Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Emissions Spec:	FCC 15.247	Class:	B
Immunity Spec:		Environment:	

EMC Test Data

For The

Schlumberger

Model

kV MFMM

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Emissions Spec:	FCC 15.247	Class:	B
Immunity Spec:		Environment:	

EUT INFORMATION

General Description

The EUT is a direct sequence spread spectrum transmitter which is designed to work with elcetric power meter to enable continuall monitoring of power usage. Normally, the EUT would be pole mounted during operation. The EUT was, therefore, treated as table top equipment during testing to simulate the end user environment. The electrical rating of the EUT is 120V, 60 Hz

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Schlumberger	KV MFMM	DSSS Transmitter	143	

Other EUT Details

The EUT consists of the transmitter and the power meter. The meter is manufactured by GE.

EUT Enclosure

The EUT does not have an enclosure as it will be installed inside a utility meter.

Modification History

Mod. #	Test	Date	Modification
1	None	-	-

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Emissions Spec:	FCC 15.247	Class:	B
Immunity Spec:		Environment:	

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
GE	kV	Watt-Hr. meter	37076930	
Schlumberger (Note 1)	none	20cm coax SMA to SMB adaptor	none	none

Note 1: Used during antenna port conducted Runs. 1.4dB loss at 917MHz

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

EUT Interface Ports

		Cable(s)		
EUT Port	Connected To	Description	Shielded or Unshielded	Length(m)
Power in	AC Mains	Power cord	Unshielded	2

EUT Operation During Emissions

The UET was continually transmitting at 917.58 MHz.

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	N/A

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 5/7/2001
Test Engineer: Chris/Jay
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.
When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 31°C
Rel. Humidity: 23

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 10000 MHz - Spurious Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	-7.5@ 3670.32MHz
2	6dB Bandwidth	15.247(a)	Pass	1.39MHzBW .89MHz Margin
3	Output Power	15.247(b)	Pass	23.12dBm -6.18dB margin
4	Power Spectral Density (PSD)	15.247(d)	Pass	3.04dBm -5dB margin
5	Processing Gain	15.247(e)	N/A	Manufacturer to provide data.

Modifications Made During Testing:

No modifications were made to the EUT during testing

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	N/A

Deviations From The Standard

No deviations were made from the requirements of the standard.

Run #1: Radiated Spurious Emissions, 1000-10000 MHz. Transmitting @ 917.58 MHz. Sorted by margin
EUT using the OOK modulation scheme

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3670.320	66.5	v	74.0	-7.5	Pk	100	1.0	
3670.320	44.5	v	54.0	-9.5	Avg	100	1.0	Note 1
4587.900	63.4	v	74.0	-10.6	Pk	12	1.0	
4587.900	38.9	v	54.0	-15.1	Avg	12	1.0	Note 1
3670.320	58.6	h	74.0	-15.4	Pk	35	1.3	
4587.900	58.1	h	74.0	-15.9	Pk	30	1.3	
2752.890	58.1	v	74.0	-15.9	Pk	283	1.0	
9175.800	55.6	h	74.0	-18.4	Pk	0	1.0	Noise floor
9175.800	55.4	v	74.0	-18.6	Pk	0	1.0	Noise floor
8258.220	54.9	v	74.0	-19.1	Pk	0	1.0	Noise floor
3670.320	34.5	h	54.0	-19.5	Avg	35	1.3	Note 1
2752.890	54.4	h	74.0	-19.6	Pk	0	1.3	
7340.640	54.1	v	74.0	-19.9	Pk	20	1.0	
4587.900	34.1	h	54.0	-19.9	Avg	30	1.3	Note 1
2752.890	33.8	v	54.0	-20.2	Avg	283	1.0	Note 1
8258.220	53.4	h	74.0	-20.6	Pk	0	1.0	Noise floor
7340.640	52.7	h	74.0	-21.4	Pk	0	1.0	Noise floor
5505.480	51.6	h	74.0	-22.4	Pk	345	1.0	
5505.480	51.2	v	74.0	-22.8	Pk	26	1.0	
7340.640	29.3	v	54.0	-24.7	Avg	20	1.0	Note 1
9175.800	29.1	h	54.0	-24.9	Avg	0	1.0	Note 1; Noise floor
8258.220	28.6	v	54.0	-25.4	Avg	0	1.0	Note 1; Noise floor
5505.480	27.7	h	54.0	-26.3	Avg	345	1.0	Note 1
7340.640	27.2	h	54.0	-26.8	Avg	0	1.0	Note 1; Noise floor
9175.800	26.8	v	54.0	-27.2	Avg	0	1.0	Note 1; Noise floor
5505.480	26.7	v	54.0	-27.3	Avg	26	1.0	Note 1
2752.890	26.4	h	54.0	-27.6	Avg	0	1.3	Note 1
8258.220	26.3	h	54.0	-27.7	Avg	0	1.0	Note 1; Noise floor

Note 1: 12.8dB subtracted from the measured average readings for duty cycle correction.

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	N/A

Run #2: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	Graph reference #
Mid	917.58	100kHz	1.390MHz	T43286/005

Run #3: Output Power

Channel	Frequency (MHz)	Res BW	Output Power	Graph reference #
Mid	917.355	3MHz	23.12dBm	T43286/004

Run #4: Power Spectral Density

Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)	Graph reference #
Low	917.355	3kHz	3.04dBm	T43286/006

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Conducted Emissions - Power Ports

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 5/7/2001
Test Engineer: Jay Dickinson
Test Location: SVOATS #3

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUTwas located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 31°C
Rel. Humidity: 23

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power 120V/60Hz	FCC B	Pass	-22.3dB @ 20.269MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30 MHz 120 V / 60 Hz

Frequency	Level	Power	FCC-B	FCC-B	Detector	Comments
MHz	dBuV	Lead	Limit	Margin	Function	
20.2690	25.7	Neutral	48.0	-22.3	QP	
20.4850	22.5	Line 1	48.0	-25.5	QP	
2.6980	22.5	Neutral	48.0	-25.5	QP	
9.3818	22.2	Line 1	48.0	-25.8	QP	
0.4724	16.4	Line 1	48.0	-31.6	QP	

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 5/7/2001
Test Engineer: Chris Byleckie
Test Location: SVOATS #3

Config. Used: 1
Config Change:
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 10 meters from the EUT for the measurement range 30 - 1000 MHz and 3m from the EUT for the frequency range 1 - 10 GHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Ambient Conditions:

Temperature: 31°C
Rel. Humidity: 23

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Preliminary Scan 30 - 1000 MHz	FCC B	Eval	-2.5dB @ 279.586MHz
2	RE, 30 - 1000MHz - Maximized Emissions	FCC B	Pass	-2.5dB @ 279.586MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing
Modifications are detailed under each run description.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Run #1: Preliminary Radiated Emissions, 30-1000 MHz
14.5647MHz, 32 kHz (transmitter) / 7.987, 20 MHz (meter)
Measurements made at 3m

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
279.586	43.5	h	46.0	-2.5	QP	277	1.2	
215.690	40.4	h	43.5	-3.1	QP	284	1.0	
183.721	39.2	h	43.5	-4.3	QP	280	1.0	
207.703	39.1	h	43.5	-4.4	QP	52	2.0	Signal Substitution
247.638	41.2	h	46.0	-4.8	QP	260	1.0	
191.708	38.1	h	43.5	-5.4	QP	94	1.0	Signal Substitution
199.695	37.7	h	43.5	-5.8	QP	300	1.0	Signal Substitution
255.625	39.4	h	46.0	-6.6	QP	79	1.3	
974.928	47.2	v	54.0	-6.8	QP	0	1.0	
175.734	34.3	h	43.5	-9.2	QP	65	1.0	Signal Substitution
311.556	36.7	h	46.0	-9.3	QP	256	1.0	
415.408	34.3	h	46.0	-11.7	QP	0	1.5	
343.511	34.0	h	46.0	-12.0	QP	0	1.0	
447.360	34.0	h	46.0	-12.0	QP	33	1.5	
511.272	34.0	h	46.0	-12.0	QP	0	1.5	
974.928	41.8	h	54.0	-12.2	QP	0	3.0	
271.599	33.3	h	46.0	-12.7	QP	258	1.3	
431.302	33.3	h	46.0	-12.7	QP	188	1.0	
215.649	30.7	v	43.5	-12.8	QP	0	1.0	
167.747	30.7	h	43.5	-12.8	QP	313	1.2	
327.534	33.0	h	46.0	-13.0	QP	0	1.0	
335.521	31.7	h	46.0	-14.3	QP	0	1.0	
319.543	30.5	h	46.0	-15.5	QP	27	1.0	
351.490	30.0	h	46.0	-16.0	QP	0	1.0	
167.727	26.9	v	43.5	-16.6	QP	182	1.0	
79.870	22.3	v	40.0	-17.7	QP	280	1.0	
135.779	25.2	h	43.5	-18.3	QP	0	1.6	
961.270	35.6	v	54.0	-18.4	QP	0	1.0	
375.463	27.2	h	46.0	-18.8	QP	173	1.0	
140.000	23.8	v	43.5	-19.7	QP	0	1.0	
367.476	24.0	h	46.0	-22.0	QP	0	1.0	
60.000	16.8	v	40.0	-23.2	QP	0	1.0	
401.441	18.9	v	46.0	-27.1	QP	0	1.0	Signal + ambient
401.441	18.3	h	46.0	-27.7	QP	320	4.0	

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Run #2: Maximized Readings From Run #1

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
279.586	43.5	h	46.0	-2.5	QP	277	1.2	10dB lower during max
215.690	40.4	h	43.5	-3.1	QP	284	1.0	6dB lower during max
183.721	39.2	h	43.5	-4.3	QP	280	1.0	6dB lower during max
207.703	39.1	h	43.5	-4.4	QP	52	2.0	Signal Substitution
247.638	41.2	h	46.0	-4.8	QP	260	1.0	10dB lower during max
191.708	38.1	h	43.5	-5.4	QP	94	1.0	Signal Substitution

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 5/14/2001
Test Engineer: Chris/Vishal
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 3 meters from the EUT for the measurement range 30 - 1000 MHz and 3m from the EUT for the frequency range 1 - 10 GHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 31°C
Rel. Humidity: 23

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Preliminary Scan 30 - 1000 MHz	FCC B	Pass	-5.2dB @ 974.928MHz
2	RE, 30 - 1000MHz - Maximized Emissions	FCC B	Pass	-2.9dB @ 974.928MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

The purpose of this scan is to compare the transmitter emission levels using the CCSK modulation with the levels measured on 5/7/01 using the OOK modulation scheme.

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Run #1: Preliminary Radiated Emissions, 30-1000 MHz. Sorted by margin

Measurements made at 3m

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
974.928	48.8	v	54.0	-5.2	QP	300	1.5	
974.928	40.7	h	54.0	-13.3	QP	10	1.0	
401.441	25.3	v	46.0	-20.7	QP	270	1.5	Signal + Ambient with OOK
401.441	24.5	v	46.0	-21.5	QP	270	1.5	Signal + Ambient
401.441	24.3	h	46.0	-21.7	QP	310	1.0	Signal + Ambient
401.441	24.2	h	46.0	-21.8	QP	310	1.0	Signal + Ambient with OOK

Run #2 Maximized Emissions from Run #1. Sorted by margin

Measurements made at 3m

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
974.928	51.1	v	54.0	-2.9	QP	300	1.5	OOK
974.928	50.8	v	54.0	-3.2	QP	300	1.5	

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Conducted Emissions - Power Ports

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 5/14/2001
Test Engineer: Jay Dickinson
Test Location: SVOATS #3

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUTwas located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 15°C
Rel. Humidity: 62%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power 120V/60Hz	FCC-B	Pass	-20.6dB @ 19.679MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

The purpose of this scan is to compare the transmitter emission levels using the CCSK modulation with the levels measured on 5/7/01 using the OOK modulation scheme.

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30 MHz 120 V / 60 Hz

Frequency	Level	Power	FCC-B		Detector	Comments
MHz	dBuV	Lead	Limit	Margin	Function	
19.6794	27.4	Line 1	48.0	-20.6	QP	
19.6784	25.9	Neutral	48.0	-22.1	QP	
9.4074	22.0	Neutral	48.0	-26.0	QP	
9.4044	19.7	Line 1	48.0	-28.3	QP	
2.7044	17.5	Neutral	48.0	-30.5	QP	
0.4724	16.4	Line 1	48.0	-31.6	QP	

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	N/A

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 5/14/2001
Test Engineer: Jay/ Chris
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.
When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected

Ambient Conditions:

Temperature: 15°C
Rel. Humidity: 62%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 10000 MHz - Spurious Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	-8.0dB @ 3670.320MHz
2	6dB Bandwidth	15.247(a)	Pass	1.385MHzBW .885MHz Margin
3	Output Power	15.247(b)	Pass	22.58dBM - 7.42dB Margin
4	Power Spectral Density (PSD)	15.247(d)	Pass	3.97dBM - 4.03 dB Margin
5	Processing Gain	15.247(e)	N/A	Manufacturer to provide data.

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	N/A

The purpose of this scan is to compare the transmitter emission levels using the CCSK modulation with the levels measured on 5/7/01 using the OOK modulation scheme.

Run #1a: Radiated Spurious Emissions, 1000-10000 MHz. Transmitting @ 917.58 MHz. Sorted by margin
EUT using the CCSK modulation scheme.

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3670.320	66.0	v	74.0	-8.0	Pk	99	1.0	
3670.320	65.7	h	74.0	-8.3	Pk	20	1.5	
4587.900	61.2	v	74.0	-12.8	Pk	30	1.2	
2752.890	58.2	v	74.0	-15.8	Pk	264	1.0	
2752.890	57.8	h	74.0	-16.2	Pk	300	1.1	
4587.900	57.0	h	74.0	-17.0	Pk	320	1.5	
9175.800	56.7	v	74.0	-17.3	Pk	300	1.4	
7340.640	54.9	h	74.0	-19.1	Pk	300	1.5	
3670.320	34.8	v	54.0	-19.2	Avg	99	1.0	Note 2
3670.320	33.9	h	54.0	-20.1	Avg	20	1.5	Note 2
9175.800	53.8	h	74.0	-20.2	Pk	80	1.2	
7340.640	52.9	v	74.0	-21.1	Pk	50	1.1	
8258.220	52.0	h	74.0	-22.0	Pk	320	1.5	
8258.220	51.8	v	74.0	-22.2	Pk	320	1.1	
5505.480	50.5	v	74.0	-23.5	Pk	320	1.0	
5505.480	48.7	h	74.0	-25.3	Pk	45	1.5	
4587.900	26.9	v	54.0	-27.1	Avg	30	1.2	Note 2
9175.800	25.0	v	54.0	-29.0	Avg	300	1.4	Note 2
2752.890	24.2	v	54.0	-29.8	Avg	264	1.0	Note 2
7340.640	22.5	h	54.0	-31.5	Avg	300	1.5	Note 2
4587.900	22.2	h	54.0	-31.8	Avg	320	1.5	Note 2
2752.890	22.0	h	54.0	-32.0	Avg	300	1.1	Note 2
9175.800	22.0	h	54.0	-32.0	Avg	80	1.2	Note 2
7340.640	20.5	v	54.0	-33.5	Avg	50	1.1	Note 2
5505.480	19.8	v	54.0	-34.2	Avg	320	1.0	Note 2
8258.220	18.7	v	54.0	-35.3	Avg	320	1.1	Note 2
8258.220	18.7	h	54.0	-35.3	Avg	320	1.5	Note 2
5505.480	16.5	h	54.0	-37.5	Avg	45	1.5	Note 2

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	19.7dB subtracted from the measured average readings for duty cycle correction.

Client:	Schlumberger	Job Number:	J43284
Model:	kV MFMM	T-Log Number:	T43286
		Proj Eng:	David Bare
Contact:	Doug Gronberg		
Spec:	FCC 15.247	Class:	N/A

If any levels measured in Run 1a were higher than the levels measured on 5/7/01 the modulation scheme was changed from CCSK to OOK using an optical probe. The azimuth and antenna hieght were not changed. This insured that the EUT would be the same position for each measurement

Run #1b: Radiated Spurious Emissions, 1000-10000 MHz. Transmitting @ 917.58 MHz.
EUT using the OOK modulation scheme.

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3670.320	65.9	h	74.0	-8.1	Pk	20	1.5	OOK modulation
3670.320	45.3	h	54.0	-8.7	Avg	20	1.5	OOK modulation, Note 3
2752.890	58.1	h	74.0	-15.9	Pk	300	1.1	OOK modulation
2752.890	40.5	h	54.0	-13.5	Avg	300	1.1	OOK modulation, Note 3

Note 3:	12.8dB subtracted from the measured average readings for duty cycle correction.

Run #2: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	Graph reference #
Mid	917.58	100kHz	1.385MHz	Run#2

Run #3: Output Power

Channel	Frequency (MHz)	Res BW	Output Power	Graph reference #
Mid	917.655	3MHz	22.58dBm	Run#3

Run #4: Power Spectral Density

Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)	Graph reference #
Low	917.409	3kHz	3.97dBm	Run#4