Elliott Laboratories Inc.
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Sunnyvale, CA 94086-3518
408-245-7800 Phone
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September 18, 2003

Chief, Equipment Authorization Branch,
Authorization and Evaluation Division,
Office of Engineering and Technology
FEDERAL COMMUNICATIONS COMMISSION
P.O. Box 358315
Pittsburgh, PA 15251-5315

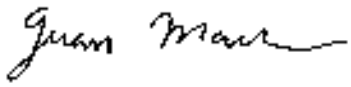
Gentlemen:

The enclosed documents constitute a formal submittal and request for a Certification pursuant to Part 22H of FCC Rules (CFR 47) regarding to Cellular Service devices. Certification is being requested for Global Data model EZ-Star CDMA-1XRTT Cellular AMR Meter Interface. The EZ-Star CDMA-1XRTT Cellular AMR Meter Interface has been tested and found to comply with FCC Part 22H 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,



Juan Martinez
Sr. EMC Engineer

JMM/dmg

Enclosures: Agent Authorization Letter
Confidentiality Letter
Schematics
External and Internal Photos
Manual
Theory of Operations
FCC ID Label and Location
Emissions Test Report with Exhibits

Elliott Laboratories Inc. 684 West Maude Avenue 408-245-7800 Phone
www.elliottlabs.com Sunnyvale, CA 94086-3518 408-245-3499 Fax

Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 129 Issue 2, FCC Part 22 Subpart H on the Global Data Model: EZ-Star CDMA-1XRTT Cellular AMR Meter Interface

FCC ID NUMBER:	L7B-STAR16-1
UPN:	2064-STAR16-1
APPLICANT:	Global Data 2250 Obispo Ave Suite 105 Signal Hill, CA 90806
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	September 18, 2003
FINAL TEST DATE:	August 27, 2003
AUTHORIZED SIGNATORY:	Sr. EMC Engineer

TABLE OF CONTENTS

FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, Section 2.1033(C) & to Industry Canada RSP-100.

2.1033(c)(1) Applicant:

Global Data
2250 ObispoAve Suite 105
Signal Hill, CA 90806

2.1033(c)(2) & RSP-100 (4) FCC ID: L7B-STAR16-1
UPN: 2064-STAR16-1

2.1033(c)(3) & RSP-100 (7.2(a)) Instructions/Installation Manual

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

2.1033(c)(4) & RSP-100 (7.2(b)(iii)) Type of emissions

FCC 22H & RSS-129**:** 1M28F9W

2.1033(c)(5) & RSP-100 (7.2(a)) Frequency Range

FCC 22H & RSS-129**:** 800MHz Transmitter: 824.04 – 839.97 MHz

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

FCC 22H & RSS-129**: 18dBm (0.0631 Watts ERP)**

2.1033(c)(7) & RSP-100 (7.2(a)) Maximum FCC & IC Allowed Power Level

Section 22.913 & RSS-129 (6.4): limited to 7 Watts ERP

2.1033(c)(8) & RSP-100 (7.2(a)) Applied voltage and currents into the final transistor elements

Refer to Exhibit 6. The schematic diagram

2.1033(c)(9) & RSP-100 (7.2(a)) Tune-up Procedure

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

2.1033(c)(10) & RSP 100 (7.2(a)) Schematic Diagram of the Transmitter

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Frequency Stabilization

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Suppression of Spurious radiation

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Modulation

For more information please refer to Exhibit 7: Theory of Operation

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Power

Refer to Exhibit 6. The schematic diagram

2.1033(c)(11) & RSP-100 (7.2(g)) Photographs or Drawing of the Equipment Identification Plate or Label

Refer to Exhibit 4

2.1033(c)(12) & RSP-100 (7.2(c)) Photographs of equipment

Refer to Exhibit 5

2.1033(c)(13) & RSP-100 (7.2(a)) Equipment Employing Digital Modulation

Modulation is CDMA

2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-133 issue 2, Rev. 1.

Refer to Exhibit 2

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:

EZ-Star CDMA-1XRTT Cellular AMR Meter Interface

Manufacturer:

Global Data
2250 Obispo Ave Suite 105
Signal Hill, CA 90806

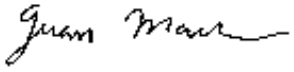
Tested to applicable standards:

RSS-129 Issue 2 (Provisional) September 25, 1999 (800 MHz Dual-Mode CDMA Cellular Telephones)
FCC Part 22 Subpart H

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845_**SV4** Dated July 30, 2001

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of TIA/EIA-603 and the specific RSS standards applicable to this device); and that the equipment performed in accordance with the data submitted in this report.



Signature	_____
Name	Juan Martinez
Title	Sr. EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	September 18, 2003

Maintenance of compliance with the above standards is the responsibility of the manufacturer. Any modification of the product which 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.).

SCOPE

FCC Part 22 Subpart H & IC RSS-129 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & IC RSS-129. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

The intentional radiator above was tested in a simulated typical installation to demonstrate compliance with the relevant FCC & RSS 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.

OBJECTIVE

The primary objective of the manufacturer is compliance with the FCC Part 22 Subpart H & IC RSS-129. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to FCC & Industry Canada. FCC & Industry Canada issues a grant of equipment authorization and a certification number 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 subsequently manufactured.

Maintenance of 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.).

SUMMARY OF TEST RESULTS

Part 22H and RSS-129 Test Summary

Part 2 Measurements Required Section	FCC Part 22 Subpart H Section	RSS-129 Section	Test Performed	Measured Value	Test Procedure Used	Result
Modulation Tested	CDMA	CDMA	-	-	-	-
2.1047: Modulation characteristics	22.901 (d)(1)(2)	8.1.1 (1)	99% Bandwidth	1.288 MHz	D	Complies
2.1046: RF power output	22.913	9.2	Radiated Output Power Test	18 dBm (0.0631 Watts ERP)	A	Complies
2.1046: RF power output	22.913	9.2	Conducted Output Power Test (**Antenna Conducted**)	N/A	N/A	N/A
-	-	9.3	Standby Output Power Measurement (Mobile)	-67.8 dBm	Used RSS-129 9.3	Complies
-	-	9.4	Minimum Controlled Output Power (Mobile)	-57.8 dBm	Used RSS-129 9.4	Complies
2.1051: Spurious emissions at antenna Port	22.917 (e)	8.1.1 (3)	Emission Limits and/or Unwanted Emission 30MHz – 25GHz (**Antenna Conducted**)	All spurious emissions < -13dBm	J	Complies
2.1051: Spurious emissions at antenna Port	22.917 (f)	8.1.1 (2)	Mobile Emission in base frequency	-83.94 dBm	O	Complies
2.1049: Occupied Bandwidth	22.917 (e)	8.1.1 (1)	Out of Block Emissions (**Antenna Conducted**)	All spurious emissions < -13dBm	I	Complies
2.1053 Field strength of spurious radiation	22.917 (e)	8.1.1 (3)	Radiated Spurious Emissions 30MHz – 25GHz	-46.8dBm @ 4244.69 MHz (-33.8 dB)	N	Complies
2.1055: Frequency stability	22.355	9.2.1	Frequency Stability (Frequency Vs. Temperature)	0.00102 MHz	K	Complies

2.1055: Frequency stability	22.355	9.2.1	Frequency Stability (Frequency Vs. Voltage)	0.00045 MHz	L & M	Complies
-	-	9.2.2	Frequency Stability (Power Vs. Temperature)	0.80 dB	K	Complies
-	-	9.2.2	Frequency Stability (Power Vs. Voltage)	0.20 dB	L	Complies
2.1093: Exposure to portable devices	-	11	Exposure of Humans to RF Fields	MPE Calculation	N/A	-
-	15.109	10 (d)	Receiver Spurious Emissions (**Antenna Conducted**)	All spurious emission below 1 GHz < 2 nanowatts and above 1 GHz < 5 nanowatts	P	Complies

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 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	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The EUT is a CDMA-1XRTT Cellular Modem, which is designed for electric utility AMR (Automatic Meter Reading) applications. Normally, the EUT would be installed on a wall, back panel, or electric service box during application. The EUT was mounted on a Form-9S electric service box to simulate the end user environment. The electrical rating of the EUT is 110Vac/60hz, 45mA(max.).

The sample was received on August 26, 2003 and tested on August 27, 2003. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number	Proposed FCC ID #
Global Data/EZ-Star CDMA-1XRTT Cellular AMR Meter Interface/Meter	N/A	L7B-STAR16-1

ENCLOSURE

The EUT enclosure is primarily constructed a plastic enclosure. It measures approximately 12cm wide by 8.6cm deep by 12.2cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with the emission specifications.

SUPPORT EQUIPMENT

No remote support equipment was used during testing.

EUT INTERFACE PORTS

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

Port	Connected to	Description	Shielded or Unshielded	Length (m)
RF	Spectrum Analyzer	RF coax	Shielded	0.5
RF	Power Meter	Direct Connection	N/A	N/A
J5	PC Serial	Mutliwire	Unshielded	1
Power Input	AC adapter	2 wire	Unshielded	1.8

EUT OPERATION DURING TESTING

Continuously transmitting at full power at the low, middle, and high channels of the cellular and PCS frequency range.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on August 27, 2003 at the Elliott Laboratories Open Area Test Site # 4 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to Section 2.948 of the FCC Rules, construction, calibration, and equipment data has been filed with the Commission.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing are performed in conformance with Section 2 of FCC Rules. Measurements are made with the EUT connected to a spectrum analyzer through an attenuator to prevent overloading the analyzer.

RADIATED EMISSIONS CONSIDERATIONS

Radiated measurements are performed in an open field environment or Anechoic Chamber. The test site is maintained free of conductive objects within the CISPR 16-1 defined elliptical area.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers are capable of measuring 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 particular 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. If average measurements above 1000MHz are performed, the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz is used.

INSTRUMENT CONTROL COMPUTER

A personal computer is utilized to record the receiver measurements of the field strength at the antenna, which is then compared directly with the appropriate specification limit. The receiver is programmed with appropriate factors to convert the received voltage into filed strength at the antenna. Results are printed in a graphic and/or tabular format, as appropriate.

The test receiver also provides a visual display of the signal being measured.

PEAK POWER METER

A peak power meter and thermister mount may be used for 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 EUT and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transmitters and 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 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.

The requirements of ANSI C63.4 were used for configuration of the equipment turntable. It 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 appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

General: For Transmitters with detachable antenna, direct measurements for output power, modulation characterization, occupied bandwidth, and frequency stability are performed with the antenna port of the EUT connected to either the power meter, modulation analyzer, or spectrum analyzer via a suitable attenuator and/or filter. The attenuators and/or filters are used to ensure that the transmitter fundamental will not overload the front end of the measurement instrument.

Procedure A – Power Measurement (Radiated Method): The following procedure was used for transmitters that do not use external antennas or with devices with test port were the output power can be measured directly, but Power must still be made with antenna attached.

1) Set the EUT to maximum power and to the lowest channel.
2) A spectrum analyzer was use to measure the power output. The search antenna was located 3 meter from the EUT.
3) The spectrum analyzer resolution and video bandwidth was set to 2 MHz to measure the power output. No amplifier was used since the fundamental will cause the amplifier to saturate.
4) The EUT was then rotated for a complete 360 degrees and the search antenna was raised and lowered to maximize the fundamental. Both vertical and horizontal polarization's were performed. All correction factors are applied to the fundamental.
5) Substitution is then performed. Substitution method is performed by replacing the EUT with a horn antenna and signal generator. The horn antenna factors can be reference to a half-wave dipole in dBi. The signal generator power level is adjusted until a similar level, which was measured, in step 4, is achieved on the spectrum analyzer. The level on the signal generator is than added to the antenna factor, in dBi, which will give the corrected value.
6) Steps 1 to 5 are repeated for the middle and the highest channel.

Procedure D - Occupied Bandwidth (Conducted Method): Either for analog, digital, or data modulations, occupied bandwidth was performed. The EUT was set to transmit the appropriate modulation at maximum power. The bandwidth was measured using following methods:

1) The built-in 99% function of the spectrum analyzer was used.
2) If the built-in 99% is not available then the following method is used:

   26-dB was subtracted to the maximum peak of the emission. Then the display line function was used, in conjunction with the marker delta function, to measure the emissions bandwidth.

3) For the above two methods a resolution and video bandwidth of 10 or 30 kHz was used to measure the emission's bandwidth.

Procedure H - Other Types of Equipment: Either digital or data modulated signals were simulated, by software or external sources, to performed the required tests. The EUT was set to transmit the appropriate digital modulation.

Procedure I – Bandedge: Where Bandedge measurements are specified the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –13 dBm.
3) Set the spectrum analyzer bandwidth to the minimum 1% of the emission bandwidth. The emission bandwidth is determined by using **procedure D**. For CDMA or TDMA modulations used trace averaging set to 100 sweeps.
4) Set the marker function to the FCC or IC specified frequency band/block.
5) Set the spectrum analyzer span to show any emission within 2 MHz above or below the frequency band/block. All spurious or intermodulation emission must not exceed the –13 dBm limit.
6) Steps 1 to 5 were repeated for all modulations and output ports that will be used for transmission. Also, bandedge is determined for blocks A (high edge), D, B, E, F, C (low edge).

Procedure J – Antenna Conducted Emissions: For spurious emission measurements at the antenna terminal the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –13-dBm.
3) Set the spectrum analyzer bandwidth to 1 MHz.
4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 10^{th} harmonic of the fundamental. All spurious or intermodulation emission must not exceed the –13dBm limit.
5) Steps 1 to 4 were repeated for all modulations and output ports that will be used for transmission.

Procedure K - Frequency Stability: The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The spectrum analyzer is configured to give a 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. The Temperature chamber was varied from –30 to +50° C (or +60° C for some IC RSS standards) in 10 degrees increment. The EUT was allowed enough time to stabilize for each temperature variation. For Industry Canada requirement the power was also monitor during the temperature test with a power meter.

Procedure L - Frequency Stability: For AC or DC operated devices the nominal voltage is varied to 85% and to 115% at either room temperature or at a controlled +20°C temperature. For Industry Canada requirement the power was also monitor during the temperature test with a power meter.

Procedure M - Frequency Stability: For battery-powered devices the voltage battery end-point is determined by reducing the dc voltage until the unit ceases to function. This is performed at either room temperature or at a controlled +20°C temperature.

Procedure N - Field Strength Measurement: The EUT was set on the turntable and the search antenna position 3 meters away. The output antenna terminal was terminated with a 50-ohm terminator. The EUT was set at the middle of the frequency band and set at maximum output power.

For the first scan, a pre-liminary measurement is performed. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. One or more of these is with the antenna polarized vertically while the one or more of these are 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.

For the final measurement, Substitution method is performed on spurious emissions not being 20-dB below the calculated radiated limit. Substitution method is performed by replacing the EUT with a horn antenna and signal generator. The horn antenna factors can be reference to a half-wave dipole in dBi. The signal generator power level was adjusted until a similar level, which was measured on the first scan, is achieved on the spectrum analyzer. The level on the signal generator is than added to the antenna factor, in dBi, which will give the corrected value.

Procedure O – Antenna Conducted Emissions (22.917(f)): For Mobile spurious emission in base frequency the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –80-dBm.
3) Set the spectrum analyzer bandwidth to 1 kHz. The reason for using 1 kHz BW was to bring the analyzer noise floor down below the limit and provide more dynamic range, since no notch filter was available to attenuate the fundamental.
4) For the spectrum analyzer, the start frequency was set to 869 MHz and the stop frequency set to 894 MHz. All spurious or intermodulation emission must not exceed the –80-dBm limit.
5) Steps 1 to 4 were repeated for low, middle, and high channels.

Procedure P – Receiver Antenna Conducted Emissions: Receiver spurious emission was measured at the antenna terminal, as a port was available.

1) Set the receiver was set to the midpoint of the operating band as specified in the standard.
2) Set the spectrum analyzer display line function to 2 nanowatts for measurements below 1 GHz and 5 nanowatts for measurements above 1 GHz.
3) Set the spectrum analyzer bandwidth to 1 MHz.
4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 5^{th} harmonic of the receiver LO. All spurious or intermodulation emission must not exceed the specified limit.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions are based on the power of the transmitter at the operating frequency. Data is measured in the logarithmic form of decibels relative to one milliwatt (dBm) or one microvolt/meter (dBuV/m,). The field strength of the emissions from the EUT is measured on a test site with a receiver.

Below is a formula example used to calculate the attenuation requirement, relative to the transmitters power output, in dBuV/m. For this example an operating power range of 3 watts is used. The radiated emissions limit for spurious signals outside of the assigned frequency block is $43+10\text{Log}_{10}$ (mean output power in watts) dB below the measured amplitude at the operating power.

CALCULATIONS – EFFECTIVE RADIATED POWER

$$E(V/m) = \frac{\sqrt{30 * P * G}}{d}$$

E= Field Strength in V/m
P= Power in Watts (for this example we use 3 watts)
G= Gain of antenna in numeric gain (Assume 1.64 for ERP)
d= distance in meters

$$E(V/m) = \frac{\sqrt{30 * 3 \text{ watts} * 1.64 \text{ dB}}}{3 \text{ meters}}$$

20 * log (4.049 V/m * 1,000,000) = 132.14 dBuV/m @ 3 meters

FCC Rules request an attenuation of 43 + 10 log (3) or 47.8 dB for all emissions outside the assigned block, the limit for spurious and harmonic emissions is:

132.1 dBuV/m – 47.8 dB = 84.3 dBuV/m @ 3 meter.

Note: Substitution Method is performed for spurious emission not being 20-dB below the calculated field strength.

EXHIBIT 1: Test Equipment Calibration Data

RF exposure measurements, 13-Apr-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Amplifier Research	Field Probe 0.5MHz-5GHz	FP4036	1496	12	2/14/2003	2/14/2004

Radiated Emissions, 1000 - 25,000 MHz, 13-Apr-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	12	2/28/2003	2/28/2004
Hewlett Packard	Spectrum Analyzer 9KHz - 26.5GHz, non programable	8563E	284	12	3/3/2003	3/3/2004
Miteq	Preamplifier, 1-18GHz	AFS44	1346	12	1/6/2003	1/6/2004
Rohde & Schwarz	Test Receiver, 20-1300MHz	ESVP	273	12	2/13/2003	2/13/2004

Radiated Emissions, 1000-25,000 MHz, 13-Apr-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	12	10/30/2002	10/30/2003

Antenna Conducted Emissions, 20-Sep-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Hewlett Packard	Spectrum Analyzer 30Hz - 40 GHz	8564E (84125C)	1148	12	4/2/2003	4/2/2004

EXHIBIT 2: Test Measurement Data

The following data includes conducted and radiated emission measurements of the Global Data, Model No: EZ-STAR CDMA-1XRTT CELLULAR AMR METER INTERFACE.

T52446_22H Frequency Stability	30 Pages 4 Pages

Elliott

EMC Test Data

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	
Contact:	Pichai Tanvilai		
Emissions Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio
Immunity Spec:		Environment:	

EMC Test Data

For The

Global Data

Model

EZ Star

Date of Last Test: 8/27/2003

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	
Contact:	Pichai Tanvilai		
Emissions Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

EUT INFORMATION

General Description

The EUT is a CDMA-1XRTT Cellular Modem, which is designed for electric utility AMR (Automatic Meter Reading) applications. Normally, the EUT would be installed on a wall, back panel, or electric service box during application. The EUT was mounted on a Form-9S electric service box to simulate the end user environment. The electrical rating of the EUT is 12Vdc, 45mA(max.).

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Global Data	EZ Star CDMA-1xRTT	Electric meter reading	N/A	TBD

Other EUT Details

EUT Enclosure

The EUT enclosure is primarily constructed a plastic enclosure. It measures approximately 12cm wide by 8.6cm deep by 12.2cm high.

Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	
Contact:	Pichai Tanvilai		
Emissions Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
RF	Spectrum Analyzer	RF coax	Shielded	0.5
RF	Power meter	direct connect	N/A	N/A
J5	PC Serial	Multiwire	Unshielded	1
Power input	AC adapter	2 wire	Unshielded	1.8

EUT Operation During Emissions (Radio)

Continuously transmitting at full power at the low, middle, and high channels of the cellular and PCS frequency range.

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

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: 3/17/2003
Test Engineer: jmartinez
Test Location: SVOATS #4

Config. Used: 1
Config Change: None
EUT Voltage: 208V/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 when measuring the Fundamental Frequency and 3m from the EUT for the frequency range 1 - 20 GHz.

Ambient Conditions:

Temperature: 12° C
Rel. Humidity: 58%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 & 2	RE, 1000 - 20,000 MHz - Maximized Emissions	FCC 22H, 24E, RSS-129 & 133	Pass	Refer to runs

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:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run #1: Radiated Emissions, 1000-9000 MHz
800 MHz

Frequency	Level	Pol	FCC 22/RSS-129		Detector	Comments
MHz	dBm	v/h	Limit	Margin	Pk/QP/Avg	
Low Channel						
4121.330	-48.3	V	-13.0	-35.3	Avg	
1648.613	-49.3	H	-13.0	-36.3	Avg	
1648.930	-50.5	V	-13.0	-37.5	Avg	
3297.450	-51.1	V	-13.0	-38.1	Avg	
3297.450	-54.1	H	-13.0	-41.1	Avg	
4121.263	-54.7	H	-13.0	-41.7	Avg	
2472.863	-61.1	V	-13.0	-48.1	Avg	
2472.863	-63.2	H	-13.0	-50.2	Avg	
Middle Channel						
1673.060	-49.6	V	-13.0	-36.6	Avg	
4182.500	-50.1	H	-13.0	-37.1	Avg	
1673.060	-51.1	H	-13.0	-38.1	Avg	
4182.500	-53.1	V	-13.0	-40.1	Avg	
3345.870	-57.0	H	-13.0	-44.0	Avg	
3345.870	-59.3	V	-13.0	-46.3	Avg	
High Channel						
4244.690	-46.8	H	-13.0	-33.8	Avg	
4244.690	-49.4	V	-13.0	-36.4	Avg	
2546.880	-49.9	H	-13.0	-36.9	Avg	
2546.880	-51.7	V	-13.0	-38.7	Avg	
1698.010	-52.1	H	-13.0	-39.1	Avg	
1698.010	-53.2	V	-13.0	-40.2	Avg	

Elliott

EMC Test Data

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run #2: Radiated Emissions, 1000-20,000 MHz
1900 MHz

Frequency	Level	Pol	FCC 24/RSS-133		Detector	Comments
MHz	dBm	v/h	Limit	Margin	Pk/QP/Avg	
Low Channel						
3702.837	-29.6	V	-13.0	-16.6	Avg	
3702.287	-37.2	H	-13.0	-24.2	Avg	
Middle Channel						
3759.900	-21.7	V	-13.0	-8.7	Avg	
3759.900	-25.7	H	-13.0	-12.7	Avg	
High Channel						
3817.513	-19.3	V	-13.0	-6.3	Avg	
3817.463	-26.1	H	-13.0	-13.1	Avg	

Note 1:	No other harmonics detected after the second harmonic 20-dB of the limit.

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Antenna Conducted Emissions (800 MHz)

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: 8/27/2003
Test Engineer: jmartinez
Test Location: SVOATS #4
Config. Used: 1
Config Change: None
EUT Voltage: 120V / 60Hz

General Test Configuration

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: 22 °C
Rel. Humidity: 66 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Output Power	22H	Pass	18 dBm (ERP)
2	Bandedge	22.917(e) & RSS-129 8.1 (1)	Pass	-17.23 dBm
3	Out of Band	22.917(e) & RSS-129 8.1 (3)	Pass	All emission < -13 dBm
3	99% BW	2.1049	Pass	1.288 MHz
3	Mobile Emission	22.917 (f) & RSS-129 8.1 (2)	Pass	-83.94 dBm
4	Bandedge	22.917(e) & RSS-129 8.1 (1)	Pass	-14.18 dBm
5	Out of Band	22.917(e) & RSS-129 8.1 (3)	Pass	All emission < -13 dBm
5	99% BW	2.1049	Pass	1.275 MHz
5	Mobile Emission	22.917 (f) & RSS-129 8.1 (2)	Pass	-84.24 dBm
6	Standby Power Output	RSS-129 (9.3 & 9.4)	Pass	-67.8 dBm
6	Control Power Output	RSS-129 (9.3 & 9.4)	Pass	-57.8 dBm

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

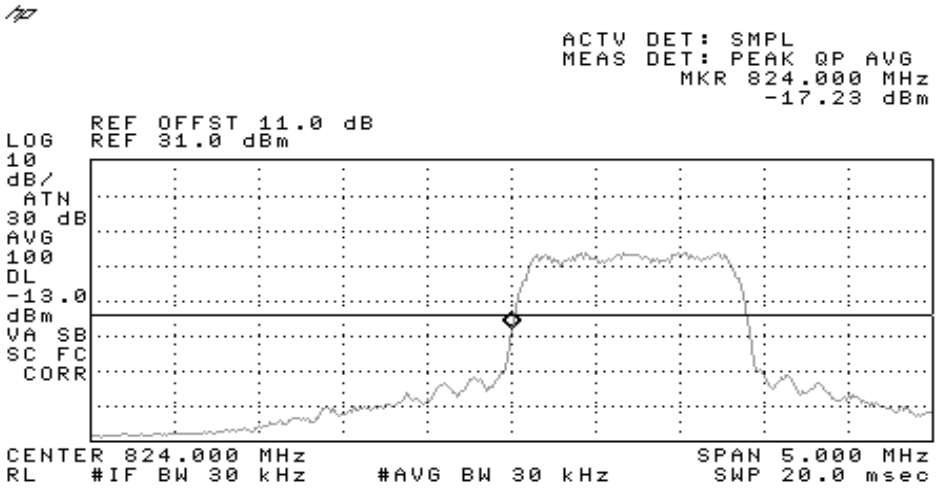
Run# 1: Output Power (Subsitution Method)

800 MHz Antenna			Substitution Note 1					Comments
Frequency	Level	Pol	Pin	Gain	EIRP	ERP	-	
MHz	dBµV/m	v/h	(dBm)	(dBi)	(dBm)	(dBm)	-	
824.25	115.0	v	17.5	2.3	19.8	17.6	-	
836.53	115.3	v	17.7	2.3	20.0	17.8	-	
848.53	115.5	v	17.9	2.3	20.2	18.0	-	

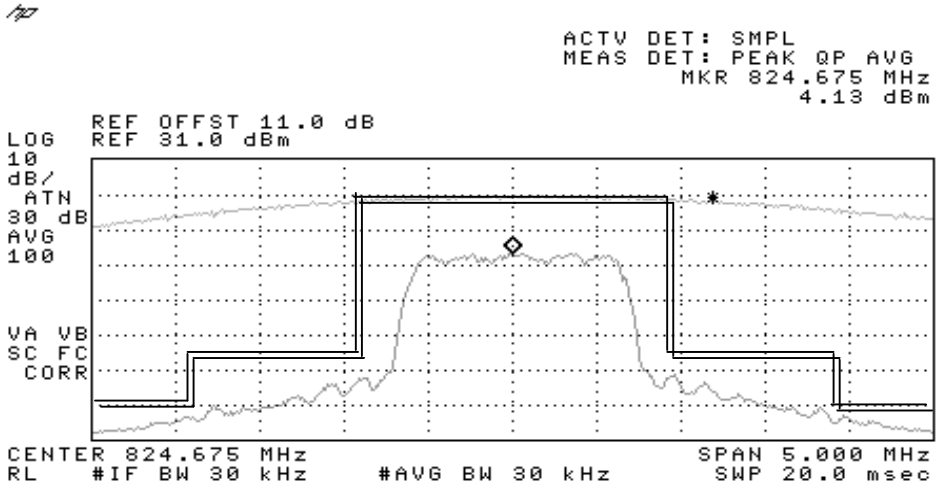
Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 2: Sub-band A of the cellular range.

Low Bandedge 1013 (824)

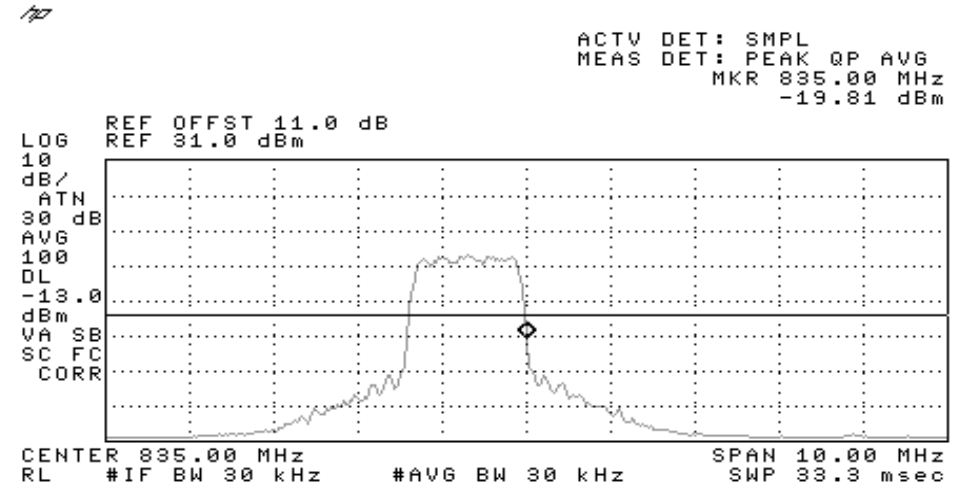


Emission Mask

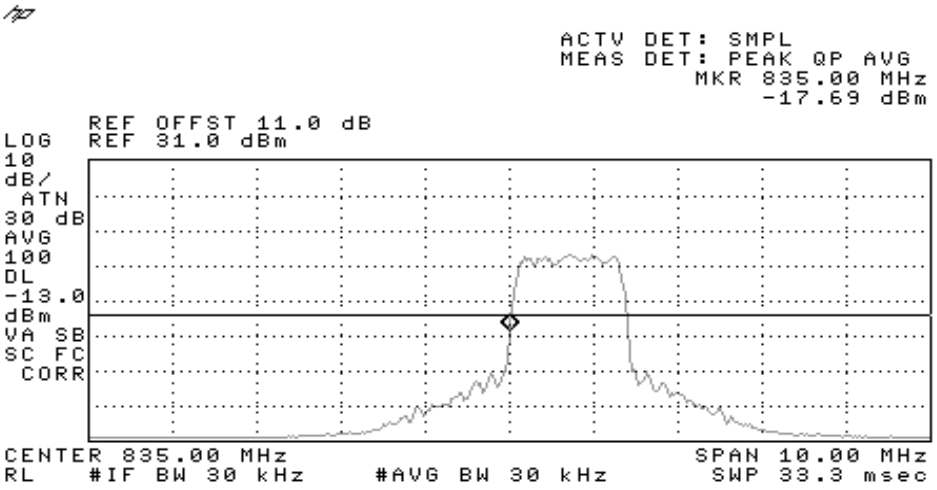


Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

High Blockedge 835



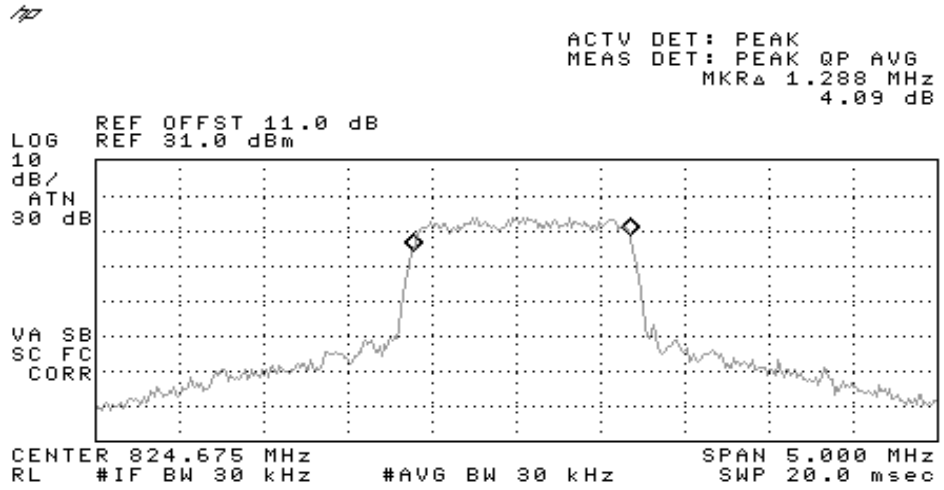
Low Blockedge 835



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

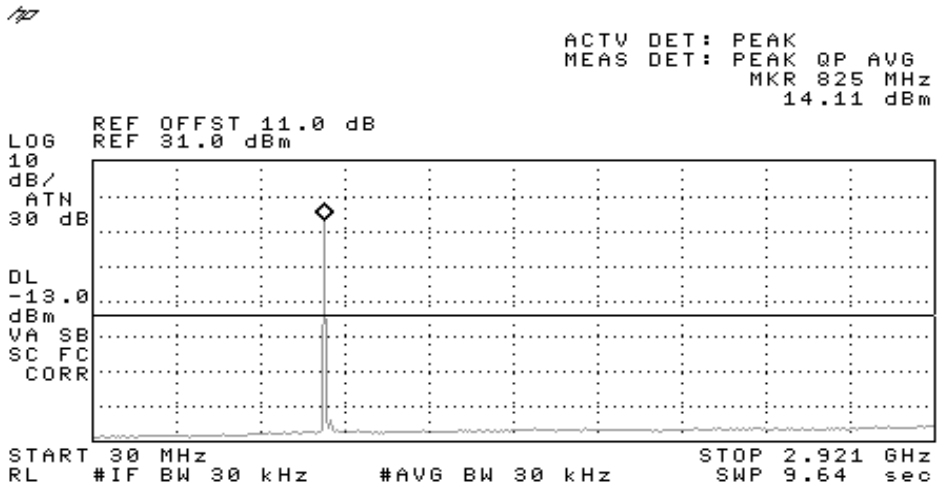
Run# 3: Sub-band A: Out of band emission, 99% BW, Mobile emissions

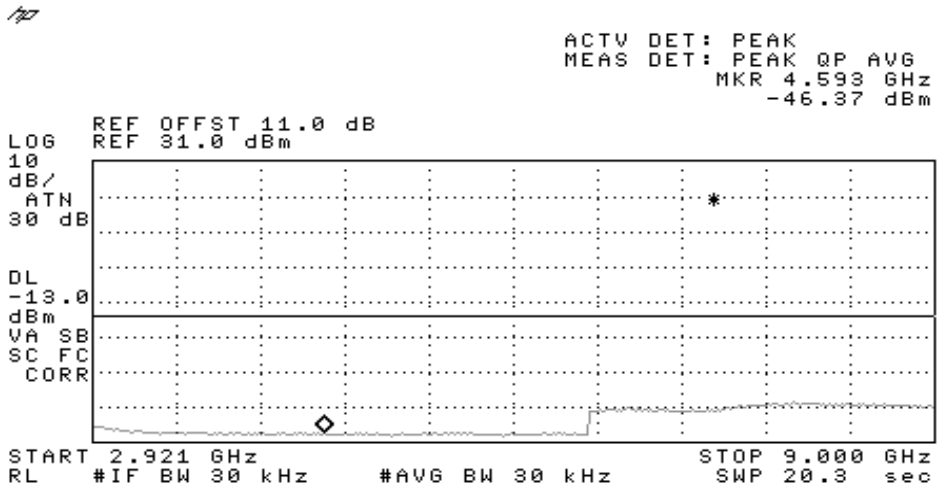
Low channel 99% BW



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

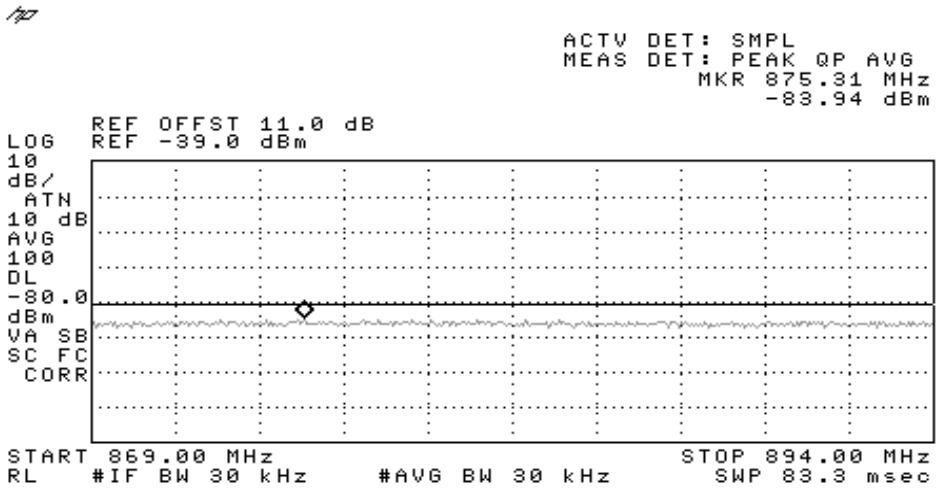
Low Channel Out of Band





Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

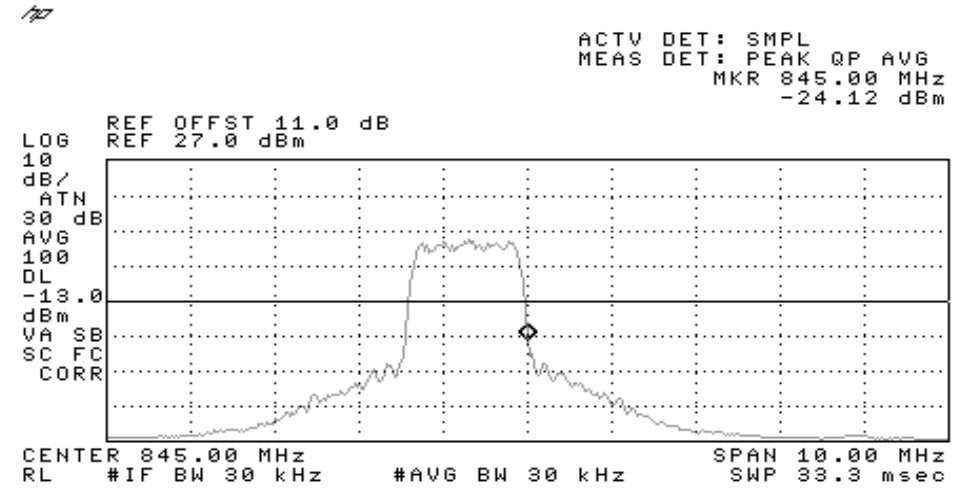
Low Channel Mobile Emissions



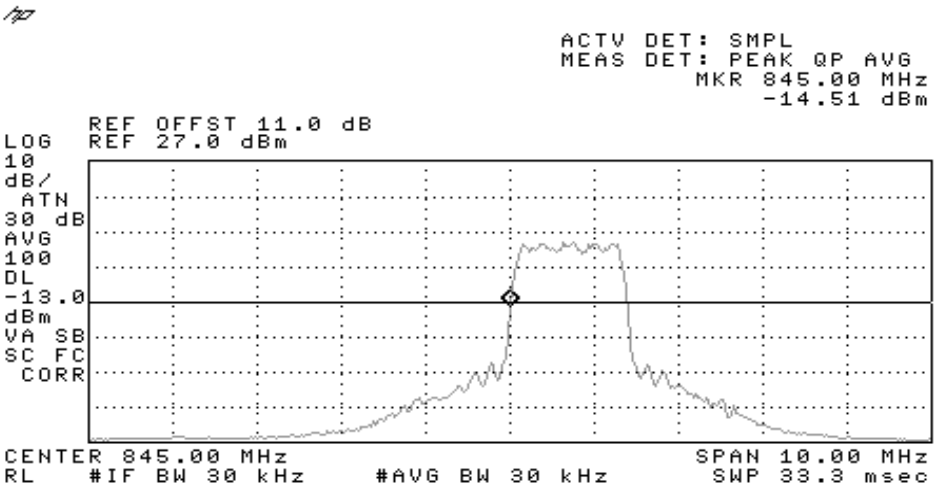
Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 4: Sub-band B of the cellular range.

High Blockedge 845

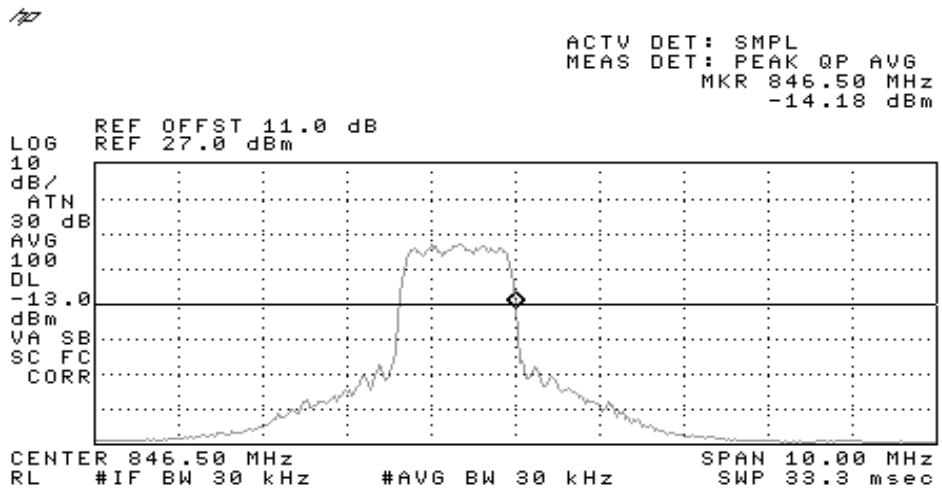


Low Blockedge 845

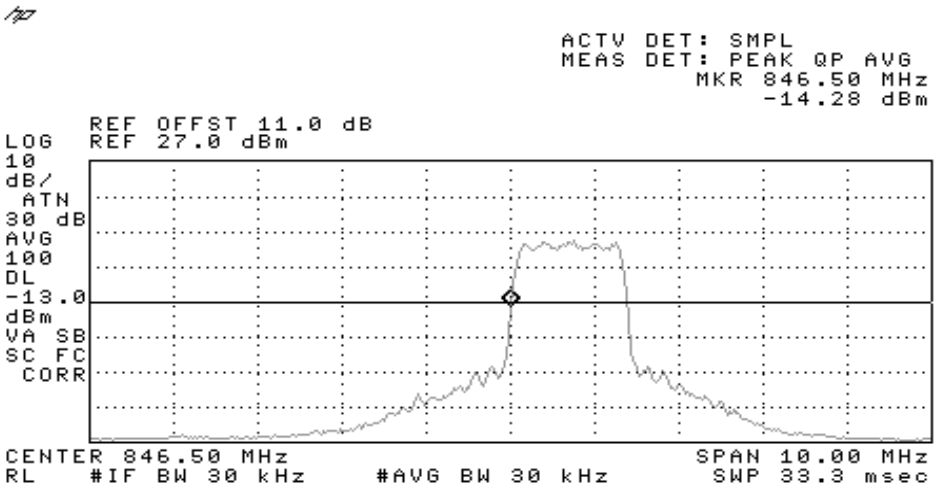


Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

High Blockedge 846.5

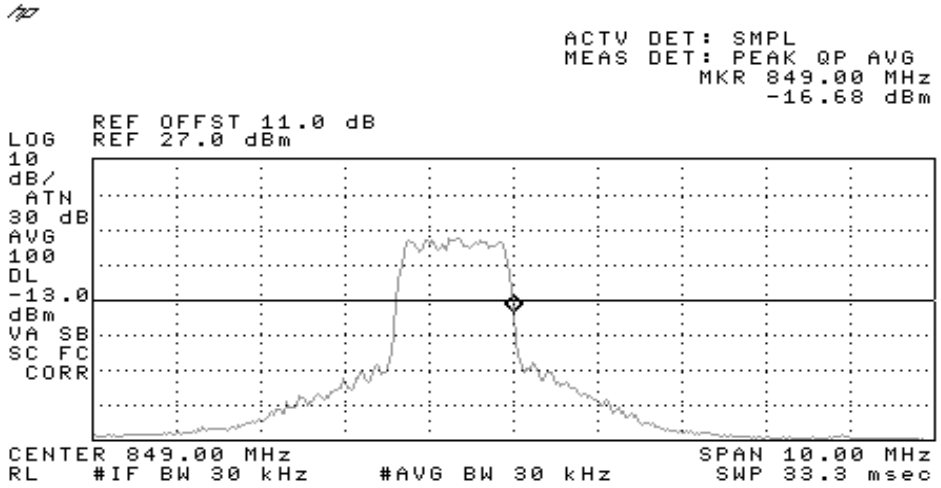


Low Blockedge 846.5



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

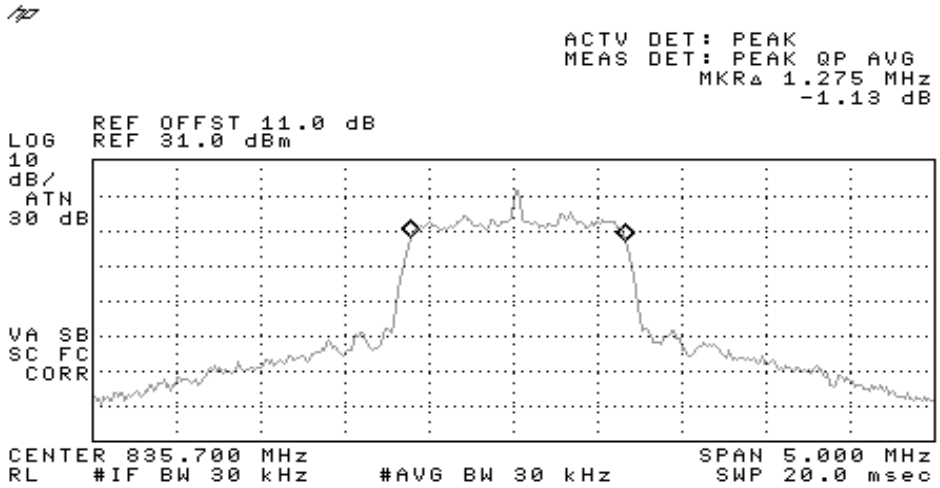
High Bandedge 849



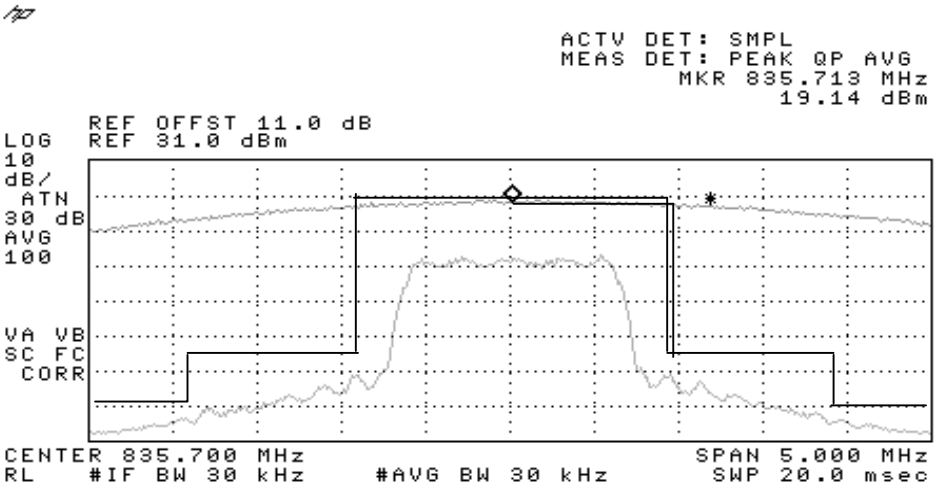
Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 5: Sub-band B: out of band emission, 99% BW, Mobile emissions.

Middle Channel 99% BW

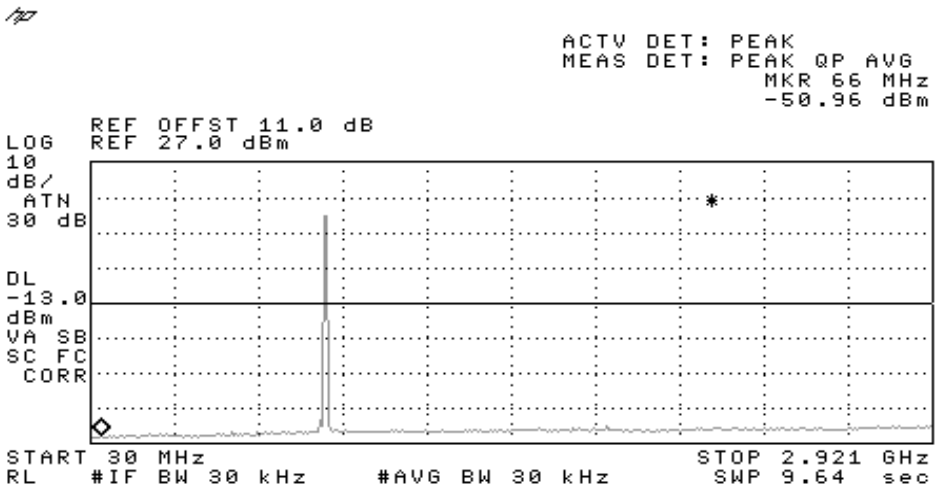


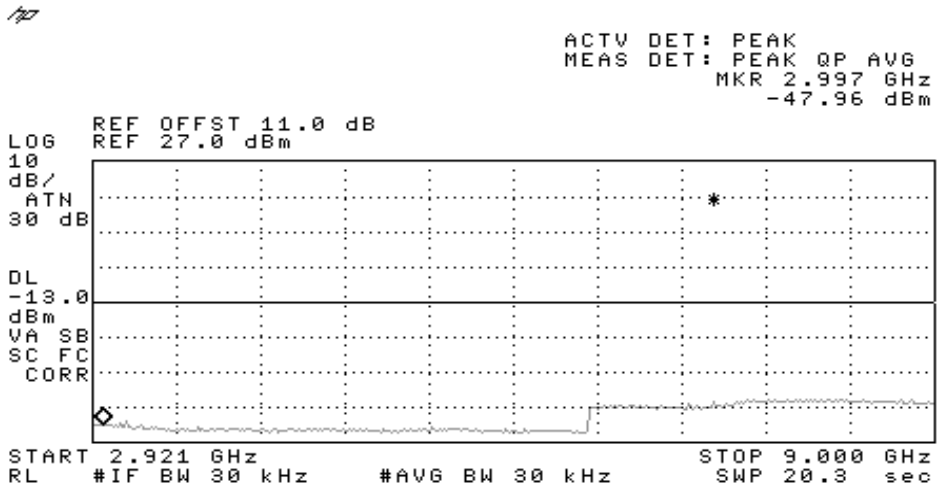
Emission Mask Middle Channel



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

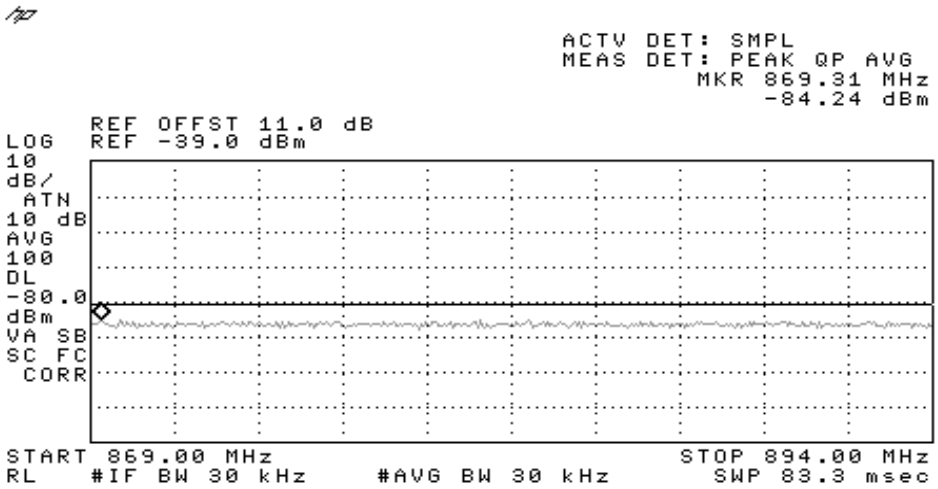
Middle Channel Out of Band





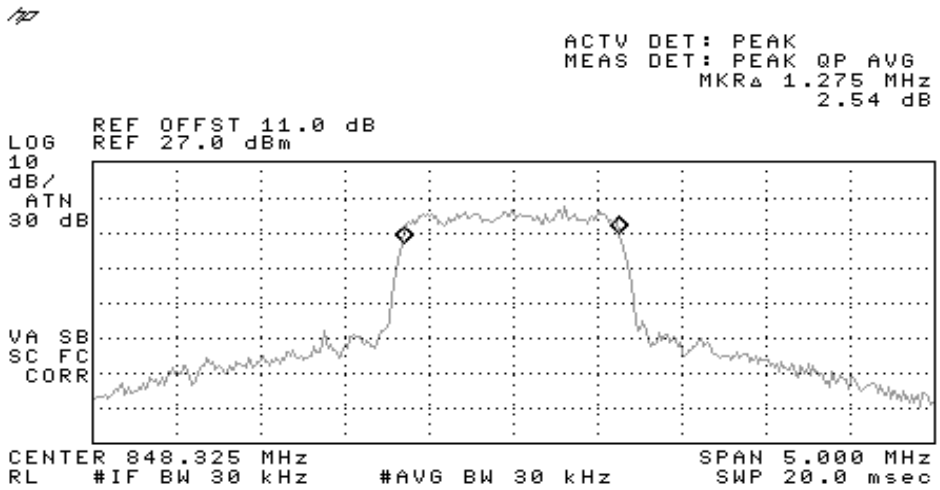
Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Middle Channel Mobile emissions

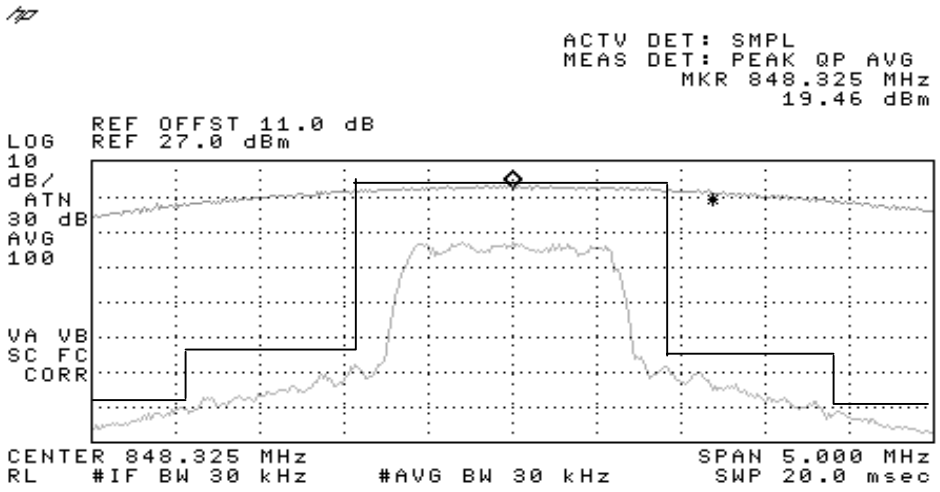


Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

High Channel 99% BW

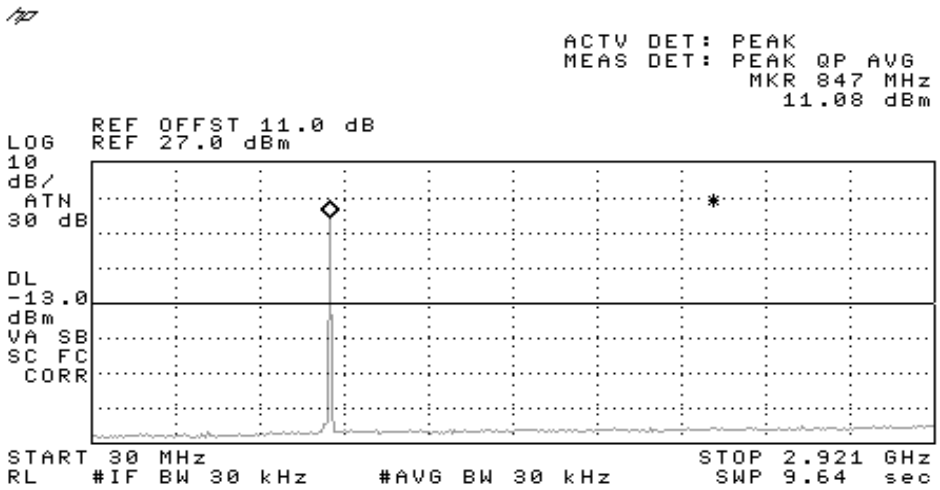


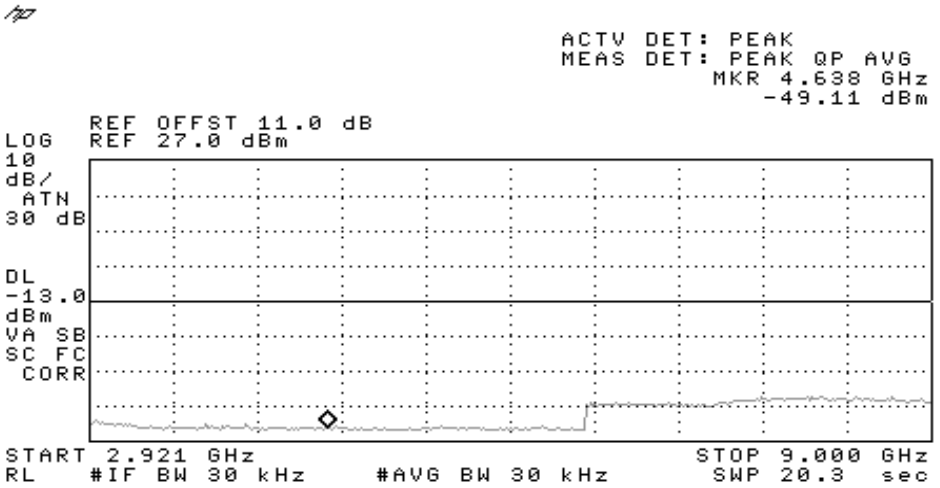
High Channel Emission mask



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

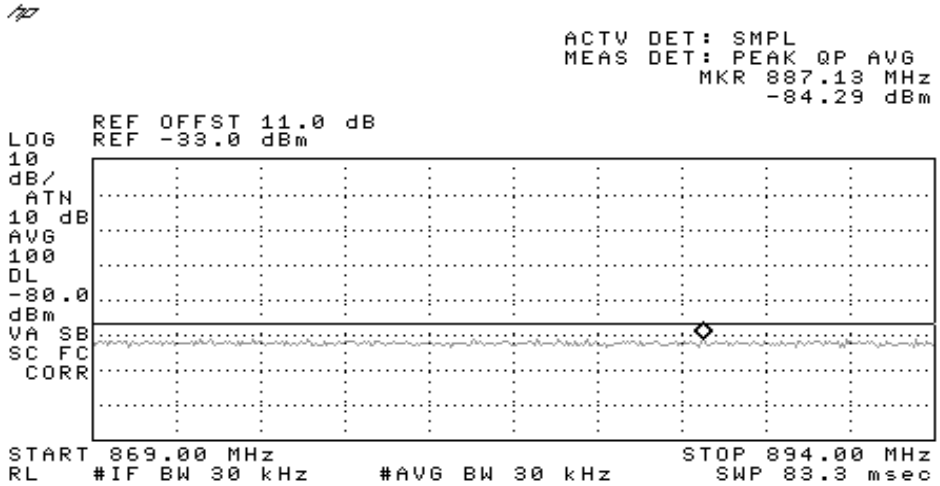
High Channel Out of Band





Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

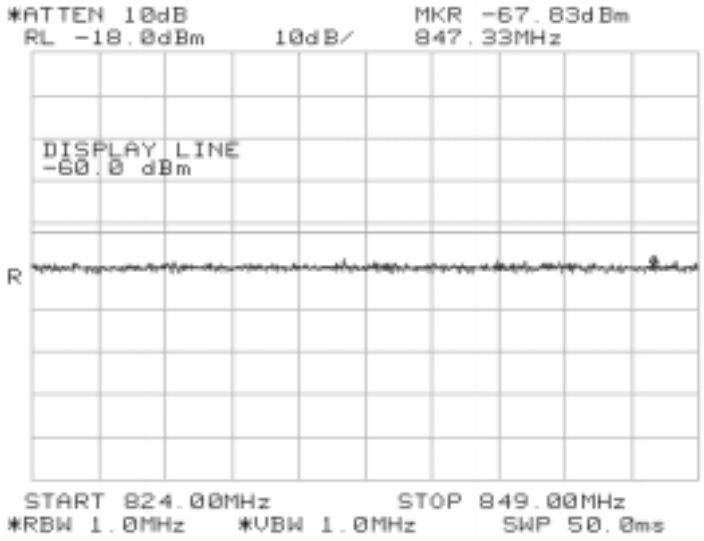
High Channel Mobile Emissions



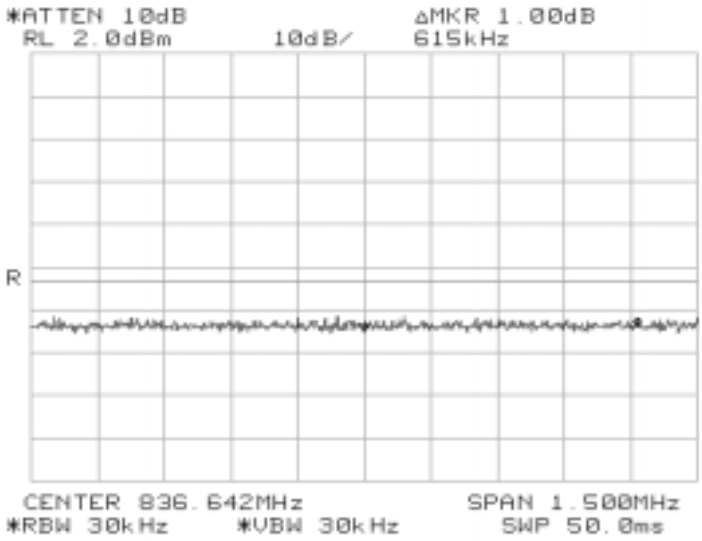
Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run #6: Minimum Standby and Control Output Power

RSS-129 (9.3)

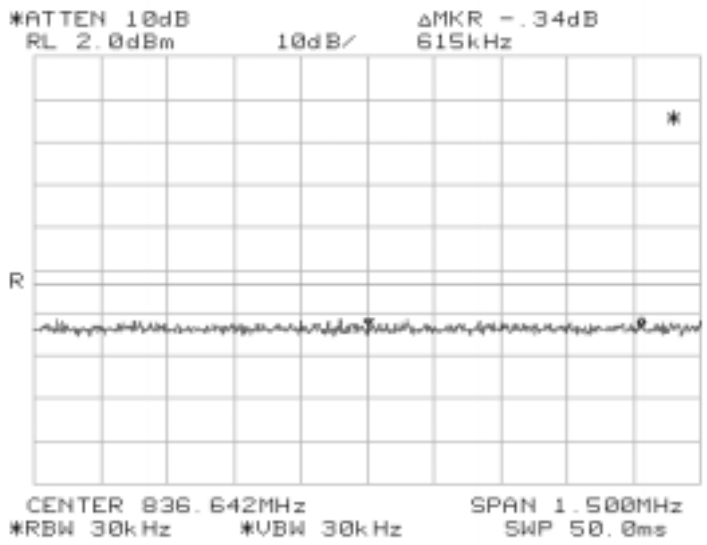


RSS-129 (9.4) Minimum Power Open Loop



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

RSS-129 (9.4) Minimum Power Close Loop



Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Receiver Conducted Emissions (1900 MHz)

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: 8/27/2003
Test Engineer: cbyleckie
Test Location: SVOATS #4
Config. Used: 1
Config Change: None
EUT Voltage: 120V / 60Hz

General Test Configuration

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: 22 °C
Rel. Humidity: 66 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Receiver Spurious	RSS 133 9(II)	Pass	All emission < -2Nw
2	Receiver Spurious	RSS 133 9(ii)	Pass	All emission < -2Nw
3	Receiver Spurious	RSS 133 9(ii)	Pass	All emission < -2Nw
4	Receiver Spurious	RSS 133 9(ii)	Pass	All emission < -2Nw
5	Receiver Spurious	RSS 133 9(ii)	Pass	All emission < -2Nw

Modifications Made During Testing:

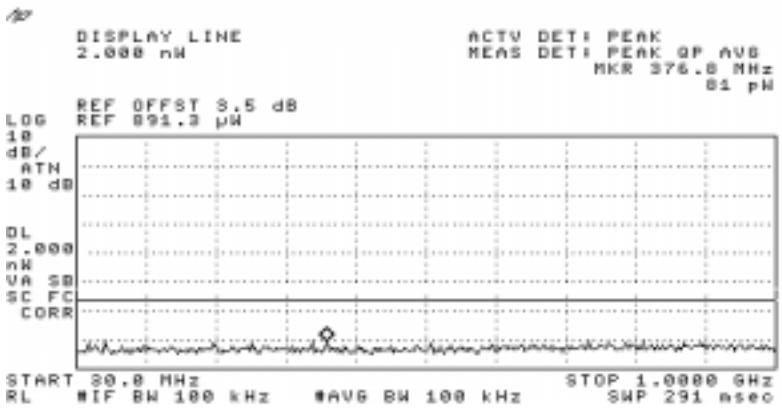
No modifications were made to the EUT during testing

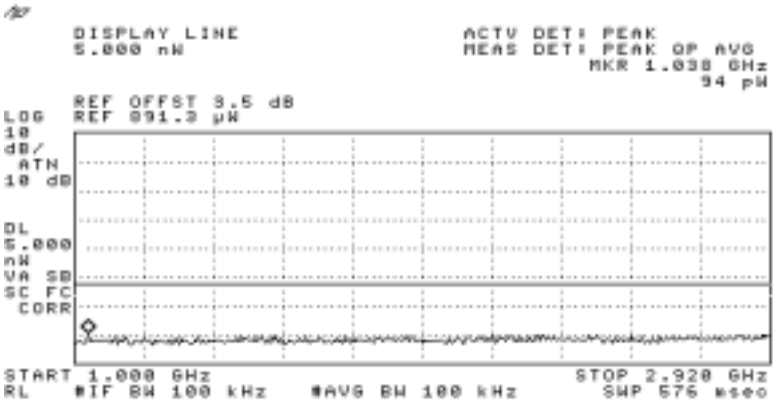
Deviations From The Standard

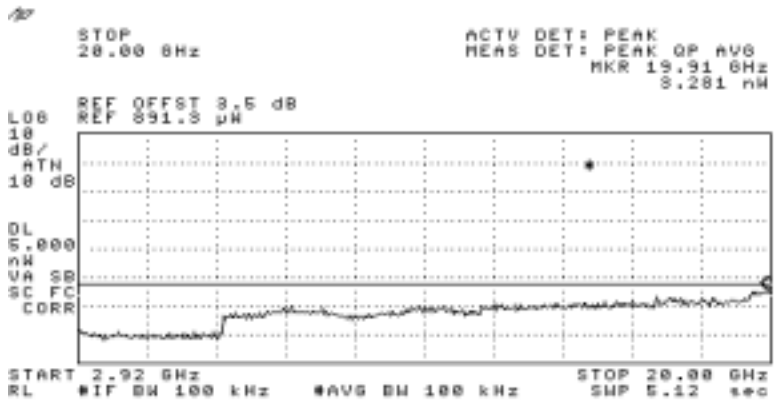
No deviations were made from the requirements of the standard.

Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 1: Receiver Spurious Emissions Block A" Ch. 1018

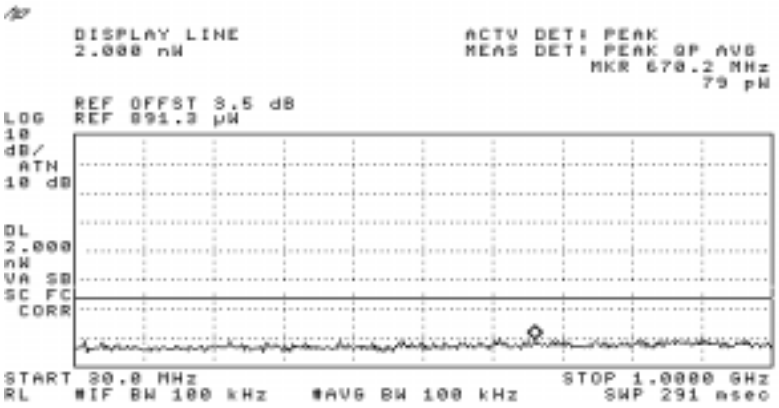


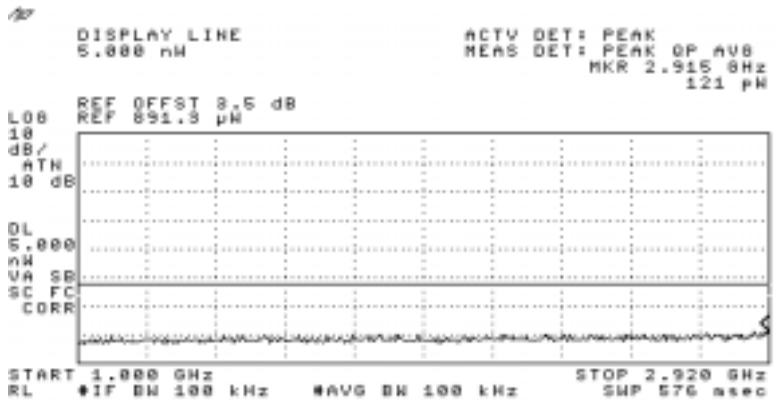


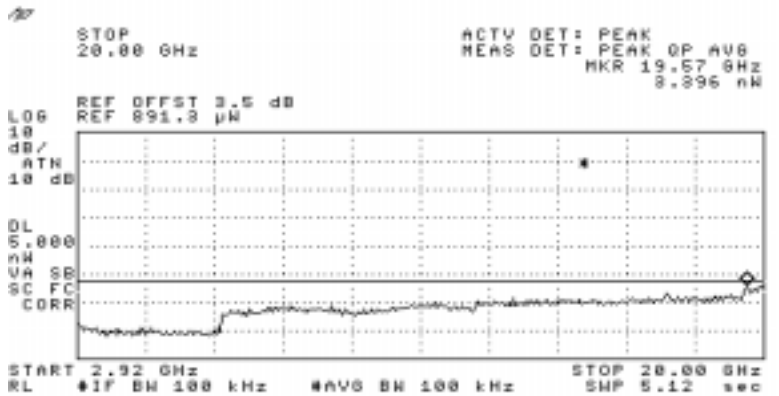


Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 2: Receiver Spurious Emissions Block A Ch 155

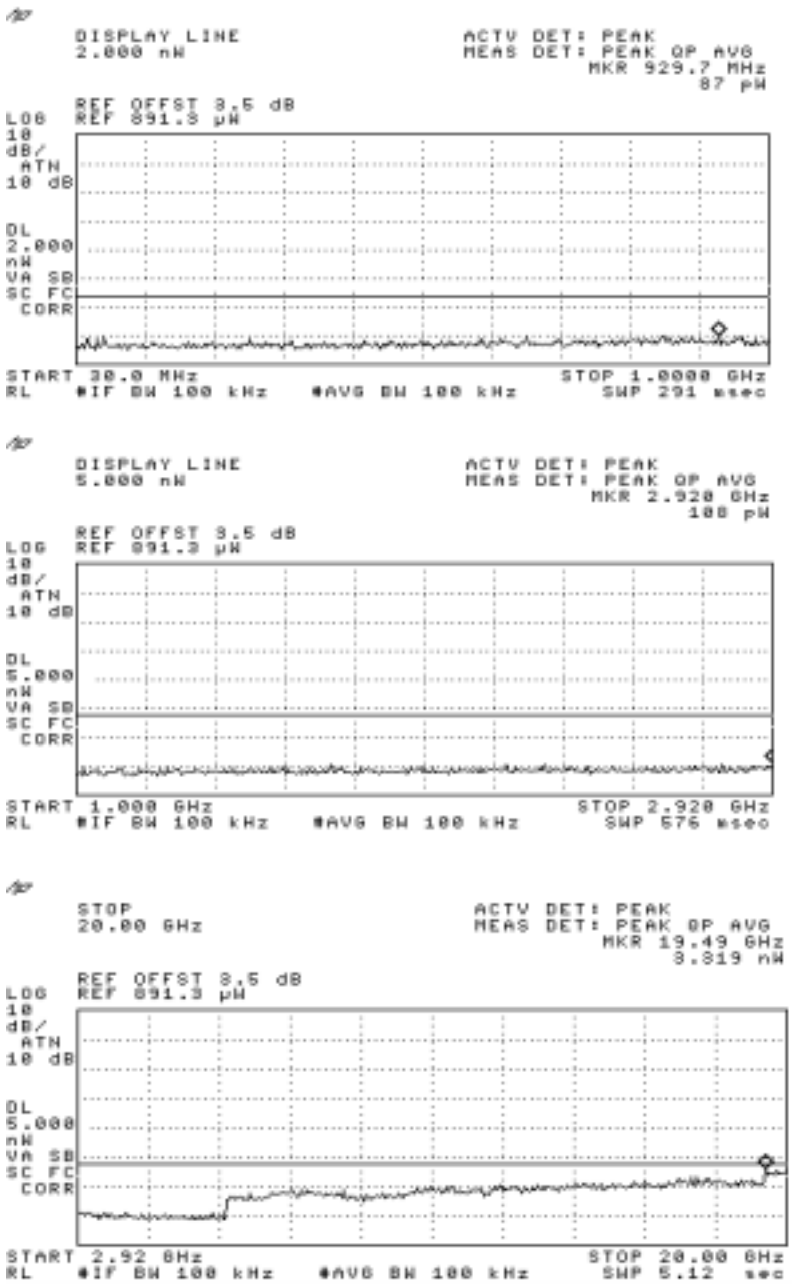






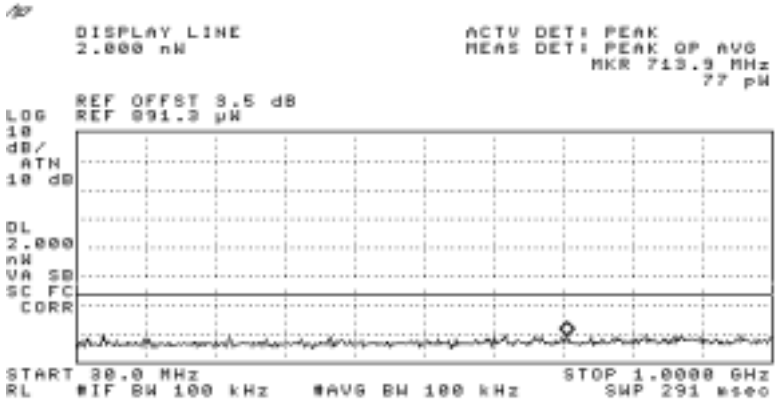
Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

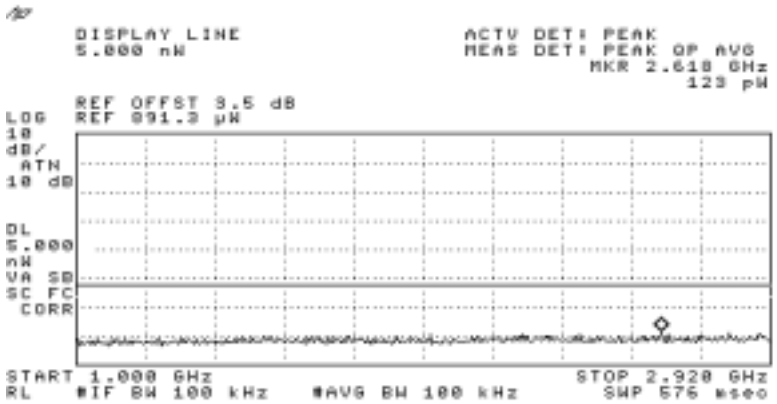
Run# 3: Receiver Spurious Emissions Block B Ch 500

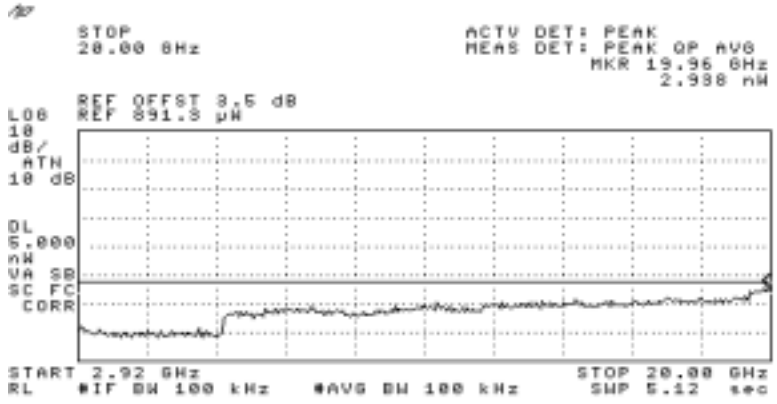


Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 4: Receiver Spurious Emissions Block A' Ch 692

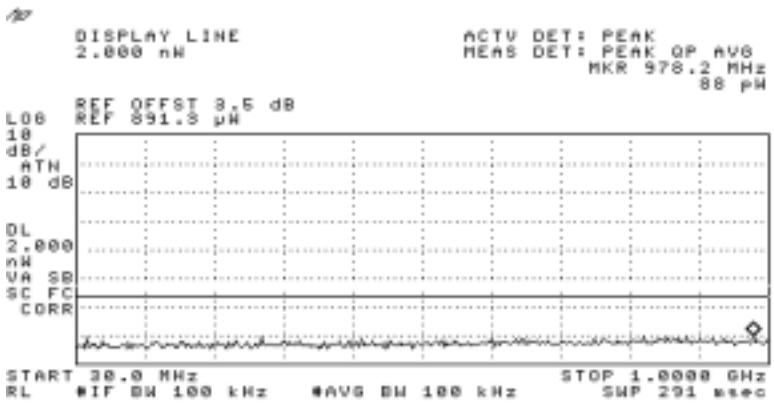


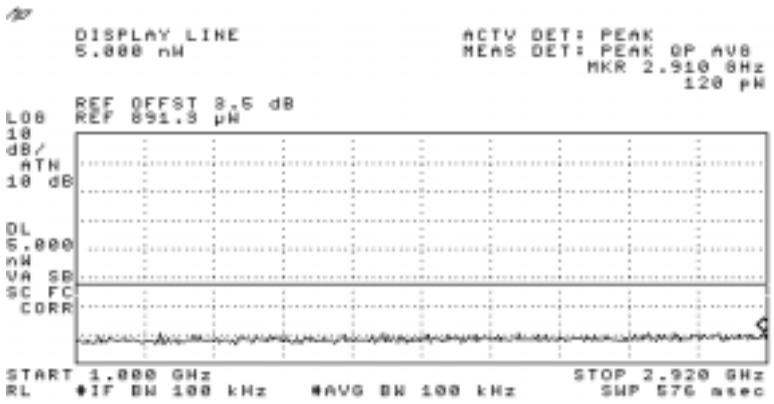


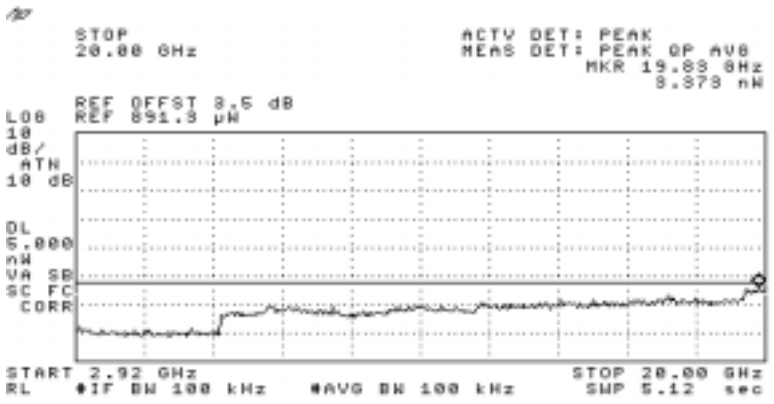


Client:	Global Data	Job Number:	J52343
Model:	EZ Star	T-Log Number:	T52446
		Account Manager:	Enter on cover sheet
Contact:	Pichai Tanvilai		
Spec:	FCC 22H & 24E, RSS-129 & 133	Class:	Radio

Run# 5: Receiver Spurious Emissions Block B' Ch 758







2.1033(c)(14)/2.1055/22.355/24.235- FREQUENCY STABILITY
Customer: Anydata
Date: 16-Apr-02
WO#: 78691
Test Engineer: Dustin Oaks

Part 22.355: 800 MHz Band
Frequency: 836.52 MHz

Temperature	DC Voltage	Frequency (MHz)	Deviation (MHz)	Limit (MHz)
-30	12	836.52102	0.00102	.0020913
-20	12	836.52100	0.00100	.0020913
-10	12	836.52090	0.00090	.0020913
0	12	836.52095	0.00095	.0020913
10	12	836.52096	0.00096	.0020913
20	10.2	836.52032	0.00032	.0020913
20	12	836.52030	0.00030	.0020913
20	13.8	836.52045	0.00045	.0020913
30	12	836.52070	0.00070	.0020913
40	12	836.52021	0.00021	.0020913
50	12	836.51991	0.00009	.0020913

RSS-129 (9.2.2): 800MHz Band

Frequency: 836.52 MHz

Temperature Vs. Power

Reference Power = 23.9 dBm

Temperature (Celsius)	Deviation (dB)	Power (dBm)
-30	0.40	23.5
-20	0.20	23.7
-10	0.70	23.2
0	0.80	23.1
10	0.40	23.5
20	0.40	23.5
30	0.30	23.6
40	0.20	23.7
50	0.10	23.8
60	0.00	23.9

Frequency: 836.52 MHz

Voltage Vs. Power

Reference Power = 23.9 dBm

Nominal Voltage is 12Vdc.

Voltage (Dc)	Voltage (DC)	Deviation (dB)	Power (dBm)
85%	10.2	0.10	23.8
115%	13.8	0.20	23.7

Part 24.235: 1900 MHz Band

Frequency: 1851.25 MHz

Temperature	DC Voltage	Frequency (MHz)	Deviation (MHz)	Limit (MHz)
-30	12	1851.21	0.04	Stays within the authorized Band
-20	12	1851.25	0	Stays within the authorized Band
-10	12	1851.27	0.02	Stays within the authorized Band
0	12	1851.26	0.01	Stays within the authorized Band
10	12	1851.28	0.03	Stays within the authorized Band
20	10.2	1851.24	0.01	Stays within the authorized Band
20	12	1851.25	0	Stays within the authorized Band
20	13.8	1851.30	0.05	Stays within the authorized Band
30	12	1851.22	0.03	Stays within the authorized Band
40	12	1851.22	0.03	Stays within the authorized Band
50	12	1851.23	0.02	Stays within the authorized Band

Frequency: 1980.75 MHz

Temperature	DC Voltage	Frequency (MHz)	Deviation (MHz)	Limit (MHz)
-30	12	1908.79	0.04	Stays within the authorized Band
-20	12	1908.73	0.02	Stays within the authorized Band
-10	12	1908.74	0.01	Stays within the authorized Band
0	12	1908.79	0.04	Stays within the authorized Band
10	12	1908.76	0.01	Stays within the authorized Band
20	10.2	1908.77	0.02	Stays within the authorized Band
20	12	1908.74	0.01	Stays within the authorized Band
20	13.8	1908.73	0.02	Stays within the authorized Band
30	12	1908.76	0.01	Stays within the authorized Band
40	12	1908.77	0.02	Stays within the authorized Band
50	12	1908.72	0.03	Stays within the authorized Band

EXHIBIT 3: Test Configuration Photos

EXHIBIT 4: FCC ID Label and Label Location

EXHIBIT 5: Detailed Photographs

EXHIBIT 6: Schematics

EXHIBIT 7: Theory of Operation

EXHIBIT 8: User Manual

EXHIBIT 9: Block Diagram

EXHIBIT 10: RF Exposure