6 – SPURIOUS EMISSIONS AT ANTENNA TERMINALS

6.1 Applicable Standards

Per FCC §2.1051and FCC §90.210

On any frequency removed from the center of the assigned channel by more than 250 percent at least:

$43 + 10 \log(P)$ dB

6.2 Test Procedure

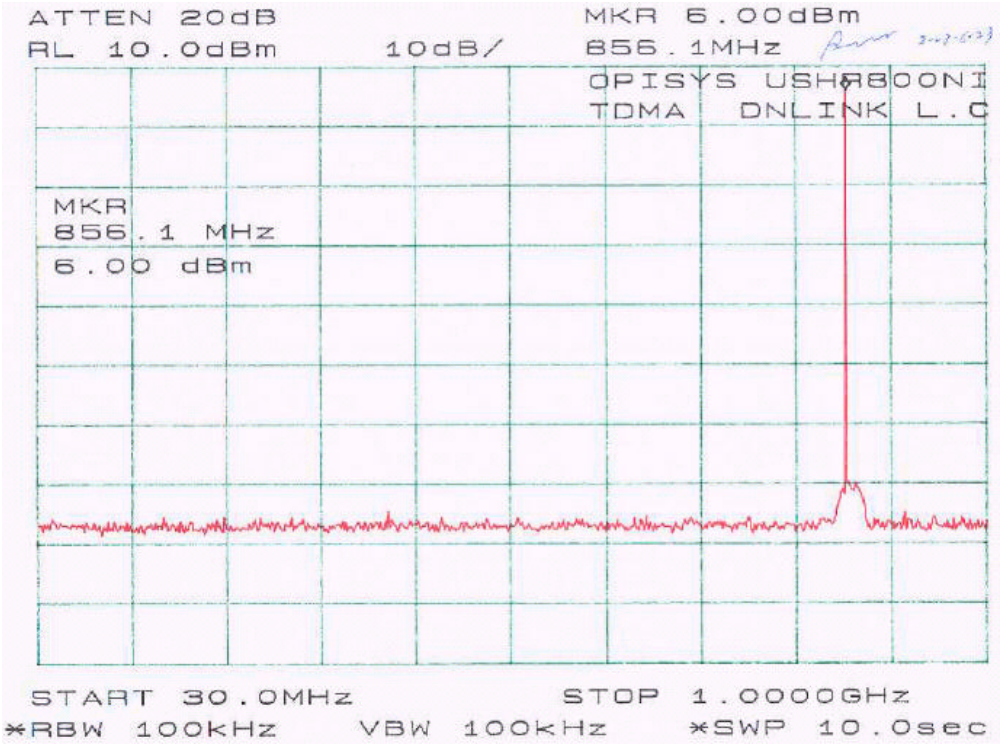
The RF output of the amplifier was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1 MHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

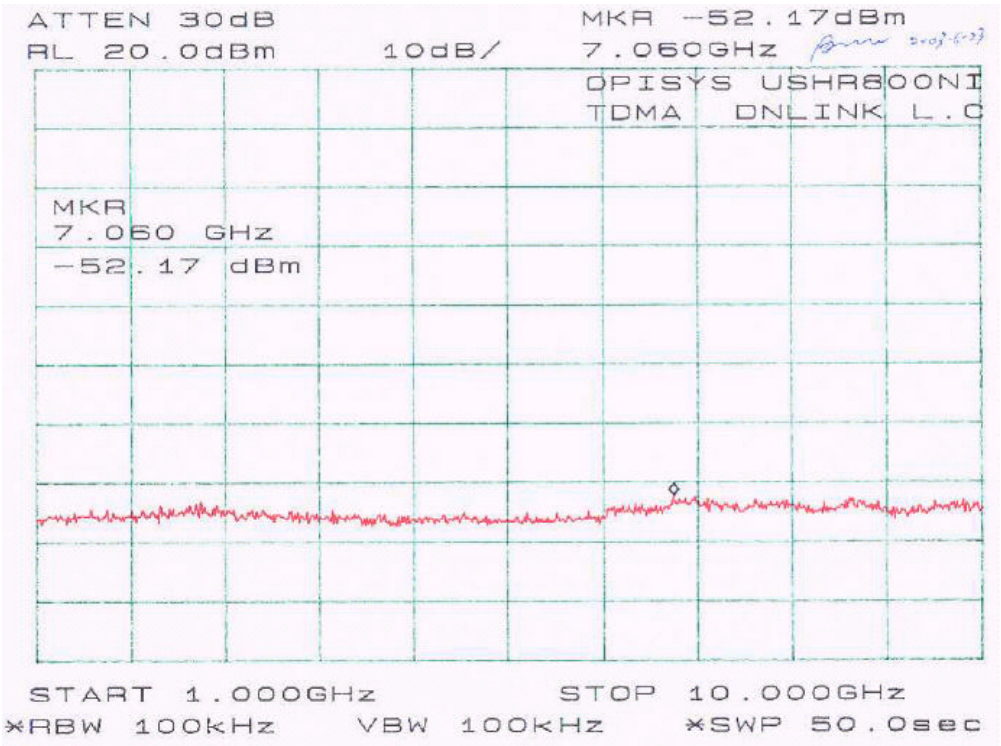
6.3 Test Results

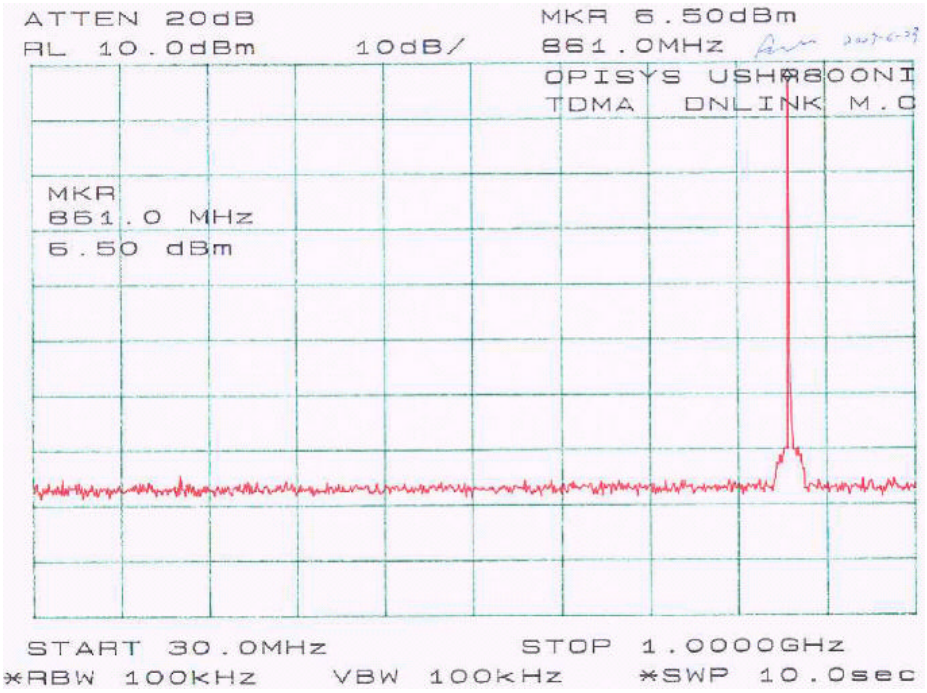
Modulation	Mode	Channel	Frequency MHz	Measured
TDMA	Forward (Down-link)	Low	855	< -13dBm
		Mid	860	< -13dBm
		High	865	< -13dBm
	Reverse (Up-link)	Low	810	< -13dBm
		Mid	815	< -13dBm
		High	820	< -13dBm

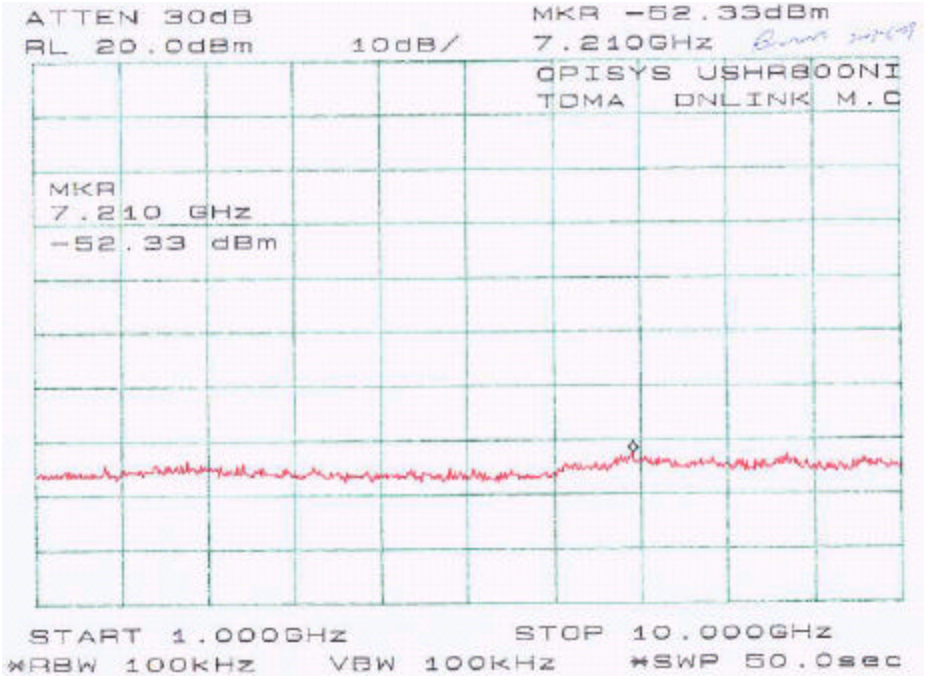
6.4 Plots of Out-of-Band Emissions at Antenna Terminal

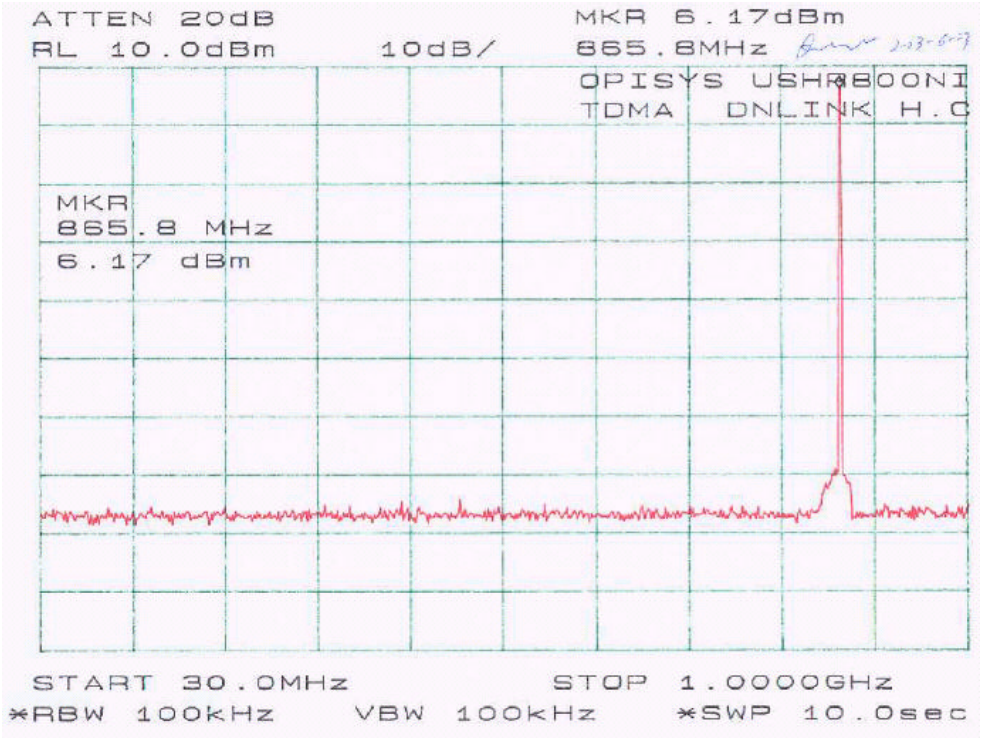
Please refer to plots hereinafter.

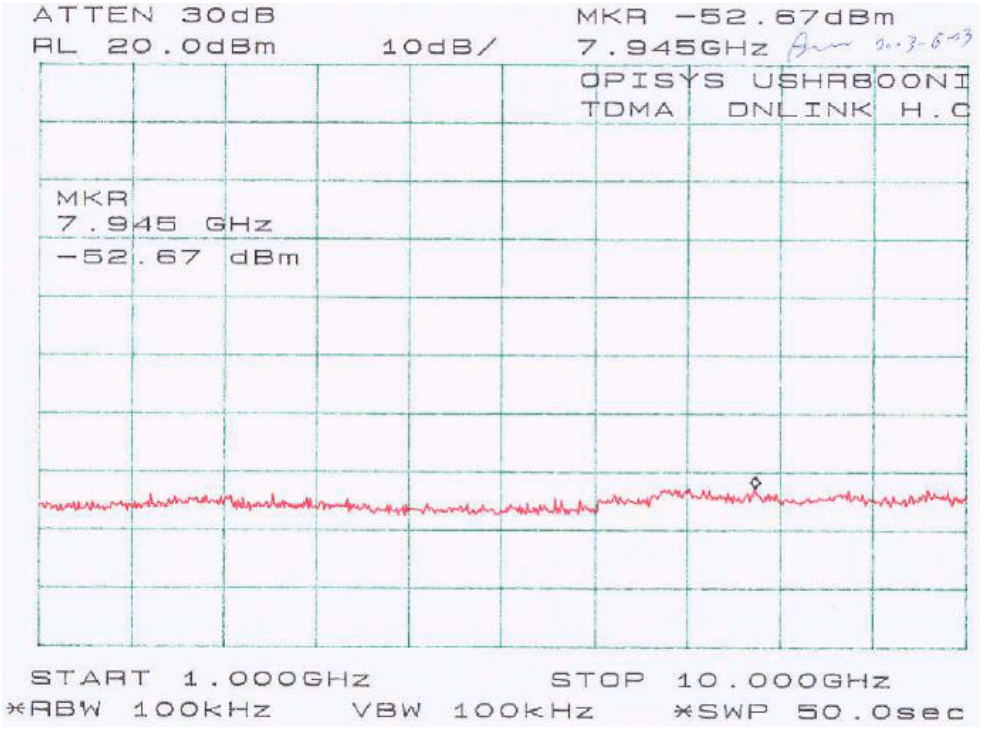

ATTEN 20dB
RL 10.0dBm
10dB/
MKR 6.00dBm
856.1MHz
OPISYS USHR800NI
TDMA DNLINK L.C
MKR
856.1 MHz
6.00 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

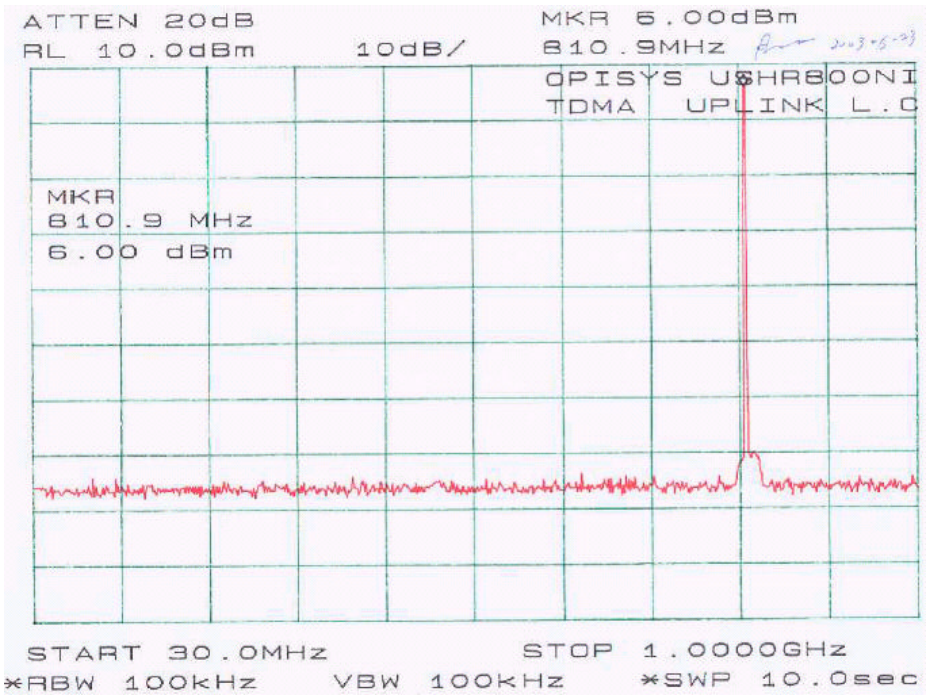

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.17dBm
7.060GHz
OPISYS USHR800NI
TDMA DNLINK L.C
MKR
7.060 GHz
-52.17 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

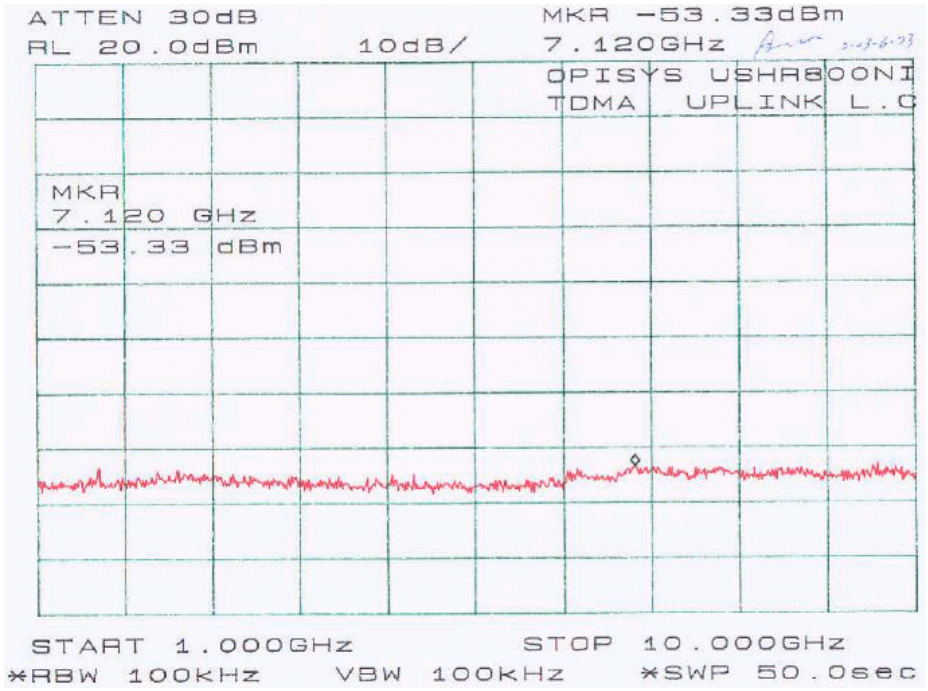

ATTEN 20dB
RL 10.0dBm
10dB/
MKR 6.50dBm
861.0MHz
OPISYS USHR800NI
TDMA DNLINK M.C
MKR
861.0 MHz
6.50 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

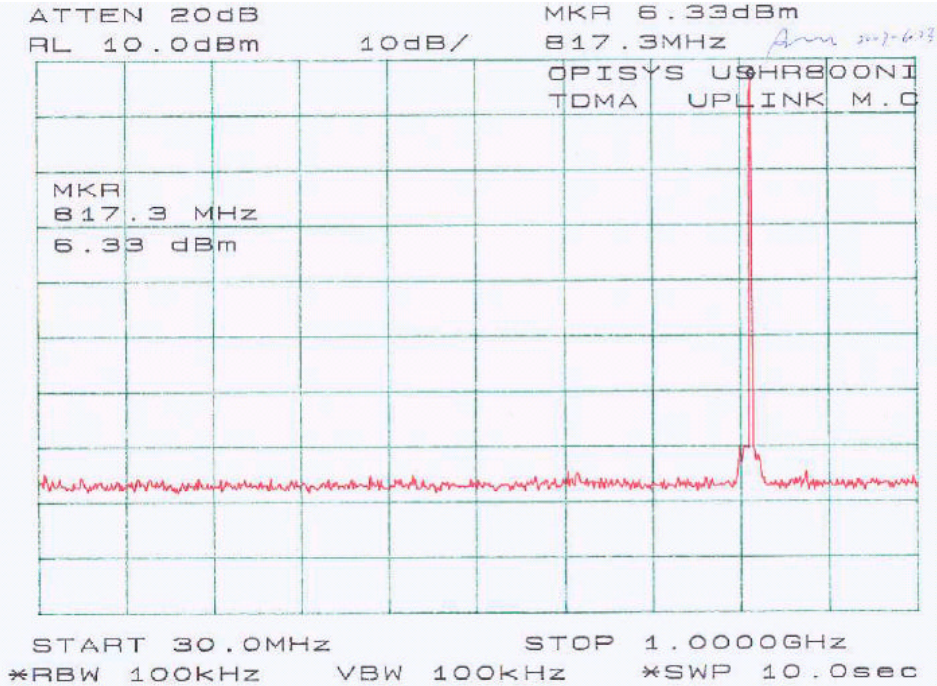

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.33dBm
7.210GHz
OPISYS USHR800NI
TDMA DNLINK M.C
MKR
7.210 GHz
-52.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

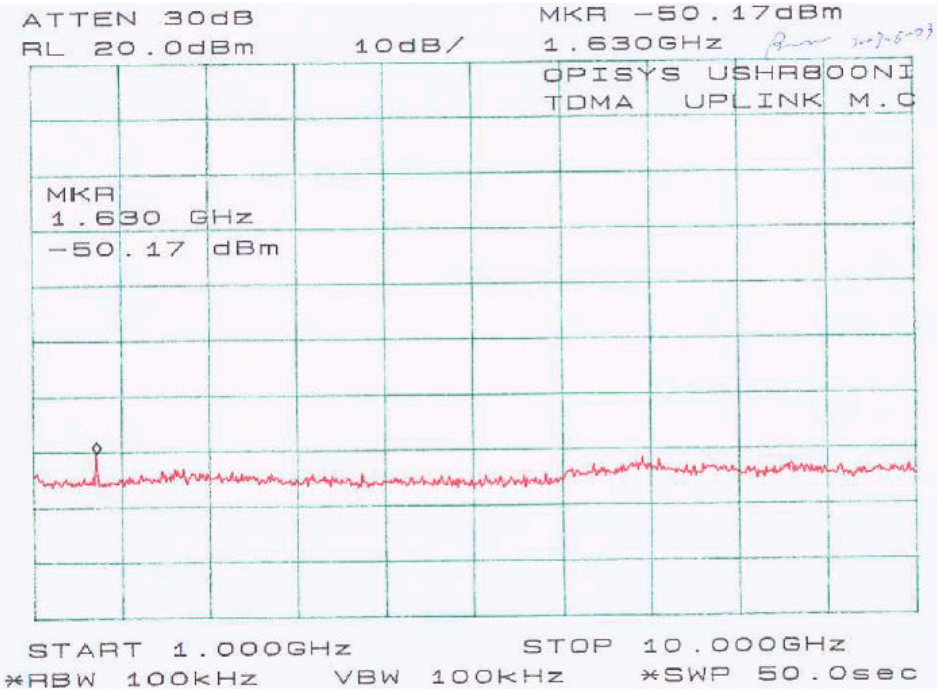

ATTEN 20dB
RL 10.0dBm
10dB/
MKR 6.17dBm
865.8MHz
OPISYS USHR800NI
TDMA DNLINK H.C
MKR
865.8 MHz
6.17 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

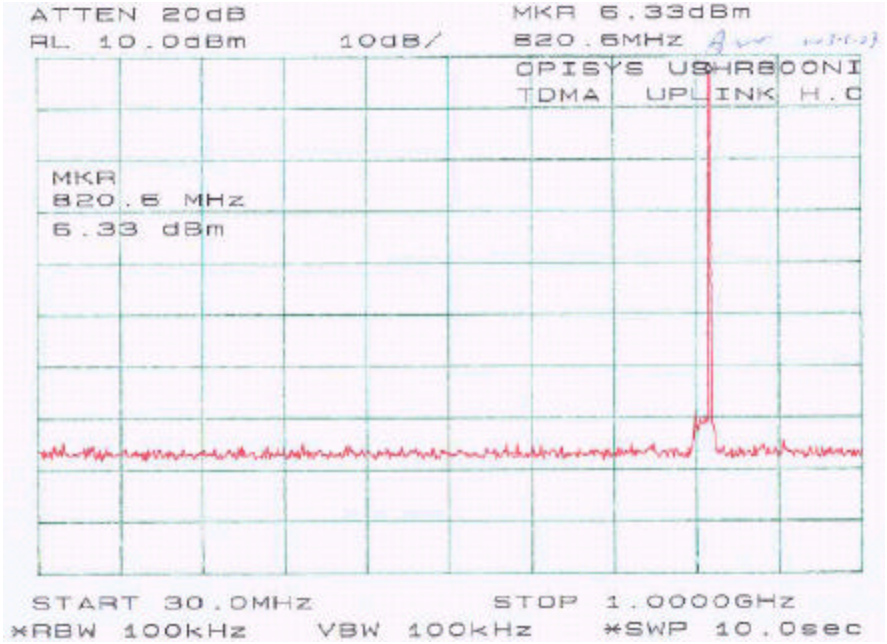

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.67dBm
7.945GHz
OPISYS USHR800NI
TDMA DNLINK H.C
MKR
7.945 GHz
-52.67 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

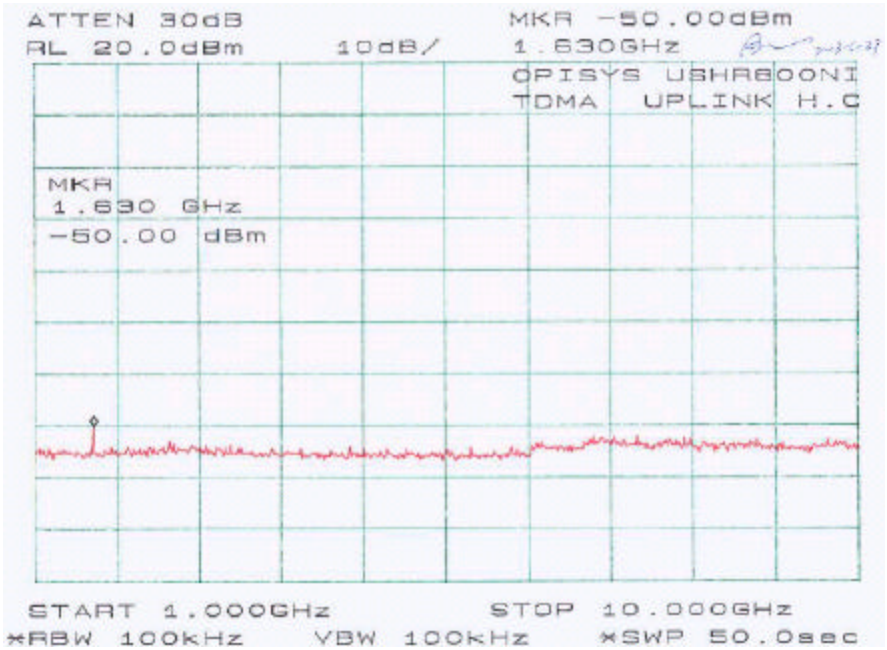

ATTEN 20dB
RL 10.0dBm
10dB/
MKR 6.00dBm
810.9MHz
OPISYS USHR800NI
TDMA UPLINK L.C
MKR
810.9 MHz
6.00 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -53.33dBm
7.120GHz
OPISYS USHR800NI
TDMA UPLINK L.C
MKR
7.120 GHz
-53.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec


ATTEN 20dB
RL 10.0dBm
10dB/
MKR 6.33dBm
817.3MHz
OPISYS USHR800NI
TDMA UPLINK M.C
MKR
817.3 MHz
6.33 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -50.17dBm
1.630GHz
OPISYS USHR800NI
TDMA UPLINK M.C
MKR
1.630 GHz
-50.17 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec


ATTEN 20dB
RL 10.0dBm
10dB/
MKR 6.33dBm
820.6MHz
OPISYS USHR800NI
TDMA UPLINK H.C
MKR
820.6 MHz
6.33 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -50.00dBm
1.630GHz
OPISYS USHR800NI
TDMA UPLINK H.C
MKR
1.630 GHz
-50.00 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

7 - TWO-TONE TEST

7.1 Applicable Standards

According to IS-138A (3.4.4), Intermodulation products must be attenuated below the rated power of the EUT by at least 43 +10log (P), equivalent to –13 dBm.

7.2 Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1 MHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic. Two input signals are equal in level (and can be raised equally), were send to the EUT.

7.3 Test Equipment

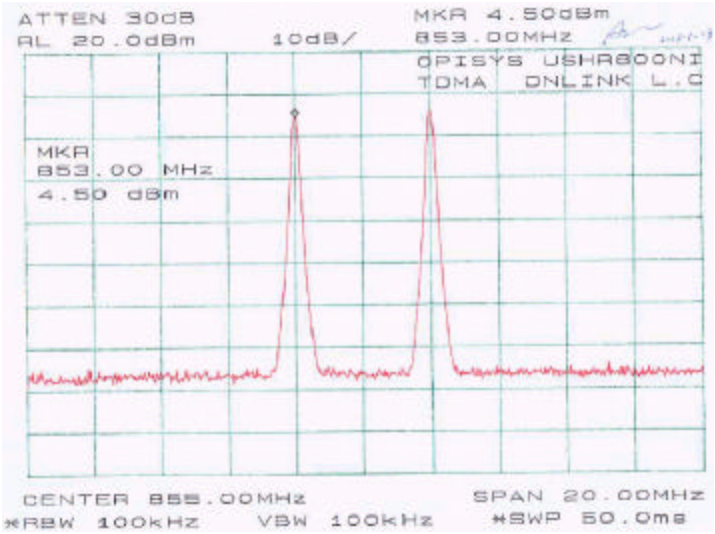
Hewlett Packard HP8565EC Spectrum Analyzer, Cal. Due Date: 2005-01-22
Rohde & Schwarz SMIQ03B Signal Generator, Cal. Due Date: 2003-07-05
Rohde & Schwarz AMIQ I/Q Modulation Generator, Cal. Due Date: 2003-07-05

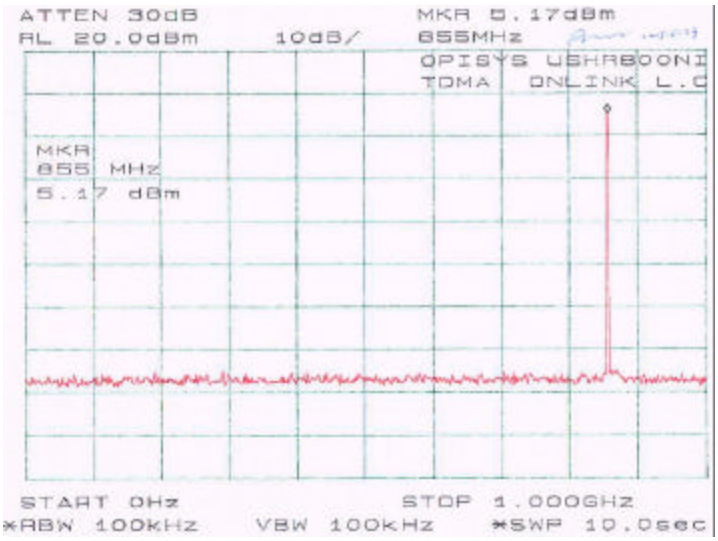
7.4 Test Results

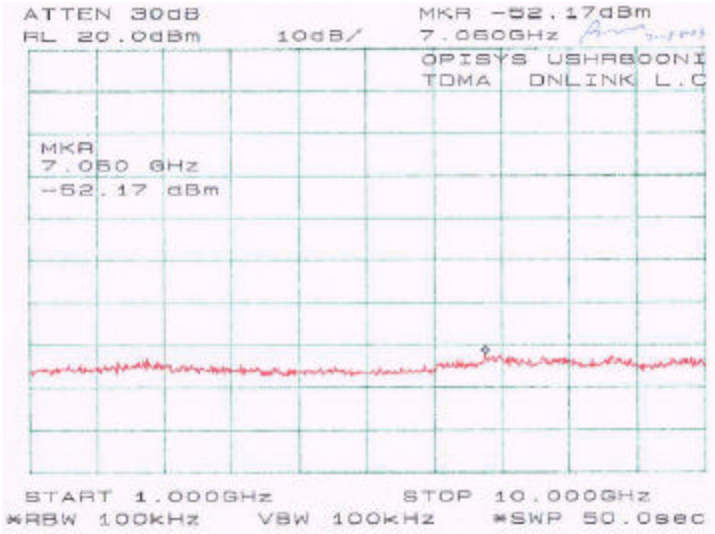
Modulation	Mode	Channel	Measured
TDMA	Forward (Down-link)	Low	< -13dBm
		Mid	< -13dBm
		High	< -13dBm
	Reverse (Up-link)	Low	< -13dBm
		Mid	< -13dBm
		High	< -13dBm

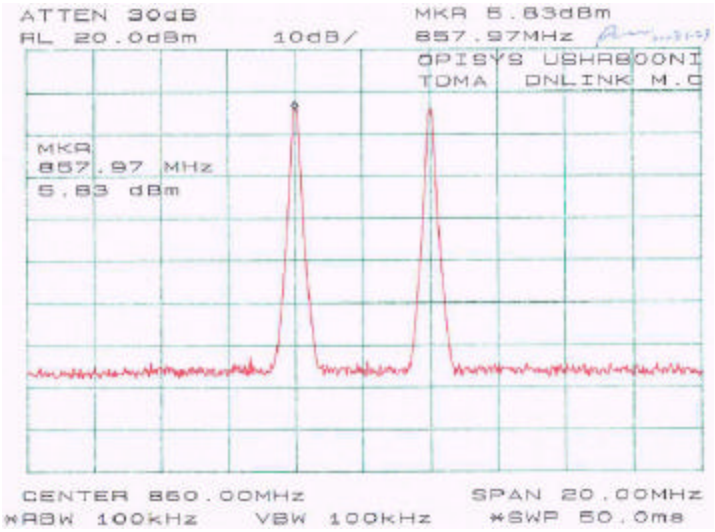
7.5 Plots of Two-Tone Test Result

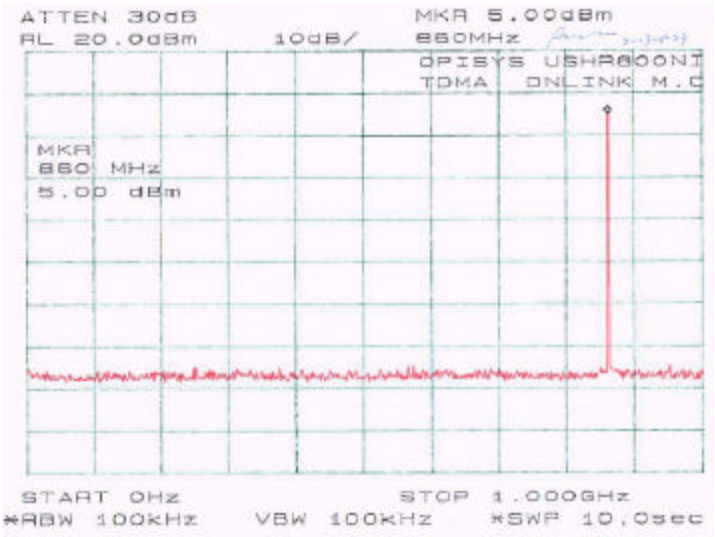
Please refer to plots hereinafter.

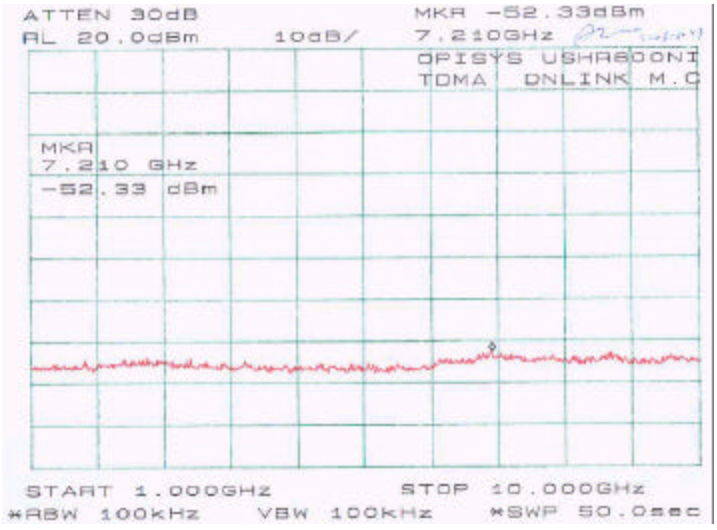

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 4.50dBm
853.00MHz
OPISYS USHR800NI
TDMA DNLINK L.C
MKR
853.00 MHz
4.50 dBm
CENTER 855.00MHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

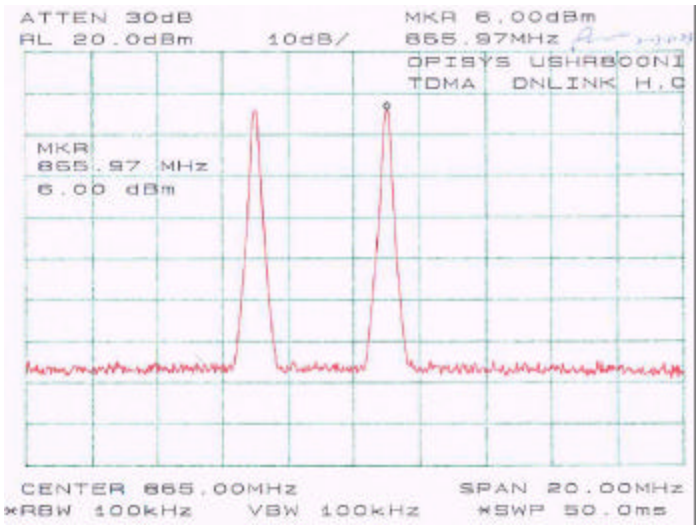

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.17dBm
855MHz
OPISYS USHR800NI
TDMA DNLINK L.C
MKR
855 MHz
5.17 dBm
START 0Hz
STOP 1.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

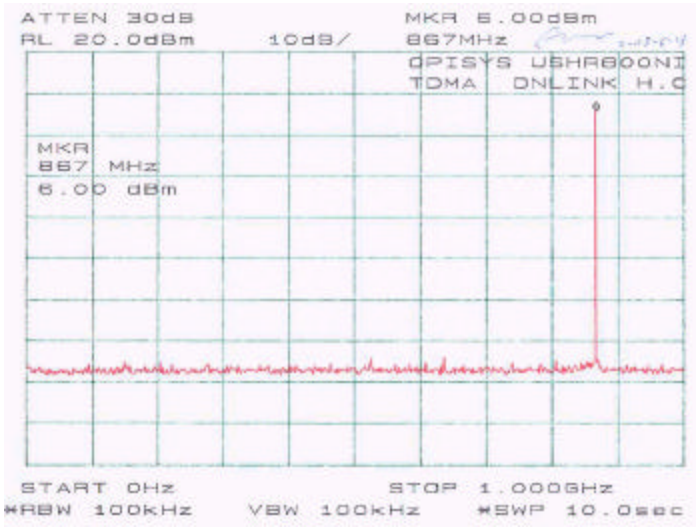

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.17dBm
7.050GHz
OPISYS USHR800NI
TDMA DNLINK L.C
MKR
7.050 GHz
-52.17 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

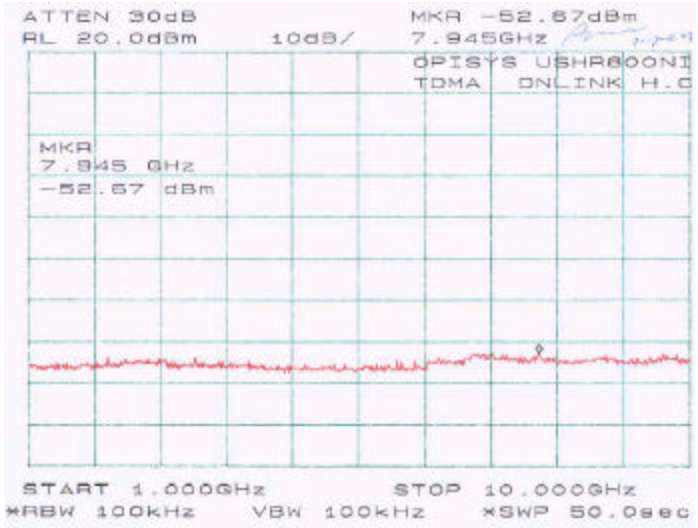

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.83dBm
857.97MHz
OPISYS USHR800NI
TDMA DNLINK M.C
MKR
857.97 MHz
5.83 dBm
CENTER 860.00MHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

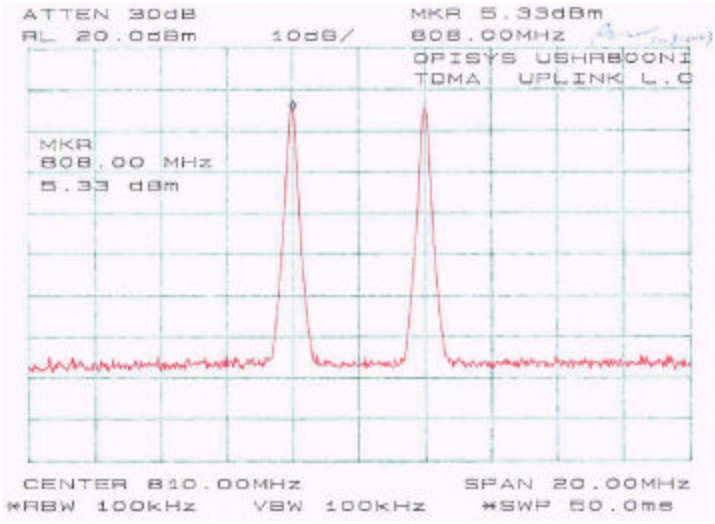

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.00dBm
860MHz
OPISYS USHR800NI
TDMA DNLINK M.C
MKR
860 MHz
5.00 dBm
START 0Hz
STOP 1.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

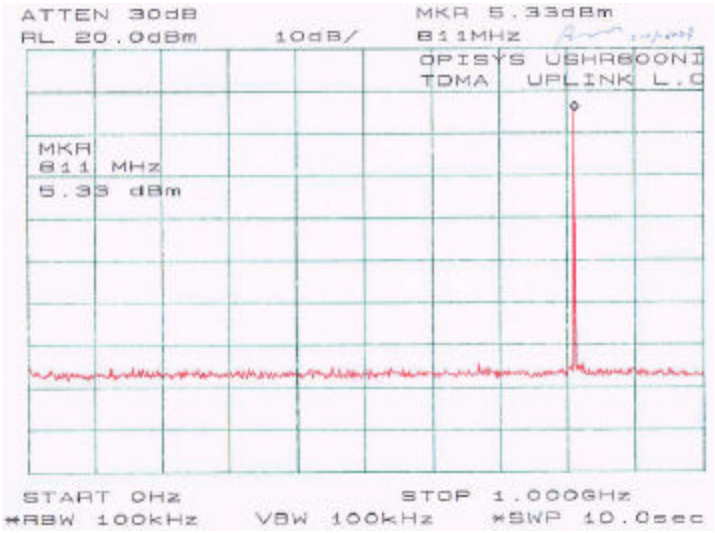

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.33dBm
7.210GHz
OPISYS USHR800NI
TDMA DNLINK M.C
MKR
7.210 GHz
-52.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

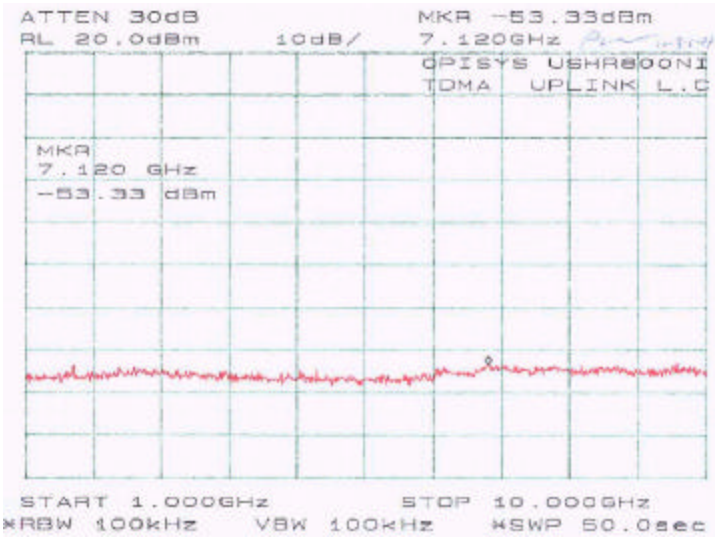

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 6.00dBm
855.97MHz
OPISYS USHR800NI
TDMA DNLINK H.C
MKR
855.97 MHz
6.00 dBm
CENTER 865.00MHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

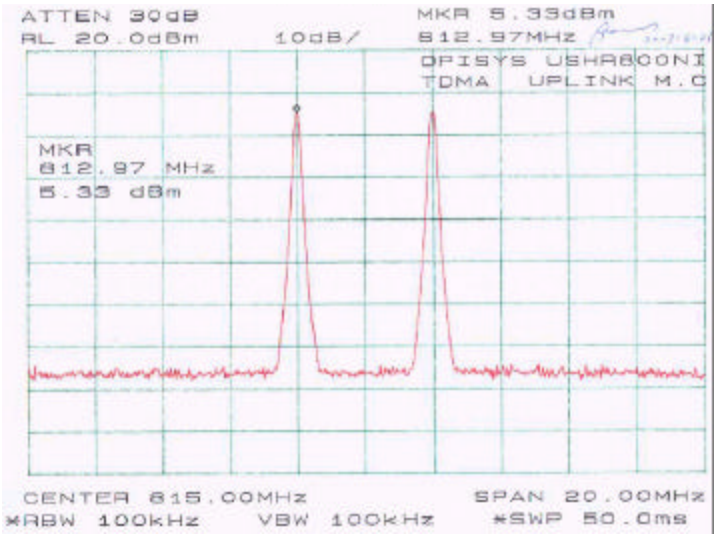

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 6.00dBm
867MHz
OPISYS USHR800NI
TDMA DNLINK H.C
MKR
867 MHz
6.00 dBm
START 0Hz
STOP 1.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

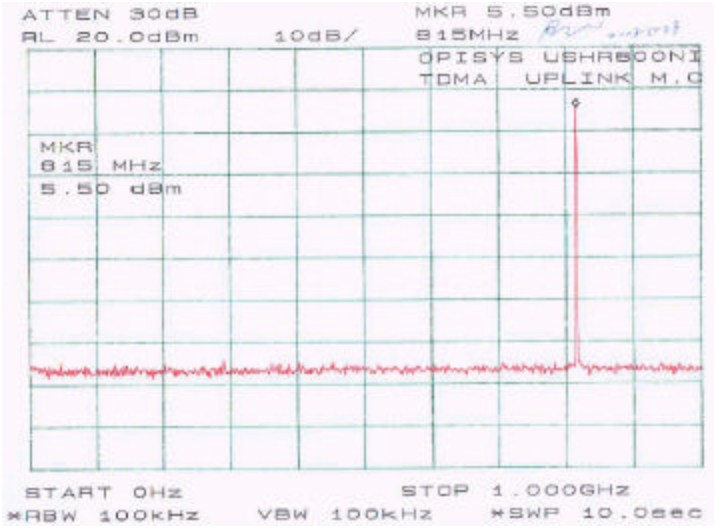

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.67dBm
7.945GHz
OPISYS USHR800NI
TDMA DNLINK H.C
MKR
7.945 GHz
-52.67 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

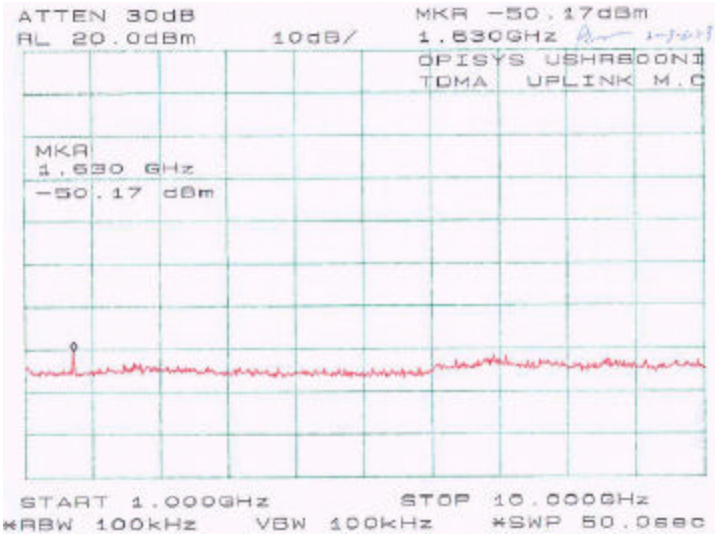

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.33dBm
808.00MHz
OPISYS USHR800NI
TDMA UPLINK L.C
MKR
808.00 MHz
5.33 dBm
CENTER 810.00MHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

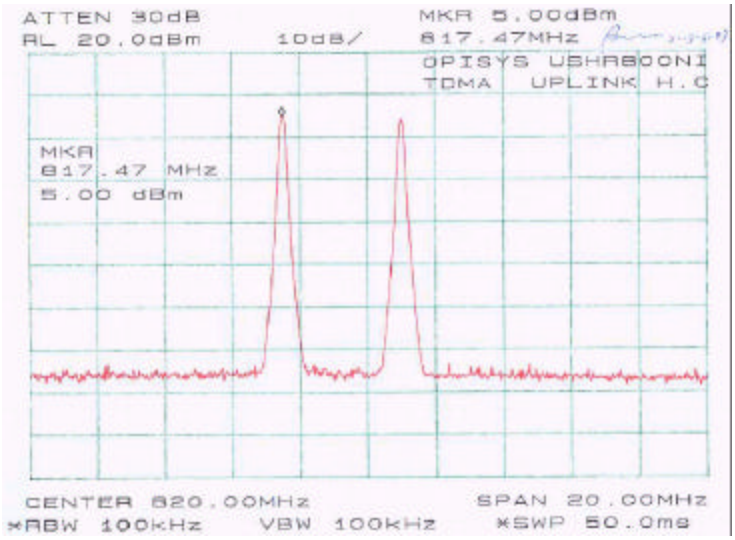

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.33dBm
811MHz
OPISYS USHR800NI
TDMA UPLINK L.C
MKR
811 MHz
5.33 dBm
START 0Hz
STOP 1.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

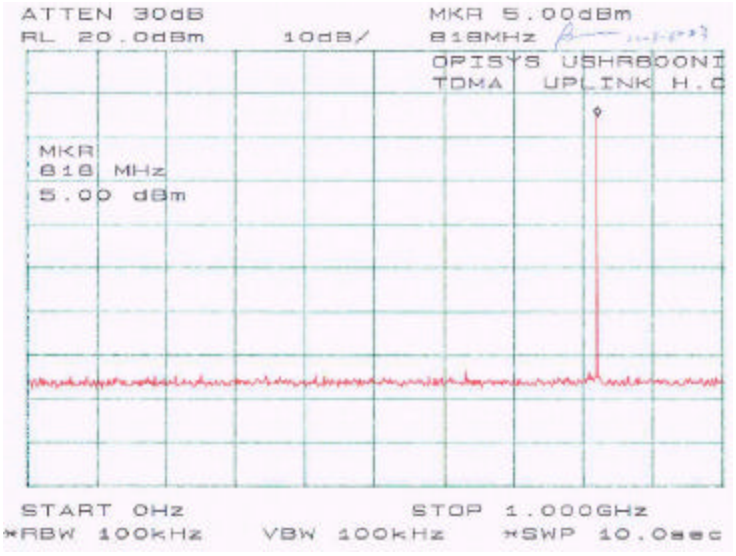

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -53.33dBm
7.120GHz
OPISYS USHR800NI
TDMA UPLINK L.C
MKR
7.120 GHz
-53.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

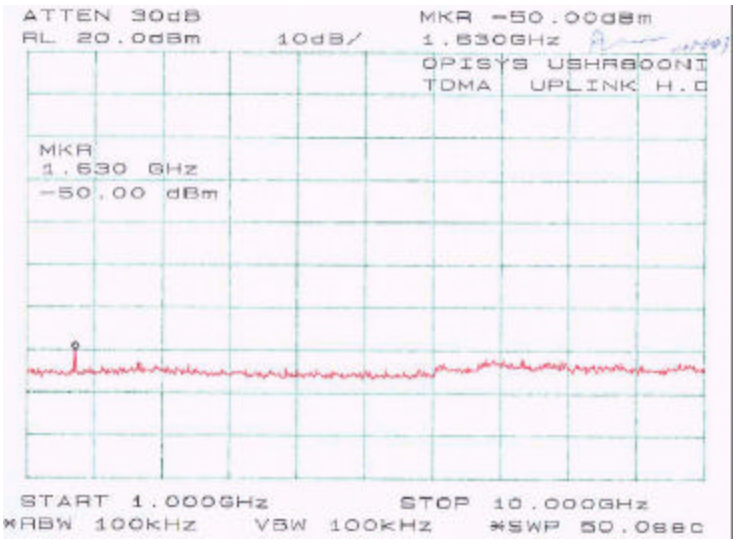

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.33dBm
812.97MHz
OPISYS USHR800NI
TDMA UPLINK M.C
MKR
812.97 MHz
5.33 dBm
CENTER 815.00MHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.50dBm
815MHz
OPISYS USHR800NI
TDMA UPLINK M.C
MKR
815 MHz
5.50 dBm
START 0Hz
STOP 1.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -50.17dBm
1.630GHz
OPISYS USHR800NI
TDMA UPLINK M.C
MKR
1.630 GHz
-50.17 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.00dBm
817.47MHz
OPISYS USHR800NI
TDMA UPLINK H.C
MKR
817.47 MHz
5.00 dBm
CENTER 820.00MHz
SPAN 20.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.00dBm
818MHz
OPISYS USHR800NI
TDMA UPLINK H.C
MKR
818 MHz
5.00 dBm
START 0Hz
STOP 1.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -50.00dBm
1.630GHz
OPISYS USHR800NI
TDMA UPLINK H.C
MKR
1.630 GHz
-50.00 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

8 – RADIATED SPURIOUS EMISSION

8.1 Test Procedure

Per FCC §2.1051and FCC §90.210

On any frequency removed from the center of the assigned channel by more than 250 percent at least:

43 + 10 log(P) dB

8.2 Test Procedure

The amplifier was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

8.3 Test Equipment

Com-Power AL-100 Antenna, Cal. Due Date: 2004-05-01
Com-Power AB-100 Antenna, Cal. Due Date: 2004-05-01
Com-Power AB-900 Antenna, Cal. Due Date: 2004-05-01
HP 8564E Spectrum Analyzer, Cal. Due Date: 2003-08-01
A.H.System SAS-200 Antenna, Cal. Due Date: 2004-05-31
HP 8449B Preamplifiers, Cal. Due Date: 2004-03-14
Rohde & Schwarz SICQ03 Generator, Cal. Due Date: 2003-07-05

8.4 Test Result

Up-link:

Low Frequency: -37.9 dBm at 1620 MHz
Middle Frequency: -37.5 dBm at 1630 MHz
High Frequency: -37.9 dBm at 1640 MHz

Down-link:

Low Frequency: -38.3 dBm at 1710 MHz
Middle Frequency: -37.6 dBm at 1720 MHz
High Frequency: -38.9 dBm at 1730 MHz

Up-Link, Low Channel at 810 MHz

EUT					Generator						Standard	
Indicated		Table	Test Antenna		Substitution			Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
810	101.3	15	1.2	v	810	5.4	v	0	0.3	5.1		
810	100.3	210	1.5	h	810	4.7	h	0	0.3	4.4		
1620	54.1	30	1.2	v	1620	-57.2	v	6.8	0.5	-50.9	-13	-37.9
2430	48.6	110	1.5	v	2430	-61.3	v	7.6	0.7	-54.4	-13	-41.4
1620	48.7	90	1.5	h	1620	-61.8	h	6.8	0.5	-55.5	-13	-42.5
2430	43.9	160	1.2	h	2430	-63.7	h	7.6	0.7	-56.8	-13	-43.8

Up-link, Mid. Channel at 815 MHz

EUT					Generator						Standard	
Indicated		Table	Test Antenna		Substitution			Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
815	102.2	230	1.8	v	815	5.8	v	0	0.3	5.5		
815	99.8	150	1.2	h	815	4.4	h	0	0.3	4.1		
1630	54.3	0	1.5	v	1630	-56.8	v	6.8	0.5	-50.5	-13	-37.5
2445	48.7	110	1.5	v	2445	-61.1	v	7.6	0.7	-54.2	-13	-41.2
1630	48.5	45	1.8	h	1630	-62.5	h	6.8	0.5	-56.2	-13	-43.2
2445	43.9	170	1.5	h	2445	-64.5	h	7.6	0.7	-57.6	-13	-44.6

Up-Link, High Channel at 820 MHz

EUT					Generator						Standard	
Indicated		Table	Test Antenna		Substitution			Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
820	101.3	270	1.8	v	820	4.4	v	2.1	0.3	6.2		
820	100.2	180	1.2	h	820	3.5	h	2.1	0.3	5.3		
1640	54.1	30	1.2	v	1640	-57.2	v	6.8	0.5	-50.9	-13	-37.9
2460	48.9	150	1.2	v	2460	-60.5	v	7.6	0.7	-53.6	-13	-40.6
1640	48.7	60	1.5	h	1640	-62.3	h	6.8	0.5	-56	-13	-43
2460	44.2	210	1.2	h	2460	-63.7	h	7.6	0.7	-56.8	-13	-43.8

Down-Link, Low Channel at 855 MHz

EUT					Generator						Standard	
Indicated		Table	Test Antenna		Substitution			Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
855	101.3	330	1.5	v	855	5.5	v	0	0.3	5.2		
855	100.7	0	1.5	h	855	4.6	h	0	0.3	4.3		
1710	53.5	30	1.2	v	1710	-57.6	v	6.8	0.5	-51.3	-13	-38.3
1710	49.7	90	1.5	h	1710	-65.3	h	6.8	0.5	-59	-13	-46
2565	43.4	110	1.5	v	2565	-68.7	v	7.6	0.7	-61.8	-13	-48.8
2565	40.6	160	1.2	h	2565	-70.1	h	7.6	0.7	-63.2	-13	-50.2

Down-Link, Mid. Channel at 860 MHz

EUT					Generator						Standard	
Indicated		Table	Test Antenna		Substitution			Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
860	104.3	310	1.8	v	860	6.1	v	0	0.3	5.8		
860	102.2	180	1.5	h	860	5.2	h	0	0.3	4.9		
1720	54.3	120	1.8	v	1720	-56.9	v	6.8	0.5	-50.6	-13	-37.6
1720	51.7	90	1.8	h	1720	-62.1	h	6.8	0.5	-55.8	-13	-42.8
2580	45.4	0	1.2	v	2580	-65.3	v	7.6	0.7	-58.4	-13	-45.4
2580	41.7	330	1.5	h	2580	-68.4	h	7.6	0.7	-61.5	-13	-48.5

Down-Link, High Channel at 865 MHz

EUT					Generator						Standard	
Indicated		Table	Test Antenna		Substitution			Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Corrected	Loss dBm	Level dB	Limit dBm	Margin DBm
865	103.7	120	1.8	v	865	5.9	v	0	0.3	5.6		
865	98.3	250	1.2	h	865	4.4	h	0	0.3	4.1		
1730	53.2	180	1.5	v	1730	-58.2	v	6.8	0.5	-51.9	-13	-38.9
1730	49.5	160	1.8	h	1730	-65.4	h	6.8	0.5	-59.1	-13	-46.1
2595	43.4	15	1.2	v	2595	-67.7	v	7.6	0.7	-60.8	-13	-47.8
2595	40.3	0	1.5	h	2595	-70.2	h	7.6	0.7	-63.3	-13	-50.3

9 – Modulation Characteristics

This EUT only is an amplifier, it is not a transmitter. There is no modulating circuit in the EUT and no modulating characteristics measurement required.

10 - FREQUENCY STABILITY

This EUT only is an amplifier, it is not a transmitter. There is no oscillator circuit in the EUT, and no frequency stability measurement required.

11 - CONDUCTED EMISSION

Not Applicable.