

Report No.: EH/2012/70047 Issue Date: Jul. 12, 2012

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# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E AND INDUSTRY CANADA RSS-132 and RSS-133 REQUIREMENT

OF

**Product Name:** PDA Phone

**Brand Name:** Sony

**Marketing Name:** ST21i

Model No.: PM-0130-BV

Model Difference: N/A

FCC ID: **PY7PM-0130** 

IC: 4170B-PM0130

**Report No.:** EH/2012/70047

**Issue Date: Jul. 12, 2012** 

FCC Rule Part: 2, 22H & 24E

IC Rule Part: RSS 132, Issue 2 and RSS 133, Issue 5

Prepared for: Sony Mobile Communications AB

Nya Vattentornet 22188 Lund/SWEDEN

SGS Taiwan Ltd.

Prepared by: Electronics & Communication Laboratory

No. 134, Wu Kung Rd., Wuku Industrial

Zone, Taipei County, Taiwan.

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## VERIFICATION OF COMPLIANCE

Sony Mobile Communications AB **Applicant:** 

Nya Vattentornet 22188 Lund/SWEDEN

**Product Name:** PDA Phone

**Brand Name:** Sony

**Marketing Name:** ST21i

Model No.: PM-0130-BV

**Model Difference:** N/A

FCC ID: PY7PM-0130

IC: 4170B-PM0130

File Number: EH/2012/70047

Date of test: Jul. 02, 2012 ~ Jul. 12, 2012

**Date of EUT Received:** Jul. 02, 2012

## 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, Issue 3 of RSS-Gen 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 PART 22 subpart H, PART 24 subpart E and IC standards Issue 2 of RSS-132, Issue 5 of RSS-133.

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

Test By:	Lazz Huang	Date:	Jul. 12, 2012
Prepared By:	Jazz Huang / Engineer  Tiffany Kao / Clerk	Date:	Jul. 12, 2012
Approved By:	Jim Chang	Date:	Jul. 12, 2012

Jim Chang / Supervisor

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## Version

Version No.	Date	Description
00	Jul. 12, 2012	Initial creation of document

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## 1. GENERAL PRODUCT INFORMATION

#### General:

General:					
Product Name:	PDA Phone				
Brand Name:	Sony				
Marketing Name:	ST21i				
Model No.:	PM-0130-BV				
Model difference:	N/A				
Data Cable (USB):	Model No.: EC450, Supplier: K-one, Part No.: 1242-6715				
Simple Hands-free (SHF):	Model No.: MH410C, Supplier: Foster Electric Type No.: CCA-0004017				
Car Charger:	Model No.: AN400, Supplier: Salcomp, Type No.: CAA-0003013				
	3.7Vdc form I	Li-Ion battery or 5Vdc form adapter.			
Power Supply:	Battery:  1. Model No.: BA700, Supplier: LG Type No.: CBA-0002025 2. Model No.: BA700, Supplier: Samsung Type No.: CBA-0002026				
	Adapter :	1. Model No.: EP800, Supplier: Salcomp Type No.: CAA-0002016-US, CAA-0002016-BV 2. Model No.: EP800, Supplier: EMERSON Type No.: CAA-0002022-US, CAA-0002022-BV			

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### GSM / GPRS:

	Operating Frequency	Rated Power		
Cellular Phone Standards	GSM/GPRS 850, Class 12	824 MHz– 849MHz	33 dBm	
Frequency Range and	EDGE 850, Class 12	824 MHz– 849MHz	33 dBm	
Power:	GSM/GPRS 1900, Class 12	1850MHz – 1910MHz	30 dBm	
65	EDGE 1900, Class 12	1850MHz – 1910MHz	30 dBm	
Type of Emission	GSM 850: 245KGXW, GSM 1900: 250KGXW GPRS 850: 251KGXW, GPRS 1900: 246KGXW EDGE 850: 250KG7W, EDGE 1900: 246KG7W			
Hardware Version:	A (Radiated)			
Software Version:	ware Version: E EMC_1.*.J.0.5_userdebug (Radiated) 1.1.J.0.3_1_03_userdebug(Conducted)			
IMEI:	004402144438003			

This test report applies for GSM/GPRS/EDGE 850/1900.

## Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)			
GSM 850	3.7 Vdc	580			
GSM 1900	3.7 Vdc	590			
GPRS 850	3.7 Vdc	610			
GPRS 1900	3.7 Vdc	630			
EDGE 850	3.7 Vdc	640			
EDGE 1900	3.7 Vdc	590			

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

This submittal(s) (test report) is intended for FCC ID: PY7PM-0130 filing to comply with Section Part 22 subpart H, Part 24 subpart E of the FCC CFR 47 Rules and IC: 4170B-PM0130 filing to comply with Issue 2 of RSS-132, Issue 5 of RSS-133.

### 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, 2.1057, issue 2 of RSS-132 and issue 3 of RSS-133...

### 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, 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 Issue 3, The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13 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.	
Power Sensor	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014	
Power Meter	Anritsu	MA2411B	917032	02/08/2012	02/07/2014	
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013	
Spectrum Analyzer	Agilent	E4440A	US41160416	03/17/2012	03/16/2014	
Radio Communication Analyzer	R & S	CMU200	102189	08/12/2010	08/11/2012	
WIDEB. RADIO COMIN. TESTER	R & S	CMW500	101582	07/12/2010	07/11/2012	
Temperature Chamber	TERCHY	MHG-120LF	911009	04/16/2012	04/15/2014	
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2012	02/27/2013	
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2012	02/27/2013	
Splitter	Agilent	11636B	N/A	02/28/2012	02/27/2013	
DC Power Supply	Agilent	E3640A	MY40005907	07/15/2011	07/14/2013	

966 Chamber							
EQUIPMENT MFR MODEL SERIAL LAST CALI							
ТҮРЕ		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013		
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/15/2011	02/14/2013		
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013		
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014		
Bilog Antenna	SCHWAZBECK	VULB9160	3158	11/24/2011	11/23/2013		
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	05/19/2011	05/18/2013		
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2011	05/18/2013		
Horn Antenna	Schwarzbeck	BBHA9170	184	01/17/2012	01/17/2014		

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Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013
RF amplifier	Miteq	AMF-6F-2600 400-40-8P	971576	12/28/2011	12/27/2012
Signal Generator	R&S	SMR40	100210	02/02/2012	02/01/2014
Signal Generator	Agilent	E4438C	MY45093613	07/15/2011	07/14/2013
Pre-Amplifier	Agilent	8447D	1937A02834	01/04/2012	01/03/2013
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2012	01/03/2013
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2012	02/27/2013
Radio Communication Analyzer	R & S	CMU200	102189	08/12/2010	08/11/2012
WIDEB. RADIO COMIN. TESTER	R & S	CMW500	101582	07/12/2010	07/11/2012
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	966_Tx	10m	01/04/2012	01/03/2013
Low Loss Cable	HUBER+SUHNER	966_Rx	3m	01/04/2012	01/03/2013
Filter 800-1000	Micro-Tronics	EWT	M2	02/28/2012	02/28/2013
Filter 1800-2000	Micro-Tronics	EWT	M2	02/28/2012	02/28/2013
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	02/28/2012	02/27/2013
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	02/28/2012	02/27/2013
3m Site NSA	SGS	966 chamber	N/A	07/15/2011	07/14/2012

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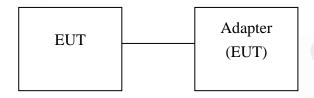


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## 2.5. Configuration of Tested System

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



### **Remote Side**

CMU200

**Table 2-1 Equipment Used in Tested System** 

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	<b>Power Cord</b>
1.	Adapter	Salcomp / EMERSON	EP800	N/A	shielded	Un-shielded
2.	Universal Radio Communication Tester	R&S	CMU200	102189	shielded	Un-shielded

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## 3. SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§2.1046(a)	N/A	RF Power Output	Compliant
\$2.1046(a) \$22.913(a)(2) \$24.232(c)	§4.8 (RSS-Gen Issue 3) §4.4 (RSS-132) §6.4 (RSS-133)	ERP/ EIRP measurement	Compliant
§2.1049(h)	§4.6.1 (RSS-Gen Issue 3) §2.3 (RSS-133)	99% Occupied Bandwidth	Compliant
\$2.1051 \$22.917(a) \$24.238(a)	§4.9 (RSS-Gen Issue 3) §4.5 (RSS-132) §6.5 (RSS-133)	Out of Band Emissions at Antenna Terminals and Band Edge	Compliant
\$2.1053 \$22.917(a) \$24.238(a)	§4.9 (RSS-Gen Issue 3) §4.5 (RSS-132) §6.5 (RSS-133)	Field Strength of Spurious Radiation	Compliant
\$2.1055(a)(1) \$22.355 \$24.235	§4.7 (RSS-Gen Issue 3) §4.3 (RSS-132) §6.3 (RSS-133)	Frequency Stability vs. Temperature	Compliant
\$2.1055(d)(2) \$22.355 \$24.235	§4.7 (RSS-Gen Issue 3) §4.3 (RSS-132) §6.3 (RSS-133)	Frequency Stability vs. Voltage	Compliant
N/A	§4.10 (RSS-Gen Issue 3) §4.6 (RSS-132) §6.6 (RSS-133)	Receiver Spurious Emissions	Compliant

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#### Max ERP/EIRP measurement result:

	dBm	W	
GSM 850 Band	24.97	ERP	0.314
GSM 1900 Band	31.66	EIRP	1.466
GPRS 850 Band	24.91	ERP	0.310
GPRS 1900 Band	30.37	EIRP	1.089
EDGE 850 Band	24.57	ERP	0.286
EDGE 1900 Band	28.71	EIRP	0.743

### **DESCRIPTION OF TEST MODES**

The EUT has been tested under operating condition.

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

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for GSM/GPRS/EDGE with power adaptor. The worst-case of E2 position for GSM850 and E1 position for GSM1900 were reported.

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# 5. MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION

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

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

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### 6. RF POWER OUTPUT MEASUREMENT

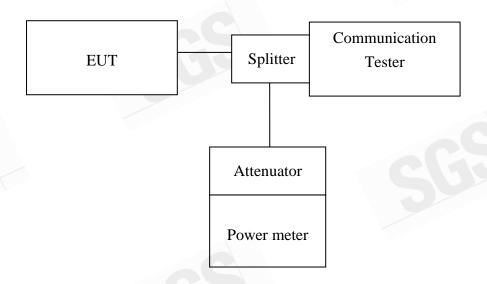
## **6.1 Standard Applicable:**

According to FCC §2.1046.

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

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

## 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.

## 6.4 Measurement Equipment Used:

Refer to section 2.4 in this report

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**Measurement Result:** 

6.5.1 RF Conducted Output Power

6.5.1.1. GSM/GPRS/EDGE (GMSK; 8-PSK)

### **Result:**

EUT Mode	Frequency (MHz)	СН	Peak Power (dBm)	Average Burst Power (dBm)
	824.2	128	32.30	32.10
GSM 850	836.6	190	32.30	32.10
	848.8	251	32.30	32.10

EUT Mode	Frequency (MHz)	СН	Peak Power (dBm)	Average Burst Power (dBm)
	1850.2	512	29.00	28.90
GSM 1900	1880.0	661	28.80	28.70
	1909.8	810	28.70	28.60

EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 1UP) class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)
	824.2	128	32.30	32.10	29.50	29.30
GPRS 850	836.6	190	32.30	32.10	29.50	29.30
	848.8	251	32.30	32.10	29.50	29.30

EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 3UP) Class 11 (dBm)	Average Burst Power (4DN 3UP) Cass 11 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
GPRS 850	824.2	128	27.60	27.50	26.40	26.20
	836.6	190	27.70	27.60	26.40	26.30
	848.8	251	27.70	27.50	26.40	26.30

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EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 1UP) class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)
GPRS 1900	1850.2	512	30.60	30.50	27.90	27.80
	1880.0	661	30.70	30.50	27.80	27.70
	1909.8	810	30.70	30.60	27.80	27.70

EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 3UP) Class 11 (dBm)	Average Burst Power (4DN 3UP) Cass 11 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
	1850.2	512	25.80	25.70	25.20	25.00
GPRS 1900	1880.0	661	25.80	25.70	25.20	25.00
	1909.8	810	25.80	25.70	25.20	25.00

EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 1UP) class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)
	824.2	128	30.10	26.90	30.10	26.90
EDGE 850	836.6	190	30.10	26.90	30.10	26.90
300	848.8	251	30.20	27.00	30.20	27.00

EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 3UP) Class 11 (dBm)	Average Burst Power (4DN 3UP) Cass 11 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
EDGE 850	824.2	128	30.00	26.80	28.90	25.70
	836.6	190	30.00	26.80	29.00	25.80
	848.8	251	30.10	26.90	29.10	25.80

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EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 1UP) class 8 (dBm)	Average Burst Power (4DN 1UP) Class 8 (dBm)	Peak Power (4DN 2UP) Class 10 (dBm)	Average Burst Power (4DN 2UP) Class 10 (dBm)
	1850.2	512	30.20	27.10	29.20	26.10
EDGE 1900	1880.0	661	30.10	26.90	29.10	26.00
	1909.8	810	30.10	26.90	29.00	25.90

EUT Mode	Frequency (MHz)	СН	Peak Power (4DN 3UP) Class 11 (dBm)	Average Burst Power (4DN 3UP) Cass 11 (dBm)	Peak Power (4DN 4UP) Class 12 (dBm)	Average Burst Power (4DN 4UP) Class 12 (dBm)
	1850.2	512	28.60	25.50	27.70	24.50
EDGE 1900	1880.0	661	28.50	25.40	27.60	24.50
	1909.8	810	28.50	25.40	27.60	24.50

Cable loss offset Low Band: 0.5 dB Cable loss offset High Band: 0.8 dB

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### 6.5.2. Minimum Communications Power Measurement

#### PCS 1900 band

PCL	0	1	2	3		4		5	6	7	8
Output power (dBm)	29.7	27.8	25.9	23.	.8	21.9	1	9.9	17.9	16	14
				•						PPO	
PCL	9	10	11	12	13	14	4	15			
Output power (dBm)	12	10	8	6.1	4.1	2.	2	0.1			

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

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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(b) Mobile station are limited to 2W EIRP.

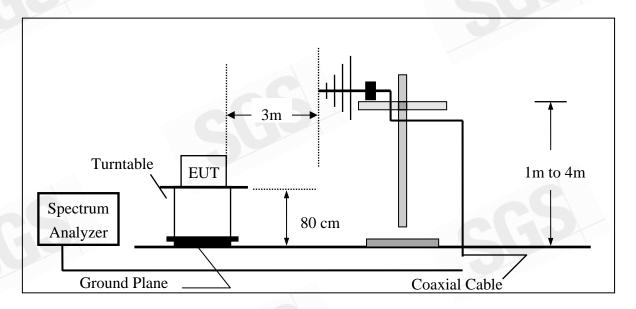
According to IC RSS-133 §6.4

The peak e.i.r.p. for transmitters operating in the band 1850-1910 MHz shall not exceed the limits 2W which given in SRSP-510.

According to issue 2 of RSS 132, section 4.4. The transmitter output power shall not exceed the limits given in SRSP-503.

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

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



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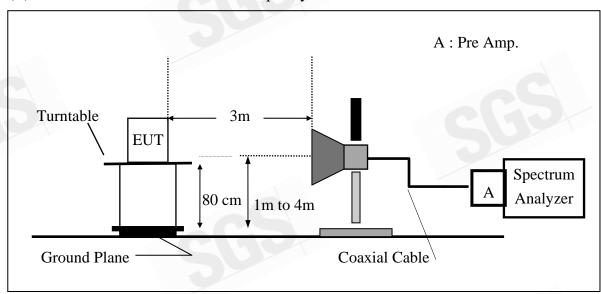
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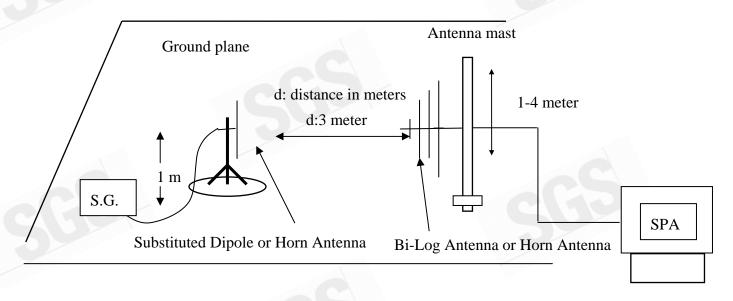
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### (B) Radiated Emission Test Set-UP Frequency Over 1 GHz



### Substituted Method Test Set-UP



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#### 7.3. Measurement Procedure:

The EUT was placed on an 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:

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

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

### 7.4. Measurement Equipment Used:

Refer to section 2.4 in this report

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### 7.5. Measurement Result:

	1	EUT	5	Measurement						
Operation Band	Pol.	Fundamental Frequency	СН	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit	
		MHz		V/H	dBm	dBd	dB	dBm	dBm	
		824.20	128	V	24.9	3.96	-4.22	24.64	38.45	
		824.20	128	Н	23.59	3.96	-4.22	23.33	38.45	
	Н	836.60	190	V	24.87	4.00	-4.24	24.63	38.45	
	п	830.00	190	Н	23.33	4.00	-4.24	23.09	38.45	
		848.80	251	V	25.22	4.03	-4.33	24.92	38.45	
		848.80	231	Н	23.06	4.03	-4.33	22.76	38.45	
		824.20	128	V	21.92	3.96	-4.22	21.66	38.45	
		824.20	126	Н	23.54	3.96	-4.22	23.28	38.45	
GSM 850	E1	836.60	.60 190	V	22.54	4.00	-4.24	22.30	38.45	
GSM 650	EI	830.00	190	Н	23.71	4.00	-4.24	23.47	38.45	
		848.80	251	V	23.59	4.03	-4.33	23.29	38.45	
		048.80	231	Н	23.89	4.03	-4.33	23.59	38.45	
		824.20	128	V	21.93	3.96	-4.22	21.67	38.45	
		824.20	120	Н	25.19	3.96	-4.22	24.93	38.45	
	E2	836.60	190	V	21.79	4.00	-4.24	21.54	38.45	
		030.00	170	Н	25.21	4.00	-4.24	24.97	38.45	
		848.80	251	V	21.23	4.03	-4.33	20.93	38.45	
		040.00	<i>43</i> 1	Н	25.38	4.03	-4.33	25.08	38.45	

### Remark:

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

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	I	EUT		Measurement					
Operation Band	Pol.	Fundamental Frequency	СН	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dBi	dB	dBm	dBm
		1850.20	512	V	26.91	4.17	-5.49	25.60	33.00
		1830.20	312	Н	25.85	4.51	-5.49	24.87	33.00
	Н	1880.00	661	V	26.19	4.13	-5.56	24.76	33.00
	п	1000.00	001	Н	23.42	4.44	-5.56	22.30	33.00
		1909.80	810	V	25.07	4.09	-5.56	23.61	33.00
		1909.80	810	Н	23.08	4.36	-5.56	21.89	33.00
		1850.20	512	V	32.98	4.17	-5.49	31.66	33.00
		1830.20	312	Н	26.3	4.51	-5.49	25.33	33.00
GSM 1900	E1	E1 1880.00 661	V	29.7	4.13	-5.56	28.27	33.00	
GSWI 1900	EI	1880.00	001	Н	23.97	4.44	-5.56	22.84	33.00
EC		1909.80	810	V	30.00	4.09	-5.56	28.54	33.00
		1909.80	810	Н	20.93	4.36	-5.56	19.74	33.00
		1850.20	512	V	30.87	4.17	-5.49	29.56	33.00
		1030.20	314	Н	30.93	4.51	-5.49	29.96	33.00
	E2	1880.00	1880.00 661	V	25.96	4.13	-5.56	24.53	33.00
	EZ	1880.00 66	001	Н	29.95	4.44	-5.56	28.82	33.00
		1000.90	910	V	25.06	4.10	-5.56	23.60	33.00
		1909.80	810	Н	30.14	4.36	-5.56	28.95	33.00

#### Remark:

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

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	]	EUT		Measurement					
Operation Band	Pol.	Fundamental Frequency	СН	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
		MHz		V/H	dBm	dBd	dB	dBm	dBm
		824.20	128	V	23.9	3.96	-4.22	23.64	38.45
		824.20	120	Н	22.59	3.96	-4.22	22.33	38.45
	Н	836.60	190	V	24.87	4.00	-4.24	24.63	38.45
	11	030.00	190	Н	21.12	4.00	-4.24	20.88	38.45
		848.80	251	V	25.22	4.03	-4.33	24.92	38.45
		040.00	231	Н	21.02	4.03	-4.33	20.72	38.45
		824.20	128	V	20.88	3.96	-4.22	20.62	38.45
		024.20	120	Н	22.51	3.96	-4.22	22.25	38.45
GPRS 850	E1	836.60	190	V	21.03	4.00	-4.24	20.79	38.45
OI NO 050	Li	030.00	170	Н	21.73	4.00	-4.24	21.49	38.45
		848.80	251	V	22.68	4.03	-4.33	22.38	38.45
		040.00	231	Н	22.61	4.03	-4.33	22.31	38.45
		824.20	128	V	20.42	3.96	-4.22	20.16	38.45
		024.20	120	Н	24.98	3.96	-4.22	24.72	38.45
	E2	836.60	190	V	20.41	4.00	-4.24	20.17	38.45
	152	030.00	170	Н	25.15	4.00	-4.24	24.91	38.45
		848.80	251	V	20.05	4.03	-4.33	19.75	38.45
		070.00	231	Н	24.54	4.03	-4.33	24.24	38.45

#### Remark:

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

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	]	EUT			M	Ieasurem	ent		
Operation Band	Pol.	Fundamental Frequency	СН	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dBi	dB	dBm	dBm
		1850.20	512	V	26.19	4.17	-5.49	24.88	33.00
		1630.20	312	Н	24.88	4.51	-5.49	23.90	33.00
	Н	1880.00	661	V	25.5	4.13	-5.56	24.07	33.00
	11	1860.00	001	Н	23.05	4.44	-5.56	21.92	33.00
		1909.80	810	V	24.44	4.09	-5.56	22.98	33.00
		1707.00	010	H	22.15	4.36	-5.56	20.96	33.00
		1850.20	512	V	31.69	4.17	-5.49	30.37	33.00
		1650.20	012	Н	25.05	4.51	-5.49	24.07	33.00
GPRS 1900	E1	1880.00	661	V	29.27	4.13	-5.56	27.84	33.00
GIAS 1900			001	Н	23.11	4.44	-5.56	21.98	33.00
EC		1909.80	810	V	27.44	4.09	-5.56	25.98	33.00
		1707.00	010	Н	20.46	4.36	-5.56	19.27	33.00
		1850.20	512	V	30.48	4.17	-5.49	29.17	33.00
		1000.20	J 1 _	Н	30.40	4.51	-5.49	29.43	33.00
	E2	1880.00	661	V	25.04	4.13	-5.56	23.61	33.00
		1880.00 66	331	Н	28.69	4.44	-5.56	27.56	33.00
		1909.80	810	V	24.33	4.09	-5.56	22.87	33.00
		1707.00	010	Н	29.16	4.36	-5.56	27.96	33.00

#### Remark:

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

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	]	EUT	1	Measurement					
Operation Band	Pol.	Fundamental Frequency	СН	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
-6		MHz		V/H	dBm	dBd	dB	dBm	dBm
		824.20	128	V	23.17	3.96	-4.22	22.91	38.45
		824.20	120	Н	21.71	3.96	-4.22	21.45	38.45
	Н	836.60	190	V	23.50	4.00	-4.24	23.26	38.45
	11	830.00	190	Н	21.28	4.00	-4.24	21.04	38.45
		848.80	251	V	23.97	4.03	-4.33	23.67	38.45
		040.00	231	Н	20.90	4.03	-4.33	20.60	38.45
		824.20	128	V	18.92	3.96	-4.22	18.66	38.45
		024.20	120	Н	21.62	3.96	-4.22	21.36	38.45
EDGE 850	E1	836.60	190	V	20.96	4.00	-4.24	20.72	38.45
LDGL 630	Li	030.00	170	Н	22.47	4.00	-4.24	22.23	38.45
		848.80	251	V	22.45	4.03	-4.33	22.15	38.45
		040.00	231	Н	22.87	4.03	-4.33	22.57	38.45
		824.20	128	V	19.53	3.96	-4.22	19.27	38.45
		027.20	120	Н	24.77	3.96	-4.22	24.51	38.45
	E2	836.60	190	V	19.50	4.00	-4.24	19.26	38.45
	152	030.00	170	Н	24.81	4.00	-4.24	24.57	38.45
		848.80	251	V	18.91	4.03	-4.33	18.61	38.45
		070.00	231	Н	24.66	4.03	-4.33	24.36	38.45

#### Remark:

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

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	]	EUT	2	Measurement					
Operation Band	Pol.	Fundamental Frequency	СН	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
		MHz		V/H	dBm	dBi	dB	dBm	dBm
		1850.20	512	V	27.16	4.17	-5.49	25.85	33.00
		1830.20	312	Н	25.29	4.51	-5.49	24.32	33.00
	Н	1880.00	661	V	23.92	4.13	-5.56	22.49	33.00
	11	1880.00	001	Н	23.33	4.44	-5.56	22.21	33.00
		1909.80	810	V	22.92	4.09	-5.56	21.45	33.00
		1707.80	010	Н	22.23	4.36	-5.56	21.04	33.00
		1850.20	512	V	30.02	4.17	-5.49	28.71	33.00
		1030.20	312	Н	26.21	4.51	-5.49	25.24	33.00
EDGE 1900	E1	1880.00	661	V	27.96	4.13	-5.56	26.53	33.00
EDGE 1900	Li	1880.00	001	Н	23.69	4.44	-5.56	22.57	33.00
		1909.80	810	V	16.69	4.09	-5.56	15.22	33.00
		1707.80	010	Н	21.26	4.36	-5.56	20.07	33.00
		1850.20	512	V	26.14	4.17	-5.49	24.83	33.00
		1630.20	314	Н	27.51	4.51	-5.49	26.53	33.00
	E2	1880.00	661	V	23.00	4.13	-5.56	21.57	33.00
	ĽZ	1000.00	001	Н	26.39	4.44	-5.56	25.27	33.00
		1909.80	810	V	22.37	4.09	-5.56	20.91	33.00
		1909.00	610	Н	25.50	4.36	-5.56	24.31	33.00

### Remark:

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

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### 8. 99% OCCUPIED BANDWIDTH MEASUREMENT

### 8.1. Standard Applicable:

According to §FCC 2.1049.

According to IC RSS-Gen Issue 3 §4.6.1

According to IC RSS-133 §2.3

### 8.2. Test Set-up:

Refer to section 6.2 in this report

#### 8.3. Measurement Procedure:

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -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)	СН	99% Bandwidth (KHz)
	824.20	128	245.1706
GSM 850	836.60	190	244.3389
	848.80	251	244.9777

EUT Mode	Frequency (MHz)	СН	99% Bandwidth (KHz)
	1850.20	512	247.9592
GSM 1900	1880.00	661	245.3926
	1909.80	810	249.6671

EUT Mode	Frequency (MHz)	СН	99% Bandwidth (KHz)
	824.20	128	242.7005
GPRS 850	836.60	190	250.6405
	848.80	251	245.2216

EUT Mode	Frequency (MHz)	СН	99% Bandwidth (KHz)
	1850.20	512	245.6027
GPRS 1900	1880.00	661	246.1011
	1909.80	810	245.7412

EUT Mode	Frequency (MHz)	СН	99% Bandwidth (KHz)
EDGE 850	824.20	128	249.8993
	836.60	190	243.0807
	848.80	251	241.8992

EUT Mode	Frequency (MHz)	СН	99% Bandwidth (KHz)
EDGE 1900	1850.20	512	244.4819
	1880.00	661	245.7628
	1909.80	810	235.6435

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Figure 8-1: GSM 850 Channel Low

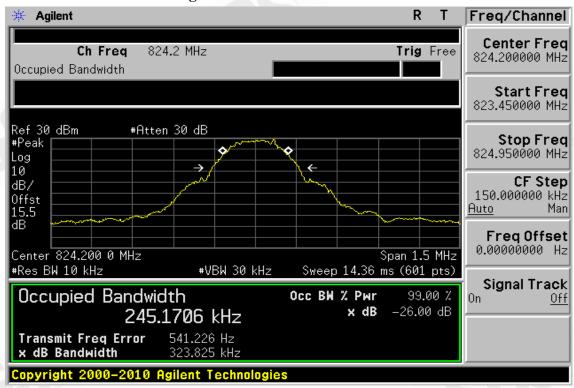
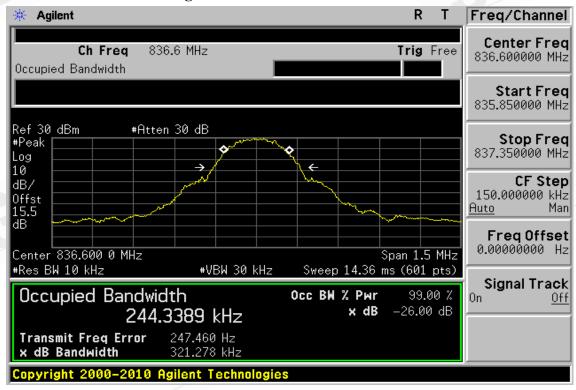


Figure 8-2: GSM 850 Channel Mid



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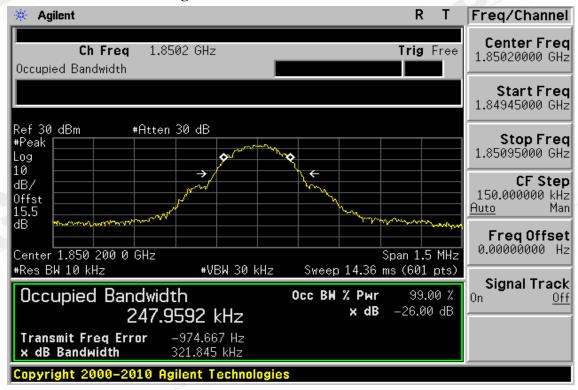
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Figure 8-3: GSM 850 Channel High



Figure 8-4: GSM 1900 Channel Low



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Figure 8-5: GSM 1900 Channel Mid

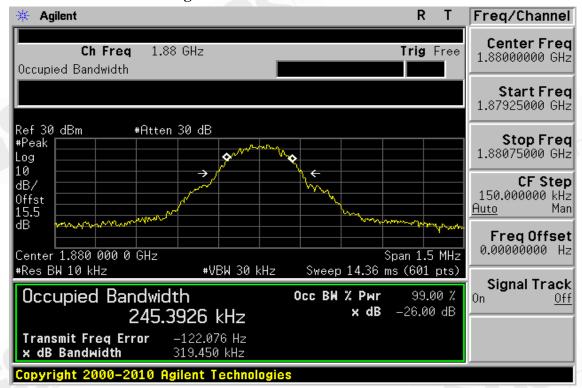
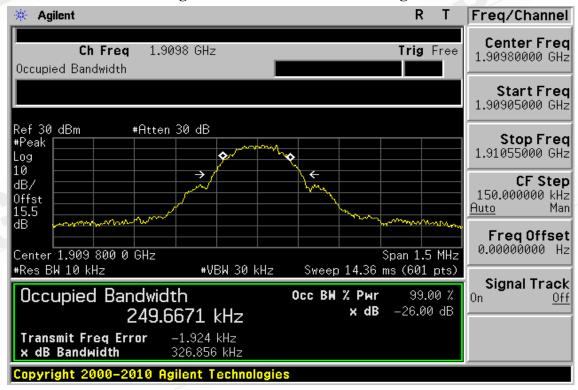


Figure 8-6: GSM 1900 Channel High



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Figure 8-7: GPRS 850 Channel Low

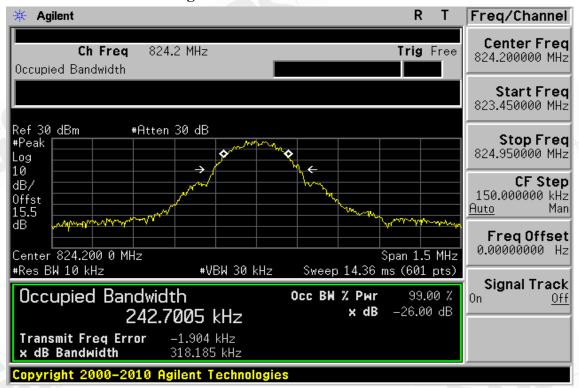
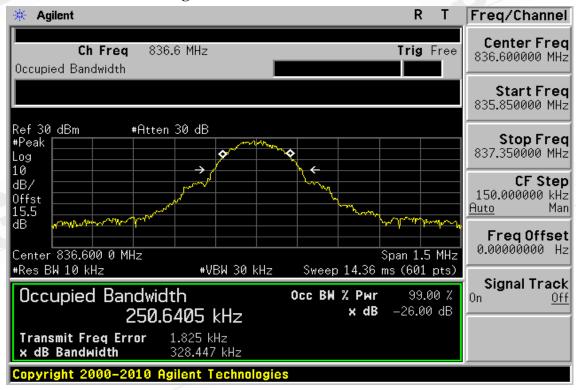


Figure 8-8: GPRS 850 Channel Mid



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Figure 8-9: GPRS 850 Channel High

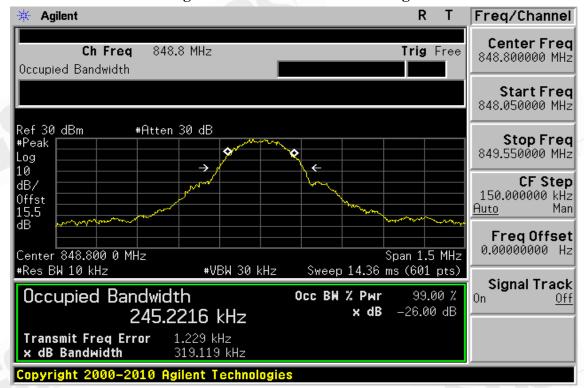
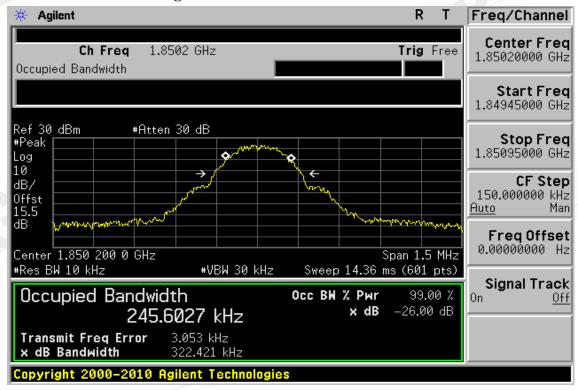


Figure 8-10: GPRS 1900 Channel Low



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Figure 8-11 GPRS 1900 Channel Mid

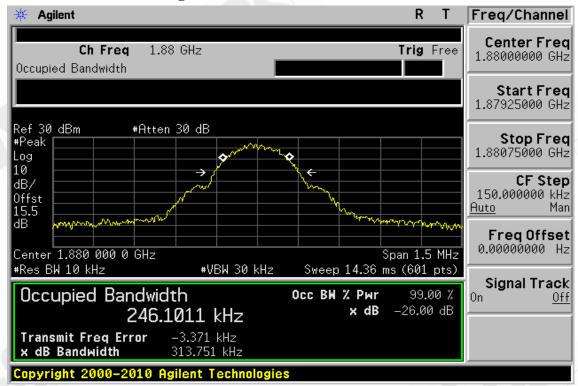
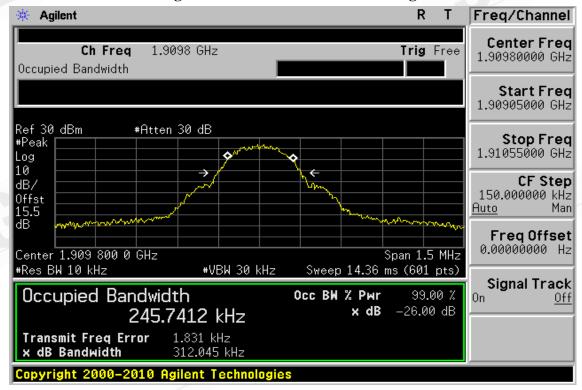


Figure 8-12: GPRS 1900 Channel High



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Figure 8-13: EDGE 850 Channel Low

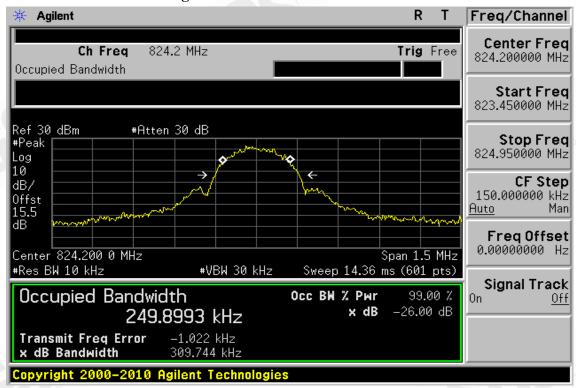
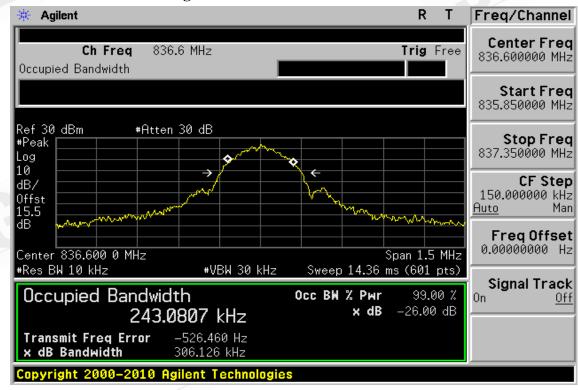


Figure 8-14 EDGE 850 Channel Mid



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Figure 8-15: EDGE 850 Channel High

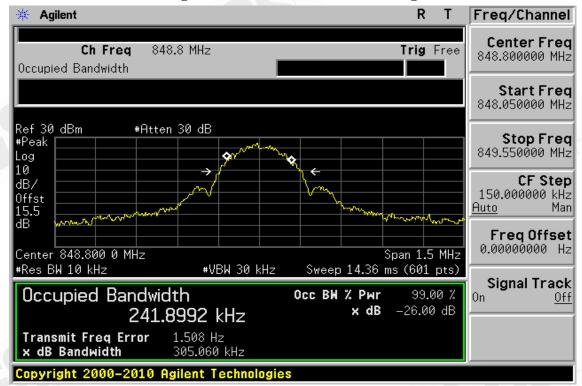
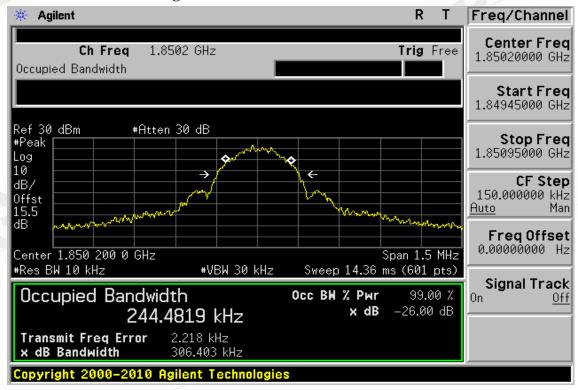


Figure 8-16: EDGE 1900 Channel Low



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## Figure 8-17 EDGE 1900 Channel Mid

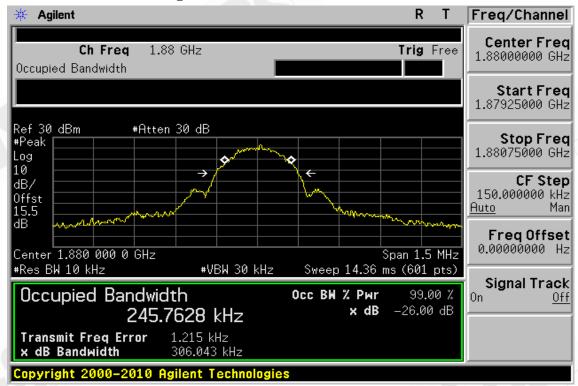
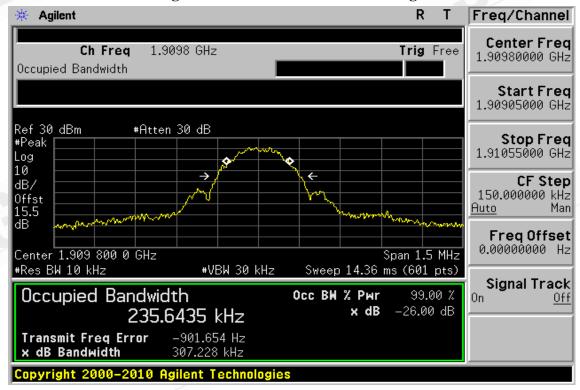


Figure 8-18: EDGE 1900 Channel High



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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)

According to RSS-132 §4.5

#### 4.5.1 Out-of-block Emissions

Mobile and base station equipment with emission bandwidth less than or equal to 4 MHz shall comply with 4.5.1.1. Mobile station equipment with emission bandwidth greater than 4 MHz shall comply with 4.5.1.2. Base station equipment with emission bandwidth greater than 4 MHz shall comply with either 4.5.1.2 or 4.5.1.3.

4.5.1.1 In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least  $43 + 10 \log (P)$ , dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least

 $43 + 10 \log (P)$ , dB, in any 100 kHz bandwidth.

4.5.1.2 In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least  $43 + 10 \log (P)$ , dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least

 $43 + 10 \log (P)$ , dB, in any 1 MHz bandwidth

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According to RSS-133 §6.5

6.5.1 Out-of-Block Emissions

a. Mobile stations must comply with subsection i. below.

In the first 1.0MHz band immediately outside and adjacent to the licensee's frequency block. the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least  $43 + 10 \log (P) dB$ .

b. After the first 1.0 MHz (for equipment that complies with a.i. of this subsection) or 1.5 MHz (for equipment that complies with all of this subsection), the power of emissions shall be attenuated below the transmitter output power by at least  $43 + 10 \log (P)$ , dB, per any MHz of bandwidth.

(Note: If the test result using 1% of the emission bandwidth is used, then power integration over 1.0 MHz is required; alternatively, the spectrum analyzer resolution and video bandwidths can be increased to 1.0 MHz for this measurement).

6.5.2 Out-of-Sub-band Emissions

Outside the sub-bands 1850-1910 MHz and 1930-1990 MHz, the attenuation shall be equal to or greater than the out-of-block emission limits in Section 6.5.1.

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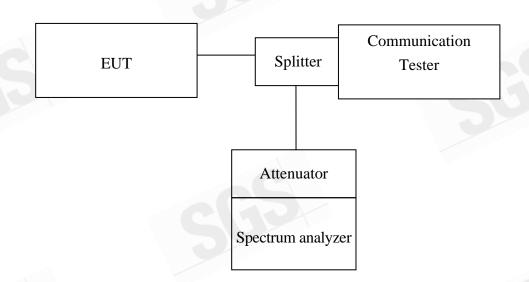
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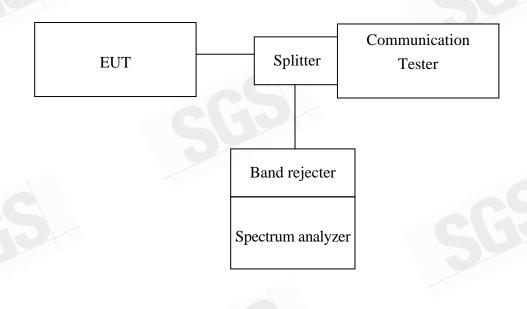
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# 9.2. Test SET-UP: Out of band emission



## **Band Edge**



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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= 10 th harmonic. Limit = -13dBm

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

#### **Conducted Emission:**

- 1、 To connect Antenna Port of EUT to Spectrum.
- Set RBW = 1MHz & VBW = 1MHz on Spectrum. 2、
- 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
- Via Software, combine 6 spans of frequency range into one plot 4、

### **Measurement Equipment Used:**

Refer to section 2.4 in this report

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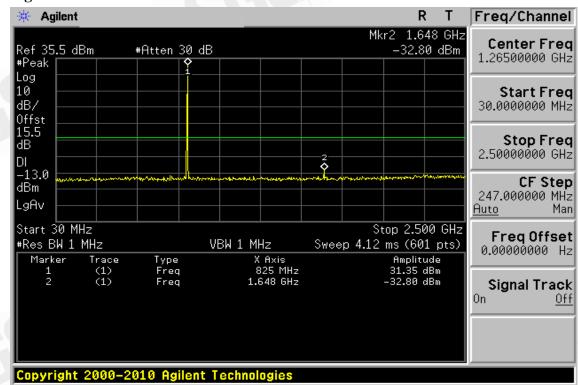


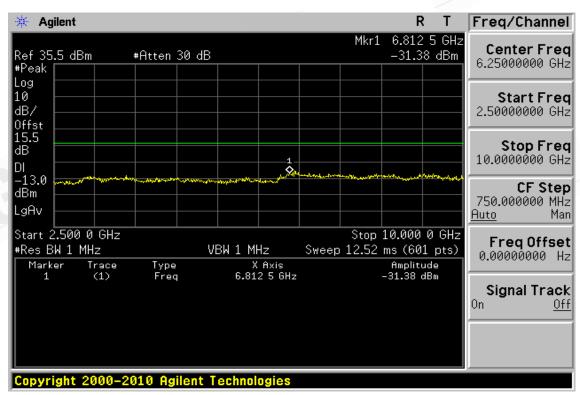
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#### 9.5. Measurement Result:

Figure 9-1: Out of Band emission at antenna terminals – GSM 850 Channel Lowest





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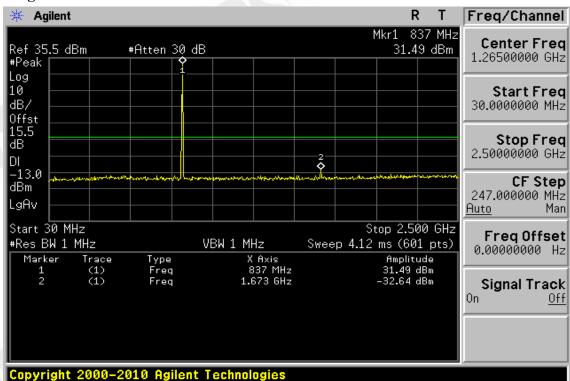
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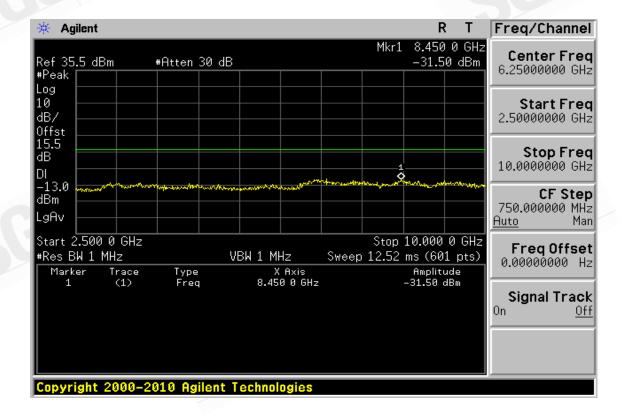


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Figure 9-2: Out of Band emission at antenna terminals – GSM 850 Channel Mid





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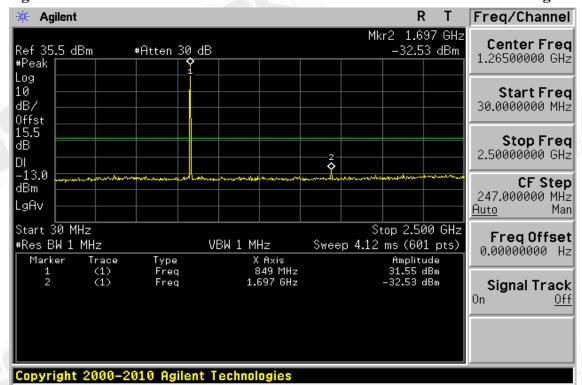
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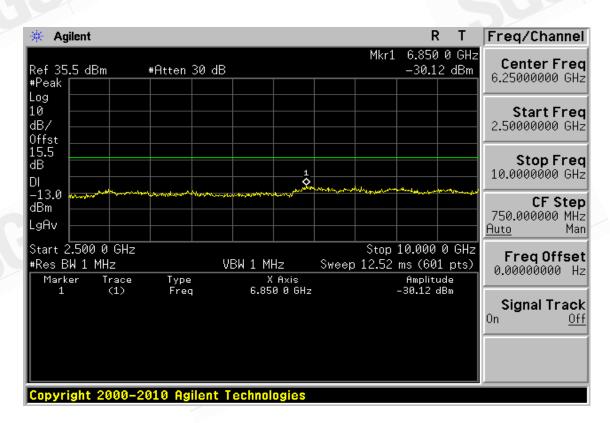


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Figure 9-3: Out of Band emission at antenna terminals – GSM 850 Channel Highest





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### Out of Band emission at antenna terminals – GSM 850

Fundamental Frequency: 824.2 MHz Engineer: Jazz

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	
30-1000	S		-13.00	
1648.40	Н	-32.80	-13.00	19.80
2472.60	Н		-13.00	
3296.80	Н		-13.00	
4121.00	H		-13.00	
4945.20	H		-13.00	
5769.40	Н		-13.00	
6593.60	Н		-13.00	
6812.50	S	-31.38	-13.00	18.38
7417.80	Н		-13.00	-
8242.00	Н		-13.00	4-6

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Fundamental Frequency: 836.6 MHz

Operation Mode :TX Mid Engineer

:Jazz

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	4.6
30-1000	S		-13.00	
1673.20	S	-32.64	-13.00	19.64
2509.80	Н		-13.00	
3346.40	Н	- C-+	-13.00	
4183.00	H		-13.00	
5019.60	Н		-13.00	
5856.20	H		-13.00	
6692.80	Н		-13.00	
7529.40	Н		-13.00	
8366.00	Н		-13.00	-
8450.00	S	-31.5	-13.00	18.50

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

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Fundamental Frequency :848.8MHz

Operation Mode :TX High

Engineer

:Jazz

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	40
30-1000	S		-13.00	
1697.60	S	-32.53	-13.00	19.53
2546.40	Н		-13.00	
3395.20	Н	C+	-13.00	
4244.00	Н		-13.00	
5092.80	Н		-13.00	
5941.60	Н		-13.00	
6790.40	Н		-13.00	
6850.00	S	-30.12	-13.00	17.12
7639.20	Н		-13.00	-
8488.00	Н		-13.00	

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Figure 9-4: Band edge emission at antenna terminals – GSM 850 Channel Lowest

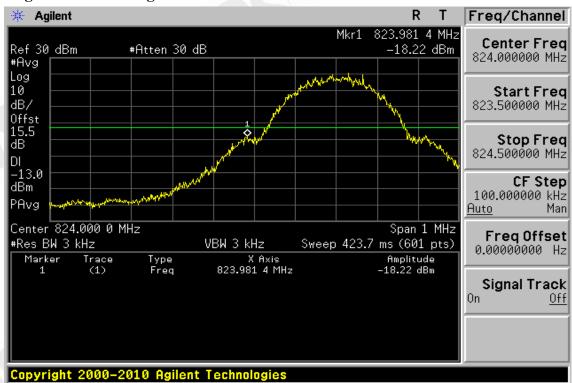
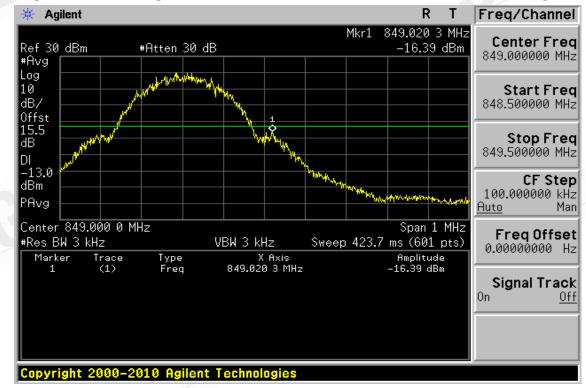


Figure 9-5: Band edge emission at antenna terminals – GSM 850 Channel Highest



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## Band edge emission at antenna terminals - GSM 850 Low & High

Test Mode **GSM 850** Engineer :Jazz

Freq. MHz	Reading dBm	Limit dBm	Safe Margin dB
823.981	-18.22	-13.00	5.22
849.020	-16.39	-13.00	3.39

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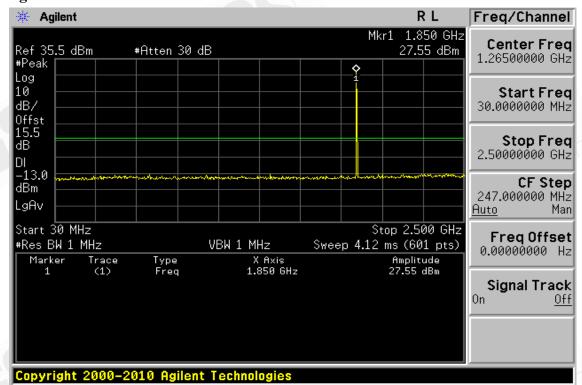
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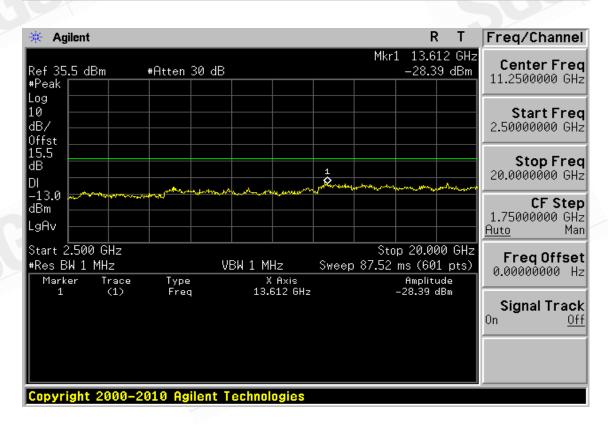


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Figure 9-6: Out of Band emission at antenna terminals – GSM 1900 Channel Lowest





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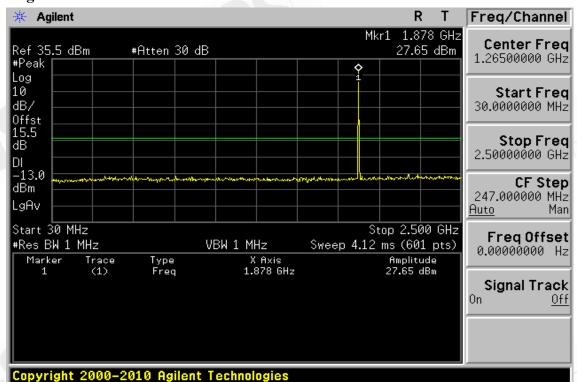
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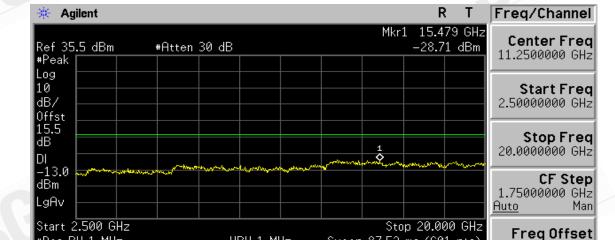


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Figure 9-7: Out of Band emission at antenna terminals – GSM 1900 Channel Mid





VBW 1 MHz

X Axis 15.479 GHz

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No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 t (886-2) 2299-3279

Sweep 87.52 ms (601 pts)

Amplitude -28.71 dBm

#Res BW 1 MHz

Marker

0.000000000 Hz

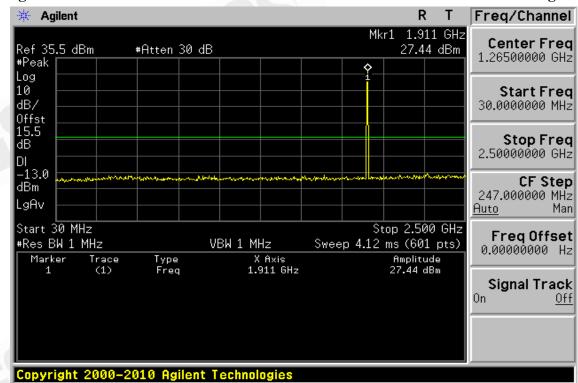
Signal Track

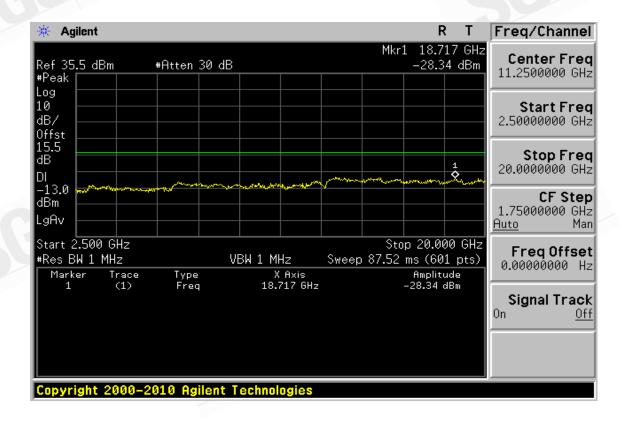


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Figure 9-8: Out of Band emission at antenna terminals – GSM 1900 Channel Highest





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### Out of Band emission at antenna terminals - GSM 1900

Fundamental Frequency :1850.2 MHz Engineer :Jazz

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	4-0
30-1000	S		-13.00	
3700.40	Н		-13.00	
5550.60	Н		-13.00	
7400.80	Н	7	-13.00	
9251.00	H		-13.00	
11101.20	H		-13.00	
12951.40	Н		-13.00	
13612.00	S	-28.39	-13.00	15.39
14801.60	Н		-13.00	
16651.80	Н		-13.00	-
18502.00	Н		-13.00	

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

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Fundamental Frequency: 1880.0 MHz Engineer: Jazz

Operation Mode :TX Mid

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	4-6
30-1000	S		-13.00	
3760.00	Н		-13.00	
5640.00	Н		-13.00	
7520.00	Н	<u> </u>	-13.00	
9400.00	H		-13.00	
11280.00	Н		-13.00	
13160.00	Н		-13.00	
15040.00	Н		-13.00	
15479.00	S	-28.71	-13.00	15.71
16920.00	Н		-13.00	-
18800.00	Н		-13.00	

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Fundamental Frequency: 1909.8 MHz Engineer: Jazz

Operation Mode :TX High

Freq (MHz		Reading dBm	Limit dBm	Safe Margin dB
				A PPO
<30	S		-13.00	
30-100	00 S		-13.00	
3819.6	50 H		-13.00	
5729.4	40 H		-13.00	
7639.2	20 H		-13.00	
9549.0	00 H		-13.00	
11458.	80 H		-13.00	
13368.	60 H		-13.00	
15278.	40 H		-13.00	
17188.	20 H		-13.00	
18717.	00 S	-28.34	-13.00	15.34
19098.	00 H		-13.00	

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Figure 9-9: Bad edge emission at antenna terminals – GSM 1900 Channel Lowest

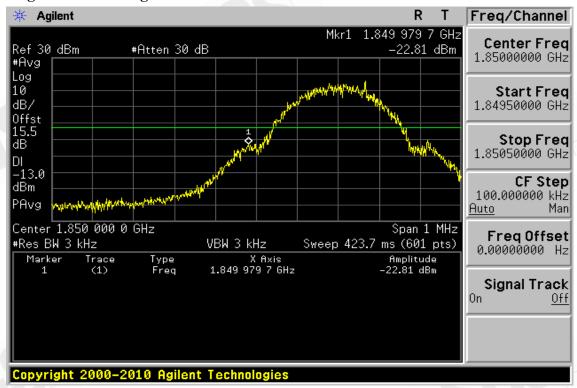
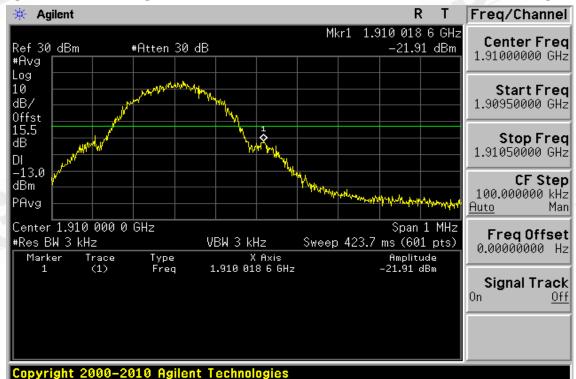


Figure 9-10: Band edge emission at antenna terminals – GPRS 1900 Channel Highest



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## Band edge emission at antenna terminals - GSM 1900 Low & High

Test Mode **GSM** 1900 Engineer :Jazz

Freq. MHz	Reading dBm	Limit dBm	Safe Margin dB
1849.979	-22.81	-13.00	9.81
1910.018	-21.91	-13.00	8.91

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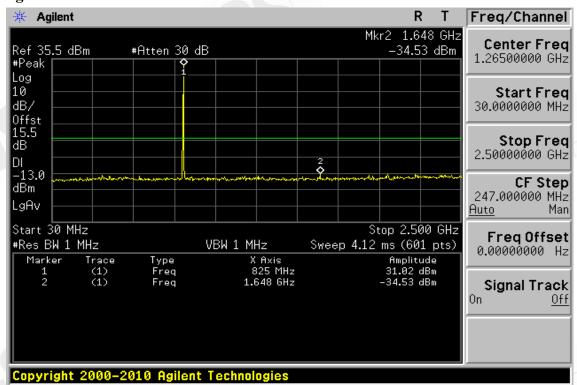
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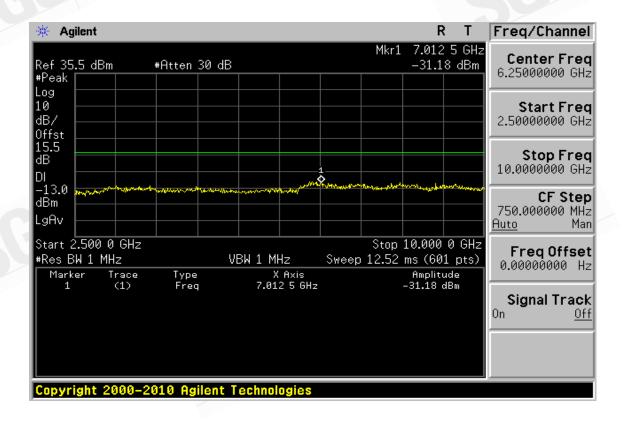


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Figure 9-11: Out of Band emission at antenna terminals - GPRS850 Channel Lowest





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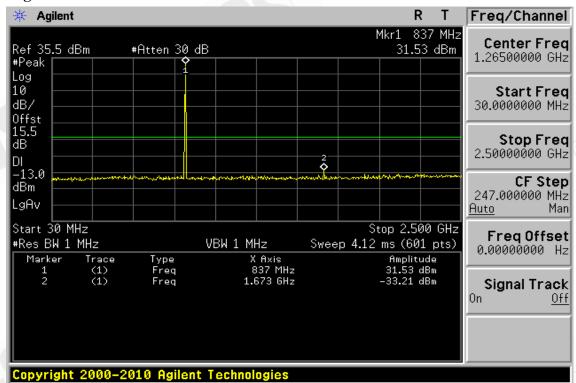
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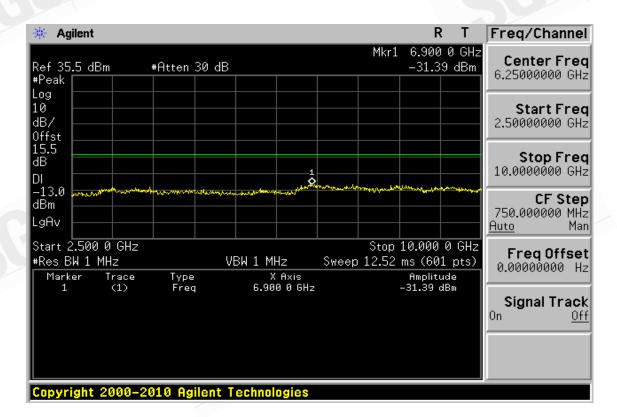


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Figure 9-12: Out of Band emission at antenna terminals - GPRS 850 Channel Mid





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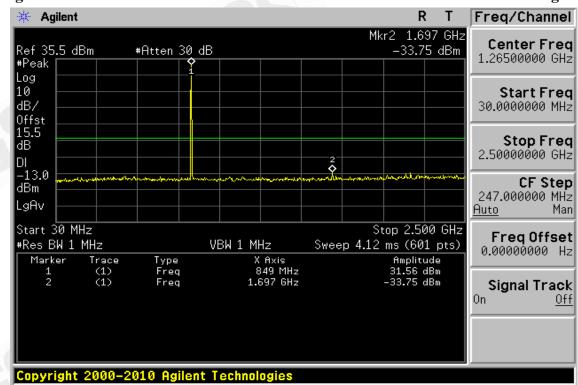
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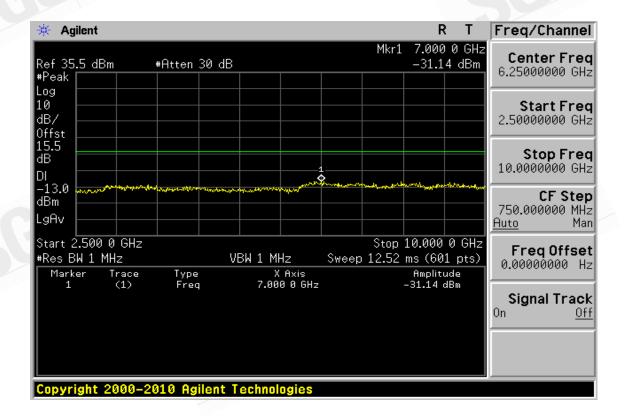


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Figure 9-13: Out of Band emission at antenna terminals – GPRS 850 Channel Highest





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### Out of Band emission at antenna terminals - GPRS 850

Fundamental Frequency: 824.2 MHz Engineer :Jazz

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	
30-1000	S		-13.00	
1648.40	S	-34.53	-13.00	21.53
2472.60	Н		-13.00	
3296.80	Н		-13.00	
4121.00	H		-13.00	
4945.20	Н		-13.00	
5769.40	H		-13.00	
6593.60	Н		-13.00	
7012.50	S	-31.18	-13.00	18.18
7417.80	Н		-13.00	
8242.00	Н		-13.00	

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

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Fundamental Frequency: 836.6 MHz

Operation Mode :TX Mid Engineer

:Jazz

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	- C C C C C C C C C C
30-1000	S		-13.00	
1673.20	S	-33.21	-13.00	20.21
2509.80	Н		-13.00	
3346.40	Н	- C-4	-13.00	
4183.00	H		-13.00	
5019.60	Н		-13.00	
5856.20	H		-13.00	
6692.80	Н		-13.00	
6900.00	S	-31.39	-13.00	18.39
7529.40	Н		-13.00	-
8366.00	Н		-13.00	

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

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Fundamental Frequency: 848.8MHz

Operation Mode :TX High Engineer

:Jazz

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	40
30-1000	S		-13.00	
1697.60	S	-33.75	-13.00	20.75
2546.40	Н		-13.00	
3395.20	Н	4	-13.00	
4244.00	H		-13.00	
5092.80	Н		-13.00	
5941.60	Н		-13.00	
6790.40	Н		-13.00	
7000.00	S	-31.14	-13.00	18.14
7639.20	Н		-13.00	-
8488.00	Н		-13.00	4-4

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

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Figure 9-14: Band edge emission at antenna terminals – GPRS 850 Channel Lowest

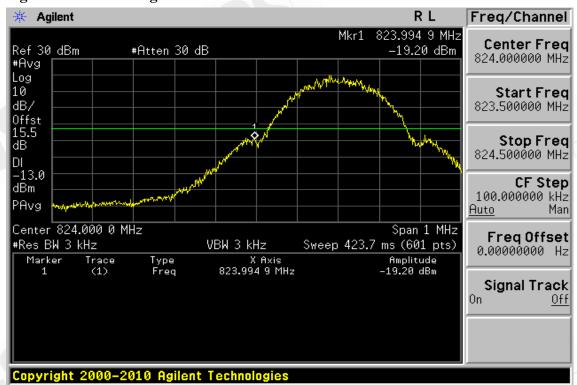
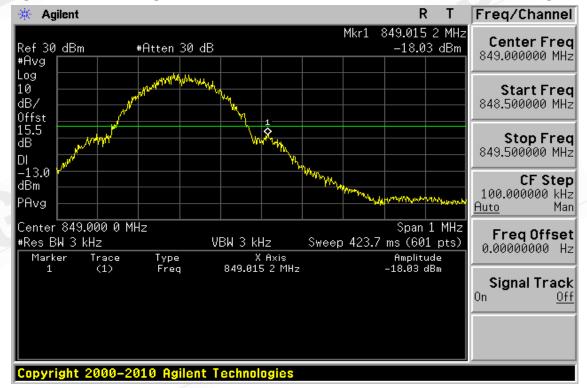


Figure 9-15: Band edge emission at antenna terminals – GPRS 850 Channel Highest



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## Band edge emission at antenna terminals - GPRS 850 Low & High

**GPRS 850** Test Mode Engineer :Jazz

Freq. MHz	Reading dBm	Limit dBm	Safe Margin dB
823.994	-19.2	-13.00	6.20
849.015	-18.03	-13.00	5.03

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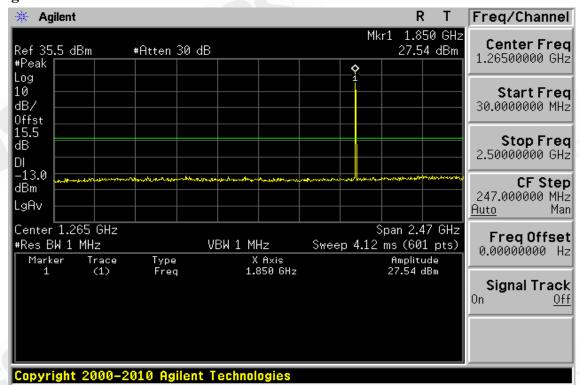
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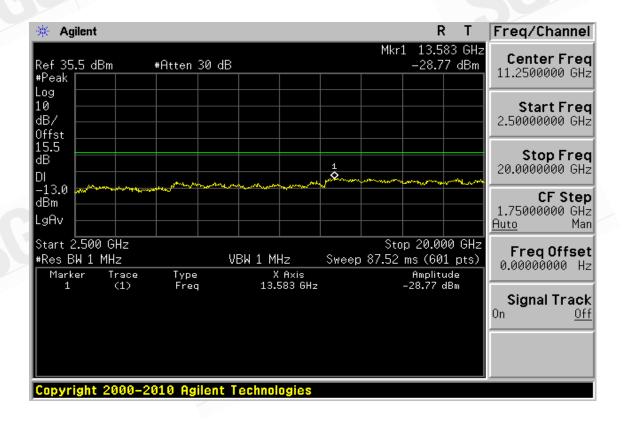


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Figure 9-16: Out of Band emission at antenna terminals - GPRS 1900 Channel Lowest





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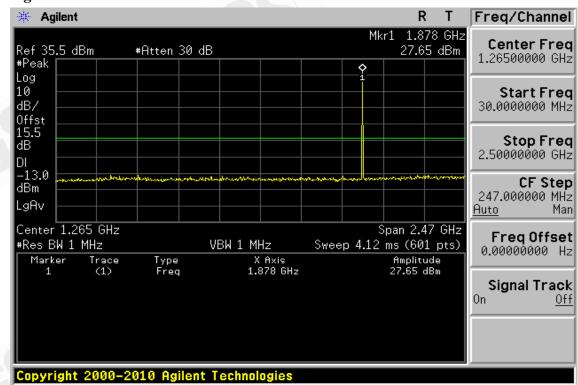
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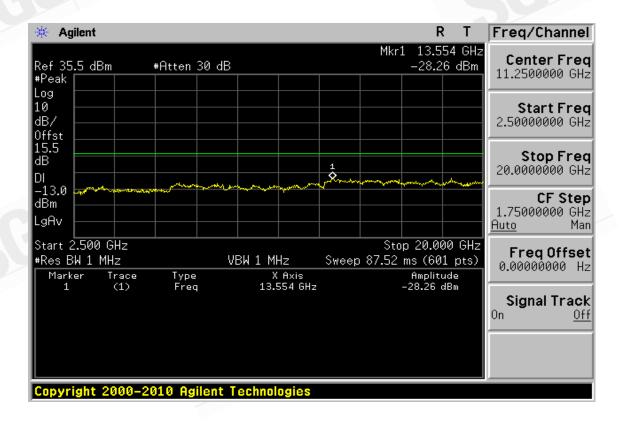


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Figure 9-17: Out of Band emission at antenna terminals - GPRS 1900 Channel Mid





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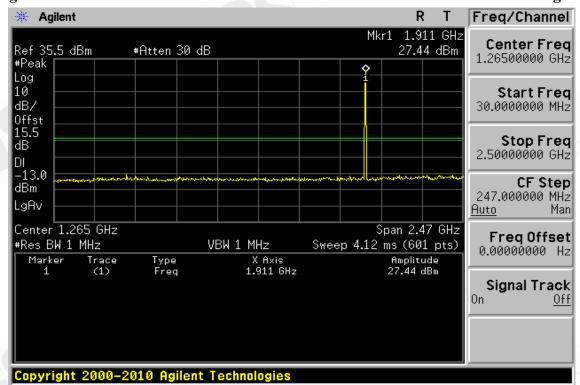
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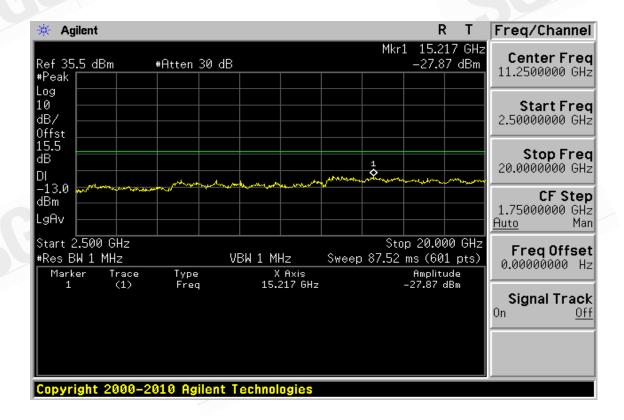


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Figure 9-18: Out of Band emission at antenna terminals – GPRS 1900 Channel Highest





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### Out of Band emission at antenna terminals - GPRS 1900

Fundamental Frequency :1850.2 MHz Engineer :Jazz

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
<30	S		-13.00	
30-1000	S		-13.00	
3700.40	Н		-13.00	
5550.60	Н		-13.00	
7400.80	Н		-13.00	
9251.00	H		-13.00	
11101.20	Н		-13.00	
12951.40	Н		-13.00	
13583.00	S	-28.77	-13.00	15.77
14801.60	Н		-13.00	(
16651.80	Н		-13.00	-
18502.00	Н		-13.00	

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

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Fundamental Frequency: 1880.0 MHz Engineer: Jazz

Operation Mode :TX Mid

Freq. (MHz)		Note Reading F/H/E/S dBm		Limit dBm	Safe Margin dB	
	<30	S		-13.00		
	30-1000	S		-13.00		
	3760.00	Н		-13.00		
	5640.00	Н		-13.00		
	7520.00	Н	- C-4	-13.00		
	9400.00	H		-13.00		
	11280.00	Н		-13.00		
	13160.00	Н		-13.00		
	13554.00	S	-28.26	-13.00	15.26	
	15040.00	Н		-13.00		
	16920.00	Н		-13.00	-	
	18800.00	Н		-13.00		

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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:Jazz

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Fundamental Frequency: 1909.8 MHz Engineer

Operation Mode :TX High

Freq. (MHz)		Note Reading F/H/E/S dBm		Limit dBm	Safe Margin dB	
	<30	S		-13.00		
	30-1000	S		-13.00		
	3819.60	Н		-13.00		
	5729.40	Н		-13.00		
	7639.20	Н		-13.00		
	9549.00	H		-13.00		
	11458.80	Н		-13.00		
	13368.60	H		-13.00		
	15217.00	S	-27.87	-13.00	14.87	
	15278.40	Н		-13.00		
	17188.20	Н		-13.00	7 - 60	
	19098.00	Н		-13.00		

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Figure 9-19: Bad edge emission at antenna terminals – GPRS 1900 Channel Lowest

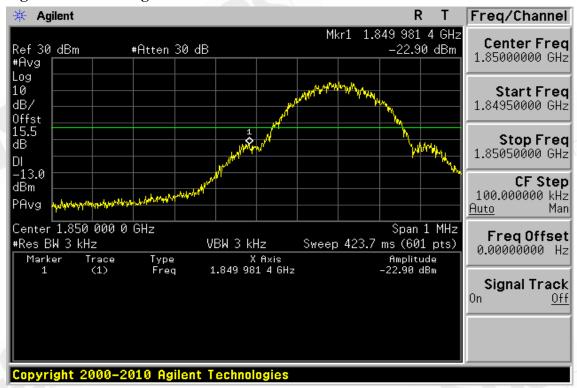
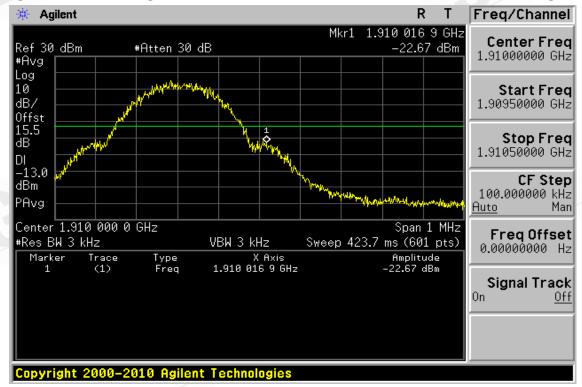


Figure 9-20: Band edge emission at antenna terminals – GPRS 1900 Channel Highest



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# Band edge emission at antenna terminals - GPRS 1900 Low & High

**GPRS 1900** Test Mode Engineer :Jazz

Freq. MHz	Reading dBm	Limit dBm	Safe Margin dB
1849.981	-22.90	-13.00	9.90
1910.016	-22.67	-13.00	9.67

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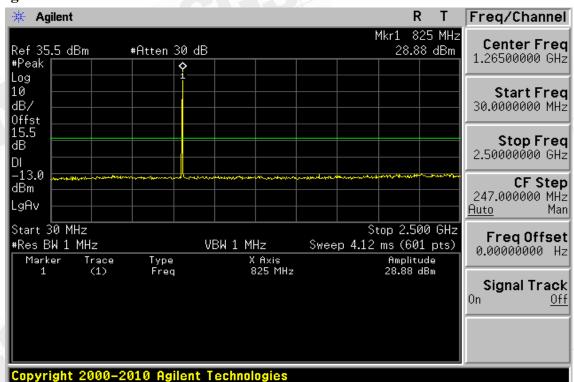
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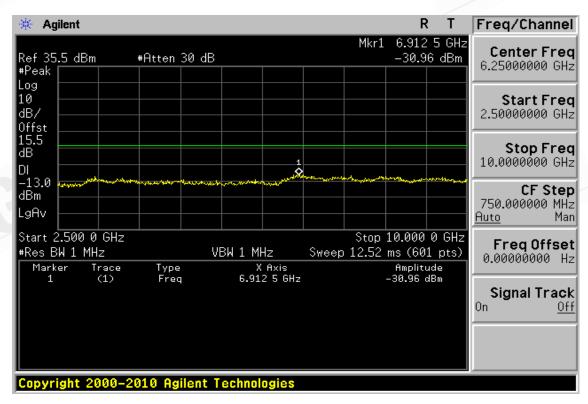


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Figure 9-21: Out of Band emission at antenna terminals – EDGE 850 Channel Lowest





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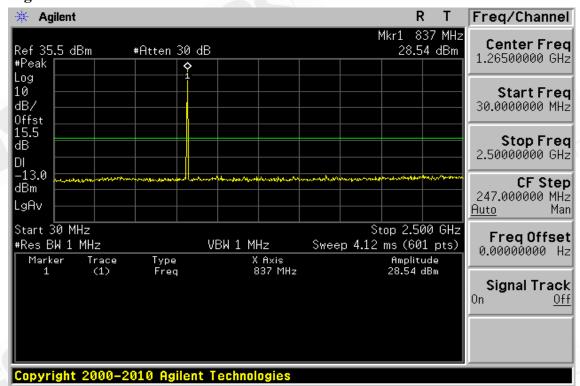
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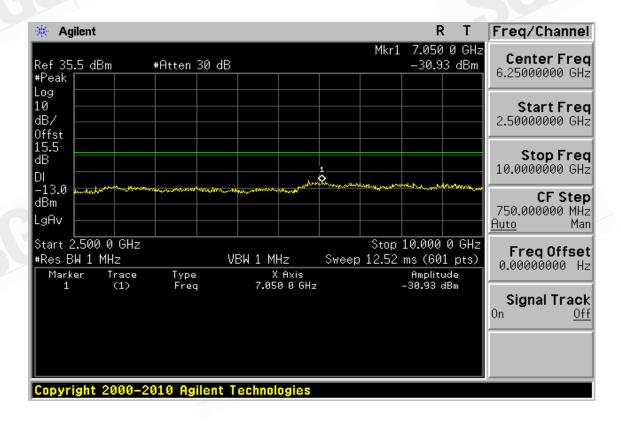


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Figure 9-22: Out of Band emission at antenna terminals - EDGE 850 Channel Mid





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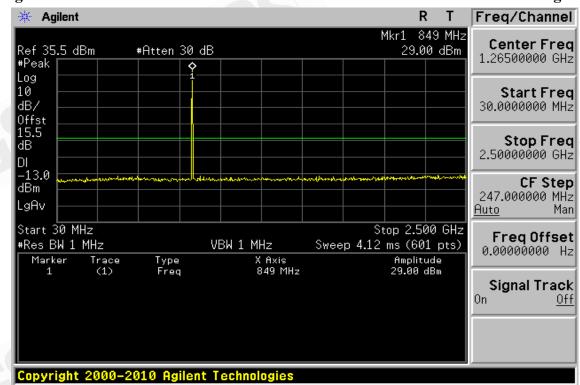
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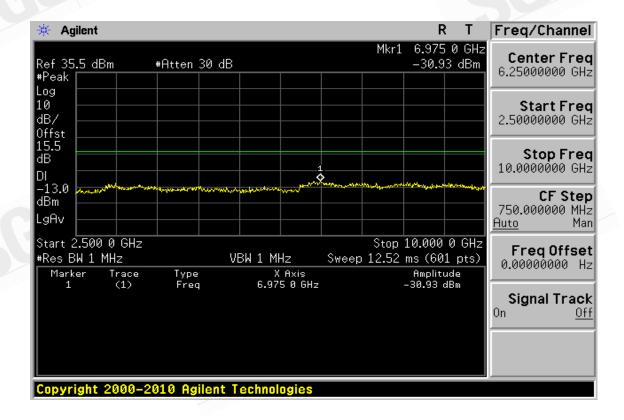


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Figure 9-23: Out of Band emission at antenna terminals – EDGE 850 Channel Highest





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### Out of Band emission at antenna terminals - EDGE 850

Fundamental Frequency :824.2 MHz Engineer :Jazz

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB	
<30	S		-13.00		
30-1000	S		-13.00		
1648.40	Н		-13.00		
2472.60	Н		-13.00		
3296.80	Н	7	-13.00		
4121.00	Н		-13.00		
4945.20	Н		-13.00		
5769.40	Н		-13.00		
6593.60	H		-13.00		
6912.50	S	-30.96	-13.00	17.96	
7417.80	Н		-13.00		
8242.00	Н		-13.00		

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

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Fundamental Frequency :836.6 MHz

Operation Mode :TX Mid

Engineer

:Jazz

Fre (MH	•	Note Reading F/H/E/S dBm		Limit dBm	Safe Margin dB		
<3	0	S		-13.00			
30-10	000	S		-13.00			
1673	.20	Н		-13.00			
2509	.80	H		-13.00			
3346	.40	Н		-13.00			
4183	.00	H		-13.00			
5019	.60	Н		-13.00			
6692	.80	H		-13.00			
7050	.00	S	-30.93	-13.00	17.93		
7529	.40	Н		-13.00			
8366	00.	Н		-13.00	-		

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Fundamental Frequency :848.8MHz

Operation Mode :TX High Engineer

:Jazz

Freq. (MHz)	Note Reading F/H/E/S dBm		Limit dBm	Safe Margin dB	
<30	S		-13.00		
30-1000	S		-13.00		
1697.60	Н		-13.00		
2546.40	H		-13.00		
3395.20	Н	C4-	-13.00		
4244.00	H		-13.00		
5092.80	Н		-13.00		
5941.60	Н		-13.00		
6790.40	Н		-13.00		
6975.00	S	-30.93	-13.00	17.93	
7639.20	Н		-13.00	-	
8488.00	Н		-13.00	(4 <sub>2</sub> )	

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

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Figure 9-24: Band edge emission at antenna terminals – EDGE 850 Channel Lowest

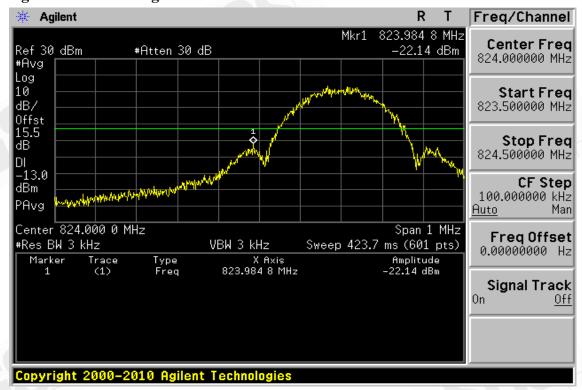
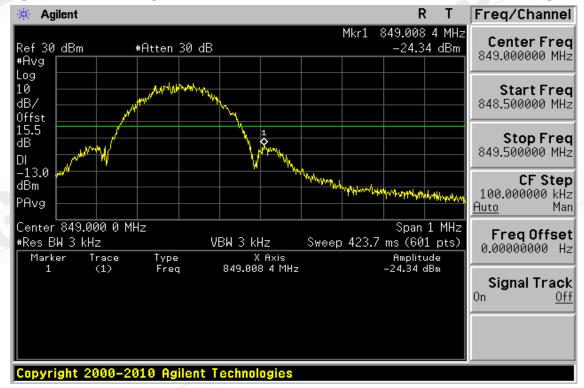


Figure 9-25: Band edge emission at antenna terminals – EDGE 850 Channel Highest



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# Band edge emission at antenna terminals - EDGE 850 Low & High

**EDGE 850** Test Mode Engineer :Jazz

Freq. MHz	Reading dBm	Limit dBm	Safe Margin dB
823.984	-22.14	-13.00	9.14
849.008	-24.34	-13.00	11.34

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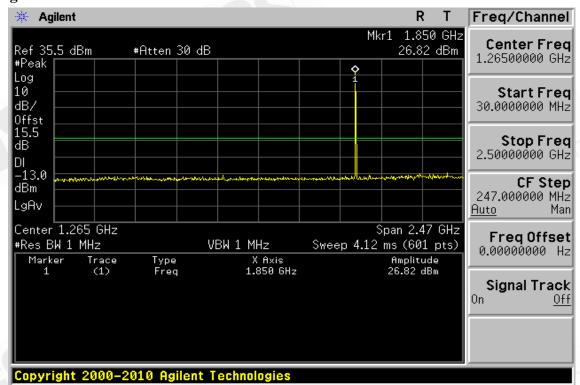
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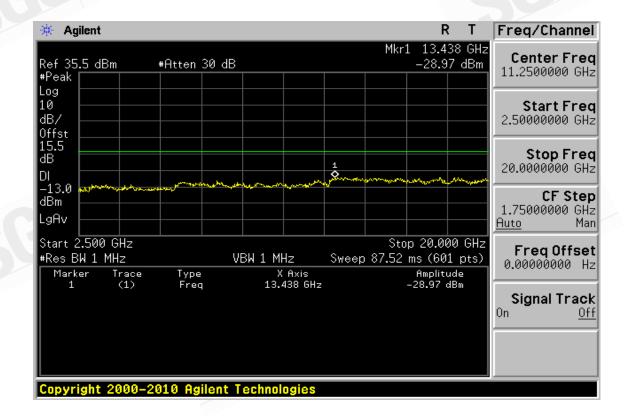


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Figure 9-26: Out of Band emission at antenna terminals – EDGE 1900 Channel Lowest





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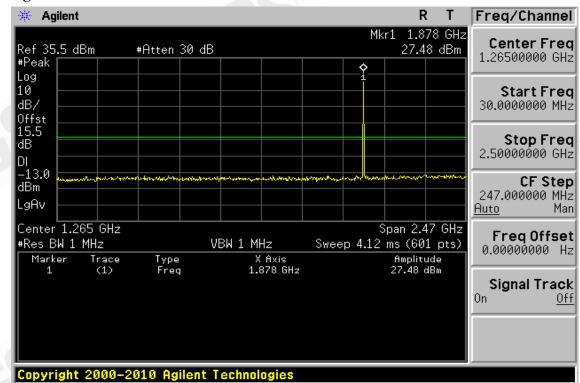
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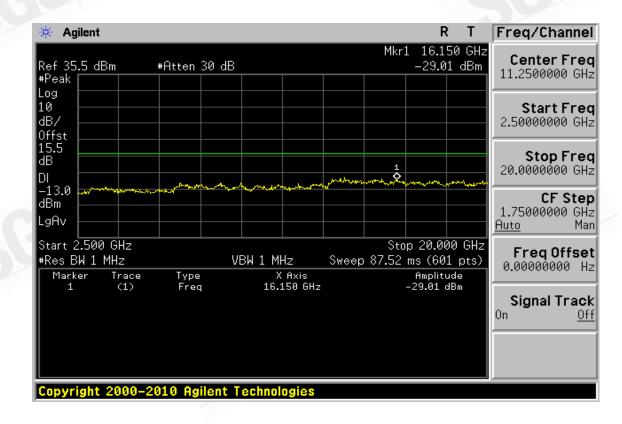


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Figure 9-27: Out of Band emission at antenna terminals – EDGE 1900 Channel Mid





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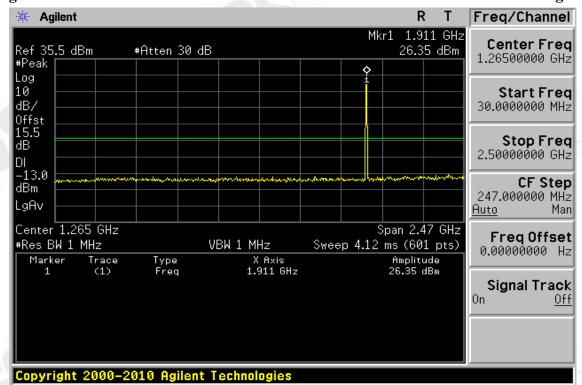
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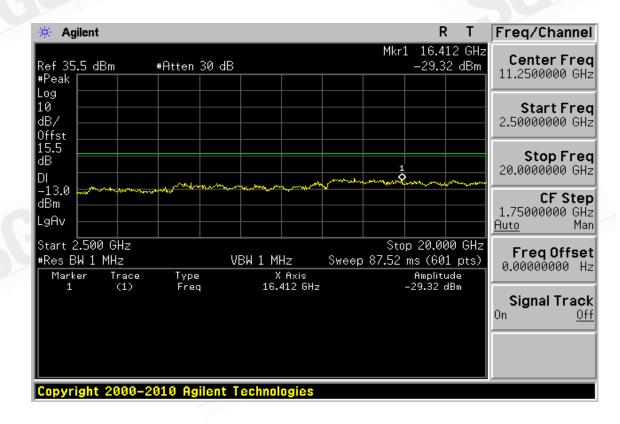


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Figure 9-28: Out of Band emission at antenna terminals – EDGE 1900 Channel Highest





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### Out of Band emission at antenna terminals - EDGE 1900

Fundamental Frequency :1850.2 MHz Engineer :Jazz

Operation Mode :TX Low

Freq. (MHz)	Note Reading F/H/E/S dBm		Limit dBm	Safe Margin dB	
<30	S		-13.00		
30-1000	S		-13.00		
3700.40	Н		-13.00		
5550.60	Н		-13.00		
7400.80	Н	- C-1-	-13.00		
9251.00	H		-13.00		
11101.20	H		-13.00		
12951.40	Н		-13.00		
13438.00	S	-28.97	-13.00	15.97	
14801.60	Н		-13.00	(	
16651.80	Н		-13.00	-	
18502.00	Н		-13.00		

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

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Fundamental Frequency: 1880.0 MHz Engineer: Jazz

Operation Mode :TX Mid

Freq. (MHz)	Note Reading F/H/E/S dBm		Limit dBm	Safe Margin dB	
<30	S		-13.00	4-6	
30-1000	S		-13.00		
3760.00	Н		-13.00		
5640.00	Н		-13.00		
7520.00	Н	<u> </u>	-13.00		
9400.00	H		-13.00		
11280.00	Н		-13.00		
13160.00	Н		-13.00		
15040.00	Н		-13.00		
16150.00	S	-29.01	-13.00	16.01	
16920.00	Н		-13.00	-	
18800.00	Н		-13.00		

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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:Jazz

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Fundamental Frequency: 1909.8 MHz Engineer

Operation Mode :TX High

				C - C-	
Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB	
<30	S		-13.00	7-6	
30-1000	S		-13.00	1	
3819.60	Н		-13.00		
5729.40	Н		-13.00		
7639.20	Н	C-+	-13.00		
9549.00	H		-13.00		
11458.80	Н		-13.00		
13368.60	Н		-13.00		
15278.40	Н		-13.00		
16412.00	S	-29.32	-13.00	16.32	
17188.20	Н		-13.00	-	
19098.00	Н		-13.00		

Note: "H": denotes Harmonic Frequency. "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Figure 9-29: Bad edge emission at antenna terminals – EDGE 1900 Channel Lowest

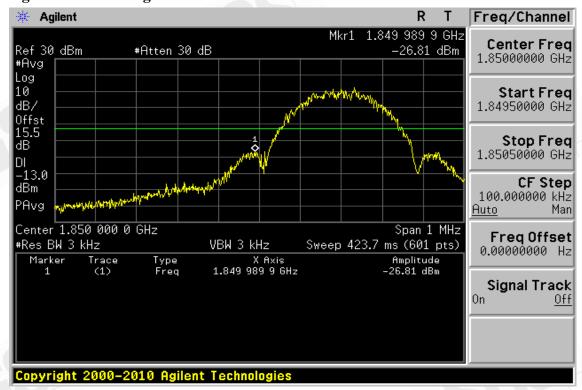
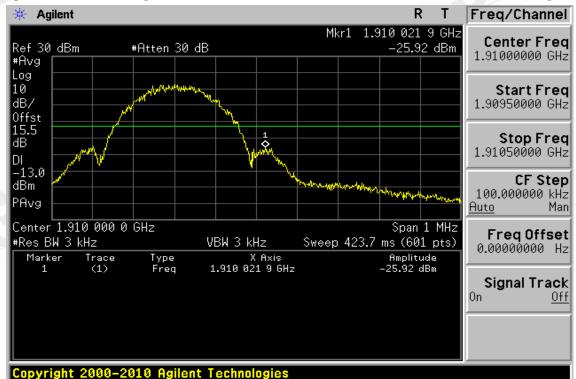


Figure 9-30: Band edge emission at antenna terminals – EDGE 1900 Channel Highest



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# Band edge emission at antenna terminals - EDGE 1900 Low & High

GSM 1900: Test Mode Engineer :Jazz

Freq. MHz	Reading dBm	Limit dBm	Safe Margin dB
1849.989	-26.81	-13.00	13.81
1910.021	-25.92	-13.00	12.92

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## 10. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

# 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)

According to RSS-132 §4.5

#### 4.5.1 Out-of-block Emissions

Mobile and base station equipment with emission bandwidth less than or equal to 4 MHz shall comply with 4.5.1.1. Mobile station equipment with emission bandwidth greater than 4 MHz shall comply with 4.5.1.2. Base station equipment with emission bandwidth greater than 4 MHz shall comply with either 4.5.1.2 or 4.5.1.3.

- 4.5.1.1 In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least  $43 + 10 \log (P)$ , dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least  $43 + 10 \log (P)$ , dB, in any 100 kHz bandwidth.
- 4.5.1.2 In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least  $43 + 10 \log (P)$ , dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least  $43 + 10 \log (P)$ , dB, in any 1 MHz bandwidth

According to RSS-133 §6.5

- 6.5.1 Out-of-Block Emissions
- a. Mobile stations must comply with subsection i. below.

In the first 1.0MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least  $43 + 10 \log (P) dB$ .

b. After the first 1.0 MHz (for equipment that complies with a.i. of this subsection) or 1.5 MHz (for equipment that complies with all of this subsection), the power of emissions shall be attenuated below the transmitter output power by at least 43 + 10 log (P), dB, per any MHz of bandwidth.

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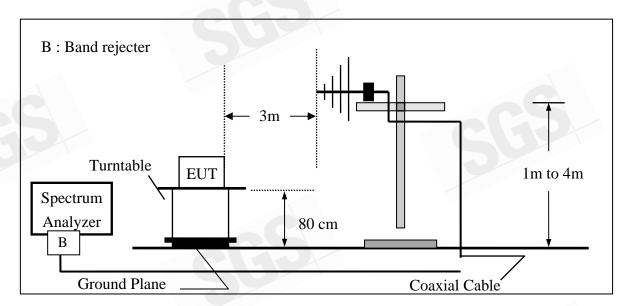
(Note: If the test result using 1% of the emission bandwidth is used, then power integration over 1.0 MHz is required; alternatively, the spectrum analyzer resolution and video bandwidths can be increased to 1.0 MHz for this measurement).

#### 6.5.2 Out-of-Sub-band Emissions

Outside the sub-bands 1850-1910 MHz and 1930-1990 MHz, the attenuation shall be equal to or greater than the out-of-block emission limits in Section 6.5.1.

# 10.2. EUT Setup (Block Diagram of Configuration):

Radiated Emission Test Set-Up, Frequency Below 1000MHz



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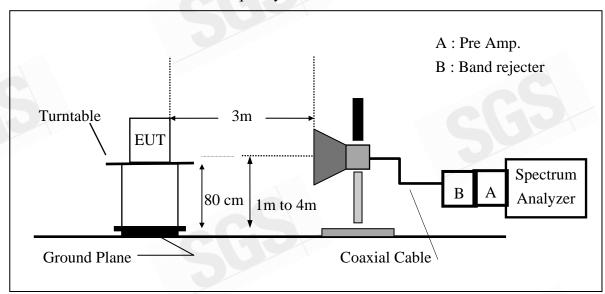
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## Radiated Emission Test Set-UP Frequency Over 1 GHz



#### 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.

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

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

#### **10.4.** Measurement Equipment Used:

Refer to section 2.4 in this report

### 10.5. Measurement Result:

Refer to attach tabular data sheets.

For radiated plot of test data, please refer to Appendix 1, page 124.

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Band :GSM 850 Test Date :2012-07-02

ARFCN :CH 128 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 824.2 MHz Engineer: Lion

Operation Mode :TX LOW

EUT Pol. :E2 Plan Measurement :VERTICAL Antenna Pol.

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
31.94	S	-70.66	-54.03	-14.15	-2.47	-13.00	-57.66
99.84	S	-86.30	-82.59	-0.99	-2.72	-13.00	-73.30
160.95	S	-85.15	-81.79	-0.43	-2.93	-13.00	-72.15
399.57	S	-81.92	-83.08	4.78	-3.62	-13.00	-68.92
543.13	S	-79.81	-80.55	4.60	-3.85	-13.00	-66.81
700.27	S	-77.80	-77.88	4.15	-4.07	-13.00	-64.80
1648.40	Н	-52.19	-49.46	2.40	-5.36	-13.00	-39.19
2472.60	Н	-54.56	-51.97	3.14	-6.15	-13.00	-41.56
3296.80	Н						
4121.00	Н						
4945.20	Н						
5769.40	Н						
6593.60	Н						
7417.80	Н						
8242.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Operation Band :GSM 850 ARFCN :CH 128

Fundamental Frequency :824.2 MHz Operation Mode :TX LOW

EUT Pol. :E2 Plan

Test Date :2012-07-02

Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :HORIZONTAL

Antenna Pol.

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
31.94	S	-84.07	-67.45	-14.15	-2.47	-13.00	-71.07
86.26	S	-87.82	-83.71	-1.45	-2.67	-13.00	-74.82
152.22	S	-86.07	-82.15	-0.99	-2.93	-13.00	-73.07
286.08	S	-83.33	-84.61	4.50	-3.22	-13.00	-70.33
382.11	S	-83.71	-84.81	4.66	-3.56	-13.00	-70.71
521.79	S	-80.66	-81.58	4.66	-3.74	-13.00	-67.66
1648.40	Н	-43.71	-41.25	2.68	-5.36	-13.00	-30.71
2472.60	Н	-50.99	-48.78	3.52	-6.15	-13.00	-37.99
3296.80	Н						
4121.00	Н						
4945.20	Н						
5769.40	Н						
6593.60	Н						
7417.80	H						
8242.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Operation Band :GSM 850 ARFCN :CH 190

Fundamental Frequency :836.6 MHz Operation Mode :TX MID

EUT Pol. :E2 Plan

Test Date :2012-07-02

Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
31.94	S	-70.35	-53.73	-14.15	-2.47	-13.00	-57.35
99.84	S	-86.35	-82.65	-0.99	-2.72	-13.00	-73.35
143.49	S	-85.61	-81.57	-1.26	-2.79	-13.00	-72.61
286.08	S	-84.79	-86.07	4.50	-3.22	-13.00	-71.79
449.04	S	-82.93	-83.70	4.47	-3.70	-13.00	-69.93
660.50	S	-78.80	-78.79	4.13	-4.14	-13.00	-65.80
1673.20	Н	-48.62	-45.89	2.33	-5.34	-13.00	-35.62
2509.80	Н	-54.45	-51.82	3.20	-6.13	-13.00	-41.45
3346.40							
4183.00	Н						
5019.60	Н						
5856.20	Н						
6692.80	Н						
7529.40	H						
8366.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Operation Band :GSM 850 ARFCN :CH 190

Fundamental Frequency :836.6 MHz Operation Mode :TX MID

EUT Pol. :E2 Plan

Test Date :2012-07-02

Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :HORIZONTAL

Antenna Pol.

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
31.94	S	-83.29	-66.67	-14.15	-2.47	-13.00	-70.29
86.26	S	-88.67	-84.55	-1.45	-2.67	-13.00	-75.67
161.92	S	-85.22	-82.00	-0.29	-2.93	-13.00	-72.22
286.08	S	-83.66	-84.94	4.50	-3.22	-13.00	-70.66
550.89	S	-80.00	-80.72	4.57	-3.85	-13.00	-67.00
708.03	S	-78.33	-78.39	4.05	-3.98	-13.00	-65.33
1673.20	Н	-44.84	-42.44	2.66	-5.34	-13.00	-31.84
2509.80	Н	-52.03	-49.76	3.56	-6.13	-13.00	-39.03
3346.40	Н						
4183.00	Н						
5019.60	Н						
5856.20	Н						
6692.80	Н						
7529.40	H						
8366.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Operation Band :GSM 850 ARFCN :CH 251

Fundamental Frequency :848.8 MHz Operation Mode :TX HIGH EUT Pol. :E2 Plan Test Date :2012-07-02 Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
31.94	S	-70.10	-53.48	-14.15	-2.47	-13.00	-57.10
50.37	S	-74.84	-61.29	-10.81	-2.73	-13.00	-61.84
99.84	S	-85.46	-81.75	-0.99	-2.72	-13.00	-72.46
143.49	S	-85.71	-81.66	-1.26	-2.79	-13.00	-72.71
504.33	S	-81.59	-82.59	4.71	-3.70	-13.00	-68.59
619.76	S	-78.10	-78.20	4.07	-3.97	-13.00	-65.10
1697.60	Н	-51.76	-48.89	2.27	-5.40	-13.00	-38.76
2546.40	Н	-53.08	-50.38	3.31	-6.24	-13.00	-40.08
3395.20	Н						
4244.00	Н						
5092.80	Н						
5941.60	Н						
6790.40	Н						
7639.20	Н						
8488.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。



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Operation Band :GSM 850 ARFCN :CH 251

Fundamental Frequency :848.8 MHz Operation Mode :TX HIGH EUT Pol. :E2 Plan Temp./Humi. :27 deg\_C / 66 RH Engineer :Lion

Measurement .L

:HORIZONTAL

:2012-07-02

Antenna Pol.

Test Date

Freq.	Note	ERP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
31.94	S	-83.73	-67.11	-14.15	-2.47	-13.00	-70.73
85.29	S	-88.31	-84.11	-1.53	-2.67	-13.00	-75.31
156.10	S	-85.67	-81.96	-0.78	-2.93	-13.00	-72.67
286.08	S	-82.19	-83.47	4.50	-3.22	-13.00	-69.19
591.63	S	-78.38	-78.60	4.12	-3.90	-13.00	-65.38
787.57	S	-77.90	-77.56	3.81	-4.16	-13.00	-64.90
1697.60	Н	-44.89	-42.39	2.65	-5.40	-13.00	-31.89
2546.40	Н	-54.86	-52.51	3.66	-6.24	-13.00	-41.86
3395.20	Н						
4244.00	Н						
5092.80	Н						
5941.60	Н						
6790.40	Н						
7639.20	Н						
8488.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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# Radiated Spurious Emission Measurement Result: GSM 1900 Mode

Operation Band :GSM 1900 Test Date :2012-07-02

ARFCN :CH 512 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 1850.2MHz Engineer: Lion

Operation Mode :TX LOW

EUT Pol. :E2 PLAN Measurement :VERTICAL Antenna Pol.

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
31.94	S	-66.60	-52.13	-12.00	-2.47	-13.00	-53.60
99.84	S	-82.48	-80.92	1.16	-2.72	-13.00	-69.48
143.49	S	-82.00	-80.10	0.89	-2.79	-13.00	-69.00
293.84	S	-83.14	-86.64	6.74	-3.25	-13.00	-70.14
480.08	S	-81.88	-84.94	6.77	-3.70	-13.00	-68.88
744.89	S	-76.81	-78.33	5.74	-4.23	-13.00	-63.81
3700.40	Н	-44.73	-45.15	7.40	-6.98	-13.00	-31.73
5550.60	Н	-42.53	-43.15	8.99	-8.37	-13.00	-29.53
7400.80	Н						
9251.00	Н						
11101.20	Н						
12951.40	Н						
14801.60	Н						
16651.80	H						
18502.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Operation Band :GSM 1900

ARFCN :CH 512

Fundamental Frequency :1850.2MHz Operation Mode :TX LOW

EUT Pol. :E2 PLAN

Test Date :2012-07-02

Temp./Humi.  $:27 \text{ deg\_C} / 66 \text{ RH}$ 

Engineer :Lion

Measurement :HORIZONTAL

Antenna Pol.

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.97	S	-75.59	-61.02	-12.11	-2.47	-13.00	-62.59
128.94	S	-84.67	-83.25	1.37	-2.79	-13.00	-71.67
194.90	S	-89.16	-92.41	6.34	-3.09	-13.00	-76.16
286.08	S	-86.31	-89.74	6.65	-3.22	-13.00	-73.31
480.08	S	-80.63	-83.70	6.77	-3.70	-13.00	-67.63
730.34	S	-77.47	-79.24	5.92	-4.14	-13.00	-64.47
3700.40	Н	-49.72	-49.66	6.92	-6.98	-13.00	-36.72
5550.60	Н	-37.43	-37.33	8.27	-8.37	-13.00	-24.43
7400.80	Н						
9251.00	Н						
11101.20	Н						
12951.40	Н						
14801.60	Н						
16651.80	H						
18502.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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**Operation Band** :GSM 1900

**ARFCN** :CH 661

Fundamental Frequency :1880.0MHz

Operation Mode :TX MID

EUT Pol. :E2 PLAN Test Date :2012-07-02

Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
31.94	S	-68.22	-53.75	-12.00	-2.47	-13.00	-55.22
91.11	S	-82.93	-81.29	1.03	-2.67	-13.00	-69.93
128.94	S	-83.79	-82.38	1.37	-2.79	-13.00	-70.79
143.49	S	-83.74	-81.85	0.89	-2.79	-13.00	-70.74
480.08	S	-81.96	-85.02	6.77	-3.70	-13.00	-68.96
677.96	S	-78.54	-80.73	6.29	-4.10	-13.00	-65.54
3760.00	Н	-45.12	-45.42	7.42	-7.12	-13.00	-32.12
5640.00	Н	-45.17	-45.92	9.01	-8.26	-13.00	-32.17
7520.00	Н						
9400.00	Н						
11280.00	Н						
13160.00	Н						
15040.00	Н						
16920.00	H						
18800.00	Н						

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

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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Operation Band :GSM 1900 ARFCN :CH 661

Fundamental Frequency: 1880.0MHz

Operation Mode :TX MID EUT Pol. :E2 PLAN Test Date :2012-07-02

Temp./Humi.  $:27 \text{ deg\_C} / 66 \text{ RH}$ 

Engineer :Lion

Measurement :HORIZONTAL Antenna Pol.

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.97	S	-75.73	-61.15	-12.11	-2.47	-13.00	-62.73
112.45	S	-86.00	-84.24	1.00	-2.77	-13.00	-73.00
134.76	S	-84.92	-83.27	1.13	-2.79	-13.00	-71.92
286.08	S	-86.37	-89.80	6.65	-3.22	-13.00	-73.37
480.08	S	-79.67	-82.73	6.77	-3.70	-13.00	-66.67
758.47	S	-78.01	-79.55	5.74	-4.20	-13.00	-65.01
3760.00	Н	-47.71	-47.45	6.85	-7.12	-13.00	-34.71
5640.00	Н	-44.58	-44.61	8.30	-8.26	-13.00	-31.58
7520.00	Н						
9400.00	Н						
11280.00	Н						
13160.00	Н						
15040.00	Н						
16920.00	Н						
18800.00	Н						

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

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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**Operation Band** :GSM 1900

**ARFCN** :CH 810

Fundamental Frequency: 1909.8MHz Operation Mode :TX HIGH

EUT Pol. :E2 PLAN Test Date :2012-07-02

Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.97	S	-68.49	-53.92	-12.11	-2.47	-13.00	-55.49
99.84	S	-82.18	-80.62	1.16	-2.72	-13.00	-69.18
143.49	S	-82.98	-81.08	0.89	-2.79	-13.00	-69.98
413.15	S	-82.71	-85.91	6.82	-3.62	-13.00	-69.71
480.08	S	-80.53	-83.59	6.77	-3.70	-13.00	-67.53
803.09	S	-76.30	-78.16	6.06	-4.20	-13.00	-63.30
3819.60	Н	-48.07	-48.39	7.51	-7.20	-13.00	-35.07
5729.40	Н	-46.42	-47.00	9.03	-8.44	-13.00	-33.42
7639.20							
9549.00	Н						
11458.80	Н						
13368.60	Н						
15278.40	Н						
17188.20	H						
19098.00	Н						

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

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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**Operation Band** :GSM 1900 **ARFCN** :CH 810

Fundamental Frequency: 1909.8MHz

Operation Mode :TX HIGH

EUT Pol. :E2 PLAN Test Date :2012-07-02

Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement

:HORIZONTAL

Antenna Pol.

Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Safe
			Output Level	Gain	Loss		Margin
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.97	S	-78.15	-63.58	-12.11	-2.47	-13.00	-65.15
47.46	S	-84.63	-72.36	-9.54	-2.73	-13.00	-71.63
130.88	S	-86.14	-84.74	1.38	-2.79	-13.00	-73.14
286.08	S	-86.05	-89.48	6.65	-3.22	-13.00	-73.05
536.34	S	-82.16	-85.16	6.77	-3.77	-13.00	-69.16
737.13	S	-77.69	-79.38	5.84	-4.14	-13.00	-64.69
3819.60	Н	-50.55	-50.41	7.05	-7.20	-13.00	-37.55
5729.40	Н	-47.49	-47.37	8.32	-8.44	-13.00	-34.49
7639.20	Н						
9549.00	Н						
11458.80	Н						
13368.60	Н						
15278.40	Н						
17188.20	H						
19098.00	Н						

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

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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# Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Band :GSM 850 Test Date :2012-07-02

ARFCN :CH 128 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 824.2MHz Engineer: Jazz

Operation Mode :RX LOW

EUT Pol. :E2 PLAN Measurement Antenna Pol. :VERTICAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
31.94	S	-70.56	-53.94	-14.15	-2.47	-13.00	-57.56
99.84	S	-85.62	-81.91	-0.99	-2.72	-13.00	-72.62
143.49	S	-85.28	-81.23	-1.26	-2.79	-13.00	-72.28
354.95	S	-84.04	-85.37	4.75	-3.43	-13.00	-71.04
601.33	S	-78.87	-78.98	4.03	-3.92	-13.00	-65.87
751.68	S	-78.18	-77.50	3.54	-4.23	-13.00	-65.18
1648.40	Н	-59.97	-57.01	2.40	-5.36	-13.00	-46.97

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Operation Band :GSM 850 Test Date :2012-07-02

ARFCN :CH 128 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 824.2MHz Engineer: Jazz

Operation Mode :RX LOW

EUT Pol. :E2 PLAN Measurement Antenna Pol. :HORIZONTAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
32.91	S	-83.89	-67.37	-14.05	-2.47	-13.00	-70.89
84.32	S	-88.76	-84.47	-1.62	-2.67	-13.00	-75.76
250.19	S	-84.36	-85.69	4.55	-3.23	-13.00	-71.36
286.08	S	-82.92	-84.20	4.50	-3.22	-13.00	-69.92
399.57	S	-82.51	-83.67	4.78	-3.62	-13.00	-69.51
621.70	S	-79.04	-79.14	4.07	-3.97	-13.00	-66.04
1648.40	Н	-58.34	-55.66	2.68	-5.36	-13.00	-45.34

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**Operation Band** :GSM 850 Test Date :2012-07-02

**ARFCN** :CH 190 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 836.6MHz Engineer :Jazz

Operation Mode :RX MID

EUT Pol. :E2 PLAN :VERTICAL Measurement Antenna Pol.

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	$dB\mu V/m$	dB
31.94	S	-70.74	-54.12	-14.15	-2.47	-13.00	-57.74
99.84	S	-86.66	-82.95	-0.99	-2.72	-13.00	-73.66
143.49	S	-85.20	-81.16	-1.26	-2.79	-13.00	-72.20
399.57	S	-81.27	-82.43	4.78	-3.62	-13.00	-68.27
548.95	S	-79.81	-80.54	4.58	-3.85	-13.00	-66.81
697.36	S	-78.20	-78.28	4.15	-4.07	-13.00	-65.20
1673.20	Н	-59.72	-56.77	2.34	-5.29	-13.00	-46.72

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Operation Band :GSM 850 Test Date :2012-07-02

ARFCN :CH 190 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 836.6MHz Engineer: Jazz

Operation Mode :RX MID

EUT Pol. :E2 PLAN Measurement Antenna Pol. :HORIZONTAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
32.91	S	-83.17	-66.66	-14.05	-2.47	-13.00	-70.17
85.29	S	-88.81	-84.61	-1.53	-2.67	-13.00	-75.81
243.40	S	-84.08	-85.30	4.44	-3.23	-13.00	-71.08
286.08	S	-83.79	-85.06	4.50	-3.22	-13.00	-70.79
399.57	S	-81.83	-82.98	4.78	-3.62	-13.00	-68.83
631.40	S	-78.50	-78.61	4.09	-3.97	-13.00	-65.50
1673.20	Н	-59.46	-56.83	2.66	-5.29	-13.00	-46.46

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**Operation Band** :GSM 850 Test Date :2012-07-02

**ARFCN** :CH 251 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 848.8MHz Engineer :Jazz

Operation Mode :RX HIGH

EUT Pol. :E2 PLAN :VERTICAL Measurement Antenna Pol.

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
31.94	S	-70.20	-53.58	-14.15	-2.47	-13.00	-57.20
99.84	S	-85.84	-82.13	-0.99	-2.72	-13.00	-72.84
143.49	S	-84.34	-80.29	-1.26	-2.79	-13.00	-71.34
286.08	S	-84.59	-85.86	4.50	-3.22	-13.00	-71.59
427.70	S	-83.73	-84.63	4.57	-3.66	-13.00	-70.73
704.15	S	-78.70	-78.82	4.10	-3.98	-13.00	-65.70
1697.60	Н	-58.08	-54.96	2.28	-5.40	-13.00	-45.08

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Operation Band :GSM 850 Test Date :2012-07-02

ARFCN :CH 251 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 848.8MHz Engineer: Jazz

Operation Mode :RX HIGH

EUT Pol. :E2 PLAN Measurement Antenna Pol. :HORIZONTAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
 MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
32.91	S	-84.16	-67.64	-14.05	-2.47	-13.00	-71.16
88.20	S	-87.59	-83.64	-1.29	-2.67	-13.00	-74.59
168.71	S	-81.78	-79.53	0.68	-2.93	-13.00	-68.78
286.08	S	-81.99	-83.26	4.50	-3.22	-13.00	-68.99
622.67	S	-78.07	-78.16	4.07	-3.97	-13.00	-65.07
720.64	S	-77.86	-77.76	3.89	-3.98	-13.00	-64.86
1697.60	Н	-57.21	-54.46	2.65	-5.40	-13.00	-44.21

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## Radiated Spurious Emission Measurement Result: GSM 1900 Mode

**Operation Band** :GSM 1900 Test Date :2012-07-02

**ARFCN** :27 deg\_C / 66 RH :CH 512 Temp./Humi.

Fundamental Frequency: 1850.2MHz Engineer :Jazz

Operation Mode :RX LOW

Measurement Antenna Pol. :VERTICAL EUT Pol. :E2 PLAN

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
30.97	S	-68.06	1.73	-12.11	-2.47	-13.00	-55.06
99.84	S	-82.48	-7.00	1.16	-2.72	-13.00	-69.48
128.94	S	-83.53	-6.29	1.37	-2.79	-13.00	-70.53
293.84	S	-83.14	-5.97	6.74	-3.25	-13.00	-70.14
510.15	S	-81.67	-4.38	6.84	-3.74	-13.00	-68.67
618.79	S	-78.24	-0.61	6.21	-3.97	-13.00	-65.24
3700.40	Н	-55.76	17.24	7.40	-6.98	-13.00	-42.76

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Operation Band :GSM 1900 Test Date :2012-07-02

ARFCN :CH 512 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 1850.2MHz Engineer: Jazz

Operation Mode :RX LOW

EUT Pol. :E2 PLAN Measurement Antenna Pol. :HORIZONTAL

Actual FS( $dB\mu V/m$ ) = SPA. Reading level( $dB\mu V$ ) + Factor(dB)

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
30.97	S	-75.59	4.28	-12.11	-2.47	-13.00	-62.59
128.94	S	-84.67	-6.15	1.37	-2.79	-13.00	-71.67
194.90	S	-89.16	-11.06	6.34	-3.09	-13.00	-76.16
286.08	S	-86.31	-9.92	6.65	-3.22	-13.00	-73.31
480.08	S	-82.63	-5.65	6.77	-3.70	-13.00	-69.63
702.21	S	-78.55	-1.49	6.27	-4.07	-13.00	-65.55
3700.40	Н	-54.04	17.24	6.91	-6.98	-13.00	-41.04

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Operation Band :GSM 1900 Test Date :2012-07-02

ARFCN :CH 661 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 1880.0MHz Engineer: Jazz

Operation Mode :RX MID

EUT Pol. :E2 PLAN Measurement Antenna Pol. :VERTICAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
30.97	S	-68.30	1.73	-12.11	-2.47	-13.00	-55.30
91.11	S	-82.93	-7.00	1.03	-2.67	-13.00	-69.93
127.00	S	-83.73	-6.29	1.25	-2.77	-13.00	-70.73
143.49	S	-83.74	-3.53	0.89	-2.79	-13.00	-70.74
356.89	S	-83.74	-6.27	6.89	-3.43	-13.00	-70.74
625.58	S	-77.85	0.18	6.23	-3.97	-13.00	-64.85
3760.00	Н	-55.22	17.43	7.42	-7.12	-13.00	-42.22

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Operation Band :GSM 1900 Test Date :2012-07-02

ARFCN :CH 661 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 1880.0MHz Engineer: Jazz

Operation Mode :RX MID

EUT Pol. :E2 PLAN Measurement Antenna Pol. :HORIZONTAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
30.97	S	-75.73	4.28	-12.11	-2.47	-13.00	-62.73
111.48	S	-86.26	-8.43	1.03	-2.77	-13.00	-73.26
134.76	S	-84.92	-6.15	1.13	-2.79	-13.00	-71.92
286.08	S	-86.37	-9.92	6.65	-3.22	-13.00	-73.37
480.08	S	-80.67	-5.65	6.77	-3.70	-13.00	-67.67
758.47	S	-78.01	-0.30	5.74	-4.20	-13.00	-65.01
3760.00	Н	-55.65	16.71	6.85	-7.12	-13.00	-42.65

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Operation Band :GSM 1900 Test Date :2012-07-02

ARFCN :CH 810 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 1907.6MHz Engineer: Jazz

Operation Mode :RX HIGH

EUT Pol. :E2 PLAN Measurement Antenna Pol. :VERTICAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	$dB\mu V/m$	dB
30.97	S	-68.49	1.73	-12.11	-2.47	-13.00	-55.49
99.84	S	-82.18	-7.00	1.16	-2.72	-13.00	-69.18
157.07	S	-84.36	-3.53	1.43	-2.93	-13.00	-71.36
286.08	S	-83.29	-5.97	6.65	-3.22	-13.00	-70.29
480.08	S	-80.53	-4.96	6.77	-3.70	-13.00	-67.53
623.64	S	-77.30	0.18	6.22	-3.97	-13.00	-64.30
3819.60	Н	-54.57	17.45	7.51	-7.20	-13.00	-41.57

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Operation Band :GSM 1900 Test Date :2012-07-02

ARFCN :CH 810 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 1907.6MHz Engineer: Jazz

Operation Mode :RX HIGH

EUT Pol. :E2 PLAN Measurement Antenna Pol. :HORIZONTAL

Actual  $FS(dB\mu V/m) = SPA$ . Reading level $(dB\mu V) + Factor(dB)$ 

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$ 

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dBμV/m	dB
30.97	S	-78.15	4.28	-12.11	-2.47	-13.00	-65.15
47.46	S	-84.63	3.55	-9.54	-2.73	-13.00	-71.63
137.67	S	-86.04	-6.15	0.95	-2.79	-13.00	-73.04
286.08	S	-86.05	-9.92	6.65	-3.22	-13.00	-73.05
513.06	S	-81.04	-5.40	6.83	-3.74	-13.00	-68.04
736.16	S	-77.44	-1.13	5.85	-4.14	-13.00	-64.44
3819.60	Н	-57.31	16.37	7.05	-7.20	-13.00	-44.31

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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

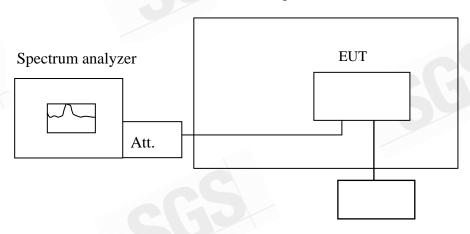
+/-2.5ppm for 1900MHz band

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

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations

# 11.2. Test Set-up:

Temperature Chamber



Variable DC Power Supply

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 25oC operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30oC. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10oC increased per stage until the highest temperature of +50oC 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 MF	łz					
	Limit: +/- 2.5 ppm = 2091 Hz								
Power Supply	Environment	Frequency	Dolto (Hz)	Limit (Hz)					
Vdc	Temperature ( )	(MHz)	Delta (Hz)	Limit (Hz)					
3.7	-30	836.600030	-36.00	2091					
3.7	-20	836.600014	-20.00	2091					
3.7	-10	836.600011	-17.00	2091					
3.7	0	836.600021	-27.00	2091					
3.7	10	836.600002	-7.60	2091					
3.7	20	836.599994	0.00	2091					
3.7	30	836.599993	1.00	2091					
3.7	40	836.599992	2.00	2091					
3.7	50	836.599998	-4.00	2091					

Reference Frequency: GPRS 1900Mid Channel 1880 MHz							
Limit: +/- 2.5 ppm = 4700 Hz							
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)			
Vdc	Temperature ( )	(MHz)					
3.7	-30	1880.000013	-7.00	4700			
3.7	-20	1880.000011	-5.00	4700			
3.7	-10	1880.000008	-2.00	4700			
3.7	0	1880.000018	-12.00	4700			
3.7	10	1880.000015	-9.00	4700			
3.7	20	1880.000006	0.00	4700			
3.7	30	1880.000003	3.00	4700			
3.7	40	1880.000014	-8.00	4700			
3.7	50	1880.000019	-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  $\pm 2.5$  ppm for mobile stations.

# 12.2. Test Set-up:

Refer to section 11.2 in this report

#### 12.3. Measurement Procedure:

Set chamber temperature to 25 . 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						
Limit: +/- 2.5 ppm = 2091 Hz						
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)		
Vdc	Temperature ( )	(MHz)				
4.2	25.00	836.600021	-3.00	2091.00		
3.7	25.00	836.600018	0.00	2091.00		
3.3	25.00	836.600022	-4.00	2091.00		
2.8	25.00	836.600027	-9.00	2091.00		
(End Point)						

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz						
Limit: +/- 2.5 ppm = 4700 Hz						
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)		
Vdc	Temperature ( )	(MHz)				
4.2	25	1880.000009	8.00	4700		
3.7	25	1880.000017	0.00	4700		
3.3	25	1880.000012	5.00	4700		
2.8	25	1880.000015	2.00	4700		
(End Point)						

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# MEASUREMENT PLOT OF RADIATED SPURIOUS **EMISSION**

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Radiated Spurious Emission Measurement Result: GSM 850 Mode

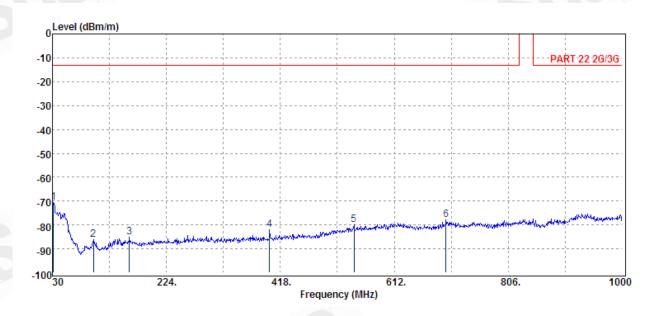
**Operation Band** :GSM 850 :2012-07-02 **Test Date** 

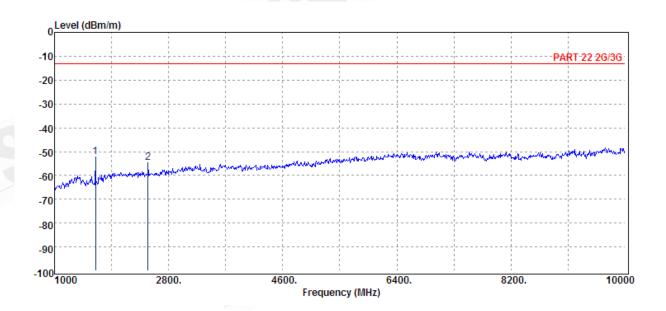
**ARFCN** :CH 128 Temp./Humi. :27 deg\_C / 66 RH

Fundamental Frequency: 824.2 MHz Engineer :Lion

Operation Mode :TX LOW

EUT Pol. :E2 Plan Measurement :VERTICAL Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 128

Fundamental Frequency :824.2 MHz Operation Mode :TX LOW EUT Pol. :E2 Plan

**Test Date** :2012-07-02

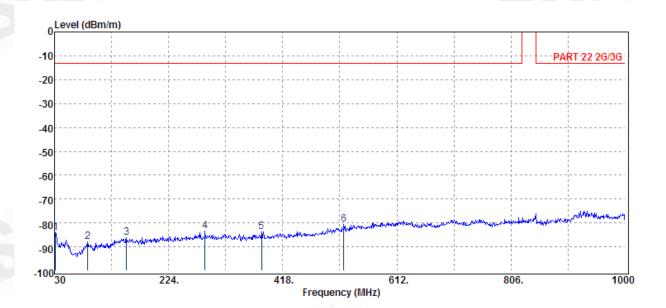
Temp./Humi. :27 deg\_C / 66 RH

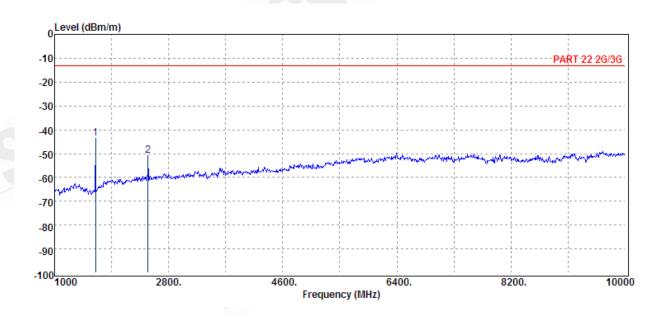
Engineer :Lion

Measurement

:HORIZONTAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 190

Fundamental Frequency: 836.6 MHz Operation Mode :TX MID EUT Pol. :E2 Plan

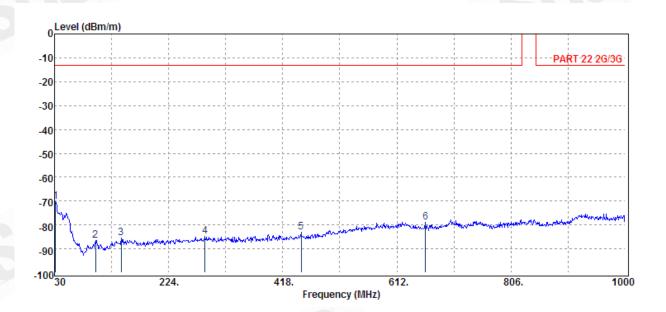
**Test Date** :2012-07-02

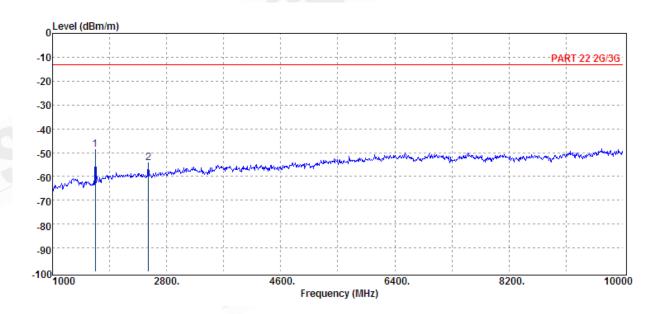
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 190

Fundamental Frequency: 836.6 MHz Operation Mode :TX MID EUT Pol. :E2 Plan

**Test Date** :2012-07-02

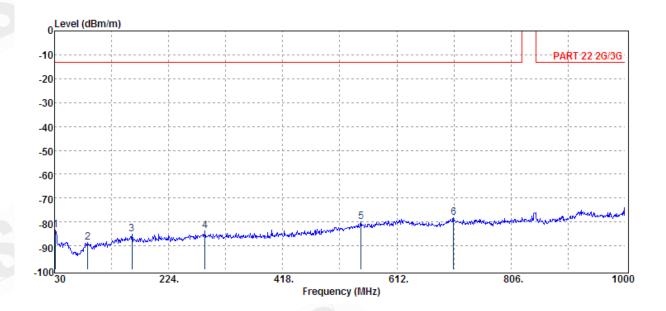
Temp./Humi. :27 deg\_C / 66 RH

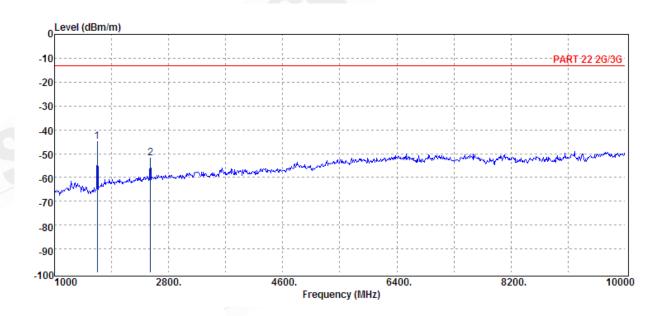
Engineer :Lion

Measurement

Antenna Pol.

:HORIZONTAL





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Operation Band :GSM 850 ARFCN :CH 251

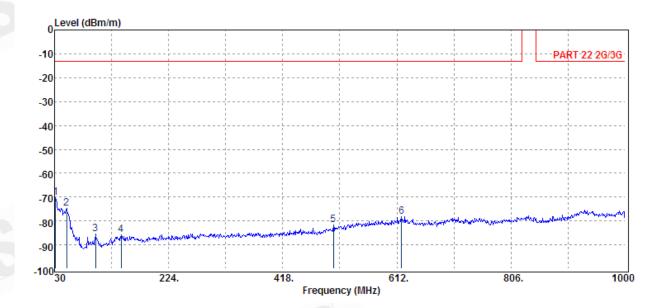
Fundamental Frequency :848.8 MHz Operation Mode :TX HIGH EUT Pol. :E2 Plan Test Date :2012-07-02

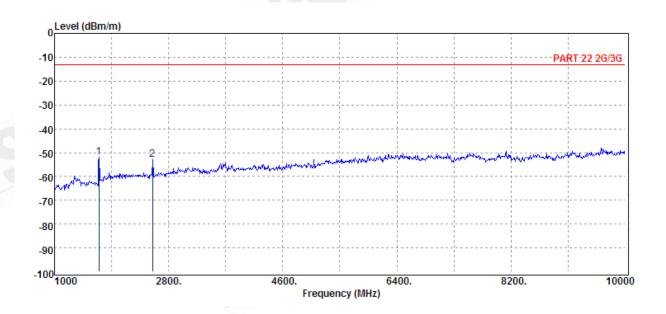
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 251

Fundamental Frequency :848.8 MHz Operation Mode :TX HIGH EUT Pol. :E2 Plan

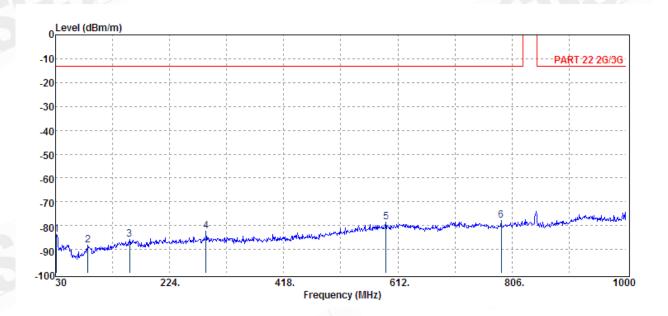
**Test Date** :2012-07-02

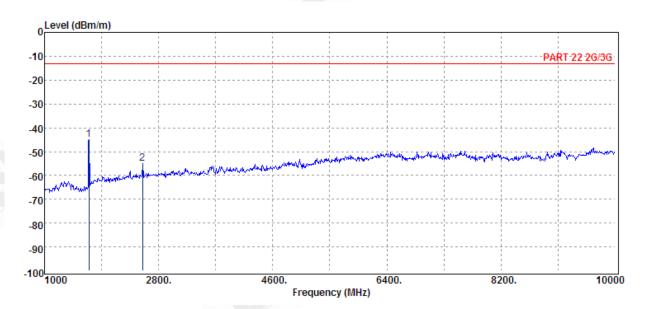
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :HORIZONTAL

Antenna Pol.





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Radiated Spurious Emission Measurement Result: GSM 1900 Mode

**Operation Band** :GSM 1900 :2012-07-02

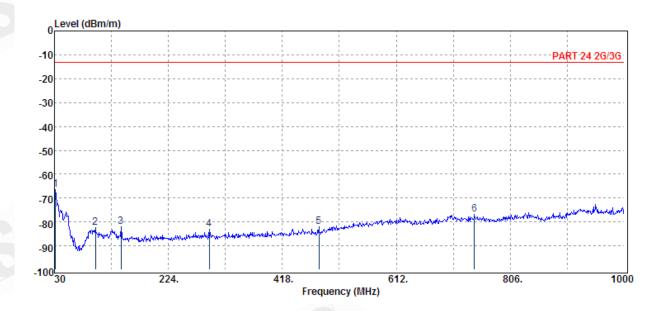
**ARFCN** :CH 512 Temp./Humi. :27 deg\_C / 66 RH

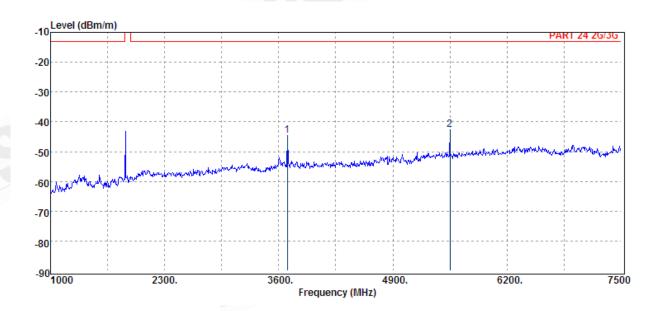
Fundamental Frequency: 1850.2MHz Engineer :Lion

Operation Mode :TX LOW

EUT Pol. :E2 PLAN Measurement :VERTICAL

Antenna Pol.





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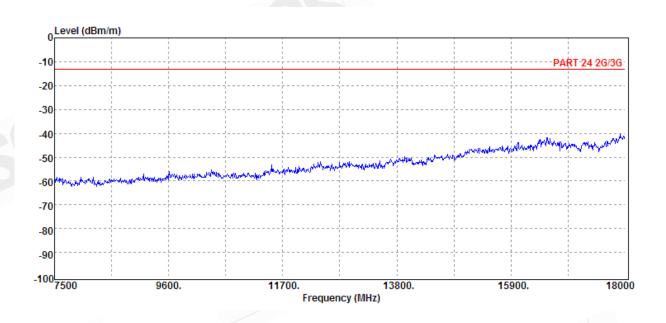
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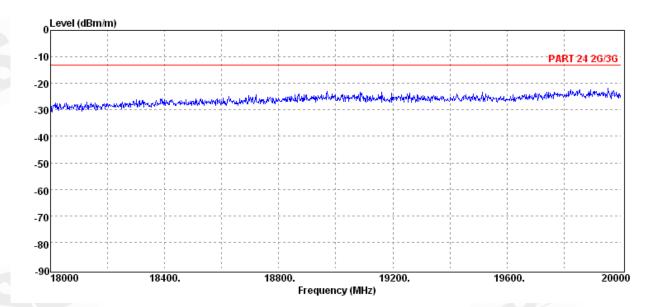
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**Operation Band** :GSM 1900 **ARFCN** :CH 512

Fundamental Frequency :1850.2MHz Operation Mode :TX LOW EUT Pol. :E2 PLAN

Test Date :2012-07-02

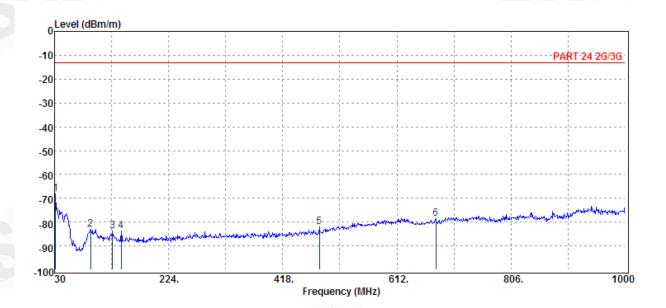
Temp./Humi. :27 deg\_C / 66 RH

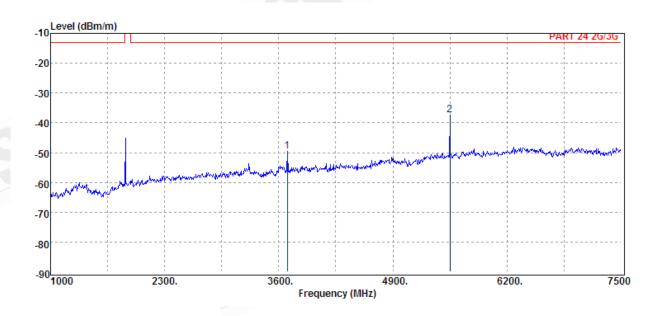
:Lion Engineer

Measurement

:HORIZONTAL

Antenna Pol.





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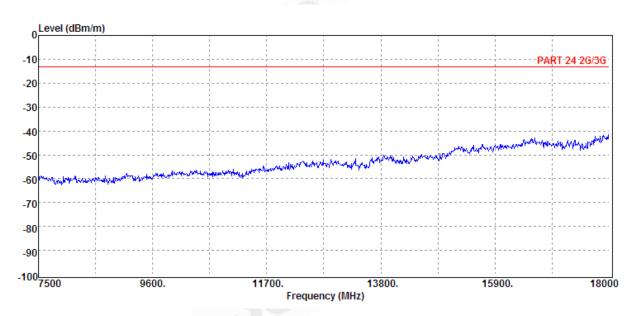
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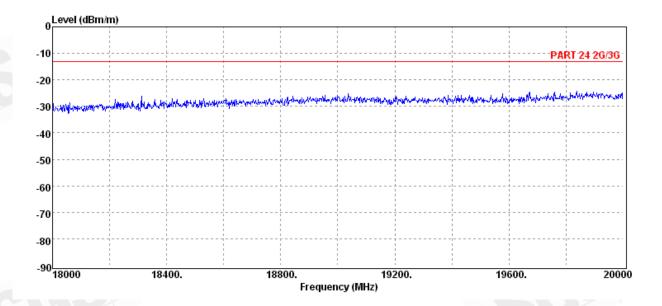
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**Operation Band** :GSM 1900 **ARFCN** :CH 661

Fundamental Frequency :1880.0MHz Operation Mode :TX MID EUT Pol. :E2 PLAN

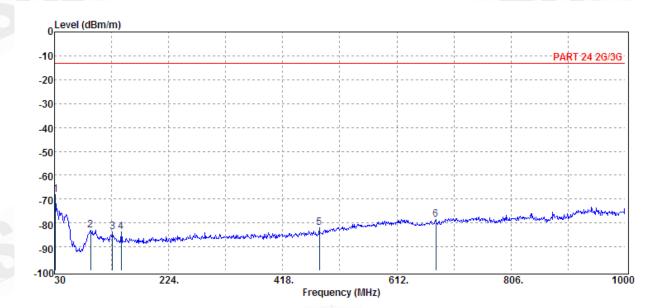
**Test Date** :2012-07-02

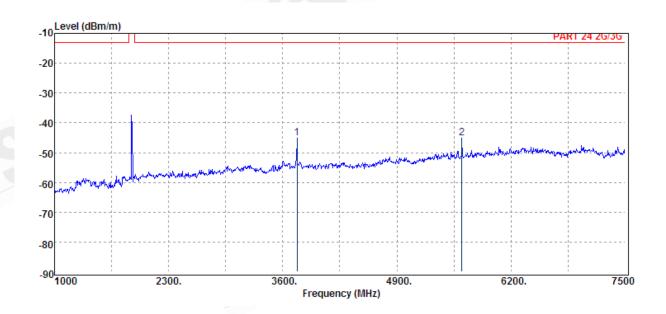
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.





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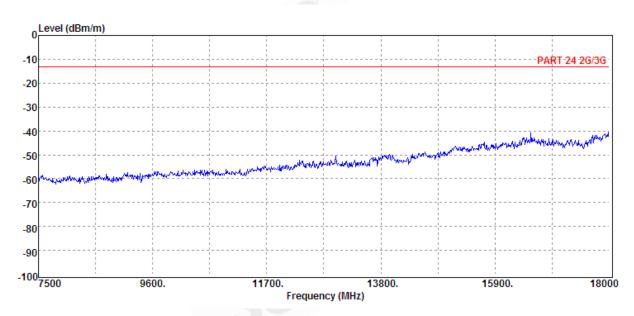
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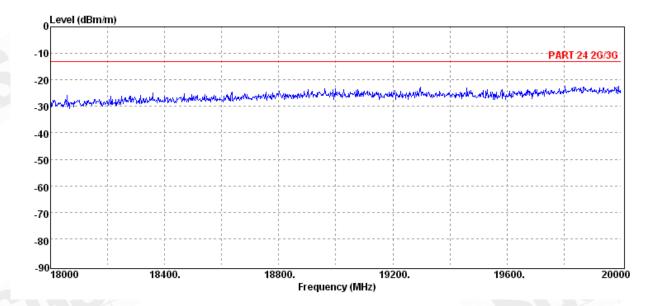
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**Operation Band** :GSM 1900 **ARFCN** :CH 661

Fundamental Frequency :1880.0MHz Operation Mode :TX MID EUT Pol. :E2 PLAN

**Test Date** :2012-07-02

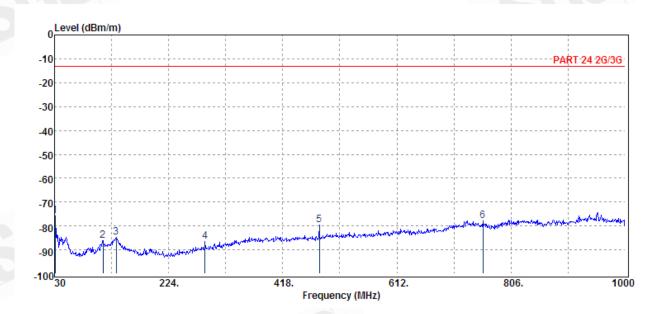
Temp./Humi. :27 deg\_C / 66 RH

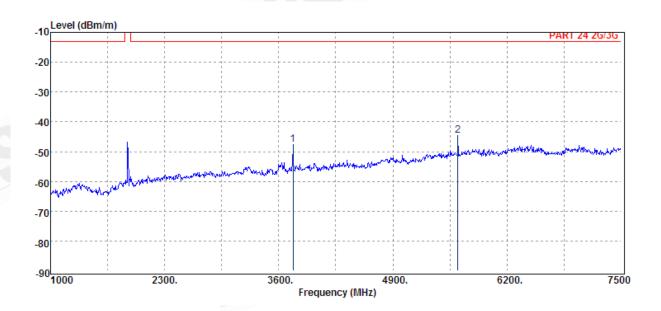
Engineer :Lion

Measurement

:HORIZONTAL

Antenna Pol.





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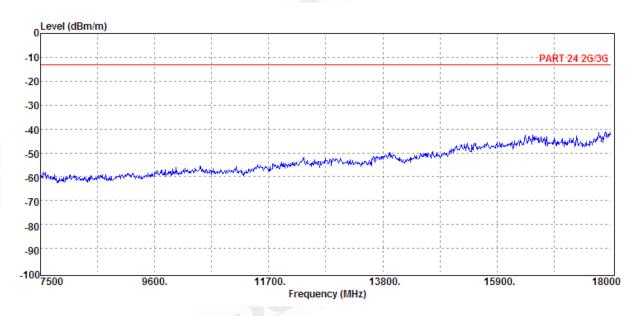
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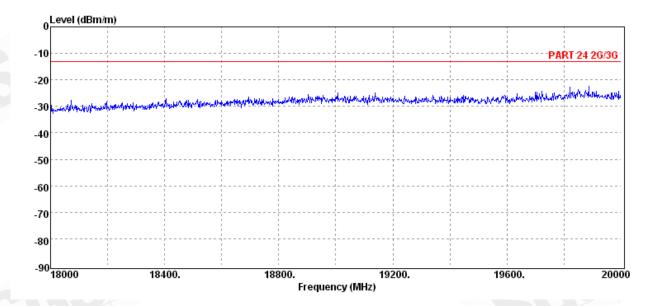
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**Operation Band** :GSM 1900 **ARFCN** :CH 810

Fundamental Frequency :1909.8MHz Operation Mode :TX HIGH EUT Pol. :E2 PLAN

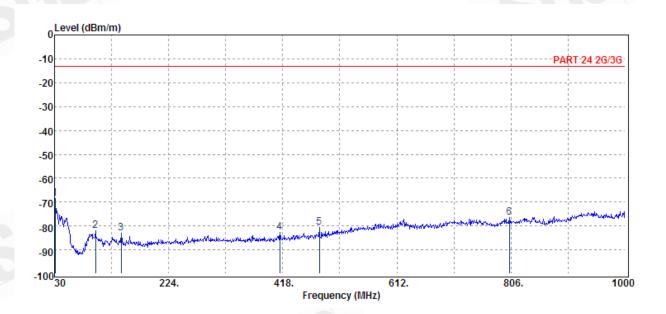
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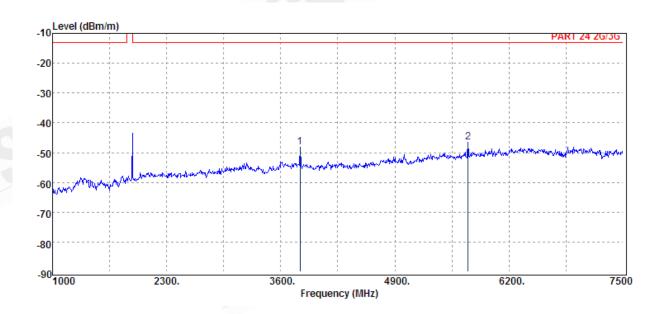
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Lion

Measurement :VERTICAL

Antenna Pol.





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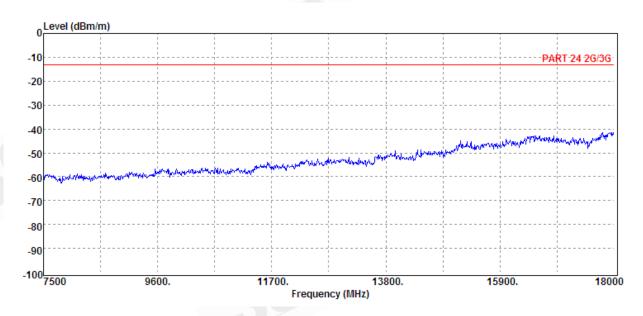
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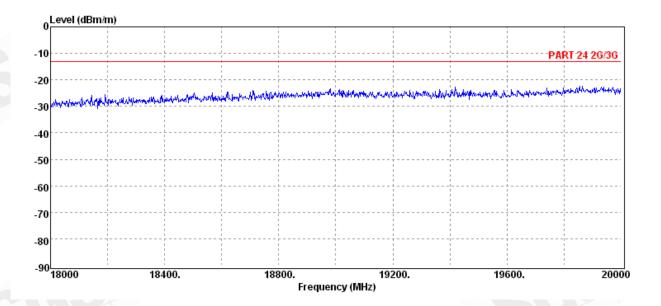
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**Operation Band** :GSM 1900 **ARFCN** :CH 810

Fundamental Frequency :1909.8MHz Operation Mode :TX HIGH EUT Pol. :E2 PLAN

**Test Date** :2012-07-02

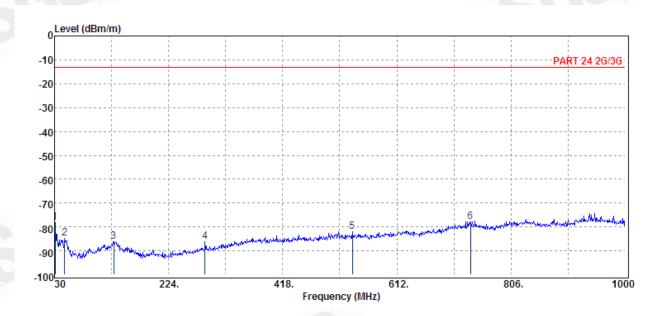
Temp./Humi. :27 deg\_C / 66 RH

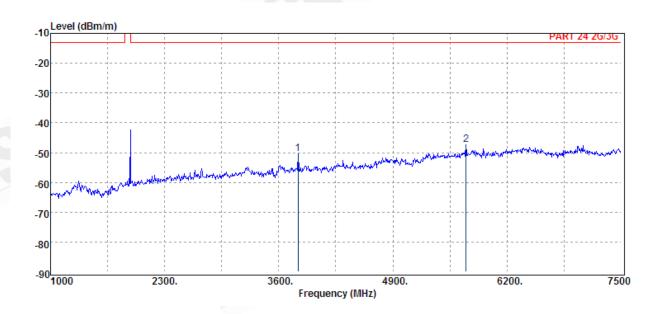
Engineer :Lion

Measurement

:HORIZONTAL

Antenna Pol.





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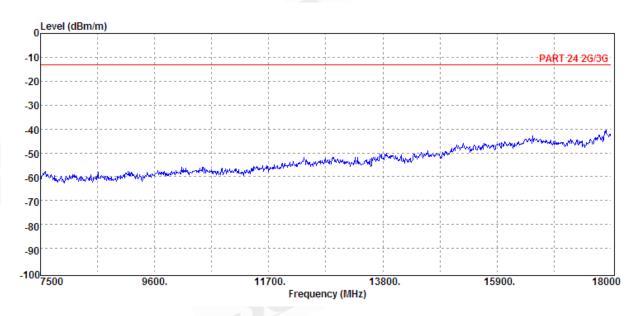
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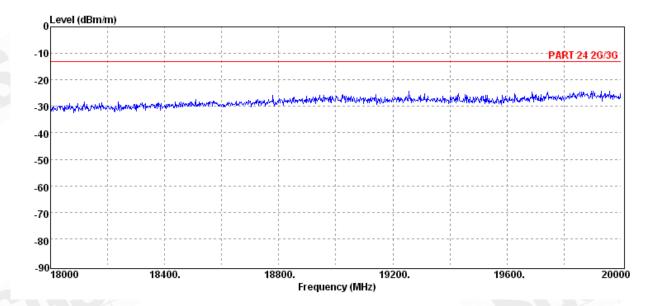
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Radiated Spurious Emission Measurement Result: GSM 850 Mode

**Operation Band** :GSM 850 :2012-07-02

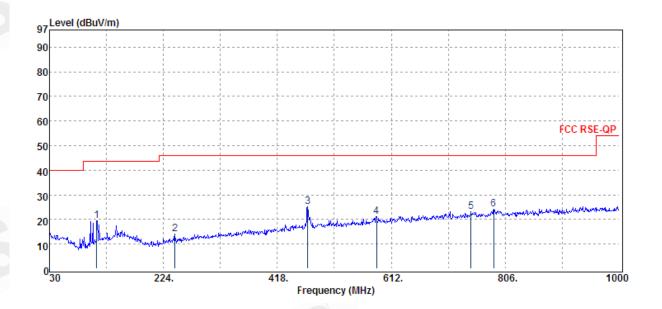
**ARFCN** :CH 128 Temp./Humi. :27 deg\_C / 66 RH

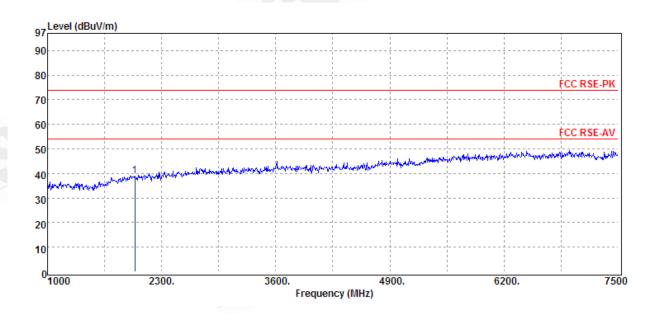
Fundamental Frequency: 824.2 MHz Engineer :Jazz

Operation Mode :RX LOW

EUT Pol. :E2 Plan Measurement :VERTICAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 128

Fundamental Frequency: 824.2 MHz Operation Mode :RX LOW EUT Pol. :E2 Plan

Test Date :2012-07-02

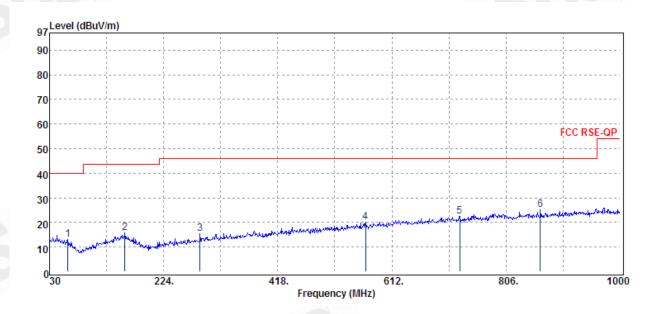
Temp./Humi. :27 deg\_C / 66 RH

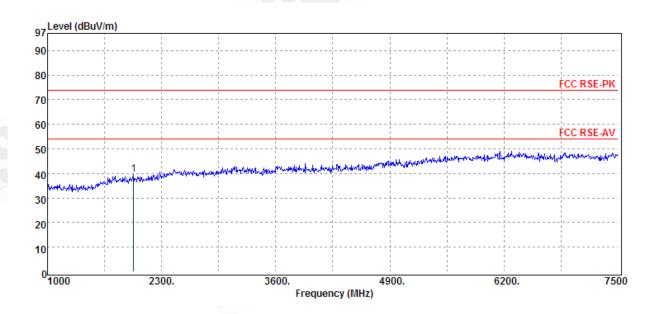
Engineer :Jazz

Measurement

:HORIZONTAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 190

Fundamental Frequency: 836.6 MHz Operation Mode :RX MID EUT Pol. :E2 Plan

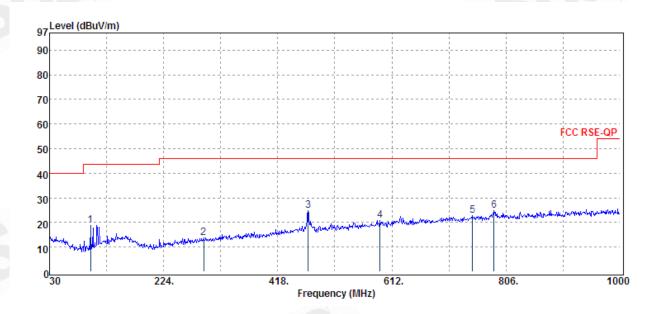
**Test Date** :2012-07-02

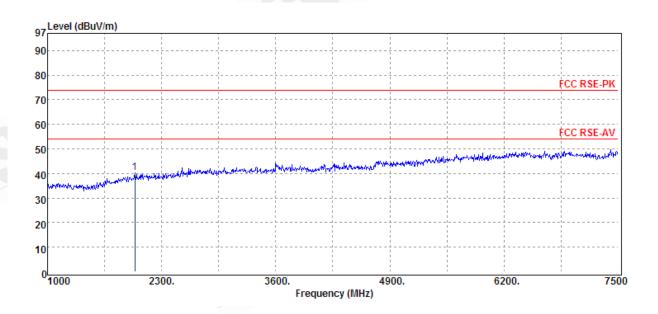
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Jazz

Measurement :VERTICAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 190

Fundamental Frequency: 836.6 MHz Operation Mode :RX MID EUT Pol. :E2 Plan

**Test Date** :2012-07-02

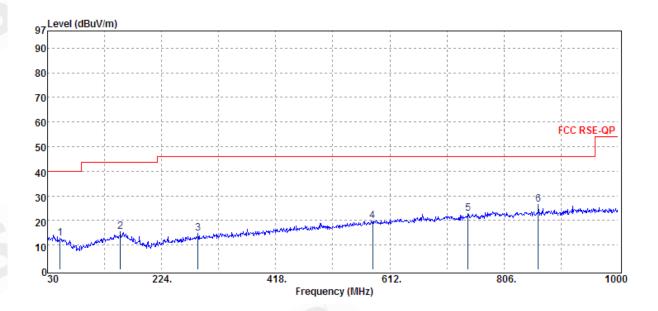
Temp./Humi. :27 deg\_C / 66 RH

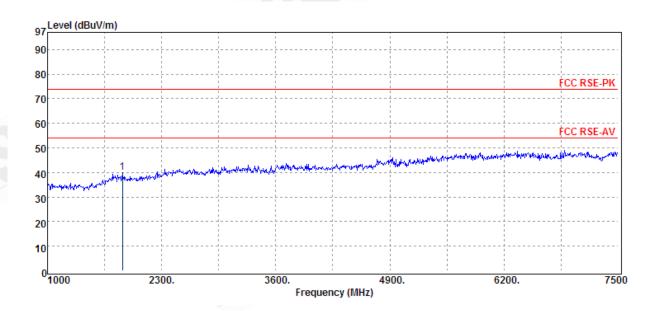
Engineer :Jazz

Measurement

:HORIZONTAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 251

Fundamental Frequency :848.8 MHz Operation Mode :RX HIGH EUT Pol. :E2 Plan

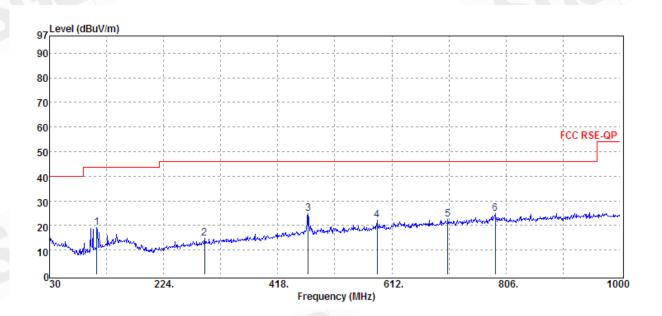
**Test Date** :2012-07-02

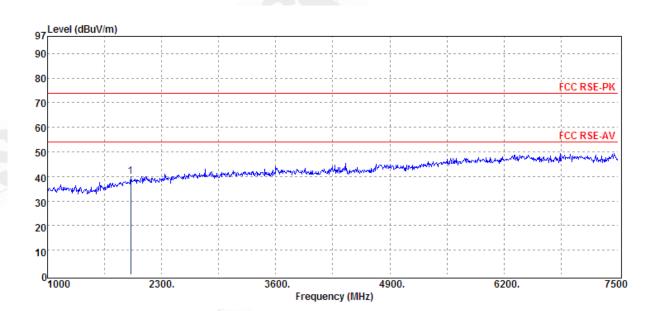
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Jazz

Measurement :VERTICAL

Antenna Pol.





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**Operation Band** :GSM 850 **ARFCN** :CH 251

Fundamental Frequency :848.8 MHz Operation Mode :RX HIGH EUT Pol. :E2 Plan

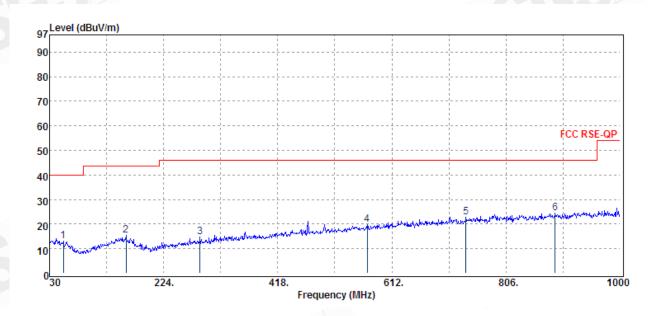
**Test Date** :2012-07-02

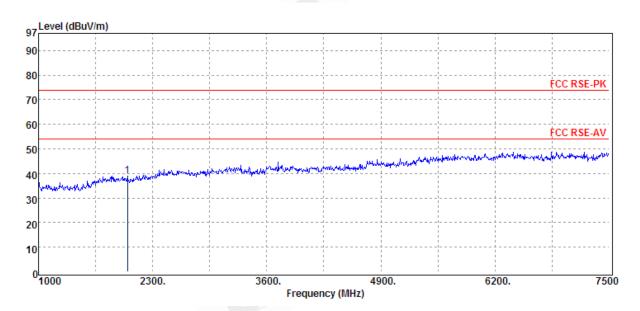
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Jazz

Measurement :HORIZONTAL

Antenna Pol.





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Radiated Spurious Emission Measurement Result: GSM 1900 Mode

**Operation Band** :GSM 1900 :2012-07-02

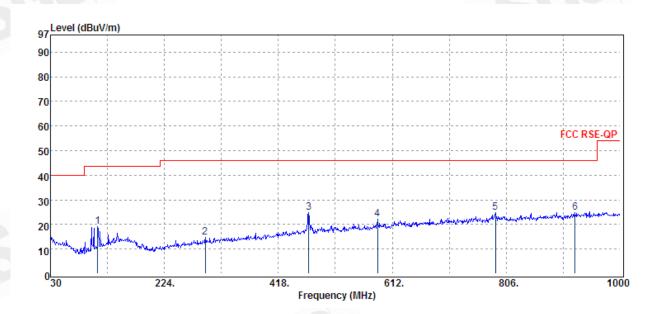
**ARFCN** :CH 512 Temp./Humi. :27 deg\_C / 66 RH

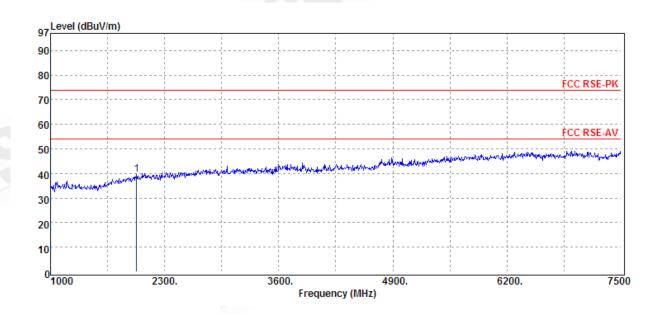
Fundamental Frequency: 1850.2MHz Engineer :Lion

Operation Mode :RX LOW

EUT Pol. :E2 PLAN Measurement :VERTICAL

Antenna Pol.





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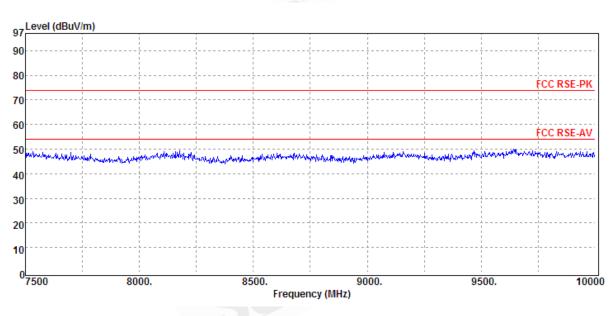
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**Operation Band** :GSM 1900 **ARFCN** :CH 512

Fundamental Frequency :1850.2MHz Operation Mode :RX LOW EUT Pol. :E2 PLAN

Test Date :2012-07-02

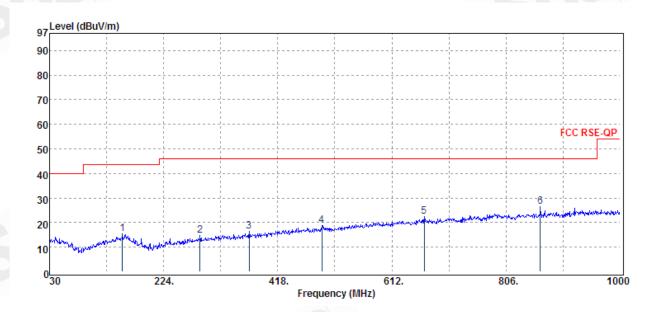
Temp./Humi. :27 deg\_C / 66 RH

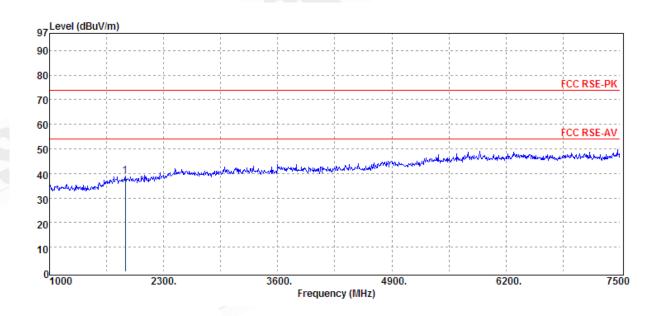
Engineer :Jazz

Measurement

:HORIZONTAL

Antenna Pol.





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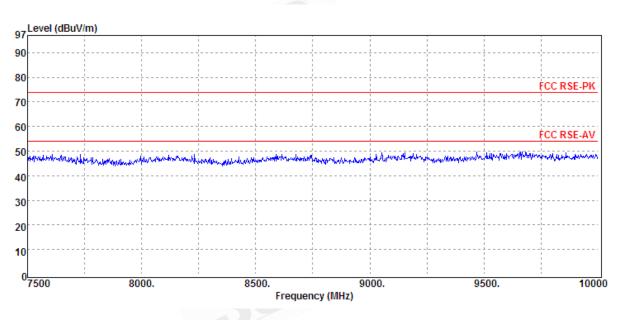
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**Operation Band** :GSM 1900 **ARFCN** :CH 661

Fundamental Frequency :1880.0MHz Operation Mode :RX MID EUT Pol. :E2 PLAN

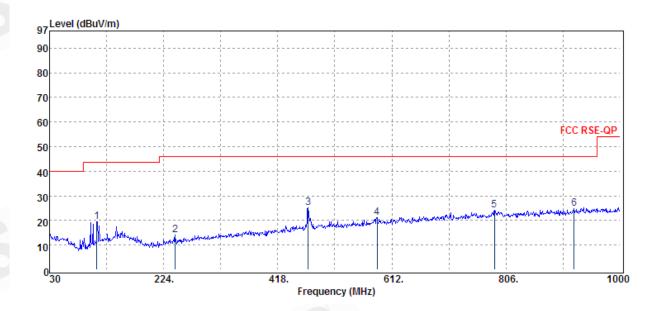
**Test Date** :2012-07-02

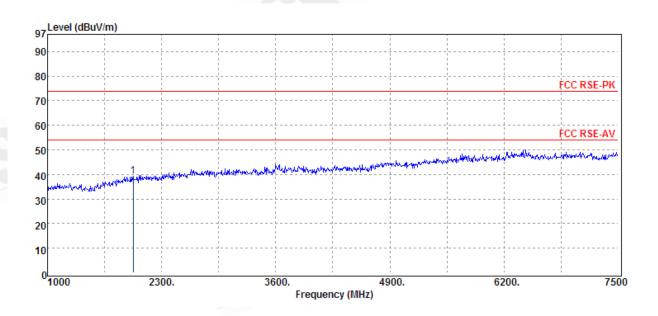
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Jazz

Measurement :VERTICAL

Antenna Pol.





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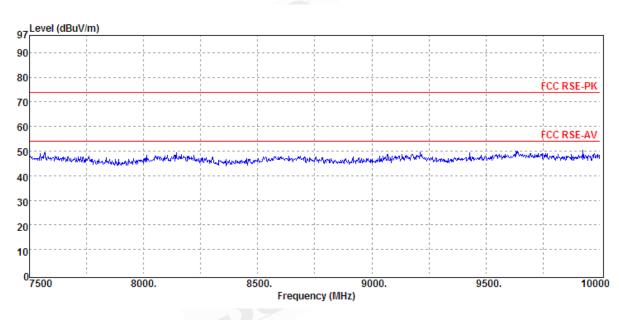
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**Operation Band** :GSM 1900 **ARFCN** :CH 661

Fundamental Frequency :1880.0MHz Operation Mode :RX MID EUT Pol. :E2 PLAN

**Test Date** :2012-07-02

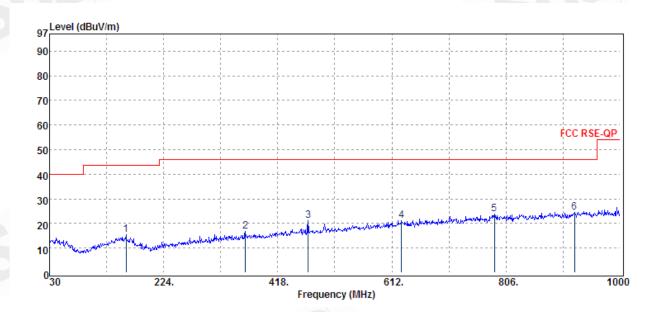
Temp./Humi. :27 deg\_C / 66 RH

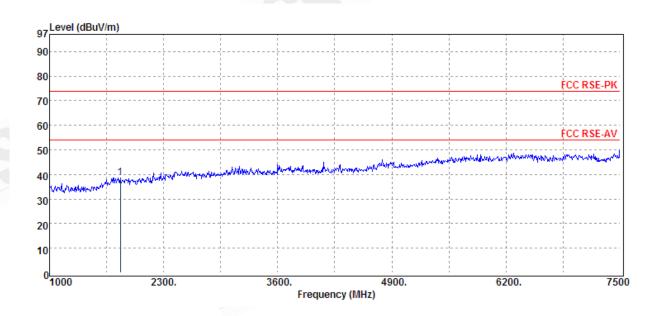
Engineer :Jazz

Measurement

:HORIZONTAL

Antenna Pol.





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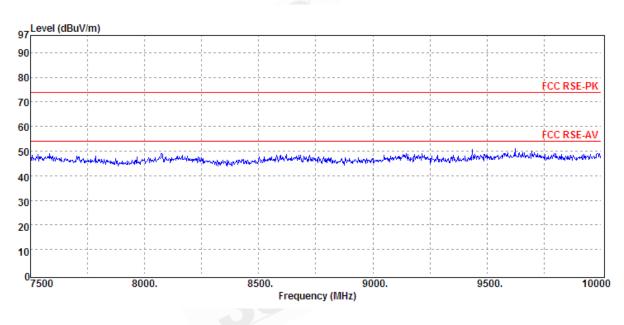
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**Operation Band** :GSM 1900 **ARFCN** :CH 810

Fundamental Frequency: 1909.8MHz Operation Mode :RX HIGH EUT Pol. :E2 PLAN

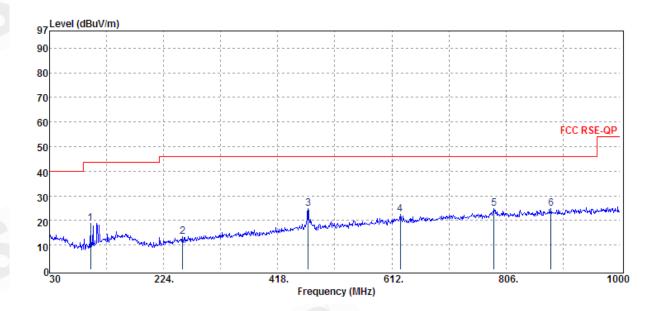
**Test Date** :2012-07-02

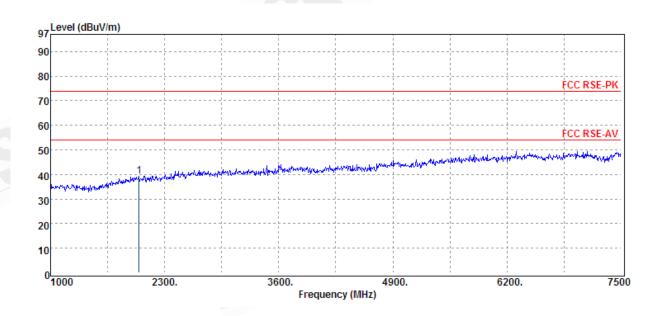
Temp./Humi. :27 deg\_C / 66 RH

Engineer :Jazz

Measurement :VERTICAL

Antenna Pol.





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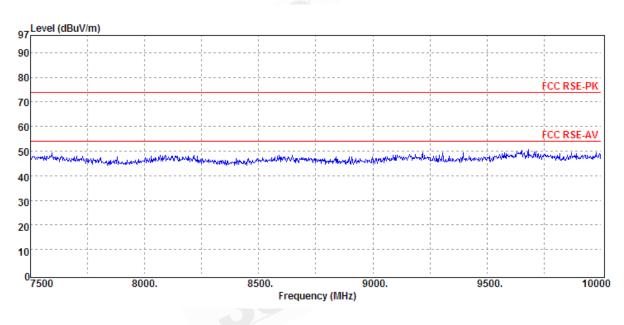
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**Operation Band** :GSM 1900 **ARFCN** :CH 810

Fundamental Frequency: 1909.8MHz Operation Mode :RX HIGH EUT Pol. :E2 PLAN

**Test Date** :2012-07-02

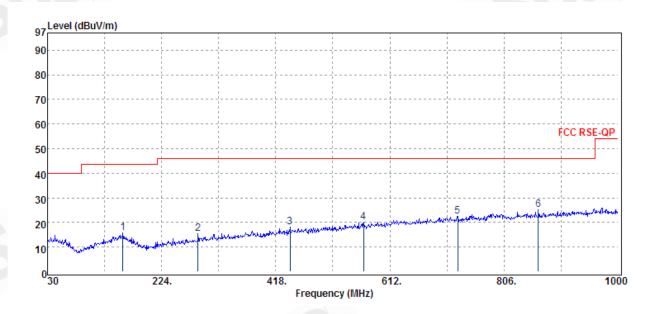
Temp./Humi. :27 deg\_C / 66 RH

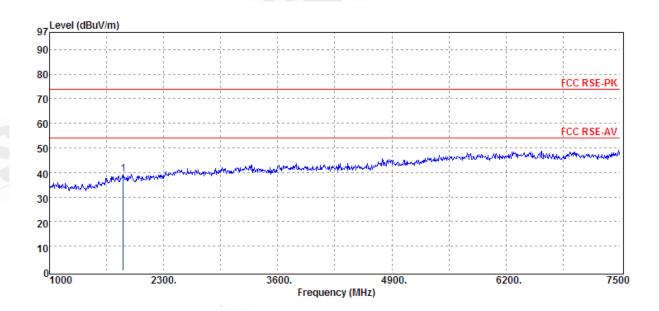
Engineer :Jazz

Measurement

:HORIZONTAL

Antenna Pol.





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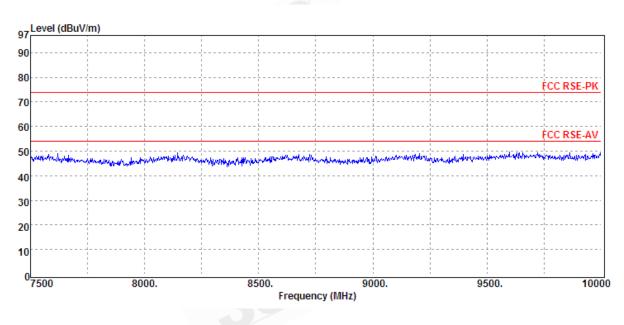
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