KTL Test Report:	8L0174EUS
Applicant:	Airtech Wireless, Inc. 1420 Valwood Pkwy., Suite 200 Carrollton, TX. 75006
Equipment Under Test: (E.U.T.)	PCS 1900 Booster, Single Feed - Single Antenna
FCC ID:	OGAS21008
In Accordance With:	**FCC Part 24, Subpart E** Broadband PCS Repeaters
Tested By:	KTL Dallas, Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	_____ T. Tidwell, Laboratory Manager
Date:	03/31/99
Total Number of Pages:	51

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Section 1. Summary of Test Results

General:

Manufacturer: Airtech Wireless, Inc.

Model No.: PCS 1900 Booster, Single Feed - Single Antenna

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 24, Subpart E.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

A	M	P

Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE: **NONE.**

NVLAP®

NVLAP LAB CODE: 100351-0

TESTED BY: Ron Gaytan DATE: 03/29/99

Ron Gaytan, RF Senior Technician

Summary Of Test Data:

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	20W	19.9526	Complies
Occupied Bandwidth (CDMA)	24.238	Input/Output	See Plots	Complies
Occupied Bandwidth (GSM)	24.238	Input/Output	See Plots	Complies
Occupied Bandwidth (NADC)	24.238	Input/Output	See Plots	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	-14.1	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	58.6	Complies
Frequency Stability	24.235	N/A*	N/A*	N/A*

*The E.U.T. is an amplifier; therefore, Frequency Stability is not applicable.

Test Conditions:

Indoor: Temperature: 24°C
Humidity: 42%

Outdoor: Temperature: 22°C
Humidity: 40%

Section 2. General Equipment Specification

Specifications:

Supply Voltage Input: 12 V DC

Frequency Range: Downlink: 1930-1990 MHz

Frequency Range: Uplink: 1850-1910 (Connected to base station via coaxial cable.)

		CDMA (F9W)	GSM (GXW)	NADC (DXW)
Type of Modulation and Designator:		☐	☒	☒

Output Impedance: 50 Ohms

Gain: 2-12 dB

Nominal Input Power from BTS: +31 dBm

RF Output (Rated): Single: 20 Watts
Composite: N/A

	F1-F1	F1-F2	N/A
Frequency Translation:	☐	☐	☒

	Software	Duplexer Change	Fullband Coverage
Band Selection:	☐	☒	☐

Description of Modifications for Class II Permissive Change:

Not Applicable

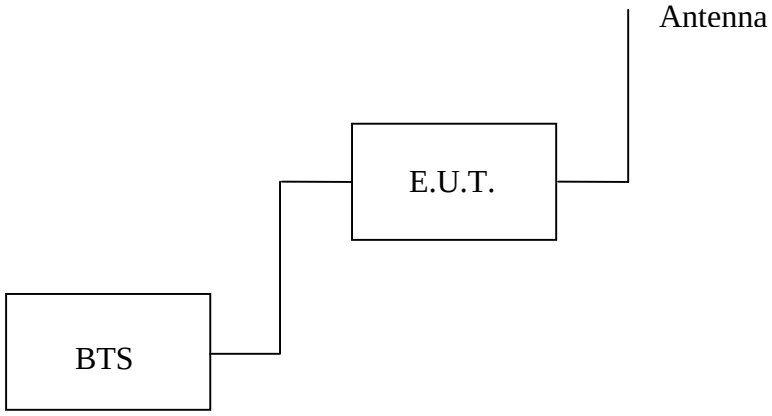
Modifications Made During Testing:

Not Applicable

Theory of Operation:

The E.U.T. is a booster amplifier installed at the masthead of a PCS 1900 MHz GSM/TDMA system. The booster amplifer is fed with a signal level of +31 dBm and delivers 20 watts nominally to the transmit antenna.

System Diagram:



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: Ron Gaytan	DATE: 03/24/99, 03/29/99

Test Results: Complies.

Test Data: See attached tables.

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	N/A	N/A
Downlink	CDMA	N/A	N/A
Uplink	GSM	26.95	N/A
Downlink	GSM	43.07	N/A
Uplink	NADC	29.2	N/A
Downlink	NADC	43	N/A

See test data on the following page.

GSM Modulation Data Sheet:

Freq. (GHz)	Meter Reading (dBm)	Attn. (dB)	Cable Loss (dB)	Correction Factor (dB)	Corrected Reading (dBm)	Corrected Reading (Watts)	Pol.	Comments:
1.93125	12.67	30	0.4		43.07	20.2768	N/A	
1.93125	-3.45	30	0.4		26.95	0.4955	N/A	Input Power Level

NADC Modulation Data Sheet:

Freq. (GHz)	Meter Reading (dBm)	Attn. (dB)	Cable Loss (dB)	Correction Factor (dB)	Corrected Reading (dBm)	Corrected Reading (Watts)	Pol.	Comments:
1.93125	12.6	30	0.4		43	19.9526	N/A	
1.93125	-1.2	30	0.4		29.2	0.8318	N/A	Input Power Level

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.1049
TESTED BY: N/A	DATE: N/A

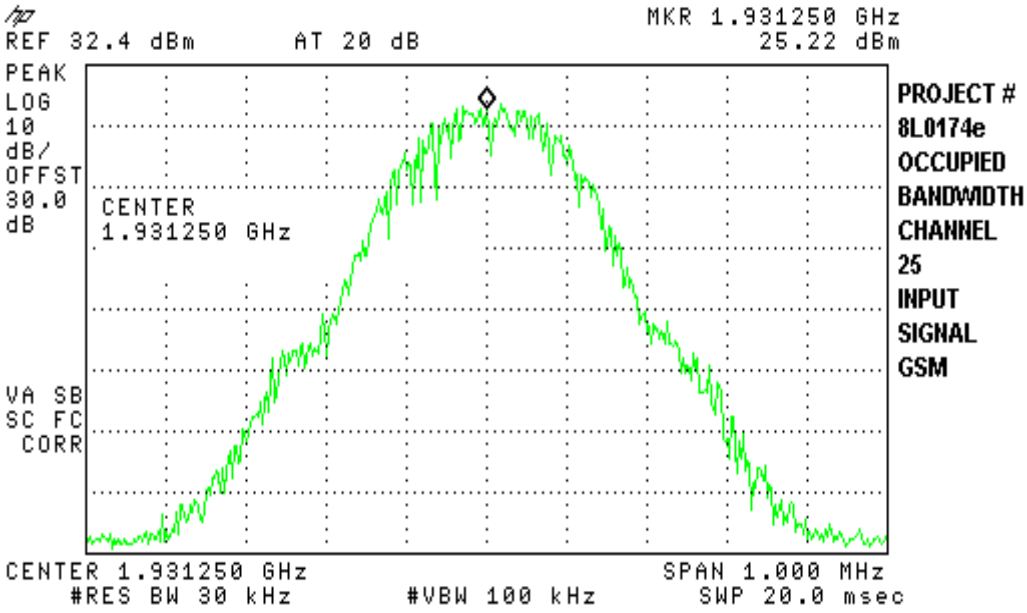
Not Applicable

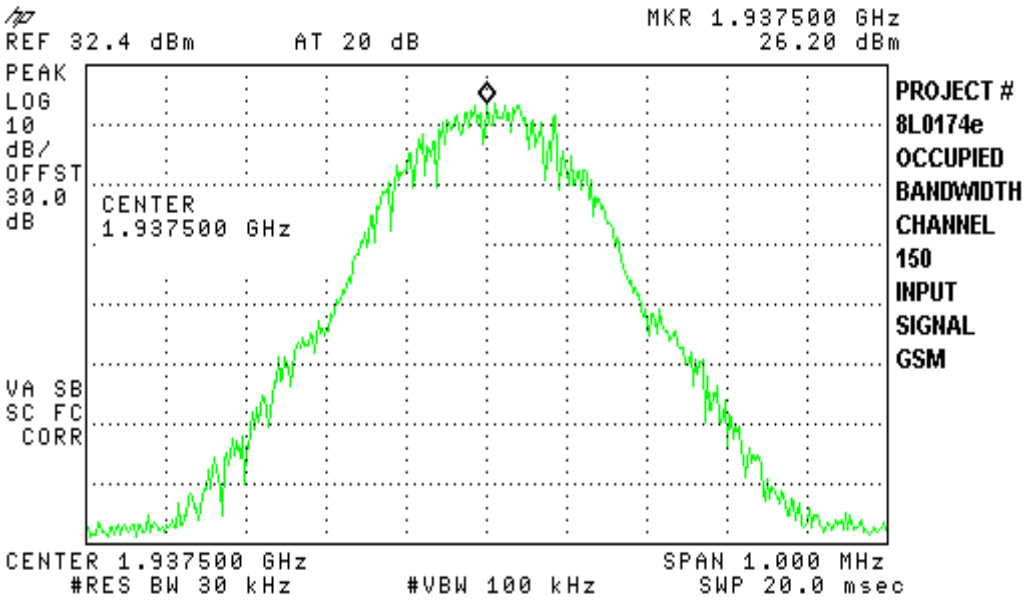
NAME OF TEST: Occupied Bandwidth (GSM)	PARA. NO.: 2.1049
TESTED BY: Ron Gaytan	DATE: 03/29/99

Test Results: Complies.

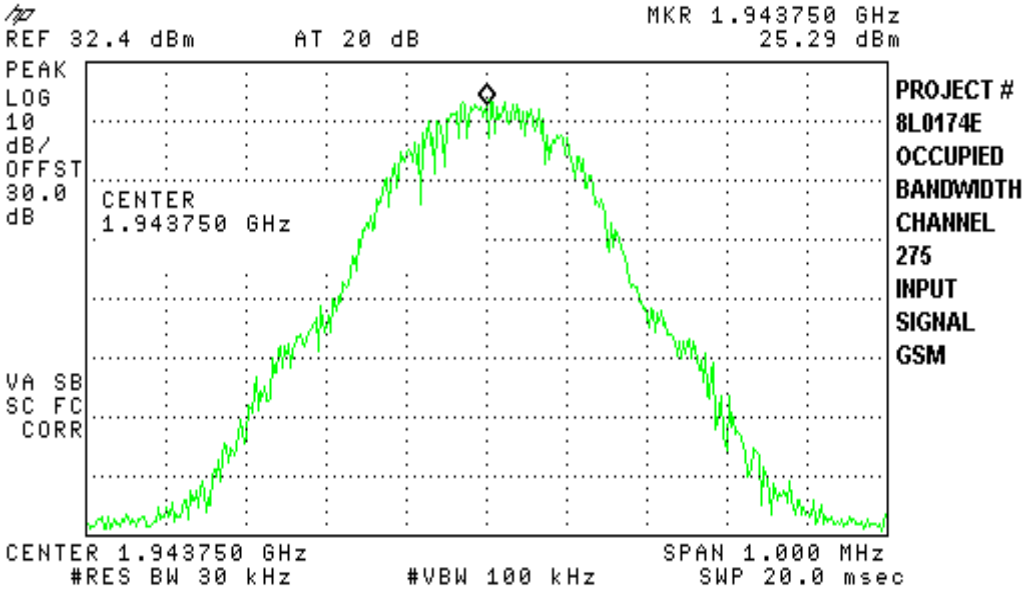
Test Data: See attached graph(s).

Input Signal:

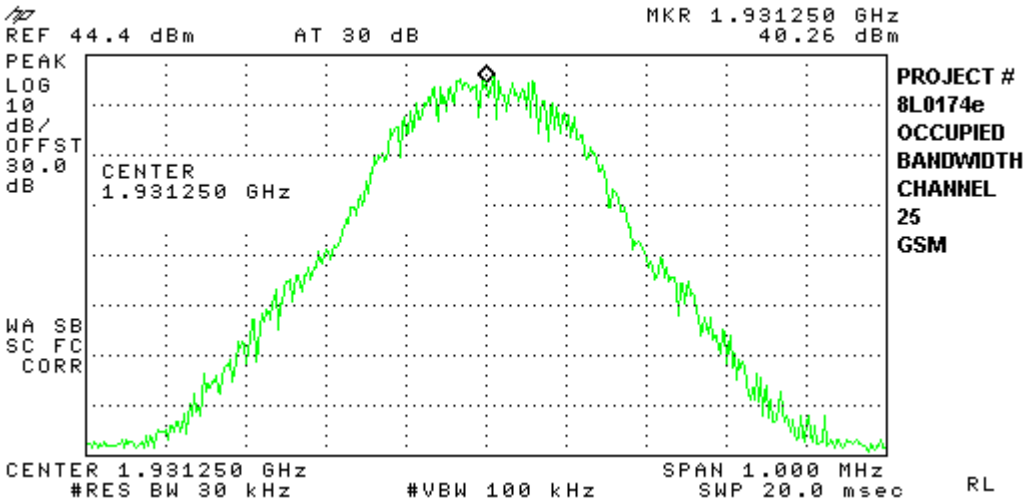


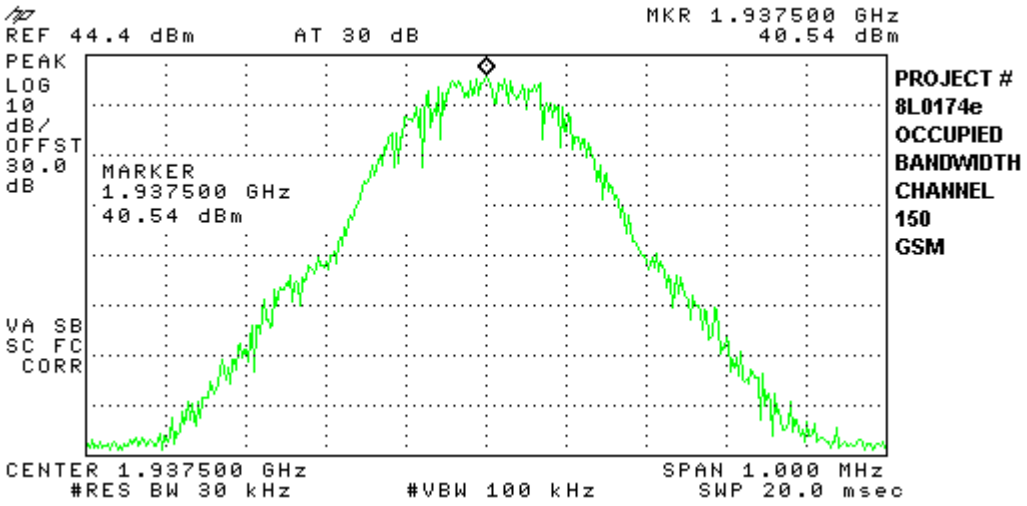


Input Signal (Continued):

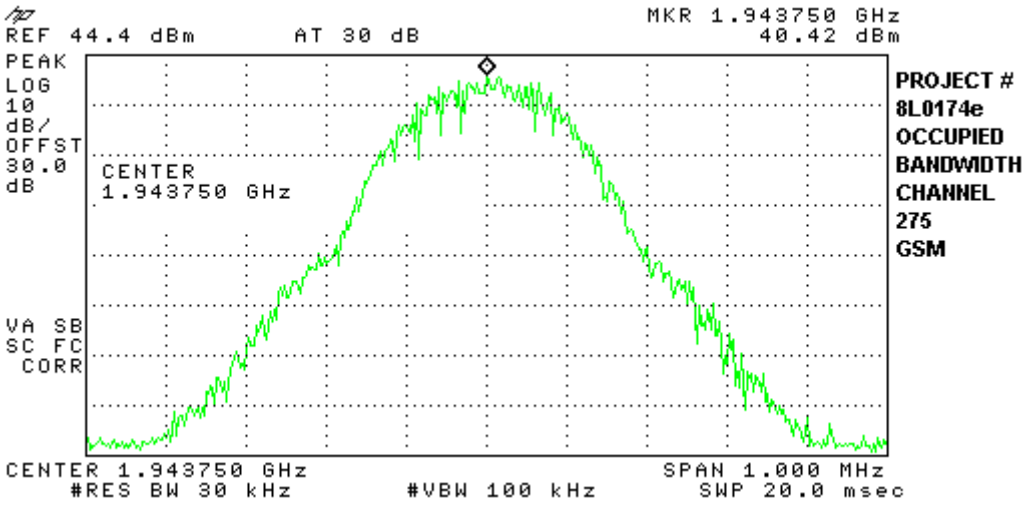


Max Power:


REF 44.4 dBm
AT 30 dB
MKR 1.931250 GHz
40.26 dBm
PEAK
LOG
10
dB/
OFFST
30.0
dB
CENTER
1.931250 GHz
WA SB
SC FC
CORR
PROJECT #
8L0174e
OCCUPIED
BANDWIDTH
CHANNEL
25
GSM
CENTER 1.931250 GHz
#RES BW 30 kHz
#VBW 100 kHz
SPAN 1.000 MHz
SWP 20.0 msec
RL


REF 44.4 dBm
AT 30 dB
MKR 1.937500 GHz
40.54 dBm
PEAK
LOG
10
dB/
OFFST
30.0
dB
MARKER
1.937500 GHz
40.54 dBm
VA SB
SC FC
CORR
PROJECT #
8L0174e
OCCUPIED
BANDWIDTH
CHANNEL
150
GSM
CENTER 1.937500 GHz
#RES BW 30 kHz
#VBW 100 kHz
SPAN 1.000 MHz
SWP 20.0 msec

Max Power (Continued):

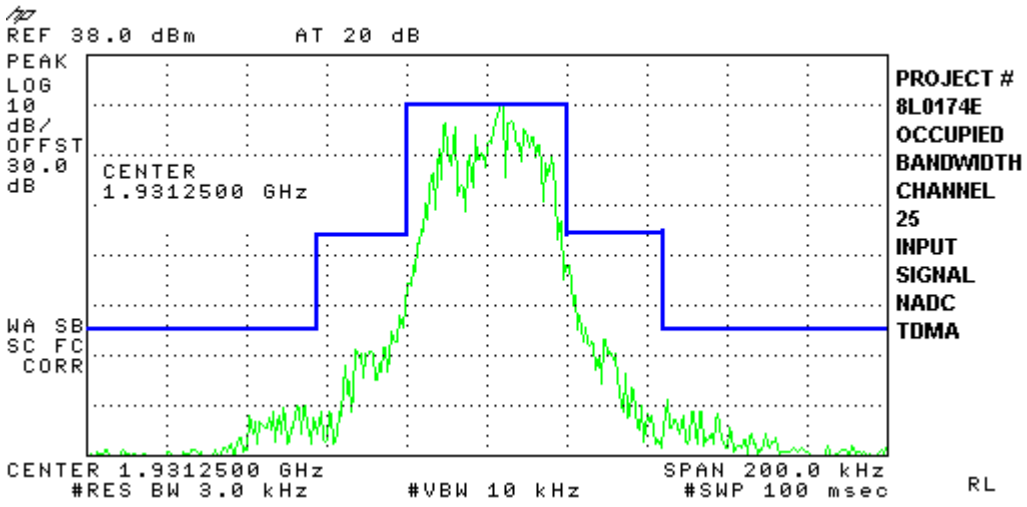


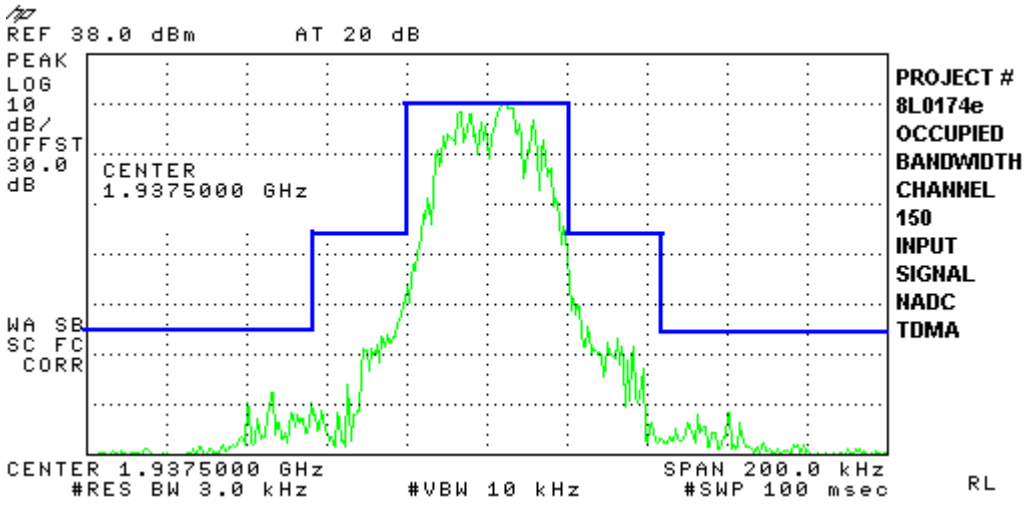
NAME OF TEST: Occupied Bandwidth (NADC)	PARA. NO.: 2.1049
TESTED BY: Ron Gaytan	DATE: 03/29/99

Test Results: Complies.

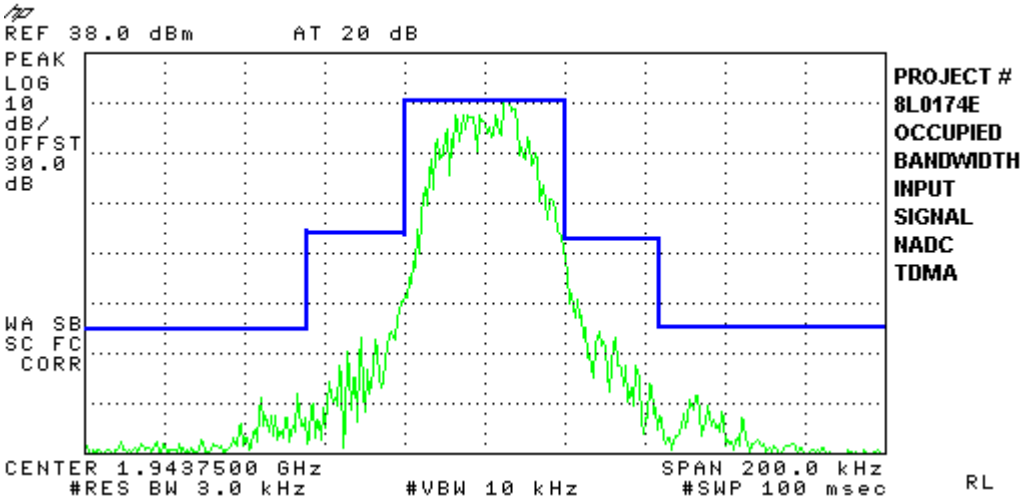
Test Data: See attached graph(s).

Input Signal:

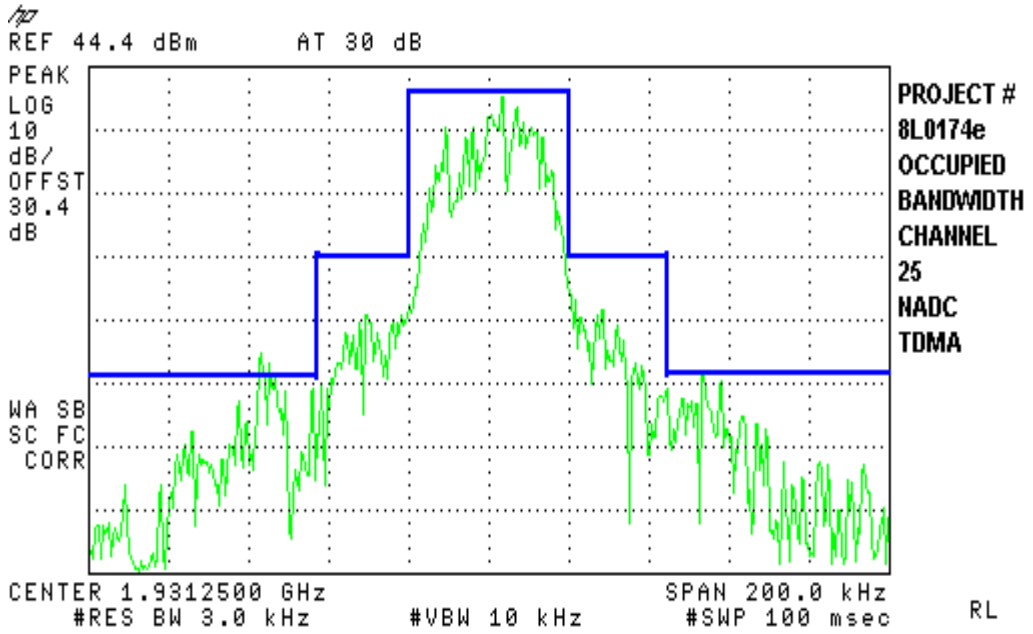


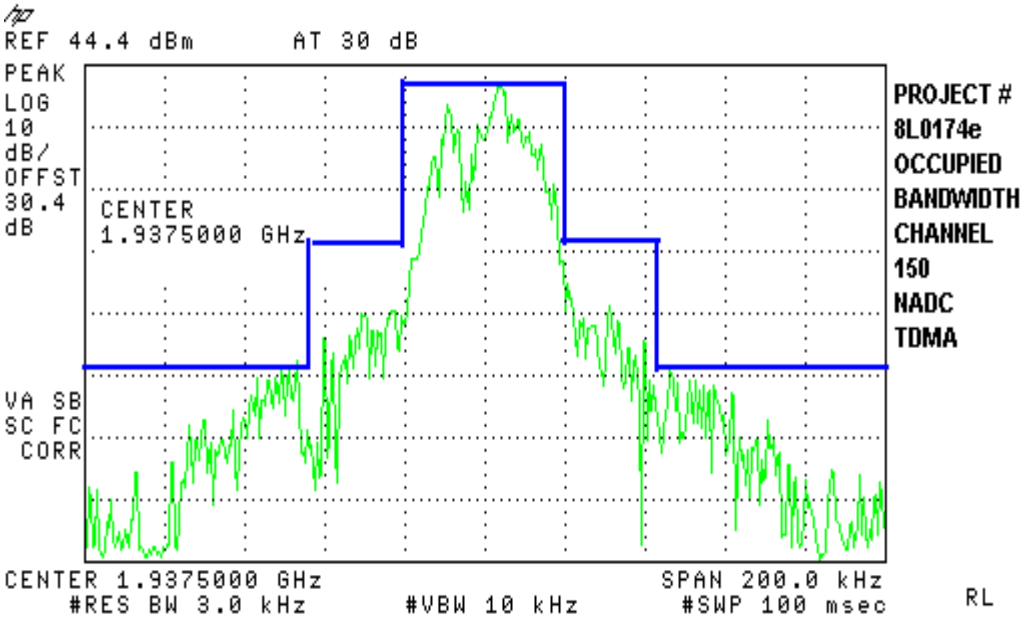


Input Signal (Continued):

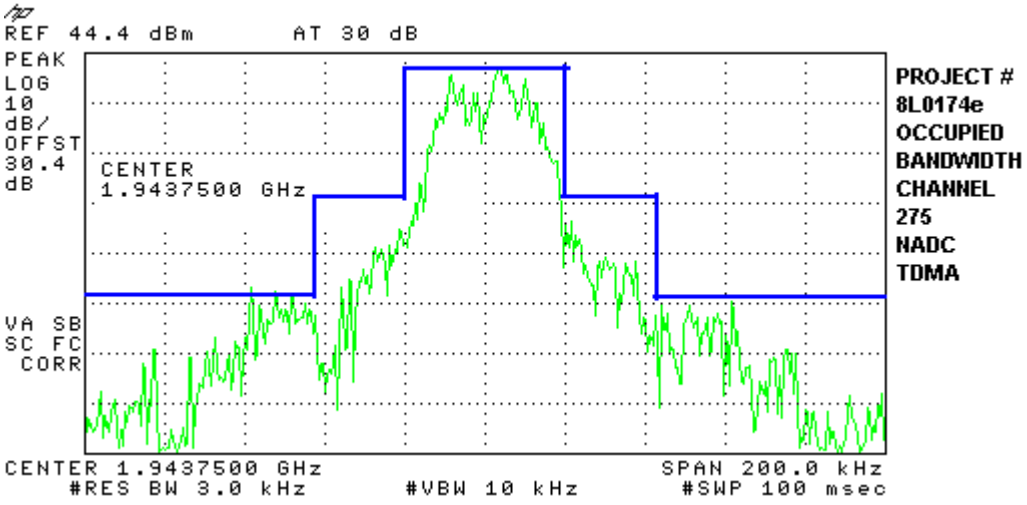


Max Power:

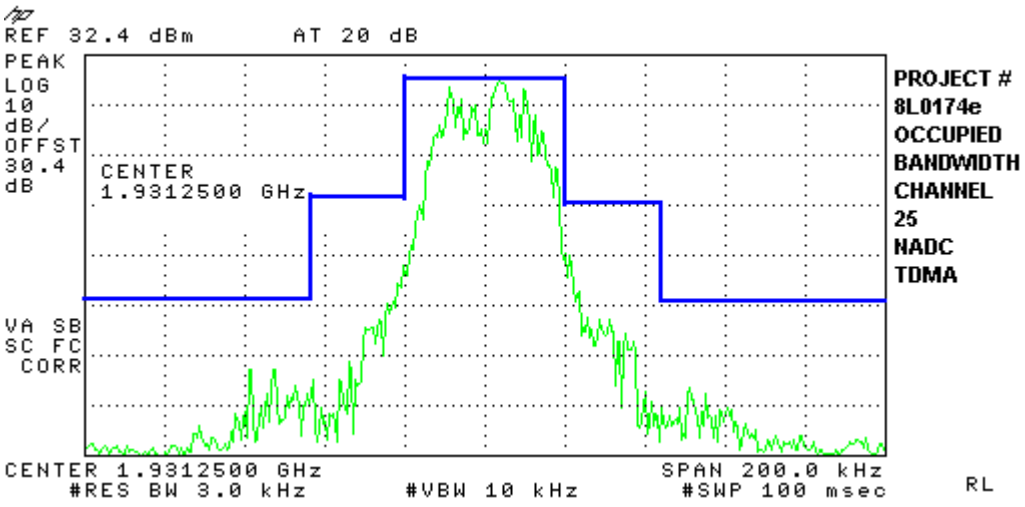

REF 44.4 dBm
AT 30 dB
PEAK
LOG
10
dB/
OFFST
30.4
dB
WA SB
SC FC
CORR
PROJECT #
8L0174e
OCCUPIED
BANDWIDTH
CHANNEL
25
NADC
TDMA
CENTER 1.9312500 GHz
#RES BW 3.0 kHz
#VBW 10 kHz
SPAN 200.0 kHz
#SWP 100 msec
RL

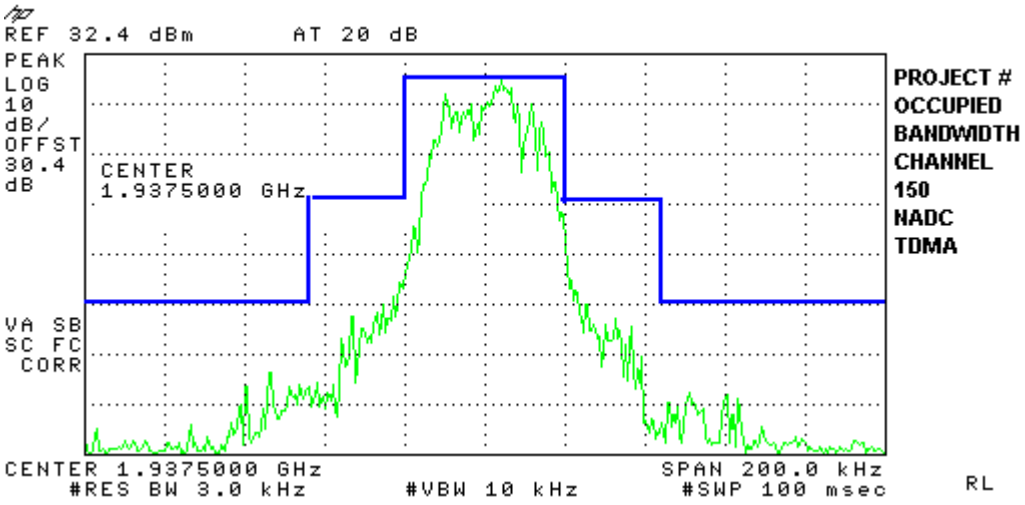

REF 44.4 dBm
AT 30 dB
PEAK
LOG
10
dB/
OFFST
30.4
dB
CENTER
1.9375000 GHz
VA SB
SC FC
CORR
PROJECT #
8L0174e
OCCUPIED
BANDWIDTH
CHANNEL
150
NADC
TDMA
CENTER 1.9375000 GHz
#RES BW 3.0 kHz
#VBW 10 kHz
SPAN 200.0 kHz
#SWP 100 msec
RL

Max Power (Continued):

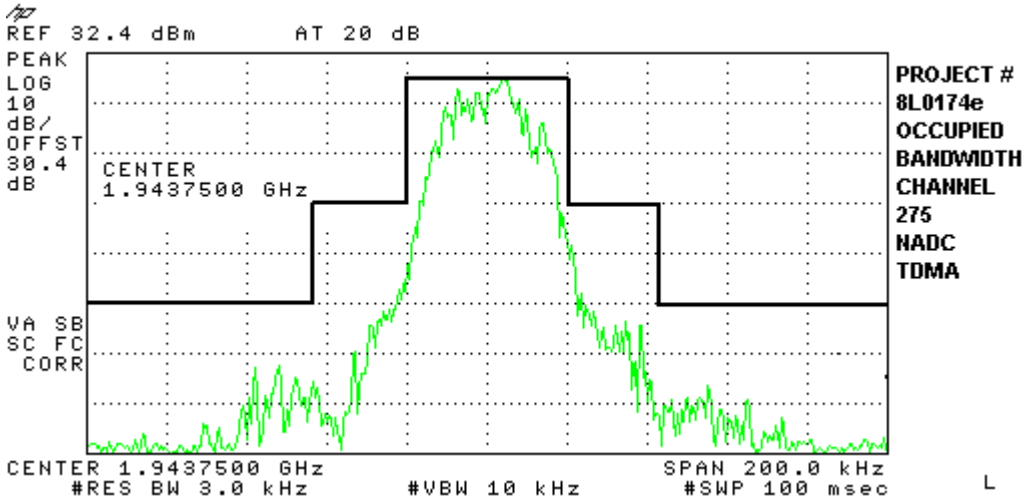


Low Power:


REF 32.4 dBm
AT 20 dB
PEAK
LOG
10
dB/
OFFST
30.4
dB
CENTER
1.9312500 GHz
VA SB
SC FC
CORR
PROJECT #
8L0174e
OCCUPIED
BANDWIDTH
CHANNEL
25
NADC
TDMA
CENTER 1.9312500 GHz
#RES BW 3.0 kHz
#VBW 10 kHz
SPAN 200.0 kHz
#SWP 100 msec
RL


REF 32.4 dBm
AT 20 dB
PEAK
LOG
10
dB/
OFFST
30.4
dB
CENTER
1.9375000 GHz
VA SB
SC FC
CORR
PROJECT #
OCCUPIED
BANDWIDTH
CHANNEL
150
NADC
TDMA
CENTER 1.9375000 GHz
#RES BW 3.0 kHz
#VBW 10 kHz
SPAN 200.0 kHz
#SWP 100 msec
RL

Low Power (Continued):



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: Ron Gaytan	DATE: 03/25/99

Test Results: Complies.

Test Data: See attached test data and graphs.

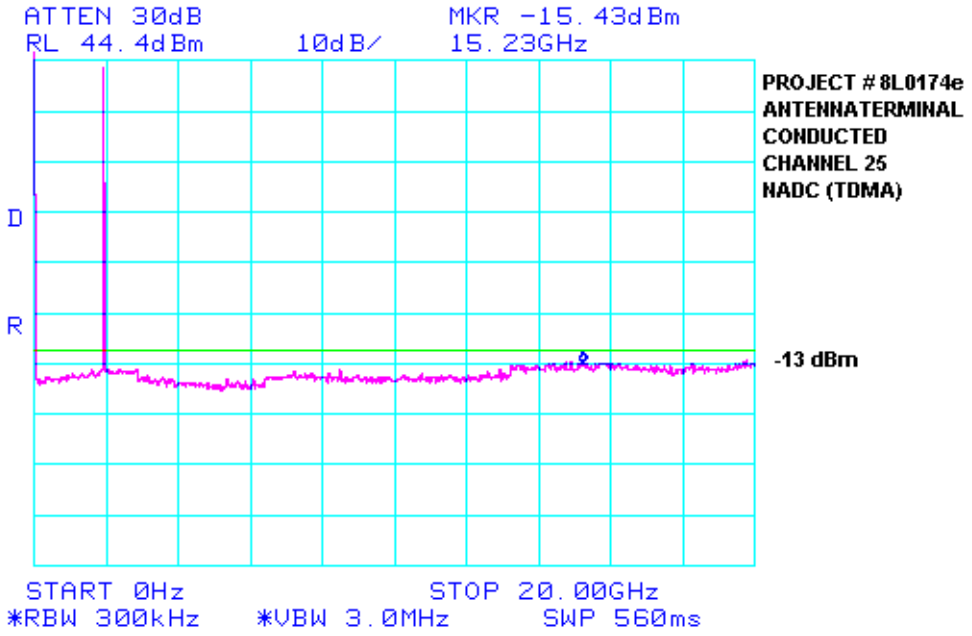
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz spurious (Uplink)	N/A
0 to 20 GHz spurious (Downlink)	-15.4
3 – signal intermodulation (Uplink)	N/A
3 - signal intermodulation (Downlink)	N/A
Lower band edge spurious (Uplink)	N/A
Lower band edge spurious (Downlink)	N/A
Upper band edge spurious (Uplink)	N/A
Upper band edge spurious (Downlink)	N/A

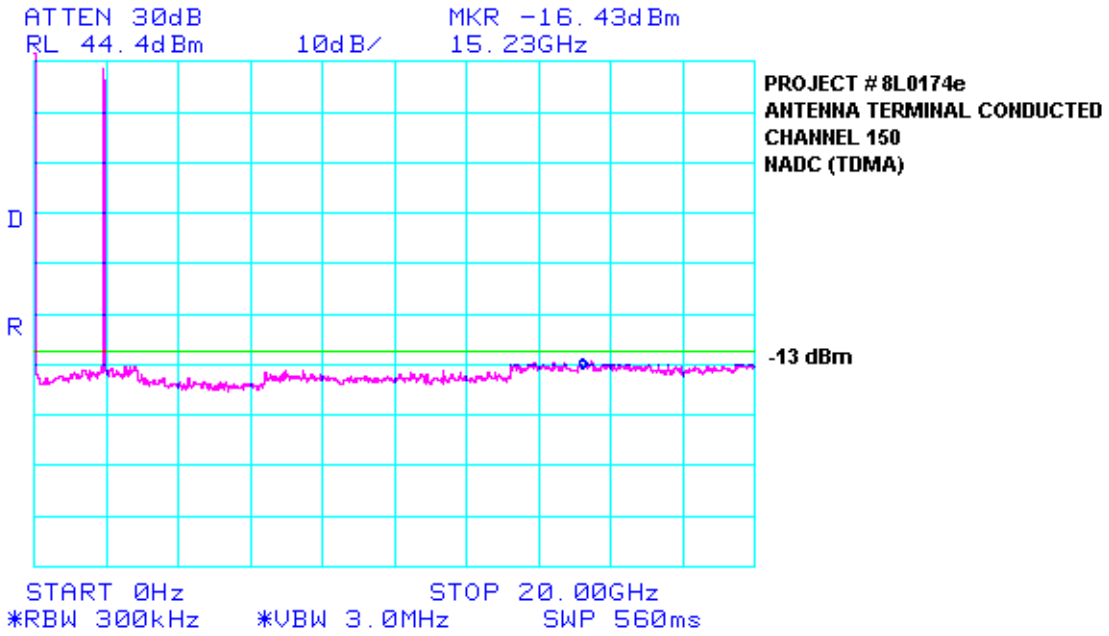
Test Data – Spurious Emissions at Antenna Terminal Test # SE-1:

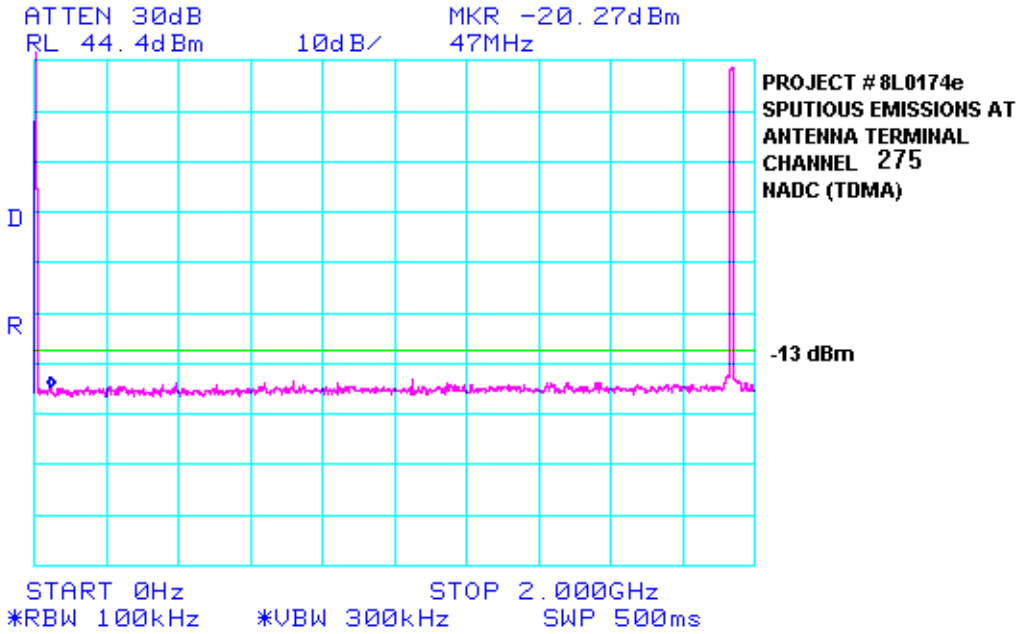
Freq. (MHz)	Meter Reading (dBuV)	Attn. (dB)	Cable Loss (dB)	Correction Factor (dB)	Corrected Reading (dBm)	Spec.limit (dBm)	Pol.	Comments: 500MHz-1000MHz RBW= 100 kHz 1GHz-20GHz RBW= 1MHz
500	3	30	0.2	-107	-73.8	-13	N/A	
920	5	30	0.2	-107	-71.8	-13	N/A	
1.924	120	30	0.4	-107	43.4	N/A	N/A	Fundemental Frequency
1.947	54	30	0.4	-107	-22.6	-13	N/A	
3.862	59	30	0.8	-107	-17.2	-13	N/A	
5.79	**62**	**30**	**0.9**	**-107**	**-14.1**	**-13**	**N/A**	
7.726	36	30	2.1	-107	-38.9	-13	N/A	
9.679	40	30	2.2	-107	-34.8	-13	N/A	
11.57	19	30	3	-107	-55	-13	N/A	
13.529	29	30	3	-107	-45	-13	N/A	
15.404	18	30	3	-107	-56	-13	N/A	Noise Floor
17.392	19	30	3	-107	-55	-13	N/A	Noise Floor
								SCANNED FROM 1GHz-20GHz

Test Data – Spurious Emissions at Antenna Terminal Test # SE-2:

Freq. (MHz)	Meter Reading (dBuV)	Attn. (dB)	Cable Loss (dB)	Correction Factor (dB)	Corrected Reading (dBm)	Spec.limit (dBm)	Pol.	Comments: 500MHz-1000MHz RBW= 100 kHz 1GHz-20GHz RBW= 1MHz
500	3	30	0.2	-107	-73.8	-13	N/A	
920	5	30	0.2	-107	-71.8	-13	N/A	
1.924	120	30	0.4	-107	43.4	N/A	N/A	Fundemental Frequency
1.932	60	30	0.4	-107	-16.6	-13	N/A	
3.859	60	30	0.8	-107	-16.2	-13	N/A	
5.786	**60**	**30**	**0.9**	**-107**	**-16.1**	**-13**	**N/A**	
7.72	32	30	2.1	-107	-42.9	-13	N/A	
9.676	34	30	2.2	-107	-40.8	-13	N/A	
11.57	18	30	3	-107	-56	-13	N/A	
13.515	26	30	3	-107	-48	-13	N/A	
15.404	18	30	3	-107	-56	-13	N/A	Noise Floor
17.392	19	30	3	-107	-55	-13	N/A	Noise Floor
								SCANNED FROM 1GHz-20GHz


ATTEN 30dB
RL 44.4dBm
10dB/
MKR -15.43dBm
15.23GHz
PROJECT # 8L0174e
ANTENNATERMINAL
CONDUCTED
CHANNEL 25
NADC (TDMA)
D
R
-13 dBm
START 0Hz
STOP 20.00GHz
*RBW 300kHz
*VBW 3.0MHz
SWP 560ms


ATTEN 30dB
RL 44.4dBm
10dB/
MKR -16.43dBm
15.23GHz
PROJECT # 8L0174e
ANTENNA TERMINAL CONDUCTED
CHANNEL 150
NADC (TDMA)
D
R
-13 dBm
START 0Hz
STOP 20.00GHz
*RBW 300kHz
*VBW 3.0MHz
SWP 560ms


ATTEN 30dB
RL 44.4dBm
10dB/
MKR -20.27dBm
47MHz
PROJECT # 8L0174e
SPUTIOUS EMISSIONS AT
ANTENNA TERMINAL
CHANNEL 275
NADC (TDMA)
D
R
-13 dBm
START 0Hz
STOP 2.000GHz
*RBW 100kHz
*VBW 300kHz
SWP 500ms

Section 6. Field Strength of Spurious Radiation

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053
TESTED BY: Ron Gaytan	DATE: 03/26/99

Test Results: Complies.
The maximum field strength is 56.5 dBµV/m @ 3m.

Test Data: See attached graph(s).

Test Data - Radiated Emissions – Uplink:

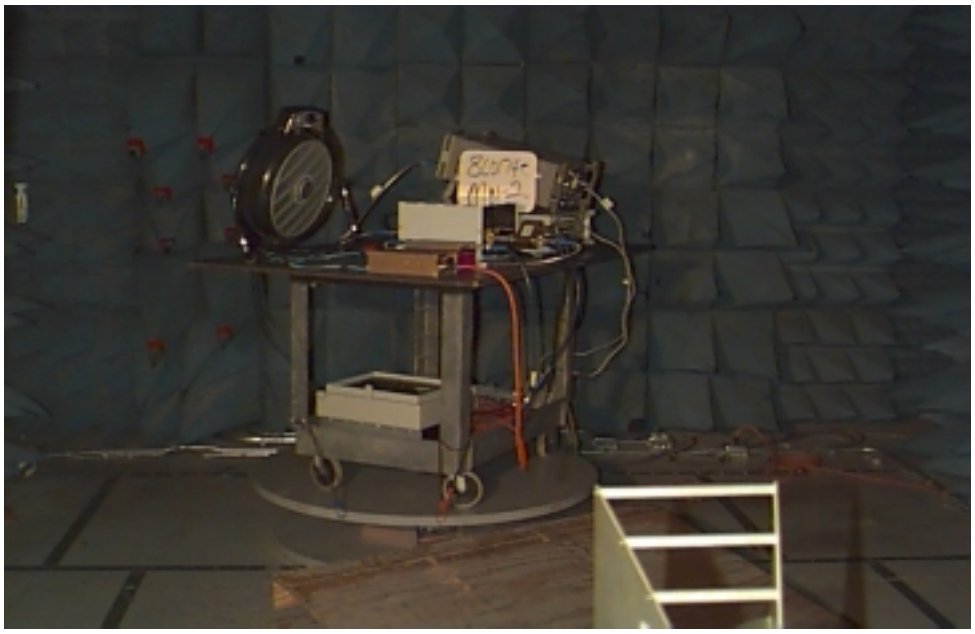
Not Applicable

Test Data - Radiated Emissions Test # MW-2 (1 GHz-20 GHz) – Downlink (GSM):

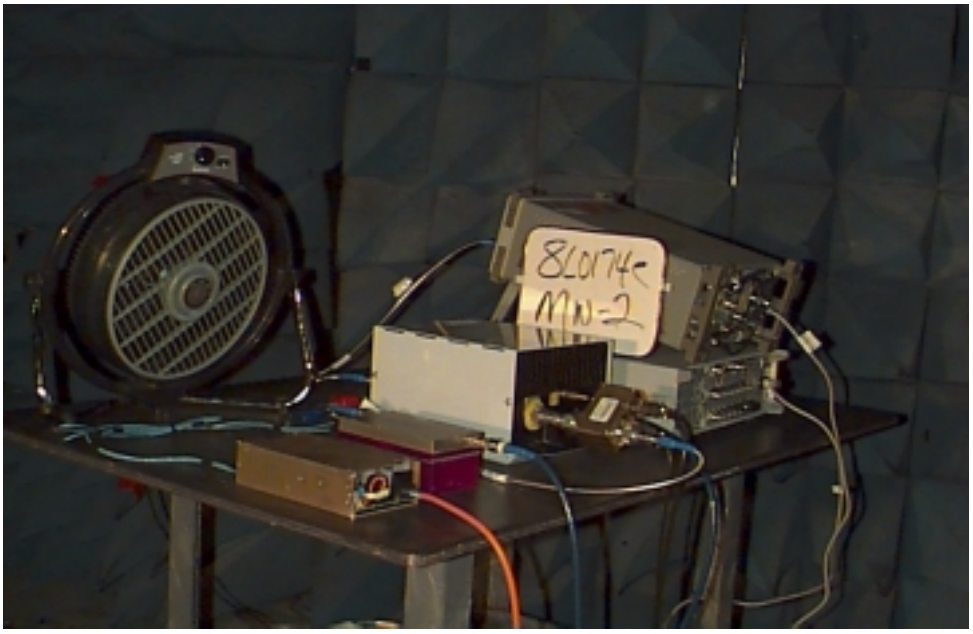
Freq. (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Pol.	Comments:
1.923	35	28.1	2.8	0	65.9	N/A	H	FUNDAMENTAL FREQ.
3.862	30	31.6	4.0	0	65.6	82.2	H	
5.79	17	35	5.1	0	57.1	82.2	H	Noise Floor
7.726	18	37.2	6.0	0	61.2	82.2	H	Noise Floor
9.679	18	37.8	6.9	0	62.7	82.2	H	Noise Floor
11.57	18	39.7	7.5	0	65.2	82.2	H	Noise Floor
13.529	18	41.4	8.3	0	67.7	82.2	H	Noise Floor
15.404	18	40.8	8.7	0	67.5	82.2	H	Noise Floor
17.392	18	44.4	9.5	0	71.9	82.2	H	Noise Floor
1.923	35	28.1	2.8	0	65.9	N/A	V	FUNDAMENTAL FREQ.
3.862	29	31.6	4.0	0	64.6	82.2	V	
5.79	17	35	5.1	0	57.1	82.2	V	
7.726	18	37.2	6.0	0	61.2	82.2	V	Noise Floor
9.679	18	37.8	6.9	0	62.7	82.2	V	Noise Floor
11.57	18	39.7	7.5	0	65.2	82.2	V	Noise Floor
13.529	18	41.4	8.3	0	67.7	82.2	V	Noise Floor
15.404	18	40.8	8.7	0	67.5	82.2	V	Noise Floor
17.392	18	44.4	9.5	0	71.9	82.2	V	Noise Floor
								Scanned 1GHz-20GHz

Radiated Emissions Photographs for Test # MW-2 (1 GHz-20 GHz) – Downlink (GSM):

FRONT VIEW:



REAR VIEW:



Test Data - Radiated Emissions Test # RE-3 (30 MHz-1000 MHz) – Downlink (GSM):

33.3	V	0.0	58.1	11.9	1.1	25.0	46.1	82.2	-36.11	Pass	BROADBAND NOISE
39.2	V	0.0	63.0	11.9	1.1	25.0	51.0	82.2	-31.21	Pass	BROADBAND NOISE
44.0	V	0.0	65.0	11.4	1.4	25.0	52.9	82.2	-29.34	Pass	BROADBAND NOISE
47.4	V	0.0	64.0	11.2	1.4	25.0	51.7	82.2	-30.54	Pass	BROADBAND NOISE
59.3	V	0.0	71.0	10.1	1.8	24.9	58.0	82.2	-24.21	Pass	BROADBAND NOISE
62.5	V	0.0	68.0	9.8	1.8	24.9	54.6	82.2	-27.59	Pass	BROADBAND NOISE
71.1	V	0.0	67.0	8.8	1.3	24.9	52.1	82.2	-30.06	Pass	BROADBAND NOISE
81.0	V	0.0	58.0	8.7	1.3	24.9	43.1	82.2	-39.11	Pass	BROADBAND NOISE
87.0	V	0.0	58.0	9.3	1.3	24.9	43.7	82.2	-38.51	Pass	BROADBAND NOISE
109.0	V	0.0	47.0	9.9	2.7	24.9	34.7	82.2	-47.47	Pass	BROADBAND NOISE
142.4	V	0.0	49.0	11.8	3.0	24.8	39.0	82.2	-43.19	Pass	BROADBAND NOISE
183.6	V	0.0	52.0	13.9	3.0	24.6	44.3	82.2	-37.86	Pass	BROADBAND NOISE
256.0	V	0.0	45.0	18.7	4.6	24.7	43.6	82.2	-38.6	Pass	
33.4	H	0.0	44.0	11.9	1.1	25.0	32.0	82.2	-50.21	Pass	BROADBAND NOISE
39.2	H	0.0	47.0	11.9	1.1	25.0	35.0	82.2	-47.21	Pass	BROADBAND NOISE
44.0	H	0.0	51.0	11.3	1.4	25.0	38.7	82.2	-43.5	Pass	BROADBAND NOISE
45.3	H	0.0	57.0	11.1	1.4	25.0	44.5	82.2	-37.66	Pass	BROADBAND NOISE
48.8	H	0.0	60.0	11.3	1.4	25.0	47.7	82.2	-34.48	Pass	BROADBAND NOISE
59.3	H	0.0	58.0	10.1	1.8	24.9	45.0	82.2	-37.21	Pass	BROADBAND NOISE
61.3	H	0.0	58.0	9.9	1.8	24.9	44.7	82.2	-37.47	Pass	BROADBAND NOISE
71.1	H	0.0	53.0	8.8	1.3	24.9	38.1	82.2	-44.06	Pass	BROADBAND NOISE
81.0	H	0.0	52.0	8.7	1.3	24.9	37.1	82.2	-45.11	Pass	BROADBAND NOISE
87.0	H	0.0	52.0	9.3	1.3	24.9	37.7	82.2	-44.51	Pass	BROADBAND NOISE
109.3	H	0.0	55.0	9.9	2.7	24.9	42.7	82.2	-39.47	Pass	BROADBAND NOISE
119.5	H	0.0	59.0	11.2	2.7	24.9	48.1	82.2	-34.12	Pass	BROADBAND NOISE
127.1	H	0.0	59.0	11.5	3.0	24.9	48.7	82.2	-33.52	Pass	BROADBAND NOISE
143.0	H	0.0	60.0	11.9	3.0	24.8	50.1	82.2	-32.12	Pass	BROADBAND NOISE
149.7	H	0.0	56.0	12.3	3.0	24.8	46.5	82.2	-35.7	Pass	BROADBAND NOISE
165.5	H	0.0	60.0	13.6	3.0	24.8	51.8	82.2	-30.42	Pass	BROADBAND NOISE
170.4	H	0.0	64.0	13.6	3.0	24.8	55.8	82.2	-26.37	Pass	BROADBAND NOISE
181.7	H	0.0	63.0	13.8	3.0	24.6	55.3	82.2	-26.95	Pass	BROADBAND NOISE
196.6	H	0.0	56.0	14.7	3.0	24.6	49.1	82.2	-33.07	Pass	BROADBAND NOISE
224.7	H	0.0	51.0	15.2	4.1	24.6	45.7	82.2	-36.53	Pass	BROADBAND NOISE
252.0	H	0.0	42.0	17.9	4.6	24.7	39.8	82.2	-42.42	Pass	BROADBAND NOISE
256.0	H	0.0	55.0	18.7	4.6	24.7	53.6	82.2	-28.6	Pass	
265.4	H	0.0	42.0	19.7	4.6	24.7	41.6	82.2	-40.58	Pass	
272.1	H	0.0	38.0	20.0	4.6	24.7	37.9	82.2	-44.3	Pass	
288.0	H	0.0	41.0	20.6	4.6	24.7	41.5	82.2	-40.7	Pass	
309.6	H	0.0	34.0	19.2	4.7	24.7	33.2	82.2	-48.96	Pass	
317.0	H	0.0	35.0	16.7	4.7	24.7	31.7	82.2	-50.46	Pass	
325.7	H	0.0	35.0	15.4	4.7	24.7	30.5	82.2	-51.71	Pass	
339.0	H	0.0	36.0	15.4	4.7	24.7	31.5	82.2	-50.71	Pass	
352.0	H	0.0	43.0	15.9	4.7	24.7	39.0	82.2	-43.21	Pass	
383.9	H	0.0	38.0	16.7	4.7	24.7	34.8	82.2	-47.41	Pass	
516.4	H	0.0	40.0	17.7	6.4	24.7	39.3	82.2	-42.91	Pass	
545.4	H	0.0	33.0	19.4	6.4	24.7	34.0	82.2	-48.23	Pass	
600.0	H	0.0	34.0	19.9	7.1	24.8	36.2	82.2	-45.99	Pass	
700.2	H	0.0	34.0	20.8	7.9	25.0	37.7	82.2	-44.48	Pass	
309.5	V	0.0	36.0	19.2	4.7	24.7	35.2	82.2	-46.96	Pass	
317.0	V	0.0	35.0	16.7	4.7	24.7	31.7	82.2	-50.46	Pass	
324.2	V	0.0	37.0	15.4	4.7	24.7	32.5	82.2	-49.71	Pass	
339.0	V	0.0	37.0	15.4	4.7	24.7	32.5	82.2	-49.71	Pass	
352.0	V	0.0	42.0	15.9	4.7	24.7	38.0	82.2	-44.21	Pass	
368.6	V	0.0	36.0	16.5	4.7	24.7	32.6	82.2	-49.64	Pass	
383.9	V	0.0	35.0	16.7	4.7	24.7	31.8	82.2	-50.41	Pass	
412.8	V	0.0	36.0	16.4	6.0	24.8	33.7	82.2	-48.49	Pass	
427.5	V	0.0	34.0	17.1	6.0	24.8	32.4	82.2	-49.83	Pass	
501.1	V	0.0	42.0	18.4	6.4	24.7	42.0	82.2	-40.19	Pass	
516.0	V	0.0	43.0	17.7	6.4	24.7	42.3	82.2	-39.91	Pass	
538.5	V	0.0	30.0	18.3	6.4	24.7	29.9	82.2	-52.31	Pass	
545.4	V	0.0	28.0	19.4	6.4	24.7	29.0	82.2	-53.23	Pass	
600.0	V	0.0	35.0	19.9	7.1	24.8	37.2	82.2	-44.99	Pass	
700.1	V	0.0	32.0	20.8	7.9	25.0	35.7	82.2	-46.48	Pass	
737.1	V	0.0	35.0	20.4	7.9	25.0	38.3	82.2	-43.86	Pass	
747.7	V	0.0	33.0	19.9	7.9	25.0	35.9	82.2	-46.34	Pass	
											Scanned from 30 MHz to 1 Ghz

Radiated Emissions Photographs for Test # RE-3 (30 MHz-1000 MHz) – Downlink (GSM):

FRONT VIEW:

REAR VIEW:

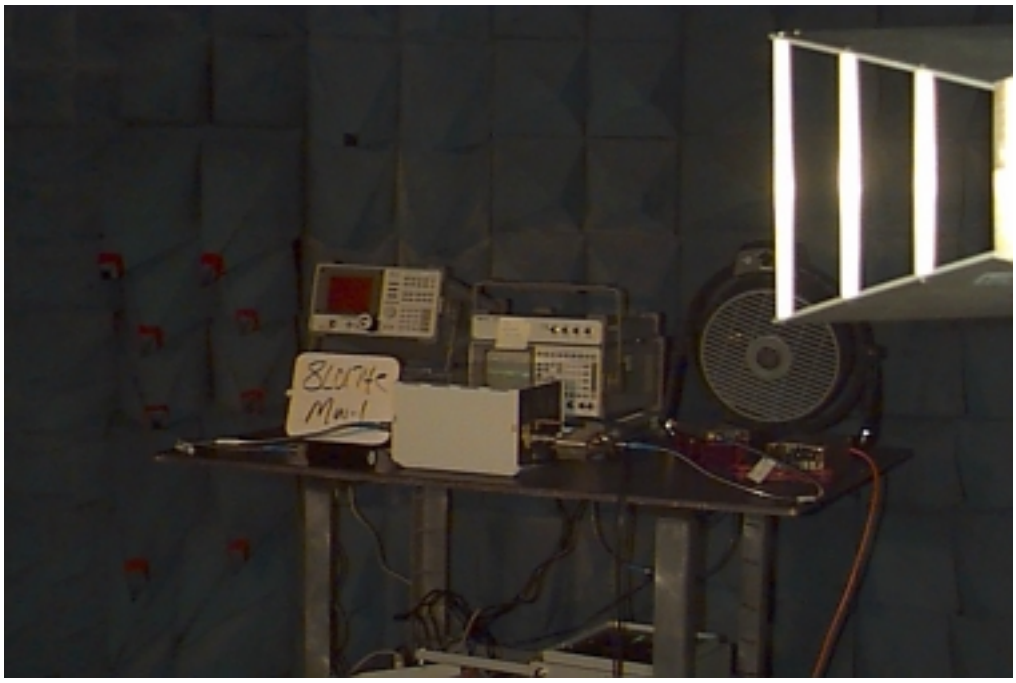
NOTE: Photographs for RE-3 are unavailable; however RE-2 set up is identical other than modulation type.

Test Data - Radiated Emissions Test # MW-1 – Downlink (TDMA):

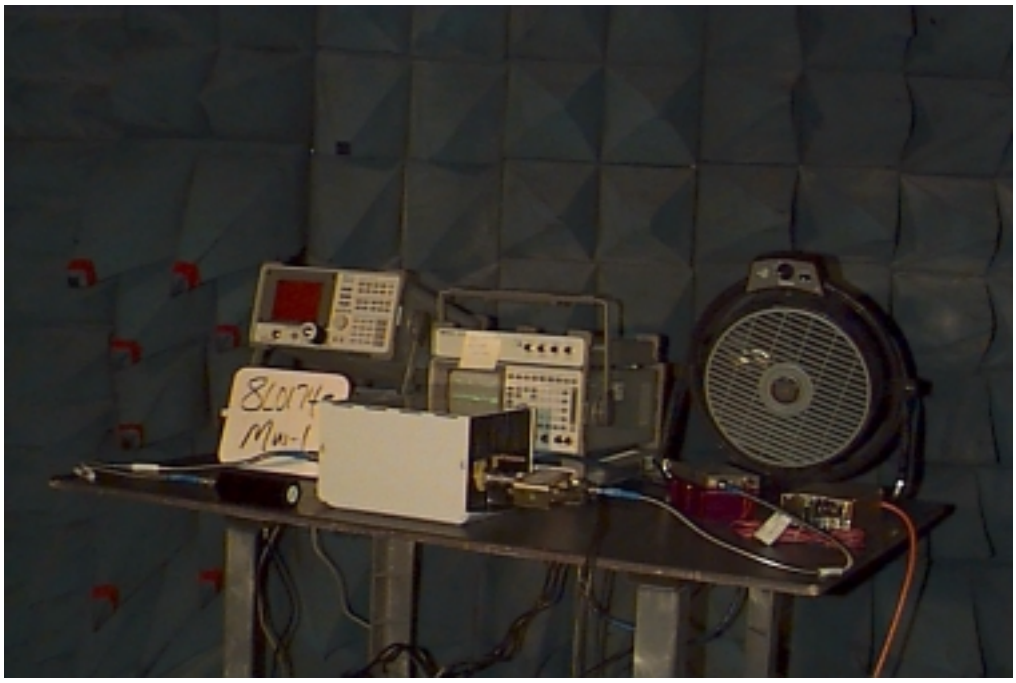
Freq. (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Pol.	Comments:
1.923	35	28.1	2.8	0	65.9	N/A	H	FUNDAMENTAL FREQ.
3.862	30	31.6	4.0	0	65.6	82.2	H	
5.79	17	35	5.1	0	57.1	82.2	H	Noise Floor
7.726	18	37.2	6.0	0	61.2	82.2	H	Noise Floor
9.679	18	37.8	6.9	0	62.7	82.2	H	Noise Floor
11.57	18	39.7	7.5	0	65.2	82.2	H	Noise Floor
13.529	18	41.4	8.3	0	67.7	82.2	H	Noise Floor
15.404	18	40.8	8.7	0	67.5	82.2	H	Noise Floor
17.392	18	44.4	9.5	0	71.9	82.2	H	Noise Floor
1.923	35	28.1	2.8	0	65.9	N/A	V	FUNDAMENTAL FREQ.
3.862	29	31.6	4.0	0	64.6	82.2	V	
5.79	17	35	5.1	0	57.1	82.2	V	
7.726	18	37.2	6.0	0	61.2	82.2	V	Noise Floor
9.679	18	37.8	6.9	0	62.7	82.2	V	Noise Floor
11.57	18	39.7	7.5	0	65.2	82.2	V	Noise Floor
13.529	18	41.4	8.3	0	67.7	82.2	V	Noise Floor
15.404	18	40.8	8.7	0	67.5	82.2	V	Noise Floor
17.392	18	44.4	9.5	0	71.9	82.2	V	Noise Floor
								Scanned 1GHz-20GHz

Radiated Emissions Photographs for Test # MW-1 – Downlink (TDMA):

FRONT VIEW:



REAR VIEW:

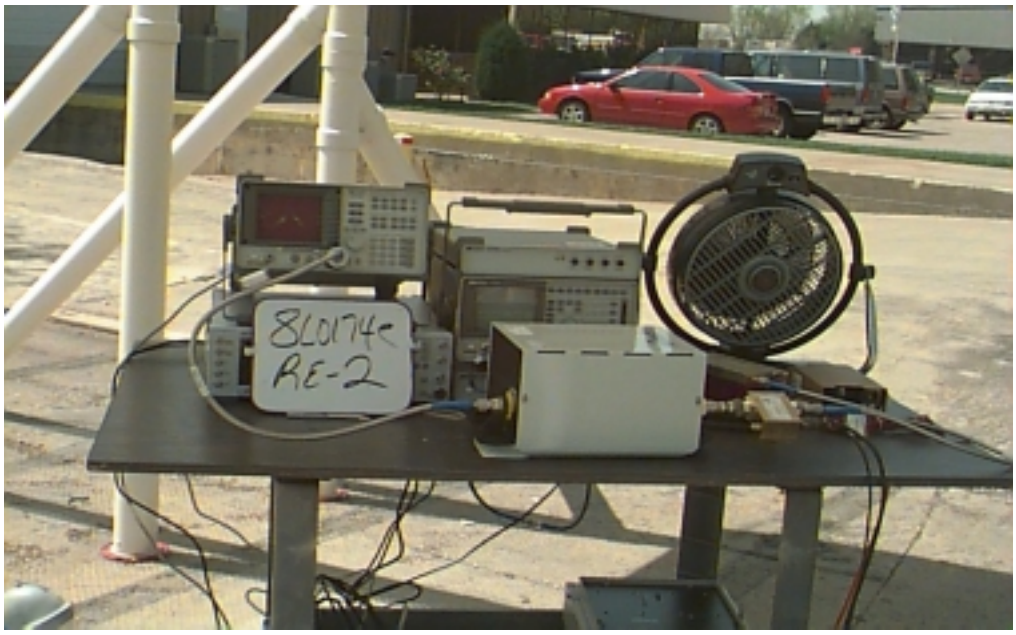


Test Data - Radiated Emissions Test # RE-2 (30 MHz-1000 MHz) – Downlink (TDMA):

Emission Frequency (MHz)	Ant. Pol. (H/V)	Det. Atten. (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
33.3	V	0.0	58.1	11.9	1.1	25.0	46.1	82.2	-36.11	Pass	BROADBAND NOISE
39.2	V	0.0	63.0	11.9	1.1	25.0	51.0	82.2	-31.21	Pass	BROADBAND NOISE
44.0	V	0.0	65.0	11.4	1.4	25.0	52.9	82.2	-29.34	Pass	BROADBAND NOISE
47.4	V	0.0	64.0	11.2	1.4	25.0	51.7	82.2	-30.54	Pass	BROADBAND NOISE
59.3	V	0.0	71.0	10.1	1.8	24.9	58.0	82.2	-24.21	Pass	BROADBAND NOISE
62.5	V	0.0	68.0	9.8	1.8	24.9	54.6	82.2	-27.59	Pass	BROADBAND NOISE
71.1	V	0.0	67.0	8.8	1.3	24.9	52.1	82.2	-30.06	Pass	BROADBAND NOISE
81.0	V	0.0	58.0	8.7	1.3	24.9	43.1	82.2	-39.11	Pass	BROADBAND NOISE
87.0	V	0.0	58.0	9.3	1.3	24.9	43.7	82.2	-38.51	Pass	BROADBAND NOISE
109.0	V	0.0	47.0	9.9	2.7	24.9	34.7	82.2	-47.47	Pass	BROADBAND NOISE
142.4	V	0.0	49.0	11.8	3.0	24.8	39.0	82.2	-43.19	Pass	BROADBAND NOISE
183.6	V	0.0	52.0	13.9	3.0	24.6	44.3	82.2	-37.86	Pass	BROADBAND NOISE
256.0	V	0.0	45.0	18.7	4.6	24.7	43.6	82.2	-38.6	Pass	
33.4	H	0.0	44.0	11.9	1.1	25.0	32.0	82.2	-50.21	Pass	BROADBAND NOISE
39.2	H	0.0	47.0	11.9	1.1	25.0	35.0	82.2	-47.21	Pass	BROADBAND NOISE
44.0	H	0.0	51.0	11.3	1.4	25.0	38.7	82.2	-43.5	Pass	BROADBAND NOISE
45.3	H	0.0	57.0	11.1	1.4	25.0	44.5	82.2	-37.66	Pass	BROADBAND NOISE
48.8	H	0.0	60.0	11.3	1.4	25.0	47.7	82.2	-34.48	Pass	BROADBAND NOISE
59.3	H	0.0	58.0	10.1	1.8	24.9	45.0	82.2	-37.21	Pass	BROADBAND NOISE
61.3	H	0.0	58.0	9.9	1.8	24.9	44.7	82.2	-37.47	Pass	BROADBAND NOISE
71.1	H	0.0	53.0	8.8	1.3	24.9	38.1	82.2	-44.06	Pass	BROADBAND NOISE
81.0	H	0.0	52.0	8.7	1.3	24.9	37.1	82.2	-45.11	Pass	BROADBAND NOISE
87.0	H	0.0	52.0	9.3	1.3	24.9	37.7	82.2	-44.51	Pass	BROADBAND NOISE
109.3	H	0.0	55.0	9.9	2.7	24.9	42.7	82.2	-39.47	Pass	BROADBAND NOISE
119.5	H	0.0	59.0	11.2	2.7	24.9	48.1	82.2	-34.12	Pass	BROADBAND NOISE
127.1	H	0.0	59.0	11.5	3.0	24.9	48.7	82.2	-33.52	Pass	BROADBAND NOISE
143.0	H	0.0	60.0	11.9	3.0	24.8	50.1	82.2	-32.12	Pass	BROADBAND NOISE
149.7	H	0.0	56.0	12.3	3.0	24.8	46.5	82.2	-35.7	Pass	BROADBAND NOISE
165.5	H	0.0	60.0	13.6	3.0	24.8	51.8	82.2	-30.42	Pass	BROADBAND NOISE
170.4	H	0.0	64.0	13.6	3.0	24.8	55.8	82.2	-26.37	Pass	BROADBAND NOISE
181.7	H	0.0	63.0	13.8	3.0	24.6	55.3	82.2	-26.95	Pass	BROADBAND NOISE
196.6	H	0.0	56.0	14.7	3.0	24.6	49.1	82.2	-33.07	Pass	BROADBAND NOISE
224.7	H	0.0	51.0	15.2	4.1	24.6	45.7	82.2	-36.53	Pass	BROADBAND NOISE
252.0	H	0.0	42.0	17.9	4.6	24.7	39.8	82.2	-42.42	Pass	BROADBAND NOISE
256.0	H	0.0	55.0	18.7	4.6	24.7	53.6	82.2	-28.6	Pass	
265.4	H	0.0	42.0	19.7	4.6	24.7	41.6	82.2	-40.58	Pass	
272.1	H	0.0	38.0	20.0	4.6	24.7	37.9	82.2	-44.3	Pass	
288.0	H	0.0	41.0	20.6	4.6	24.7	41.5	82.2	-40.7	Pass	
309.6	H	0.0	34.0	19.2	4.7	24.7	33.2	82.2	-48.96	Pass	
317.0	H	0.0	35.0	16.7	4.7	24.7	31.7	82.2	-50.46	Pass	
325.7	H	0.0	35.0	15.4	4.7	24.7	30.5	82.2	-51.71	Pass	
339.0	H	0.0	36.0	15.4	4.7	24.7	31.5	82.2	-50.71	Pass	
352.0	H	0.0	43.0	15.9	4.7	24.7	39.0	82.2	-43.21	Pass	
383.9	H	0.0	38.0	16.7	4.7	24.7	34.8	82.2	-47.41	Pass	
516.4	H	0.0	40.0	17.7	6.4	24.7	39.3	82.2	-42.91	Pass	
545.4	H	0.0	33.0	19.4	6.4	24.7	34.0	82.2	-48.23	Pass	
600.0	H	0.0	34.0	19.9	7.1	24.8	36.2	82.2	-45.99	Pass	
700.2	H	0.0	34.0	20.8	7.9	25.0	37.7	82.2	-44.48	Pass	
309.5	V	0.0	36.0	19.2	4.7	24.7	35.2	82.2	-46.96	Pass	
317.0	V	0.0	35.0	16.7	4.7	24.7	31.7	82.2	-50.46	Pass	
324.2	V	0.0	37.0	15.4	4.7	24.7	32.5	82.2	-49.71	Pass	
339.0	V	0.0	37.0	15.4	4.7	24.7	32.5	82.2	-49.71	Pass	
352.0	V	0.0	42.0	15.9	4.7	24.7	38.0	82.2	-44.21	Pass	
368.6	V	0.0	36.0	16.5	4.7	24.7	32.6	82.2	-49.64	Pass	
383.9	V	0.0	35.0	16.7	4.7	24.7	31.8	82.2	-50.41	Pass	
412.8	V	0.0	36.0	16.4	6.0	24.8	33.7	82.2	-48.49	Pass	
427.5	V	0.0	34.0	17.1	6.0	24.8	32.4	82.2	-49.83	Pass	
501.1	V	0.0	42.0	18.4	6.4	24.7	42.0	82.2	-40.19	Pass	
516.0	V	0.0	43.0	17.7	6.4	24.7	42.3	82.2	-39.91	Pass	
538.5	V	0.0	30.0	18.3	6.4	24.7	29.9	82.2	-52.31	Pass	
545.4	V	0.0	28.0	19.4	6.4	24.7	29.0	82.2	-53.23	Pass	
600.0	V	0.0	35.0	19.9	7.1	24.8	37.2	82.2	-44.99	Pass	
700.1	V	0.0	32.0	20.8	7.9	25.0	35.7	82.2	-46.48	Pass	
737.1	V	0.0	35.0	20.4	7.9	25.0	38.3	82.2	-43.86	Pass	
747.7	V	0.0	33.0	19.9	7.9	25.0	35.9	82.2	-46.34	Pass	
											Scanned from 30 MHz to 1 Ghz

Radiated Emissions Photographs for Test # RE-2 (30 MHz-1000 MHz) – Downlink (TDMA):

FRONT VIEW:



REAR VIEW:

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: N/A	DATE: N/A

Not Applicable

Section 8. Test Equipment List

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items is typically 12 months from the calibration date shown.

KTL ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
C1A	A O.A.T.S. Cable Set			04/03/98
CF31	Storm Cable (7.6 meters)	Semi Flex		11/11/98
398	Preamplifier, 25dB (30 MHz - 1.5 GHz)	ICC LNA25	398	06/18/98
494	Horn Antenna	A.H. Systems SAS-200/571	162	04/29/98
606	Autotransformer	General Radio W20HMT3A	NSN	CNR
660(a)	Spectrum Analyzer	Hewlett Packard 8567A	2541A00109	08/05/98
660(b)	Display Unit	Hewlett Packard 85662A	2542A10537	08/05/98
660(c)	Quasi-Peak Adapter	Hewlett Packard 85650A	2551A00608	08/05/98
677	Receiver (1 - 18 GHz)	Electro Metrics EMC 50	185	07/24/97
G1017B	Attenuator	Narda 776B-20	N/A	08/14/98
G1018	Attenuator	Narda 776B-10	N/A	10/27/98
G2017	Antenna, Log Periodic	A.H. Systems SAS-200/510	556	01/25/99
G2031	Biconical Antenna	ICC BCON-30300	N/A	11/17/98
G2624	Spectrum Analyzer	Hewlett Packard 8563E	3551A04428	10/05/98
N/A	Coaxial Cable (Type N)	Huber & Suhner SUCOFLEX 104PB	16156/4PB	03/24/99

Test Equipment List (Continued):

KTL ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
		ANECHOIC CHAMBER # 1		
	Antenna Tripod	Polarad HFU-2		CNR
		SITE A O.A.T.S. (OPEN AREA TEST SITE) 10 Meter Site		
	Turntable, 4 foot	RF Consultants (Automated)		CNR
	Antenna Mast, 4 Meter	EMCO Part # 1050 (Automated)		CNR

LEGEND:

CNR CALIBRATION NOT REQUIRED
N/A NOT APPLICABLE
CBU CALIBRATED BEFORE USE

ANNEX A

TEST METHODOLOGIES

NAME OF TEST: RF Power Output	**PARA. NO.: 2.1046**

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement:

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts
E = the maximum measured field strength in V/m
R = the measurement range (3 meters)
G = the numeric gain of the transmit antenna in relation to an isotropic radiator

NAME OF TEST: Occupied Bandwidth	**PARA. NO.: 2.1049**

Minimum Standard: Para. No. 24.238(b). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB.

Method Of Measurement:

CDMA

Spectrum analyzer settings:
RBW: 30 kHz
VBW: ≥ RBW
Span: 5 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz
VBW: ≥ RBW
Span: 2 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz
VBW: ≥ RBW
Span: 1 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: Disabled

NADC

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

NAME OF TEST: Field Strength of Spurious Radiation PARA. NO.: 2.1053

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Calculation Of Field Strength Limit:

An example of attenuation requirement of 43 + 10 Log P is equivalent to -13 dBm (5×10^{-5} Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

$GP/4\pi R^2 = E^2/120\pi$

For emissions ≤ 1 GHz:

G = 1.64 (Dipole Gain)
$P = 10^{-5}$ Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$

$$E = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V / m} = 84.4 \text{ dB}\mu\text{V / m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)
$P = 1 \times 10^{-5}$ Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

$$E = 84.4 - 20Log\sqrt{1.64} = 82.3 dB\mu V \text{ / } m@3m$$

NAME OF TEST: Frequency Stability	**PARA. NO.: 2.1055**

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement:

Frequency Stability With Voltage Variation:

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

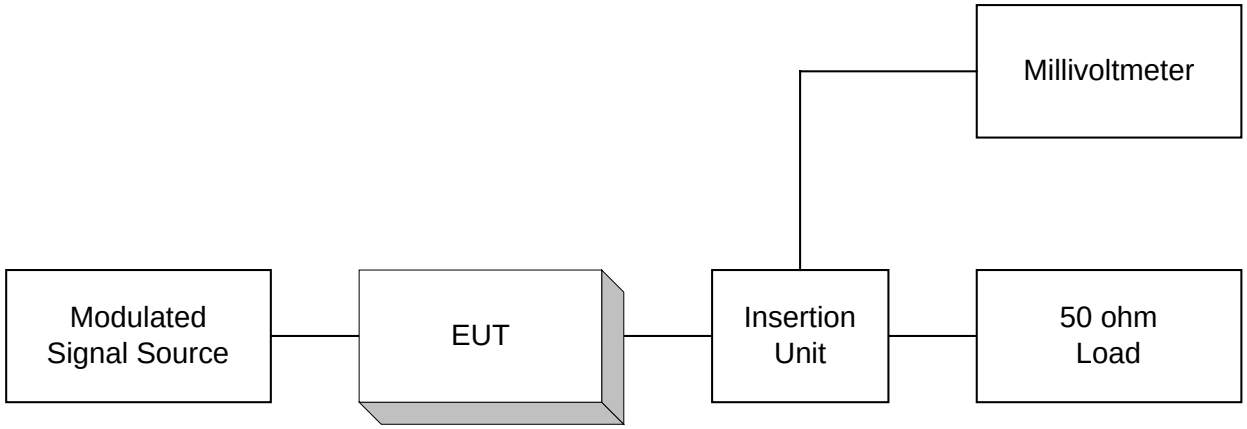
Frequency Stability With Temperature Variation:

The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

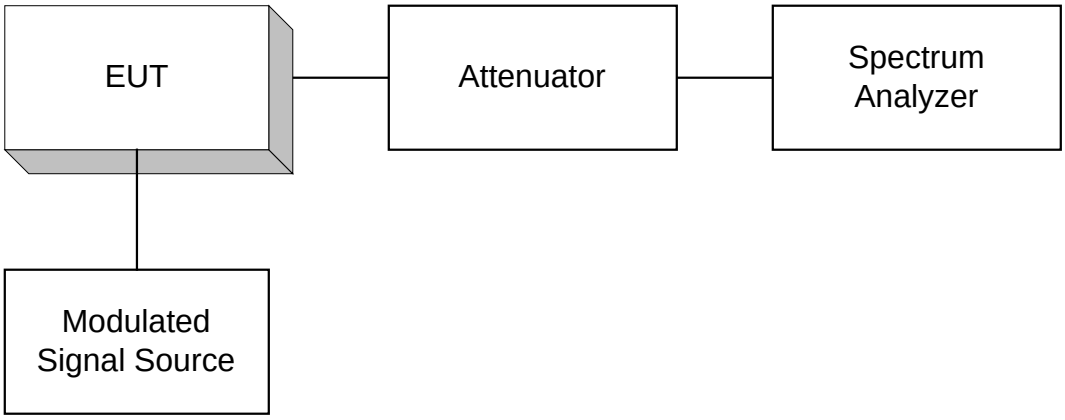
ANNEX B

TEST DIAGRAMS

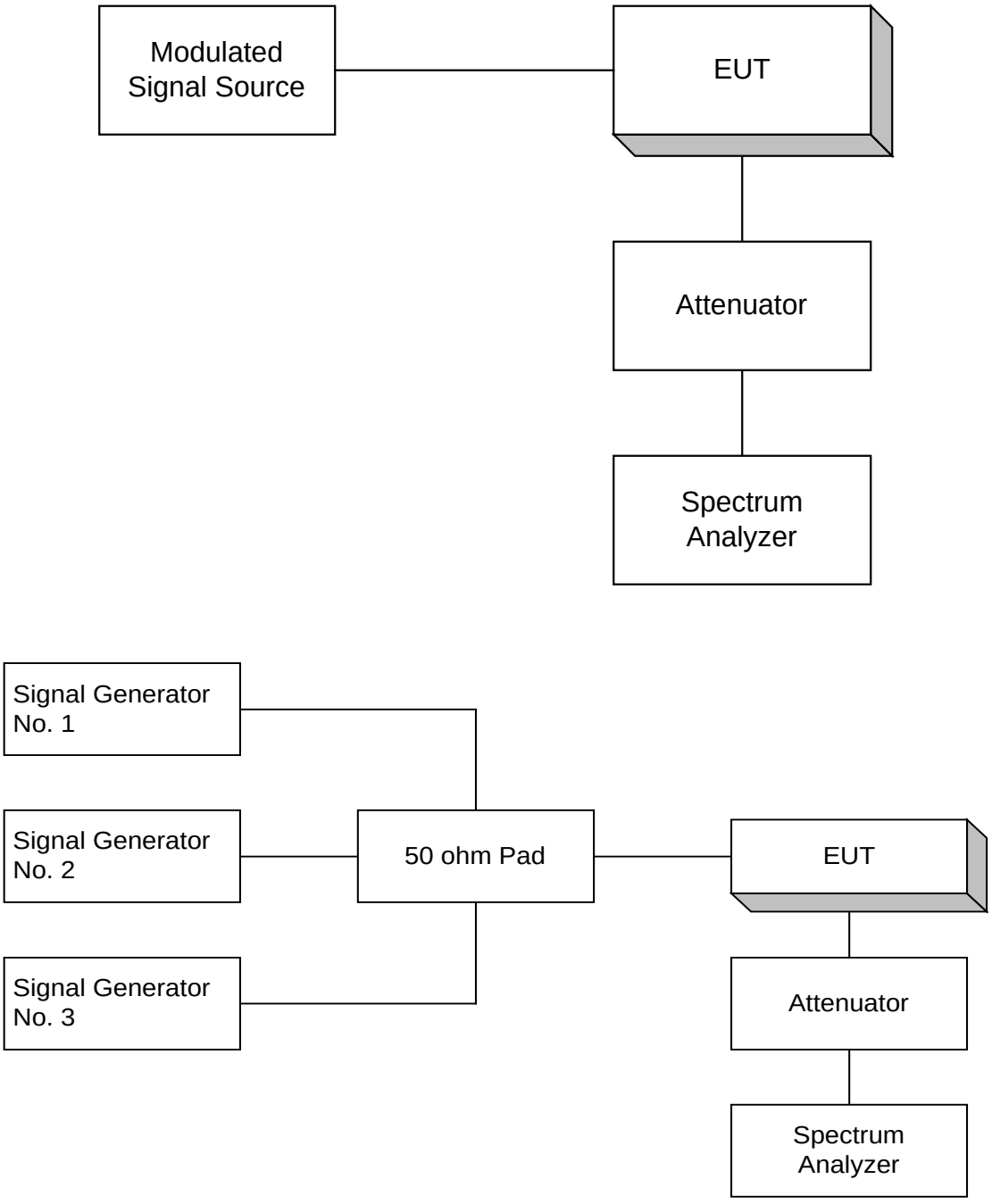
Para. No. 2.985 - R.F. Power Output:



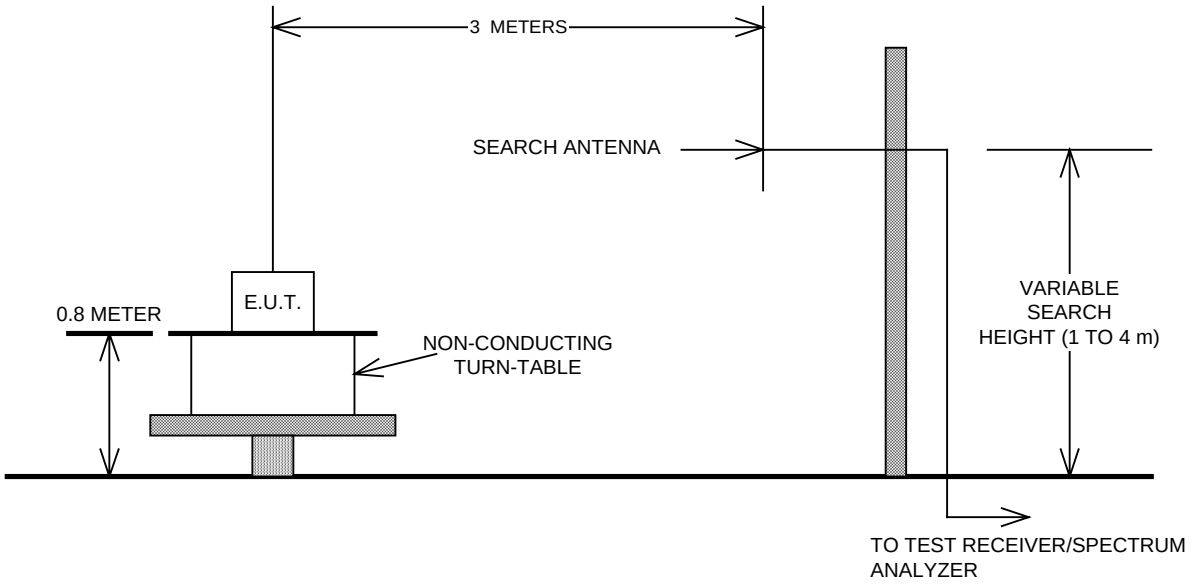
Para. No. 2.989 - Occupied Bandwidth:



Para. No. 2.991 Spurious Emissions at Antenna Terminals:



Para. No. 2.993 - Field Strength of Spurious Radiation:



Para. No. 2.995 - Frequency Stability: