Micro Systems Engineering, Inc.

BELOS DRT

Summary of FCC Testing

October 11, 2002

Report No. MICR0004

Report Prepared By:

NORTHWEST EMC

1-888-EMI-CERT

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:
Single

Operating Modes Investigated:
Typical

Antennas Investigated:
Integral

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
Battery

Frequency Range Investigated			
Start Frequency	30 MHz	Stop Frequency	4050 MHz

Software\Firmware Applied During Test			
Exercise software	Standard Production Software	Version	Unknown
Description			
The system was tested using standard operating production software to exercise the functions of the device during the testing.			

Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	Micro Systems Engineering	Belos DRT	79630000

Cables

Cable Type	S/N	Shield	Length (m)	Ferrite	Connection 1	Connection 2
High Voltage Model DF-1	10206150	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23278301	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23031884	Yes	.8	No	EUT	Unterminated

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	03/19/2002	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	03/19/2002	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	12/03/2001	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	12 mo
Pre-Amplifier	Miteq	AMF-4D-010120-30-10P	AOP	07/09/2002	12 mo
Antenna, Horn	EMCO	3115	AHJ	05/23/2002	12 mo
Multimeter	Fluke	79	MMC	09/11/2002	12 mo
Thermocouple Module	Fluke	80TK	MML	10/10/2002	12 mo

Client Measurement Equipment used to Validate Tissue Substitute Material

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Vector Network Analyzer	Hewlett-Packard	8753ES	US39170321	05/16/2001	18 mo
Dielectric Probe Kit	Agilent	85070C	85070C-628	09/24/2001	36 mo

Test Description

Requirement: Per 95.635(d) and 2.1053, the Field Strength of Radiated Emissions more than 250 kHz outside the MICS band (402-405 MHz) shall be attenuated to a level no greater than that shown in 90.635(d)(1). The emission limits shown in 90.635(d)(1) are based upon measurements employing a CISPR quasi-peak detector except that above 1 GHz, the limit is based on measurements employing an average detector. Measurements above 1 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

Furthermore, per 95.639(f)(1), the maximum EIRP for a MICS transmitter is 25uW. This is equivalent to a radiated field strength 85.2 dBuV/m at 3 meters when measured over a reference ground plane.

Configuration: The Field Strength of Radiated Emissions were measured in the far-field at an FCC Listed Semi-anechoic Chamber. Spectrum analyzer and linearly polarized antennas were used to measure the effective radiated power (EIRP) of the fundamental, as well as unwanted radiated harmonics and spurious emissions.

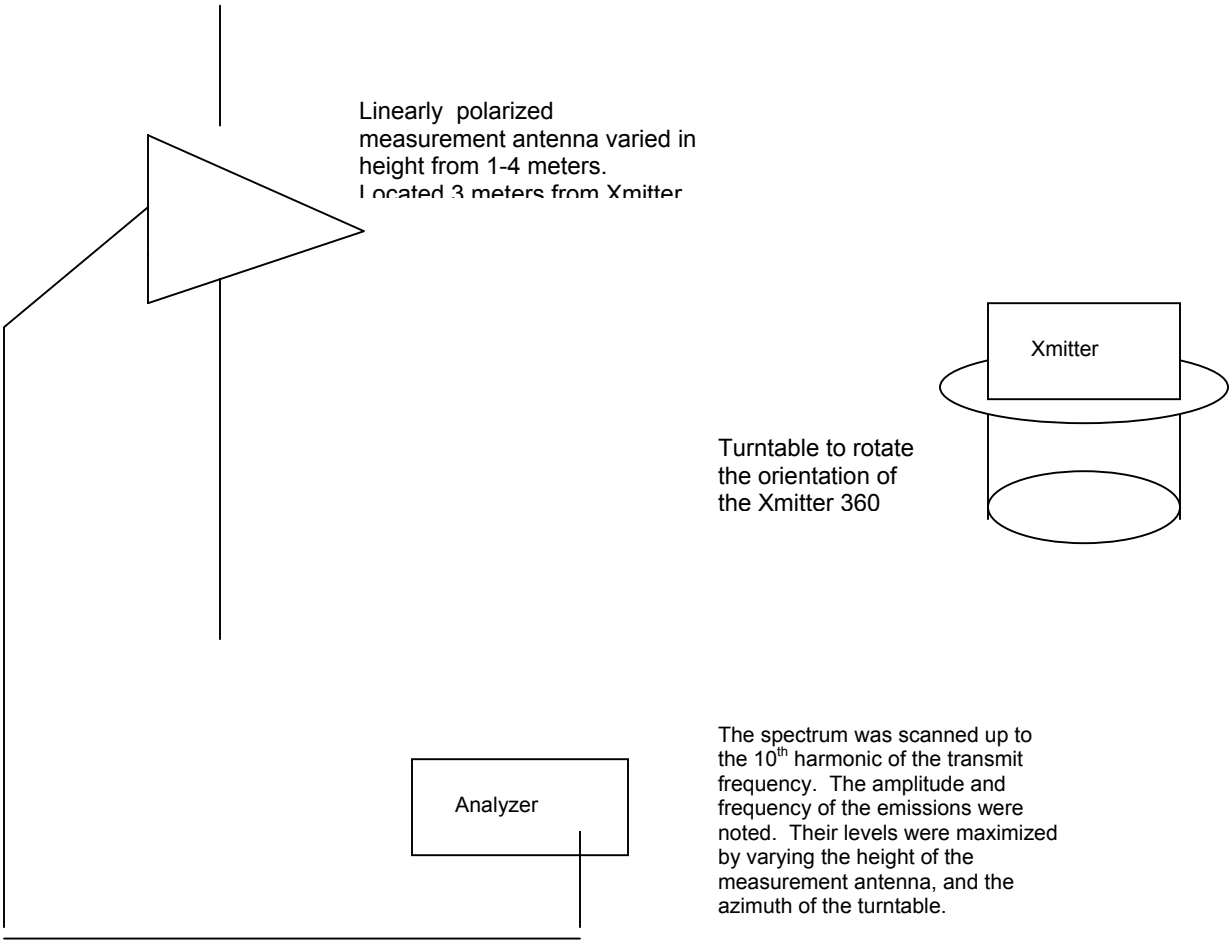
The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions.

The EUT was configured to transmit in a fixture that simulates the human torso. The dimensions of the test fixture and the characteristics of the tissue substitute material met the requirements of 95.639(f)(2)(i-ii). The dielectric and conductivity properties of the tissue substitute material were verified the morning of the test (see client data for tissue substitute material), and the temperature was measured before and after the test to verify compliance with 95.639(f)(2)(i). At the start of the test, the tissue substitute material was 21.2 degrees centigrade. At the conclusion of testing, it was 22.6 degrees centigrade.

Test Methodology

At an approved test site, the transmitter was placed in the human torso test fixture located on a remotely controlled turntable, and the measurement antenna was placed 3 meters from the transmitter. The height of the transmitter was 1.5-meter above the reference ground plane. The turntable azimuth was varied to maximize the level of radiated emissions. The height of the measurement antenna was also varied from 1 to 4 meters. The amplitude and frequency of the emissions were noted.

Test Setup for Field Strength Measurements

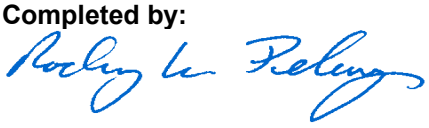


The spectrum was scanned up to the 10th harmonic of the transmit frequency. The amplitude and frequency of the emissions were noted. Their levels were maximized by varying the height of the measurement antenna, and the azimuth of the turntable.

Bandwidths Used for Measurements

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

Completed by:



NORTHWEST
EMC

OATS DATA SHEET

REV
df3.01
09/20/2002

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02 10:16
Customer:	Micro Systems Engineering, Inc.			Temperature:	70
Attendees:	Lawrence Koran, Jay Lanz			Humidity:	40%
Cust. Ref. No.:				Barometric Pressure	30.02
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(1-3)	Year:	1998
Method:	ANSI C63.4	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT vertical in test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

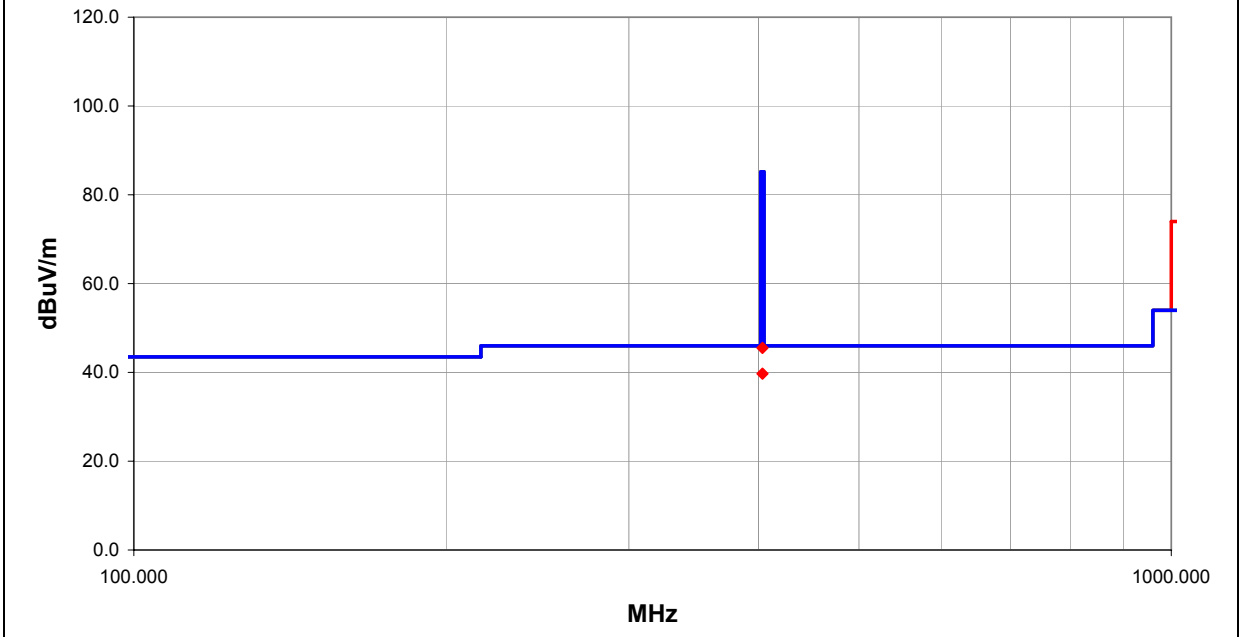
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	2

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
403.597	57.4	-11.9	-1.0	1.2	3.0	0.0	H-Bilog	PK	0.0	45.5	85.2	-39.7
403.597	51.6	-11.9	166.0	1.9	3.0	0.0	V-Bilog	PK	0.0	39.7	85.2	-45.5

NORTHWEST EMC

OATS DATA SHEET

REV df3.01 09/20/2002

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02 11:06
Customer:	Micro Systems Engineering, Inc.			Temperature:	70
Attendees:	Lawrence Koran, Jay Lanz			Humidity:	40%
Cust. Ref. No.:				Barometric Pressure	30.02
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(1-3)	Year:	1998
Method:	ANSI C63.4	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT vertical in test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

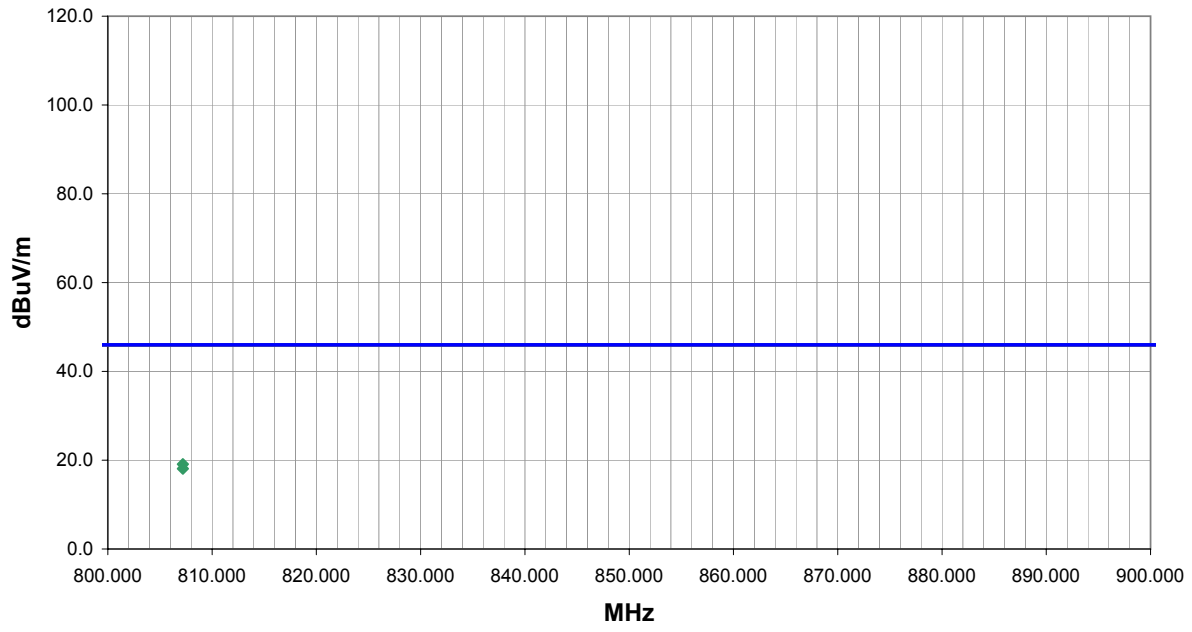
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	4

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
807.194	25.7	-6.6	98.0	1.4	3.0	0.0	H-Bilog	QP	0.0	19.1	46.0	-26.9
807.194	24.7	-6.6	215.0	2.5	3.0	0.0	V-Bilog	QP	0.0	18.1	46.0	-27.9

NORTHWEST
EMC

OATS DATA SHEET

REV
df3.01
09/20/2002

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02 12:36
Customer:	Micro Systems Engineering, Inc.			Temperature:	70
Attendees:	Lawrence Koran, Jay Lanz			Humidity:	40%
Cust. Ref. No.:				Barometric Pressure	30.02
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(1-3)	Year:	1998
Method:	ANSI C63.4	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT vertical in test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

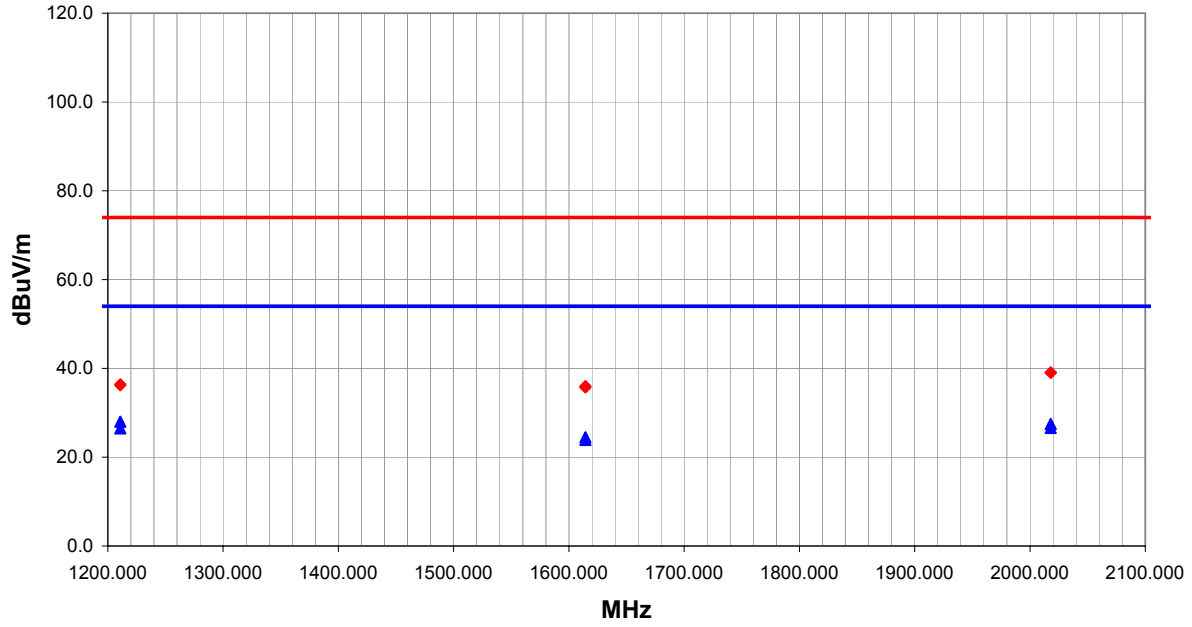
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	6

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1210.791	33.5	-5.5	188.0	2.4	3.0	0.0	H-Horn	AV	0.0	28.0	54.0	-26.0
2017.985	27.8	-0.3	157.0	1.9	3.0	0.0	H-Horn	AV	0.0	27.5	54.0	-26.5
2017.985	26.9	-0.3	155.0	1.5	3.0	0.0	V-Horn	AV	0.0	26.6	54.0	-27.4
1210.791	32.0	-5.5	172.0	1.7	3.0	0.0	V-Horn	AV	0.0	26.5	54.0	-27.5
1614.388	27.7	-3.2	161.0	1.7	3.0	0.0	V-Horn	AV	0.0	24.5	54.0	-29.5
1614.388	27.1	-3.2	172.0	1.8	3.0	0.0	H-Horn	AV	0.0	23.9	54.0	-30.1
2017.985	39.4	-0.3	157.0	1.9	3.0	0.0	H-Horn	PK	0.0	39.1	74.0	-34.9
2017.985	39.3	-0.3	155.0	1.5	3.0	0.0	V-Horn	PK	0.0	39.0	74.0	-35.0
1210.791	41.9	-5.5	188.0	2.4	3.0	0.0	H-Horn	PK	0.0	36.4	74.0	-37.6
1210.791	41.7	-5.5	172.0	1.7	3.0	0.0	V-Horn	PK	0.0	36.2	74.0	-37.8
1614.388	39.2	-3.2	161.0	1.7	3.0	0.0	V-Horn	PK	0.0	36.0	74.0	-38.0
1614.388	38.9	-3.2	172.0	1.8	3.0	0.0	H-Horn	PK	0.0	35.7	74.0	-38.3

NORTHWEST EMC

OATS DATA SHEET

REV df3.01 09/20/2002

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02 13:27
Customer:	Micro Systems Engineering, Inc.			Temperature:	70
Attendees:	Lawrence Koran, Jay Lanz			Humidity:	40%
Cust. Ref. No.:				Barometric Pressure	30.02
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(1-3)	Year:	1998
Method:	ANSI C63.4	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT vertical in test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

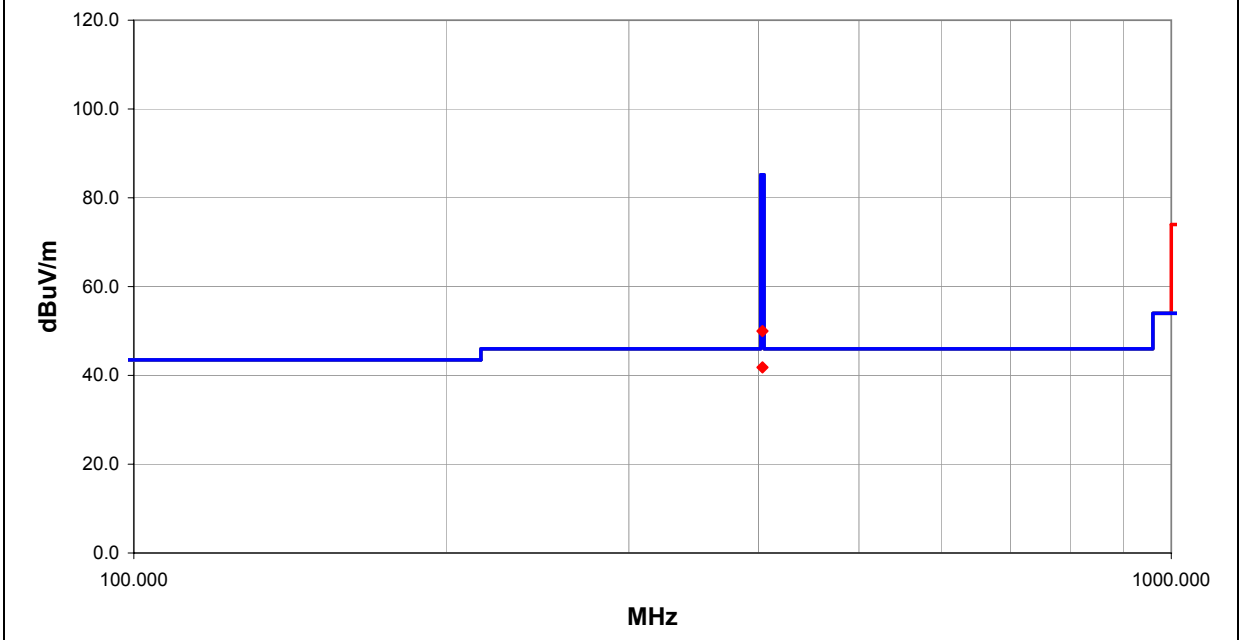
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	8

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
403.587	61.9	-11.9	51.0	1.8	3.0	0.0	V-Bilog	PK	0.0	50.0	85.2	-35.2
403.597	53.7	-11.9	205.0	2.1	3.0	0.0	H-Bilog	PK	0.0	41.8	85.2	-43.4

NORTHWEST EMC

OATS DATA SHEET

REV df3.01 09/20/2002

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02 14:07
Customer:	Micro Systems Engineering, Inc.			Temperature:	75
Attendees:	Lawrence Koran, Jay Lanz			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.01
Tested by:	Rodney Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(1-3)	Year:	1998
Method:	ANSI C63.4	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT vertical in test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

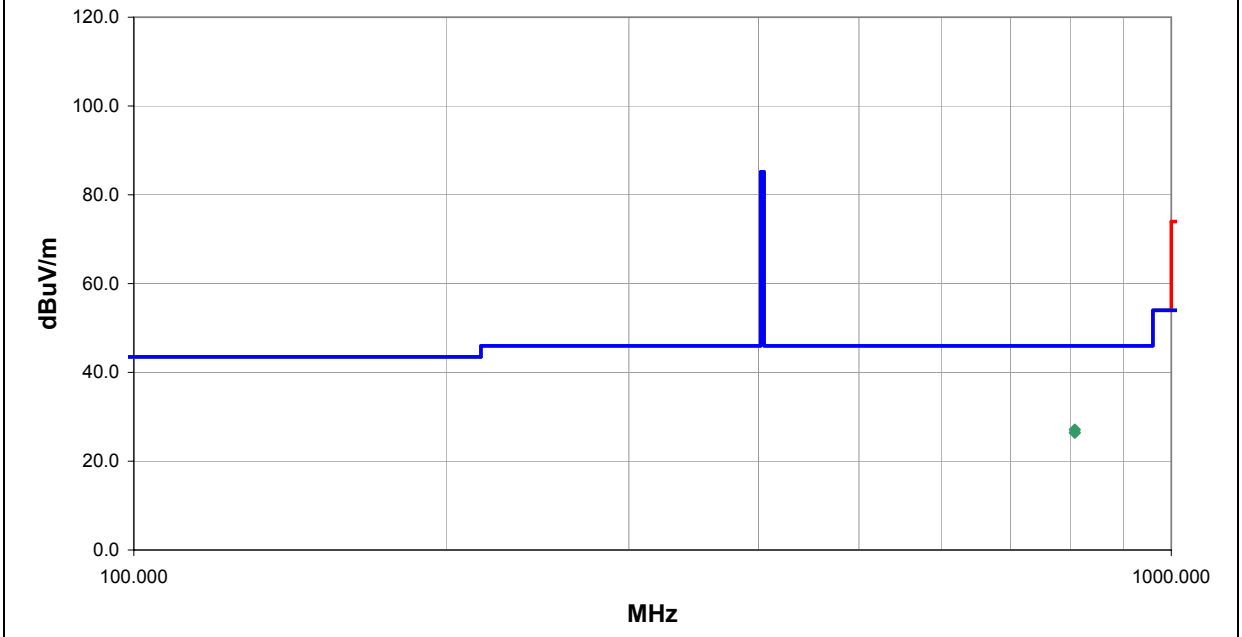
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	10

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
807.194	33.7	-6.6	45.0	1.4	3.0	0.0	H-Bilog	QP	0.0	27.1	46.0	-18.9
807.194	33.0	-6.6	71.0	1.2	3.0	0.0	V-Bilog	QP	0.0	26.4	46.0	-19.6

NORTHWEST
EMC

OATS DATA SHEET

REV
df3.01
09/20/2002

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02 15:15
Customer:	Micro Systems Engineering, Inc.			Temperature:	75
Attendees:	Lawrence Koran, Jay Lanz			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.01
Tested by:	Rodney Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(1-3)	Year:	1998
Method:	ANSI C63.4	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT vertical in test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

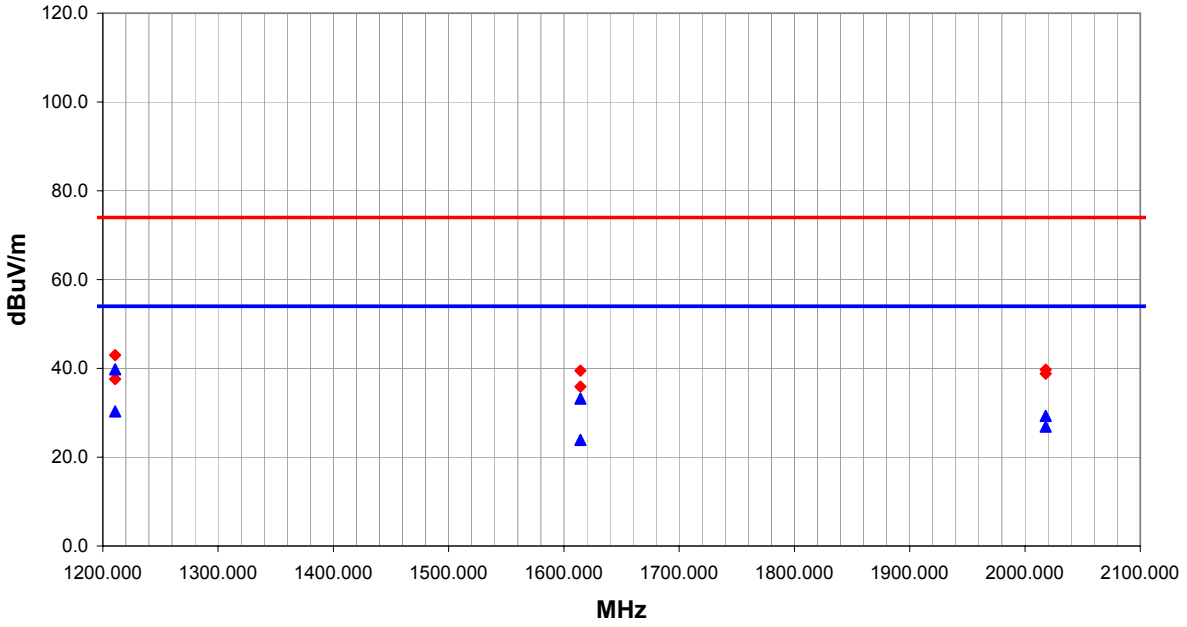
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	11

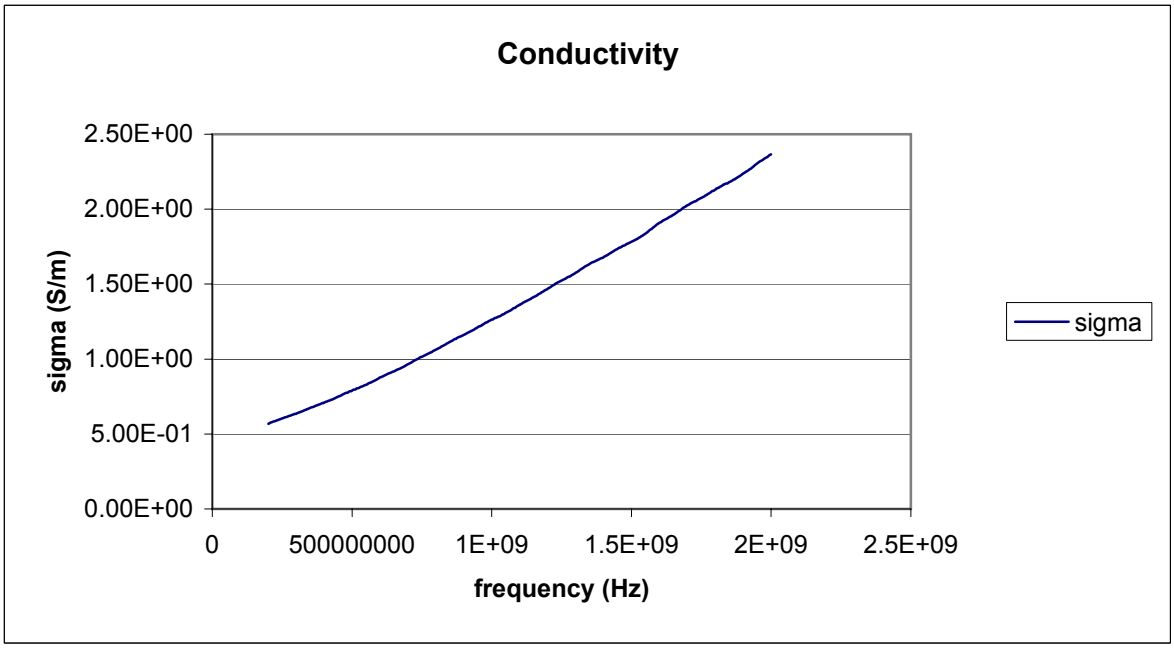
Other

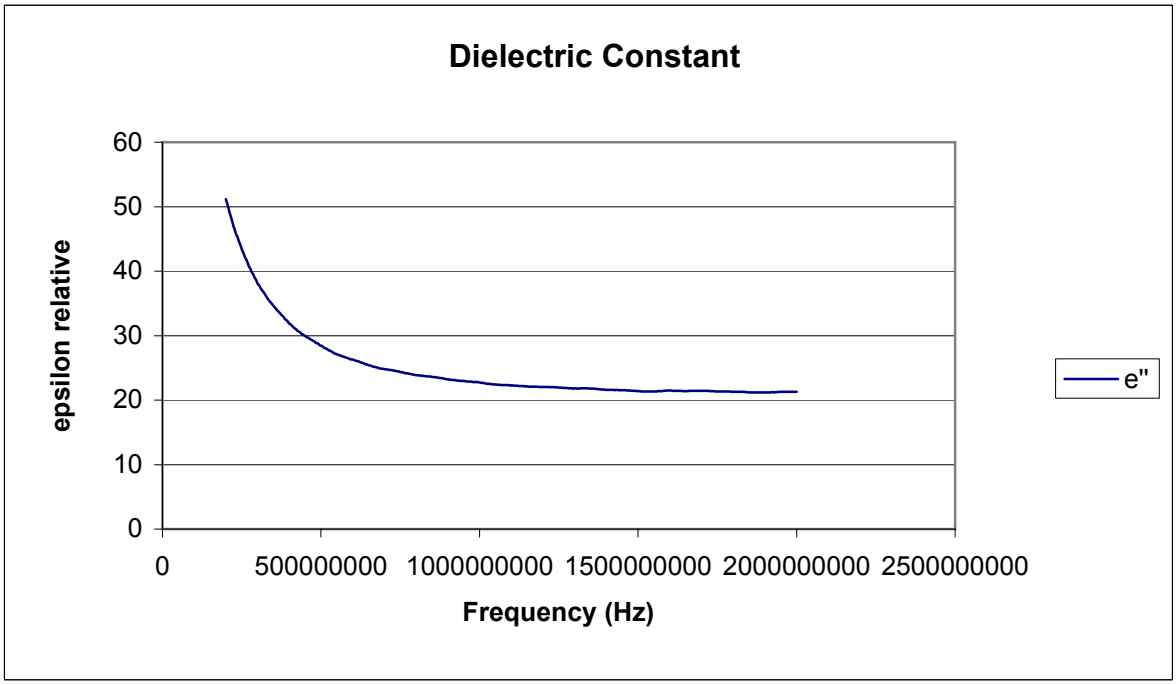
Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1210.743	45.3	-5.5	106.0	2.0	3.0	0.0	H-Horn	AV	0.0	39.8	54.0	-14.2
1614.388	36.4	-3.2	74.0	1.4	3.0	0.0	H-Horn	AV	0.0	33.2	54.0	-20.8
1210.659	35.8	-5.5	79.0	2.4	3.0	0.0	V-Horn	AV	0.0	30.3	54.0	-23.7
2017.985	29.6	-0.3	17.0	2.1	3.0	0.0	H-Horn	AV	0.0	29.3	54.0	-24.7
2017.985	27.2	-0.3	126.0	1.3	3.0	0.0	V-Horn	AV	0.0	26.9	54.0	-27.1
1614.388	27.1	-3.2	166.0	2.1	3.0	0.0	V-Horn	AV	0.0	23.9	54.0	-30.1
1210.743	48.5	-5.5	106.0	2.0	3.0	0.0	H-Horn	PK	0.0	43.0	74.0	-31.0
2017.985	40.0	-0.3	17.0	2.1	3.0	0.0	H-Horn	PK	0.0	39.7	74.0	-34.3
1614.388	42.7	-3.2	74.0	1.4	3.0	0.0	H-Horn	PK	0.0	39.5	74.0	-34.5
2017.985	39.1	-0.3	126.0	1.3	3.0	0.0	V-Horn	PK	0.0	38.8	74.0	-35.2
1210.659	43.1	-5.5	79.0	2.4	3.0	0.0	V-Horn	PK	0.0	37.6	74.0	-36.4
1614.388	39.1	-3.2	166.0	2.1	3.0	0.0	V-Horn	PK	0.0	35.9	74.0	-38.1

Frequency	4.03E+08
Conductivity	7.11E-01
Dielectric	58.246





frequency	e'	e''	sigma
2E+08	61.2993	51.1818	5.69E-01
2.05E+08	61.168	50.3707	5.72E-01
2.09E+08	61.1032	49.611	5.76E-01
2.14E+08	61.0637	48.7396	5.78E-01
2.18E+08	61.0378	48.0608	5.82E-01
2.23E+08	60.9365	47.3256	5.85E-01
2.27E+08	60.9381	46.5754	5.87E-01
2.32E+08	60.9261	45.917	5.91E-01
2.36E+08	60.9261	45.3414	5.94E-01
2.41E+08	60.8484	44.7482	5.98E-01
2.45E+08	60.7574	44.1408	6.01E-01
2.5E+08	60.7133	43.5216	6.03E-01
2.54E+08	60.5699	42.9393	6.06E-01
2.59E+08	60.5842	42.4517	6.10E-01
2.63E+08	60.5162	41.8909	6.12E-01
2.68E+08	60.2801	41.4447	6.16E-01
2.72E+08	60.2111	40.9166	6.18E-01
2.77E+08	60.0782	40.4484	6.21E-01
2.81E+08	59.9102	39.9476	6.24E-01
2.86E+08	59.8043	39.5339	6.27E-01
2.9E+08	59.6195	39.1268	6.30E-01
2.95E+08	59.5199	38.7149	6.33E-01
2.99E+08	59.3663	38.2246	6.35E-01
3.04E+08	59.1744	37.875	6.39E-01
3.08E+08	59.0063	37.5699	6.43E-01
3.13E+08	58.7912	37.1094	6.44E-01
3.17E+08	58.81	36.8797	6.49E-01
3.22E+08	58.7433	36.5128	6.52E-01
3.26E+08	58.5976	36.1626	6.55E-01
3.31E+08	58.5967	35.8724	6.59E-01
3.35E+08	58.6203	35.5284	6.61E-01
3.4E+08	58.5657	35.2808	6.65E-01
3.44E+08	58.5465	34.9862	6.69E-01
3.49E+08	58.5596	34.7165	6.72E-01
3.53E+08	58.549	34.4574	6.76E-01
3.58E+08	58.5986	34.1976	6.79E-01
3.62E+08	58.6146	33.9078	6.82E-01
3.67E+08	58.6188	33.71	6.86E-01
3.71E+08	58.6421	33.4526	6.89E-01
3.76E+08	58.6466	33.1878	6.92E-01
3.8E+08	58.591	33.0079	6.97E-01
3.85E+08	58.5865	32.7056	6.99E-01
3.89E+08	58.5496	32.4648	7.02E-01
3.94E+08	58.415	32.3013	7.06E-01
3.98E+08	58.3173	31.9676	7.07E-01
4.03E+08	58.246	31.7885	7.11E-01
4.07E+08	58.1039	31.6241	7.15E-01
4.12E+08	57.982	31.3821	7.17E-01
4.16E+08	57.8449	31.1869	7.21E-01
4.21E+08	57.6441	31.0209	7.25E-01
4.25E+08	57.4586	30.7885	7.27E-01

4.3E+08	57.3371	30.6167	7.31E-01
4.34E+08	57.2053	30.5022	7.35E-01
4.39E+08	57.0925	30.2915	7.38E-01
4.43E+08	56.9393	30.182	7.43E-01
4.48E+08	56.8329	30.0264	7.46E-01
4.52E+08	56.7545	29.8868	7.50E-01
4.57E+08	56.7112	29.7185	7.54E-01
4.61E+08	56.6238	29.6073	7.58E-01
4.66E+08	56.6182	29.4874	7.63E-01
4.7E+08	56.6111	29.3151	7.65E-01
4.75E+08	56.582	29.2461	7.71E-01
4.79E+08	56.5687	29.0928	7.74E-01
4.84E+08	56.5899	28.8775	7.76E-01
4.88E+08	56.644	28.8325	7.82E-01
4.93E+08	56.5799	28.6804	7.85E-01
4.97E+08	56.6081	28.4883	7.87E-01
5.02E+08	56.6099	28.4357	7.92E-01
5.06E+08	56.5402	28.2977	7.95E-01
5.11E+08	56.5205	28.0945	7.97E-01
5.15E+08	56.4691	28.0244	8.02E-01
5.2E+08	56.4157	27.8869	8.05E-01
5.24E+08	56.3079	27.7323	8.07E-01
5.29E+08	56.2155	27.637	8.11E-01
5.33E+08	56.1346	27.5518	8.16E-01
5.38E+08	56.0498	27.3961	8.18E-01
5.42E+08	55.8185	27.2691	8.21E-01
5.47E+08	55.7087	27.1876	8.25E-01
5.51E+08	55.5548	27.0932	8.29E-01
5.56E+08	55.4146	27.0141	8.34E-01
5.6E+08	55.3021	26.9389	8.38E-01
5.65E+08	55.1637	26.8509	8.42E-01
5.69E+08	55.0665	26.7736	8.46E-01
5.74E+08	54.9611	26.7007	8.51E-01
5.78E+08	54.9104	26.5981	8.54E-01
5.83E+08	54.8335	26.5464	8.59E-01
5.87E+08	54.7946	26.4533	8.63E-01
5.92E+08	54.7369	26.3683	8.66E-01
5.96E+08	54.6968	26.3117	8.71E-01
6.01E+08	54.7169	26.2782	8.77E-01
6.05E+08	54.6925	26.1833	8.80E-01
6.1E+08	54.7063	26.1136	8.84E-01
6.14E+08	54.7195	26.0556	8.89E-01
6.19E+08	54.7116	25.9839	8.93E-01
6.23E+08	54.6933	25.9114	8.97E-01
6.28E+08	54.7231	25.8206	9.00E-01
6.32E+08	54.6718	25.7568	9.04E-01
6.37E+08	54.6637	25.6498	9.07E-01
6.41E+08	54.6185	25.5692	9.11E-01
6.46E+08	54.535	25.5103	9.15E-01
6.5E+08	54.5279	25.4268	9.18E-01
6.55E+08	54.4373	25.3568	9.22E-01
6.59E+08	54.3304	25.2947	9.26E-01

6.64E+08	54.2218	25.2241	9.30E-01
6.68E+08	54.1312	25.1683	9.34E-01
6.73E+08	53.9892	25.109	9.38E-01
6.77E+08	53.9534	25.0532	9.42E-01
6.82E+08	53.8229	24.9764	9.46E-01
6.86E+08	53.6862	24.9292	9.50E-01
6.91E+08	53.6044	24.8753	9.54E-01
6.95E+08	53.5105	24.873	9.60E-01
7E+08	53.4695	24.8136	9.64E-01
7.04E+08	53.3766	24.7821	9.69E-01
7.09E+08	53.3345	24.7495	9.74E-01
7.13E+08	53.2864	24.7002	9.78E-01
7.18E+08	53.2581	24.6825	9.84E-01
7.22E+08	53.2538	24.6495	9.89E-01
7.27E+08	53.2484	24.6122	9.93E-01
7.31E+08	53.2384	24.5625	9.98E-01
7.36E+08	53.2187	24.5224	1.00E+00
7.4E+08	53.2322	24.4676	1.01E+00
7.45E+08	53.2424	24.458	1.01E+00
7.49E+08	53.2554	24.3892	1.01E+00
7.54E+08	53.2214	24.3422	1.02E+00
7.58E+08	53.2306	24.3043	1.02E+00
7.63E+08	53.1934	24.2263	1.03E+00
7.67E+08	53.173	24.1933	1.03E+00
7.72E+08	53.1137	24.1458	1.03E+00
7.76E+08	53.0175	24.0975	1.04E+00
7.81E+08	52.9926	24.0586	1.04E+00
7.85E+08	52.8859	24.003	1.05E+00
7.9E+08	52.8158	23.9822	1.05E+00
7.94E+08	52.7306	23.9368	1.06E+00
7.99E+08	52.6392	23.8953	1.06E+00
8.03E+08	52.5433	23.8798	1.07E+00
8.08E+08	52.462	23.8443	1.07E+00
8.12E+08	52.3709	23.8143	1.07E+00
8.17E+08	52.2995	23.7846	1.08E+00
8.21E+08	52.2203	23.7549	1.08E+00
8.26E+08	52.1549	23.7235	1.09E+00
8.3E+08	52.1014	23.723	1.09E+00
8.35E+08	52.0851	23.6774	1.10E+00
8.39E+08	52.0301	23.6605	1.10E+00
8.44E+08	52.0153	23.6506	1.11E+00
8.48E+08	51.9942	23.6262	1.11E+00
8.53E+08	51.9827	23.5927	1.12E+00
8.57E+08	51.9823	23.5538	1.12E+00
8.62E+08	51.9982	23.5199	1.13E+00
8.66E+08	51.9886	23.5036	1.13E+00
8.71E+08	51.9879	23.4521	1.13E+00
8.75E+08	51.9709	23.4355	1.14E+00
8.8E+08	51.9665	23.4082	1.14E+00
8.84E+08	51.9245	23.366	1.15E+00
8.89E+08	51.9315	23.333	1.15E+00
8.93E+08	51.9065	23.2955	1.16E+00

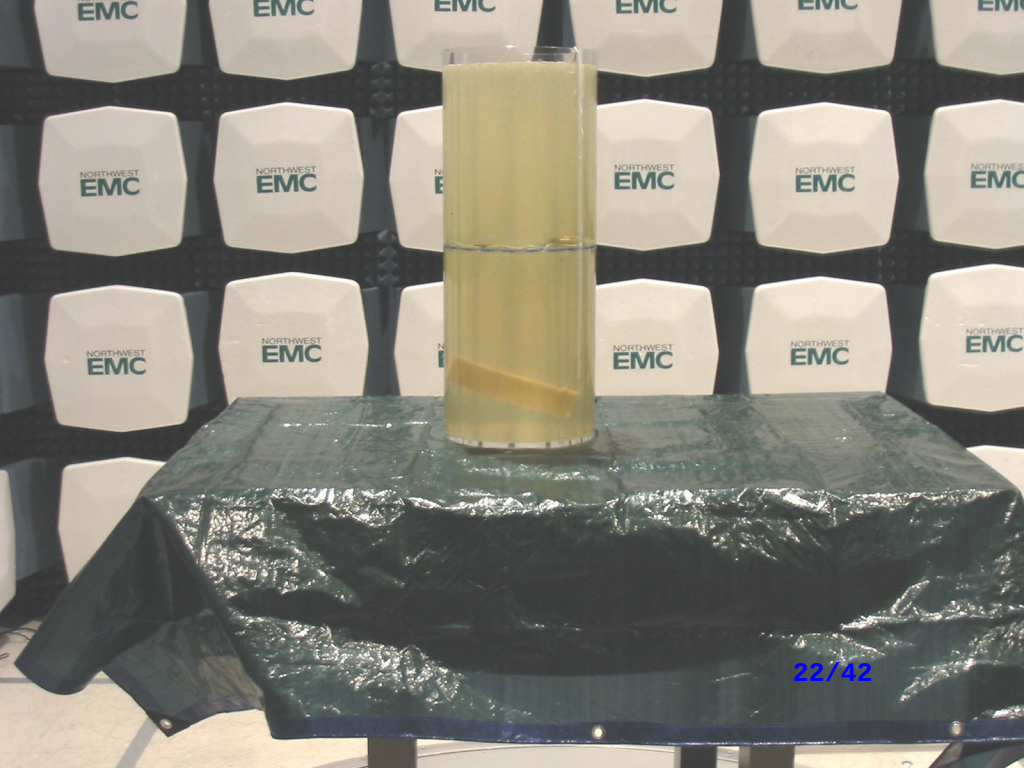
8.98E+08	51.8342	23.2492	1.16E+00
9.02E+08	51.8043	23.2238	1.16E+00
9.07E+08	51.7661	23.1818	1.17E+00
9.11E+08	51.6918	23.1428	1.17E+00
9.16E+08	51.6295	23.132	1.18E+00
9.2E+08	51.5611	23.108	1.18E+00
9.25E+08	51.4643	23.0536	1.18E+00
9.29E+08	51.3862	23.0237	1.19E+00
9.34E+08	51.3168	23.0233	1.19E+00
9.38E+08	51.2565	22.9764	1.20E+00
9.43E+08	51.1647	22.9771	1.20E+00
9.47E+08	51.0971	22.9815	1.21E+00
9.52E+08	51.0772	22.9723	1.21E+00
9.56E+08	51.0343	22.9429	1.22E+00
9.61E+08	51.0008	22.892	1.22E+00
9.65E+08	50.9428	22.8845	1.23E+00
9.7E+08	50.9226	22.8766	1.23E+00
9.74E+08	50.9298	22.8574	1.24E+00
9.79E+08	50.9046	22.8526	1.24E+00
9.83E+08	50.8933	22.799	1.25E+00
9.88E+08	50.8674	22.8115	1.25E+00
9.92E+08	50.8997	22.7821	1.26E+00
9.97E+08	50.8918	22.7598	1.26E+00
1E+09	50.8863	22.7199	1.26E+00
1.01E+09	50.8621	22.6751	1.27E+00
1.01E+09	50.8526	22.6745	1.27E+00
1.01E+09	50.7968	22.6289	1.28E+00
1.02E+09	50.7719	22.5935	1.28E+00
1.02E+09	50.7192	22.551	1.28E+00
1.03E+09	50.6744	22.5205	1.29E+00
1.03E+09	50.5643	22.4937	1.29E+00
1.04E+09	50.5305	22.4855	1.30E+00
1.04E+09	50.4592	22.4407	1.30E+00
1.05E+09	50.3766	22.4153	1.30E+00
1.05E+09	50.3271	22.4101	1.31E+00
1.06E+09	50.2469	22.3924	1.31E+00
1.06E+09	50.1534	22.3835	1.32E+00
1.06E+09	50.105	22.3633	1.32E+00
1.07E+09	50.0637	22.3469	1.33E+00
1.07E+09	50.0033	22.3429	1.33E+00
1.08E+09	49.9471	22.3444	1.34E+00
1.08E+09	49.922	22.3191	1.34E+00
1.09E+09	49.9042	22.3169	1.35E+00
1.09E+09	49.8751	22.3142	1.35E+00
1.1E+09	49.8622	22.3053	1.36E+00
1.1E+09	49.8529	22.2827	1.36E+00
1.1E+09	49.8323	22.2597	1.37E+00
1.11E+09	49.8173	22.2567	1.37E+00
1.11E+09	49.8407	22.2522	1.38E+00
1.12E+09	49.8394	22.2327	1.38E+00
1.12E+09	49.8172	22.2038	1.38E+00
1.13E+09	49.7826	22.2025	1.39E+00

1.13E+09	49.7801	22.1843	1.39E+00
1.14E+09	49.745	22.1684	1.40E+00
1.14E+09	49.7034	22.1533	1.40E+00
1.15E+09	49.6774	22.155	1.41E+00
1.15E+09	49.6247	22.1326	1.41E+00
1.15E+09	49.5761	22.1042	1.42E+00
1.16E+09	49.5124	22.0977	1.42E+00
1.16E+09	49.432	22.0877	1.43E+00
1.17E+09	49.3916	22.0855	1.43E+00
1.17E+09	49.3048	22.0695	1.44E+00
1.18E+09	49.2424	22.0603	1.44E+00
1.18E+09	49.1781	22.0642	1.45E+00
1.19E+09	49.1265	22.0412	1.45E+00
1.19E+09	49.0792	22.0457	1.46E+00
1.19E+09	48.9965	22.0523	1.46E+00
1.2E+09	48.9512	22.03	1.47E+00
1.2E+09	48.9325	22.0349	1.47E+00
1.21E+09	48.8816	22.0247	1.48E+00
1.21E+09	48.8248	22.0265	1.48E+00
1.22E+09	48.8241	22.0383	1.49E+00
1.22E+09	48.8029	22.0198	1.49E+00
1.23E+09	48.7899	22.0069	1.50E+00
1.23E+09	48.7856	22.0216	1.51E+00
1.24E+09	48.7802	22.0074	1.51E+00
1.24E+09	48.7575	21.9944	1.51E+00
1.24E+09	48.7646	21.9755	1.52E+00
1.25E+09	48.7586	21.9585	1.52E+00
1.25E+09	48.7002	21.9346	1.53E+00
1.26E+09	48.6854	21.9244	1.53E+00
1.26E+09	48.6604	21.8995	1.54E+00
1.27E+09	48.6006	21.8817	1.54E+00
1.27E+09	48.5798	21.8765	1.54E+00
1.28E+09	48.527	21.8617	1.55E+00
1.28E+09	48.4695	21.8398	1.55E+00
1.28E+09	48.3945	21.8383	1.56E+00
1.29E+09	48.3582	21.8238	1.56E+00
1.29E+09	48.2978	21.8054	1.57E+00
1.3E+09	48.2272	21.8023	1.57E+00
1.3E+09	48.1711	21.818	1.58E+00
1.31E+09	48.123	21.7992	1.58E+00
1.31E+09	48.0625	21.7973	1.59E+00
1.32E+09	48.0194	21.8083	1.59E+00
1.32E+09	47.9879	21.8146	1.60E+00
1.33E+09	47.9634	21.8196	1.61E+00
1.33E+09	47.922	21.8158	1.61E+00
1.33E+09	47.9141	21.827	1.62E+00
1.34E+09	47.891	21.8172	1.62E+00
1.34E+09	47.8683	21.8074	1.63E+00
1.35E+09	47.8587	21.7951	1.63E+00
1.35E+09	47.8421	21.792	1.64E+00
1.36E+09	47.832	21.7732	1.64E+00
1.36E+09	47.8105	21.7671	1.65E+00

1.37E+09	47.7965	21.7374	1.65E+00
1.37E+09	47.7591	21.7188	1.65E+00
1.37E+09	47.7248	21.6944	1.66E+00
1.38E+09	47.7022	21.6937	1.66E+00
1.38E+09	47.6708	21.6535	1.66E+00
1.39E+09	47.6269	21.652	1.67E+00
1.39E+09	47.5766	21.6415	1.67E+00
1.4E+09	47.528	21.6052	1.68E+00
1.4E+09	47.4648	21.5951	1.68E+00
1.41E+09	47.4128	21.5942	1.69E+00
1.41E+09	47.3672	21.5782	1.69E+00
1.42E+09	47.3177	21.5656	1.70E+00
1.42E+09	47.2669	21.5687	1.70E+00
1.42E+09	47.2331	21.5657	1.71E+00
1.43E+09	47.1868	21.5553	1.71E+00
1.43E+09	47.1482	21.5674	1.72E+00
1.44E+09	47.1033	21.5531	1.72E+00
1.44E+09	47.0799	21.5607	1.73E+00
1.45E+09	47.0578	21.5429	1.73E+00
1.45E+09	47.0394	21.5293	1.74E+00
1.46E+09	47.0194	21.5349	1.74E+00
1.46E+09	47.0064	21.5139	1.75E+00
1.46E+09	47.0028	21.4997	1.75E+00
1.47E+09	47.0044	21.5129	1.76E+00
1.47E+09	46.9925	21.4704	1.76E+00
1.48E+09	46.9814	21.4628	1.76E+00
1.48E+09	46.9747	21.4516	1.77E+00
1.49E+09	46.9656	21.4285	1.77E+00
1.49E+09	46.9385	21.417	1.77E+00
1.5E+09	46.9269	21.407	1.78E+00
1.5E+09	46.9087	21.3885	1.78E+00
1.51E+09	46.8833	21.3694	1.79E+00
1.51E+09	46.8689	21.3588	1.79E+00
1.51E+09	46.8395	21.3507	1.80E+00
1.52E+09	46.8165	21.3373	1.80E+00
1.52E+09	46.782	21.3304	1.80E+00
1.53E+09	46.7377	21.3321	1.81E+00
1.53E+09	46.7207	21.3284	1.82E+00
1.54E+09	46.6623	21.3289	1.82E+00
1.54E+09	46.6291	21.3256	1.83E+00
1.55E+09	46.5883	21.3293	1.83E+00
1.55E+09	46.5573	21.3316	1.84E+00
1.55E+09	46.5342	21.3345	1.84E+00
1.56E+09	46.5178	21.3528	1.85E+00
1.56E+09	46.4995	21.3763	1.86E+00
1.57E+09	46.4674	21.3912	1.86E+00
1.57E+09	46.4668	21.3859	1.87E+00
1.58E+09	46.4571	21.4095	1.88E+00
1.58E+09	46.4512	21.4369	1.88E+00
1.59E+09	46.4467	21.4494	1.89E+00
1.59E+09	46.418	21.4694	1.90E+00
1.6E+09	46.4108	21.4777	1.90E+00

1.6E+09	46.3914	21.4795	1.91E+00
1.6E+09	46.382	21.4726	1.91E+00
1.61E+09	46.3557	21.4463	1.92E+00
1.61E+09	46.3277	21.4566	1.92E+00
1.62E+09	46.2842	21.4531	1.93E+00
1.62E+09	46.2637	21.4398	1.93E+00
1.63E+09	46.2161	21.4268	1.94E+00
1.63E+09	46.183	21.4219	1.94E+00
1.64E+09	46.1428	21.4203	1.95E+00
1.64E+09	46.0872	21.4088	1.95E+00
1.64E+09	46.0282	21.4007	1.96E+00
1.65E+09	45.9887	21.4098	1.96E+00
1.65E+09	45.9394	21.4041	1.97E+00
1.66E+09	45.883	21.4051	1.97E+00
1.66E+09	45.8264	21.4206	1.98E+00
1.67E+09	45.7633	21.4285	1.98E+00
1.67E+09	45.7493	21.4368	1.99E+00
1.68E+09	45.7095	21.4242	1.99E+00
1.68E+09	45.68	21.4334	2.00E+00
1.69E+09	45.6451	21.4514	2.01E+00
1.69E+09	45.6331	21.4415	2.01E+00
1.69E+09	45.6246	21.4425	2.02E+00
1.7E+09	45.5911	21.4496	2.02E+00
1.7E+09	45.594	21.4472	2.03E+00
1.71E+09	45.5708	21.4349	2.03E+00
1.71E+09	45.5565	21.4318	2.04E+00
1.72E+09	45.5445	21.4198	2.04E+00
1.72E+09	45.5183	21.4179	2.05E+00
1.73E+09	45.5001	21.395	2.05E+00
1.73E+09	45.4855	21.3793	2.05E+00
1.73E+09	45.4477	21.3823	2.06E+00
1.74E+09	45.4353	21.3718	2.06E+00
1.74E+09	45.3847	21.3498	2.07E+00
1.75E+09	45.3641	21.3373	2.07E+00
1.75E+09	45.2945	21.3308	2.08E+00
1.76E+09	45.2674	21.3251	2.08E+00
1.76E+09	45.2055	21.3223	2.09E+00
1.77E+09	45.1561	21.3249	2.09E+00
1.77E+09	45.1369	21.3194	2.10E+00
1.78E+09	45.0884	21.3186	2.10E+00
1.78E+09	45.0401	21.3212	2.11E+00
1.78E+09	44.9957	21.3205	2.11E+00
1.79E+09	44.9688	21.3304	2.12E+00
1.79E+09	44.9393	21.309	2.12E+00
1.8E+09	44.8976	21.31	2.13E+00
1.8E+09	44.8667	21.3077	2.13E+00
1.81E+09	44.8498	21.3055	2.14E+00
1.81E+09	44.83	21.2894	2.14E+00
1.82E+09	44.8136	21.294	2.15E+00
1.82E+09	44.7993	21.2934	2.15E+00
1.82E+09	44.7991	21.2826	2.16E+00
1.83E+09	44.7922	21.2785	2.16E+00

1.83E+09	44.7941	21.2658	2.17E+00
1.84E+09	44.7842	21.2581	2.17E+00
1.84E+09	44.7796	21.2214	2.17E+00
1.85E+09	44.7515	21.2154	2.18E+00
1.85E+09	44.7525	21.211	2.18E+00
1.86E+09	44.7452	21.2014	2.19E+00
1.86E+09	44.7263	21.197	2.19E+00
1.87E+09	44.7128	21.1976	2.20E+00
1.87E+09	44.6824	21.1813	2.20E+00
1.87E+09	44.6694	21.1852	2.21E+00
1.88E+09	44.6329	21.1825	2.21E+00
1.88E+09	44.5951	21.1848	2.22E+00
1.89E+09	44.554	21.1737	2.22E+00
1.89E+09	44.5237	21.1861	2.23E+00
1.9E+09	44.4869	21.1952	2.23E+00
1.9E+09	44.4521	21.2025	2.24E+00
1.91E+09	44.4089	21.1948	2.24E+00
1.91E+09	44.3849	21.212	2.25E+00
1.91E+09	44.3556	21.1974	2.25E+00
1.92E+09	44.3456	21.211	2.26E+00
1.92E+09	44.3273	21.2163	2.27E+00
1.93E+09	44.3057	21.2115	2.27E+00
1.93E+09	44.2829	21.2185	2.28E+00
1.94E+09	44.2772	21.2283	2.28E+00
1.94E+09	44.242	21.2489	2.29E+00
1.95E+09	44.2453	21.2667	2.30E+00
1.95E+09	44.2239	21.2835	2.31E+00
1.96E+09	44.2255	21.2795	2.31E+00
1.96E+09	44.2062	21.2911	2.32E+00
1.96E+09	44.1984	21.2907	2.32E+00
1.97E+09	44.1941	21.2867	2.33E+00
1.97E+09	44.177	21.2898	2.33E+00
1.98E+09	44.1517	21.2915	2.34E+00
1.98E+09	44.1331	21.2862	2.34E+00
1.99E+09	44.1033	21.283	2.35E+00
1.99E+09	44.068	21.3032	2.36E+00
2E+09	44.0302	21.2953	2.36E+00
2E+09	43.9926	21.2841	2.36E+00


NORTHWEST
EMC
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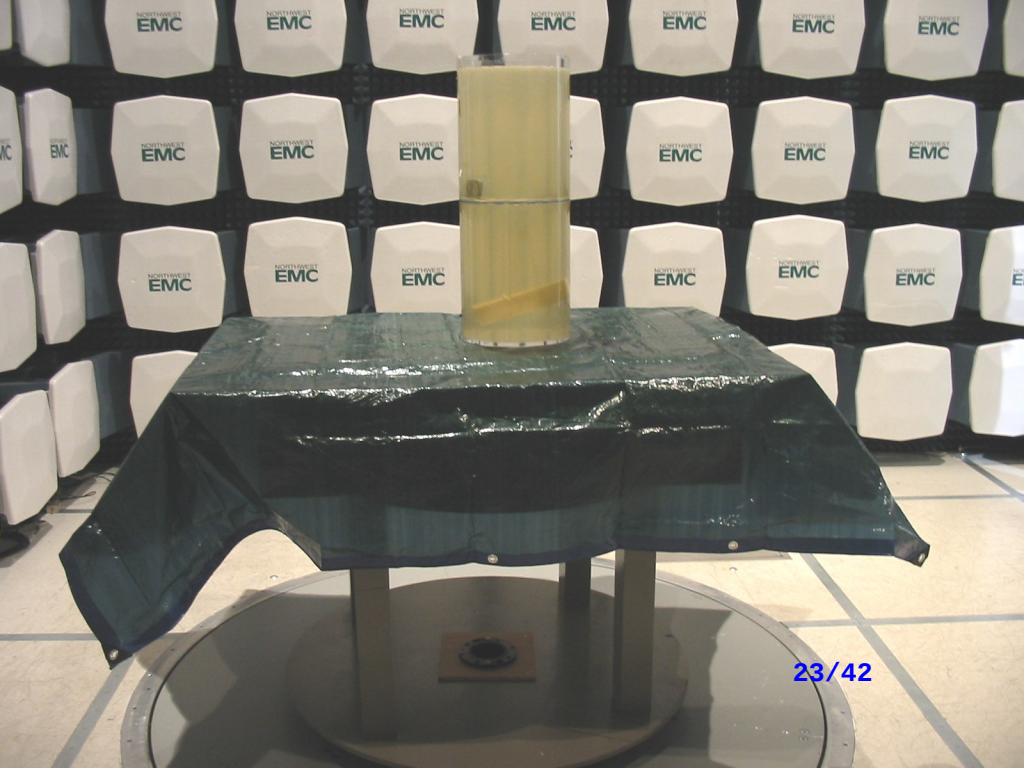
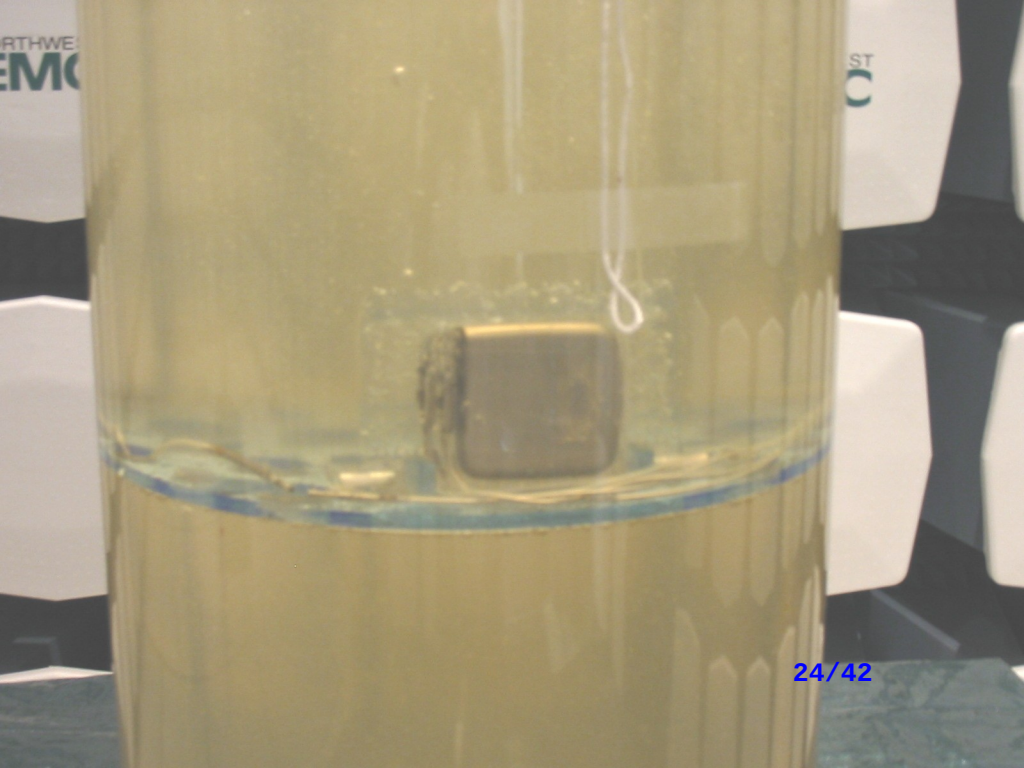

NORTHWEST EMC
23/42


24/42


25/42

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:
Single

Operating Modes Investigated:
Typical

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
Battery

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
The system was tested using standard operating production software to exercise the functions of the device during the testing.			

Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	Micro Systems Engineering	Belos DRT	79630000

Cables

Cable Type	S/N	Shield	Length (m)	Ferrite	Connection 1	Connection 2
High Voltage Model DF-1	10206150	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23278301	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23031884	Yes	.8	No	EUT	Unterminated

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett Packard	8594E	AAD	05/31/2002	12 mo

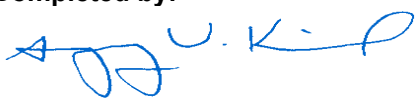
Test Description

Requirement: Per 47 CFR 95.633(e)(1) and 2.1049, the Occupied Bandwidth was measured. The maximum authorized emission bandwidth is 300 kHz.

Configuration: Per 47 CFR 95.633(e)(3), the emission bandwidth was determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 20 dB down relative to the maximum level of the modulated carrier. A spectrum analyzer using a peak detector with no video filtering was used with a resolution bandwidth equal to approximately 1.0 percent of the emission bandwidth of the EUT.

An emission bandwidth measurement was made using a 300Hz resolution bandwidth (no video filtering) and a peak detector. With these instrument settings, an emission bandwidth of 19.75 kHz was measured. This most closely satisfied the specified measurement criteria. It is important to use a RBW that is sufficiently narrow to plot the actual bandwidth of the signal and not the filter response curve of the spectrum analyzer. However, various plots were made using different frequency spans and resolution bandwidths in an attempt to not only satisfy the measurement criteria, but to also show that all emissions outside of the occupied band are greatly attenuated

Completed by:



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02
Customer:	Micro Systems Engineering, Inc.			Temperature:	23 degrees C
Attendees:	Lawrence Koran, Jay Lanz	Tested by:	Greg Kiemel	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.633(e)(1)	Year:	Most Current	Method:	95.633(e)(3) & ANSI C63.4	Year:	Most Current

SAMPLE CALCULATIONS

COMMENTS

EUT Vertical in Test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The maximum authorized emission bandwidth is 300 kHz

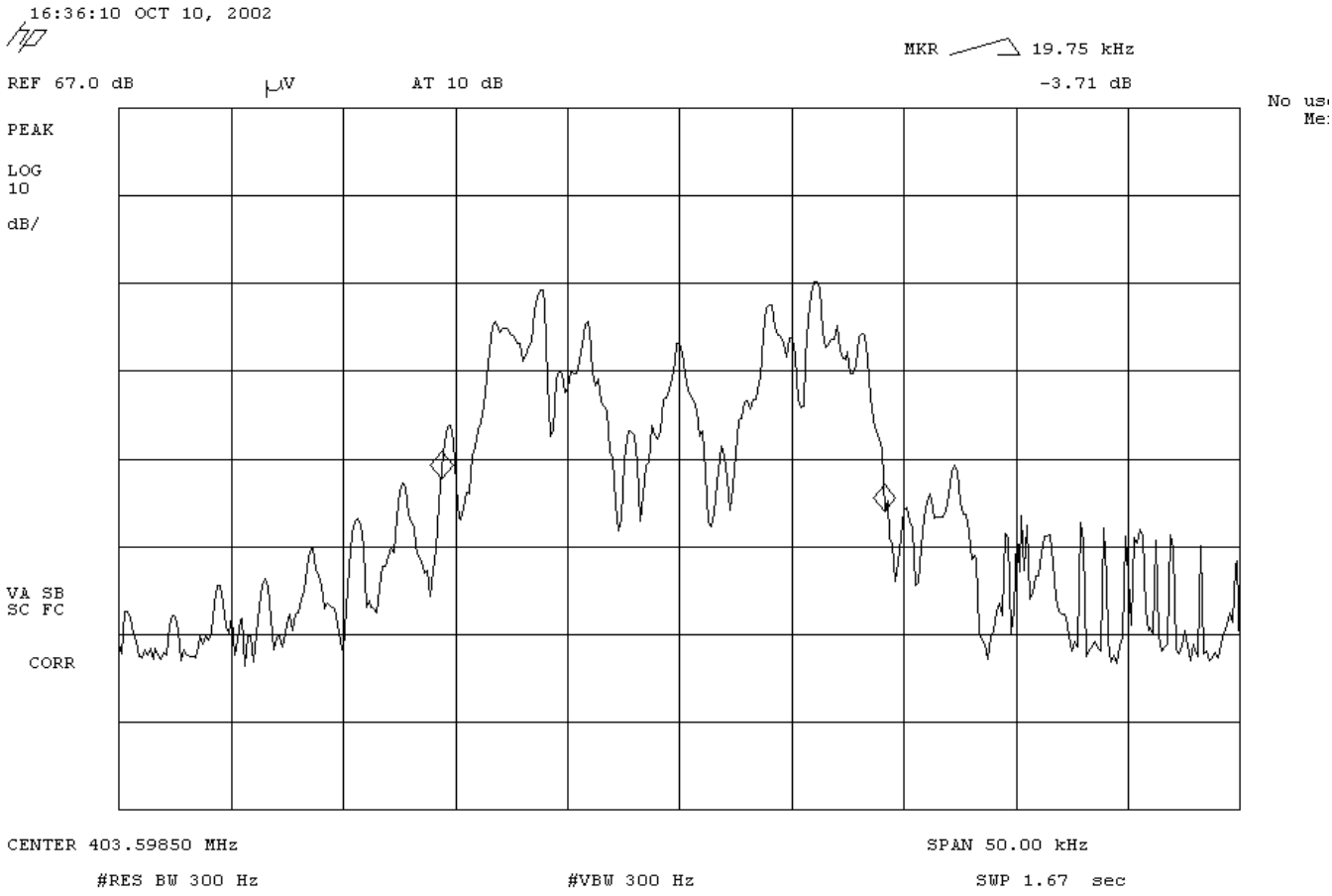
RESULTS	BANDWIDTH
Pass	19.75 kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Occupied Bandwidth



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02
Customer:	Micro Systems Engineering, Inc.			Temperature:	23 degrees C
Attendees:	Lawrence Koran, Jay Lanz	Tested by:	Greg Kiemel	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.633(e)(1)	Year:	Most Current	Method:	95.633(e)(3) & ANSI C63.4	Year:	Most Current

SAMPLE CALCULATIONS

COMMENTS

EUT Vertical in Test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The maximum authorized emission bandwidth is 300 kHz

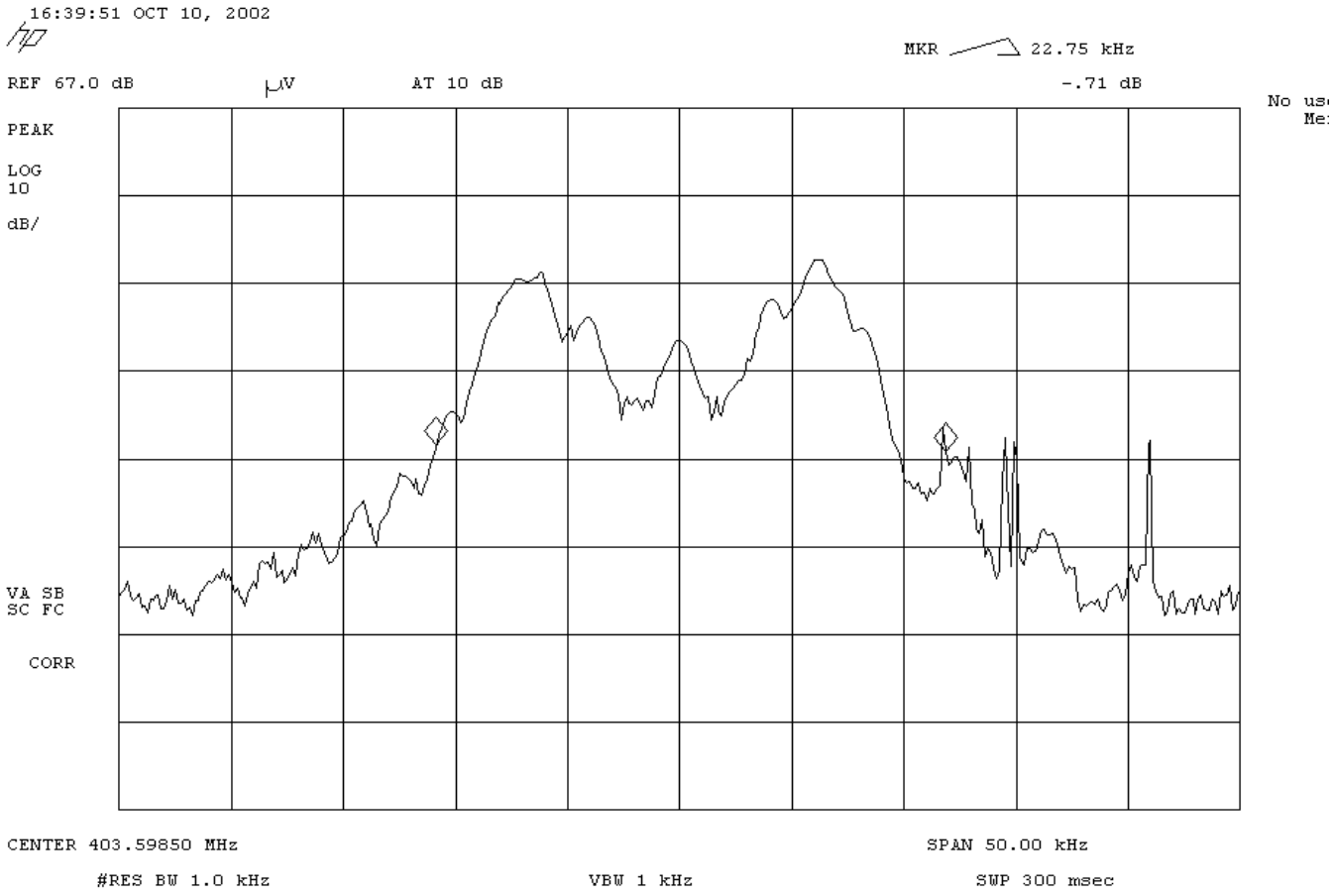
RESULTS	BANDWIDTH
Pass	22.75 kHz

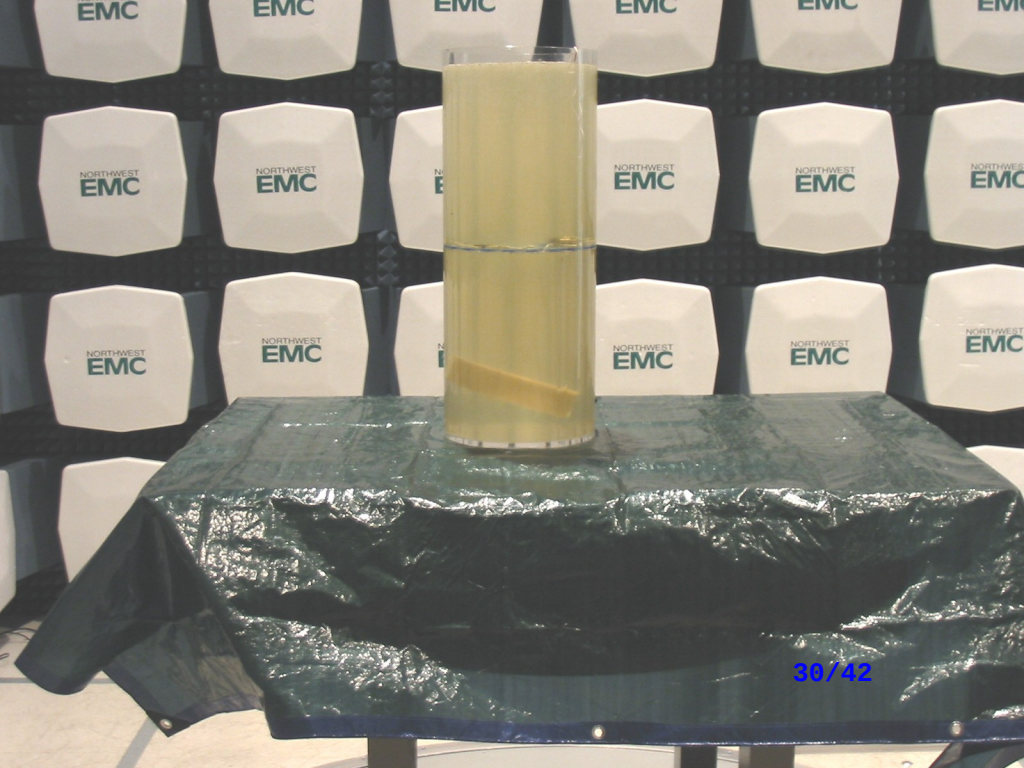
SIGNATURE

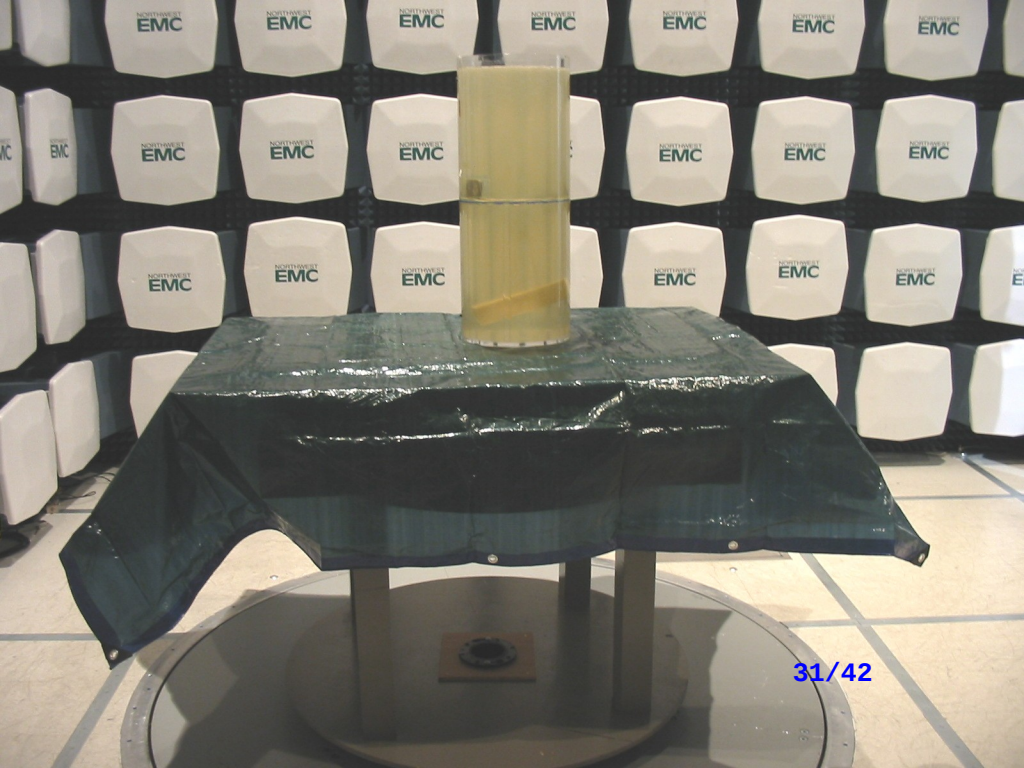
Tested By: _____

DESCRIPTION OF TEST

Occupied Bandwidth




NORTHWEST
EMC
30/42


NORTHWEST EMC
31/42

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:
Single

Operating Modes Investigated:
Typical

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
Battery

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
The system was tested using standard operating production software to exercise the functions of the device during the testing.			

Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	Micro Systems Engineering	Belos DRT	79630000

Cables

Cable Type	S/N	Shield	Length (m)	Ferrite	Connection 1	Connection 2
High Voltage Model DF-1	10206150	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23278301	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23031884	Yes	.8	No	EUT	Unterminated

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett Packard	8594E	AAD	05/31/2002	12 mo
Near-field Probe	EMCO	7405	IPD	No calibration required	N/A
Temp. / Humidity Chamber	Cincinnati Sub Zero ZH-32-2-2-H/AC	ZN9722620	TBA	09/20/02	12 mo

Test Description

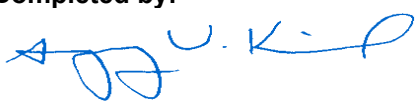
Requirement: Per 47 CFR 95.628(e)(1) and 2.1055, the Frequency Stability was measured. The transmitter must maintain a frequency stability of +/- 100 parts per million (ppm), or better, for variations of temperature over the range of 25 to 45 degrees centigrade.

Configuration: The Frequency Stability was measured using a near-field probe and a spectrum analyzer. The spectrum analyzer is configured with a precision frequency reference that exceeds the stability requirement of the transmitter.

The EUT was placed inside a temperature / humidity chamber. The near-field probe was placed near the transmitter. A low-loss coaxial cable connected the near-field probe to the spectrum analyzer outside of the chamber.

The transmit frequency was recorded at the extremes of the specified temperature range (+25° to +45° C) and at 10°C intervals.

Completed by:



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/11/02
Customer:	Micro Systems Engineering, Inc.			Temperature:	See Data
Attendees:	N/A	Tested by:	Greg Kiemel	Humidity:	35% RH
Customer Ref. No.:	N/A	Power:	N/A	Job Site:	EV09

TEST SPECIFICATIONS

Specification:	95.628(e)(1) & 2.1055	Year:	Most Current	Method:	TIA/EIA - 603	Year:	1993

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Transmitting single channel

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Must maintain a frequency stability of +/- 100 parts per million (ppm) or better for variations of temperature over the range of 25 to 45 degrees centigrade

RESULTS	WORST CASE FREQUENCY STABILITY
Pass	-9.91 ppm

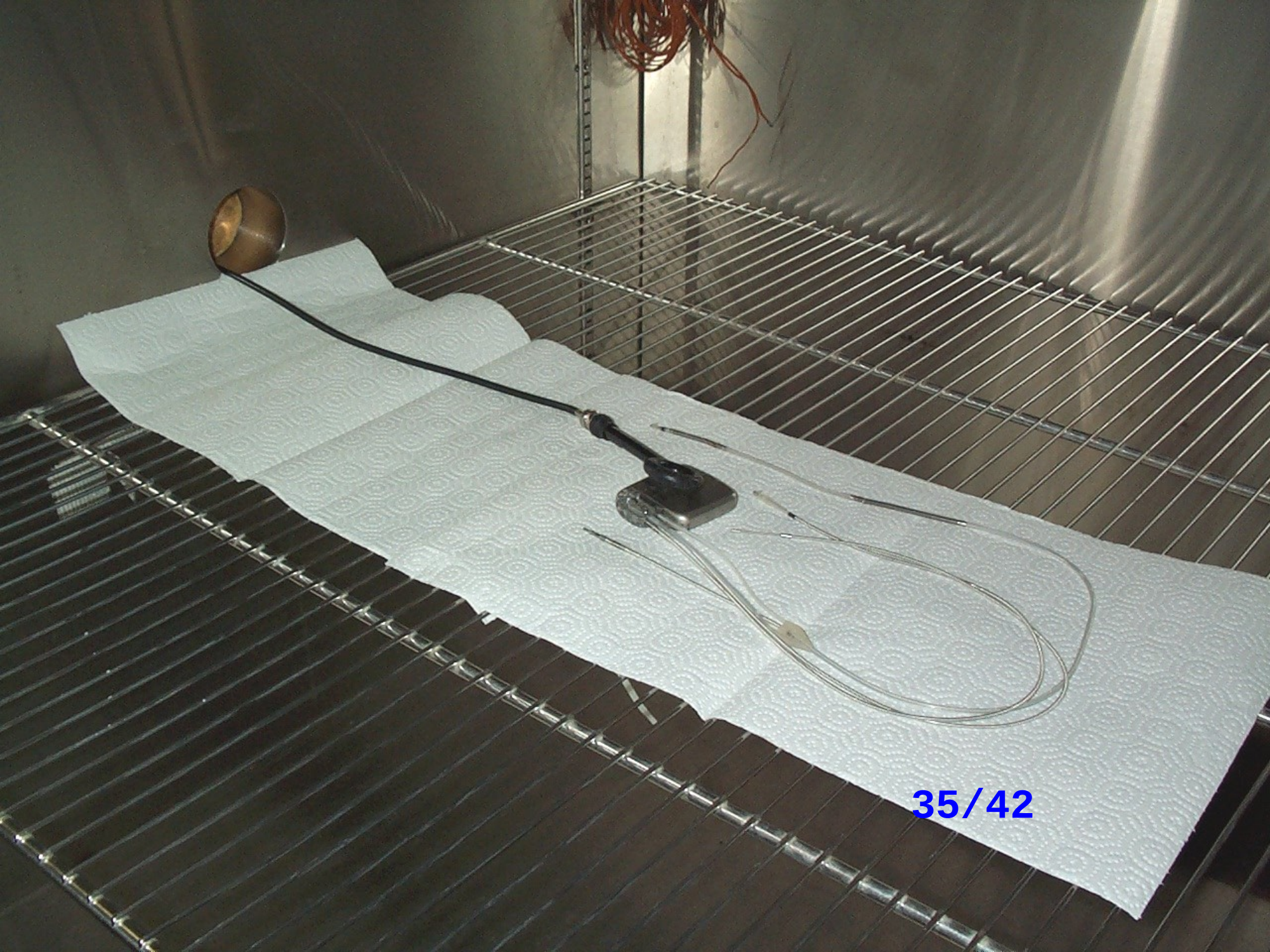
SIGNATURE

Tested By: A.J. U.K.P

DESCRIPTION OF TEST

Frequency Stability

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
25	403.595050	403.597720	6.62	100
35	403.595050	403.595050	0.00	100
45	403.595050	403.591050	-9.91	100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Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:
Single

Operating Modes Investigated:
Typical

Data Rates Investigated:
Maximum

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
Battery

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
The system was tested using standard operating production software to exercise the functions of the device during the testing.			

Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	Micro Systems Engineering	Belos DRT	79630000

Cables

Cable Type	S/N	Shield	Length (m)	Ferrite	Connection 1	Connection 2
High Voltage Model DF-1	10206150	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23278301	Yes	.8	No	EUT	Unterminated
Pacing Sensing Lead Model IS-1BI	23031884	Yes	.8	No	EUT	Unterminated

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett Packard	8594E	AAD	05/31/2002	12 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	03/19/2002	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	03/19/2002	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	12/03/2001	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	12 mo

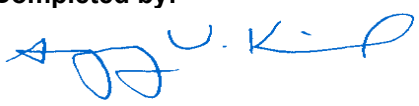
Test Description

Requirement: Per 47 CFR 95.635(d)(4-5) the emission mask was measured. Emissions more than 150 kHz away from the center frequency must be attenuated below the transmitter output power by at least 20 dB. In addition, emissions 250 kHz or less above and below the MICS band (402-405 MHz) must be attenuated below the maximum permitted output power by at least 20 dB.

Configuration: The emission mask was measured in the same configuration as radiated spurious emissions. All emissions measurements were made with the EUT placed in the tissue substitute material. First, the EUT orientation (horizontal or vertical), the turntable azimuth and measurement antenna height, were maximized to achieve the maximum field strength of the fundamental transmit frequency.

Then, a spectrum analyzer was used to measure the emission mask. A spectrum analyzer using a peak detector with no video filtering was used with a resolution bandwidth equal to approximately 1.0 percent of the emission bandwidth of the EUT. However, various plots were made using different frequency spans and resolution bandwidths in an attempt to not only satisfy the measurement criteria, but to also show that all emissions outside of the occupied band are greatly attenuated.

Completed by:



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02
Customer:	Micro Systems Engineering, Inc.			Temperature:	23 degrees C
Attendees:	Lawrence Koran, Jay Lanz	Tested by:	Greg Kiemel	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(4)	Year:	Most Current	Method:	95.635(d)(4) & ANSI C63.4	Year:	Most Current

SAMPLE CALCULATIONS

COMMENTS

EUT Vertical in Test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Emissions more than 150 kHz away from the center frequency must be attenuated below the transmitter ouput power by at least 20 dB

RESULTS

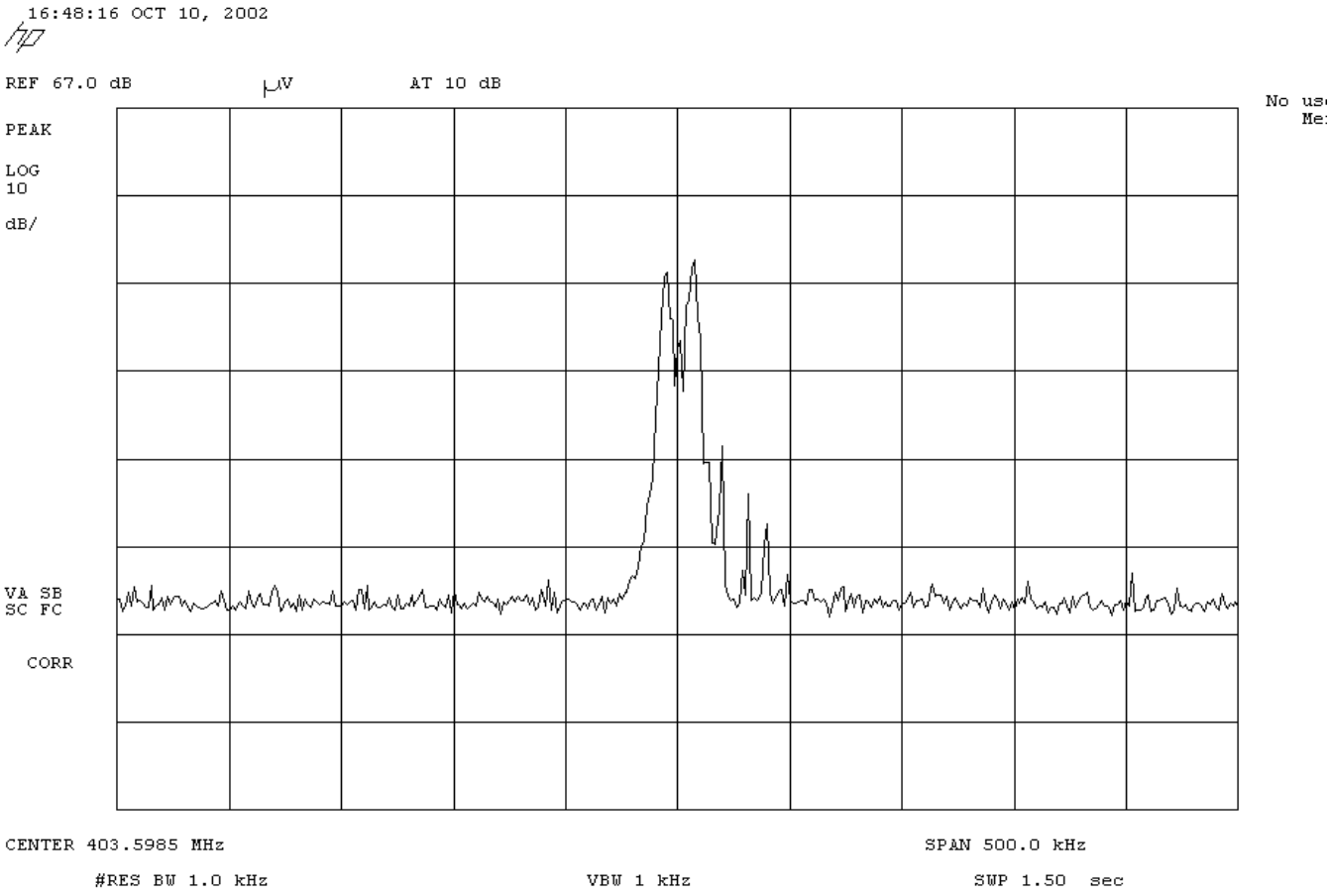
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Emission Mask



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02
Customer:	Micro Systems Engineering, Inc.			Temperature:	23 degrees C
Attendees:	Lawrence Koran, Jay Lanz	Tested by:	Greg Kiemel	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(4)	Year:	Most Current	Method:	95.635(d)(4) & ANSI C63.4	Year:	Most Current

SAMPLE CALCULATIONS

COMMENTS

EUT Vertical in Test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Emissions more than 150 kHz away from the center frequency must be attenuated below the transmitter ouput power by at least 20 dB

RESULTS

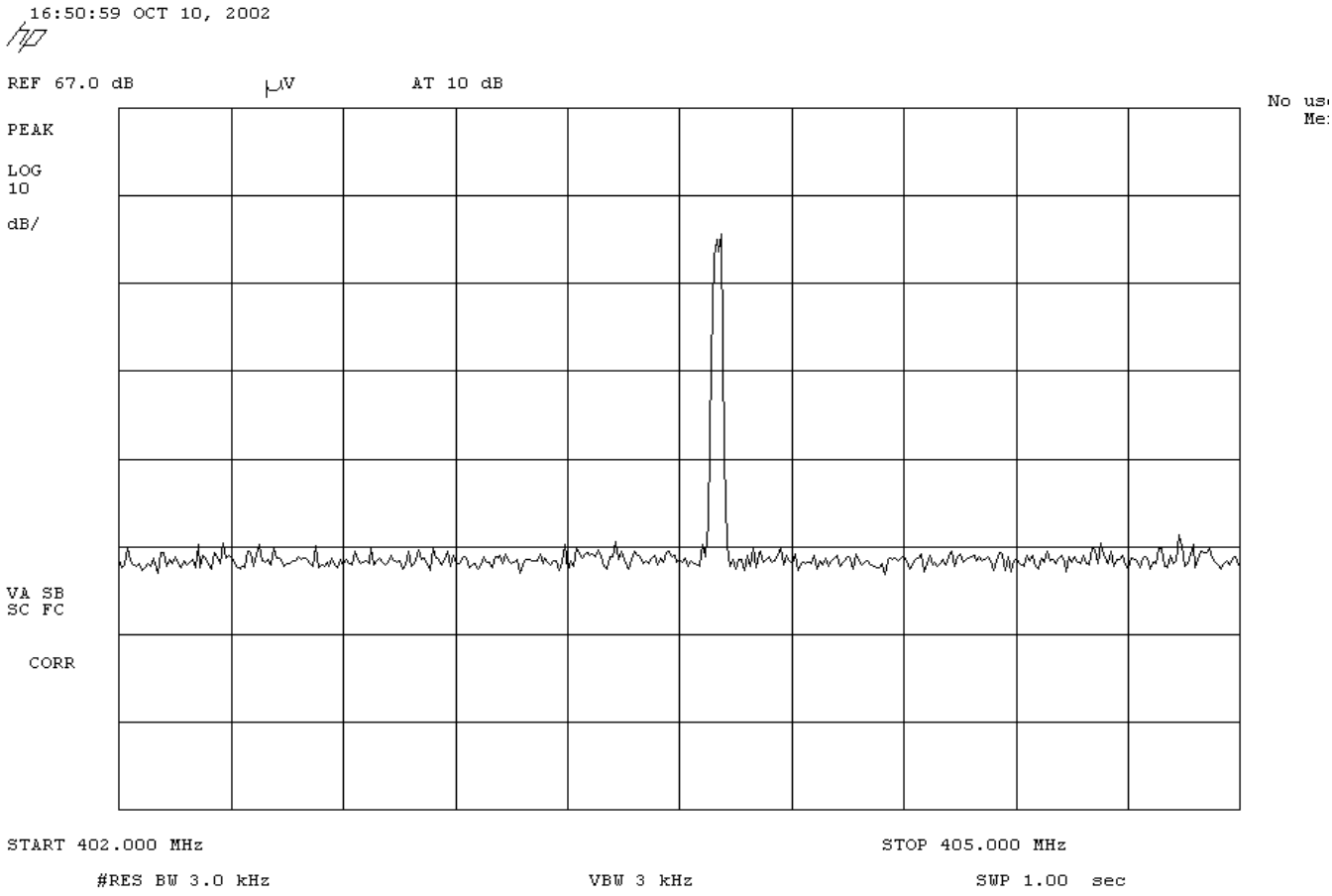
Pass

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Emission Mask



NORTHWEST EMC

EMISSIONS DATA SHEET

Rev BETA 01/30/01

EUT:	Belos DRT			Work Order:	MICR0004
Serial Number:	79630006			Date:	10/10/02
Customer:	Micro Systems Engineering, Inc.			Temperature:	23 degrees C
Attendees:	Lawrence Koran, Jay Lanz	Tested by:	Greg Kiemel	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	47 CFR 95.635(d)(5)	Year:	Most Current	Method:	95.635(d)(5) & ANSI C63.4	Year:	Most Current

SAMPLE CALCULATIONS

COMMENTS

EUT Vertical in Test fixture at 1.5m height

EUT OPERATING MODES

Transmitting single channel

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Emissions 250 kHz or less above and below the MICS band (402-405 MHz) must be attenuated below the maximum permitted ouput power by at least 20 dB

RESULTS

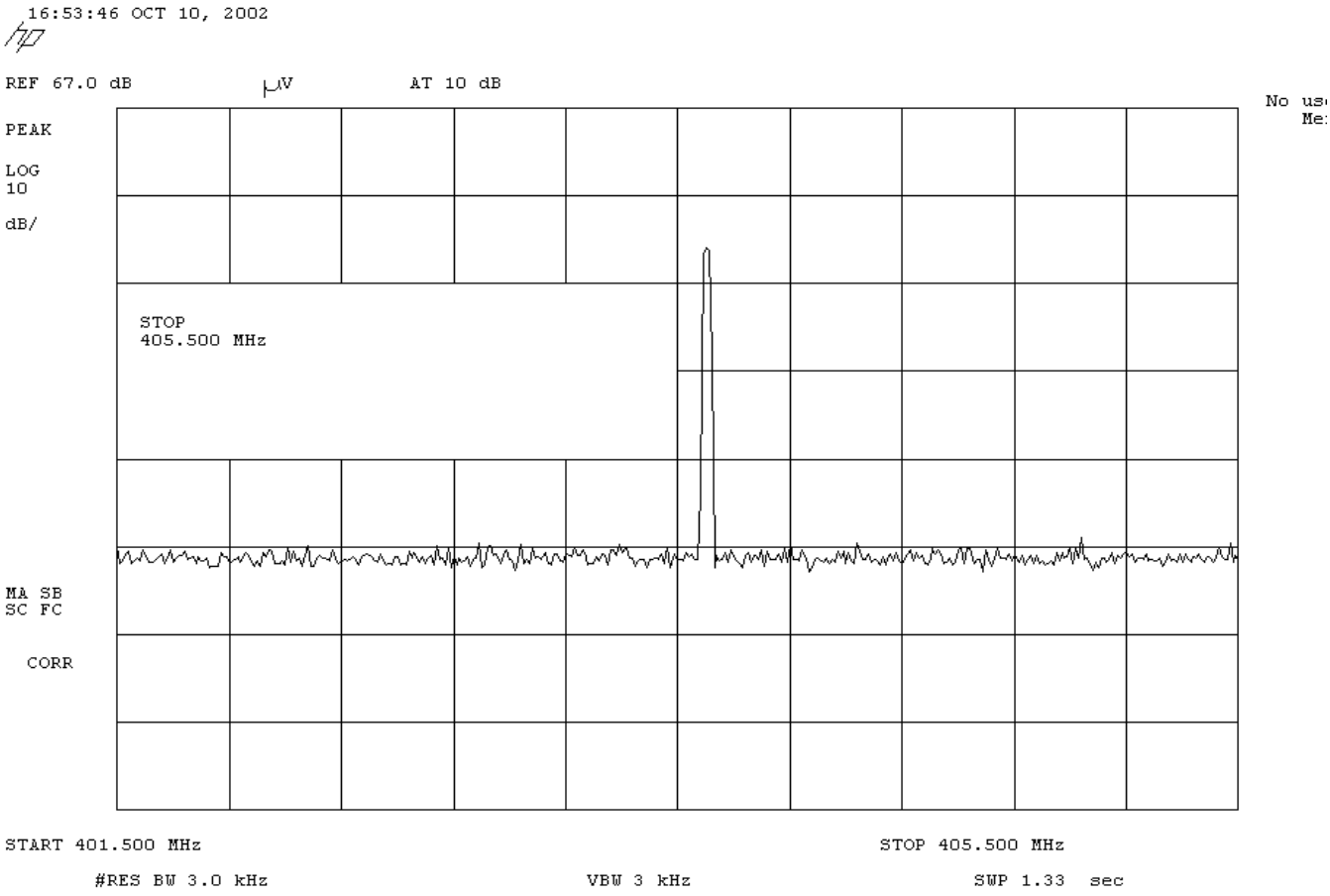
Pass

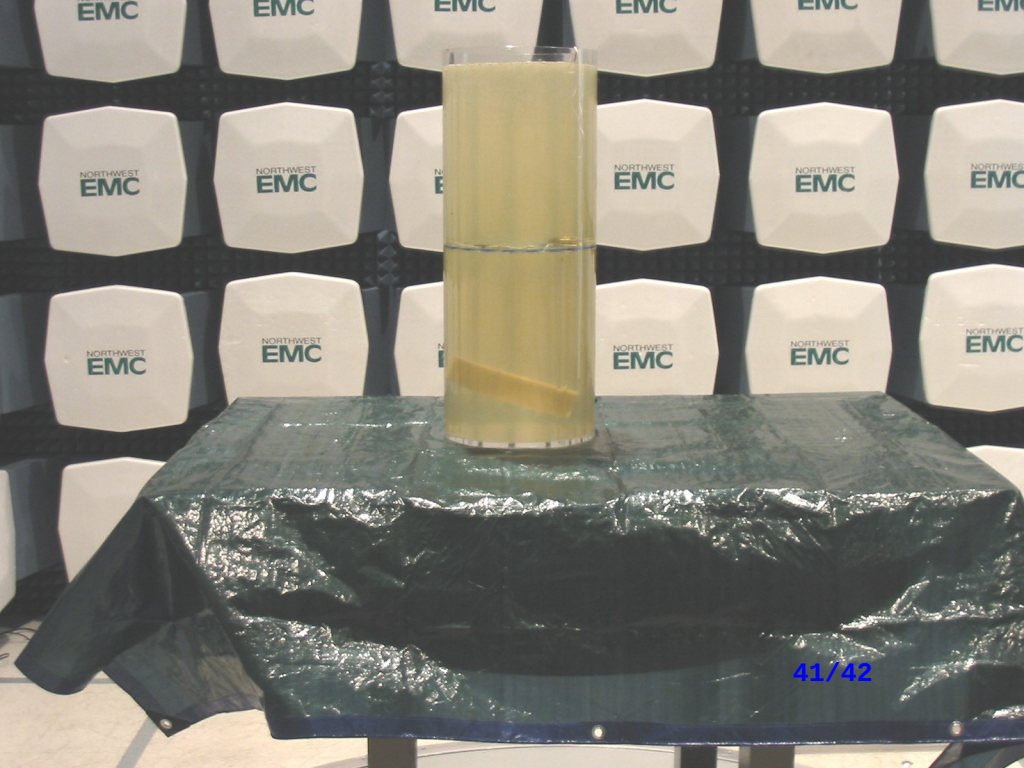
SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Emission Mask




NORTHWEST
EMC
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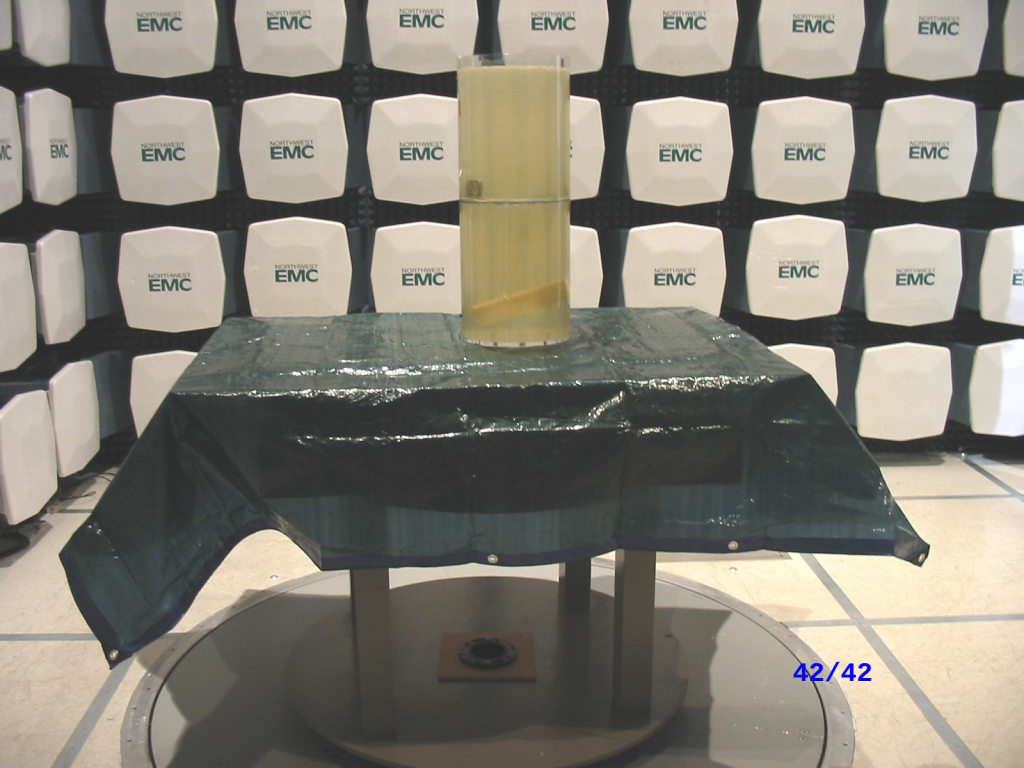
NORTHWEST
EMC
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