ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E and PART 27 SUBPART C REQUIREMENT

OF

Product Name:	**Offenders Bracelet**
Brand Name:	**TRACK GROUP**
Model No.:	**SHADOW V2, TR00MUV200**
Model Difference:	**N/A**
FCC ID:	**TPO-MUV2**
Report No.:	**ER/2015/20044**
Issue Date:	**Apr. 30, 2015**
FCC Rule Part:	**2 , 22H & 24E & 27C**
Prepared for:	**SecureAlert Inc 405 South Main Street Suite 700, Salt Lake City, Utah, United States, 84111**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803**

Testing Laboratory
0513

VERIFICATION OF COMPLIANCE

Applicant:	SecureAlert Inc. 405 South Main Street Suite 700, Salt Lake City, Utah, United States, 84111
Product Name:	Offenders Bracelet
Brand Name:	TRACK GROUP
Model No.:	SHADOW V2, TR00MUV200
Model Difference:	N/A
FCC ID:	TPO-MUV2
File Number:	ER/2015/20044
Date of test:	Mar. 04, 2015 ~ Apr. 30, 2015
Date of EUT Received:	Mar. 04, 2015

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.
The test results of this report relate only to the tested sample identified in this report.

Test By:	Marcus Tseng	***Date:***	Apr. 30, 2015
	Marcus Tseng / Engineer		
Prepared By:	Allen Tsai	***Date:***	Apr. 30, 2015
	Allen Tsai / Engineer		
Approved By:	Jim Chang	***Date:***	Apr. 30, 2015
	Jim Chang / Asst. Manager		

Revision History

Report Number	Revision	Description	Issue Date
ER/2015/20044	Rev.00	Initial creation of document	Apr. 30, 2015

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1. GENERAL PRODUCT INFORMATION

1.1. Product Description

General:

Product Name:	Offenders Bracelet	
Brand Name:	TRACK GROUP	
Model No.:	SHADOW V2, TR00MUV200	
Model Difference:	N/A	
Product SW/HW version:	MU2A-25 / V2	
Radio SW/HW version:	MU2A-25 / V2	
Test SW Version:	N/A	
RF power setting in TEST SW:	N/A	
Power Supply:	3.7Vdc from rechargeable lithium-ion polymer cell	
	Battery:	Model No: HJL113465,Supplier: Shenzhen HJL Battery Co.,Ltd..
IMEI:	351579052678370	

GPRS / WCDMA:

Cellular Phone Standards Frequency Range and Power	Operating Frequency		Rated Power
	GPRS 850	824.2 MHz– 848.8 MHz	33dBm
	EDGE 850	824.2 MHz– 848.8 MHz	27dBm
	GPRS 1900	1850.2MHz – 1909.8MHz	30dBm
	EDGE 1900	1850.2MHz – 1909.8MHz	26dBm
	WCDMA/HSUPA/HSDPA /HSPA+ Band II	1852.4MHz – 1907.6MHz	24dBm
	WCDMA/HSUPA/HSDPA /HSPA+ Band IV	1712.4 MHz -1752.6 MHz	24dBm
	WCDMA/HSUPA/HSDPA /HSPA+ Band V	826.4MHz - 846.6MHz	24dBm

Type of Emission:	GPRS 850	245KGXW
	EDGE 850	248KG7W
	GPRS 1900	240KGXW
	EDGE 1900	253KG7W
	WCDMA Band II	4M06F9W
	HSDPA Band II	4M07F9W
	HSUPA Band II	4M07F9W
	WCDMA Band IV	4M05F9W
	HSDPA Band IV	4M07F9W
	HSUPA Band IV	4M07F9W
	WCDMA Band V	4M07F9W
	HSDPA Band V	4M06F9W
	HSUPA Band V	4M08F9W

Max ERP/EIRP Power Measurement Result:

	dBm		W
GPRS 850 Band	24.63	ERP	0.290
GPRS 1900 Band	28.88	EIRP	0.773
EDGE 850 Band	22.61	ERP	0.182
EDGE 1900 Band	27.98	EIRP	0.628
WCDMA Band II	25.07	EIRP	0.321
WCDMA Band IV	26.36	EIRP	0.433
WCDMA Band V	17.57	ERP	0.057
HSDPA Band II	25.36	EIRP	0.344
HSDPA Band IV	26.86	EIRP	0.485
HSDPA Band V	18.28	ERP	0.067
HSUPA Band II	25.31	EIRP	0.340
HSUPA Band IV	26.72	EIRP	0.470
HSUPA Band V	18.21	ERP	0.066

1.2. Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22, 24, 27

ANSI / TIA / EIA 603C-C-2004

KDB971168 D01 Power Meas license Digital System v02r01

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

TS 151 010-1 is used to set, and measure the output power.

Note:

1. All test items have been performed and record as per the above standards.
2. The composite system is compliance with FCC Subpart B is authorized under the certification procedure.

1.3. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan. (TAF code 0513)

FCC Registration Numbers are: 990257

Canada Registration Number: 4620A-4..

1.4. Special Accessories

No special accessories were used during testing.

1.5. Equipment Modifications

There were no modifications incorporated into the EUT.

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

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

2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port

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

2.3.2 Radiated Emissions (ERP/EIRP)

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

2.4. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Following shows an offset computation example with

cable loss 1dB for GPRS/EDGE 850 and WCDMA/HSDPA/HSUPA B5

cable loss 0.7dB for GPRS/EDGE 1900 and WCDMA/HSDPA/HSUPA B2 & B4

attenuator 10 dB for all.

Offset = RF cable loss (dB)+ attenuation factor(dB) =1+10=11(dB)

Offset = RF cable loss (dB)+ attenuation factor(dB) =0.7+10=10.7(dB)

2.5. Final Amplifier Voltage and Current Information:

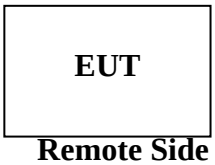
Test Mode	DC voltage (V)	DC current (mA)
GPRS 850	3.7 Vdc	283
GPRS 1900	3.7 Vdc	212
EDGE 850	3.7 Vdc	229
EDGE 1900	3.7 Vdc	253
WCDMA B2	3.7 Vdc	549
WCDMA B4	3.7 Vdc	481
WCDMA B5	3.7 Vdc	451
HSUPA B2	3.7 Vdc	522
HSUPA B4	3.7 Vdc	463
HSUPA B5	3.7 Vdc	441
HSDPA B2	3.7 Vdc	544
HSDPA B4	3.7 Vdc	453
HSDPA B5	3.7 Vdc	446

2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel-Conducted)

2G/3G

Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)



Remote Side

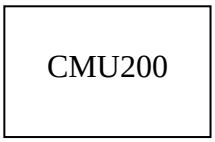


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Universal Radio Communication Tester	R&S	CMU200	102189	shielded	Un-shielded
2.	DC Power Supply	HP	E3640A	MY40005907	shielded	Un-shielded

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a)	RF Power Output	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c) §27.50(d)(4)	ERP/ EIRP measurement	Compliant
§2.1049(h)	Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a) §27.53(h)	Out of Band Emissions at Antenna Terminals and Band Edge	Compliant
§2.1053 §22.917(a) §24.238(a) §27.53(h)	Field Strength of Spurious Radiation	Compliant
§24.232(d) §27.53(i) (B)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235 §27.54	Frequency Stability	Compliant

4. DESCRIPTION OF TEST MODES

4.1. The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found as listed below. Following channel(s) was (were) selected for the final test as listed below:

BAND	ERP/EIRP	RADIATED EMISSION
GPRS/EDGE 850	E2-plan	E2-plan
GPRS/EDGE 1900	E2-plan	E2-plan
WCDMA/HSPA Band II	E2-plan	E2-plan
WCDMA/HSPA Band IV	E2-plan	E2-plan
WCDMA/HSPA Band V	E2-plan	E2-plan

GSM/GPRS/EDGE MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	128 to 251	128, 190, 251	GPRS/EDGE 850
EIRP	512 to 810	512, 661, 810	GPRS/EDGE 1900
FREQUENCY STABILITY	128 to 251 512 to 810	190 661	GPRS 850 GPRS 1900
OCCUPIED BANDWIDTH	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS/EDGE 850 GPRS/EDGE 1900
PEAK TO AVERAGE RATIO	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS/EDGE 850 GPRS/EDGE 1900
BAND EDGE	128 to 251 512 to 810	128, 251 512, 810	GPRS/EDGE 850 GPRS/EDGE 1900
CONDCUDETED EMISSION	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS/EDGE 850 GPRS/EDGE 1900
RADIATED EMISSION	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GPRS 850 GPRS 1900

WCDMA/HSPA MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	4132 to 4233	4132, 4183, 4233	WCDMA/HSPA Band V
EIRP	9262 to 9538	9262, 9400, 9583	WCDMA/HSPA Band II
	1312 to 1513	1312, 1413, 1513	WCDMA/HSPA Band IV
FREQUENCY STABILITY	4132 to 4233	4183	WCDMA Band II
	1312 to 1513	1413	WCDMA Band IV
	9262 to 9538	9400	WCDMA Band V
OCCUPIED BANDWIDTH	4132 to 4233	4132, 4183, 4233	WCDMA/HSPA Band II
	1312 to 1513	1312, 1413, 1513	WCDMA/HSPA Band IV
	9262 to 9538	9262, 9400, 9583	WCDMA/HSPA Band V
PEAK TO AVERAGE RATIO	4132 to 4233	4132, 4183, 4233	WCDMA/HSPA Band II
	1312 to 1513	1312, 1413, 1513	WCDMA/HSPA Band IV
	9262 to 9538	9262, 9400, 9583	WCDMA/HSPA Band V
BAND EDGE	4132 to 4233	4132, 4233	WCDMA/HSPA Band II
	1312 to 1513	1312, 1513	WCDMA/HSPA Band IV
	9262 to 9538	9262, 9583	WCDMA/HSPA Band V
CONDCUDETED EMISSION	4132 to 4233	4132, 4183, 4233	WCDMA/HSPA Band II
	1312 to 1513	1312, 1413, 1513	WCDMA/HSPA Band IV
	9262 to 9538	9262, 9400, 9583	WCDMA/HSPA Band V
RADIATED EMISSION	4132 to 4233	4132, 4183, 4233	HSDPA Band II
	1312 to 1513	1312, 1413, 1513	HSDPA Band IV
	9262 to 9538	9262, 9400, 9583	HSDPA Band V

5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Power Output	+/- 1.42 dB
ERP/ EIRP measurement	Vertical Polarization = +/- 4.74dB Horizontal Polarization =+/- 4.62dB
99% Occupied Bandwidth	+/- 123.36 Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 1.55 dB
Peak to Average Ratio	+/- 1.55 dB
Frequency Stability vs. Temperature	+/- 123.36 Hz
Frequency Stability vs. Voltage	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : **Horizontal**)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

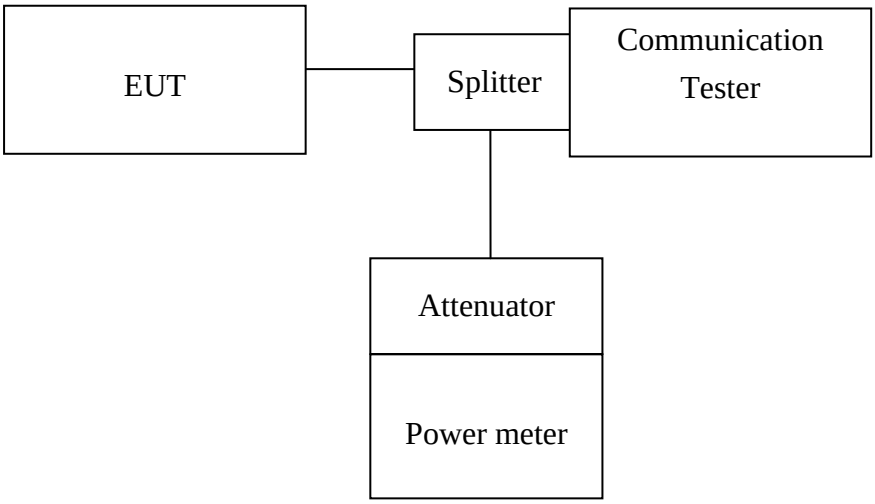
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6. RF CONDUCTED OUTPUT POWER MEASUREMENT

6.1 Standard Applicable

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

6.2 Test Set-up



Note: *Measurement setup for testing on Antenna connector*

6.3 Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. TS 151 010-1 is reference to conduct the test measurement of output power.

The Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, (WCDMA/HSPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing, and KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results

6.4 Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Power Meter	Anritsu	ML2495A	1005007	12/20/2014	12/19/2015
Power Sensor	Anritsu	MA2411B	917032	12/20/2014	12/19/2015
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

6.5 Measurement Result

RF Conducted Output Power

GPRS/EDGE (GMSK; 8-PSK) Result:

EUT Mode	Frequency (MHz)	CH	Peak Power (4DN 1UP) Class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)	Peak Power (4DN 3UP) Class 12 (dBm)	Average Burst Power (4DN 3UP) Class 12 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
GPRS 850	824.2	128	31.95	31.76	31.53	31.33	31.07	30.87	30.30	30.09
	836.6	190	31.95	31.75	31.52	31.31	31.05	30.85	30.30	30.10
	848.8	251	**32.00**	31.79	31.54	31.34	31.10	30.93	30.40	30.20
GPRS 1900	1850.2	512	**28.54**	28.44	28.53	28.43	27.75	27.64	26.58	26.48
	1880.0	661	28.53	28.43	28.53	28.43	27.75	27.65	26.58	26.49
	1909.8	810	28.52	28.42	28.53	28.42	27.74	27.64	26.58	26.48
EDGE 850	824.2	128	29.00	26.10	29.10	26.30	28.40	25.50	27.40	24.50
	836.6	190	29.10	26.20	29.20	26.40	28.50	25.60	27.50	24.60
	848.8	251	29.20	26.30	**29.30**	26.50	26.50	25.60	27.70	24.80
EDGE 1900	1850.2	512	28.50	25.40	28.60	25.70	27.30	24.30	26.30	23.30
	1880.0	661	28.60	25.50	**28.70**	25.80	27.20	24.30	26.30	23.20
	1909.8	810	28.50	25.40	28.60	25.70	27.30	24.30	26.30	23.20

WCDMA mode

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 V8.4.0 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7). RMC 12.2kps is used for this testing.

Results:

EUT Mode	Frequency (MHz)	CH	Peak Power (dBm)	Avg. Power (dBm)
WCDMA Band II	1852.4	9262	25.46	22.71
	1880.0	9400	25.42	22.60
	1907.6	9538	**25.57**	22.86
WCDMA Band IV	1712.4	1312	**25.37**	22.54
	1732.6	1413	25.35	22.51
	1752.6	1513	25.31	22.54
WCDMA Band V	826.4	4132	**25.41**	22.70
	836.6	4183	25.32	22.62
	846.6	4233	25.24	22.50
HSDPA Band II	1852.4	9262	25.07	22.41
	1880.0	9400	25.03	22.28
	1907.6	9538	**25.14**	22.54
HSDPA Band IV	1712.4	1312	**25.11**	22.10
	1732.6	1413	25.08	22.01
	1752.6	1513	24.93	22.14
HSDPA Band V	826.4	4132	**25.22**	22.49
	836.6	4183	25.19	22.40
	846.6	4233	25.16	22.24

EUT Mode	Frequency (MHz)	CH	Peak Power (dBm)	Avg. Power (dBm)
HSUPA Band II	1852.4	9262	24.81	21.71
	1880.0	9400	24.94	21.65
	1907.6	9538	**25.07**	21.78
HSUPA Band IV	1712.4	1312	**25.06**	21.57
	1732.6	1413	25.02	21.50
	1752.6	1513	24.87	21.59
HSUPA Band V	826.4	4132	**25.16**	21.74
	836.6	4183	25.13	21.69
	846.6	4233	25.12	21.63

Note: The results above reflect max power with all up bits.
Cable loss offset Low Band: 11 dB
Cable loss offset High Band: 10.7 dB

HSDPA Release 6 mode

The following 4 Sub-Tests were completed according to the test requirements outlined in section 5.2A of the 3GPP TS34.121-1 V8.4.0 specification. All TX RMS power requirements for Power Class 3 were met according to table 5.2AA.5 and 5.2B.5 All UE channels and power ratio's are set according to table C10.1.4 & C11.1.3 in the 3GPP TS34.121-1 V8.4.0. RMC 12.2kps is used for this testing.

HSDPA SUB-TEST Setting

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH(FOR HSDPA)

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} (*Note1, Note 2*)	CM (dB) *(Note 3)*	MPR (dB) *(Note 3)*	RMC (Kbps)
1	2/15	15/15	64	2/15	4/15	0.0	0.0	12.2
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0	12.2
3	15/15	8/15	64	15/8	30/15	1.5	0.5	12.2
4	15/15	4/15	64	15/4	30/15	1.5	0.5	12.2

Note: The recommended HSDPA MPRs are implemented as per following sub-tests.

Results:

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		9262	**9400**	**9538**		
HSDPA (B2)	**1**	22.93	22.85	**23.05**	20.3dBm – 25.7dBm	**Pass**
	2	22.64	22.49	22.73	20.3dBm – 25.7dBm	**Pass**
	3	22.47	22.37	22.56	19.8dBm – 25.7dBm	**Pass**
	4	22.52	22.41	22.62	19.8dBm – 25.7dBm	**Pass**

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		1312	**1413**	**1513**		
HSDPA (B4)	**1**	**22.61**	22.52	22.58	20.3dBm – 25.7dBm	**Pass**
	2	22.32	22.16	22.26	20.3dBm – 25.7dBm	**Pass**
	3	22.15	22.04	22.09	19.8dBm – 25.7dBm	**Pass**
	4	22.20	22.08	22.15	19.8dBm – 25.7dBm	**Pass**

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		4132	4183	4233		
HSDPA (B5)	1	**22.92**	22.87	22.69	20.3dBm – 25.7dBm	**Pass**
	2	22.63	22.51	22.37	20.3dBm – 25.7dBm	**Pass**
	3	22.46	22.39	22.20	19.8dBm – 25.7dBm	**Pass**
	4	22.51	22.43	22.26	19.8dBm – 25.7dBm	**Pass**

6.5.1.4.: HSPA (HSDPA & HSUPA) Release 6 mode

The following 5 Sub-Tests were completed according to the test requirements outlined in section 5.2A of the 3GPP TS34.121-1 V8.4.0 specification. All TX RMS power requirements for Power Class 3 were met according to table 5.2AA.5 and 5.2B.5 All UE channels and power ratio's are set according to table C11.1.3 in the 3GPP TS34.121-1 V8.4.0. RMC 12.2kps is used for this testing

HSPA SUB-TEST Setting

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH(FOR HSUPA)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (Codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI	RMC (Kbps)
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75	12.2
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67	12.2
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92	12.2
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71	12.2
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81	12.2

Note: The recommended HSUPA MPRs are implemented as per following sub-tests.

Results:

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		9262	9400	9538		
HSUPA(B2)	1	22.67	22.53	**22.77**	18.8dBm – 25.7dBm	**Pass**
	2	20.73	20.61	20.81	16.8dBm – 25.7dBm	**Pass**
	3	21.64	21.59	21.80	17.8dBm – 25.7dBm	**Pass**
	4	20.78	20.67	20.89	16.8dBm – 25.7dBm	**Pass**
	5	22.53	22.36	22.66	18.8dBm – 25.7dBm	**Pass**
Mode	**Sub-test**	**Avg. Power (dBm) Channel**			**Power Class 3 Limitation (dBm)**	**Comments**
		1312	**1413**	**1513**		
HSUPA(B4)	1	**22.35**	22.20	22.30	18.8dBm – 25.7dBm	**Pass**
	2	20.41	20.28	20.34	16.8dBm – 25.7dBm	**Pass**
	3	21.32	21.26	21.33	17.8dBm – 25.7dBm	**Pass**
	4	20.46	20.34	20.42	16.8dBm – 25.7dBm	**Pass**
	5	22.21	22.03	22.19	18.8dBm – 25.7dBm	**Pass**

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		4132	4183	4233		
HSUPA(B4)	1	**22.66**	22.55	22.41	18.8dBm – 25.7dBm	**Pass**
	2	20.72	20.63	20.45	16.8dBm – 25.7dBm	**Pass**
	3	21.63	21.61	21.44	17.8dBm – 25.7dBm	**Pass**
	4	20.77	20.69	20.53	16.8dBm – 25.7dBm	**Pass**
	5	22.52	22.38	22.30	18.8dBm – 25.7dBm	**Pass**

Minimum Communications Power Measurement

PCS 1900 band

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

PCL	9	10	11	12	13	14	15
Output power (dBm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Note: This device does not support GSM Band

WCDMA/HSDPA/HSUPA band II, V

The EUT output power was controlled by simulator. Set Communication Tester CMU200 function key “UE Power Control” and enter max rated power 24dBm. The EUT is going to be set to max output power to 24dBm. Then record the read (see page 15 for measurement data) . The min. power was measures by a function key “minimum power” then record the read. It is -52.3dBm. The power variation can be 0.1dB step by setting.

7 EFFECTIVE RADIATED POWER AND EQUIVALENT ISOTROPIC RADIATED POWER MEASUREMENT

7.1 Standard Applicable

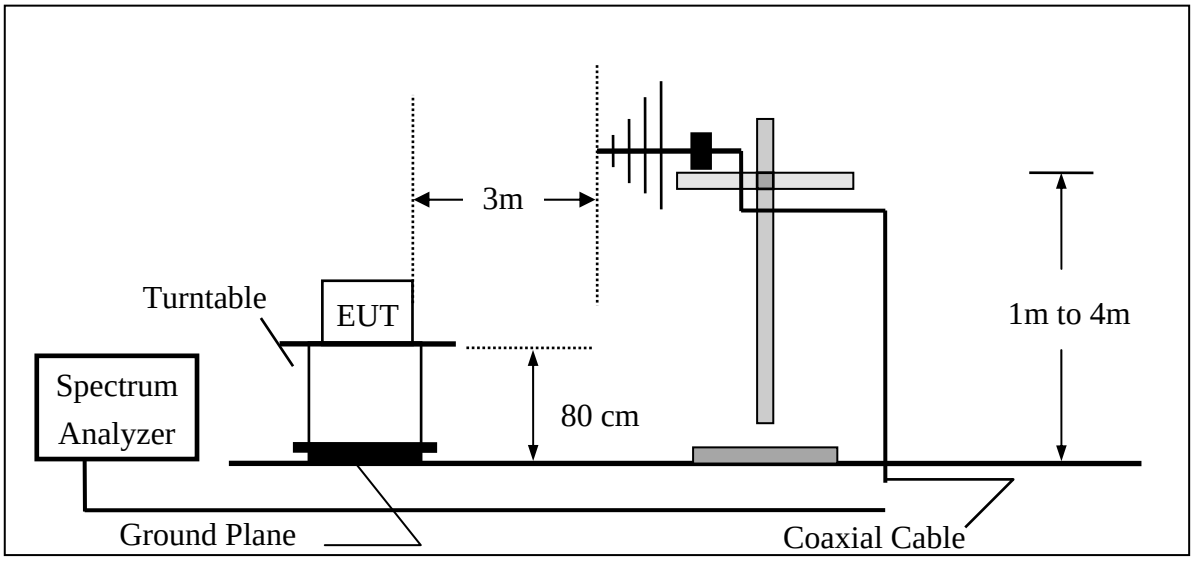
FCC 22.913(a) Mobile station is limited to 7W ERP.

FCC 24.232(b) Mobile station is limited to 2W EIRP.

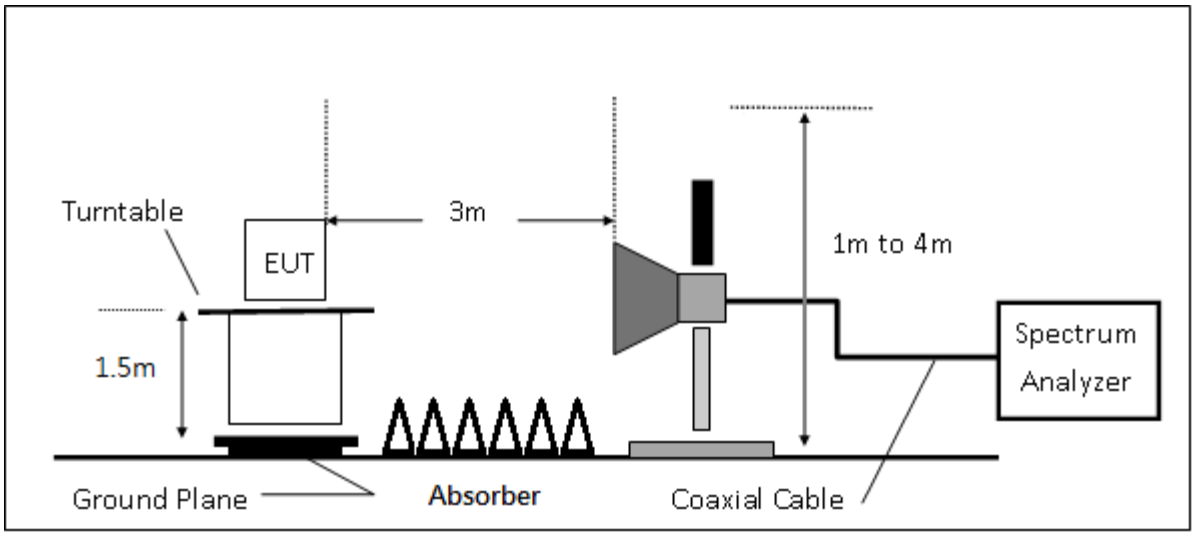
FCC 27, 50(d)(4) Mobile and other user stations. Mobile stations are limited to 2 W EIRP

7.2 Test SET-UP

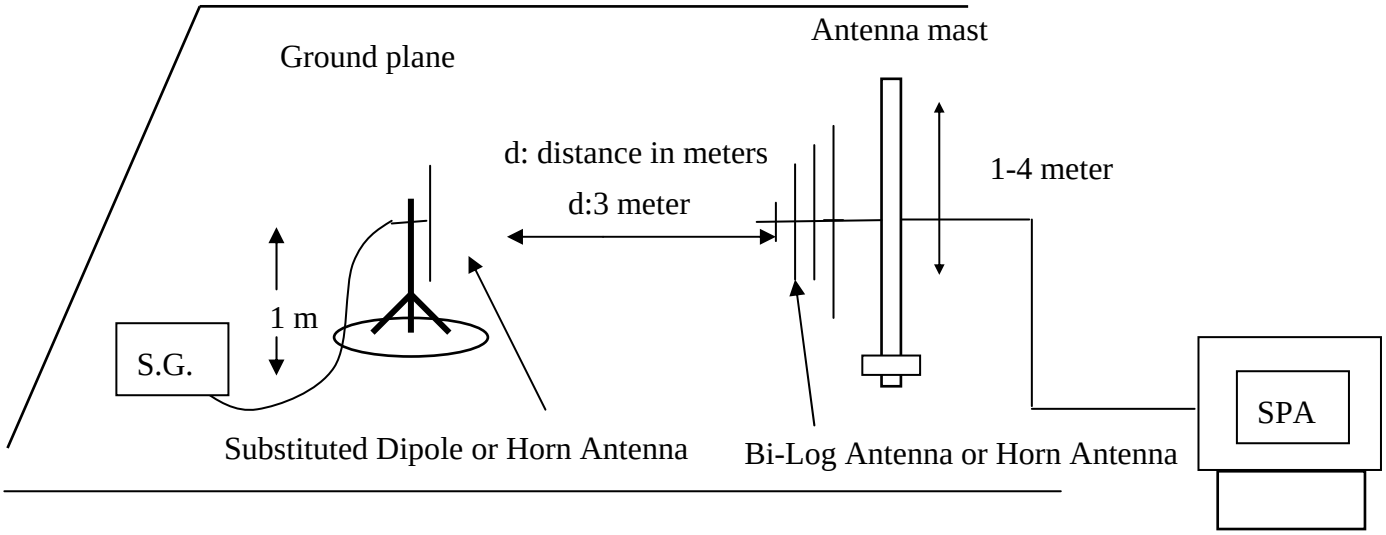
(A) Radiated Power Test Set-Up, Frequency Below 1000MHz



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



(C) Substituted Method Test Set-UP



7.3 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 971168 D01
2. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
3. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated
4. The testing follows the Measurement Procedure of FCC KDB 971168 D01
5. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
6. ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)
7. ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)
8. Spectrum setting:

   (1) Detector = Peak, marker the highest value of the detector by maximum hold, set RBW wide enough to capture the entire signal of emission, and VBW > =3xRBW.

   (2) KDB 971168 D01 is adopted, and the procedure as lists under item 4, Measurement of the Average Power over the Fundamental Signal Bandwidth, is followed to set correspondingly for the acquisition of proper measurement data.

   Set frequency = nominal signal center frequency;

   Set span = 2 X occupied BW;

   Set RBW ≈ 1~5% of the span, not to exceed 1 MHz

   Set VBW = 3 x RBW;

   Select average power (RMS) detector

   Set sweep time and number of measurement points to achieve a minimum of 1 millisecond/pt integration time (ex. Point = 601points, then sweep time = $601*10^{-3}$ = 6s.

Activate trace averaging routine over a minimum of 10 sweeps;
Activate marker/span pair and set span = signal or channel bandwidth;
Activate the band/interval power marker function;
Record the band power level;

Record adjusted value as the average signal power level. Then activate the occupied bandwidth measurement function.

The proper adjustment due to limitation of spectrum capability is given compensated to spectrum with conversion factor of 10*log (TBW/RBW), where TBW is the transmission of UE exceeding the maximum BW UE can extends, and RBW is the resolution BW in UE.

7.4 Measurement Equipment Used

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015
Bilog Antenna	SCHWAZBECK	VULB9160	3158	10/31/2014	10/30/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015
Horn antenna	ETS.LINDGREN	3117	123991	12/19/2014	12/18/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015
Horn Antenna	Schwarzbeck	BBHA9170	185	07/29/2014	07/28/2015
Network Analyze	Anritsu	MS4644A	1216312	05/24/2014	05/23/2015
Signal Generator	Agilent	E4438C	MY45093613	08/06/2014	08/05/2015
Pre-Amplifier	Agilent	8447D	1937A02834	01/02/2015	01/01/2016
Pre-Amplifier	Agilent	8449B	3008A00578	01/02/2015	01/01/2016
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	966_Tx	10m	01/02/2015	01/01/2016
Low Loss Cable	HUBER+SUHNER	966_Rx	3m	01/02/2015	01/01/2016
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015

7.5 Measurement Result: (Peak) –using option of peak measurement

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 850	824.2	128	V	17.17	3.45	-2.94	17.69	38.45
			H	23.97	3.45	-2.94	24.49	38.45
	836.6	190	V	15.88	3.46	-2.97	16.36	38.45
			H	23.98	3.46	-2.97	24.47	38.45
	848.8	251	V	16.56	3.47	-3.01	17.02	38.45
			H	24.17	3.47	-3.01	**24.63**	38.45

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
EDGE 850	824.2	128	V	14.2	3.45	-2.94	14.71	38.45
			H	22.09	3.45	-2.94	**22.61**	38.45
	836.6	190	V	13.17	3.46	-2.97	13.66	38.45
			H	22.00	3.46	-2.97	22.48	38.45
	848.8	251	V	13.68	3.47	-3.01	14.14	38.45
			H	21.65	3.47	-3.01	22.11	38.45

Remark： (1) The RBW,VBW of SPA for frequency RBW=300 KHz, VBW=1MHz

EUT			Measurement					
Operation Band	**Fundamental Frequency**	**CH**	**Antenna Pol.**	**S.G. Output**	**Antenna Gain**	**Cable Loss**	**EIRP**	**Limit**
	MHz		**V/H**	**dBm**	**dBi**	**dB**	**dBm**	**dBm**
GPRS 1900	1850.2	512	V	21.68	4.84	-4.49	22.04	33.01
			H	28.52	4.84	-4.49	**28.88**	33.01
	1880.0	661	V	22.63	4.79	-4.53	22.89	33.01
			H	28.42	4.79	-4.53	28.68	33.01
	1909.8	810	V	20.8	4.74	-4.57	20.98	33.01
			H	28.04	4.74	-4.57	28.22	33.01

EUT			Measurement					
Operation Band	**Fundamental Frequency**	**CH**	**Antenna Pol.**	**S.G. Output**	**Antenna Gain**	**Cable Loss**	**EIRP**	**Limit**
	MHz		**V/H**	**dBm**	**dBi**	**dB**	**dBm**	**dBm**
EDGE 1900	1850.2	512	V	20.26	4.84	-4.49	20.62	33.01
			H	27.55	4.84	-4.49	27.91	33.01
	1880.0	661	V	21.35	4.79	-4.53	21.61	33.01
			H	27.71	4.79	-4.53	**27.98**	33.01
	1909.8	810	V	20.80	4.74	-4.57	20.18	33.01
			H	27.09	4.74	-4.57	27.26	33.01

Remark：

(1) The RBW,VBW of SPA for frequency RBW=300K, VBW=1MHz

EUT			Measurement					
Operation Band	**Fundamental Frequency**	**CH**	**Antenna Pol.**	**S.G. Output**	**Antenna Gain**	**Cable Loss**	**EIRP**	**Limit**
	MHz		**V/H**	**dBm**	**dBi**	**dB**	**dBm**	**dBm**
WCDMA B2	1852.4	9262	V	18.24	4.84	-4.49	18.59	33.01
			H	24.52	4.84	-4.49	24.87	33.01
	1880.0	9400	V	18.63	4.79	-4.53	18.90	33.01
			H	24.81	4.79	-4.53	**25.07**	33.01
	1907.6	9538	V	20.80	4.75	-4.56	16.88	33.01
			H	24.36	4.75	-4.56	24.54	33.01

EUT			Measurement					
Operation Band	**Fundamental Frequency**	**CH**	**Antenna Pol.**	**S.G. Output**	**Antenna Gain**	**Cable Loss**	**EIRP**	**Limit**
	MHz		**V/H**	**dBm**	**dBi**	**dB**	**dBm**	**dBm**
HSDPA B2	1852.4	9262	V	18.74	4.84	-4.49	19.09	33.01
			H	25.01	4.84	-4.49	**25.36**	33.01
	1880.0	9400	V	18.74	4.79	-4.53	19.00	33.01
			H	24.80	4.79	-4.53	25.07	33.01
	1907.6	9538	V	20.80	4.75	-4.56	17.99	33.01
			H	25.10	4.75	-4.56	25.29	33.01

EUT			Measurement					
Operation Band	**Fundamental Frequency**	**CH**	**Antenna Pol.**	**S.G. Output**	**Antenna Gain**	**Cable Loss**	**EIRP**	**Limit**
	MHz		**V/H**	**dBm**	**dBi**	**dB**	**dBm**	**dBm**
HSUPA B2	1852.4	9262	V	18.70	4.84	-4.49	19.06	33.01
			H	24.79	4.84	-4.49	25.15	33.01
	1880.0	9400	V	18.89	4.79	-4.53	19.16	33.01
			H	25.04	4.79	-4.53	**25.31**	33.01
	1907.6	9538	V	20.80	4.75	-4.56	17.86	33.01
			H	28.84	4.75	-4.56	25.03	33.01

Remark：

(1) The RBW,VBW of SPA for frequency RBW= 5MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
WCDMA B4	1712.4	1312	V	19.90	5.08	-4.29	20.70	30.00
			H	25.26	5.09	-4.29	26.06	30.00
	1732.6	1413	V	18.00	5.05	-4.31	18.73	30.00
			H	24.17	5.05	-4.31	24.91	30.00
	1752.6	1513	V	18.87	5.01	-4.37	19.51	30.00
			H	25.98	5.01	-4.37	**26.63**	30.00

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
HSDPA B4	1712.4	1312	V	20.16	5.09	-4.29	20.96	30.00
			H	26.06	5.08	-4.29	**26.86**	30.00
	1732.6	1413	V	18.65	5.05	-4.31	19.39	30.00
			H	25.43	5.05	-4.32	26.16	30.00
	1752.6	1513	V	19.26	5.01	-4.37	19.91	30.00
			H	26.16	5.01	-4.37	26.80	30.00

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
HSUPA B4	1712.4	1312	V	20.11	5.08	-4.29	20.90	30.00
			H	25.91	5.09	-4.29	26.71	30.00
	1732.6	1413	V	18.92	5.05	-4.32	19.66	30.00
			H	25.28	5.05	-4.31	26.02	30.00
	1752.6	1513	V	19.09	5.01	-4.37	19.73	30.00
			H	26.08	5.01	-4.37	**26.72**	30.00

Remark：

(1) The RBW,VBW of SPA for frequency RBW= 5MHz , VBW= 8MHz

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
WCDMA B5	826.4	4132	V	9.25	3.46	-2.94	9.76	38.45
			H	16.35	3.46	-2.94	16.86	38.45
	836.6	4183	V	9.14	3.46	-2.97	9.63	38.45
			H	17.08	3.46	-2.97	**17.57**	38.45
	846.6	4233	V	8.70	3.47	-3.00	9.16	38.45
			H	16.50	3.47	-3.00	16.96	38.45

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
HSDPA B5	826.4	4132	V	10.25	3.46	-2.95	10.76	38.45
			H	17.36	3.46	-2.95	17.87	38.45
	836.6	4183	V	10.00	3.46	-2.98	10.49	38.45
			H	17.79	3.46	-2.98	**18.28**	38.45
	846.6	4233	V	9.20	3.47	-3.00	9.66	38.45
			H	16.97	3.47	-3.00	17.44	38.45

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
HSUPA B5	826.4	4132	V	10.20	3.46	-2.95	10.71	38.45
			H	17.45	3.46	-2.95	17.96	38.45
	836.6	4183	V	9.87	3.46	-2.98	10.35	38.45
			H	17.73	3.46	-2.98	**18.21**	38.45
	846.6	4233	V	9.86	3.47	-3.00	10.32	38.45
			H	17.41	3.47	-3.00	17.88	38.45

Remark：

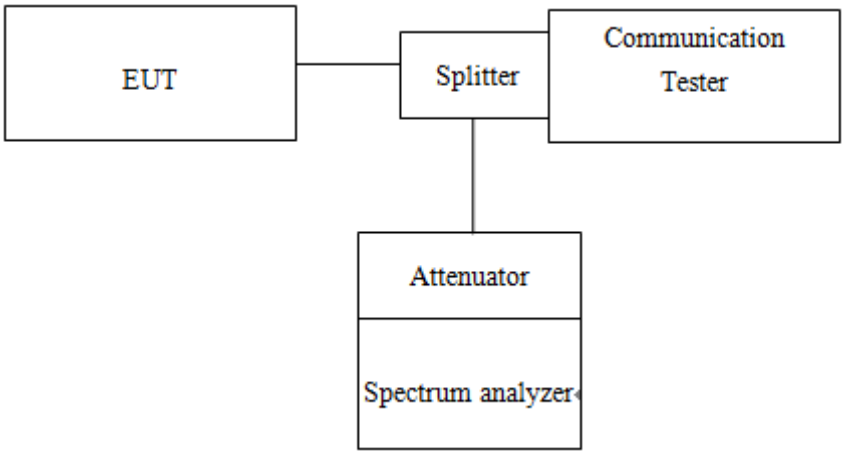
(1) The RBW,VBW of SPA for frequency RBW= 5MHz , VBW= 8MHz

8 OCCUPIED BANDWIDTH MEASUREMENT

8.1 Standard Applicable

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

8.2 Test Set-up



8.3 Measurement Procedure

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -26dBc display line was placed on the screen (or 26dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

NOTE: For the plot of bandwidth measurement, the marker of the 99% bandwidth is diamond-shape while the marker of the 26dB BW is arrow-mark

8.4 Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

8.5 Measurement Result

99% Bandwidth

Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		GPRS	EDGE
824.20	128	**0.245**	0.247
836.60	190	0.243	**0.248**
848.80	251	0.243	0.244

Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		GPRS	EDGE
1850.20	512	0.237	**0.253**
1880.00	661	0.238	0.249
1909.80	810	**0.240**	0.251

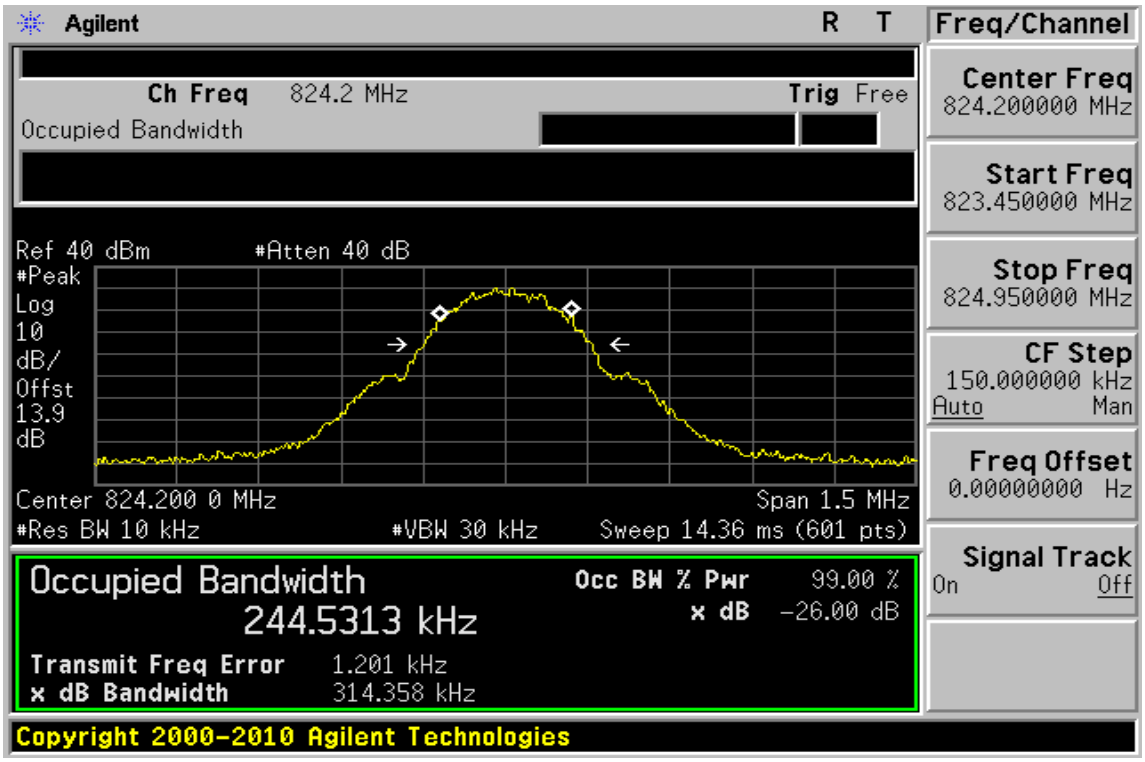
Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		WCDMA II	HSDPA II	HSUPA II
1852.40	9262	4.0630	**4.0699**	4.0659
1880.00	9400	**4.0632**	4.0422	4.0465
1909.80	9538	4.0374	4.0343	**4.0671**

Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		WCDMA IV	HSDPA IV	HSUPA IV
1712.4	1312	4.0354	4.0608	**4.0658**
1732.6	1413	4.0464	4.0489	4.0590
1752.6	1513	**4.0549**	**4.0651**	4.0476

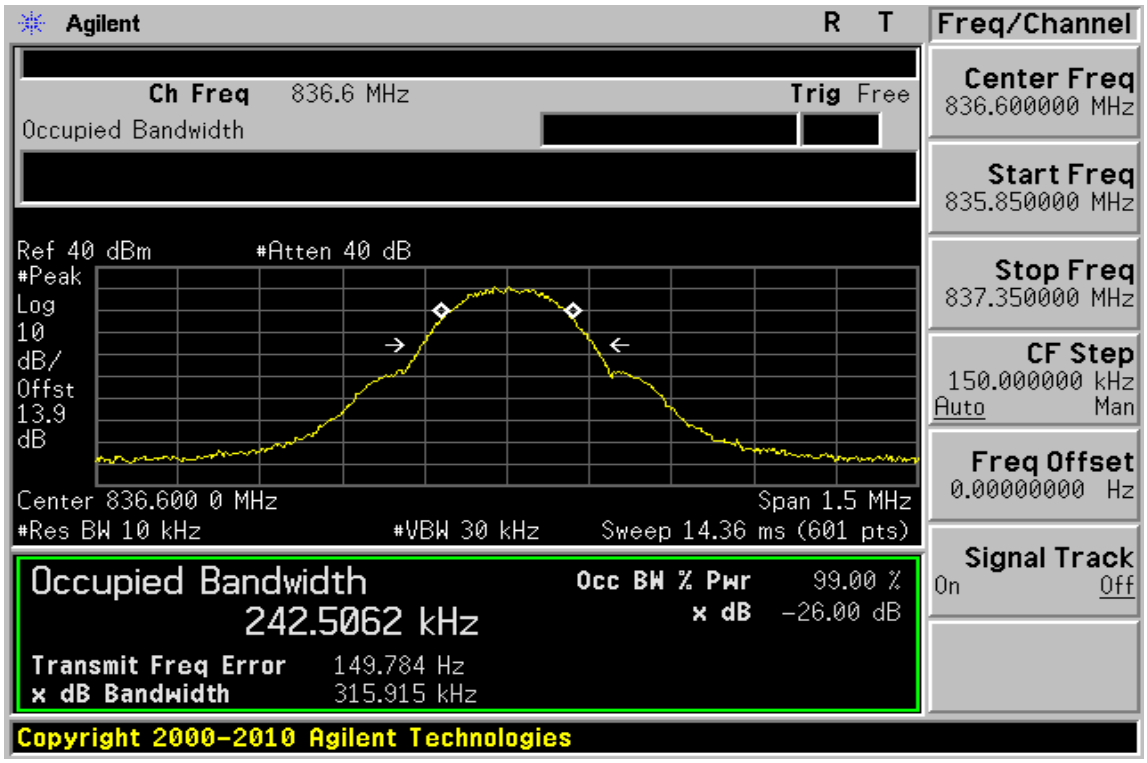
Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		WCDMA V	HSDPA V	HSUPA V
826.40	4132	4.0653	4.0605	4.0545
836.60	4183	**4.0726**	**4.0648**	**4.0769**
846.60	4233	4.0693	4.0536	4.0600

99% Bandwidth Test Data

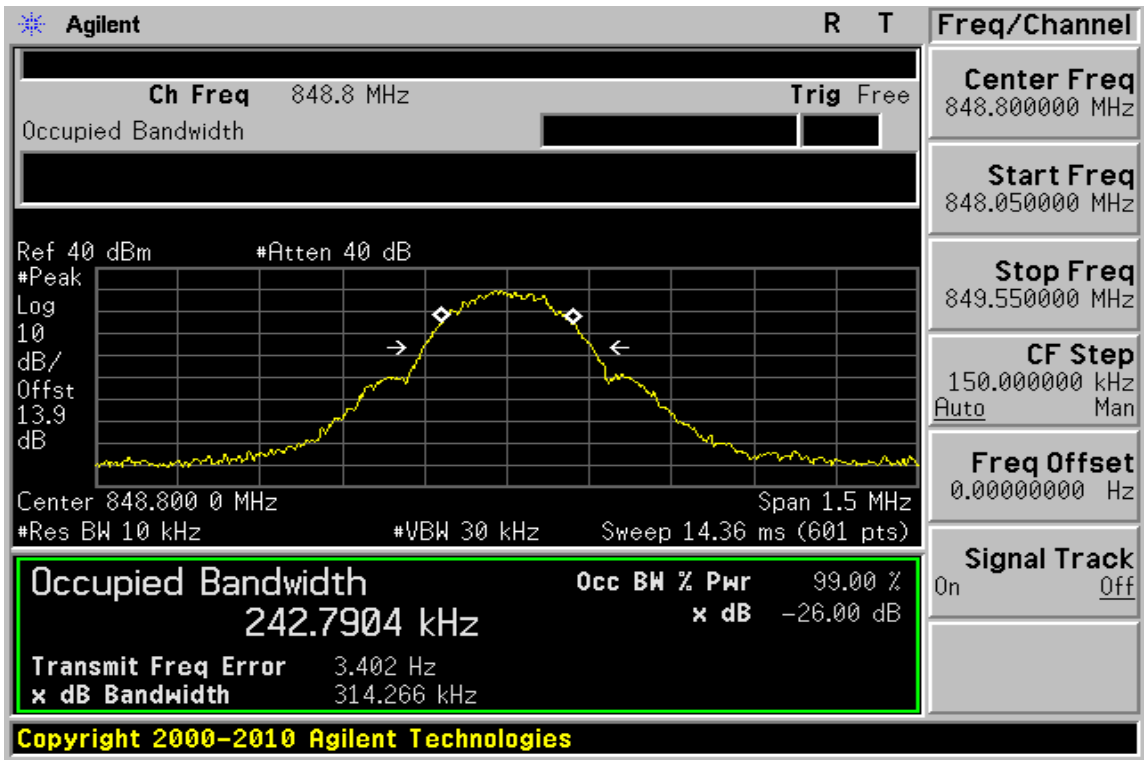
GPRS 850 Channel Low



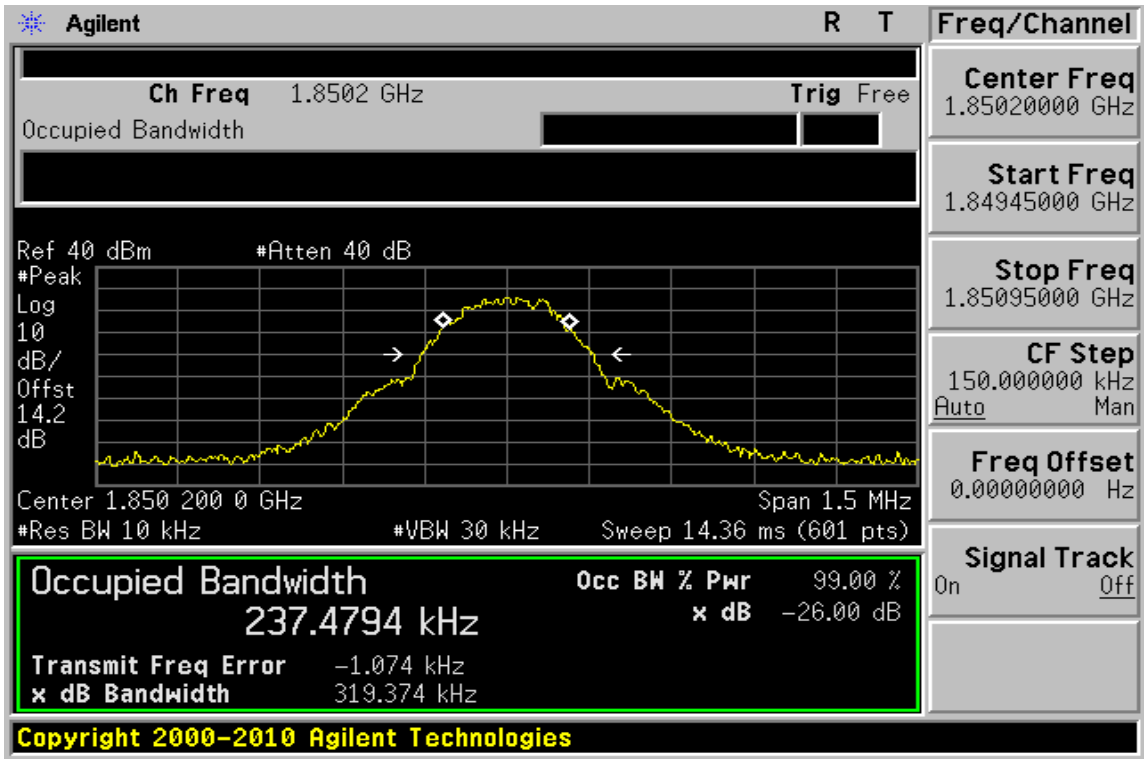
GPRS 850 Channel Mid



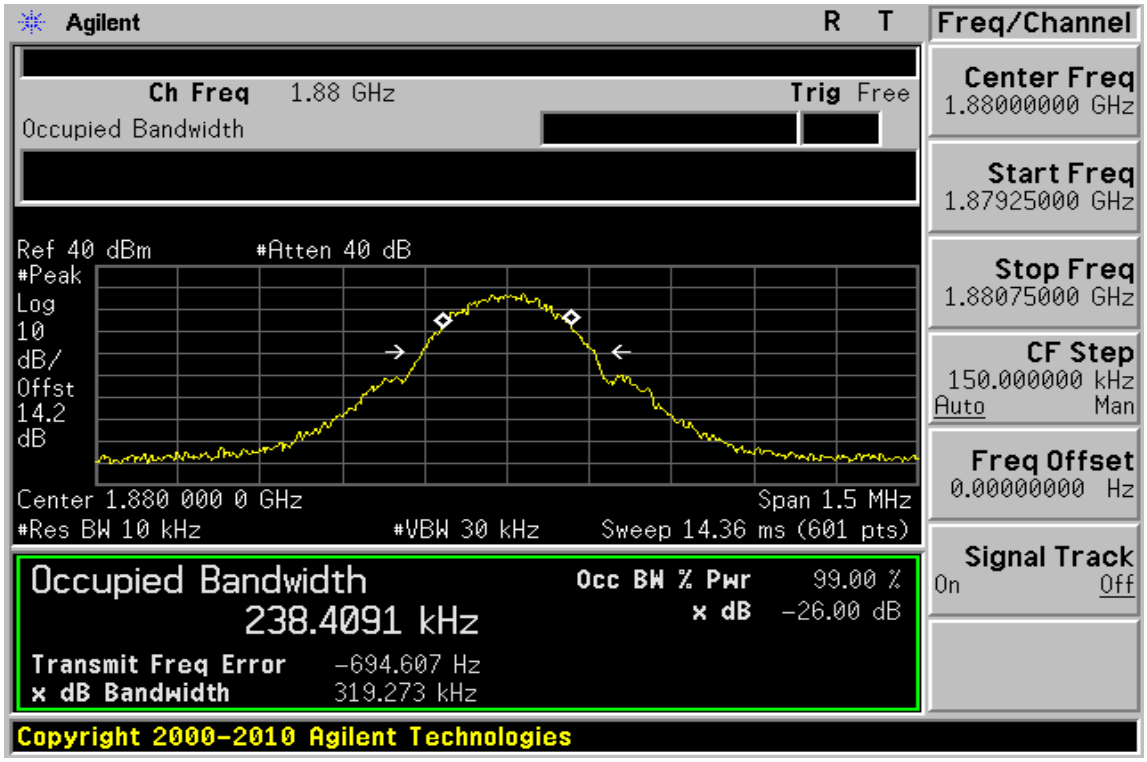
GPRS 850 Channel High



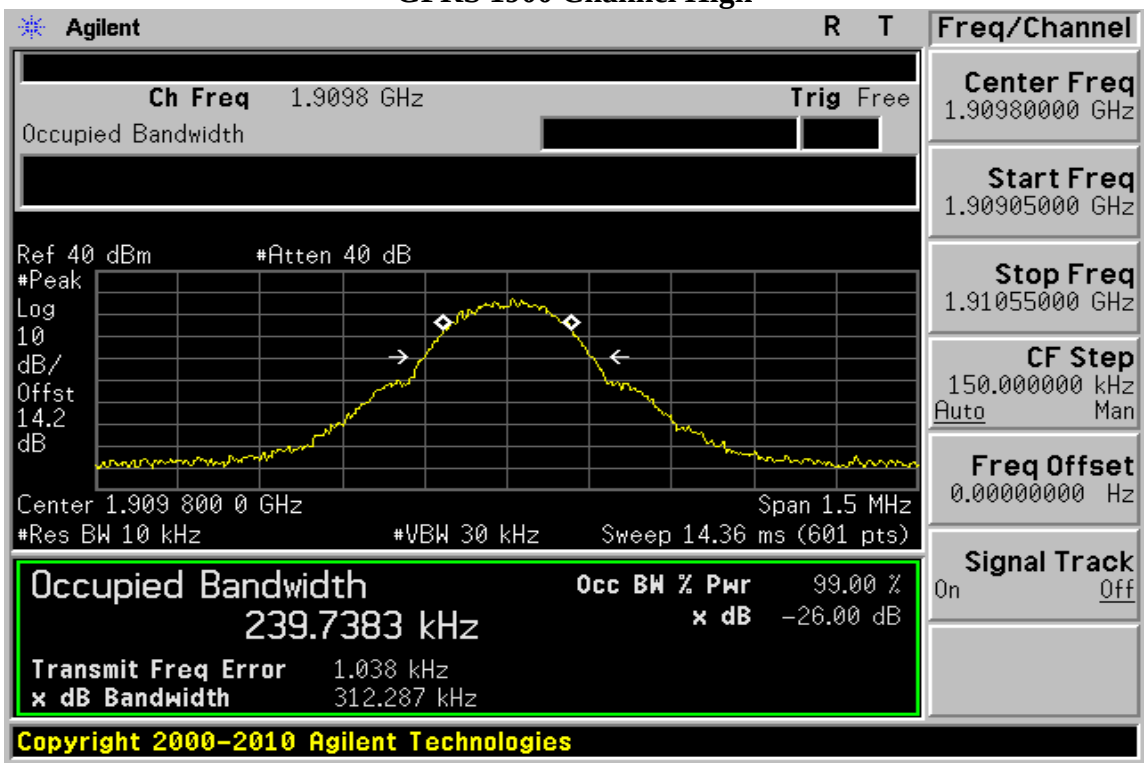
GPRS 1900 Channel Low



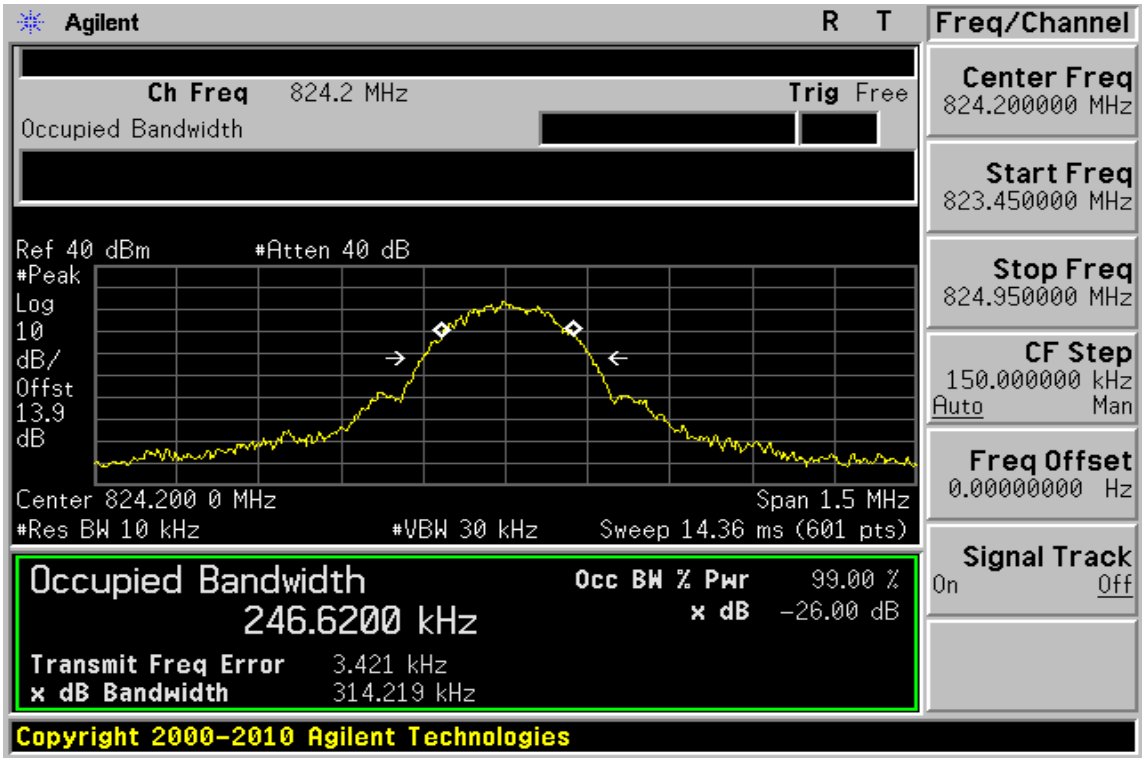
GPRS 1900 Channel Mid



GPRS 1900 Channel High



EDGE 850 Channel Low



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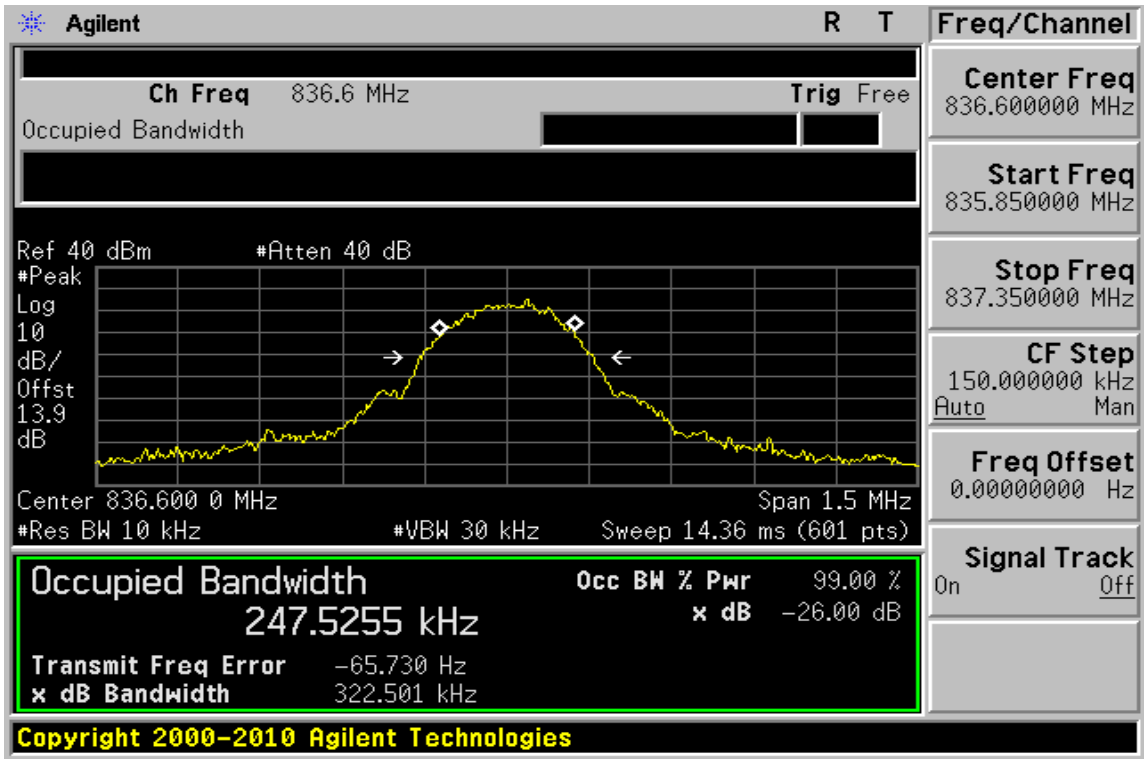
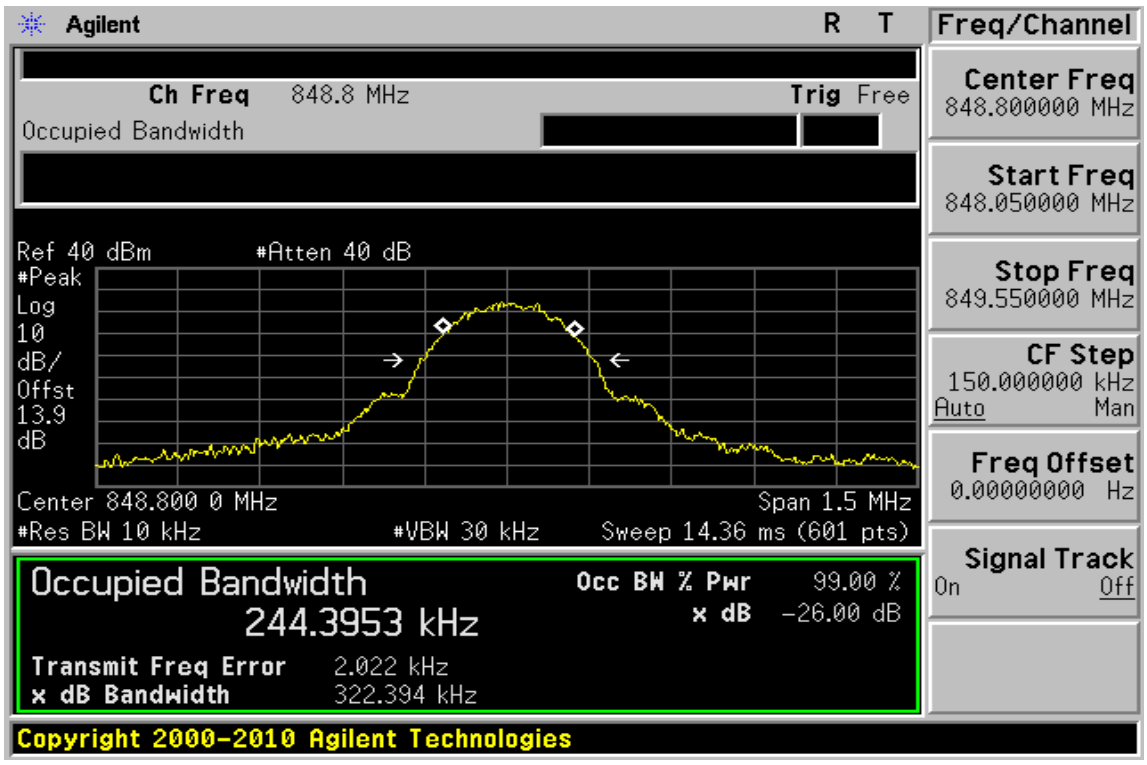


EDGE 850 Channel High



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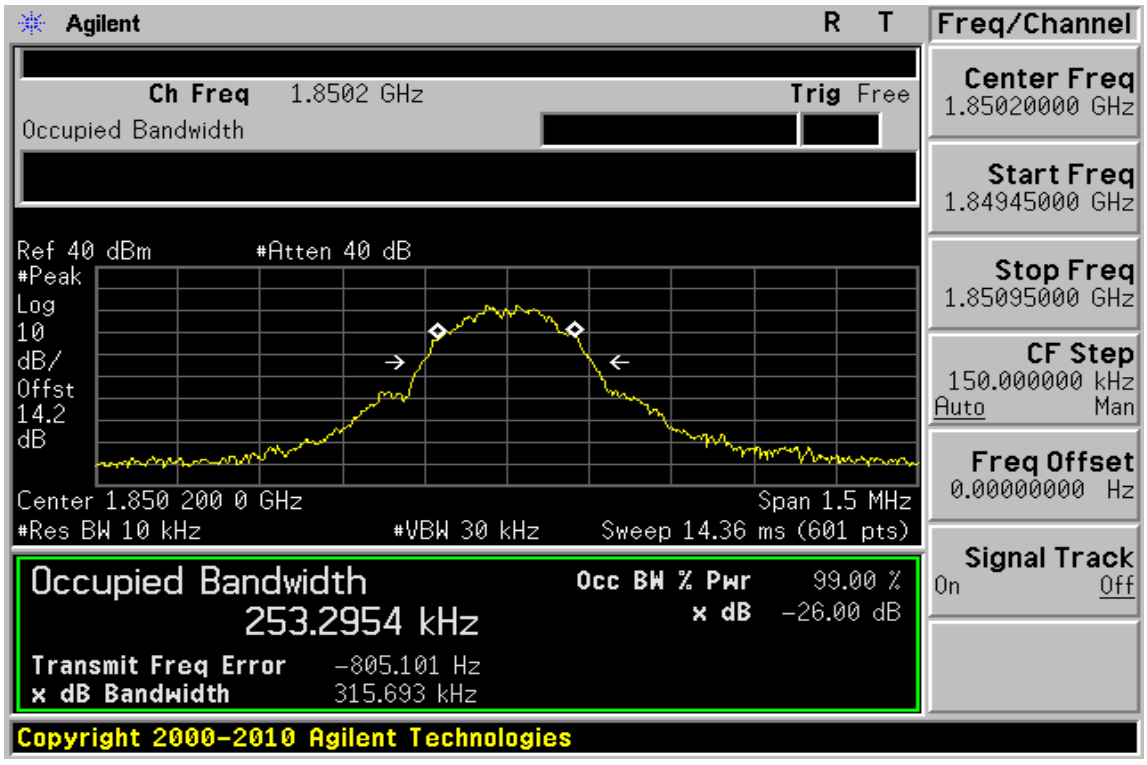

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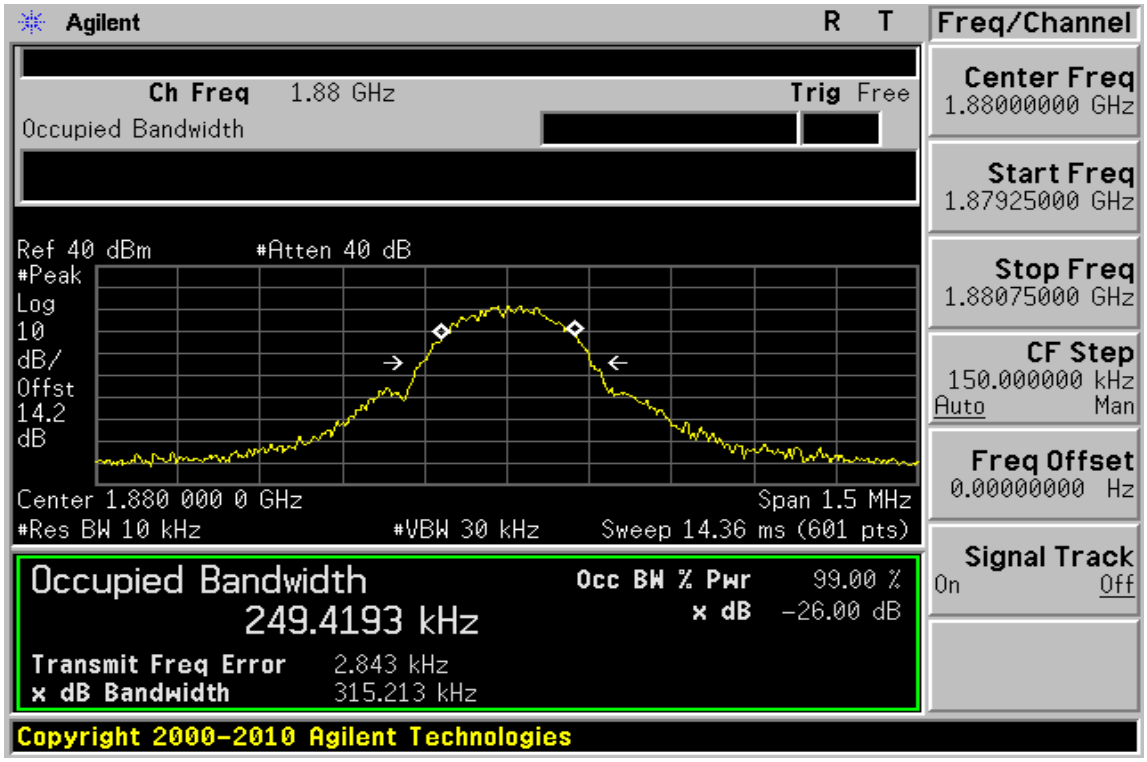
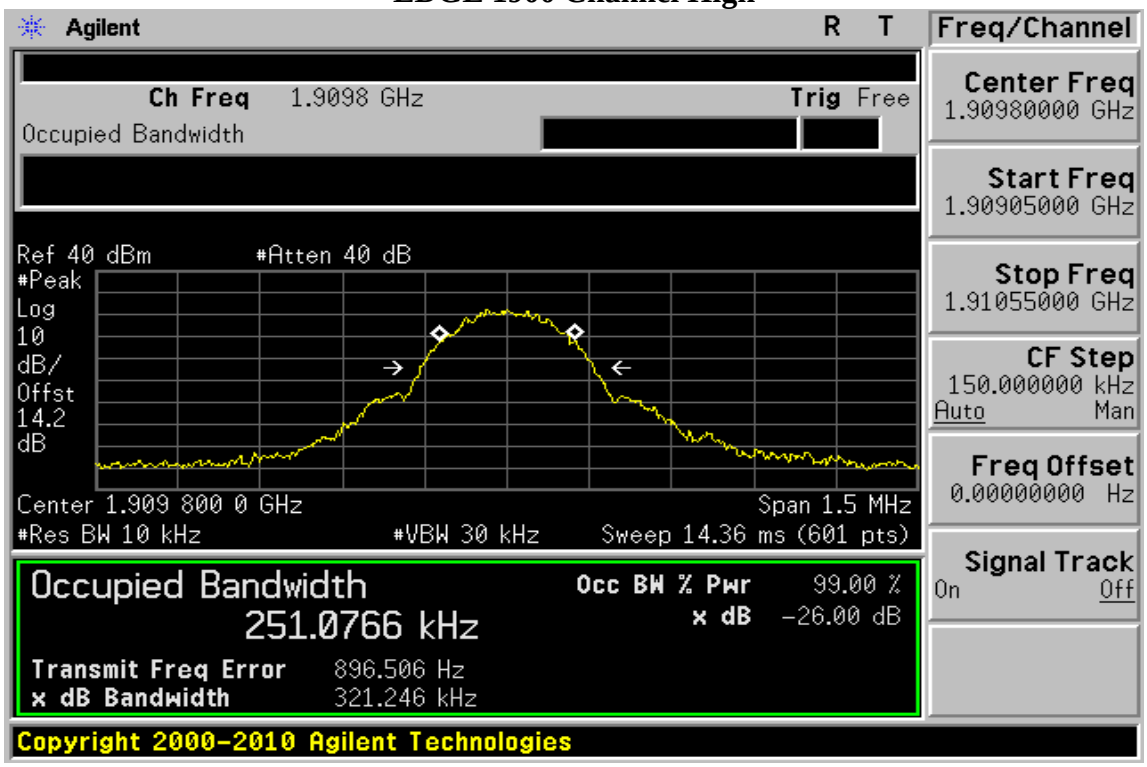
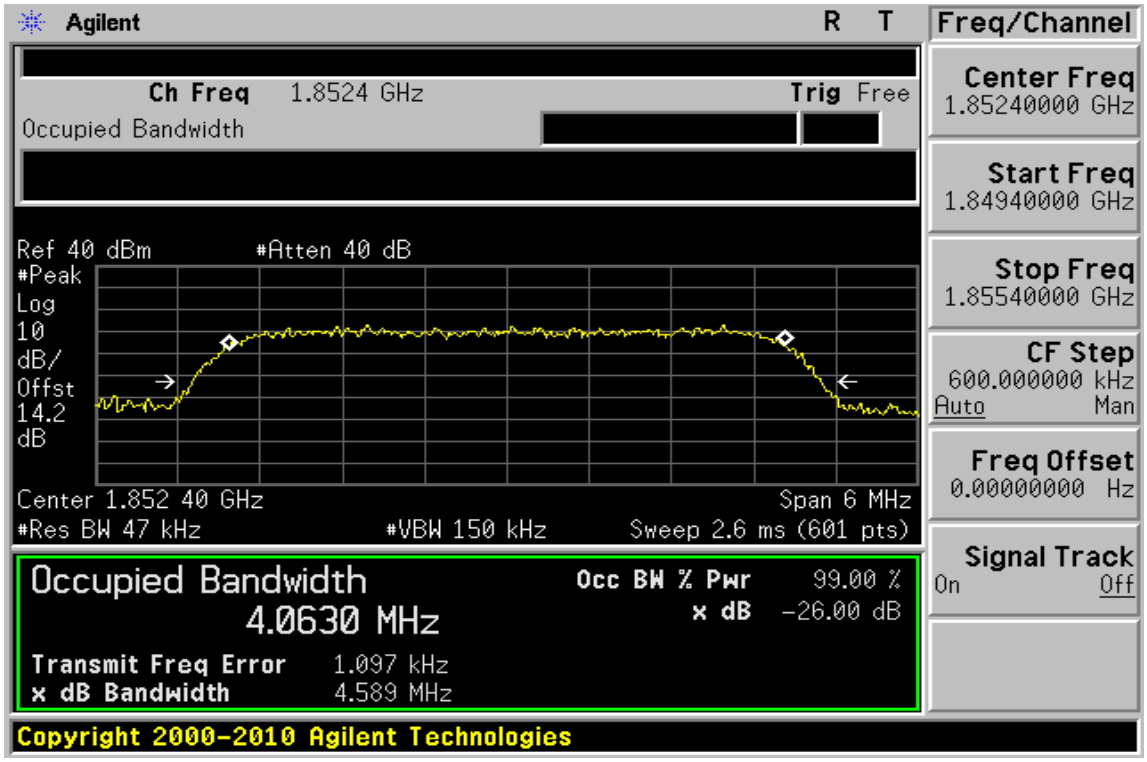


EDGE 1900 Channel High



WCDMA II Channel Low



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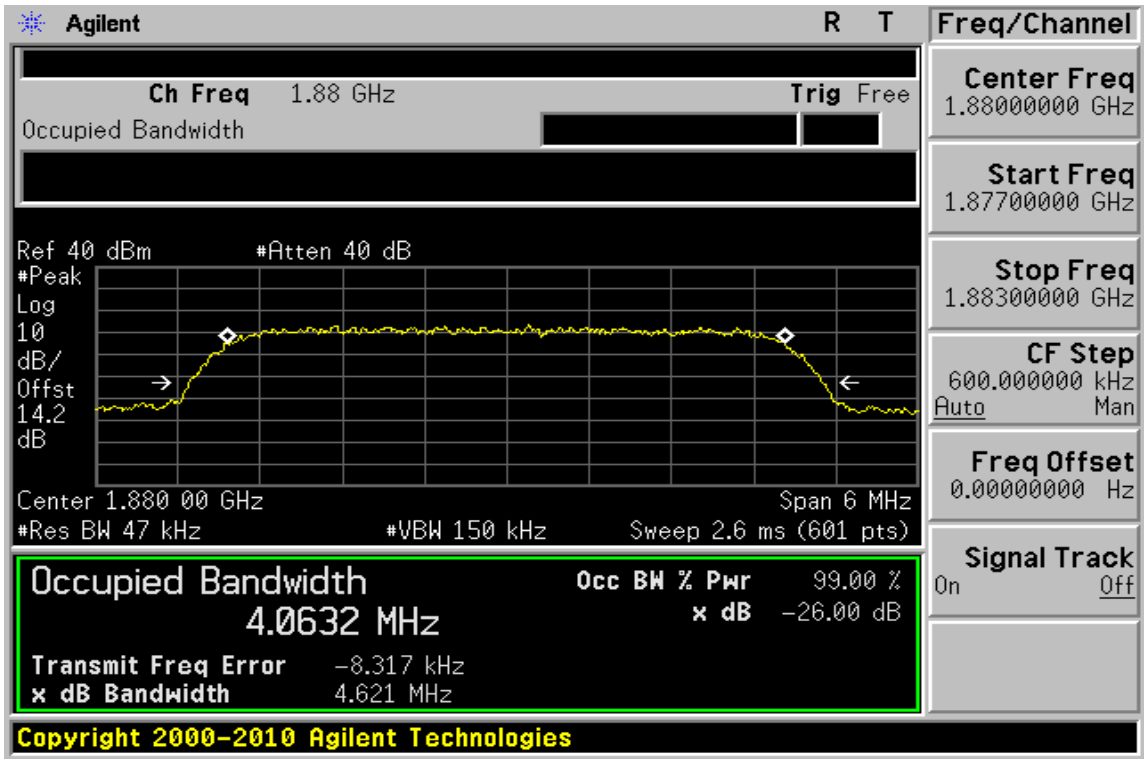
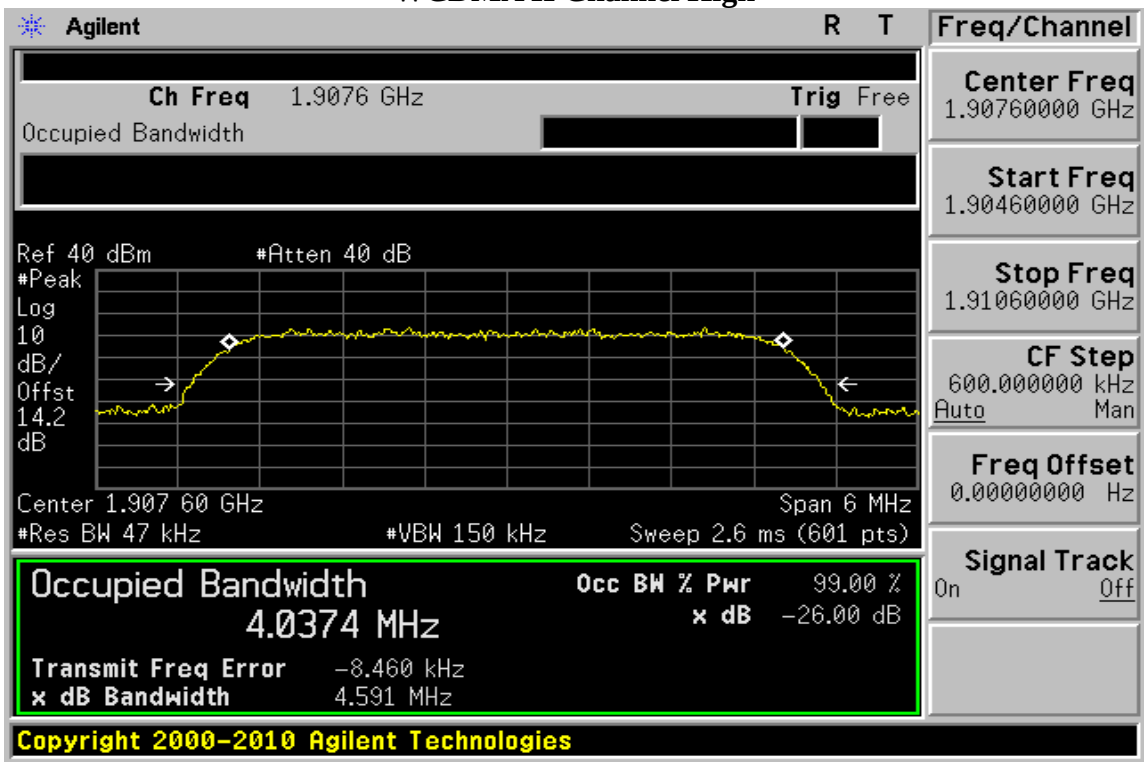
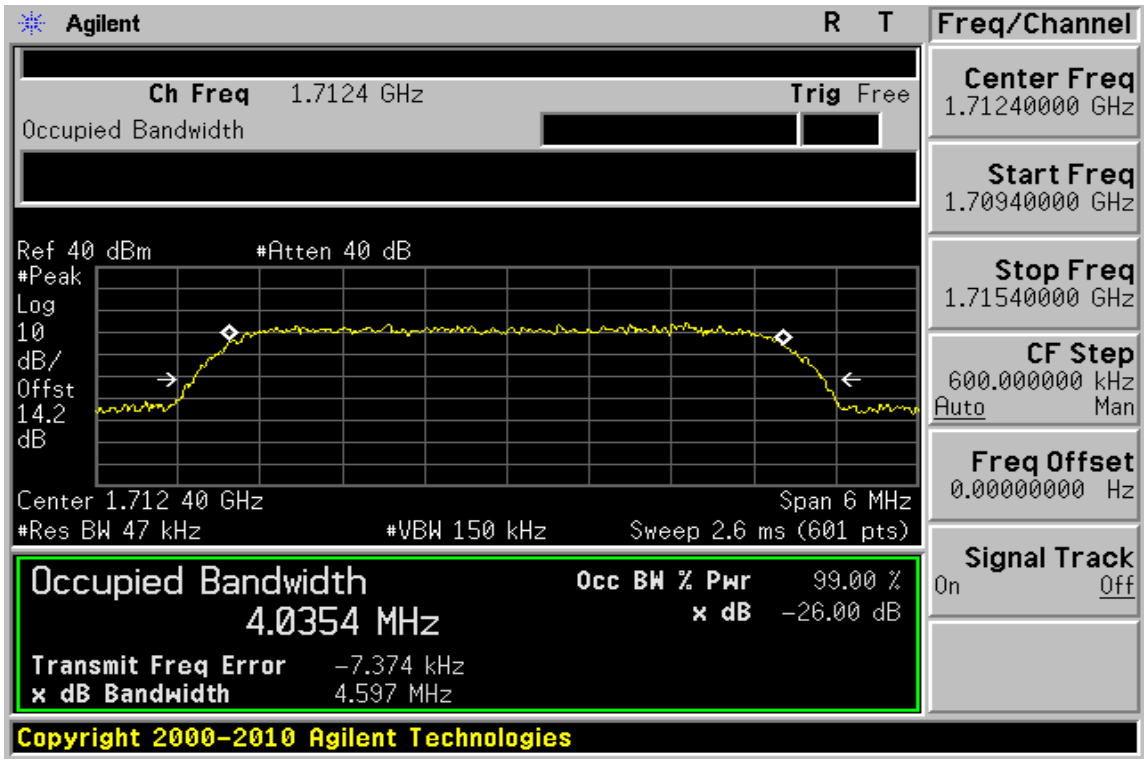


WCDMA II Channel High



WCDMA IV Channel Low



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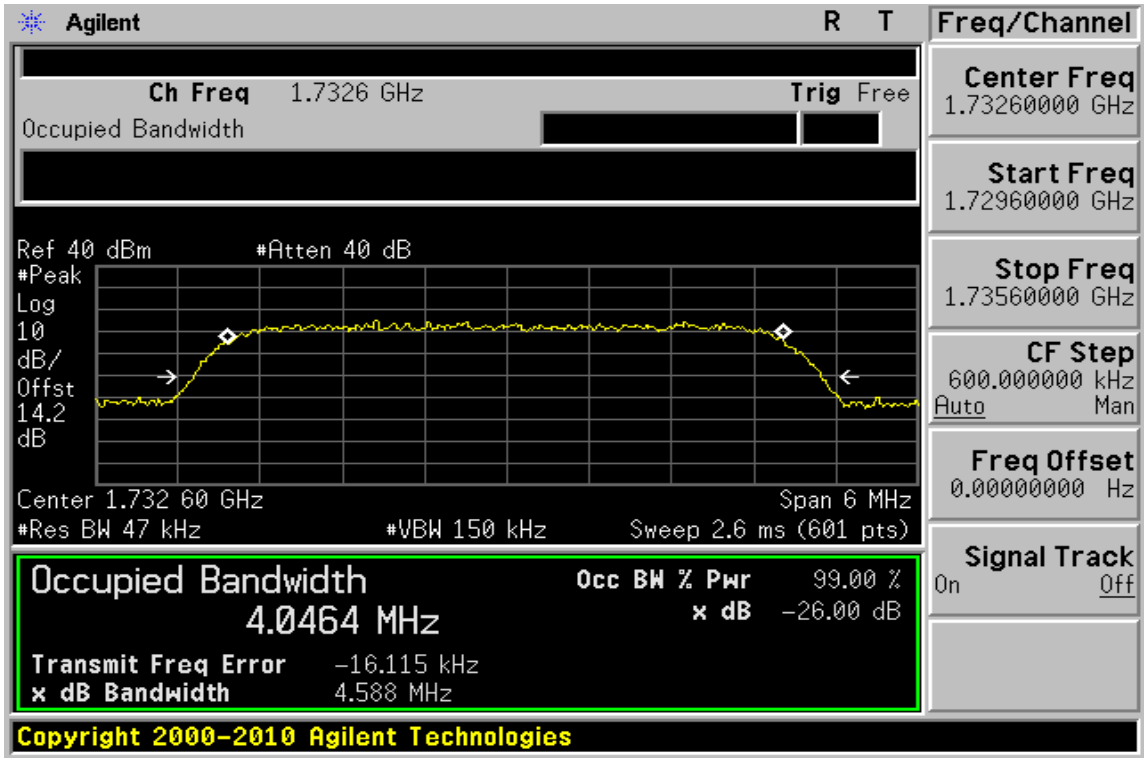

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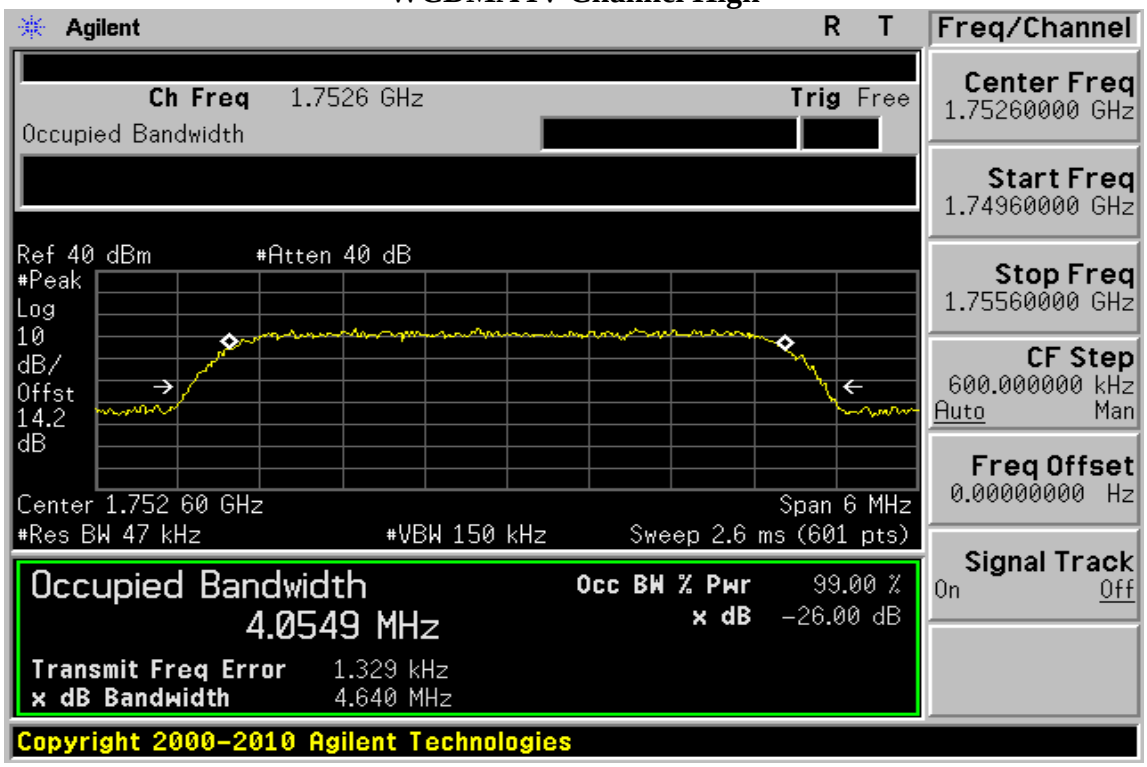
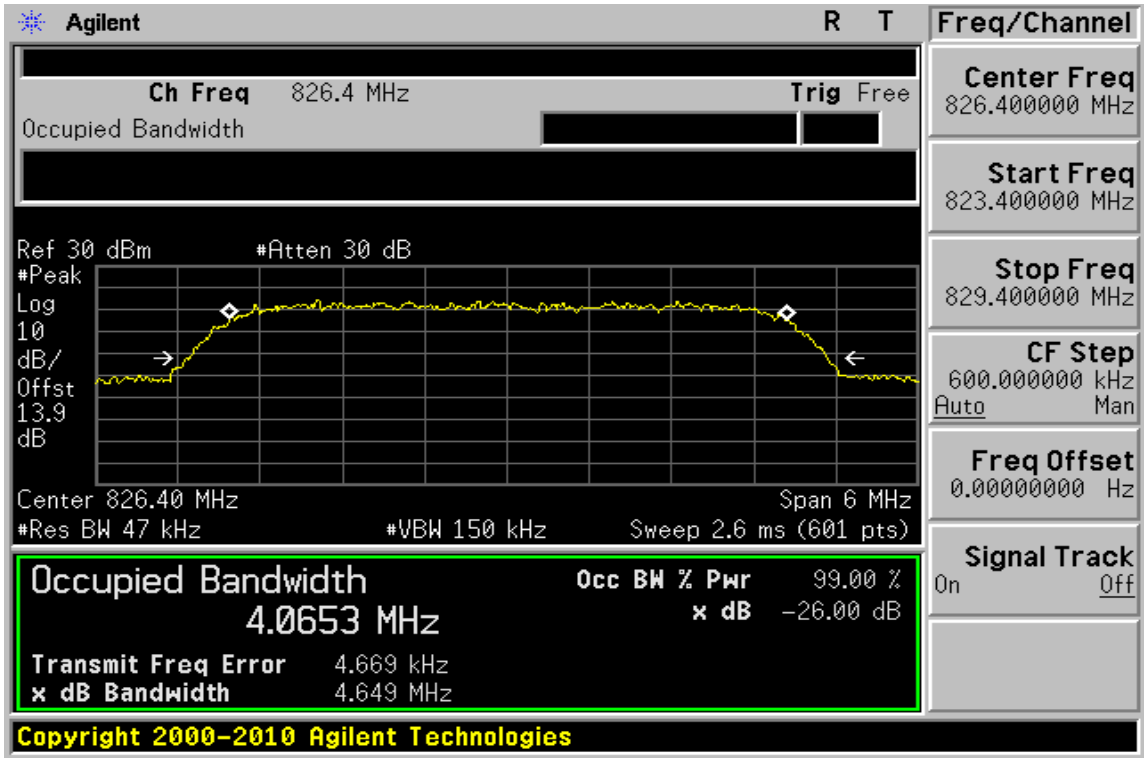
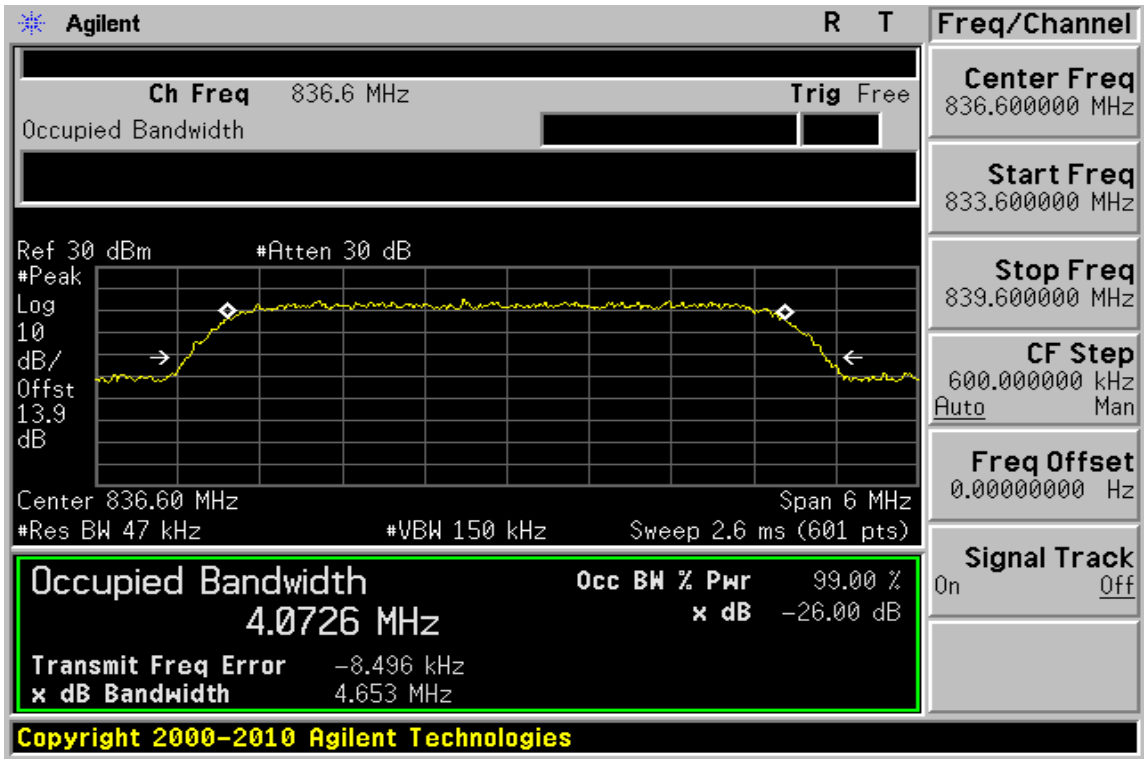


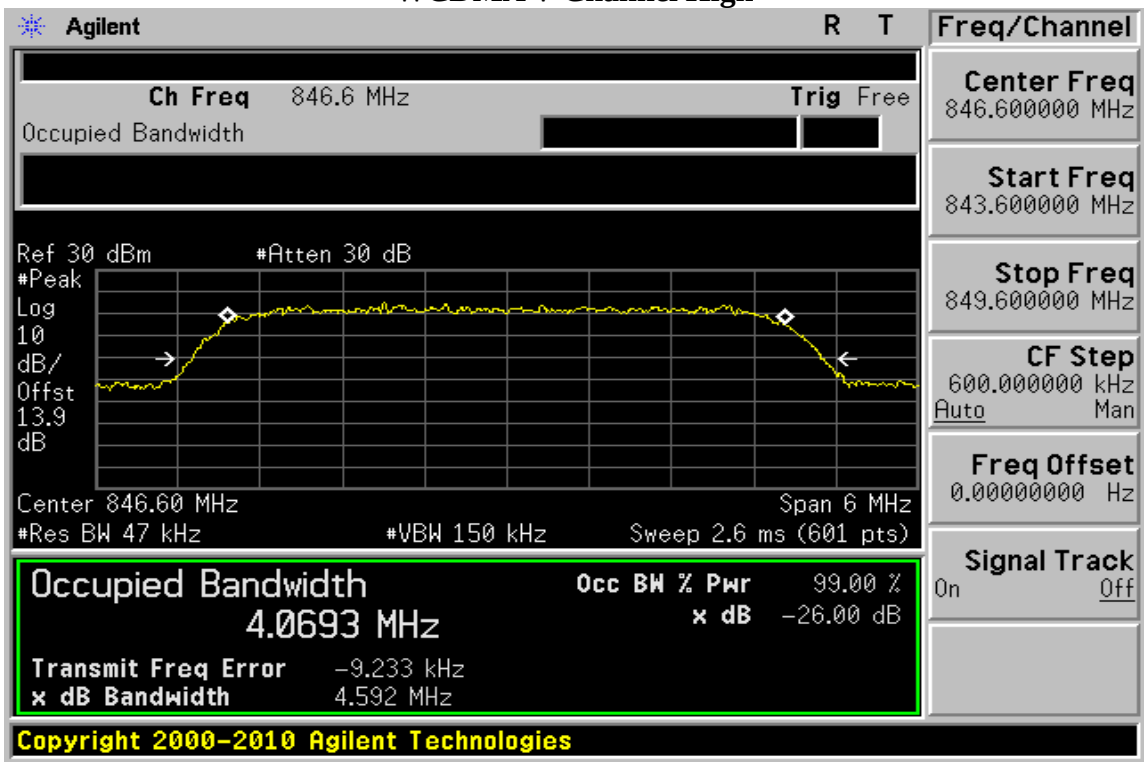
WCDMA V Channel Low



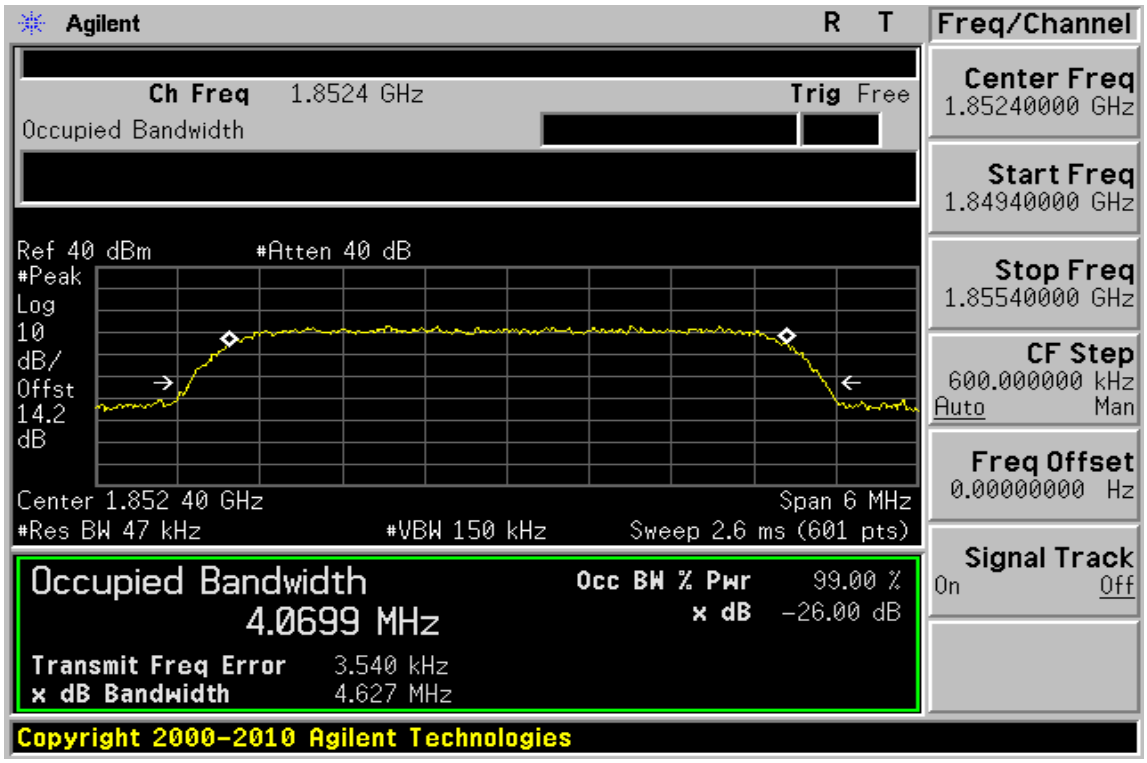
WCDMA V Channel Mid



WCDMA V Channel High



HSDPA II Channel Low



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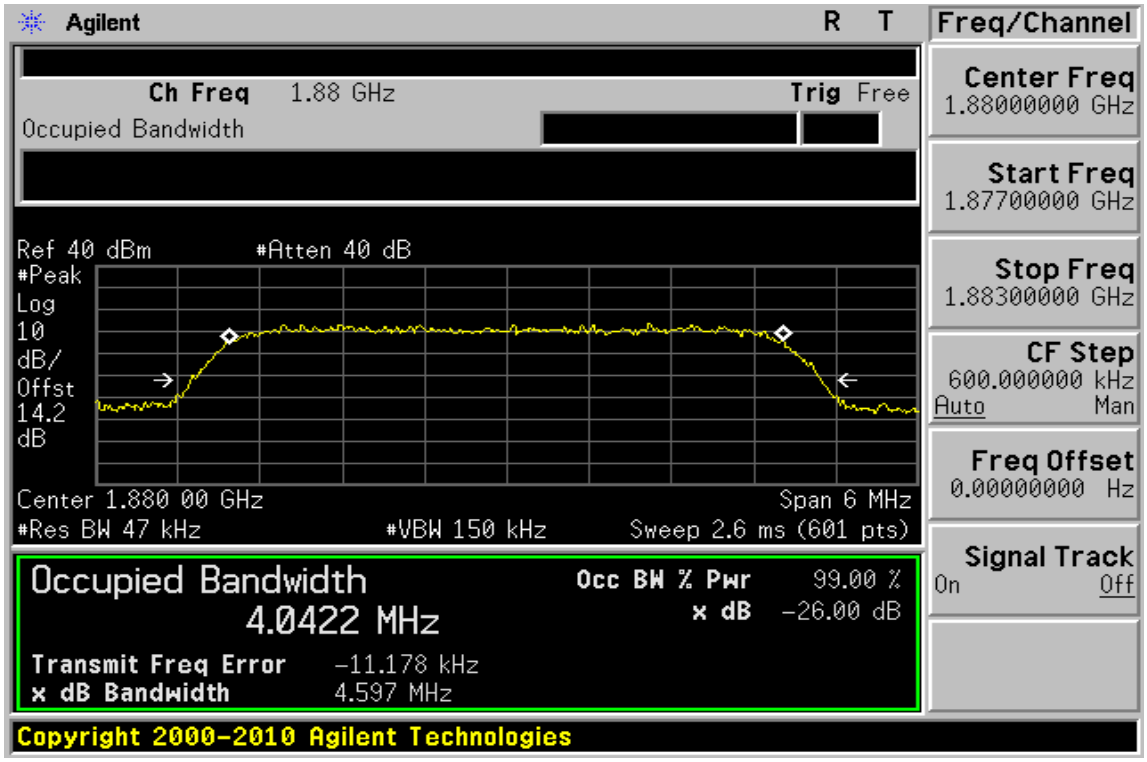

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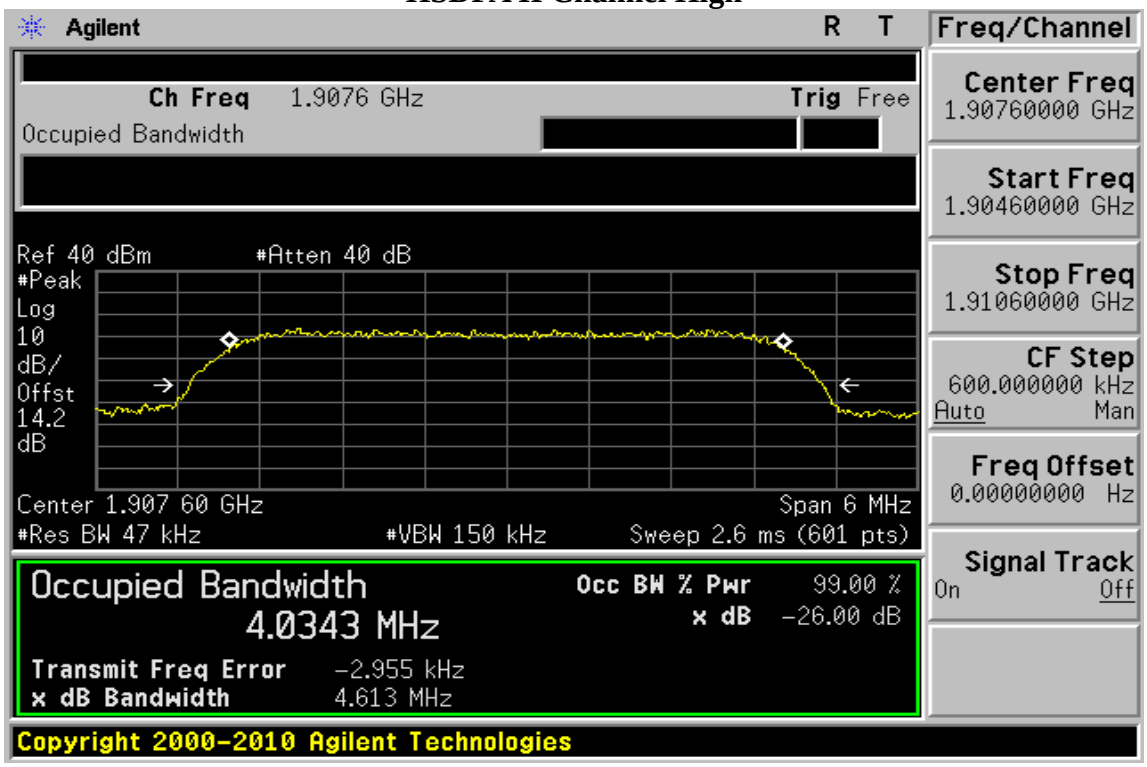

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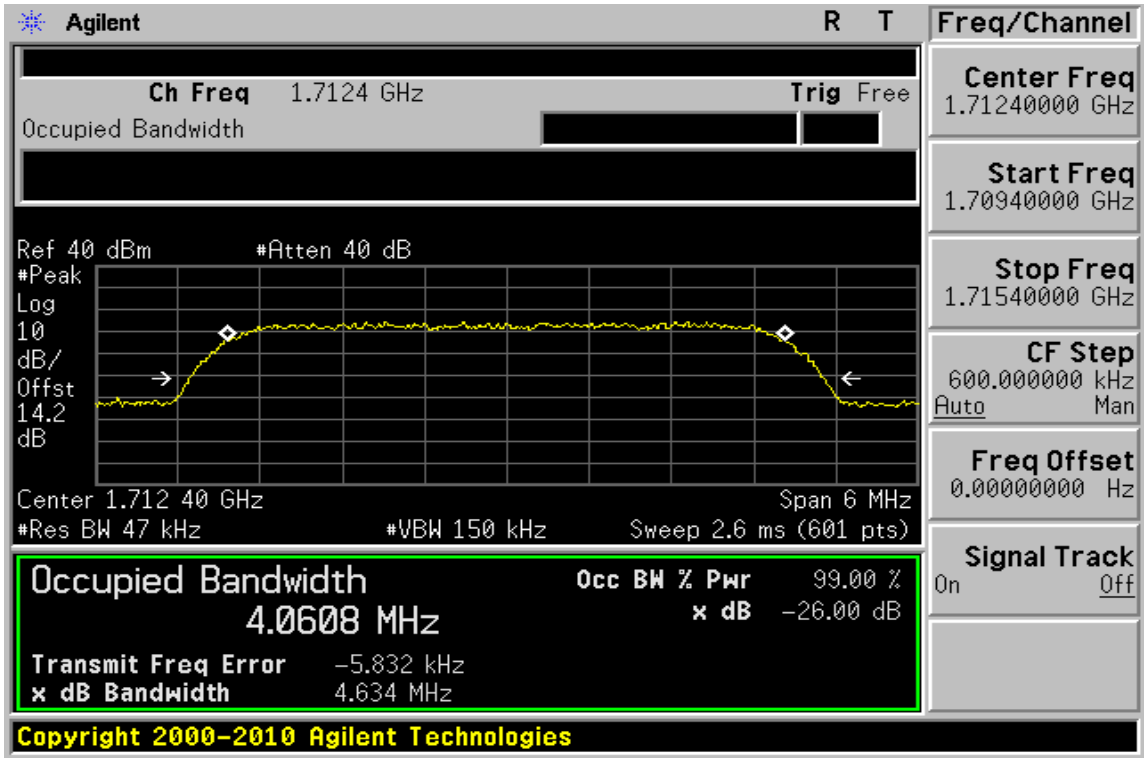

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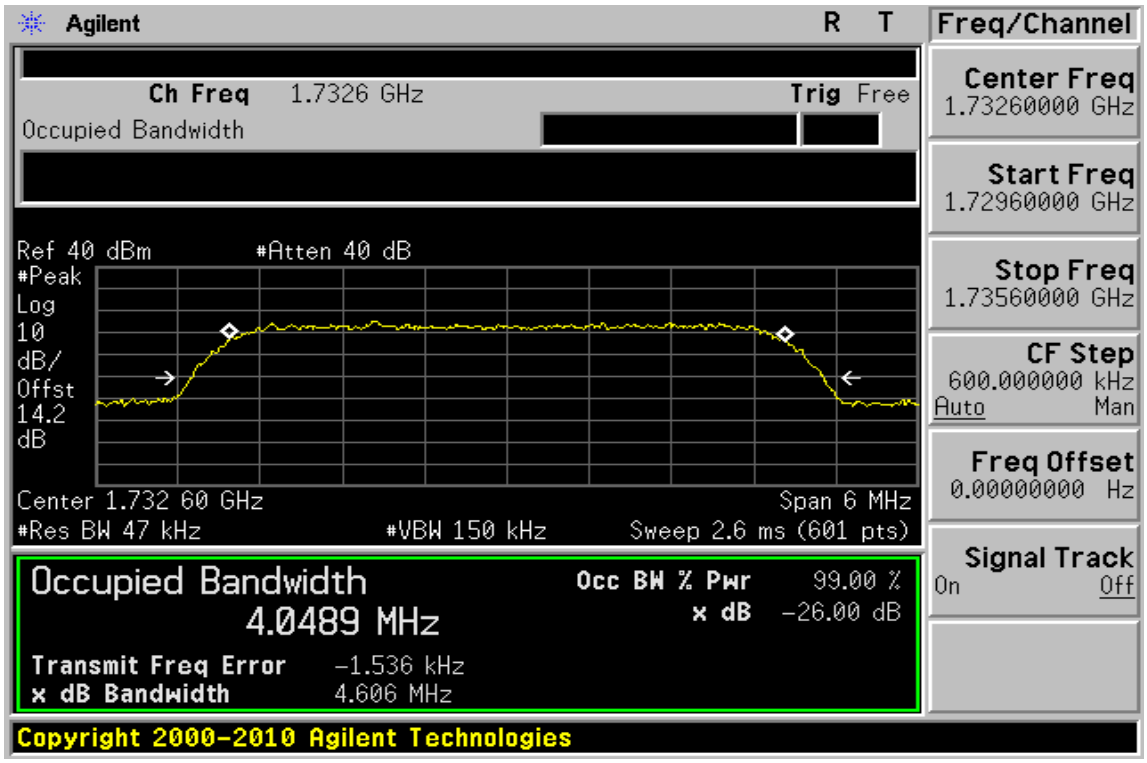

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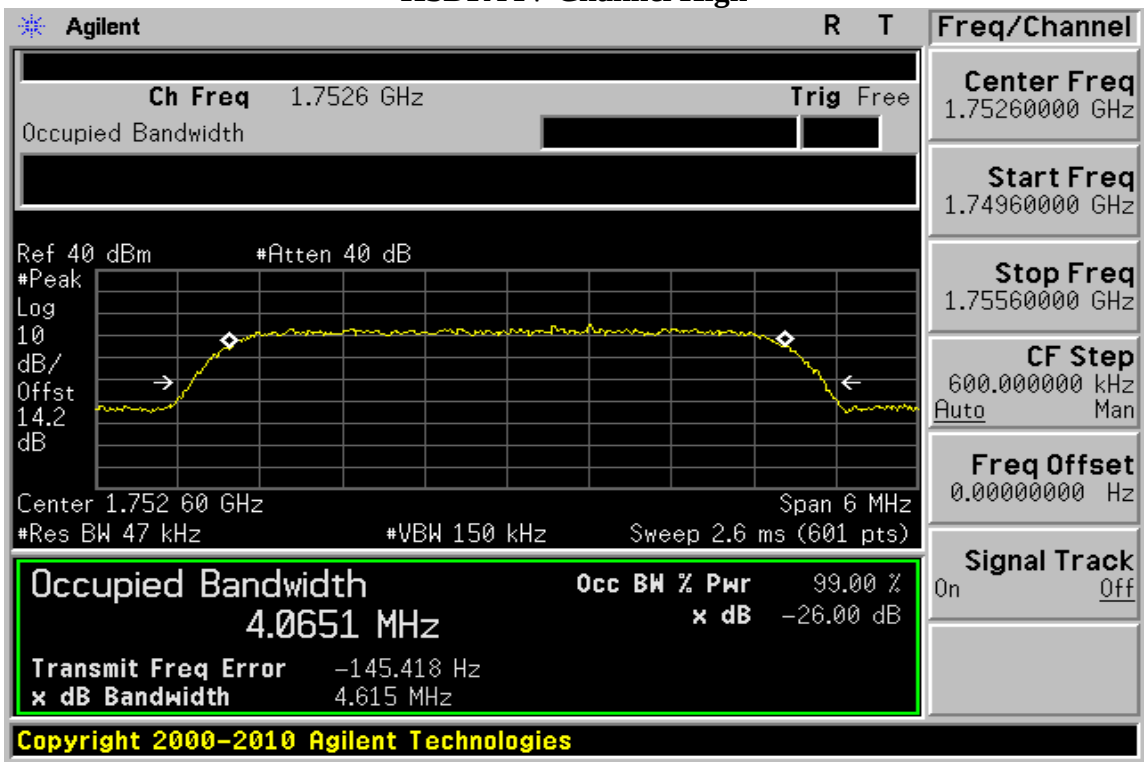
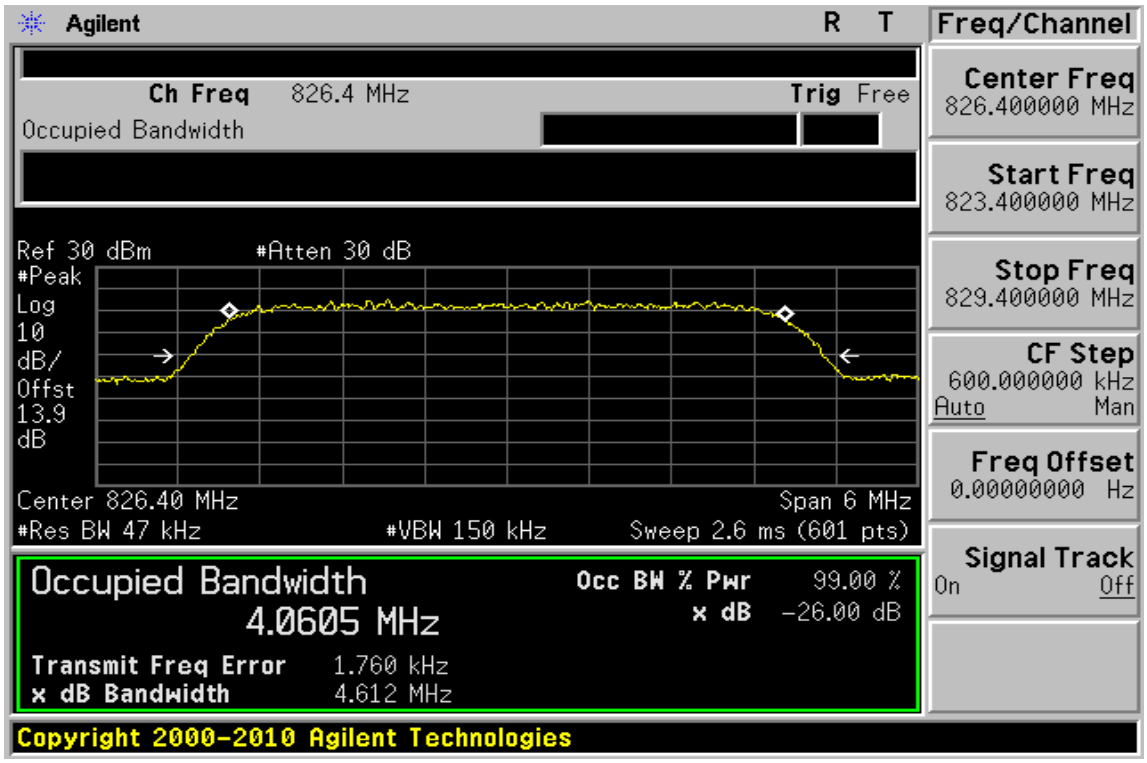


HSDPA V Channel Low



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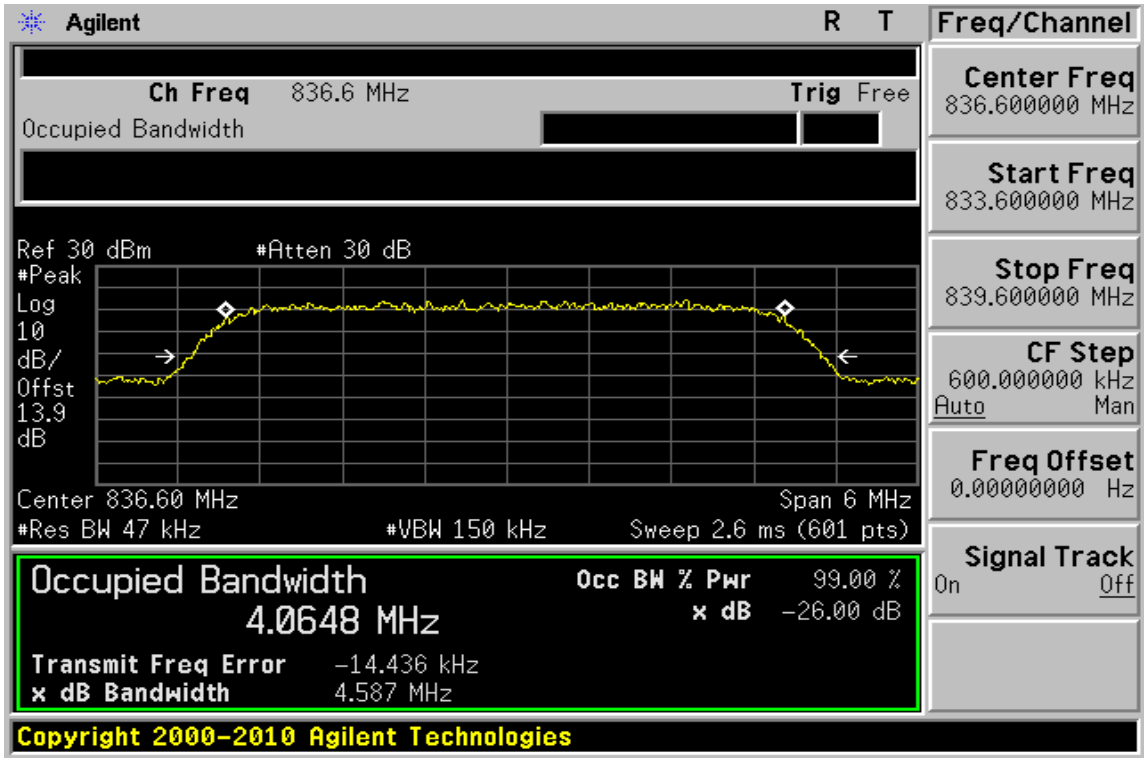
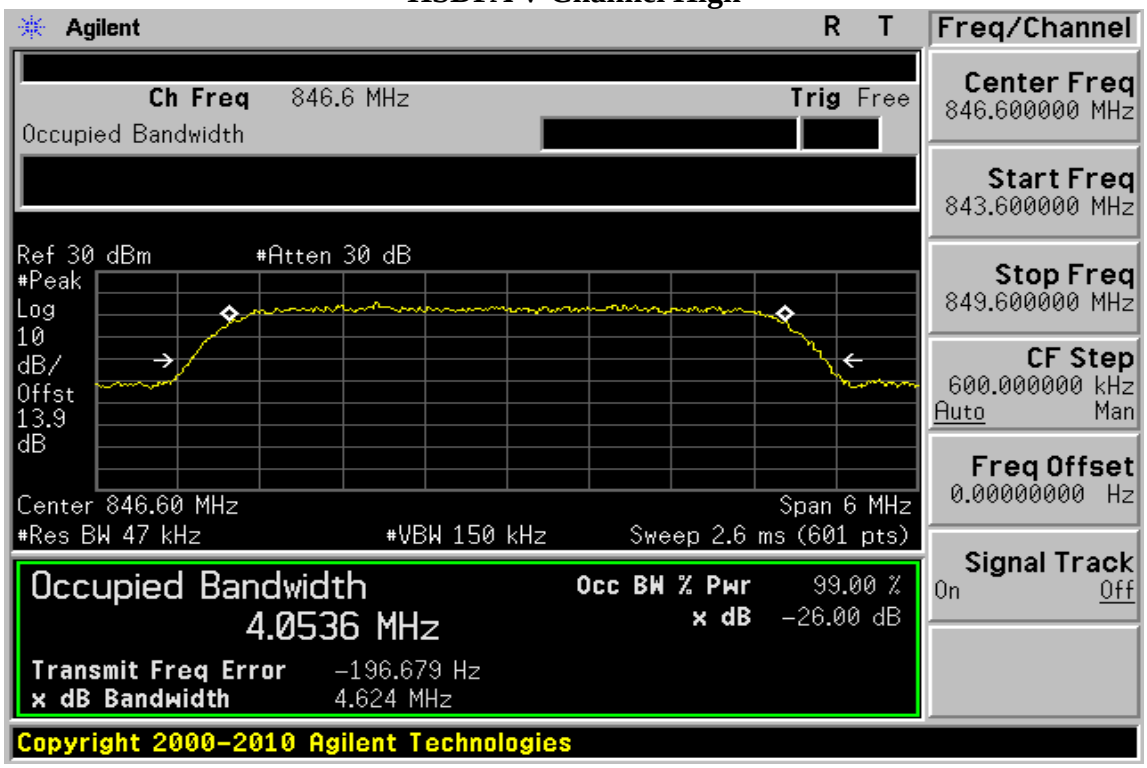
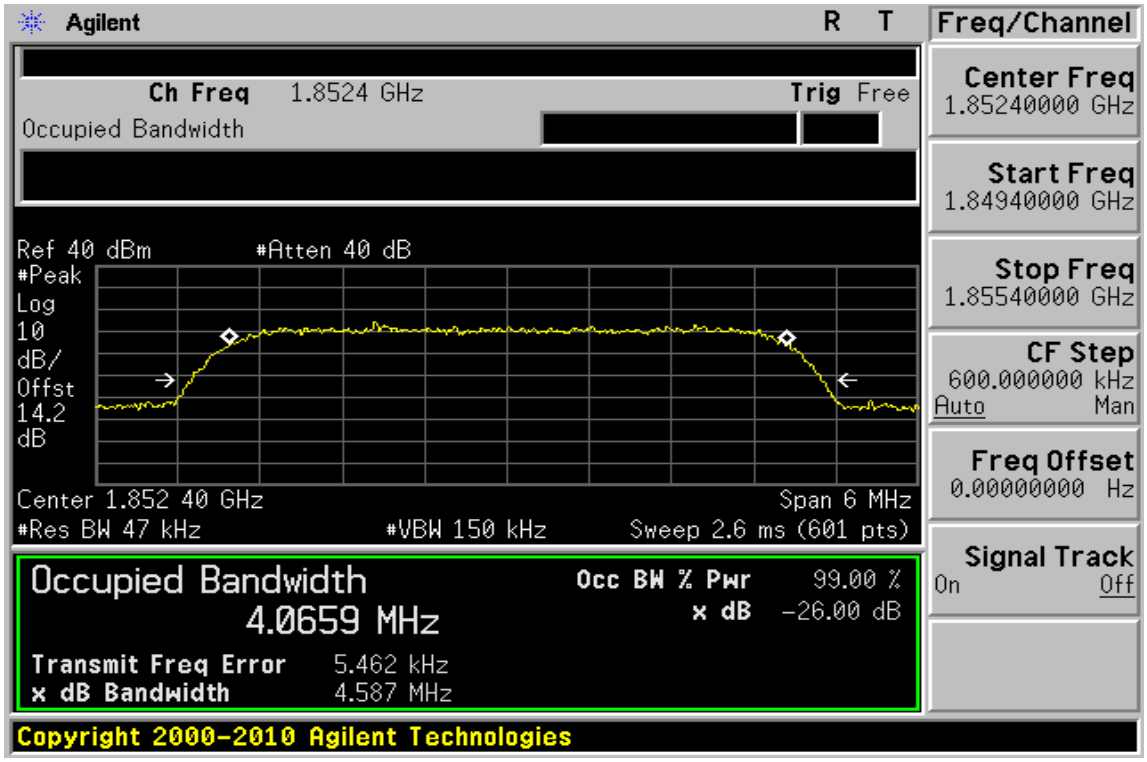


HSDPA V Channel High



HSUPA II Channel Low



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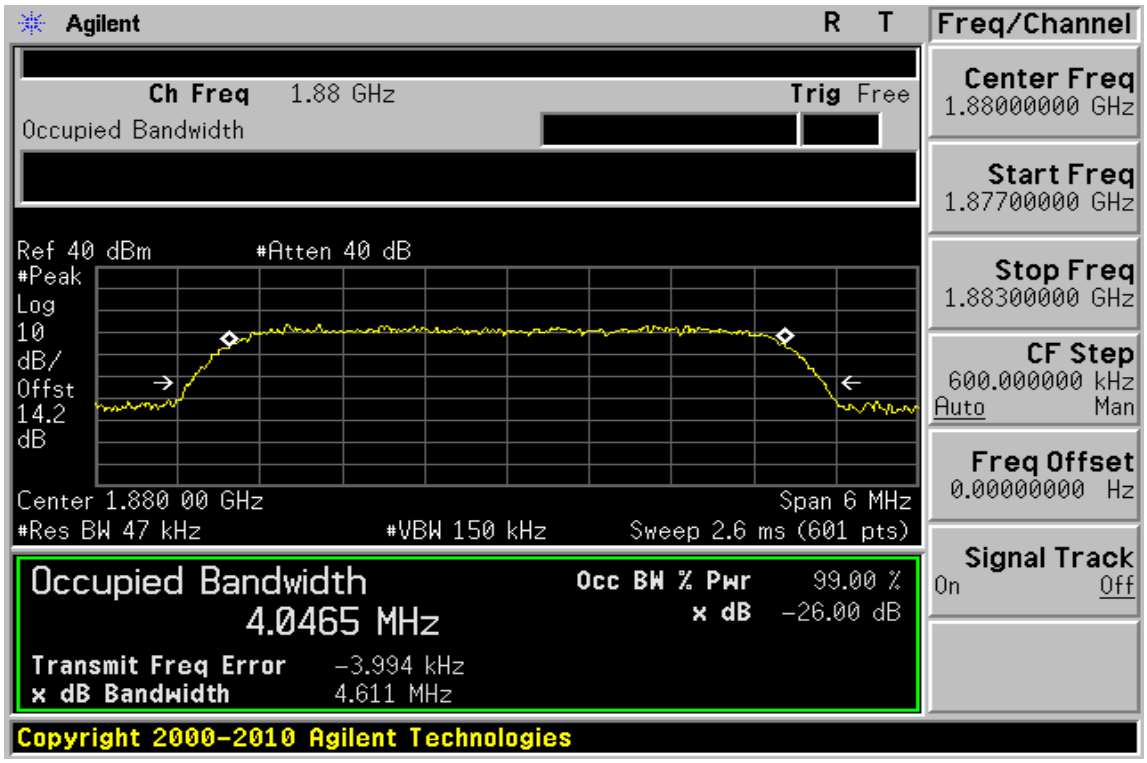

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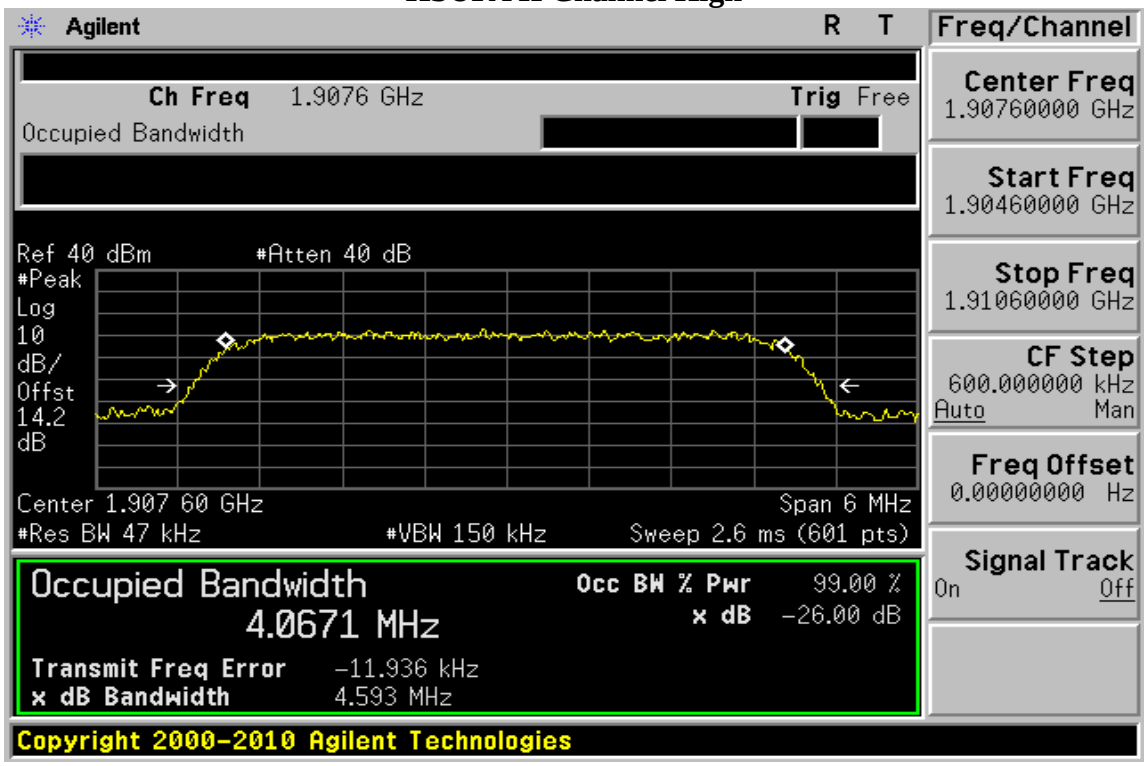
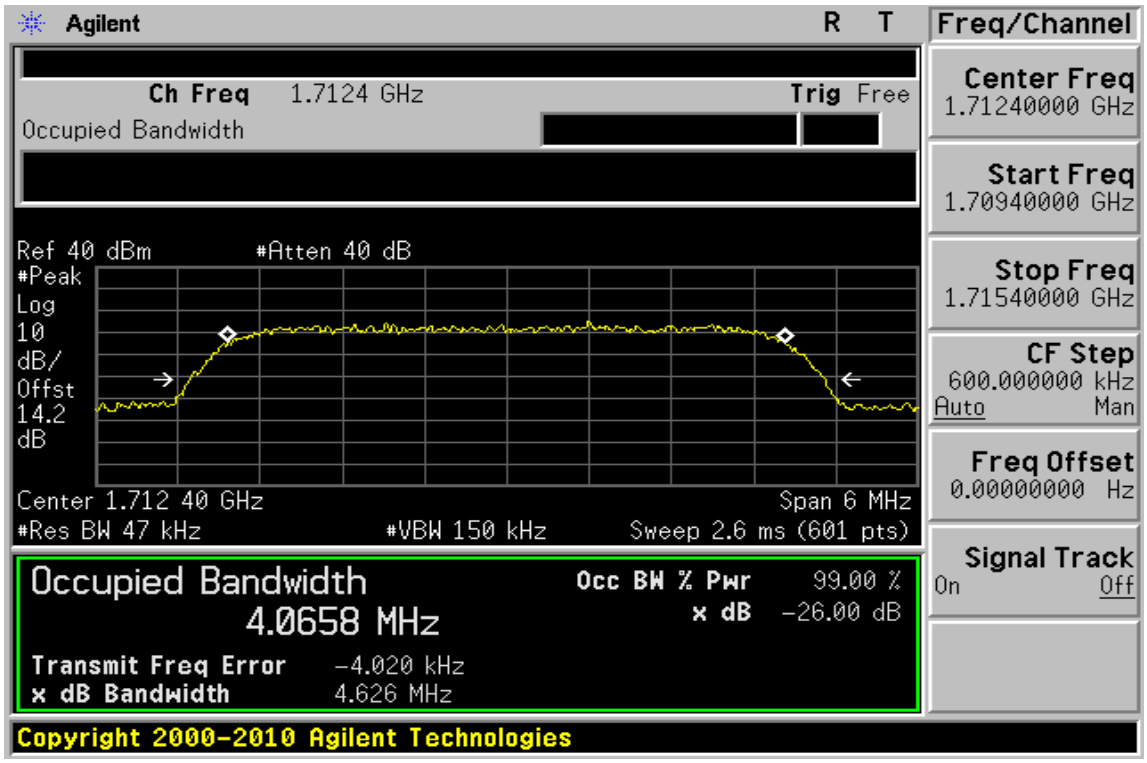


HSUPA IV Channel Low



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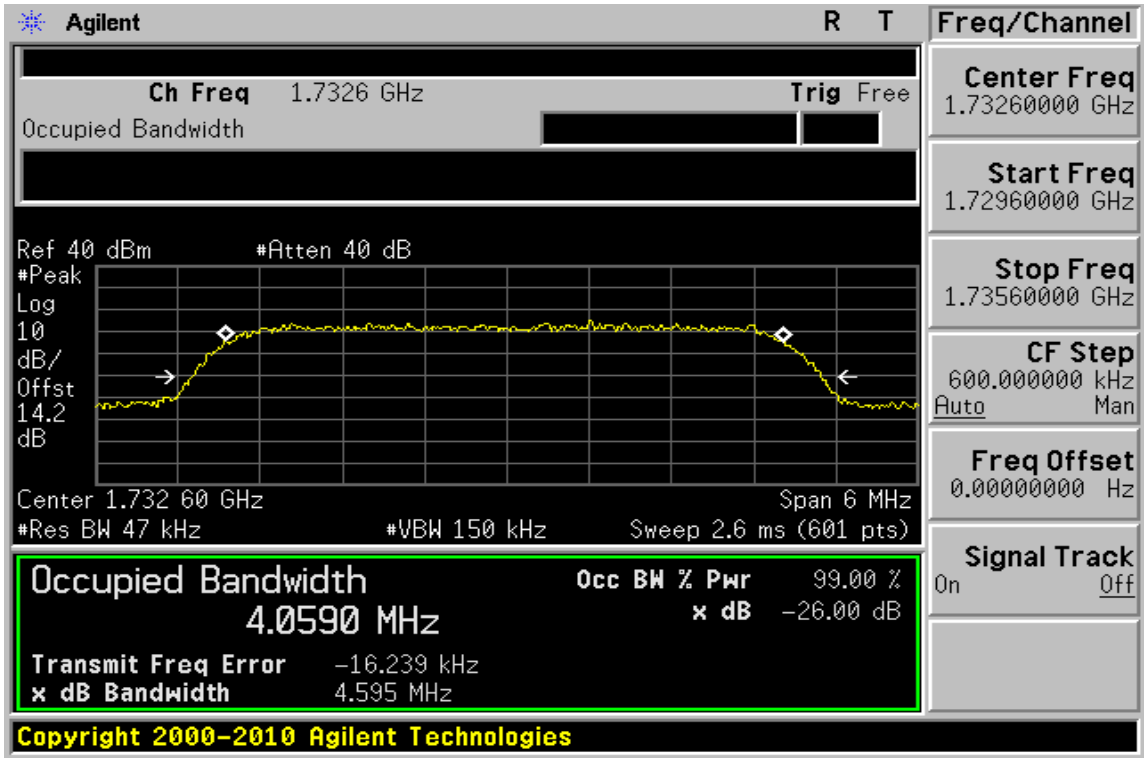
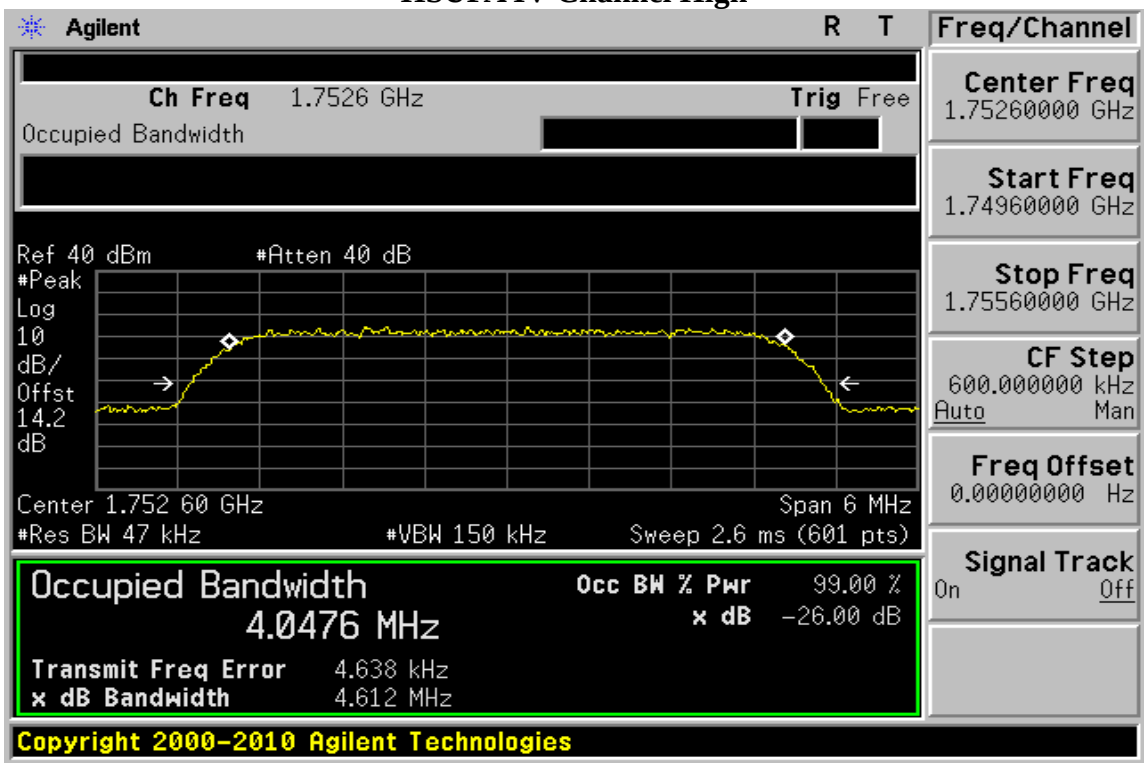


HSUPA IV Channel High



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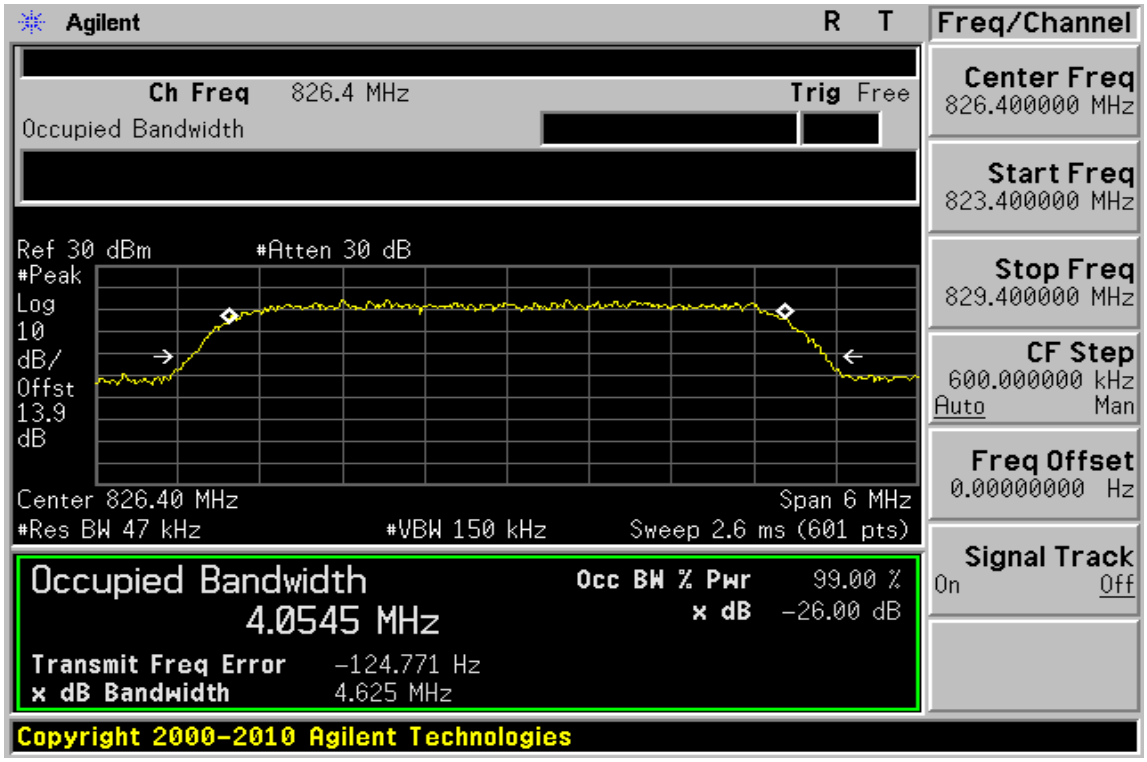

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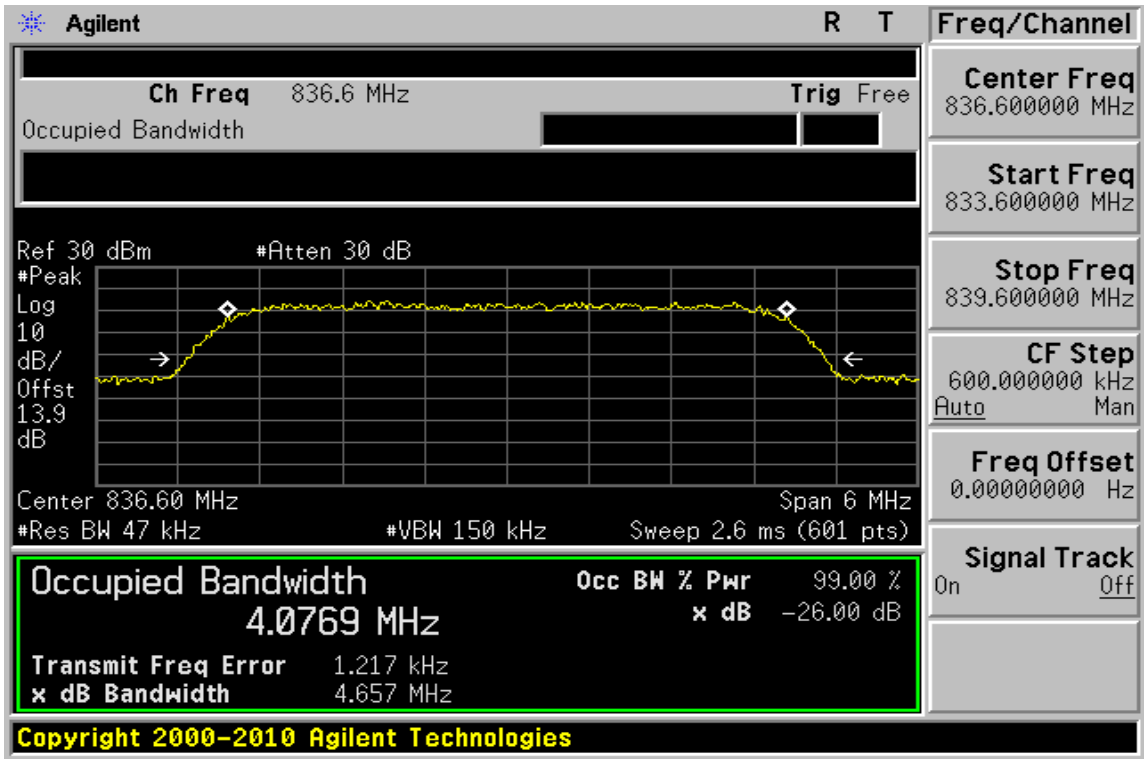

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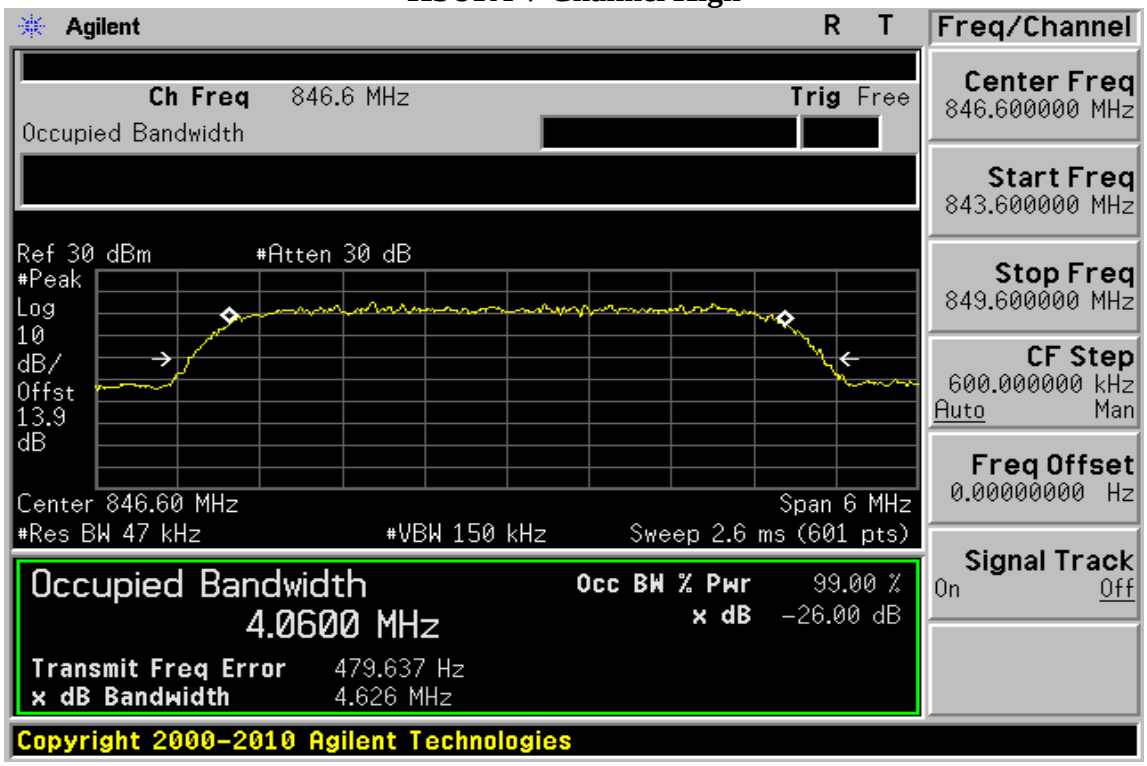


9 OUT OF BAND EMISSION AT ANTENNA TERMINALS

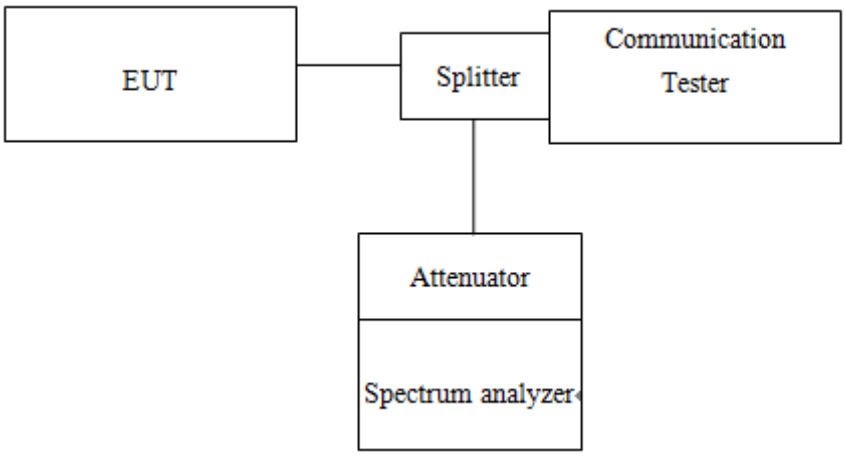
9.1 Standard Applicable

FCC §22.917(a), §24.238(a), §27.53(h) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

FCC §27.53(h)

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's 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 emissions are attenuated at least 26 dB below the transmitter power.

9.2 Test SET-UP



9.3 Measurement Procedure

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

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

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

h) For operations in the 1710–1755 MHz band, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB. Limit, -13dBm

(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. Limit, -13dBm

Conducted Emission

1、 To connect Antenna Port of EUT to Spectrum.
2、 Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3、 Allow trace to fully stabilize.
4、 Repeat above procedures until all default test channel measured were complete.

9.4 Measurement Equipment Used

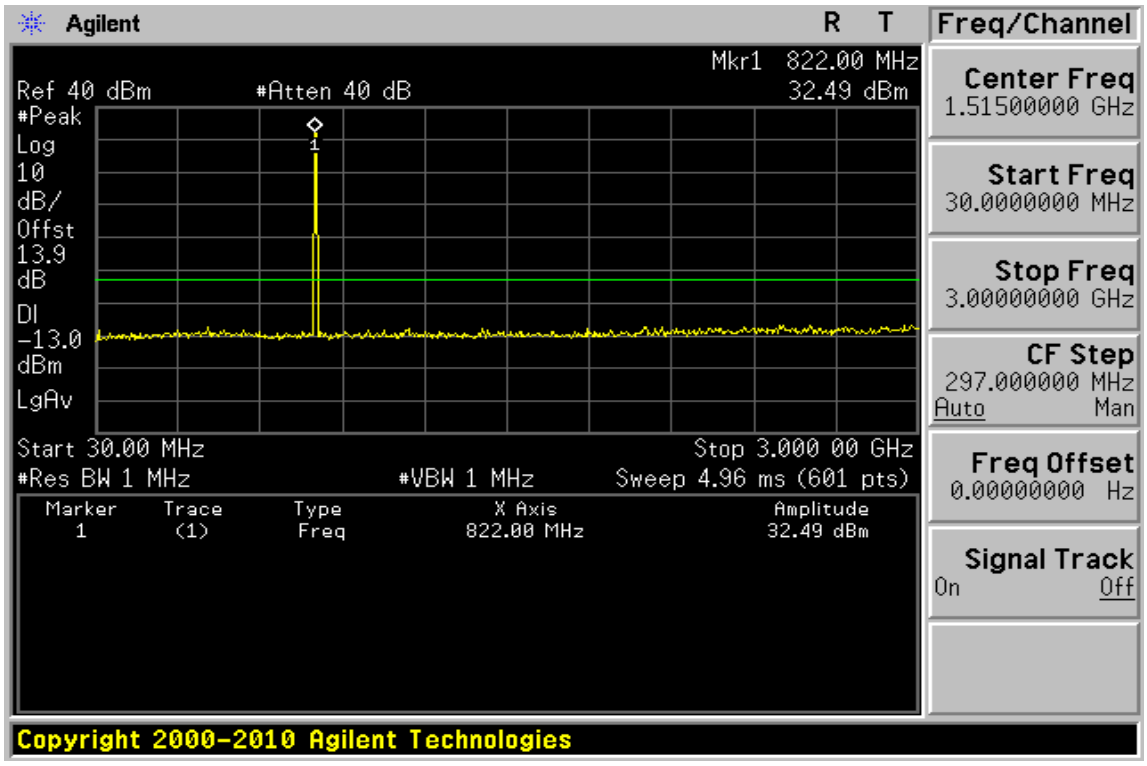
Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/07/2014	05/06/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

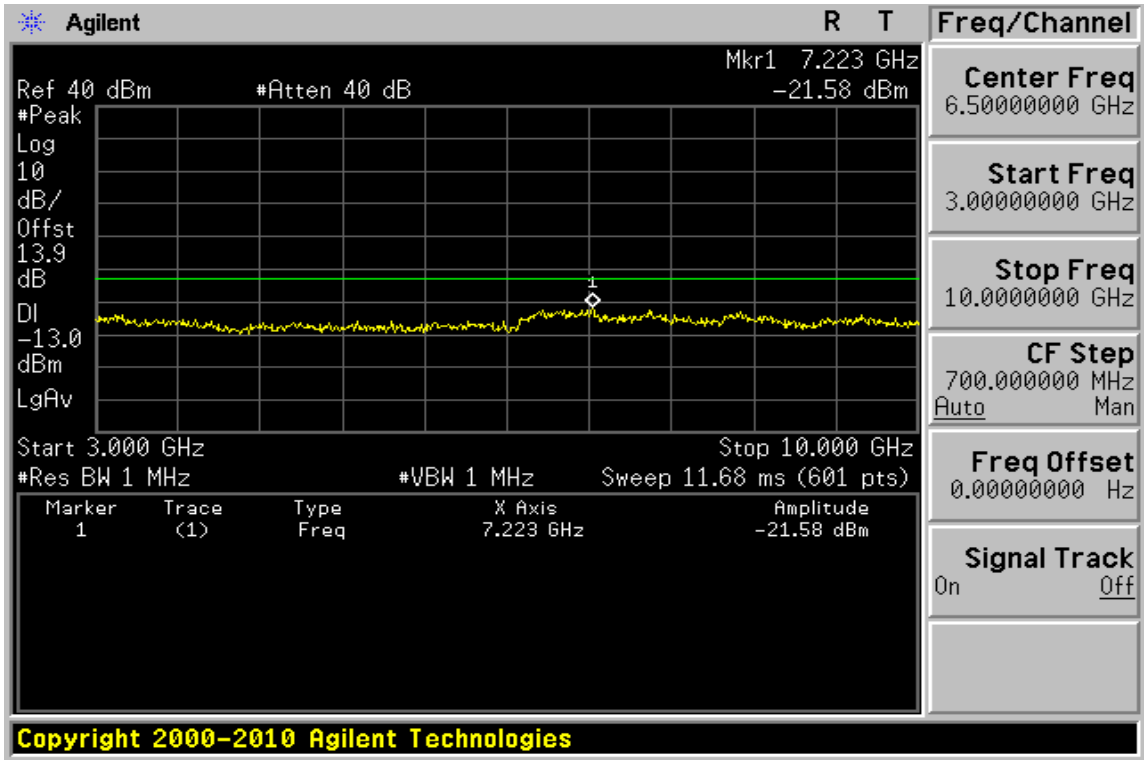
9.5 Measurement Result:

Refer to next pages.

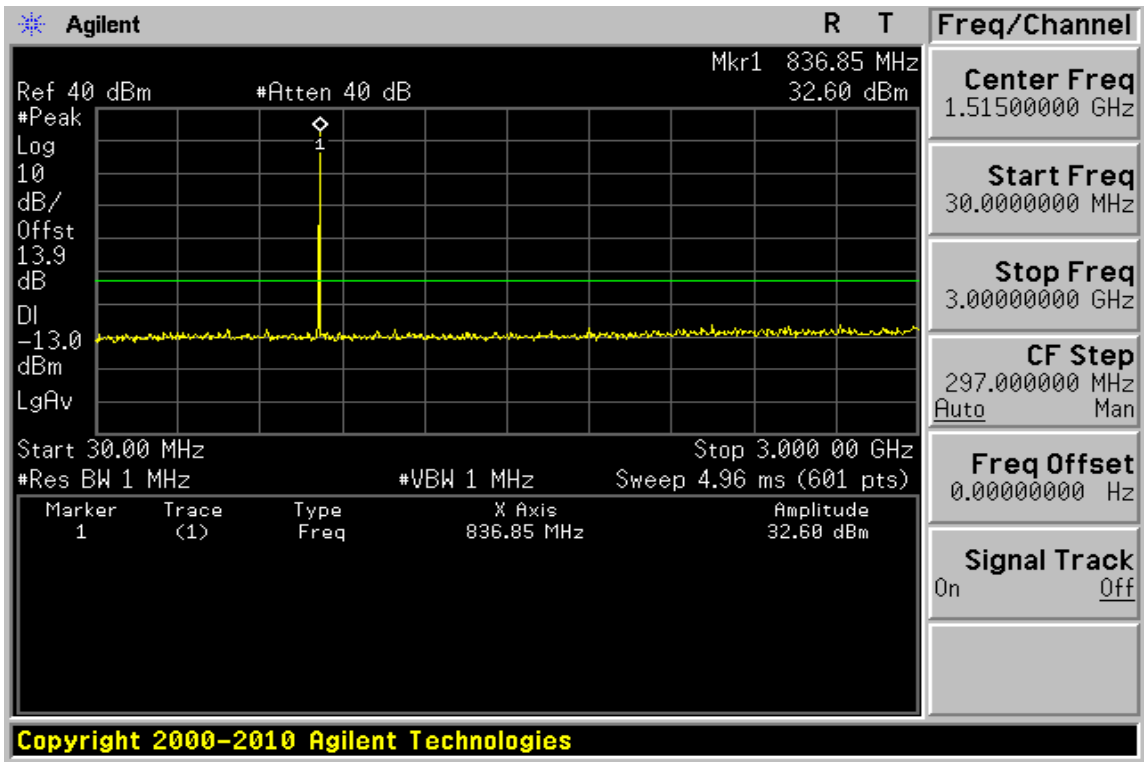
NOTE: the occurrence of the spike on the conducted emission is the signal of the fundamental emission.

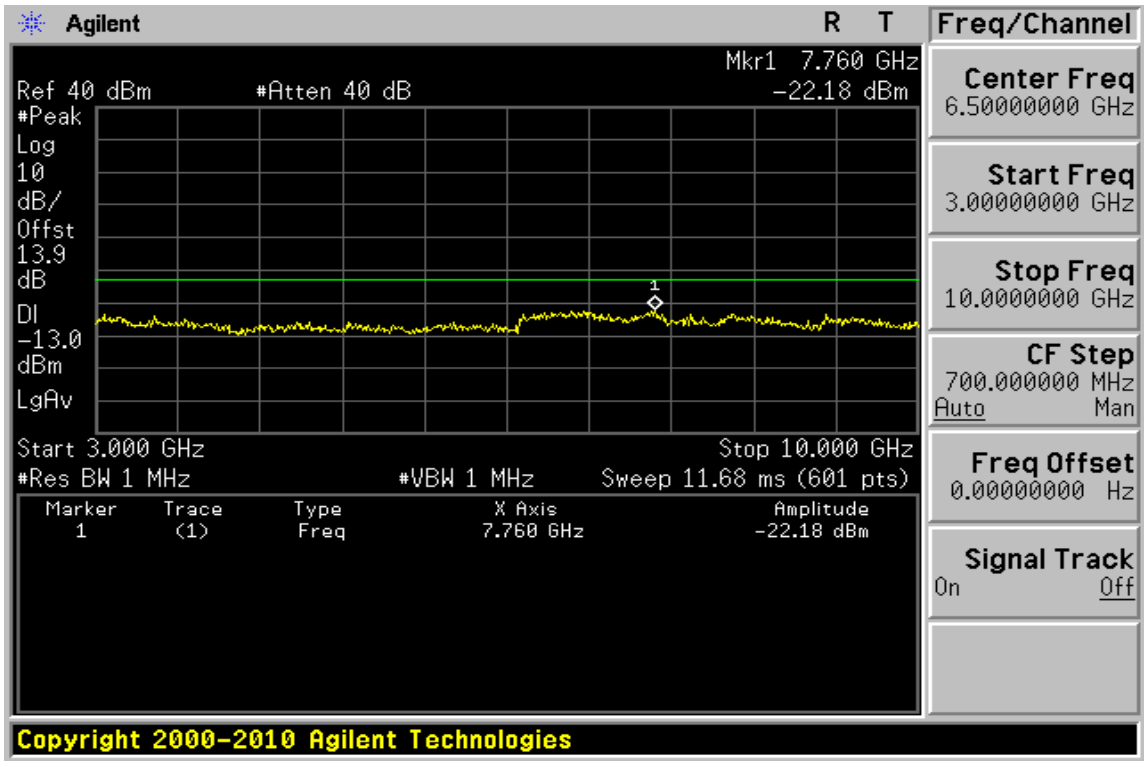
Out of Band emission at antenna terminals – GPRS850 Channel Lowest



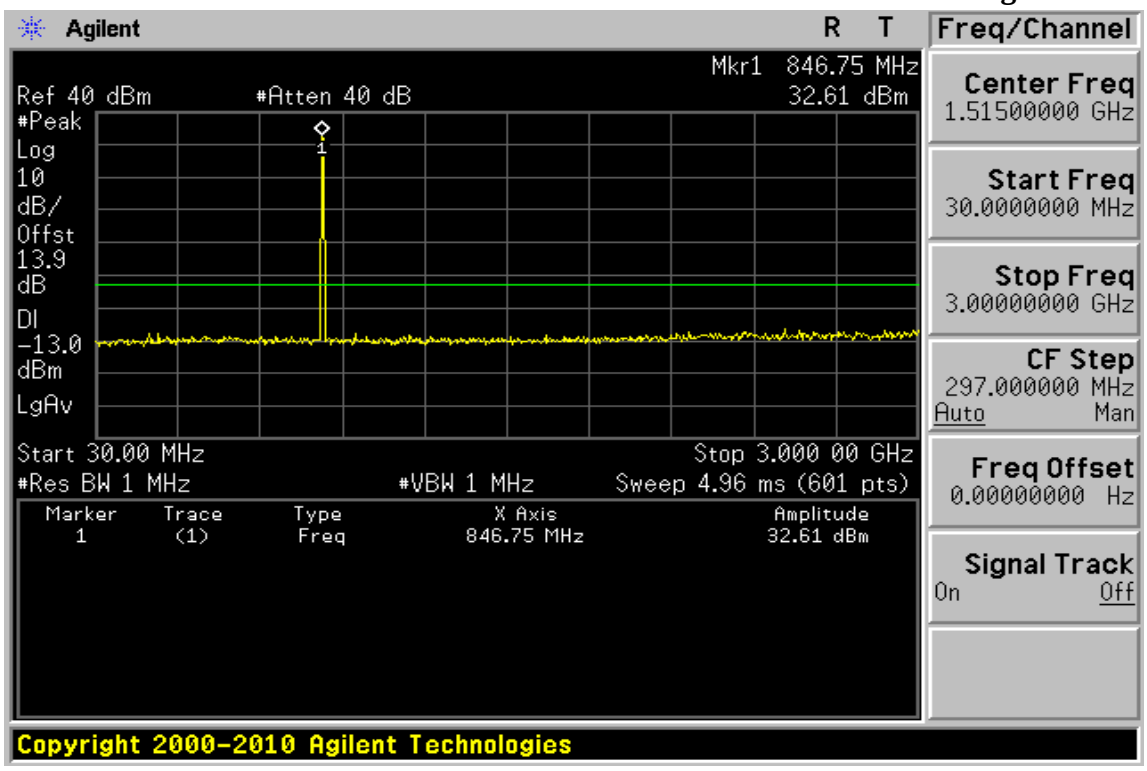


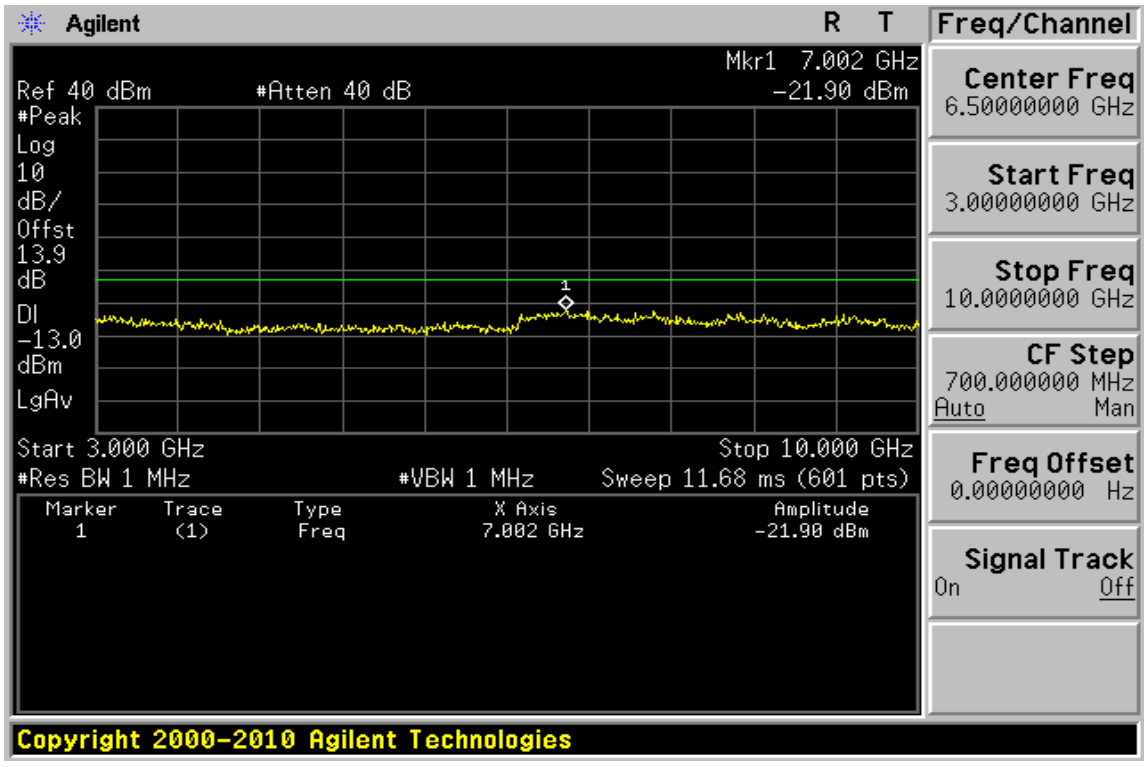
Out of Band emission at antenna terminals – GPRS 850 Channel Mid



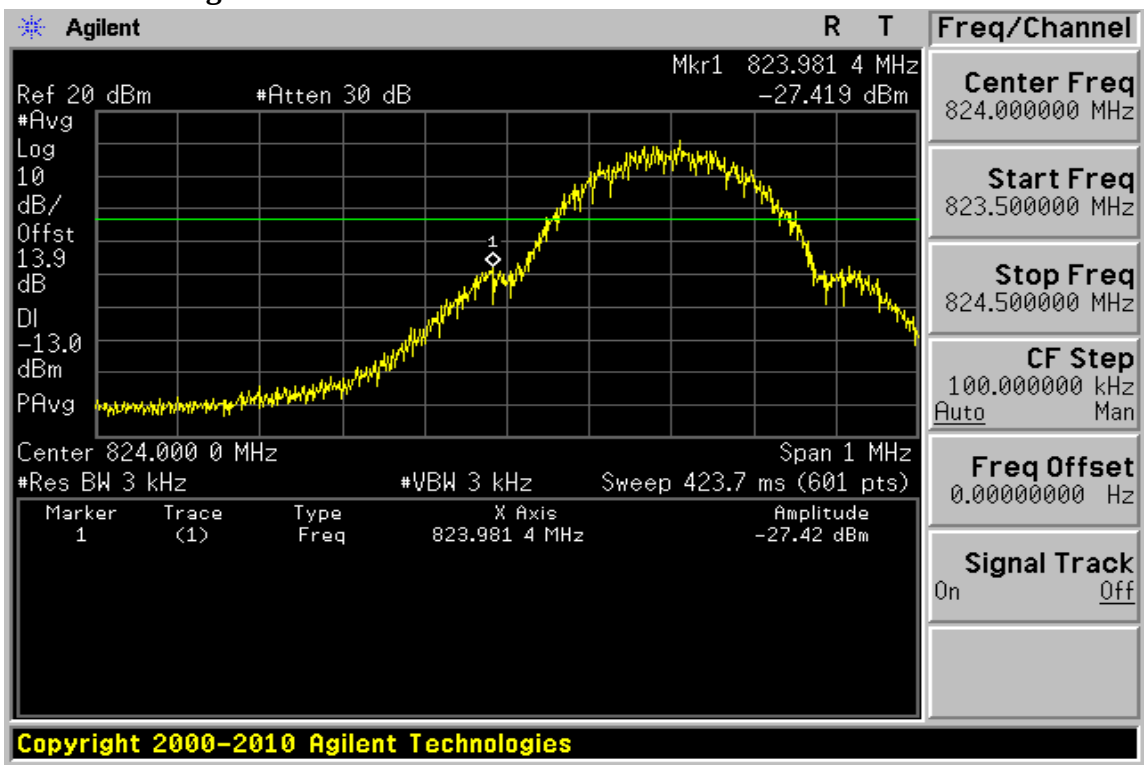


Out of Band emission at antenna terminals – GPRS 850 Channel Highest

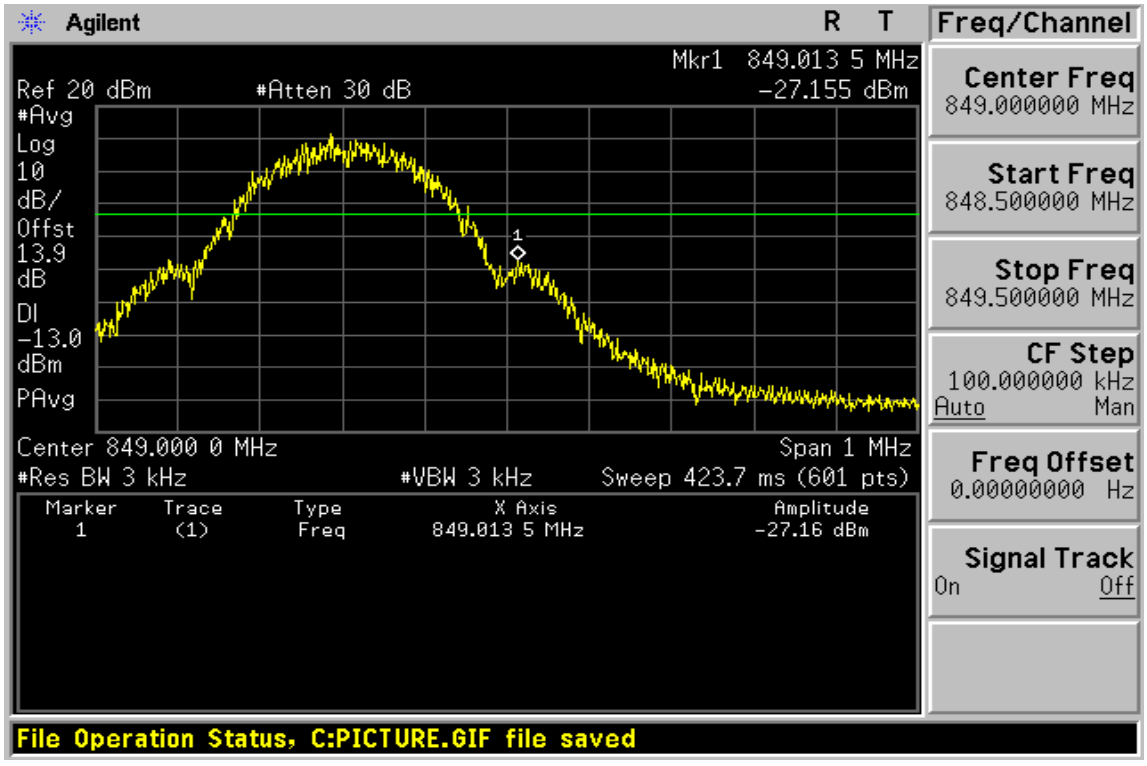




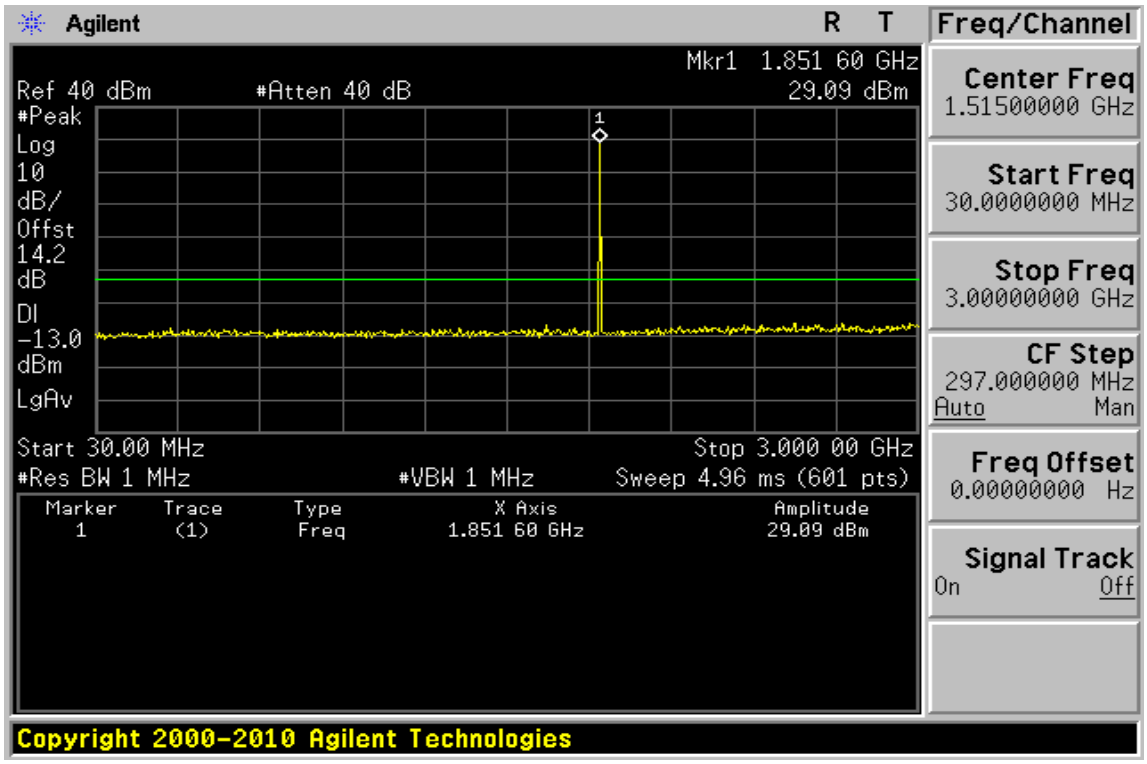
Band edge emission at antenna terminals – GPRS 850 Channel Lowest

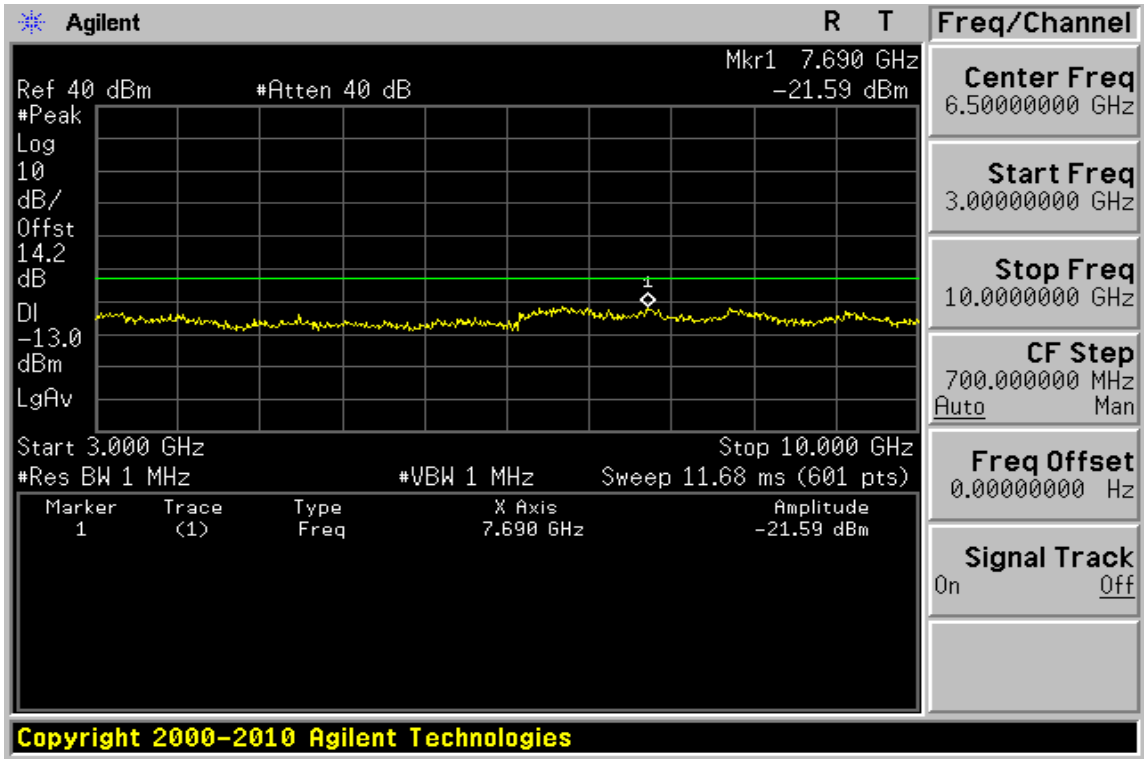


Band edge emission at antenna terminals – GPRS 850 Channel Highest

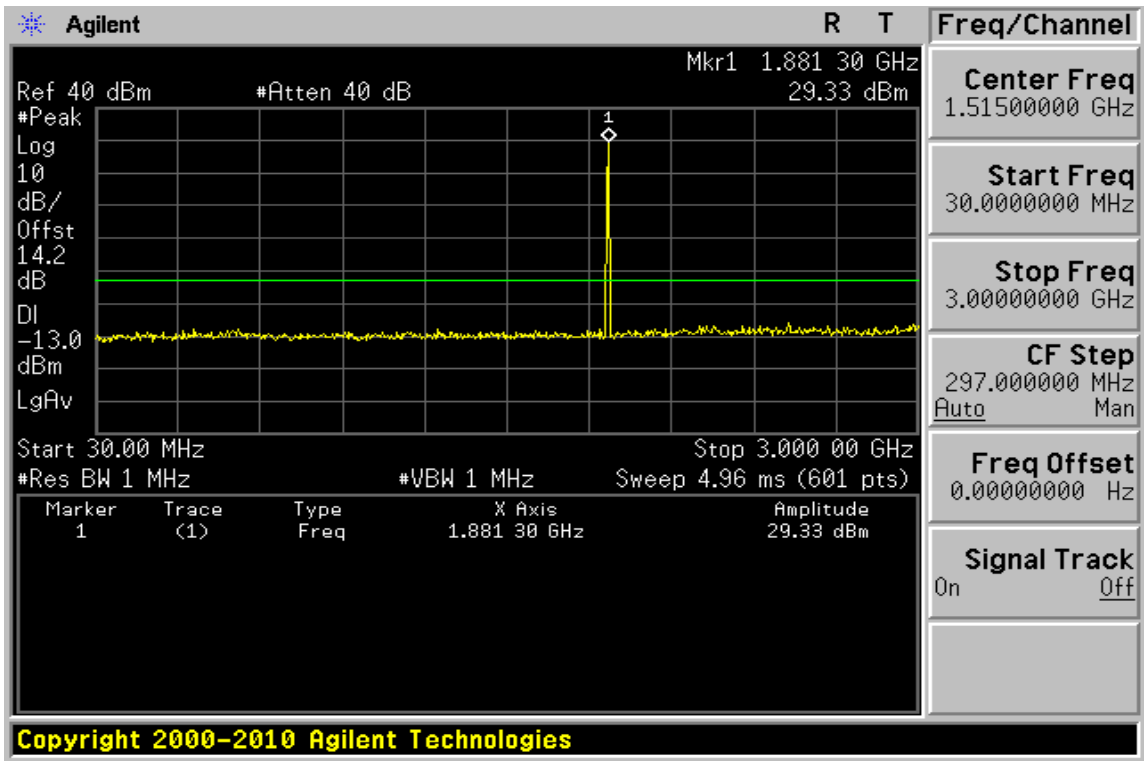


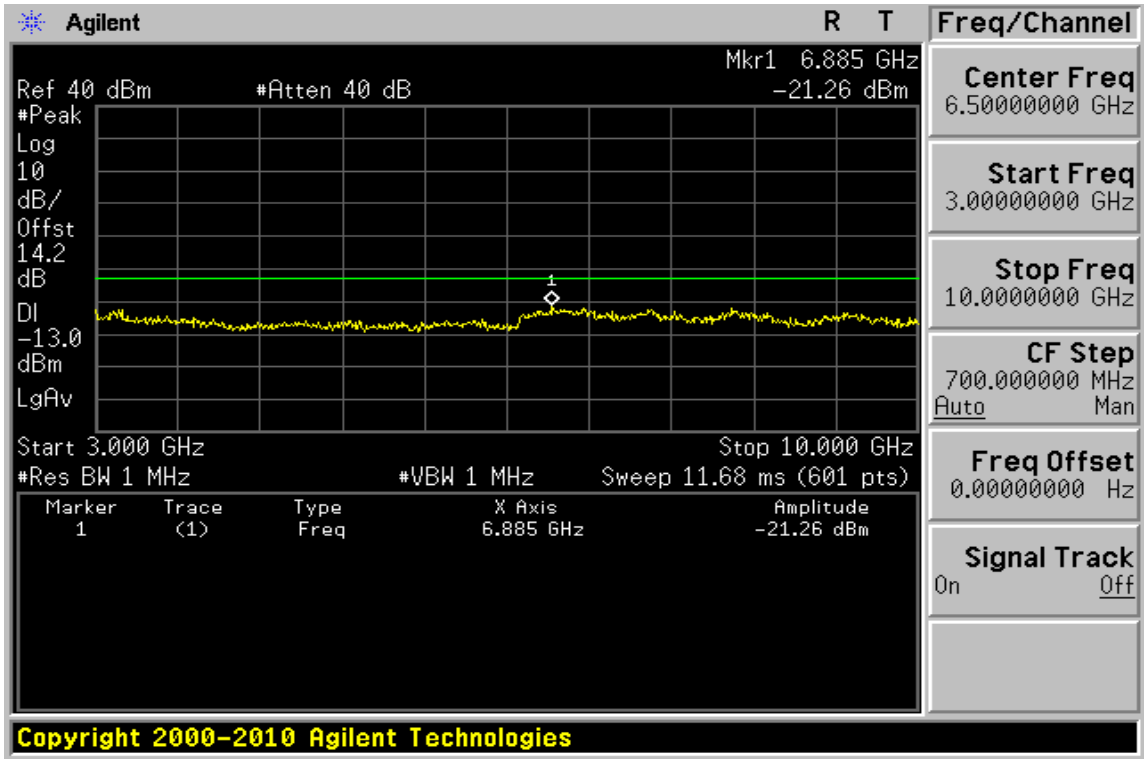
Out of Band emission at antenna terminals – GPRS 1900 Channel Lowest



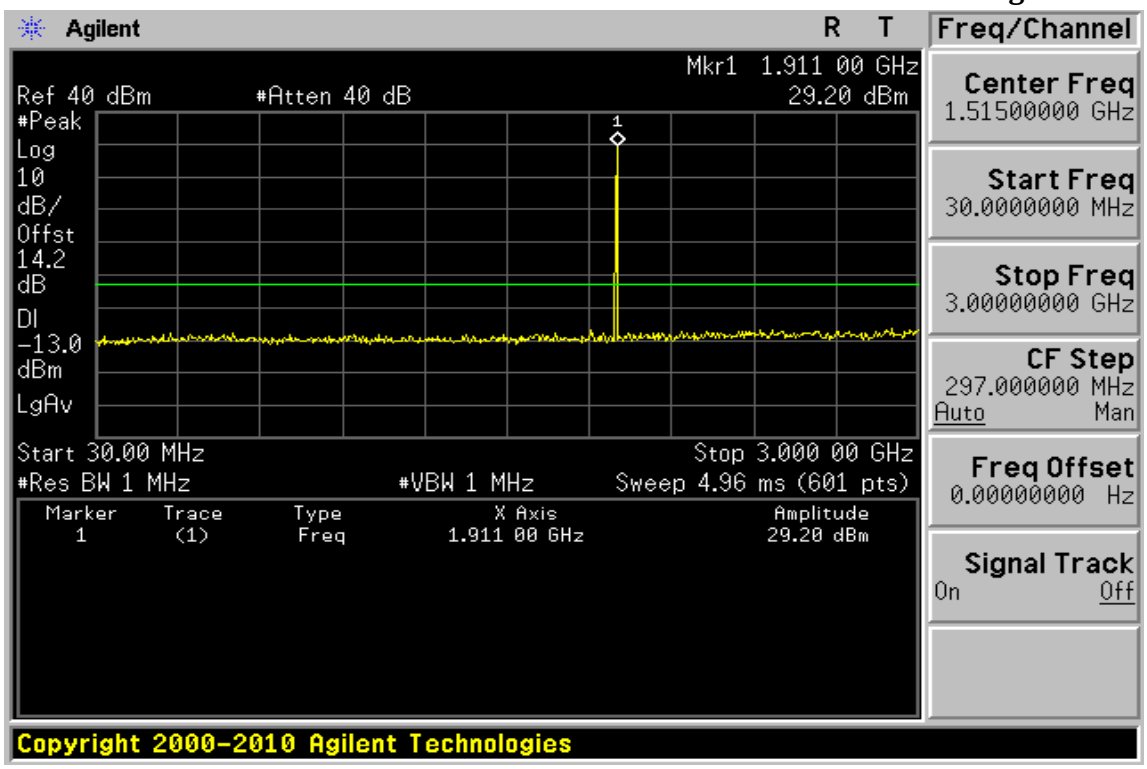


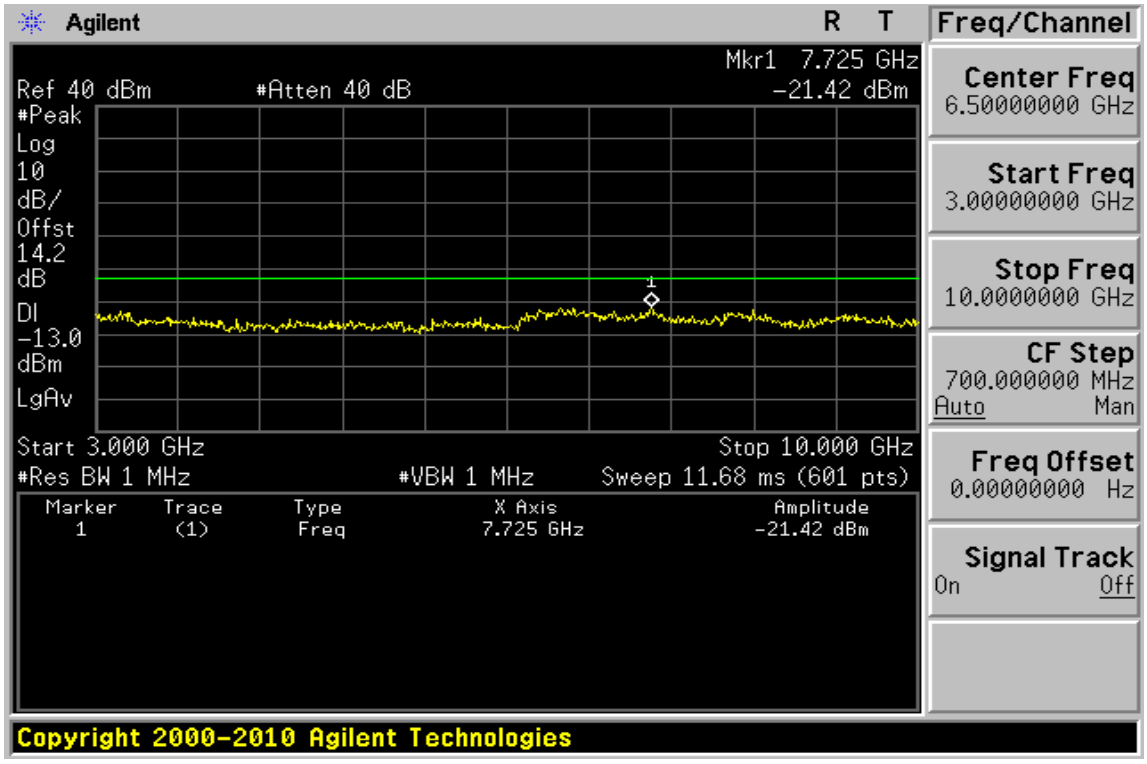
Out of Band emission at antenna terminals – GPRS 1900 Channel Mid



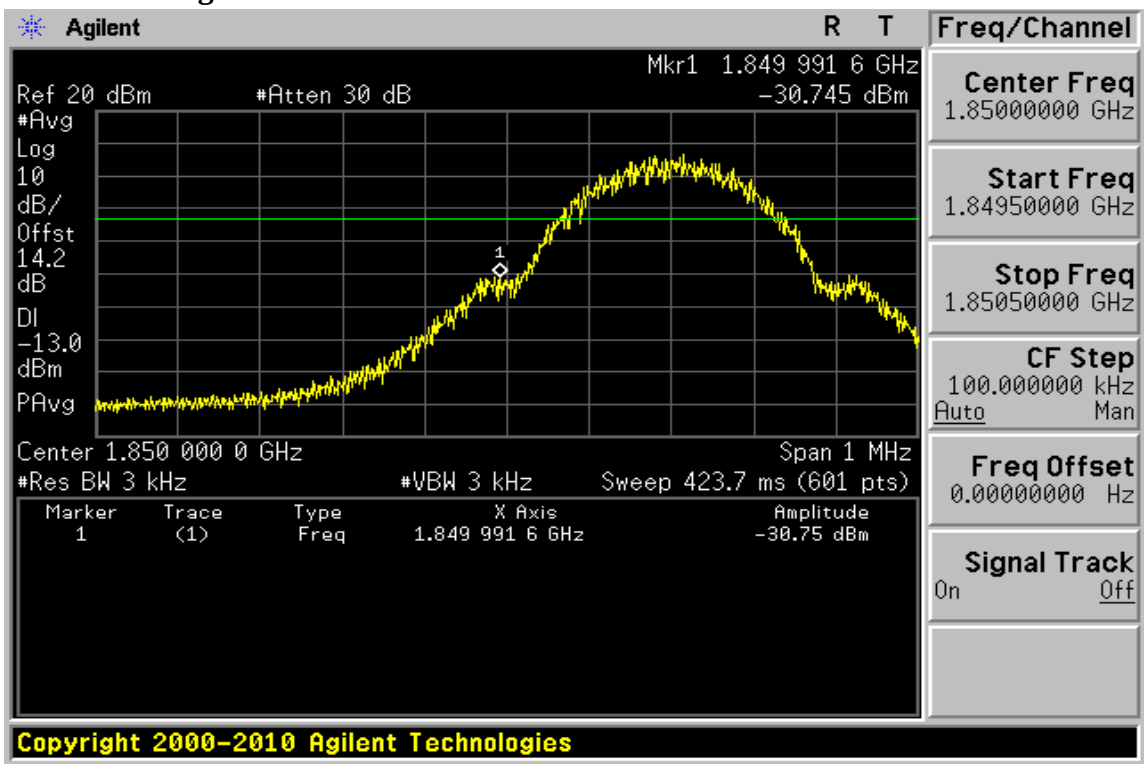


Out of Band emission at antenna terminals – GPRS 1900 Channel Highest

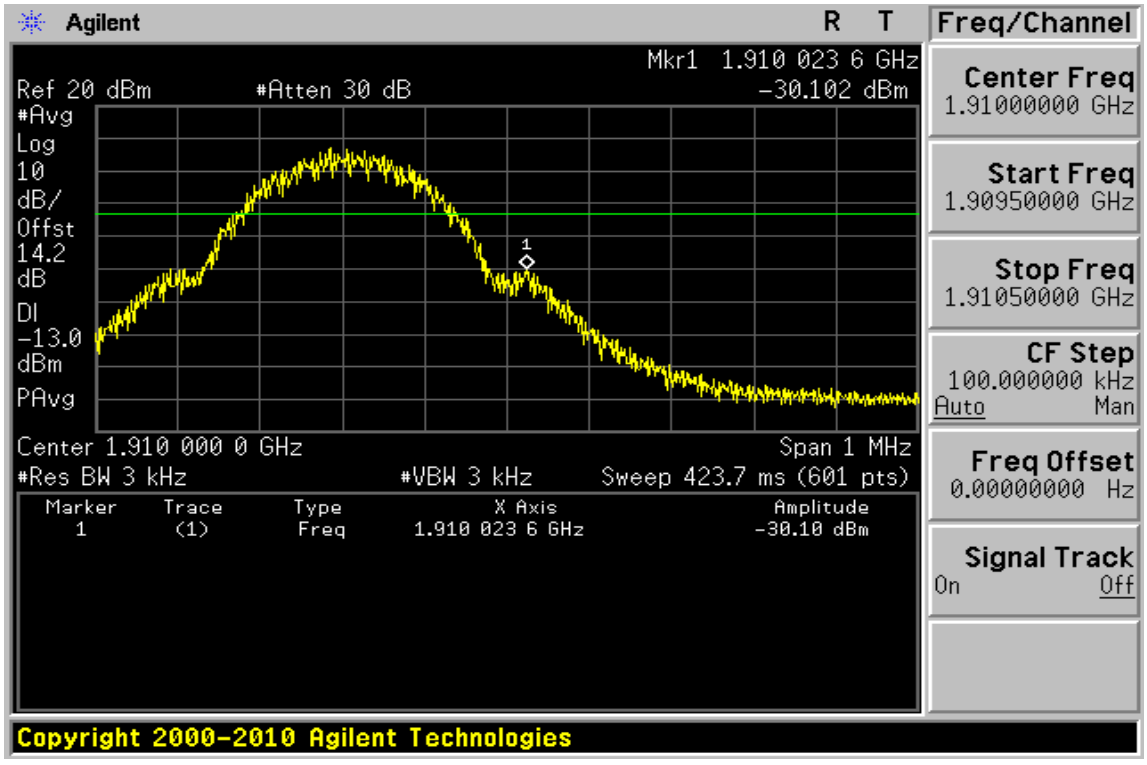




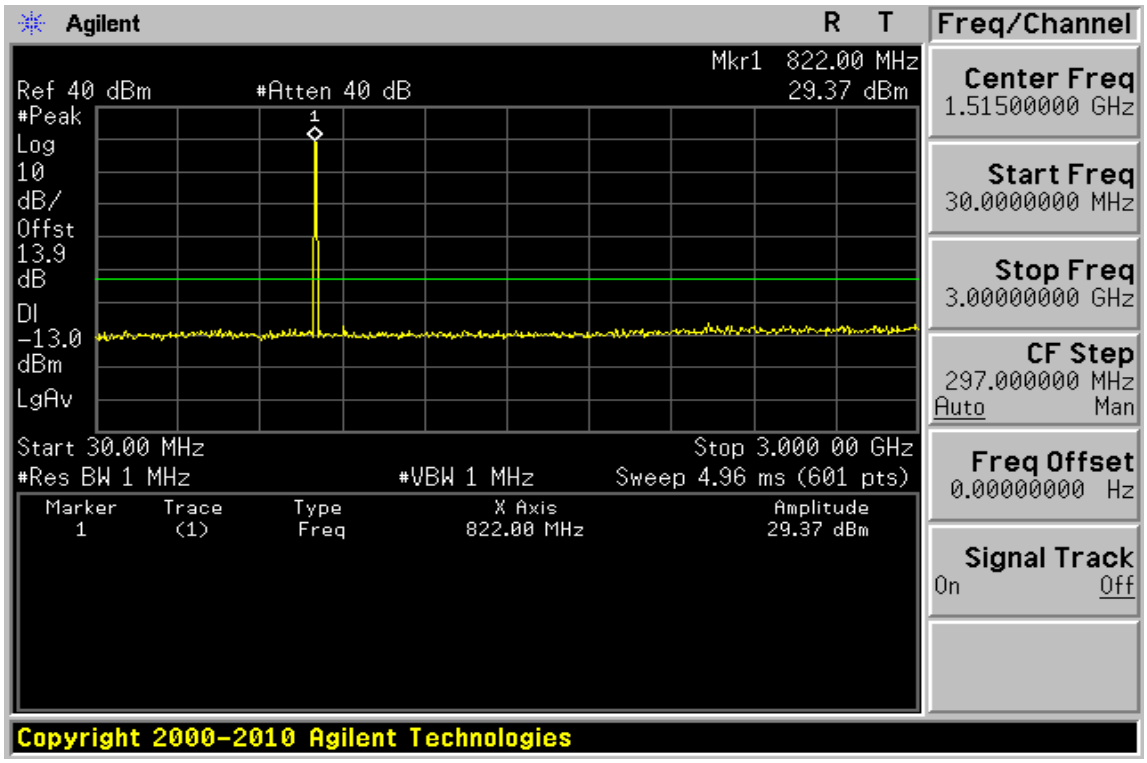
Band edge emission at antenna terminals – GPRS 1900 Channel Lowest

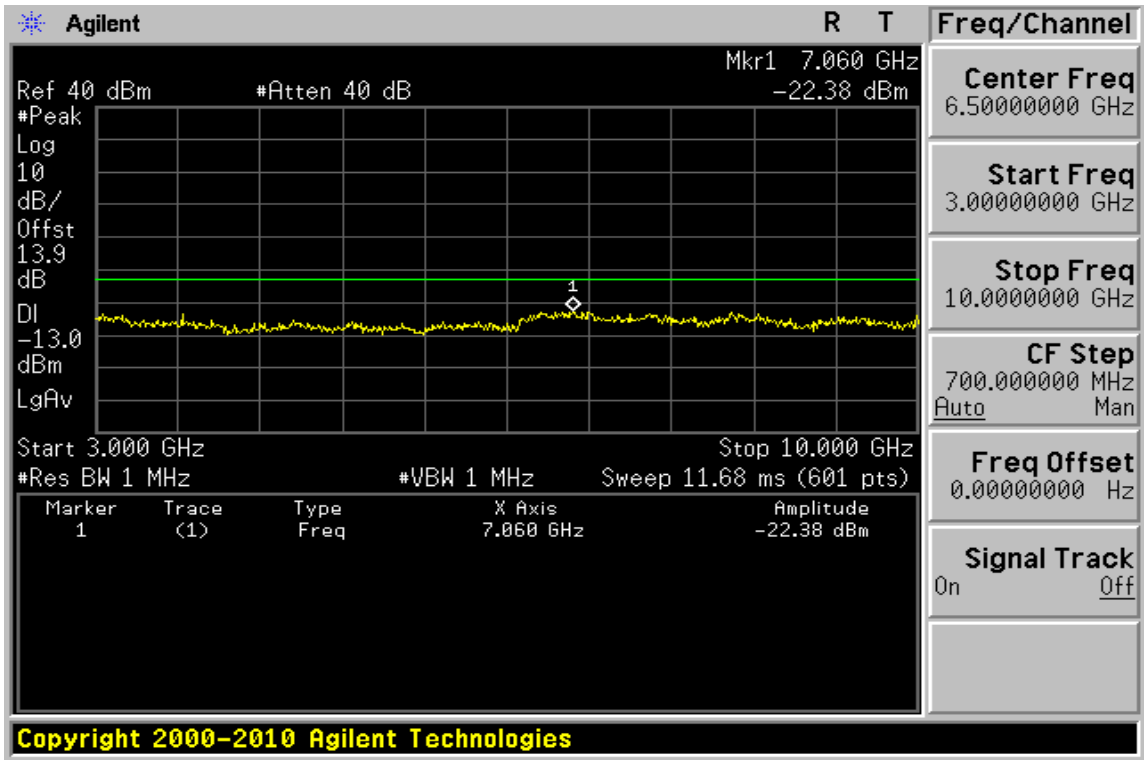


Band edge emission at antenna terminals – GPRS 1900 Channel Highest

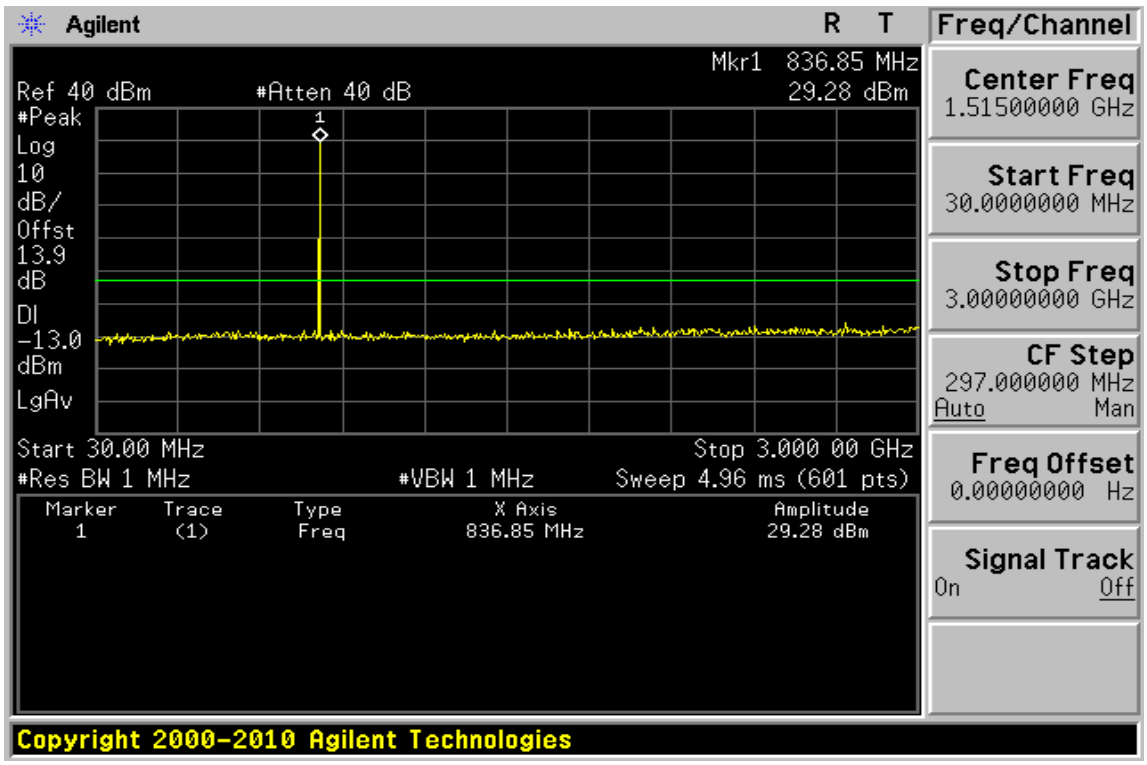


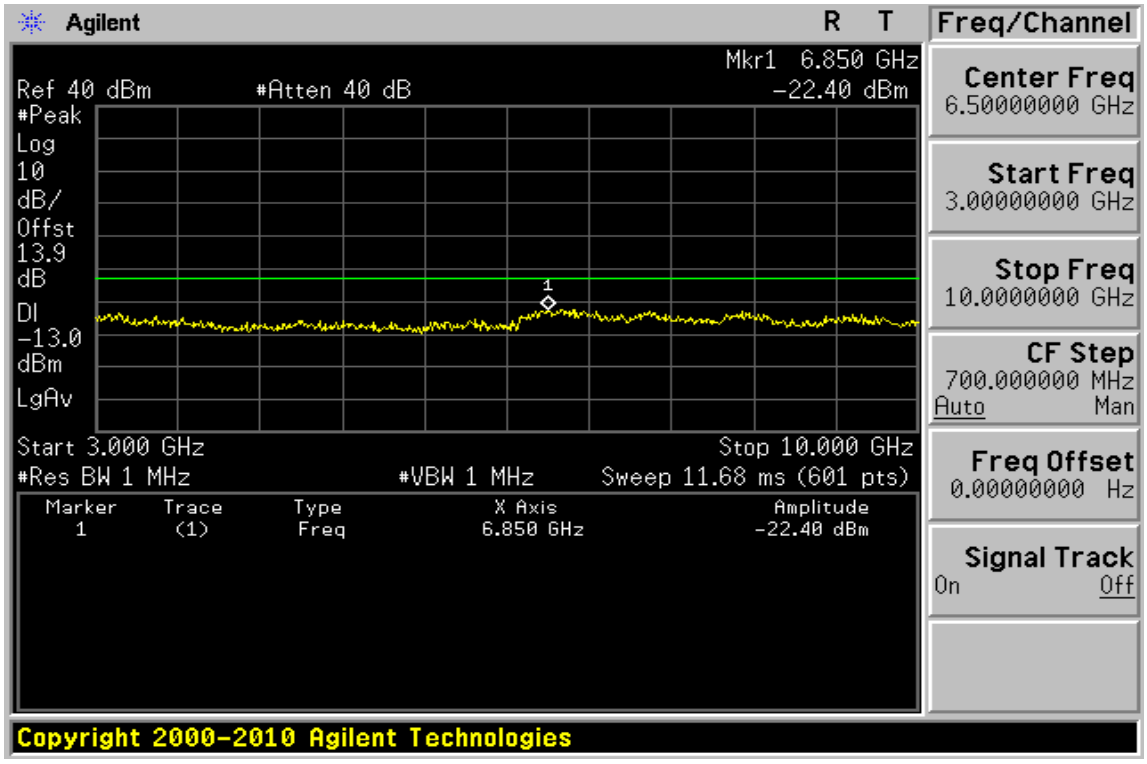
Out of Band emission at antenna terminals – EDGE 850 Channel Lowest



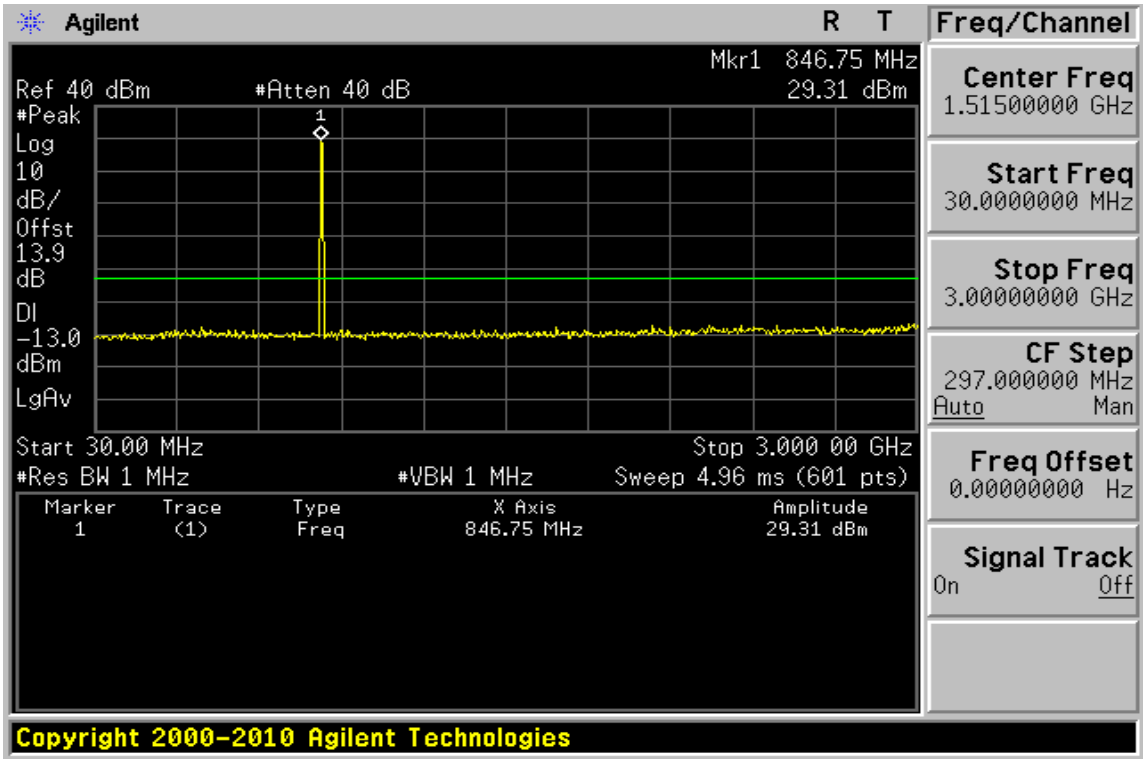


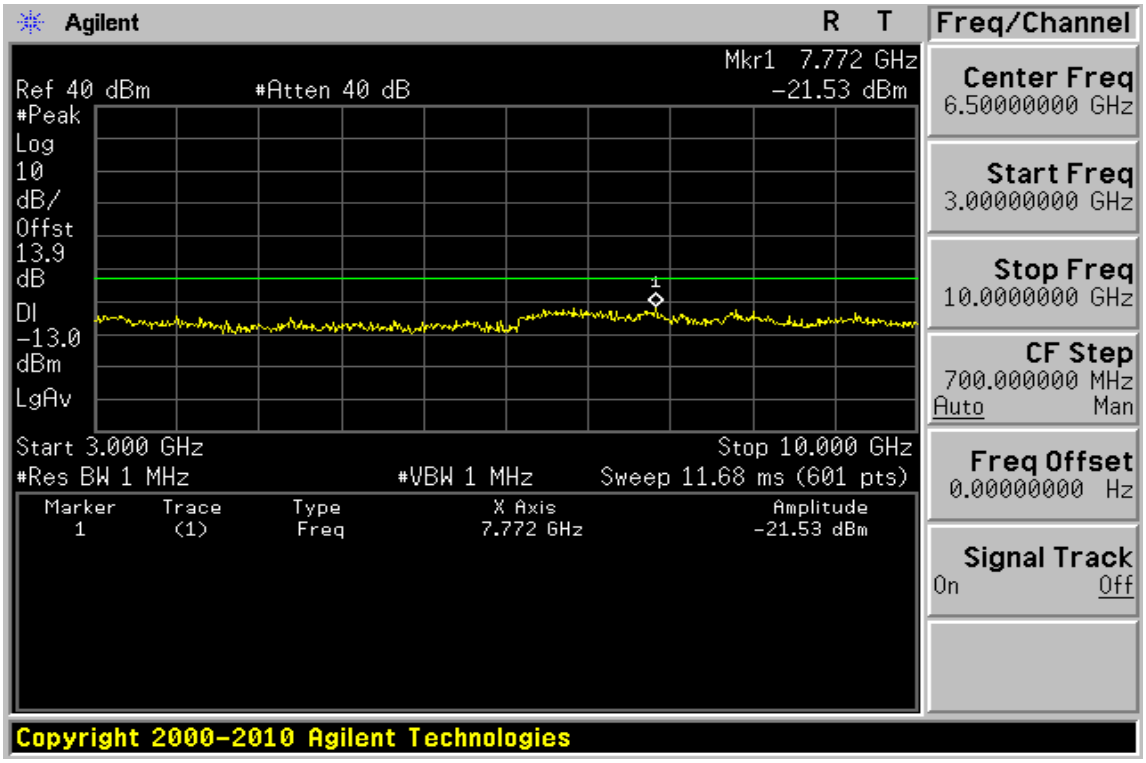
Out of Band emission at antenna terminals – EDGE 850 Channel Mid



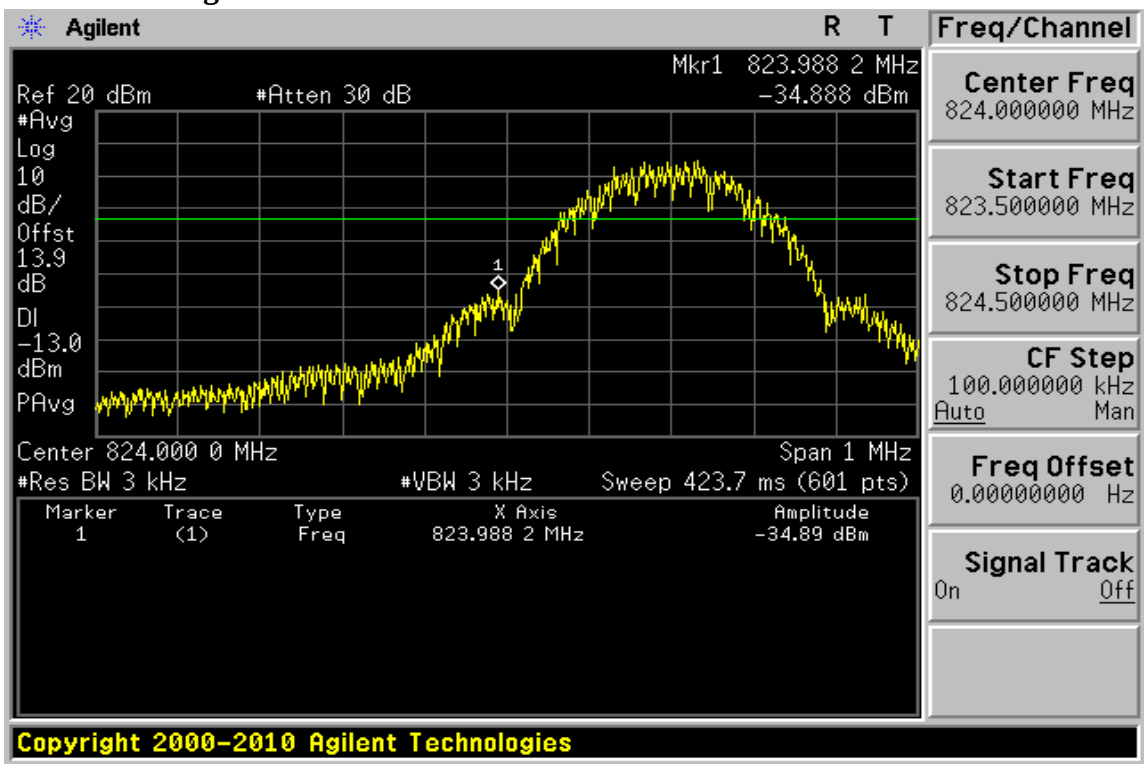


Out of Band emission at antenna terminals – EDGE 850 Channel Highest

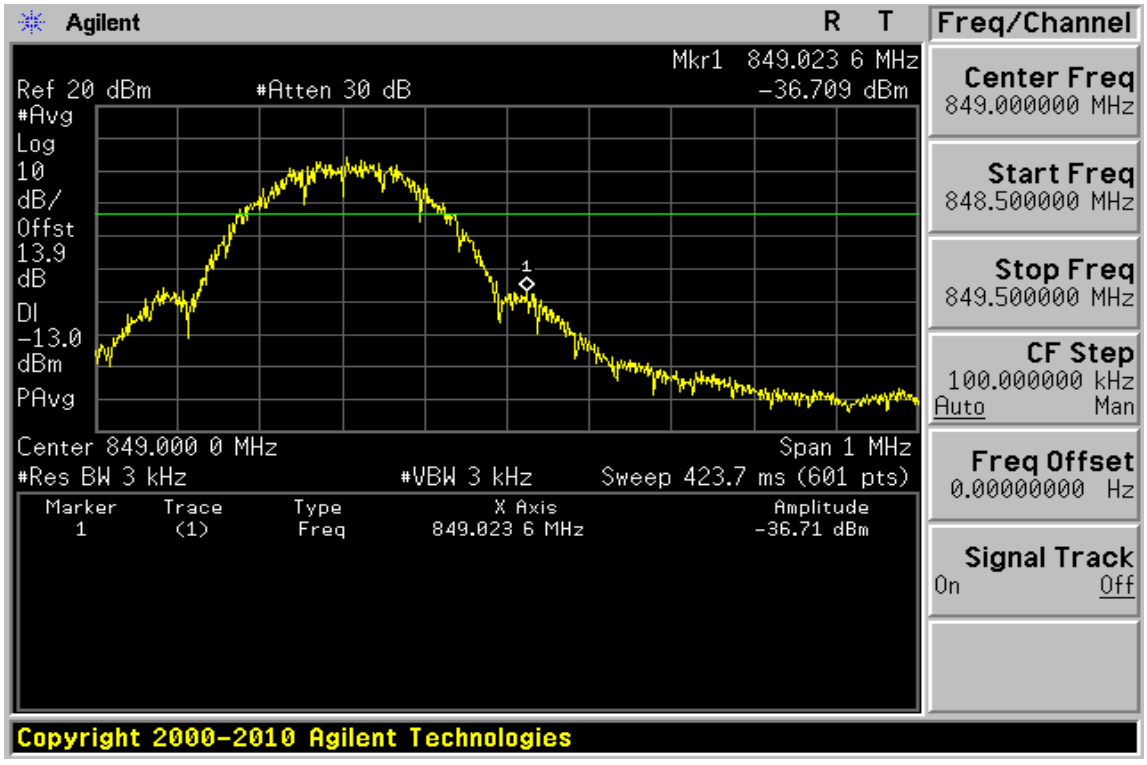




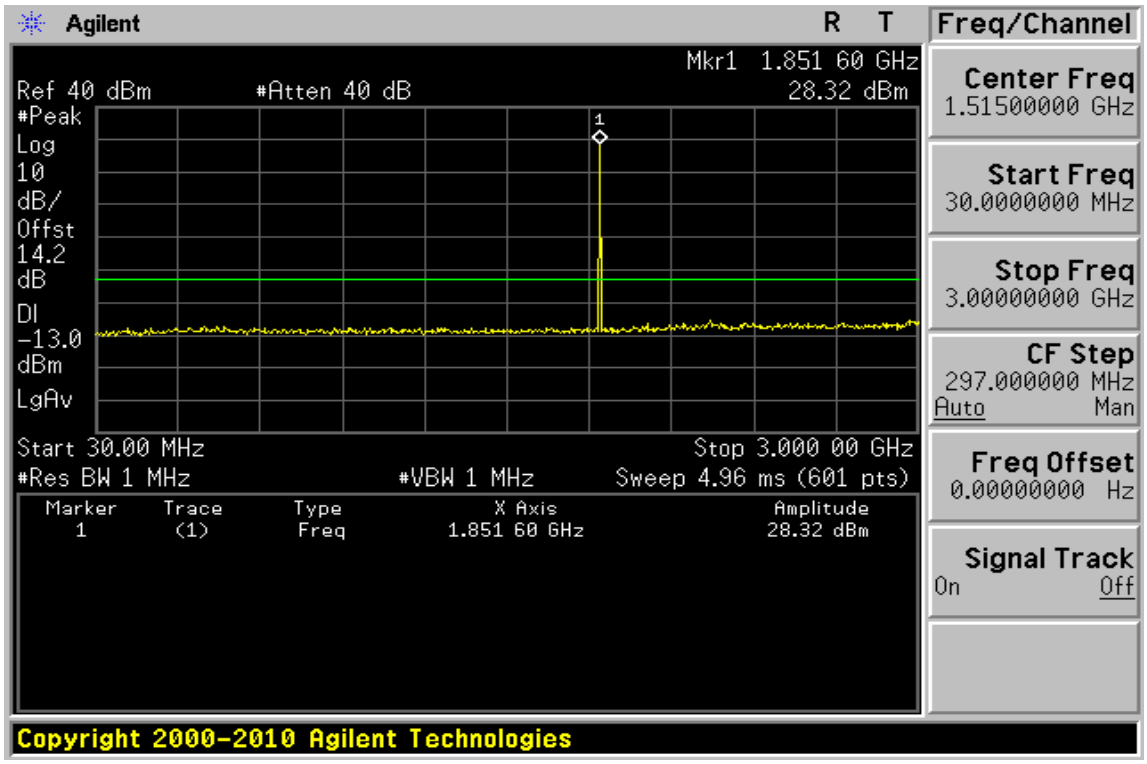
Band edge emission at antenna terminals – EDGE 850 Channel Lowest

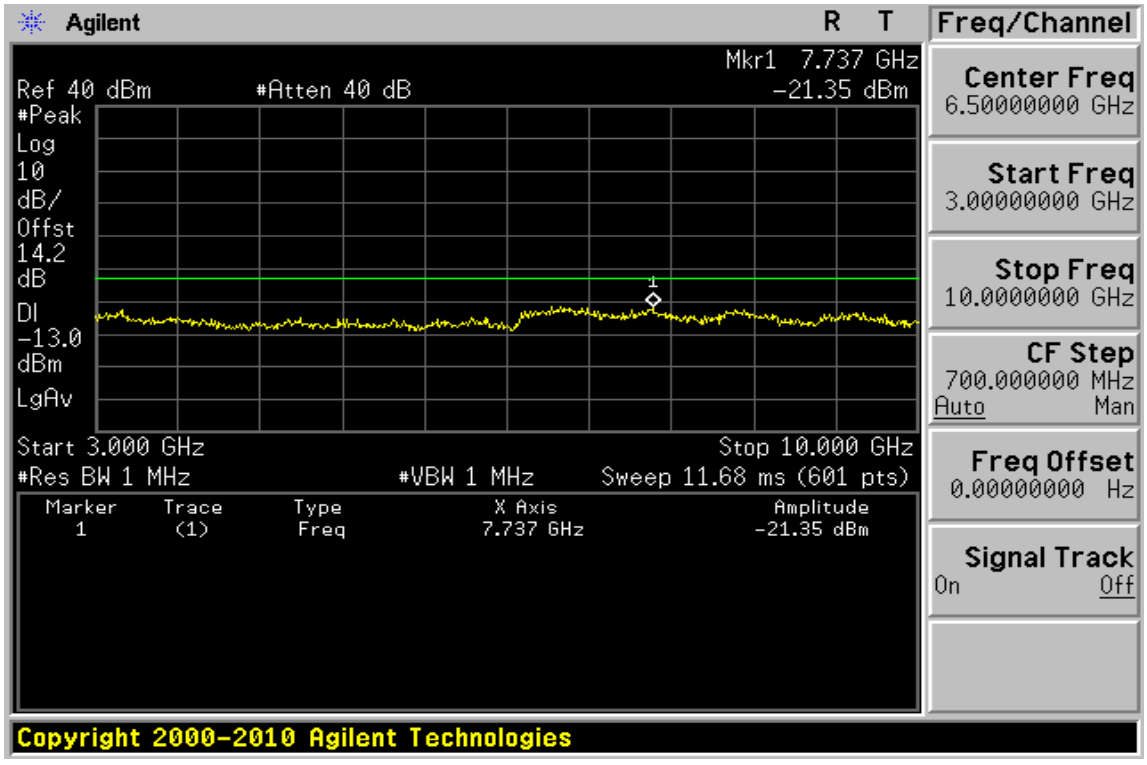


Band edge emission at antenna terminals – EDGE 850 Channel Highest

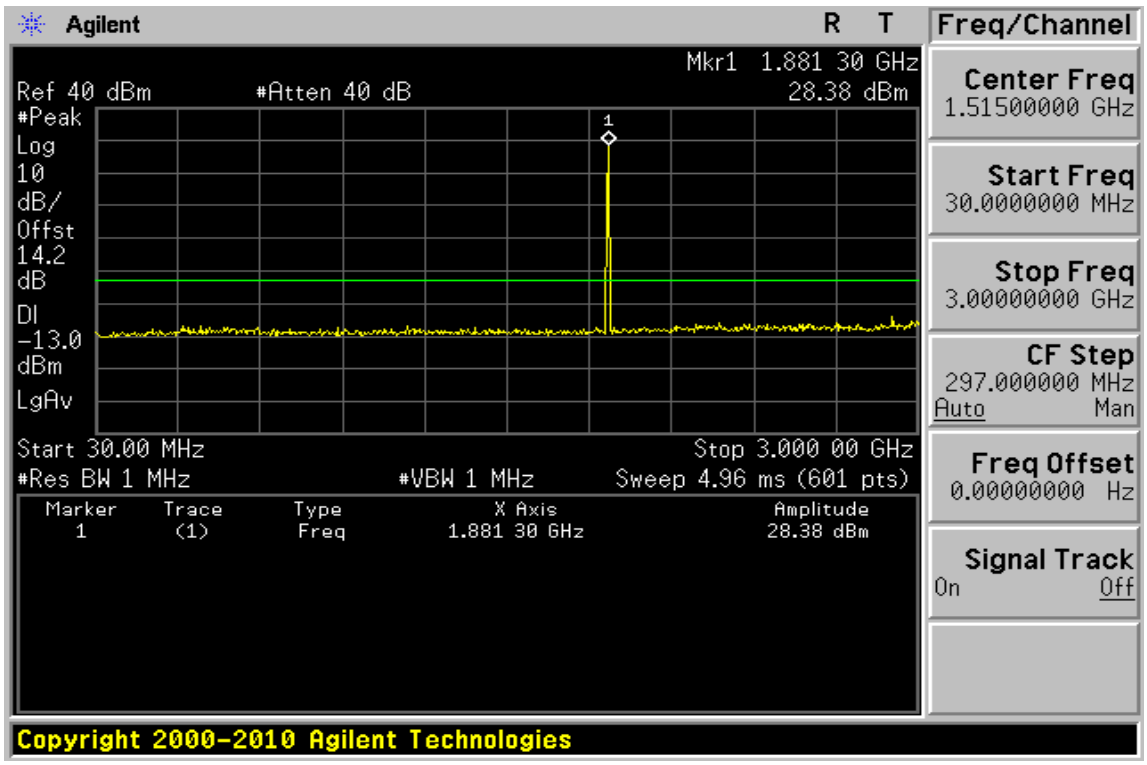


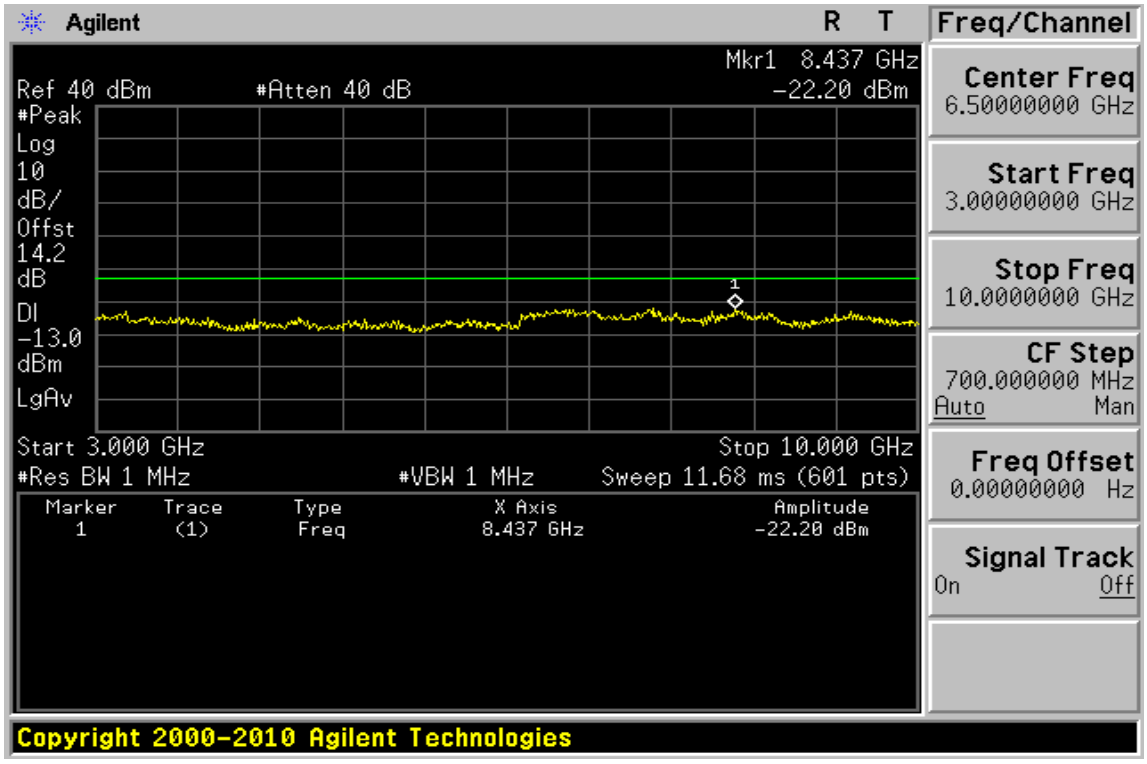
Out of Band emission at antenna terminals – EDGE 1900 Channel Lowest



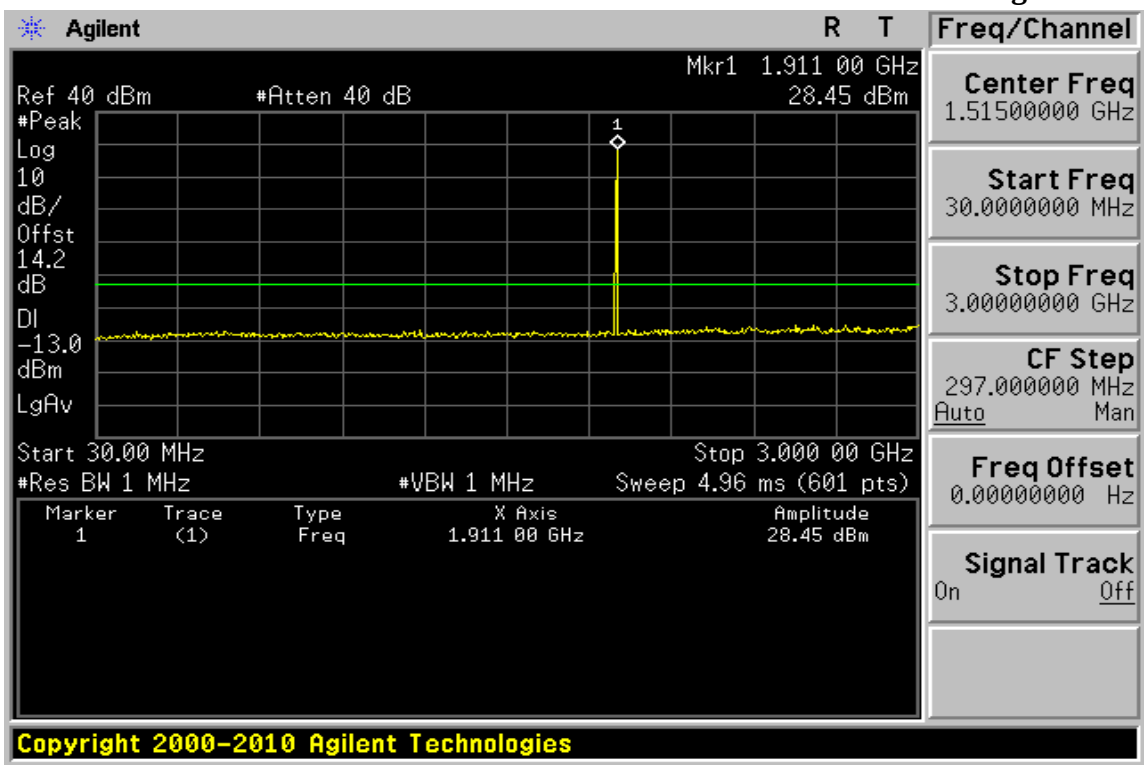


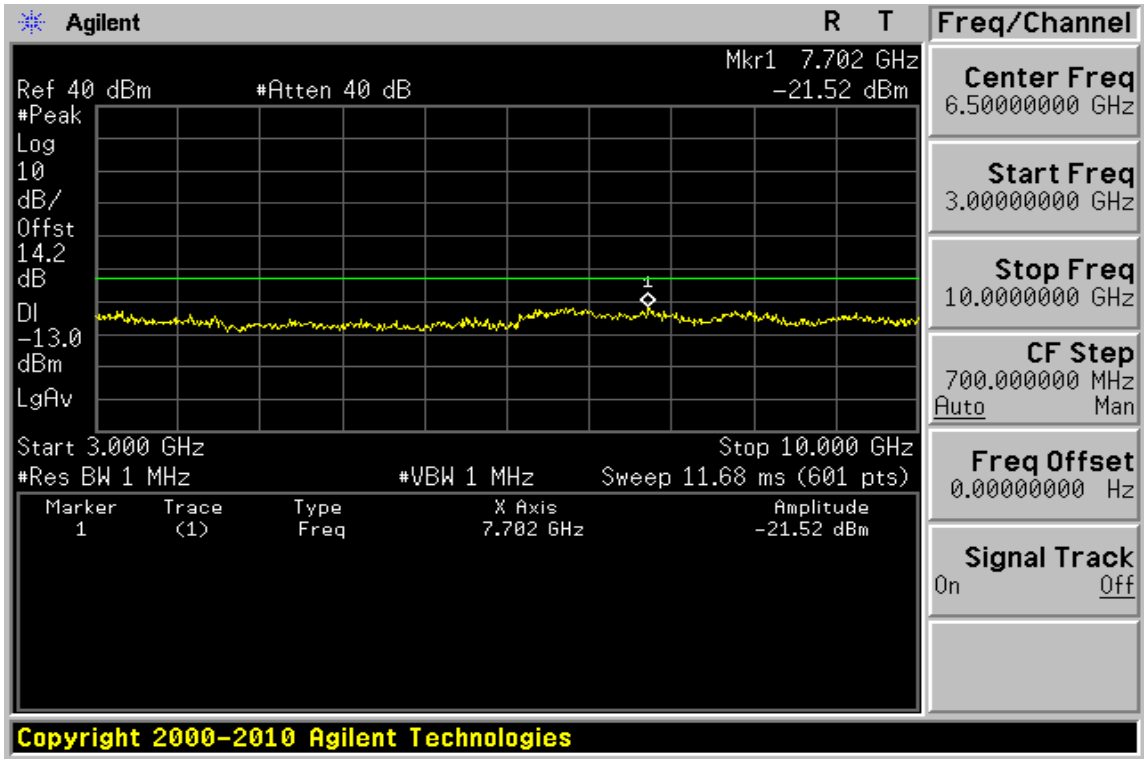
Out of Band emission at antenna terminals – EDGE 1900 Channel Mid



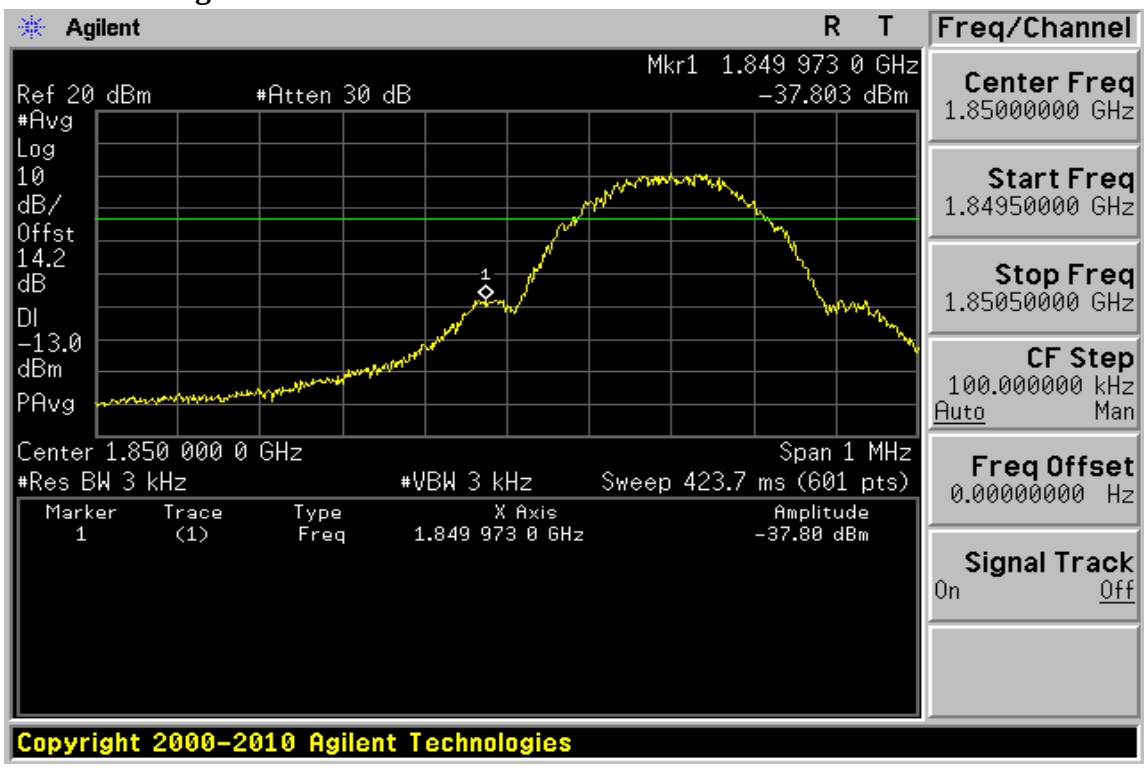


Out of Band emission at antenna terminals – EDGE 1900 Channel Highest

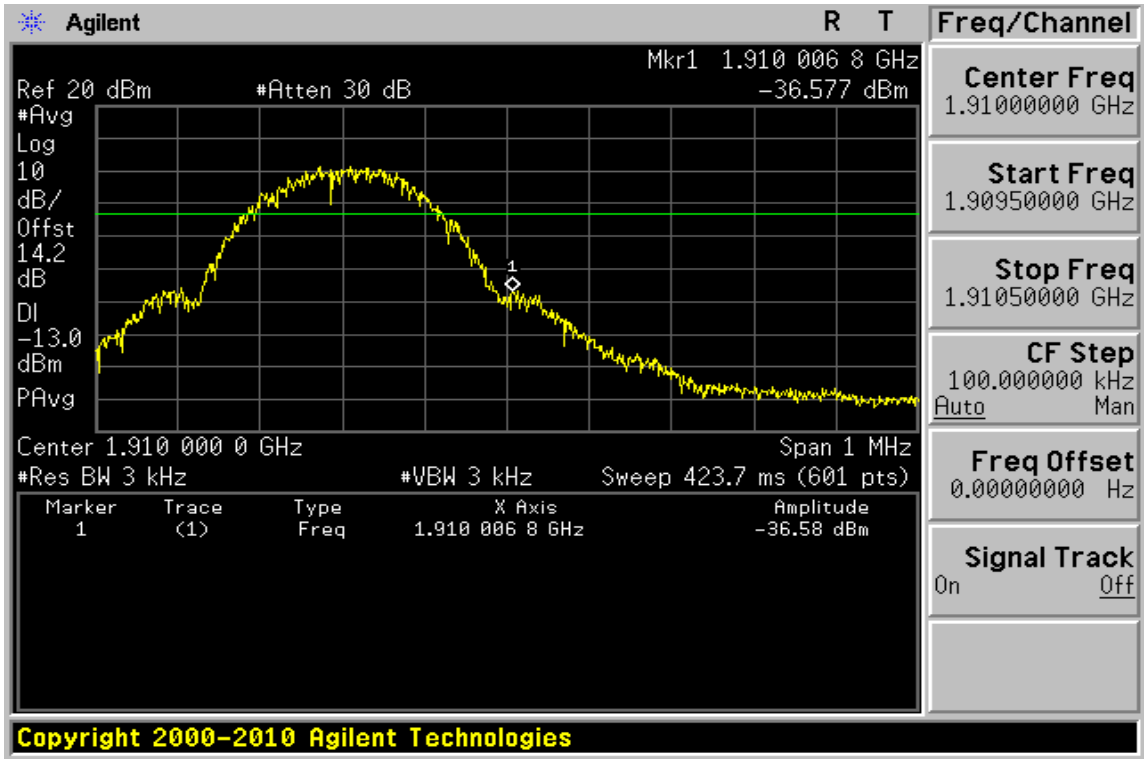




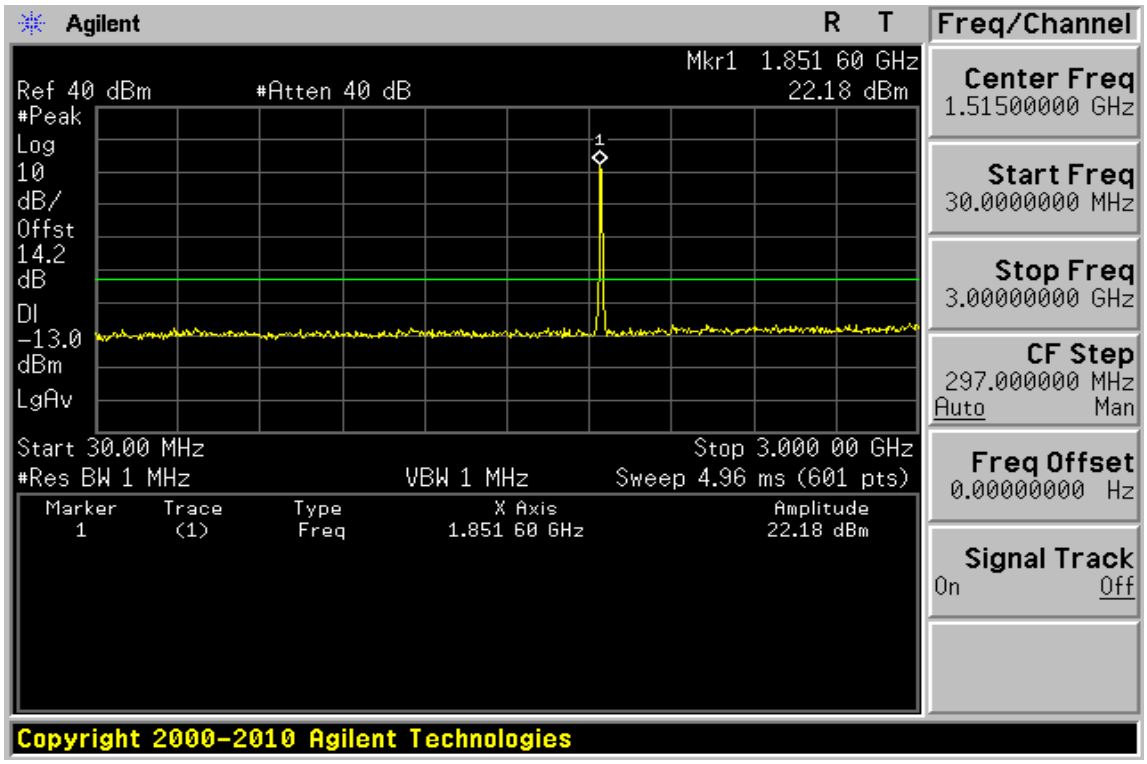
Band edge emission at antenna terminals – EDGE 1900 Channel Lowest

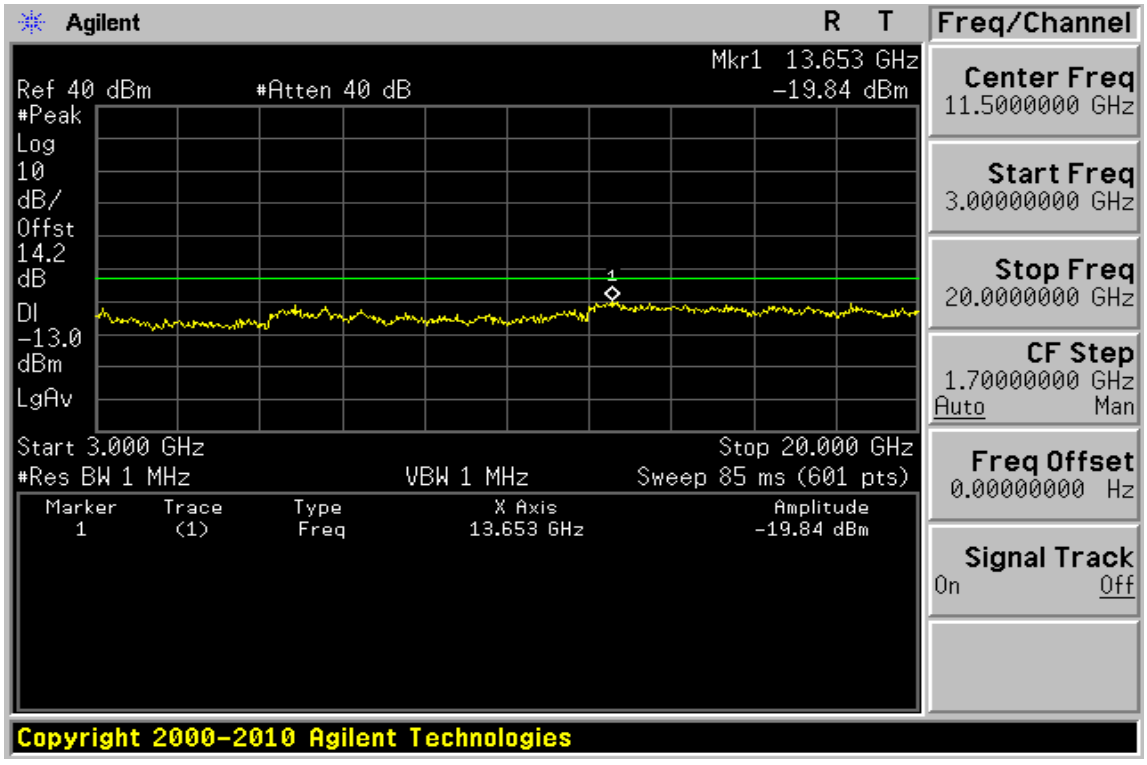


Band edge emission at antenna terminals – EDGE 1900 Channel Highest

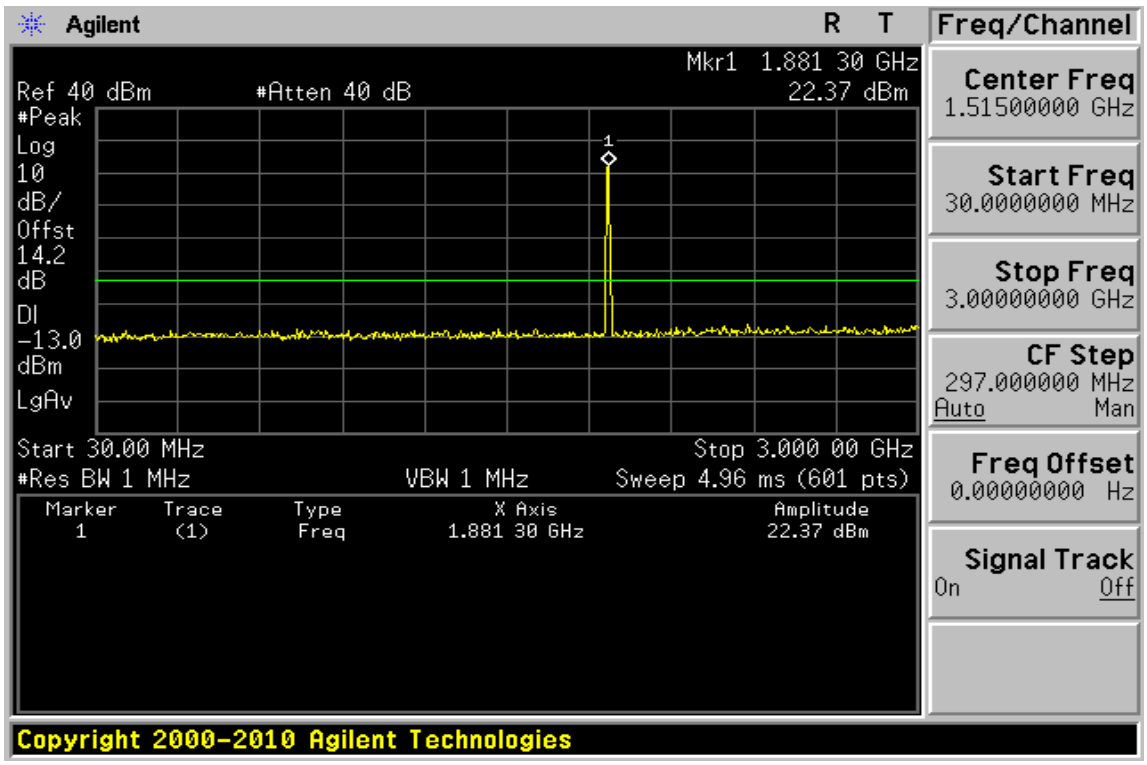


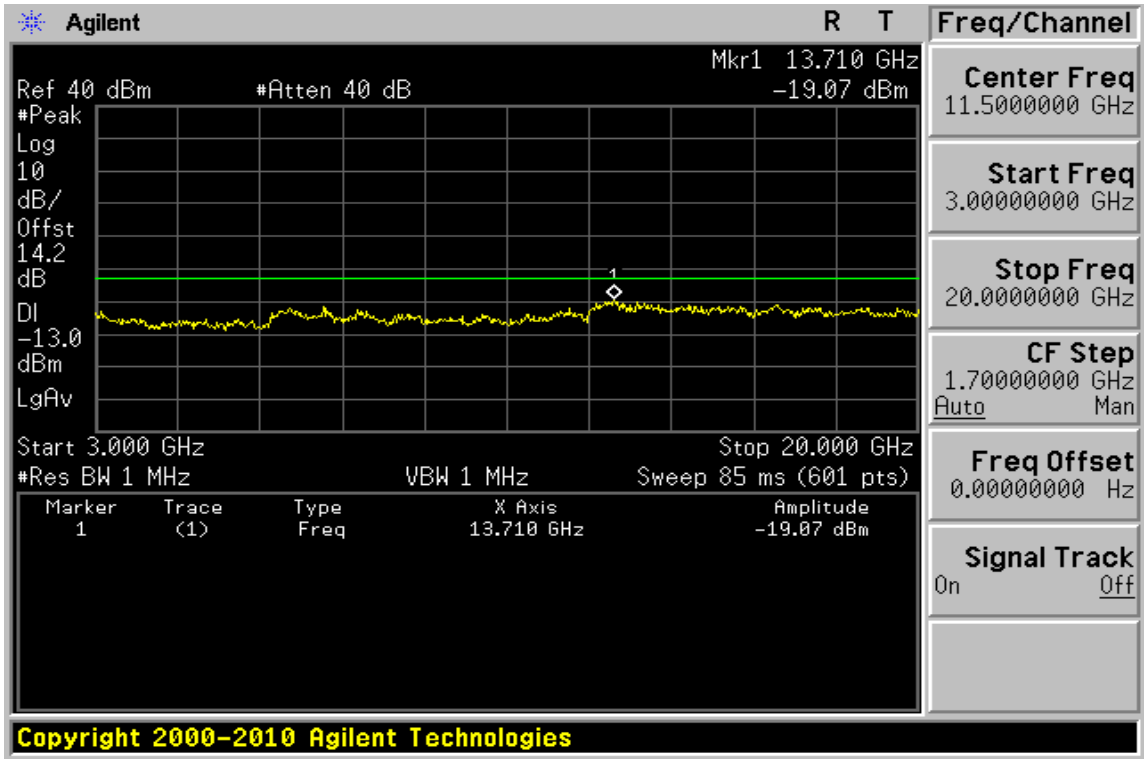
Out of Band emission at antenna terminals – WCDMA II Channel Lowest



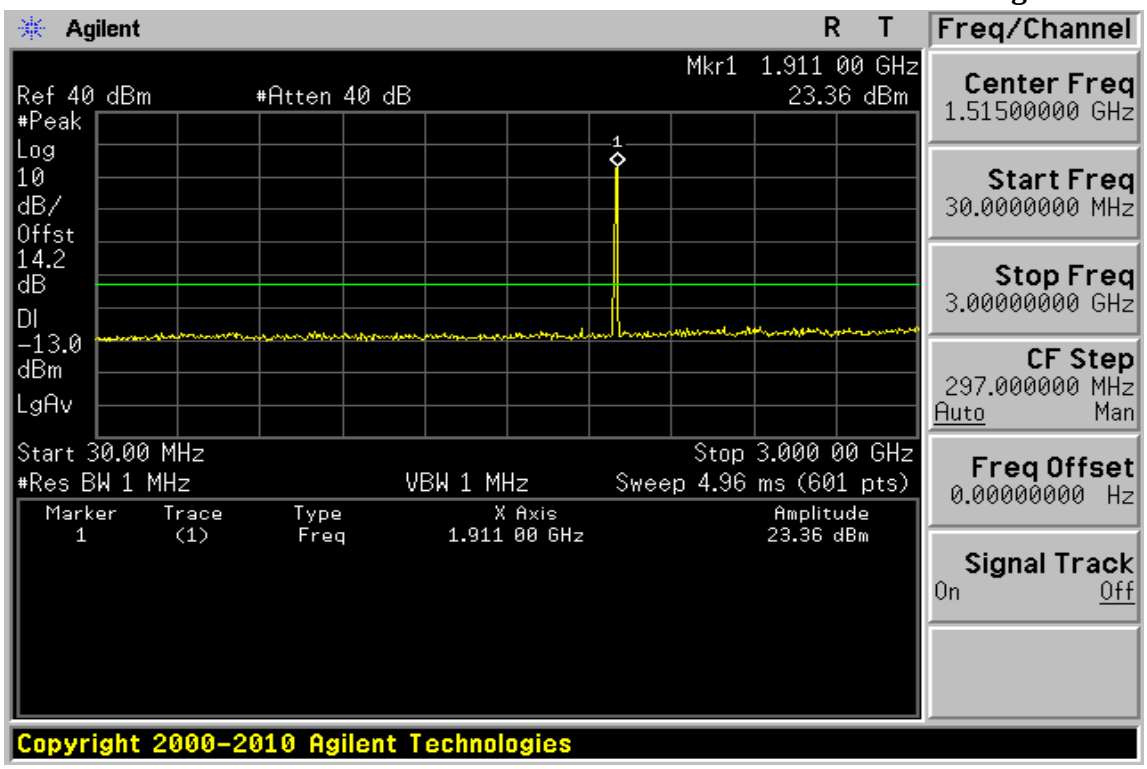


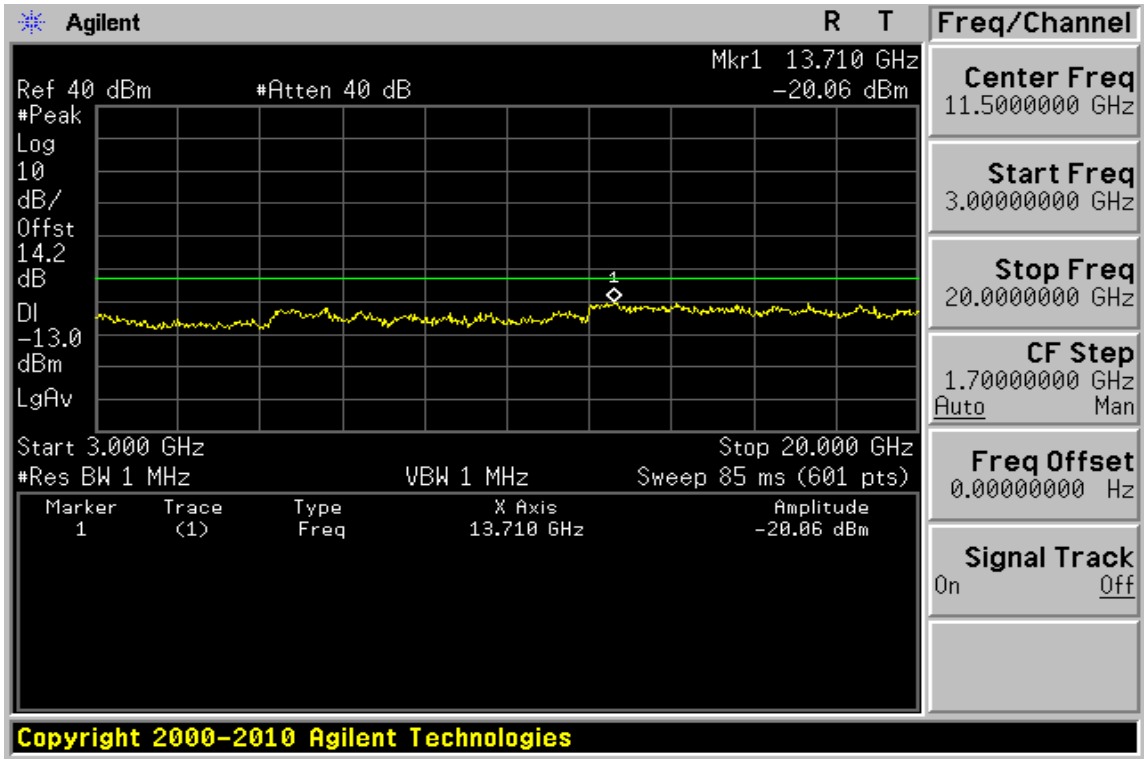
Out of Band emission at antenna terminals – WCDMA II Channel Mid



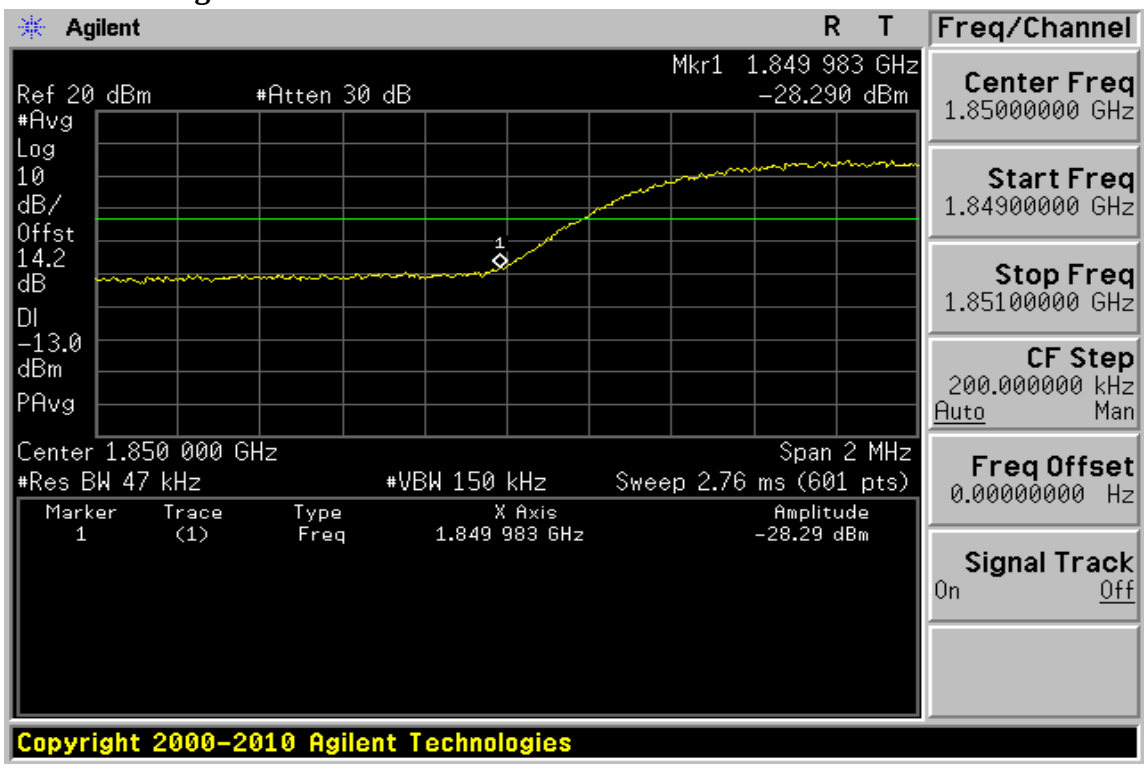


Out of Band emission at antenna terminals – WCDMA II Channel Highest

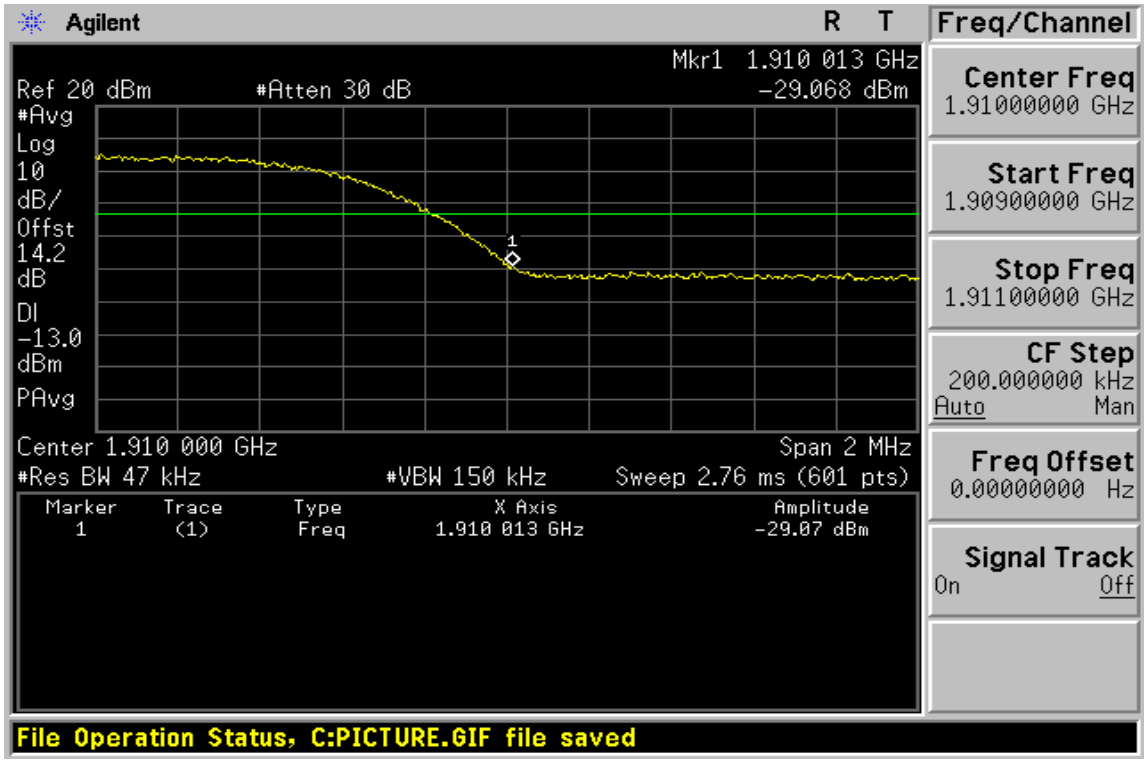




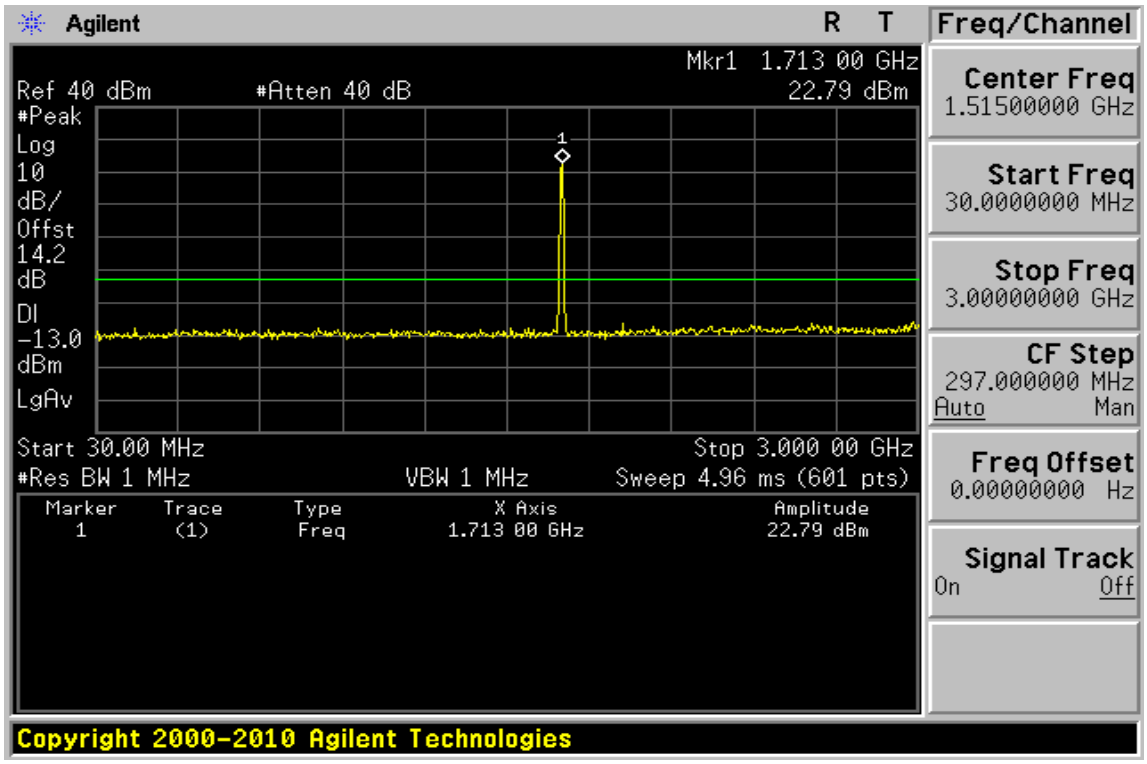
Band edge emission at antenna terminals – WCDMA II Channel Lowest

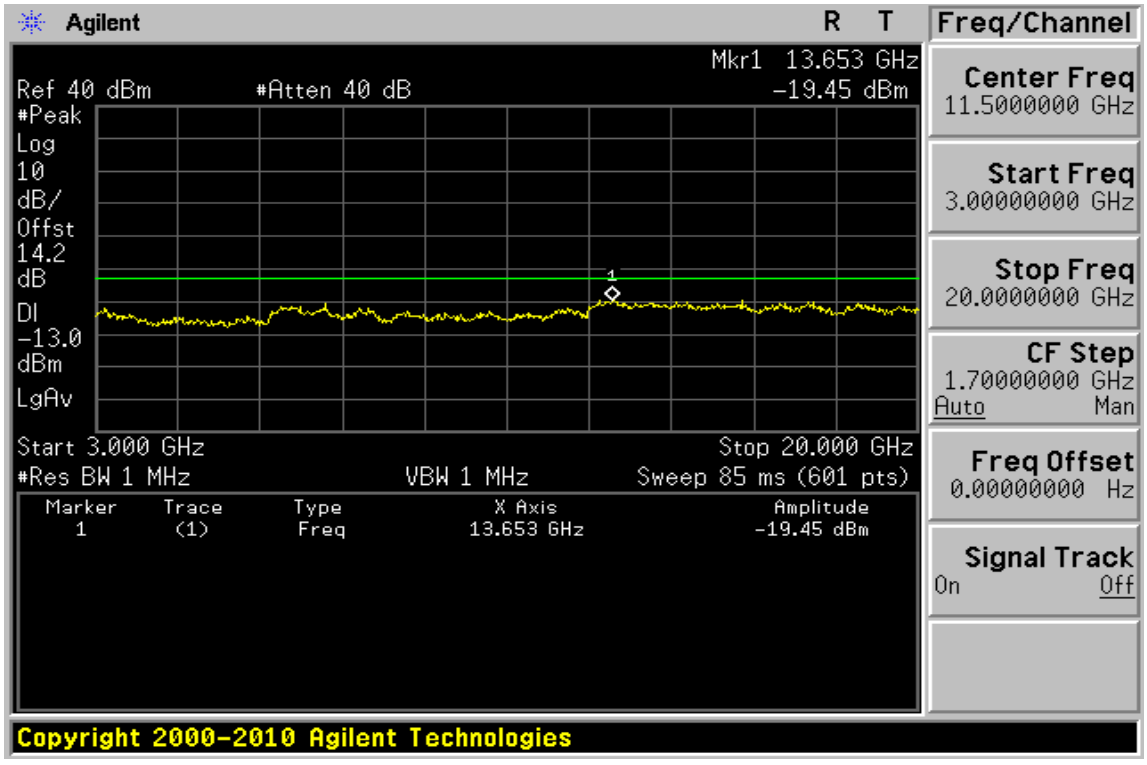


Band edge emission at antenna terminals – WCDMA II Channel Highest

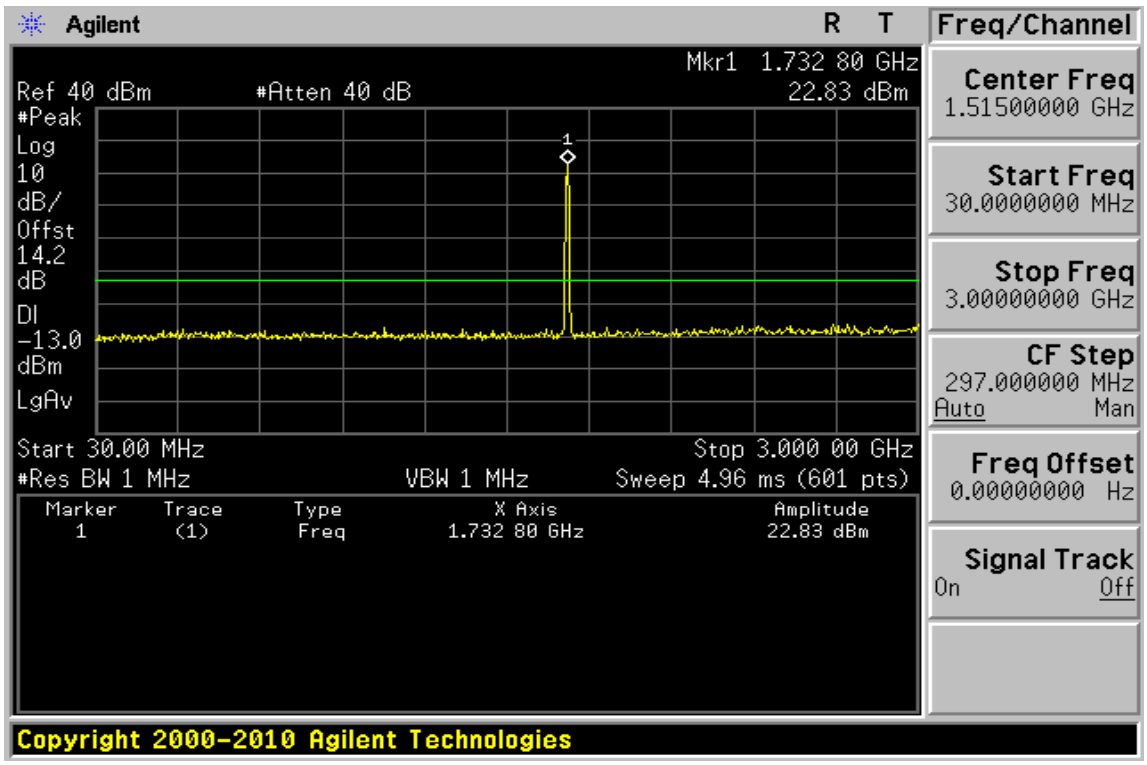


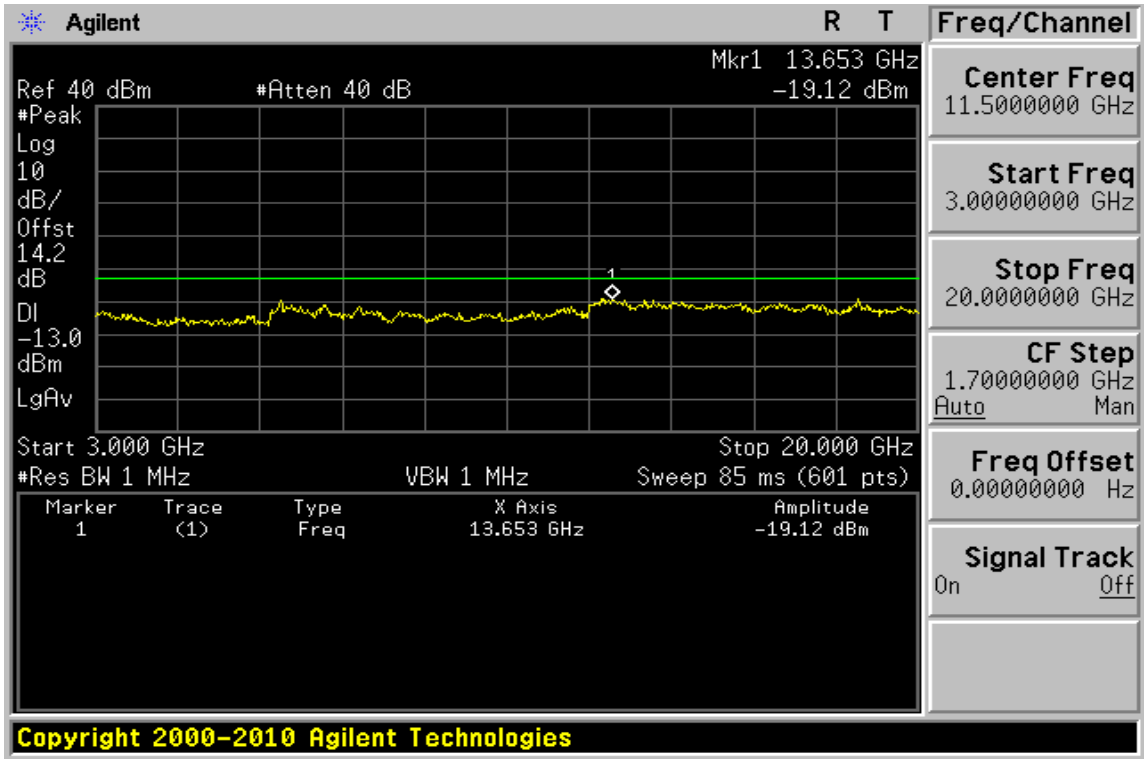
Out of Band emission at antenna terminals – WCDMA IV Channel Lowest



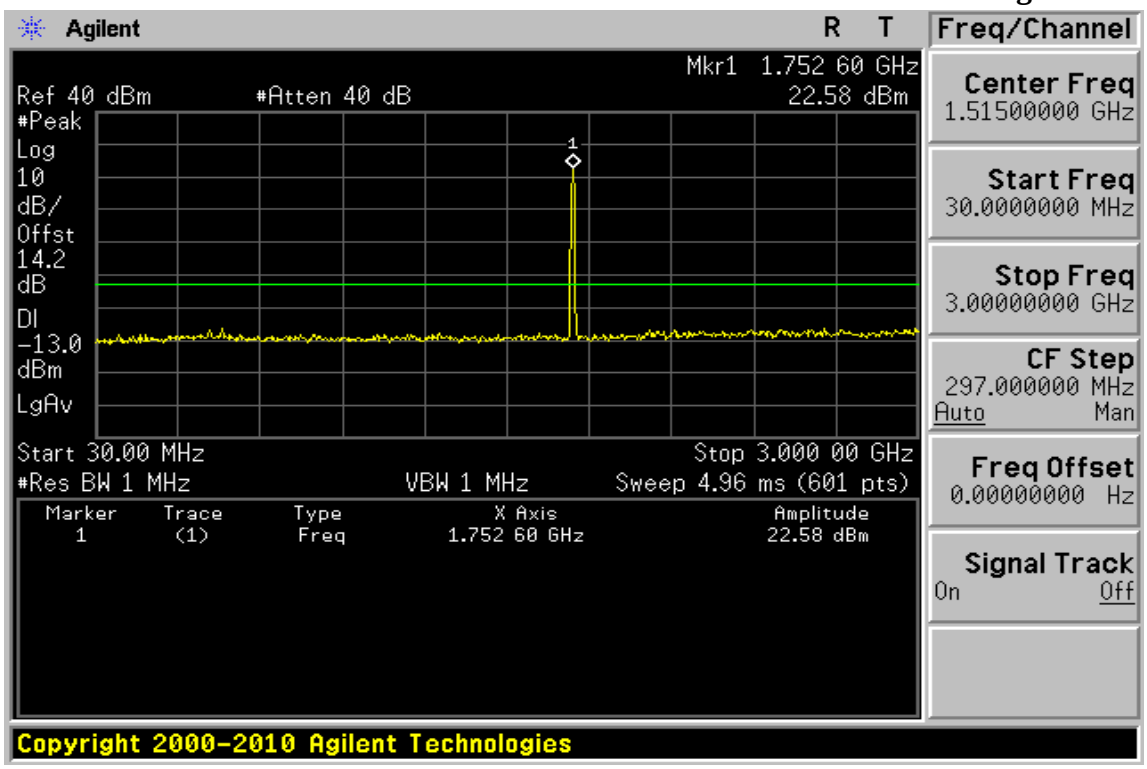


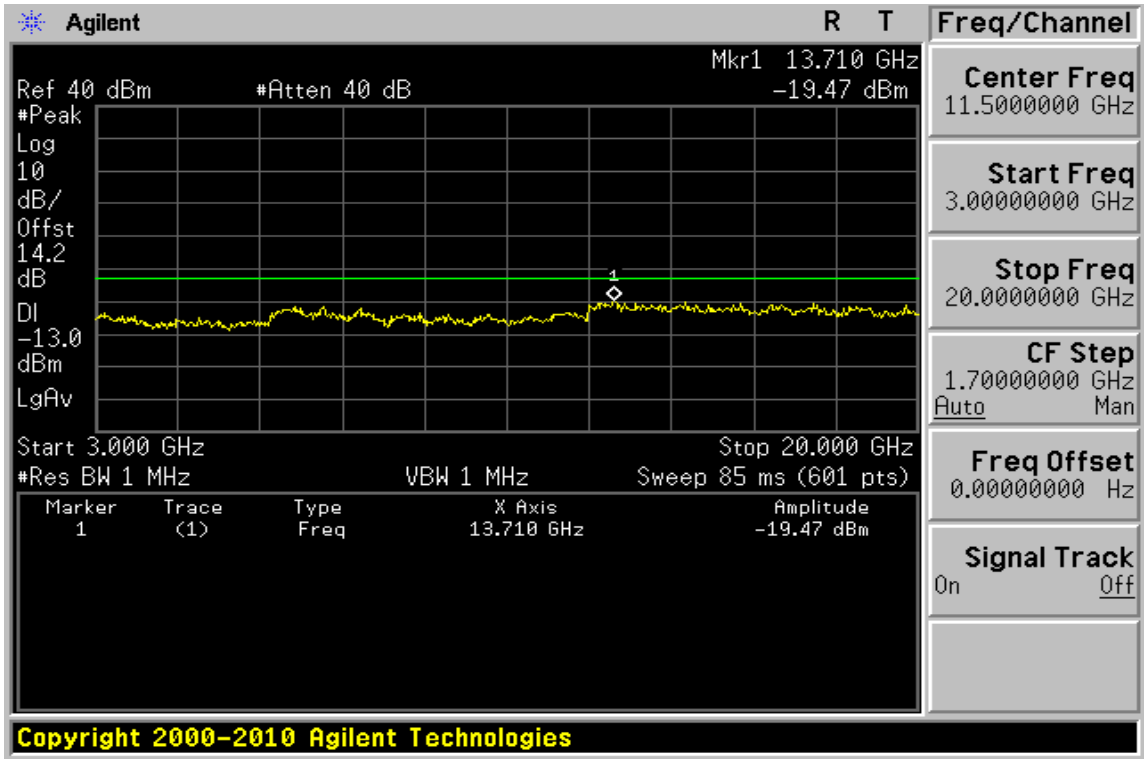
Out of Band emission at antenna terminals – WCDMA IV Channel Mid



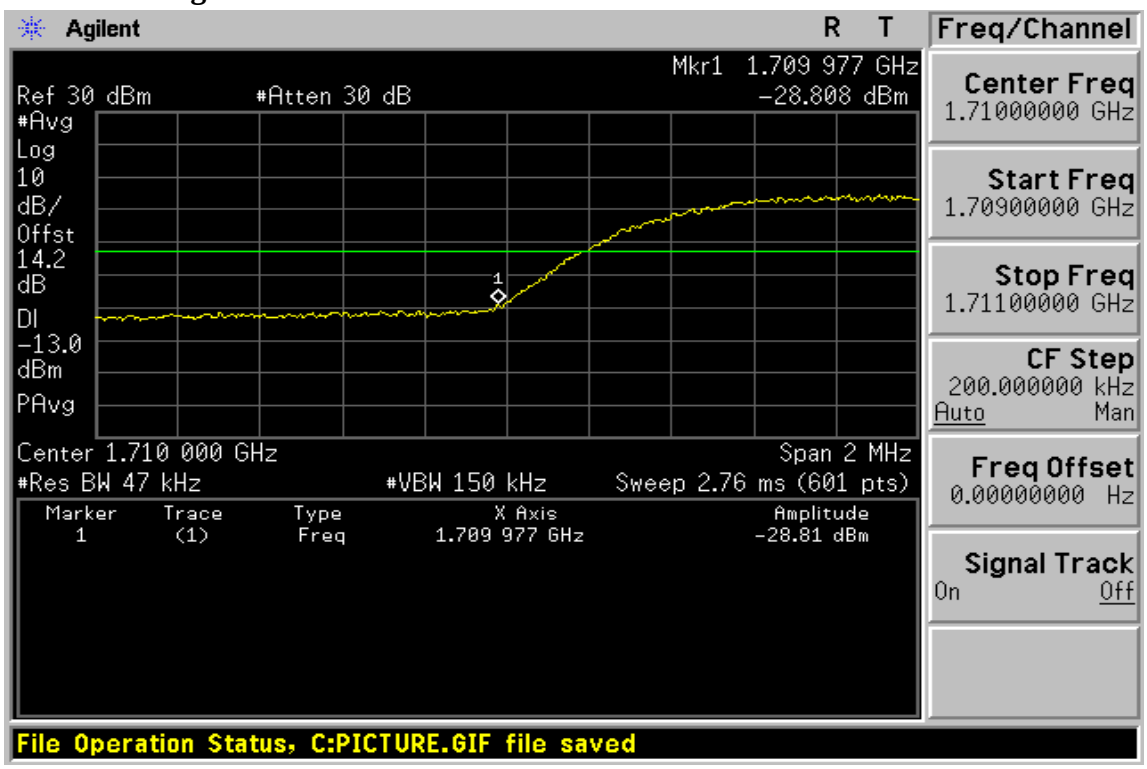


Out of Band emission at antenna terminals – WCDMA IV Channel Highest

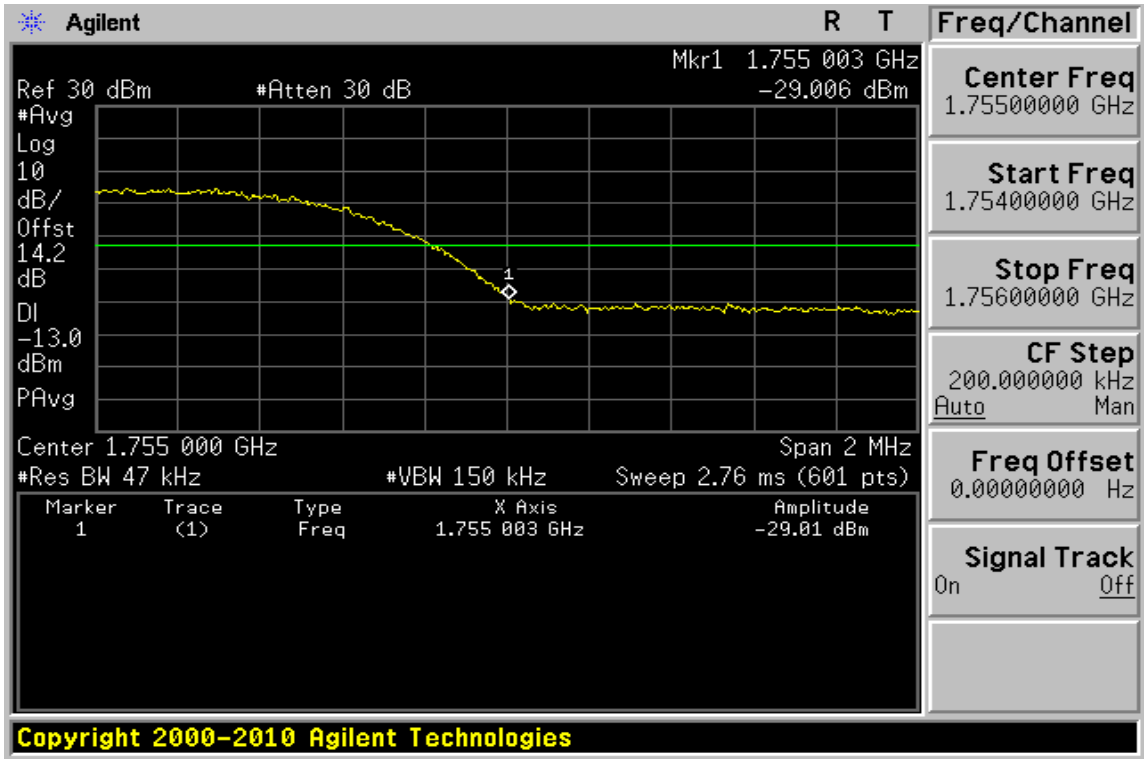




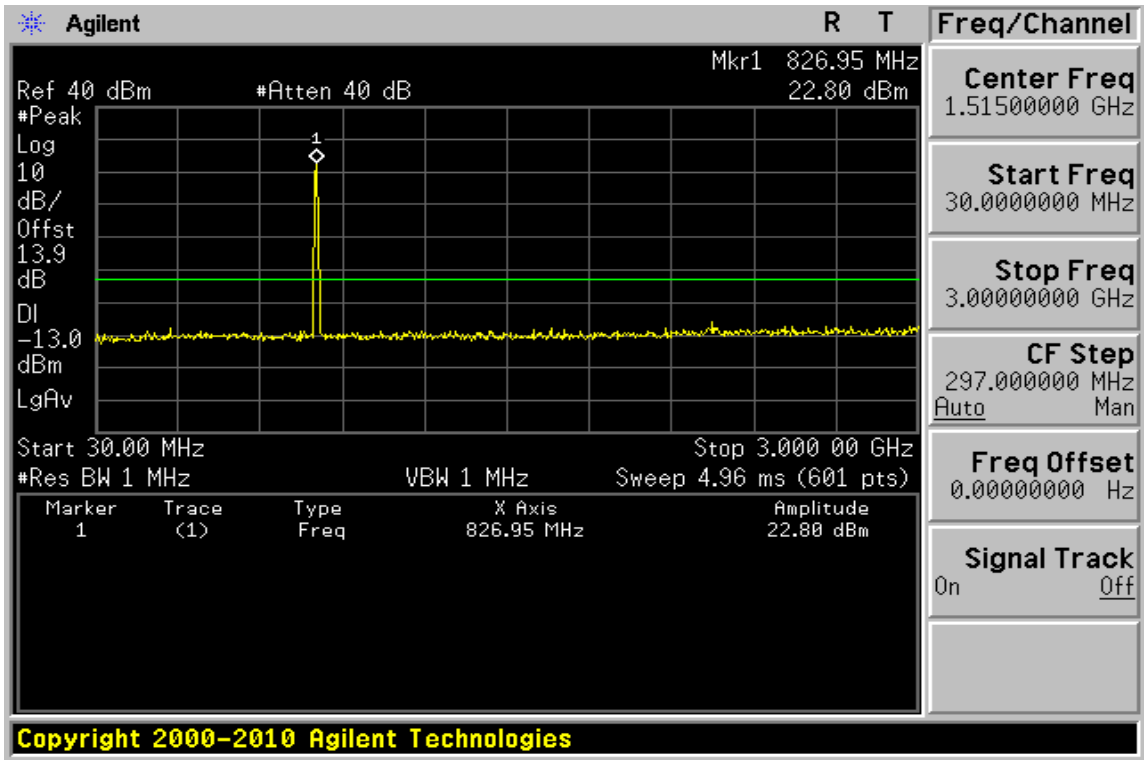
Band edge emission at antenna terminals – WCDMA IV Channel Lowest

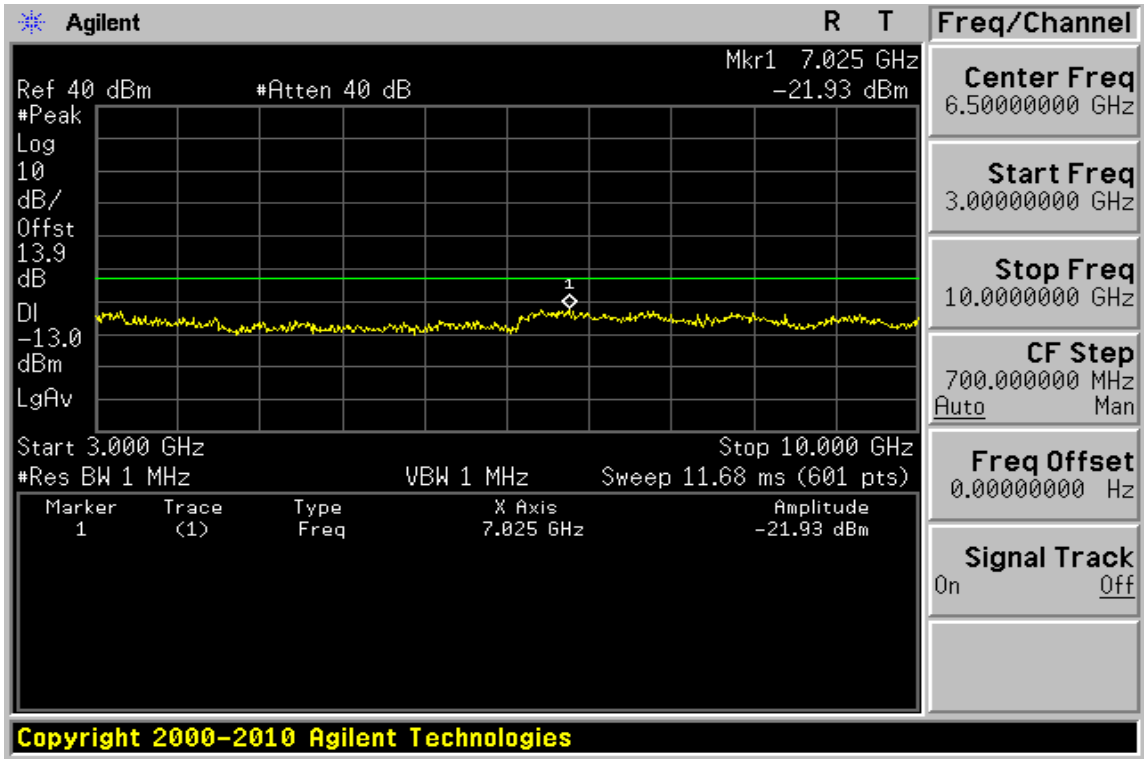


Band edge emission at antenna terminals – WCDMA V Channel Highest

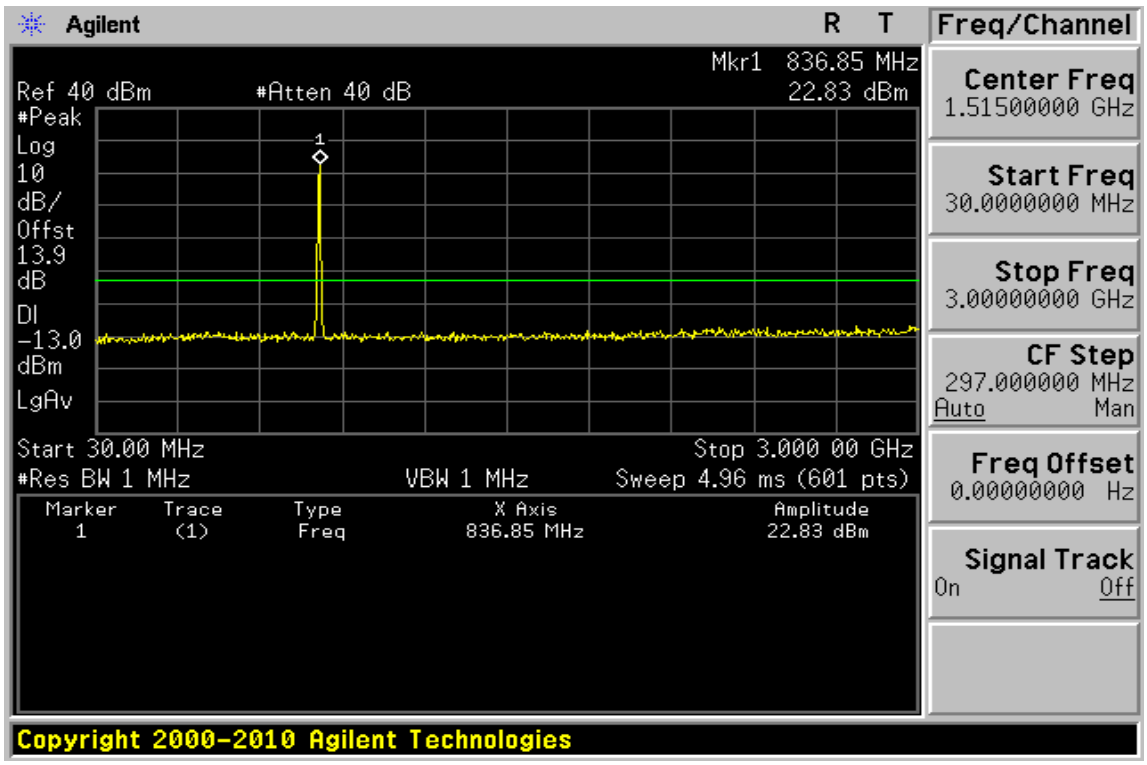


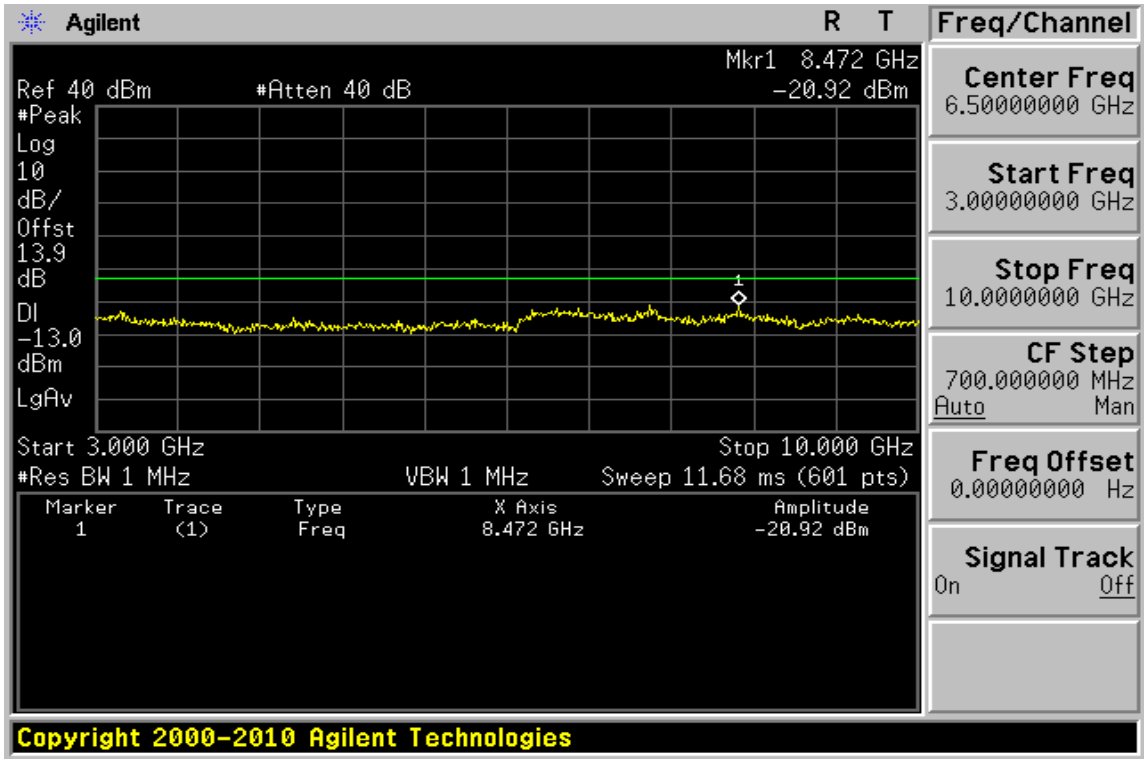
Out of Band emission at antenna terminals – WCDMA V Channel Lowest



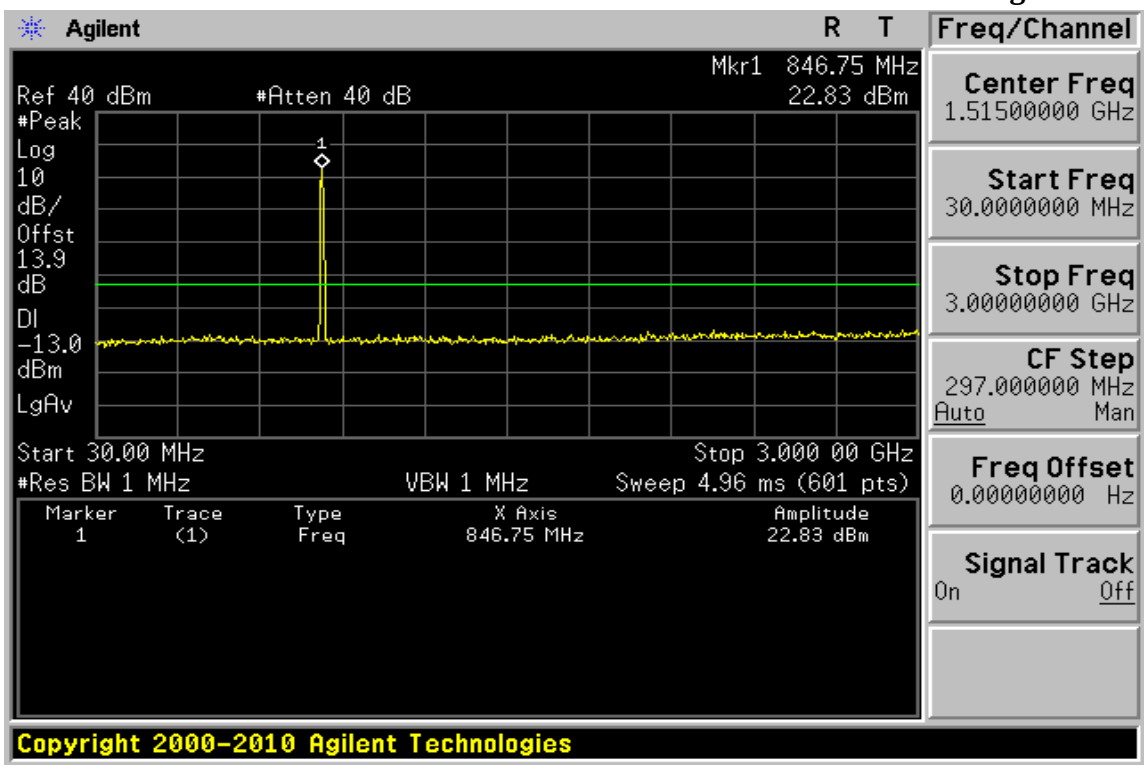


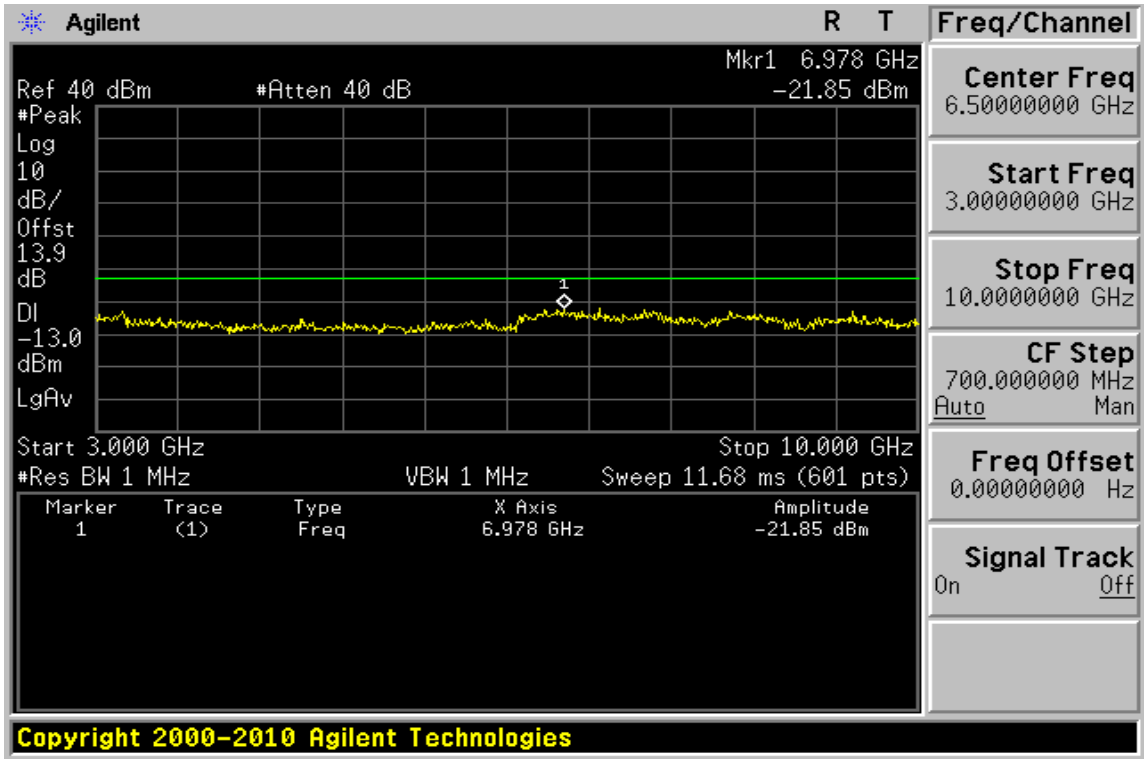
Out of Band emission at antenna terminals – WCDMA V Channel Mid



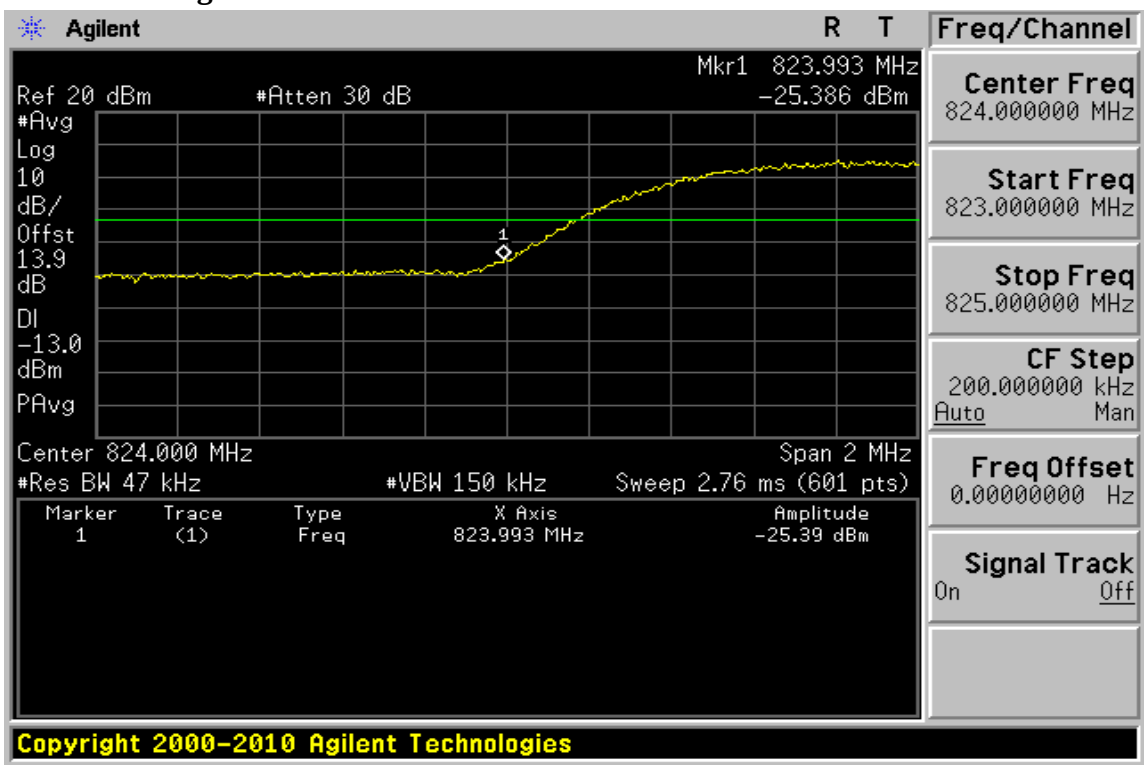


Out of Band emission at antenna terminals – WCDMA V Channel Highest

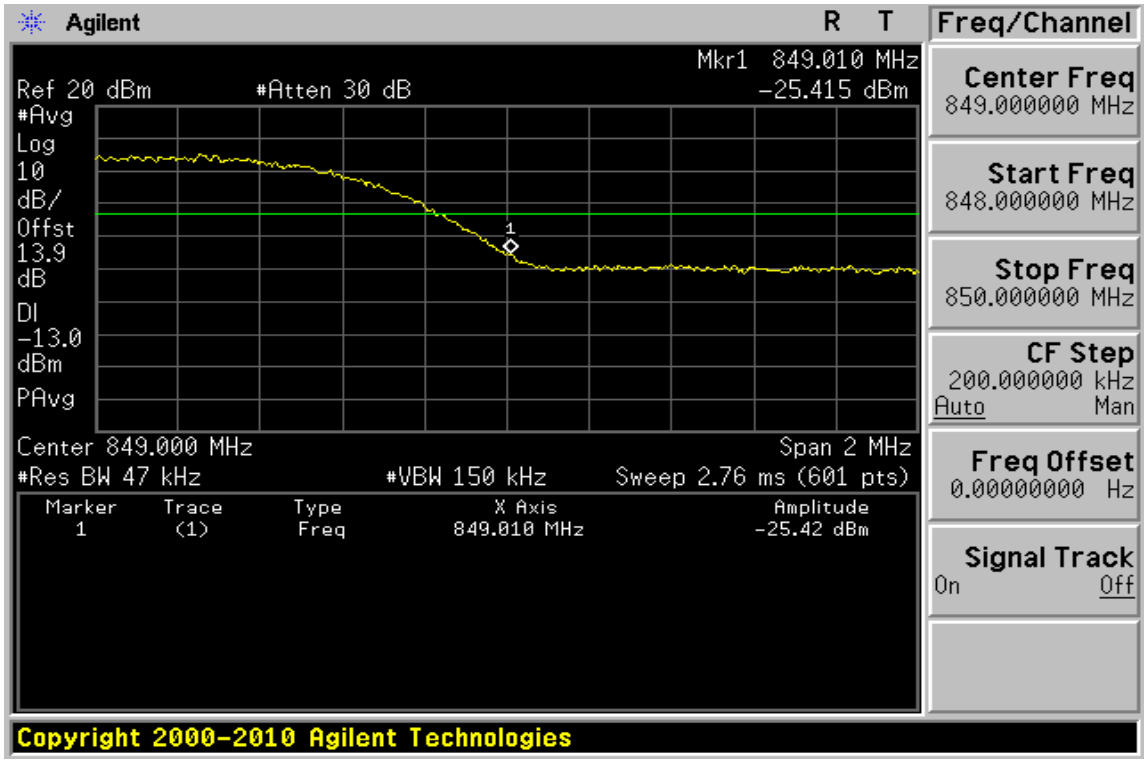




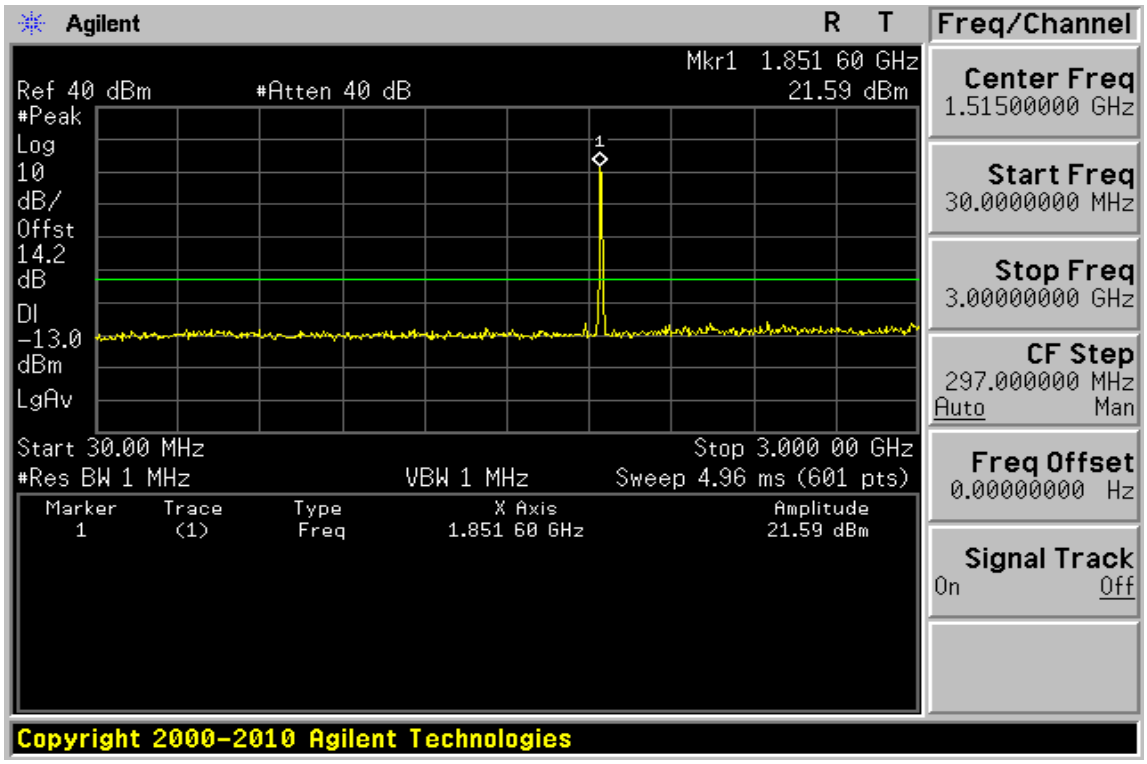
Band edge emission at antenna terminals – WCDMA V Channel Lowest

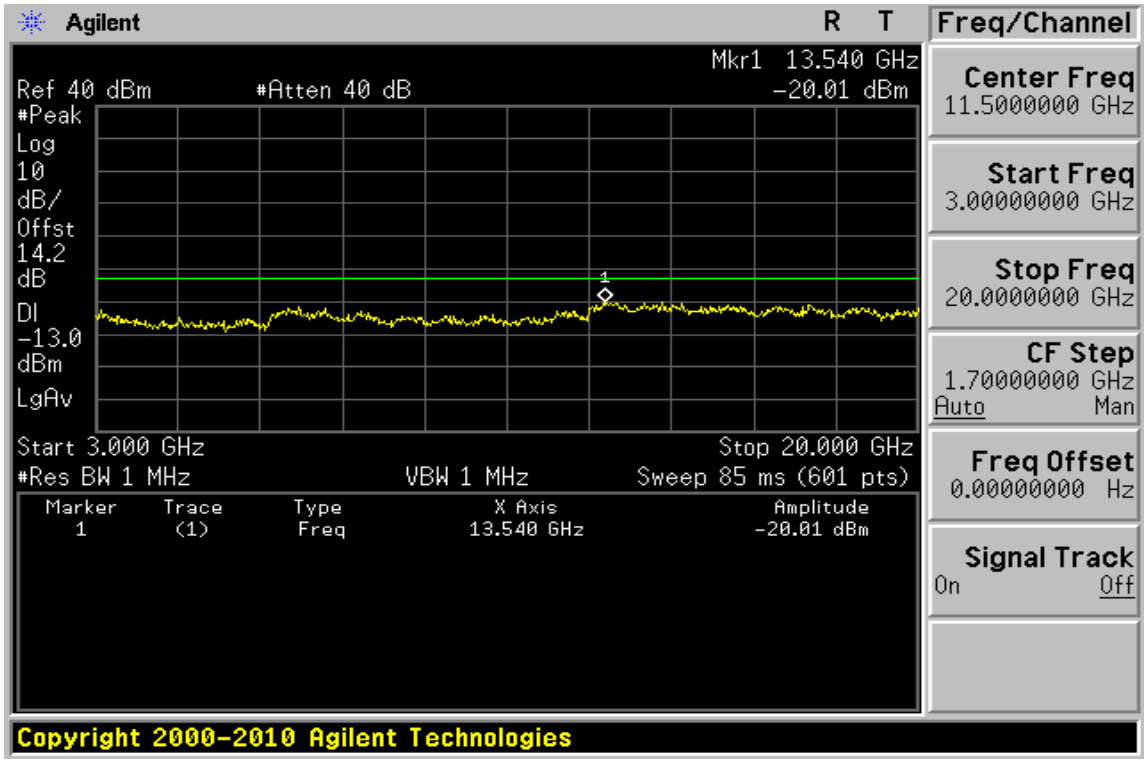


Band edge emission at antenna terminals – WCDMA V Channel Highest

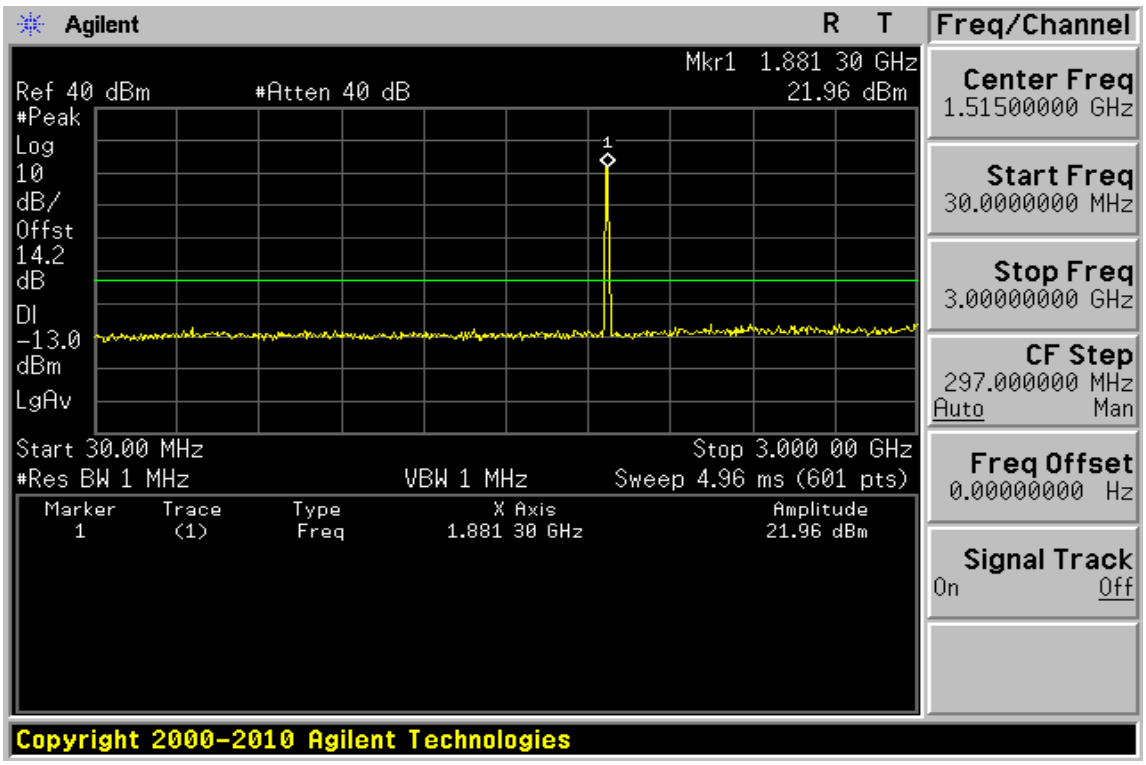


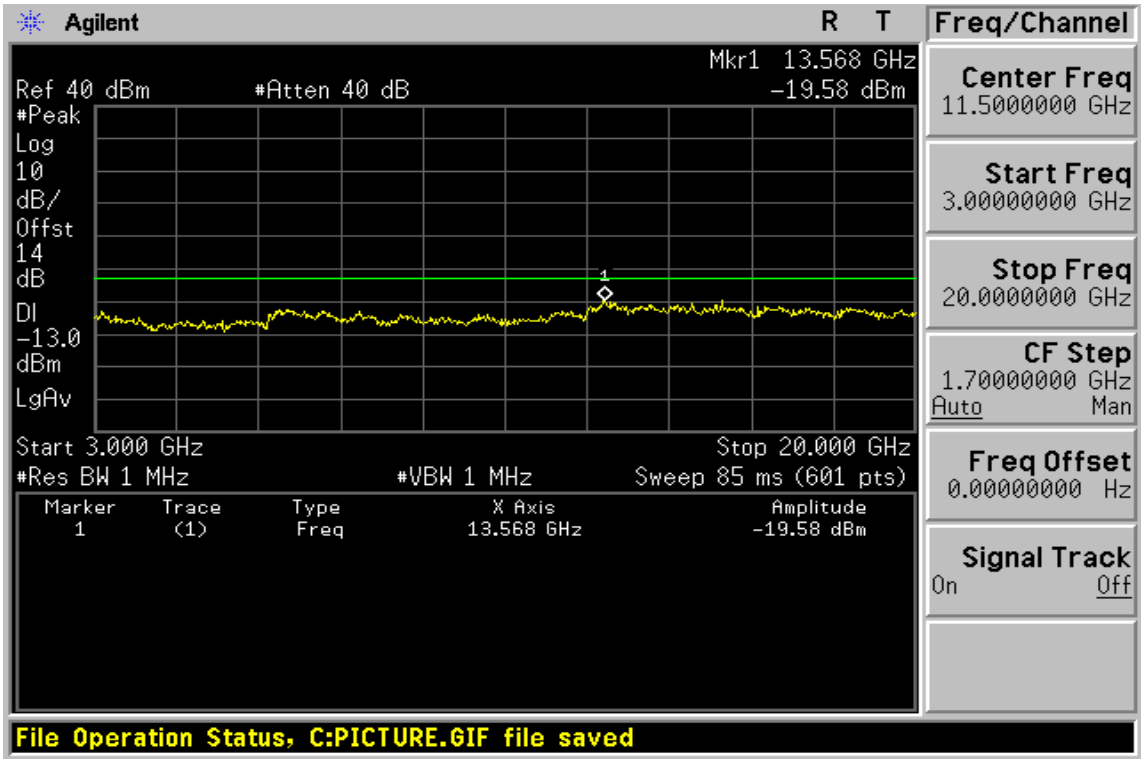
Out of Band emission at antenna terminals – HSDPA II Channel Lowest



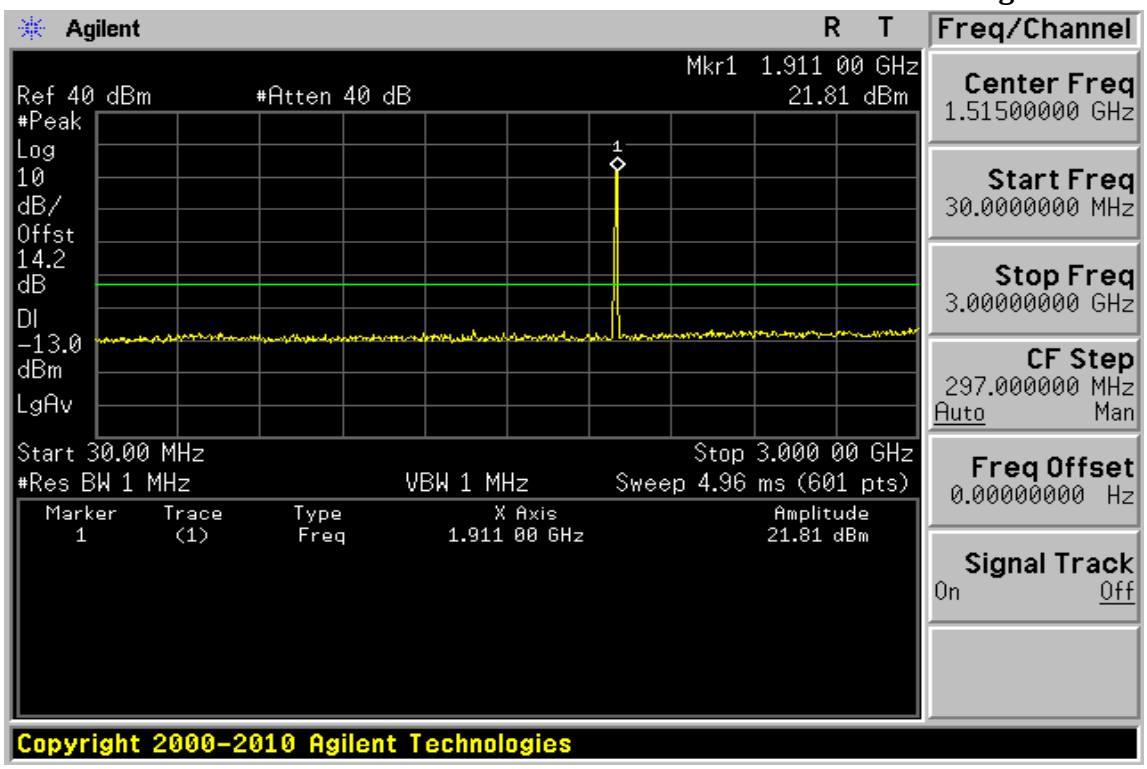


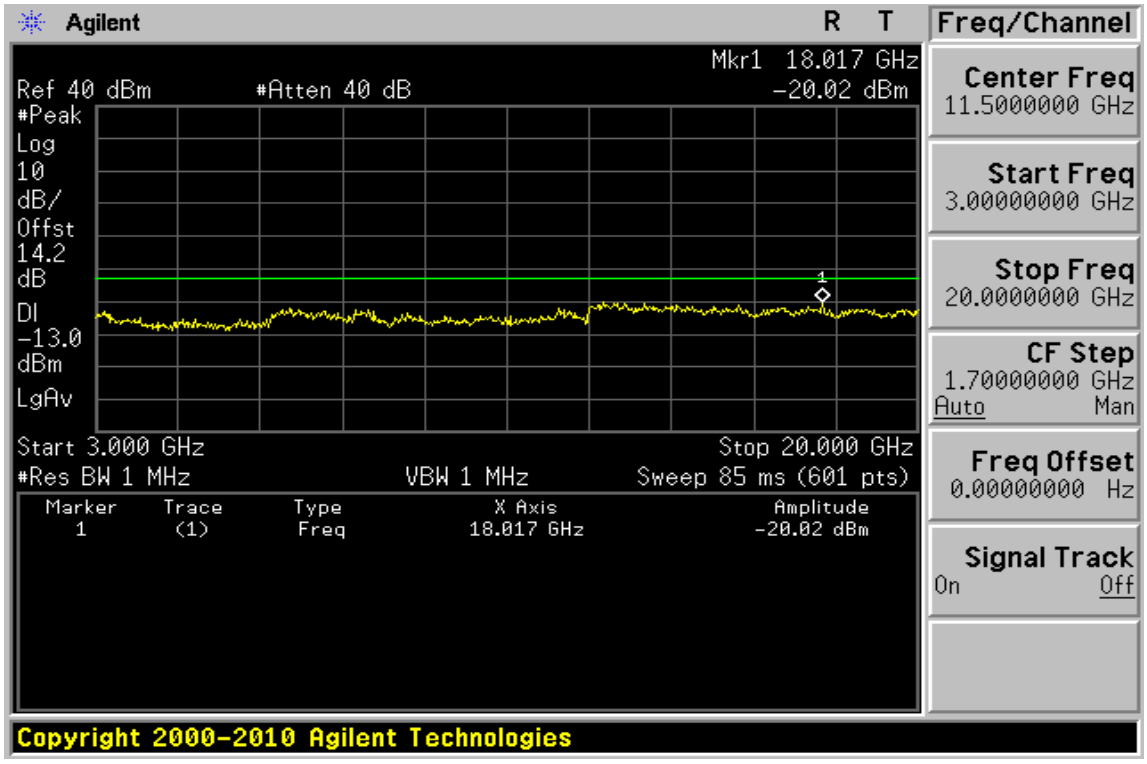
Out of Band emission at antenna terminals – HSDPA II Channel Mid



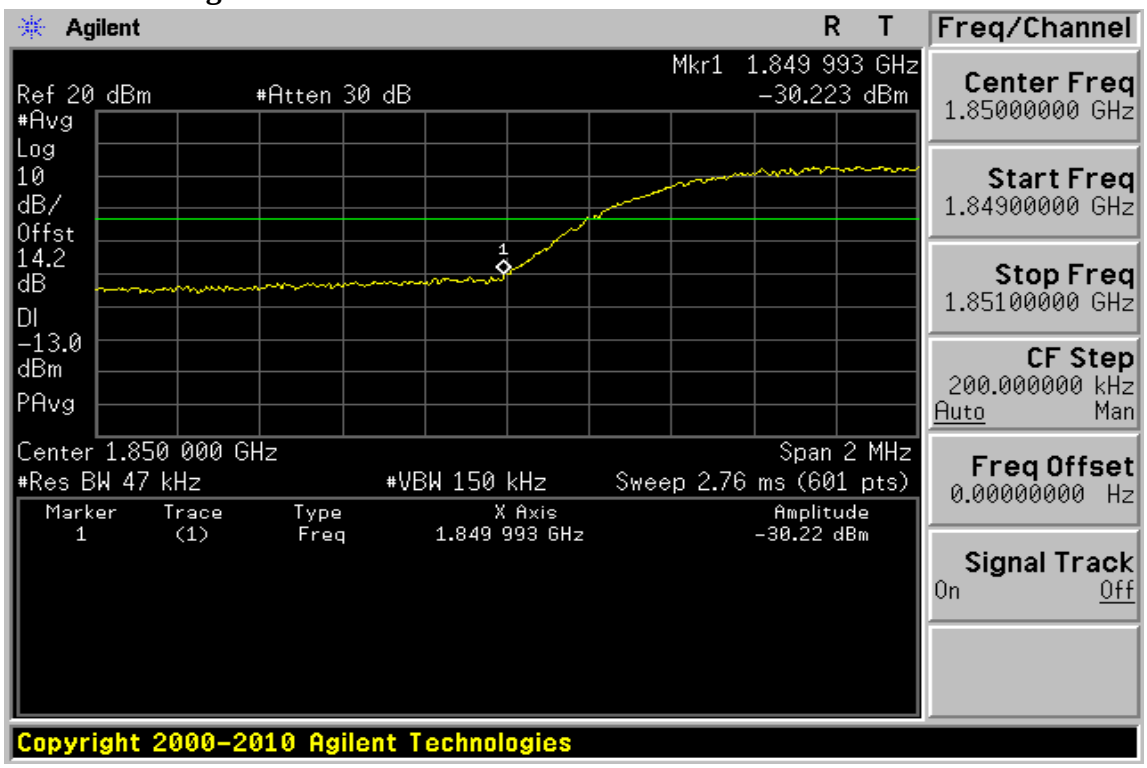


Out of Band emission at antenna terminals – HSDPA II Channel Highest

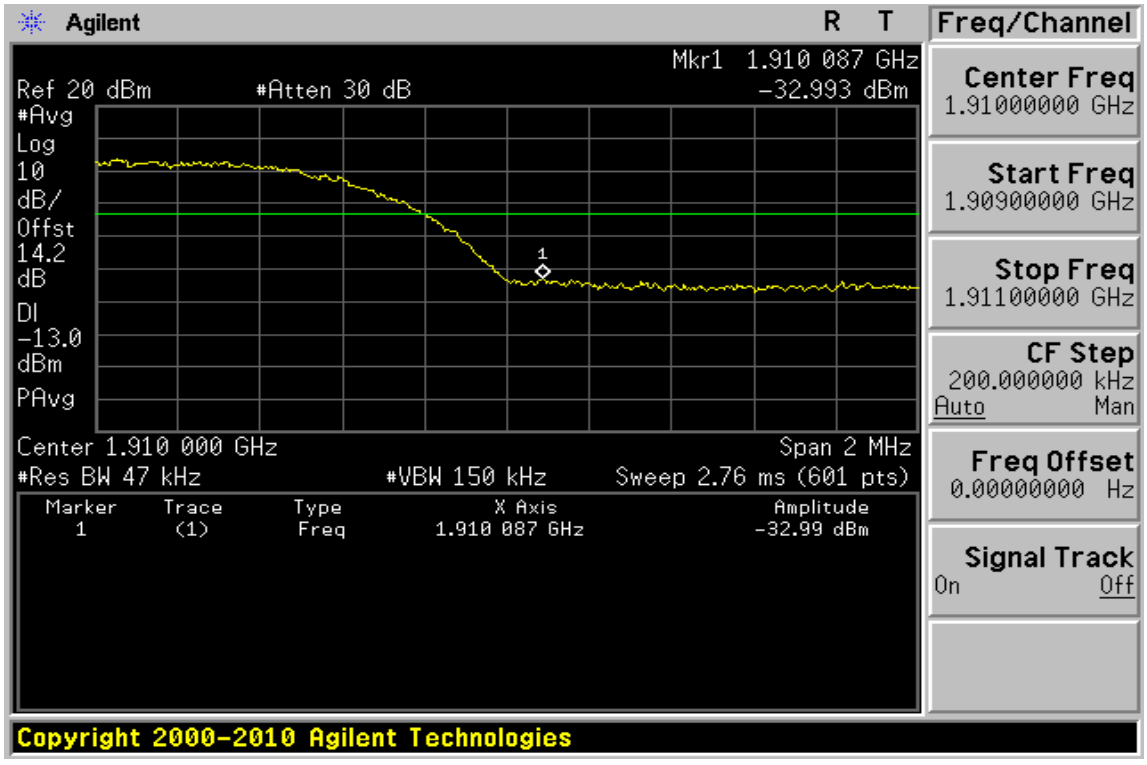




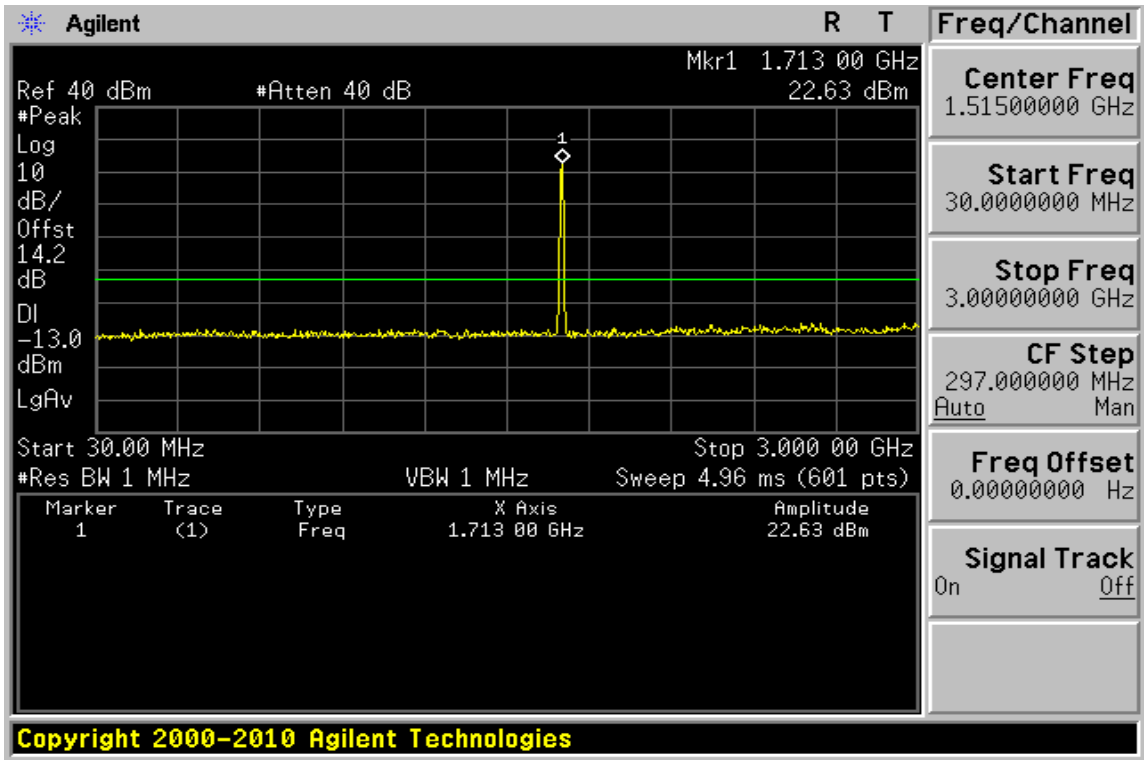
Band edge emission at antenna terminals – HSDPA II Channel Lowest

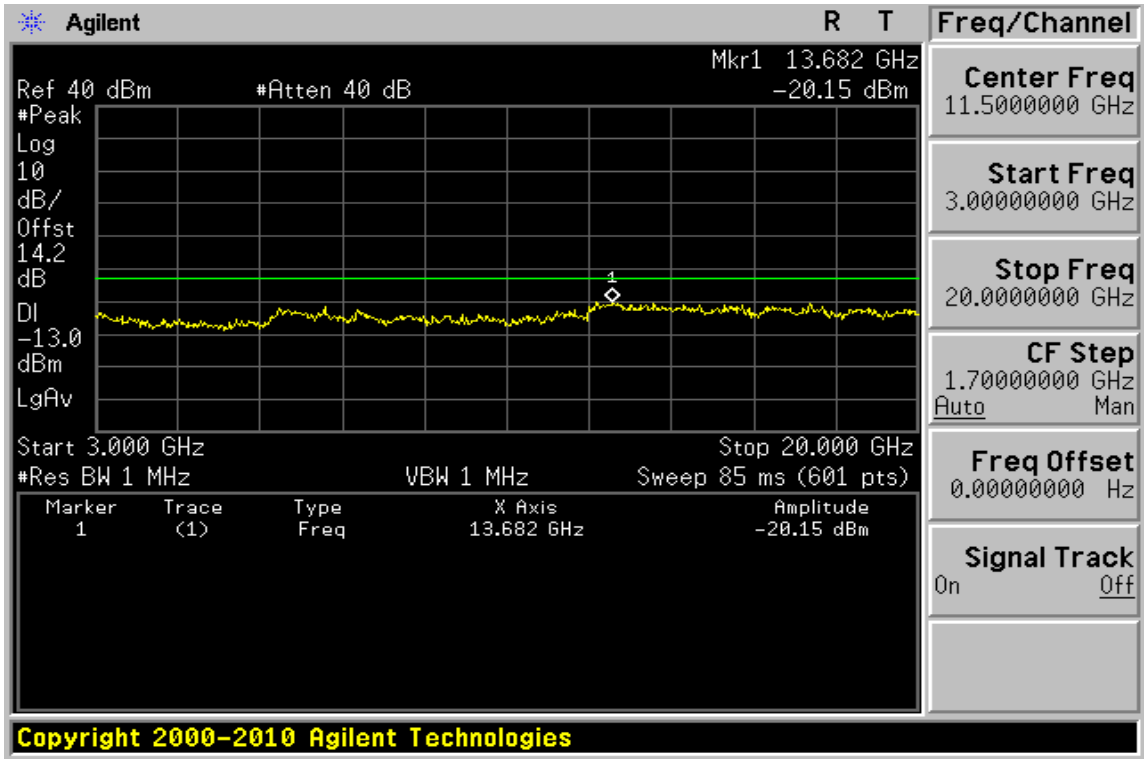


Band edge emission at antenna terminals – HSDPA II Channel Highest

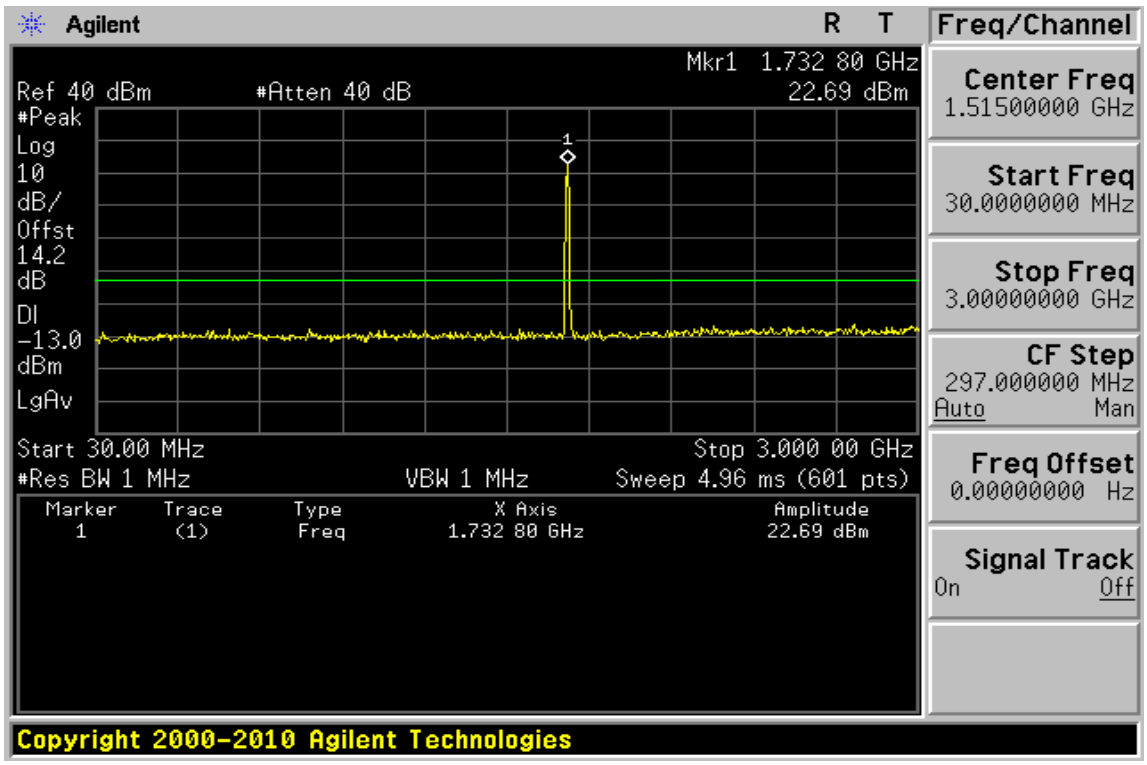


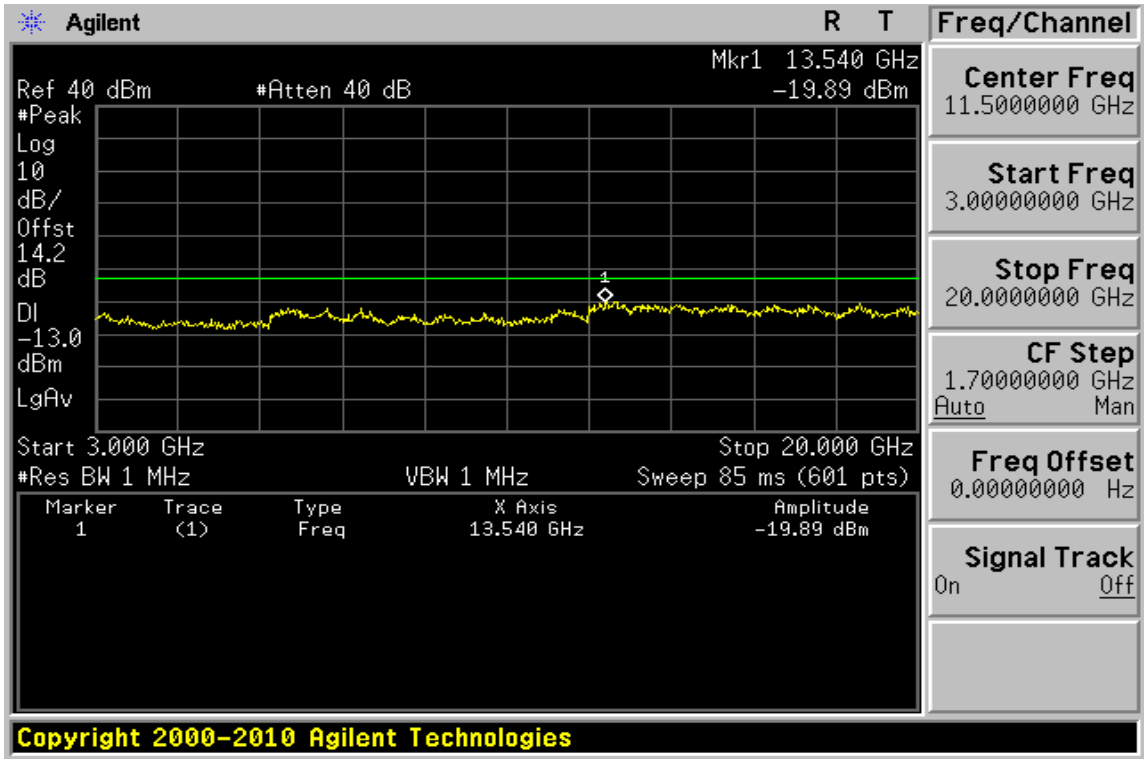
Out of Band emission at antenna terminals – HSDPA IV Channel Lowest



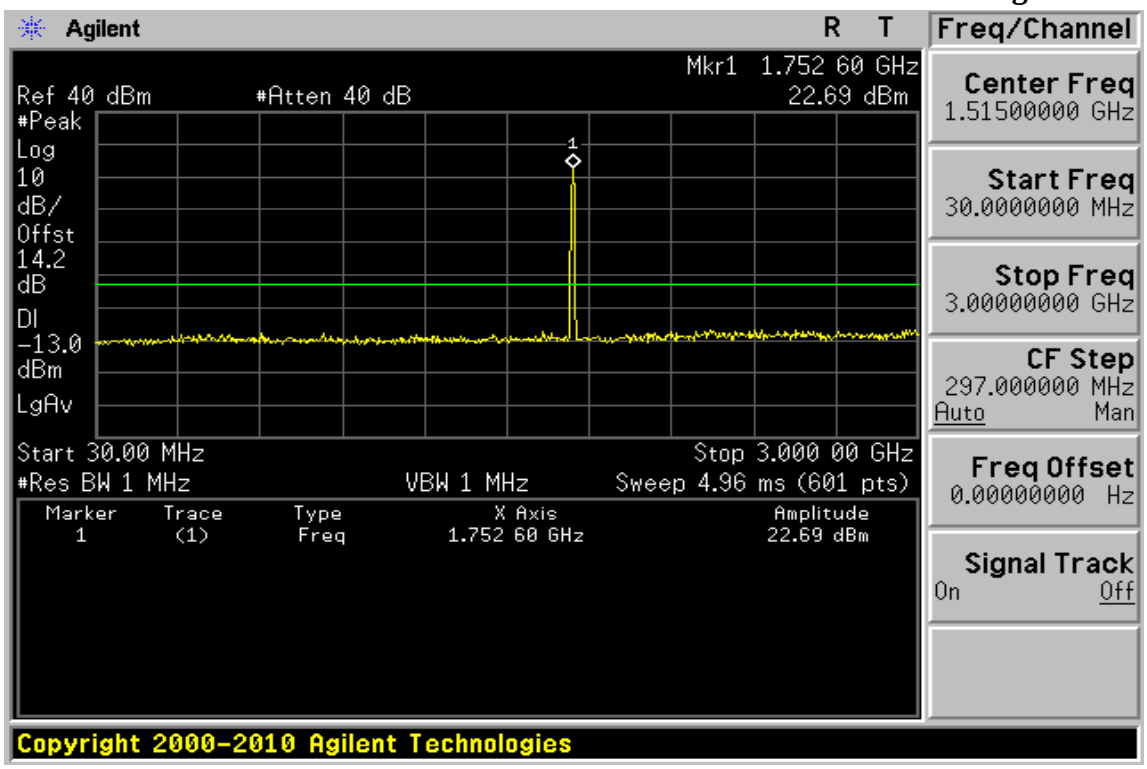


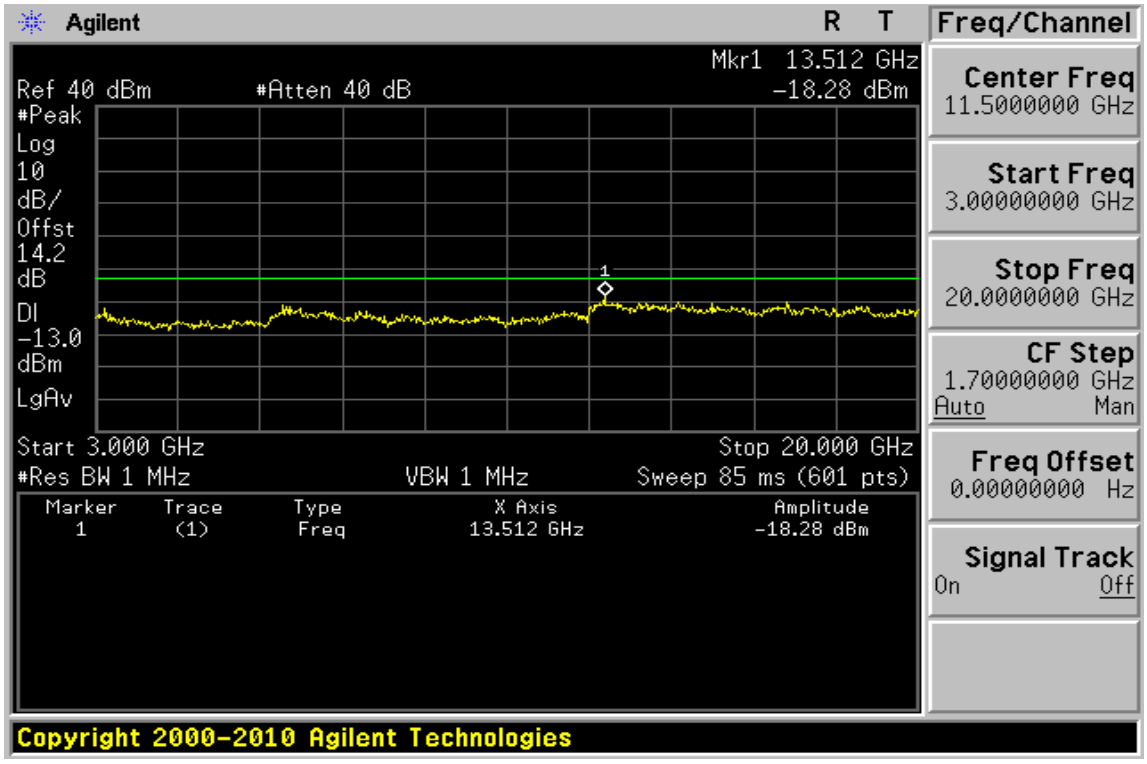
Out of Band emission at antenna terminals – HSDPA IV Channel Mid



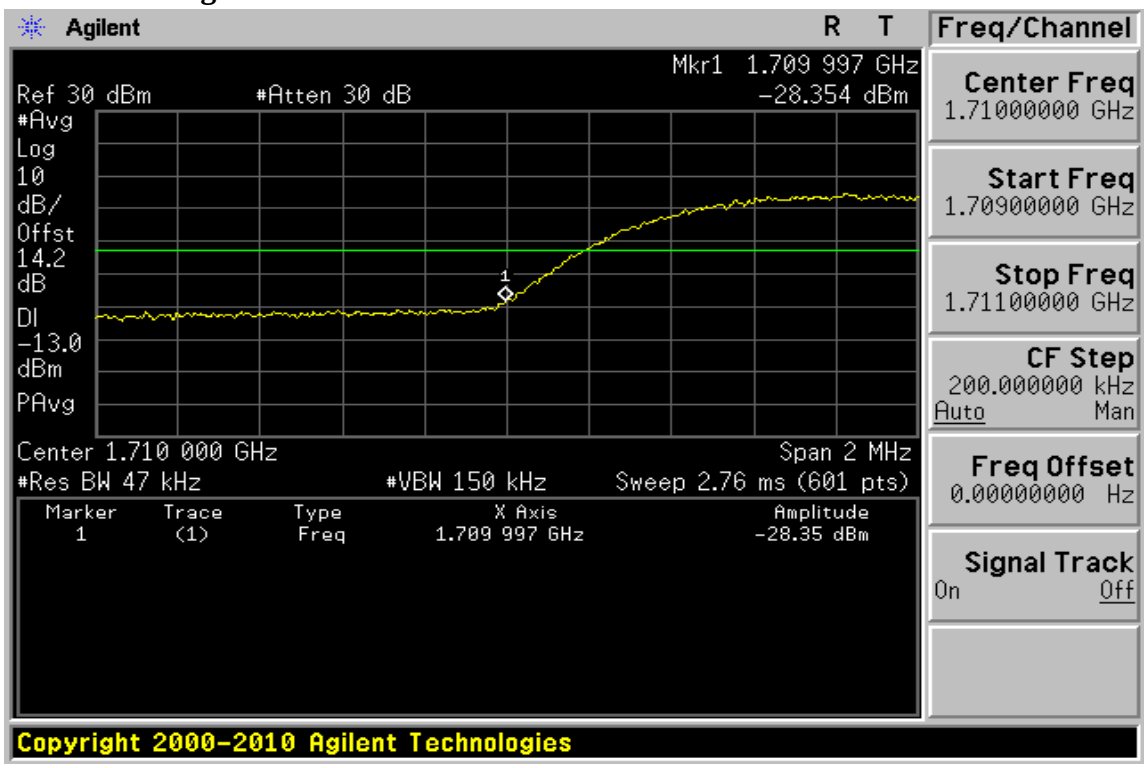


Out of Band emission at antenna terminals – HSDPA IV Channel Highest

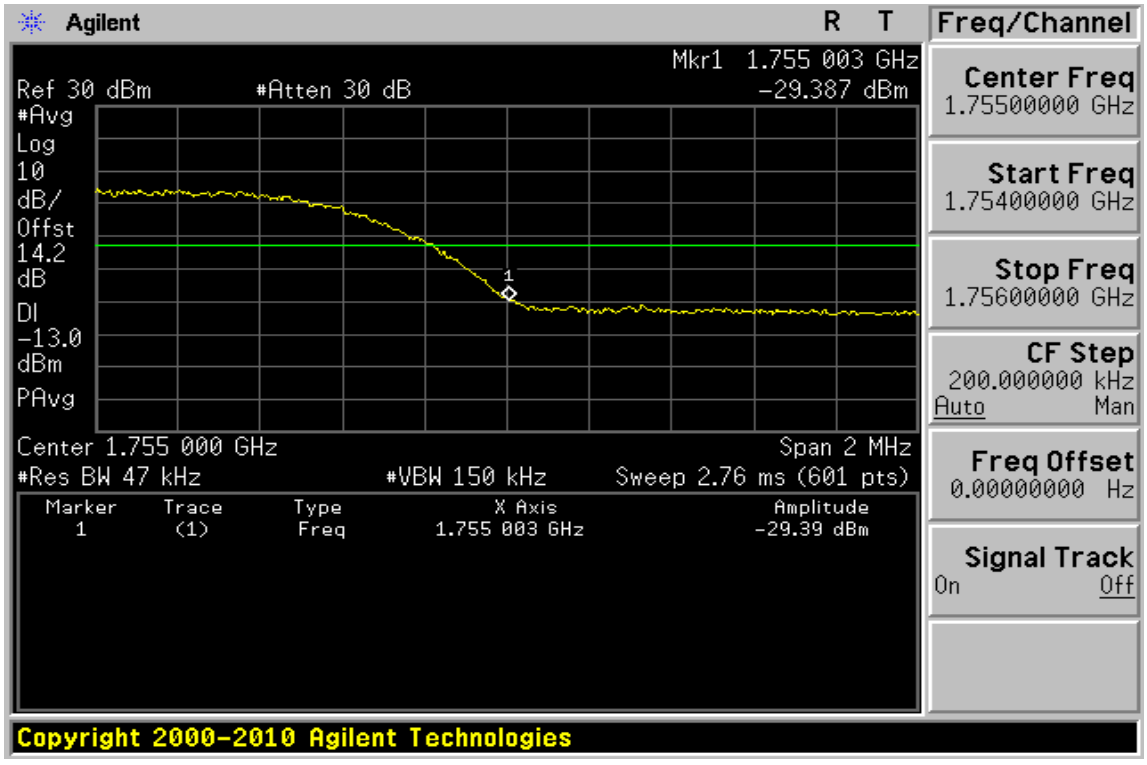




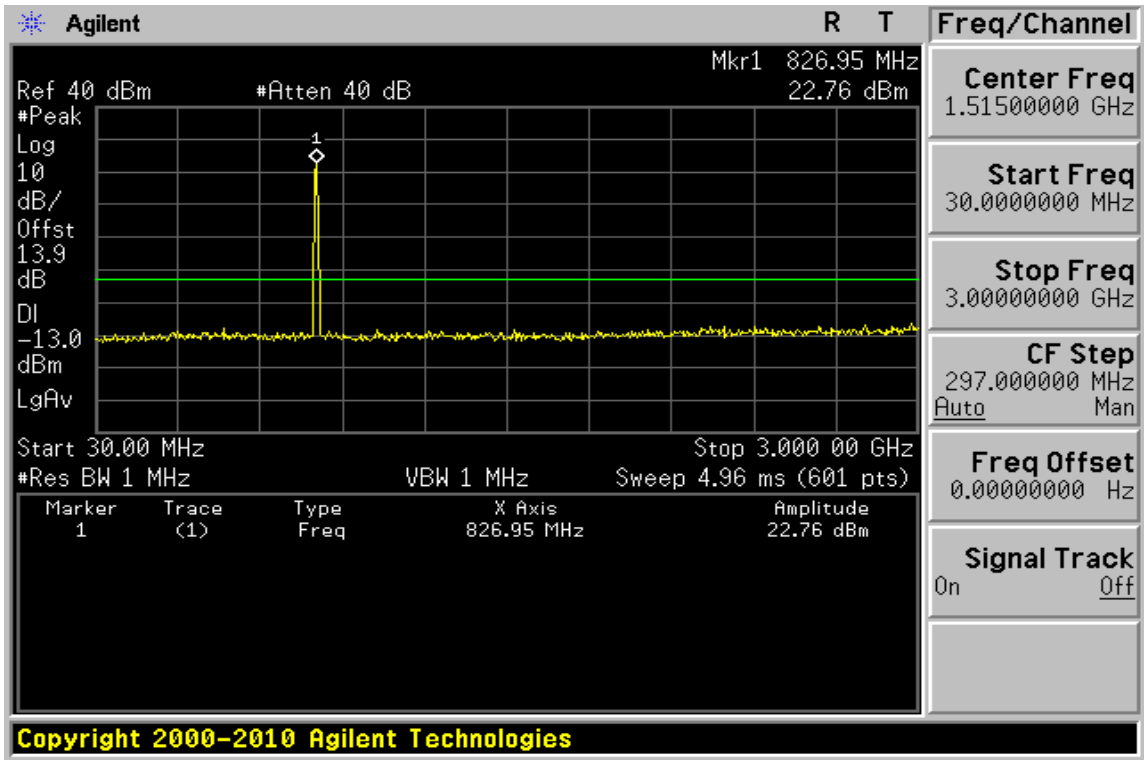
Band edge emission at antenna terminals – HSDPAI V Channel Lowest

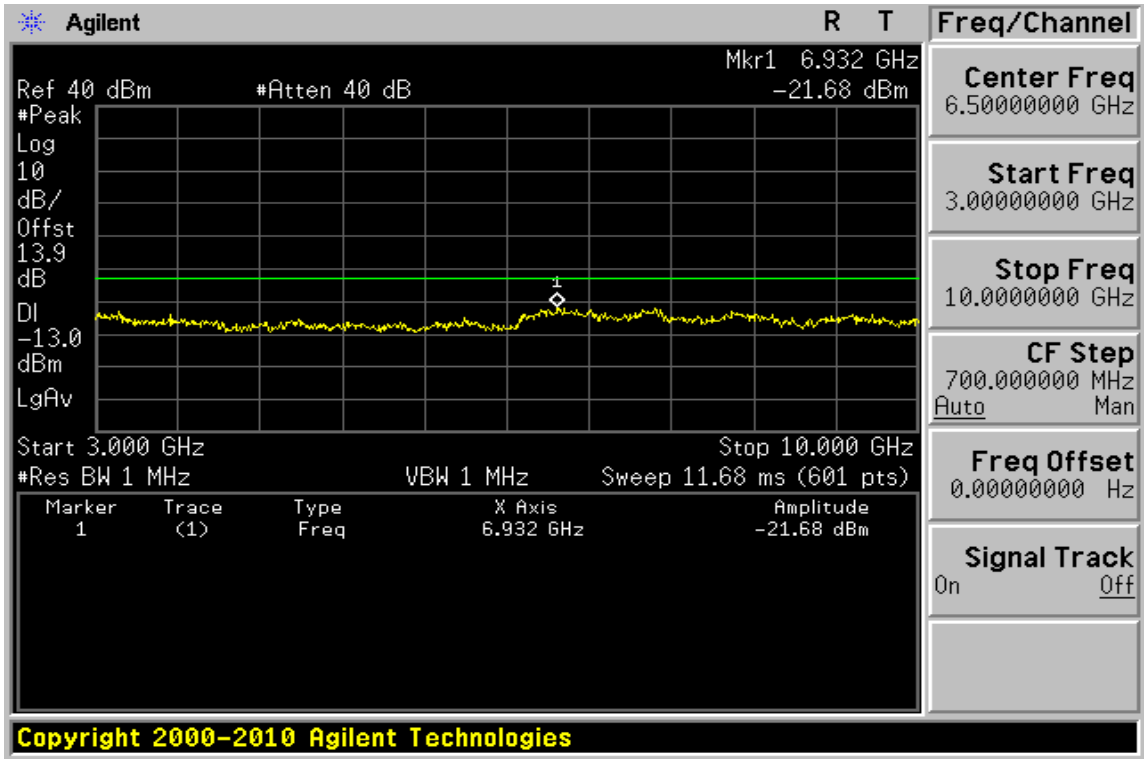


Band edge emission at antenna terminals – HSDPA IV Channel Highest

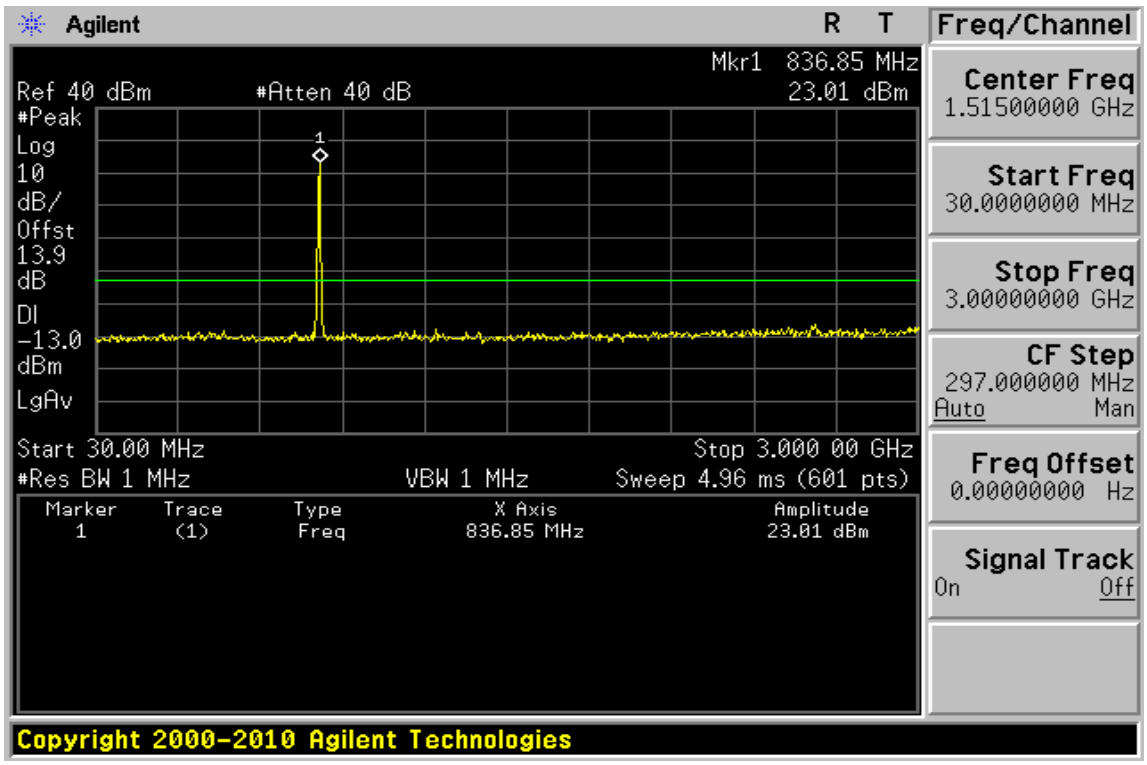


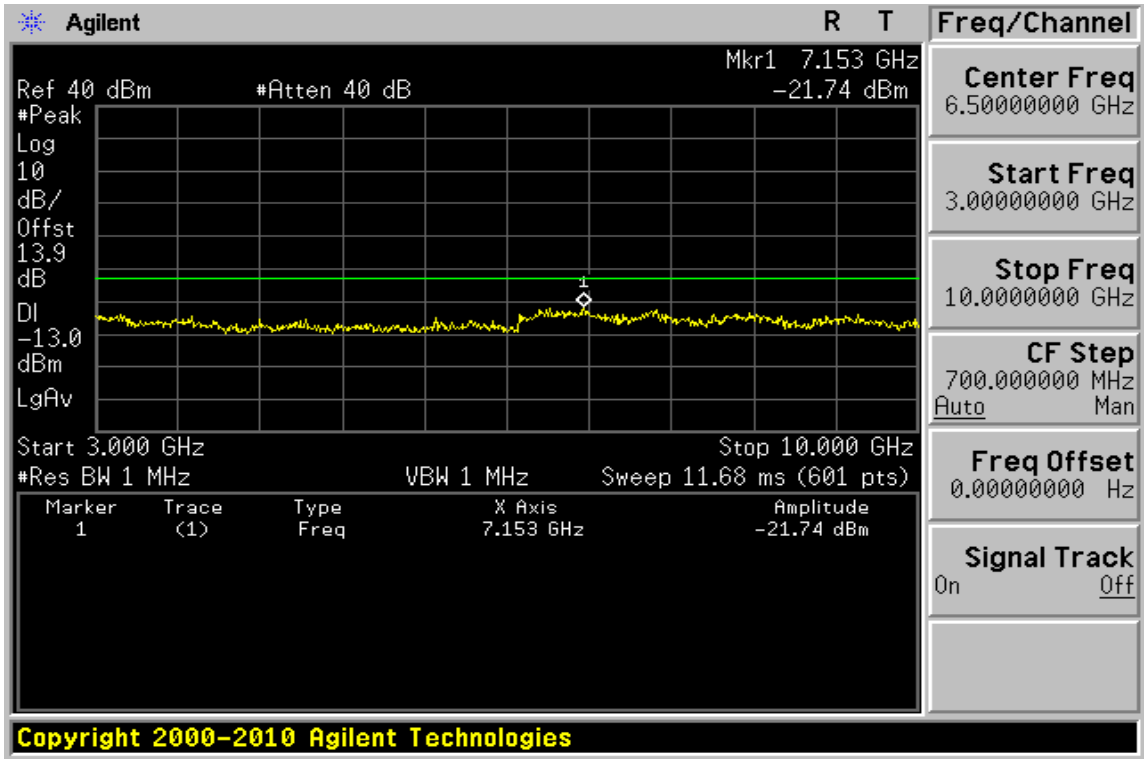
Out of Band emission at antenna terminals – HSDPA V Channel Lowest



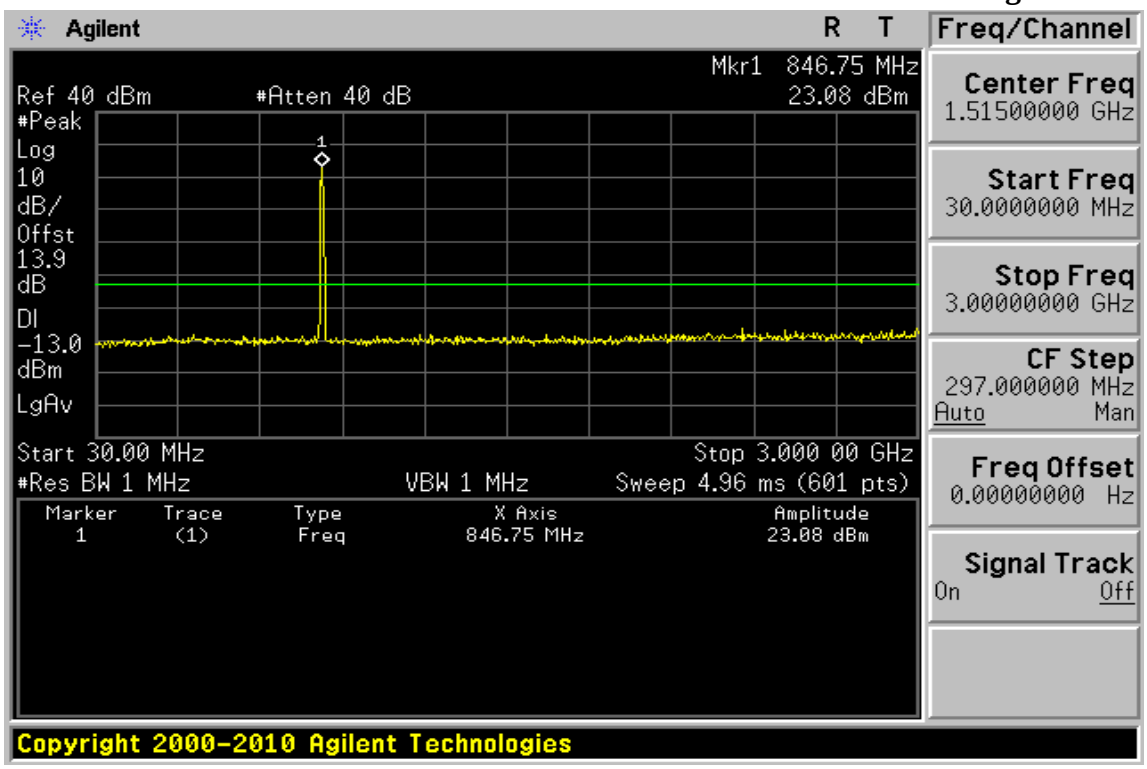


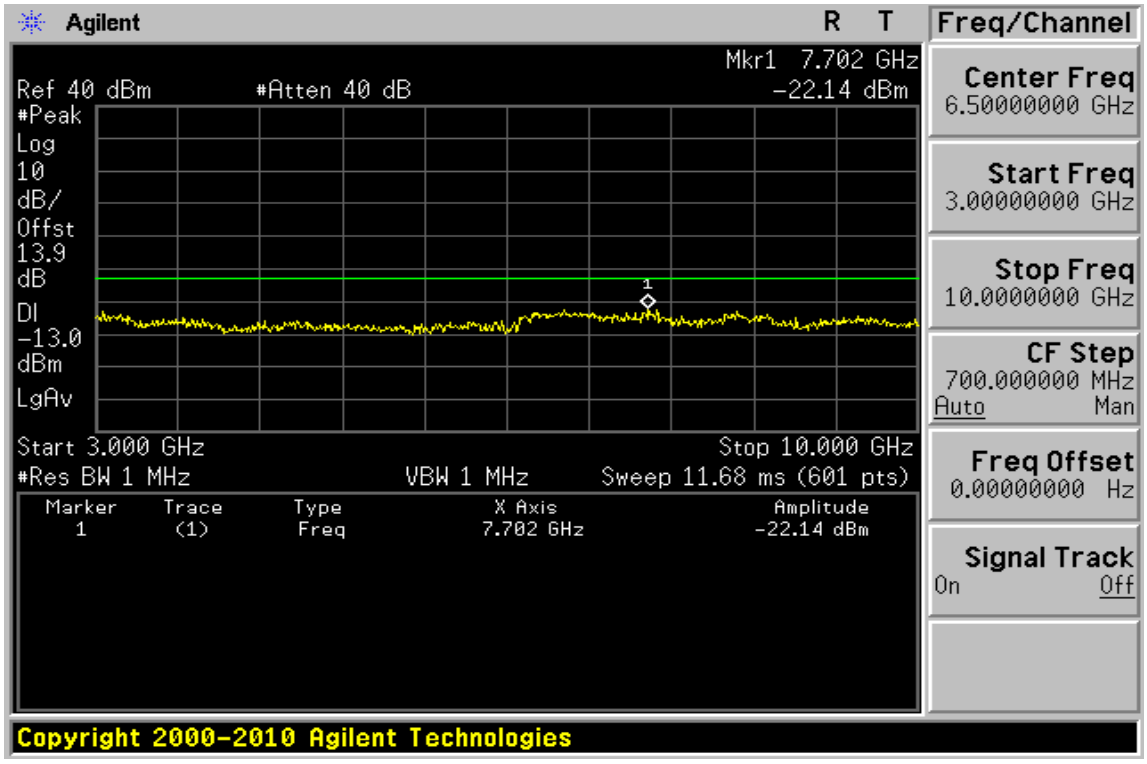
Out of Band emission at antenna terminals – HSDPA V Channel Mid



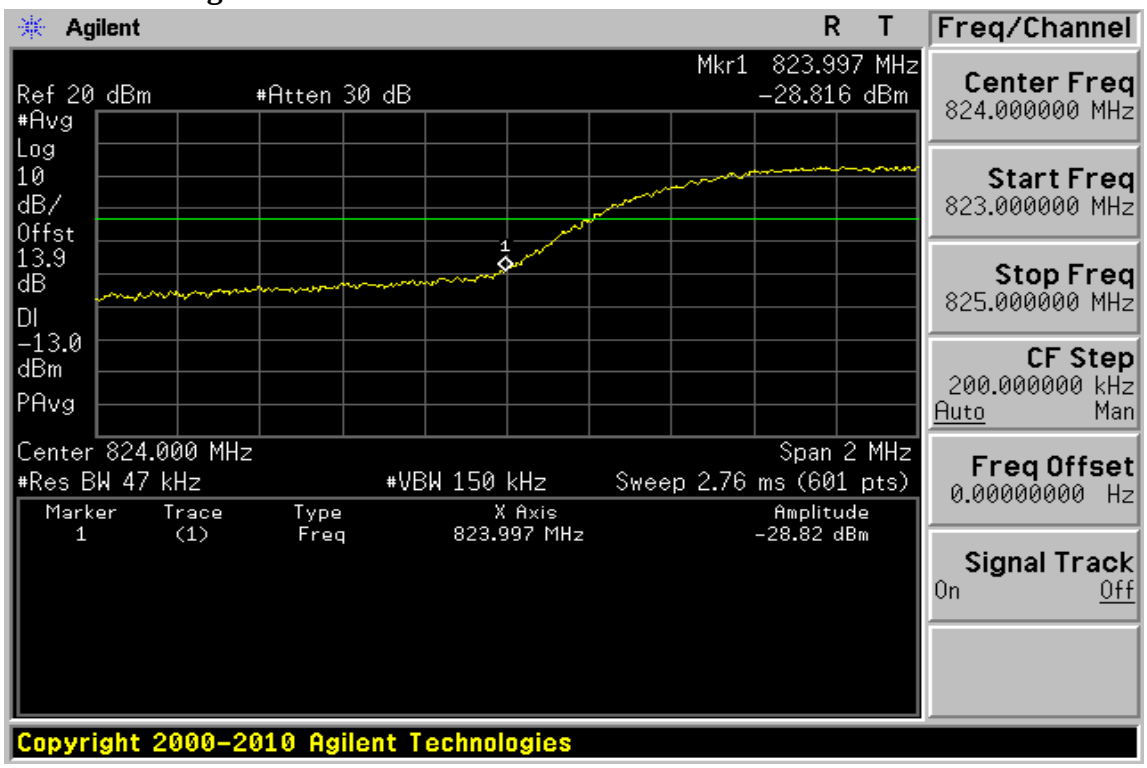


Out of Band emission at antenna terminals – HSDPA V Channel Highest

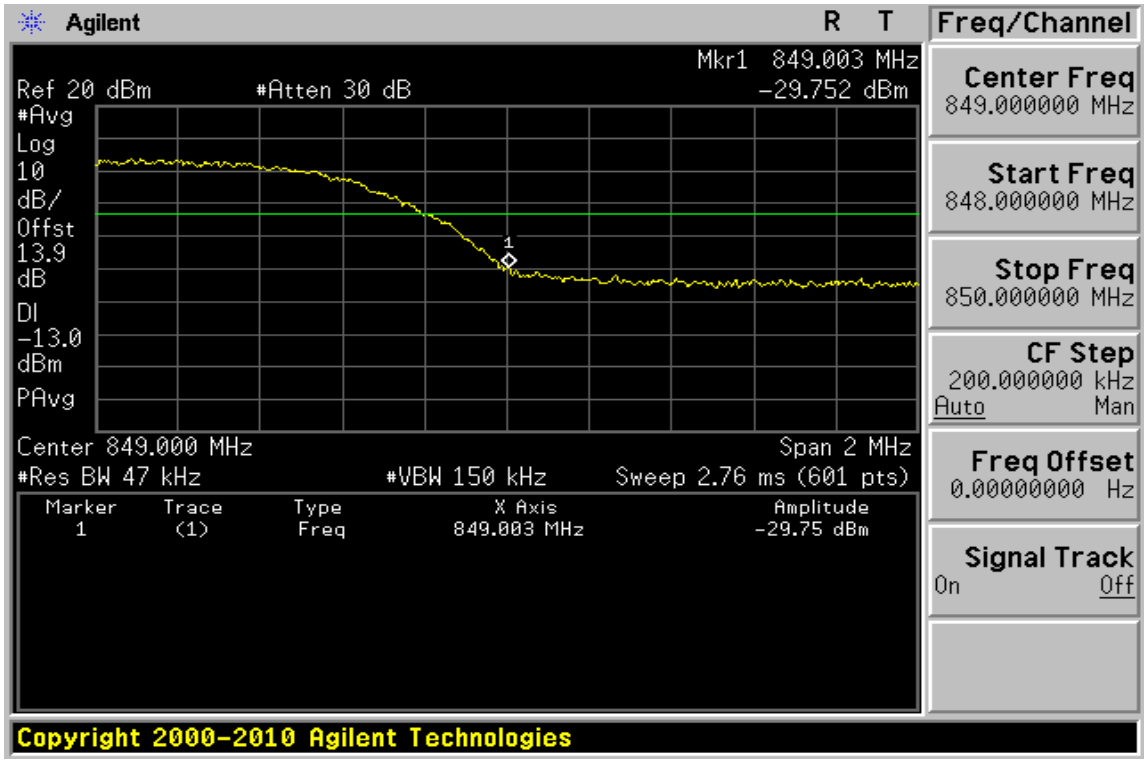




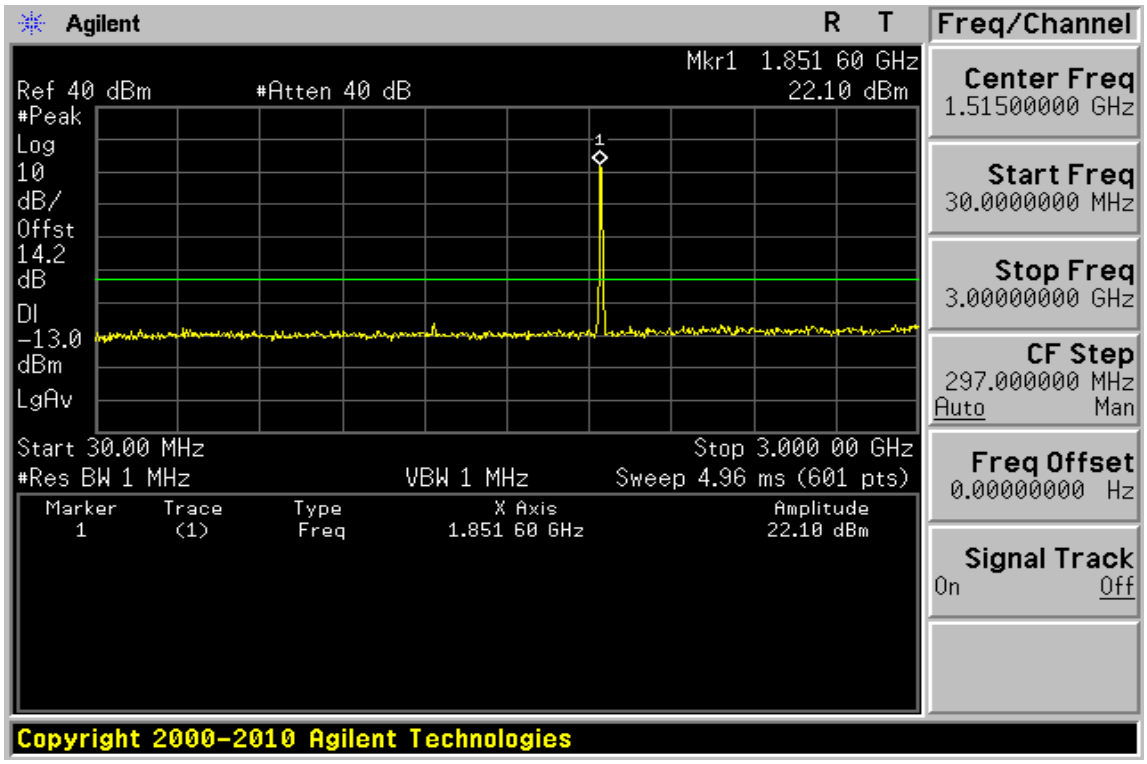
Band edge emission at antenna terminals – HSDPA V Channel Lowest

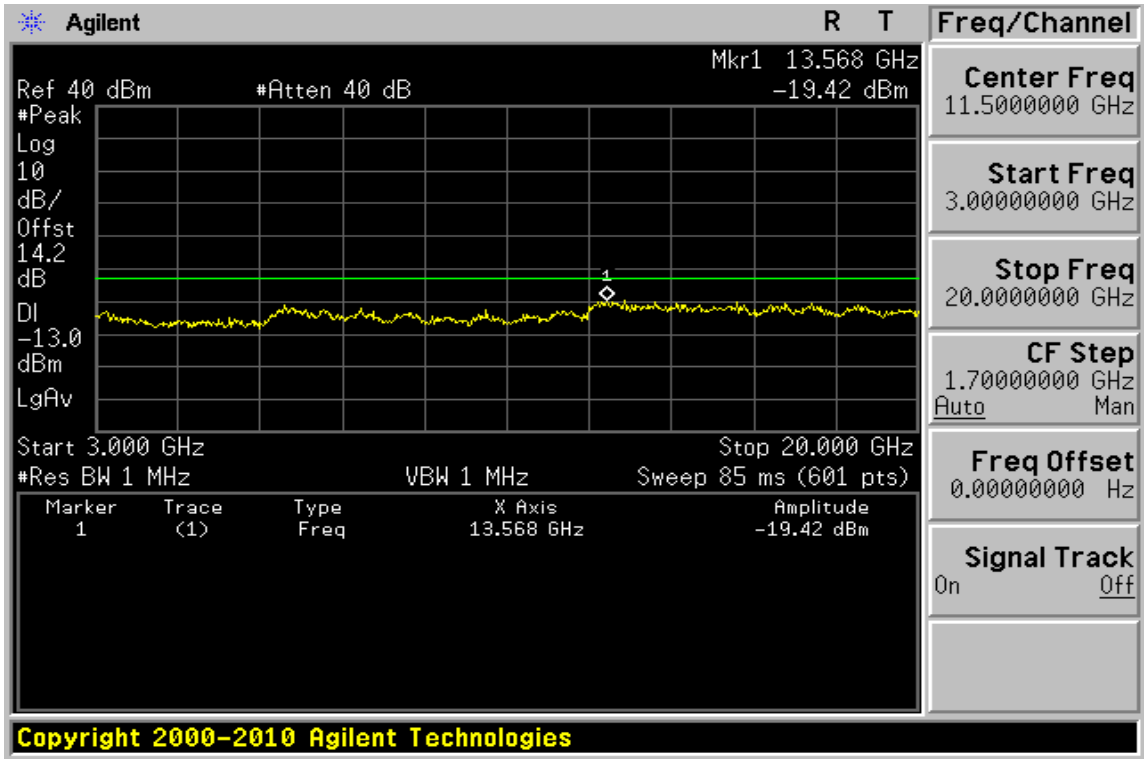


Band edge emission at antenna terminals – HSDPA V Channel Highest

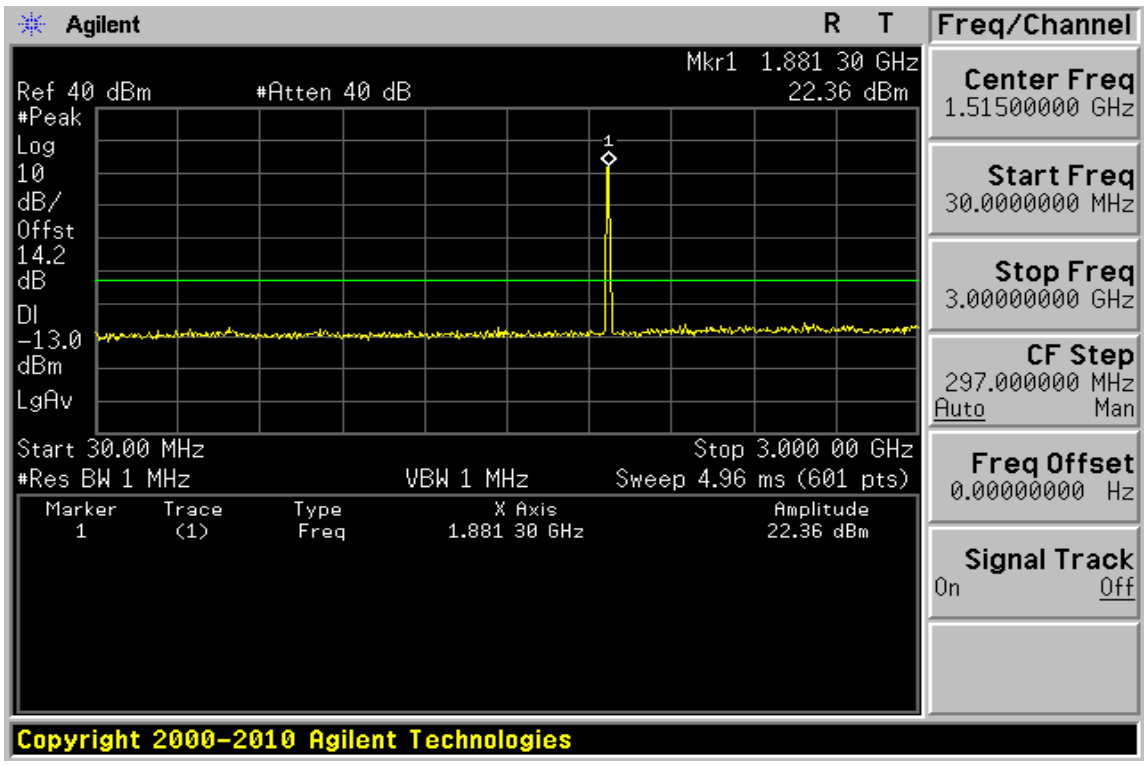


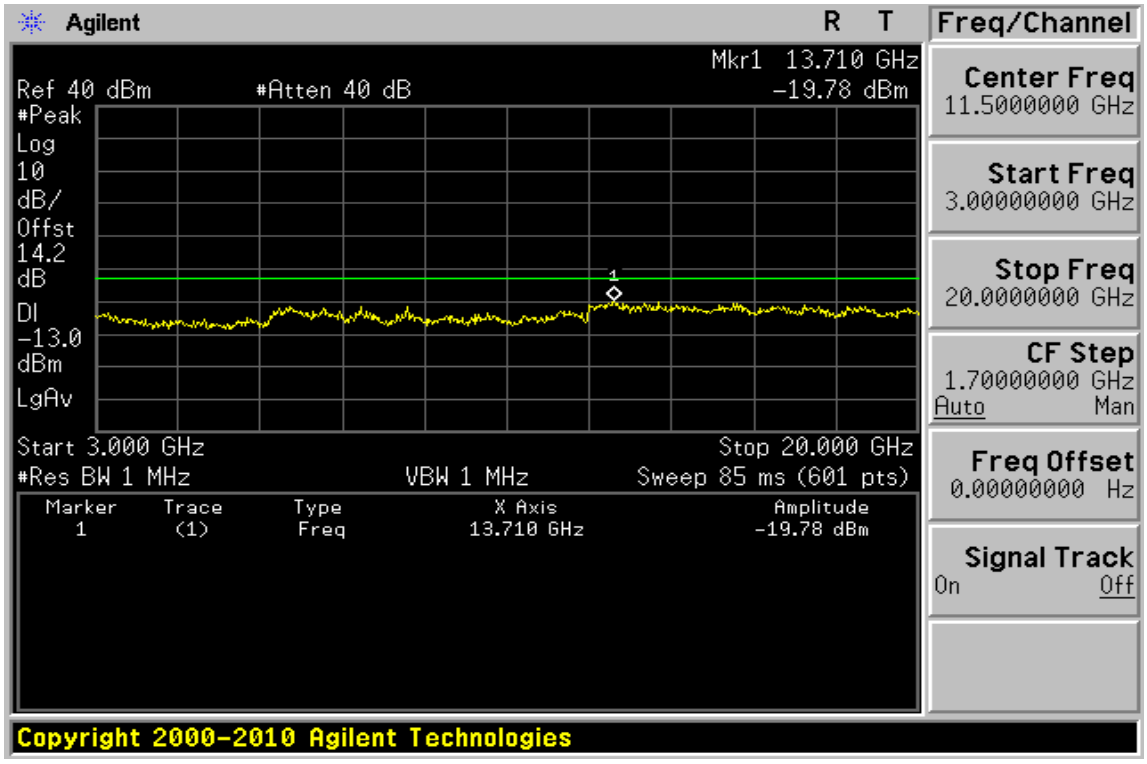
Out of Band emission at antenna terminals – HSUPA II Channel Lowest



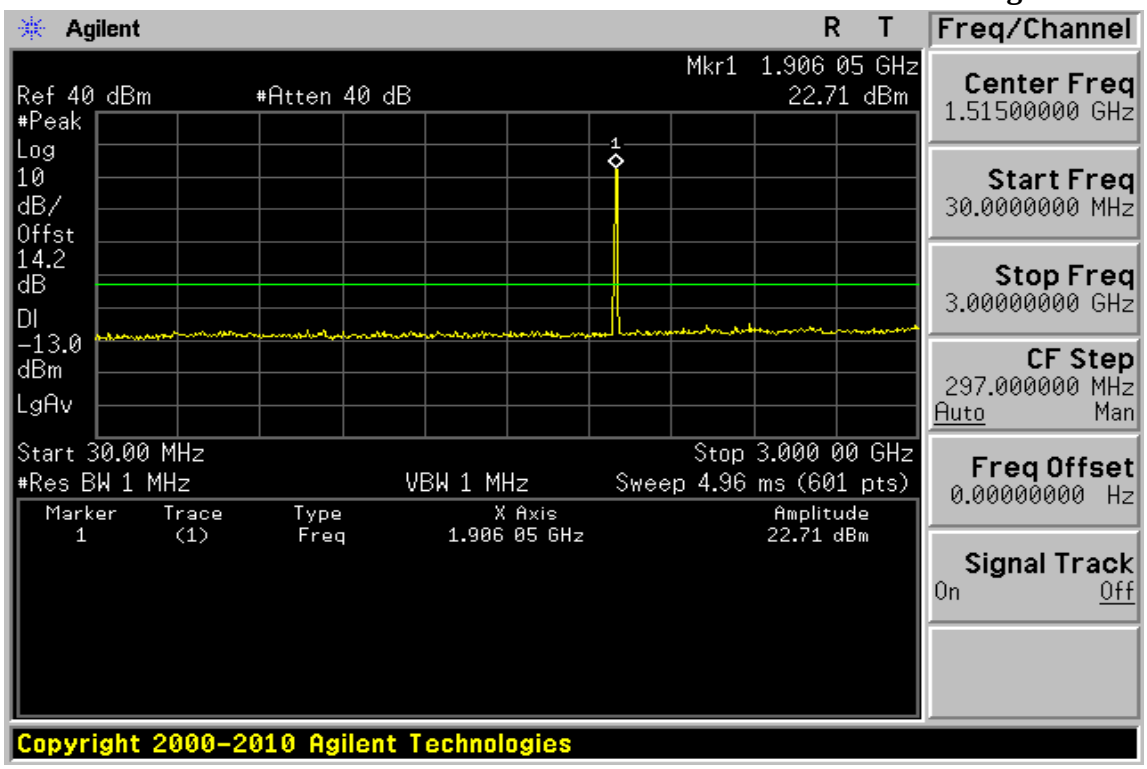


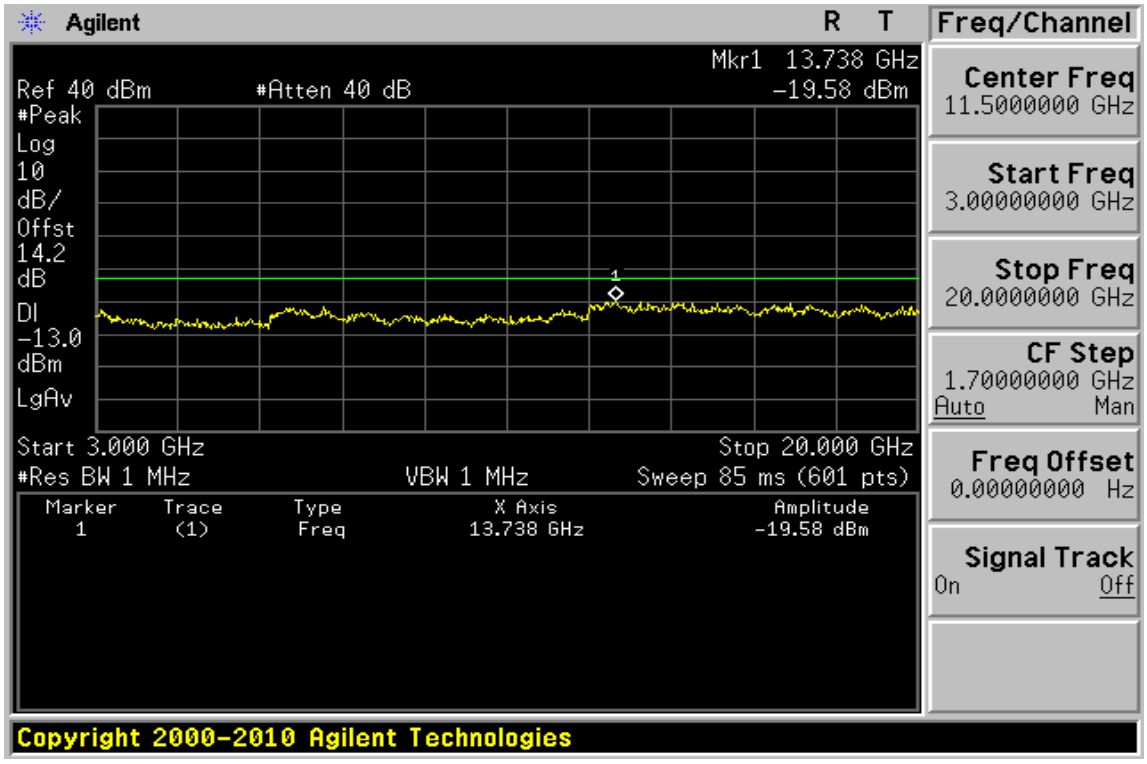
Out of Band emission at antenna terminals – HSUPA II Channel Mid



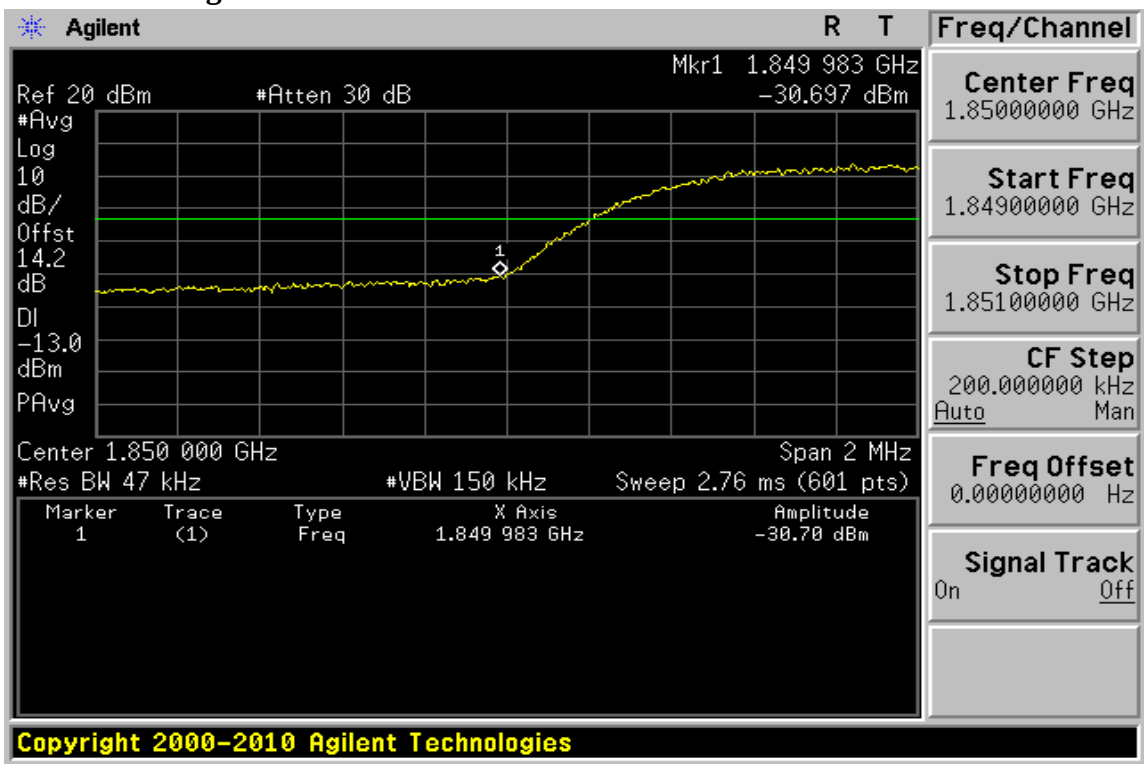


Out of Band emission at antenna terminals – HSUPA II Channel Highest

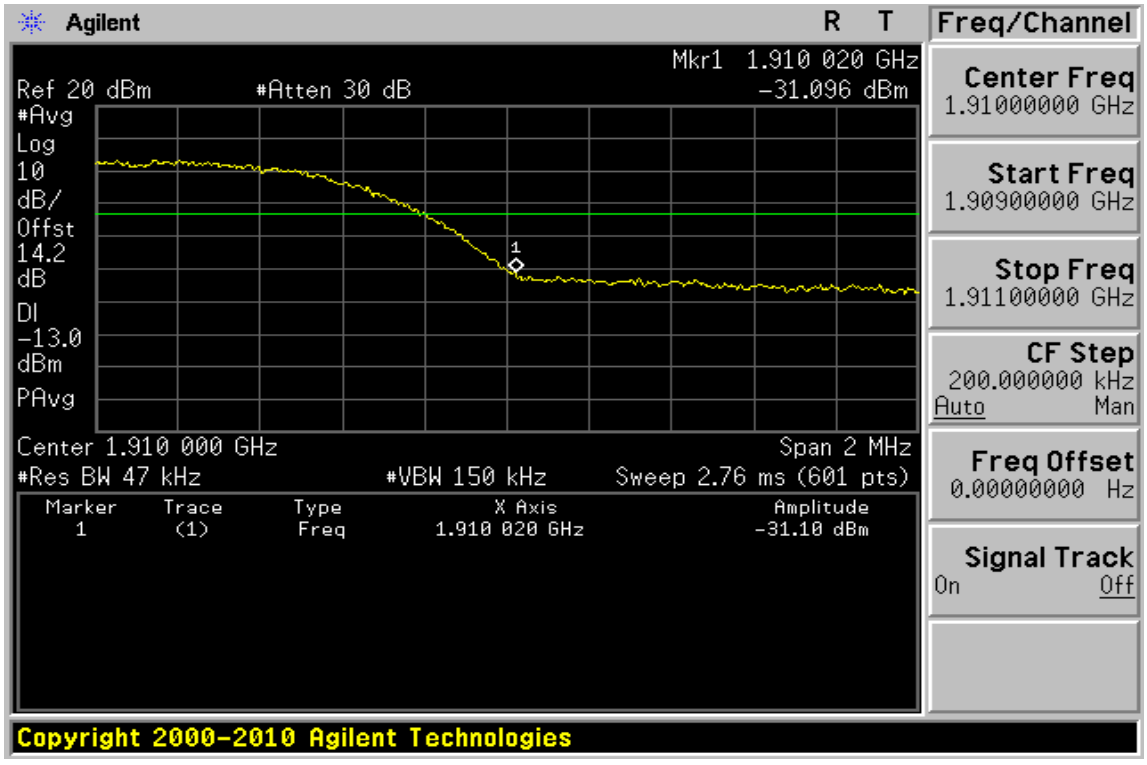




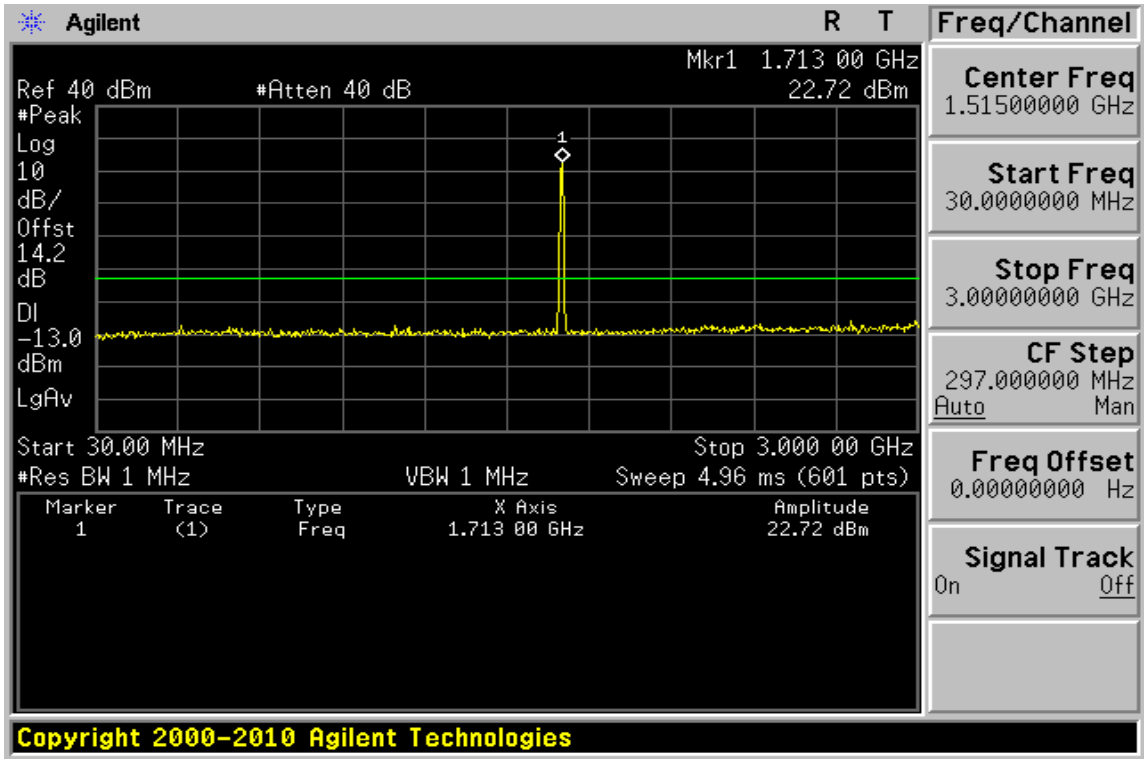
Band edge emission at antenna terminals – HSUPA II Channel Lowest

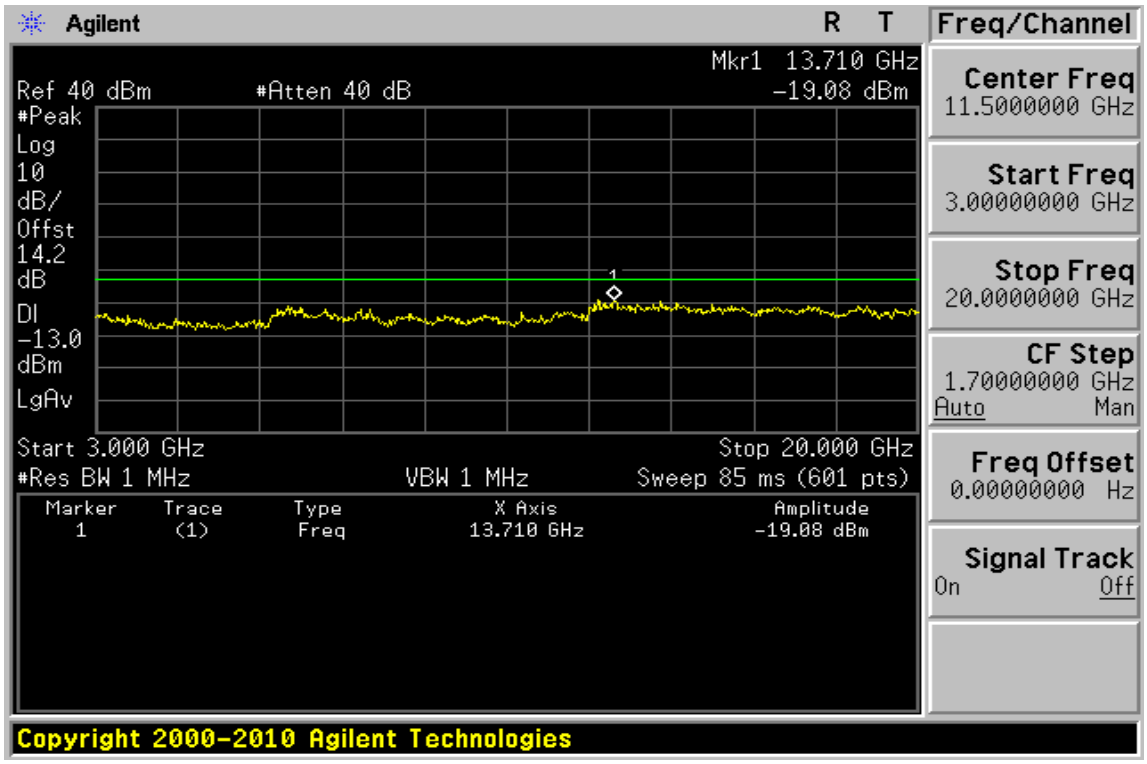


Band edge emission at antenna terminals – HSUPA II Channel Highest

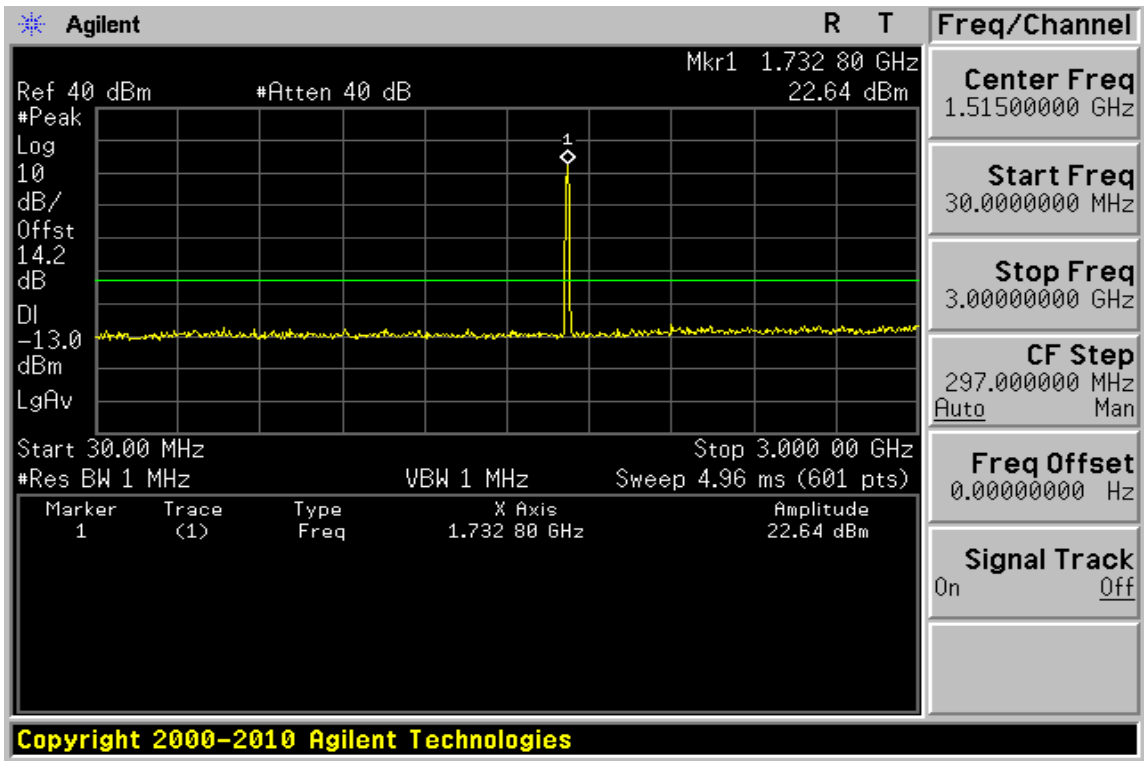


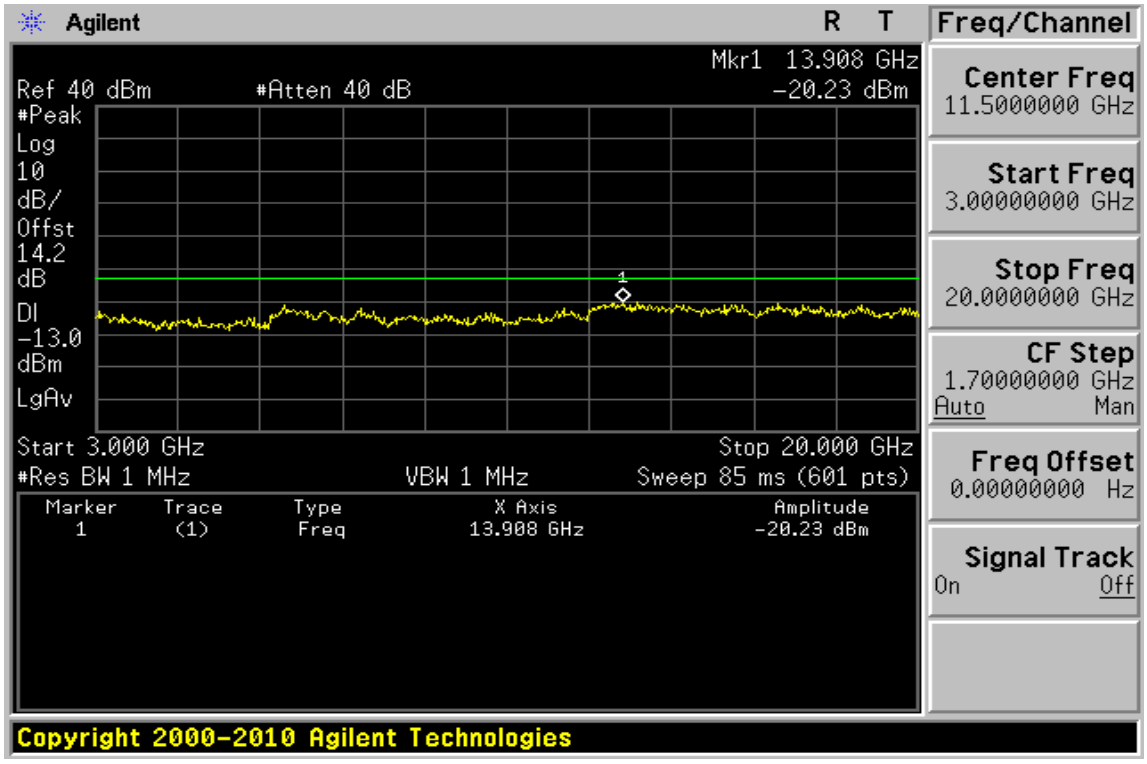
Out of Band emission at antenna terminals – HSUPA IV Channel Lowest



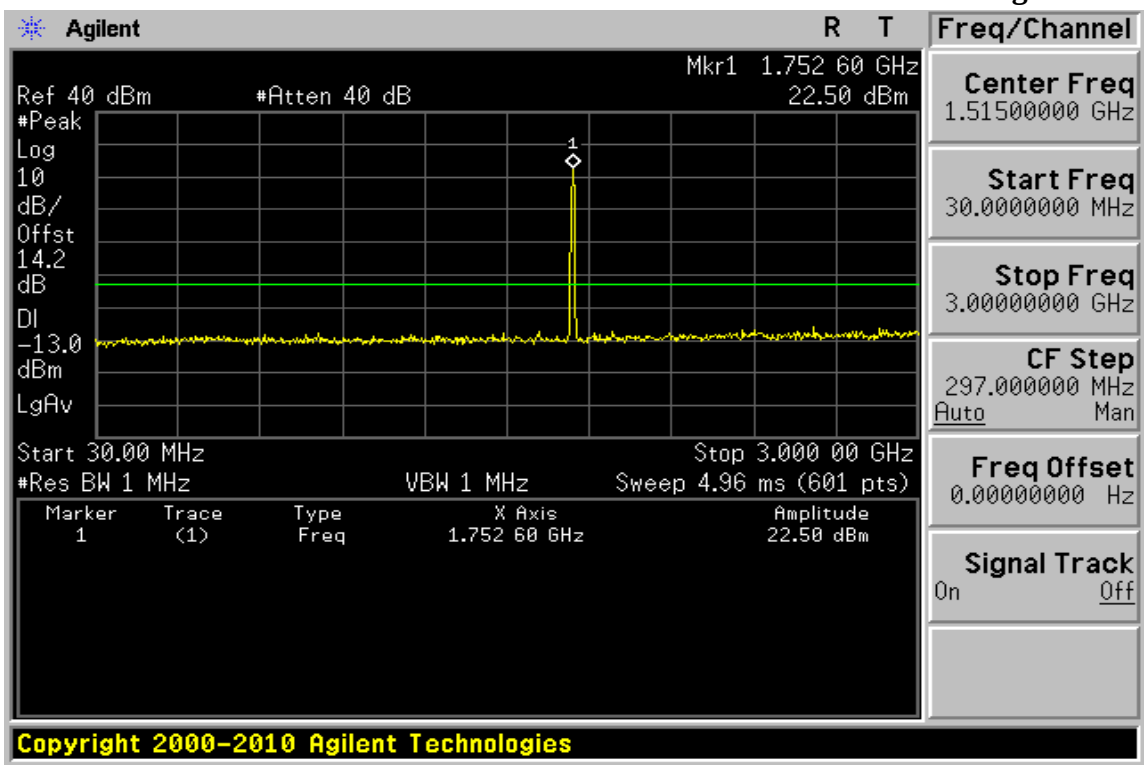


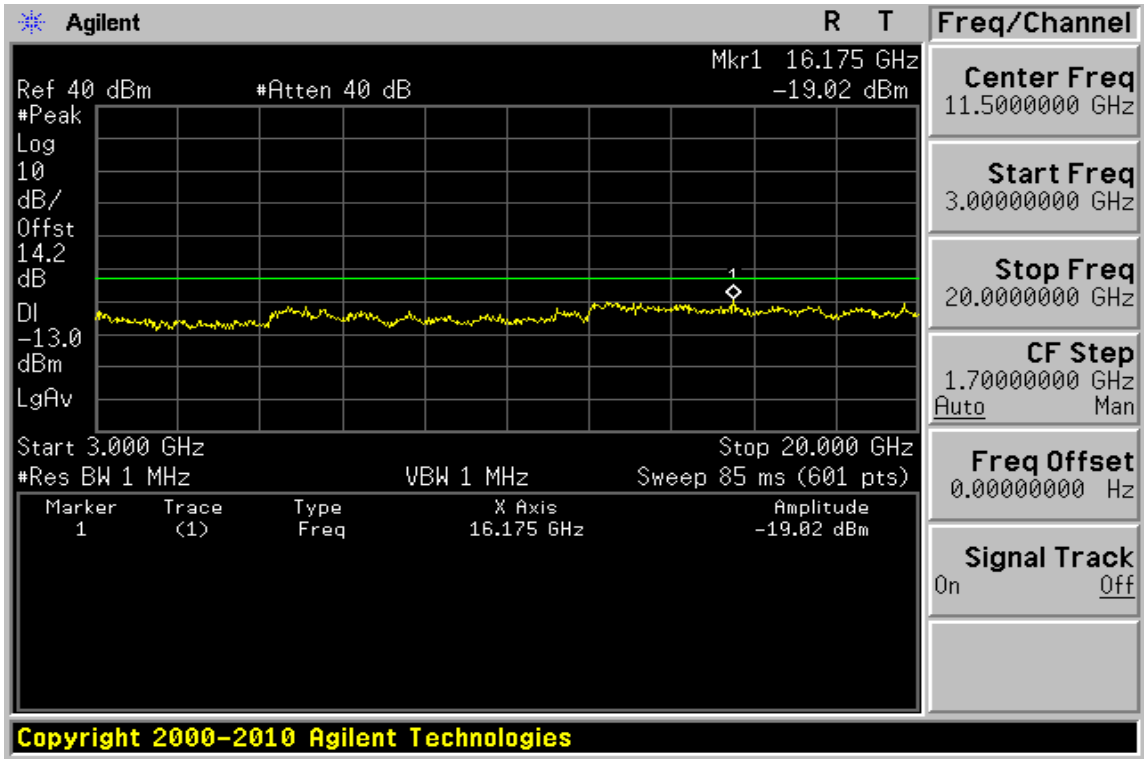
Out of Band emission at antenna terminals – HSUPA IV Channel Mid



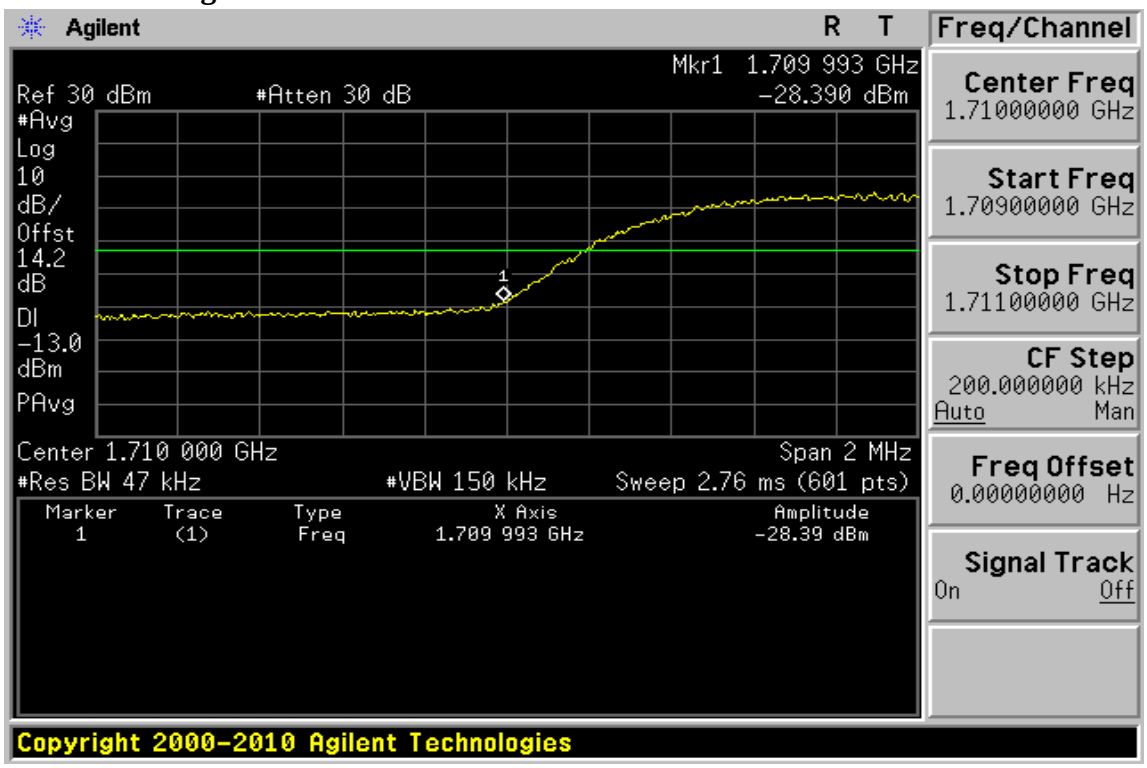


Out of Band emission at antenna terminals – HSUPA IV Channel Highest

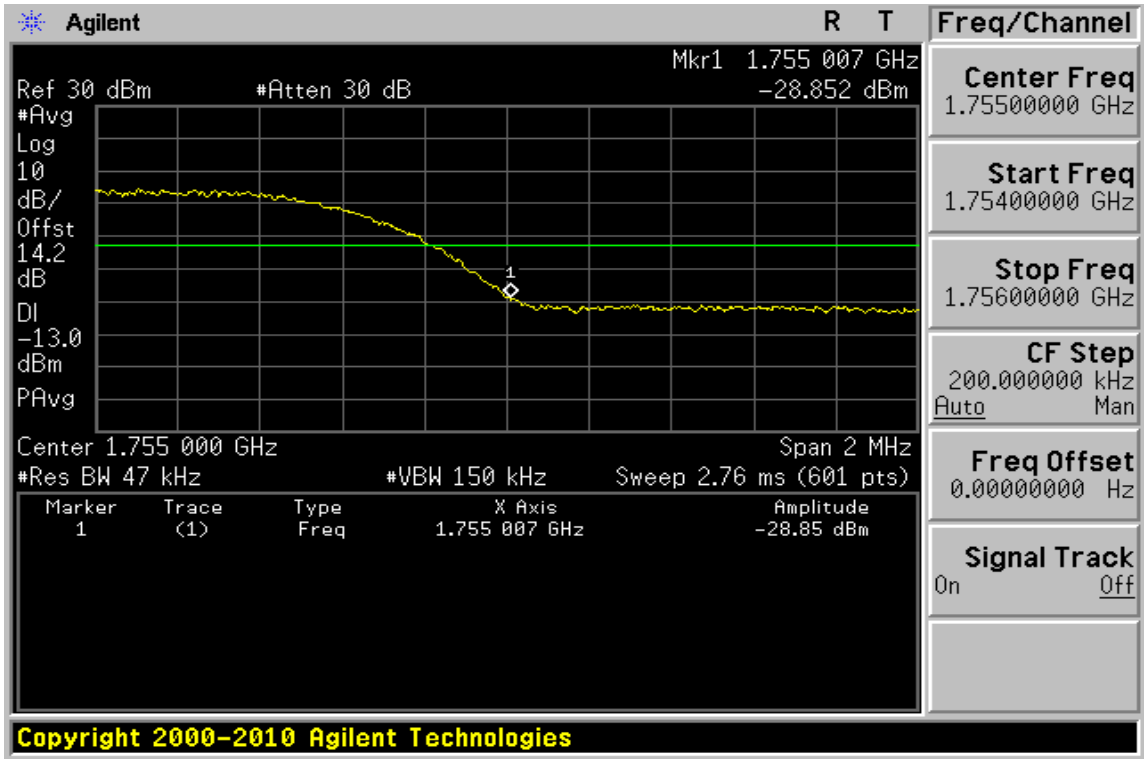




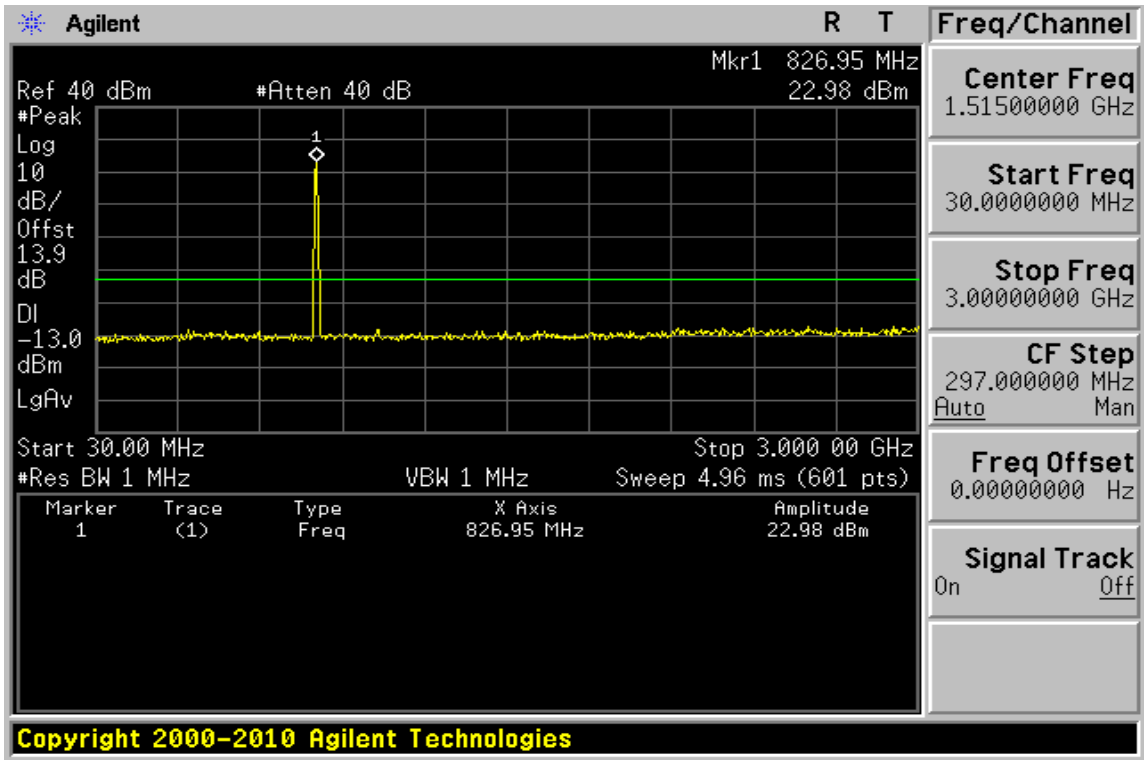
Band edge emission at antenna terminals – HSUPA IV Channel Lowest

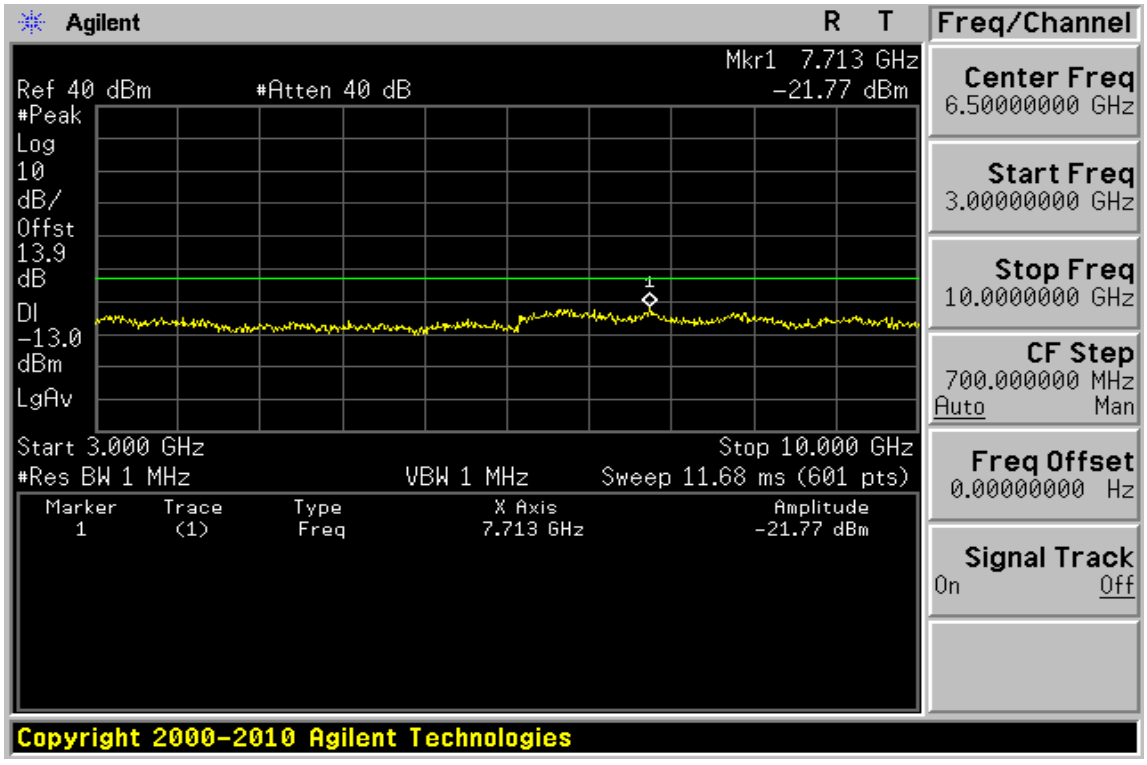


Band edge emission at antenna terminals – HSUPA IV Channel Highest

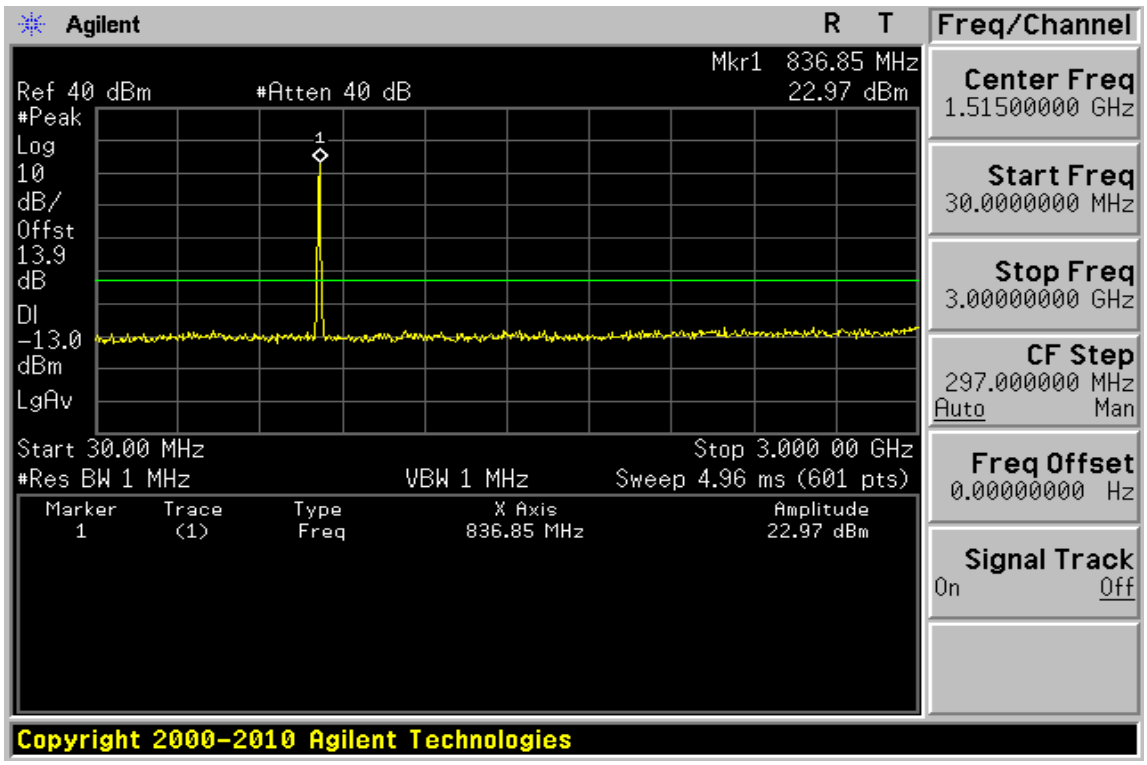


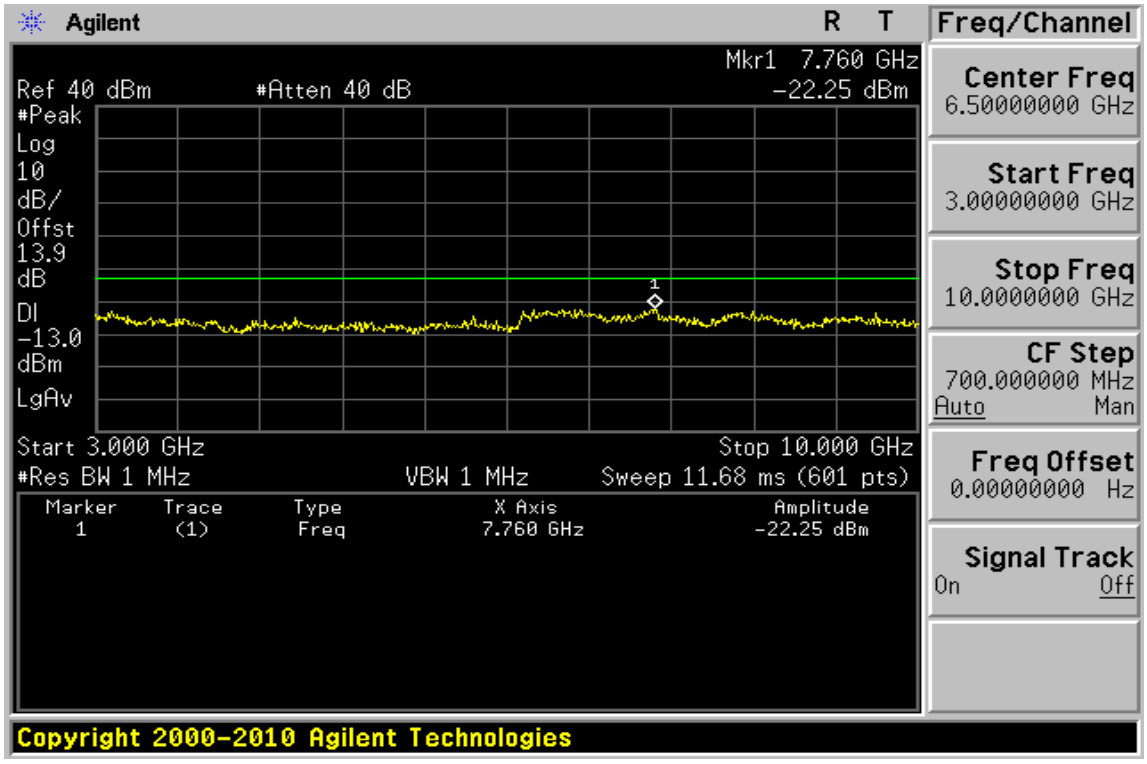
Out of Band emission at antenna terminals – HSUPA V Channel Lowest



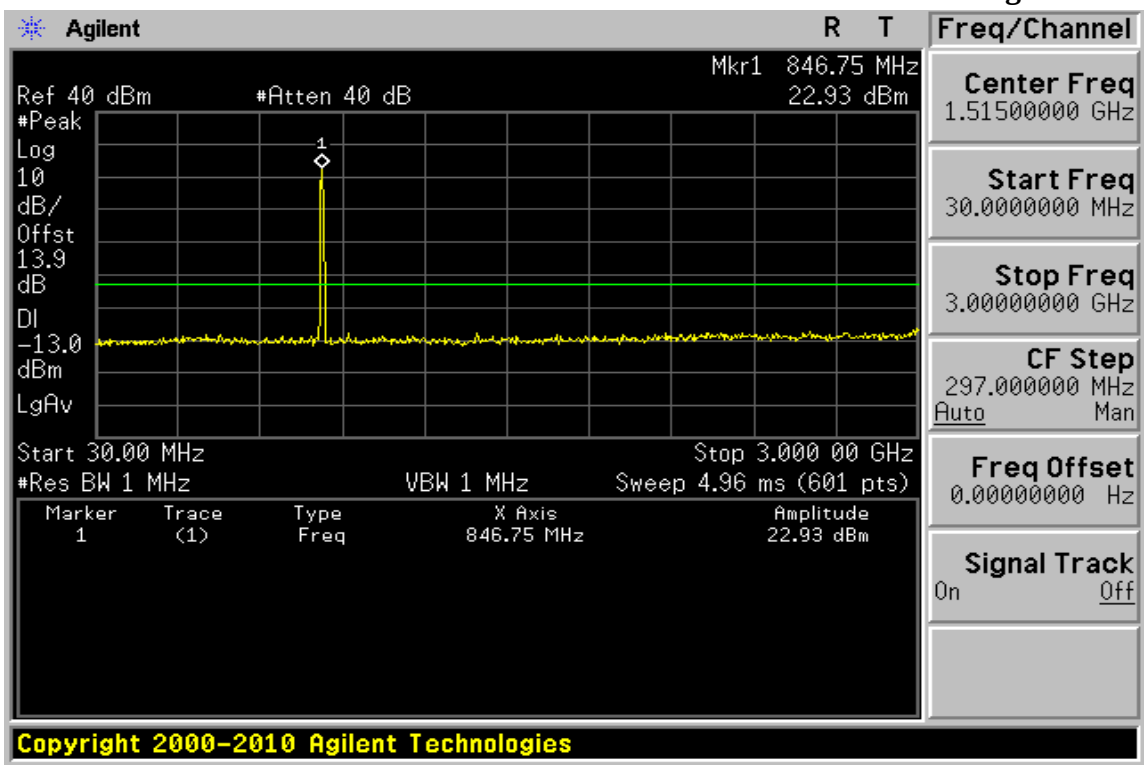


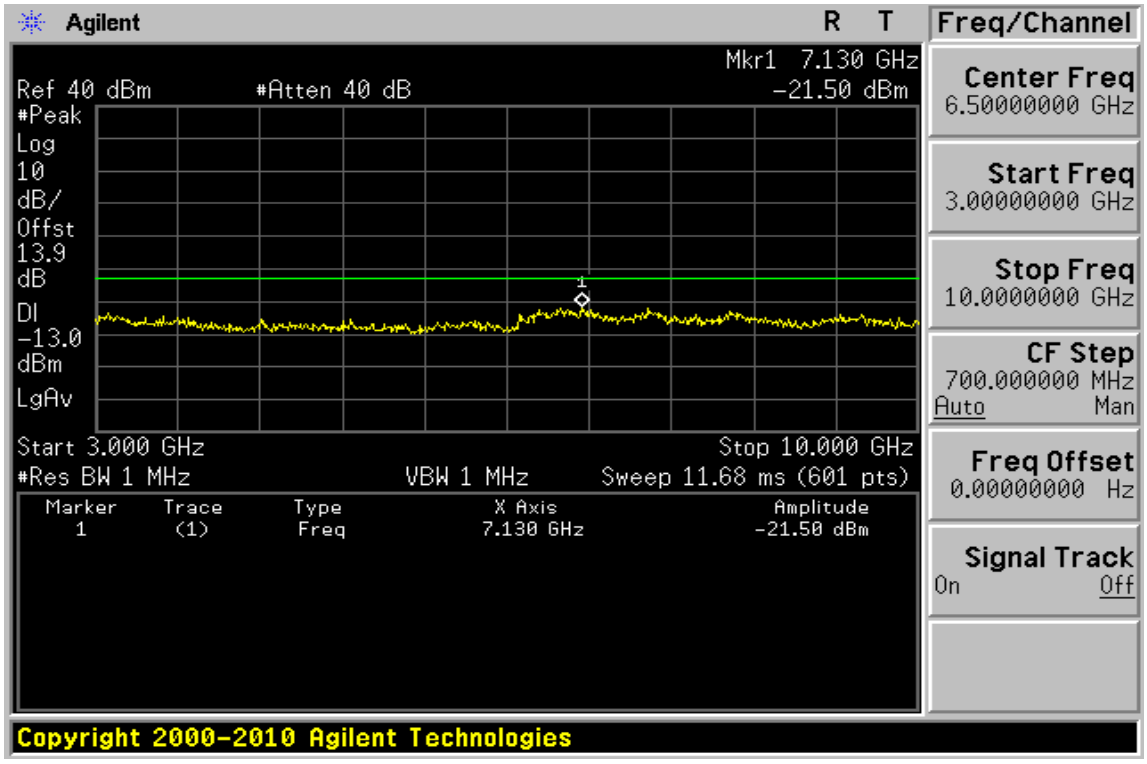
Out of Band emission at antenna terminals – HSUPA V Channel Mid



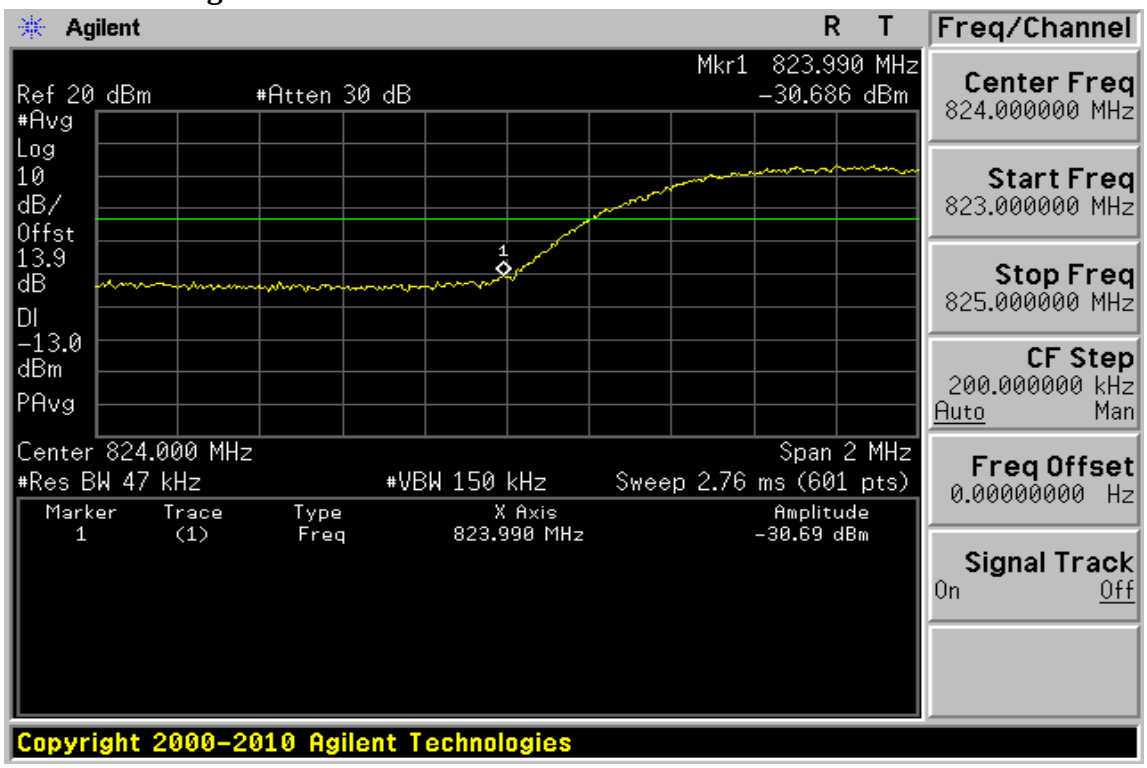


Out of Band emission at antenna terminals – HSUPA V Channel Highest

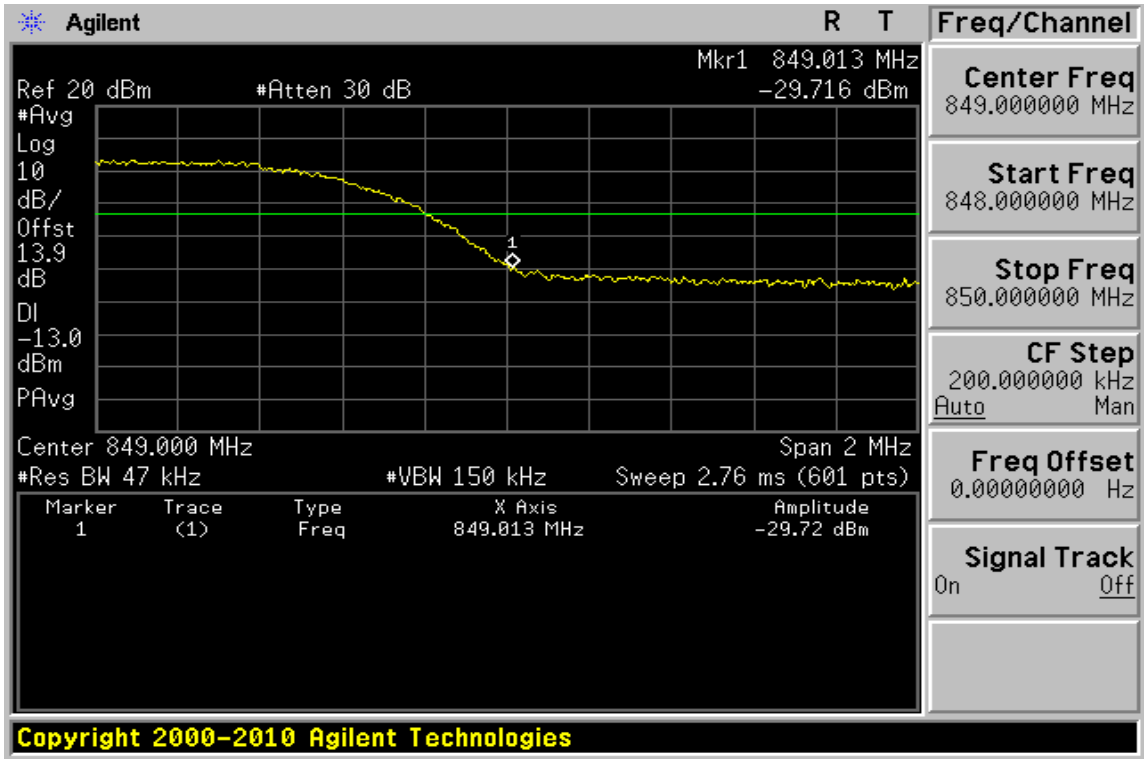




Band edge emission at antenna terminals – HSUPA V Channel Lowest



Band edge emission at antenna terminals – HSUPA V Channel Highest



10 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

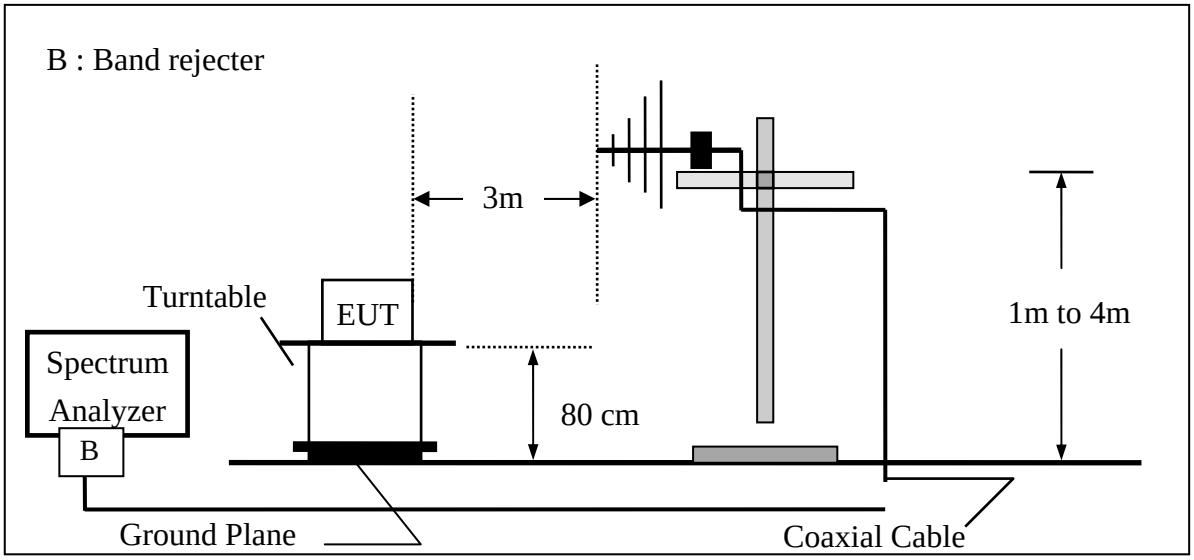
10.1 Standard Applicable:

According to FCC §2.1053,

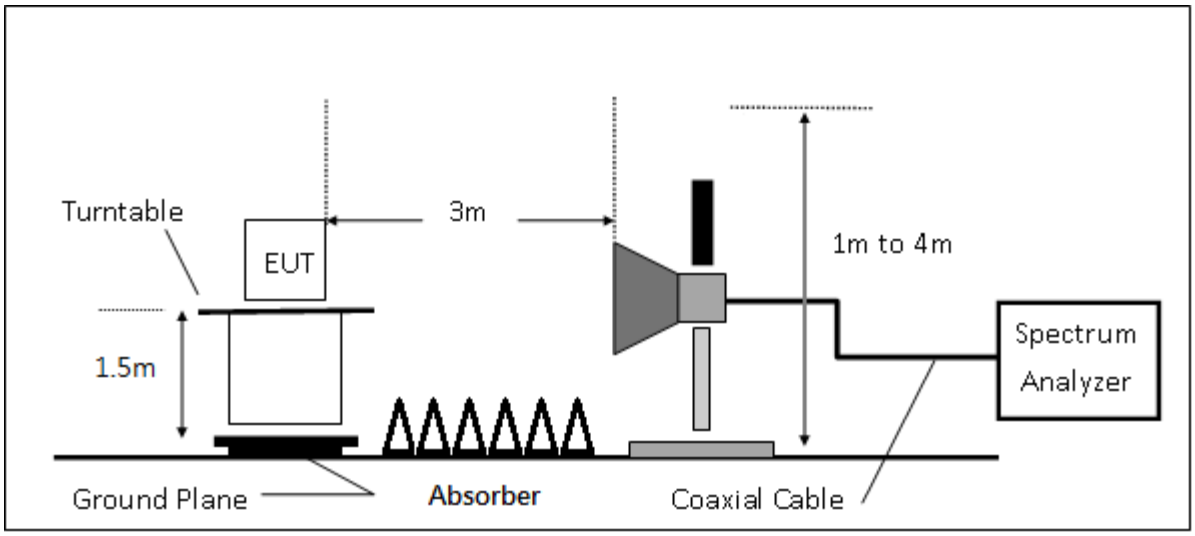
FCC §22.917(a),§24.238(a) , §27.53 (h) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

10.2 EUT Setup (Block Diagram of Configuration):

Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-UP Frequency Over 1 GHz



10.3 Measurement Procedure:

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

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

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

ERP= S.G. output (dBm) + Antenna Gain (dBd) + Cable Loss (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) +Cable Loss (dB)

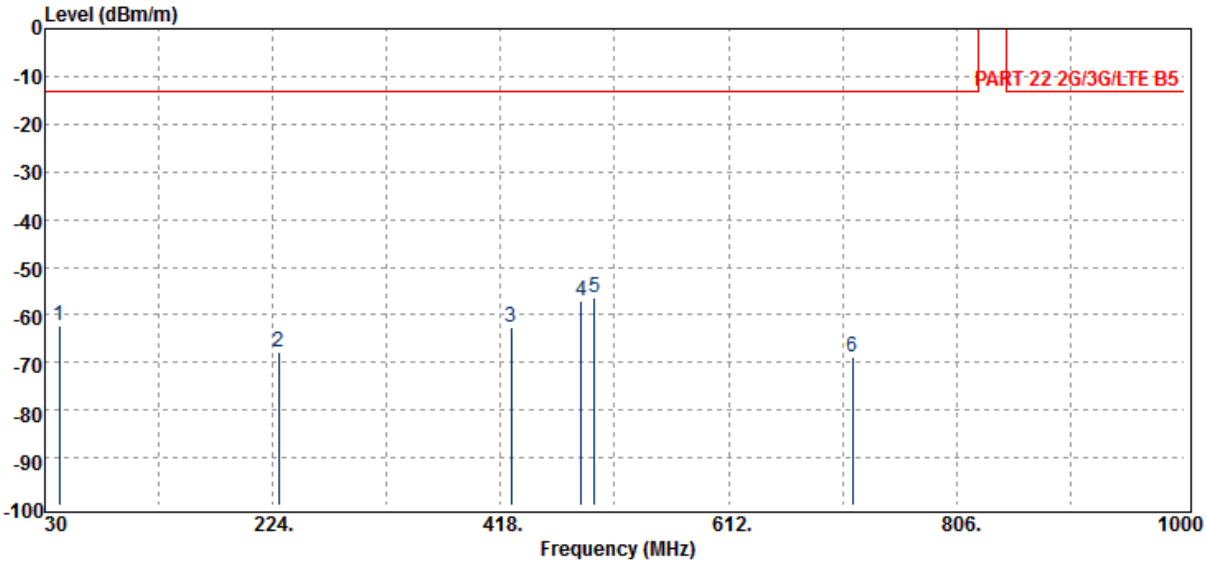
10.4 Measurement Equipment Used:

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015
Bilog Antenna	SCHWAZBECK	VULB9160	3158	10/31/2014	10/30/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015
Horn antenna	ETS.LINDGREN	3117	123991	12/19/2014	12/18/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015
Horn Antenna	Schwarzbeck	BBHA9170	185	07/29/2014	07/28/2015
Network Analyze	Anritsu	MS4644A	1216312	05/24/2014	05/23/2015
Signal Generator	Agilent	E4438C	MY45093613	08/06/2014	08/05/2015
Pre-Amplifier	Agilent	8447D	1937A02834	01/02/2015	01/01/2016
Pre-Amplifier	Agilent	8449B	3008A00578	01/02/2015	01/01/2016
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	966_Tx	10m	01/02/2015	01/01/2016
Low Loss Cable	HUBER+SUHNER	966_Rx	3m	01/02/2015	01/01/2016
Filter 800-1000	Micro-Tronics	EWT	M2	01/02/2015	01/01/2016
Filter 1800-2000	Micro-Tronics	EWT	M2	01/02/2015	01/01/2016
Filter 1700-1800	Micro-Tronics	BRC15751	001	01/02/2015	01/01/2016
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	01/02/2015	01/01/2016
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	01/02/2015	01/01/2016
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015

10.5 Measurement Result:

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

ARFCN	:CH 128	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

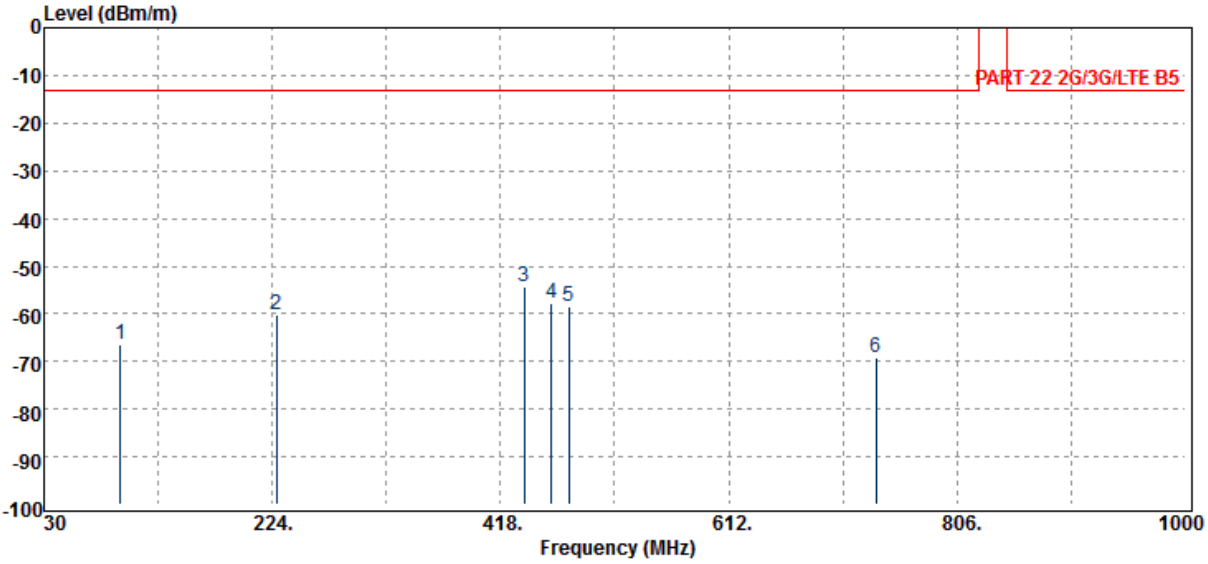


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
42.61	S	-62.32	-48.92	-12.55	-0.85	-13.00	-49.32
228.85	S	-67.97	-69.71	3.32	-1.58	-13.00	-54.97
426.73	S	-62.63	-64.11	3.47	-1.99	-13.00	-49.63
486.87	S	-56.92	-58.35	3.65	-2.22	-13.00	-43.92
497.54	S	-56.51	-57.97	3.74	-2.29	-13.00	-43.51
717.73	S	-68.75	-69.48	3.35	-2.62	-13.00	-55.75

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 128	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

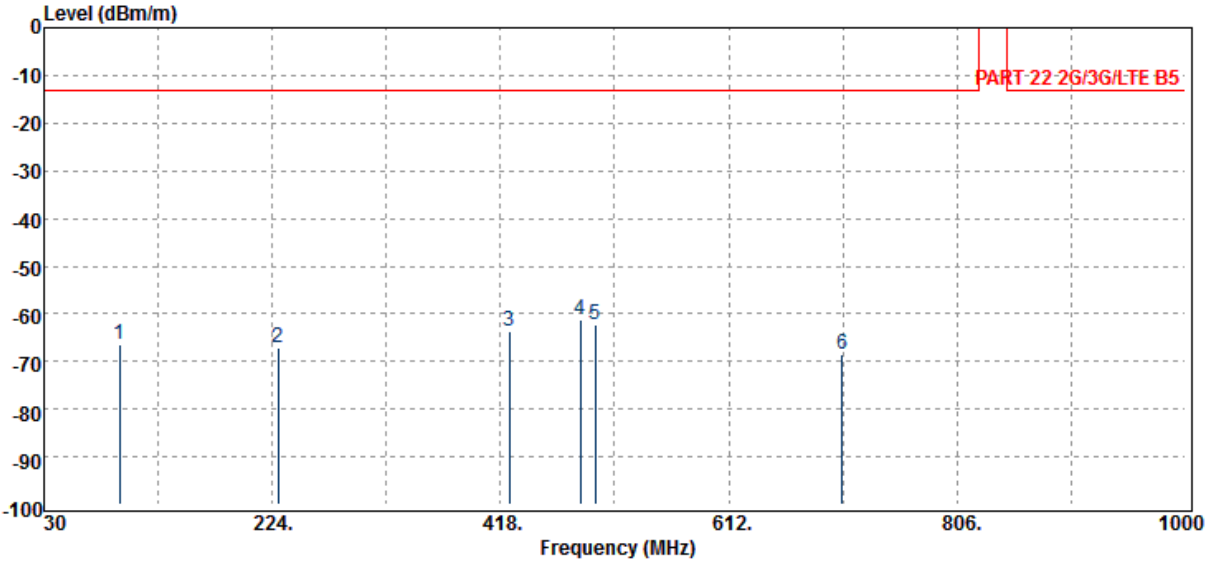


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
94.99	S	-66.32	-64.23	-0.99	-1.11	-13.00	-53.32
227.88	S	-60.11	-61.86	3.32	-1.57	-13.00	-47.11
438.37	S	-54.28	-55.66	3.41	-2.03	-13.00	-41.28
461.65	S	-57.92	-59.26	3.44	-2.10	-13.00	-44.92
476.20	S	-58.34	-59.75	3.57	-2.16	-13.00	-45.34
737.13	S	-69.25	-69.89	3.31	-2.67	-13.00	-56.25

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 190	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:836.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

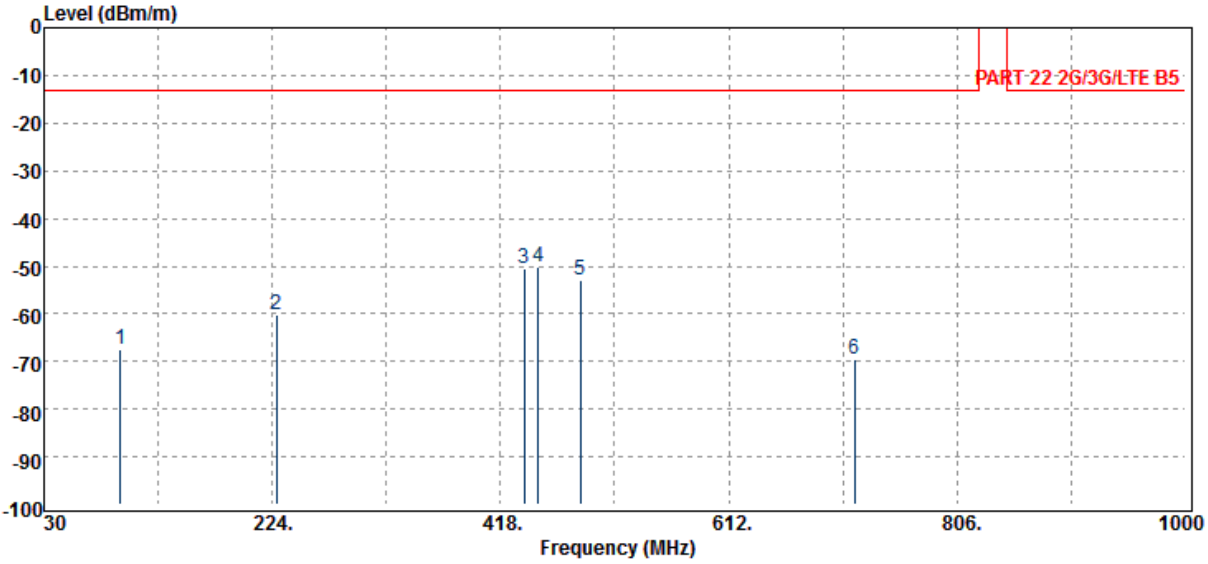


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
94.02	S	-66.27	-64.28	-0.89	-1.10	-13.00	-53.27
228.85	S	-67.29	-69.03	3.32	-1.58	-13.00	-54.29
425.76	S	-63.65	-65.13	3.47	-1.99	-13.00	-50.65
485.90	S	-61.25	-62.67	3.65	-2.22	-13.00	-48.25
498.51	S	-62.29	-63.74	3.75	-2.29	-13.00	-49.29
708.03	S	-68.47	-69.23	3.37	-2.60	-13.00	-55.47

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 190	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:836.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

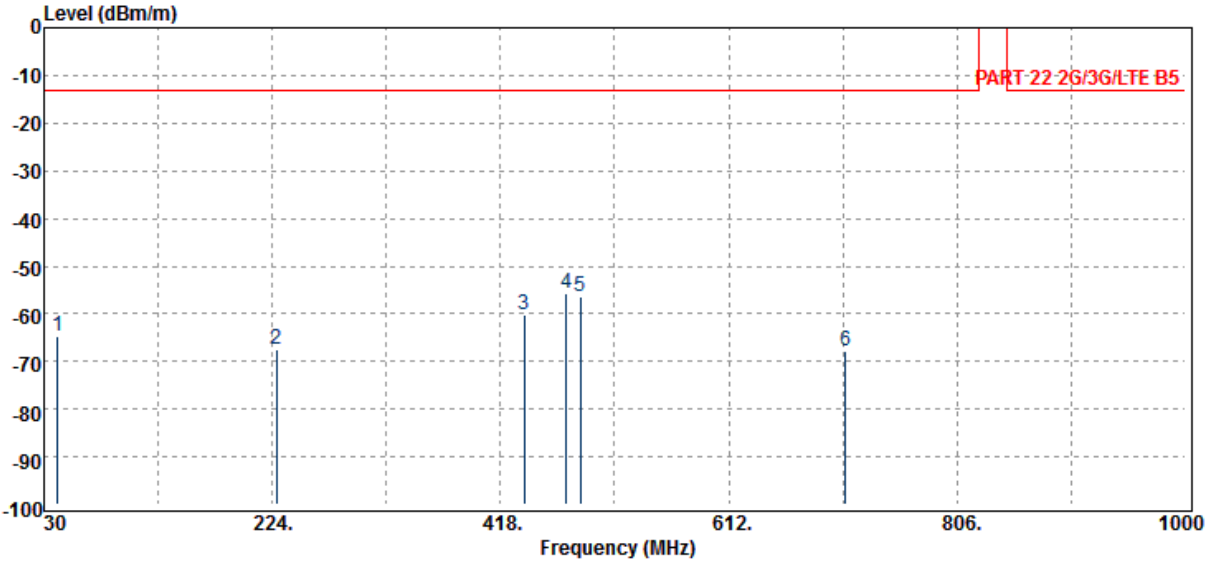


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
94.99	S	-67.63	-65.54	-0.99	-1.11	-13.00	-54.63
227.88	S	-60.25	-61.99	3.32	-1.57	-13.00	-47.25
438.37	S	-50.56	-51.93	3.41	-2.03	-13.00	-37.56
450.01	S	-50.22	-51.50	3.34	-2.07	-13.00	-37.22
485.90	S	-52.86	-54.29	3.65	-2.22	-13.00	-39.86
718.70	S	-69.48	-70.20	3.34	-2.62	-13.00	-56.48

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 251	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:848.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

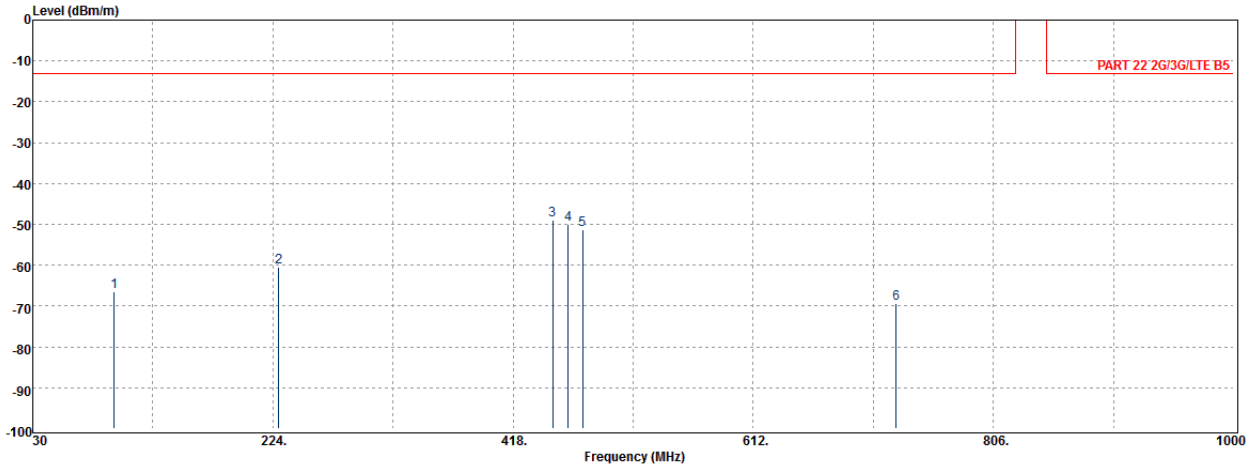


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
41.64	S	-64.71	-51.24	-12.63	-0.84	-13.00	-51.71
227.88	S	-67.62	-69.36	3.32	-1.57	-13.00	-54.62
438.37	S	-60.11	-61.49	3.41	-2.03	-13.00	-47.11
474.26	S	-55.72	-57.12	3.55	-2.15	-13.00	-42.72
485.90	S	-56.34	-57.77	3.65	-2.22	-13.00	-43.34
710.94	S	-67.69	-68.44	3.36	-2.60	-13.00	-54.69

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 251	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:848.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

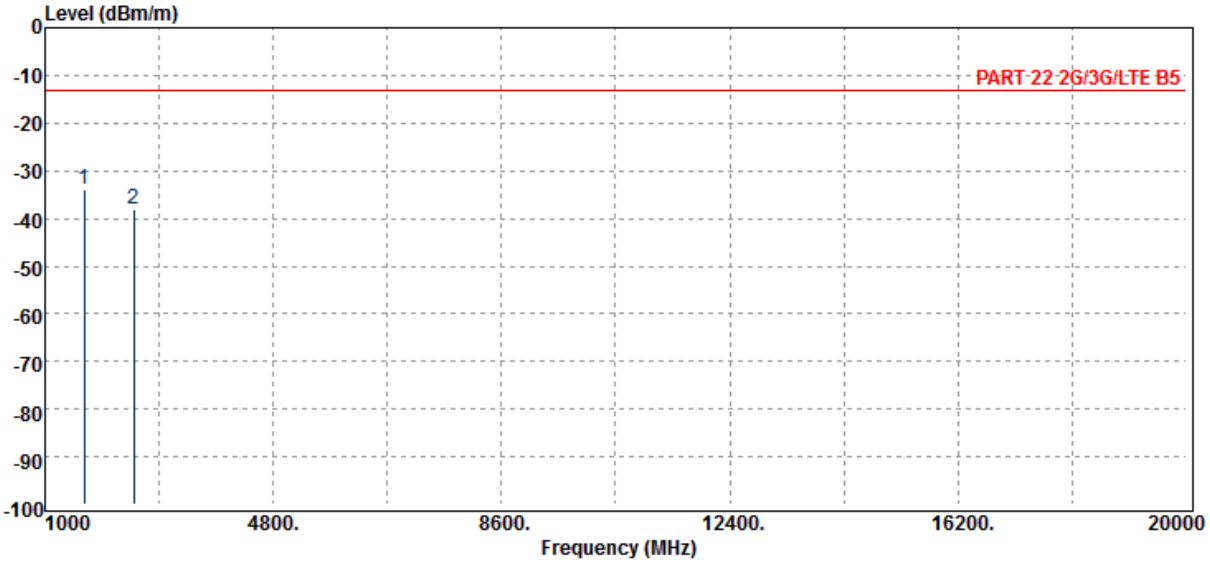


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
95.96	S	-66.54	-64.33	-1.10	-1.11	-13.00	-53.54
228.85	S	-60.47	-62.21	3.32	-1.58	-13.00	-47.47
450.01	S	-48.92	-50.20	3.34	-2.07	-13.00	-35.92
462.62	S	-49.96	-51.31	3.45	-2.10	-13.00	-36.96
474.26	S	-51.22	-52.62	3.55	-2.15	-13.00	-38.22
727.43	S	-69.33	-70.02	3.33	-2.64	-13.00	-56.33

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 128	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

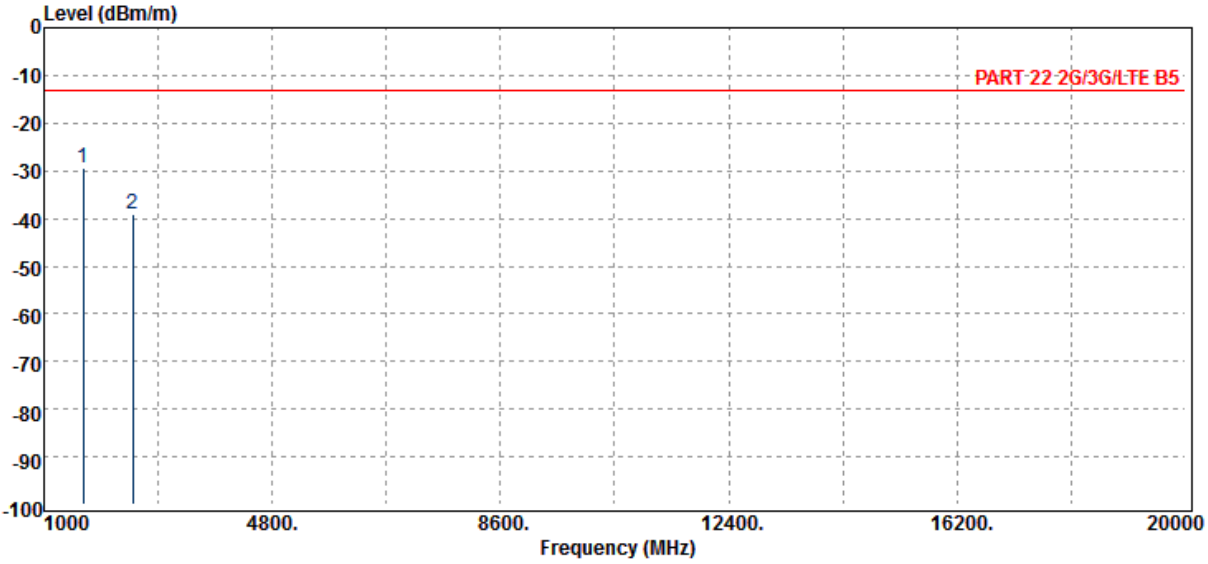


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1648.40	H	-34.01	-35.00	5.20	-4.21	-13.00	-21.01
2472.60	H	-38.01	-38.43	5.74	-5.32	-13.00	-25.01

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 128	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:824.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

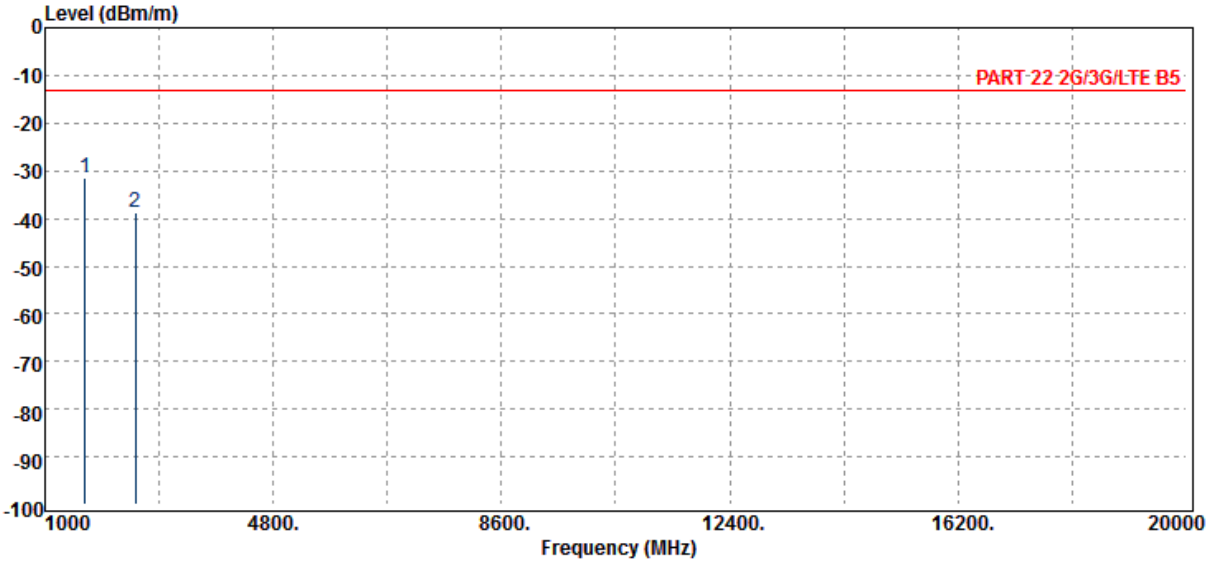


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1648.40	H	-29.35	-30.34	5.20	-4.21	-13.00	-16.35
2472.60	H	-39.14	-39.56	5.74	-5.32	-13.00	-26.14

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 190	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:836.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

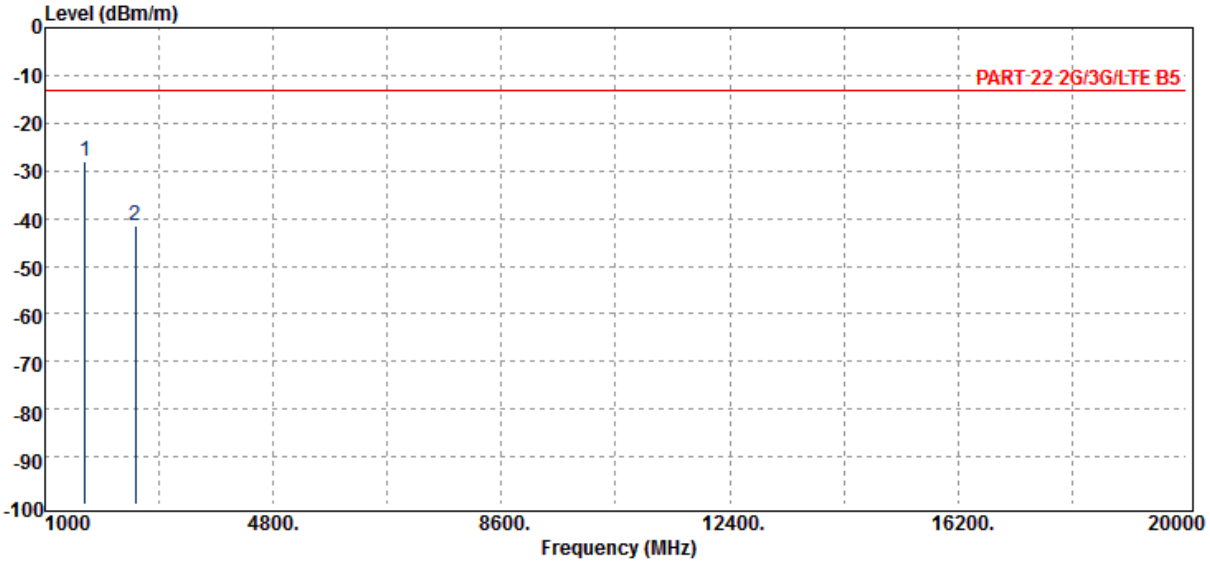


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1673.20	H	-31.33	-32.23	5.16	-4.26	-13.00	-18.33
2509.80	H	-38.69	-39.16	5.82	-5.35	-13.00	-25.69

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 190	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:836.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

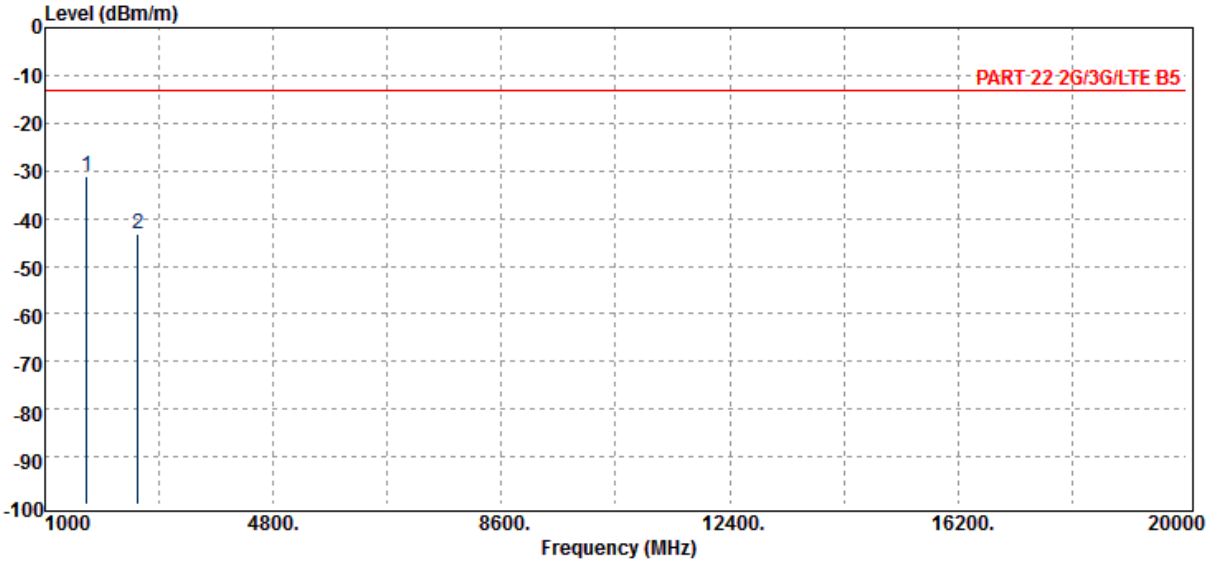


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1673.20	H	-27.91	-28.82	5.16	-4.26	-13.00	-14.91
2509.80	H	-41.53	-42.00	5.82	-5.35	-13.00	-28.53

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 251	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:848.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

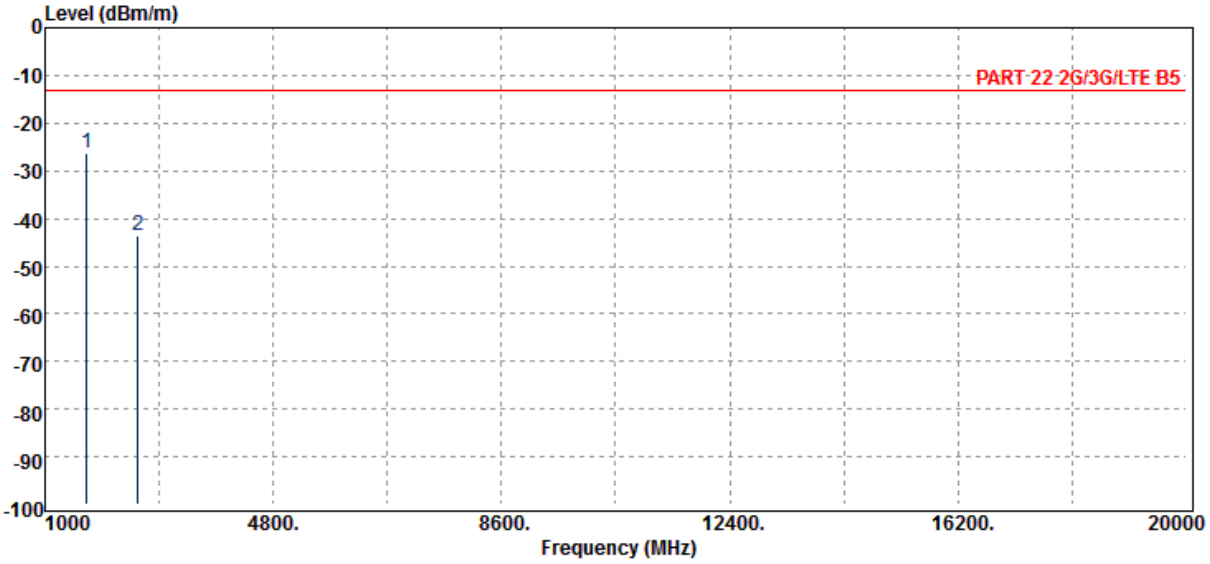


Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1697.60	H	-31.07	-31.91	5.11	-4.28	-13.00	-18.07
2546.40	H	-43.40	-43.90	5.90	-5.41	-13.00	-30.40

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 251	Test Date	:2015-03-20
Operation Band	:GPRS 850	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:848.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



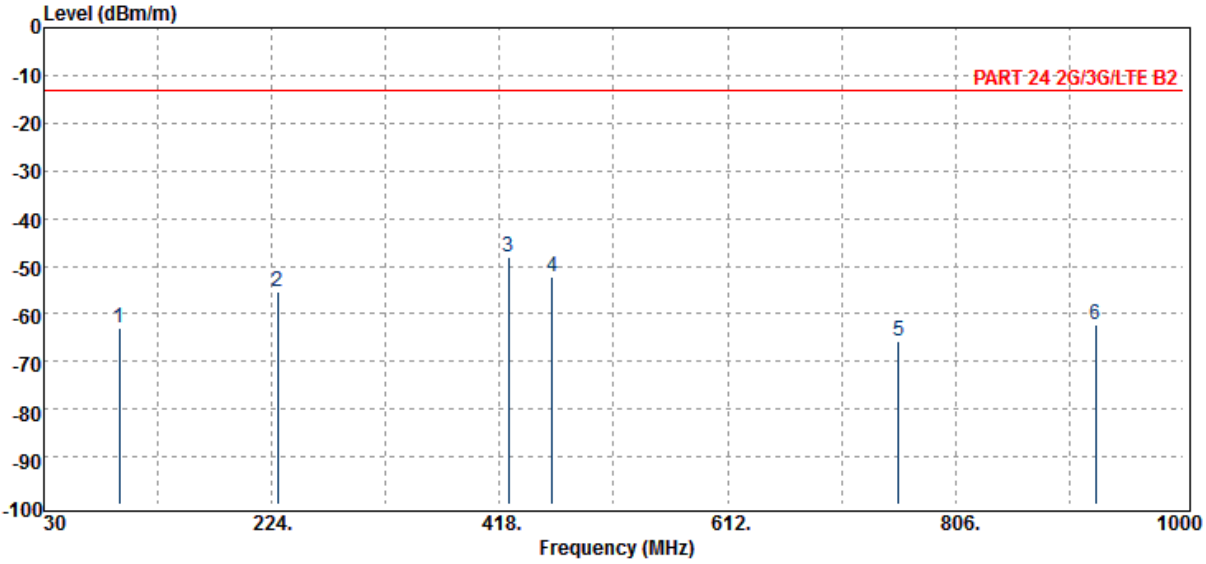
Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1697.60	H	-26.23	-27.06	5.11	-4.28	-13.00	-13.23
2546.40	H	-43.50	-43.99	5.90	-5.41	-13.00	-30.50

ERP(dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

ARFCN	:CH 512	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

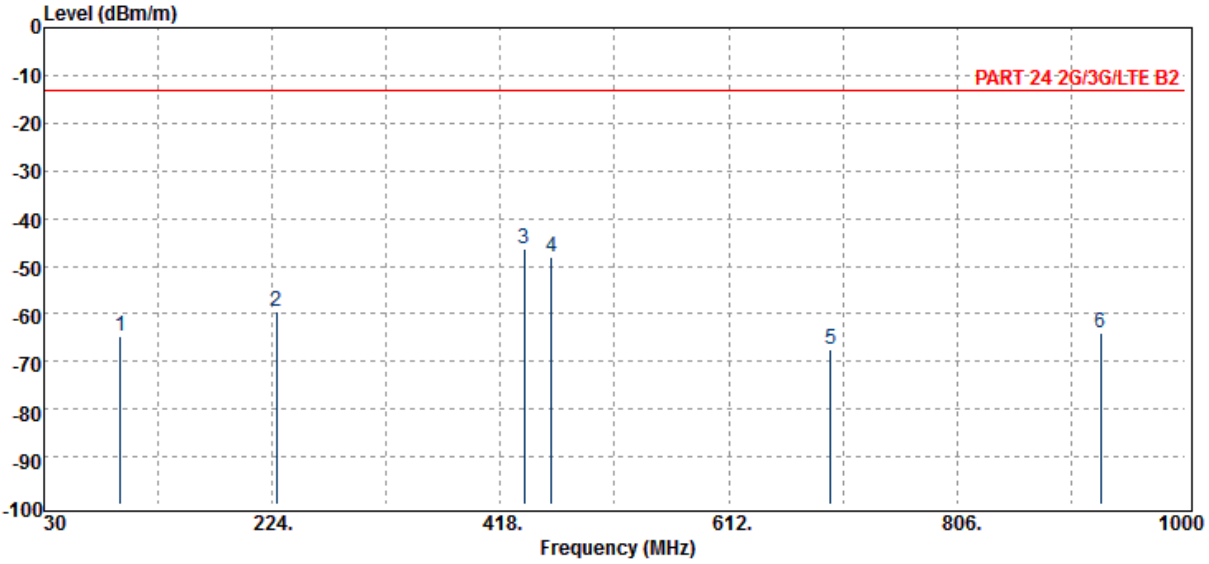


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.02	S	-62.82	-62.99	1.26	-1.10	-13.00	-49.82
228.85	S	-55.54	-59.43	5.47	-1.58	-13.00	-42.54
425.76	S	-48.00	-51.64	5.62	-1.99	-13.00	-35.00
462.62	S	-52.40	-55.90	5.60	-2.10	-13.00	-39.40
757.50	S	-65.74	-68.48	5.46	-2.71	-13.00	-52.74
925.31	S	-62.19	-64.43	5.40	-3.17	-13.00	-49.19

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 512	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

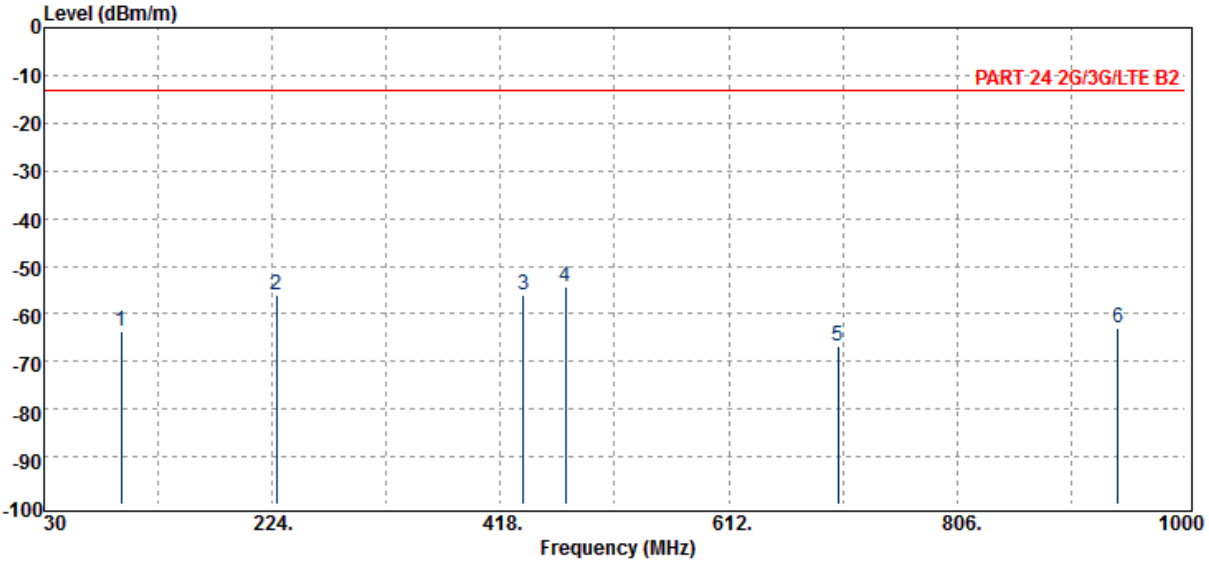


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.99	S	-64.81	-64.86	1.16	-1.11	-13.00	-51.81
227.88	S	-59.37	-63.26	5.47	-1.57	-13.00	-46.37
438.37	S	-46.51	-50.04	5.56	-2.03	-13.00	-33.51
461.65	S	-48.03	-51.52	5.59	-2.10	-13.00	-35.03
698.33	S	-67.31	-70.24	5.54	-2.61	-13.00	-54.31
928.22	S	-64.00	-66.22	5.40	-3.17	-13.00	-51.00

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 661	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

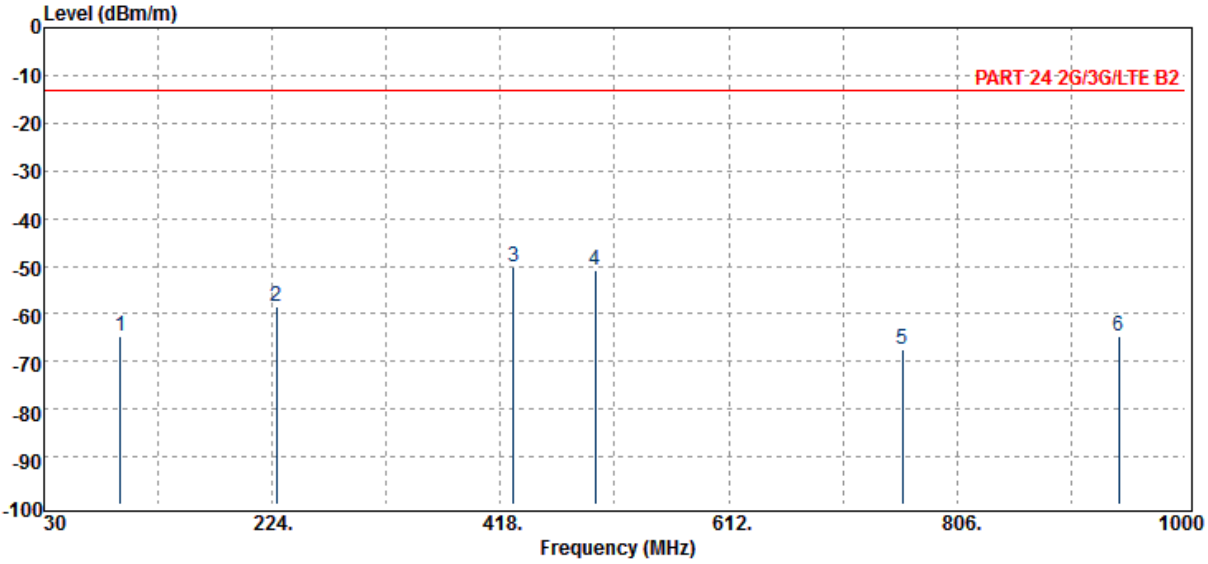


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
95.96	S	-63.57	-63.52	1.05	-1.11	-13.00	-50.57
227.88	S	-56.22	-60.11	5.47	-1.57	-13.00	-43.22
437.40	S	-56.09	-59.62	5.56	-2.03	-13.00	-43.09
473.29	S	-54.45	-58.00	5.69	-2.14	-13.00	-41.45
705.12	S	-66.64	-69.56	5.52	-2.60	-13.00	-53.64
942.77	S	-63.09	-65.28	5.39	-3.19	-13.00	-50.09

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 661	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

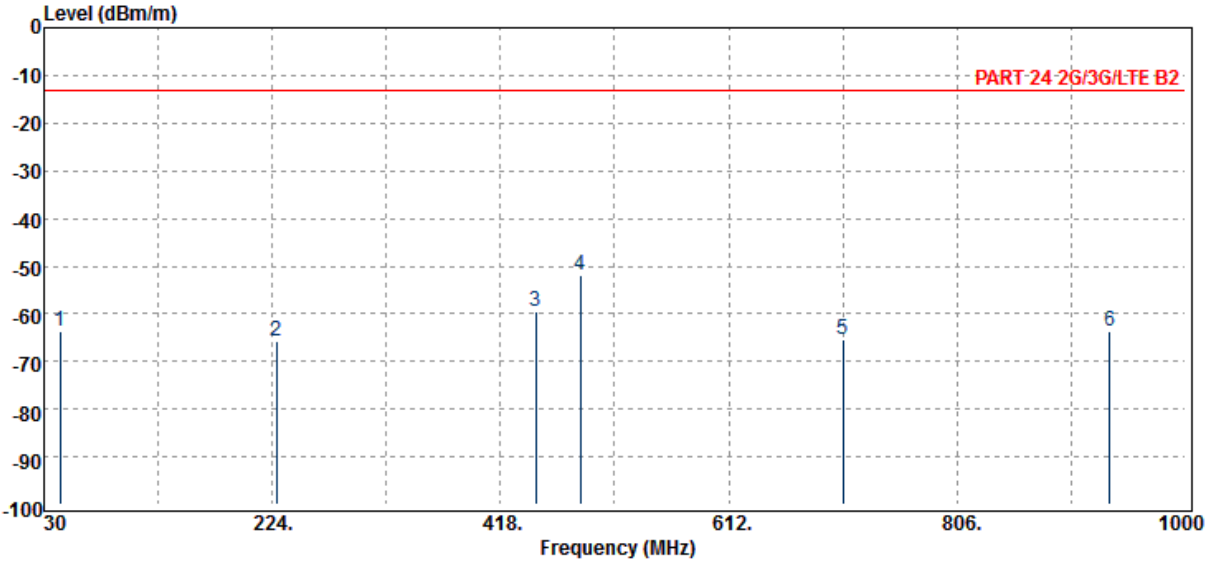


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.99	S	-64.85	-64.91	1.16	-1.11	-13.00	-51.85
227.88	S	-58.59	-62.48	5.47	-1.57	-13.00	-45.59
428.67	S	-50.30	-53.91	5.61	-2.00	-13.00	-37.30
498.51	S	-50.92	-54.52	5.90	-2.29	-13.00	-37.92
759.44	S	-67.46	-70.20	5.46	-2.72	-13.00	-54.46
943.74	S	-64.63	-66.83	5.39	-3.19	-13.00	-51.63

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 810	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

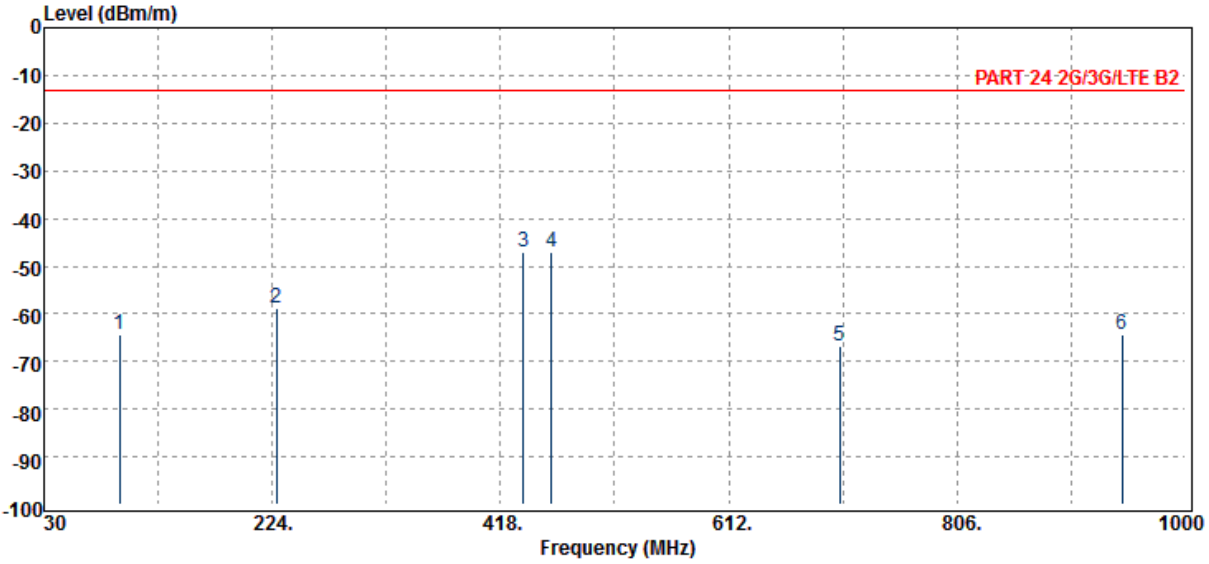


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
43.58	S	-63.79	-52.61	-10.32	-0.86	-13.00	-50.79
227.88	S	-65.77	-69.66	5.47	-1.57	-13.00	-52.77
448.07	S	-59.43	-62.87	5.50	-2.06	-13.00	-46.43
485.90	S	-51.94	-55.52	5.80	-2.22	-13.00	-38.94
709.00	S	-65.56	-68.48	5.51	-2.60	-13.00	-52.56
935.98	S	-63.50	-65.71	5.39	-3.18	-13.00	-50.50

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 810	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

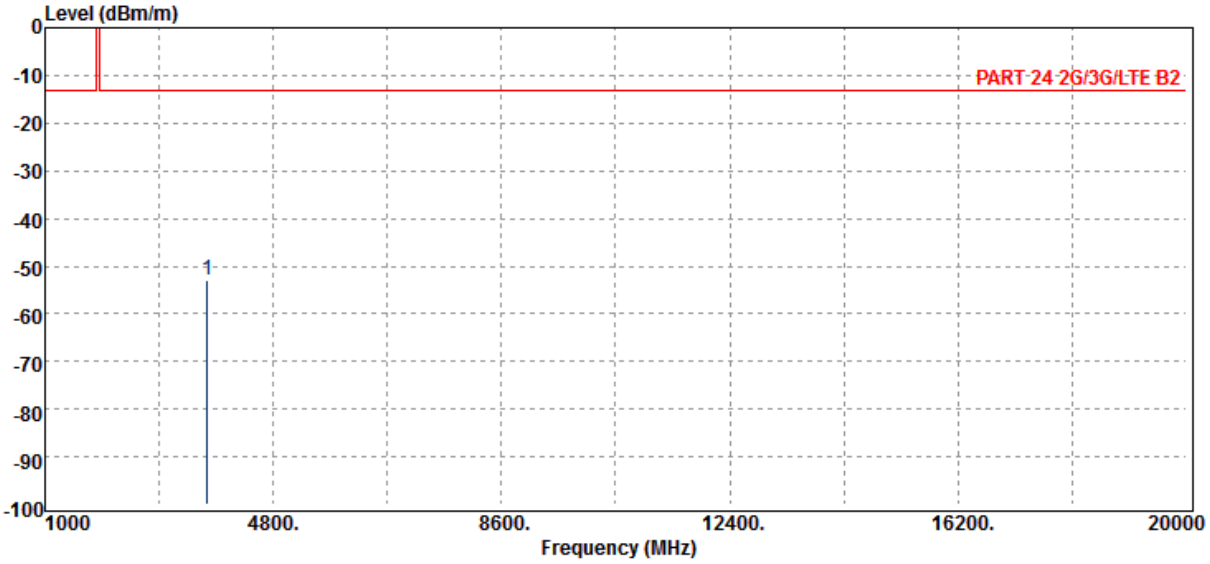


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.02	S	-64.45	-64.62	1.26	-1.10	-13.00	-51.45
227.88	S	-58.89	-62.78	5.47	-1.57	-13.00	-45.89
437.40	S	-47.07	-50.60	5.56	-2.03	-13.00	-34.07
461.65	S	-47.22	-50.71	5.59	-2.10	-13.00	-34.22
706.09	S	-66.64	-69.56	5.52	-2.60	-13.00	-53.64
946.65	S	-64.41	-66.60	5.39	-3.20	-13.00	-51.41

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 512	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

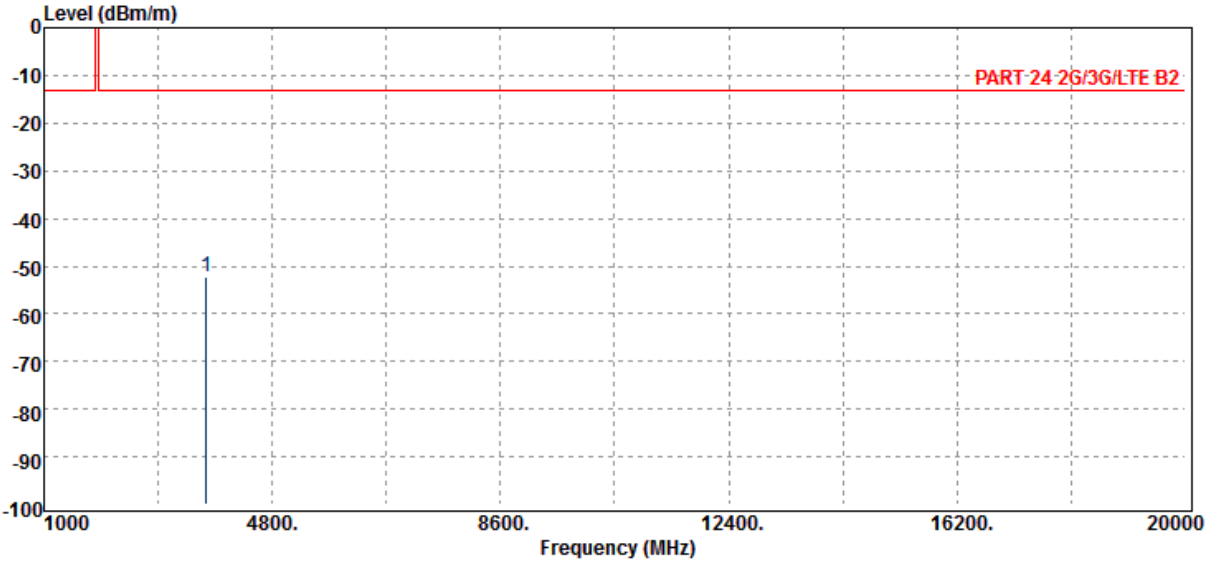


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3700.40	H	-52.87	-54.42	8.43	-6.88	-13.00	-39.87

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 512	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1850.2 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

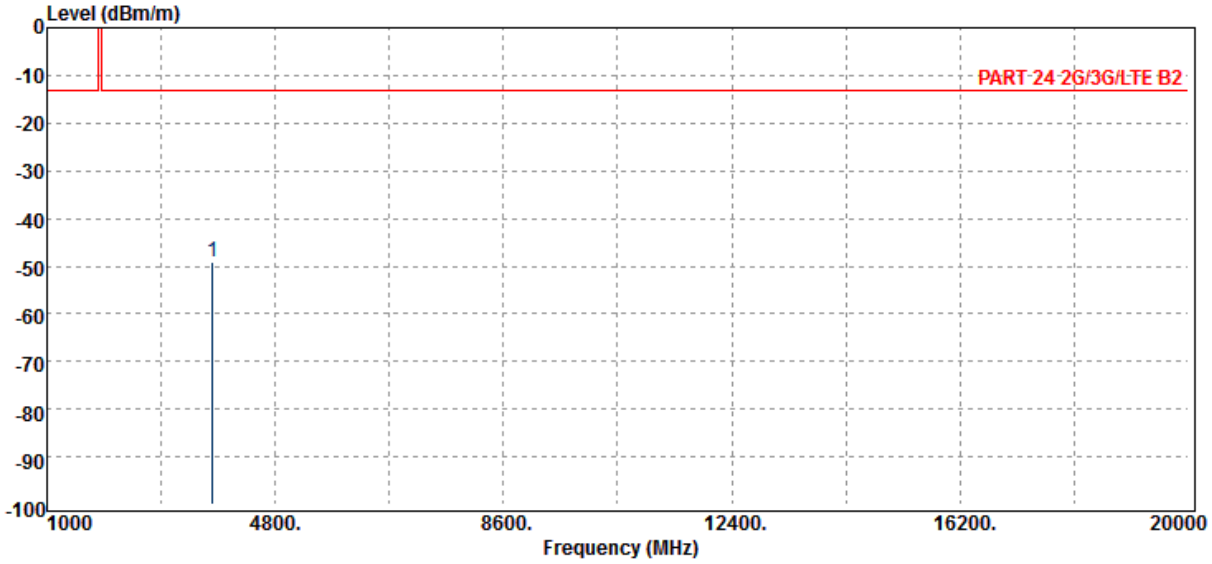


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3700.40	H	-52.30	-53.85	8.43	-6.88	-13.00	-39.30

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 661	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

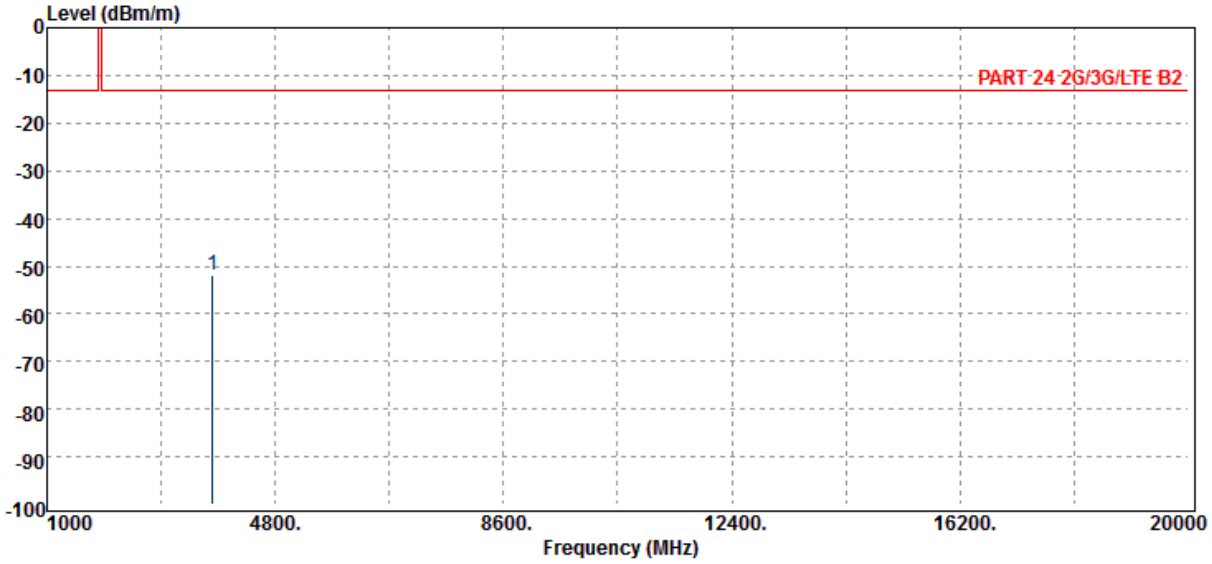


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3760.00	H	-49.06	-50.50	8.46	-7.02	-13.00	-36.06

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 661	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

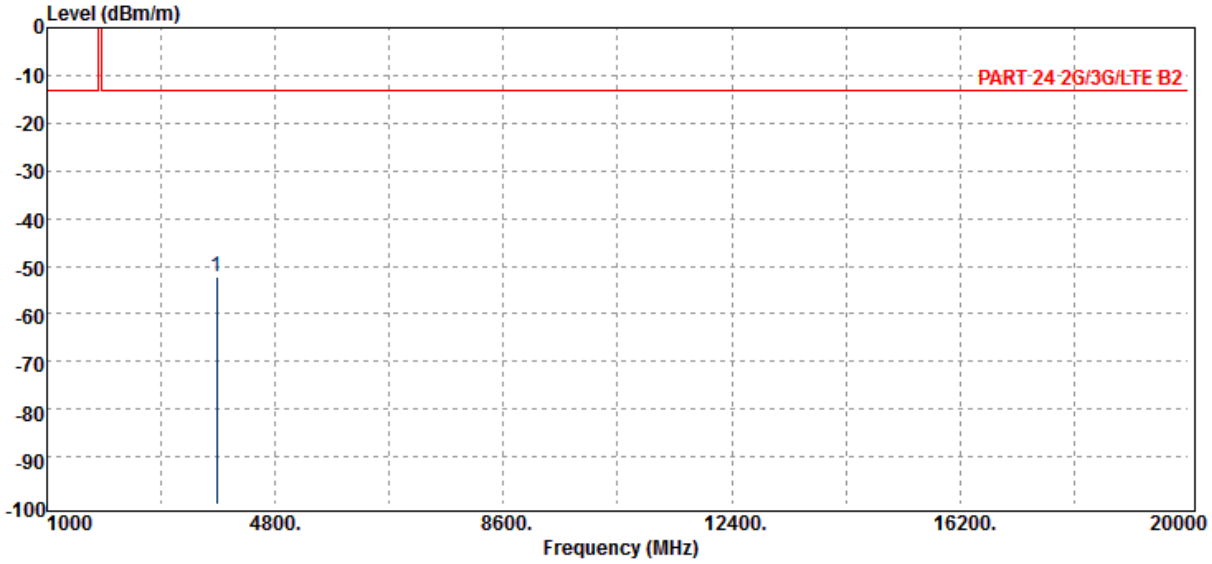


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3760.00	H	-51.74	-53.18	8.46	-7.02	-13.00	-38.74

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 810	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

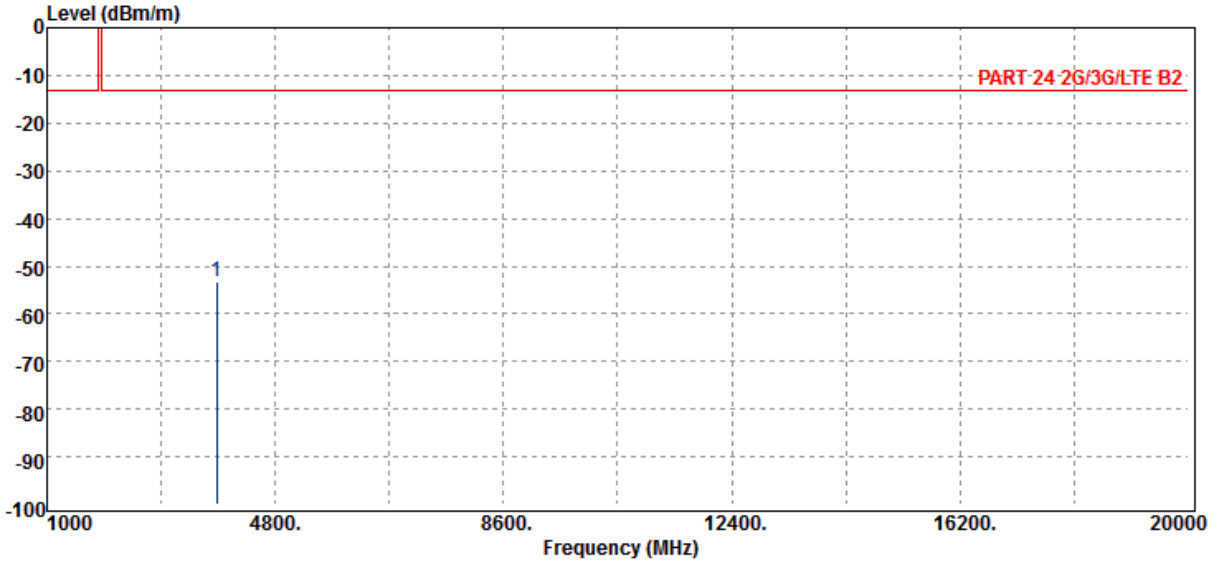


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3819.60	H	-52.41	-53.85	8.50	-7.05	-13.00	-39.41

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 810	Test Date	:2015-03-20
Operation Band	:GPRS 1900	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1909.8 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



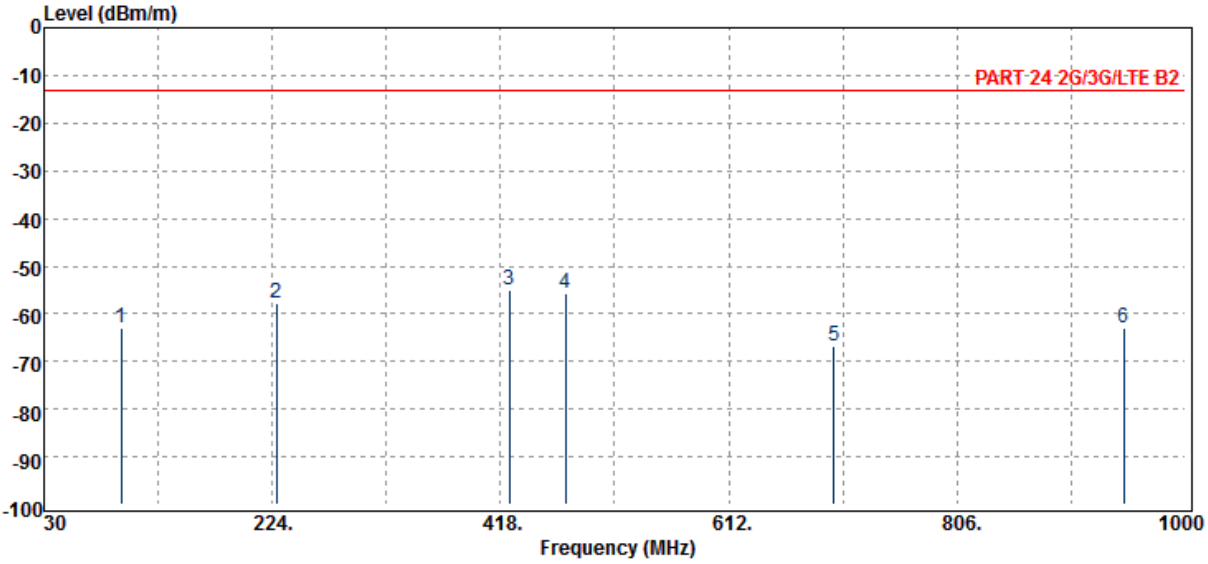
Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3819.60	H	-53.38	-54.83	8.50	-7.05	-13.00	-40.38

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Radiated Spurious Emission Measurement Result: HSDPA B2 Mode

ARFCN	:CH 9262	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

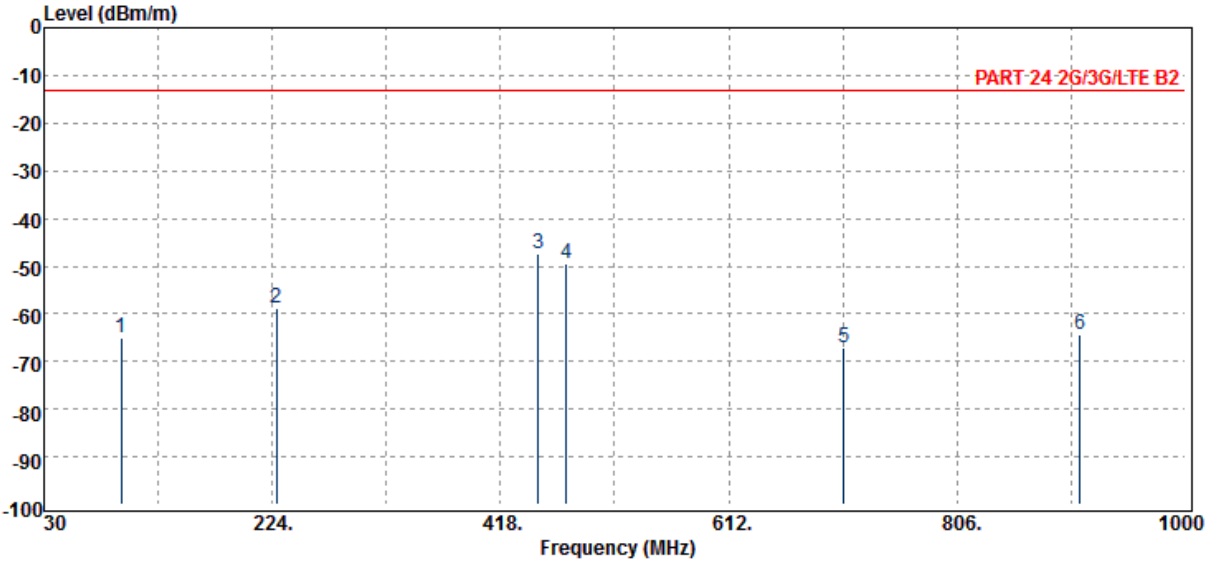


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
95.96	S	-62.88	-62.83	1.05	-1.11	-13.00	-49.88
227.88	S	-57.86	-61.75	5.47	-1.57	-13.00	-44.86
425.76	S	-55.16	-58.79	5.62	-1.99	-13.00	-42.16
473.29	S	-55.67	-59.22	5.69	-2.14	-13.00	-42.67
701.24	S	-66.63	-69.55	5.53	-2.61	-13.00	-53.63
947.62	S	-62.92	-65.10	5.39	-3.20	-13.00	-49.92

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9262	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

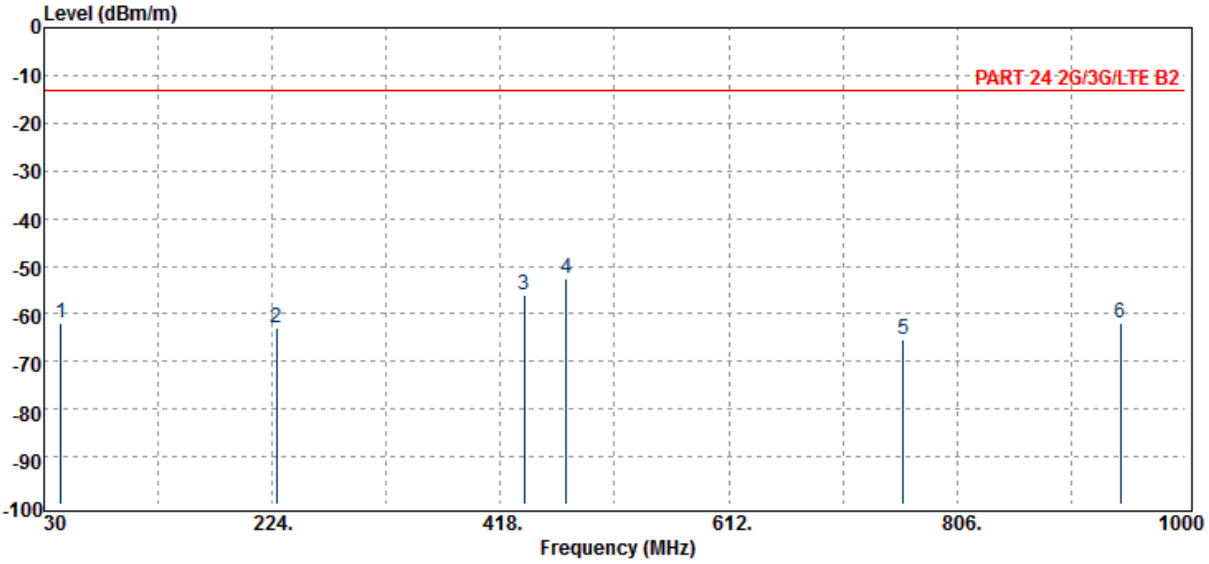


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
95.96	S	-64.97	-64.92	1.05	-1.11	-13.00	-51.97
227.88	S	-58.69	-62.58	5.47	-1.57	-13.00	-45.69
450.01	S	-47.26	-50.69	5.49	-2.07	-13.00	-34.26
474.26	S	-49.52	-53.07	5.70	-2.15	-13.00	-36.52
709.97	S	-67.25	-70.16	5.51	-2.60	-13.00	-54.25
910.76	S	-64.30	-66.57	5.41	-3.15	-13.00	-51.30

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9400	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

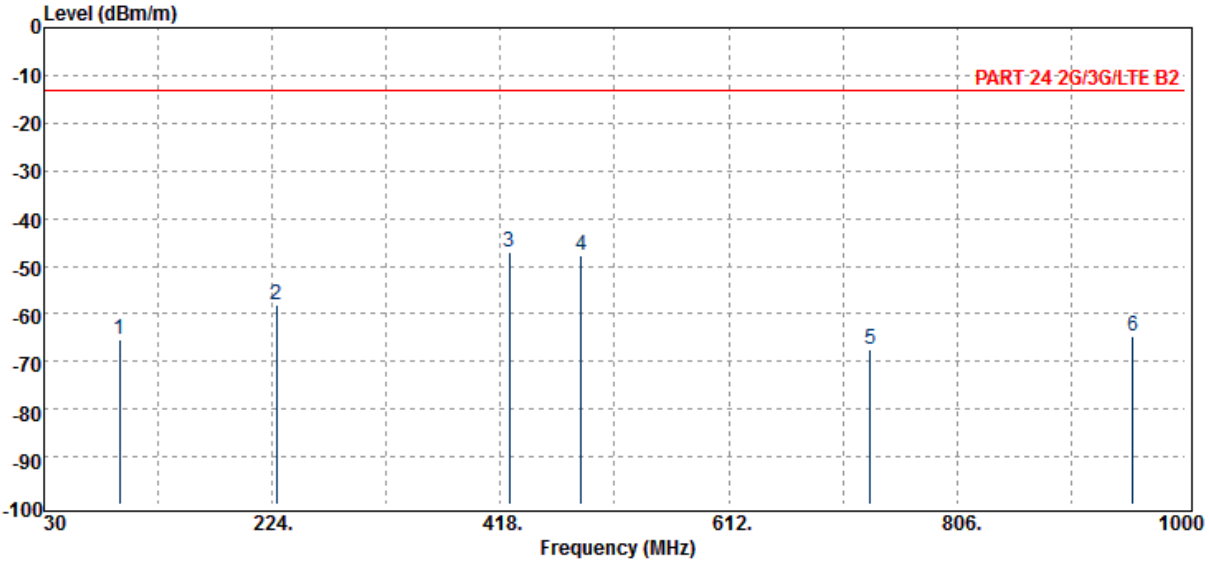


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
44.55	S	-61.82	-50.71	-10.24	-0.87	-13.00	-48.82
227.88	S	-62.93	-66.83	5.47	-1.57	-13.00	-49.93
438.37	S	-55.99	-59.52	5.56	-2.03	-13.00	-42.99
474.26	S	-52.68	-56.23	5.70	-2.15	-13.00	-39.68
760.41	S	-65.52	-68.27	5.47	-2.72	-13.00	-52.52
944.71	S	-61.88	-64.07	5.39	-3.20	-13.00	-48.88

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9400	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

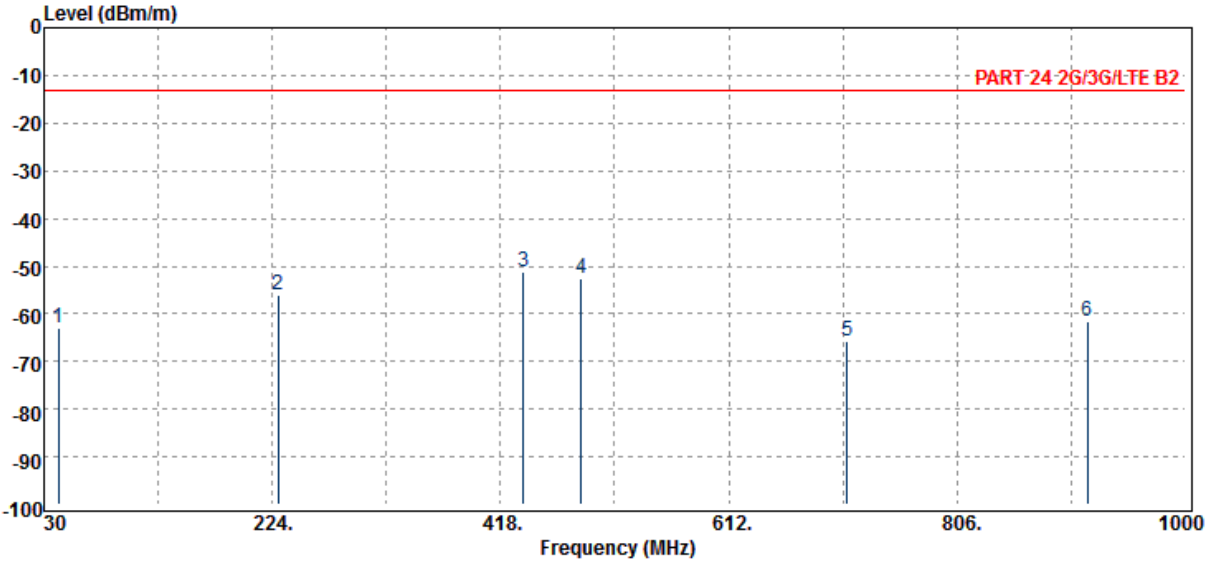


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.02	S	-65.25	-65.41	1.26	-1.10	-13.00	-52.25
227.88	S	-58.20	-62.09	5.47	-1.57	-13.00	-45.20
425.76	S	-46.95	-50.58	5.62	-1.99	-13.00	-33.95
486.87	S	-47.81	-51.39	5.80	-2.22	-13.00	-34.81
732.28	S	-67.53	-70.35	5.47	-2.65	-13.00	-54.53
955.38	S	-64.55	-66.37	5.02	-3.21	-13.00	-51.55

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9538	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1907.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

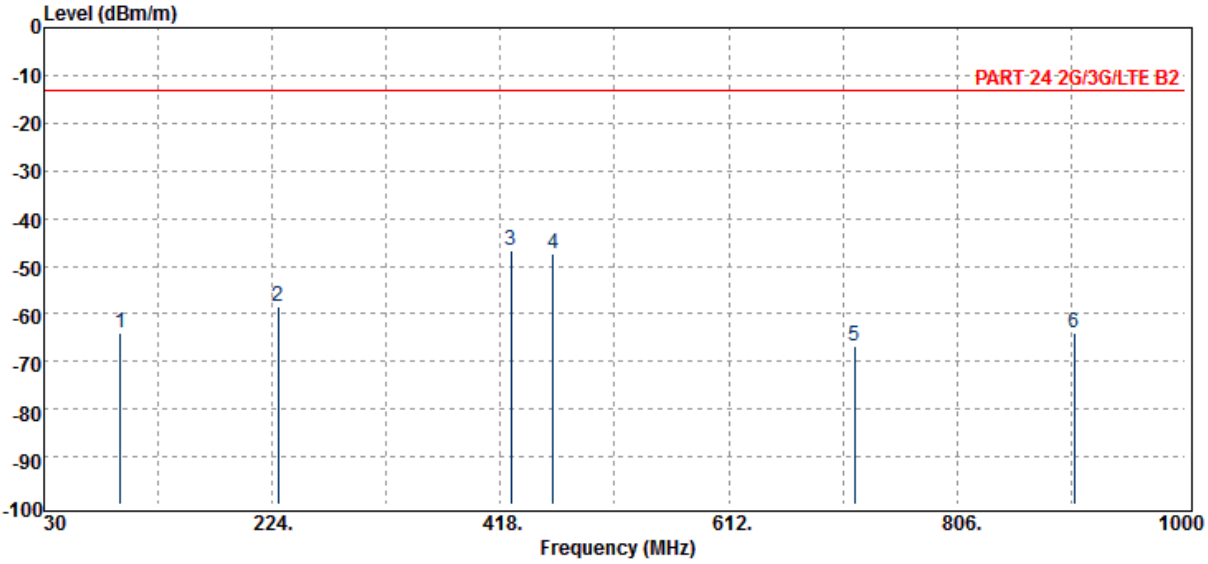


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
42.61	S	-63.04	-51.78	-10.40	-0.85	-13.00	-50.04
228.85	S	-56.10	-59.99	5.47	-1.58	-13.00	-43.10
437.40	S	-51.25	-54.78	5.56	-2.03	-13.00	-38.25
486.87	S	-52.44	-56.02	5.80	-2.22	-13.00	-39.44
712.88	S	-65.90	-68.80	5.51	-2.61	-13.00	-52.90
916.58	S	-61.44	-63.69	5.40	-3.15	-13.00	-48.44

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9538	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1907.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

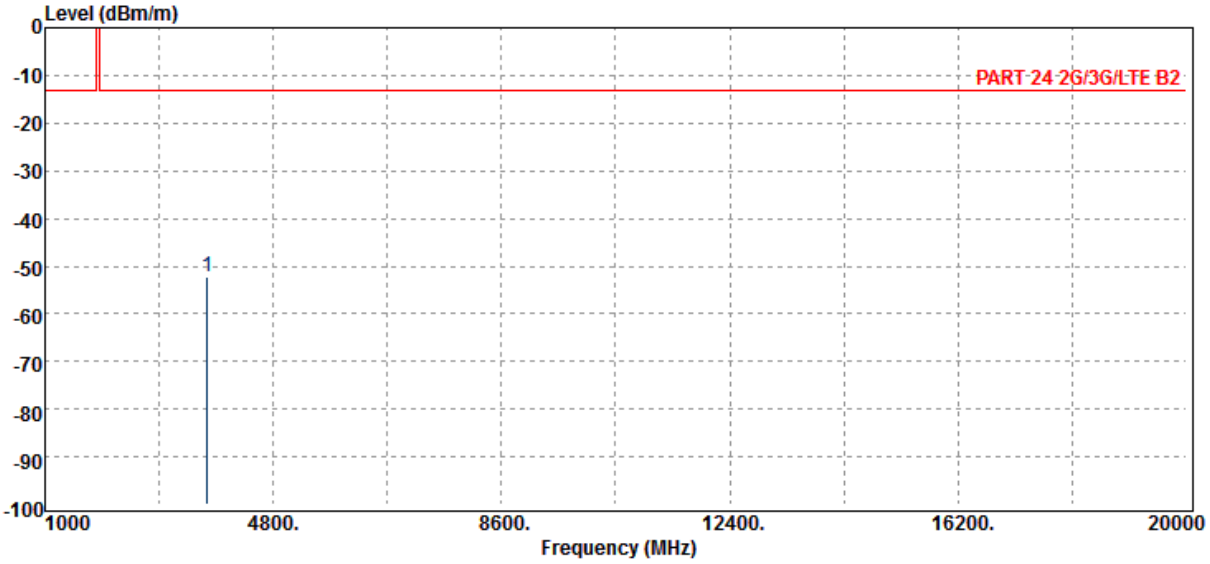


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.99	S	-64.08	-64.13	1.16	-1.11	-13.00	-51.08
228.85	S	-58.31	-62.20	5.47	-1.58	-13.00	-45.31
426.73	S	-46.61	-50.24	5.62	-1.99	-13.00	-33.61
462.62	S	-47.30	-50.80	5.60	-2.10	-13.00	-34.30
718.70	S	-66.83	-69.70	5.49	-2.62	-13.00	-53.83
905.91	S	-64.04	-66.31	5.41	-3.14	-13.00	-51.04

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9262	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

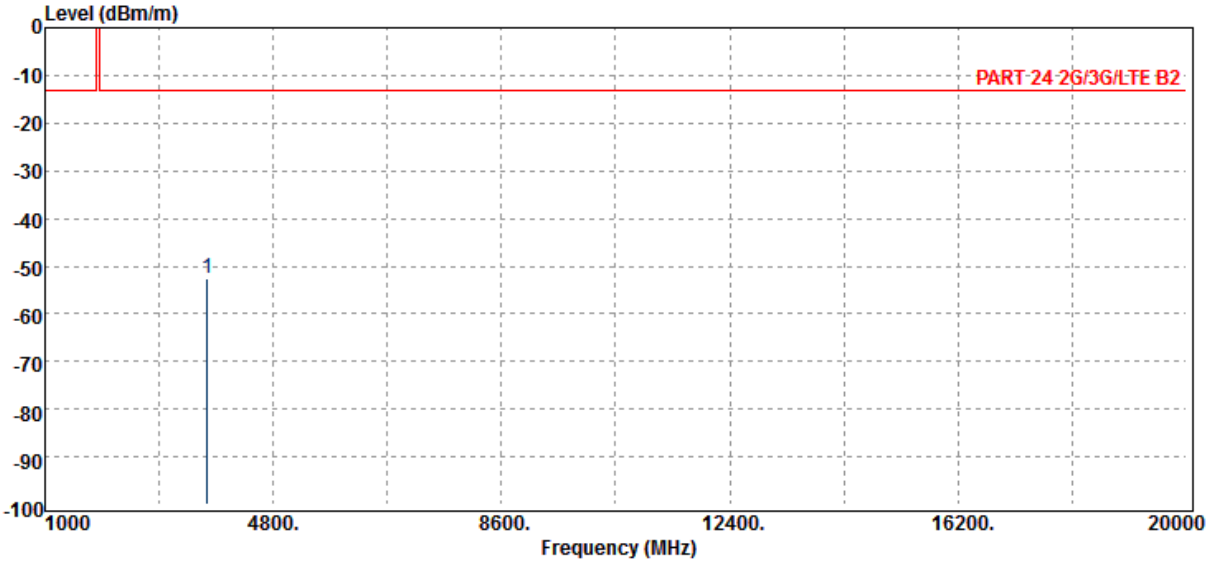


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3704.80	H	-52.19	-53.73	8.43	-6.89	-13.00	-39.19

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 9262	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1852.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

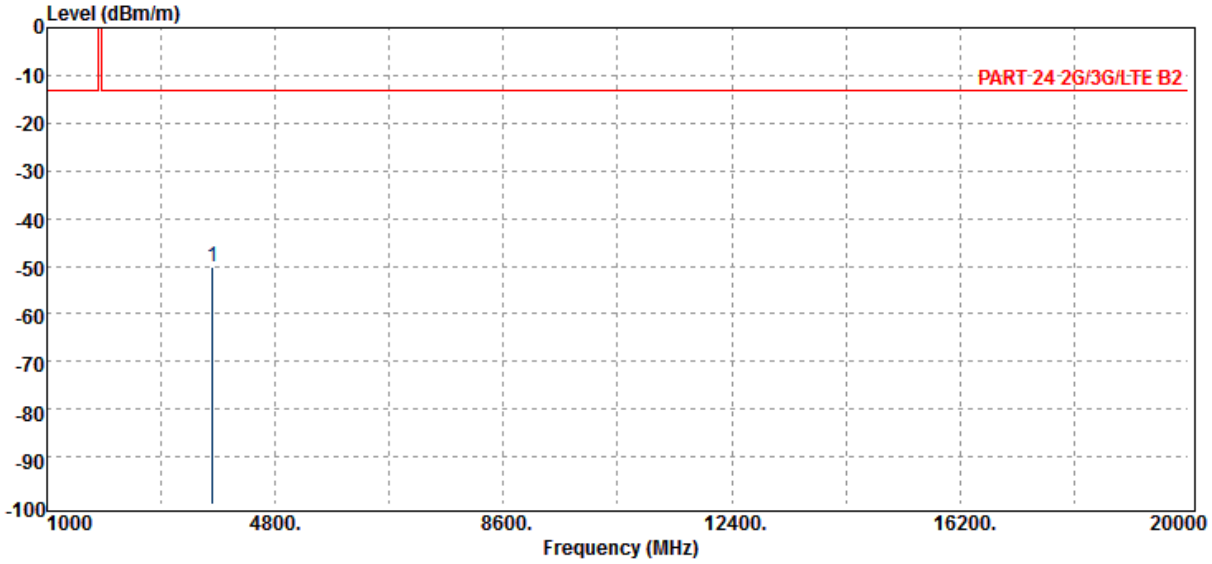


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3704.80	H	-52.57	-54.11	8.43	-6.89	-13.00	-39.57

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 9400	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

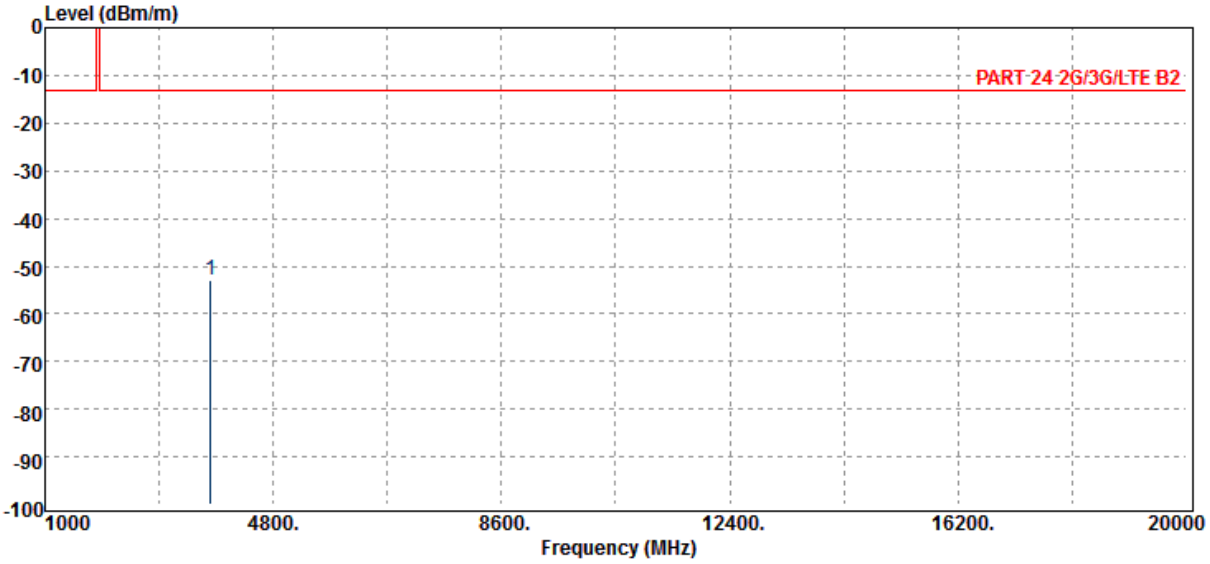


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3760.00	H	-50.27	-51.71	8.46	-7.02	-13.00	-37.27

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 9400	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1880 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

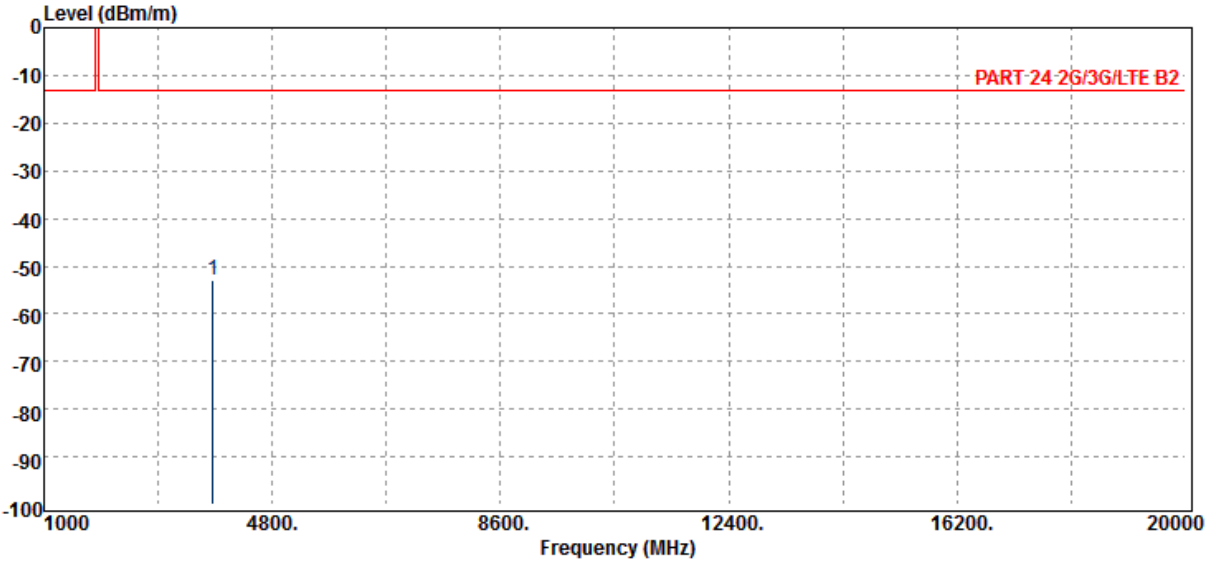


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3760.00	H	-52.98	-54.42	8.46	-7.02	-13.00	-39.98

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 9538	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1907.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

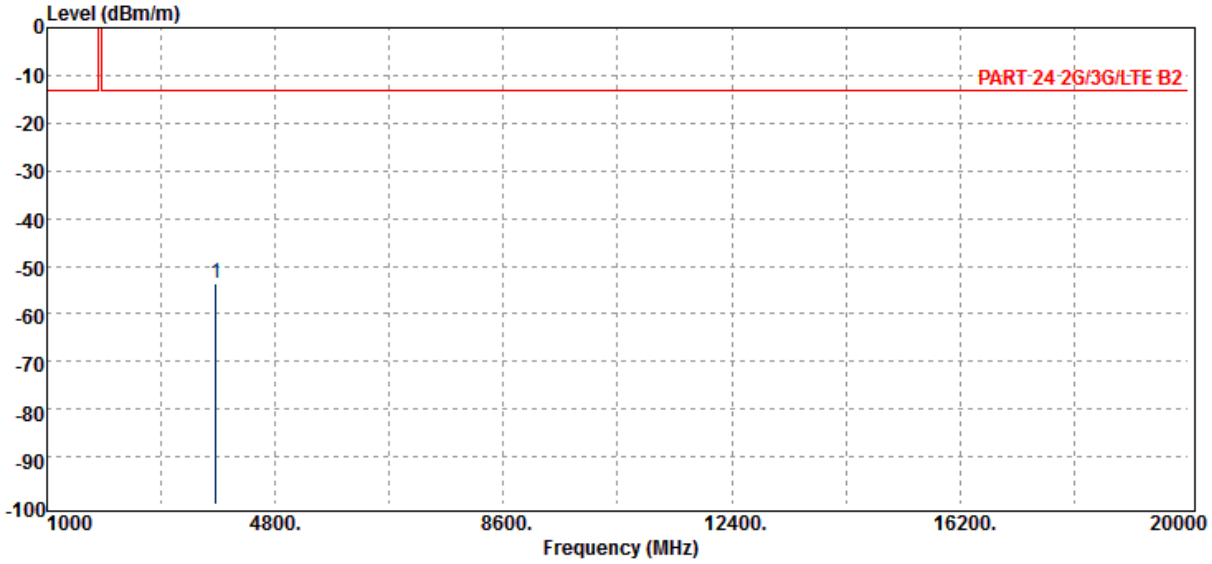


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3815.20	H	-52.80	-54.24	8.49	-7.05	-13.00	-39.80

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 9538	Test Date	:2015-03-20
Operation Band	:HSDPA B2	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1907.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



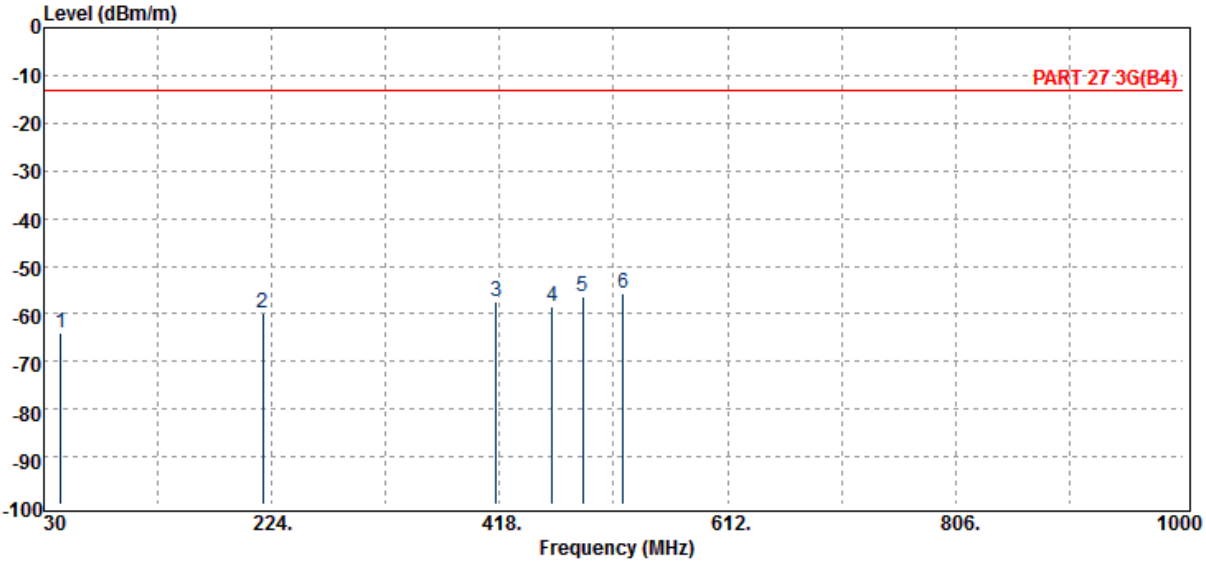
Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3815.20	H	-53.65	-55.10	8.49	-7.05	-13.00	-40.65

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Radiated Spurious Emission Measurement Result: HSDPA B4 Mode

ARFCN	:CH 1312	Test Date	:2015-03-20
Operation Band	:HSDPA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1712.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

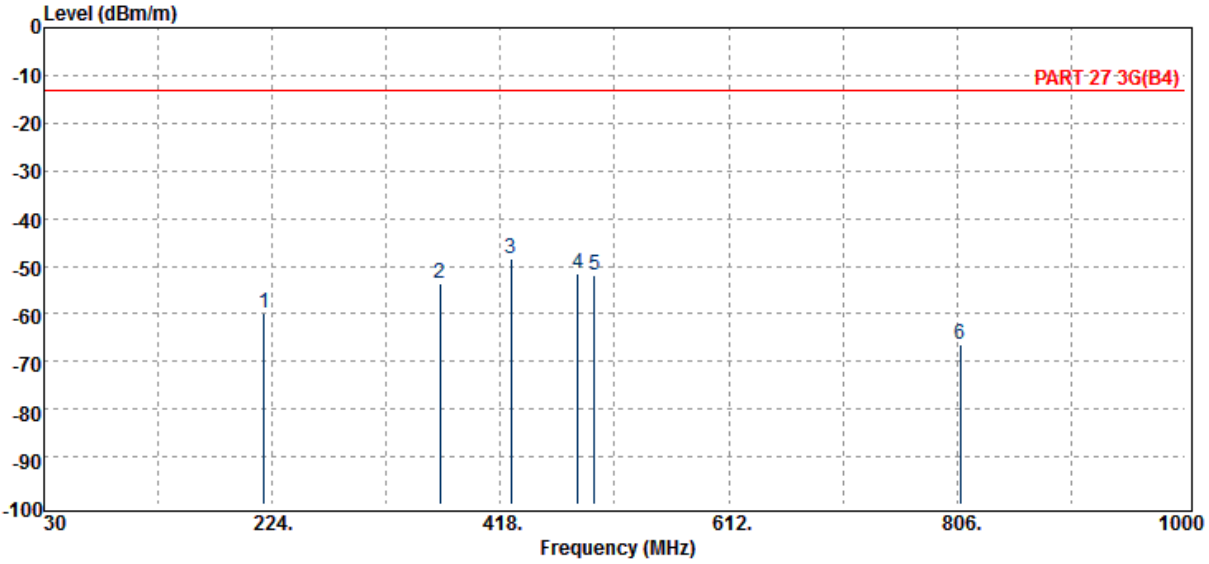


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
44.55	S	-63.94	-52.83	-10.24	-0.87	-13.00	-50.94
216.24	S	-59.99	-64.06	5.63	-1.56	-13.00	-46.99
415.09	S	-57.55	-61.28	5.68	-1.96	-13.00	-44.55
462.62	S	-58.58	-62.08	5.60	-2.10	-13.00	-45.58
488.81	S	-56.32	-59.91	5.82	-2.24	-13.00	-43.32
522.76	S	-55.73	-59.13	5.83	-2.43	-13.00	-42.73

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1312	Test Date	:2015-03-20
Operation Band	:HSDPA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1712.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

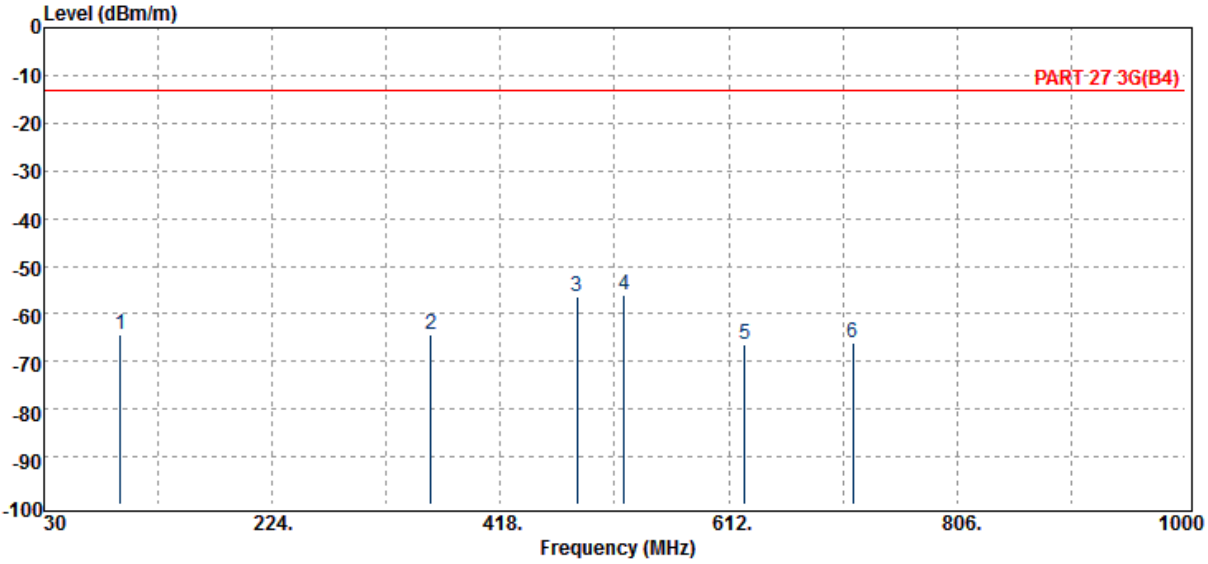


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
217.21	S	-59.70	-63.73	5.59	-1.56	-13.00	-46.70
366.59	S	-53.78	-57.68	5.86	-1.96	-13.00	-40.78
426.73	S	-48.46	-52.09	5.62	-1.99	-13.00	-35.46
483.96	S	-51.59	-55.17	5.78	-2.21	-13.00	-38.59
497.54	S	-51.76	-55.37	5.89	-2.29	-13.00	-38.76
808.91	S	-66.28	-68.99	5.60	-2.88	-13.00	-53.28

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1413	Test Date	:2015-03-20
Operation Band	:HSDPA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1732.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

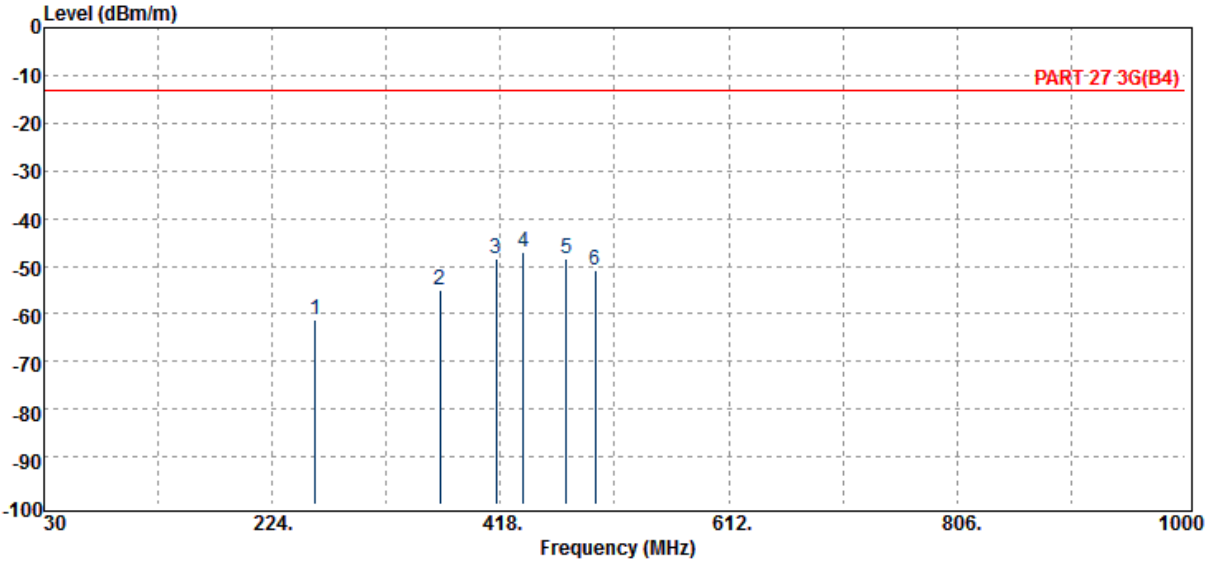


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
94.99	S	-64.44	-64.49	1.16	-1.11	-13.00	-51.44
358.83	S	-64.28	-68.21	5.89	-1.96	-13.00	-51.28
482.99	S	-56.36	-59.93	5.77	-2.20	-13.00	-43.36
522.76	S	-55.88	-59.28	5.83	-2.43	-13.00	-42.88
625.58	S	-66.57	-69.56	5.69	-2.70	-13.00	-53.57
717.73	S	-66.26	-69.14	5.50	-2.62	-13.00	-53.26

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1413	Test Date	:2015-03-20
Operation Band	:HSDPA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1732.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

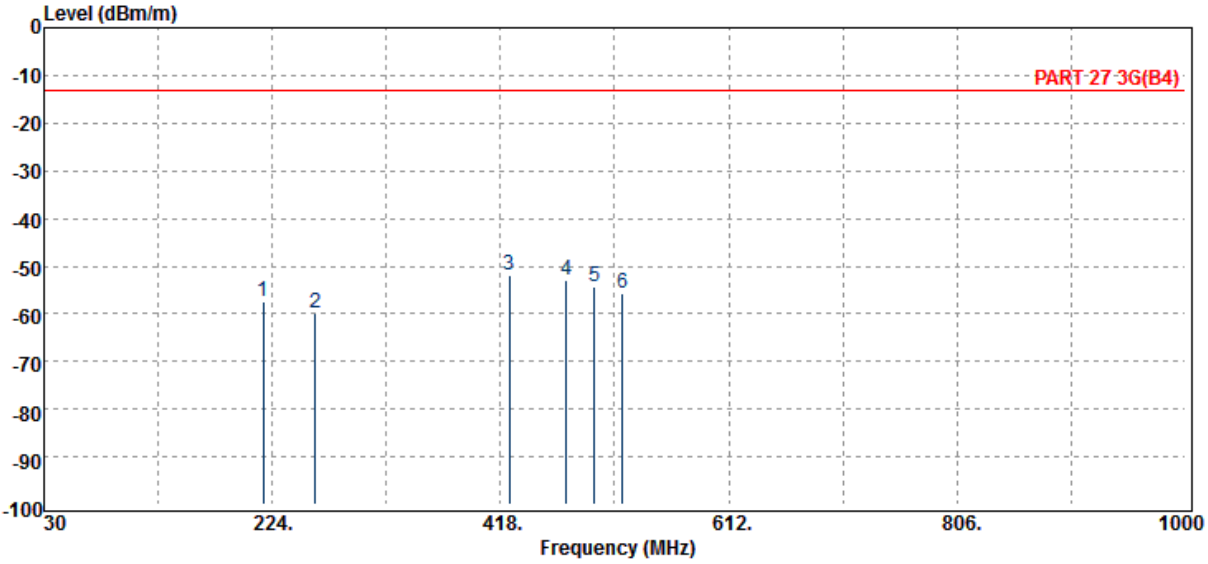


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
260.86	S	-61.23	-65.38	5.82	-1.67	-13.00	-48.23
366.59	S	-55.08	-58.98	5.86	-1.96	-13.00	-42.08
414.12	S	-48.35	-52.09	5.69	-1.95	-13.00	-35.35
437.40	S	-46.98	-50.51	5.56	-2.03	-13.00	-33.98
474.26	S	-48.44	-52.00	5.70	-2.15	-13.00	-35.44
498.51	S	-50.95	-54.55	5.90	-2.29	-13.00	-37.95

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1513	Test Date	:2015-03-20
Operation Band	:HSDPA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1752.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

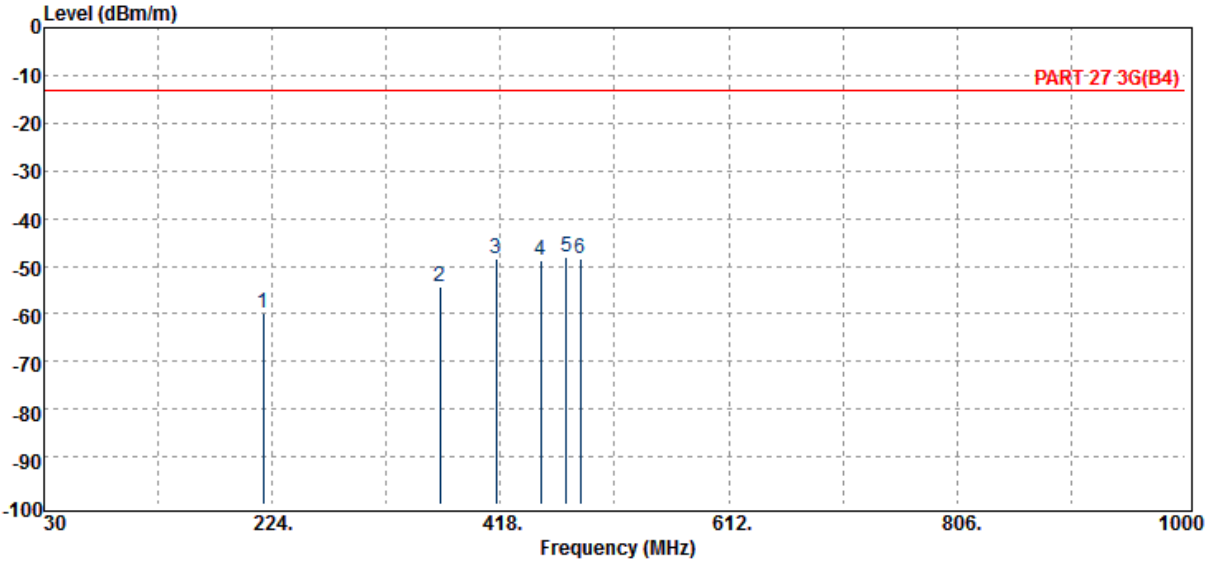


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
216.24	S	-57.57	-61.64	5.63	-1.56	-13.00	-44.57
260.86	S	-59.73	-63.89	5.82	-1.67	-13.00	-46.73
425.76	S	-51.89	-55.52	5.62	-1.99	-13.00	-38.89
474.26	S	-52.96	-56.51	5.70	-2.15	-13.00	-39.96
497.54	S	-54.19	-57.79	5.89	-2.29	-13.00	-41.19
521.79	S	-55.60	-59.01	5.83	-2.42	-13.00	-42.60

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1513	Test Date	:2015-03-20
Operation Band	:HSDPA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1752.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

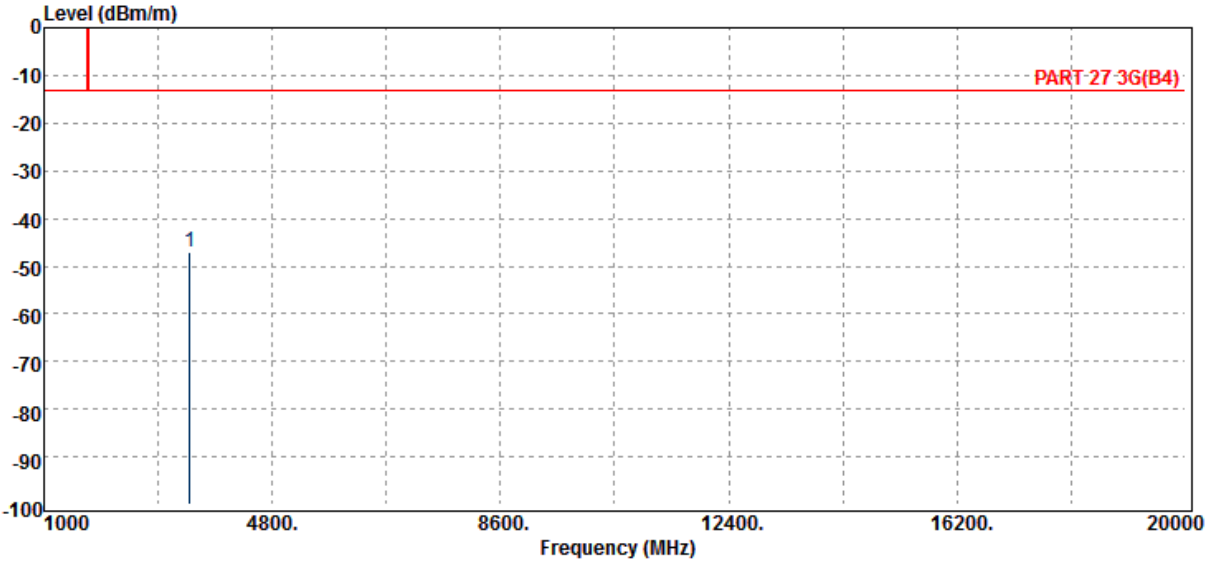


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
216.24	S	-59.99	-64.06	5.63	-1.56	-13.00	-46.99
366.59	S	-54.28	-58.19	5.86	-1.96	-13.00	-41.28
414.12	S	-48.55	-52.28	5.69	-1.95	-13.00	-35.55
451.95	S	-48.82	-52.26	5.51	-2.07	-13.00	-35.82
474.26	S	-48.13	-51.68	5.70	-2.15	-13.00	-35.13
485.90	S	-48.46	-52.04	5.80	-2.22	-13.00	-35.46

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1312	Test Date	:2015-03-20
Operation Band	:HSPDA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1712.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

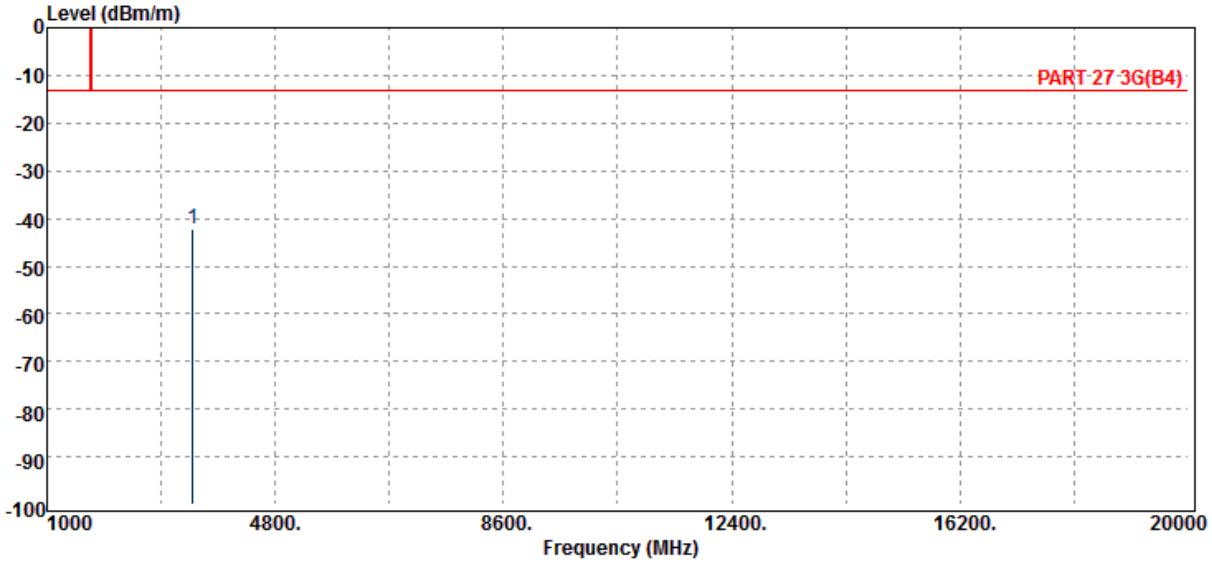


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3424.80	H	-46.90	-48.45	8.09	-6.54	-13.00	-33.90

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 1312	Test Date	:2015-03-20
Operation Band	:HSPDA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1712.4 MHz	Engineer	:Tin
Operation Mode	:TX LOW		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

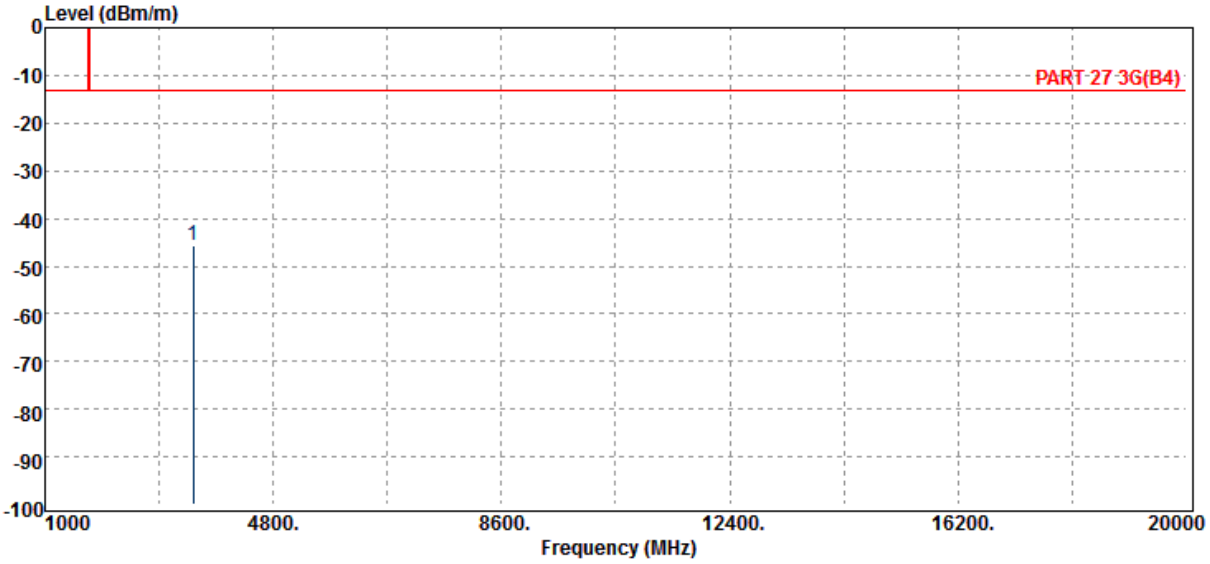


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3424.80	H	-42.09	-43.64	8.09	-6.54	-13.00	-29.09

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1413	Test Date	:2015-03-20
Operation Band	:HSPDA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1732.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

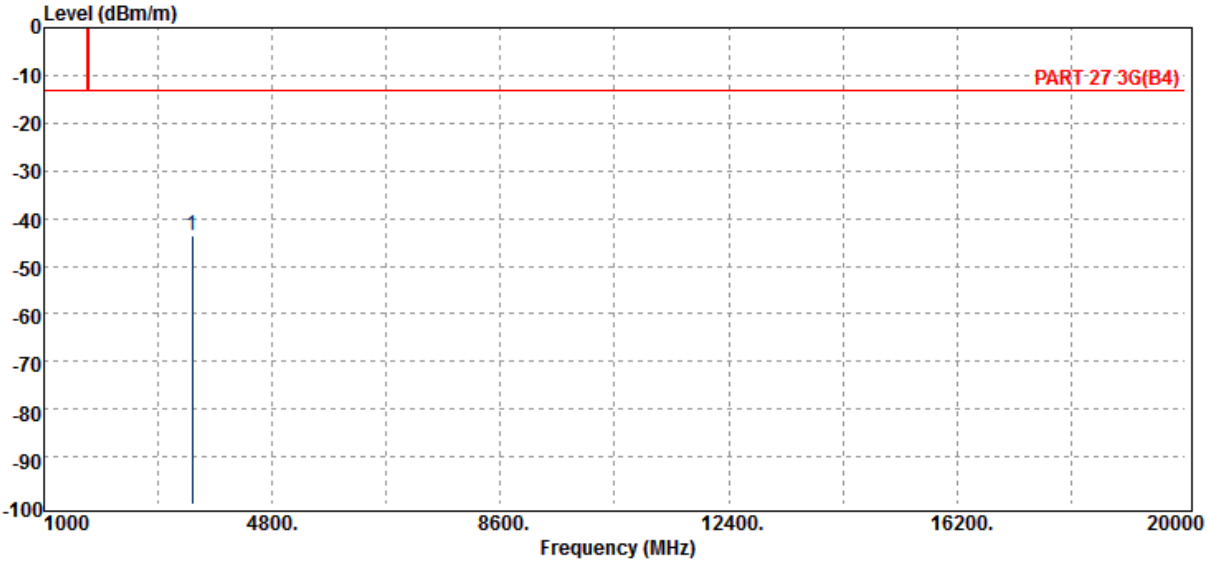


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3465.20	H	-45.83	-47.50	8.20	-6.53	-13.00	-32.83

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

ARFCN	:CH 1413	Test Date	:2015-03-20
Operation Band	:HSPDA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1732.6 MHz	Engineer	:Tin
Operation Mode	:TX MID		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

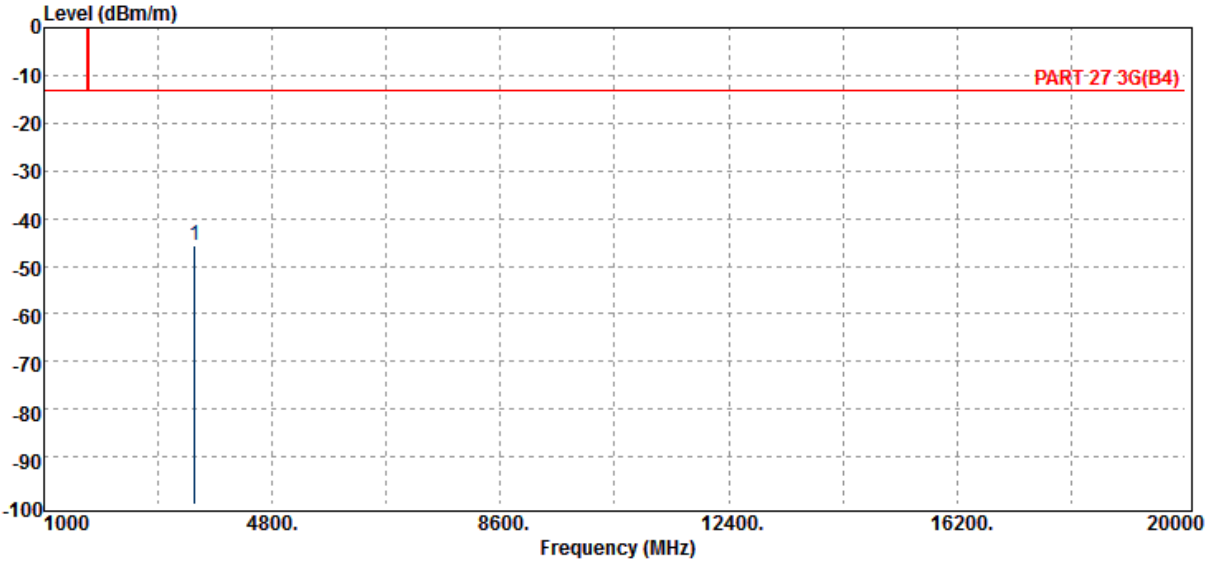


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3465.20	H	-43.65	-45.32	8.20	-6.53	-13.00	-30.65

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1513	Test Date	:2015-03-20
Operation Band	:HSPDA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1752.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

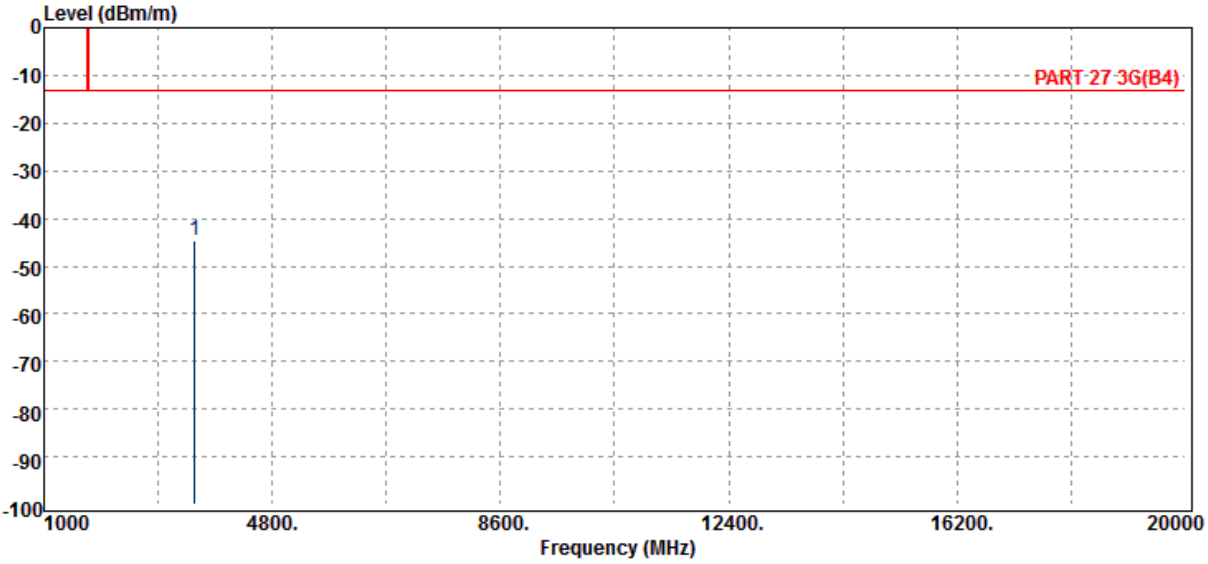


Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3505.20	H	-45.63	-47.26	8.30	-6.68	-13.00	-32.63

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor.

ARFCN	:CH 1513	Test Date	:2015-03-20
Operation Band	:HSPDA B4	Temp./Humi.	:23 deg_C / 52 RH
Fundamental Frequency	:1752.6 MHz	Engineer	:Tin
Operation Mode	:TX HIGH		
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	EIRP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3505.20	H	-44.52	-46.15	8.30	-6.68	-13.00	-31.52

EIRP(dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

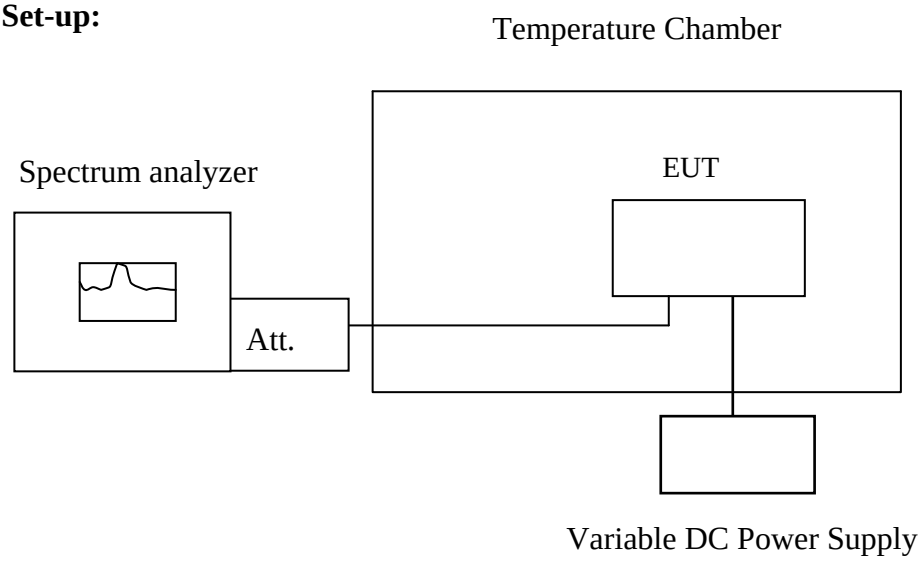
Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

11 FREQUENCY STABILITY MEASUREMENT

11.1 Standard Applicable:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

11.2 Test Set-up:



Note: Measurement setup for testing on Antenna connector

11.3 Measurement Procedure:

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

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

Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint as declared by the manufacturer, record the maximum frequency change.

11.4 Measurement Equipment Used:

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/12/2015	03/11/2016
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
Temperature Chamber	TERCHY	MHG-120LF	911009	05/07/2014	05/06/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

11.5 Measurement Result:

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (℃)	(Hz)		
4.2	20	836599989	-1	2091
3.7	20	836599990	0	2091
3.5	20	836599994	4	2091
3.5 (End point)	20	836599994	4	2091

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (℃)	(Hz)		
3.7	50	836599982	-8	2091
3.7	40	836599984	-6	2091
3.7	30	836599988	-2	2091
3.7	20	836599990	0	2091
3.7	10	836599992	2	2091
3.7	0	836599993	3	2091
3.7	-10	836599998	8	2091
3.7	-20	836599999	9	2091
3.7	-30	836600001	11	2091

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (℃)	(Hz)		
4.2	20	1879999989	-3	4700
3.7	20	1879999992	0	4700
3.5	20	1879999998	6	4700
3.5 (End point)	20	1879999998	6	4700

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (℃)	(Hz)		
3.7	50	1879999982	-10	4700
3.7	40	1879999986	-6	4700
3.7	30	1879999990	-2	4700
3.7	20	1879999992	0	4700
3.7	10	1879999994	2	4700
3.7	0	1879999999	7	4700
3.7	-10	1880000002	10	4700
3.7	-20	1880000007	15	4700
3.7	-30	1880000010	18	4700

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: WCDMA II Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(Hz)		
4.2	20	1879999996	1	4700
3.7	20	1879999995	0	4700
3.5	20	1879999993	-2	4700
3.5 (End point)	20	1879999993	-2	4700

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: WCDMA II Mid Channel 1880				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(Hz)		
3.7	50	1879999980	-15	4700
3.7	40	1879999985	-10	4700
3.7	30	1879999991	-4	4700
3.7	20	1879999995	0	4700
3.7	10	1880000000	5	4700
3.7	0	1880000006	11	4700
3.7	-10	1880000007	12	4700
3.7	-20	1880000011	16	4700
3.7	-30	1880000016	21	4700

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: WCDMA IV Mid Channel 1732.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(Hz)		
4.2	20	173260000	1	4331
3.7	20	173259999	0	4331
3.5	20	173259997	-2	4331
3.5 (End point)	20	173259997	-2	4331

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: WCDMA V Mid Channel 1732.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(Hz)		
3.7	50	173259984	-15	4331
3.7	40	173259989	-10	4331
3.7	30	173259995	-4	4331
3.7	20	173259999	0	4331
3.7	10	173260004	5	4331
3.7	0	173260010	11	4331
3.7	-10	173260011	12	4331
3.7	-20	173260015	16	4331
3.7	-30	173260020	21	4331

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: WCDMA V Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(Hz)		
4.2	20	836599993	-4	2091
3.7	20	836599997	0	2091
3.5	20	836600001	4	2091
3.5 (End point)	20	836600001	4	2091

FREQUENCY ERROR vs. TEMPERATURE

Reference Frequency: WCDMA V Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (°C)	(Hz)		
3.7	50	836599983	-14	2091
3.7	40	836599986	-11	2091
3.7	30	836599991	-6	2091
3.7	20	836599997	0	2091
3.7	10	836599999	2	2091
3.7	0	836600004	7	2091
3.7	-10	836600008	11	2091
3.7	-20	836600012	15	2091
3.7	-30	836600021	24	2091

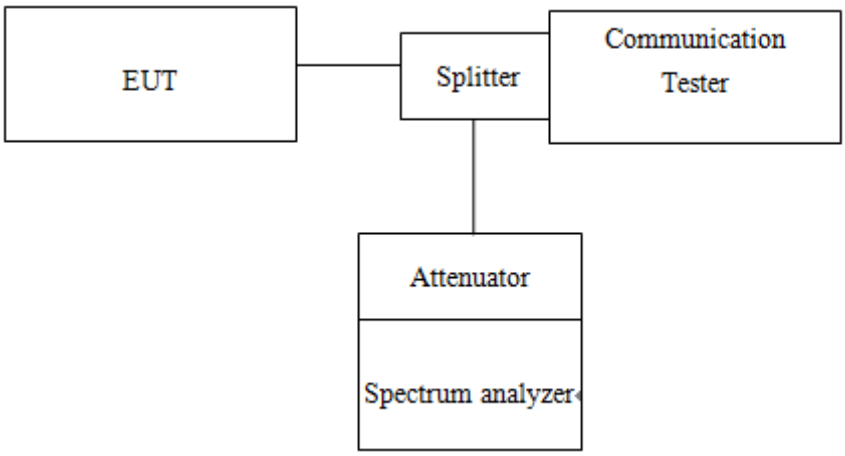
Note: The battery is rated 3.7Vdc.

1. PEAK TO AVERAGE RATIO

11.6 Standard Applicable

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

11.7 Test SET-UP



11.8 Measurement Procedure

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth; & internal =1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

11.9 Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2015	02/10/2016
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	10/08/2014	10/09/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016
DC Power Supply	Agilent	E3640A	MY52410006	11/10/2014	11/09/2015

11.10 Measurement Result

Tabular Results:

Frequency (MHz)	CH	Peak-to-Average Ratio (dB)	
		GPRS 850	EDGE 850
824.20	128	10.44	11.16
836.60	190	10.32	12.63
848.80	251	9.48	11.34

Frequency (MHz)	CH	Peak-to-Average Ratio (dB)	
		GPRS 1900	EDGE 1900
1850.20	512	9.94	11.43
1880.00	661	11.36	12.38
1909.80	810	11.54	11.80

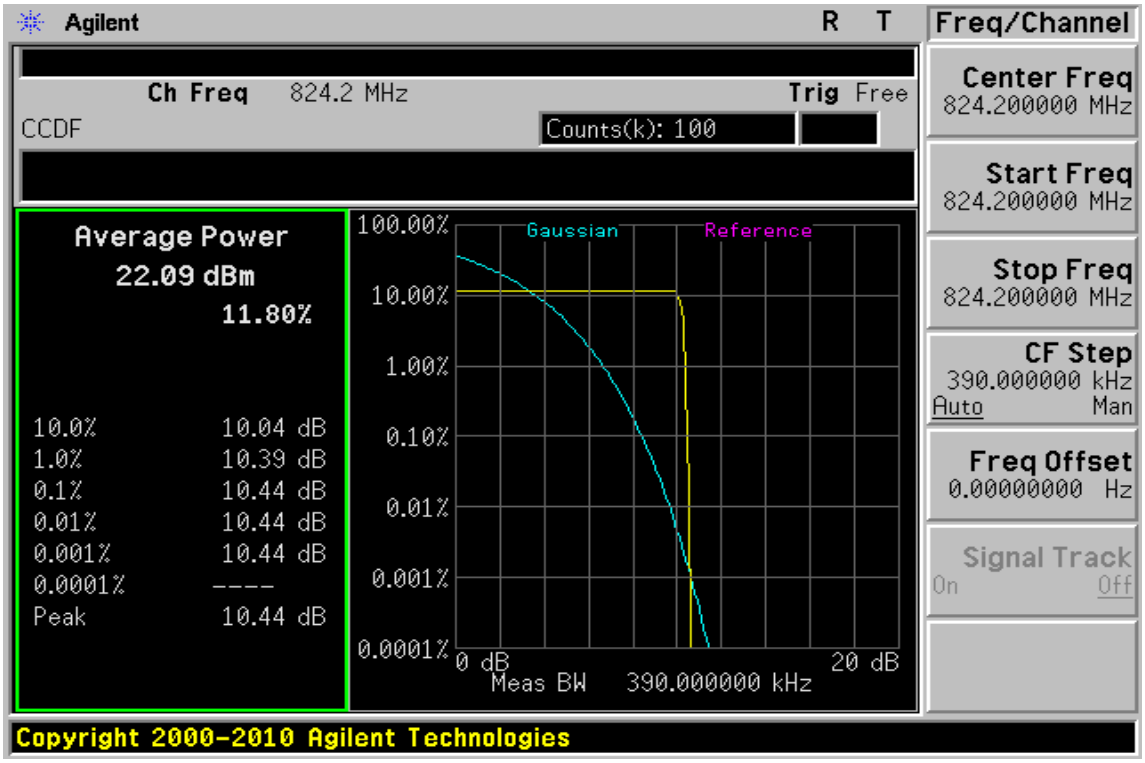
Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA II	HSDPA II	HSUPA II
1850.20	9262	2.75	3.69	3.80
1880.00	9400	2.75	3.80	4.00
1909.80	9538	2.76	3.72	3.76

Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA IV	HSDPA IV	HSUPA IV
1712.4	1312	2.80	2.82	2.83
1732.6	1413	2.80	2.82	2.80
1752.6	1513	2.80	2.81	2.81

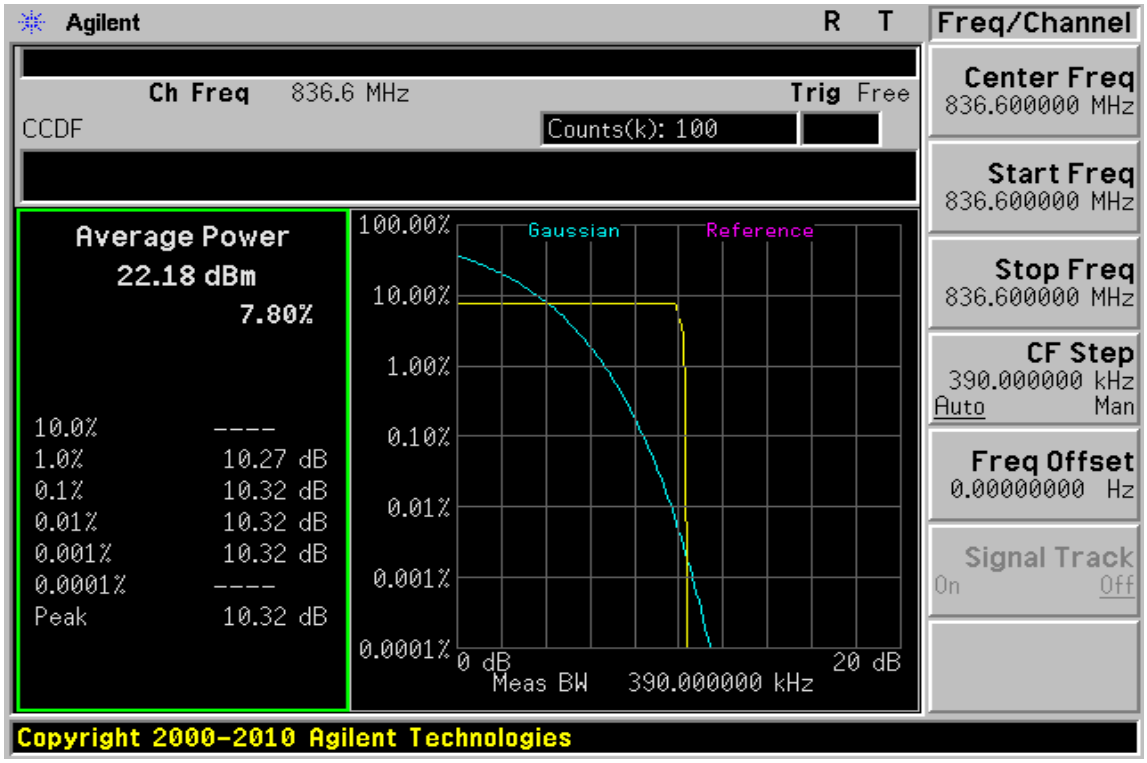
Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA V	HSDPA V	HSUPA V
826.40	4132	2.71	3.79	3.87
836.60	4183	2.71	4.09	4.16
846.60	4233	2.77	4.19	3.84

Measurement Results:

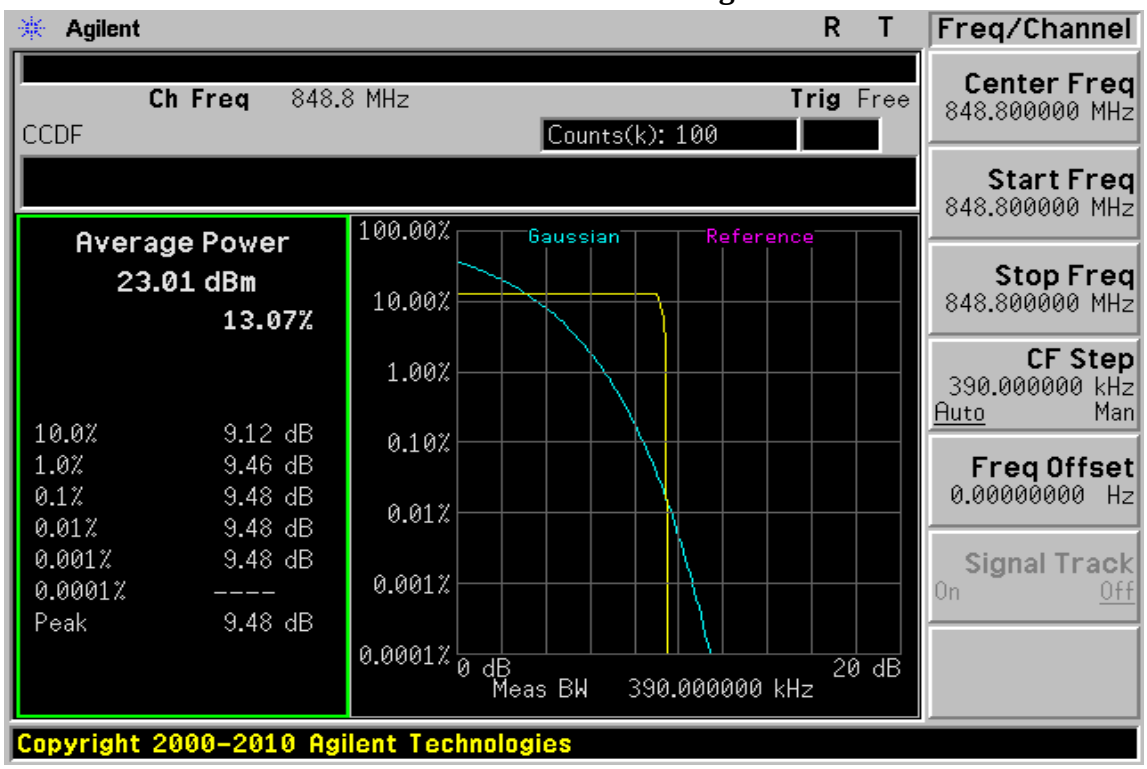
GPRS 850 Channel Low



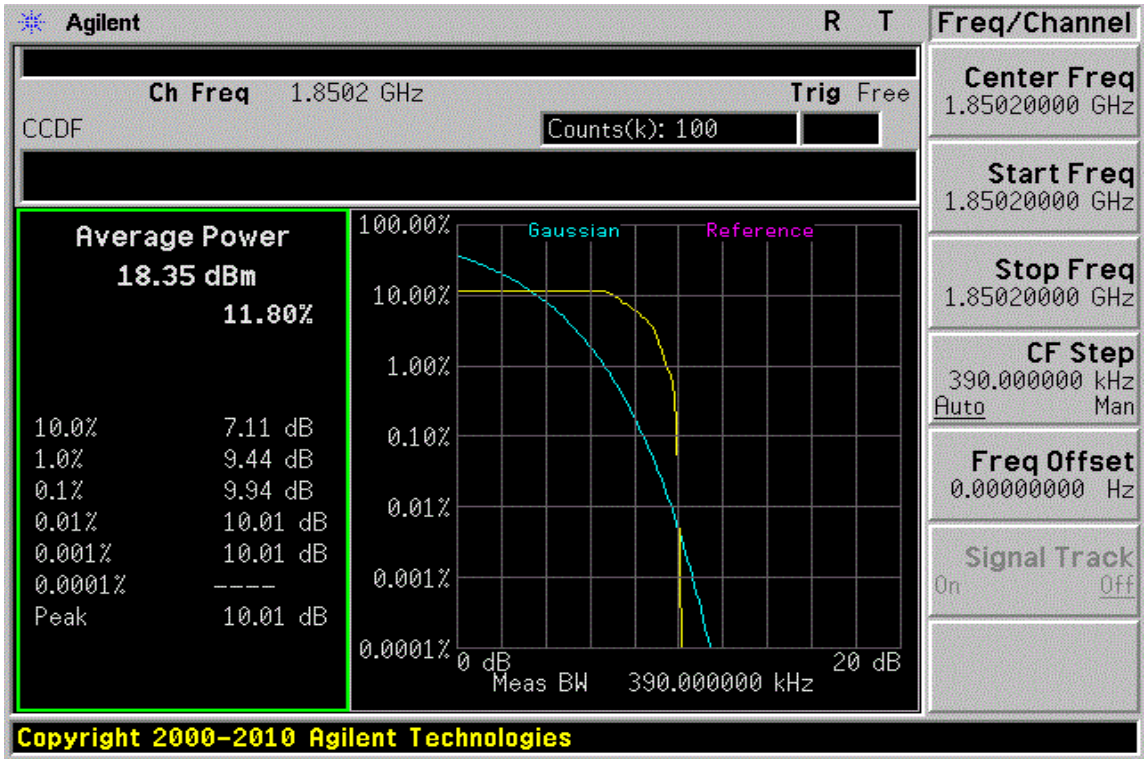
GPRS 850 Channel Mid



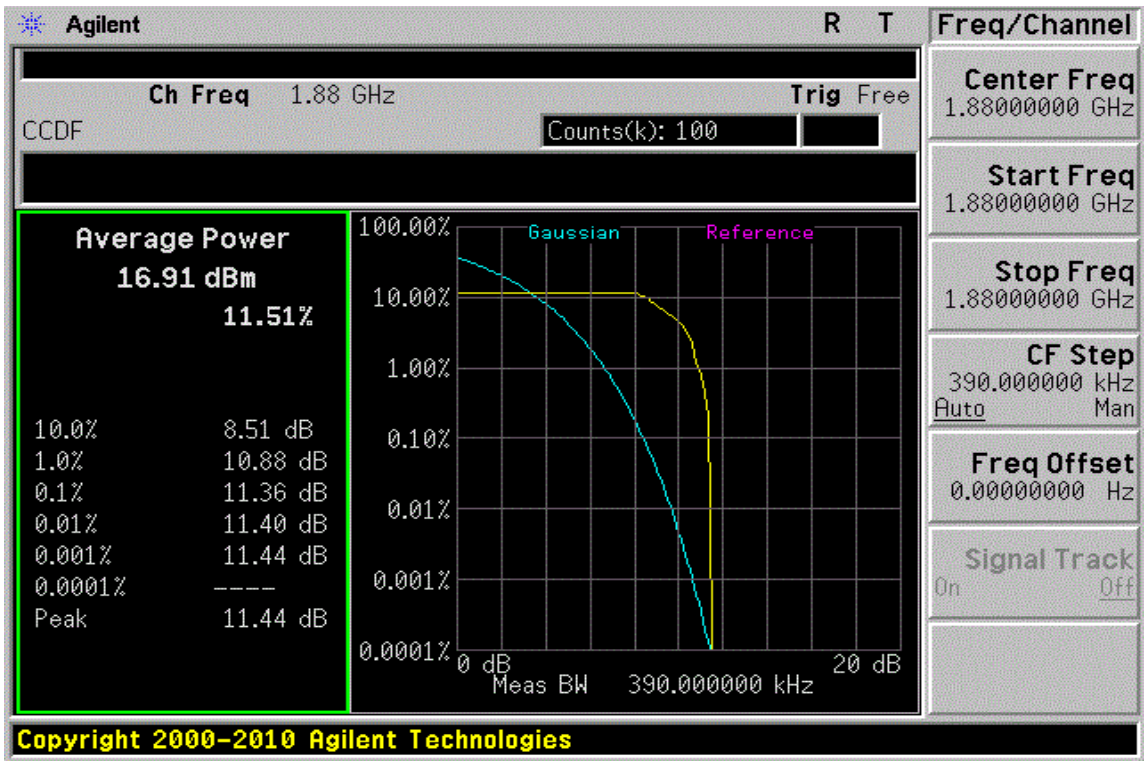
GPRS 850 Channel High



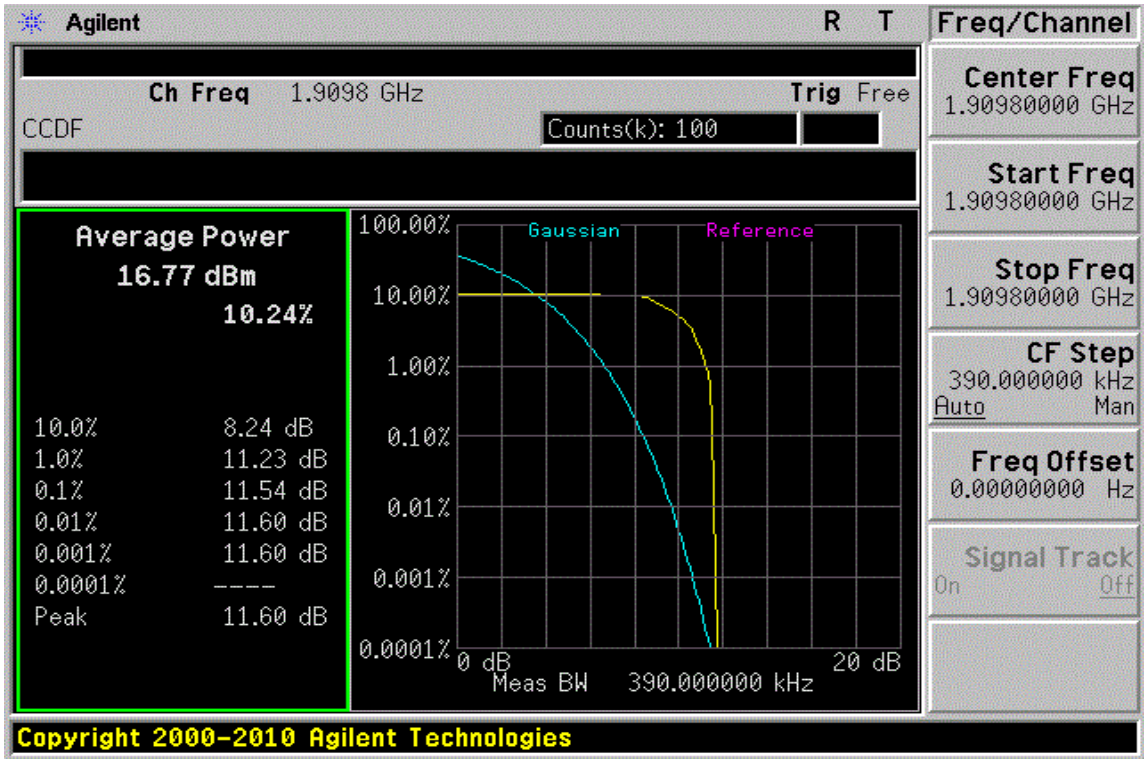
GPRS 1900 Channel Low



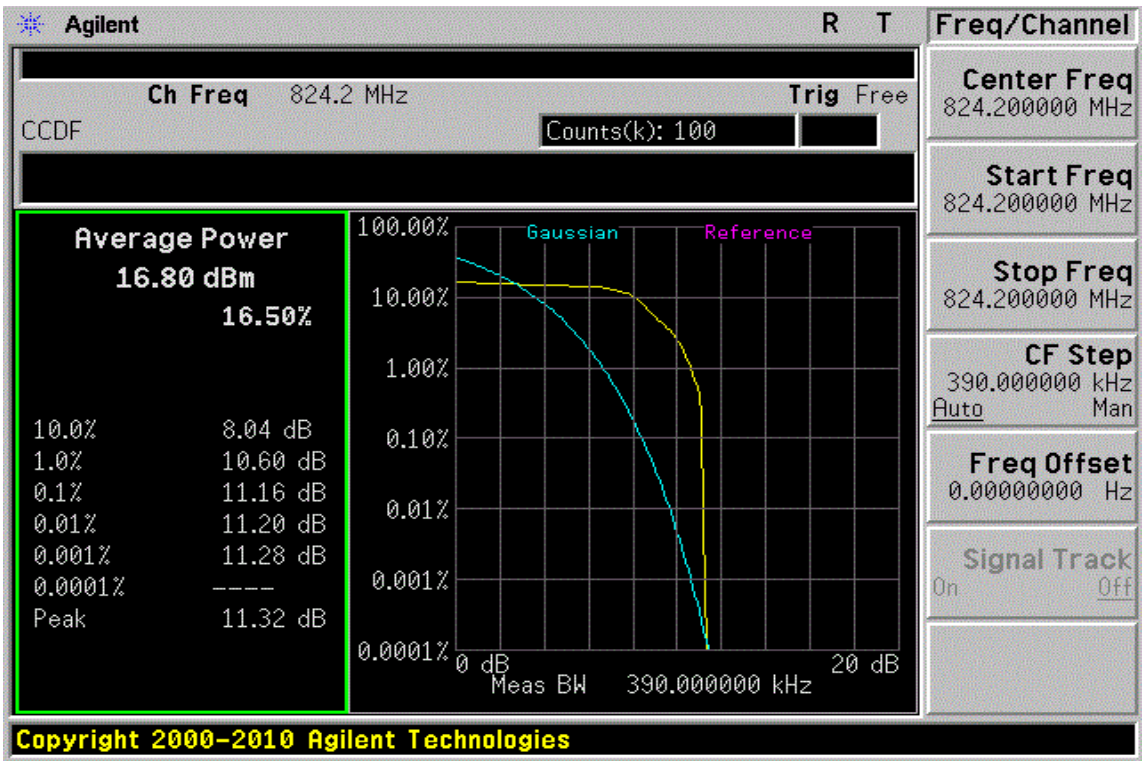
GPRS 1900 Channel Mid



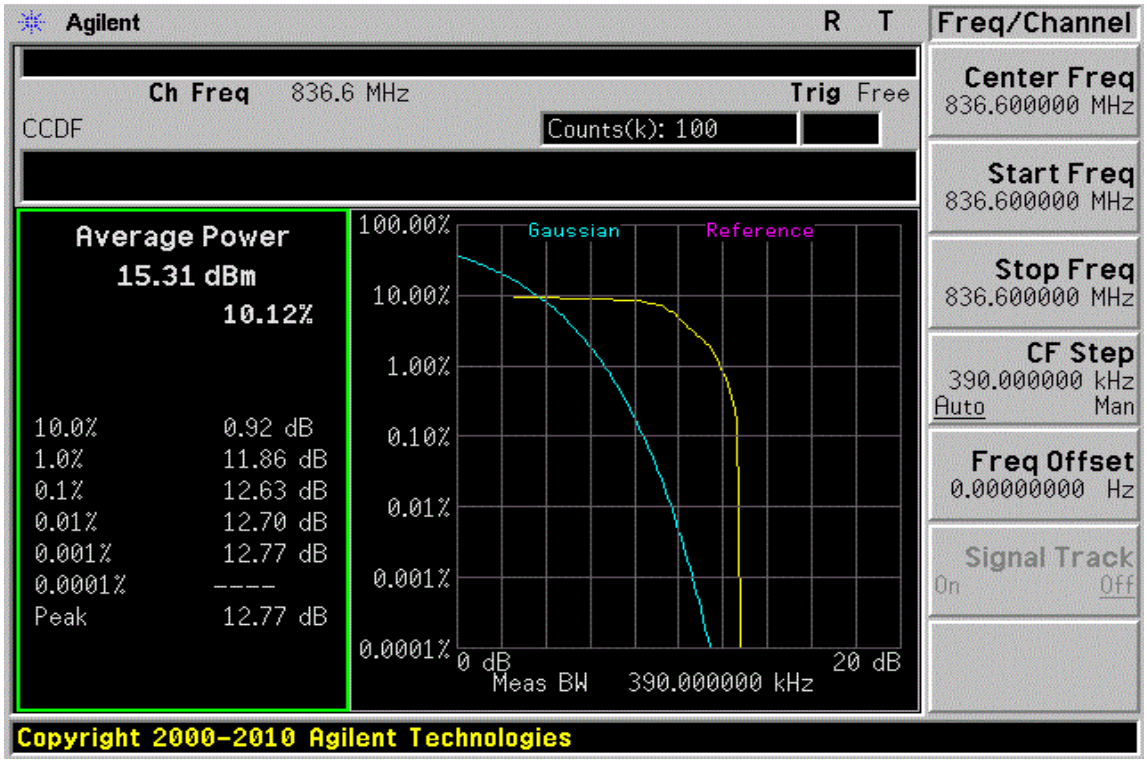
GPRS 1900 Channel High



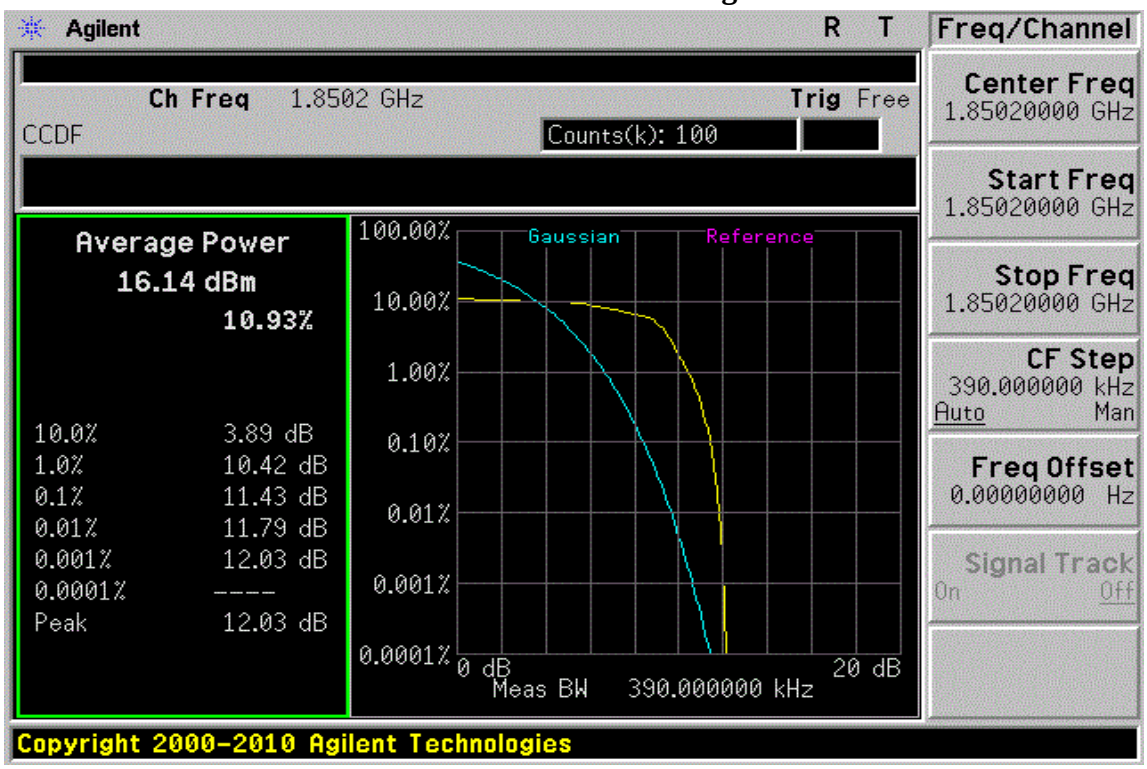
EDGE 850 Channel Low



EDGE 850 Channel Mid



EDGE 850 Channel High



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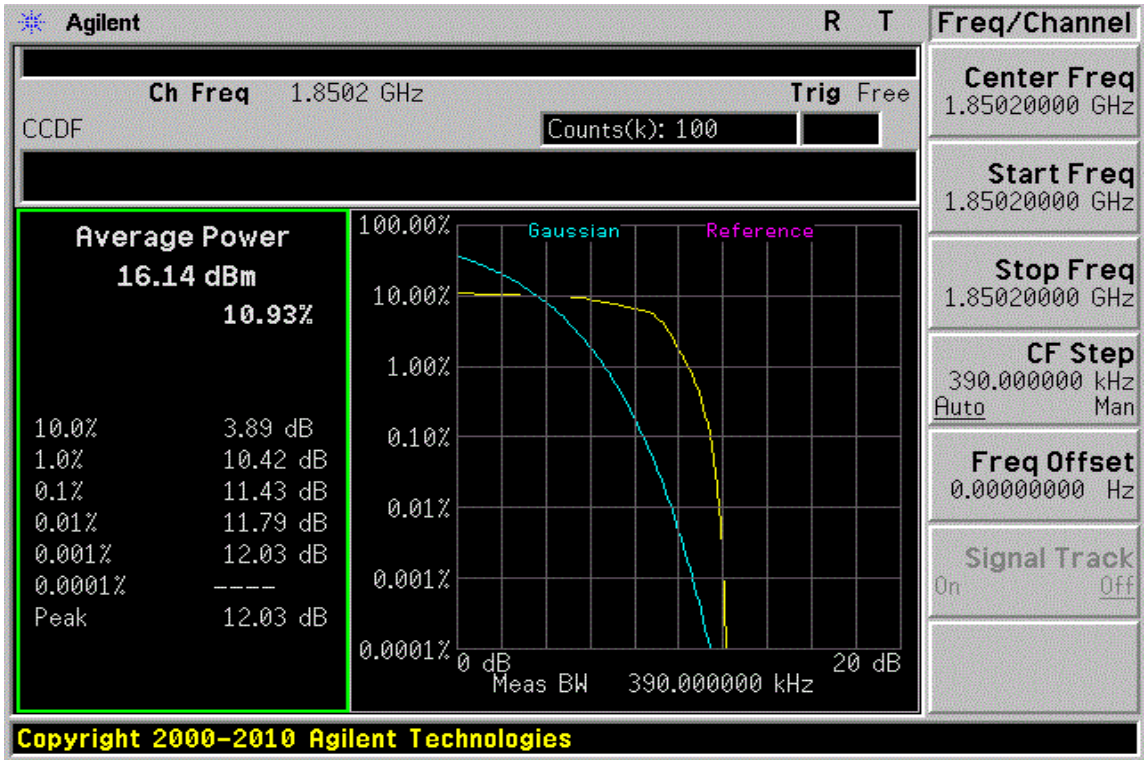

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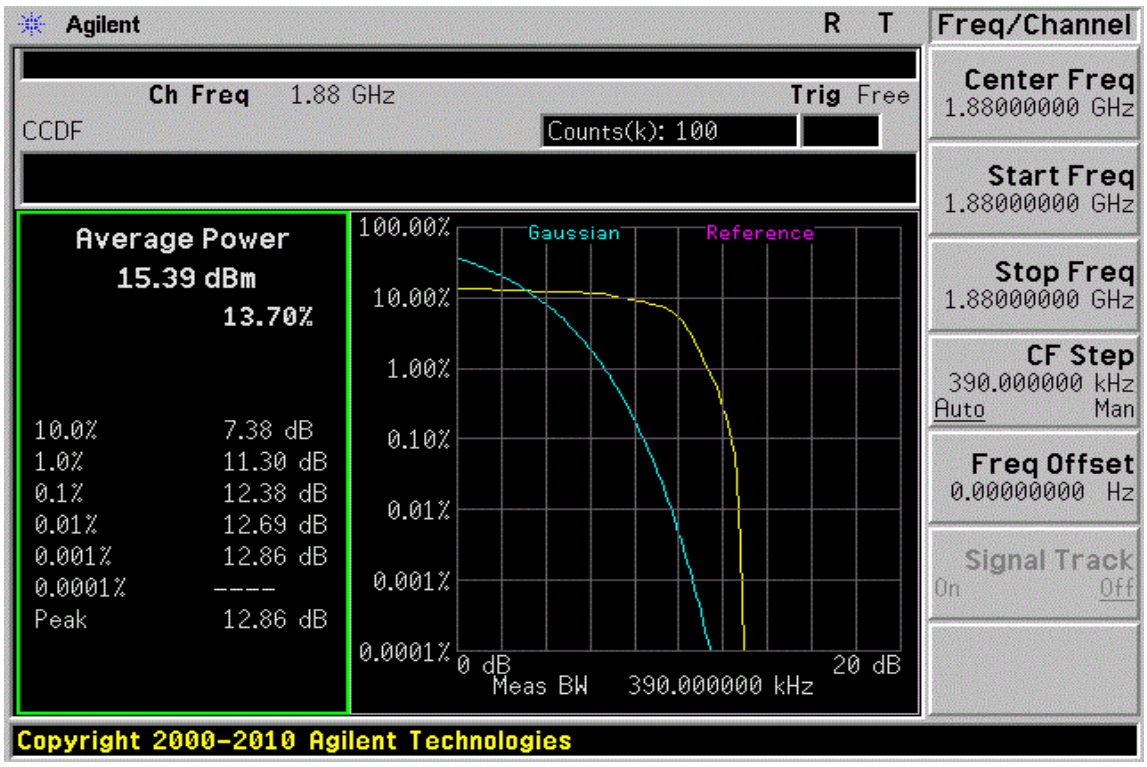
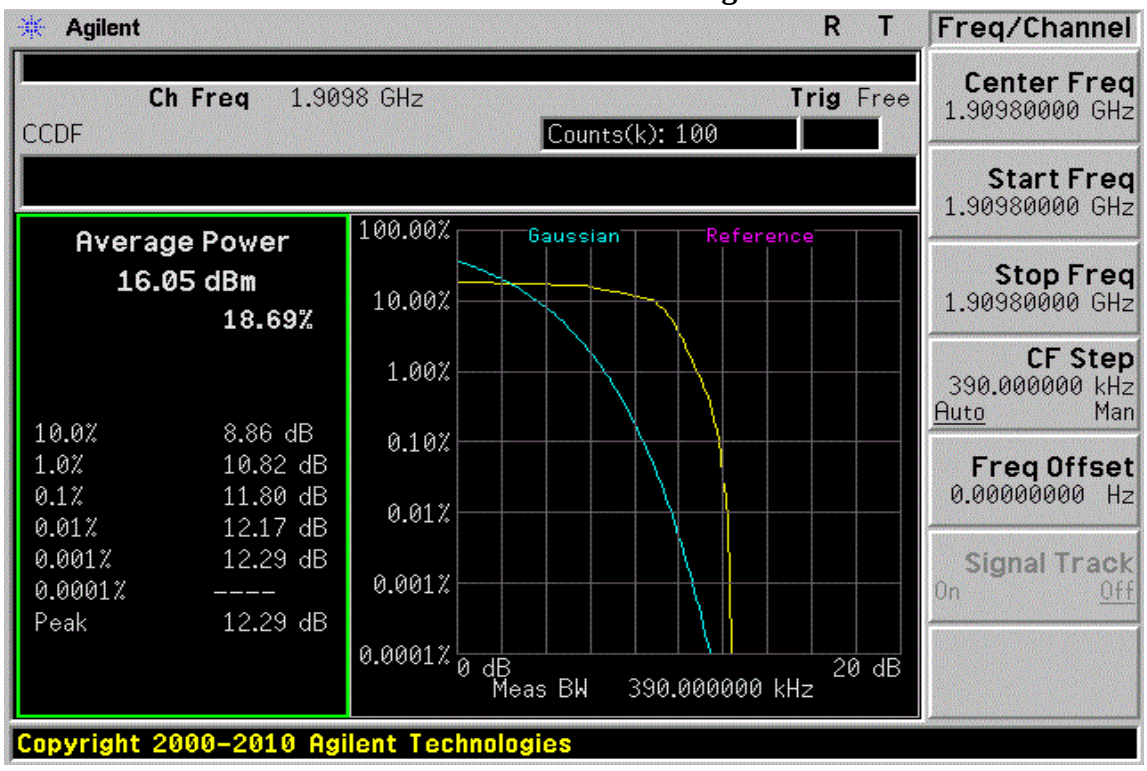
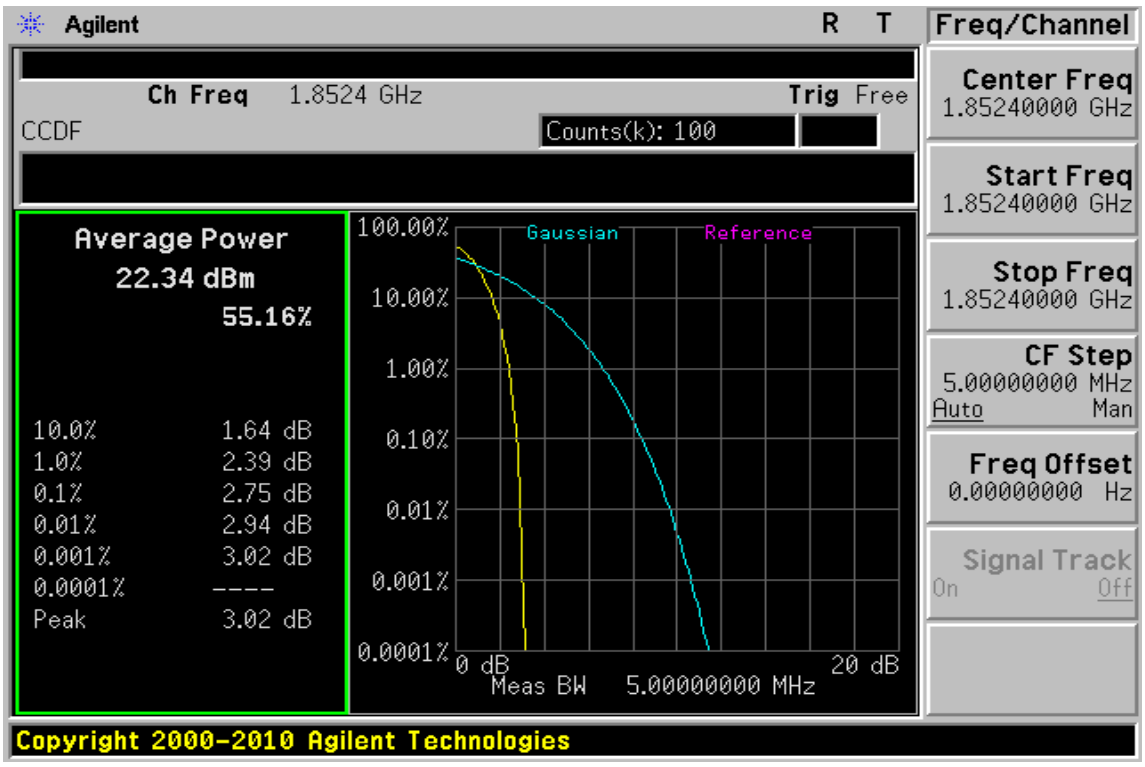


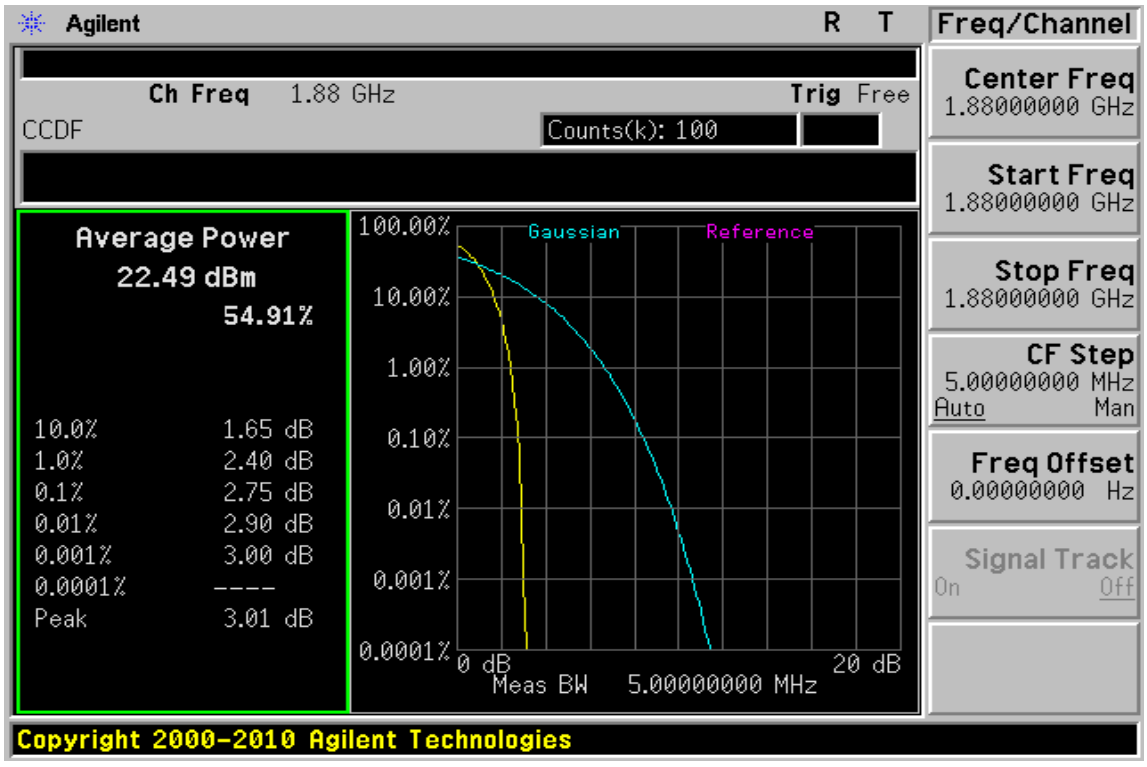
EDGE 1900 Channel High



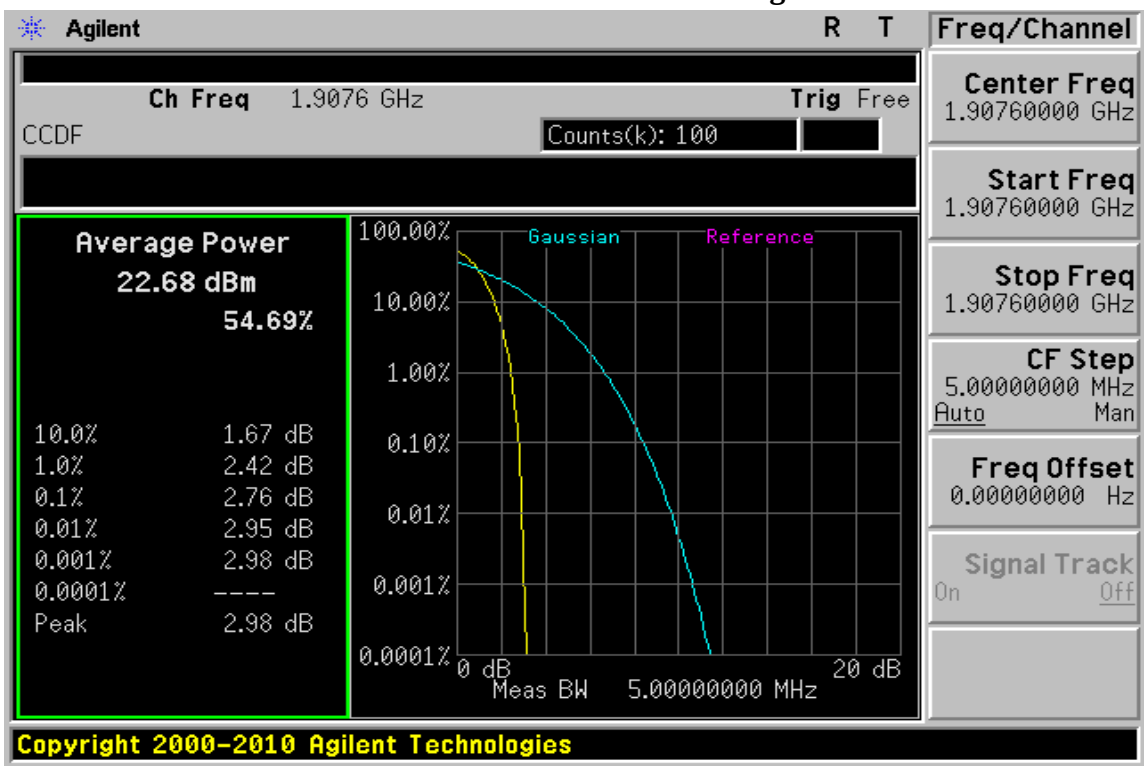
WCDMA Band II Channel Low



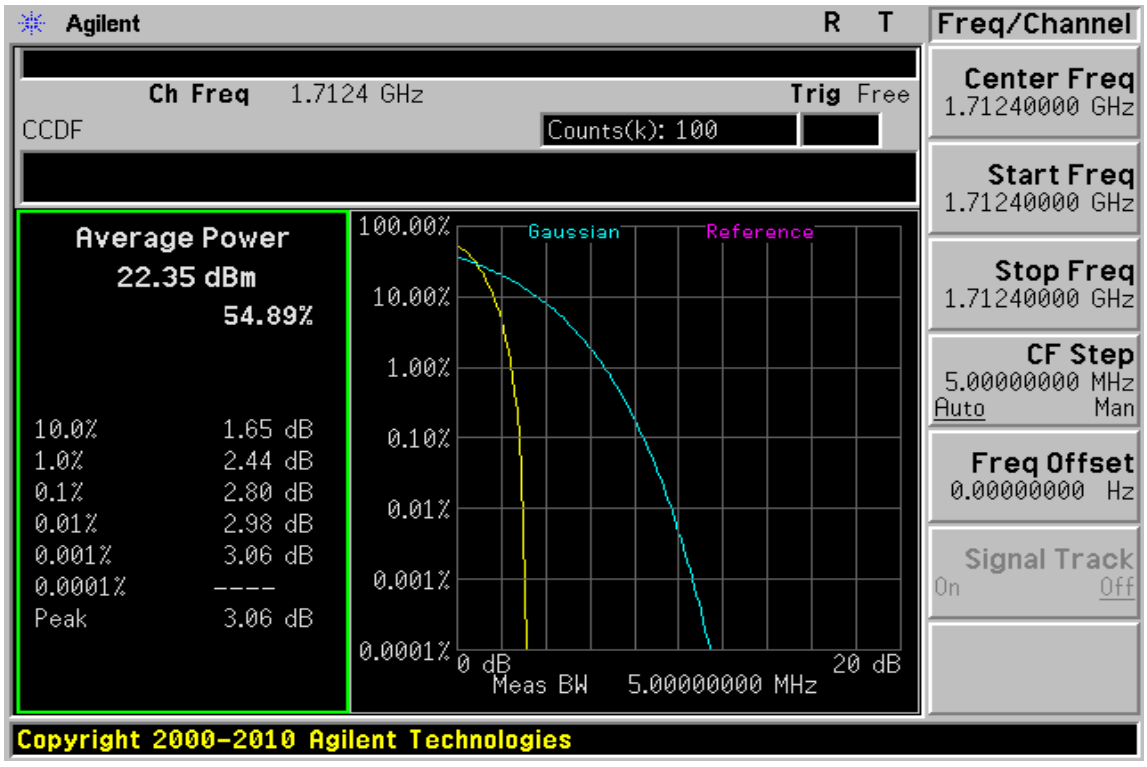
WCDMA Band II Channel Mid



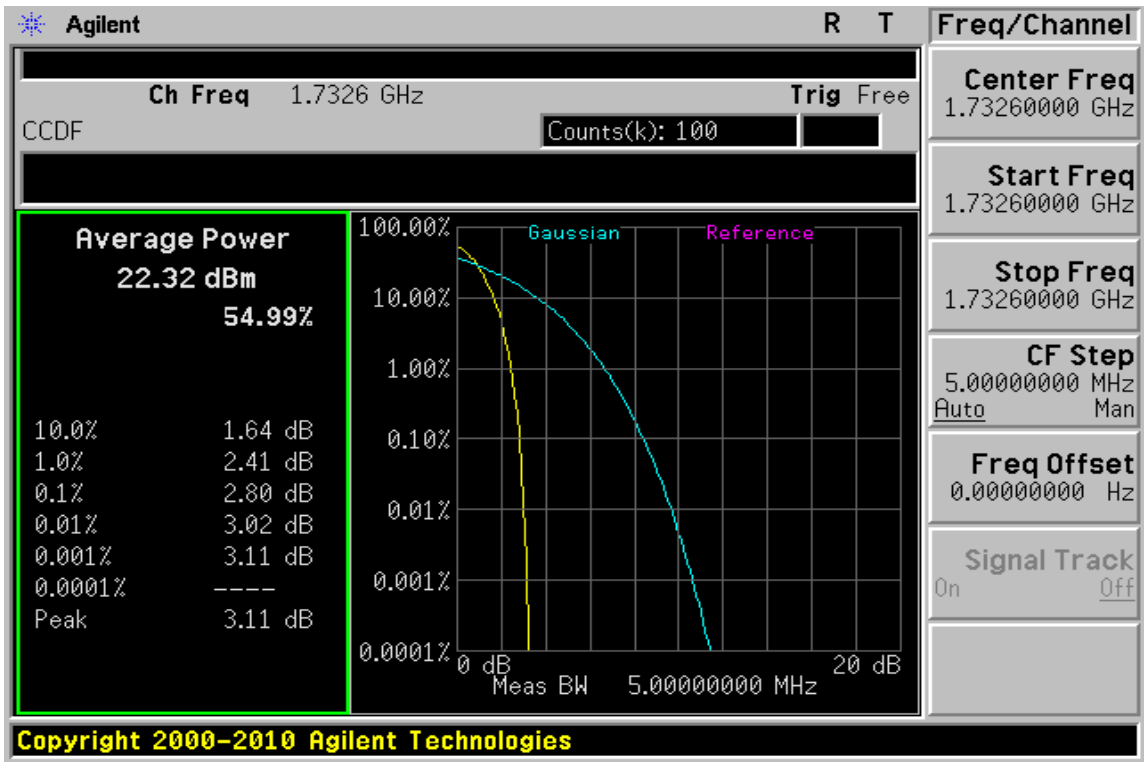
WCDMA Band II Channel High



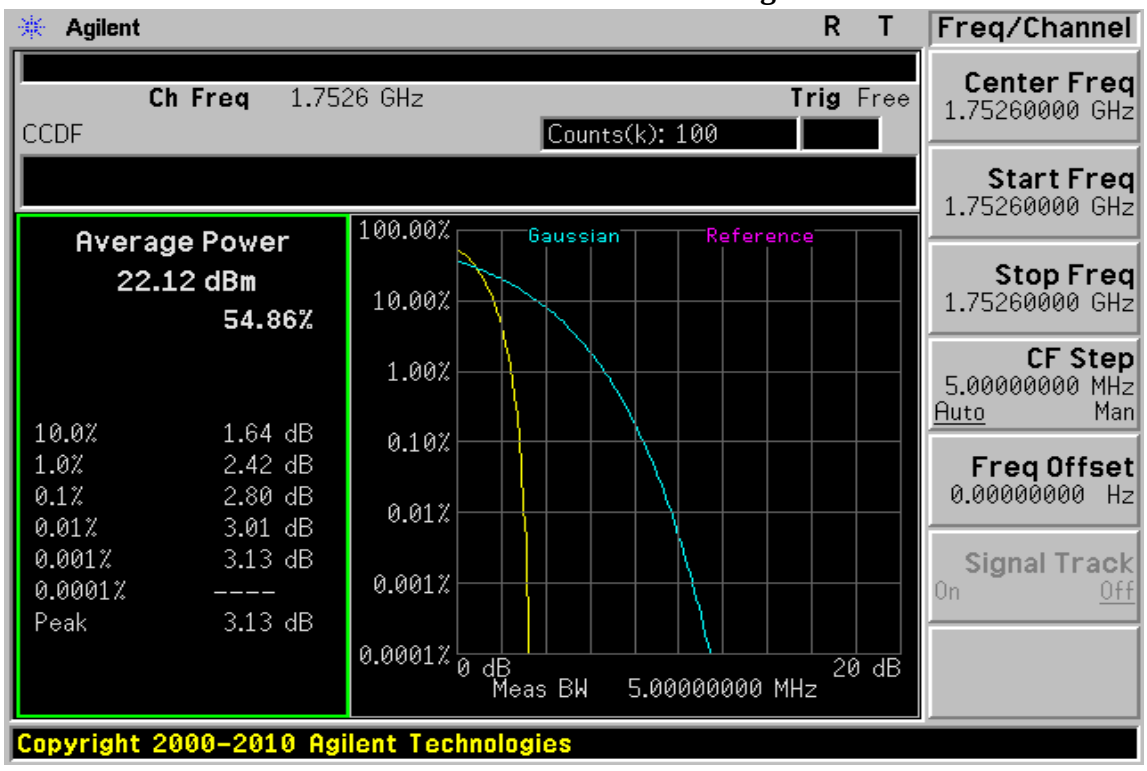
WCDMA Band IV Channel Low



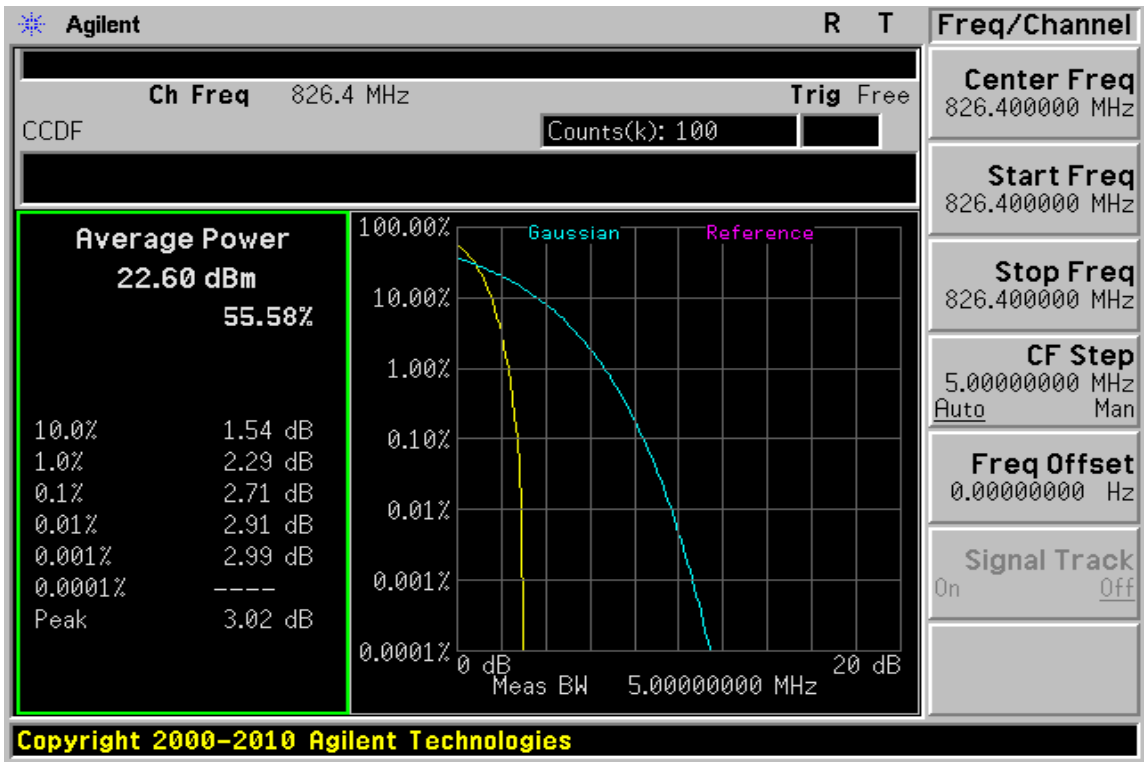
WCDMA Band V Channel Mid



WCDMA Band V Channel High



WCDMA Band V Channel Low



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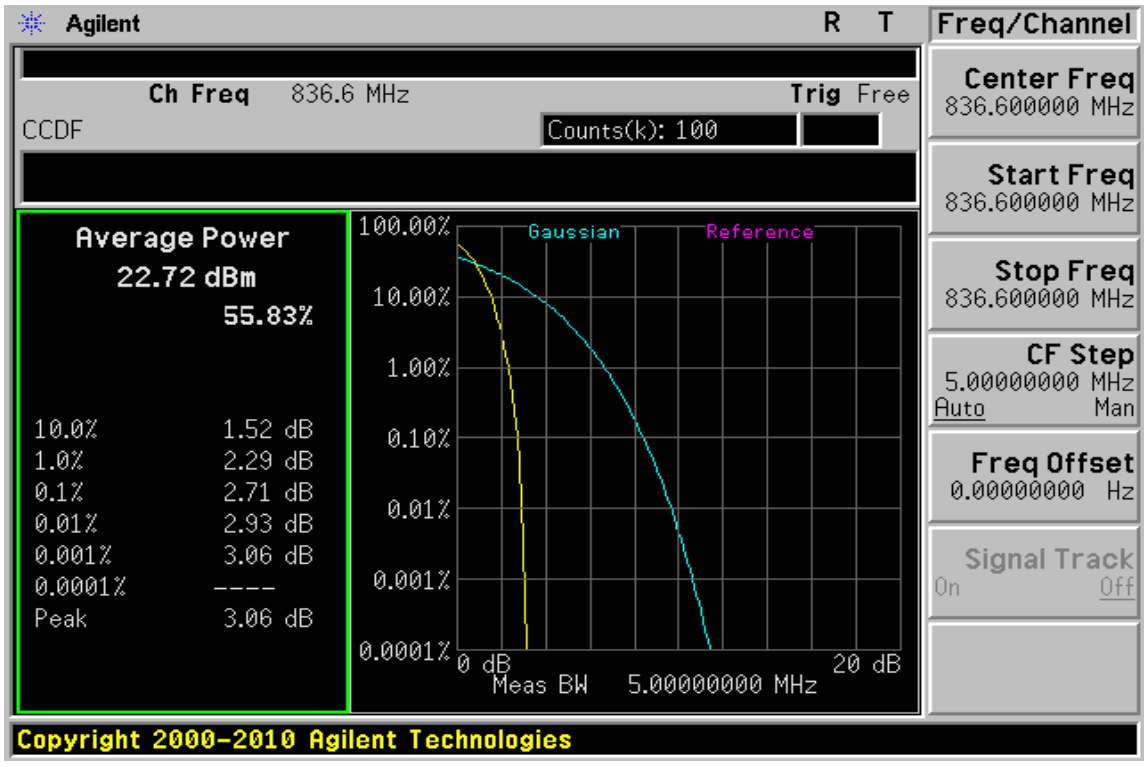
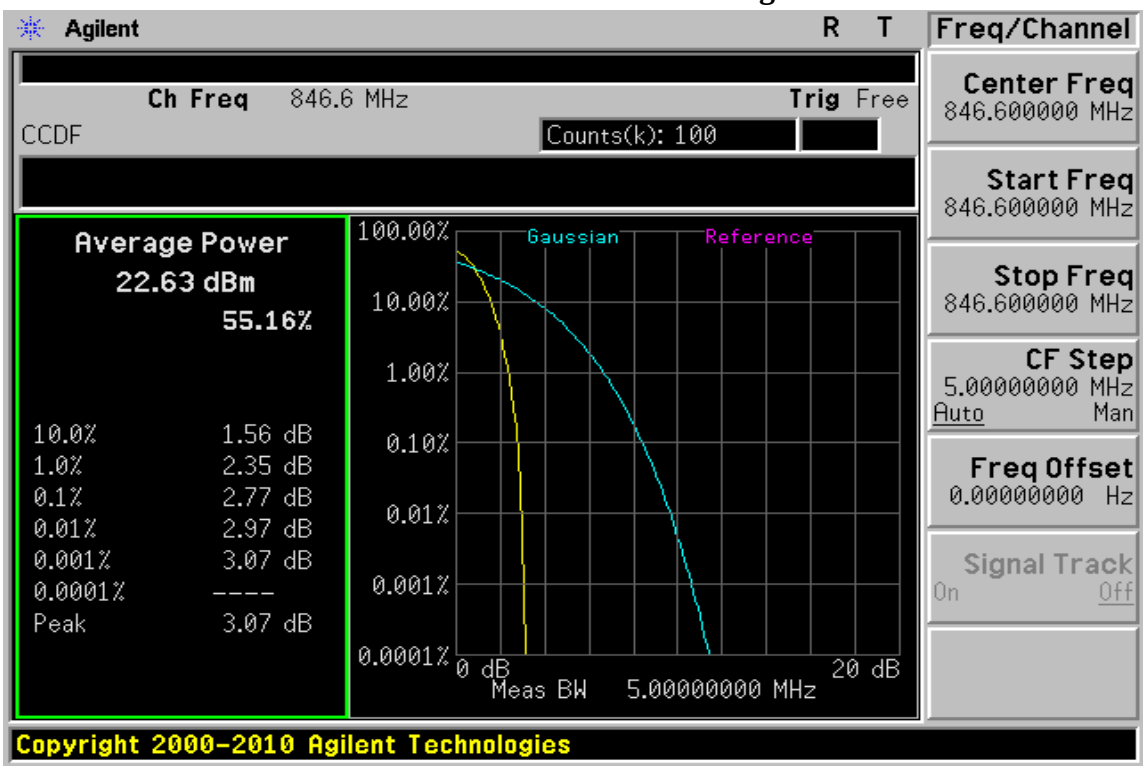
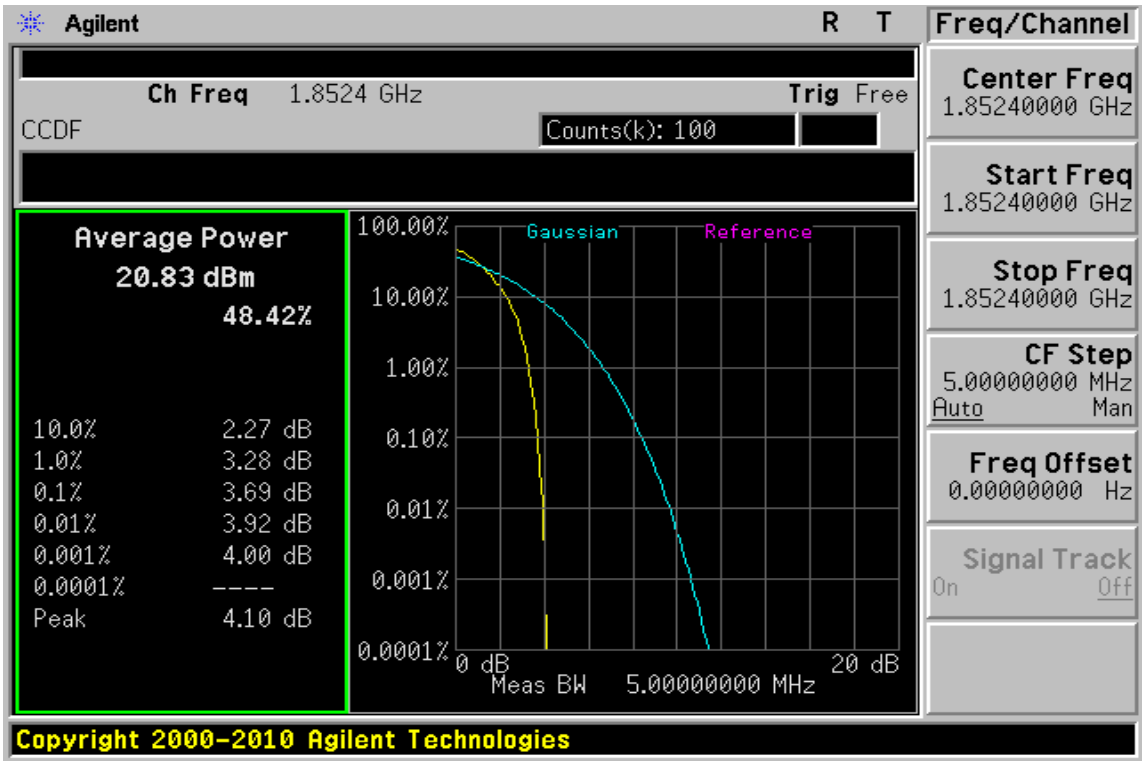


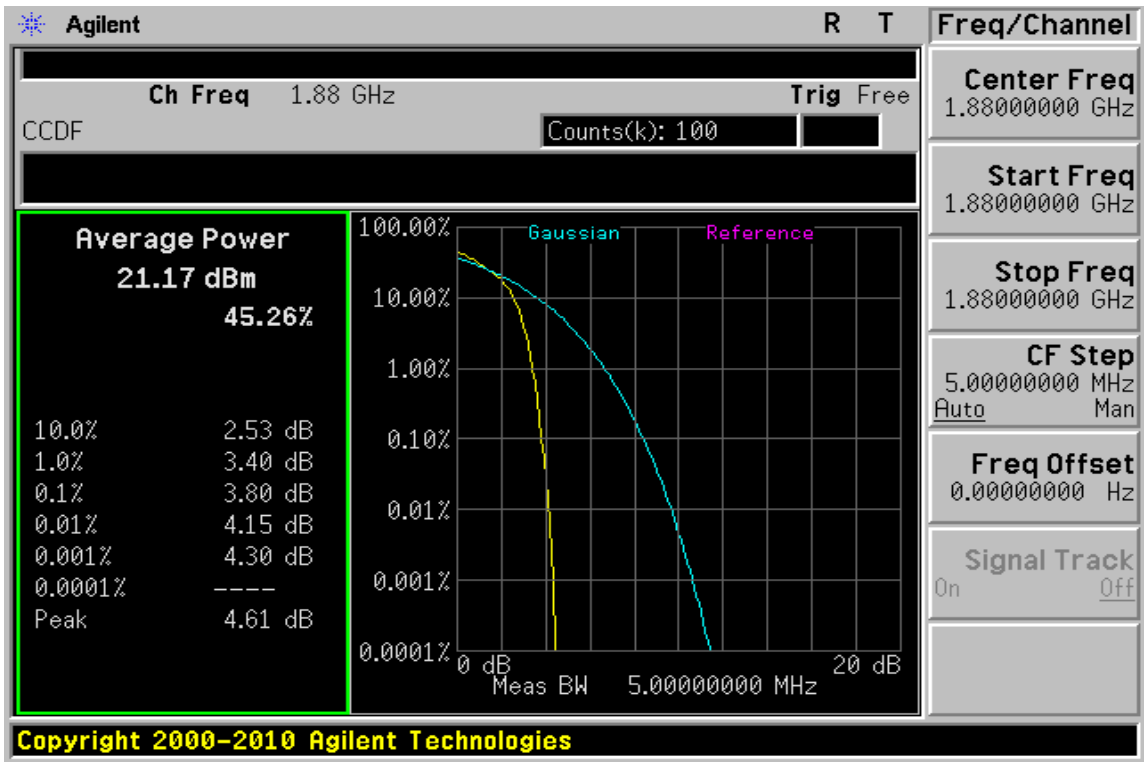
WCDMA Band V Channel High



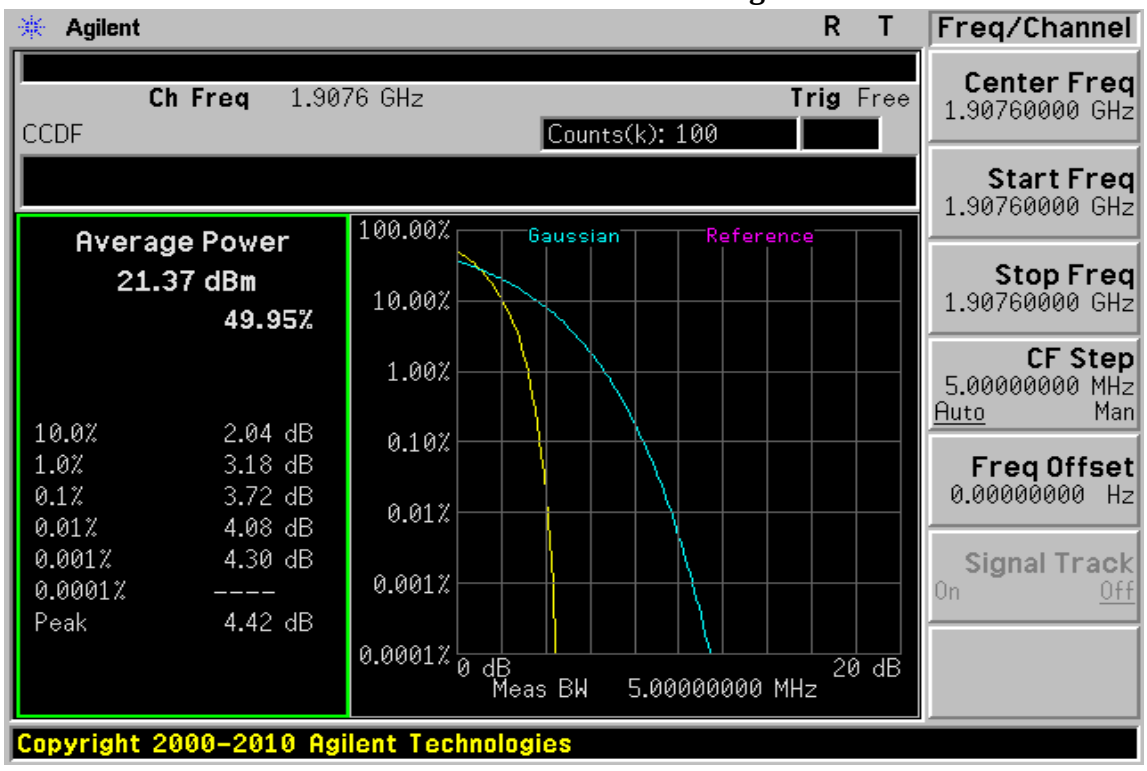
HSDPA Band II Channel Low



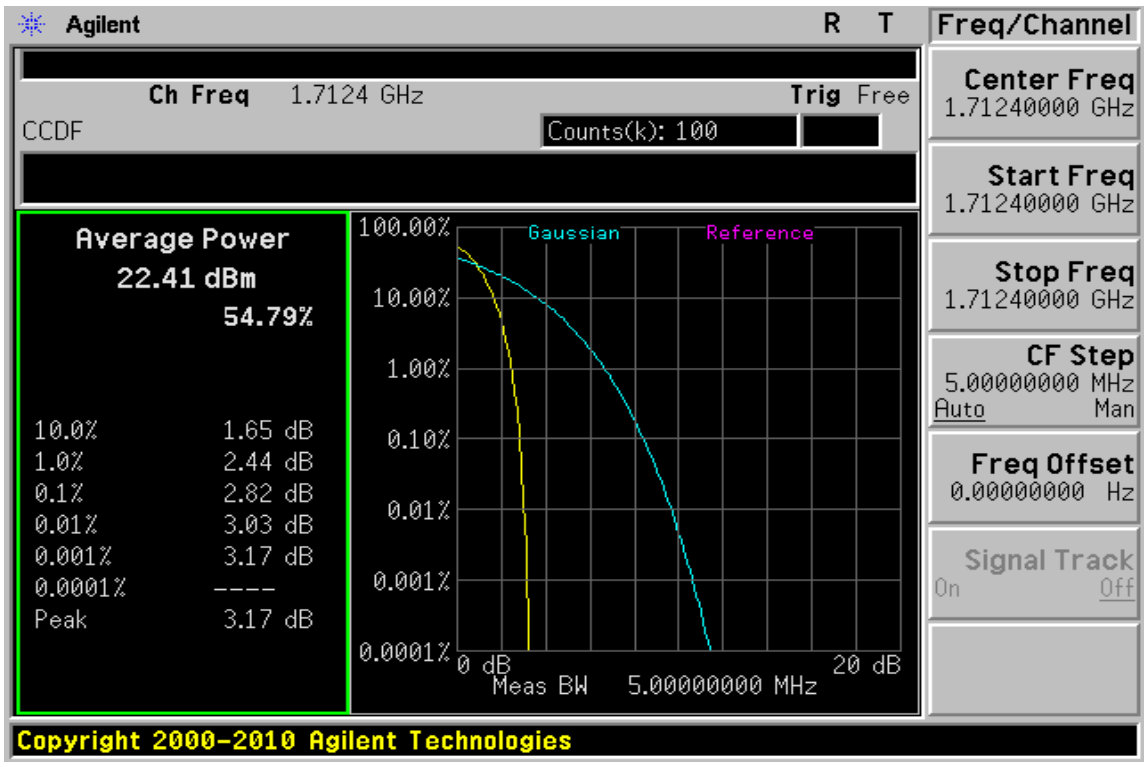
HSDPA Band II Channel Mid



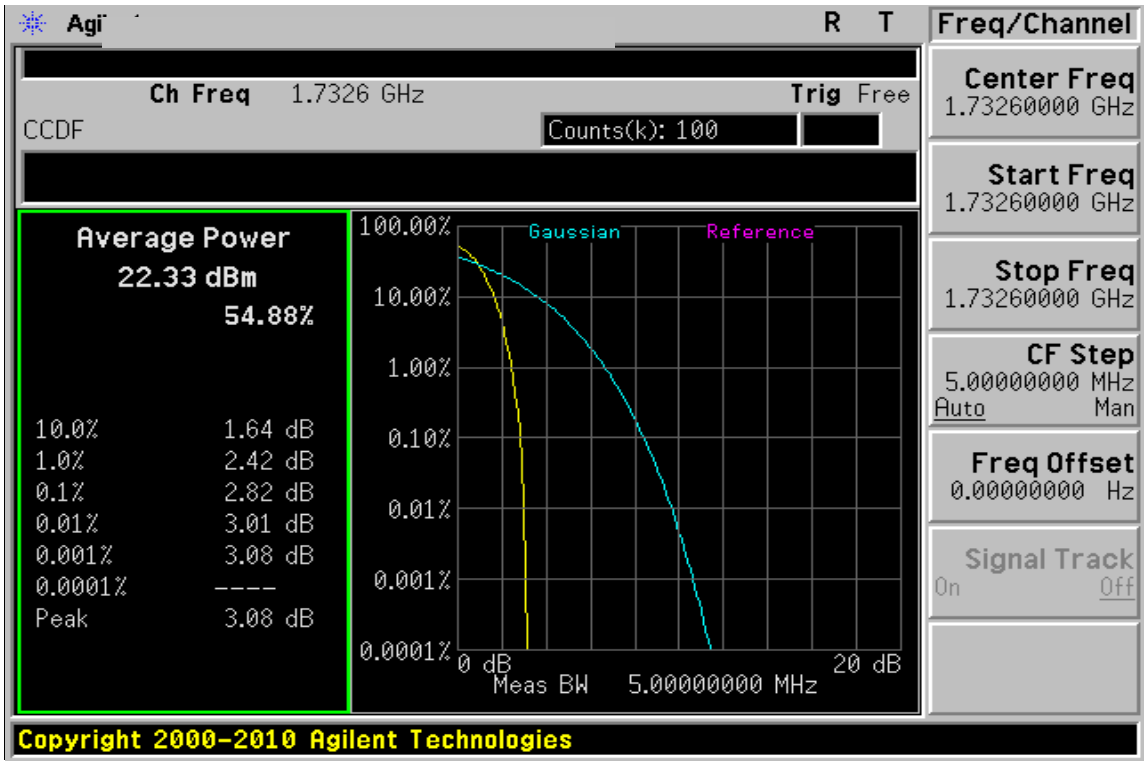
HSDPA Band II Channel High



HSDPA Band IV Channel Low



HSDPA Band IV Channel Mid



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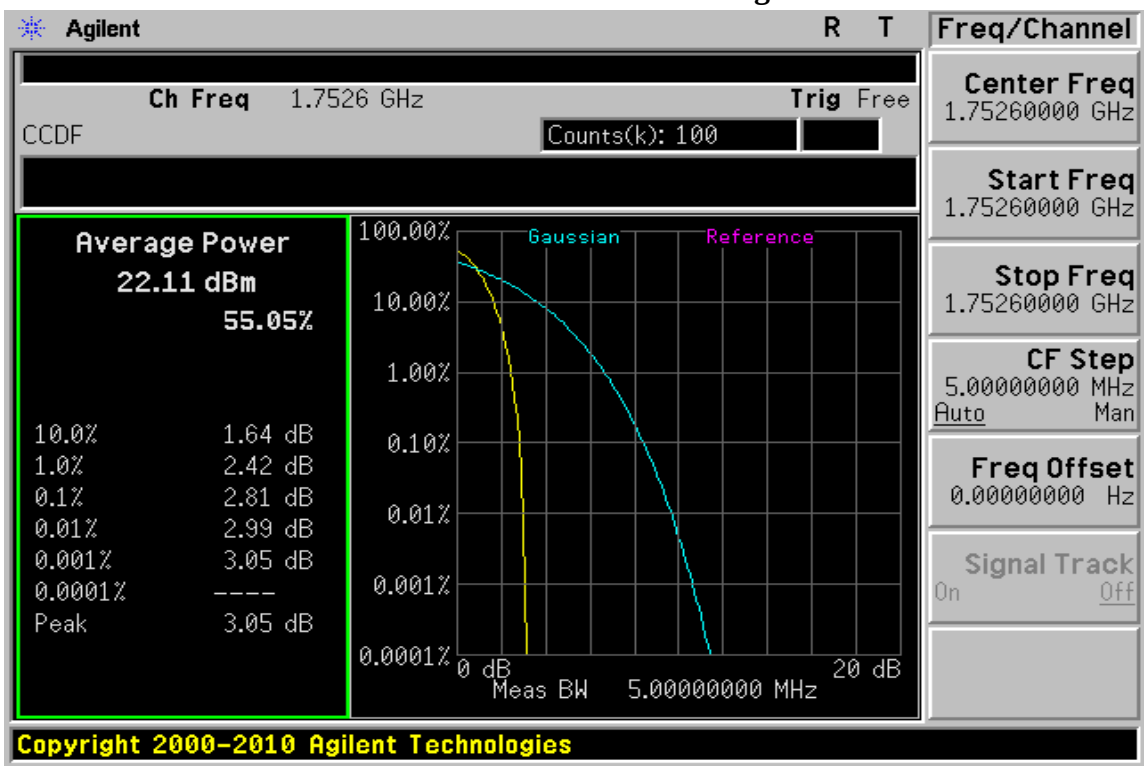
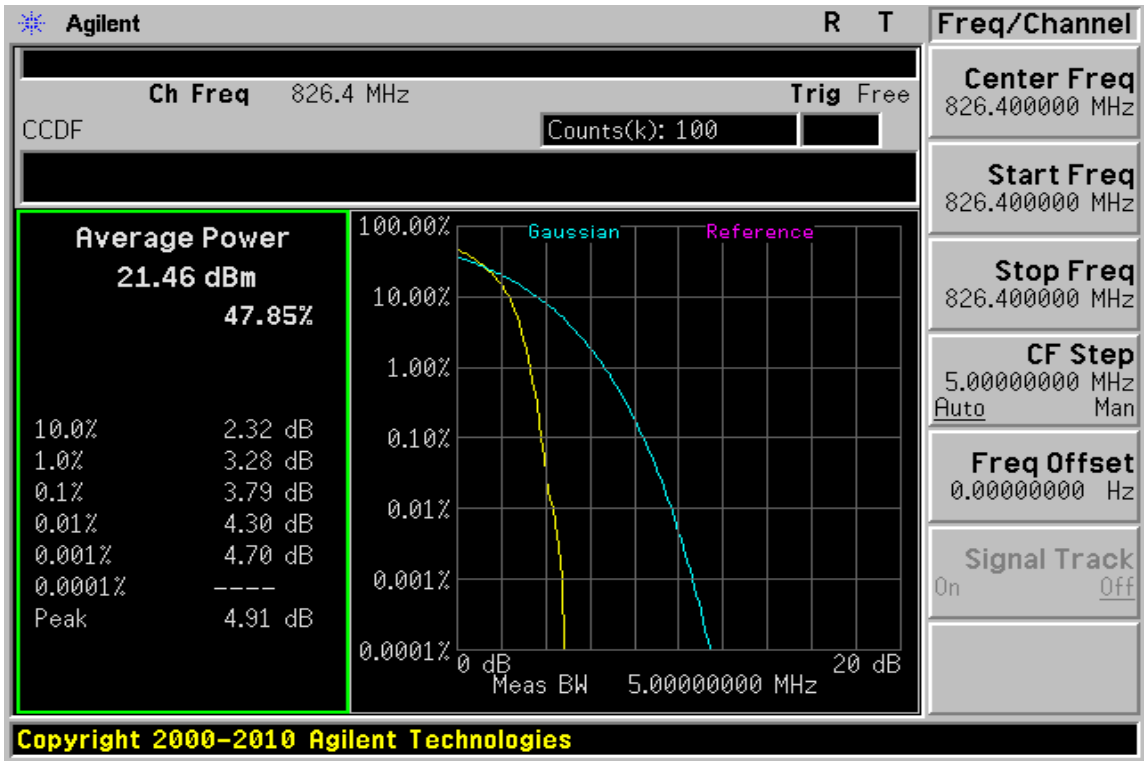


HSDPA Band V Channel Low



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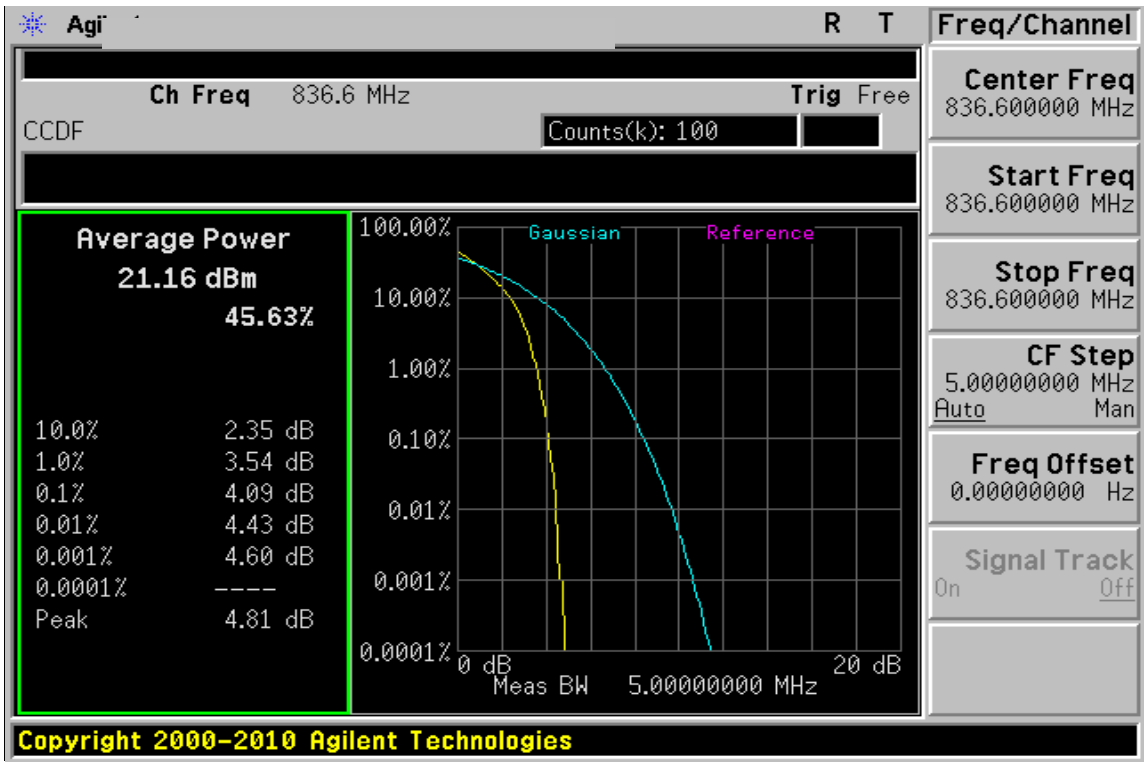
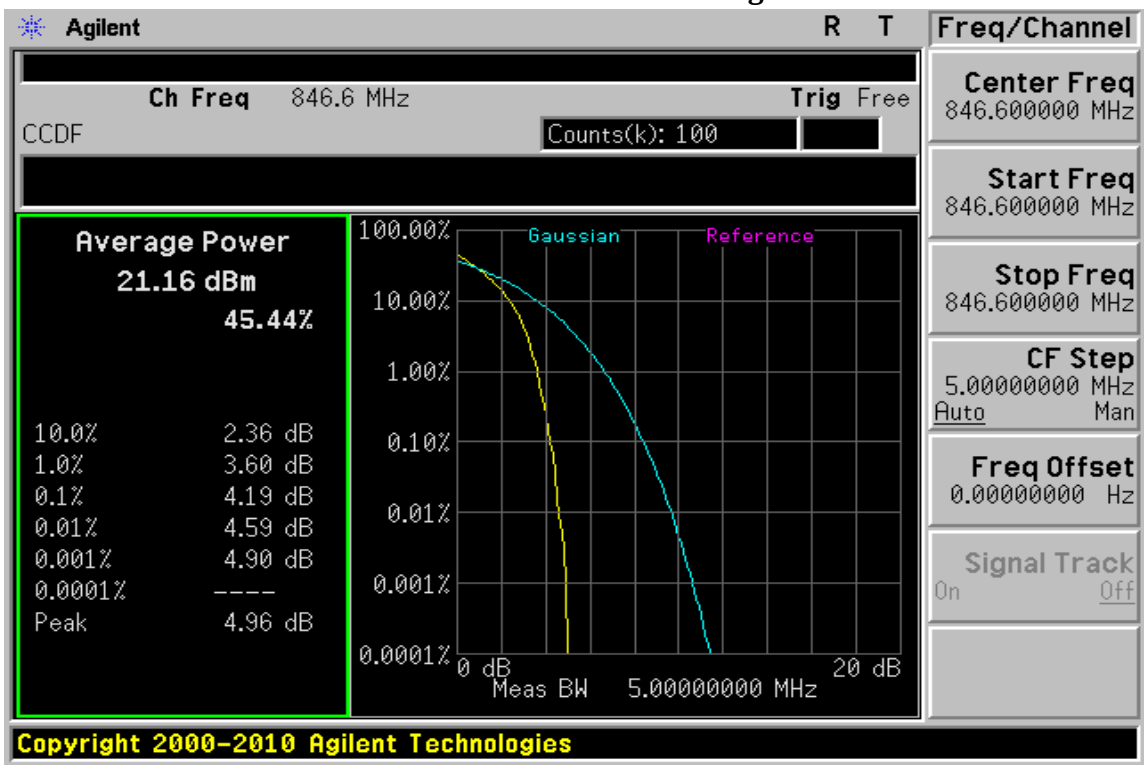
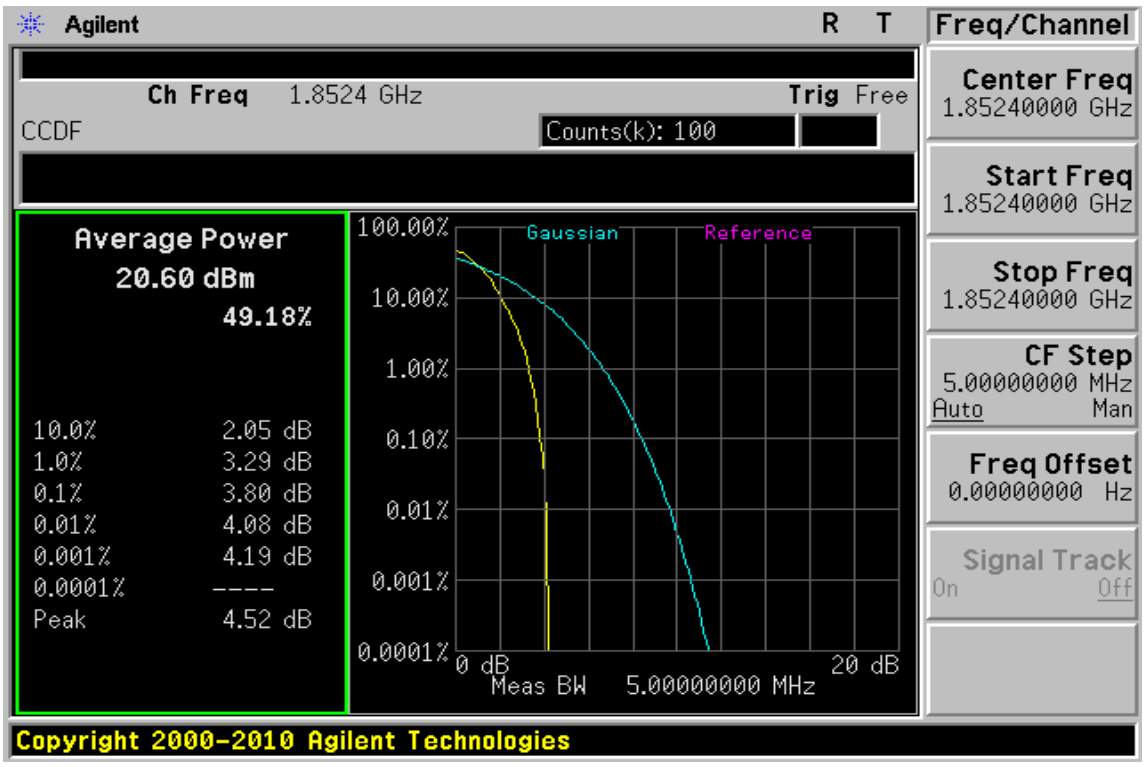


HSDPA Band V Channel High



HSUPA Band II Channel Low



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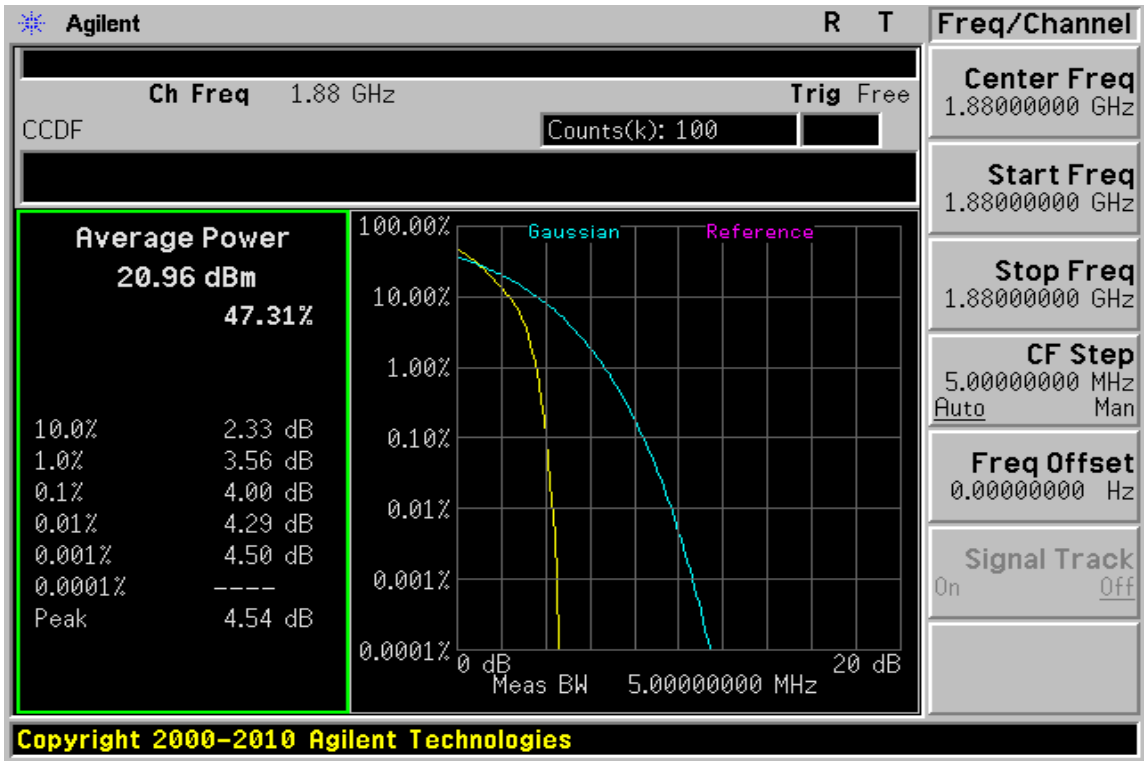

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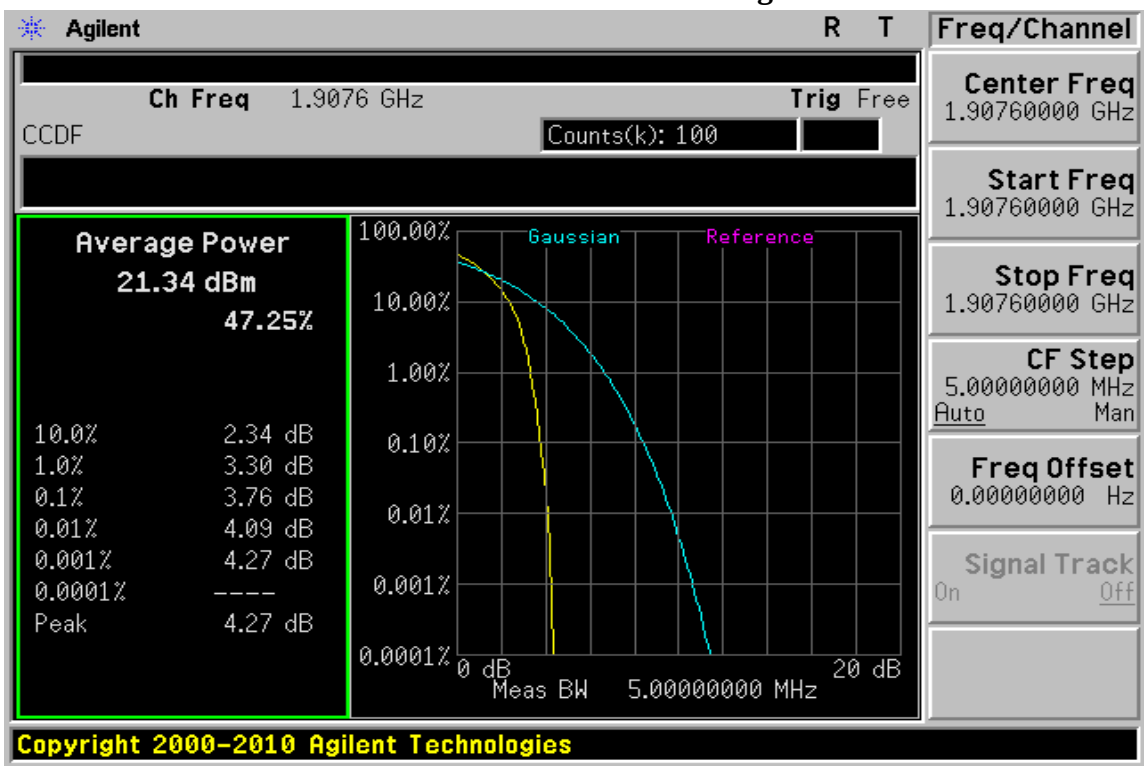
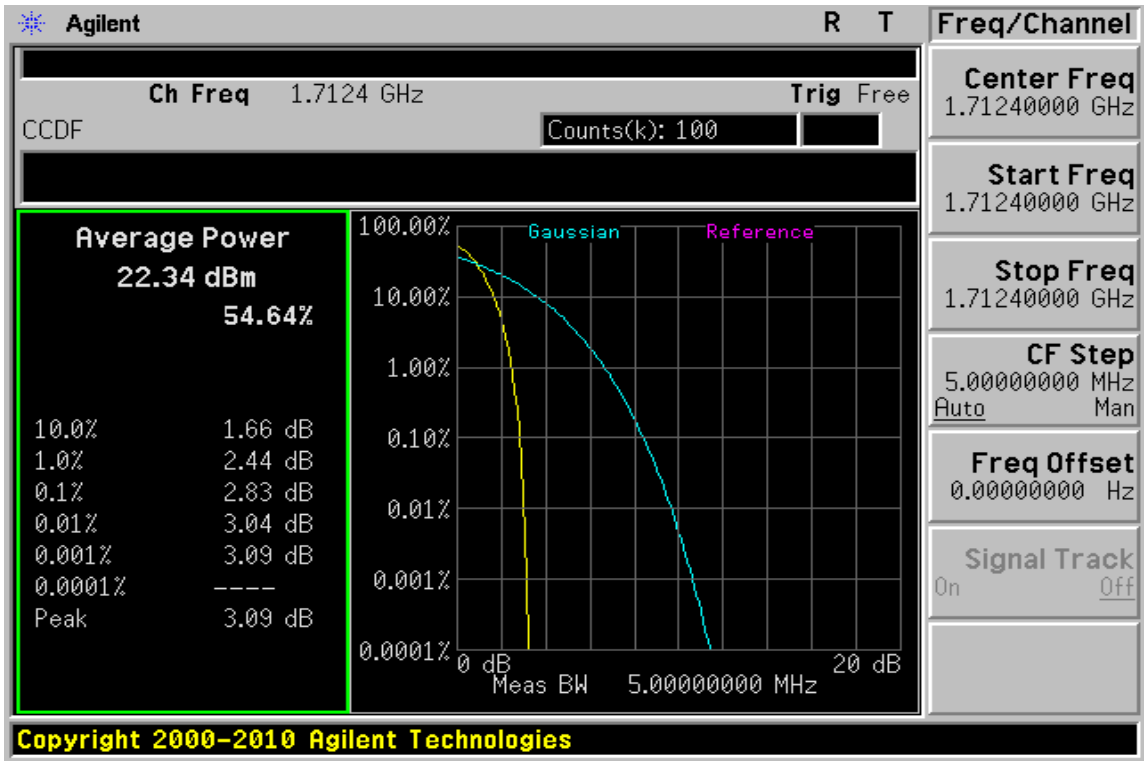


HSUPA Band IV Channel Low



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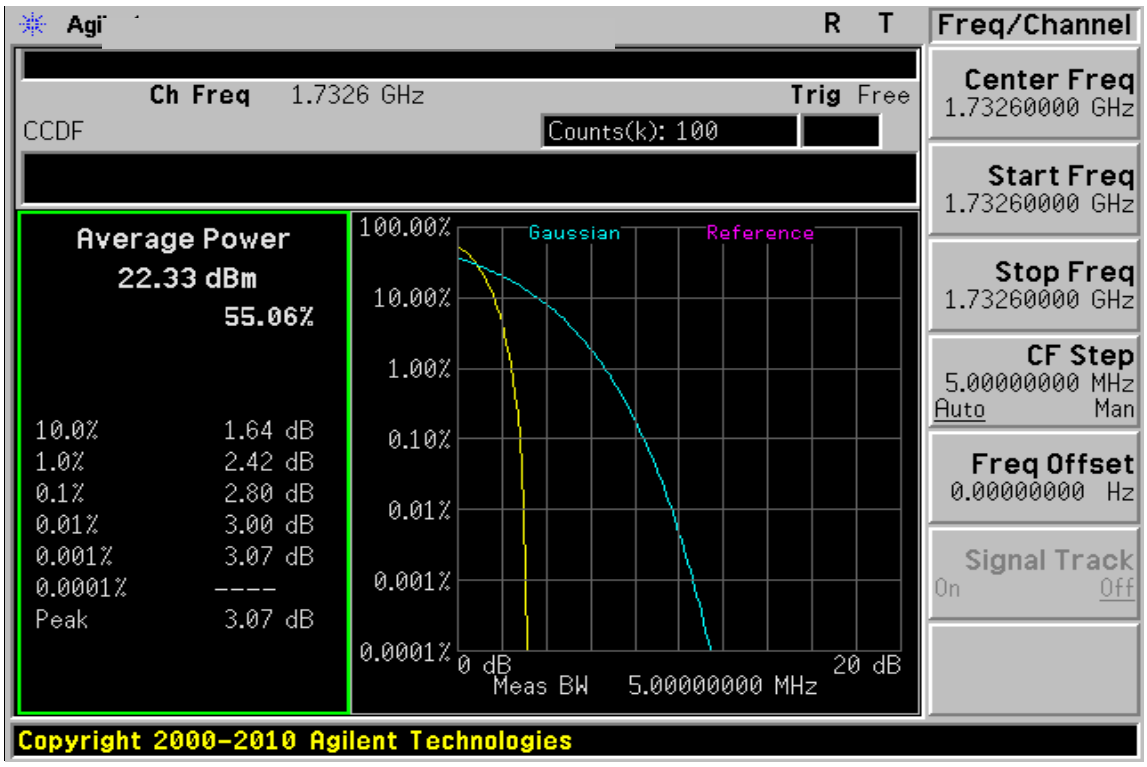

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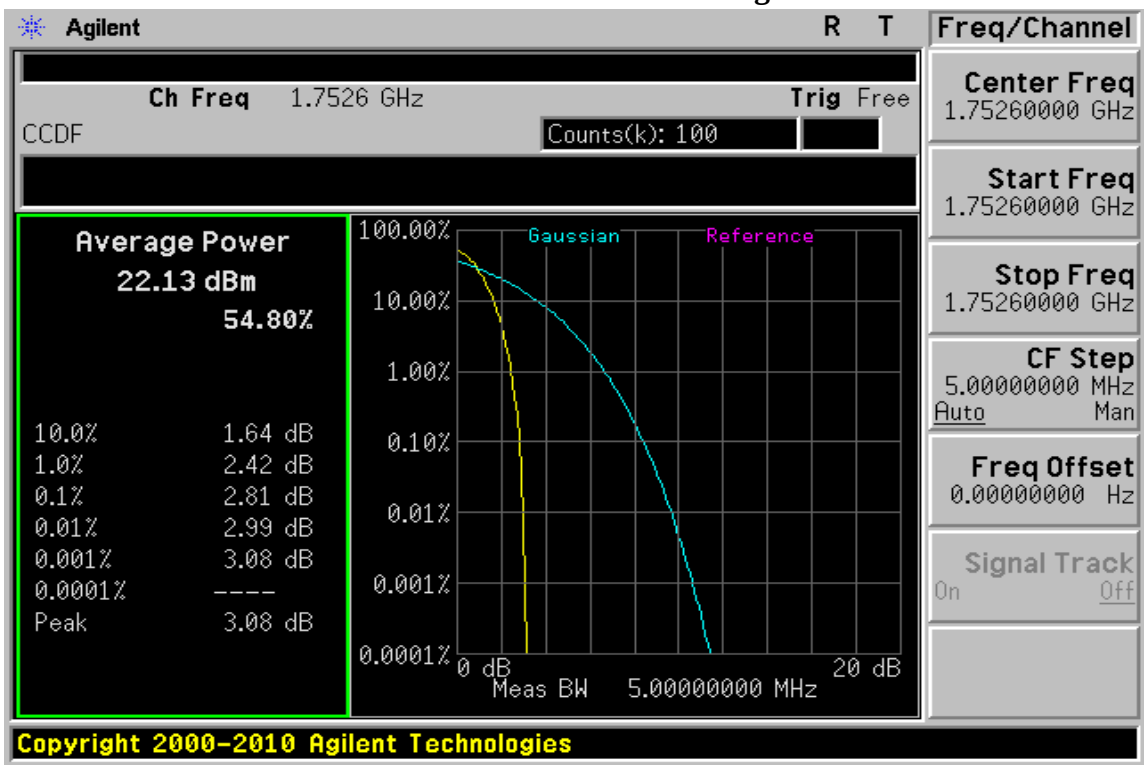

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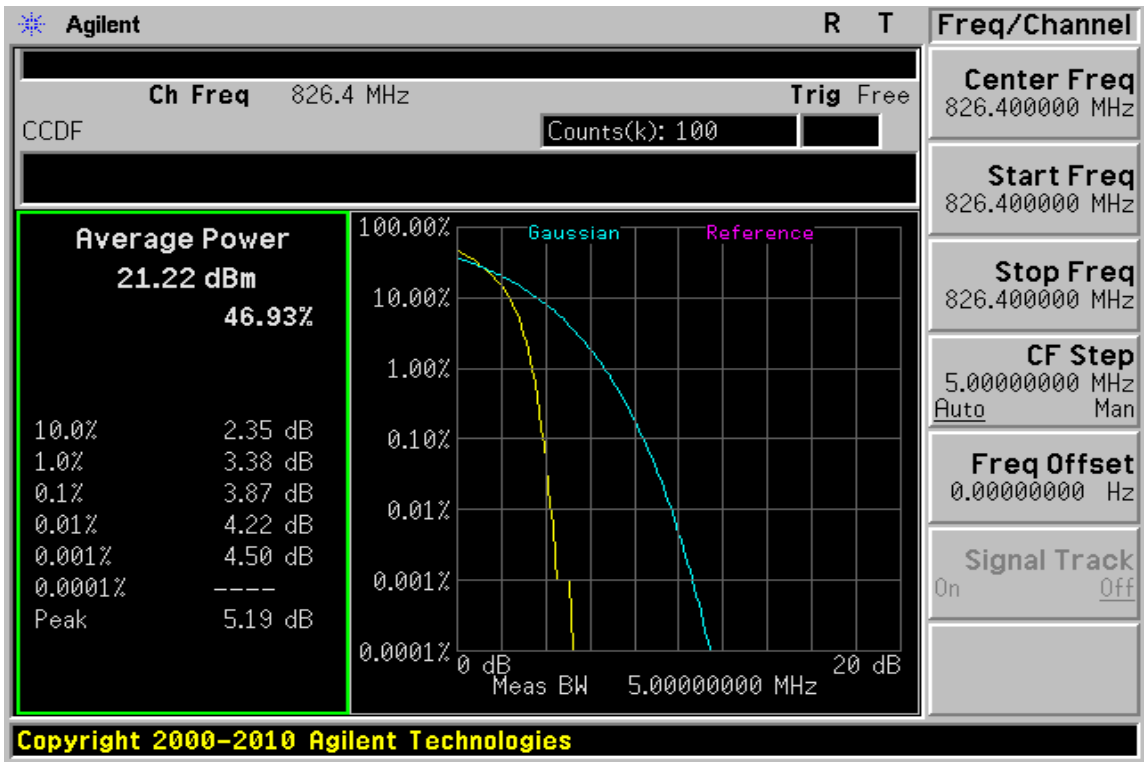
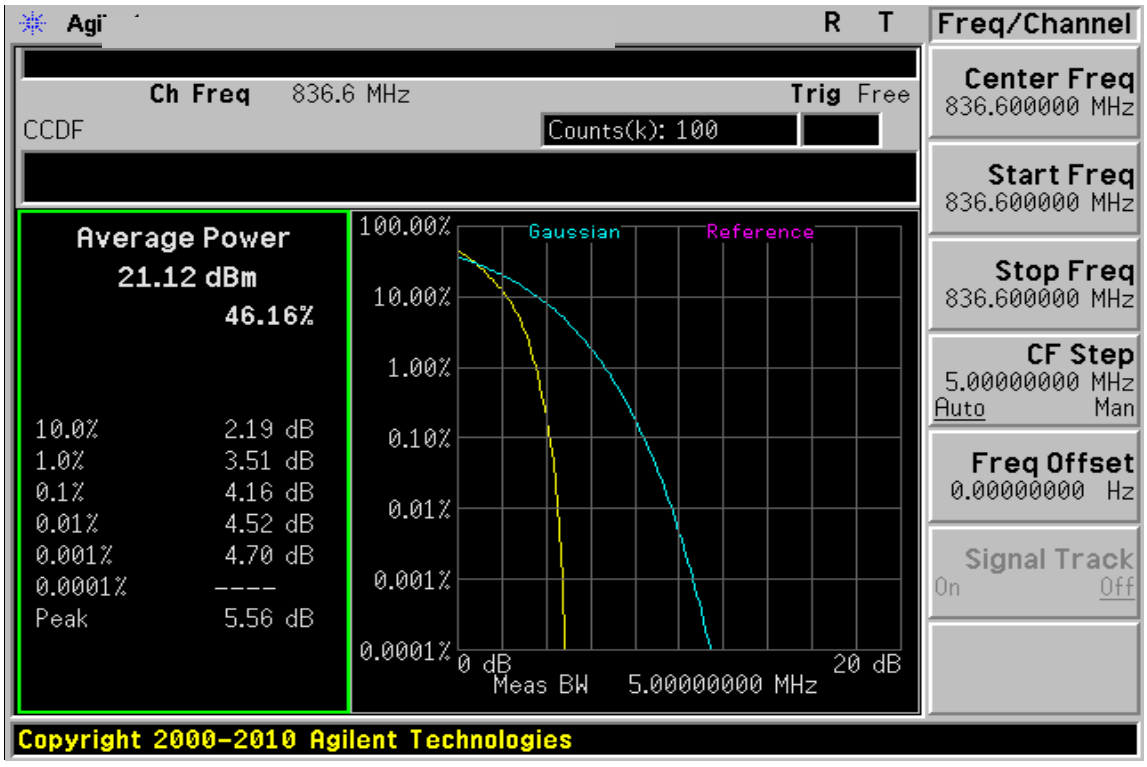


HSUPA Band V Channel Mid



HSUPA Band V Channel High