FCC Test Report

Report No.: AGC05320160702FE02

FCC ID	:	2AE7RSTKSYNC5E
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Smart Phone
BRAND NAME	:	STK
MODEL NAME	:	SYNC 5E
CLIENT	:	Santok Limited.
DATE OF ISSUE	:	Aug. 12, 2016
STANDARD(S)	:	FCC Part 22H & 24E Rules
REPORT VERSION	:	V1.0

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

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 12, 2016	Valid	Original Report

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1. VERIFICATION OF COMPLIANCE

Applicant	Santok Limited.
Address	Santok house,Unit L, Braintree Industrial Estate Braintree Road, South RuislipMiddlesex, HA4 0EJ United Kingdom.
Manufacturer	Santok Limited.
Address	Santok house,Unit L, Braintree Industrial Estate Braintree Road, South RuislipMiddlesex, HA4 0EJ United Kingdom.
Product Designation	Smart Phone
Brand Name	STK
Test Model	SYNC 5E
Date of test	July 27, 2016~Aug. 11, 2016
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA- 603-D-2010. The sample tested as described in this report is in compliance with the FCC Rules Part 22H and 24E.

The test results of this report relate only to the tested sample identified in this report.

Tested By	Dota Zhang	
	Dota Zhang(Zhang Jianfeng)	Aug. 12, 2016
Reviewed By	Bart Xie	
	Bart Xie(Xie Xiaobin)	Aug. 12, 2016
Approved By	Solger Zhang	
	Solger Zhang(Zhang Hongyi) Authorized Officer	Aug. 12, 2016

2. GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Smart Phone
Hardware version:	Y813_MB_V2-1
Software version:	Sync_5e_DS_819_V0.0.1_20160627
Frequency Bands:	☒GSM 850 ☒PCS 1900 (U.S. Bands) ☒GSM 900 ☒DCS 1800 (Non-U.S. Bands) ☒UMTS FDD Band II ☒UMTS FDD Band V (U.S. Bands) ☐UMTS FDD Band I ☐UMTS FDD Band VIII (Non-U.S. Bands)
Antenna:	PIFA Antenna
Type of Modulation	GSM / GPRS : GMSK HSPA:QPSK/16QAM HSUPA:BPSK WCDMA : QPSK
Antenna gain(GSM):	-0.7dBi
Power Supply:	DC 3.8V by battery
Battery parameter:	DC3.8/1950mAh
Adapter Input:	AC100-240V, 50-60Hz 0.15A
Adapter Output:	DC5V,1A
Dual Card:	WCDMA / GSM Card Slot GSM Card Slot
GPRS Class	12
Extreme Vol. Limits:	DC3.4 V to 4.35V (Normal: DC3.8 V)
Extreme Temp. Tolerance	-10℃ to +50℃
*** Note: The High Voltage DC4.35V and Low Voltage DC3.4V were declared by manufacturer, The EUT couldn't be operating normally with higher or lower voltage. Other functions have been performed according to verification procedure except for Bluetooth and MS function. Card 1 can't transmit with Card 2 simultaneously.	

***** Note:** 1.The maximum power levels are GSM for MCS-4**:** GMSK link, and RMC 12.2kbps mode for WCDMA band II, WCDMA band V, only these modes were used for all tests.

2. We found out the test mode with the highest power level after we analyze all the data rates. So we chose the worst case as a representative.

WCDMA Card Slot:

	Maximum ERP/EIRP (dBm)	Max. Conducted Power (dBm)	Max. Average Burst Power (dBm)
GSM 850	30.96	32.34	31.27
PCS 1900	27.82	29.55	28.62
UMTS BAND II	21.61	23.02	21.72
UMTS BAND V	21.76	23.31	21.88

GSM Card Slot:

	Maximum ERP/EIRP (dBm)	Max. Conducted Power (dBm)	Max. Average Burst Power (dBm)
GSM 850	30.22	31.68	30.89
PCS 1900	27.40	28.73	28.11

2.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AE7RSTKSYNC5E**, filing to comply with the FCC Part 22H&24E requirements.

2.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-D-2010, and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.
KDB 971168 D01 Power Meas License Digital Systems v02r02

2.4 TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents of ANSI/TIA-603-D-2010.

2.5 MEASUREMENT INSTRUMENTS

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9168	D69250	Mar 1, 2016	Feb 28, 2017
Trilog Broadband Antenna(substituted antenna) (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96221	July 3, 2016	July 2, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 5, 2016	June 4, 2017
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 5, 2016	June 4, 2017
Spectrum analyzer	Agilent	E4407B	MY46185649	June 5, 2016	June 4, 2017
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 10, 2016	July 9, 2017
Horn Antenna(substituted antenna) (1G-18GHz)	ETS LINDGREN	3117	00034609	Mar 1, 2016	Feb 28, 2017

Spectrum Analyzer	Agilent	E4411B	MY4511453	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 6, 2016	July 5, 2017
RF Cable	SCHWARZBECK	AK9515H	96220	July 7, 2016	July 6, 2017
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 5, 2016	June 4, 2017
Artificial Mains Network	Narda	L2-16B	000WX31025	July 7, 2016	July 6, 2017
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 7, 2016	July 6, 2017
RF Cable	SCHWARZBECK	AK9515E	96222	July 3, 2016	July 2, 2017
Shielded Room	CHENGYU	843	PTS-002	June 5, 2016	June 4, 2017
COMMUNICATION TESTER	AGILENT	8960	GB46490550	July 25, 2015	July 24, 2016
RF attenuator	N/A	RFA20db	68	N/A	N/A
Signal Generator	AGILENT	N5182A	MY50140530	Oct 16,2015	Oct 15,2016
Signal Generator(substituted equipment)	AGILENT	E8257D	MY45141029	Oct 16,2015	Oct 15,2016

2.6 SPECIAL ACCESSORIES

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

2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

3.3 GENERAL TECHNICAL REQUIREMENTS

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

3.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Smart Phone	SYNC 5E	2AE7RSTKSYNC5E	EUT
2	Adapter	HJ-0501000B3-US	DC5V /1000mA	Accessory
3	Battery	SYNC 5E	DC3.8V/1950mAh	Accessory
4	Earphone	SYNC 5E	N/A	Accessory
5	USB Cable	SYNC 5E	N/A	Accessory

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

4. SUMMARY OF TEST RESULTS

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

5. DESCRIPTION OF TEST MODES

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

*****Note:** 1.GSM/GPRS 850, GSM/GPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band V, mode have been tested during the test.

2. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions

3. All antenna port conducted emissions testing was performed on a test bench with the antenna Port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

6. OUTPUT POWER

6.1 CONDUCTED OUTPUT POWER

6.1.1 MEASUREMENT METHOD

The transmitter output port was connected to base station.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

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

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes (GSM/GPRS850, GSM/GPRS1900, WCDMA/HSPA band II, WCDMA/HSPA band V) at 3 typical channels (the Top Channel, the Middle Channel and the Bottom Channel) for each band.

6.1.2 MEASUREMENT RESULT

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

GSM 850:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance	Avg.Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)
GSM850	824.2	33	**32.34**	-0.66	**31.27**	-9	22.27
	836.6	33	31.89	-1.11	31.14	-9	22.14
	848.8	33	31.85	-1.15	31.20	-9	22.2
GPRS850 (1 Slot)	824.2	33	31.43	-1.57	30.12	-9	21.12
	836.6	33	31.18	-1.82	30.34	-9	21.34
	848.8	33	31.22	-1.78	30.13	-9	21.13
GPRS850 (2 Slot)	824.2	30	29.17	-0.83	28.42	-6	22.42
	836.6	30	29.32	-0.68	28.39	-6	22.39
	848.8	30	29.18	-0.82	28.27	-6	22.27
GPRS850 (3 Slot)	824.2	28.23	27.28	-0.95	26.11	-4.26	21.85
	836.6	28.23	27.04	-1.19	26.46	-4.26	22.2
	848.8	28.23	27.03	-1.2	26.37	-4.26	22.11
GPRS850 (4 Slot)	824.2	27	26.27	-0.73	25.44	-3	22.44
	836.6	27	26.12	-0.88	25.38	-3	22.38
	848.8	27	26.23	-0.77	25.75	-3	22.75

PCS 1900:

Mode	Frequency (MHz)	Reference Power	Peak Power	Tolerance	Avg.Burst Power	Duty cycle Factor(dB)	Frame Power(dBm)
GSM1900	1850.2	30	**29.55**	-0.45	**28.62**	-9	19.62
	1880	30	29.21	-0.79	28.44	-9	19.44
	1909.8	30	29.32	-0.68	28.38	-9	19.38
GPRS1900 (1 Slot)	1850.2	30	28.51	-1.49	27.04	-9	18.04
	1880	30	28.17	-1.83	27.28	-9	18.28
	1909.8	30	28.63	-1.37	27.14	-9	18.14
GPRS1900 (2 Slot)	1850.2	27	26.18	-0.82	25.32	-6	19.32
	1880	27	26.27	-0.73	25.24	-6	19.24
	1909.8	27	26.28	-0.72	25.27	-6	19.27
GPRS1900 (3 Slot)	1850.2	25.23	24.31	-0.92	23.15	-4.26	18.89
	1880	25.23	24.29	-0.94	23.36	-4.26	19.1
	1909.8	25.23	24.21	-1.02	23.18	-4.26	18.92
GPRS1900 (4 Slot)	1850.2	24	23.39	-0.61	22.39	-3	19.39
	1880	24	23.61	-0.39	22.17	-3	19.17
	1909.8	24	23.48	-0.52	22.55	-3	19.55

UMTS BAND II

Mode	Frequency (MHz)	Reference power	Peak Power	Tolerance	Avg.Burst Power
WCDMA 1900 RMC	1852.6	24	**23.02**	-0.98	**21.72**
	1880	24	22.89	-1.11	21.51
	1907.4	24	22.75	-1.25	21.42
WCDMA 1900 AMR	1852.6	24	22.44	-1.56	21.18
	1880	24	22.38	-1.62	21.19
	1907.4	24	22.17	-1.83	21.13
HSDPA Subtest 1	1852.6	24	22.19	-1.81	20.71
	1880	24	22.38	-1.62	20.29
	1907.4	24	22.49	-1.51	20.23
HSDPA Subtest 2	1852.6	24	22.56	-1.44	20.17
	1880	24	22.38	-1.62	20.25
	1907.4	24	22.47	-1.53	20.39
HSDPA Subtest 3	1852.6	24	22.29	-1.71	20.42
	1880	24	22.35	-1.65	20.18
	1907.4	24	22.18	-1.82	20.23
HSDPA Subtest 4	1852.6	24	22.29	-1.71	20.49
	1880	24	22.15	-1.85	20.15
	1907.4	24	22.12	-1.88	20.17
HSUPA Subtest 1	1852.6	24	22.74	-1.26	20.29
	1880	24	22.33	-1.67	20.32
	1907.4	24	22.42	-1.58	20.14
HSUPA Subtest 2	1852.6	24	22.26	-1.74	20.24
	1880	24	22.29	-1.71	20.37
	1907.4	24	22.15	-1.85	20.16
HSUPA Subtest 3	1852.6	24	22.28	-1.72	20.12
	1880	24	22.32	-1.68	20.38
	1907.4	24	22.26	-1.74	20.52
HSUPA Subtest 4	1852.6	24	22.27	-1.73	20.14
	1880	24	22.21	-1.79	20.06
	1907.4	24	22.14	-1.86	20.33
HSUPA Subtest 5	1852.6	24	22.13	-1.87	20.15
	1880	24	22.19	-1.81	20.23

	1907.4	24	22.15	-1.85	20.11

UMTS BAND V

Mode	Frequency (MHz)	Reference power	Peak Power	Tolerance	Avg.Burst Power
WCDMA 850 RMC	826.6	24	**23.31**	-0.69	**21.88**
	836.4	24	23.07	-0.93	21.57
	846.4	24	23.13	-0.87	21.72
WCDMA 850 AMR	826.6	24	22.69	-1.31	21.34
	836.4	24	22.58	-1.42	21.18
	846.4	24	22.64	-1.36	21.28
HSDPA Subtest 1	826.6	24	22.17	-1.83	20.14
	836.4	24	22.23	-1.77	20.22
	846.4	24	22.43	-1.57	20.21
HSDPA Subtest 2	826.6	24	22.19	-1.81	20.12
	836.4	24	22.34	-1.66	20.14
	846.4	24	22.36	-1.64	20.02
HSDPA Subtest 3	826.6	24	22.15	-1.85	20.17
	836.4	24	22.22	-1.78	20.26
	846.4	24	22.18	-1.82	20.19
HSDPA Subtest 4	826.6	24	22.52	-1.48	20.34
	836.4	24	22.16	-1.84	20.25
	846.4	24	22.21	-1.79	20.16
HSUPA Subtest 1	826.6	24	22.31	-1.69	20.15
	836.4	24	22.29	-1.71	20.29
	846.4	24	22.56	-1.44	20.24
HSUPA Subtest 2	826.6	24	22.27	-1.73	20.23
	836.4	24	22.16	-1.84	20.21
	846.4	24	22.32	-1.68	20.29
HSUPA Subtest 3	826.6	24	22.47	-1.53	20.2
	836.4	24	22.51	-1.49	20.15
	846.4	24	22.18	-1.82	20.16
HSUPA Subtest 4	826.6	24	22.23	-1.77	20.34
	836.4	24	22.47	-1.53	20.15
	846.4	24	22.11	-1.89	20.32
HSUPA Subtest 5	826.6	24	22.16	-1.84	20.37
	836.4	24	22.23	-1.77	20.14

	846.4	24	22.18	-1.82	20.38

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

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

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

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

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

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

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

6.2 RADIATED OUTPUT POWER

6.2.1 MEASUREMENT METHOD

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

1. Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signal operating below 1GHz are performed using dipole antennas. Measurements on signals operating above 1GHz are performed using broadband horn antennas. All measurements are performed as RMS average measurements while the EUT operating at its maximum duty cycle, at maximum power, and at the approximate frequencies.
2. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
3. The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. The ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl
4. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
5. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
6. The EUT is then put into continuously transmitting mode at its maximum power level.
7. Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
8. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).
9. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi...

6.2.2 PROVISIONS APPLICABLE

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

Mode	Nominal Peak Power
GSM 850	<=38.45 dBm (7W)
PCS 1900	<=33 dBm (2W)
UMTS BAND II	<=33 dBm (2W)
UMTS BANDV	<=38.45 dBm (7W)

6.2.3 MEASUREMENT RESULT

Radiated Power (ERP) for GSM 850				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. ERP	
GSM850	824.2	**30.96**	Horizontal	Pass
	836.6	30.72	Horizontal	Pass
	848.8	30.64	Horizontal	Pass
	824.2	29.81	Vertical	Pass
	836.6	28.54	Vertical	Pass
	848.8	28.66	Vertical	Pass

Radiated Power (E.I.R.P) for PCS 1900				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
GSM 1900	1850.2	27.49	Horizontal	Pass
	1880.0	**27.82**	Horizontal	Pass
	1909.8	27.57	Horizontal	Pass
	1850.2	26.73	Vertical	Pass
	1880.0	26.61	Vertical	Pass
	1909.8	25.55	Vertical	Pass

Radiated Power (E.I.R.P) for UMTS band II				
Mode	Frequency	Result		
		Max. Peak E.I.R.P (dBm)	Polarization Of Max. E.I.R.P	
RMC 12.2kbps	1852.6	**21.61**	Horizontal	Pass
	1880	21.43	Horizontal	Pass
	1907.4	21.28	Horizontal	Pass
	1852.6	21.33	Vertical	Pass
	1880	20.81	Vertical	Pass
	1907.4	20.93	Vertical	Pass

Radiated Power (ERP) for UMTS band V				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. E.I.R.P.	
RMC 12.2kbps	826.6	**21.76**	Horizontal	Pass
	836.4	20.51	Horizontal	Pass
	846.4	21.51	Horizontal	Pass
	826.6	20.63	Vertical	Pass
	836.4	20.48	Vertical	Pass
	846.4	21.32	Vertical	Pass

Note: Above is the worst mode data.

6.3. PEAK-TO-AVERAGE RATIO

6.3.1 MEASUREMENT METHOD

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

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

6.3.2 PROVISIONS APPLICABLE

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

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

6.3.3 MEASUREMENT RESULT

Modes	GSM850(GSM)		
Channel	128	190	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.6	848.8
Peak-To-Average Ratio (dB)/GSM	1.07	0.75	0.65

Modes	PCS 1900 (GSM)		
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
Peak-To-Average Ratio (dB)/GSM	0.93	0.77	0.94

Modes	UMTS BAND II		
Channel	9663	9800	9937
	(Low)	(Mid)	(High)
Frequency (MHz)	1852.6	1880	1907.4
Peak-To-Average Ratio (dB)	1.3	1.38	1.33

Modes	UMTS BAND V		
Channel	4358	4407	4457
	(Low)	(Mid)	(High)
Frequency (MHz)	826.6	836.6	846.4
Peak-To-Average Ratio (dB)	1.43	1.5	1.41

7. OCCUPIED BANDWIDTH

7.1 TEST OVERVIEW

1. The Occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper Frequency limits, the mean power radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

2. RBW=1~5% of the expected OBW, VBW>=3 x RBW, Detector=Peak, Trace mode=max hold, Sweep=auto couple, and the trace was allowed to stabilize.

7.2 PROVISIONS APPLICABLE

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

7.3 MEASUREMENT RESULT

APPENDIX A:BANDWIDTH

Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
GSM850	GSM	LCH	247.47	317.64	PASS
		MCH	241.66	312.28	PASS
		HCH	238.89	322.32	PASS

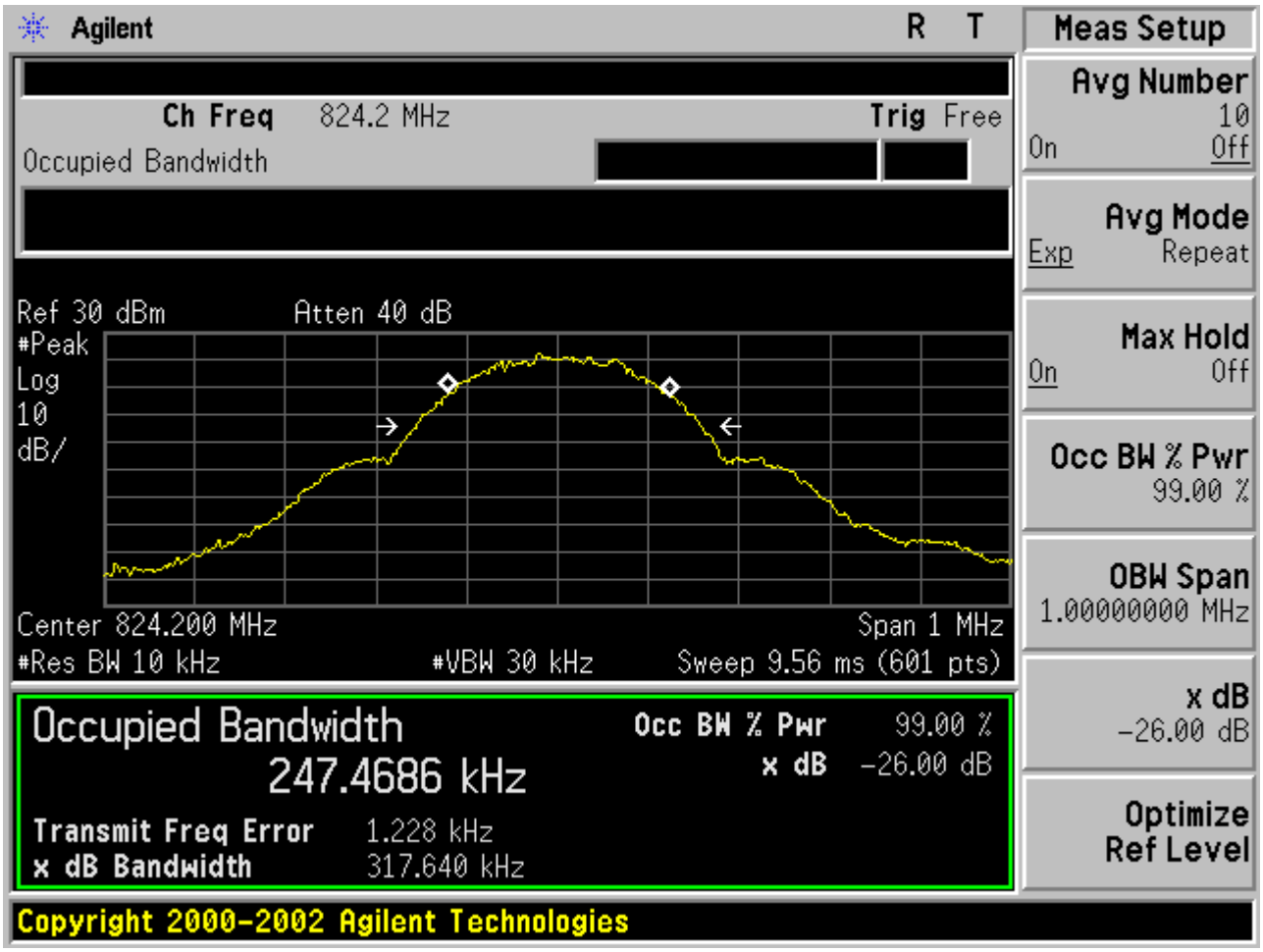
Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
GSM1900	GSM	LCH	247.63	317.13	PASS
		MCH	243.53	307.52	PASS
		HCH	245.95	316.16	PASS

For GSM

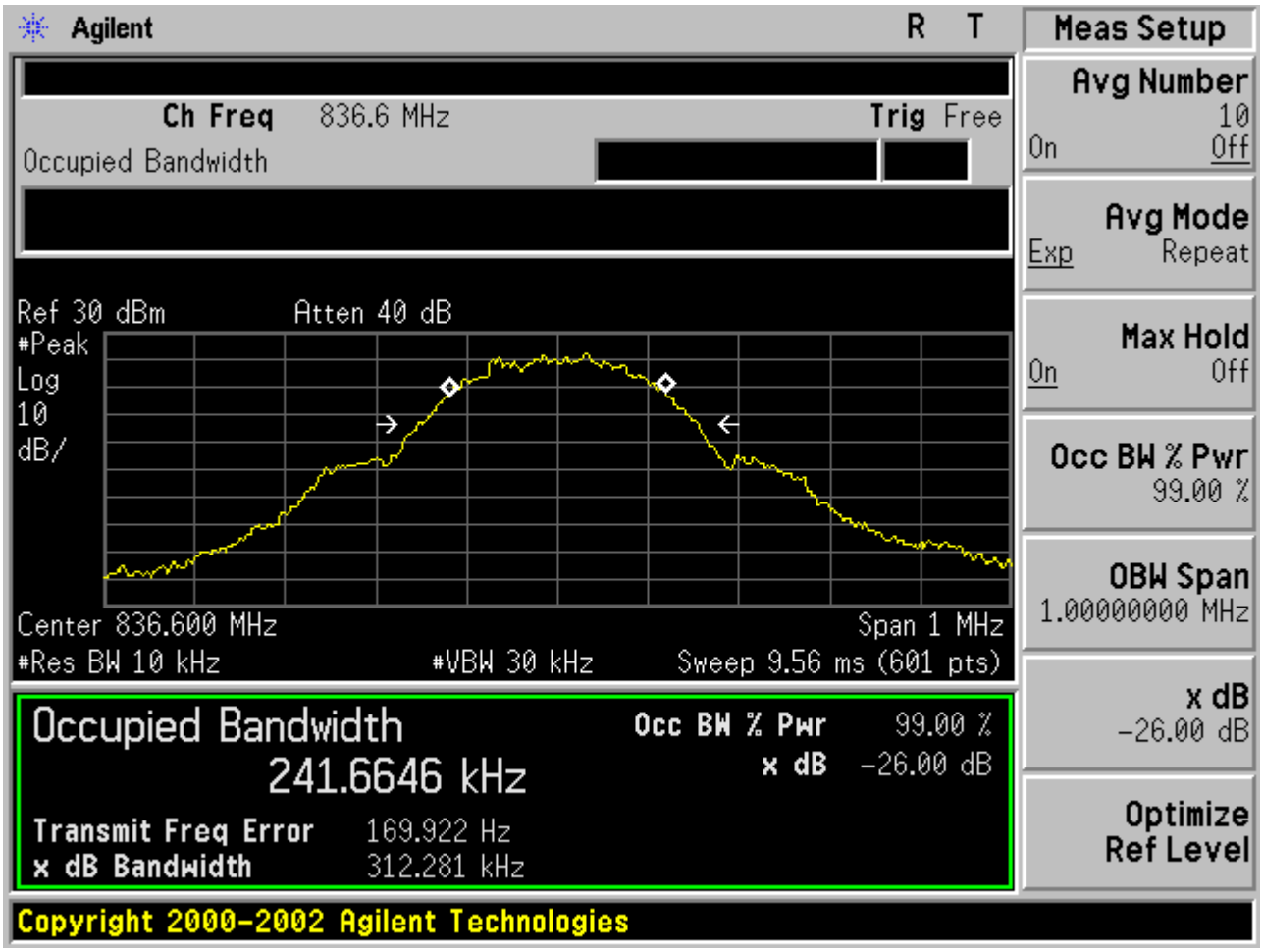
Test Band=GSM850

Test Mode=GSM

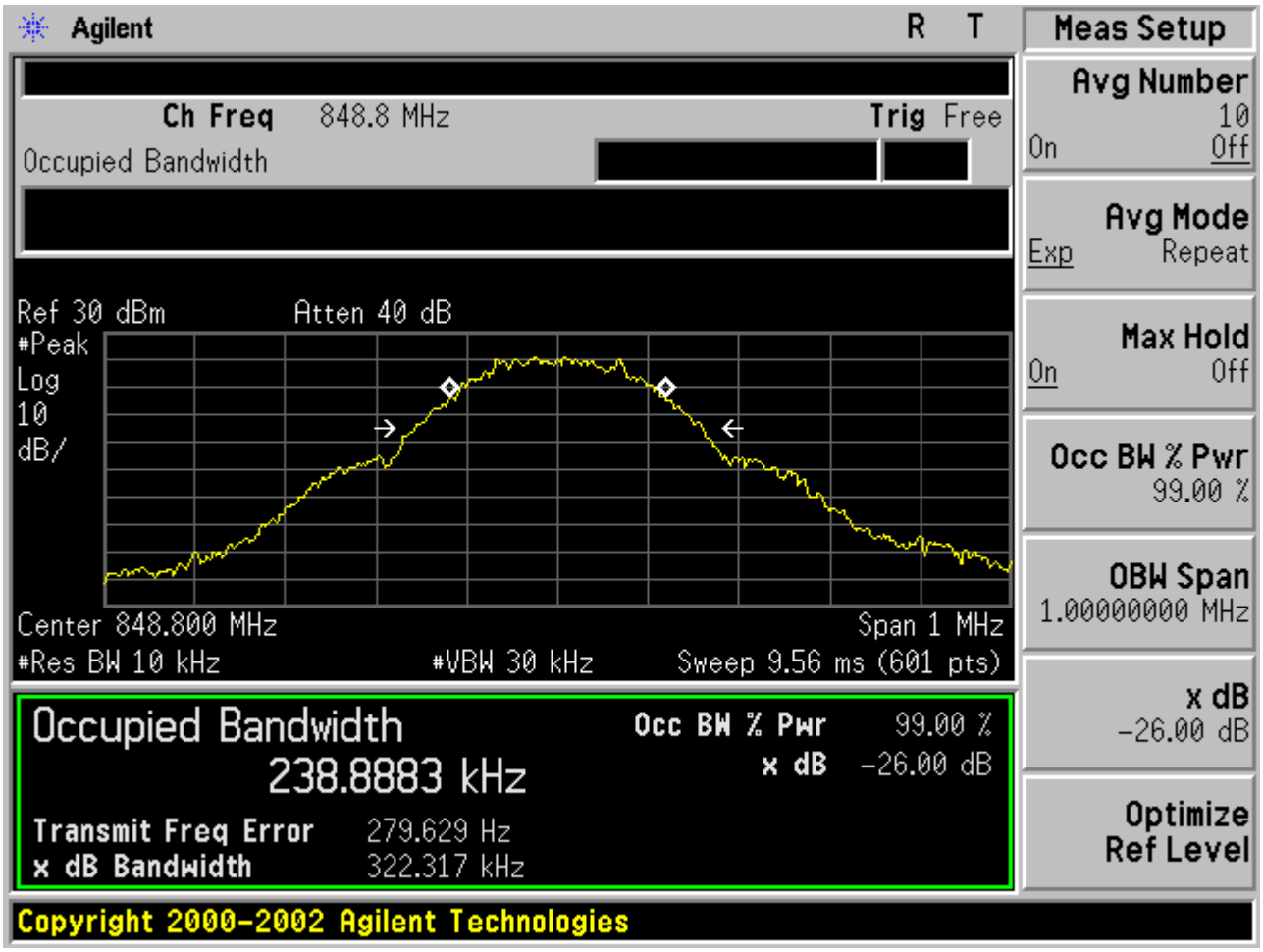
Test Channel=LCH



Test Channel=MCH



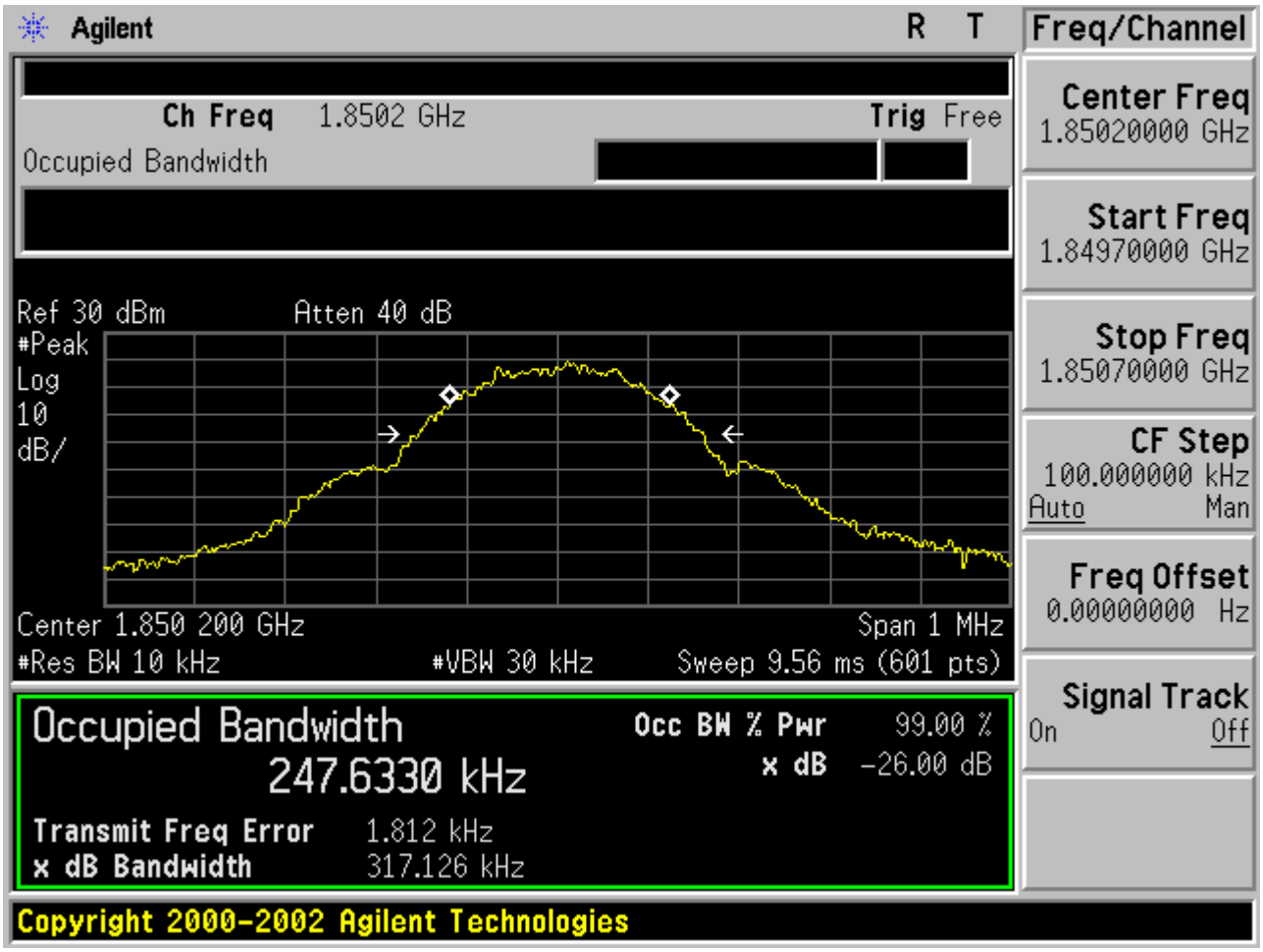
Test Channel=HCH



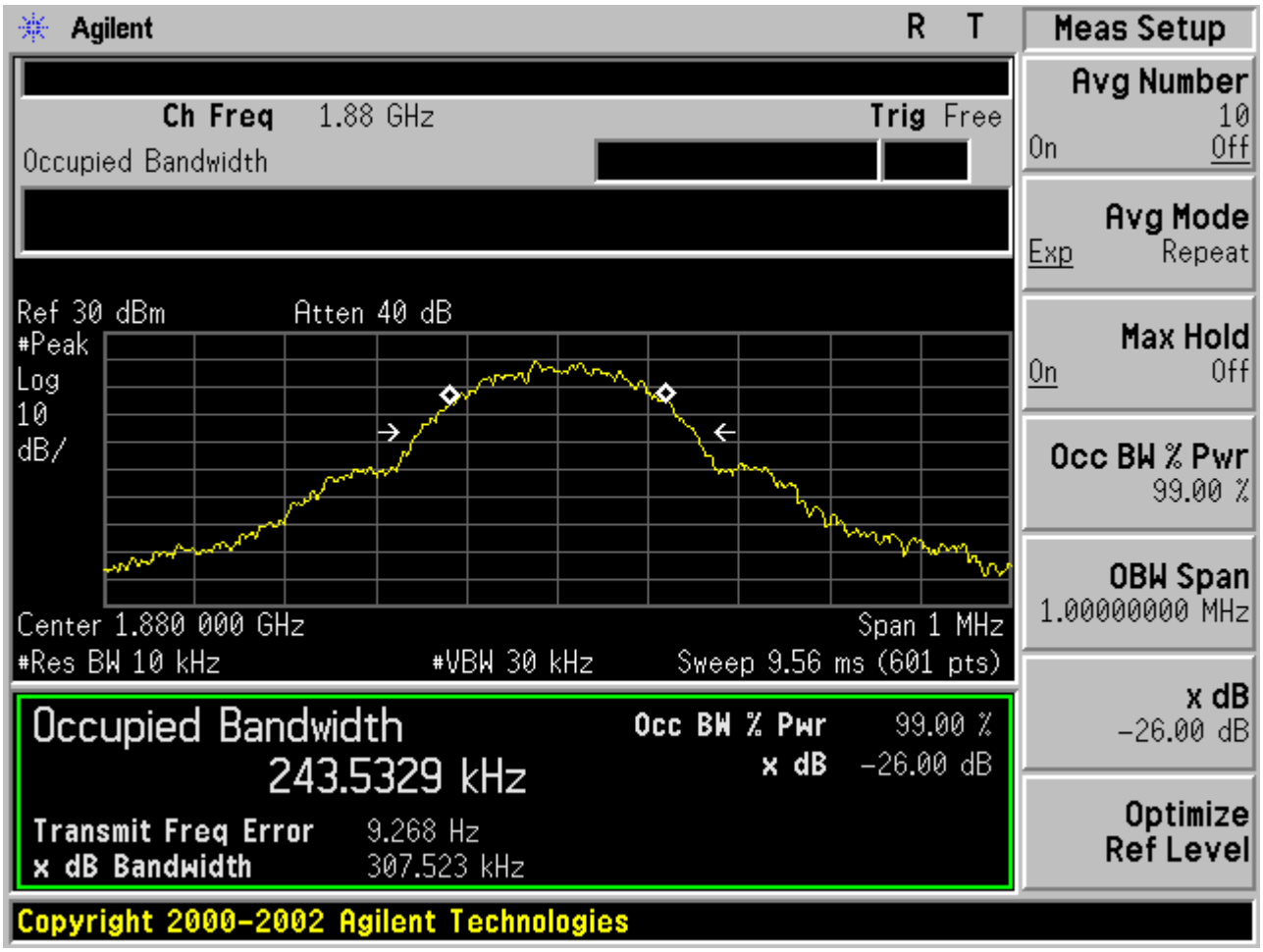
Test Band=GSM1900

Test Mode=GSM

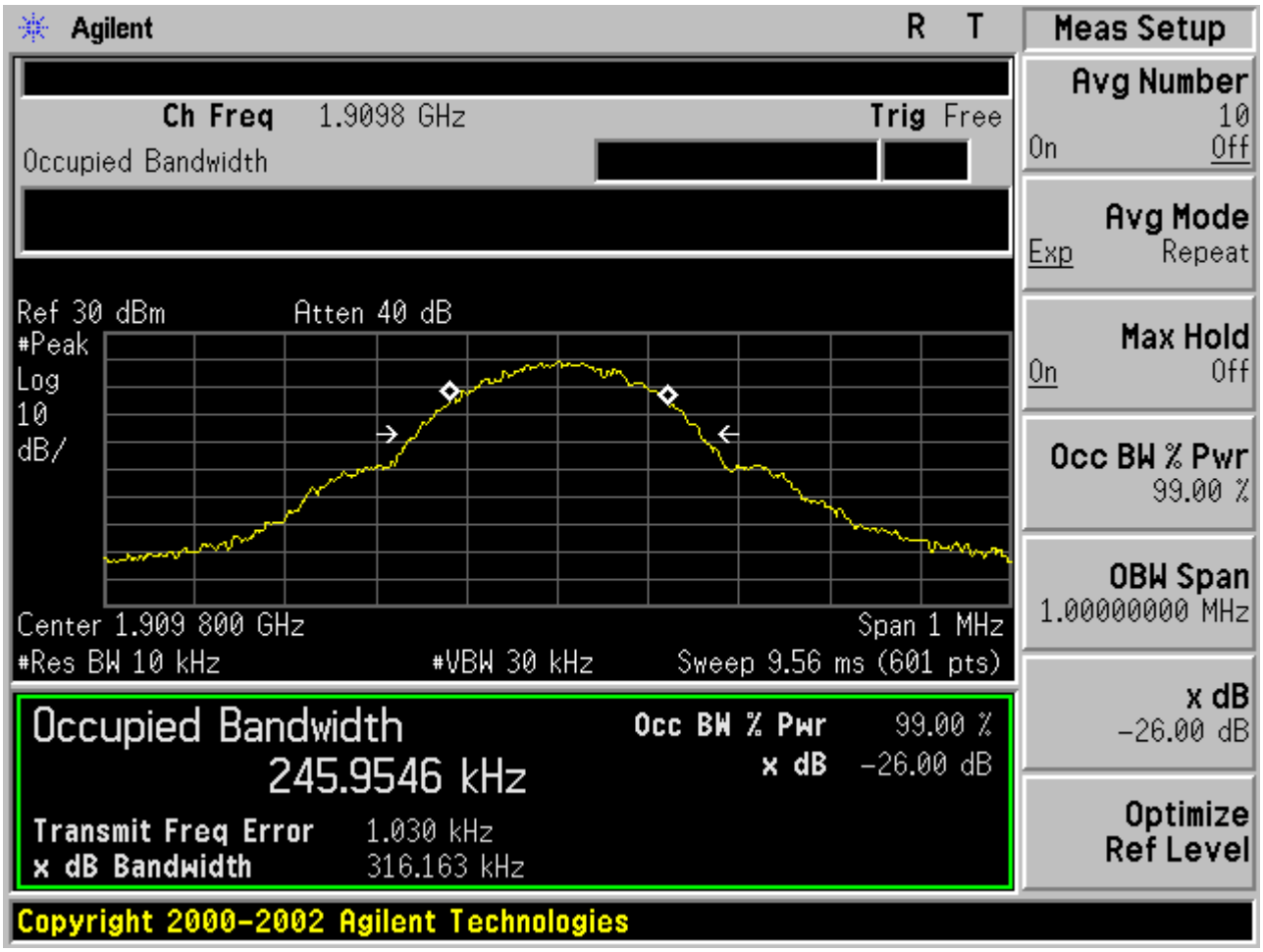
Test Channel=LCH



Test Channel=MCH



Test Channel=HCH



Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA850	UMTS	LCH	4.1819	4.733	PASS
		MCH	4.1513	4.703	PASS
		HCH	4.1770	4.665	PASS

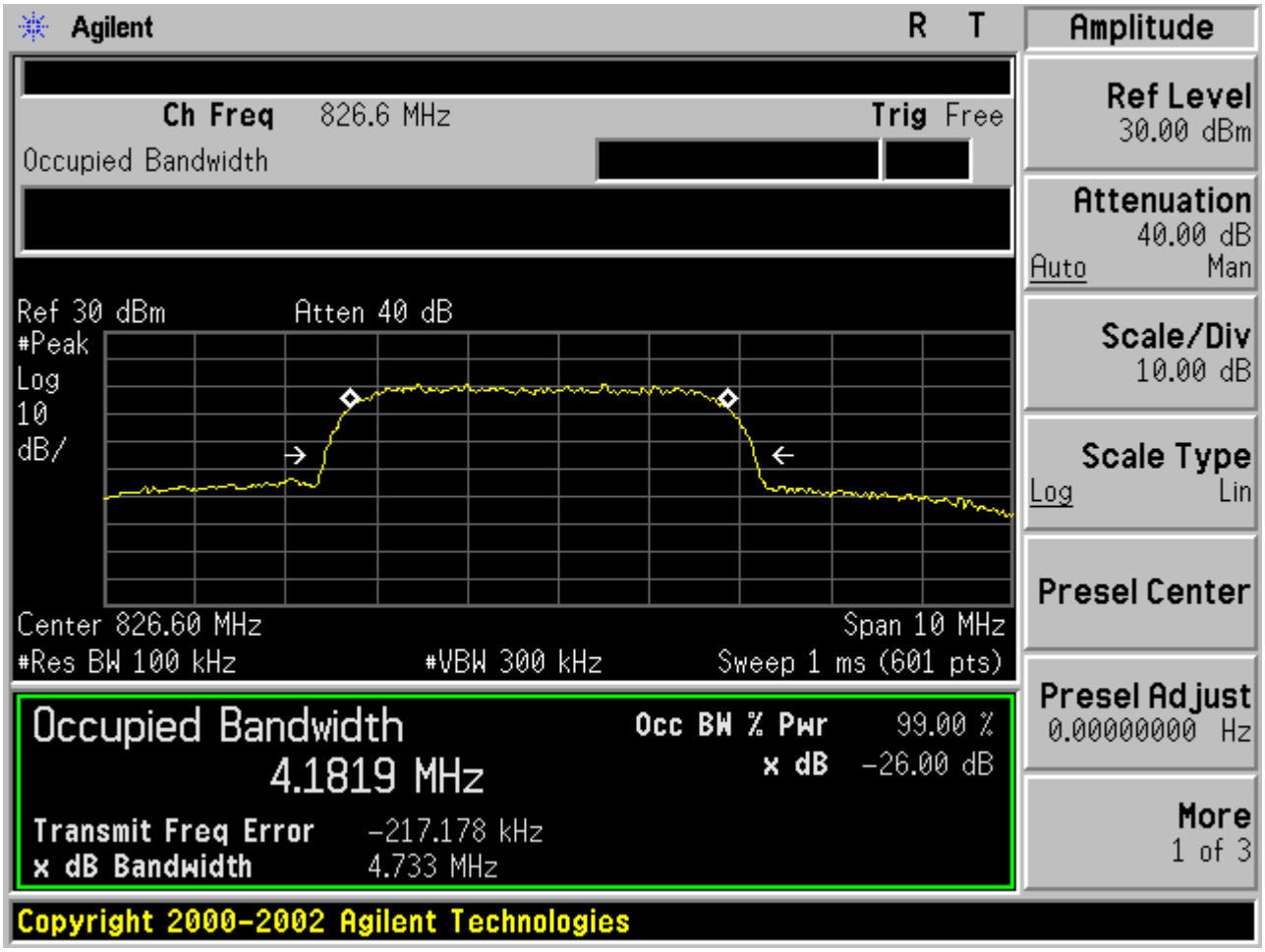
Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA1900	UMTS	LCH	4.1776	4.731	PASS
		MCH	4.1740	4.770	PASS
		HCH	4.1649	4.715	PASS

For WCDMA

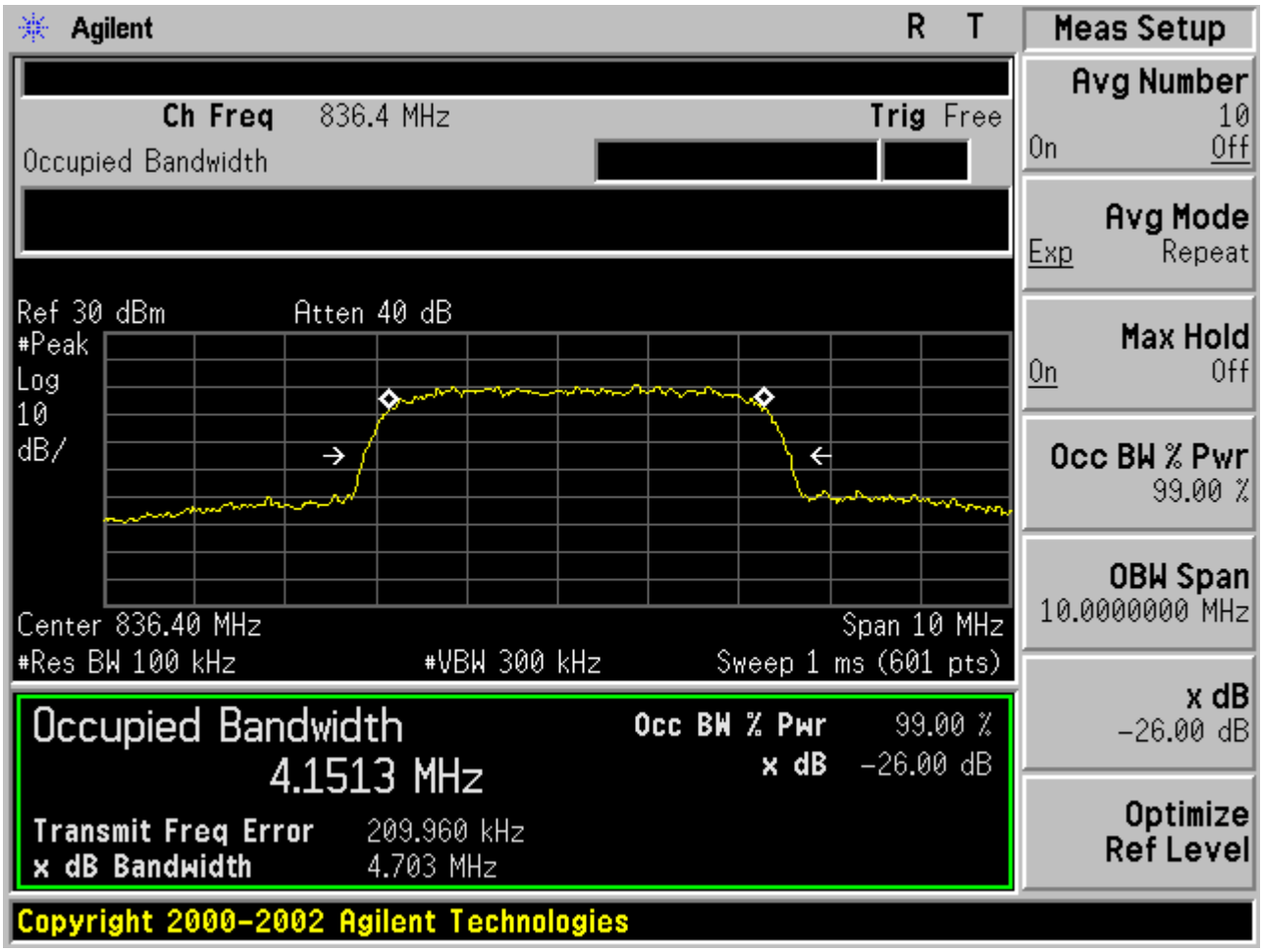
Test Band=WCDMA850

Test Mode=UMTS

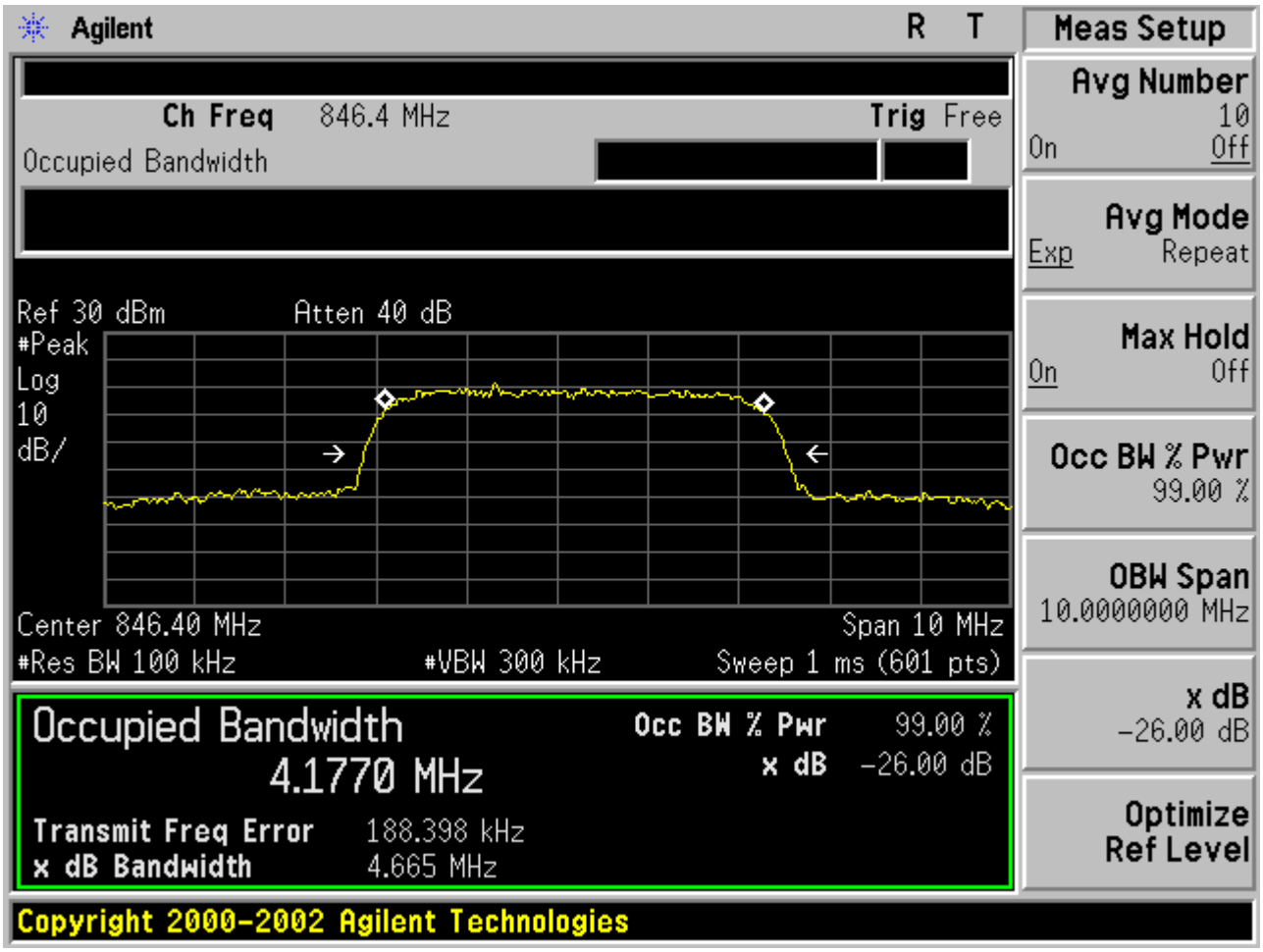
Test Channel=LCH



Test Channel=MCH



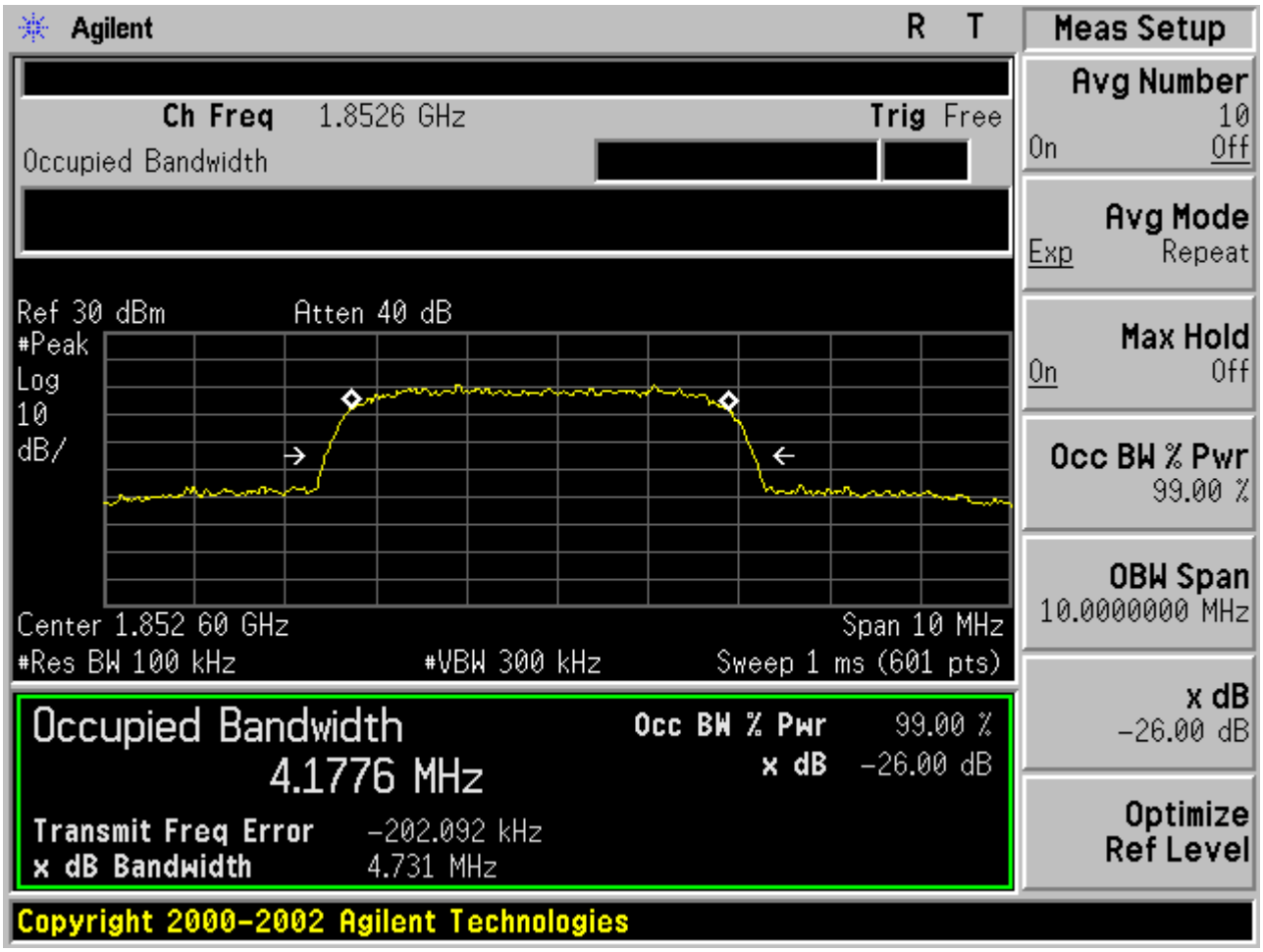
Test Channel=HCH



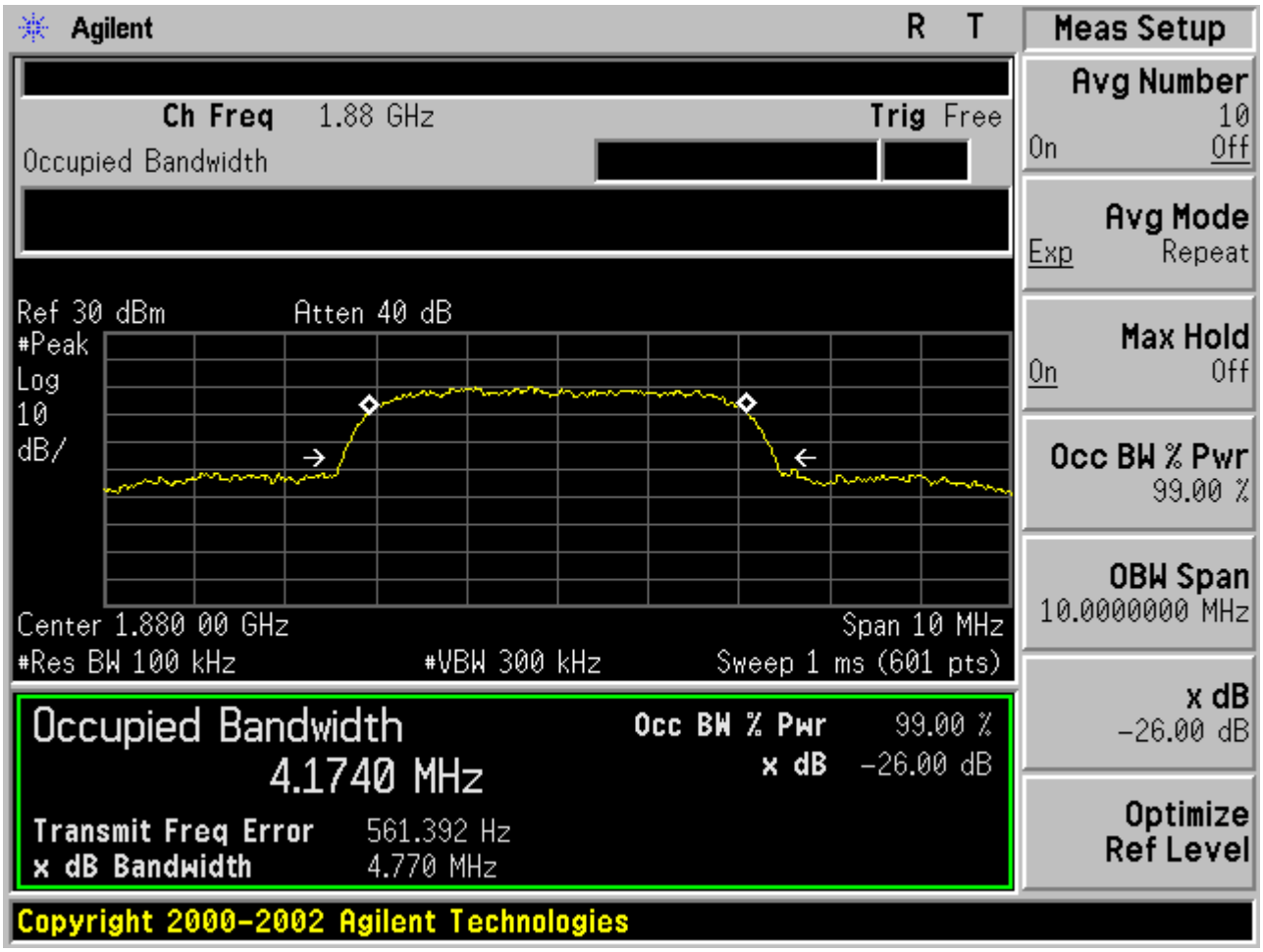
Test Band=WCDMA1900

Test Mode=UMTS

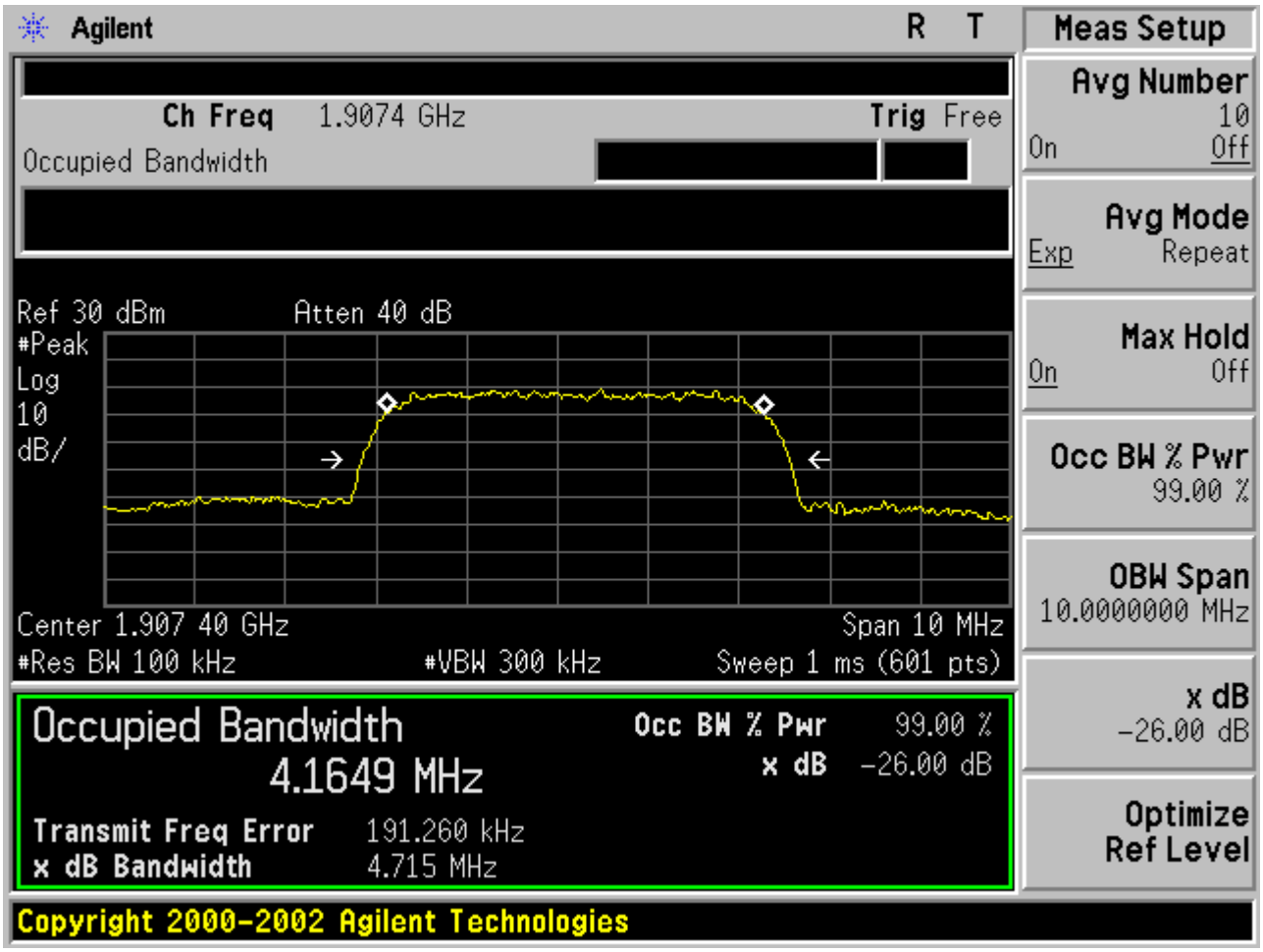
Test Channel=LCH



Test Channel=MCH



Test Channel=HCH



8. BAND EDGE

8.1 MEASUREMENT METHOD

1. All out of band emissions are measured with an analyzer spectrum connected to the antenna terminal of the EUT while the EUT at its maximum duty cycle, at maximum power, and at the approximate frequencies. All data rates were investigated to determine the worst case configuration
2. The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.
3. Start and stop frequency were set such that the band edge would be placed in the center of the plot.
4. Span was set large enough so as to capture all out of band emissions near the band edge.
5. RBW>1% of the emission bandwidth, VBW >=3 x RBW, Detector=RMS, Number of points>=2 x Span/RBW, Trace mode=max hold, Sweep time=auto couple, and the trace was allowed to stabilize

8.2 PROVISIONS APPLICABLE

As Specified in FCC rules of 22.917(a) and 24.238(a) and KDB 971168 V02r02

8.3 MEASUREMENT RESULT

APPENDIX B: BAND EDGES COMPLIANCE

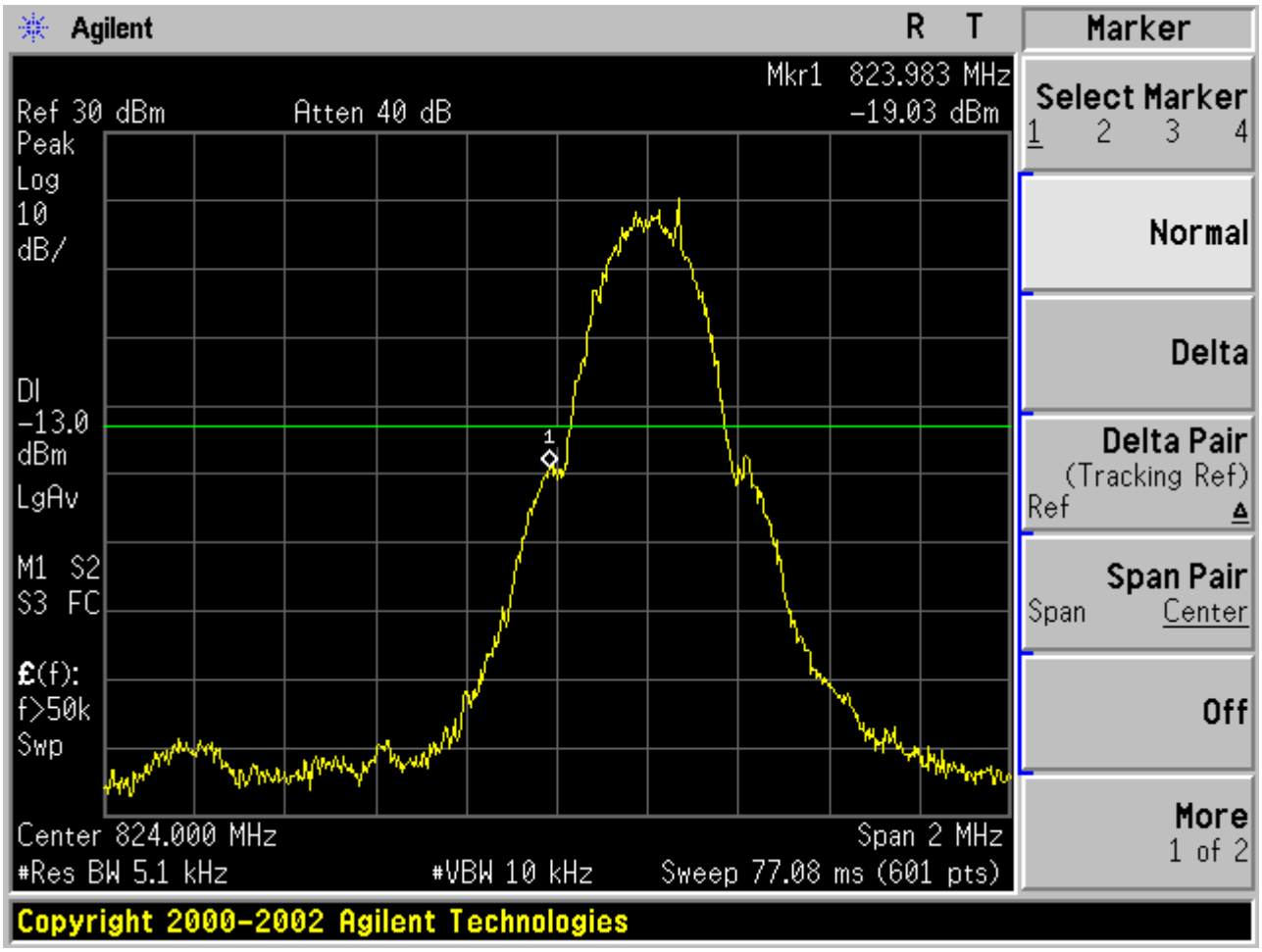
Test Results

For GSM

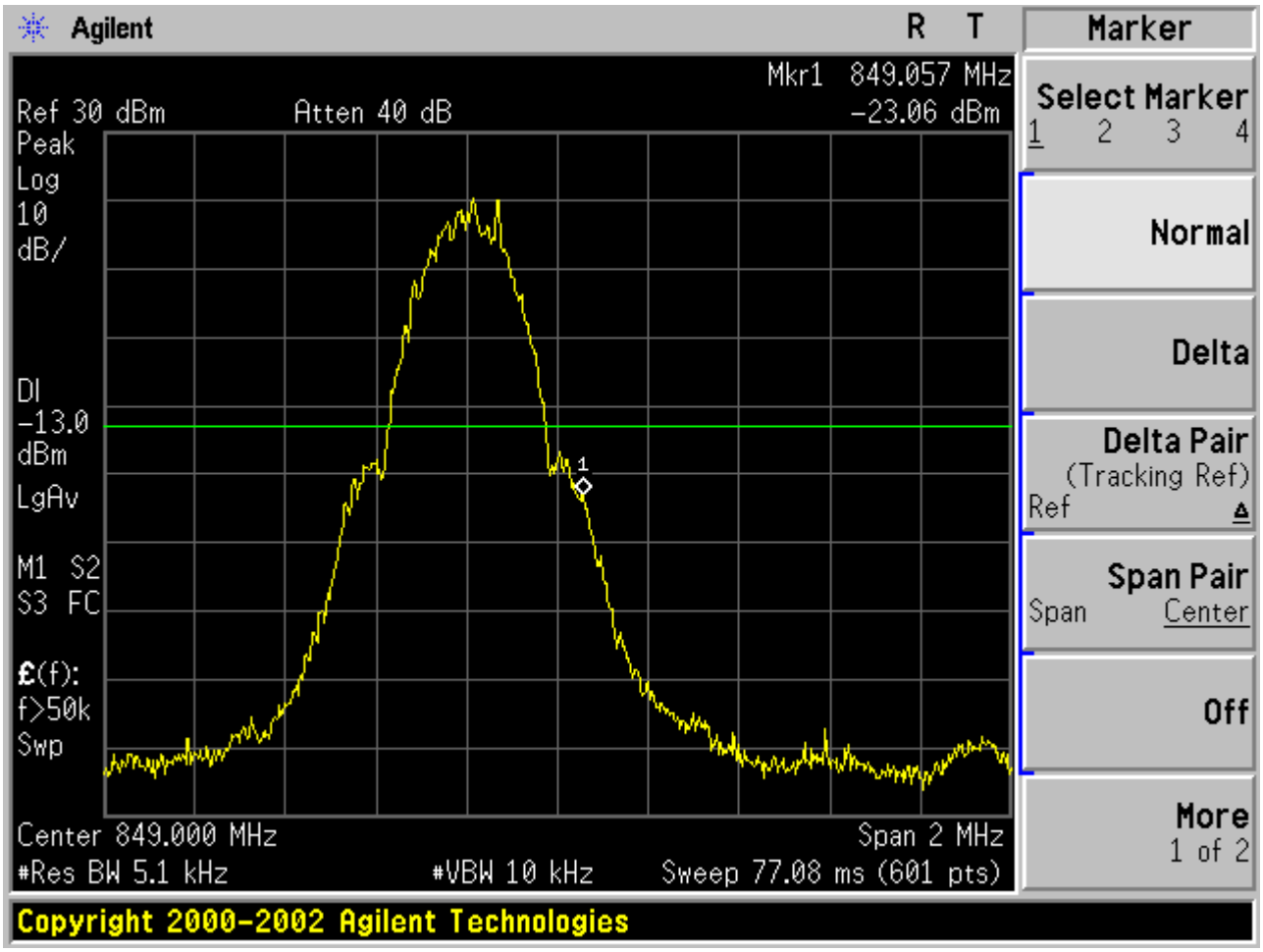
Test Band=GSM850

Test Mode=GSM

Test Channel=LCH



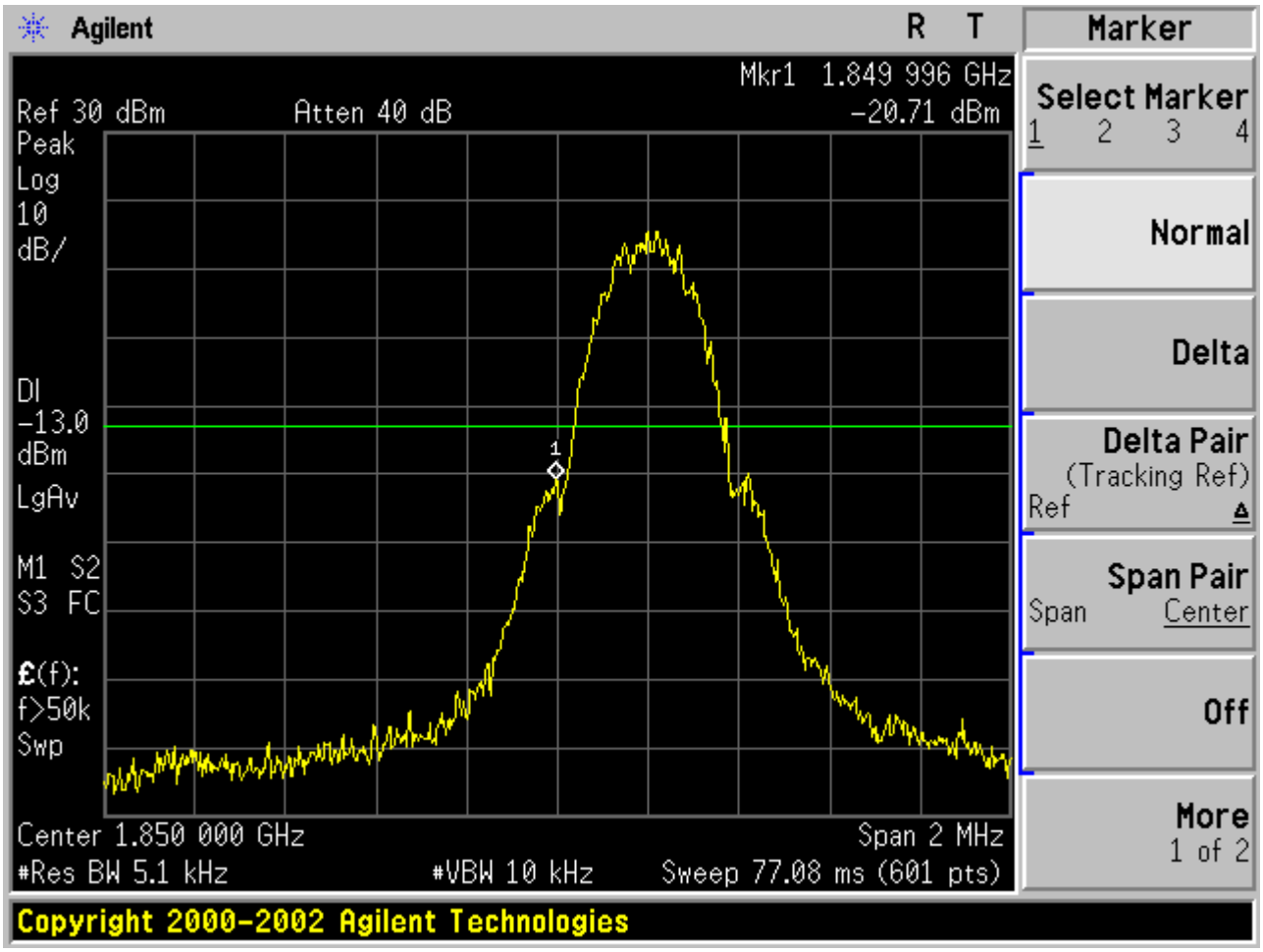
Test Channel=HCH



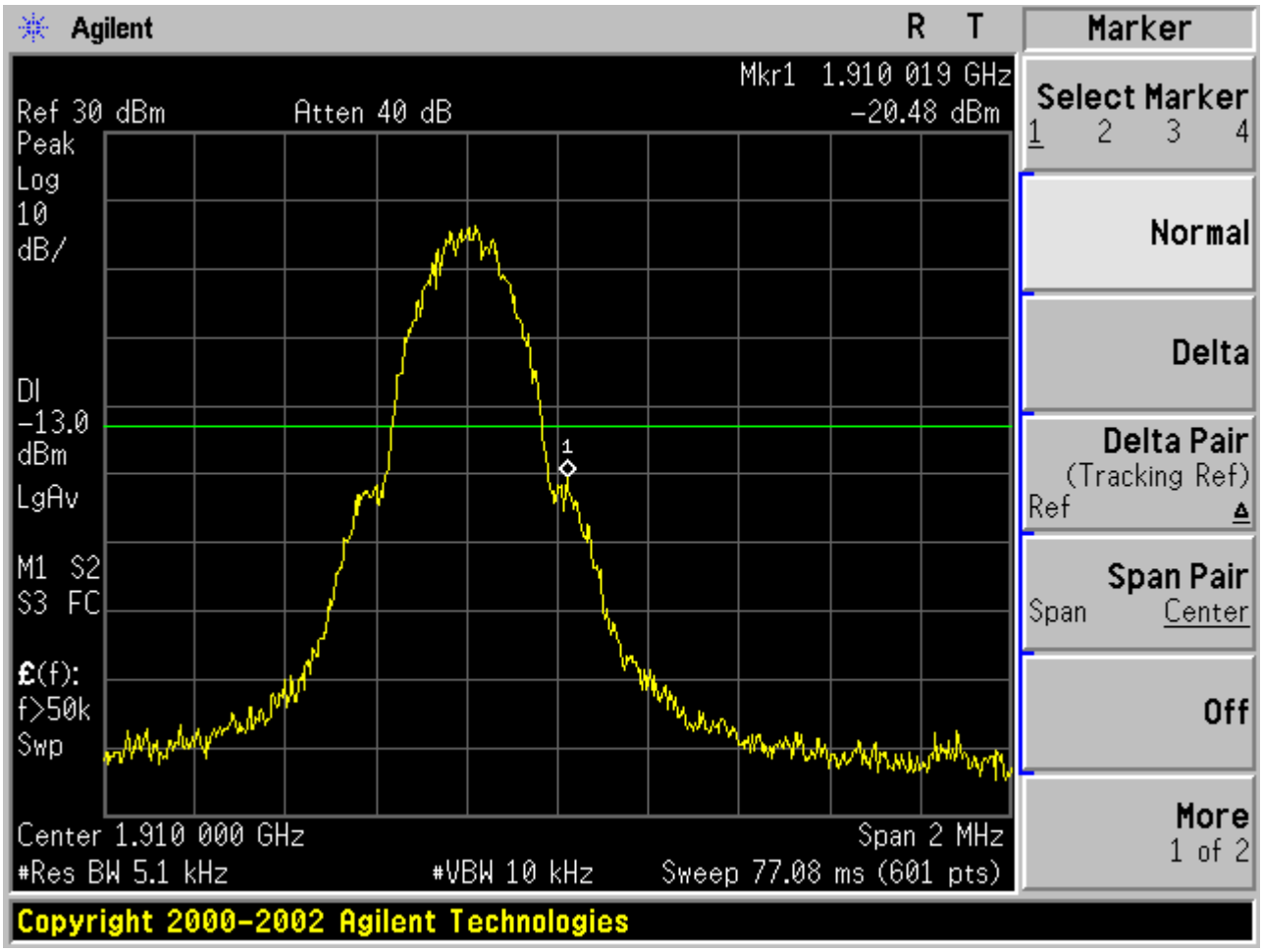
Test Band=GSM1900

Test Mode=GSM

Test Channel=LCH



Test Channel=HCH

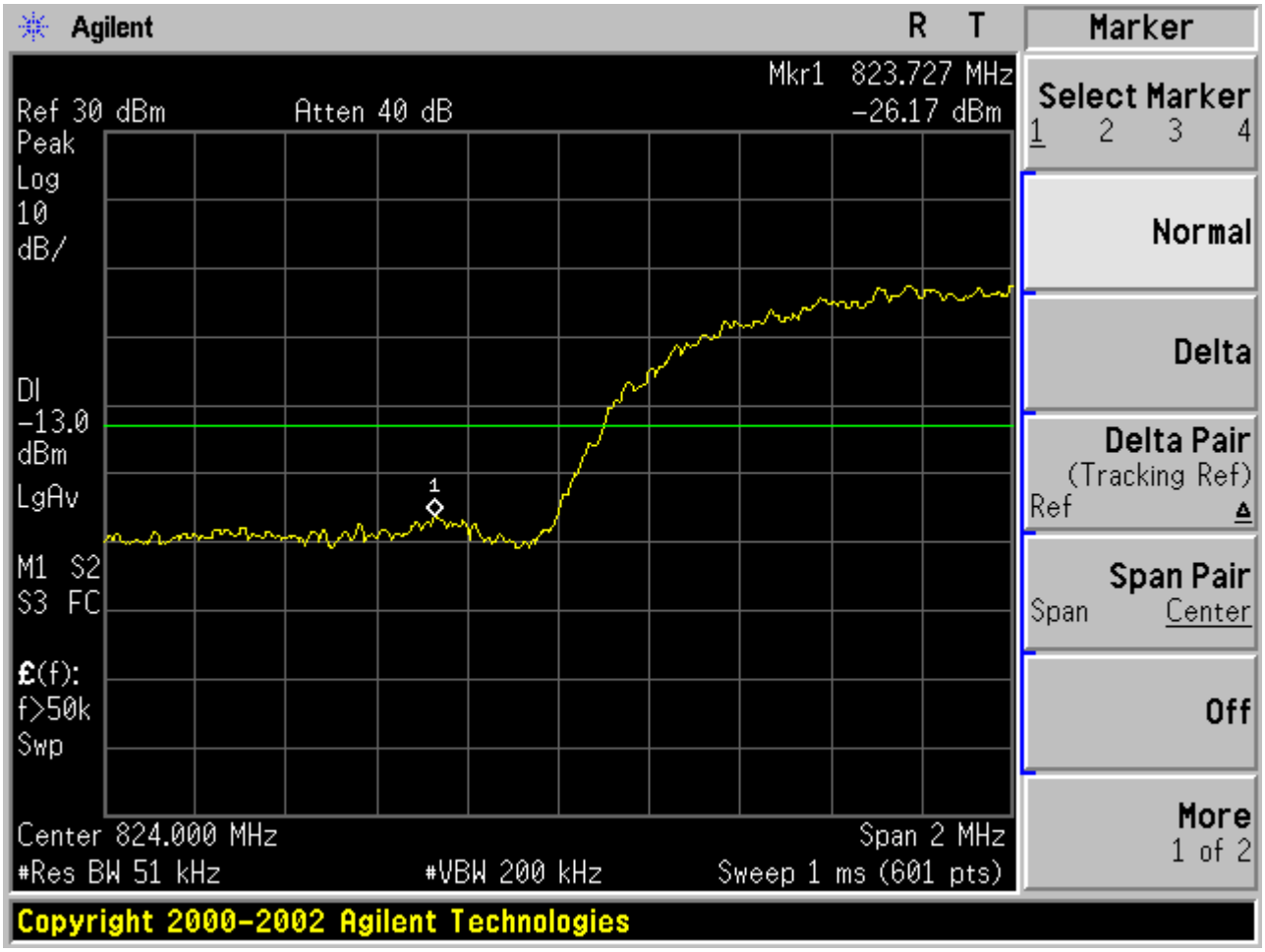


For WCDMA

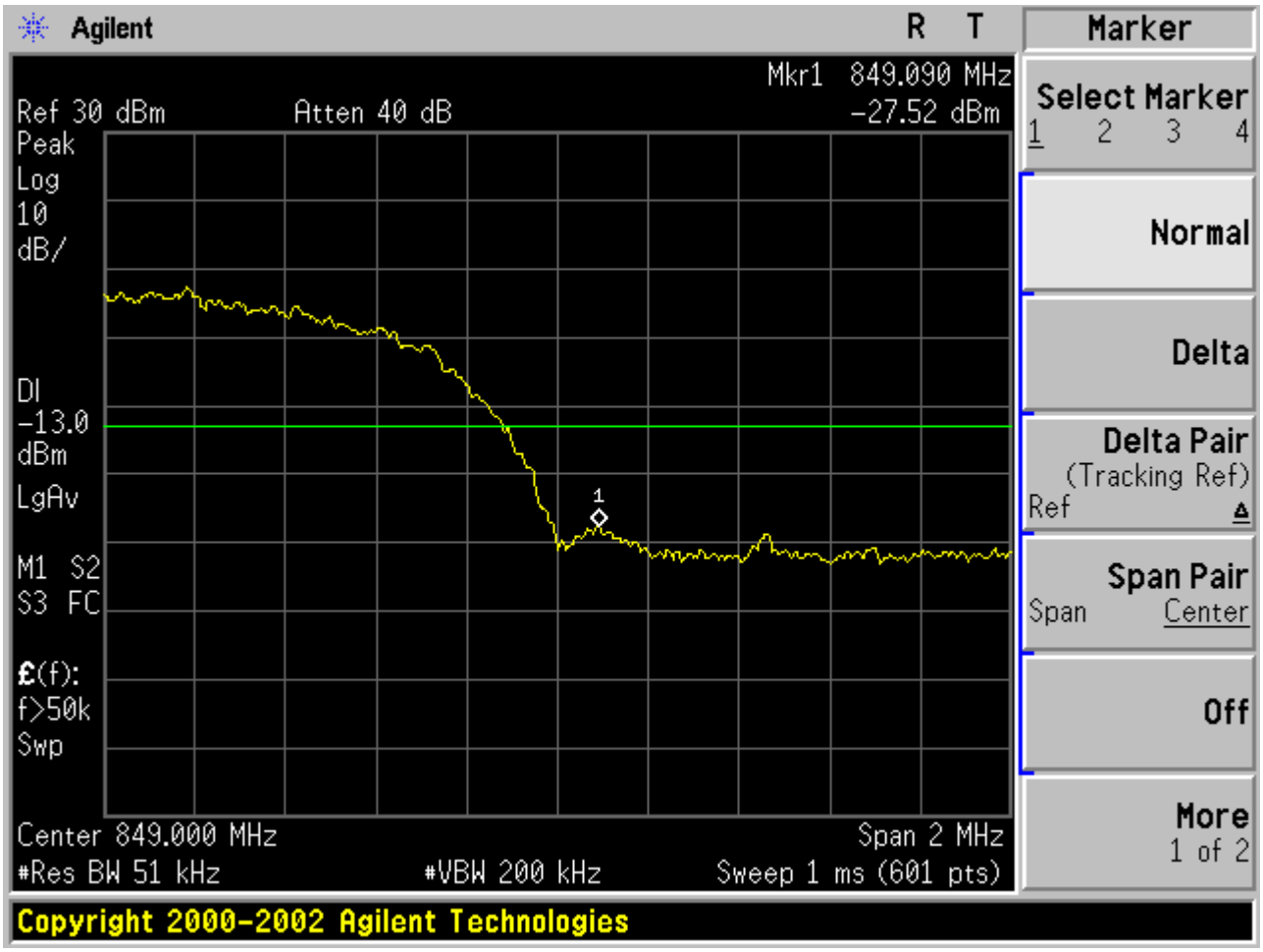
Test Band=WCDMA850

Test Mode=UMTS

Test Channel=LCH



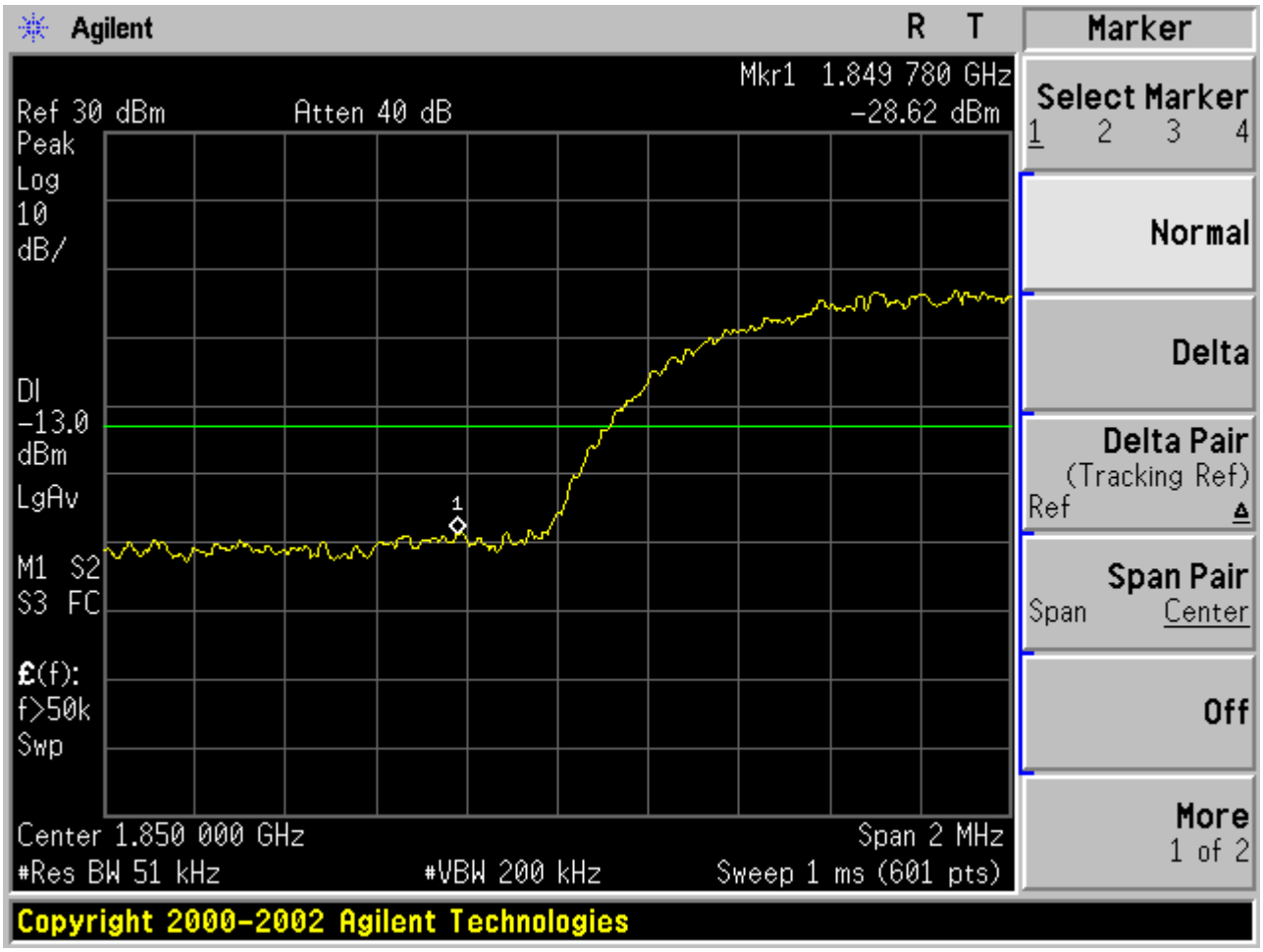
Test Channel=HCH



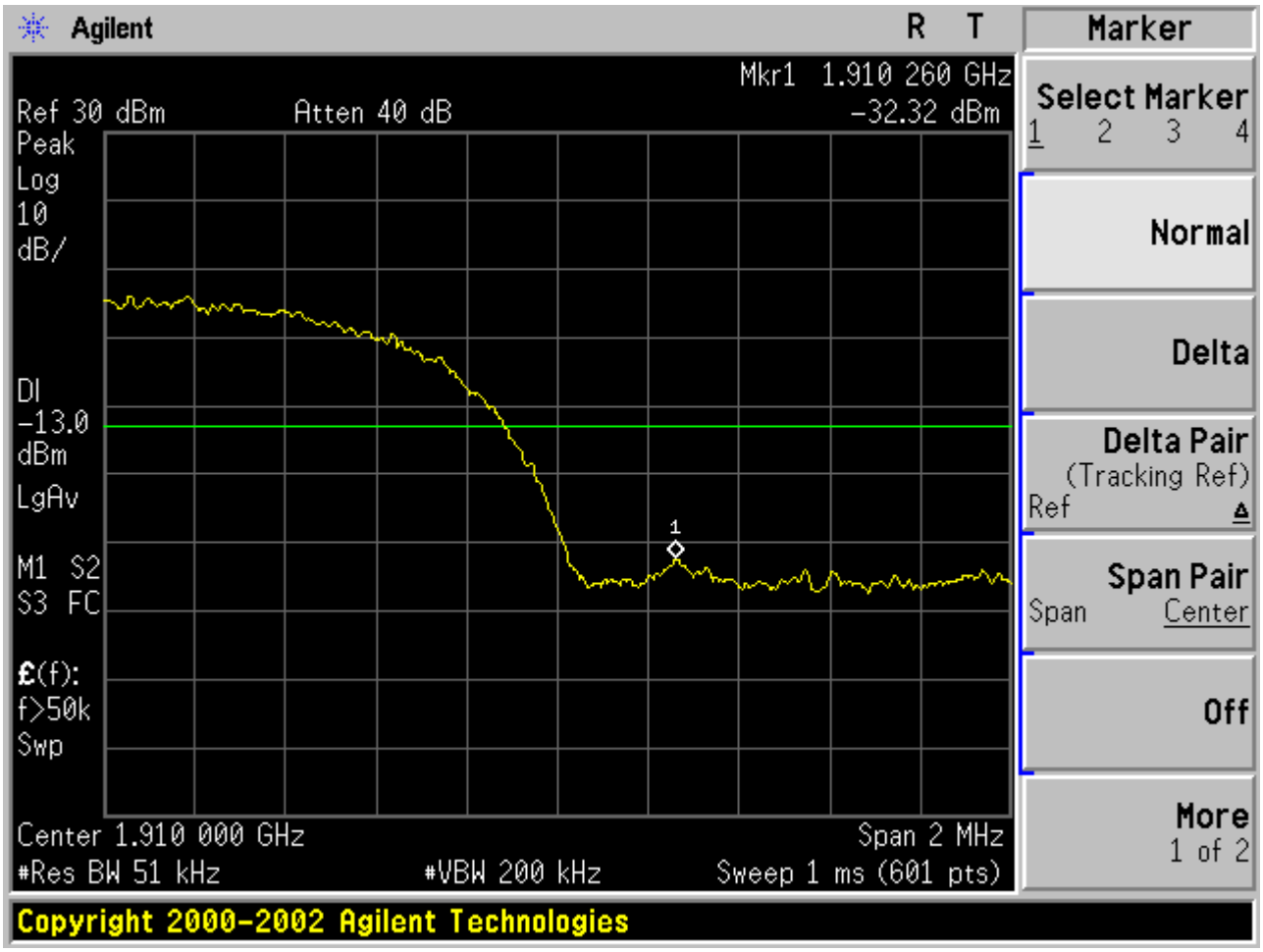
Test Band=WCDMA1900

Test Mode=UMTS

Test Channel=LCH



Test Channel=HCH



9. SPURIOUS EMISSION

9.1 CONDUCTED SPURIOUS EMISSION

9.1.1 MEASUREMENT METHOD

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

1. The level of the carrier and the various conducted spurious and harmonic frequency is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10^{th} harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the approximate frequencies. All data rates were investigated to determine the worst case configuration.

2. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM 850, data taken from 30 MHz to 9 GHz.

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

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

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

Typical Channels for testing of UMTS band II	
Channel	Frequency (MHz)
9663	1852.6
9800	1880
9937	1907.4

Typical Channels for testing of UMTS band V	
Channel	Frequency (MHz)
4358	826.6
4407	836.4
4457	846.4

9.1.2 PROVISIONS APPLICABLE

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

9.1.3 MEASUREMENT RESULT

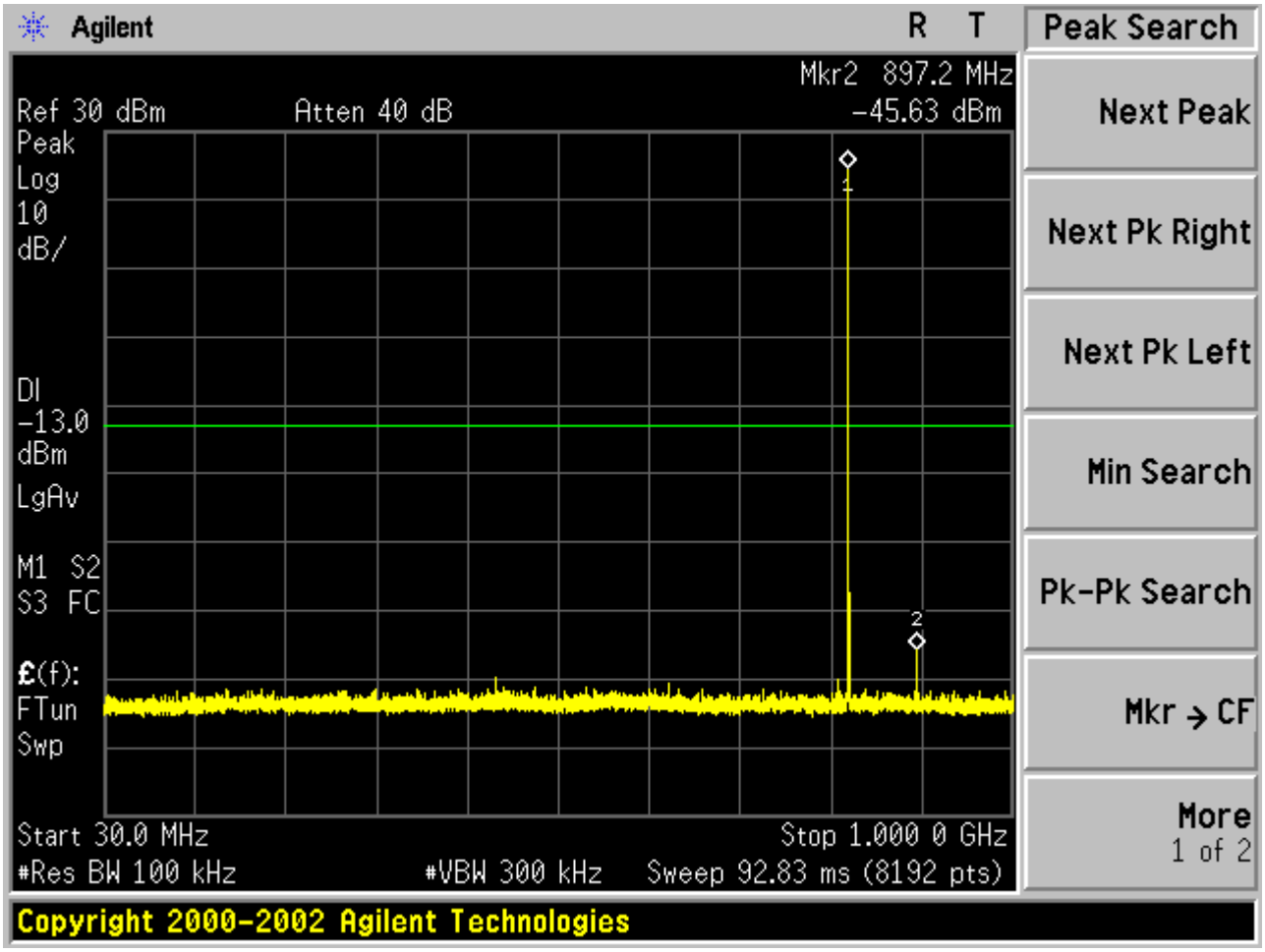
APPENDIX C: SPURIOUS EMISSION AT ANTENNA TERMINAL

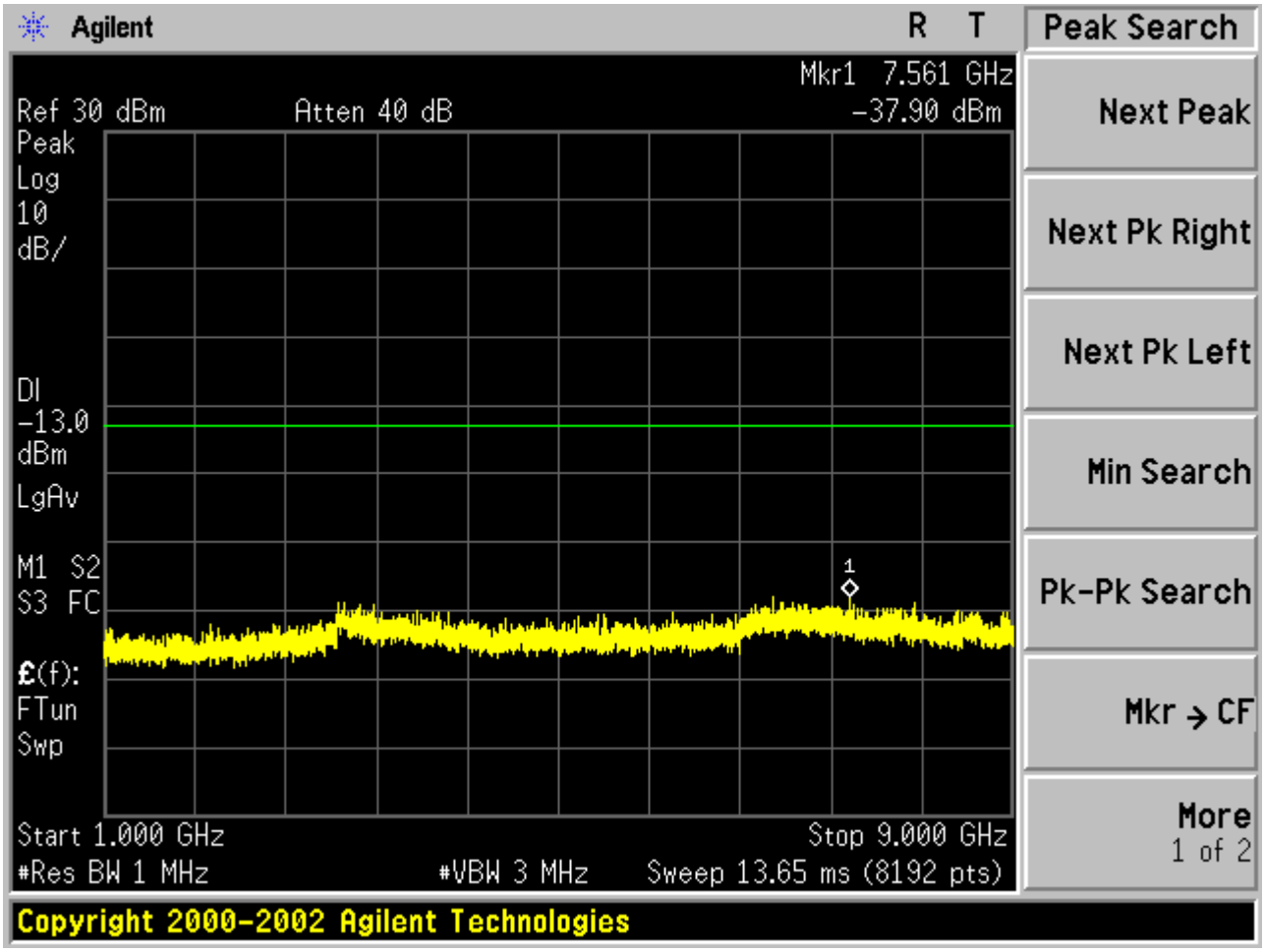
Test Results

Test Band=GSM850

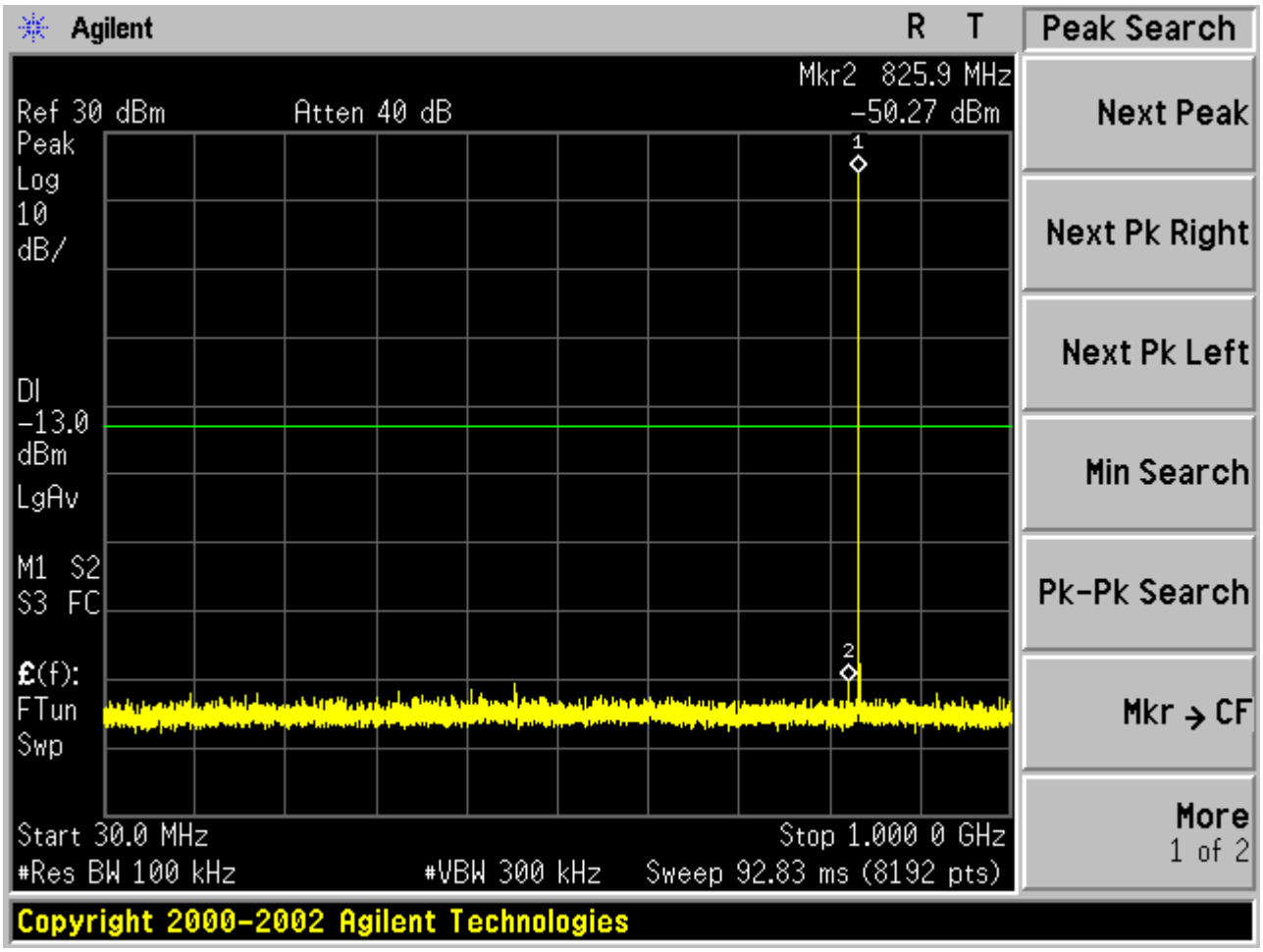
Test Mode=GSM

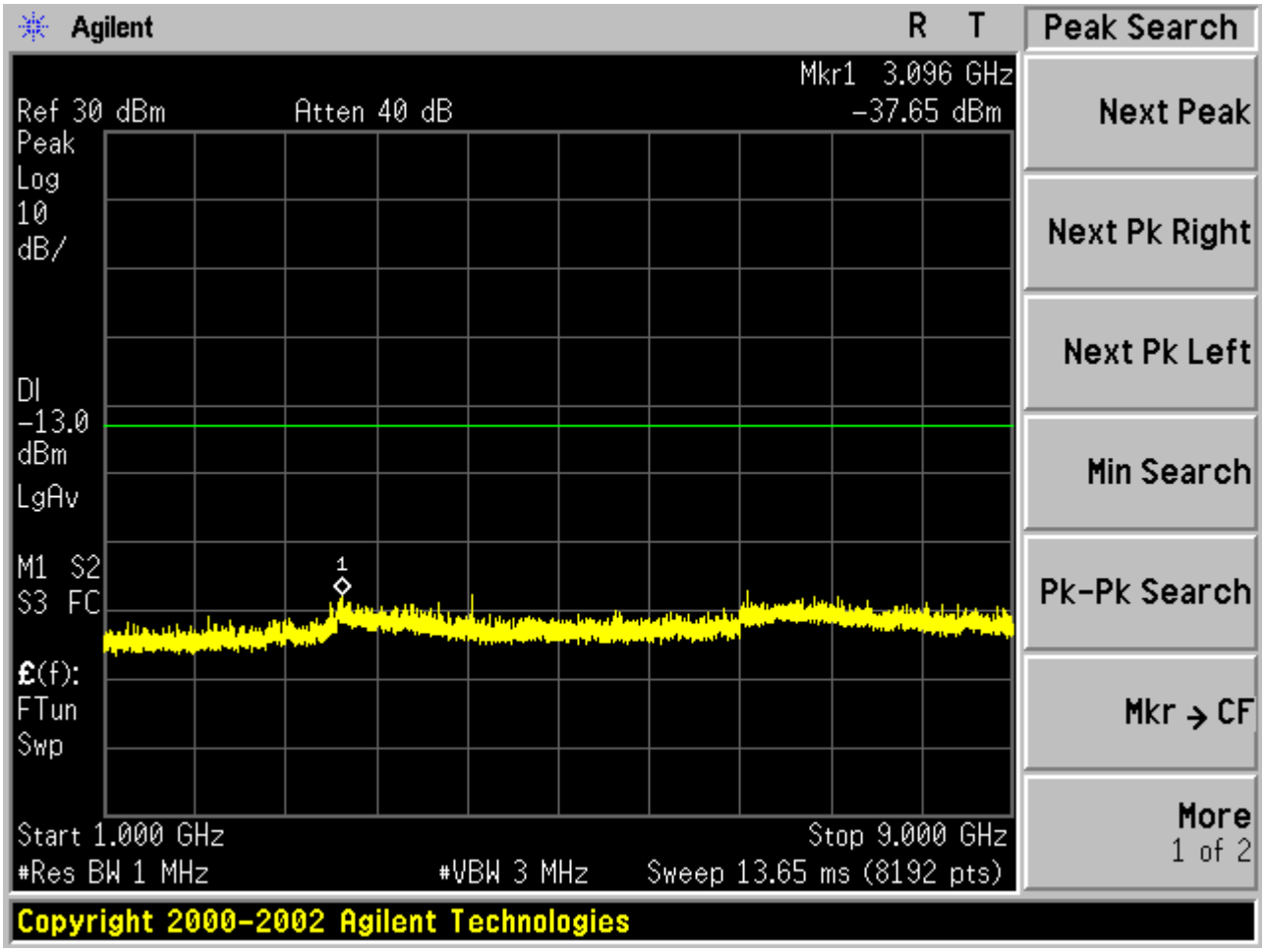
Test Channel=LCH


Agilent
R T
Peak Search
Mkr2 897.2 MHz
Ref 30 dBm
Atten 40 dB
-45.63 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 92.83 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

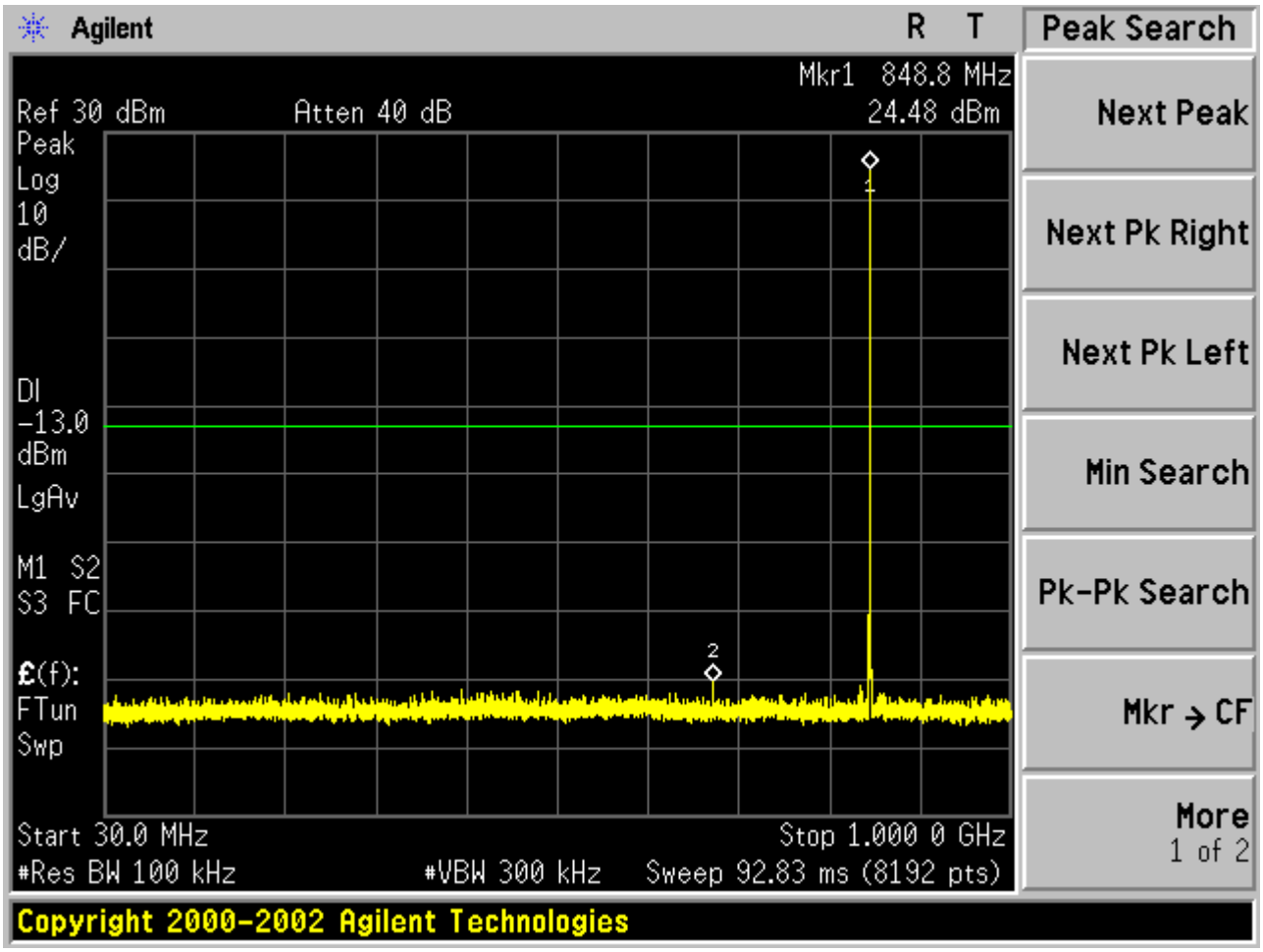

Agilent
R T
Peak Search
Mkr1 7.561 GHz
Ref 30 dBm
Atten 40 dB
-37.90 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
1
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 9.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

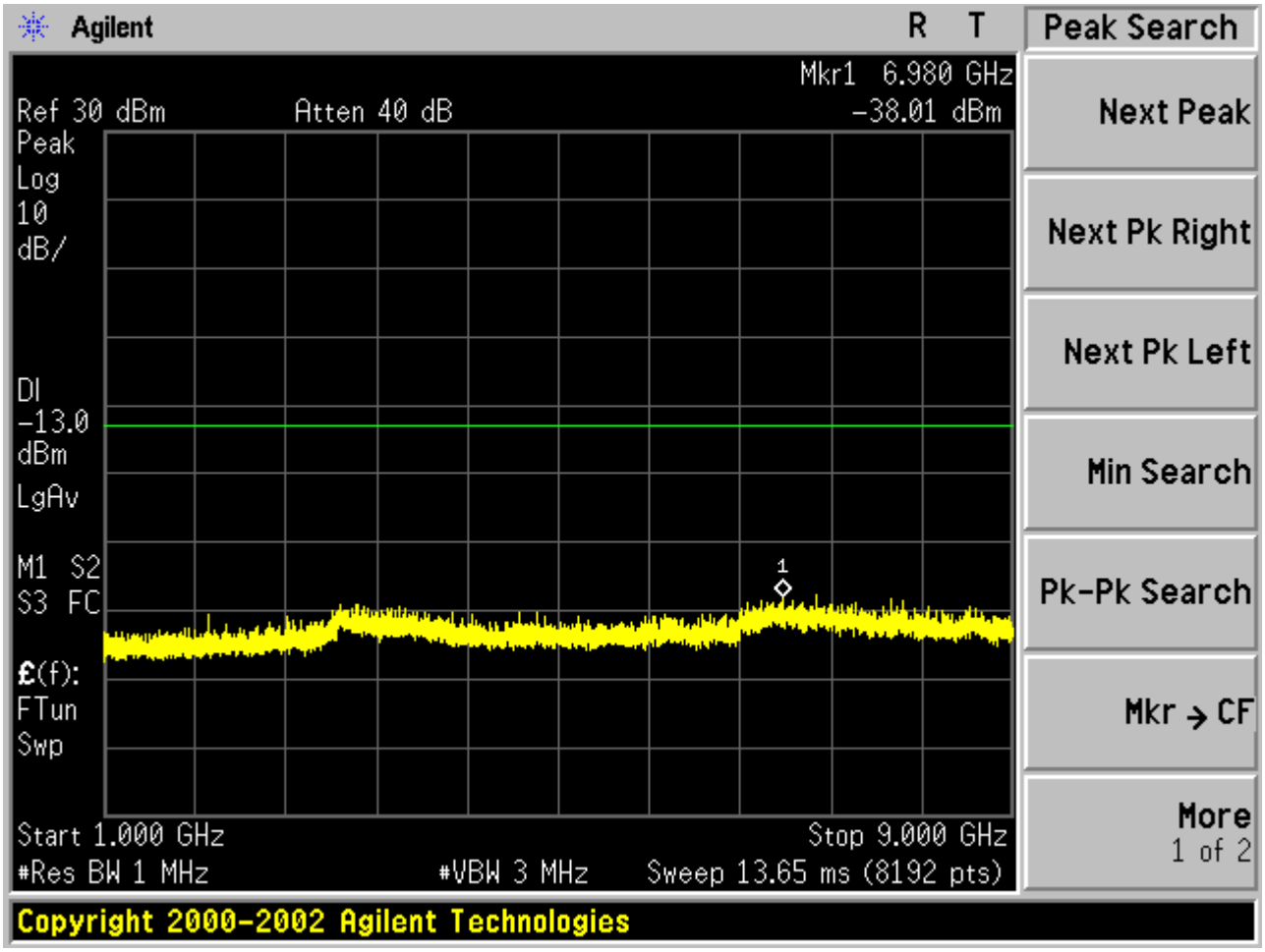
Test Channel=MCH




Agilent
R T
Peak Search
Mkr1 3.096 GHz
Ref 30 dBm
Atten 40 dB
-37.65 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
1
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 9.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Channel=HCH

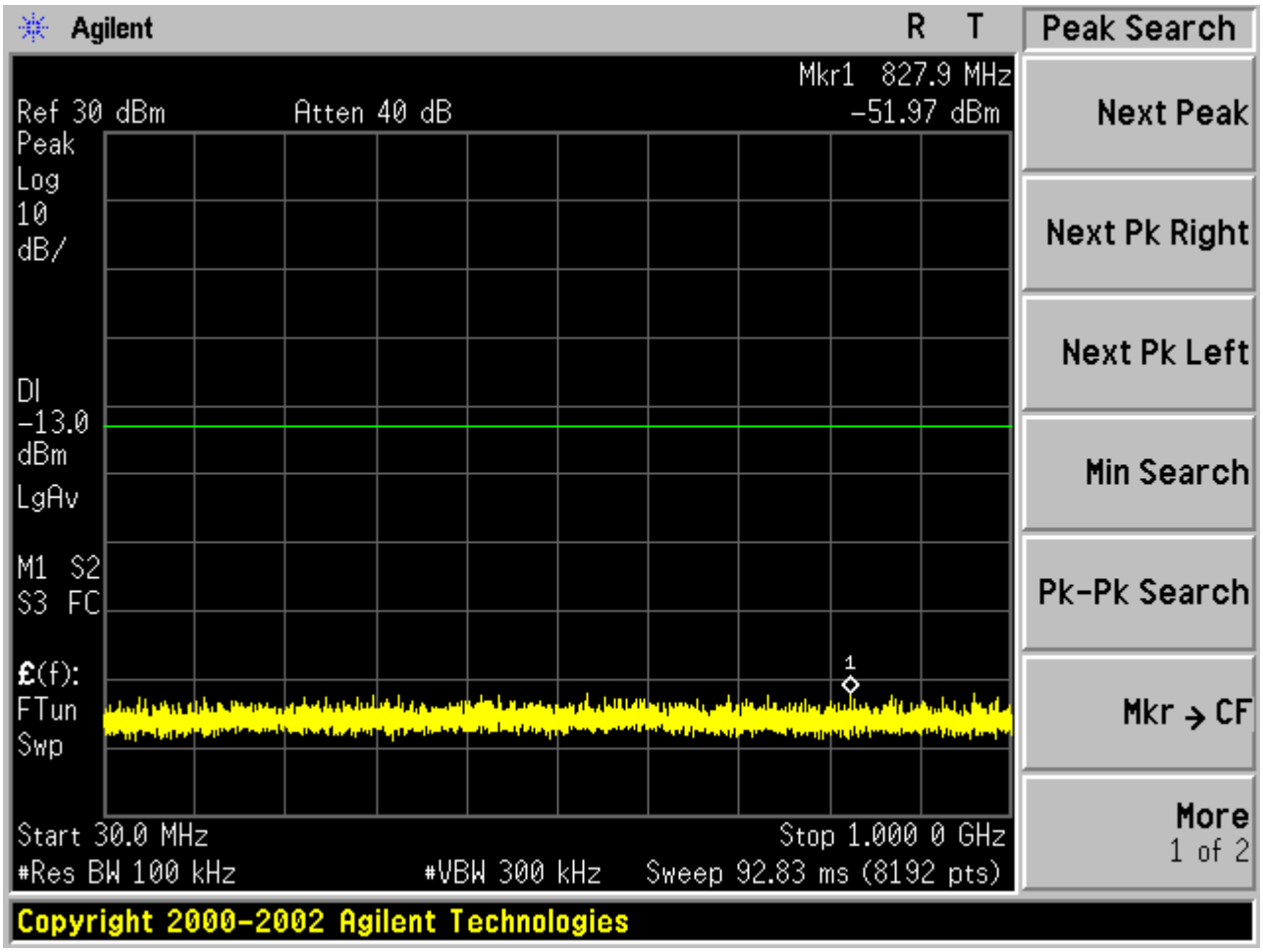


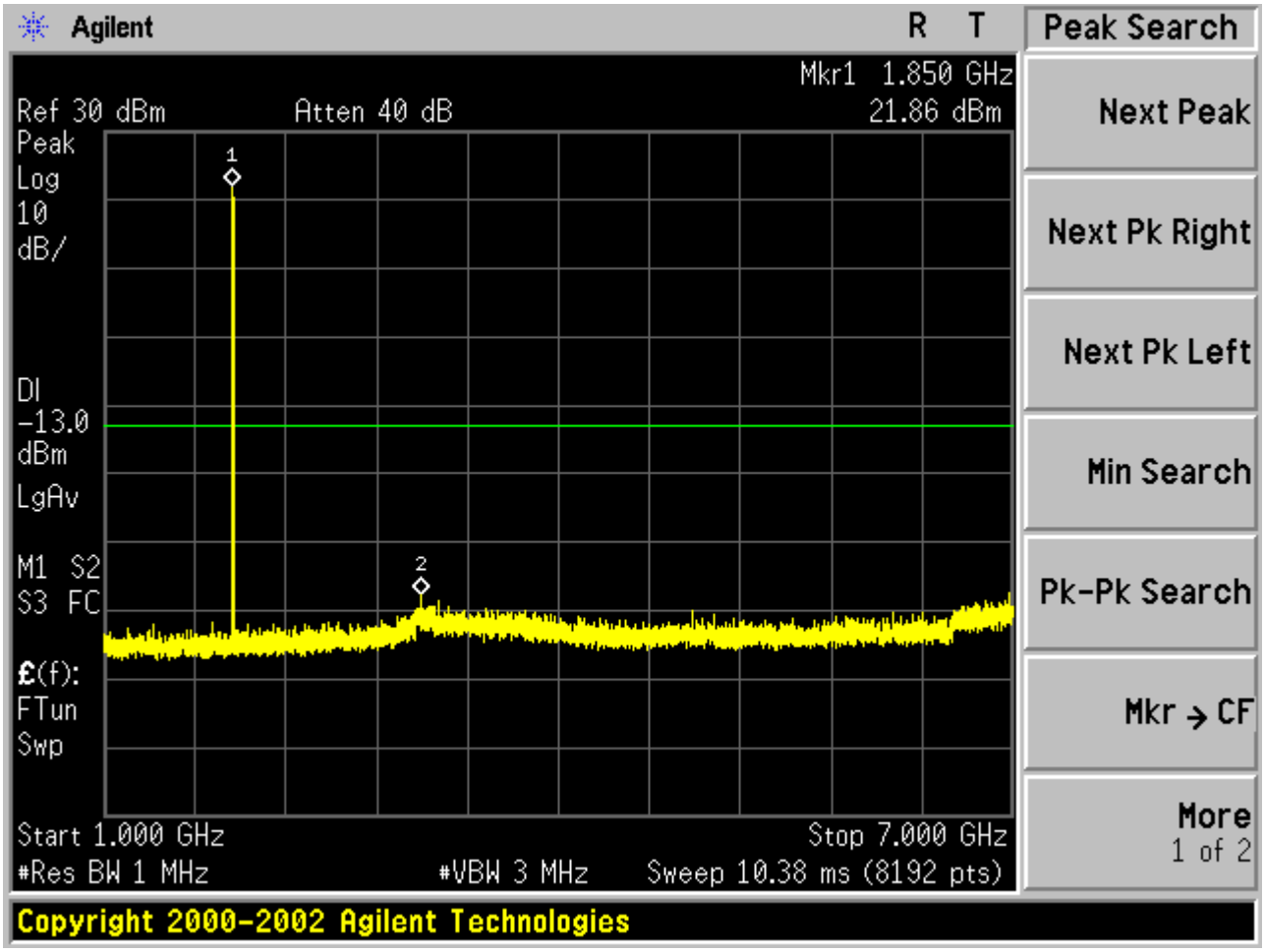

Agilent
R T
Peak Search
Mkr1 6.980 GHz
Ref 30 dBm
Atten 40 dB
-38.01 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 9.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

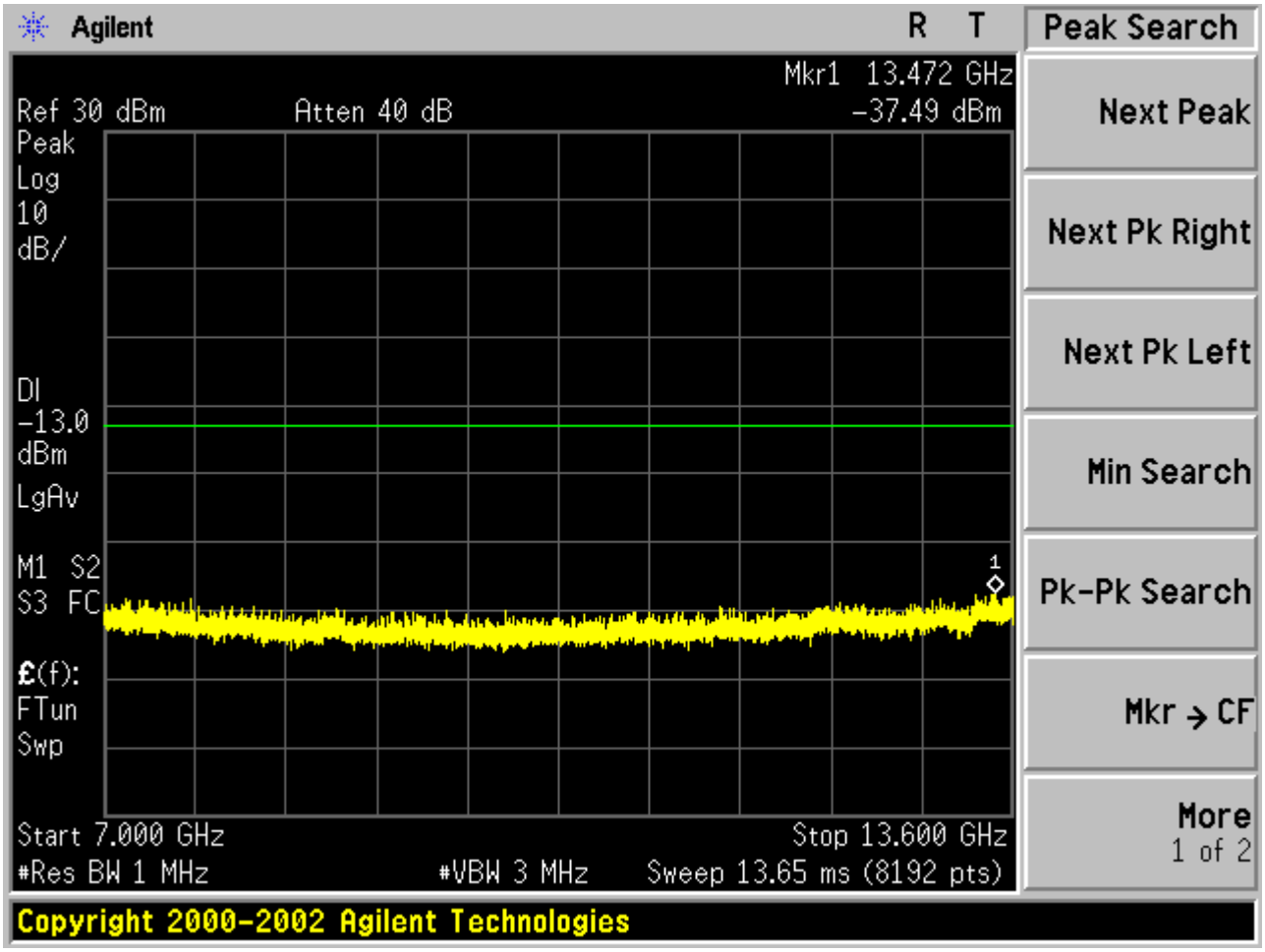
Test Band=GSM1900

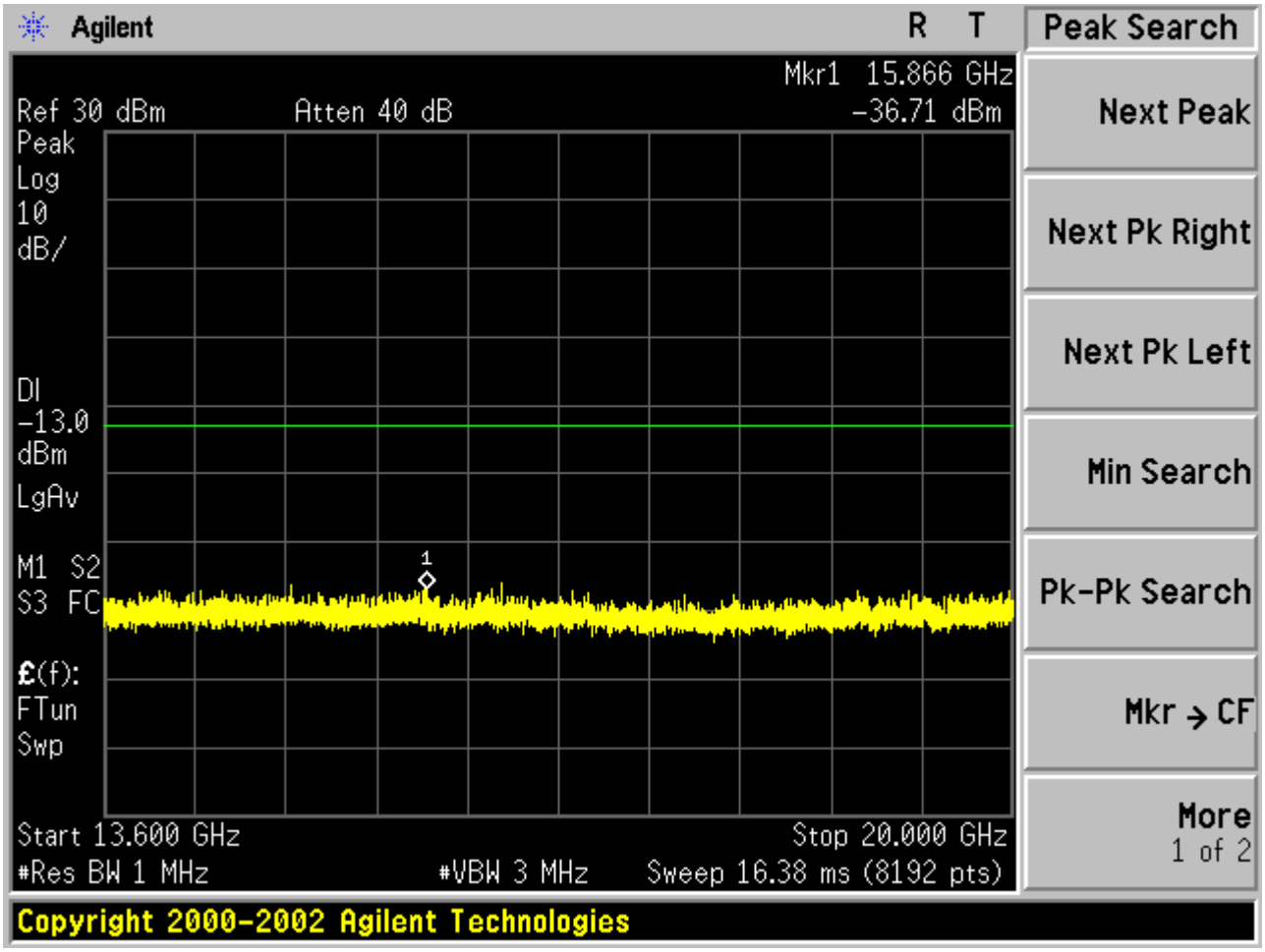
Test Mode=GSM

Test Channel=LCH

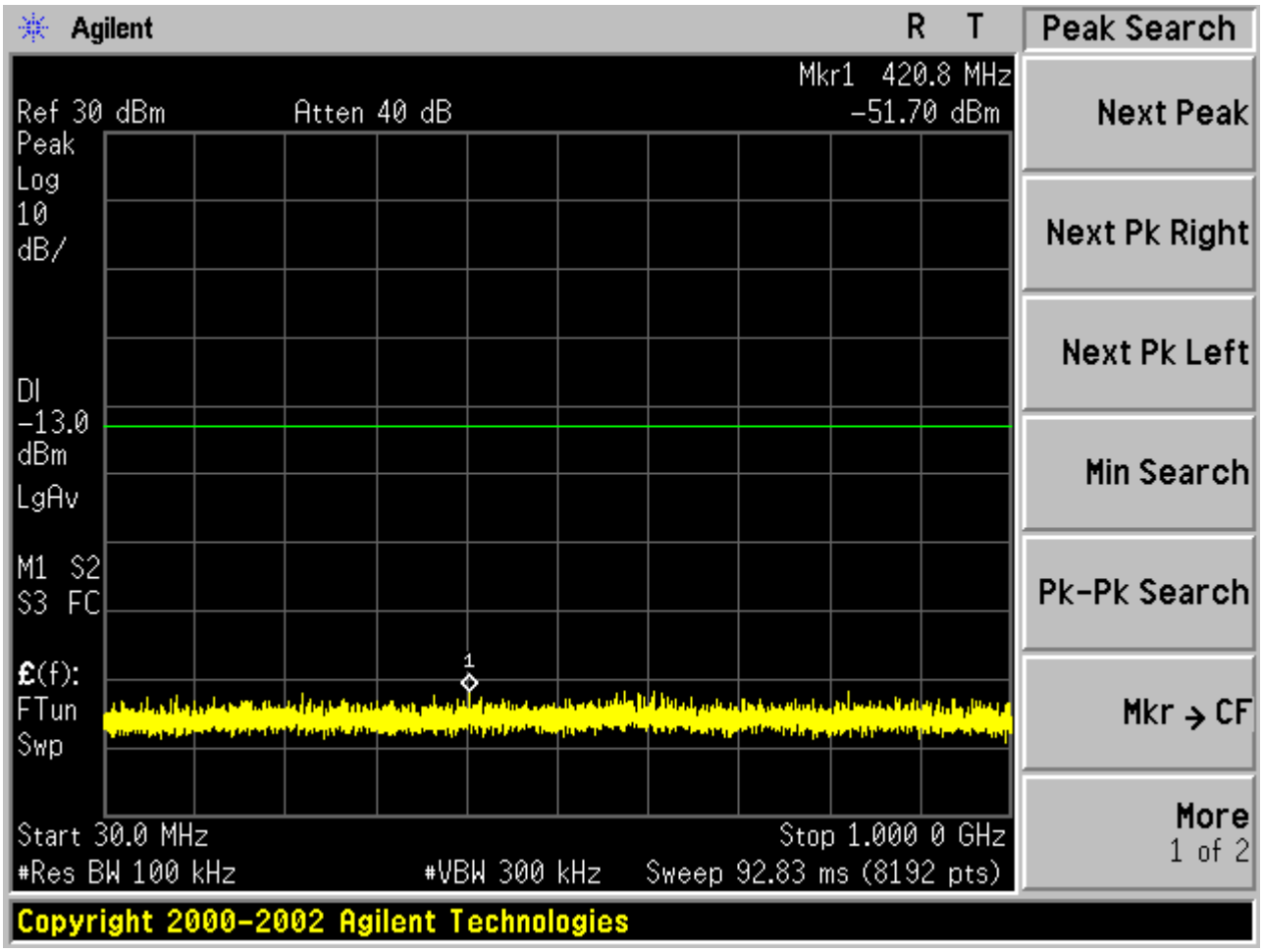


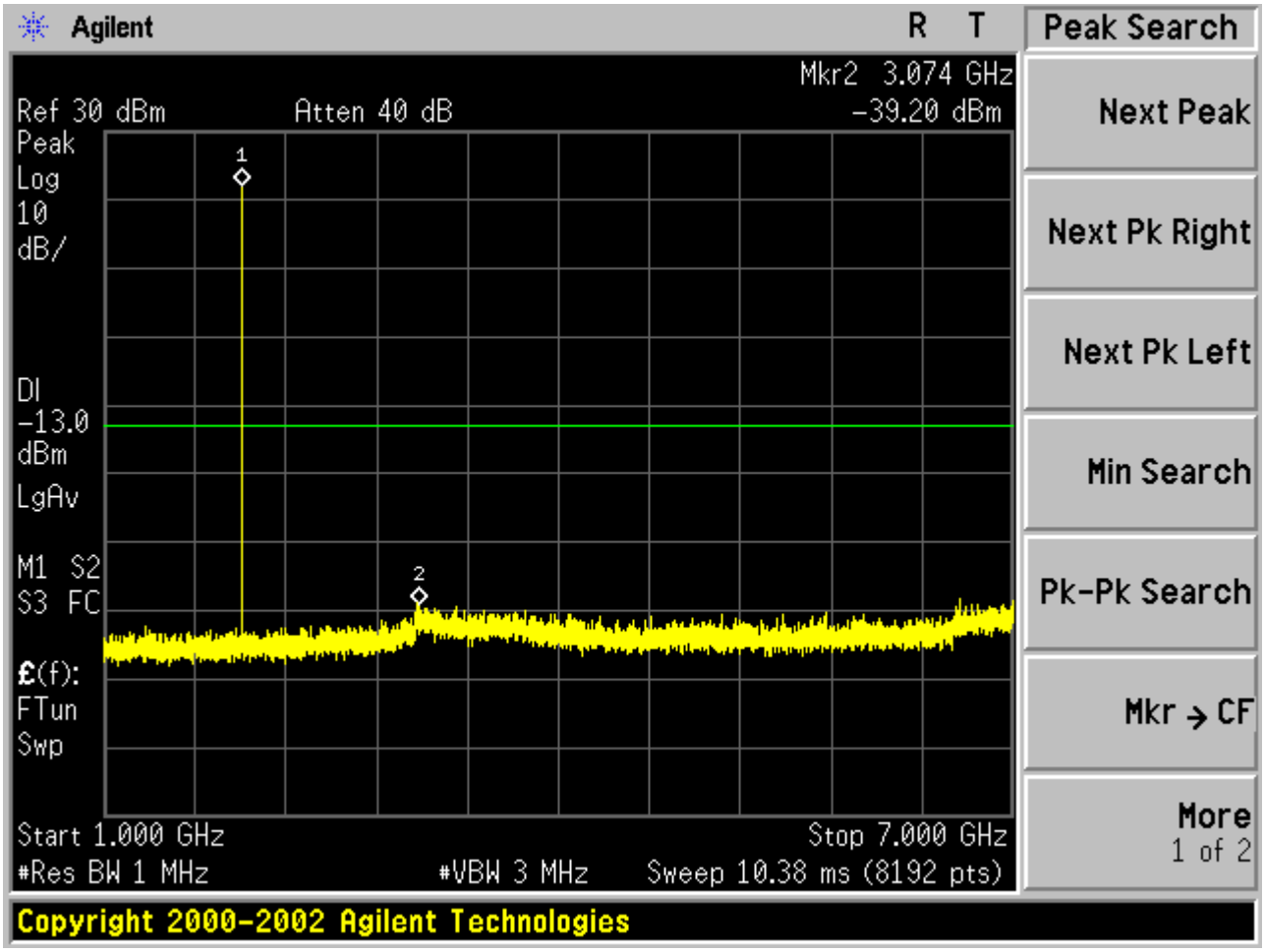

Agilent
R T
Peak Search
Mkr1 1.850 GHz
21.86 dBm
Ref 30 dBm
Atten 40 dB
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 1.000 GHz
Stop 7.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 10.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

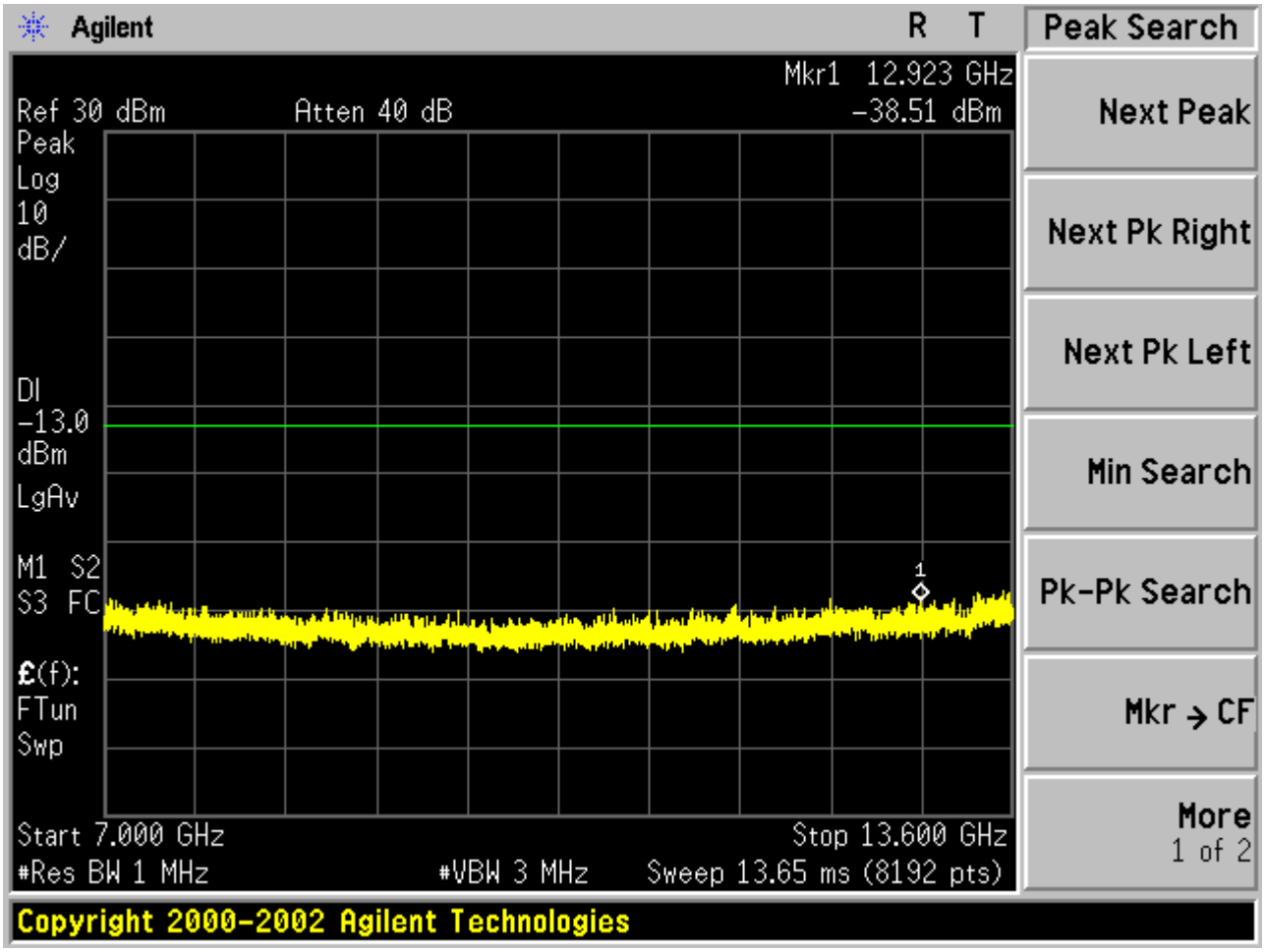

Agilent
R T
Peak Search
Mkr1 13.472 GHz
-37.49 dBm
Ref 30 dBm
Atten 40 dB
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 7.000 GHz
Stop 13.600 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

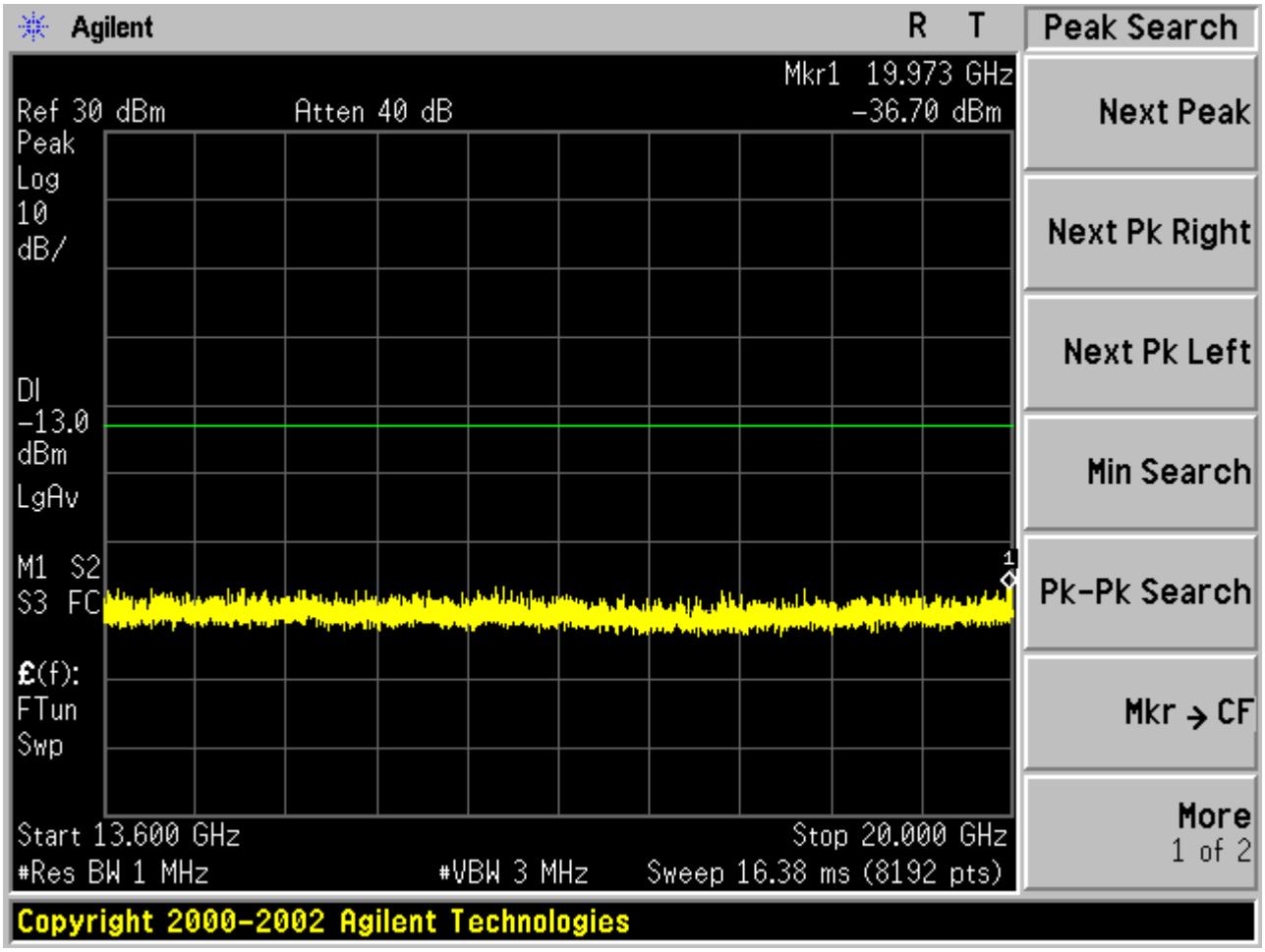

Agilent
R T
Peak Search
Mkr1 15.866 GHz
Ref 30 dBm
Atten 40 dB
-36.71 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 13.600 GHz
Stop 20.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 16.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Channel=MCH

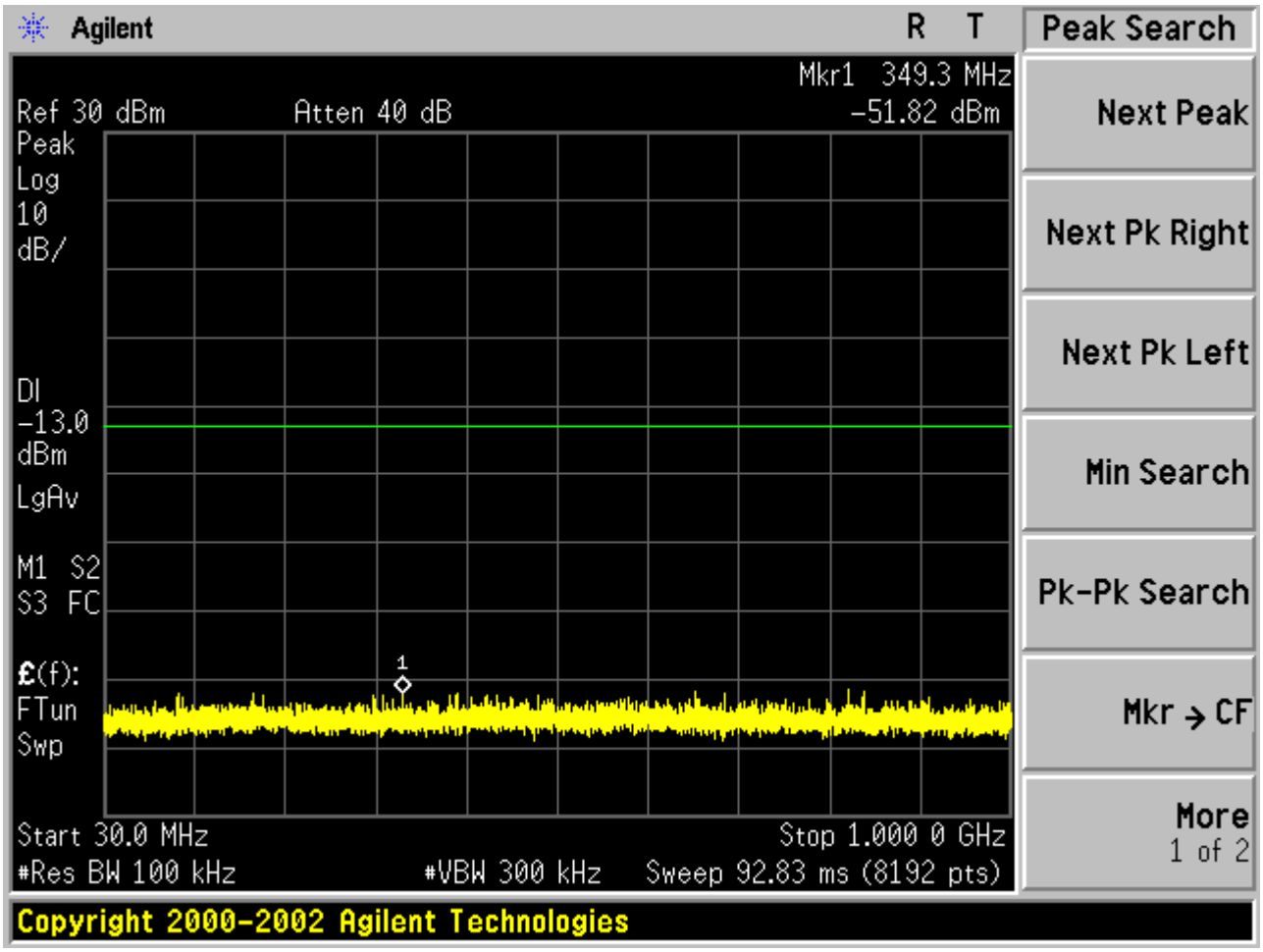


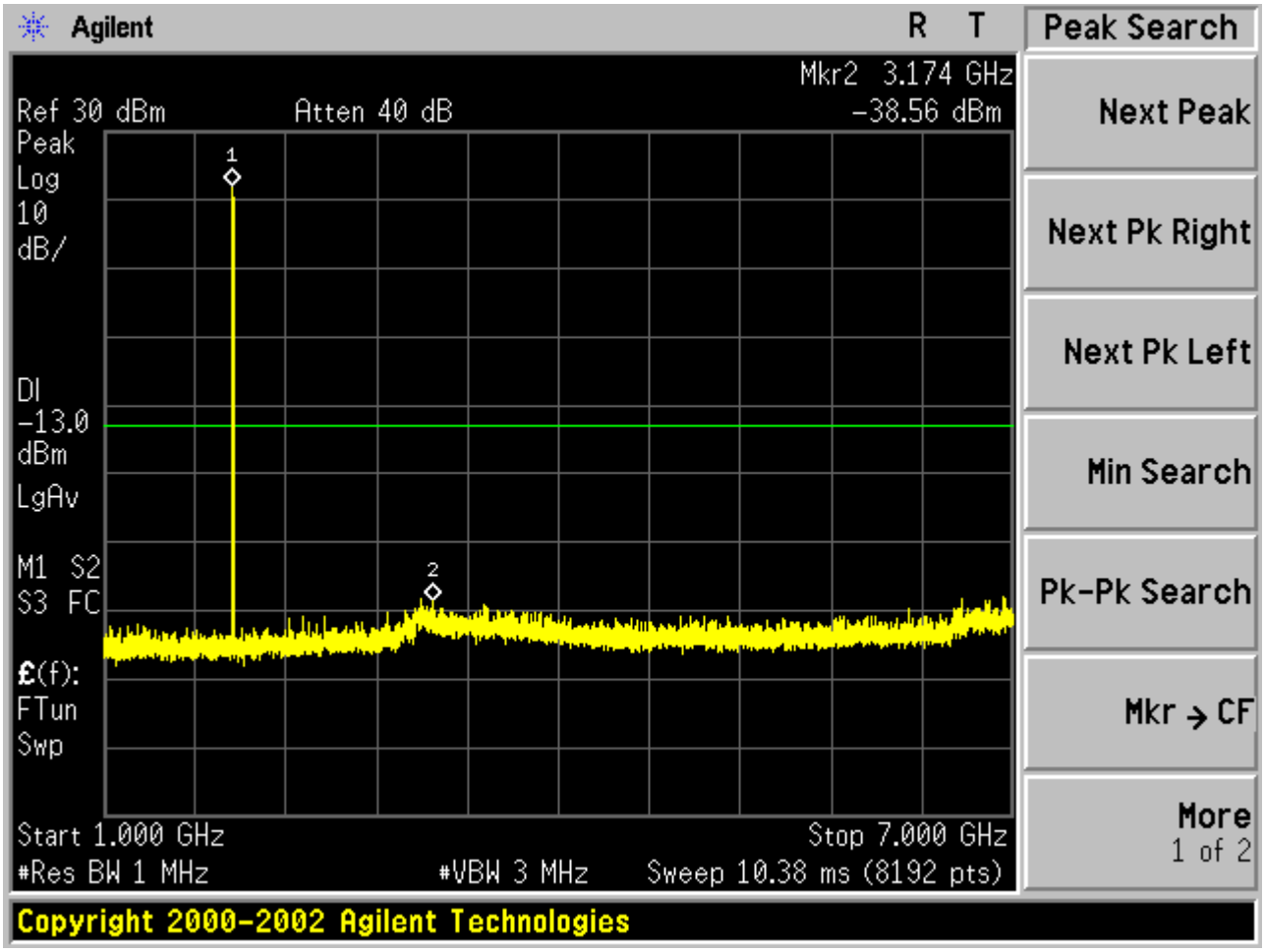

Agilent
R T
Peak Search
Mkr2 3.074 GHz
Ref 30 dBm
Atten 40 dB
-39.20 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 7.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 10.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

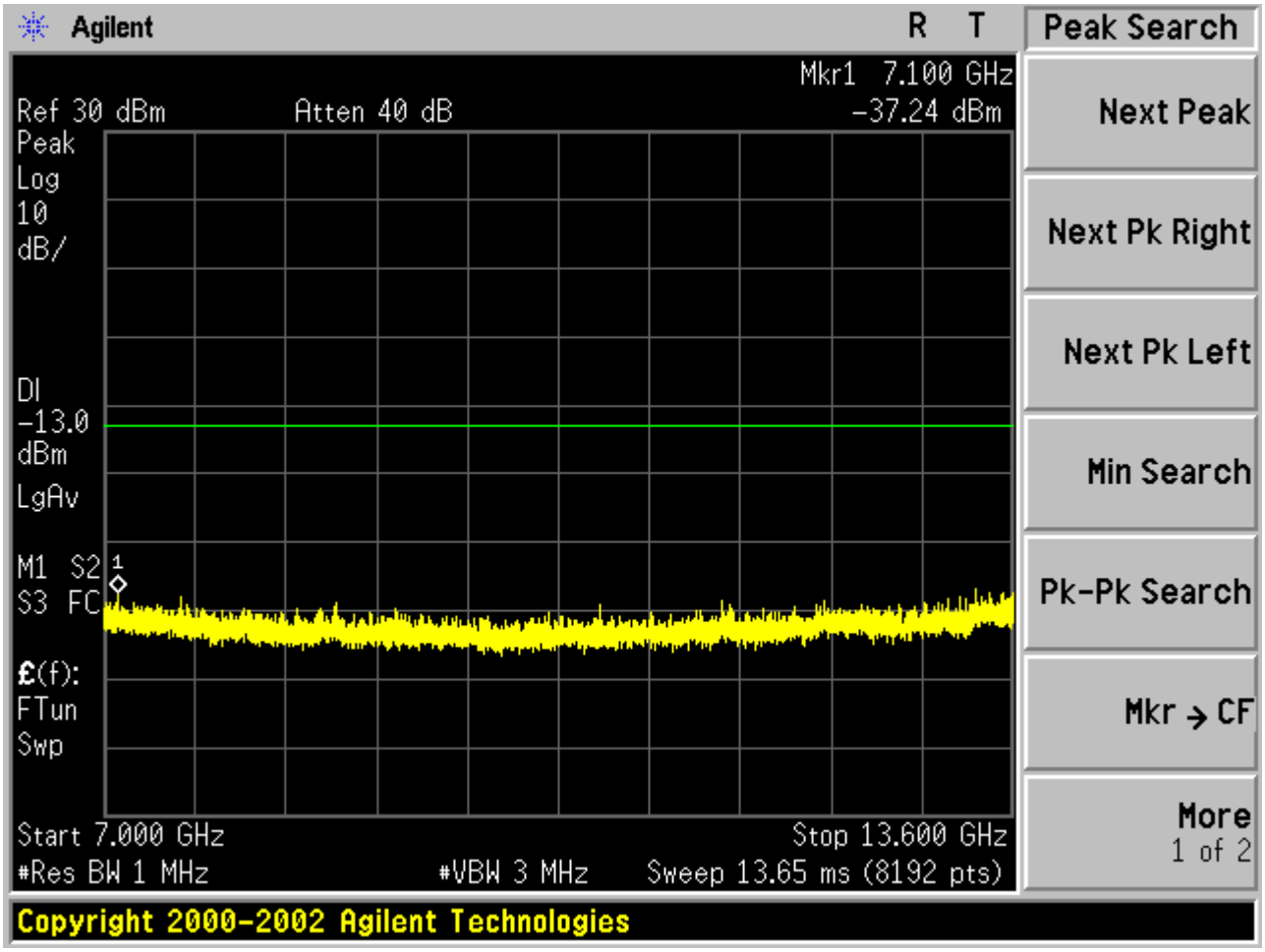

Agilent
R T
Peak Search
Mkr1 12.923 GHz
Ref 30 dBm
Atten 40 dB
-38.51 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 7.000 GHz
Stop 13.600 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

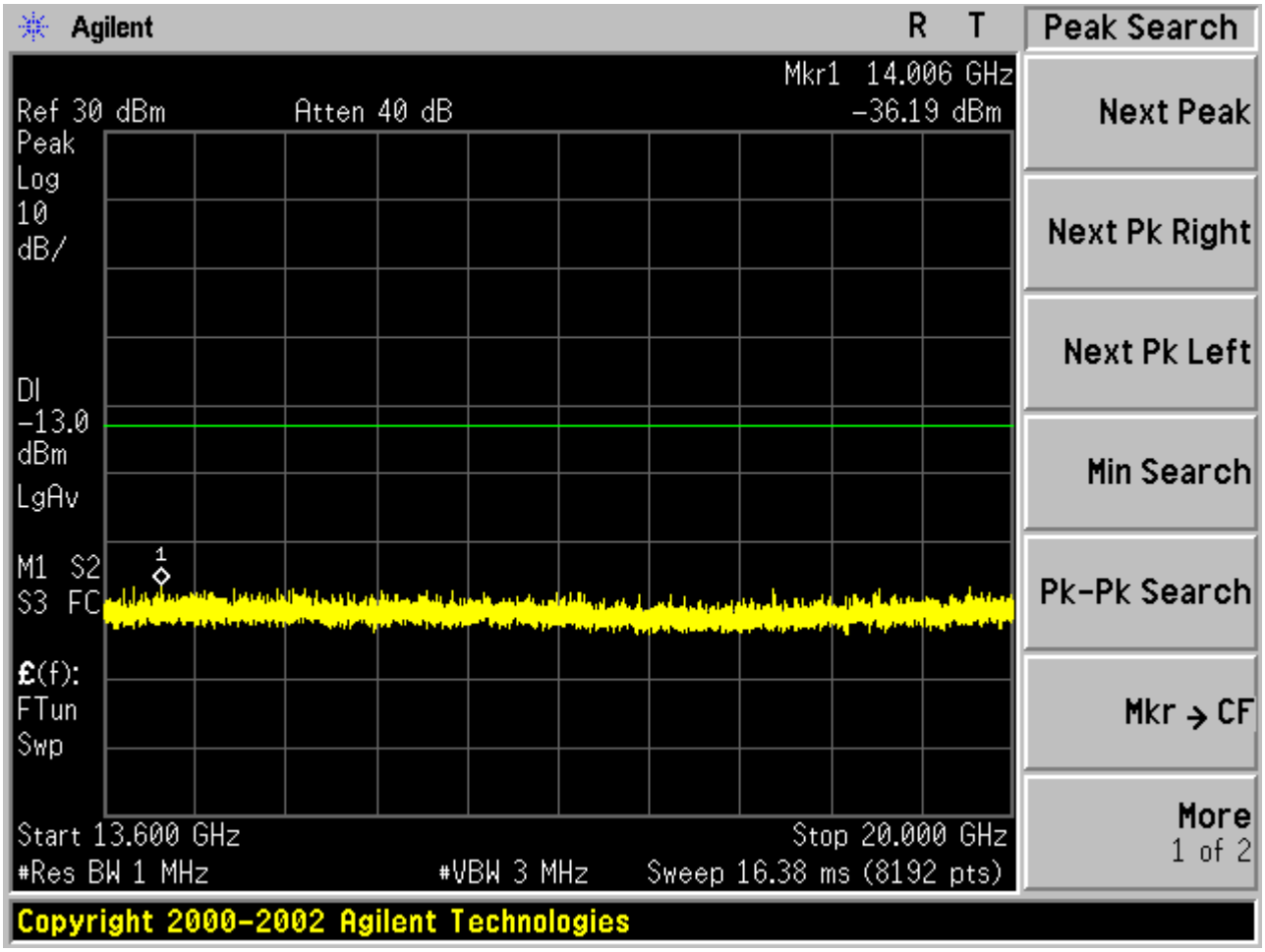

Agilent
R T
Peak Search
Mkr1 19.973 GHz
Ref 30 dBm
Atten 40 dB
-36.70 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 13.600 GHz
Stop 20.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 16.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Channel=HCH




Agilent
R T
Peak Search
Mkr2 3.174 GHz
Ref 30 dBm
Atten 40 dB
-38.56 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 1.000 GHz
Stop 7.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 10.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

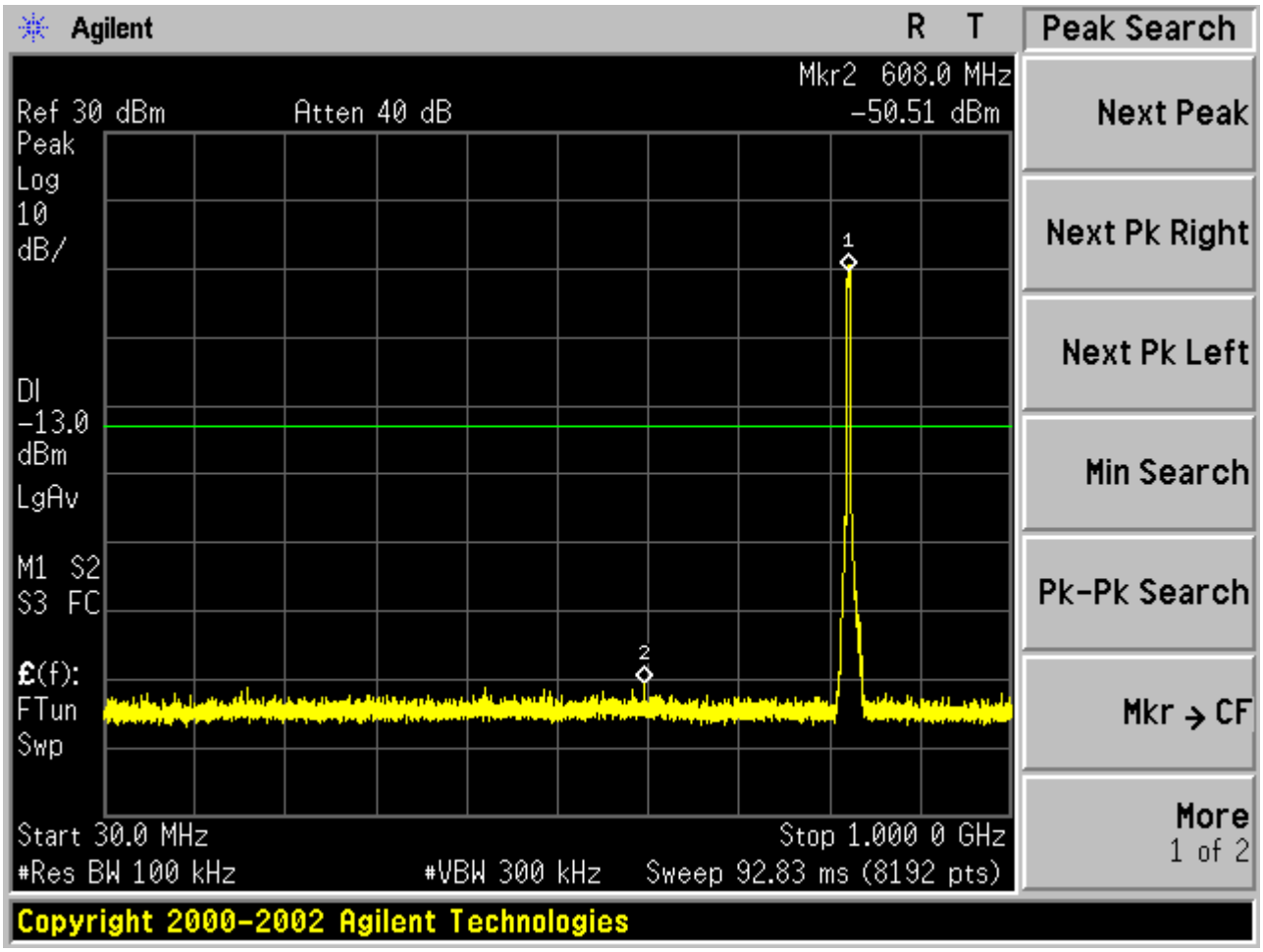

Agilent
R T
Peak Search
Mkr1 7.100 GHz
Ref 30 dBm
Atten 40 dB
-37.24 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 7.000 GHz
Stop 13.600 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

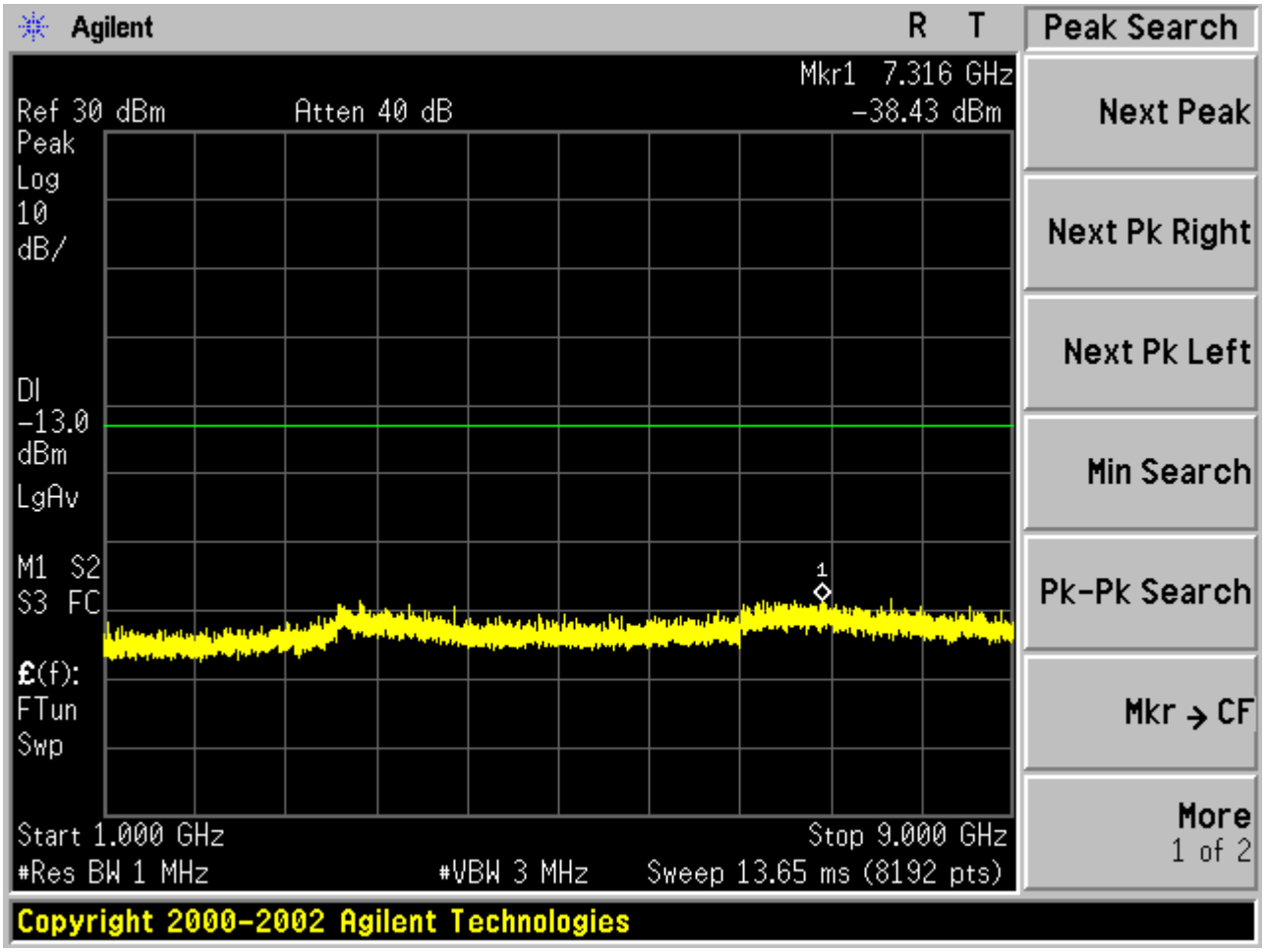

Agilent
R T
Peak Search
Mkr1 14.006 GHz
Ref 30 dBm
Atten 40 dB
-36.19 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 13.600 GHz
Stop 20.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 16.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Band=WCDMA850

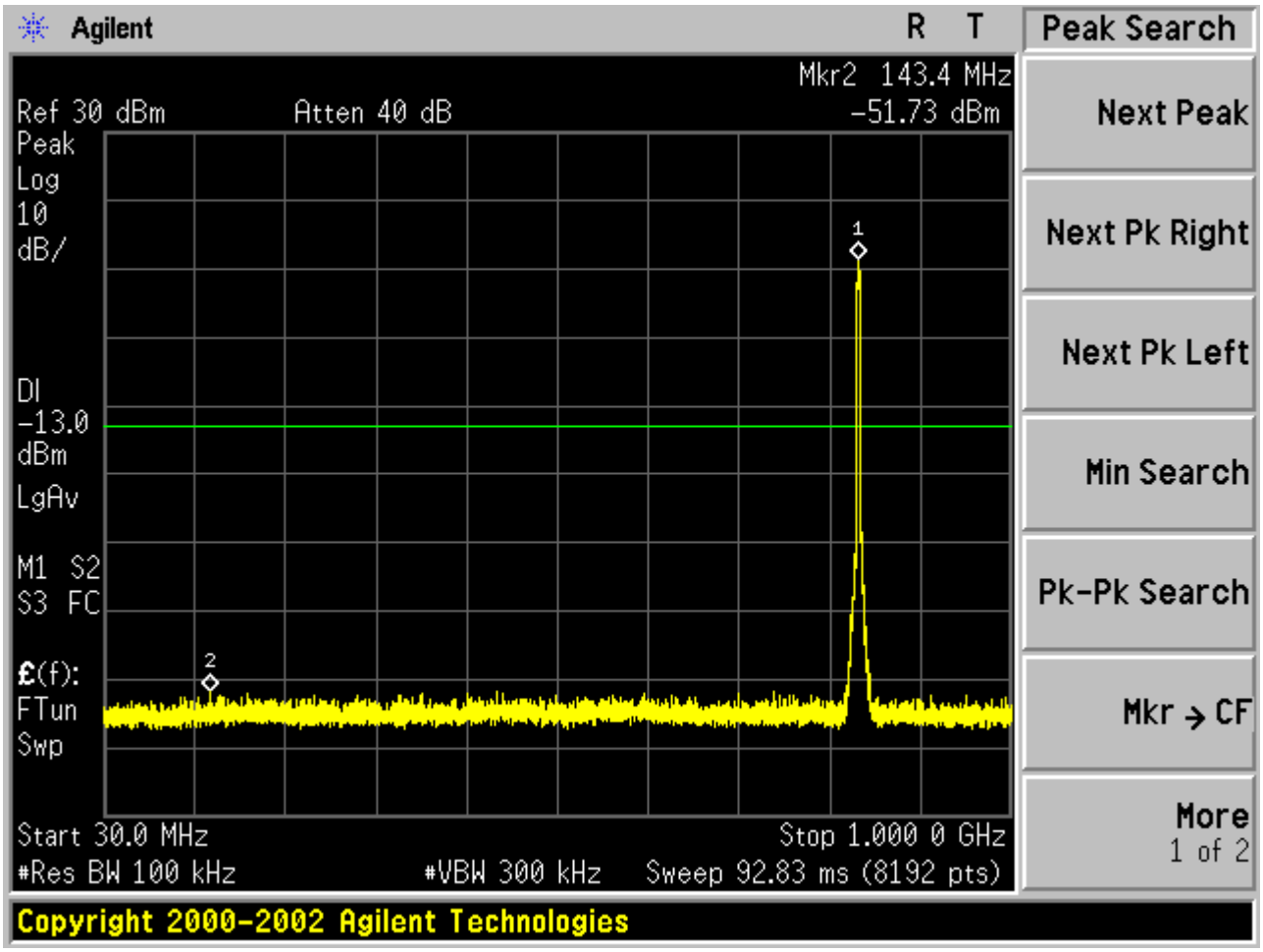
Test Mode=UMTS

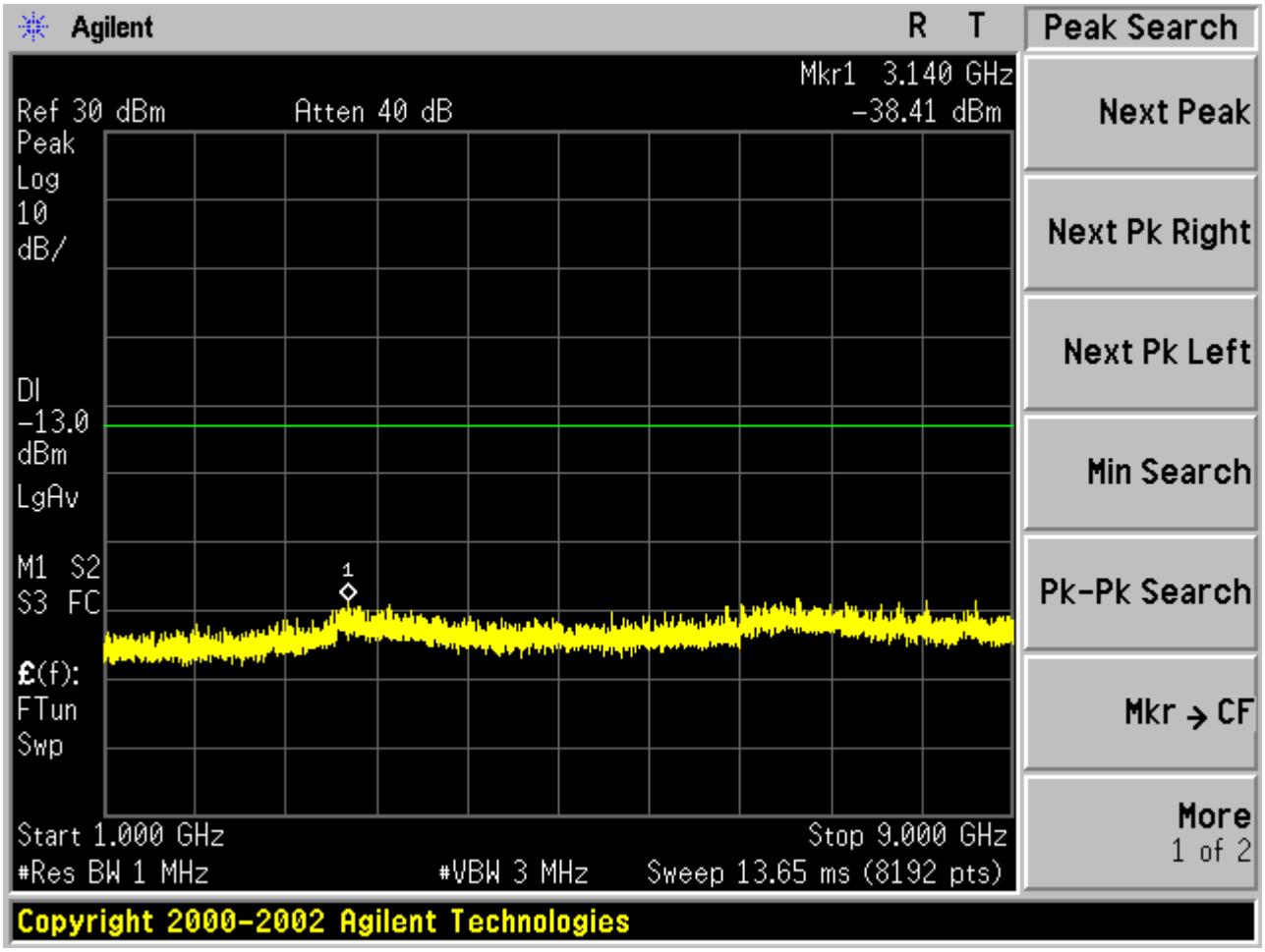
Test Channel=LCH



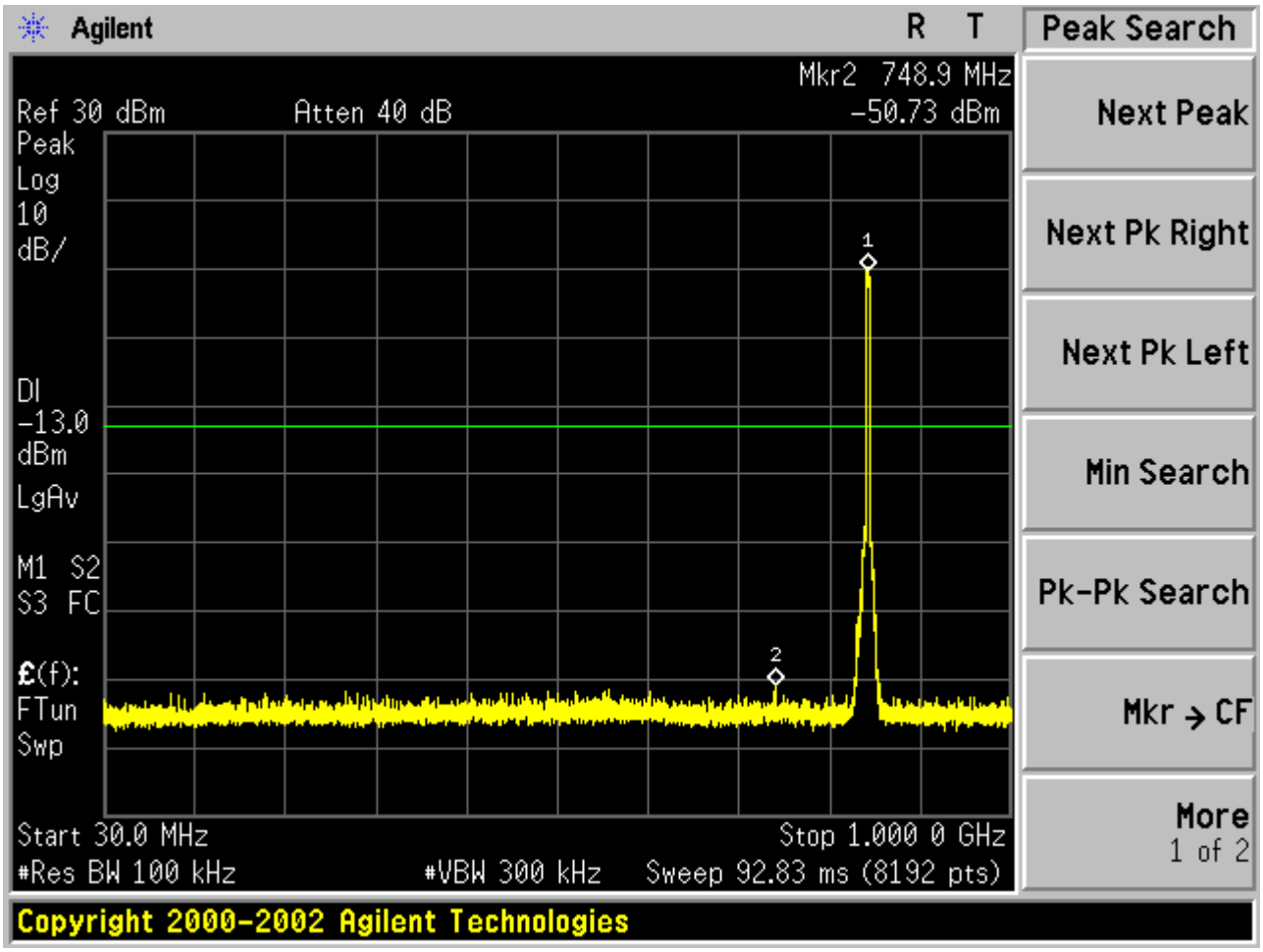

Agilent
R T
Peak Search
Mkr1 7.316 GHz
Ref 30 dBm
Atten 40 dB
-38.43 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 9.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

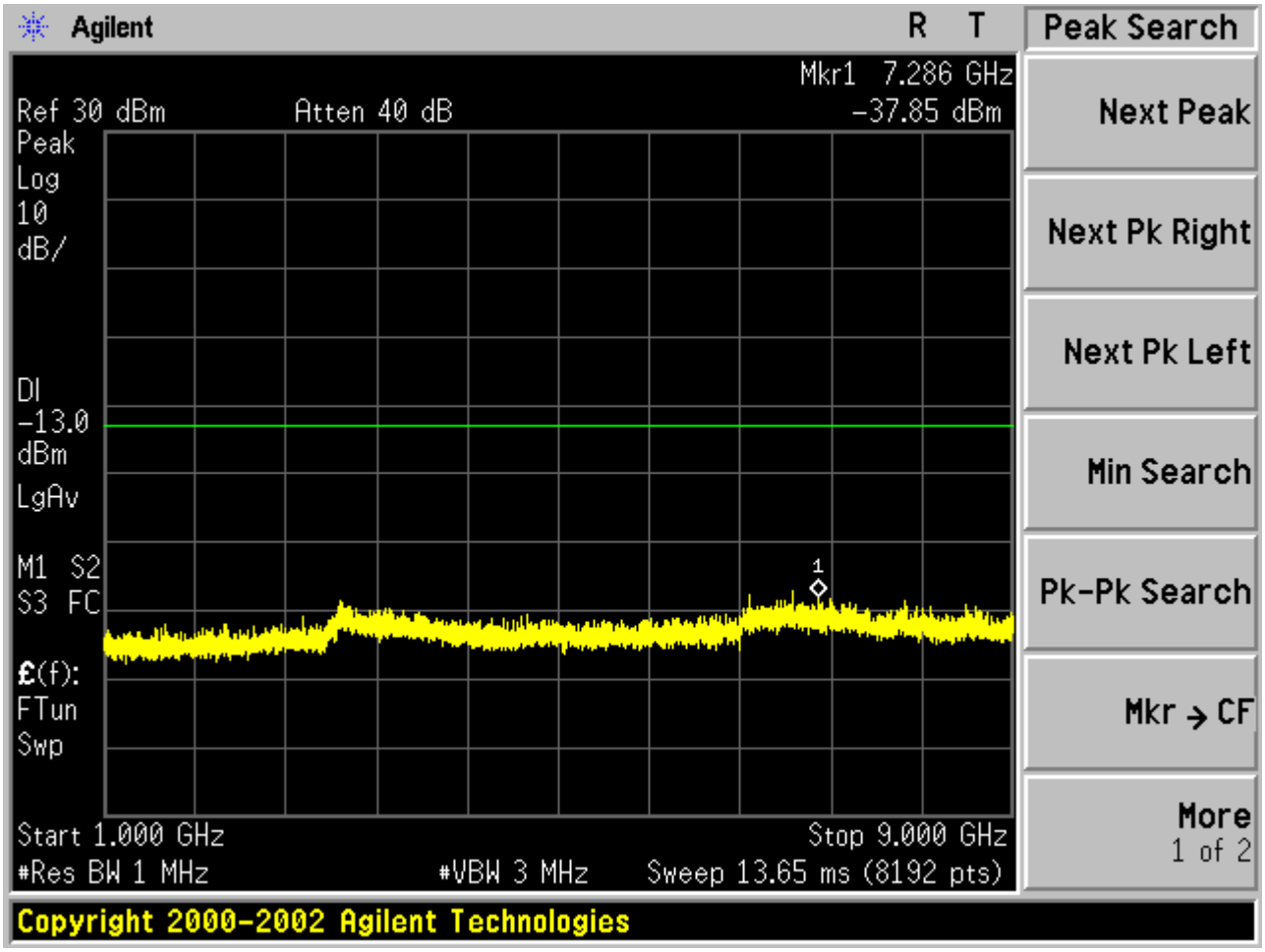
Test Channel=MCH




Agilent
R T
Peak Search
Mkr1 3.140 GHz
Ref 30 dBm
Atten 40 dB
-38.41 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
1
£(f):
FTun
Swp
Start 1.000 GHz
Stop 9.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Channel=HCH

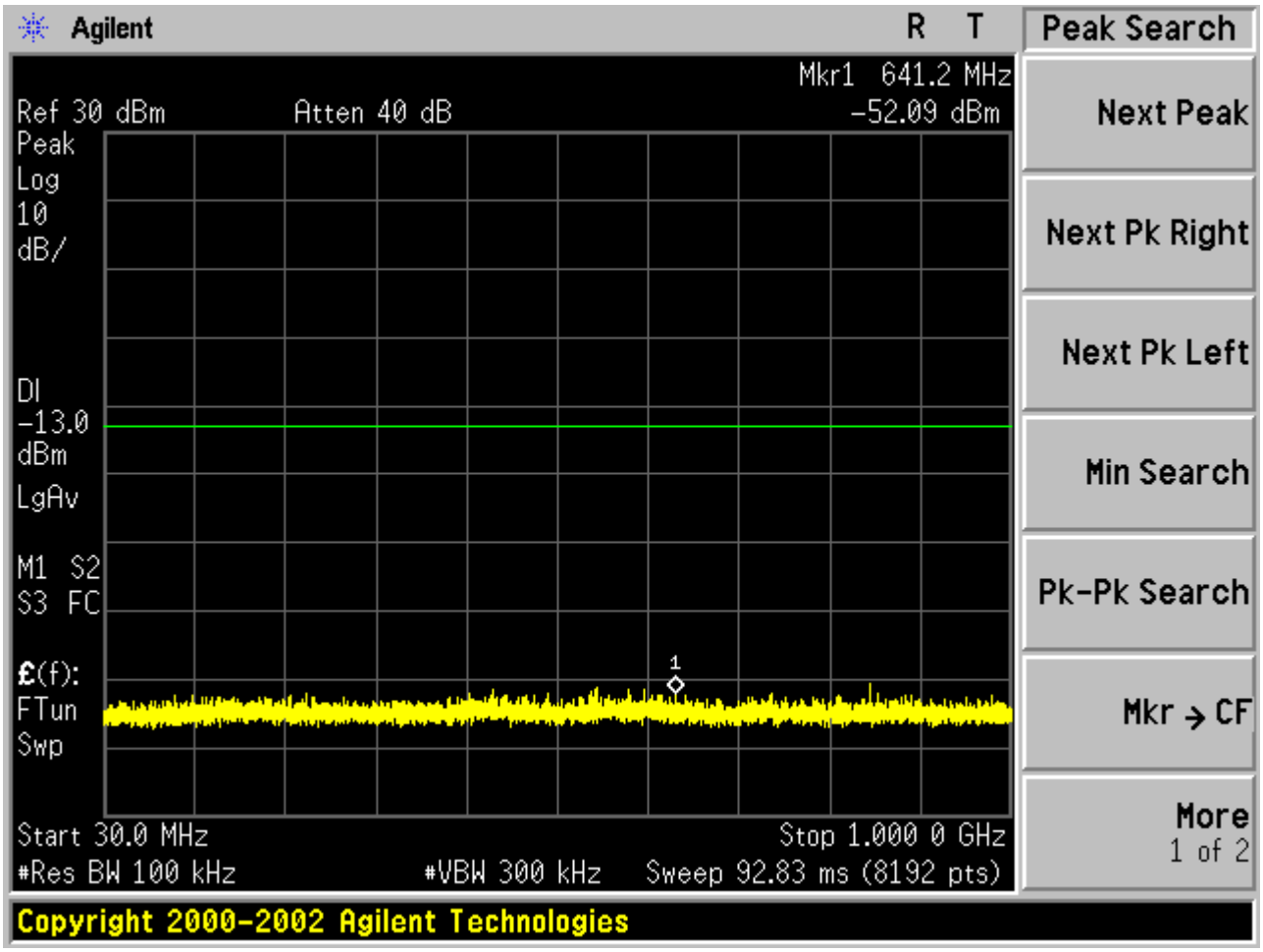


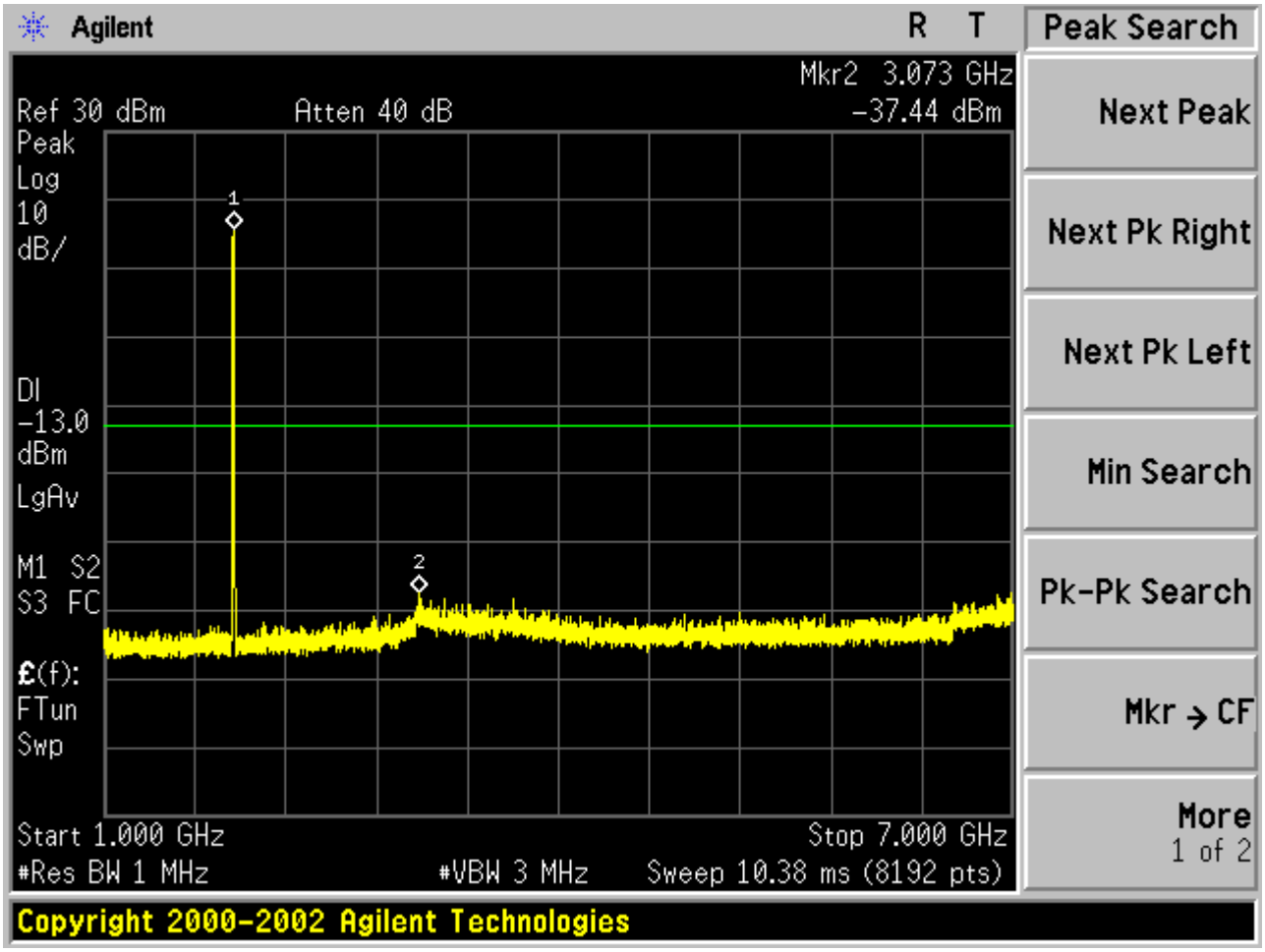

Agilent
R T
Peak Search
Mkr1 7.286 GHz
Ref 30 dBm
Atten 40 dB
-37.85 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
1
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 9.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

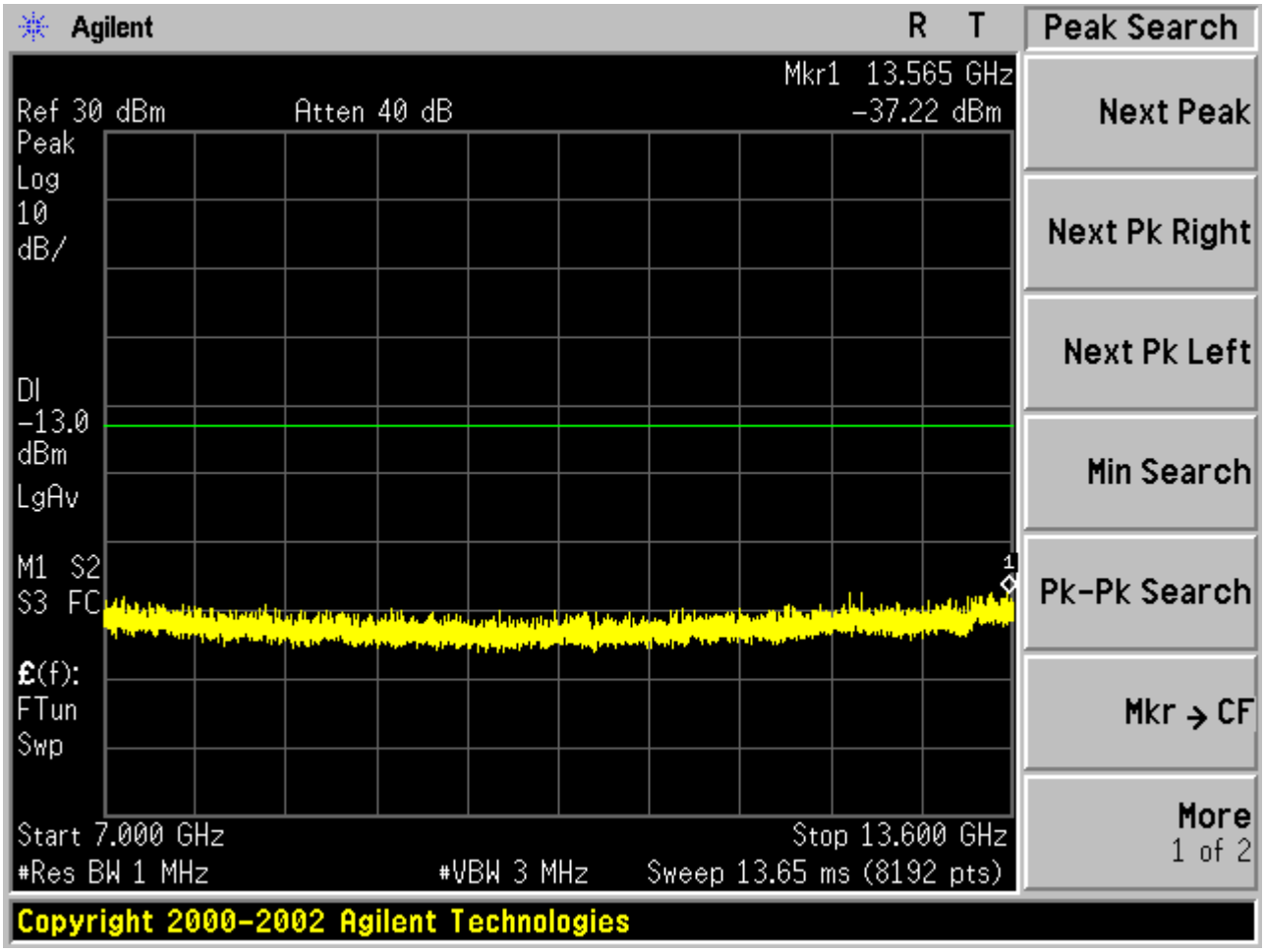
Test Band=WCDMA1900

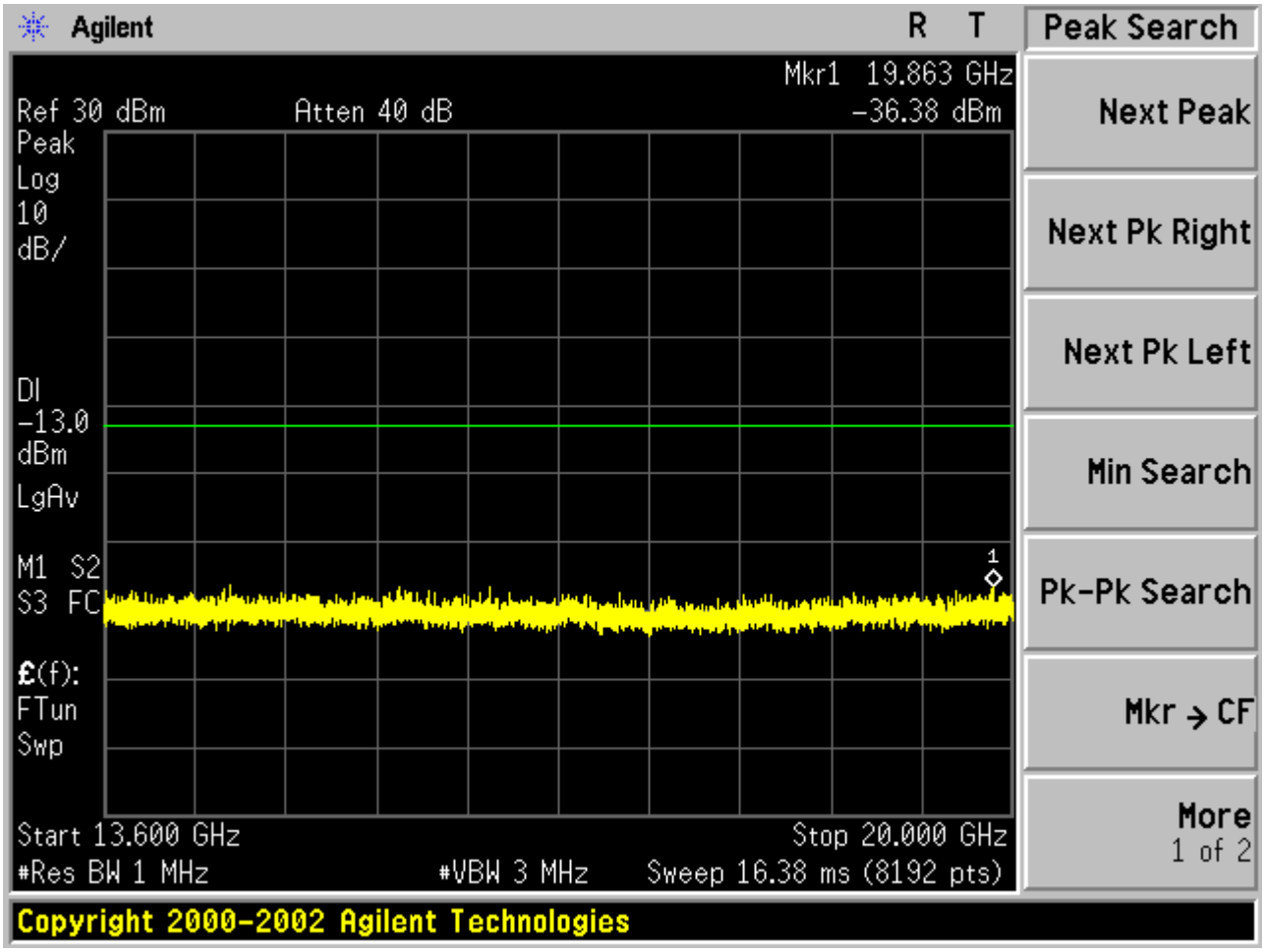
Test Mode=UMTS

Test Channel=LCH

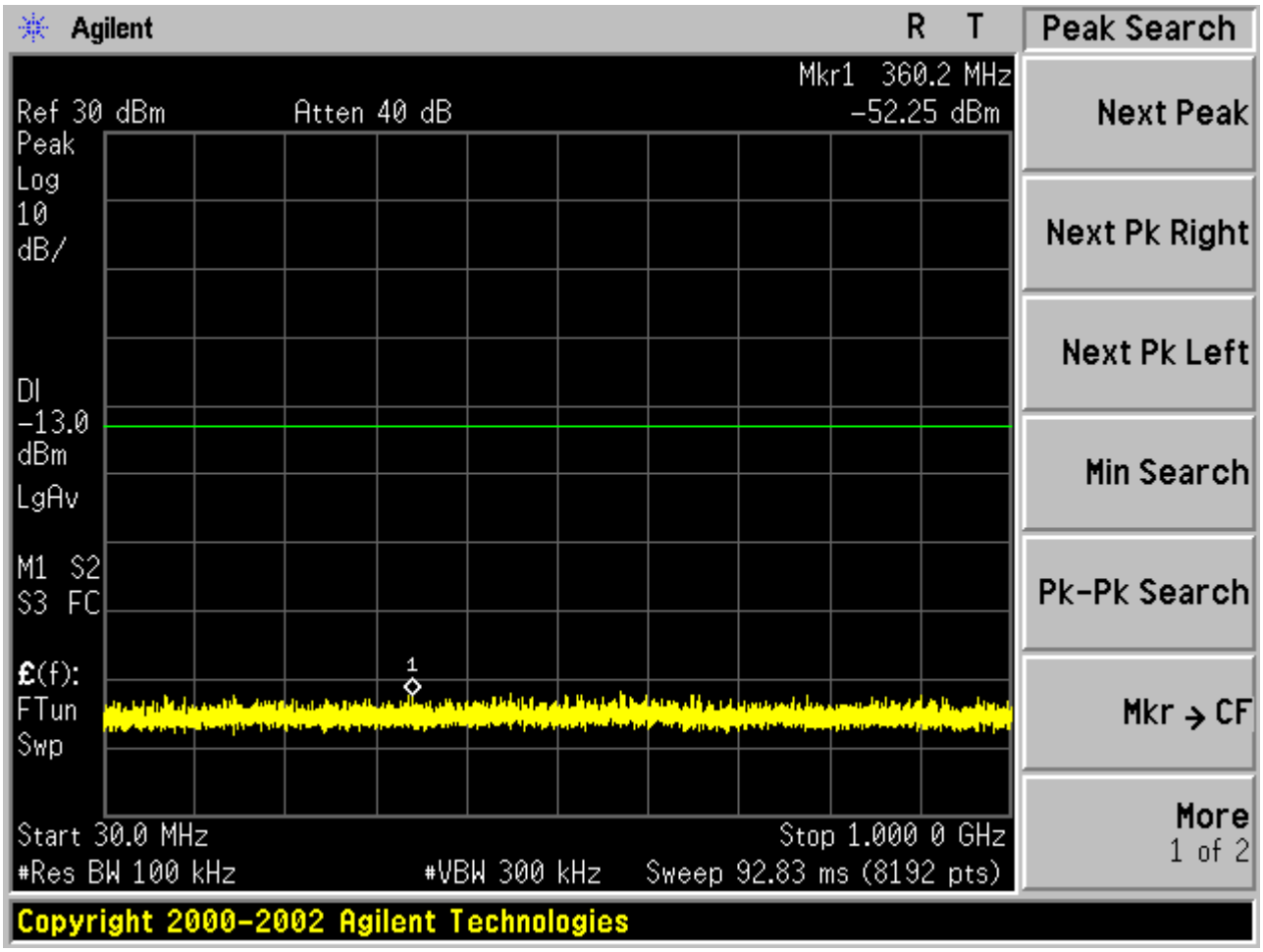


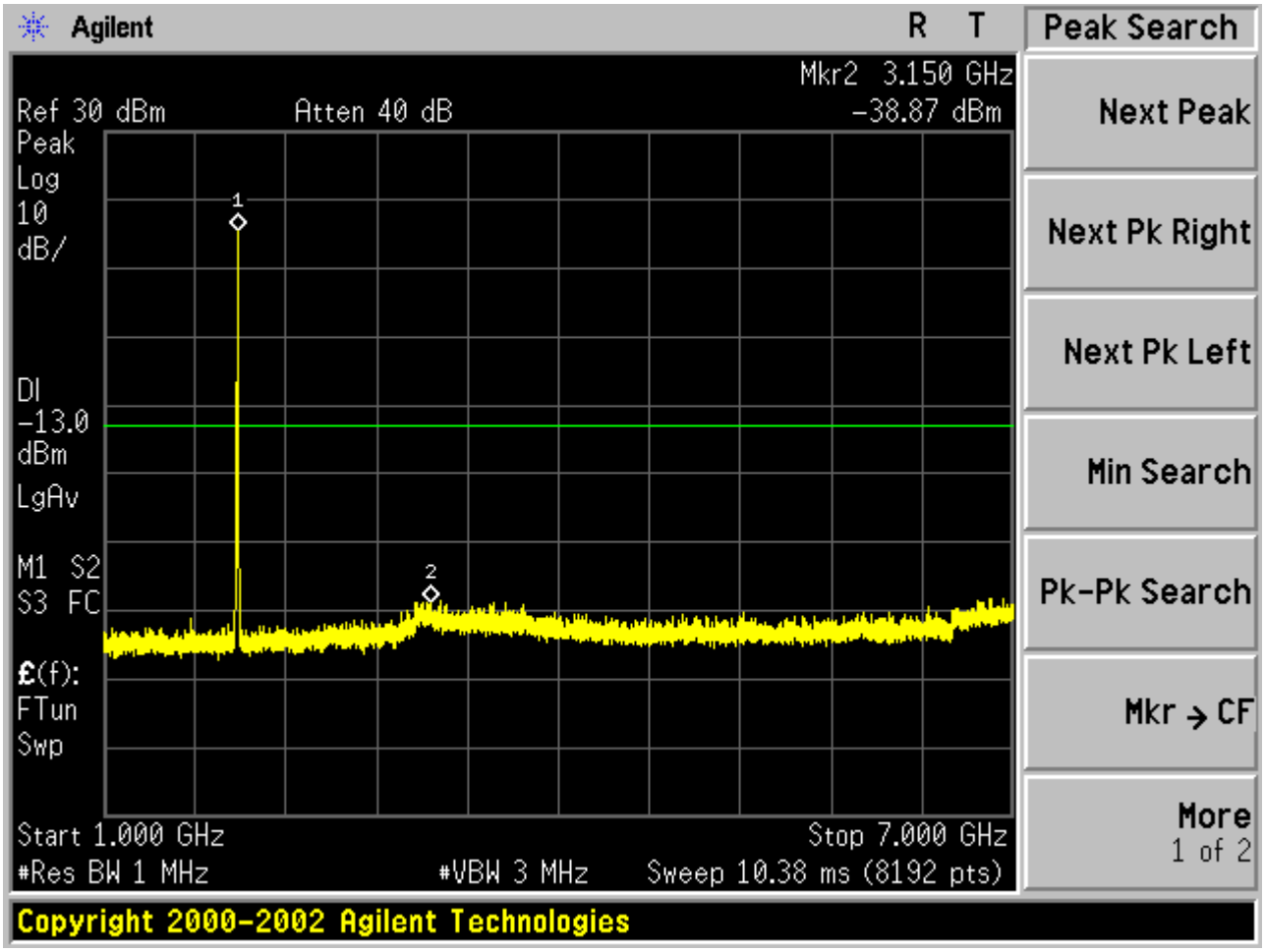

Agilent
R T
Peak Search
Mkr2 3.073 GHz
Ref 30 dBm
Atten 40 dB
-37.44 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 1.000 GHz
Stop 7.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 10.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

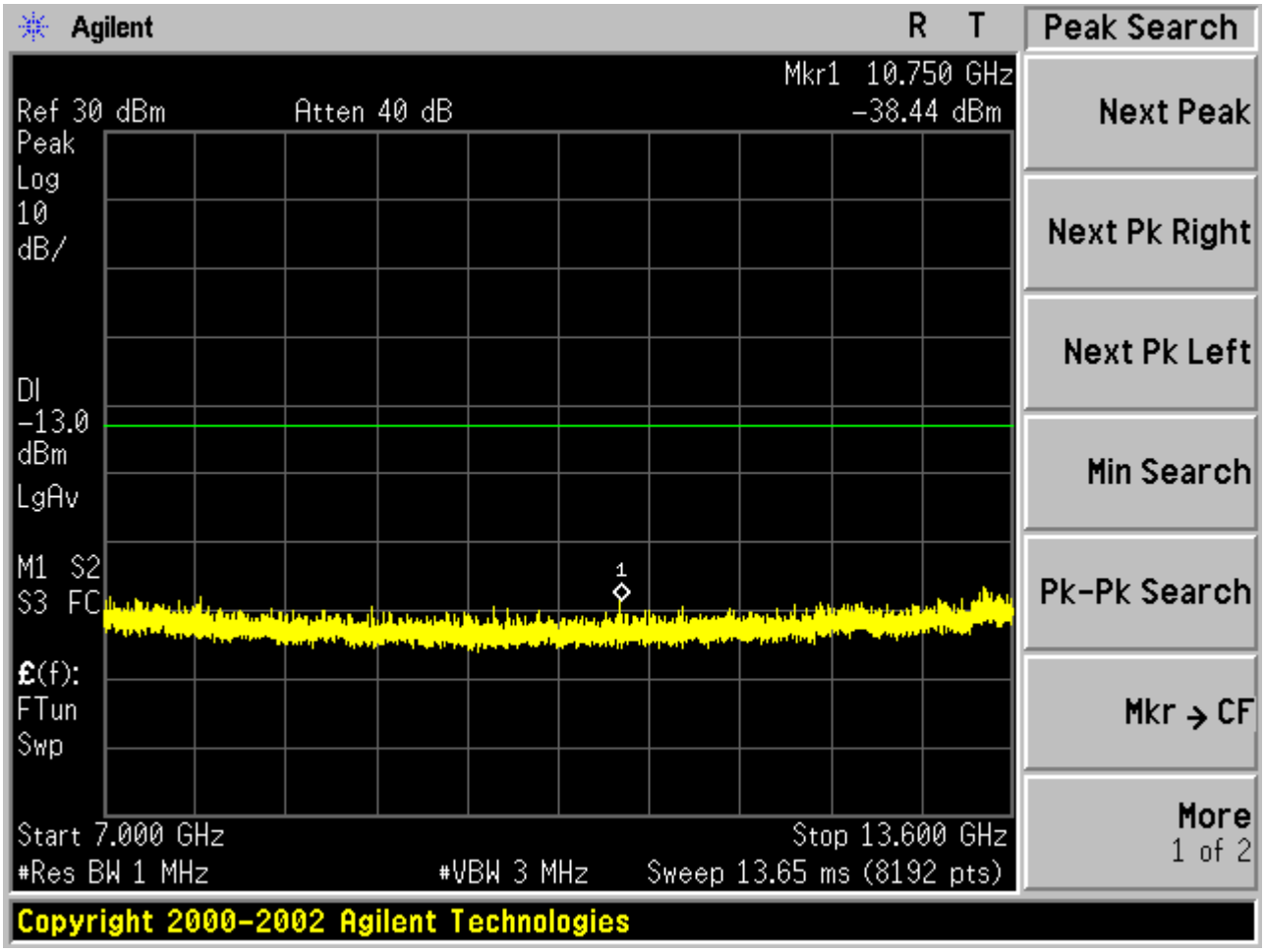

Agilent
R T
Peak Search
Mkr1 13.565 GHz
Ref 30 dBm
Atten 40 dB
-37.22 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 7.000 GHz
Stop 13.600 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

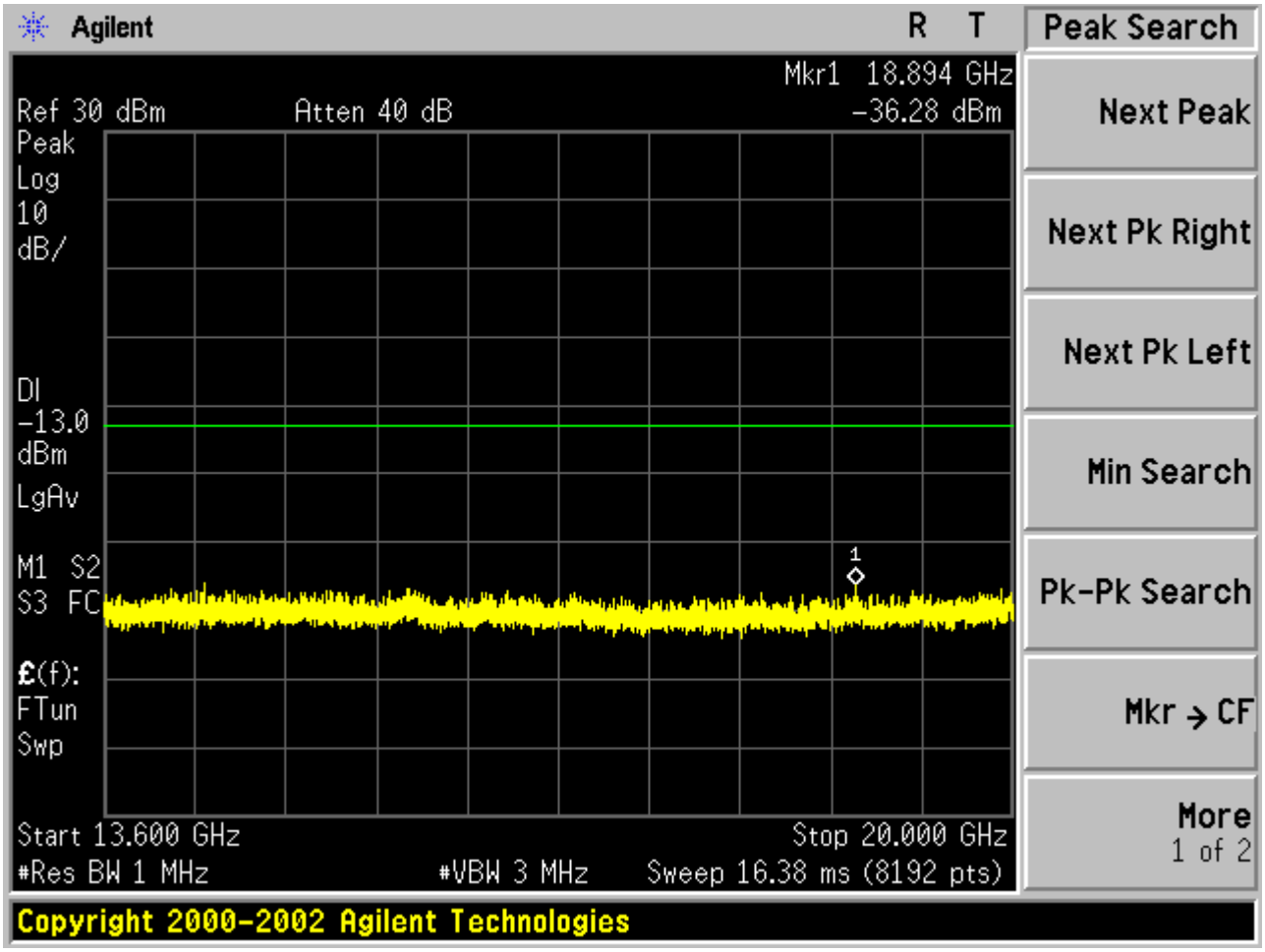

Agilent
R T
Peak Search
Mkr1 19.863 GHz
Ref 30 dBm
Atten 40 dB
-36.38 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
1
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 13.600 GHz
Stop 20.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 16.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Channel=MCH

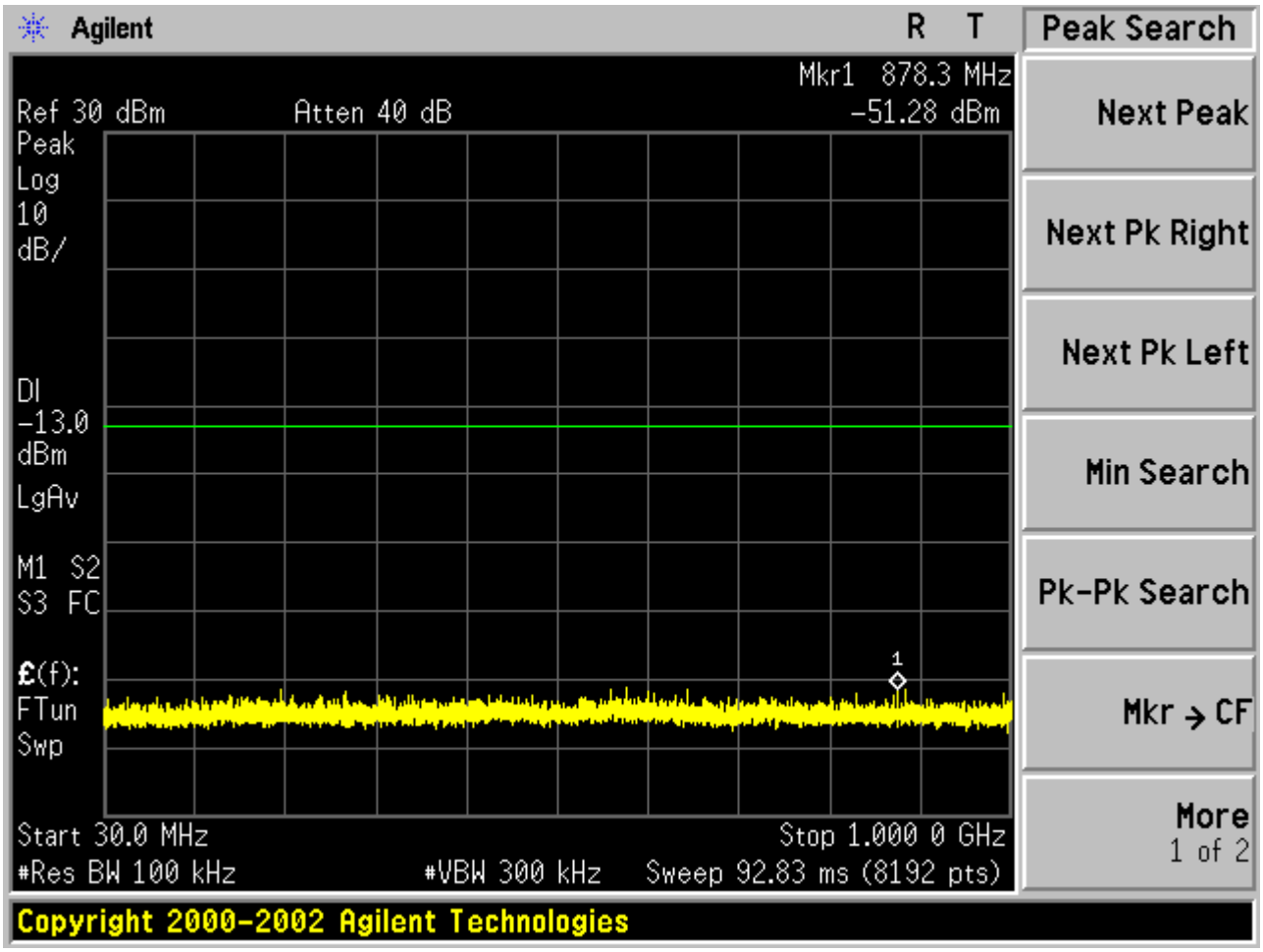


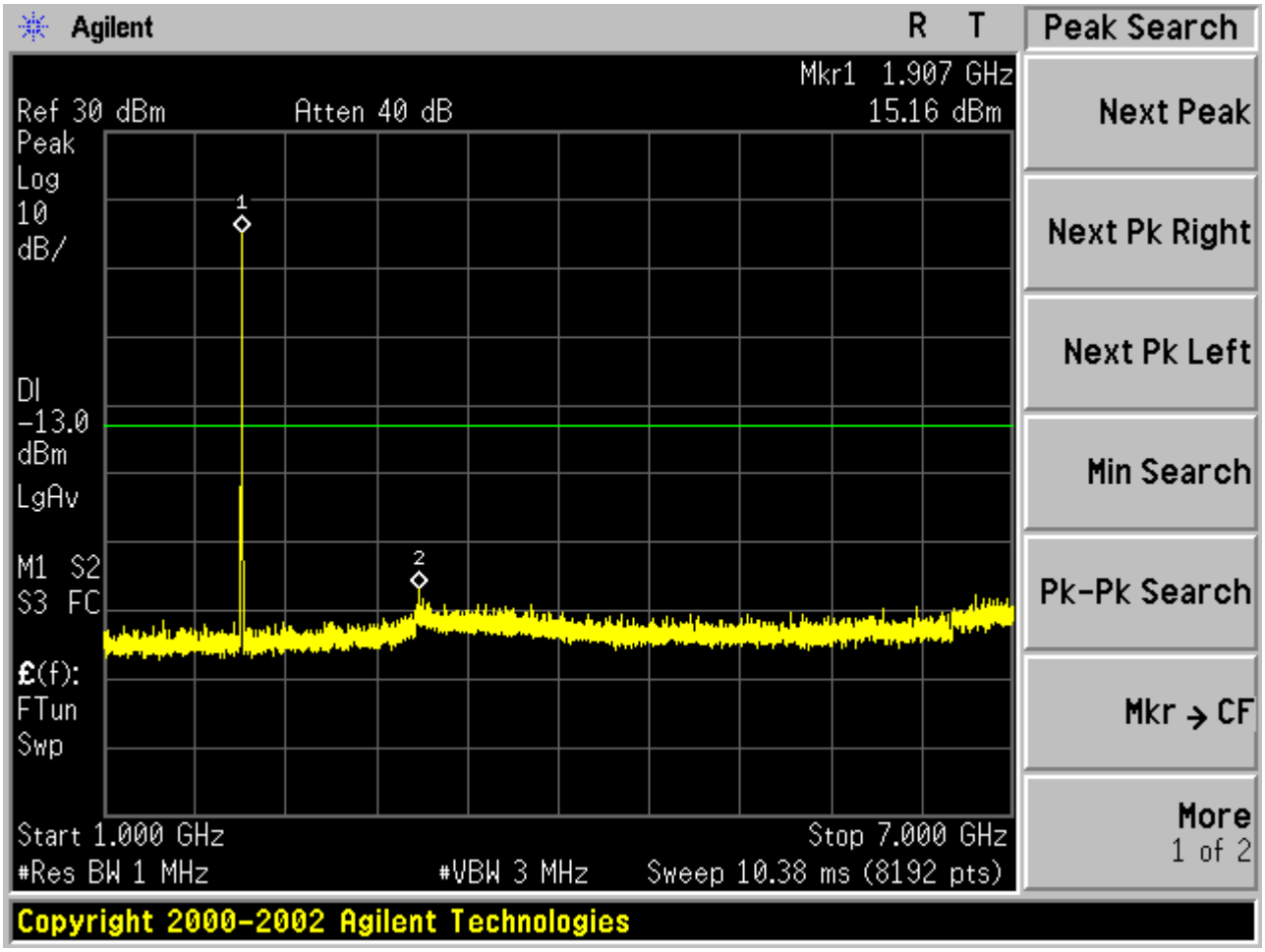

Agilent
R T
Peak Search
Mkr2 3.150 GHz
-38.87 dBm
Ref 30 dBm
Atten 40 dB
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 1.000 GHz
Stop 7.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 10.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

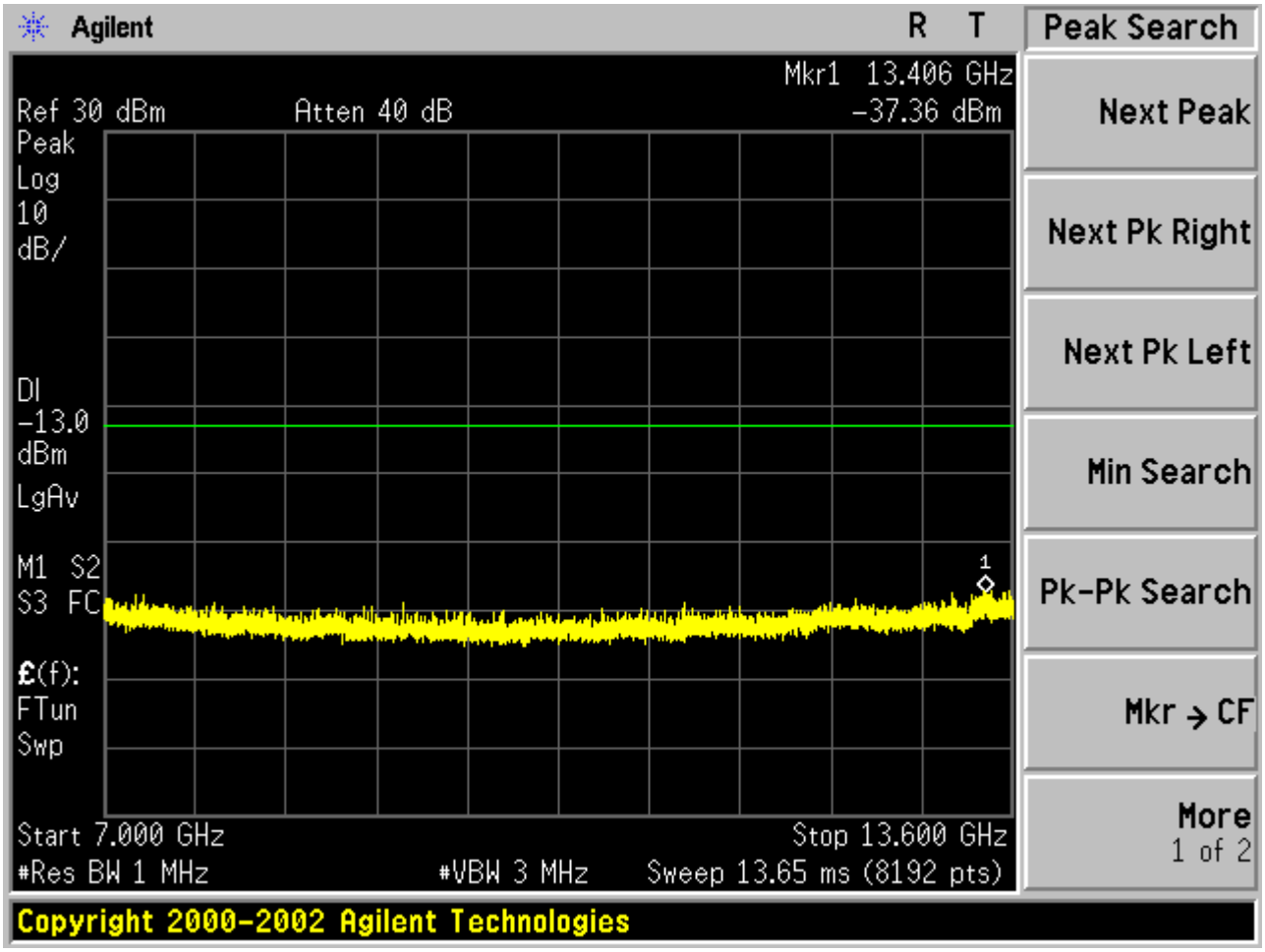

Agilent
R T
Peak Search
Mkr1 10.750 GHz
Ref 30 dBm
Atten 40 dB
-38.44 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 7.000 GHz
Stop 13.600 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

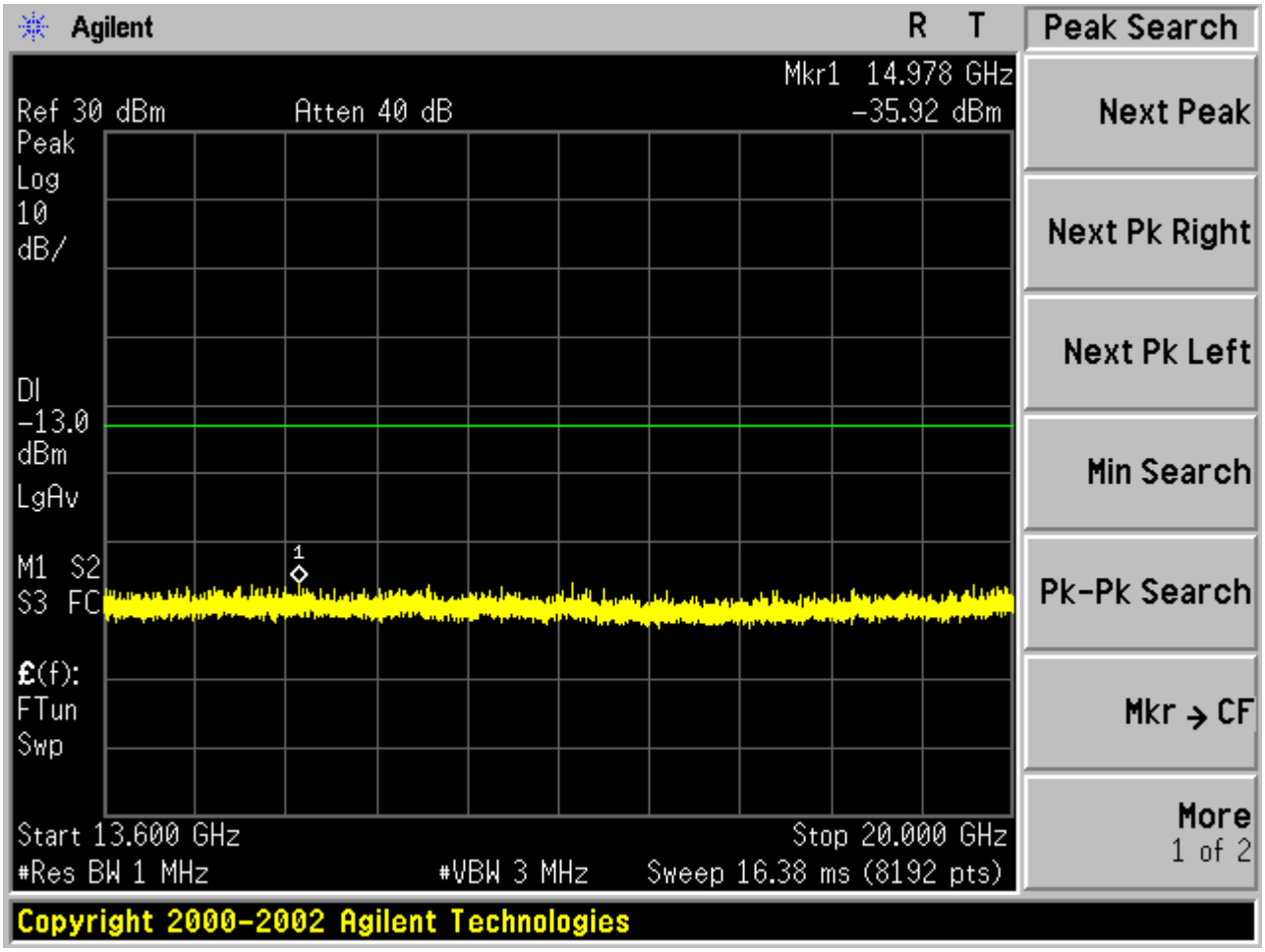

Agilent
R T
Peak Search
Mkr1 18.894 GHz
Ref 30 dBm
Atten 40 dB
-36.28 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 13.600 GHz
Stop 20.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 16.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies

Test Channel=HCH




Agilent
R T
Peak Search
Mkr1 1.907 GHz
Ref 30 dBm
Atten 40 dB
15.16 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 1.000 GHz
Stop 7.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 10.38 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies


Agilent
R T
Peak Search
Mkr1 13.406 GHz
Ref 30 dBm
Atten 40 dB
-37.36 dBm
Next Peak
Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-13.0
dBm
LgAv
Min Search
M1 S2
S3 FC
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 7.000 GHz
Stop 13.600 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 13.65 ms (8192 pts)
Copyright 2000-2002 Agilent Technologies



Note: 1. Below 30MHZ no Spurious found and The GSM modes is the worst condition.

2. As no emission found in standby or receive mode, no recording in this report.

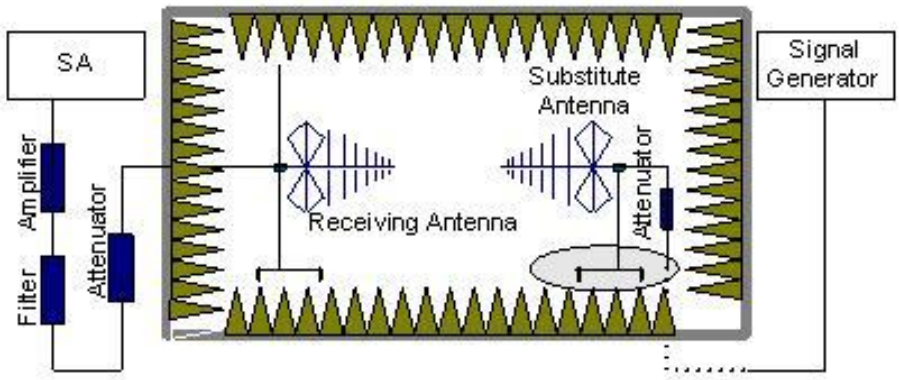
9.2 RADIATED SPURIOUS EMISSION

9.2.1 MEASUREMENT METHOD

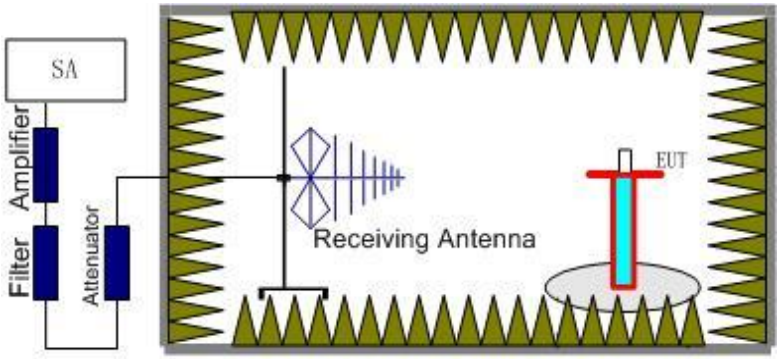
The measurements procedures specified in TIA-603-D-2010 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes(GPRS 850, GPRS 1900, HSPA band II, HSPA band V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The procedure of radiated spurious emissions is as follows:

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



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



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS 1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) ,GSM850 band (824.2MHz, 836.6MHz, 848.8MHz), UMTS band II(1852.6MHz, 1880MHz, 1907.4MHz), UMTS band V(826.6MHz, 836.4MHz, 846.4MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: $Power=P_{Mea}+A_{Rpl}$

9.2.2 PROVISIONS APPLICABLE

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

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

9.2.3 MEASUREMENT RESULT

GSM 850:

The Worst Test Results for Channel 251/848.8 MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit（dBm）	Polarity
1685.23	-45.44	-5.01	-50.45	-13.00	Horizontal
2456.12	-46.37	-2.18	-48.55	-13.00	Vertical
3645.78	-47.11	3.46	-43.65	-13.00	Vertical
4536.58	-42.53	2.79	-39.74	-13.00	Horizontal

PCS 1900:

The Worst Test Results for Channel 810/1909.8MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit（dBm）	Polarity
1429.36	-41.47	-3.22	-44.69	-13.00	Vertical
2563.47	-43.68	-0.24	-43.92	-13.00	Vertical
3645.26	-41.05	3.98	-37.07	-13.00	Horizontal
4563.56	-45.47	11.56	-33.91	-13.00	Vertical
5689.25	-43.42	17.89	-25.53	-13.00	Horizontal

UMTS band II:

The Worst Test Results for Channel 9938/1907.4MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit（dBm）	Polarity
2000.00	-38.72	-2.25	-40.97	-13.00	Vertical
9548.50	-41.58	-3.03	-44.61	-13.00	Horizontal
13367.40	-45.34	-1.87	-47.21	-13.00	Horizontal
15277.80	-46.38	8.52	-37.86	-13.00	Vertical
17931.60	-42.22	18.7	-23.52	-13.00	Horizontal

UMTS band V:

The Worst Test Results for Channel 4458/846.4MHz					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit（dBm）	Polarity
1598.26	-45.41	-2.26	-47.67	-13.00	Vertical
2365.78	-42.25	-3.12	-45.37	-13.00	Horizontal
4967.65	-46.31	-1.74	-48.05	-13.00	Horizontal
6457.86	-40.17	8.74	-31.43	-13.00	Vertical
7896.56	-49.36	17.89	-31.47	-13.00	Horizontal

Note: ARpl= Factor=Antenna Factor+ Cable loss-Amplifier gain.

The “Factor” value can be calculated automatically by software of measurement system.

Below 30MHZ no Spurious found and The GSM modes is the worst condition.

10. MAINS CONDUCTED EMISSION

10.1 MEASUREMENT METHOD

The measurement procedure specified in ANSI/TIA-603-D-2010 was used for testing. Conducted Emission was measured with travel charger.

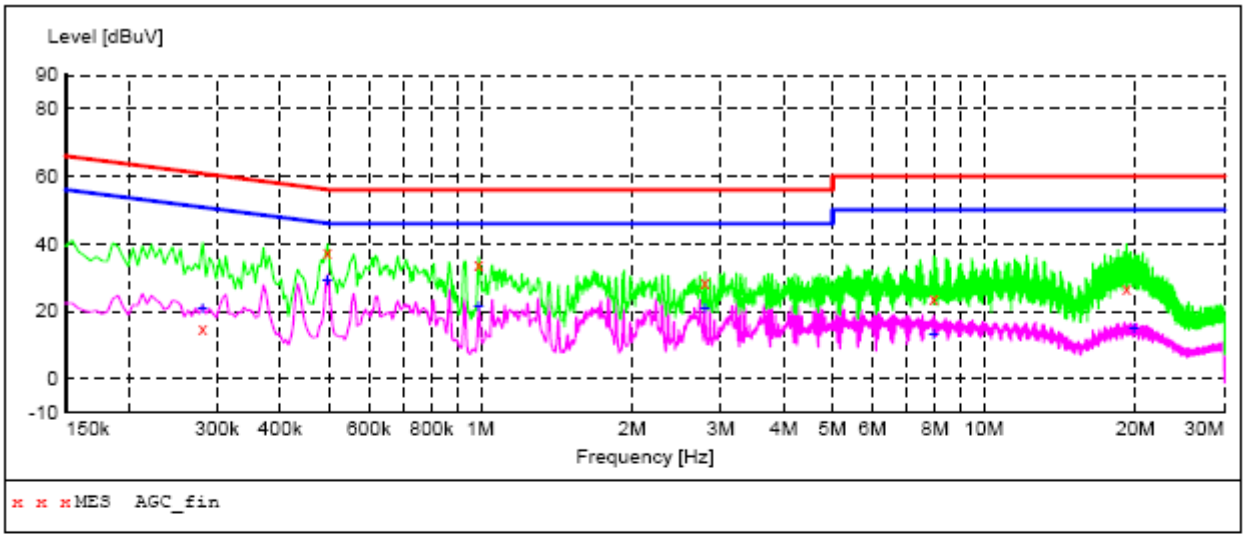
10.2 PROVISIONS APPLICABLE

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

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

10.3 MEASUREMENT RESULT

LINE CONDUCTED EMISSION – L



MEASUREMENT RESULT: "AGC_fin"

2016/7/30 15:29

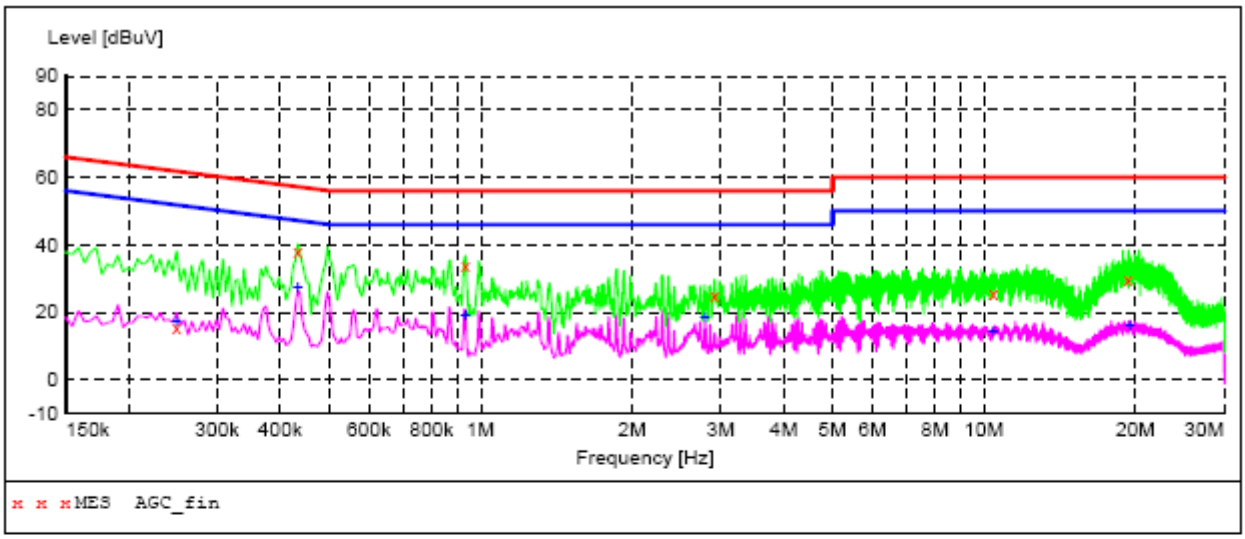
Frequency	Level	Transd	Limit	Margin	Detector	Line	PE	AUX STATE
MHz	dBuV	dB	dBuV	dB				
0.280500	14.90	10.3	61	45.9	QP	L1	GND	ON
0.496500	37.50	10.3	56	18.6	QP	L1	GND	ON
0.991500	33.80	10.4	56	22.2	QP	L1	GND	ON
2.791500	28.50	10.5	56	27.5	QP	L1	GND	ON
7.948500	23.70	10.7	60	36.3	QP	L1	GND	ON
19.189500	26.90	12.0	60	33.1	QP	L1	GND	ON

MEASUREMENT RESULT: "AGC_fin2"

2016/7/30 15:29

Frequency	Level	Transd	Limit	Margin	Detector	Line	PE	AUX STATE
MHz	dBuV	dB	dBuV	dB				
0.280500	20.70	10.3	51	30.1	AV	L1	GND	ON
0.496500	29.30	10.3	46	16.8	AV	L1	GND	ON
0.991500	21.30	10.4	46	24.7	AV	L1	GND	ON
2.791500	20.60	10.5	46	25.4	AV	L1	GND	ON
7.948500	13.00	10.7	50	37.0	AV	L1	GND	ON
19.869000	14.60	12.1	50	35.4	AV	L1	GND	ON

LINE CONDUCTED EMISSION – N



MEASUREMENT RESULT: "AGC_fin"

2016/7/30 15:50

Frequency	Level	Transd	Limit	Margin	Detector	Line	PE	AUX STATE
MHz	dBuV	dB	dBuV	dB				
0.249000	15.70	10.3	62	46.1	QP	N	GND	ON
0.433500	37.80	10.3	57	19.4	QP	N	GND	ON
0.933000	33.90	10.4	56	22.1	QP	N	GND	ON
2.913000	24.90	10.5	56	31.1	QP	N	GND	ON
10.432500	25.40	10.8	60	34.6	QP	N	GND	ON
19.342500	29.50	12.0	60	30.5	QP	N	GND	ON

MEASUREMENT RESULT: "AGC_fin2"

2016/7/30 15:50

Frequency	Level	Transd	Limit	Margin	Detector	Line	PE	AUX STATE
MHz	dBuV	dB	dBuV	dB				
0.249000	17.40	10.3	52	34.4	AV	N	GND	ON
0.433500	27.60	10.3	47	19.6	AV	N	GND	ON
0.933000	19.30	10.4	46	26.7	AV	N	GND	ON
2.791500	18.30	10.5	46	27.7	AV	N	GND	ON
10.432500	14.00	10.8	50	36.0	AV	N	GND	ON
19.477500	15.80	12.0	50	34.2	AV	N	GND	ON

Note: The GSM850 mode is the worst condition.

11. FREQUENCY STABILITY

11.1 MEASUREMENT METHOD

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

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3.With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900 band , channel 190 for GSM 850 band, channel 9400 for UMTS band II and channel 4175 for UMTS band V measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4.Repeat the above measurements at 10℃ increments from -10℃ to +55℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +55℃.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10℃ increments from +55℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9.At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

11.2 PROVISIONS APPLICABLE

11.2.1 For Hand carried battery powered equipment

According to the ANSI/TIA-603-D-2010, the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.4V DC and 4.2V DC, with a nominal voltage of 4.2V DC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

11.2.2 For equipment powered by primary supply voltage

According to the ANSI/TIA-603-D-2010, the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment, the normal environment temperature is 20^{o}C.

11.3 MEASUREMENT RESULT

Appendix D:Frequency Stability

Test Results

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.(V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	GSM	LCH	TN	3.4	14.08	0.02	±2.5	PASS
			TN	3.7	12.33	0.01	±2.5	PASS
			TN	4.2	17.89	0.02	±2.5	PASS
		MCH	TN	3.4	14.27	0.02	±2.5	PASS
			TN	3.7	15.50	0.02	±2.5	PASS
			TN	4.2	11.95	0.01	±2.5	PASS
		HCH	TN	3.4	18.34	0.02	±2.5	PASS
			TN	3.7	17.50	0.02	±2.5	PASS
			TN	4.2	15.69	0.02	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM1900	GSM	LCH	TN	3.4	16.14	0.01	±2.5	PASS
			TN	3.7	23.12	0.01	±2.5	PASS
			TN	4.2	28.93	0.02	±2.5	PASS
		MCH	TN	3.4	23.25	0.01	±2.5	PASS
			TN	3.7	13.50	0.01	±2.5	PASS
			TN	4.2	15.37	0.01	±2.5	PASS
		HCH	TN	3.4	29.25	0.02	±2.5	PASS
			TN	3.7	16.59	0.01	±2.5	PASS
			TN	4.2	14.33	0.01	±2.5	PASS

Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM850	GSM	LCH	VN	-10	12.01	0.01	±2.5	PASS
			VN	0	15.43	0.02	±2.5	PASS
			VN	10	13.37	0.02	±2.5	PASS
			VN	20	12.14	0.01	±2.5	PASS
			VN	30	14.85	0.02	±2.5	PASS
			VN	40	12.72	0.02	±2.5	PASS
			VN	50	22.34	0.03	±2.5	PASS
GSM850	GSM	MCH	VN	-10	13.17	0.02	±2.5	PASS
			VN	0	16.40	0.02	±2.5	PASS
			VN	10	12.72	0.02	±2.5	PASS
			VN	20	17.24	0.02	±2.5	PASS
			VN	30	17.37	0.02	±2.5	PASS
			VN	40	14.14	0.02	±2.5	PASS
			VN	50	15.17	0.02	±2.5	PASS
GSM850	GSM	HCH	VN	-10	20.34	0.02	±2.5	PASS
			VN	0	13.95	0.02	±2.5	PASS
			VN	10	15.24	0.02	±2.5	PASS
			VN	20	16.27	0.02	±2.5	PASS
			VN	30	18.34	0.02	±2.5	PASS
			VN	40	15.17	0.02	±2.5	PASS
			VN	50	14.46	0.02	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
GSM1900	GSM	LCH	VN	-10	15.17	0.01	±2.5	PASS
			VN	0	21.37	0.01	±2.5	PASS
			VN	10	20.53	0.01	±2.5	PASS
			VN	20	15.50	0.01	±2.5	PASS
			VN	30	26.47	0.01	±2.5	PASS
			VN	40	20.15	0.01	±2.5	PASS
			VN	50	18.47	0.01	±2.5	PASS
GSM1900	GSM	MCH	VN	-10	22.21	0.01	±2.5	PASS
			VN	0	21.05	0.01	±2.5	PASS
			VN	10	16.85	0.01	±2.5	PASS
			VN	20	21.95	0.01	±2.5	PASS
			VN	30	14.27	0.01	±2.5	PASS
			VN	40	20.15	0.01	±2.5	PASS
			VN	50	16.27	0.01	±2.5	PASS
GSM1900	GSM	HCH	VN	-10	28.15	0.01	±2.5	PASS
			VN	0	27.51	0.01	±2.5	PASS
			VN	10	31.19	0.02	±2.5	PASS
			VN	20	22.73	0.01	±2.5	PASS
			VN	30	19.95	0.01	±2.5	PASS
			VN	40	26.67	0.01	±2.5	PASS
			VN	50	17.56	0.01	±2.5	PASS

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	UMTS	LCH	TN	3.4	-13.28	-0.02	±2.5	PASS
			TN	3.7	-11.44	-0.01	±2.5	PASS
			TN	4.2	-14.19	-0.02	±2.5	PASS
		MCH	TN	3.4	-10.53	-0.01	±2.5	PASS
			TN	3.7	-11.44	-0.01	±2.5	PASS
			TN	4.2	-5.72	-0.01	±2.5	PASS
		HCH	TN	3.4	-16.94	-0.02	±2.5	PASS
			TN	3.7	-11.44	-0.02	±2.5	PASS
			TN	4.2	-17.17	-0.02	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt. (V)	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA1900	UMTS	LCH	TN	3.4	38.68	0.02	±2.5	PASS
			TN	3.7	35.48	0.02	±2.5	PASS
			TN	4.2	30.90	0.02	±2.5	PASS
		MCH	TN	3.4	40.97	0.02	±2.5	PASS
			TN	3.7	35.48	0.02	±2.5	PASS
			TN	4.2	37.54	0.02	±2.5	PASS
		HCH	TN	3.4	37.54	0.02	±2.5	PASS
			TN	3.7	35.48	0.02	±2.5	PASS
			TN	4.2	49.90	0.03	±2.5	PASS

Frequency Error vs. Temperature:

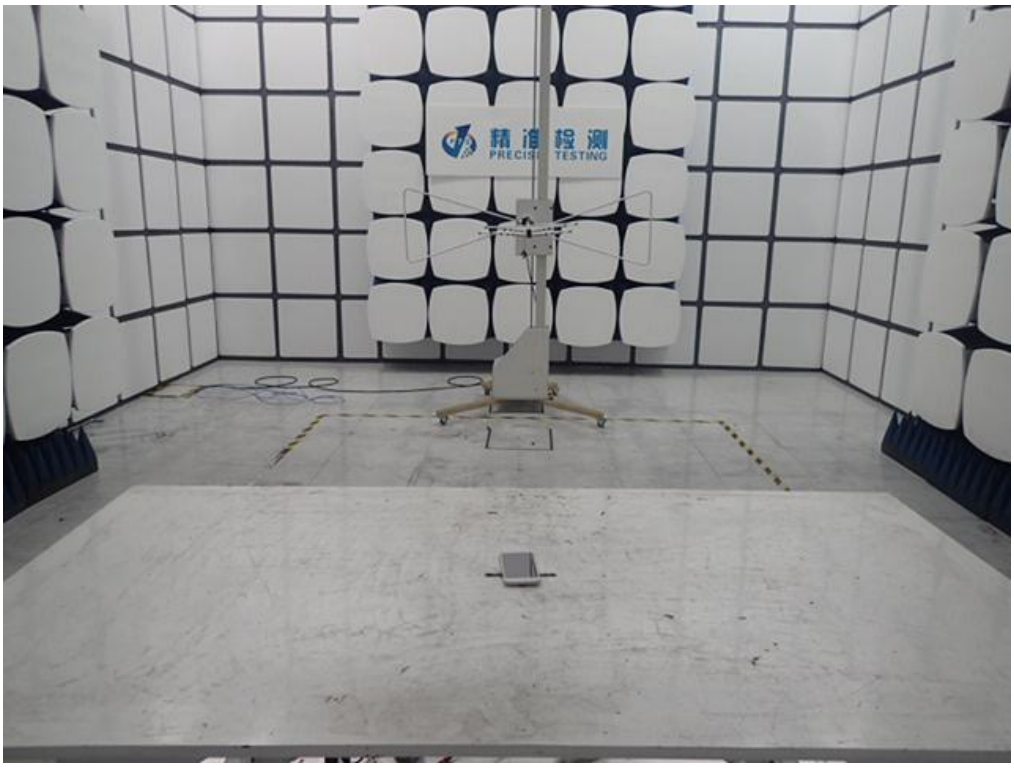
Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	UMTS	LCH	VN	-10	-8.93	-0.01	±2.5	PASS
			VN	0	-14.19	-0.02	±2.5	PASS
			VN	10	-13.96	-0.02	±2.5	PASS
			VN	20	-15.79	-0.02	±2.5	PASS
			VN	30	-11.90	-0.01	±2.5	PASS
			VN	40	-12.36	-0.01	±2.5	PASS
			VN	50	-12.13	-0.01	±2.5	PASS
WCDMA850	UMTS	MCH	VN	-10	-9.61	-0.01	±2.5	PASS
			VN	0	10.07	0.01	±2.5	PASS
			VN	10	-7.78	-0.01	±2.5	PASS
			VN	20	-5.95	-0.01	±2.5	PASS
			VN	30	-5.95	-0.01	±2.5	PASS
			VN	40	-11.90	-0.01	±2.5	PASS
			VN	50	-6.87	-0.01	±2.5	PASS
WCDMA850	UMTS	HCH	VN	-10	-14.42	-0.02	±2.5	PASS
			VN	0	-9.38	-0.01	±2.5	PASS
			VN	10	-14.42	-0.02	±2.5	PASS
			VN	20	-13.96	-0.02	±2.5	PASS
			VN	30	-15.56	-0.02	±2.5	PASS
			VN	40	-14.65	-0.02	±2.5	PASS
			VN	50	-14.65	-0.02	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA 1900	UMTS	LCH	VN	-10	35.02	0.02	±2.5	PASS
			VN	0	32.96	0.02	±2.5	PASS
			VN	10	43.03	0.02	±2.5	PASS
			VN	20	41.20	0.02	±2.5	PASS
			VN	30	43.03	0.02	±2.5	PASS
			VN	40	44.63	0.02	±2.5	PASS
			VN	50	30.44	0.02	±2.5	PASS
WCDMA 1900	UMTS	MCH	VN	-10	41.43	0.02	±2.5	PASS
			VN	0	31.13	0.02	±2.5	PASS
			VN	10	33.87	0.02	±2.5	PASS
			VN	20	41.43	0.02	±2.5	PASS
			VN	30	43.03	0.02	±2.5	PASS
			VN	40	35.25	0.02	±2.5	PASS
			VN	50	42.34	0.02	±2.5	PASS
WCDMA 1900	UMTS	HCH	VN	-10	53.56	0.03	±2.5	PASS
			VN	0	38.91	0.02	±2.5	PASS
			VN	10	39.83	0.02	±2.5	PASS
			VN	20	33.87	0.02	±2.5	PASS
			VN	30	40.51	0.02	±2.5	PASS
			VN	40	51.50	0.03	±2.5	PASS
			VN	50	48.75	0.03	±2.5	PASS

PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION

RADIATED SPURIOUS EMISSION



CONDUCTED MEASUREMENTS

PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

THE LABEL OF ADAPTER

THE LABEL OF BATTERY

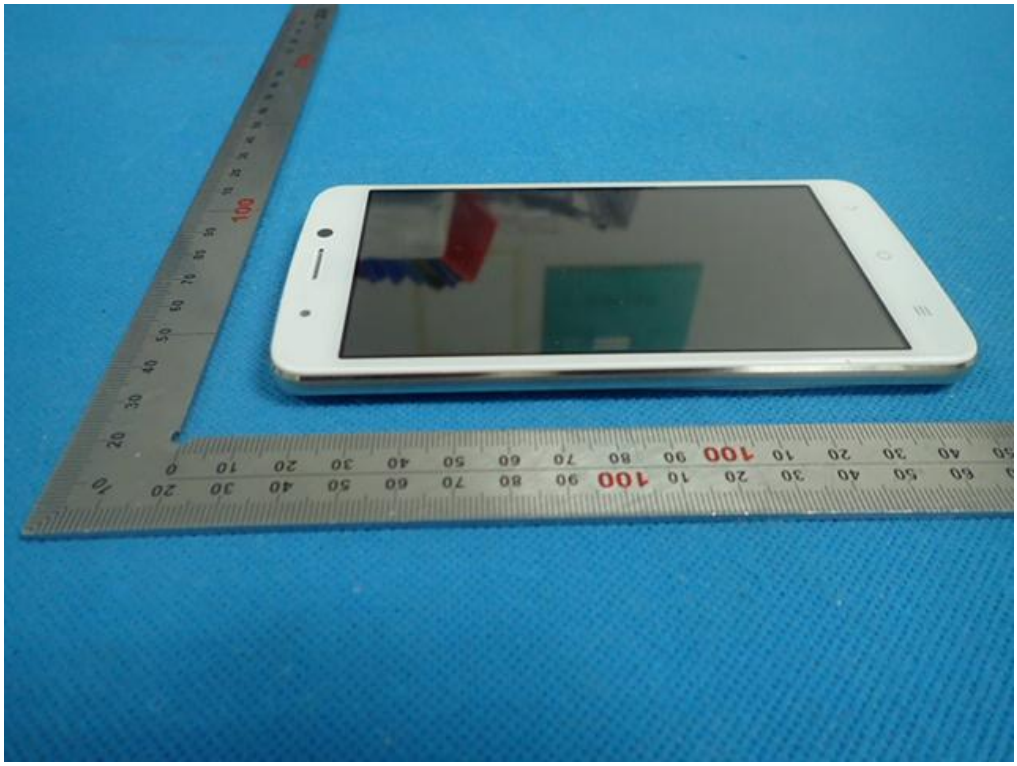
TOP VIEW OF EUT

BOTTOM VIEW OF EUT

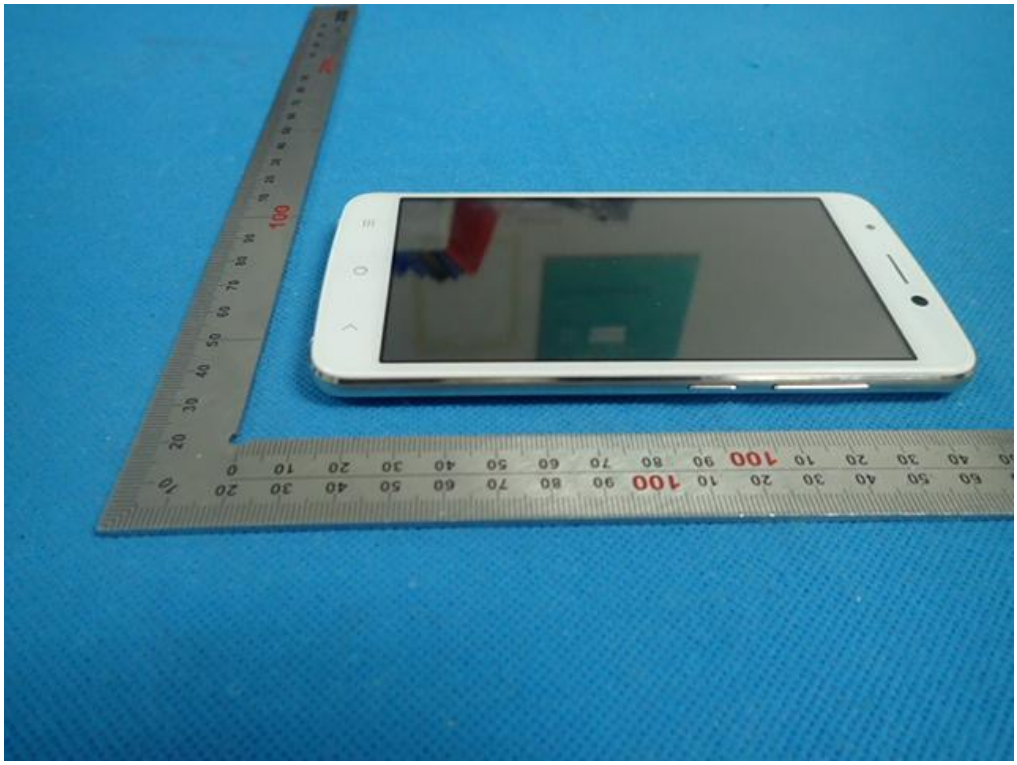
FRONT VIEW OF EUT

BACK VIEW OF EUT

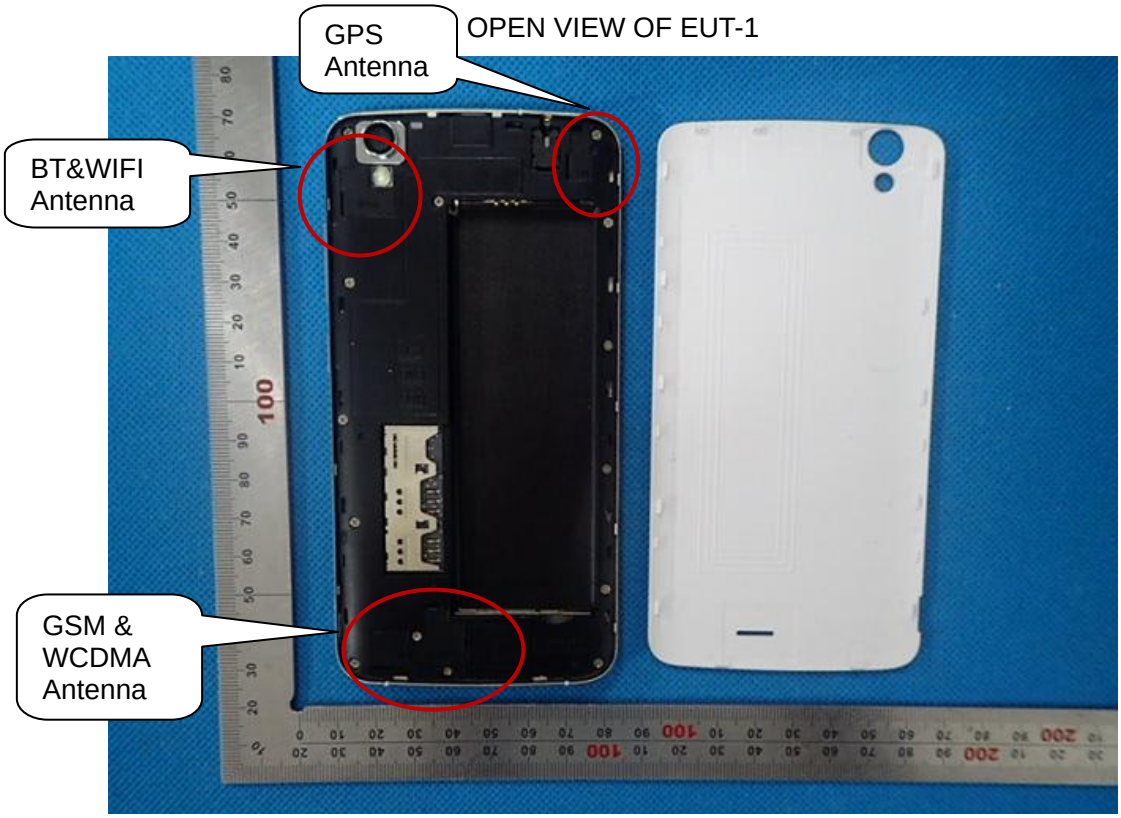
LEFT VIEW OF EUT



RIGHT VIEW OF EUT



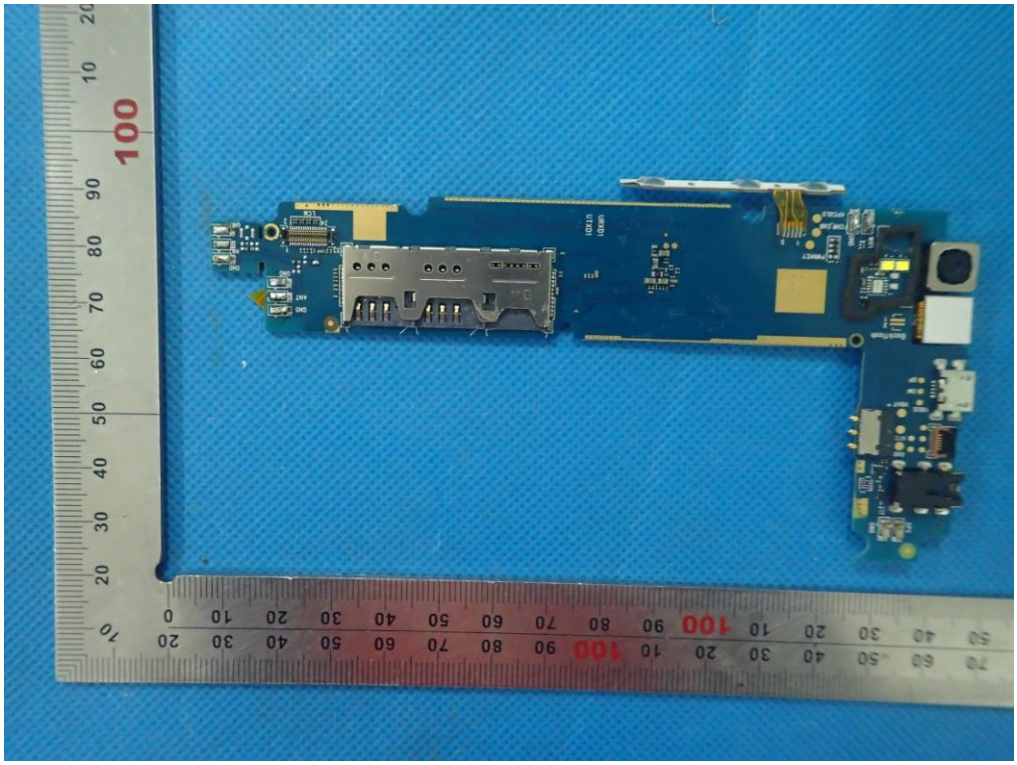
OPEN VIEW OF EUT-1



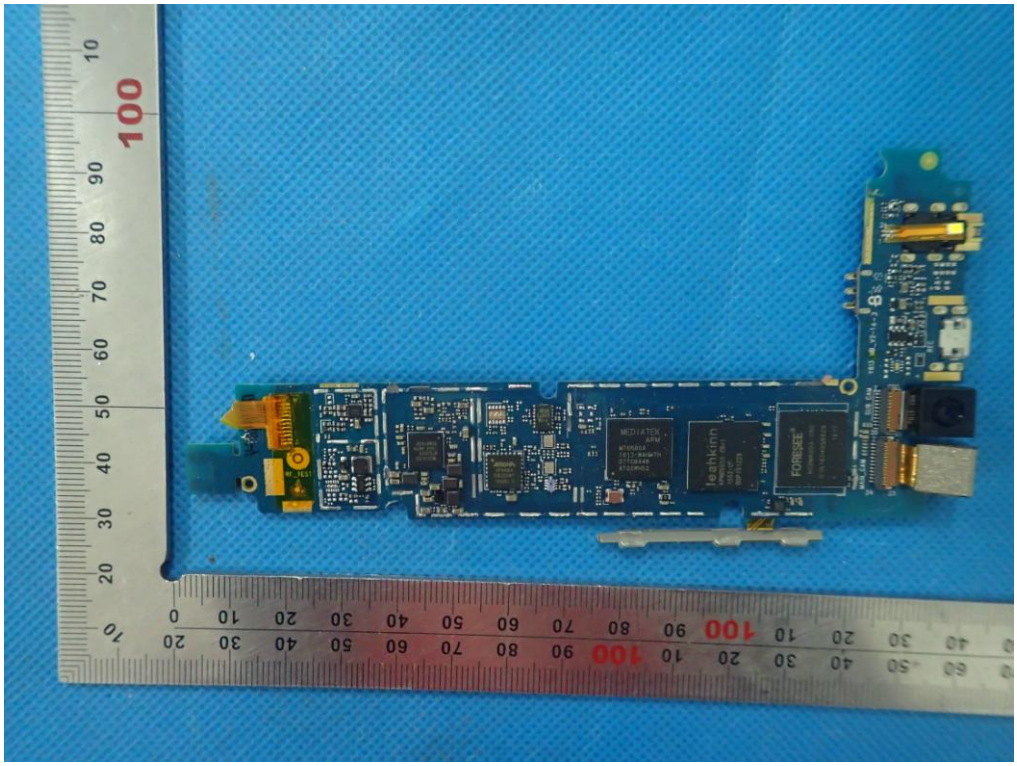
OPEN VIEW OF EUT-2

OPEN VIEW OF EUT-3

INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----