



# FCC Test Report

## FCC Part 22, 24

for  
**Duncan Technologies**

**X3W**

**Model Number: X3W**

**FCC ID: UIB-X3W**

**TEST REPORT #: EMC\_DUNCA\_001\_FCC22\_24**  
**DATE: 2008-09-10**



Certificate # 2135.01



FCC listed  
A2LA certified  
IC recognized #  
3462B

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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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## 1 Assessment

**The following is in compliance with the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations.**

Company	Description	Model #
<b>Duncan Technologies</b>	<b>Handheld mobile computer with integrated printer, for parking and traffic enforcement</b>	<b>X3W</b>

**This test report reviewed by:**

**Peter Mu**

**2008-09-10 EMC & Radio (Project Engineer)**

Date	Section	Name	Signature
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**Project Leader:**

**Marc Douat**

**2008-09-10 EMC & Radio (Project Engineer)**

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

## **2 Administrative Data**

### **2.1 Identification of the Testing Laboratory**

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Lothar Schmidt

### **2.2 Identification of the Client**

Applicant's Name:	Duncan Technologies
Address:	4129 Avenida de la Plata  Oceanside CA 92056, USA
Contact Person:	Ryan Vincent
Phone No.	+1 760 945 9893
Fax:	+1 760 945 5815
e-mail:	rvincent@duncansolutions.com

### **2.3 Identification of the Manufacturer**

Manufacturer's Name:	Same as above
Manufacturer's Address:	

### **3 Equipment under Test (EUT)**

#### **3.1 Specification of the Equipment under Test**

Product Type	Handheld mobile computer with integrated printer, for parking and traffic enforcement.	
Marketing Name:	X3W	
Model No:	X3W	
Hardware Revision :	1.0	
Software Revision :	1053.46	
FCC-ID:	UIB-X3W	
IC-ID :	N/A	
Frequency Range:	824 MHz to 849 MHz, 1850 MHz to 1910 MHz	
Number of Channels	124-GSM850, 299-GSM1900	
Type(s) of Modulation:	GMSK	
Antenna Type:	Internal	
Radiated Output Power:	836.6 MHz	25.22 dBm (0.333 W)
	1909.8 MHz	26.87 dBm (0.486 W)

## **4 Subject of Investigation**

Data presented in this test report only includes Radiated emissions and Radiated power. AC conducted emissions is not applicable since the device is powered by a battery.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

## **5 Measurements**

### **5.1 RF Power Output**

#### **5.1.1 FCC 2.1046 Measurements required: RF power output.**

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

#### **5.1.2 Limits:**

##### **5.1.2.1 §22.913(a) & RSS-129 (9.1) Effective radiated power limits.**

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

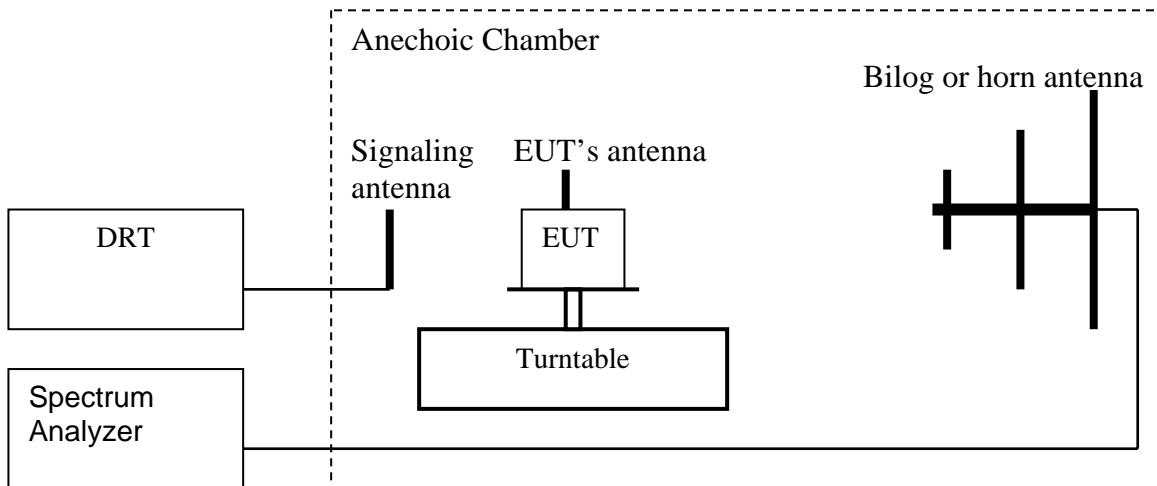
##### **5.1.2.2 §24.232(b)(c) & RSS-133 (4.3) & (6.4) Power limits.**

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).

(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

**5.1.3 Radiated Output Power measurement procedure:**

Based on TIA-603C 2004

**2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)**

1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:  

$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
8. Determine the EIRP using the following equation:  

$$\text{EIRP (dBm)} = \text{ERP (dBm)} - 2.14 \text{ (dB)}$$
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band. **Spectrum analyzer settings = rbw=vbw=3MHz**

**(note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

**5.1.4 ERP Results 850 MHz band:**

<b>Power Control Level</b>	<b>Burst Peak ERP</b>
<b>5</b>	<b>≤38.45dBm (7W)</b>

<b>Frequency (MHz)</b>	<b>Effective Radiated Power (dBm)</b>	<small><sup>Note 1</sup></small>
	<b>GSM</b>	
<b>824.2</b>	<b>24.72</b>	
<b>836.6</b>	<b>25.22</b>	
<b>848.8</b>	<b>23.06</b>	

Note 1: Measurements were obtained in EIRP (Refer to plots) and converted EIRP to ERP by subtracting 2.14dB from EIRP.

**5.1.5 EIRP Results 1900 MHz band:**

<b>Power Control Level</b>	<b>Burst Peak EIRP</b>
<b>0</b>	<b>≤33dBm (2W)</b>

<b>Frequency (MHz)</b>	<b>Effective Isotropic Radiated Power (dBm)</b>	
	<b>GSM</b>	
<b>1850.2</b>	<b>23.58</b>	
<b>1880.0</b>	<b>25.92</b>	
<b>1909.8</b>	<b>26.87</b>	

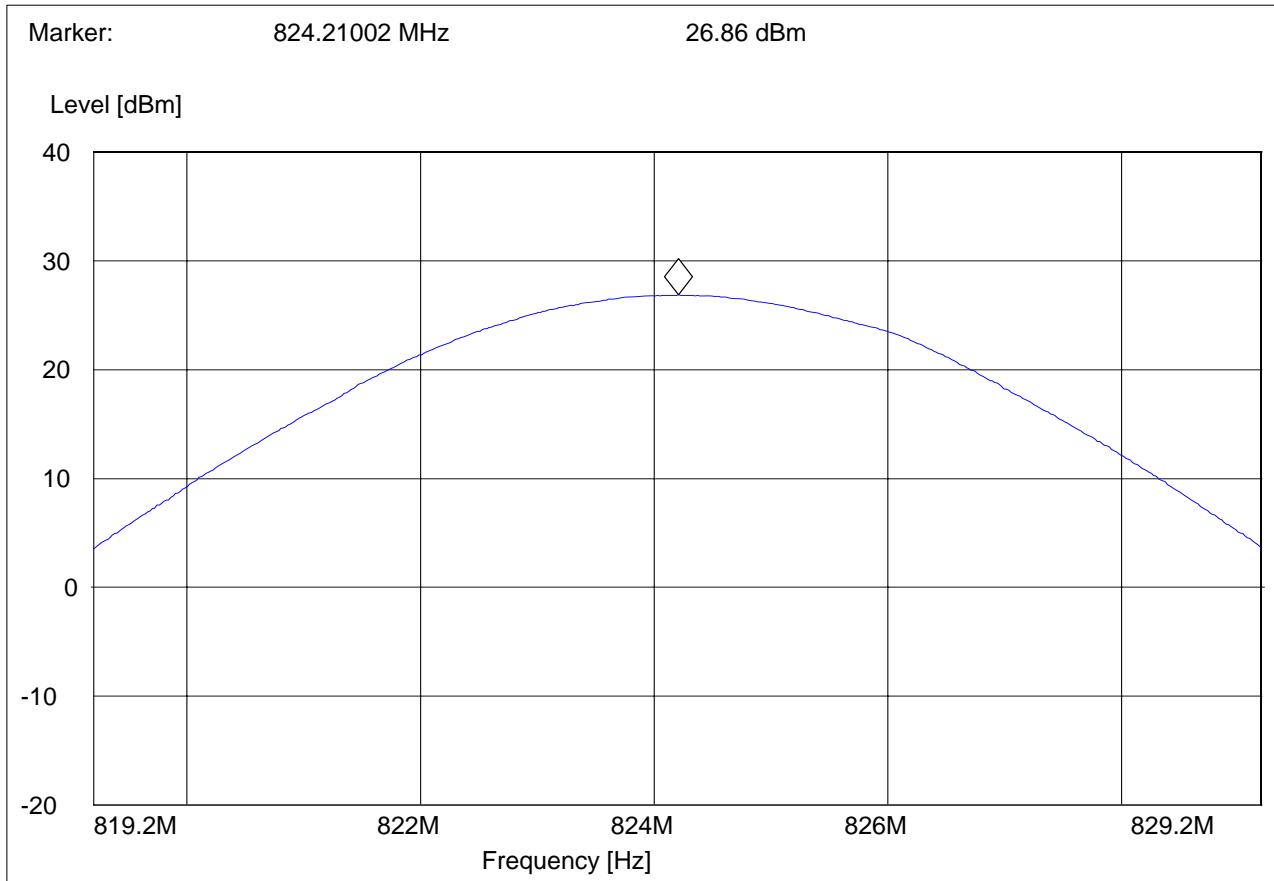
**EIRP (GSM 850)**  
**RF OUTPUT POWER (GSM-850)**  
**CHANNEL 128 GPRS**

**\$22.913(a) & RSS-129 (9.1)**

EUT: AUTOCITE  
 Customer:: DUNCAN SOLUTIONS  
 Test Mode: GSM 850  
 ANT Orientation: V  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "EIRP 850 CH 128 V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
819.2 MHz	829.2 MHz	MaxPeak	MaxPeak	3 MHz DUMMY-DBM

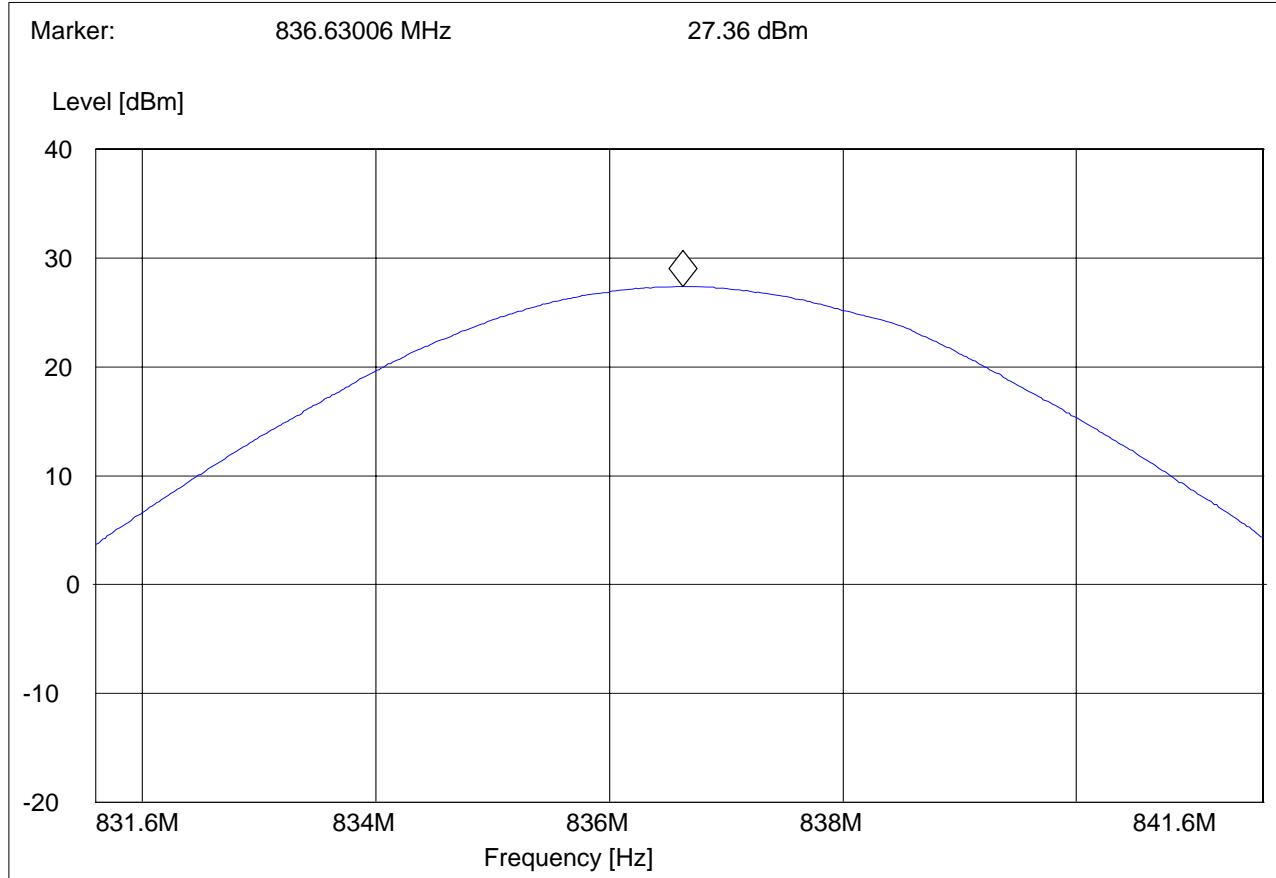


**RF OUTPUT POWER (GSM-850)  
CHANNEL 190 GPRS****§22.913(a) & RSS-129 (9.1)**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850  
 ANT Orientation: V  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "EIRP 850 CH 190 V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
831.6 MHz	841.6 MHz	MaxPeak	Coupled	3 MHz DUMMY-DBM
		MaxPeak		



**RF OUTPUT POWER (GSM-850)  
CHANNEL 251 GPRS****§22.913(a) & RSS-129 (9.1)**

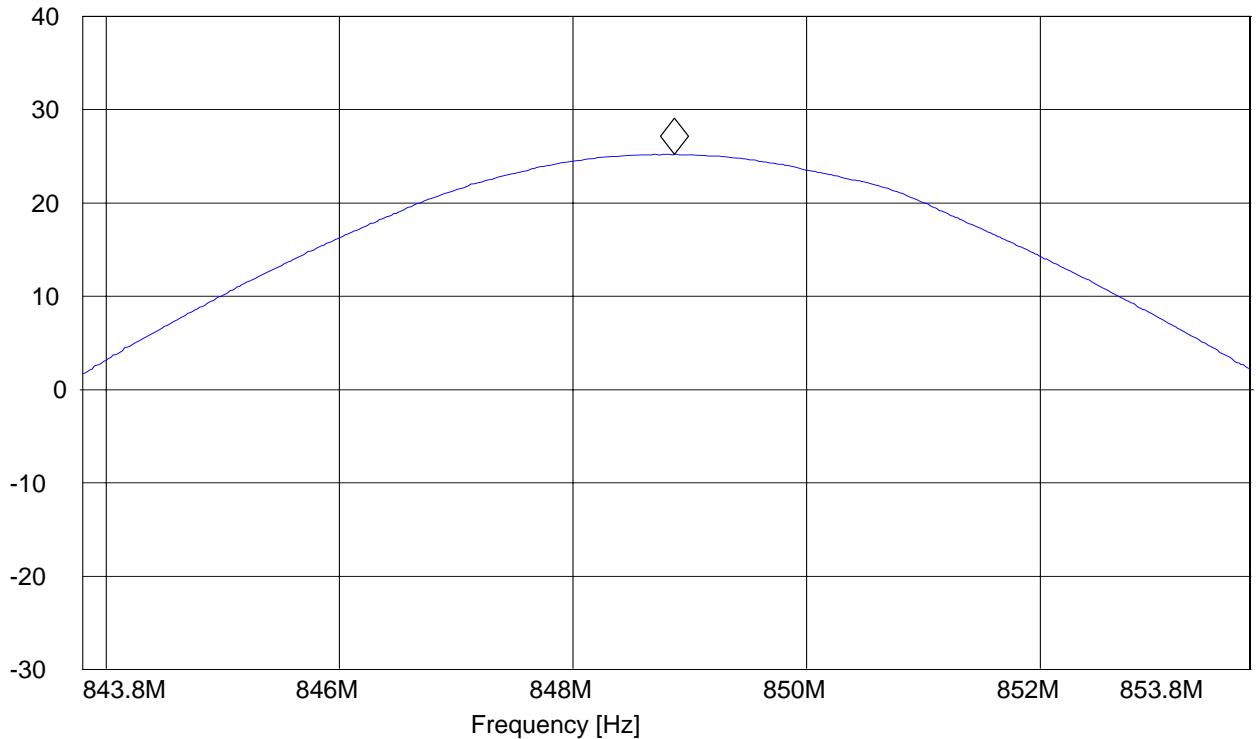
EUT: AUTOCITE  
Customer: DUNCAN SOLUTIONS  
Test Mode: GSM 850  
ANT Orientation: V  
EUT Orientation: V  
Test Engineer: SAM  
Voltage: BATTERY  
Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "EIRP 850 CH 251 V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
843.8 MHz	853.8 MHz	MaxPeak	Coupled	3 MHz DUMMY-DBM

Marker: 848.87014 MHz 25.2 dBm

Level [dBm]

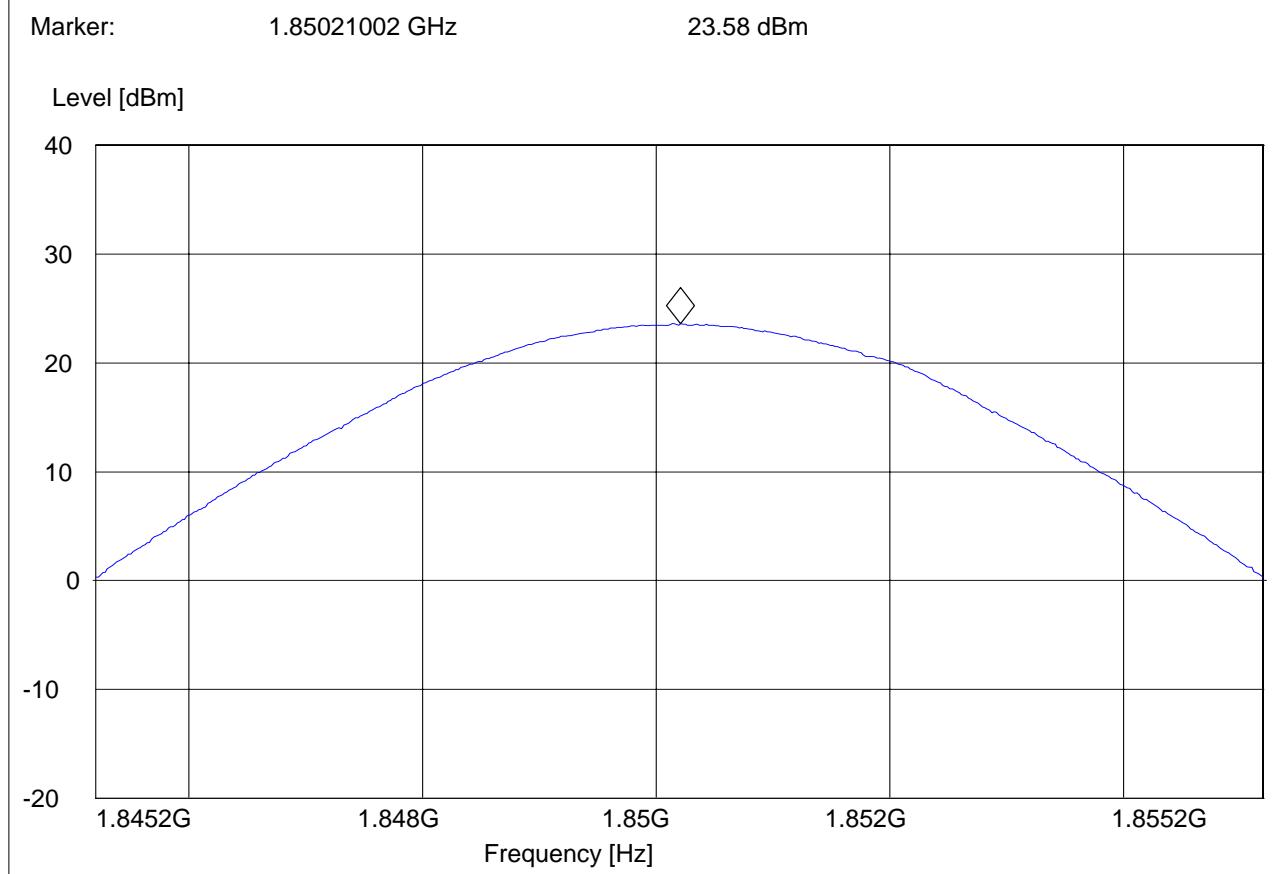


**RF OUTPUT POWER (PCS-1900)  
CHANNEL 512 GPRS****§24.232(b)(c) & RSS-133 (4.3) & (6.4)**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "EIRP 1900 CH512"***

Short Description: EIRP PCS 1900 for channel-512  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.8 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

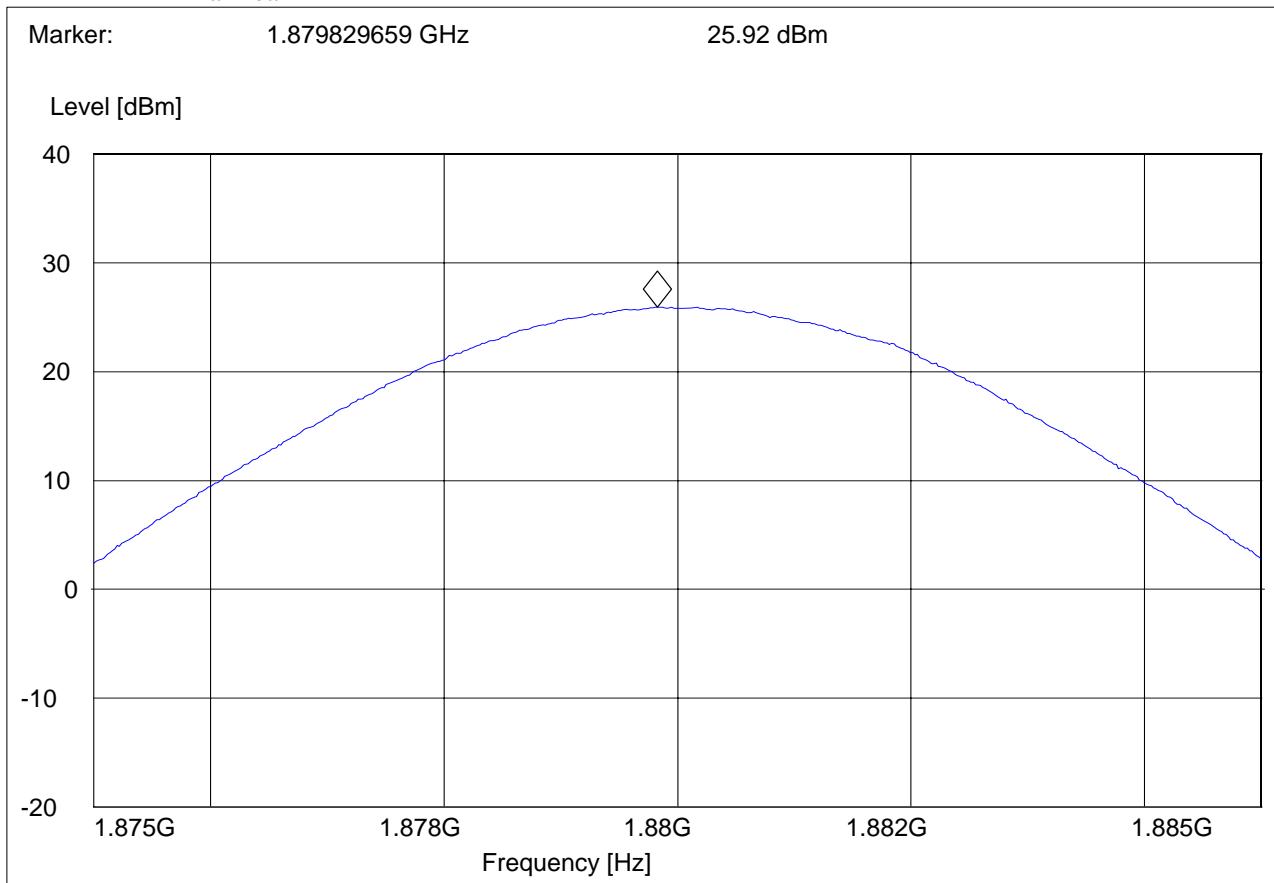


**RF OUTPUT POWER (PCS-1900)  
CHANNEL 661 GPRS****§24.232(b)(c) & RSS-133 (4.3) & (6.4)**

EUT: AUTOCITE  
Customer: DUNCAN SOLUTIONS  
Test Mode: GSM 1900  
ANT Orientation: H  
EUT Orientation: V  
Test Engineer: SAM  
Voltage: BATTERY  
Comments: TT @ 122°

***SWEEP TABLE: "EIRP 1900 CH661"***

Short Description: EIRP PCS 1900 for channel-661  
Start Stop Detector Meas. IF Transducer  
Frequency Frequency Time Bandw.  
1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM  
MaxPeak

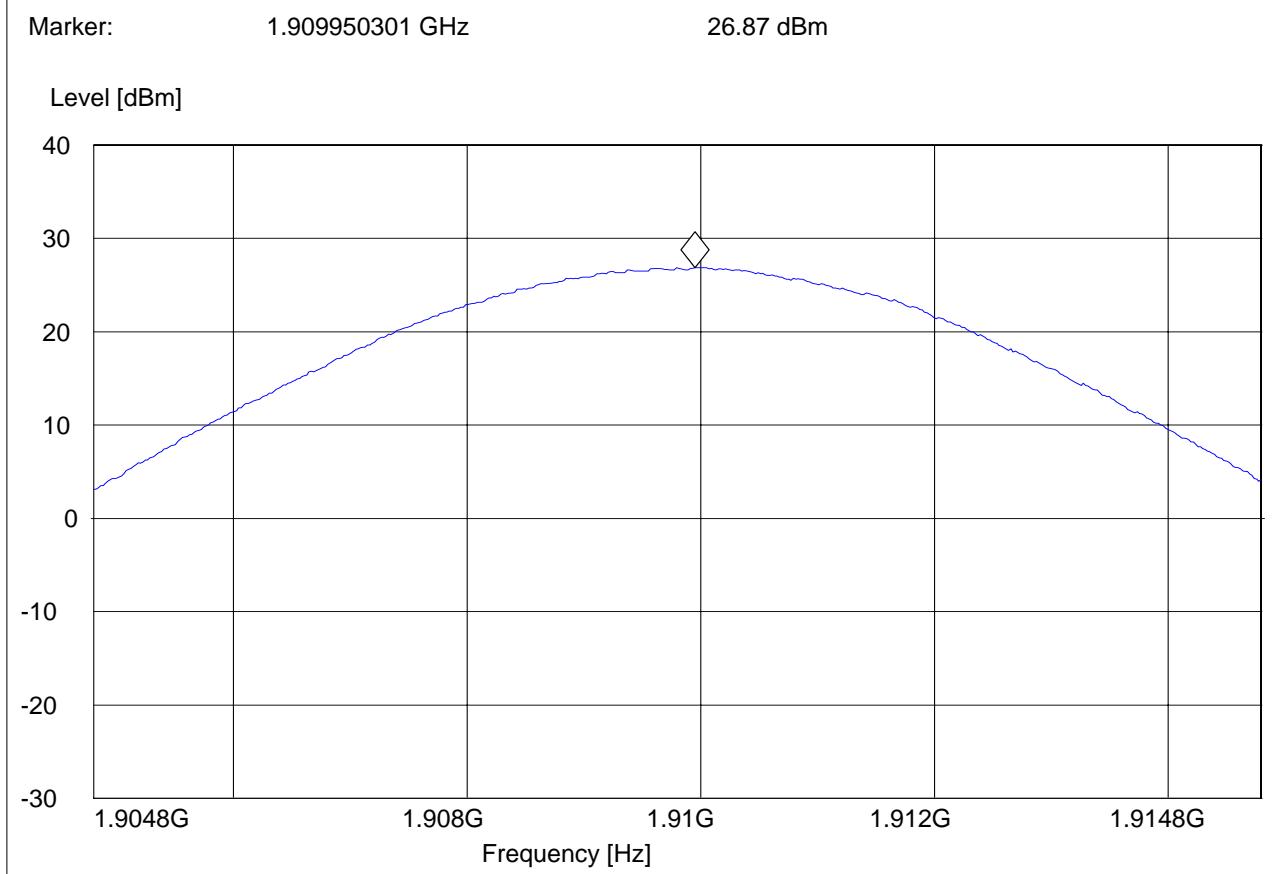


**RF OUTPUT POWER (PCS-1900)  
CHANNEL 810 GPRS****§24.232(b)(c) & RSS-133 (4.3) & (6.4)**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "EIRP 1900 CH810"***

Short Description: EIRP PCS 1900 for channel-810  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM



## **5.2 Transmitter Spurious Emissions Radiated**

### **5.2.1 FCC 2.1053 Measurements required: Field strength of spurious radiation.**

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

### **5.2.2 Limits:**

#### **5.2.2.1 §22.917 & RSS-129 (8.1.2) Emission limitations for cellular equipment.**

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

#### **5.2.2.2 §24.238 & RSS-133 (4.4) & (6.5) Emission limitations for Broadband PCS equipment.**

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

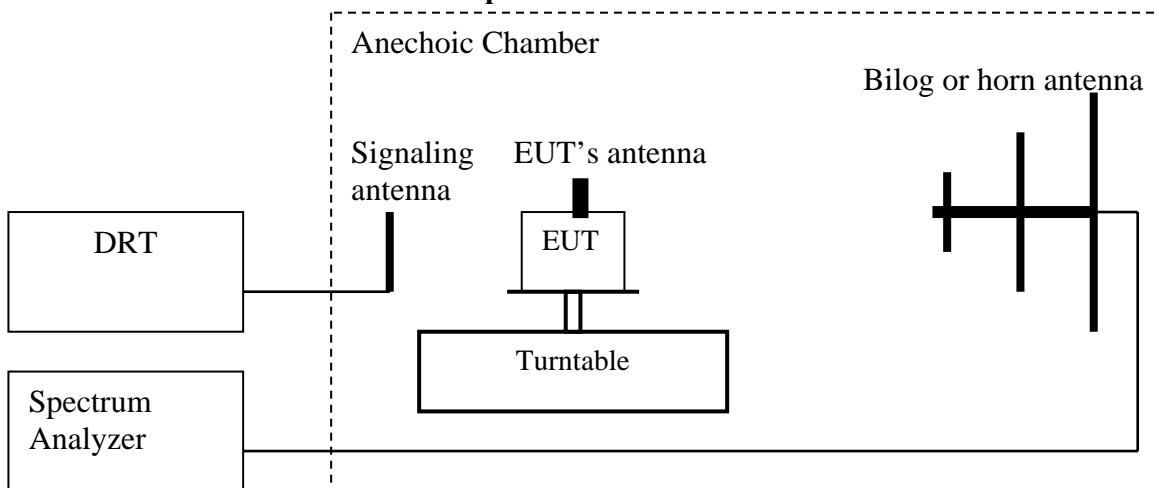
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the

carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 5.2.3 Radiated out of band measurement procedure:

Based on TIA-603C 2004

#### 2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:  

$$\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:  

$$\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(note: Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

#### Spectrum analyzer settings:

Res B/W: 1 MHz  
VID B/W: 1 MHz

**Measurement Survey:**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the GSM-850 & PCS-1900 bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the GSM-850 & PCS-1900 band into any of the other blocks respectively. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**5.2.4 Radiated out of band emissions results on EUT:****5.2.4.1 RESULTS OF RADIATED TESTS GSM-850:**

Harmonics	Tx ch-8 Freq. (MHz)	Level (dBm)	Tx ch-383 Freq. (MHz)	Level (dBm)	Tx ch-758 Freq. (MHz)	Level (dBm)
2	<b>1648.4</b>	NF	<b>1673.2</b>	NF	<b>1697.6</b>	NF
3	<b>2472.6</b>	NF	<b>2509.8</b>	NF	<b>2546.4</b>	NF
4	<b>3296.8</b>	NF	<b>3346.4</b>	NF	<b>3395.2</b>	NF
5	<b>4121</b>	NF	<b>4183</b>	NF	<b>4244</b>	NF
6	<b>4945.2</b>	NF	<b>5019.6</b>	NF	<b>5092.8</b>	NF
7	<b>5769.4</b>	NF	<b>5856.2</b>	NF	<b>5941.6</b>	NF
8	<b>6593.6</b>	NF	<b>6692.8</b>	NF	<b>6790.4</b>	NF
9	<b>7417.8</b>	NF	<b>7529.4</b>	NF	<b>7639.2</b>	NF
10	<b>8242</b>	NF	<b>8366</b>	NF	<b>8488</b>	NF
NF = NOISE FLOOR						

**5.2.4.2 RADIATED SPURIOUS EMISSIONS (GSM-850)****TX: 30MHz - 1GHz**

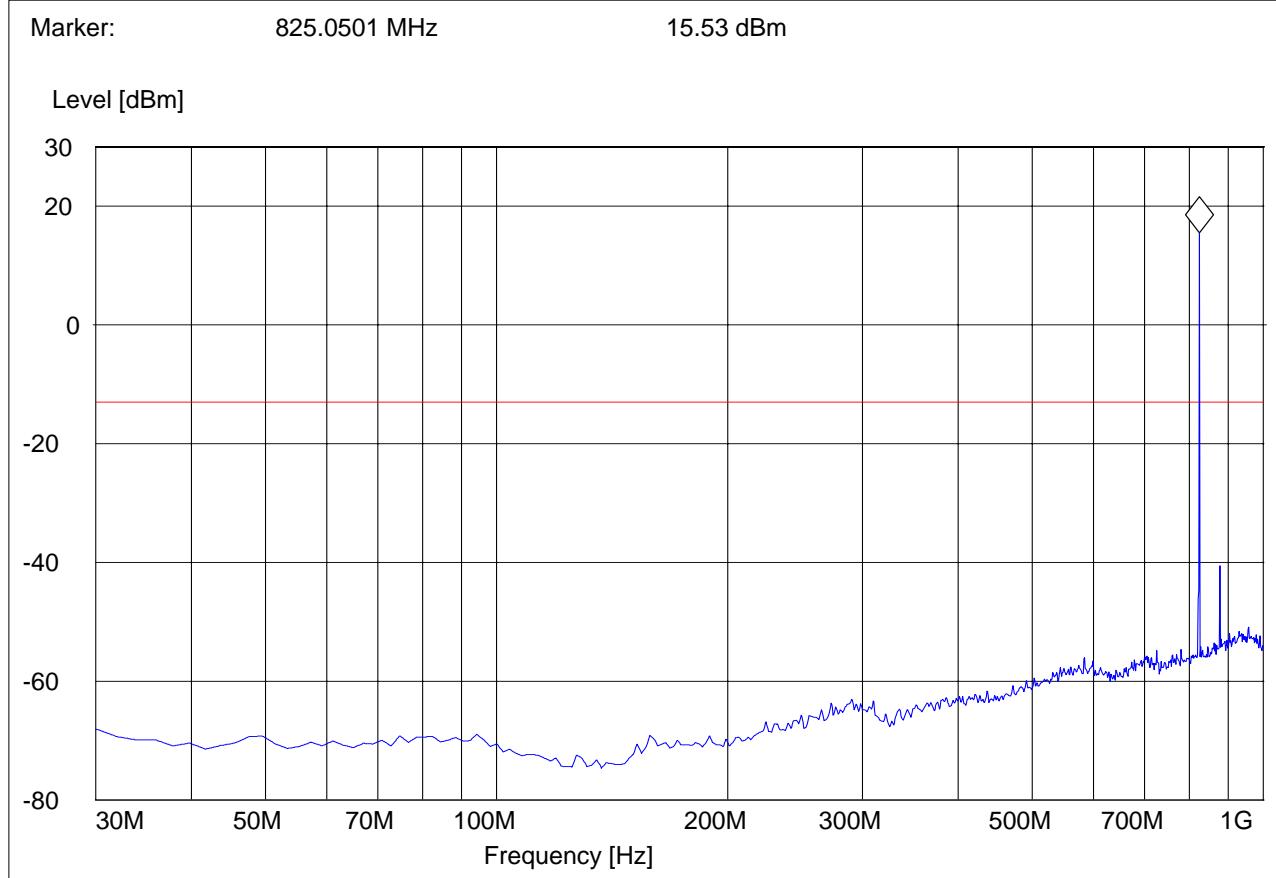
Spurious emission limit -13dBm

**Note: 1.The peak above the limit line is the carrier freq.**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850 CH 128  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_H"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz DUMMY-DBM



**TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Note: 1. The peak above the limit line is the carrier freq.**

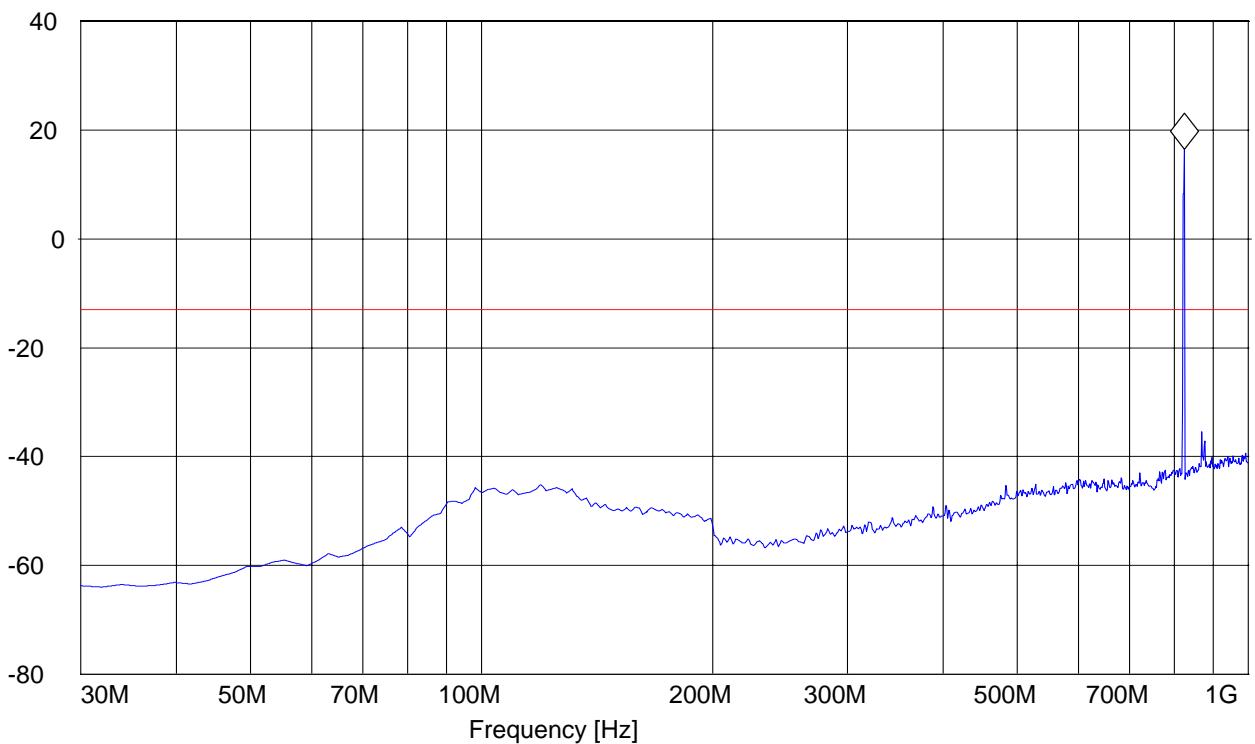
EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850 CH 128  
 ANT Orientation: V  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM

Marker: 825.0501 MHz 16.49 dBm

Level [dBm]



**TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Note: 1. The peak above the limit line is the carrier freq.**

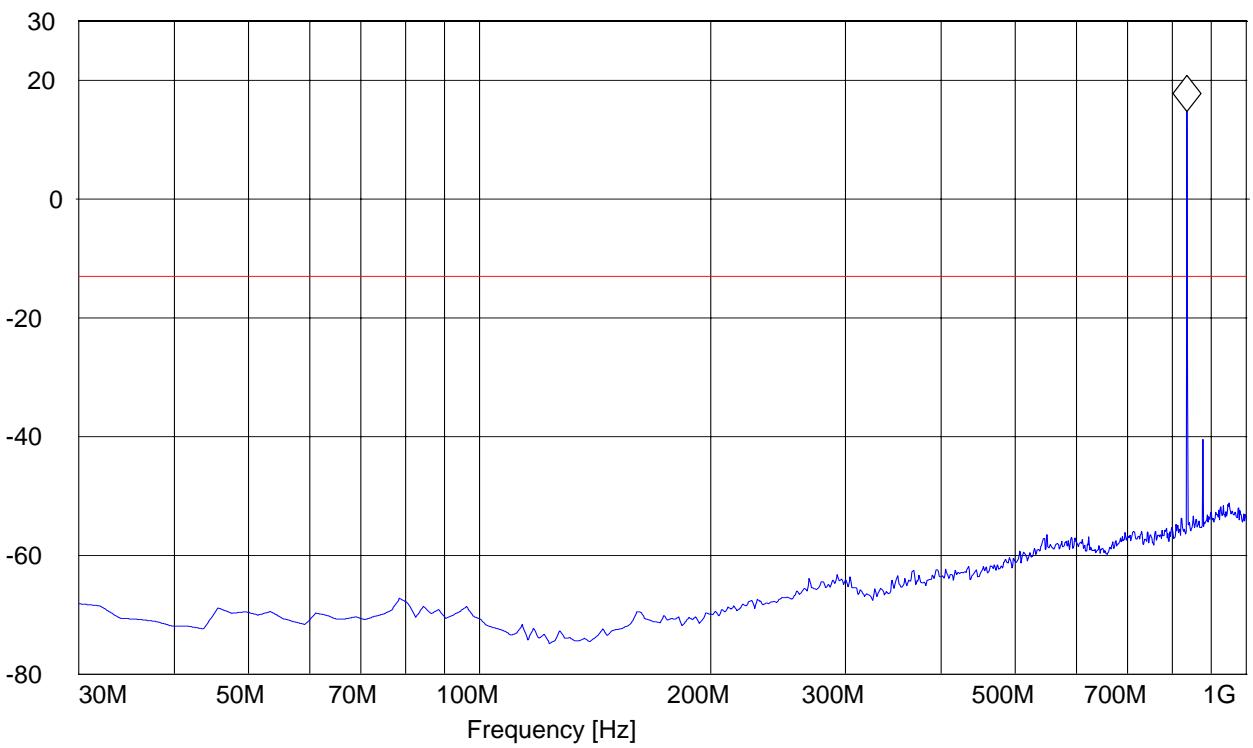
EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850 CH 190  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_H"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz DUMMY-DBM

Marker: 836.713427 MHz 14.78 dBm

Level [dBm]



**TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Note: 1. The peak above the limit line is the carrier freq.**

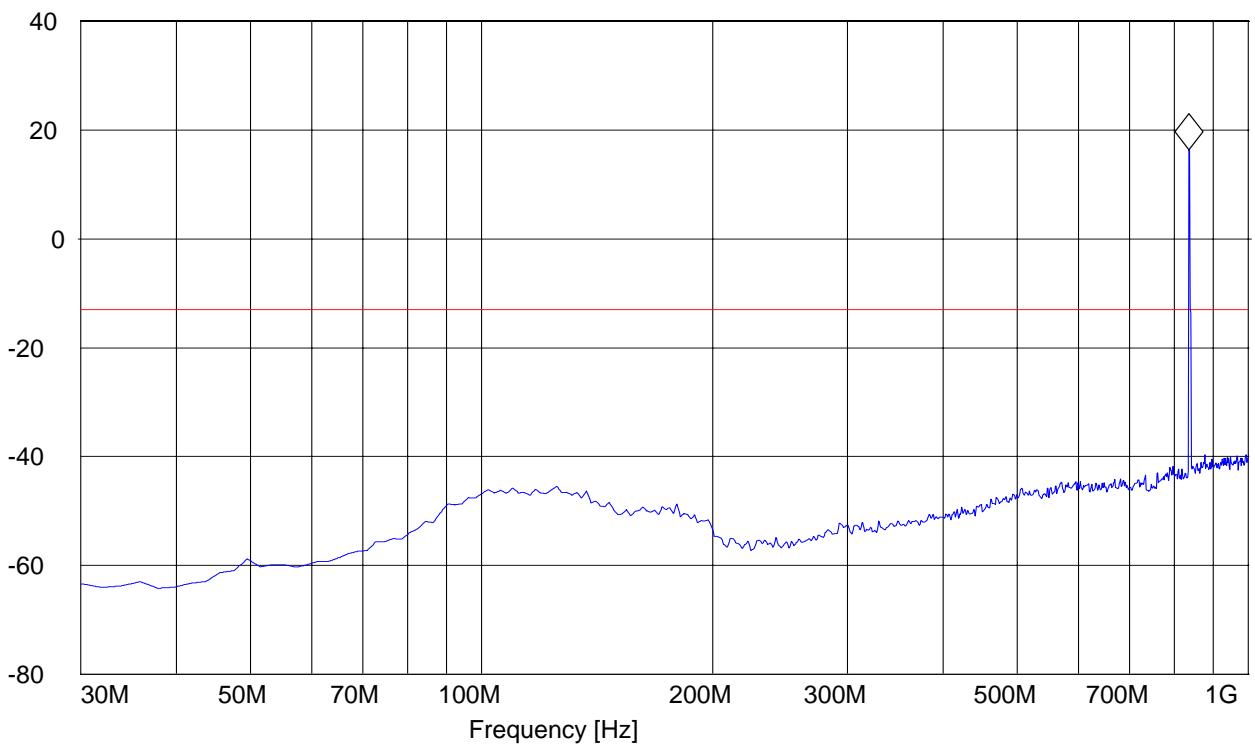
EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850 CH 190  
 ANT Orientation: V  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM

Marker: 836.713427 MHz 16.36 dBm

Level [dBm]



**TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Note: 1. The peak above the limit line is the carrier freq.**

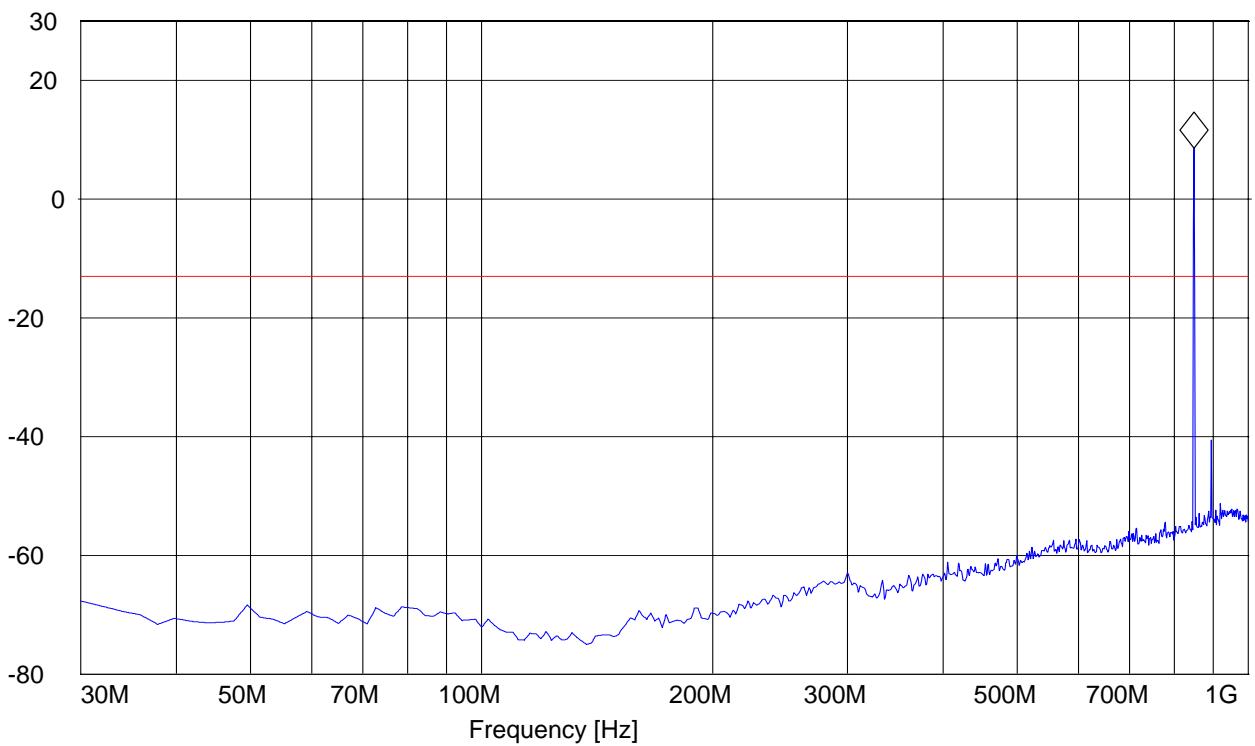
EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850 CH 251  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_H"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz DUMMY-DBM

Marker: 850.320641 MHz 8.62 dBm

Level [dBm]



**TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Note: 1. The peak above the limit line is the carrier freq.**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850 CH 251

ANT Orientation: V

EUT Orientation: V

Test Engineer: SAM

Voltage: BATTERY

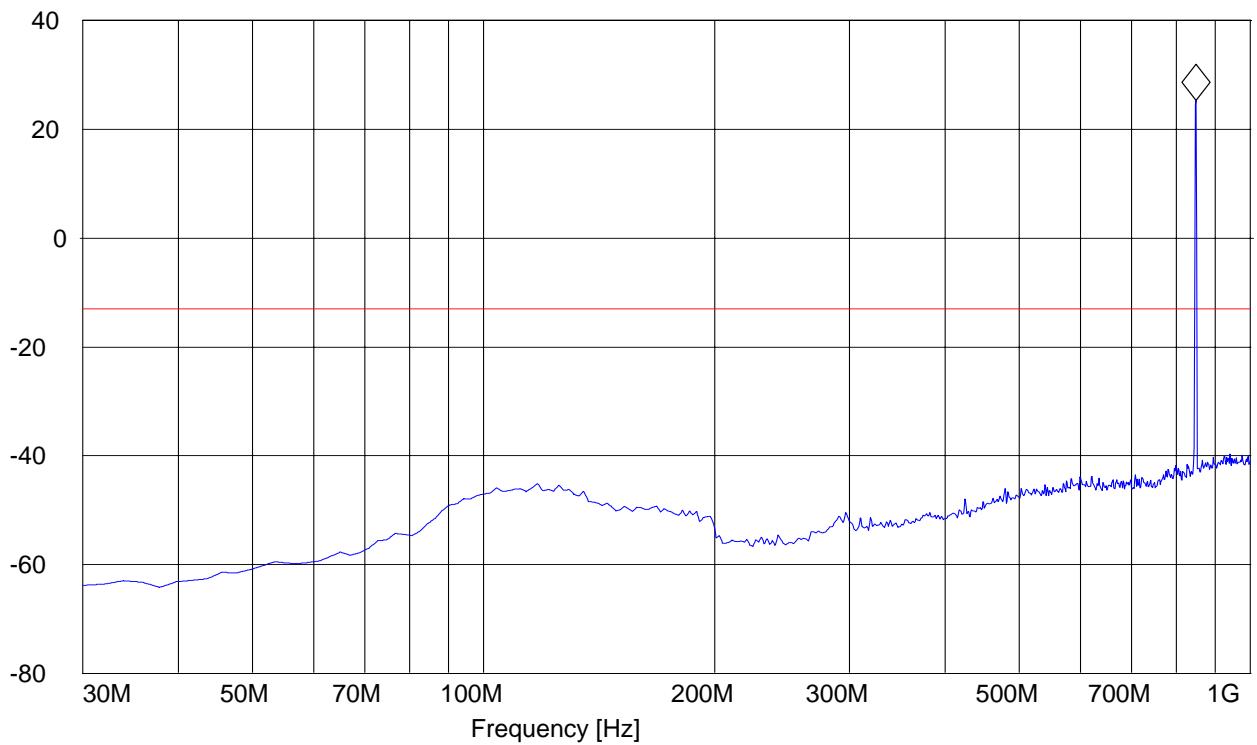
Comments: TT @ 76°; ANT 161cm

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM

Marker: 850.320641 MHz 25.31 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

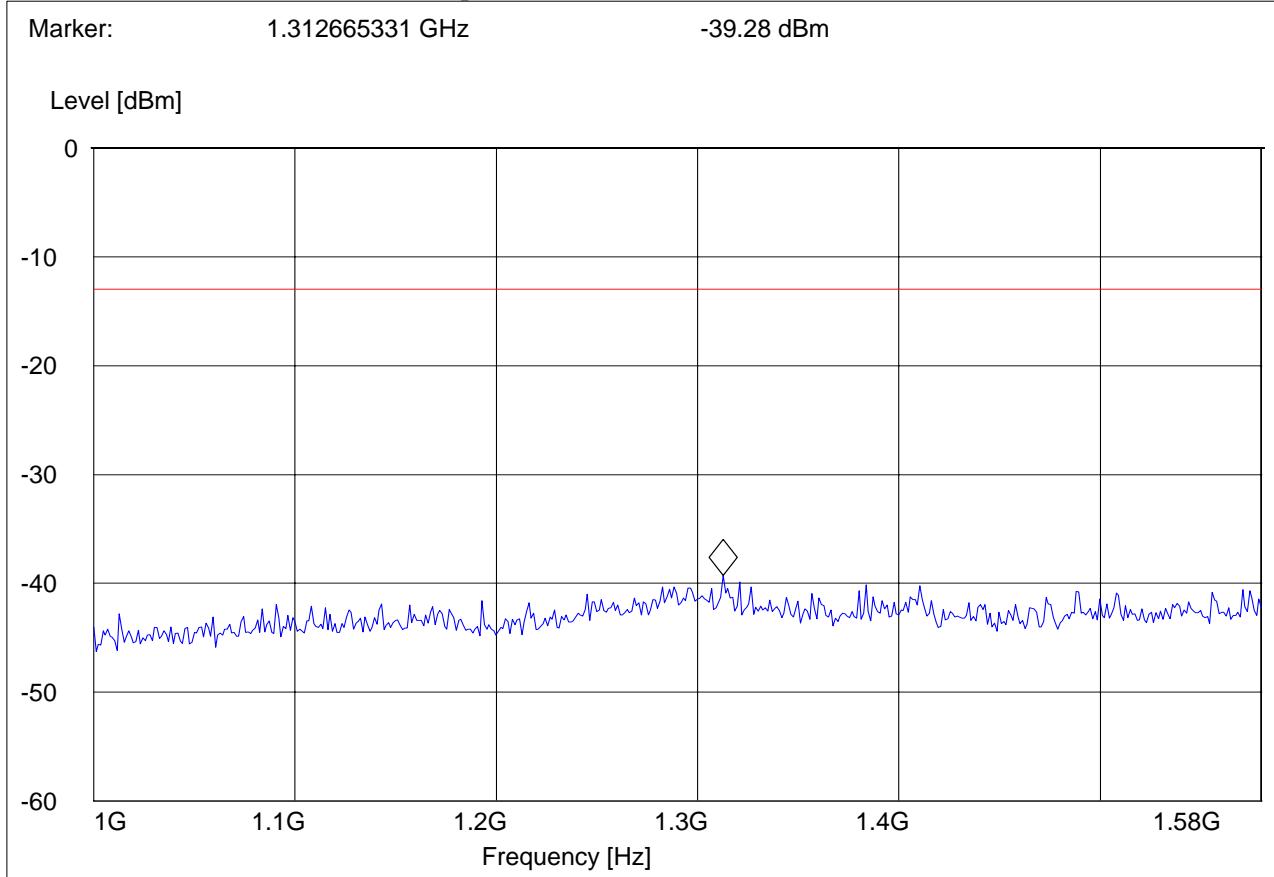
Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 1-1.58G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

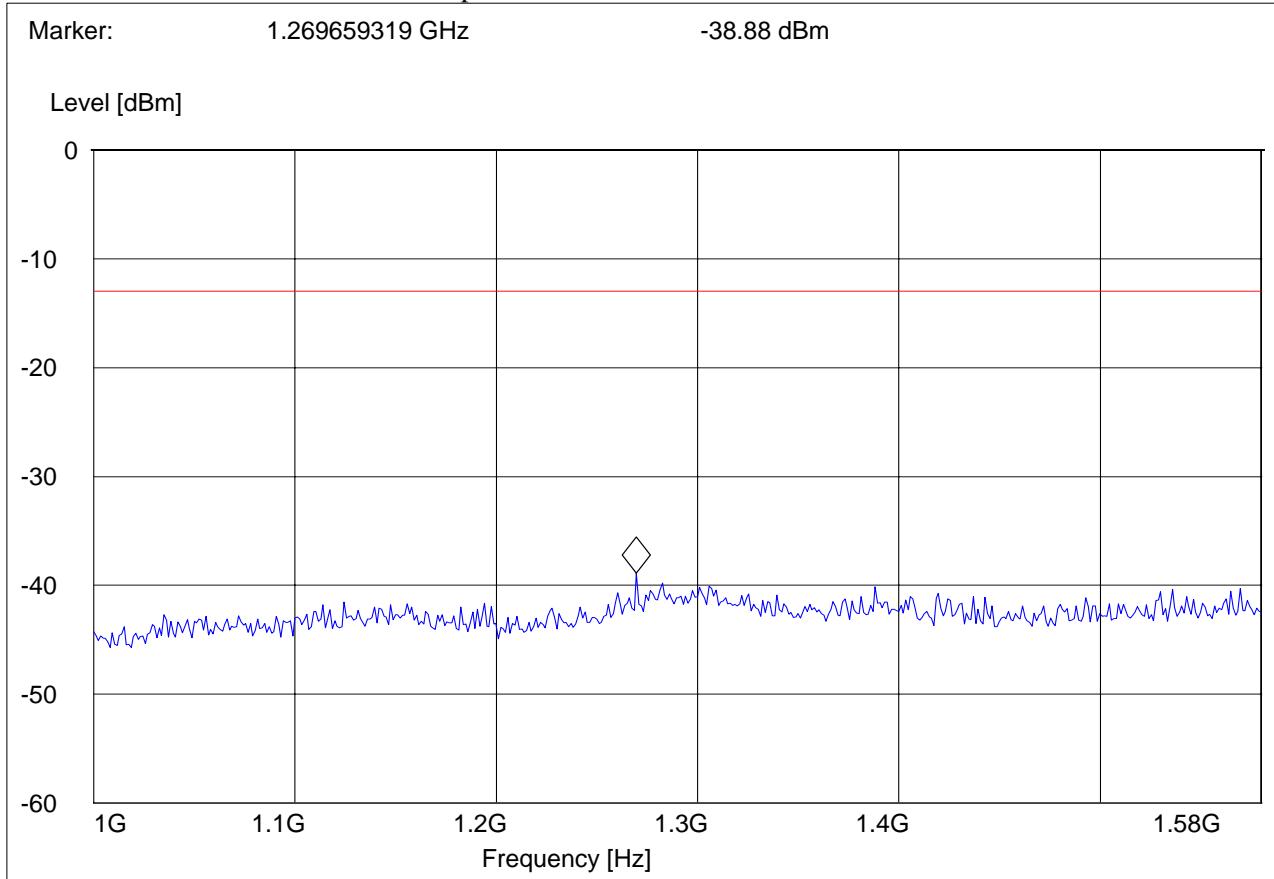
Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 1-1.58G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

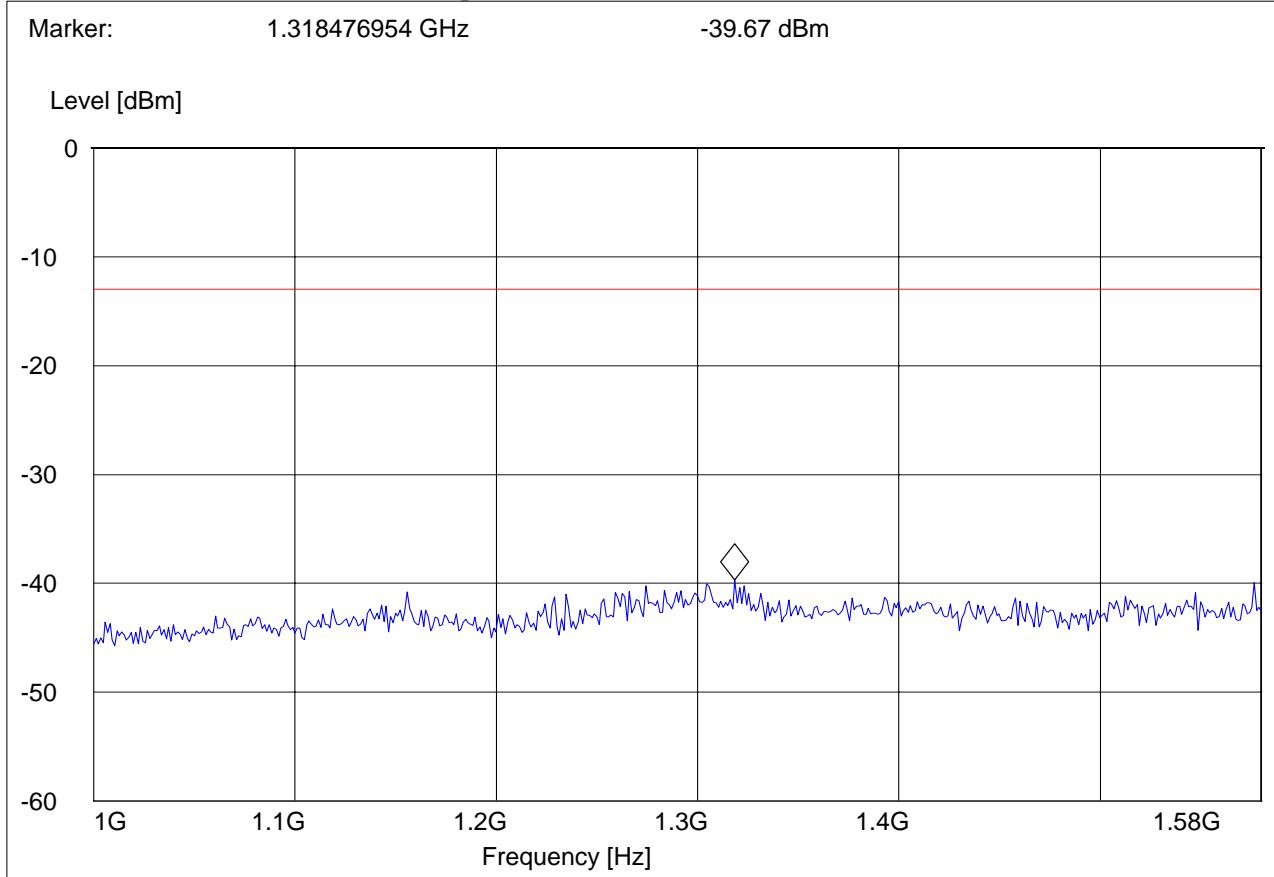
Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 1-1.58G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

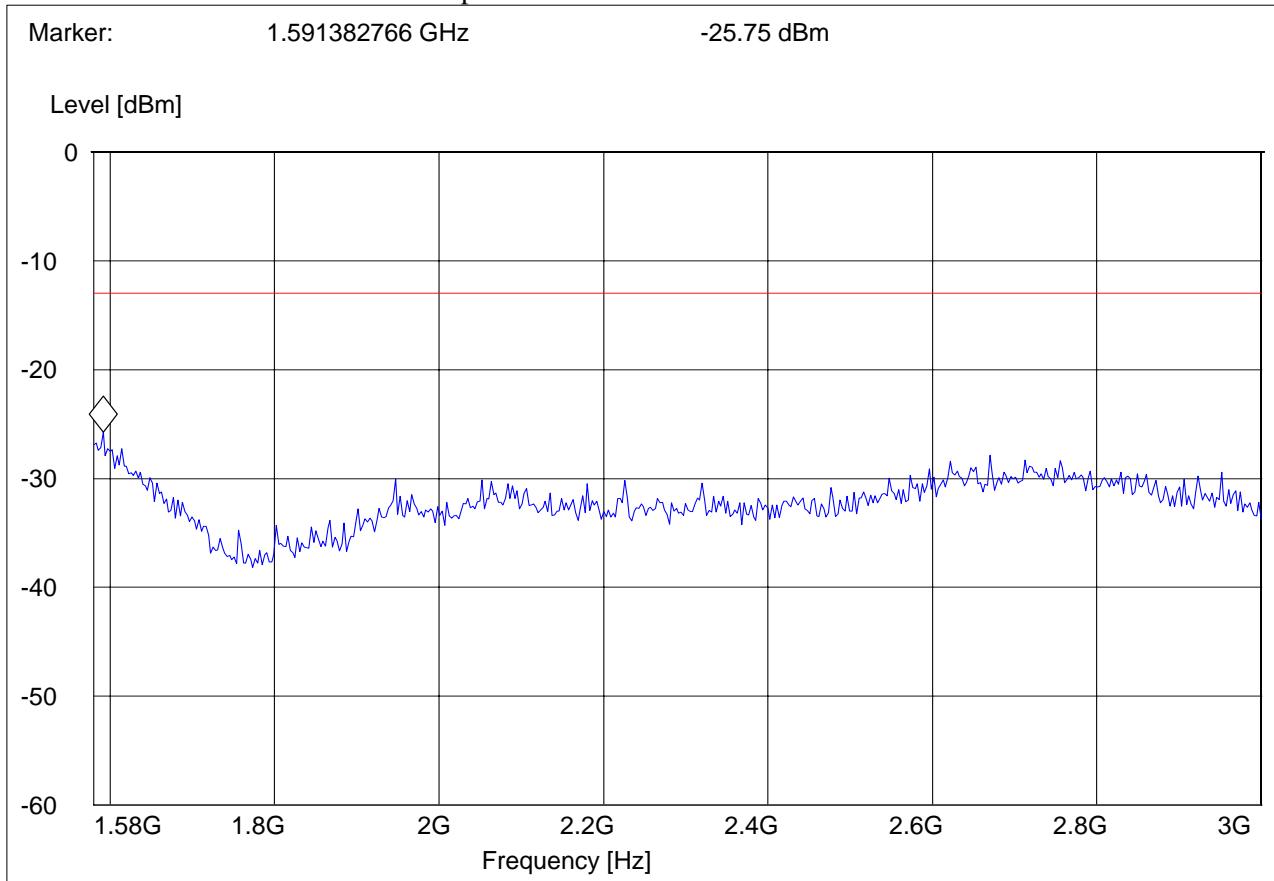
Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 1.58-3G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)**

Tx @ 836.6MHz: 1.58GHz – 3GHz

Spurious emission limit –13dBm

**Note:** This plot is valid for horizontal and vertical polarization (worst-case plot)

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

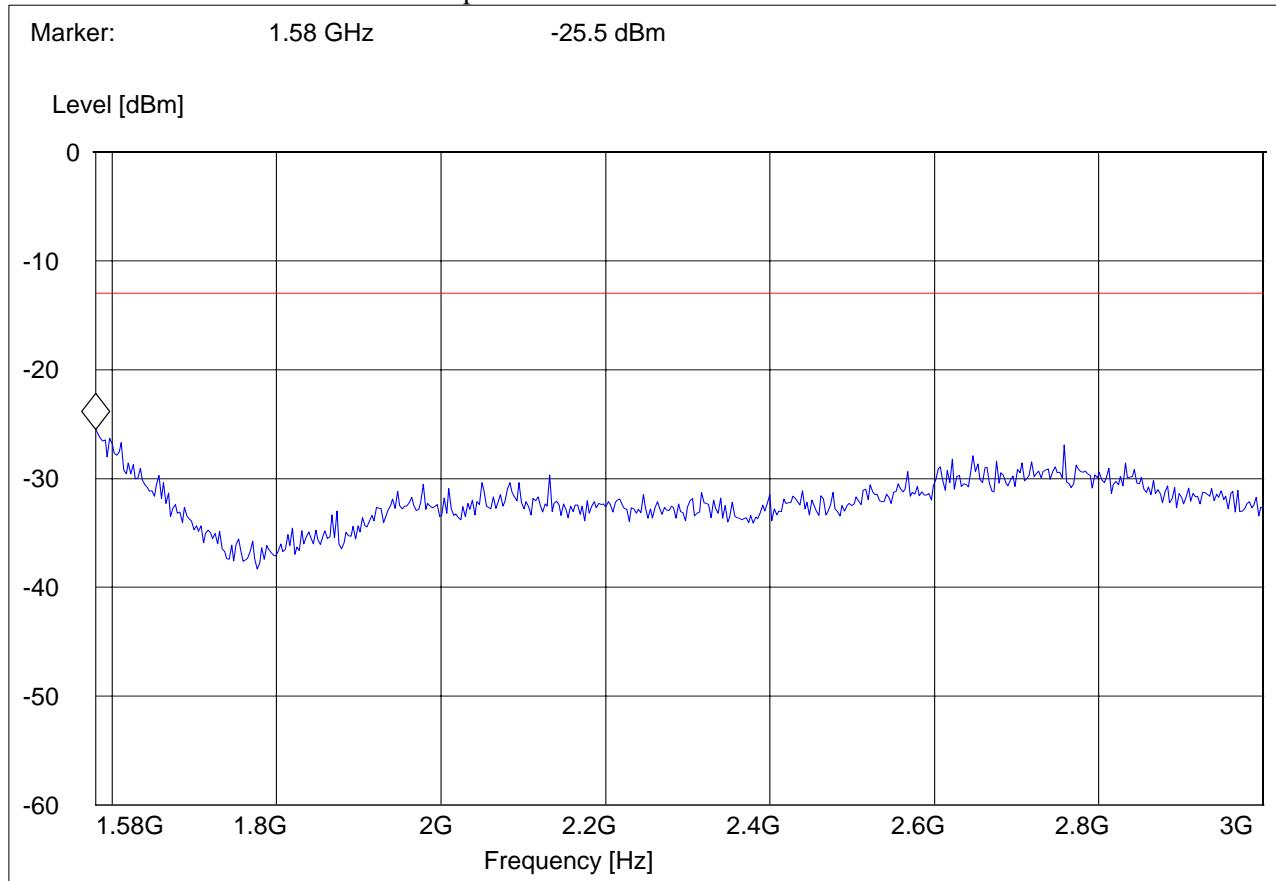
Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 1.58-3G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

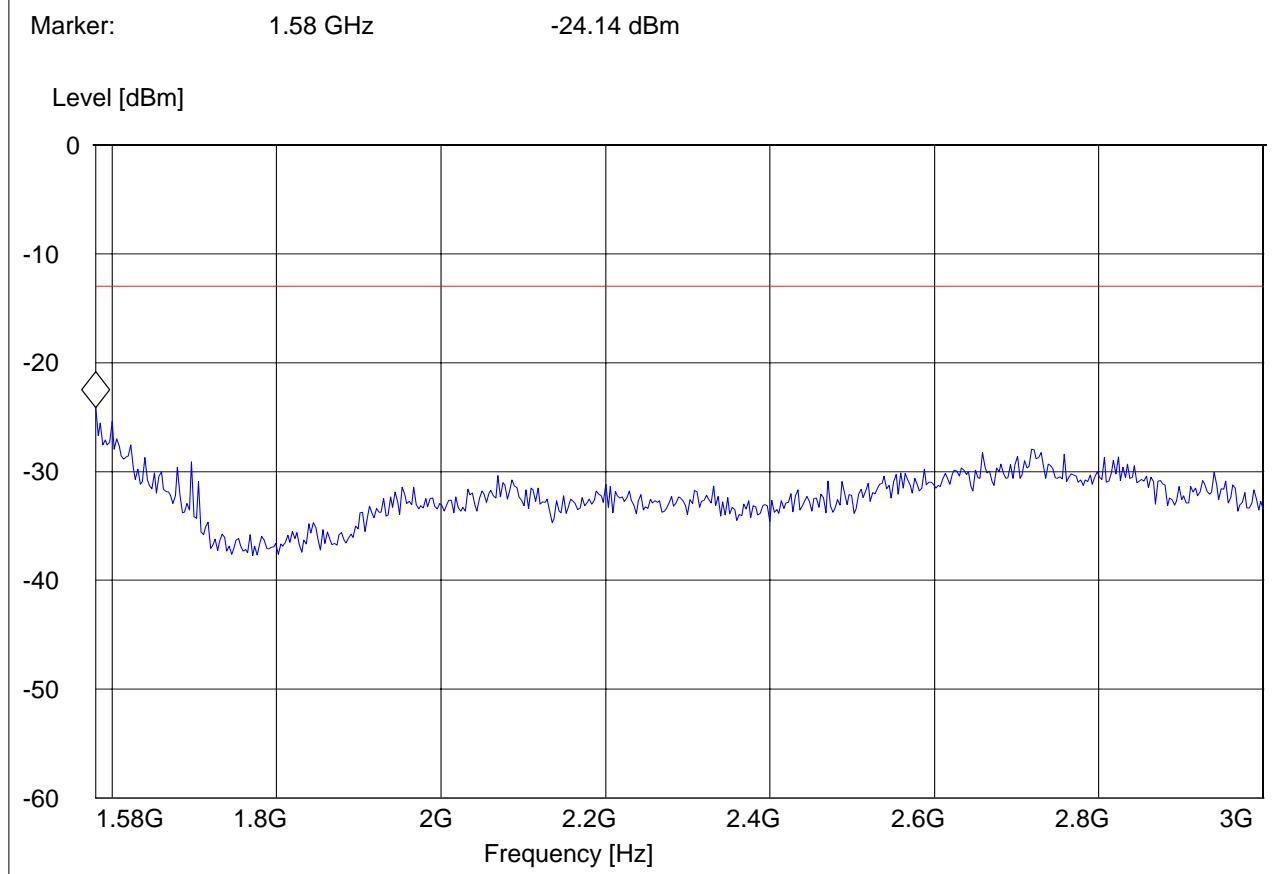
Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 1.58-3G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 3 – 9GHz**

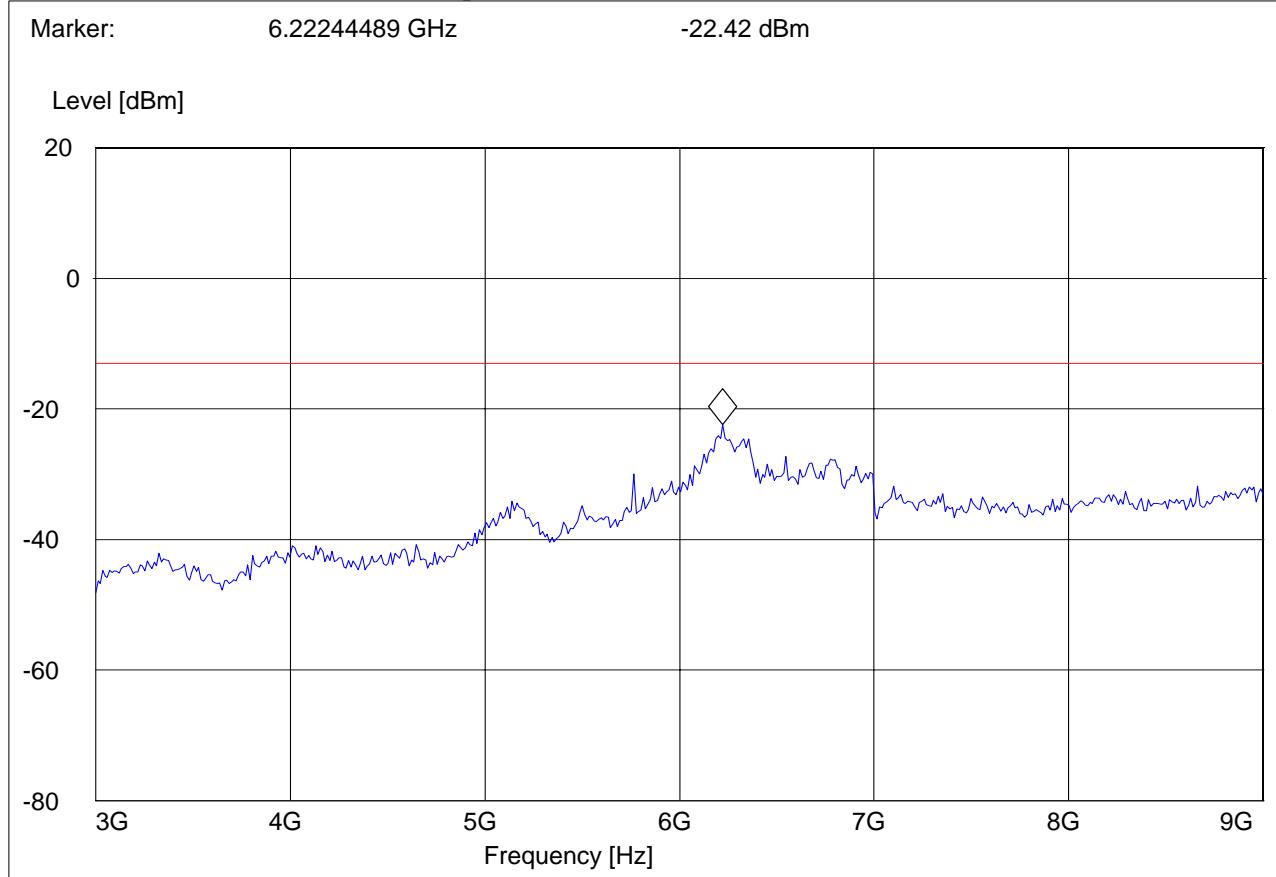
Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments:

***SWEEP TABLE: "FCC 22Spuri 3-9G"***

Short Description: FCC 24 1GHz-8GHz  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 3.0 GHz 9.0 GHz MaxPeak Coupled 1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 3 – 9GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE

Customer: DUNCAN SOLUTIONS

Test Mode: GSM 850

ANT Orientation: H

EUT Orientation: V

Test Engineer: SAM

Voltage: BATTERY

Comments:

***SWEEP TABLE: "FCC 22Spuri 3-9G"***

Short Description: FCC 24 1GHz-8GHz

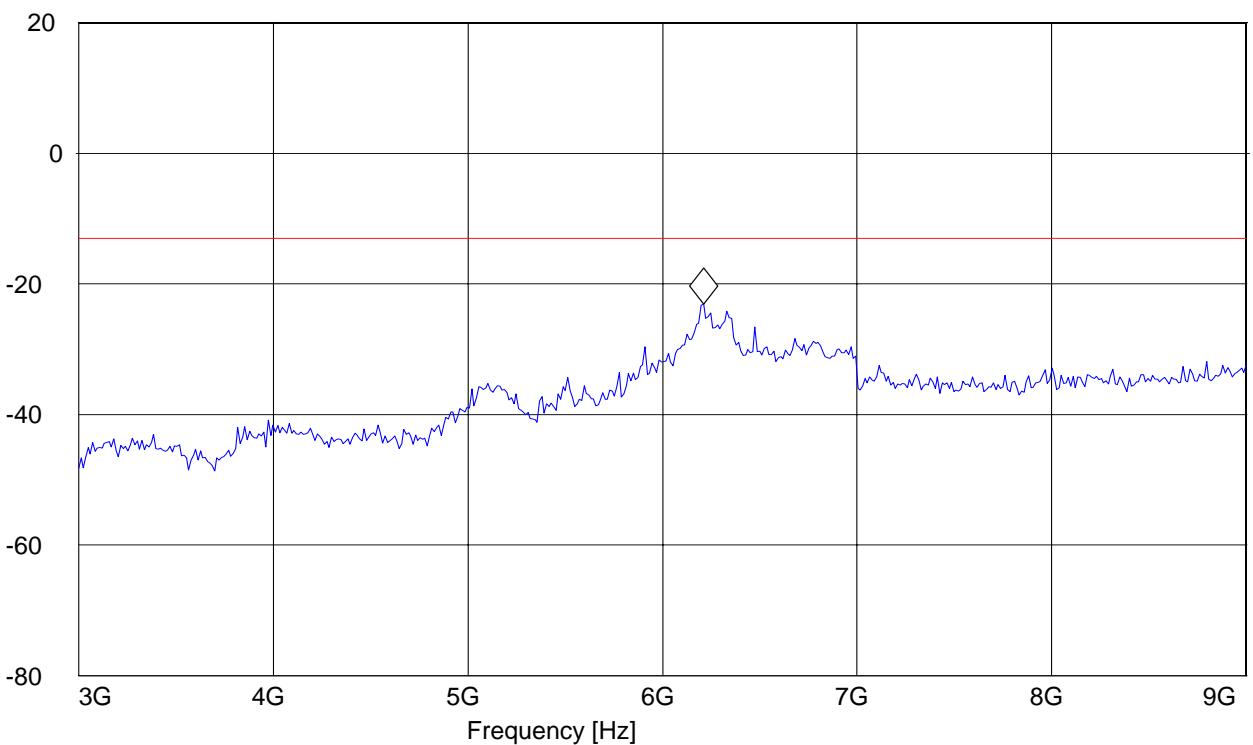
Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

3.0 GHz 9.0 GHz MaxPeak Coupled 1 MHz DUMMY-DBM

Marker: 6.210420842 GHz -23.04 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 3 – 9GHz**

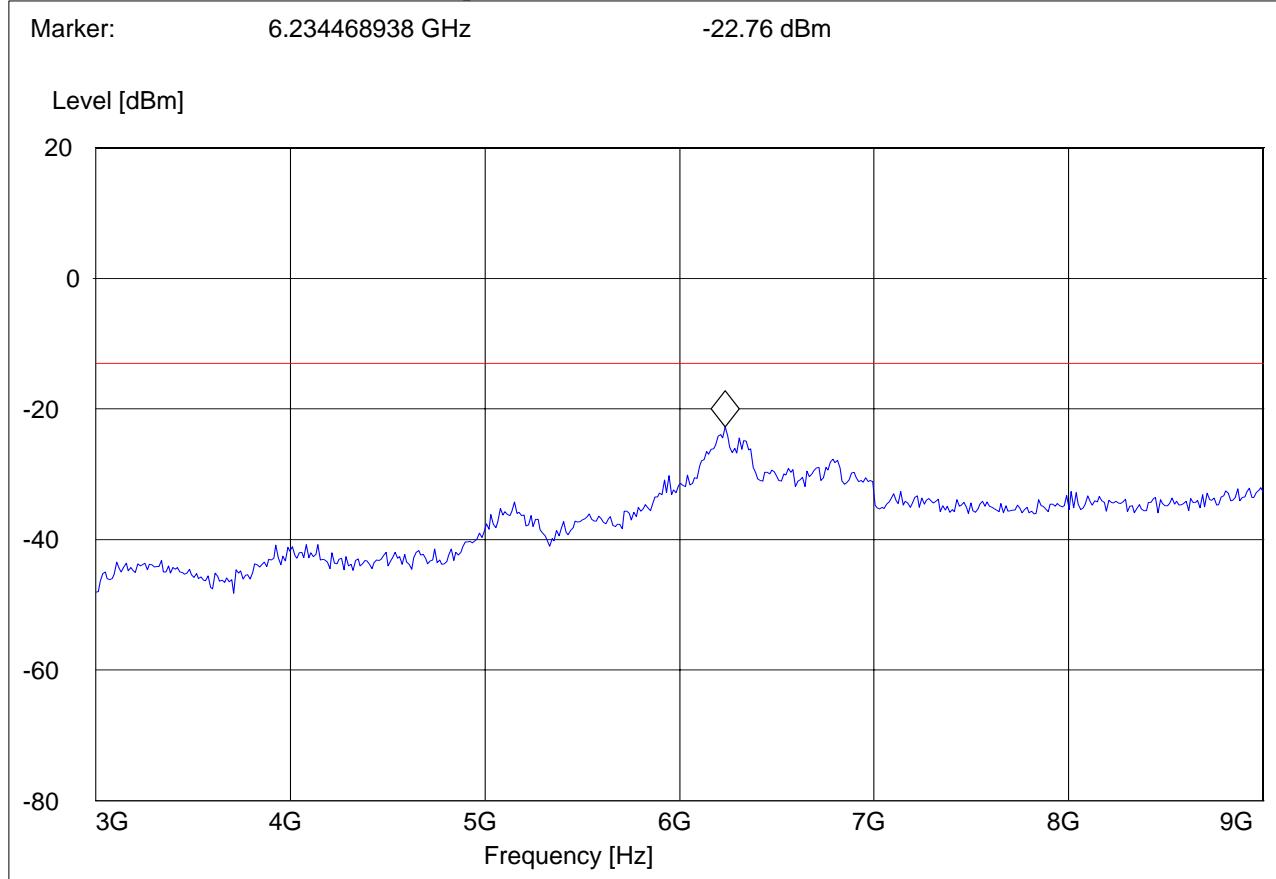
Spurious emission limit –13dBm

**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 850  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments:

***SWEEP TABLE: "FCC 22Spuri 3-9G"***

Short Description: FCC 24 1GHz-8GHz  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 3.0 GHz 9.0 GHz MaxPeak Coupled 1 MHz DUMMY-DBM



**5.2.4.3 RESULTS OF RADIATED TESTS PCS-1900:**

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
2	<b>3700.4</b>	NF	<b>3760</b>	NF	<b>3819.6</b>	NF
3	<b>5550.6</b>	NF	<b>5640</b>	NF	<b>5729.4</b>	NF
4	<b>7400.8</b>	NF	<b>7520</b>	NF	<b>7639.2</b>	NF
5	<b>9251</b>	NF	<b>9400</b>	NF	<b>9549</b>	NF
6	<b>11101.2</b>	NF	<b>11280</b>	NF	<b>11458.8</b>	NF
7	<b>12951.4</b>	NF	<b>13160</b>	NF	<b>13368.6</b>	NF
8	<b>14801.6</b>	NF	<b>15040</b>	NF	<b>15278.4</b>	NF
9	<b>16651.8</b>	NF	<b>16920</b>	NF	<b>17188.2</b>	NF
10	<b>18502</b>	NF	<b>18800</b>	NF	<b>19098</b>	NF
NF = NOISE FLOOR						

**5.2.4.4 RADIATED SPURIOUS EMISSIONS (PCS 1900)****TX: 30MHz - 1GHz**

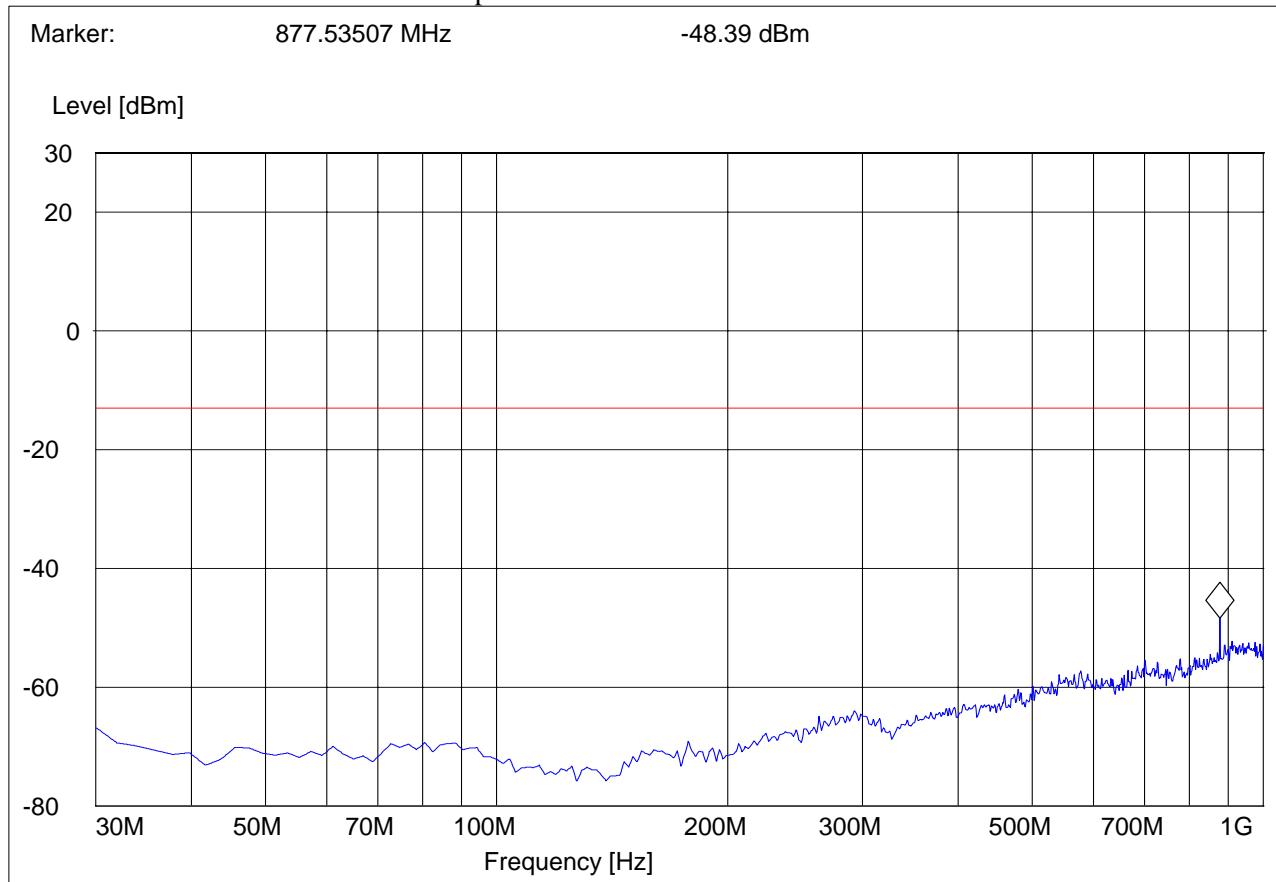
Spurious emission limit -13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot)**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_H"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (PCS 1900)****TX: 30MHz - 1GHz**

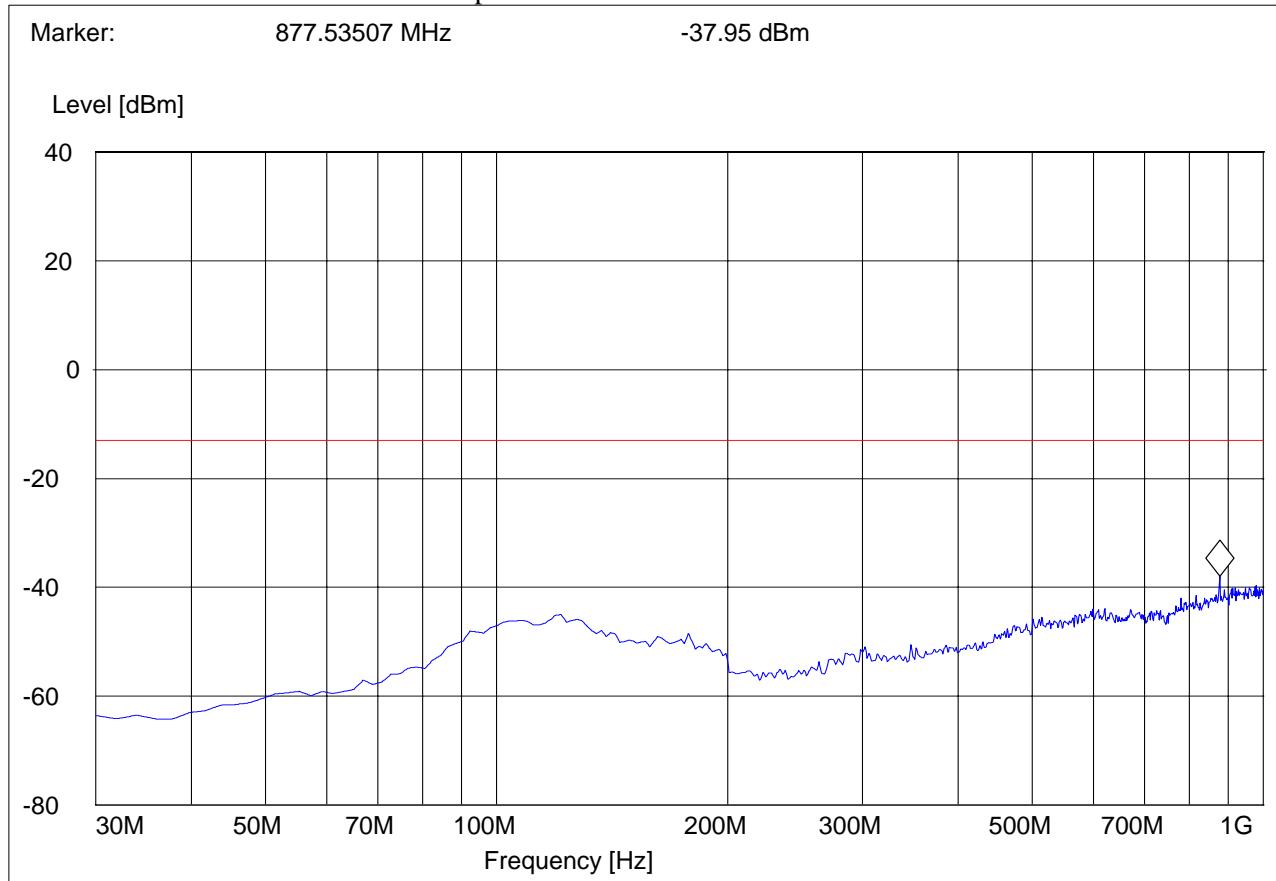
Spurious emission limit -13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot).**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: V  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "FCC 24 Spur 30M-1G\_V"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx @ 1850.2 MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

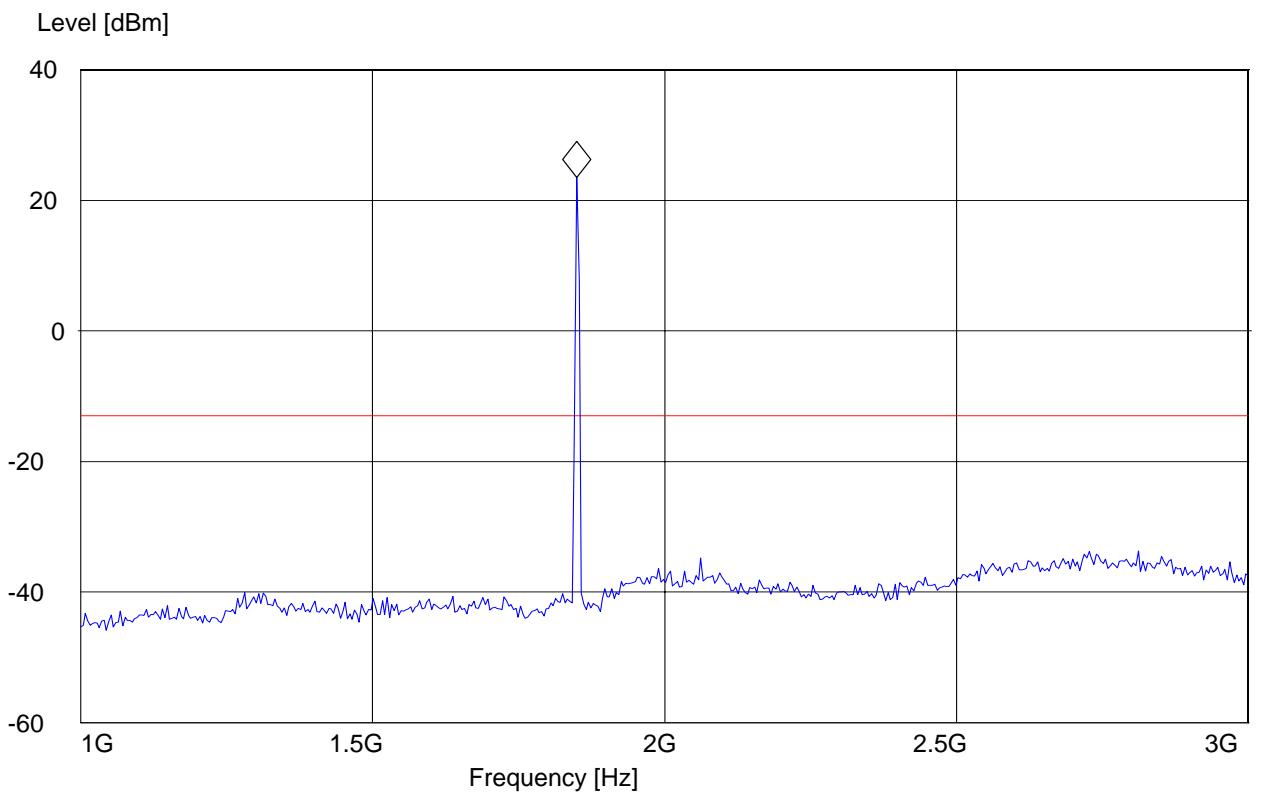
**Note: The peak above the limit line is the carrier freq. at ch-512.**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM

Marker:	1.849699399 GHz	23.52 dBm
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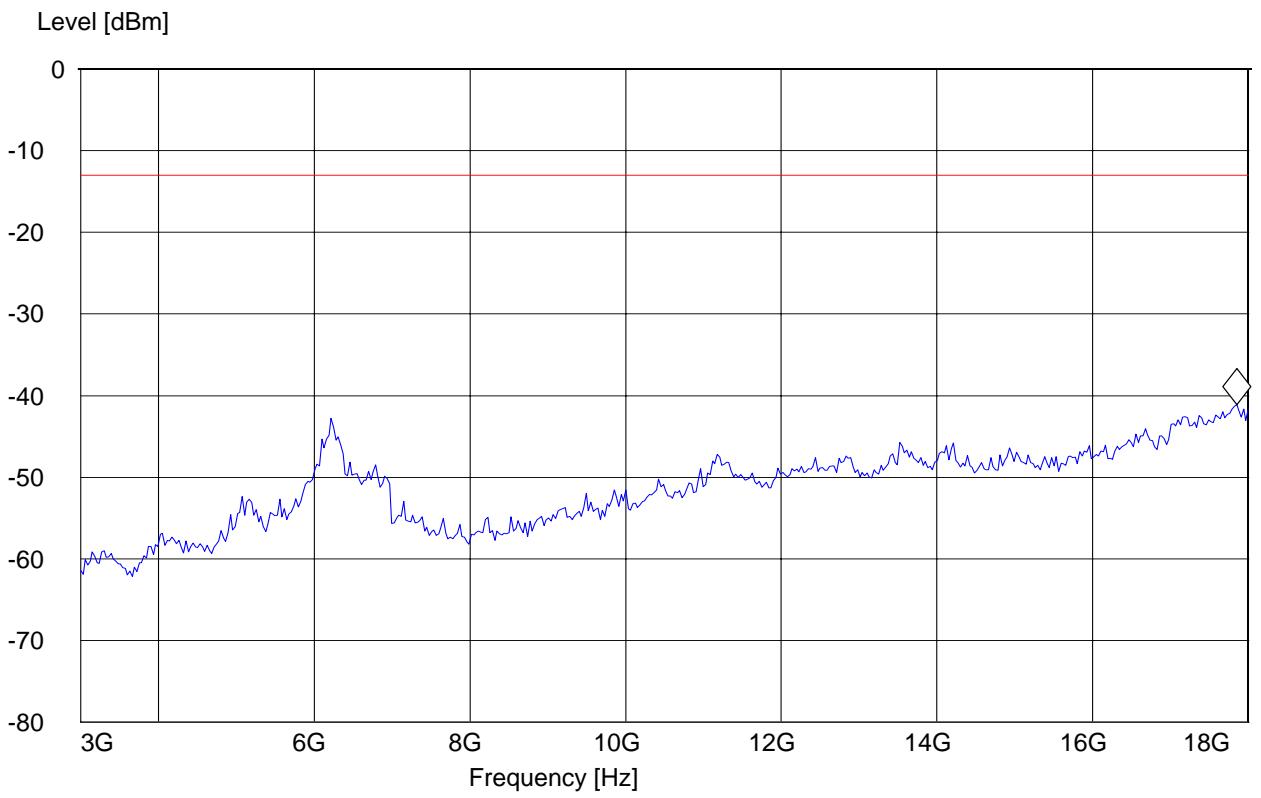
**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx @ 1850.2 MHz: 3GHz – 18GHz**

EUT: AUTOCITE  
Customer: DUNCAN SOLUTIONS  
Test Mode: GSM 1900  
ANT Orientation: H  
EUT Orientation: V  
Test Engineer: SAM  
Voltage: BATTERY  
Comments: TT @ 122°

***SWEEP TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 17.849699399 GHz -41.14 dBm



**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx @ 1880.0MHz: 1GHz – 3GHz**

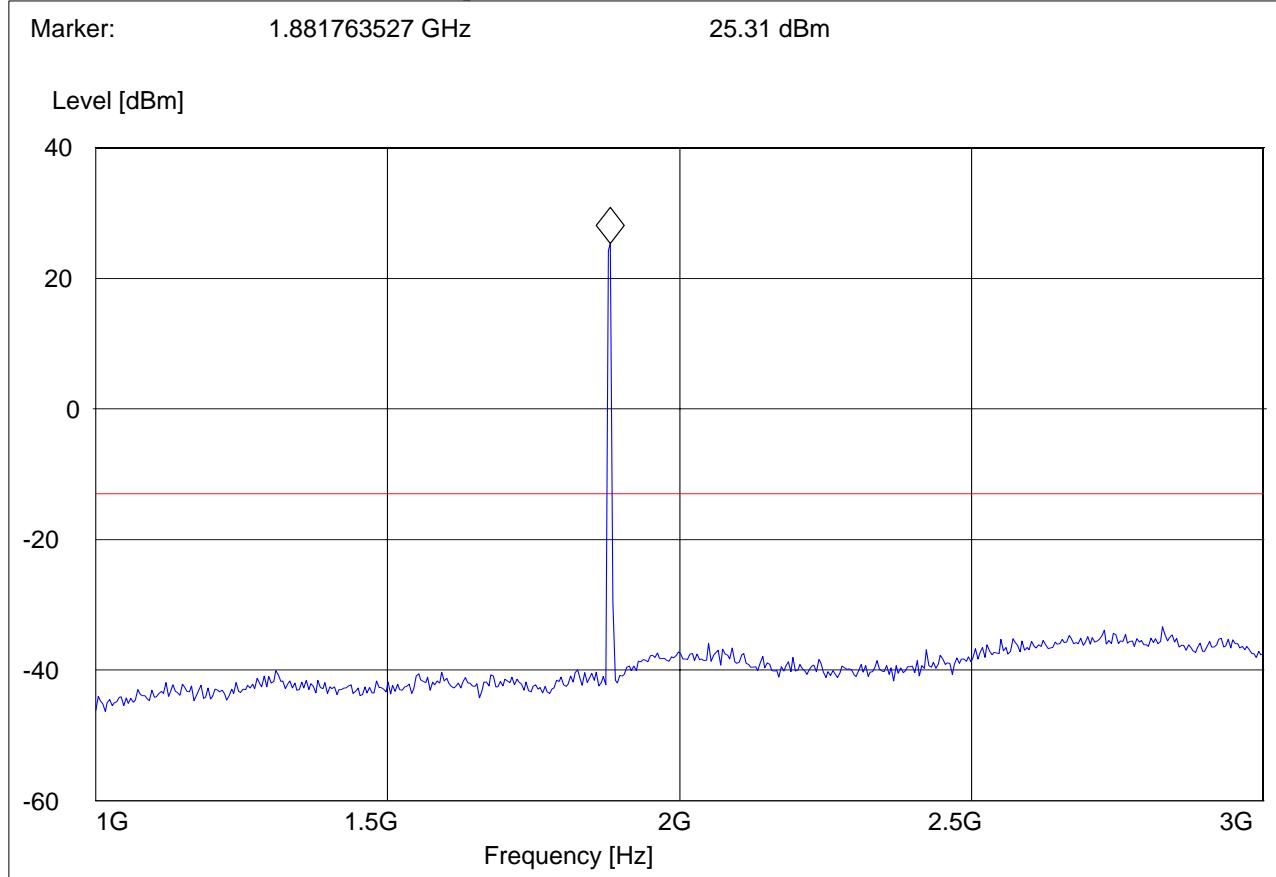
Spurious emission limit –13dBm

**Note: The peak above/close to the limit line is the carrier freq. at ch-661.**

EUT: AUTOCITE  
Customer: DUNCAN SOLUTIONS  
Test Mode: GSM 1900  
ANT Orientation: H  
EUT Orientation: V  
Test Engineer: SAM  
Voltage: BATTERY  
Comments: TT @ 122°

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



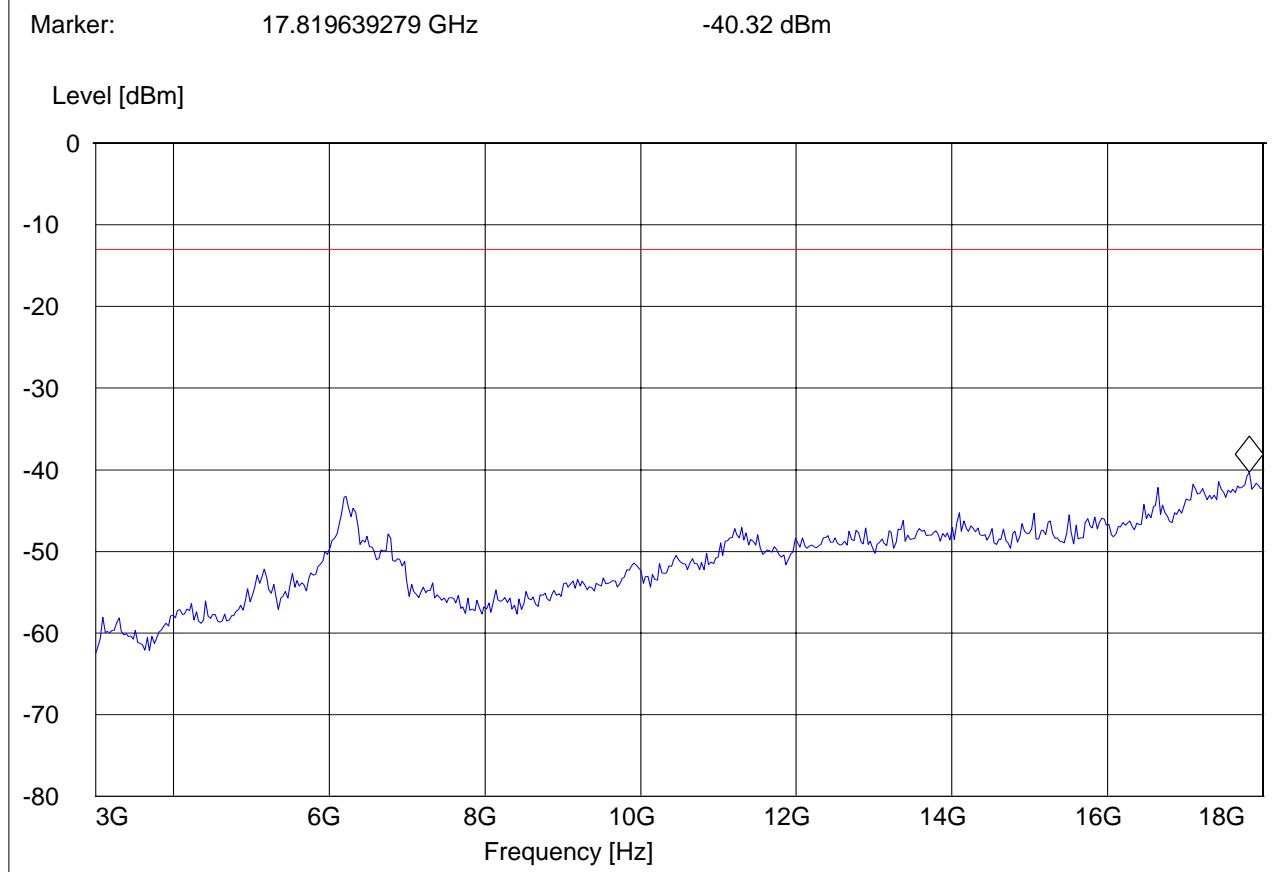
**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx @ 1880.0MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx @ 1909.8 MHz: 1GHz – 3GHz**

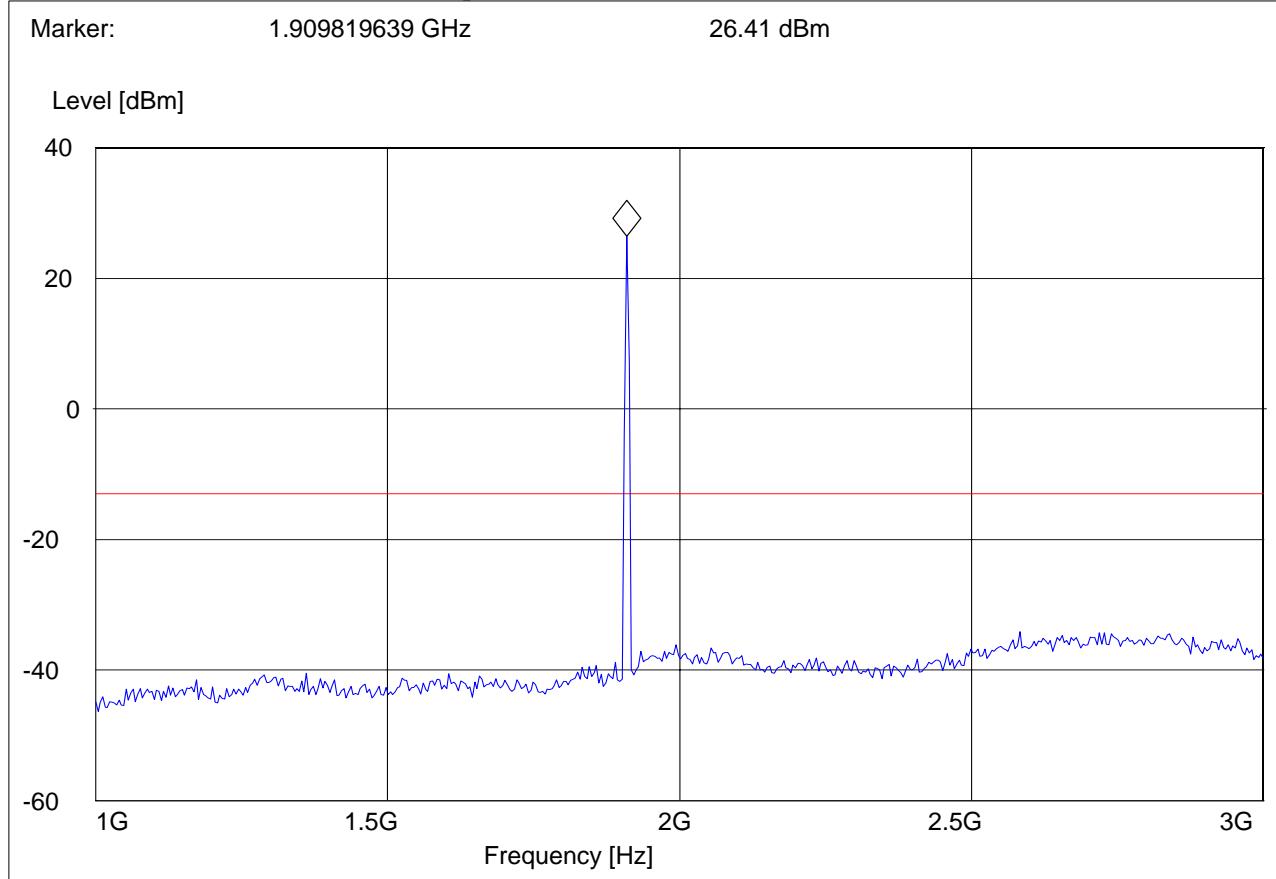
Spurious emission limit –13dBm

**Note: The peak above the limit line is the carrier freq. at ch-810.**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



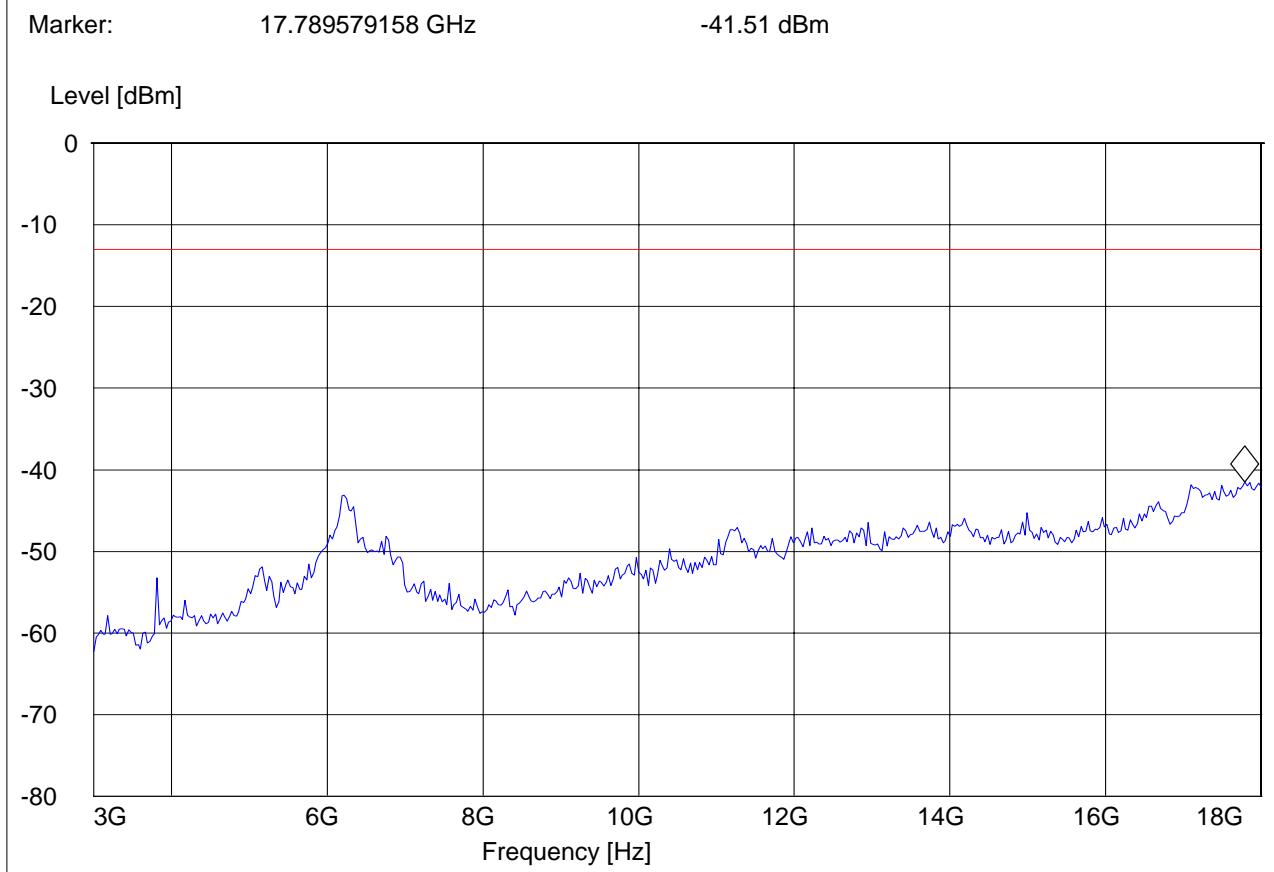
**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx @ 1909.8 MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

EUT: AUTOCITE  
Customer:: DUNCAN SOLUTIONS  
Test Mode: GSM 1900  
ANT Orientation: H  
EUT Orientation: V  
Test Engineer: SAM  
Voltage: BATTERY  
Comments: TT @ 122°

***SWEEP TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (PCS 1900)****Tx mode: 18GHz – 19.1GHz**

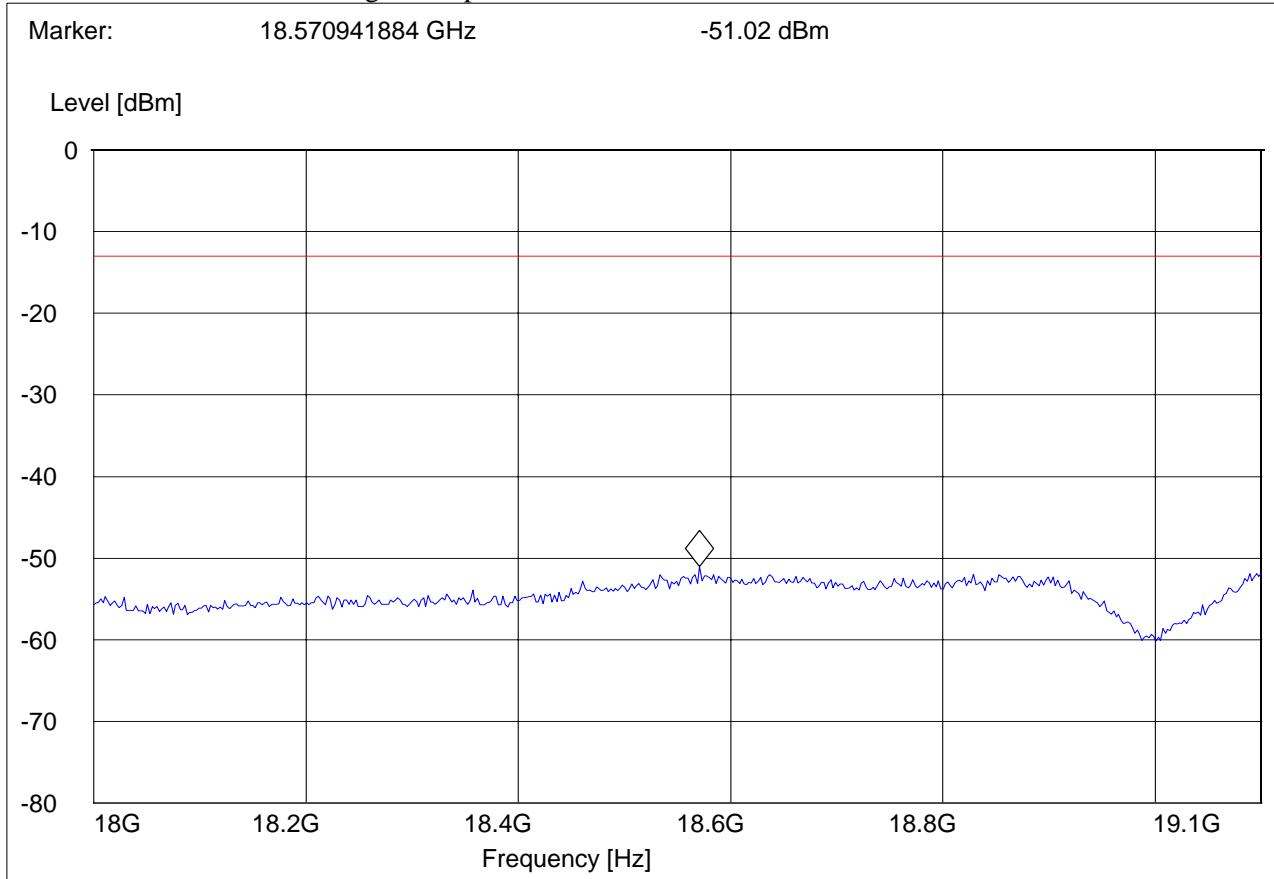
Spurious emission limit –13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot).**

EUT: AUTOCITE  
 Customer: DUNCAN SOLUTIONS  
 Test Mode: GSM 1900  
 ANT Orientation: H  
 EUT Orientation: V  
 Test Engineer: SAM  
 Voltage: BATTERY  
 Comments: TT @ 122°

***SWEEP TABLE: "FCC 24spuri 18-19.1G"***

Start Frequency	Stop Frequency	Detector Meas.	IF Time	Transducer Bandw.
18.0 GHz	19.1 GHz	Average Coupled	1 MHz	DUMMY-DBM

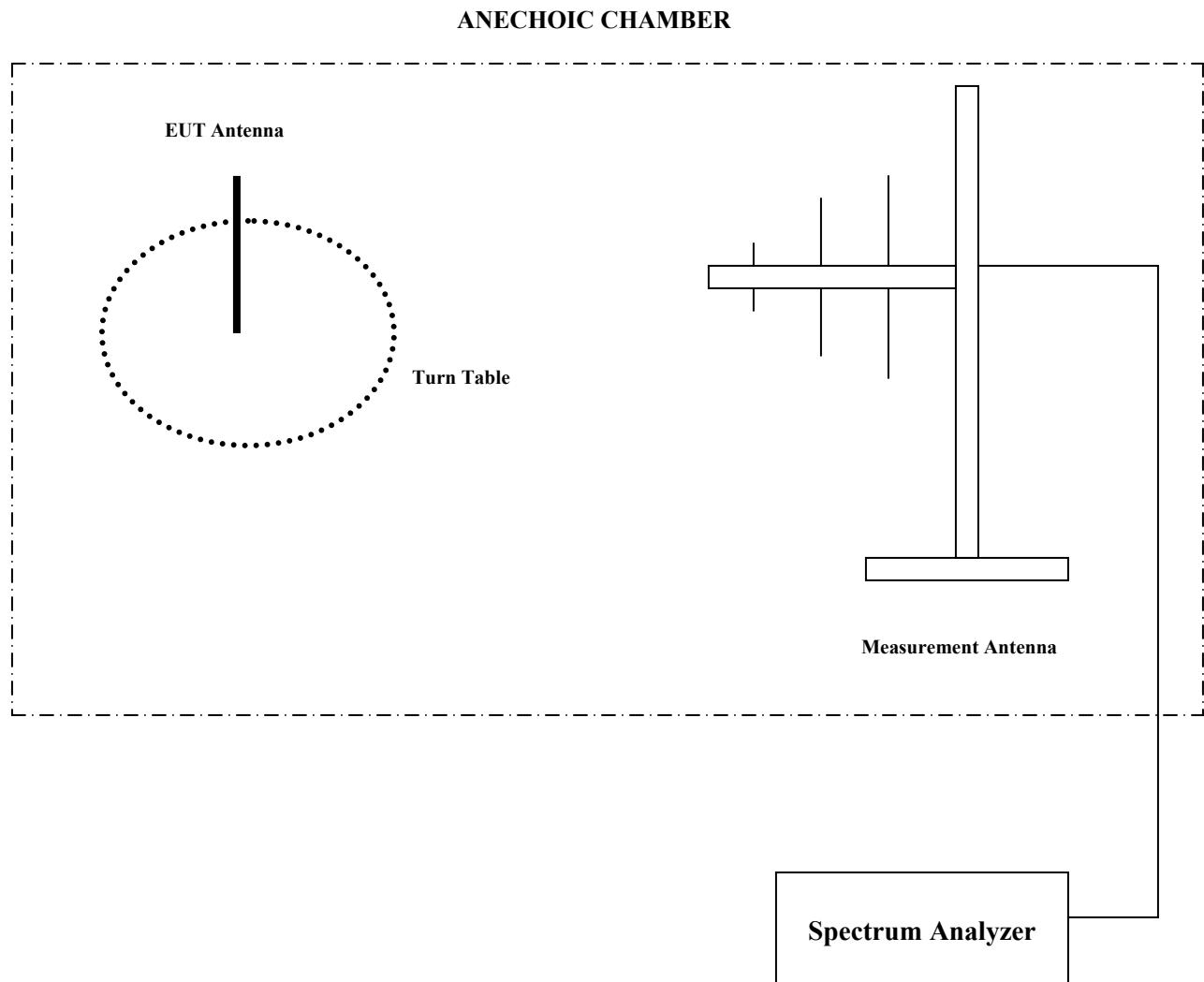


**6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

<b>No</b>	<b>Instrument/Ancillary</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Serial No.</b>	<b>Cal Due</b>	<b>Interval</b>
<b>01</b>	Anechoic Chamber	3 meter	Euroshield	NA	NA	In house
<b>02</b>	Receiver / Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100017	May 2009	1 year
<b>03</b>	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
<b>04</b>	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
<b>05</b>	Biconilog Antenna	3141	EMCO	0005-1186	July 2009	1 year
<b>06</b>	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
<b>07</b>	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
<b>08</b>	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
<b>09</b>	Turn table	2088	EMCO/ETS	NA	NA	In house
<b>10</b>	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
<b>11</b>	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
<b>12</b>	Pre-Amplifier	JS4-00102600	Miteq	340125	May 2009	1 year
<b>13</b>	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
<b>14</b>	MAPS Position Controller	2092	ETS-Lindgren	0004-1510	NA	In house
<b>15</b>	Universal Radio Comm. Tester	CMU 200 #2	Rohde & Schwarz	109879	May 2009	1 year
<b>16</b>	EMC Software	ESK1	Rohde & Schwarz	NA	NA	NA

## **7 BLOCK DIAGRAMS**

### **Radiated Testing**



**Conducted Testing**