FCC CFR47 CERTIFICATION

PART 22H

TEST REPORT

FOR

TRI BAND POCKET PC CELL PHONE WITH GPRS CLASS 10/GSM CLASS B PHONE

MODEL: PPC4100

FCC ID: PU5SP230A

REPORT NUMBER: 04T2541-1

ISSUE DATE: MARCH 03, 2004

Prepared for
WISTRON COPORATION
21F, 88 SEC. 1, HSIN TAI WU RD.
HSICHIH, TAIPEI, TAIWAN

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD, ROUTE 2
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

TABLE OF CONTENT

1. TEST RESULT CERTIFICATION 3

2. EUT DESCRIPTION 4

3. TEST METHODOLOGY 4

4. TEST FACILITY 4

5. ACCREDITATION AND LISTING 4

6. MEASURING INSTRUMENT CALIBRATION 4

7. TEST SETUP, PROCEDURE AND RESULT 5

7.1. SECTION 2.1046: RF POWER OUTPUT 5
7.2. SECTION 2.1047: MODULATION CHARACTERISTICS 11
7.3. SECTION 2.1049: OCCUPIED BANDWIDTH 11
7.4. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL 19
7.5. SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION 32
7.6. SECTION 2.1055: FREQUENCY STABILITY 37

8. APENDIX 40

8.1. EXTERNAL & INTERNAL PHOTOS 40
8.2. SCHEMATICS 40
8.3. BLOCK DIAGRAM 40
8.4. USER MANUAL 40

1. TEST RESULT CERTIFICATION

COMPANY NAME: WISTRON COPORATION
21F, 88, SEC. 1 HSIN TAI WU ROAD
HSICHIH, TAIPEI HSIEN,
TAIWAN 221, R.O.C

EUT DESCRIPTION: TRI BAND (850/1800/1900) POCKET PC CELL PHONE

MODEM NAME: PPC4100

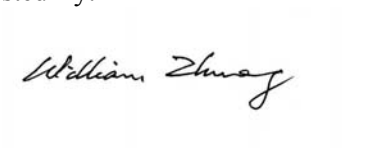
DATE TESTED: FEBUARY 26 - 29, 2004

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	LICENSED TX MODULE IN MOBILE APPLICATION
MEASUREMENT PROCEDURE	ANSI 63.4 / 2001, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 22 Subpart H

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 22 Subpart H-Cellular Radiotelephone Service. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Tested By:



CHIN PANG
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is a Tri-Band Pocket PC Cell Phone with GPRS Class 10 / GSM class B. The EUT of GSM 850MHz has an output power of 31.9dBm (GSM, ERP) / 32.1dBm (GPRS, ERP), which is designed for the Cellular band transmitting of frequency range 824 ~ 849MHz, and also only this band has been tested and used in this report.

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

6. MEASURING INSTRUMENT CALIBRATION

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

7. TEST SETUP, PROCEDURE AND RESULT

7.1. SECTION 2.1046: RF POWER OUTPUT

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	HP	E4446A	7/23/2004
Power Splitter	HP	11667B	NCR
EMI Receiver 9KHz-2.9GHz	HP	8542E	12/22/2004
Amplifier 1-26GHz	MITEQ	NSP2600-44	4/25/2004
1.5GHz HPF	MicroTronic	HPM13193	NCR
Temperature Chamber	Thermotron	SE600-10-10	11/21/2004
Bilog Antenna	Sunol Science	JB1	12/22/2004
Power Supply	Kenwood	PA36-3A	NCR
Auto Transformer	Variac	W8MT3VM	NCR
Horn Antenna	EMCO	3115 SN: 6717	2/5/2005
Communication Tester	R & S	CMU 200	12/1/2004
Horn Antenna	EMCO	3115 SN: 3245	2/4/2005
Dipole Antenna	EMCO	3121C-DD4 SN:1629	5/8/2004

MEASUREMENT PROCEDURE

1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.

3). The output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

4). The transmitter shall be placed 0.80 meter above the ground plane, the X, Y, and Z positions shall be tested and the worst case reported. The transmitter shall be switched on with typical modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

5). The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

6). The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

8). The maximum signal level detected by the measuring receiver shall be noted.

9). The transmitter shall be replaced by a tuned dipole / horn (substitution antenna).

10). The substitution antenna shall be oriented for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

11). The substitution antenna shall be connected to a calibrated signal generator.

12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

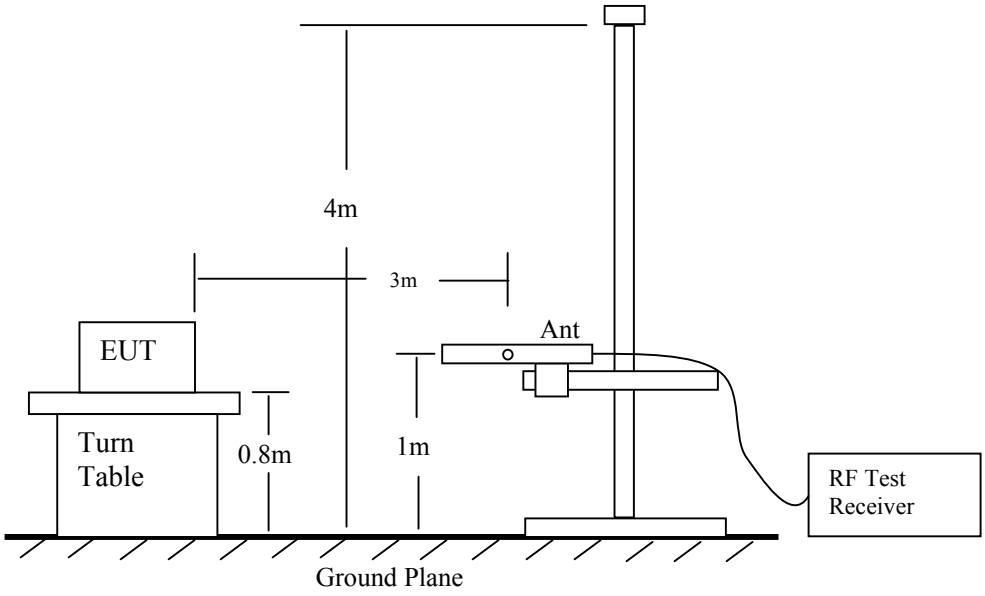
13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

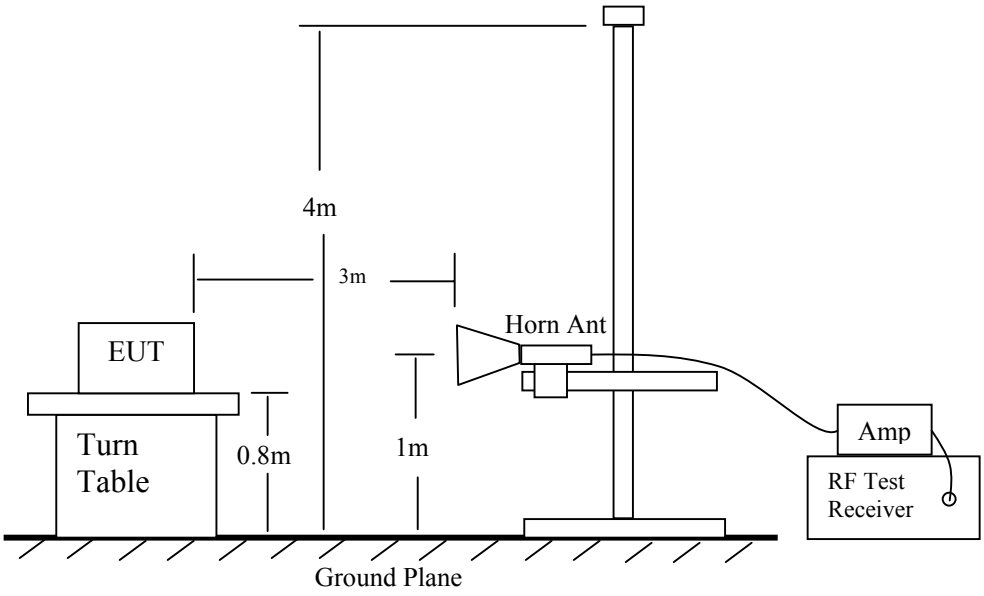
15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

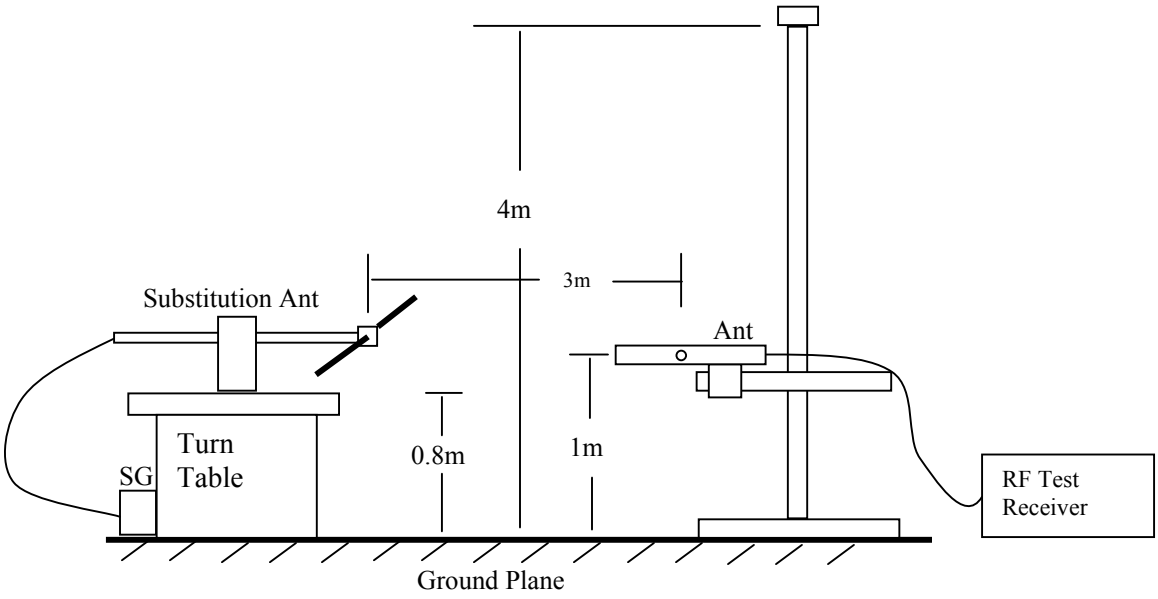
17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.



Radiated Emission Measurement 30 to 1000 MHz



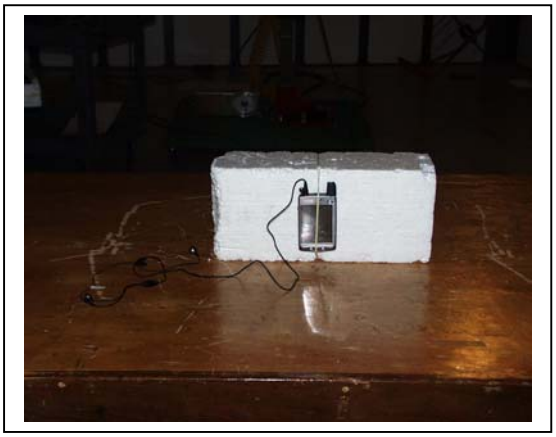
Radiated Emission Above 1000 MHz



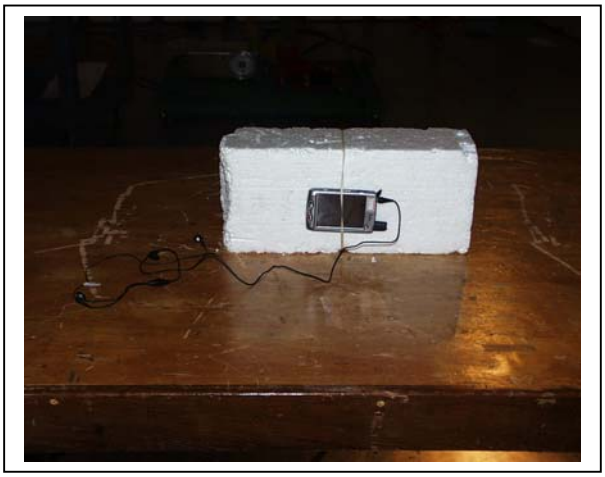
Radiated Emission – Substitution Method

SETUP PHOTO

X-Axis



Y-Axis



Z-Axis

Test result:

Mode of Operation: Transmit, GSM Mode (EUT @ X Worst Position)

	Channel #	Frequency	ERP Output Power (dBm)
Low	128	824.4	31.9
Mid	193	837.2	31.8
High	251	848.8	31.5

Mode of Operation: Transmit, GPRS Class 10 Mode (EUT @ X Worst Position)

	Channel #	Frequency	ERP Output Power (dBm)
Low	128	824.4	32.1
Mid	193	837.2	31.5
High	251	848.8	31.2

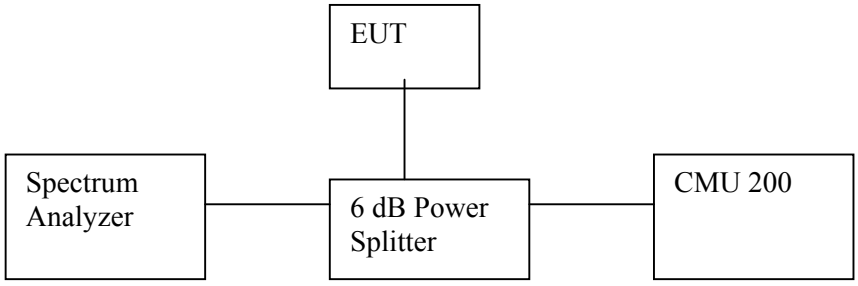
RBW=VBW=3MHz

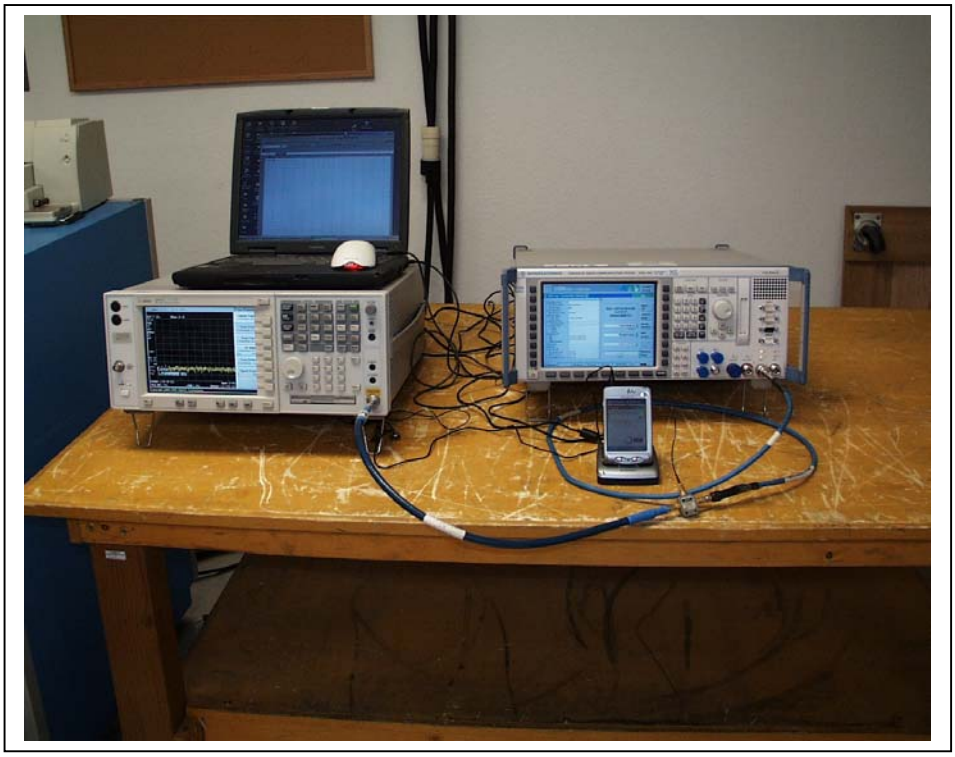
7.2. SECTION 2.1047: MODULATION CHARACTERISTICS

Not applicable

7.3. SECTION 2.1049: OCCUPIED BANDWIDTH

SETUP CONFIGURATION





INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E44446A	7/23/2004
Communication Tester	R & S	CMU 200	12/1/2004
Power Splitter	HP	11667B	NCR
10 dB Attenuator	ME/Weinschel	56-10	NCR

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

No non-compliance noted:

GSM MODE

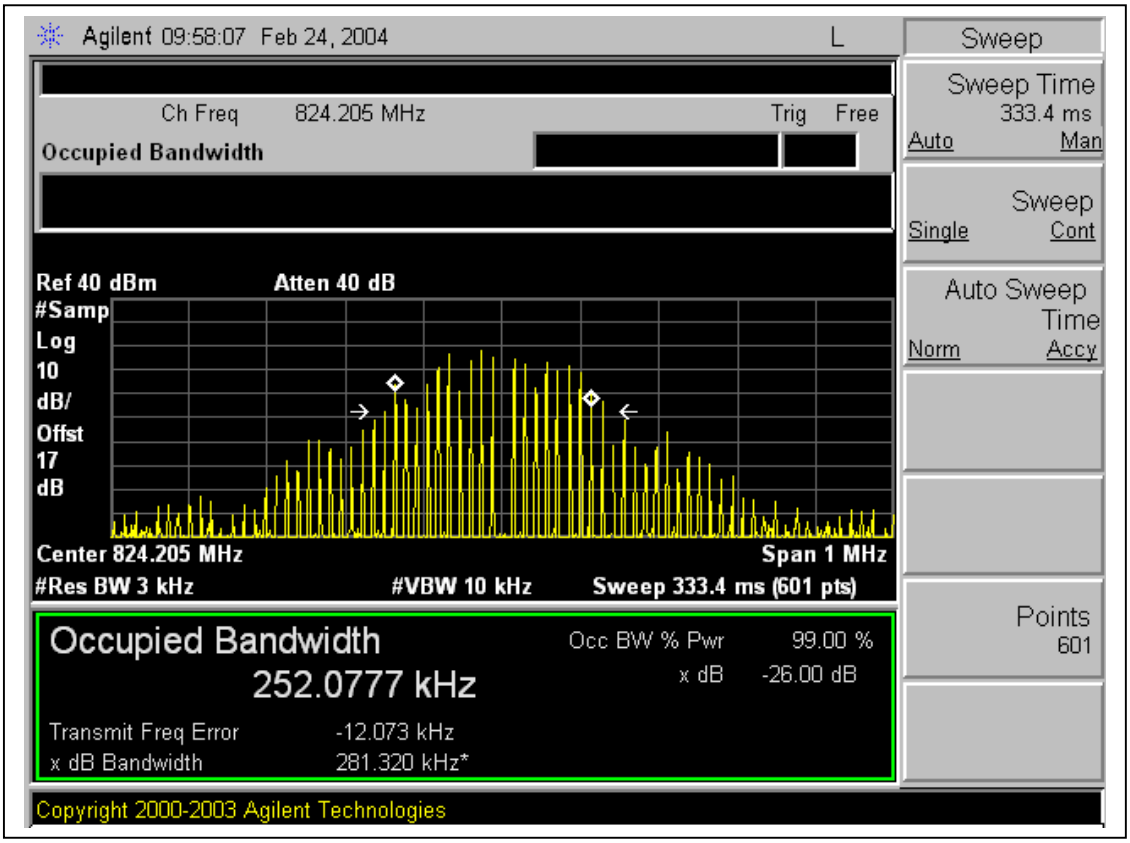
Channel	Frequency (MHz)	26dB BW (KHz)
Low	824.40	281.320
Middle	8372.50	281.563
High	848.80	282.106

GPRS Class 10 MODE

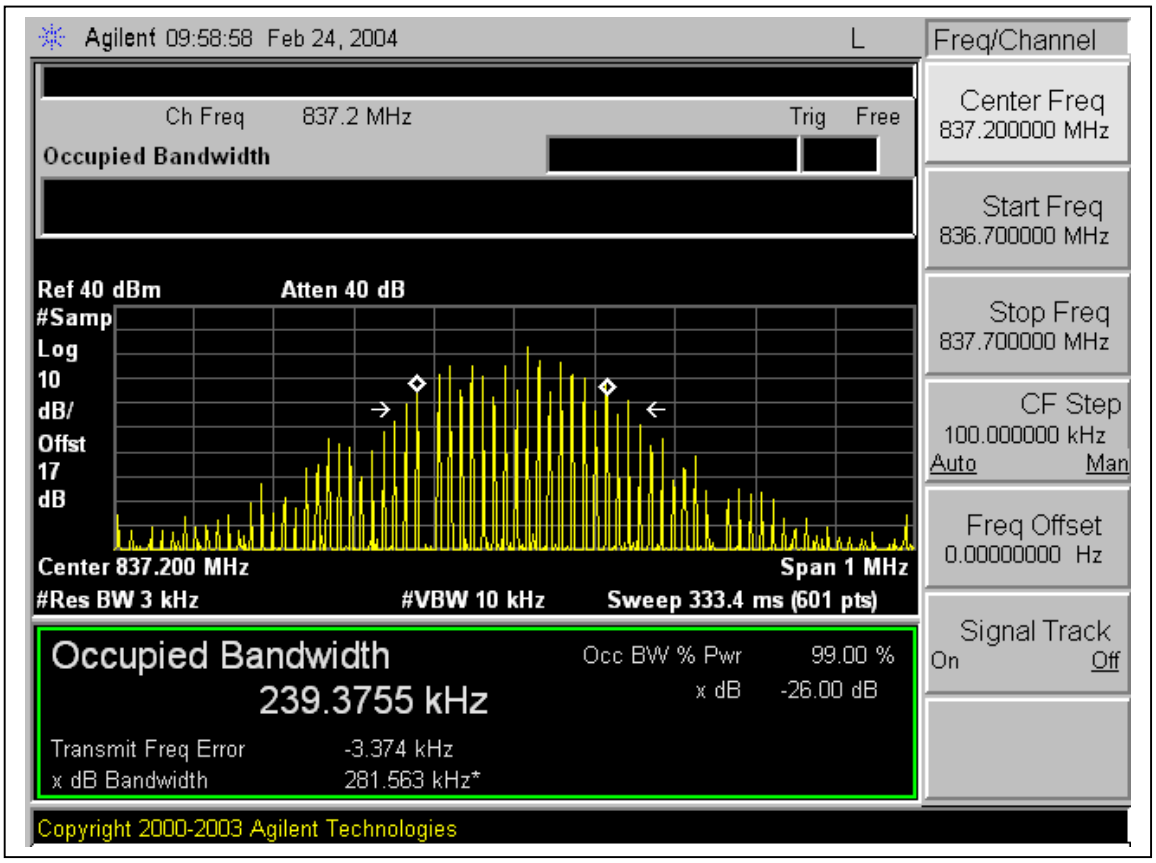
Channel	Frequency (MHz)	26dB BW (MHz)
Low	824.40	295.804
Middle	837.20	294.285
High	848.80	297.149

26dB BANDWIDTH (Low Channel)

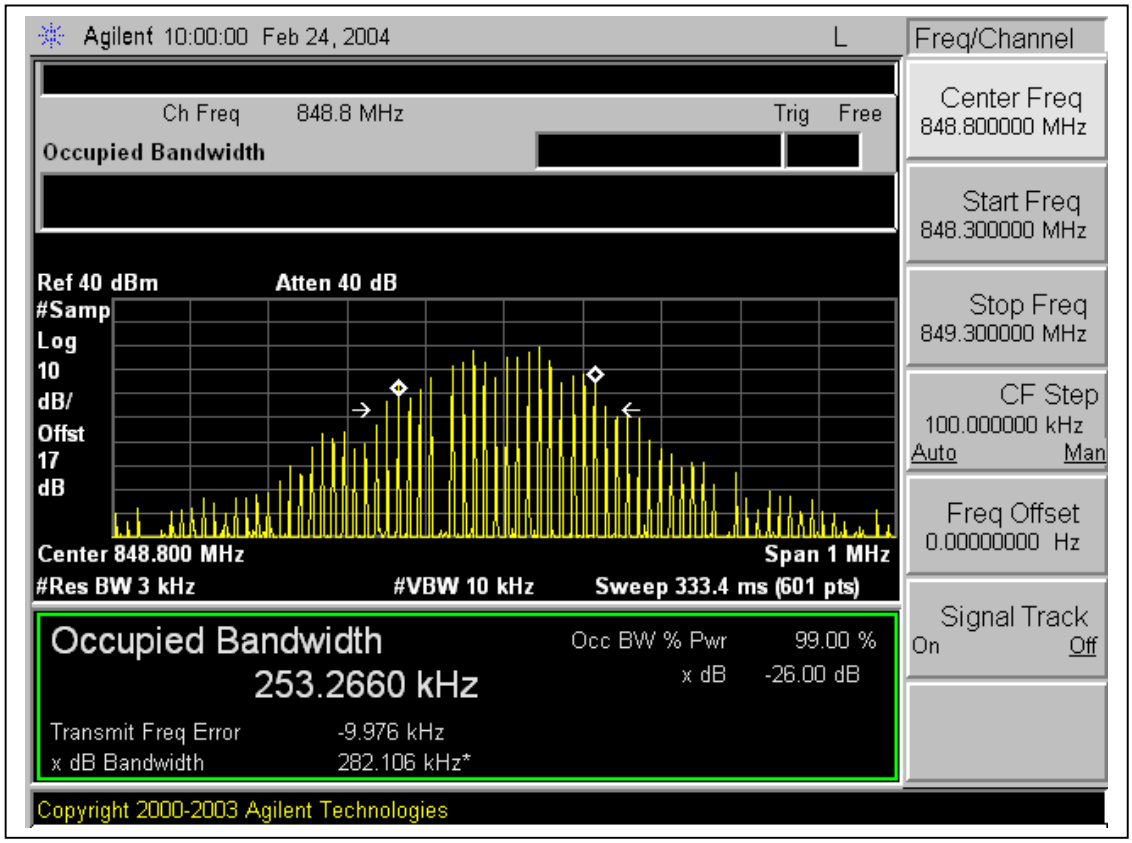
GSM MODE



26dB BANDWIDTH (Mid Channel)

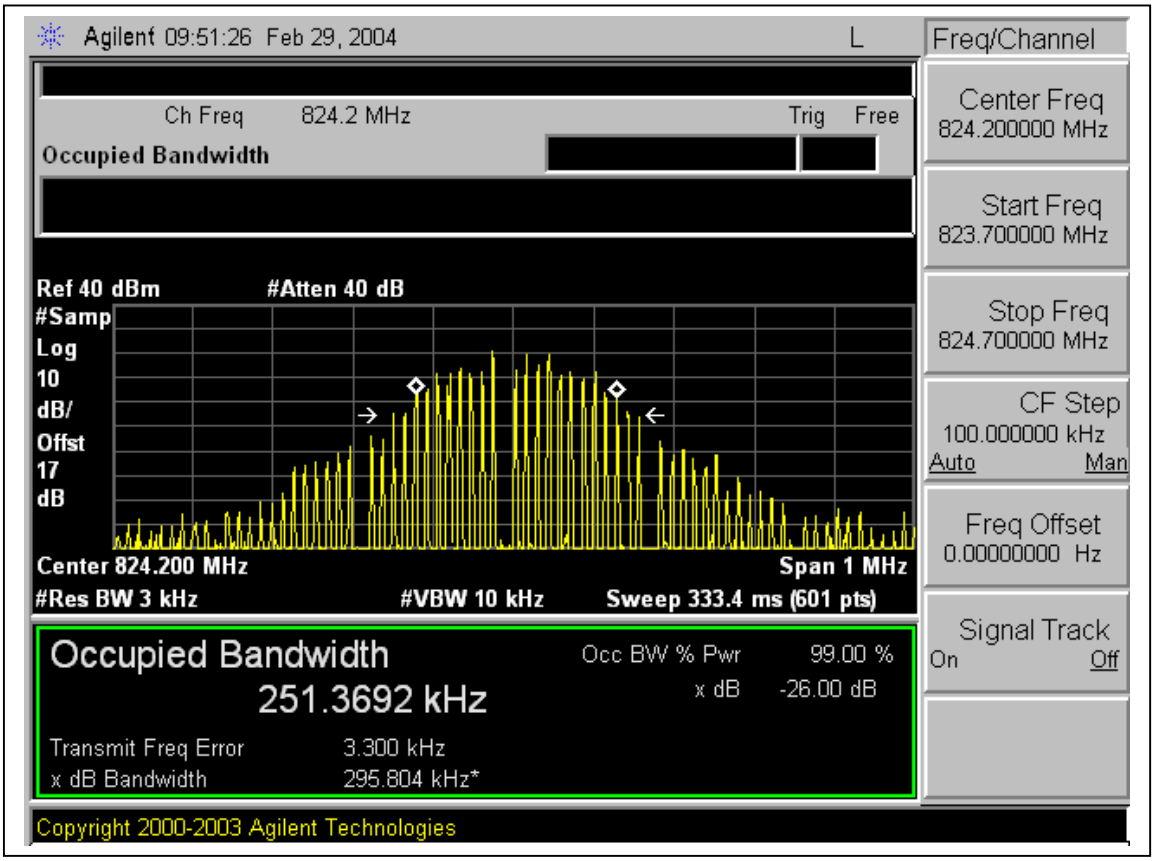


26dB BANDWIDTH (High Channel)

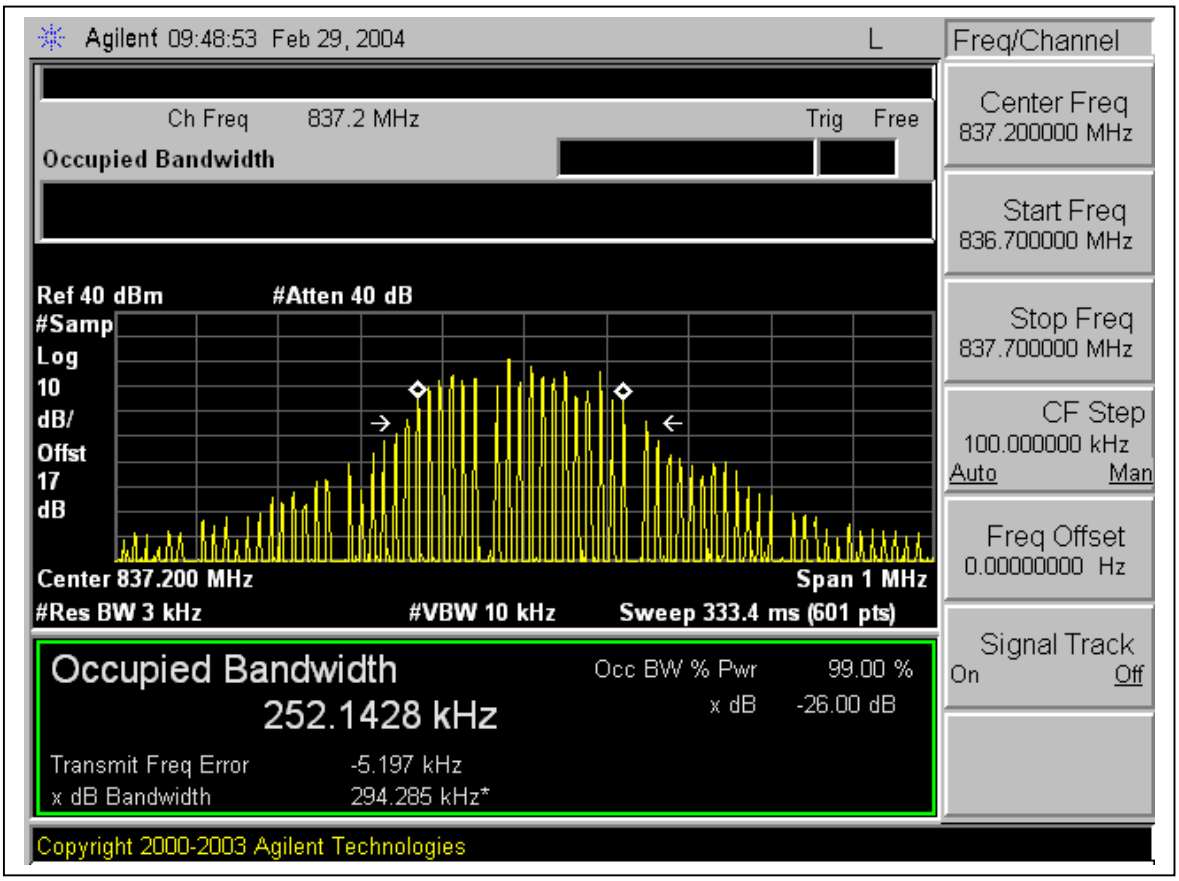


26dB BANDWIDTH (Low Channel)

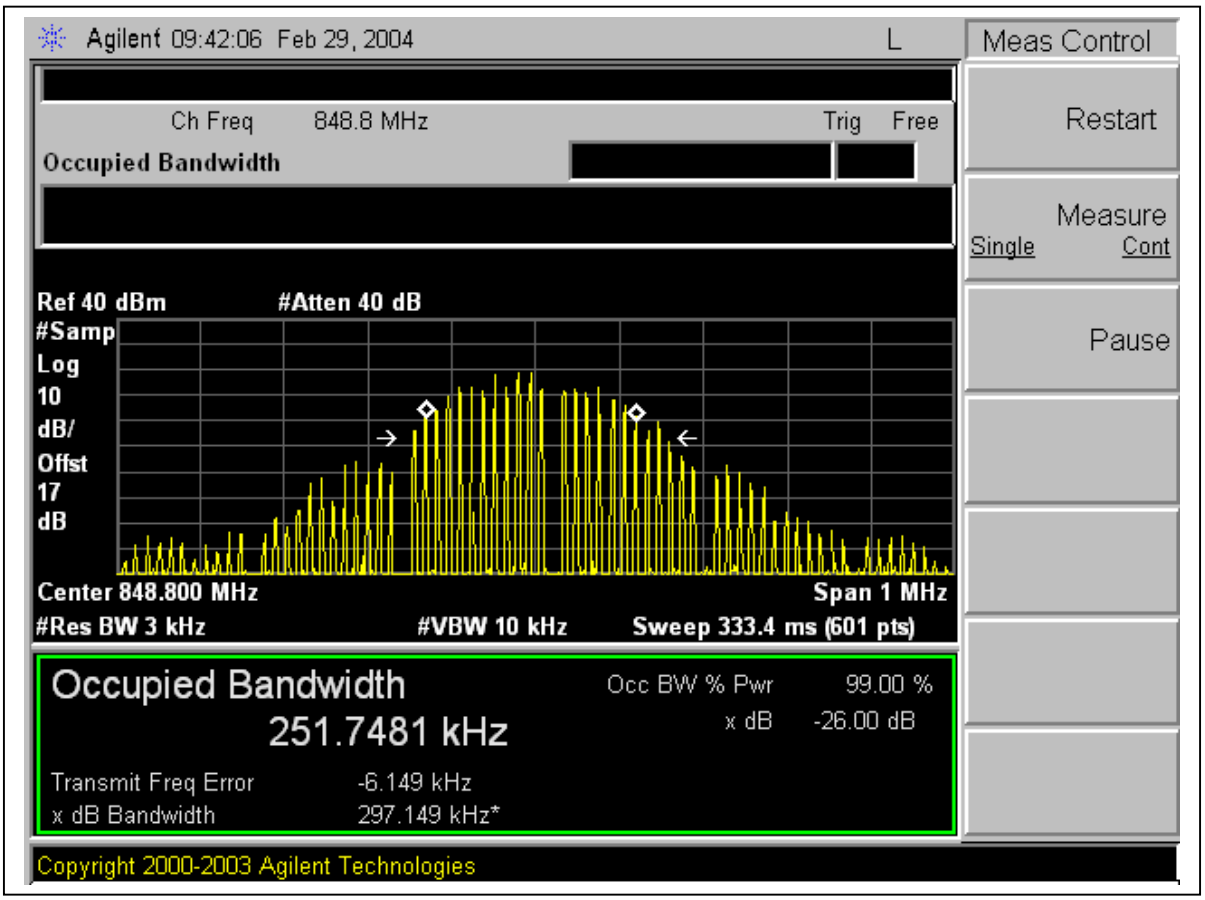
GPRS CLASS 10 MODE



26dB BANDWIDTH (Mid Channel)



26dB BANDWIDTH (High Channel)

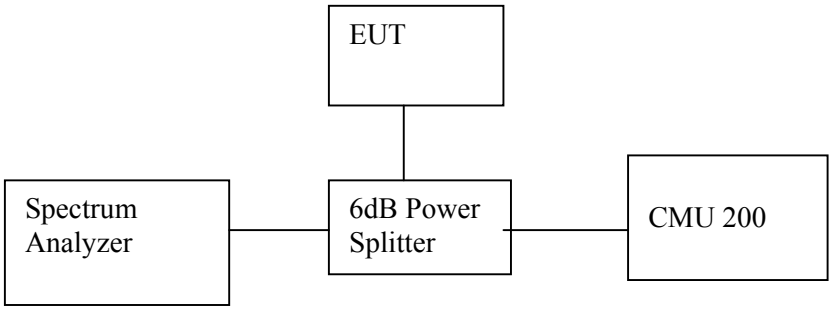


7.4. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	1/13/04
Attenuator	MINI CIRCUITS	MCL BW-S10W2	N/A

TEST SETUP



TEST PROCEDURE

1) EUT's RF output connector (made solely for the purpose of the test) is connected to the spectrum analyzer, and set as close as possible to the bottom of the block edge and one set as close as possible to the top of the block edge. Set the RES BW to 1% of the emission bandwidth to show compliance with the –13dBm limit, in the 1 MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

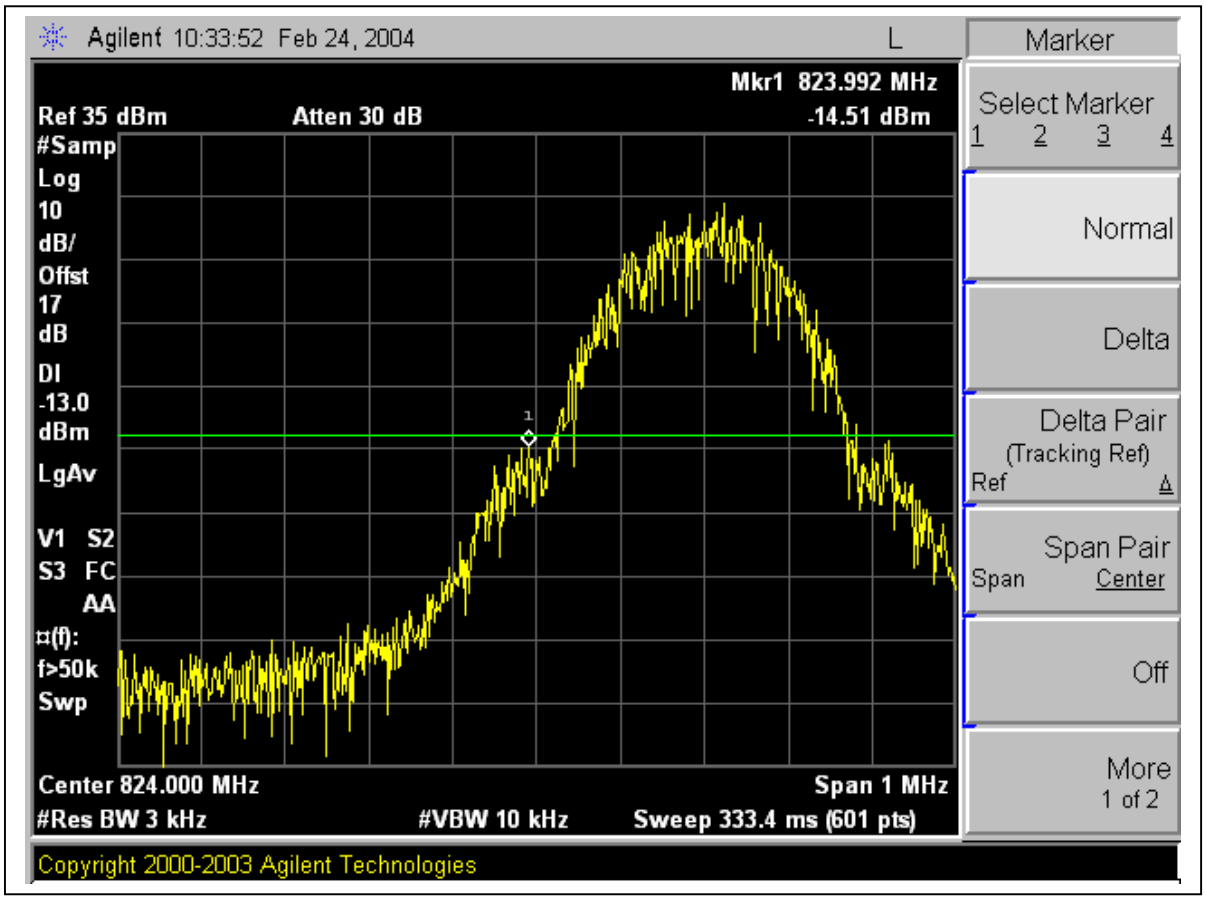
2) For the Out-of-Band measurements a 1 MHz RES BW was used to scan from 15 MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at –13dBm to show compliance for spurious, and harmonics.

3) 22.917(f): Mobile emissions in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed –80dBm at the transmit antenna connector.

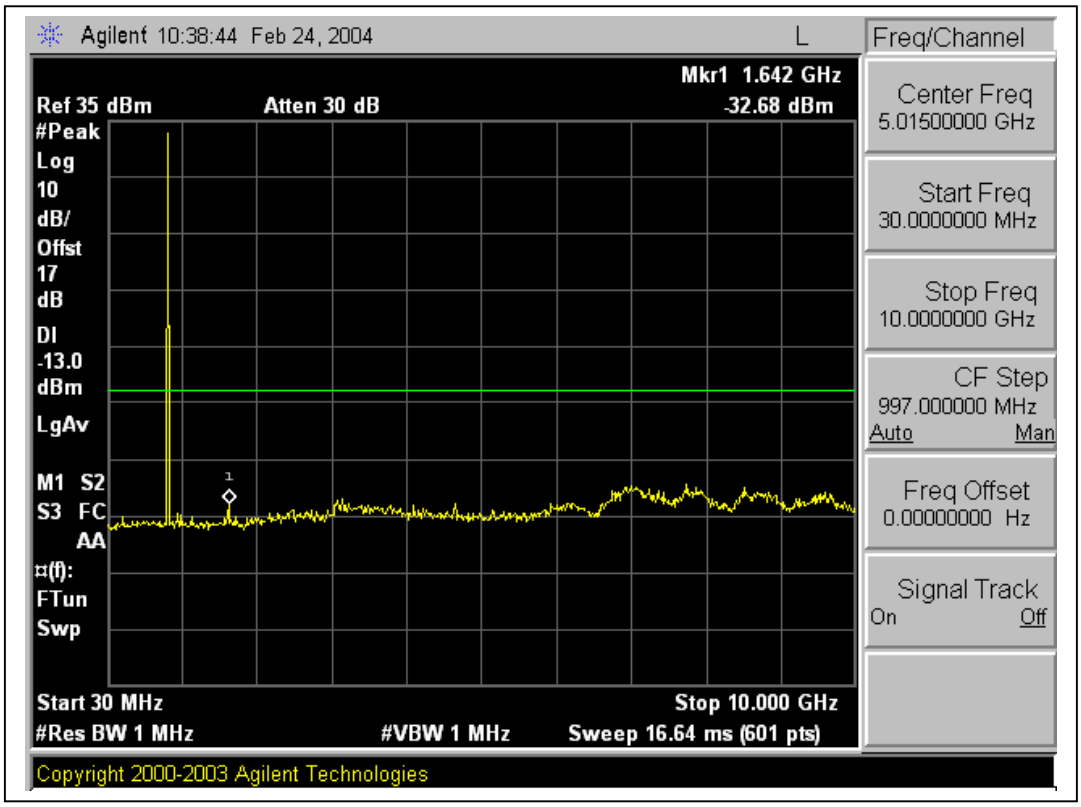
RESULT:

GSM Mode: Low / Mid / High, Band Edge, Out-Of-Band Emissions

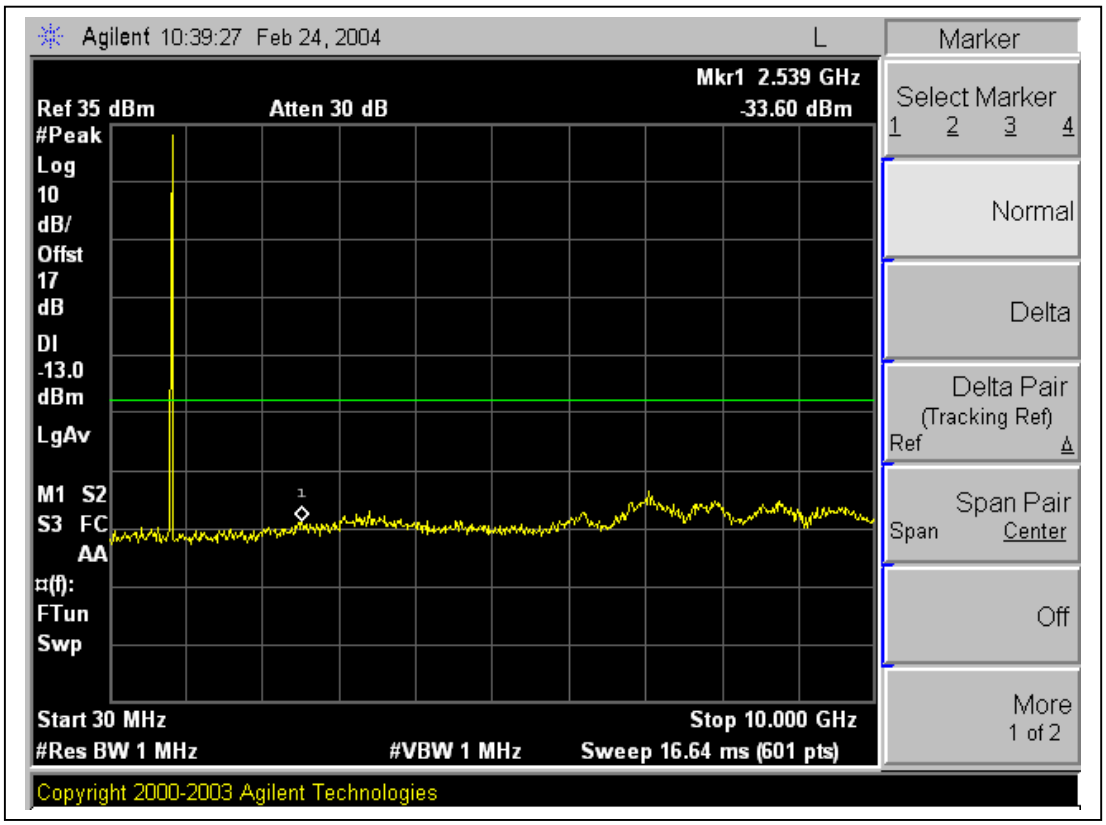
Low Channel, Band edge:



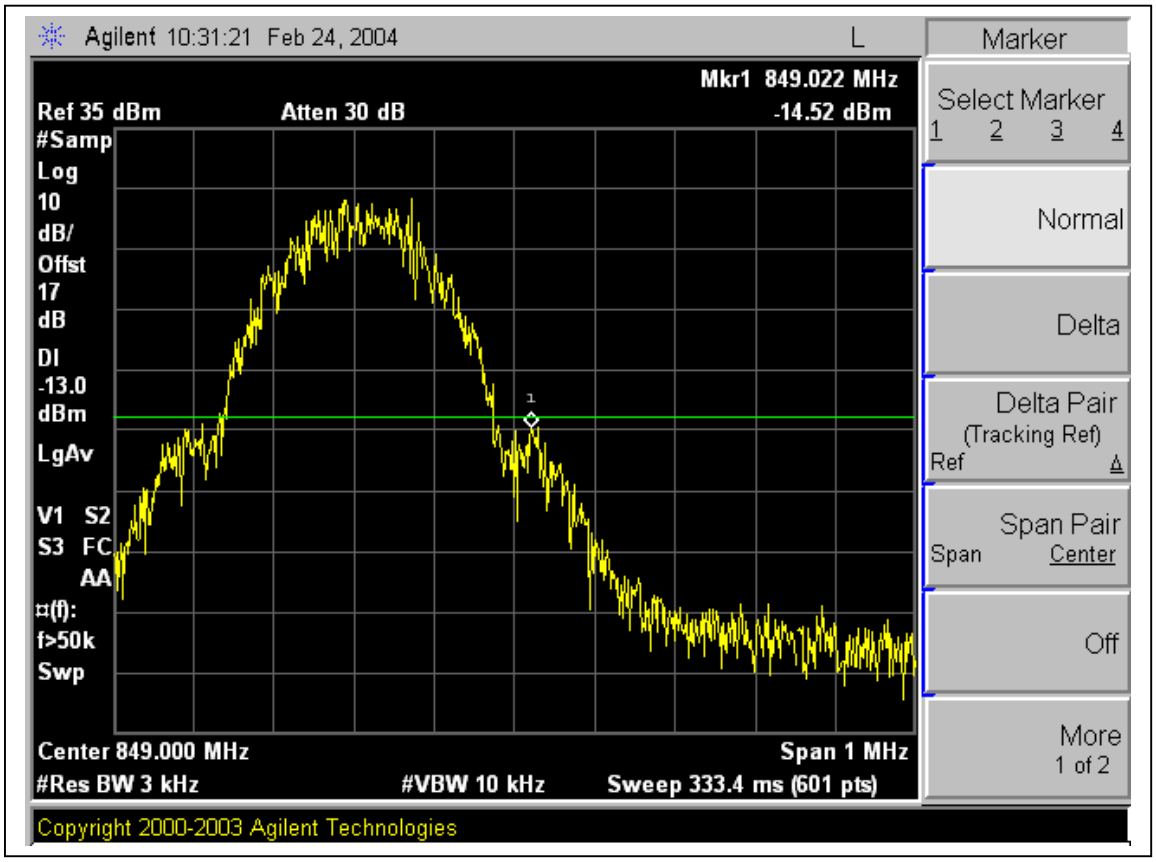
Low Channel, Out-Of-Band Emissions:



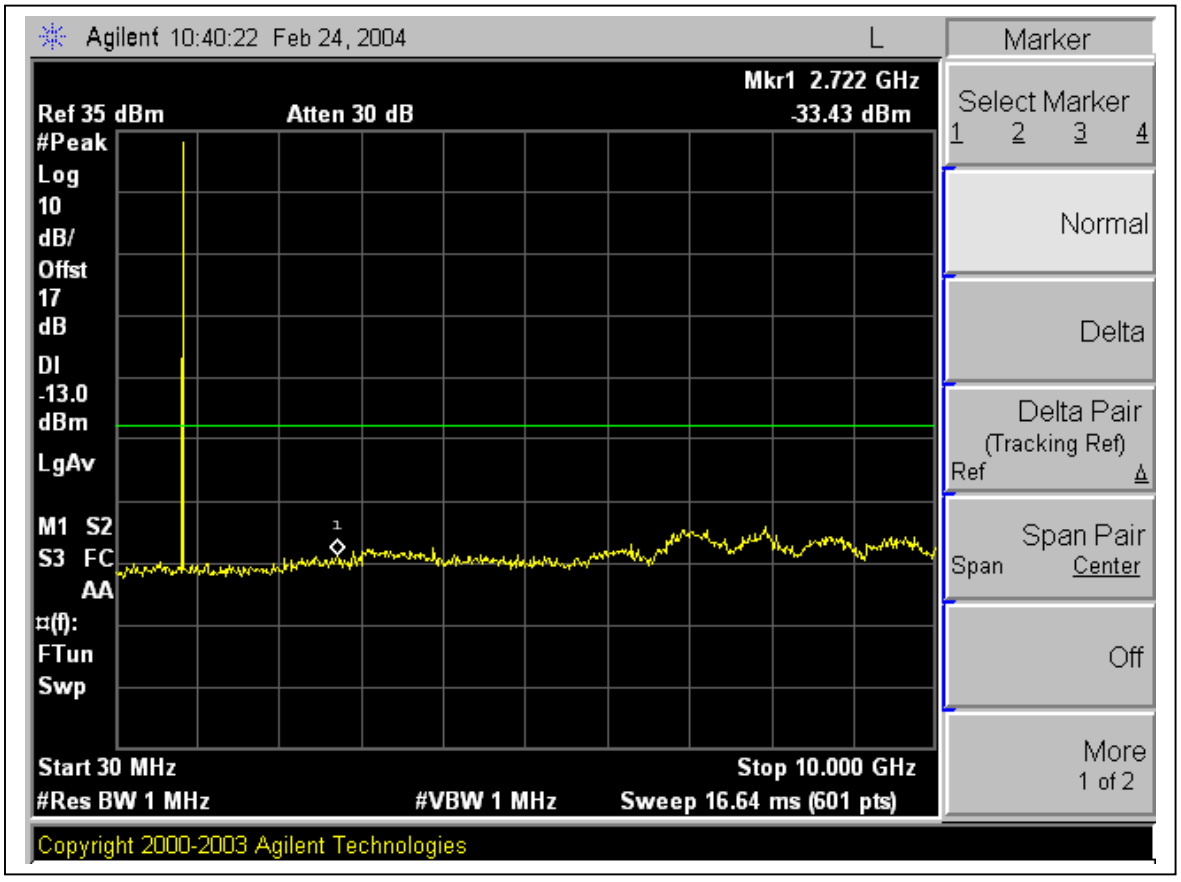
Mid Channel, Out-OF-Band Emissions:



High Channel, Band edge:

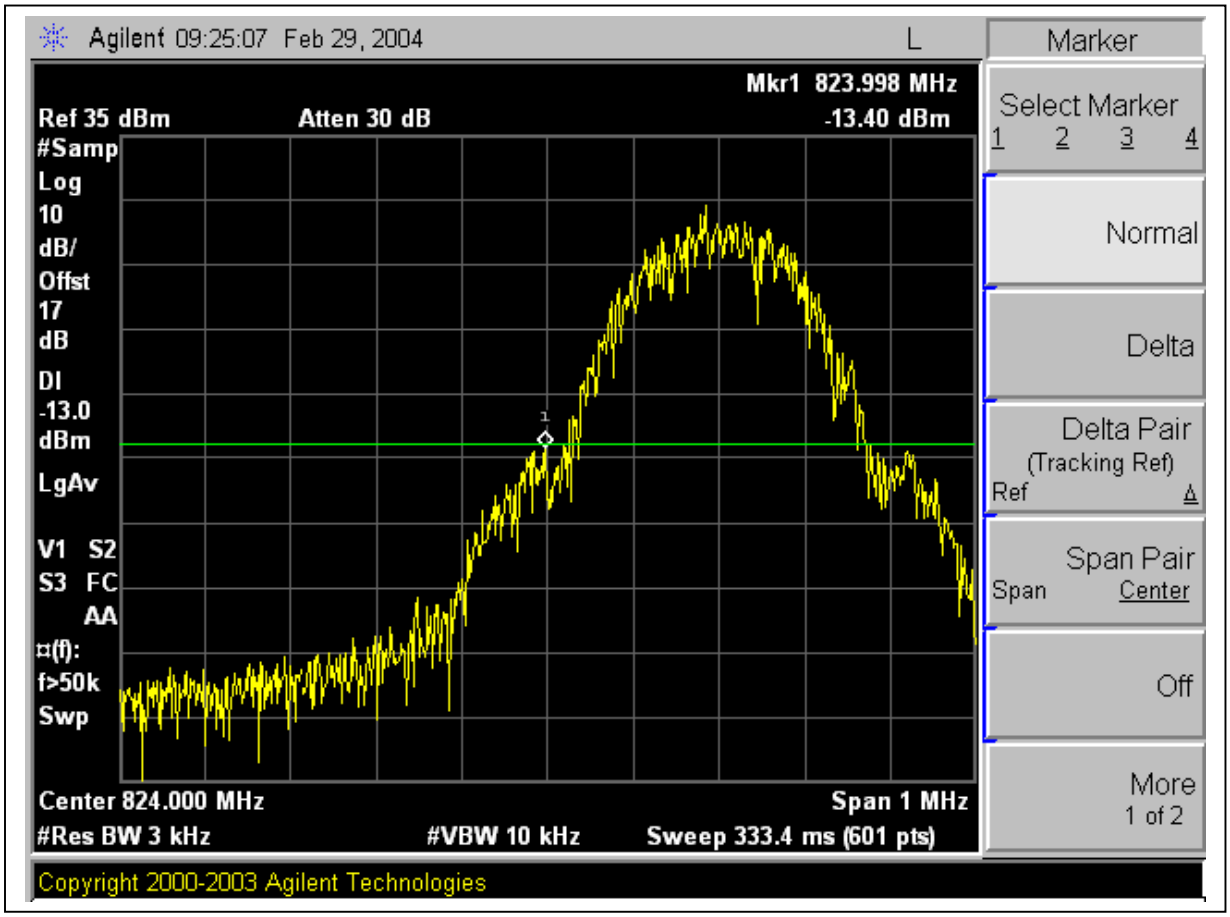


High Channel, Out-OF-Band Emissions:

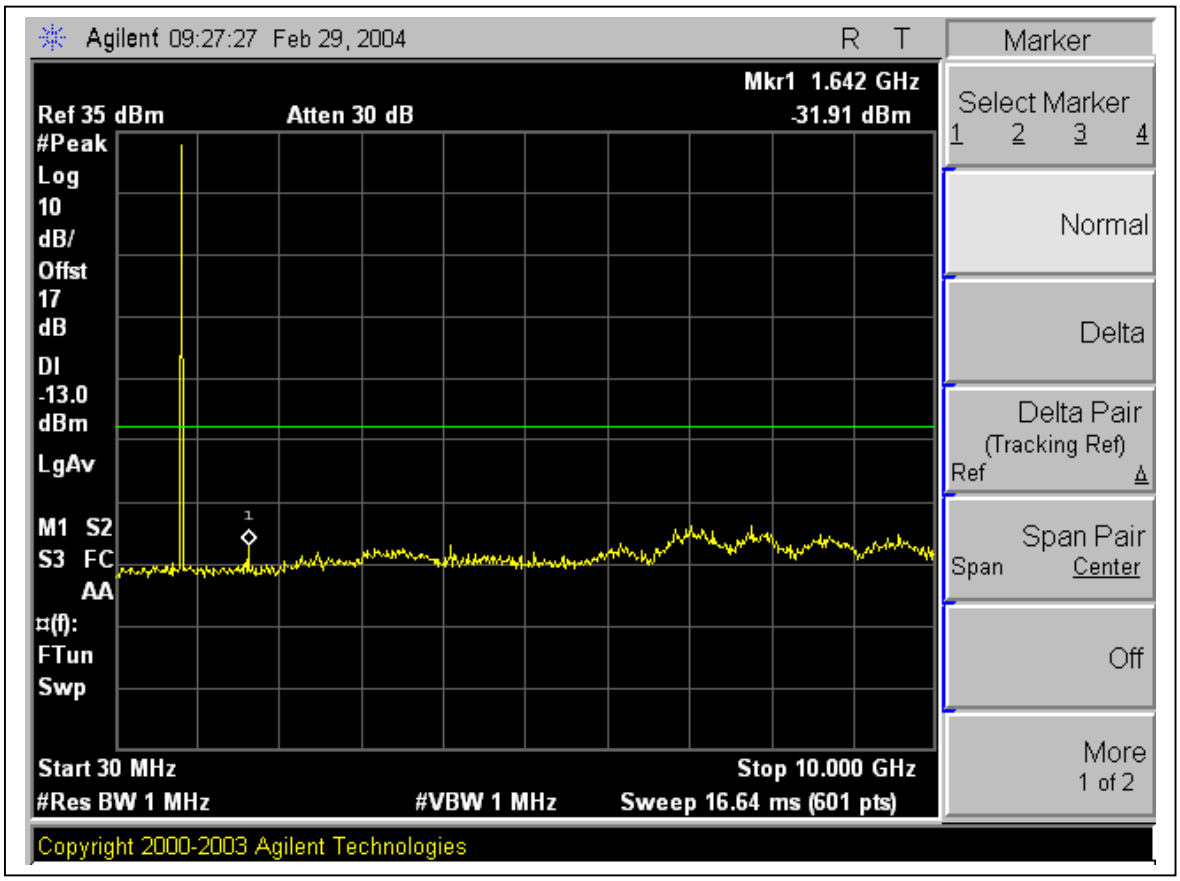


GPRS Class 10: Low / Mid / High, Band Edge, Out-Of-Band Emissions

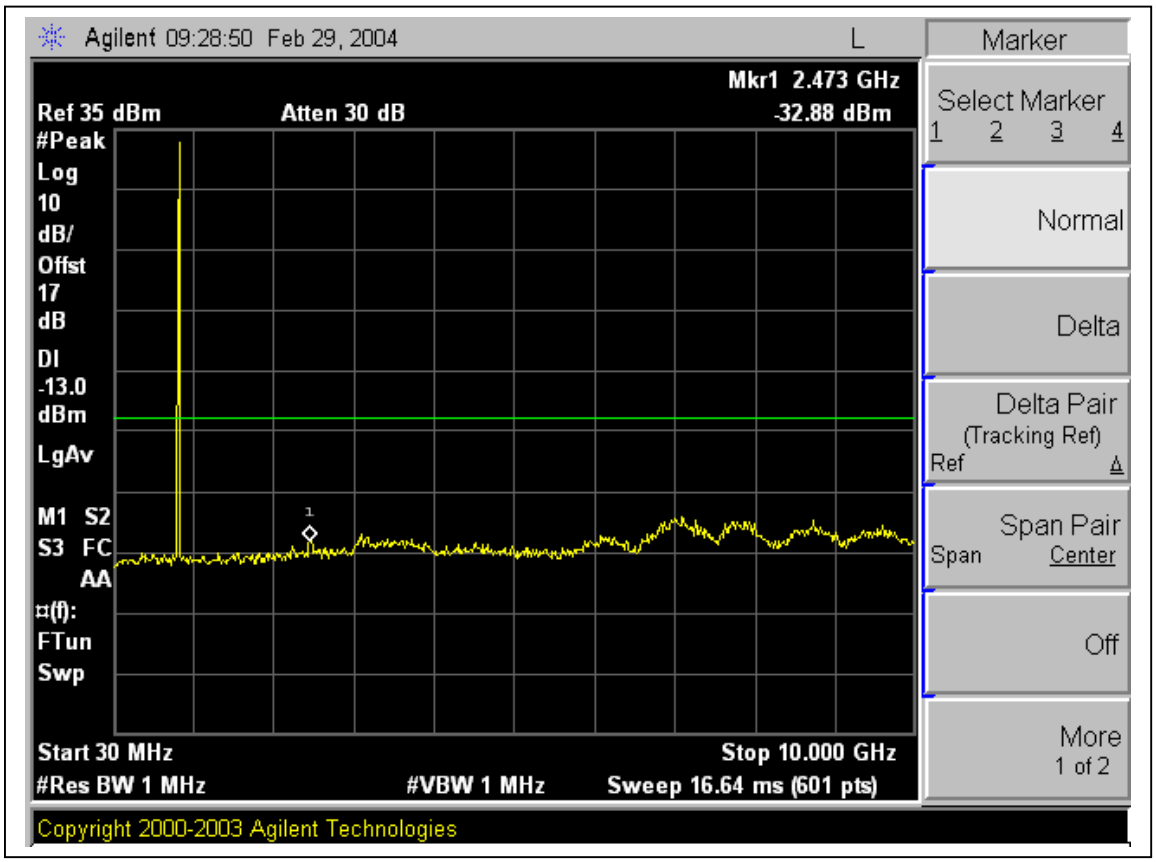
Low Channel, Band edge:



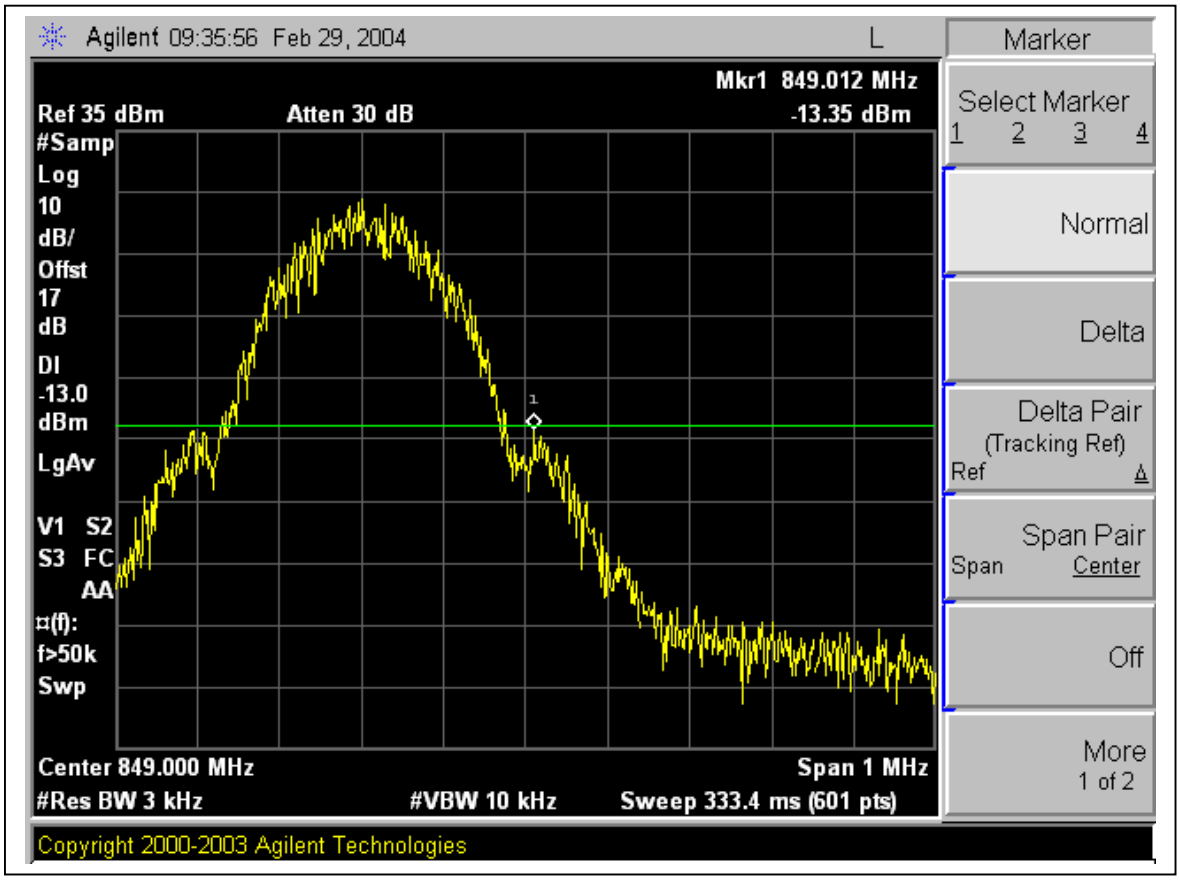
Low Channel, Out-Of-Band Emissions:



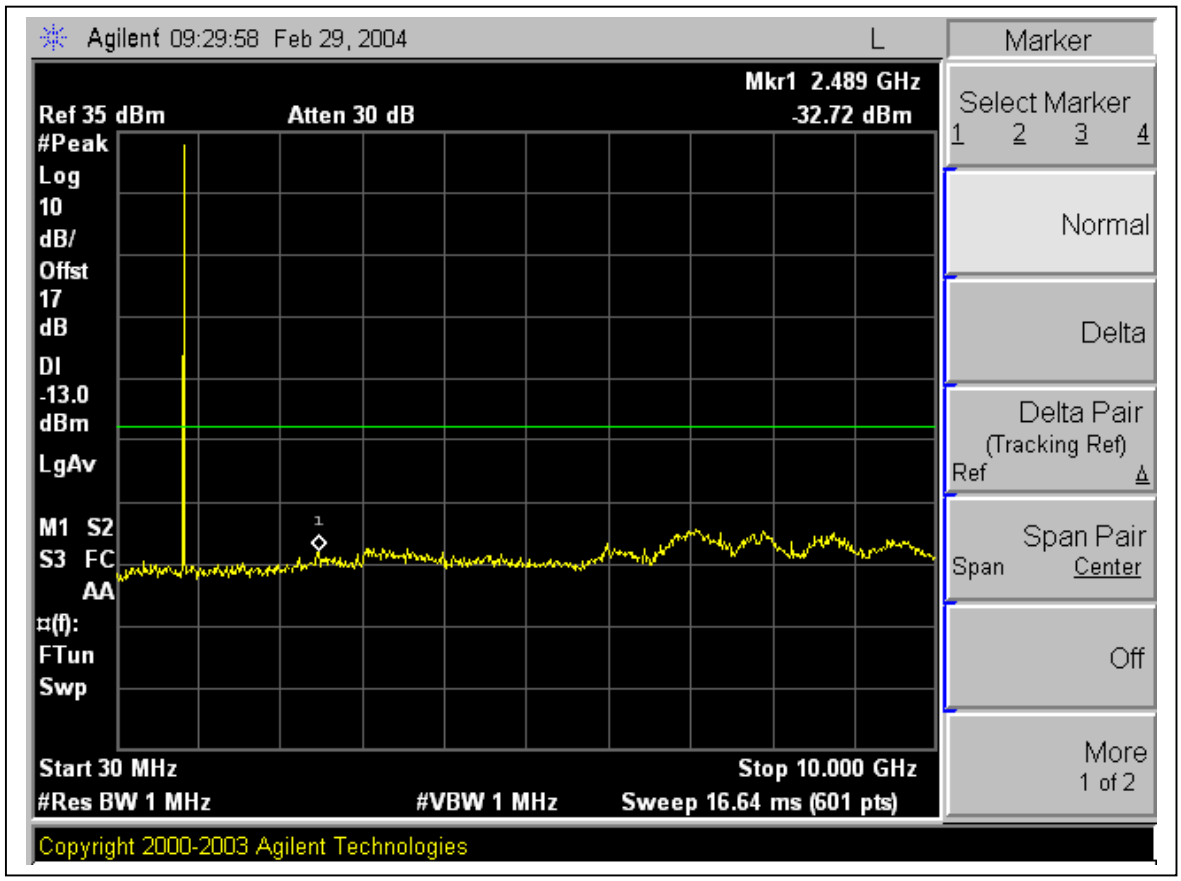
Mid Channel, Out-OF-Band Emissions:



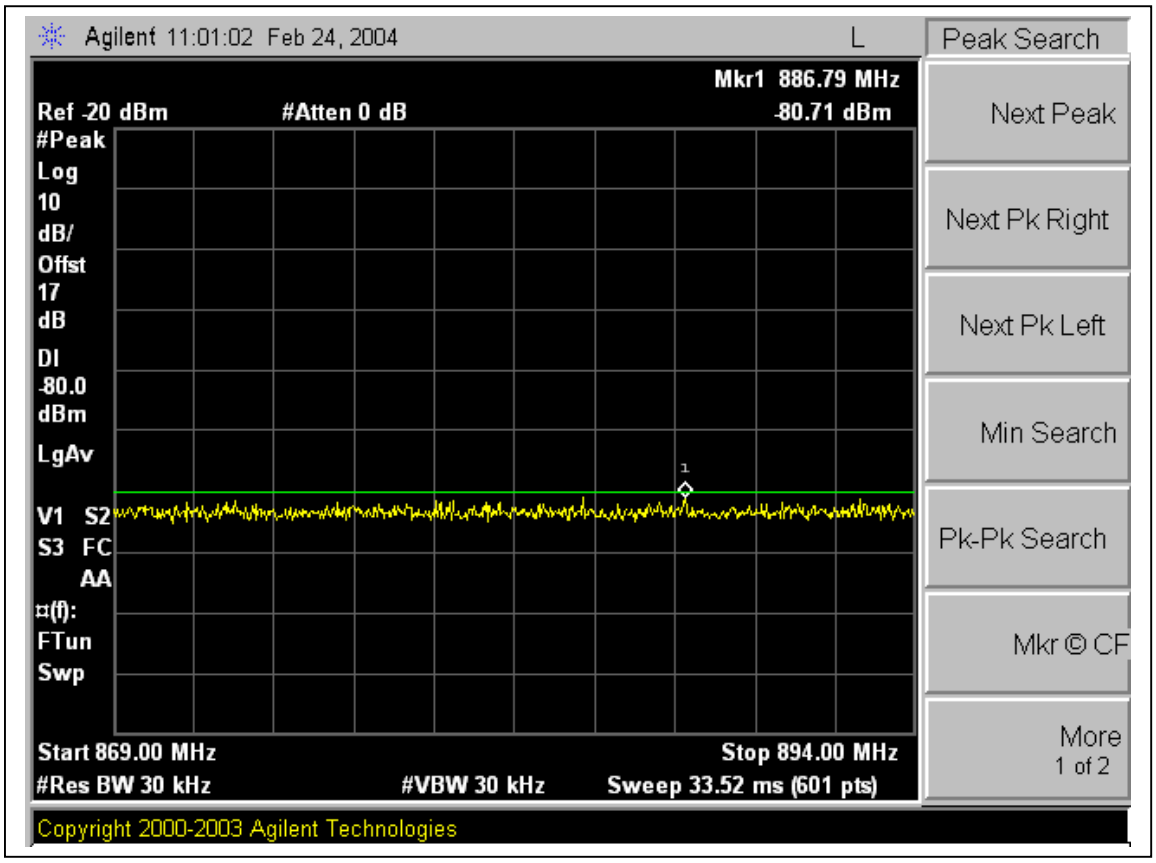
High Channel, Band edge:



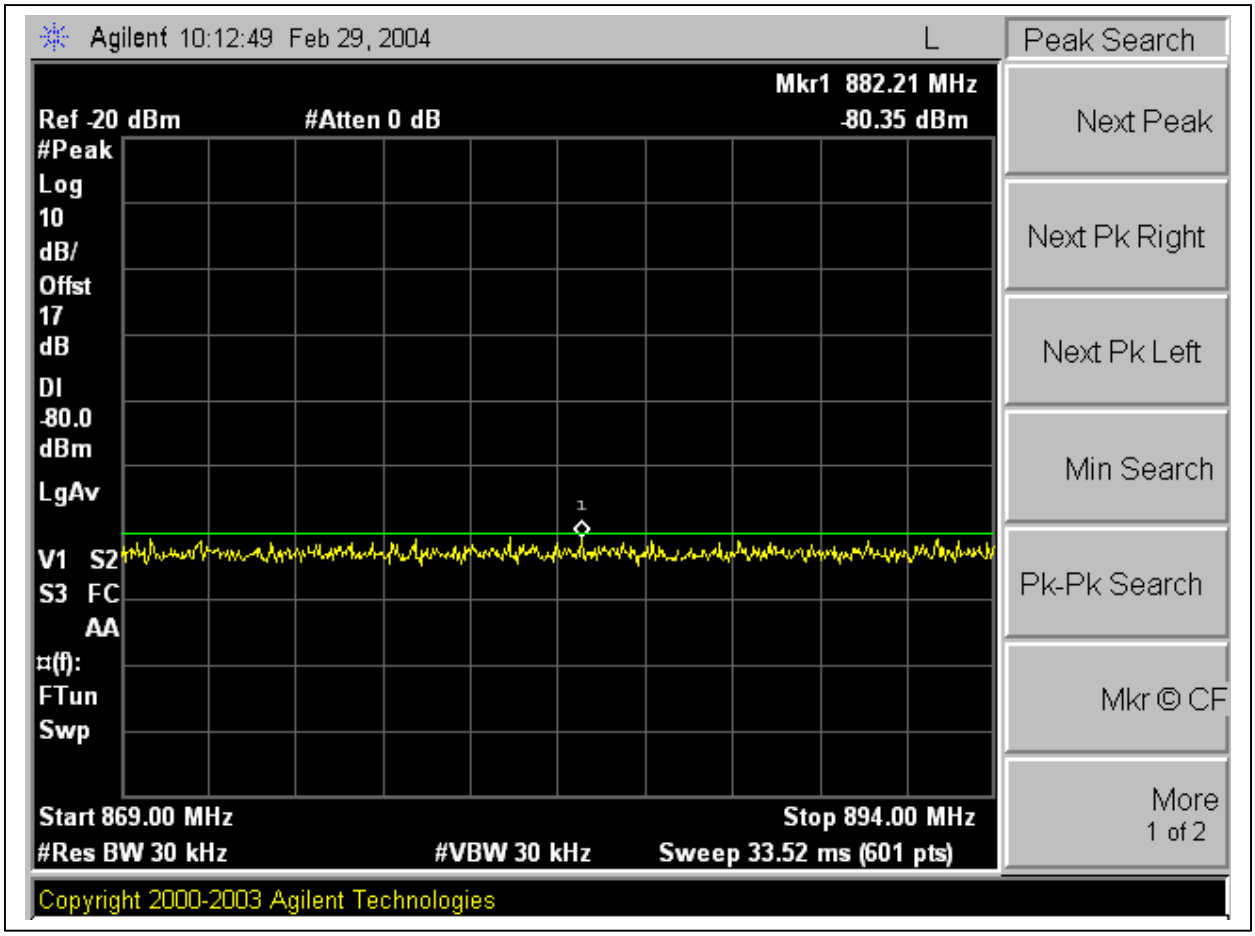
High Channel, Out-OF-Band Emissions:



GSM: Mobile Emissions in Base Frequency Range:



GPRS Class 10: Mobile Emissions in Base Frequency Range:



7.5. SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION

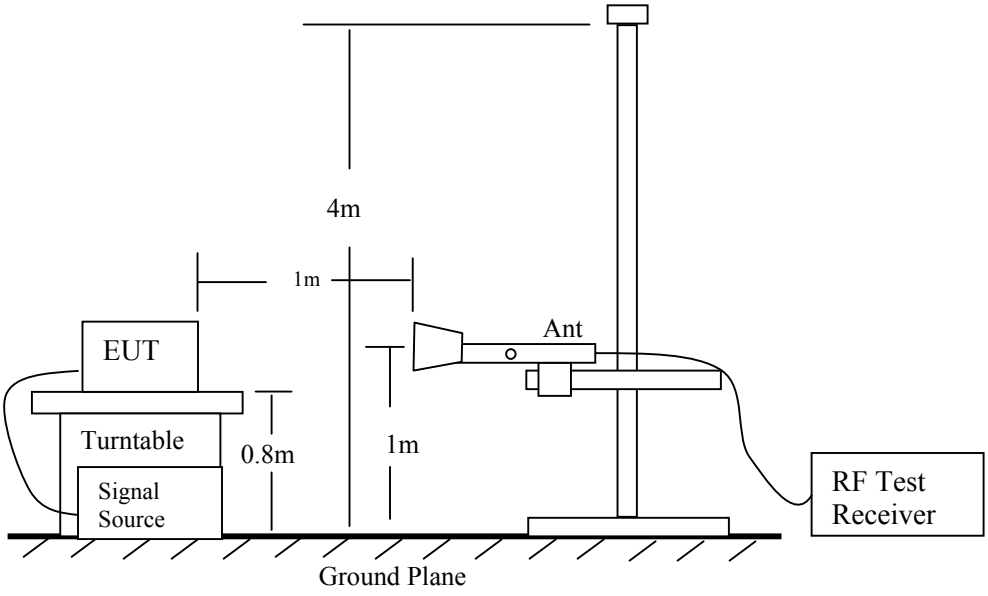
INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Spectrum Analyzer	HP	8593EM	6/11/03
Amplifier	MITEQ	NSP2600-44	4/25/04
Signal Generator, 10 MHz ~ 20 GHz	HP	83732B	4/4/04
Bicon Antenna	Eaton	94455-1	3/6/04
LP Antenna	EMCO	3146	3/6/04
Tune Dipole	Compliance Design	Robert	5/15/04
Tx Horn Antenna	EMCO	3115	2/4/04
Rx Horn Antenna	EMCO	3115	2/4/04
HPF	MICROLAB	FH-1800H	N/A
HPF	MICROLAB	FH-2400H	N/A
50 ohm terminator	SHX	TF-5	N/A

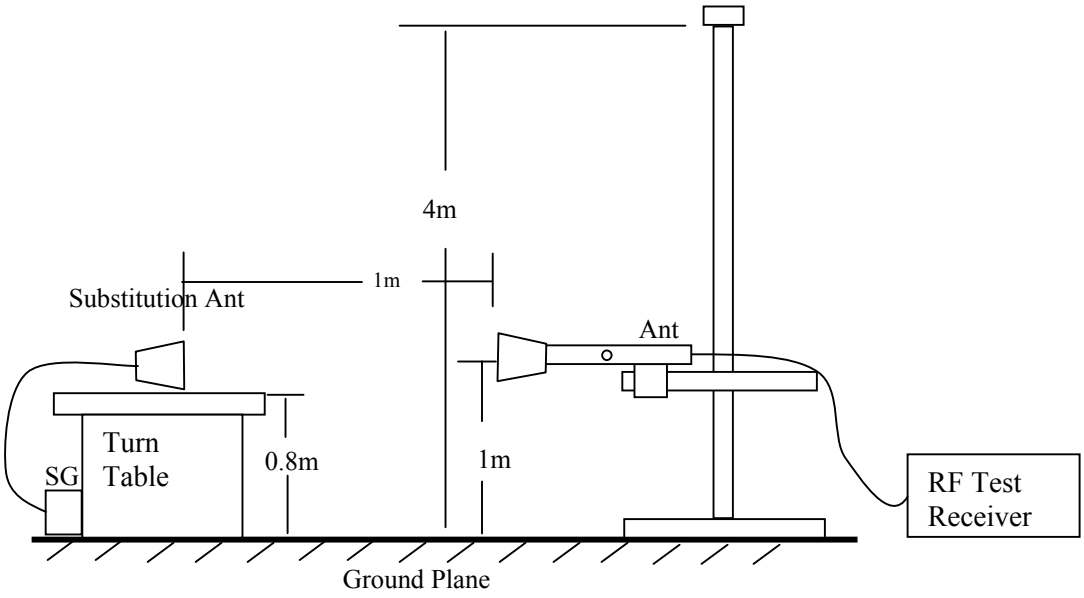
Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak ☐ Average	☒ 1 MHz ☐ 1 MHz	☒ 1 MHz ☐ 10 Hz

TEST SETUP



Radiated Emission Measurement



Radiated Emission – Substitution Method set-up

TEST PROCEDURE

1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
2). The test antenna shall be oriented initially for vertical polarization located 1m from the EUT to correspond to the frequency of the transmitter.
3). The output of the test antenna shall be connected to the measuring receiver and either a peak or average detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
4). The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6). The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8). The maximum signal level detected by the measuring receiver shall be noted.
9). The transmitter shall be replaced by a substitution antenna.
10). The substitution antenna shall be oriented for vertical polarization.
11). The substitution antenna shall be connected to a calibrated signal generator.
12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

RESULT

No non-compliance noted, as shown below

Low, Mid, & High Channels Spurious Harmonic

GSM Mode (EUT @ X Worst Position)

02/23/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:Chin Pang
Project #:04T2541-1
Company:Wistron Neweb Corporation
EUT Descrip.:Tri-Band GSM 850/1800/1900 PDA
EUT M/N:PPC4100
Test Target:FCc Part 22
Mode Oper:Tx, GSM Mode @ X Worst Position

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3n		Agilent E4446A Analyzer		FCC 22

Hi Frequency Cables: (2 ft) (2 ~ 3 ft) (4 ~ 6 ft) (12 ft)

Peak Measurements:
Fundamental: RBW>99% or 26dB Emissions BW, VBW=RBW
Bandedge: RBW=>1% Emissions BW, VBW=> 3*RBW
Spurious: RBW=1MHz, VBW=1MHz

f GHz	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch, 824.4MHz									
1.648	80.2	-35.9	0.7	7.5	5.4	-31.2	-13.0	-18.2	
2.472	66.2	-46.5	0.9	8.6	6.4	-41.0	-13.0	-28.0	
1.648	83.5	-30.7	0.7	7.5	5.4	-26.0	-13.0	-13.0	
2.472	72.0	-39.9	0.9	8.6	6.4	-34.4	-13.0	-21.4	
Mid Ch, 837.2MHz									
1.674	78.9	-35.6	0.7	7.6	5.4	-30.9	-13.0	-17.9	
2.511	64.8	-47.4	0.9	8.6	6.4	-41.8	-13.0	-28.8	
1.674	82.4	-31.4	0.7	7.6	5.4	-26.7	-13.0	-13.7	
2.511	67.5	-40.6	0.9	8.6	6.4	-35.0	-13.0	-22.0	
High Ch, 848.8MHz									
1.697	77.1	-35.1	0.7	7.6	5.5	-30.4	-13.0	-17.4	
2.546	64.7	-45.8	0.9	8.6	6.5	-40.2	-13.0	-27.2	
1.697	82.4	-31.1	0.7	7.6	5.5	-26.4	-13.0	-13.4	
2.546	71.5	-40.3	0.9	8.6	6.5	-34.7	-13.0	-21.7	
No other emissions were detected up to 10GHz									

Low, Mid, & High Channels Harmonic and Spurios

GPRS class 10 (EUT @ X Worst Position)

02/29/04 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:Chin Pang
Project #:04T2541-1
Company:Wistron Neweb Corporation
EUT Descrip.:Tri-Band GSM 850/1800/1900 PDA
EUT M/N:PPC4100
Test Target:FCc Part 22
Mode Oper:Tx, GPRS Class 10 Mode @ X Worst Position

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3n		Agilent E4446A Analyzer		FCC 22

Hi Frequency Cables
☐ (2 ft) ☐ (2 ~ 3 ft) ☑ (4 ~ 6 ft) ☐ (12 ft)

Peak Measurements:
Fundamental: RBW>99% or 26dB Emissions BW, VBW=RBW
Bandedge: RBW=>1% Emissions BW, VBW=> 3*RBW
Spurious: RBW=1MHz, VBW=1MHz

f GHz	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch, 824.4MHz									
1.648	80.2	-34.7	0.7	7.5	5.4	-30.0	-13.0	-17.0	
2.472	66.2	-46.3	0.9	8.6	6.4	-40.8	-13.0	-27.8	
1.648	83.5	-31.4	0.7	7.5	5.4	-26.7	-13.0	-13.7	
2.472	72.0	-40.5	0.9	8.6	6.4	-35.0	-13.0	-22.0	
Mid Ch, 837.2MHz									
1.674	78.9	-35.9	0.7	7.6	5.4	-31.2	-13.0	-18.2	
2.511	64.8	-47.6	0.9	8.6	6.4	-42.0	-13.0	-29.0	
1.674	82.4	-32.4	0.7	7.6	5.4	-27.7	-13.0	-14.7	
2.511	67.5	-44.9	0.9	8.6	6.4	-39.3	-13.0	-26.3	
High Ch, 848.8MHz									
1.697	77.1	-37.6	0.7	7.6	5.5	-32.9	-13.0	-19.9	
2.546	64.7	-47.6	0.9	8.6	6.5	-42.0	-13.0	-29.0	
1.697	82.4	-32.3	0.7	7.6	5.5	-27.6	-13.0	-14.6	
2.546	71.5	-40.8	0.9	8.6	6.5	-35.2	-13.0	-22.2	
No other emissions were detected up to 10GHz									

7.6. SECTION 2.1055: FREQUENCY STABILITY

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Communication Tester	R & S	CMU 200	12/1/2004
Auto Transformer	Variac	W8MT3VM	NCR
Power Supply	HP	Kenwood	NCR
Environmental Chamber	Thermotron	SE 600-10-10	4/26/04

TEST SETUP

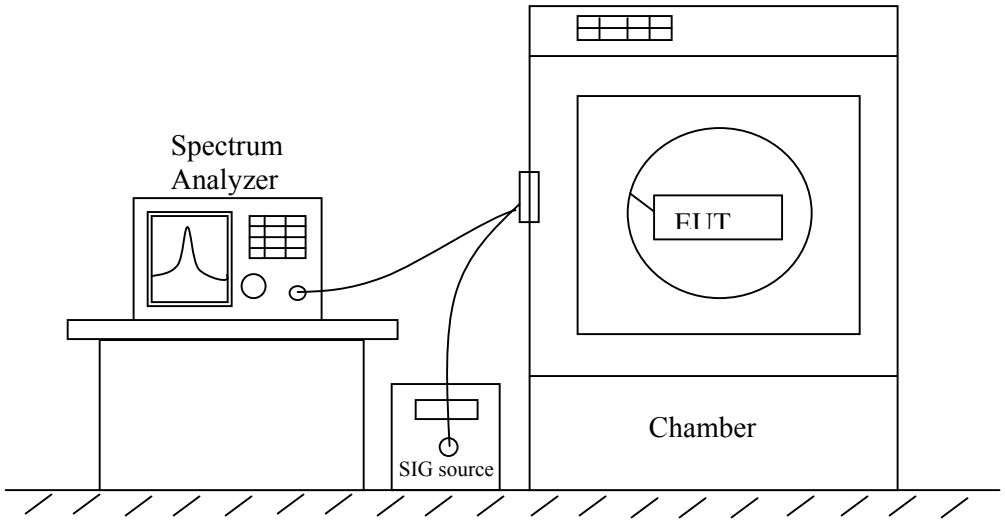
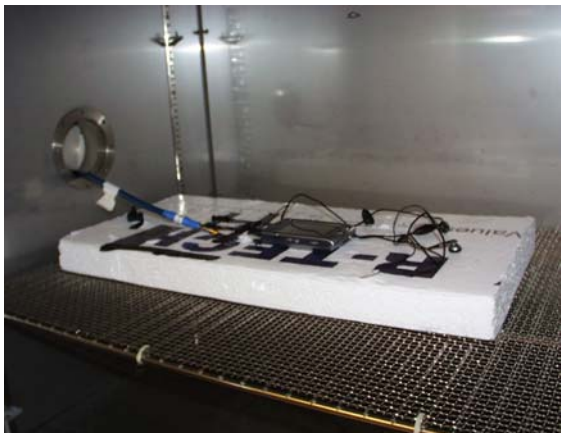


Fig. 3: Frequency Stability Setup

PHOTO SETUP



TEST PROCEDURE

- **Frequency stability versus environmental temperature**

1). Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 25°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
2). Turn EUT off and set Chamber temperature to -30°C.
3). Allow sufficient time (approximately 20 to 30 minus after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

- **Frequency stability versus AC input voltage**

1). Setup the configuration per figure 6 and set chamber temperature to 25°C. Use a variable AC power supply to power the EUT and set AC output voltage to EUT nominal input AC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
2). Slowly reduce the EUT input voltage to specified extreme voltage variation (±15%) and record the maximum frequency change.

RESULT

No non-compliance noted, as shown below because the EUT uses the same OSC in both receiver and transmitter LO circuit. As a result, the frequency does not shift in Frequency Stability Test.

Reference Frequency: GSM Mid Channel 837.20000MHz @ 25?C Limit: to stay ± 2.5 ppm = 2093.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vdc)	**Temperature (?C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
4.20	50	837.20002100	-0.025	± 2.5
4.20	40	837.20002000	-0.024	± 2.5
4.20	30	837.20001800	-0.022	± 2.5
4.20	***25***	***837.20000000***	***0***	***± 2.5***
4.20	20	837.20001400	-0.017	± 2.5
4.20	10	837.20001500	-0.018	± 2.5
4.20	0	837.20001800	-0.022	± 2.5
4.20	-10	837.19998400	0.019	± 2.5
4.20	-20	837.20001700	-0.020	± 2.5
4.20	-30	837.20002000	-0.024	± 2.5

Reference Frequency: GSM Mid Channel 837.20000MHz @ 25?C Limit: to stay ± 2.5 ppm = 2093.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vdc)	**Temperature (?C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
4.20	***25***	***837.20000000***	***0***	***± 2.5***
3.85 (end point)	25	837.19998900	*0.013*	± 2.5
3.85	25	837.19998900	*0.013*	± 2.5
4.83	25	837.20001300	*-0.016*	± 2.5

Reference Frequency: GSM Mid Channel 837.20000MHz @ 25?C Limit: to stay ± 2.5 ppm = 2093.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vac)	**Temperature (?C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
120.00	***25***	***837.20000000***	***0***	***± 2.5***
102	25	837.20002	*-0.024*	± 2.5
138	25	837.20002	*-0.019*	± 2.5

8. APENDIX

8.1. EXTERNAL & INTERNAL PHOTOS

Please Refer to attach Sheets.

8.2. SCHEMATICS

Please refer to attached sheets.

8.3. BLOCK DIAGRAM

Please refer to attached sheets.

8.4. USER MANUAL

Please refer to attached sheets.

END OF REPORT