
MINIMUM STANDARD
The minimum waveform quality figure for a spread-spectrum CDMA signal is -0.4 dB or 0.912 as measured with a Rho meter.

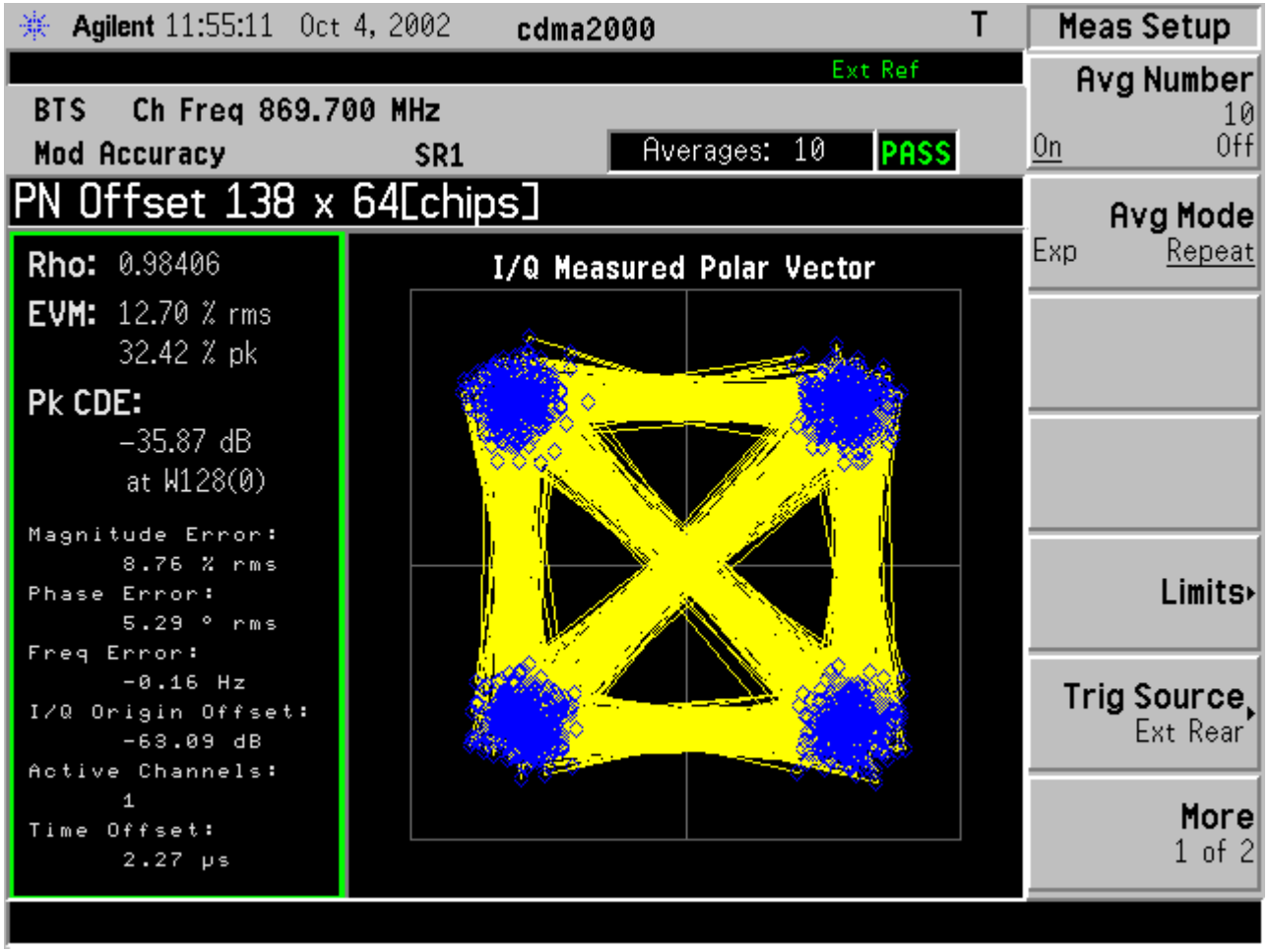
METHOD OF MEASUREMENT
Set the pilot level to 20% of the CDMA Avg. power, and transmit the pilot signal only. Connect the Rho meter directly to the transmit port. On the CDMA Rho Meter, disable the RF generator and set the tuning mode to manual. Enter the base station's RF transmit frequency and set the input attenuation to hold. Set the input attenuation to 20 dB. Now, set the DSP Analyzer test mode to continuous and chose the Rho measurement as the measurement type. Set the channel to forward and choose amplitude middle as the trigger qualifier. Set the gain to 0 dB. Set the reference frequency to 19.6608 MHz. Select internal to lock-on to the CDMA time base reference. Read the measured value for Rho on the Rho meter.
Measurements conducted with both long filter (LF) and short filter (SF).



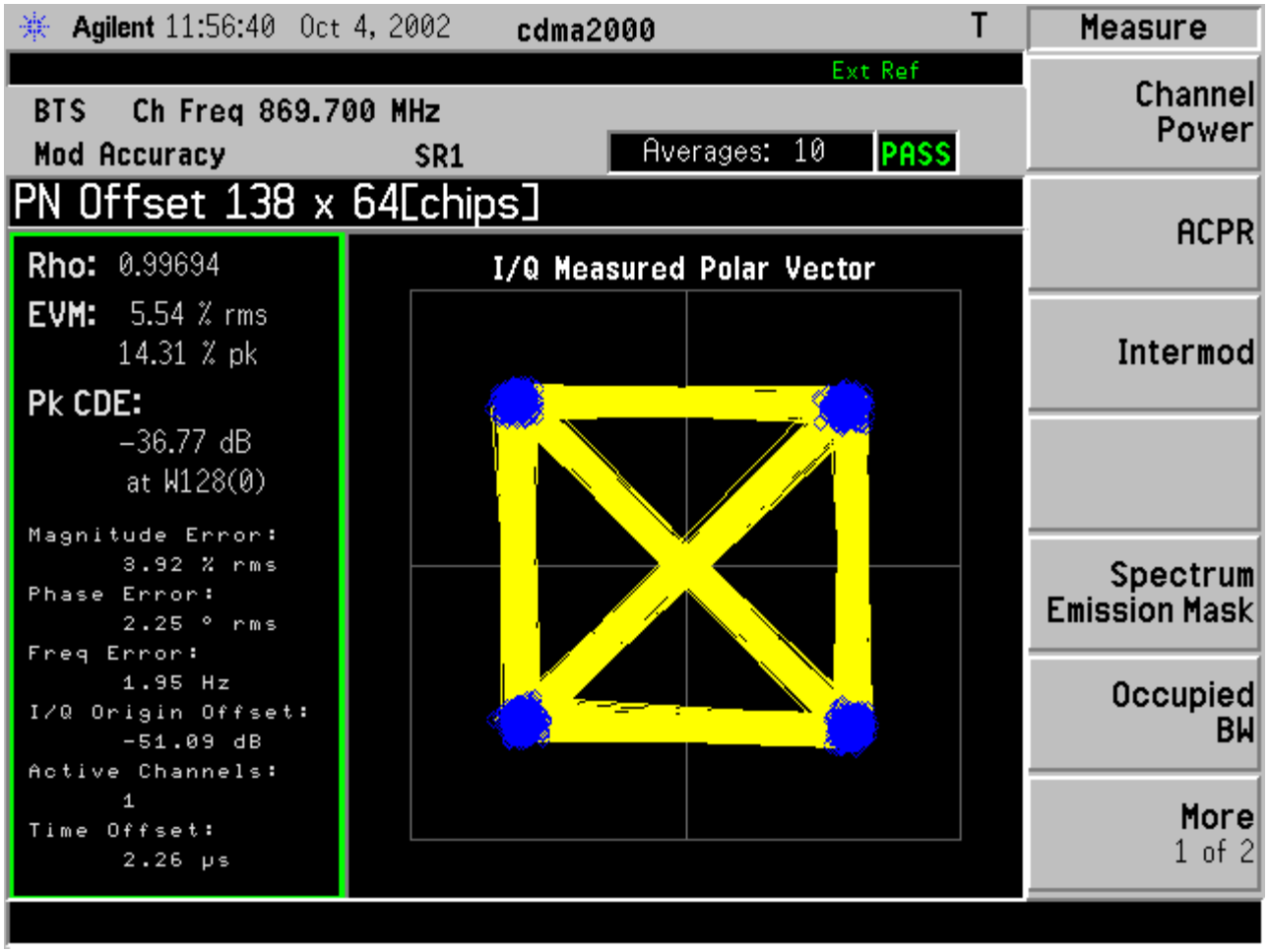
RHO 777 60W LF



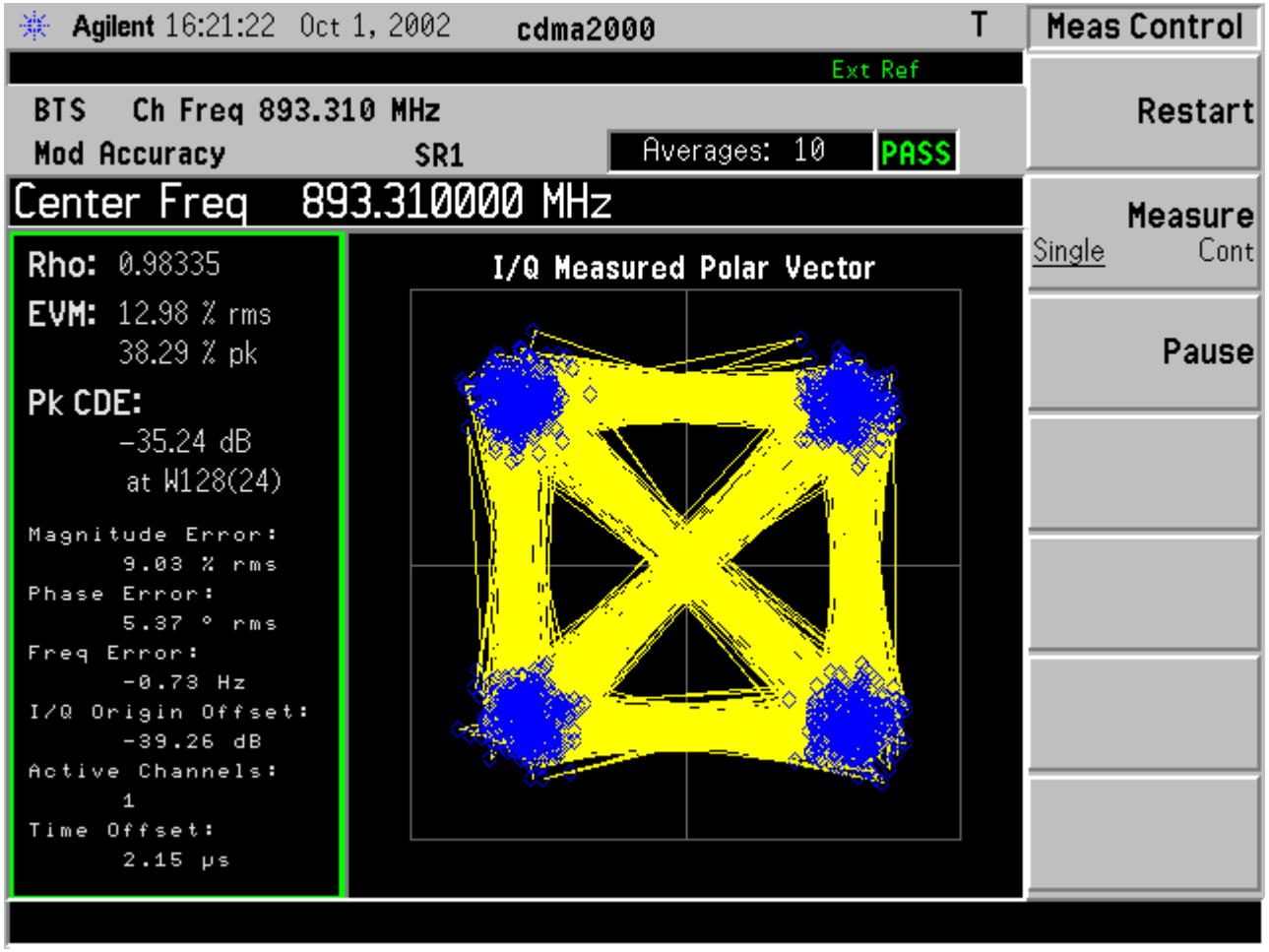
RHO 777 60W SF



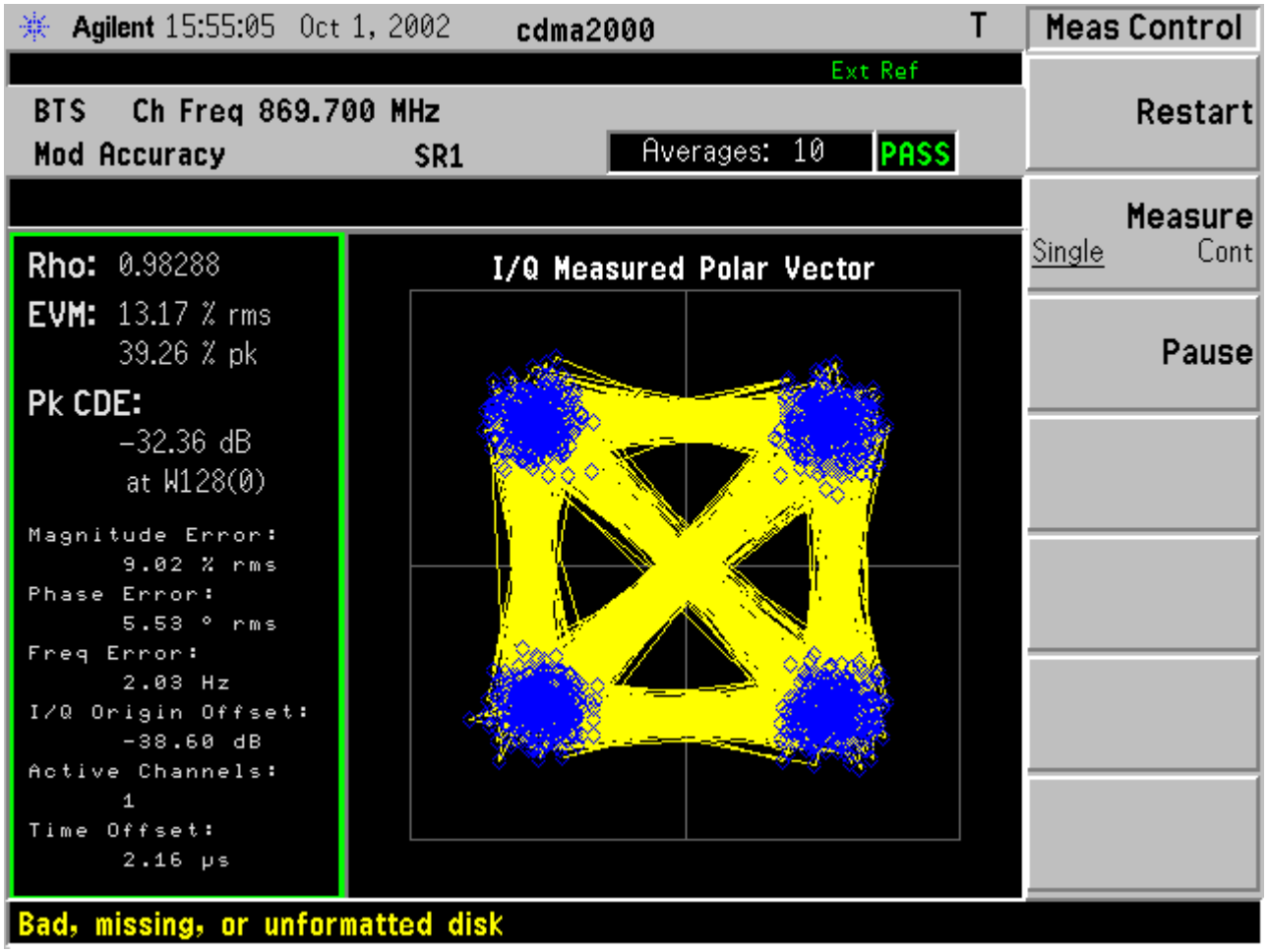
RHO 1013 60W LF



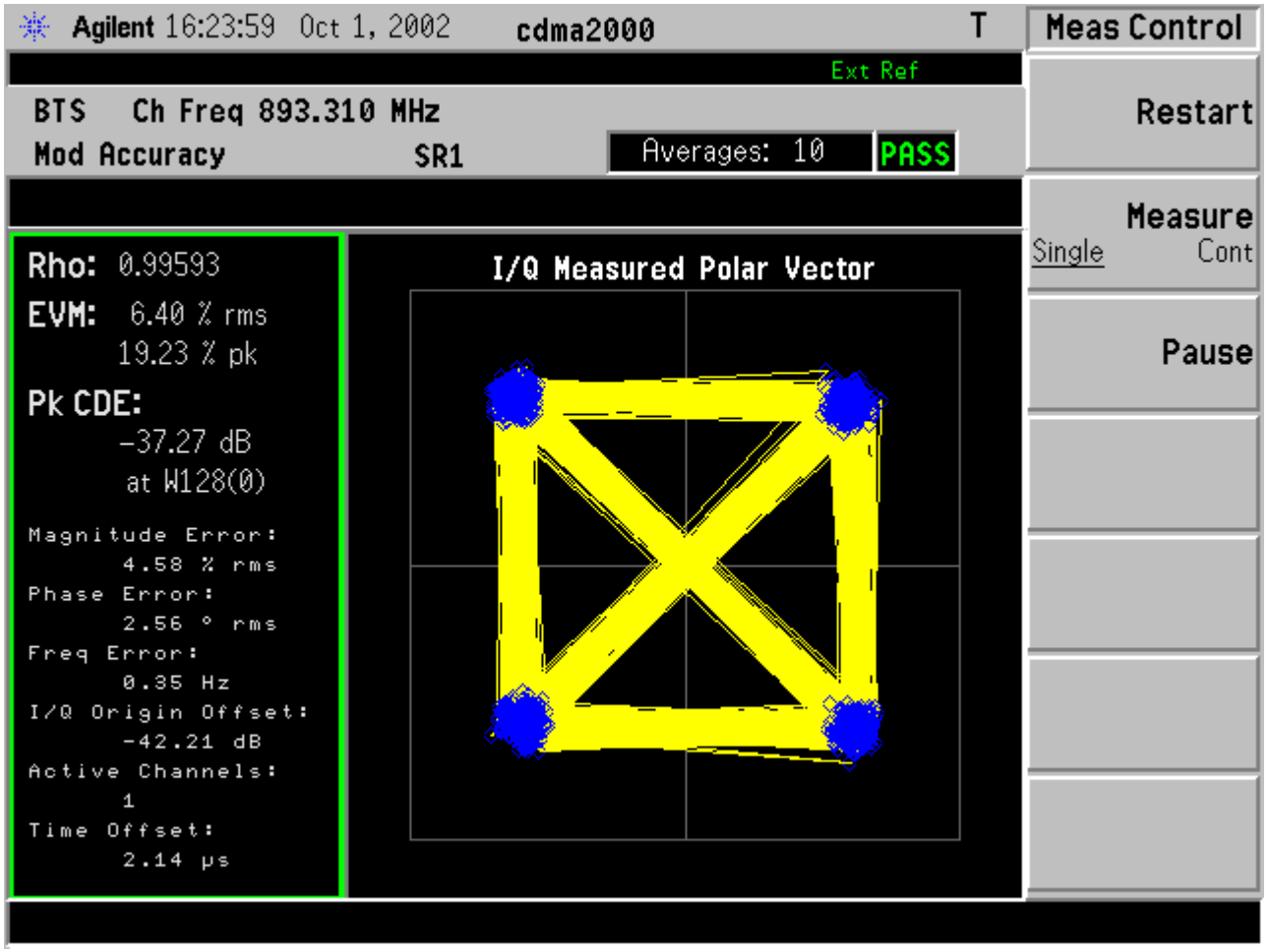
RHO 1013 60W SF



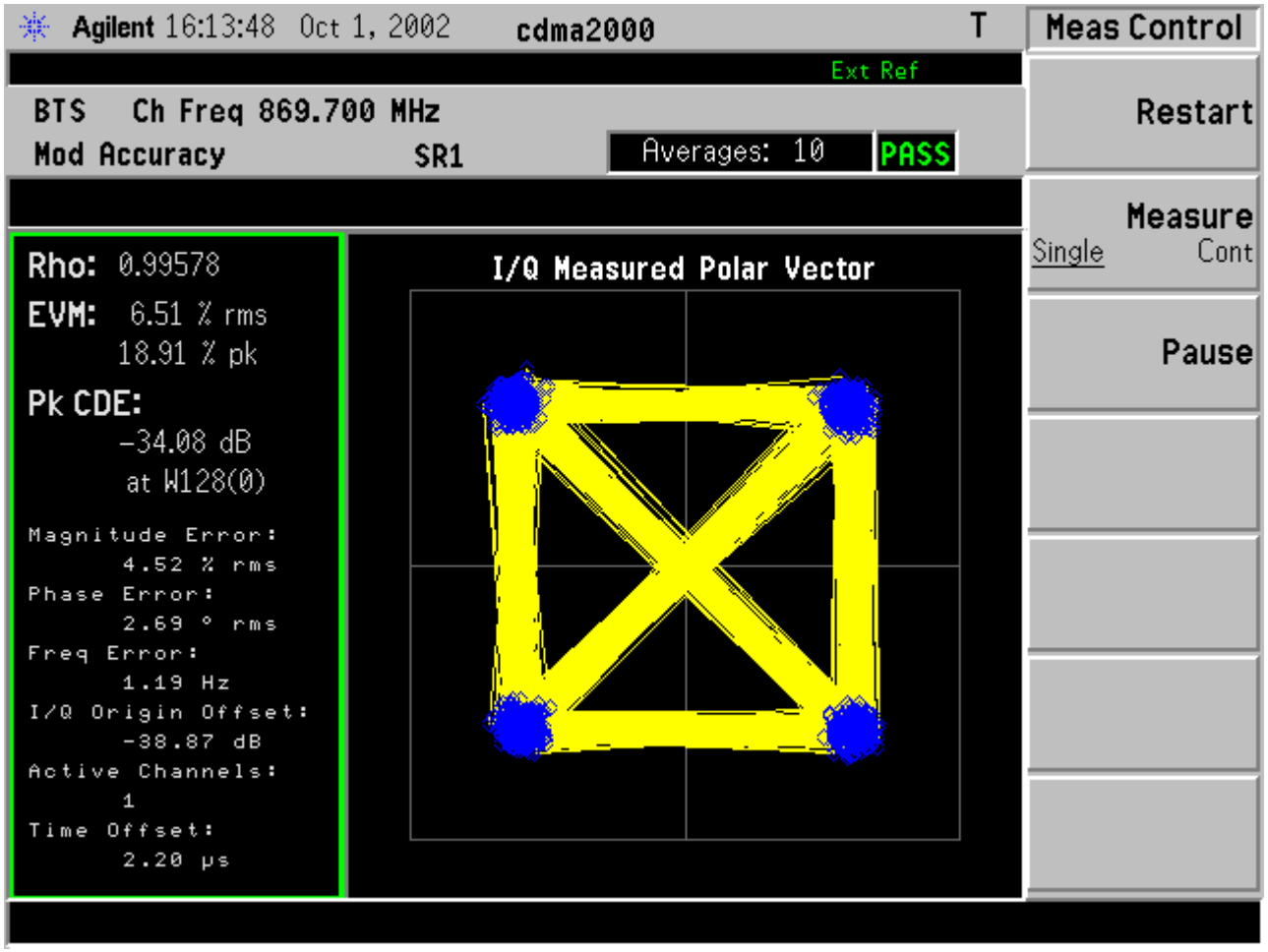
RHO 777 400mW LF



RHO 1013 400mW LF



RHO 777 400mW SF



RHO 1013 400mW SF

APPENDIX C

Sample Calculations

Per 22.917 (b) (2) any frequency removed from the carrier was attenuated bellow the mean power of the unmodulated carrier wave by 43+10logP (dBc) as follows:

Low Power

P = 400mW = 0.4W = 26dBm = 133dBµ V
43 + 10log(0.4) = 39dB
Limit = 26dBm – 39dB = -13dBm = 94dBµ V

High Power

P = 60W = 47.78dBm = 154.78dBµ V
43 + 10log(60) = 60.78dB
Limit = 47.78dBm – 60.78dB = -13dBm = 94dBµ V

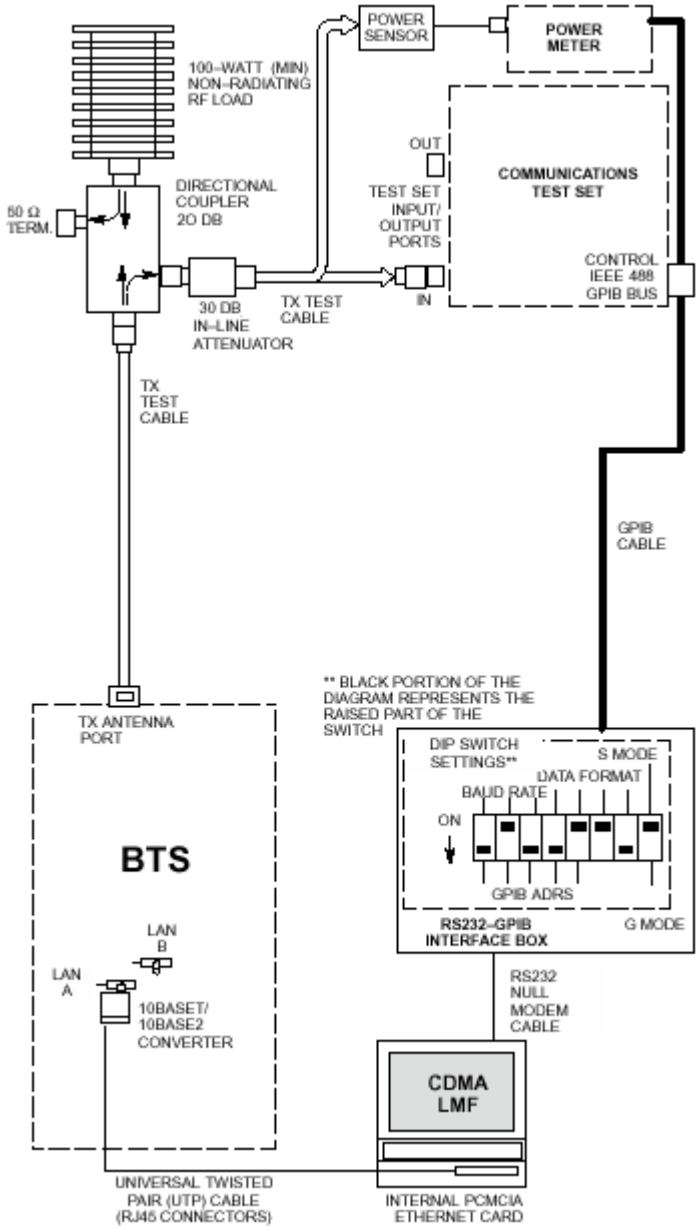
APPENDIX D

Transmit Power, Occupied Bandwidth or RHO

TEST SET-UP

The following test set-up below was used either to test for Transmit Power, Occupied Bandwidth or RHO.
The BTS was configured for maximum power out of 47.78 dBm and minimum power out of 26.0 dBm respectively.
The output power was set respectively to 60.0 Watts or 400 mWatts using an HP437B power meter.

Transmit Power Out, Occupied Bandwidth and RHO TEST SET-UP



Conducted Spurious and Harmonic Emissions

NOTE: In Band Spurious Emissions plots are measured in a 100 kHz resolution bandwidth. The following formula is used to obtain the correct zero dB reference point relative to the bandwidth of the 1.2288 MHz CDMA signal.

Power (measured in 100 kHz bandwidth) + 10 log (1.2288 MHz/ 100 kHz)

UL witnessed that the BTS was configured for maximum power out of 60.0 dBm and minimum power out of 26.0 dBm respectively.

The output power was set respectively to 60.0 Watts or 400 mWatts using an HP437B power meter.

NOTE: Out of Band Spurious and Harmonic Emissions plots are measured in a 1MHz resolution bandwidth.

OCCUPIED BANDWIDTH

NOTE: The occupied bandwidth plots are measured in a 30 kHz resolution bandwidth. The following formula is used to obtain the correct zero dB reference point relative to the bandwidth of the 1.2288 MHz CDMA signal.

Power (measured in 30 kHz bandwidth) + 10 log (1.2288 MHz/ 30 kHz)

UL witnessed that the BTS was configured for maximum power out of 60.0 dBm and minimum power out of 26.0 dBm respectively.

The output power was set respectively to 60.0 Watts or 400 mWatts using an HP437B power meter.