

# HCT CO., LTD.

## CERTIFICATE OF COMPLIANCE FCC Certification

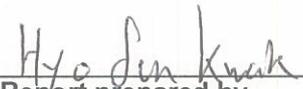
<b>Applicant Name:</b> LG Electronics Inc.	<b>Date of Issue:</b> March 30, 2012
<b>Address:</b> 60-39, Gasan-dong, Gumchon-gu, Seoul 153-023, Korea	<b>Location:</b> HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon- si, Kyunggi-Do, Korea
	<b>Test Report No.:</b> HCTR1202FR19-2
	<b>HCT FRN:</b> 0005866421

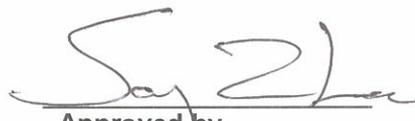
<b>FCC ID:</b>	<b>BEJLTGEN97GLNB</b>
<b>APPLICANT:</b>	<b>LG Electronics Inc.</b>

<b>FCC Model(s):</b>	TG97AAJU
<b>EUT Type:</b>	GSM Transceiver (Telematics module)
<b>FCC Classification:</b>	PCS Licensed Transmitter (PCB)
<b>FCC Rule Part(s):</b>	§22, §24, §2
<b>Tx Frequency:</b>	824.20 - 848.80 MHz (GSM850) 1 850.20 - 1 909.80 MHz (GSM1900)
<b>Rx Frequency:</b>	869.20 - 893.80 MHz (GSM850) 1 930.20 - 1 989.80 MHz (GSM1900)
<b>Max. Conducted Power:</b>	2.168 W GSM850 (33.36 dBm) / 1.250 W GSM1900 (30.97 dBm) 0.402 W EDGE850 (26.04 dBm) / 0.372 W EDGE1900 (25.70 dBm)
<b>Emission Designator(s):</b>	248 KGXW (GSM850) 246 KGXW (GSM1900) 247 KG7W (GSM850 EDGE) 244 KG7W (GSM1900 EDGE)

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C. 853(a)

  
**Report prepared by**  
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**Approved by**  
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# Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1202FR19	February 23, 2012	First Approval Report
HCTR1202FR19-1	March 21, 2012	Changed Band Edge (Page 29 ~ 36) Add conducted Output Power peak values.
HCTR1202FR19-2	March 30, 2012	Modified page 9,14,15,16,18

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# MEASUREMENT REPORT

## 1. GENERAL INFORMATION

**Applicant Name:** LG Electronics Inc.  
**Address:** 60-39, Gasan-dong, Gumchon-gu, Seoul 153-023, Korea

**FCC ID:** BEJLTGEN97GLNB  
**Application Type:** Certification  
**FCC Classification:** PCS Licensed Transmitter (PCB)  
**FCC Rule Part(s):** §22, §24, §2  
**EUT Type:** GSM Transceiver (Telematics module)  
**FCC Model(s):** TG97AAJU  
**Tx Frequency:** 824.20 - 848.80 MHz (GSM850)  
1 850.20 - 1 909.80 MHz (GSM1900)

**Rx Frequency:** 869.20 - 893.80 MHz (GSM850)  
1 930.20 - 1 989.80 MHz (GSM1900)

**Max. Conducted Power:** 2.168 W GSM850 (33.36 dBm) / 1.250 W GSM1900 (30.97 dBm)  
0.402 W EDGE850 (26.04 dBm) / 0.372 W EDGE1900 (25.70 dBm)

**Emission Designator(s):** 248 KGXW (GSM850) 246 KGXW (GSM1900)  
247 KG7W (GSM850 EDGE) 244 KG7W (GSM1900 EDGE)

**Date(s) of Tests:** February 03, 2012 ~ February 13, 2012

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## 2. INTRODUCTION

### **2.1. EUT DESCRIPTION**

The LG Electronics Inc. TG97AAJU GSM Transceiver (Telematics module) of GSM850, GSM1900.

### **2.2. MEASURING INSTRUMENT CALIBRATION**

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### **2.3. TEST FACILITY**

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri , Majang-Myeon, Icheon-si, 467-811, KOREA.

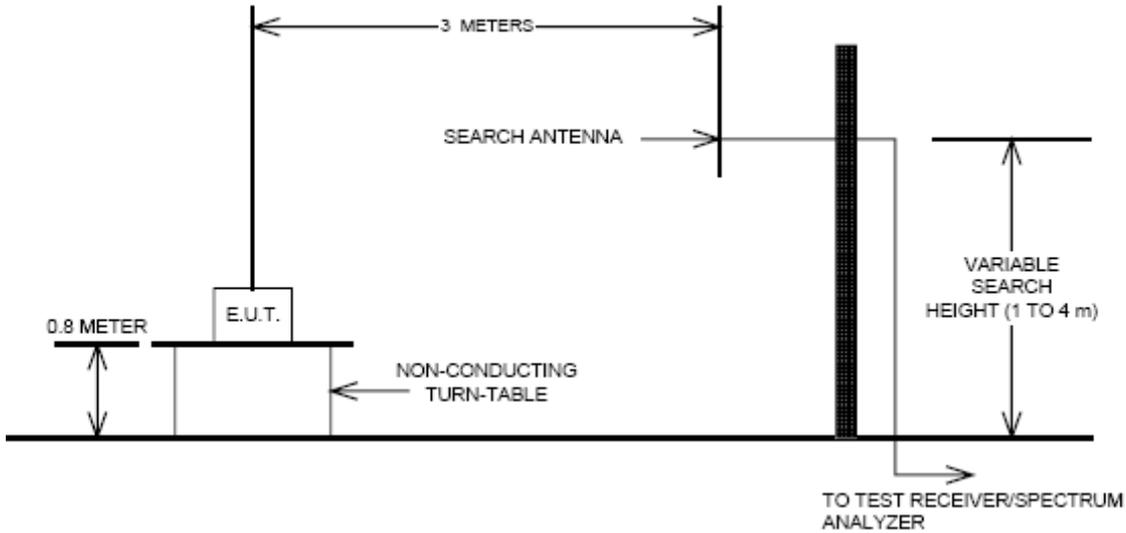
The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

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### 3. DESCRIPTION OF TESTS

#### 3.1 EFFECTIVE RADIATED POWER/EQUIVALENT ISOTROPIC RADIATED POWER

##### Test Set-up



##### Test Procedure

Radiated emission measurements were performed at an Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters from the receive antenna. A turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. 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

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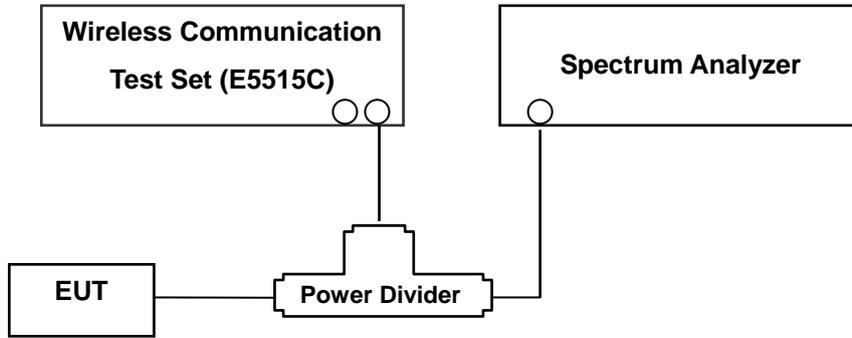
### 3.2 PEAK- TO- AVERAGE RATIO

A peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA and WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function ( CCDF ) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. Plots of the EUT's Peak- to- Average Ratio are shown herein.

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### 3.3 OCCUPIED BANDWIDTH.

#### Test set-up



(Configuration of conducted Emission measurement)

#### Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

### 3.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

#### Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 10 MHz to 10 GHz. (GSM1900 Mode: 10 MHz to 20 GHz). A display line was placed at – 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

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

#### FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)	Freq(MHz)	Factor(dB)
30	26.57	4000	28.08
100	26.30	5000	28.16
200	26.08	6000	27.98
300	26.17	7000	27.64
400	26.69	8000	27.94
500	26.94	9000	27.96
600	26.44	10000	29.50
700	26.25	11000	29.19
800	26.70	12000	28.69
824*	26.53	13000	28.90
836*	26.56	14000	28.12
849*	26.70	15000	28.43
900	27.04	16000	28.64
1000	26.93	17000	28.31
1850*	27.18	18000	28.35
1880*	27.30	19000	28.28
1910*	27.55	20000	28.22
3000	27.01		

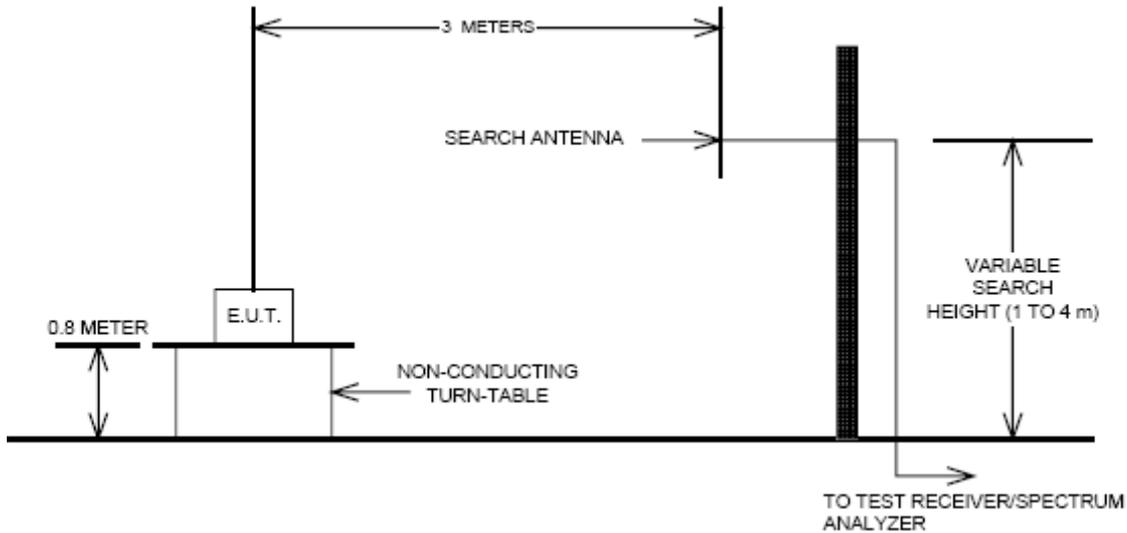
Note : 1. "\*" is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss + Splitter

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### 3.5 RADIATED SPURIOUS AND HARMONIC EMISSIONS

#### Test Set-up



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The Fully-anechoic chamber meets requirements in ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable platform mounted at three from the antenna mast.

- 1) The unit mounted on a turntable 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
- 2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
- 3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
- 4) The spectrum shall be scanned up to the 10<sup>th</sup> harmonic of the fundamental frequency.

#### Test Procedure

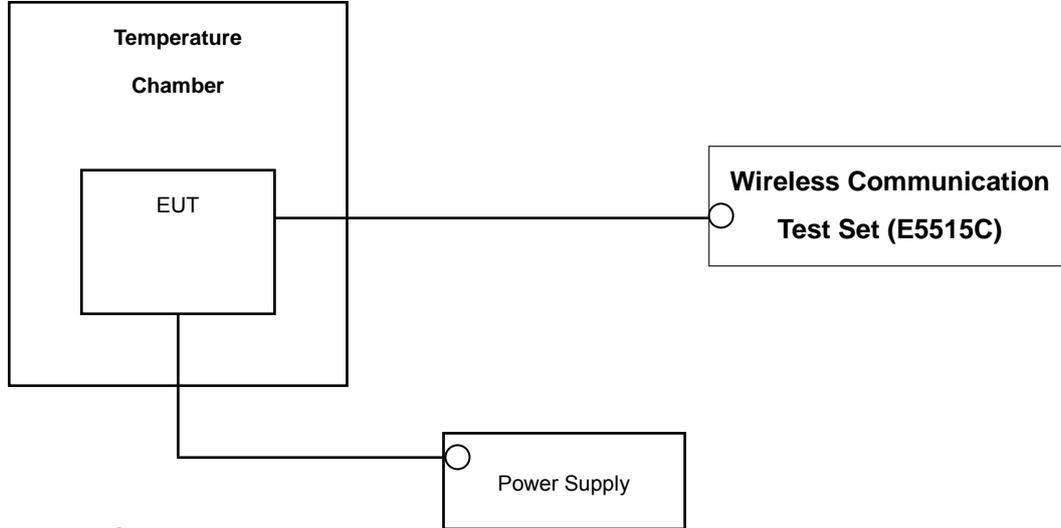
The equipment under test is placed on a non-conductive table 3-meters from the receive antenna. A turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. 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.

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### 3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

#### Test Set-up



\* Nominal Operating Voltage

#### Test Procedure

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point 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  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency.

#### Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

1. 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 is made within one minute after applying power to the transmitter.
2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

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

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## 4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	N9020A	MY51110020	Annual	09/23/2012
Agilent	E9327A/ Power Sensor	MY4442009	Annual	05/02/2012
R&S	CMW500/ Base Station	1201.0002K50_10395	Annual	04/20/2012
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	Annual	09/24/2012
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	05/02/2012
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	05/02/2012
Agilent	11636B/ Power Divider	11377	Annual	11/07/2012
Digital	EP-3010/ Power Supply	3110117	Annual	11/07/2012
Schwarzbeck	UHAP/ Dipole Antenna	557	Biennial	05/03/2012
Schwarzbeck	UHAP/ Dipole Antenna	558	Biennial	05/03/2012
Korea Engineering	KR-1005L / Chamber	KRAB05063-3CH	Annual	11/07/2012
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	04/13/2012
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	05/02/2012
WEINSCHL	ATTENUATOR	BR0592	Annual	11/07/2012
REOHDE&SCHWARZ	FSP30/Spectrum Analyzer	839117/011	Annual	03/23/2012
Agilent	8960 (E5515C)/ Base Station	GB44400269	Annual	02/10/2013
Hewlett Packard	11667B / Power Splitter	10126	Annual	11/04/2012
REOHDE&SCHWARZ	CMU200/ Base Station	114136	Annual	01/20/2013

## 5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049, 22.917(a), 24.238(a)	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 22.917(a), 24.238(a)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions		PASS
2.1046	Conducted Output Power	-		PASS
24.232(d)	Peak- to- Average Ratio	< 13 dB		PASS
2.1055, 22.355, 24.235	Frequency stability / variation of ambient temperature	< 2.5 ppm		PASS
2.1053, 22.917(a), 24.238(a)	Radiated Spurious and Harmonic Emissions	< 43 + 10log10 (P[Watts]) for all out-of band emissions	RADIATED	PASS

## 6. SAMPLE CALCULATION

### A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured	Substitute	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)	Level(dBm)	LEVEL(dBm)				W	dBm
GSM850	128	824.20	-11.56	34.28	-8.32	1.17	H	0.30	24.79

**ERP = SubstituteLEVEL(dBm) + Ant. Gain – CL(Cable Loss)**

- 1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
- 2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (ERP).

### B. Emission Designator

#### GSM Emission Designator

**Emission Designator = 249KGXW**

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

### C. Conducted Output Power and PAR Sample Calculation

#### Conducted Output Power

Output Power = Reading Value + Cable loss(1 ea)  
= 30 dBm + 0.8 dB = 30.8 dBm

Note: Power values in Base-Station power Measurement function are applied offset.

#### PAR

PAR = Reading Value + ATT(20 dB) + Splitter + Cable loss(2 ea)  
= 5 dBm + 20 dB + 6 dB + 1.2 dB = 32.2 dBm

Note: Power values in plots of spectrum analyzer are applied offset.

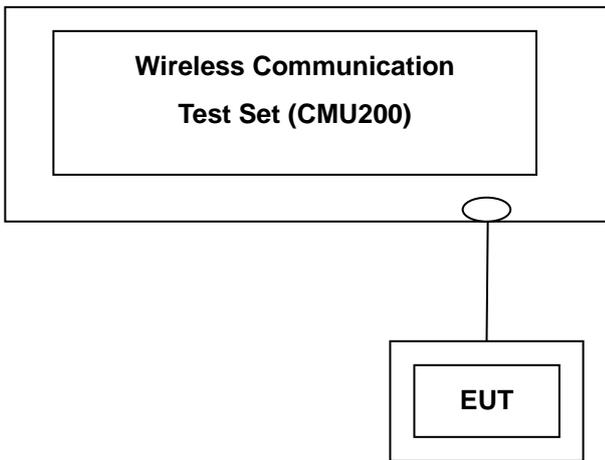
(where) offset = ATT(20 dB) + Splitter + Cable loss(2 ea)

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## 7. TEST DATA

### 7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



Test Result

Band	Channel	Voice		GPRS Data							
		GSM		GPRS 1 TX Slot		GPRS 2 TX Slot		GPRS 3 TX Slot		GPRS 4 TX Slot	
		Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)
GSM 850	128	33.36	33.62	33.33	33.63	31.70	31.87	30.50	30.67	29.15	29.23
	190	33.18	33.40	33.16	33.37	31.63	31.80	30.28	30.40	28.91	29.08
	251	33.10	33.37	33.10	33.38	31.63	31.76	30.16	30.40	28.91	29.08
GSM 1900	512	30.86	30.99	30.85	30.94	30.28	30.35	28.93	28.97	27.79	27.89
	661	30.97	31.12	30.96	31.06	29.89	29.96	28.78	28.86	27.70	27.83
	810	30.62	30.91	30.61	30.71	30.18	30.27	28.80	28.85	27.65	27.70

(GSM Conducted Output Powers)

Band	Channel	EDGE Data							
		EDGE 1 TX Slot		EDGE 2 TX Slot		EDGE 3 TX Slot		EDGE 4 TX Slot	
		Average (dBm)	Peak (dBm)						
GSM 850	128	26.04	29.22	25.91	29.08	24.80	27.48	23.64	26.70
	190	25.95	29.22	25.83	28.18	24.70	27.01	23.57	26.56
	251	25.87	29.07	25.75	28.88	24.63	27.75	23.50	26.23
GSM 1900	512	25.67	28.10	25.70	28.76	25.64	28.32	24.62	27.68
	661	25.63	28.27	25.64	28.25	25.59	27.90	24.57	27.53
	810	25.66	28.34	25.66	28.79	25.63	28.75	24.60	27.33

(GSM EDGE Conducted Output Powers)

Note :

1. We apply to cable loss in base-station for testing conducted output power.
2. Actual offset values are 0.55 dB in GSM850 and 0.89 dB in GSM1900.

## 7.2 PEAK-TO-AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown Page 28.

Note :

1. We apply to cable loss, splitter and attenuation for testing PAR.
2. Actual offset values is 27.3 dB in GSM1900.

### 7.3 OCCUPIED BANDWIDTH

Band	Channel	Frequency(MHz)	Data (GSM: kHz / WCDMA : MHz)
GSM850	128	824.20	247.5392
	190	836.60	239.9330
	251	848.80	246.8313
GSM850 EDGE	128	824.20	247.0540
GSM1900	512	1850.20	245.3174
	661	1880.00	246.2022
	810	1909.80	242.9632
GSM1900 EDGE	661	1880.00	244.1396

- Plots of the EUT's Occupied Bandwidth are shown Page 24 ~ 27.

## 7.4 CONDUCTED SPURIOUS EMISSIONS

Band	Channel	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
GSM850	128	7.650	-31.78
	190	7.662	-32.21
	251	7.150	-31.71
GSM1900	512	14.240	-29.57
	661	13.970	-29.30
	810	19.920	-29.88

- Plots of the EUT's Conducted Spurious Emissions are shown Page 37 ~ 42.

### 7.4.1 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 29 ~ 36.

Note : Actual offset values is included the table on page 9.

## 7.5 RADIATED SPURIOUS EMISSIONS

### 7.5.1 RADIATED SPURIOUS EMISSIONS (GSM850)

MODULATION SIGNAL:                   GSM850                    
 DISTANCE:                   3 meters                    
 LIMIT:                   - 13 dBm                  

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	Margin
128 (824.2)	1,648.40	-51.34	9.66	-55.97	2.63	H	-48.94	35.94
	2,472.60	-40.34	10.79	-43.18	3.55	V	-35.94	22.94
	3,296.80	-	-	-	-	-	-	-
190 (836.6)	1,673.20	-51.25	9.77	-55.95	2.67	H	-48.85	35.85
	2,509.80	-42.81	10.82	-45.92	3.61	V	-38.71	25.41
	3,346.40	-	-	-	-	-	-	-
251 (848.8)	1,697.60	-48.73	9.94	-53.86	2.61	V	-46.53	33.53
	2,546.40	-51.00	10.84	-54.64	3.60	V	-47.40	34.40
	3,395.20	-	-	-	-	-	-	-

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
  2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5<sup>th</sup> Harmonic for all channel.
  3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
  - Spectrum setting:
    - Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.

### 7.5.2 RADIATED SPURIOUS EMISSIONS (GSM1900)

MODULATION SIGNAL:                     GSM1900                      
 DISTANCE:                     3 meters                      
 LIMIT:                     - 13 dBm                    

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	EIRP (dBm)	Margin
512 (1850.2)	3,700.40	-33.57	12.36	-35.36	4.87	H	-27.87	14.87
	5,550.60	-49.02	12.61	-45.47	6.66	V	-39.52	26.52
	7,400.80	-	-	-	-	-	-	-
661 (1880.0)	3,760.00	-28.10	12.40	-29.82	4.88	H	-22.30	9.30
	5,640.00	-49.64	12.65	-45.85	6.54	V	-39.74	26.74
	7,520.00	-58.08	10.84	-45.70	7.32	V	-42.18	29.18
810 (1909.8)	3,819.60	-33.93	12.45	-36.16	5.02	H	-28.73	15.73
	5,729.40	-50.70	12.71	-47.17	6.54	H	-41.00	28.00
	7,639.20	-54.72	10.87	-41.81	7.78	V	-38.72	25.72

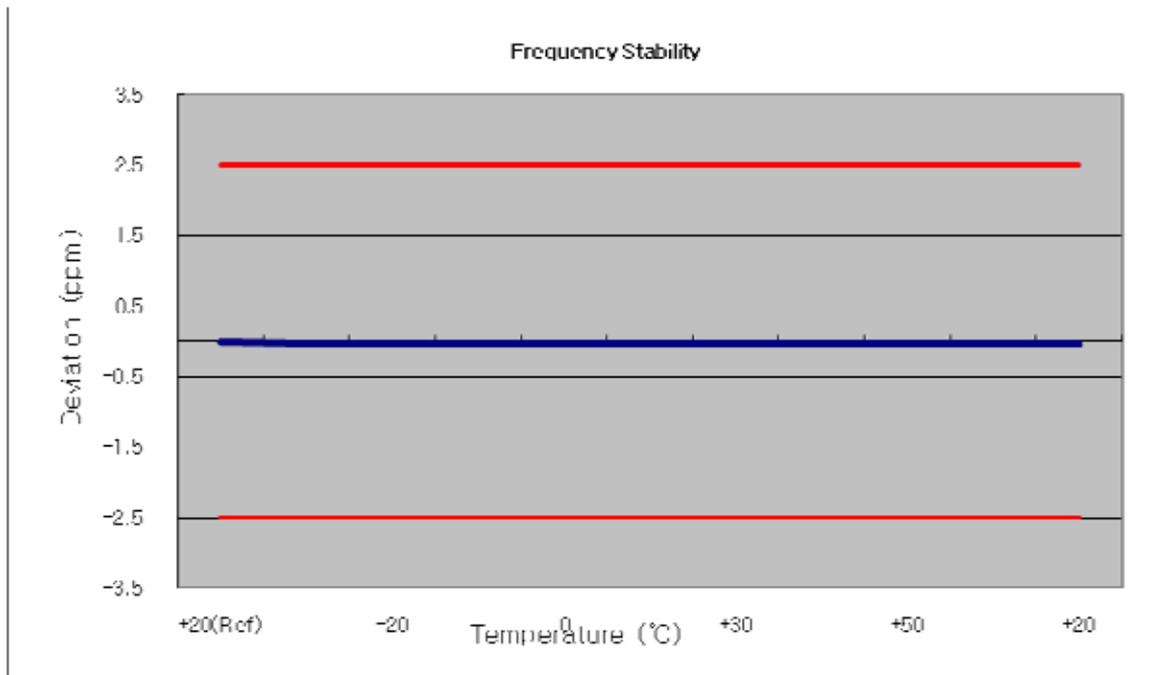
- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
  2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5<sup>th</sup> Harmonic for all channel.
  3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
  4. Spectrum setting:
    - Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.

## 7.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

### 7.6.1 FREQUENCY STABILITY (GSM850)

OPERATING FREQUENCY: 836,600,000 Hz  
 CHANNEL: 190  
 REFERENCE VOLTAGE: 3.7 VDC  
 DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

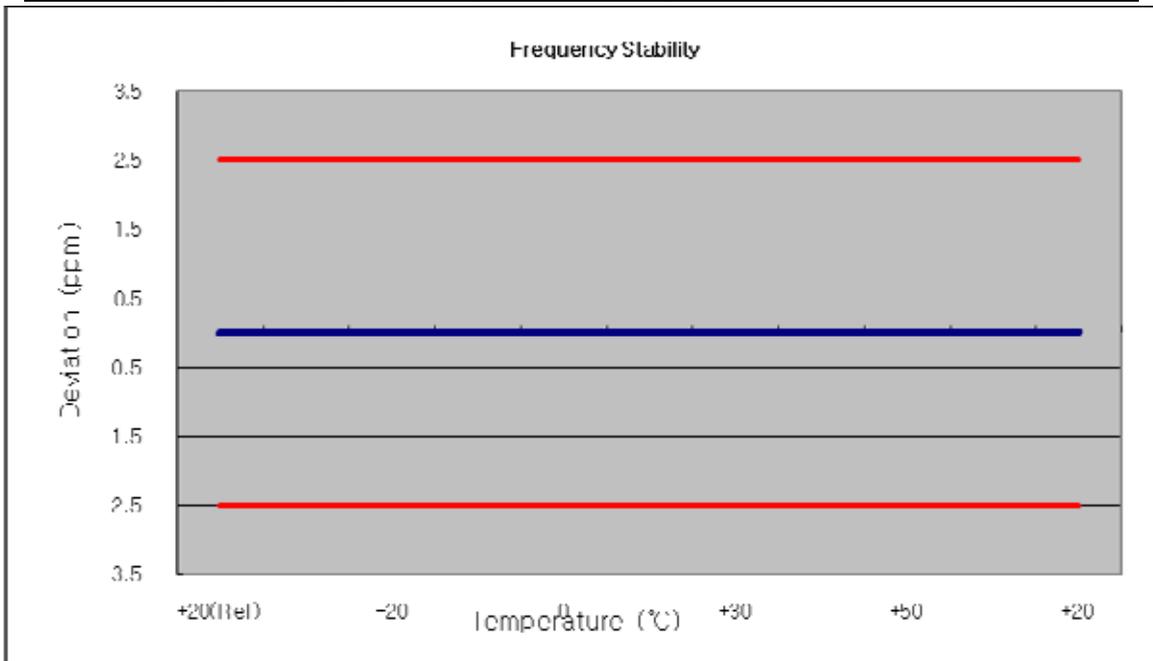
Voltage (%)	Power (VDC)	Temp. ( )	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	836 600 024	0	0.000 000	0.000
100%		-30	836 600 001	-23.37	-0.000 003	-0.028
100%		-20	836 600 001	-23.69	-0.000 003	-0.028
100%		-10	836 600 002	-22.84	-0.000 003	-0.027
100%		0	836 599 999	-25.65	-0.000 003	-0.031
100%		+10	836 600 008	-16.10	-0.000 002	-0.019
100%		+30	836 600 005	-18.91	-0.000 002	-0.023
100%		+40	836 599 997	-27.66	-0.000 003	-0.033
100%		+50	836 599 996	-27.94	-0.000 003	-0.033
115%		4.255	+20	836 600 003	-21.53	-0.000 003
Batt. Endpoint	3.400	+20	836 599 993	-31.02	-0.000 004	-0.037



### 7.6.2 FREQUENCY STABILITY (GSM1900)

OPERATING FREQUENCY: 1880,000,000 Hz  
 CHANNEL: 661  
 REFERENCE VOLTAGE: 3.7 VDC  
 DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. ( )	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	1879 999 968	0	0.000 000	0.000
100%		-30	1880 000 001	33.29	0.000 002	0.018
100%		-20	1879 999 998	30.39	0.000 002	0.016
100%		-10	1879 999 993	25.86	0.000 001	0.014
100%		0	1879 999 991	23.30	0.000 001	0.012
100%		+10	1879 999 988	20.78	0.000 001	0.011
100%		+30	1879 999 992	24.84	0.000 001	0.013
100%		+40	1879 999 991	22.99	0.000 001	0.012
100%		+50	1879 999 984	16.83	0.000 001	0.009
115%		4.255	+20	1879 999 994	26.71	0.000 001
Batt. Endpoint	3.400	+20	1879 999 986	18.04	0.000 001	0.010

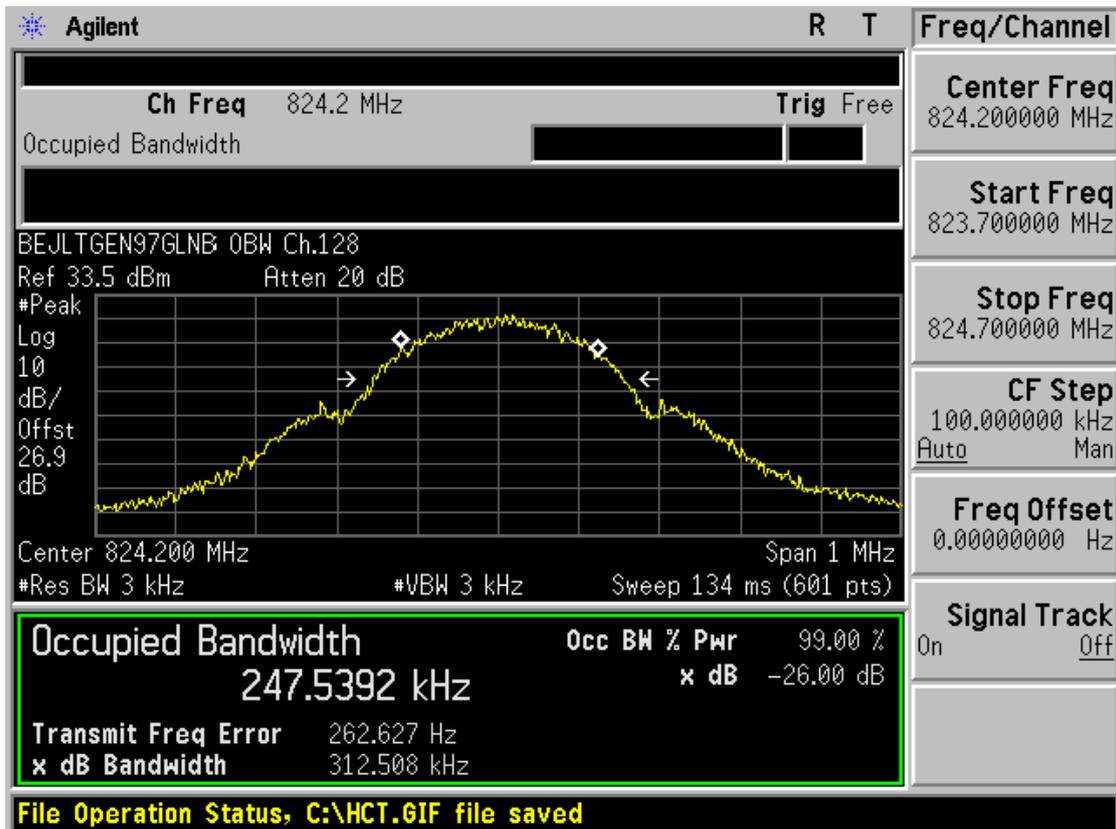




## 8. TEST PLOTS

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

■ GSM850 MODE (128 CH.) Occupied Bandwidth

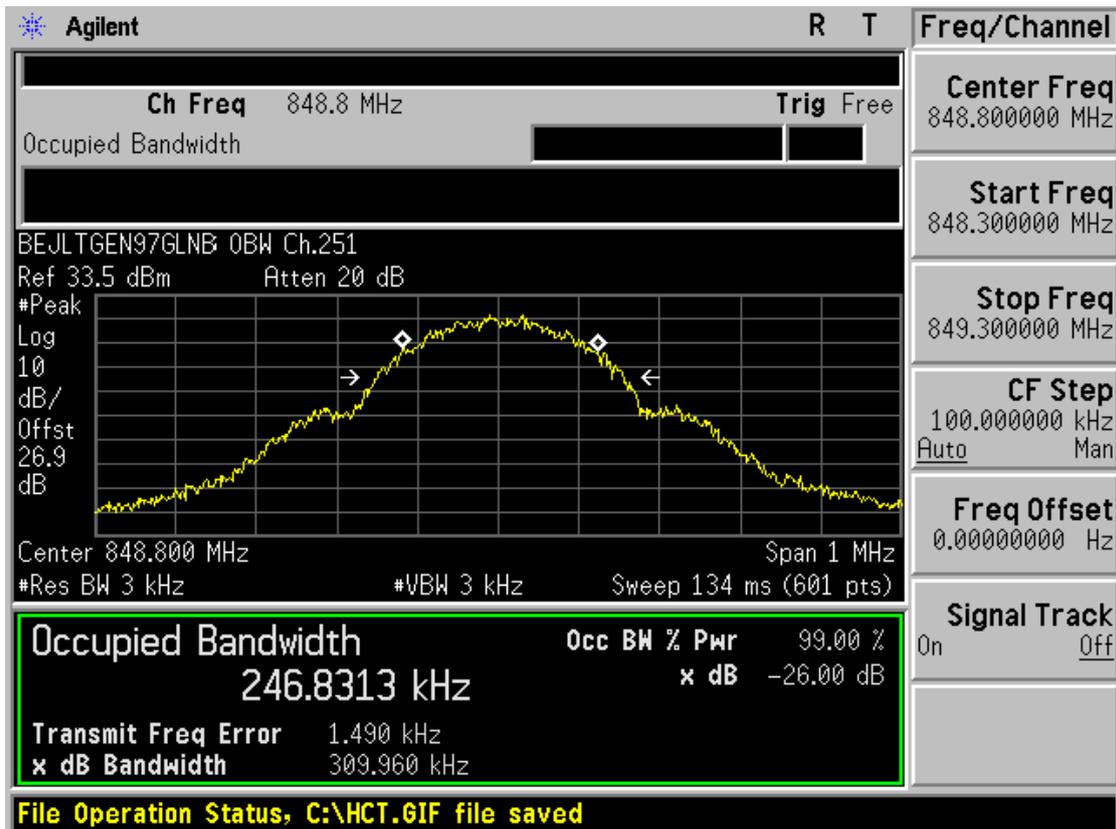


■ GSM850 MODE (190 CH.) Occupied Bandwidth

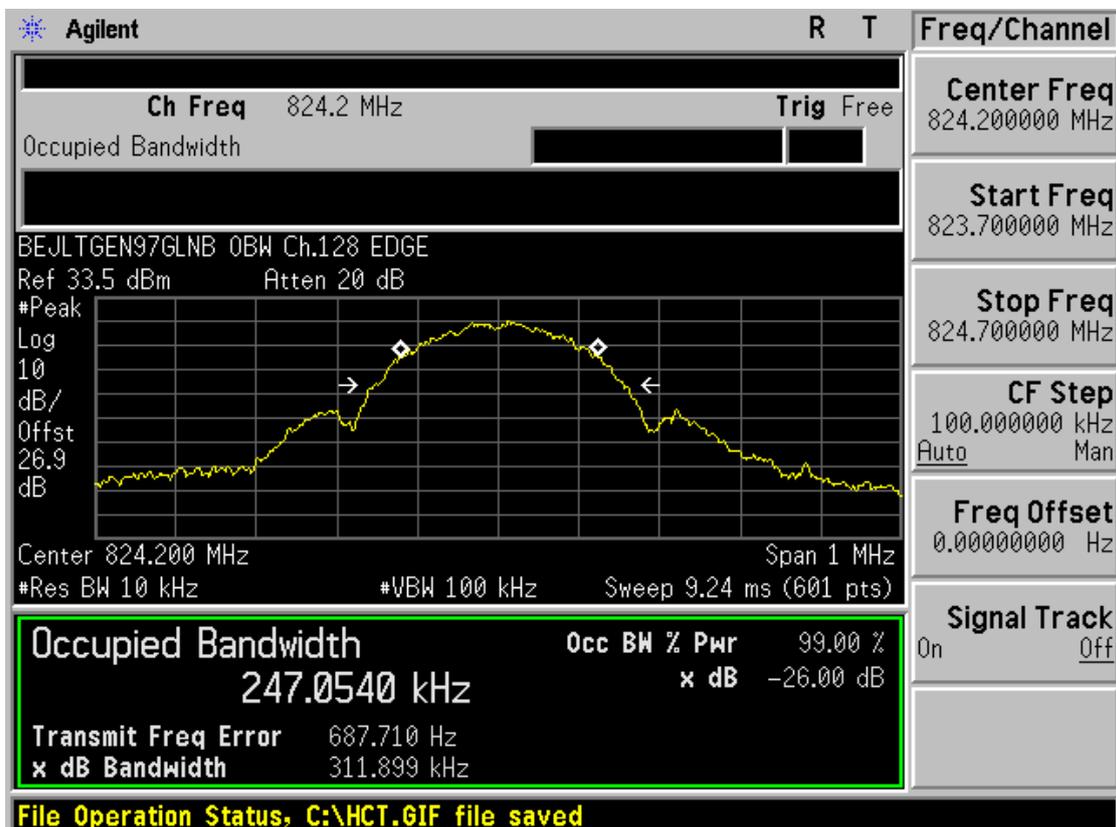


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

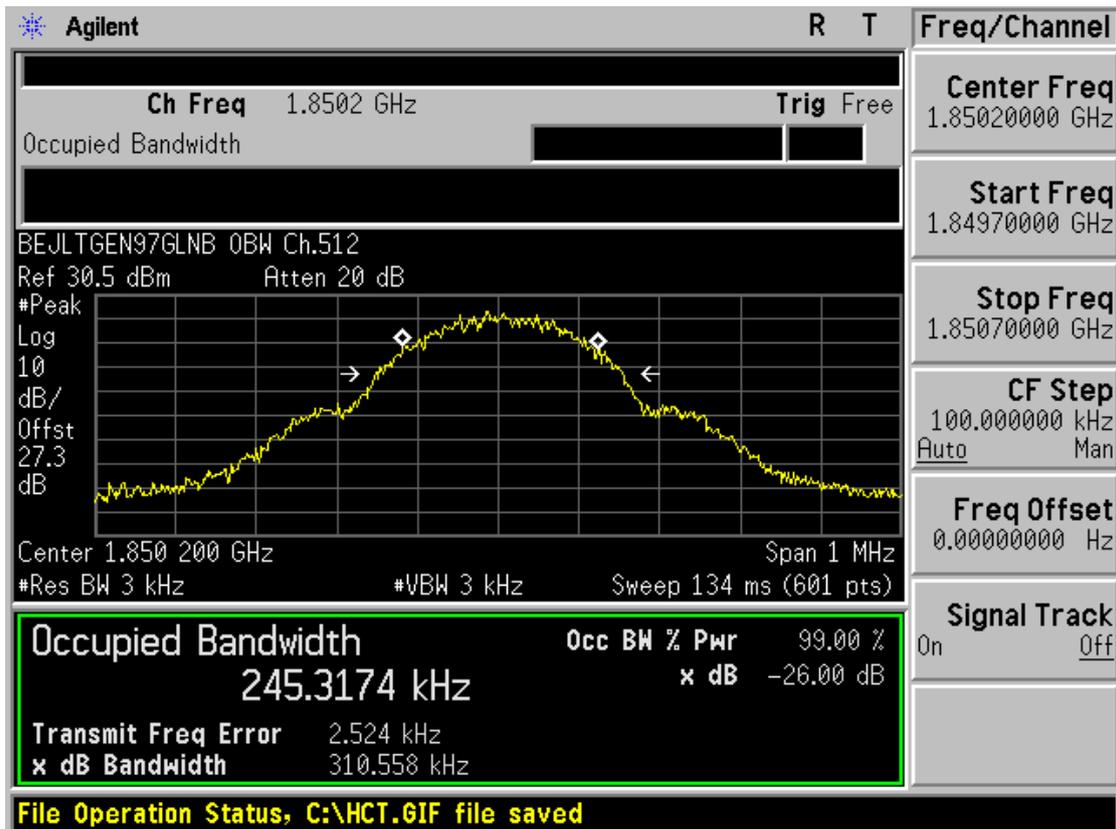
■ GSM850 MODE (251 CH.) Occupied Bandwidth



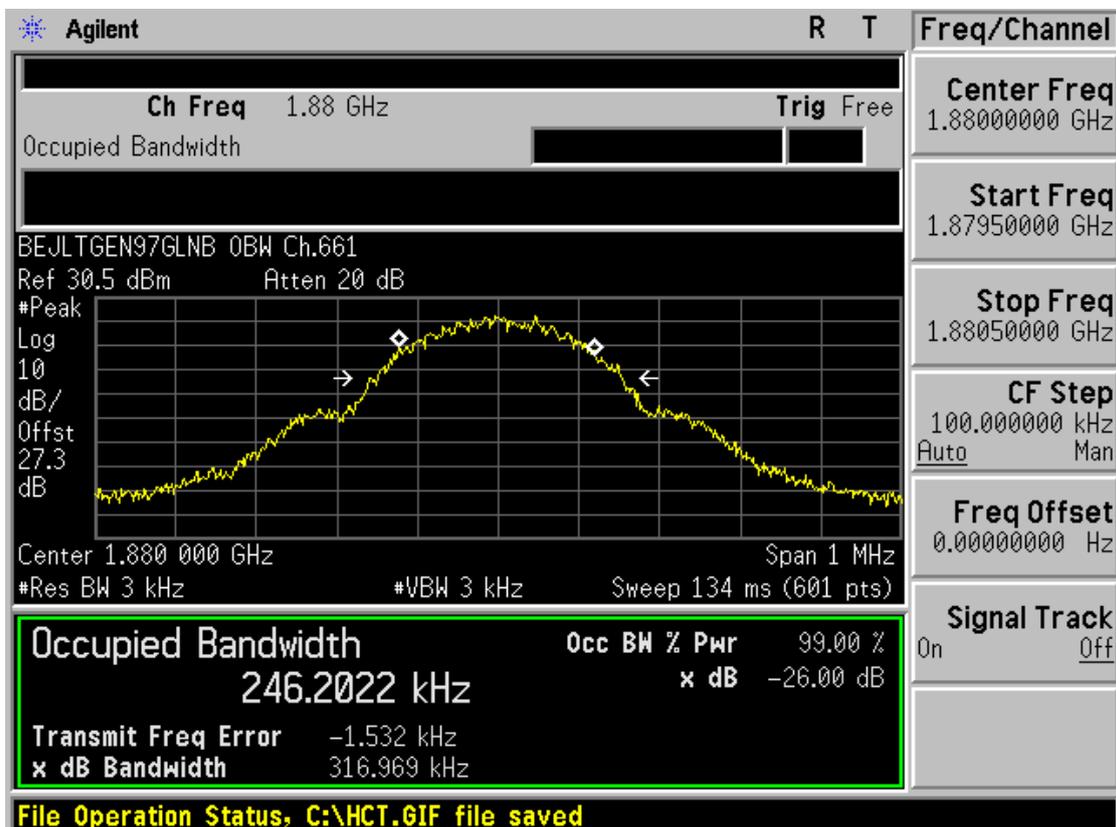
■ GSM850 EDGE (128 CH.) Occupied Bandwidth



■ GSM1900 MODE (512 CH.) Occupied Bandwidth

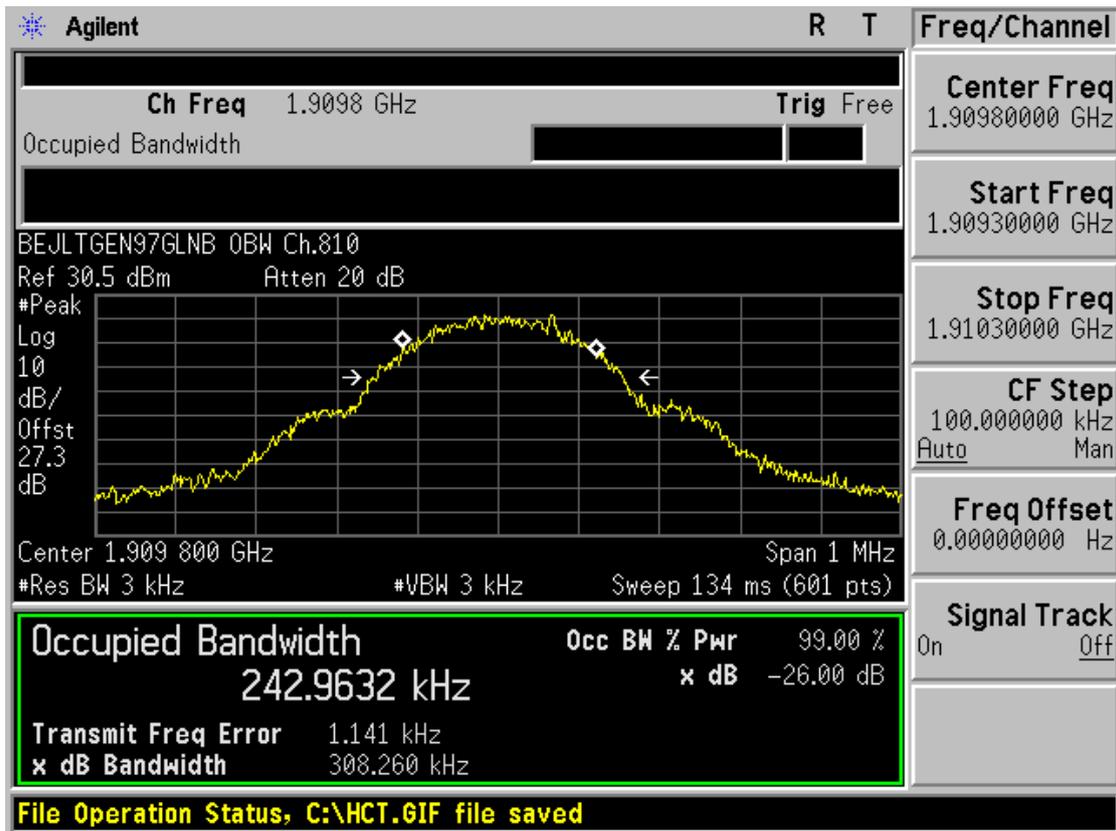


■ GSM1900 MODE (661 CH.) Occupied Bandwidth

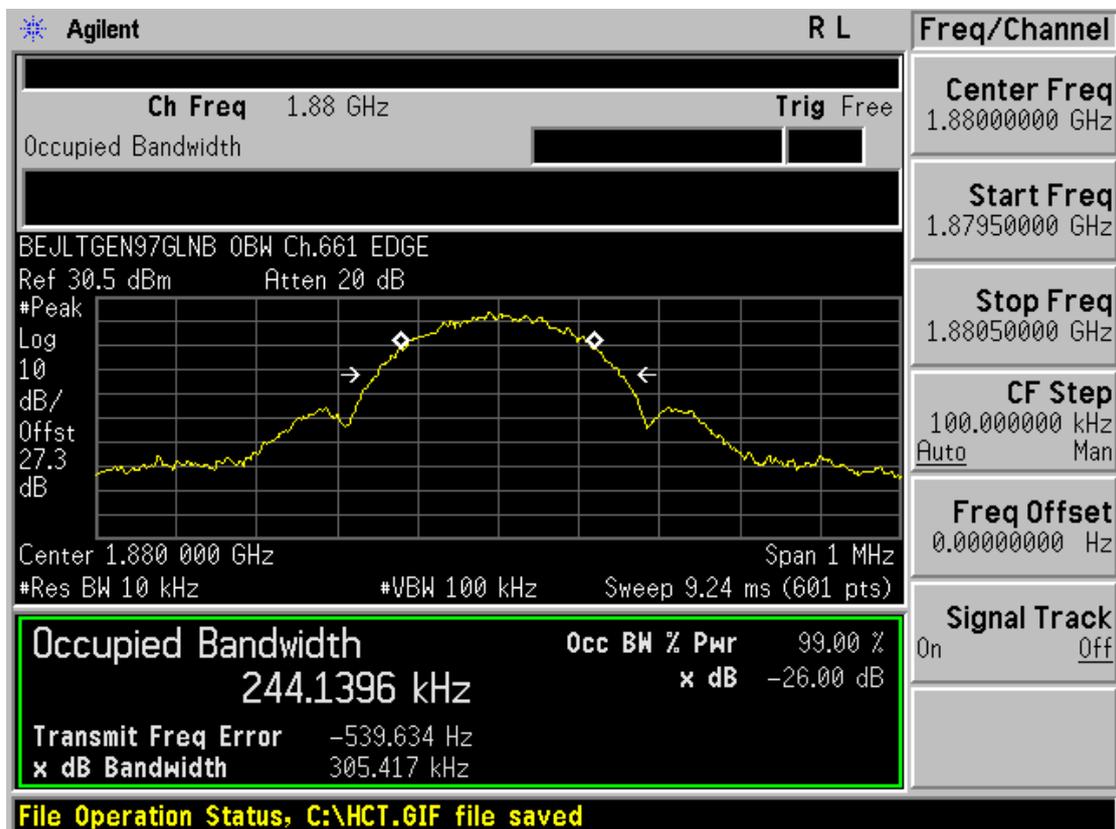


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

■ GSM1900 MODE (810 CH.) Occupied Bandwidth

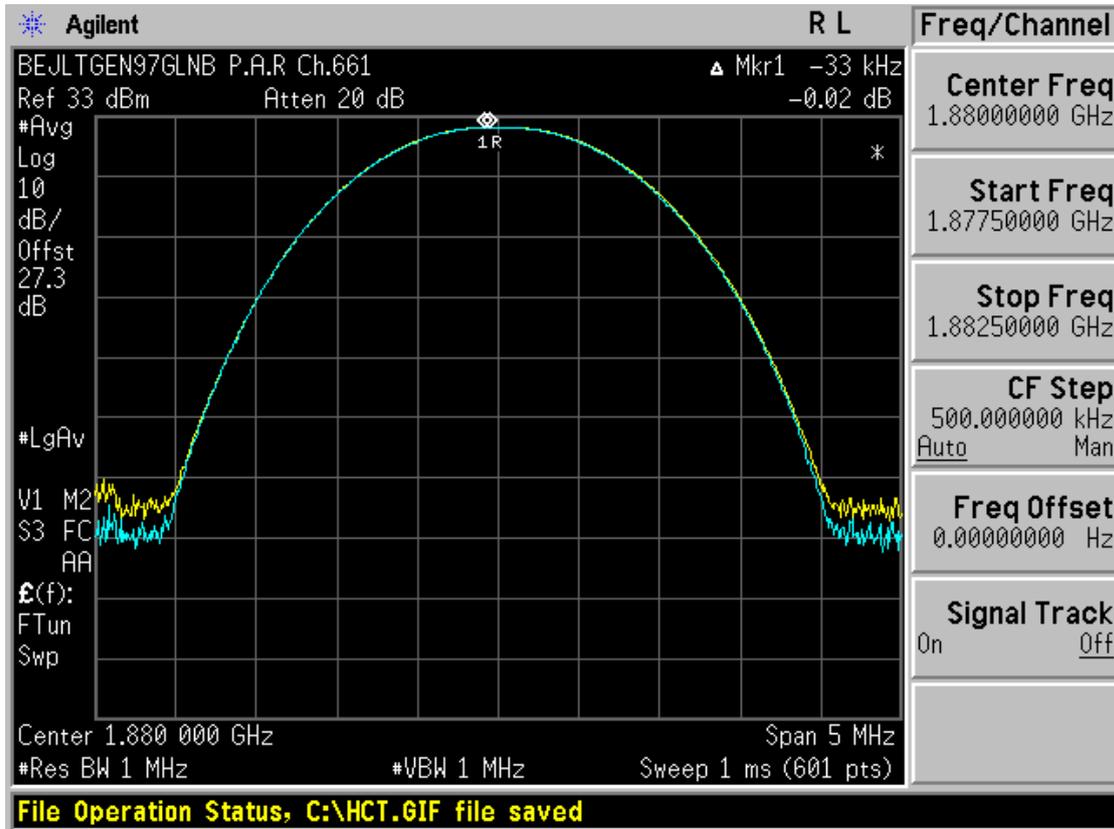


■ GSM1900 EDGE (661 CH.) Occupied Bandwidth

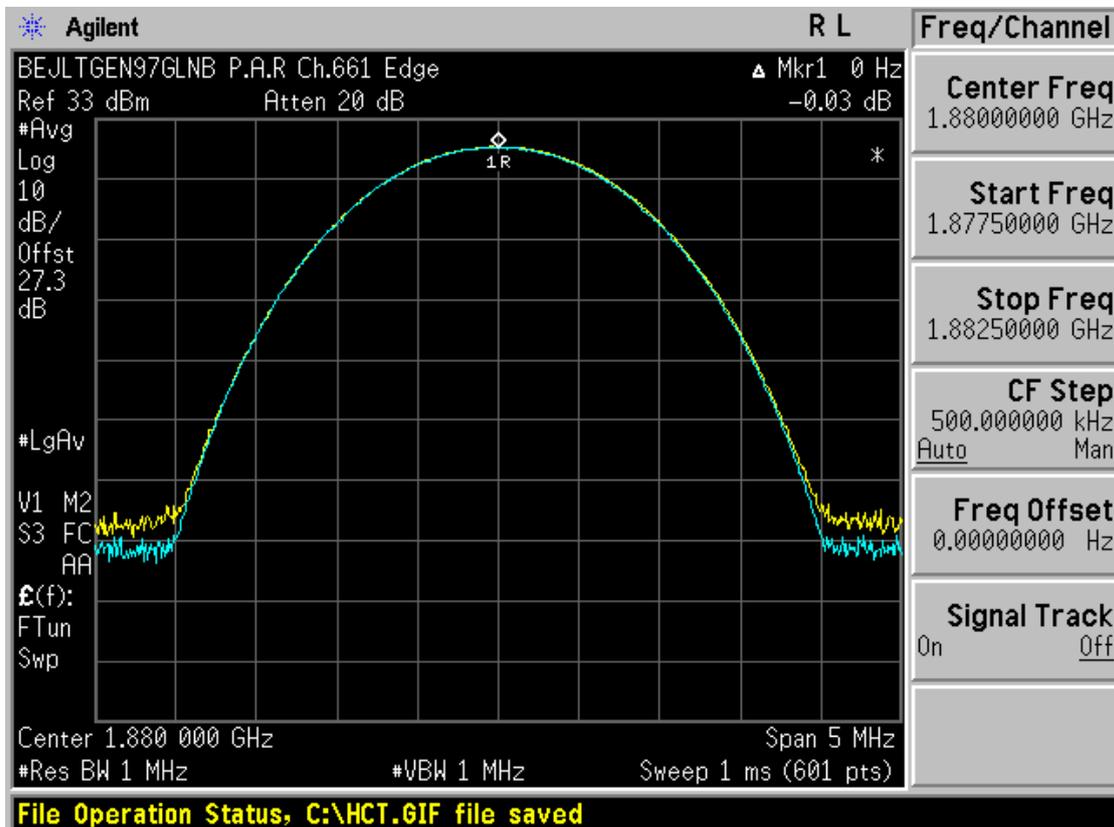


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

■ GSM1900 MODE (661 CH.) Peak-to-Average Ratio

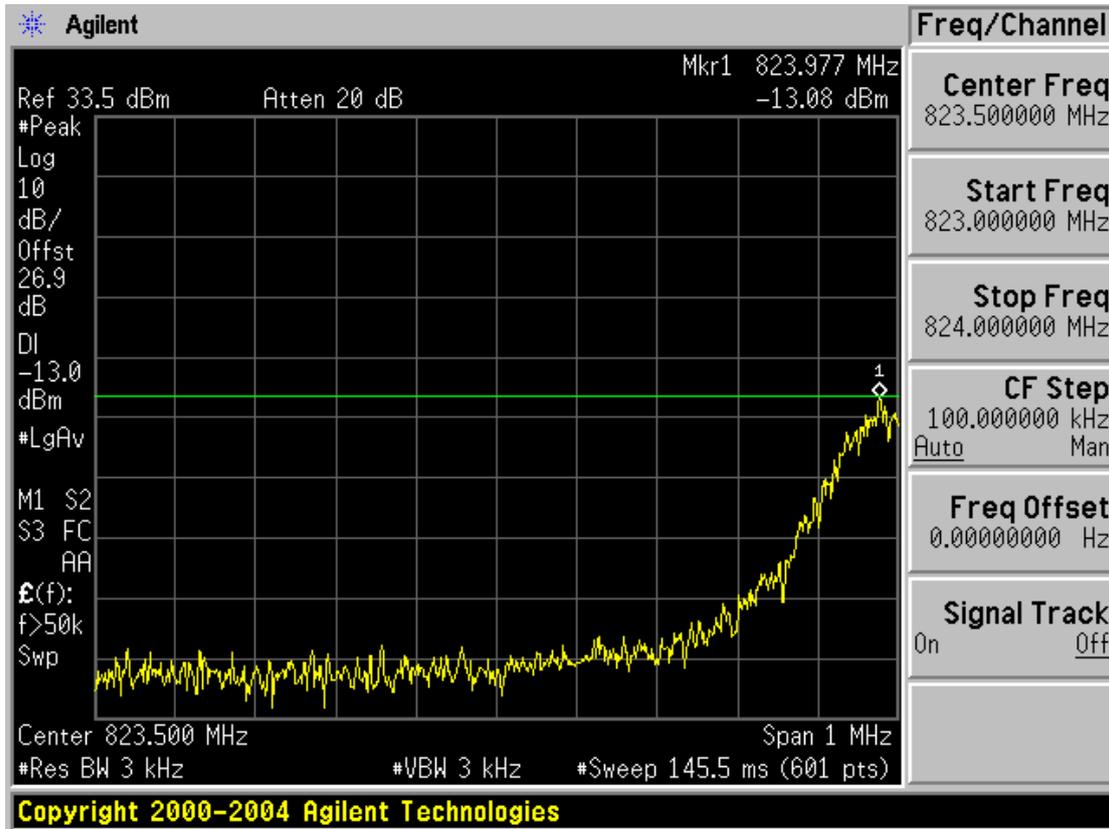


■ GSM1900 EDGE MODE (661 CH.) Peak-to-Average Ratio

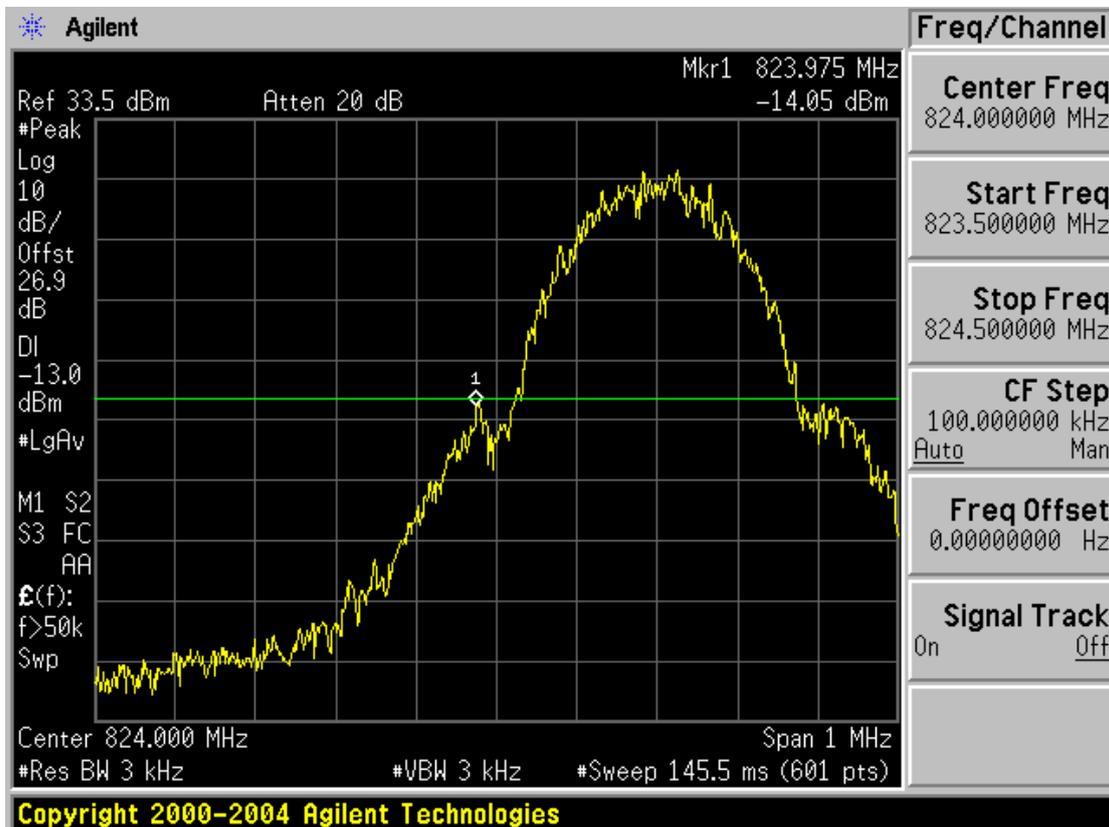


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

■ GSM850 MODE (128 CH.) Block Edge 1

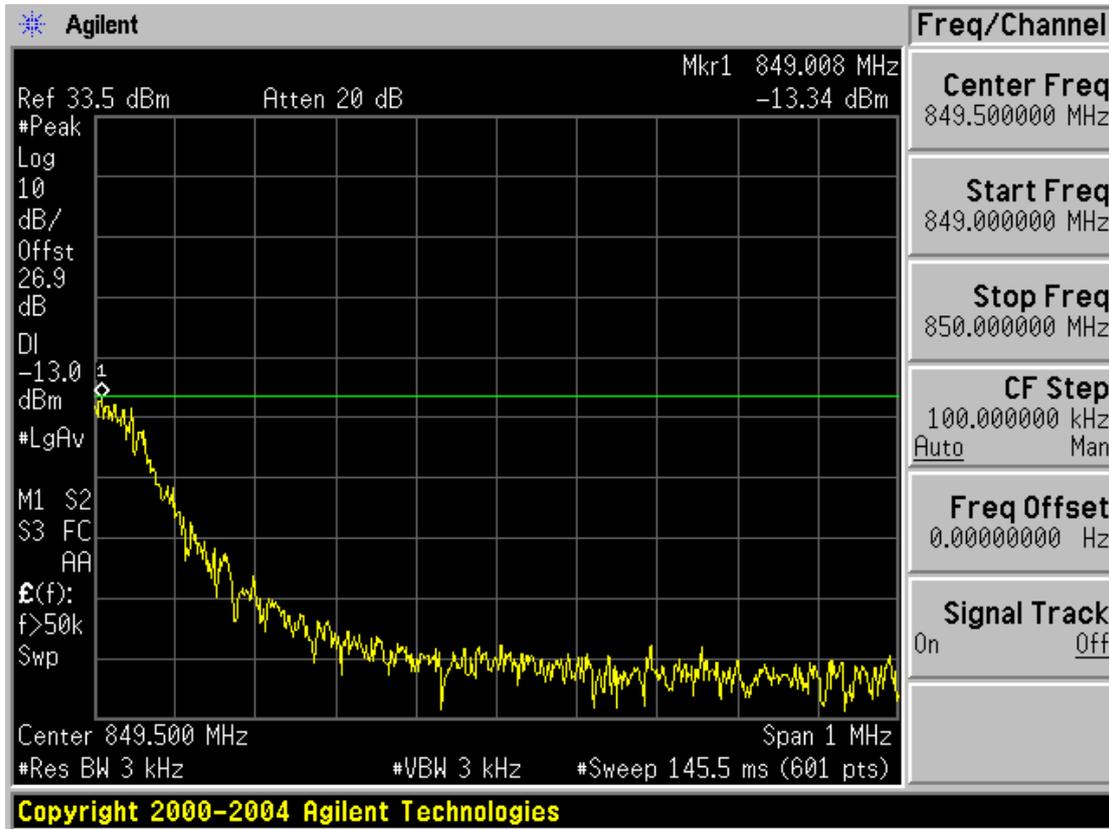


■ GSM850 MODE (128 CH.) Block Edge 2

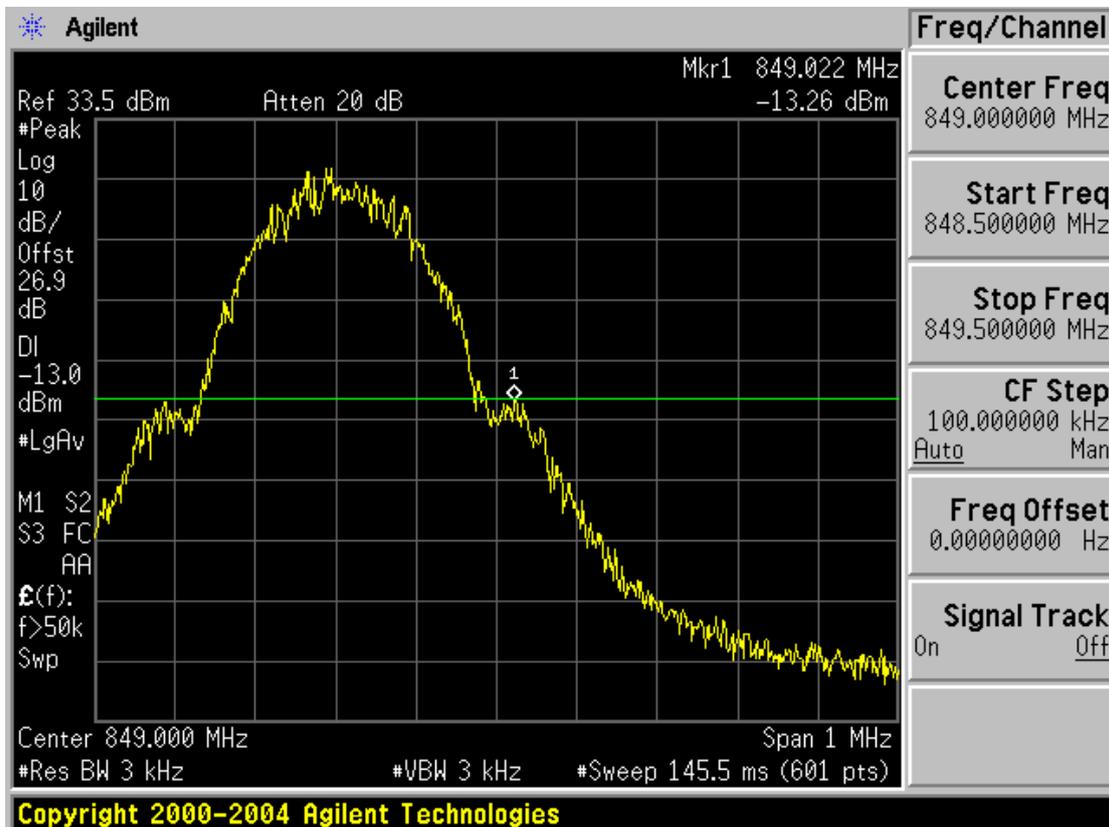


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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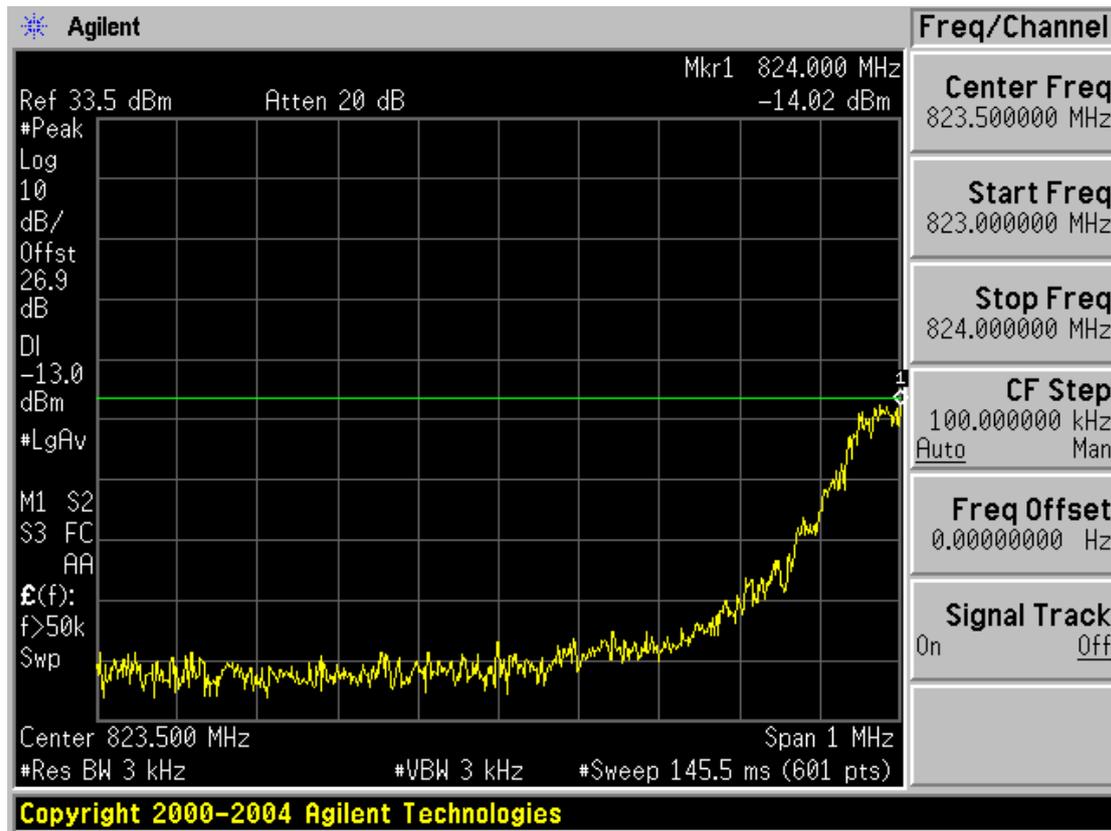
■ GSM850 MODE (251 CH.) Block Edge 1



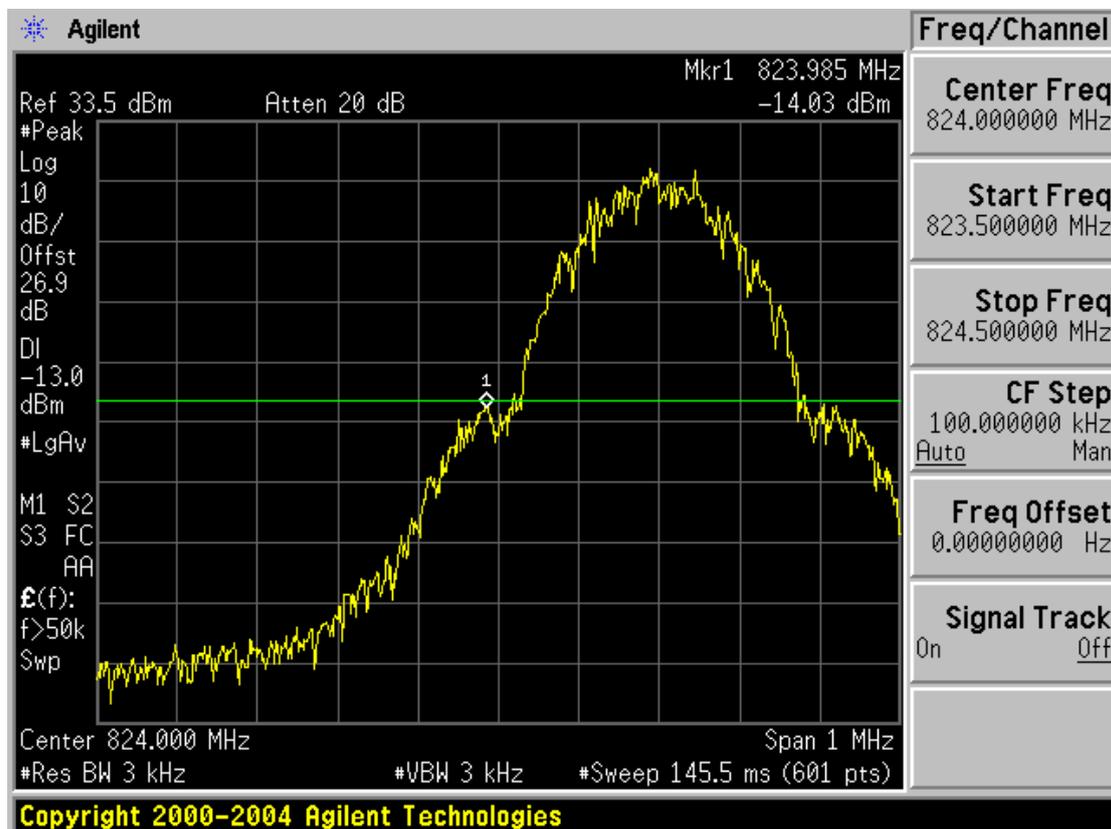
■ GSM850 MODE (251 CH.) Block Edge 2



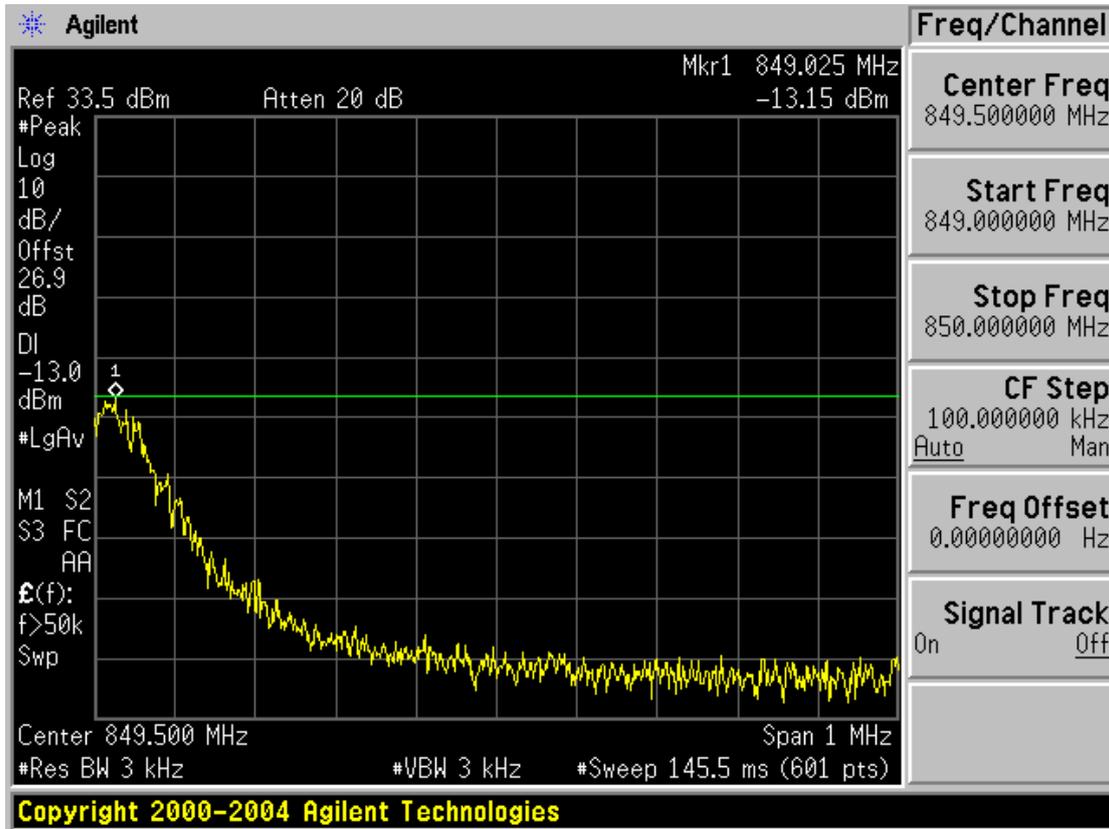
■ EDGE MODE (128 CH.) Block Edge 1



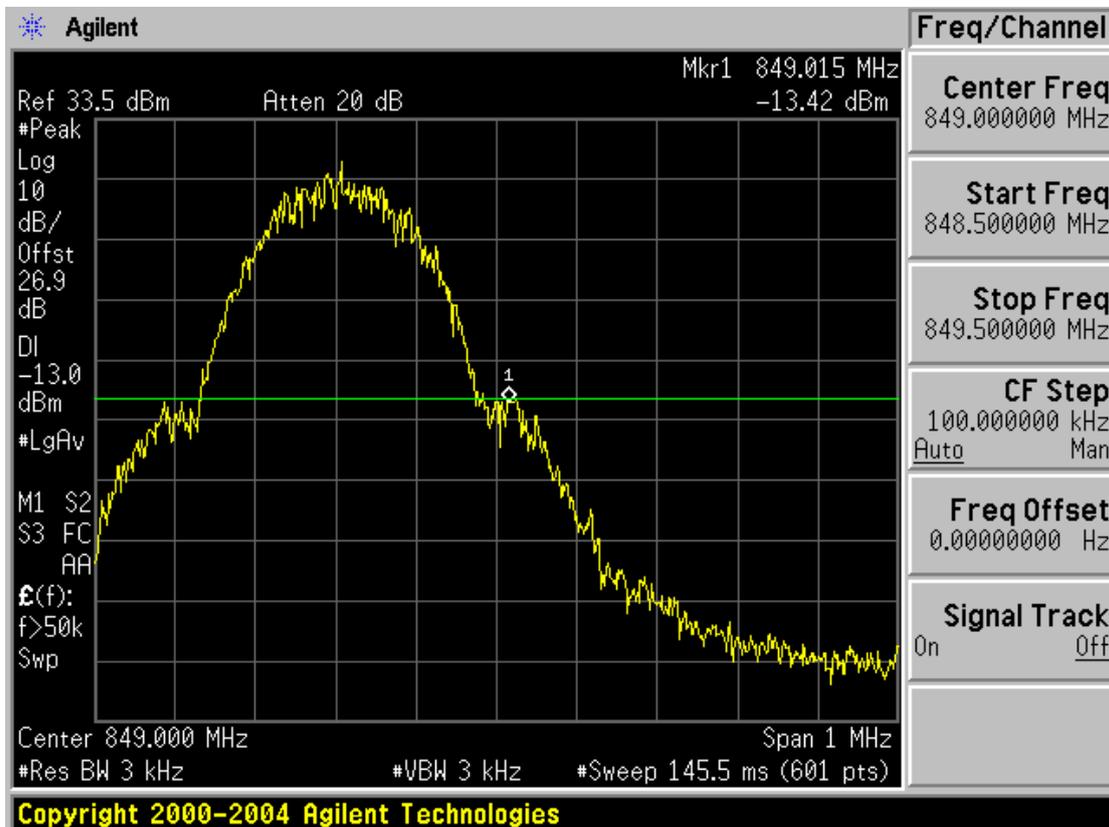
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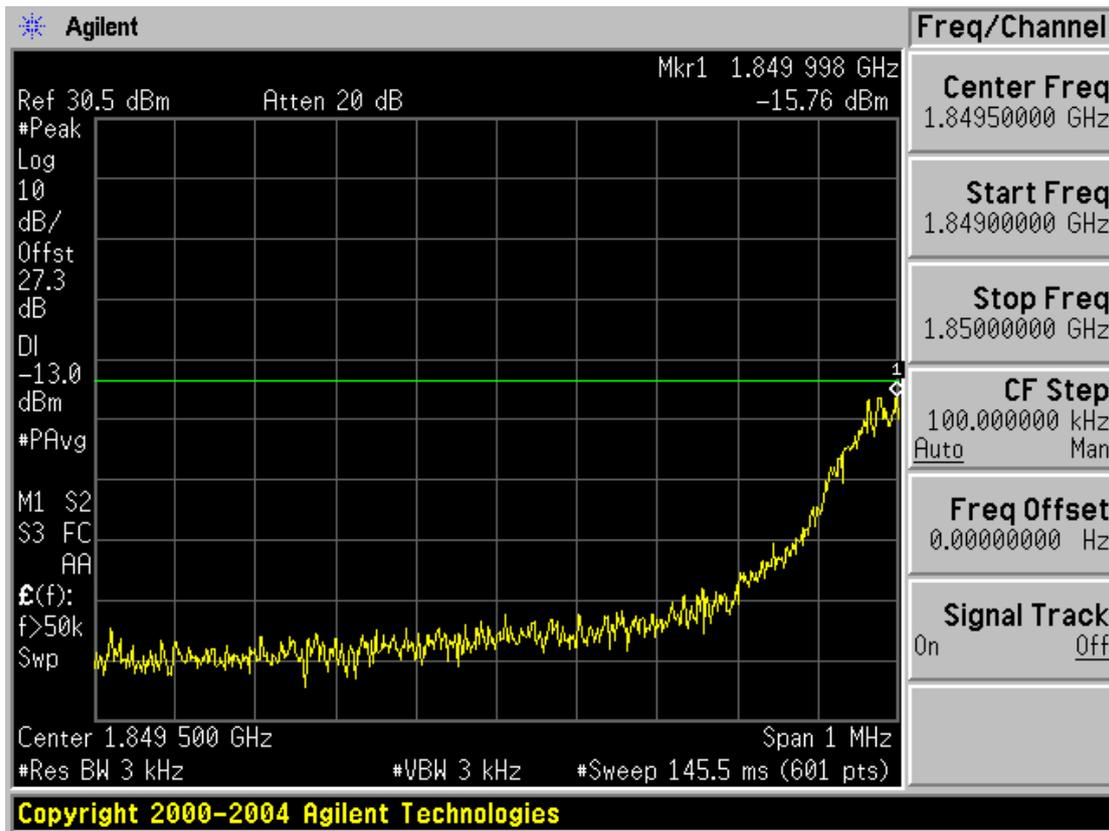
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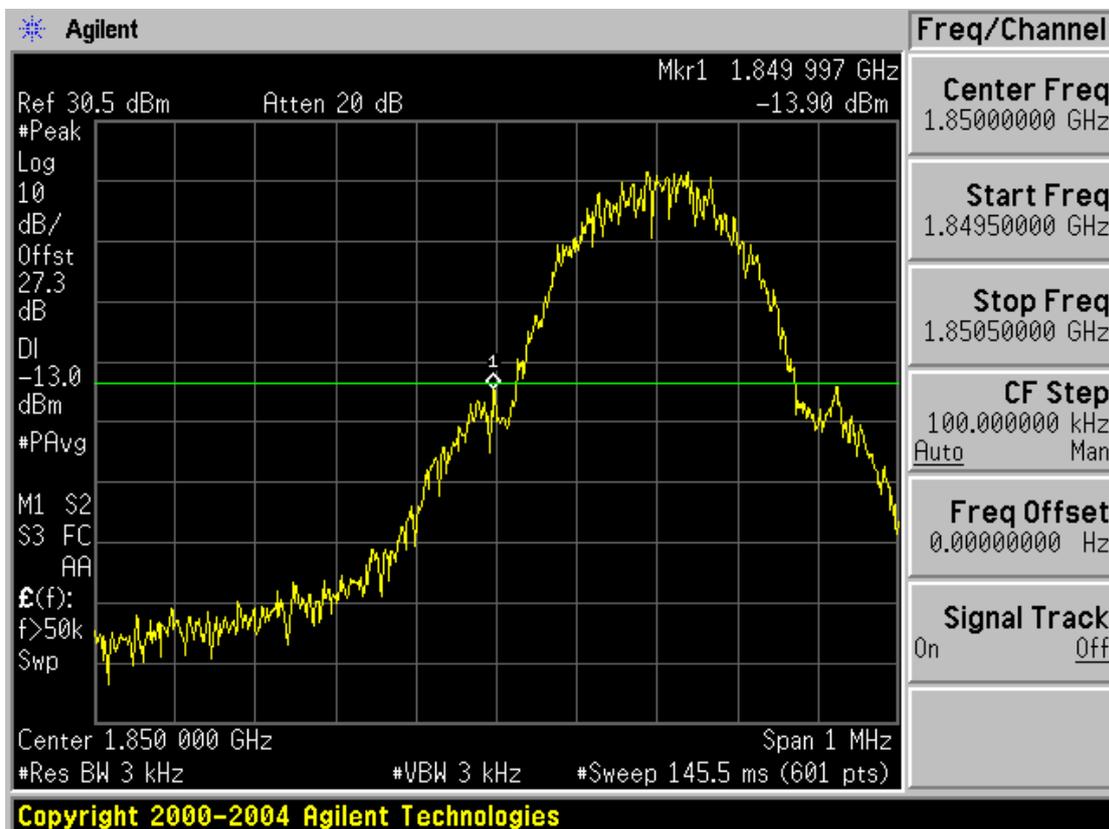
■ EDGE MODE (251 CH.) Block Edge 2



■ GSM1900 MODE (512 CH.) Block Edge 1

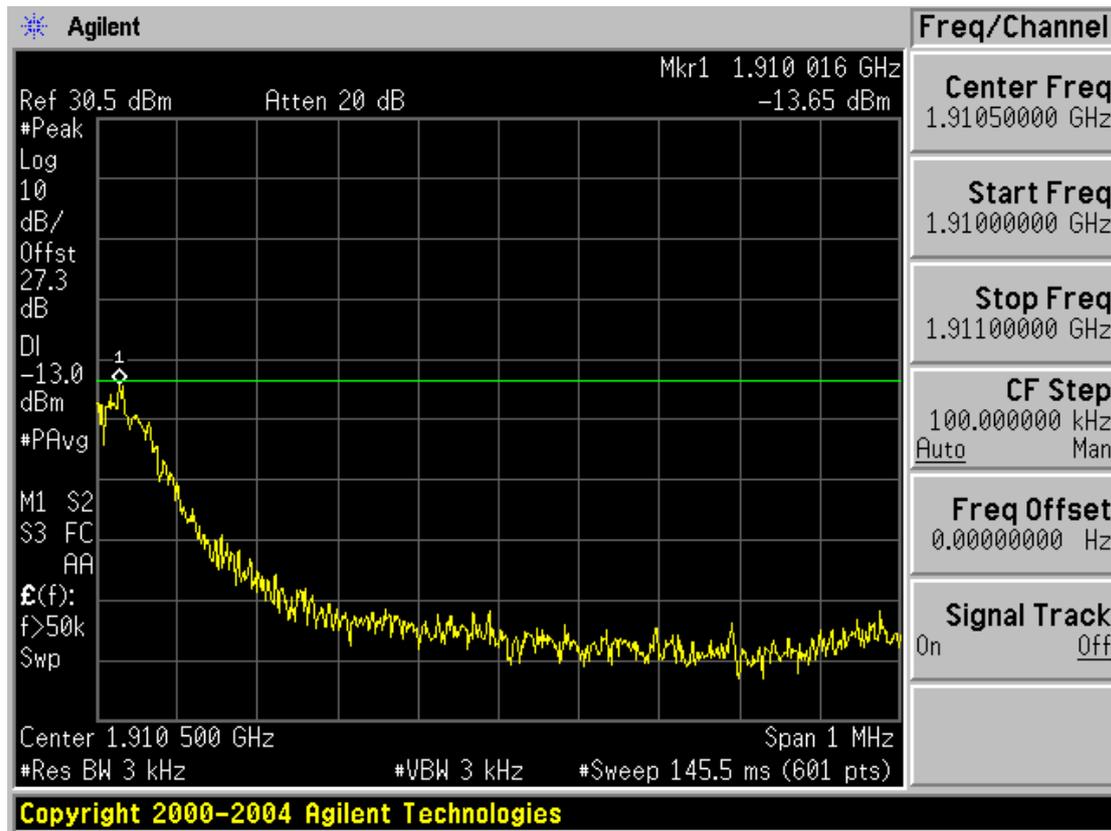


■ GSM1900 MODE (512 CH.) Block Edge 2

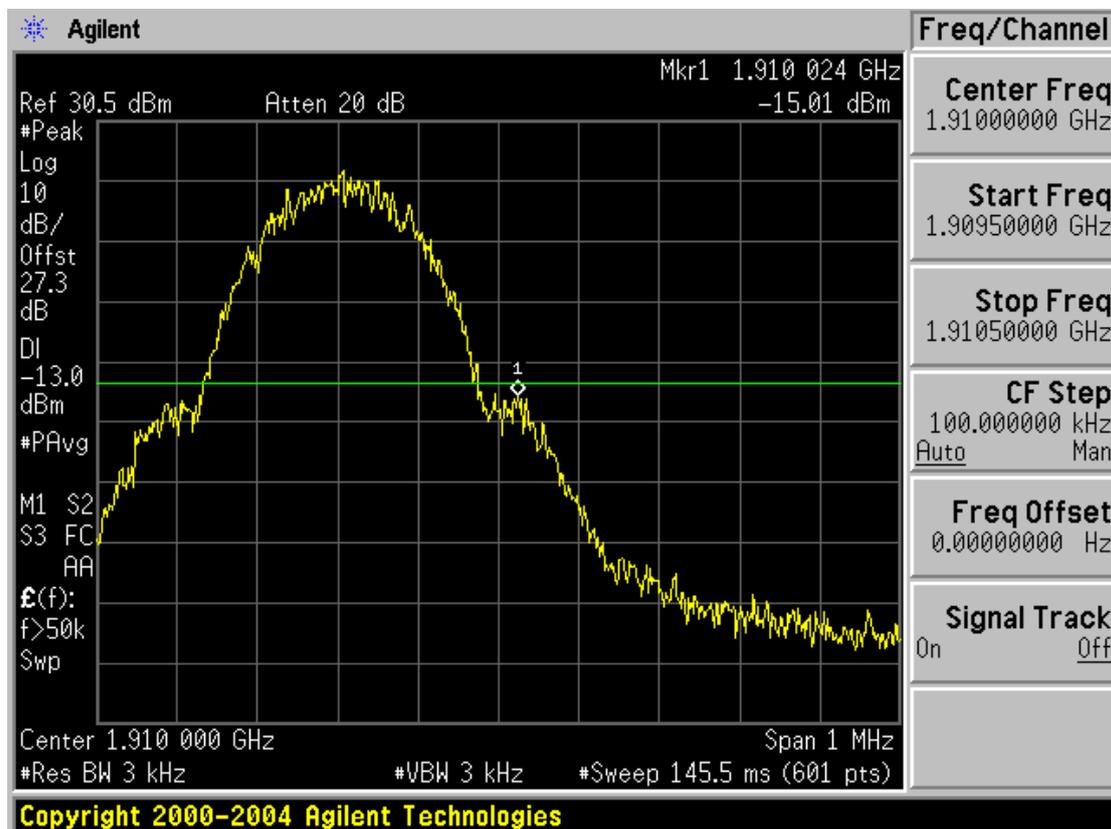


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■ GSM1900 MODE (810 CH.) Block Edge 1

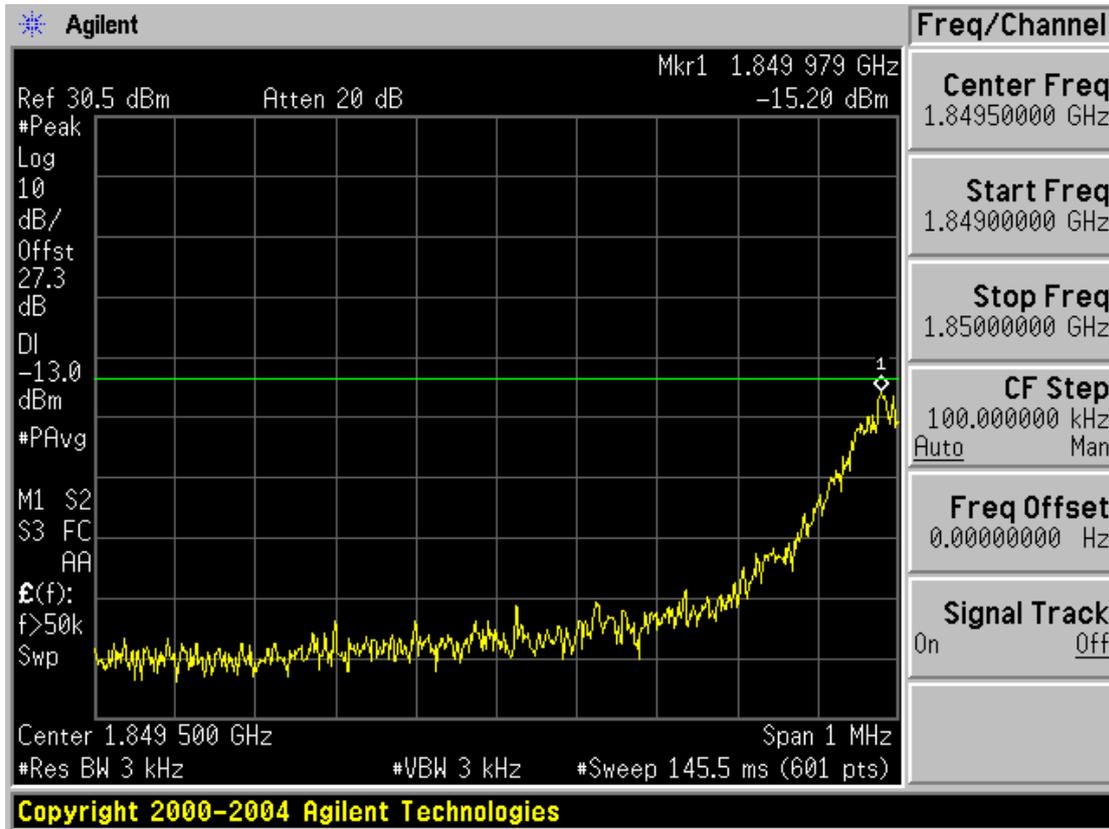


■ GSM1900 MODE (810 CH.) Block Edge 2

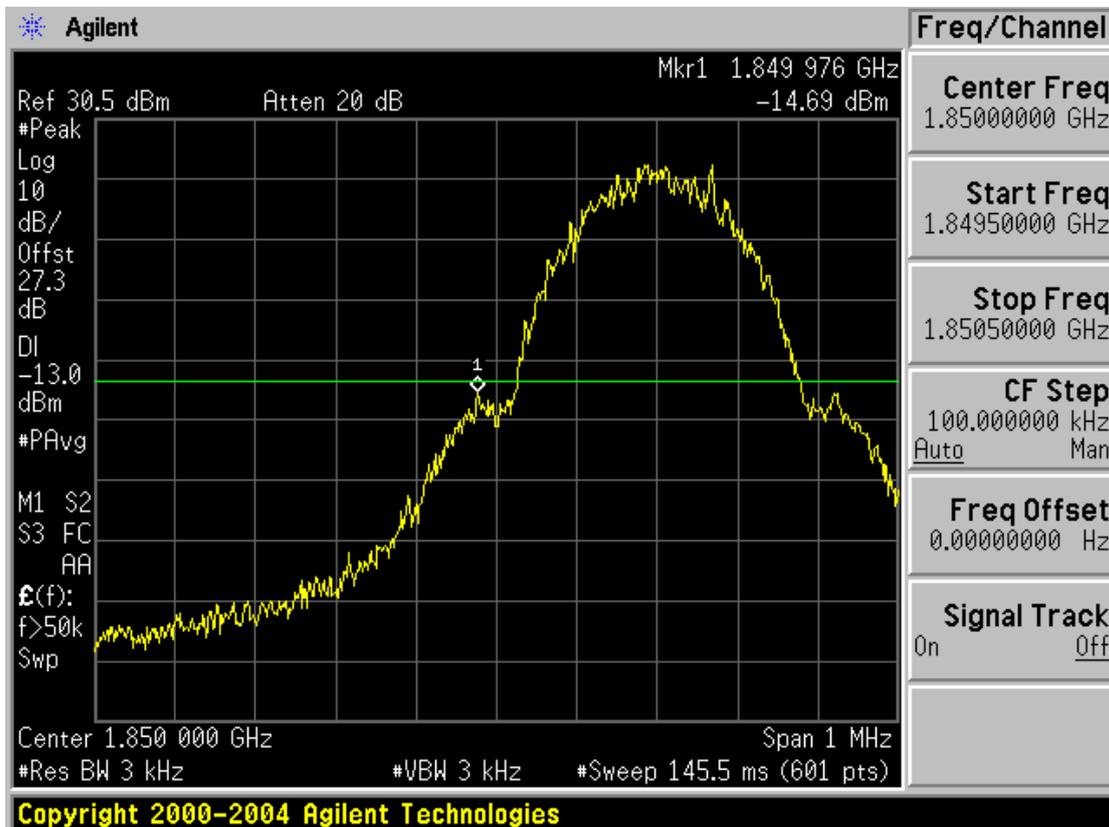


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

■ EDGE MODE (512 CH.) Block Edge 1

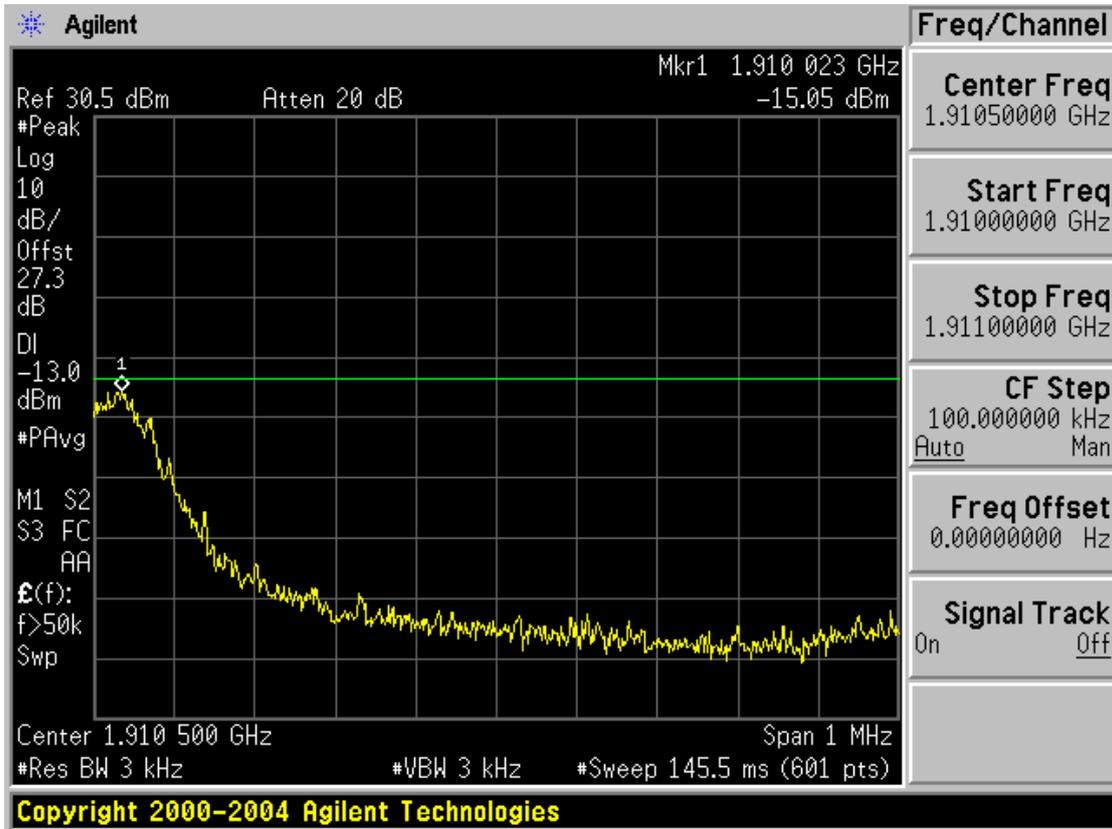


■ EDGE MODE (512 CH.) Block Edge 2

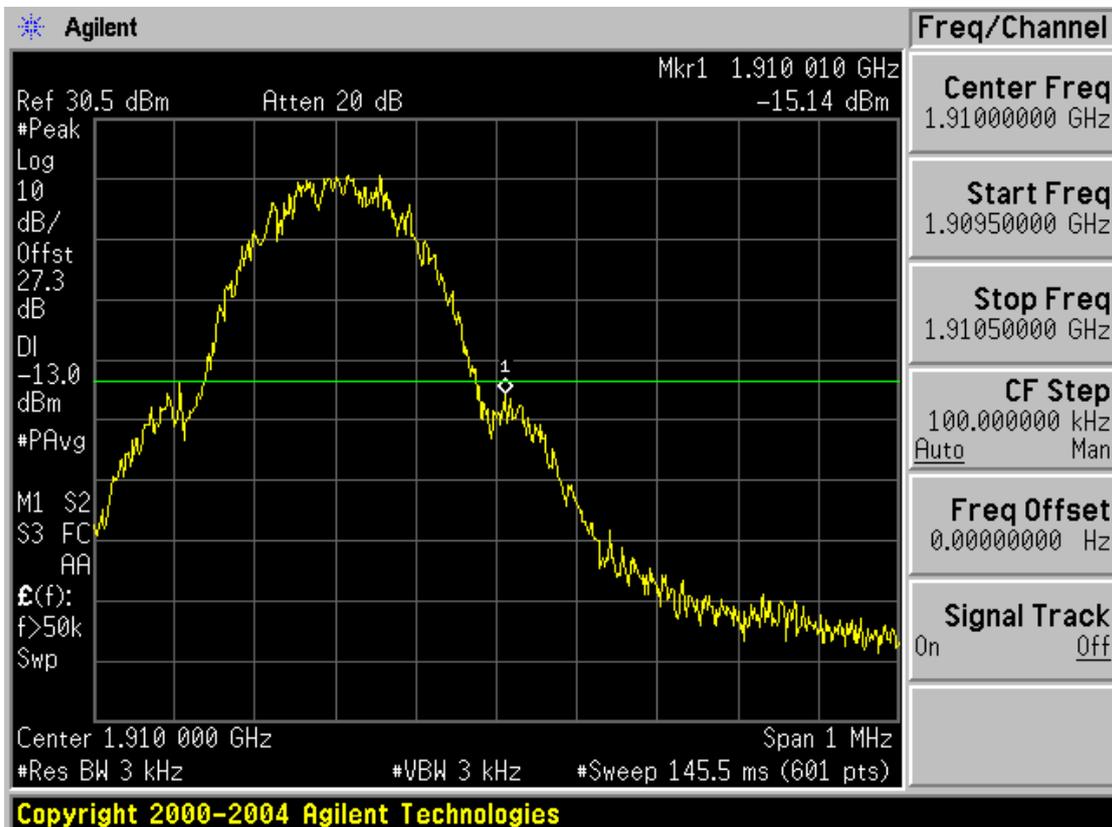


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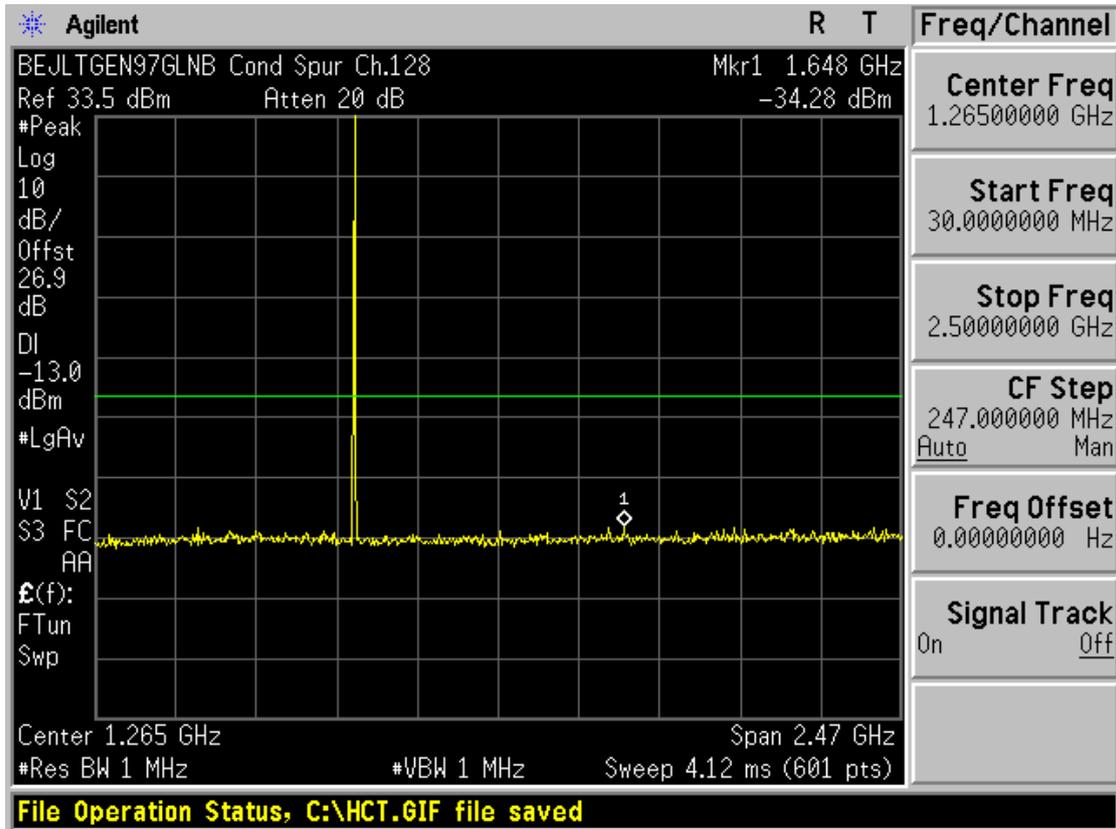
■ EDGE MODE (810 CH.) Block Edge 1



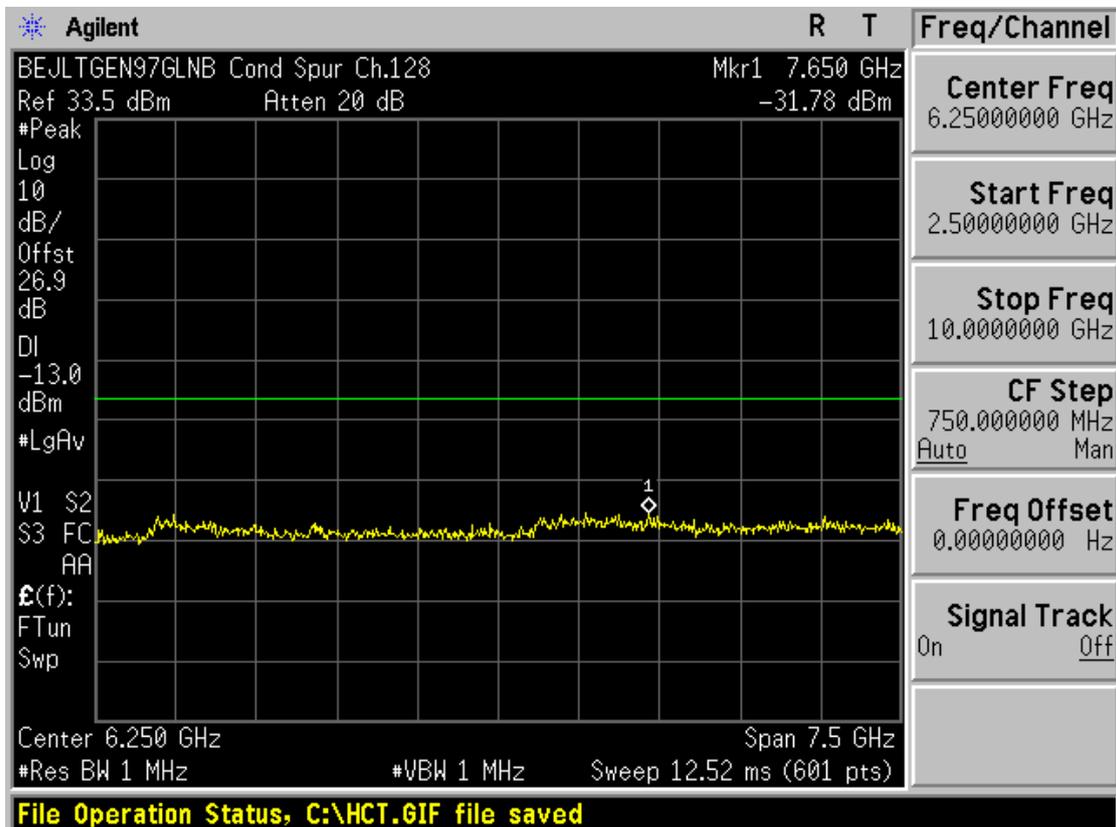
■ EDGE MODE (810 CH.) Block Edge 2



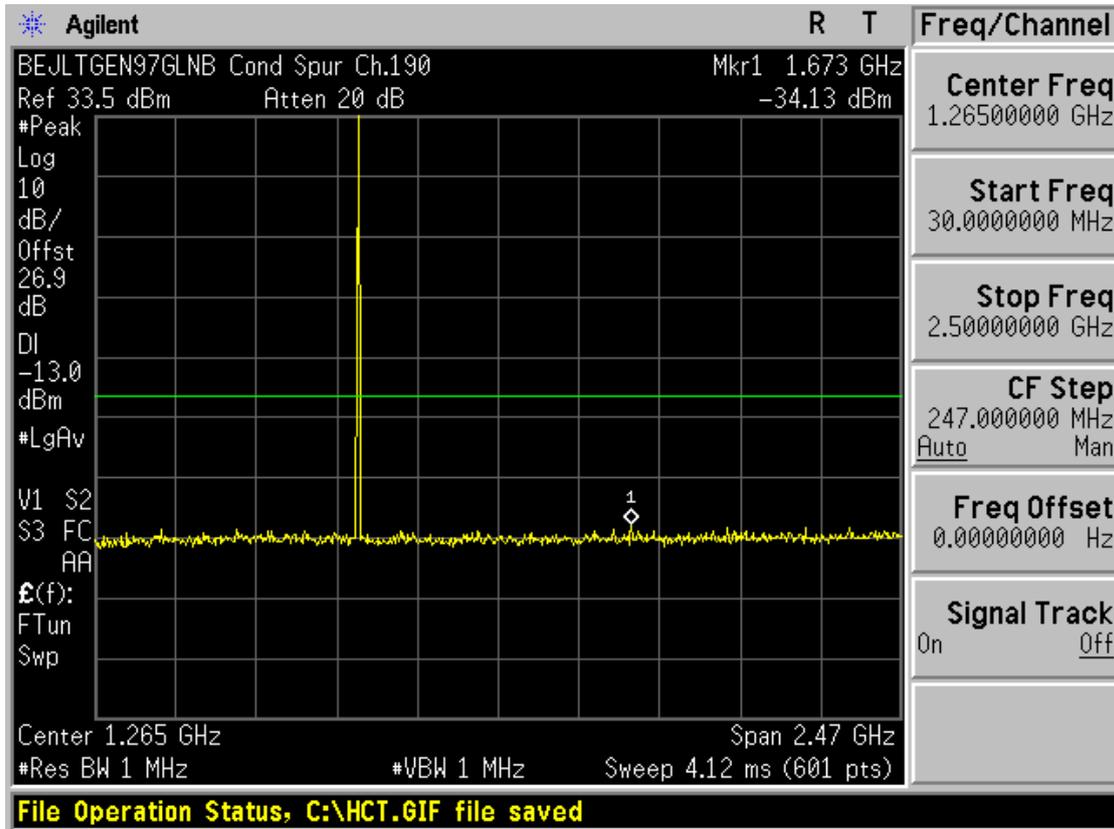
■ GSM850 MODE (128 CH.) Conducted Spurious Emissions1



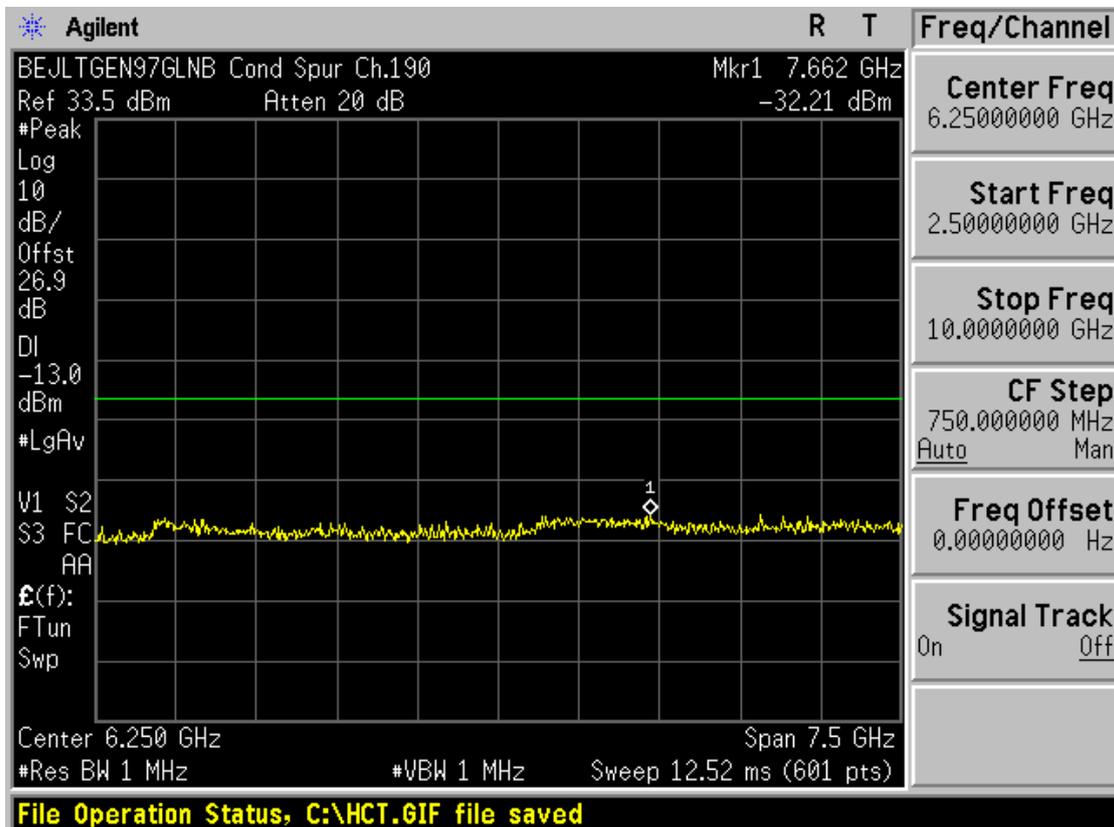
■ GSM850 MODE (128 CH.) Conducted Spurious Emissions2



■ GSM850 MODE (190 CH.) Conducted Spurious Emissions1

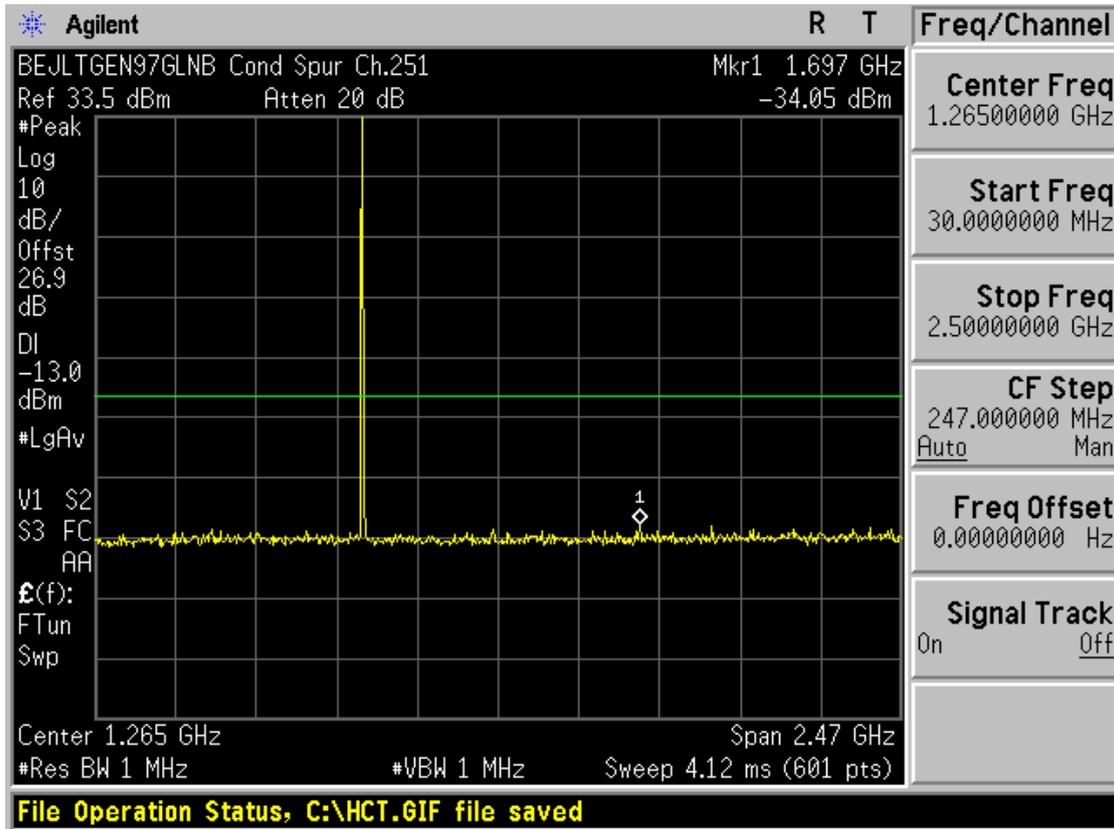


■ GSM850 MODE (190 CH.) Conducted Spurious Emissions2

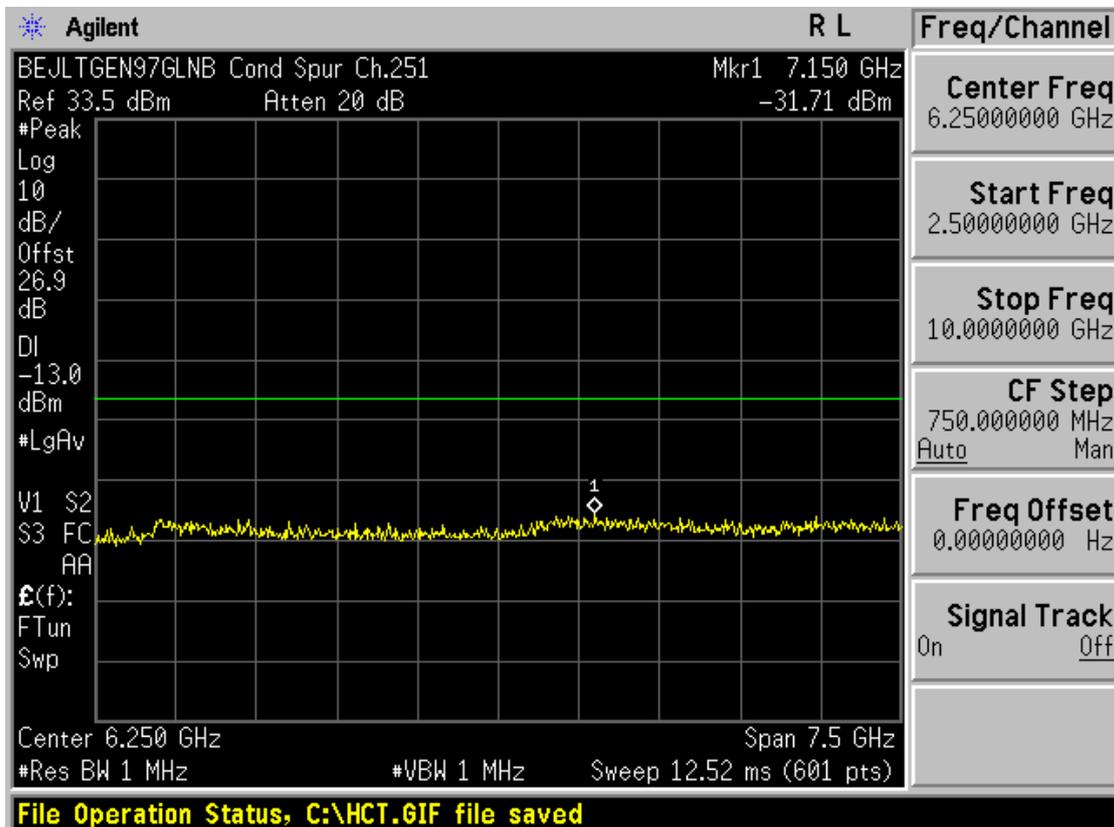


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Test Report No. HCTR1202FR19-2	Date of Issue: March 30, 2012	EUT Type: GSM Transceiver (Telematics module)	FCC ID: BEJLTGEN97GLNB

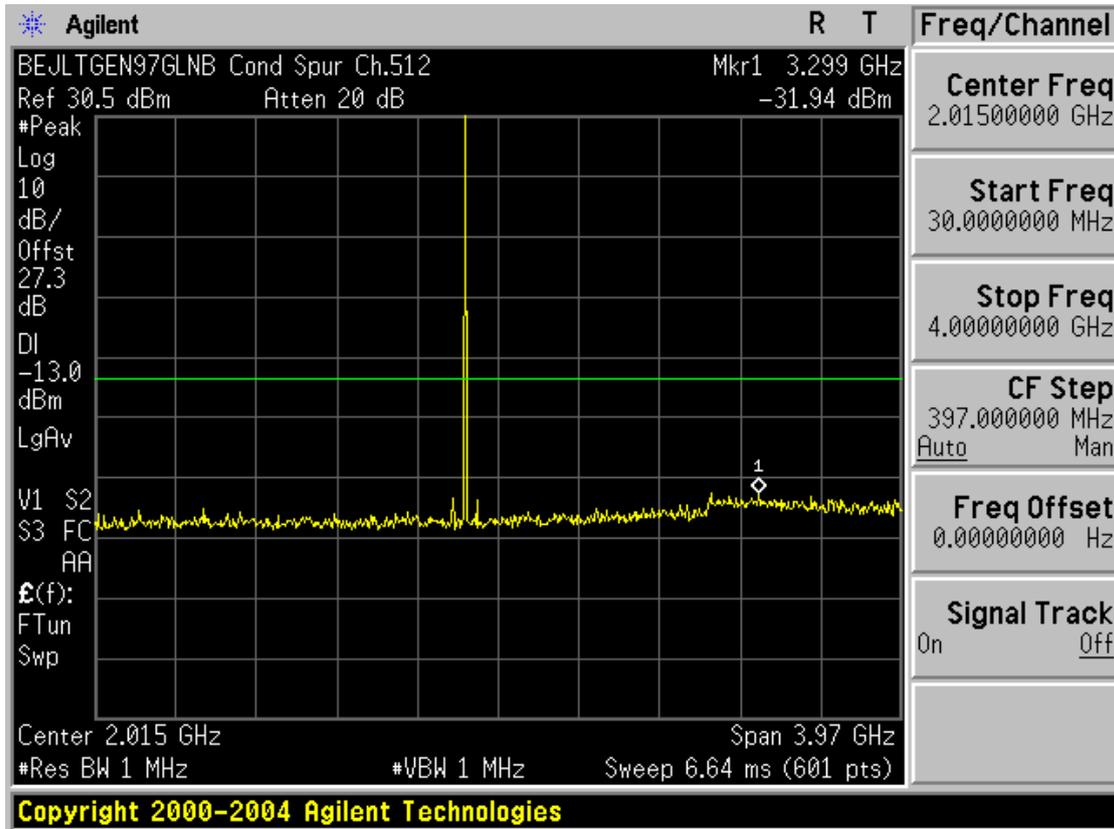
■ GSM850 MODE (251 CH.) Conducted Spurious Emissions1



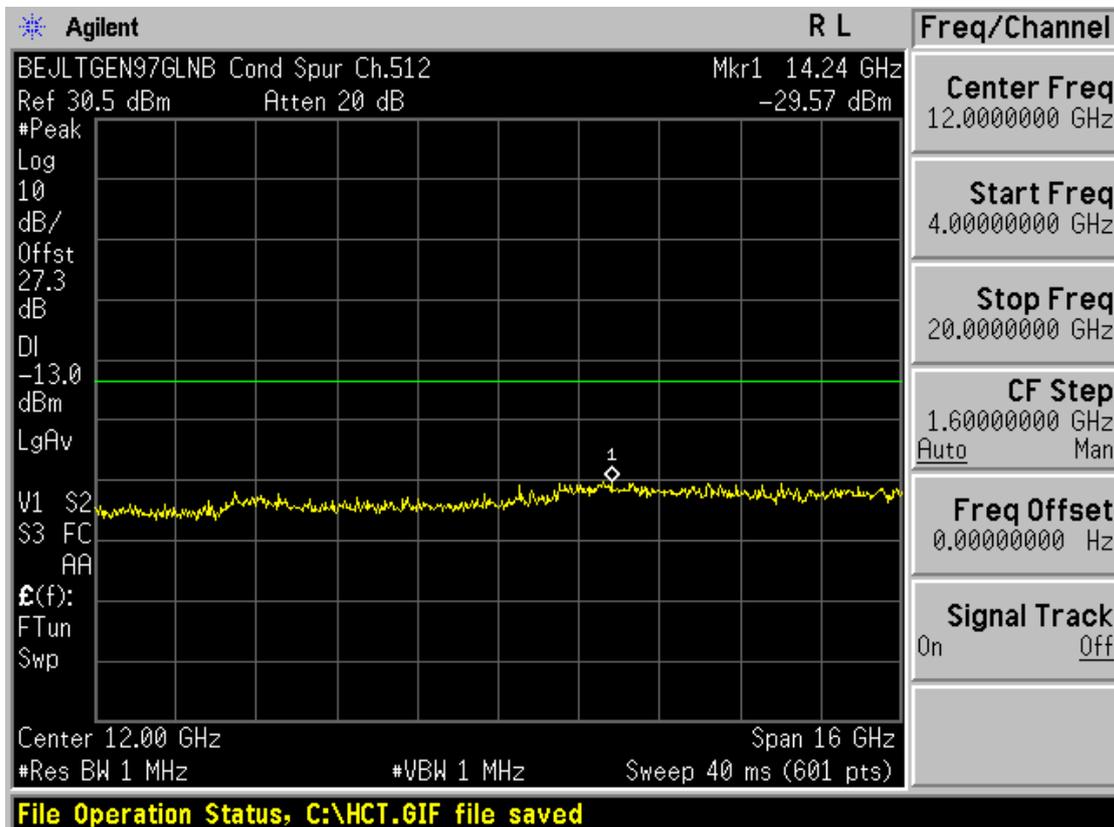
■ GSM850 MODE (251 CH.) Conducted Spurious Emissions2



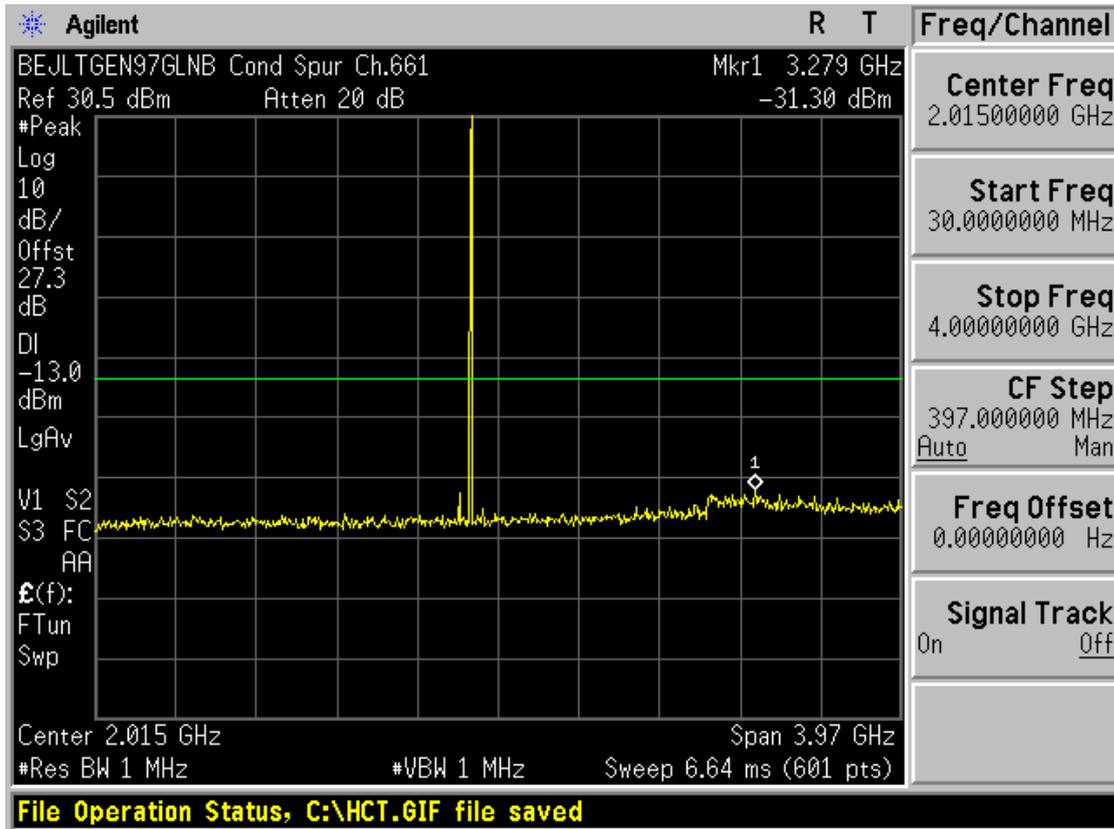
■ GSM1900 MODE (512 CH.) Conducted Spurious Emissions1



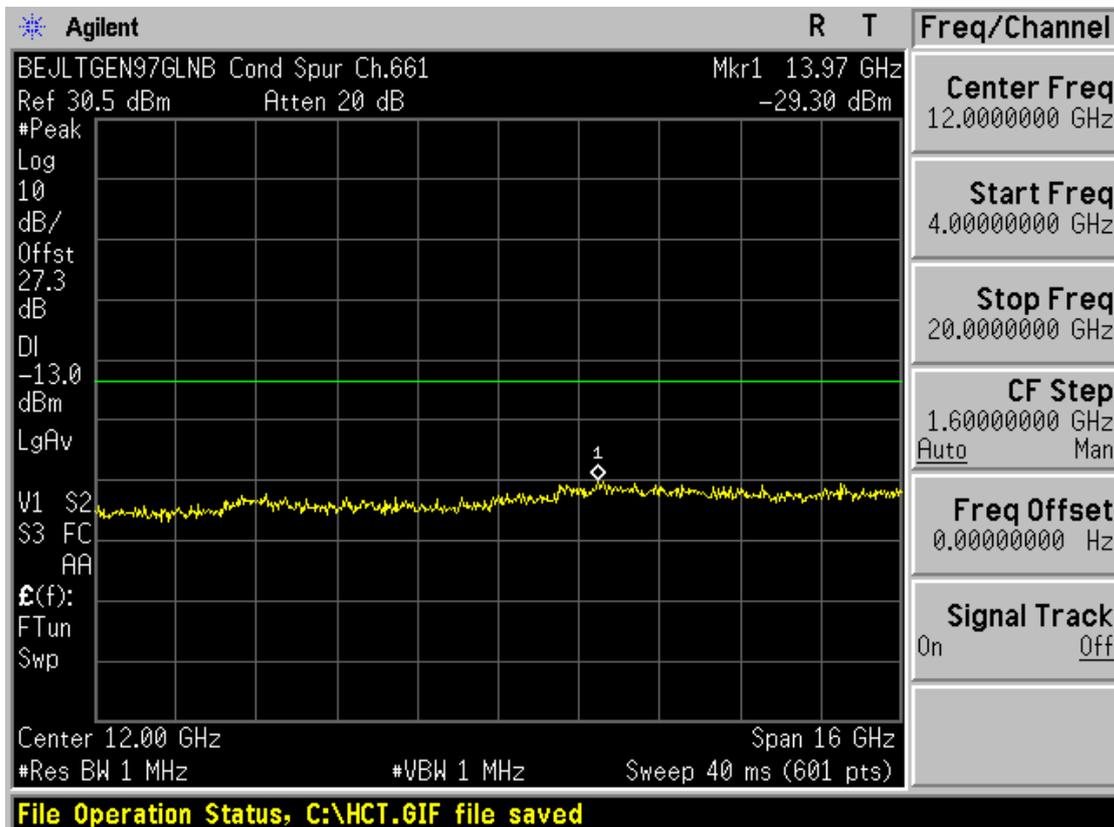
■ GSM1900 MODE (512 CH.) Conducted Spurious Emissions2



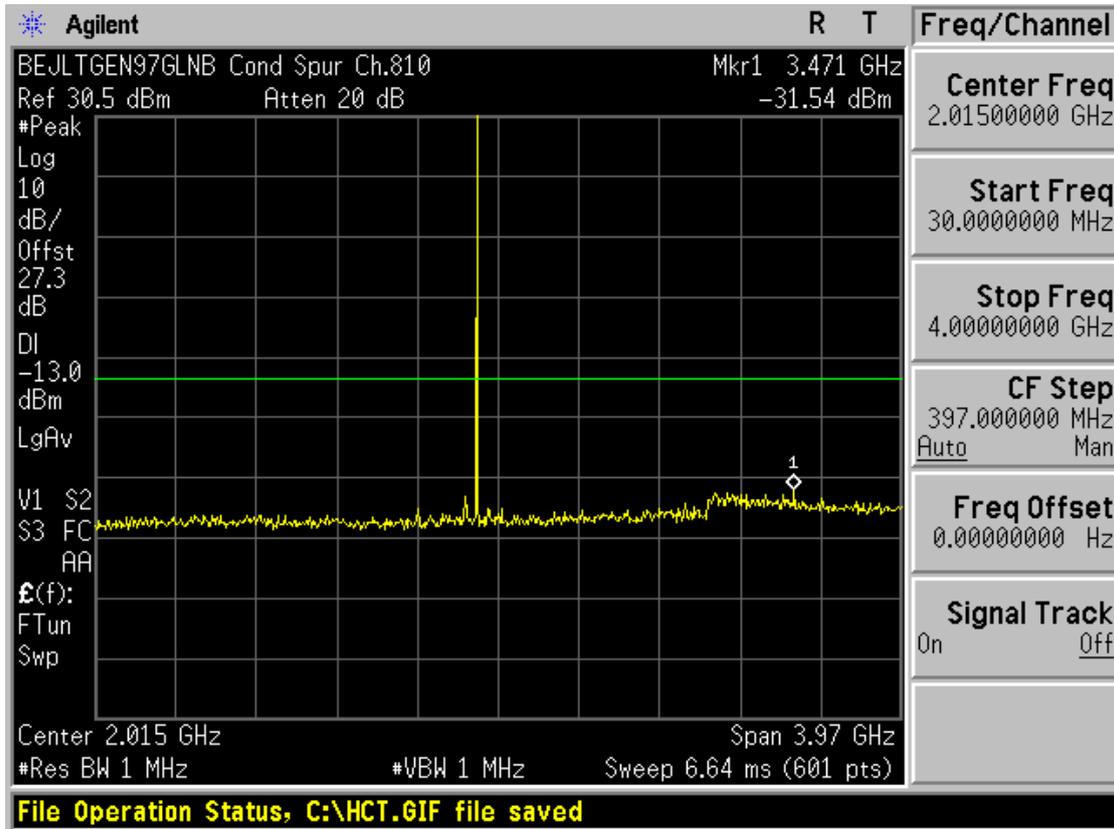
■ GSM1900 MODE (661 CH) Conducted Spurious Emissions1



■ GSM1900 MODE (661 CH.) Conducted Spurious Emissions2



■ GSM1900 MODE (810 CH.) Conducted Spurious Emissions1



■ GSM1900 MODE (810 CH.) Conducted Spurious Emissions2

