

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E

OF

Product Name: Assets GPS Tracker

Brand Name: SAPLING

Model No.: V120

Model Differences: N/A

FCC ID: XKVV120

Report No.: EH/2011/A0034

Issue Date: Jan. 11, 2012

FCC Rule Part: 2, 22H & 24E

Prepared for: ADVANCE VISION ELECTRONICS CO., LTD.
6F., No. 199, Lide St., Jhonghe City, Taipei
County, Taiwan, R.O.C.

Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No. 134, Wu Kung Rd., Wuku Industrial Zone,
Taipei County, Taiwan.

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VERIFICATION OF COMPLIANCE

Applicant: ADVANCE VISION ELECTRONICS CO., LTD.
6F., No. 199, Lide St., Jhonghe City, Taipei County, Taiwan, R.O.C.

Product Name: Assets GPS Tracker

Brand Name: SAPLING

Model No.: V120

Model Different: N/A

FCC ID: XKVV120

File Number: EH/2011/A0034

Date of test: Oct. 28, 2011 ~ Jan. 10, 2012

Date of EUT Received: Oct. 28, 2011

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 subpart H, PART 24 subpart E.

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

Test By:**Date:**

Jan. 11, 2012

Lion Wang / Engineer**Prepared By:****Date:**

Jan. 11, 2012

Celine Chou / Clerk**Approved By:****Date:**

Jan. 11, 2012

Jim Chang / Supervisor

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Version

Version No.	Date	Description
00	Jan. 11, 2012	Initial creation of document

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Table of Contents

1. GENERAL PRODUCT INFORMATION	6
1.1. Related Submittal(s) / Grant (s)	7
1.2. Test Methodology	7
1.3. Test Facility.....	7
1.4. Special Accessories.....	7
1.5. Equipment Modifications.....	7
2. SYSTEM TEST CONFIGURATION	8
2.1. EUT Configuration	8
2.2. EUT Exercise	8
2.3. Test Procedure.....	8
2.4. Measurement Equipment Used:.....	9
2.5. Configuration of Tested System.....	11
3. SUMMARY OF TEST RESULTS	12
4. DESCRIPTION OF TEST MODES	13
5. MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION	13
6. RF POWER OUTPUT MEASUREMENT	14
6.1. Standard Applicable:	14
6.2. Test Set-up:	15
6.3. Measurement Procedure:	15
6.4. Measurement Equipment Used:.....	15
6.5. Measurement Result:	16
7. ERP, EIRP MEASUREMENT	21
7.1. Standard Applicable:	21
7.2. Test SET-UP (Block Diagram of Configuration):.....	21
7.3. Measurement Procedure:	23
7.4. Measurement Equipment Used:.....	23
7.5. Measurement Result:	24
8. 99% OCCUPIED BANDWIDTH MEASUREMENT.....	25
8.1. Standard Applicable:	25
8.2. Test Set-up:	25
8.3. Measurement Procedure:	25
8.4. Measurement Equipment Used:.....	25
8.5. Measurement Result:	26

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9. OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	30
9.1. Standard Applicable:	30
9.2. Test SET-UP:.....	30
9.3. Measurement Procedure:	31
9.4. Measurement Equipment Used:	31
9.5. Measurement Result:	32
10. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT (TX).....	40
10.1. Standard Applicable:	40
10.2. EUT Setup (Block Diagram of Configuration):.....	40
10.3. Measurement Procedure:	41
10.4. Measurement Equipment Used:	41
10.5. Measurement Result:	41
11. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT	54
11.1. Standard Applicable:	54
11.2. Test Set-up:	54
11.3. Measurement Procedure:	54
11.4. Measurement Equipment Used:	54
11.5. Measurement Result:	55
12. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT	56
12.1. Standard Applicable:	56
12.2. Test Set-up:	56
12.3. Measurement Procedure:	56
12.4. Measurement Equipment Used:	56
12.5. Measurement Result:	57

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1. GENERAL PRODUCT INFORMATION

General:

Product Name:	Assets GPS Tracker	
Brand Name:	SAPLING	
Model No.:	V120	
Model Difference:	N/A	
Power Supply:	3.7Vdc Li-ion battery or 12/24Vdc by Power Adapter Battery: Model No.: BP1513C000AA, Supplier: Win-Win Tech Adapter: Model No.: DSC-6PFA-12 FUS 120050, Supplier: DVE	

GPRS:

Cellular Phone Standards Frequency Range and Power:	Operating Frequency		Rated Power
	GPRS 850, Class 10		33 dBm
	GPRS 1900, Class 10		30 dBm
Type of Emission:	GPRS850: 251KGXW, GPRS1900: 244KGXW		
Hardware Version:	V1.0		
Software Version:	V1.0		
IMEI:	35869604159579706		

Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
GPRS 850	3.7 Vdc	300
GPRS 1900	3.7 Vdc	320

This test report applies for GPRS 850/1900.

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1.1. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **XKVV120** filing to comply with Section Part 22 subpart H, Part 24 subpart E of the FCC CFR 47 Rules.

1.2. Test Methodology

Both conducted and radiated testing were performed according to the procedures document of TIA/EIA 603C and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

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

1.3. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 & 10 meters) and FCC Registration Number: 94644.

All equipment is calibrated externally and traceable to SI (International System of Unit).

1.4. Special Accessories

Not available for this EUT intended for grant.

1.5. Equipment Modifications

Not available for this EUT intended for grant.

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2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

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

2.2. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port:

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

2.3.2 Radiated Emissions (ERP/EIRP):

According to measurement procured TIA/EIA 603C and RSS-Gen, The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13 of ANSI C63.4:2003.

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2.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	US41160416	01/25/2011	01/24/2012
Radio Communication Analyzer	R&S	CMU200	111787	12/07/2011	12/06/2013
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2012	01/04/2013
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2012	01/04/2013
Temperature Chamber	TERCHY	MHG-120LF	911009	04/30/2010	04/29/2012
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/24/2010	02/23/2012
DC Block	Agilent	BLK-18	155452	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S20W5	N/A	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S10W5	N/A	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S6W5	N/A	01/05/2012	01/04/2013
Splitter	Agilent	11636B	N/A	01/05/2012	01/04/2013
DC Power Supply	Chroma	41901	777188	04/15/2010	04/14/2012

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966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	03/30/2011	03/29/2012
Bilog Antenna	SCHWAZBECK	VULB9160	3136	11/19/2011	11/18/2013
Dipole Antenna	SCHWAZBECK	VHAP	908/909	07/17/2010	07/16/2012
Dipole Antenna	SCHWAZBECK	UHAP	891/892	07/17/2010	07/16/2012
Horn antenna	ETS.LINDGREN	3117	123995	03/19/2011	03/18/2013
Signal Generator	R&S	SMR40	100210	02/10/2010	02/09/2012
Signal Generator	Agilent	E4438C	MY45093613	07/08/2011	07/07/2013
Pre-Amplifier	Agilent	8447D	1937A02834	01/05/2012	01/04/2013
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2012	01/04/2013
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2012	01/04/2013
Radio Communication Analyzer	R&S	CMU200	111787	12/07/2011	12/06/2013
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2012	01/04/2013
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2012	01/04/2013
Filter 800-1000	Micro-Tronics	BRM13462	1	01/05/2012	01/04/2013
Filter 1800-2000	Micro-Tronics	BRM13463	1	01/05/2012	01/04/2013
3m Site	SGS	966 chamber	N/A	07/15/2011	07/14/2012

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2.5. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

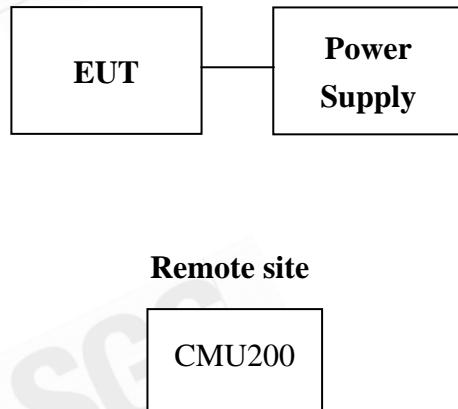


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model / Type No.	Series No.
1.	Power Supply	HP	E3640A	KR93300208
2.	Universal Radio Communication Tester	R&S	CMU200	102189

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a)	RF Power Output	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c)	ERP/ EIRP measurement	Compliant
§2.1049(h)	99% Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a)	Out of Band Emissions at Antenna Terminals and Band Edge	Compliant
§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	Compliant
§2.1055(a)(1) §22.355 §24.235	Frequency Stability vs. Temperature	Compliant
§2.1055(d)(2) §22.355 §24.235	Frequency Stability vs. Voltage	Compliant

Max ERP/EIRP measurement result:

	dBm	dB	W
GPRS 850 Band	23.04	ERP	0.201
GPRS 1900 Band	18.71	EIRP	0.074

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4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

EUT was staying in continuous transmitting mode. Channel Low, Mid and High for each band with rated data rate were chosen for full testing.

5. MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION

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

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

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6. RF POWER OUTPUT MEASUREMENT

6.1. Standard Applicable:

According to FCC §2.1046.

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

FCC 24.232(C) Peak Power Measurement to 2W.

3GPP Power limitation for HSDPA and HSUPA

Maximum Output Powers for HSDPA

Sub-test in table C.10.1.4	Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
1	+24	+1.7/-3.7	+21	+2.7/-2.7
2	+24	+1.7/-3.7	+21	+2.7/-2.7
3	+23.5	+2.2/-3.7	+20.5	+3.2/-2.7
4	+23.5	+2.2/-3.7	+20.5	+3.2/-2.7

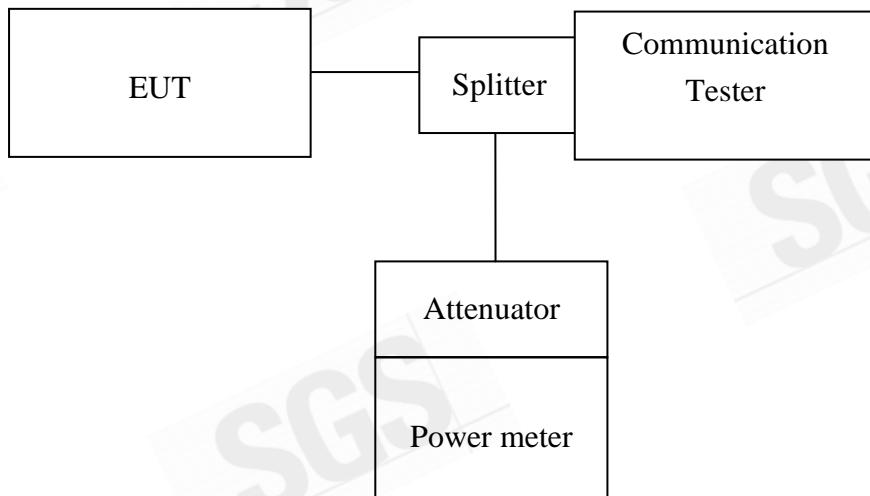
Maximum Output Powers for HSUPA

Sub-test in table C.11.1.3	Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
1	+24	+1.7/-6.7	+21	+2.7/-5.7
2	+22	+3.7/-5.2	+19	+4.7/-4.2
3	+23	+2.7/-5.2	+20	+3.7/-4.2
4	+22	+3.7/-5.2	+19	+4.7/-4.2
5	+24	+1.7/-6.7	+21	+2.7/-5.7

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6.2. Test Set-up:



Note: Measurement setup for testing on Antenna connector

6.3. Measurement Procedure:

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. The Procedure of KDB941225 KDB941125 (SAR Measurement Procedures for 3G devices, WCDMA/HSDPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing

6.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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6.5. Measurement Result:**6.5.1. RF Conducted Output Power****5.5.1.1.: GPRS (GMSK)****Result:**

EUT Mode	Frequency (MHz)	CH	Peak Power (1DN 1UP) (dBm)	Avg. Power (1DN 1UP) (dBm)	Peak Power (1DN 2UP) (dBm)	Avg. Power (1DN 2UP) (dBm)
GPRS 850 (Class 10)	824.2	128	32.10	31.90	30.50	30.20
	836.6	190	31.70	31.50	30.10	30.00
	848.8	251	31.20	31.10	29.20	29.00

EUT Mode	Frequency (MHz)	CH	Peak Power (1DN 1UP) (dBm)	Avg. Power (1DN 1UP) (dBm)	Peak Power (1DN 2UP) (dBm)	Avg. Power (1DN 2UP) (dBm)
GPRS 1900 (Class 10)	1850.2	512	29.60	29.50	28.10	27.90
	1880.0	661	29.30	29.20	27.70	27.60
	1909.8	810	29.00	28.90	27.40	27.30

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5.5.1.2.: WCDMA mode

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

Results:

N/A, because the EUT does not supports 3G function.

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5.5.1.3.:HSDPA Release 6 mode

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

HSDPA SUB-TEST Setting

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

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

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

Results:

N/A, because the EUT does not supports 3G function.

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5.5.1.4: HSPA (HSDPA & HSUPA) Release 6 mode

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

HSPA SUB-TEST Setting

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (Codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI	RMC (Kbps)
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75	12.2
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67	12.2
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92	12.2
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71	12.2
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81	12.2

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

Results:

N/A, because the EUT does not supports 3G function.

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5.5.2. Minimum Communications Power Measurement

PCS 1900 band

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	29.6	28.1	26.2	24.1	22.5	20.4	18.0	15.9	13.6
PCL	9	10	11	12	13	14	15	16	17
Output power (dBm)	11.5	9.4	8.2	6.1	4.0	2.8	1.1		

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

WCDMA/HSDPA band II

The EUT output power was controlled by simulator. Set Communication Tester CMU200 function key “UE Power Control” and enter max rated power 24dBm. The EUT is going to be set to max output power to 24dBm. then record the read(see page 19 for measurement data) . The min. power was measures by a function key “minimum power” then record the read. It is -52.5dBm. The power variation can be 0.1dB step by setting.

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7. ERP, EIRP MEASUREMENT

7.1. Standard Applicable:

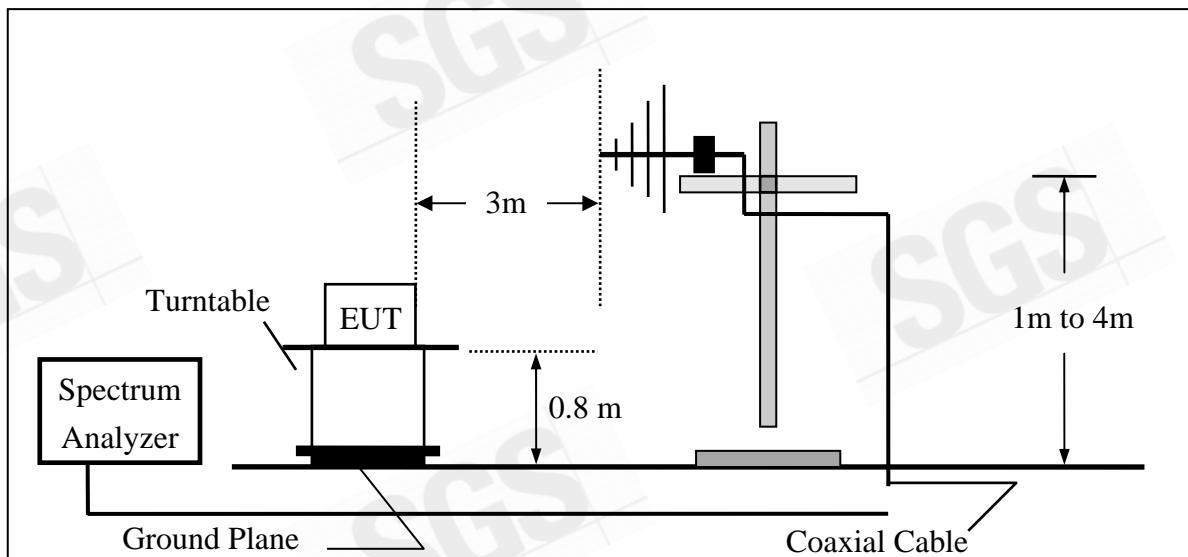
According to FCC §2.1046

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

FCC 24.232(c) Mobile station are limited to 2W EIRP.

7.2. Test SET-UP (Block Diagram of Configuration):

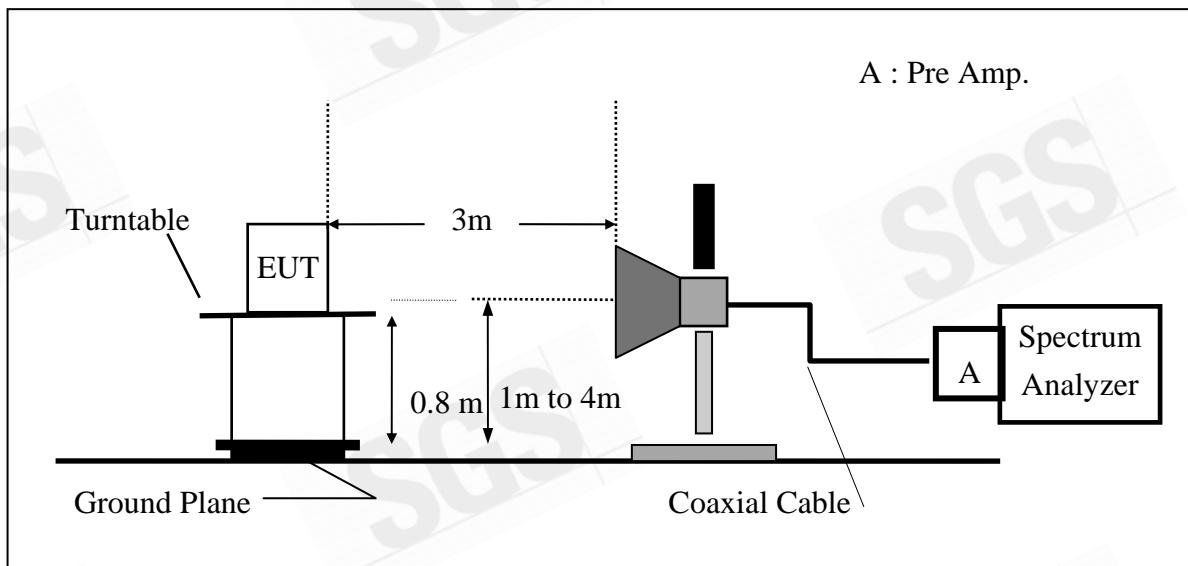
(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



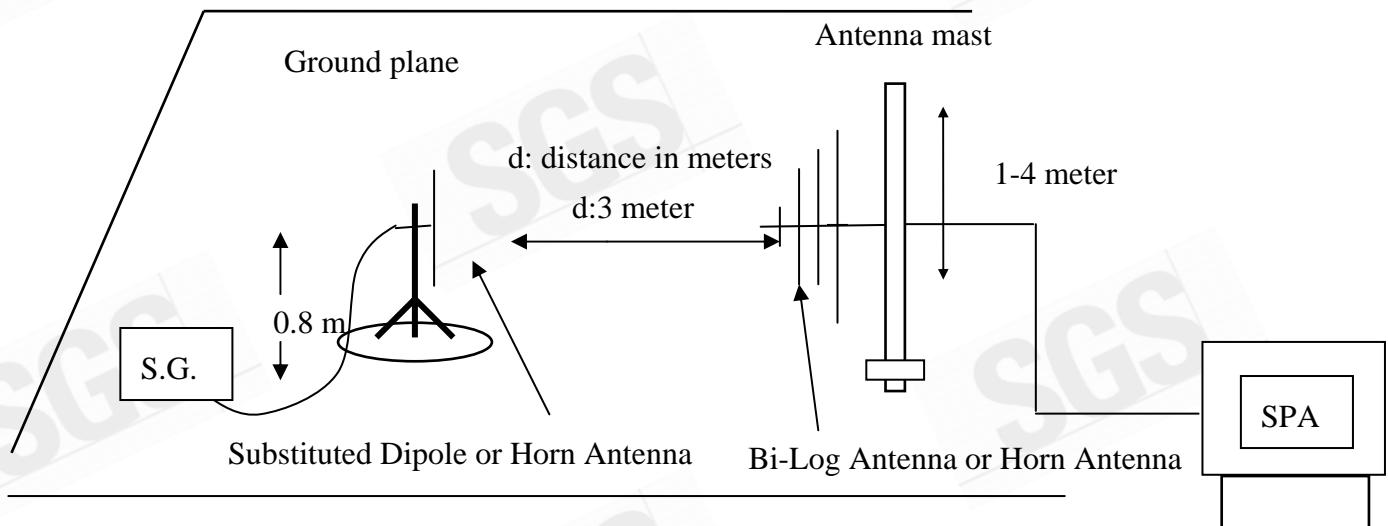
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(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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7.3. Measurement Procedure:

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.80MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1710-1755MHz and 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

7.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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7.5. Measurement Result:

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency MHz	CH	Antenna Pol. V/H	S.G. Output dBm	Antenna Gain dBd	Cable Loss dB	ERP dBm	Limit dBm
GPRS 850	E2	824.20	128	V	13.22	3.96	-4.22	12.96	38.40
				H	23.30	3.96	-4.22	23.04	38.40
		836.60	190	V	13.54	4.00	-4.24	13.30	38.40
				H	22.98	4.00	-4.24	22.74	38.40
		848.80	251	V	12.87	4.03	-4.33	12.57	38.40
				H	22.56	4.03	-4.33	22.26	38.40

EUT				Measurement					
Operation Band	Pol.	Fundamental Frequency MHz	CH	Antenna Pol. V/H	S.G. Output dBm	Antenna Gain dBi	Cable Loss dB	EIRP dBm	Limit dBm
GPRS 1900	E2	1850.20	512	V	16.38	4.17	-5.49	15.07	33.00
				H	10.89	4.51	-5.49	9.92	33.00
		1880.00	661	V	18.04	4.13	-5.56	16.61	33.00
				H	10.75	4.44	-5.56	9.62	33.00
		1909.80	810	V	20.17	4.09	-5.56	18.71	33.00
				H	12.92	4.36	-5.56	11.73	33.00

Remark :

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

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8. 99% OCCUPIED BANDWIDTH MEASUREMENT

8.1. Standard Applicable:

According to §FCC 2.1049.

8.2. Test Set-up:

Refer to section 5.2 in this report

8.3. Measurement Procedure:

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW (10/30KHz) was set to about 1% of emission BW, VBW= 3 times RBW(30/100KHz), -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

8.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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8.5. Measurement Result:

EUT Mode	Frequency (MHz)	CH	99% Bandwidth (kHz)
GPRS 850	824.20	128	250.8782
	836.60	190	250.5748
	848.80	251	250.7373

EUT Mode	Frequency (MHz)	CH	99% Bandwidth (kHz)
GPRS 1900	1850.20	512	234.9690
	1880.00	661	240.7869
	1909.80	810	244.3182

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Figure 7-1: GPRS 850 Channel Low

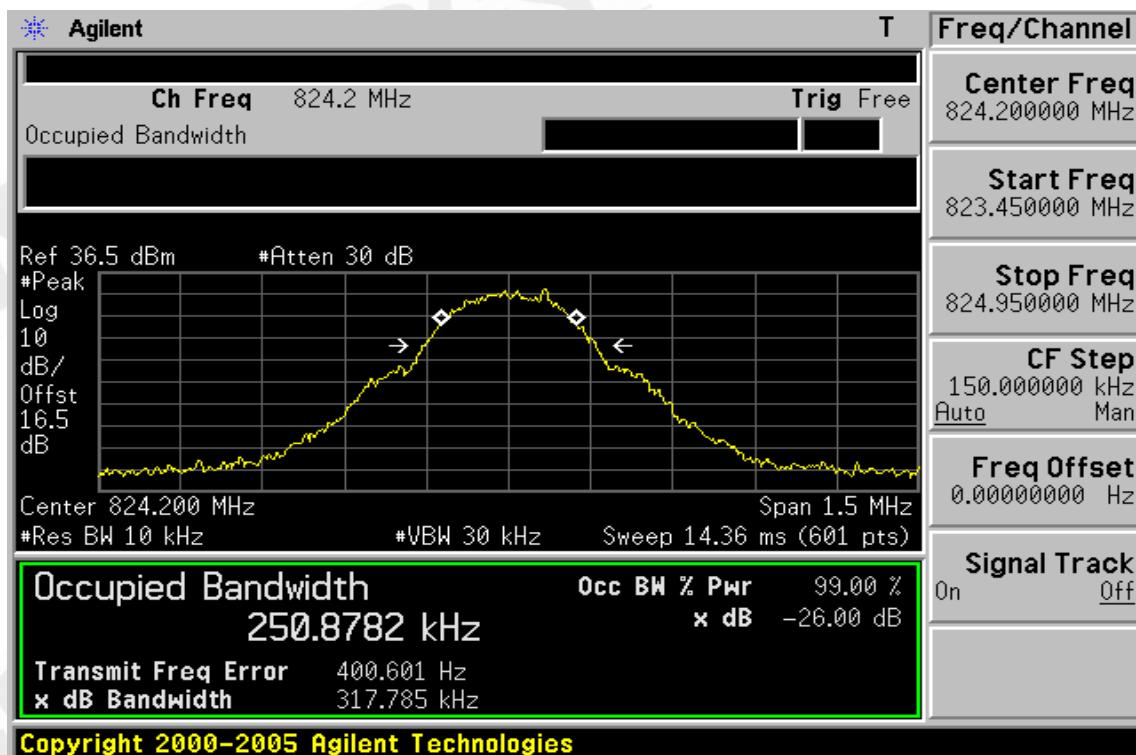
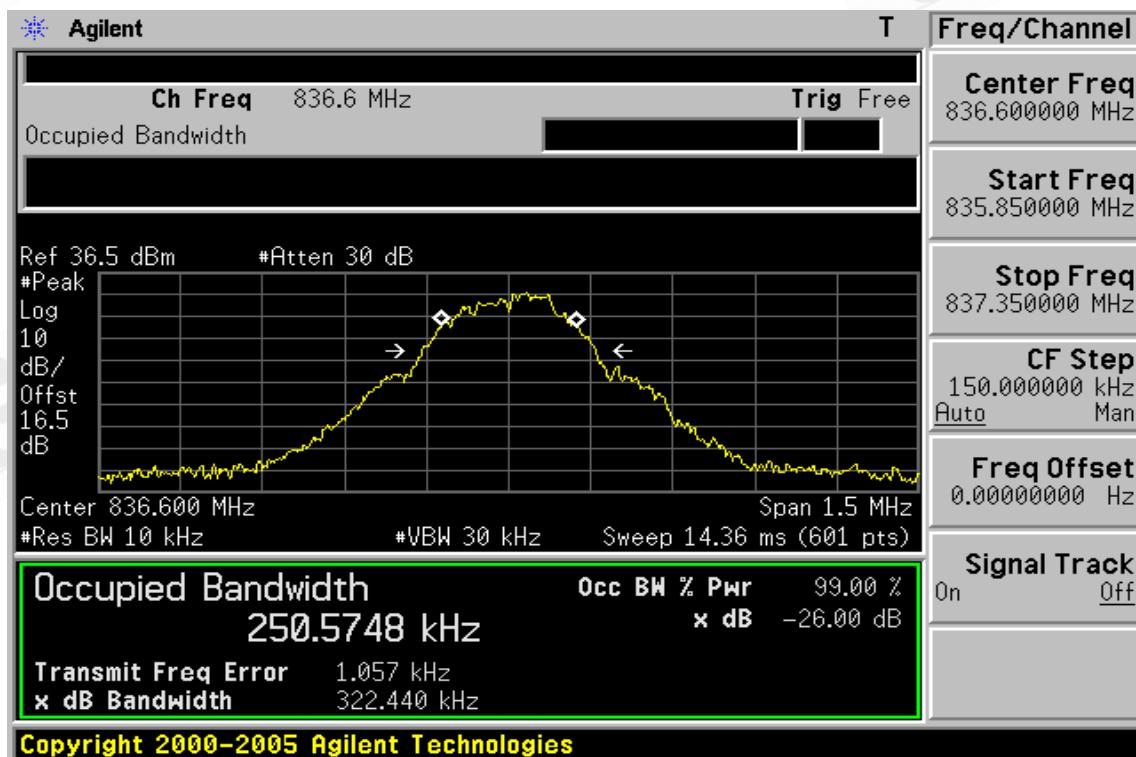


Figure 7-2 GPRS 850 Channel Mid



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Figure 7-3: GPRS 850 Channel High

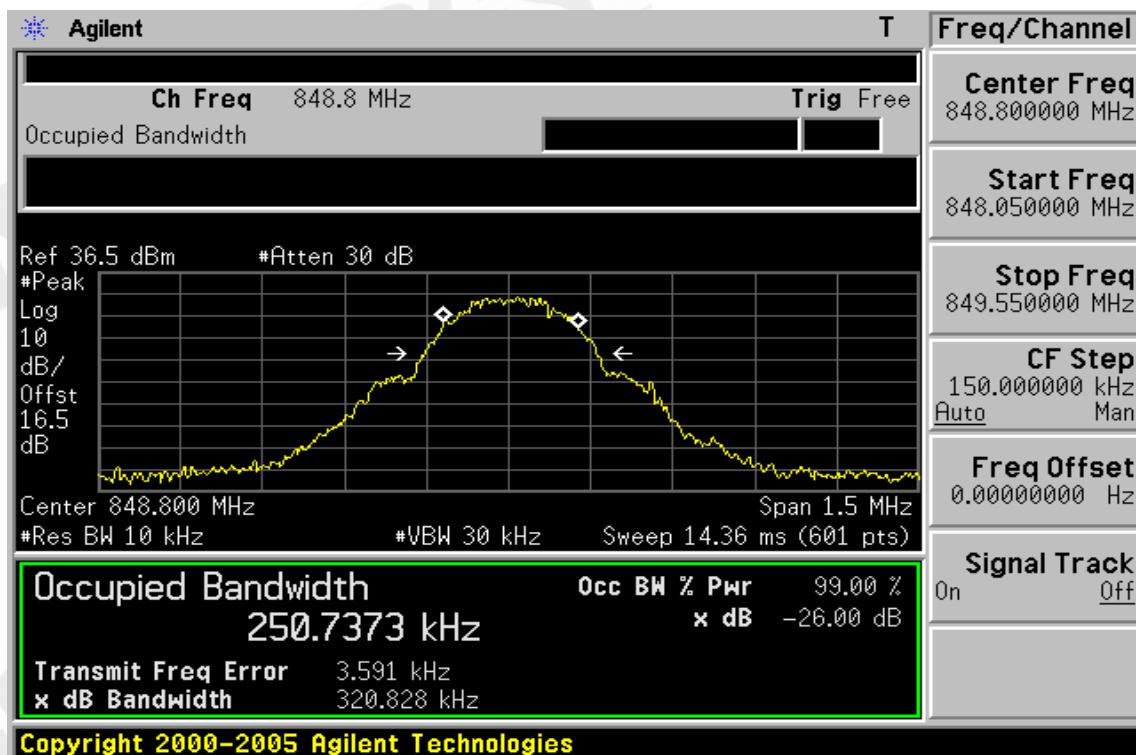
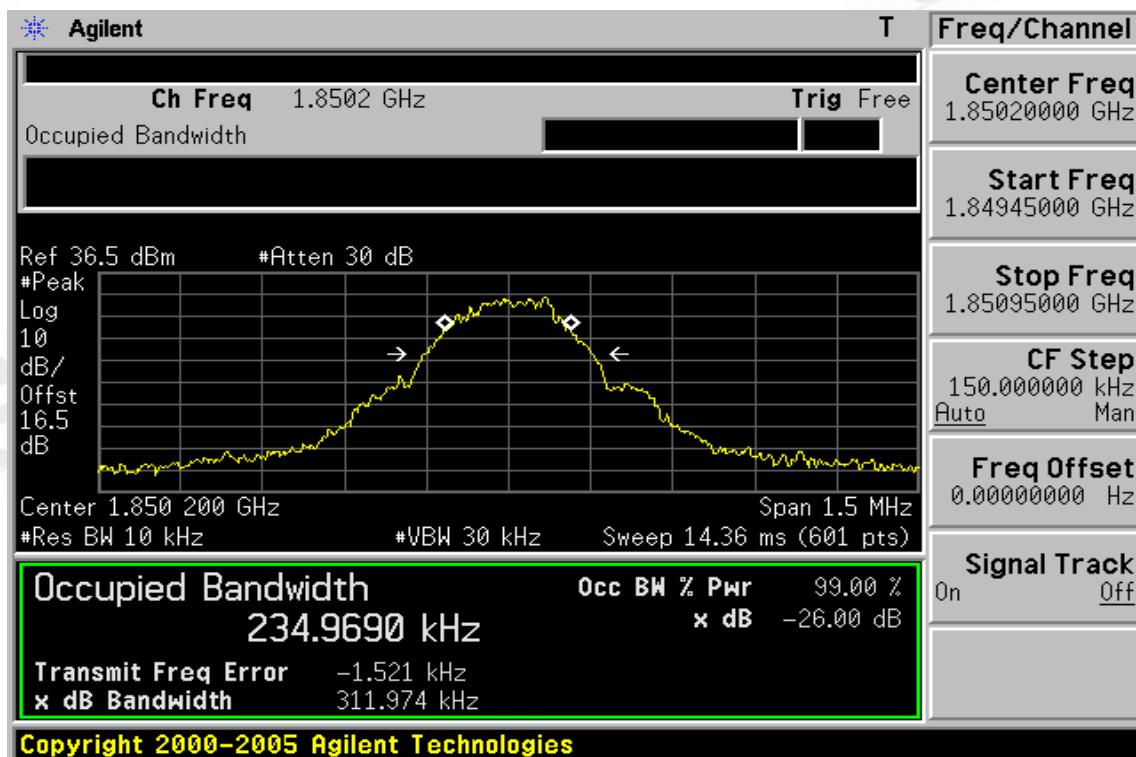


Figure 7-4: GPRS 1900 Channel Low



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Figure 7-5: GPRS 1900 Channel Mid

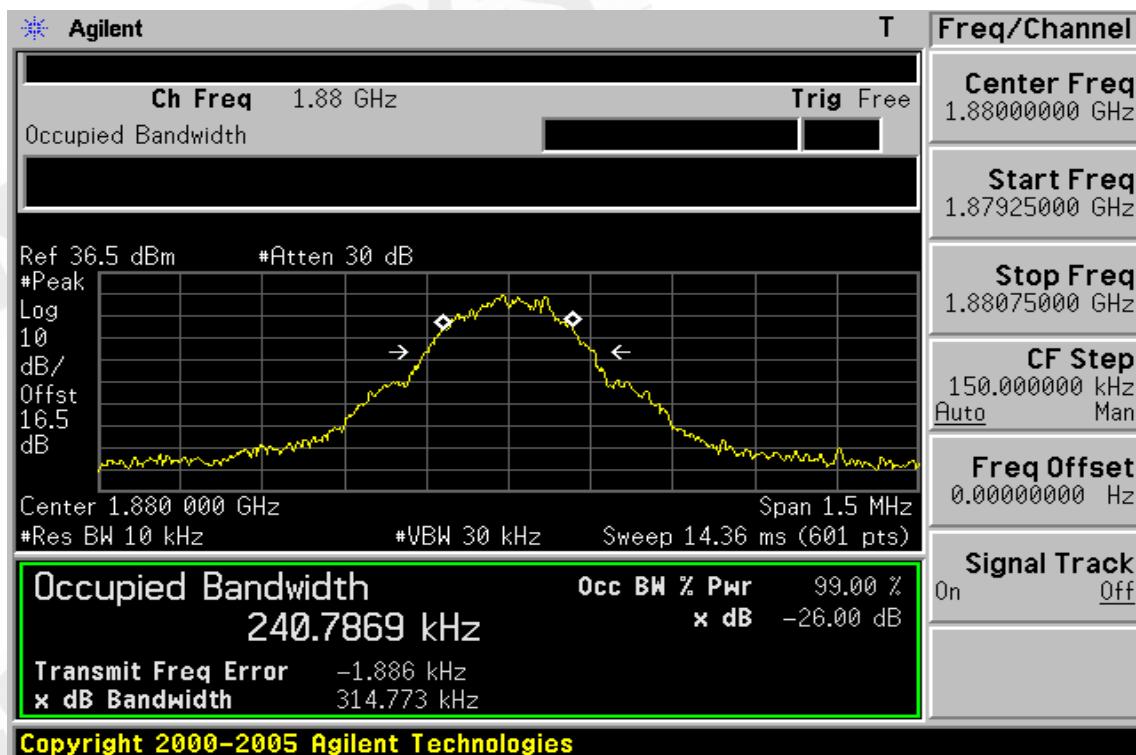
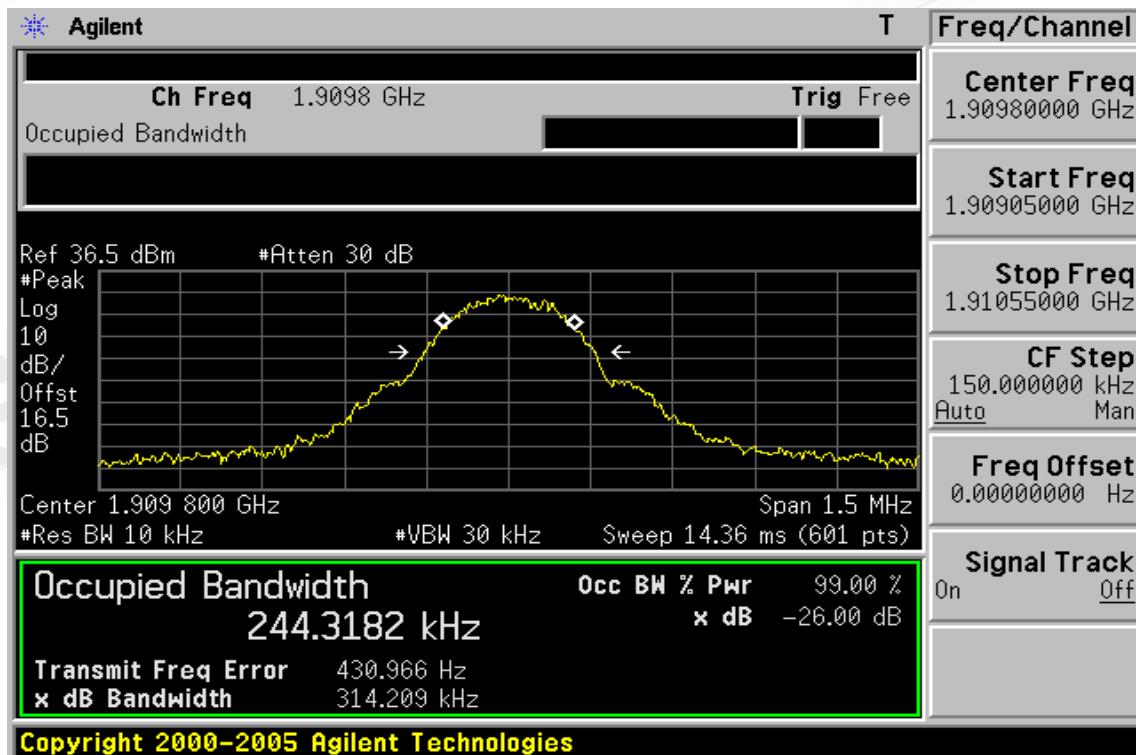


Figure 7-6: GPRS 1900 Channel High



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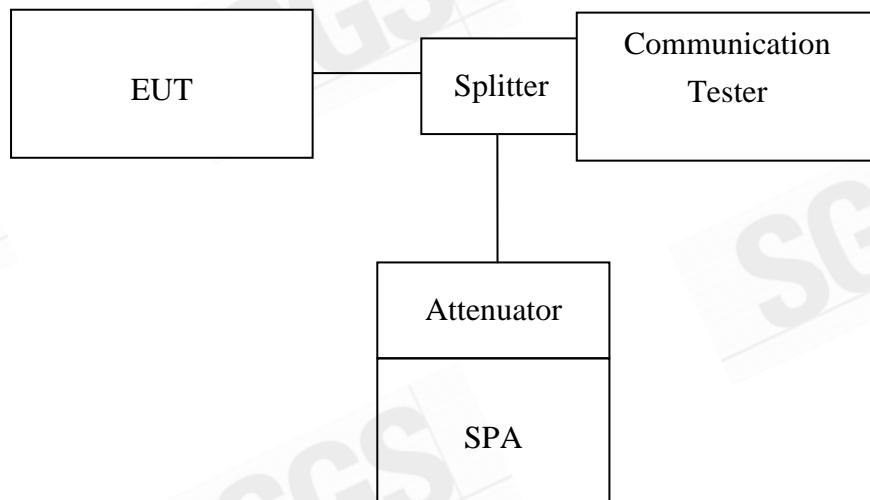
9. OUT OF BAND EMISSION AT ANTENNA TERMINALS

9.1. Standard Applicable:

According to FCC §2.1051.

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

9.2. Test SET-UP:



Note: Measurement setup for testing on Antenna connector

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9.3. Measurement Procedure:

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

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

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

Conducted Emission:

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 1G, 1G to 2.5G, 2.5G to 7.5G, 7.5G to 10G ,10G to 15G and 15G to 20GHz
4. Via Software, combine 6 spans of frequency range into one plot

9.4. Measurement Equipment Used:

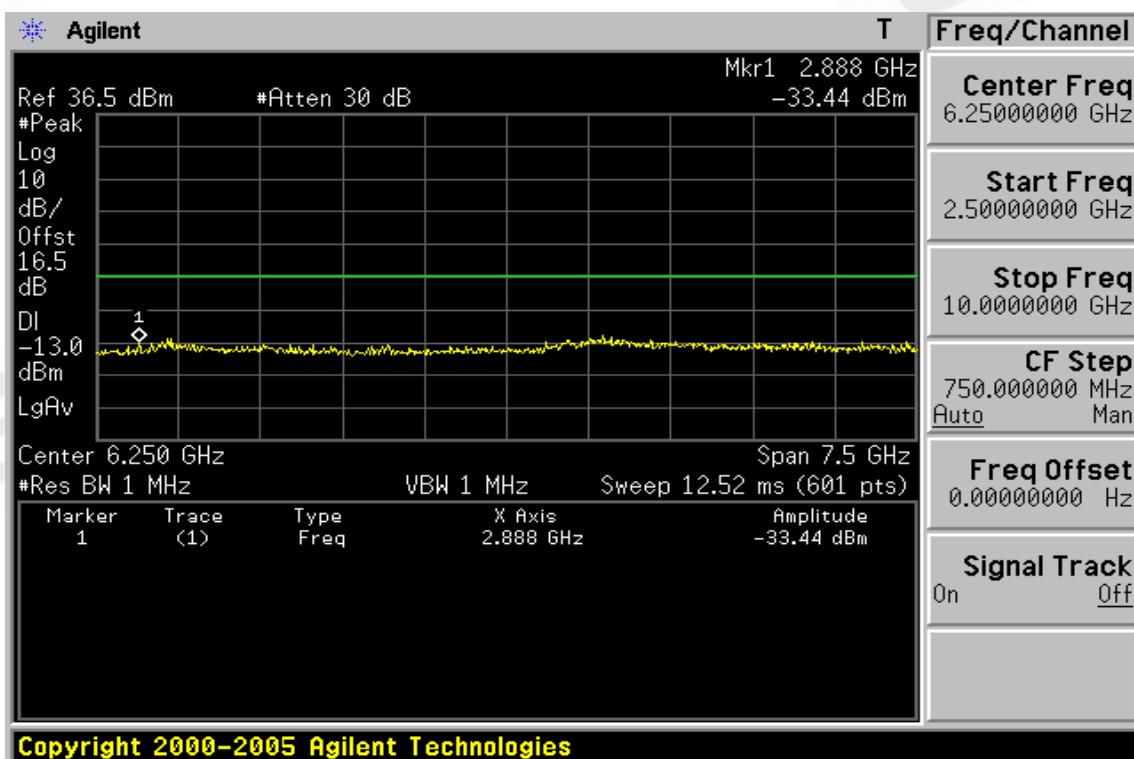
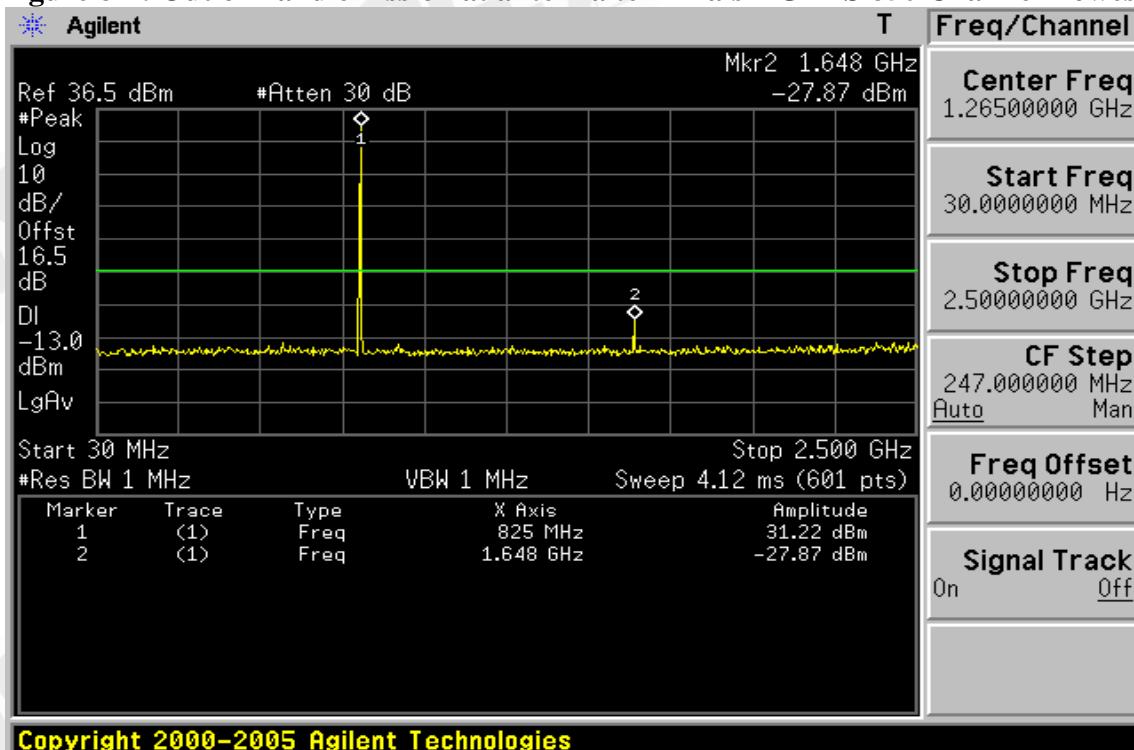
Refer to section 2.4 in this report

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9.5. Measurement Result:

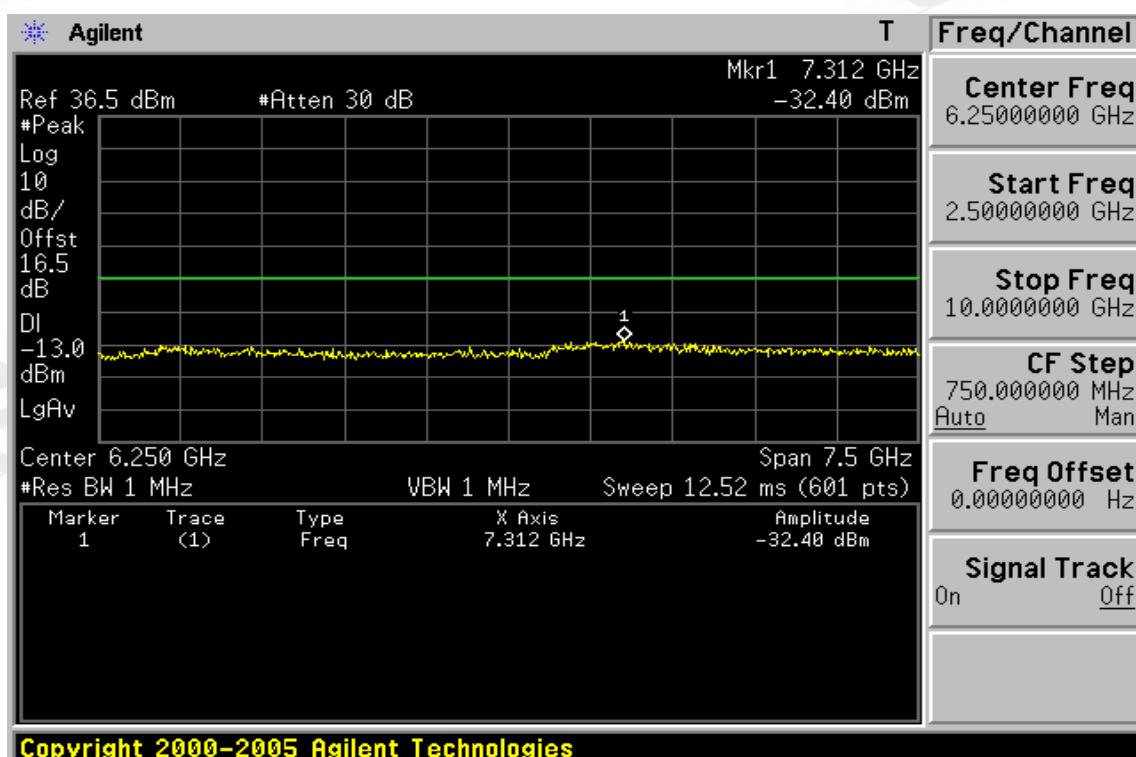
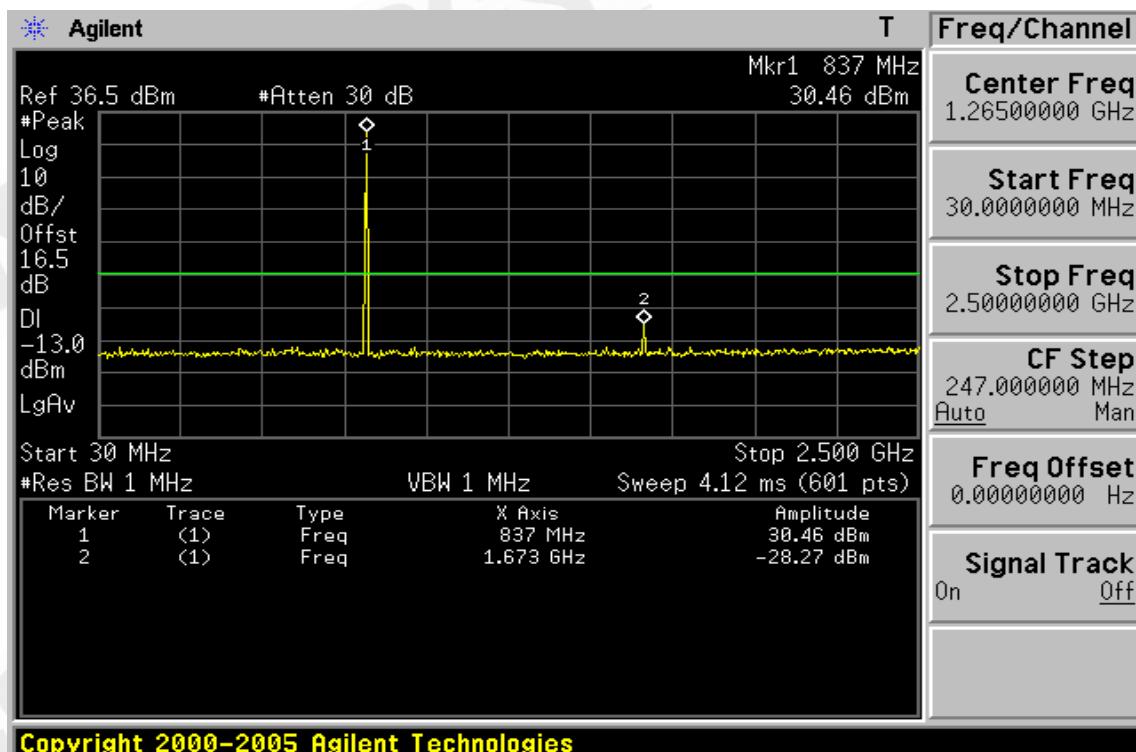
Figure 8-1: Out of Band emission at antenna terminals – GPRS 850 Channel Lowest



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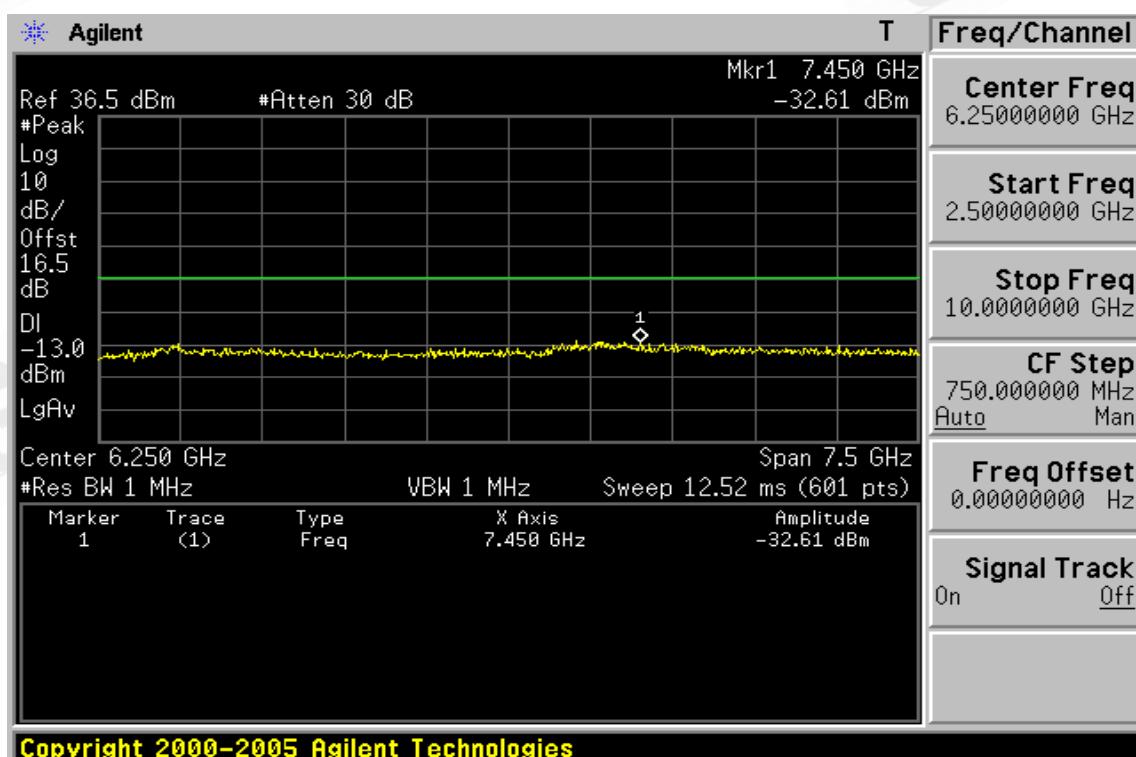
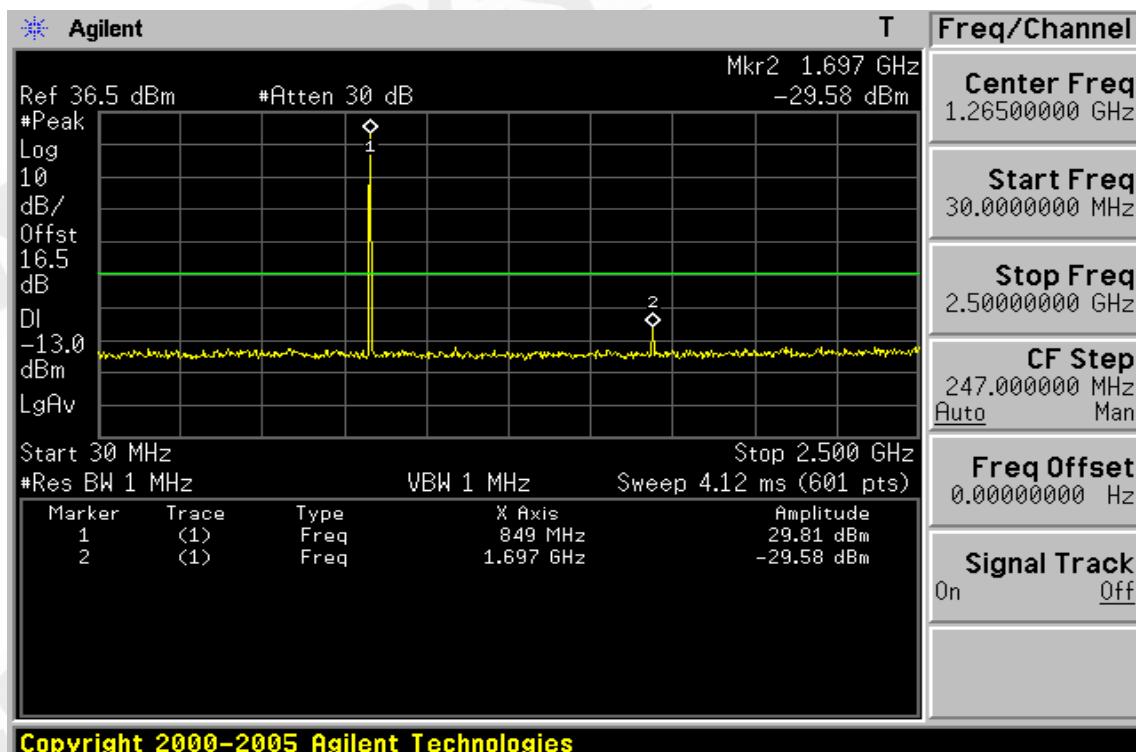
Figure 8-2: Out of Band emission at antenna terminals – GPRS 850 Channel Mid



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Figure 8-3: Out of Band emission at antenna terminals – GPRS 850 Channel Highest



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Figure 8-4: Band edge emission at antenna terminals – GPRS 850 Channel Lowest

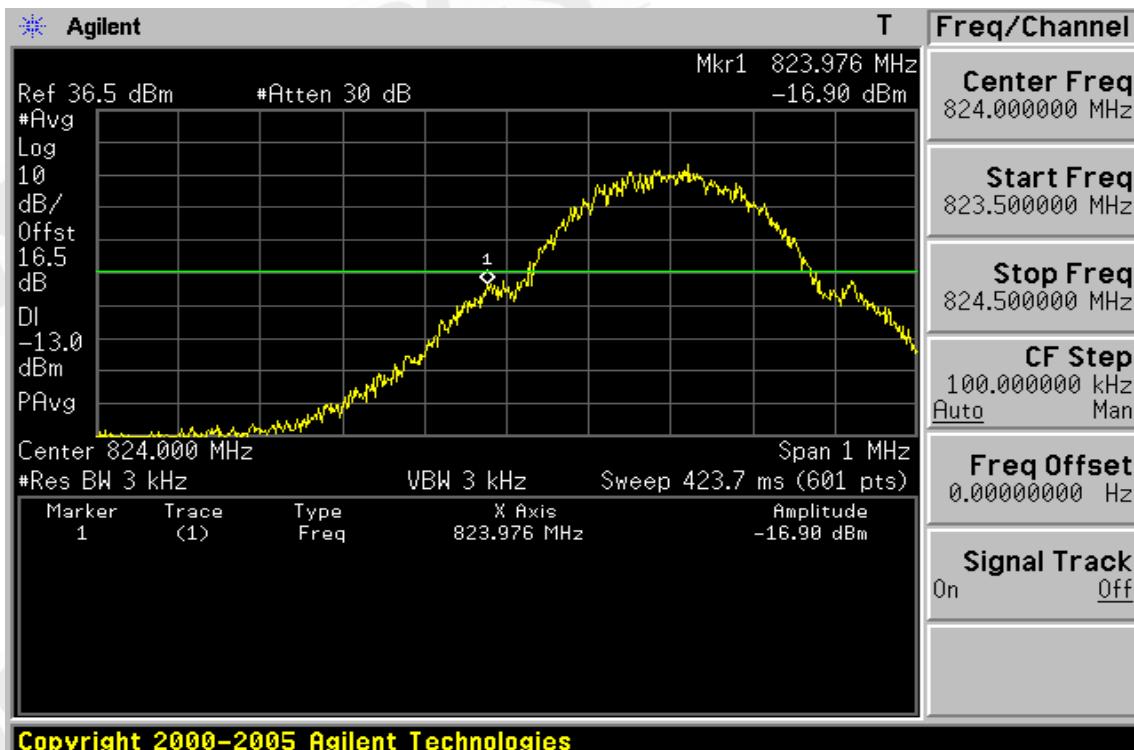
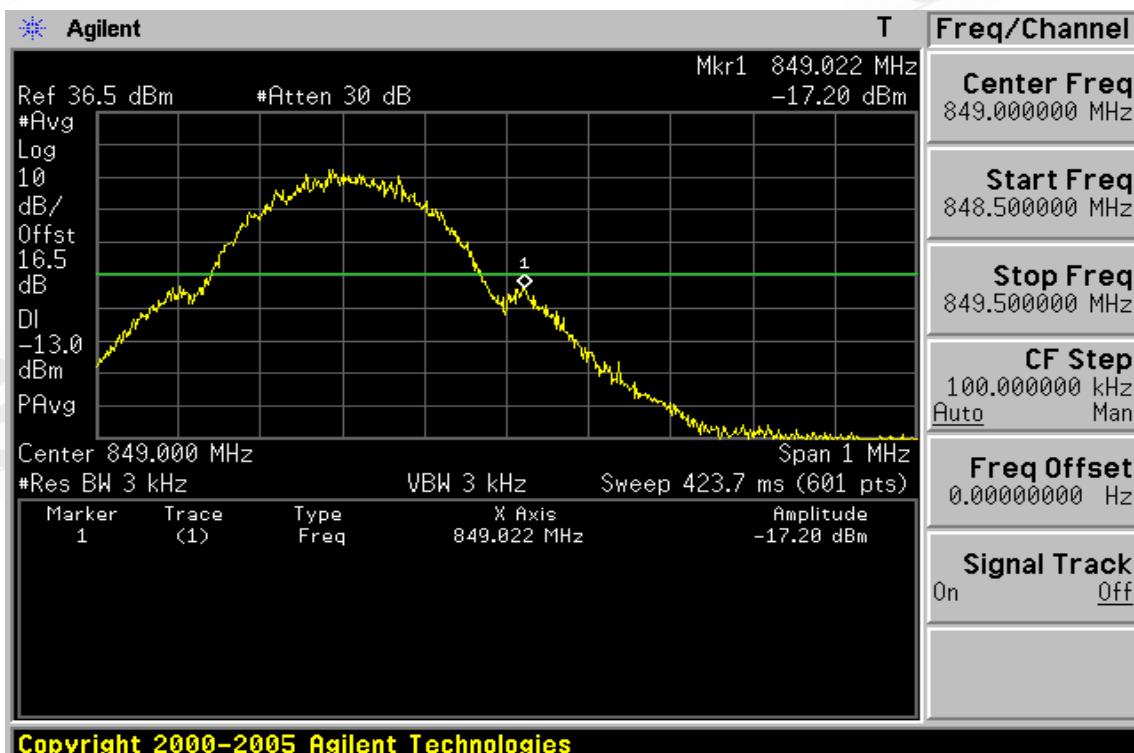


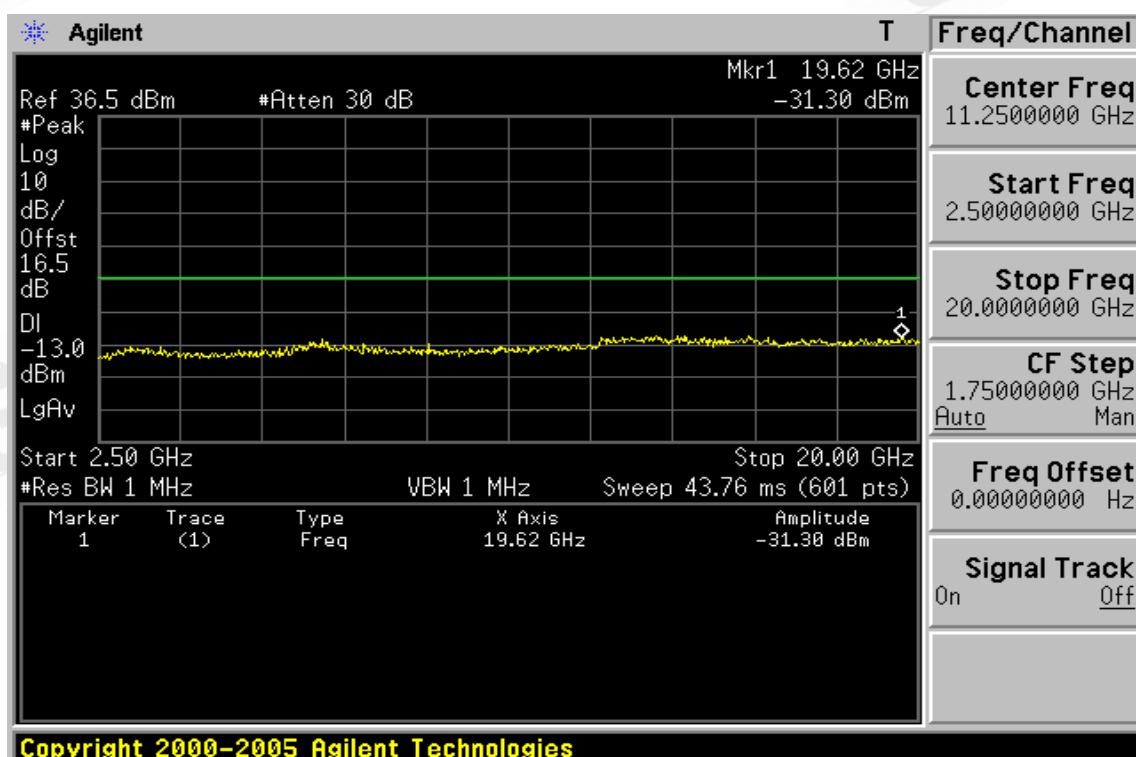
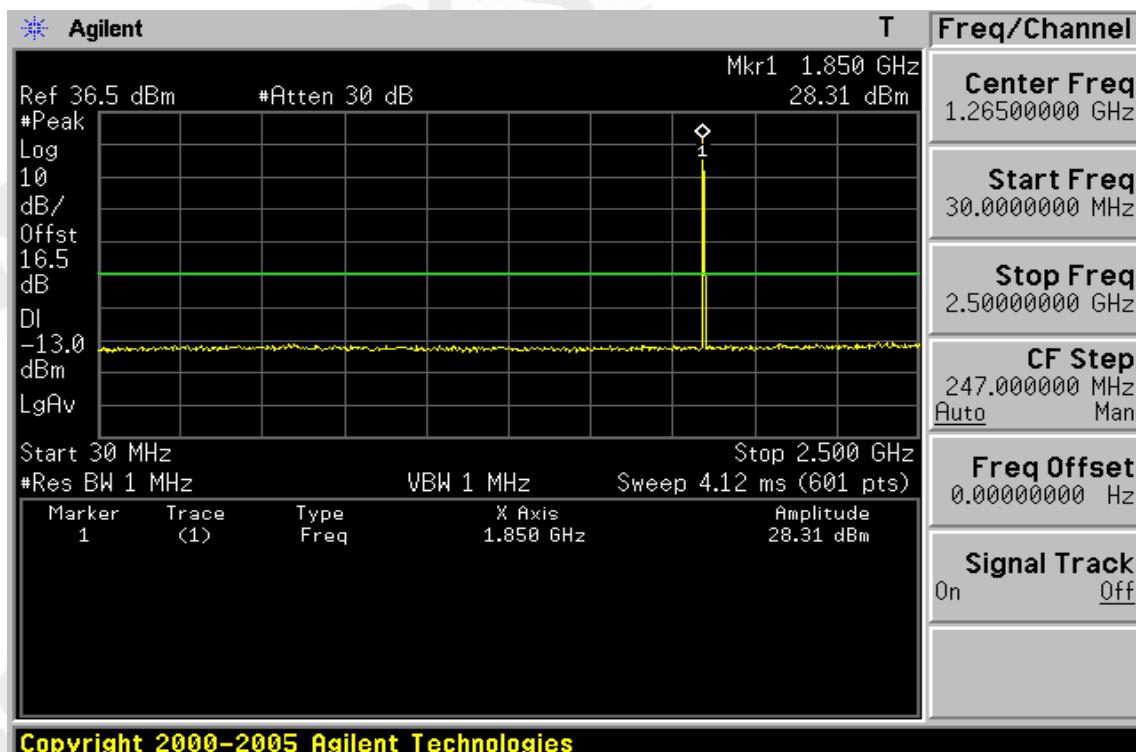
Figure 8-5: Band edge emission at antenna terminals – GPRS 850 Channel Highest



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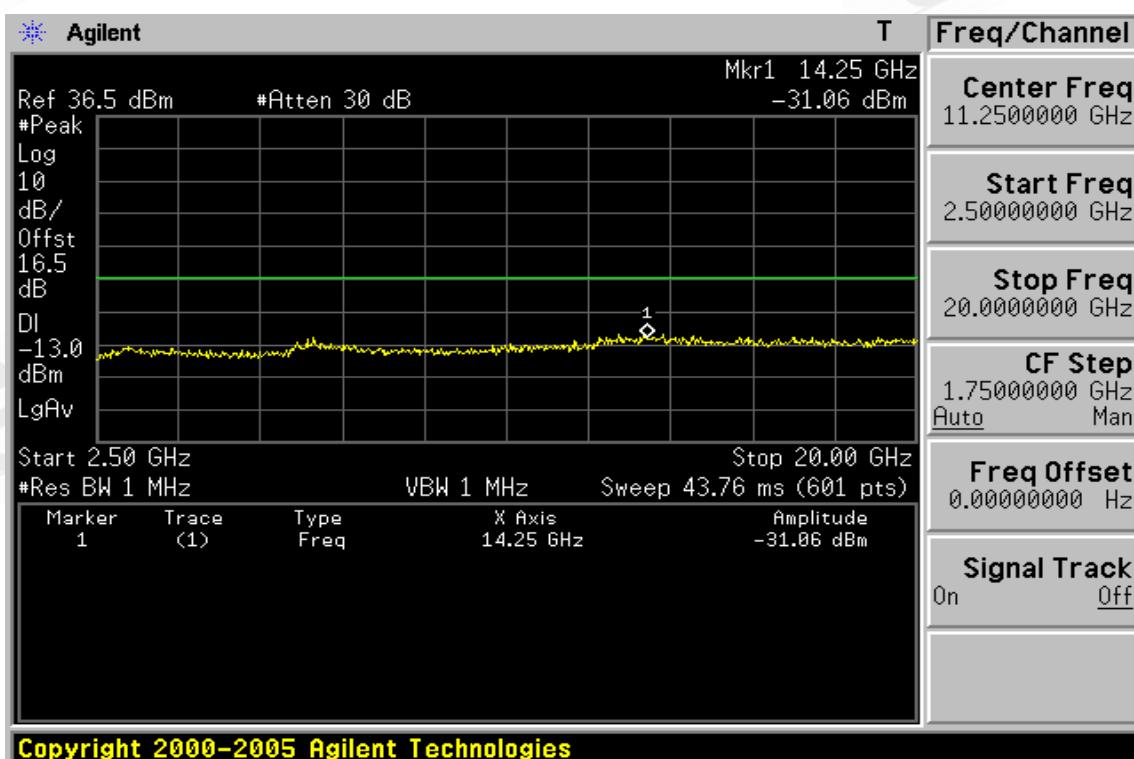
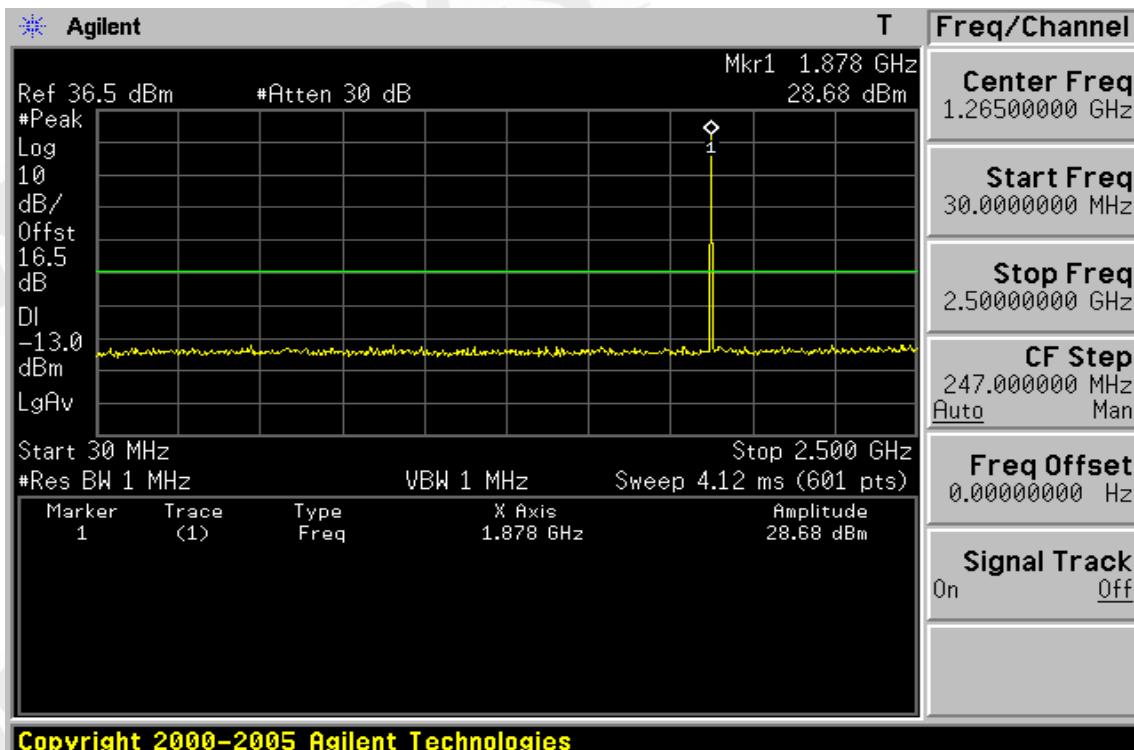
Figure 8-6: Out of Band emission at antenna terminals – GPRS 1900 Channel Lowest



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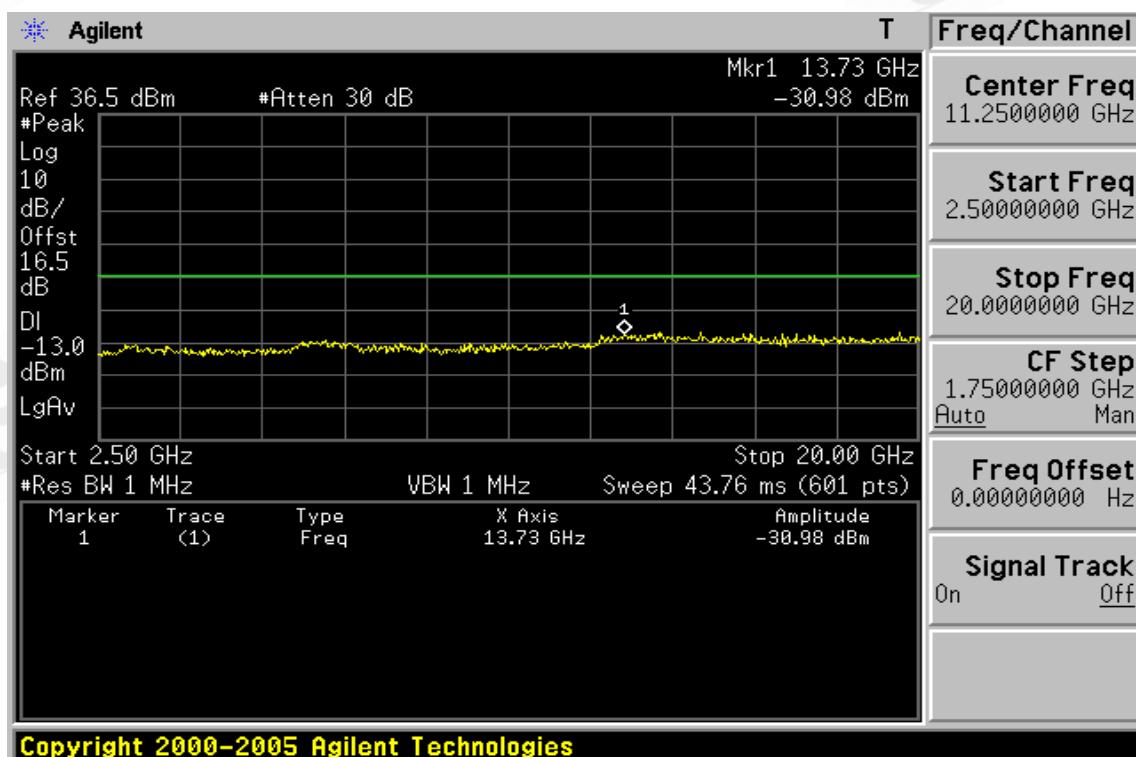
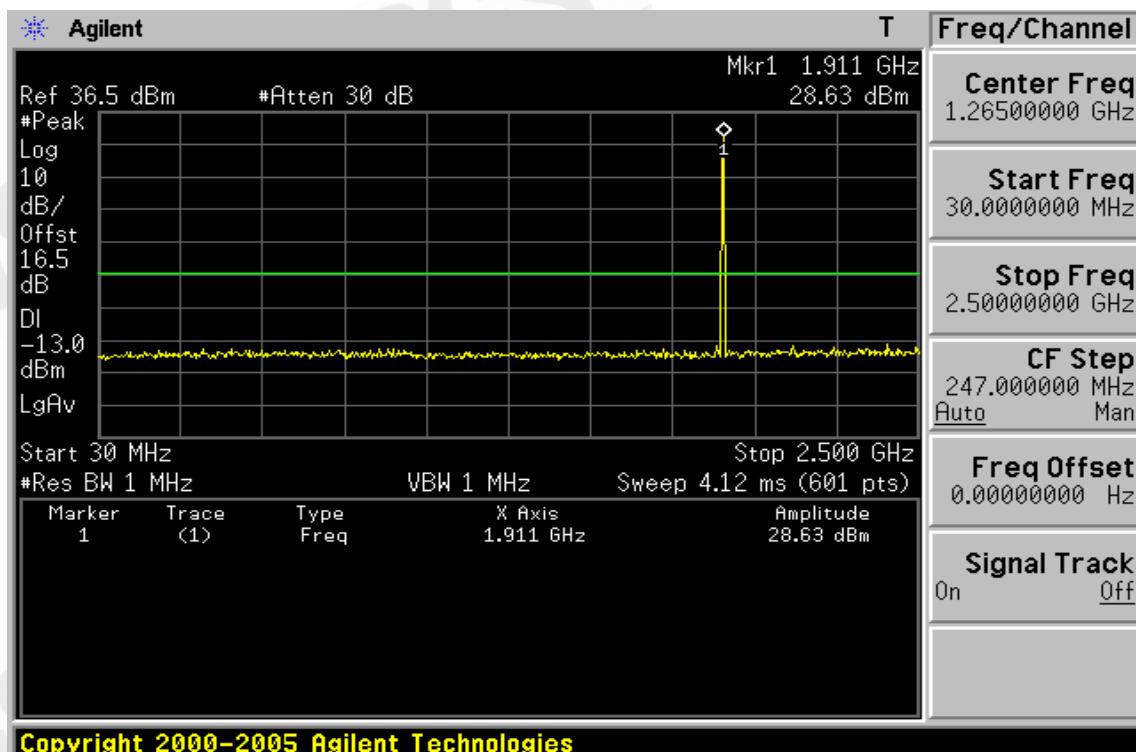
Figure 8-7: Out of Band emission at antenna terminals – GPRS 1900 Channel Mid



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Figure 8-8: Out of Band emission at antenna terminals – GPRS 1900 Channel Highest



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Figure 8-9: Band edge emission at antenna terminals – GPRS 1900 Channel Lowest

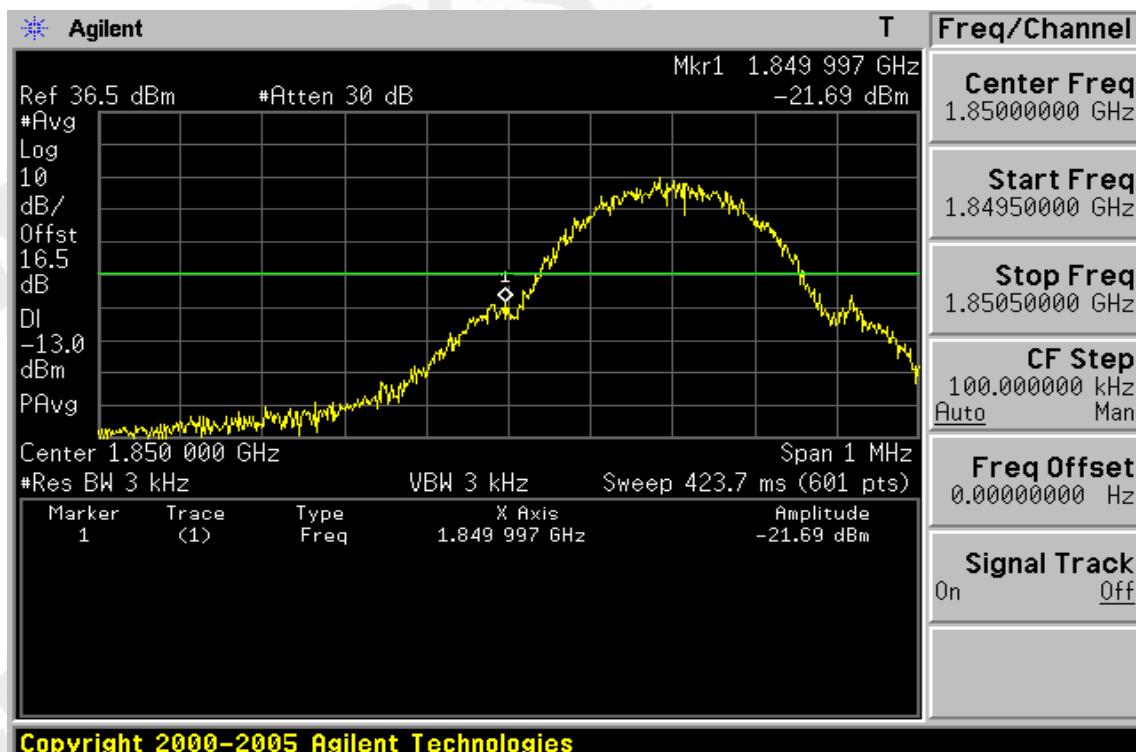
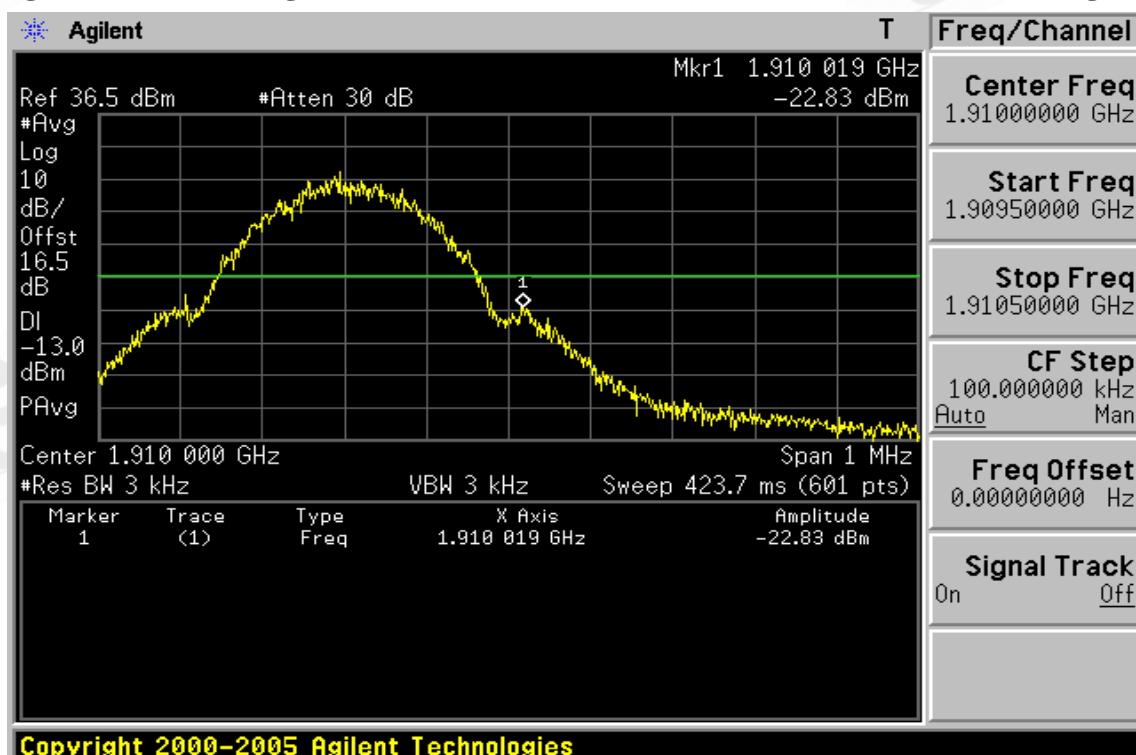


Figure 8-10: Band edge emission at antenna terminals – GPRS 1900 Channel Highest



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10. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT (TX)

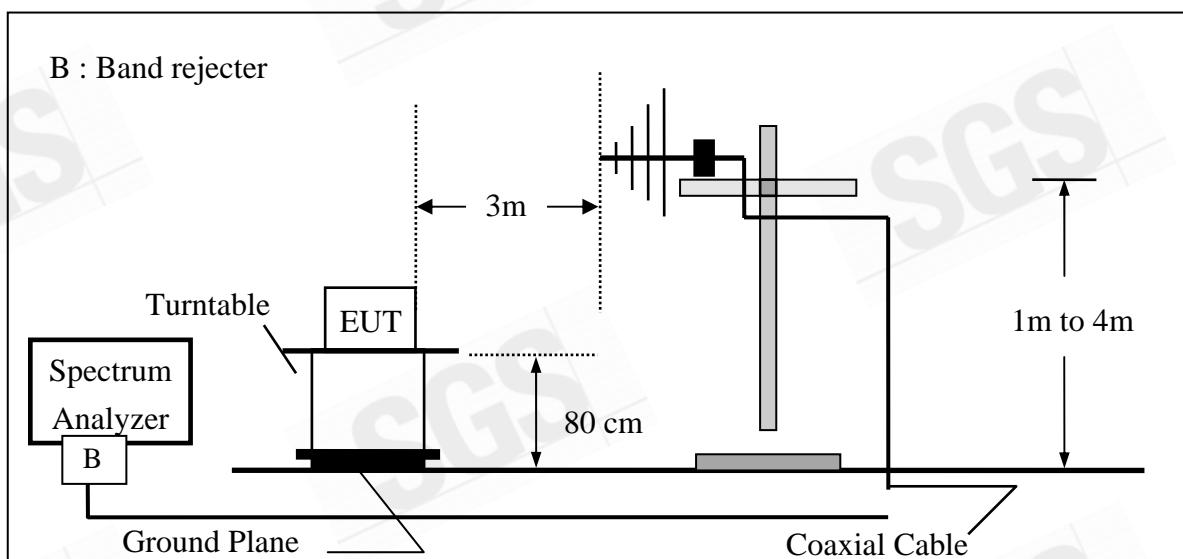
10.1. Standard Applicable:

According to FCC §2.1053,

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

10.2. EUT Setup (Block Diagram of Configuration):

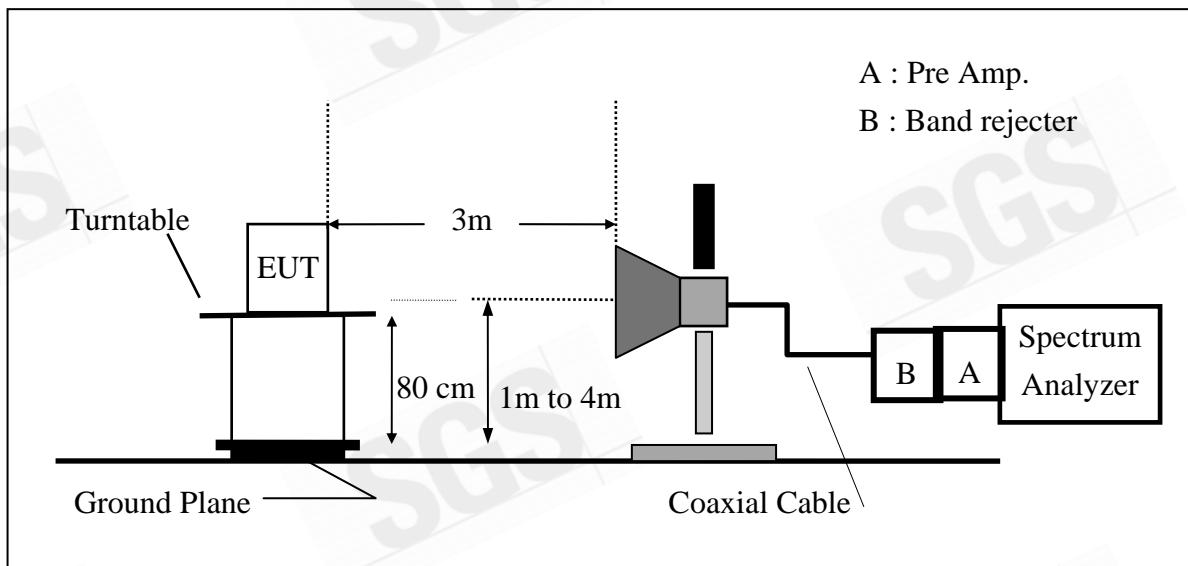
Radiated Emission Test Set-Up, Frequency Below 1000MHz



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Radiated Emission Test Set-UP Frequency Over 1 GHz



10.3. Measurement Procedure:

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

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

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

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$$

10.4. Measurement Equipment Used:

Refer to section 2.4 in this report

10.5. Measurement Result:

Refer to attach tabular data sheets.

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Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Band :GPRS 850 Test Date :2012-01-06
 ARFCN :CH 128 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :824.2 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBd	Loss dB	dBm	Margin dB
143.49	S	-84.84	-80.81	-1.26	-2.79	-13.00	-71.84
288.99	S	-84.96	-86.34	4.53	-3.22	-13.00	-71.96
360.77	S	-83.82	-85.20	4.71	-3.43	-13.00	-70.82
449.04	S	-83.80	-84.70	4.47	-3.70	-13.00	-70.80
498.51	S	-81.65	-82.81	4.71	-3.70	-13.00	-68.65
709.00	S	-76.79	-77.89	4.04	-3.98	-13.00	-63.79
1648.40	H	-29.66	-26.93	2.40	-5.36	-13.00	-16.66
2472.60	H	-36.05	-33.47	3.14	-6.15	-13.00	-23.05
3288.00	H	-23.32	-21.36	4.70	-6.83	-13.00	-10.32
4121.00	H	-38.39	-36.93	5.81	-7.31	-13.00	-25.39
4945.20	H	-39.15	-37.86	6.58	-7.99	-13.00	-26.15
5769.40	H	-52.51	-50.86	6.89	-8.55	-13.00	-39.51
6593.60	H	-51.72	-50.49	7.44	-8.73	-13.00	-38.72
7417.80	H	-41.02	-39.93	8.17	-9.38	-13.00	-28.02
8242.00	H	-44.76	-43.92	8.95	-9.95	-13.00	-31.76

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

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Operation Band :GPRS 850 Test Date :2012-01-06
 ARFCN :CH 128 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :824.2 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :HORIZONTAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBd	Loss dB	dBm	Margin dB
145.43	S	-88.95	-84.97	-1.21	-2.79	-13.00	-75.95
286.08	S	-85.70	-87.04	4.50	-3.22	-13.00	-72.70
370.47	S	-84.76	-86.07	4.64	-3.43	-13.00	-71.76
447.10	S	-83.63	-84.54	4.48	-3.70	-13.00	-70.63
498.51	S	-83.48	-84.64	4.71	-3.70	-13.00	-70.48
763.32	S	-78.43	-78.94	3.63	-4.20	-13.00	-65.43
1648.40	H	-28.61	-26.15	2.68	-5.36	-13.00	-15.61
2472.60	H	-40.74	-38.54	3.52	-6.15	-13.00	-27.74
3288.00	H	-26.28	-24.30	4.68	-6.83	-13.00	-13.28
4121.00	H	-42.07	-40.33	5.52	-7.31	-13.00	-29.07
4945.20	H	-47.64	-45.79	6.02	-7.99	-13.00	-34.64
5769.40	H	-53.03	-50.67	6.18	-8.55	-13.00	-40.03
6593.60	H	-51.79	-49.67	6.55	-8.73	-13.00	-38.79
7417.80	H	-47.85	-46.02	7.42	-9.38	-13.00	-34.85
8242.00	H	-50.73	-49.03	8.10	-9.95	-13.00	-37.73

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

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Operation Band :GPRS 850 Test Date :2012-01-06
 ARFCN :CH 190 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :836.6 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBd	Loss dB	dBm	Margin dB
143.49	S	-84.92	-80.89	-1.26	-2.79	-13.00	-71.92
277.35	S	-85.16	-86.47	4.46	-3.22	-13.00	-72.16
343.31	S	-84.60	-86.01	4.75	-3.44	-13.00	-71.60
449.04	S	-83.68	-84.58	4.47	-3.70	-13.00	-70.68
487.84	S	-83.01	-84.11	4.66	-3.70	-13.00	-70.01
752.65	S	-77.25	-77.65	3.55	-4.23	-13.00	-64.25
1673.20	H	-28.45	-25.72	2.33	-5.34	-13.00	-15.45
2509.80	H	-37.89	-35.26	3.20	-6.13	-13.00	-24.89
3346.40	H	-27.60	-25.83	4.85	-6.79	-13.00	-14.60
4183.00	H	-33.36	-31.89	5.89	-7.47	-13.00	-20.36
5019.60	H	-34.62	-33.52	6.66	-7.87	-13.00	-21.62
5856.20	H	-51.35	-49.98	6.93	-8.48	-13.00	-38.35
6692.80	H	-50.75	-49.71	7.53	-8.64	-13.00	-37.75
7529.40	H	-44.67	-43.52	8.31	-9.50	-13.00	-31.67
8366.00	H	-39.83	-39.12	9.00	-9.96	-13.00	-26.83

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“--“ : denotes Noise Floor.

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Operation Band :GPRS 850 Test Date :2012-01-06
 ARFCN :CH 190 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :836.6 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :HORIZONTAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBd	Loss dB	dBm	Margin dB
128.94	S	-88.59	-85.02	-0.78	-2.79	-13.00	-75.59
286.08	S	-85.78	-87.12	4.50	-3.22	-13.00	-72.78
350.10	S	-85.13	-86.59	4.79	-3.43	-13.00	-72.13
410.24	S	-83.76	-84.93	4.70	-3.62	-13.00	-70.76
484.93	S	-83.49	-84.56	4.64	-3.70	-13.00	-70.49
744.89	S	-77.09	-77.53	3.59	-4.23	-13.00	-64.09
1673.20	H	-28.13	-25.73	2.66	-5.34	-13.00	-15.13
2509.80	H	-42.88	-40.62	3.56	-6.13	-13.00	-29.88
3346.40	H	-30.23	-28.43	4.82	-6.79	-13.00	-17.23
4183.00	H	-37.80	-35.98	5.54	-7.47	-13.00	-24.80
5019.60	H	-44.94	-43.23	6.05	-7.87	-13.00	-31.94
5856.20	H	-52.38	-50.26	6.18	-8.48	-13.00	-39.38
6692.80	H	-53.06	-51.11	6.62	-8.64	-13.00	-40.06
7529.40	H	-50.89	-48.98	7.54	-9.50	-13.00	-37.89
8366.00	H	-44.45	-42.89	8.16	-9.96	-13.00	-31.45

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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Operation Band :GPRS 850 Test Date :2012-01-06
 ARFCN :CH 251 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :848.8 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBd	Loss dB	dBm	Margin dB
143.49	S	-85.27	-81.24	-1.26	-2.79	-13.00	-72.27
276.38	S	-85.00	-86.32	4.47	-3.22	-13.00	-72.00
374.35	S	-84.86	-86.14	4.61	-3.43	-13.00	-71.86
446.13	S	-83.39	-84.30	4.49	-3.70	-13.00	-70.39
483.96	S	-82.70	-83.77	4.64	-3.70	-13.00	-69.70
753.62	S	-76.93	-77.34	3.56	-4.23	-13.00	-63.93
1697.60	H	-25.58	-22.71	2.27	-5.40	-13.00	-12.58
2546.40	H	-46.39	-43.69	3.31	-6.24	-13.00	-33.39
3395.20	H	-51.44	-49.90	4.97	-6.85	-13.00	-38.44
4244.00	H	-35.29	-33.87	5.97	-7.43	-13.00	-22.29
5092.80	H	-41.03	-39.68	6.66	-8.06	-13.00	-28.03
5941.60	H	-51.77	-50.27	6.96	-8.54	-13.00	-38.77
6790.40	H	-51.69	-50.33	7.62	-9.13	-13.00	-38.69
7639.20	H	-50.33	-49.37	8.33	-9.37	-13.00	-37.33
8488.00	H	-42.33	-41.83	9.05	-9.89	-13.00	-29.33

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

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Operation Band :GPRS 850 Test Date :2012-01-06
 ARFCN :CH 251 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :848.8 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :HORIZONTAL

Freq. MHz	Note F/H/E/S	ERP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBd	Loss dB	dBm	Margin dB
145.43	S	-88.99	-85.00	-1.21	-2.79	-13.00	-75.99
286.08	S	-85.77	-87.11	4.50	-3.22	-13.00	-72.77
372.41	S	-84.74	-86.04	4.63	-3.43	-13.00	-71.74
446.13	S	-84.25	-85.16	4.49	-3.70	-13.00	-71.25
495.60	S	-83.26	-84.41	4.70	-3.70	-13.00	-70.26
768.17	S	-78.37	-78.92	3.67	-4.20	-13.00	-65.37
1697.60	H	-26.89	-24.39	2.65	-5.40	-13.00	-13.89
2546.40	H	-52.20	-49.85	3.66	-6.24	-13.00	-39.20
3395.20	H	-53.57	-51.98	4.92	-6.85	-13.00	-40.57
4244.00	H	-40.95	-39.12	5.56	-7.43	-13.00	-27.95
5092.80	H	-50.25	-48.31	6.07	-8.06	-13.00	-37.25
5941.60	H	-52.52	-50.24	6.18	-8.54	-13.00	-39.52
6790.40	H	-52.69	-50.43	6.72	-9.13	-13.00	-39.69
7639.20	H	-51.46	-49.76	7.59	-9.37	-13.00	-38.46
8488.00	H	-47.97	-46.64	8.22	-9.89	-13.00	-34.97

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

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Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Band :GPRS 1900 Test Date :2012-01-06
 ARFCN :CH 512 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :1850.2 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

Freq. MHz	Note F/H/E/S	EIRP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBi	Loss dB	dBm	Margin dB
110.51	S	-84.79	-83.14	1.06	-2.72	-13.00	-71.79
283.17	S	-84.67	-88.07	6.61	-3.22	-13.00	-71.67
345.25	S	-84.71	-88.22	6.91	-3.43	-13.00	-71.71
436.43	S	-83.74	-86.74	6.68	-3.70	-13.00	-70.74
496.57	S	-82.73	-85.92	6.85	-3.70	-13.00	-69.73
773.99	S	-78.08	-79.81	5.86	-4.20	-13.00	-65.08
3700.40	H	-27.28	-27.82	7.40	-6.98	-13.00	-14.28
5550.60	H	-39.55	-40.48	8.99	-8.37	-13.00	-26.55
7400.80	H	-34.55	-35.52	10.29	-9.36	-13.00	-21.55
9251.00	H	-30.23	-31.66	11.70	-10.46	-13.00	-17.23
11101.20	H	-29.33	-30.44	11.63	-10.67	-13.00	-16.33
12951.40	H	---					
14801.60	H	---					
16651.80	H	---					
18502.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

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Operation Band :GPRS 1900 Test Date :2012-01-06
 ARFCN :CH 512 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :1850.2 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :HORIZONTAL

Freq. MHz	Note F/H/E/S	EIRP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBi	Loss dB	dBm	Margin dB
129.91	S	-88.76	-87.41	1.43	-2.79	-13.00	-75.76
286.08	S	-85.68	-89.12	6.65	-3.22	-13.00	-72.68
380.17	S	-85.00	-88.39	6.80	-3.43	-13.00	-72.00
433.52	S	-84.29	-87.35	6.69	-3.66	-13.00	-71.29
496.57	S	-83.44	-86.63	6.85	-3.70	-13.00	-70.44
789.51	S	-78.87	-80.76	5.97	-4.16	-13.00	-65.87
3700.40	H	-33.47	-33.51	6.91	-6.98	-13.00	-20.47
5550.60	H	-44.32	-44.54	8.27	-8.37	-13.00	-31.32
7400.80	H	-41.30	-41.54	9.55	-9.36	-13.00	-28.30
9251.00	H	-38.71	-39.19	10.75	-10.46	-13.00	-25.71
11101.20	H	-39.15	-39.44	10.80	-10.67	-13.00	-26.15
12951.40	H	---					
14801.60	H	---					
16651.80	H	---					
18502.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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Operation Band :GPRS 1900 Test Date :2012-01-06
 ARFCN :CH 661 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :1880 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

Freq. MHz	Note F/H/E/S	EIRP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBi	Loss dB	dBm	Margin dB
143.49	S	-84.28	-82.39	0.89	-2.79	-13.00	-71.28
288.02	S	-84.68	-88.14	6.67	-3.22	-13.00	-71.68
364.65	S	-84.51	-87.94	6.83	-3.43	-13.00	-71.51
450.01	S	-84.22	-87.18	6.62	-3.70	-13.00	-71.22
495.60	S	-82.81	-86.00	6.85	-3.70	-13.00	-69.81
796.30	S	-78.34	-80.23	6.02	-4.20	-13.00	-65.34
3760.00	H	-25.63	-26.23	7.42	-7.12	-13.00	-12.63
5640.00	H	-38.21	-39.12	9.01	-8.26	-13.00	-25.21
7520.00	H	-31.54	-32.61	10.46	-9.50	-13.00	-18.54
9400.00	H	-33.90	-34.87	11.54	-10.76	-13.00	-20.90
11280.00	H	-32.55	-33.77	11.83	-10.76	-13.00	-19.55
13160.00	H	---					
15040.00	H	---					
16920.00	H	---					
18800.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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Operation Band :GPRS 1900 Test Date :2012-01-06
 ARFCN :CH 661 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :1880 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :HORIZONTAL

Freq. MHz	Note F/H/E/S	EIRP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBi	Loss dB	dBm	Margin dB
145.43	S	-88.62	-86.78	0.94	-2.79	-13.00	-75.62
286.08	S	-85.04	-88.48	6.65	-3.22	-13.00	-72.04
356.89	S	-84.92	-88.41	6.89	-3.43	-13.00	-71.92
435.46	S	-84.56	-87.57	6.68	-3.70	-13.00	-71.56
496.57	S	-83.60	-86.80	6.85	-3.70	-13.00	-70.60
782.72	S	-78.91	-80.74	5.92	-4.16	-13.00	-65.91
3760.00	H	-34.61	-34.64	6.86	-7.12	-13.00	-21.61
5640.00	H	-46.50	-46.70	8.30	-8.26	-13.00	-33.50
7520.00	H	-42.45	-42.75	9.69	-9.50	-13.00	-29.45
9400.00	H	-41.52	-41.64	10.69	-10.76	-13.00	-28.52
11280.00	H	-36.05	-36.29	10.85	-10.76	-13.00	-23.05
13160.00	H	---					
15040.00	H	---					
16920.00	H	---					
18800.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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Operation Band :GPRS 1900 Test Date :2012-01-06
 ARFCN :CH 810 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :1909.8 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

Freq. MHz	Note F/H/E/S	EIRP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBi	Loss dB	dBm	Margin dB
143.49	S	-85.34	-83.45	0.89	-2.79	-13.00	-72.34
276.38	S	-85.59	-89.00	6.62	-3.22	-13.00	-72.59
318.09	S	-84.34	-87.76	6.78	-3.39	-13.00	-71.34
444.19	S	-83.90	-86.87	6.65	-3.70	-13.00	-70.90
494.63	S	-83.21	-86.40	6.84	-3.70	-13.00	-70.21
791.45	S	-78.17	-80.07	5.99	-4.16	-13.00	-65.17
3819.60	H	-25.00	-25.51	7.51	-7.20	-13.00	-12.00
5729.40	H	-37.47	-38.17	9.03	-8.44	-13.00	-24.47
7639.20	H	-31.73	-33.11	10.48	-9.37	-13.00	-18.73
9549.00	H	-37.42	-38.73	11.49	-10.36	-13.00	-24.42
11458.80	H	-28.00	-28.86	11.43	-10.73	-13.00	-15.00
13368.60	H	---					
15278.40	H	---					
17188.20	H	---					
19098.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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Operation Band :GPRS 1900 Test Date :2012-01-06
 ARFCN :CH 810 Temp./Humi. :27 deg_C / 66 RH
 Fundamental Frequency :1909.8 MHz Engineer :Lion
 Operation Mode :TX
 EUT Pol. :E2 Plan Measurement Antenna Pol. :HORIZONTAL

Freq. MHz	Note F/H/E/S	EIRP dBm	SG	Antenna	Cable	Limit	Safe
			Output Level dBm	Gain dBi	Loss dB	dBm	Margin dB
133.79	S	-88.29	-86.71	1.20	-2.79	-13.00	-75.29
286.08	S	-85.67	-89.11	6.65	-3.22	-13.00	-72.67
320.03	S	-84.72	-88.14	6.78	-3.39	-13.00	-71.72
449.04	S	-84.10	-87.05	6.62	-3.70	-13.00	-71.10
482.02	S	-83.99	-87.10	6.78	-3.70	-13.00	-70.99
795.33	S	-78.54	-80.43	6.02	-4.20	-13.00	-65.54
3819.60	H	-34.06	-34.10	7.04	-7.20	-13.00	-21.06
5729.40	H	-42.97	-42.96	8.32	-8.44	-13.00	-29.97
7639.20	H	-36.96	-37.61	9.74	-9.37	-13.00	-23.96
9549.00	H	-46.01	-46.49	10.67	-10.36	-13.00	-33.01
11458.80	H	-33.25	-33.48	10.80	-10.73	-13.00	-20.25
13368.60	H	---					
15278.40	H	---					
17188.20	H	---					
19098.00	H	---					

$$\text{ERP(dBm)} = \text{SG Level(dBm)} + \text{Antenna Gain(dBd)} + \text{Cable Loss(dB)}$$

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

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11. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

11.1. Standard Applicable:

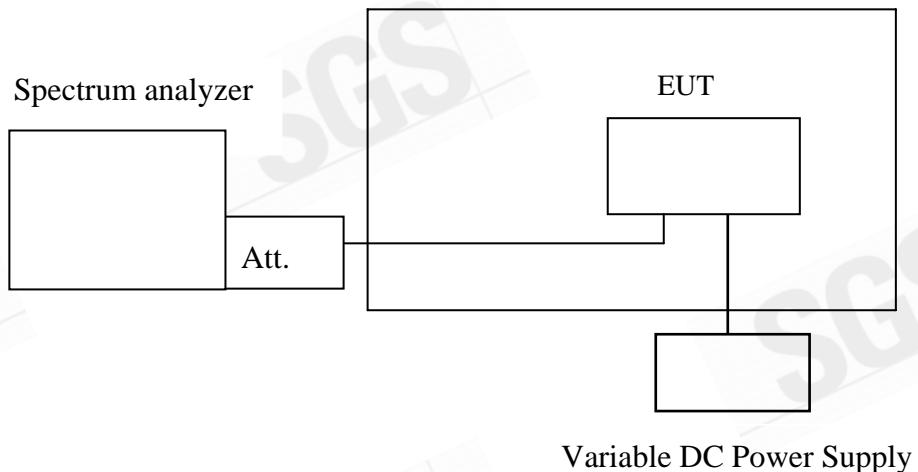
According to FCC §2.1055(a) (1)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

11.2. Test Set-up:

Temperature Chamber



Note : Measurement setup for testing on Antenna connector

11.3. Measurement Procedure:

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

11.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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11.5. Measurement Result:

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz @ 25				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
3.7	-30	836.600016	-16.00	2091
3.7	-20	836.600018	-18.00	2091
3.7	-10	836.600014	-14.00	2091
3.7	0	836.600005	-5.00	2091
3.7	10	836.600004	-4.00	2091
3.7	20	836.600001	-1.00	2091
3.7	30	836.600000	0.00	2091
3.7	40	836.600009	-9.00	2091
3.7	50	836.600007	-7.00	2091

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz @ 20				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
3.7	-30	1880.000021	-17.00	4700
3.7	-20	1880.000010	-6.00	4700
3.7	-10	1880.000013	-9.00	4700
3.7	0	1880.000012	-8.00	4700
3.7	10	1880.000010	-6.00	4700
3.7	20	1880.000008	-4.00	4700
3.7	30	1880.000004	0.00	4700
3.7	40	1880.000011	-7.00	4700
3.7	50	1880.000017	-13.00	4700

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12. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

12.1. Standard Applicable:

According to FCC §2.1055(a) (1)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

According to RSS-133 §6.3, RSS-132 §4.3

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

12.2. Test Set-up:

Refer to section 10.2 in this report

12.3. Measurement Procedure:

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

Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

12.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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12.5. Measurement Result:

Reference Frequency: GPRS 850 Mid Channel 836.6 MHz @ 25				
Limit: +/- 2.5 ppm = 2091 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
4.2	25.00	836.600009	-1.00	2091.00
3.7	25.00	836.600008	0.00	2091.00
3.5	25.00	836.600008	0.00	2091.00
3.2 (End Point)	25.00	836.600016	-8.00	2091.00

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz @ 25				
Limit: +/- 2.5 ppm = 4700 Hz				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature ()	(MHz)		
4.2	25	1880.000016	-4.00	4700
3.7	25	1880.000012	0.00	4700
3.5	25	1880.000008	4.00	4700
3.2 (End Point)	25	1880.000026	-14.00	4700

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