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APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5ZA1

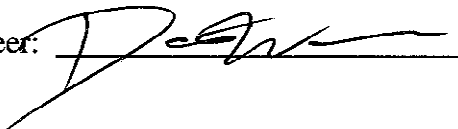
Summary of Radiated Spurious RF Measurements

**WORST CASE RADIATED SPUR LEVEL
MEASURED IN TRANSMIT AND RECEIVE MODE
FOR SC800 @800 MHz CDMA FIXED WIRELESS TERMINAL**

SPUR FREQUENCY (Mhz)	DISTANCE MEASURED (meters)	SPUR LEVEL MEASURED (dBμV/meter)	FCC MAX LIMIT dBuV/m
35.9	3	31.2	40.0
1672	3	48	54
2509	3	37	54

FCC Max. Limit Per 47 CFR Part 15, Subpart B

Unit was tested at an off site FCC approved range at 3 meters distance from 30 Mhz to 10 times the highest oscillator frequency (10 Ghz)

Engineer:  11/20/99
Date

EQUIPMENT: ST11056B 800MHZ FWT

Test Data - Radiated Emissions Test # RE-2

Emission Frequency (MHz)	Ant. Pol. (H/V)	Det. Attenu. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	CRSL Delta (dB)	Pass Fail Marginal	Notes
RX MODE											
392.0	H		29.5	14.8	5.1	24.7	24.7	46.0	-21.3	Pass	
313.6	H		27.6	14.8	5.1	24.7	22.8	46.0	-23.2	Pass	
523.0	H		22.1	17.8	6.7	25.1	21.5	46.0	-24.5	Pass	NOISE FLOOR
840.0	H		22.1	21.6	8.5	25.0	27.2	46.0	-18.8	Pass	NOISE FLOOR
313.6	V		23.7	14.8	5.1	24.7	18.9	46.0	-27.1	Pass	
500.0	V		22.1	17.6	6.7	25.1	21.3	46.0	-24.7	Pass	NOISE FLOOR
850.0	V		22.1	21.4	8.5	25.0	27.0	46.0	-19.0	Pass	NOISE FLOOR
35.0	V		26.6	13.9	1.9	24.6	17.8	40.0	-22.2	Pass	NOISE FLOOR
170.0	V		23.7	12.5	3.3	24.6	14.9	43.5	-28.6	Pass	NOISE FLOOR
275.0	V		23.3	17.7	4.5	24.6	20.9	46.0	-25.1	Pass	NOISE FLOOR
35.0	H		21.7	13.9	1.9	24.6	12.9	40.0	-27.1	Pass	NOISE FLOOR
170.0	H		23.2	12.5	3.3	24.6	16.4	43.5	-27.1	Pass	NOISE FLOOR
275.0	H		22.7	17.7	4.5	24.6	20.3	46.0	-25.7	Pass	NOISE FLOOR
TX MODE											
359	H		40.0	13.9	1.9	24.6	31.2	40.0	-8.8	Pass	
463	H		37.9	12.5	1.9	24.6	27.6	40.0	-12.4	Pass	
275.0	H		21.7	17.7	4.5	24.6	19.3	46.0	-26.7	Pass	NOISE FLOOR
35.0	V		26.0	13.9	1.9	24.6	17.2	40.0	-22.8	Pass	NOISE FLOOR
175.0	V		26.0	12.9	3.3	24.6	17.6	43.5	-25.9	Pass	NOISE FLOOR
275.0	V		22.9	17.7	4.5	24.6	20.5	46.0	-25.5	Pass	NOISE FLOOR
836.5	H		61.6	21.7	8.5	25.0	66.8	46.0	20.8	Fail	FUNDAMENTAL
350.0	H		21.8	14.0	5.1	24.7	16.2	46.0	-29.8	Pass	NOISE FLOOR
950.0	H		21.8	23.4	9.1	24.9	29.4	46.0	-16.6	Pass	NOISE FLOOR
836.5	V		59.0	21.7	8.5	25.0	64.2	46.0	18.2	Fail	FUNDAMENTAL
350.0	V		21.7	14.0	5.1	24.7	16.1	46.0	-29.9	Pass	NOISE FLOOR
950.0	V		21.7	23.4	9.1	24.9	29.3	46.0	-16.7	Pass	NOISE FLOOR
SCANNED 30 TO 1000 MHz											

EQUIPMENT: STI1056B 800MHZ FWT

Microwave Radiated Emissions Test # MW-2

Freq. (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Pol.	Comments: DELTA
									TX mode
1.672	48.6	25.1	4.415	31	0	47	54	V	6.9
3.346	24.6	30.3	3.5	31.5	0	27	54	V	27.1
4.183	31	31.8	4	31.6	0	35	54	V	18.8
5.019	28	33.9	4.67	30.5	0	36	54	V	17.9
5.855	22	35.3	5.33	30.5	0	32	54	V	21.9
1.672	49	25.1	4.415	31	0	48	54	H	6.5
2.509	33	29.1	5.2	30.2	0	37	54	H	16.9
3.346	21	30.3	3.5	31.5	0	23	54	H	30.7
4.182	23	31.8	4	31.6	0	27	54	H	26.8
4.96	33	33.9	4.67	30.5	0	41	54	H	12.9
									RX MODE
1.1	31	23.1	2.0	28.2	0	28	54	H	26.1 N. F.
2.5	33	29.1	5.2	30.2	0	37	54	H	16.9 N. F.
5.0	20.8	33.9	4.67	30.5	0	29	54	H	25.1 N. F.
1.1	31	23.1	2.0	28.2	0	28	54	V	26.1 N. F.
2.5	33	29.1	5.2	30.2	0	37	54	V	16.9 N. F.
5.0	20	33.9	4.67	30.5	0	28	54	V	25.9 N. F.
									SCANNED 1.0
									TO 10 GHz

Legend:

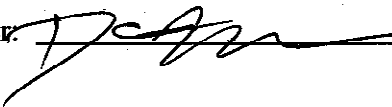
N.F. = Noise Floor reading

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5ZA1

Summary of Maximum Transmitter Power

Frequency Mhz (Channel)	RF Output Power dBm	RF Output Power Watts
822.92 (034)	23.3	0.213
833.42 (384)	23.1	0.204
845.21 (777)	23.0	0.200

Engineer:  1/20/99
Date

14: 25: 49 AUG 16, 1999

VKQ 823.989 MHz

REF 26.3 dBm

AT 40 GB

-39.04 dBm

SMPL

LOG

10

dB/

DSP

CORR

EXTAT

1.6

AVG

5

VA SB

SC FS MS CH 34

START 822.920 MHz

STOP 829.120 MHz

#RES BW 30 MHz

VBW 3 kHz

SWP 207 msec

SPUR TX MAX POWER

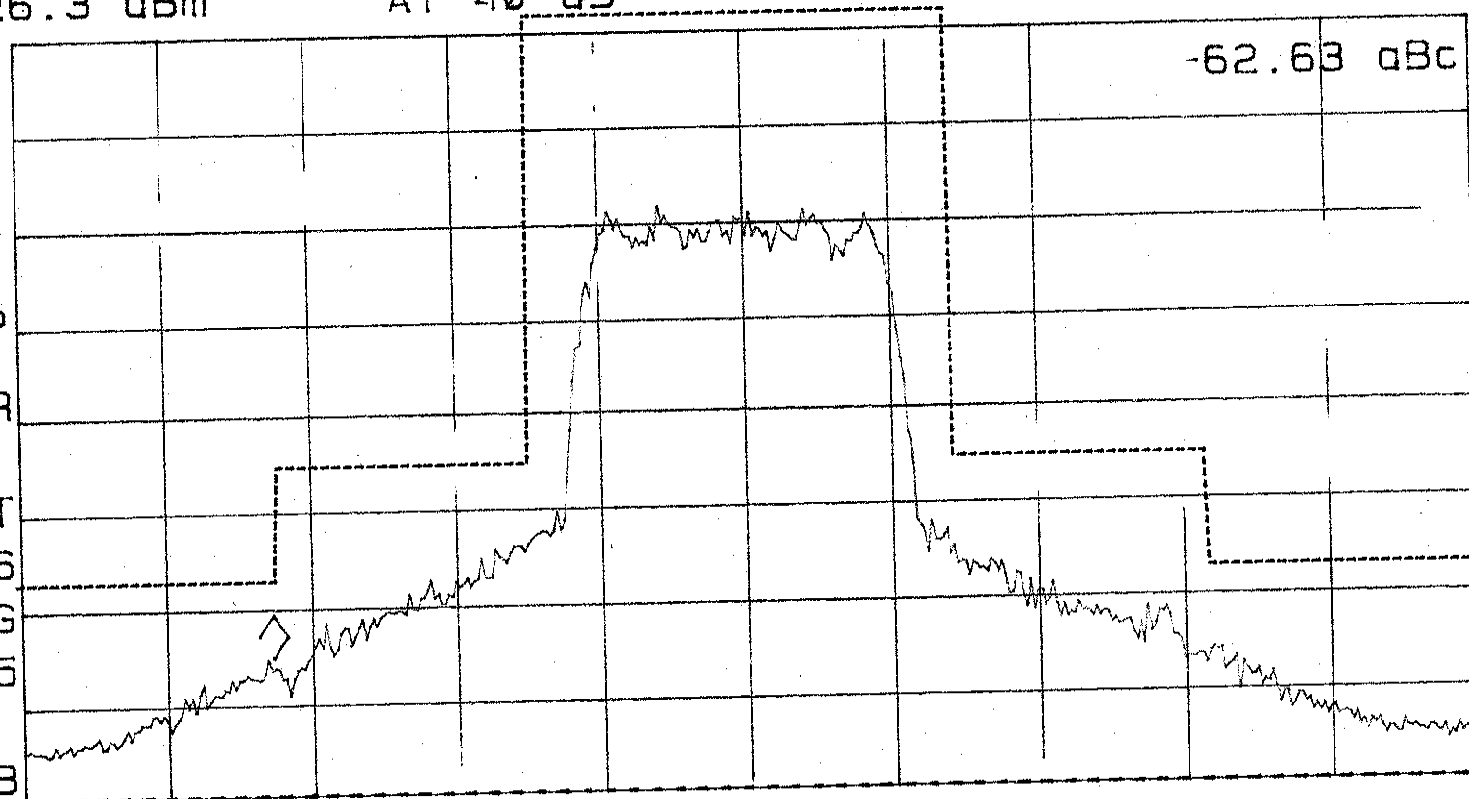
PASS

(dBc/30kHz) Fc Δ1m -8.3 dB

Δc -2.030 MHz

Chan Power

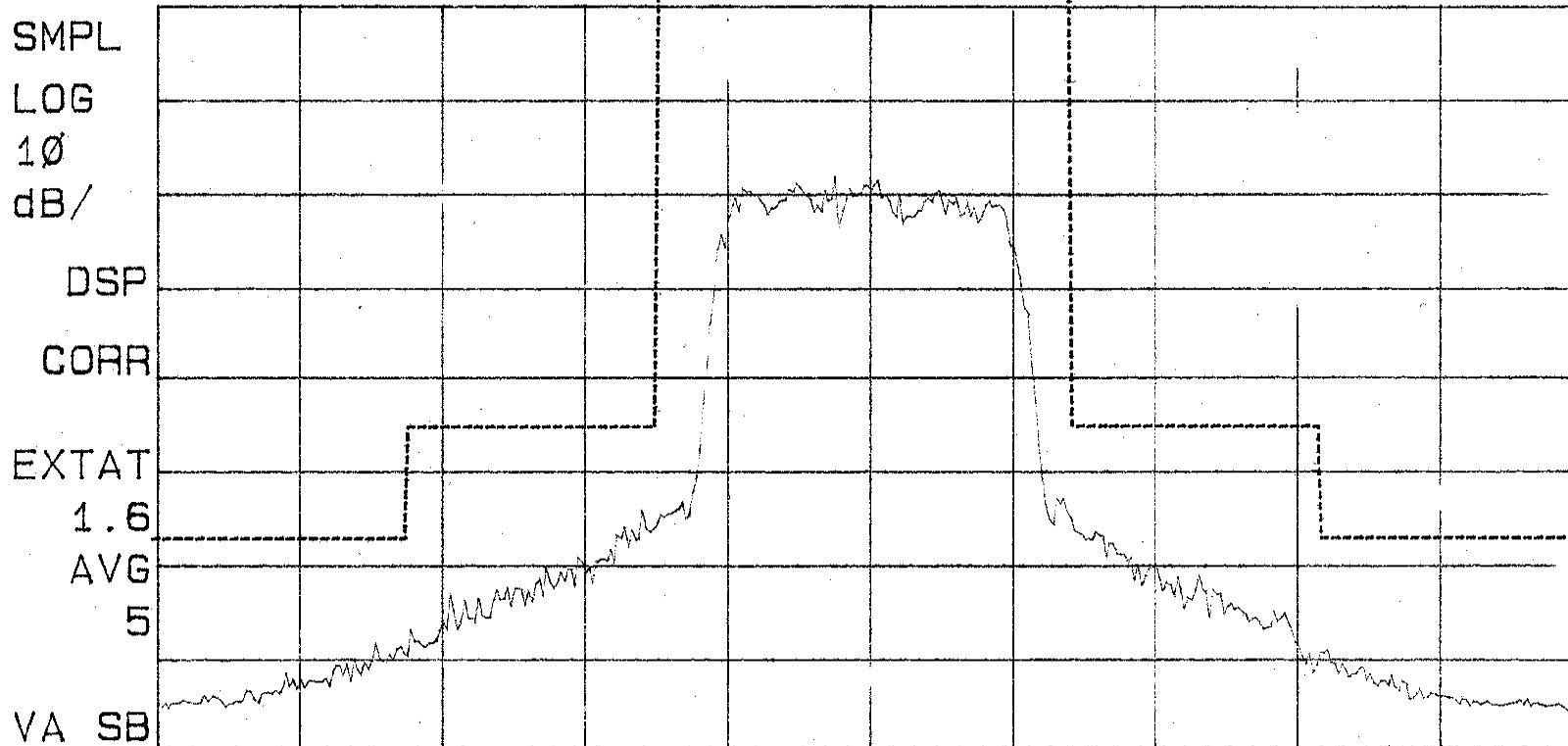
23.3 dBm



14:21:08 AUG 16, 1999

REF 26.1 dBm

AT 40 dB



SC FS MS CH 384

START 833.420 MHz

STOP 839.620 MHz

#RES BW 30 kHz

#VBW 3 kHz

SWP 20/ msec

SPUR TX MAX POWER

2 \ SS

(dBc/30kHz) Fc Δ 1m -9.4 dB

Δ fc -990.0 kHz

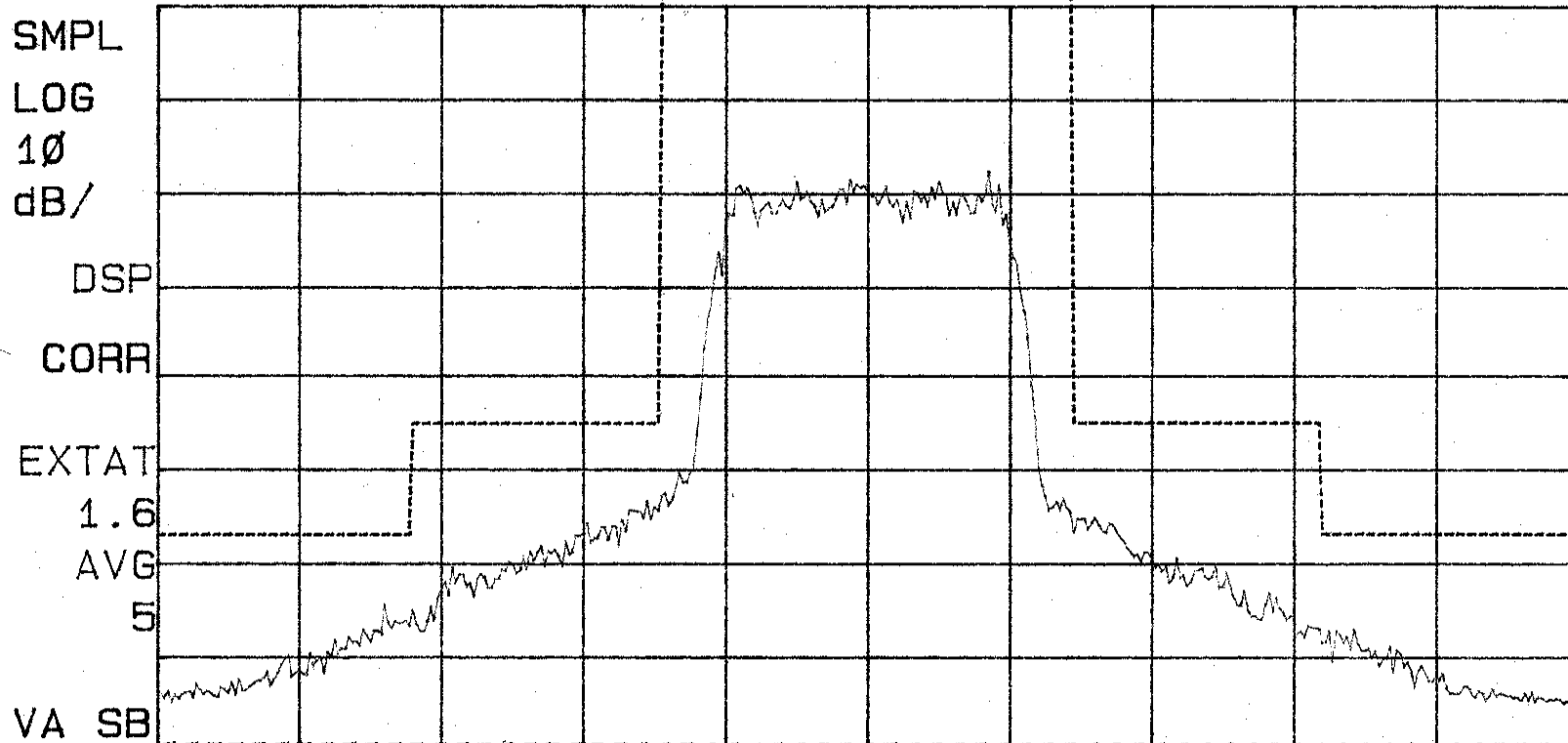
Chan Power

23.1 dBm

14: 15: 37 AUG 16, 1999

REF 26.0 dBm

AT 40 dB



SC FS MS CH 777

START 845.210 MHz

STOP 851.410 MHz

#RES BW 30 kHz

#VBW 3 kHz

SWP 207 msec

SPUR TX MAX POWER

PASS

(dBc/30kHz) Fc Lim -7.5 dB

Δf_c -2.110 MHz

Chan Power

23.0 dBm

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5ZA1

Summary of Transmitter Conducted Spurious

Frequency MHz	Spur Level dBc	FCC Limit
1652	55.5	36 dBc
1673	58.2	36 dBc
1695.5	59	36 dBc

Note:

1. Spurious emissions were measured at the harmonics of the Transmitter at high, mid and low channel. All other conducted emissions were at least 20 dB below FCC limits

2. FCC limit

$43 + 10 \log(P)$ in dB where $P=0.20$ Watt; Limit = 36 dBc

3. No signals were found in the 869 MHz to 894 MHz base station band.

10:42:32 AUG 28, 1999

FCC ID IHET5ZA1

REF 33.0 dBm

AT 50 dB

MKR Δ 0 Hz

.01 dB

SMPL

LOG

10

dB/

MARKER Δ

0 Hz

.01 dB

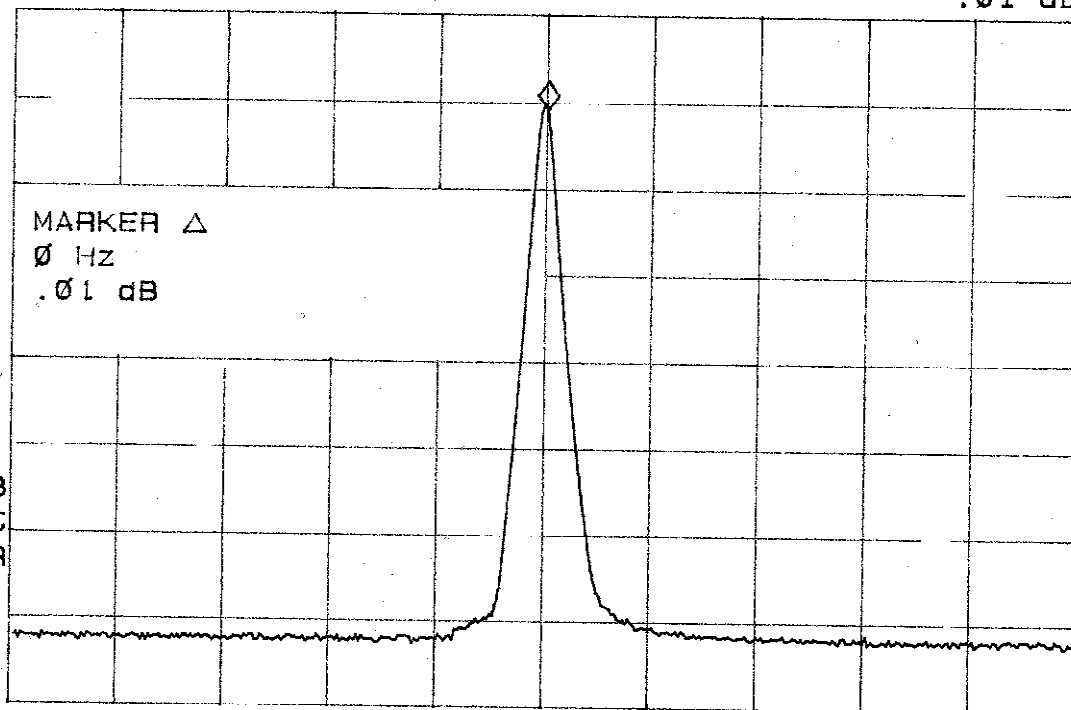
AVG

100

WA SB

SC FC

CORR



CENTER 826.0 MHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:45:31 AUG 28, 1999

FCC ID IHET5ZA1

REF 33.0 dBm

AT 50 dB

MKR Δ 826.0 MHz

-55.56 dB

SMPL

LOG

10

dB/

CENTER

1.6520 GHz

STEP 826.0 MHz

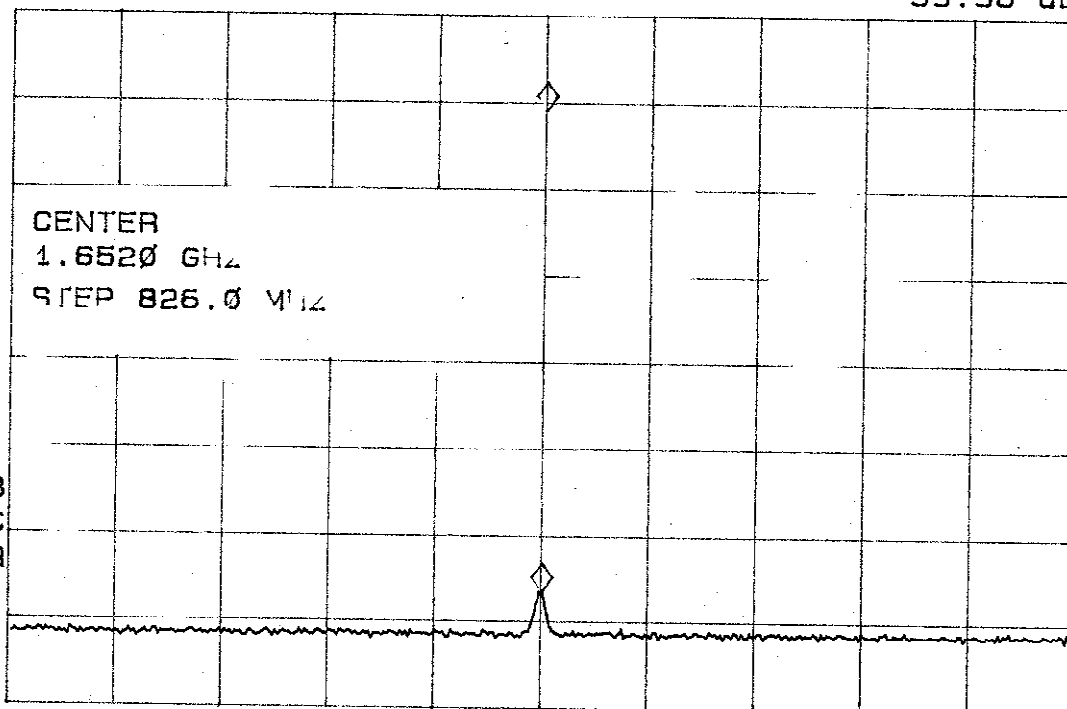
AVG

100

WA SB

SC FC

CORR



CENTER 1.6520 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:48:04 AUG 28, 1999

FCC ID IHET5ZA1

MKR Δ 1.6520 GHz

REF 33.0 dBm

AT 50 dB

-58.67 dB

SMPL

LOG

10

dB/

CENTER

2.4781 GHz

STEP 826.0 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 2.4781 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:50:23 AUG 28, 1999

FCC ID IHET5ZA1

MKR Δ 2.1781 GHz

REF 33.0 dBm

AT 50 dB

-58.86 dB

SMPL

LOG

10

dB/

CENTER

3.3041 GHz

STEP 826.0 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 3.3041 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:23:38 AUG 28, 1999
FCC ID IHET5ZA1
REF 33.0 dBm AT 50 dB

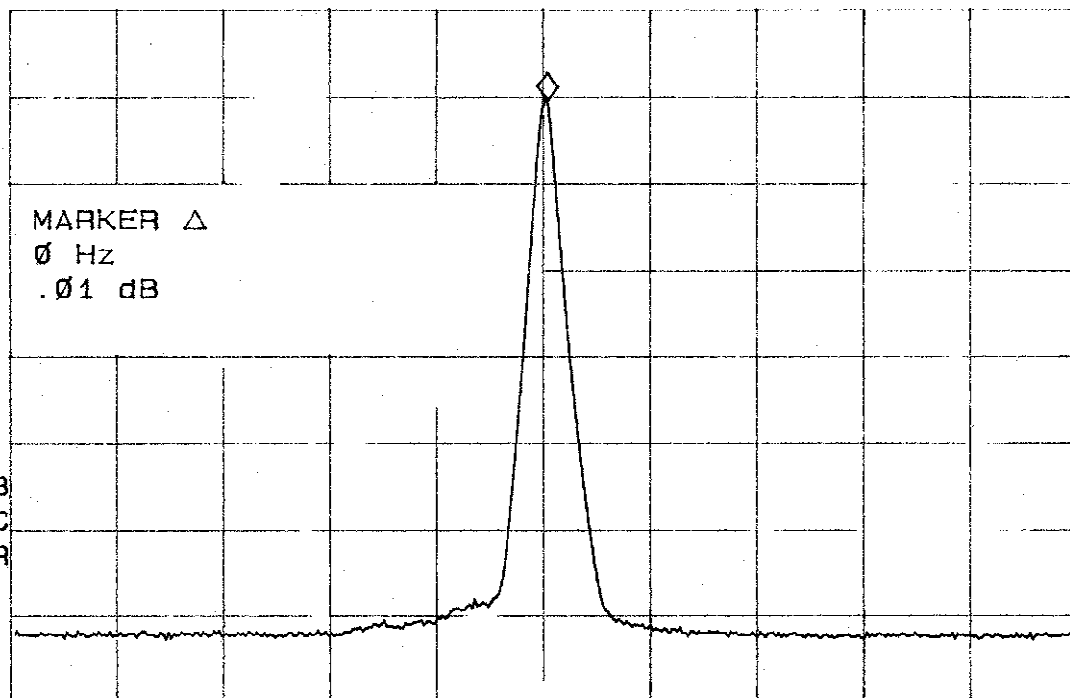
MKR Δ 0 Hz
.01 dB

SMPL
LOG
10
dB/

MARKER Δ
0 Hz
.01 dB

AVG
100

WA SB
SC FC
CORR



CENTER 836.5 MHz
#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz
SWP 20.0 msec

10:28:52 AUG 28, 1999
FCC ID IHET5ZA1
REF 33.0 dBm AT 50 dB

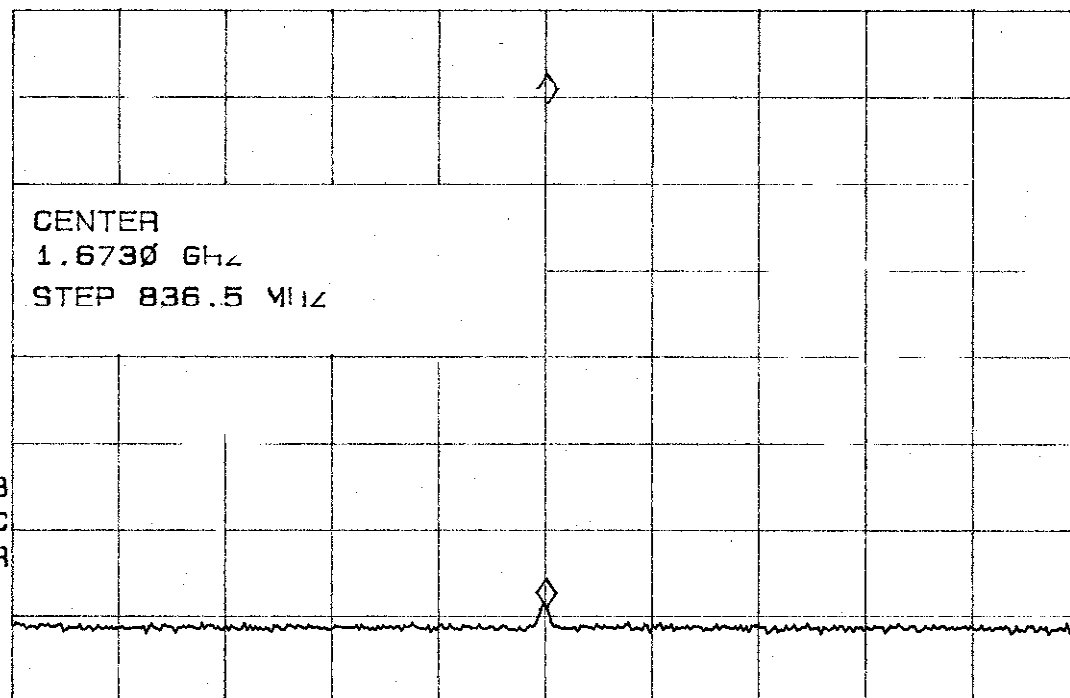
MKR Δ 836.5 MHz
-58.23 dB

SMP
LOG
10
dB/

CENTER
1.6730 GHz
STEP 836.5 MHz

AVG
100

WA SB
SC FC
CORR



CENTER 1.6730 GHz
#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz
SWP 20.0 msec

10:31:36 AUG 28, 1999

FCC ID IHET5ZA1

MKR Δ 1.6730 GHz

REF 33.0 dBm

AT 50 dB

-59.03 dB

SMPL

LOG

10

dB/

CENTER

2.5096 GHz

STEP 836.5 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 2.5096 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:33:46 AUG 28, 1999

FCC ID IHET5ZA1

MKR Δ 2.5096 GHz

REF 33.0 dBm

AT 50 dB

-59.32 dB

SMPL

LOG

10

dB/

CENTER

3.3461 GHz

STEP 836.5 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 3.3461 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:12:07 AUG 28, 1999

FCC ID IHET5ZA1

REF 33.0 dBm

AT 50 dB

MKR Δ 0 Hz

-0.01 dB

SMPL

LOG

10

dB/

MARKER Δ

0 Hz

-0.01 dB

AVG

100

WA SB

SC FC

CORR

CENTER 847.7 MHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:14:05 AUG 28, 1999

FCC ID IHET5ZA1

REF 33.0 dBm

AT 50 dB

MKR Δ 847.7 MHz

59.56 dB

SMPL

LOG

10

dB/

CENTER

1.6955 GHz

STEP 847.7 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 1.6955 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:16:20 AUG 28, 1999

FCC ID IHET5ZA1

MKR Δ 1.6955 GHz

REF 33.0 dBm

AT 50 dB

-58.97 dB

SMPL

LOG

10

dB/

CENTER

2.5432 GHz

STEP 847.7 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 2.5432 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

10:18:25 AUG 28, 1999

FCC ID IHET5ZA1

MKR Δ 2.5432 GHz

REF 33.0 dBm

AT 50 dB

-59.03 dB

SMPL

LOG

10

dB/

CENTER

3.3910 GHz

STEP 847.7 MHz

AVG

100

WA SB

SC FC

CORR

CENTER 3.3910 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SPAN 100.0 MHz

SWP 20.0 msec

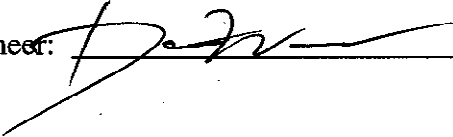
APPLICANT: MOTOROLA

TRANSCIVER TYPE: IHET5ZA1

Summary of Transmit Frequency

Drift Vs. Temperature

Ambient Temperature Degrees C	Lowest Channel Frequency Error Hz Drift from Nominal Channel Center	Highest Channel Frequency Error Hz Drift from Nominal Channel Center
-30	-18	22
-20	-27	40
-10	-22	43
0	-21	30
10	-24	31
20	-21	34
30	-24	37
40	-18	45
50	-21	44

Engineer: 

1/20/99

Date

APPLICANT: MOTOROLA

TRANSCIVER TYPE: IHET5ZA1

Summary of Transmit Frequency

Drift Vs. Line Voltage

Power Supply Line Voltage	Lowest Channel Frequency Error Hz Drift from Nominal Channel Center	Highest Channel Frequency Error Hz Drift from Nominal Channel Center
102 Vac	-42	39
120 Vac	-38	45
138 Vac	-59	31

Engineer: 

1/20/99
Date

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5ZA1

Occupied Bandwidth

Plots attached

Comments: Modulation products in a bandwidth of 30 Khz centered +/- 900 Khz from the channel center

frequency should be at least 45 dB and shall be at least 42 dB below the mean output power level.

OCCUPIED BANDWIDTH

14:25:49 AUG 16, 1999

MR 823.989 MHz

REF 26.3 dBm

AT 40 c3

39.04 dBm

SMPL

LOG

10

dB/

DSP

CORR

EXTAT

1.6

AVG

5

VA SB

SC FS MS CH 34

START 822.920 MHz

#RES BW 30 kHz

VBW 3 kHz

STOP 829.120 MHz

SWP 207 nsec

SPUR TX MAX POWER

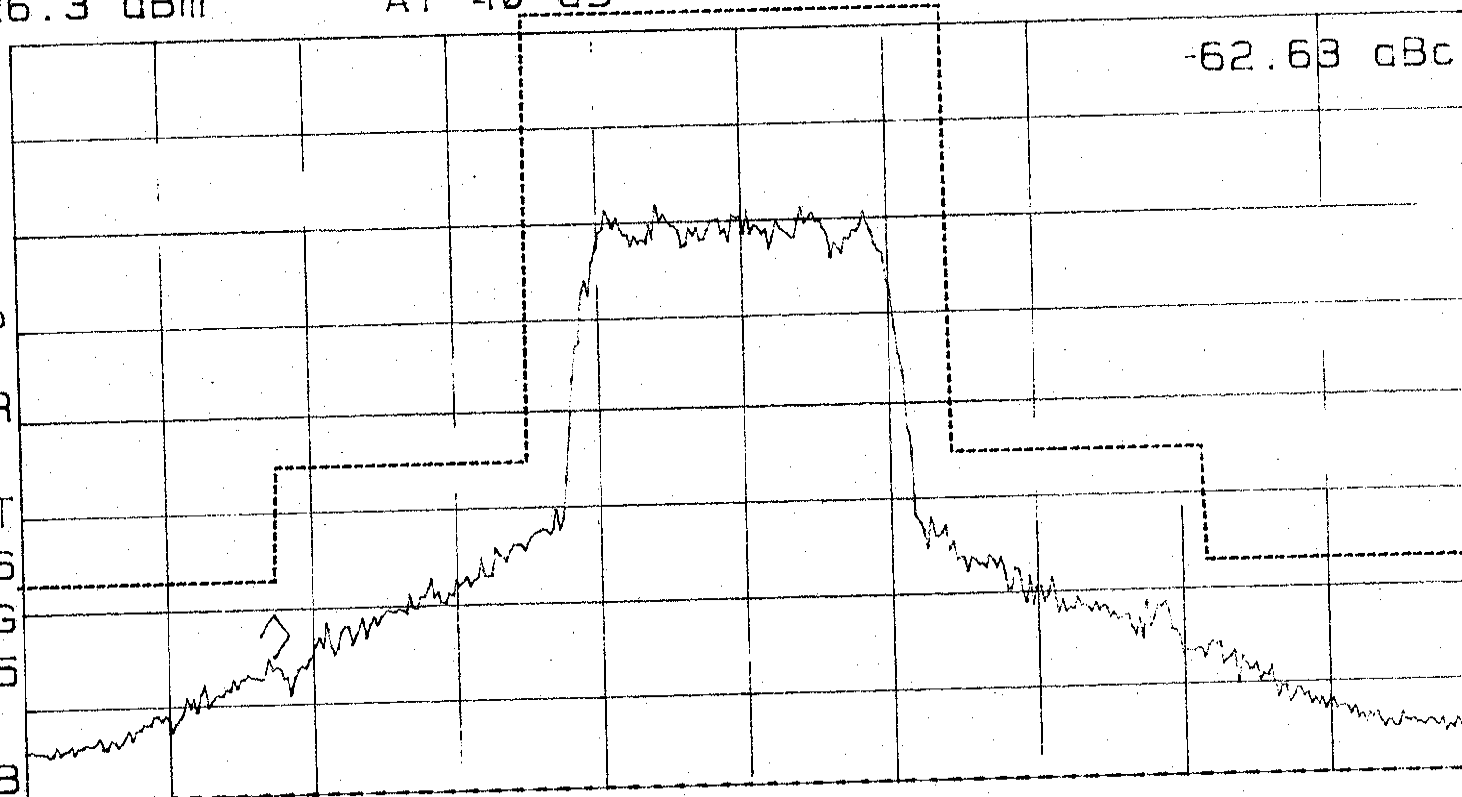
PASS

(dBc/30kHz) Fc Δ 1m -8.3 dB

Δ c -2.030 MHz

Chan Power

23.3 dBm



14: 21: 08 AUG 16, 1999

REF 26.1 dBm

AT 40 dB

SMPL

LOG

10

dB/

DSP

CORR

EXTAT

1.6

AVG

5

VA SB

SC FS MS CH 384

START 833.420 MHz

STOP 839.620 MHz

#RES BW 30 kHz

#VBW 3 kHz

SWP 20/ msec

SPUR TX MARK POWER

2.55

(dBc/30kHz) Fc 1m -9.4 dB

Δf_c -990.0 kHz

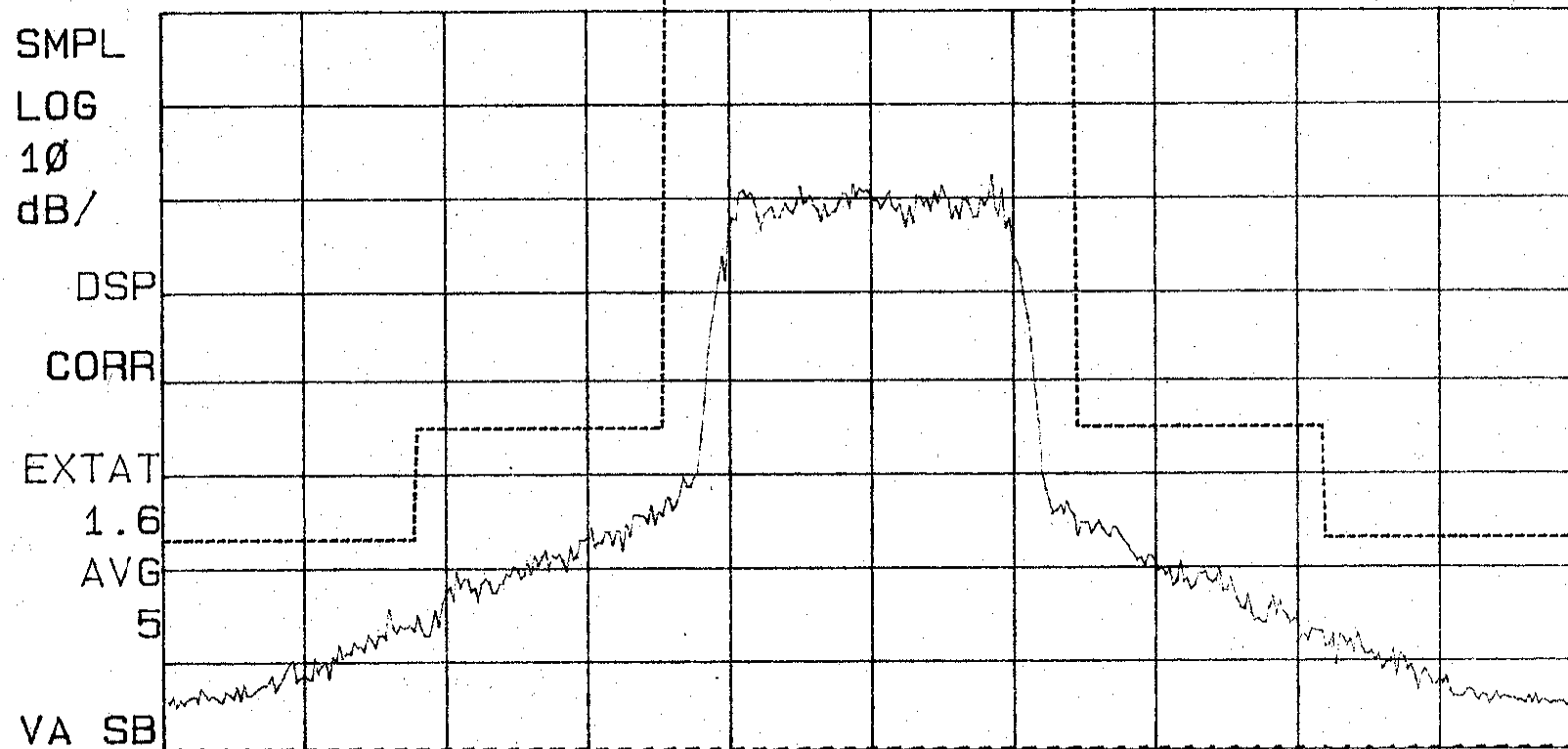
Chan Power

23.1 dBm

14: 15: 37 AUG 16, 1999
hp

REF 26.0 dBm

AT 40 dB



SC FS MS CH 777

START 845.210 MHz

STOP 851.410 MHz

#RES BW 30 kHz

#VBW 3 kHz

SWP 207 msec

SPUR TX MAX POWER

PASS

(dBc/30kHz) Fc Δ lim -7.5 c3

Δ fc -2.110 MHz

Chan Power

23.0 dBm

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5ZA1

CDMA Waveform Quality Rho

Frequency (Channel)	Power Level Maximum 23 dBm	Lower Power Level -20 dBm
(034)	0.976	0.973
(384)	0.983	0.975
(777)	0.983	0.979

Note: Minimum Standard per EIA IS-98-A is $\rho > 0.940$

CDMA CELLULAR MOBILE TRANSMITTER TEST

Traffic Rho		Phs Error	deg
0.976		7.4	
Freq Error	Hz	Avg Power	dBm
12.4		22.23	

Meas Cntl Single/Cont		Traffic Data Mode Svc Opt 2	Sctr A Pwr -104.0 dBm/BW	To Screen ● CDMA CALL CNTL SMS AUTHN
		Data Rate Full	RF Power -104.00 dBm/BW	○ Analog RX TEST
		Power Meas Zero		Config TESTS

CH 34

CDMA CELLULAR MOBILE TRANSMITTER TEST

Traffic Rho	0.983	Phs Error	6.8
Freq Error	-48.0 Hz	Avg Power	19.96 dBm

Meas Cntl Single/Cont		Traffic Data Mode Svc Opt 2	Sctr A Pwr -104.0 dBm/BW	To Screen ● CDMA CALL CNTL SMS AUTHN
		Data Rate Full	RF Power -104.00 dBm/BW	○ Analog RX TEST
		Power Meas Zero		Confis TESTS

CH 384

8924C CDMA Mobile Station Test Set: 01/22/99 05:05:00 PM

CDMA CELLULAR MOBILE TRANSMITTER TEST

Traffic Rho		Phs Error	deg
0.983		6.5	
Freq Error	Hz	Avg Power	dBm
-13.4		22.41	

Meas Cntl Single/Land		Traffic Data Mode Svc Opt 2	Sctr A Pwr -104.0 dBm/BW	To Screen ● CDMA CALL CNTL SMS AUTHN
		Data Rate Full	RF Power -104.00 dBm/BW	○ Analog RX TEST
		Power Meas Zero		Config TESTS

CH758

CDMA CELLULAR MOBILE TRANSMITTER TEST

Traffic Rho	0.973	Phs Error	7.2
Err Error	13.5	Avs Power	-20.09

Meas Cntl Single/Cont		Traffic Data Mode Succ Upd 2	Sctr A Pwr -40.0 dBm/BW	To Screen ● CDMA CALL CNTL SMS AUTHN
		Data Rate Full	RF Power -40.00 dBm/BW	○ Analog RX TEST
		Power Meas Zero		Confis TESTS

CH 34

8924C CDMA Mobile Station Test Set: 01/22/99 05:42:00 pm

CDMA CELLULAR MOBILE TRANSMITTER TEST

Traffic Rho		Phs Error	deg
0.975		7.8	
Freq Error	Hz	Avg Power	dBm
13.7		-20.10	

Meas Cntl Single/Cont		Traffic Data Mode Suc Opt 2	Sctr A Pwr -40.0 dBm/BW	To Screen ● CDMA CALL CNTL SMS AUTHN
		Data Rate Full	RF Power -40.00 dBm/BW	○ Analog RX TEST
		Power Meas Zero		Confis TESTS

CH 384

89240 CDMA Mobile Station Test Set: 01/22/99 05:43:00 am

CDMA CELLULAR MOBILE TRANSMITTER TEST

Traffic Rho		Phs Error	deg
0.979		7.0	
Freq Error	Hz	Avg Power	dBm
29.3		-19.74	

Meas Cntl Single Port		Traffic Data Mode Svc Opt 2	Sctr A Pwr -40.0 dBm/BW	To Screen ● CDMA CALL Cntl SMS AUTHN
		Data Rate Full	RF Power -40.00 dBm/BW	○ Analog RX TEST
		Power Meas Zero		Confis TESTS

CH 758