



PCTEST ENGINEERING LABORATORY, INC.

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CERTIFICATE OF COMPLIANCE FCC Part 22 & 24 Certification

Applicant Name:

Panasonic Corporation of North America
One Panasonic Way, 4B-8
Secaucus, NJ 07094
United States

Date of Testing:

November 6 - 7, 2006

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Test Report Serial No.:

0610040878-G

FCC ID: ACJ9TGCF-194

APPLICANT: PANASONIC CORPORATION OF NORTH AMERICA

Application Type: Certification

FCC Classification: PCS Licensed Transmitter (PCB)

FCC Rule Part(s): §2; §22(H), §24(E)

EUT Type: Toughbook Model: CF-19

Model(s): CF-19

Tx Frequency Range: 824.20 - 848.80MHz (Cell. GPRS) / 1850.20 - 1909.80MHz (PCS GPRS)

Rx Frequency Range: 869.20 - 893.80MHz (Cell. GPRS) / 1930.20 - 1989.80MHz (PCS GPRS)

Max. RF Output Power: 1.590 W ERP Cellular GPRS (32.015 dBm) /
0.815 W EIRP PCS GPRS (29.111 dBm)

Max. SAR Measurement: 0.370 W/kg Cell. GPRS Body SAR; 0.340 W/kg PCS GPRS Body SAR

Emission Designator(s): 278KGXW (Cellular GPRS), 246KG7W (EDGE850) /
277KGXW (PCS GPRS), 245KG7W (EDGE1900)

Test Device Serial No.: identical prototype [S/N: N/A]

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Grant Conditions: Power output listed is ERP for Part 22 and EIRP for Part 24. SAR compliance for body-worn operating configuration is based on a separation distance of 1.5cm between the back of the unit and the body of the user. End-users must be informed of the body-worn operating requirements for satisfying RF exposure compliance. Belt clips or holsters may not contain metallic components.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.


Randy Ortanez
President

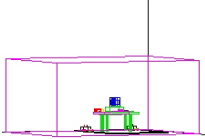


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MEASUREMENT REPORT



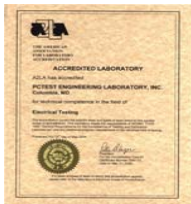
FCC Part 22 & 24

A. §2.1033 General Information

APPLICANT: Panasonic Corporation of North America
APPLICANT ADDRESS: One Panasonic Way, 4B-8
Secaucus, NJ 07094
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S): §2; §22(H), §24(E)
MODEL NAME: CF-19
FCC ID: ACJ9TGCF-194
FCC CLASSIFICATION: PCS Licensed Transmitter (PCB)
EMISSION DESIGNATOR(S): 278KGXW (Cellular GPRS), 246KG7W (EDGE850) /
277KGXW (PCS GPRS), 245KG7W (EDGE1900)
MODE: GPRS / EDGE
FREQUENCY TOLERANCE: ± 0.00025 % (2.5 ppm)
Test Device Serial No.: N/A ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: November 6 - 7, 2006
TEST REPORT S/N: 0610040878-G

A.1 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.



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1.0 INTRODUCTION

1.1 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (see Figure 1-1). The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

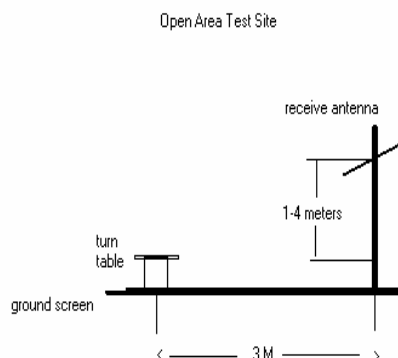


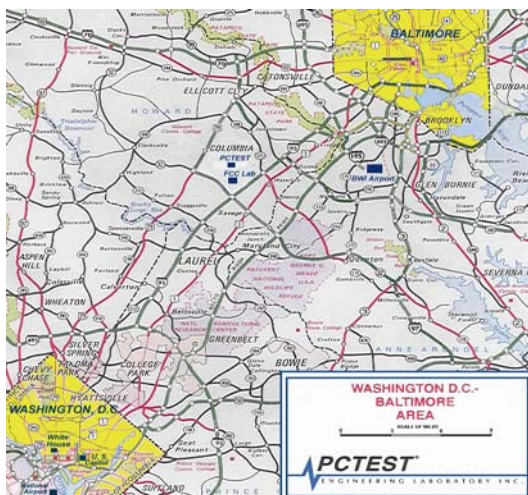
Figure 1-1. Diagram of 3-meter outdoor test range

Deviation from Measurement Procedure.....None

1.2 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

1.3 Testing Facility



These measurement tests were conducted at PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on January 27, 2006 and Industry Canada.

Figure 1-3. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Panasonic Toughbook Model: CF-19 FCC ID: ACJ9TGCF-194**. The EUT consisted of the following component(s):

Manufacturer / Description	FCC ID	Model
Panasonic Notebook PC	ACJ9TGCF-194	CF-19
Intel PRO/Wireless Network Module	PD9WM3945ABG	WM3945ABG
Taiyo Yuden Bluetooth Module	N/A	EYSF1CSMX
Novatel Quad-Band GPRS/EGPRS/UMTS/HSDPA Wireless Module	NBZNRM-EU730	EU730

Table 2-1. EUT Equipment Description

2.2 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing.

- None

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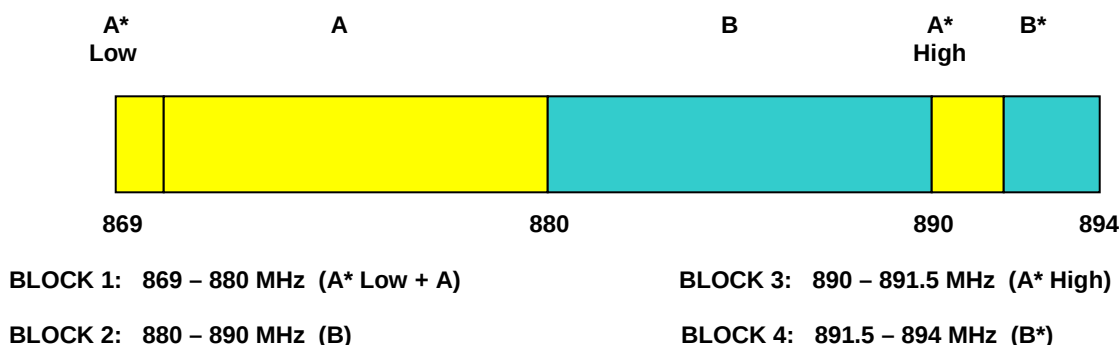
3.0 DESCRIPTION OF TESTS

3.1 Occupied Bandwidth Emission Limits

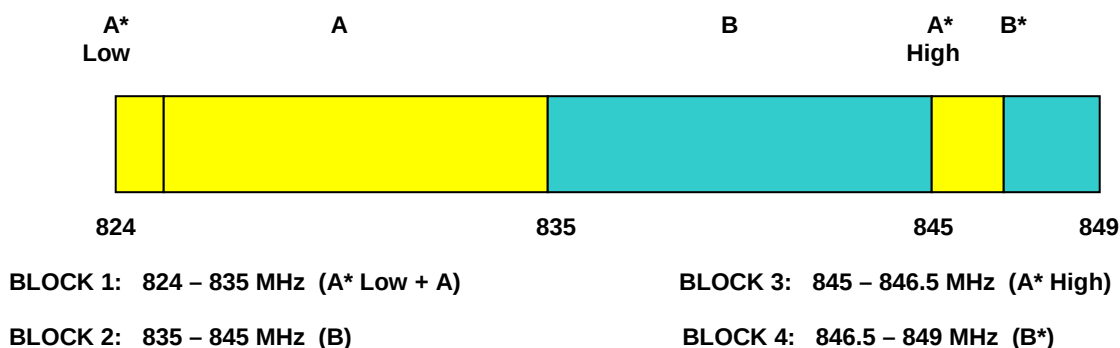
§2.1049, 22.917(a), 24.238(a)

- On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.
- Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
- When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

3.2 Cellular - Base Frequency Blocks

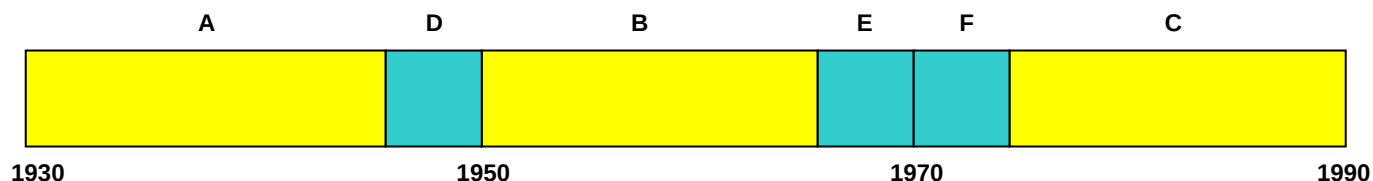


3.3 Cellular - Mobile Frequency Blocks



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3.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

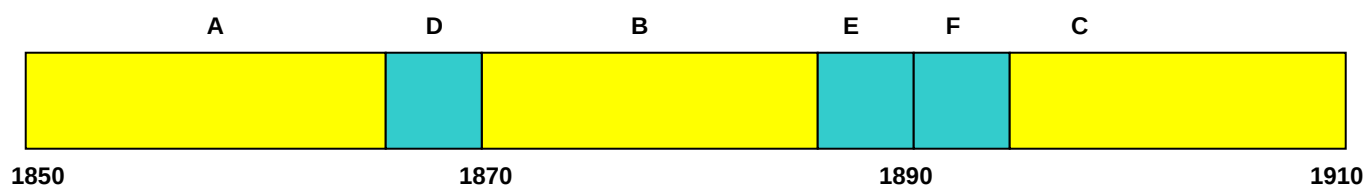
BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

3.5 PCS - Mobile Frequency Blocks



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

3.6 Spurious and Harmonic Emissions at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10 GHz. The transmitter is modulated with a 2500 Hz tone at a level of 16 dB greater than that required to provide 50% modulation.

At the input terminals of the spectrum analyzer, an isolator (RF circulator with one port terminated in 50 Ω) and an 870 MHz to 890 MHz band-pass filter is connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The rejection of the band-pass filter to signals in the 825 – 845 MHz range is adequate to limit the transmit energy from the test transceiver which appears to a level which will allow the analyzer to measure signals less than –90 dBm. Calibration of the test receiver is performed in the 870 – 890 MHz range to insure accuracy to allow variation in the band-pass filter insertion loss to be calibrated.

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3.7 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and a high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter (signals below 1.6 GHz) is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

3.8 Radiated Spurious and Harmonic Emissions

§2.1051, 22.917(a), 24.238(a); RSS-132 (4.5.1) / RSS-133 (6.5.1)

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration. This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band.

3.9 Frequency Stability / Temperature Variation

§2.1055, 22.355, 24.235; RSS-132 (4.3) / RSS-133 (6.3)

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +60°C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 0.00025 (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (22°C to 25°C to provide a reference).
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight “soak” at -30°C (usually 14-16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.

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3.9 Frequency Stability / Temperature Variation (Cont'd)

§2.1055, 22.355, 24.235; RSS-132 (4.3) / RSS-133 (6.3)

5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30°C up to +50°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

NOTE: The EUT is tested down to the battery endpoint.

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4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

TYPE	MODEL	CAL. DUE DATE	CAL. INTERVAL	SERIAL No.
Microwave Spectrum Analyzer	Agilent E4448A (3Hz-50GHz)	09/22/07	Annual	US42510244
Spectrum Analyzer	HP 8566B (100Hz-22GHz)	12/22/06	Annual	3638A08713
PSG Analog Signal Generator	Agilent E8257D (250kHz-20GHz)	02/11/07	Annual	MY45470194
5 Watt Amplifier	5S1G4 (800MHz-4.2GHz)	N/A	N/A	22332
Wireless Communication Test Set	Agilent 8960 Series 10 E5515C	06/10/07	Annual	6B46110872
Universal Power Meter	Gigatronics 8651A (50MHz-18GHz)	07/28/07	Annual	1834052
Power Sensor	Gigatronics 80701A	04/11/07	Annual	1833460
Quasi-Peak Adapter	HP 85650A	12/22/06	Annual	2043A00301
Preamplifier	HP 8449B (1-26.5GHz)	12/22/06	Annual	3008A00985
Attenuation/Switch Driver	HP 11713A	12/22/06	Annual	N/A
Preselector	HP 85685A (20Hz-2GHz)	12/22/06	Annual	N/A
6dB Res BW Spec. Analyzer Display	OPT 462	12/22/06	Annual	3701A22204
Horn Antenna	EMCO Model 3115 (1-18GHz)	08/25/07	Biennial	9704-5182
Horn Antenna	EMCO Model 3116 (18-40GHz)	08/25/07	Biennial	9203-2178
EMCO Dipoles (2)	N/A	05/08/08	Biennial	00023951
SOLAR LISN (2)	8012-50	11/18/07	Biennial	0313233, 0310234
10dB Attenuator	HP 8493B	N/A	N/A	N/A
Bi-Directional Coax Coupler	PE2208-6	N/A	Annual	N/A
Microwave Cables	MicroCoax (1.0-26.5GHz)	02/26/07	Annual	N/A
Temperature & Humidity Chamber	ESPEC SCP-220	06/08/07	Annual	017620

Table 4-1. Test Equipment

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5.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 250KGXW

GSM BW = 250 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

Spurious Radiated Emission - PCS Band

Example: Channel 512 PCS Mode 2nd Harmonic (3700.40 MHz)

The receive analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the receive analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm - (-24.80) = 50.3 dBc.

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6.0 TEST RESULTS

Summary

The intentional radiator has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards. The radio was transmitting at full power on the specified channels. The channels tested are high, middle and low of the allocated bands. Final system data was gathered in a mode that tended to maximize emissions by varying the orientation of the EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization. This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band.

Method/System: PCS Licensed Transmitter (PCB)

Mode(s): GPRS

FCC Part Section(s)	RSS Section	Test Description	Test Limit	Test Condition	Test Result
TRANSMITTER MODE (TX)					
2.1049, 22.917(a), 24.238(a)	N/A	Occupied Bandwidth	N/A	CONDUCTED	N/A
22.917(a), 24.238(a)	RSS-132 (4.5.1) / RSS-133 (6.5.1)	Band Edge / Conducted Spurious Emissions	< 43 + log ₁₀ (P[Watts]) at Band Edge / for all out-of-band emissions		PASS
2.1046	N/A	Transmitter Conducted Output Power	N/A		N/A
22.913(a)(2)	RSS-132 (4.4) [SRSP-503(5.1.3)]	Effective Radiated Power	< 7 Watts max. ERP (<6.3 Watts max. ERP (IC))	RADIATED	PASS
24.232(c)	RSS-133 (6.4) [SRSP-510 (5.1.2)]	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS
2.1051, 22.917(a), 24.238(a)	RSS-132 (4.5.1) / RSS-133 (6.5.1)	Undesirable Emissions	< 43 + log ₁₀ (P[Watts]) for all out-of-band emissions		PASS
2.1055, 22.355, 24.235	RSS-132 (4.3) / RSS-133 (6.3)	Frequency Stability	< 2.5 ppm		PASS
RECEIVER MODE (RX)					
15.107	RSS-210 (7.4)	AC Conducted Emissions 150kHz – 30MHz	EN55022	Line Conducted	PASS
15.109	RSS-132 (4.6) / RSS-133(6.7(a)) / [RSS-Gen (7.2.2)] / RSS-210 (7.3)	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.209 limits or < RSS-210 table 3 limits	RADIATED (30MHz-1GHz) (1-25 GHz)	PASS
RF EXPOSURE (SAR)					
2.1093	RSS-102	SAR Test or MPE	1.6 W/kg (SAR Limit)	3 Channels	PASS

Table 6-1. Summary of Test Results

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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6.1 Conducted Output Power

S2.1046

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band.

Band	Channel	Power Control Level	Conducted Power
			[dBm]
Cellular	128	5	32.27
	190	5	32.28
	251	5	32.58
PCS	512	0	29.52
	661	0	29.37
	810	0	29.41

Table 6-2. GPRS Conducted Output Powers

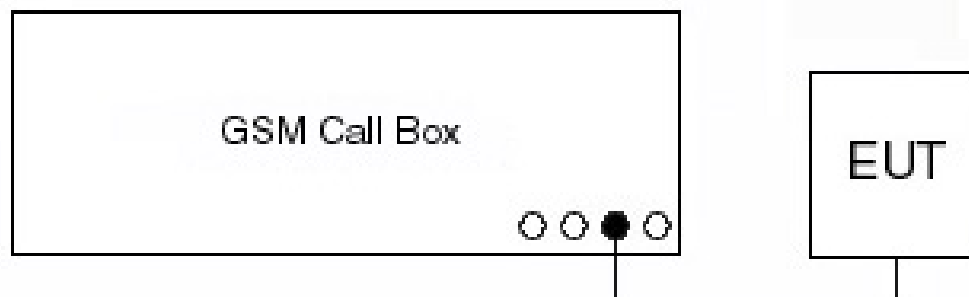


Figure 6-1. GPRS Conducted Power Test Setup Diagram

6.2 Effective Radiated Power Output Data

§22.913(a)(2)

POWER: High (GPRS Mode)

Freq. Tuned (MHz)	REF. LEVEL (dBm)	Mode	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
824.20	-9.258	GPRS	H	1.590	32.015	Standard
836.60	-9.752	GPRS	H	1.473	31.681	Standard
848.80	-9.814	GPRS	H	1.503	31.769	Standard
836.60	-12.980	EDGE850	H	0.725	28.603	Standard

Table 6-3. Effective Radiated Power Output Data

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

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6.3 Equivalent Isotropic Radiated Power Output Data

§24.232(c)

Radiated measurements at 3 meters

Supply Voltage: 10.65 VDC

Modulation: PCS GPRS

FREQ. (MHz)	REF. LEVEL (dBm)	Mode	POL (H/V)	Azimuth (o angle)	EIRP (dBm)	EIRP (W)	Battery
1850.20	-14.230	GPRS	H	95	28.851	0.768	Standard
1880.00	-14.140	GPRS	H	95	29.111	0.815	Standard
1909.80	-14.450	GPRS	H	95	28.971	0.789	Standard
1850.20	-16.789	EDGE1900	H	95	26.632	0.460	Standard

Table 6-4. Equivalent Isotropic Radiated Power Output Data

NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

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6.4 Cellular GPRS Radiated Measurements

S2.1051, 22.917(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128
 MEASURED OUTPUT POWER: 32.015 dBm = 1.590 W
 MODULATION SIGNAL: GSM
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$: 45.01 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1648.40	-59.83	6.10	-53.73	H	85.7
2472.60	-66.05	6.70	-59.35	H	91.4
3296.80	-66.39	6.80	-59.59	H	91.6
4121.00	-69.28	6.50	-62.78	V	94.8
4945.20	-84.38	7.00	-77.38	H	109.4

Table 6-5. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
 according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

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Cellular GPRS Radiated Measurements (Cont'd)

§2.1051, 22.917(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.60 MHz
CHANNEL: 190
MEASURED OUTPUT POWER: 32.015 dBm = 1.590 W
MODULATION SIGNAL: GSM
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10} (W) =$ 45.01 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-59.13	6.10	-53.03	H	85.0
2509.80	-64.56	6.70	-57.86	V	89.9
3346.40	-64.60	6.80	-57.80	V	89.8
4183.00	-67.51	6.50	-61.01	V	93.0
5019.60	-83.88	7.00	-76.88	H	108.9

Table 6-6. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

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Cellular GPRS Radiated Measurements (Cont'd)

§2.1051, 22.917(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.80 MHz
CHANNEL: 251
MEASURED OUTPUT POWER: 32.015 dBm = 1.590 W
MODULATION SIGNAL: GSM
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10} (W) =$ 45.01 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1697.60	-59.34	6.10	-53.24	H	85.3
2546.40	-65.46	6.70	-58.76	V	90.8
3395.20	-65.41	6.80	-58.61	V	90.6
4244.00	-68.35	6.50	-61.85	V	93.9
5092.80	-83.98	7.00	-76.98	H	109.0

Table 6-7. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

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6.5 PCS GPRS Radiated Measurements

S2.1051, 24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1850.20 MHz
CHANNEL: 512
MEASURED OUTPUT POWER: 29.111 dBm = 0.815 W
MODULATION SIGNAL: GSM
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10} (W) =$ 42.11 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3700.40	-61.50	6.10	-55.40	V	84.5
5550.60	-54.25	6.70	-47.55	V	76.7
7400.80	-67.87	6.80	-61.07	H	90.2
9251.00	-85.68	6.50	-79.18	V	108.3
11101.20	-84.38	7.00	-77.38	H	106.5

Table 6-8. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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PCS GPRS Radiated Measurements (Cont'd)

§2.1051, 24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz
CHANNEL: 661
MEASURED OUTPUT POWER: 29.111 dBm = 0.815 W
MODULATION SIGNAL: GSM
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10} (W) =$ 42.11 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-63.35	6.10	-57.25	V	86.4
5640.00	-56.73	6.70	-50.03	H	79.1
7520.00	-65.72	6.80	-58.92	V	88.0
9400.00	-85.78	6.50	-79.28	H	108.4
11280.00	-83.78	7.00	-76.78	H	105.9

Table 6-9. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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PCS GPRS Radiated Measurements (Cont'd)

§2.1051, 24.238(a)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1909.80 MHz
CHANNEL: 810
MEASURED OUTPUT POWER: 29.111 dBm = 0.815 W
MODULATION SIGNAL: GSM
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10} (W) =$ 42.11 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3819.60	-61.09	6.10	-54.99	V	84.1
5729.40	-46.37	6.70	-39.67	H	68.8
7639.20	-66.35	6.80	-59.55	H	88.7
9549.00	-85.68	6.50	-79.18	H	108.3
11458.80	-83.98	7.00	-76.98	H	106.1

Table 6-10. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested using a PCL of 0 in the PCS Band and a PCL of 5 in the Cellular Band. This unit was tested with its standard battery.

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6.6 Cellular GPRS Frequency Stability Measurements

S2.1055

OPERATING FREQUENCY: 836,600,007 Hz

CHANNEL: 190

REFERENCE VOLTAGE: 10.65 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	10.65	+ 20 (Ref)	836,600,007	0.00	0.000000
100 %		-30	836,600,049	-41.83	-0.000005
100 %		-20	836,600,141	-133.86	-0.000016
100 %		-10	836,600,116	-108.76	-0.000013
100 %		0	836,600,099	-92.03	-0.000011
100 %		10	836,600,132	-125.49	-0.000015
100 %		20	836,600,183	-175.69	-0.000021
100 %		25	836,600,191	-184.05	-0.000022
100 %		30	836,600,208	-200.78	-0.000024
100 %		40	836,600,233	-225.88	-0.000027
100 %		50	836,600,158	-150.59	-0.000018
100 %		60	836,600,141	-133.86	-0.000016
85 %	9.05	20	836,600,116	-108.76	-0.000013
115 %	12.25	20	836,600,183	-175.69	-0.000021
BATT. ENDPOINT	8.73	20	836,600,191	-184.05	-0.000022

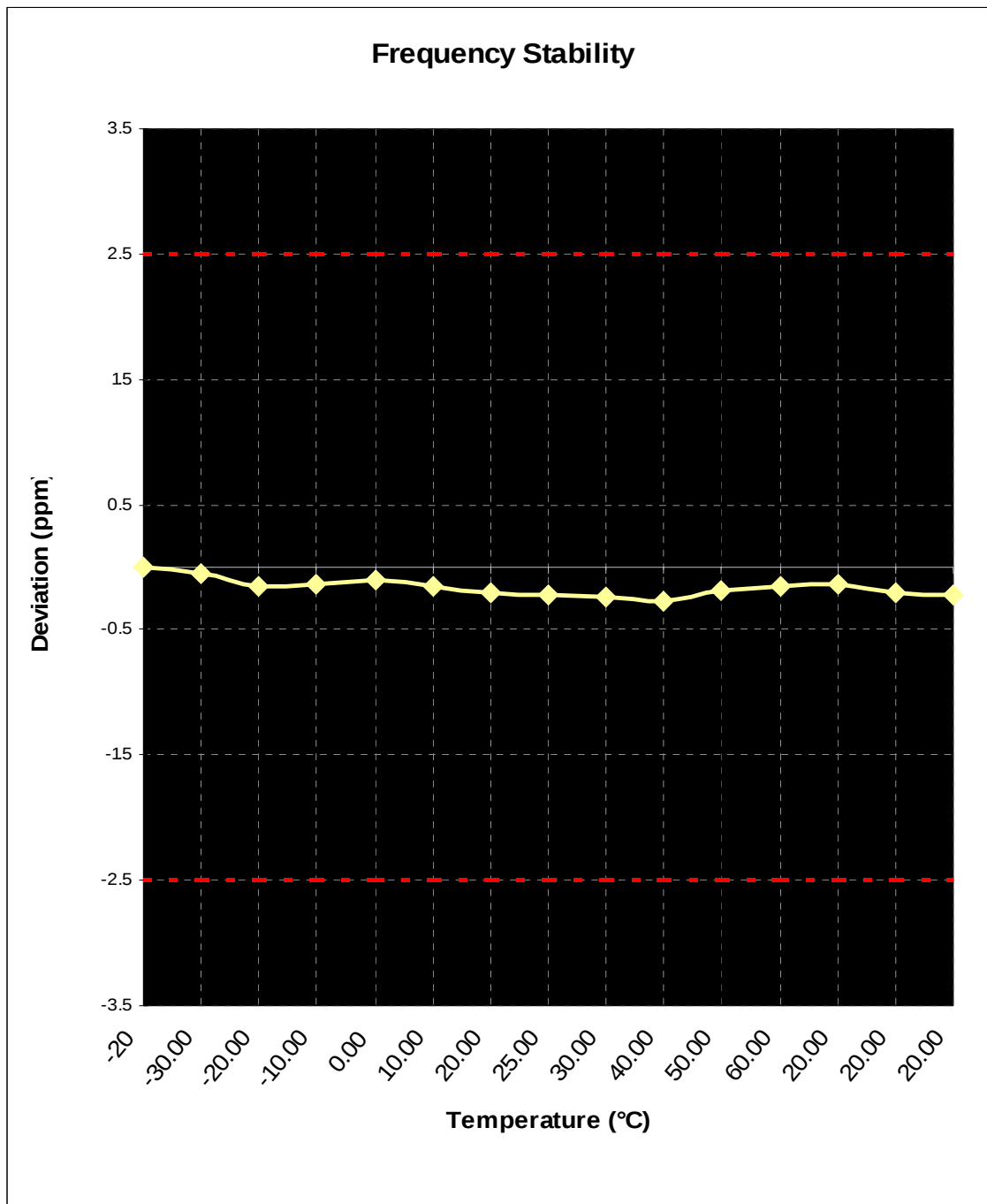
Table 6-11. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

Note: This unit was tested with its standard battery.

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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Cellular GPRS Frequency Stability Measurements (Cont'd)

§2.1055



Plot 6-1. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

Note: This unit was tested with its standard battery.

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6.7 PCS GPRS Frequency Stability Measurements

S2.1055, 24.235

OPERATING FREQUENCY: 1,880,000,003 Hz

CHANNEL: 661

REFERENCE VOLTAGE: 10.65 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	10.65	+ 20 (Ref)	1,880,000,003	0.00	0.000000
100 %		-30	1,880,000,097	-94.00	-0.000005
100 %		-20	1,880,000,116	-112.80	-0.000006
100 %		-10	1,880,000,153	-150.40	-0.000008
100 %		0	1,879,999,834	169.20	0.000009
100 %		10	1,879,999,815	188.00	0.000010
100 %		20	1,880,000,210	-206.80	-0.000011
100 %		25	1,880,000,285	-282.00	-0.000015
100 %		30	1,880,000,473	-470.00	-0.000025
100 %		40	1,880,000,435	-432.40	-0.000023
100 %		50	1,880,000,379	-376.00	-0.000020
100 %		60	1,880,000,172	-169.20	-0.000009
85 %	9.05	20	1,880,000,285	-282.00	-0.000015
115 %	12.25	20	1,880,000,360	-357.20	-0.000019
BATT. ENDPOINT	8.75	20	1,880,000,341	-338.40	-0.000018

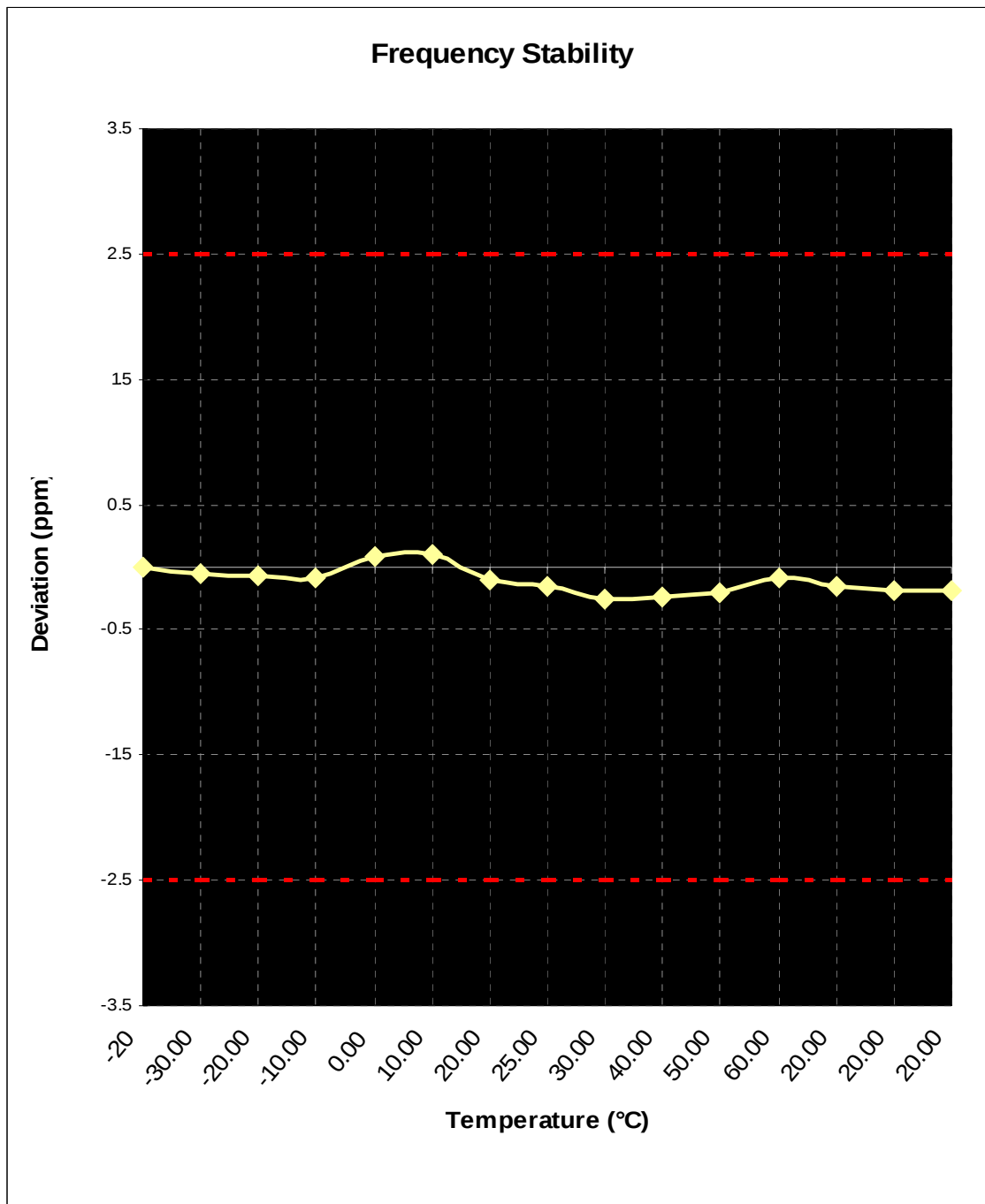
Table 6-12. Frequency Stability Data (PCS GPRS Mode – Ch. 661)

Note: This unit was tested with its standard battery.

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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PCS GPRS Frequency Stability Measurements (Cont'd)

§2.1055, 24.235



Plot 6-2. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

Note: This unit was tested with its standard battery.

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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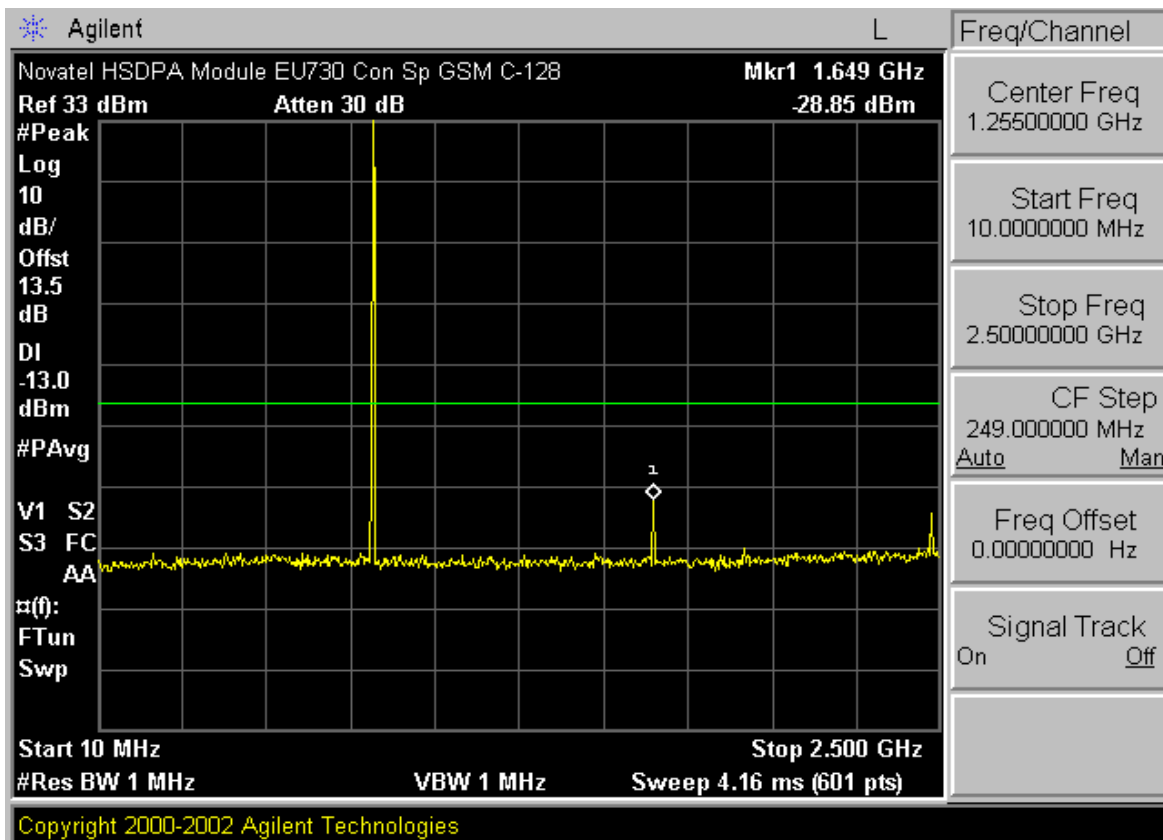
7.0 CONCLUSION

The data collected shows that the Panasonic Toughbook Model: CF-19 FCC ID: ACJ9TGCF-194 complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

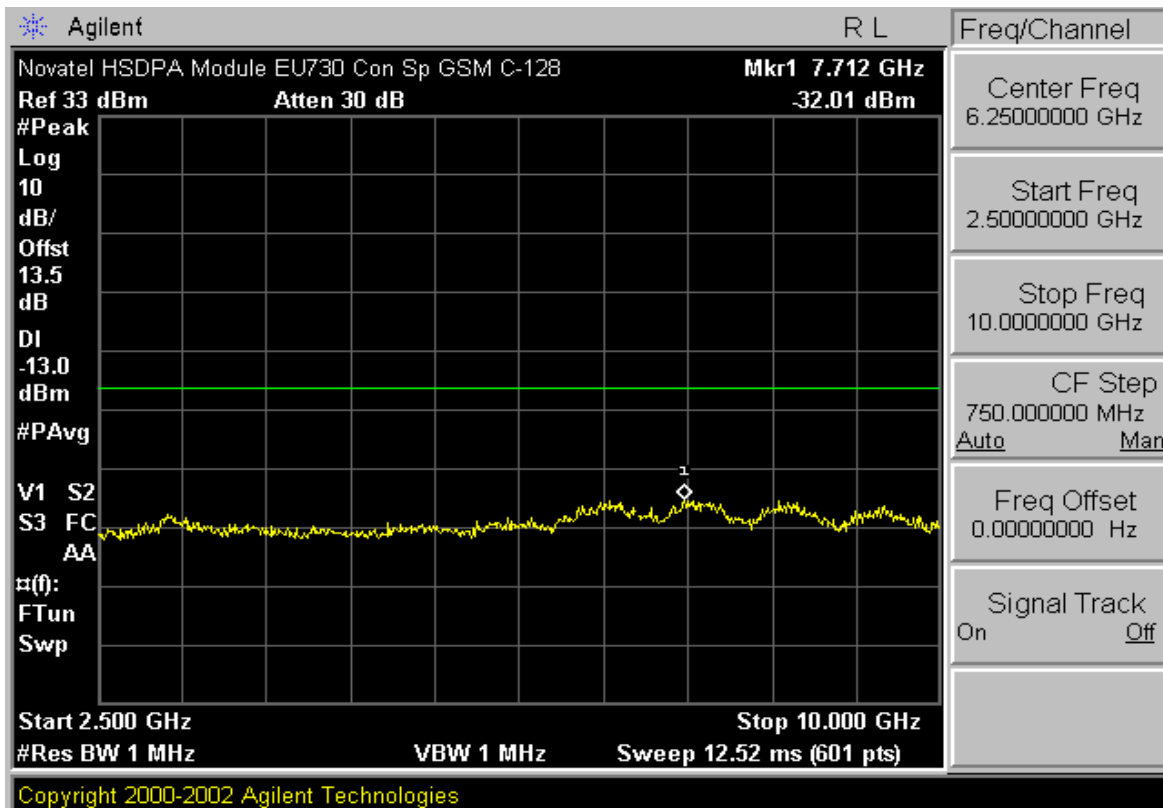
FCC ID: ACJ9TGCF-194	 PCTEST wireless	FCC Pt. 22/24 GPRS MEASUREMENT REPORT	 Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 26 of 29

EXHIBIT A - PLOT(S) OF EMISSIONS

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
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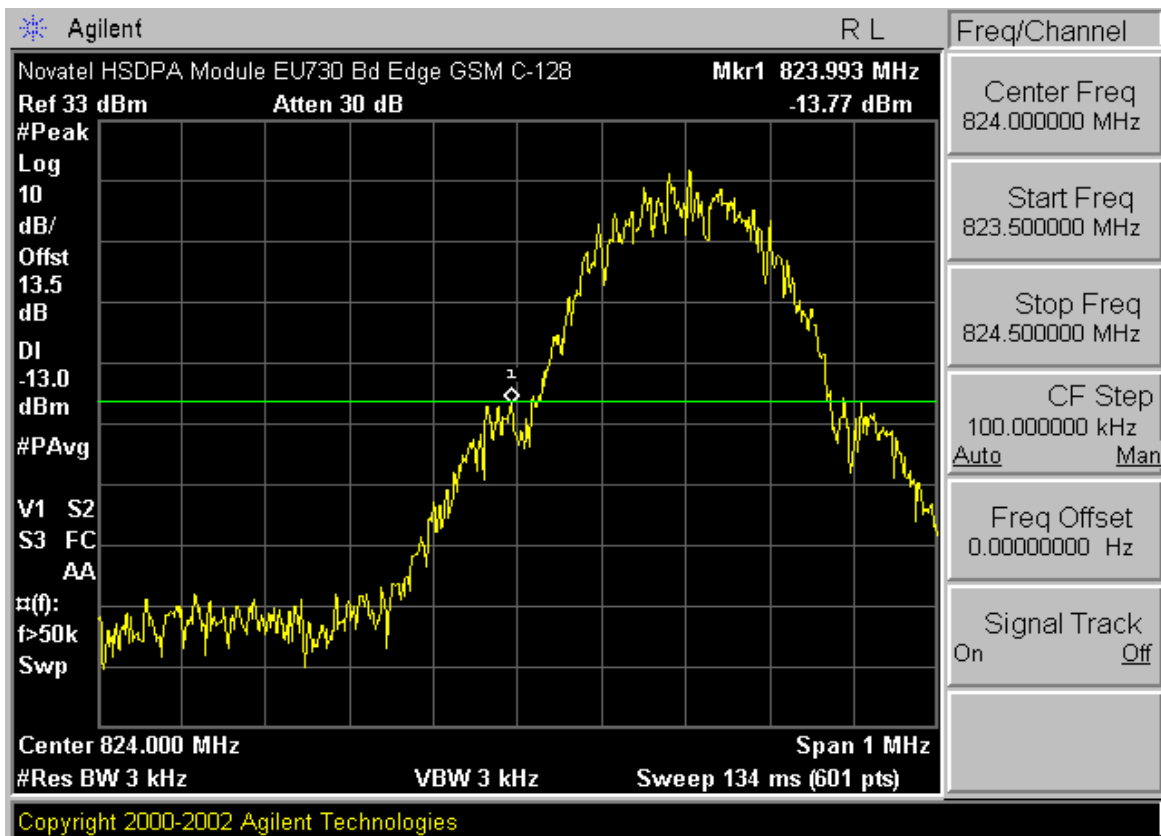


Plot A-1. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

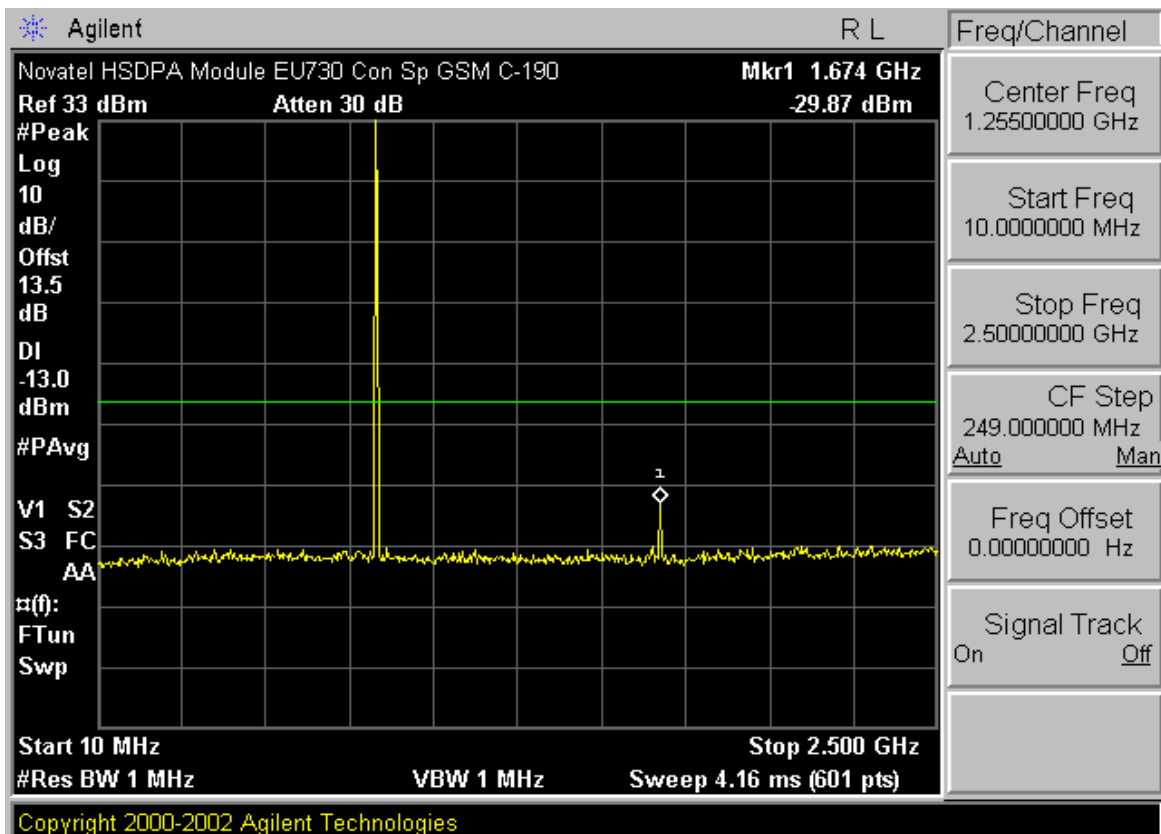


Plot A-2. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
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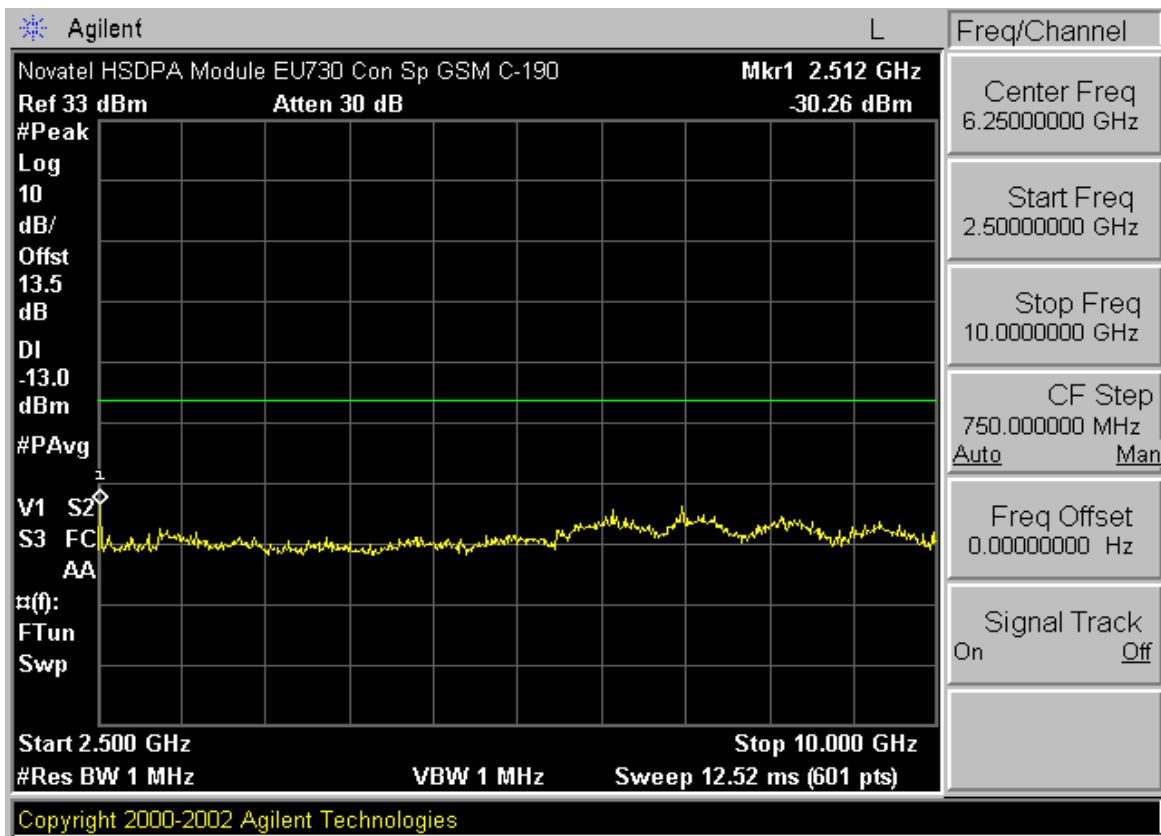


Plot A-3. Band Edge Plot (Cellular GPRS Mode – Ch. 128)

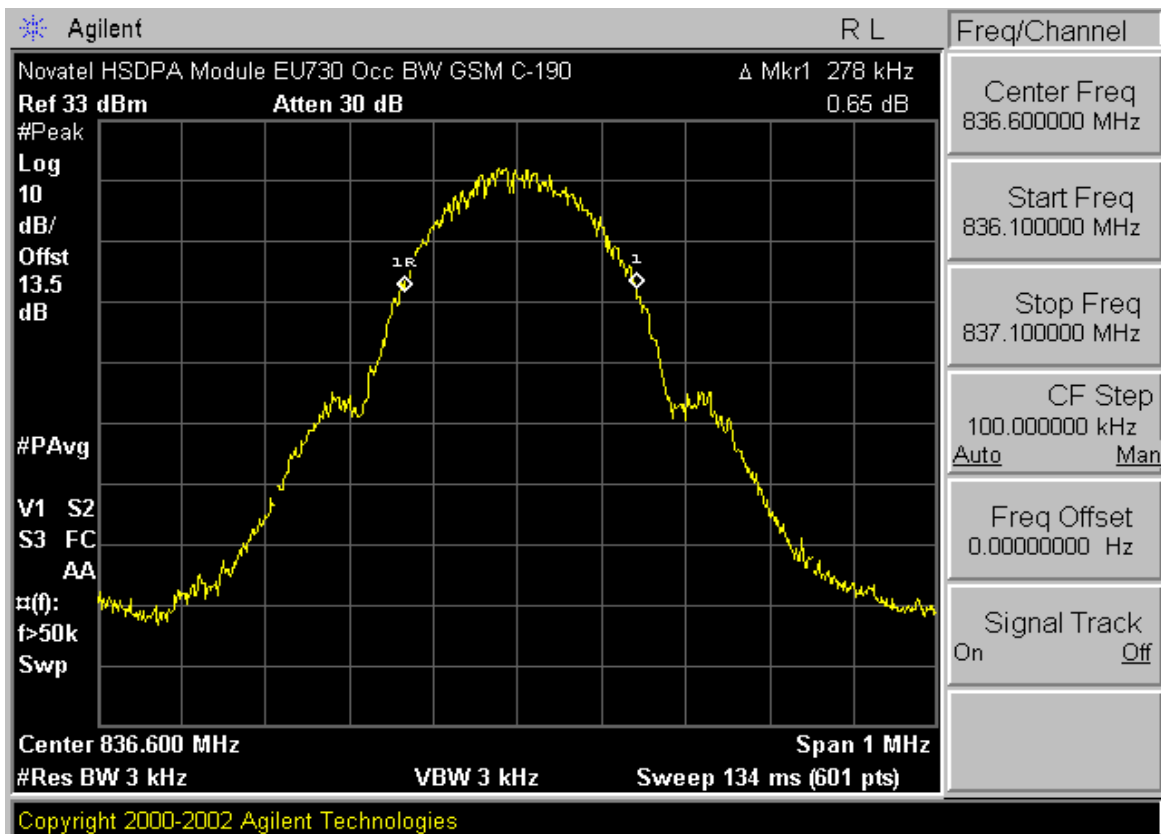


Plot A-4. Conducted Spurious (Cellular GPRS Mode – Ch. 190)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
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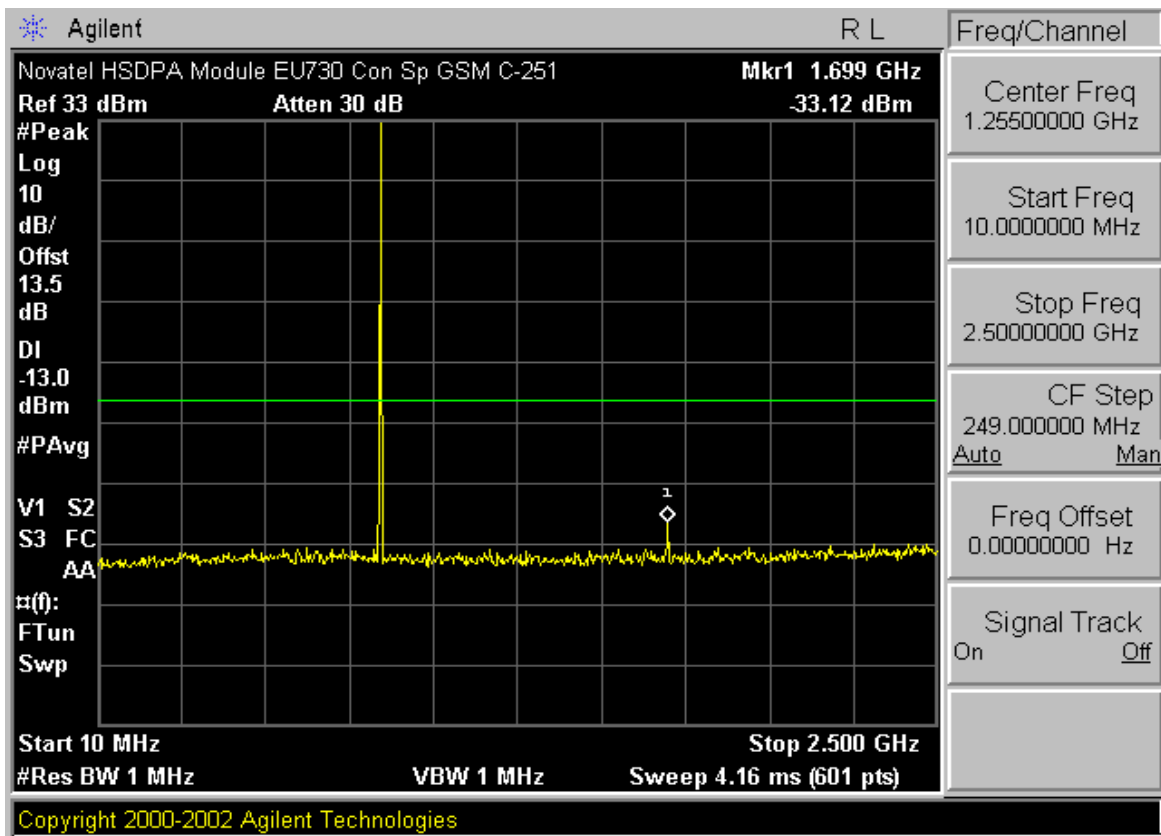


Plot A-5. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

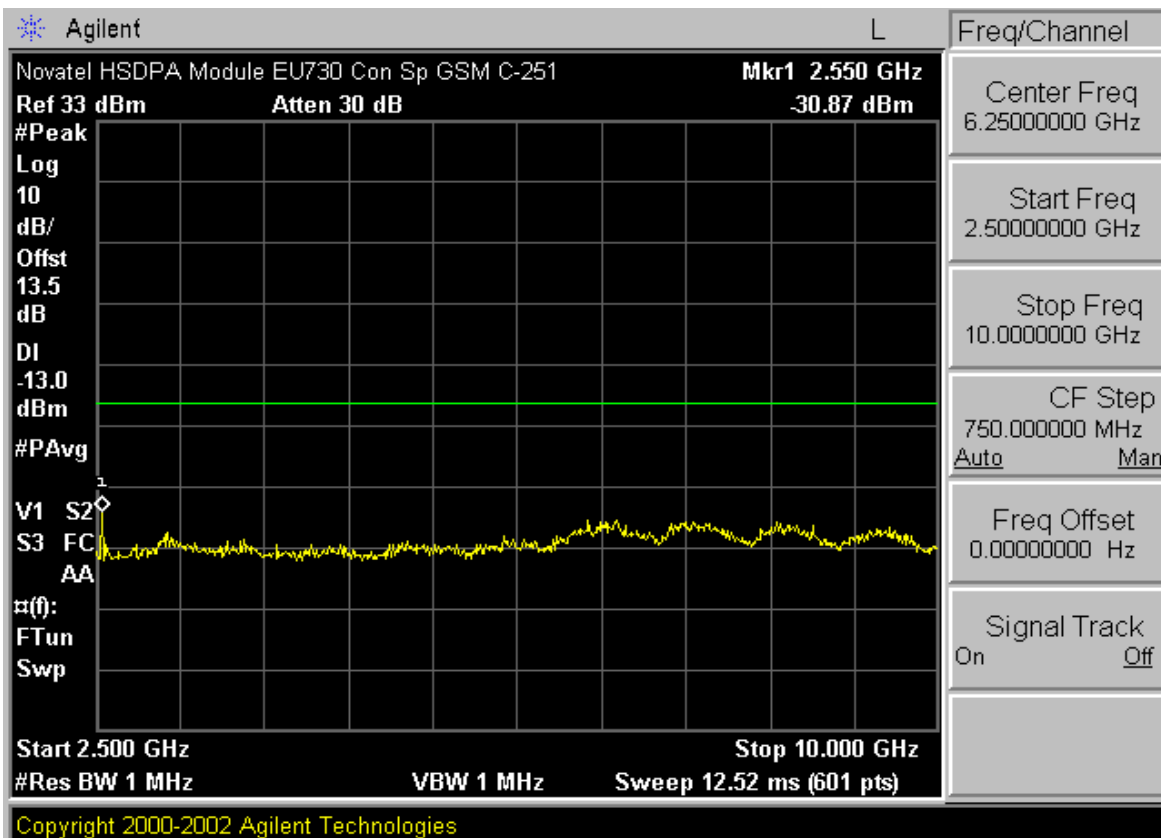


Plot A-6. Occupied Bandwidth Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ACJ9TGCF-194	 PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	 Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 3 of 10

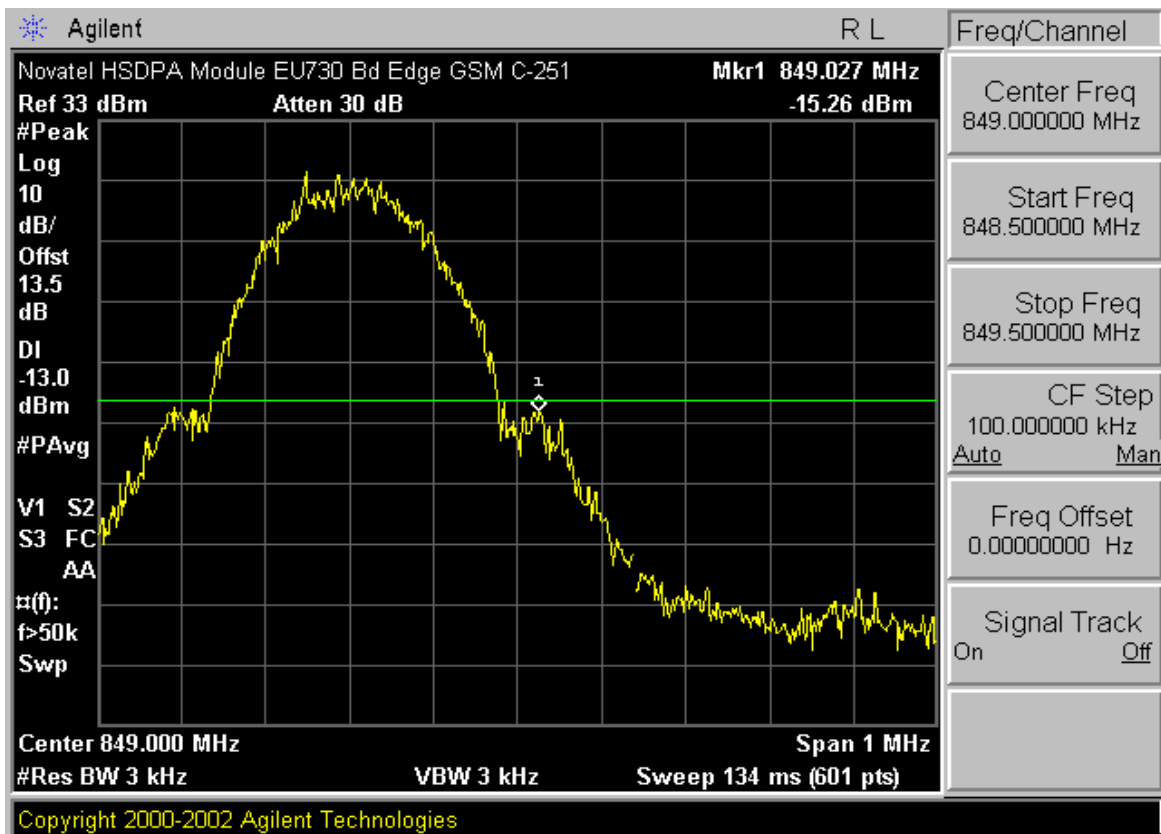


Plot A-7. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 251)

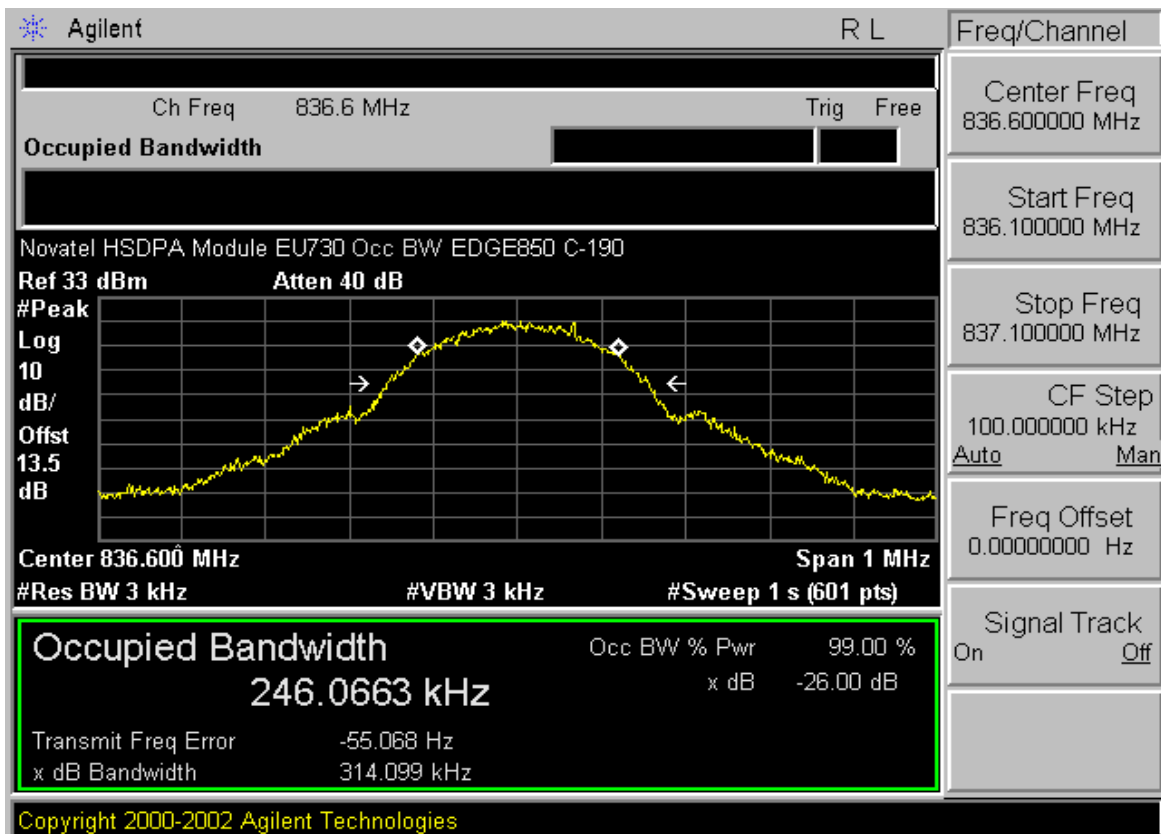


Plot A-8. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 251)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 4 of 10

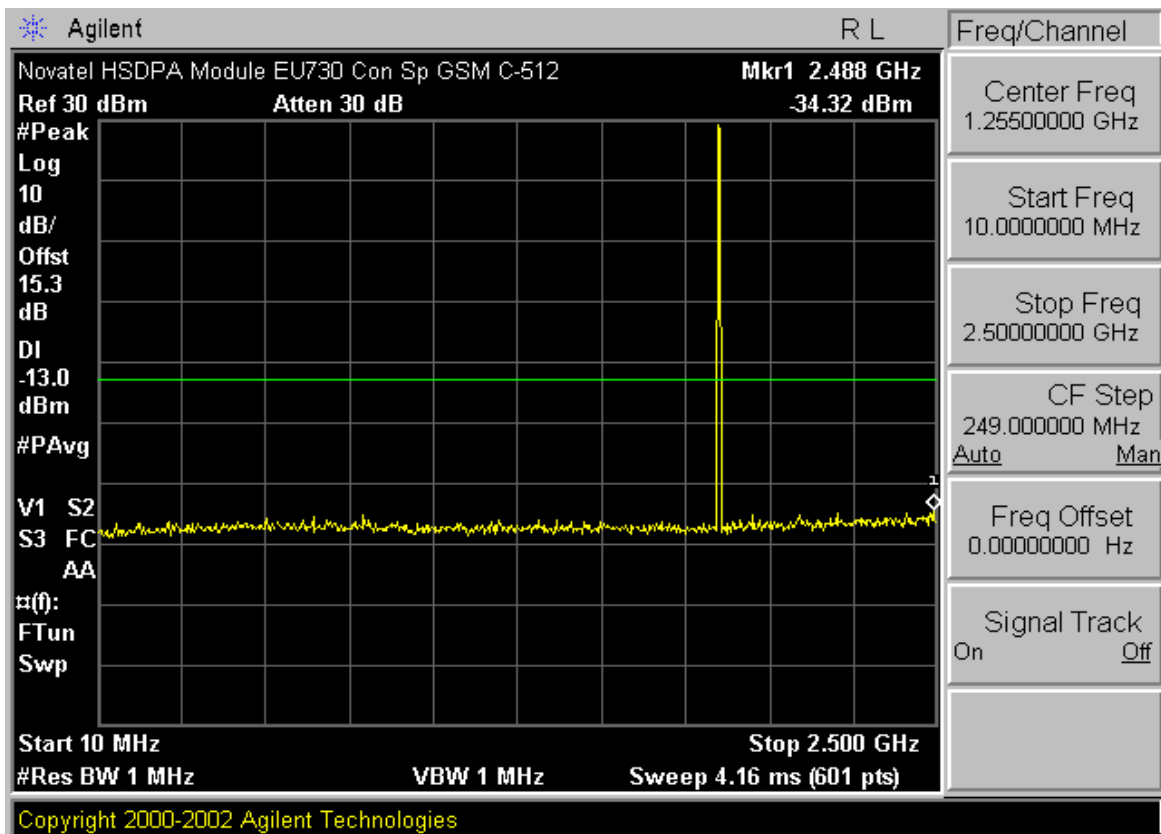


Plot A-9. Band Edge Plot (Cellular GPRS Mode – Ch. 251)

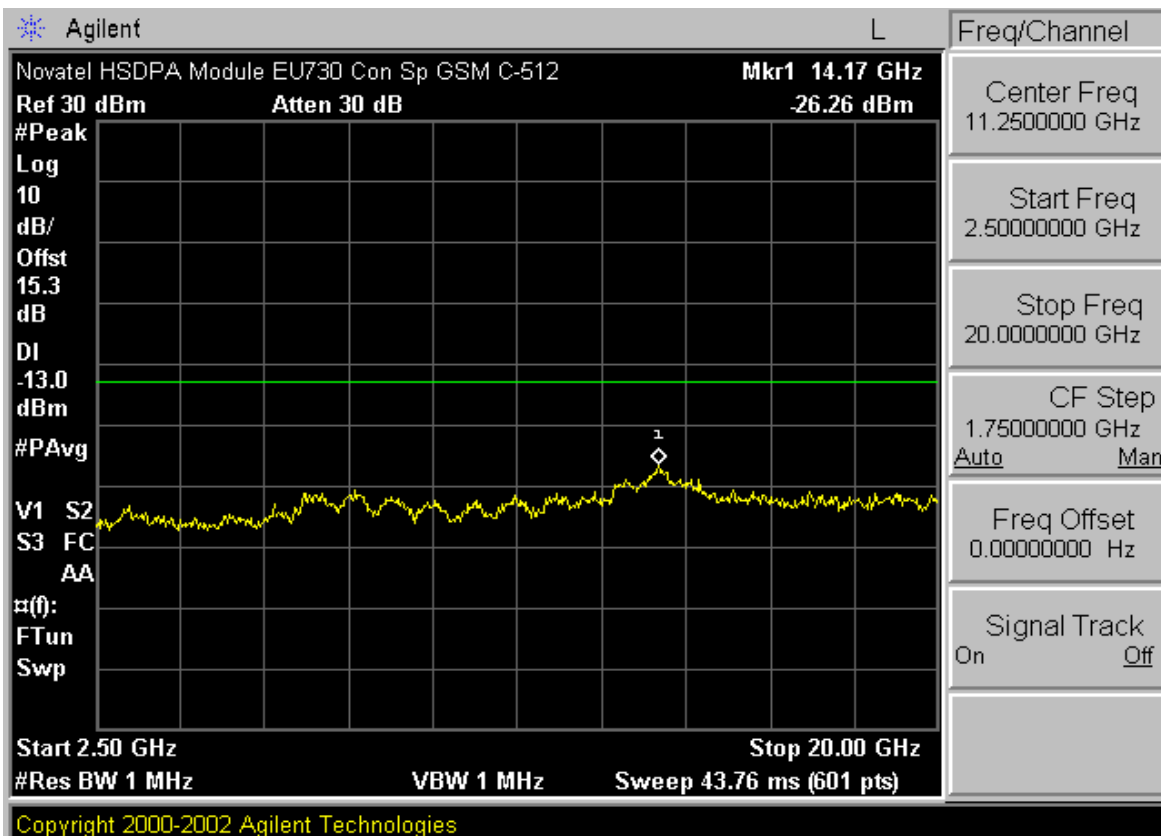


Plot A-10. Occupied Bandwidth Plot (EDGE850 Mode – Ch. 190)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 5 of 10

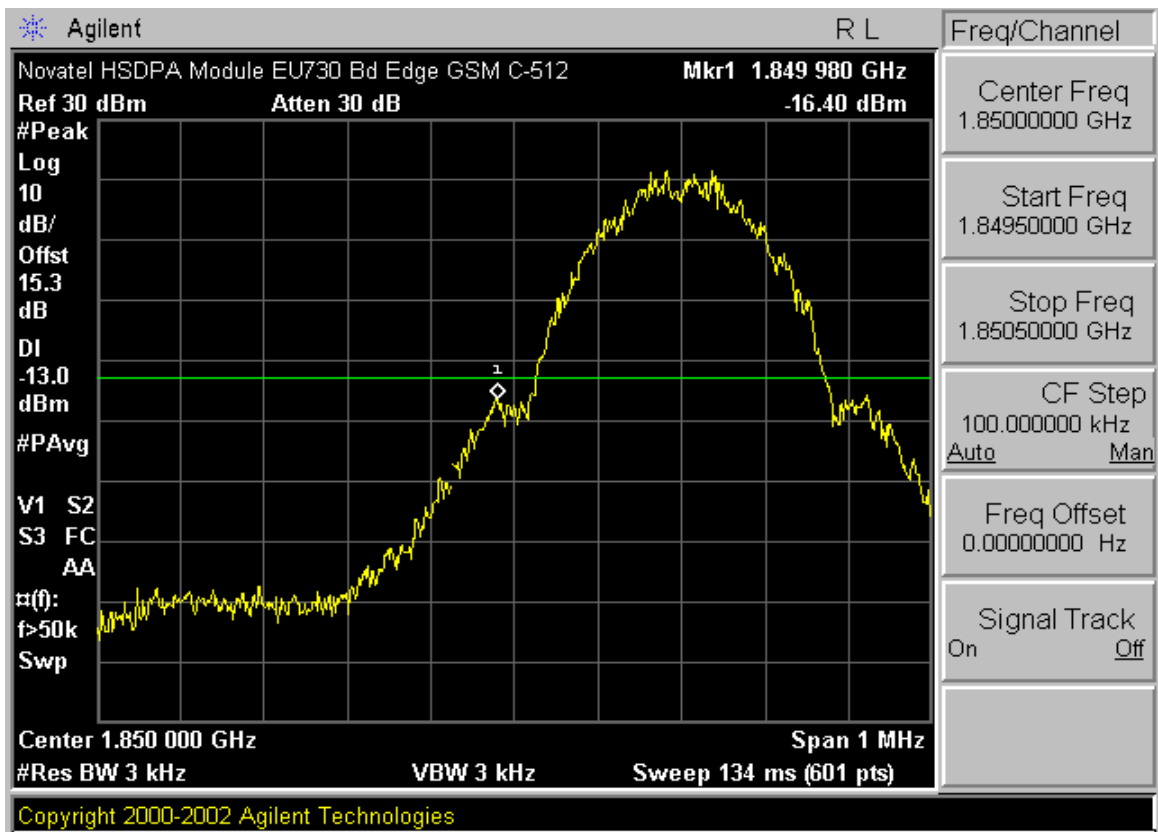


Plot A-11. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

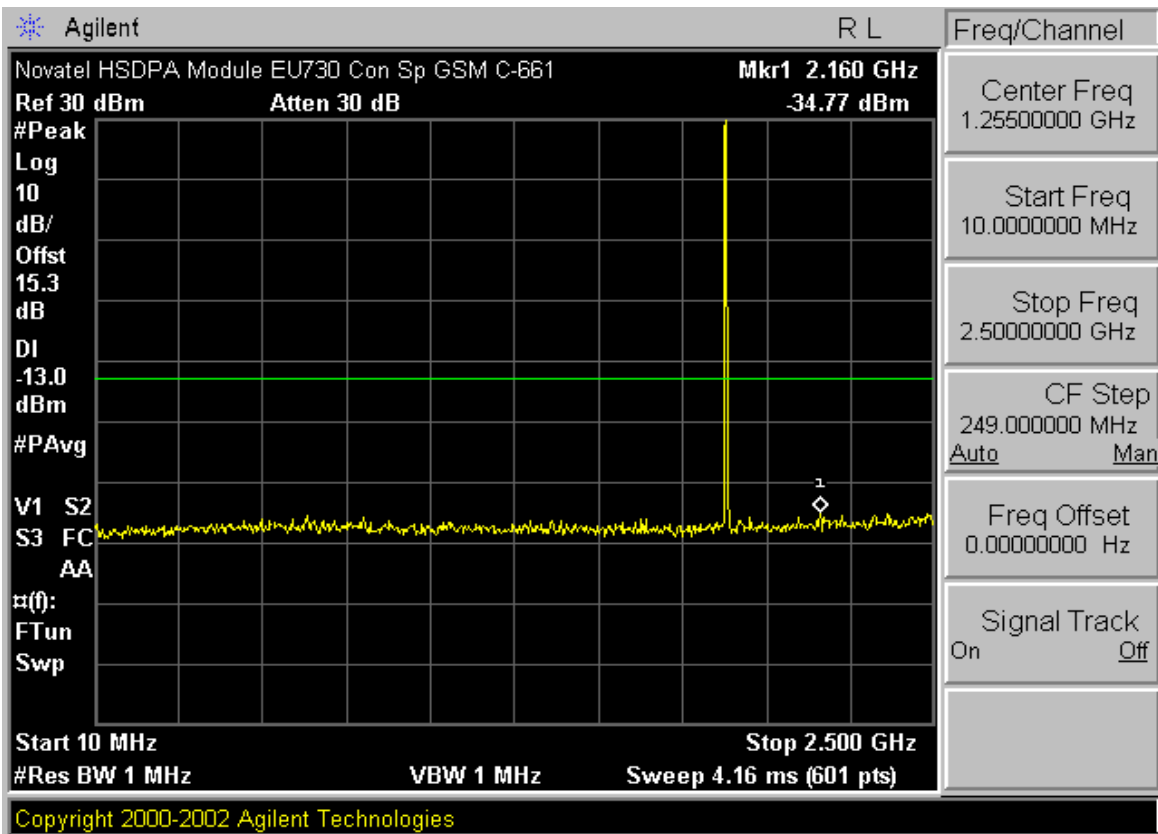


Plot A-12. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 6 of 10

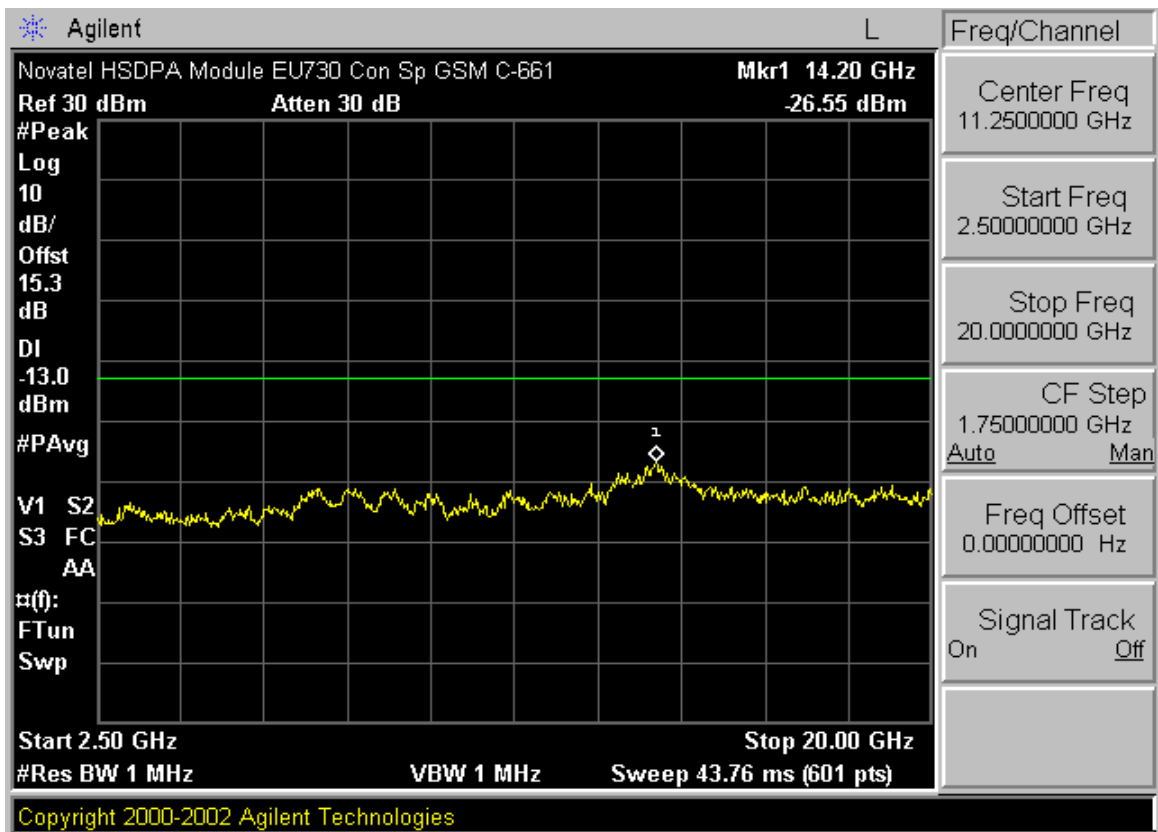


Plot A-13. Band Edge Plot (PCS GPRS Mode – Ch. 512)

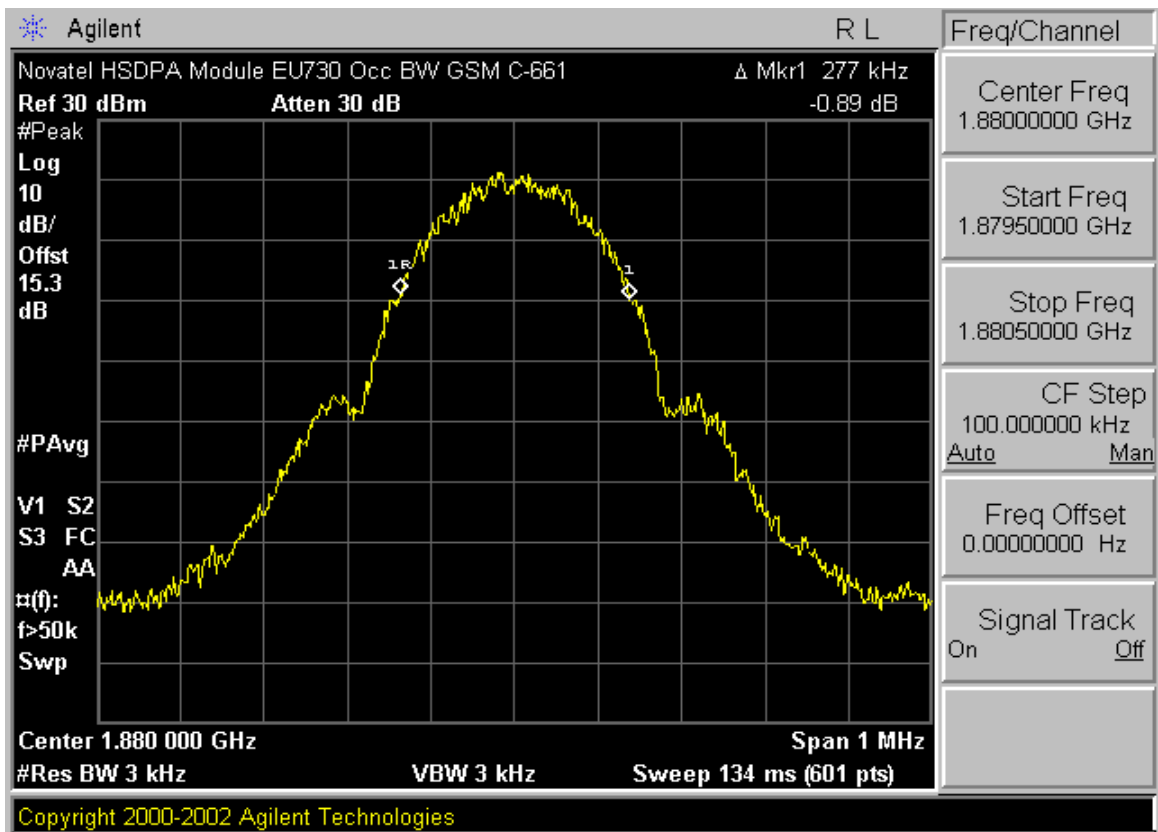


Plot A-14. Conducted Spurious Plot (PCS GPRS Mode – Ch. 661)

FCC ID: ACJ9TGCF-194	 PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	 Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 7 of 10

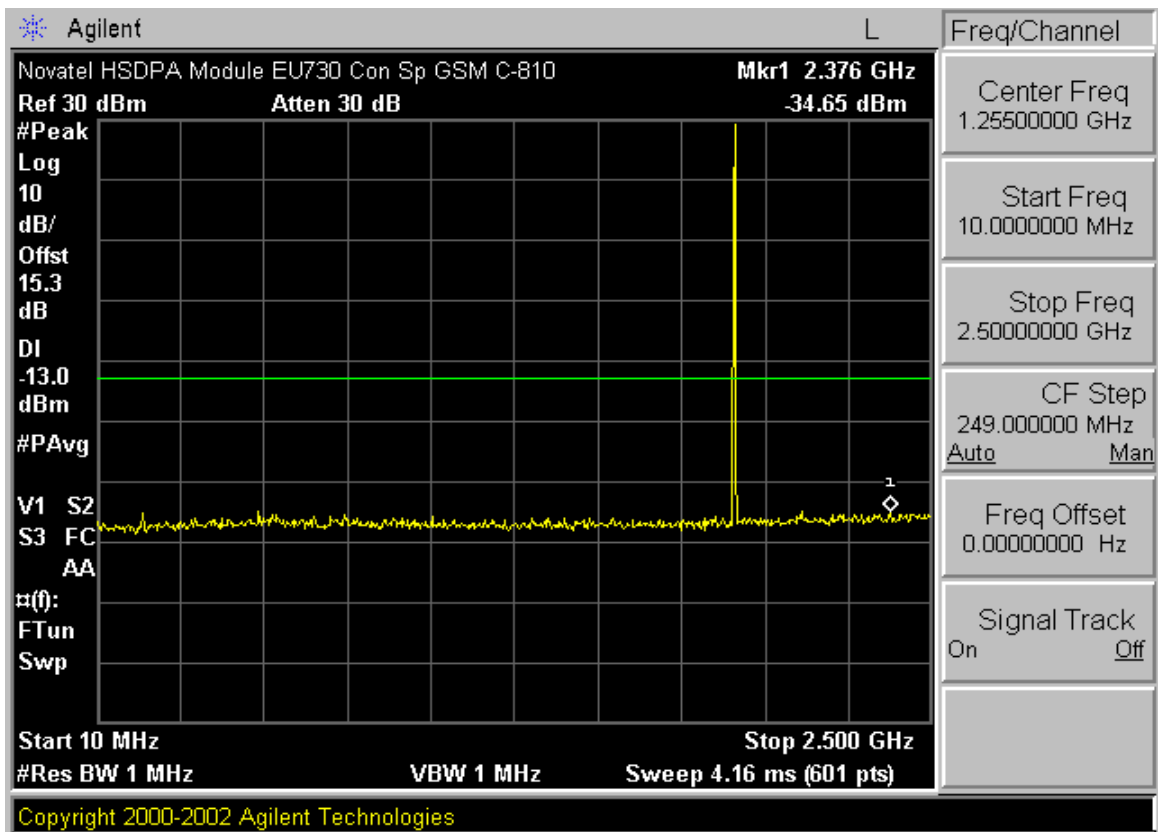


Plot A-15. Conducted Spurious Plot (PCS GPRS Mode – Ch. 661)

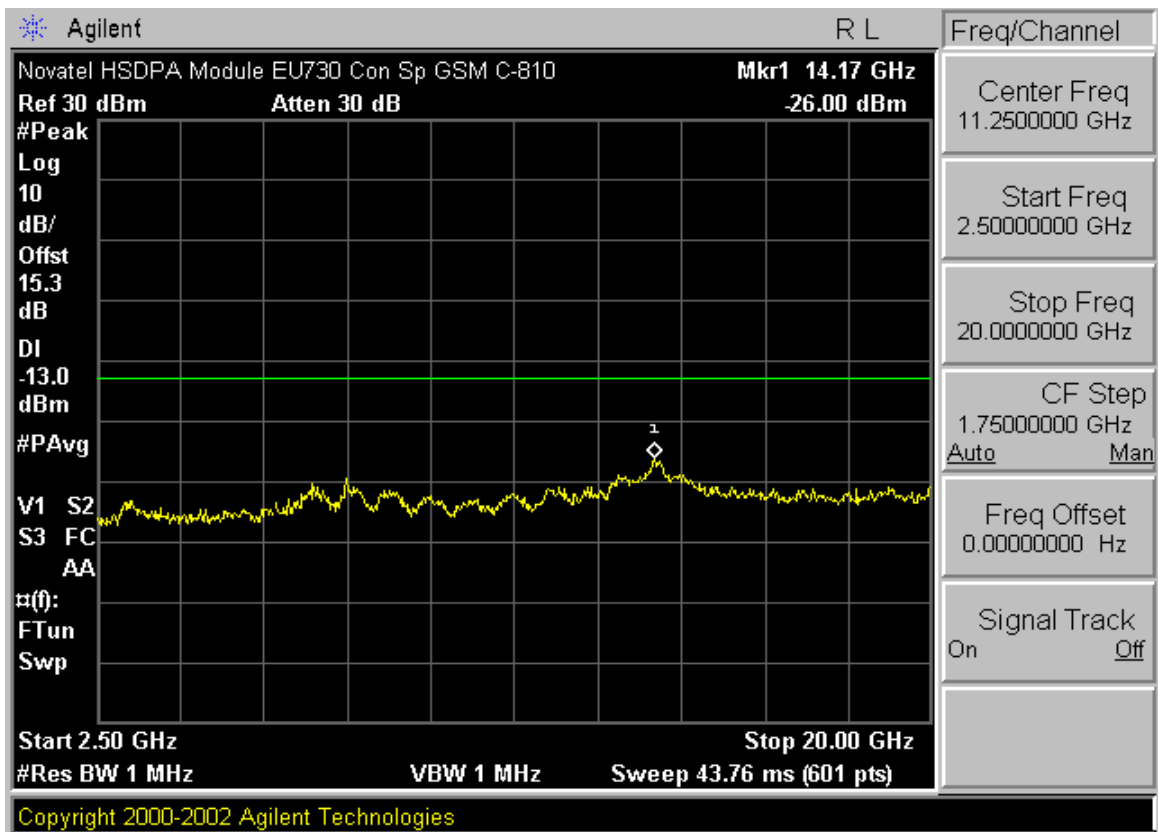


Plot A-16. Occupied Bandwidth Plot (PCS GPRS Mode – Ch. 661)

FCC ID: ACJ9TGCF-194	 PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	 Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 8 of 10

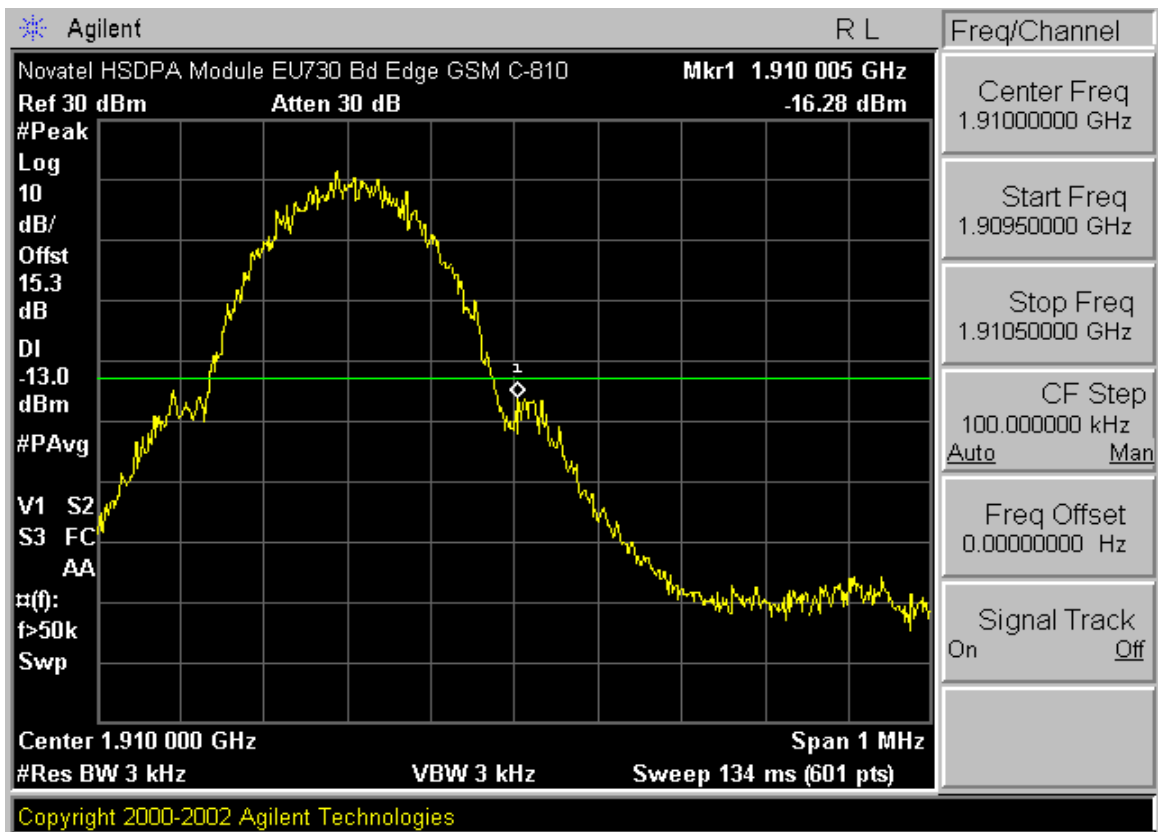


Plot A-17. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

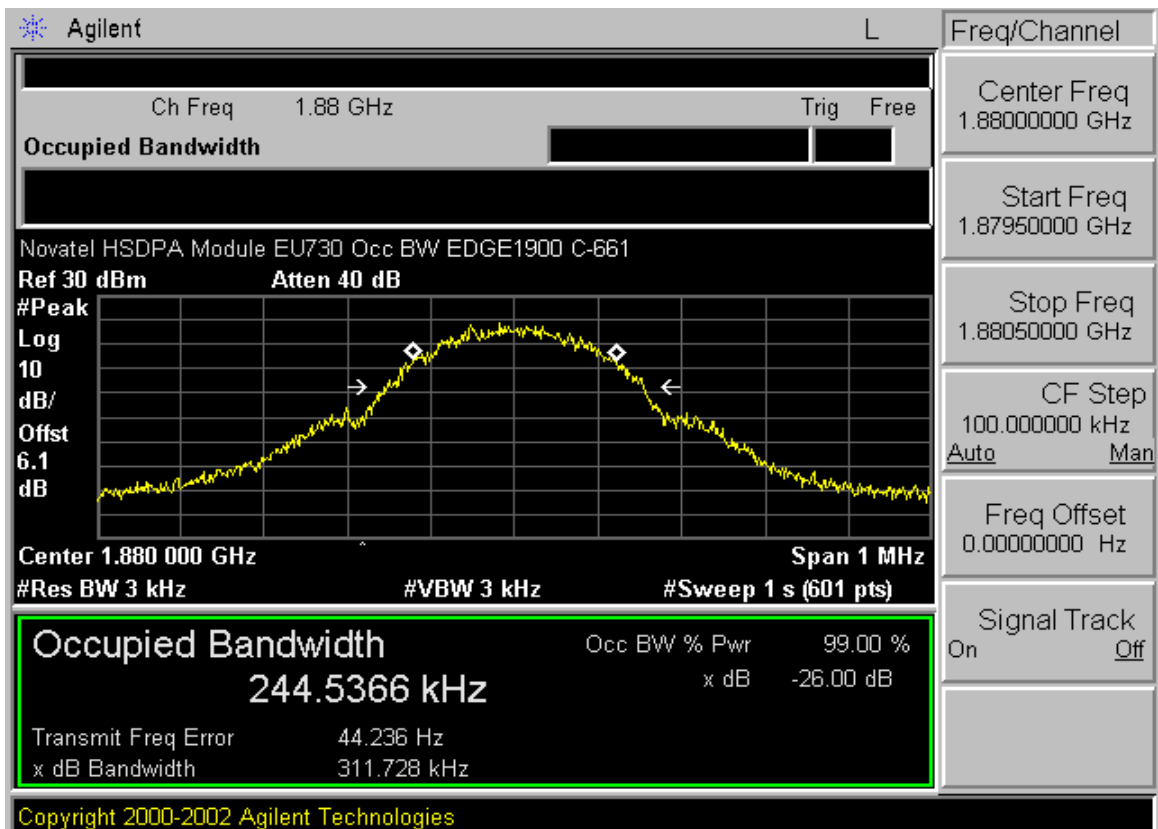


Plot A-18. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 9 of 10



Plot A-19. Band Edge Plot (PCS GPRS Mode – Ch. 810)



Plot A-20. Occupied Bandwidth Plot (EDGE1900 Mode – Ch. 810)

FCC ID: ACJ9TGCF-194	PCTEST	FCC Pt. 22/24 GPRS/EDGE MODE CONDUCTED PLOTS	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 10 of 10



EXHIBIT B – TEST SETUP PHOTOGRAPHS

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 28 of 29



EXHIBIT C – INTERNAL/EXTERNAL PHOTOGRAPHS

FCC ID: ACJ9TGCF-194		FCC Pt. 22/24 GPRS MEASUREMENT REPORT		Reviewed by: Quality Manager
Test Report S/N: 0610040878-G	Test Dates: November 6 - 7, 2006	EUT Type: Toughbook Model: CF-19		Page 29 of 29