



EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	T41217
		Proj Eng:	David Bare
Contact:	Micheal Malin		
Emissions Spec:	FCC 22 (Cellular)	Class:	N/A
Immunity Spec:		Environment:	

EMC Test Data

For The

Standard Communications

Model

CMM 7700 & 8700



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Contact:	Micheal Malin		
Emissions Spec:	FCC 22 (Cellular)	Class:	N/A
Immunity Spec:	Enter immunity spec on cover	Environment:	

TEST SUMMARY

Date	Test Performed	Level	Results	Margin
12/27/00	Power Output	22.917(a)	Pass	Level 0
12/27/00	Power Output	22.917(a)	Pass	Level 1
12/27/00	Power Output	22.917(a)	Pass	Level 2
12/27/00	Power Output	22.917(a)	Pass	Level 3
12/27/00	Power Output	22.917(a)	Pass	Level 4
12/27/00	Power Output	22.917(a)	Pass	Level 5
12/27/00	Power Output	22.917(a)	Pass	Level 6
12/27/00	Power Output	22.917(a)	Pass	Level 7
12/27/00	Occupied Bandwidth	22.917(d)	Pass	Wideband data
12/27/00	Out-Of-Band	22.917(e)	Pass	Wideband data
12/27/00	Mobile Emission	22.917 (f)	Pass	Wideband data
12/21/00	RE, 1000 - 9000 MHz Maximized Emissions	22.917(e)	Pass	-5dB @ 1669.878 MHz
12/27/00	Temperature Vs. Frequency	22.355	Pass	
12/27/00	Voltage Vs. Frequency	22.355	Pass	Battery end point is 4.5Vdc

Abbreviations Used: RE - Radiated Emissions, CE- Conducted Emissions, RI - Radiated Immunity, CI - Conducted Immunity, ESD - Electrostatic Discharge, EFT - Electrical Fast Transients, VDI - Voltage Dips and Interrupts



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Immunity Spec:	Enter immunity spec on cover	Environment:	

EUT INFORMATION

General Description

The EUT is a Cellular radio module which is designed to transmitt data from vendor machines, credit card transactions, GPS, and monitoring devices. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end user environment. The electrical rating of the EUT 12 Vdc.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Standrad Communications	CMM 7700 and 8700	Cellular module	N/A	

Other EUT Details

EUT Enclosure

The EUT does not have a main enclouser, but does have shields for the RF circuit section. It measures approximately 4.9784 cm wide by 11.176 cm deep by 1.3462 cm high.

Modification History

Mod. #	Test	Date	Modificaiton
1			
2			
3			



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Contact:	Micheal Malin		
Emissions Spec:	FCC 22 (Cellular)	Class:	N/A
Immunity Spec:	Enter immunity spec on cover	Environment:	

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	None	None	None	None

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	None	None	None	None

EUT Interface Ports

EUT Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
None	None	None		

EUT Operation During Emissions

EUT was set to transmit continuously.



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Spec:	FCC 22 (Cellular)	Class:	N/A

Section 2.1046: RF Power

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 12/27/00

Test Engineer: jmartinez

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

EUT Voltage: 12 Vdc

General Test Configuration

The EUT and all local support equipment were located on the table for testing. The Eut was connected directly to Test Receiver. A 20-dB attenuator was used between the EUT and Test Receiver.

Ambient Conditions:

Temperature: 23°C

Rel. Humidity: 31%

Summary of Results

Plot	Test Performed	Limit	Result	Comment
# 1	Power Output	22.917(a)	Pass	Level 0
# 2	Power Output	22.917(a)	Pass	Level 1
# 3	Power Output	22.917(a)	Pass	Level 2
# 4	Power Output	22.917(a)	Pass	Level 3
# 5	Power Output	22.917(a)	Pass	Level 4
# 6	Power Output	22.917(a)	Pass	Level 5
# 7	Power Output	22.917(a)	Pass	Level 6
# 8	Power Output	22.917(a)	Pass	Level 7

Modifications Made During Testing:

No modifications were made to the EUT during testing

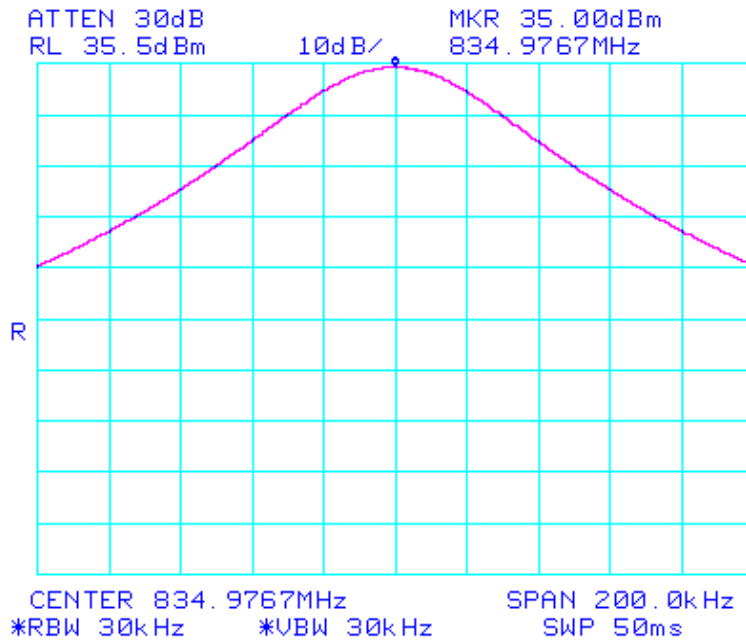
Deviations From The Standard

No deviations were made from the requirements of the standard.



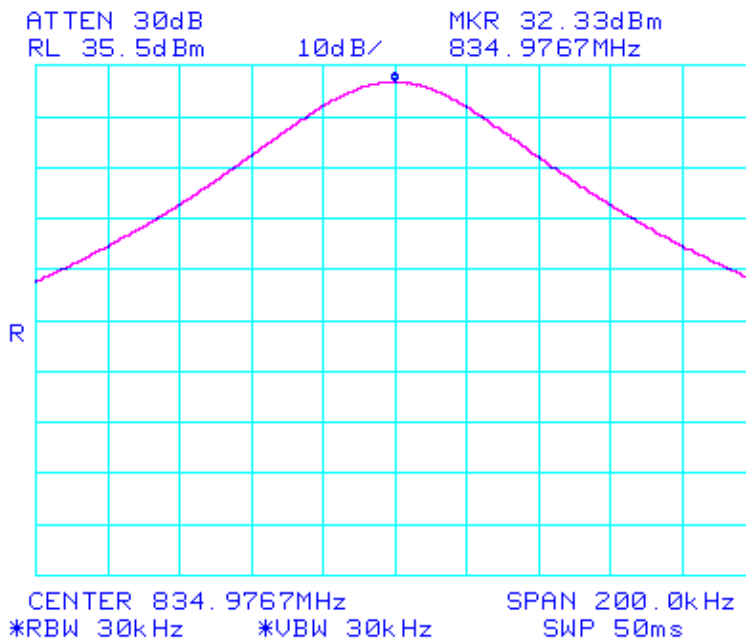
EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A



Plot# 1

Power Output
Ch. 333
Level 0



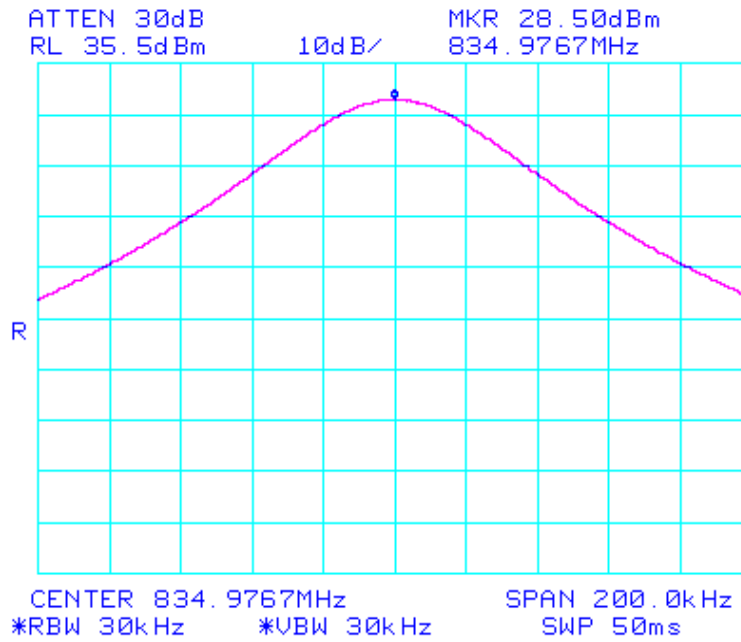
Plot# 2

Power Output
CH. 333
Level 1



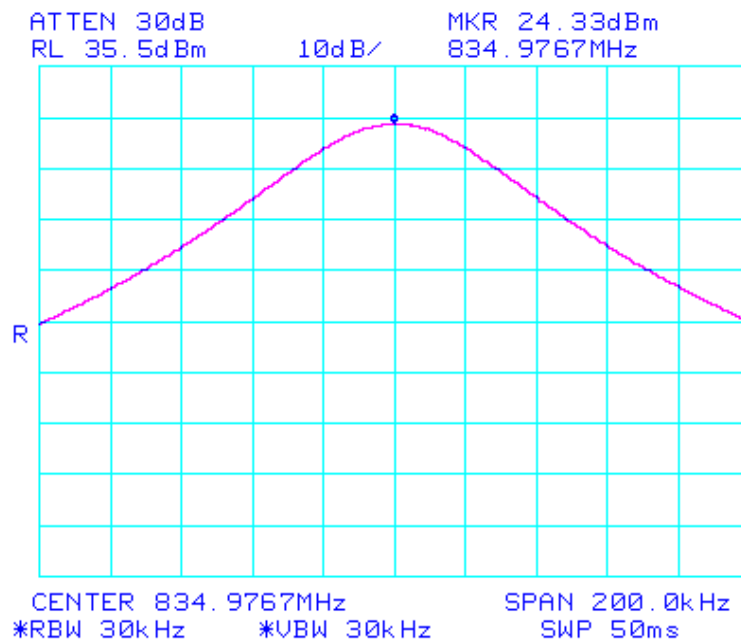
EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A



Plot# 3

Power Output
CH. 333
Level 2



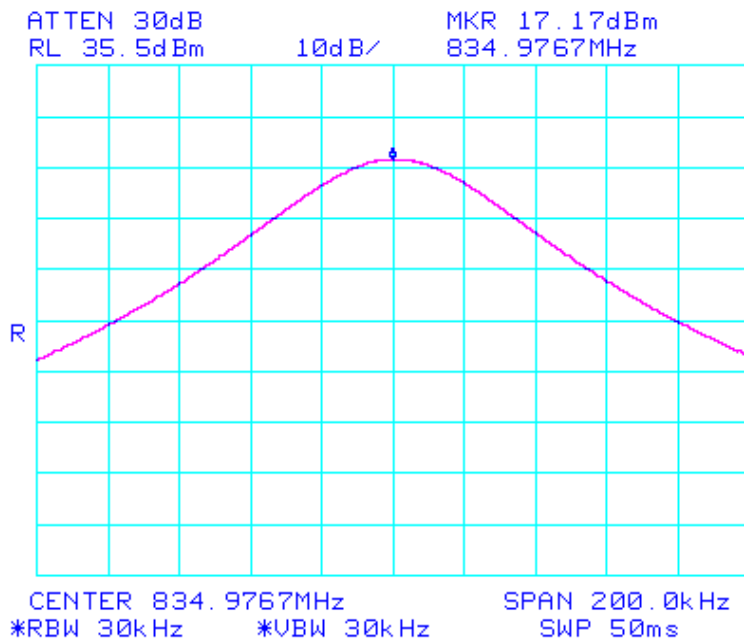
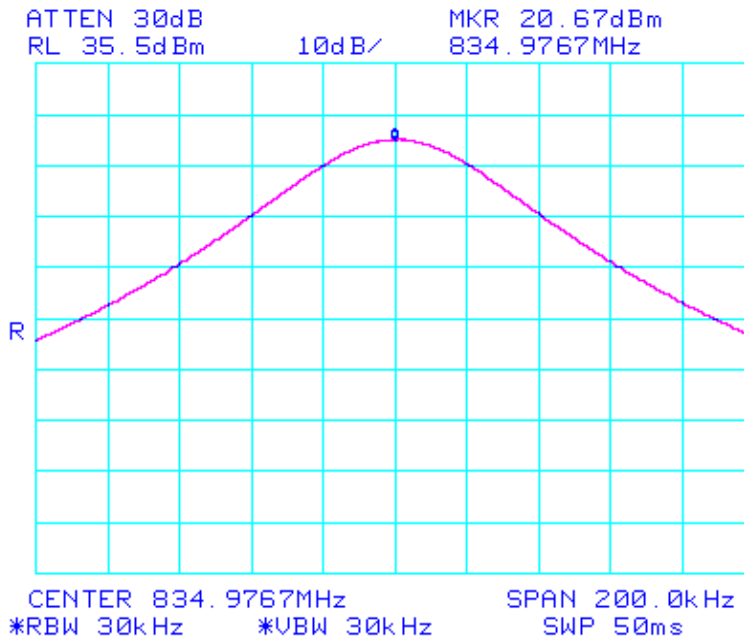
Power Output
Ch. 333
Level 3

Plot# 4



EMC Test Data

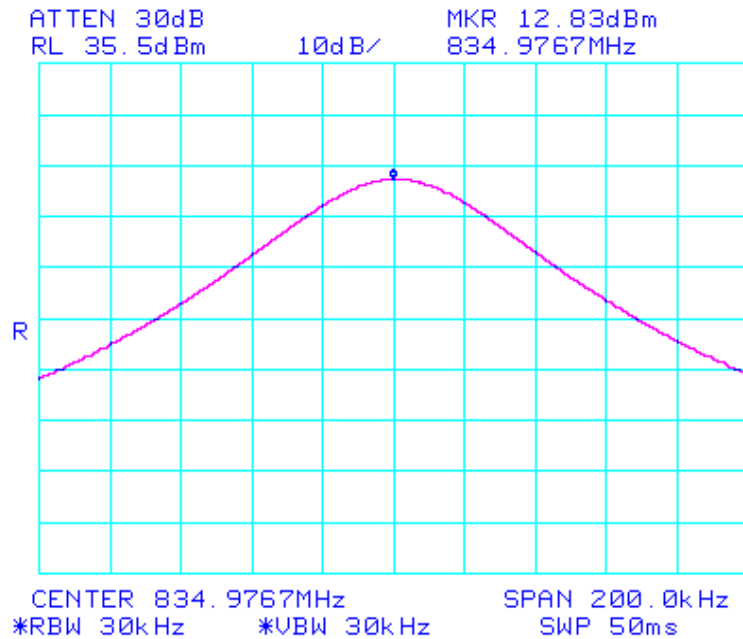
Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A





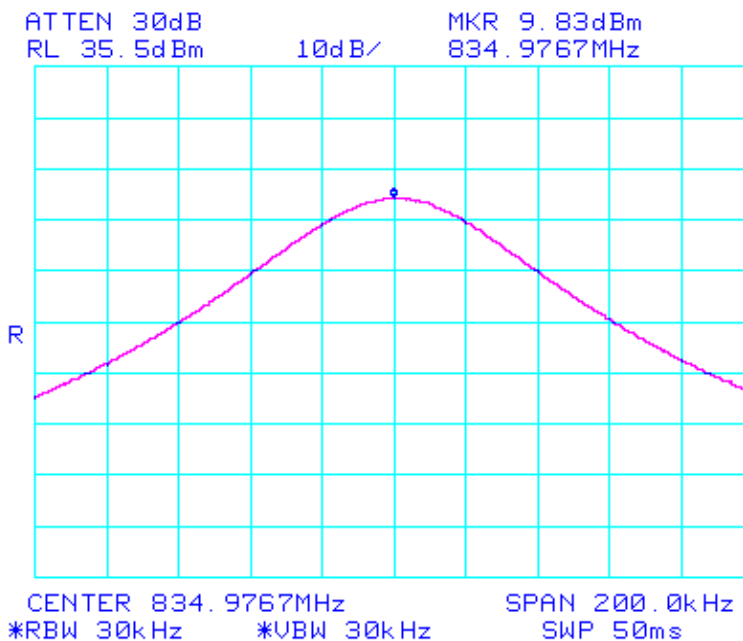
EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A



Plot# 7

Power Output
CH. 333
Level 6



Plot# 8

Power Output
CH. 333
Level 7



EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A

Section 2.1049: Occupied Bandwidth

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 12/27/00

Test Engineer: jmartinez

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

EUT Voltage: 12 Vdc

General Test Configuration

The EUT and all local support equipment were located on the table for testing. The Eut was connected directly to Test Receiver. A 20-dB attenuator was used between the EUT and Test Receiver.

Ambient Conditions:

Temperature: 23°C

Rel. Humidity: 31%

Summary of Results

Plot	Test Performed	Limit	Result	Comment
# 9	Occupied Bandwidth	22.917(d)	Pass	Wideband data

Modifications Made During Testing:

No modifications were made to the EUT during testing

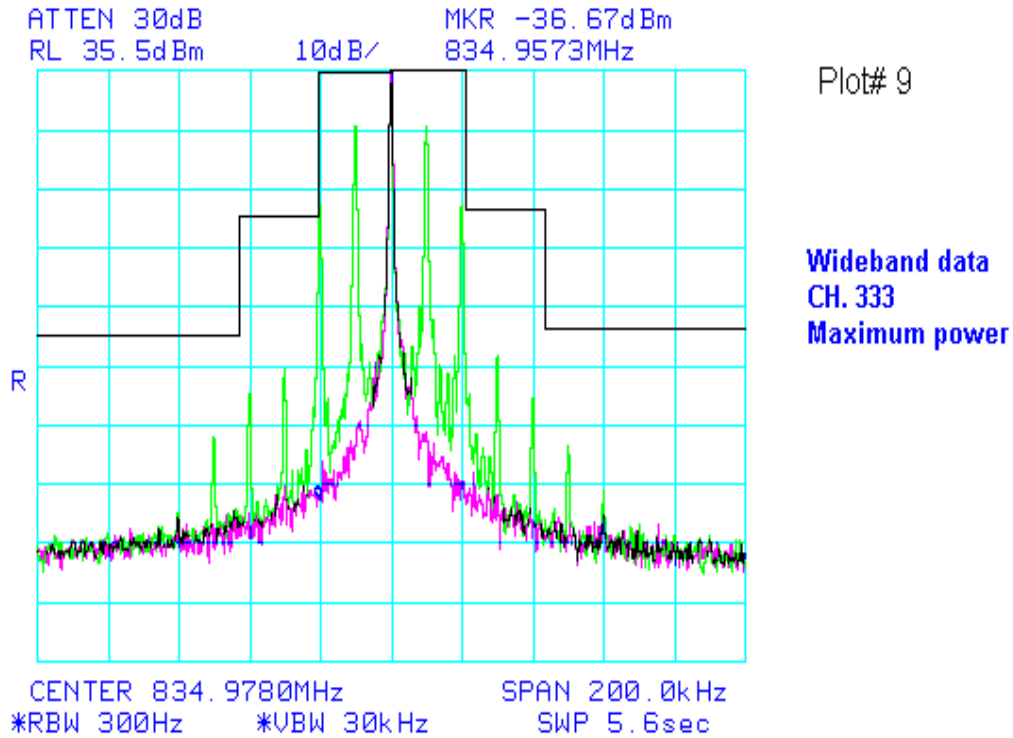
Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A





EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A

Section 2.1051: Spurious emission at the Antenna Terminal

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 12/27/00

Test Engineer: jmartinez

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

EUT Voltage: 12 Vdc

General Test Configuration

The EUT and all local support equipment were located on the table for testing. The Eut was connected directly to Test Receiver. A 20-dB attenuator was used between the EUT and Test Receiver.

Ambient Conditions:

Temperature: 23°C

Rel. Humidity: 31%

Summary of Results

Plot	Test Performed	Limit	Result	Comment
# 10	Out-Of-Band	22.917(e)	Pass	Wideband data
# 11	Mobile Emission	22.917 (f)	Pass	Wideband data

Modifications Made During Testing:

No modifications were made to the EUT during testing

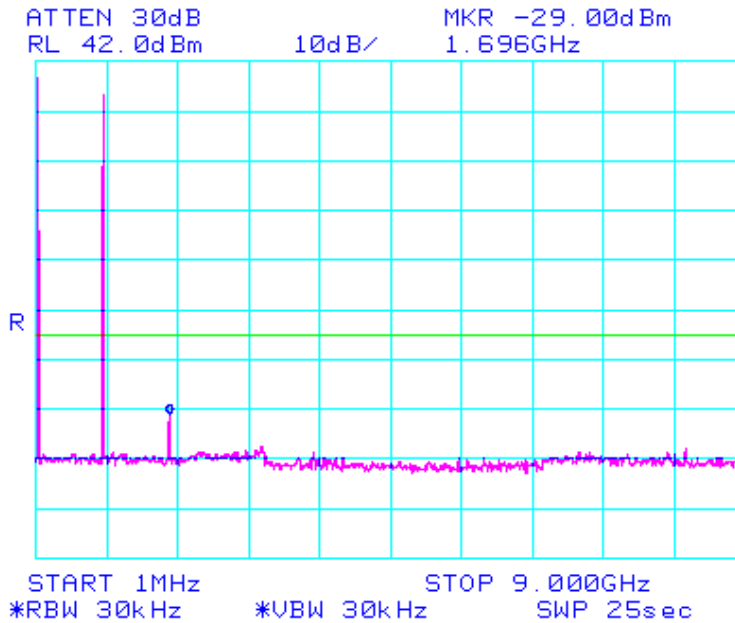
Deviations From The Standard

No deviations were made from the requirements of the standard.



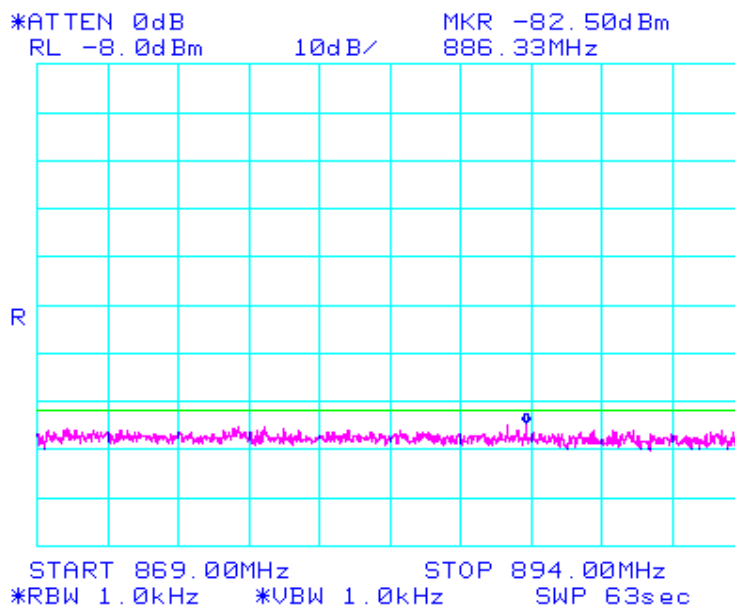
EMC Test Data

Client:	Standard Communications	Job Number:	J41061
Model:	CMM 7700 & 8700	T-Log Number:	41217
Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A



Plot# 10

WideBand data
Out-of-Band



Plot# 11

Wideband data
22.917(f)
Mobile emissions

DL= -80 dBm



EMC Test Data

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Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A

Section 2.1053: Field strenght of Spurious emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 12/21/00

Test Engineer: jmartinez

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

EUT Voltage: 12 Vdc

General Test Configuration

The EUT was located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 3m from the EUT for the frequency range 1 - 10 GHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 21°C

Rel. Humidity: 35%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 9000 MHz Maximized Emissions	22.917(e)	Pass	-5dB @ 1669.878 MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



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Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A

CMM 8700

Run #1: Maximized readings, 1000 - 9000 MHz

Harmonic measurements of the Fundamental Frequency of 834.99 MHz

Frequency MHz	Level dBμV/m	Pol v/h	FCC A Limit	FCC A Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
1669.878	79.4	V	84.4	-5.0	Pk	329	1.1	Peak reading, peak limit
2504.916	65.4	V	84.4	-19.0	Pk	5	1.1	Peak reading, peak limit
3340.046	63.8	V	84.4	-20.6	Pk	135	1.1	Peak reading, peak limit
4174.930								Analyzer Noise floor
5010.072								Analyzer Noise floor
5845.163								Analyzer Noise floor
6680.000								Analyzer Noise floor
7515.000								Analyzer Noise floor
8350.000								Analyzer Noise floor
1669.883	75.4	H	84.4	-9.0	Pk	208	1.1	Peak reading, peak limit
2504.976	64.1	H	84.4	-20.3	Pk	192	1.1	Peak reading, peak limit
3340.006	64.8	H	84.4	-19.6	Pk	130	1.1	Peak reading, peak limit
4174.930								Analyzer Noise floor
5010.072								Analyzer Noise floor
5845.163								Analyzer Noise floor
6680.000								Analyzer Noise floor
7515.000								Analyzer Noise floor
8350.000								Analyzer Noise floor



EMC Test Data

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Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A

Section 2.1055: Frequency Stability

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 12/27/00

Test Engineer: jmartinez

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

EUT Voltage: 12 Vdc

General Test Configuration

The EUT and all local support equipment were located on the table for testing. The Eut was connected directly to Test Receiver. A 20-dB attenuator was used between the EUT and Test Receiver.

Ambient Conditions:

Temperature: N/A

Rel. Humidity: N/A

Summary of Results

Run #	Test Performed	Limit	Result	Comment
1a & 1b	Temperature Vs. Frequency	22.355	Pass	
2a & 2b	Voltage Vs. Frequency	22.355	Pass	Battery end point is 4.5Vdc

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

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Contact:	Micheal Malin	Proj Eng:	David Bare
Spec:	FCC 22 (Cellular)	Class:	N/A

Run# 1a: Temperature Vs. Frequency

$$2.5\text{ppm} * 834.99 = 2087.475 \text{ Hz}$$

Temperature (Celsius)	Drift (Hz)	Limit (Hz)
-30	-450.0	2087.475
-20	-310.0	2087.475
-10	-108.0	2087.475
0	4.0	2087.475
10	46.0	2087.475
20	451.0	2087.475
30	-345.0	2087.475
40	-850.0	2087.475
50	-1240.0	2087.475
60	1140.0	2087.475

Run# 1b: Temperature Vs. Power

Reference Power = 35 dBm

Temperature (Celsius)	Deviation (dB)	Power (dBm)
-30	0.03	35.2
-20	0.23	35.4
-10	-0.07	35.1
0	-0.67	34.5
10	0.03	35.2
20	-0.47	34.7
30	0.03	35.2
40	0.03	35.2
50	0.13	35.3
60	0.016	35.3

Run# 2a: Voltage Vs. Frequency

Battery end point is **4.5Vdc**. This will be stated by the manufacturer. No frequency drift occurred, only power decreased as voltage decreased.



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Spec:	FCC 22 (Cellular)	Class:	N/A

Run# 2b: Voltage Vs. Frequency

Nominal Voltage is 12Vdc.

Voltage	Drift	Limit
(Dc)	(Hz)	(Hz)
80%	1.0	2087.475