Elliott Laboratories Inc.
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684 West Maude Avenue
Sunnyvale, CA 94086-3518
408-245-7800 Phone
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May 25, 2001

American TCB
6731 Whittier Avenue
McLean, VA 22101

Gentlemen:

The enclosed documents constitute a formal submittal and application for a Grant of Equipment Authorization pursuant to Subpart C of Part 15 of FCC Rules (CFR 47) regarding intentional radiators. Data within this report demonstrates that the equipment tested complies with the FCC limits for intentional radiators.

Elliott Laboratories, as duly authorized agent prepared this submittal. A copy of the letter of our appointment as agent is enclosed.

If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance.

Sincerely,

David W. Bare
Chief Technical Officer

DWB/pjp
Enclosures: Agent Authorization Letter
Emissions Test Report with Exhibits

File: R43531

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Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to FCC Part 15, Subpart C Specifications for an Intentional Radiator on the Schlumberger - RMS Div. Model: Endpoint Transceiver (eT)

FCC ID:	F9C25-1962
GRANTEE:	Schlumberger - RMS Div. 125 Shoreway Road San Carlos, CA 94070
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	May 25, 2001
FINAL TEST DATE:	April 17, 2001

AUTHORIZED SIGNATORY: _____

David W. Bare
Chief Technical Officer

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SCOPE

An electromagnetic emissions test has been performed on the Schlumberger - RMS Div. model Endpoint Transceiver (eT) pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Schlumberger - RMS Div. model Endpoint Transceiver (eT) and therefore apply only to the tested sample. The sample was selected and prepared by Jefferson Webster of Schlumberger - RMS Div.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units that are subsequently manufactured.

STATEMENT OF COMPLIANCE

The tested sample of Schlumberger - RMS Div. model Endpoint Transceiver (eT) complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators.

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product that may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Schlumberger - RMS Div. model Endpoint Transceiver (eT). The actual test results are contained in an exhibit of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

Conducted emissions was not performed on the EUT as it does not have an AC power port.

LIMITS OF ANTENNA CONDUCTED POWER

All emissions from the device were measured as field strength since the EUT does not have an antenna port.

LIMITS OF RADIATED INTERFERENCE FIELD STRENGTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.247 and 15.209 in the case of emissions falling within the frequency bands specified in Section 15.205.

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an exhibit of this report.

30-1000 MHz

Frequency MHz	Level dBuV/m	Pol v/h	FCC 15.247 Limit	FCC 15.247 Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
3640.000	52.6	V	54.0	-1.4	Avg	341	1.1	-

LIMITS OF POWER AND BANDWIDTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.247.

The maximum power output was 22.4 dBm at 911.58 MHz. The minimum 6 dB bandwidth was 1.35 Megahertz at 911.58 MHz. The maximum power spectral density was 2.8 dBm at 911.58 MHz. The actual test data and any correction factors are contained in an exhibit of this report.

MEASUREMENT UNCERTAINTIES

ISO Guide 25 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.2

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Schlumberger - RMS Div. model Endpoint Transceiver (eT) is a pulse direct sequence spread spectrum radio designed for gas meters. The EUT is a module with the definition provided by the FCC. Normally, the EUT would be installed in a system 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 10.5 - 15.5V DC. The sample was received and tested on April 17, 2001. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Schlumberger	Endpoint Transceiver	DSSS radio	A15	-

ENCLOSURE

The EUT will be installed inside a utility meter enclosure.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with the specification

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
BK Precision	1682	Power Supply	282-00001	n/a

No remote support equipment was used during emissions testing.

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

		Cable(s)		
EUT Port	Connected To	Description	Shielded or Unshielded	Length (m)
Interface ribbon cable	support	RS232	Unshielded	1.5

TEST SOFTWARE

The EUT was set to continuously pulse transmissions at one-second intervals at full power. Normally, the EUT would only transmit an average of once every 5 minutes.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on April 17, 2001 at the Elliott Laboratories Open Area Test Site #3 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

POWER METER

A power meter and thermister mount are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS, SECTION 15.207

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.209

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - B = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level - Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

Radiated Emissions, 30 - 6500 MHz, 16-Apr-01 05:37 PM
Engineer: David

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Dorado International Corp	Horn Antenna, 1 - 12 GHz	GH1-12N	1258		11/9/2000	11/9/2001
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	773	12	2/15/2001	2/15/2002
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	787	12	2/14/2001	2/14/2002
Hewlett Packard	Microwave Preamplifier 0.5-26.5GHz	83017A	1257	12	10/16/2000	10/16/2001

Radiated Emissions, 30 - 1000 MHz, 18-Apr-01 05:12 PM
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	11	10/12/2000	10/12/2001
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	12	8/17/2000	8/17/2001
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	12	1/30/2001	1/30/2002
Rohde & Schwarz	Test Receiver, 20-1300MHz	ESVP	273	12	10/5/2000	10/5/2001

Radiated Emissions, 1 - 9 GHz, 18-Apr-01 05:12 PM
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Horn antenna, D. Ridge 1-18GHz (SA40 system antenna)	3115	1142	12	1/29/2001	1/29/2002
Hewlett Packard	Microwave EMI test system (SA40, 30Hz - 40GHz)	84125C	1149	12	2/5/2001	2/5/2002

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T43018	20 Pages
Processing Gain	4 Pages
Maximum Permissible Exposure	2 Pages

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Emissions Spec:	FCC 15.247 (Direct Sequence)	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Schlumberger

Model

Endpoint Transceiver (eT)

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Emissions Spec:	FCC 15.247 (Direct Sequence)	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a pulse direct sequence spread spectrum radio which is designed for Gas meters. The EUT is a module with the definition provided by the FCC. Normally, the EUT would be installed in a system 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 10.5 - 15.5V DC.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Schlumberger	Endpoint Transceiver	DSSS radio	A15	-

EUT Enclosure

The EUT will be installed inside a utility meter enclosure.

Modification History

Mod. #	Test	Date	Modification
1	None	-	-

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Emissions Spec:	FCC 15.247 (Direct Sequence)	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
BK Precision	1682	Power Supply	282-00001	n/a

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
-	-	-	-	-

EUT Interface Ports

		Cable(s)		
EUT Port	Connected To	Description	Shielded or Unshielded	Length(m)
Interface ribbon cable	support	RS232	unshielded	1.5

EUT Operation During Emissions

The EUT was set to continuously pulse transmissions at full power.

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	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: 4/17/2001
Test Engineer: jmartinez
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 12Vdc

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 21°C
Rel. Humidity: 23%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 9115.8 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-1.5dB @ 3640 MHz
2a, 2b	6dB Bandwidth	15.247(a)(2)	Pass	Refer to Run
3a, 3b	Output Power	15.247(b)(1)	Pass	Refer to Run
4a, 4b	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to Run
N/A	Processing Gain	15.247(e)(1)(2)	Pass	Manufacturer 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:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #1: Radiated Spurious Emissions, 30-9115.8 MHz. Center Channel @ 911.58 MHz

	H	V
Fundamental emission @ 3m in 100kHz RBW:	100.7	110.3
Limit for emissions outside of restricted bands:	90.3 dBµV/m	

Modulation: CCSK worst case modulation tested only

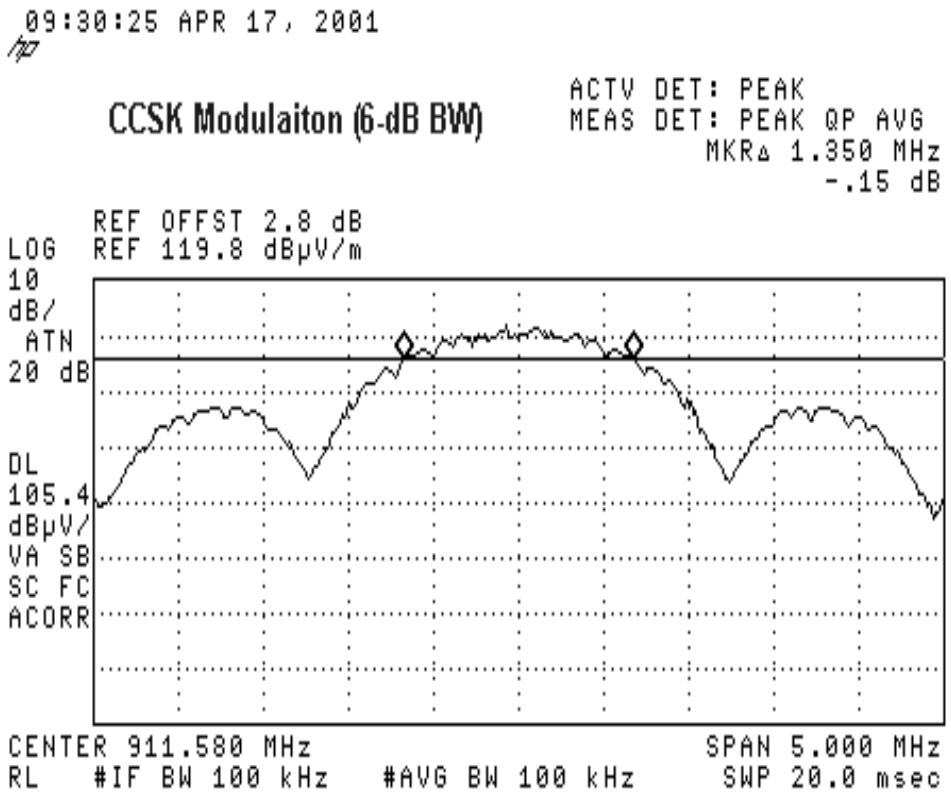
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
956.297	37.6	h	90.3	-52.7	PK	360	1.0	
956.297	40.6	v	90.3	-49.7	PK	221	1.0	
1823.000	70.5	h	90.3	-19.8	Pk	91	1.2	
2734.000	49.4	h	54.0	-4.6	Pk	21	1.4	Restricted Band
3640.000	55.5	h	74.0	-18.5	Pk	245	1.2	Restricted Band
3640.000	36.3	h	54.0	-17.7	Avg	245	1.2	Restricted Band
4550.000	49.5	h	54.0	-4.5	Pk	255	1.3	Restricted Band
5469.890	51.2	h	54.0	-2.8	Pk	212	1.3	Restricted Band
6380.000	53.7	h	90.3	-36.7	Pk	391	1.1	
7292.000	48.2	h	54.0	-5.8	Pk	222	1.3	Restricted Band
8200.000	51.2	h	54.0	-2.8	Pk	231	1.2	Restricted Band
9115.800	43.2	h	54.0	-10.8	Pk	245	1.2	Restricted Band
1823.000	73.4	v	90.3	-16.9	Pk	320	1.0	
2734.000	50.5	v	74.0	-23.5	Pk	343	1.0	Restricted Band
2734.000	35.2	v	54.0	-18.8	Avg	343	1.0	Restricted Band
3640.000	63.5	v	74.0	-10.5	Pk	341	1.1	Restricted Band
3640.000	52.6	v	54.0	-1.4	Avg	341	1.1	Restricted Band
4550.000	51.3	v	74.0	-22.7	Pk	17	1.7	Restricted Band
4550.000	36.9	v	54.0	-17.1	Avg	17	1.7	Restricted Band
5469.890	48.5	v	74.0	-25.5	Pk	320	1.5	Restricted Band
5469.890	32.5	v	54.0	-21.5	Avg	320	1.5	Restricted Band
6380.000	40.8	v	90.3	-49.6	Pk	310	1.5	
7292.000	57.7	v	74.0	-16.3	Pk	366	1.3	Restricted Band
7292.000	40.8	v	54.0	-13.2	Avg	366	1.3	Restricted Band
8200.000	60.2	v	74.0	-13.8	Pk	364	1.0	Restricted Band
8200.000	42.4	v	54.0	-11.6	Avg	364	1.0	Restricted Band
9115.800	66.4	v	74.0	-7.6	Pk	332	1.2	Restricted Band
9115.800	44.9	v	54.0	-9.1	Avg	332	1.2	Restricted Band

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #2a: Signal Bandwidth
Modulation: CCSK

Channel	Frequency (MHz)	Resolution Bandwidth	Limit 15.247(a)(2)	6dB Signal Bandwidth
Low	911.58	100 kHz	≥ 500 kHz	1.35 MHz

Note 1:	Add note here
Note 2:	

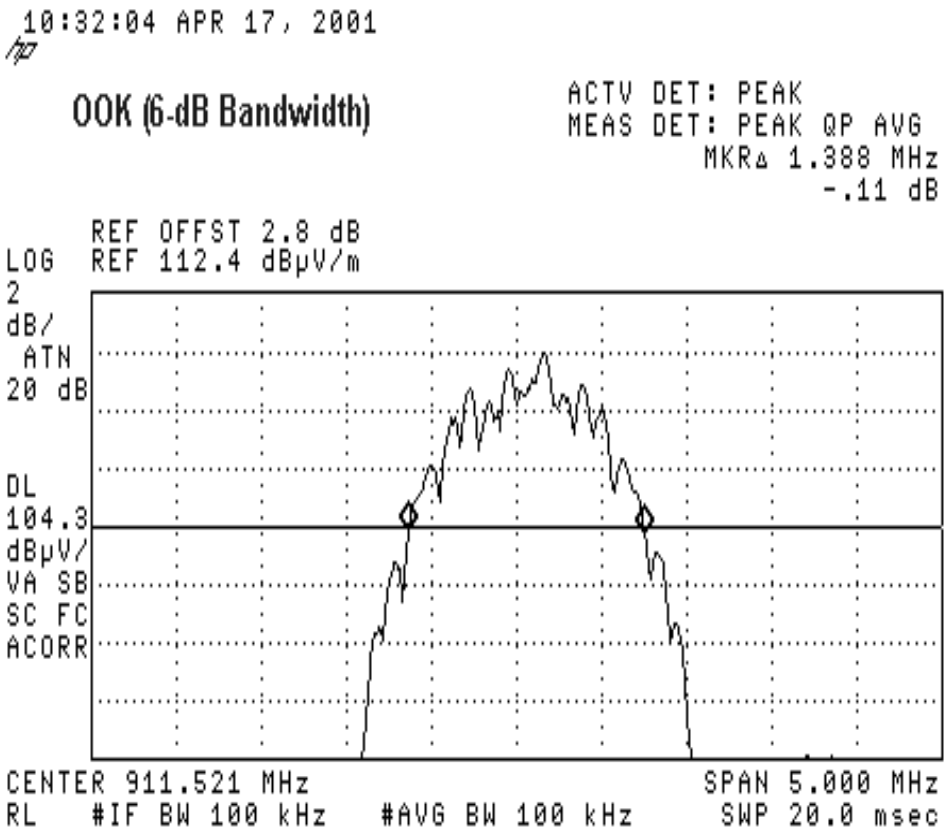


Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #2b: Signal Bandwidth
Modulation: OOK

Channel	Frequency (MHz)	Resolution Bandwidth	Limit 15.247(a)(2)	6dB Signal Bandwidth
Low	911.58	100 kHz	≥ 500 kHz	1.388 MHz

Note 1:	Add note here
Note 2:	

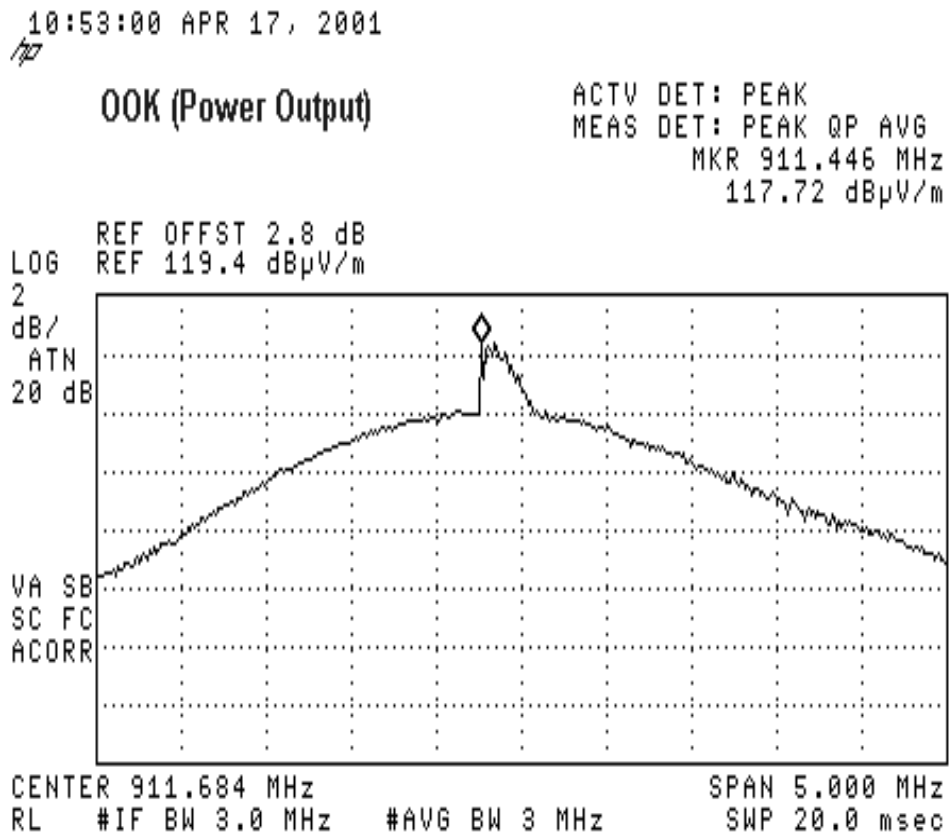


Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #3a: Output Power
Modulation: OOK

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	Output Power
Low	911.58	100.73	H	3 MHz	5.43
Low	911.58	117.72	V	3 MHz	22.42

Note 1:	Add note here
Note 2:	

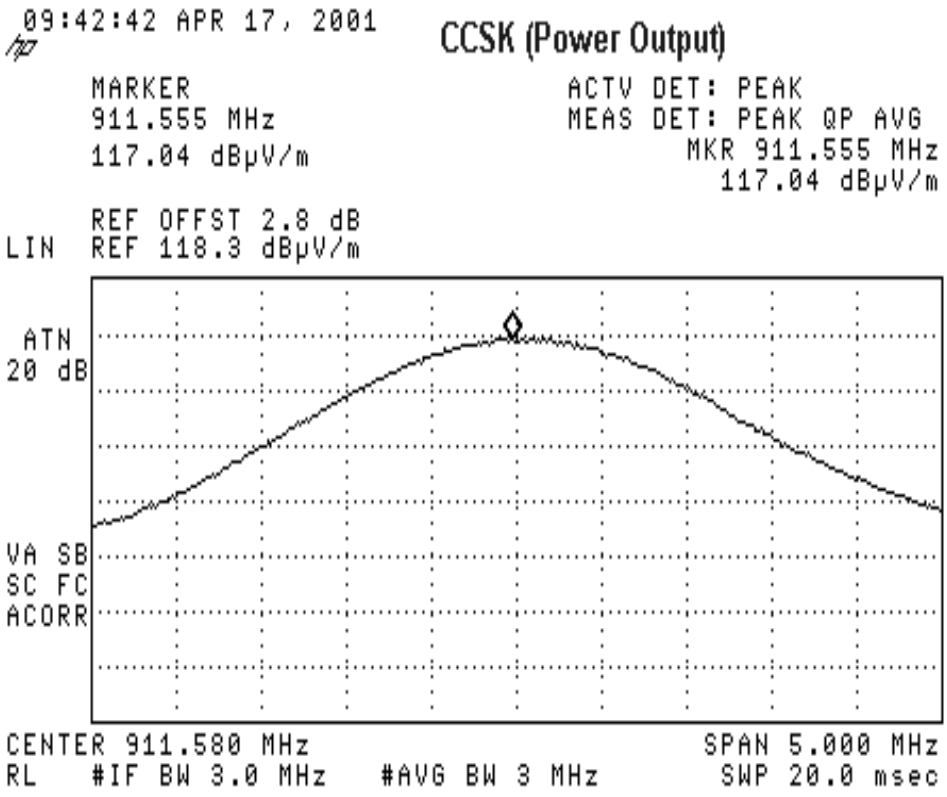


Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #3b: Output Power
Modulation: CCSK

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	Output Power
Low	911.58	107.46	H	3 MHz	12.16
Low	911.58	117.04	V	3 MHz	21.74

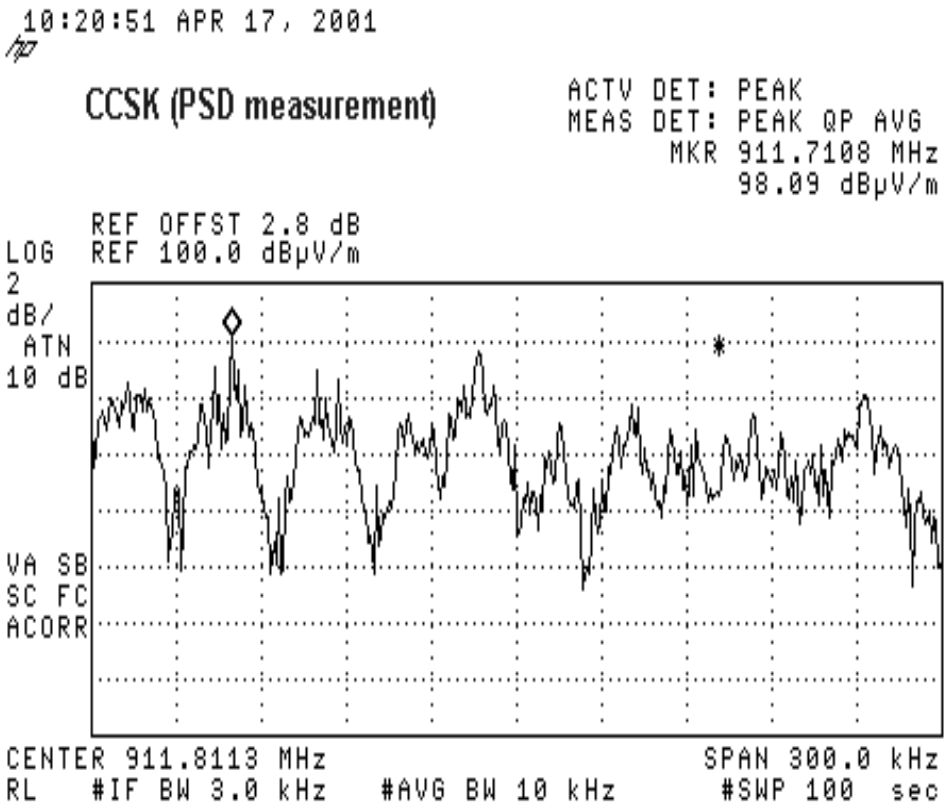
Note 1:	Add note here
Note 2:	



Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #4a: Power Spectral Density
Modulation: CCSK

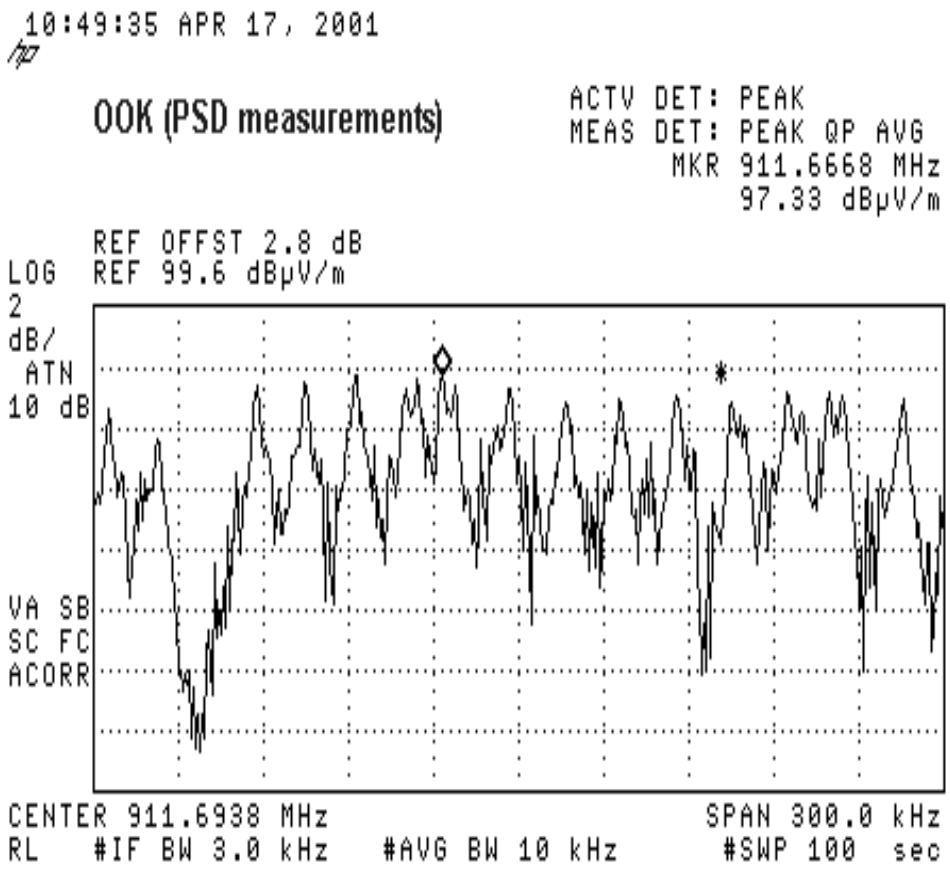
Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)
Low	911.58	89.48	H	3 kHz	-5.82
Low	911.58	98.09	V	3 kHz	2.79



Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #4b: Power Spectral Density
Modulation: OOK

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)
Low	911.58	83.64	H	3 kHz	-11.66
Low	911.58	97.33	V	3 kHz	2.03



Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	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: 4/17/2001
Test Engineer: jmartinez
Test Location: SVOATS #3
Config. Used: 1
Config Change: None
EUT Voltage: 12Vdc

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 21°C
Rel. Humidity: 23%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a	RE, 30 - 9175.8 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-8.9dB @ 3670 MHz
1b	RE, 30 - 9175.8 MHz - Spurious Emissions In	FCC Part 15.209 / 15.247(c)	Pass	-2.8dB @ 9175.89 MHz
2a, 2b	6dB Bandwidth	15.247(a)(2)	Pass	Refer to Run
3a, 3b	Output Power	15.247(b)(1)	Pass	Refer to Run
4a, 4b	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to Run
N/A	Processing Gain	15.247(e)(1)(2)	Pass	Manufacturer provide data.

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

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.

Run #1a: Radiated Spurious Emissions, 30-9175.8 MHz. Center Channel @ 917.68 MHz
Modulation: OOK

	H	V
Fundamental emission @ 3m in 100kHz RBW:	106.1	107.9
Limit for emissions outside of restricted bands:	87.9 dBµV/m	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2752.000	50.8	h	74.0	-23.2	Pk	61	1.6	Restricted Band
2752.000	31.0	h	54.0	-23.0	Avg	61	1.6	Restricted Band
3670.000	59.9	h	74.0	-14.1	Pk	320	1.6	Restricted Band
3670.000	36.9	h	54.0	-17.2	Avg	320	1.6	Restricted Band
4587.000	39.3	h	74.0	-34.7	Pk	0	1.1	Restricted Band
4587.000	24.5	h	54.0	-29.5	Avg	0	1.1	Restricted Band
5505.000		h	74.0	-74.0	Pk			Restricted Band
5505.000		h	54.0	-54.0	Avg			Restricted Band
6423.000		h	74.0	-74.0	Pk			Restricted Band
6423.000		h	54.0	-54.0	Avg			Restricted Band
7340.000		h	74.0	-74.0	Pk			Restricted Band
8258.000		h	54.0	-54.0	Avg			Restricted Band
9175.800		h	74.0	-74.0	Pk			Restricted Band
2752.000	52.3	V	74.0	-21.7	Pk	159	1.1	Restricted Band
2752.000	31.3	V	54.0	-22.7	Avg	159	1.1	Restricted Band
3670.000	65.2	V	74.0	-8.8	Pk	27	1.6	Restricted Band
3670.000	35.3	V	54.0	-18.7	Avg	27	1.6	Restricted Band
4587.000		V	74.0	-74.0	Pk			Restricted Band
4587.000		V	54.0	-54.0	Avg			Restricted Band
7340.000	61.0	V	74.0	-13.0	Pk	0	1.2	Restricted Band
7340.000	38.2	V	54.0	-15.8	Avg	0	1.2	Restricted Band
8258.000	64.9	V	74.0	-9.2	Pk	0	1.3	Restricted Band
8258.000	43.3	V	54.0	-10.8	Avg	0	1.3	Restricted Band
9175.800	67.6	V	74.0	-6.4	Pk	0	1.3	Restricted Band
9175.800	44.4	V	54.0	-9.6	Avg	0	1.3	Restricted Band
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.							

Elliott

EMC Test Data

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #2: Radiated Spurious Emissions, 30-9175.8 MHz. High Channel @ 917.58 MHz
Modulation: CCSK

	H	V
Fundamental emission @ 3m in 100kHz RBW:	107.9	109.0
Limit for emissions outside of restricted bands:	89.0 dBµV/m	

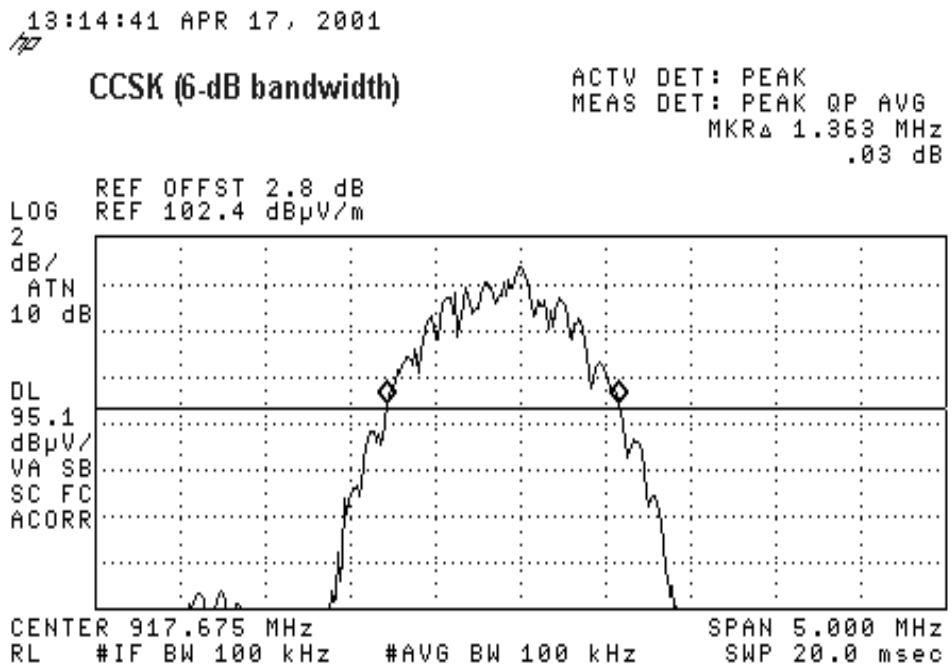
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2752.000	52.0	v	74.0	-22.0	Pk	309	1.2	Restricted Band
2752.000	34.6	v	54.0	-19.4	Avg	309	1.2	Restricted Band
3670.000	66.6	v	74.0	-7.4	Pk	352	1.3	Restricted Band
3670.000	44.1	v	54.0	-9.9	Avg	352	1.3	Restricted Band
4587.000	50.9	v	74.0	-23.1	Pk	361	1.2	Restricted Band
4587.000	37.2	v	54.0	-16.8	Avg	361	1.2	Restricted Band
7340.000	61.3	v	74.0	-12.8	Pk	329	1.3	Restricted Band
7340.000	41.6	v	54.0	-12.4	Avg	329	1.3	Restricted Band
8258.000	65.3	v	74.0	-8.7	Pk	358	1.4	Restricted Band
8258.000	44.0	v	54.0	-10.0	Avg	358	1.4	Restricted Band
9175.800	68.4	v	74.0	-5.6	Pk	0	1.2	Restricted Band
9175.800	51.3	v	54.0	-2.7	Avg	0	1.2	Restricted Band
2752.000	50.2	h	74.0	-23.8	Pk	0	1.1	Restricted Band
2752.000	37.9	h	54.0	-16.1	Avg	0	1.1	Restricted Band
3670.000	61.9	h	74.0	-12.1	Pk	366	1.3	Restricted Band
3670.000	43.3	h	54.0	-10.7	Avg	366	1.3	Restricted Band
4587.000		h	74.0	-74.0	Pk			20dB below the limit
4587.000		h	54.0	-54.0	Avg			20dB below the limit
7340.000		h	74.0	-74.0	Pk			Restricted Band
7340.000		h	54.0	-54.0	Avg			Restricted Band
8258.000		h	74.0	-74.0	Pk			Restricted Band
8258.000		h	54.0	-54.0	Avg			Restricted Band
9175.800		h	74.0	-74.0	Pk			20dB below the limit
9175.800		h	54.0	-54.0	Avg			20dB below the limit
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:								

Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #2a: Signal Bandwidth
Modulation: CCSK

Channel	Frequency (MHz)	Resolution Bandwidth	Limit 15.247(a)(2)	6dB Signal Bandwidth
High	917.63	100 kHz	≥ 500 kHz	1.363 MHz

Note 1:	Add note here
Note 2:	

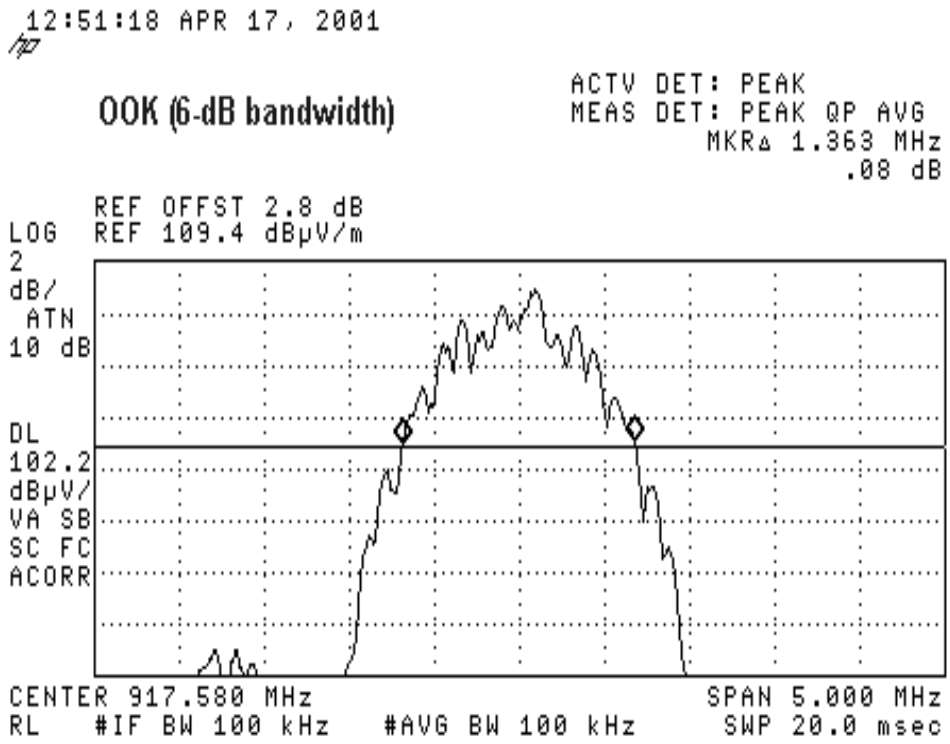


Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #2b: Signal Bandwidth
Modulation: OOK

Channel	Frequency (MHz)	Resolution Bandwidth	Limit 15.247(a)(2)	6dB Signal Bandwidth
High	917.63	100 kHz	≥ 500 kHz	1.363 MHz

Note 1:	Add note here
Note 2:	

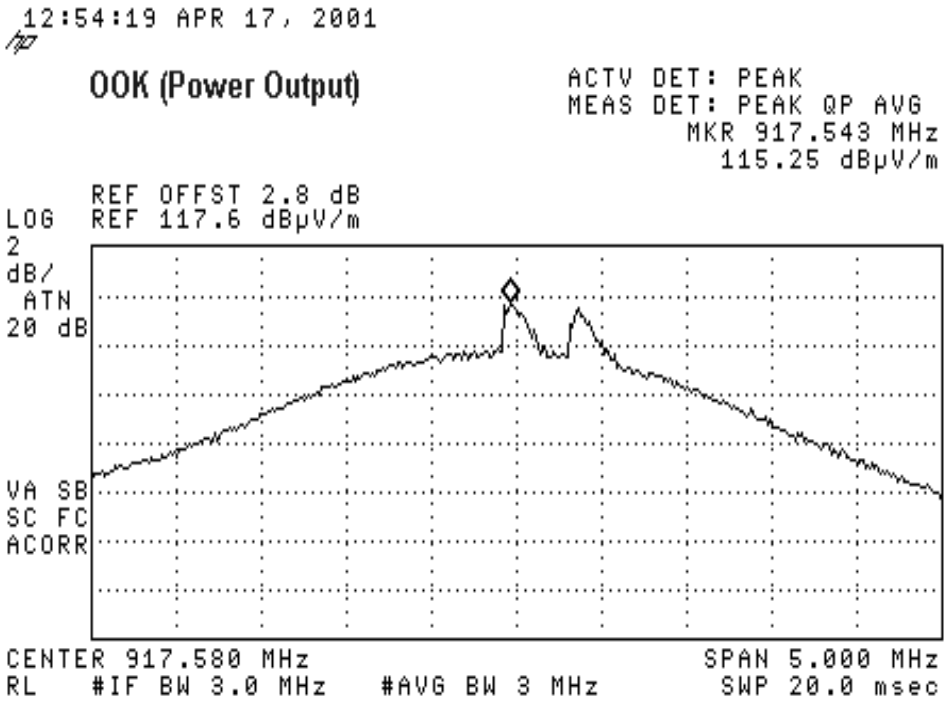


Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #3a: Output Power
Modulation: OOK

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	Output Power
High	917.63	106.13	H	3 MHz	10.83
High	917.63	115.25	V	3 MHz	19.95

Note 1:	Add note here
Note 2:	

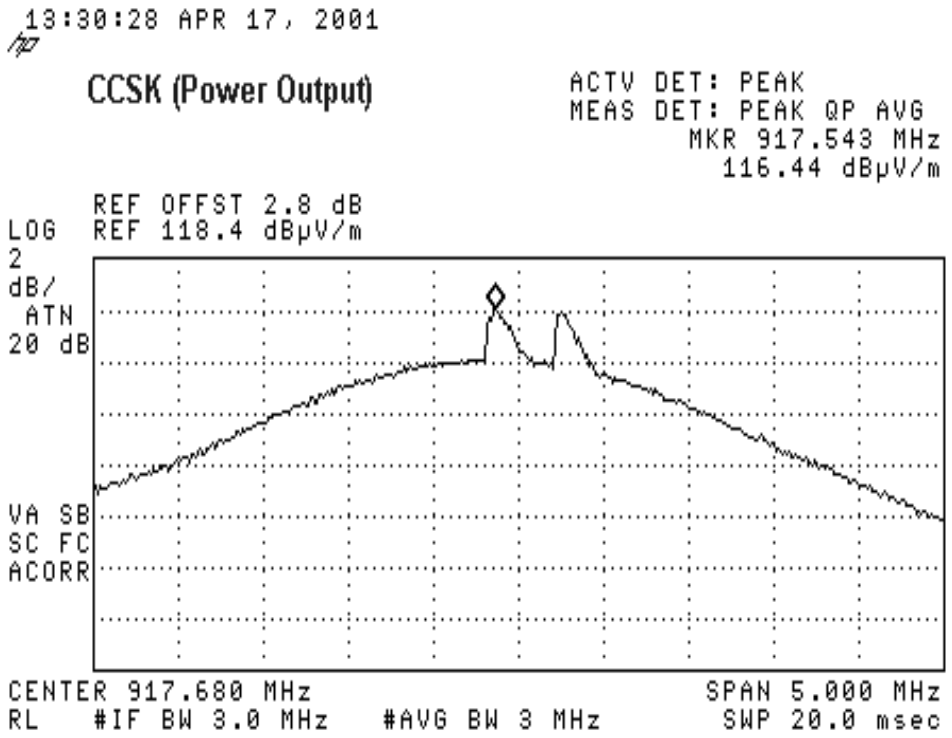


Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #3b: Output Power
Modulation: CCSK

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	Output Power
High	917.63	107.94	H	3 MHz	12.64
High	917.63	116.44	V	3 MHz	21.14

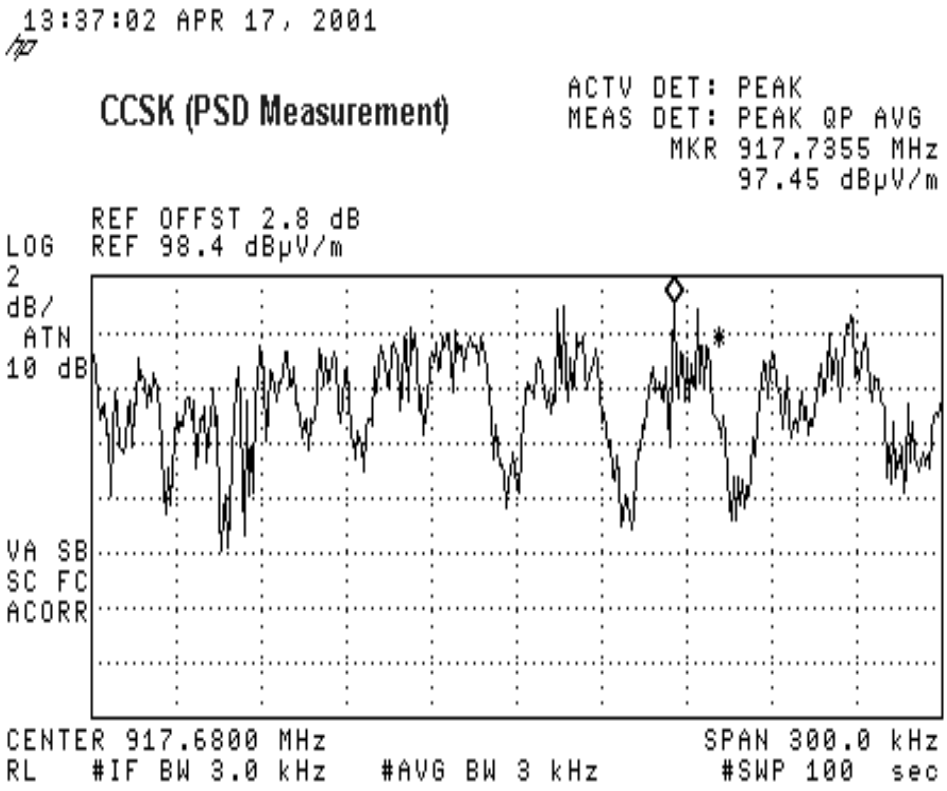
Note 1:	Add note here
Note 2:	



Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #4a: Power Spectral Density
Modulation: CCSK

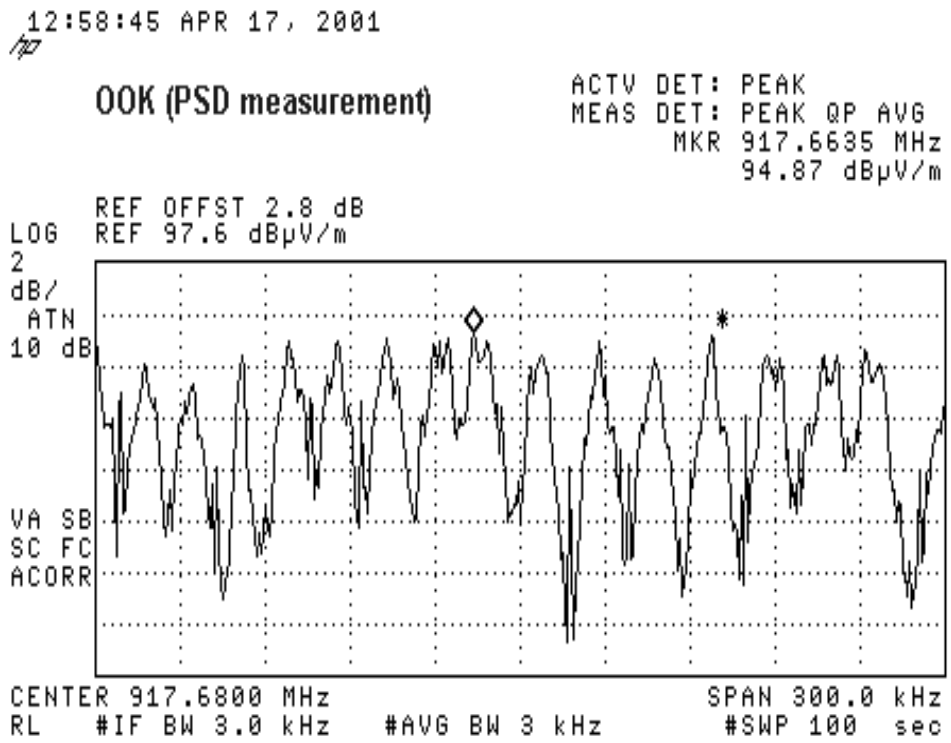
Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)
High	917.63	89.11	H	3 kHz	-6.19
High	917.63	97.45	V	3 kHz	2.15



Client:	Schlumberger	Job Number:	J43017
Model:	Endpoint Transceiver (eT)	T-Log Number:	T43018
		Proj Eng:	David W. Bare
Contact:	Jeff Webster		
Spec:	FCC 15.247 (Direct Sequence)	Class:	N/A

Run #4b: Power Spectral Density
Modulation: OOK

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)
High	917.63	85.74	H	3 kHz	-9.56
High	917.63	94.87	V	3 kHz	-0.43

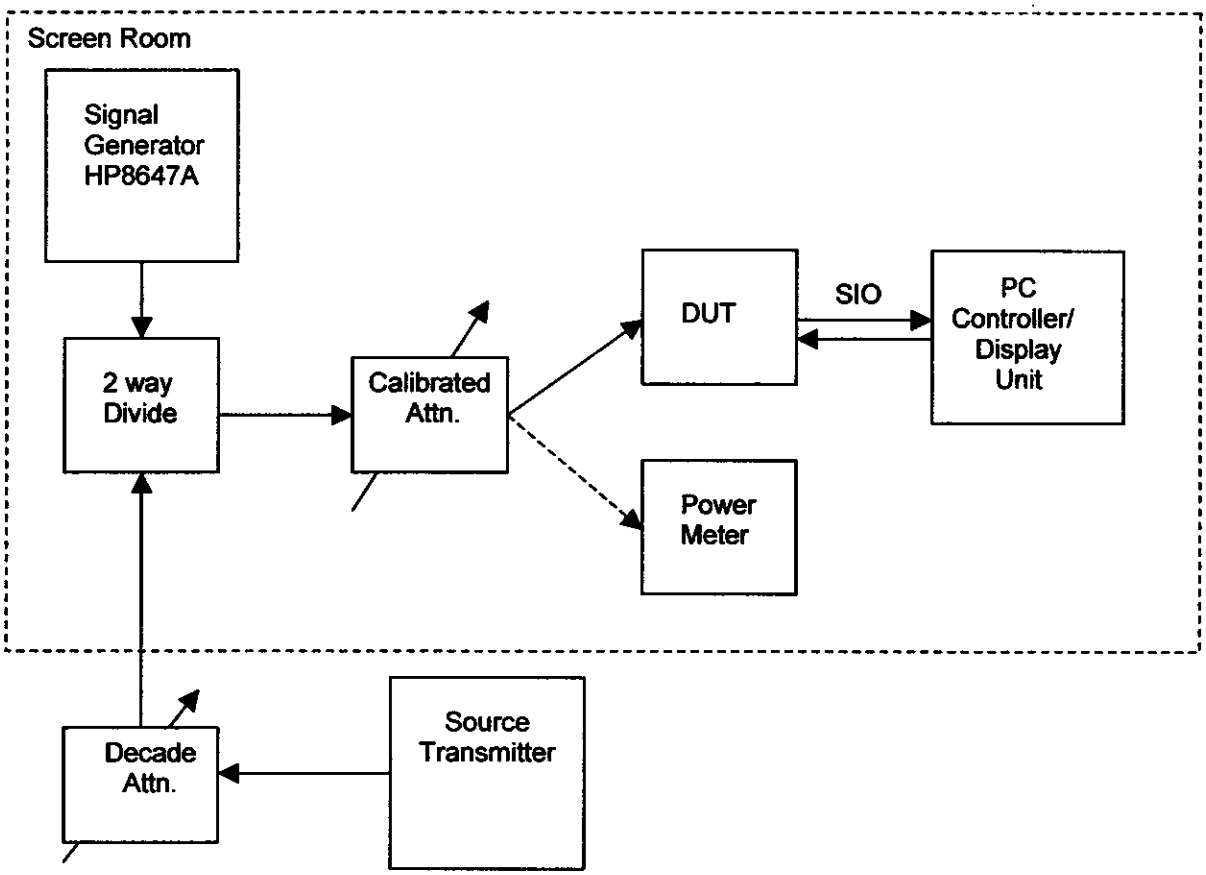


Process Gain Measurement

Method

The processing gain is measured using the CW jamming method. The equipment arrangement is shown in the block diagram below.

Process Gain Tests Configuration



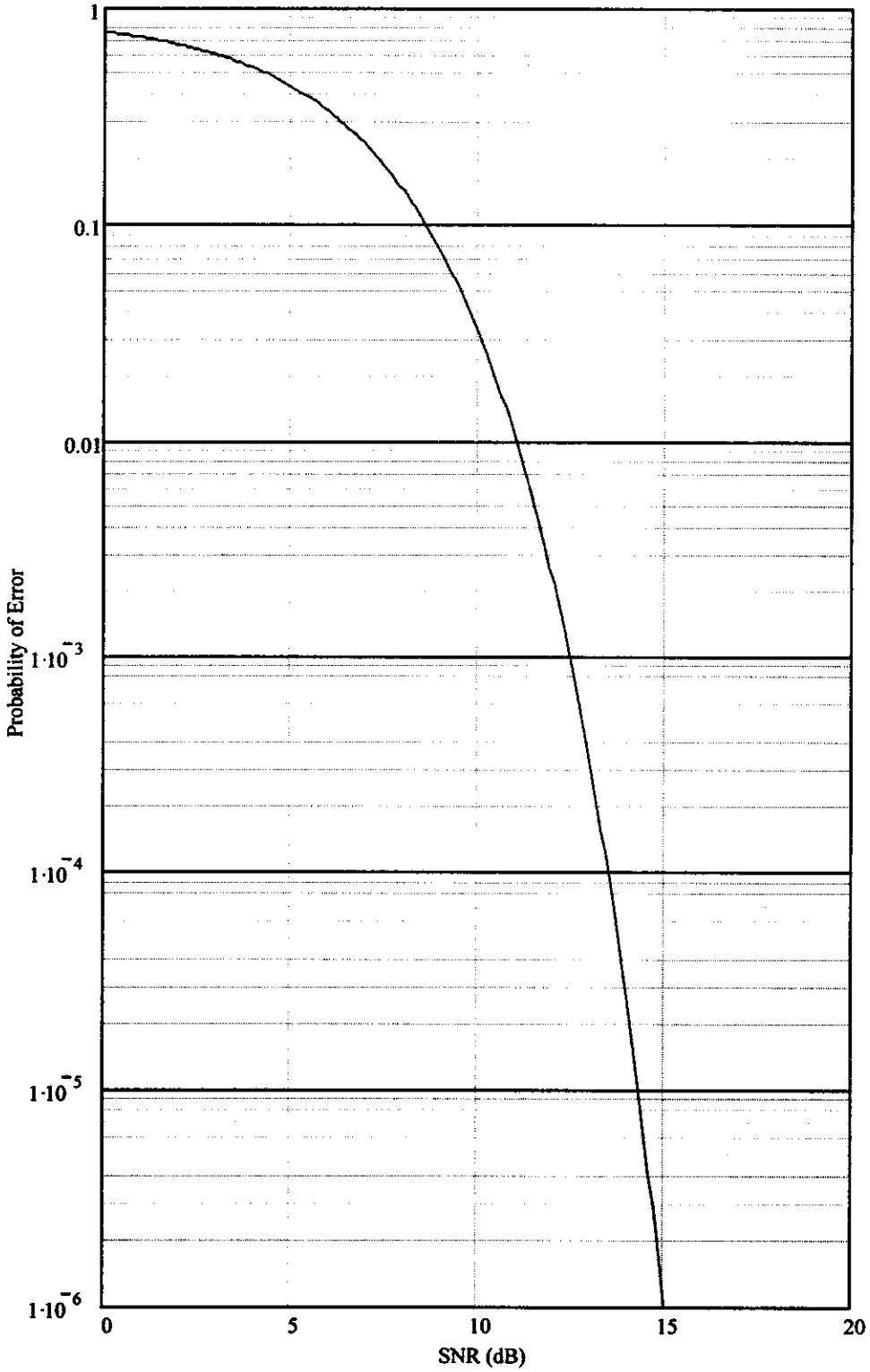
Procedure

A signal generator is stepped in 50kHz increments across the passband of the system. At each point the generator level required to produce a bit error rate equivalent to 2.7 x 10E-3, the threshold of designed performance for the system, is recorded as the jammer level (J). The output power of the transmitter is measured at the same point and recorded as signal (S). The jammer to signal ratio (J/S) is then calculated with 20% of the worst data points discarded. The lowest remaining J/S ratio is used to calculate the processing gain using the formula:

$$Gp = (S/N)o + Mj + Lsys$$

The theoretical probability of error vs. S/N is shown in the curve below, obtained from section 4.3.2 of Digital Communications, second edition, John G. Proakis, McGraw-Hill.

16-Orthogonal Signalling Probability of Error Curve



For the threshold error rate of 2.7 x 10E-3, the theoretical Signal to Noise ratio is 11.9 dB.

Results

With:

(S/N)o = 11.9dB

Lsys = 2dB

Mj = 2.3dB

Gp = 11.9dB + 6.6dB +2dB = 20.5dB

Processing Gain Test Tables

Pass band = 917.58MHz ± 1.2MHz

Jmmr Freq. (in MHz)	Deviation (KHz)	Jammer (dBm)	Sig. In (dBm)	J/S Ratio (dB)
916.38	1200	-104	-114	10
916.43	1150	-104.3	-114	9.7
916.48	1100	-104.7	-114	9.3
916.53	1050	-104.9	-114	9.1
916.58	1000	-105.3	-114	8.7
916.63	950	-105.6	-114	8.4
916.68	900	-105.9	-114	8.1
916.73	850	-106.0	-114	8.0
916.78	800	-106.0	-114	8.0
916.83	750	-105.7	-114	8.3
916.88	700	-106.2	-114	7.8
916.93	650	-106.2	-114	7.8
916.98	600	-106.1	-114	7.9
917.03	550	-106.9	-114	7.1
917.08	500	-106.2	-114	7.8
917.13	450	-106.9	-114	7.1
917.18	400	-107.8	-114	6.2
917.23	350	-106.9	-114	7.1
917.28	300	-107.3	-114	6.7
917.33	250	-106.5	-114	7.5
917.38	200	-107.6	-114	6.4
917.43	150	-106.6	-114	7.4
917.48	100	-107.3	-114	6.7
917.53	50	-107.2	-114	6.8

917.58	0	-106.5	-114	7.5
917.63	-50	-106.9	-114	7.1
917.68	-100	-106.9	-114	7.1
917.73	-150	-106.9	-114	7.1
917.78	-200	-108.1	-114	5.9
917.83	-250	-107.1	-114	6.9
917.88	-300	-107.6	-114	6.4
917.93	-350	-108.2	-114	5.8
917.98	-400	-107.4	-114	6.6
918.03	-450	-107.5	-114	6.5
918.08	-500	-107.2	-114	6.8
918.13	-550	-107.4	-114	6.6
918.18	-600	-107.1	-114	6.9
918.23	-650	-107.1	-114	6.9
918.28	-700	-107.2	-114	6.8
918.33	-750	-107.4	-114	6.6
918.38	-800	-107.4	-114	6.6
918.43	-850	-107.8	-114	6.2
918.48	-900	-107.4	-114	6.6
918.53	-950	-107.4	-114	6.6
918.58	-1000	-107.4	-114	6.6
918.63	-1050	-107.3	-114	6.7
918.68	-1100	-107.4	-114	6.6

Title: Evaluation of RF Exposure from CellNet Transmitters for General Population / Uncontrolled Exposure

Methodology:

Using Table 1 in Appendix A of FCC OET Bulletin 65 (Edition 97-01), the Maximum Permissible Exposure limit for general population / uncontrolled exposure is specified as a power density:

$MPE = f / 1500$ milliwatts per square centimeter, where f is in MHz (between 300 and 1500 MHz)

averaged over 30 minutes. Based on spherical surface around the source, the minimum distance D can be computed as:

$D = \mathrm{SQRT}(EIRP / (4\pi * MPE)$

where D is in centimeters, $EIRP$ is in mW, and MPE is in mW per square centimeters.

Table 1. Maximum Permissible Exposure (MPE) Limit for General Population / Uncontrolled Exposure

Hardware	average transmit power (dBm)	antenna gain (dBi)	duty cycle (averaged over 30 minutes)	avg EIRP (dBm)	avg EIRP (mW)	frequency (MHz)	MPE (mW per sq. cm)	minimum distance (cm)	minimum distance (inches)
CM	32	11	100%	43.00	19953	953	0.6353	50	20
RR	28	11	10%	29.00	794	929	0.6193	10	4
RAMWAN	33	5	2%	21.01	126	902	0.6013	4	2
cellphone	34.8	5	2%	22.81	191	880	0.5867	5	2
Repeater (Selective)	27	5	4%	18.02	63	918	0.6120	3	1
Repeater (Repeat All)	27	5	25%	25.98	396	918	0.6120	7	3
LAN xcvr	27	5	2%	15.01	32	918	0.6120	2	1
TOMM	30	0	0.01%	-11.15	0	918	0.6120	0	0
MCC (with Remote Radio & LAN Transceiver)					826.03	929 , 918	0.6120	10	4
MCC (with RAMWAN Radio & LAN Transceiver)					157.89	902 , 918	0.6013	5	2
MCC (with Cellphone WAN & LAN Transceiver)					222.70	880 , 918	0.5867	5	2

Notes:

1. Minimum safe distance to Cell Master Antenna for uncontrolled exposure is 20 inches.
2. Minimum safe distance to an MCC with unknown WAN type for uncontrolled exposure is 4 inches.
3. Minimum safe distance to a Repeater with unknown configuration for uncontrolled exposure is less than 3 inches.
4. Duty cycle denotes how long the transmitter is ON over the thirty-minute averaging period. A duty cycle of 100% means the transmitter is ON for 30 minutes.
5. A remote read of all TOU+Demand meters on an MCC is representative of heavy WAN load. This can result in about 80 bytes of WAN payload (after data compression) per TOMM or 60,000 bytes for 750 TOMMs. Additional WAN traffic due to MCC health checks, polling, etc., are assumed to have a small contribution to the duty cycle.
6. The 9QPR WAN protocol limits transmissions from the MCC to less than 10% duty cycle.
7. RAMWAN has a 1,000 byte per second rate and so will be transmitting for 60 seconds out of 30 minutes for a duty cycle of less than 1% for the heavy WAN load shown above. A similar duty cycle for cell phones is assumed. A 2% duty cycle was entered in the table above for margin.
8. Simple Repeater assumes extreme LAN utilization and no transmit attenuation.
9. Selective Repeater assumes 250 plain vanilla electric TOMMs in the repeater table being received at high PSR and no transmit attenuation.

Reference:

[1] FCC OET Bulletin 65 (97-01 Edition), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields", August 1997.
[2] FCC OET Bulletin 56 (under revision).

Enclosure

* Practice limited to matters and proceedings before federal courts and agencies.

RF Emissions Statement

The instant device, a Part 15 spread spectrum transmitter, is a fixed device professionally installed inside an enclosed utility meter. Accordingly, the device is not designed to be used by any person. The antenna associated with the device is not external but is rather also contained within the same utility meter enclosure. The device communicates with a fixed local area network.

This transmitter does not fit within the definition of a "mobile device" set forth in section 2.1091(b) of the Commission's rules, 47 C.F.R. § 2.1091(b), because it is designed to be used in fixed locations. In addition, the transmitter does not meet the definition of a "portable device" contained in section 2.1093(b), because it is not designed to be used by any person. Furthermore, section 1.1307(b)(1), which is referenced by section 15.247(b)(4), categorically excludes this Part 15 device from the requirement to conduct a routine environmental evaluation for RF exposure since the device is neither a millimeter wave device, nor an unlicensed personal communications service device.

In any event, based on the maximum output power (+30 dBm) and antenna gain information contained in the underlying equipment authorization application for this device, the emissions for the device are well below the maximum exposure limits set forth in sections 1.1310 and 2.1093(d). Furthermore, the device only emits approximately six very brief transmissions in any given one-half hour period, each with a duration approximately 0.0027 seconds. Accordingly, the RF emissions for the device are well within the limits set by the Commission.

EXHIBIT 3: Radiated Emissions Test Configuration Photographs

2 Pages

EXHIBIT 4: Proposed FCC ID Label & Label Location

1 Page

EXHIBIT 5: Detailed Photographs of Schlumberger - RMS Div. Model Endpoint Transceiver (eT) Construction

3 Pages

EXHIBIT 6: Operator's Manual for Schlumberger - RMS Div. Model Endpoint Transceiver (eT)

1 Page

EXHIBIT 7: Block Diagram of Schlumberger - RMS Div. Model Endpoint Transceiver (eT)

1 Page

EXHIBIT 8: Schematic Diagrams for Schlumberger - RMS Div. Model Endpoint Transceiver (eT)

9 Pages

EXHIBIT 9: Theory of Operation for Schlumberger - RMS Div. Model Endpoint Transceiver (eT)

24 Pages