REPORT OF MEASUREMENTS

FOR

CELLULAR SPECIALTIES, INC.

DIGITAL REPEATER

MODEL: CSI-DSP85-1W-C

FCC ID: NVRCSI-DSP85-1W-C

CERTIFICATION APPLICATION

Applicant/Manufacturer:	**Cellular Specialties** **670 North Commercial Street** **Manchester, NH 03101**
Equipment under Test (EUT):	**The EUT is a Digital Repeater used to amplify signals in the cellular band.**
Model:	**CSI-DSP85-1W-C**
FCC ID Number:	**FCC ID: NVRCSI-DSP85-1W-C**
Applicable Test Standard:	**FCC Parts 2 & 22**
Device Classification:	**Mobile**
EUT Frequency Range Band 1:	**Uplink: 824MHz TO 849MHz** **Downlink: 869MHz TO 894MHz**
EUT Gain:	**Uplink: 78.6dB** **Downlink: 77.8dB**
Power Output Rating Based on max input single channel (For Certification Grant):	**Uplink: +29.74dBm = .942W** **Downlink: +29.91dBm = .979mW**
Modulation Type:	**CDMA, TDMA, GSM**
RF Exposure + Antenna Installation:	**See Attached Installation/Users Manual and MPE Evaluation**
Power Ratings Per Channel:	**See Power Per Channel Test Data**
Measurements Required by FCC:	**See Report Section 1 (Summary of Test Program) and the following Test Report Data Attachments:** **-RF Power Output** **-Intermodulation Characteristics (Two-Tone)** **-Occupied Bandwidth** **-Spurious Emissions at Antenna Terminals** **-Effective Radiated Power of Spurious Radiation** -Frequency Stability

SECTION 1
SUMMARY OF TEST PROGRAM

INTERMODULATION CHARACTERISTICS (TWO TONE)

Measurement Procedure:

Two signals were injected, in turn, to each uplink and downlink frequency band via a two way power combiner. Testing was performed at both the low band edge and high band edge of each pass band. The output of each signal generator was adjusted so that the two output fundamental frequencies were equal in magnitude. Testing was performed for TDMA, CDMA and GSM Modulation types. At the maximum specified input power levels all intermodulation products were at -13dBm or below for each modulation. See attached test data.

OCCUPIED BANDWIDTH

Measurement Procedure:

For Occupied Bandwidth, measurements were made to compare the input signal to the output signal. The signal generator output was connected to the spectrum analyzer. A TDMA modulation signal was then applied to the carrier. Waveforms were then noted on an X-Y plot. Next, the signal generator was connected to the EUT and the output of the EUT was connected to the spectrum analyzer. The output waveform after amplification was then compared to the original input signal to ensure that no significant differences occurred between the input signal and the amplified signal. Testing was performed at two frequencies within each passband (uplink and downlink). See Occupied Bandwidth Data. An explanation of the data is as follows: There are two signals superimposed on each plot, one signal is the waveform before modulation, the other is the modulated carrier. In each case the center of the grid shows a narrowband signal projecting out from the center of the modulation envelope. This signal is actually the stored unmodulated signal.

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Measurement Procedure:

The signal generator output was connected in turn to the uplink and downlink input ports of the EUT. The input power level was at the maximum level which was ascertained during the Power Output test. A spectrum analyzer was connected to the output of the EUT. The input test frequencies used were three frequencies within each passband (uplink and downlink). The level of any spurious emission was recorded. Testing was performed in the frequency range of 30MHz to 9GHz. Testing was performed for TDMA, CDMA and GSM modulation types. The spurious emissions limit is -13dBm as specified in FCC Part 22. All emissions were below the specified -13dBm limit. See attached test data.

EFFECTIVE RADIATED POWER OF SPURIOUS RADIATION

Measurement Procedure:

The test sample was placed on a 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed test site. A signal generator was connected to the input of the amplifier. The signal generator output was set to provide the input power level necessary to achieve maximum output power of the amplifier at 3 frequencies within each passband (uplink and downlink). The effective radiated power of each out of band spurious emission was measured using the substitution method specified in TIA/EIA-603. The frequency range of the test was 30MHz – 9GHz. The limit for out of band spurious emissions is -13dBm as specified in Part 22. All emissions were below the specified -13dBm limit. See attached test data.

RF POWER OUTPUT

A signal generator was connected in turn to the uplink and downlink input ports of the test sample. The signal generator was set to maximum input rating and the amplifier was operating at maximum gain. The maximum single channel output power for both the uplink and downlink was measured with a spectrum analyzer connected to the output port. The measured output power was 0.5W for each the uplink and downlink which matched the manufacturer's rated output power. See attached test data.

FREQUENCY STABILITY MEASUREMENTS

The test sample was placed into a temperature chamber with AC input power supplied through a variable power source. A signal generator was used to provide the input signal and the output was measured with a frequency counter. With the test sample operating at maximum output power the test sample's output frequency was measured and recorded at the extremes of the temperature range and at 10 degree increments from -30 degrees C to +50 degrees C while the AC input voltage was varied from 85 to 115% of nominal. The output frequency for both the uplink and the downlink stayed within the assigned frequency band. See attached test data.

SECTION 2

EQUIPMENT LISTS

Spurious Emissions at Antenna Terminals

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
4962	Attenuator	Narda	DC - 18 GHz	757C-20dB	02/07/2006	02/07/2007
4972	Coaxial Termination	Philco	DC - 1 GHz	1608-150	02/02/2006	02/02/2007
5016	30 dB Attenuator	Narda	DC - 18 GHz	776B-30	02/08/2006	02/08/2007
5026	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
4895	Spectrum Analyzer	Hewlett Packard	9kHz - 22GHz	8593EM	9/20/2005	9/20/2006
R420	Signal Generator	Agilent	250kHz - 3GHz	AT-E4436B	7/25/2005	7/25/2007

Radiated Spurious Emissions

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
3116	Pre-Amplifier	Miteq	0.1 GHz - 18 GHz	AFS42-35	08/21/2005	08/21/2006
4972	Coaxial Termination	Philco	DC - 1 GHz	1608-150	02/02/2006	02/02/2007
5053	Biconilog	EMCO	26 MHz - 3000 MHz	3142C	02/07/2006	02/07/2007
4895	Spectrum Analyzer	Hewlett Packard	9kHz - 22GHz	8593EM	9/20/2005	9/20/2006
3258	Double Ridge Guide	EMCO	1 - 18 GHz	3115	10/25/2005	10/25/2006
3430	Horn	MCS	18 - 26.5GHz	K-5039	1/25/2006	1/25/2007

RF Power Output/Occupied Bandwidth

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
4962	Attenuator	Narda	DC - 18 GHz	757C-20dB	02/07/2006	02/07/2007
4972	Coaxial Termination	Philco	DC - 1 GHz	1608-150	02/02/2006	02/02/2007
5016	30 dB Attenuator	Narda	DC - 18 GHz	776B-30	02/08/2006	02/08/2007
5026	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
4895	Spectrum Analyzer	Hewlett Packard	9kHz - 22GHz	8593EM	9/20/2005	9/20/2006
R420	Signal Generator	Agilent	250kHz - 3GHz	AT-E4436B	7/25/2005	7/25/2007

Intermodulation (Two Tone)

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
4962	Attenuator	Narda	DC - 18 GHz	757C-20dB	02/07/2006	02/07/2007
4972	Coaxial Termination	Philco	DC - 1 GHz	1608-150	02/02/2006	02/02/2007
5016	30 dB Attenuator	Narda	DC - 18 GHz	776B-30	02/08/2006	02/08/2007
5026	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
4895	Spectrum Analyzer	Hewlett Packard	9kHz - 22GHz	8593EM	9/20/2005	9/20/2006
R420	Signal Generator	Agilent	250kHz - 3GHz	AT-E4436B	7/25/2005	7/25/2007

EQUIPMENT LIST

Frequency Stability

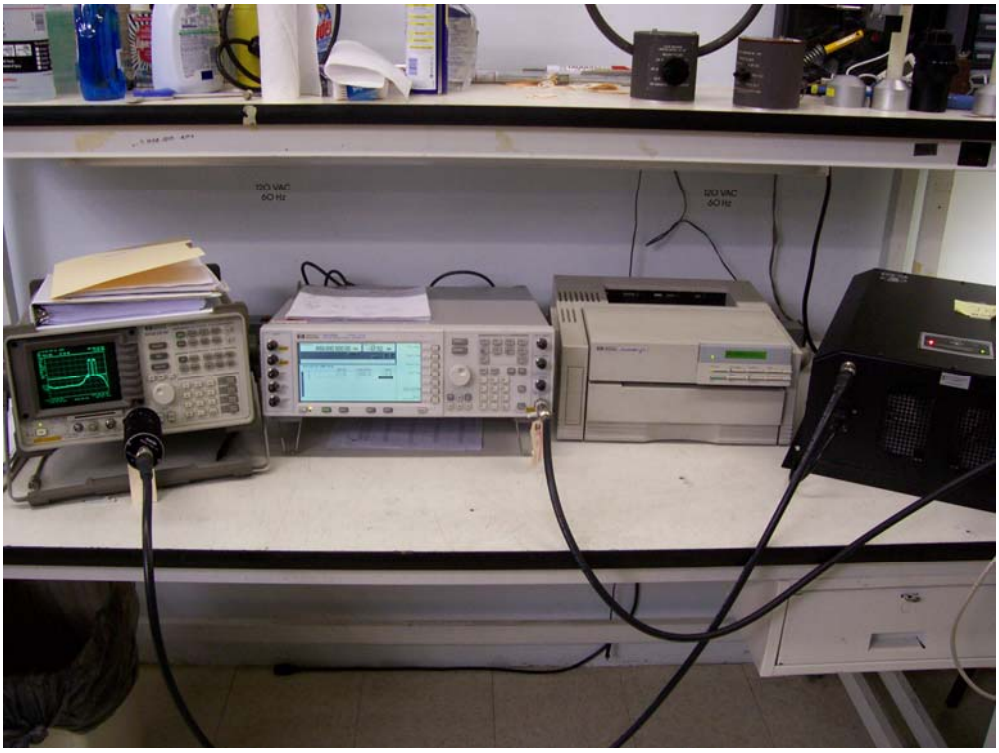
EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
4962	Attenuator	Narda	DC - 18 GHz	757C-20dB	02/07/2006	02/07/2007
4972	Coaxial Termination	Philco	DC - 1 GHz	1608-150	02/02/2006	02/02/2007
4997	Digital Thermometer	Omega	N/A		03/13/2006	03/13/2007
5016	30 dB Attenuator	Narda	DC - 18 GHz	776B-30	02/08/2006	02/08/2007
5026	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	02/07/2006	02/07/2007
557	Temperature Chamber	Associated Env.	-73 C - +177 C	SK 3105	09/02/2005	09/02/2006
4895	Spectrum Analyzer	Hewlett Packard	9kHz - 22GHz	8593EM	9/20/2005	9/20/2006
R420	Signal Generator	Agilent	250kHz - 3GHz	AT-E4436B	7/25/2005	7/25/2007

SPURIOUS RADIATED EMISSIONS

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

OCCUPIED BANDWIDTH/RF POWER OUTPUT

INTERMODULATION (TWO TONE)



Test Report No. R-4681N-1
FCC ID: NVRCSI-DSP85-1W-C

FREQUENCY STABILITY