

FCC TEST REPORT  
For  
TOPTEN ELECTRONICS TECHNOLOGY LIMITED

OBD-II GPS Tracker  
Model No.: TK228, TK228S, TK218, TK218S, TK208, TK208S

Prepared for : TOPTEN ELECTRONICS TECHNOLOGY LIMITED  
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## TEST REPORT

Applicant : TOPTEN ELECTRONICS TECHNOLOGY LIMITED  
Manufacturer : Guangzhou Topten Electronics Factory  
EUT : OBD-II GPS Tracker  
Model No. : TK228, TK228S, TK218, TK218S, TK208, TK208S  
Serial No. : N.A.  
Trade Mark : TOPTEN  
Rating : Input DC 12V

Measurement Procedure Used:

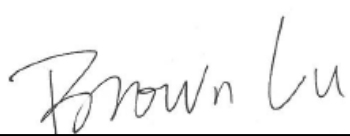
### **FCC Part 2, FCC Part 22 Subpart H, FCC Part 24 Subpart E, ANSI/TIA 603-D (2010)**

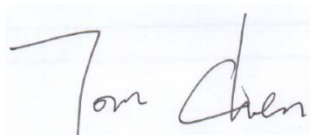
The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 22(H):2016; FCC Part 24(E):2016 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Mar. 07~Apr.10, 2017

Prepared by :    
(Test Engineer / Kyle Xu)

Reviewer :   
(Project Manager / Brown Lu)

Approved & Authorized Signer :   
(Manager/ Tom Chen)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

| EUT                  | : OBD-II GPS Tracker                                                                                                                                                                                            |                 |                     |           |                                                    |        |              |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------|-----------|----------------------------------------------------|--------|--------------|
| Model Number         | : TK228, TK228S, TK218, TK218S, TK208, TK208S(Note: All samples are the same except the model number and colour, so we prepare “TK228” for test only.)                                                          |                 |                     |           |                                                    |        |              |
| Test Voltage         | : DC 12V                                                                                                                                                                                                        |                 |                     |           |                                                    |        |              |
| Frequency Bands:     | <table><tr><th>Types of module</th><th>Operating Frequency</th></tr><tr><td>WCDMA/GSM</td><td>GSM850 ,PCS1900 ,UMTS FDD Band II, UMTS FDD Band V</td></tr><tr><td>BT 4.0</td><td>2402-2480MHz</td></tr></table> | Types of module | Operating Frequency | WCDMA/GSM | GSM850 ,PCS1900 ,UMTS FDD Band II, UMTS FDD Band V | BT 4.0 | 2402-2480MHz |
| Types of module      | Operating Frequency                                                                                                                                                                                             |                 |                     |           |                                                    |        |              |
| WCDMA/GSM            | GSM850 ,PCS1900 ,UMTS FDD Band II, UMTS FDD Band V                                                                                                                                                              |                 |                     |           |                                                    |        |              |
| BT 4.0               | 2402-2480MHz                                                                                                                                                                                                    |                 |                     |           |                                                    |        |              |
| Modulation Type:     | : GSM / GPRS: GMSK<br>EGPRS: GMSK, 8PSK<br>UMTS-FDD: QPSK, 16QAM<br>BT 4.0: GFSK                                                                                                                                |                 |                     |           |                                                    |        |              |
| Antenna Type         | : WCDMA/GSM: FPCB Antenna<br>BT 4.0: PCB Antenna                                                                                                                                                                |                 |                     |           |                                                    |        |              |
| Antenna Gain         | : WCDMA/GSM: 1.0 dBi<br>BT 4.0: 1.0 dBi                                                                                                                                                                         |                 |                     |           |                                                    |        |              |
| Applicant Address    | : TOPTEN ELECTRONICS TECHNOLOGY LIMITED<br>5/F, Building B, No.3, Tangdong Guangtang West Rd., Tianhe District, Guangzhou, China                                                                                |                 |                     |           |                                                    |        |              |
| Manufacturer Address | : Guangzhou Topten Electronics Factory<br>5/F, Building B, No.3, Tangdong Guangtang West Rd., Tianhe District, Guangzhou, China                                                                                 |                 |                     |           |                                                    |        |              |
| Date of receipt      | : Mar. 07, 2017                                                                                                                                                                                                 |                 |                     |           |                                                    |        |              |
| Date of Test         | : Mar. 07~29, 2017                                                                                                                                                                                              |                 |                     |           |                                                    |        |              |
| Note                 | : This report is for WCDMA/GSM.                                                                                                                                                                                 |                 |                     |           |                                                    |        |              |

## 1.2. Auxiliary Equipment Used during Test

N/A

## 1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### **FCC-Registration No.: 752021**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

### **IC-Registration No.: 8058A-1**

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, Jun. 13, 2016.

### **Test Location**

All Emissions tests were performed at  
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC  
Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong,  
China

## 1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.1 dB (Horizontal)  
Ur = 4.3 dB (Vertical)

Conduction Uncertainty : Uc = 3.4dB

## 2. Technical test

### 2.1. Summary of Test Results

|                                                                                                            |      |
|------------------------------------------------------------------------------------------------------------|------|
| No Deviations from the technical specification(s) were ascertained<br>in the course of the tests Performed |      |
| Final Verdict:<br>(only “Pass” if all single measurements are “Pass”)                                      | Pass |

### 2.2. Test Report

The EUT has been tested according to the following specifications:

The radiated emission testing was performed according to the procedures of TIA/EIA 603D and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

| Item Number | Item Description      |                             | FCC Rules                |
|-------------|-----------------------|-----------------------------|--------------------------|
| 1           | Output Power          | Conducted output power      | 22.913(a) / 24.232 (b)   |
|             |                       | Radiated output power       |                          |
| 2           | Spurious Emission     | Conducted spurious emission | 2.1051 / 22.917 / 24.238 |
|             |                       | Radiated spurious emission  |                          |
| 3           | Frequency Stability   |                             | 2.1055 /24.235           |
| 4           | Occupied Bandwidth    |                             | 2.1049 (h)(i)            |
| 5           | Emission Bandwidth    |                             | 22.917(b) / 24.238 (b)   |
| 6           | Band Edge             |                             | 22.917(b) / 24.238 (b)   |
| 7           | Peak-to-Average Ratio |                             | 24.232(d)                |

## 3. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both GSM850 and GSM1900 frequency band.

Note: GSM/GPRS 850, GSM/GPRS 1900, HSDPA band II, HSUPA band II, HSDPA band V, HSUPA band V modes have been tested during the test. the worst condition (GSM850 + GSM1900 RMC 12.2k) be recorded in the test report if no other modes test data.

#### 4.TEST EQUIPMENT

| Item | Equipment                            | Manufacturer            | Model No.              | Serial No.    | Last Cal.     | Cal. Interval |
|------|--------------------------------------|-------------------------|------------------------|---------------|---------------|---------------|
| 1    | Spectrum Analysis                    | Agilent                 | E4407B                 | US39390582    | Jul. 12, 2016 | 1 Year        |
| 2    | Preamplifier                         | Instruments corporation | EMC011830              | 980100        | Jun. 17, 2016 | 1 Year        |
| 3    | EMI Test Receiver                    | Rohde & Schwarz         | ESPI                   | 101604        | Jun. 17, 2016 | 1 Year        |
| 4    | Double Ridged Horn Antenna           | Instruments corporation | GTH-0118               | 351600        | May 06, 2016  | 1 Year        |
| 5.   | Bilog Broadband Antenna              | Schwarzbeck             | VULB9163               | VULB 9163-289 | May 06, 2016  | 1 Year        |
| 6    | Pre-amplifier                        | SONOMA                  | 310N                   | 186860        | Jun. 17, 2016 | 1 Year        |
| 7.   | EMI Test Software EZ-EMC             | SHURPLE                 | N/A                    | N/A           | N/A           | N/A           |
| 8    | MXA Spectrum Analysis                | Agilent                 | N9020A                 | MY51170037    | Jun. 17, 2016 | 1 Year        |
| 9    | MXG RF Vector Signal Generator       | Agilent                 | N5182A                 | MY48180656    | Jun. 17, 2016 | 1 Year        |
| 10   | DC Power supply                      | IV                      | IV-8080                | YQSB0096      | Jun. 17, 2016 | 1 Year        |
| 11   | TEMP&HUMI PROGRAMMABLE CHAMBER       | Bell Group              | BE-THK-150M8           | SE-0137       | Jun. 17, 2016 | 1 Year        |
| 12   | UNIVERSAL RADIO COMMUNICATION TESTER | Rohde & Schwarz         | CMU 200                | 117888        | Jun. 17, 2016 | 1 Year        |
| 13   | UNIVERSAL RADIO COMMUNICATION TESTER | Rohde & Schwarz         | CMU 500                | 104209        | Jun. 17, 2016 | 1 Year        |
| 14   | Filter                               | COM-MW                  | ZHPF-BM 1100-4000-0730 | 1307006523    | Jun. 17, 2016 | 1 Year        |
| 15   | Filter                               | COM-MW                  | ZHPT-M35-18G-3834      | B2015094550   | Jun. 17, 2016 | 1 Year        |



## 5. OUTPUT POWER

### 5.1 Conducted Output Power

#### 5.1.1 measurement method

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes(GSM/GPRS 850, GSM/GPRS 1900, HSDPA band II, HSUPA band II, HSDPA band V, HSUPA band V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

#### 5.1.2 Measurement Result

**GSM850:**

| Mode             | Frequency(MHz) | Maximum<br>Burst-Average<br>Output Power |
|------------------|----------------|------------------------------------------|
| GSM850           | 824.2          | 32.54                                    |
|                  | 836.6          | 32.33                                    |
|                  | 848.8          | 32.26                                    |
| GPRS850(1 Slot)  | 824.2          | 32.43                                    |
|                  | 836.6          | 32.26                                    |
|                  | 848.8          | 32.59                                    |
| GPRS850(2 Slot)  | 824.2          | 31.45                                    |
|                  | 836.6          | 31.32                                    |
|                  | 848.8          | 31.54                                    |
| GPRS850(3 Slot)  | 824.2          | 29.74                                    |
|                  | 836.6          | 29.66                                    |
|                  | 848.8          | 29.52                                    |
| GPRS850(4 Slot)  | 824.2          | 28.35                                    |
|                  | 836.6          | 28.84                                    |
|                  | 848.8          | 28.10                                    |
| EGPRS850(1 Slot) | 824.2          | 32.35                                    |
|                  | 836.6          | 32.86                                    |
|                  | 848.8          | 32.45                                    |
| EGPRS850(2 Slot) | 824.2          | 31.62                                    |
|                  | 836.6          | 31.65                                    |
|                  | 848.8          | 31.74                                    |
| EGPRS850(3 Slot) | 824.2          | 29.64                                    |
|                  | 836.6          | 29.53                                    |
|                  | 848.8          | 29.57                                    |
| EGPRS850(4 Slot) | 824.2          | 28.48                                    |
|                  | 836.6          | 28.29                                    |
|                  | 848.8          | 28.71                                    |

**PCS1900:**

| Mode              | Frequency(MHz) | Maximum Burst-Average Output Power |
|-------------------|----------------|------------------------------------|
| GSM1900           | 1850.2         | 29.15                              |
|                   | 1880           | 28.48                              |
|                   | 1909.8         | 29.64                              |
| GPRS1900(1 Slot)  | 1850.2         | 28.52                              |
|                   | 1880           | 28.31                              |
|                   | 1909.8         | 28.54                              |
| GPRS1900(2 Slot)  | 1850.2         | 27.37                              |
|                   | 1880           | 27.55                              |
|                   | 1909.8         | 27.24                              |
| GPRS1900(3 Slot)  | 1850.2         | 27.64                              |
|                   | 1880           | 27.73                              |
|                   | 1909.8         | 27.84                              |
| GPRS1900(4 Slot)  | 1850.2         | 26.82                              |
|                   | 1880           | 26.79                              |
|                   | 1909.8         | 26.48                              |
| EGPRS1900(1 Slot) | 1850.2         | 29.45                              |
|                   | 1880           | 29.38                              |
|                   | 1909.8         | 29.57                              |
| EGPRS1900(2 Slot) | 1850.2         | 28.64                              |
|                   | 1880           | 28.51                              |
|                   | 1909.8         | 28.30                              |
| EGPRS1900(3 Slot) | 1850.2         | 27.36                              |
|                   | 1880           | 27.74                              |
|                   | 1909.8         | 27.22                              |
| EGPRS1900(4 Slot) | 1850.2         | 26.69                              |
|                   | 1880           | 26.27                              |
|                   | 1909.8         | 26.68                              |

## UMTS BAND II

| Mode            | Frequency(MHz) | MaximumBurst-Average<br>Output Power |
|-----------------|----------------|--------------------------------------|
| WCDMA 1900RMC   | 1852.4         | 21.54                                |
|                 | 1880.0         | 21.63                                |
|                 | 1907.6         | 21.42                                |
| WCDMA 1900AMR   | 1852.4         | 21.48                                |
|                 | 1880.0         | 21.19                                |
|                 | 1907.6         | 21.36                                |
| HSDPA Subtest 1 | 1852.4         | 20.48                                |
|                 | 1880           | 20.25                                |
|                 | 1907.6         | 20.79                                |
| HSDPA Subtest 2 | 1852.4         | 20.65                                |
|                 | 1880           | 20.36                                |
|                 | 1907.6         | 20.44                                |
| HSDPA Subtest 3 | 1852.4         | 20.87                                |
|                 | 1880           | 20.45                                |
|                 | 1907.6         | 20.36                                |
| HSDPA Subtest 4 | 1852.4         | 19.56                                |
|                 | 1880           | 19.42                                |
|                 | 1907.6         | 19.76                                |
| HSUPA Subtest 1 | 1852.4         | 21.54                                |
|                 | 1880.0         | 21.66                                |
|                 | 1907.6         | 21.21                                |
| HSUPA Subtest 2 | 1852.4         | 20.05                                |
|                 | 1880.0         | 20.23                                |
|                 | 1907.6         | 20.11                                |
| HSUPA Subtest 3 | 1852.4         | 20.75                                |
|                 | 1880.0         | 20.23                                |
|                 | 1907.6         | 20.25                                |
| HSUPA Subtest 4 | 1852.4         | 19.32                                |
|                 | 1880.0         | 19.54                                |
|                 | 1907.6         | 19.33                                |
| HSUPA Subtest 5 | 1852.4         | 19.23                                |
|                 | 1880.0         | 19.32                                |
|                 | 1907.6         | 19.34                                |

**UMTS BAND V**

| Mode            | Frequency(MHz) | Maximum Burst-Average Output Power |
|-----------------|----------------|------------------------------------|
| WCDMA 850 RMC   | 826.4          | 22.16                              |
|                 | 835.0          | 22.37                              |
|                 | 846.6          | 22.08                              |
| WCDMA 850 AMR   | 826.4          | 21.43                              |
|                 | 835.0          | 21.21                              |
|                 | 846.6          | 21.35                              |
| HSDPA Subtest 1 | 826.4          | 20.64                              |
|                 | 835.0          | 20.29                              |
|                 | 846.6          | 20.31                              |
| HSDPA Subtest 2 | 826.4          | 20.36                              |
|                 | 835.0          | 20.52                              |
|                 | 846.6          | 20.49                              |
| HSDPA Subtest 3 | 826.4          | 20.24                              |
|                 | 835.0          | 20.37                              |
|                 | 846.6          | 20.35                              |
| HSDPA Subtest 4 | 826.4          | 19.19                              |
|                 | 835.0          | 19.54                              |
|                 | 846.6          | 19.20                              |
| HSUPA Subtest 1 | 826.4          | 21.15                              |
|                 | 835.0          | 21.72                              |
|                 | 846.6          | 21.43                              |
| HSUPA Subtest 2 | 826.4          | 20.66                              |
|                 | 835.0          | 20.51                              |
|                 | 846.6          | 20.20                              |
| HSUPA Subtest 3 | 826.4          | 20.13                              |
|                 | 835.0          | 20.68                              |
|                 | 846.6          | 20.29                              |
| HSUPA Subtest 4 | 826.4          | 19.54                              |
|                 | 835.0          | 19.74                              |
|                 | 846.6          | 19.45                              |
| HSUPA Subtest 5 | 826.4          | 19.58                              |
|                 | 835.0          | 19.67                              |
|                 | 846.6          | 19.36                              |

## 5.2 Radiated Output Power

### 5.2.1 measurement method

The measurements procedures specified in TIA-603-D-2010 were applied.

- 1 In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power ( $P_{in}$ ) is applied to the input of the dipole, and the power received ( $P_r$ ) at the chamber's probe antenna is recorded.
- 2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as  $AR_{pl} = P_{in} + 2.15 - P_r$ . The  $AR_{pl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below:  $Power = P_{Mea} + AR_{pl}$
- 3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
- 4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
- 5 The EUT is then put into continuously transmitting mode at its maximum power level.
- 6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
- 7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power ( $P_{in}$ ).
- 8 ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15 \text{ dBi}$ .
9. Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 5.2.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

| Mode       | Nominal Peak Power            |
|------------|-------------------------------|
| GSM 850    | $\leq 38.45 \text{ dBm}$ (7W) |
| PCS 1900   | $\leq 33 \text{ dBm}$ (2W)    |
| UMTS BANDV | $\leq 38.45 \text{ dBm}$ (7W) |

### 5.2.3 Measurement Result

| Radiated Power (E.R.P) for GSM 850 MHZ |           |                               |                         |                          |                       |                            |            |
|----------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                   | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| GSM<br>850                             | 824.2     | 24.25                         | Horizontal              | 6.4                      | 0.52                  | 30.13                      | Pass       |
|                                        | 824.2     | 24.34                         | Vertical                | 6.4                      | 0.52                  | 30.22                      | Pass       |
|                                        | 836.6     | 24.04                         | Horizontal              | 6.4                      | 0.52                  | 29.92                      | Pass       |
|                                        | 836.6     | 24.05                         | Vertical                | 6.4                      | 0.52                  | 29.93                      | Pass       |
|                                        | 848.8     | 24.07                         | Horizontal              | 6.5                      | 0.52                  | 30.05                      | Pass       |
|                                        | 848.8     | 24.09                         | Vertical                | 6.5                      | 0.52                  | 30.07                      | Pass       |

| Radiated Power (E.R.P) for GPRS 850 MHZ |           |                               |                         |                          |                       |                            |            |
|-----------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                    | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| GPRS<br>850                             | 824.2     | 24.03                         | Horizontal              | 6.4                      | 0.52                  | 29.91                      | Pass       |
|                                         | 824.2     | 24.27                         | Vertical                | 6.4                      | 0.52                  | 30.15                      | Pass       |
|                                         | 836.6     | 23.74                         | Horizontal              | 6.4                      | 0.52                  | 29.62                      | Pass       |
|                                         | 836.6     | 24.06                         | Vertical                | 6.4                      | 0.52                  | 29.94                      | Pass       |
|                                         | 848.8     | 23.81                         | Horizontal              | 6.5                      | 0.52                  | 29.79                      | Pass       |
|                                         | 848.8     | 23.94                         | Vertical                | 6.5                      | 0.52                  | 29.92                      | Pass       |

| Radiated Power (E.R.P) for EGPRS 850 MHZ |           |                               |                         |                          |                       |                            |            |
|------------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                     | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| EGPRS<br>850                             | 824.2     | 23.88                         | Horizontal              | 6.4                      | 0.52                  | 29.76                      | Pass       |
|                                          | 824.2     | 24.13                         | Vertical                | 6.4                      | 0.52                  | 30.01                      | Pass       |
|                                          | 836.6     | 23.63                         | Horizontal              | 6.4                      | 0.52                  | 29.51                      | Pass       |
|                                          | 836.6     | 23.9                          | Vertical                | 6.4                      | 0.52                  | 29.78                      | Pass       |
|                                          | 848.8     | 23.75                         | Horizontal              | 6.5                      | 0.52                  | 29.73                      | Pass       |
|                                          | 848.8     | 23.84                         | Vertical                | 6.5                      | 0.52                  | 29.82                      | Pass       |

| Radiated Power (E.I.R.P) for PCS 1900 MHZ |           |                               |                         |                          |                       |                            |            |
|-------------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                      | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| PCS 1900                                  | 1850.2    | 22.37                         | Horizontal              | 8.13                     | 0.96                  | 29.54                      | Pass       |
|                                           | 1850.2    | 21.72                         | Vertical                | 8.13                     | 0.96                  | 28.89                      | Pass       |
|                                           | 1880.0    | 22.29                         | Horizontal              | 8.14                     | 0.96                  | 29.47                      | Pass       |
|                                           | 1880.0    | 21.77                         | Vertical                | 8.14                     | 0.96                  | 28.95                      | Pass       |
|                                           | 1909.8    | 21.83                         | Horizontal              | 8.14                     | 0.96                  | 29.01                      | Pass       |
|                                           | 1909.8    | 21.48                         | Vertical                | 8.14                     | 0.96                  | 28.66                      | Pass       |



| Radiated Power (E.I.R.P) for GPRS 1900 MHZ |           |                               |                         |                          |                       |                            |            |
|--------------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                       | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| <b>GPRS<br/>1900</b>                       | 1850.2    | 21.27                         | Horizontal              | 8.13                     | 0.96                  | 28.44                      | Pass       |
|                                            | 1850.2    | 21.52                         | Vertical                | 8.13                     | 0.96                  | <b>28.69</b>               | Pass       |
|                                            | 1880.0    | 20.79                         | Horizontal              | 8.14                     | 0.96                  | 27.97                      | Pass       |
|                                            | 1880.0    | 20.83                         | Vertical                | 8.14                     | 0.96                  | 28.01                      | Pass       |
|                                            | 1909.8    | 21.44                         | Horizontal              | 8.14                     | 0.96                  | 28.62                      | Pass       |
|                                            | 1909.8    | 20.8                          | Vertical                | 8.14                     | 0.96                  | 27.98                      | Pass       |

| Radiated Power (E.I.R.P) for EGPRS 1900 MHZ |           |                               |                         |                          |                       |                            |            |
|---------------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                        | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| <b>EGPRS<br/>1900</b>                       | 1850.2    | 21.24                         | Horizontal              | 8.13                     | 0.96                  | 28.41                      | Pass       |
|                                             | 1850.2    | 21.46                         | Vertical                | 8.13                     | 0.96                  | <b>28.63</b>               | Pass       |
|                                             | 1880.0    | 20.74                         | Horizontal              | 8.14                     | 0.96                  | 27.92                      | Pass       |
|                                             | 1880.0    | 20.55                         | Vertical                | 8.14                     | 0.96                  | 27.73                      | Pass       |
|                                             | 1909.8    | 21.24                         | Horizontal              | 8.14                     | 0.96                  | 28.42                      | Pass       |
|                                             | 1909.8    | 20.45                         | Vertical                | 8.14                     | 0.96                  | 27.63                      | Pass       |

| Radiated Power (E.I.R.P) for UMTS band II |           |                               |                         |                          |                       |                            |            |
|-------------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                      | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| RMC<br>12.2kbps                           | 1852.4    | 15.47                         | Horizontal              | 8.13                     | 0.96                  | <b>22.64</b>               | Pass       |
|                                           | 1852.4    | 15.27                         | Vertical                | 8.13                     | 0.96                  | 22.44                      | Pass       |
|                                           | 1880.0    | 15.38                         | Horizontal              | 8.14                     | 0.96                  | 22.56                      | Pass       |
|                                           | 1880.0    | 14.68                         | Vertical                | 8.14                     | 0.96                  | 21.86                      | Pass       |
|                                           | 1907.6    | 14.79                         | Horizontal              | 8.14                     | 0.96                  | 21.97                      | Pass       |
|                                           | 1907.6    | 14.83                         | Vertical                | 8.14                     | 0.96                  | 22.01                      | Pass       |

| Radiated Power (E.R.P) for UMTS band V |           |                               |                         |                          |                       |                            |            |
|----------------------------------------|-----------|-------------------------------|-------------------------|--------------------------|-----------------------|----------------------------|------------|
| Mode                                   | Frequency | Substituted<br>Level<br>(dBm) | Antenna<br>Polarization | Antenna<br>Gain<br>(dBi) | Cable<br>loss<br>(dB) | Absolute<br>Level<br>(dBm) | Conclusion |
| RMC<br>12.2kbps                        | 826.4     | 16.18                         | Horizontal              | 6.4                      | 0.52                  | 22.06                      | Pass       |
|                                        | 826.4     | 16.61                         | Vertical                | 6.4                      | 0.52                  | <b>22.49</b>               | Pass       |
|                                        | 836.6     | 15.93                         | Horizontal              | 6.4                      | 0.52                  | 21.81                      | Pass       |
|                                        | 836.6     | 16.06                         | Vertical                | 6.4                      | 0.52                  | 21.94                      | Pass       |
|                                        | 846.6     | 15.84                         | Horizontal              | 6.5                      | 0.52                  | 21.82                      | Pass       |
|                                        | 846.6     | 16.17                         | Vertical                | 6.5                      | 0.52                  | 22.15                      | Pass       |

NOTE 1: in the part, result the worst case GPRS 1slot for GSM 850 and PCS1900, and RMC 12.2kbps for band II and band v.

## 6. SPURIOUS EMISSION

### 6.1 CONDUCTED SPURIOUS EMISSION

#### 6.1.1 measurement method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1, Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 9 GHz.

2, Determine EUT transmit frequencies: the following typical channels were chosen to conducted emissions testing.

| Typical Channels for testing of GSM 850 MHz |                 |
|---------------------------------------------|-----------------|
| Channel                                     | Frequency (MHz) |
| 128                                         | 824.2           |
| 190                                         | 836.6           |
| 251                                         | 848.8           |

| Typical Channels for testing of PCS 1900 MHz |                 |
|----------------------------------------------|-----------------|
| Channel                                      | Frequency (MHz) |
| 512                                          | 1850.2          |
| 661                                          | 1880.0          |
| 810                                          | 1909.8          |

| Typical Channels for testing of UMTS band II |                 |
|----------------------------------------------|-----------------|
| Channel                                      | Frequency (MHz) |
| 9262                                         | 1852.4          |
| 9400                                         | 1880.0          |
| 9538                                         | 1907.6          |

| Typical Channels for testing of UMTS band V |                 |
|---------------------------------------------|-----------------|
| Channel                                     | Frequency (MHz) |
| 4132                                        | 826.4           |
| 4183                                        | 836.6           |
| 4233                                        | 846.6           |

### 6.1.2 PROVISIONS APPLICABLE

On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\log(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

### 6.1.3 Measurement Result

**PLEASE REFER TO :** APPENDIX I TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

**Note:** 1. Below 30MHZ no Spurious found and The GSM modes is the worst condition.  
2. As no emission found in standby or receive mode, no recording in this report.

## 6.2 Radiated Spurious Emission

### 6.2.1 measurement method

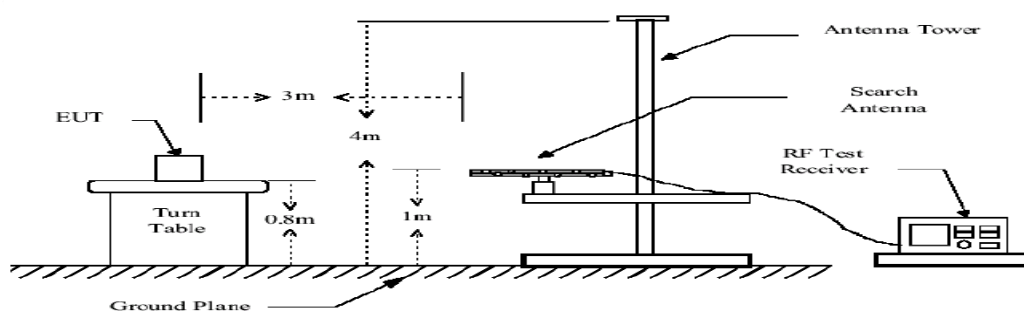
Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power and at the appropriate frequencies. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

The procedure of radiated spurious emissions is as follows:

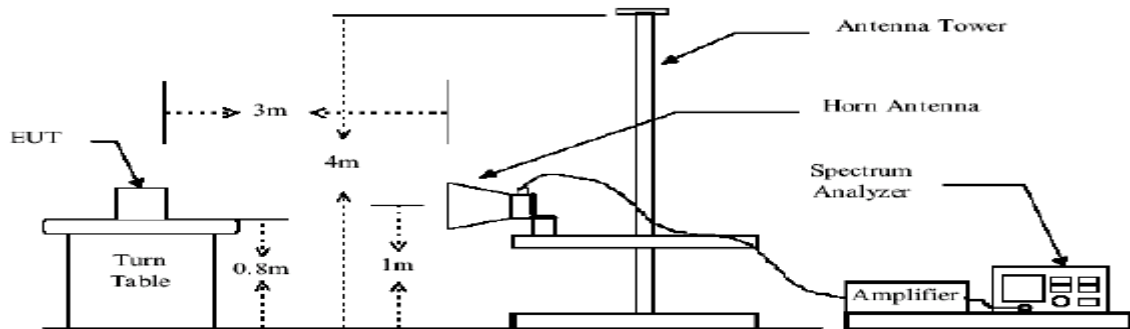
1. The testing follows FCC KDB 971168 D01 Section 5.8 and ANSI/TIA-603-D-2010 – Section 2.2.12
2. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
3. VBW  $\geq 3 \times$  RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $> 2 \times$  span/RBW
6. Detector = Peak
7. Trace mode = max hold
8. The trace was allowed to stabilize

### TEST SETUP

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS 1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz), GSM850 band (824.2MHz, 836.6MHz, 848.8MHz), UMTS band II(1852.4MHz, 1880MHz, 1907.6MHz), UMTS band V(826.4MHz, 836.6MHz, 846.6MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:

Power=P<sub>Mea</sub>-Antenna gain+cable loss

## 6.2.2 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\log(P)$  dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**Note:** only result the worst condition of each test mode:

### 6.2.3 Measurement Result

GSM 850:

| GSM 850                                |            |                    |                |            |             |            |
|----------------------------------------|------------|--------------------|----------------|------------|-------------|------------|
| Test Results for Channel 128/824.2 MHz |            |                    |                |            |             |            |
| Frequency(MHz)                         | Power(dBm) | Antenna Gain (dBi) | Cable loss(dB) | PMea (dBm) | Limit (dBm) | Polarity   |
| 1648.4                                 | -31.21     | 8.42               | 0.62           | -23.41     | -13.00      | Vertical   |
| 1648.4                                 | -31.14     | 8.42               | 0.62           | -23.34     | -13.00      | Horizontal |
| 2472.6                                 | -31.43     | 12.0               | 1.0            | -20.43     | -13.00      | Vertical   |
| 2472.6                                 | -31.17     | 12.0               | 1.0            | -20.17     | -13.00      | Horizontal |
| 3296.8                                 | -31.35     | 13.8               | 1.5            | -19.05     | -13.00      | Horizontal |
| 3296.8                                 | -31.12     | 13.8               | 1.5            | -18.82     | -13.00      | Vertical   |
| Test Results for Channel 190/836.6 MHz |            |                    |                |            |             |            |
| 1673.2                                 | -33.12     | 8.7                | 0.7            | -25.12     | -13.00      | Vertical   |
| 1673.2                                 | -32.35     | 8.7                | 0.7            | -24.35     | -13.00      | Horizontal |
| 2509.8                                 | -31.34     | 12.2               | 1.0            | -20.14     | -13.00      | Vertical   |
| 2509.8                                 | -31.51     | 12.2               | 1.0            | -20.31     | -13.00      | Horizontal |
| 3346.4                                 | -32.42     | 14.2               | 1.6            | -19.82     | -13.00      | Horizontal |
| 3346.4                                 | -32.62     | 14.2               | 1.6            | -20.02     | -13.00      | Vertical   |
| Test Results for Channel 251/848.8 MHz |            |                    |                |            |             |            |
| 1697.6                                 | -30.43     | 8.78               | 0.68           | -22.33     | -13.00      | Vertical   |
| 1697.6                                 | -30.22     | 8.78               | 0.68           | -22.12     | -13.00      | Horizontal |
| 2546.4                                 | -32.35     | 12.69              | 1.0            | -20.66     | -13.00      | Vertical   |
| 2546.4                                 | -33.12     | 12.69              | 1.0            | -21.43     | -13.00      | Horizontal |
| 3395.2                                 | -33.41     | 14.52              | 1.6            | -20.49     | -13.00      | Horizontal |
| 3395.2                                 | -32.34     | 14.52              | 1.6            | -19.42     | -13.00      | Vertical   |

NOTE:1.All other emissions more than 30dB below the limit.

2.ALL mode were investigating.The results above show only the worst case.

PCS 1900:

| PCS1900                                |            |                    |                |            |             |            |
|----------------------------------------|------------|--------------------|----------------|------------|-------------|------------|
| Test Results for Channel 512/1850.2MHz |            |                    |                |            |             |            |
| Frequency(MHz)                         | Power(dBm) | Antenna Gain (dBi) | Cable loss(dB) | PMea(dBm ) | Limit (dBm) | Polarity   |
| 3700.4                                 | -34.02     | 15.45              | 2.03           | -20.6      | -13.00      | Horizontal |
| 3700.4                                 | -35.26     | 15.45              | 2.03           | -21.84     | -13.00      | Vertical   |
| 5550.6                                 | -33.96     | 19.63              | 2.51           | -16.84     | -13.00      | Vertical   |
| 5550.6                                 | -31.57     | 19.63              | 2.51           | -14.45     | -13.00      | Horizontal |
| 7400.8                                 | -35.85     | 22.88              | 3.62           | -16.59     | -13.00      | Horizontal |
| 7400.8                                 | -35.48     | 22.88              | 3.62           | -16.22     | -13.00      | Vertical   |
| Test Results for Channel 661/1880.0MHz |            |                    |                |            |             |            |
| 3760                                   | -36.95     | 15.83              | 2.07           | -23.19     | -13.00      | Horizontal |
| 3760                                   | -34.74     | 15.83              | 2.07           | -20.98     | -13.00      | Vertical   |
| 5640                                   | -35.26     | 20.32              | 2.76           | -17.7      | -13.00      | Vertical   |
| 5640                                   | -39.98     | 20.32              | 2.76           | -22.42     | -13.00      | Horizontal |
| 7520                                   | -38.97     | 23.48              | 3.88           | -19.37     | -13.00      | Horizontal |
| 7520                                   | -39.41     | 23.48              | 3.88           | -19.81     | -13.00      | Vertical   |
| Test Results for Channel 810/1909.8MHz |            |                    |                |            |             |            |
| 3819.6                                 | -35.95     | 16.14              | 2.27           | -22.08     | -13.00      | Horizontal |
| 3819.6                                 | -31.48     | 16.14              | 2.27           | -17.61     | -13.00      | Vertical   |
| 5729.4                                 | -36.59     | 20.43              | 2.77           | -18.93     | -13.00      | Vertical   |
| 5729.4                                 | -34.56     | 20.43              | 2.77           | -16.9      | -13.00      | Horizontal |
| 7639.2                                 | -40.14     | 23.78              | 4.03           | -20.39     | -13.00      | Horizontal |
| 7639.2                                 | -39.97     | 23.78              | 4.03           | -20.22     | -13.00      | Vertical   |

NOTE:

- 1.All other emissions more than 30dB below the limit.
- 2.ALL mode were investigating.The results above show only the worst case.



UMTS band II:

| Test Results for Channel 9262/1852.4MHz |            |                    |                |            |             |            |
|-----------------------------------------|------------|--------------------|----------------|------------|-------------|------------|
| Frequency(MHz)                          | Power(dBm) | Antenna Gain (dBi) | Cable loss(dB) | PMea (dBm) | Limit (dBm) | Polarity   |
| 3700.8                                  | -32.06     | 15.45              | 2.03           | -18.64     | -13.00      | Horizontal |
| 3700.8                                  | -31.69     | 15.45              | 2.03           | -18.27     | -13.00      | Vertical   |
| 5551.2                                  | -36.55     | 19.63              | 2.51           | -19.43     | -13.00      | Vertical   |
| 5551.2                                  | -34.51     | 19.63              | 2.51           | -17.39     | -13.00      | Horizontal |
| Test Results for Channel 9400/1880MHz   |            |                    |                |            |             |            |
| 3760                                    | -32.26     | 15.83              | 2.07           | -18.5      | -13.00      | Horizontal |
| 3760                                    | -31.41     | 15.83              | 2.07           | -17.65     | -13.00      | Vertical   |
| 5640                                    | -40.59     | 20.32              | 2.76           | -23.03     | -13.00      | Vertical   |
| 5640                                    | -39.68     | 20.32              | 2.76           | -22.12     | -13.00      | Horizontal |
| Test Results for Channel 9538/1907.6MHz |            |                    |                |            |             |            |
| 3819.6                                  | -35.64     | 16.14              | 2.27           | -21.77     | -13.00      | Horizontal |
| 3819.6                                  | -35.29     | 16.14              | 2.27           | -21.42     | -13.00      | Vertical   |
| 5729.4                                  | -39.67     | 20.43              | 2.77           | -22.01     | -13.00      | Vertical   |
| 5729.4                                  | -36.41     | 20.43              | 2.77           | -18.75     | -13.00      | Horizontal |

NOTE:

- 1.All other emissions more than 30dB below the limit.
- 2.ALL mode were investigating.The results above show only the worst case.

UMTS band V:

| Test Results for Channel 4132/826.4MHz |            |                    |                |            |             |            |
|----------------------------------------|------------|--------------------|----------------|------------|-------------|------------|
| Frequency(MHz)                         | Power(dBm) | Antenna Gain (dBi) | Cable loss(dB) | PMea (dBm) | Limit (dBm) | Polarity   |
| 1652.8                                 | -30.23     | 8.62               | 0.62           | -22.23     | -13.00      | Vertical   |
| 1652.8                                 | -31.42     | 8.62               | 0.62           | -23.42     | -13.00      | Horizontal |
| 2479.2                                 | -31.41     | 12.2               | 1.0            | -20.21     | -13.00      | Vertical   |
| 2479.2                                 | -30.45     | 12.2               | 1.0            | -19.25     | -13.00      | Horizontal |
| 3305.6                                 | -32.33     | 14.2               | 1.6            | -19.73     | -13.00      | Horizontal |
| 3305.6                                 | -29.71     | 14.2               | 1.6            | -17.11     | -13.00      | Vertical   |
| Test Results for Channel 190/836.6 MHz |            |                    |                |            |             |            |
| 1673.2                                 | -31.36     | 8.7                | 0.7            | -23.36     | -13.00      | Vertical   |
| 1673.2                                 | -30.24     | 8.7                | 0.7            | -22.24     | -13.00      | Horizontal |
| 2509.8                                 | -31.63     | 12.2               | 1.0            | -20.43     | -13.00      | Vertical   |
| 2509.8                                 | -33.46     | 12.2               | 1.0            | -22.26     | -13.00      | Horizontal |
| 3346.4                                 | -31.25     | 14.2               | 1.6            | -18.65     | -13.00      | Horizontal |
| 3346.4                                 | -32.31     | 14.2               | 1.6            | -19.71     | -13.00      | Vertical   |
| Test Results for Channel 4233/846.6MHz |            |                    |                |            |             |            |
| 1673.2                                 | -29.64     | 8.78               | 0.68           | -21.54     | -13.00      | Vertical   |
| 1673.2                                 | -30.45     | 8.78               | 0.68           | -22.35     | -13.00      | Horizontal |
| 2509.8                                 | -32.23     | 12.69              | 1.0            | -20.54     | -13.00      | Vertical   |
| 2509.8                                 | -34.34     | 12.69              | 1.0            | -22.65     | -13.00      | Horizontal |
| 3346.4                                 | -34.49     | 14.52              | 1.6            | -21.57     | -13.00      | Horizontal |
| 3346.4                                 | -39.77     | 14.52              | 1.6            | -26.85     | -13.00      | Vertical   |

**Note:** Below 30MHz no Spurious found.

- 1.All other emissions more than 30dB below the limit.
- 2.ALL mode were investigated.The results above show only the worst case.

## 7. FREQUENCY STABILITY

### 7.1 measurement method

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

- 1 Measure the carrier frequency at room temperature.
- 2 Subject the EUT to overnight soak at -10°C.
- 3 With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900 band, channel 190 for GSM 850 band, channel 9400 for UMTS band II and channel 4175 for UMTS band V measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- 4 Repeat the above measurements at 10°C increments from -10°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
- 5 Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
- 6 Subject the EUT to overnight soak at +50°C.
- 7 With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- 8 Repeat the above measurements at 10°C increments from +50°C to -10°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
- 9 At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

### 7.2 PROVISIONS APPLICABLE

#### 7.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC and 4.2VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

### 7.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment, the normal environment temperature is 20°C.

### 7.3 Measurement Result

| Frequency Error Against Voltage for GSM 850 band |                      |                       |             |
|--------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                      | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                             | 31                   | 0.037                 | ±2.5        |
| 12.0                                             | 19                   | 0.023                 | ±2.5        |
| 13.8                                             | 14                   | 0.017                 | ±2.5        |

| Frequency Error Against Temperature for GSM 850 band |                      |                       |             |
|------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                     | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                  | 38                   | 0.045                 | ±2.5        |
| 0                                                    | 27                   | 0.032                 | ±2.5        |
| 10                                                   | 25                   | 0.030                 | ±2.5        |
| 20                                                   | 19                   | 0.023                 | ±2.5        |
| 30                                                   | 22                   | 0.026                 | ±2.5        |
| 40                                                   | 27                   | 0.032                 | ±2.5        |
| 50                                                   | 33                   | 0.039                 | ±2.5        |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for GPRS 850 band |                      |                       |             |
|---------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                       | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                              | 33                   | 0.039                 | $\pm 2.5$   |
| 12.0                                              | 20                   | 0.024                 | $\pm 2.5$   |
| 13.8                                              | 17                   | 0.020                 | $\pm 2.5$   |

| Frequency Error Against Temperature for GPRS 850 band |                      |                       |             |
|-------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                      | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                   | 35                   | 0.042                 | $\pm 2.5$   |
| 0                                                     | 24                   | 0.029                 | $\pm 2.5$   |
| 10                                                    | 28                   | 0.033                 | $\pm 2.5$   |
| 20                                                    | 17                   | 0.020                 | $\pm 2.5$   |
| 30                                                    | 22                   | 0.026                 | $\pm 2.5$   |
| 40                                                    | 26                   | 0.031                 | $\pm 2.5$   |
| 50                                                    | 37                   | 0.044                 | $\pm 2.5$   |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for EGPRS 850 band |                      |                       |             |
|----------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                        | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                               | 32                   | 0.038                 | $\pm 2.5$   |
| 12.0                                               | 24                   | 0.029                 | $\pm 2.5$   |
| 13.8                                               | 12                   | 0.014                 | $\pm 2.5$   |

| Frequency Error Against Temperature for EGPRS 850 band |                      |                       |             |
|--------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                       | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                    | 34                   | 0.041                 | $\pm 2.5$   |
| 0                                                      | 23                   | 0.027                 | $\pm 2.5$   |
| 10                                                     | 27                   | 0.032                 | $\pm 2.5$   |
| 20                                                     | 15                   | 0.018                 | $\pm 2.5$   |
| 30                                                     | 24                   | 0.029                 | $\pm 2.5$   |
| 40                                                     | 25                   | 0.030                 | $\pm 2.5$   |
| 50                                                     | 30                   | 0.036                 | $\pm 2.5$   |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for PCS 1900 band |                      |                       |             |
|---------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                       | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                              | 21                   | 0.011                 | $\pm 2.5$   |
| 12.0                                              | 34                   | 0.018                 | $\pm 2.5$   |
| 13.8                                              | 25                   | 0.013                 | $\pm 2.5$   |

| Frequency Error Against Temperature for PCS 1900 band |                      |                       |             |
|-------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                      | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                   | 29                   | 0.015                 | $\pm 2.5$   |
| 0                                                     | 24                   | 0.013                 | $\pm 2.5$   |
| 10                                                    | 32                   | 0.017                 | $\pm 2.5$   |
| 20                                                    | 37                   | 0.020                 | $\pm 2.5$   |
| 30                                                    | 20                   | 0.011                 | $\pm 2.5$   |
| 40                                                    | 18                   | 0.010                 | $\pm 2.5$   |
| 50                                                    | 17                   | 0.009                 | $\pm 2.5$   |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for GPRS 1900 band |                      |                       |             |
|----------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                        | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                               | 23                   | 0.012                 | $\pm 2.5$   |
| 12.0                                               | 31                   | 0.016                 | $\pm 2.5$   |
| 13.8                                               | 27                   | 0.014                 | $\pm 2.5$   |

| Frequency Error Against Temperature for GPRS 1900 band |                      |                       |             |
|--------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                       | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                    | 25                   | 0.013                 | $\pm 2.5$   |
| 0                                                      | 23                   | 0.012                 | $\pm 2.5$   |
| 10                                                     | 35                   | 0.019                 | $\pm 2.5$   |
| 20                                                     | 33                   | 0.018                 | $\pm 2.5$   |
| 30                                                     | 23                   | 0.012                 | $\pm 2.5$   |
| 40                                                     | 12                   | 0.006                 | $\pm 2.5$   |
| 50                                                     | 15                   | 0.008                 | $\pm 2.5$   |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for EGPRS 1900 band |                      |                       |             |
|-----------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                         | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                                | 27                   | 0.014                 | $\pm 2.5$   |
| 12.0                                                | 33                   | 0.018                 | $\pm 2.5$   |
| 13.8                                                | 22                   | 0.012                 | $\pm 2.5$   |

| Frequency Error Against Temperature for EGPRS 1900 band |                      |                       |             |
|---------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                        | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                     | 22                   | 0.012                 | $\pm 2.5$   |
| 0                                                       | 27                   | 0.014                 | $\pm 2.5$   |
| 10                                                      | 31                   | 0.016                 | $\pm 2.5$   |
| 20                                                      | 35                   | 0.019                 | $\pm 2.5$   |
| 30                                                      | 23                   | 0.012                 | $\pm 2.5$   |
| 40                                                      | 12                   | 0.006                 | $\pm 2.5$   |
| 50                                                      | 15                   | 0.008                 | $\pm 2.5$   |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for UMTS band II |                      |                       |             |
|--------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                      | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                             | 22                   | 0.012                 | $\pm 2.5$   |
| 12.0                                             | 19                   | 0.010                 | $\pm 2.5$   |
| 13.8                                             | 26                   | 0.014                 | $\pm 2.5$   |

| Frequency Error Against Temperature for UMTS band II |                      |                       |             |
|------------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                     | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                  | 34                   | 0.018                 | $\pm 2.5$   |
| 0                                                    | 31                   | 0.016                 | $\pm 2.5$   |
| 10                                                   | 18                   | 0.010                 | $\pm 2.5$   |
| 20                                                   | 36                   | 0.019                 | $\pm 2.5$   |
| 30                                                   | 37                   | 0.020                 | $\pm 2.5$   |
| 40                                                   | 25                   | 0.013                 | $\pm 2.5$   |
| 50                                                   | 19                   | 0.010                 | $\pm 2.5$   |

Note: The EUT doesn't work below -10°C

| Frequency Error Against Voltage for UMTS band V |                      |                       |             |
|-------------------------------------------------|----------------------|-----------------------|-------------|
| Voltage (V)                                     | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 10.2                                            | 28                   | 0.033                 | $\pm 2.5$   |
| 12.0                                            | 15                   | 0.018                 | $\pm 2.5$   |
| 13.8                                            | 23                   | 0.027                 | $\pm 2.5$   |

| Frequency Error Against Temperature for UMTS band V |                      |                       |             |
|-----------------------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                                    | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                                                 | 33                   | 0.039                 | $\pm 2.5$   |
| 0                                                   | 26                   | 0.031                 | $\pm 2.5$   |
| 10                                                  | 31                   | 0.037                 | $\pm 2.5$   |
| 20                                                  | 19                   | 0.023                 | $\pm 2.5$   |
| 30                                                  | 24                   | 0.029                 | $\pm 2.5$   |
| 40                                                  | 19                   | 0.023                 | $\pm 2.5$   |
| 50                                                  | 27                   | 0.032                 | $\pm 2.5$   |

**Note:** The EUT doesn't work below -10°C



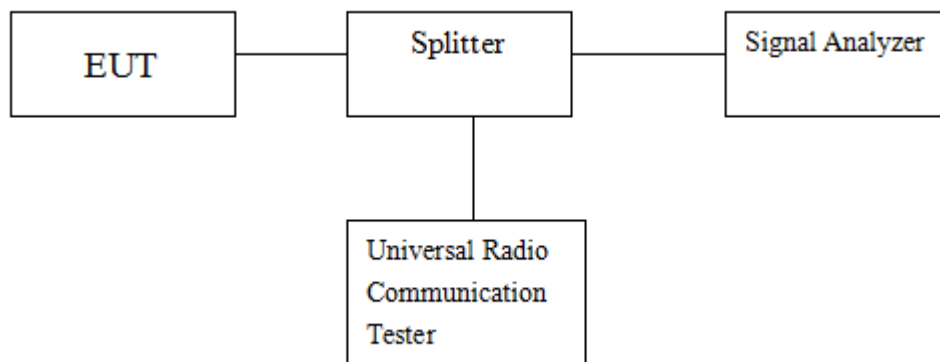
## 8. BANDWIDTH

### 8.1 Applicable Standard

FCC §2.1049, §22.917, §22.905 and §24.238.

### 8.2 Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.
3. Details according with KDB 971168 section 4.1 & 4.2.



### Test Equipment List and Details

Refer a test equipment and calibration data table in this test report.

### 8.3 Measurement Result

| Occupied Bandwidth (99%) for GSM 850 band |                |                                |
|-------------------------------------------|----------------|--------------------------------|
| Mode                                      | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| Low Channel                               | 824.2          | 244.393                        |
| Middle Channel                            | 836.6          | 245.689                        |
| High Channel                              | 848.8          | 242.196                        |

| Occupied Bandwidth (99%) for PCS 1900 band |                |                                |
|--------------------------------------------|----------------|--------------------------------|
| Mode                                       | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| Low Channel                                | 1850.2         | 244.076                        |
| Middle Channel                             | 1880.0         | 250.017                        |
| High Channel                               | 1909.8         | 242.912                        |

| Occupied Bandwidth (99%) for GPRS 850 band |                |                                |
|--------------------------------------------|----------------|--------------------------------|
| Mode                                       | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |

|                |       |         |
|----------------|-------|---------|
| Low Channel    | 824.2 | 244.537 |
| Middle Channel | 836.6 | 243.568 |
| High Channel   | 848.8 | 247.644 |

| Occupied Bandwidth (99%) for GPRS 1900 band |                |                                |
|---------------------------------------------|----------------|--------------------------------|
| Mode                                        | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| Low Channel                                 | 1850.2         | 244.035                        |
| Middle Channel                              | 1880.0         | 243.109                        |
| High Channel                                | 1909.8         | 246.649                        |

| Occupied Bandwidth (99%) for EGPRS 850 band |                |                                |
|---------------------------------------------|----------------|--------------------------------|
| Mode                                        | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| Low Channel                                 | 824.2          | 243.282                        |
| Middle Channel                              | 836.6          | 240.883                        |
| High Channel                                | 848.8          | 244.906                        |

| Occupied Bandwidth (99%) for EGPRS 1900 band |                |                                |
|----------------------------------------------|----------------|--------------------------------|
| Mode                                         | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| Low Channel                                  | 1850.2         | 247.763                        |
| Middle Channel                               | 1880.0         | 239.646                        |
| High Channel                                 | 1909.8         | 243.433                        |

| Occupied Bandwidth (99%) for UMTS band II |                |                                |
|-------------------------------------------|----------------|--------------------------------|
| Mode                                      | Frequency(MHz) | Occupied Bandwidth (99%)( MHz) |
| Low Channel                               | 1852.4         | 4.164                          |
| Middle Channel                            | 1880.0         | 4.170                          |
| High Channel                              | 1907.6         | 4.168                          |

| Occupied Bandwidth (99%) for UMTS band V |                |                                |
|------------------------------------------|----------------|--------------------------------|
| Mode                                     | Frequency(MHz) | Occupied Bandwidth (99%)( MHz) |
| Low Channel                              | 826.4          | 4.162                          |
| Middle Channel                           | 836.4          | 4.156                          |
| High Channel                             | 846.6          | 4.152                          |

| Emission Bandwidth (-26dBc) for GSM 850 band |  |  |
|----------------------------------------------|--|--|
|----------------------------------------------|--|--|

| Mode           | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
|----------------|----------------|-----------------------------------|
| Low Channel    | 824.2          | 317.514                           |
| Middle Channel | 836.6          | 318.268                           |
| High Channel   | 848.8          | 308.743                           |

| Emission Bandwidth (-26dBc) for PCS 1900 band |                |                                   |
|-----------------------------------------------|----------------|-----------------------------------|
| Mode                                          | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| Low Channel                                   | 1850.2         | 315.910                           |
| Middle Channel                                | 1880.0         | 323.802                           |
| High Channel                                  | 1909.8         | 315.447                           |

| Emission Bandwidth (-26dBc) for GPRS 850 band |                |                                   |
|-----------------------------------------------|----------------|-----------------------------------|
| Mode                                          | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| Low Channel                                   | 824.2          | 318.316                           |
| Middle Channel                                | 836.6          | 311.915                           |
| High Channel                                  | 848.8          | 322.406                           |

| Emission Bandwidth (-26dBc) for GPRS 1900 band |                |                                   |
|------------------------------------------------|----------------|-----------------------------------|
| Mode                                           | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| Low Channel                                    | 1850.2         | 320.357                           |
| Middle Channel                                 | 1880.0         | 314.336                           |
| High Channel                                   | 1909.8         | 318.427                           |

| Emission Bandwidth (-26dBc) for EGPRS 850 band |                |                                   |
|------------------------------------------------|----------------|-----------------------------------|
| Mode                                           | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| Low Channel                                    | 824.2          | 315.584                           |
| Middle Channel                                 | 836.6          | 313.986                           |
| High Channel                                   | 848.8          | 323.942                           |

| Emission Bandwidth (-26dBc) for EGPRS 1900 band |                |                                   |
|-------------------------------------------------|----------------|-----------------------------------|
| Mode                                            | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| Low Channel                                     | 1850.2         | 318.597                           |
| Middle Channel                                  | 1880.0         | 316.008                           |
| High Channel                                    | 1909.8         | 316.501                           |

| Emission Bandwidth (-26dBc) for UMTS band II |                |                                   |
|----------------------------------------------|----------------|-----------------------------------|
| Mode                                         | Frequency(MHz) | Emission Bandwidth (-26dBc)( MHz) |
| Low Channel                                  | 1852.4         | 4.728                             |
| Middle Channel                               | 1880.0         | 4.696                             |
| High Channel                                 | 1907.6         | 4.749                             |

| Emission Bandwidth (-26dBc) for UMTS band V |                |                                   |
|---------------------------------------------|----------------|-----------------------------------|
| Mode                                        | Frequency(MHz) | Emission Bandwidth (-26dBc)( MHz) |
| Low Channel                                 | 826.4          | 4.715                             |
| Middle Channel                              | 836.4          | 4.712                             |
| High Channel                                | 846.6          | 4.691                             |

## 9. BAND EDGE

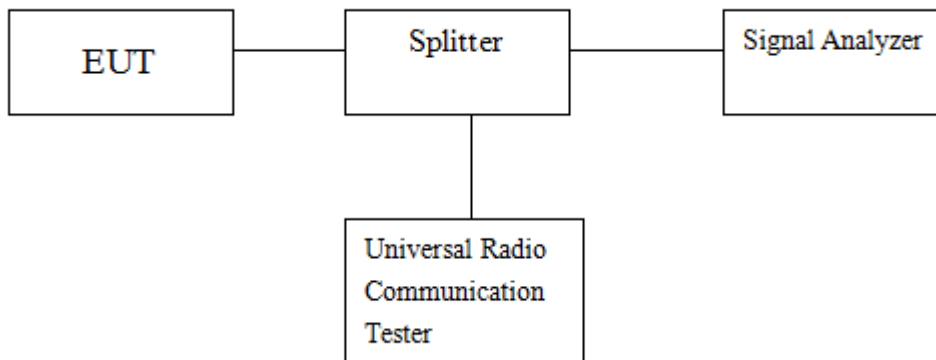
### 9.1 Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to § 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### 9.2 Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The Band Edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
3. Details according with KDB 971168 section 6.0.



### Test Equipment List and Details

Refer a test equipment and calibration data table in this test report.

### 9.3 Measurement Result

Please refers to Appendix III for compliance test plots for band edges

## 10. PEAK-TO-AVERAGE RATIO

### 10.1 MEASURING INSTRUMENTS

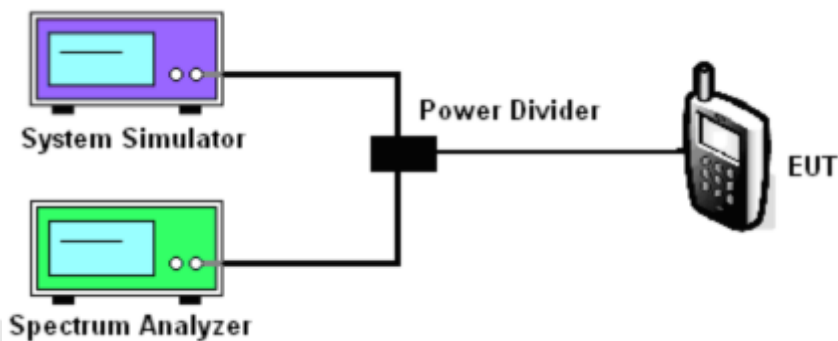
See list of measuring instruments of this test report.

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 10.2 TEST PROCEDURES

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

### 10.3 TEST SETUP



#### 10.4 TEST RESULT OF PEAK-TO-AVERAGE RATIO

| Cellular Band                 |              |              |               |              |              |               |
|-------------------------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Modes                         | GSM850       |              |               | GSM1900      |              |               |
| Channel                       | 128<br>(Low) | 190<br>(Mid) | 251<br>(High) | 512<br>(Low) | 661<br>(Mid) | 810<br>(High) |
| Frequency(MHz)                | 824.2        | 836.6        | 848.8         | 1850.2       | 1880         | 1909.8        |
| Peak-to-Average Ratio<br>(dB) | 9.54         | 9.27         | 9.47          | 8.78         | 9.41         | 9.30          |

| Cellular Band                 |                                 |               |                |                                |               |                |
|-------------------------------|---------------------------------|---------------|----------------|--------------------------------|---------------|----------------|
| Modes                         | WCDMA Band II<br>(RMC 12.2Kbps) |               |                | WCDMA Band V<br>(RMC 12.2Kbps) |               |                |
| Channel                       | 9262<br>(Low)                   | 9400<br>(Mid) | 9538<br>(High) | 4132<br>(Low)                  | 4175<br>(Mid) | 4233<br>(High) |
| Frequency(MHz)                | 1852.4                          | 1880          | 1907.6         | 826.4                          | 836.6         | 846.6          |
| Peak-to-Average Ratio<br>(dB) | 3.08                            | 3.05          | 2.96           | 3.29                           | 3.55          | 3.31           |

| Cellular Band                 |              |              |               |              |              |               |
|-------------------------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Modes                         | GPRS850      |              |               | GPRS1900     |              |               |
| Channel                       | 128<br>(Low) | 190<br>(Mid) | 251<br>(High) | 512<br>(Low) | 661<br>(Mid) | 810<br>(High) |
| Frequency(MHz)                | 824.2        | 836.6        | 848.8         | 1850.2       | 1880         | 1909.8        |
| Peak-to-Average Ratio<br>(dB) | 9.74         | 9.88         | 9.98          | 9.48         | 9.20         | 9.67          |

| Cellular Band                 |              |              |               |              |              |               |
|-------------------------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Modes                         | EGPRS850     |              |               | EGPRS1900    |              |               |
| Channel                       | 128<br>(Low) | 190<br>(Mid) | 251<br>(High) | 512<br>(Low) | 661<br>(Mid) | 810<br>(High) |
| Frequency(MHz)                | 824.2        | 836.6        | 848.8         | 1850.2       | 1880         | 1909.8        |
| Peak-to-Average Ratio<br>(dB) | 12.43        | 12.55        | 11.88         | 12.14        | 11.93        | 12.79         |

GSM850



GSM1900



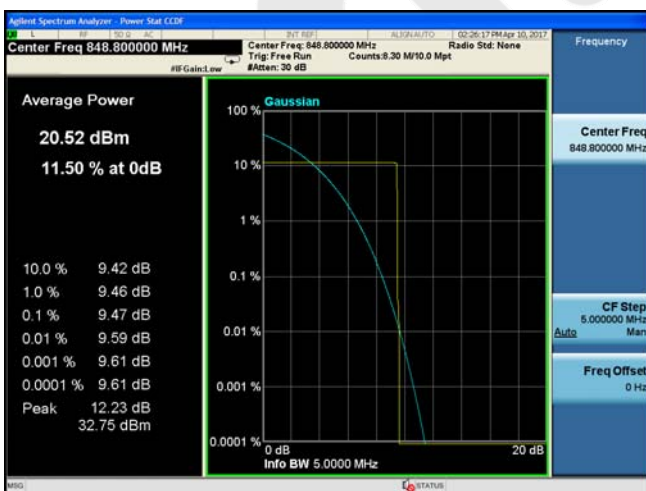
Low



Low



Mid



Mid



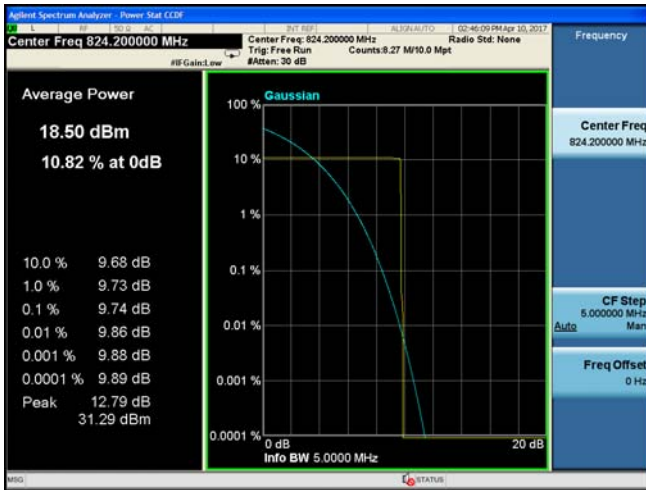
High

High



GPRS850

GPRS1900



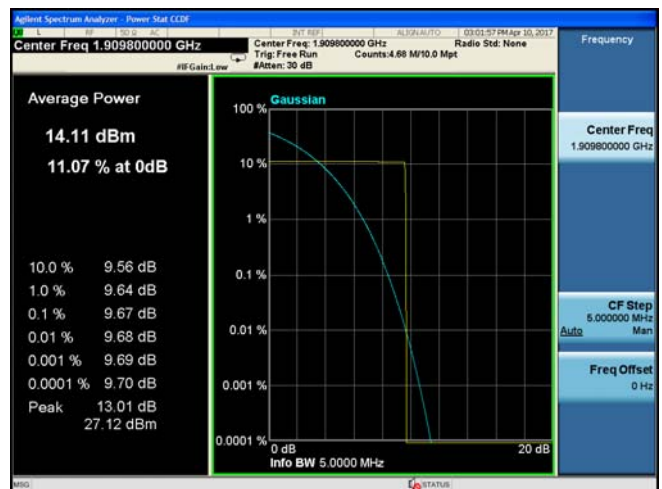
Low

Low



Mid

Mid



High

High

EGPRS850



EGPRS1900



Low

Low



Mid

Mid



High

High

WCDMA Band V



WCDMA Band II



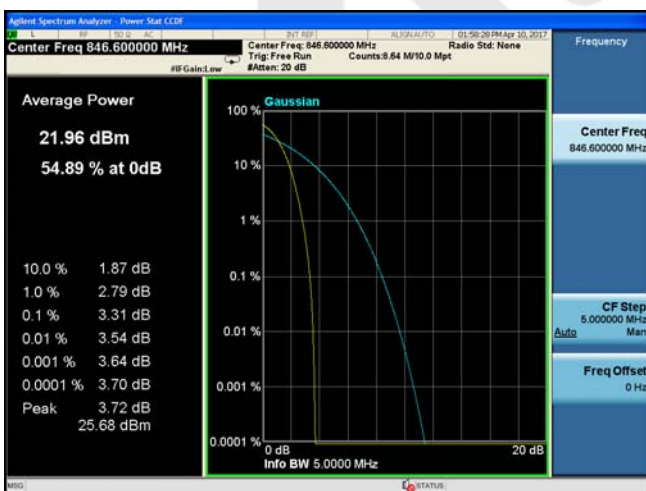
Low

Low



Mid

Mid



High

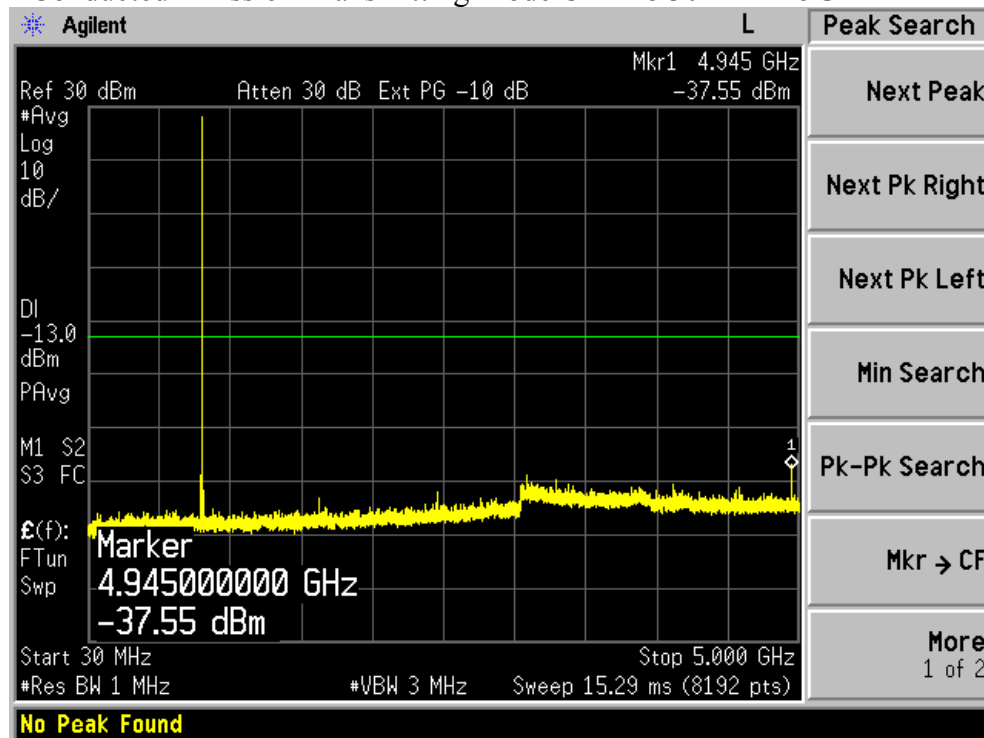
High

## APPENDIX I

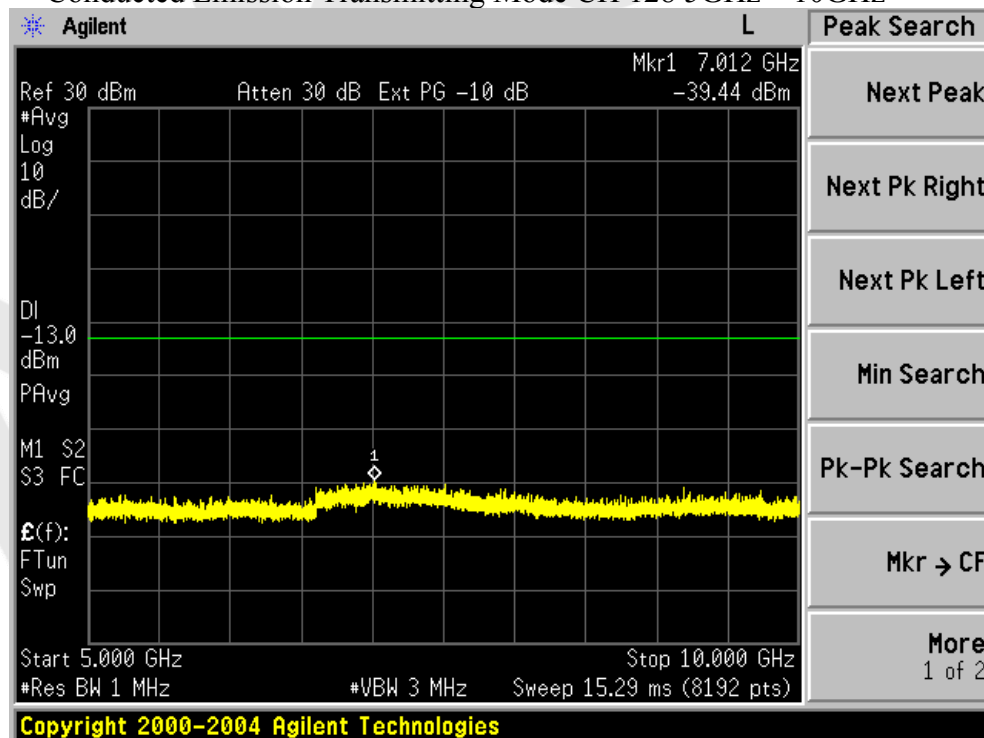
### TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

#### CONDUCTED EMISSION IN GSM 850 BAND

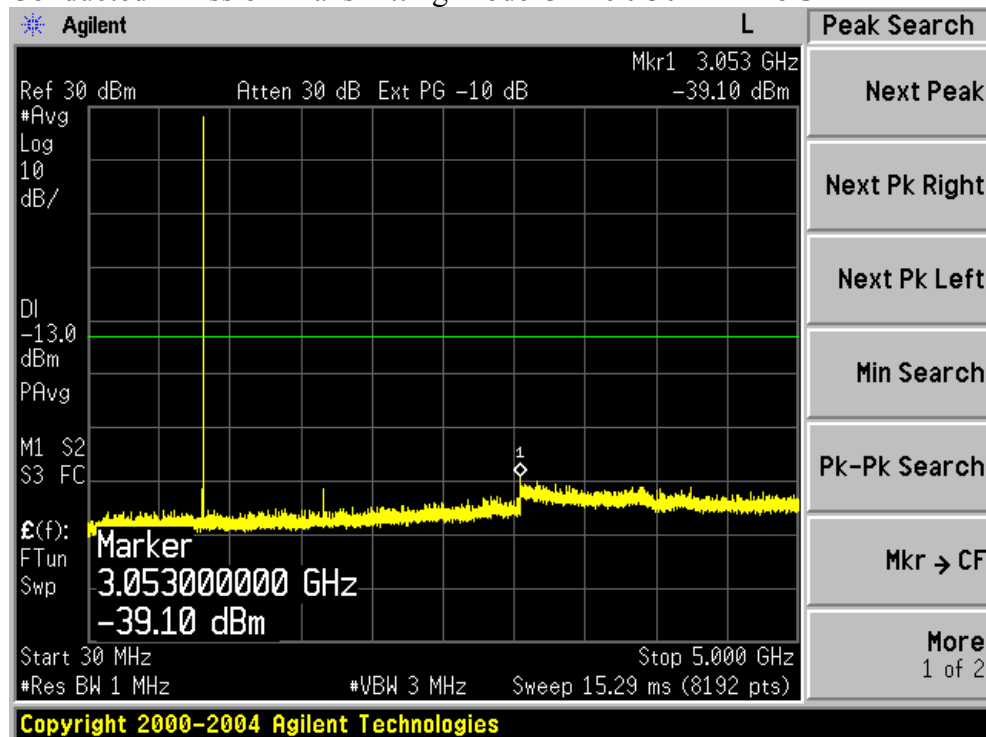
Conducted Emission Transmitting Mode CH 128 30MHz – 5GHz



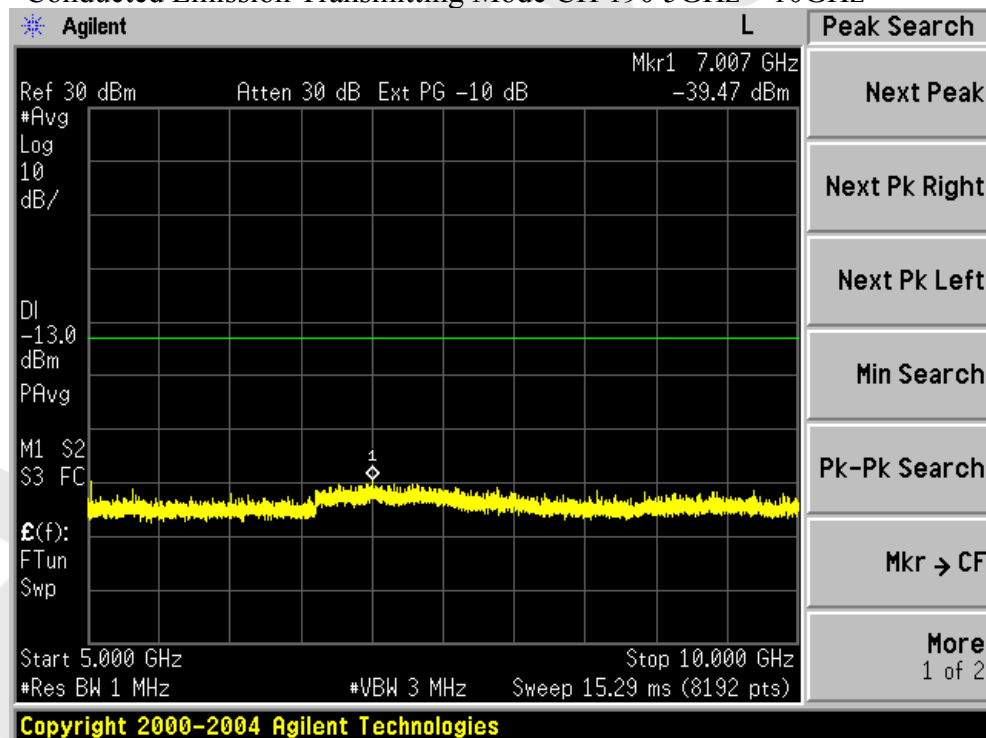
Conducted Emission Transmitting Mode CH 128 5GHz – 10GHz



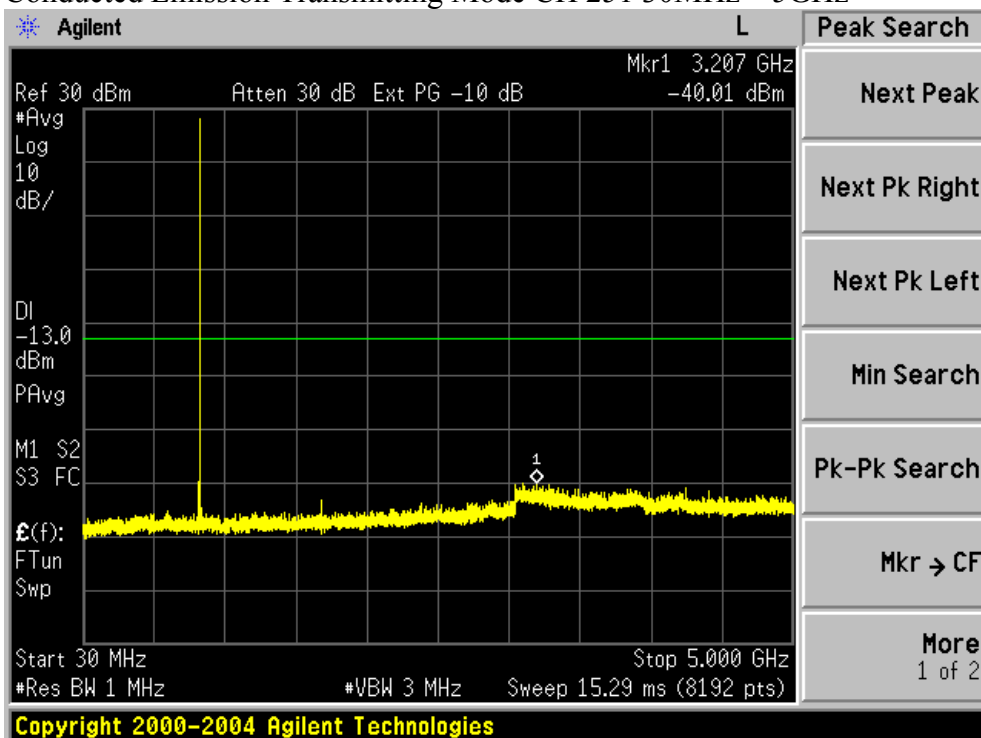
Conducted Emission Transmitting Mode CH 190 30MHz – 5GHz



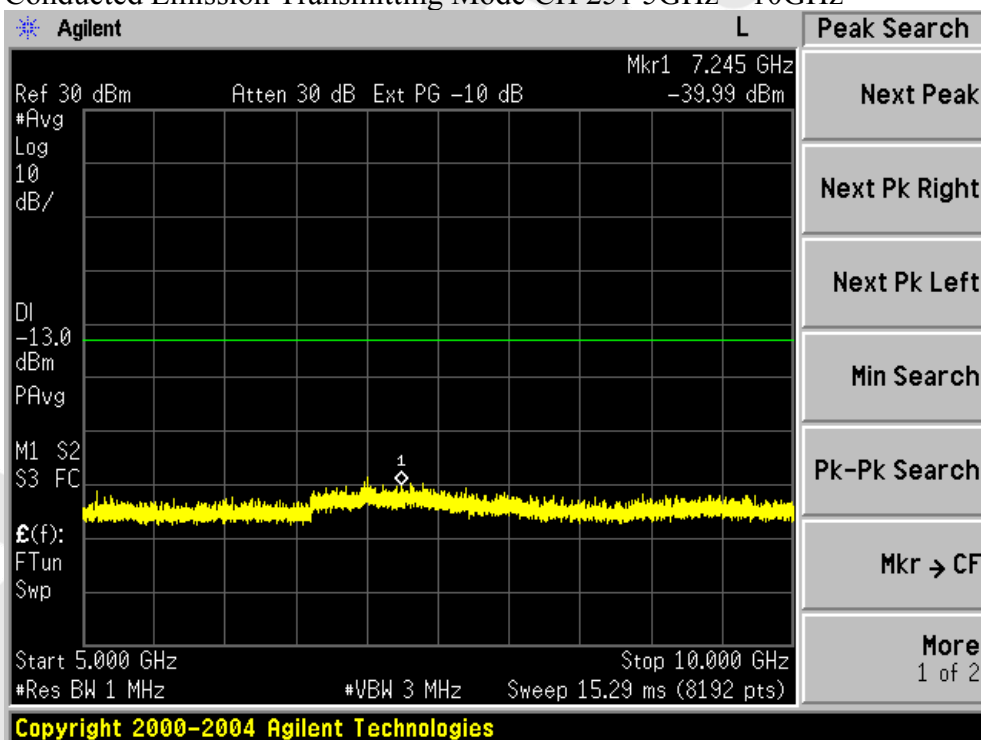
Conducted Emission Transmitting Mode CH 190 5GHz – 10GHz



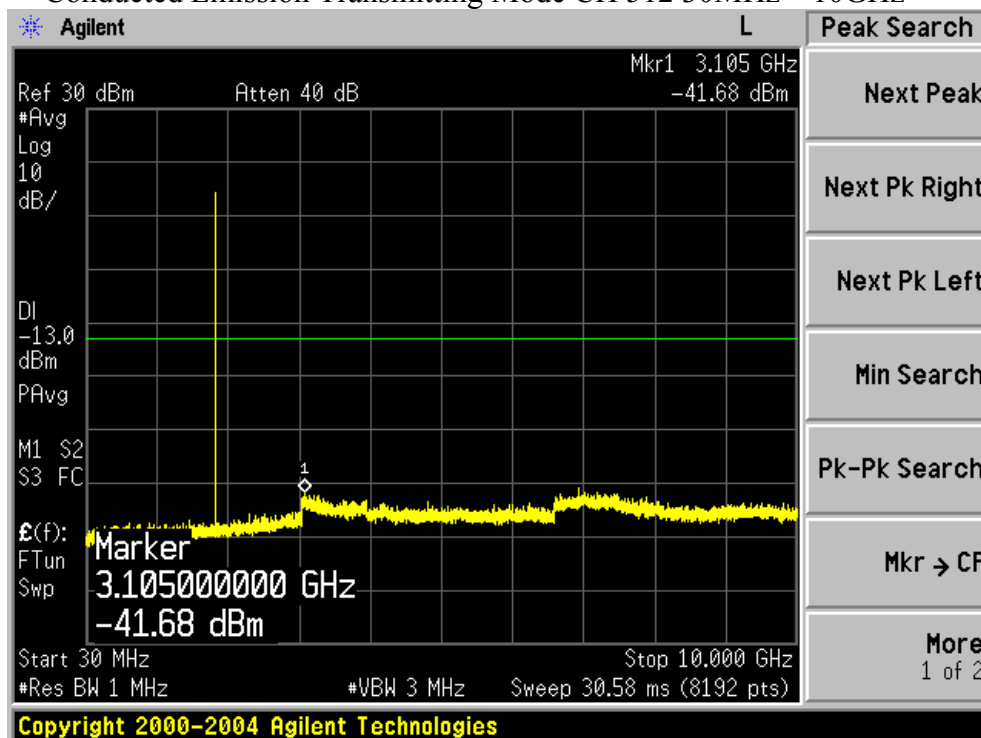
Conducted Emission Transmitting Mode CH 251 30MHz – 5GHz



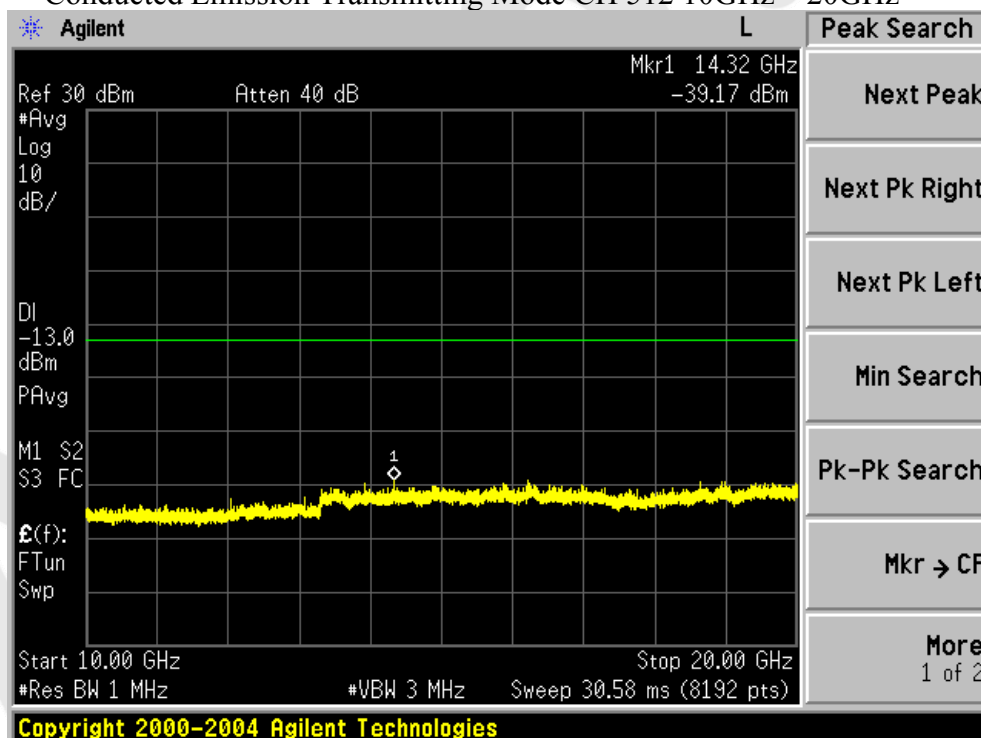
Conducted Emission Transmitting Mode CH 251 5GHz – 10GHz



CONDUCTED EMISSION IN PCS1900 BAND  
Conducted Emission Transmitting Mode CH 512 30MHz – 10GHz

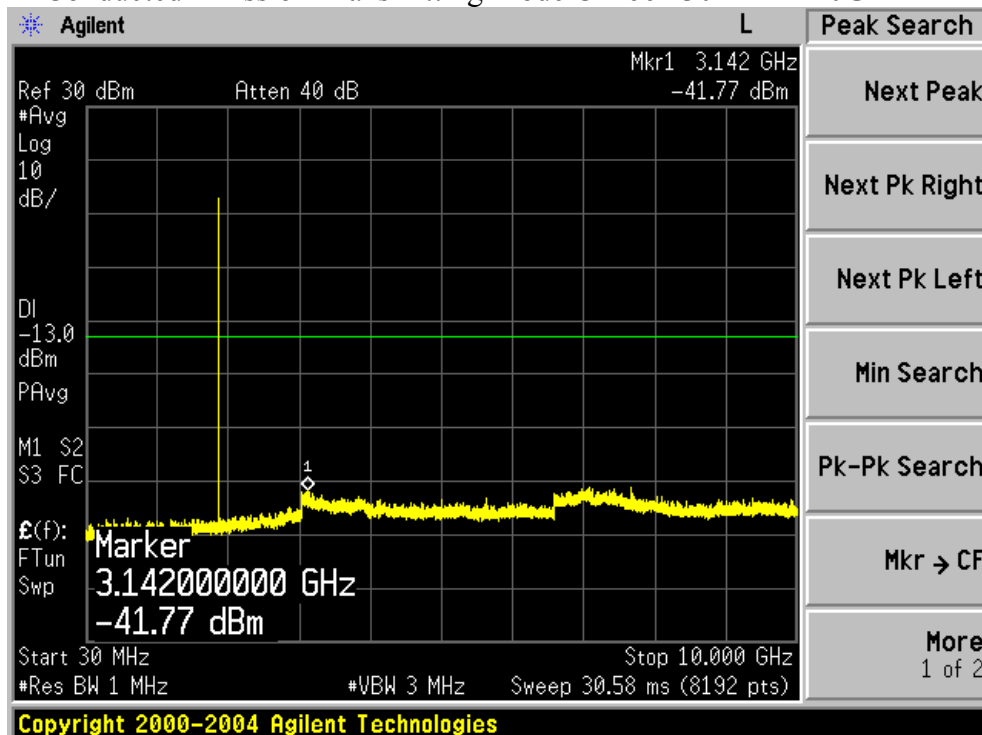


Conducted Emission Transmitting Mode CH 512 10GHz – 20GHz

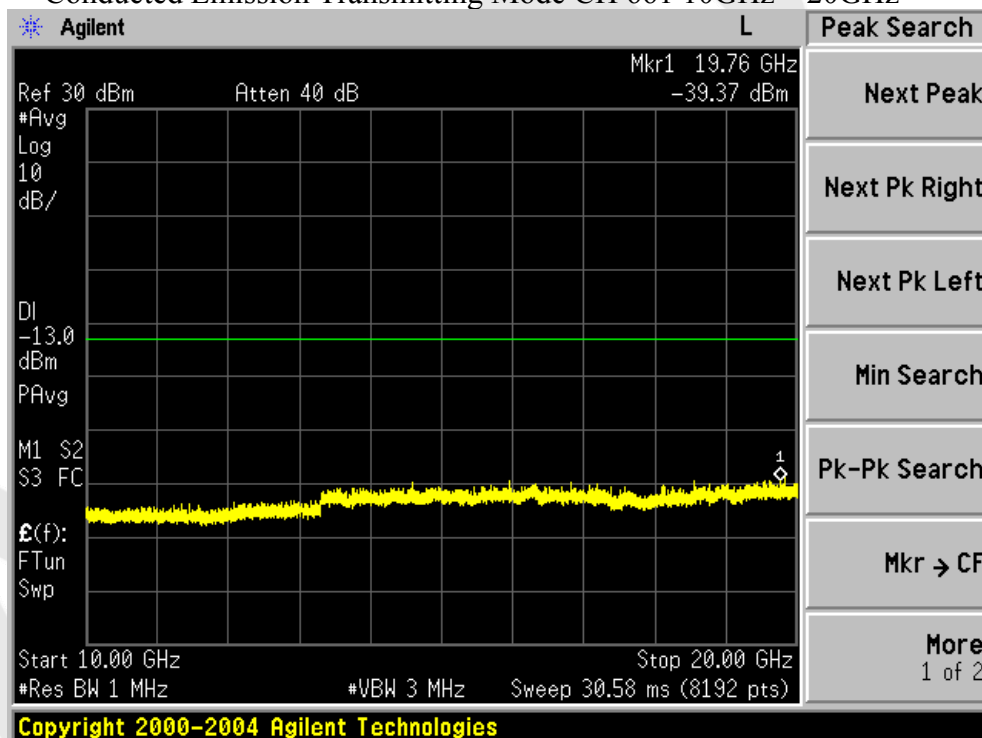




Conducted Emission Transmitting Mode CH 661 30MHz – 10GHz

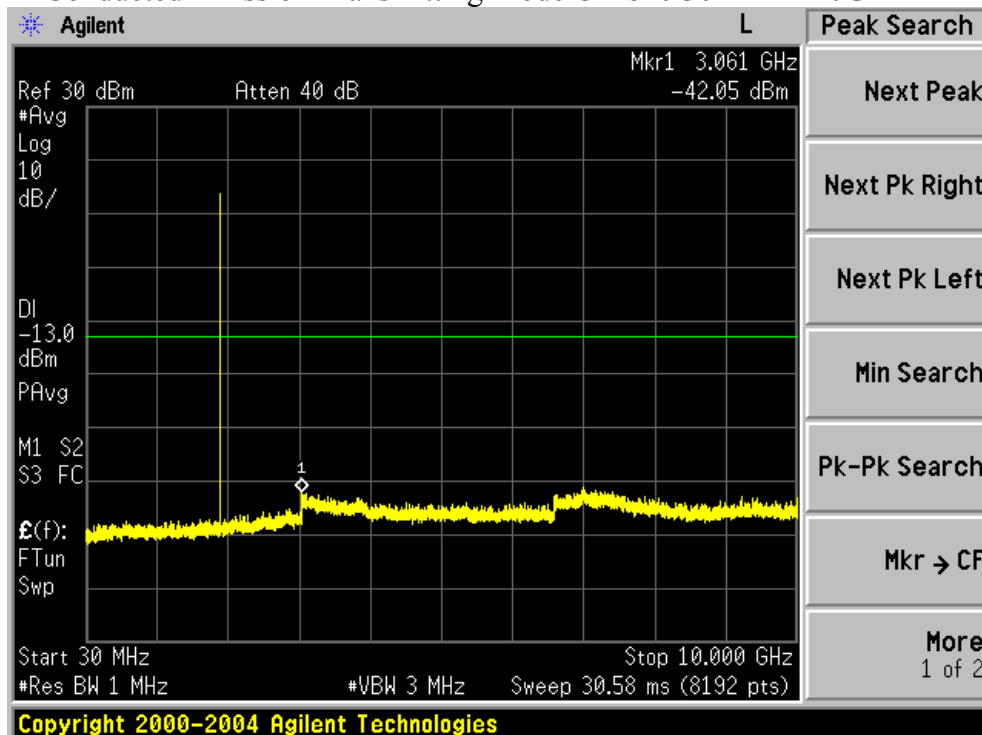


Conducted Emission Transmitting Mode CH 661 10GHz – 20GHz

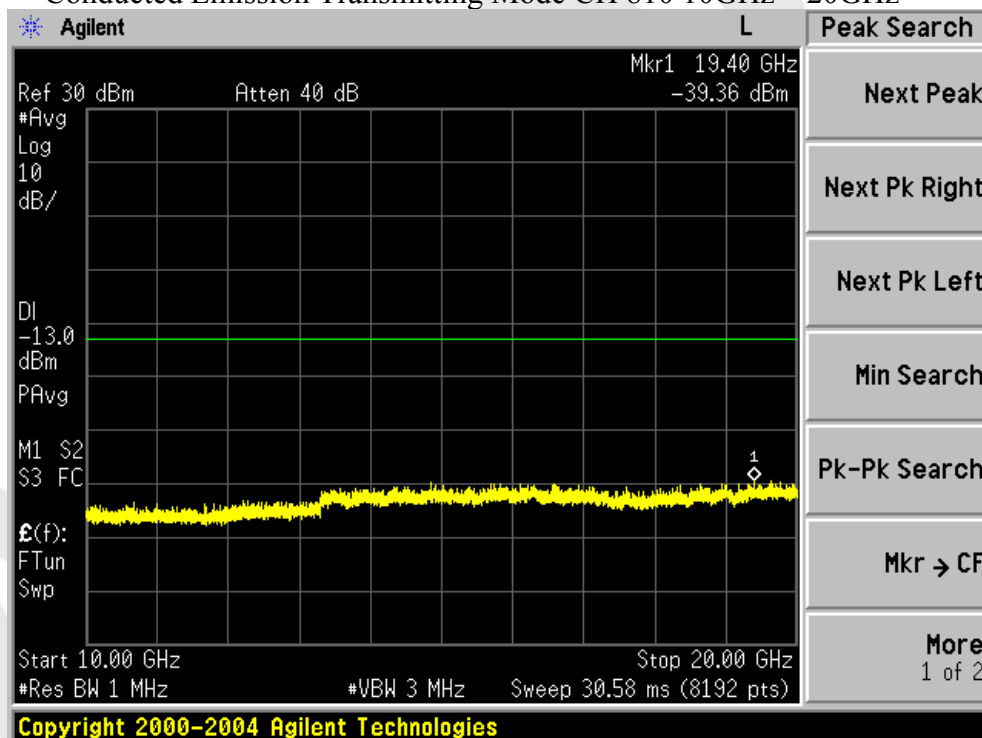




Conducted Emission Transmitting Mode CH 810 30MHz – 10GHz

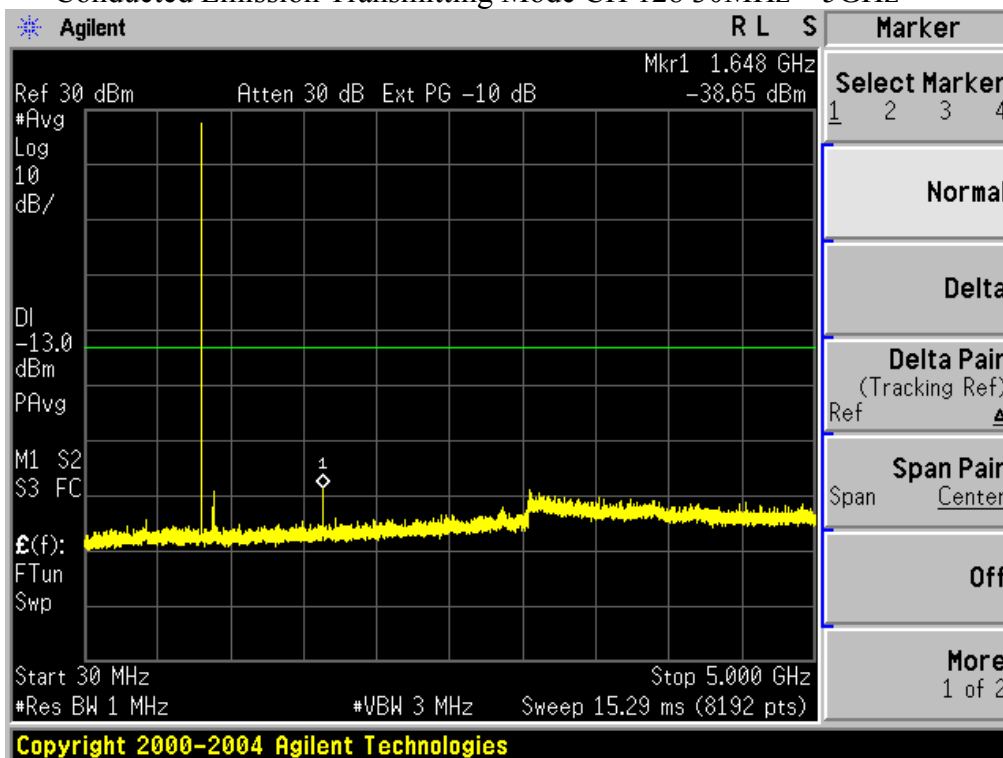


Conducted Emission Transmitting Mode CH 810 10GHz – 20GHz

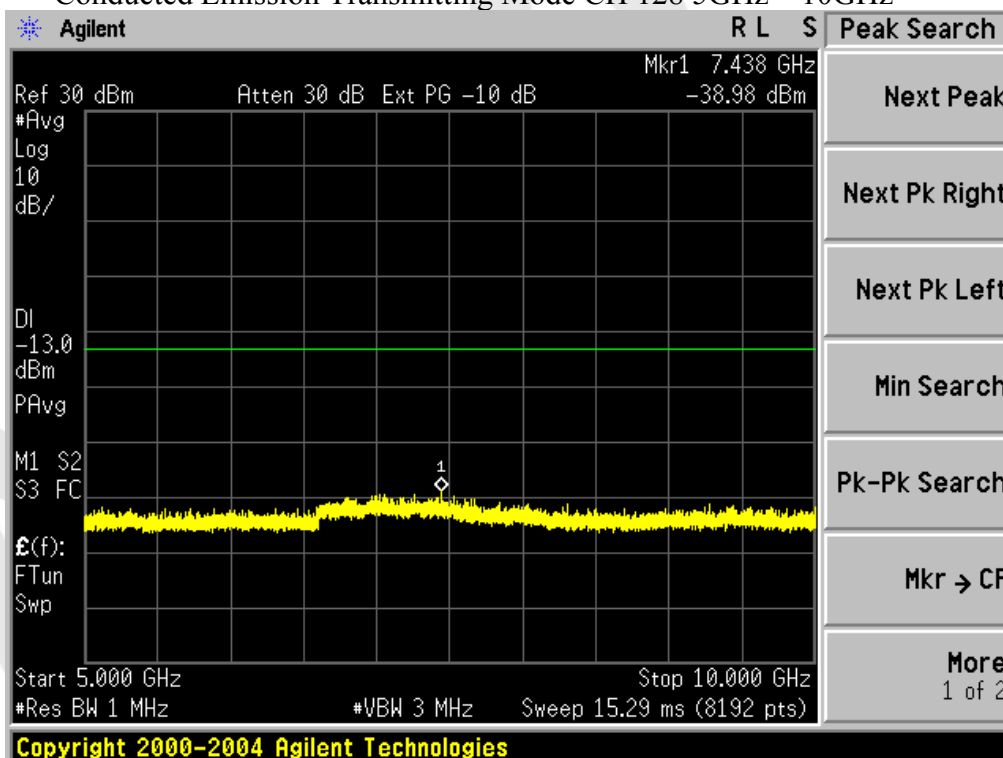


### CONDUCTED EMISSION IN GPRS850 BAND

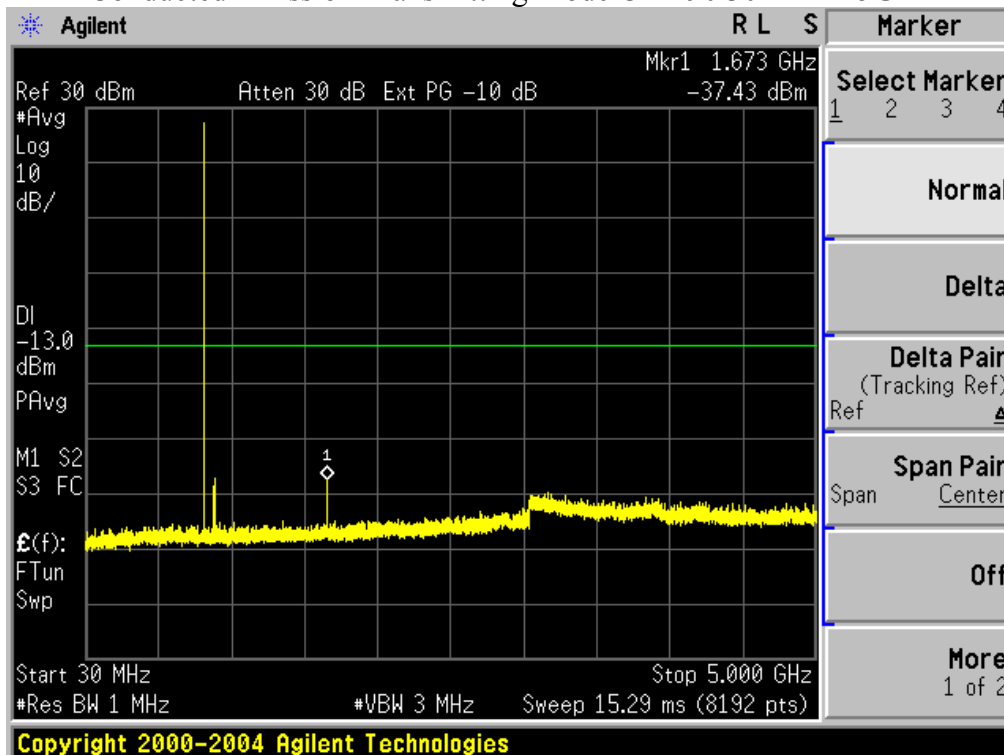
Conducted Emission Transmitting Mode CH 128 30MHz – 5GHz



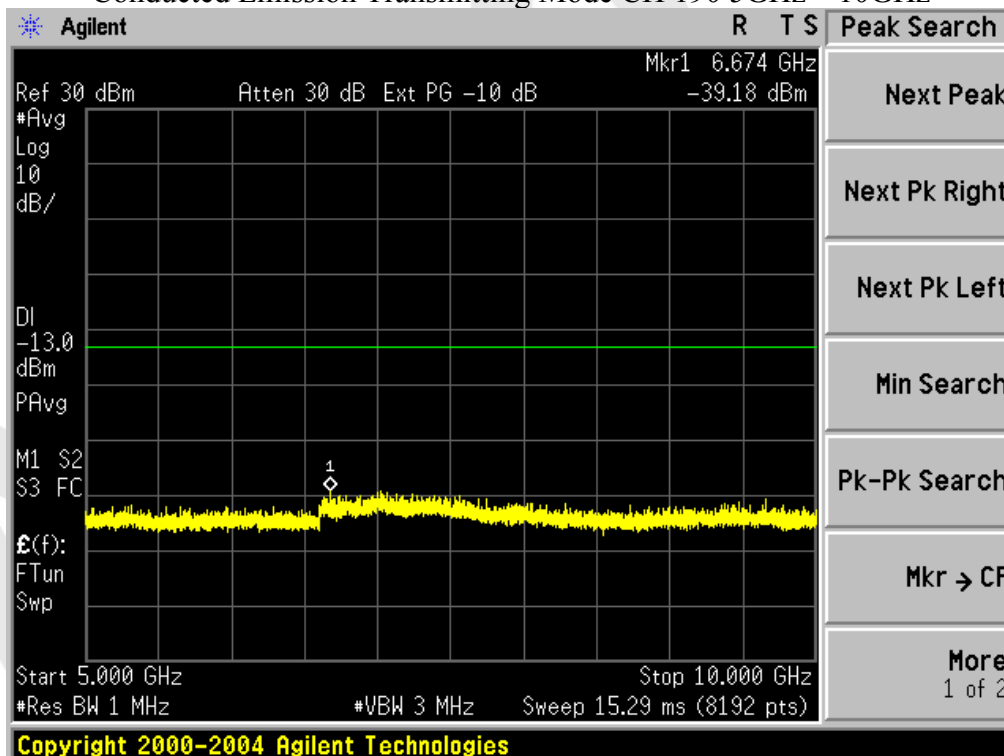
Conducted Emission Transmitting Mode CH 128 5GHz – 10GHz



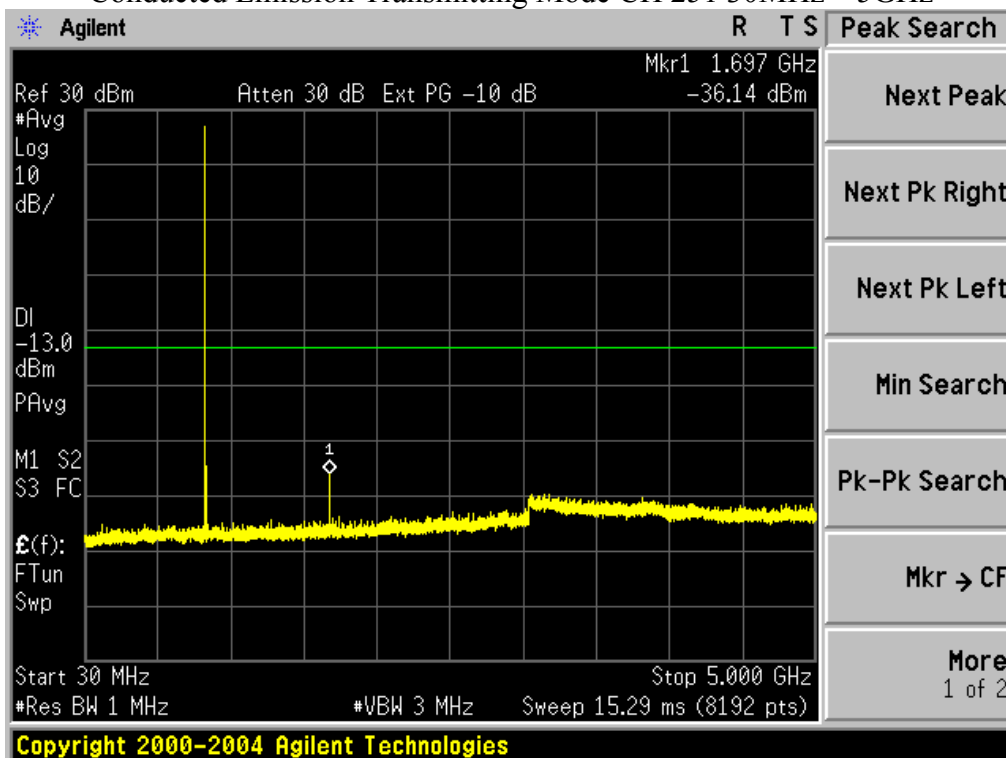
Conducted Emission Transmitting Mode CH 190 30MHz – 5GHz



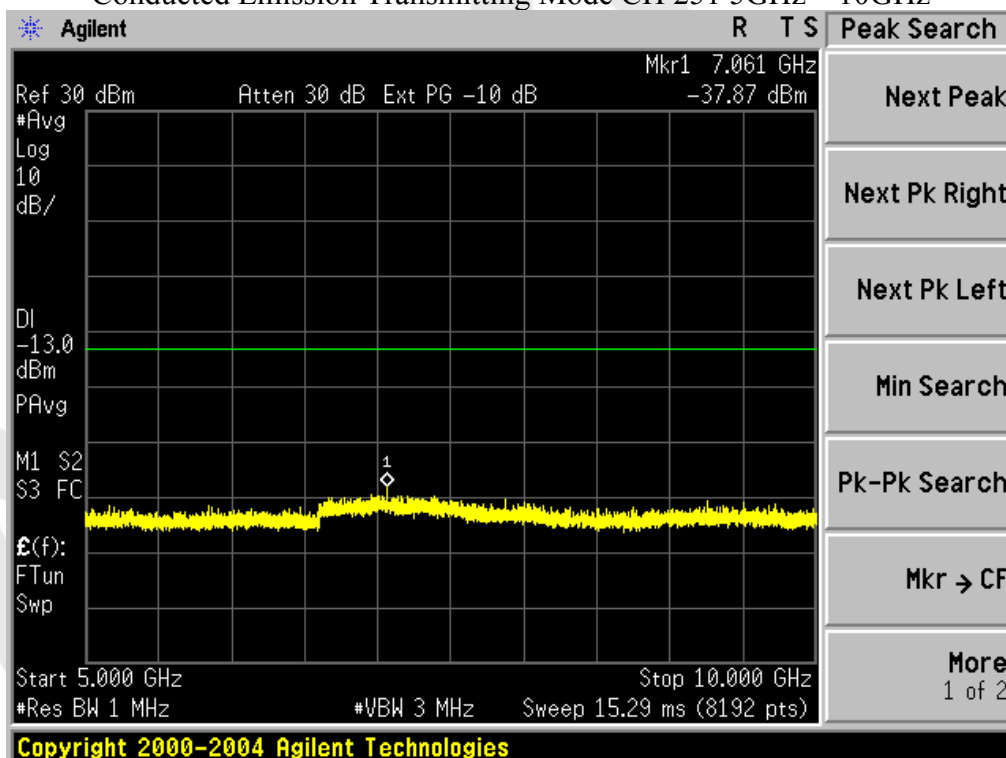
Conducted Emission Transmitting Mode CH 190 5GHz – 10GHz



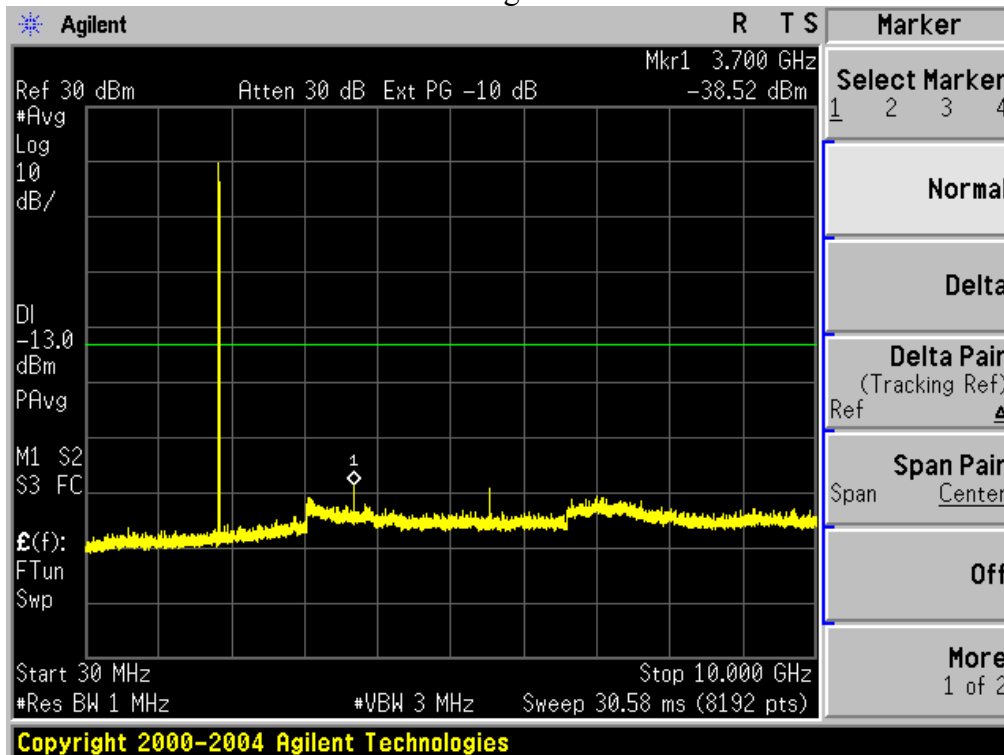
Conducted Emission Transmitting Mode CH 251 30MHz – 5GHz



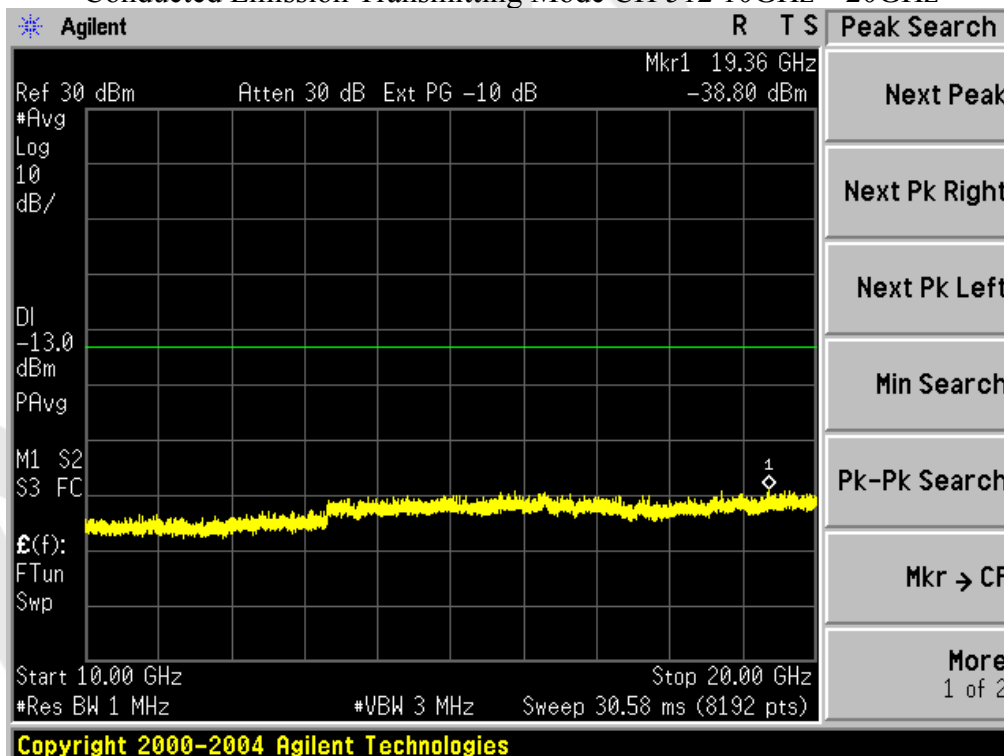
Conducted Emission Transmitting Mode CH 251 5GHz – 10GHz



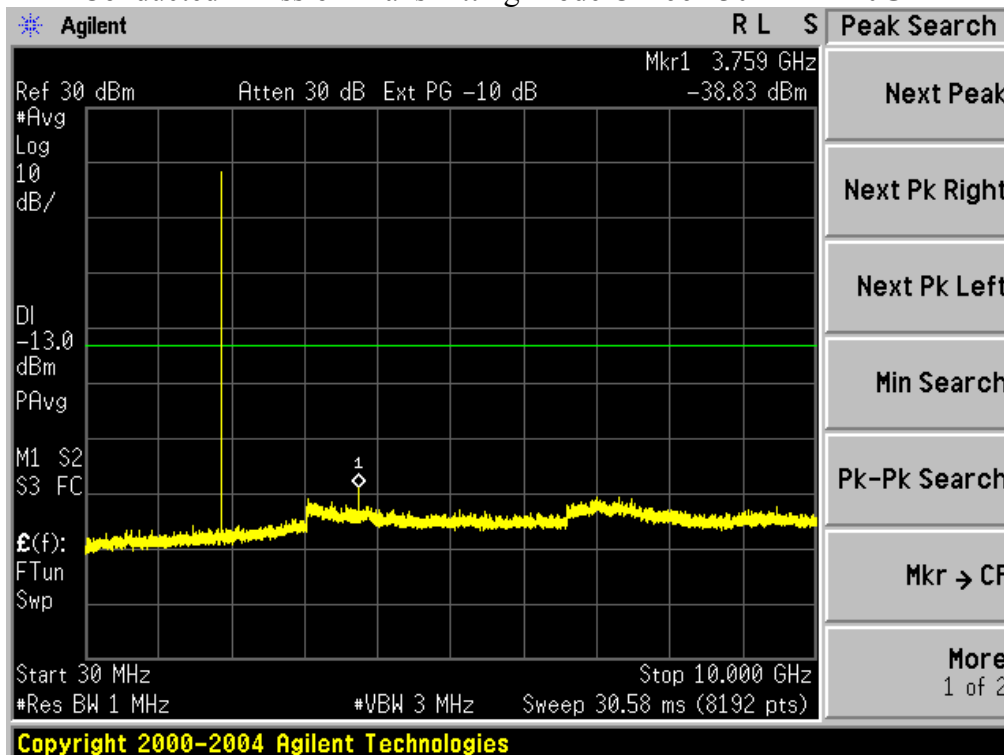
CONDUCTED EMISSION IN GPRS1900 BAND  
Conducted Emission Transmitting Mode CH 512 30MHz – 10GHz



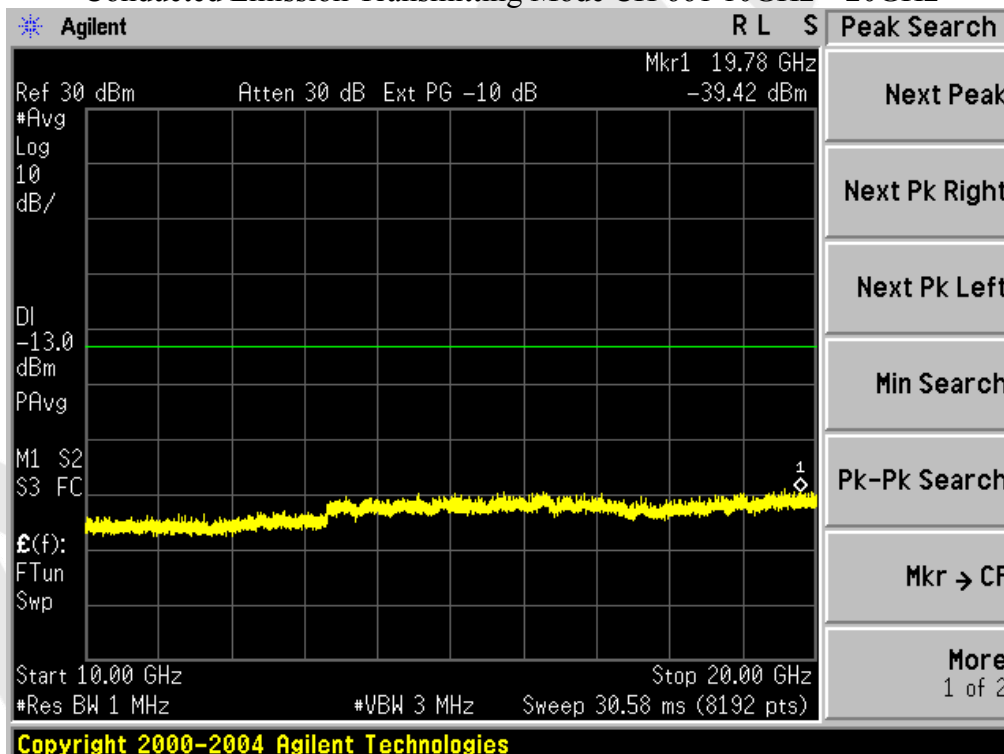
Conducted Emission Transmitting Mode CH 512 10GHz – 20GHz



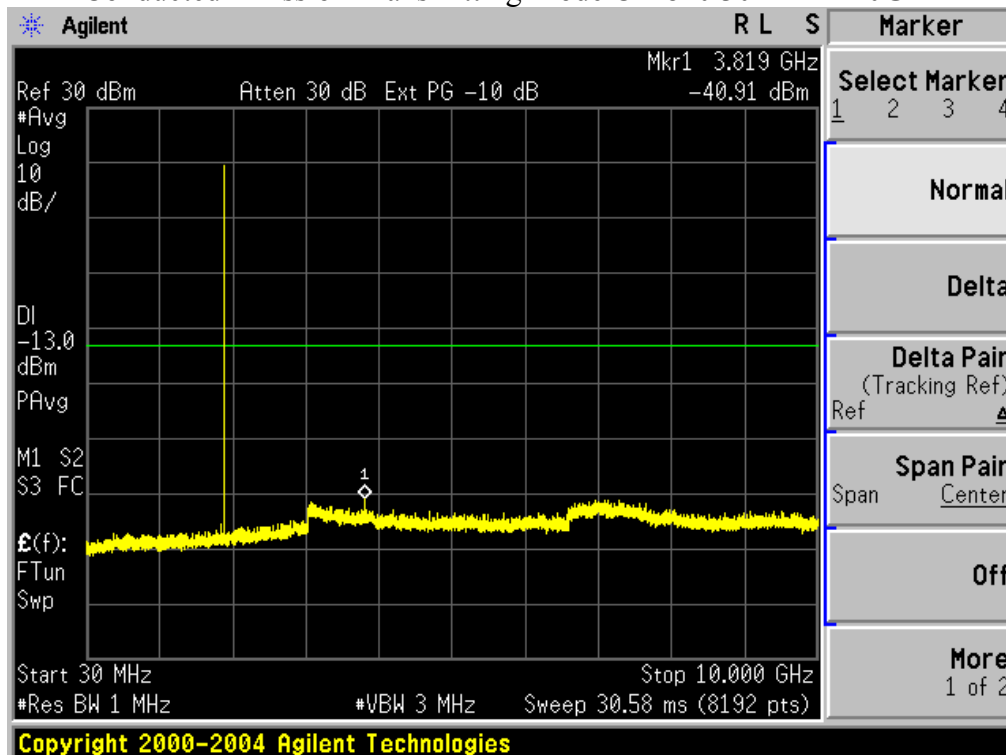
Conducted Emission Transmitting Mode CH 661 30MHz – 10GHz



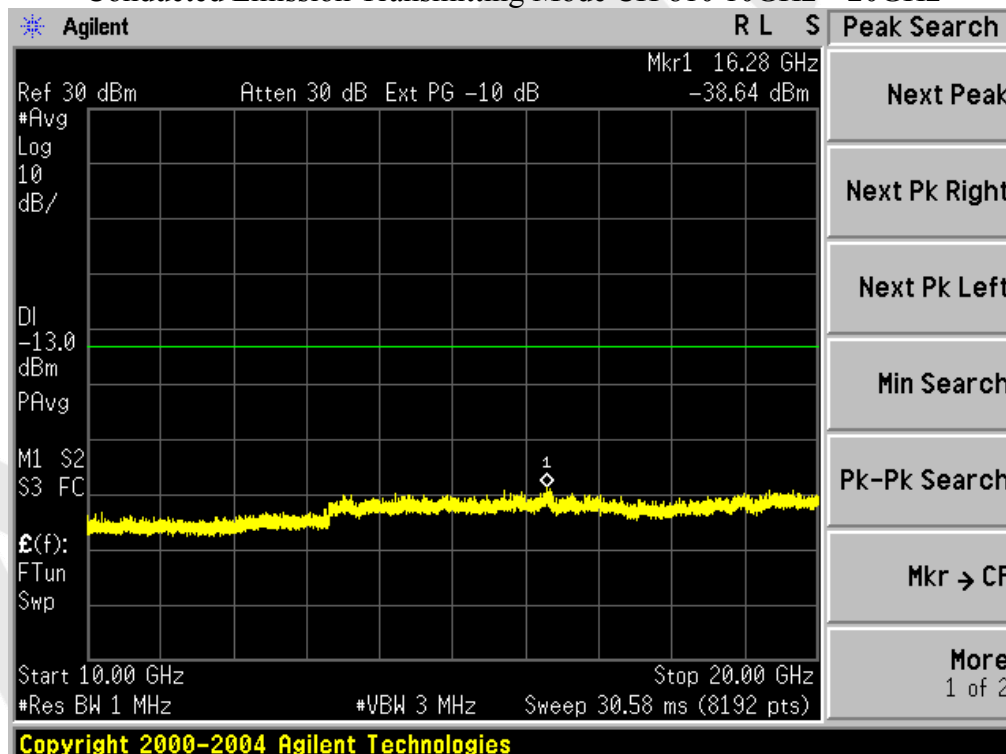
Conducted Emission Transmitting Mode CH 661 10GHz – 20GHz



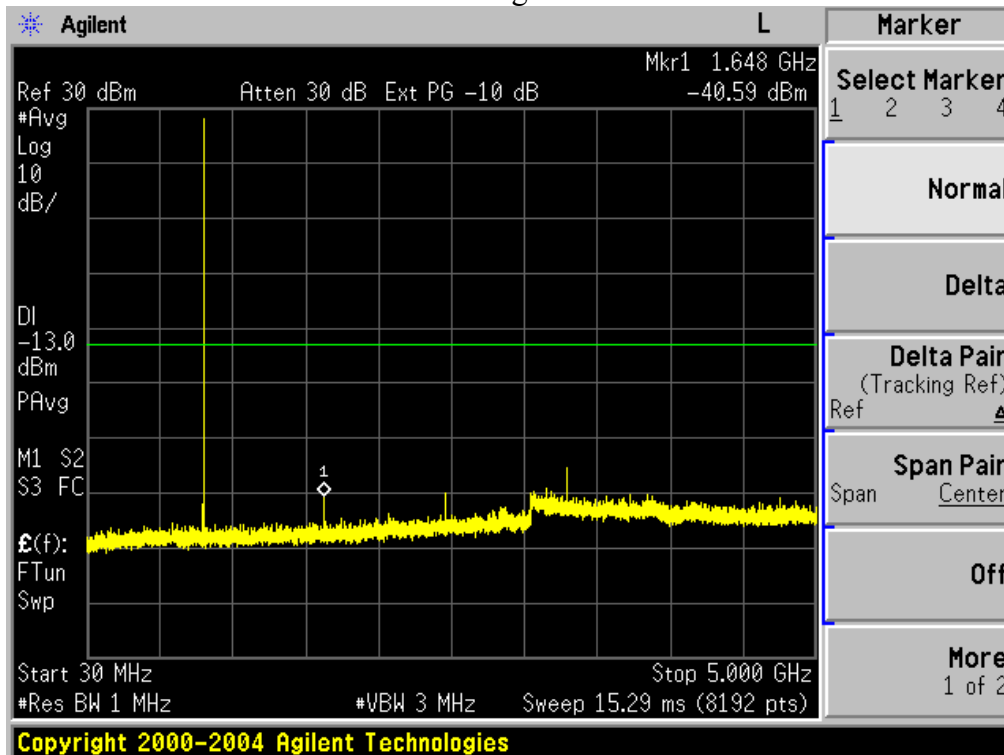
Conducted Emission Transmitting Mode CH 810 30MHz – 10GHz



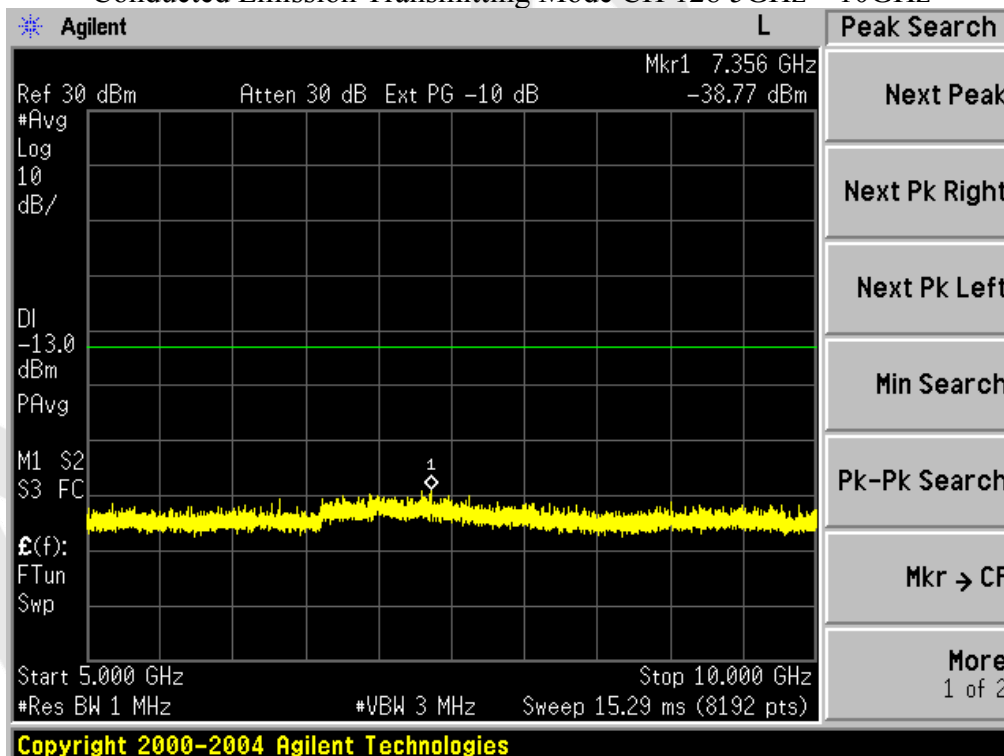
Conducted Emission Transmitting Mode CH 810 10GHz – 20GHz



CONDUCTED EMISSION IN EGPRS 850 BAND  
Conducted Emission Transmitting Mode CH 128 30MHz – 5GHz

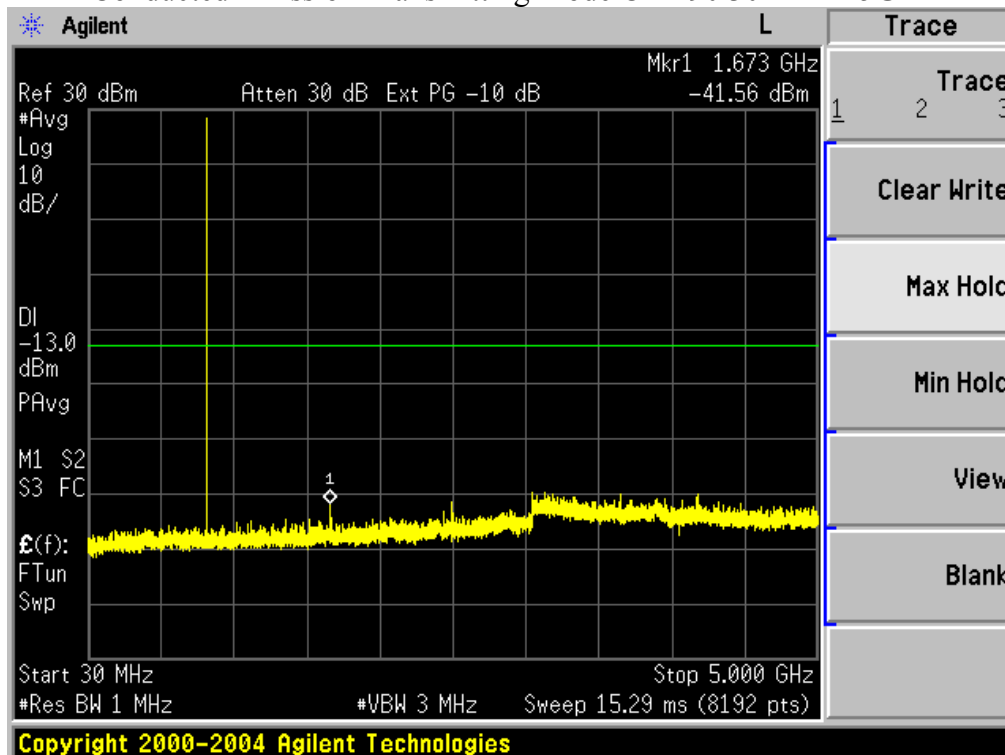


Conducted Emission Transmitting Mode CH 128 5GHz – 10GHz

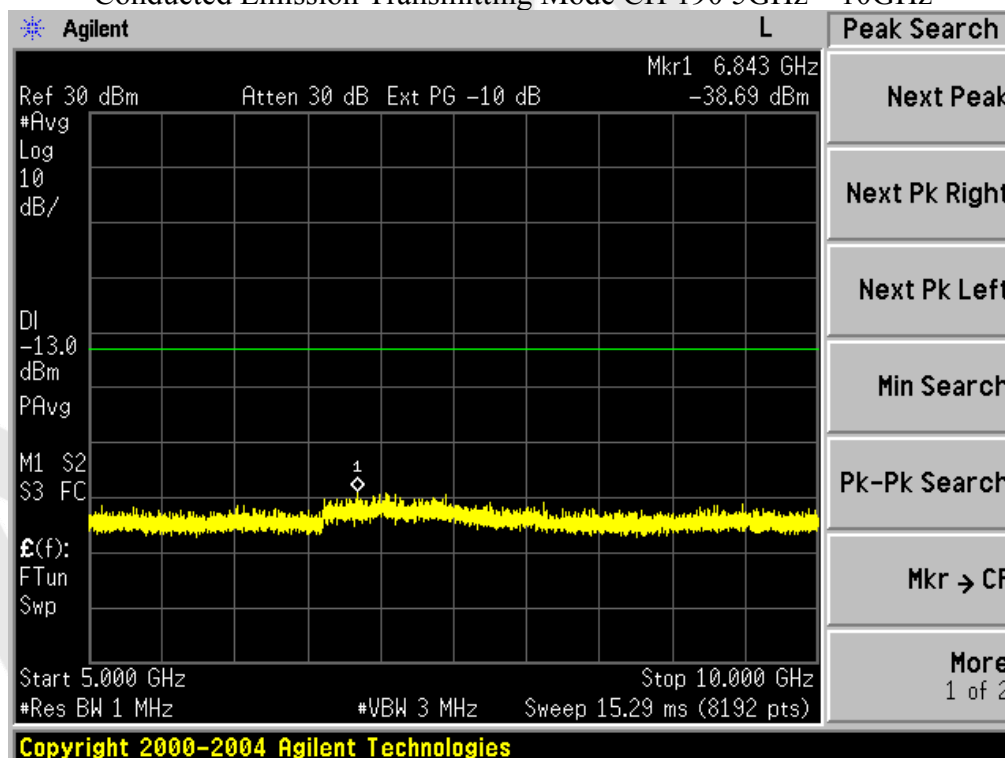




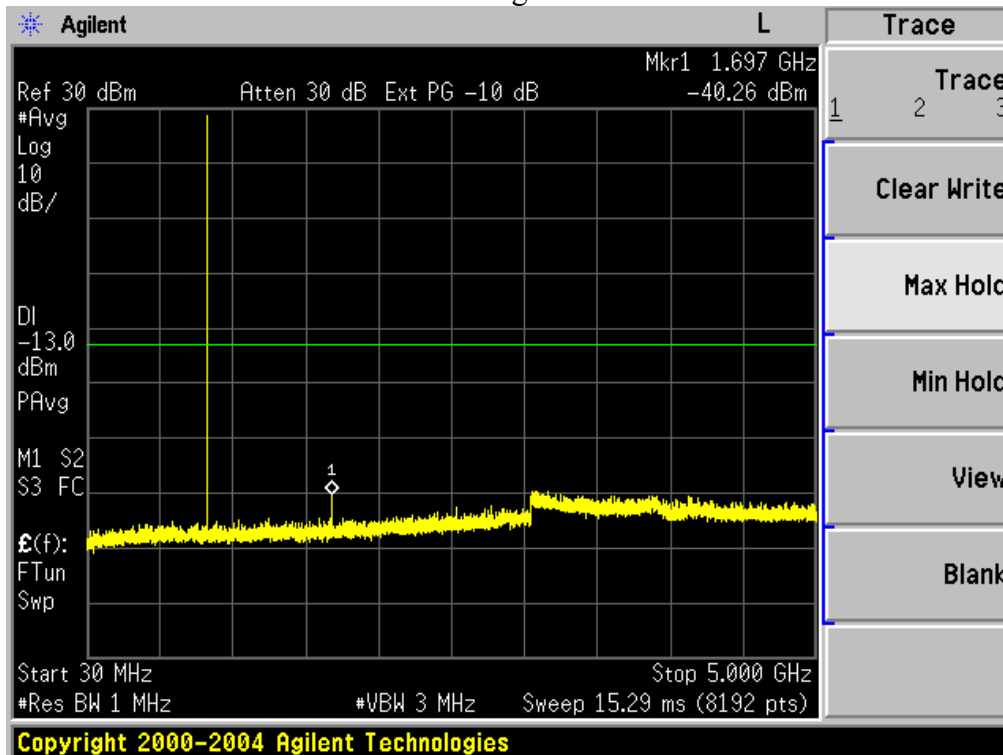
Conducted Emission Transmitting Mode CH 190 30MHz – 5GHz



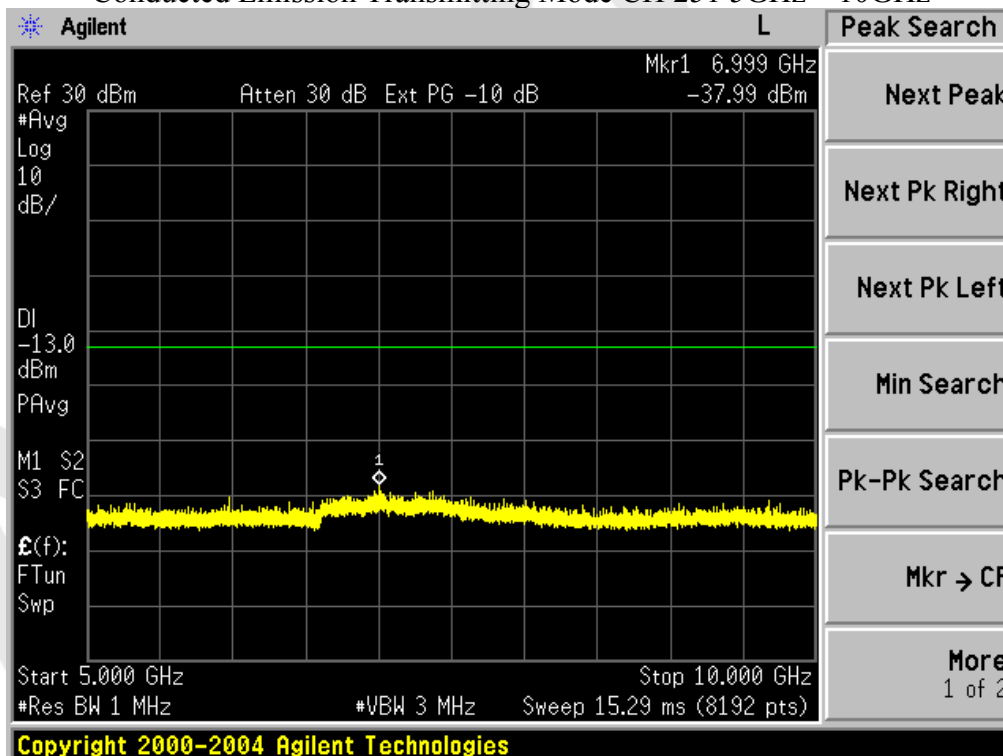
Conducted Emission Transmitting Mode CH 190 5GHz – 10GHz



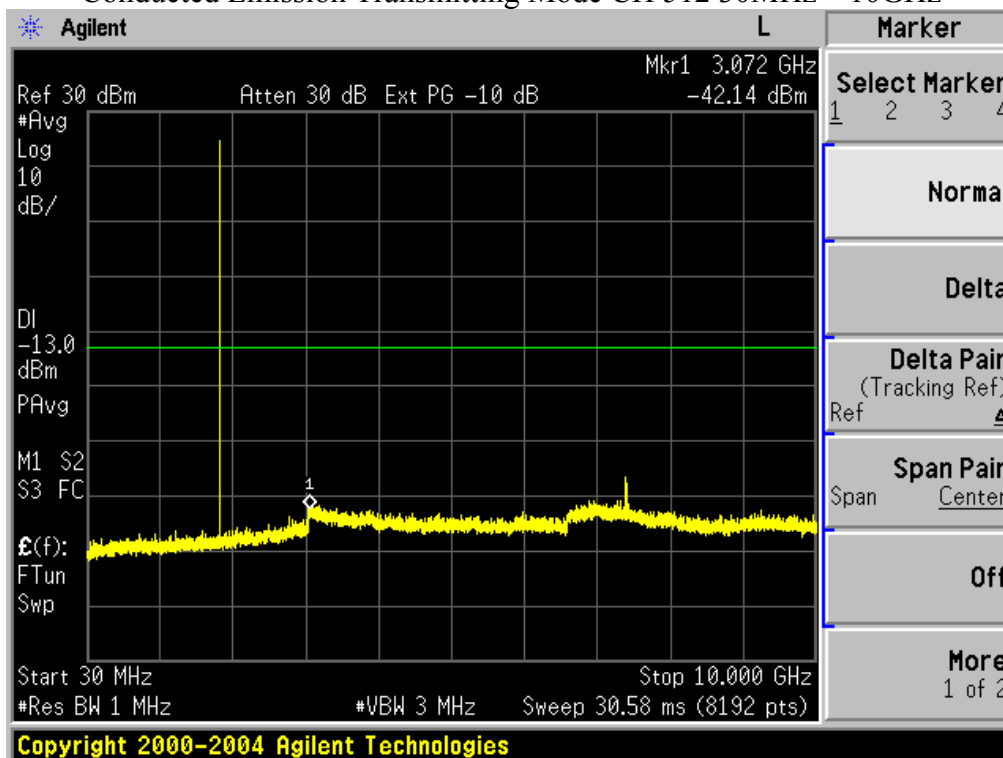
Conducted Emission Transmitting Mode CH 251 30MHz – 5GHz



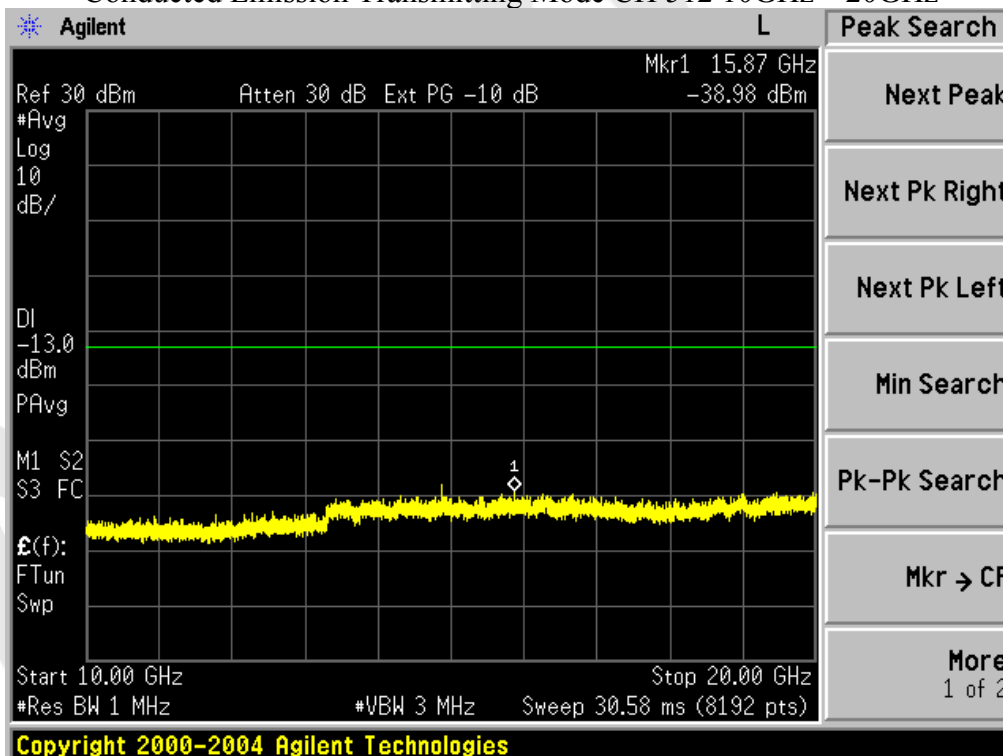
Conducted Emission Transmitting Mode CH 251 5GHz – 10GHz



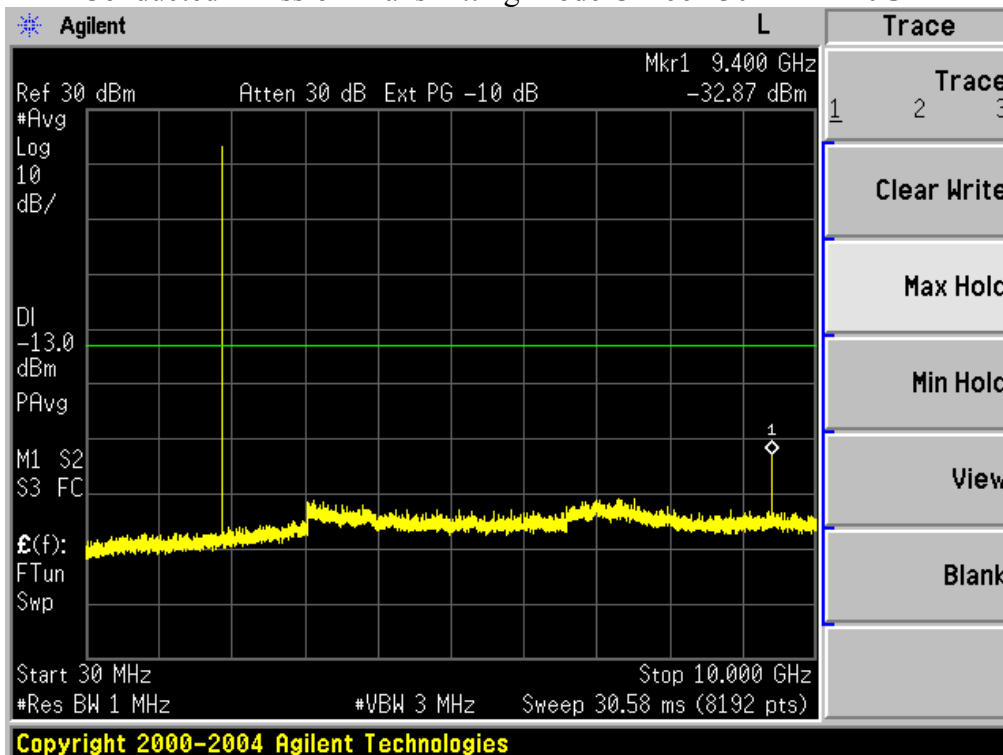
CONDUCTED EMISSION IN EGPRS1900 BAND  
Conducted Emission Transmitting Mode CH 512 30MHz – 10GHz



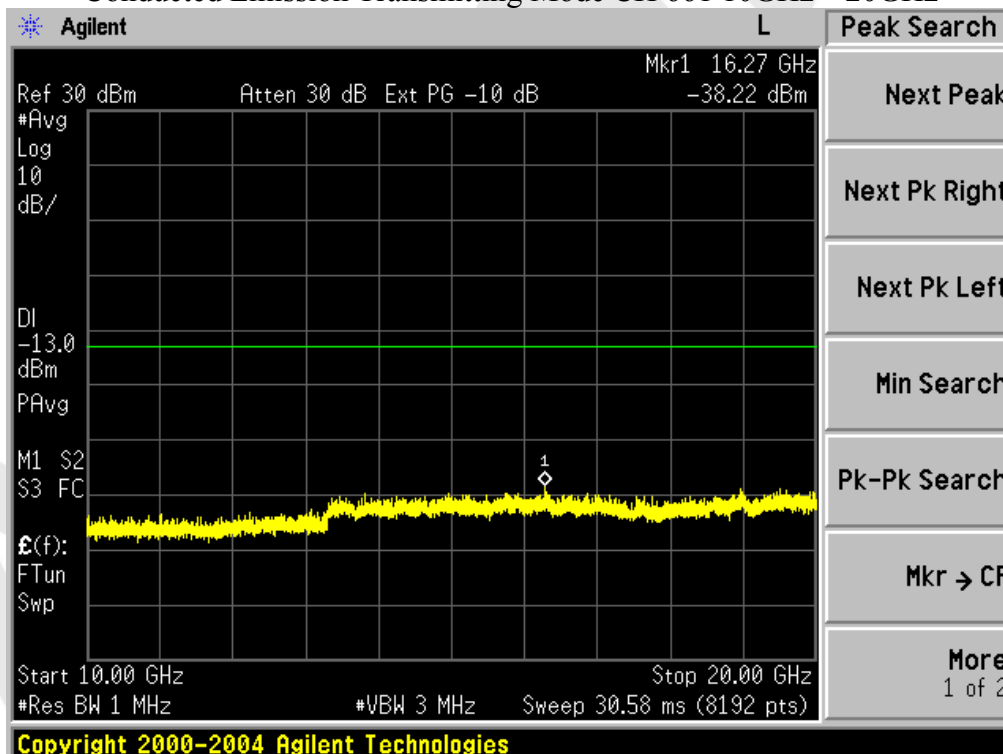
Conducted Emission Transmitting Mode CH 512 10GHz – 20GHz



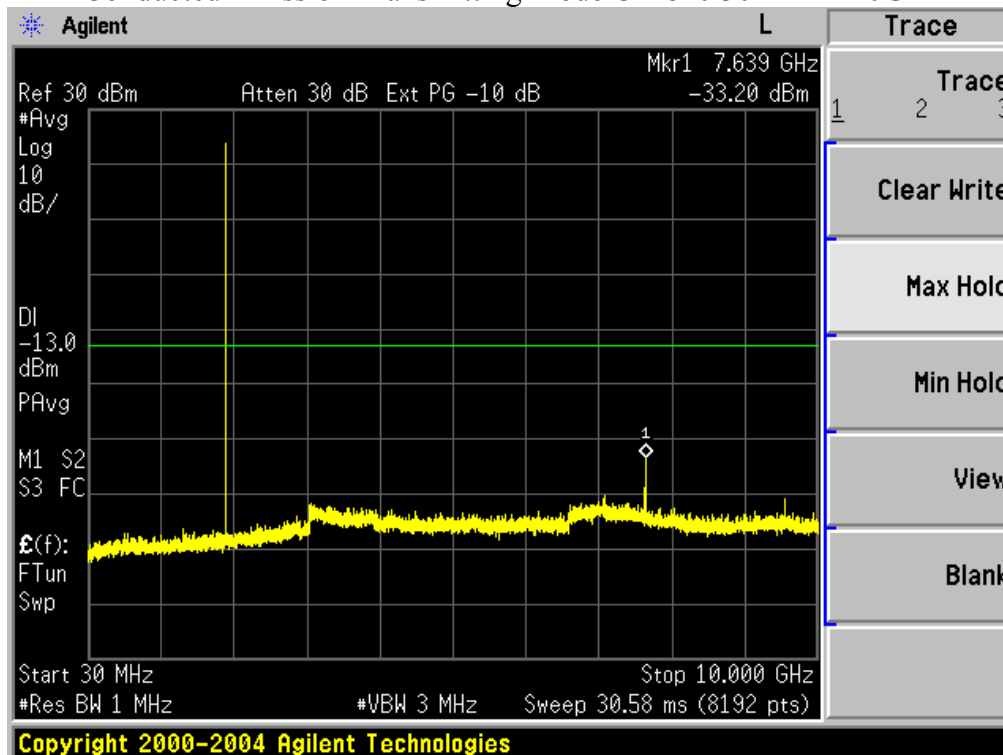
Conducted Emission Transmitting Mode CH 661 30MHz – 10GHz



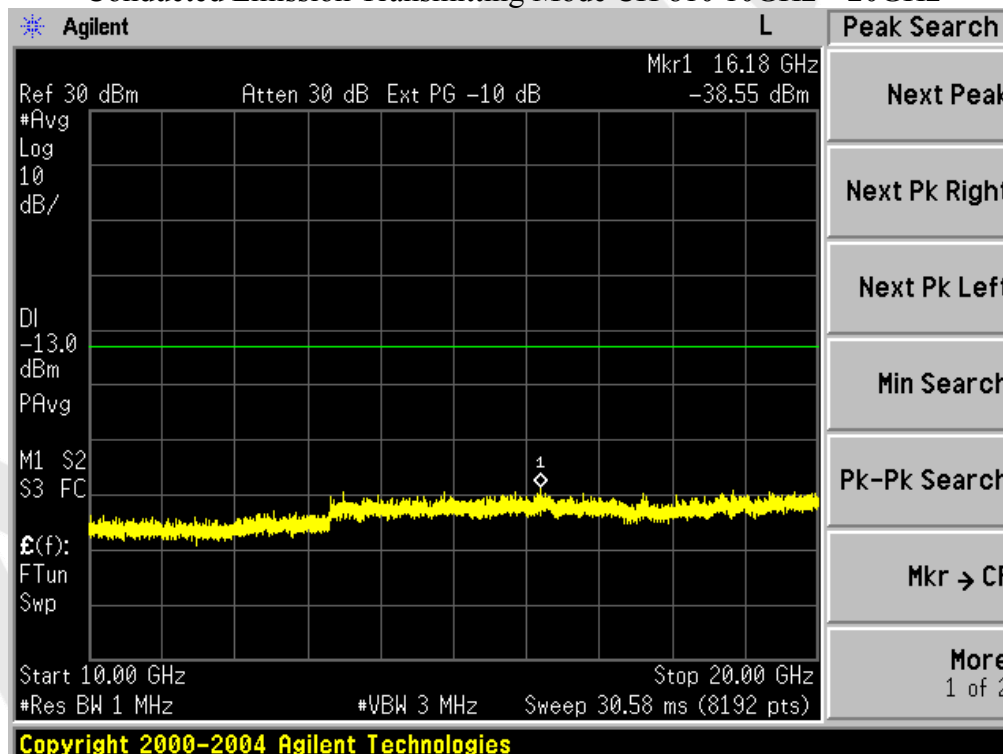
Conducted Emission Transmitting Mode CH 661 10GHz – 20GHz



Conducted Emission Transmitting Mode CH 810 30MHz – 10GHz

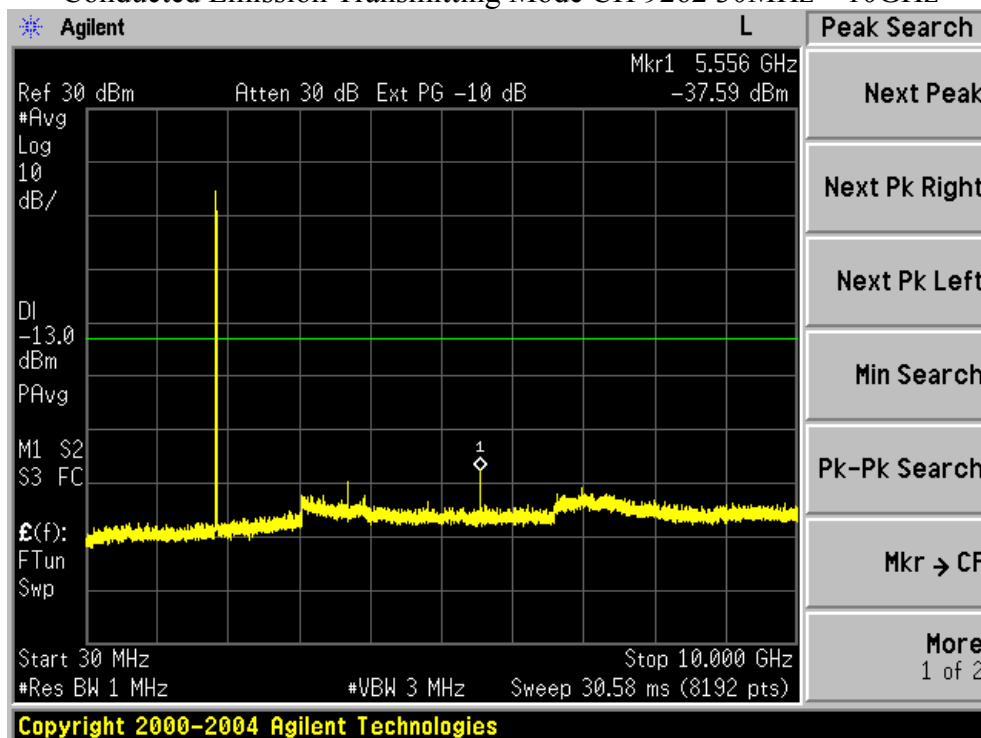


Conducted Emission Transmitting Mode CH 810 10GHz – 20GHz

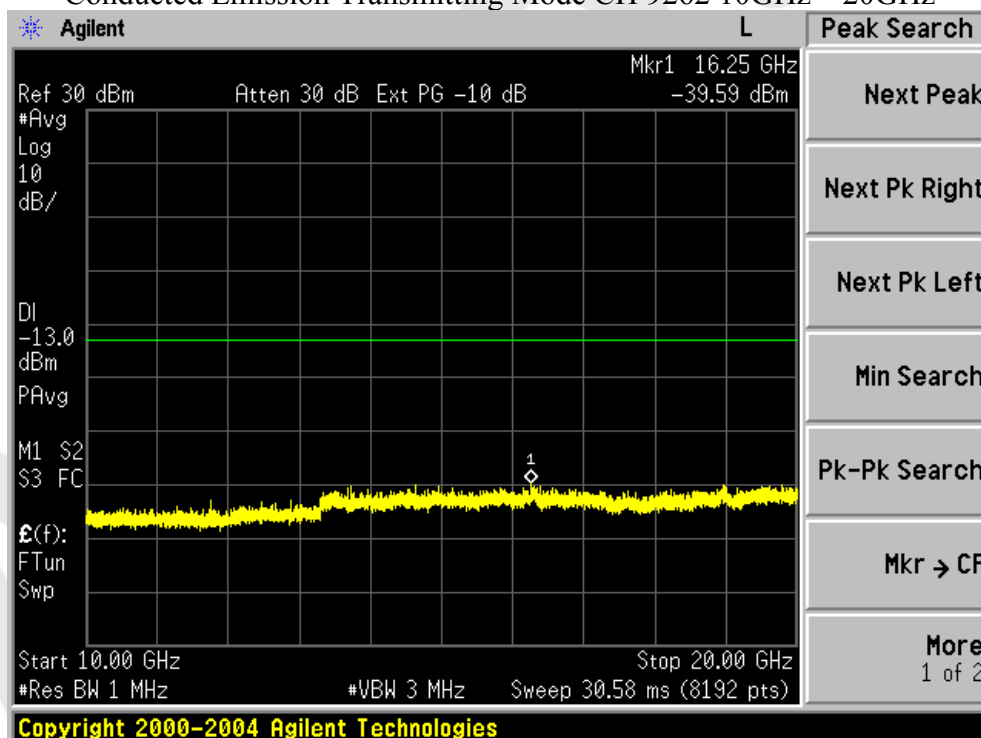


# CONDUCTED EMISSION IN UMTS band II

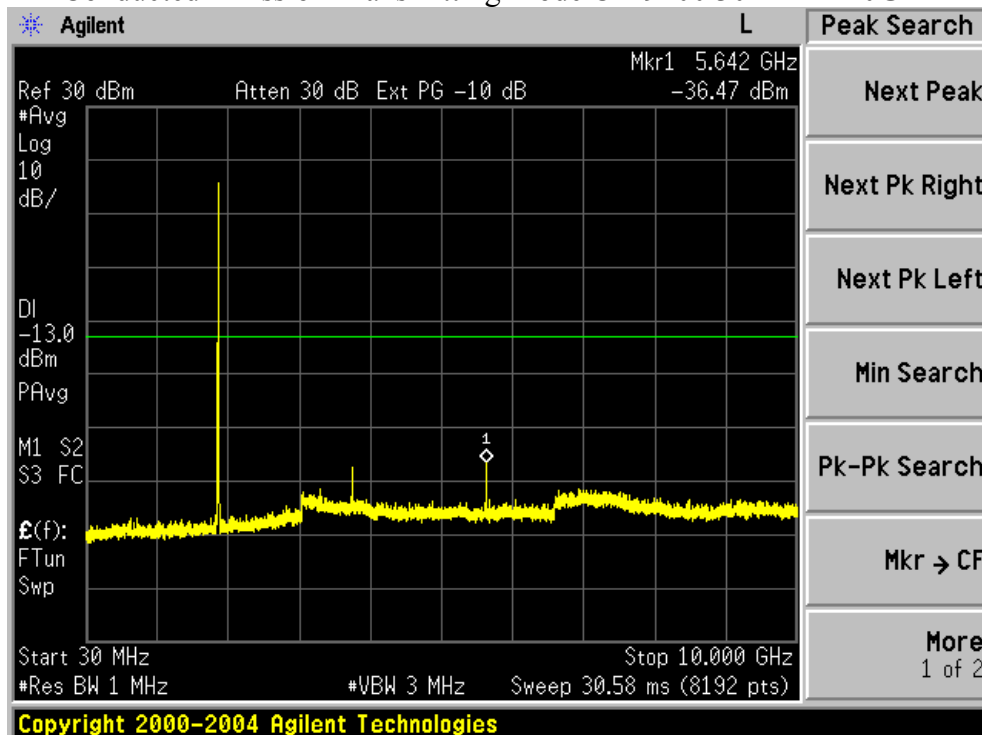
Conducted Emission Transmitting Mode CH 9262 30MHz – 10GHz



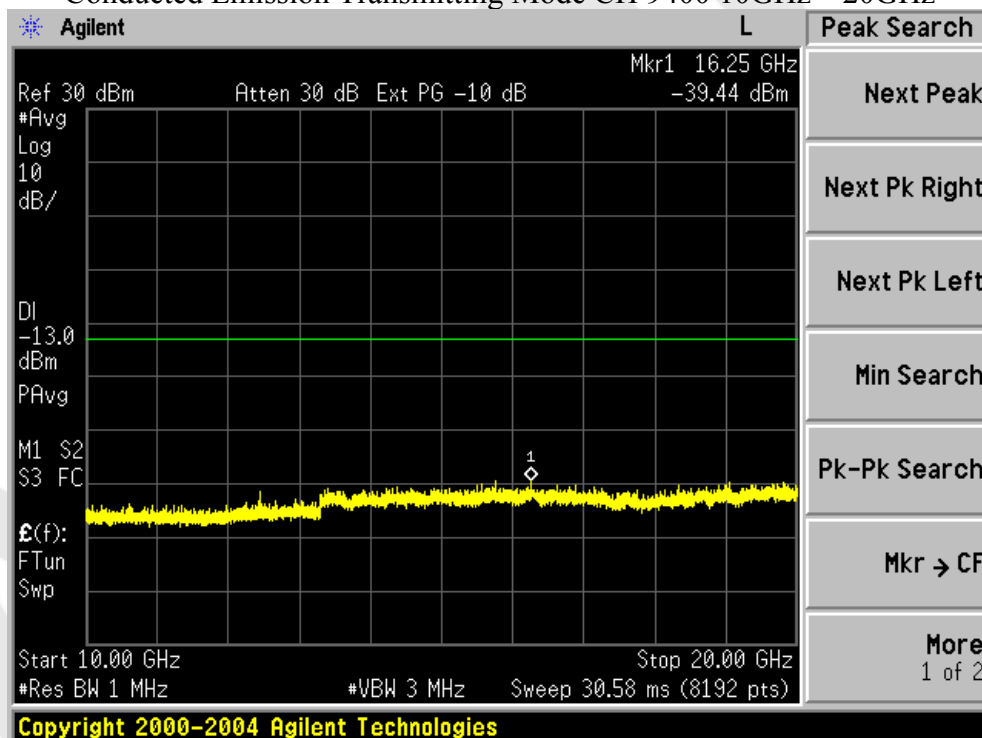
Conducted Emission Transmitting Mode CH 9262 10GHz – 20GHz



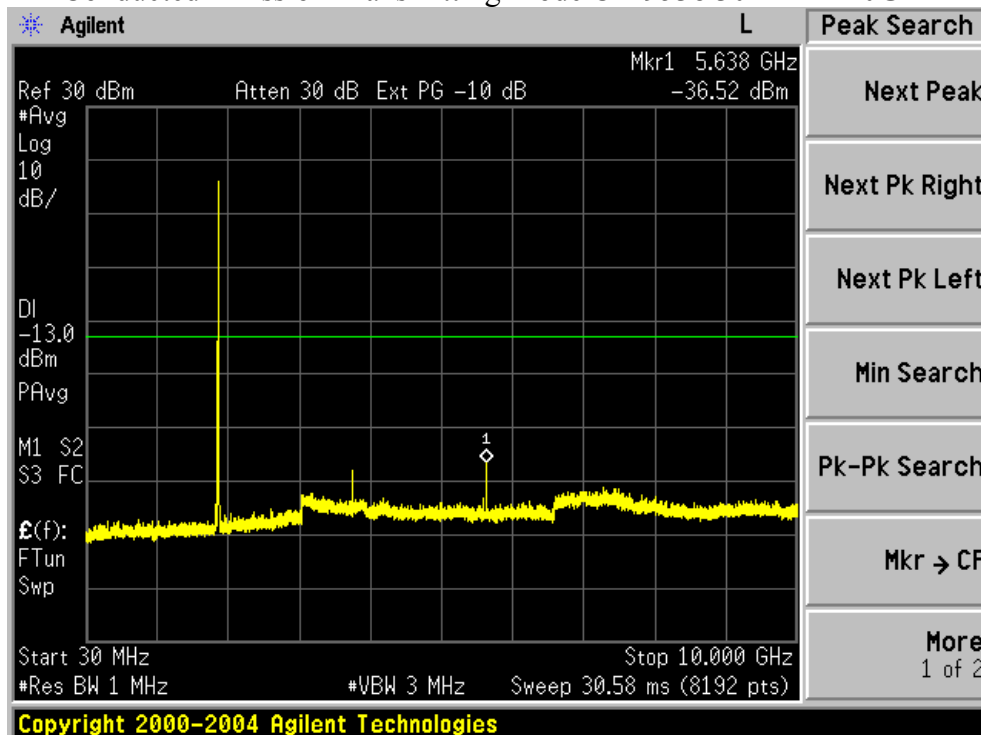
Conducted Emission Transmitting Mode CH 9400 30MHz – 10GHz



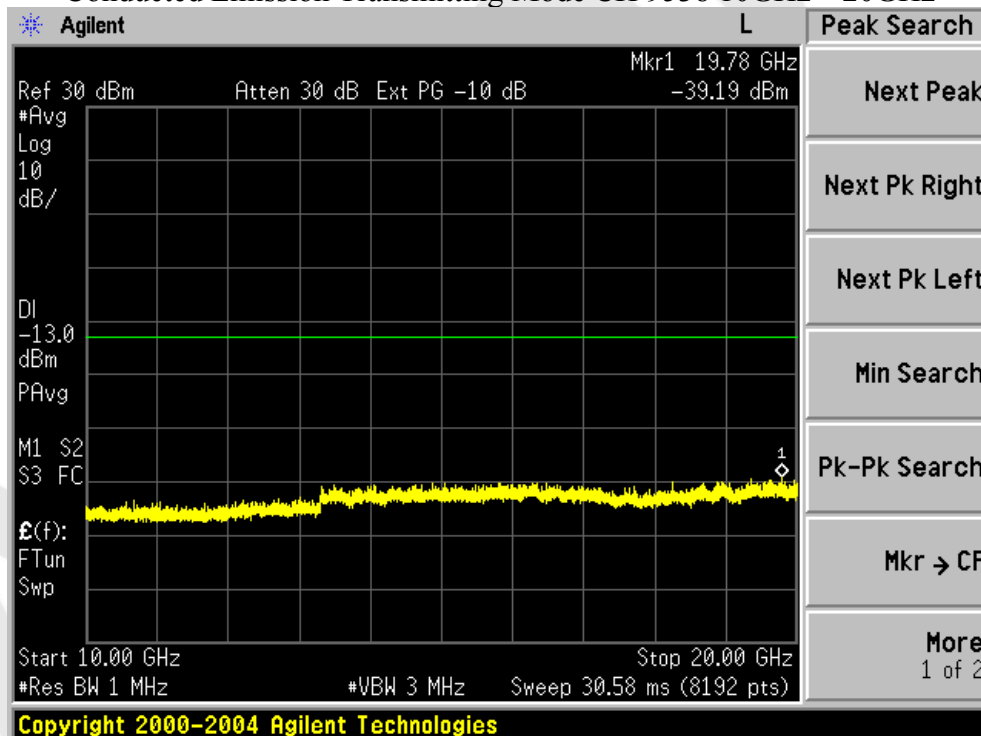
Conducted Emission Transmitting Mode CH 9400 10GHz – 20GHz



Conducted Emission Transmitting Mode CH 9538 30MHz – 10GHz



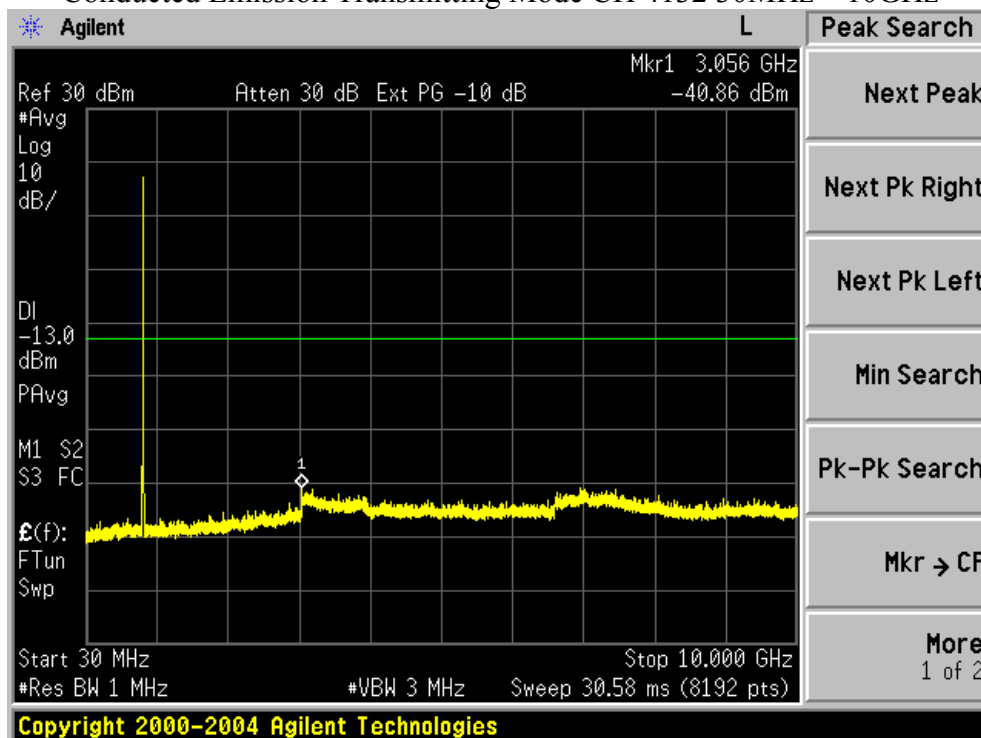
Conducted Emission Transmitting Mode CH 9538 10GHz – 20GHz



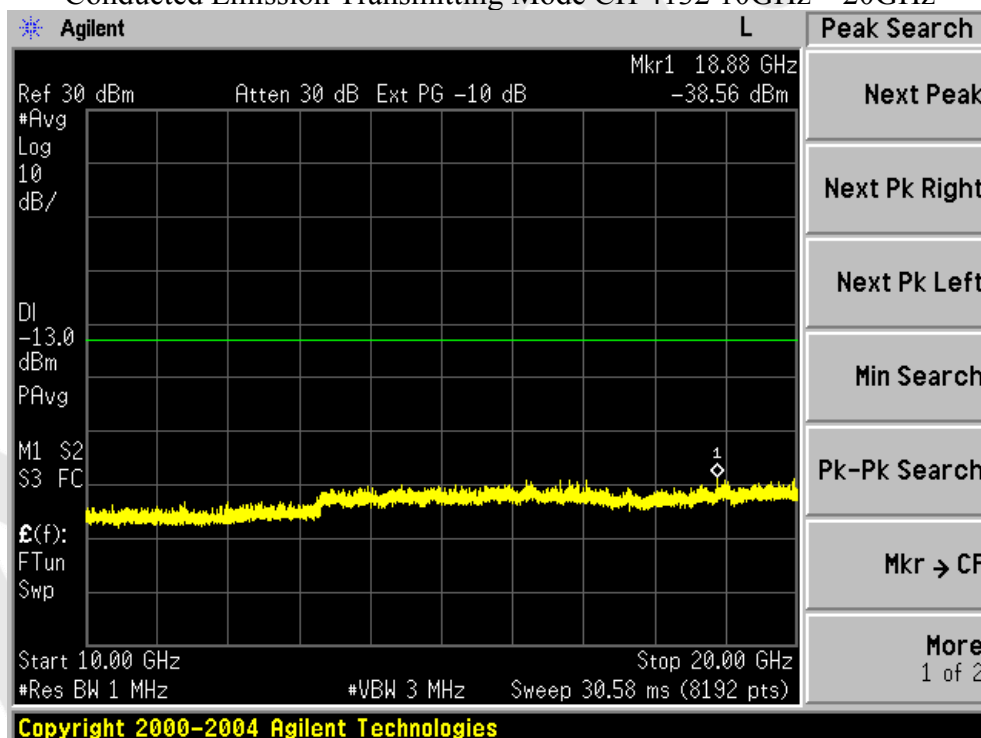


# CONDUCTED EMISSION IN UMTS band V

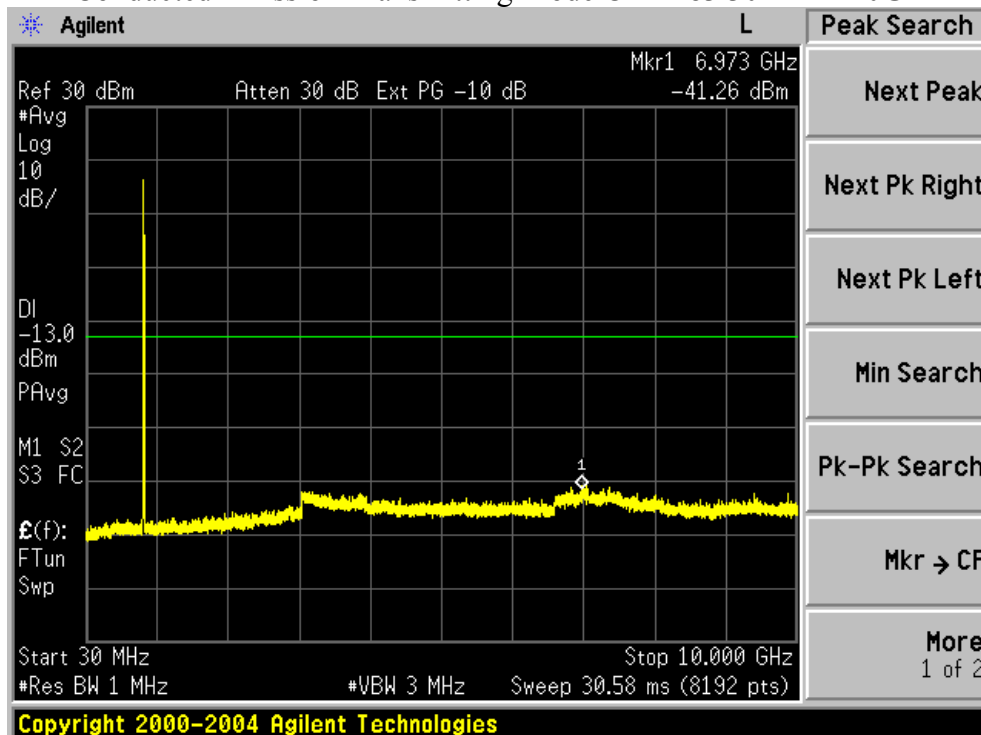
Conducted Emission Transmitting Mode CH 4132 30MHz – 10GHz



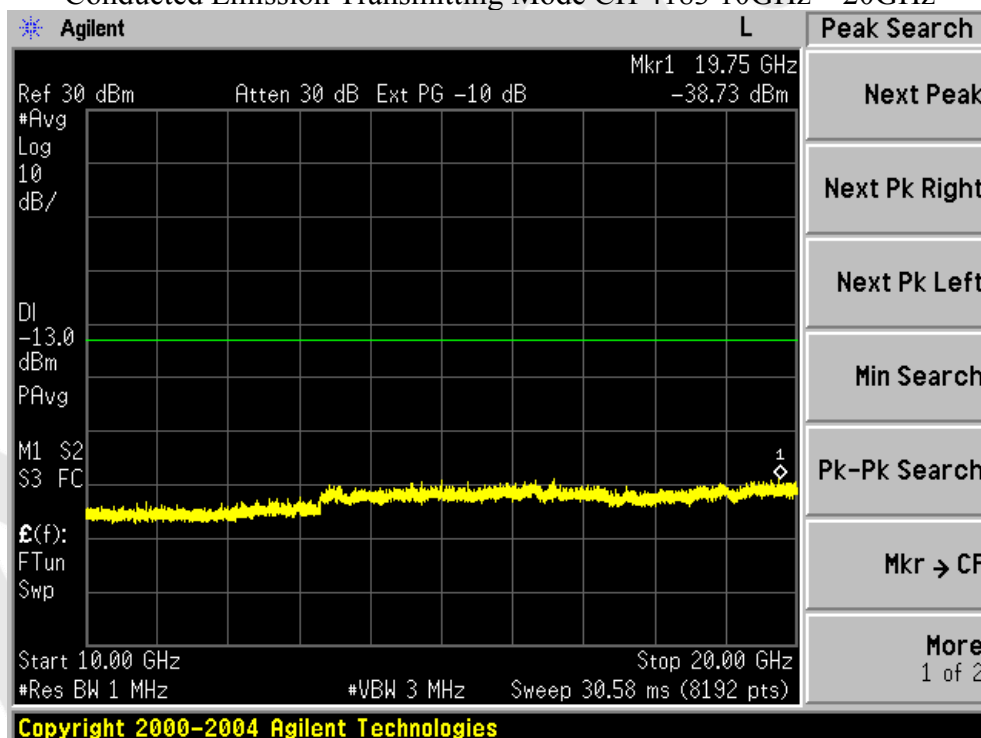
Conducted Emission Transmitting Mode CH 4132 10GHz – 20GHz



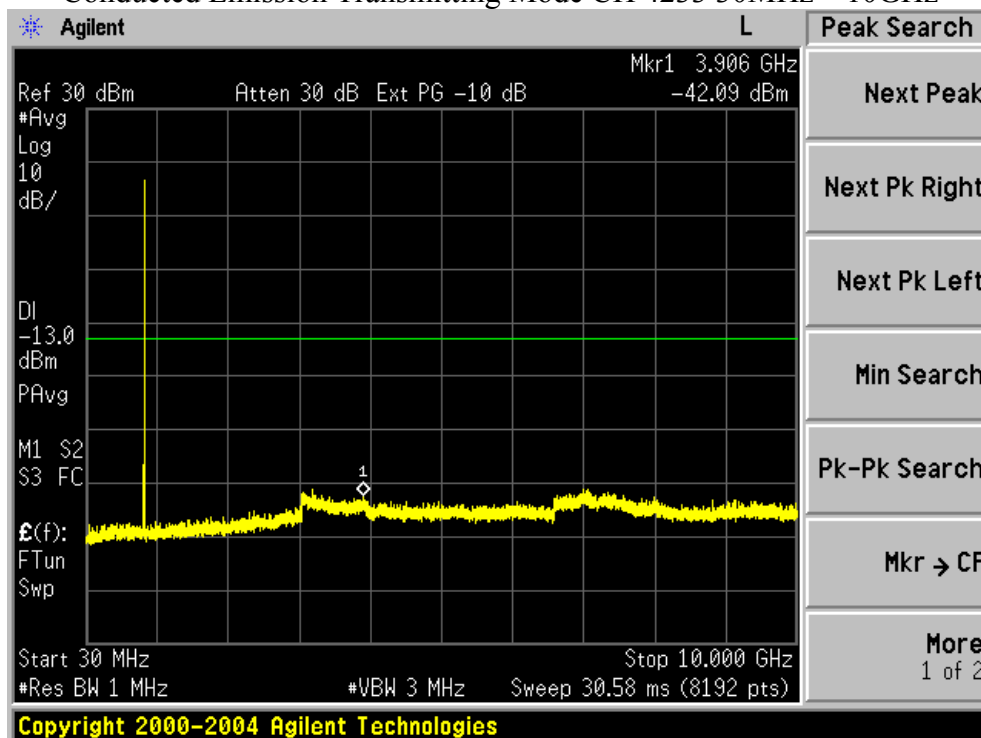
Conducted Emission Transmitting Mode CH 4183 30MHz –10GHz



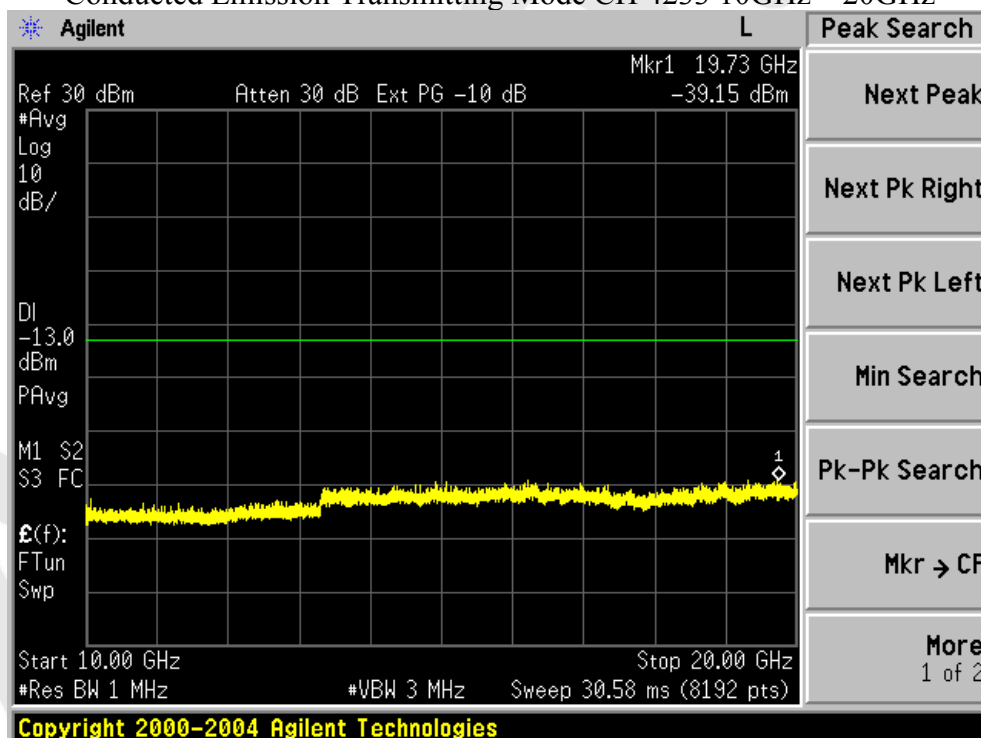
Conducted Emission Transmitting Mode CH 4183 10GHz – 20GHz



Conducted Emission Transmitting Mode CH 4233 30MHz – 10GHz



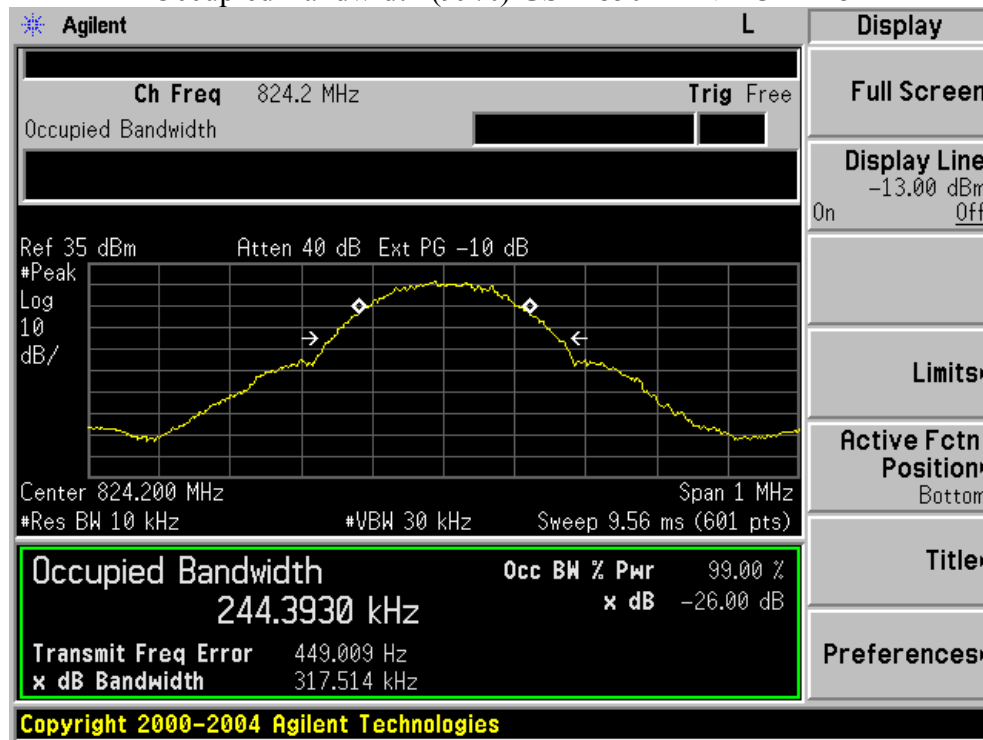
Conducted Emission Transmitting Mode CH 4233 10GHz – 20GHz



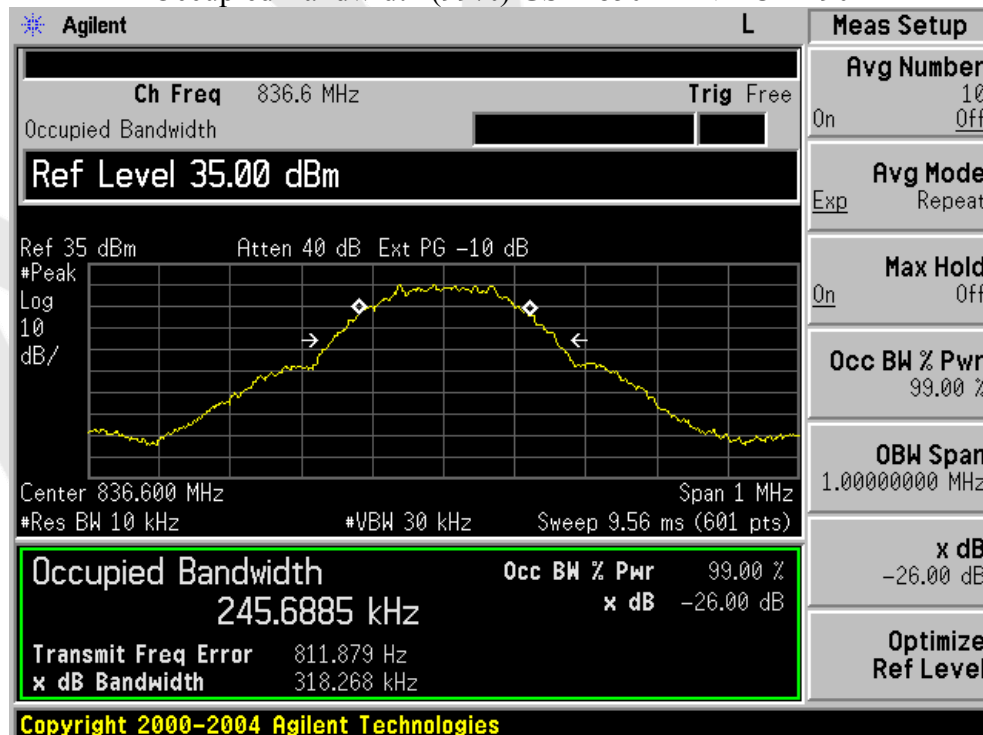
## APPENDIX II

### TEST PLOTS FOR OCCUPIED BANDWIDTH (99%) EMISSION BANDWIDTH (-26dBC)

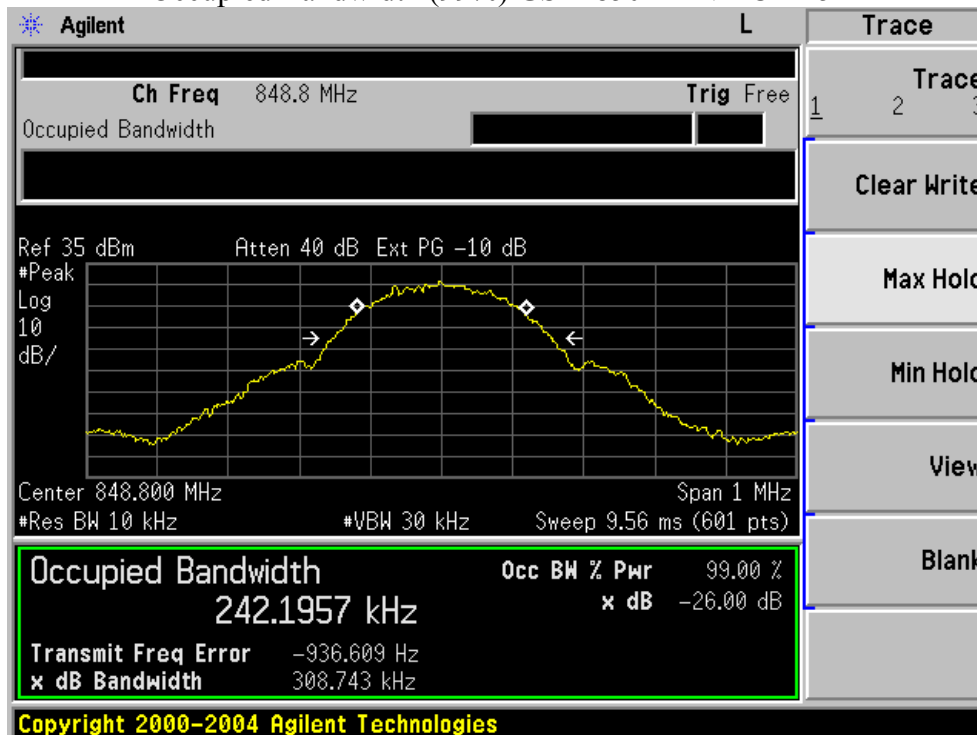
Occupied Bandwidth (99%) GSM 850 BAND CH 128



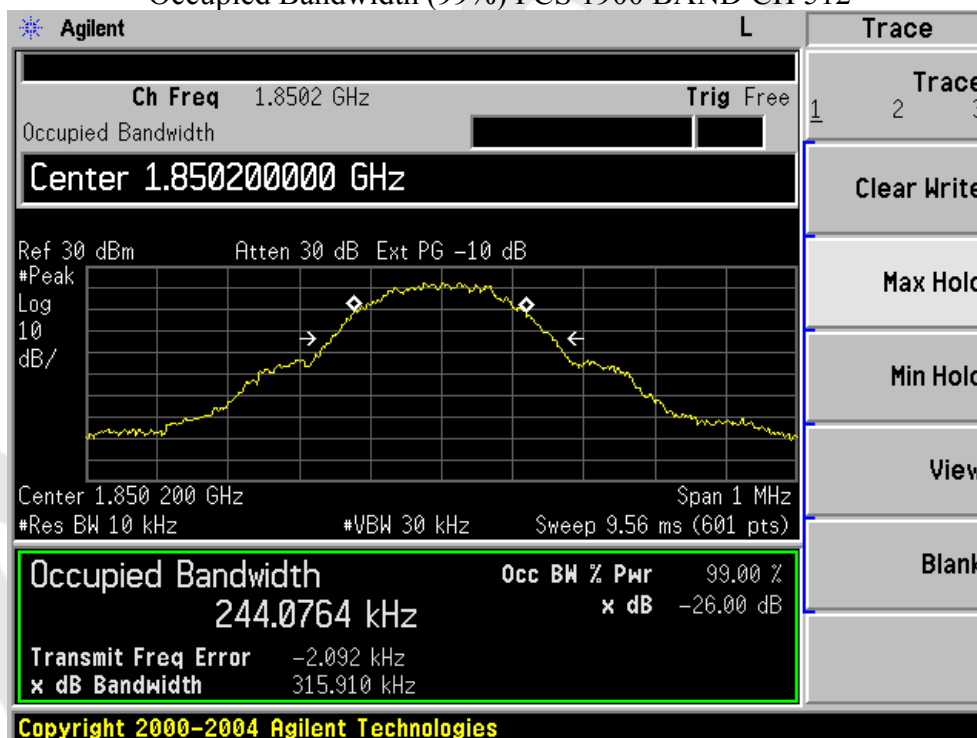
Occupied Bandwidth (99%) GSM 850 BAND CH 190



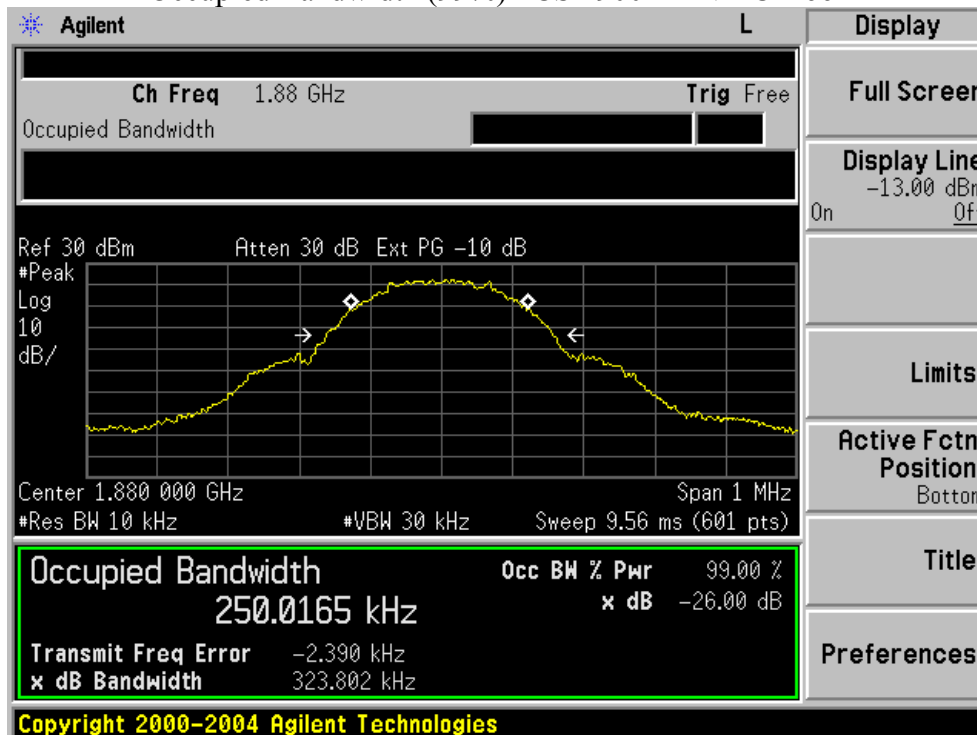
Occupied Bandwidth (99%) GSM 850 BAND CH 251



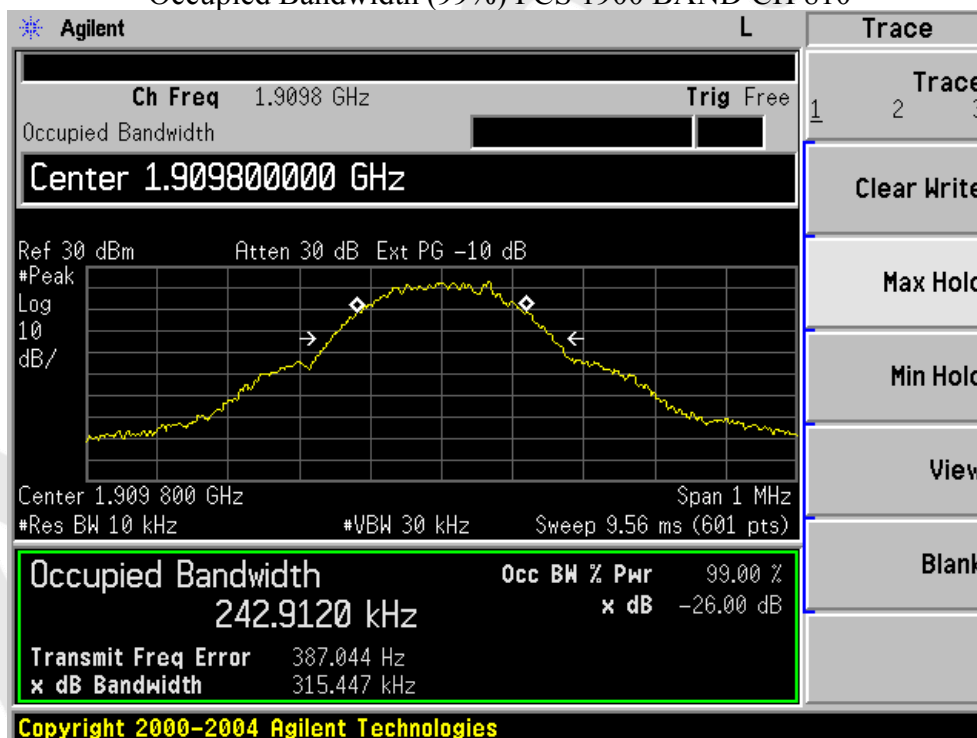
Occupied Bandwidth (99%) PCS 1900 BAND CH 512



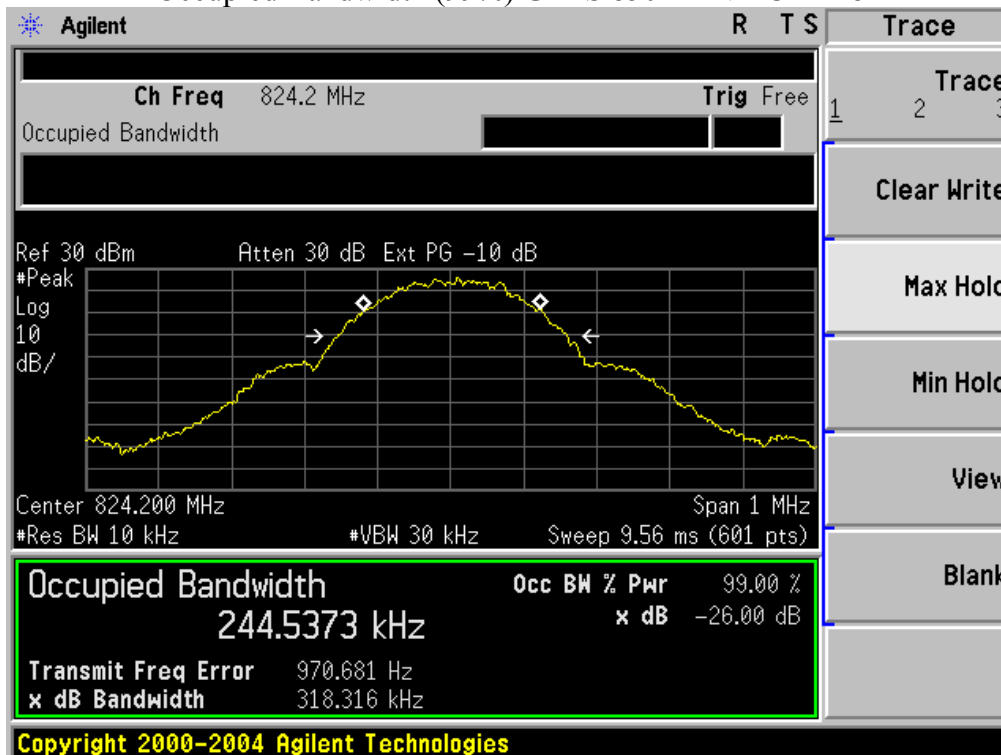
Occupied Bandwidth (99%) PCS 1900 BAND CH 661



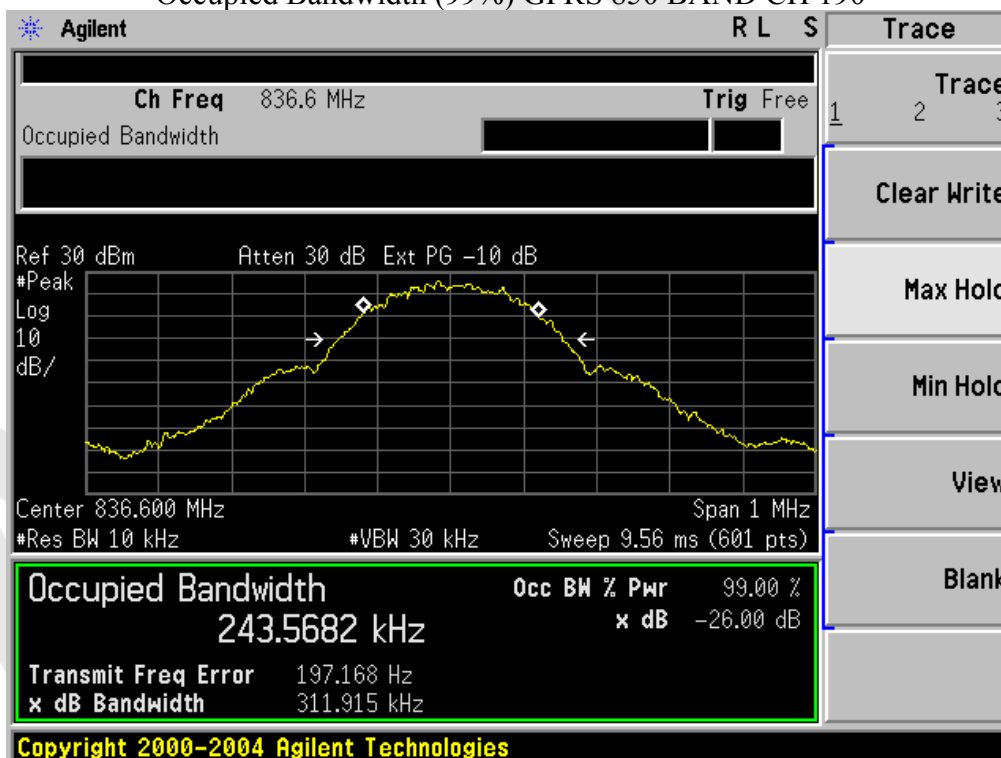
Occupied Bandwidth (99%) PCS 1900 BAND CH 810



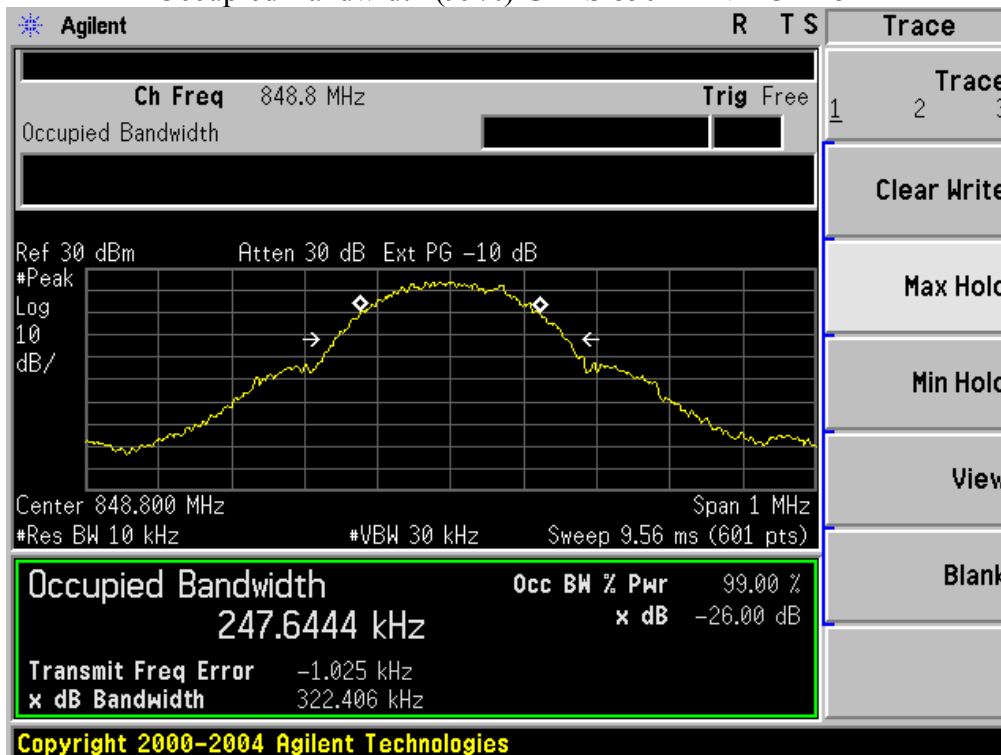
Occupied Bandwidth (99%) GPRS 850 BAND CH 128



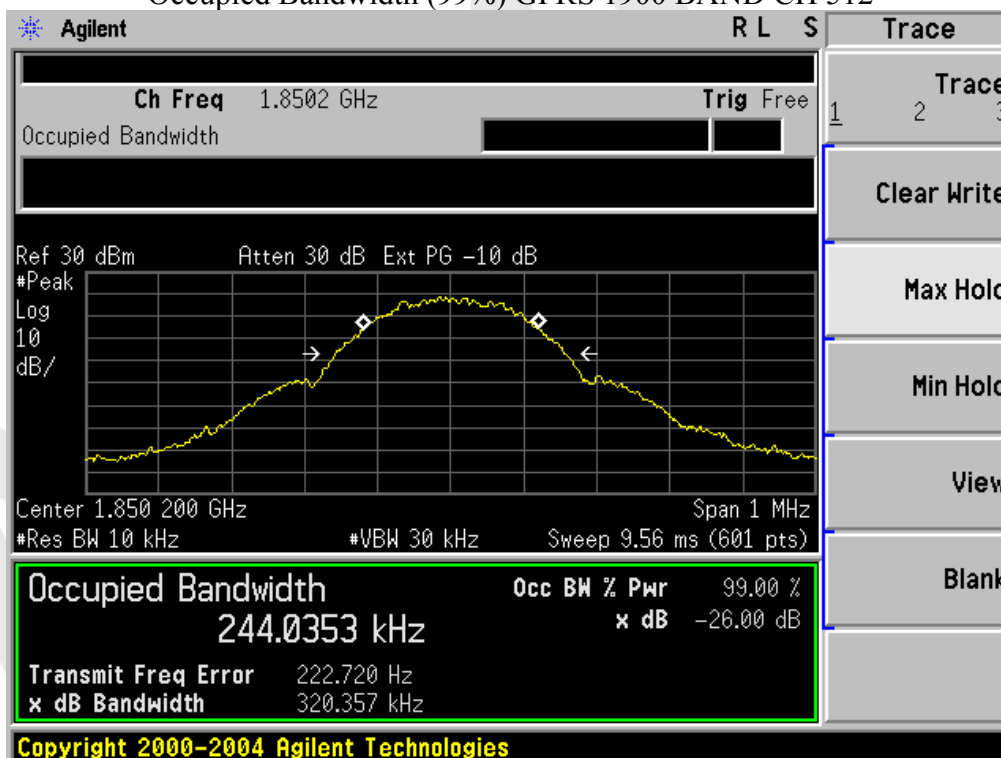
Occupied Bandwidth (99%) GPRS 850 BAND CH 190



Occupied Bandwidth (99%) GPRS 850 BAND CH 251

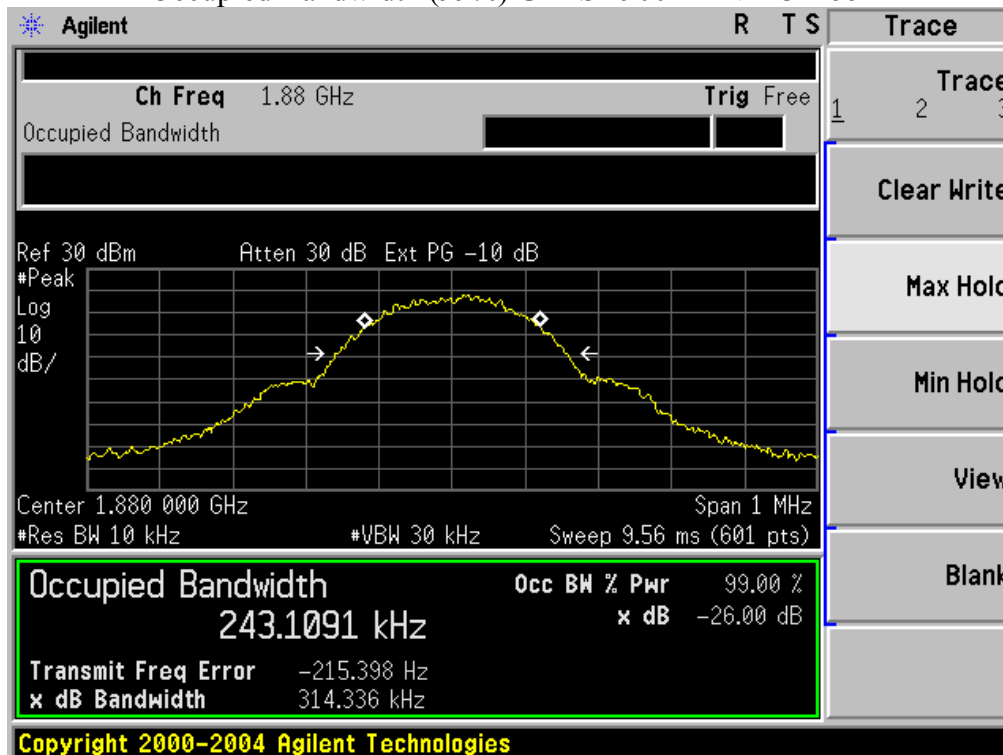


Occupied Bandwidth (99%) GPRS 1900 BAND CH 512





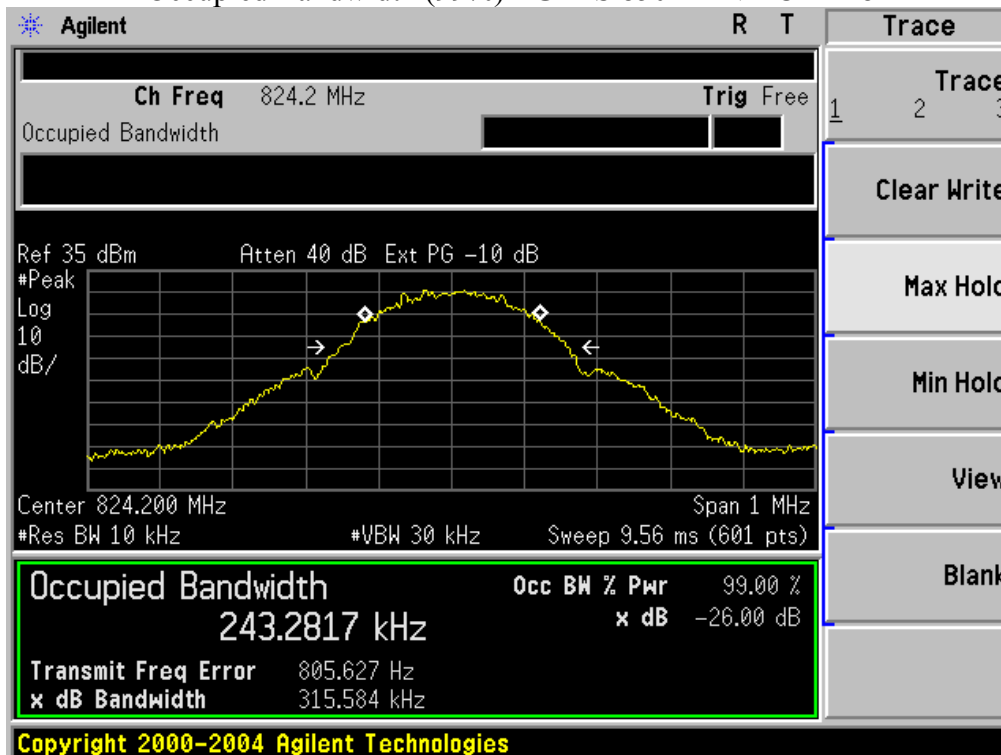
Occupied Bandwidth (99%) GPRS 1900 BAND CH 661



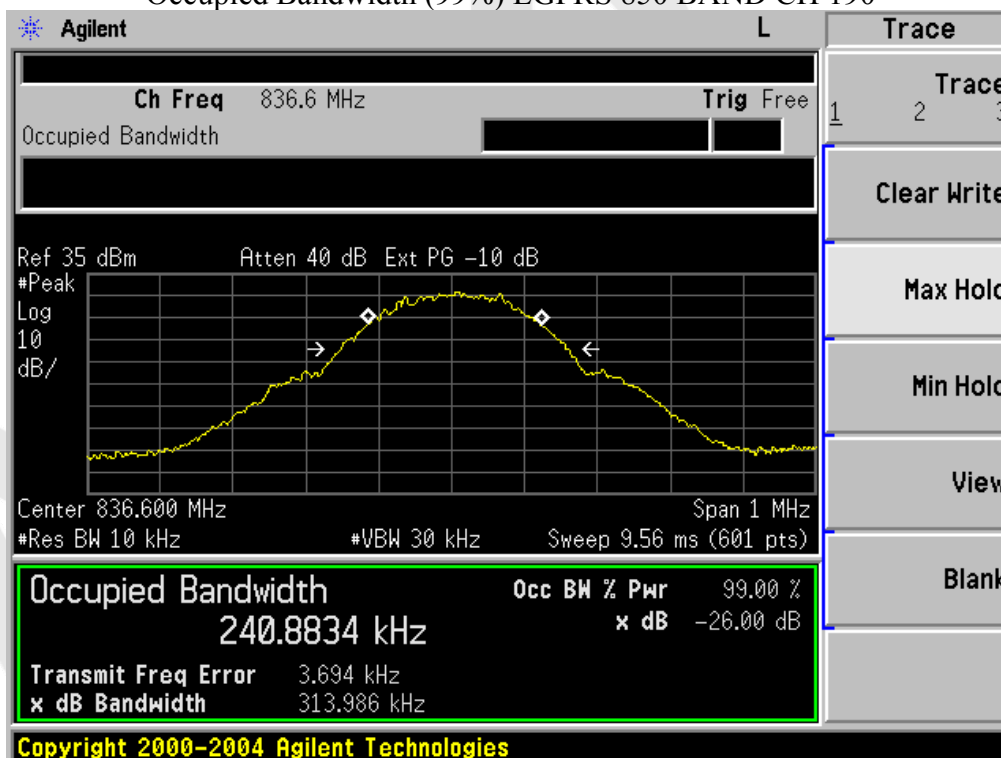
Occupied Bandwidth (99%) GPRS 1900 BAND CH 810



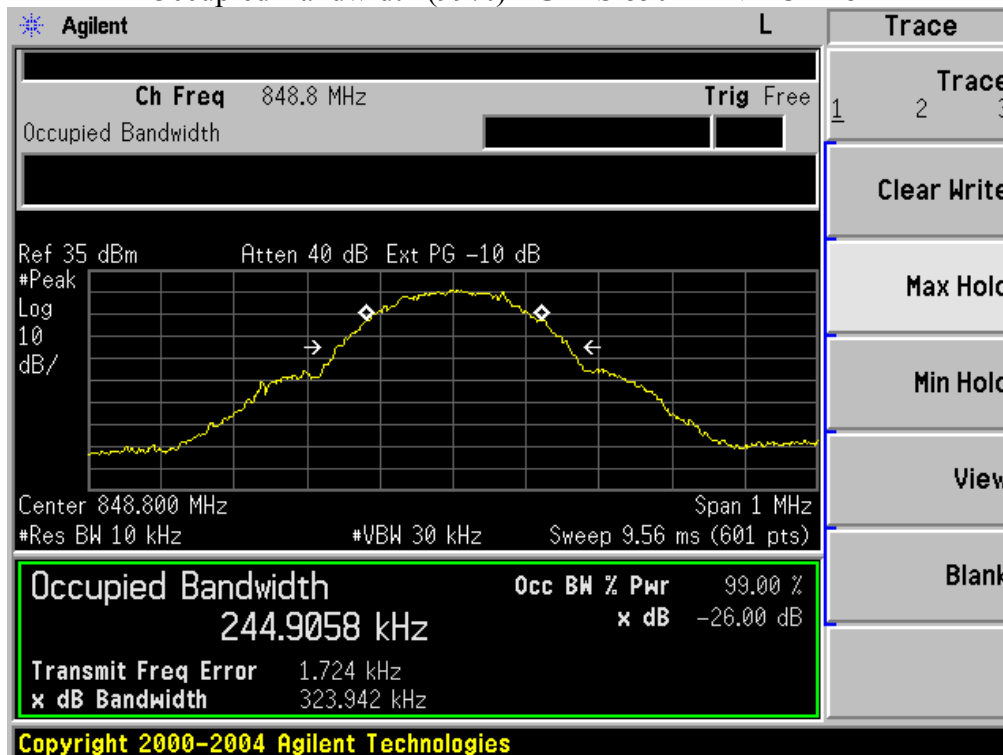
Occupied Bandwidth (99%) EGPRS 850 BAND CH 128



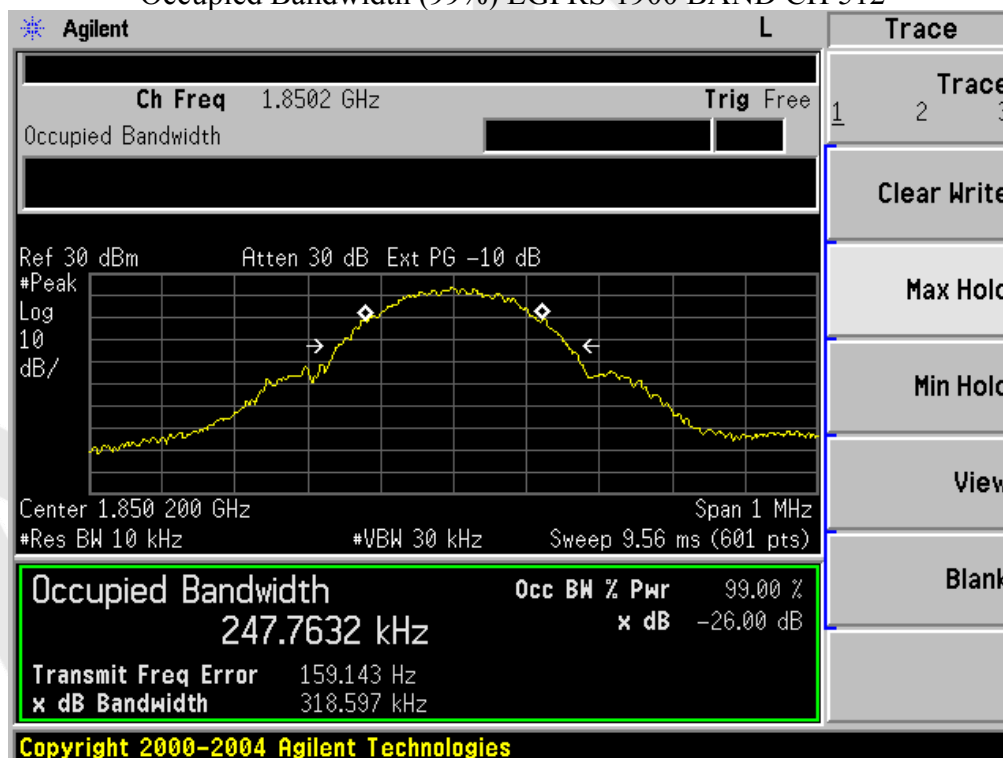
Occupied Bandwidth (99%) EGPRS 850 BAND CH 190



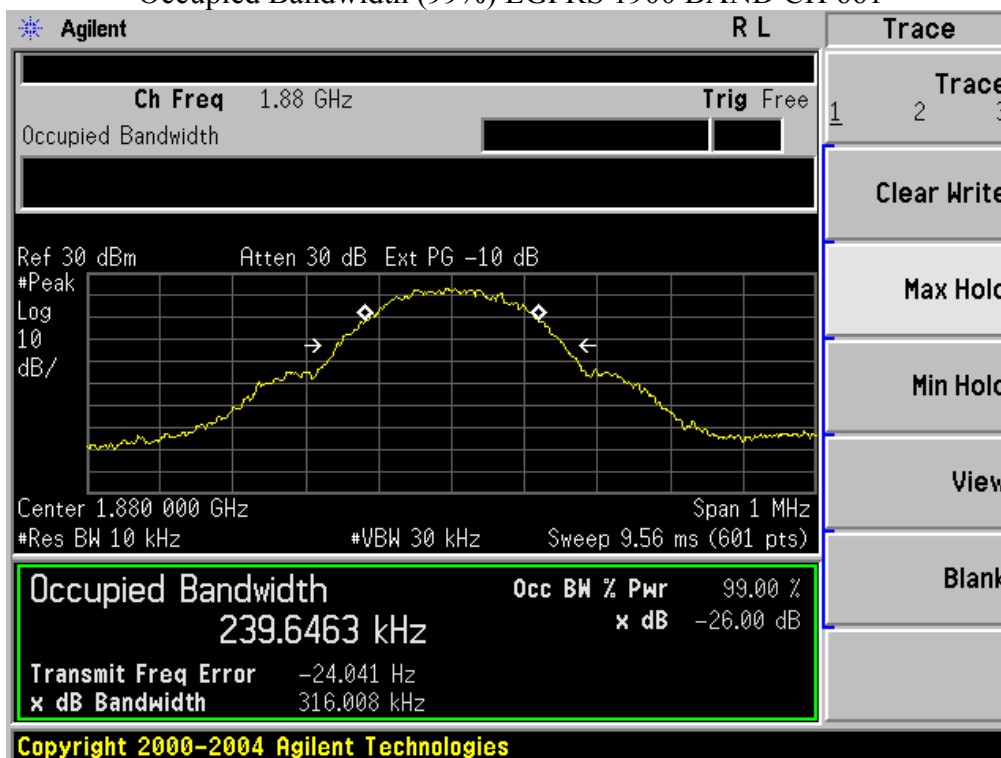
Occupied Bandwidth (99%) EGPRS 850 BAND CH 251



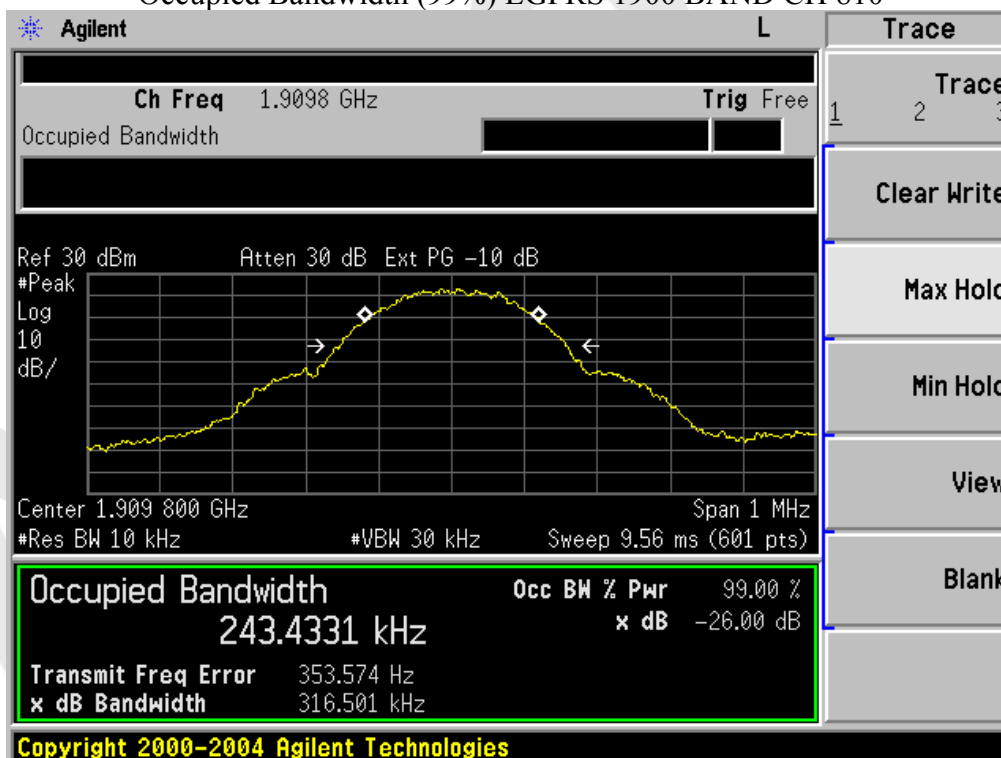
Occupied Bandwidth (99%) EGPRS 1900 BAND CH 512



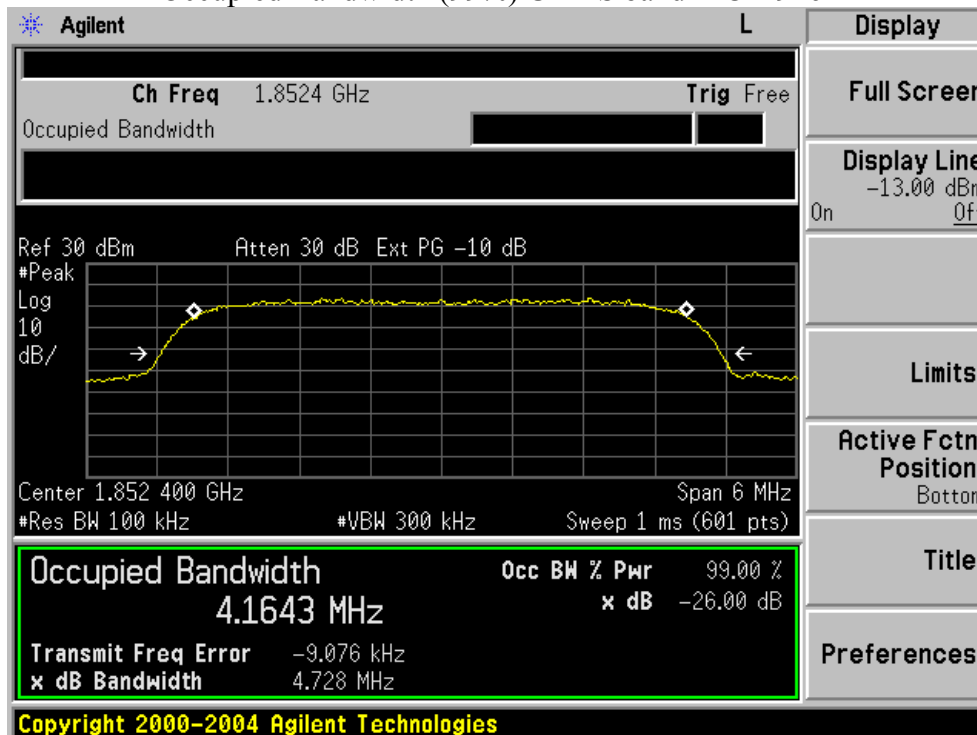
Occupied Bandwidth (99%) EGPRS 1900 BAND CH 661



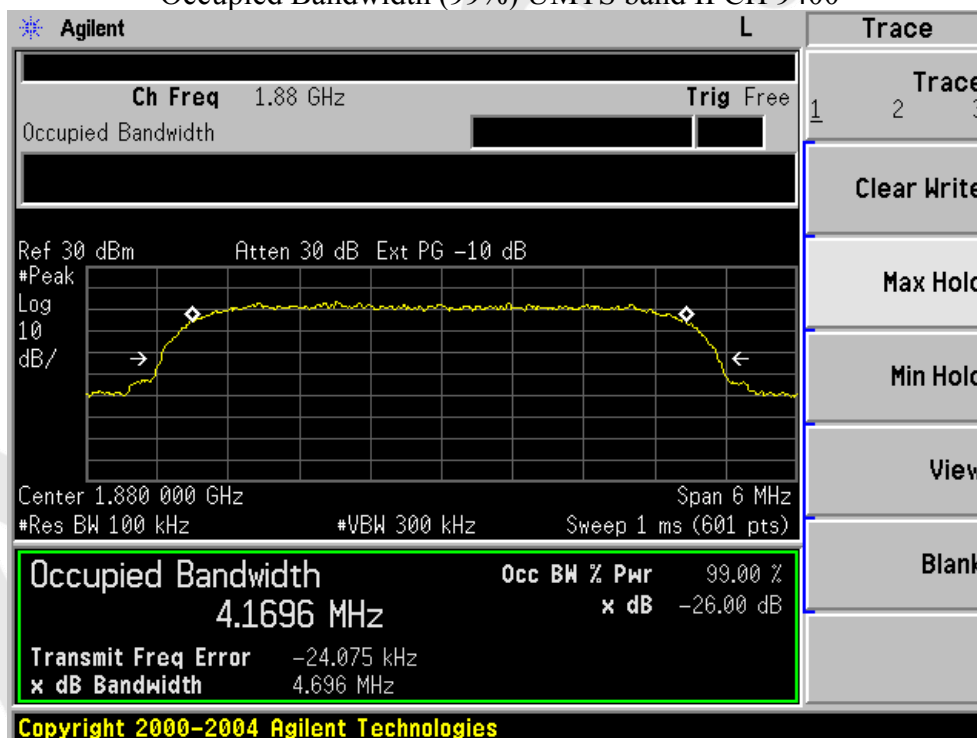
Occupied Bandwidth (99%) EGPRS 1900 BAND CH 810



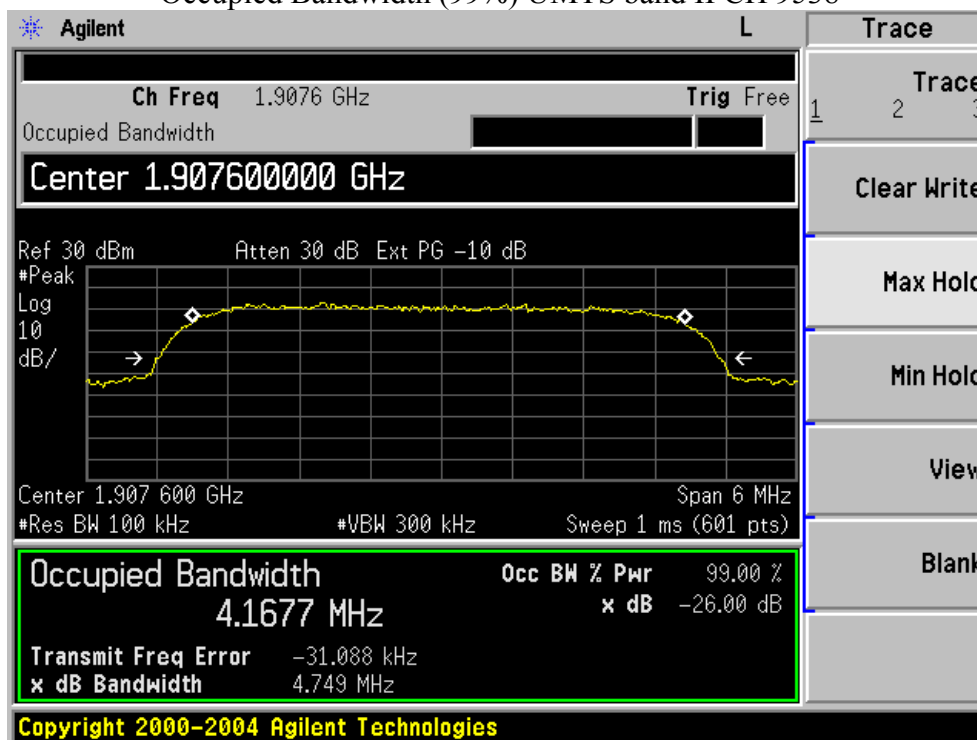
Occupied Bandwidth (99%) UMTS band II CH 9262



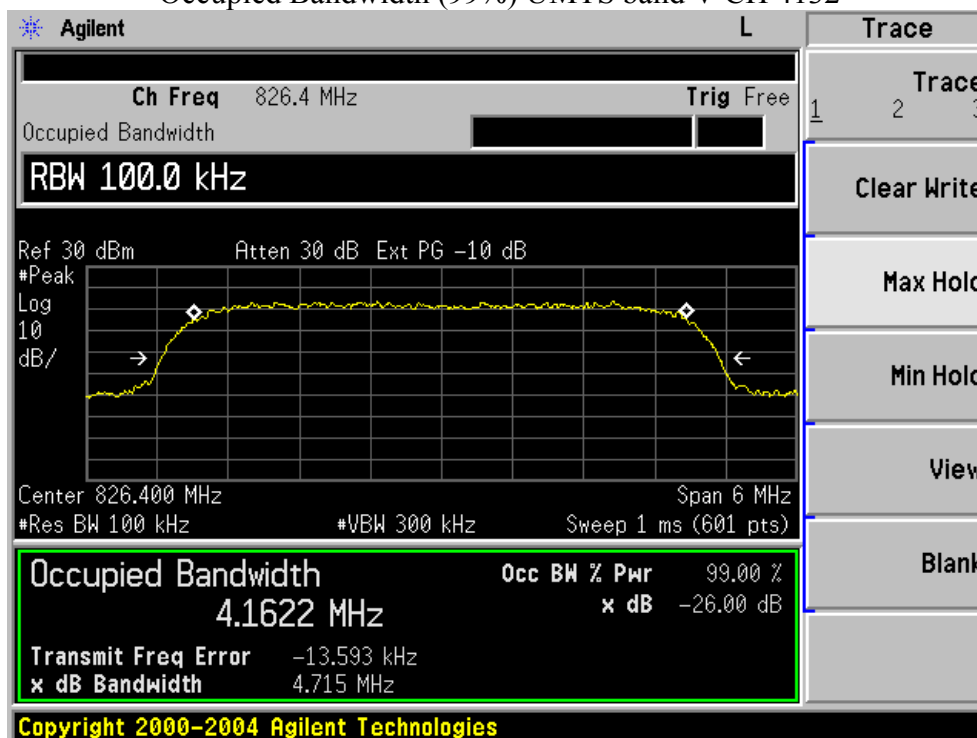
Occupied Bandwidth (99%) UMTS band II CH 9400



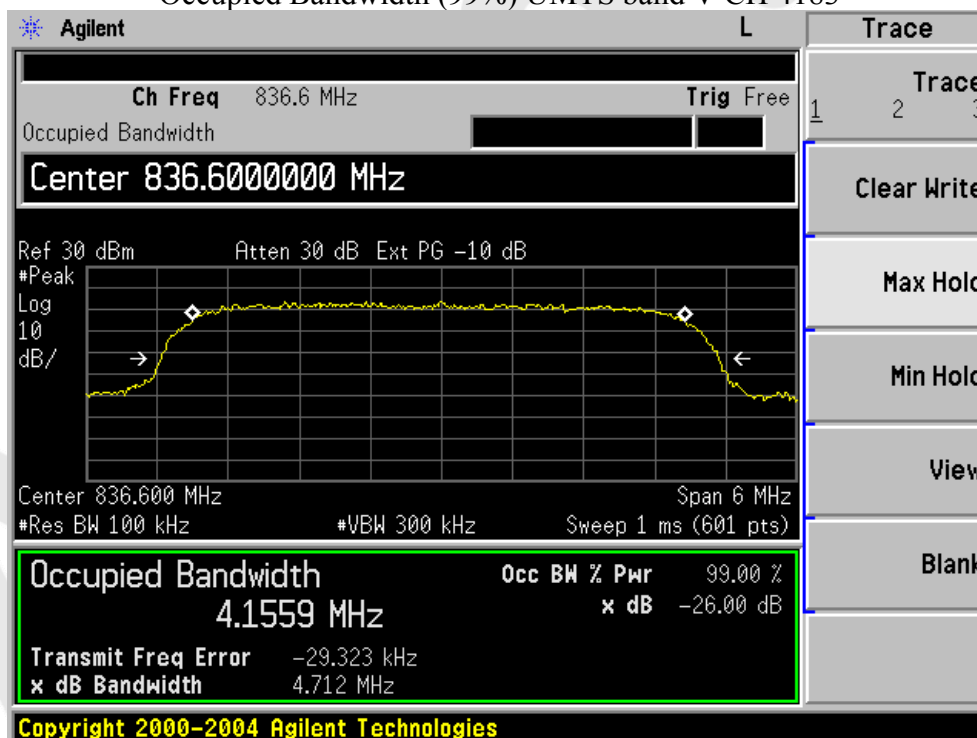
Occupied Bandwidth (99%) UMTS band II CH 9538



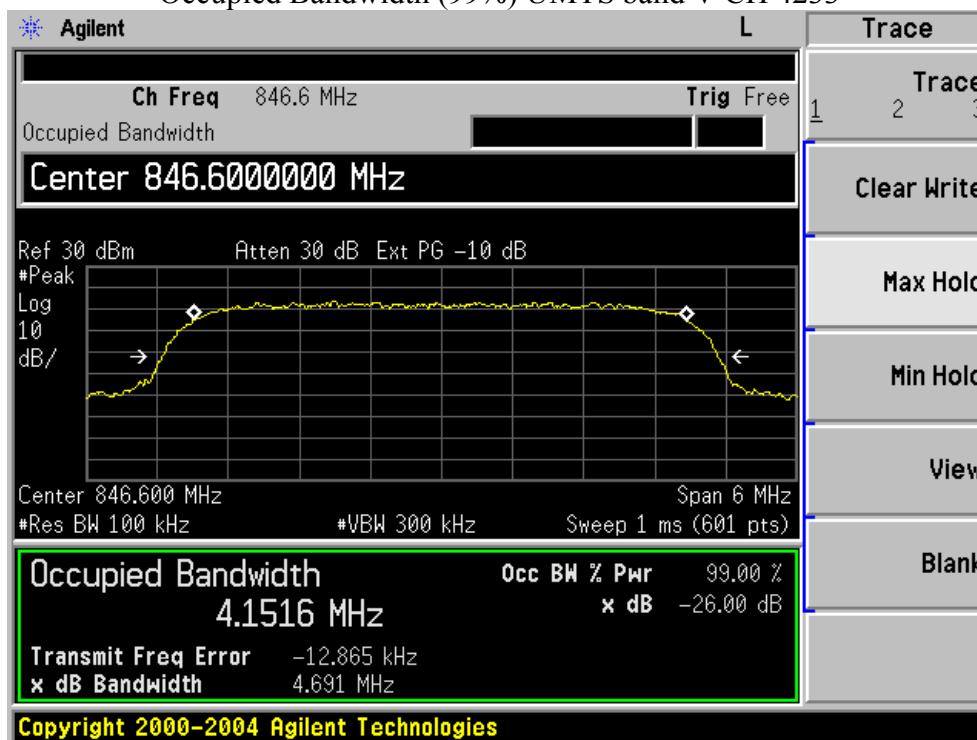
Occupied Bandwidth (99%) UMTS band V CH 4132



Occupied Bandwidth (99%) UMTS band V CH 4183



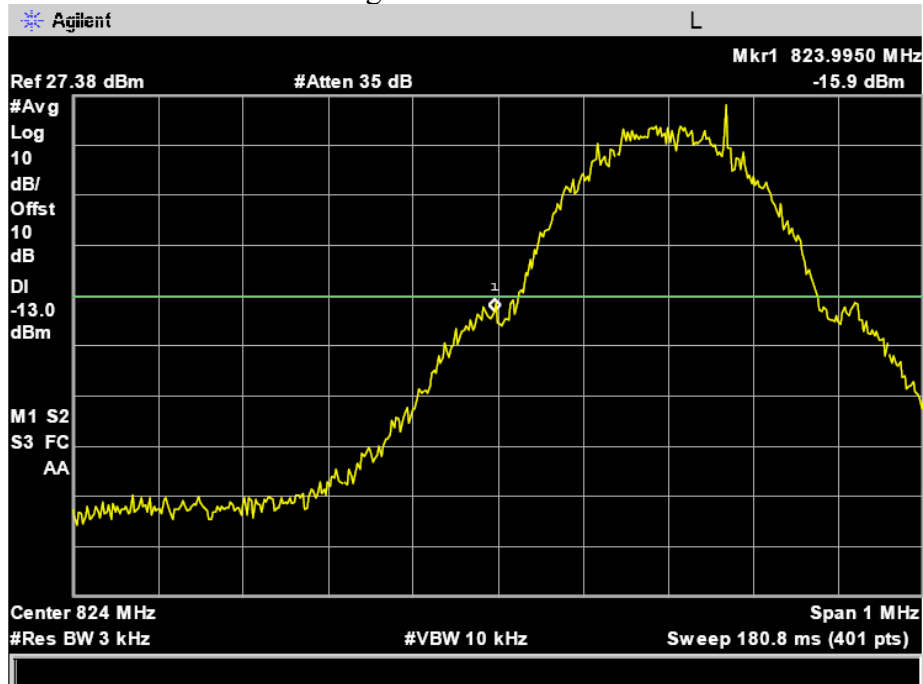
Occupied Bandwidth (99%) UMTS band V CH 4233



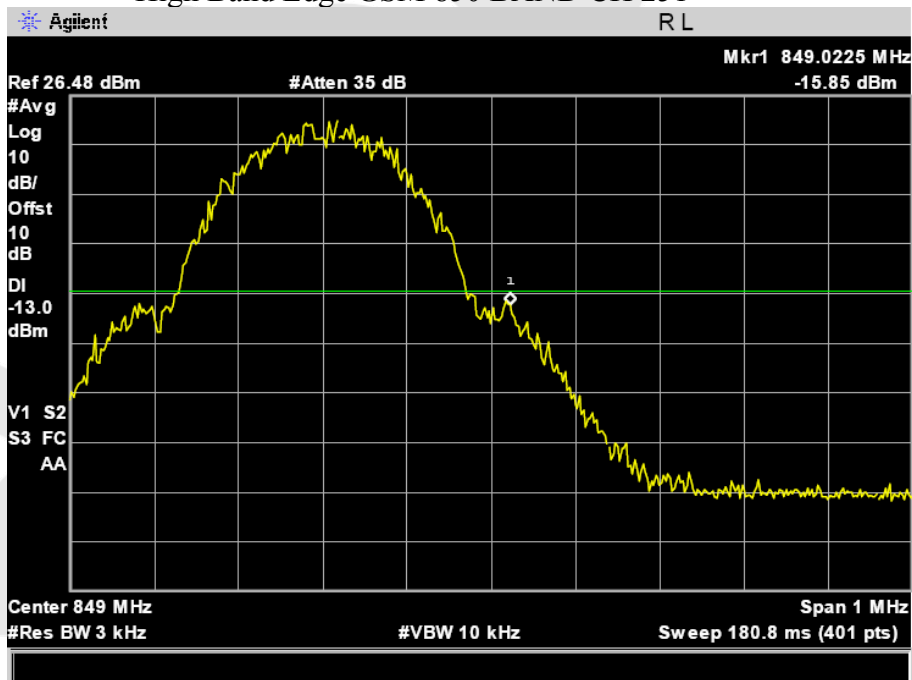


## APPENDIX III TEST PLOTS FOR BAND EDGES

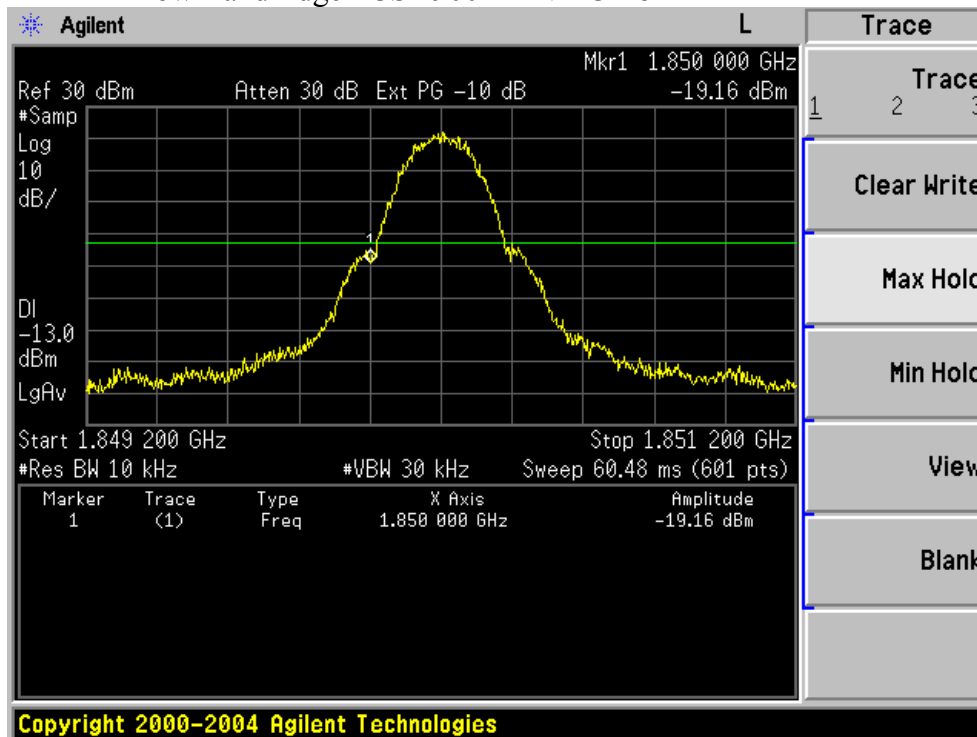
Low Band Edge GSM 850 BAND CH 128



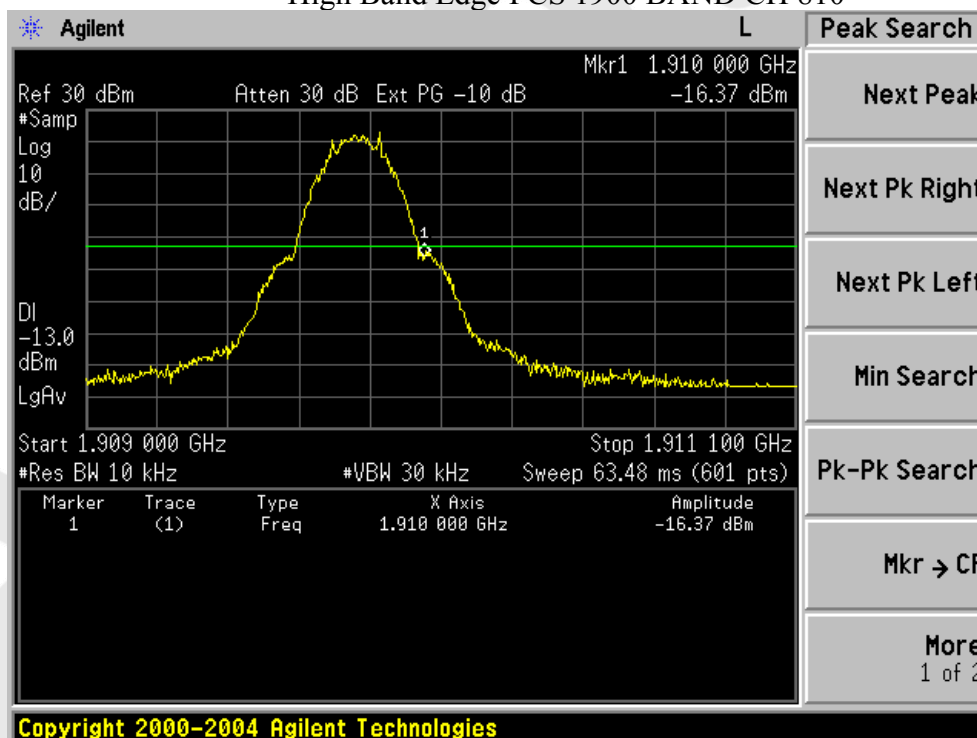
High Band Edge GSM 850 BAND CH 251



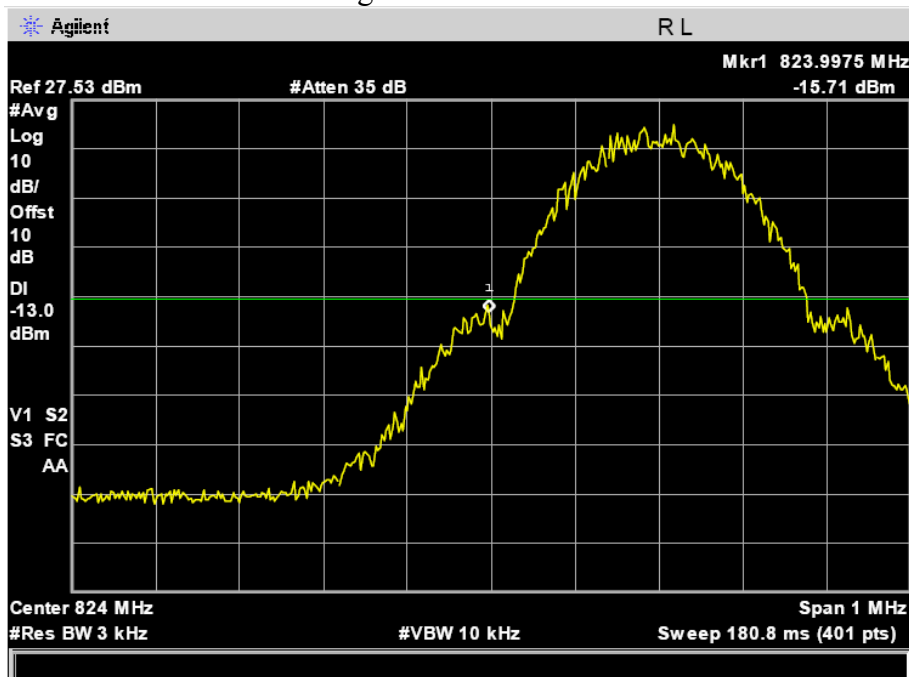
### Low Band Edge PCS 1900 BAND CH 512



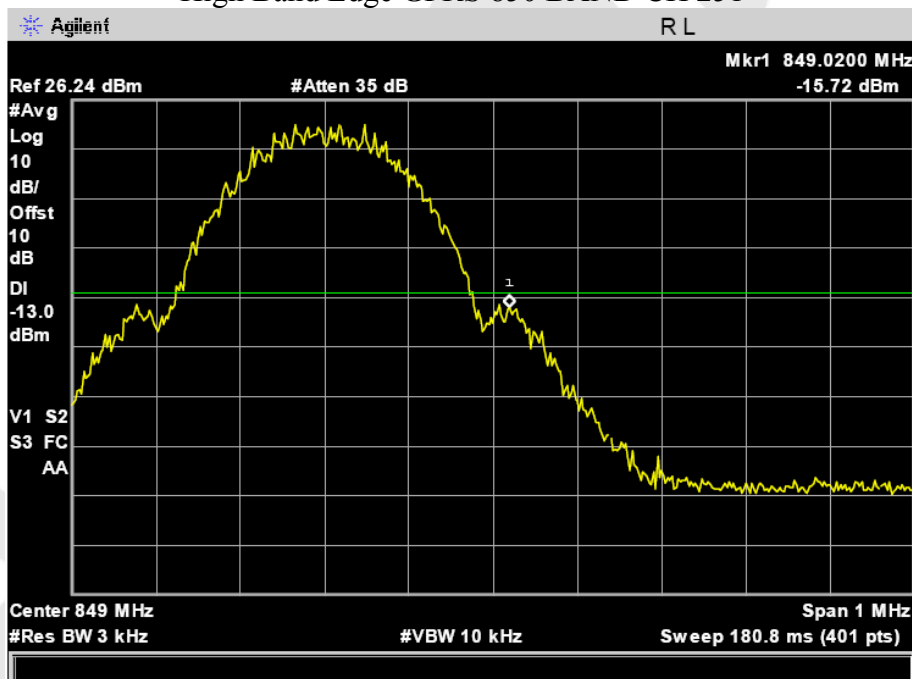
### High Band Edge PCS 1900 BAND CH 810



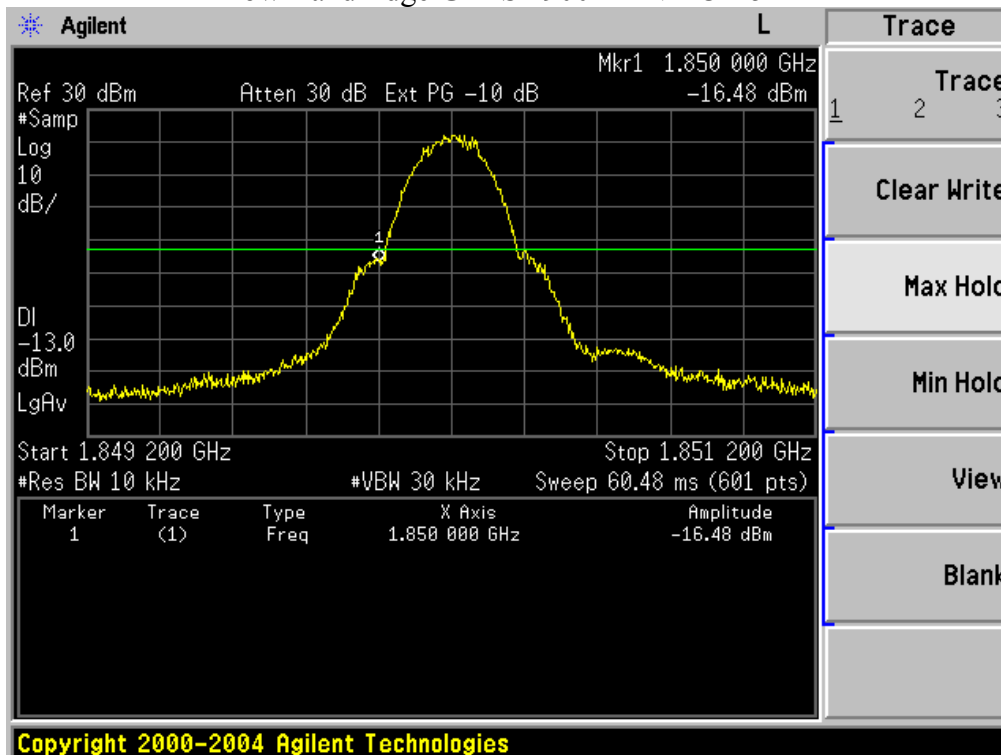
### Low Band Edge GPRS 850 BAND CH 128



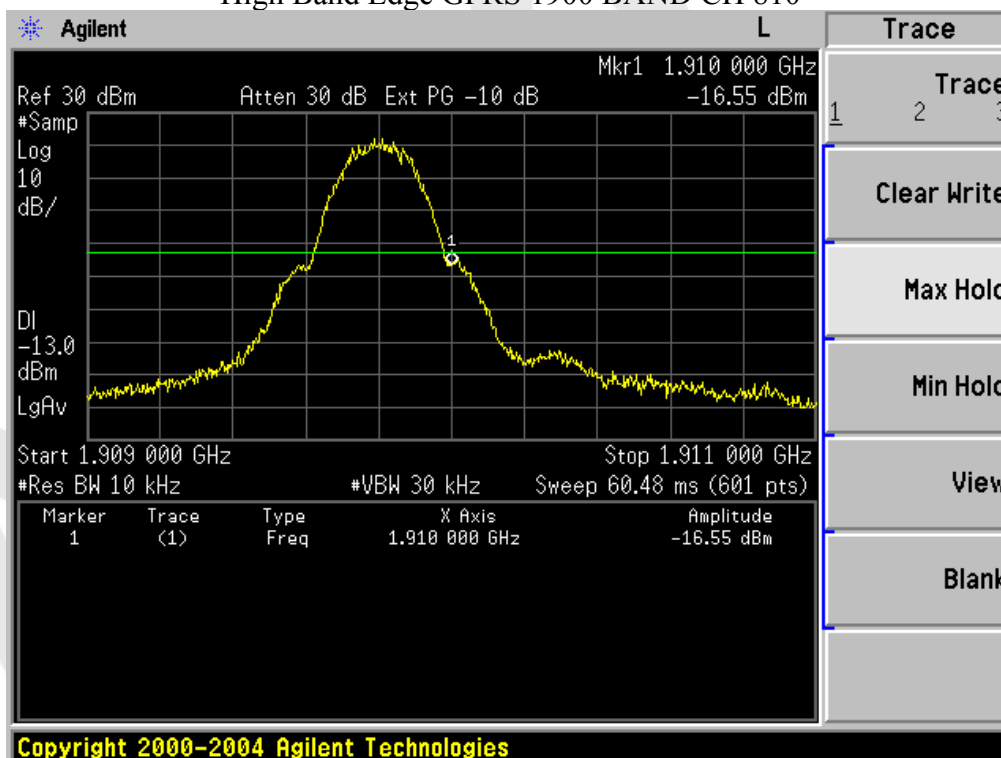
### High Band Edge GPRS 850 BAND CH 251



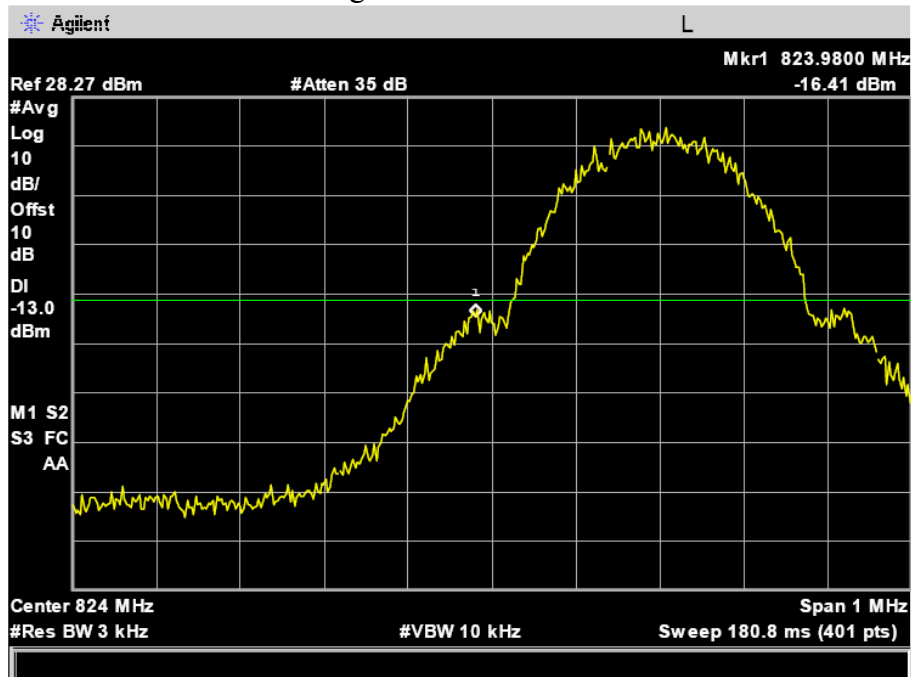
### Low Band Edge GPRS 1900 BAND CH 512



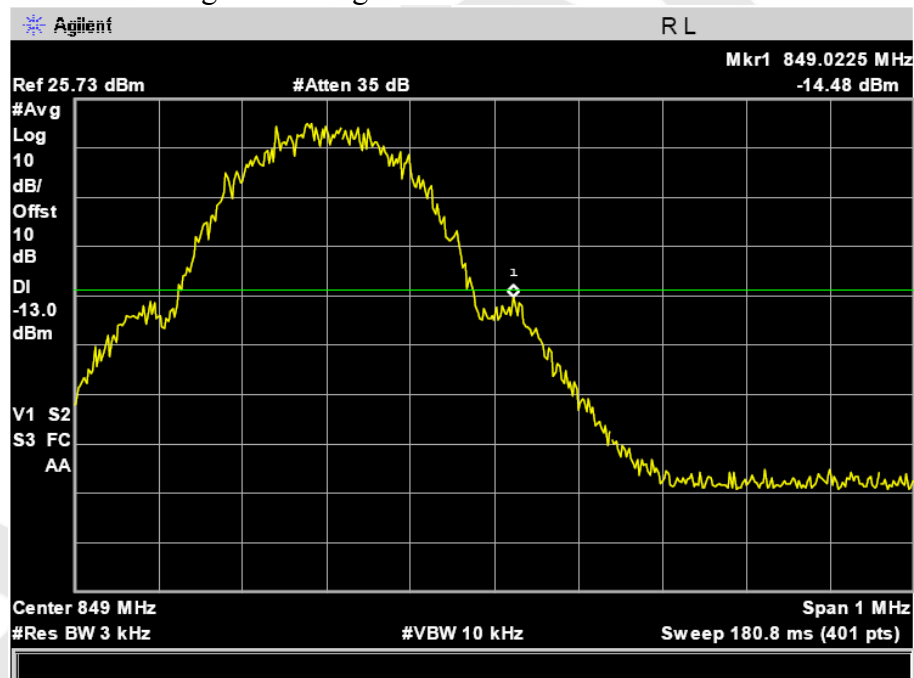
### High Band Edge GPRS 1900 BAND CH 810



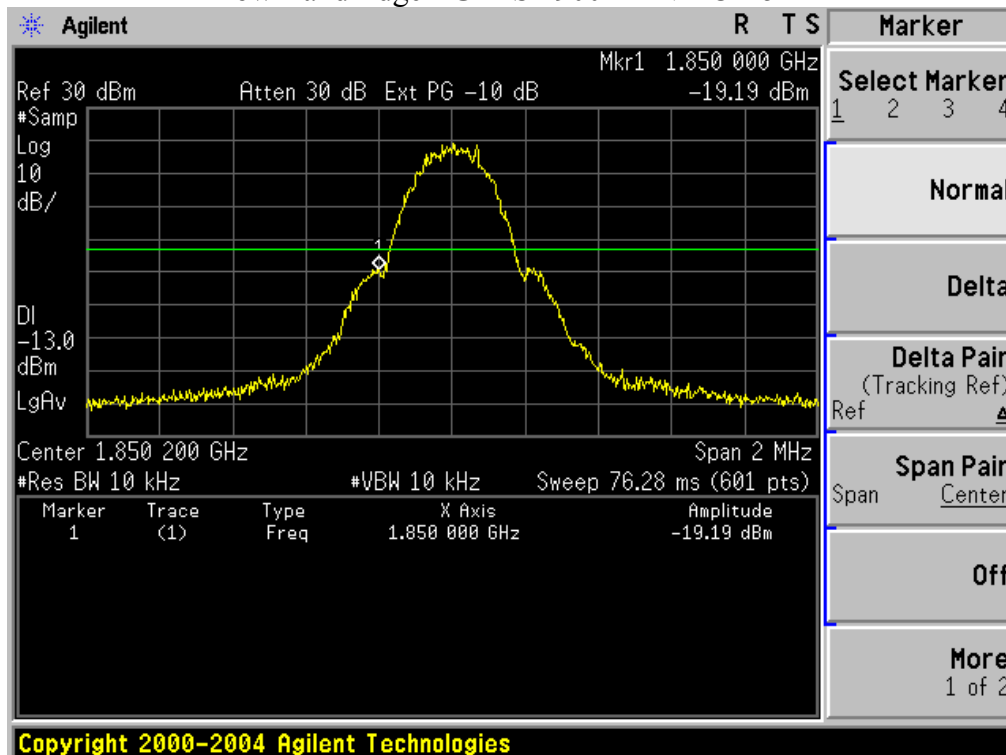
### Low Band Edge EGPRS 850 BAND CH 128



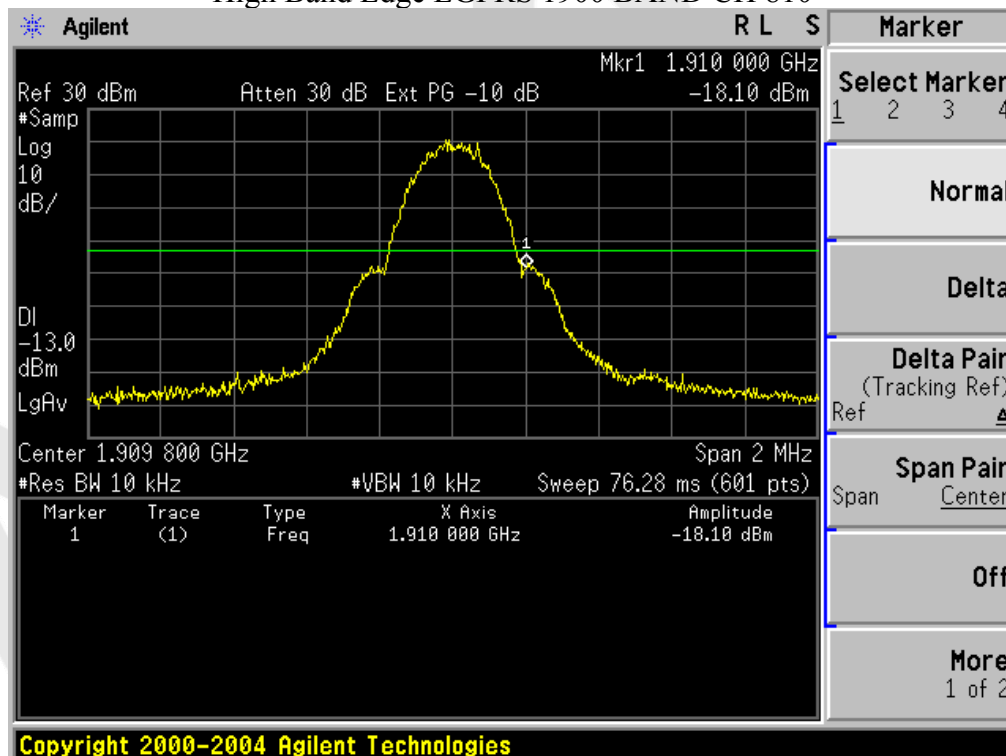
### High Band Edge EGPRS 850 BAND CH 251



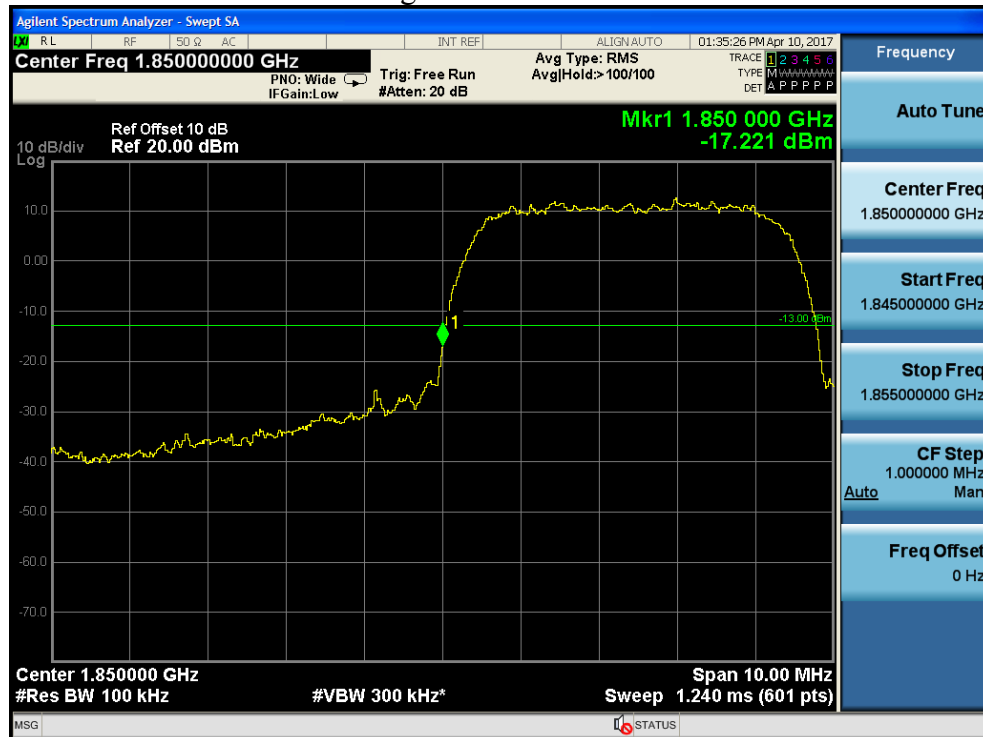
Low Band Edge EGPRS 1900 BAND CH 512



High Band Edge EGPRS 1900 BAND CH 810



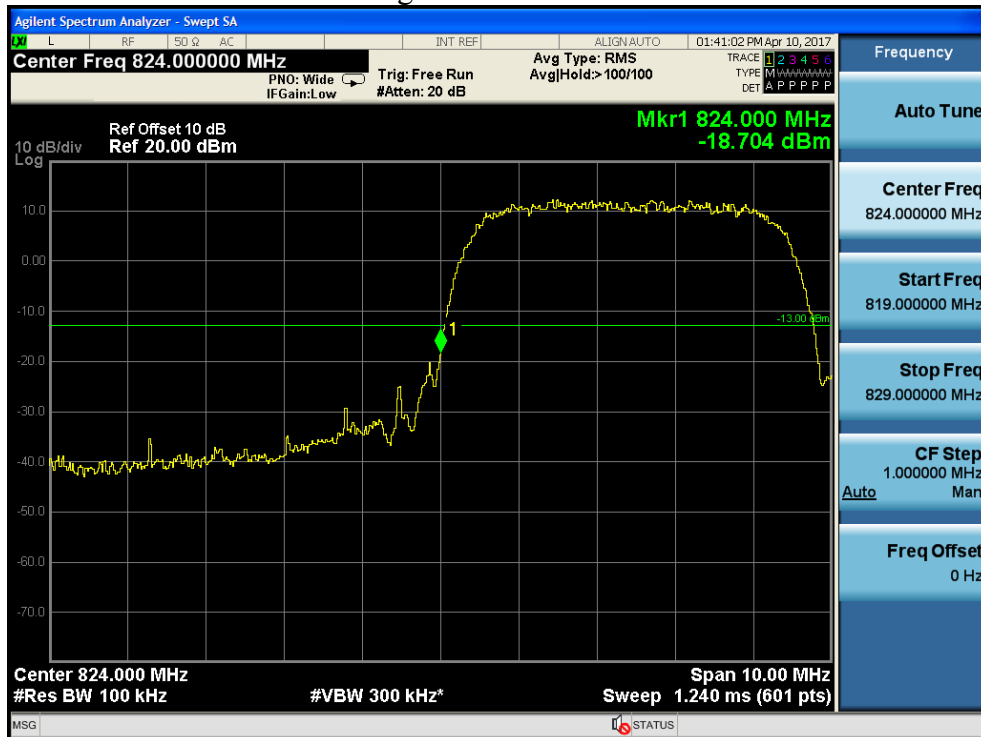
### Low Band Edge UMTS BAND II CH 9262



### High Band Edge UMTS BAND II CH 9538



### Low Band Edge UMTS BAND V CH 4132



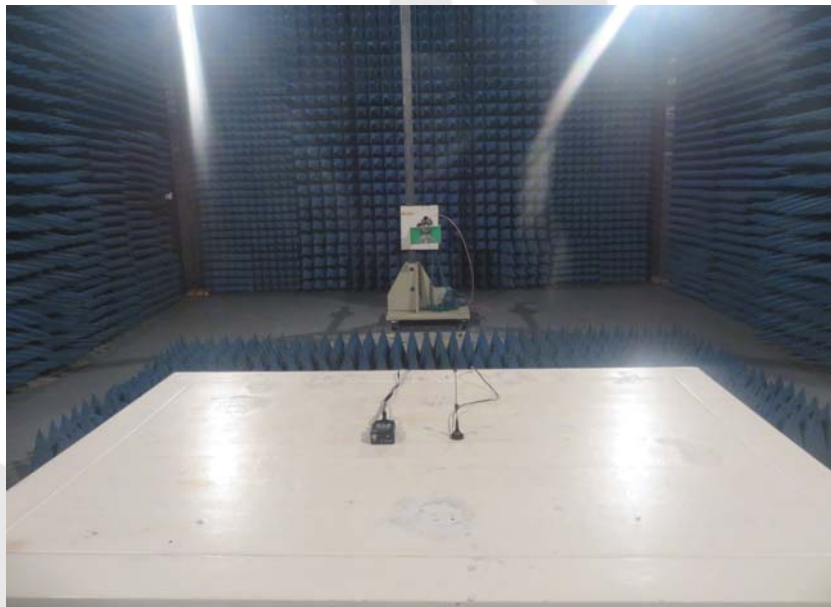
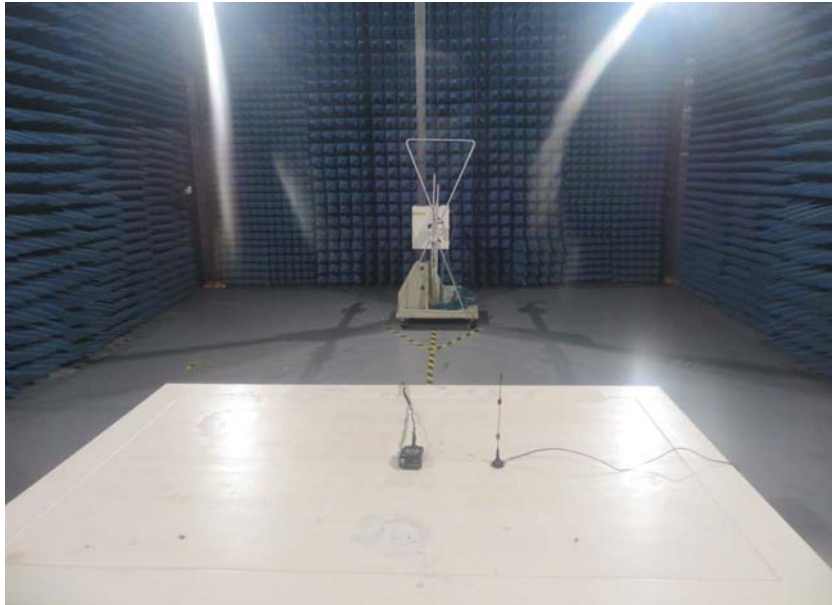
### High Band Edge UMTS BAND V CH 4233



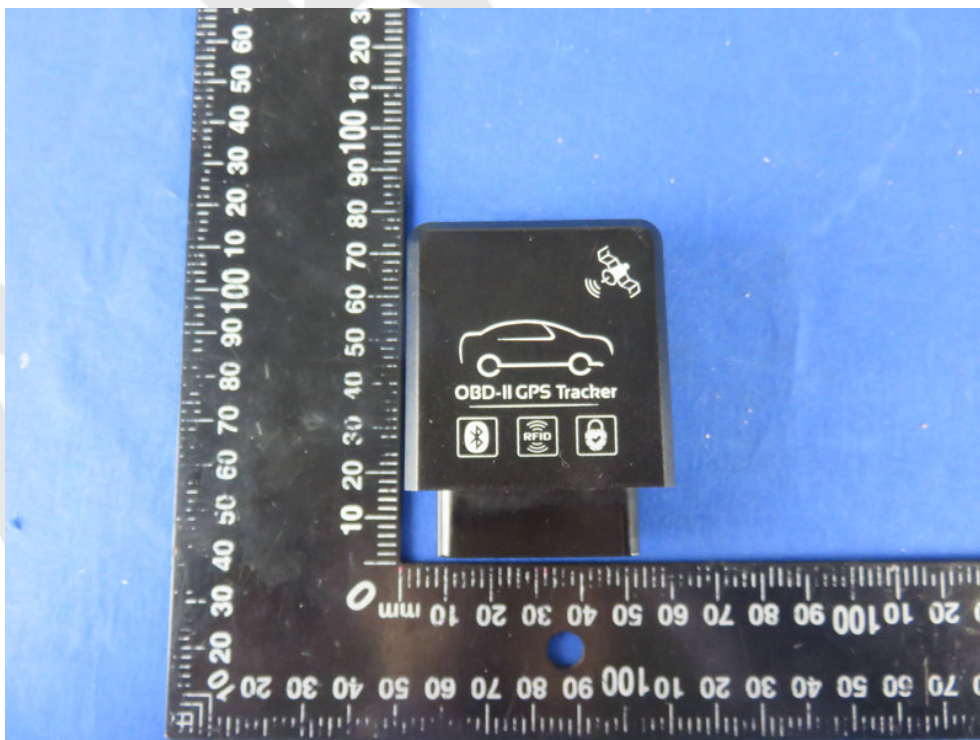
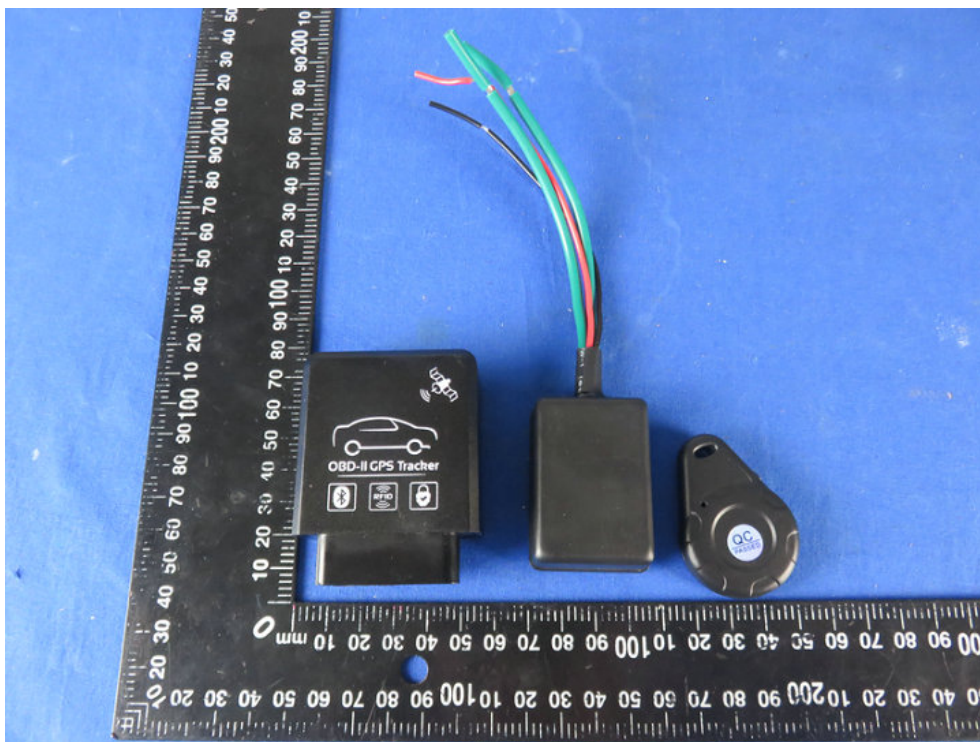


## APPENDIX IV (TEST PHOTOGRAPHS)

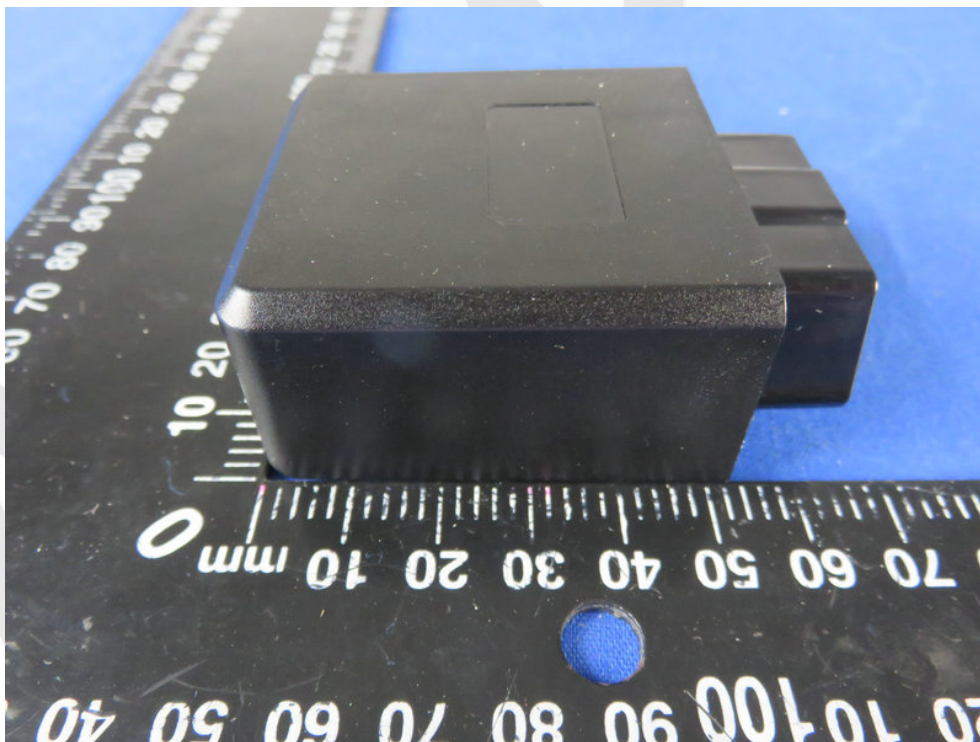
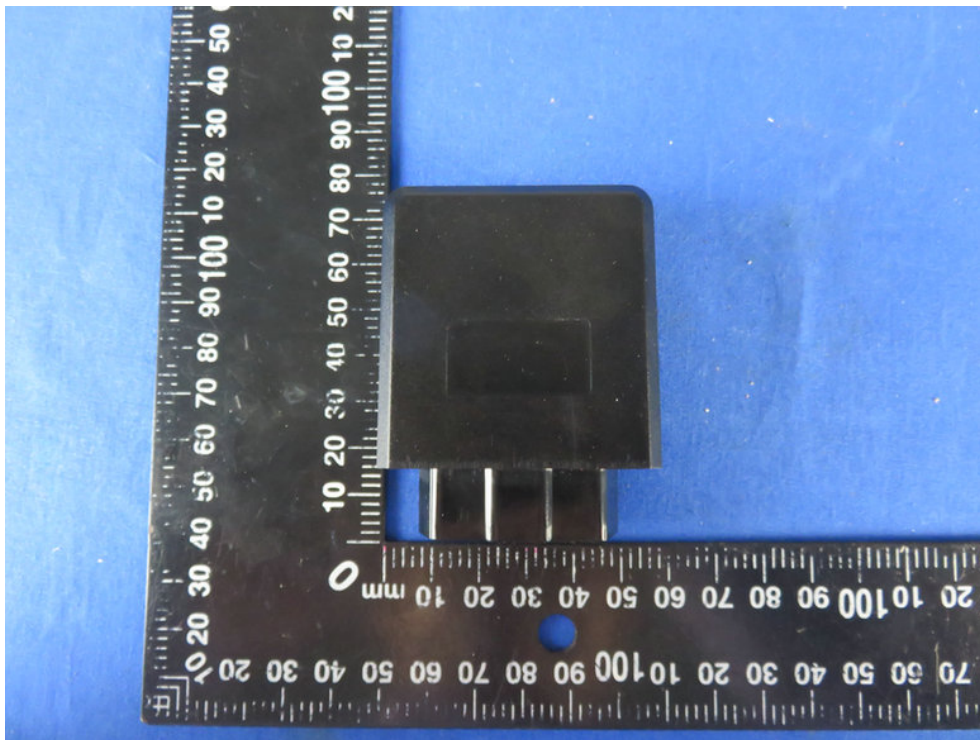
Photo of Radiated Emission Test

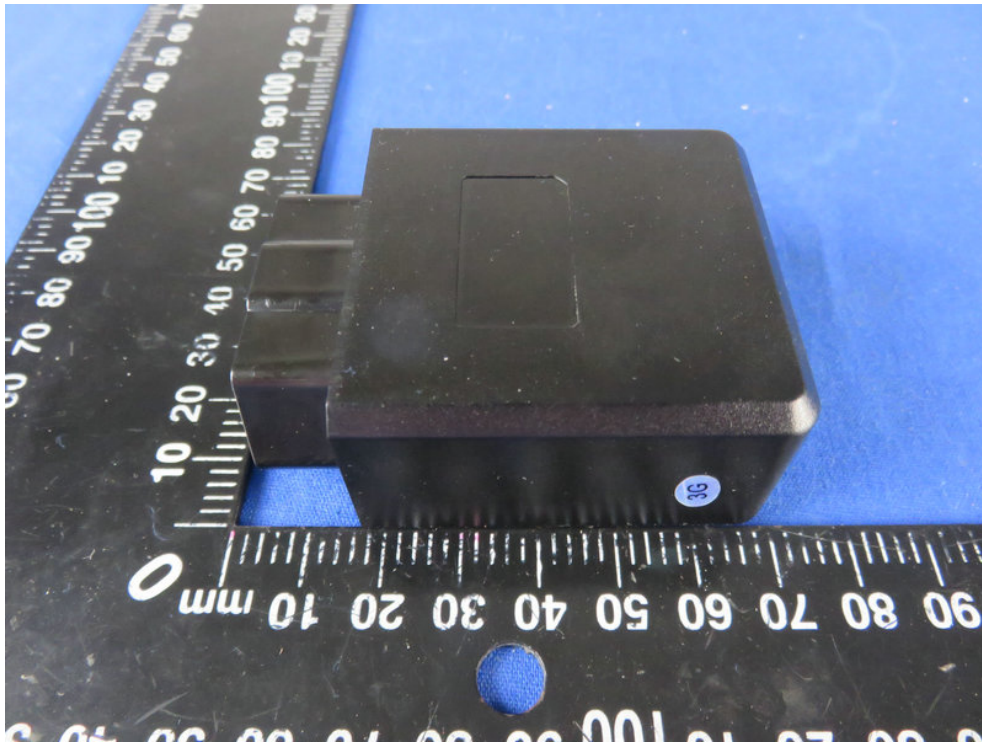


## APPENDIX V (EXTERNAL PHOTOS)

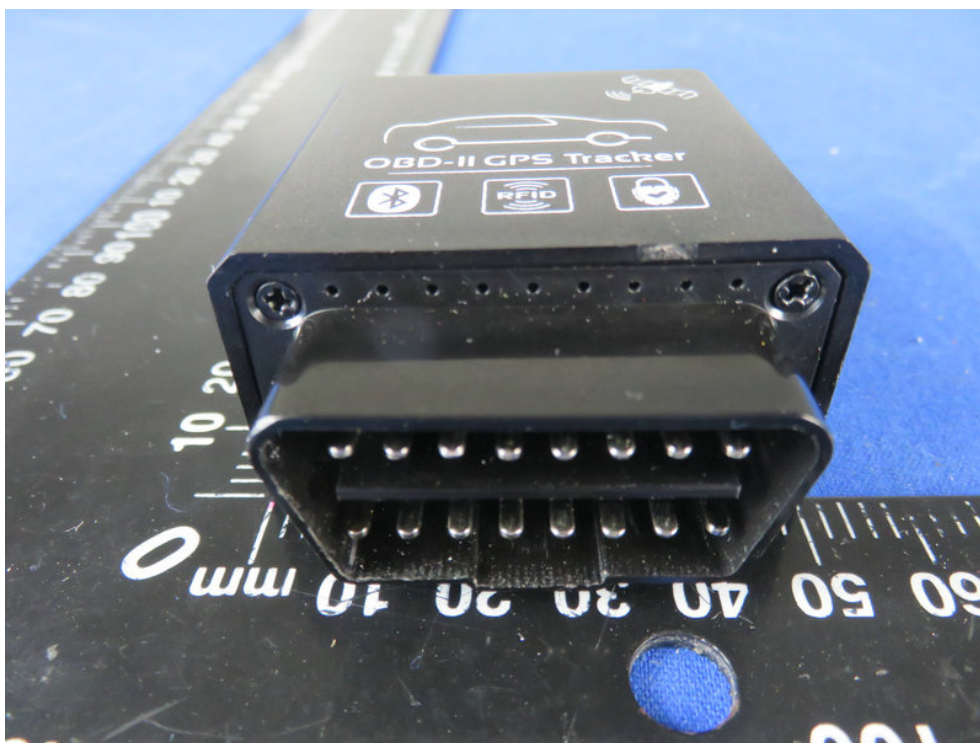












## APPENDIX VI (INTERNAL PHOTOS)

