# FCC Test Report

Report No.: AGC00068140305FE02

| | | |
|---|---|---|
| **FCC ID** | : | O5531103210 |
| **APPLICATION PURPOSE** | : | Original Equipment |
| **PRODUCT DESIGNATION** | : | GSM Mobile Phone |
| **BRAND NAME** | : | iSWAG |
| **MODEL NAME** | : | iSwag Rock, IS-T3110, IS-T3210, Logic X1, G53511, G5350, VOS2000, VOS2002, V3100, V3101, U3501, U3502 |
| **CLIENT** | : | SWAGTEK |
| **DATE OF ISSUE** | : | Mar. 31, 2014 |
| **STANDARD(S)** | : | FCC Part 22H & 24E Rules |
| **REPORT VERSION** | : | V1.0 |

***A***ttestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd.

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## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Mar. 31, 2014 | Valid | Original Report |

# TABLE OF CONTENTS

**1.VERIFICATION OF COMPLIANCE.....5**

**2. GENERAL INFORMATION .....6**

2.1 PRODUCT DESCRIPTION .....6

2.2 RELATED SUBMITTAL(S) / GRANT (S) .....8

2.3 TEST METHODOLOGY .....8

2.4 TEST FACILITY .....8

2.5 MEASUREMENT INSTRUMENTS .....8

2.6 SPECIAL ACCESSORIES .....9

2.7 EQUIPMENT MODIFICATIONS.....9

**3. SYSTEM TEST CONFIGURATION.....10**

3.1 EUT CONFIGURATION .....10

3.2 EUT EXERCISE.....10

3.3 GENERAL TECHNICAL REQUIREMENTS .....10

3.4 CONFIGURATION OF EUT SYSTEM.....11

**4. SUMMARY OF TEST RESULTS.....12**

**5. DESCRIPTION OF TEST MODES.....12**

**6. OUTPUT POWER .....13**

6.1 Conducted Output Power.....13

6.2 RADIATED OUTPUT POWER .....20

6.3. Peak-to-Average Ratio .....23

**7. SPURIOUS EMISSION .....25**

7.1 CONDUCTED SPURIOUS EMISSION.....25

7.2 Radiated Spurious Emission.....28

**8. MAINS CONDUCTED EMISSION.....32**

8.1 MEASUREMENT METHOD .....32

8.2 PROVISIONS APPLICABLE.....32

8.3 MEASUREMENT RESULT .....33

**9. FREQUENCY STABILITY .....35**

9.1 MEASUREMENT METHOD ..... 35
9.2 PROVISIONS APPLICABLE ..... 35
9.3 MEASUREMENT RESULT (WORST) ..... 36

**10. OCCUPIED BANDWIDTH ..... 39**
10.1 MEASUREMENT METHOD ..... 39
10.2 PROVISIONS APPLICABLE ..... 39
10.3 MEASUREMENT RESULT ..... 39

**11. EMISSION BANDWIDTH ..... 41**
11.1 MEASUREMENT METHOD ..... 41
11.2 PROVISIONS APPLICABLE ..... 41
11.3 MEASUREMENT RESULT ..... 41

**12. BAND EDGE ..... 43**
12.1 MEASUREMENT METHOD ..... 43
12.2 PROVISIONS APPLICABLE ..... 43
12.3 MEASUREMENT RESULT ..... 43

**TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION ..... 44**

**TEST PLOTS FOR OCCUPIED BANDWIDTH (99%) ..... 72**

**EMISSION BANDWIDTH (-26DBC) ..... 72**

**APPENDIX C ..... 82**

**TEST PLOTS FOR BAND EDGES ..... 82**

**APPENDIX D ..... 89**

**PHOTOGRAPHS OF TEST SETUP ..... 89**

**PHOTOGRAPHS OF EUT ..... 92**

# 1.VERIFICATION OF COMPLIANCE

| | |
|---|---|
| **Applicant** | SWAGTEK |
| **Address** | 10205 NW 19th Street, STE 101, Miami, FL33172, USA |
| **Manufacturer** | Kingtech Telecom (Shenzhen) Co., Ltd. |
| **Address** | Floor 3, Building A, No.3, Road 1 of Shangxue Dengxinkeng Industry Park, Bantian Street, Longgang District, Shenzhen City, PRC |
| **Product Designation** | GSM Mobile Phone |
| **Brand Name** | iSWAG |
| **Test Model** | iSwag Rock |
| **Series Model** | IS-T3110, IS-T3210, Logic X1, G53511, G5350, VOS2000, VOS2002, V3100, V3101, U3501, U3502 |
| **Difference description** | All the same except for model name. |
| **Date of test** | Mar. 19, 2014 to Mar.28, 2014 |
| **Deviation** | None |
| **Condition of Test Sample** | Normal |

**We hereby certify that:**

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2003 and TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part 22H and 24E.
The test results of this report relate only to the tested sample identified in this report.

Tested By : Bart Xie

Bart Xie Mar. 31, 2014

Reviewed By : Kidd Yang

Kidd Yang Mar. 31, 2014

Approved By: Solger Zhang

Solger Zhang Mar. 31, 2014

# 2. GENERAL INFORMATION

## 2.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

| | |
|---|---|
| Product Designation: | GSM Mobile Phone |
| Hardware version: | Z35_MB_V2.0 |
| Software version: | N/A |
| Frequency Bands: | ☒GSM 850 ☒PCS 1900 (U.S. Bands)<br>☒GSM 900 ☒DCS 1800 (Non-U.S. Bands)<br>☒UMTS FDD Band II ☒UMTS FDD Band V (U.S. Bands)<br>☐UMTS FDD Band I ☐UMTS FDD Band VIII (Non-U.S. Bands) |
| Antenna: | PIFA Antenna |
| Antenna gain: | -1.0dBi(GSM/WCDMA 850), -0.8dBi (GSM/WCDMA 1900) |
| Power Supply: | DC 3.7V by Battery |
| Battery parameter: | DC3.7V/2000 mAh |
| Adapter Input: | AC100-240V, 50-60Hz 0.1A |
| Adapter Output: | DC5V, 700mA |
| Dual Card: | GSM Card Slot<br>WCDMA / GSM Card Slot |
| GPRS Class | 12 |
| Extreme Vol. Limits: | DC3.4 V to 4.2 V (Normal: DC3.7 V) |
| Extreme Temp. Tolerance | -10℃ to +50℃ |
| *** Note: The High Voltage DC4.2V and Low Voltage DC3.4V were declared by manufacturer, The EUT couldn't be operating normally with higher or lower voltage.<br>Other functions have been performed according to verification procedure except for Bluetooth and MS function. Card 1 can't transmit with Card 2 simultaneously. | |

***** Note:** The maximum power levels are GSM for MCS-4: GMSK link, EDGE for MCS-9:8PSK link, and RMC 12.2kbps mode for WCDMA band II, WCDMA band V, only these modes were used for all tests.
We found out the test mode with the highest power level after we analyze all the data rates. So we chose worst case as a representative.

**WCDMA Card Slot:**

| | Maximum ERP/EIRP (dBm) | Max. Conducted Power (dBm) | Max. Average Burst Power (dBm) |
|---|---|---|---|
| GSM 850 | 30.78 | 32.67 | 31.76 |
| PCS 1900 | 27.86 | 29.74 | 28.79 |
| UMTS BAND II | 22.28 | 23.66 | 22.77 |
| UMTS BAND V | 21.82 | 23.52 | 22.66 |

**GSM Card Slot:**

| | Maximum ERP/EIRP (dBm) | Max. Conducted Power (dBm) | Max. Average Burst Power (dBm) |
|---|---|---|---|
| GSM 850 | 30.44 | 32.38 | 31.42 |
| PCS 1900 | 27.32 | 29.28 | 28.37 |

## 2.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: O5531103210**, filing to comply with the FCC Part 22H&24E requirements.

## 2.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI C 63.4: 2003; TIA/EIA 603 and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.
KDB 971168 D01 Power Meas License Digital Systems v02r01

## 2.4 TEST FACILITY

The test site used to collect the radiated data is located at:
Attestation of Global Compliance (Shenzhen) Co., Ltd.
2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC register No.: 259865

## 2.5 MEASUREMENT INSTRUMENTS

| NAME OF EQUIPMENT | MANUFACTURER | MODEL | SERIAL NUMBER | Calibration Date | Calibration Due. |
|---|---|---|---|---|---|
| SPECTRUM ANALYZER | AGILENT | E4440A | US41421290 | July 17, 2013 | July 16, 2014 |
| TEST RECEIVER | R&S | ESCI | 100694 | July 17, 2013 | July 16, 2014 |
| COMMUNICATION TESTER | AGILENT | 8960 | 122500087 | Oct.21, 2013 | Oct.20, 2014 |
| COMMUNICATION TESTER | R&S | CMU200 | 122500166 | Feb.27,2014 | Feb.26,2015 |
| SIGNAL GENERATOR | AGILENT | E4438C | MY44260051 | Feb.23,2014 | Feb. 22,2015 |
| LISN | R&S | ESH3-Z5 | 8389791009 | July 17, 2013 | July 16, 2014 |
| CLIMATE CHAMBER | ALBATROSS | -- | -- | July 17, 2013 | July 16, 2014 |
| Loop Antenna | A.H. | SAS-562B | SEL0097 | July 17, 2013 | July 16, 2014 |
| Bilogical Antenna | A.H. Systems Inc. | SAS-521-4 | 26 | June 7,2013 | June 6, 2014 |
| Substitution Antenna | EMCO | 3142C | --- | June 7,2013 | June 6, 2014 |
| Substitution Antenna | EM | EM-AH-10180 | 69 | Apr.20, 2013 | Apr.19, 2014 |
| Horn Antenna | EM | EM-AH-10180 | 67 | Apr.20, 2013 | Apr.19, 2014 |
| Horn Antenna | A.H. Systems Inc. | SAS-574 | -- | June 7,2013 | June 6, 2014 |

## 2.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

## 2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

# 3. SYSTEM TEST CONFIGURATION

## 3.1 EUT CONFIGURATION

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

## 3.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

## 3.3 GENERAL TECHNICAL REQUIREMENTS

| Item Number | Item Description | | FCC Rules |
|---|---|---|---|
| 1 | Output Power | Conducted output power | 2.1046/22.913(a) (2) / 24.232 (c) |
| | | Radiated output power | |
| 2 | Peak-to-Average Ratio | Peak-to-Average Ratio | 24.232(d) |
| 3 | Spurious Emission | Conducted spurious emission | 2.1051 / 22.917 / 24.238 |
| | | Radiated spurious emission | |
| 4 | Mains Conducted Emission | | 15.107 / 15.207 |
| 5 | Frequency Stability | | 2.1055/22.355 /24.235 |
| 6 | Occupied Bandwidth | | 2.1049 (h)(i) |
| 7 | Emission Bandwidth | | 22.917(a)/24.238(a) |
| 8 | Band Edge | | 22.917(a)/24.238(a) |

**3.4 CONFIGURATION OF EUT SYSTEM**

Fig. 2-1 Configuration of EUT System

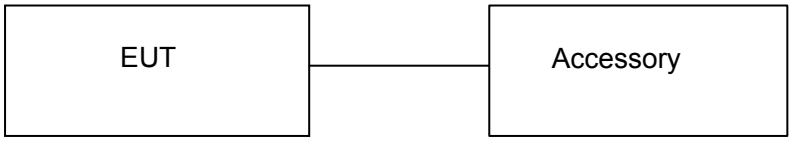



Table 2-1 Equipment Used in EUT System

| Item | Equipment | Model No. | ID or Specification | Note |
|---|---|---|---|---|
| 1 | GSM Mobile Phone | iSWAG | FCC ID: O5531103210 | EUT |
| 2 | Adapter | iSWAG | 5.0V / 700mA | Accessory |
| 3 | Battery | iSWAG | DC3.7V / 2000 mAh | Accessory |
| 4 | Earphone | iSWAG | N/A | Accessory |
| 5 | USB Cable | iSWAG | N/A | Accessory |

****Note: All the accessories have been used during the test. The following "EUT" in setup diagram means EUT system.*

# 4. SUMMARY OF TEST RESULTS

| Item Number | Item Description | | FCC Rules | Result |
|---|---|---|---|---|
| 1 | Output Power | Conducted Output Power | 2.1046/22.913(a) (2) / 24.232 (c) | Pass |
| | | Radiated Output Power | | |
| 2 | Peak-to-Average Ratio | Peak-to-Average Ratio | 24.232(d) | Pass |
| 3 | Spurious Emission | Conducted Spurious Emission | 2.1051 / 22.917 / 24.238 | Pass |
| | | Radiated Spurious Emission | | |
| 4 | Mains Conducted Emission | | 15.107 / 15.207 | Pass |
| 5 | Frequency Stability | | 2.1055/22.355 /24.235 | Pass |
| 6 | Occupied Bandwidth | | 2.1049 (h)(i) | Pass |
| 7 | Emission Bandwidth | | 22.917(a)/24.238(a) | Pass |
| 8 | Band Edge | | 22.917(a)/24.238(a) | Pass |

# 5. 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 GSM and PCS frequency band.

*****Note:** GSM/GPRS/EGPRS 850, GSM/GPRS/EGPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band V, mode have been tested during the test.

The worst condition was recorded in the test report if no other modes test data.

# 6. OUTPUT POWER

## 6.1 Conducted Output Power

### 6.1.1 MEASUREMENT METHOD

The transmitter output port was connected to base station.

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.

Measure the maximum burst average power and average power for other modulation signal.

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/EGPRS 850, GSM/GPRS/EGPRS1900, WCDMA/HSPA band II, WCDMA/HSPA band V) at 3 typical channels (the Top Channel, the Middle Channel and the Bottom Channel) for each band.

### 6.1.2 MEASUREMENT RESULT

| **Conducted Output Power Limits for GSM850/EDGE band** | | |
|---|---|---|
| **Mode** | **Nominal Peak Power** | **Tolerance(dB)** |
| GSM | 33 dBm (2W) | **- 1** |
| EDGE | 27 dBm(0.5W) | ±1 |
| **Conducted Output Power Limits for PCS1900/EDGE band** | | |
| **Mode** | **Nominal Peak Power** | **Tolerance(dB)** |
| GSM | 30 dBm (1W) | - 1 |
| EDGE | 26 dBm (0.4W) | ±1 |
| **Conducted Output Power Limits for UMTS band II** | | |
| **Mode** | **Nominal Peak Power** | **Tolerance(dB)** |
| WCDMA | 24 dBm (0.25W) | - 2 |
| **Conducted Output Power Limits for UMTS band V** | | |
| **Mode** | **Nominal Peak Power** | **Tolerance(dB)** |
| WCDMA | 24 dBm (0.25W) | - 2 |

**GSM 850:**

| Mode | Frequency (MHz) | Reference Power | Peak Power | Tolerance | Avg.Burst Power | Duty cycle Factor(dB) | Frame Power(dBm) |
|---|---|---|---|---|---|---|---|
| GSM850 | 824.2 | 33 | **32.67** | -0.33 | 31.76 | -9 | 22.76 |
| | 836.6 | 33 | 32.54 | -0.46 | 31.62 | -9 | 22.62 |
| | 848.8 | 33 | 32.48 | -0.52 | 31.56 | -9 | 22.56 |
| GPRS850 (1 Slot) | 824.2 | 33 | 32.44 | -0.56 | 31.51 | -9 | 22.51 |
| | 836.6 | 33 | 32.32 | -0.68 | 31.42 | -9 | 22.42 |
| | 848.8 | 33 | 32.29 | -0.71 | 31.37 | -9 | 22.37 |
| GPRS850 (2 Slot) | 824.2 | 30 | 29.49 | -0.51 | 28.54 | -6 | 22.54 |
| | 836.6 | 30 | 29.35 | -0.65 | 28.42 | -6 | 22.42 |
| | 848.8 | 30 | 29.23 | -0.77 | 28.31 | -6 | 22.31 |
| GPRS850 (3 Slot) | 824.2 | 28.23 | 27.34 | -0.89 | 26.42 | -4.26 | 22.16 |
| | 836.6 | 28.23 | 27.22 | -1.01 | 26.32 | -4.26 | 22.06 |
| | 848.8 | 28.23 | 27.21 | -1.02 | 26.31 | -4.26 | 22.05 |
| GPRS850 (4 Slot) | 824.2 | 27 | 26.36 | -0.64 | 25.42 | -3 | 22.42 |
| | 836.6 | 27 | 26.24 | -0.76 | 25.33 | -3 | 22.33 |
| | 848.8 | 27 | 26.18 | -0.82 | 25.27 | -3 | 22.27 |

| Mode | Channel | Frequency (MHz) | Peak Power (dBm) | Avg.Burst Power (dBm) |
|---|---|---|---|---|
| EDGE (1 Slot) | 128 | 824.2 | 26.87 | 26.42 |
| | 189 | 836.6 | 26.83 | 26.39 |
| | 251 | 848.8 | 26.64 | 26.28 |
| EDGE (2 Slot) | 128 | 824.2 | 25.54 | 24.86 |
| | 189 | 836.6 | 25.33 | 24.79 |
| | 251 | 848.8 | 25.26 | 24.64 |
| EDGE (3 Slot) | 128 | 824.2 | 23.74 | 22.83 |
| | 189 | 836.6 | 23.53 | 22.74 |
| | 251 | 848.8 | 23.48 | 22.65 |
| EDGE (4 Slot) | 128 | 824.2 | 22.63 | 21.82 |
| | 189 | 836.6 | 22.46 | 20.68 |
| | 251 | 848.8 | 22.37 | 21.61 |

**PCS 1900:**

| Mode | Frequency (MHz) | Reference Power | Peak Power | Tolerance | Avg.Burst Power | Duty cycle Factor(dB) | Frame Power(dBm) |
|---|---|---|---|---|---|---|---|
| GSM1900 | 1850.2 | 30 | 29.62 | -0.38 | 28.71 | -9 | 19.71 |
| | 1880 | 30 | **29.74** | -0.26 | 28.79 | -9 | 19.79 |
| | 1909.8 | 30 | 29.48 | -0.52 | 28.56 | -9 | 19.56 |
| GPRS1900 (1 Slot) | 1850.2 | 30 | 29.41 | -0.59 | 28.48 | -9 | 19.48 |
| | 1880 | 30 | 29.54 | -0.46 | 28.59 | -9 | 19.59 |
| | 1909.8 | 30 | 29.33 | -0.67 | 28.42 | -9 | 19.42 |
| GPRS1900 (2 Slot) | 1850.2 | 27 | 26.29 | -0.71 | 25.38 | -6 | 19.38 |
| | 1880 | 27 | 26.43 | -0.57 | 25.52 | -6 | 19.52 |
| | 1909.8 | 27 | 26.26 | -0.74 | 25.33 | -6 | 19.33 |
| GPRS1900 (3 Slot) | 1850.2 | 25.23 | 24.46 | -0.77 | 24.55 | -4.26 | 20.29 |
| | 1880 | 25.23 | 24.55 | -0.68 | 24.62 | -4.26 | 20.36 |
| | 1909.8 | 25.23 | 24.38 | -0.85 | 24.47 | -4.26 | 20.21 |
| GPRS1900 (4 Slot) | 1850.2 | 24 | 23.48 | -0.52 | 22.56 | -3 | 19.56 |
| | 1880 | 24 | 23.56 | -0.44 | 22.66 | -3 | 19.66 |
| | 1909.8 | 24 | 23.33 | -0.67 | 22.47 | -3 | 19.47 |

| Mode | Channel | Frequency (MHz) | Peak Power (dBm) | Avg.Burst Power (dBm) |
|---|---|---|---|---|
| EDGE (1 Slot) | 512 | 1850.2 | 25.74 | 25.32 |
| | 661 | 1880 | 25.88 | 25.38 |
| | 810 | 1909.8 | 25.56 | 25.17 |
| EDGE (2 Slot) | 512 | 1850.2 | 24.38 | 23.86 |
| | 661 | 1880 | 24.55 | 23.91 |
| | 810 | 1909.8 | 24.26 | 23.73 |
| EDGE (3 Slot) | 512 | 1850.2 | 22.47 | 22.28 |
| | 661 | 1880 | 22.68 | 22.36 |
| | 810 | 1909.8 | 22.36 | 22.15 |
| EDGE (4 Slot) | 512 | 1850.2 | 21.56 | 20.73 |
| | 661 | 1880 | 21.73 | 20.84 |
| | 810 | 1909.8 | 21.44 | 20.61 |

**UMTS BAND II**

| Mode | Frequency (MHz) | Reference power | Peak Power | Tolerance | Avg.Burst Power |
|---|---|---|---|---|---|
| WCDMA 1900 RMC | 1852.4 | 24 | **23.66** | -0.34 | 22.77 |
| | 1880 | 24 | 23.48 | -0.52 | 22.56 |
| | 1907.6 | 24 | 23.33 | -0.67 | 22.45 |
| WCDMA 1900 AMR | 1852.4 | 24 | 22.44 | -1.56 | 22.33 |
| | 1880 | 24 | 22.37 | -1.63 | 22.28 |
| | 1907.6 | 24 | 22.24 | -1.76 | 22.15 |
| HSDPA Subtest 1 | 1852.4 | 24 | 22.44 | -1.56 | 22.37 |
| | 1880 | 24 | 22.36 | -1.64 | 22.26 |
| | 1907.6 | 24 | 22.27 | -1.73 | 22.23 |
| HSDPA Subtest 2 | 1852.4 | 24 | 22.43 | -1.57 | 22.37 |
| | 1880 | 24 | 22.32 | -1.68 | 22.34 |
| | 1907.6 | 24 | 22.24 | -1.76 | 22.14 |
| HSDPA Subtest 3 | 1852.4 | 24 | 22.45 | -1.55 | 22.33 |
| | 1880 | 24 | 22.33 | -1.67 | 22.23 |
| | 1907.6 | 24 | 22.24 | -1.76 | 22.18 |
| HSDPA Subtest 4 | 1852.4 | 24 | 22.63 | -1.37 | 22.38 |
| | 1880 | 24 | 22.43 | -1.57 | 22.34 |
| | 1907.6 | 24 | 22.37 | -1.63 | 22.22 |
| HSUPA Subtest 1 | 1852.4 | 24 | 22.52 | -1.48 | 22.37 |
| | 1880 | 24 | 22.37 | -1.63 | 22.21 |
| | 1907.6 | 24 | 22.26 | -1.74 | 22.18 |
| HSUPA Subtest 2 | 1852.4 | 24 | 22.41 | -1.59 | 22.24 |
| | 1880 | 24 | 22.24 | -1.76 | 22.12 |
| | 1907.6 | 24 | 22.18 | -1.82 | 22.09 |
| HSUPA Subtest 3 | 1852.4 | 24 | 22.36 | -1.64 | 22.23 |
| | 1880 | 24 | 22.22 | -1.78 | 22.18 |
| | 1907.6 | 24 | 22.29 | -1.71 | 22.16 |
| HSUPA Subtest 4 | 1852.4 | 24 | 22.44 | -1.56 | 22.37 |
| | 1880 | 24 | 22.32 | -1.68 | 22.24 |
| | 1907.6 | 24 | 22.25 | -1.75 | 22.16 |
| HSUPA Subtest 5 | 1852.4 | 24 | 22.49 | -1.51 | 22.37 |
| | 1880 | 24 | 22.34 | -1.66 | 22.25 |
| | 1907.6 | 24 | 22.23 | -1.77 | 22.14 |

**UMTS BAND V**

| Mode | Frequency (MHz) | Reference power | Peak Power | Tolerance | Avg.Burst Power |
|---|---|---|---|---|---|
| WCDMA 850 RMC | 826.4 | 24 | **23.52** | -0.48 | 22.66 |
| | 832.2 | 24 | 23.47 | -0.53 | 22.58 |
| | 846.6 | 24 | 23.33 | -0.67 | 22.43 |
| WCDMA 850 AMR | 826.4 | 24 | 22.48 | -1.52 | 22.38 |
| | 832.2 | 24 | 22.36 | -1.64 | 22.28 |
| | 846.6 | 24 | 22.24 | -1.76 | 22.21 |
| HSDPA Subtest 1 | 826.4 | 24 | 22.47 | -1.53 | 22.36 |
| | 832.2 | 24 | 22.34 | -1.66 | 22.24 |
| | 846.6 | 24 | 22.29 | -1.71 | 22.16 |
| HSDPA Subtest 2 | 826.4 | 24 | 22.51 | -1.49 | 22.44 |
| | 832.2 | 24 | 22.38 | -1.62 | 22.34 |
| | 846.6 | 24 | 22.42 | -1.58 | 22.35 |
| HSDPA Subtest 3 | 826.4 | 24 | 22.47 | -1.53 | 22.35 |
| | 832.2 | 24 | 22.33 | -1.67 | 22.28 |
| | 846.6 | 24 | 22.33 | -1.67 | 22.26 |
| HSDPA Subtest 4 | 826.4 | 24 | 22.58 | -1.42 | 22.47 |
| | 832.2 | 24 | 22.36 | -1.64 | 22.26 |
| | 846.6 | 24 | 22.44 | -1.56 | 22.38 |
| HSUPA Subtest 1 | 826.4 | 24 | 22.37 | -1.63 | 22.26 |
| | 832.2 | 24 | 22.25 | -1.75 | 22.17 |
| | 846.6 | 24 | 22.32 | -1.68 | 22.27 |
| HSUPA Subtest 2 | 826.4 | 24 | 22.48 | -1.52 | 22.25 |
| | 832.2 | 24 | 22.23 | -1.77 | 22.18 |
| | 846.6 | 24 | 22.38 | -1.62 | 22.16 |
| HSUPA Subtest 3 | 826.4 | 24 | 22.36 | -1.64 | 22.22 |
| | 832.2 | 24 | 22.27 | -1.73 | 22.17 |
| | 846.6 | 24 | 22.24 | -1.76 | 22.18 |
| HSUPA Subtest 4 | 826.4 | 24 | 22.49 | -1.51 | 22.36 |
| | 832.2 | 24 | 22.35 | -1.65 | 22.24 |
| | 846.6 | 24 | 22.24 | -1.76 | 22.17 |
| HSUPA Subtest 5 | 826.4 | 24 | 22.46 | -1.54 | 22.36 |
| | 832.2 | 24 | 22.23 | -1.77 | 22.18 |
| | 846.6 | 24 | 22.21 | -1.79 | 22.13 |

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

| UE Transmit Channel Configuration | CM(db) | MPR(db) |
|---|---|---|
| For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH | 0≤ CM≤3.5 | MAX(CM-1,0) |
| Note: CM=1 for $\beta_c/\beta_d$=12/15, $\beta_{hs}/\beta_c$=24/15.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference. | | |

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensate for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

# 6.2 RADIATED OUTPUT POWER

## 6.2.1 MEASUREMENT METHOD

The measurements procedures specified in TIA-603C-2004 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 (Pin) is applied to the input of the dipole, and the power received (Pr) 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 ARpl=Pin + 2.15 - Pr. The ARpl 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=PMea+ARpl

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 (Pin).

8 ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi..

## 6.2.2 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/EDGE | <=38.45 dBm (7W) |
| PCS 1900/EDGE | <=33 dBm (2W) |
| UMTS BAND II | <=33 dBm (2W) |
| UMTS BANDV | <=38.45 dBm (7W) |

### 6.2.3 MEASUREMENT RESULT

| Radiated Power (ERP) for GSM 850/EDGE 8 | | | | |
|---|---|---|---|---|
| Mode | Frequency | Result | | Conclusion |
| | | Max. Peak ERP (dBm) | Polarization Of Max. ERP | |
| GSM850 | 824.2 | **30.78** | Horizontal | Pass |
| | 836.6 | 30.67 | Horizontal | Pass |
| | 848.8 | 30.54 | Horizontal | Pass |
| | 824.2 | 29.29 | Vertical | Pass |
| | 836.6 | 28.44 | Vertical | Pass |
| | 848.8 | 28.33 | Vertical | Pass |
| EDGE | 824.2 | 25.82 | Horizontal | Pass |
| | 836.6 | 25.56 | Horizontal | Pass |
| | 848.8 | 25.43 | Horizontal | Pass |
| | 824.2 | 25.67 | Vertical | Pass |
| | 836.6 | 25.48 | Vertical | Pass |
| | 848.8 | 25.33 | Vertical | Pass |

| Radiated Power (E.I.R.P) for PCS 1900/EDGE 8 | | | | |
|---|---|---|---|---|
| Mode | Frequency | Result | | Conclusion |
| | | Max. Peak E.I.R.P.(dBm) | Polarization Of Max. E.I.R.P. | |
| GSM 1900 | 1850.2 | 27.71 | Horizontal | Pass |
| | 1880.0 | **27.86** | Horizontal | Pass |
| | 1909.8 | 27.44 | Horizontal | Pass |
| | 1850.2 | 26.58 | Vertical | Pass |
| | 1880.0 | 26.63 | Vertical | Pass |
| | 1909.8 | 25.81 | Vertical | Pass |
| EDGE | 1850.2 | 24.56 | Horizontal | Pass |
| | 1880.0 | 24.74 | Horizontal | Pass |
| | 1909.8 | 24.42 | Horizontal | Pass |
| | 1850.2 | 23.49 | Vertical | Pass |
| | 1880.0 | 23.54 | Vertical | Pass |
| | 1909.8 | 23.33 | Vertical | Pass |

| Radiated Power (E.I.R.P) for UMTS band II | | | | |
|---|---|---|---|---|
| **Mode** | **Frequency** | **Result** | | |
| | | **Max. Peak E.I.R.P (dBm)** | **Polarization Of Max. E.I.R.P** | |
| RMC 12.2kbps | 1852.4 | **22.28** | Horizontal | Pass |
| | 1880 | 21.84 | Horizontal | Pass |
| | 1907.6 | 21.73 | Horizontal | Pass |
| | 1852.4 | 21.54 | Vertical | Pass |
| | 1880 | 20.76 | Vertical | Pass |
| | 1907.6 | 21.41 | Vertical | Pass |

| Radiated Power (ERP) for UMTS band V | | | | |
|---|---|---|---|---|
| **Mode** | **Frequency** | **Result** | | **Conclusion** |
| | | **Max. Peak ERP (dBm)** | **Polarization Of Max. E.I.R.P.** | |
| RMC 12.2kbps | 826.4 | **21.82** | Horizontal | Pass |
| | 835.0 | 20.96 | Horizontal | Pass |
| | 846.6 | 21.66 | Horizontal | Pass |
| | 826.4 | 20.91 | Vertical | Pass |
| | 835.0 | 20.28 | Vertical | Pass |
| | 846.6 | 21.17 | Vertical | Pass |

Note: Above is worst mode data.

## 6.3. Peak-to-Average Ratio

### 6.3.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

PAPR (dB) = PPk (dBm) - PAvg (dBm).

### 6.3.2 PROVISIONS APPLICABLE

This is the test for the Peak-to-Average Ratio from the EUT.

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 6.3.3 MEASUREMENT RESULT

| **Modes** | **GSM850(GSM)** | | |
|---|---|---|---|
| **Channel** | **128** | **190** | **251** |
| | **(Low)** | **(Mid)** | **(High)** |
| **Frequency (MHz)** | **824.2** | **836.6** | **848.8** |
| **Peak-To-Average Ratio (dB)/GSM** | 0.91 | 0.92 | 0.92 |
| **Peak-To-Average Ratio (dB)/EDGE** | 0.45 | 0.44 | 0.36 |

| **Modes** | **PCS 1900 (GSM)** | | |
|---|---|---|---|
| **Channel** | **512** | **661** | **810** |
| | **(Low)** | **(Mid)** | **(High)** |
| **Frequency (MHz)** | **1850.2** | **1880** | **1909.8** |
| **Peak-To-Average Ratio (dB)/GSM** | 0.91 | 0.95 | 0.92 |
| **Peak-To-Average Ratio (dB)/EDGE** | 0.42 | 0.5 | 0.39 |

| Modes | UMTS BAND II | | |
|---|---|---|---|
| Channel | 9662 | 9800 | 9938 |
| | (Low) | (Mid) | (High) |
| Frequency (MHz) | 1852.4 | 1880 | 1907.6 |
| Peak-To-Average Ratio (dB) | 0.89 | 0.92 | 0.88 |

| Modes | UMTS BAND V | | |
|---|---|---|---|
| Channel | 4357 | 4386 | 4458 |
| | (Low) | (Mid) | (High) |
| Frequency (MHz) | 826.4 | 832.2 | 846.6 |
| Peak-To-Average Ratio (dB) | 0.86 | 0.89 | 0.9 |

# 7. SPURIOUS EMISSION

## 7.1 CONDUCTED SPURIOUS EMISSION

### 7.1.1 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 GSM 850, 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/EDGE 8** | |
|---|---|
| Channel | Frequency (MHz) |
| 128 | 824.2 |
| 190 | 836.6 |
| 251 | 848.8 |

| **Typical Channels for testing of PCS 1900/EDGE 8** | |
|---|---|
| Channel | Frequency (MHz) |
| 512 | 1850.2 |
| 661 | 1880.0 |
| 810 | 1909.8 |

| Typical Channels for testing of UMTS band II | |
|---|---|
| Channel | Frequency (MHz) |
| 9662 | 1852.4 |
| 9800 | 1880 |
| 9938 | 1907.6 |

| Typical Channels for testing of UMTS band V | |
|---|---|
| Channel | Frequency (MHz) |
| 4357 | 826.4 |
| 4386 | 832.2 |
| 4458 | 846.6 |

### 7.1.2 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+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

### 7.1.3 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.

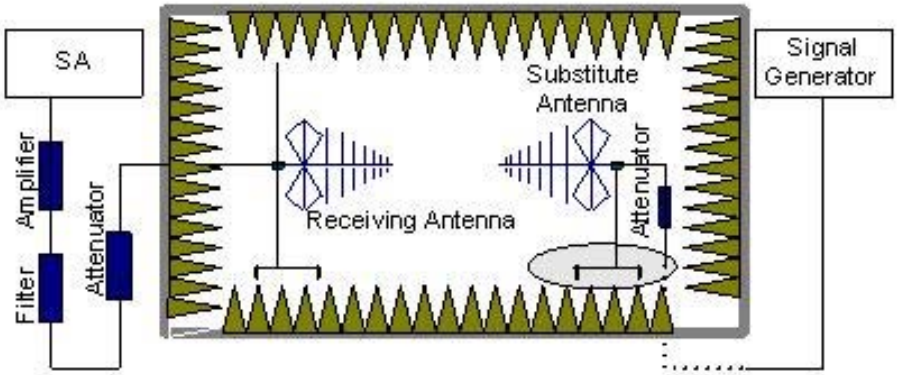
## 7.2 Radiated Spurious Emission

### 7.2.1 MEASUREMENT METHOD

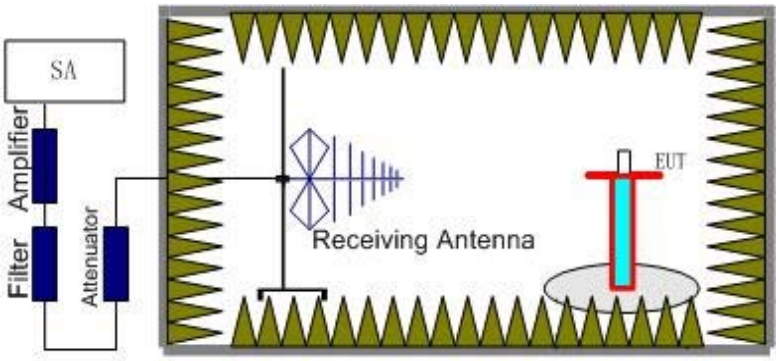
The measurements procedures specified in TIA-603C-2004 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes(GPRS/EGPRS 850, GPRS/EGPRS 1900, HSPA band II, HSPA band V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.




b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.




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, 835.0MHz, 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 $A_{Rpl}$ 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=$P_{Mea}$+$A_{Rpl}$

### 7.2.2 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+10Log(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:

### 7.2.3 MEASUREMENT RESULT

**GSM 850:**

| The Worst Test Results for Channel 251/848.8 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency(MHz) | Power(dBm) | ARpl (dBm) | PMea(dBm) | Limit（dBm） | Polarity |
| 1685.23 | -43.48 | -5.01 | -48.49 | -13.00 | Horizontal |
| 2456.12 | -46.74 | -2.18 | -48.92 | -13.00 | Vertical |
| 3645.78 | -48.66 | 3.46 | -45.20 | -13.00 | Vertical |
| 4536.58 | -45.38 | 2.79 | -42.59 | -13.00 | Horizontal |

**GSM 850(EDGE 8):**

| The Worst Test Results for Channel 251/848.8 MHz | | | | | |
|---|---|---|---|---|---|
| Frequency(MHz) | Power(dBm) | ARpl (dBm) | PMea(dBm) | Limit（dBm） | Polarity |
| 1696.28 | -47.38 | -2.26 | -49.64 | -13.00 | Horizontal |
| 2162.19 | -46.44 | -3.12 | -49.56 | -13.00 | Vertical |
| 3645.78 | -45.28 | -1.74 | -47.02 | -13.00 | Vertical |
| 9257.65 | -42.31 | 8.46 | -33.85 | -13.00 | Horizontal |

**PCS 1900:**

| The Worst Test Results for Channel 810/1909.8MHz | | | | | |
|---|---|---|---|---|---|
| Frequency(MHz) | Power(dBm) | ARpl (dBm) | PMea(dBm) | Limit（dBm） | Polarity |
| 1429.36 | -46.82 | -3.22 | -50.04 | -13.00 | Vertical |
| 2563.47 | -47.68 | -0.24 | -47.92 | -13.00 | Vertical |
| 3645.26 | -47.55 | 3.98 | -43.57 | -13.00 | Horizontal |
| 4563.56 | -46.74 | 11.56 | -35.18 | -13.00 | Vertical |
| 5689.25 | -45.53 | 17.89 | -27.64 | -13.00 | Horizontal |

**PCS 1900(EDGE 8):**

| The Worst Test Results for Channel 810/1909.8MHz | | | | | |
|---|---|---|---|---|---|
| Frequency(MHz) | Power(dBm) | ARpl (dBm) | PMea(dBm) | Limit（dBm） | Polarity |
| 1430.15 | -47.73 | 2.7 | -45.03 | -13.00 | Vertical |
| 9367.91 | -48.46 | 11.6 | -36.86 | -13.00 | Vertical |
| 13356.68 | -49.37 | 14.89 | -34.48 | -13.00 | Horizontal |
| 15249.71 | -47.71 | 13.87 | -33.84 | -13.00 | Vertical |
| 17913.63 | -44.68 | 19.76 | -24.92 | -13.00 | Horizontal |

**UMTS band II:**

| The Worst Test Results for Channel 9938/1907.6MHz | | | | | |
|---|---|---|---|---|---|
| Frequency(MHz) | Power(dBm) | ARpl (dBm) | PMea(dBm) | Limit（dBm） | Polarity |
| 2000.00 | -38.74 | -2.25 | -40.99 | -13.00 | Vertical |
| 9548.50 | -41.47 | -3.03 | -44.5 | -13.00 | Horizontal |
| 13367.40 | -44.62 | -1.87 | -46.49 | -13.00 | Horizontal |
| 15277.80 | -39.83 | 8.52 | -31.31 | -13.00 | Vertical |
| 17931.60 | -55.67 | 18.7 | -36.97 | -13.00 | Horizontal |

**UMTS band V:**

| The Worst Test Results for Channel 4458/846.6MHz | | | | | |
|---|---|---|---|---|---|
| Frequency(MHz) | Power(dBm) | ARpl (dBm) | PMea(dBm) | Limit（dBm） | Polarity |
| 1598.26 | -39.64 | -2.26 | -41.9 | -13.00 | Vertical |
| 2365.78 | -38.82 | -3.12 | -41.94 | -13.00 | Horizontal |
| 4967.65 | -41.71 | -1.74 | -43.45 | -13.00 | Horizontal |
| 6457.86 | -38.83 | 8.74 | -30.09 | -13.00 | Vertical |
| 7896.56 | -41.28 | 17.89 | -23.39 | -13.00 | Horizontal |

**Note:** ARpl= Factor=Antenna Factor+ Cable loss-Amplifier gain.
The “Factor” value can be calculated automatically by software of measurement system.
Below 30MHZ no Spurious found and The GSM modes is the worst condition.

# 8. MAINS CONDUCTED EMISSION

## 8.1 MEASUREMENT METHOD

The measurement procedure specified in ANSI C63.4-2003 was used for testing. Conducted Emission was measured with travel charger.

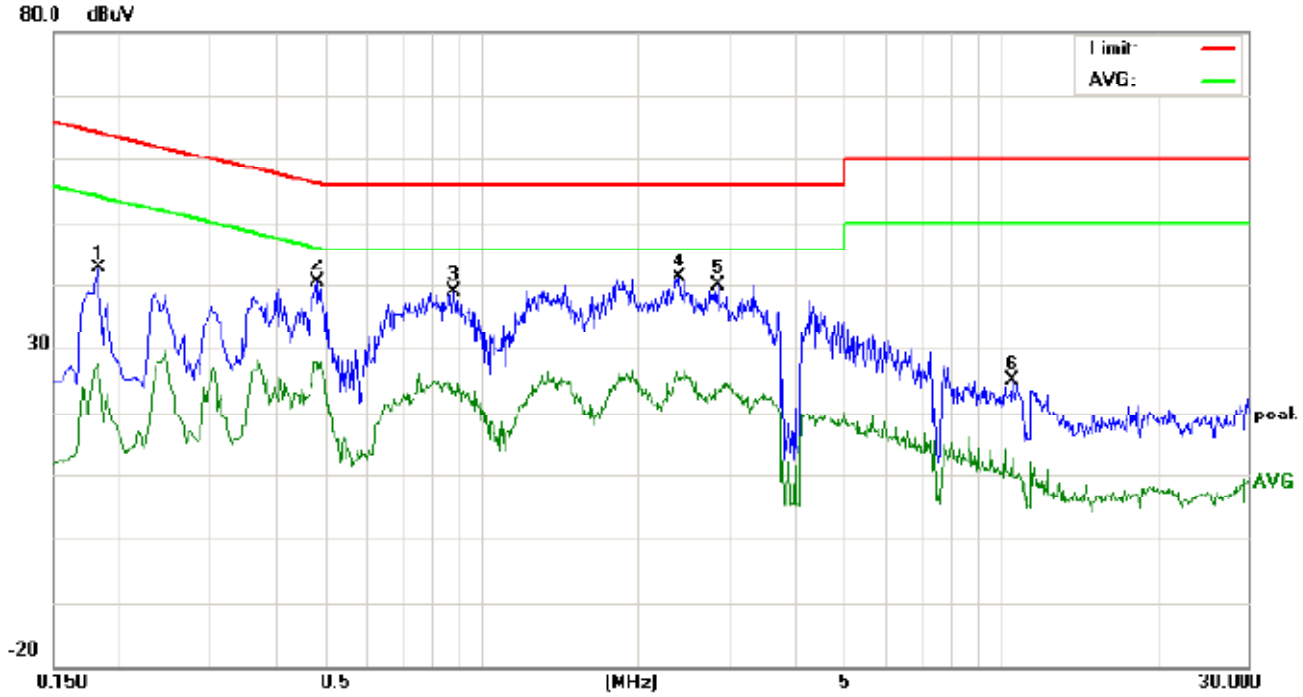
## 8.2 PROVISIONS APPLICABLE

| Frequency of Emission (MHz) | Conducted Limit(dBuV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15 – 0.5 | 66 to 56 * | 56 to 46 * |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |
| *Decreases with the logarithm of the frequency.<br>*The lower limit shall apply at the transition frequency. | | |

**Note:** The GSM850 mode is the worst condition and the test result as following:

## 8.3 MEASUREMENT RESULT

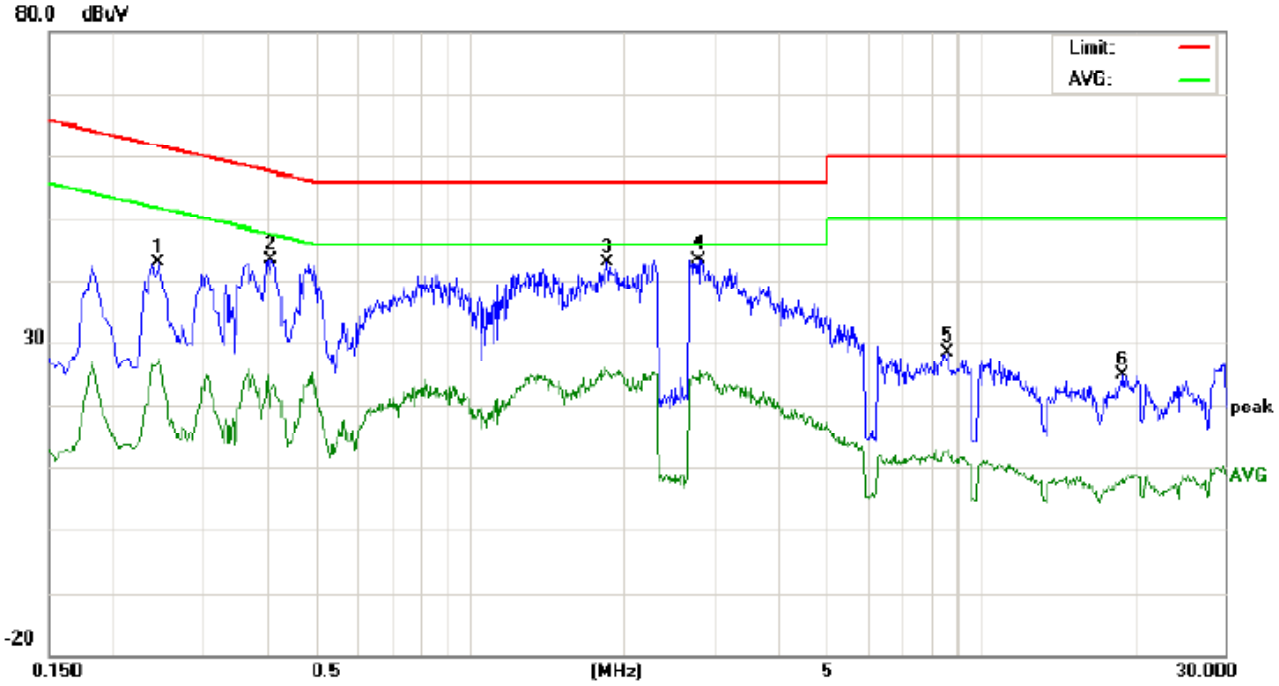
LINE CONDUCTED EMISSION - L




Site: Conduction
Phase: L1
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power: AC 120V/60Hz
Humidity: 60 %
EUT: GSM Mobile Phone
M/N: iSwag Rock
Mode: Call
Note:

| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Peak | QP | AVG | dB | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.1819 | 32.46 | | 17.44 | 10.20 | 42.66 | | 27.64 | 64.39 | 54.39 | -21.73 | -26.75 | P | |
| 2 | 0.4818 | 30.07 | | 17.39 | 10.39 | 40.46 | | 27.78 | 56.31 | 46.31 | -15.85 | -18.53 | P | |
| 3 | 0.8820 | 28.42 | | 12.87 | 10.39 | 38.81 | | 23.26 | 56.00 | 46.00 | -17.19 | -22.74 | P | |
| 4 | 2.4060 | 30.62 | | 14.70 | 10.39 | 41.01 | | 25.09 | 56.00 | 46.00 | -14.99 | -20.91 | P | |
| 5 | 2.8420 | 29.32 | | 12.92 | 10.51 | 39.83 | | 23.43 | 56.00 | 46.00 | 16.17 | 22.57 | P | |
| 6 | 10.5336 | 14.76 | | 2.85 | 10.10 | 24.86 | | 12.95 | 60.00 | 50.00 | -35.14 | -37.05 | P | |

LINE CONDUCTED EMISSION - N




Site: Conduction
Phase: N
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power: AC 120V/60Hz
Humidity: 60 %
EUT: GSM Mobile Phone
M/N: iSwag Rock
Mode: Call
Note:

| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Peak | QP | AVG | dB | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.2459 | 32.50 | | 17.21 | 10.27 | 42.77 | | 27.48 | 61.89 | 51.89 | -19.12 | -24.41 | P | |
| 2 | 0.4097 | 33.07 | | 12.09 | 10.34 | 43.41 | | 22.43 | 57.65 | 47.65 | -14.24 | -25.22 | P | |
| 3 | 1.8580 | 32.68 | | 15.07 | 10.27 | 42.95 | | 25.34 | 56.00 | 46.00 | -13.05 | -20.66 | P | |
| 4 | 2.8220 | 32.84 | | 14.88 | 10.51 | 43.35 | | 25.39 | 56.00 | 46.00 | -12.65 | -20.61 | P | |
| 5 | 8.6456 | 18.05 | | 2.48 | 10.30 | 28.35 | | 12.78 | 60.00 | 50.00 | -31.65 | -37.22 | P | |
| 6 | 18.9618 | 14.56 | | -1.90 | 10.12 | 24.68 | | 8.22 | 60.00 | 50.00 | -35.32 | -41.78 | P | |

**Note:** The GSM850 mode is the worst condition.

# 9. FREQUENCY STABILITY

## 9.1 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℃.

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℃ increments from -10℃ to +50℃. 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℃.

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℃ increments from +50℃ to -10℃. 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℃ during the measurement procedure.

## 9.2 PROVISIONS APPLICABLE

### 9.2.1 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 6.3VDC and 8.5VDC, with a nominal voltage of 7.4VDC. 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.

### 9.2.2 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$^{o}$C.

## 9.3 MEASUREMENT RESULT (WORST)

| Frequency Error Against Voltage for GSM850/EDGE 8 band | | | | |
|---|---|---|---|---|
| Voltage(V) | GSM | | EDGE 8 | |
| | Frequency error(Hz) | Frequency error(ppm) | Frequency error(Hz) | Frequency error(ppm) |
| 3.4 | 16 | 0.019 | 14 | 0.017 |
| 3.7 | 12 | 0.014 | 18 | 0.022 |
| 4.2 | 27 | 0.032 | 24 | 0.029 |

| Frequency Error Against Temperature for GSM850/EDGE 8 band | | | | |
|---|---|---|---|---|
| temperature(℃) | GSM | | EDGE 8 | |
| | Frequency error(Hz) | Frequency error(ppm) | Frequency error(Hz) | Frequency error(ppm) |
| -10 | 28 | 0.033 | 24 | 0.029 |
| 0 | 26 | 0.031 | 25 | 0.030 |
| 10 | 24 | 0.029 | 25 | 0.030 |
| 20 | 29 | 0.035 | 29 | 0.035 |
| 30 | 22 | 0.026 | 23 | 0.028 |
| 40 | 20 | 0.024 | 24 | 0.029 |
| 50 | 21 | 0.025 | 27 | 0.032 |

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

| Frequency Error Against Voltage for PCS1900/EDGE 8 band | | | | |
|---|---|---|---|---|
| Voltage(V) | GSM | | EDGE 8 | |
| | Frequency error(Hz) | Frequency error(ppm) | Frequency error(Hz) | Frequency error(ppm) |
| 3.4 | 26 | 0.014 | 26 | 0.014 |
| 3.7 | 27 | 0.014 | 24 | 0.013 |
| 4.2 | 24 | 0.013 | 22 | 0.012 |

| Frequency Error Against Voltage for PCS1900/EDGE 8 band | | | | |
|---|---|---|---|---|
| temperature(℃) | GSM | | EDGE 8 | |
| | Frequency error(Hz) | Frequency error(ppm) | Frequency error(Hz) | Frequency error(ppm) |
| -10 | 27 | 0.014 | 25 | 0.013 |
| 0 | 23 | 0.012 | 24 | 0.013 |
| 10 | 25 | 0.013 | 24 | 0.013 |
| 20 | 17 | 0.009 | 17 | 0.009 |
| 30 | 22 | 0.012 | 22 | 0.012 |
| 40 | 23 | 0.012 | 28 | 0.015 |
| 50 | 27 | 0.014 | 27 | 0.014 |

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

| Frequency Error Against Voltage for UMTS band II | | |
|---|---|---|
| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
| 3.4 | 32 | 0.017 |
| 3.7 | 28 | 0.015 |
| 4.2 | 24 | 0.013 |

| Frequency Error Against Temperature for UMTS band II | | |
|---|---|---|
| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
| -10 | 32 | 0.017 |
| 0 | 35 | 0.019 |
| 10 | 31 | 0.016 |
| 20 | 33 | 0.018 |
| 30 | 35 | 0.019 |
| 40 | 36 | 0.019 |
| 50 | 32 | 0.017 |

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

| Frequency Error Against Voltage for UMTS band V | | |
|---|---|---|
| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
| 6.3 | 26 | 0.031 |
| 7.4 | 23 | 0.028 |
| 8.5 | 24 | 0.029 |

| Frequency Error Against Temperature for UMTS band V | | |
|---|---|---|
| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
| -10 | 22 | 0.026 |
| 0 | 23 | 0.028 |
| 10 | 24 | 0.029 |
| 20 | 26 | 0.031 |
| 30 | 21 | 0.025 |
| 40 | 33 | 0.040 |
| 50 | 31 | 0.037 |

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

# 10. OCCUPIED BANDWIDTH

## 10.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

## 10.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

## 10.3 MEASUREMENT RESULT

| Occupied Bandwidth (99%) for GSM850 band | | | |
|---|---|---|---|
| | Mode | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| **GSM** | Low Channel | 824.2 | 245.26 |
| | Middle Channel | 836.6 | 248.55 |
| | High Channel | 848.8 | 244.62 |
| **EDGE 8** | Low Channel | 824.2 | 243.37 |
| | Middle Channel | 836.6 | 243.35 |
| | High Channel | 848.8 | 252.65 |

| Occupied Bandwidth (99%) for PCS1900 band | | | |
|---|---|---|---|
| | Mode | Frequency(MHz) | Occupied Bandwidth (99%)( kHz) |
| **GSM** | Low Channel | 1850.2 | 247.94 |
| | Middle Channel | 1880.0 | 242.79 |
| | High Channel | 1909.8 | 246.75 |
| **EDGE 8** | Low Channel | 1850.2 | 246.45 |
| | Middle Channel | 1880.0 | 241.49 |
| | High Channel | 1909.8 | 245.29 |

| Occupied Bandwidth (99%) for UMTS band II | | |
|---|---|---|
| Mode | Frequency(MHz) | Occupied Bandwidth (99%)( MHz) |
| Low Channel | 1852.4 | 4.18 |
| Middle Channel | 1880 | 4.19 |
| High Channel | 1907.6 | 4.17 |

| Occupied Bandwidth (99%) for UMTS band V | | |
|---|---|---|
| Mode | Frequency(MHz) | Occupied Bandwidth (99%)( MHz) |
| Low Channel | 826.4 | 4.18 |
| Middle Channel | 832.2 | 4.16 |
| High Channel | 846.6 | 4.16 |

# 11. EMISSION BANDWIDTH

## 11.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

## 11.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

## 11.3 MEASUREMENT RESULT

| Emission Bandwidth (-26dBc) for GSM850 (EDGE 8) band | | | |
|---|---|---|---|
| | Mode | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| **GSM** | Low Channel | 824.2 | 308.62 |
| | Middle Channel | 836.6 | 311.77 |
| | High Channel | 848.8 | 309.98 |
| **EDGE 8** | Low Channel | 824.2 | 319.82 |
| | Middle Channel | 836.6 | 312.47 |
| | High Channel | 848.8 | 316.08 |

| Emission Bandwidth (-26dBc) for PCS1900 (EDGE 8) band | | | |
|---|---|---|---|
| | Mode | Frequency(MHz) | Emission Bandwidth (-26dBc)( kHz) |
| **GSM** | Low Channel | 1850.2 | 311.05 |
| | Middle Channel | 1880.0 | 308.28 |
| | High Channel | 1909.8 | 318.31 |
| **EDGE 8** | Low Channel | 1850.2 | 319.04 |
| | Middle Channel | 1880.0 | 314.51 |
| | High Channel | 1909.8 | 312.29 |

| Emission Bandwidth (-26dBc) for UMTS band II | | |
|---|---|---|
| Mode | Frequency(MHz) | Occupied Bandwidth (99%)( MHz) |
| Low Channel | 1852.4 | 4.74 |
| Middle Channel | 1880 | 4.82 |
| High Channel | 1907.6 | 4.80 |

| Emission Bandwidth (-26dBc) for UMTS band V | | |
|---|---|---|
| Mode | Frequency(MHz) | Occupied Bandwidth (99%)( MHz) |
| Low Channel | 826.4 | 4.69 |
| Middle Channel | 832.2 | 4.68 |
| High Channel | 846.6 | 4.69 |

# 12. BAND EDGE

## 12.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

## 12.2 PROVISIONS APPLICABLE

As Specified in FCC rules of 22.917(a) and 24.238(a)

## 12.3 MEASUREMENT RESULT

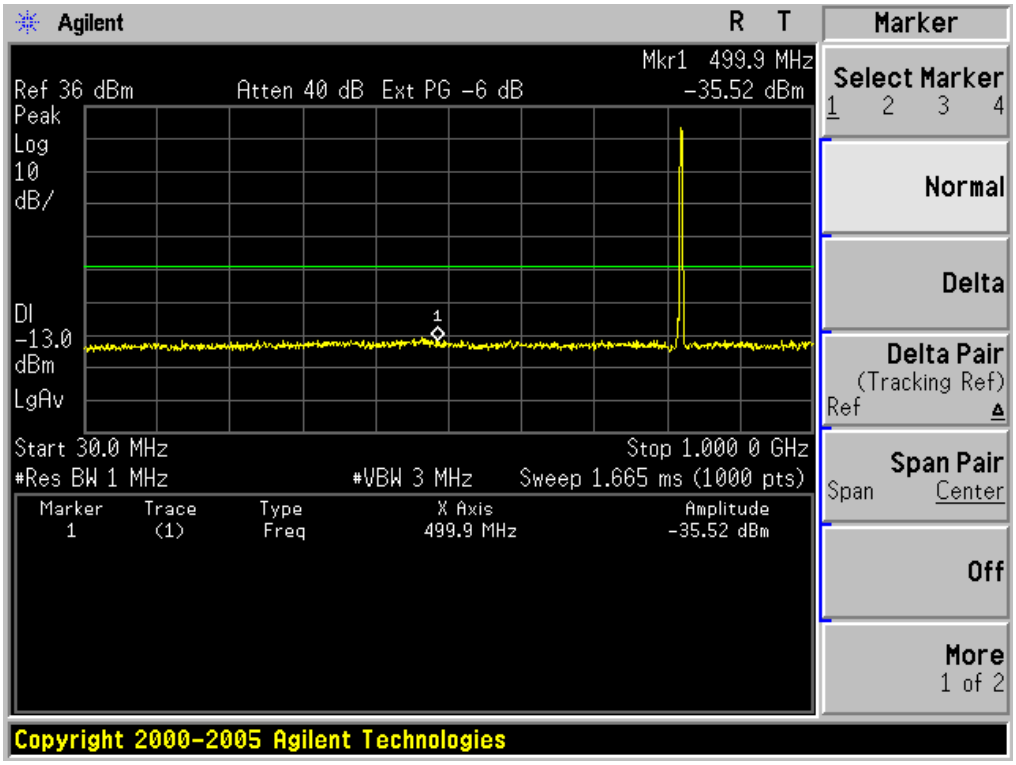
Please refers to Appendix III for compliance test plots for band edges

# APPENDIX A

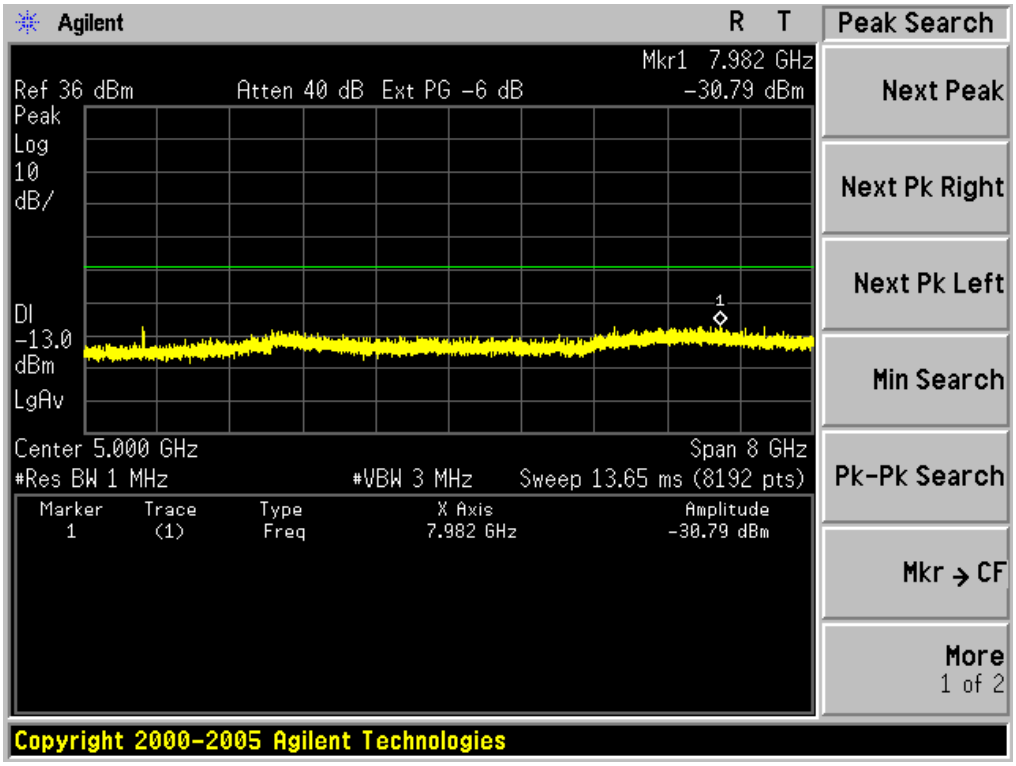
# TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

**CONDUCTED EMISSION IN GSM850 BAND**

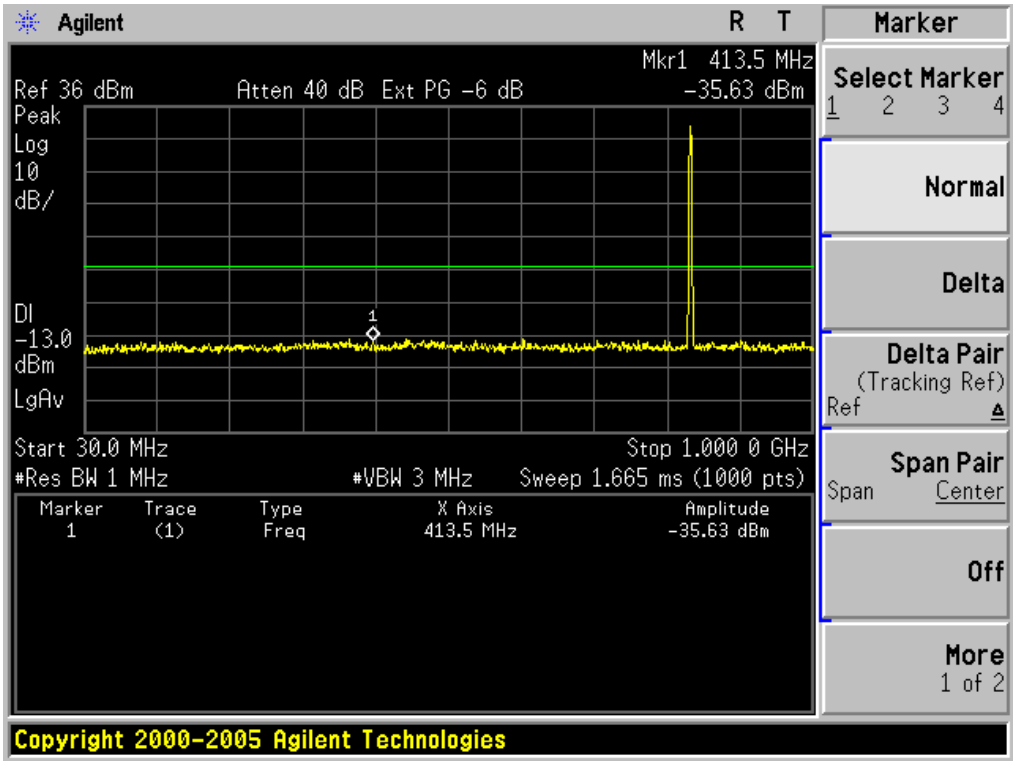
Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



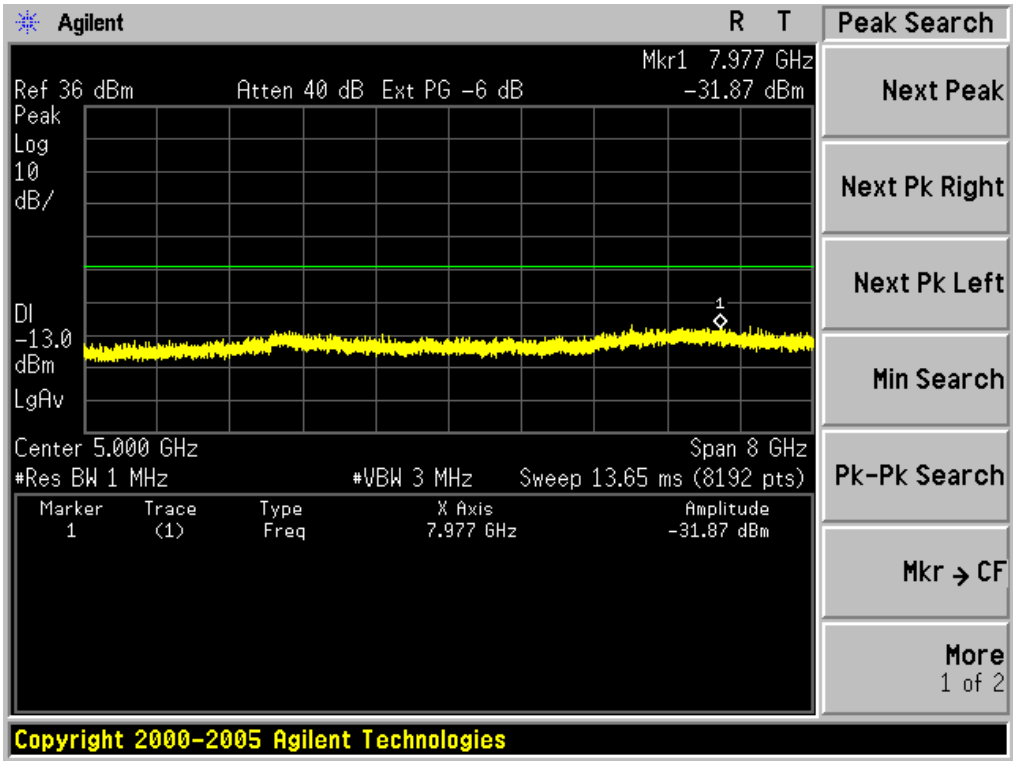

Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



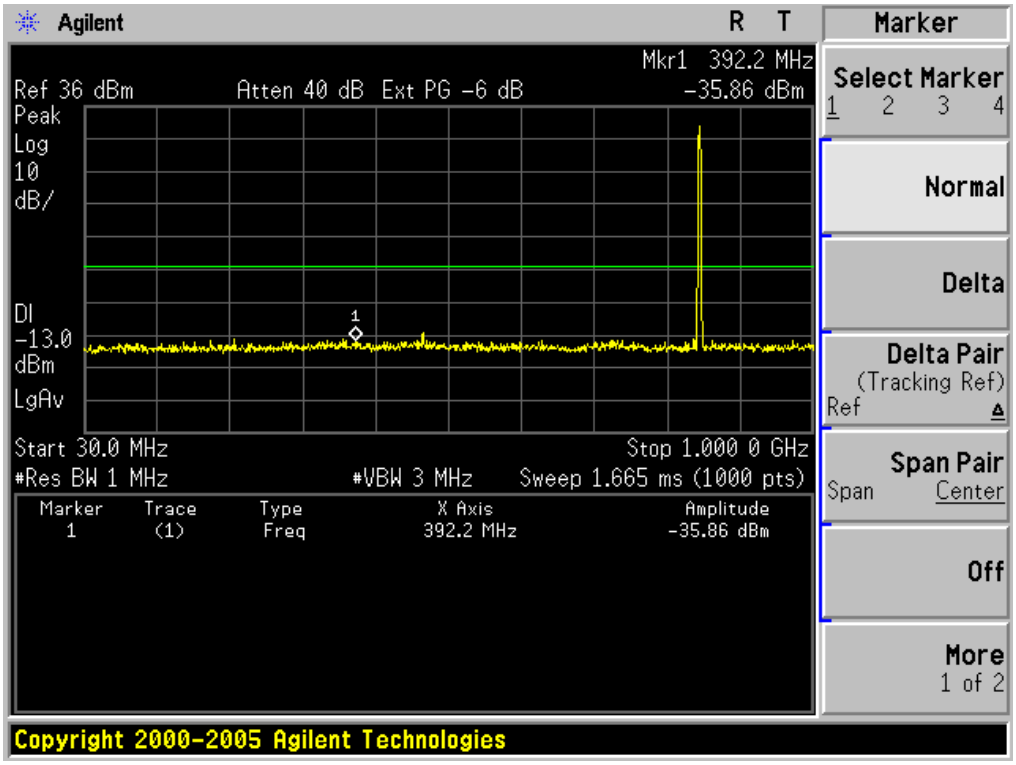
Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



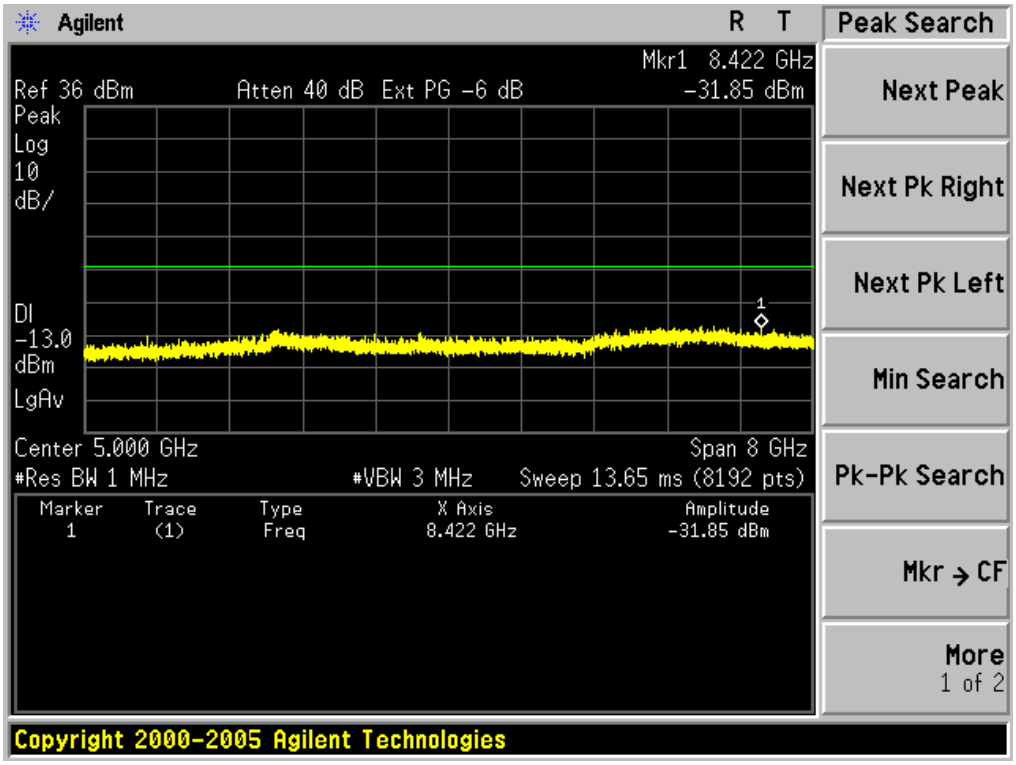

Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz

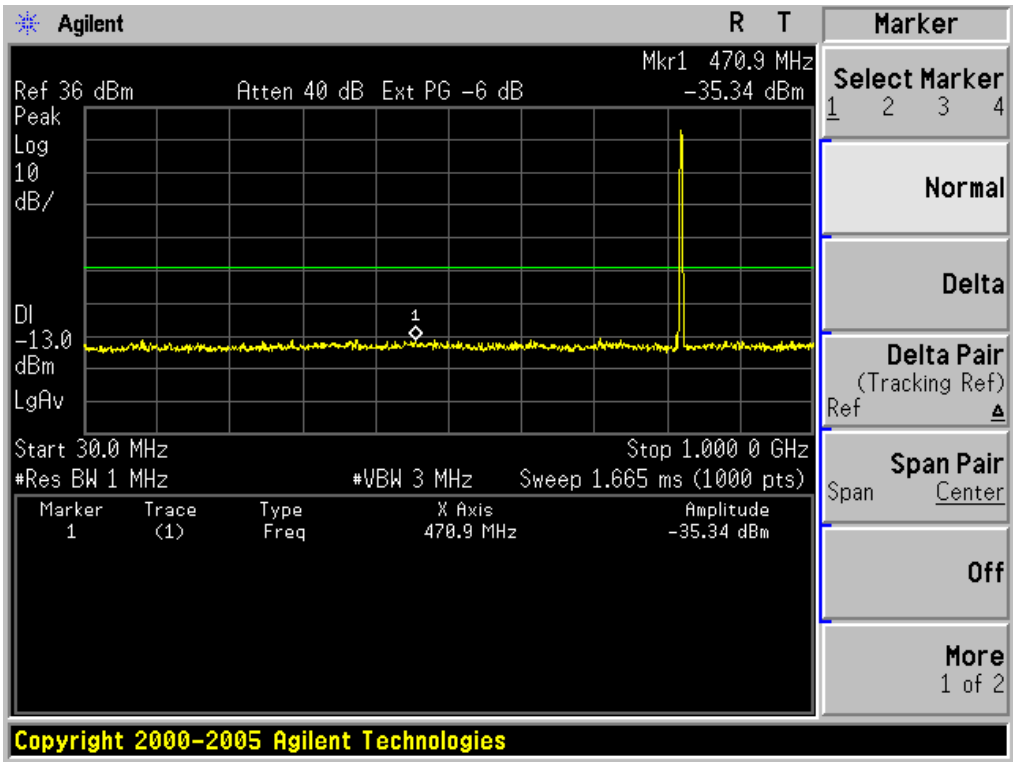



Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz

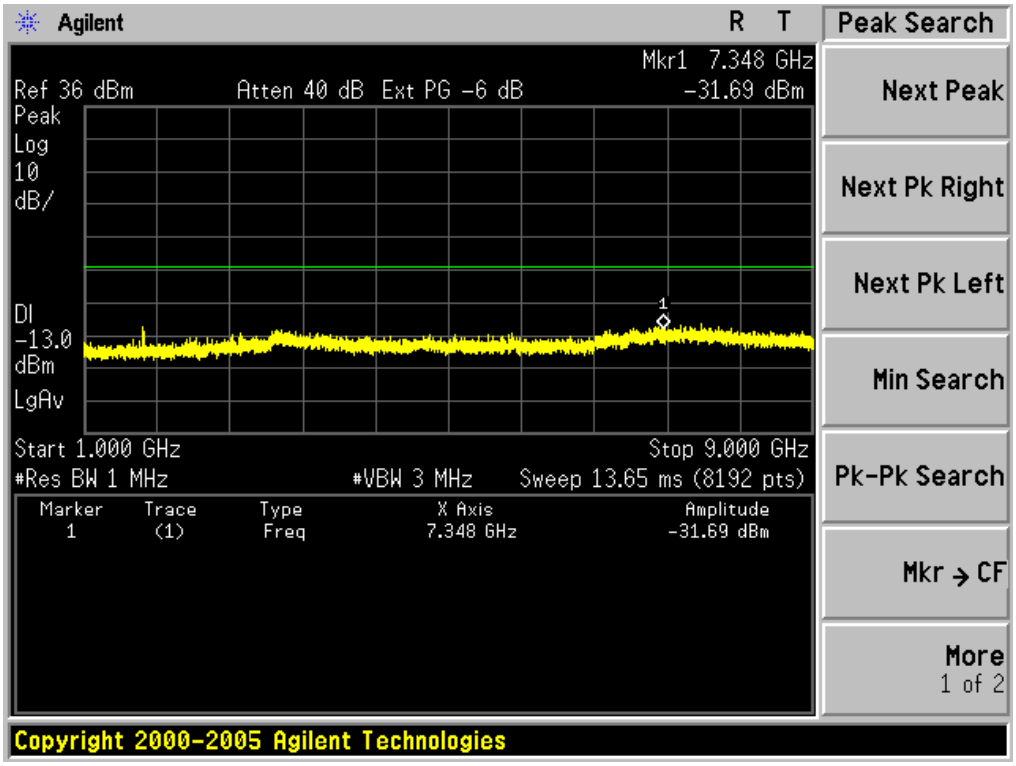


**CONDUCTED EMISSION IN GSM850 (EDGE 8) BAND**

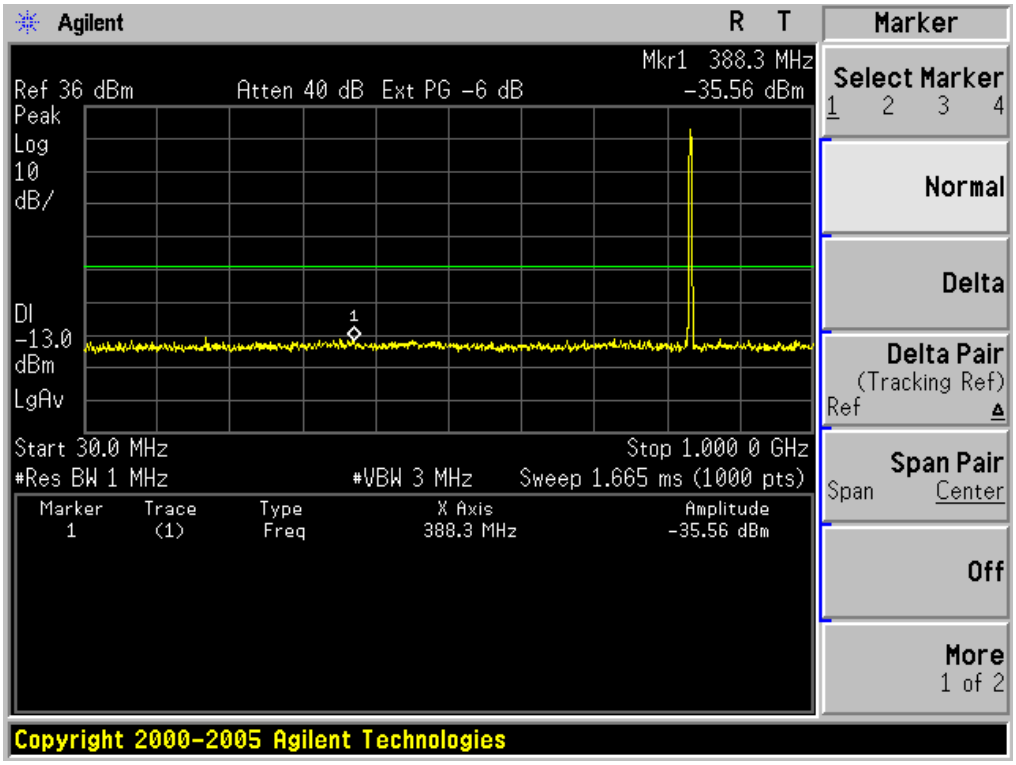
Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



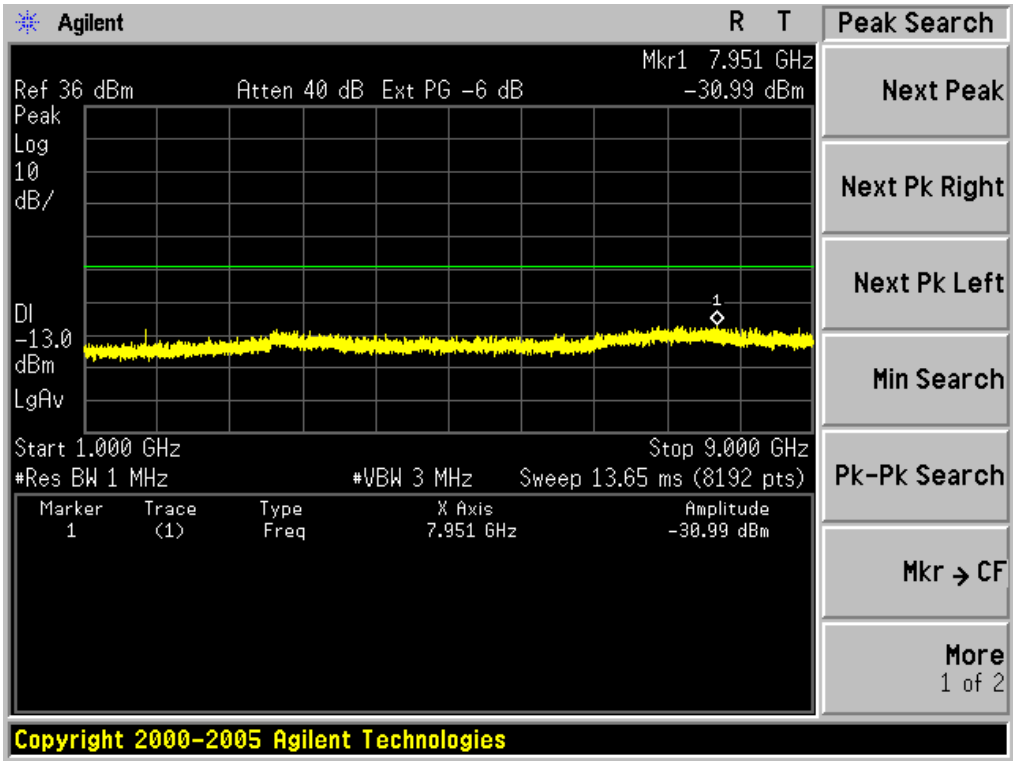

Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



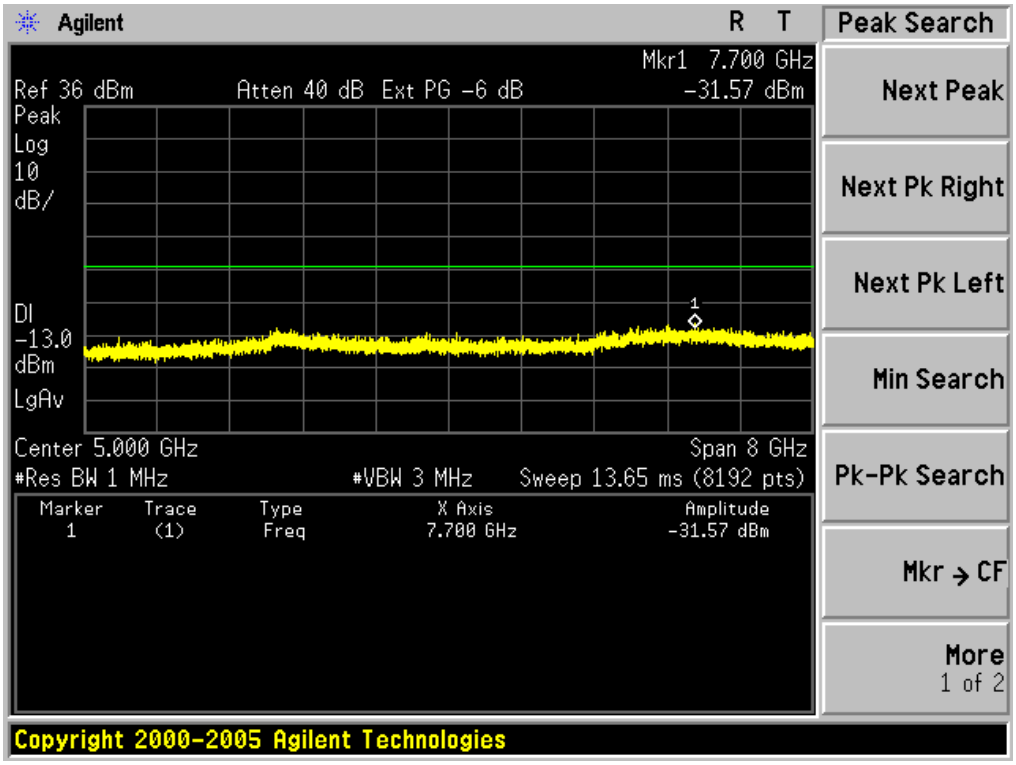
Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



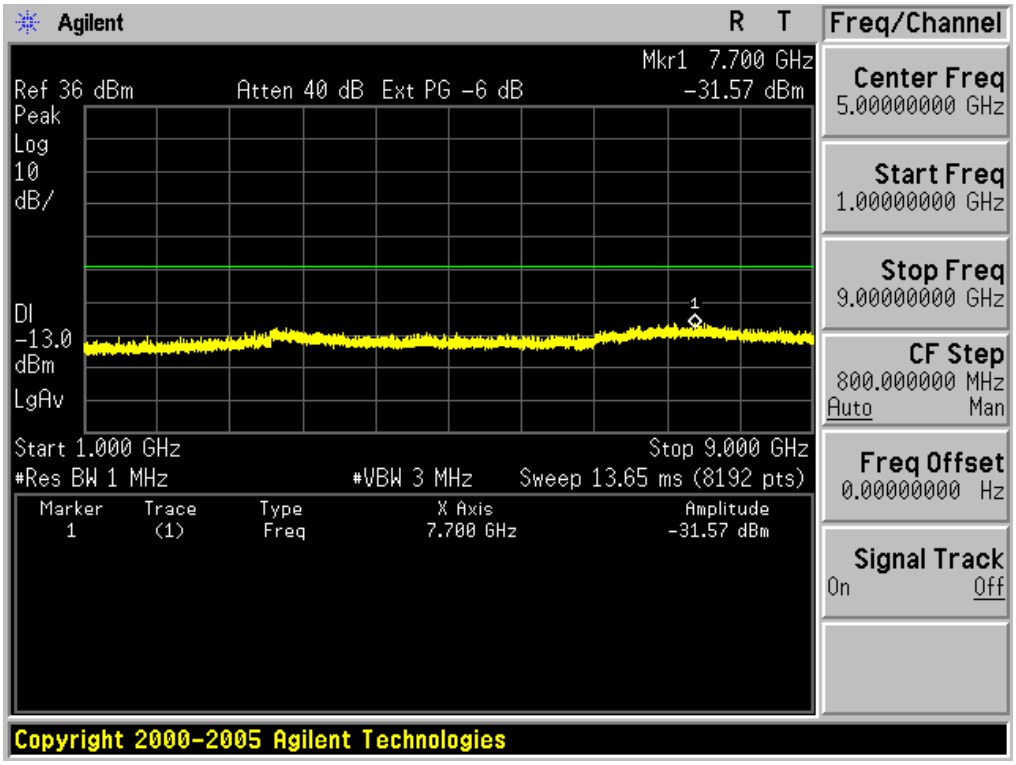

Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz

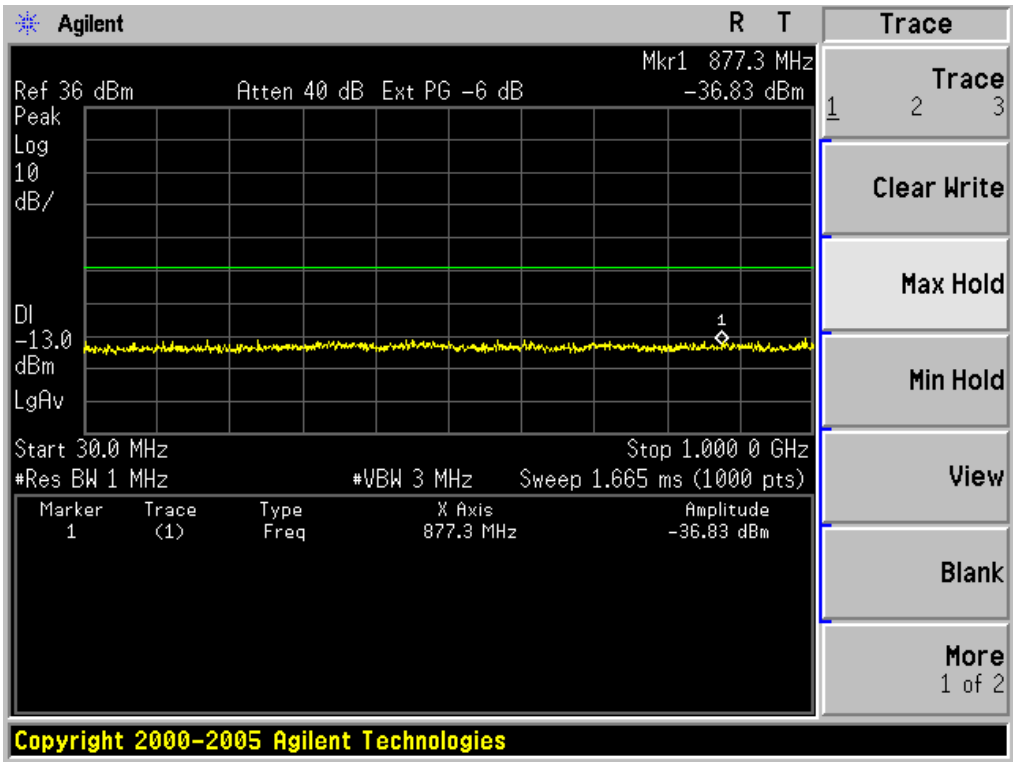



Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz

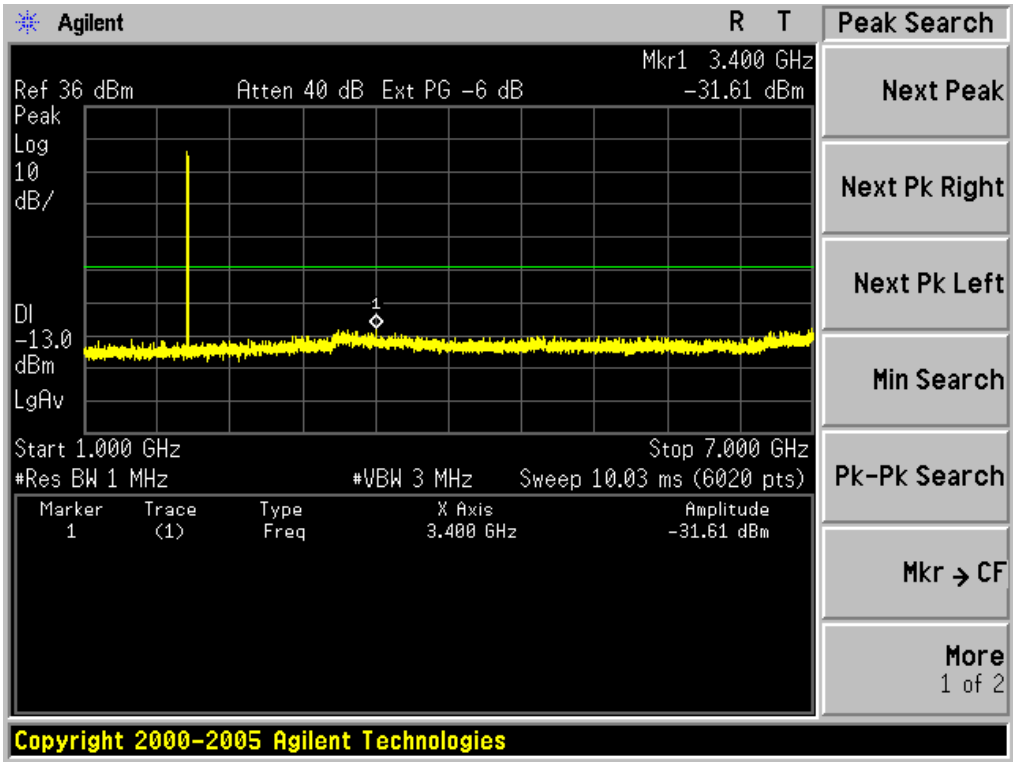


**CONDUCTED EMISSION IN PCS1900 BAND**

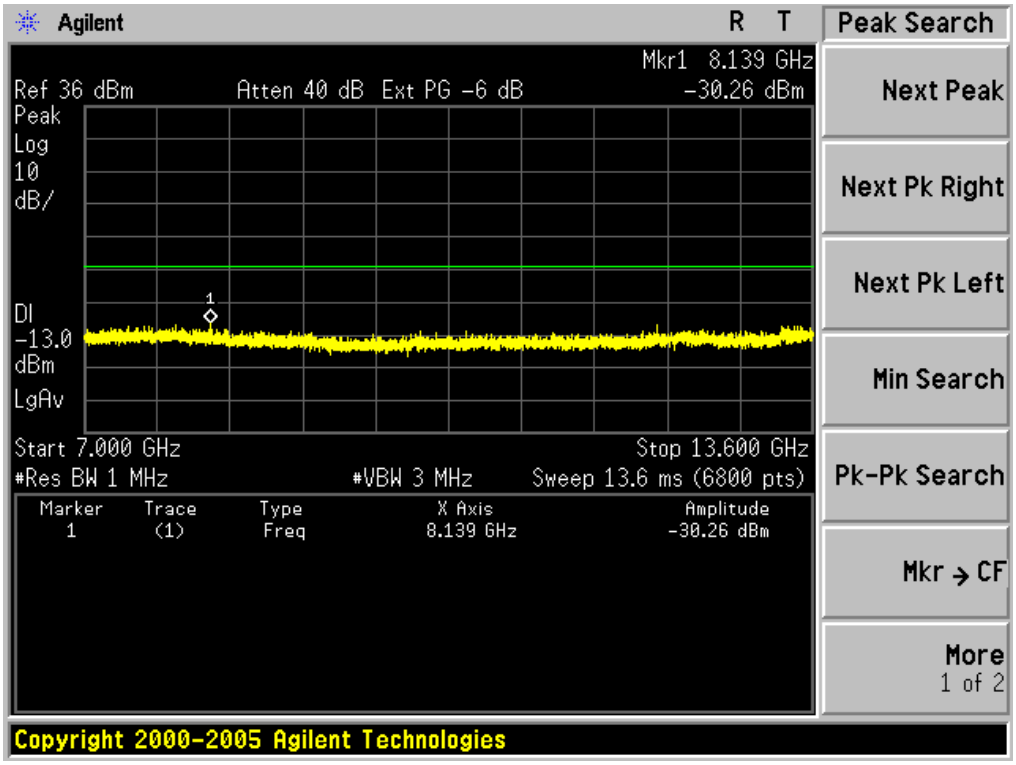
Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



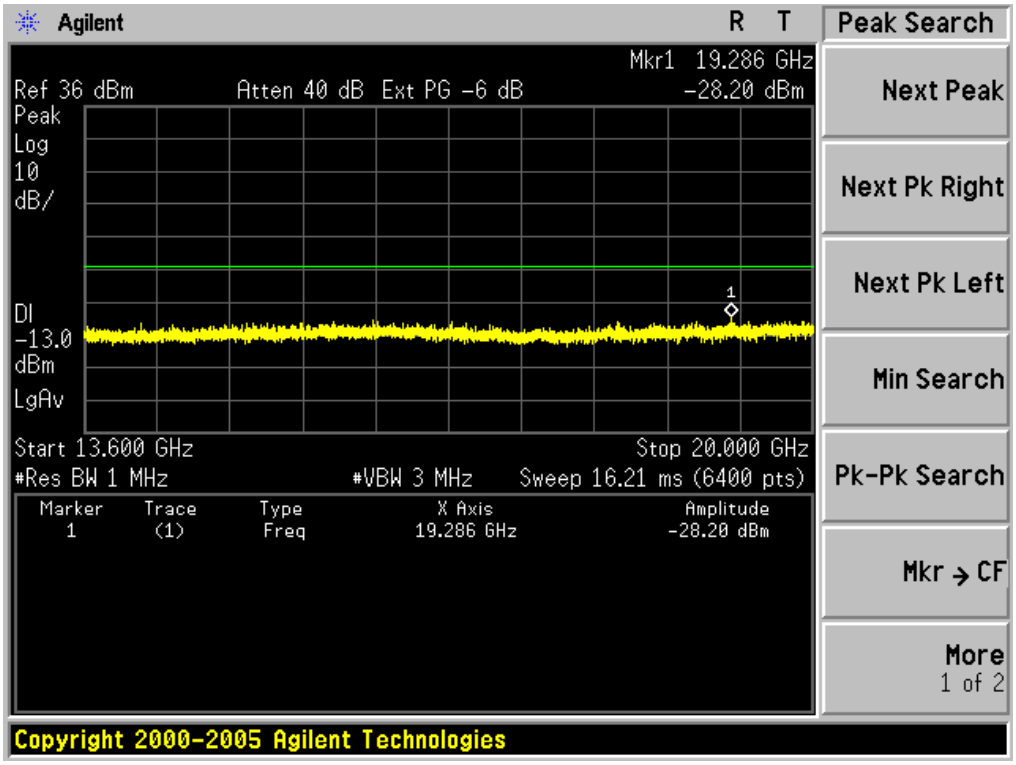

Conducted Emission Transmitting Mode CH 512 1GHz – 7GHz



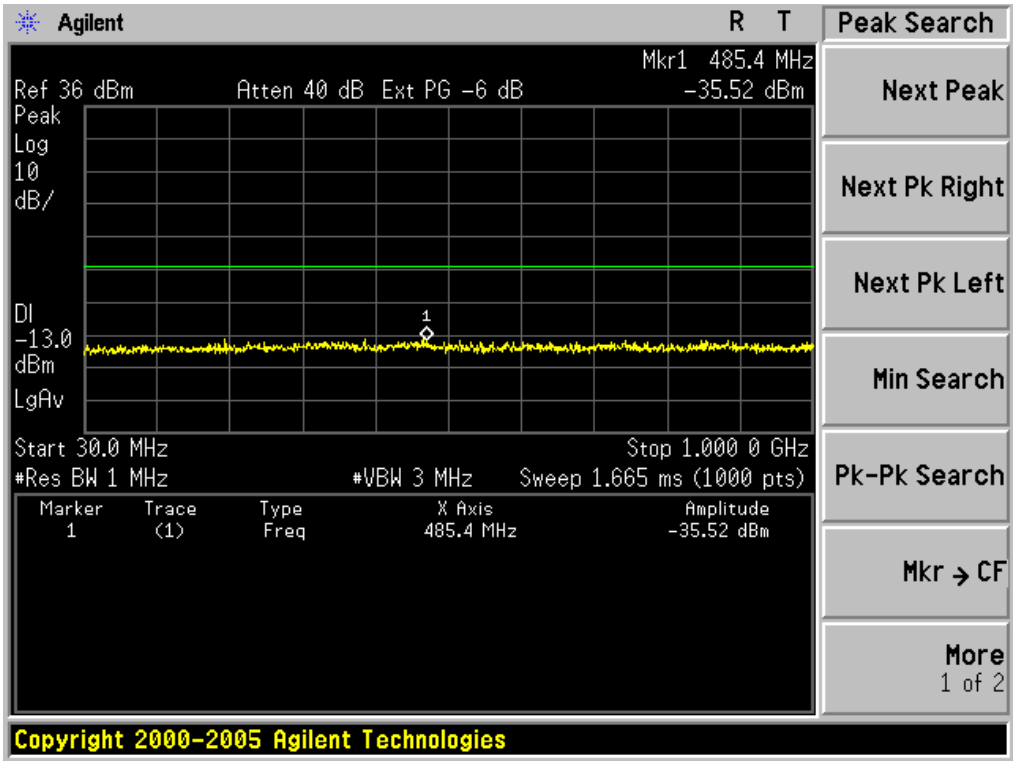
Conducted Emission Transmitting Mode CH 512 7GHz – 13.6GHz



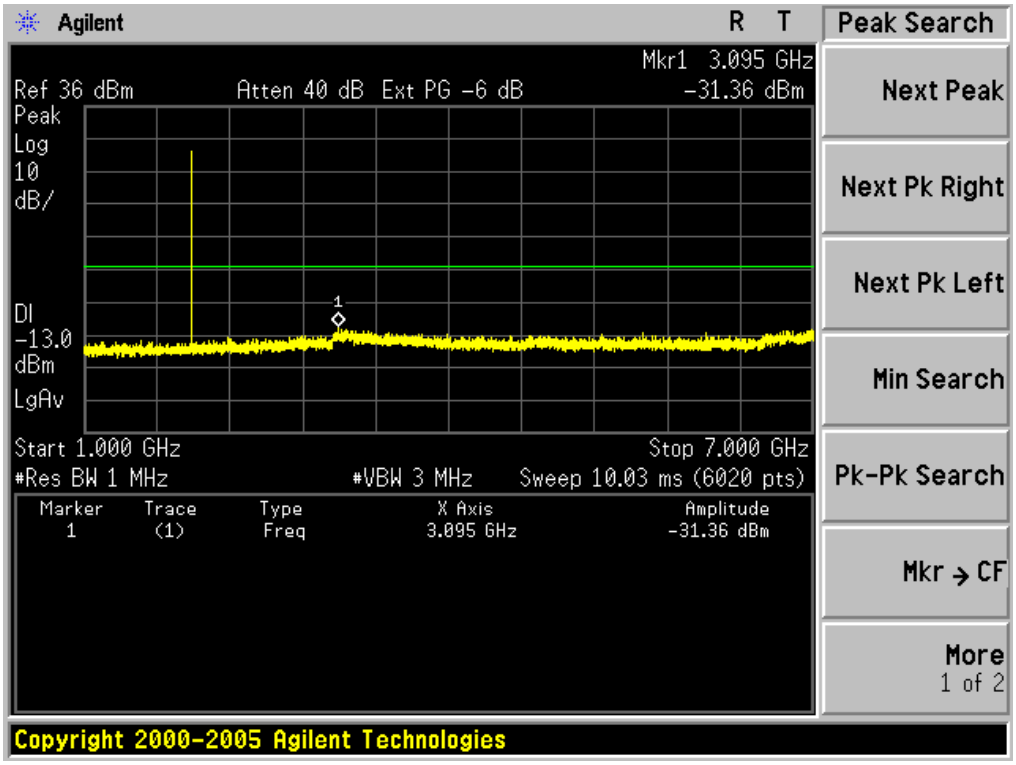

Conducted Emission Transmitting Mode CH 512 13.6GHz – 20GHz



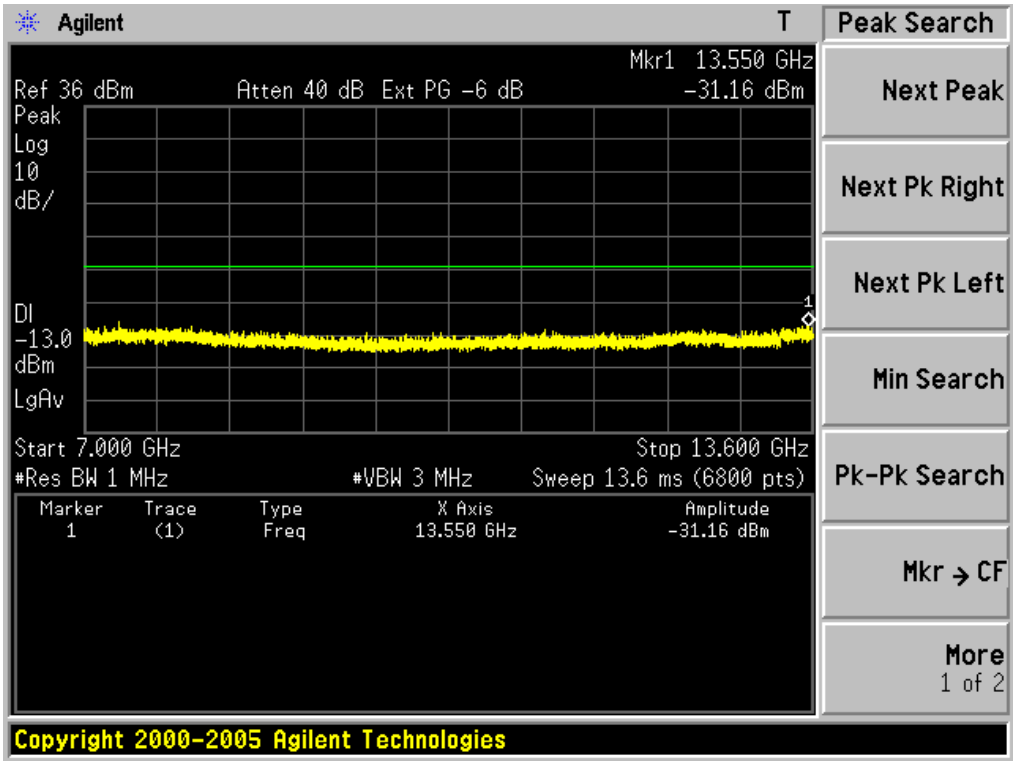
Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



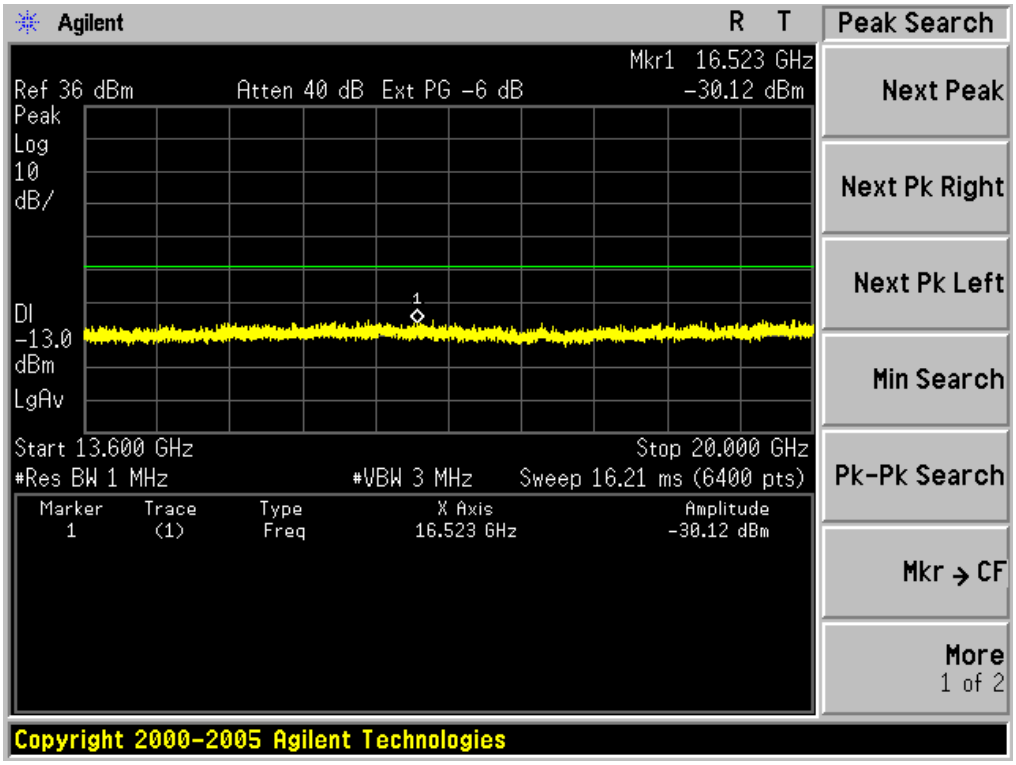

Conducted Emission Transmitting Mode CH 661 1GHz – 7GHz



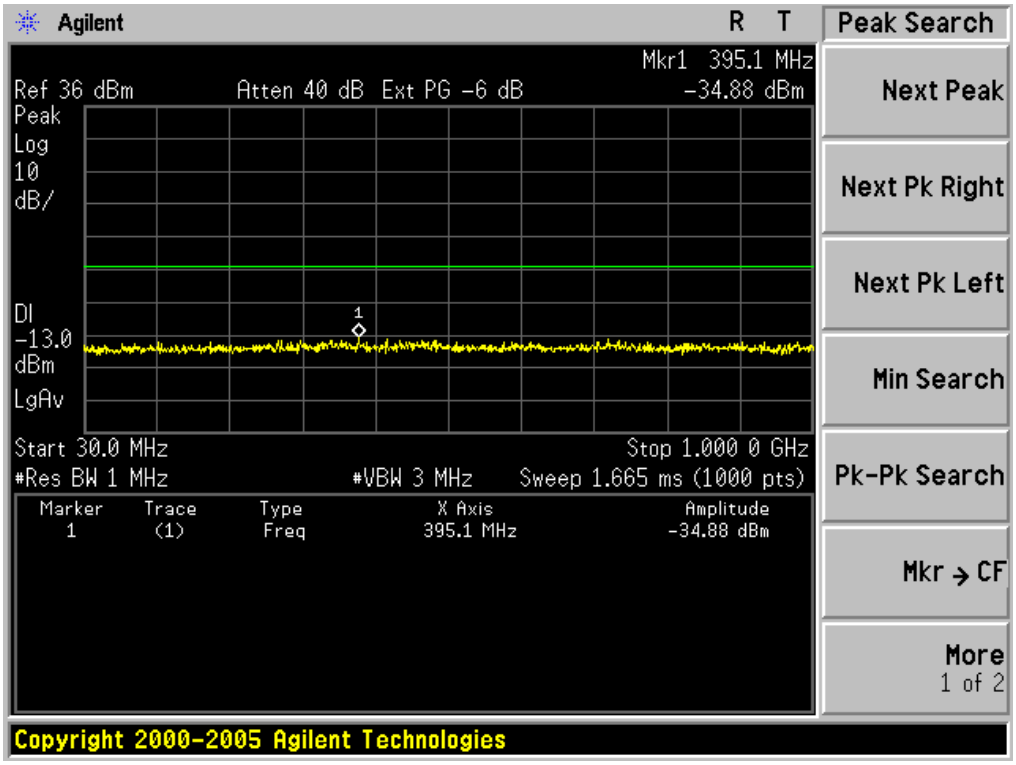
Conducted Emission Transmitting Mode CH 661 7GHz – 13.6GHz



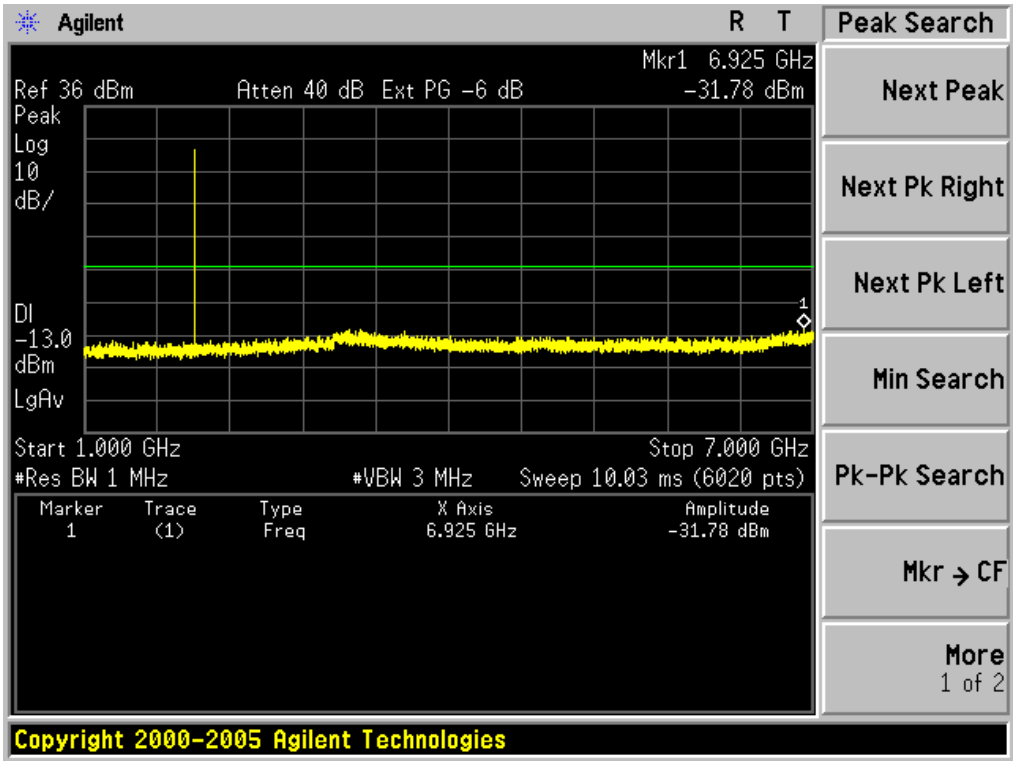

Conducted Emission Transmitting Mode CH 661 13.6GHz – 20GHz



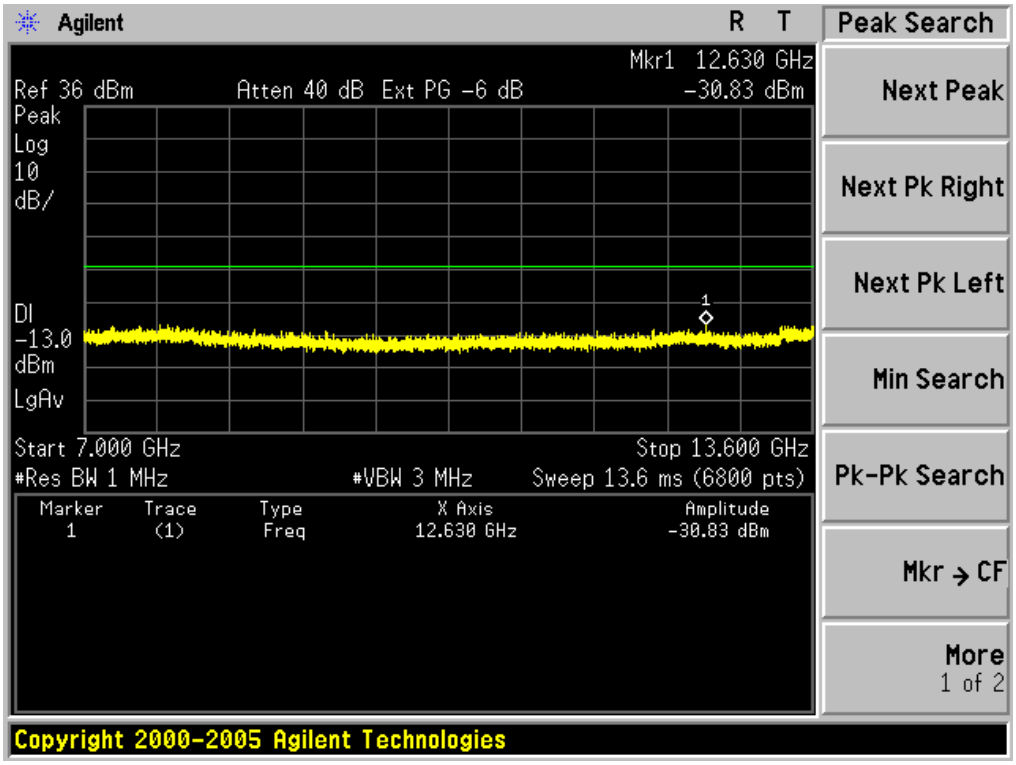
Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz



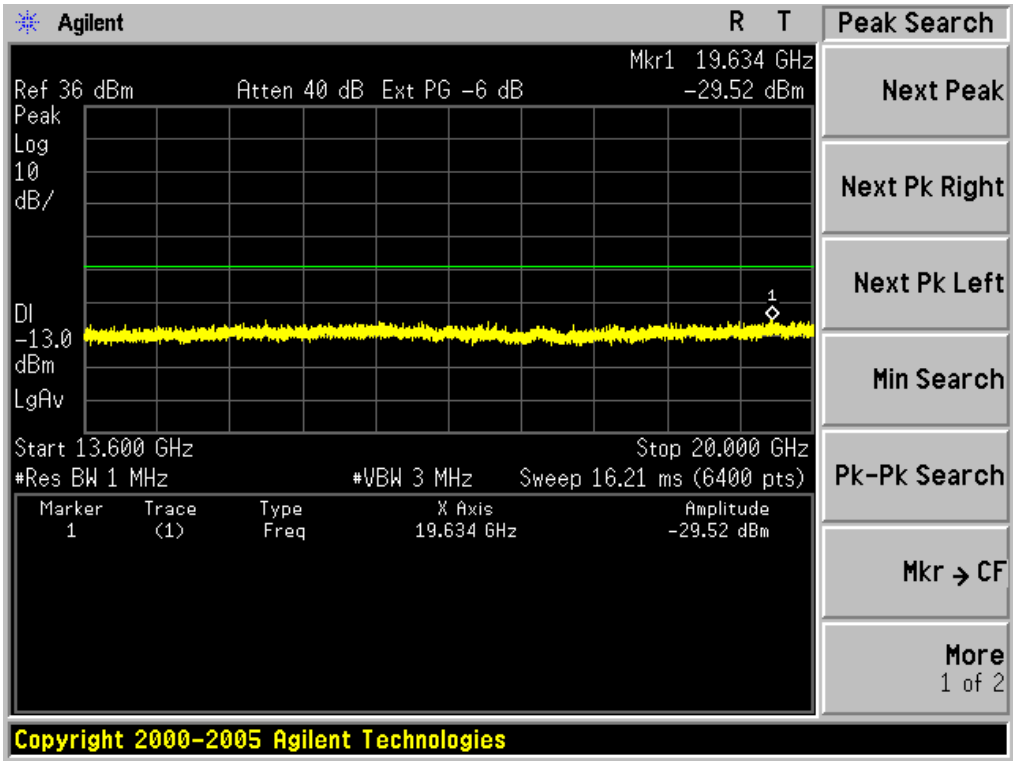

Conducted Emission Transmitting Mode CH 810 1GHz – 7GHz



Conducted Emission Transmitting Mode CH 810 7GHz – 13.6GHz

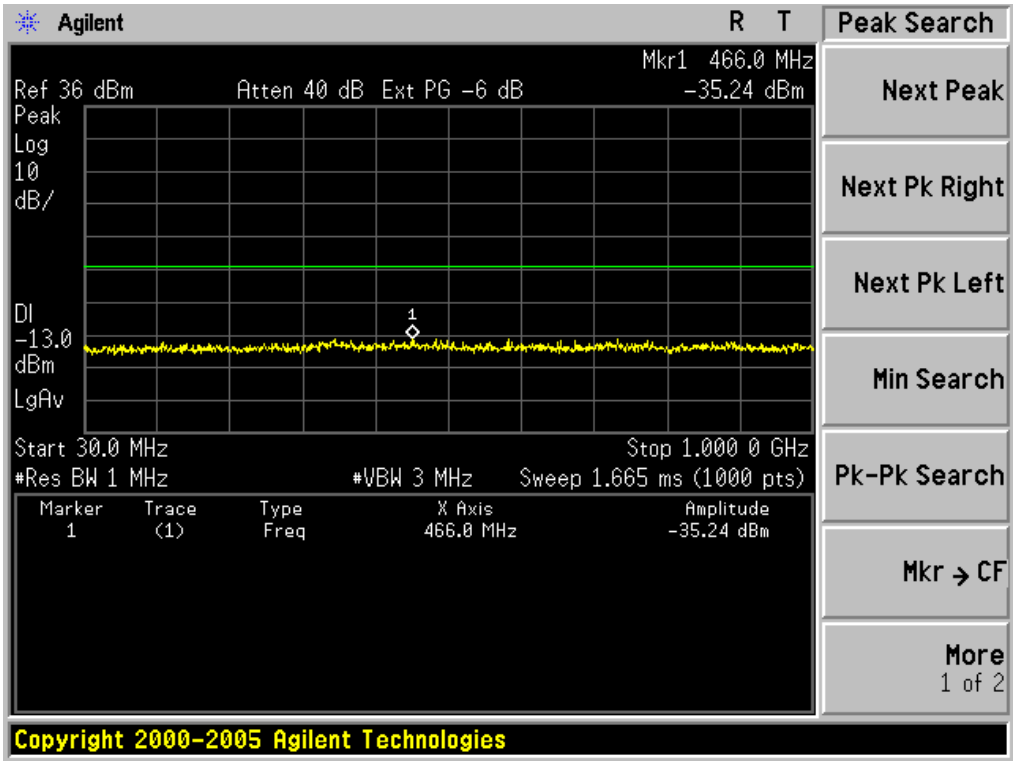



Conducted Emission Transmitting Mode CH 810 13.6GHz – 20GHz

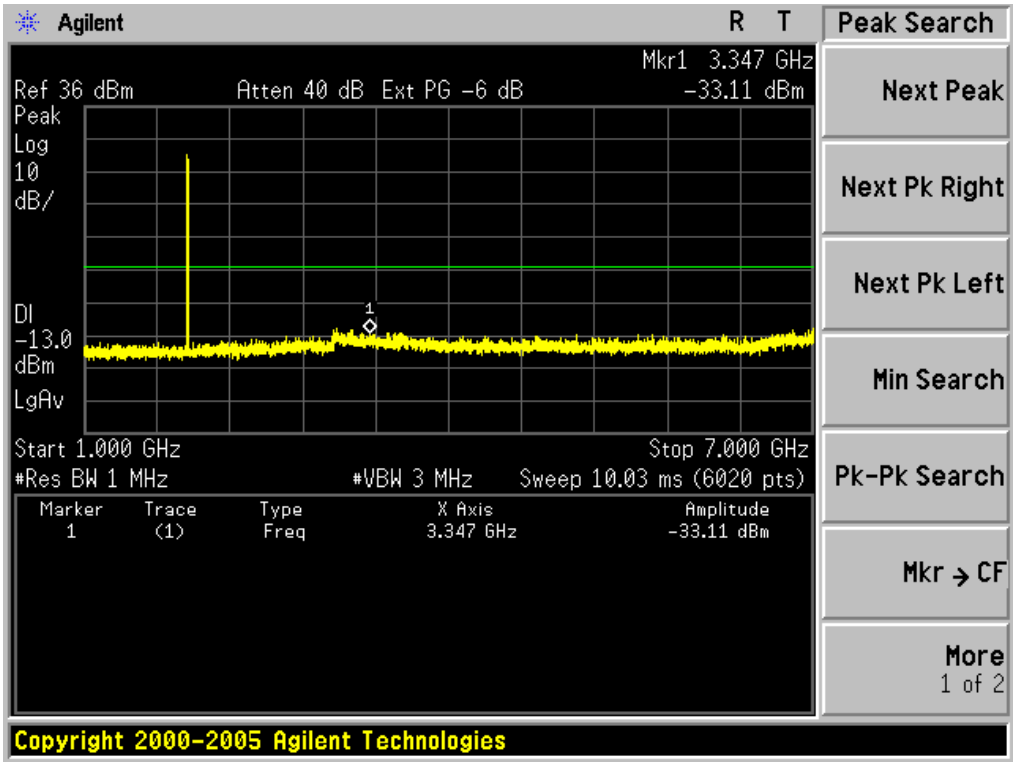


**CONDUCTED EMISSION IN PCS1900 (EDGE 8) BAND**

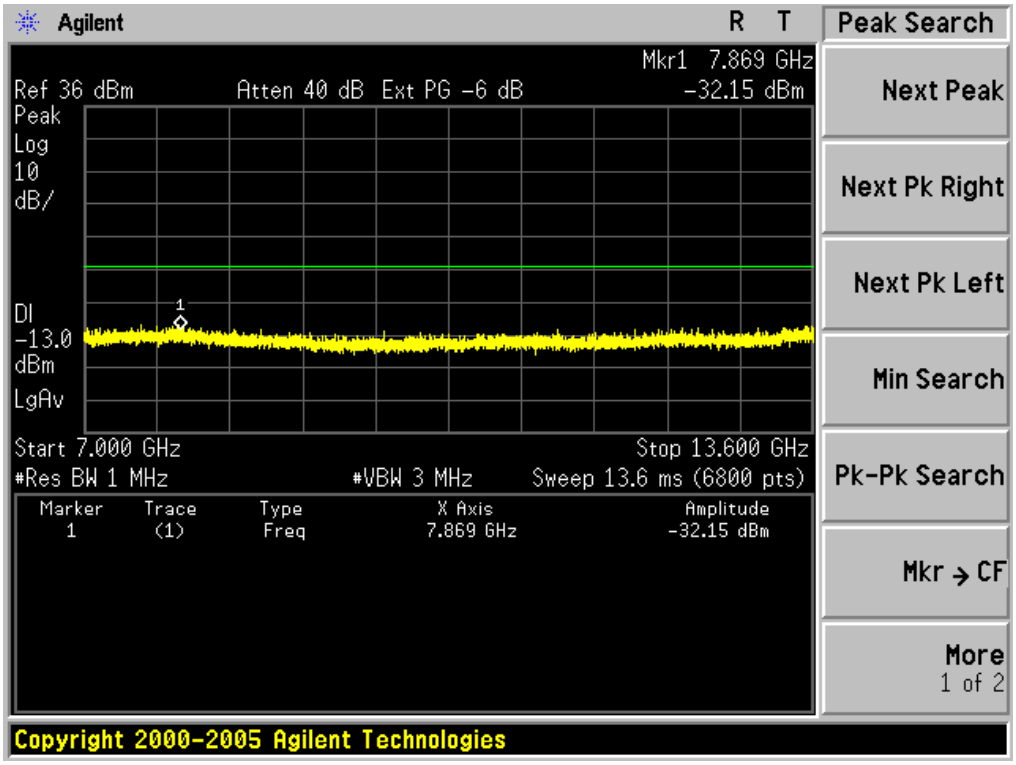
Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



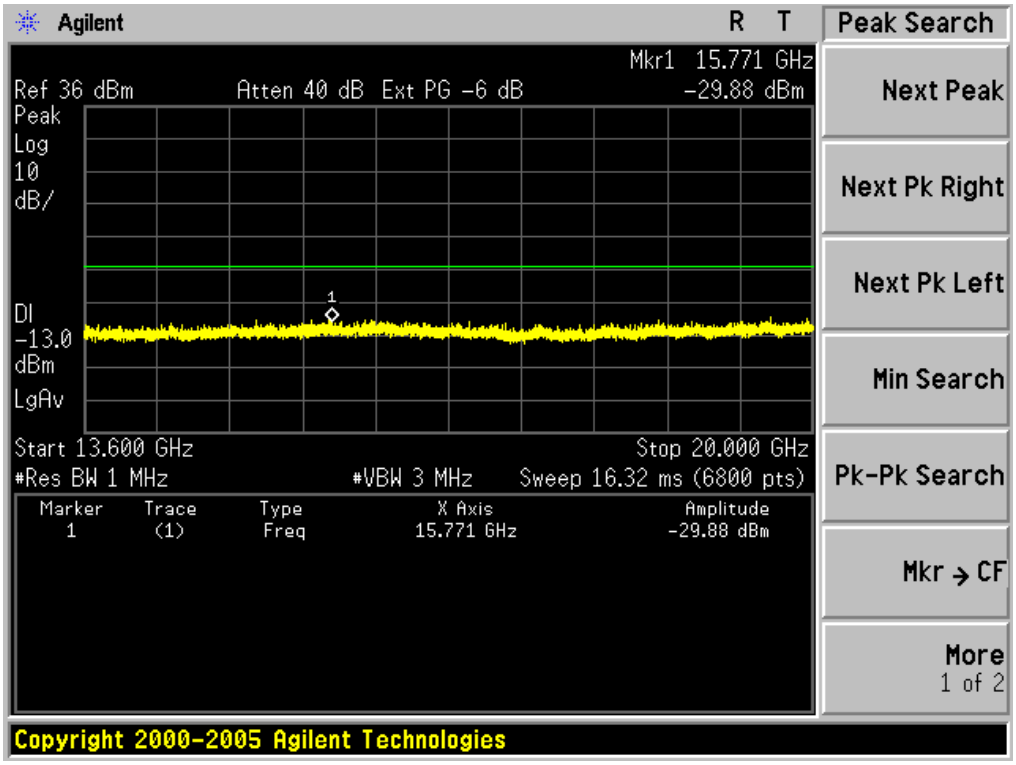

Conducted Emission Transmitting Mode CH 512 1GHz – 7GHz



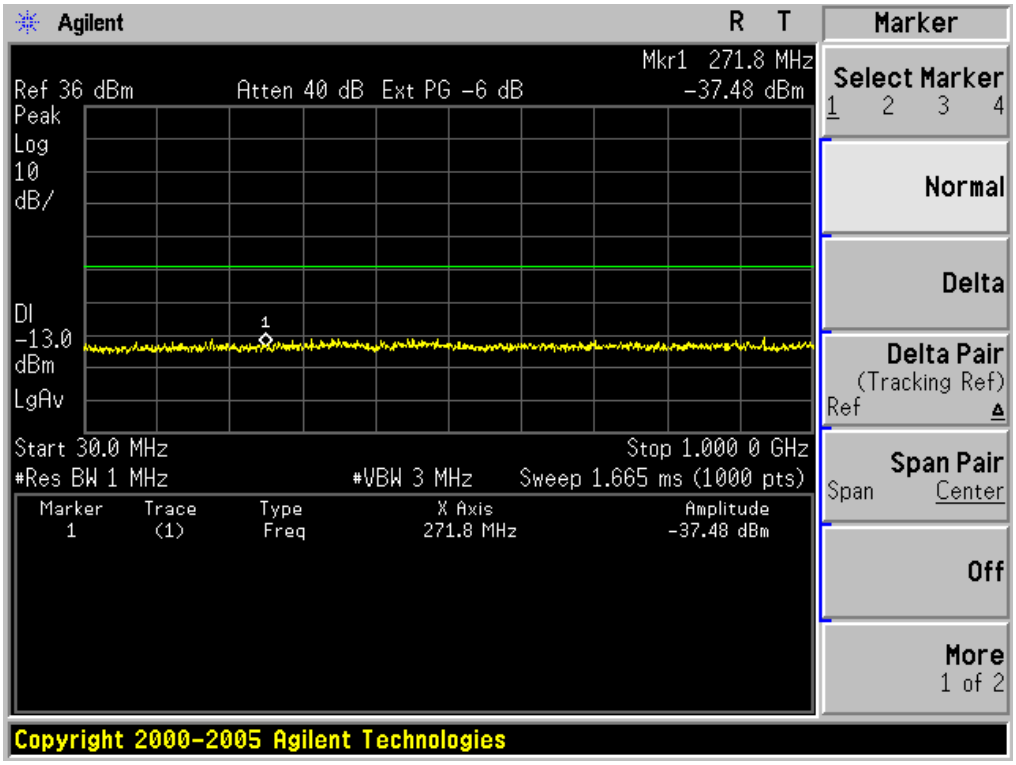
Conducted Emission Transmitting Mode CH 512 7GHz – 13.6GHz



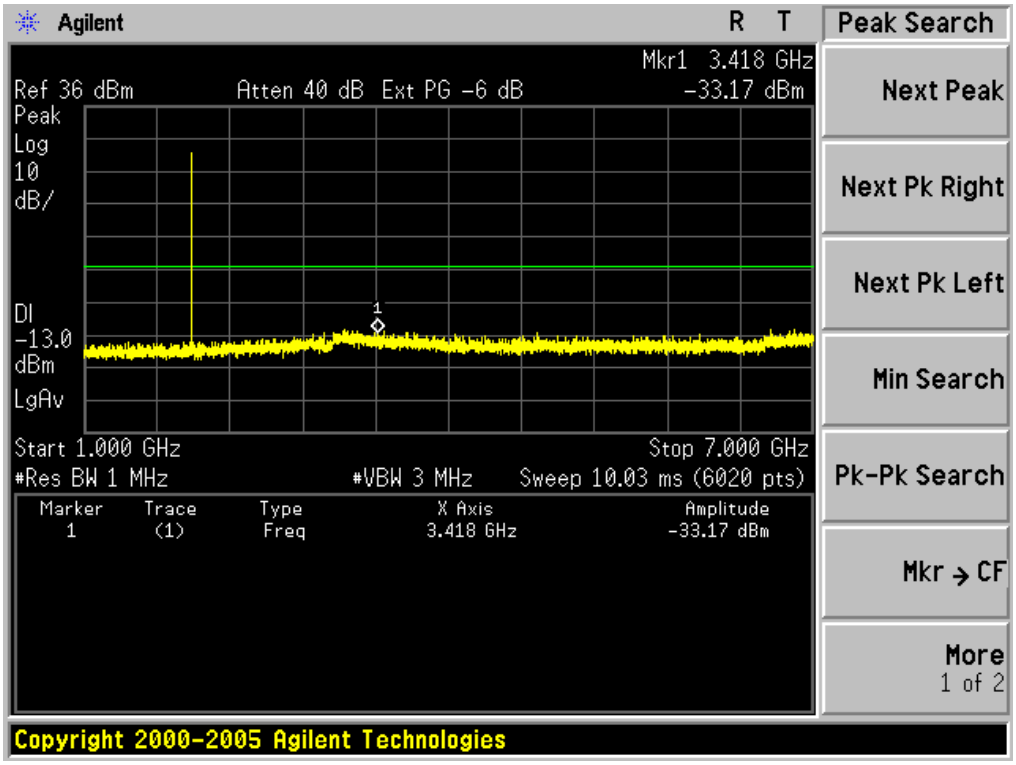

Conducted Emission Transmitting Mode CH 512 13.6GHz – 20GHz



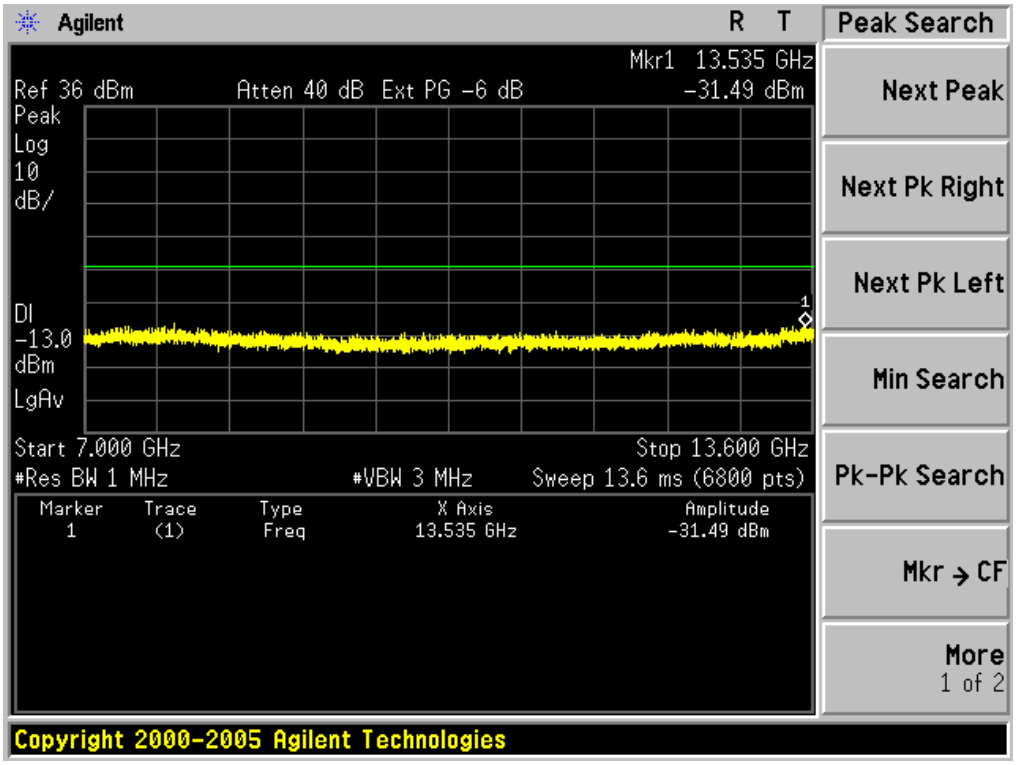
Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



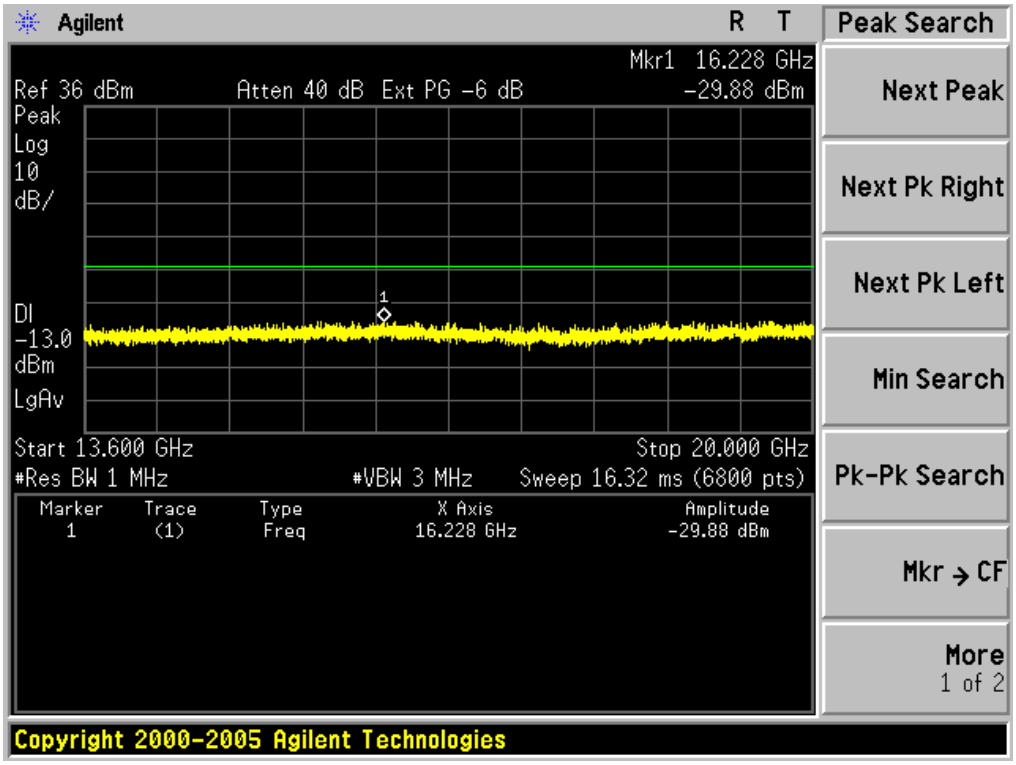

Conducted Emission Transmitting Mode CH 661 1GHz – 7GHz



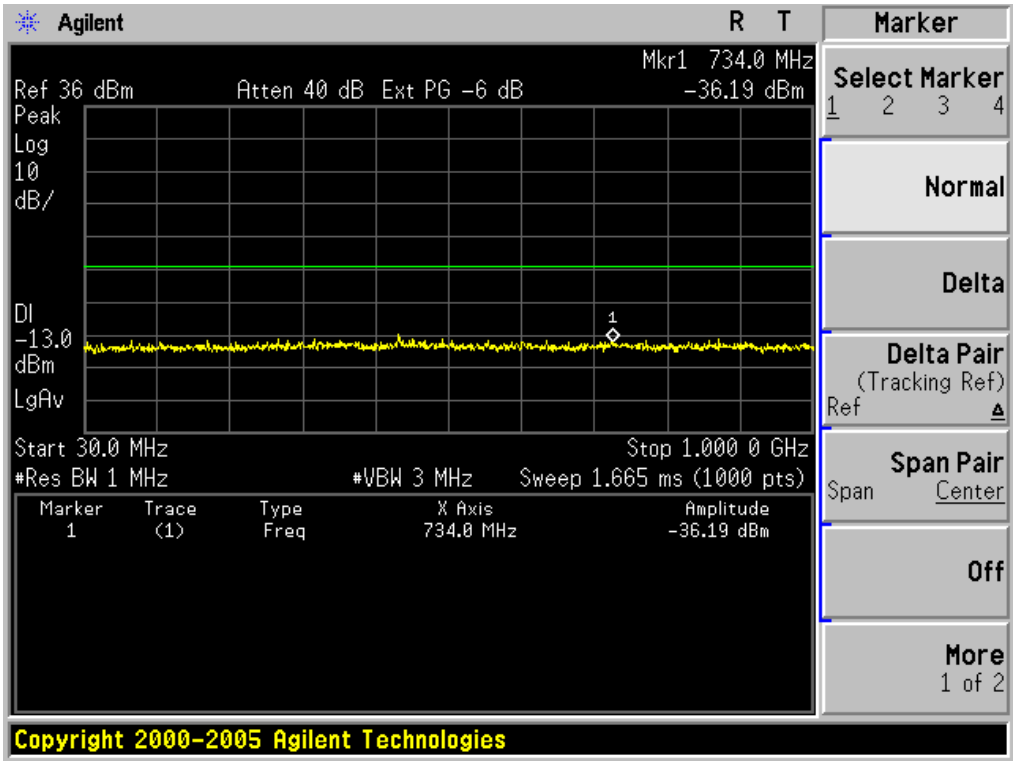
Conducted Emission Transmitting Mode CH 661 7GHz – 13.6GHz



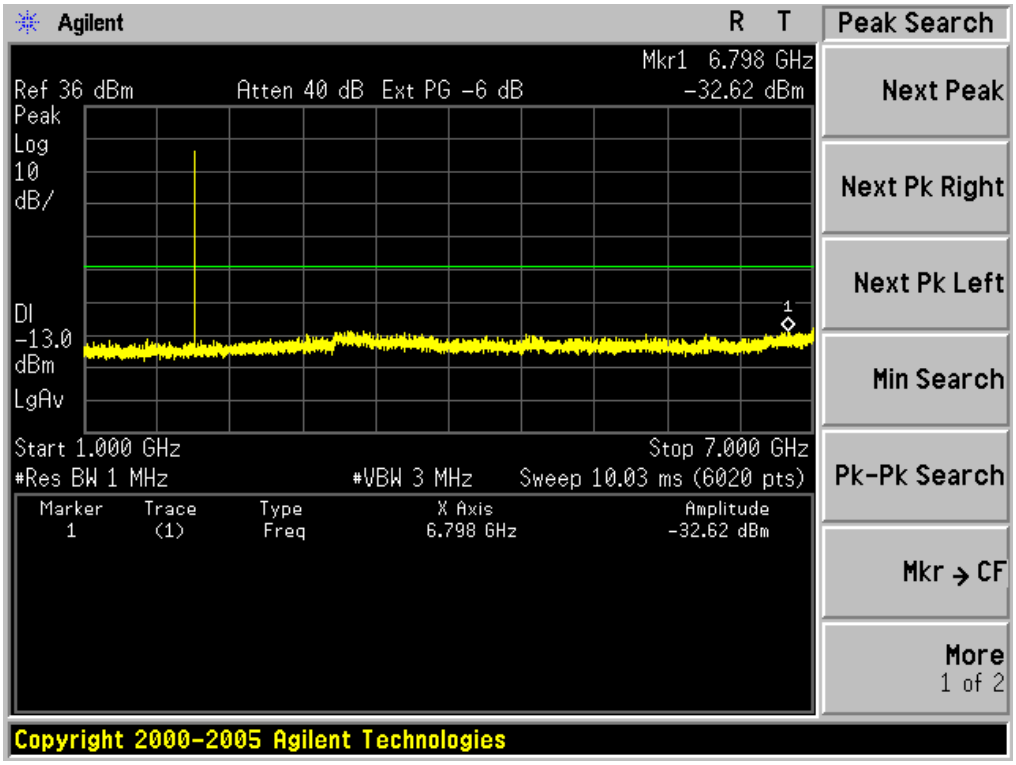

Conducted Emission Transmitting Mode CH 661 13.6GHz – 20GHz



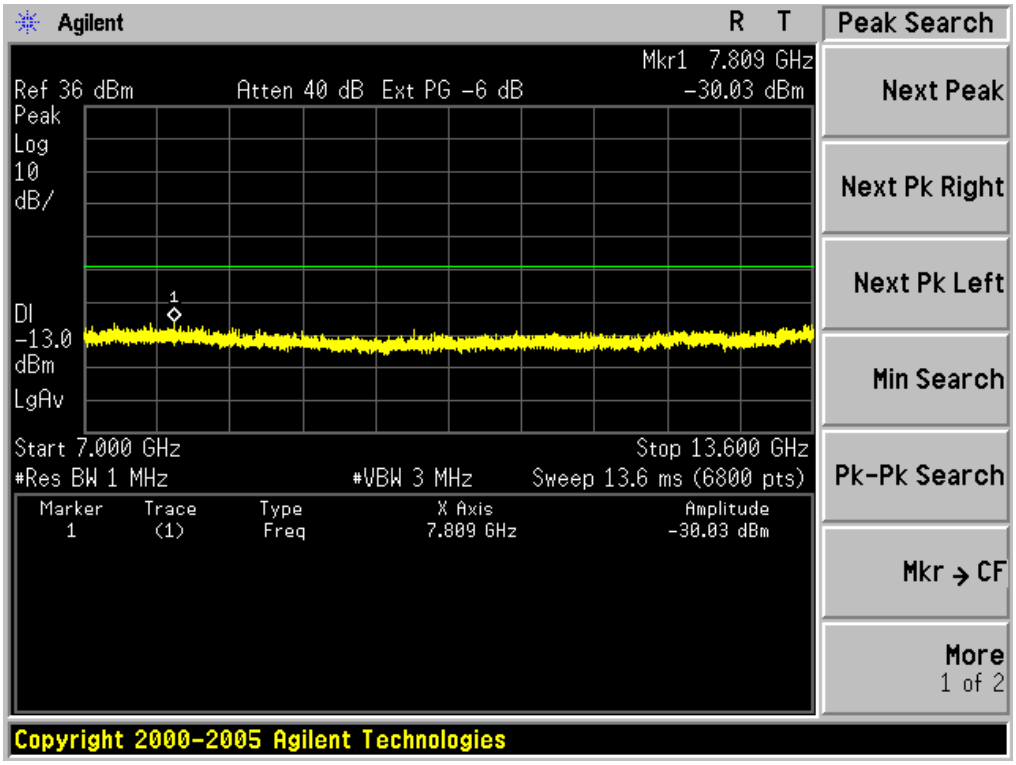
Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz



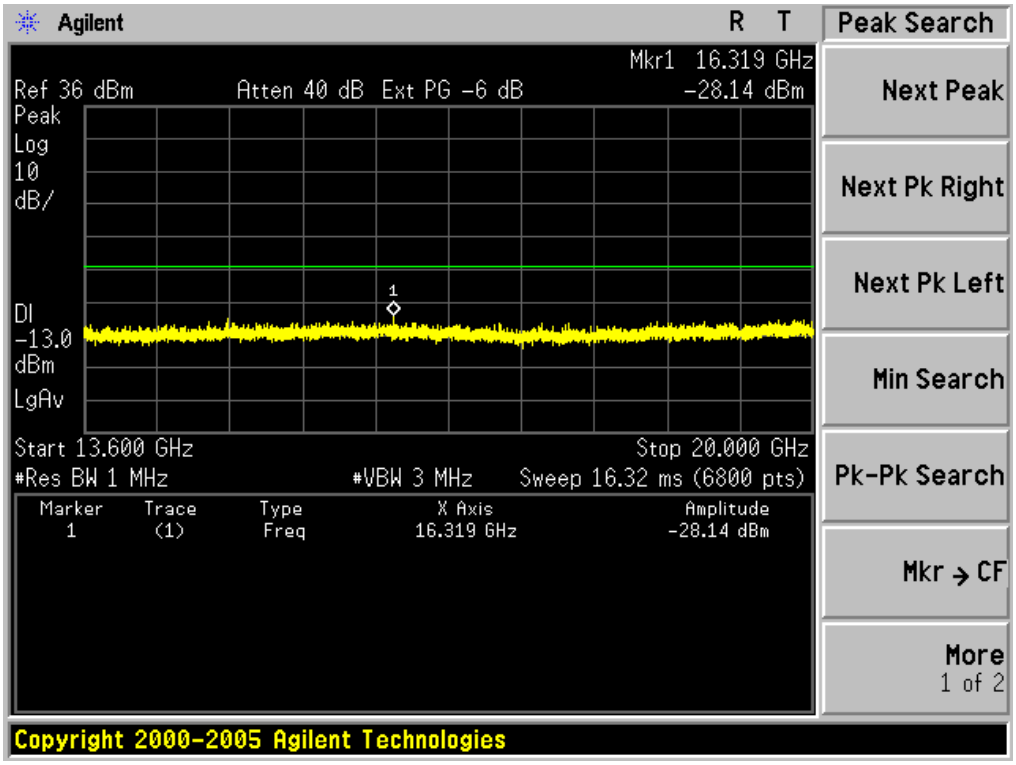

Conducted Emission Transmitting Mode CH 810 1GHz – 7GHz



Conducted Emission Transmitting Mode CH 810 7GHz – 13.6GHz

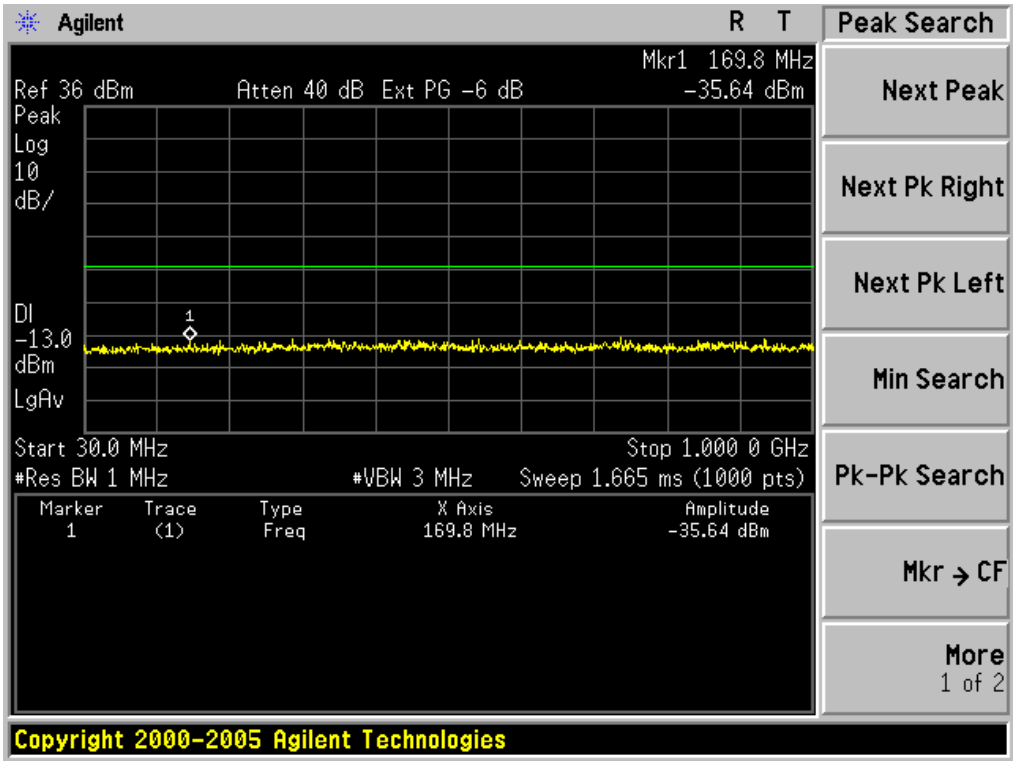



Conducted Emission Transmitting Mode CH 810 13.6GHz – 20GHz

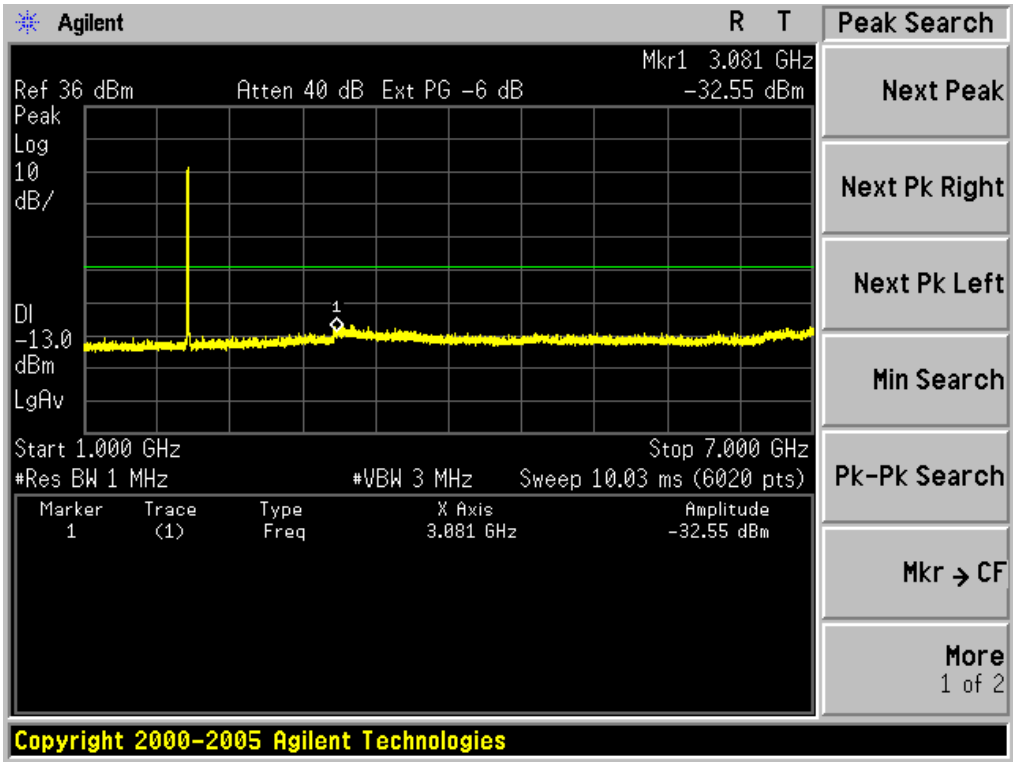


**CONDUCTED EMISSION IN UMTS band II**

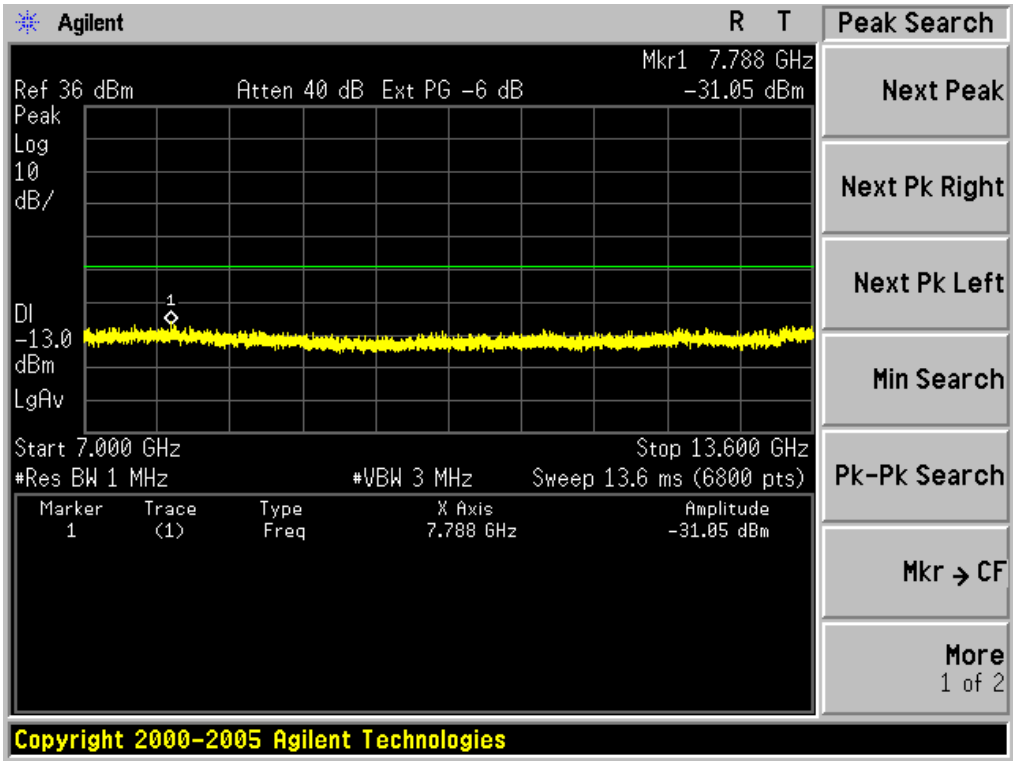
Conducted Emission Transmitting Mode CH 9662 30MHz – 1GHz



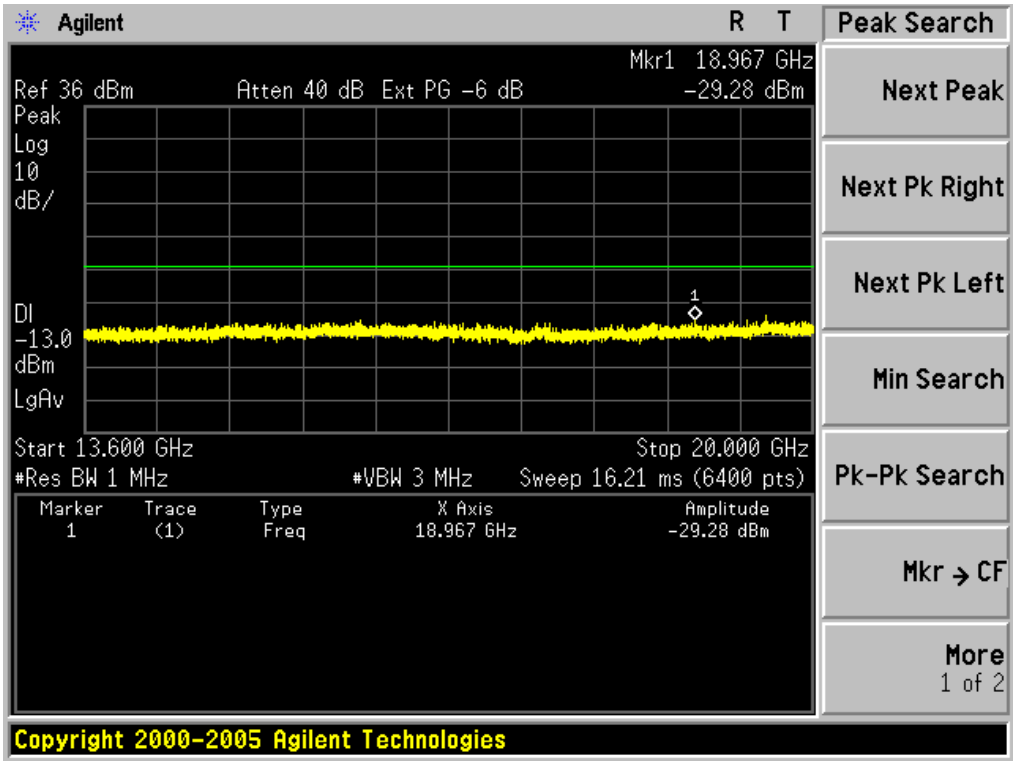

Conducted Emission Transmitting Mode CH 9662 1GHz – 7GHz



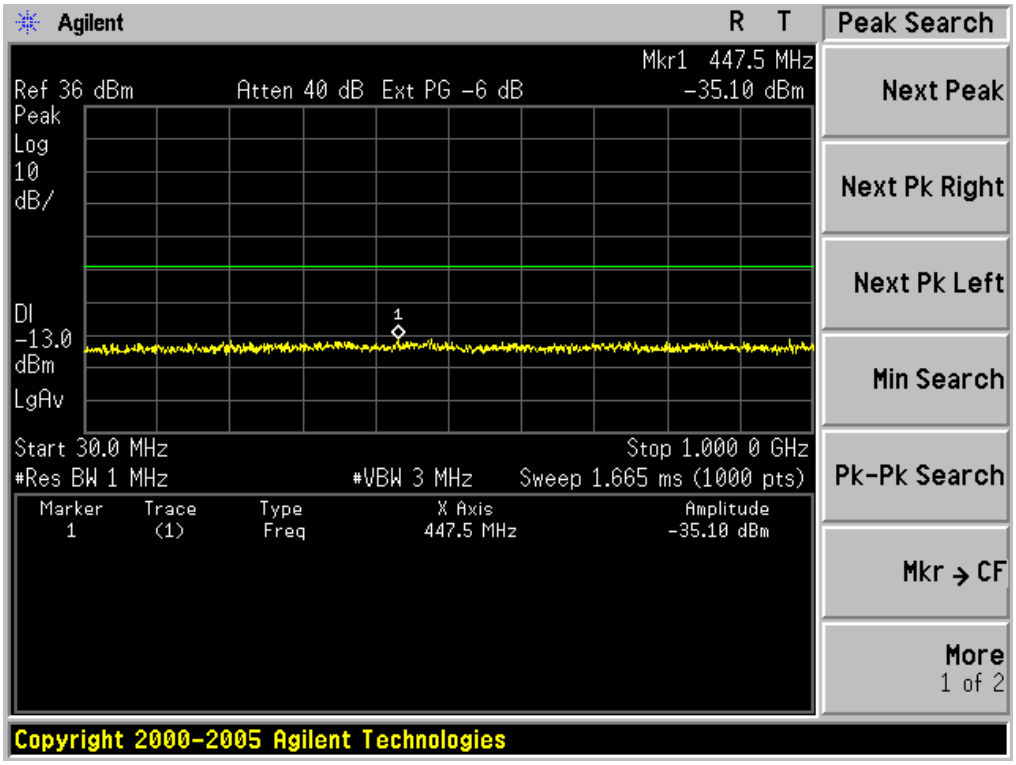
Conducted Emission Transmitting Mode CH 9662 7GHz – 13.6GHz



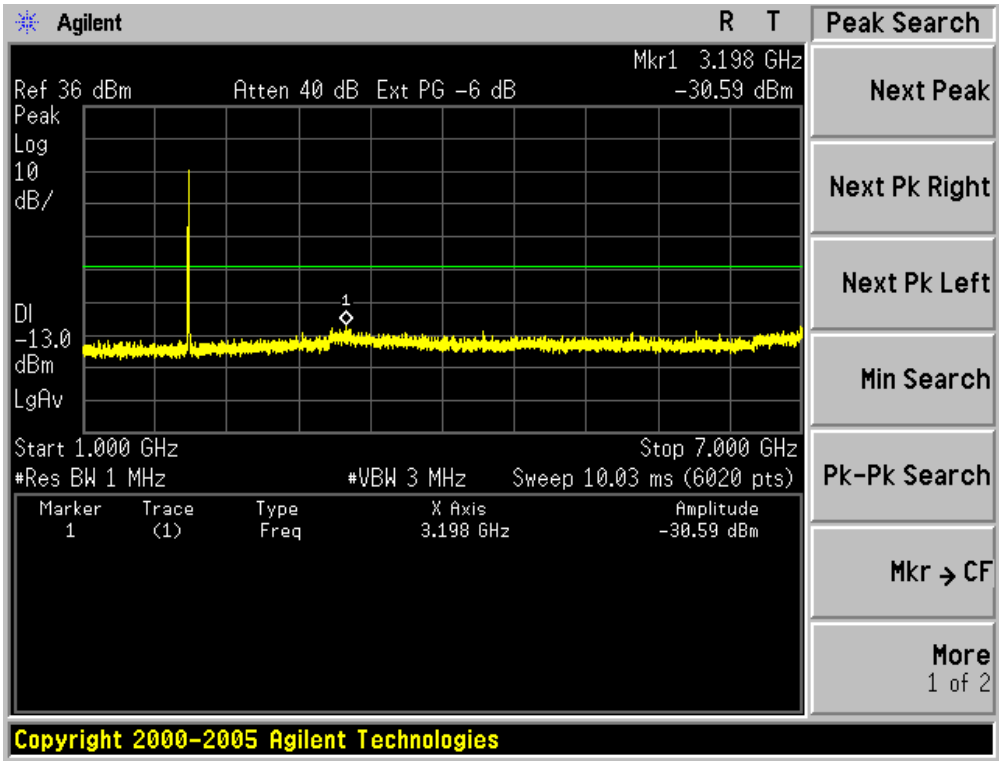

Conducted Emission Transmitting Mode CH 9662 13.6GHz – 20GHz



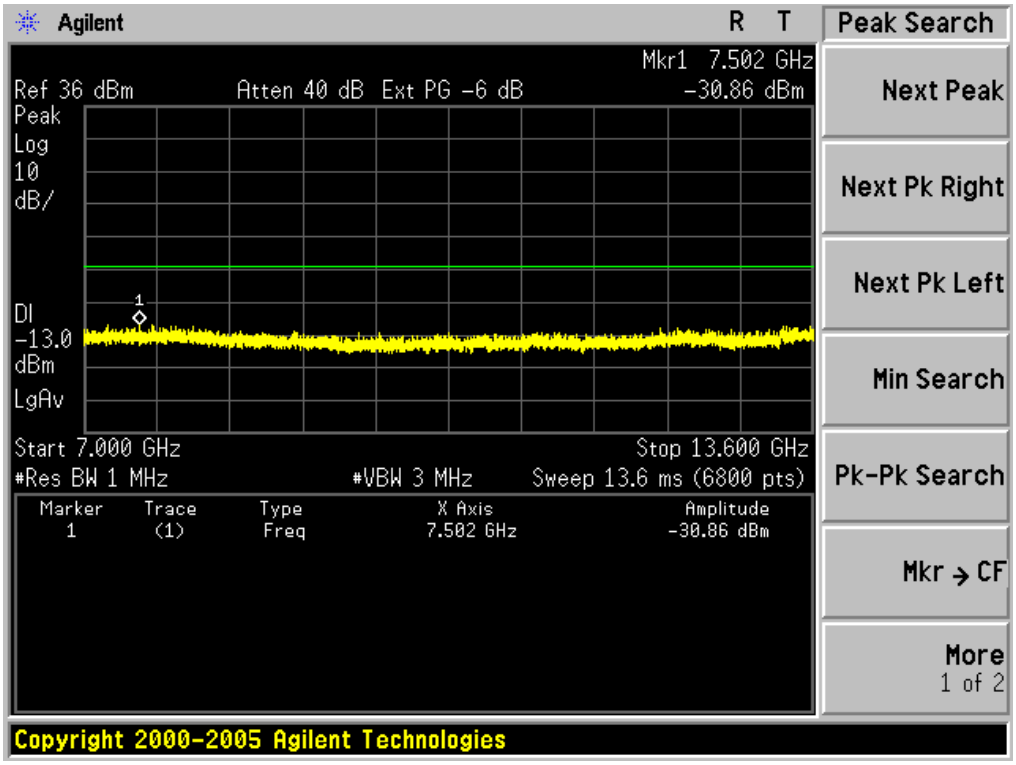
Conducted Emission Transmitting Mode CH 9800 30MHz – 1GHz



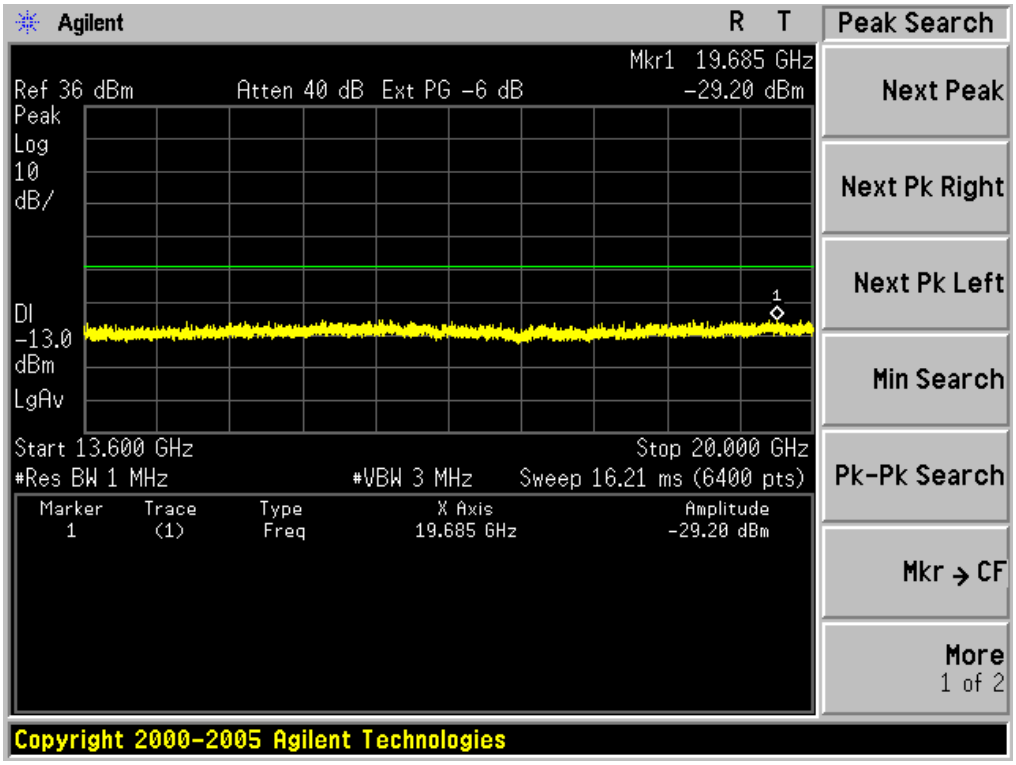

Conducted Emission Transmitting Mode CH 9800 1GHz – 7GHz



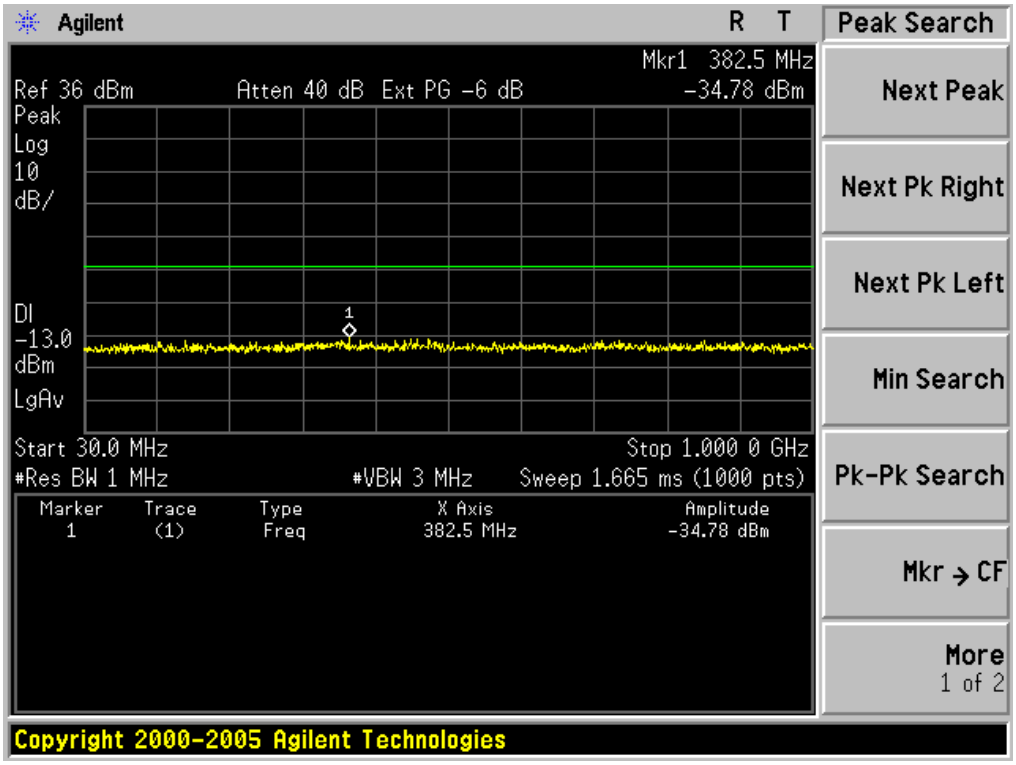
Conducted Emission Transmitting Mode CH 9800 7GHz – 13.6GHz



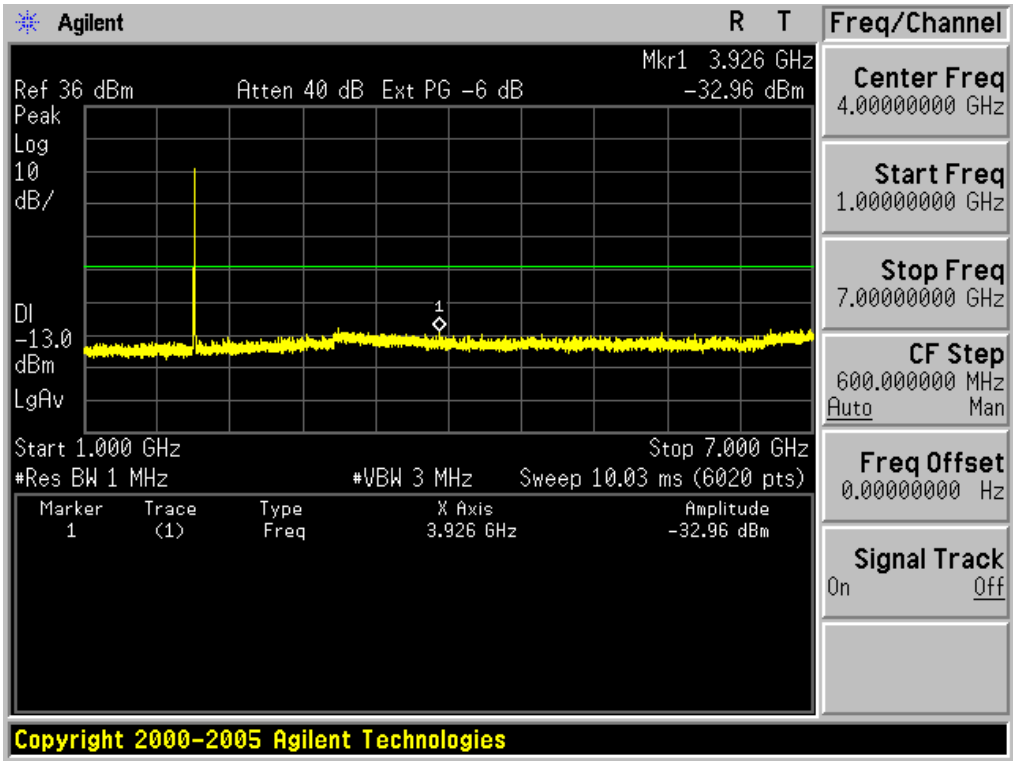

Conducted Emission Transmitting Mode CH 9800 13.6GHz – 20GHz



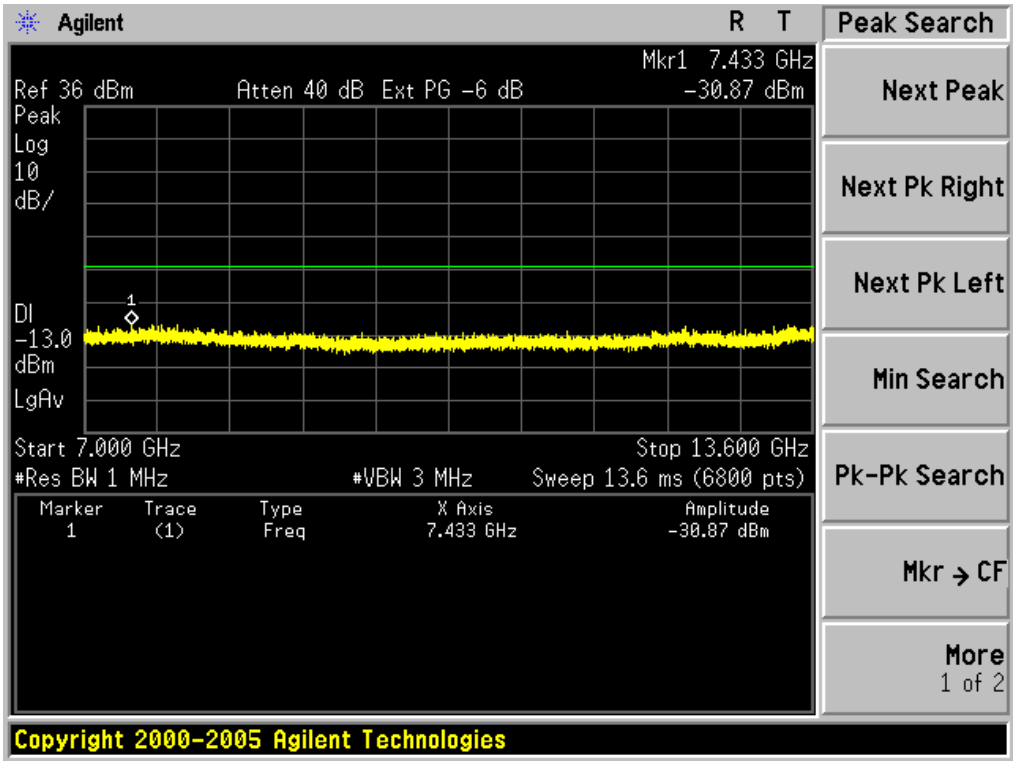
Conducted Emission Transmitting Mode CH 9938 30MHz – 1GHz



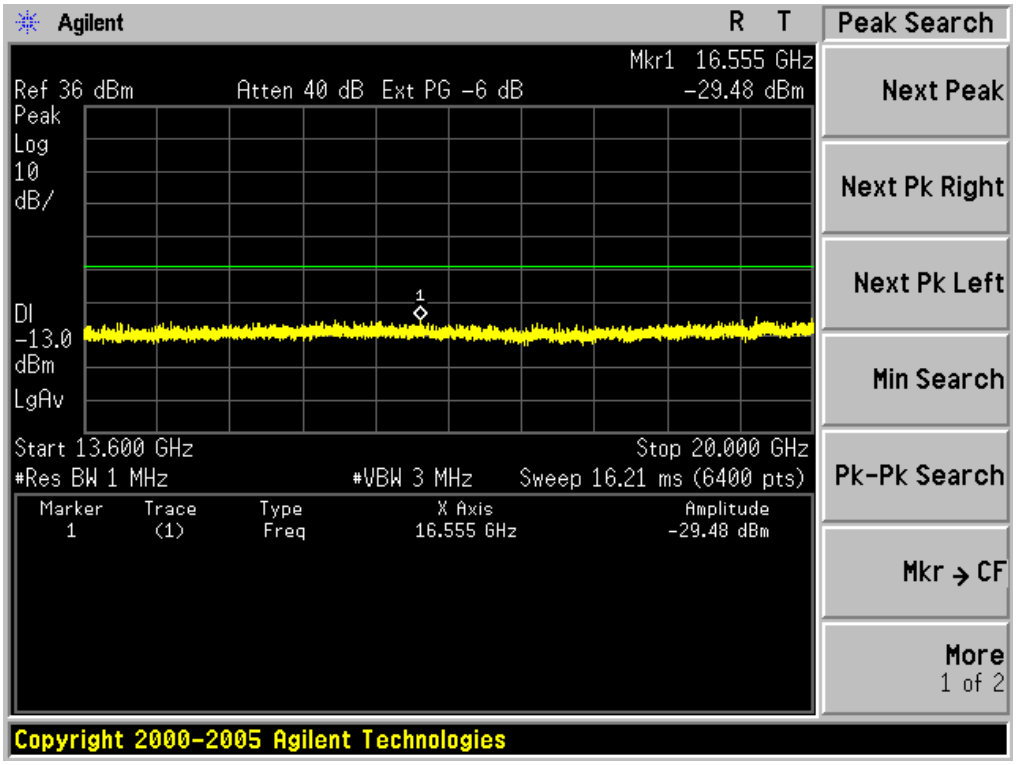

Conducted Emission Transmitting Mode CH 9938 1GHz – 7GHz



Conducted Emission Transmitting Mode CH 9938 7GHz – 13.6GHz

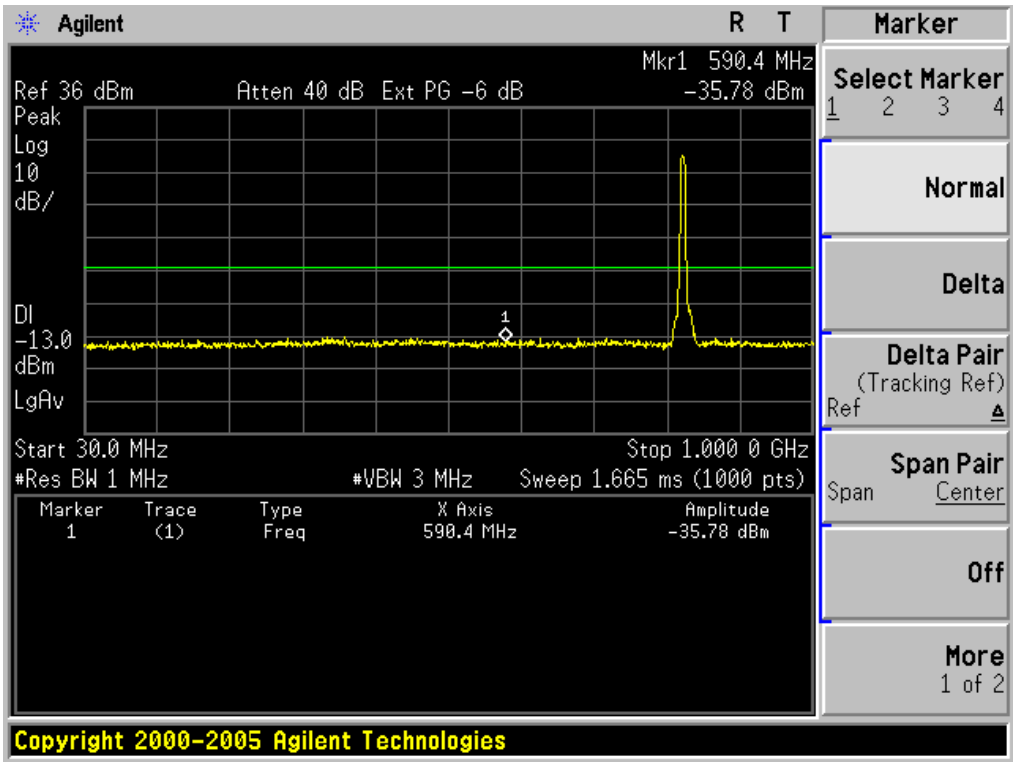



Conducted Emission Transmitting Mode CH 9938 13.6GHz – 20GHz

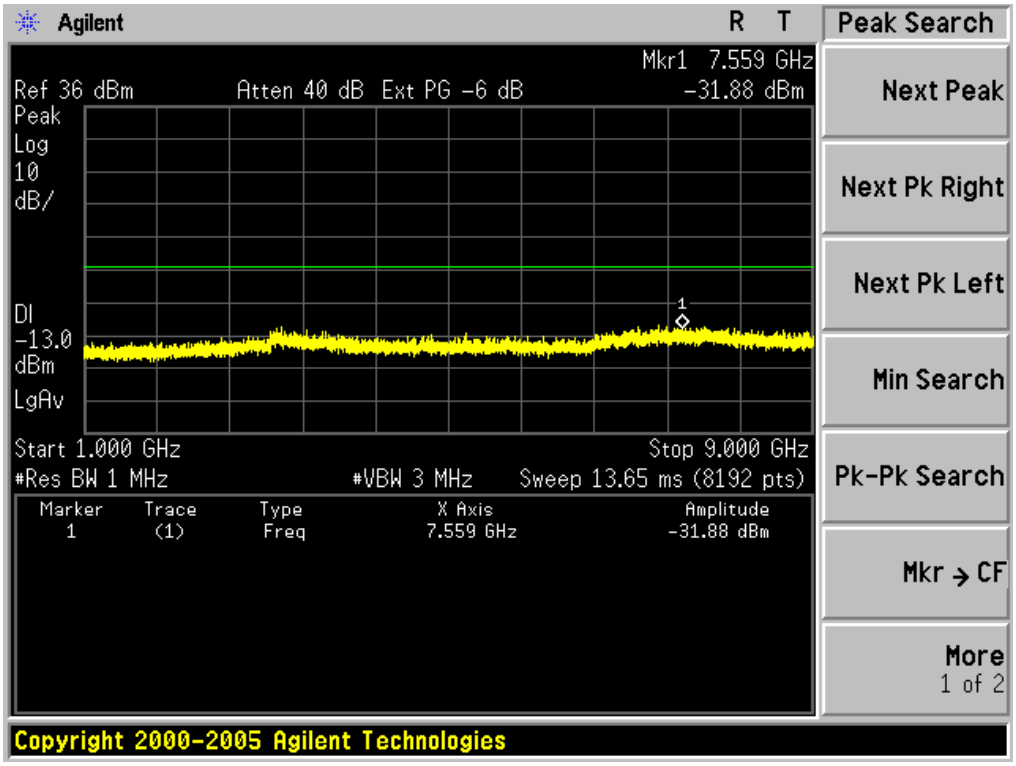


**CONDUCTED EMISSION IN UMTS band V**

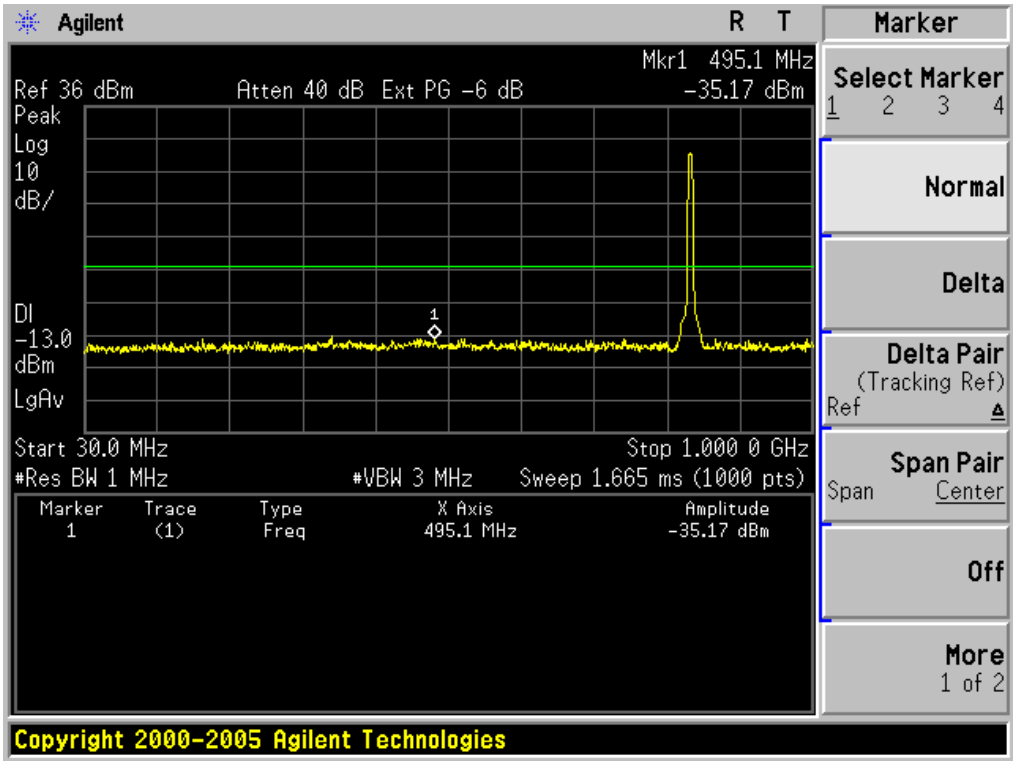
Conducted Emission Transmitting Mode CH 4357 30MHz – 1GHz



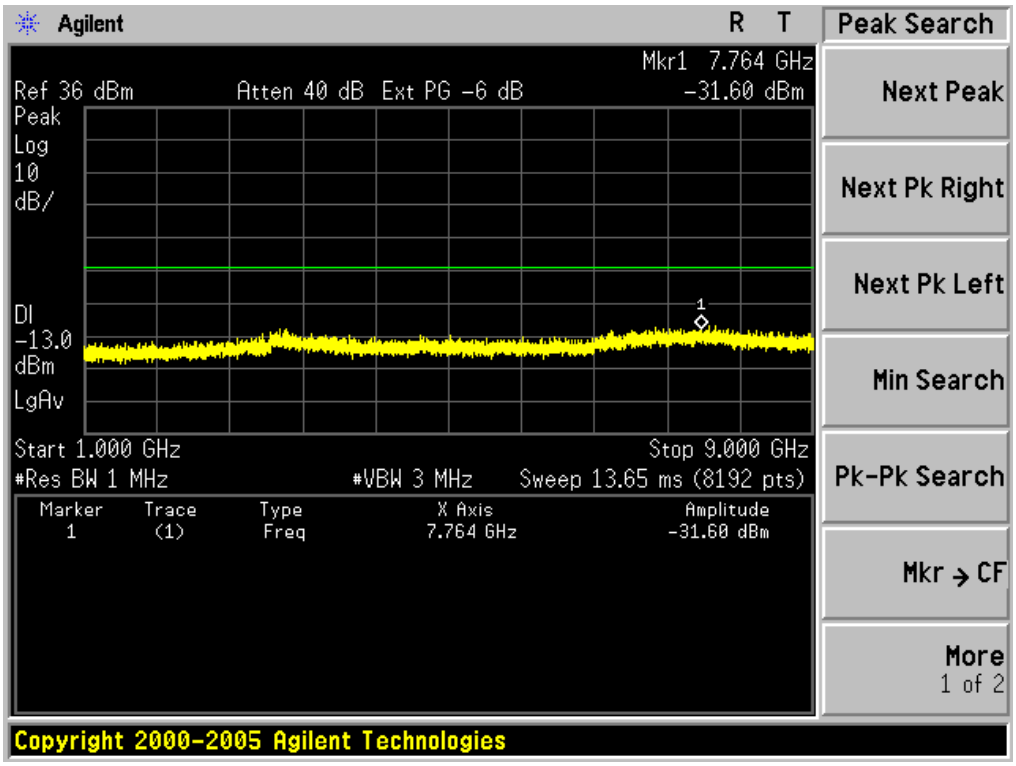

Conducted Emission Transmitting Mode CH 4357 1GHz – 9GHz



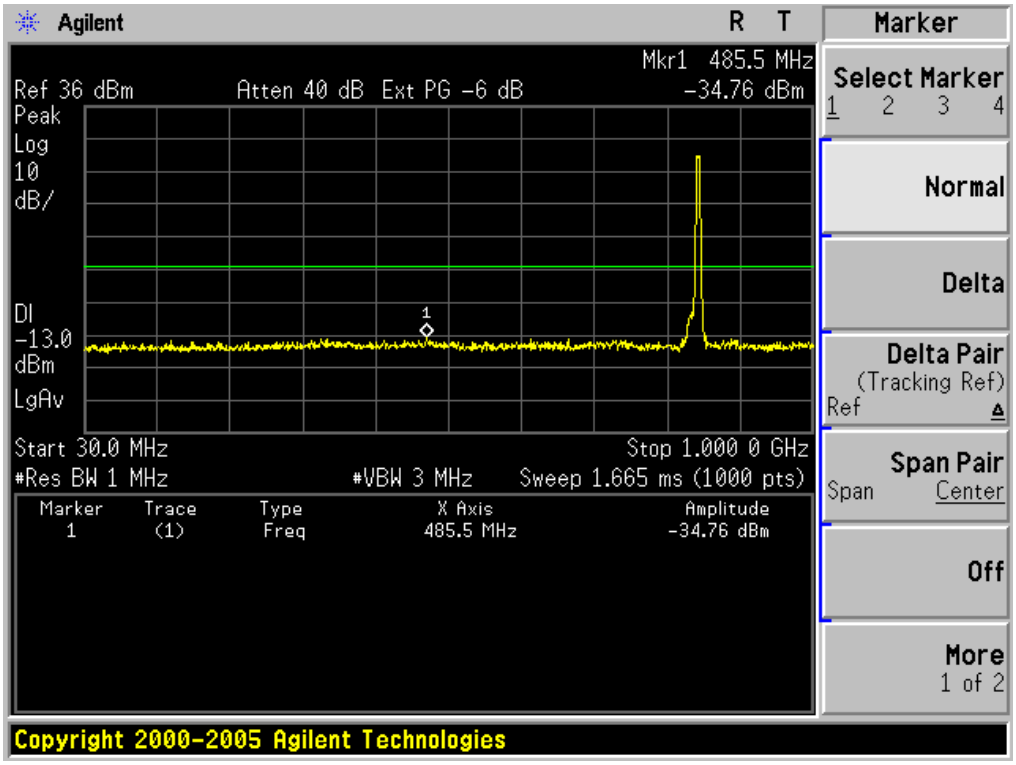
Conducted Emission Transmitting Mode CH 4386 30MHz – 1GHz



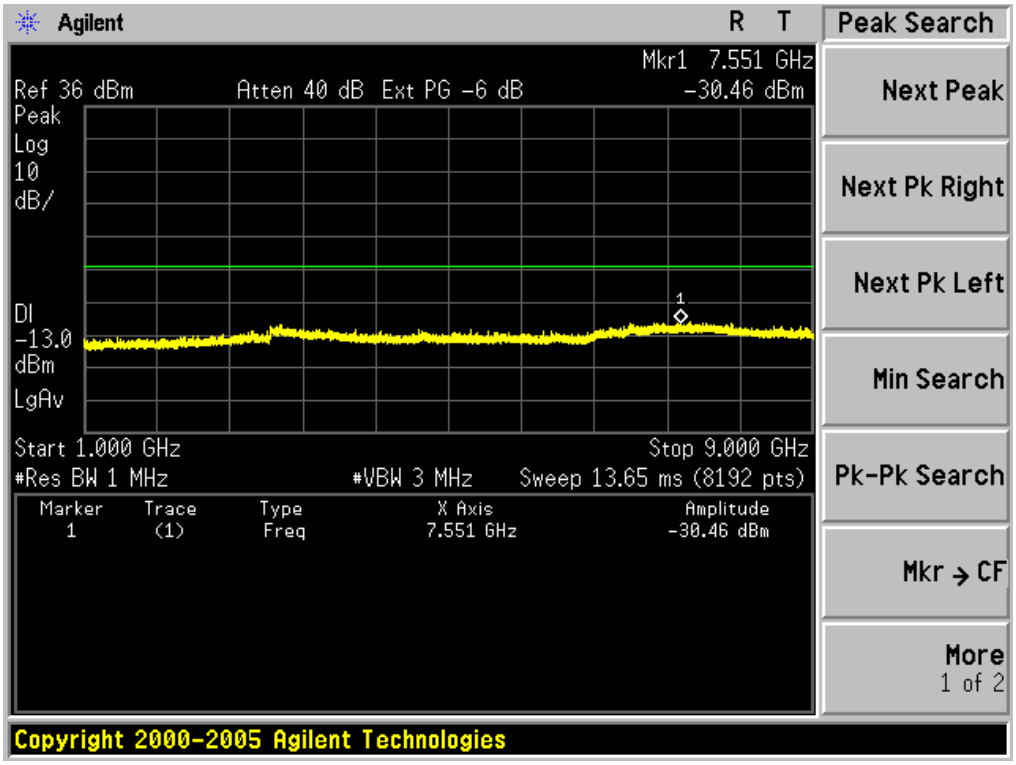

Conducted Emission Transmitting Mode CH 4386 1GHz – 9GHz



Conducted Emission Transmitting Mode CH 4458 30MHz – 1GHz




Conducted Emission Transmitting Mode CH 4458 1GHz – 9GHz

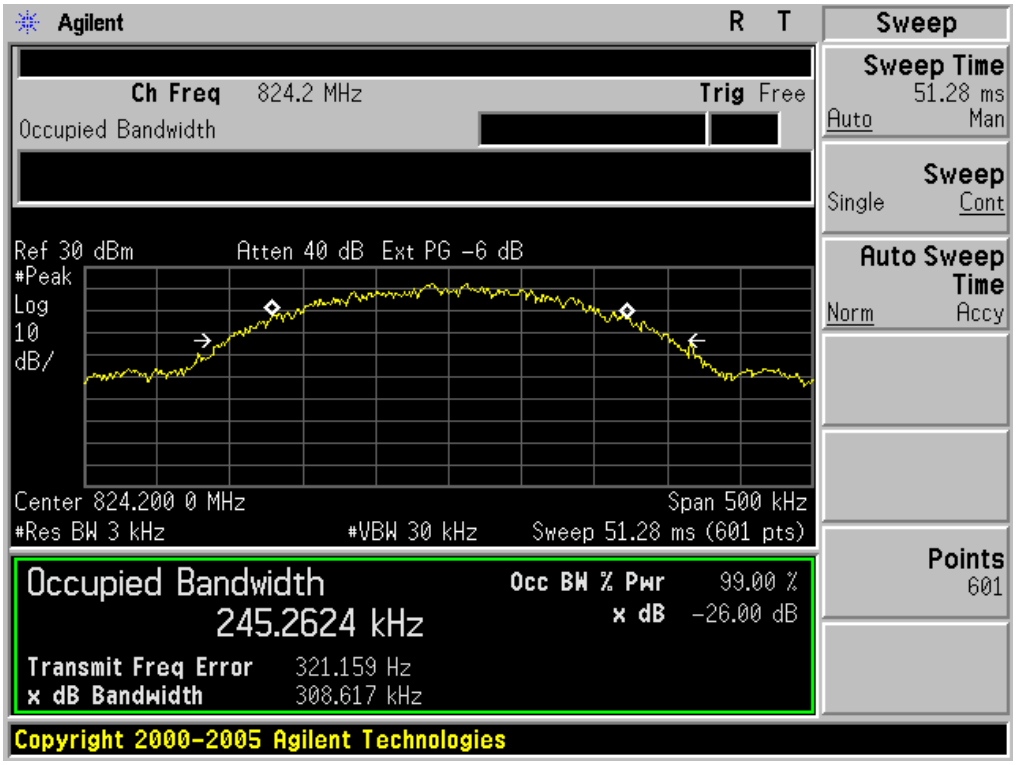


# APPENDIX B

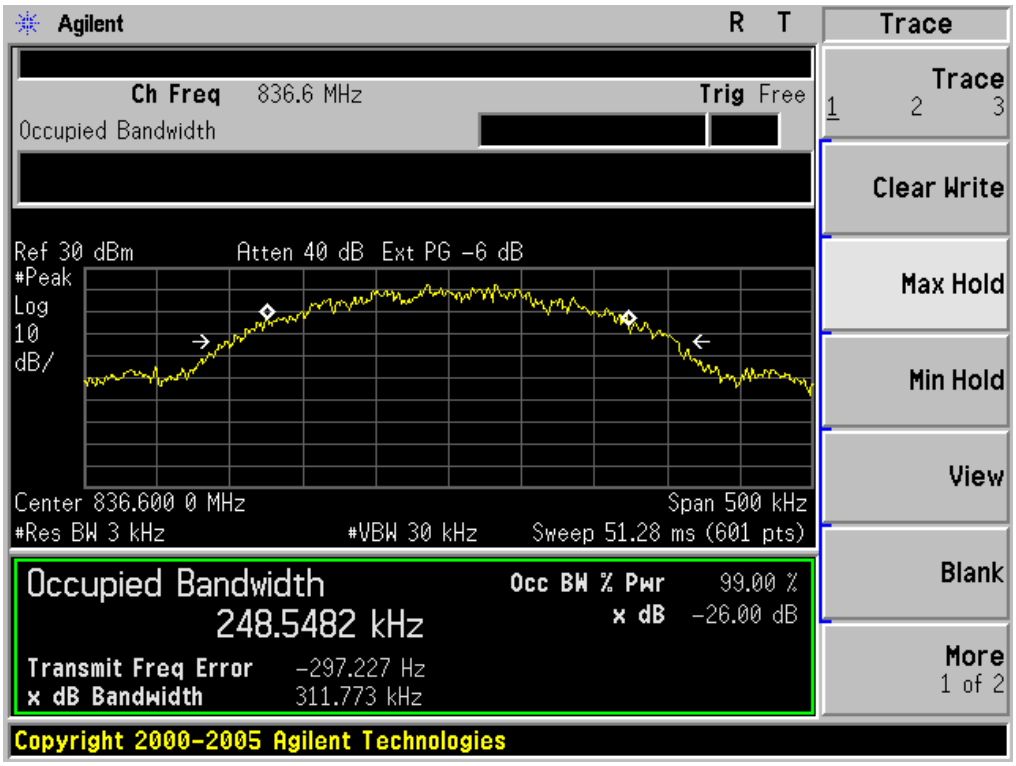
# TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)

# EMISSION BANDWIDTH (-26dBC)

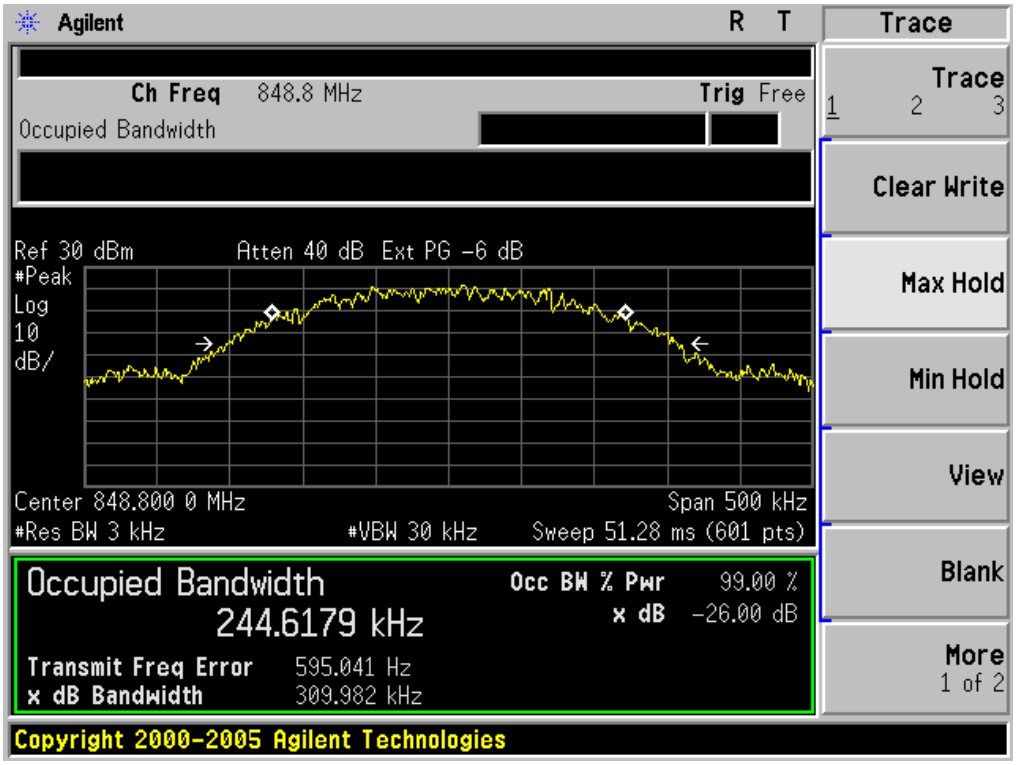
Occupied Bandwidth (99%) GSM 850 BAND CH 128



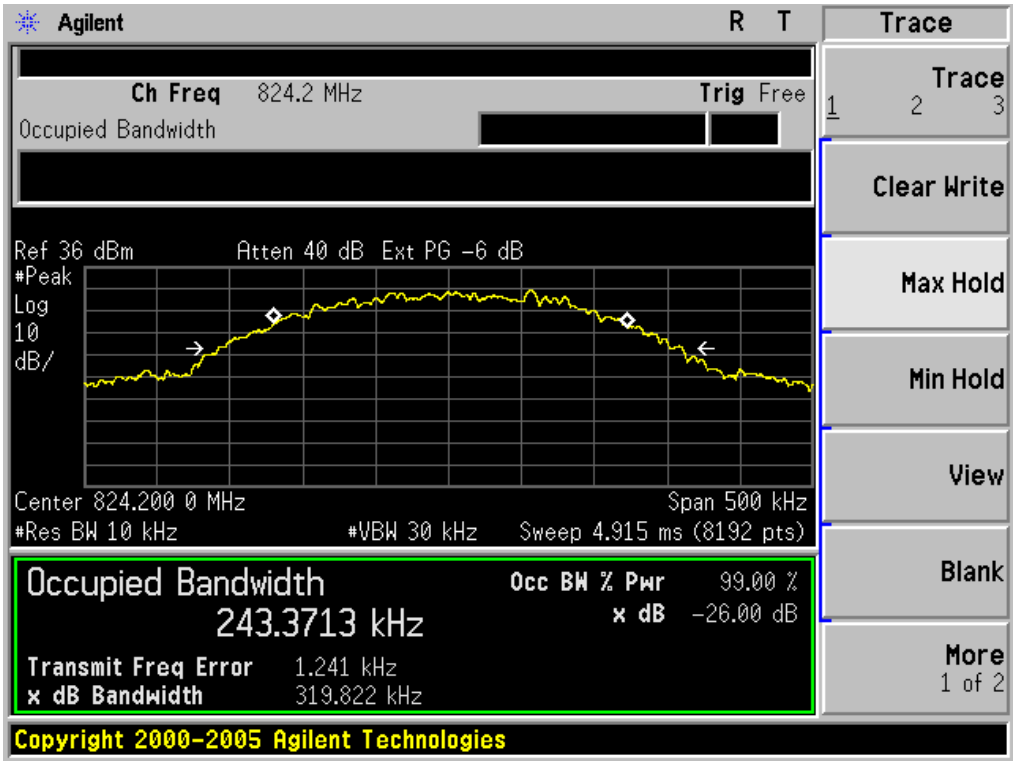

Occupied Bandwidth (99%) GSM 850 BAND CH 190



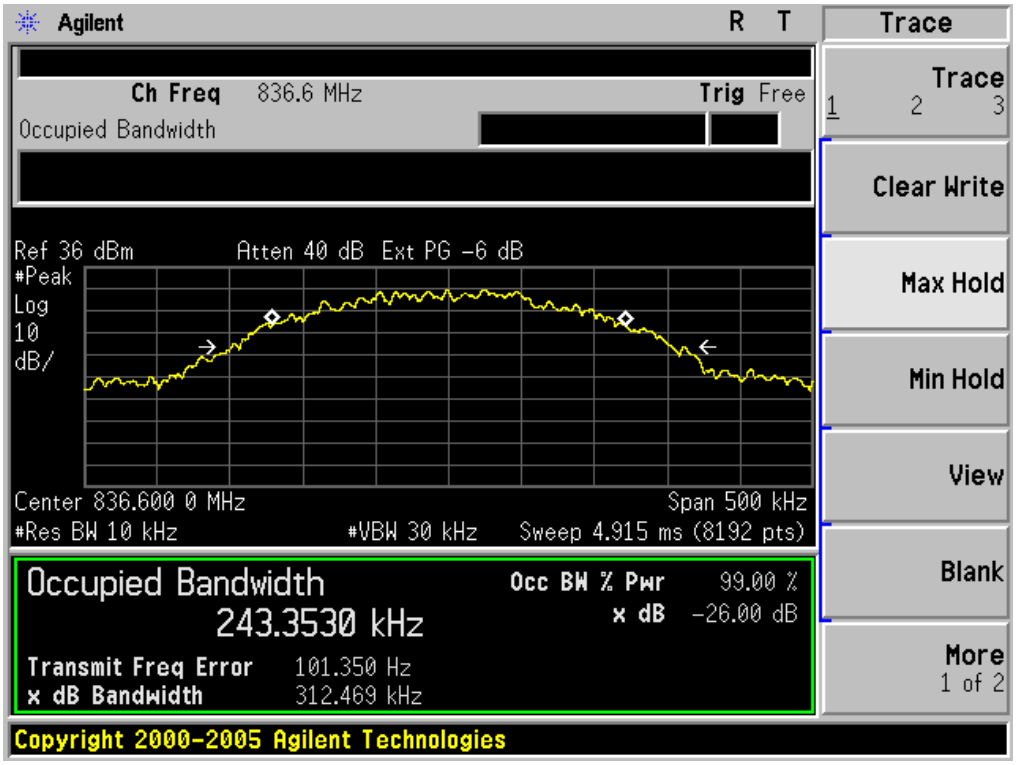
Occupied Bandwidth (99%) GSM 850 BAND CH 251



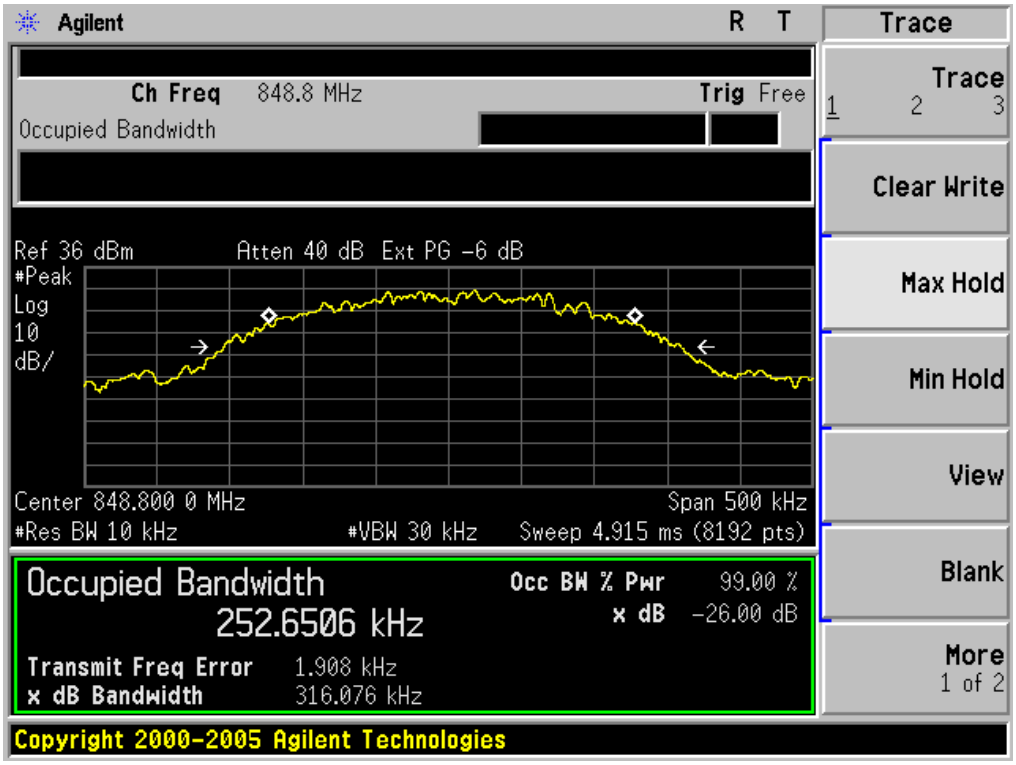

Occupied Bandwidth (99%) GSM 850(EDGE 8) BAND CH 128



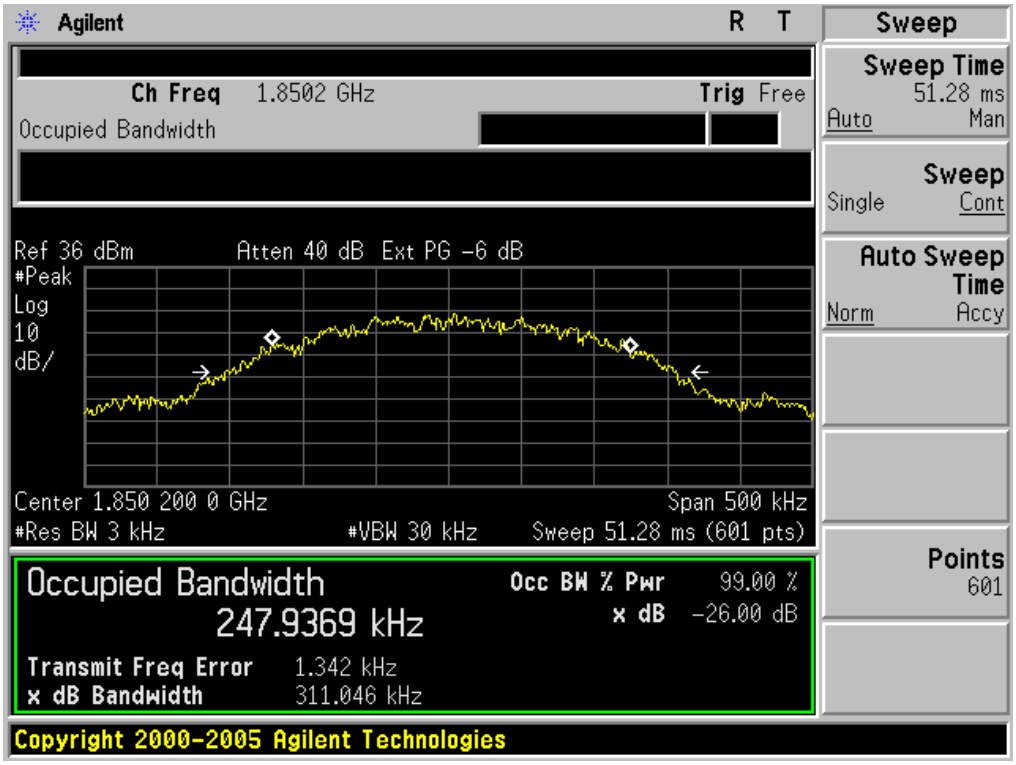
Occupied Bandwidth (99%) GSM 850 (EDGE 8) BAND CH 190



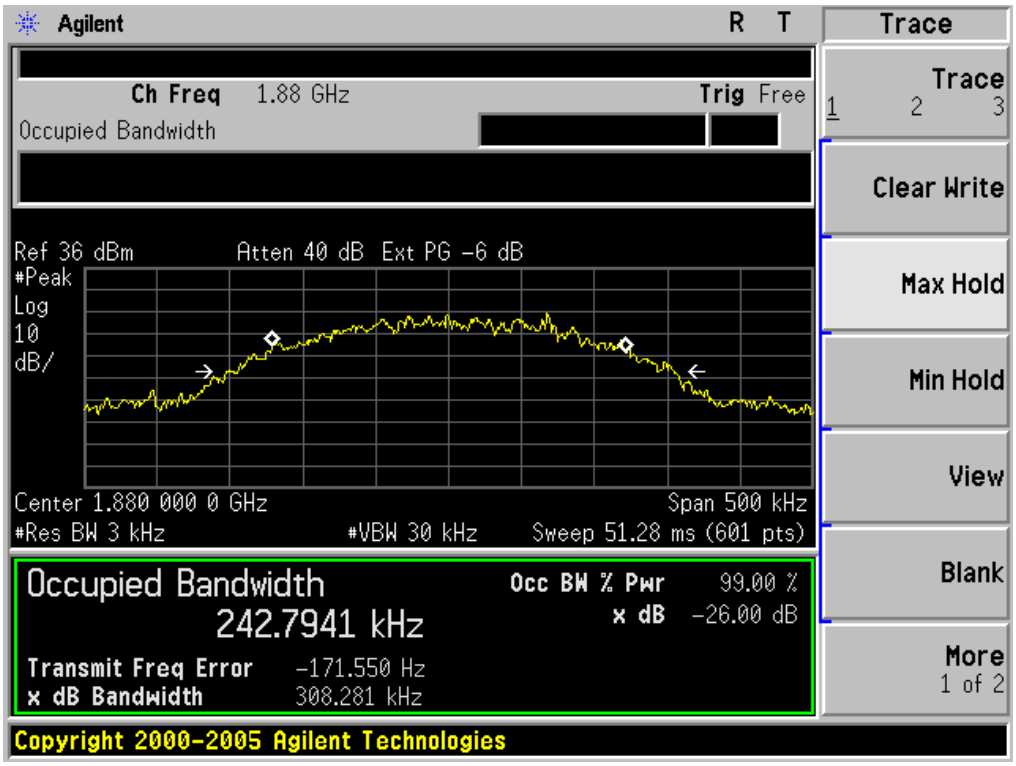

Occupied Bandwidth (99%) GSM 850 (EDGE 8) BAND CH 251



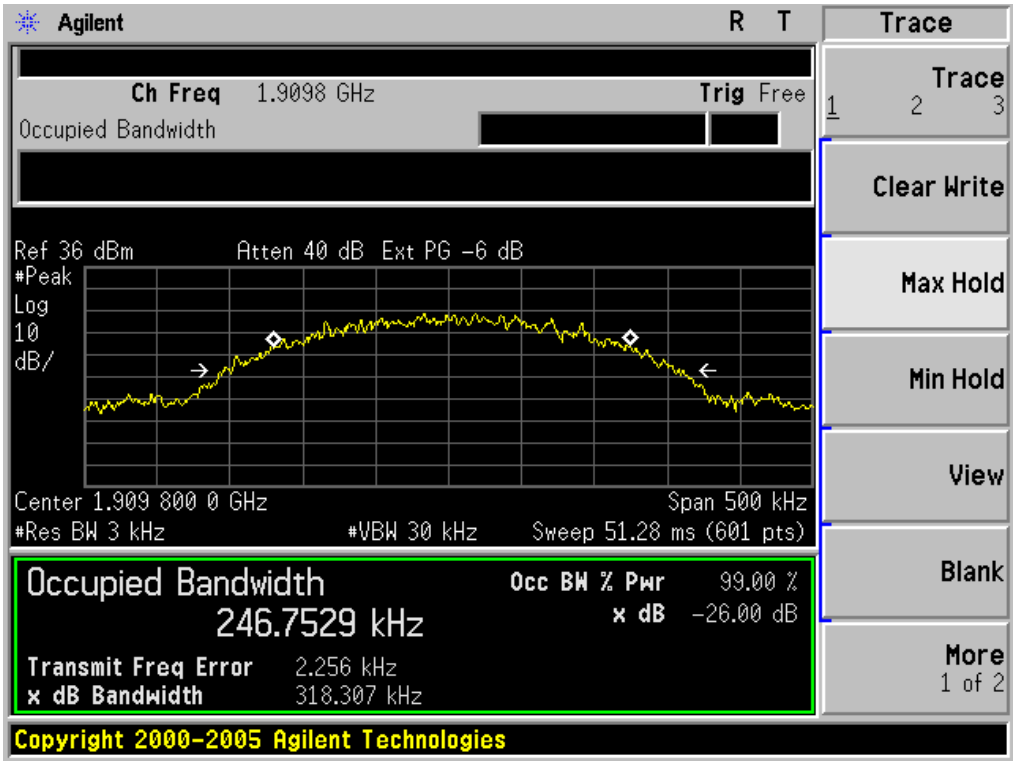
Occupied Bandwidth (99%) PCS 1900 BAND CH 512



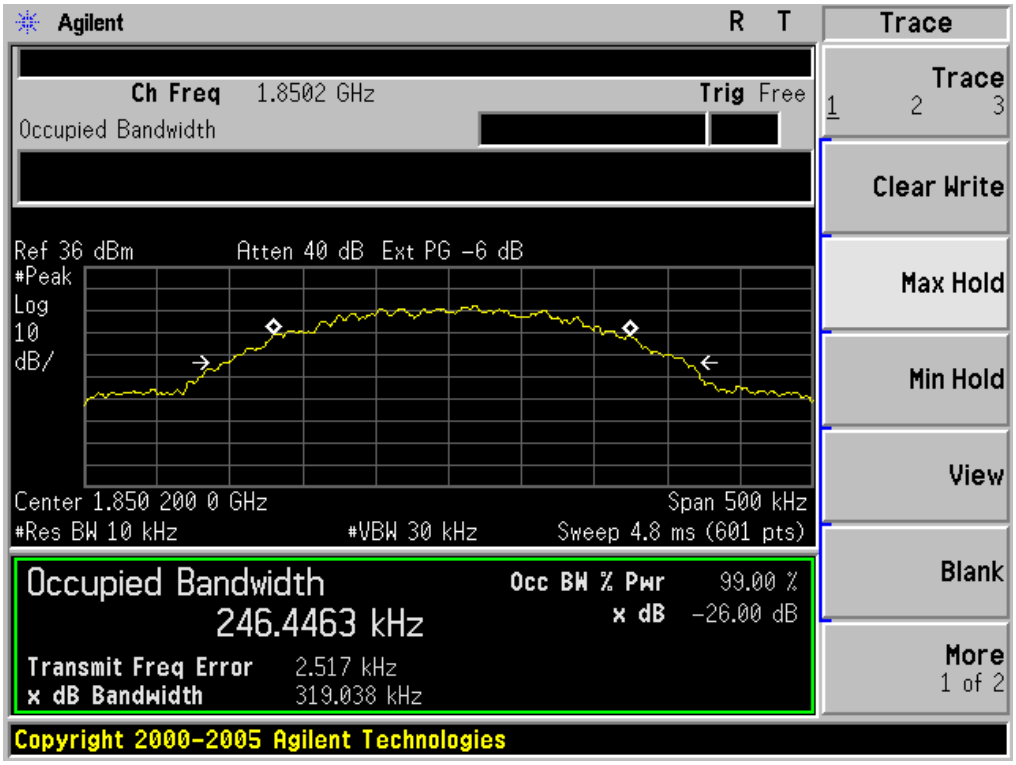

Occupied Bandwidth (99%) PCS 1900 BAND CH 661



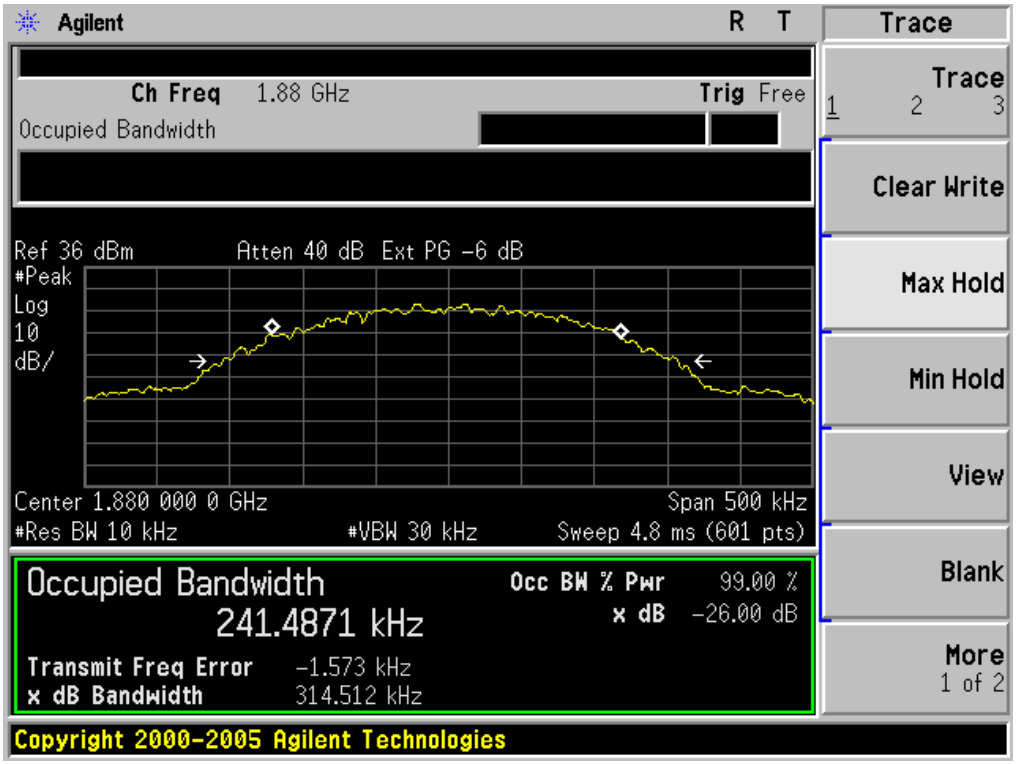
Occupied Bandwidth (99%) PCS 1900 BAND CH 810



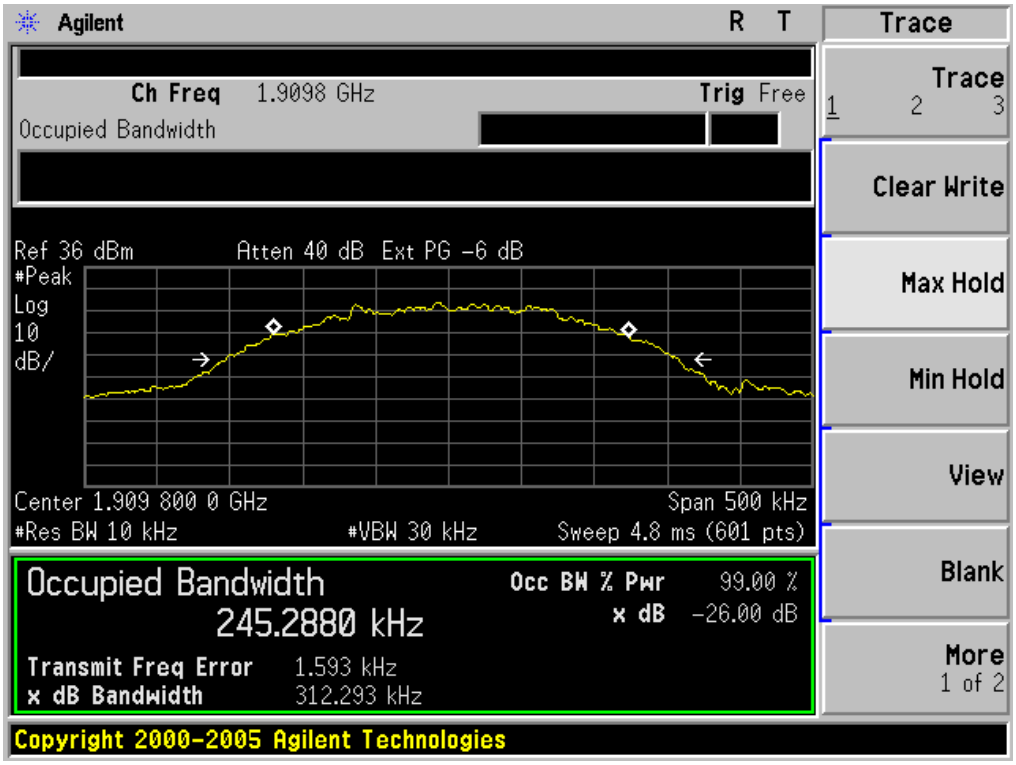

Occupied Bandwidth (99%) PCS 1900 (EDGE 8) BAND CH 512



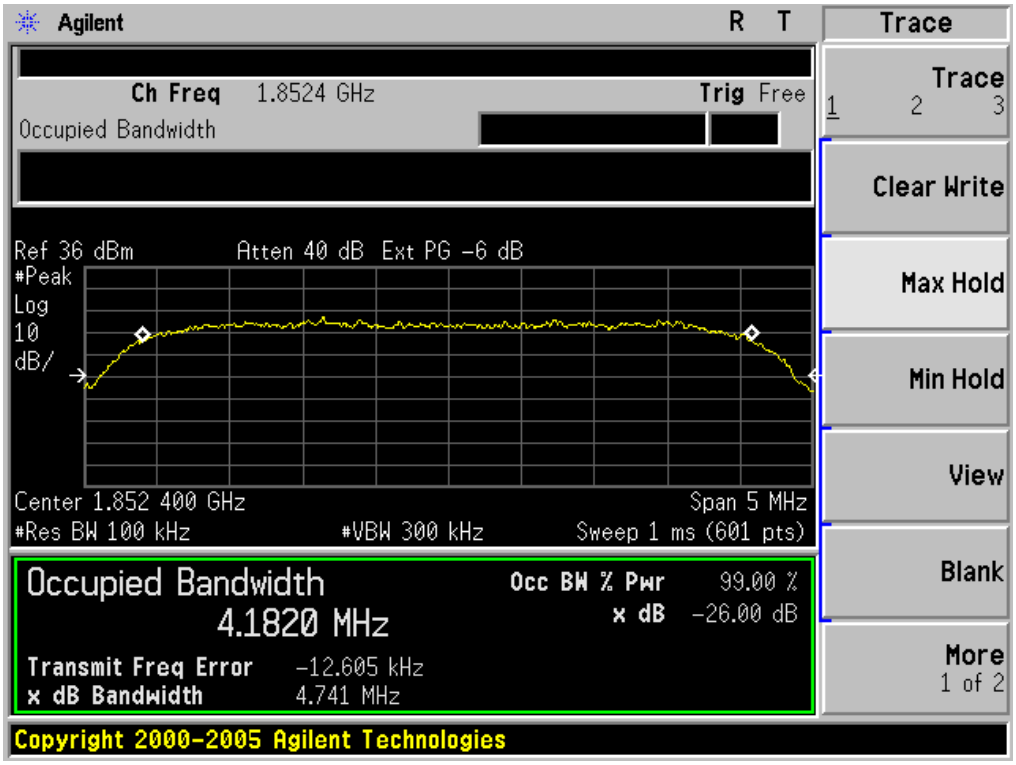
Occupied Bandwidth (99%) PCS 1900 (EDGE 8) BAND CH 661



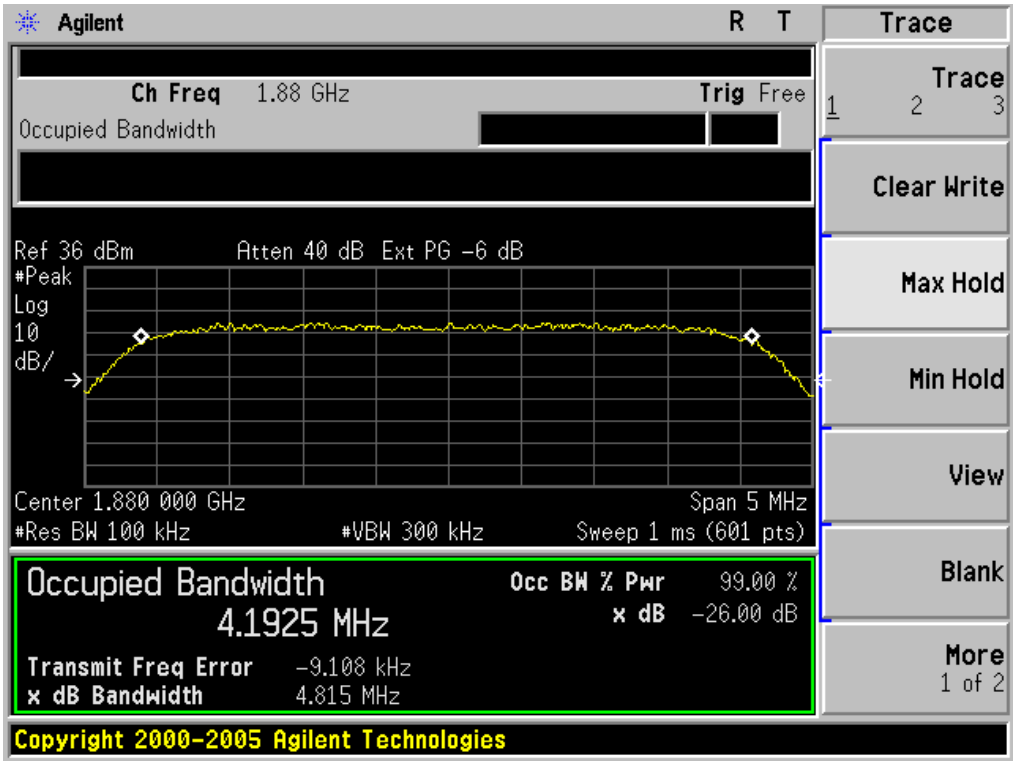

Occupied Bandwidth (99%) PCS 1900 (EDGE 8) BAND CH 810



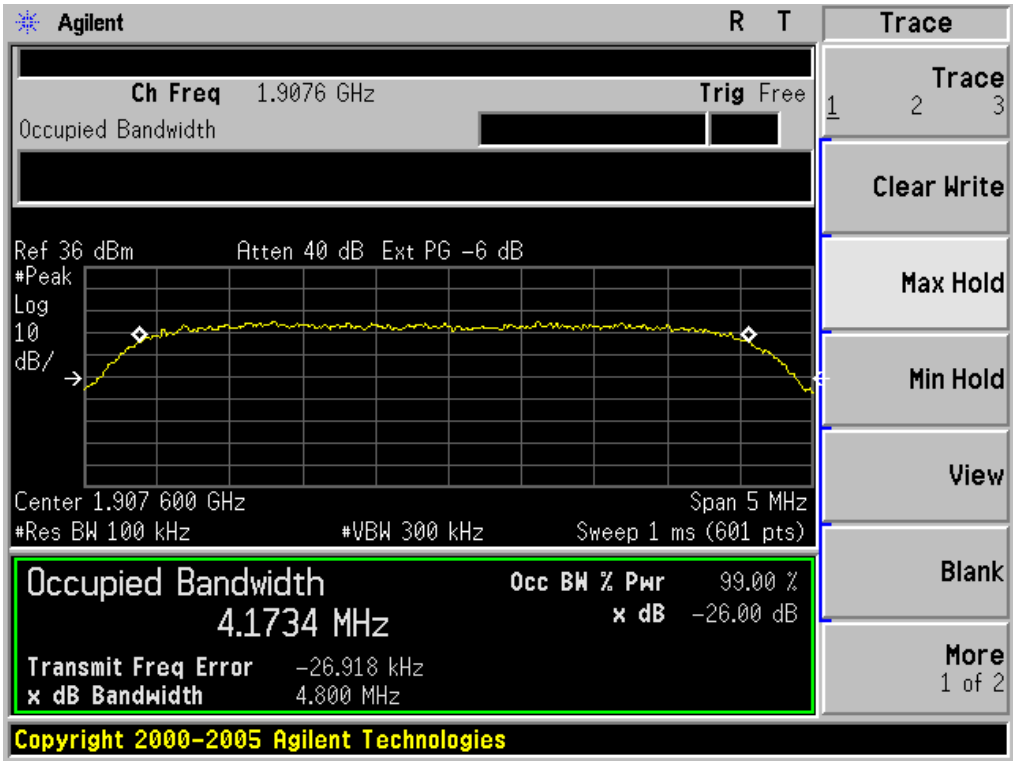
Occupied Bandwidth (99%) UMTS band II CH 9662



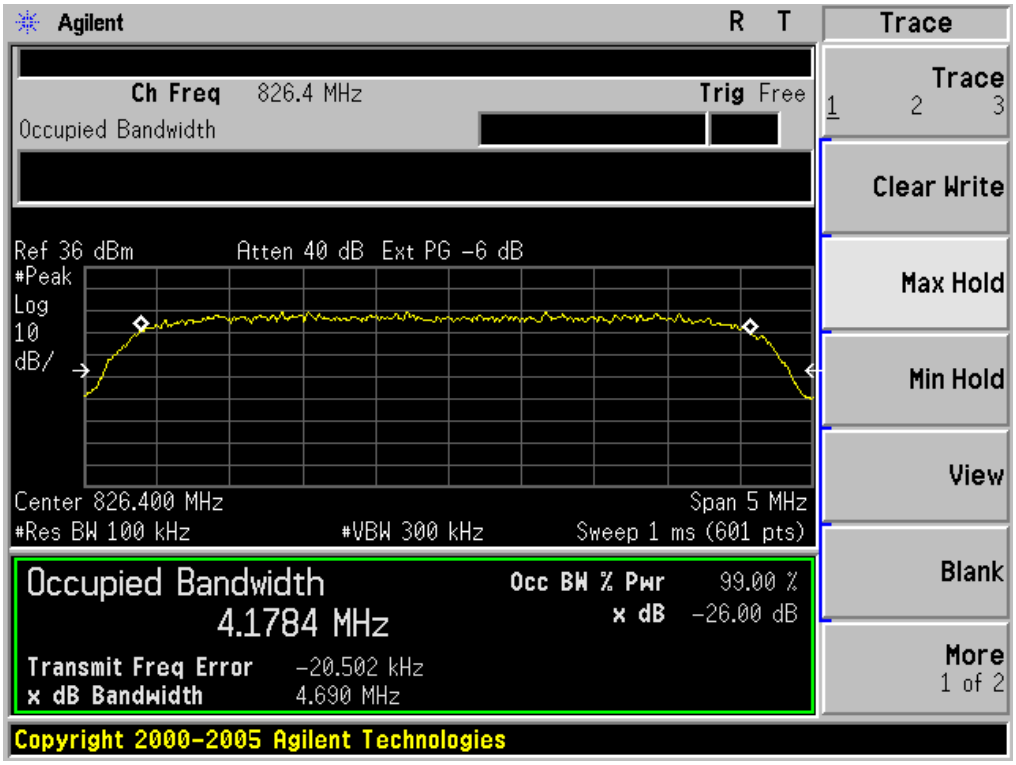

Occupied Bandwidth (99%) UMTS band II CH 9800



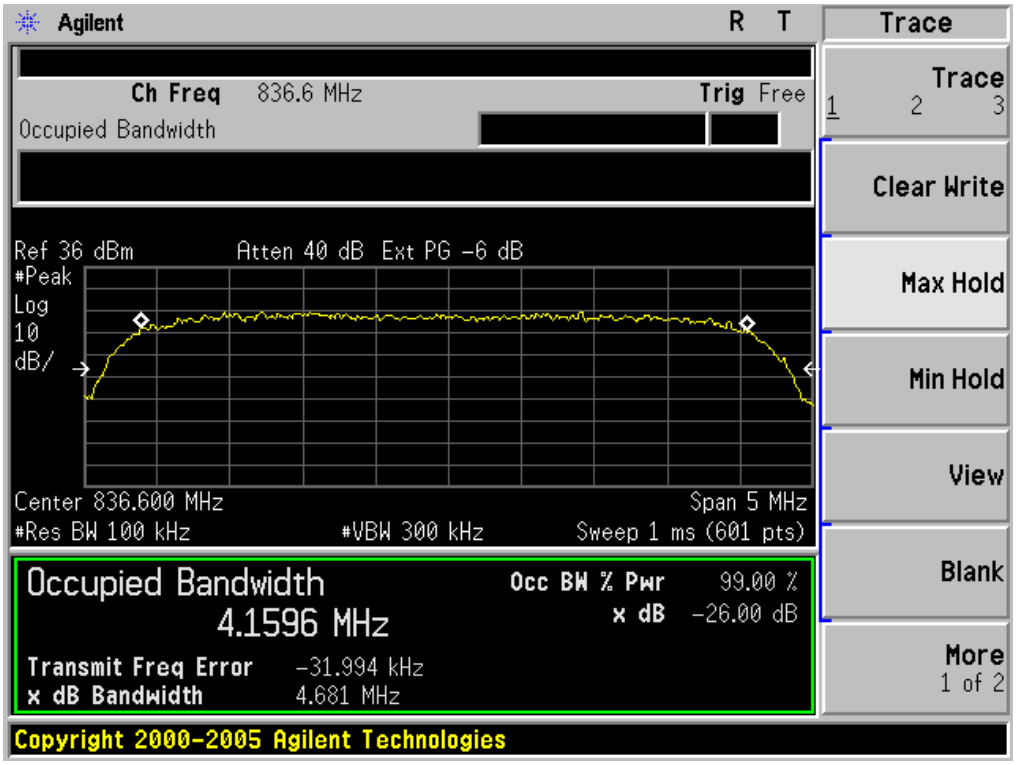
Occupied Bandwidth (99%) UMTS band II CH 9938



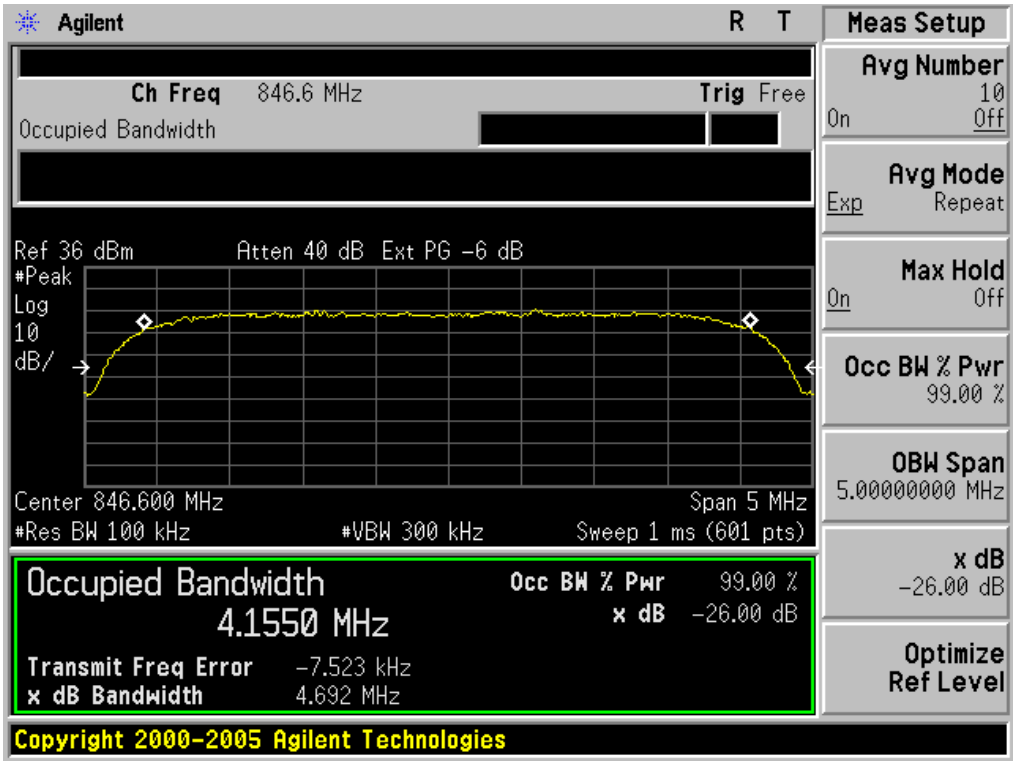

Occupied Bandwidth (99%) UMTS band V CH 4357



Occupied Bandwidth (99%) UMTS band V CH 4386



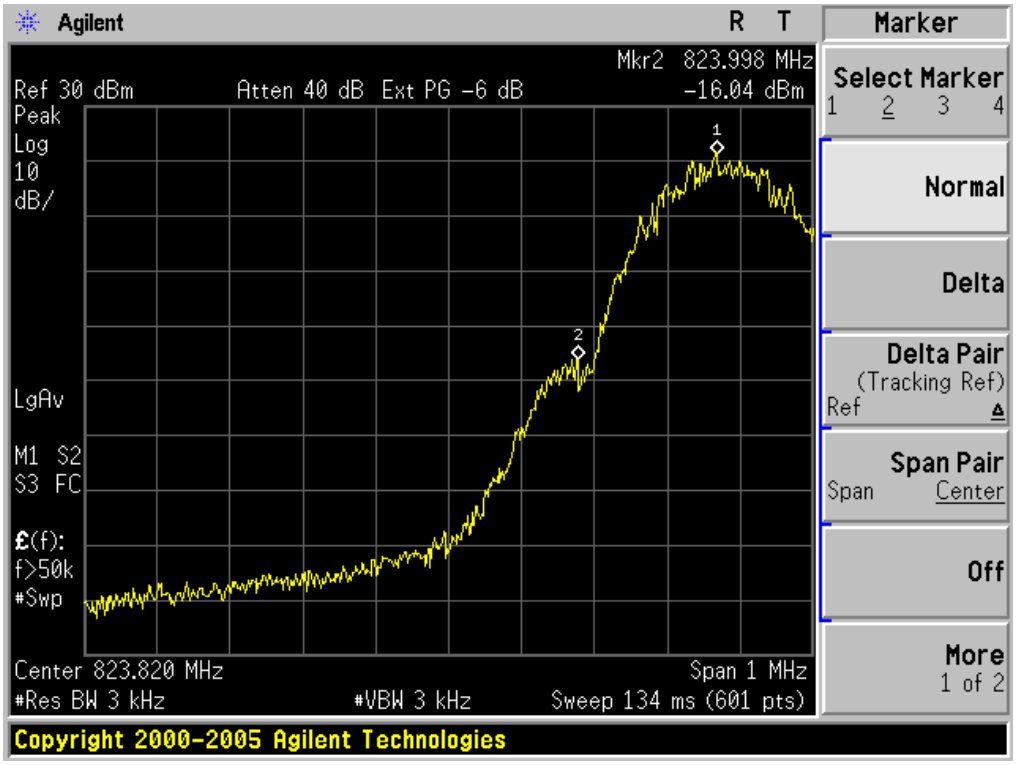

Occupied Bandwidth (99%) UMTS band V CH 4458



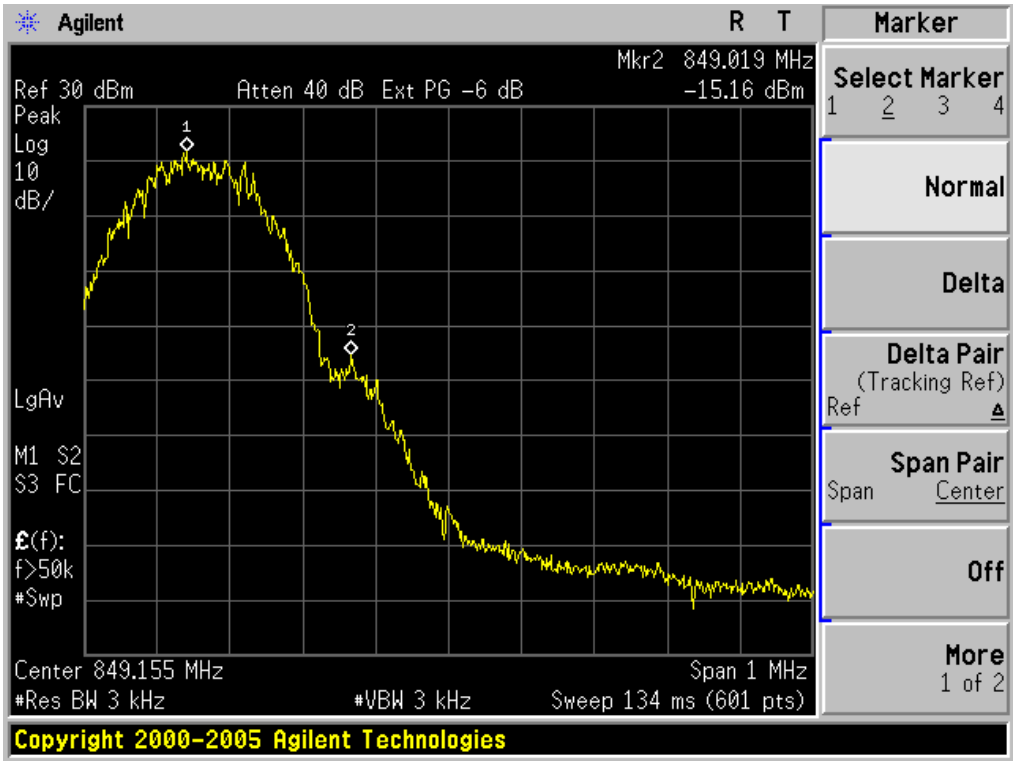
# APPENDIX C

# TEST PLOTS FOR BAND EDGES

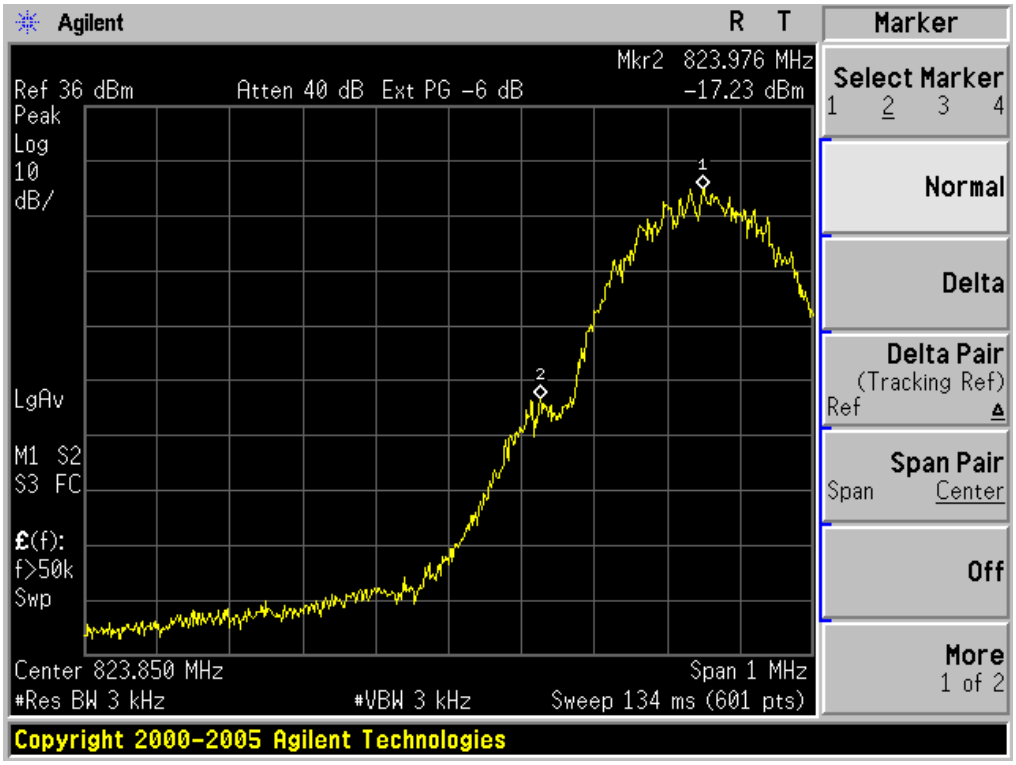
Low Band Edge GSM 850 BAND CH 128



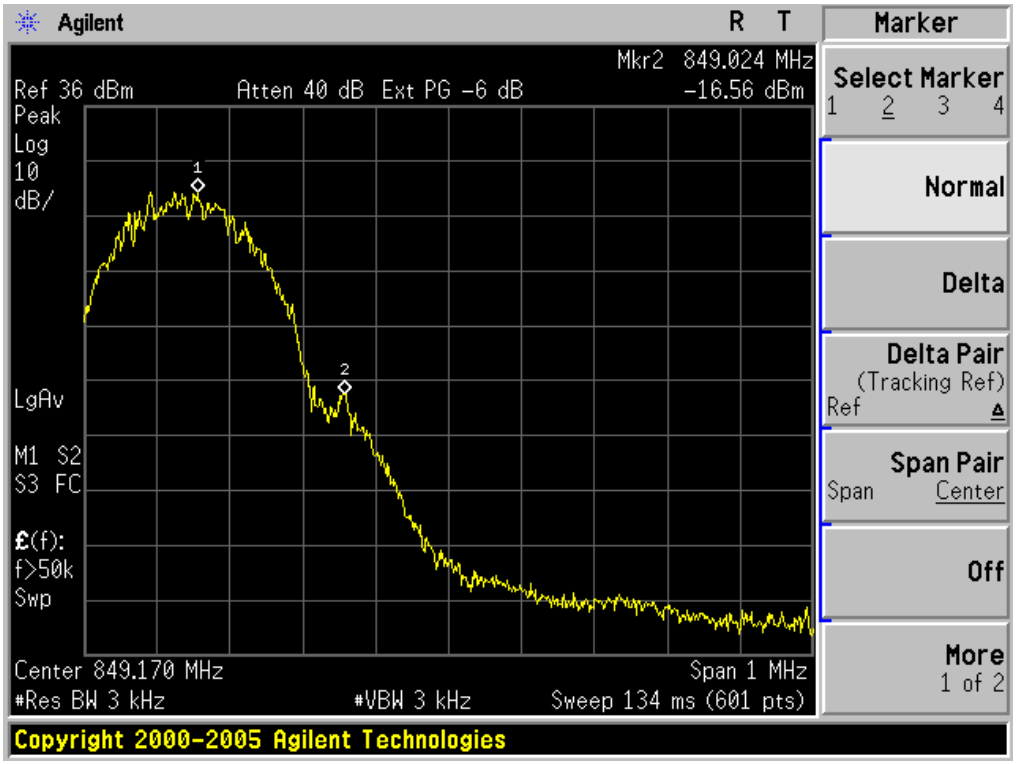

High Band Edge GSM 850 BAND CH 251



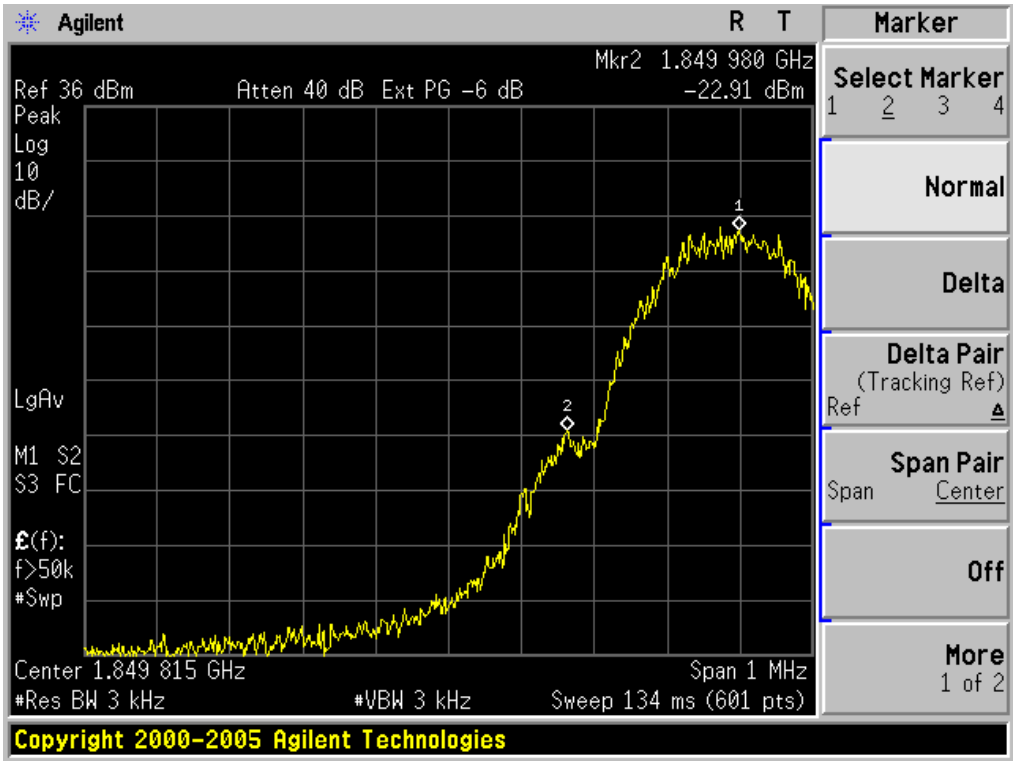
Low Band Edge GSM 850 (EDGE 8) BAND CH 128



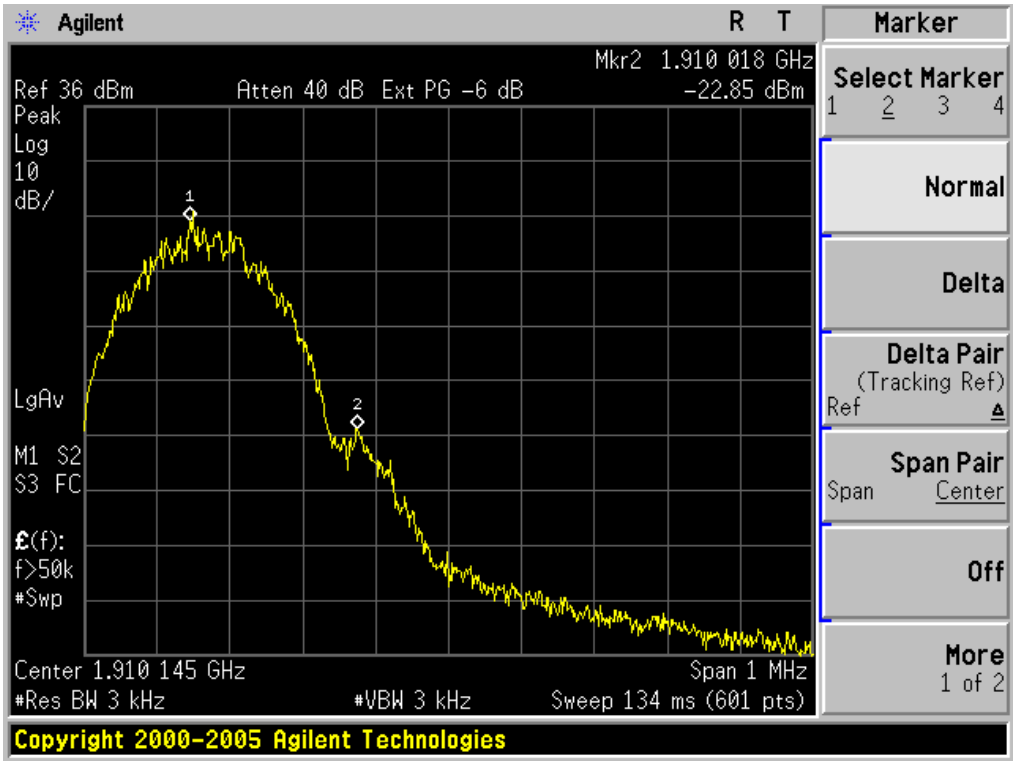

High Band Edge GSM 850 (EDGE 8) BAND CH 251



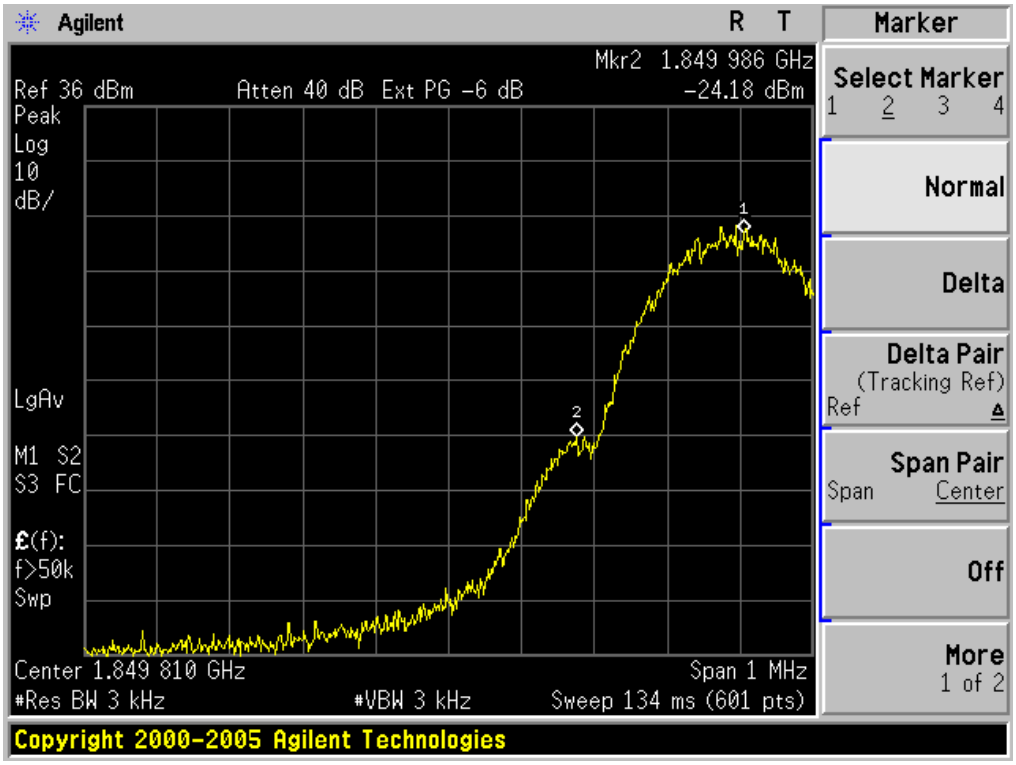
Low Band Edge PCS 1900 BAND CH 512



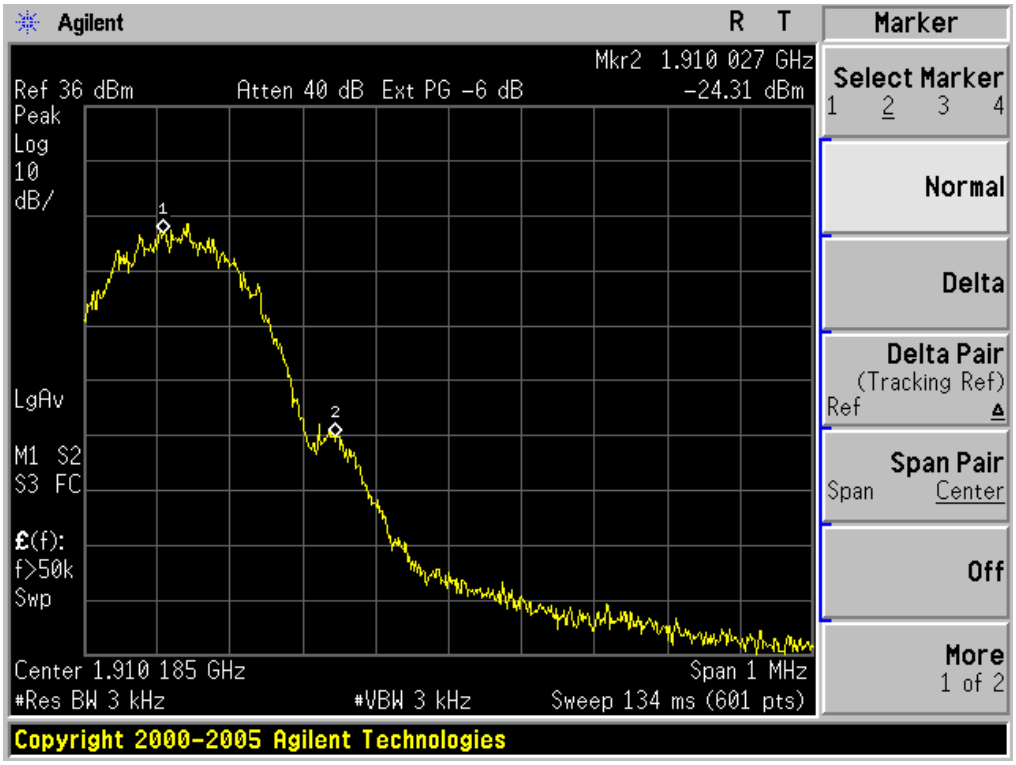

High Band Edge PCS 1900 BAND CH 810



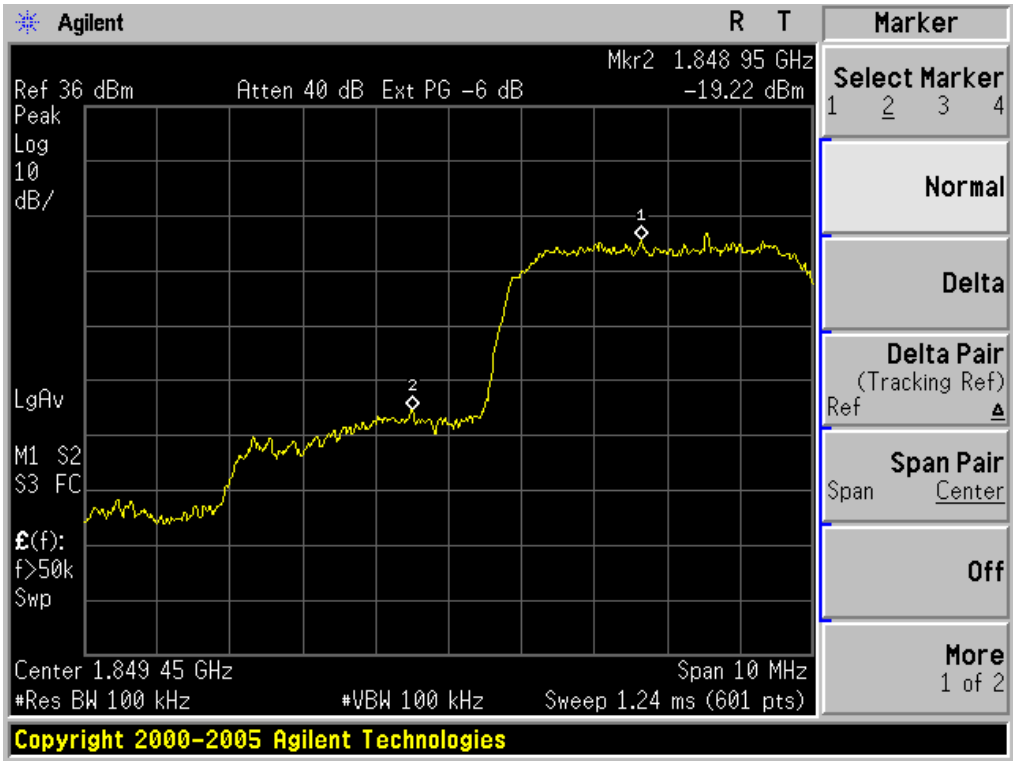
Low Band Edge PCS 1900 (EDGE 8) BAND CH 512



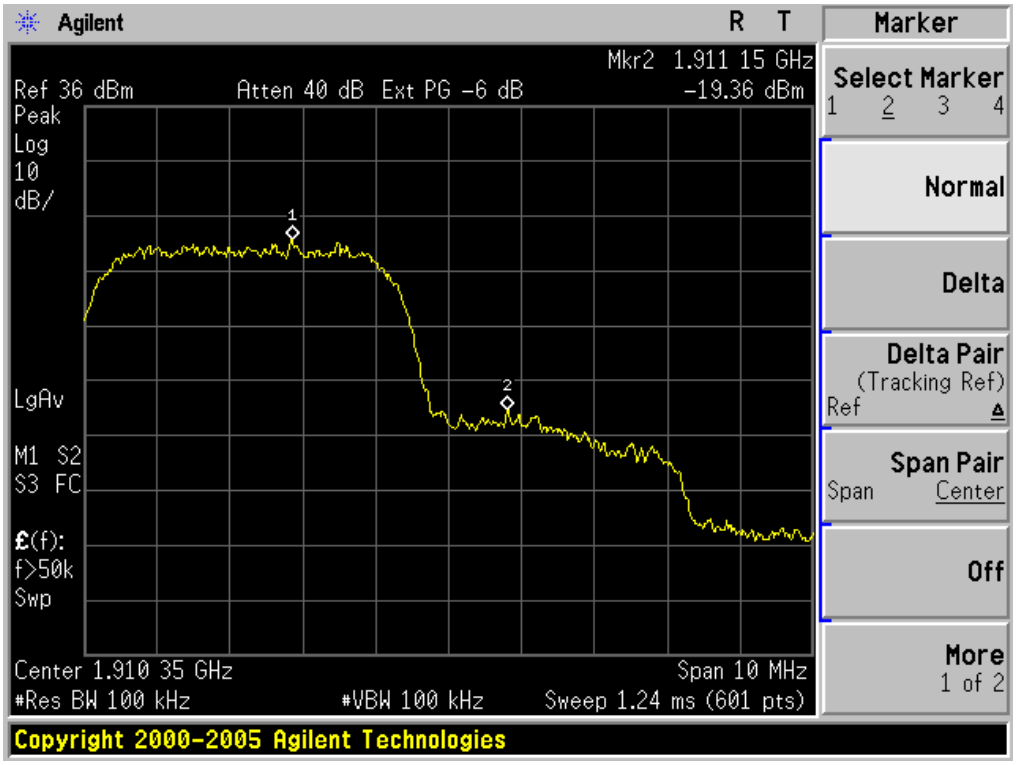

High Band Edge PCS 1900 (EDGE 8) BAND CH 810



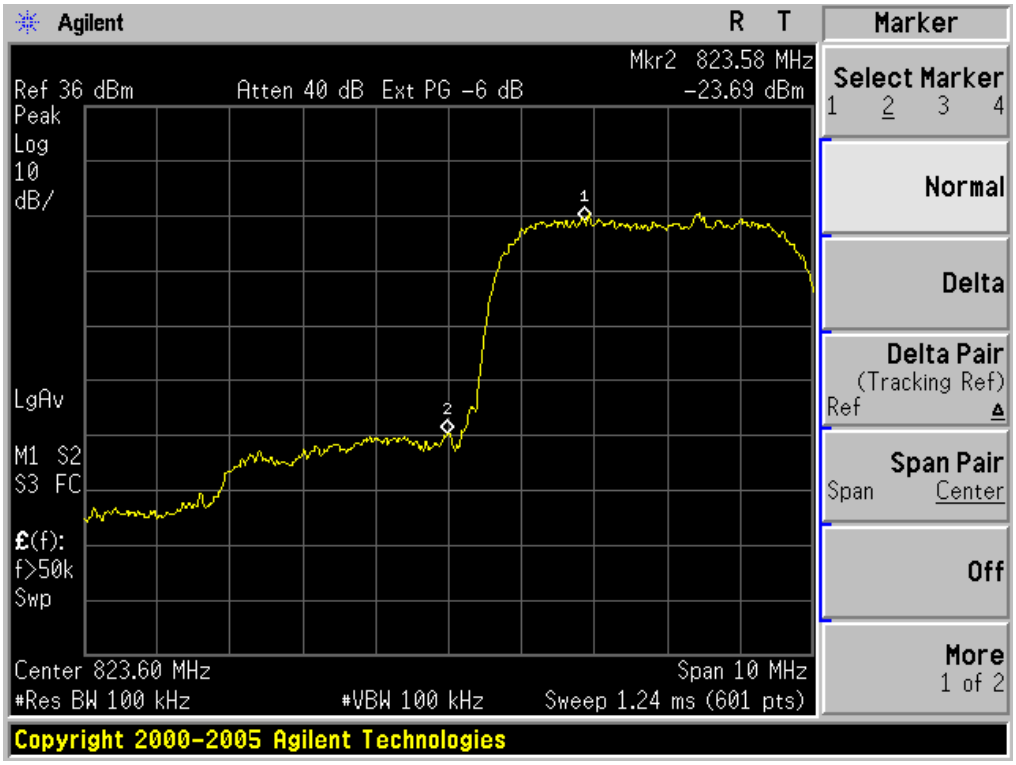
Low Band Edge UMTS BAND II CH 9662



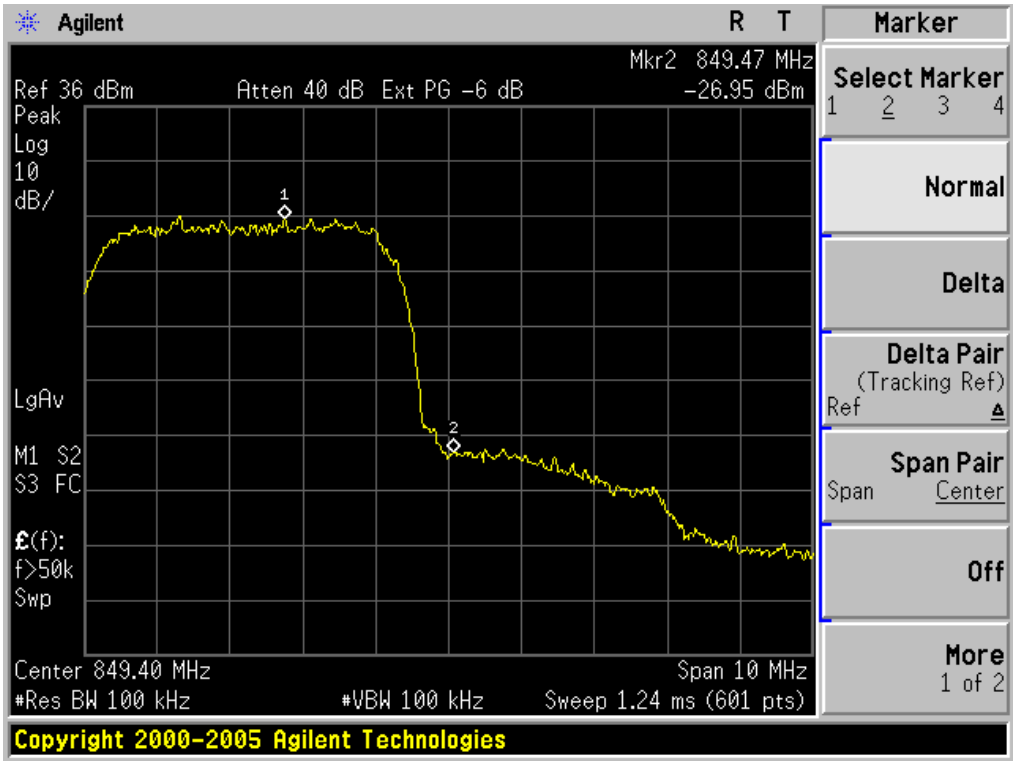

High Band Edge UMTS BAND II CH 9938



Low Band Edge UMTS BAND V CH 4357




High Band Edge UMTS BAND V CH 4458

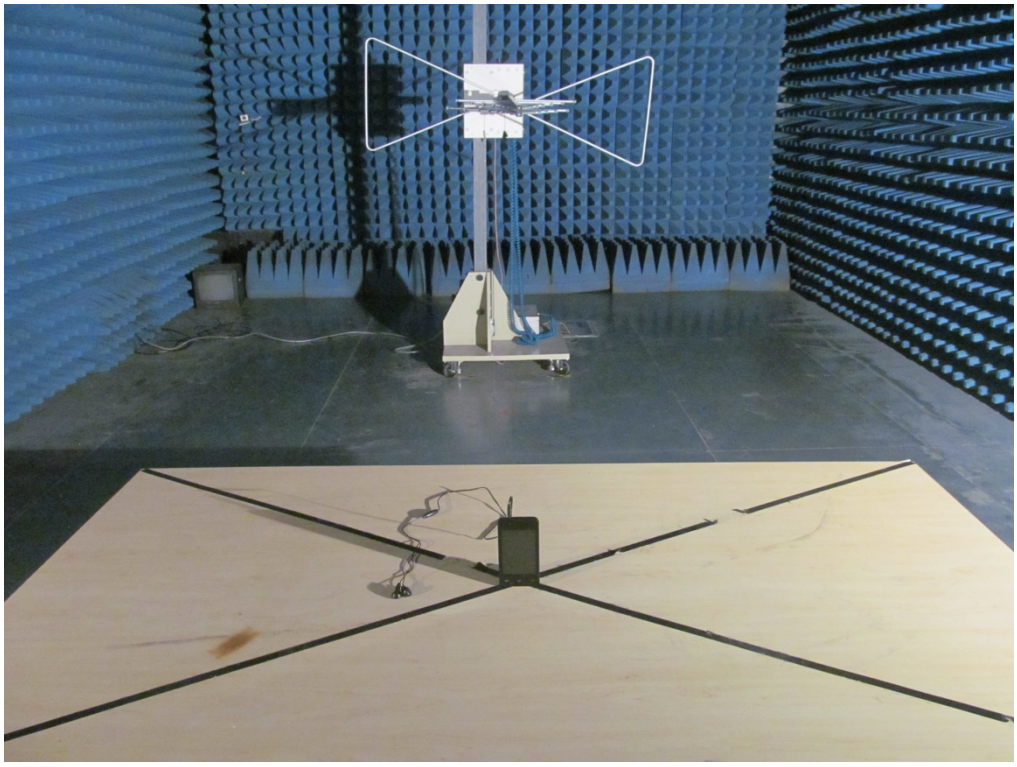


# APPENDIX D

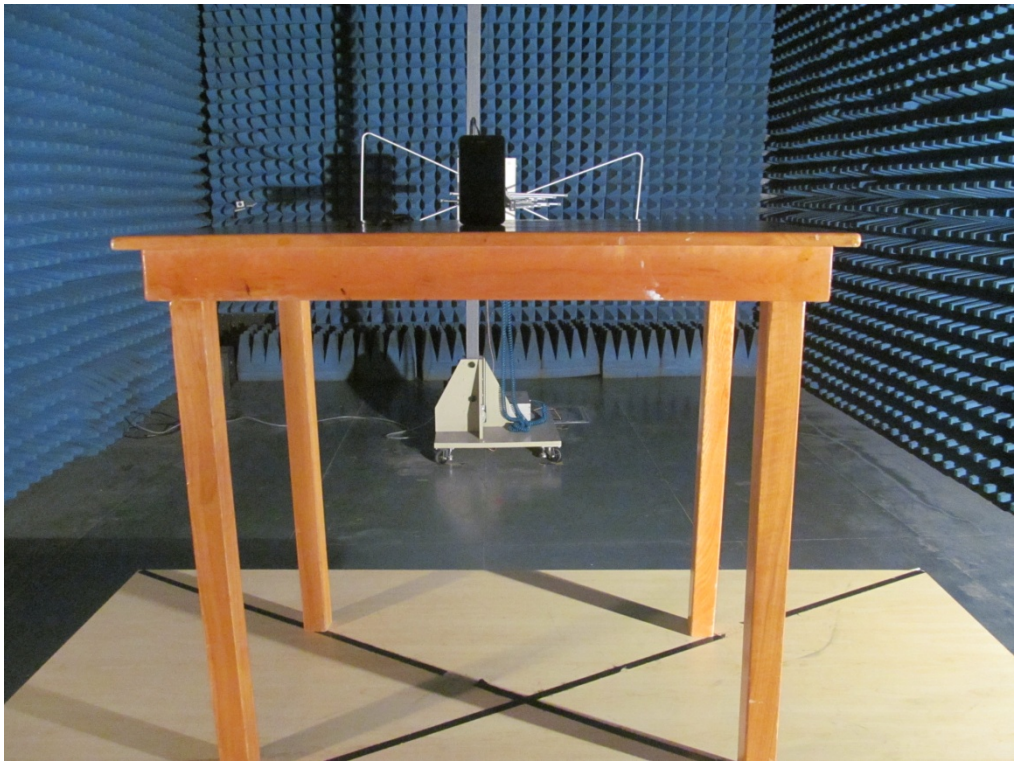
# PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION

RADIATED SPURIOUS EMISSION-GSM 850



RADIATED SPURIOUS EMISSION-PCS 1900



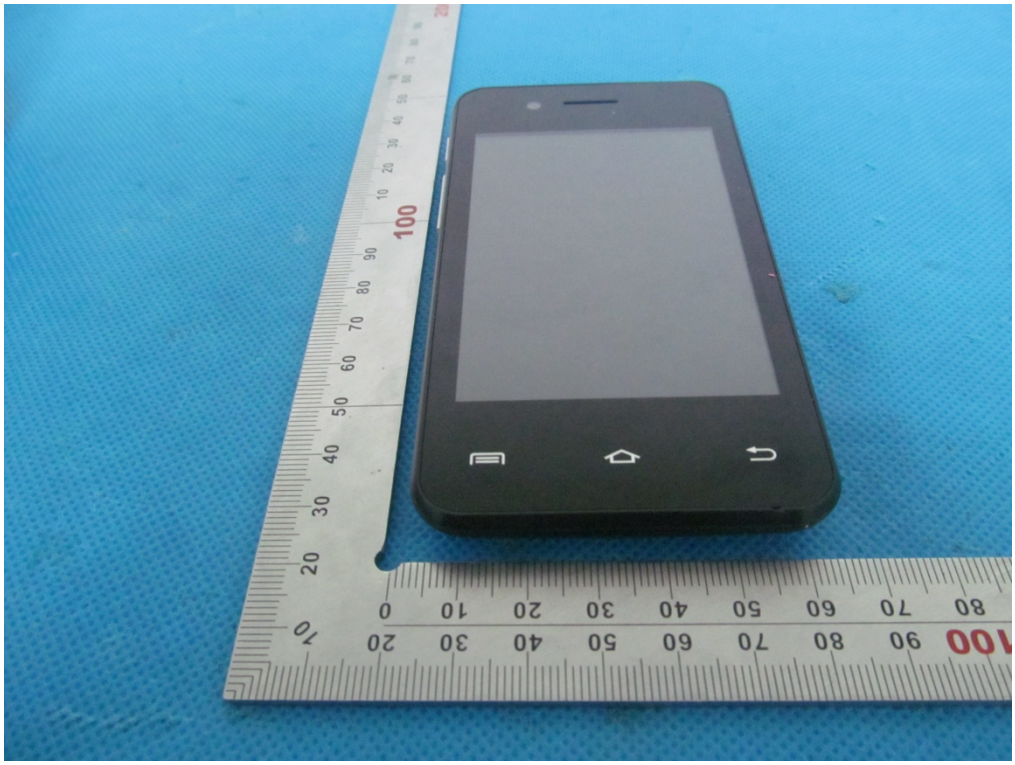
# APPENDIX E

# PHOTOGRAPHS OF EUT

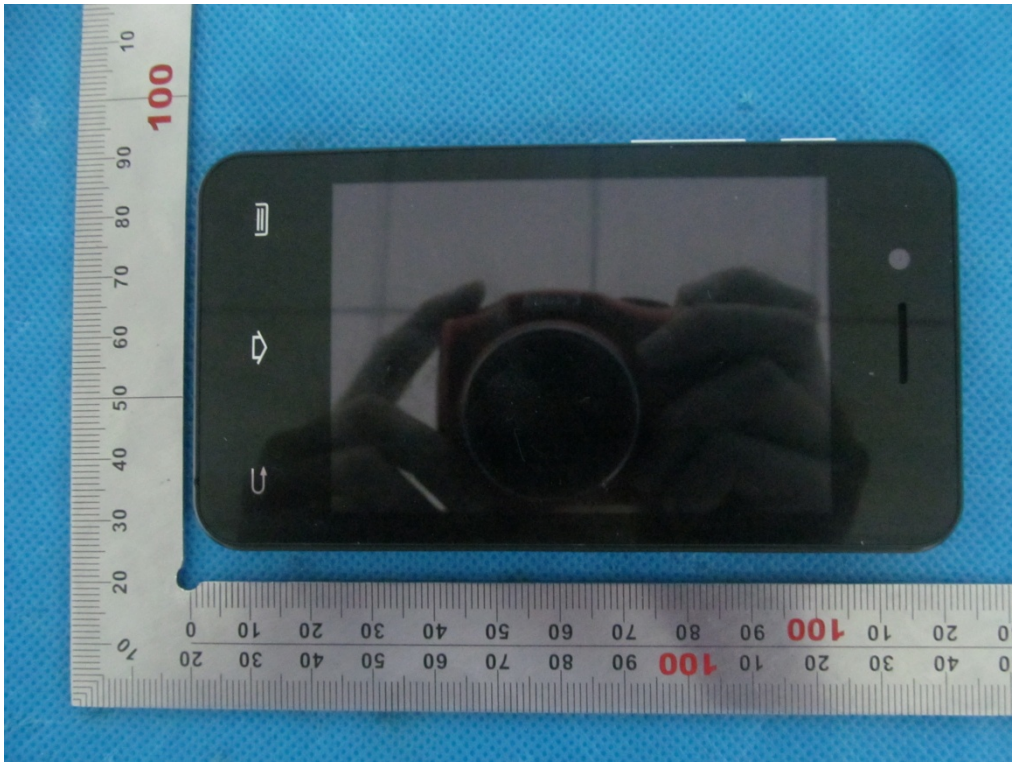
TOTAL VIEW OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

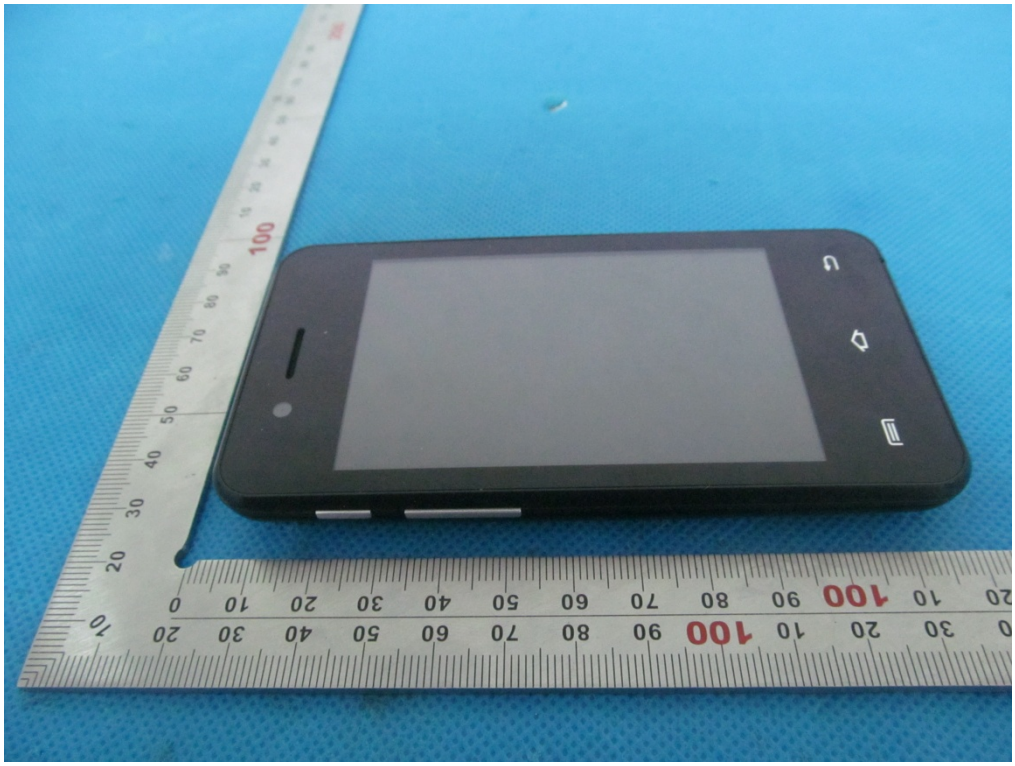


FRONT VIEW OF EUT

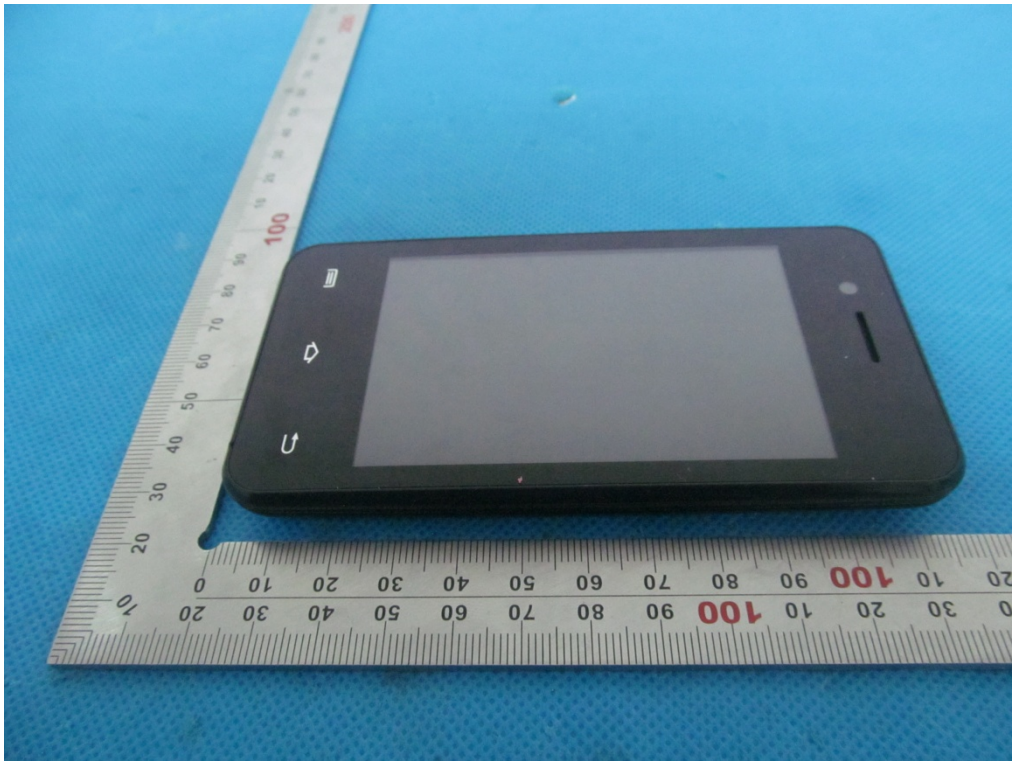


BACK VIEW OF EUT

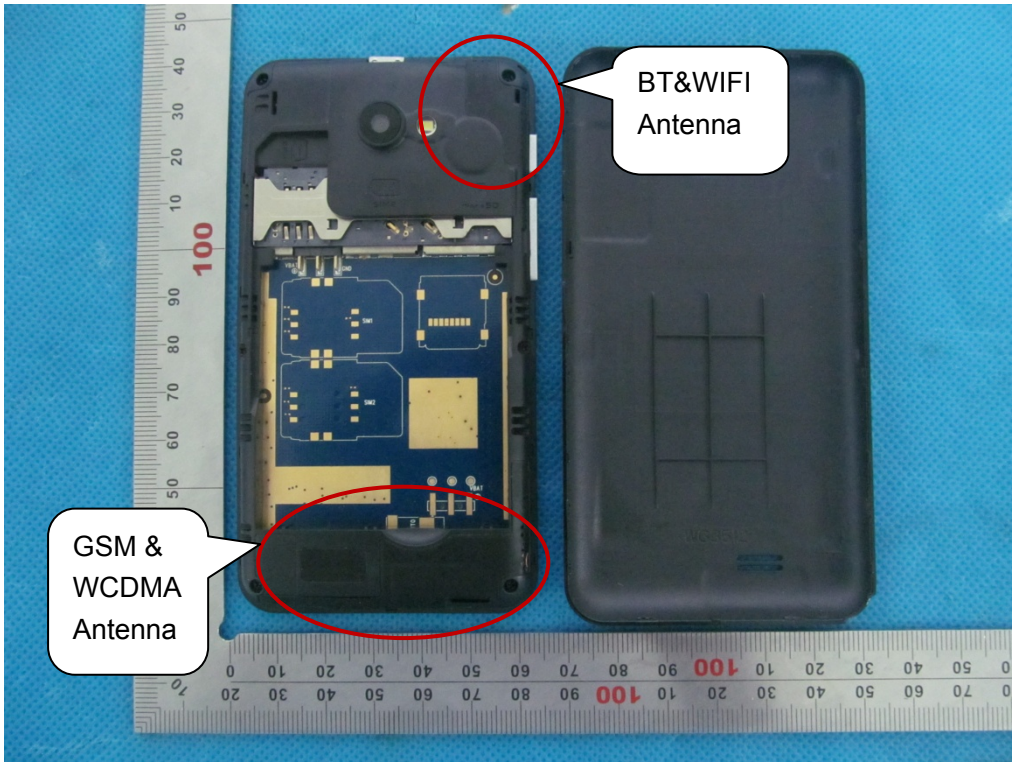
LEFT VIEW OF EUT



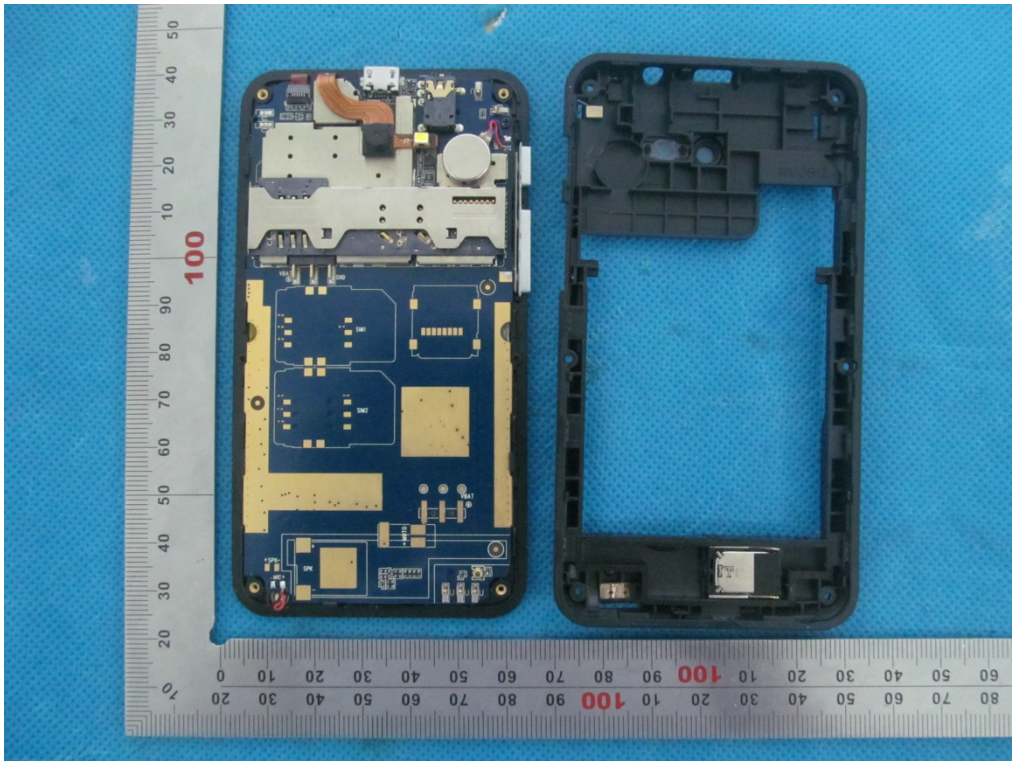
RIGHT VIEW OF EUT



OPEN VIEW OF EUT-1

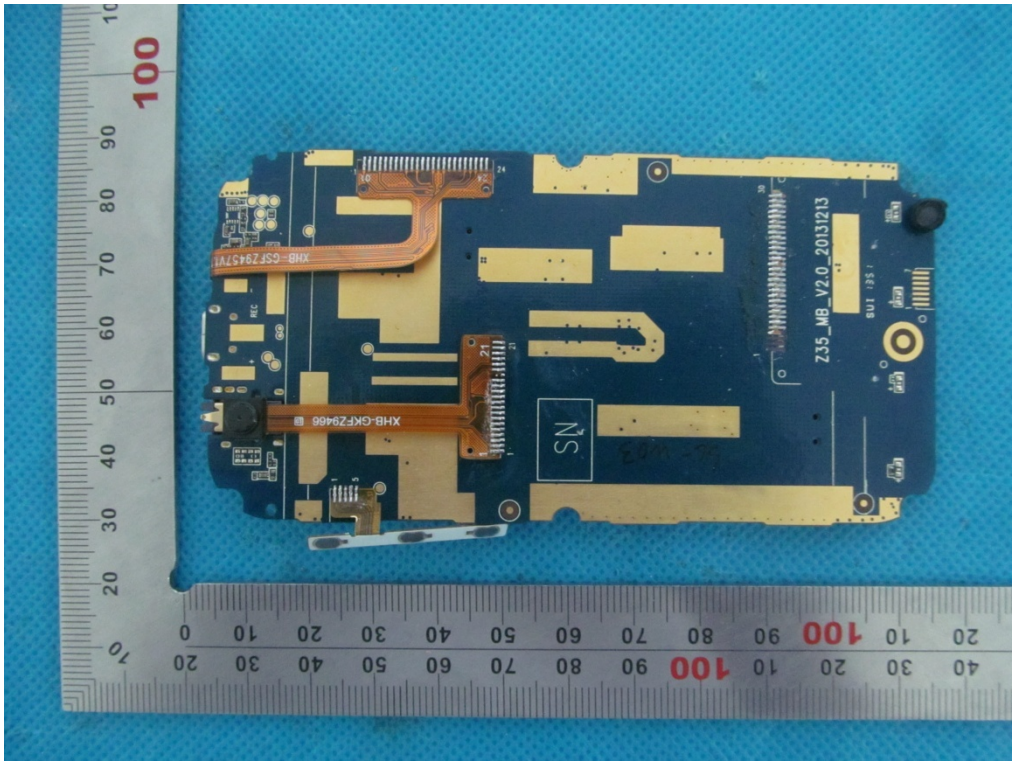


OPEN VIEW OF EUT-2

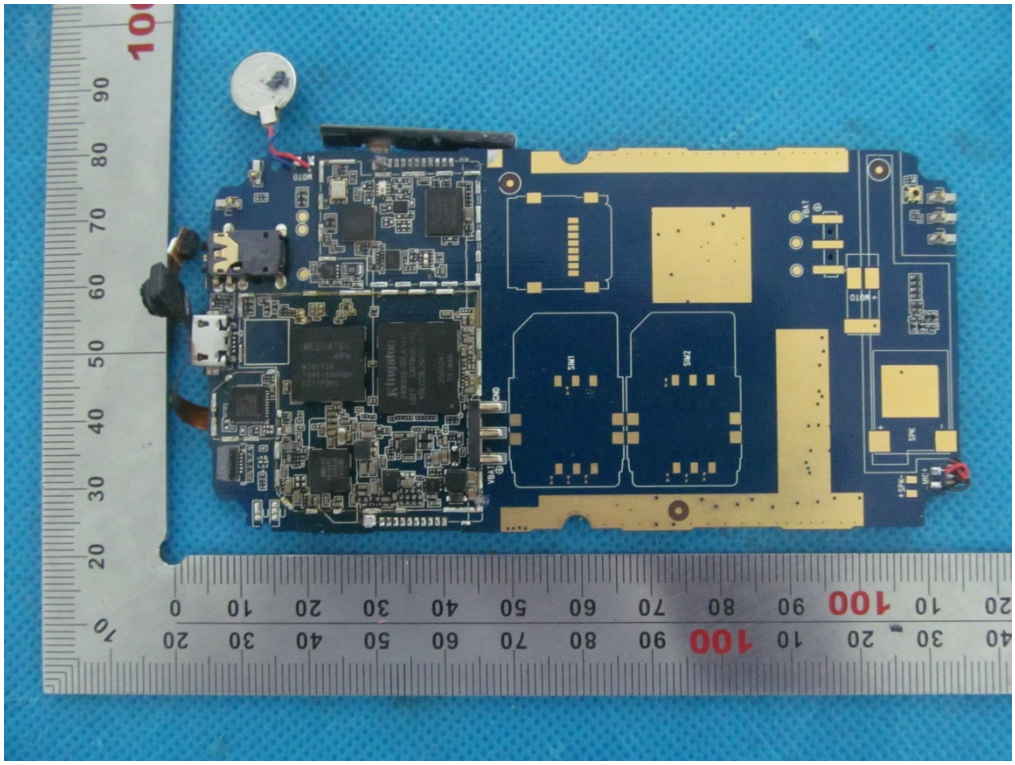


OPEN VIEW OF EUT-3

INTERNAL VIEW OF EUT-1




INTERNAL VIEW OF EUT-2



**----END OF REPORT----**