# **TEST REPORT**

DT&C	Co.,	Ltd.
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42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea

Tel: 031-321-2664, Fax: 031-321-1664

Report No : DRTFCC1605-0065 Pages:(1) / (78) page



1. Customer

• Name : Ecube Labs Co.,Ltd.

• Address : Guro-dong, Acetechnotower 5th Bldg, 20, Digital-ro31-gil, Guro-gu406, 20,

Digital-ro 31-gil, Guro-gu Seoul, Korea

- 2. Use of Report : FCC & IC Original Grant
- 3. Product Name (FCCID / IC) : Clean Cube (2AHTD-STSM240 / 21258-STSM240)

4. Date of Test : 2016-02-25 ~ 2016-03-17

5. Test Method Used: FCC Part 22, 24 RSS-132, 133

6. Testing Environment : See appended test report

7. Test Result : 🛛 Pass 📋 Fail

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Affirmation	Tested by Name : Jaejin Lee	(Signature)	Technical Manager Name : GeunKi Son (Signature)	
2016.05.09.				
		DT&C Co.,	Ltd.	
			-	

\* If this test report is required to confirmation of authenticity, please contact to report@dtnc.net



# **Test Report Version**

Test Report No.	Date	Description
DRTFCC1605-0065	May. 09, 2016	Initial issue



# **Table of Contents**

1. GENERAL INFORMATION	
2.1. EUT DESCRIPTION	
2.2. Support equipment	
2.3. MEASURING INSTRUMENT CALIBRATION	
2.4. TEST FACILITY	
3. DESCRIPTION OF TESTS	
3.1 ERP & EIRP	
3.2 PEAK TO AVERAGE RATIO	
3.3 OCCUPIED BANDWIDTH.	
3.4 BAND EDGE EMISSIONS AT ANTENNA TERMINAL.	-
3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	
3.6 RADIATED SPURIOUS EMISSIONS	
3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	
4. LIST OF TEST EQUIPMENT	
5. SUMMARY OF TEST RESULTS	
6. SAMPLE CALCULATION	17
7. TEST DATA	
7.1 Conducted OUTPUT POWER	
7.2 PEAK TO AVERAGE RATIO	20
7.3 OCCUPIED BANDWIDTH	20
7.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	-
7.5 BAND EDGE	20
7.6 EFFECTIVE RADIATED POWER	21
7.7 EQUIVALENT ISOTROPIC RADIATED POWER	
7.8 RADIATED SPURIOUS EMISSIONS	23
7.8.1 RADIATED SPURIOUS EMISSIONS (GPRS850)	23
7.8.2 RADIATED SPURIOUS EMISSIONS (WCDMA850)	
7.8.3 RADIATED SPURIOUS EMISSIONS (HSUPA850)	25
7.8.4 RADIATED SPURIOUS EMISSIONS (GPRS1900)	26
7.8.5 RADIATED SPURIOUS EMISSIONS (WCDMA1900)	27
7.8.6 RADIATED SPURIOUS EMISSIONS (HSUPA1900)	28
7.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	29
7.9.1 FREQUENCY STABILITY (GPRS850)	29
7.9.2 FREQUENCY STABILITY (WCDMA850)	30
7.9.3 FREQUENCY STABILITY (HSUPA850)	31
7.9.4 FREQUENCY STABILITY (GPRS1900)	32
7.9.5 FREQUENCY STABILITY (WCDMA1900)	33
7.9.6 FREQUENCY STABILITY (HSUPA1900)	
8. TEST PLOTS	35
8.1 Peak to Average Ratio	
8.2 Occupied Bandwidth (99 % Bandwidth)	
8.3 Spurious Emissions at Antenna Terminal	54
8.4 Band Edge	69



# **1. GENERAL INFORMATION**

Applicant Name:	Ecube Labs Co.,Ltd.					
Address:	Guro-dong, Acetechnotower 5th Bldg, 20, Digital-ro31-gil, Guro-gu406, 20, Digital-ro 31-gil, Guro-gu Seoul, Korea					
FCC ID	: 2AHTD-STSM240					
IC	: 21258-STSM240					
FCC Classification	: PCS Licensed Transmitter (PCB)					
EUT	: Clean Cube					
Model Name	: STSM-240					
Add Model Name	: STSM-120, STSM-100 (Added models are same technically and mechanically except for size.)					
Supplying power	: Standard Battery - Rating: DC 12V					
Antenna Informatic	n : Dipole Antenna					

Tx Fre	Tx Frequency	Emission Designator	ERP(Max.power)		EIRP(Max.power)	
Mode	(MHz)		dBm	W	dBm	W
GPRS850	824.2 ~ 848.8 MHz	244KGXW	24.69	0.294	26.84	0.483
EDGE850	824.2 ~ 848.8 MHz	245KG7W	20.36	0.109	22.51	0.178
WCDMA850	826.4 ~ 846.6 MHz	4M06F9W	18.67	0.074	20.82	0.121
HSUPA850	826.4 ~ 846.6 MHz	4M08F9W	17.61	0.058	19.76	0.095
GPRS1900	1850.2 ~ 1909.8 MHz	244KGXW	-	-	20.99	0.126
EDGE1900	1850.2 ~ 1909.8 MHz	255KG7W	-	-	17.88	0.061
WCDMA1900	1852.4 ~ 1907.6 MHz	4M09F9W	-	-	14.63	0.029
HSUPA1900	1852.4 ~ 1907.6 MHz	4M09F9W	-	-	14.04	0.025

Note: FCC is 850 band based on ERP.



# 2. INTRODUCTION

## 2.1. EUT DESCRIPTION

The Equipment Under Test(EUT) supports GPRS/WCDMA.

## 2.2. Support equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

Note: The above equipment were supported by manufacturer.

## 2.3. MEASURING INSTRUMENT CALIBRATION

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

## 2.4. TEST FACILITY

The 3m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935. The site is constructed in conformance with the requirements.

- 3m test site registration Number: 165783(FCC) & 5740A-3 (IC)

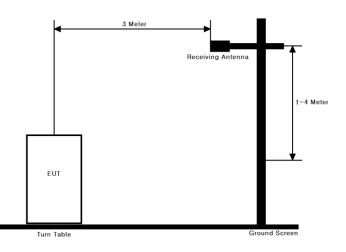


# **3. DESCRIPTION OF TESTS**

### 3.1 ERP & EIRP

(Effective Radiated Power & Equivalent Isotropic Radiated Power)

### Test Set-up



## Test Procedure

- ANSI/TIA-603-C-2004 Section 2.2.17
- KDB971168 v02r02 Section 5.2.1

These measurements were performed at 3 m test site. The EUT is placed on turntable of ground plane and 3 meters from the receive antenna. If necessary to prevent direct metallic contact of the EUT and the reference ground plane, insulating material (up to 12 mm thick) shall be placed under the EUT.

## Test setting

- 1. Set span to at least 1.5 times the OBW.
- 2. Set RBW = 1-5 % of the OBW, not to exceed 1 MHz.
- 3. Set VBW  $\geq$  3 x RBW.
- 4. Set number of points in sweep  $\geq$  2 × span / RBW.
- 5. Sweep time = auto couple.
- 6. Detector = RMS (power averaging).
- 7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle  $\geq$  98 %), then set the trigger to free run.
- 8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep.

Ensure that the sweep time is less than or equal to the transmission burst duration.

- 9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- 10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.



The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

The ERP/EIRP is calculated using the following formula:

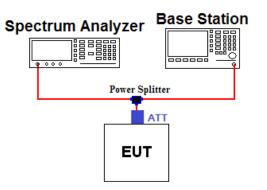
ERP/EIRP = The conducted power at the substitute antenna's terminal [dBm] + Substitute Antenna gain [dBd for ERP, dBi for EIRP]

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn antenna and an isotropic antenna are taken into consideration.



## **3.2 PEAK TO AVERAGE RATIO**

#### Test set-up



## Test Procedure

A peak to average ratio measurement is performed using the following procedure.

## CCDF Procedure

- KDB971168 v02r02-Section 5.7.1
- 1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth
- 2. Set the number of counts to a value that stabilizes the measured CCDF curve
- 3. Set the measurement interval as follows:
  - 1) For continuous transmissions, set to 1 ms
  - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
- 4. Record the maximum PAPR level associated with a probability of 0.1%



## Alternate Procedure

## - KDB971168 v02r02-Section 5.7.2

Use one of the measurement procedures of the peak power and record as PPk.

Use one of the measurement procedures of the average power and record as PAvg.

Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

PAPR (dB) =  $P_{Pk}$  (dBm) -  $P_{Avg}$  (dBm).

## - Peak Power Measurement

- 1. Set the RBW  $\geq$  OBW
- 2. Set VBW ≥ 3 × RBW
- 3. Set span ≥ 2 x RBW
- 4. Sweep time = auto couple
- 5. Detector = peak
- 6. Ensure that the number of measurement points  $\geq$  span/RBW.
- 7. Trace mode = max hold
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the peak amplitude level.

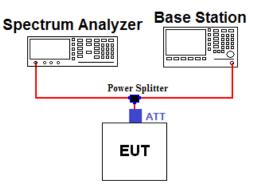
## - Average Power Measurement

- 1. Set span to at least 1.5 times the OBW.
- 2. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
- 3. Set VBW  $\geq$  3 x RBW.
- 4. Set number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- 5. Sweep time = auto-couple.
- 6. Detector = RMS (power averaging).
- 7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
- 8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.</p>
- 9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- 10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.



## 3.3 OCCUPIED BANDWIDTH.

### Test set-up



#### Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
824.2	18.68	1850.2	19.20
826.4	18.68	1852.4	19.19
836.6	18.69	1880.0	19.25
846.6	18.76	1907.6	19.27
848.8	18.75	1909.8	19.27
-	-	-	-

Note. 1: The offset values from EUT to Spectrum analyzer were measured and used for test. Offset value = Cable A + Splitter +ATT+ Cable B

## **Test Procedure**

## - KDB971168 v02r02-Section 4.2

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

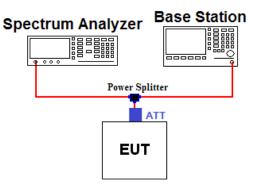
## Test setting

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 ~ 5 % of the expected OBW & VBW  $\ge$  3 X RBW
- 3. Detector = Peak
- 4. Trance mode = Max hold
- 5. Sweep = Auto couple
- 6. The trace was allowed to stabilize
- 7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within  $1 \sim 5 \%$  of the 99 % occupied bandwidth observed in step 6.



## 3.4 BAND EDGE EMISSIONS AT ANTENNA TERMINAL.

#### Test set-up



#### Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
823.0	18.66	1849.0	19.19
824.0	18.68	1850.0	19.20
849.0	18.77	1910.0	19.27
850.0	18.77	1911.0	19.27
-	-	-	-

Note. 1: The offset value from EUT to Spectrum analyzer was measured and used for test. Offset value = Cable A + Splitter +ATT+ Cable B

## **Test Procedure**

## - KDB971168 v02r02 - Section 6.0

All out of band emissions are measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its lowest and highest channel with all modulations.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P) dB$ 

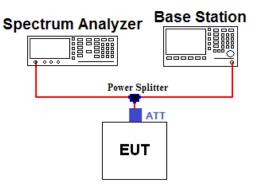
#### Test setting

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW  $\geq$  1 % of the emission
- 4. VBW  $\geq$  3 X RBW
- 5. Detector = RMS & Trace mode = Max hold
- 6. Sweep time = Auto couple or 1 s for band edge
- 7. Number of sweep point  $\geq$  2 X span / RBW
- 8. The trace was allowed to stabilize
  - Note 1: In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of **at least one percent** of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.



## 3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

### Test set-up



#### Offset value information

Frequency (MHz)	Offset Value (dB)	Frequency (MHz)	Offset Value (dB)
10000.0	20.75	20000.0	23.27
-	-	-	-

Note. 1: The offset value from EUT to Spectrum analyzer was measured and used for test. Offset value = Cable A + Splitter +ATT+ Cable B

## Test Procedure

## - KDB971168 v02r02 - Section 6.0

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its low, middle, high channel with all bandwidths. The spectrum is scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

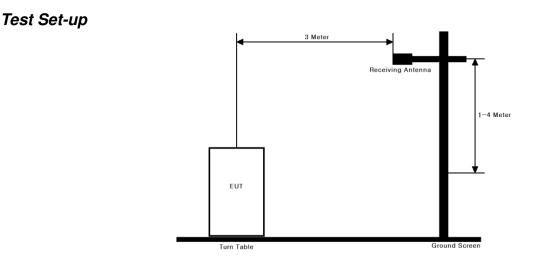
The power of any spurious emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P) dB$ 

#### Test setting

- 1. RBW = 100 KHz or 1 MHz & VBW  $\ge$  3 X RBW (Refer to Note 1)
- 2. Detector = RMS & Trace mode = Max hold
- 3. Sweep time = Auto couple
- 4. Number of sweep point  $\geq$  2 X span / RBW
- 5. The trace was allowed to stabilize
- Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24.



## 3.6 RADIATED SPURIOUS EMISSIONS



## Test Procedure

- ANSI/TIA-603-C-2004 - Section 2.2.12

## - KDB971168 v02r02 - Section 5.8

These measurements were performed at 3 m test site. The EUT is placed on turntable of ground plane and 3 meters from the receive antenna. If necessary to prevent direct metallic contact of the EUT and the reference ground plane, insulating material (up to 12 mm thick) shall be placed under the EUT.

## Test setting

- 1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW  $\geq$  3 X RBW
- 2. Detector = Peak & Trace mode = Max hold
- 3. Sweep time = Auto couple
- 4. Number of sweep point  $\geq$  2 X span / RBW
- 5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

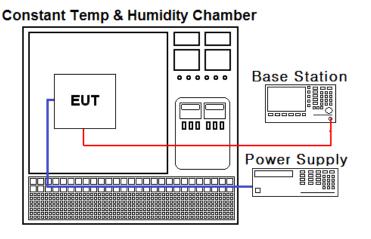
For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in X axis.



## 3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

### Test Set-up



## Test Procedure

- ANSI/TIA-603-C-2004
- KDB971168 v02r02 Section 9.0

The frequency stability of the transmitter is measured by:

## a.) **Temperature:**

The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

## b.) Primary Supply Voltage:

The primary supply voltage is varied from 85 % to 115 % of the nominal value for non handcarried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

## Specification:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24. The frequency stability of the transmitter shall be maintained within  $\pm$  0.000 25 % ( $\pm$  2.5 ppm) of the center frequency for Part 22.

## Time Period and Procedure:

- 1. The carrier frequency of the transmitter is measured at room temperature. (20 °C to provide a reference)
- 2. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.



# 4. LIST OF TEST EQUIPMENT

Туре	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
MXA Signal Analyzer	Agilent Technologies	N9020A	16/01/06	17/01/06	MY46471096
MXA Signal Analyzer	Agilent Technologies	N9020A	16/01/06	17/01/06	MY46471172
DC Power Supply	HP	66332A	15/09/23	16/09/23	US36320377
Multimeter	FLUKE	17B	15/04/27	16/04/27	26030065WS
Temp & Humi Test Chamber	SJ Science	SJ-TH-S50	15/10/19	16/10/19	SJ-TH-S50-131011
Vector Signal Generator	R&S	SMBV100A	16/01/05	17/01/05	255571
Signal Generator	R&S	SMF100A	15/06/29	16/06/29	102341
8960 Series 10 Wireless Comms Test Set	Agilent Technologies	E5515C	15/09/10	16/09/10	GB41321164
Universalradio Communication Tster	R&S	CMU200	16/02/25	17/02/25	106760
Power Splitter	Anritsu	K241B	15/10/20	16/10/20	1701061
2W 3dB Attenuator	SMAJK	SMAJK-2-3	15/10/19	16/10/19	3
50W 10dB Attenuator	SMAJK	SMAJK-50-10	15/10/19	16/10/19	2-50-10
Thermohygrometer	BODYCOM	BJ5478	16/02/25	17/02/25	1209
Loop Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
TRILOG Broadband Test- Antenna	Schwarzbeck	VULB 9160	14/07/31	16/07/31	3363
Dipole Antenna	Schwarzbeck	VHA9103	15/05/29	17/05/29	2116
Dipole Antenna	Schwarzbeck	VHA9103	14/04/01	16/04/01	2117
Dipole Antenna	Schwarzbeck	UHA9105	15/05/29	17/05/29	2261
Dipole Antenna	Schwarzbeck	UHA9105	14/04/01	16/04/01	2262
HORN ANT	ETS	3115	15/02/09	17/02/09	00021097
HORN ANT	ETS	3117	14/05/12	16/05/12	140394
HORN ANT	A.H.Systems	SAS-574	15/04/30	17/04/30	154
HORN ANT	A.H.Systems	SAS-574	15/09/03	17/09/03	155
Amplifier	EMPOWER	BBS3Q7ELU	15/09/09	16/09/09	1020
Low Noise Pre Amplifier	tsj	MLA-010K01-B01- 27	15/04/09	16/04/09	1844539
Amplifier (30dB)	Agilent	8449B	15/11/06	16/11/06	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000- 15000-40SS	15/09/23	16/09/23	7
High-pass filter	Wainwright	WHKX12-2580- 3000-18000-80SS	15/09/23	16/09/23	3



# **5. SUMMARY OF TEST RESULTS**

FCC Part Section(s)	RSS Section(s)	Parameter	Status Note 1		
2.1046	RSS-132 [5.4] RSS-133 [6.4]	Conducted Output Power	С		
22.913(a)(2) 24.232(c)	RSS-132 [5.4] RSS-133 [6.4]	Effective Radiated Power (Part 22) Equivalent Isotropic Radiated Power (Part24, 27), (RSS-132, 133, 139)	С		
2.1049	RSS-Gen [6.6]	Occupied Bandwidth	С		
22.917(a) 24.238(a) 2.1051	RSS-132 [5.5] RSS-133 [6.5]	Band Edge Spurious and Harmonic Emissions at Antenna Terminal	С		
24.232(d)	RSS-132 [5.4] RSS-133 [6.4]	Peak to Average Ratio	С		
22.917(a) 24.238(a) 2.1053	RSS-132 [5.5] RSS-133 [6.5]	Radiated Spurious and Harmonic Emissions	С		
22.355 24.235 2.1055	RSS-132 [5.3] RSS-133 [6.3]	Frequency Stability	С		
Note 1: C=Com	Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable				
	a tastad assarding to the	e following specification:			

The sample was tested according to the following specification: ANSI/TIA/EIA-603-C-2004 and KDB 971168 D01 v02r02



# 6. SAMPLE CALCULATION

# A. Emission Designator

## **GPRS850 Emission Designator**

Emission Designator = **244KGXW** 

GPRS OBW = 244.32 kHz

(Measured at the 99.75 % power bandwidth)

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

## WCDMA850 Emission Designator

Emission Designator = **4M06F9W** WCDMA OBW = 4.0626 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data) **GPRS1900 Emission Designator** 

Emission Designator = **244KGXW** GPRS OBW = 244.32 kHz (Measured at the 99.75 % power bandwidth) G = Phase Modulation X = Cases not otherwise covered W = Combination (Audio/Data)

# WCDMA1900 Emission Designator

Emission Designator = **4M09F9W** WCDMA OBW = 4.0872 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data)

## EDGE850 Emission Designator

Emission Designator = **245KG7W** EDGE OBW = 245.13 kHz (Measured at the 99.75 % power bandwidth) G = Phase Modulation 7 = Two or more channels containing quantized or digital information

W = Combination (Audio/Data)

## HSUPA850 Emission Designator

Emission Designator = **4M08F9W** HSUPA OBW = 4.0774 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data) EDGE1900 Emission Designator

Emission Designator = **255KG7W** EDGE OBW = 255.10 kHz (Measured at the 99.75 % power bandwidth) G = Phase Modulation 7 = Two or more channels containing quantized or digital information W = Combination (Audio/Data) HSUPA1900 Emission Designator Emission Designator = **4M09F9W** 

HSUPA OBW = 4.0933 MHz

- (Measured at the 99.75 % power bandwidth)
- F = Frequency Modulation
- 9 = Composite Digital Information
- W = Combination (Audio/Data)

Report No.: DRTFCC1605-0065



#### IC: 21258-STSM240

# **B. EIRP Sample Calculation**

MODE	Channel	Freg.(MHz)	Spectrum Reading	EUT	Ant Pol	Level(dBm)	TX Ant	Res	sult
MODE	Channel	Freq.(MHZ)	Value(dBm)	Axis	(H/V)	@ Ant Terminal	Gain(dBi)	(dBm)	(W)
GPRS1900	512	1850.2	-22.35	Х	Н	11.98	9.01	20.99	0.126

### EIRP = @ Ant Terminal LEVEL(dBm) + Ant. Gain

1) The EUT mounted on turntable of ground plane.

2) During the test, the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

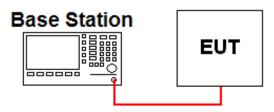
6) The signal generator output level with Ant. Gain is the rating of effective isotropic radiated power (EIRP).



# 7. TEST DATA

## 7.1 Conducted OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



The output power was measured using the Agilent E5515C

#### • GPRS / EDGE

		Test Result(dBm)									
Band	Channel	GSM Voice	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot	
	128	-	31.12	28.04	26.45	25.41	25.02	22.52	20.58	19.91	
Cellular	190	-	31.10	28.21	26.35	25.29	24.92	22.58	20.60	19.94	
	251	-	31.00	28.12	26.36	25.34	24.93	22.41	20.54	19.92	
	512	-	29.08	26.52	24.78	23.56	25.04	22.45	20.61	19.80	
PCS	661	-	29.16	26.58	24.81	23.58	25.06	22.57	20.59	19.64	
	810	-	29.22	26.59	24.84	23.62	25.03	22.46	20.93	19.68	

## • WCDMA / HSDPA / HSUPA

3GPP		3GPP 34.121	Cellu	lar Band (	dBm)	PC	S Band (dl	Bm)	3GPP
Release Version	Mode	Subtest	4132	4183	4233	9262	9400	9538	MPR (dB)
99	WCDMA	12.2 kbps RMC	23.50	23.78	23.47	23.28	22.73	23.13	-
99	WCDIVIA	12.2 kbps AMR	-	-	-	-	-	-	-
5		Subtest 1	23.36	23.66	23.40	23.26	22.69	23.13	0
5		Subtest 2	22.60	22.95	22.69	22.53	21.97	22.39	0
5	HSDPA	Subtest 3	22.35	22.66	22.41	22.29	21.67	22.10	0.5
5		Subtest 4	22.15	22.48	22.16	22.00	21.42	21.86	0.5
6		Subtest 1	21.99	22.20	21.98	21.75	21.22	21.58	0
6		Subtest 2	20.64	20.98	20.75	20.50	19.94	20.39	2
6	HSUPA	Subtest 3	21.61	21.94	21.68	21.53	20.94	21.35	1
6		Subtest 4	20.86	21.18	20.86	20.74	20.16	20.58	2
6		Subtest 5	22.70	23.00	22.67	22.55	22.05	22.41	0



## 7.2 PEAK TO AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown in Clause 8.1

## 7.3 OCCUPIED BANDWIDTH

Band	Channel	Frequency	Test Result (kHz)
	128	824.2	240.30
GPRS850	190	836.6	244.32
	251	848.8	241.80
	128	824.2	243.34
EDGE850	190	836.6	241.96
	251	848.8	245.13
	4132	826.4	4049.00
WCDMA850	4183	836.6	4045.20
	4233	846.6	4062.60
	4132	826.4	4060.40
HSUPA850	4183	836.6	4077.40
	4233	846.6	4043.30
	512	1850.2	244.32
GPRS1900	661	1880.0	240.63
	810	1909.8	242.06
	512	1850.2	251.31
EDGE1900	661	1880.0	255.10
	810	1909.8	252.71
	9262	1852.4	4087.20
WCDMA1900	9400	1880.0	4071.60
	9538	1907.6	4060.20
	9262	1852.4	4093.30
HSUPA1900	9400	1880.0	4080.20
	9538	1907.6	4071.00

- Plots of the EUT's Occupied Bandwidth are shown in Clause 8.2

## 7.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

- Plots of the EUT's Conducted Spurious Emissions are shown in Clause 8.3

## 7.5 BAND EDGE

- Plots of the EUT's Band Edge are shown in Clause 8.4



# 7.6 EFFECTIVE RADIATED POWER

#### - GPRS850

	EUT				Test mode			
Freq(MHz) CH	Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Rated Voltage	Note.
824.2 128	x	V	23.46	1.23	24.69	0.294	DC 12V	GPRS
836.6 190	Х	V	20.80	1.17	21.97	0.157	DC 12V	GPRS
848.8 251	Х	V	22.42	1.11	23.53	0.225	DC 12V	GPRS
824.2 128	x	V	19.13	1.23	20.36	0.109	DC 12V	EDGE

#### - WCDMA850 data

	EUT		Test mode 12.2 kbps RMC								
Freq(MHz) CH	Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Rated Voltage	Note.			
826.4 4132	Х	V	16.09	1.22	17.31	0.054	DC 12V	-			
836.6 4183	Х	V	16.48	1.17	17.65	0.058	DC 12V	-			
846.6 4233	x	V	17.55	1.12	18.67	0.074	DC 12V	-			

### - HSUPA850 data

	EUT		Test mode subtest 5						
Freq(MHz) CH	Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Rated Voltage	Note.	
826.4 4132	Х	V	15.88	1.22	17.10	0.051	DC 12V	-	
836.6 4183	Х	V	15.58	1.17	16.75	0.047	DC 12V	-	
846.6 4233	X	V	16.49	1.12	17.61	0.058	DC 12V	-	

#### NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



## 7.7 EQUIVALENT ISOTROPIC RADIATED POWER

## - GPRS1900 data

	EUT				Test mode			
Freq(MHz) CH	Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Rated Voltage	Note.
1850.2 512	x	Н	11.98	9.01	20.99	0.126	DC 12V	GPRS
1880.0 661	Х	Н	9.26	9.05	18.31	0.068	DC 12V	GPRS
1909.80 810	Х	Н	9.25	9.08	18.33	0.068	DC 12V	GPRS
1850.2 512	x	Н	8.87	9.01	17.88	0.061	DC 12V	EDGE

## - WCDMA1900 data

	EUT			Test n	node 12.2 kbps	2 kbps RMC					
Freq(MHz) CH	q(MHz) CH Position (Axis)		LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)		EIRP (W)	Rated Voltage	Note.			
1852.4 9262	x	н	5.62	9.01	14.63	0.029	DC 12V	-			
1880.0 9400	Х	Н	3.33	9.05	12.38	0.017	DC 12V	-			
1907.6 9538	Х	Н	1.81	9.08	10.89	0.012	DC 12V	-			

## - HSUPA1900 data

	сит			st 5				
Freq(MHz) CH	EUT Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Rated Voltage	Note.
1852.4 9262	x	Н	5.03	9.01	14.04	0.025	DC 12V	-
1880.0 9400	Х	Н	2.78	9.05	11.83	0.015	DC 12V	-
1907.6 9538	Х	Н	1.47	9.08	10.55	0.011	DC 12V	-

#### NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



# 7.8 RADIATED SPURIOUS EMISSIONS

## 7.8.1 RADIATED SPURIOUS EMISSIONS (GPRS850)

Channel (ERP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
	1648.50	Х	V	-48.13	6.64	-41.49	66.18	
128	2472.60	Х	Н	-57.78	7.58	-50.20	74.89	07.00
(0.294 W)	-	-	-	-	-	-	-	37.69
	-	-	-	-	-	-	-	
	1673.61	Х	V	-53.71	6.66	-47.05	69.02	
190	2509.70	Х	Н	-57.25	7.61	-49.64	71.61	04.07
(0.157 W)	-	-	-	-	-	-	-	34.97
	-	-	-	-	-	-	-	
	1697.38	Х	V	-53.58	6.69	-46.89	70.42	
251	2546.83	Х	Н	-56.22	7.60	-48.62	72.15	00.50
(0.225 W)	-	-	-	-	-	-	-	36.53
	-	-	-	-	-	-	-	

- Limit Calculation= 43 + 10 log<sub>10</sub>( ERP [W] ) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

## NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



### 7.8.2 RADIATED SPURIOUS EMISSIONS (WCDMA850)

Channel (ERP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
	1654.62	Х	Н	-51.10	6.64	-44.46	61.77	
4132 (0.054 W)	-	-	-	-	-	-	-	30.31
(0.000.00)	-	-	-	-	-	-	-	
	1671.38	Х	Н	-49.66	6.66	-43.00	60.65	
4183 (0.058 W)	-	-	-	-	-	-	-	30.65
(0.000 11)	-	-	-	-	-	-	-	
	1695.24	Х	Н	-52.66	6.69	-45.97	64.64	
4233 (0.074 W)	-	-	-	-	-	-	-	31.67
(0.0.1.1.1)	-	-	-	-	-	-	-	

- Limit Calculation= 43 + 10 log10( ERP [W] ) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

## NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



## 7.8.3 RADIATED SPURIOUS EMISSIONS (HSUPA850)

Channel (ERP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
	1650.94	Х	Н	-52.70	6.64	-46.06	63.16	
4132 (0.051 W)	-	-	-	-	-	-	-	30.10
(0.001.11)	-	-	-	-	-	-	-	
	1675.45	Х	Н	-50.49	6.67	-43.82	60.57	
4183 (0.047 W)	-	-	-	-	-	-	-	29.75
(0.017 11)	-	-	-	-	-	-	-	
	1695.14	Х	Н	-54.06	6.69	-47.37	64.98	
4233 (0.058 W)	-	-	-	-	-	-	-	30.61
(0.000 11)	-	-	-	-	-	-	-	

- Limit Calculation= 43 + 10 log10( ERP [W] ) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

## NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



## 7.8.4 RADIATED SPURIOUS EMISSIONS (GPRS1900)

Channel (EIRP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
	3700.60	Х	Н	-50.14	9.91	-40.23	61.22	
512	-	-	-	-	-	-	-	33.99
(0.126 W)	-	-	-	-	-	-	-	33.99
	-	-	-	-	-	-	-	
	3760.08	Х	Н	-49.41	9.86	-39.55	57.86	
661	-	-	-	-	-	-	-	31.31
(0.068 W)	-	-	-	-	-	-	-	31.31
	-	-	-	-	-	-	-	
	3819.69	Х	Н	-45.40	9.80	-35.60	53.93	
810	-	-	-	-	-	-	-	21.22
(0.068 W)	-	-	-	-	-	-	-	31.33
	-	-	-	-	-	-	-	

- Limit Calculation =  $43 + 10 \log_{10}(EIRP[W]) [dBc]$ 

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

## NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



### 7.8.5 RADIATED SPURIOUS EMISSIONS (WCDMA1900)

Channel (EIRP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
	3702.88	Х	Н	-43.19	9.91	-33.28	47.91	
9262	-	-	-	-	-	-	-	27.63
(0.029 W)	-	-	-	-	-	-	-	27.03
	-	-	-	-	-	-	-	
	3762.09	Х	Н	-50.77	9.85	-40.92	53.30	
9400	-	-	-	-	-	-	-	25.38
(0.017 W)	-	-	-	-	-	-	-	20.30
	-	-	-	-	-	-	-	
	3817.18	Х	Н	-47.33	9.80	-37.53	48.42	
9538	-	-	-	-	-	-	-	22.00
(0.012 W)	-	-	-	-	-	-	-	23.89
	-	-	-	-	-	-	-	

- Limit Calculation = 43 + 10 log<sub>10</sub>( EIRP [W] ) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

## NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".



### 7.8.6 RADIATED SPURIOUS EMISSIONS (HSUPA1900)

Channel (EIRP)	Freq. (MHz)	EUT Position (Axis)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Result (dBc)	Limit (dBc)
	3702.86	Х	Н	-46.82	9.91	-36.91	50.95	
9262	-	-	-	-	-	-	-	27.04
(0.025 W)	-	-	-	-	-	-	-	27.04
	-	-	-	-	-	-	-	
	3761.98	Х	Н	-51.83	9.85	-41.98	53.81	
9400	-	-	-	-	-	-	-	24.83
(0.015 W)	-	-	-	-	-	-	-	24.03
	-	-	-	-	-	-	-	
	3817.35	Х	Н	-49.17	9.80	-39.37	49.92	
9538	-	-	-	-	-	-	-	00 FF
(0.011 W)	-	-	-	-	-	-	-	23.55
	-	-	-	-	-	-	-	

- Limit Calculation = 43 + 10 log<sub>10</sub>( EIRP [W] ) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

## NOTES:

This device was tested under all configuration and modes which is GPRS, WCDMA and HSUPA with highest power. The GPRS mode of power control level is set to "0" in PCS band and "5" in cellular band.

Also, WCDMA mode is set to HSDPA inactive with 12.2kbps RMC and TPC bits set to "1".

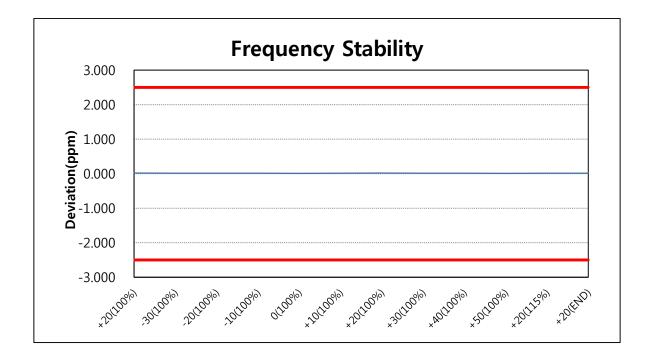


## 7.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

## 7.9.1 FREQUENCY STABILITY (GPRS850)

OPERATING FREQUENCY	:	<u>836,600,000 Hz</u>		
CHANNEL	:	<u>190(Mid)</u>		
REFERENCE VOLTAGE	:	<u>12.0 </u> V DC		
DEVIATION LIMIT(FCC & IC)	:	<u>± 0.00025</u> % or	2.5	_ppm

VOLTAGE	POWER	TEMP	FREQ	Dev	viation
(%)	(V DC)	(°C)	(Hz)	(ppm)	(%)
100%	12.0	+20(Ref)	836,600,014	0.017	0.00000167
100%		-30	836,600,010	0.012	0.00000120
100%		-20	836,600,012	0.014	0.00000143
100%		-10	836,600,010	0.012	0.00000120
100%		0	836,600,009	0.011	0.00000108
100%		+10	836,600,011	0.013	0.00000131
100%		+20	836,600,014	0.017	0.00000167
100%		+30	836,600,010	0.012	0.00000120
100%		+40	836,600,012	0.014	0.00000143
100%		+50	836,600,007	0.008	0.0000084
115%	13.8	+20	836,600,011	0.013	0.00000131
BATT.ENDPOINT	10.2	+20	836,600,012	0.014	0.00000143

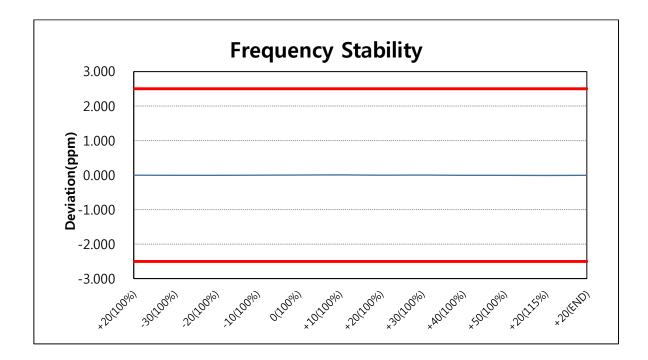




#### 7.9.2 FREQUENCY STABILITY (WCDMA850)

OPERATING FREQUENCY	:	<u>836,600,000</u> Hz		
CHANNEL	:	<u>4183(Mid)</u>		
REFERENCE VOLTAGE	-	<u>12.0 </u> V DC		
DEVIATION LIMIT(FCC & IC)	:	<u>± 0.00025</u> % or	2.5	_ppm

VOLTAGE	POWER	TEMP	FREQ	Dev	viation
(%)	(V DC)	(°C)	(℃) (Hz)		(%)
100%	12.0	+20(Ref)	836,599,997	-0.004	-0.00000036
100%		-30	836,599,995	-0.006	-0.00000060
100%		-20	836,599,996	-0.005	-0.00000048
100%		-10	836,599,997	-0.004	-0.00000036
100%		0	836,600,002	0.002	0.00000024
100%		+10	836,600,005	0.006	0.00000060
100%		+20	836,599,997	-0.004	-0.00000036
100%		+30	836,600,003	0.004	0.0000036
100%		+40	836,599,994	-0.007	-0.00000072
100%		+50	836,599,994	-0.007	-0.00000072
115%	13.8	+20	836,599,992	-0.010	-0.00000096
BATT.ENDPOINT	10.2	+20	836,599,995	-0.006	-0.0000060

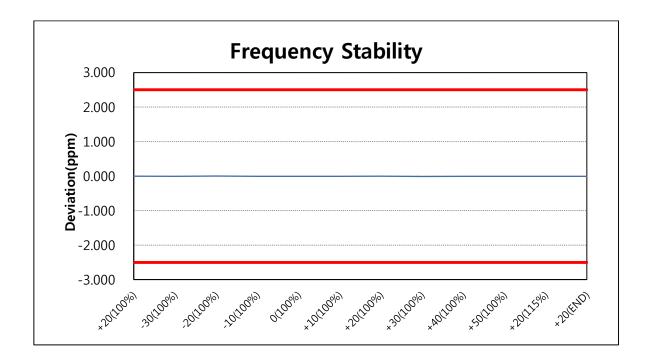




#### 7.9.3 FREQUENCY STABILITY (HSUPA850)

OPERATING FREQUENCY	:	<u>836,600,000</u> Hz
CHANNEL	:	<u>4183(Mid)</u>
REFERENCE VOLTAGE	:	<u>12.0 </u> V DC
DEVIATION LIMIT(FCC & IC)	:	<u>± 0.00025</u> % or <u>2.5</u> ppm

VOLTAGE	POWER	TEMP	FREQ	Dev	viation
(%)	(V DC)	(°C)	(Hz)	(ppm)	(%)
100%	12.0	+20(Ref)	836,599,998	-0.002	-0.00000024
100%		-30	836,599,993	-0.008	-0.00000084
100%		-20	836,600,001	0.001	0.00000012
100%		-10	836,599,995	-0.006	-0.00000060
100%		0	836,599,993	-0.008	-0.0000084
100%		+10	836,599,996	-0.005	-0.00000048
100%		+20	836,599,998	-0.002	-0.00000024
100%		+30	836,599,992	-0.010	-0.00000096
100%		+40	836,599,995	-0.006	-0.00000060
100%		+50	836,599,994	-0.007	-0.00000072
115%	13.8	+20	836,599,996	-0.005	-0.00000048
BATT.ENDPOINT	10.2	+20	836,599,996	-0.005	-0.00000048

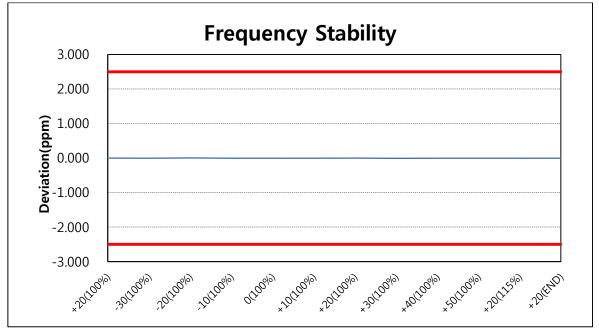




### 7.9.4 FREQUENCY STABILITY (GPRS1900)

OPERATING FREQUENCY		<u>1,880,000,000</u> Hz
CHANNEL :	:	<u>661(Mid)</u>
REFERENCE VOLTAGE	:	12.0 V DC
LIMIT(FCC)	:	The frequency stability shall be sufficient to ensure that the
		fundamental emission stays wthin the authorized frequency
		block.
DEVIATION LIMIT(IC)		<u>± 0.00025</u> % or <u>2.5</u> ppm

VOLTAGE	POWER	TEMP	FREQ	Dev	viation
(%)	(V DC)	(°C)	(Hz)	(ppm)	(%)
100%	12.0	+20(Ref)	1,879,999,996	-0.002	-0.00000021
100%		-30	1,879,999,997	-0.002	-0.00000016
100%		-20	1,879,999,984	-0.009	-0.00000085
100%		-10	1,879,999,989	-0.006	-0.00000059
100%		0	1,879,999,991	-0.005	-0.00000048
100%		+10	1,879,999,988	-0.006	-0.00000064
100%		+20	836,599,998	-0.002	-0.00000024
100%		+30	1,879,999,990	-0.005	-0.00000053
100%		+40	1,879,999,993	-0.004	-0.00000037
100%		+50	1,879,999,983	-0.009	-0.00000090
115%	13.8	+20	1,879,999,989	-0.006	-0.00000059
BATT.ENDPOINT	10.2	+20	1,879,999,995	-0.003	-0.00000027



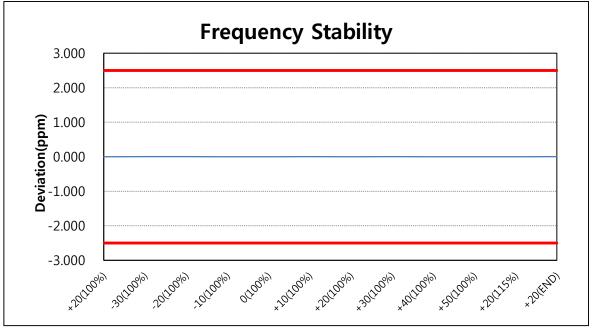
**Note.** Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. as such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. therefore the device is determined to remain operating in band over the temperature and voltage range as tested.



### 7.9.5 FREQUENCY STABILITY (WCDMA1900)

OPERATING FREQUENCY		<u>1,880,000,000</u> Hz
CHANNEL	:	<u>9400(Mid)</u>
REFERENCE VOLTAGE	:	<u>12.0 </u> V DC
LIMIT(FCC)	:	The frequency stability shall be sufficient to ensure that the
		fundamental emission stays wthin the authorized frequency
		block.
DEVIATION LIMIT(IC)	:	<u>± 0.00025</u> % or <u>2.5</u> ppm

VOLTAGE	POWER	TEMP (℃)	FREQ (Hz)	Deviation	
(%)	(%) (V DC)			(ppm)	(%)
100%	12.0	+20(Ref)	1,879,999,996	-0.002	-0.00000021
100%		-30	1,880,000,006	0.003	0.0000032
100%		-20	1,880,000,007	0.004	0.0000037
100%		-10	1,879,999,997	-0.002	-0.00000016
100%		0	1,880,000,003	0.002	0.00000016
100%		+10	1,880,000,005	0.003	0.00000027
100%		+20	1,879,999,996	-0.002	-0.00000021
100%		+30	1,880,000,006	0.003	0.00000032
100%		+40	1,880,000,004	0.002	0.00000021
100%		+50	1,879,999,998	-0.001	-0.00000011
115%	13.8	+20	1,879,999,997	-0.002	-0.00000016
BATT.ENDPOINT	10.2	+20	1,880,000,009	0.005	0.00000048



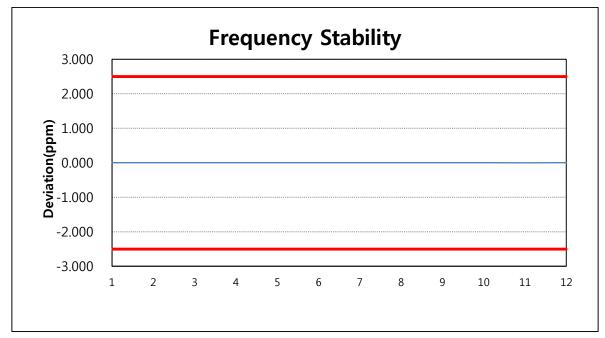
**Note.** Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. as such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. therefore the device is determined to remain operating in band over the temperature and voltage range as tested.



## 7.9.6 FREQUENCY STABILITY (HSUPA1900)

OPERATING FREQUENCY :	<u>1,880,000,000</u> Hz
CHANNEL :	<u>9400(Mid)</u>
REFERENCE VOLTAGE :	<u>12.0</u> V DC
LIMIT(FCC) :	The frequency stability shall be sufficient to ensure that the
	fundamental emission stays wthin the authorized frequency
	block.
DEVIATION LIMIT(IC)	<u>± 0.00025</u> % or <u>2.5</u> ppm

VOLTAGE	POWER	TEMPFREQ(°C)(Hz)	Deviation		
(%)	(V DC)		(Hz)	(ppm)	(%)
100%	12.0	+20(Ref)	1,880,000,008	0.004	0.0000043
100%		-30	1,880,000,004	0.002	0.0000021
100%		-20	1,880,000,003	0.002	0.0000016
100%		-10	1,880,000,008	0.004	0.0000043
100%		0	1,880,000,006	0.003	0.0000032
100%		+10	1,880,000,009	0.005	0.0000048
100%		+20	1,880,000,008	0.004	0.0000043
100%		+30	1,880,000,008	0.004	0.0000043
100%		+40	1,880,000,007	0.004	0.0000037
100%		+50	1,880,000,005	0.003	0.0000027
115%	13.8	+20	1,879,999,997	-0.002	-0.00000016
BATT.ENDPOINT	10.2	+20	1,880,000,006	0.003	0.0000032



**Note.** Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. as such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. therefore the device is determined to remain operating in band over the temperature and voltage range as tested.



# 8. TEST PLOTS

## 8.1 Peak to Average Ratio

-P <sub>Pk</sub> (dBm)	GPRS1900 & Channel: 661
Agilent Spectrum Analyzer - Swept SA W RL RF 50 Ω AC SENSE:INT Center Freq 1.880000000 GHz PN0: Fast IFGaint aw #Atten: 32 dB	ALIGN OFF 04:13:48 PM Mar 04, 2016 #Avg Type: Log-Pwr TRACE 123456 TYPE MWWWW DET PPPPP
Ref Offset 19.25 dB 10 dB/div Ref 40.00 dBm	Mkr2 1.880 000 GHz Auto Tune 29.62 dBm
Log 30.0 20.0 10.0	Center Freq 1.880000000 GHz
0.00 -10.0 -20.0 -30.0	Start Freq 1.877500000 GHz
-40.0	Stop Freq 1.882500000 GHz
	Span 5.000 MHz         CF Step           Sweep 1.00 ms (1001 pts)         500.000 kHz           JNCTION         FUNCTION VALUE         Man
1         N         1         f         1.880 045 GHz         29.63 dBm           2         N         1         f         1.880 000 GHz         29.62 dBm           3         4         5         6         6         6	Freq Offset
7 8 8 9 9 10 11	
I2 MSG	STATUS

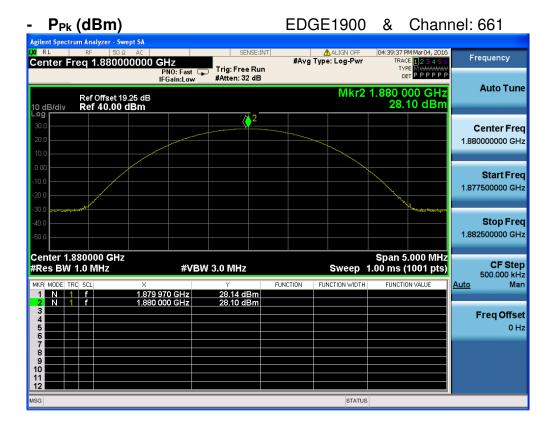
-P<sub>Avg</sub> (dBm)

#### GPRS 1900 & Channel: 661



PAPR (dB) = P<sub>Pk</sub> (dBm) - P<sub>Avg</sub> (dBm) = 29.62 dBm - 29.08 dBm = 0.54 dB

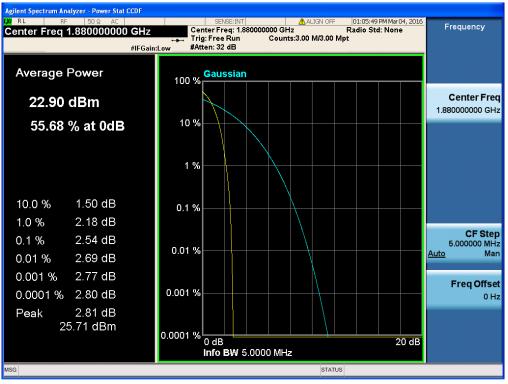






PAR (dB) = P<sub>Pk</sub> (dBm) - P<sub>Avg</sub> (dBm) = 28.10 dBm - 24.74 dBm = 3.36 dB



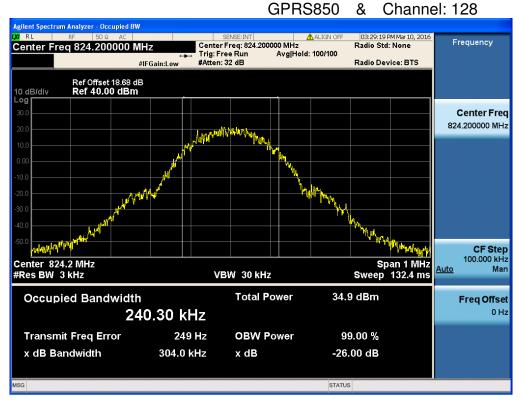


# HSUPA1900 & Channel: 9400

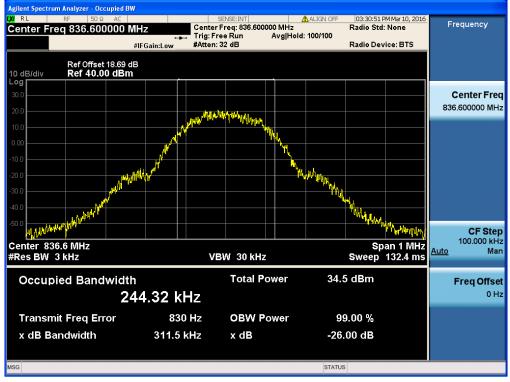




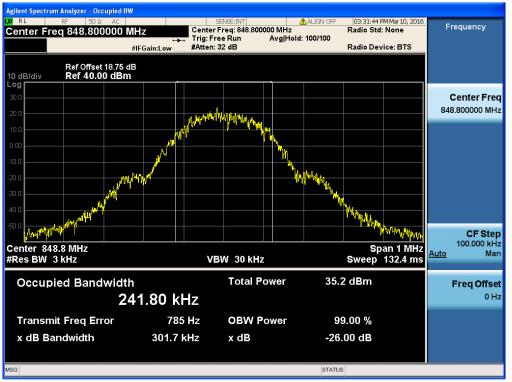
# 8.2 Occupied Bandwidth (99 % Bandwidth)



# GPRS850 & Channel: 190

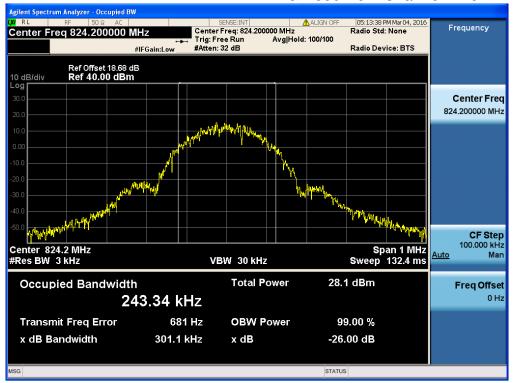






#### GPRS850 & Channel: 251





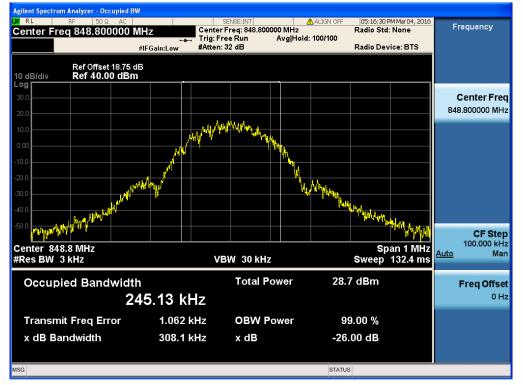
#### EDGE 850 & Channel: 128

# EDGE 850 & Channel: 190



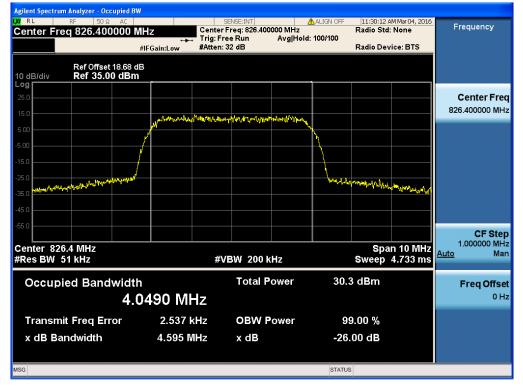


#### EDGE 850 & Channel: 251





#### WCDMA850 & Channel: 4132

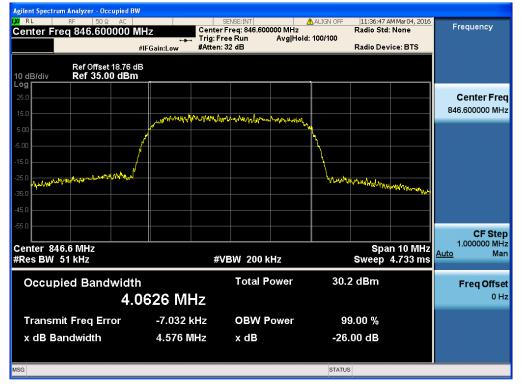


# WCDMA850 & Channel: 4183



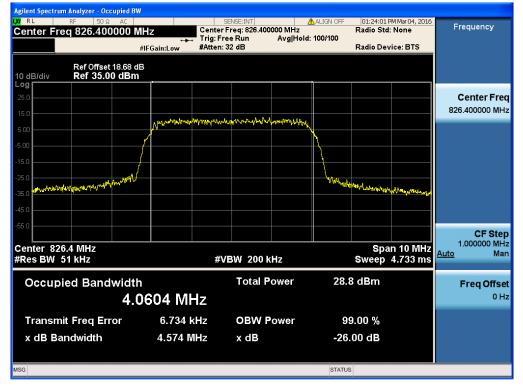


# WCDMA850 & Channel: 4233

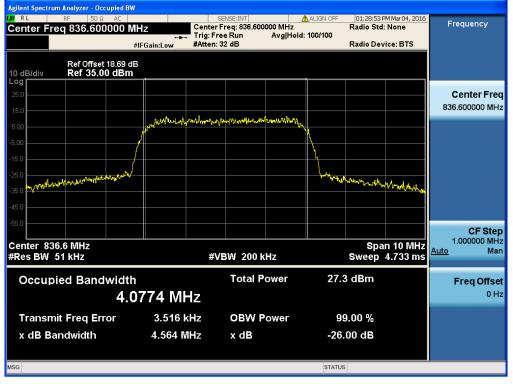




HSUPA850 & Channel: 4132

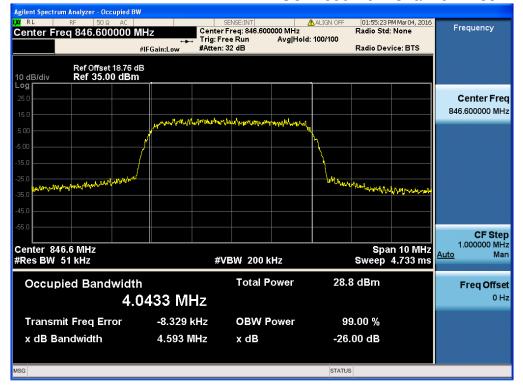


# HSUPA850 & Channel: 4183



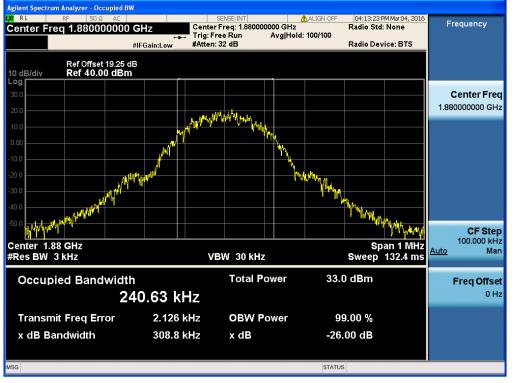


HSUPA850 & Channel: 4233

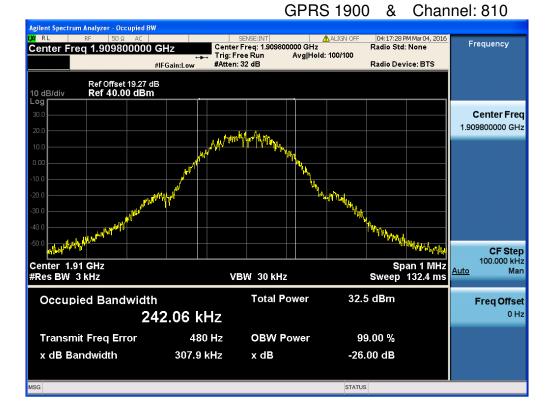










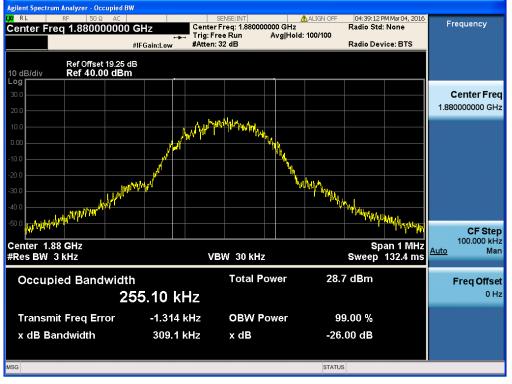




#### Occupied BV 04:37:02 PM Mar 04, 2016 Radio Std: None Center Freq: 1.850200000 GHz Trig: Free Run Avg|Hold: 100/100 #Atten: 32 dB RI Frequency Center Freq 1.850200000 GHz #IFGain:Low Radio Device: BTS Ref Offset 19.2 dB Ref 40.00 dBm 10 dB/div \_00 **Center Freq** 1.850200000 GHz httyral of Martin La m 14 Million CF Step 100.000 kHz TV-Center 1.85 GHz #Res BW 3 kHz Span 1 MHz Sweep 132.4 ms <u>Auto</u> Man VBW 30 kHz **Total Power** 28.5 dBm **Occupied Bandwidth** Freq Offset 0 Hz 251.31 kHz 938 Hz **OBW Power** 99.00 % **Transmit Freq Error** x dB Bandwidth -26.00 dB 307.5 kHz x dB STATUS

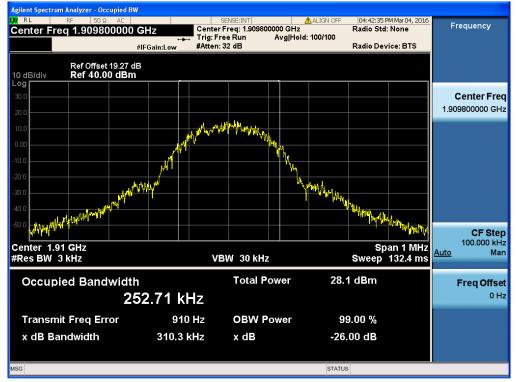
#### EDGE 1900 & Channel: 512

# EDGE 1900 & Channel: 661

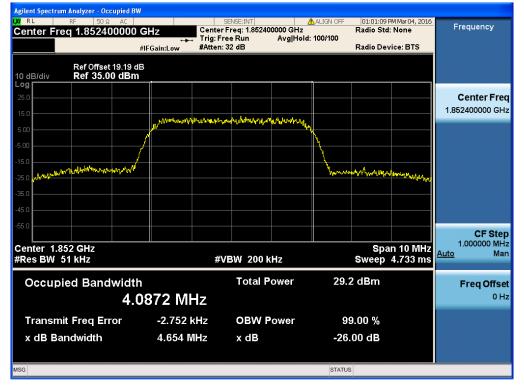


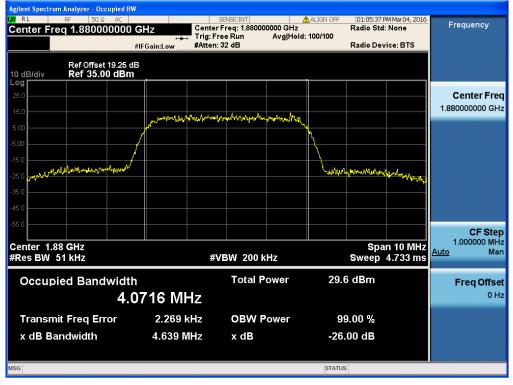


#### EDGE 1900 & Channel: 810

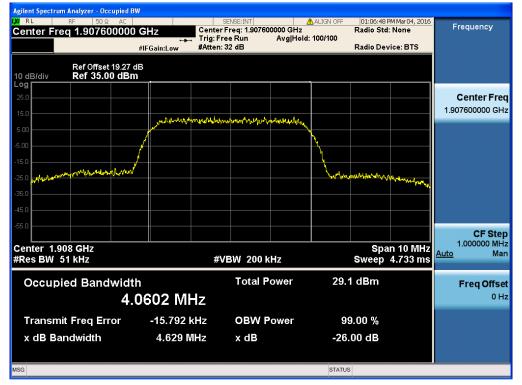




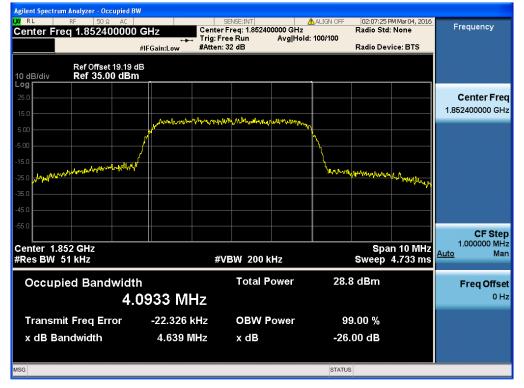








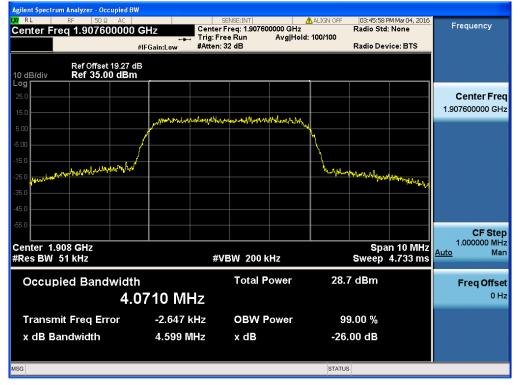




# HSUPA1900 & Channel: 9400

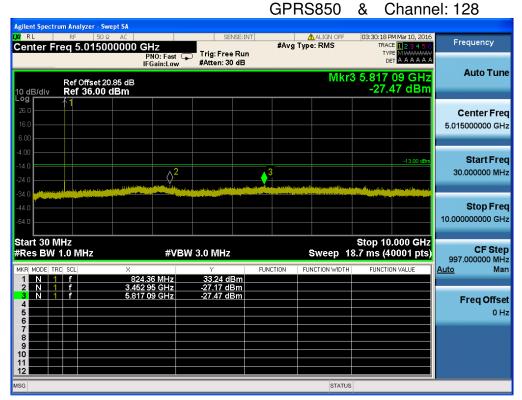




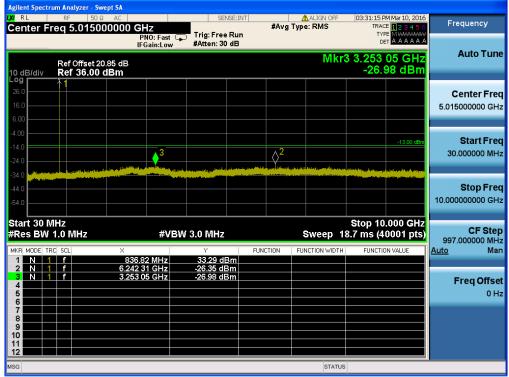


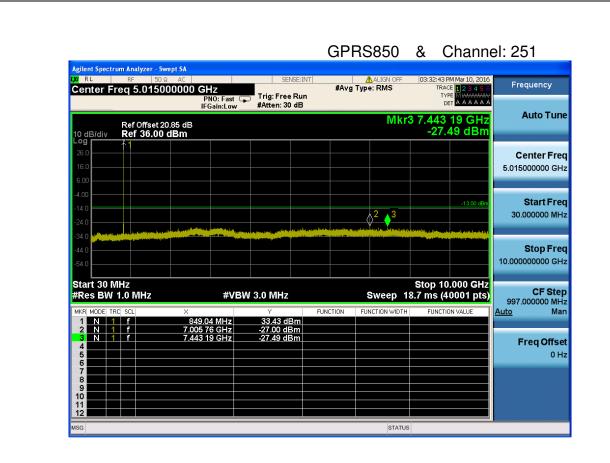


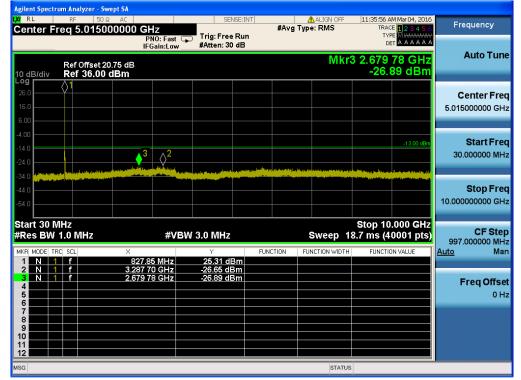
# 8.3 Spurious Emissions at Antenna Terminal



# GPRS850 & Channel: 190

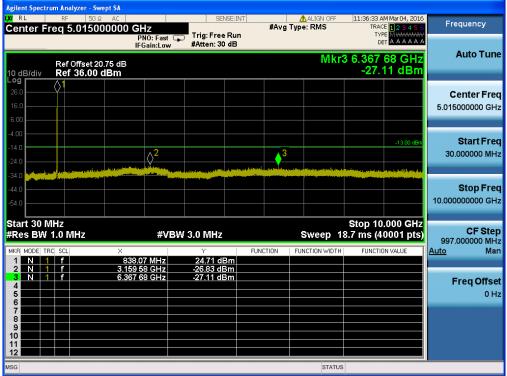






#### WCDMA850 & Channel: 4132

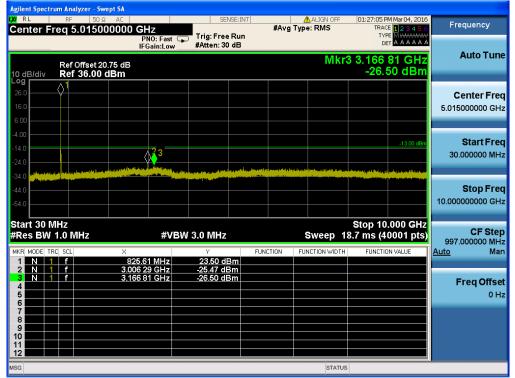
# WCDMA850 & Channel: 4183





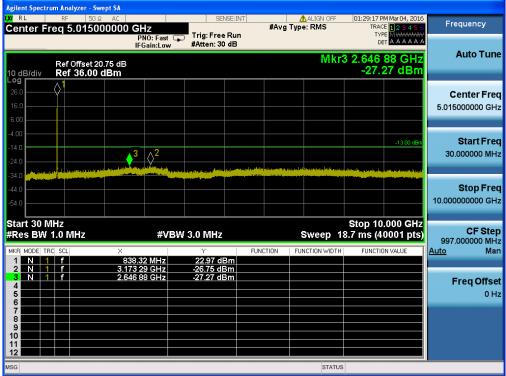
# WCDMA850 & Channel: 4233

Agilent Spectrum Analyzer - Swept SA						
XIRL RF 50Ω AC		SENSE:IN		ALIGN OFF	11:39:50 AM Mar 04, 2 TRACE 1 2 3 4	
Center Freq 5.0150000	PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 30 dB	FOY 9			
Ref Offset 20.75 c 10 dB/div Ref 36.00 dBm				Mkr	3 2.740 10 GH -27.10 dB	
26.0						Center Fred
16.0						5.015000000 GH:
6.00						
14.0					-13.00 (	
-24.0	$3 0^2$					30.000000 MH
34.0 <b>All statistics and statistics and statistics</b>			and and and a second			
-44.0						Stop Free
-54.0						10.000000000 GH
Start 30 MHz #Res BW 1.0 MHz	#VBV	/ 3.0 MHz		Sweep 1	Stop 10.000 G 3.7 ms (40001 p	
	<	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
1 N 1 f 2 N 1 f	846.04 MHz 3.297 67 GHz	25.06 dBm -26.40 dBm				
3 N 1 f	2.740 10 GHz	-27.10 dBm				Freq Offse
6						
8						
10						
11 12 12						
ISG				STATUS		



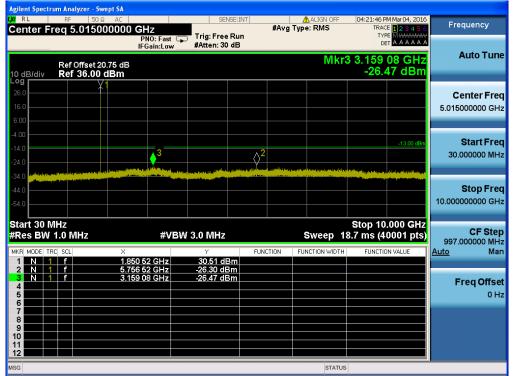
#### HSUPA850 & Channel: 4132

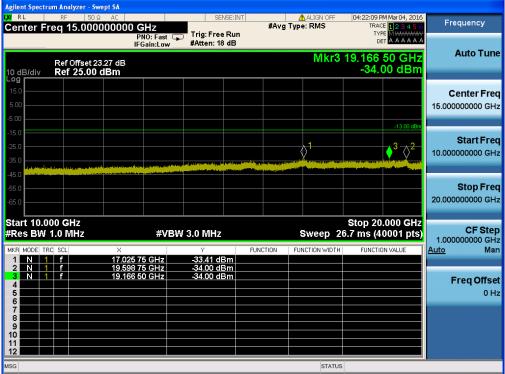
# HSUPA850 & Channel: 4183

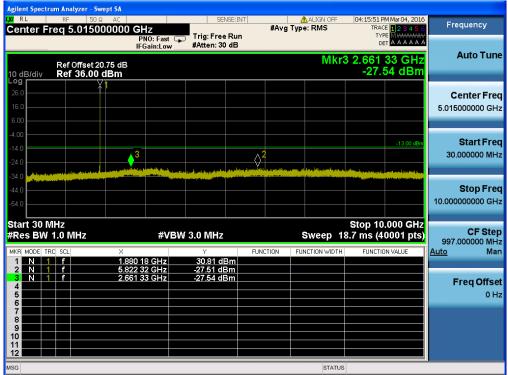


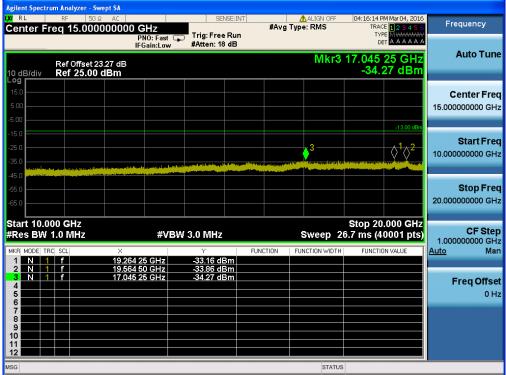
	nalyzer - Swept SA						
<b>4</b>	F 50 Q AC	) GHz	SENSE:I	#Avg	ALIGN OFF	01:58:31 PM Mar 04, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWW	
Re	ef Offset 20.75 dB	PNO: Fast C IFGain:Low	► Trig: Free Rui #Atten: 30 dB	1	Mkr	2.623 94 GHz -27.10 dBm	Auto Tuno
Log 16.0							Center Freq 5.015000000 GHz
-4.00 -14.0 -24.0	, i zoonalik likute talek jagund gabilitaand	3		ورم المراجع الم	Colorate Michael Andrea Sprang	-13.00 dBm	Start Freq 30.000000 MHz
-34.0							Stop Fred 10.000000000 GHz
Start 30 MHz #Res BW 1.0		#VB	W 3.0 MHz		Sweep 1	Stop 10.000 GHz 3.7 ms (40001 pts)	CF Step 997.000000 MH
MKR MODE TRC SC 1 N 1 f 2 N 1 f	8	345.80 MHz 249 31 GHz	⊻ 23.81 dBm -26.51 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
3 N 1 f 4 5 6		523 94 GHz	-27.10 dBm				Freq Offset 0 Hz
7 8 9 9 10 11 12 12 12 12 12 12 12 12 12 12 12 12							
MSG					STATUS		

# HSUPA850 & Channel: 4233





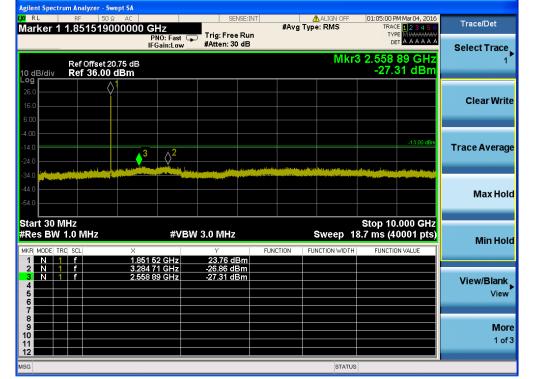




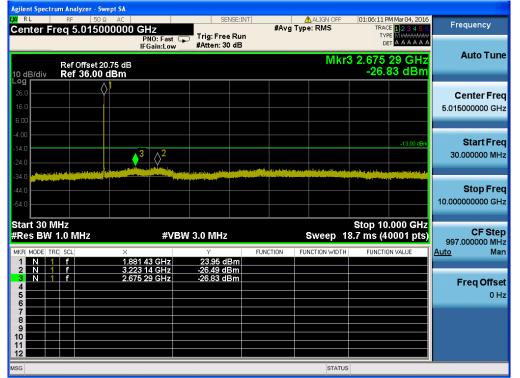


Agilent Spectrum Analyze			-			
Center Freq 15.	50 Ω AC 00000000 GHz	SENSE:IN	#Avg Typ	ALIGN OFF	04:18:49 PM Mar 04, 2016 TRACE 123456	Frequency
	PNO: Fast IFGain:Low	Trig: Free Run #Atten: 18 dB				
10 dB/div Ref 2:	set 23.27 dB i.00 dBm			Mkr3	16.944 25 GHz -34.12 dBm	Auto Tune
15.00						Center Freq 15.000000000 GHz
-15.0 -25.0 -35.0	ng ( ) process, well to the difference matching	and and the second s		3-	-13.00 dBm	<b>Start Freq</b> 10.000000000 GHz
-45.0 -55.0 -65.0						<b>Stop Freq</b> 20.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MH:	z #V	BW 3.0 MHz		Sweep 20	Stop 20.000 GHz 5.7 ms (40001 pts)	CF Step 1.00000000 GHz
MKR MODE TRC SCL	× 18.979 00 GHz	۲ -33.91 dBm	FUNCTION FI	JNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 3 N 1 f 4 5 6	19.575 00 GHz 16.944 25 GHz	-34.02 dBm -34.12 dBm				<b>Freq Offset</b> 0 Hz
7 8 9 9 9 10 11						
12 MSG				STATUS		





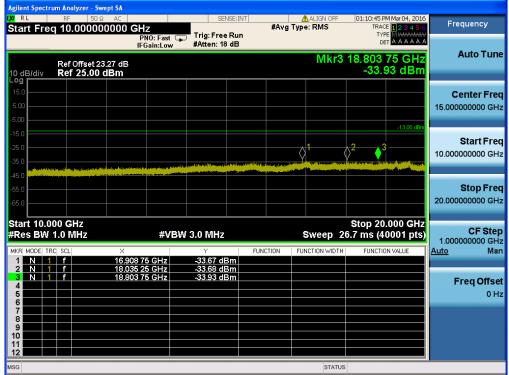
ilent Spectr RL	um Analyzer RF	- Swept SA 50 Ω AC		SENSE	INT	ALIGN OFF	01:05:22.0	M Mar 04, 2016	
		00000000			#Av	g Type: RMS	TRAC		Trace/Det
			PNO: Fast ( IFGain:Low	Trig: Free Ri #Atten: 18 di			DE		Select Trace
) dB/div	Ref Offse Ref 25.0	t 23.27 dB 00 dBm				Mkr3		75 GHz 32 dBm	
5.0									
00									Clear Wri
00								-13.00 dBm	
i.0								-13.00 ubii	
5.0						<mark>2</mark>		3∕_1	Trace Avera
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.0		A DESCRIPTION OF THE OWNER OF THE	الشكائنية وتلبيهم بيب محمادتها						
i.0									Max Ho
art 10.0 les BW	00 GHz 1.0 MHz		#VB	W 3.0 MHz		Sweep 2	Stop 20 6.7 ms (4	.000 GHz 0001 pts)	
R  MODE  TF	RC SCL	×		Y	FUNCTION	FUNCTION WIDTH	FUNCTIO	IN VALUE	Min Ho
N 1 N 1	f		2 50 GHz	-33.36 dBm -33.54 dBm					
8 N 1	f	19.270	0 75 GHz	-33.82 dBm					View/Blan
									Vie
									Ма
									1 c
3						STATUS			



Agilent Spectrum Analyzer -	Swept SA						
	DΩ AC	SENSE:IN		\Lambda ALIGN OFF	01:06:34 PM		Frequency
Center Freg 15.00				Type: RMS	TRACE	123456 MWWWWW	Frequency
	PNO: Fast		1		IYPE		
	IFGain:Low	#Atten: 18 dB					A
D.C.07-1	00.07.10			Mkr3	17.087 2	5 GHz	Auto Tur
Ref Offset 10 dB/div Ref 25.0					-34 10	) dBm	
	U UBIII						
15.0							
							Center Fre
5.00							15.00000000 GI
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						-13.00 dBm	
15.0							Start Fre
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35.0						V V I	10.00000000 GH
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65.0							20.00000000 GI
tart 10.000 GHz					Stop 20.0	00 GHz	CF Ste
Res BW 1.0 MHz	#V	3W 3.0 MHz		Sweep 2	6.7 ms (40	001 pts)	1.000000000 G
IKR MODE TRC SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION		
1 N 1 f	19.584 00 GHz	-33.52 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE	<u>Auto</u> M
2 N 1 f	19.222 50 GHz	-33.66 dBm					
3 N 1 f	17.087 25 GHz	-34.10 dBm					Ener Offe
4							Freq Offs
5							0
6							
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ŏ <b></b>							
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	rum Analyzer								
XI RL		50 Ω AC		SENSE:		ALIGN OFF	01:10:22 PM		Frequency
Start Fre	q 30.000	000 MHz	PNO: Fast G	Trig: Free Ru		j Type: Rivis	TYPE	123456 Mwwwww AAAAAA	
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Log	Kei Ju.								
26.0									Center Freq
16.0									5.015000000 GH
6.00									5.01500000 GH2
-4.00								10.00.40-	Start Fred
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a sublimentation	and the second se								Stop Fred
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-54.0									10.00000000 GHz
Dtaut 20 I							Oton 10.0		
Start 30 I #Res BW			#\/D)	N 3.0 MHz		Swoon 1	Stop 10.0 8.7 ms (40)		CF Step
			#VD	V 3.0 WINZ		Sweep	8.7 IIIS (40)	uu i pisj	997.000000 MHz
MKR MODE T		×		Y	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE	<u>Auto</u> Man
1 N /	f f		60 GHz 21 GHz	23.49 dBm -26.86 dBm					
3 N /	f	3.161	83 GHz	-27.15 dBm					Freq Offset
4									
5									0 Hz
7									
8									
10									
11									
12									
ISG						STATUS	5		



	um Analyzer - Swept S						
Center Er	RF 50 Ω A		SENSE:II		ALIGN OFF	02:12:00 PM Mar 04, 201 TRACE 1 2 3 4 5	6 Frequency
		PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 30 dB	n	Mke	TYPE MUMMM DET A A A A A 3 3.017 26 GH:	Auto Turo
10 dB/div Log	Ref Offset 20.75 Ref 36.00 dBr				WINI	-26.61 dBn	
26.0	Ŷ <u></u>						Center Freq
16.0 6.00							5.015000000 GHz
-4.00						-13.00 dBi	
-24.0	و المراجع ملي مراجع المراجع ملي مراجع ملي مراجع المراجع م	3,2	والمتعرفين والمتعرفين ومروا المتعرفين والمتعرفين	والمراحم والمراجع	and a grant of the part of the	The state of the second st	30.000000 MHz
-34.0 <b>-44.0</b>		and the second s		a debit a secondaria de la construcción de la construcción de la construcción de la construcción de la constru La construcción de la construcción d			Stop Freq
-54.0							10.000000000 GHz
Start 30 N #Res BW		#VB	W 3.0 MHz		Sweep 1	Stop 10.000 GH 8.7 ms (40001 pts	CF Step
MKR MODE TR		× 1.853 51 GHz	⊻ 22.48 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 3 N 1	f	3.296 67 GHz 3.017 26 GHz	-26.39 dBm -26.61 dBm				<b>F</b> 0 <b>f</b>
4 5							Freq Offset 0 Hz
6 7 8							
9 10							
11 12							
MSG					STATUS		

# HSUPA 1900 & Channel: 9262

Agilent Spectro	um Analyzer - Sw RF 50 G	rept SA	SENSE:I	NT	ALIGN OFF	02:12:23 PM Mar 04, 2016	_
Center Fr	eq 15.000	000000 GHz PNO: Fast	Trig: Free Ru	#Avg n	Type: RMS	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET A A A A A A	Frequency
10 dB/div	Ref Offset 23 Ref 25.00	IFGain:Low	#Atten: 18 dB		Mkr3	18.842 50 GHz -34.15 dBm	Auto Tune
Log 15.0 5.00							Center Fred 15.000000000 GHz
-15.0 -25.0 -35.0	مراجع المراجع المراجع المراجع المراجع	a a construction of the second s			1		Start Fred 10.000000000 GHz
-45.0 -55.0 -65.0							Stop Fred 20.000000000 GHz
Start 10.0 #Res BW	1.0 MHz		3W 3.0 MHz	FUNCTION		Stop 20.000 GHz 6.7 ms (40001 pts)	CF Step 1.000000000 GH
MKR MODE TR	f	× 17.008 00 GHz 19.565 75 GHz	Y -33.15 dBm -34.03 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
2 N 1 3 N 1 4 5 6	f	18.842 50 GHz	-34.15 dBm				Freq Offset 0 Hz
7 8 9 10							
12 MSG					STATUS		

Agilent Spectrum Analyzer - Swept SA						
X RL RF 50 Ω AC Center Freq 5.015000000	GHz	SENSE:		ALIGN OFF	02:15:56 PM Mar 04 TRACE 1 2 3	
	PNO: Fast G IFGain:Low	Trig: Free Ru #Atten: 30 dB	n		TYPE A A A	
Ref Offset 20.75 dB 10 dB/div Ref 36.00 dBm Log					-27.05 di	
26.0 1 16.0						Center Freq 5.015000000 GHz
6.00 -4.00 -14.0	3 ^2				-13.0	O dBin 30.000000 MHz
-24.0 -34.0				erren an a della se etti erren andra simmer a bakker	Liste of the part of the sector of the secto	Stop Freq
-54.0 Start 30 MHz					Stop 10.000 (	10.00000000 GHz
#Res BW 1.0 MHz	#VBV	/ 3.0 MHz		Sweep 1	8.7 ms (40001	DTS) CF Step 997.000000 MHz
MKR         MODE         TRC         SCL         X           1         N         1         f         1.87           2         N         1         f         3.28	9 19 GHz 5 95 GHz	Y 22.81 dBm -25.55 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Man
3 N 1 f 2.71 4 5 6 6	4 17 GHz	-27.05 dBm				Freq Offset 0 Hz
7 8 9 9 10						
11 12 MSG				STATUS		

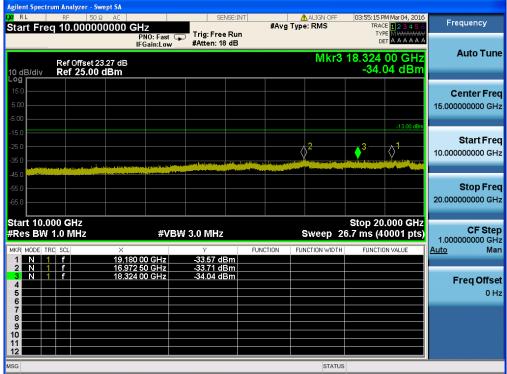
# HSUPA1900 & Channel: 9400

Agilent Spectrum Analyzer - Swept SA	
Center Freg 15.00000000 GHz #Avg Type:	LIGN OFF 02:16:19 PM Mar 04, 2016 RMS TRACE 1 2 3 4 5 6 Frequency
PNO: Fast 🖵 Trig: Free Run IFGain:Low #Atten: 18 dB	
Ref Offset 23.27 dB	Mkr3 19.542 50 GHz Auto Tune
10 dB/div Ref 25.00 dBm	-33.70 dBm
15.0	Center Freq
5.00	15.00000000 GHz
-5.00	-13.00 dBm
-15.0	Start Freq
-25.0	2 3 10.00000000 GHz
	Stop Freq
-65.0	20.00000000 GHz
Start 10.000 GHz	Stop 20.000 GHz
	1.000000000 GHz
MKR MODE         TRC SCL         X         Y         FUNCTION         FUNC           1         N         1         f         16.972.25 GHz         -33.65 dBm         -33.65 dBm	ION WIDTH FUNCTION VALUE Auto Man
2 N 1 f 18.972 00 GHz -33.67 dBm 3 N 1 f 19.542 50 GHz -33.70 dBm	
4	Freq Offset
5 6	0 H2
8	
9	
MSG	STATUS



	rum Analyzer							
		50 Q AC		SENSE:1		ALIGN OFF	03:54:52 PM Mar 04, 20: TRACE 12345	
Start Fre	iq 30.000		PNO: Fast	Trig: Free Ru	n	Type. Railo		<b>H</b>
			FGain:Low	#Atten: 30 dB			DET A A A A A	
	Ref Offer	et 20.75 dB				Mkr	3 2.681 27 GH	Auto Tune
10 dB/div		00 dBm					-27.49 dBn	n
Log		<u></u> 1						
26.0								Center Free
16.0								5.015000000 GH
6.00								
-4.00								
-14.0		_					-13.00 dB	
-24.0		-   I 🍐	<sup>3</sup> ∆ <sup>2</sup>					30.000000 MHz
-34.0 <b></b>		And and the second second loss of the	- and the second of	A DESCRIPTION OF THE OWNER	Second States a Berlin of the	and the second	وفاعوره بالتقعة ويتعادره والاعتدا	
- Control of					The second se			Oton From
-44.0								Stop Fred
-54.0								10.00000000 GHz
Start 30 I	111-7						Stop 10.000 GH	7
	1.0 MHz		#VBI	V 3.0 MHz		Sween 1	8.7 ms (40001 pts	CF Step
						-	· · ·	997.000000 MHz
MKR MODE T		× 1 906	85 GHz	۲ 22.20 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Mar
2 N 1	1 f	3.190	49 GHz	-27.25 dBm				
3 N '	1 f	2.681	27 GHz	-27.49 dBm				Freq Offse
5								0 H:
6								
8								
9								
10								
12								
1SG						STATUS		

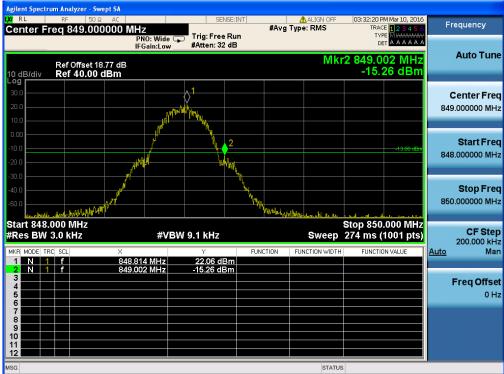
# HSUPA1900 & Channel: 9538



# 8.4 Band Edge



# GPRS850 & Channel: 251



# GPRS850 & Channel: 128







# WCDMA 850 & Channel: 4132

Agilent Spectrum Analyzer - Swept SA X RL RF 50Ω AC Center Freq 821.000000	MHz	#Avg Typ		11:35:33 AM Mar 04, 2016 TRACE 12 3 4 5 6	Frequency
Ref Offset 18.66 dE 10 dB/div Ref 35.00 dBm	PNO: Wide Trig: Fre IFGain:Low #Atten: 3		Mkr2 8	822.950 MHz -21.89 dBm	Auto Tune
25.0 15.0 5.00					Center Freq 821.000000 MHz
-5.00		and the manager that a contraction the	and the state	-13.00 0	Start Fred 819.000000 MH;
-35.0 -45.0 -55.0					Stop Free 823.000000 MH;
Start 819.000 MHz #Res BW 100 kHz	#VBW 300 kHz		Sweep 1.0	op 823.000 MHz 0 ms (1001 pts)	CF Step 400.000 kH
1 N 1 f 8	22.952 MHz 21.89 d 22.950 MHz 21.89 d	Bm			Auto Mar Freq Offse 0 H:
ISG			STATUS		



#### APRENE RF 50 Q AC Center Freq 849.000000 MHz PN0: Wide IFGain:Low #Atten: 32 dB 38:14 AM Mar 04, 2016 TRACE 1 2 3 4 5 6 TYPE M WANNAW DET A A A A A A ALIGN #Avg Type: RMS Frequency Auto Tune Mkr2 849.00 MHz -20.35 dBm Ref Offset 18.77 dB Ref 35.00 dBm 10 dB/div Log **Center Freq** 849.000000 MHz Start Freq 844.000000 MHz Stop Freq 854.000000 MHz Start 844.000 MHz #Res BW 51 kHz Stop 854.000 MHz Sweep 4.73 ms (1001 pts) CF Step 1.000000 MHz Man #VBW 200 kHz FUNCTION FUNCTION WIDTH FUNCTION VALUE <u>Auto</u> 15.60 dBm -20.35 dBm 847.18 MHz 849.00 MHz <u>N 1 f</u> N 1 f Freq Offset 0 Hz 11 12

#### WCDMA 850 & Channel: 4233

# WCDMA 850 & Channel: 4233

XI RL	um Analyzer - Swept SA RF 50.0 AC req 852.000000		SENSE:IM Trig: Free Run #Atten: 32 dB	#Avg	ALIGN OFF Type: RMS	11:39:27 AM Mar 04, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWW DET A A A A A A	Frequency
10 dB/div	Ref Offset 18.77 d Ref 35.00 dBm	3			Mkr	2 850.145 MHz -21.96 dBm	Auto Tune
25.0 15.0 5.00							Center Freq 852.000000 MHz
-5.00 -15.0 <b>2</b> -25.0		and the second and the second and	- American and		Mouse Martine of	-13.00 dBm	Start Free 850.000000 MH2
35.0 45.0 55.0							Stop Free 854.000000 MH:
Start 850. Res BW	<b>100 kHz</b> ac  scl  ×		V 300 kHz Y -21.96 dBm	FUNCTION		Stop 854.000 MHz 1.00 ms (1001 pts) FUNCTION VALUE	<b>CF Step</b> 400.000 kH <u>Auto</u> Mar
2 N 1 3 4 5 6 7 8	f s	50.145 MHz	-21.96 dBm				Freq Offse 0 H:
9 10 11 12 15G					STATUS		



# HSUPA 850 & Channel: 4132

# HSUPA 850 & Channel: 4132

Agilent Spectrum Analyzer - Swept SA					
RL RF 50 Q AC	MH-	E:INT A		M Mar 04, 2016	Frequency
	PNO: Wide Trig: Free F IFGain:Low #Atten: 32 d	Run	TY		
Ref Offset 18.66 dB 10 dB/div Ref 35.00 dBm	3		Mkr2 822.8 -22.	46 MHz 60 dBm	Auto Tune
25.0 15.0 5.00				8	Center Free 21.000000 MH
-5.00 -15.0 -25.0	www.www.plm.Mar	Laco and a second	arhantifua digtor and a farmer	-13.00 - 10 2 - 10 - 10 2 - 10	Start Free 19.000000 MH:
-45.0					Stop Fre 23.000000 MH
Start 819.000 MHz #Res BW 100 kHz	#VBW 300 kHz			.000 MHz 1001 pts)	CF Ste 400.000 k⊢
	22.848 MHz -22.60 dBn	n	CTION WIDTH FUNCTION	DN VALUE Auto	Ma
2 N 1 f 82 3 4 5 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	22.846 MHz -22.60 dBn				Freq Offse 0 ⊢
7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					
SG			STATUS		

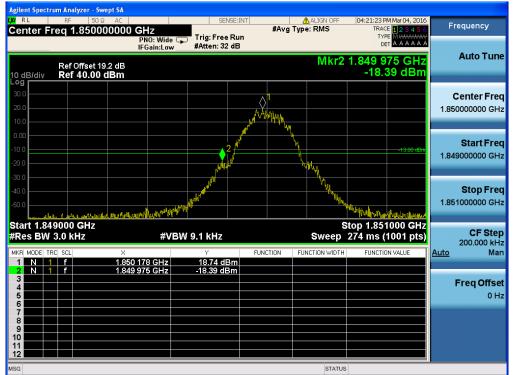


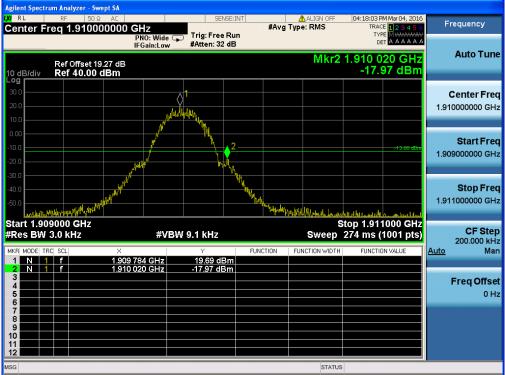
# HSUPA850 & Channel: 4233



# HSUPA850 & Channel: 4233

	n Analyzer - Swept SA			-			
Center Fre	RF 50 Q AC	lHz	SENSE:IN		ALIGN OFF	01:58:07 PM Mar 04, 2016 TRACE 1 2 3 4 5 6	Frequency
	Ref Offset 18.77 dB Ref 35.00 dBm	PNO: Wide G IFGain:Low	☐ Trig: Free Run #Atten: 32 dB		Mkı	2 850.009 MHz -23.35 dBm	
25.0 5.00							Center Freq 852.000000 MHz
-5.00 -15.0 ( <b>2</b> -25.0 ( <b>5</b> ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	mar water to a construction of the constructio	monte		m-mhom man h	and the second	-13.00 dBm	Start Fred 850.000000 MHz
-35.0 -45.0 -55.0							Stop Fred 854.000000 MH:
Start 850.00 #Res BW 10	<b>00 kHz</b>		V 300 kHz	FUNCTION		Stop 854.000 MHz 1.00 ms (1001 pts) FUNCTION VALUE	
1 N 1 2 N 1 3 4 5 6		1.008 MHz 1.009 MHz	-23.35 dBm -23.35 dBm				Freq Offse 0 H
7 8 9 9 10 11 12							
MSG					STATUS	3	













12

#### Agiton Space RF 50 Ω AC Center Freq 1.910000000 GHz PN0: Wide → IFGain:Low #Atten: 32 dB ALIGN #Avg Type: RMS Frequency TRACE 2 3 4 5 6 TYPE MWWWW DET A A A A A A Auto Tune Mkr2 1.910 00 GHz -18.08 dBm Ref Offset 19.27 dB Ref 35.00 dBm 10 dB/div Log **Center Freq** $\Diamond^1$ 1.910000000 GHz Start Freq 1.905000000 GHz Stop Freq 1.915000000 GHz Start 1.905000 GHz #Res BW 51 kHz Stop 1.915000 GHz Sweep 4.73 ms (1001 pts) CF Step 1.000000 MHz Man #VBW 200 kHz FUNCTION FUNCTION WIDTH FUNCTION VALUE

# WCDMA1900 & Channel: 9538

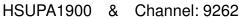
# <u>Auto</u> 1.906 71 GHz 1.910 00 GHz 14.58 dBm -18.08 dBm <u>N 1 f</u> N 1 f Freq Offset

# WCDMA1900 & Channel: 9538

0 Hz

a <sub>RL</sub> Start Freq	RF 50 Ω 1.9110000	000 GHz		SENSE:INT	#Avg	ALIGN OFF Type: RMS	TRACE	Mar 04, 2016 2 3 4 5 6 M M A A A A A T A A A A A A A	F	requency
10 dB/div	Ref Offset 19. Ref 35.00 c	27 dB	LUW			Mkr2	1.911 1: -17.0	33 GHz )9 dBm		Auto Tune
25.0 15.0 5.00										Center Free 3000000 GH:
-5.00 <b>1 2</b> -15.0 -25.0	······································				****			-13.00 dBm	1.91	Start Free 1000000 GH:
-35.0 -45.0 -55.0									1.91	<b>Stop Fre</b> 5000000 GH
Start 1.911 Res BW 1			#VBW 3.0 MI	lz			top 1.915 1.00 s (1			CF Ste 400.000 kH
MKR MODE TRC	SCL f	× <u>1.911 000 GI</u> 1.911 133 GI	Y Hz -15.44 Hz -17.09	dBm dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	N VALUE	<u>Auto</u>	Mai
3 4 5 6										Freq Offse 0 H
7 8 9 10 11 12										
SG						STATUS				













# HSUPA1900 & Channel: 9538

Agilent Spectrum Analyzer - Sw LXI RL RF 50 ହ	ept SA	SENSE:IN	T	🔥 ALIGN OFF	03:54:29 PM Mar 04, 2016	
Start Freq 1.911000	PNO: Fast	Trig: Free Run		Type: RMS	TRACE 123456 TYPE MWWWW DET A A A A A A	Frequency
Ref Offset 19 10 dB/div Ref 35.00		#Atten: 32 dB		Mkr2	1.911 029 GHz -16.79 dBm	Auto Tune
Log 25.0 15.0 5.00						Center Freq 1.913000000 GHz
-5.00 2 -15.0					-13.00 dBm	<b>Start Freq</b> 1.911000000 GHz
-35.0 -45.0 -55.0						<b>Stop Freq</b> 1.915000000 GHz
Start 1.911000 GHz #Res BW 1.0 MHz	#VB	W 3.0 MHz			top 1.915000 GHz 1.00 s (1001 pts)	
MKR MODE TRC SCL	× 1.911 000 GHz	۲ -16.51 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 3 4 5 6 6	1.911 029 GHz	-16.79 dBm				<b>Freq Offset</b> 0 Hz
7 8 9 9 10 11 12						
MSG				STATUS		