FCC Test Report

Report No.: AGC09U110701F2A

FCC ID	:	ZOJMURANO
PRODUCT DESIGNATION	:	Mobile Phone
BRAND NAME	:	MOBO
TEST MODEL	:	MURANO
CLIENT	:	MOBO USA CORP
DATE OF ISSUE	:	Aug. 08, 2011
STANDARD(S)	:	FCC Part 22H & 24E Rules

Attestation of ***G***lobal ***C***ompliance Co., Ltd.

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VERIFICATION OF COMPLIANCE

Applicant:	MOBO USA CORP
	6000 NW 97 AV unit 14 Miami Florida 33178 USA
Manufacturer:	Shenzhen Telacom Science & Technology Co., Ltd
	Room 1701, Block B, Chang Xing Building, No.4002 Huaqiangbei Road, Futian District, Shenzhen, China
Product Description:	Mobile Phone
Brand Name:	MOBO
Model Name:	MURANO
FCC ID:	ZOJMURANO
Report Number:	AGC09U110701F2A
Date of Test:	Aug. 04, 2011 to Aug. 06, 2011

We hereby certify that:

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

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

Tested By: _____

Curoky Chen Aug. 08, 2011

Reviewed By: _____

Forrest Lei Aug. 08, 2011

Approved By: _____

Solger Zhang Aug. 08, 2011

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1. GENERAL INFORMATION

PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Mobile Phone
FCC ID:	ZOJMURANO
Frequency Bands:	GSM 850: 824.2- 848.8MHz PCS 1900: 1850.2-1909.8MHz
Antenna:	Integrated Antenna
Power Supply:	DC3.7V by Built-in Li-ion Battery (and DC 5V by Adapter)
Battery parameter:	1000MAH / 3.7V
Adapter Input:	AC100-240V, 50-60Hz
Adapter Output:	DC5V, 500mA
Output Power:	30.71 dBm Maximum ERP measured for GSM 850 32.63 dBm Maximum Conducted Power for GSM 850 28.09 dBm Maximum EIRP measured for GSM 1900 29.78 dBm Maximum Conducted Power for GSM 1900
GPRS Class	12
Extreme Vol. Limits:	DC3.4 V to 4.2 V (Nominal DC3.7 V)
Extreme Temp. Tolerance	-10℃ to +50℃
** Note: The High Voltage 4.2V and Low Voltage 3.4V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage. Other function have been performed according to verification procedure except for Bluetooth and MS function.	

1.2 RELATED SUBMITTAL(S) / GRANT (S)

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

1.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI C 63.4: 2003; TIA/EIA 603 and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

1.4 TEST FACILITY

The test site used to collect the radiated data is located at:
Attestation of Global Compliance Co., Ltd.
1F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.
FCC register No.: 259865

1.5 MEASUREMENT INSTRUMENTS

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	E4440A	US44300399	2012.6.26
TEST RECEIVER	R&S	ESCI	A0304218	2012.6.26
COMMUNICATION TESTER	AGILENT	8960	3104A03367	2012.6.26
COMMUNICATION TESTER	R&S	CMU200	A0304247	2012.6.26
TEST RECEIVER	R&S	FCKL1528	A0304230	2012.6.26
LISN	SCHWARZBECK	NSLK8127	A0304233	2012.6.26
CLIMATE CHAMBER	ALBATROSS	--	--	2012.6.26
LOOP ANTENNA	R&S	HFH2-Z2	A0304220	2012.6.26
BROADBAND ANT.	R&S	HL562	A0304224	2012.6.26
HORN ANT.	R&S	HF906	100150	2012.6.26

1.6 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.

1.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 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.

2.2 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.

2.3 GENERAL TECHNICAL REQUIREMENTS

Item Number	Item Description		FCC Rules
1	Output Power	Conducted	22.913(a) / 24.232 (b)
		Radiated	
2	Spurious Emission	Conducted Spurious Emission	2.1051 / 22.917 / 24.238
		Radiated Spurious Emission	
3	Mains Conducted Emission		15.107 / 15.207
4	Frequency Stability		2.1055 /24.235
5	Occupied Bandwidth		2.1049 (h)(i)
6	Emission Bandwidth		22.917(b) / 24.238 (b)
7	Band Edge		22.917(b) / 24.238 (b)

2.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

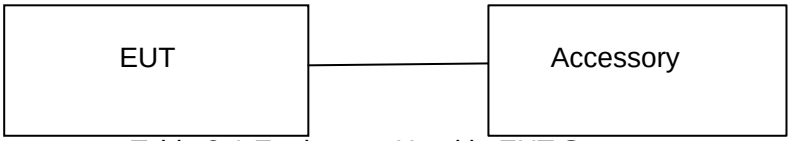


Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	MURANO	FCC ID: ZOJMURANO	EUT
2	Adapter	TW	5V / 500mA	Accessory
3	BATTERY	N/A	1000 MAH/3.7V	Accessory
4	USB Cable	N/A	N/A	Accessory
5	Earphone	N/A	N/A	Accessory

Note: all the accessories have been used during the test. And the EUT in setup diagram means "EUT System".

3. SUMMARY OF TEST RESULTS

Item Number	Item Description		FCC Rules	Result
1	Output Power	Conducted Output Power	22.913(a) / 24.232 (b)	Pass
		Radiated Output Power		
2	Spurious Emission	Conducted Spurious Emission	2.1051 / 22.917 / 24.238	Pass
		Radiated Spurious Emission		
3	Mains Conducted Emission		15.107 / 15.207	Pass
4	Frequency Stability		2.1055 /24.235	Pass
5	Occupied Bandwidth		2.1049 (h)(i)	Pass
6	Emission Bandwidth		22.917(b) / 24.238 (b)	Pass
7	Band Edge		22.917(b) / 24.238 (b)	Pass

4. DESCRIPTION OF TEST MODES

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

Note: GSM and GPRS modes have been tested during the test. the worst condition (GSM) be recorded in the test report if no other modes test data.

5. OUTPUT POWER

5.1 Conducted Output Power

5.1.1 MEASUREMENT METHOD

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes(GSM, GPRS,) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for both GSM band and PCS band.

5.1.2 PROVISIONS APPLICABLE

Conducted Output Power Limits for GSM 850 MHZ			
Mode	**Power Step**	**Nominal Peak Power**	**Tolerance(dB)**
GSM	5	33 dBm (2W)	- 1
GPRS	3	33 dBm (2W)	- 1

Conducted Output Power Limits for PCS 1900 MHZ			
Mode	**Power Step**	**Nominal Peak Power**	**Tolerance(dB)**
GSM	0	30 dBm (1W)	- 1
GPRS	3	30 dBm (1W)	- 1

5.1.3 MEASUREMENT RESULT

Conducted Output Power for GSM 850 MHZ					
Mode	**Frequency**	**Reference Power (dBm)**	**Measured Result**		**Conclusion**
			Peak Power (dBM)	**Tolerance (dB)**	
GSM	824.2	33	32.51	-0.49	Pass
	836.6	33	**32.63**	-0.37	Pass
	848.8	33	32.41	-0.59	Pass
GPRS 1 slot	824.2	33	32.46	-0.54	Pass
	836.6	33	32.57	-0.43	Pass
	848.8	33	32.33	-0.67	Pass
GPRS 2 slots	824.2	30	29.53	-0.47	Pass
	836.6	30	29.61	-0.39	Pass
	848.8	30	29.44	-0.56	Pass
GPRS 3 slots	824.2	28.22	27.79	-0.43	Pass
	836.6	28.22	27.90	-0.32	Pass
	848.8	28.22	27.69	-0.53	Pass
GPRS 4 slots	824.2	27	26.48	-0.52	Pass
	836.6	27	26.59	-0.41	Pass
	848.8	27	26.36	-0.64	Pass

Conducted Output Power for PCS 1900 MHZ					
Mode	**Frequency**	**Reference Power (dBm)**	**Result**		**Conclusion**
			Peak Power (dBM)	**Tolerance (dB)**	
GSM	1850.2	30	29.72	-0.28	Pass
	1880.0	30	**29.78**	-0.22	Pass
	1909.8	30	29.64	-0.36	Pass
GPRS 1slot	1850.2	30	29.71	-0.29	Pass
	1880.0	30	29.75	-0.25	Pass
	1909.8	30	29.62	-0.38	Pass
GPRS 2 slots	1850.2	27	26.73	-0.27	Pass
	1880.0	27	26.79	-0.21	Pass
	1909.8	27	26.61	-0.39	Pass
GPRS 3 slots	1850.2	25.22	24.98	-0.24	Pass
	1880.0	25.22	25.01	-0.21	Pass
	1909.8	25.22	24.86	-0.36	Pass
GPRS 4 slots	1850.2	24	23.47	-0.53	Pass
	1880.0	24	23.51	-0.49	Pass
	1909.8	24	23.39	-0.61	Pass

5.2 Radiated Output Power

5.2.1 MEASUREMENT METHOD

The measurements procedures specified in TIA-603C-2004 were applied.

1 In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.

2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. The ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.

4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.

5 The EUT is then put into continuously transmitting mode at its maximum power level.

6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.

7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).

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

5.2.2 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.”

Radiated Power Limits for GSM 850 MHZ (ERP)		
Mode	**Power Step**	**Nominal Peak Power**
GSM	5	<=38.45 dBm (7W)
GPRS	3	<=38.45 dBm (7W)

Radiated Power Limits for PCS 1900 MHZ (E.I.R.P.)		
Mode	**Power Step**	**Nominal Peak Power**
GSM	0	<=33 dBm (2W)
GPRS	3	<=33 dBm (2W)

5.2.3 MEASUREMENT RESULT

Radiated Power (ERP) for GSM 850 MHZ					
Mode	Frequency	Power Step	Result		Conclusion
			Max. Peak ERP (dBm)	Polarization Of Max. ERP	
GSM	824.2	5	30.65	Horizontal	Pass
	836.6	5	**30.71**	Horizontal	Pass
	848.8	5	30.54	Horizontal	Pass
GPRS 1 slot	824.2	3	30.57	Horizontal	Pass
	836.6	3	30.62	Horizontal	Pass
	848.8	3	30.49	Horizontal	Pass
GPRS 2 slots	824.2	3	Less than 27 dBm	Horizontal	Pass
	836.6	3		Horizontal	Pass
	848.8	3		Horizontal	Pass
GPRS 3 slots	824.2	2		Horizontal	Pass
	836.6	2		Horizontal	Pass
	848.8	2		Horizontal	Pass
GPRS 4 slots	824.2	2		Horizontal	Pass
	836.6	2		Horizontal	Pass
	848.8	2		Horizontal	Pass

Radiated Power (E.I.R.P) for PCS 1900 MHZ					
Mode	Frequency	Power Step	Result		Conclusion
			Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
GSM	1850.2	0	27.98	Horizontal	Pass
	1880.0	0	**28.09**	Horizontal	Pass
	1909.8	0	28.04	Horizontal	Pass
GPRS 1slot	1850.2	3	28.06	Horizontal	Pass
	1880.0	3	28.08	Horizontal	Pass
	1909.8	3	28.01	Horizontal	Pass
GPRS 2 slots	1850.2	3	Less than 27 dBm	Horizontal	Pass
	1880.0	3		Horizontal	Pass
	1909.8	3		Horizontal	Pass
GPRS 3 slots	1850.2	2		Horizontal	Pass
	1880.0	2		Horizontal	Pass
	1909.8	2		Horizontal	Pass
GPRS 4 slots	1850.2	2		Horizontal	Pass
	1880.0	2		Horizontal	Pass
	1909.8	2		Horizontal	Pass

6. SPURIOUS EMISSION

6.1 CONDUCTED SPURIOUS EMISSION

6.1.1 MEASUREMENT METHOD

The following steps outline the procedure used to measure the conducted emissions from the EUT.
1, Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 9 GHz.
2, Determine EUT transmit frequencies: the following typical channels were chosen to conducted emissions testing.

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

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

6.1.2 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.

6.1.3 MEASUREMENT RESULT

Conducted Spurious Emission for GSM 850 MHz						
Harmonic	Tx ch. 128 Freq. (MHz)	Level (dBm)	Tx ch. 190 Freq. (MHz)	Level (dBm)	Tx ch. Freq. (MHz) 251	Level (dBm)
2	1648.4	B.I.N.F	1673.2	B.I.N.F	1697.6	B.I.N.F
3	2472.6	B.I.N.F	2509.8	B.I.N.F	2546.4	B.I.N.F
4	3296.8	B.I.N.F	3346.4	B.I.N.F	3395.2	B.I.N.F
5	4121	B.I.N.F	4183	B.I.N.F	4244	B.I.N.F
6	4945.2	B.I.N.F	5019.6	B.I.N.F	5092.8	B.I.N.F
7	5769.4	B.I.N.F	5856.2	B.I.N.F	5941.6	B.I.N.F
8	6593.6	B.I.N.F	6692.8	B.I.N.F	6790.4	B.I.N.F
9	7417.8	B.I.N.F	7529.4	B.I.N.F	7639.2	B.I.N.F
10	8242	B.I.N.F	8366	B.I.N.F	8488	B.I.N.F
● **B.I.N.F: Below Instruments Noise floor**						

Conducted Spurious Emission for PCS 1900 MHz						
Harmonic	Tx ch. 512 Freq. (MHz)	Level (dBm)	Tx ch. 661 Freq. (MHz)	Level (dBm)	Tx ch. 810 Freq. (MHz)	Level (dBm)
2	3700.4	B.I.N.F	3760	B.I.N.F	3819.6	B.I.N.F
3	5550.6	B.I.N.F	5640	B.I.N.F	5729.4	B.I.N.F
4	7400.8	B.I.N.F	7520	B.I.N.F	7639.2	B.I.N.F
5	9251.0	B.I.N.F	9400	B.I.N.F	9549.0	B.I.N.F
6	11101.2	B.I.N.F	11280	B.I.N.F	11458.8	B.I.N.F
7	12951.4	B.I.N.F	13160	B.I.N.F	13368.6	B.I.N.F
8	14801.6	B.I.N.F	15040	B.I.N.F	15278.4	B.I.N.F
9	16651.8	B.I.N.F	16920	B.I.N.F	17188.2	B.I.N.F
10	18502.0	B.I.N.F	18800	B.I.N.F	19098.0	B.I.N.F
● **B.I.N.F: Below Instruments Noise floor**						

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

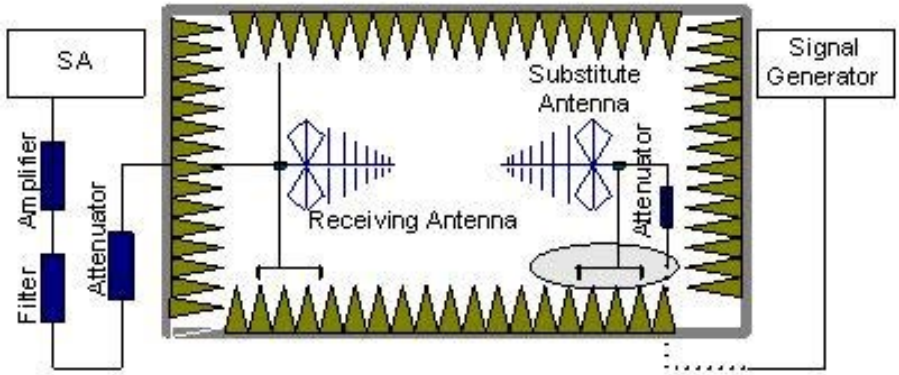
6.2 Radiated Spurious Emission

6.2.1 MEASUREMENT METHOD

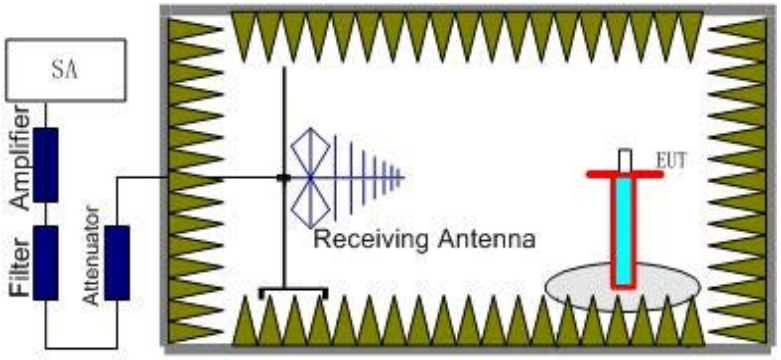
The measurements procedures specified in TIA-603C-2004 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes(GSM, GPRS) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for both GSM band and PCS 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 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) ,GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . 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 the PCS1900 ,GSM850 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: $Power=P_{Mea}+A_{Rpl}$

6.2.2 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.

6.2.3 MEASUREMENT RESULT

The Worst Test Results for Channel 128 / 824.2 MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1648.00	-38.99	-4.08	-43.07	-13.00	Horizontal
1752.00	-39.72	-3.09	-42.81	-13.00	Vertical
2472.00	-39.79	2.46	-37.33	-13.00	Horizontal
9086.00	-41.8	2.7	-39.10	-13.00	Horizontal

The Worst Test Results for Channel 190/836.6 MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1673.00	-41.04	-3.16	-44.20	-13.00	Horizontal
1903.00	-37.54	-0.79	-38.33	-13.00	Vertical
9089.00	-39.29	2.98	-36.31	-13.00	Vertical

The Worst Test Results for Channel 251/848.8 MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1698.00	-40.31	-2.77	-43.08	-13.00	Horizontal
1888.50	-41.96	-3.65	-45.61	-13.00	Vertical
2131.00	-47.00	-1.89	-48.89	-13.00	Vertical
9089.00	-39.30	8.6	-30.70	-13.00	Horizontal

The Worst Test Results for Channel 512/1850.2 MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1999.00	-41.57	9.18	-32.39	-13.00	Horizontal
3700.00	-38.25	7.49	-30.76	-13.00	Horizontal
12950.40	-37.98	12.38	-25.60	-13.00	Vertical
17919.60	-41.64	17.88	-23.76	-13.00	Vertical

The Worst Test Results for Channel 661/1880.0 MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
2000.50	-42.89	8.78	-34.11	-13.00	Vertical
9399.00	-37.12	10.98	-26.14	-13.00	Vertical
13160.40	-35.91	14.5	-21.41	-13.00	Horizontal
15039.60	-38.69	14.58	-24.11	-13.00	Vertical
17941.20	-43.07	20.28	-22.79	-13.00	Horizontal
The Worst Test Results for Channel 810/1909.8 MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
2000.00	-36.47	9.9	-26.57	-13.00	Vertical
9548.50	-32.87	10.28	-22.59	-13.00	Horizontal
13367.40	-41.55	11.28	-30.27	-13.00	Horizontal
15277.80	-36.58	15.59	-20.99	-13.00	Vertical
17931.60	-41.01	19.26	-21.75	-13.00	Horizontal

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

7. MAINS CONDUCTED EMISSION

7.1 MEASUREMENT METHOD

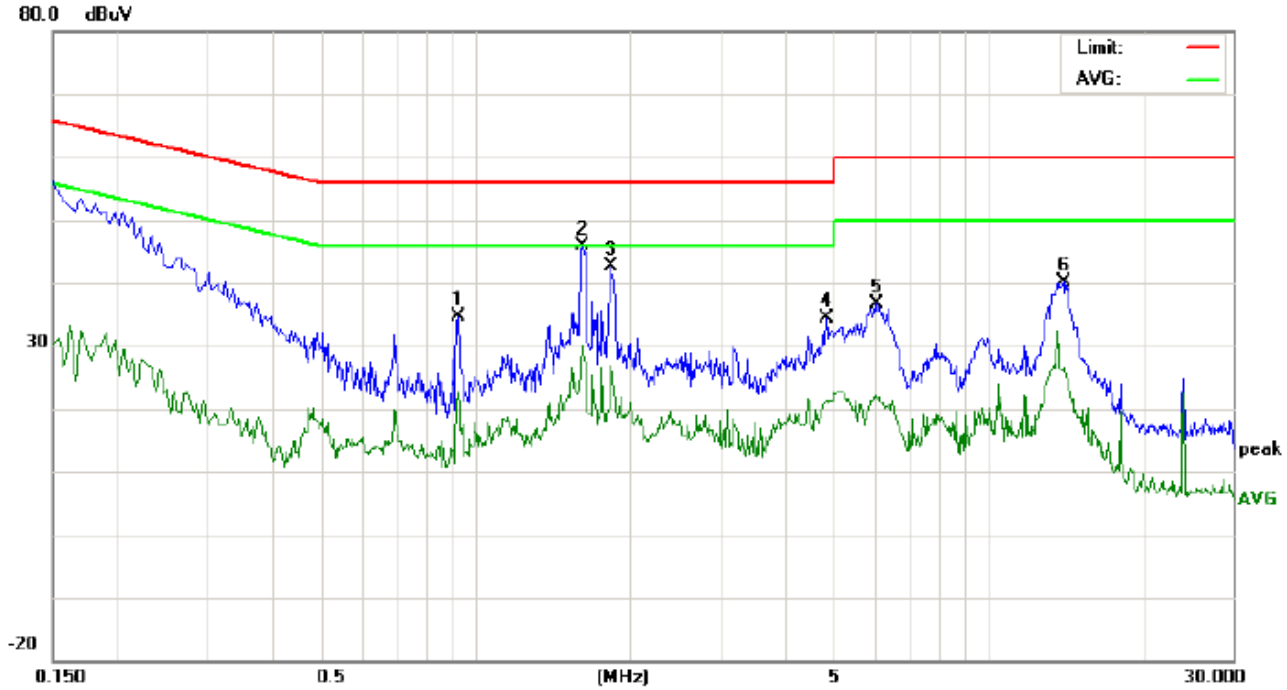
The measurement procedure specified in ANSI C63.4-2003 was used for testing. Conducted Emission was measured with travel charger.

7.2 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.		

7.3 MEASUREMENT RESULT

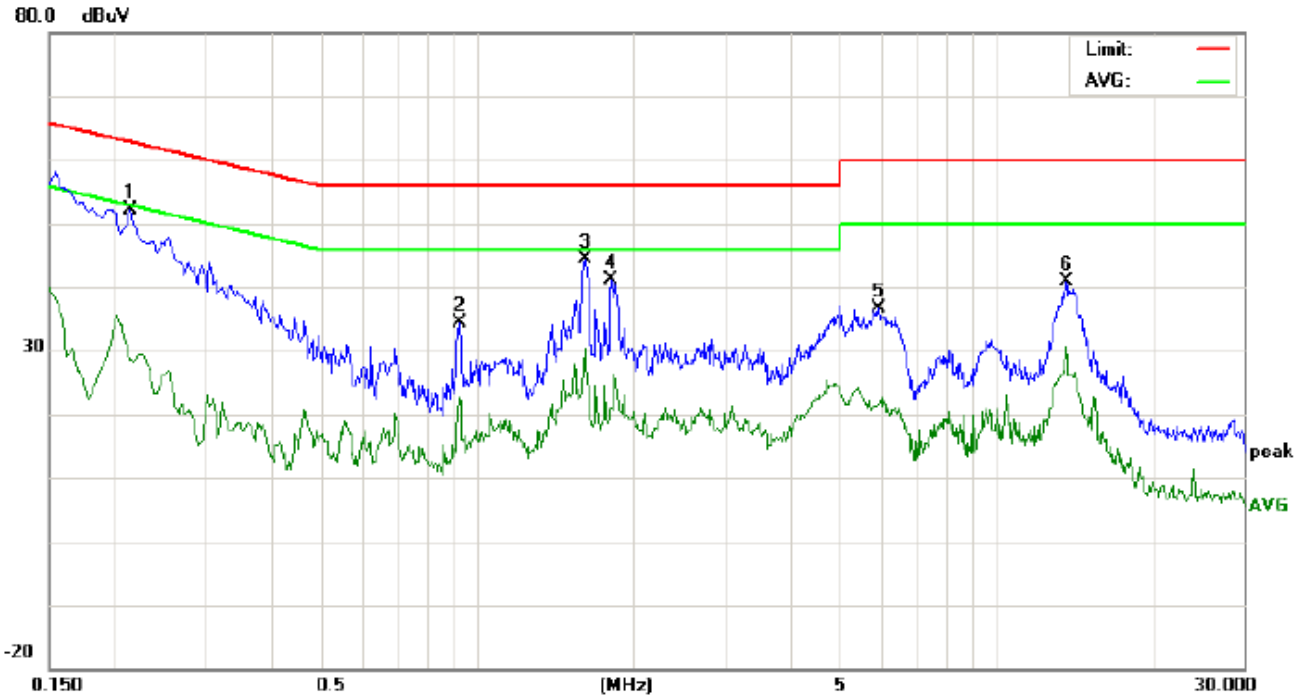
LINE CONDUCTED EMISSION - L



Site: Conduction
Phase: *L1*
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power:
Humidity: 60 %
EUT: Mobilie Phone
M/N: MURANO
Mode: CALL
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.9260	24.27		12.29	10.40	34.67		22.69	56.00	46.00	-21.33	-23.31	P	
2	1.6220	35.50		18.77	10.34	45.84		29.11	56.00	46.00	-10.16	-16.89	P	
3	1.8380	32.41		13.49	10.27	42.68		23.76	56.00	46.00	-13.32	-22.24	P	
4	4.8380	24.17		11.11	10.23	34.40		21.34	56.00	46.00	-21.60	-24.66	P	
5	6.0580	26.47		11.38	10.28	36.75		21.66	60.00	50.00	-23.25	-28.34	P	
6	13.9980	29.94		16.50	10.12	40.06		26.62	60.00	50.00	-19.94	-23.38	P	

LINE CONDUCTED EMISSION - N



Site: Conduction
Phase: N
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power:
Humidity: 60 %
EUT: Mobilie Phone
M/N: MURANO
Mode: Bluetooth
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2140	41.94		18.42	10.23	52.17		28.65	63.04	53.04	-10.87	-24.39	P	
2	0.9260	23.98		12.33	10.40	34.38		22.73	56.00	46.00	-21.62	-23.27	P	
3	1.6180	34.07		19.98	10.34	44.41		30.32	56.00	46.00	-11.59	-15.68	P	
4	1.8100	30.84		10.87	10.28	41.12		21.15	56.00	46.00	-14.88	-24.85	P	
5	5.9540	26.30		11.45	10.28	36.58		21.73	60.00	50.00	-23.42	-28.27	P	
6	13.6580	30.69		20.54	10.13	40.82		30.67	60.00	50.00	-19.18	-19.33	P	

Note: The GSM850 modes is the worst condition.

8. FREQUENCY STABILITY

8.1 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 , channel 190 for GSM850 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

4 , Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

5 , Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

6 , Subject the EUT to overnight soak at +50℃.

7 , With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

8 , Repeat the above measurements at 10℃ increments from +50℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

9 , At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

8.2 PROVISIONS APPLICABLE

8.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.4VDC and 4.2VDC, with a nominal voltage of 3.7VDC. 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.

8.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

8.3 MEASUREMENT RESULT

Frequency Error Against Voltage for GSM 850 MHz		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.4	16	0.019
3.7	15	0.018
4.2	18	0.022

Frequency Error Against Temperature for GSM 850 MHz		
temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-10	37	0.044
0	32	0.038
10	24	0.029
20	17	0.020
30	27	0.032
40	31	0.037
50	39	0.047

Note: The EUT doesn’t work below -10℃

Frequency Error Against Voltage for PCS 1900 MHz		
Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.4	28	0.015
3.7	24	0.013
4.2	29	0.015

Frequency Error Against Temperature for PCS 1900 MHz		
temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-10	41	0.022
0	36	0.019
10	30	0.016
20	28	0.015
30	24	0.013
40	32	0.017
50	39	0.021

Note: The EUT doesn't work below -10℃

9. OCCUPIED BANDWIDTH

9.1 MEASUREMENT METHOD

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

9.2 PROVISIONS APPLICABLE

The occupied bandwidth (99%) shall not exceed 300 KHz.

9.3 MEASUREMENT RESULT

Occupied Bandwidth (99%) for GSM 850 MHz		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	824.2	241.41
Middle Channel	836.6	247.92
High Channel	848.8	249.33

Occupied Bandwidth (99%) for PCS 1900 MHz		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	1850.2	245.96
Middle Channel	1880.0	244.60
High Channel	1909.8	244.78

10. EMISSION BANDWIDTH

10.1 MEASUREMENT METHOD

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

10.2 PROVISIONS APPLICABLE

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

10.3 MEASUREMENT RESULT

Emission Bandwidth (-26dBc) for GSM 850 MHz		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	312.28
Middle Channel	836.6	311.24
High Channel	848.8	316.71

Emission Bandwidth (-26dBc) for PCS 1900 MHz		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	317.93
Middle Channel	1880.0	313.62
High Channel	1909.8	322.04

11. BAND EDGE

11.1 MEASUREMENT METHOD

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

11.2 PROVISIONS APPLICABLE

as Specified in FCC rules of 22.917(b) and 24.238(b)

11.3 MEASUREMENT RESULT

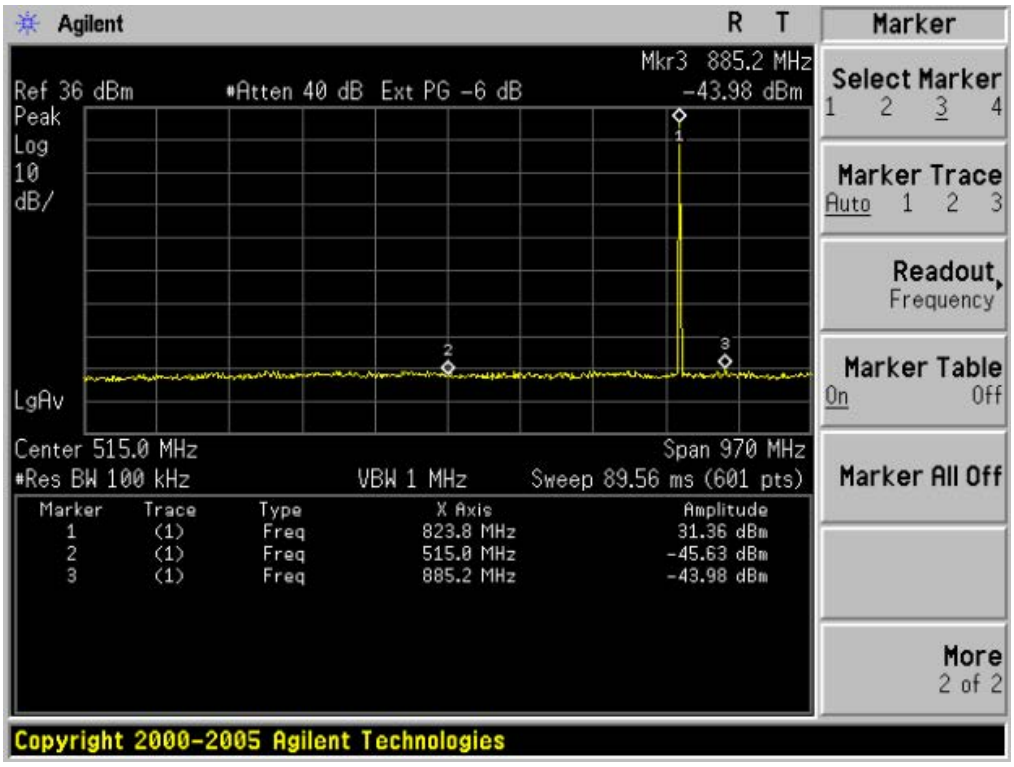
Please refers to Appendix III for compliance test plots for band edges

APPENDIX I

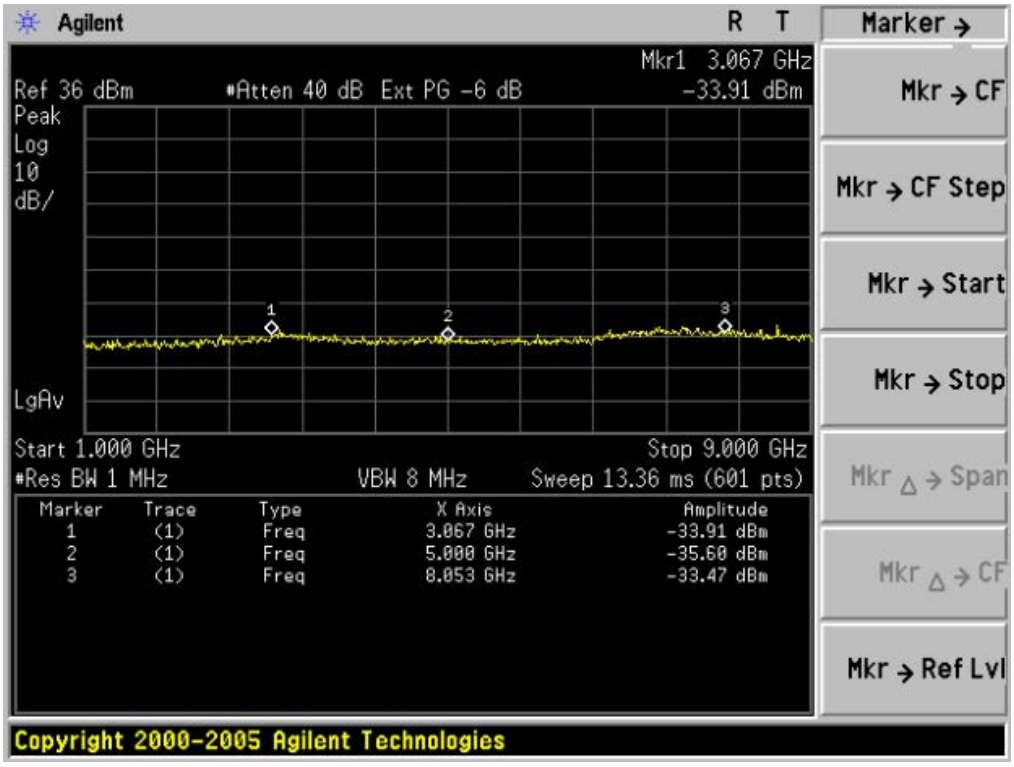
TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

CONDUCTED EMISSION IN GSM BAND

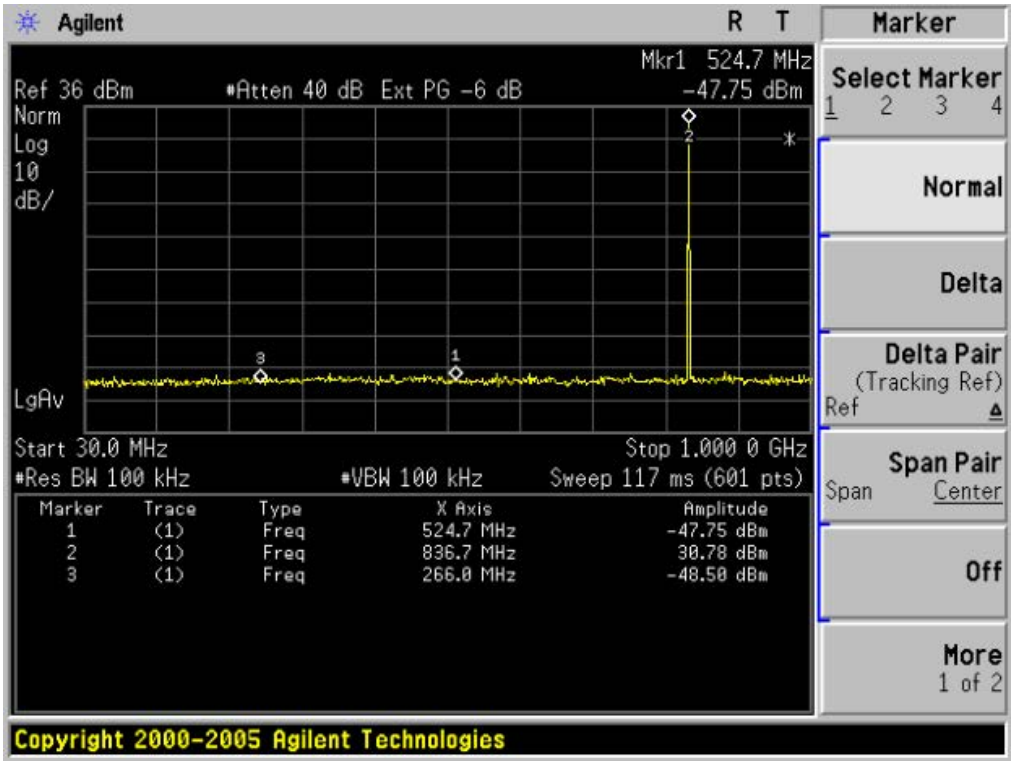
Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



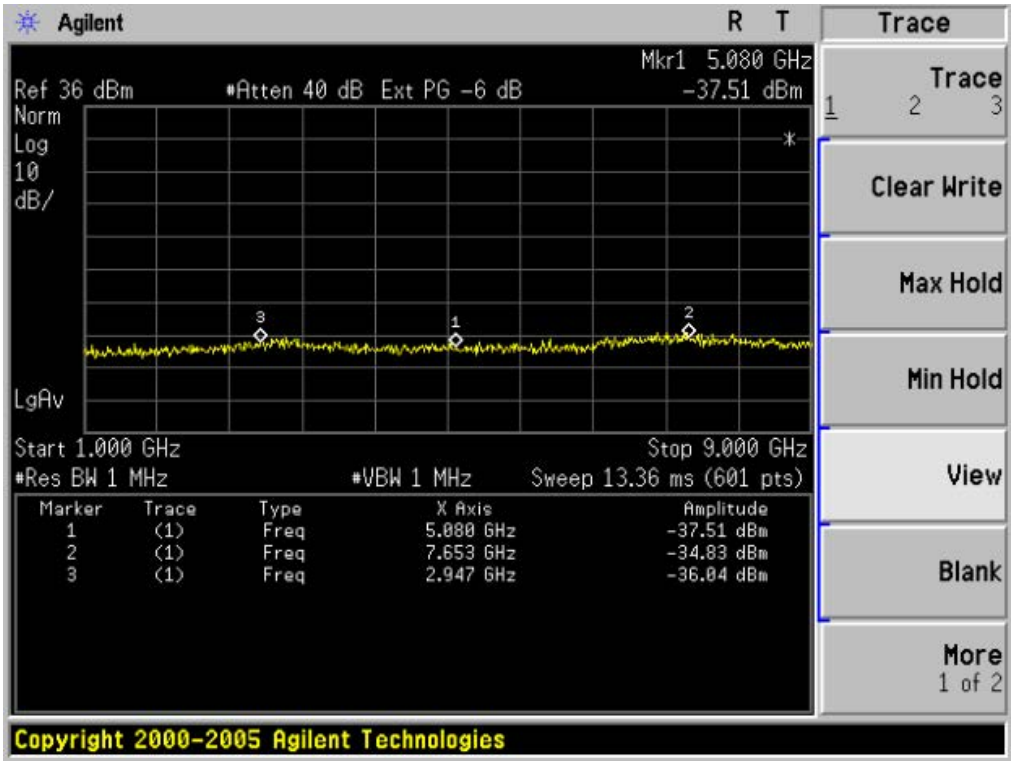
Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



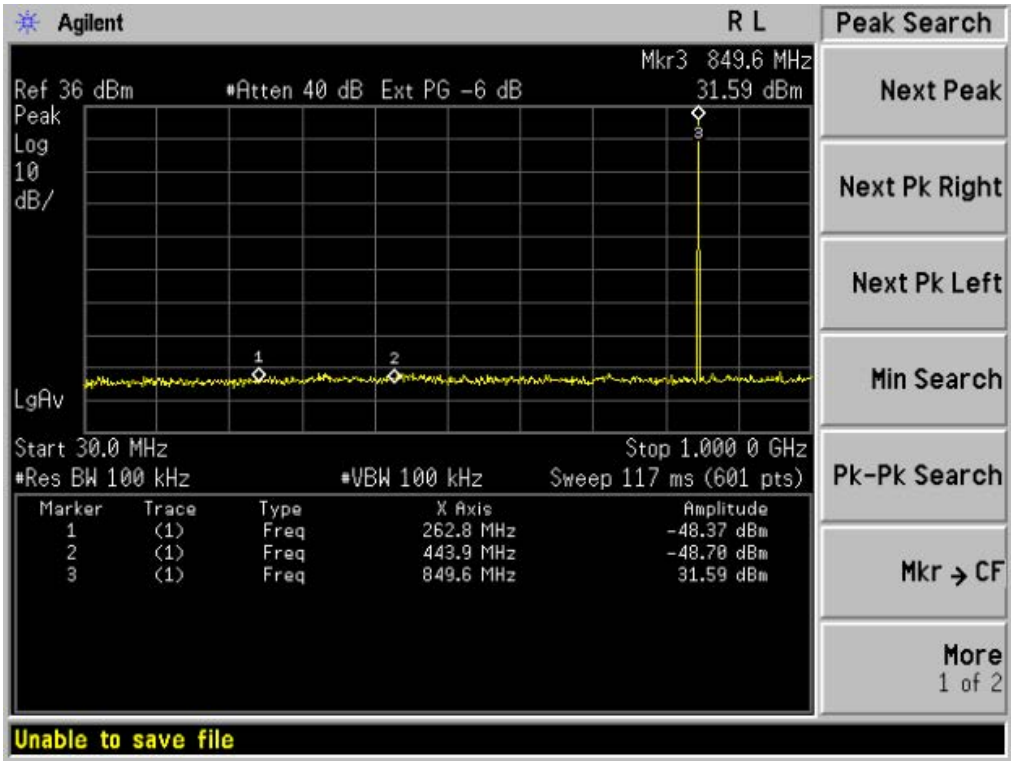
Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



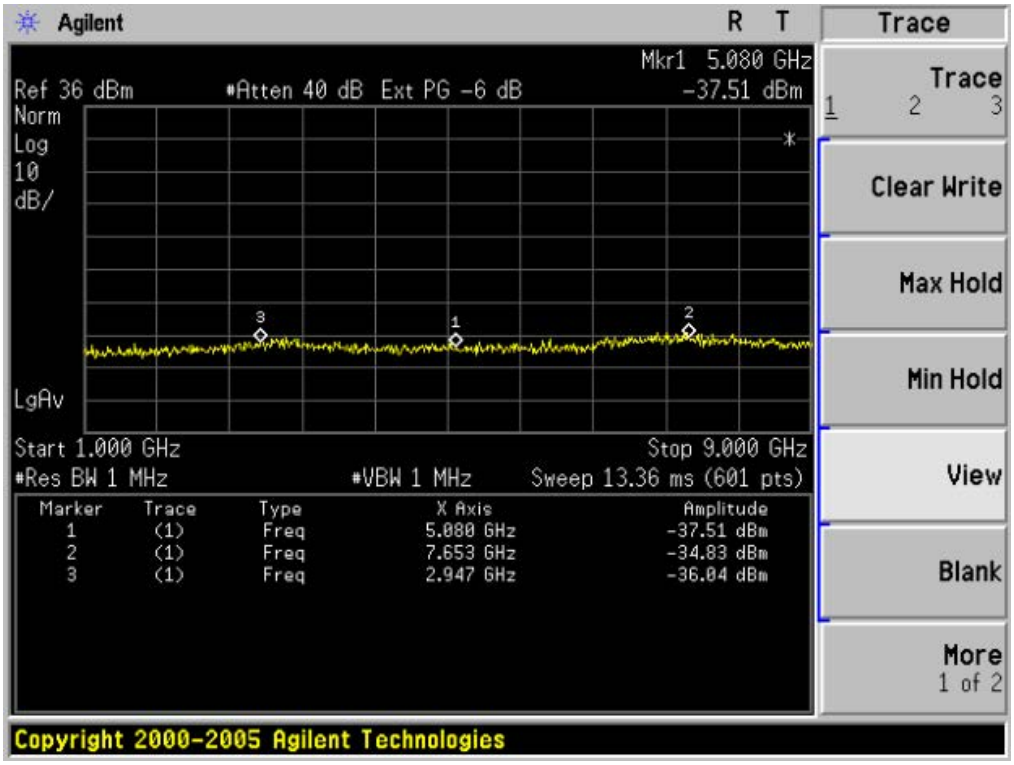
Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



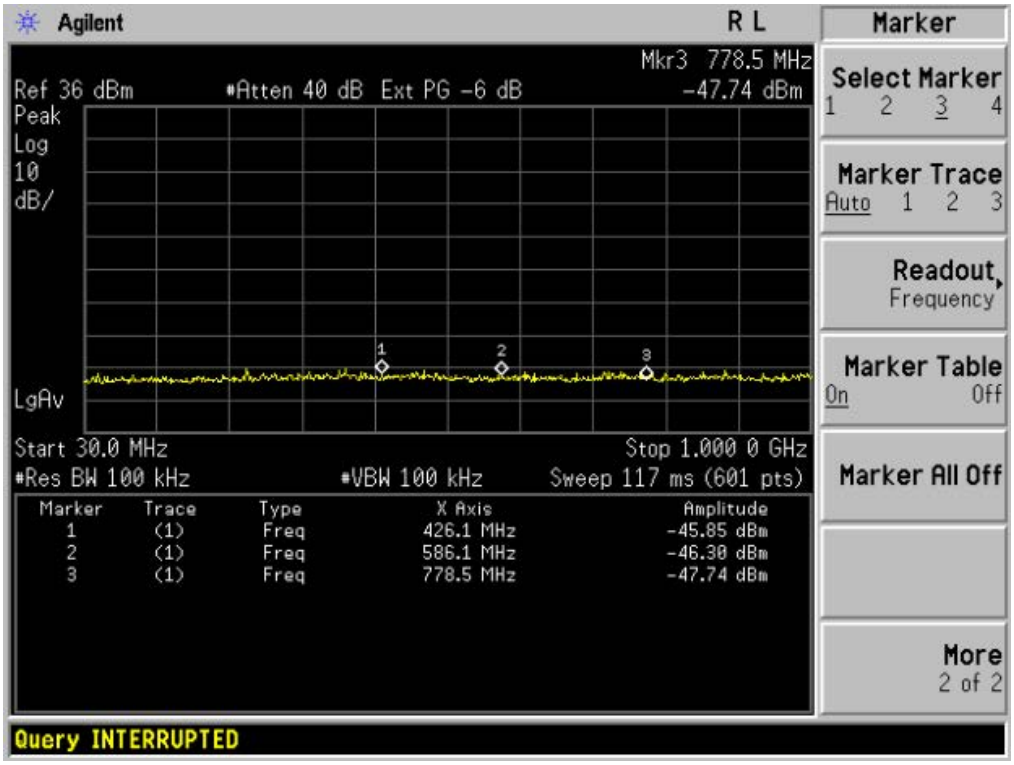
Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz



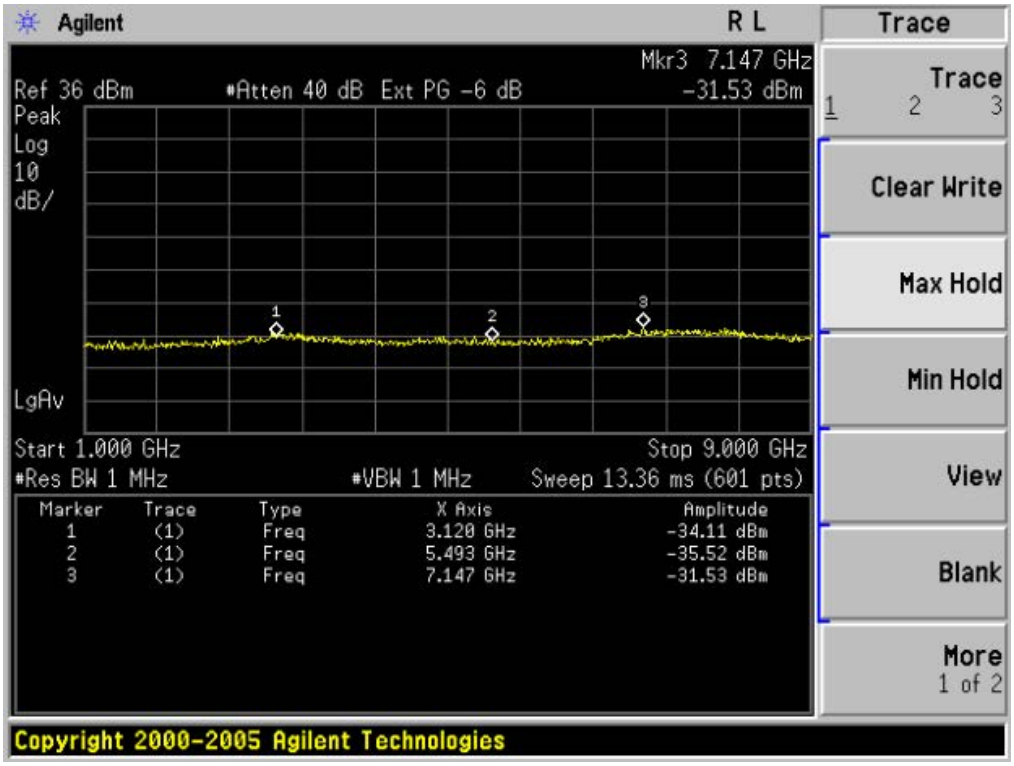
Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz



Conducted Emission Idle Mode 30MHz – 1GHz

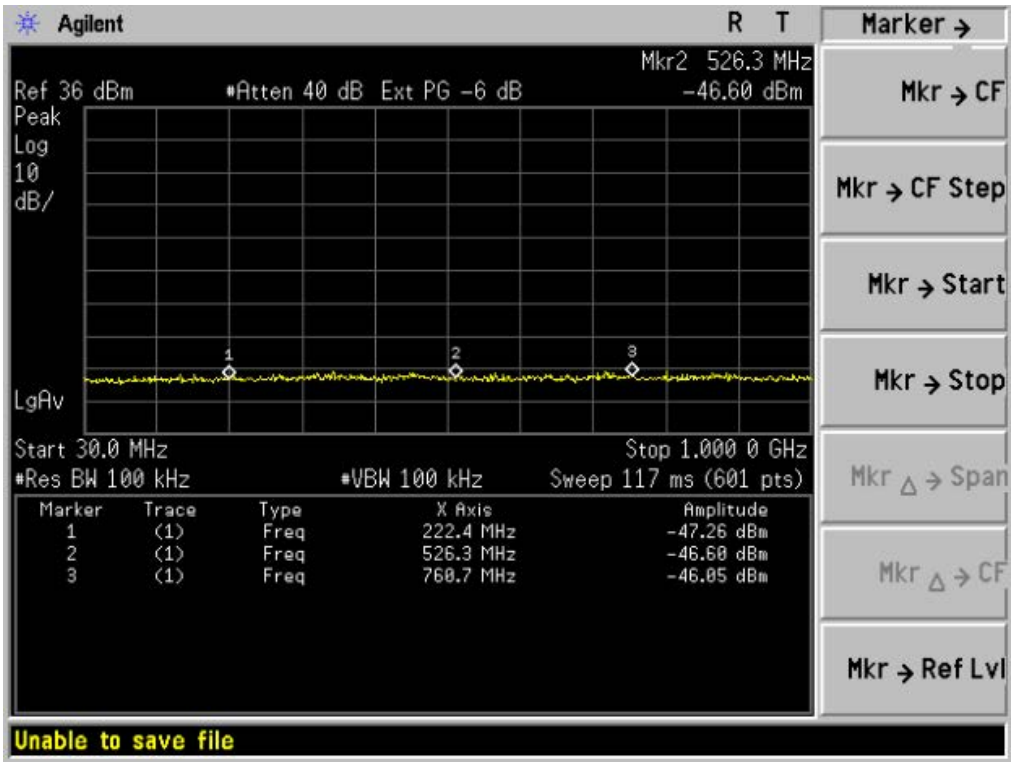


Conducted Emission Idle Mode 1GHz – 9GHz

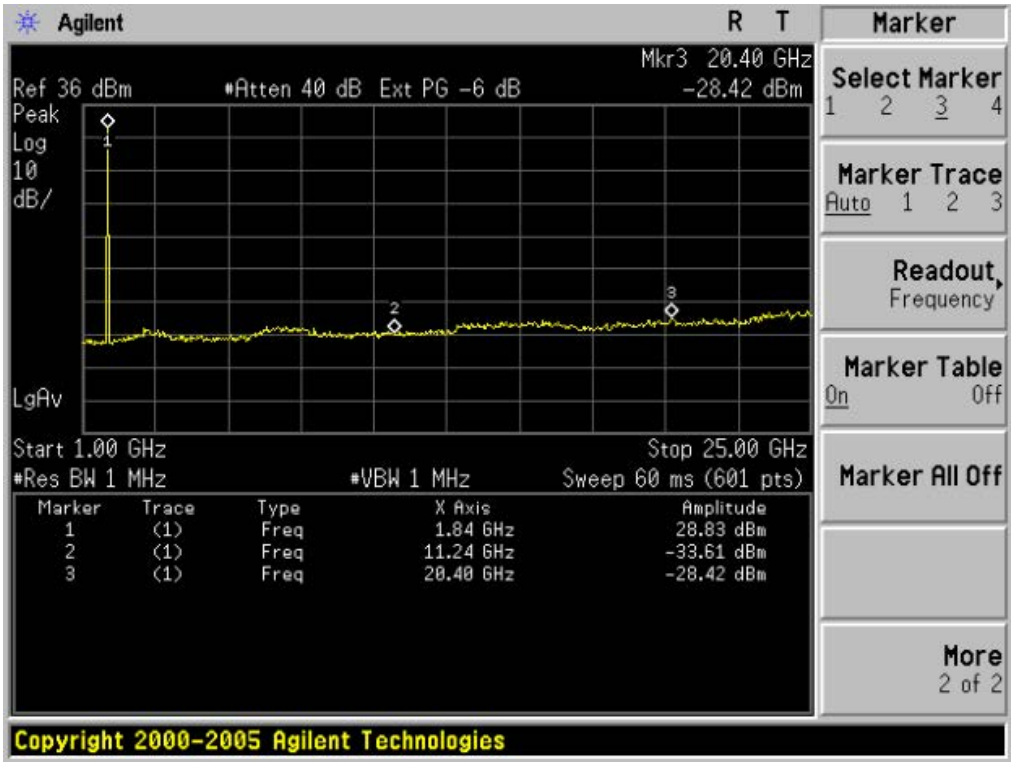


CONDUCTED EMISSION IN PCS BAND

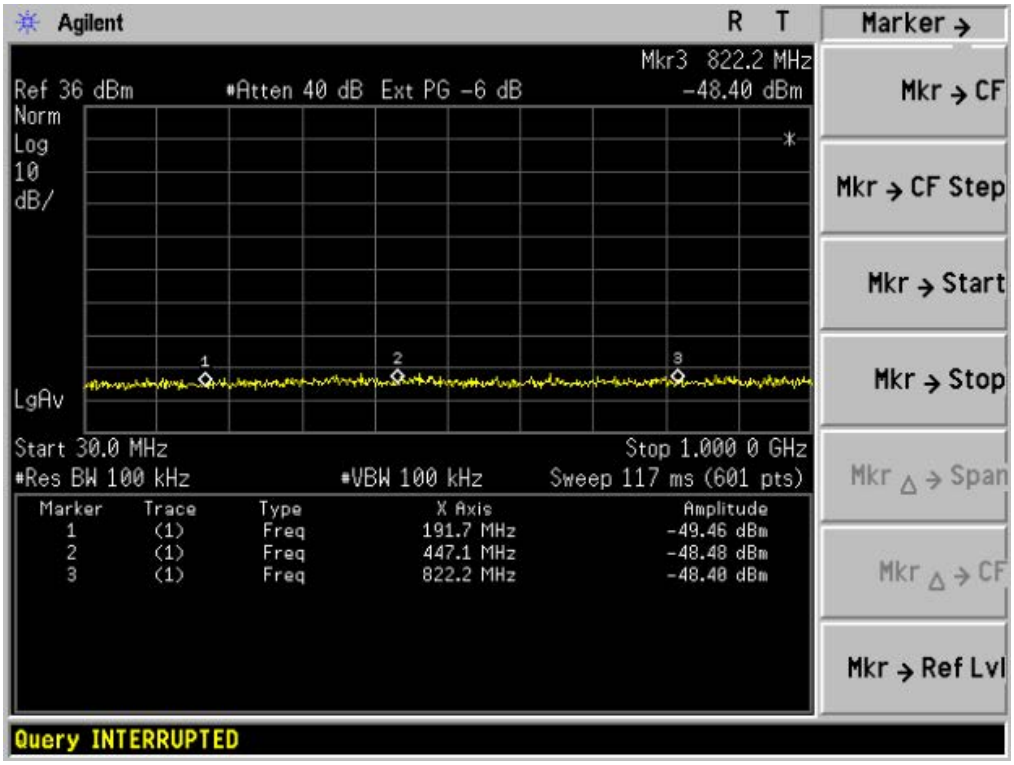
Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



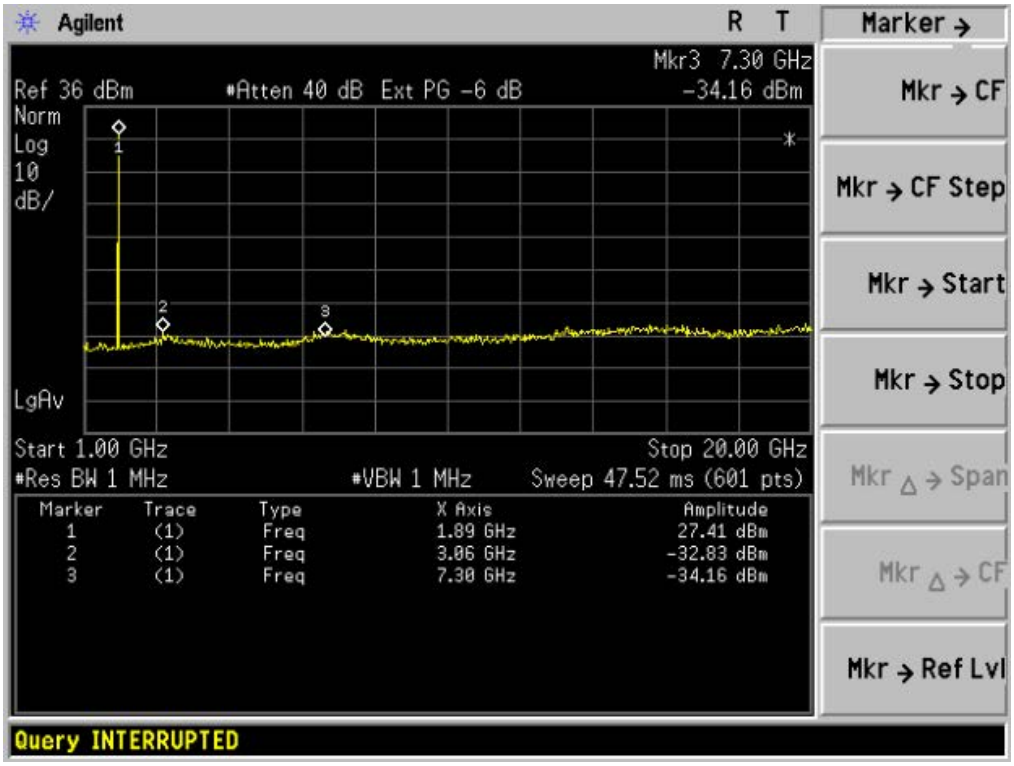
Conducted Emission Transmitting Mode CH 512 1GHz – 20GHz



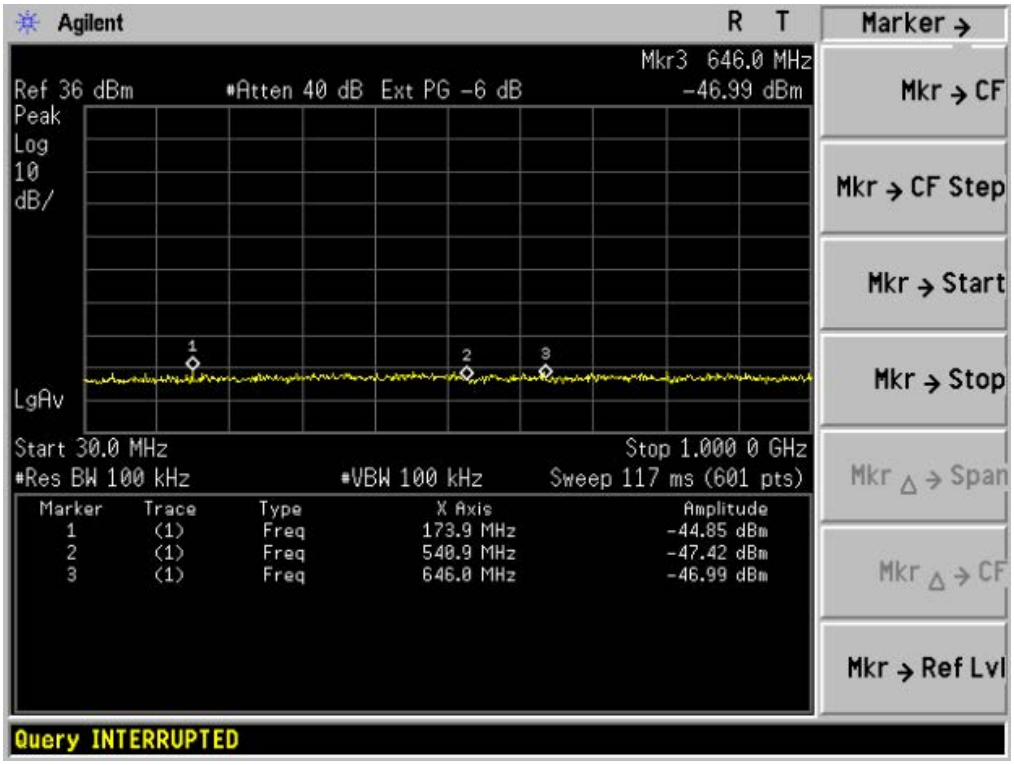
Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



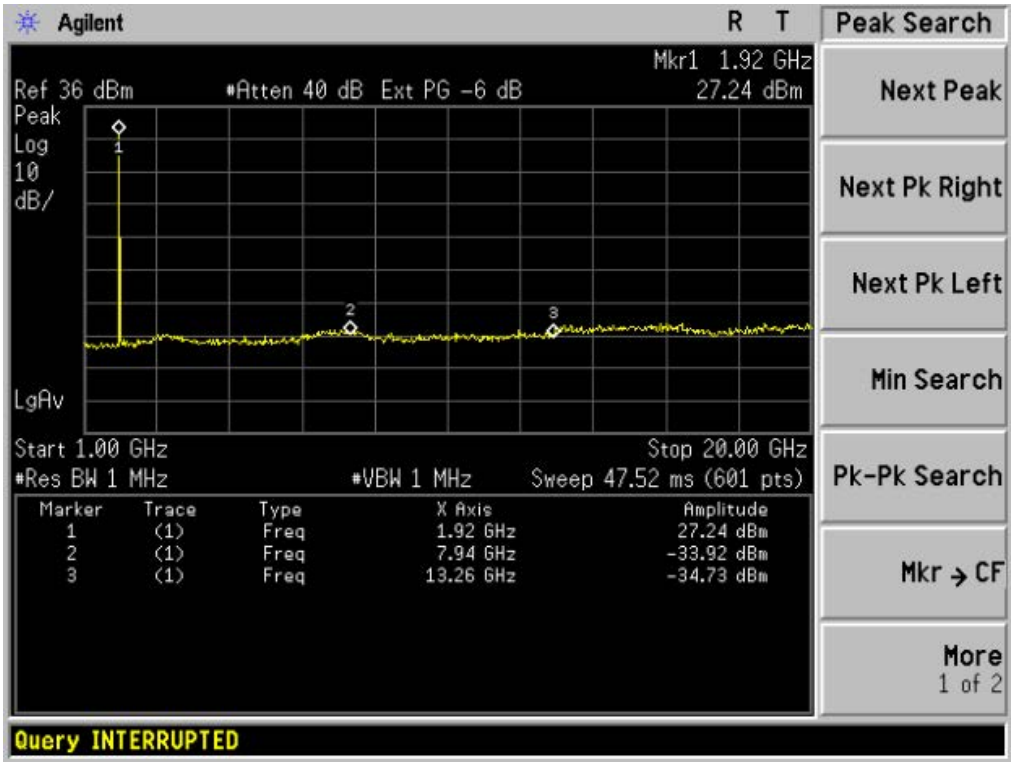
Conducted Emission Transmitting Mode CH 661 1GHz – 20GHz



Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz



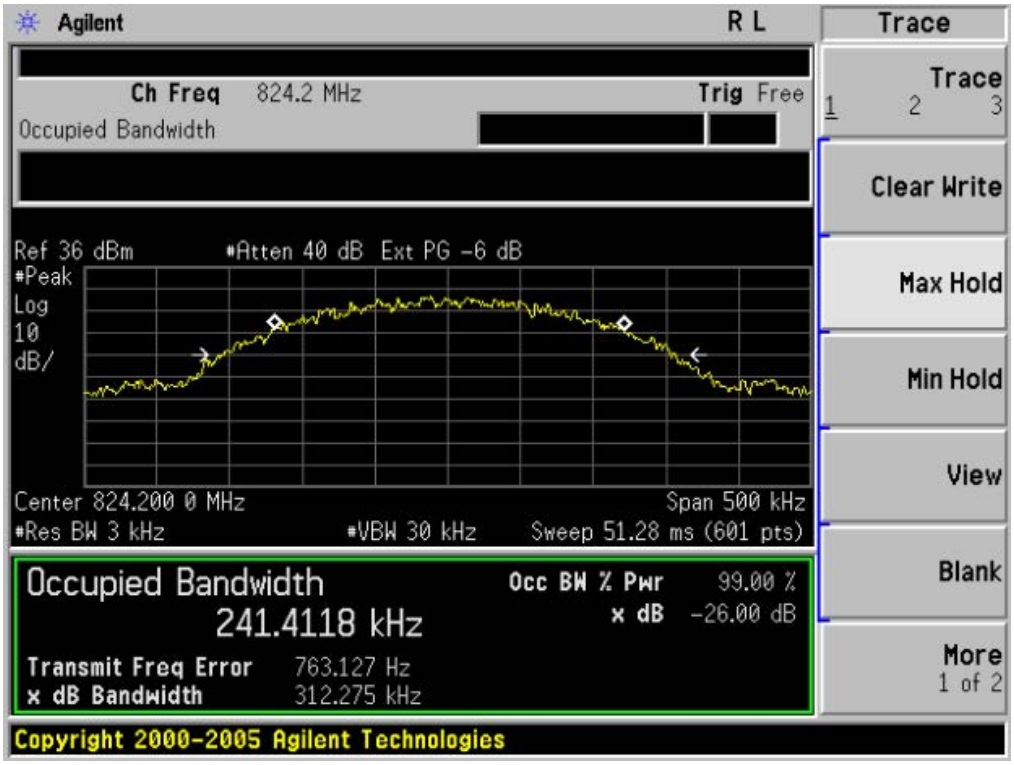
Conducted Emission Transmitting Mode CH 810 1GHz – 20GHz



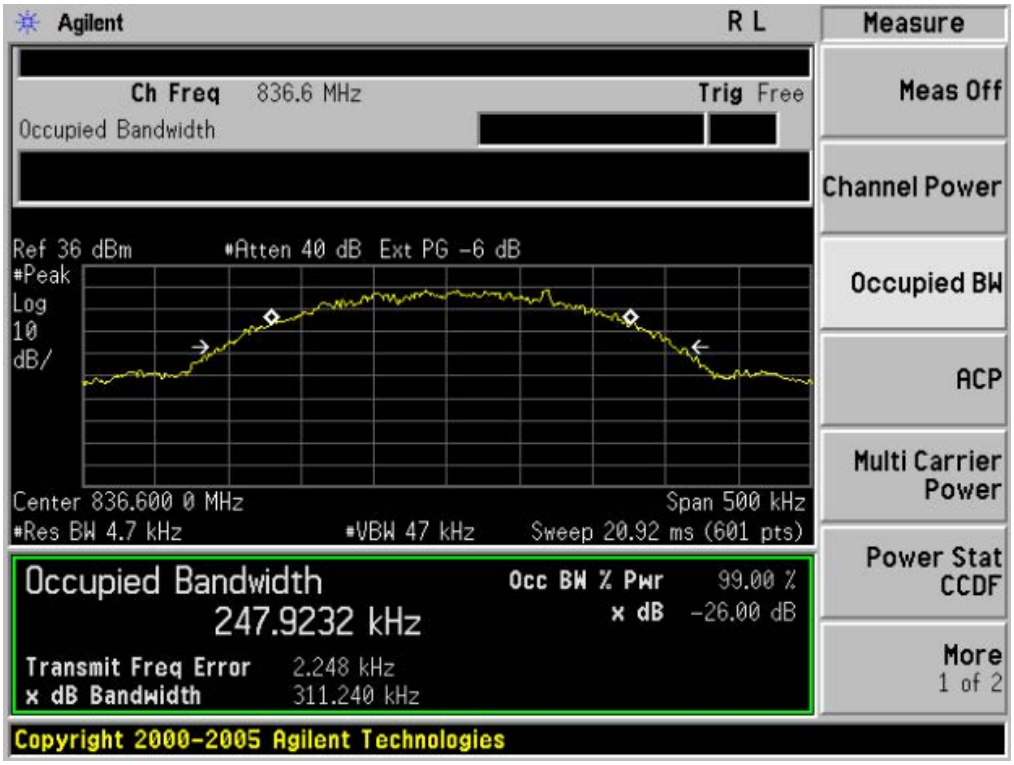
APPENDIX II

TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)
EMISSION BANDWIDTH (-26dBC)

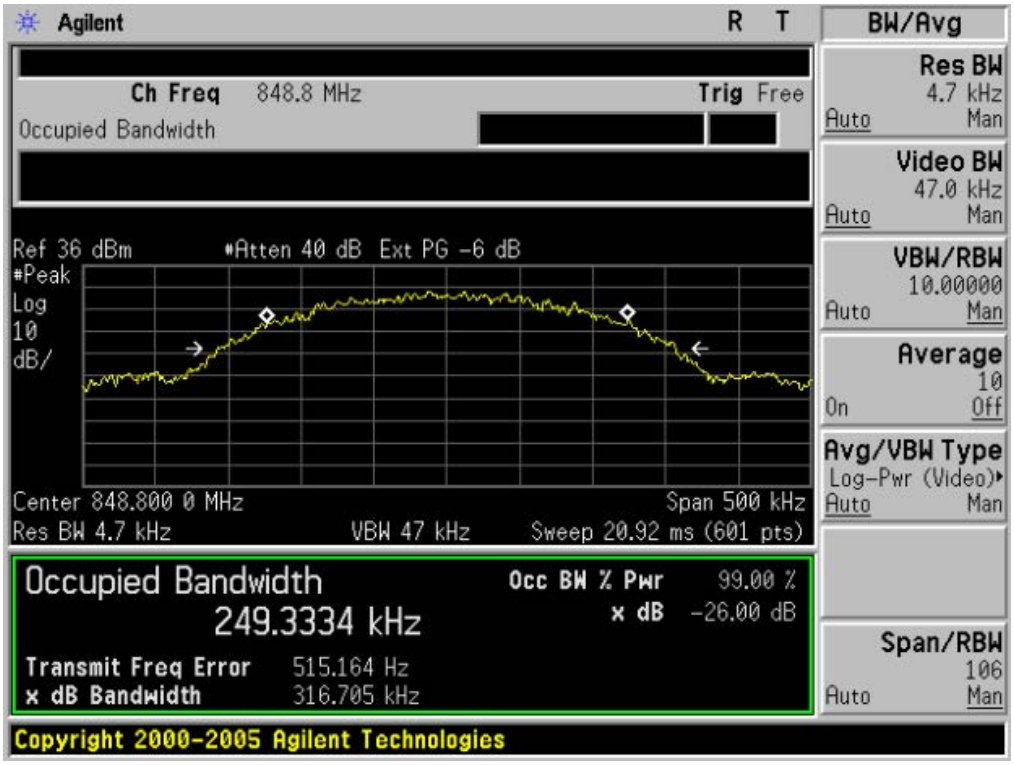
Occupied Bandwidth (99%) GSM 850 BAND CH 128



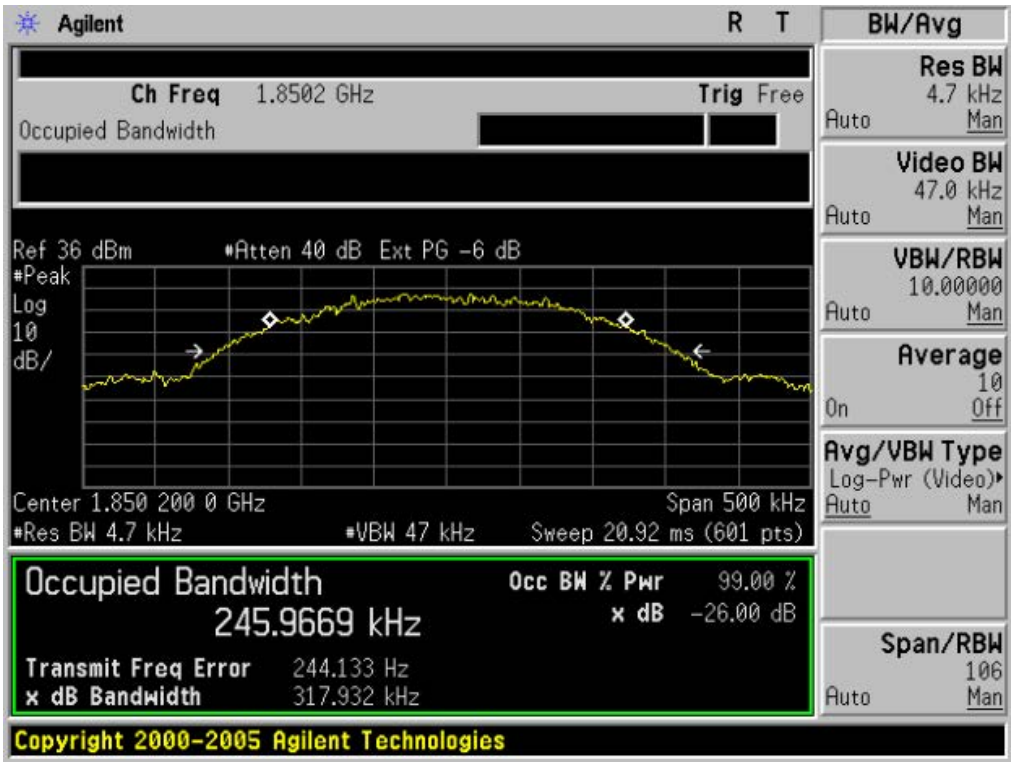
Occupied Bandwidth (99%) GSM 850 BAND CH 190



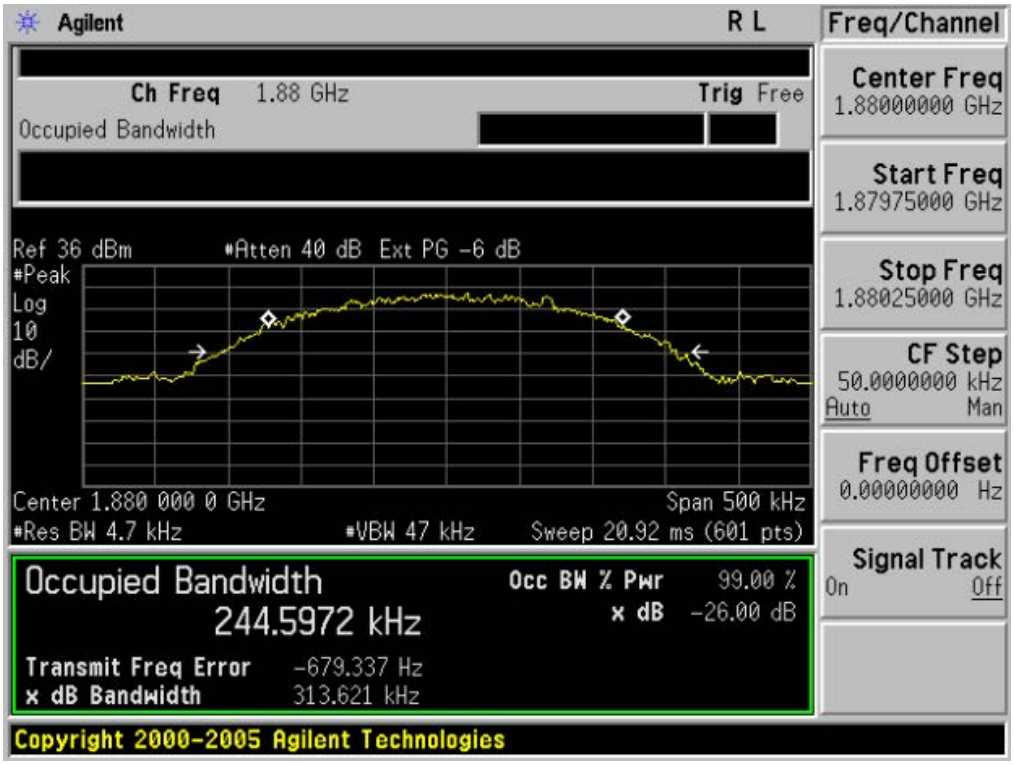
Occupied Bandwidth (99%) GSM 850 BAND CH 251



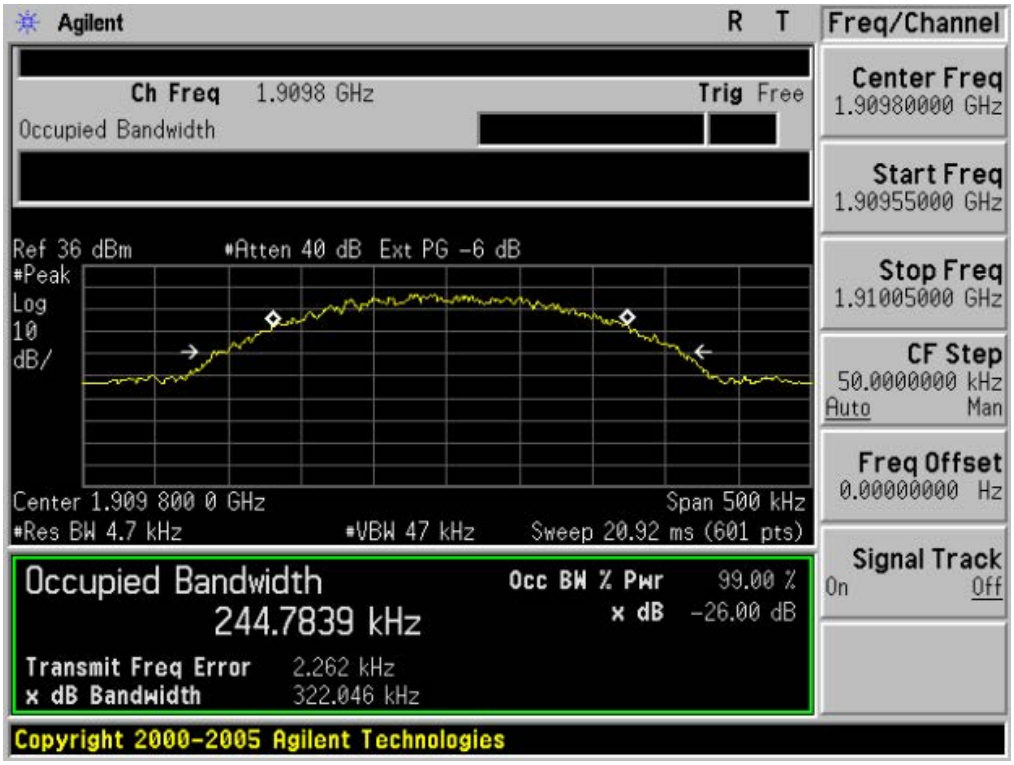
Occupied Bandwidth (99%) PCS 1900 BAND CH 512



Occupied Bandwidth (99%) PCS 1900 BAND CH 661



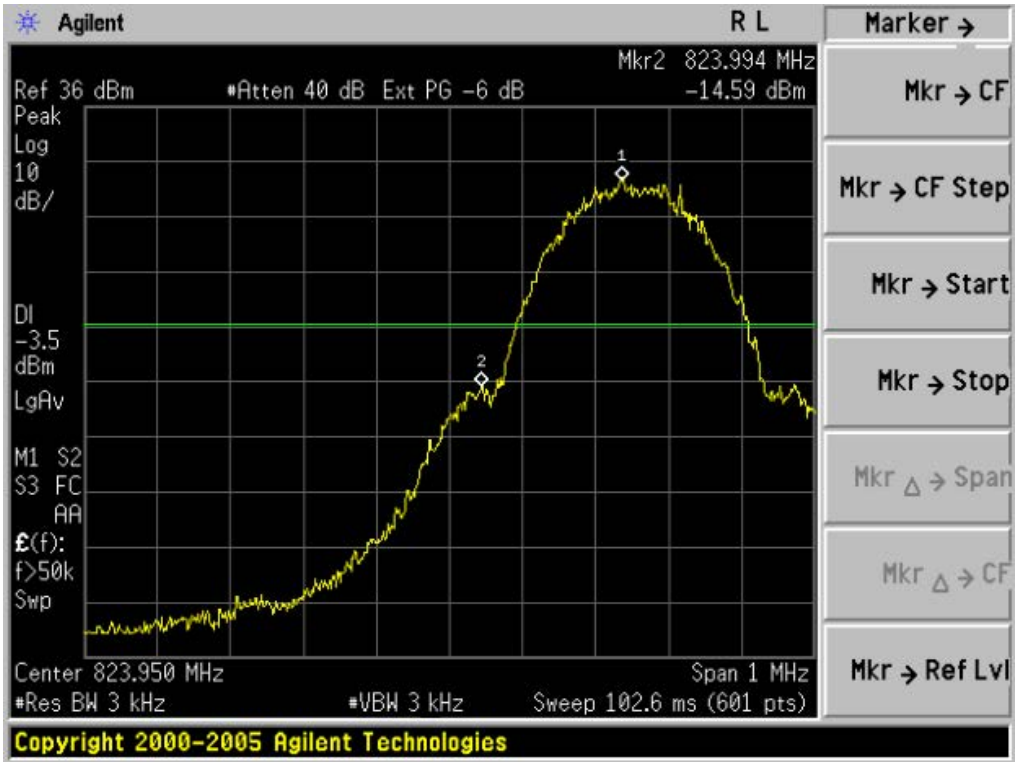
Occupied Bandwidth (99%) PCS 1900 BAND CH 810



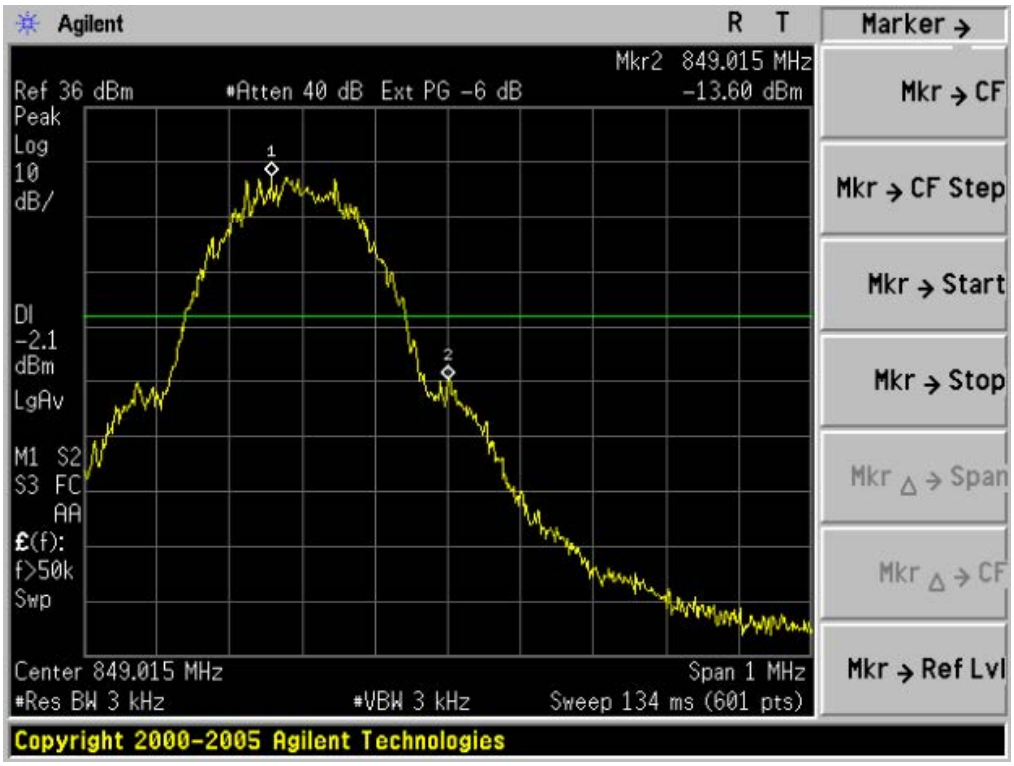
APPENDIX III

TEST PLOTS FOR BAND EDGES

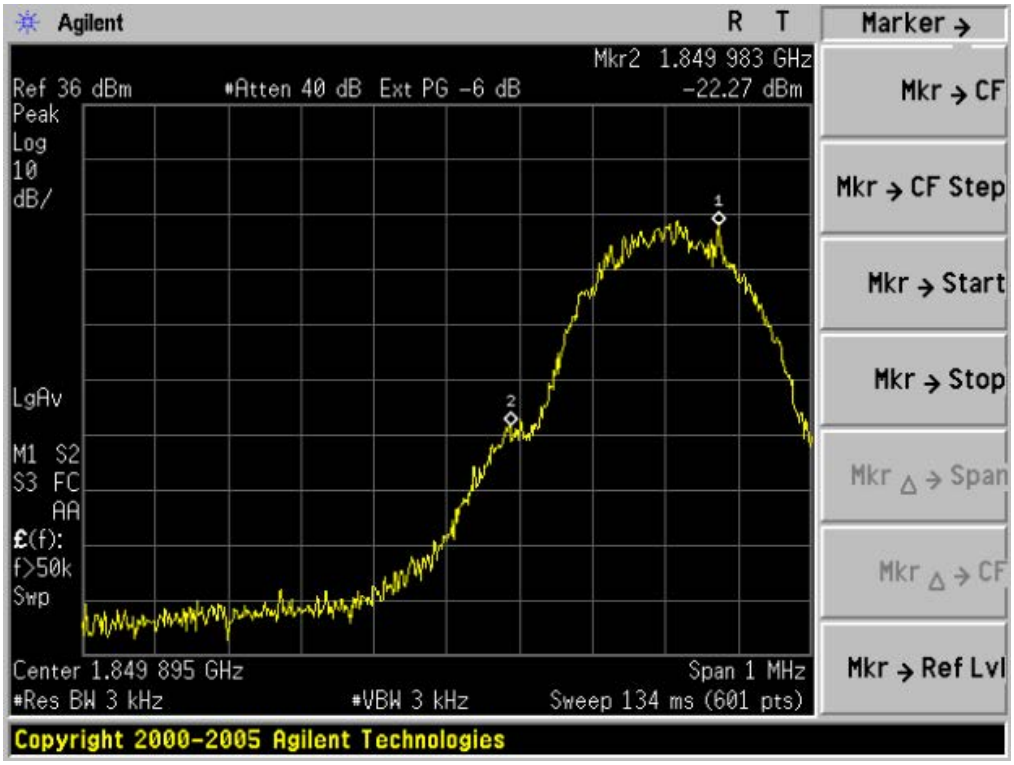
Low Band Edge GSM 850 BAND CH 128



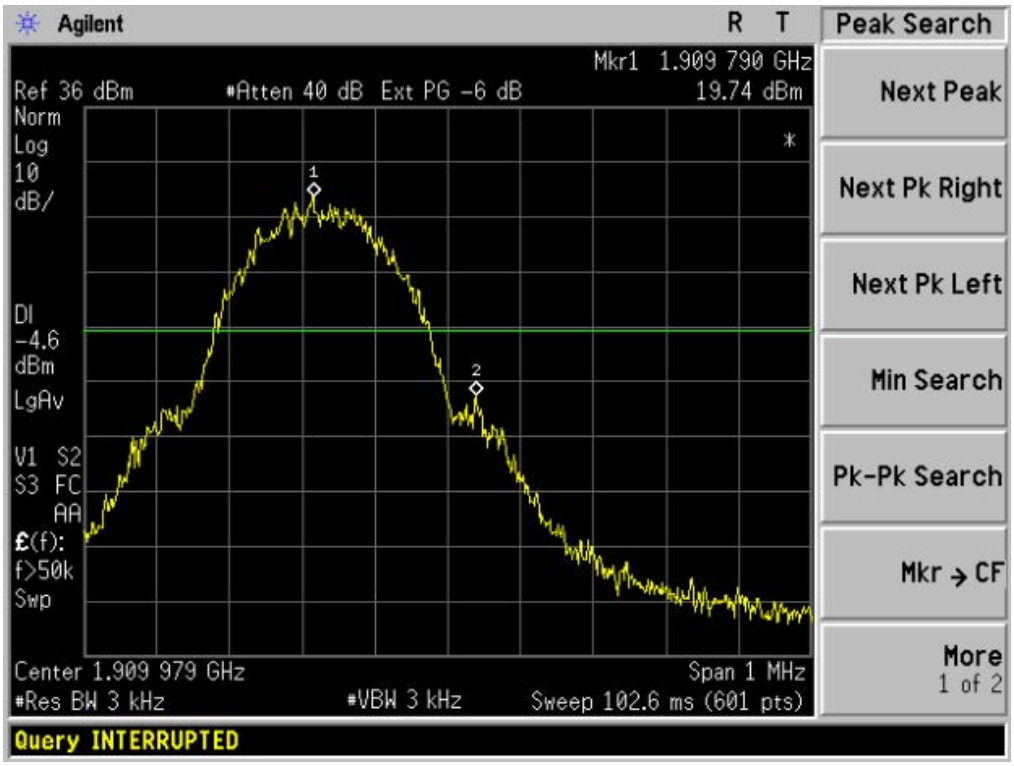
High Band Edge GSM 850 BAND CH 251



Low Band Edge PCS 1900 BAND CH 512



High Band Edge PCS 1900 BAND CH 810

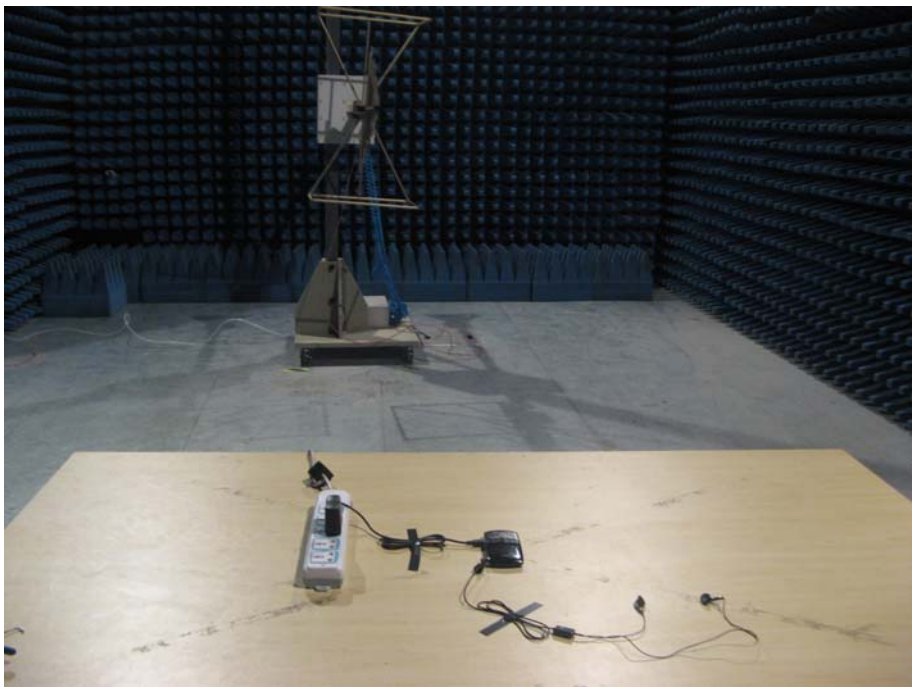


APPENDIX IV

PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION

RADIATED SPURIOUS EMISSION



APPENDIX V

PHOTOGRAPHS OF EUT

TOP VIEW OF SAMPLE

BOTTOM VIEW OF SAMPLE

LEFT VIEW OF SAMPLE

RIGHT VIEW OF SAMPLE

FRONT VIEW OF SAMPLE

BACK VEIW OF SAMPLE

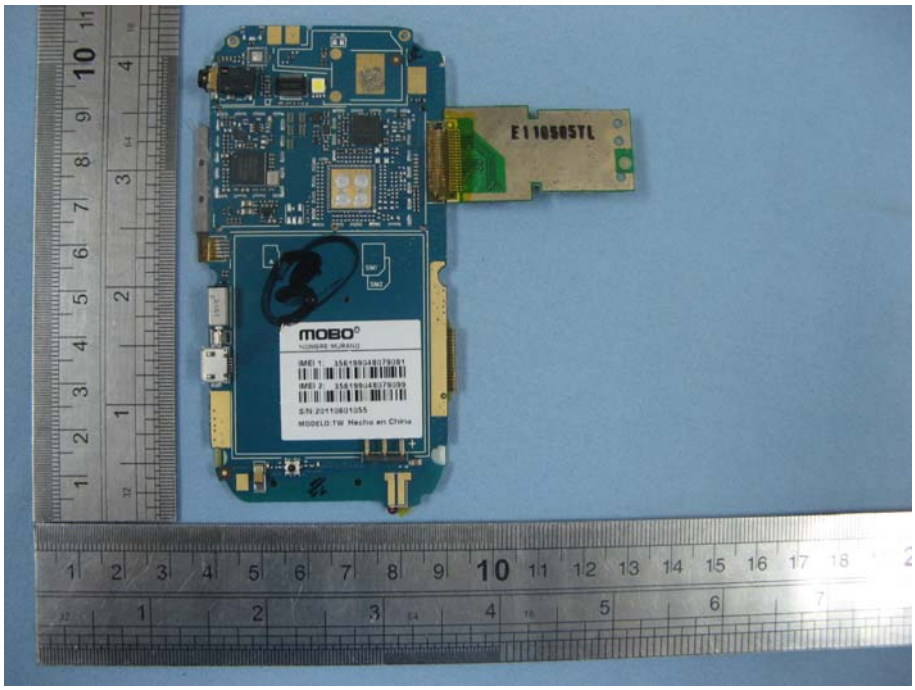
ALL VIEW OF SAMPLE

OPEN VIEW OF SAMPLE-1

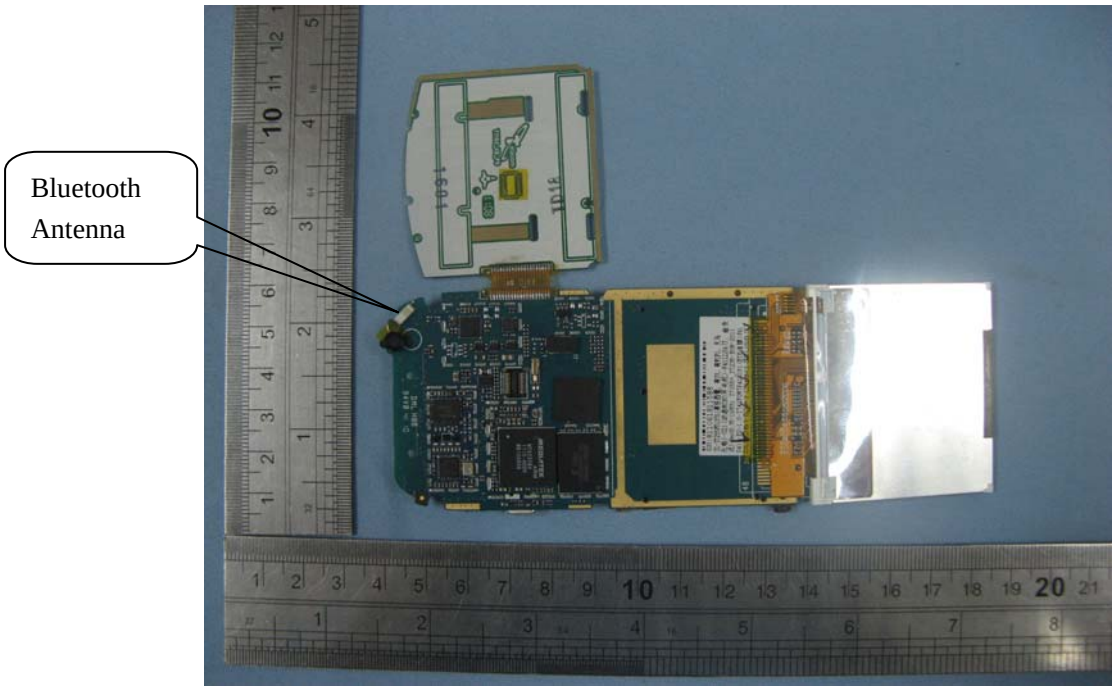
OPEN VIEW OF SAMPLE-2

OPEN VIEW OF SAMPLE-3

INTERNAL VIEW OF SAMPLE – 1



INTERNAL VIEW OF SAMPLE – 2



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