CERTIFICATE OF COMPLIANCE
FCC PART 90 CERTIFICATION

Test Lab:	**Applicant Information:**
CELLTECH RESEARCH INC. Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250 - 860-3130 Fax: 250 - 860-3110 Toll Free: 1-877-545-6287 e-mail: info@celltechlabs.com web site: www.celltechlabs.com	**VERSATILE MOBILE SYSTEMS, INC.** 19105 36th Avenue West Lynnwood, WA 98036

FCC Classification:	**Licensed Non-Broadcast Station Transmitter (TNB)**
FCC Rule Part(s):	**§90, §2**
FCC ID:	**PS9VC1727C-R8**
Model(s):	**VC1727C/R8**
Equipment Type:	**Wireless Cradle with RIM 802 DataTAC Radio Modem & Vehicle Mount Antenna (for Symbol PDT 1740 Handheld PC)**
Tx Frequency Range:	**806 - 821 MHz**
Rx Frequency Range:	**851 - 870 MHz**
Max. RF Output Power:	**1.21 Watts (ERP)**
Frequency Tolerance:	**2.5 PPM**
Emission Designator:	**20K0F1D**
Antenna Type:	**Vehicle Mount GPS/Cellular Dual-Band Mobile Antenna (Radiall/Larsen Antenna Technologies Model: GPSC008)**

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Celltech Research Inc. certifies that no party to this application has been denied FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

Shawn McMillen
General Manager
Celltech Research Inc.

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FCC PART 90 MEASUREMENT REPORT

1.1 SCOPE

Measurement and determination of electromagnetic emissions (EME) from radio frequency devices for compliance with the technical rules and regulations of the Federal Communications Commission.

§2.1033(a) General Information

APPLICANT:

VERSATILE MOBILE SYSTEMS, INC.
19105 36th Avenue West
Lynnwood, WA 98036

FCC ID	**PS9VC1727C-R8**
Model	**VC1727C/R8**
EUT Type	**Wireless Cradle with RIM 802 DataTAC Radio Modem & Vehicle Mount GPS/Cellular Antenna**
Classification	**Licensed Non-Broadcast Station Transmitter (TNB)**
Rule Part(s)	**§90, §2**
Max. RF Output Power	**1.21 Watts (ERP)**
Tx Freq. Range	**806 - 821 MHz**
Rx Freq. Range	**851 - 870 MHz**
Emission Designator	**20K0F1D**
Signal Modulation	**FSK**
Modes Tested	**Unmodulated Carrier, RD-LAP, MDC**
Antenna Type	**GPS/Cellular Dual Band Mobile Antenna (Radiall/Larsen Model: GPSC008)**
Power Supply	**12VDC (from Vehicle Battery)**

2.1 MEASUREMENT PROCEDURES

2.2 OCCUPIED BANDWIDTH - §2.1049(c)

The antenna output terminal of the EUT was connected to the input of a 50Ω spectrum analyzer through a matched 30dB attenuator. The radio transmitter was operating at maximum output power with and without internal data modulation.

Test Results

A. UNMODULATED CARRIER – High power
33.0dBm conducted power with a 30dB matched attenuator and coaxial cable with a total loss of 1.0dB.

B. INTERNAL MODULATION
Please see attached test plots. 100% of the in-band modulation is below the specified mask per 90.210(j).

Emission Mask: 806 - 821 MHz (DataTAC)

FREQUENCY (MHz)	FORMULA	LIMIT (dBc)
-26500	43+10 log (P)	- 46
-0.050	43+10 log (P)	- 46
-0.050	50+10 log (P)	- 53
-0.0175	116 log (f_d / 6.1)	- 53
-0.010	116 log (f_d / 6.1) or 83 log ((f_d / 5)	- 25
-0.005	83 log ((f_d / 5)	0.0
0.005	83 log ((f_d / 5)	0.0
0.010	116 log (f_d / 6.1) or 83 log ((f_d / 5)	- 25
0.0175	116 log (f_d / 6.1)	- 53
0.050	50+10 log (P)	- 53
0.050	43+10 log (P)	- 46
26500	43+10 log (P)	- 46

2.3 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL - §2.1051

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from 10MHz to 20GHz. The antenna output terminal of the EUT was connected to the input of a 50Ω spectrum analyzer through a matched 30dB attenuator and coaxial cable. The transmitter was operating at maximum power with and without internal data modulation.

2.4 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

Radiated and harmonic emissions above 1 GHz were measured at our 3-meter outdoor site. The EUT is placed on the turntable with the transmitter transmitting into a non-radiating load. A receiving antenna located 3 meters from the turntable receives any signal radiated from the transmitter and its operating accessories. The receiving antenna is varied from 1 to 4 meters and the polarization is varied (horizontal and vertical) to determine the worst-case emission level.

2.5 FREQUENCY STABILITY / TEMPERATURE VARIATION - §2.1055

The frequency stability of the transmitter was measured by:

a) Temperature: The temperature was varied from -30°C to +60°C using an environmental chamber.
b) Primary Supply Voltage: The primary supply voltage was varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables were not supplied. The device was powered by a 15 Volt DC power supply.

Specification – The minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators were measured at room temperature (25°C to 27°C to provide a reference).
2. The equipment was subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight “soak” at -30°C (usually 14-16 hours), the equipment was turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators was made within a three-minute interval after applying power to the transmitter.
4. Frequency measurements were made at 10°C intervals up to +60°C then back to room temperature. A minimum period of one and one half-hour was provided to allow stabilization of the equipment at each temperature level.

3.1 TEST DATA

3.2 EFFECTIVE RADIATED POWER OUTPUT - §2.1046

Freq. Tuned	**EUT Conducted Power**	**Max. Field Strength of EUT** (dBm)	**Dipole Gain**	**Dipole Forward Conducted Power**	**ERP of EUT Dipole Gain + Dipole Forward Conducted Power**	
(MHz)	(dBm)	(Vert. Pol.)	(dBd)	(dBm)	dBm	Watts
806	32.67	- 8.90	-1.10	31.93	30.83	1.21
821	32.51	-11.63	-1.14	30.35	29.21	0.834

Notes:

ERP Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A half-wave dipole was substituted in place of the EUT. The dipole was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the dipole, and the input level of the dipole was adjusted to the same field strength level as the EUT. The feed point for the dipole was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the dipole antenna. The conducted power at the antenna feed point was recorded. The forward power for the dipole was then determined and the ERP level was determined by adding the forward dipole power and the dipole gain in dB. For readings above 1GHz the above method is repeated using standard gain horn antennas.

3.3 FIELD STRENGTH OF SPURIOUS RADIATION - 2.1053

Operating Frequency (MHz):	806
Channel:	Low
Measured Cond. Pwr. (dBm):	32.67
Measured ERP (dBm):	30.83
Modulation:	Unmodulated Carrier
Distance:	3 Meters
Limit:	43 + 10 log (W) = 39.47 dBc

Frequency (MHz)	**Field Strength of Spurious Radiation** (dBm)	**Horn Forward Cond. Pwr.** (dBm)	**Standard Gain Horn Antenna Gain** (dBi)	**POL** (H/V)	**EIRP** (dBm)	**ERP** (dBm)	**dBc**
1612	-95.03	-55.41	6.6	V	-48.81	-50.95	81.78
2418	-92.58	-56.95	7.8	V	-49.15	-51.29	82.12
3224	-94.17	-59.03	7.75	V	-51.28	-53.42	84.25
4030	-98.68	-54.52	7.6	V	-46.92	-49.06	79.89
4836	-101.81	-65.78	8.5	V	-57.28	-59.42	90.25
5642	-104.37	-68.54	8.8	V	-59.74	-61.88	92.71
6448	-102.79	-65.94	9.6	V	-56.34	-58.48	89.31
7254	-104.51	-78.07	9.0	V	-69.07	-71.21	102.04
8060	-104.33	-73.25	9.3	V	-63.95	-66.09	96.92

Notes:

Radiated Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A standard gain horn antenna was substituted in place of the EUT. The antenna was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the antenna, and the input level of the antenna was adjusted to the same field strength level as the EUT. The feed point for the antenna was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the horn antenna. The conducted power at the antenna feed point was recorded. The forward power for the antenna was then determined and the EIRP level was determined by adding the forward power and the antenna gain in dB.

Operating Frequency (MHz):	821
Channel:	High
Measured Cond. Pwr. (dBm):	32.51
Measured ERP (dBm):	29.21
Modulation:	Unmodulated Carrier
Distance:	3 Meters
Limit:	43 + 10 log (W) = 39.47 dBc

Frequency (MHz)	**Field Strength of Spurious Radiation** (dBm)	**Horn Forward Cond. Pwr.** (dBm)	**Standard Gain Horn Antenna Gain** (dBi)	**POL** (H/V)	**EIRP** (dBm)	**ERP** (dBm)	**dBc**
1642	-92.63	-58.51	6.6	V	-51.91	-54.05	83.26
2463	-94.78	-60.05	7.8	V	-52.25	-54.39	83.60
3284	-93.11	-62.13	7.75	V	-54.38	-56.52	85.73
4105	-96.55	-57.62	7.6	V	-50.02	-52.16	81.37
4926	-103.51	-68.88	8.5	V	-60.38	-62.52	91.73
5747	-104.44	-71.98	8.8	V	-63.18	-65.32	94.53
6568	-101.66	-75.08	9.6	V	-65.48	-67.62	96.83
7389	-105.25	-81.17	9.0	V	-72.17	-74.31	103.52
8210	-105.68	-76.35	9.3	V	-67.05	-69.19	98.40

Notes:
Radiated Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A standard gain horn antenna was substituted in place of the EUT. The antenna was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the antenna, and the input level of the antenna was adjusted to the same field strength level as the EUT. The feed point for the antenna was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the horn antenna. The conducted power at the antenna feed point was recorded. The forward power for the antenna was then determined and the EIRP level was determined by adding the forward power and the antenna gain in dB.

3.4 FREQUENCY STABILITY - § 2.1055

Operating Frequency: 815,000,000 Hz

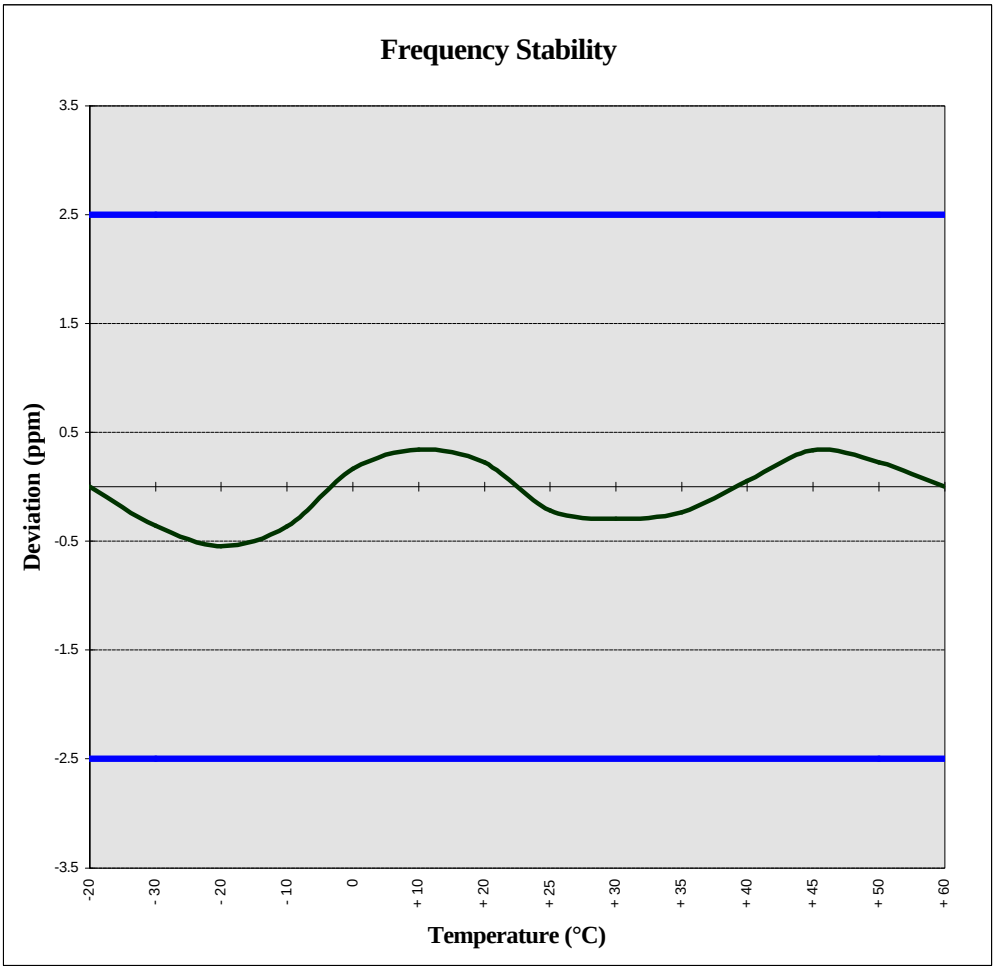
Channel: Mid

Reference Voltage: 12.0 VDC

Deviation Limit: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	**POWER** (VDC)	**TEMP** (ºC)	**FREQ.** (Hz)	**Deviation** (%)
100 %	12.00	+ 20 (Ref)	815000000	0.00000000
100 %		- 30	815000291.8	-0.00000036
100 %		- 20	815000443.4	-0.00000054
100 %		- 10	815000295.5	-0.00000036
100 %		0	814999865.9	0.00000016
100 %		+ 10	814999723.1	0.00000034
100 %		+ 20	814999819.3	0.00000022
100 %		+ 25	815000177.6	-0.00000022
100 %		+ 30	815000240.2	-0.00000029
100 %		+ 35	815000189.7	-0.00000023
100 %		+ 40	814999956.2	0.00000005
85 %	N/A	+ 45	814999725.2	0.00000034
115 %	N/A	+ 50	814999816.3	0.00000023
BATT. ENDPOINT	N/A	+ 60	815000000	0.00000000

FREQUENCY STABILITY - § 2.1055



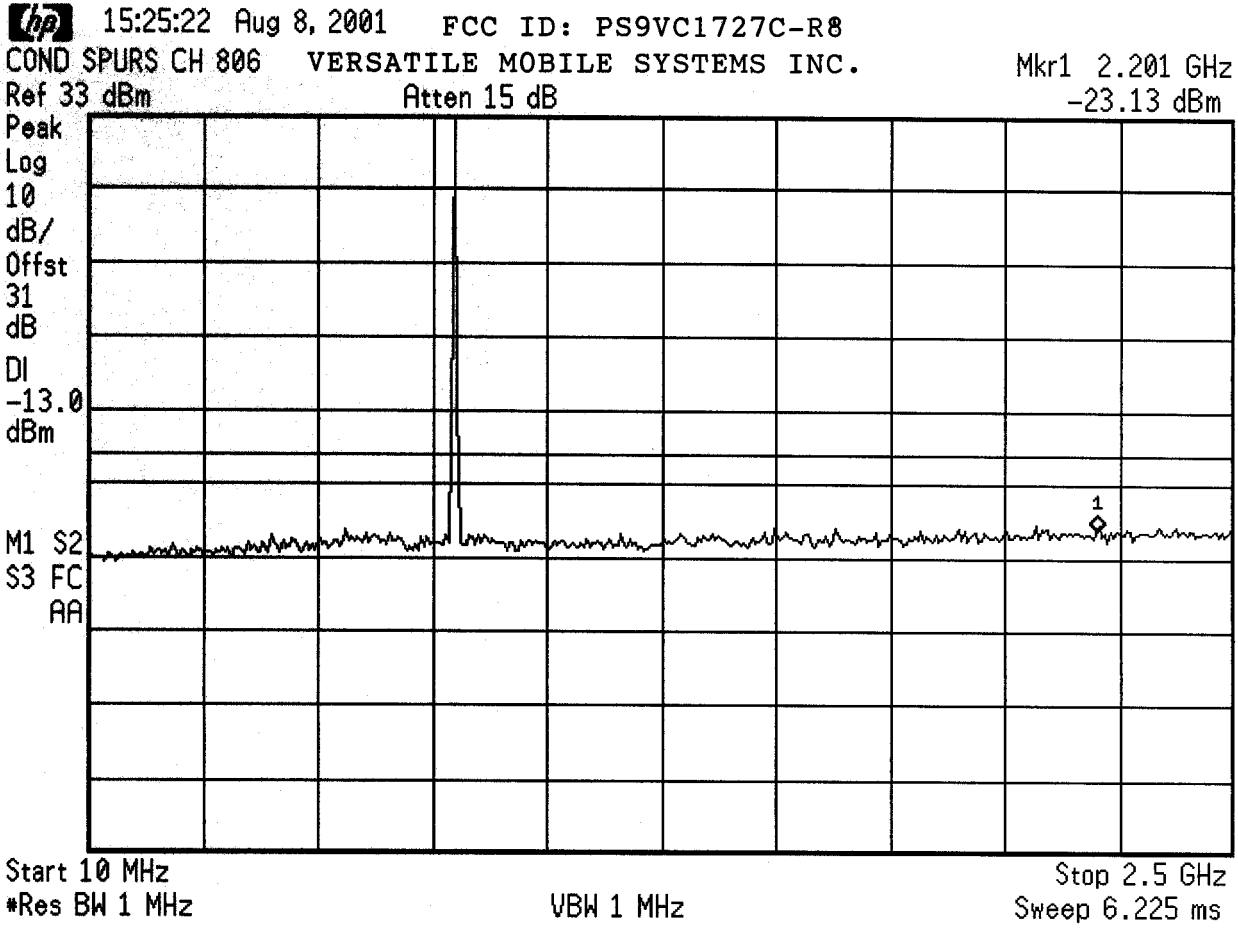
4.1 TEST EQUIPMENT

Type	Model	Calib. Date	Serial No.
Signal Generator	HP 8648D (9kHz-4.0GHz)	Nov 1999	3847A00611
Gigatronics Power Meter	8652A	Oct 1999	1835272
Gigatronics Power Sensor (2)	80701A (0.05-18GHz)	Oct 1999	1833535, 1833542
Amplifier Research Power Amp.	5S1G4 (5W, 800MHz-4.2GHz)	N/A	26235
Microwave System Amplifier	HP 83017A (0.5-26.5GHz)	N/A	3123A00587
Network Analyzer	HP 8753E (30kHz-3GHz)	Nov 1999	US38433013
Audio Analyzer	HP 8903B	March 1999	3729A18691
Modulation Analyzer	HP 8901A	March 1999	3749A07154
Frequency Counter	HP 53181A (3GHz)	May 1999	3736A05175
CDMA Base Station Test Set	Agilent E8285A	N/A	US40332926
DC Power Supply	HP E3611A	N/A	KR83015294
15 Volt DC Power Supply	Adcole Corp. Ealing	N/A	107896
Multi-Device Controller	EMCO 2090	N/A	9912-1484
Mini Mast	EMCO 2075	N/A	0001-2277
Turntable	EMCO 2080-1.2/1.5	N/A	0002-1002
Double Ridged Horn Antenna	ETS 3115 (1-18GHz)	Oct. 2000	6267
Double Ridged Horn Antenna	ETS 3115 (1-18GHz)	Oct. 2000	6276
Horn Antenna	Chase BBHA 9120-A (0.7-4.8GHz)	Sept 1998	9120A-239
Horn Antenna	Chase BBHA 9120-A (0.7-4.8GHz)	Sept 1998	9120A-240
Roberts Dipoles	Compliance Design (2 sets) 3121C	June 2000	
Spectrum Analyzer	HP 8594E	March 2000	3543A02721
Spectrum Analyzer	HP E4408B	Nov 1999	US39240170
Shielded Screen Room	Lindgren R.F. 18W-2/2-0	N/A	16297
Environmental Chamber	ESPEC ECT-2 (Temperature/Humidity)	Feb 2000	0510154-B

5.1 CONCLUSION

The data collected shows that the VERSATILE MOBILE SYSTEMS, INC. Model: VC1727C/R8 Wireless Cradle FCC ID: PS9VC1727C-R8 with RIM 802 DataTAC Radio Modem (for Symbol Technologies PDT 1740 Handheld PC) complies with all the requirements of Parts 2 and 90 of the FCC rules.

TEST PLOTS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Atten 15 dB
Peak
Log
10
dB/
Offst
31
dB
Dl
-13.0
dBm
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S3 FC
AA
1
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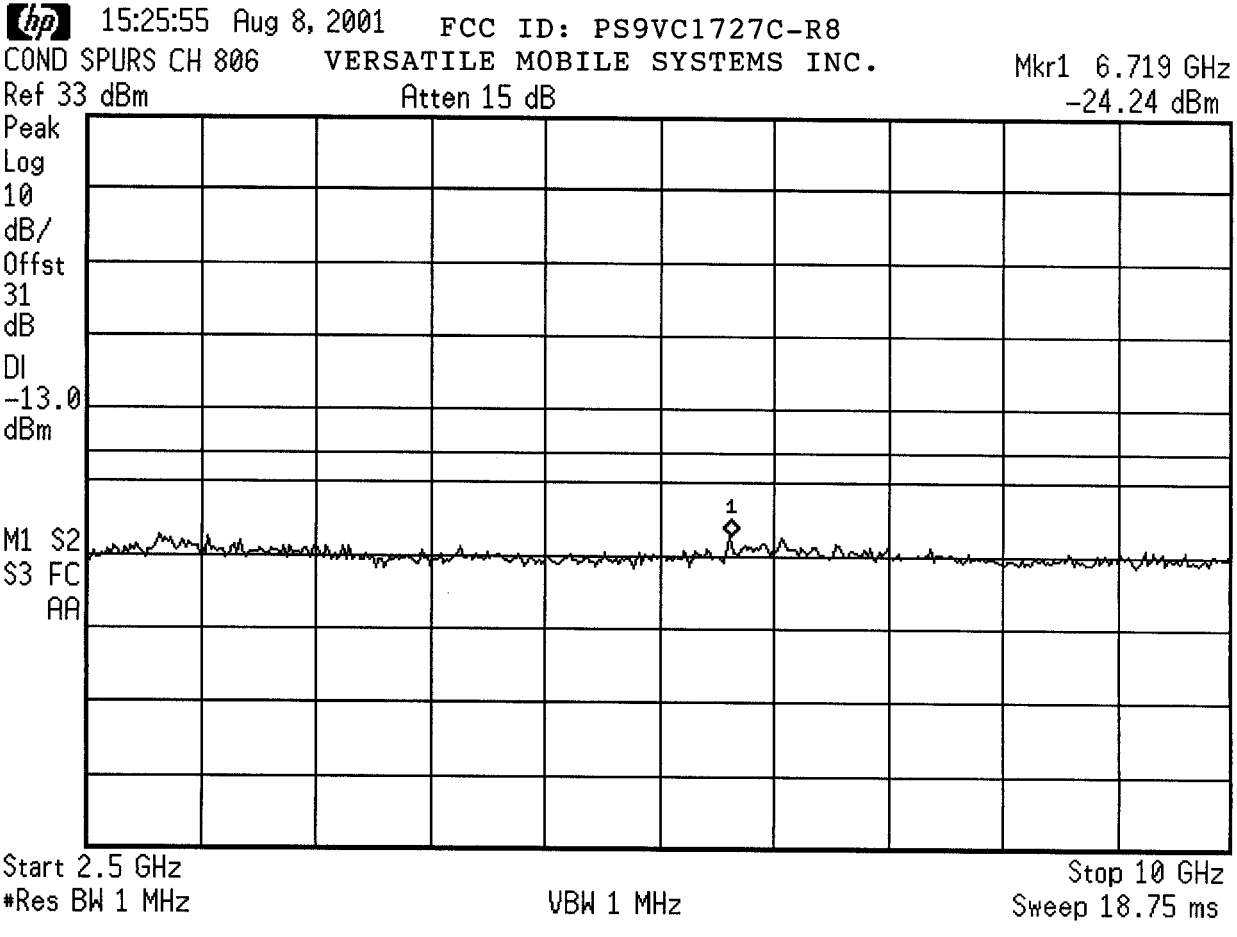
*Res BW 1 MHz
VBW 1 MHz
Stop 2.5 GHz
Sweep 6.225 ms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Log
10
dB/
Offst
31
dB
Dl
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S3 FC
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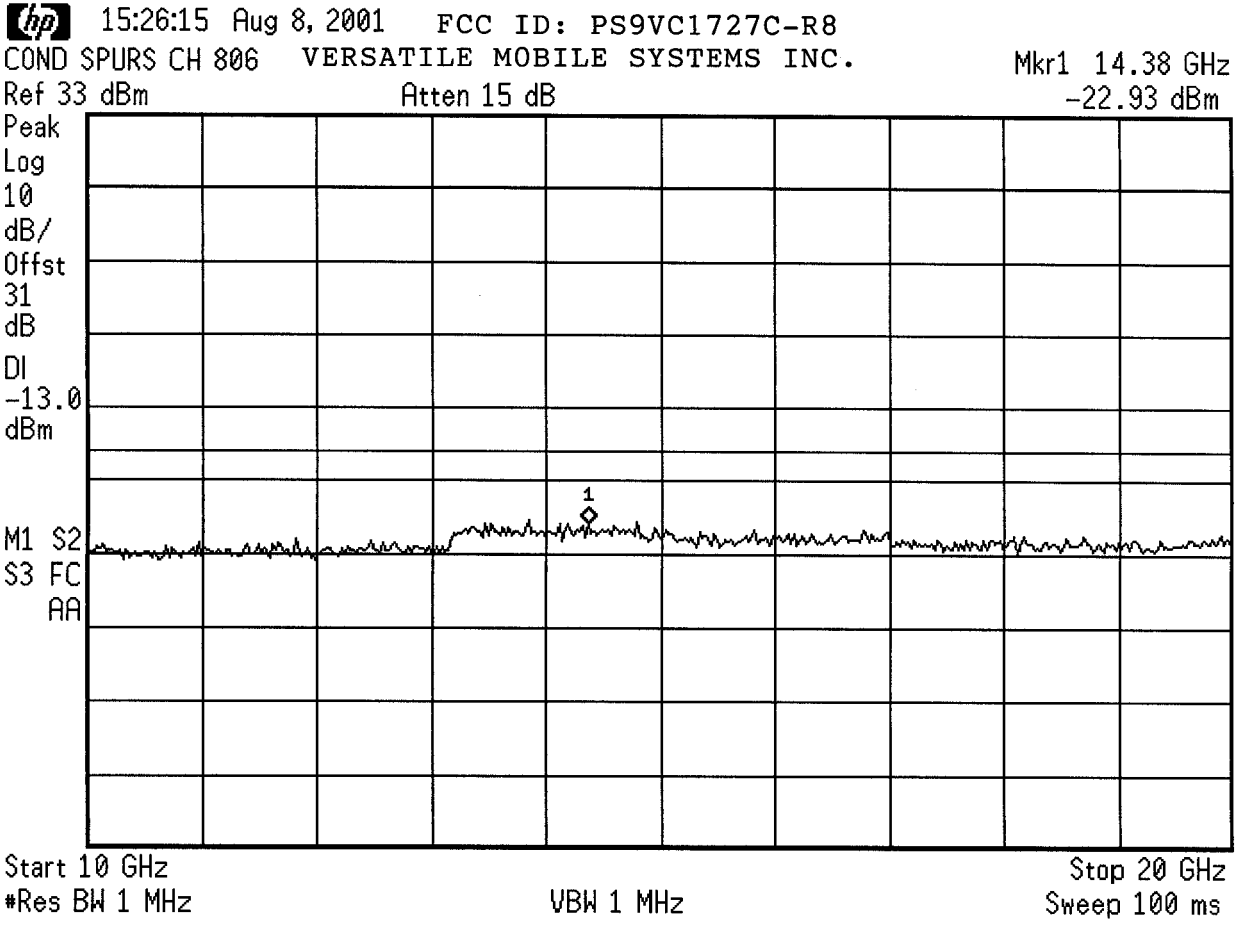
#Res BW 1 MHz
VBW 1 MHz
Stop 10 GHz
Sweep 18.75 ms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Log
10
dB/
Offst
31
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
1
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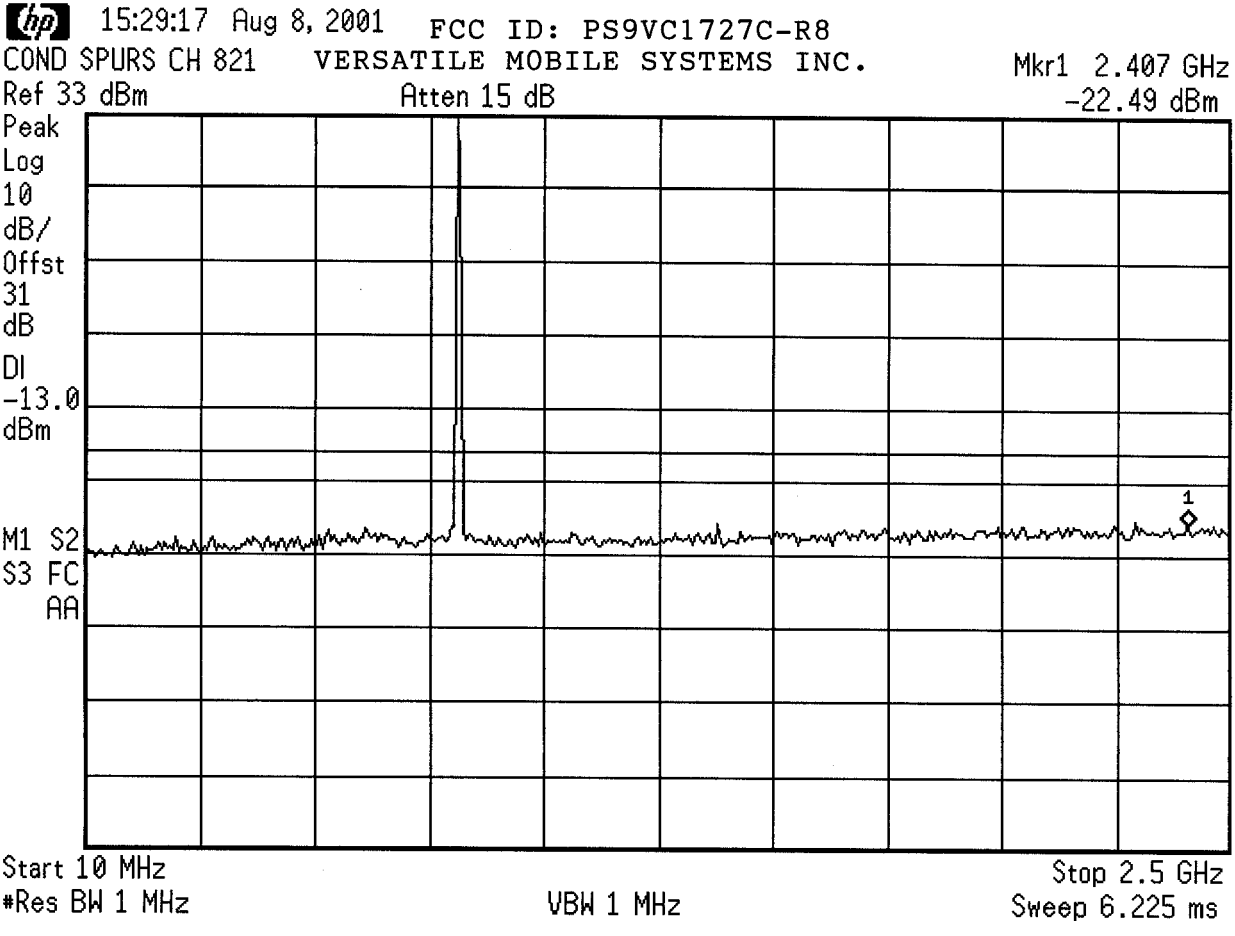
VBW 1 MHz
Stop 20 GHz
Sweep 100 ms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Atten 15 dB
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dB/
Offst
31
dB
Dl
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dBm
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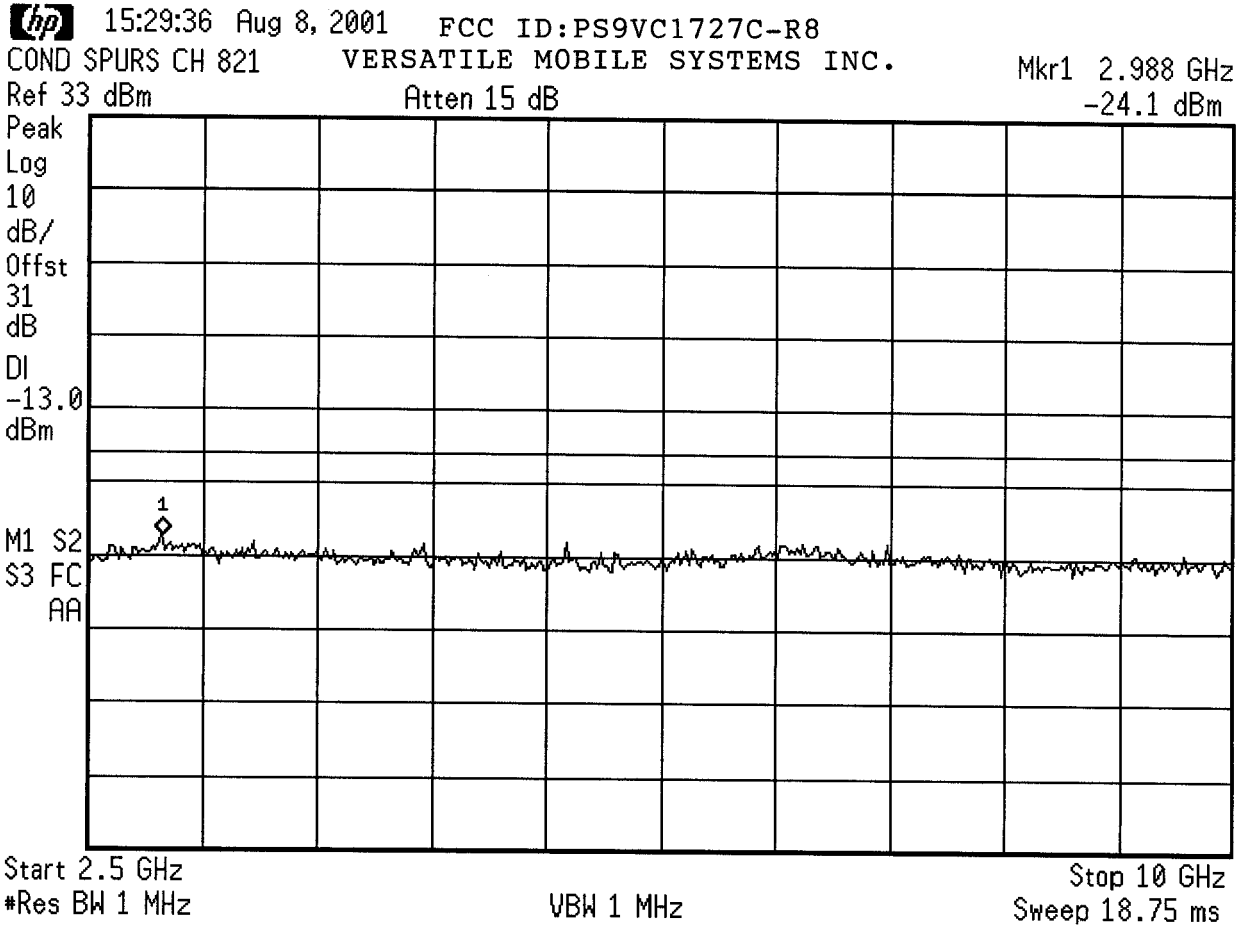
AA
1
Start 10 MHz
#Res BW 1 MHz
VBW 1 MHz
Stop 2.5 GHz
Sweep 6.225 ms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Log
10
dB/
Offst
31
dB
Dl
-13.0
dBm
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S3 FC
AA
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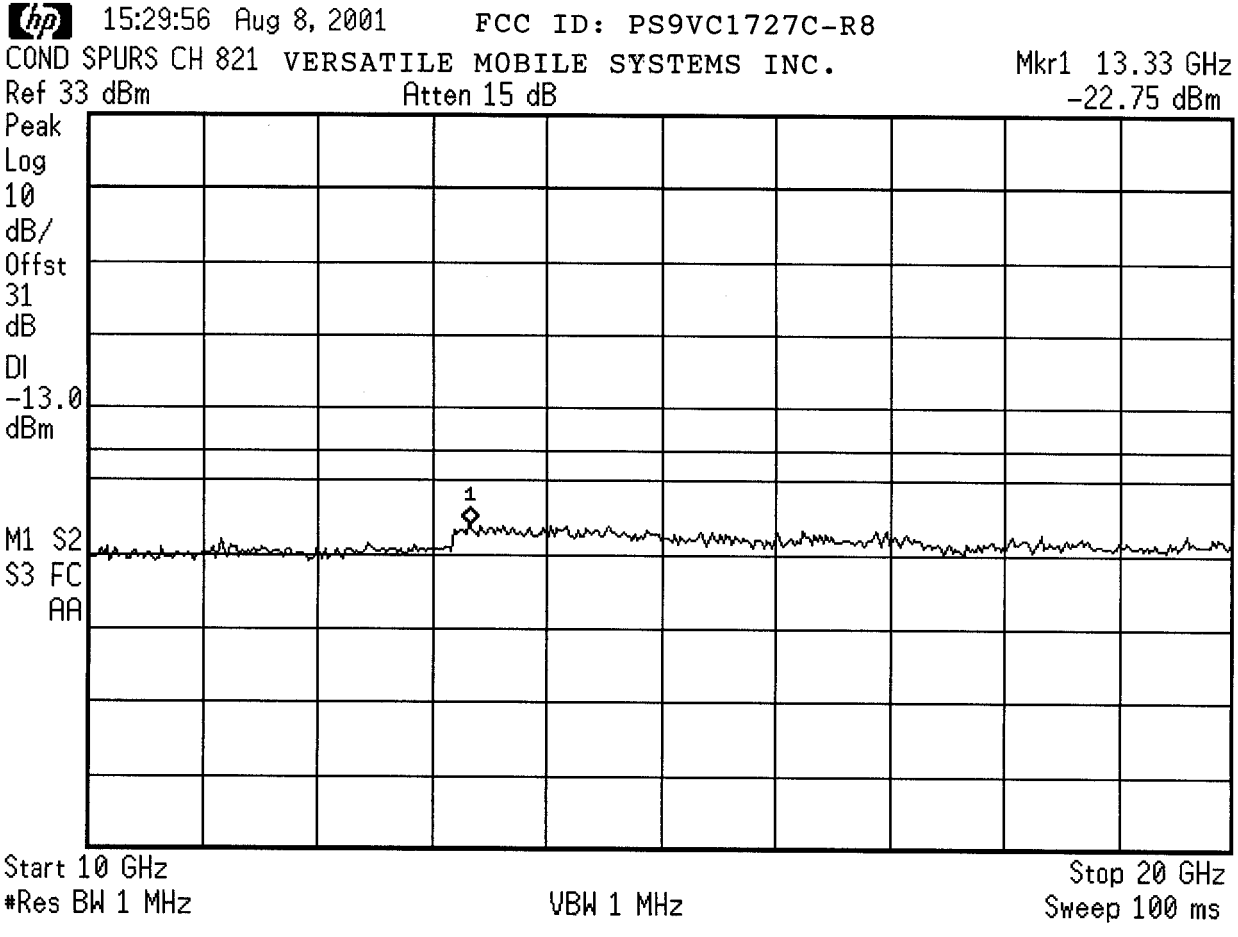
VBW 1 MHz
Stop 10 GHz
Sweep 18.75 ms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Ref 33 dBm
Atten 15 dB
Peak
Log
10
dB/
Offst
31
dB
Dl
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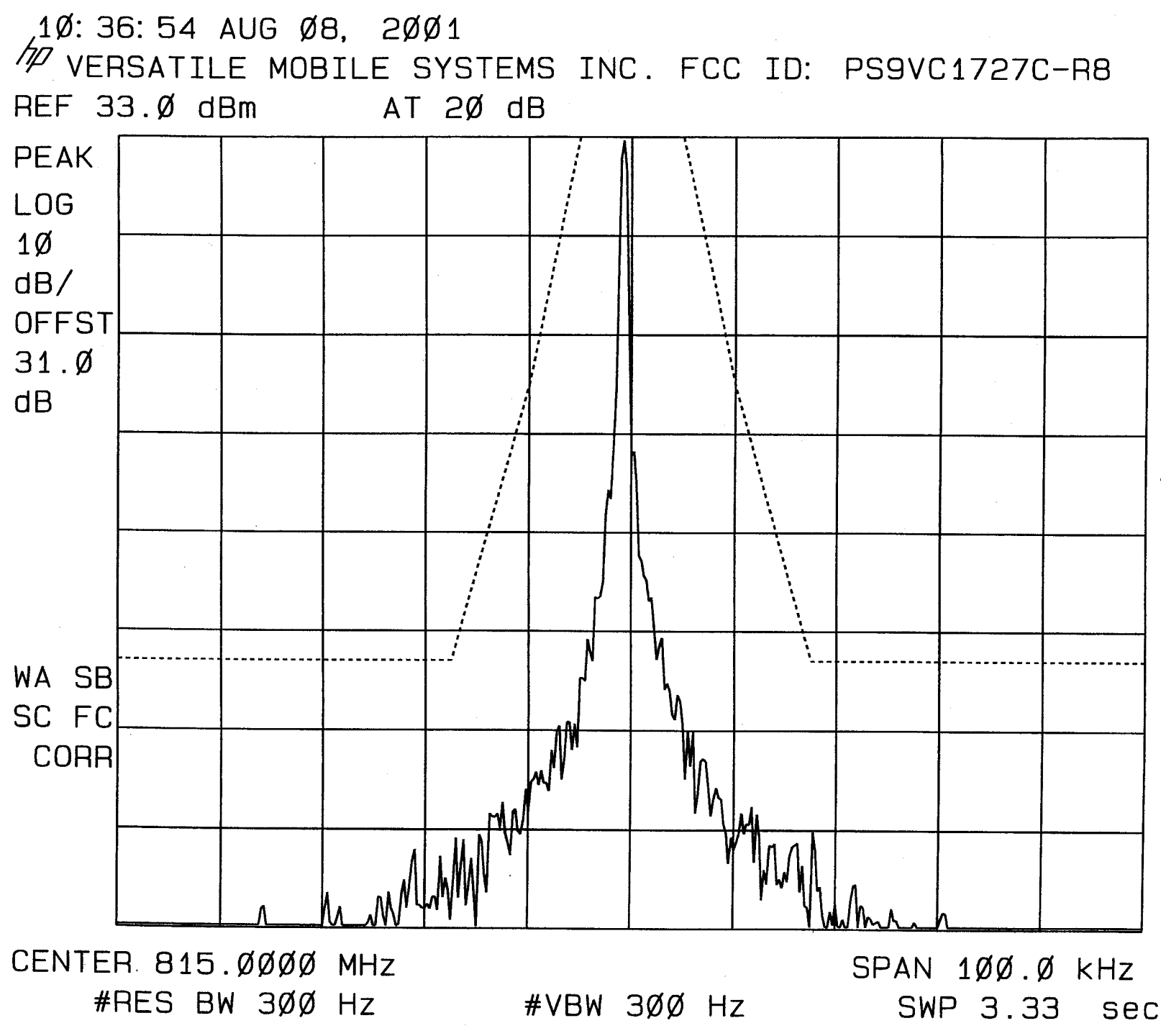
VBW 1 MHz
Stop 20 GHz
Sweep 100 ms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dB/
OFFST
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SC FC
CORR
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SPAN 100.0 kHz
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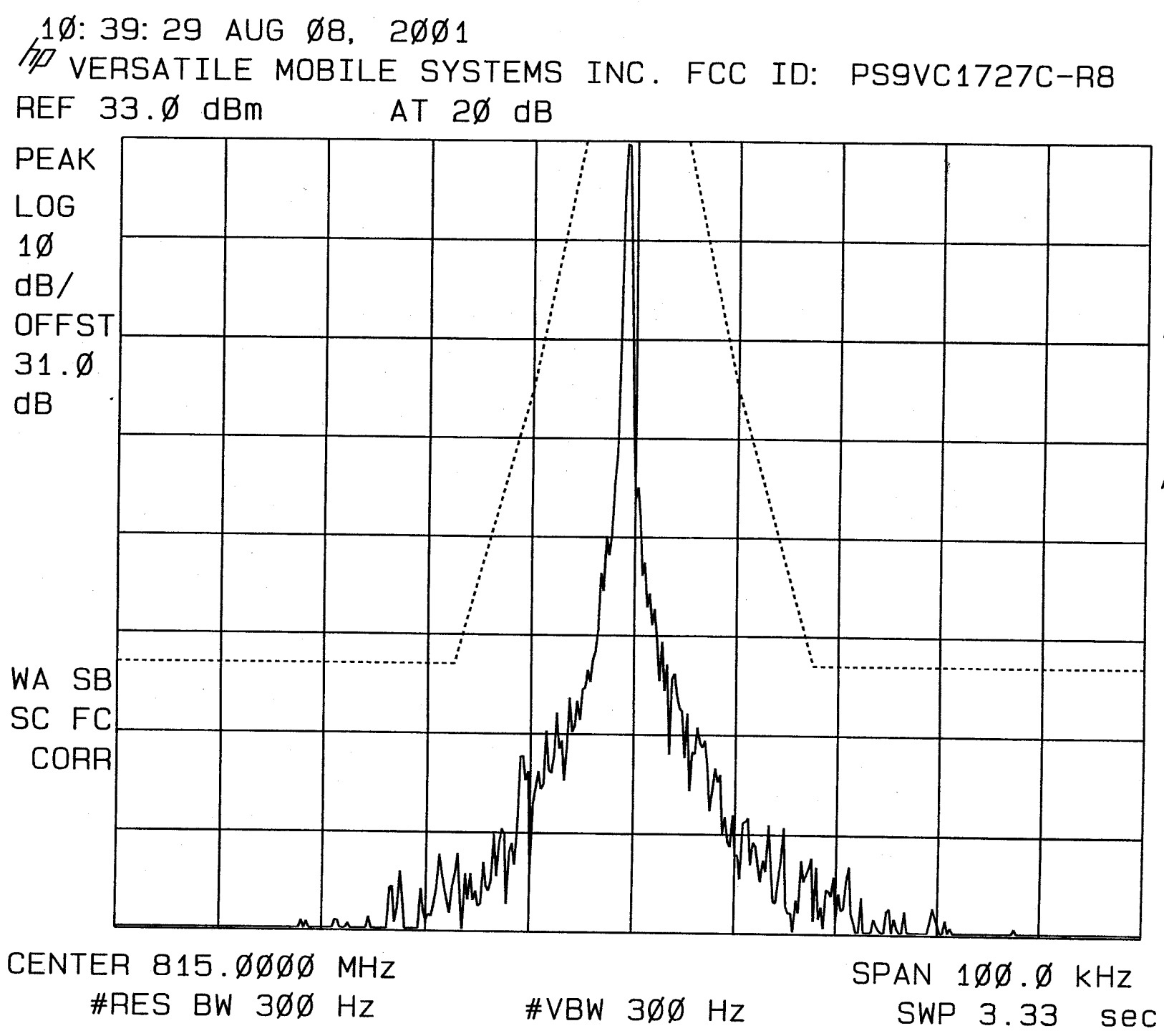
#VBW 300 Hz
SWP 3.33 sec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dB/
OFFST
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SC FC
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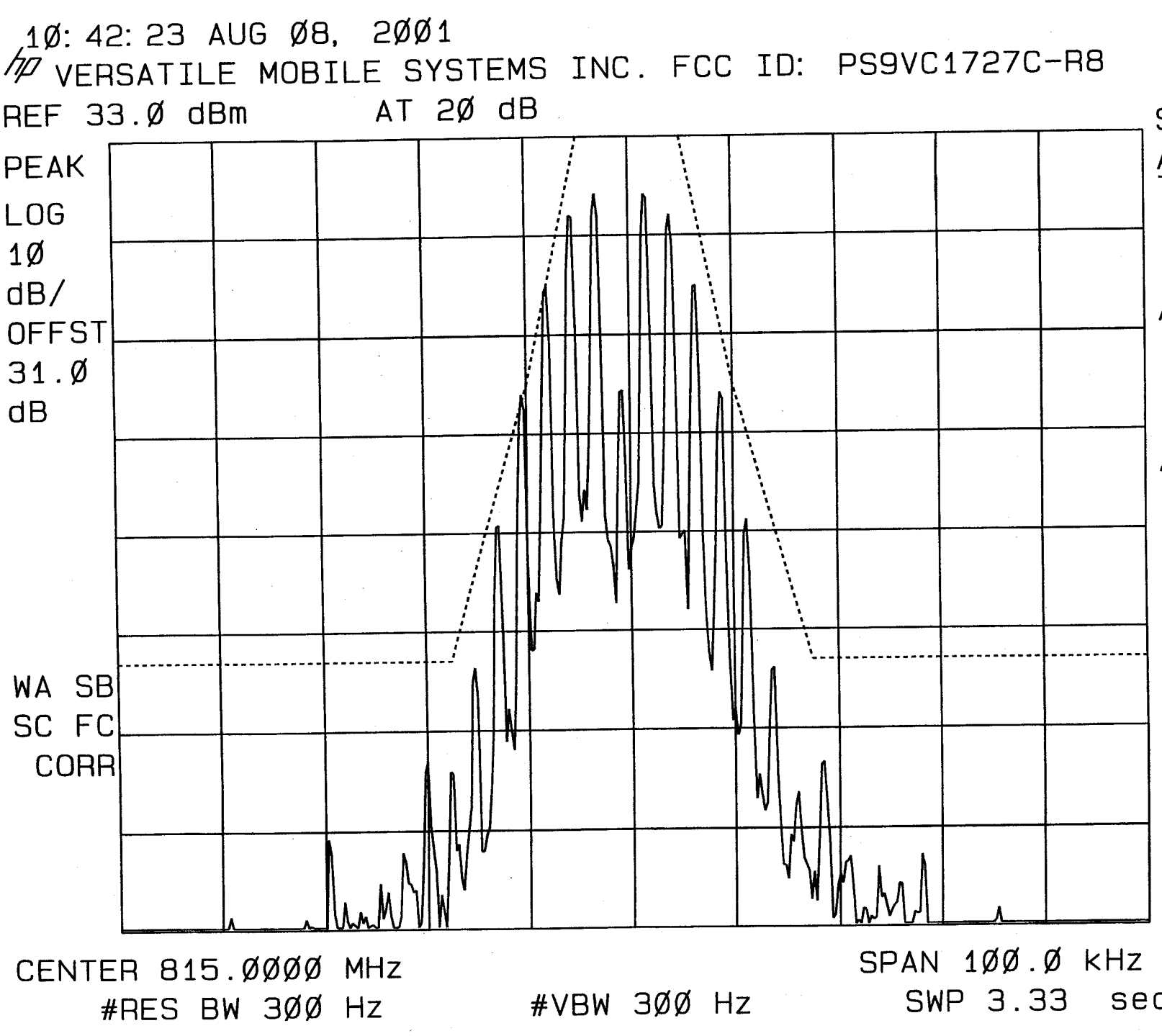
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OFFST
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dB
WA SB
SC FC
CORR
CENTER 815.0000 MHz
#RES BW 300 Hz
#VBW 300 Hz
SPAN 100.0 kHz
SWP 3.33 sec