

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E

OF

**Product Name:** Avon TV

**Marketing Name:** EX139

**Brand Name:** Motorola

**Model No.:** EX139

**Model Differences:** N/A

**FCC ID:** IHDT56MQ3

**Report No.:** EH/2011/70015

**Issue Date:** Jul. 21, 2011

**FCC Rule Part:** 2, 22H & 24E

**Prepared for:** Motorola Mobility, Inc  
No. 1 Wang Jing East Road, Chao Yang District Beijing, China 100102  
SGS Taiwan Ltd.

**Prepared by:** Electronics & Communication Laboratory  
No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.

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## VERIFICATION OF COMPLIANCE

**Applicant:** Motorola Mobility, Inc  
No. 1 Wang Jing East Road, Chao Yang District Beijing, China 100102

**Product Name:** Avon TV

**Marketing Name:** EX139

**Brand Name:** Motorola

**Model No.:** EX139

**Model Different:** N/A

**FCC ID:** IHDT56MQ3

**File Number:** EH/2011/70015

**Date of test:** Jul. 13, 2011 ~ Jul. 21, 2011

**Date of EUT Received:** Jul. 13, 2011

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 subpart H, PART 24 subpart E.

The test results of this report relate only to the tested sample identified in this report.

|                     |                                                                                     |              |               |
|---------------------|-------------------------------------------------------------------------------------|--------------|---------------|
| <b>Test By:</b>     |  | <b>Date:</b> | Jul. 21, 2011 |
|                     | <i>Nick Lin / Engineer</i>                                                          |              |               |
| <b>Prepared By:</b> |  | <b>Date:</b> | Jul. 21, 2011 |
|                     | <i>Cherry Chen / Clerk</i>                                                          |              |               |
| <b>Approved By:</b> |  | <b>Date:</b> | Jul. 21, 2011 |
|                     | <i>Jim Chang / Supervisor</i>                                                       |              |               |

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## Version

| Version No. | Date          | Description                  |
|-------------|---------------|------------------------------|
| 00          | Jul. 21, 2011 | Initial creation of document |
|             |               |                              |
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## 1. GENERAL PRODUCT INFORMATION

### General:

|                    |                                          |                                         |  |
|--------------------|------------------------------------------|-----------------------------------------|--|
| Product Name:      | Avon TV                                  |                                         |  |
| Marketing Name:    | EX139                                    |                                         |  |
| Brand Name:        | Motorola                                 |                                         |  |
| Model No.:         | EX139                                    |                                         |  |
| Model Difference:  | N/A                                      |                                         |  |
| Simple Hands-Free: | M/N: SJYN0760A, Supplier: Motorola       |                                         |  |
| Data Cable:        | M/N: N/A, Supplier: N/A , Length:1.3M    |                                         |  |
| Power Supply:      | 3.8Vdc from battery or 5Vdc from adapter |                                         |  |
|                    | Adaptor:                                 | M/N: DCH3050BE0303C, Supplier: Motorola |  |
|                    | Battery:                                 | M/N: BQ50, Supplier: Motorola           |  |

### GSM:

|                                                           |                                                                          |                       |                |
|-----------------------------------------------------------|--------------------------------------------------------------------------|-----------------------|----------------|
| Cellular Phone Standards<br>Frequency Range and<br>Power: | Operating Frequency                                                      |                       | Rated<br>Power |
|                                                           | GSM/GPRS 850, Class 10                                                   | 824.2 MHz– 848.8 MHz  | 33 dBm         |
|                                                           | GSM/GPRS 1900, Class 10                                                  | 1850.2MHz – 1909.8MHz | 30 dBm         |
| Type of Emission:                                         | GSM850: 247KGXW, GSM1900: 251KGXW<br>GPRS850: 246KGXW, GPRS1900: 249KGXW |                       |                |
| Hardware Version:                                         | P1 ~ PCR                                                                 |                       |                |
| Software Version:                                         | AVONTV_G_07.01.02RDD                                                     |                       |                |
| IMEI:                                                     | 354639030000589                                                          |                       |                |

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## Final Amplifier Voltage and Current Information:

| Test Mode | DC voltage (V) | DC current (mA) |
|-----------|----------------|-----------------|
| GSM 850   | 3.8 Vdc        | 292             |
| GSM 1900  | 3.8 Vdc        | 287             |
| GPRS 850  | 3.8 Vdc        | 288             |
| GPRS 1900 | 3.8 Vdc        | 294             |

This test report applies for GSM/GPRS 850/1900.

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### 1.1. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: IHDT56MQ3** filing to comply with Section Part 22 subpart H, Part 24 subpart E of the FCC CFR 47 Rules.

### 1.2. Test Methodology

Both conducted and radiated testing were performed according to the procedures document of TIA/EIA 603C and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

The Output power Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, WCDMA / HSDPA) was used for EUT and Base station setting.

### 1.3. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 & 10 meters) and FCC Registration Number: 94644.

All equipment is calibrated externally and traceable to SI (International System of Unit).

### 1.4. Special Accessories

Not available for this EUT intended for grant.

### 1.5. Equipment Modifications

Not available for this EUT intended for grant.

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## 2. SYSTEM TEST CONFIGURATION

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

### 2.3. Test Procedure

#### 2.3.1 AC Power Line Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in TIA/EIA 603C. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

#### 2.3.2 Conducted Measurement at Antenna Port:

According to measurement procured TIA/EIA 603C and RSS-Gen, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

#### 2.3.3 Radiated Emissions (ERP/EIRP):

According to measurement procured TIA/EIA 603C and RSS-Gen, The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13 of ANSI C63.4:2003.

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## 2.4. Measurement Equipment Used:

| Conducted Emission Test Site |               |                  |               |            |            |
|------------------------------|---------------|------------------|---------------|------------|------------|
| EQUIPMENT TYPE               | MFR           | MODEL NUMBER     | SERIAL NUMBER | LAST CAL.  | CAL DUE.   |
| Spectrum Analyzer            | Agilent       | E4446A           | MY43360126    | 04/19/2010 | 04/18/2012 |
| Spectrum Analyzer            | Agilent       | E4440A           | US41160416    | 01/25/2011 | 01/24/2012 |
| Radio Communication Analyzer | R&S           | CMU200           | 111787        | 12/07/2011 | 12/06/2013 |
| 800 – 1000MHz Filter         | Micro-Tronics | BRM13462         | 001           | 01/05/2011 | 01/04/2012 |
| 1800 – 2000MHz Filter        | Micro-Tronics | BRM13463         | 001           | 01/05/2011 | 01/04/2012 |
| Temperature Chamber          | TERCHY        | MHG-120LF        | 911009        | 04/14/2010 | 04/13/2012 |
| Temperature Chamber          | GIANT FORCE   | GTH-150-40-CP-AR | MAA0512-018   | 02/24/2010 | 02/23/2012 |
| DC Block                     | Agilent       | BLK-18           | 155452        | 01/05/2011 | 01/04/2012 |
| Attenuator                   | Mini-Circuit  | BW-S20W5         | N/A           | 01/05/2011 | 01/04/2012 |
| Attenuator                   | Mini-Circuit  | BW-S10W5         | N/A           | 01/05/2011 | 01/04/2012 |
| Attenuator                   | Mini-Circuit  | BW-S6W5          | N/A           | 01/05/2011 | 01/04/2012 |
| Splitter                     | Agilent       | 11636B           | N/A           | 01/05/2011 | 01/04/2012 |
| DC Power Supply              | Chroma        | 41901            | 777188        | 04/15/2010 | 04/14/2012 |

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| 966 Chamber                     |               |                        |                  |              |            |
|---------------------------------|---------------|------------------------|------------------|--------------|------------|
| EQUIPMENT<br>TYPE               | MFR           | MODEL<br>NUMBER        | SERIAL<br>NUMBER | LAST<br>CAL. | CAL DUE.   |
| Spectrum Analyzer               | R&S           | FSP 40                 | 100034           | 03/30/2010   | 03/29/2012 |
| Bilog Antenna                   | SCHWAZBECK    | VULB9160               | 3136             | 11/19/2010   | 11/18/2011 |
| Dipole Antenna                  | SCHWAZBECK    | VHAP                   | 908/909          | 07/17/2010   | 07/16/2012 |
| Dipole Antenna                  | SCHWAZBECK    | UHAP                   | 891/892          | 07/17/2010   | 07/16/2012 |
| Horn antenna                    | SCHWAZBECK    | BBHA 9120D             | 309/320          | 01/22/2010   | 01/21/2012 |
| Signal Generator                | R&S           | SMR40                  | 100210           | 01/22/2010   | 01/21/2012 |
| Signal Generator                | Agilent       | E4438C                 | MY45093613       | 07/08/2011   | 07/07/2013 |
| Pre-Amplifier                   | Agilent       | 8447D                  | 1937A02834       | 11/28/2010   | 11/27/2011 |
| Pre-Amplifier                   | Agilent       | 8449B                  | 3008A01973       | 01/05/2010   | 01/04/2012 |
| Attenuator                      | Mini-Circuit  | BW-S20W5               | 001              | 01/05/2010   | 01/04/2012 |
| Attenuator                      | Mini-Circuit  | BW-S10W5               | 001              | 01/05/2010   | 01/04/2012 |
| Attenuator                      | Mini-Circuit  | BW-S6W5                | 001              | 01/05/2010   | 01/04/2012 |
| Radio Communication<br>Analyzer | R&S           | CMU200                 | 111787           | 12/07/2011   | 12/06/2013 |
| Turn Table                      | HD            | DT420                  | N/A              | N.C.R        | N.C.R      |
| Antenna Tower                   | HD            | MA240-N                | 240/657          | N.C.R        | N.C.R      |
| Controller                      | HD            | HD100                  | N/A              | N.C.R        | N.C.R      |
| Low Loss Cable                  | HUBER+SUHNER  | SUCOFLEX<br>104PEA-10M | 10m              | 01/05/2011   | 01/04/2012 |
| Low Loss Cable                  | HUBER+SUHNER  | SUCOFLEX<br>104PEA-3M  | 3m               | 01/05/2010   | 01/04/2012 |
| Filter 800-1000                 | Micro-Tronics | BRM13462               | 1                | 01/05/2010   | 01/04/2012 |
| Filter 1800-2000                | Micro-Tronics | BRM13463               | 1                | 01/05/2010   | 01/04/2012 |
| 3m Site                         | SGS           | 966 chamber            | N/A              | 11/08/2010   | 11/09/2011 |

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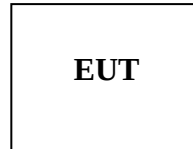
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## 2.5. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Remote Side

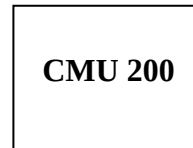


Table 2-1 Equipment Used in Tested System

| Item | Equipment                    | Mfr/Brand | Model / Type No. | Series No. |
|------|------------------------------|-----------|------------------|------------|
| 1.   | Radio Communication Analyzer | R&S       | CMU200           | 102189     |

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### 3. SUMMARY OF TEST RESULTS

| FCC Rules                                 | Description Of Test                                            | Result    |
|-------------------------------------------|----------------------------------------------------------------|-----------|
| §2.1046(a)                                | RF Power Output                                                | Compliant |
| §2.1046(a)<br>§22.913(a)(2)<br>§24.232(c) | ERP/ EIRP measurement                                          | Compliant |
| §2.1049(h)                                | 99% Occupied Bandwidth                                         | Compliant |
| §2.1051<br>§22.917(a)<br>§24.238(a)       | Out of Band Emissions at Antenna<br>Terminals and<br>Band Edge | Compliant |
| §2.1053<br>§22.917(a)<br>§24.238(a)       | Field Strength of Spurious Radiation                           | Compliant |
| §2.1055(a)(1)<br>§22.355<br>§24.235       | Frequency Stability vs. Temperature                            | Compliant |
| §2.1055(d)(2)<br>§22.355<br>§24.235       | Frequency Stability vs. Voltage                                | Compliant |

Max ERP/EIRP measurement result:

|               | dBm   | dB   | W     |
|---------------|-------|------|-------|
| GSM 850 Band  | 30.55 | ERP  | 1.135 |
| GSM 1900 Band | 28.07 | EIRP | 0.641 |

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#### 4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

EUT was staying in continuous transmitting mode. Channel Low, Mid and High for each band with rated data rate were chosen for full testing.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for GSM/GPRS with power adaptor. The worst-case of E2 position for GSM 850 and GSM 1900 band were reported.

#### 5. MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION

|                                                              |                        |
|--------------------------------------------------------------|------------------------|
| Measurement uncertainty<br>(Polarization : <b>Vertical</b> ) | 30MHz - 180MHz: 3.37dB |
|                                                              | 180MHz -417MHz: 3.19dB |
|                                                              | 0.417GHz-1GHz: 3.19dB  |
|                                                              | 1GHz - 18GHz: 4.04dB   |
|                                                              | 18GHz - 40GHz: 4.04dB  |

|                                                                |                        |
|----------------------------------------------------------------|------------------------|
| Measurement uncertainty<br>(Polarization : <b>Horizontal</b> ) | 30MHz - 167MHz: 4.22dB |
|                                                                | 167MHz -500MHz: 3.44dB |
|                                                                | 0.5GHz-1GHz: 3.39dB    |
|                                                                | 1GHz - 18GHz: 4.08dB   |
|                                                                | 18GHz - 40GHz: 4.08dB  |

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## 6. RF POWER OUTPUT MEASUREMENT

### 6.1. Standard Applicable:

According to FCC §2.1046.

FCC 22.913(a) Mobile station are limited to 7W.

FCC 24.232(C) Peak Power Measurement to 2W.

3GPP Power limitation for HSDPA and HSUPA

Maximum Output Powers for HSDPA

| Sub-test in table<br>C.10.1.4 | Power Class 3  |             | Power Class 4  |             |
|-------------------------------|----------------|-------------|----------------|-------------|
|                               | Power<br>(dBm) | Tol<br>(dB) | Power<br>(dBm) | Tol<br>(dB) |
| 1                             | +24            | +1.7/-3.7   | +21            | +2.7/-2.7   |
| 2                             | +24            | +1.7/-3.7   | +21            | +2.7/-2.7   |
| 3                             | +23.5          | +2.2/-3.7   | +20.5          | +3.2/-2.7   |
| 4                             | +23.5          | +2.2/-3.7   | +20.5          | +3.2/-2.7   |

Maximum Output Powers for HSUPA

| Sub-test in table<br>C.11.1.3 | Power Class 3  |             | Power Class 4  |             |
|-------------------------------|----------------|-------------|----------------|-------------|
|                               | Power<br>(dBm) | Tol<br>(dB) | Power<br>(dBm) | Tol<br>(dB) |
| 1                             | +24            | +1.7/-6.7   | +21            | +2.7/-5.7   |
| 2                             | +22            | +3.7/-5.2   | +19            | +4.7/-4.2   |
| 3                             | +23            | +2.7/-5.2   | +20            | +3.7/-4.2   |
| 4                             | +22            | +3.7/-5.2   | +19            | +4.7/-4.2   |
| 5                             | +24            | +1.7/-6.7   | +21            | +2.7/-5.7   |

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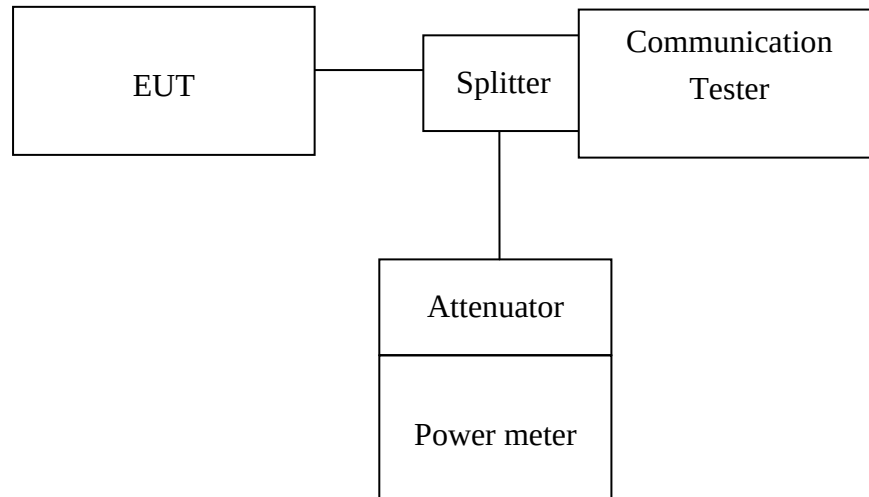
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## 6.2. Test Set-up:



**Note:** Measurement setup for testing on Antenna connector

## 6.3. Measurement Procedure:

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. The Procedure of KDB941225 KDB941125 (SAR Measurement Procedures for 3G devices, WCDMA/HSDPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing

## 6.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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## 6.5. Measurement Result:

### 6.5.1. RF Conducted Output Power

#### 6.5.1.1.: GSM/GPRS/EDGE (GMSK; 8-PSK)

Result:

| EUT Mode              | Frequency<br>(MHz) | CH  | Peak Power<br>(dBm) | Avg. Power<br>(dBm) |
|-----------------------|--------------------|-----|---------------------|---------------------|
| GSM 850<br>(Class 10) | 824.2              | 128 | 33.40               | 33.20               |
|                       | 836.6              | 190 | 33.30               | 33.20               |
|                       | 848.8              | 251 | 33.30               | 33.10               |

| EUT Mode               | Frequency<br>(MHz) | CH  | Peak Power<br>(dBm) | Avg. Power<br>(dBm) |
|------------------------|--------------------|-----|---------------------|---------------------|
| GSM 1900<br>(Class 10) | 1850.2             | 512 | 29.50               | 29.30               |
|                        | 1880.0             | 661 | 29.40               | 29.30               |
|                        | 1909.8             | 810 | 29.50               | 29.30               |

| EUT Mode               | Frequency<br>(MHz) | CH  | Peak Power<br>(1DN<br>1UP)<br>(dBm) | Avg. Power<br>(1DN<br>1UP)<br>(dBm) | Peak Power<br>(1DN<br>2UP)<br>(dBm) | Avg. Power<br>(1DN<br>2UP)<br>(dBm) |
|------------------------|--------------------|-----|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| GPRS 850<br>(Class 10) | 824.2              | 128 | 33.40                               | 33.20                               | 32.00                               | 31.90                               |
|                        | 836.6              | 190 | 33.40                               | 33.20                               | 31.90                               | 31.80                               |
|                        | 848.8              | 251 | 33.30                               | 33.10                               | 31.90                               | 31.80                               |

| EUT Mode                | Frequency<br>(MHz) | CH  | Peak Power<br>(1DN<br>1UP)<br>(dBm) | Avg. Power<br>(1DN<br>1UP)<br>(dBm) | Peak Power<br>(1DN<br>2UP)<br>(dBm) | Avg. Power<br>(1DN<br>2UP)<br>(dBm) |
|-------------------------|--------------------|-----|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| GPRS 1900<br>(Class 10) | 1850.2             | 512 | 29.30                               | 28.40                               | 28.20                               | 29.30                               |
|                         | 1880.0             | 661 | 29.30                               | 28.30                               | 28.20                               | 29.30                               |
|                         | 1909.8             | 810 | 29.30                               | 28.60                               | 28.40                               | 29.30                               |

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## 6.5.2. Minimum Communications Power Measurement

### PCS 1900 band

| PCL                | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|--------------------|------|------|------|------|------|------|------|------|------|
| Output power (dBm) | 29.4 | 29.4 | 29.4 | 29.4 | 27.5 | 25.4 | 23.4 | 21.4 | 19.5 |
| PCL                | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   |
| Output power (dBm) | 17.5 | 15.4 | 13.5 | 11.5 | 9.4  | 7.5  | 6.1  | 4.1  | 17.5 |

Note: The EUT output power was controlled by simulator. Set Communication Tester CMU200 PCL as above, and get the mobile phone output power reading.

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## 7. ERP, EIRP MEASUREMENT

### 7.1. Standard Applicable:

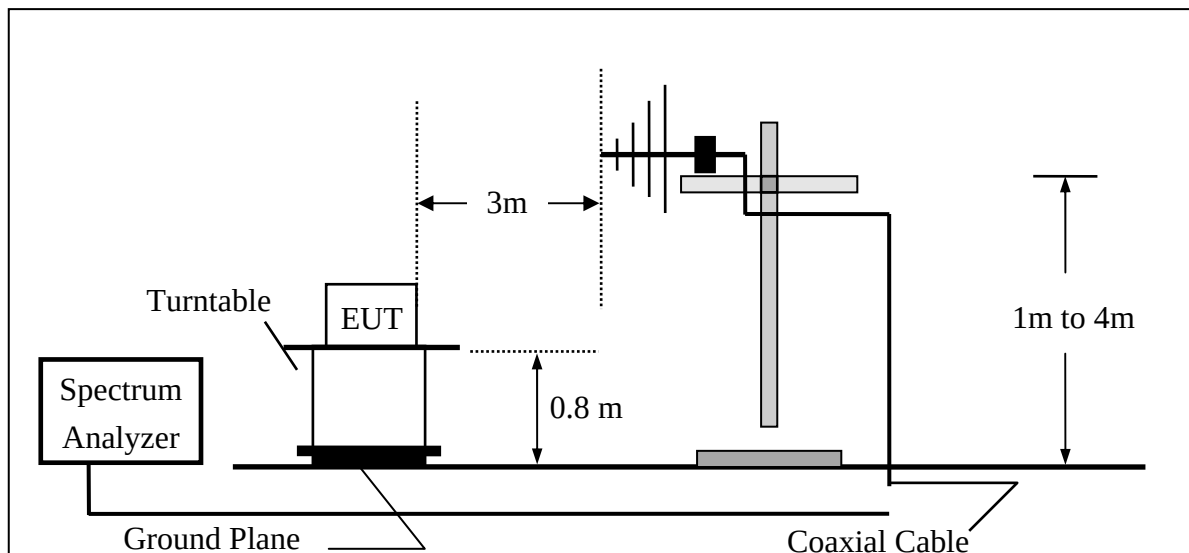
According to FCC §2.1046

FCC 22.913(a) Mobile station are limited to 7W ERP.

FCC 24.232(c) Mobile station are limited to 2W EIRP.

### 7.2. Test SET-UP (Block Diagram of Configuration):

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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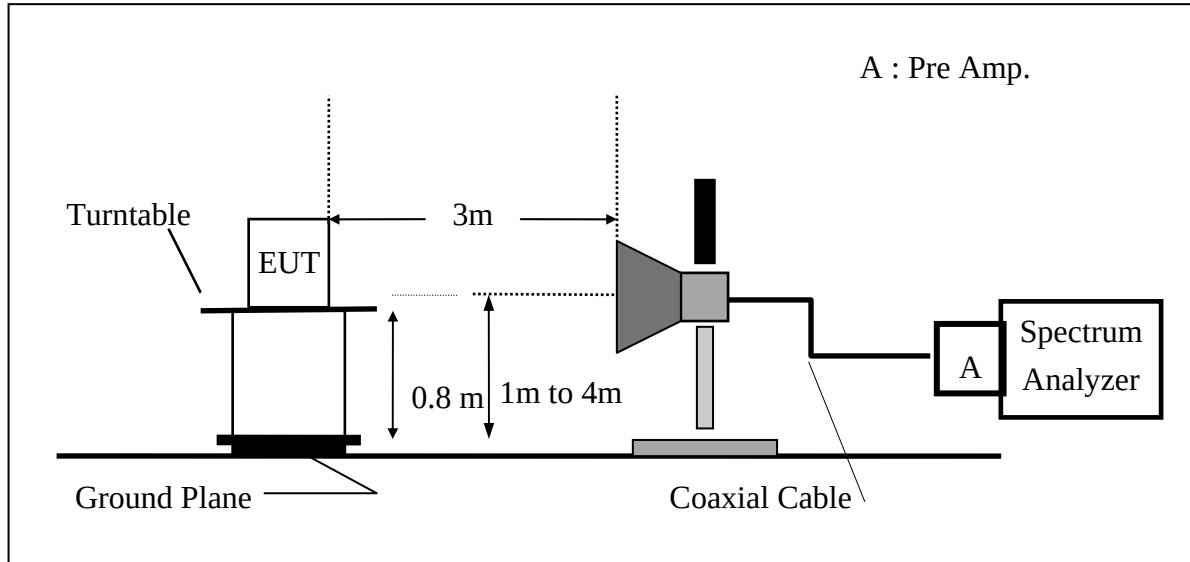
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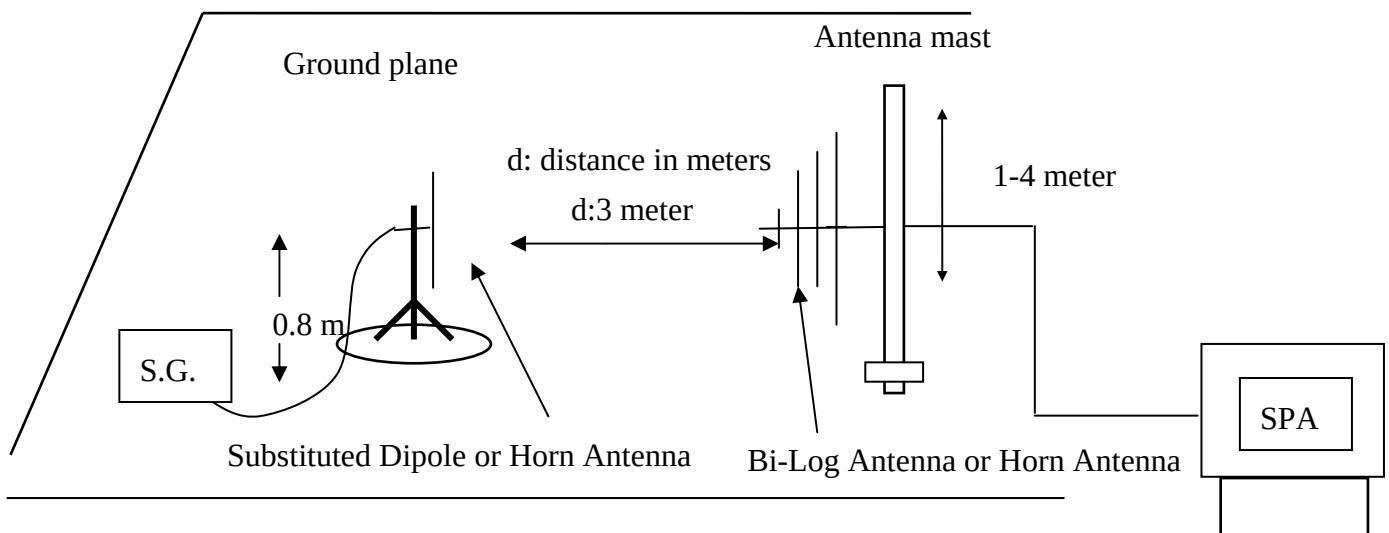
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## (B) Radiated Emission Test Set-UP Frequency Over 1 GHz



## (C) Substituted Method Test Set-UP



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### 7.3. Measurement Procedure:

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement, the EUT was in communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.80MHz were measured using a substitution method. The EUT was replaced by a dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1710-1755MHz and 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

### 7.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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## 7.5. Measurement Result:

| EUT Mode | Frequency (MHz) | CH  | EUT Pol. | Antenna Pol. | SPA Reading (dBuV) | S.G. Output (dBm) | Antenna Gain (dBd) | Cable Loss (dB) | ERP (dBm)    | Limit (dBm) |
|----------|-----------------|-----|----------|--------------|--------------------|-------------------|--------------------|-----------------|--------------|-------------|
| GSM 850  | 824.20          | 128 | H        | V            | 124.24             | 37.85             | -7.87              | 3.62            | 26.35        | 38.45       |
|          |                 |     |          | H            | 118.98             | 32.71             | -7.87              | 3.62            | 21.21        | 38.45       |
|          |                 |     | E1       | V            | 119.03             | 32.64             | -7.87              | 3.62            | 21.14        | 38.45       |
|          |                 |     |          | H            | 124.59             | 38.32             | -7.87              | 3.62            | 26.82        | 38.45       |
|          |                 |     | E2       | V            | 121.98             | 35.59             | -7.87              | 3.62            | 24.09        | 38.45       |
|          |                 |     |          | H            | 125.84             | 39.57             | -7.87              | 3.62            | 28.07        | 38.45       |
|          | 836.60          | 190 | H        | V            | 126.73             | 40.48             | -7.88              | 3.65            | 28.95        | 38.45       |
|          |                 |     |          | H            | 122.09             | 35.86             | -7.88              | 3.65            | 24.33        | 38.45       |
|          |                 |     | E1       | V            | 122.03             | 35.78             | -7.88              | 3.65            | 24.25        | 38.45       |
|          |                 |     |          | H            | 126.49             | 40.26             | -7.88              | 3.65            | 28.73        | 38.45       |
|          |                 |     | E2       | V            | 124.83             | 38.58             | -7.88              | 3.65            | 27.05        | 38.45       |
|          |                 |     |          | H            | 128.31             | 42.08             | -7.88              | 3.65            | <b>30.55</b> | 38.45       |
|          | 848.80          | 251 | H        | V            | 126.54             | 40.42             | -7.88              | 3.68            | 28.86        | 38.45       |
|          |                 |     |          | H            | 122.28             | 36.09             | -7.88              | 3.68            | 24.53        | 38.45       |
|          |                 |     | E1       | V            | 121.87             | 35.75             | -7.88              | 3.68            | 24.19        | 38.45       |
|          |                 |     |          | H            | 125.89             | 39.70             | -7.88              | 3.68            | 28.14        | 38.45       |
|          |                 |     | E2       | V            | 124.64             | 38.52             | -7.88              | 3.68            | 26.96        | 38.45       |
|          |                 |     |          | H            | 128.03             | 41.84             | -7.88              | 3.68            | 30.28        | 38.45       |

### Remark :

- (1) The RBW,VBW of SPA for frequency

RBW=300 KHz, VBW=1MHz

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### Measurement Result:

| EUT Mode | Frequency (MHz) | CH  | EUT Pol. | Antenna Pol. | SPA Reading (dBuV) | S.G. Output (dBm) | Antenna Gain (dBi) | Cable Loss (dB) | EIRP (dBm)   | Limit (dBm) |
|----------|-----------------|-----|----------|--------------|--------------------|-------------------|--------------------|-----------------|--------------|-------------|
| GSM 1900 | 1850.20         | 512 | H        | V            | 123.48             | 19.09             | 9.90               | 5.56            | 23.43        | 33.00       |
|          |                 |     |          | H            | 122.77             | 18.59             | 9.90               | 5.56            | 22.93        | 33.00       |
|          |                 |     | E1       | V            | 126.49             | 22.10             | 9.90               | 5.56            | 26.44        | 33.00       |
|          |                 |     |          | H            | 125.72             | 21.54             | 9.90               | 5.56            | 25.88        | 33.00       |
|          |                 |     | E2       | V            | 116.75             | 12.36             | 9.90               | 5.56            | 16.70        | 33.00       |
|          |                 |     |          | H            | 127.32             | 23.14             | 9.90               | 5.84            | 27.20        | 33.00       |
|          | 1880.00         | 661 | H        | V            | 123.38             | 19.02             | 9.99               | 5.61            | 23.40        | 33.00       |
|          |                 |     |          | H            | 122.63             | 18.49             | 9.99               | 5.61            | 22.86        | 33.00       |
|          |                 |     | E1       | V            | 126.52             | 22.16             | 9.99               | 5.61            | 26.54        | 33.00       |
|          |                 |     |          | H            | 125.32             | 21.18             | 9.99               | 5.61            | 25.55        | 33.00       |
|          |                 |     | E2       | V            | 117.55             | 13.19             | 9.99               | 5.61            | 17.57        | 33.00       |
|          |                 |     |          | H            | 124.28             | 20.14             | 9.99               | 5.61            | 24.51        | 33.00       |
|          | 1909.80         | 810 | H        | V            | 123.47             | 19.14             | 10.08              | 5.66            | 23.56        | 33.00       |
|          |                 |     |          | H            | 123.16             | 19.05             | 10.08              | 5.66            | 23.47        | 33.00       |
|          |                 |     | E1       | V            | 127.05             | 22.72             | 10.08              | 5.66            | 27.14        | 33.00       |
|          |                 |     |          | H            | 124.59             | 20.48             | 10.08              | 5.66            | 24.90        | 33.00       |
|          |                 |     | E2       | V            | 127.57             | 23.24             | 10.08              | 5.66            | 27.66        | 33.00       |
|          |                 |     |          | H            | 127.76             | 23.65             | 10.08              | 5.66            | <b>28.07</b> | 33.00       |

### Remark :

(1) The RBW,VBW of SPA for frequency

RBW=300K, VBW=1MHz

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## 8. 99% OCCUPIED BANDWIDTH MEASUREMENT

### 8.1. Standard Applicable:

According to §FCC 2.1049.

### 8.2. Test Set-up:

Refer to section 5.2 in this report

### 8.3. Measurement Procedure:

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW (10/30KHz) was set to about 1% of emission BW, VBW= 3 times RBW(30/100KHz), -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

### 8.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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## 8.5. Measurement Result:

| EUT Mode | Frequency (MHz) | CH  | 99% Bandwidth (kHz) |
|----------|-----------------|-----|---------------------|
| GSM 850  | 824.20          | 128 | 244.1772            |
|          | 836.60          | 190 | 246.3583            |
|          | 848.80          | 251 | 247.2302            |

| EUT Mode | Frequency (MHz) | CH  | 99% Bandwidth (kHz) |
|----------|-----------------|-----|---------------------|
| GSM 1900 | 1850.20         | 512 | 248.1557            |
|          | 1880.00         | 661 | 250.3555            |
|          | 1909.80         | 810 | 251.2413            |

| EUT Mode | Frequency (MHz) | CH  | 99% Bandwidth (kHz) |
|----------|-----------------|-----|---------------------|
| GPRS 850 | 824.20          | 128 | 244.5320            |
|          | 836.60          | 190 | 246.1565            |
|          | 848.80          | 251 | 240.9029            |

| EUT Mode  | Frequency (MHz) | CH  | 99% Bandwidth (kHz) |
|-----------|-----------------|-----|---------------------|
| GPRS 1900 | 1850.20         | 512 | 247.3592            |
|           | 1880.00         | 661 | 245.9664            |
|           | 1909.80         | 810 | 249.0391            |

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Figure 7-1: GSM 850 Channel Low

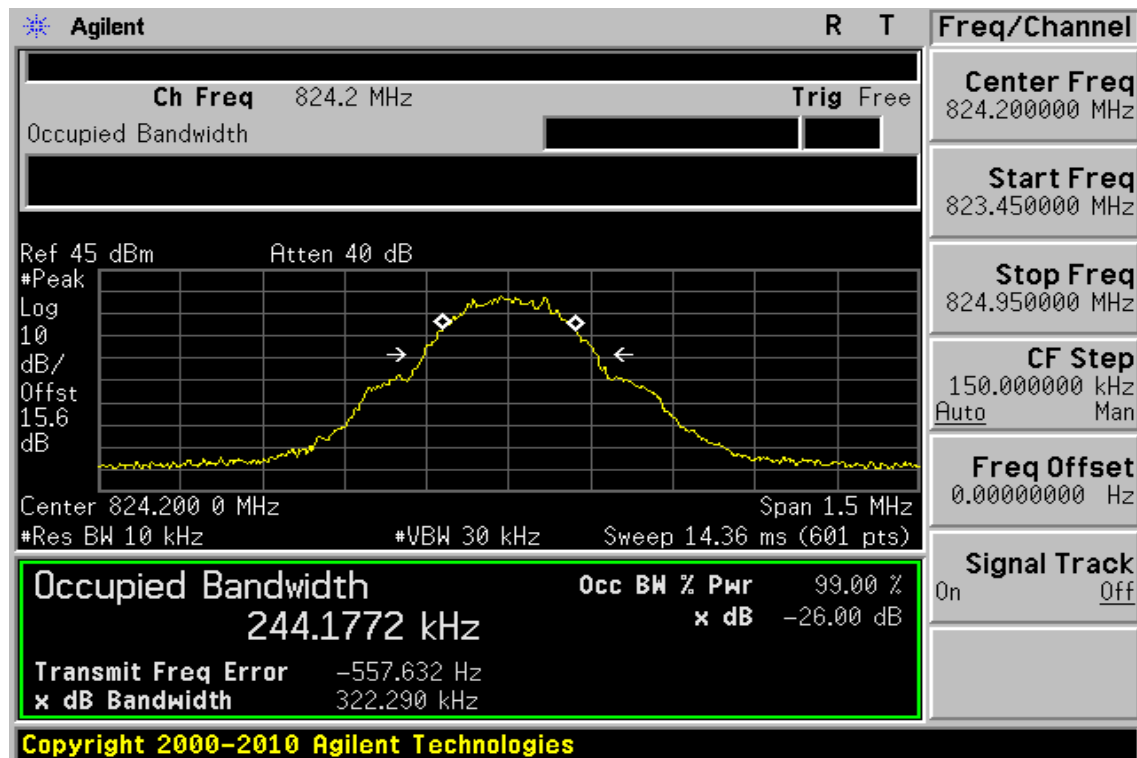
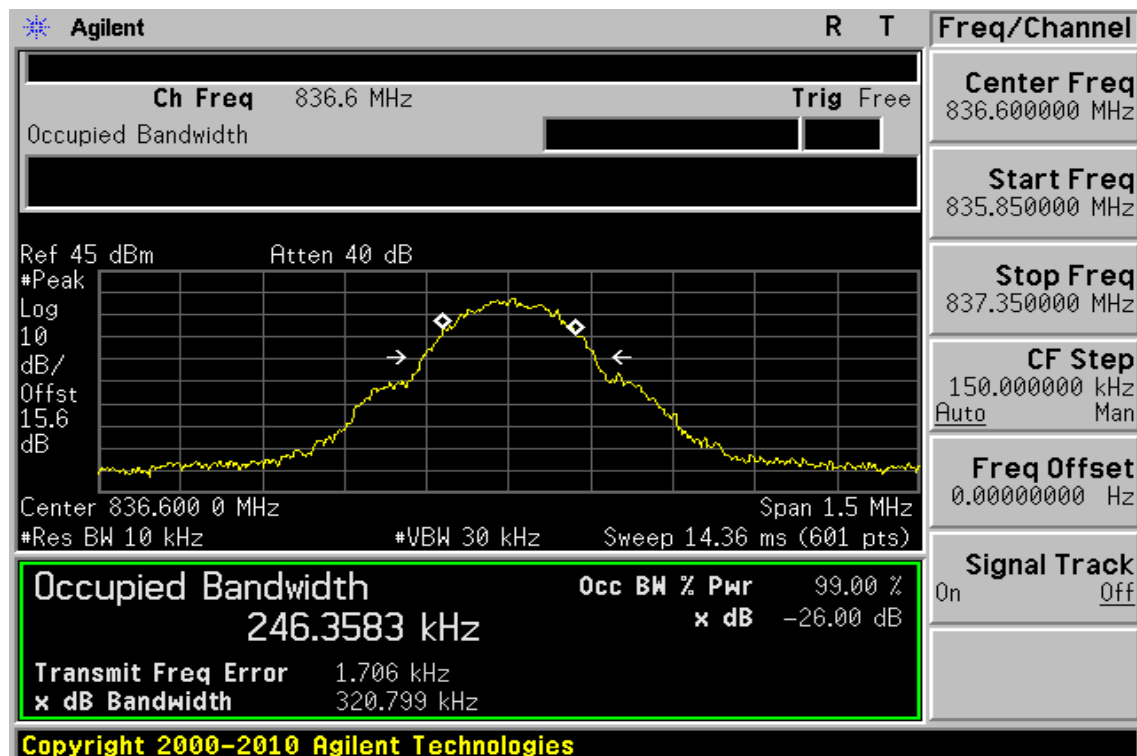


Figure 7-2 GSM 850 Channel Mid



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Figure 7-3: GSM 850 Channel High

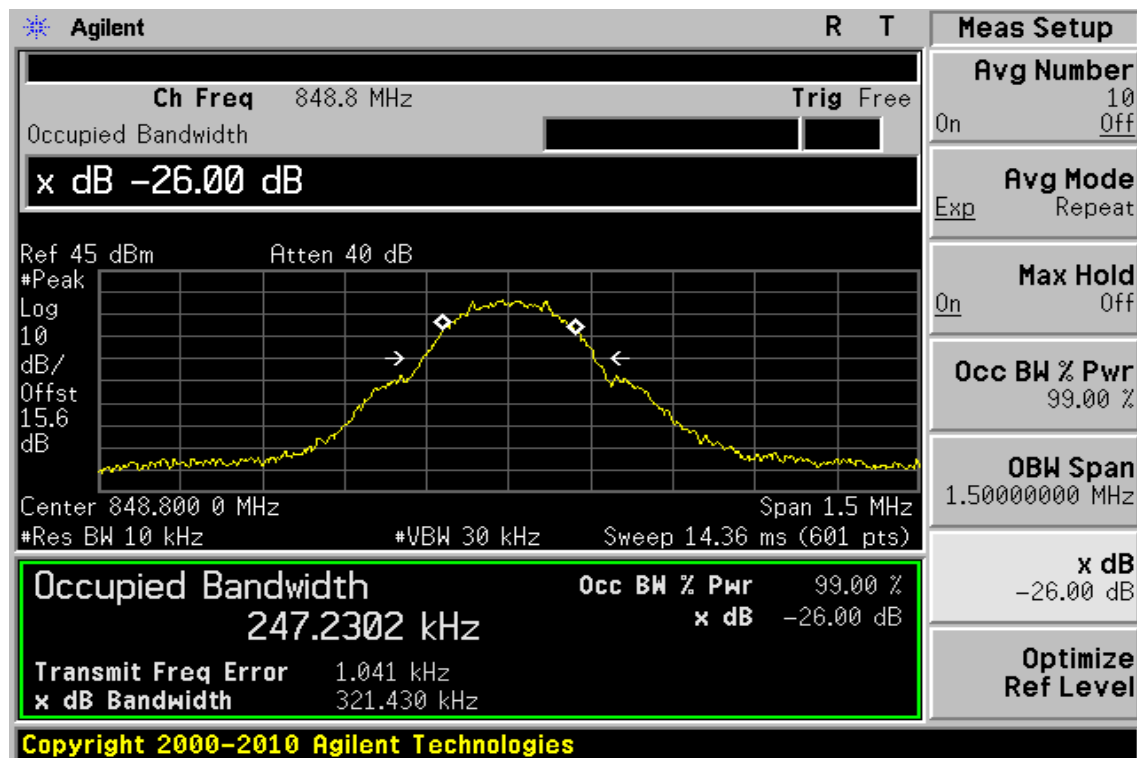
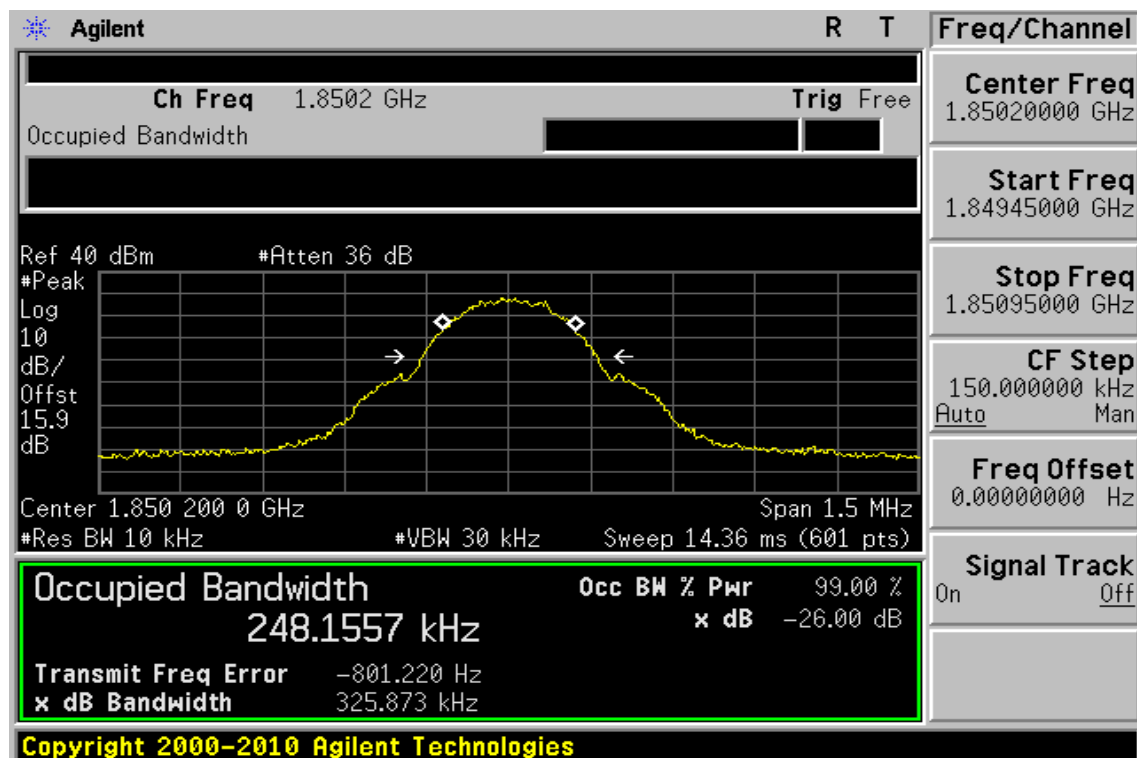


Figure 7-4: GSM 1900 Channel Low



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Figure 7-5 GSM 1900 Channel Mid

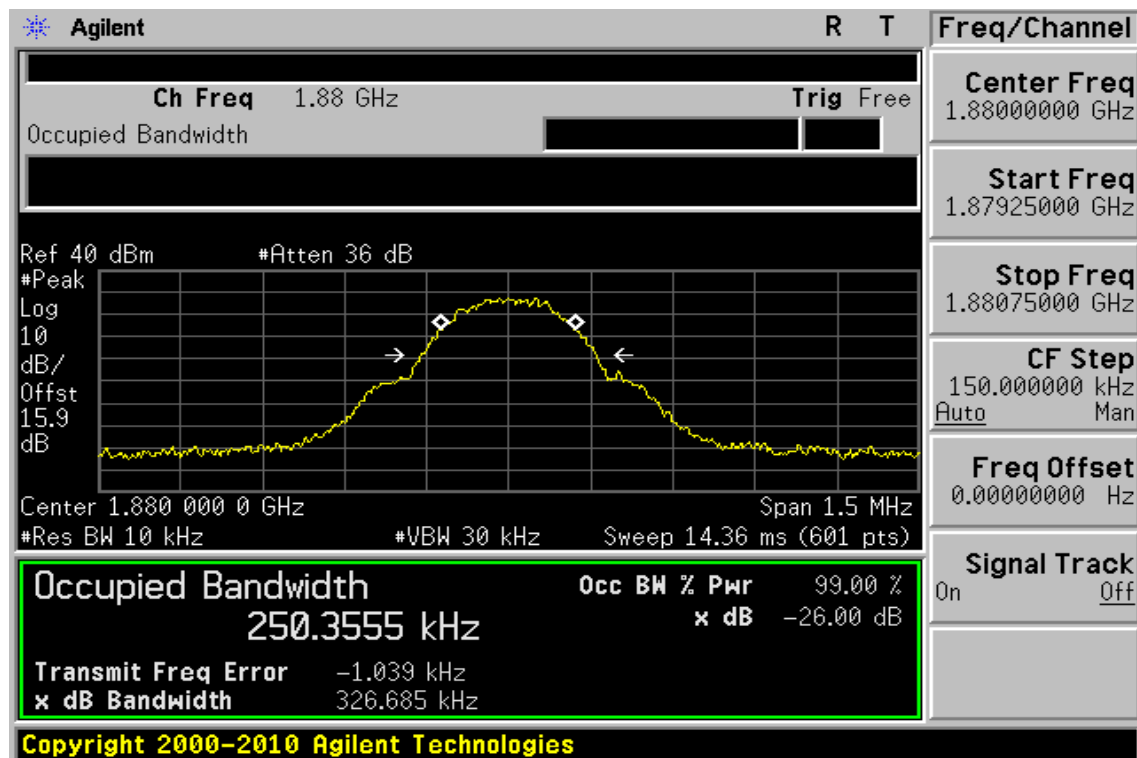
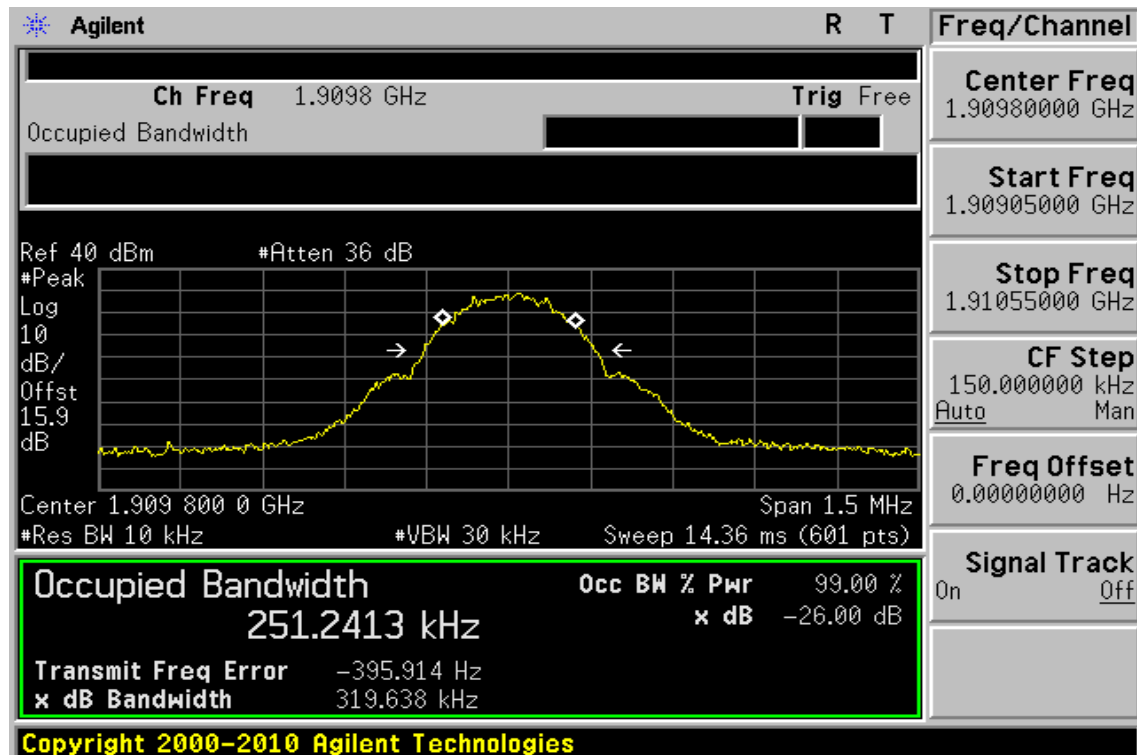


Figure 7-6: GSM 1900 Channel High



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Figure 7-7: GPRS 850 Channel Low

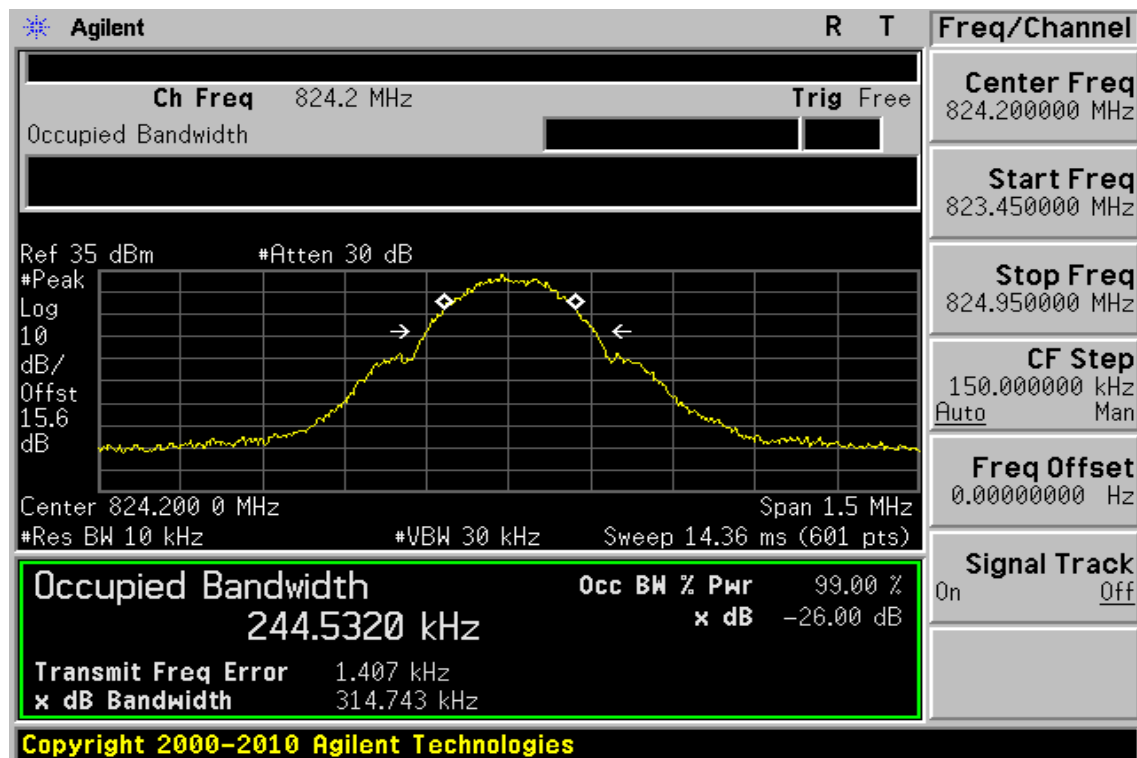
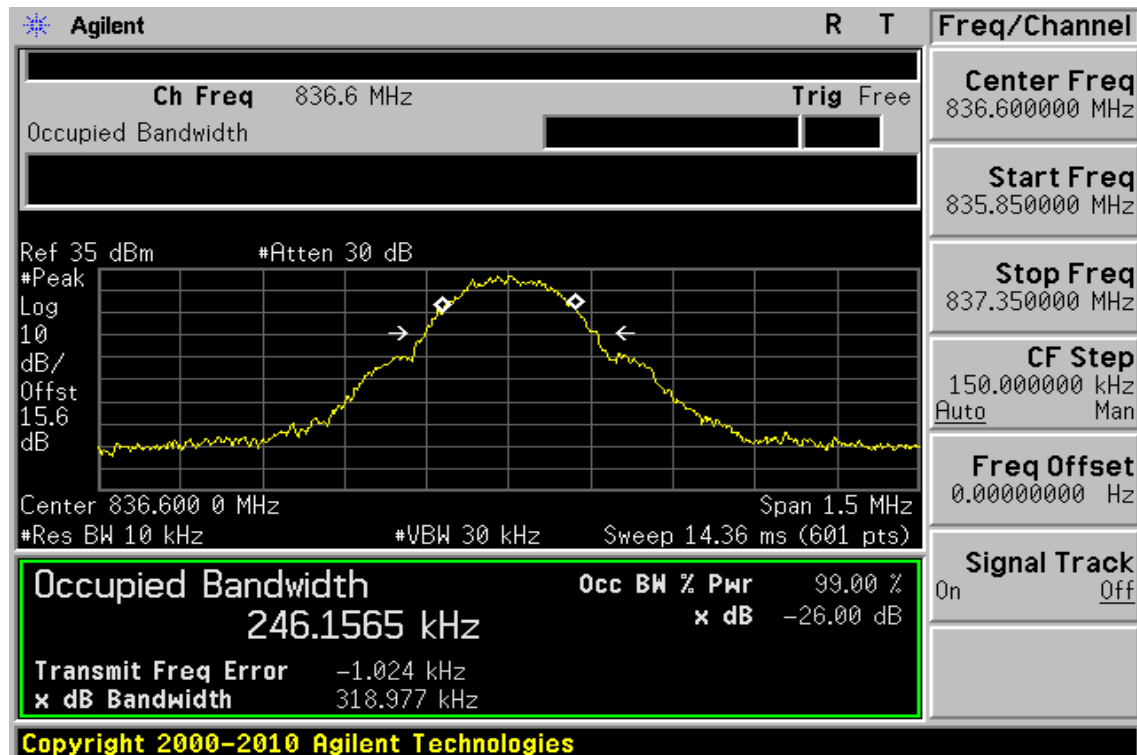


Figure 7-8 GPRS 850 Channel Mid



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Figure 7-9: GPRS 850 Channel High

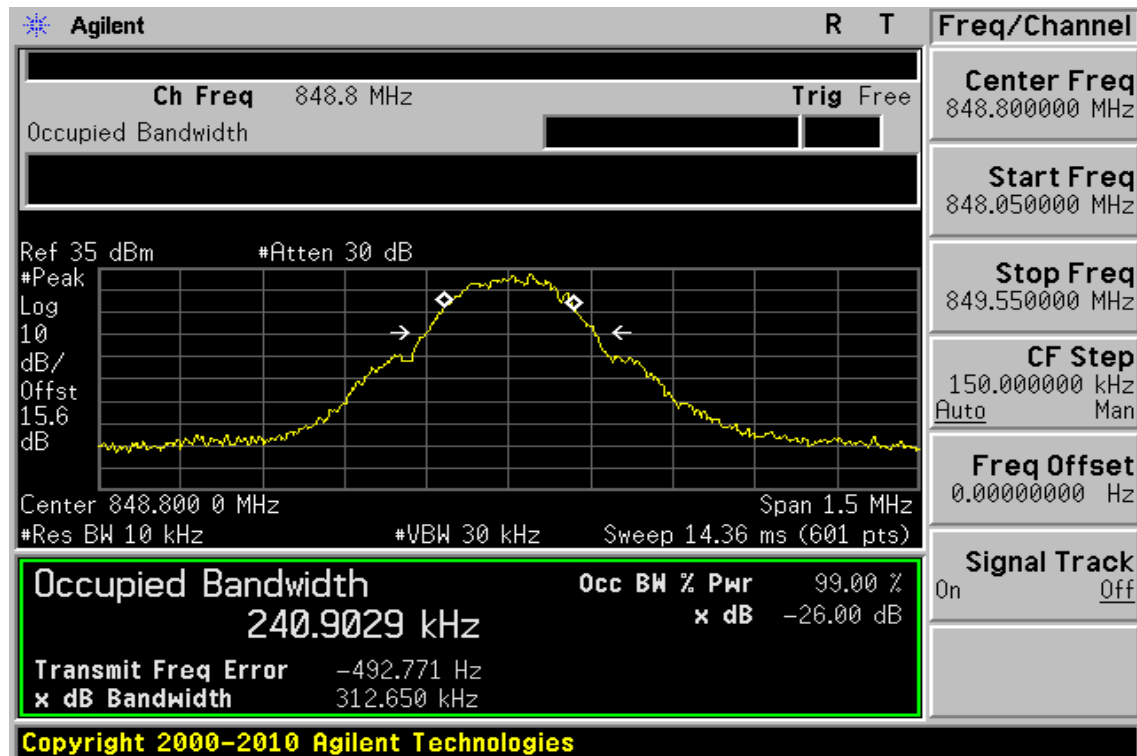
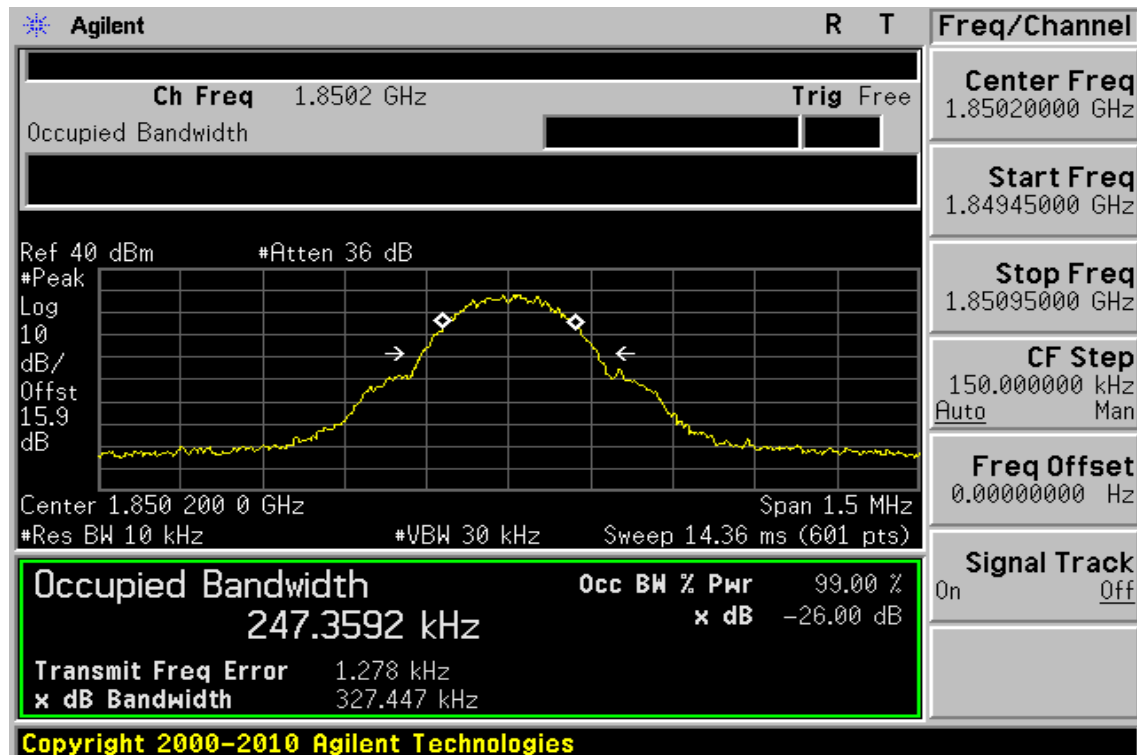


Figure 7-10: GPRS 1900 Channel Low



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Figure 7-11: GPRS 1900 Channel Mid

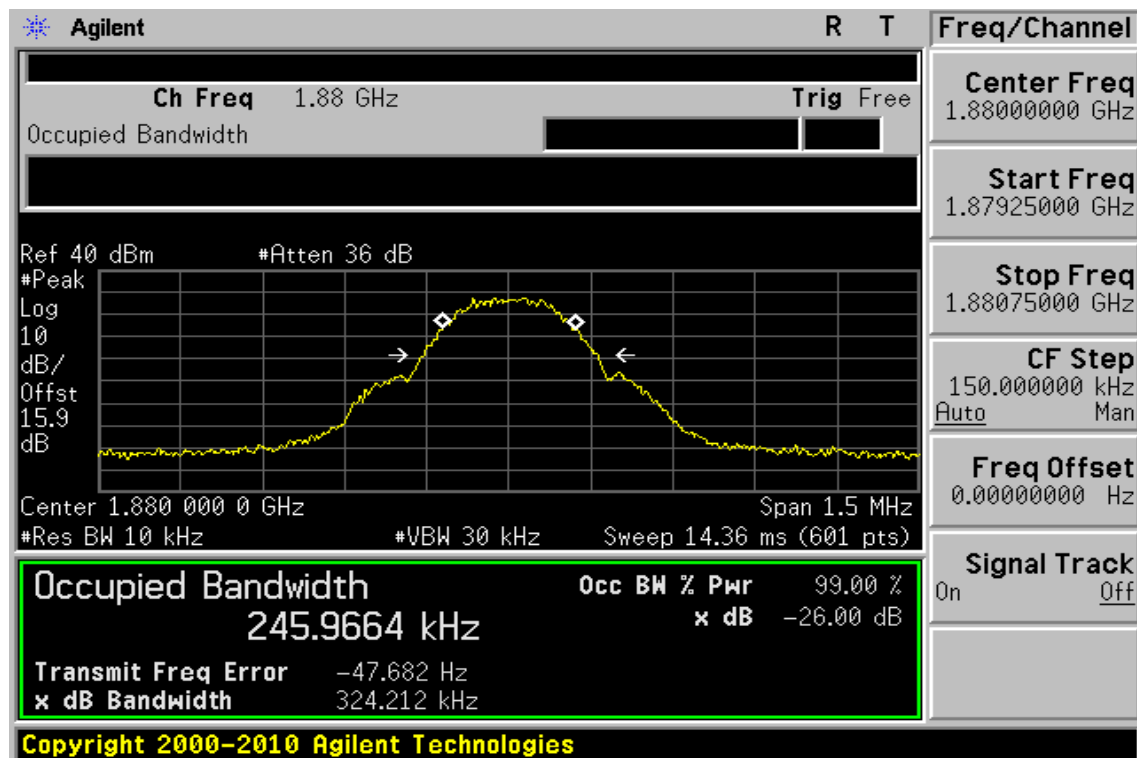
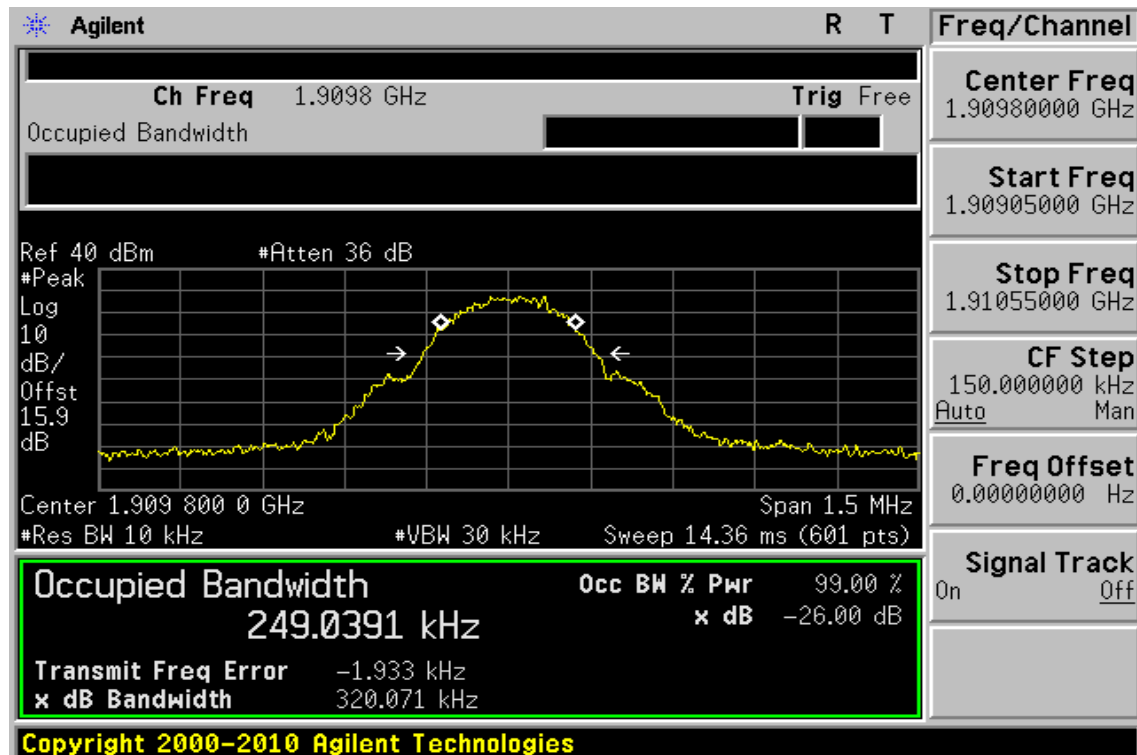


Figure 7-12: GPRS 1900 Channel High



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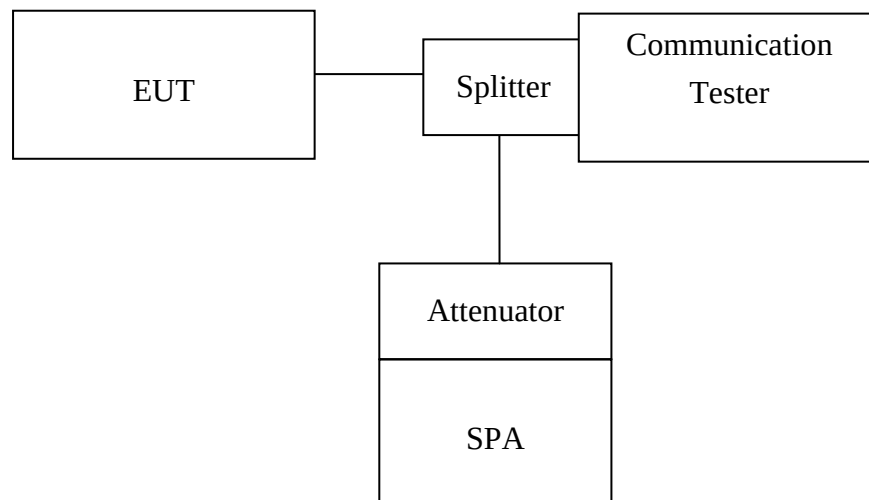
## 9. OUT OF BAND EMISSION AT ANTENNA TERMINALS

### 9.1. Standard Applicable:

According to FCC §2.1051.

FCC §22.917(a), §24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than  $43 + 10 \log$  (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

### 9.2. Test SET-UP:



**Note:** Measurement setup for testing on Antenna connector

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### 9.3. Measurement Procedure:

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

### 9.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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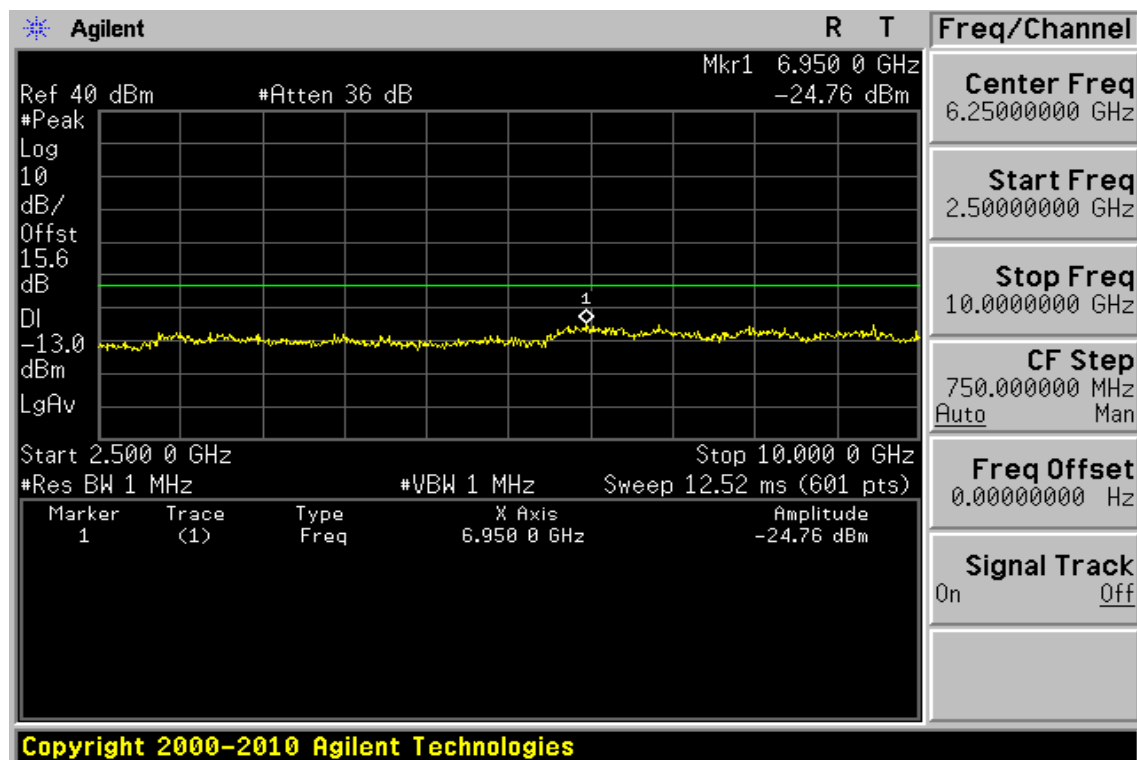
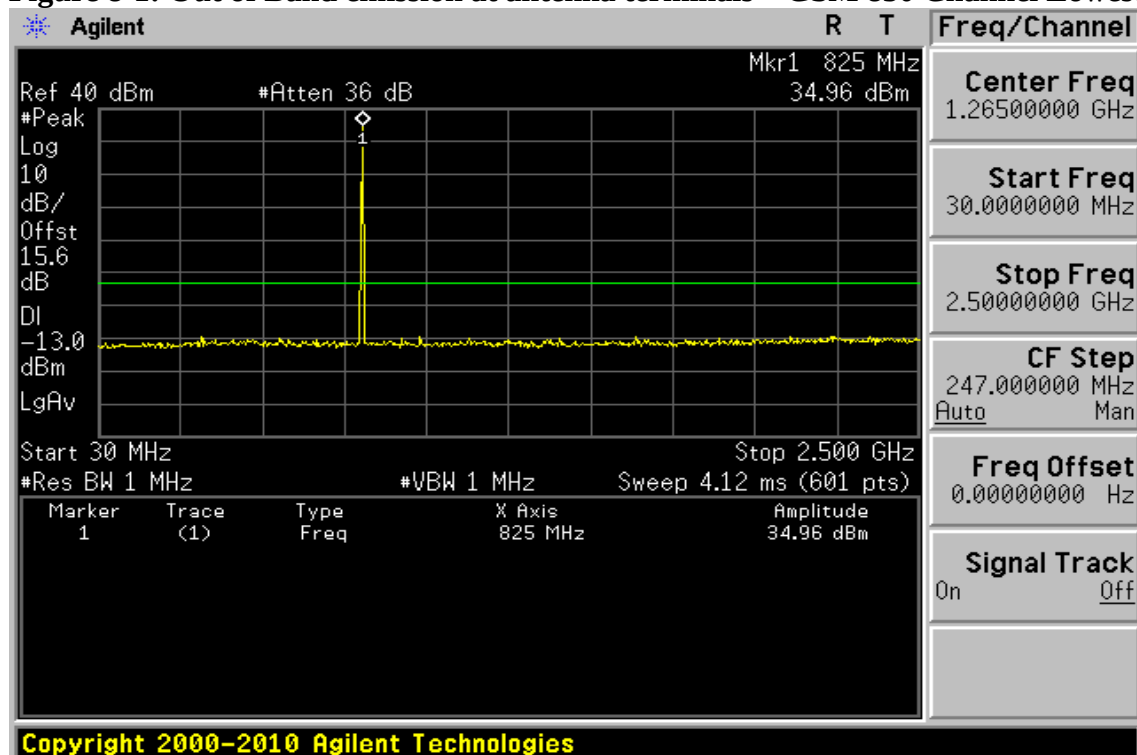
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## 9.5. Measurement Result:

Figure 8-1: Out of Band emission at antenna terminals – GSM 850 Channel Lowest

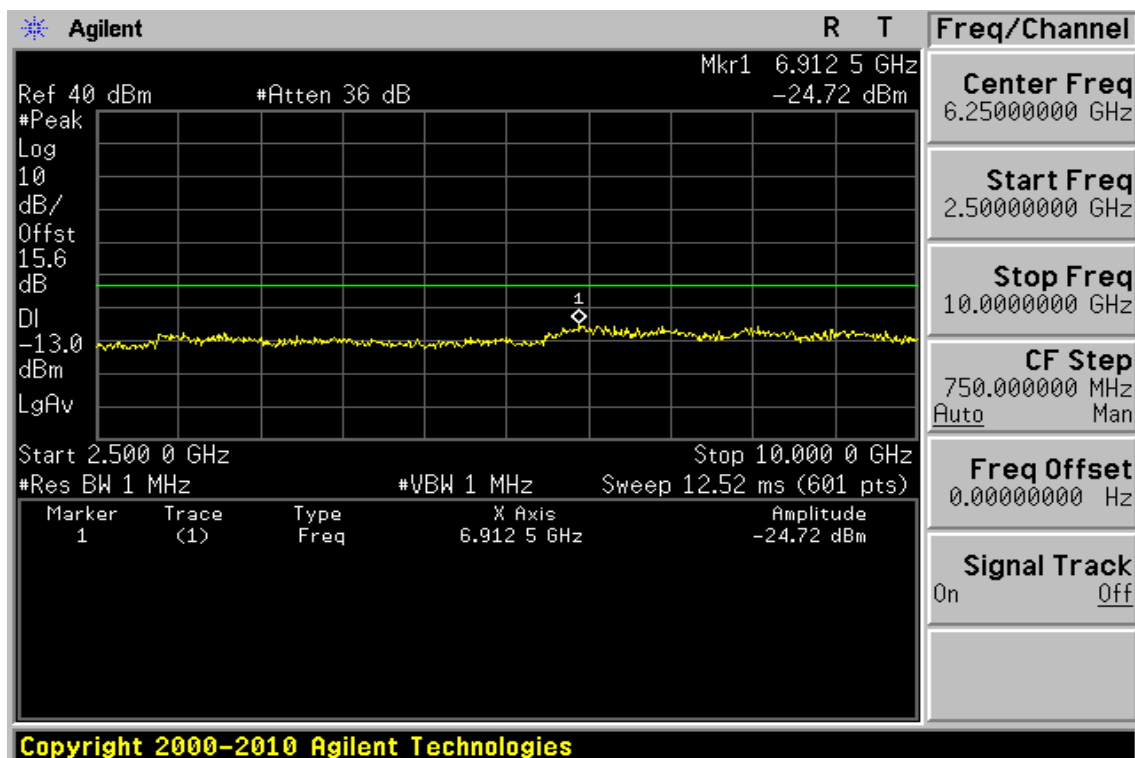
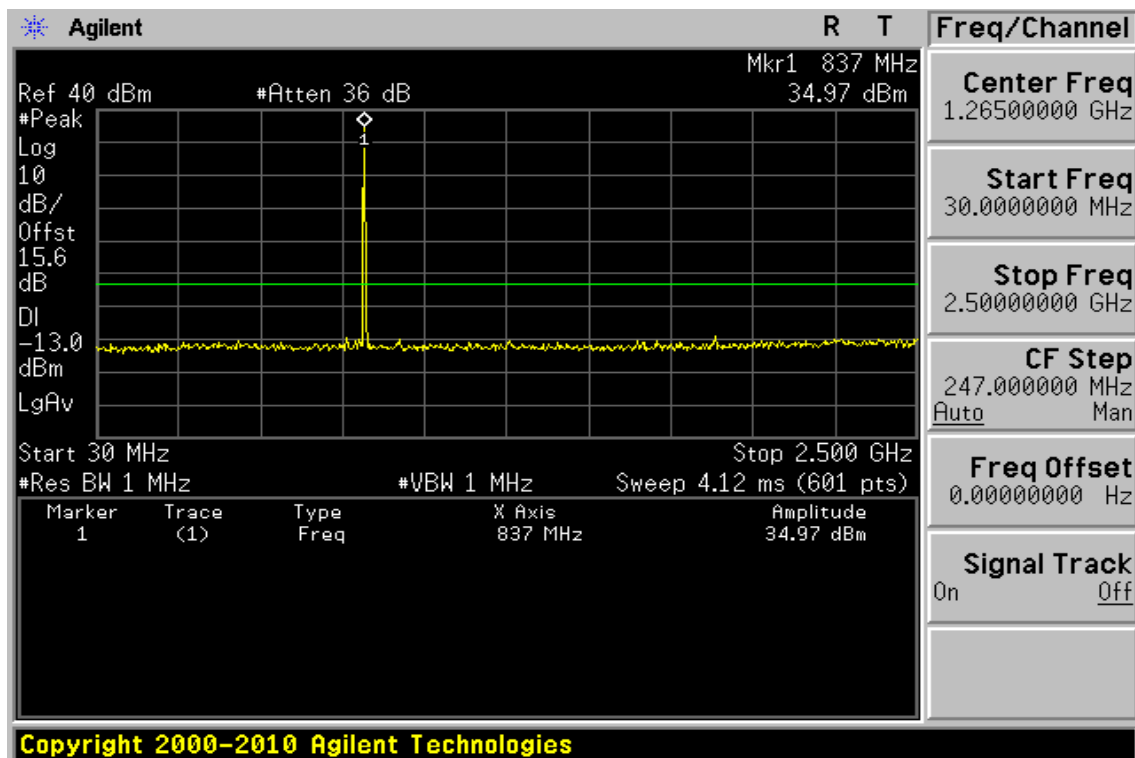


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Figure 8-2: Out of Band emission at antenna terminals – GSM 850 Channel Mid



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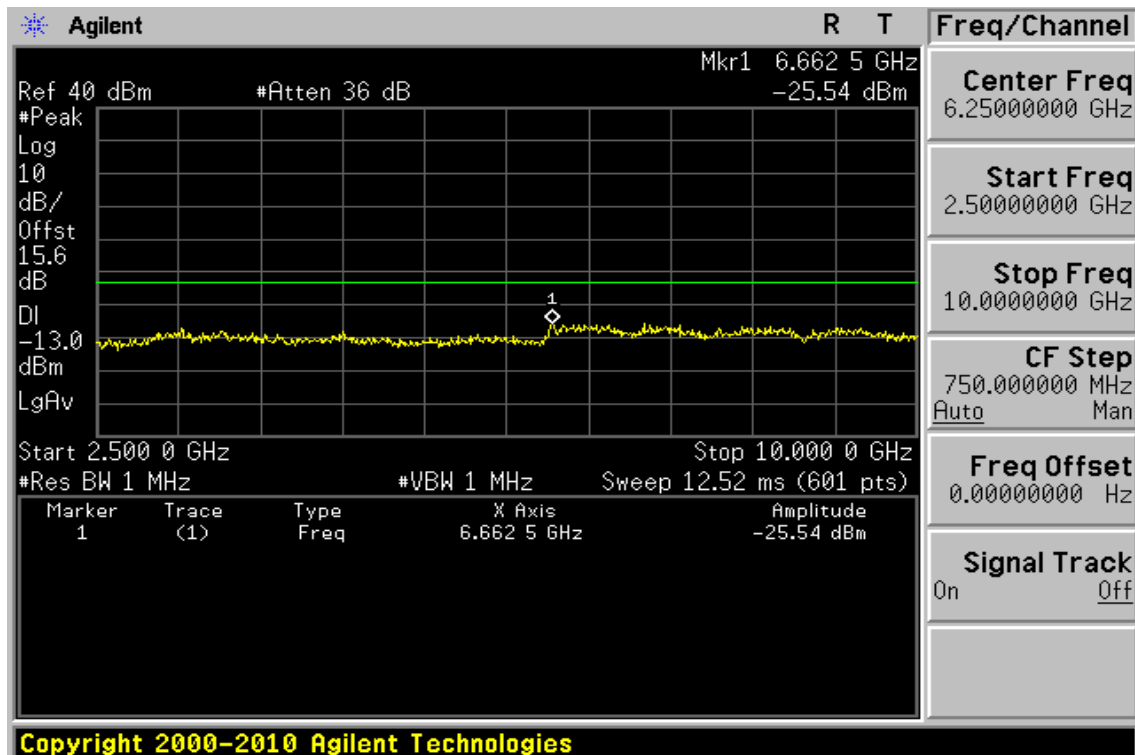
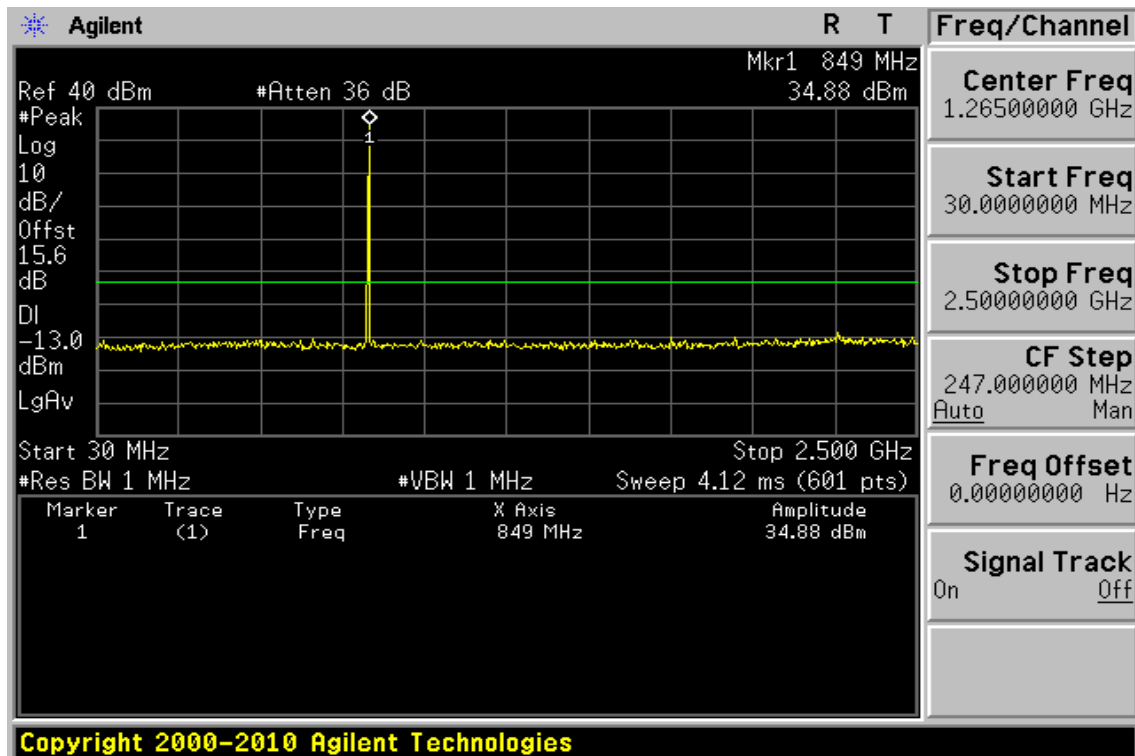
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Figure 8-3: Out of Band emission at antenna terminals – GSM 850 Channel Highest



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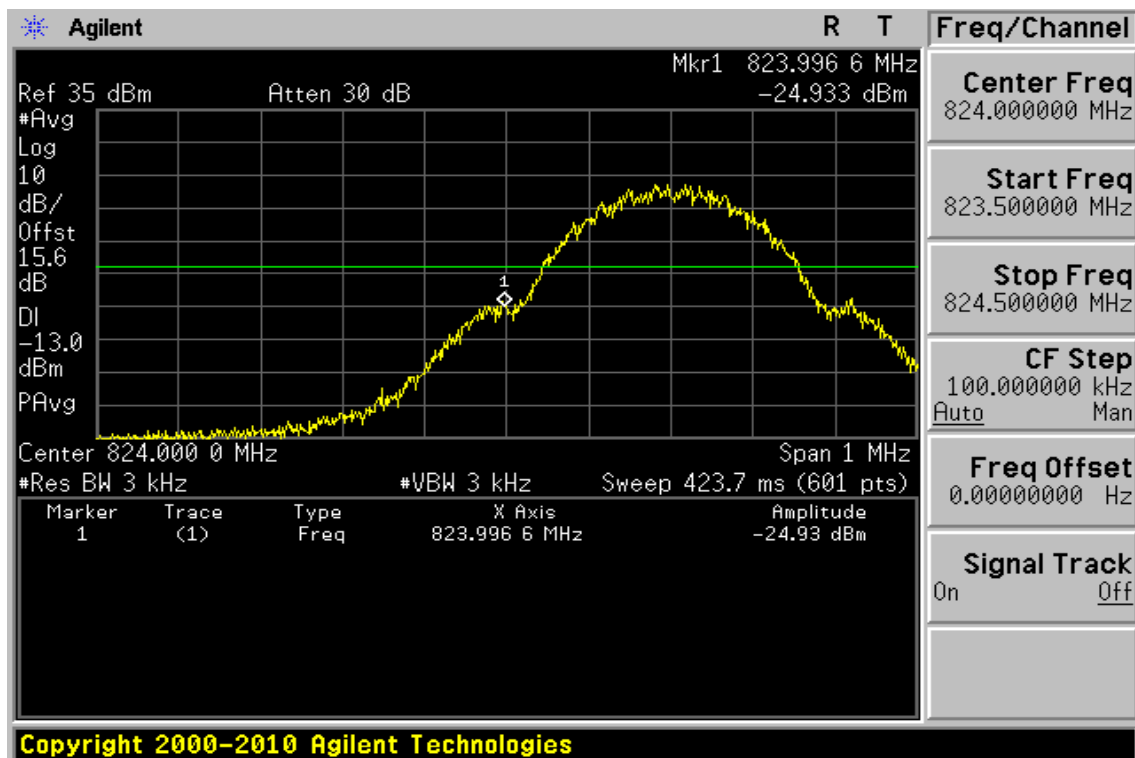
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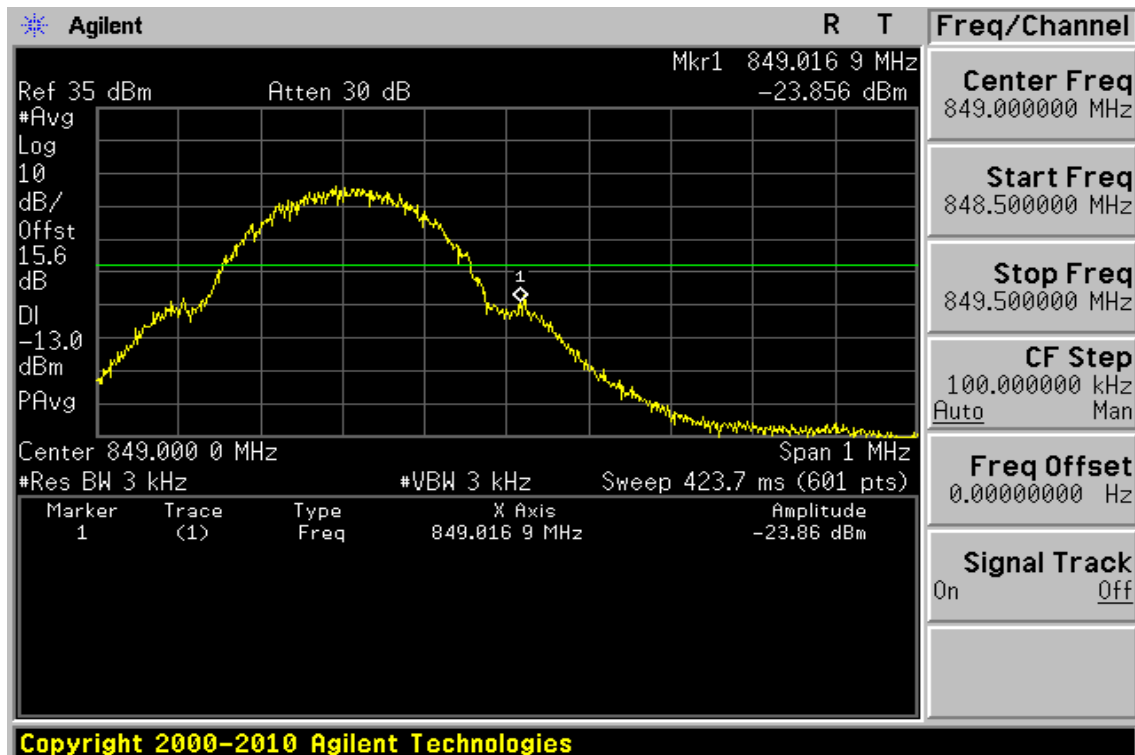
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**Figure 8-4: Band edge emission at antenna terminals – GSM 850 Channel Lowest**



**Figure 8-5: Band edge emission at antenna terminals – GSM 850 Channel Highest**



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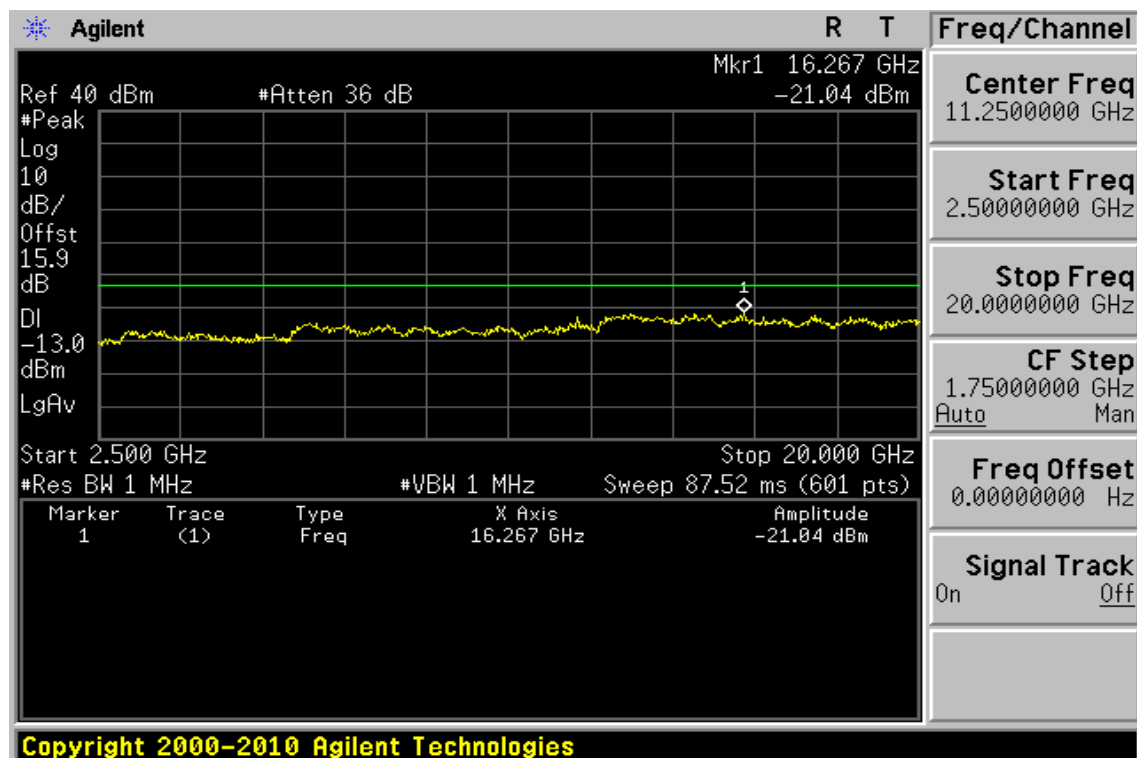
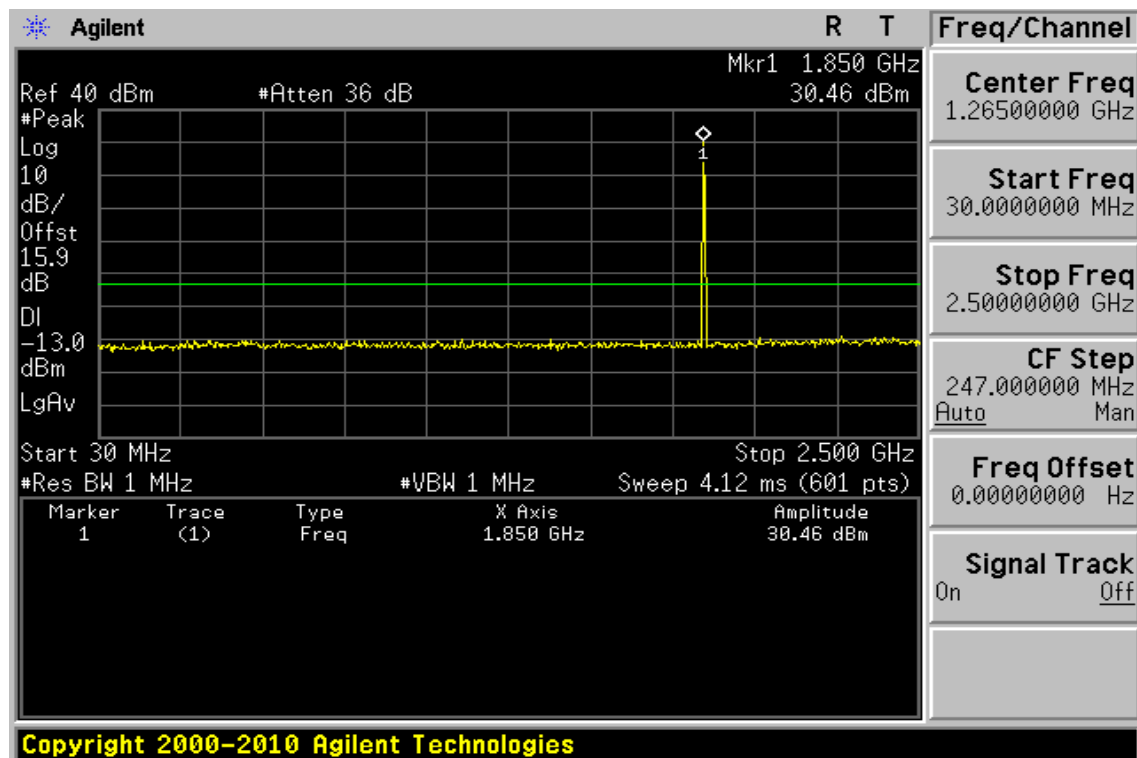
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Figure 8-6: Out of Band emission at antenna terminals – GSM 1900 Channel Lowest



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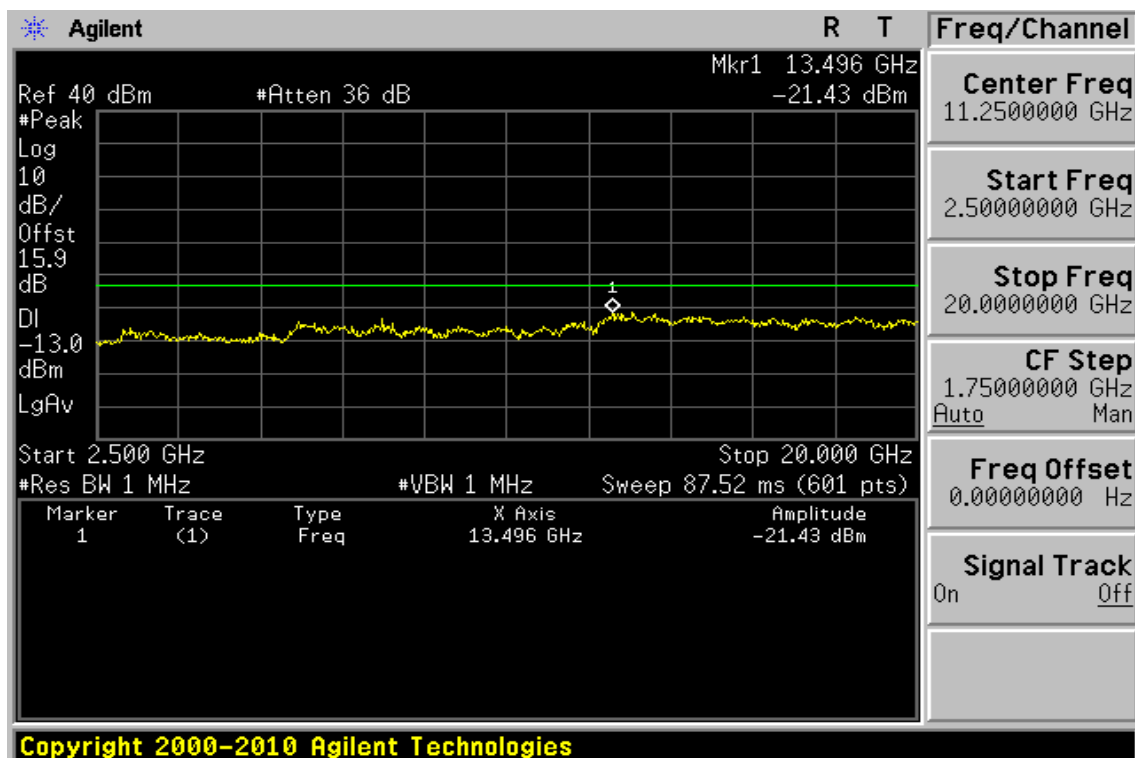
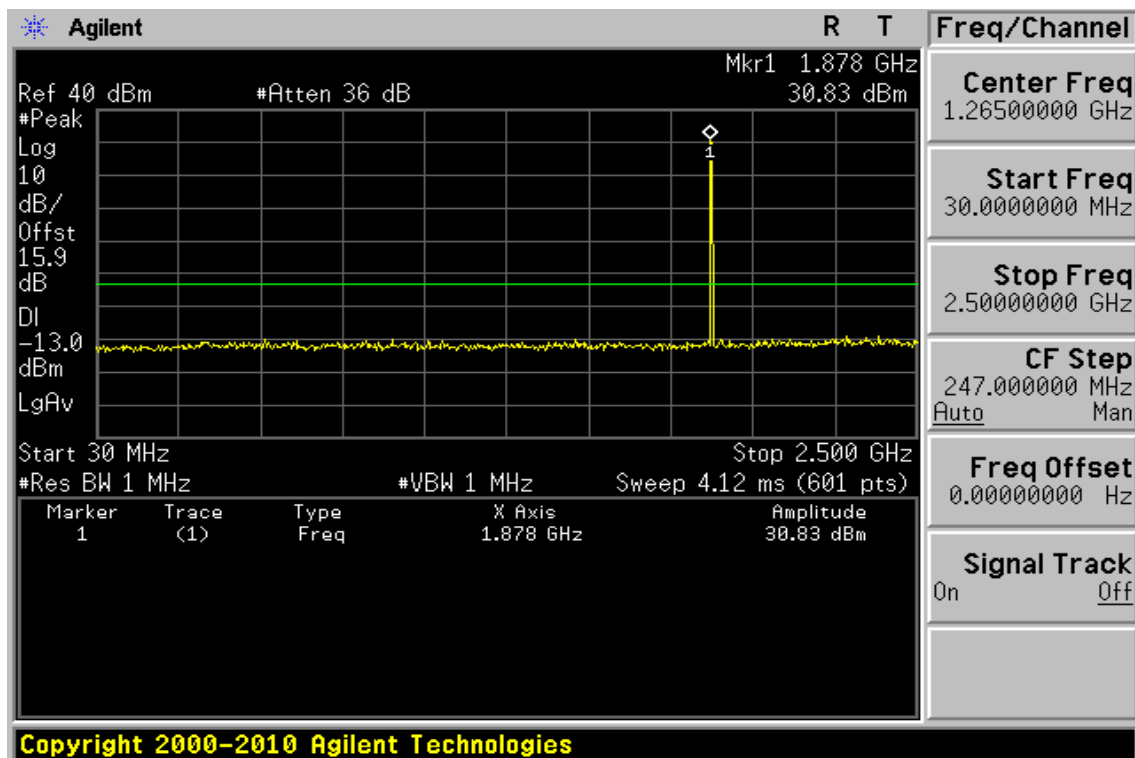
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**Figure 8-7: Out of Band emission at antenna terminals – GSM 1900 Channel Mid**



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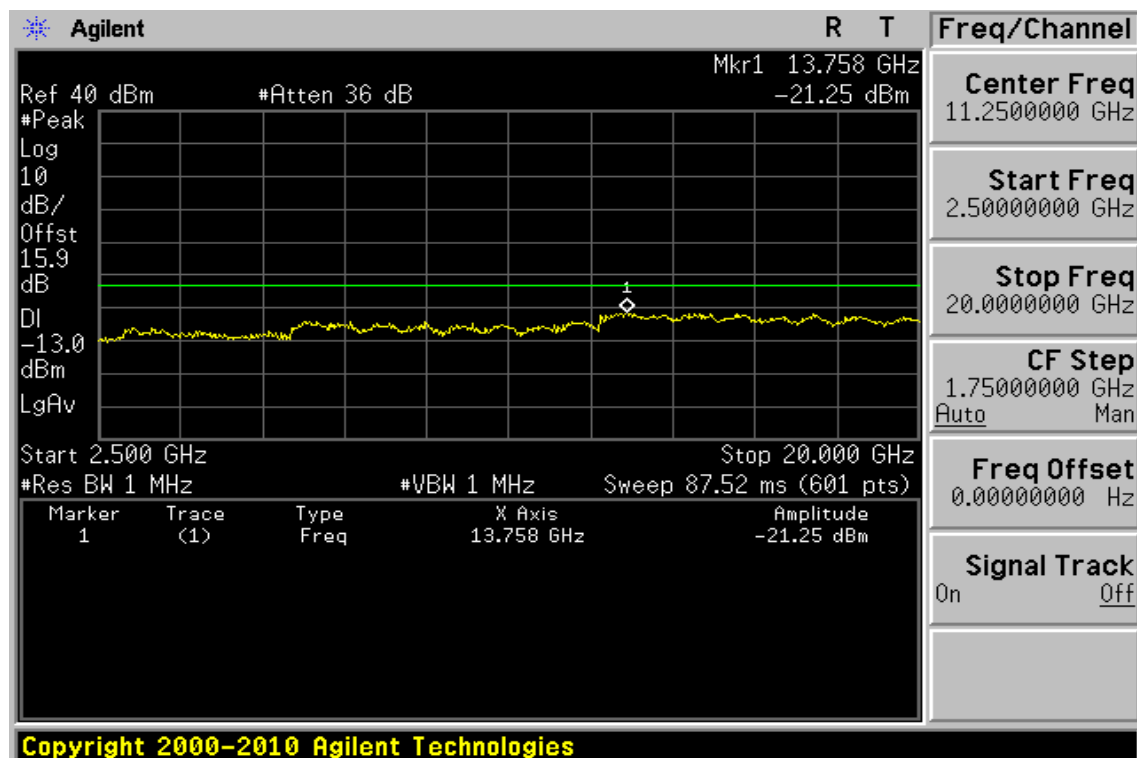
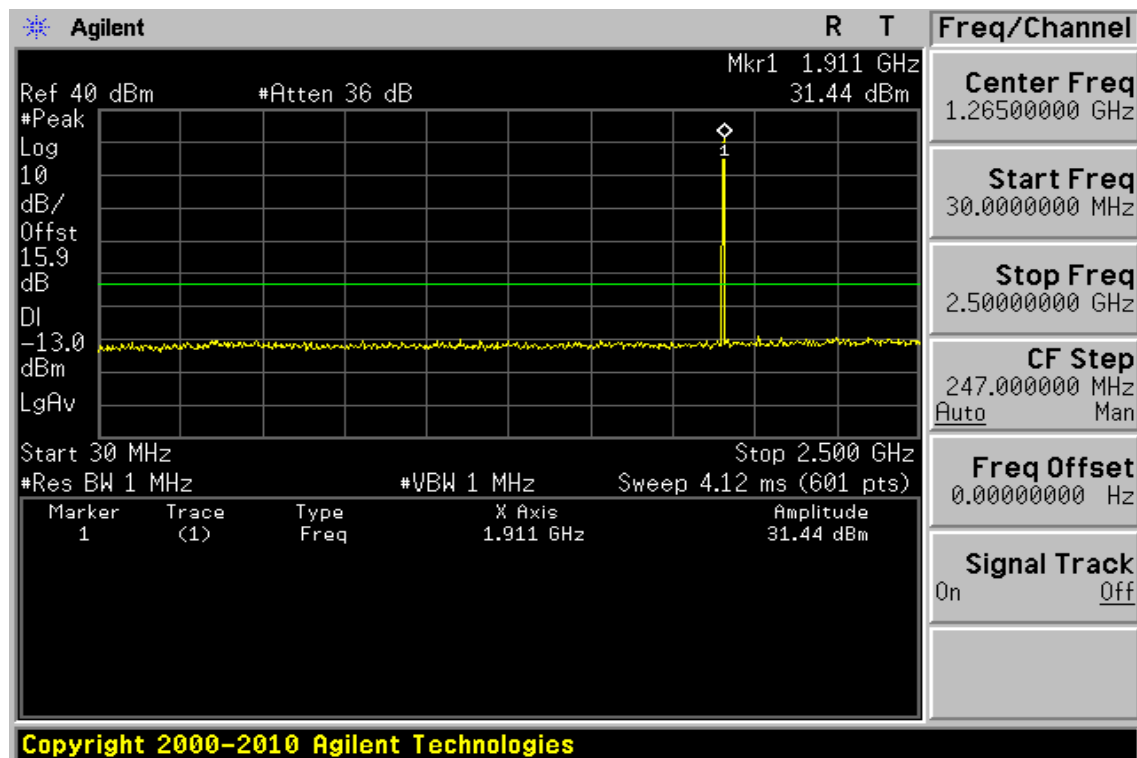
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Figure 8-8: Out of Band emission at antenna terminals – GSM 1900 Channel Highest



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Figure 8-9: Band edge emission at antenna terminals – GSM 1900 Channel Lowest

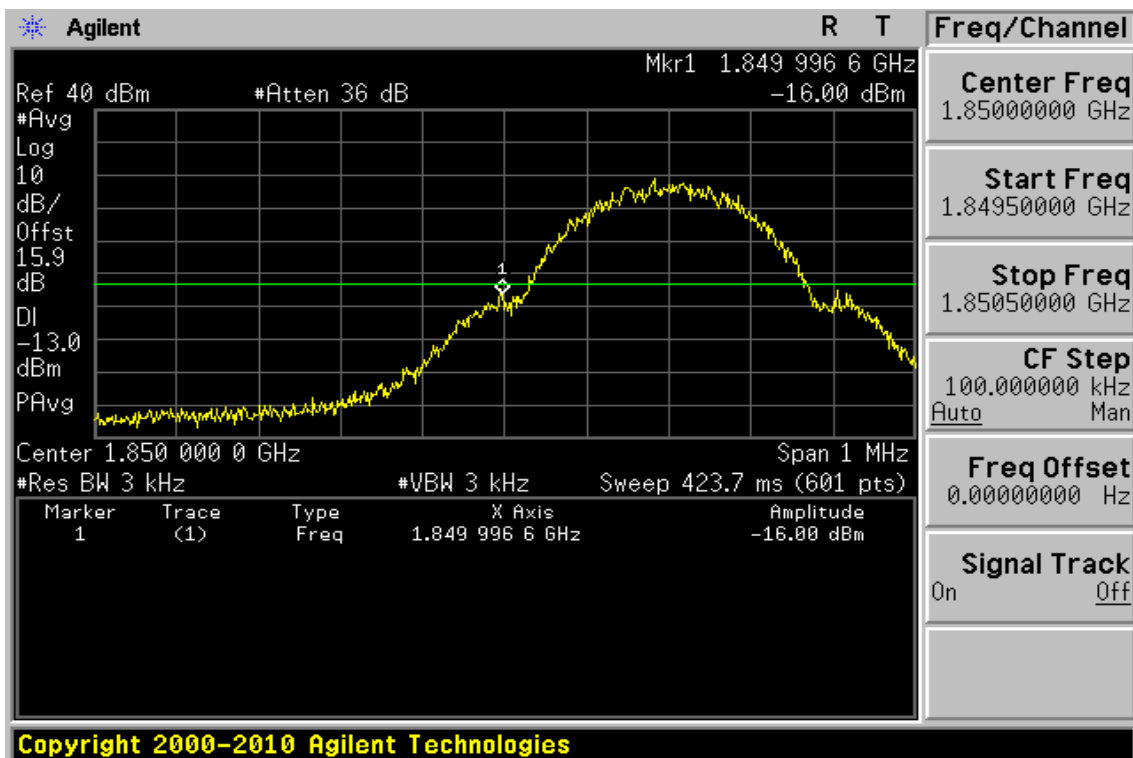
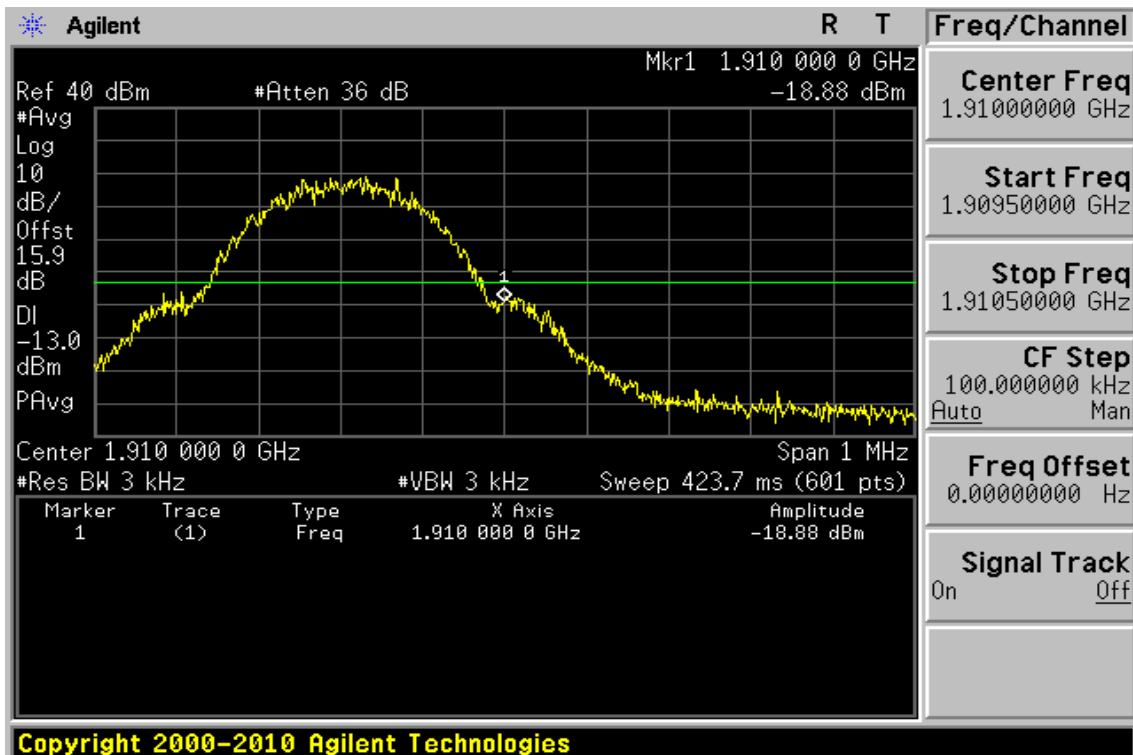


Figure 8-10: Band edge emission at antenna terminals – GSM 1900 Channel Highest



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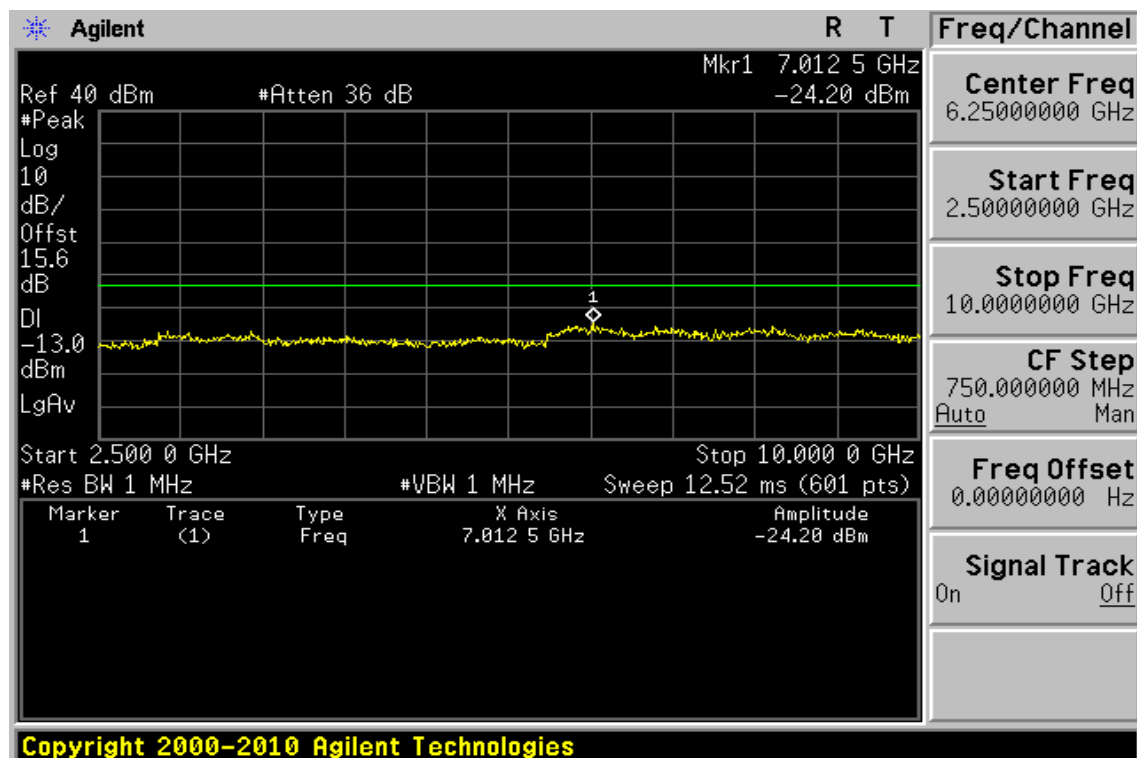
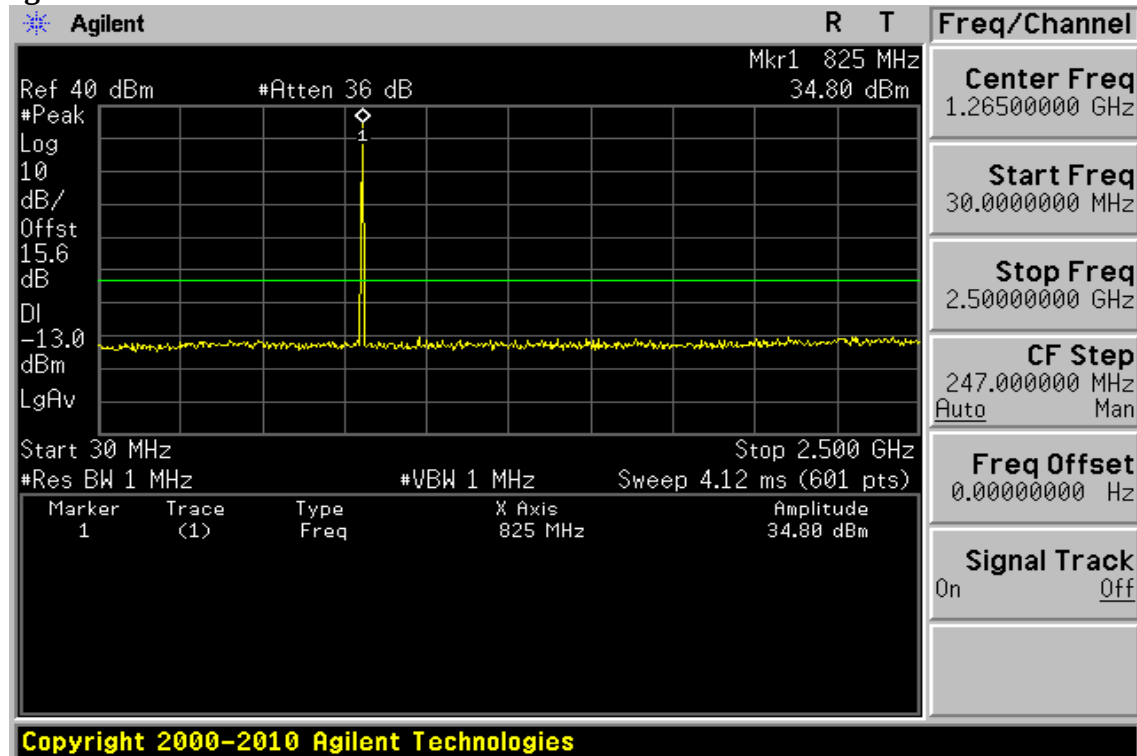
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Figure 8-11: Out of Band emission at antenna terminals – GPRS 850 Channel Lowest



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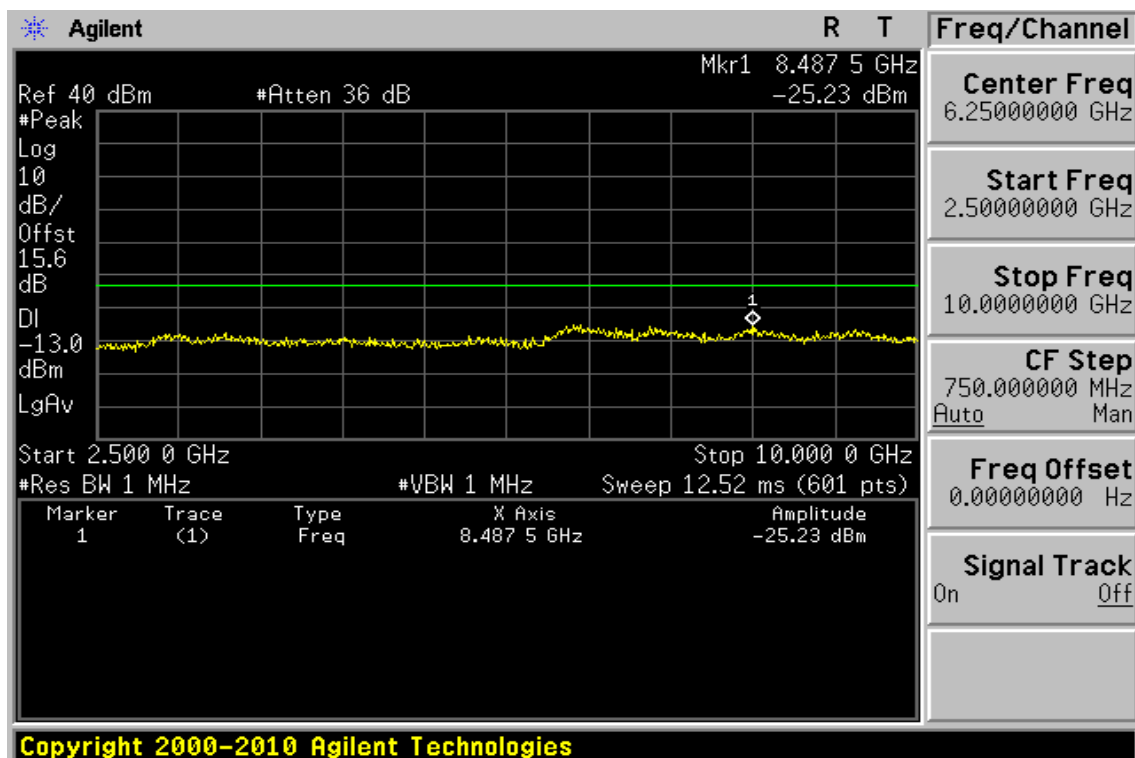
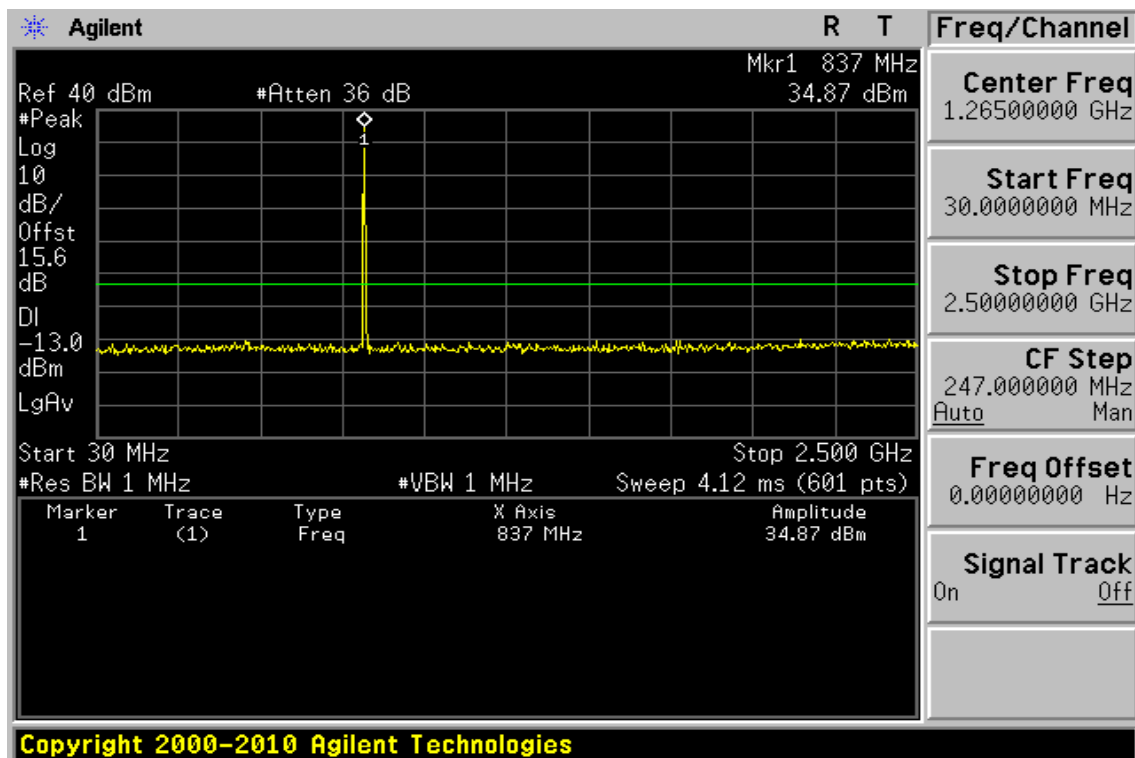
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Figure 8-12: Out of Band emission at antenna terminals – GPRS 850 Channel Mid



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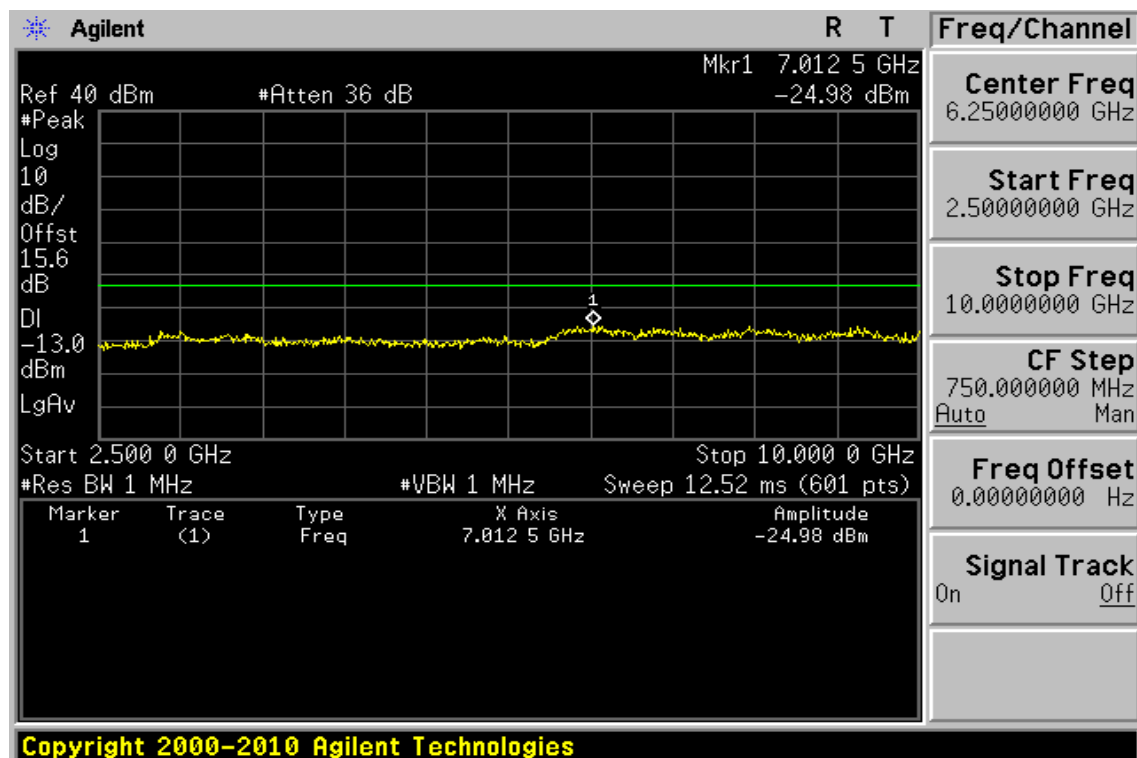
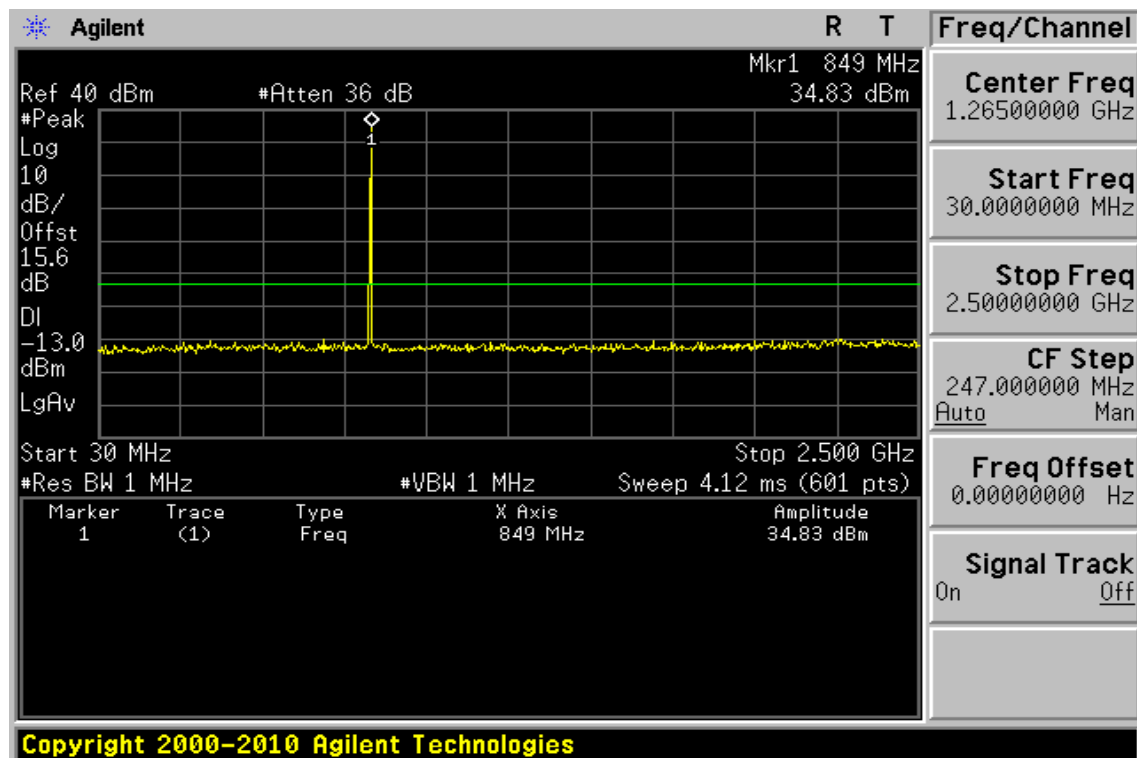
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Figure 8-13: Out of Band emission at antenna terminals – GPRS 850 Channel Highest



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Figure 8-14: Band edge emission at antenna terminals – GPRS 850 Channel Lowest

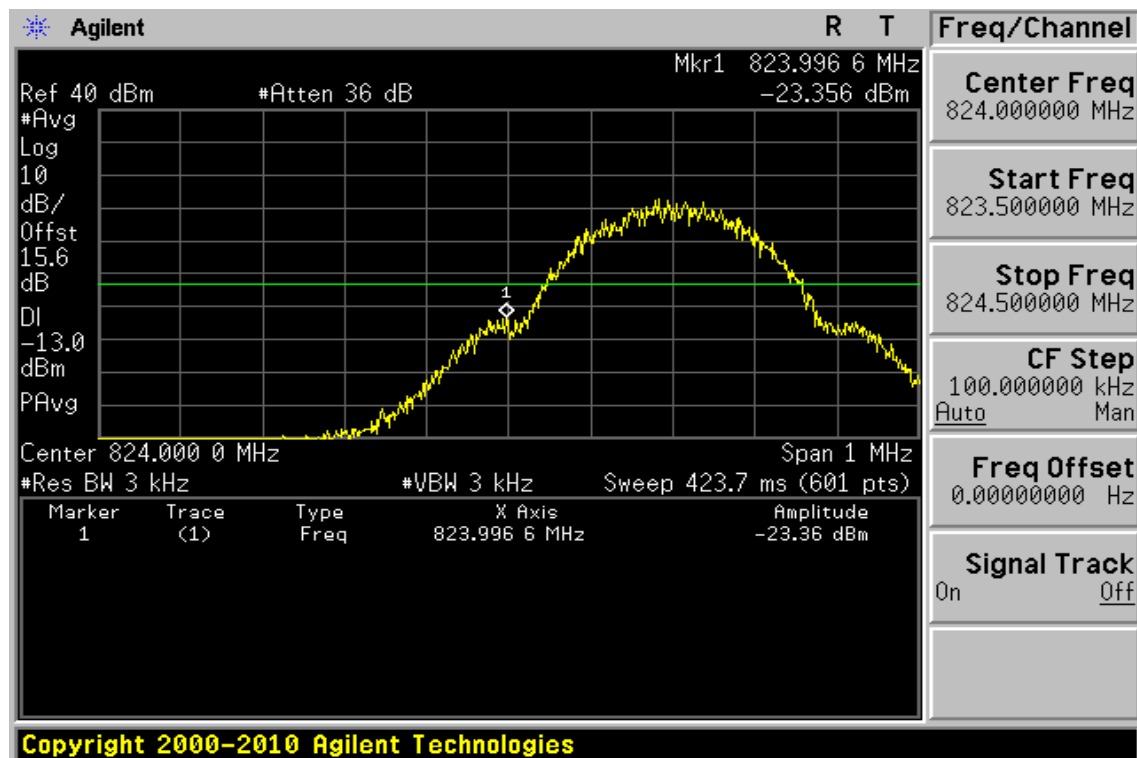
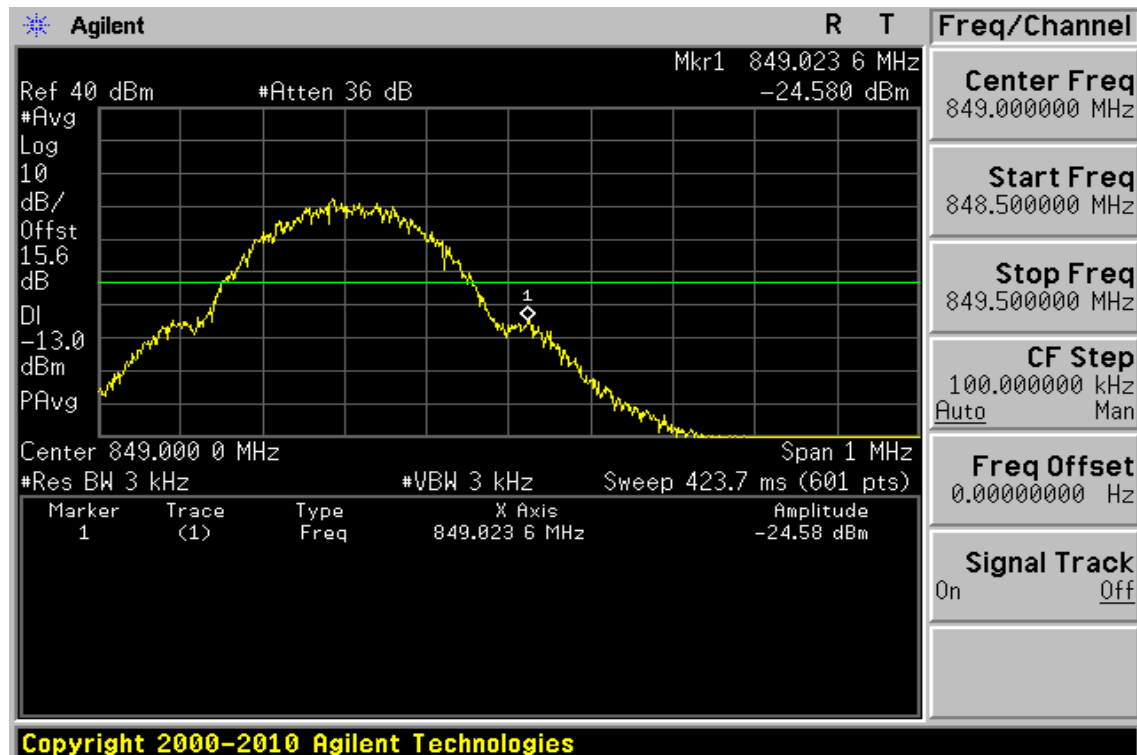


Figure 8-15: Band edge emission at antenna terminals – GPRS 850 Channel Highest



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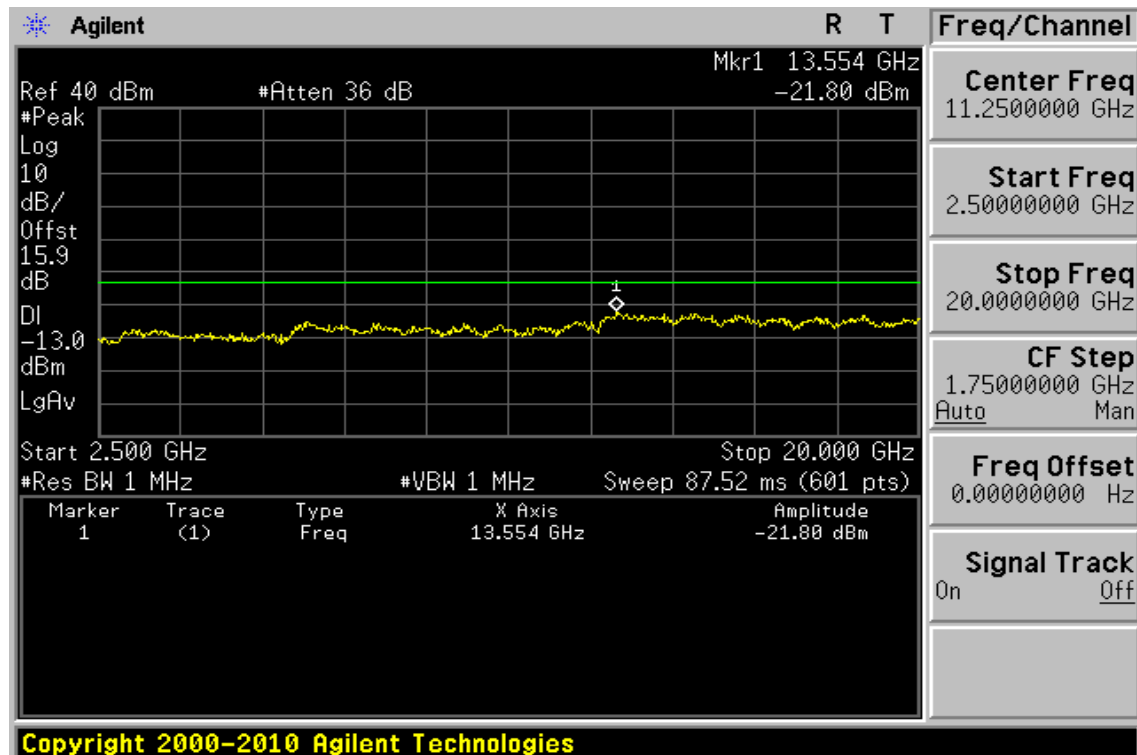
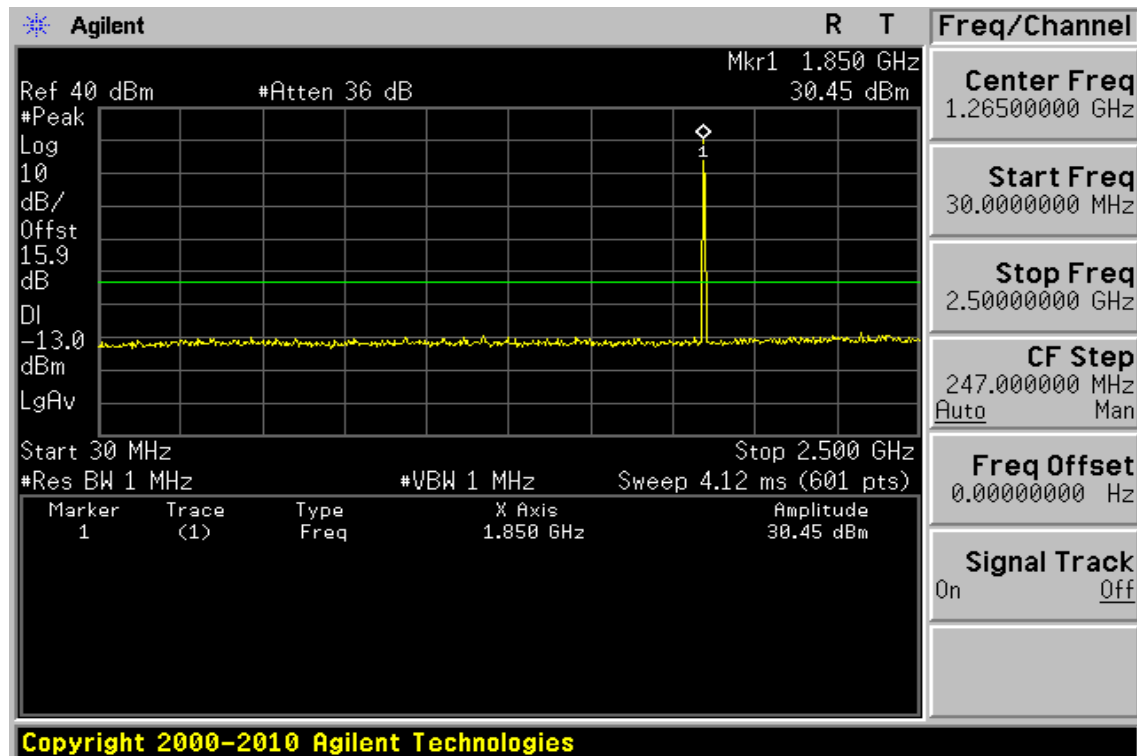
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Figure 8-16: Out of Band emission at antenna terminals – GPRS 1900 Channel Lowest



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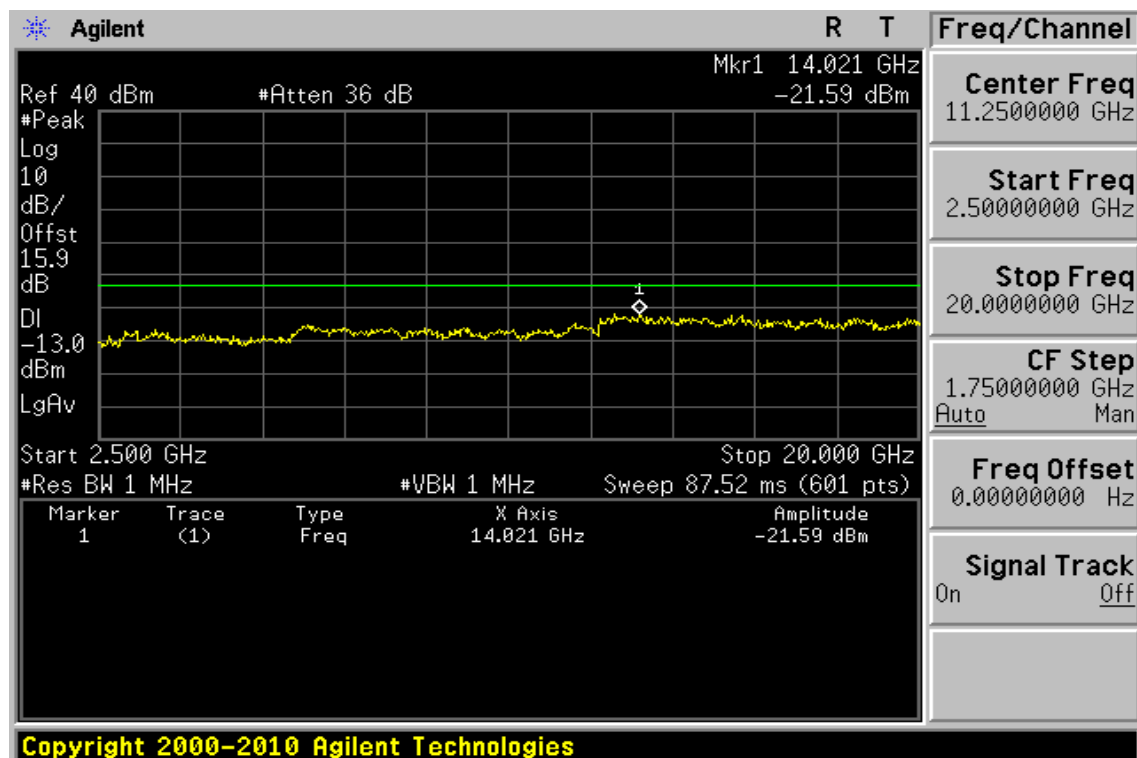
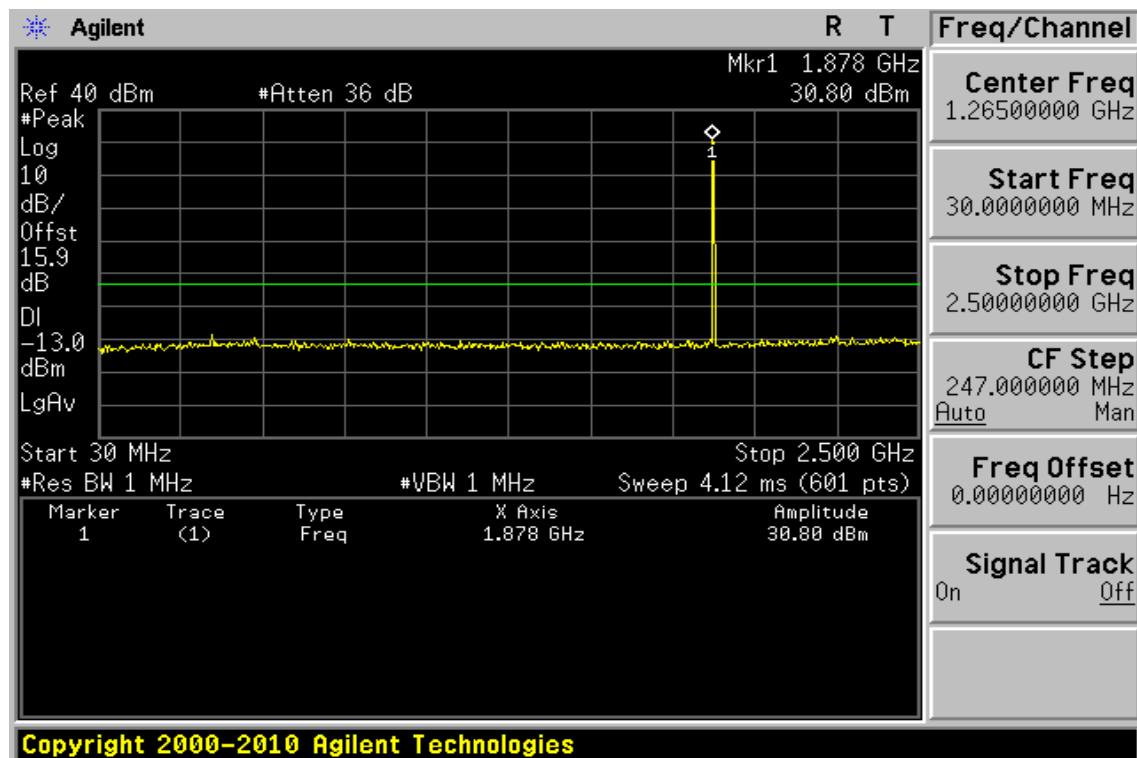
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Figure 8-17: Out of Band emission at antenna terminals – GPRS 1900 Channel Mid



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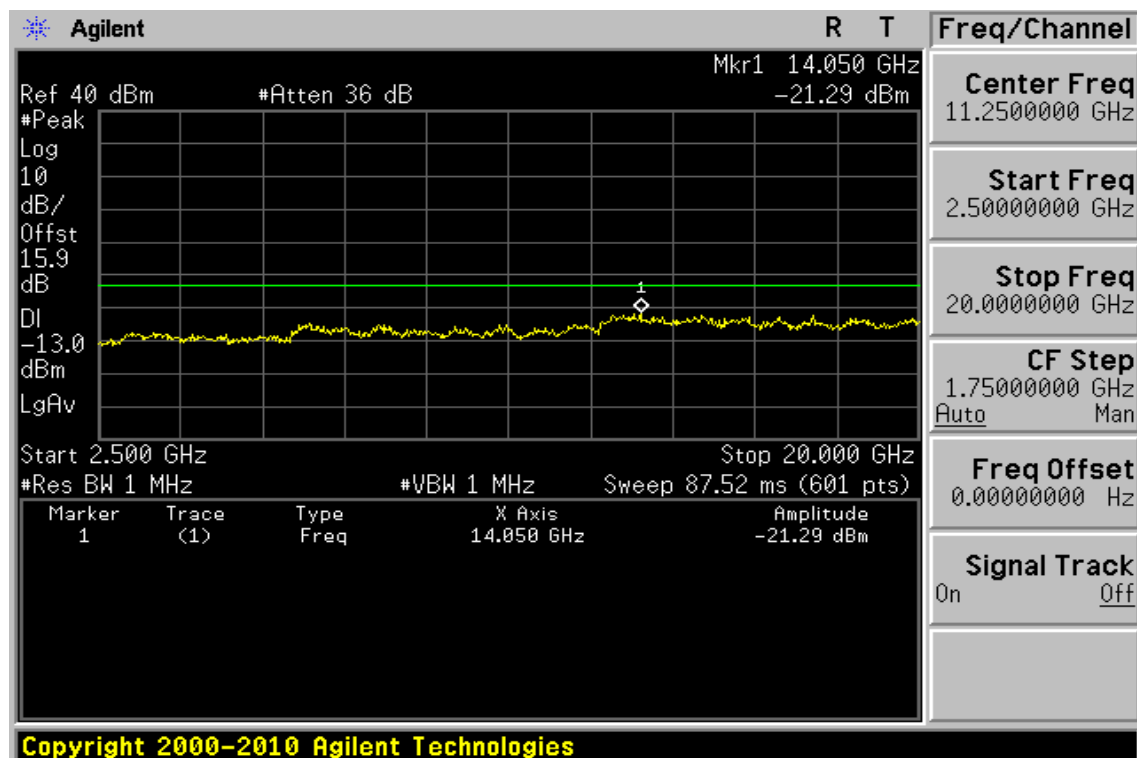
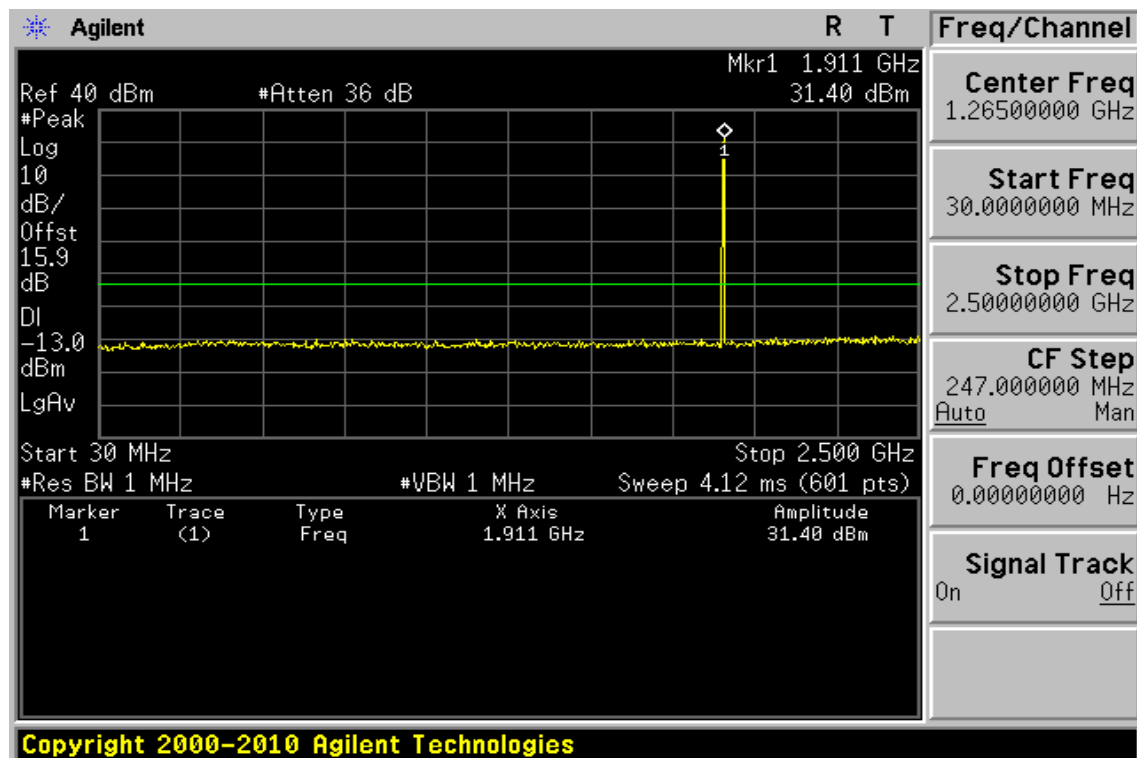
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Figure 8-18: Out of Band emission at antenna terminals – GPRS 1900 Channel Highest



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Figure 8-19: Band edge emission at antenna terminals – GPRS 1900 Channel Lowest

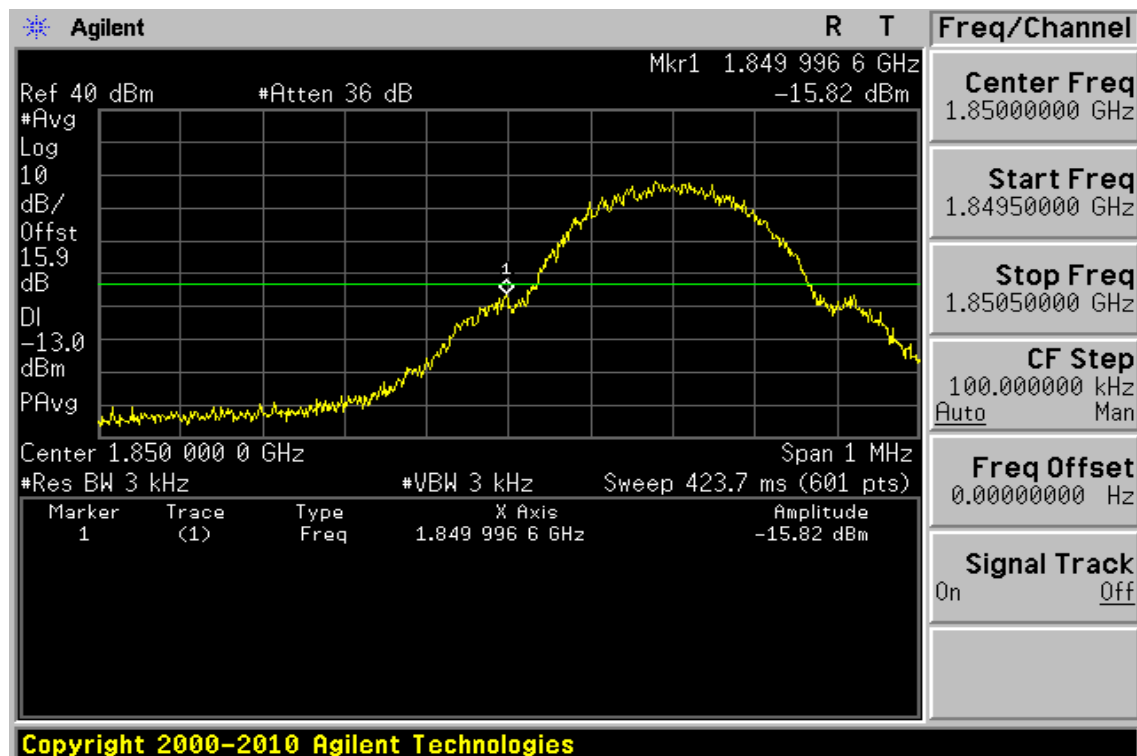
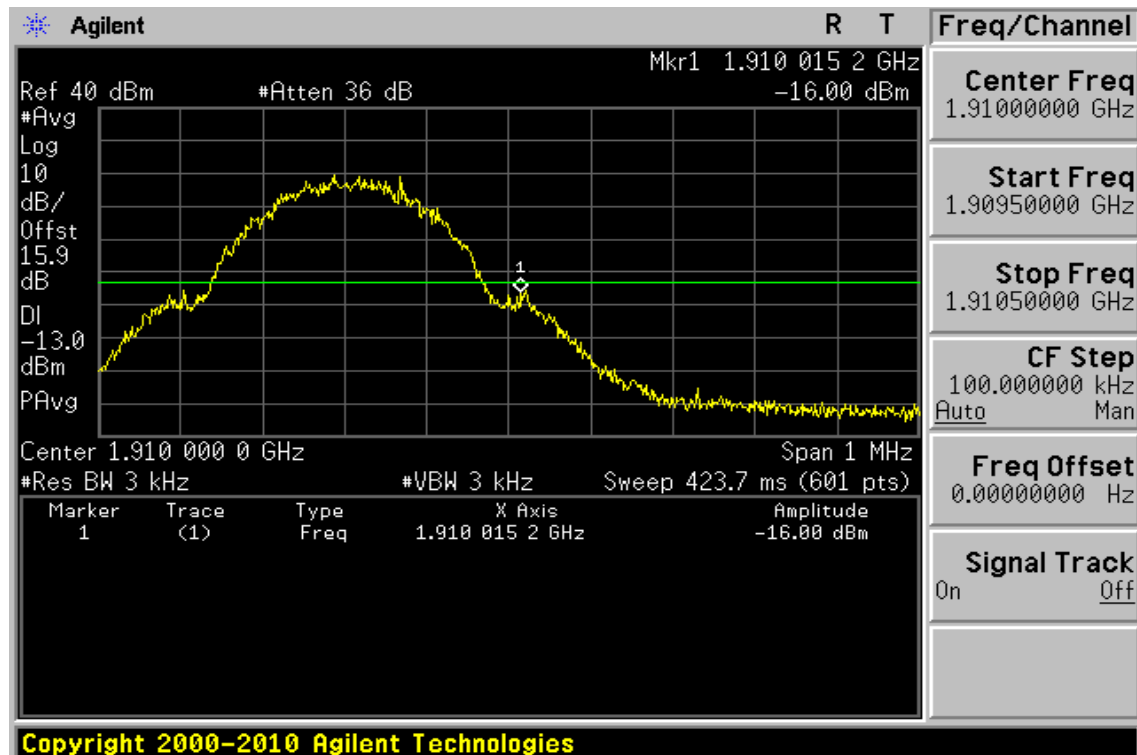


Figure 8-20: Band edge emission at antenna terminals – GPRS 1900 Channel Highest



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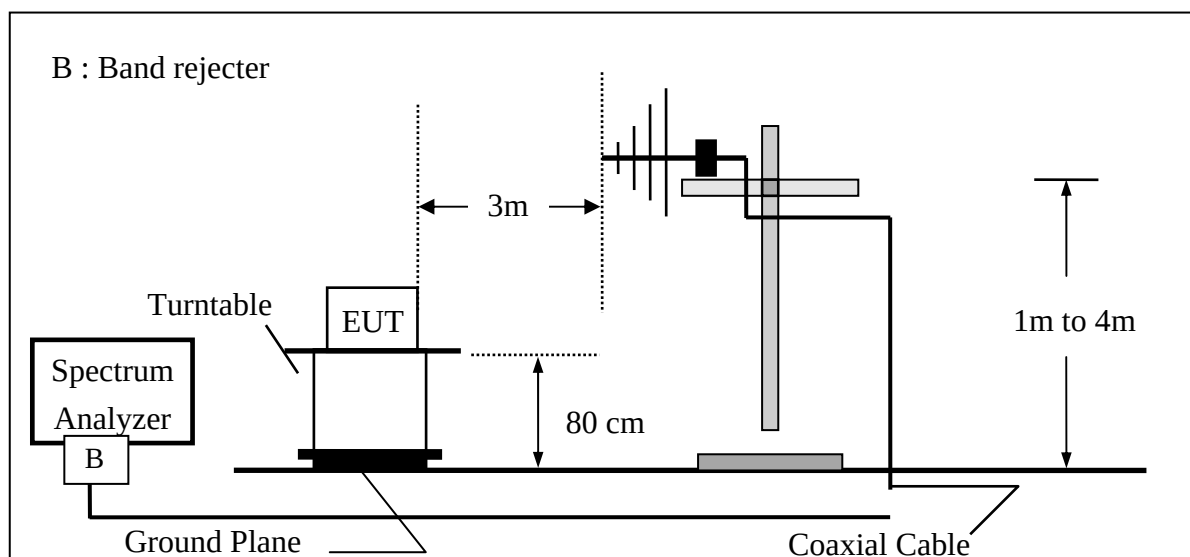
### 10.1. Standard Applicable:

According to FCC §2.1053,

FCC §22.917(a), §24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than  $43 + 10 \log$  (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

### 10.2. EUT Setup (Block Diagram of Configuration):

Radiated Emission Test Set-Up, Frequency Below 1000MHz



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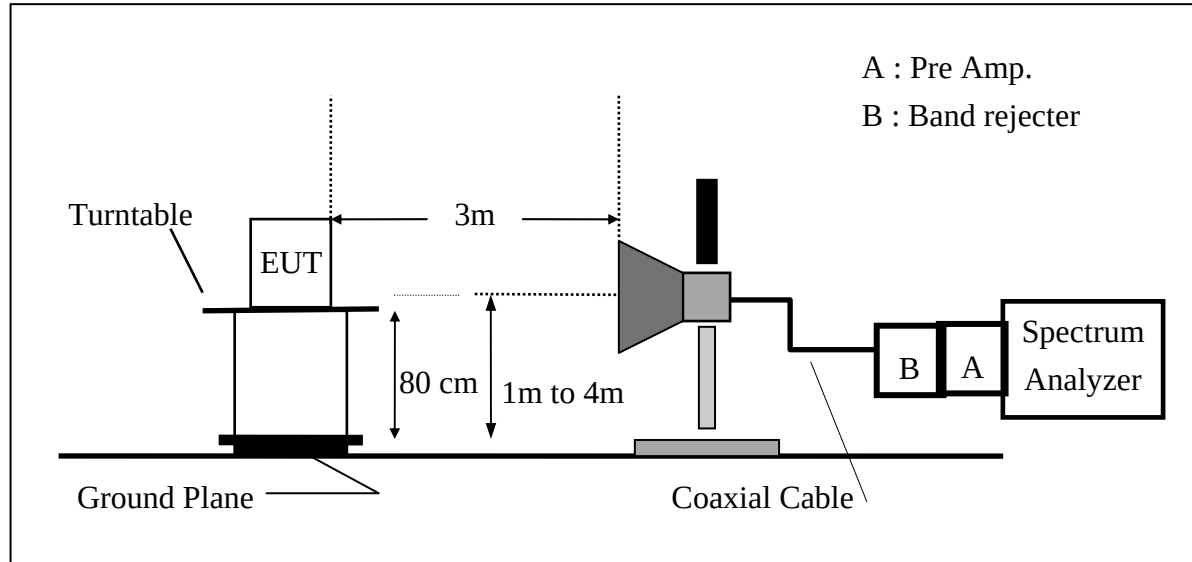
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### Radiated Emission Test Set-UP Frequency Over 1 GHz



### 10.3. Measurement Procedure:

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$ERP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$

$$EIRP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

### 10.4. Measurement Equipment Used:

Refer to section 2.4 in this report

### 10.5. Measurement Result:

Refer to attach tabular data sheets.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan / 台北縣五股工業區五工路 134 號

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# Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode : TX CH Low Mode

Test Date: July 19, 2011

Fundamental Frequency : 824.20 MHz

Test By: Nick

Temperature : 23°C

Pol: Ver

Humidity : 60%

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/ EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|-----------------|-------------|-------------------|
| 134.76      | 41.20               | V            | -57.50            | -7.79                 | 1.52            | -66.81          | -13.00      | -53.81            |
| 222.06      | 35.20               | V            | -65.75            | -7.86                 | 1.83            | -75.44          | -13.00      | -62.44            |
| 321.00      | 38.50               | V            | -59.49            | -7.80                 | 2.25            | -69.54          | -13.00      | -56.54            |
| 342.34      | 35.59               | V            | -62.13            | -7.68                 | 2.33            | -72.15          | -13.00      | -59.15            |
| 451.95      | 33.71               | V            | -60.23            | -7.70                 | 2.67            | -70.59          | -13.00      | -57.59            |
| 558.65      | 32.90               | V            | -59.08            | -7.77                 | 2.97            | -69.82          | -13.00      | -56.82            |
| 1648.40     | 49.03               | V            | -55.55            | 9.29                  | 5.23            | -51.49          | -13.00      | -38.49            |
| 2472.60     | ---                 | V            |                   | 10.08                 | 6.53            |                 | -13.00      |                   |
| 3296.80     | ---                 | V            |                   | 12.17                 | 7.71            |                 | -13.00      |                   |
| 4121.00     | ---                 | V            |                   | 12.61                 | 8.86            |                 | -13.00      |                   |
| 4945.20     | ---                 | V            |                   | 12.65                 | 9.74            |                 | -13.00      |                   |
| 5769.40     | 40.96               | V            | -49.24            | 13.55                 | 10.54           | -46.22          | -13.00      | -33.22            |
| 6593.60     | ---                 | V            |                   | 12.05                 | 11.30           |                 | -13.00      |                   |
| 7417.80     | ---                 | V            |                   | 11.49                 | 12.10           |                 | -13.00      |                   |
| 8242.00     | ---                 | V            |                   | 11.48                 | 12.71           |                 | -13.00      |                   |

## Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP \text{ (dBm)} = SG \text{ Setting (dBm)} + Antenna \text{ Gain (dB/dBi)} - Cable \text{ loss (dB)}$

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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f (886-2) 2298-0488

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Member of SGS Group

Operation Mode : TX CH Low Mode  
 Fundamental Frequency : 824.20 MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Hor

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/ EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|-----------------|-------------|-------------------|
| 167.74      | 40.11               | H            | -59.04            | -7.81                 | 1.63            | -68.48          | -13.00      | -55.48            |
| 196.84      | 43.43               | H            | -57.97            | -7.84                 | 1.70            | -67.51          | -13.00      | -54.51            |
| 245.34      | 35.89               | H            | -63.56            | -7.89                 | 1.96            | -73.41          | -13.00      | -60.41            |
| 332.64      | 35.17               | H            | -62.19            | -7.74                 | 2.29            | -72.22          | -13.00      | -59.22            |
| 645.95      | 33.03               | H            | -56.77            | -7.81                 | 3.15            | -67.73          | -13.00      | -54.73            |
| 707.06      | 34.71               | H            | -54.24            | -7.86                 | 3.32            | -65.42          | -13.00      | -52.42            |
| 1648.40     | 50.70               | H            | -53.70            | 9.29                  | 5.23            | -49.64          | -13.00      | -36.64            |
| 2472.60     | ---                 | H            |                   | 10.08                 | 6.53            |                 | -13.00      |                   |
| 3296.80     | ---                 | H            |                   | 12.17                 | 7.71            |                 | -13.00      |                   |
| 4121.00     | ---                 | H            |                   | 12.61                 | 8.86            |                 | -13.00      |                   |
| 4945.20     | ---                 | H            |                   | 12.65                 | 9.74            |                 | -13.00      |                   |
| 5769.40     | ---                 | H            |                   | 13.55                 | 10.54           |                 | -13.00      |                   |
| 6593.60     | ---                 | H            |                   | 12.05                 | 11.30           |                 | -13.00      |                   |
| 7417.80     | ---                 | H            |                   | 11.49                 | 12.10           |                 | -13.00      |                   |
| 8242.00     | ---                 | H            |                   | 11.48                 | 12.71           |                 | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dB/dBi) - Cable \text{ loss} (dB)$

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Operation Mode : TX CH Mid Mode  
 Fundamental Frequency : 836.60 MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Ver

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/ EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|-----------------|-------------|-------------------|
| 194.90      | 39.13               | V            | -62.19            | -7.84                 | 1.70            | -71.73          | -13.00      | -58.73            |
| 225.94      | 35.28               | V            | -65.52            | -7.87                 | 1.86            | -75.24          | -13.00      | -62.24            |
| 251.16      | 35.14               | V            | -64.71            | -7.89                 | 1.99            | -74.60          | -13.00      | -61.60            |
| 350.10      | 34.73               | V            | -62.90            | -7.64                 | 2.36            | -72.90          | -13.00      | -59.90            |
| 474.26      | 34.80               | V            | -59.23            | -7.71                 | 2.73            | -69.67          | -13.00      | -56.67            |
| 604.24      | 33.71               | V            | -55.80            | -7.79                 | 3.04            | -66.64          | -13.00      | -53.64            |
| 1673.20     | 47.33               | V            | -57.23            | 9.36                  | 5.27            | -53.13          | -13.00      | -40.13            |
| 2509.80     | 43.43               | V            | -57.35            | 10.09                 | 6.58            | -53.85          | -13.00      | -40.85            |
| 3346.40     | ---                 | V            |                   | 12.28                 | 7.79            |                 | -13.00      |                   |
| 4183.00     | 36.52               | V            | -59.37            | 12.62                 | 8.93            | -55.68          | -13.00      | -42.68            |
| 5019.60     | ---                 | V            |                   | 12.67                 | 9.81            |                 | -13.00      |                   |
| 5856.20     | ---                 | V            |                   | 13.68                 | 10.62           |                 | -13.00      |                   |
| 6692.80     | ---                 | V            |                   | 11.95                 | 11.39           |                 | -13.00      |                   |
| 7529.40     | ---                 | V            |                   | 11.45                 | 12.20           |                 | -13.00      |                   |
| 8366.00     | ---                 | V            |                   | 11.59                 | 12.81           |                 | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belongs to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP \text{ (dBm)} = SG \text{ Setting (dBm)} + Antenna \text{ Gain (dB/dBi)} - Cable \text{ loss (dB)}$

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Operation Mode : TX CH Mid Mode  
Fundamental Frequency : 836.60 MHz  
Temperature : 23°C  
Humidity : 60%

Test Date: July 19, 2011  
Test By: Nick  
Pol: Hor

| Freq.<br>(MHz) | SPA.<br>Reading<br>(dBuV) | Ant.Pol.<br>H/V | S.G Out-<br>put<br>(dBm) | Antenna<br>Gain<br>(dB/dBi) | Cable<br>Loss<br>(dB) | ERP/<br>EIRP<br>(dBm) | Limit<br>(dBm) | Safe<br>Margin<br>(dBm) |
|----------------|---------------------------|-----------------|--------------------------|-----------------------------|-----------------------|-----------------------|----------------|-------------------------|
| 190.05         | 41.77                     | H               | -59.11                   | -7.83                       | 1.69                  | -68.63                | -13.00         | -55.63                  |
| 212.36         | 40.63                     | H               | -60.42                   | -7.85                       | 1.78                  | -70.05                | -13.00         | -57.05                  |
| 245.34         | 34.16                     | H               | -65.29                   | -7.89                       | 1.96                  | -75.14                | -13.00         | -62.14                  |
| 280.26         | 35.99                     | H               | -62.29                   | -7.91                       | 2.10                  | -72.29                | -13.00         | -59.29                  |
| 306.45         | 36.04                     | H               | -61.56                   | -7.88                       | 2.19                  | -71.64                | -13.00         | -58.64                  |
| 561.56         | 35.02                     | H               | -56.46                   | -7.77                       | 2.98                  | -67.21                | -13.00         | -54.21                  |
| 1673.20        | 49.90                     | H               | -54.48                   | 9.36                        | 5.27                  | -50.38                | -13.00         | -37.38                  |
| 2509.80        | 40.21                     | H               | -60.49                   | 10.09                       | 6.58                  | -56.99                | -13.00         | -43.99                  |
| 3346.40        | ---                       | H               |                          | 12.28                       | 7.79                  |                       | -13.00         |                         |
| 4183.00        | ---                       | H               |                          | 12.62                       | 8.93                  |                       | -13.00         |                         |
| 5019.60        | ---                       | H               |                          | 12.67                       | 9.81                  |                       | -13.00         |                         |
| 5856.20        | 35.89                     | H               | -54.13                   | 13.68                       | 10.62                 | -51.07                | -13.00         | -38.07                  |
| 6692.80        | ---                       | H               |                          | 11.95                       | 11.39                 |                       | -13.00         |                         |
| 7529.40        | ---                       | H               |                          | 11.45                       | 12.20                 |                       | -13.00         |                         |
| 8366.00        | ---                       | H               |                          | 11.59                       | 12.81                 |                       | -13.00         |                         |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP \text{ (dBm)} = SG \text{ Setting (dBm)} + Antenna \text{ Gain (dB/dBi)} - Cable \text{ loss (dB)}$

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Operation Mode : TX CH High Mode  
 Fundamental Frequency : 848.80 MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Ver

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|----------------|-------------|-------------------|
| 180.35      | 35.30               | V            | -64.72            | -7.82                 | 1.66            | -74.20         | -13.00      | -61.20            |
| 202.66      | 39.21               | V            | -62.47            | -7.84                 | 1.72            | -72.04         | -13.00      | -59.04            |
| 238.55      | 34.44               | V            | -65.88            | -7.88                 | 1.93            | -75.69         | -13.00      | -62.69            |
| 296.75      | 34.95               | V            | -63.41            | -7.92                 | 2.16            | -73.48         | -13.00      | -60.48            |
| 350.10      | 35.94               | V            | -61.69            | -7.64                 | 2.36            | -71.69         | -13.00      | -58.69            |
| 584.84      | 33.85               | V            | -56.61            | -7.78                 | 3.01            | -67.40         | -13.00      | -54.40            |
| 1697.60     | 46.64               | V            | -57.90            | 9.44                  | 5.31            | -53.77         | -13.00      | -40.77            |
| 2546.40     | 44.87               | V            | -55.77            | 10.20                 | 6.63            | -52.21         | -13.00      | -39.21            |
| 3395.20     | ---                 | V            |                   | 12.38                 | 7.87            |                | -13.00      |                   |
| 4244.00     | ---                 | V            |                   | 12.63                 | 9.00            |                | -13.00      |                   |
| 5092.80     | ---                 | V            |                   | 12.74                 | 9.88            |                | -13.00      |                   |
| 5941.60     | 47.62               | V            | -42.07            | 13.81                 | 10.70           | -38.96         | -13.00      | -25.96            |
| 6790.40     | 44.80               | V            | -39.73            | 11.86                 | 11.48           | -39.36         | -13.00      | -26.36            |
| 7639.20     | ---                 | V            |                   | 11.40                 | 12.27           |                | -13.00      |                   |
| 8488.00     | ---                 | V            |                   | 11.70                 | 12.91           |                | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
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- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dB/dBi) - Cable \text{ loss} (dB)$

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Operation Mode : TX CH High Mode  
 Fundamental Frequency : 848.80 MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Hor

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|----------------|-------------|-------------------|
| 185.20      | 37.88               | H            | -62.62            | -7.83                 | 1.67            | -72.12         | -13.00      | -59.12            |
| 214.30      | 47.92               | H            | -53.04            | -7.85                 | 1.79            | -62.68         | -13.00      | -49.68            |
| 222.06      | 39.37               | H            | -61.21            | -7.86                 | 1.83            | -70.90         | -13.00      | -57.90            |
| 306.45      | 37.13               | H            | -60.47            | -7.88                 | 2.19            | -70.55         | -13.00      | -57.55            |
| 350.10      | 34.26               | H            | -62.94            | -7.64                 | 2.36            | -72.94         | -13.00      | -59.94            |
| 503.36      | 33.33               | H            | -60.00            | -7.72                 | 2.81            | -70.54         | -13.00      | -57.54            |
| 1697.60     | 44.53               | H            | -59.82            | 9.44                  | 5.31            | -55.69         | -13.00      | -42.69            |
| 2546.40     | 42.69               | H            | -57.91            | 10.20                 | 6.63            | -54.35         | -13.00      | -41.35            |
| 3395.20     | ---                 | H            |                   | 12.38                 | 7.87            |                | -13.00      |                   |
| 4244.00     | ---                 | H            |                   | 12.63                 | 9.00            |                | -13.00      |                   |
| 5092.80     | ---                 | H            |                   | 12.74                 | 9.88            |                | -13.00      |                   |
| 5941.60     | 44.84               | H            | -44.90            | 13.81                 | 10.70           | -41.79         | -13.00      | -28.79            |
| 6790.40     | 48.28               | H            | -36.24            | 11.86                 | 11.48           | -35.87         | -13.00      | -22.87            |
| 7639.20     | ---                 | H            |                   | 11.40                 | 12.27           |                | -13.00      |                   |
| 8488.00     | ---                 | H            |                   | 11.70                 | 12.91           |                | -13.00      |                   |

Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dB/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GSM 1900 Mode**

Operation Mode : TX CH Low Mode

Test Date: July 19, 2011

Fundamental Frequency : 1850.20MHz

Test By: Nick

Temperature : 23°C

Pol: Ver

Humidity : 60%

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|----------------|-------------|-------------------|
| 199.75      | 41.76               | V            | -60.00            | -7.84                 | 1.71            | -69.55         | -13.00      | -56.55            |
| 216.24      | 44.84               | V            | -56.33            | -7.86                 | 1.80            | -65.98         | -13.00      | -52.98            |
| 253.10      | 35.20               | V            | -64.59            | -7.89                 | 2.00            | -74.48         | -13.00      | -61.48            |
| 330.70      | 35.53               | V            | -62.34            | -7.75                 | 2.29            | -72.37         | -13.00      | -59.37            |
| 348.16      | 39.73               | V            | -57.92            | -7.65                 | 2.35            | -67.93         | -13.00      | -54.93            |
| 542.16      | 33.16               | V            | -59.59            | -7.75                 | 2.93            | -70.28         | -13.00      | -57.28            |
| 3700.40     | ---                 | V            |                   | 12.61                 | 8.31            |                | -13.00      |                   |
| 5550.60     | ---                 | V            |                   | 13.23                 | 10.33           |                | -13.00      |                   |
| 7400.80     | 37.59               | V            | -43.65            | 11.50                 | 12.08           | -44.23         | -13.00      | -31.23            |
| 9251.00     | ---                 | V            |                   | 11.92                 | 13.50           |                | -13.00      |                   |
| 11101.20    | ---                 | V            |                   | 11.66                 | 15.11           |                | -13.00      |                   |
| 12951.40    | ---                 | V            |                   | 13.63                 | 16.60           |                | -13.00      |                   |
| 14801.60    | ---                 | V            |                   | 12.76                 | 17.95           |                | -13.00      |                   |
| 16651.80    | ---                 | V            |                   | 15.92                 | 19.14           |                | -13.00      |                   |
| 18502.00    | ---                 | V            |                   | 18.75                 | 10.40           |                | -13.00      |                   |

**Remark:**

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dB/dBi) - Cable \text{ loss} (dB)$

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Operation Mode : TX CH Low Mode  
 Fundamental Frequency : 1850.20MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Hor

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|----------------|-------------|-------------------|
| 199.75      | 48.55               | H            | -53.08            | -7.84                 | 1.71            | -62.63         | -13.00      | -49.63            |
| 216.24      | 40.56               | H            | -60.30            | -7.86                 | 1.80            | -69.96         | -13.00      | -56.96            |
| 322.94      | 39.02               | H            | -58.43            | -7.79                 | 2.26            | -68.48         | -13.00      | -55.48            |
| 419.94      | 35.05               | H            | -60.37            | -7.68                 | 2.57            | -70.61         | -13.00      | -57.61            |
| 580.96      | 34.16               | H            | -56.93            | -7.78                 | 3.00            | -67.71         | -13.00      | -54.71            |
| 658.56      | 32.91               | H            | -56.45            | -7.82                 | 3.18            | -67.45         | -13.00      | -54.45            |
| 3700.40     | 34.17               | H            | -63.87            | 12.61                 | 8.31            | -59.57         | -13.00      | -46.57            |
| 5550.60     | ---                 | H            |                   | 13.23                 | 10.33           |                | -13.00      |                   |
| 7400.80     | ---                 | H            |                   | 11.50                 | 12.08           |                | -13.00      |                   |
| 9251.00     | ---                 | H            |                   | 11.92                 | 13.50           |                | -13.00      |                   |
| 11101.20    | ---                 | H            |                   | 11.66                 | 15.11           |                | -13.00      |                   |
| 12951.40    | ---                 | H            |                   | 13.63                 | 16.60           |                | -13.00      |                   |
| 14801.60    | ---                 | H            |                   | 12.76                 | 17.95           |                | -13.00      |                   |
| 16651.80    | ---                 | H            |                   | 15.92                 | 19.14           |                | -13.00      |                   |
| 18502.00    | ---                 | H            |                   | 18.75                 | 10.40           |                | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dB/dBi) - Cable \text{ loss} (dB)$

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Operation Mode : TX CH Mid Mode  
 Fundamental Frequency : 1880MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Ver

| Freq.<br>(MHz) | SPA.<br>Reading<br>(dBuV) | Ant.Pol.<br>H/V | S.G Out-<br>put<br>(dBm) | Antenna<br>Gain<br>(dB/dBi) | Cable<br>Loss<br>(dB) | ERP/<br>EIRP<br>(dBm) | Limit<br>(dBm) | Safe<br>Margin<br>(dBm) |
|----------------|---------------------------|-----------------|--------------------------|-----------------------------|-----------------------|-----------------------|----------------|-------------------------|
| 146.40         | 35.98                     | V               | -61.64                   | -7.80                       | 1.57                  | -71.01                | -13.00         | -58.01                  |
| 196.84         | 37.70                     | V               | -63.80                   | -7.84                       | 1.70                  | -73.34                | -13.00         | -60.34                  |
| 225.94         | 35.97                     | V               | -64.83                   | -7.87                       | 1.86                  | -74.55                | -13.00         | -61.55                  |
| 251.16         | 34.36                     | V               | -65.49                   | -7.89                       | 1.99                  | -75.38                | -13.00         | -62.38                  |
| 377.26         | 33.99                     | V               | -62.48                   | -7.65                       | 2.44                  | -72.57                | -13.00         | -59.57                  |
| 515.00         | 34.42                     | V               | -59.23                   | -7.73                       | 2.85                  | -69.81                | -13.00         | -56.81                  |
| 3760.00        | 33.27                     | V               | -64.39                   | 12.60                       | 8.39                  | -60.17                | -13.00         | -47.17                  |
| 5640.00        | ---                       | V               |                          | 13.36                       | 10.41                 |                       | -13.00         |                         |
| 7520.00        | ---                       | V               |                          | 11.45                       | 12.19                 |                       | -13.00         |                         |
| 9400.00        | ---                       | V               |                          | 11.93                       | 13.61                 |                       | -13.00         |                         |
| 11280.00       | ---                       | V               |                          | 11.92                       | 15.27                 |                       | -13.00         |                         |
| 13160.00       | ---                       | V               |                          | 13.33                       | 16.71                 |                       | -13.00         |                         |
| 15040.00       | ---                       | V               |                          | 13.76                       | 18.15                 |                       | -13.00         |                         |
| 16920.00       | ---                       | V               |                          | 15.27                       | 19.32                 |                       | -13.00         |                         |
| 18800.00       | ---                       | V               |                          | 18.68                       | 16.58                 |                       | -13.00         |                         |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP \text{ (dBm)} = SG \text{ Setting (dBm)} + Antenna \text{ Gain (dB/dBi)} - Cable \text{ loss (dB)}$

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Operation Mode : TX CH Mid Mode  
 Fundamental Frequency : 1880MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Hor

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/ EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|-----------------|-------------|-------------------|
| 185.20      | 41.49               | H            | -59.01            | -7.83                 | 1.67            | -68.51          | -13.00      | -55.51            |
| 202.66      | 44.45               | H            | -57.07            | -7.84                 | 1.72            | -66.64          | -13.00      | -53.64            |
| 222.06      | 35.21               | H            | -65.37            | -7.86                 | 1.83            | -75.06          | -13.00      | -62.06            |
| 328.76      | 37.07               | H            | -60.33            | -7.76                 | 2.28            | -70.36          | -13.00      | -57.36            |
| 563.50      | 34.89               | H            | -56.55            | -7.77                 | 2.98            | -67.30          | -13.00      | -54.30            |
| 655.65      | 32.75               | H            | -56.73            | -7.82                 | 3.17            | -67.72          | -13.00      | -54.72            |
| 3760.00     | 33.13               | H            | -64.64            | 12.60                 | 8.39            | -60.43          | -13.00      | -47.43            |
| 5640.00     | ---                 | H            |                   | 13.36                 | 10.41           |                 | -13.00      |                   |
| 7520.00     | ---                 | H            |                   | 11.45                 | 12.19           |                 | -13.00      |                   |
| 9400.00     | ---                 | H            |                   | 11.93                 | 13.61           |                 | -13.00      |                   |
| 11280.00    | ---                 | H            |                   | 11.92                 | 15.27           |                 | -13.00      |                   |
| 13160.00    | ---                 | H            |                   | 13.33                 | 16.71           |                 | -13.00      |                   |
| 15040.00    | ---                 | H            |                   | 13.76                 | 18.15           |                 | -13.00      |                   |
| 16920.00    | ---                 | H            |                   | 15.27                 | 19.32           |                 | -13.00      |                   |
| 18800.00    | ---                 | H            |                   | 18.68                 | 16.58           |                 | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP \text{ (dBm)} = SG \text{ Setting (dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$

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Operation Mode : TX CH High Mode  
 Fundamental Frequency : 1909.8 MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Ver

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/ EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|-----------------|-------------|-------------------|
| 144.46      | 38.18               | V            | -59.62            | -7.80                 | 1.56            | -68.98          | -13.00      | -55.98            |
| 199.75      | 40.29               | V            | -61.47            | -7.84                 | 1.71            | -71.02          | -13.00      | -58.02            |
| 238.55      | 36.02               | V            | -64.30            | -7.88                 | 1.93            | -74.11          | -13.00      | -61.11            |
| 262.80      | 38.33               | V            | -61.14            | -7.90                 | 2.04            | -71.07          | -13.00      | -58.07            |
| 330.70      | 33.55               | V            | -64.32            | -7.75                 | 2.29            | -74.35          | -13.00      | -61.35            |
| 544.10      | 38.21               | V            | -54.47            | -7.76                 | 2.94            | -65.17          | -13.00      | -52.17            |
| 3819.60     | 35.67               | V            | -61.72            | 12.60                 | 8.47            | -57.59          | -13.00      | -44.59            |
| 5729.40     | ---                 | V            |                   | 13.49                 | 10.50           |                 | -13.00      |                   |
| 7639.20     | ---                 | V            |                   | 11.40                 | 12.27           |                 | -13.00      |                   |
| 9549.00     | ---                 | V            |                   | 11.95                 | 13.74           |                 | -13.00      |                   |
| 11458.80    | ---                 | V            |                   | 12.17                 | 15.43           |                 | -13.00      |                   |
| 13368.60    | ---                 | V            |                   | 12.97                 | 16.82           |                 | -13.00      |                   |
| 15278.40    | ---                 | V            |                   | 15.00                 | 18.29           |                 | -13.00      |                   |
| 17188.20    | ---                 | V            |                   | 14.47                 | 19.52           |                 | -13.00      |                   |
| 19098.00    | ---                 | V            |                   | 18.66                 | 20.78           |                 | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP \text{ (dBm)} = SG \text{ Setting (dBm)} + \text{Antenna Gain (dB/dBi)} - \text{Cable loss (dB)}$

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Operation Mode : TX CH High Mode  
 Fundamental Frequency : 1909.8 MHz  
 Temperature : 23°C  
 Humidity : 60%

Test Date: July 19, 2011  
 Test By: Nick  
 Pol: Hor

| Freq. (MHz) | SPA. Reading (dBuV) | Ant.Pol. H/V | S.G Out-put (dBm) | Antenna Gain (dB/dBi) | Cable Loss (dB) | ERP/EIRP (dBm) | Limit (dBm) | Safe Margin (dBm) |
|-------------|---------------------|--------------|-------------------|-----------------------|-----------------|----------------|-------------|-------------------|
| 199.75      | 47.02               | H            | -54.61            | -7.84                 | 1.71            | -64.16         | -13.00      | -51.16            |
| 235.64      | 35.96               | H            | -63.96            | -7.88                 | 1.91            | -73.74         | -13.00      | -60.74            |
| 299.66      | 38.92               | H            | -58.75            | -7.92                 | 2.17            | -68.84         | -13.00      | -55.84            |
| 388.90      | 34.36               | H            | -62.24            | -7.66                 | 2.48            | -72.37         | -13.00      | -59.37            |
| 419.94      | 34.30               | H            | -61.12            | -7.68                 | 2.57            | -71.36         | -13.00      | -58.36            |
| 613.94      | 33.41               | H            | -57.02            | -7.80                 | 3.07            | -67.88         | -13.00      | -54.88            |
| 3819.60     | 40.18               | H            | -57.33            | 12.60                 | 8.47            | -53.19         | -13.00      | -40.19            |
| 5729.40     | ---                 | H            |                   | 13.49                 | 10.50           |                | -13.00      |                   |
| 7639.20     | ---                 | H            |                   | 11.40                 | 12.27           |                | -13.00      |                   |
| 9549.00     | ---                 | H            |                   | 11.95                 | 13.74           |                | -13.00      |                   |
| 11458.80    | ---                 | H            |                   | 12.17                 | 15.43           |                | -13.00      |                   |
| 13368.60    | ---                 | H            |                   | 12.97                 | 16.82           |                | -13.00      |                   |
| 15278.40    | ---                 | H            |                   | 15.00                 | 18.29           |                | -13.00      |                   |
| 17188.20    | ---                 | H            |                   | 14.47                 | 19.52           |                | -13.00      |                   |
| 19098.00    | ---                 | H            |                   | 18.66                 | 20.78           |                | -13.00      |                   |

#### Remark:

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark “---” means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dB/dBi) - Cable \text{ loss} (dB)$

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## 11. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

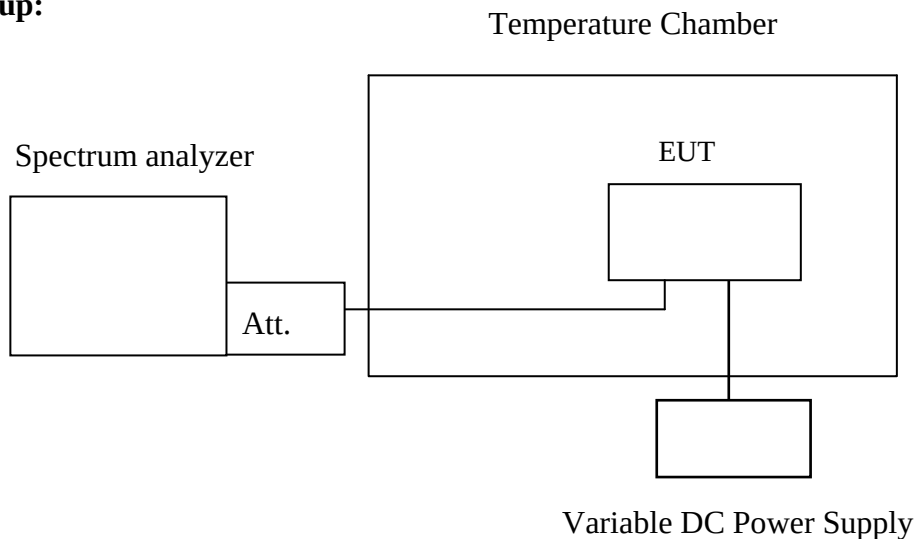
### 11.1. Standard Applicable:

According to FCC §2.1055(a) (1)

Frequency Tolerance:  $\pm 2.5$ ppm for 850MHz band

$\pm 2.5$ ppm for 1900MHz band

### 11.2. Test Set-up:



**Note :** Measurement setup for testing on Antenna connector

### 11.3. Measurement Procedure:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

### 11.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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### 11.5. Measurement Result:

| Reference Frequency: GPRS 850 Mid Channel 836.6 MHz @ 25°C |                  |            |            |            |
|------------------------------------------------------------|------------------|------------|------------|------------|
| Limit: +/- 2.5 ppm = 2091 Hz                               |                  |            |            |            |
| Power Supply                                               | Environment      | Frequency  | Delta (Hz) | Limit (Hz) |
| Vdc                                                        | Temperature (°C) | (MHz)      |            |            |
| 3.8                                                        | -10              | 836.600009 | -12.00     | 2091       |
| 3.8                                                        | 0                | 836.600013 | -16.00     | 2091       |
| 3.8                                                        | 10               | 836.600005 | -8.00      | 2091       |
| 3.8                                                        | 20               | 836.599995 | 2.00       | 2091       |
| 3.8                                                        | 30               | 836.599997 | 0.00       | 2091       |
| 3.8                                                        | 40               | 836.599993 | 4.00       | 2091       |
| 3.8                                                        | 50               | 836.599990 | 7.00       | 2091       |
| 3.8                                                        | 55               | 836.599987 | 10.00      | 2091       |

| Reference Frequency: GPRS 1900 Mid Channel 1880 MHz @ 20°C |                  |             |            |            |
|------------------------------------------------------------|------------------|-------------|------------|------------|
| Limit: +/- 2.5 ppm = 4700 Hz                               |                  |             |            |            |
| Power Supply                                               | Environment      | Frequency   | Delta (Hz) | Limit (Hz) |
| Vdc                                                        | Temperature (°C) | (MHz)       |            |            |
| 3.8                                                        | -10              | 1880.000001 | -10.10     | 4700       |
| 3.8                                                        | 0                | 1880.000007 | -16.00     | 4700       |
| 3.8                                                        | 10               | 1880.000012 | -21.00     | 4700       |
| 3.8                                                        | 20               | 1879.999951 | 40.00      | 4700       |
| 3.8                                                        | 30               | 1879.999991 | 0.00       | 4700       |
| 3.8                                                        | 40               | 1880.000008 | -17.00     | 4700       |
| 3.8                                                        | 50               | 1880.000016 | -25.00     | 4700       |
| 3.8                                                        | 50               | 1880.000027 | -36.00     | 4700       |

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## 12. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

### 12.1. Standard Applicable:

According to FCC §2.1055(a) (1)

Frequency Tolerance:  $\pm 2.5$ ppm for 850MHz band

$\pm 2.5$ ppm for 1900MHz band

According to RSS-133 §6.3, RSS-132 §4.3

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

### 12.2. Test Set-up:

Refer to section 10.2 in this report

### 12.3. Measurement Procedure:

Set chamber temperature to 25°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specified extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

### 12.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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**12.5. Measurement Result:**

| Reference Frequency: GPRS 850 Mid Channel 836.6 MHz @ 25°C |                  |            |            |            |
|------------------------------------------------------------|------------------|------------|------------|------------|
| Limit: +/- 2.5 ppm = 2091 Hz                               |                  |            |            |            |
| Power Supply                                               | Environment      | Frequency  | Delta (Hz) | Limit (Hz) |
| Vdc                                                        | Temperature (°C) | (MHz)      |            |            |
| 4.2                                                        | 25               | 836.599990 | 5.00       | 2091       |
| 3.8                                                        | 25               | 836.599995 | 0.00       | 2091       |
| 3.5                                                        | 25               | 836.599978 | 17.00      | 2091       |
| 3.0<br>(End Point)                                         | 25               | 836.599973 | 22.00      | 2091       |

| Reference Frequency: GPRS 1900 Mid Channel 1880 MHz @ 25°C |                  |             |            |            |
|------------------------------------------------------------|------------------|-------------|------------|------------|
| Limit: +/- 2.5 ppm = 4700 Hz                               |                  |             |            |            |
| Power Supply                                               | Environment      | Frequency   | Delta (Hz) | Limit (Hz) |
| Vdc                                                        | Temperature (°C) | (MHz)       |            |            |
| 4.2                                                        | 25               | 1879.999953 | -2.00      | 4700       |
| 3.8                                                        | 25               | 1879.999951 | 0.00       | 4700       |
| 3.5                                                        | 25               | 1879.999960 | -9.00      | 4700       |
| 3.0<br>(End Point)                                         | 25               | 1879.999991 | -40.00     | 4700       |

~ End of Report ~

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