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MX-1110/1111

800MHz CDMA/FM Cellular Phone.

IS-98A Evaluation Report Rev. A
(Receiver/Transmitter)

Date : Apr. 23rd 2000
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Subject : MX-1110/1111 IS-98A Evaluation report

Date : Apr. 23rd 2000
File Name : V:\MSM3000 Based Design\MX-1110\1111\FCC Docs\MX-1111_IS-98A_Report.doc

This is an IS-98A type evaluation report for class-III CDMA mobile.

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* CDG 2 and part of CDG 1 test requires co-work with Notel.
* Radiated Spurious Emissions (TIA/IS-98A item 9.5.2 and 10.5.2) will be substituted by FCC Type approval.

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2.4.6	Minimum controlled Output Power	TIA/IS-98A item 10.4.6	yes/***pass***	CDG 1 (item 3.3.6)
2.4.7	Standby Output Power and Gated Output Power	TIA/IS-98A item 10.4.7	yes/***fail***	CDG 1 (item 3.3.7)
2.5	***Limitations on Emission***	TIA/IS-98A item 10.5	-	-
2.5.1	Conducted Spurious Emissions	TIA/IS-98A item 10.5.1	yes/***pass***	Not listed
2.5.2	Radiated Spurious Emissions	TIA/IS-98A item 10.5.2	no	Not listed
3.	***The requirements on stability to mechanical and climatic effects***	According to GOST 16019-78 and TIA/IS-98A item 11	no	Not listed

* CDG 2 and part of CDG 1 test requires co-work with Notel.
* Radiated Spurious Emissions (TIA/IS-98A item 9.5.2 and 10.5.2) will be substituted by FCC Type approval.

1. The requirements to the receiver

1.1 Frequency requirements.(TIA/IS-98A item 9.1)

The mobile station shall support CDMA operations on channel numbers 1013 through 1023, 1 through 311, 356 through 644, 689 through 694, and 739 through 777 inclusive.

Table 1.1.1 Test items and result.

Channel numbers	Minimum Requirements (Hand off between channels)	Test Result
1013 through 1023	No failure	Pass
1 through 311	No failure	Pass
356 through 644	No failure	Pass
689 through 694	No failure	Pass
739 through 777	No failure	Pass

1.2 Acquisition requirements.(TIA/IS-98A item 9.2)

1.2.1 Idle handoff in Non-Slotted Mode.(TIA/IS-98A item 9.2.2) - Requires Base stations to perform.

When in the *Mobile Station Idle State*, the mobile station continually searches for the strongest Pilot Channel signal on the current CDMA frequency assignment. The mobile station determines that an idle handoff should occur when it detects a Pilot Channel signal sufficiently stronger than the one it is currently monitoring.

Test 1 verifies that the mobile station does not perform alternating idle handoffs between two Pilot Channels so frequently that the mobile station can not receive paging messages on either of the Forward CDMA channels by checking the number of idle handoffs performed and Paging Channel message error rate(MER).

Test 2 verifies that the mobile station performs an idle handoff whenever the Ec/Io of a pilot in the Neighbor Set exceeds the Ec/Io of the pilot in the Active Set by 3dB, as measured at the mobile station antenna connector, for a period longer than one second. This is accomplished by checking the number of idle handoff performed and Paging Channel MER.

1.2.2 Idle handoff in Slotted Mode.(TIA/IS-98A item 9.2.3) - Requires Base stations to perform.

When in the *Mobile Station Idle State*, the mobile station searches for the strongest Pilot Channel signal on the current CDMA frequency assignment during the assigned slots. The mobile station determines that an idle handoff should occur when it detects a Pilot Channel signal sufficiently stronger than the one it is currently monitoring.

This test verifies that the mobile station performs an idle handoff whenever the Ec/Io of a pilot in the Neighbor Set exceeds the Ec/Io of the pilot in the Active Set by 3dB, as measured at the mobile station antenna connector. By measuring the number of idle handoffs performed in fixed period of time.

1.2.3 Neighbor Set Pilot Detection and Incorrect Detection in Soft Handoff.(TIA/IS-98A item 9.2.4) - Requires Base stations to perform.

When in the Mobile Station Idle State, the mobile station searches for the strongest Pilot Channel signal on the current CDMA frequency assignment during the assigned slots. The mobile station determines that an idle handoff should occur when it detects a Pilot Channel signal sufficiently stronger than the one it is currently monitoring.

This test verifies that the mobile station performs an idle handoff whenever the Ec/Io of a pilot in the Neighbor Set exceeds the Ec/Io of the pilot in the Active Set by 3dB, as measured at the mobile station antenna connector, by measuring the number of idle handoffs performed in a fixed period of time.

1.2.4 Candidate Set Pilot Detection and Incorrect Detection in Soft Handoff.(TIA/IS-98A item 9.2.5)
- Requires Base stations to perform.

A correct detection of a pilot in the Neighbor Set is defined as the acquisition of a pilot with Ec/Io above the value defined by T_ADD. The value of T_ADD is set to 28(-14dB) as specified in 12.5.2. And incorrect detection of a pilot in the Neighbor Set is defined as the acquisition of a pilot with Ec/Io below the value defined by T_ADD.

This test measures the detection time for a pilot in the Neighbor Set at three values of pilot Ec/Io. The detection time of a pilot is defined as the time elapsed from the time when the pilot increases to a given Ec/Io until the mobile station sends a *Pilot Strength Measurement Message* containing this pilot. The accuracy of the Candidate Set pilot PN phase reported in the corresponding *Pilot Strength Measurement Message* is also examined.

1.2.5 Active Set Pilot Loss Detection in Soft Handoff.(TIA/IS-98A item 9.2.6)
- Requires Base stations to perform.

A correct detection of a pilot in the Candidate Set is defined as the detection of a pilot in the Candidate Set with Ec/Io at least 0.5 x T_COMP dB above the Ec/Io of a Active Set pilot. The value of T_COMP is set to 5(2.5dB) as specified in 12.5.2. An incorrect detection of a pilot in the Candidate Set is defined as the detection of a pilot with Ec/Io less than 0.5 x T_COMP dB above the Ec/Io of any Active Set pilot.

This test measures the detection time for a pilot in the Candidate Set. The detection time of a pilot is defined as the time elapsed from the time when the pilot increase to a given Ec/Io until the mobile station sends a *Pilot Strength Measurement Message* containing this pilot. The accuracy of the Active Set pilot PN phase and Active Set pilot strength, reported in the corresponding *Pilot Strength Measurement Message*, is also examined.

1.3 Demodulation requrements.(TIA/IS-98A item 9.3)

1.3.1 Demodulation of Non-Slotted Mode Paging Channel in Additive White Gaussian Noise.
(TIA/IS-98A item 9.3.1)
- Requires Base stations to perform.

The performance of the demodulation of Paging Channel in an AWGN(no fading or multipath) environment is determined by the message error rate (MER). The MER is measured only for 9600 bps data rate.

1.3.2 Demodulation of Slotted Mode Paging Channel in Additive White Gaussian Noise.
(TIA/IS-98A 9.3.2)
- Requires Base stations to perform.

When operating in the slotted mode, the mobile station starts monitoring the Paging Channel at the beginning of the assigned slots. This test verifies that the mobile station wakes up in time so that it does not miss the beginning of its assigned slots. This test also examines the demodulation performance of the Paging Channel in an AWGN(no fading or multipath) environment. The demodulation performance of the Paging Channel is determined by the message error rate(MER). The MER is measured only for 9600 bps data rate.

1.3.3 Demodulation of Forward Traffic Channel in Additive White Gaussian Noise.
(TIA/IS-98A 9.3.3)

The performance of the demodulation of Forward Traffic Channel in an AWGN(no fading or multipath) environment is determined by the frame error rate(FER). The FER is calculated for each individual data rate. For Rate Set 2, the accuracy of the Erasure Indicator bits sent by the mobile station is verified in this test.

Table 1.3.3.1 Test items and result

Parameter	Units	Test 1	Test 2	Test 3
Ior / Ioc	dB	-1		
Pilot Ec / Ior	dB	-7		
Traffic Ec / Ior	dB	-16.3	-15.8	-15.6
Ioc	dBm/1.23MHz	-54		
Data Rate	bps	9600	9600	9600
Traffic Eb/Nt	dB	3.8	4.3	4.5
Limit (%)		***3.00***	***1.00***	***0.50***
Test Results(FER) # 1		***Pass(0.63%)***	***Pass(0.00%)***	***Pass(0.00%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***	***Pass(0.00%)***

Table 1.3.3.2 Test items and result

Parameter	Units	Test 4	Test 5	Test 6
Ior / Ioc	dB	-1		
Pilot Ec / Ior	dB	-7		
Traffic Ec / Ior	dB	-19.1	-21.6	-24.5
Ioc	dBm/1.23MHz	-54		
Data Rate	bps	4800	2400	1200
Traffic Eb/Nt	dB	4.0	4.5	4.6
Limit (%)		***1.00***	***1.00***	***1.00***
Test Results(FER) # 1		***Pass(0.00%)***	***Pass(0.00%)***	***Pass(0.21%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***	***Pass(0.32%)***

1.3.4 Demodulation of Forward Traffic Channel in Multipath Fading Channel.

(TIA/IS-98A 9.3.4)

- Requires Base stations to perform.

The performance of the demodulation of Forward Traffic Channel in multipath fading channel is determined by the frame error rate (FER) or the error rate in each frame category. The FER is calculated for each individual data rate. The following table summarizes the fading tests to be performed;

Case	**Rate Set**	**Channel Simulator Configuration Number**
1	1	1 (8 km/h, 2 paths)
2	1	3 (30 km/h, 1 path)
3	1	4 (100 km/h, 3 paths)
4	2	1 (8 km/h, 2 paths)
5	2	3 (30 km/h, 1 path)
6	2	4 (100 km/h, 3 paths)

Cases 1 and 4 test the demodulation performance for the 8 km/hr. two-path case by checking the full rate FER. Cases 2 and 5 test the demodulation performance for the 30 km/hr, single-path case by checking the FER at all four possible data rates. Case 3 and 6 test the demodulation performance and the rate determination for the 100 km/hr, three path- case by checking the FER and the error rate in each frame category.

1.3.5 Demodulation of Forward Traffic Channel During Soft Handoff.(TIA/IS-98A item 9.3.5)
- Requires Base stations to perform.

The performance of the demodulation of Forward Traffic Channel during a two-way soft handoff is determined by the frame error rate(FER).

1.3.6 Decision of Power Control Bit for Channels Belonging to Different Power Control Sets During Soft Handoff. (TIA/IS-98A item 9.3.6)
- Requires Base stations to perform.

When simultaneously receiving channels belonging to different power control sets, the mobile station shall increase its transmit power if all valid power control bits received from all power control sets indicate an increment, and shall reduce its transmit power if any valid power control bit received indicates a decrement. This test verifies the above "or of downs" logic.

1.3.7 Decision of Power Control Bit for Channels Belonging to the Same Power Control Set. (TIA/IS-98A item 9.3.7)
- Requires Base stations to perform.

In each power control group containing valid power control bits, the mobile station should provide diversity combining of identical power control subchannels and shall obtain at most one power control bit from each set of identical power control subchannels. This test partially verifies the diversity combining of power control bits belonging to identical power control subchannels and the diversity combining of power control bits belonging to different paths of the same power control subchannel.

1.3.8 Demodulation of Power Control Subchannel During Soft Handoff.(TIA/IS-98A item 9.3.8)
- Requires Base stations to perform.

The mobile station shall not use a power control subchannel when the pilot Ec/Io of the corresponding CDMA Channel is low. This test verifies that the mobile station stops using a power control subchannel in the "or of downs" when the pilot Ec/Io of the corresponding CDMA Channel is low.

1.4 Receiver Performance.(TIA/IS-98A item 9.4)

1.4.1 Receiver Sensitivity and Dynamic Range.(TIA/IS-98A item 9.4.1)

The RF sensitivity of the mobile station receiver is the minimum received power, measured at the mobile station antenna connector, at which the frame error rate(FER) does not exceed a specified value. The receiver dynamic range is the input power range at the mobile station antenna connector over which the FER does not exceed a specific value.

Table 1.4.1.1 Test items and result

Parameter	Units	Test 1	Test 2
Ior	dBm / 1.23 MHz	-104	-25
Pilot Ec / Ior	dB	-7	
Traffic Ec / Ior	dB	-15.6	
Test Results(FER) # 1		***Pass(0.00%)***	***Pass(0.00%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***

1.4.2 Single Tone Desensitization.(TIA/IS-98A item 9.4.2)

Single tone desensitization is a measure of a receiver's ability to receive a CDMA signal at its assigned channel frequency in the presence of a single tone spaced at a given frequency offset from the center frequency of the assigned channel. The receiver desensitization performance is measured by the frame error rate(FER).

Table 1.4.2.1 Test items and result

Parameter	Units	Test 1	Test 2
Tone Offset from Carrier	kHz	+900	-900
Tone Power	dBm	-30	
Ior	DBm/1.23MHz	-101	
Pilot Ec / Ior	dB	-7	
Traffic Ec / Ior	dB	-15.6	
Test Results(FER) # 1		***Pass(0.00%)***	***Pass(0.00%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***

1.4.3 Inter Modulation Spurious Response Attenuation.(TIA/IS-98A item 9.4.3)

Conducted spurious emissions are spurious emissions generated or amplified in a receiver that appear at the mobile station antenna connector.

* The FER in Test 1,2,5 and 6 shall not exceed 0.01 with 95% confidence.
* The FER in Test 3 and 4 should not exceed 0.01 with 95% confidence.
(Not available with MX-1110/1111)

Table 1.4.3.1 Test items and result

Parameter	Units	Test 1	Test 2
Tone 1 Offset from Carrier	KHz	+900	-900
Tone Power	dBm	-43	
Tone 2 Offset from Carrier	KHz	+1700	-1700
Tone Power 2	dB	-43	
Ior	dBm / 1.23 MHz	-101	
Pilot Ec / Ior	dB	-7	
Traffic Ec / Ior	dB	-15.6	
Test Results(FER) # 1		***Pass(0.00%)***	***Pass(0.00%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***

(*This test was performed under LNA was on)

Table 1.4.3.2 Test items and result

Parameter	Units	Test 1	Test 2
Tone 1 Offset from Carrier	KHz	+900	-900
Tone Power	dBm	-32	
Tone 2 Offset from Carrier	KHz	+1700	-1700
Tone Power 2	dB	-32	
Ior	dBm / 1.23 MHz	-90	
Pilot Ec / Ior	dB	-7	
Traffic Ec / Ior	dB	-15.6	
Test Results(FER) # 1		***Pass(0.00%)***	***Pass(0.00%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***

(*This test was performed under LNA was off)

Table 1.4.3.3 Test items and result

Parameter	Units	Test 5	Test 6
Tone 1 Offset from Carrier	KHz	+900	-900
Tone Power	DBm	-21	
Tone 2 Offset from Carrier	KHz	+1700	-1700
Tone Power 2	DB	-21	
Ior	dBm / 1.23 MHz	-79	
Pilot Ec / Ior	DB	-7	
Traffic Ec / Ior	DB	-15.6	
Test Results(FER) # 1		***Pass(0.00%)***	***Pass(0.00%)***
Test Results(FER) # 2		***Pass(0.00%)***	***Pass(0.00%)***

(*This test was performed under LNA was off)

1.5 Limitations on Emissions.(TIA/IS-98A item 9.5)

1.5.1 Conducted Spurious Emissions.(TIA/IS-98A item 9.5.1)

Conducted spurious emissions are spurious emissions generated or amplified in a receiver that appear at the mobile station antenna connector.

Table 1.5.1.1 Test items and result

Frequency Range	Bandwidth	Spec. Limits	Test Result
869 - 894 MHz	1 MHz	Less than -81dBm	***Pass (-87.0 dBm)***
824 - 849 MHz	1 MHz	Less than -61dBm	***Pass (-75.6 dBm)***
All other frequencies	30 KHz	Less than -47dBm	***Pass (-71.2 dBm)***

1.5.2 Radiated Spurious Emissions.(TIA/IS-98A item 9.5.2)

Radiated spurious emissions are those spurious emissions generated or amplified in a receiver and radiated by the antenna, housing and all power, control, and audio leads connected to the receiver.

Table 1.5.2.1 Test items and result

Frequency Range	Maximum Allowable EIRP	Test Result
25 to 70 MHz	-45 dBm	***NA***
70 to 130 MHz	-41 dBm	***NA***
130 to 174 MHz	-41 to -32 dBm*	***NA***
174 to 260 MHz	-32 dBm	***NA***
260 to 470 MHz	-32 to -26 dBm*	***NA***
470 to 1000 MHz	-21 dBm	***NA***

*Interpolate linearly on a log frequency scale.

*Test Result "***NA***" will be reported in other part of IS-98A evaluation report.

1.6 Supervision.(TIA/IS-98A item 9.6)

1.6.1 Paging Channel.(TIA/IS-98A item 9.6.1)

When in the *System Access State*, the mobile station shall monitor the Paging Channel. The mobile station shall reset a timer for T_{40m} seconds whenever a valid message is received on the Paging Channel, whether addressed to the mobile station or not. If the timer expires, the mobile station shall stop transmitting access attempts. This test verifies the mobile station supervision of the Paging Channel when it is in the *System Access State*.

1.6.2 Forward Traffic Channel.(TIA/IS-98A item 9.6)

When in the *Mobile Station Control* on the *Traffic Channel State*, the mobile station shall monitor the Forward Traffic channel at all times. If the mobile station receives N_{2m} consecutive bad frames on the Forward Traffic Channel, it shall disable its transmitter. Thereafter, if the mobile station receives N_{3m} consecutive good frames, the mobile station should re-enable its transmitter.

The mobile station shall establish a Forward Traffic Channel fade timer. The timer shall be enabled when the mobile station first enables its transmitter when in the *Traffic Channel Initialization Substate* of the *Mobile Station Control* on the *Traffic Channel State*. The fade timer shall be reset for T_{5m} seconds whenever N_{3m} consecutive good frames are received on the Forward Traffic Channel. If the timer expires, the mobile station shall disable its transmitter and declare a loss of the Forward Traffic Channel.

Test 1 Verifies that the mobile station disables its transmitter after receiving N_{2m} consecutive bad frames.

Test 2 Verifies that the mobile station disables its transmitter and declares a loss of the Forward Traffic Channel after not receiving any N_{3m} consecutive good frames for a period of T_{5m} seconds.

1.7 Ear Protection.(TIA/IS-98A item 15.3) ***- Not applicable to WLL***

To protect the user from possible ear damage, earpiece acoustic output shall be limited so as not to exceed $120dB_{SPL}$ when placed to the ear as measured in accordance with IEEE Standard 269-1992 with the exception that the six cubic centimeter acoustic soupler specified shall be replaced by the IEC Audiometric Coupler.

2 The requirements to the transmitter.

2.1 Frequency Requirements.(TIA/IS-98A item 10.1)

2.1.1 Frequency Accuracy.(TIA/IS-98A item 10.1.1)

Frequency accuracy is the ability of a mobile station transmitter to transmit at an assigned carrer frequency.

Table 2.1.1.1 Test items and result

Test Channel (Frequency)	Units	Limit	Test Result	
			# 1	# 2
384(836.5200)	Ch/MHz	Within +/- 300Hz	***Pass (+41.42Hz)***	***Pass (-26.60Hz)***

2.2 Handoff.(TIA/IS-98A item 10.2)

2.2.1 CDMA to CDMA Hard Handoff.(TIA/IS-98A item 10.2.1)

- Requires Base stations to perform.

The base station directs the mobile station to perform a CDMA to CDMA hard handoff by sending an *Extended Handoff Direction Message* in which the mobile station is transitioned between disjoint sets of base stations, different frequency assignments, or different frame offsets. Hard handoff is characterized by a temporary disconnection of the Traffic Channel.

This test measure the time to execute a CDMA to CDMA hard handoff between Traffic Channels belonging to different base stations(different pilot PN offset indices) with different CDMA frequency assignments. This test also verifies that the mobile station disables its transmitter before changing frequency.

Table 2.2.1.1 Test items and result

Time window	Units	Limit	Test Result
T_1	ms	less than 2ms	***NA***
T_2	ms	Less than 140ms	***NA***

2.3 Modulation Requirements.(TIA/IS-98A item 10.3)

2.3.1 Time Reference.(TIA/IS-98A item 10.3.1)

The mobile station time reference is derived from the earliest arriving multipath component being used for demodulation. When receiving the Forward Traffic Channel, the mobile station time reference shall be used as the transmit time of the Reverse Traffic Channel.

Table 2.3.1.1 Test items and result

Test Item	Units	Limit	Test Result	
			# 1	# 2
Transmit Static Timing Offset	uSEC	less than 1uSEC	***Pass (-0.99uS)***	***Pass (-0.99uS)***

2.3.2 Waveform Quality and Frequency Accuracy.(TIA/IS-98A item 10.3.2)

The waveform quality factor, ρ(See IS-98A 12.4.2), is measured in this test. The measurement also returns values for Δf and τ. The value of Δf found in maximizing the expression for ρ is used to provide an estimate of carrier frequency error. The value of τ found in maximizing the expressions for ρ is used to provide an estimate of transmit time error.

Table 2.3.2.1 Test items and result

Test Item	Symbol	Limit	Test Result	
			# 1	# 2
Waveform quality factor	ρ	Greater than 0.944	***Pass (0.99)***	***Pass (0.99)***
Frequency error	Δf	Within +/- 300Hz	***Pass (+41.42)***	***Pass (-26.60)***
Transmit time error	τ	less than 1uS	***Pass (-0.99uS)***	***Pass (-0.99uS)***

2.3.3 Coding Accuracy.(TIA/IS-98A item 10.3.3) - Requires Base stations to perform.

The Reverse Traffic Channel coding accuracy is the ability of the mobile station to properly encode data. It is tested by demodulating a frame of data transmitted by the mobile station at the mobile station antenna connector and checking the I and Q data chips against the prestored patterns.

Table 2.3.3.1 Test items and result

Parameter	Units	Value
Ior	dBm/1.23MHz	-75
Pilot Ec / Ior	dB	-7
Traffic Ec / Ior	dB	-7.4
Number of Chips	Chips	24576
Test Results(Number of chip error(s))		***NA***

2.4 RF Output Power Requirements.(TIA/IS-98A item 10.4)

2.4.1 Range of Open Loop Output Power.(TIA/IS-98A item 10.4.1)

The mobile station estimates its open loop mean output power from its mean input power. The estimate is defined as

mean output power (dBm) = - mean input power (dBm)
- 73
+ NOM_PWR (dB)
+ INIT_PWR (dB).

This test measures the range of the estimated open loop output power.

Table 2.4.1.1 Test items and result for Class III mobile unit.

Parameter	Units	Test 1	Test 2	Test 3
Ior	dBm/1.23MHz	-25	-65	-104
Pilot Ec / Ior	dB	-7	-7	-7
Traffic Ec / Ior	dB	-7.4	-7.4	-7.4
Limits	dBm/1.23MHz	-48 ± 9.5	-8 ± 9.5	18 to 30
Test Results # 1 (Open loop output power)		***Pass (-52.12dBm)***	***Pass (-9.11dBm)***	***Pass (24.38dBm)***
Test Results # 2 (Open loop output power)		***Pass (-51.72dBm)***	***Pass (-10.19dBm)***	***Pass (24.45dBm)***

2.4.2 Range of Open Loop Output Power.(TIA/IS-98A item 10.4.2)

Table 2.4.2.1 Test items and result

Parameter	Units	Test 1	Test 2	Test 3	Test 4
Ior	dBm/1.23MHz	-60 to -40	-40 to -60	-60 to -80	-80 to -60
Limits (See Below)					
Test Results (Open loop output power in dBm/1.23MHz)		***Pass (Fig.2.4.2.1)***	***Pass (Fig.2.4.2.2)***	***Pass (Fig.2.4.2.3)***	***Pass (Fig.2.4.2.4)***
Test Results (Open loop output power in dBm/1.23MHz)		***Pass (Fig.2.4.2.5)***	***Pass (Fig.2.4.2.6)***	***Pass (Fig.2.4.2.7)***	***Pass (Fig.2.4.2.8)***

* Upper limit :

for $0 < t < 24$ms : $\max[1.2 \times |\Delta Pin| \times (t/24), |\Delta Pin| \times (t/24) + 2.0\text{ dB}] + 1.5\text{dB}$,

for $t \geq 24$ ms : $\max[1.2 \times |\Delta Pin|, |\Delta Pin| + 0.5\text{ dB}] + 1.5\text{ dB}$;

* Lower limit :

for $t \geq 0$: $\max [0.8 \times |\Delta Pin| \times [1 - e^{(1.25 - t)/36}] - 2.0\text{ dB}, 0] - 1\text{ dB}$;

where t is expressed in units of milliseconds, ΔPin is expressed in units of dB, and max[x,y] is the maximum of x and y.

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Figure 2.4.2.1 Test result for Test 1 (#1)

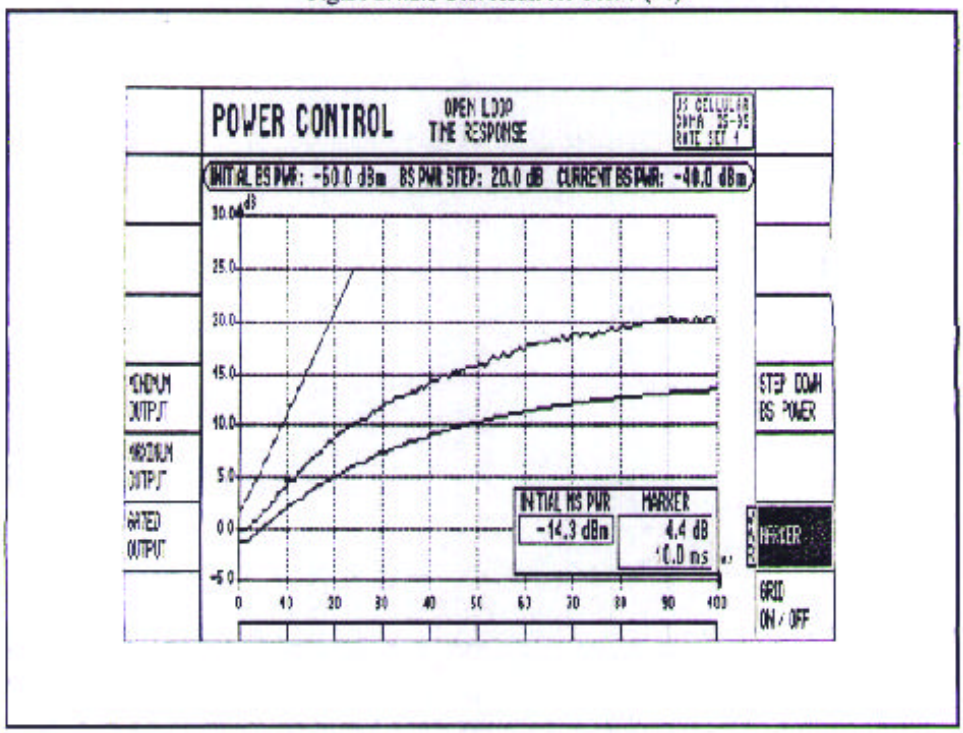

Figure 2.4.2.2 Test result for Test 2 (#1)

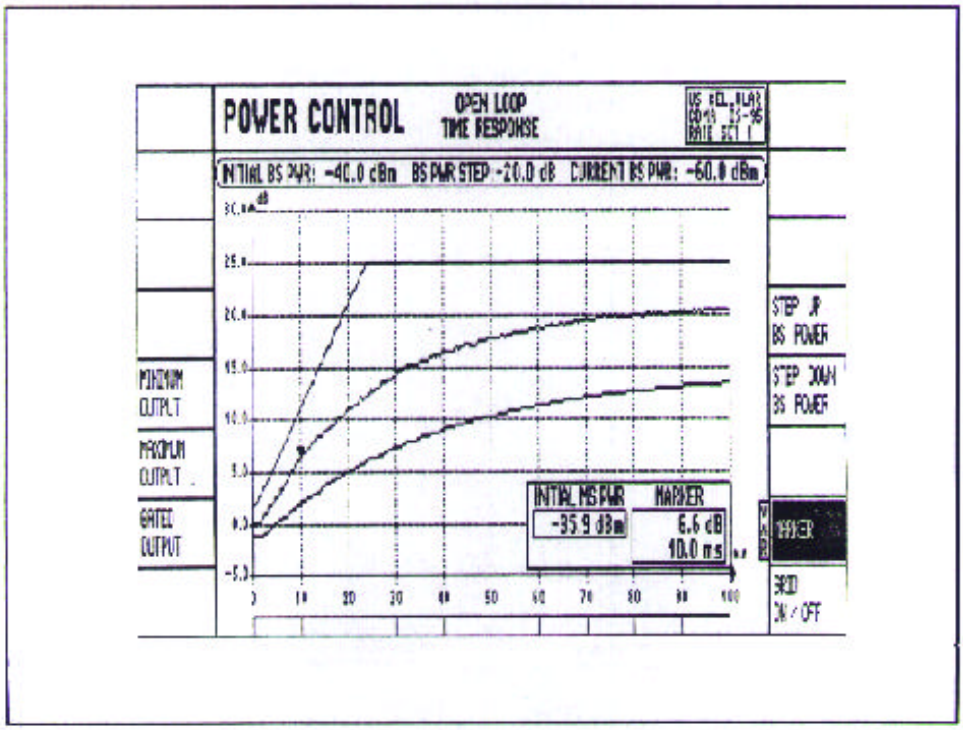

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Figure 2.4.2.3 Test result for Test 3 (#1)

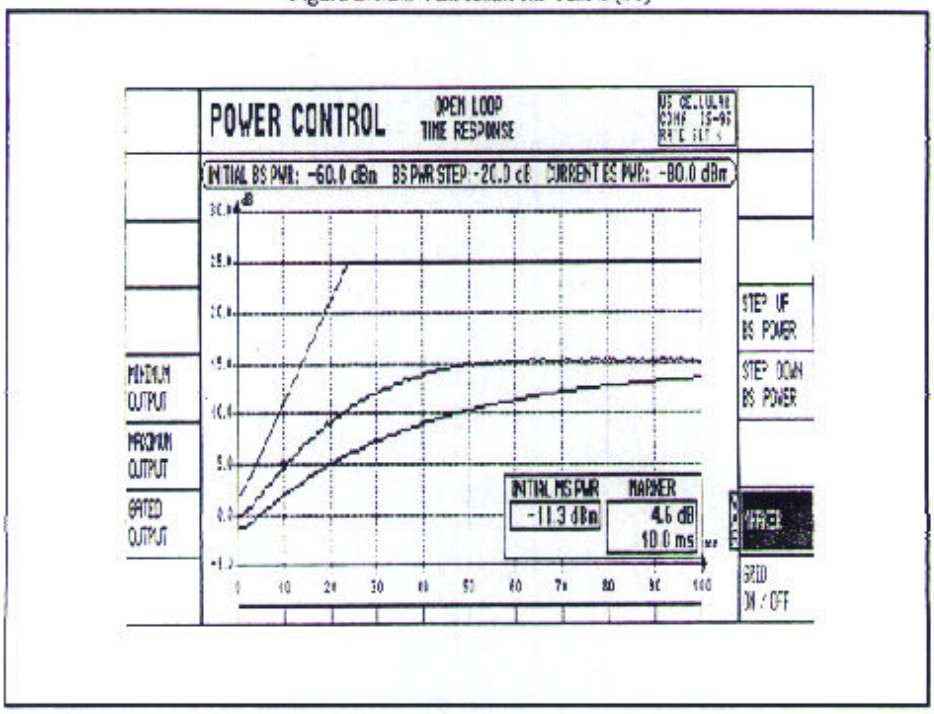

Figure 2.4.2.4 Test result for Test 4 (#1)

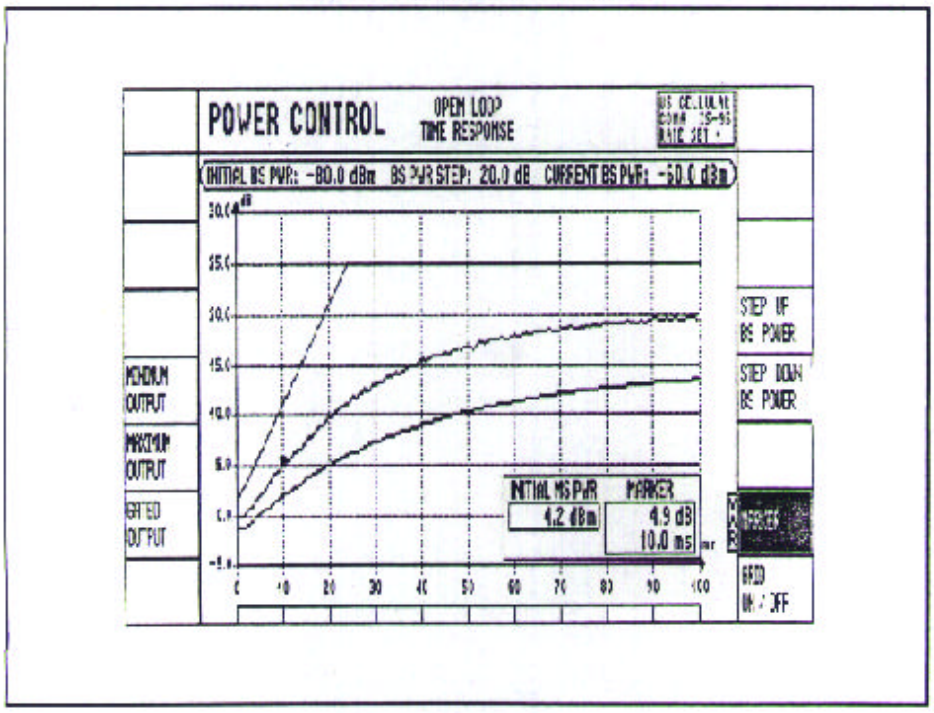

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Figure 2.4.2.5 Test result for Test 1 (#2)

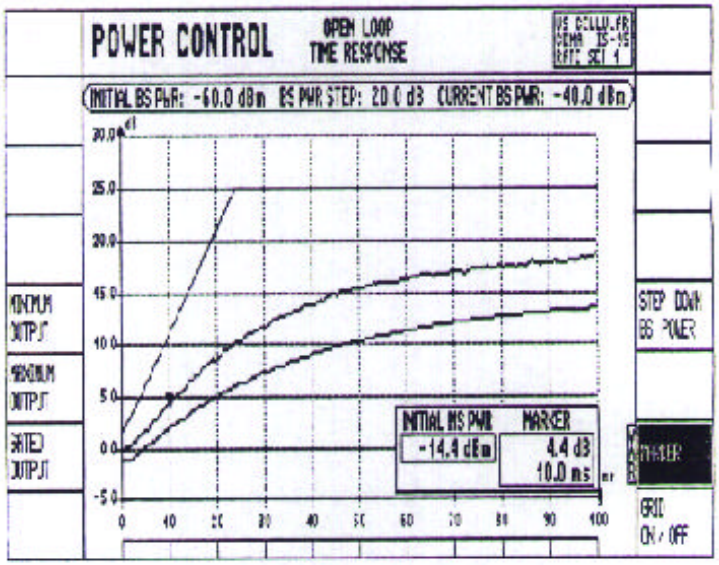

Figure 2.4.2.6 Test result for Test 2 (#2)

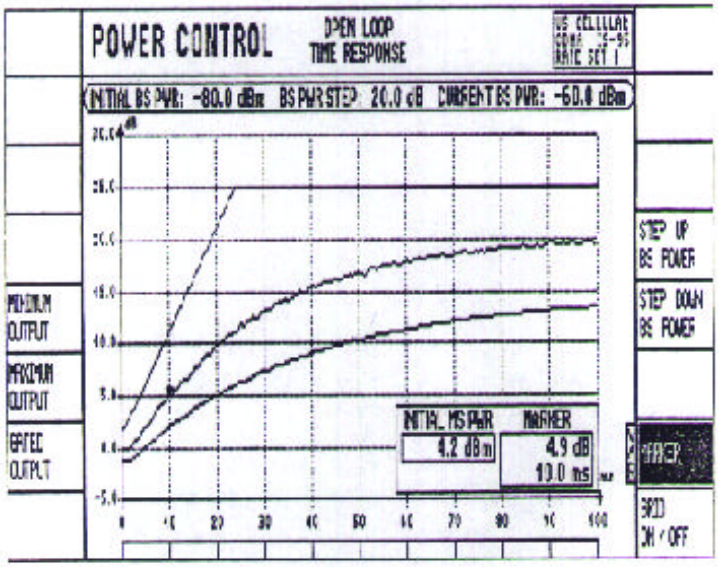

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Figure 2.4.2.7 Test result: for Test 3 (#2)

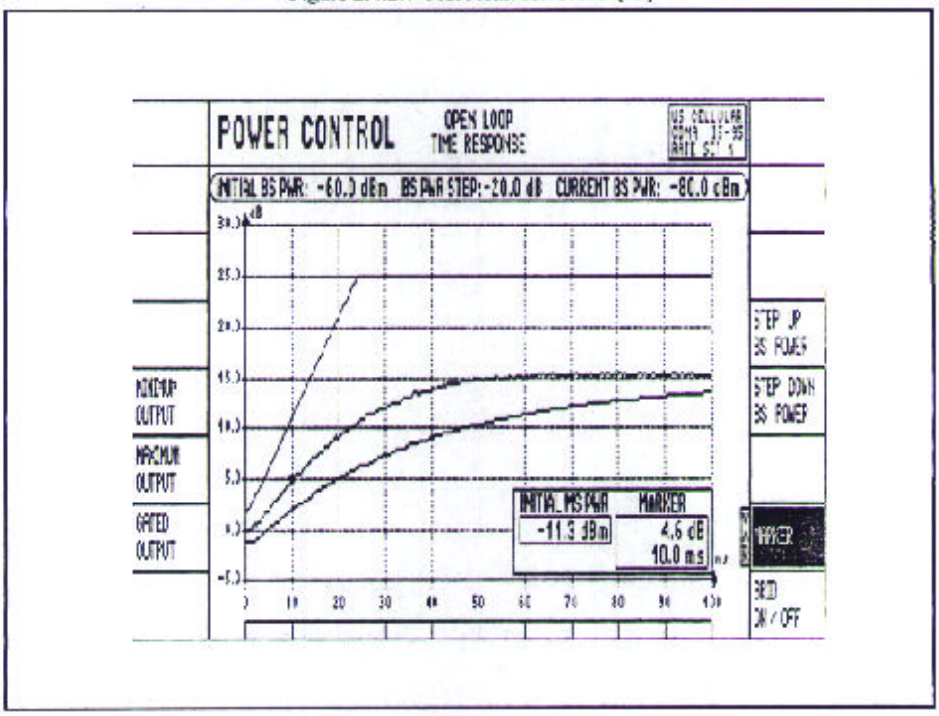
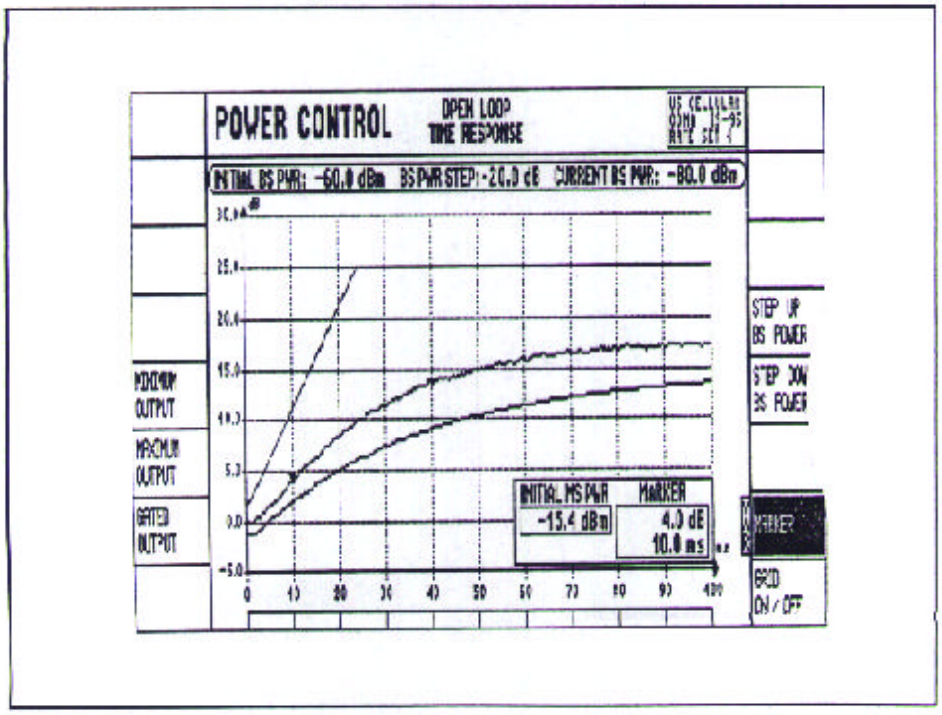


Figure 2.4.2.8 Test result for Test 4 (#2)



2.4.3 Access Probe Output Power.(TIA/IS-98A item 10.4.3)

This test verifies the following access parameters: nominal power offset, initial power offset, power increment between consecutive probes, number of access probes in one probe sequence, and the number of probe sequences in one access attempt.

Table 2.4.3.1 Test items and result

Parameter	Units	Test 1	Test 2
Ior	dBm/1.23MHz	-75	-75
NOM_PWR	dB	0	3
INIT_PWR	dB	0	3
PWR_STEP	dB	0	1
NUM_STEP	-	4	4
MAX_RSP_SEQ	-	1	3
Limits	Initial power	***0.33dB***	***6.82dB***
	Δ Power between access probes	***Less Than 1 dB***	***Within 1 ± 0.5 dB***
	Number of access probe in each access probe sequence	***5***	***5***
	Number of attempt	***1***	***3***
Test Result # 1		***PASS (figure 2.4.3.1)***	***PASS (figure 2.4.3.2)***
Test Result # 2		***PASS (figure 2.4.3.3)***	***PASS (figure 2.4.3.4)***

Test limits for Test 1

* The Power of all access probes shall be within a range of ± 1dB.
* The number of access probes in an access probe sequence shall be five.
* There shall be one access probe sequence in the access attempt.

Test limits for Test 2

* The Initial power shall be greater than “Test 1” by 6±1.2dB.
* The Power increment between consecutive access probes in each access probe sequence shall be 1 ± 0.5 dB.
* The total number of access probes in each access probe sequence shall be five.
* The number of access probe sequences in the access attempt shall be three.

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Figure 2.4.3.1 Test result printing for Test 1 (#1)

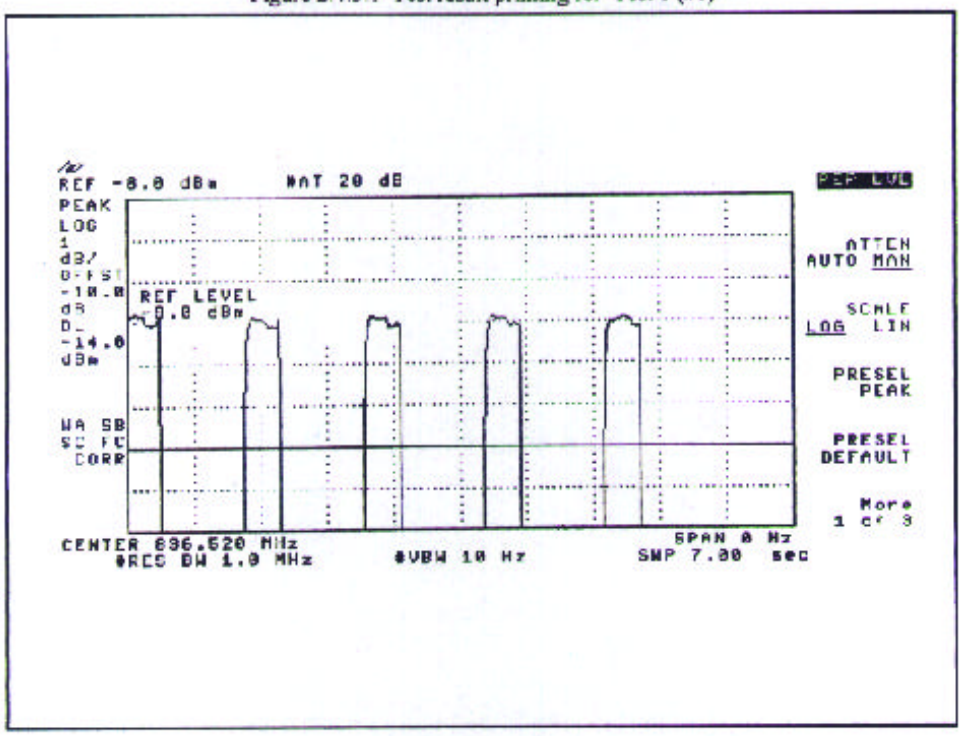

Figure 2.4.3.2 Test result printing for Test 2 (#1)

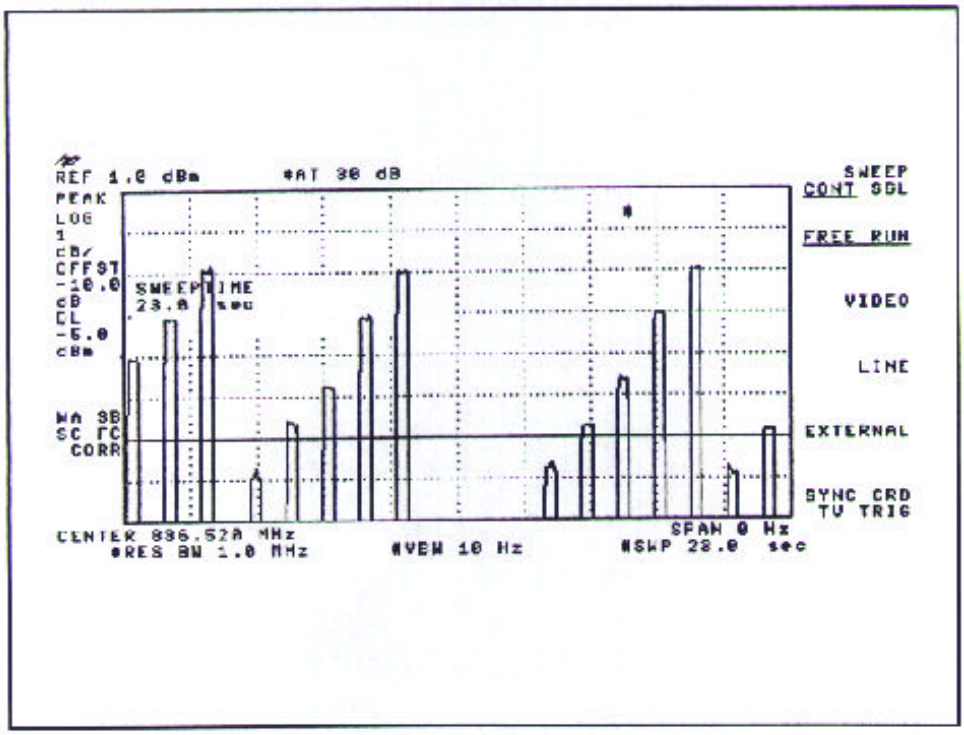

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Figure 2.4.3.3 Test result printing for Test 1 (#2)

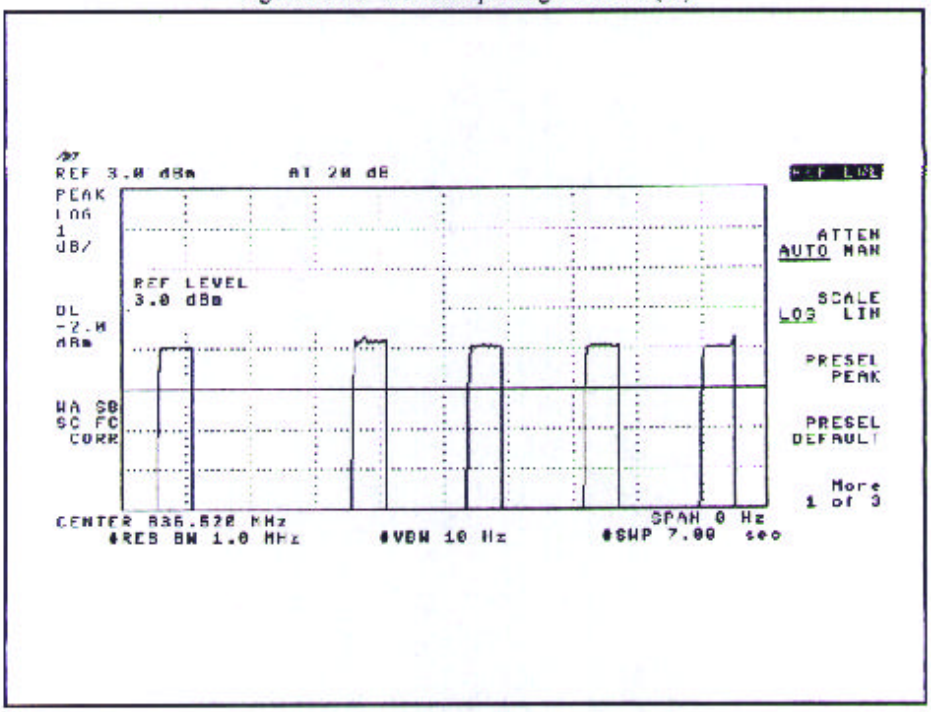
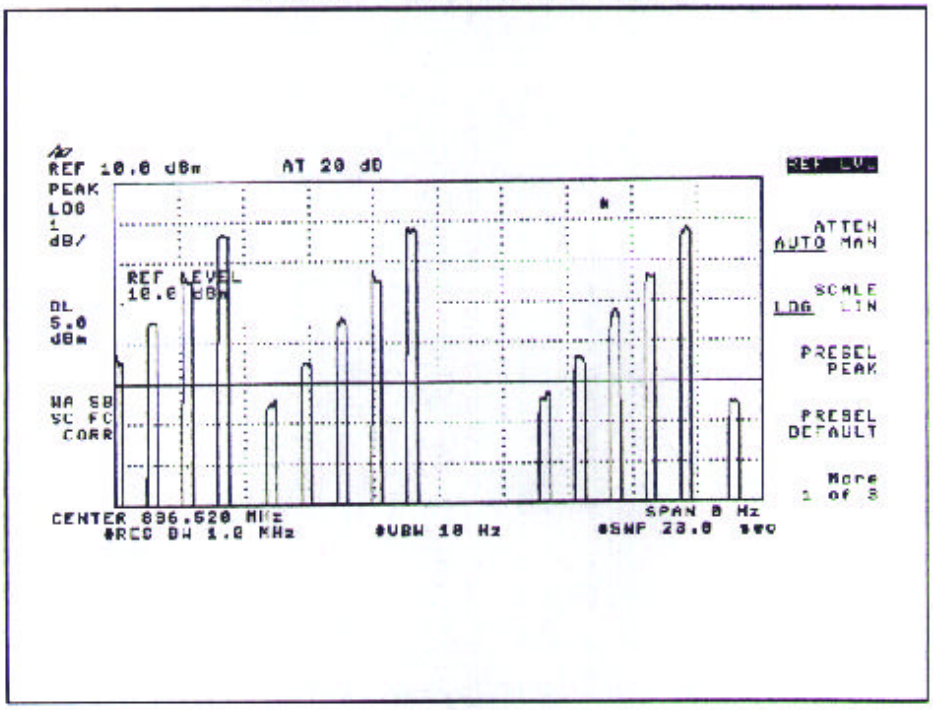


Figure 2.4.3.4 Test result printing for Test 2 (#2)



2.4.4 Range of Closed Loop Power Control.(TIA/IS-98A item 10.4.4)

The mobile station provides a closed loop adjustment to its open loop estimate. Adjustments are made in response to valid received power control bits. The range of the adjustment is defined by the difference between the maximum mobile station output power and the open loop estimate, and the difference between the minimum mobile station output power and the open loop estimate.

Table 2.4.4.1 Test items and result.

Data Rates	Units	Limits	Test Result			
			# 1		# 2	
			Down	Up	Down	Up
9600	bps	± 24 dB	***- 37.11***	***+ 40.82***	***- 37.97***	***+ 39.86***
4800			***- 38.19***	***+ 39.94***	***- 39.66***	***+ 38.74***
2400			***- 36.64***	***+ 41.58***	***- 38.96***	***+ 39.19***
1200			***- 36.41***	***+ 41.88***	***- 37.73***	***+ 40.51***

2.4.5 Maximum RF Output Power.(TIA/IS-98A item 10.4.5)

The maximum RF output power is defined as the maximum power, measured at the mobile station antenna connector, that the mobile station transmits.

Table 2.4.5.1 Test items and result.

Item	Units	Lower Limits	Upper Limits	Test Result	
				# 1	# 2
Maximum RF Output Power	dBW	-7(+23dBm)	0(+30dBm)	***+ 25.59 dBm***	***+ 25.78 dBm***

2.4.6 Minimum Controlled Output Power.(TIA/IS-98A item 10.4.6)

The minimum controlled output power of the mobile station is the output power, measured at the mobile station antenna connector, when both closed loop and open loop power control indicate minimum output.

Table 2.4.6.1 Test items and result.

Item	Unit	Limit	Test Result	
			# 1	# 2
Minimum controlled Output Power	dBm	Less than -50 dBm	***- 54.85 dBm***	***- 55.00 dBm***

2.4.7 Standby Output Power and Gated Output Power.(TIA/IS-98A item 10.4.7)

The standby output power is the mobile station output power when its transmit functions are disable(e.g., during the *Mobile station Initialization State*, *Mobile Station Idle State* and during the *System Access State* when the mobile station does not transmit access probes).

When operating in the variable data rate transmission mode, the mobile station transmits at nominal controlled power level only during gated-on periods, each defined as a power control group. The transmitted power level is suppressed during gated-off periods. This test measures the time response of the mean output power for an isolated gated-on power control group(1.25mS)

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Table 2.4.7.1 Test item and result.

Item	Unit	Limit	Test Result	
			# 1	# 2
Standby Output Power (between 824 and 894 MHz)	dBm	Less than -61 dBm	*- 75.60 dBm*	*-74.70dBm*

Table 2.4.7.2 Test item and result.

Item	Unit	Limit	Test Result	
			# 1	# 2
Gated Output Power	-	-	***Figure 2.4.7.1***	***Figure 2.4.7.2***

Figure 2.4.7.1 Test result printing for Gated Output Power (#1)

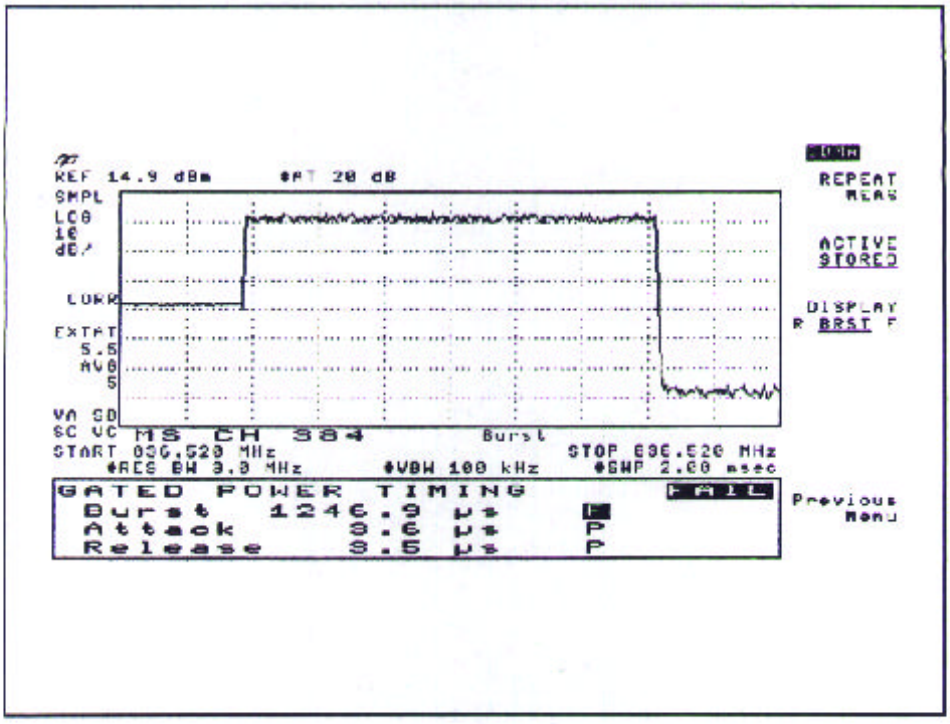

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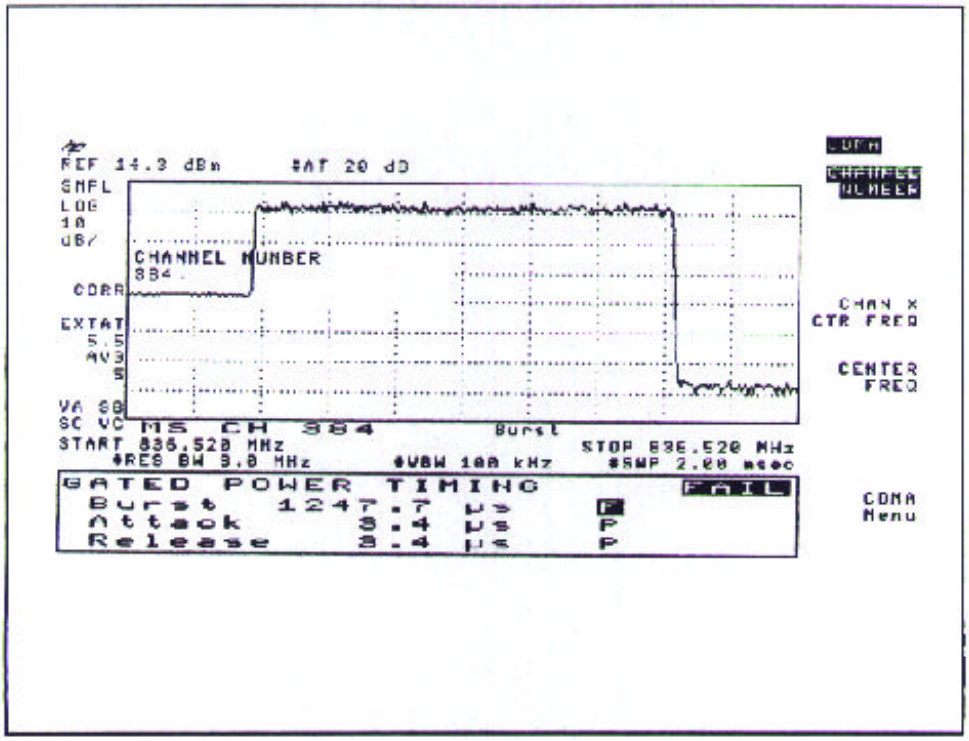
Figure 2.4.7.2 Test result printing for Gated Output Power (#2)



2.5 Limitations on Emission.(TIA/IS-98A item 10.5)

2.5.1 Conducted Spurious Emissions.(TIA/IS-98A item 10.5.1)

Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA Channel, measured at the mobile station antenna connector. This test measures the spurious emissions during continuous transmissions and gated transmission.

Table 2.5.1.1 Test item and result.

Center Frequency Offset Δf, with |Δf|	Greater than 900 KHz for 30 KHz bandwidth or Greater than 1.385 MHz for 1 MHz bandwidth	Greater than 1.98 MHz for 30 KHz bandwidth or Greater than 2.465 MHz for 1 MHz bandwidth
Spurious emission levels shall be less than either (a), or both (b) and (c)	(a) -42 dBc / 30KHz	(a) -54 dBc / 30 KHz
	(b) -60 dBm / 30KHz (c) -55 dBm / MHz	(b) -60 dBm / 30 KHz (c) -55 dBm / MHz
Test Results # 1	***Pass (a)*** ***Figure 2.5.1.1***	
Test Results # 2	***Pass (a)*** ***Figure 2.5.1.2***	

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Figure 2.5.1.1 Test result printing for Spurious Emission When Transmitting. (#1)

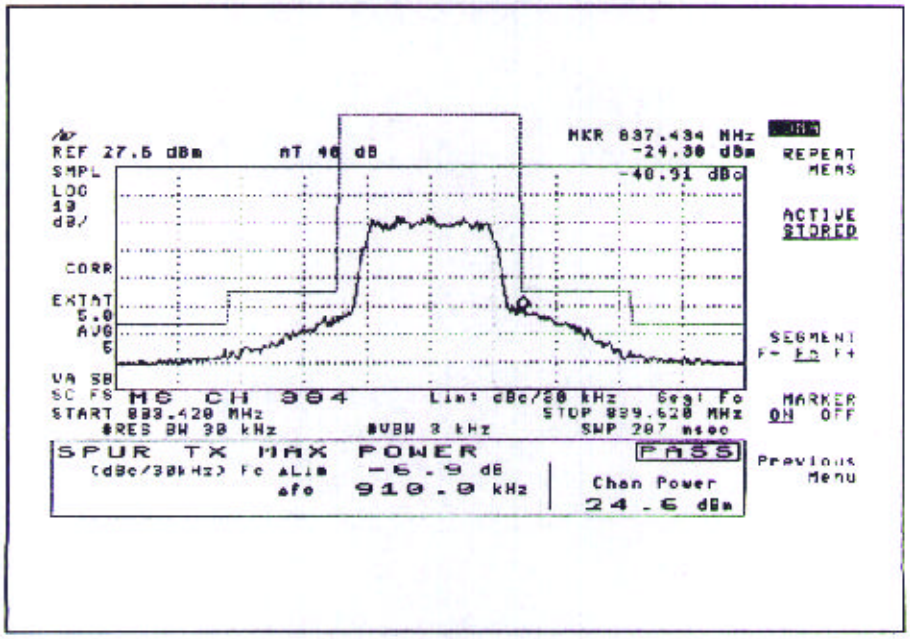
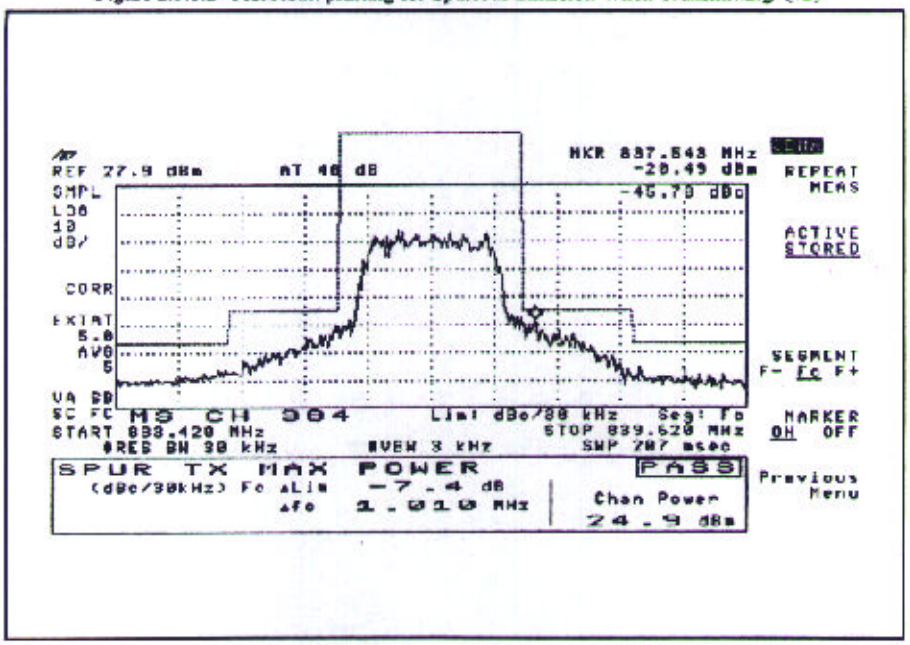


Figure 2.5.1.2 Test result printing for Spurious Emission When Transmitting. (#2)



2 Radiated Spurious Emissions.(TIA/IS-98A item 10.5.2)

Radiated spurious emissions are emissions generated or amplified by the mobile station and radiated by the housing and all power, control and audio leads connected to the mobile station, when connected to a non-radiating load, at frequencies that are outside the assigned CDMA Channel.

Table 2.5.1.1 Test item and result.

Center Frequency Offset Δf, with |Δf|	Greater than 900 KHz for 30 KHz bandwidth or Greater than 1.385 MHz for 1 MHz bandwidth	Greater than 1.98 MHz for 30 KHz bandwidth or Greater than 2.465 MHz for 1 MHz bandwidth
Spurious emission levels shall be less than either (a), or both (b) and (c)	(a) -42 dBc / 30KHz	(a) -54 dBc / 30 KHz
	(b) -60 dBm / 30KHz (c) -55 dBm / MHz	(b) -60 dBm / 30 KHz (c) -55 dBm / MHz
Test Results	***NA***	***NA***

* Test Result "***NA***" will be reported in other part of IS-98A evaluation report.

2.3 The requirements on stability to mechanical and climatic effects. (According to GOST 16019-78 and TIA/IS-98A item 11)

* Temperature, Power Supply Voltage, High Humidity, Vibration Stability and Shock stability will be reported in other part of IS-98A evaluation report.