TEST REPORT

D	T	&	С	C	o.,	Ltd	

42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea Tel : 031-321-2664, Fax : 031-321-1664

Report No : DRTFCC1608-0117 Pages:(1) / (55) page



1. Customer

- Name : Suntech International Ltd.
- Address : B-1506, Greatvally, 32, 9-Gil, Digital-Ro, Geumcheon-Gu, Seoul 153-709
- 2. Use of Report : FCC & IC Original Grant
- 3. Product Name (FCC ID / IC): Tracker (WA2-STU630 / 21484-STU630)
- 4. Date of Test : 2016-08-09 ~ 2016-08-18
- 5. Test Method Used: §22(H), §24(E)

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 Technical Manager Name : Jaejin Lee (Signature) Name : GeunKi Son	nature)					
	2016.08.29.						
	DT&C Co., Ltd.						
		2.1					

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



Test Report Version

Test Report No. Date		Description
DRTFCC1608-0117	Aug. 29, 2016	Initial issue



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1. GENERAL INFORMATION

Applicant Name:	Suntech International Ltd.					
Address:	B-1506,	Greatvally, 32, 9-Gil, Digital-Ro, Geumcheon-Gu, Seoul 153-709				
FCC ID	:	WA2-STU630				
IC	:	21484-STU630				
FCC Classification	:	PCS Licensed Transmitter (PCB)				
EUT	:	Tracker				
Model Name	:	STU630				
Add Model Name	:	ST630				
Supplying power	:	DC 12 V				
Antenna Informatio	n :	Internal Antenna				

Mada	Tx Frequency	Emission	ERP(Ma	x.power)	EIRP(Max.power)	
Mode (MHz)		Designator	dBm	W	dBm	w
WCDMA850	826.4 ~ 846.6 MHz	4M07F9W	19.62	0.092	21.77	0.150
HSUPA850	826.4 ~ 846.6 MHz	4M07F9W	18.81	0.076	20.96	0.125
WCDMA1900	1852.4 ~ 1907.6 MHz	4M08F9W	-	-	20.09	0.102
HSUPA1900	1852.4 ~ 1907.6 MHz	4M07F9W	-	-	18.42	0.070

Note: FCC is 850 band based on ERP.



2. INTRODUCTION

2.1. EUT DESCRIPTION

The Equipment Under Test(EUT) supports WCDMA.

2.2. SUPPOTR 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. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

Test items	Measurement uncertainty		
Conducted spurious emission	0.96 dB (The confidence level is about 95 %, $k = 2$)		
Radiated emission(1GHz Below)	5.1 dB (The confidence level is about 95 %, $k = 2$)		
Radiated emission(1GHz Above)	5.4 dB (The confidence level is about 95 %, $k = 2$)		

2.5. 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.

- Semi anechoic chamber registration Number: 165783 (FCC) & 5740A-3 (IC)

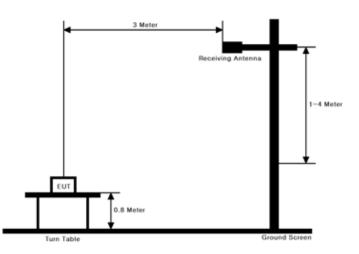


3. DESCRIPTION OF TESTS

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 &10 m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna.

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:

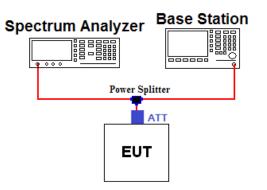
ERP/EIRP = The conducted power at the substitute antenna's terminal [dBm] + Substitute Antenna gain [dBd for ERP, dBi for EIRP]

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 \geq 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.

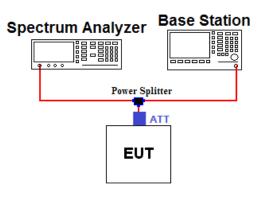
- Average Power Measurement

- 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)
826.4	18.68	1852.4	19.19
836.6	18.69	1880.0	19.25
846.6	18.76	1907.6	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.

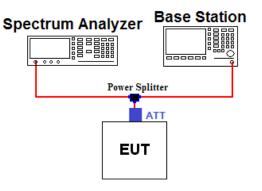
Test setting

- 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 \geq 3 X RBW
- 3. Detector = Peak
- 4. Trance mode = Max hold
- 5. Sweep = Auto couple
- 6. The trace was allowed to stabilize
- If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within 1 ~ 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 $43 + 10 \log(P) dB$

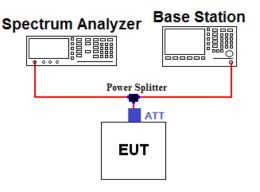
Test setting

- 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	20.45	20000.0	22.57
-	-	-	-
-	-	-	-

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 10th harmonic.

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

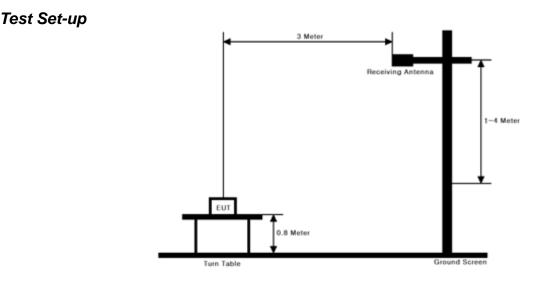
Test setting

- 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 & 10m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna.

Test setting

- 1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW \ge 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.

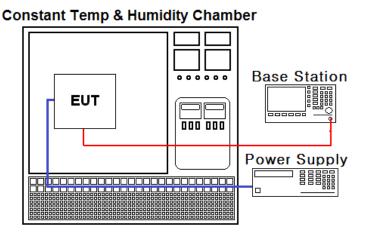
For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic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

This measurement was performed with the EUT oriented in 3 orthogonal 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:

- The carrier frequency of the transmitter is measured at room temperature. (25 °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	15/09/09	16/09/09	MY46471248
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
DC Power Supply	SM techno	SDP30-5D	15/09/23	16/09/23	305DMG305
Multimeter	FLUKE	17B	16/04/21	17/04/21	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	16/06/23	17/06/23	102341
8960 Series 10 Wireless Comms Test Set	Agilent Technologies	E5515C	15/09/10	16/09/10	GB41321164
Thermohygrometer	BODYCOM	BJ5478	16/02/25	17/02/25	1209
Loop Antenna	Schwarzbeck	FMZB1513	16/04/22	18/04/22	1513-128
Bilog Antenna	Schwarzbeck	CBL6112B	14/12/10	16/12/10	2737
Dipole Antenna	Schwarzbeck	VHA9103	15/05/29	17/05/29	2116
Dipole Antenna	Schwarzbeck	VHA9103	16/04/15	18/04/15	2117
Dipole Antenna	Schwarzbeck	UHA9105	15/05/29	17/05/29	2261
Dipole Antenna	Schwarzbeck	UHA9105	16/04/15	18/04/15	2262
HORN ANT	ETS	3115	15/02/09	17/02/09	00021097
HORN ANT	ETS	3117	16/05/03	18/05/03	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	16/03/10	17/03/10	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) 24.232(c)	RSS-132 [5.4] [SRSP-503(5.1.3)] RSS-133 [6.4] [SRSP-510(5.1.2)]	Effective Radiated Power Equivalent Isotropic Radiated Power	С
22.917(a) 24.238(a) 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	ply NC=Not Comply	NT=Not Tested NA=Not Applicable	

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

WCDMA850 Emission Designator

Emission Designator = **4M07F9W** WCDMA OBW = 4.0741 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data) **WCDMA1900 Emission Designator**

Emission Designator = **4M08F9W** WCDMA OBW = 4.0792 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data)

B. ERP Sample Calculation

HSUPA850 Emission Designator

Emission Designator = **4M07F9W** HSUPA OBW = 4.0723 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data) HSUPA1900 Emission Designator

Emission Designator = **4M07F9W** HSUPA OBW = 4.0728 MHz (Measured at the 99.75 % power bandwidth) F = Frequency Modulation 9 = Composite Digital Information W = Combination (Audio/Data)

MODE	Ch.	/ Freq	Spectrum Reading	EUT	Ant Pol	Level(dBm)	TX Ant	Re	sult
MODE	channel	Freq.(MHz)	Value(dBm)	Axis	(H/V)	@ Ant Terminal	Gain(dBd)	(dBm)	(W)
WCDMA850	4132	826.4	-15.52	Х	Н	18.32	1.24	19.56	0.090

ERP = @ Ant Terminal LEVEL(dBm) + Ant. Gain

1) The EUT mounted on a non-conductive turntable is 0.8 meter above test site ground level.

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).

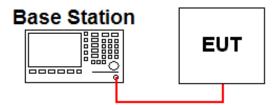
6) The signal generator output level with Ant. Gain is the rating of effective radiated power (ERP).



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

• WCDMA / HSDPA / HSUPA

3GPP	Mada	3GPP 34.121	Cellu	lar Band (dBm)	PC	S Band (dl	3m)	3GPP
Release Version	Mode	Subtest	4132	4183	4233	9262	9400	9538	MPR (dB)
99		12.2 kbps RMC	22.43	22.12	22.15	22.25	22.47	22.39	-
99	WCDMA	12.2 kbps AMR	-	-	-	-	-	-	-
5		Subtest 1	22.41	22.10	22.07	22.23	22.42	22.34	0
5	HSDPA	Subtest 2	22.16	21.83	21.86	21.93	22.20	22.15	0
5	HSDPA	Subtest 3	21.87	21.58	21.55	21.73	21.95	21.91	0.5
5		Subtest 4	21.57	21.31	21.33	21.49	21.70	21.67	0.5
6		Subtest 1	21.02	20.99	21.05	20.90	21.20	21.08	0
6		Subtest 2	20.15	19.96	19.93	20.02	19.87	19.82	2
6	HSUPA	Subtest 3	20.89	20.68	20.69	21.01	21.17	21.05	1
6		Subtest 4	20.40	20.07	20.08	20.31	20.41	20.33	2
6		Subtest 5	20.92	20.69	20.99	20.72	21.17	21.03	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)
	4132	826.4	4050.80
WCDMA850	4183	836.6	4064.10
	4233	846.6	4074.10
	4132	826.4	4070.20
HSUPA850	4183	836.6	4067.90
	4233	846.6	4072.30
	9262	1852.4	4063.90
WCDMA1900	9400	1880.0	4079.20
	9538	1907.6	4065.90
	9262	1852.4	4072.80
HSUPA1900	9400	1880.0	4055.20
	9538	1907.6	4060.80

- 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

- WCDMA850 data

	EUT			Test n	node 12.2 kbps	S 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	Н	18.32	1.24	19.56	0.090	DC 12V	-
836.6 4183	Х	н	17.87	1.30	19.17	0.083	DC 12V	-
846.6 4233	x	Н	18.27	1.35	19.62	0.092	DC 12V	-

- HSUPA850 data

	сит			Tes	st mode subtes	st 1		
Freq(MHz) CH	EUT Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Rated Voltage	Note.
826.4 4132	Х	Н	17.15	1.24	18.39	0.069	DC 12V	-
836.6 4183	Х	н	16.77	1.30	18.07	0.064	DC 12V	-
846.6 4233	X	Н	17.46	1.35	18.81	0.076	DC 12V	-

NOTES:

This EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and HSUPA mode with 12.2 kbps + HSPA and subtest 1. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna. The worst case data is reported.



7.7 EQUIVALENT ISOTROPIC RADIATED POWER

- WCDMA1900 data

	EUT			Test n	node 12.2 kbps	S RMC		
Freq(MHz) CH	Position (Axis)	Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Rated Voltage	Note.
1852.4 9262	Z	V	11.08	9.01	20.09	0.102	DC 12V	-
1880.0 9400	Z	V	9.98	9.05	19.03	0.080	DC 12V	-
1907.6 9538	Z	V	10.07	9.08	19.15	0.082	DC 12V	-

- HSUPA1900 data

	EUT			Tes	st mode subtes	st 1		
Freq(MHz) CH	Iz) Position (Axis) Pol. (H/V)		Pol. (H/V)		EIRP (dBm)	EIRP (W)	Rated Voltage	Note.
1852.4 9262	Z	V	9.41	9.01	18.42	0.070	DC 12V	-
1880.0 9400	Z	V	8.71	9.05	17.76	0.060	DC 12V	-
1907.6 9538	Z	V	8.82	9.08	17.90	0.062	DC 12V	-

NOTES:

This EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and HSUPA mode with 12.2 kbps + HSPA and subtest 1. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna. The worst case data is reported.



7.8 RADIATED SPURIOUS EMISSIONS

7.8.1 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)
	1650.44	Х	Н	-50.32	6.64	-43.68	63.24	
4132 (0.090 W)	2475.49	Х	Н	-52.60	7.58	-45.02	64.58	32.56
(0.000)	-	-	-	-	-	-	-	
	1671.34	Х	н	-50.20	6.66	-43.54	62.71	
4183 (0.083 W)	2513.79	Х	Н	-52.64	7.61	-45.03	64.20	32.17
(01000 11)	-	-	-	-	-	-	-	
	1690.76	Х	н	-53.31	6.68	-46.63	66.25	
4233 (0.092 W)	2536.41	Х	н	-52.90	7.60	-45.30	64.92	32.62
(0.002.00)	-	-	-	-	-	-	-	

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

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

NOTES:

This EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and HSUPA mode with 12.2 kbps + HSPA and subtest 1. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported



7.8.2 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)
	1652.64	Х	Н	-50.60	6.64	-43.96	62.35	
4132 (0.069 W)	2479.35	Х	Н	-52.93	7.59	-45.34	63.73	31.39
(0.000)	-	-	-	-	-	-	-	
	1673.44	Х	Н	-50.46	6.66	-43.80	61.87	
4183 (0.064 W)	2509.76	Х	Н	-53.96	7.61	-46.35	64.42	31.07
(0.00111)	-	-	-	-	-	-	-	
	1693.48	Х	Н	-52.52	6.69	-45.83	64.64	
4233 (0.076 W)	2539.64	Х	Н	-53.46	7.60	-45.86	64.67	31.81
(0.010 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 EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and HSUPA mode with 12.2 kbps + HSPA and subtest 1. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported



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)
	3707.00	Х	V	-54.45	9.91	-44.54	64.63	
9262 (0.102 W)	5561.36	Z	Н	-53.41	10.99	-42.42	62.51	33.09
(00)	-	-	-	-	-	-	-	
	3762.50	Х	V	-55.64	9.85	-45.79	64.82	
9400 (0.080 W)	5643.62	Z	Н	-51.07	11.12	-39.95	58.98	32.03
(0.000)	-	-	-	-	-	-	-	
	3813.33	Х	V	-55.05	9.80	-45.25	64.40	
9538 (0.082 W)	5726.38	Z	Н	-53.88	11.24	-42.64	61.79	32.15
(0.002.11)	-	-	-	-	-	-	-	

7.8.3 RADIATED SPURIOUS EMISSIONS (WCDMA1900)

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

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

NOTES:

This EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and HSUPA mode with 12.2 kbps + HSPA and subtest 1. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported



7.8.4 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)
	3704.66	Х	V	-55.81	9.91	-45.90	64.32	
9262 (0.070 W)	5558.34	Z	Н	-53.74	10.99	-42.75	61.17	31.42
(0.01011)	-	-	-	-	-	-	-	
	3761.08	Х	V	-55.91	9.85	-46.06	63.82	
9400 (0.060 W)	5641.12	Z	Н	-53.16	11.11	-42.05	59.81	30.76
(0.000 11)	-	-	-	-	-	-	-	
	3815.52	Х	V	-55.51	9.80	-45.71	63.61	
9538 (0.062 W)	5721.95	Z	Н	-54.64	11.23	-43.41	61.31	30.90
(0.002 11)	-	-	-	-	-	-	-	

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

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

NOTES:

This EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and HSUPA mode with 12.2 kbps + HSPA and subtest 1. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna. The worst case data is reported

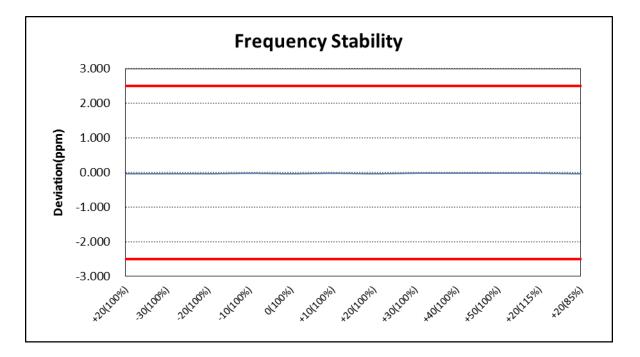


7.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.9.1 FREQUENCY STABILITY (WCDMA850)

OPERATING FREQUENCY	:	<u>836,600,000 Hz</u>		
CHANNEL	:	<u>4183(Mid)</u>		
REFERENCE VOLTAGE	:	<u>12 </u> V DC		
DEVIATION LIMIT(FCC & IC)	:	<u>± 0.00025</u> % or	2.5	_ppm

VOLTAGE	POWER	TEMP	FREQ	Deviation		
(%)	(V DC)	(°C)	(Hz)	(ppm)	(%)	
100%	12.0	+20(Ref)	836,599,967	-0.039	-0.00000394	
100%		-30	836,599,971	-0.035	-0.00000347	
100%		-20	836,599,975	-0.030	-0.00000299	
100%		-10	836,599,980	-0.024	-0.00000239	
100%		0	836,599,970	-0.036	-0.00000359	
100%		+10	836,599,977	-0.027	-0.00000275	
100%		+20	836,599,967	-0.039	-0.00000394	
100%		+30	836,599,986	-0.017	-0.00000167	
100%		+40	836,599,982	-0.022	-0.00000215	
100%		+50	836,599,982	-0.022	-0.00000215	
115%	13.8	+20	836,599,980	-0.024	-0.00000239	
85%	10.2	+20	836,599,975	-0.030	-0.00000299	

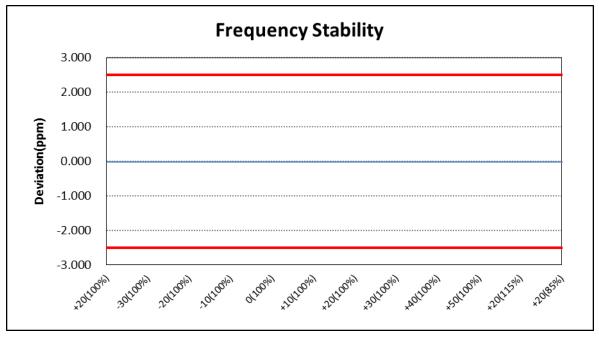




7.9.2 FREQUENCY STABILITY (WCDMA1900)

OPERATING FREQUENCY :	<u>1,880,000,000</u> Hz
CHANNEL :	<u>9400(Mid)</u>
REFERENCE VOLTAGE :	<u>12</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	Deviation		
(%)	(V DC)	(°C)	(Hz)	(ppm)	(%)	
100%	12.0	+20(Ref)	1,879,999,971	-0.015	-0.00000154	
100%		-30	1,879,999,980	-0.011	-0.00000106	
100%		-20	1,879,999,978	-0.012	-0.00000117	
100%		-10	1,879,999,949	-0.027	-0.00000271	
100%		0	1,879,999,973	-0.014	-0.00000144	
100%		+10	1,879,999,966	-0.018	-0.00000181	
100%		+20	1,879,999,971	-0.015	-0.00000154	
100%		+30	1,879,999,962	-0.020	-0.00000202	
100%		+40	1,879,999,971	-0.015	-0.00000154	
100%		+50	1,879,999,951	-0.026	-0.00000261	
115%	13.8	+20	1,879,999,969	-0.016	-0.00000165	
BAT. End Point	10.2	+20	1,879,999,957	-0.023	-0.00000229	

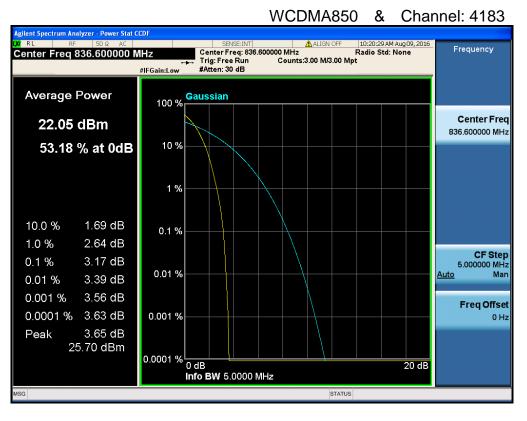


Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. as such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability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

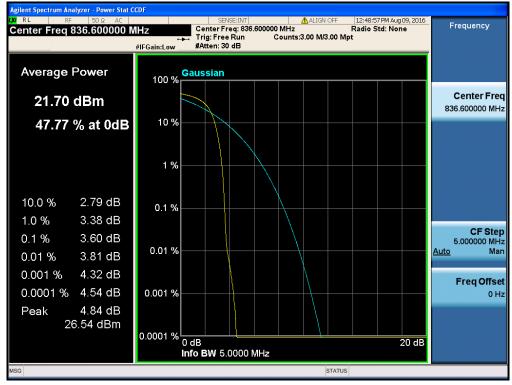


8. TEST PLOTS

8.1 Peak to Average Ratio

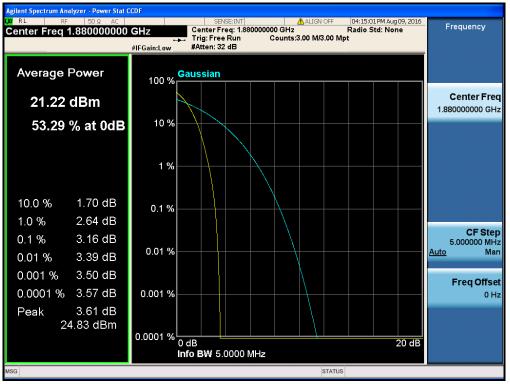


HSUPA850 & Channel: 4183



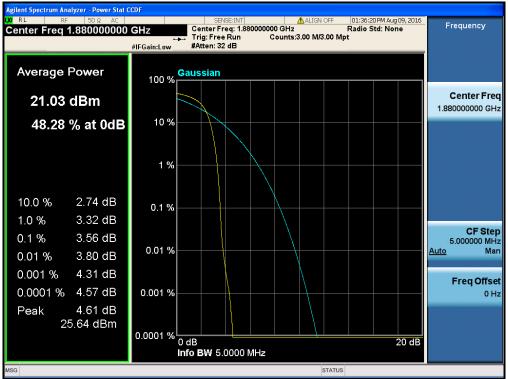
TRF-RF-210(08)160407





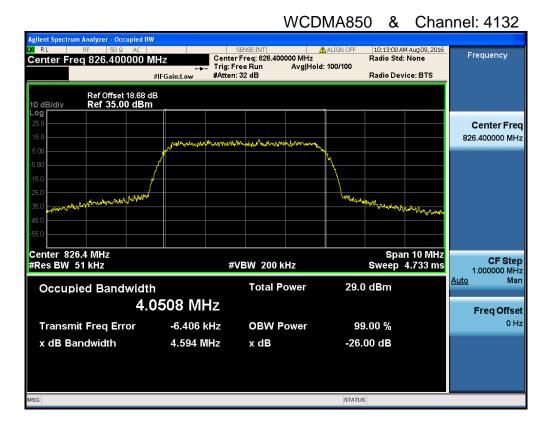
WCDMA1900 & Channel: 9400

HSUPA1900 & Channel: 9400





8.2 Occupied Bandwidth (99 % Bandwidth)



WCDMA850 & Channel: 4183

Agilent Spectrum Analyzer -					
KI RF 5 Center Freq 836.6		SENSE:INT Center Freq: 836.6000 → Trig: Free Run #Atten: 32 dB	ALIGN OFF	10:17:41 AM Aug 09, 2016 Radio Std: None Radio Device: BTS	Frequency
	set 18.69 dB 5.00 dBm				
25.0 15.0		and the state of t	Armenlum		Center Fre 836.600000 MH
-5.00					
-15.0 -25.0 -35.0 -45.0	when the second s		Mining	WWW you way and a way with a share a	
-45.0					
Center 836.6 MHz #Res BW 51 kHz		#VBW 200 k	Hz	Span 10 MHz Sweep 4.733 ms	CF Ste 1.000000 MH
Occupied Bar	ndwidth	Total Po	ower 28.7	′ dBm	<u>Auto</u> Ma
	4.0641 M	Hz			Freq Offse
Transmit Freq I	Error 954	Hz OBW Po	ower 99	0.00 %	0 H
x dB Bandwidth	a 4.613 l	MHz xdB	-26.	00 dB	
ISG			STATUS	3	





WCDMA850 & Channel: 4233





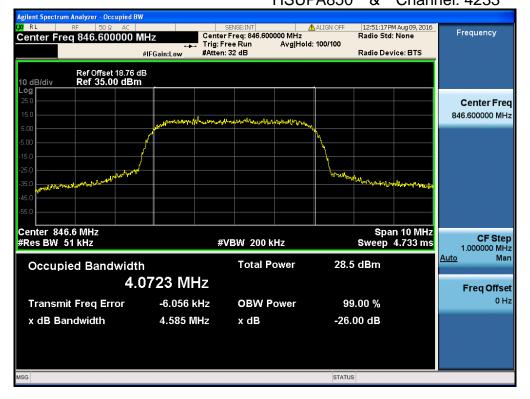
HSUPA850 & Channel: 4132

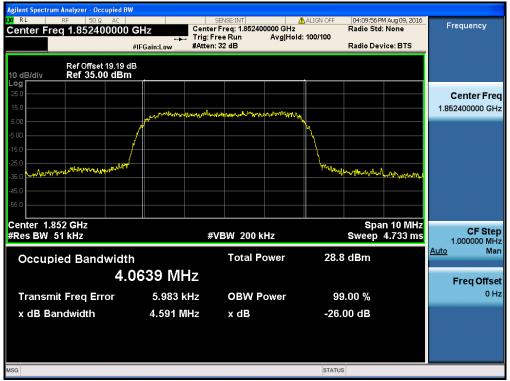
HSUPA850 & Channel: 4183





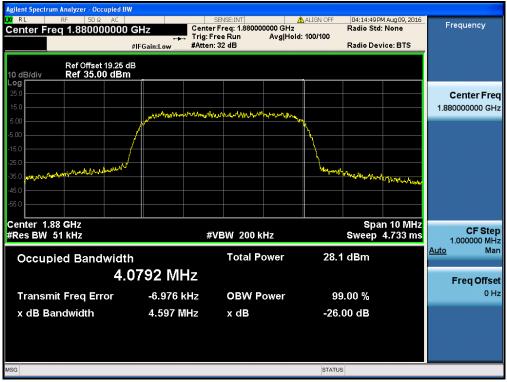
HSUPA850 & Channel: 4233





WCDMA1900 & Channel: 9262

WCDMA1900 & Channel: 9400



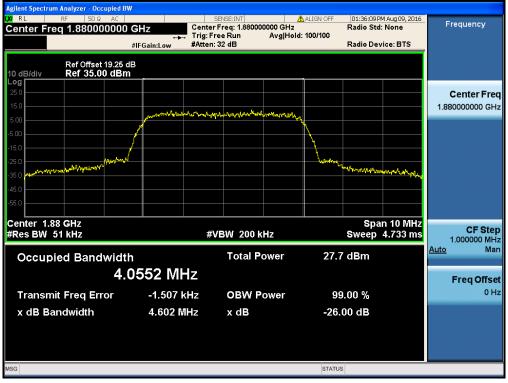
gilent Spectrum Analyzer - Occupied BW SENSE:INT ALIGN OFF Center Freq: 1.907600000 GHz Trig: Free Run Avg|Hold: 100/100 #Atten: 32 dB 04:16:18 PM Aug 09, 2016 Radio Std: None RL Frequency Center Freq 1.907600000 GHz #IFGain:Low Radio Device: BTS Ref Offset 19.27 dB Ref 35.00 dBm 10 dB/div Log **Center Freq** 1.907600000 GHz molamenta al an and los Center 1.908 GHz #Res BW 51 kHz Span 10 MHz Sweep 4.733 ms CF Step 1.000000 MHz Man #VBW 200 kHz Auto **Occupied Bandwidth Total Power** 28.3 dBm 4.0659 MHz **Freq Offset** 0 Hz Transmit Freq Error -5.481 kHz **OBW Power** 99.00 % x dB Bandwidth 4.570 MHz x dB -26.00 dB STATUS G

WCDMA1900 & Channel: 9538



HSUPA1900 & Channel: 9262

HSUPA1900 & Channel: 9400



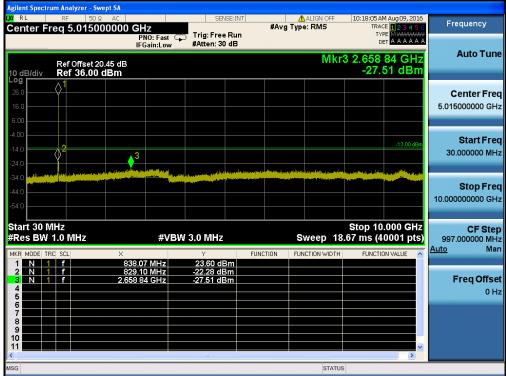
	Hz IFGain:Low Center Trig: Fr #Atten:	Freq: 1.907600000 GHz ee Run Avg Hold	R: 1: 100/100	11:37:39PM Aug 09, 2016 adio Std: None adio Device: BTS	Frequency
Ref Offset 19.27 dB 10 dB/div Ref 35.00 dBm Log					
15.0 5.00		hanananananana			Center Freq 1.907600000 GHz
-5.00			N		
-25.0 -35.0 - Walnuter Married Married			- www.wernational.	memoninan	
-45.0					
Center 1.908 GHz #Res BW 51 kHz	#V	'BW 200 kHz	s	Span 10 MHz weep 4.733 ms	CF Step 1.000000 MHz
Occupied Bandwidth	608 MHz	Total Power	27.9 d	Bm	<u>Auto</u> Man
Transmit Freq Error	-9.932 kHz	OBW Power	99.0	0 %	Freq Offset 0 Hz
x dB Bandwidth	4.635 MHz	x dB	-26.00	dB	
MSG			STATUS		



8.3 Spurious Emissions at Antenna Terminal

								<u> </u>	NCD	MA8	50	&	Cha	nne	el: 4132
	pectru		alyzer - Swept	SA											
Cente	r Fr	_{RF} eq t	50 Ω 5.015000	000 GH	iz NO: Fast ()	Trig: Fre			#Avg Typ	ALIGN OFI pe: RMS	F	TRAC TYP	1 Aug 09, 2016 E 1 2 3 4 5 6 E MWWWWW		Frequency
10 dB/d	liv		Offset 20.45 5 36.00 dB	IFG 5 dB	Gain:Low	#Atten: 3	0 dB			M	kr3 (3.465	16 GHz 53 dBm		Auto Tune
26.0 -		∲ 1												5.	Center Freq .015000000 GHz
-4.00 -14.0 -24.0			n an le dan ser and a	anter a constant a const	∂ ² ³		والمراجع وسامل		- Leveling out the			telbas, a ficantil.	-13.00 dBm		Start Freq 30.000000 MHz
-34.0 -44.0 -54.0												. Siles damen		10.	Stop Freq .000000000 GHz
Start 3 #Res B	BW 1	1.0 N	ИHz		#VB	W 3.0 MHz				Sweep		7 m s (4	.000 GHz 0001 pts)	Aut	CF Step 997.000000 MHz o Man
MKR MOD	1	C SCL		× 825.36 3.282.21	6 MHz	Y 23.91 d -27.15 d	Bm	FUNCT	TON FU	JNCTION WID	TH	FUNCTIO	IN VALUE	Aut	
3 N 4 5 6 7 8 9 10 11				3.282 2 3.465 16	3 GHz	-27.15 d -27.53 d	Bm Bm								Freq Offset 0 Hz
MSG										STA	TUS				

WCDMA850 & Channel: 4183



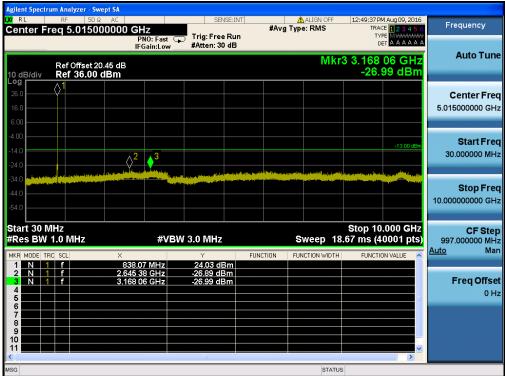
gilent Spectrum Analyzer - Swept SA Center Freq 5.015000000 GHz PNO: Fast IFGain:Low #Atten: 30 dB ALIGN C #Avg Type: RMS Frequency Auto Tune Mkr3 9.496 76 GHz -26.94 dBm Ref Offset 20.45 dB Ref 36.00 dBm I0 dB/div **Center Freq** 5.015000000 GHz Start Freq 30.000000 MHz ⊘² 13 Stop Freq 10.00000000 GHz Start 30 MHz #Res BW 1.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) **CF Step** 997.000000 MHz <u>ito</u> Man #VBW 3.0 MHz Auto FUNCTION FUNCTION WIDTH FUNCTION 1 f 1 f 1 f 23.40 dBm -26.23 dBm -26.94 dBm 3.191 74 GHz 9.496 76 GHz Freq Offset N 0 Hz STATUS

WCDMA850 & Channel: 4233

Agilent Spectrum Analyzer - Swept SA							
M RL RF 50Ω AC Center Freq 5.015000000		SENSE:I	#Avg	ALIGN OFF	12:47:42 PM / TRACE	Aug 09, 2016	Frequency
Ref Offset 20.45 dB 10 dB/div Ref 36.00 dBm	PNO: Fast 🖵 IFGain:Low	#Atten: 30 dB		Mkr	DET 3 3.301 4	A A A A A A	Auto Tune
26.0 1 16.0 6.00							Center Freq 5.015000000 GHz
-4.00 -14.0 -24.0	3	ومراقاة المورور (مرسارير ال	ور مع المراجع المحمد و ال راجع محمد	ومتقاوير المعاور المعاور المعاور المعاور	ngen folgen er er geneter som	-13.00 dBm	Start Freq 30.000000 MHz
-34.0 -44.0 -54.0							Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz		3.0 MHz	FUNCTION	Sweep 18 FUNCTION WIDTH	Stop 10.0 .67 ms (40 FUNCTION	001 pts)	CF Step 997.000000 MHz <u>Auto</u> Man
2 N 1 f 3.2	25.86 MHz 28 38 GHz D1 41 GHz	23.33 dBm -26.67 dBm -26.77 dBm					Freq Offset 0 Hz
MSG				STATUS			

HSUPA850 & Channel: 4132

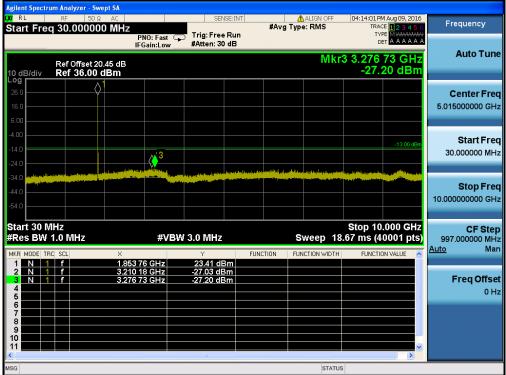
HSUPA850 & Channel: 4183



	um Analyzer - Swept SA						_		
Center Fr	RF 50Ω AC req 5.01500000			E:INT	#Avg Typ	ALIGN OFF e: RMS	TRAC	M Aug 09, 2016 CE <mark>1 2 3 4 5 6</mark>	Frequency
10 dB/div	Ref Offset 20.45 o Ref 36.00 dBm	PNO: Fast (IFGain:Low	Trig: Free #Atten: 30			Mkr	ں 3 9.440	68 GHz 72 dBm	Auto Tune
26.0									Center Freq 5.015000000 GHz
-4.00 -14.0 -24.0		2 ²		at statutelines jadialikes	ومعالمة المعرور ومطاطراتهم	and allow of a collection	br. danish da birdina	-13.00 dBm	Start Freq 30.000000 MHz
-34.0 -44.0									Stop Freq 10.000000000 GHz
Start 30 N #Res BW	1.0 MHz		W 3.0 MHz				.67 ms (4	.000 GHz 0001 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TF 1 N 1 2 N 1 3 N 1 4 5 1	f	× 845.30 MHz 3.207 69 GHz 9.440 68 GHz	2 <u>3.71 dB</u> -26.46 dB -27.72 dB	m		ICTION WIDTH	FUNCTIO		Freq Offset 0 Hz
6 7 8 9 10 11									
< MSG						STATUS	5		

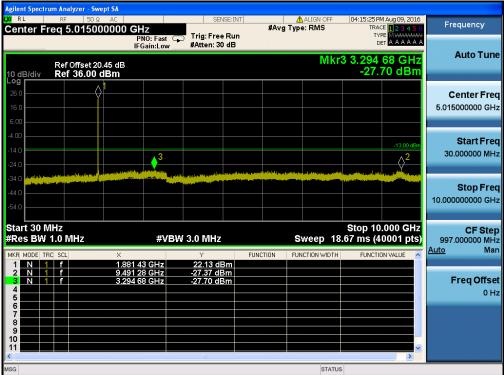
HSUPA850 & Channel: 4233





LXIRL	um Analyzer - Swept Sa RF 50 Ω AC q 10.00000000		SENSE:I	#Avş n	ALIGN OFF	04:14:24 PM Aug 09, 2016 TRACE 123456 TYPE	
10 dB/div	Ref Offset 22.57 Ref 25.00 dBn	IFGain:Low	#Atten: 18 dE		Mkr3	0ET A A A A A A 17.843 25 GHz -35.15 dBm	Auto Tupo
Log 15.0 5.00							Center Fred 15.000000000 GH:
-15.0 -25.0 -35.0				N		-13.00 dBm 31	Start Free 10.000000000 GH:
-45.0 -55.0 -65.0							Stop Free 20.000000000 GH
Start 10.0 #Res BW	1.0 MHz	#VE ×	BW 3.0 MHz Y	FUNCTION	Sweep 26	Stop 20.000 GHz 5.67 ms (40001 pts) FUNCTION VALUE	CF Step 1.000000000 GH Auto Mar
1 N 1 2 N 1 3 N 1 4 5 6 7	f 1	9.082 50 GHz 7.080 00 GHz 7.843 25 GHz	-34.29 dBm -34.43 dBm -35.15 dBm				Freq Offse 0 H:
8 9 10 11 11 11 11 11 11 11 11 11 11 11 11					STATU	~	

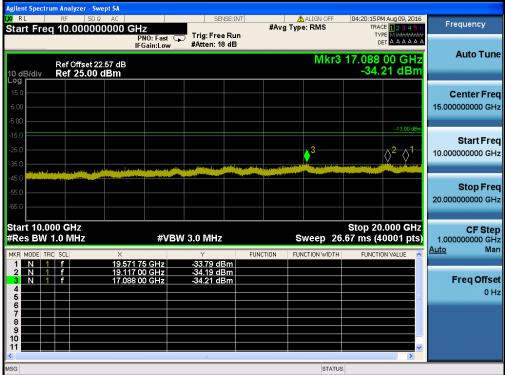




LXI RL		AC	SENSE:]		🛕 ALIGN OFF	04:15:48 PM Aug 09, 2016	
Center Fr	req 15.0000	000000 GHz PNO: Fast IFGain:Low		ın Č	Type: RMS	TRACE 12345 TYPE MUMANAN DET A A A A A A	
10 dB/div	Ref Offset 22 Ref 25.00 (Mkr3	19.815 50 GHz -34.83 dBm	Auto Tune
Log 15.0 5.00							Center Freq 15.00000000 GHz
-15.0 -25.0 -35.0		a das to re-standad la Devoratanção		11 2 yu 2 kul ^{14 4} y nga _{Ma} yana ng kanana		-13.00 dBm	Start Fred 10.000000000 GHz
-45.0 -55.0 -65.0							Stop Fred 20.000000000 GHz
Start 10.0 #Res BW	1.0 MHz	#V ×	BW 3.0 MHz	FUNCTION	Sweep 26	Stop 20.000 GHz .67 ms (40001 pts)	CF Step 1.000000000 GHz Auto Mar
1 N 1 2 N 1 3 N 1 4 5 6	f f	19.066 50 GHz 16.942 00 GHz 19.815 50 GHz	-34.23 dBm -34.49 dBm -34.83 dBm	FONCTION			Freq Offse 0 Hz
7 8 9 10 11							
MSG			ш		STATUS	> ;	

ilent Spectrum Analyzer - Swept SA RL ALIGN C #Avg Type: RMS Frequency Start Freg 30.000000 MHz TRACE Trig: Free Run #Atten: 30 dB PNO: Fast 🖵 IFGain:Low Auto Tune Mkr3 2.684 01 GHz -26.97 dBm Ref Offset 20.45 dB Ref 36.00 dBm 10 dB/div _og r **Center Freq** 5.015000000 GHz Start Freq 30.000000 MHz <mark>♦</mark>3 |₀2 Stop Freq 10.00000000 GHz Start 30 MHz #Res BW 1.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) CF Step 997.000000 MHz #VBW 3.0 MHz Man Auto FUNCTION FUNCTION WIDTH N 1 N 1 N 1 3.166 06 GHz 2.684 01 GHz 26.82 dBn 26.97 dBn Freq Offset 0 Hz STATUS

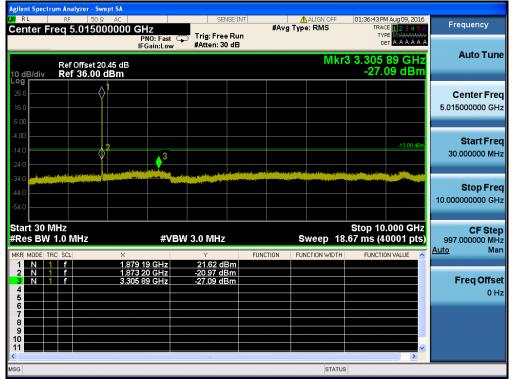
WCDMA1900 & Channel: 9538



gilent Spectrum Analyzer - Swept SA ALIGN O #Avg Type: RMS 01:13:43 PM Aug 09, 2016 Frequency Start Freq 30.000000 MHz TRACE PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB Auto Tune Mkr3 3.098 27 GHz -26.70 dBm Ref Offset 20.45 dB Ref 36.00 dBm \Diamond **Center Freq** 5.015000000 GHz Start Freq -13.00 d 30.000000 MHz 3 Stop Freq 10.000000000 GHz Start 30 MHz #Res BW 1.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) **CF Step** 997.000000 MHz <u>ito</u> Man #VBW 3.0 MHz Auto FUNCTION FUNCTION WIDTH FUNCTION ' 21.82 dBm -26.13 dBm -26.70 dBm Freq Offset 0 Hz STATUS

HSUPA1900 & Channel: 9262

	m Analyzer - Sw						
Start Freq				ISE:INT	ALIGN OFF	01:14:06 PM Aug 09, 2016 TRACE 2 3 4 5 6	Frequency
	Ref Offset 22	IFGain:L	ast 😱 Trig: Free .ow #Atten: 18		Mkr3		Auto Tuno
10 dB/div Log	Ref 25.00					-34.80 dBm	
15.00 5.00							Center Freq 15.000000000 GHz
-15.0 -25.0 -35.0			an a	ution and the second		-13.00 dBm	Start Freq 10.000000000 GHz
-45.0							Stop Freq 20.000000000 GHz
Start 10.00 #Res BW 1		#	¥VBW 3.0 MHz		Sweep 26	Stop 20.000 GHz 6.67 ms (40001 pts)	1.000000000 GHz
MKR MODE TRO	SCL	× 17.012 50 GH	z34.25 dB	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 3 N 1 4 5	f	17.718 75 GH 19.087 50 GH	z -34.33 dE	3m			Freq Offset 0 Hz
6 7 8 9 10							
11						~	
MSG					STATU	· · · ·	

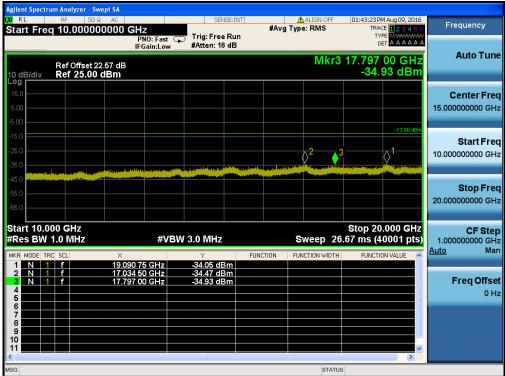


	um Analyzer - Sw						
Center Fi		AC 000000 GHz			ALIGN OFF	01:37:06 PM Aug 09, 20 TRACE 1 2 3 4 TYPE MINIMUM	Frequency
		PNO: Fa IFGain:L			Mkr3	DET A A A A	
10 dB/div Log	Ref Offset 22 Ref 25.00				WIKIS	-34.82 dB	
15.0 5.00							Center Freq 15.000000000 GHz
-5.00 -15.0 -25.0					1	-13.00 o	Start Freq 10.000000000 GHz
-35.0 -45.0			and a state of the				Stop Freq
-65.0 Start 10.0	000 GHz					Stop 20.000 Gł	20.00000000 GHz
#Res BW	1.0 MHz		VBW 3.0 MHz		-	6.67 ms (40001 pt	(S) 1.00000000 GHz
MKR MODE TF	f	× 16.966 50 GH: 19.152 25 GH:	z -33.90 dE z -34.42 dE	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
3 N 1 4 5	f	19.522 50 GH;	z -34.82 dB	lm			Freq Offset
6 7 8 9 10							
11						>	
MSG					STATU	S	

IC: 21484-STU630

ilent Spectrum Analyzer - Swept SA RL ALIGN C Frequency Start Freg 30.000000 MHz Trig: Free Run #Atten: 30 dB PNO: Fast 🖵 IFGain:Low Auto Tune Mkr3 3.128 93 GHz -27.37 dBm Ref Offset 20.45 dB Ref 36.00 dBm 10 dB/div _og r **Center Freq** 5.015000000 GHz Start Freq 30.000000 MHz $\Diamond^2 \diamond^3$ Stop Freq 10.00000000 GHz Start 30 MHz #Res BW 1.0 MHz Stop 10.000 GHz Sweep 18.67 ms (40001 pts) CF Step 997.000000 MHz #VBW 3.0 MHz Man Auto FUNCTION FUNCTION WIDTH N 1 N 1 N 1 21.95 dBn -26.91 dBn -27.37 dBn 2.719 66 GHz 3.128 93 GHz Freq Offset 0 Hz 10 STATUS

HSUPA1900 & Channel: 9538



IC: 21484-STU630

8.4 Band Edge



WCDMA 850 & Channel: 4132

WCDMA 850 & Channel: 4132

	um Analyzer - Sw							
(XIRL)	RF 50Ω req 821.000		SENSE		ALIGN OFF	10:16:08 AM Aug 09, 2 TRACE 1 2 3 4	5.6	Frequency
Genter	164 02 1.000	PNO: Wide		un	, , , , , , , , , , , , , , , , , , , ,			
		IFGain:Low	#Atten: 32 d	0			_	Auto Tune
10 dB/div	Ref Offset 18 Ref 35.00				IVIK	r2 822.998 MH -24.62 dB	m	
Log 25.0								Center Freq
15.0								821.000000 MHz
5.00								
-5.00								
-15.0						-13.00	dRm 2	Start Freq 819.000000 MHz
-25.0								819.000000 MHz
-35.0	ndda.s.a	-	man	mon	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
-45.0	····							Stop Freq
-55.0								823.000000 MHz
Start 819 #Res BW		#V	BW 300 kHz			Stop 823.000 M .000 ms (1001 p	ts)	CF Step 400.000 kHz
MKR MODE T		Х	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE		<u>luto</u> Man
1 N 1 2 N 1		823.000 MHz 822.998 MHz	-24.62 dBm -24.62 dBm					
3								Freq Offset
5							=	0 Hz
6								
8								
10								
11			ш			.		
MSG					STATU	S		



WCDMA 850 & Channel: 4233

WCDMA 850 & Channel: 4233

	ım Analyzer - Swept !						
Center Fr	RF 50Ω A eq 852.00000		SENSE:	#Avg	ALIGN OFF	10:23:59 AM Aug 09, 201 TRACE 1 2 3 4 5	5 Frequency
		PNO: Wide IFGain:Low	Trig: Free Ru #Atten: 32 dE				
10 dB/div	Ref Offset 18.77 Ref 35.00 dB				Mk	r2 850.181 MH: -29.81 dBr	
25.0							Center Free
15.0 5.00							852.000000 MHz
-5.00						-13.00 dBr	Start Fred
-15.0						10.00 424	850.000000 MH:
-35.0	nin and and and and and and and and and an	-	man man	man	man	and a the second of the second second	Stop Fred
-45.0							854.000000 MH
Start 850.0	000 MHz					Stop 854.000 MH:	CF Step
#Res BW	100 kHz	#VE	3W 300 kHz			.000 ms (1001 pts	
MKR MODE TRI	f	× 850.180 MHz 850.181 MHz	Y -29.81 dBm -29.81 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 3 4		850.181 MHZ	-29.81 dBm				Freq Offse
5							
8							
10 11			Ш.				
MSG					STATUS	3	



HSUPA 850 & Channel: 4132

HSUPA 850 & Channel: 4132

gilent Spectri	um Analyzer - Swep	pt SA					
RL	RF 50 Ω	AC	SEN	ISE:INT	ALIGN OFF	12:47:19 PM Aug 09, 2016	_
Center Fr	reg 821.000	000 MHz			vg Type: RMS	TRACE 1 2 3 4 5 6	Frequency
		PNO: V	Vide 🖵 Trig: Free				
		IFGain	Low #Atten: 32	dB			
	-				Mk	r2 822.970 MHz	Auto Tun
	Ref Offset 18.6 Ref 35.00 d					-24.98 dBm	
10 dB/div Log	Ref 35.00 a	Bm				-24.00 abiii	
25.0							0
23.0							Center Fre
15.0							821.000000 MH
5.00							
-5.00							Start Fre
-15.0						-13.00 dBm	819.000000 MH
							819.000000 MF
-25.0					manna	man man man	
35.0	Arrest Contract Wyl Low Moore	~~~~~~	m warman Amar	and a second and a second and a second			
45.0							Stop Fre
45.0							823.000000 MH
-55.0							
Start 819.	.000 MHz					Stop 823.000 MHz	CF Ste
#Res B₩	100 kHz		#VBW 300 kHz		Sweep 1	l.000 ms (1001 pts)	400.000 kH
							Auto Ma
MKR MODE TR		×	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
1 N 1 2 N 1	f	822.972 MI 822.970 MI					
3		822.970 101	HZ -24.98 dE	Sm			Freq Offs
4							01
5							UI
6							
7							
8							
10							
11						~	
			Ш			>	
SG					STATU	s	
					SIAIO	-	

IC: 21484-STU630

Agilent Spectrum Analyzer - Swept SA				
KE RF 50 Ω AC Center Freq 849.000000 MHz	SENSE:INT	ALIGN OFF #Avg Type: RMS	12:52:58 PM Aug 09, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
PNO: Wid IFGain:Lo Ref Offset 18.77 dB 10 dB/div Ref 35.00 dBm		MI	r2 849.00 MHz -23.23 dBm	Auto Tune
25.0 15.0 5.00	erne brikene			Center Freq 849.000000 MHz
-5.00 -15.0 -25.0	2 	Now Jacow Marsh Same	-13.00 dBm	Start Freq 844.000000 MHz
-36.0 -45.0 -55.0		and the second of the second se	and a second of the second have	Stop Freq 854.000000 MHz
Start 844.000 MHz #Res BW 51 kHz #\	/BW 200 kHz	Sweep 4	Stop 854.000 MHz .733 ms (1001 pts)	CF Step 1.000000 MHz <u>Auto</u> Man
1 N 1 f 845.63 MHz 2 N 1 f 849.00 MHz 3 3 3 3 4 4 5 6 6 7 8 8 8 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<>	15.30 dBm			Freq Offset 0 Hz
9 10 11 MSG		STATUS	×	

HSUPA850 & Channel: 4233

HSUPA850 & Channel: 4233

Agilent Spectr	rum Analyzer - Swept SA RF 50 Ω AC		SENSE:I	NT	ALIGN OFF	12:54:26 PM Aug 09, 2016	
Center Fi	req 852.000000	Trig: Free Ru	#Avş n	g Type: RMS	TRACE 12345	Frequency	
		PNO: Wide G	#Atten: 32 dB			DET A A A A A	Auto Tupo
10 dB/div	Ref Offset 18.77 dB Ref 35.00 dBm				Mk	r2 850.001 MHz -26.82 dBm	
25.0							Center Free 852,000000 MH;
5.00							332.000000 With
-15.0 2						-13.00 dBm	Start Free 850.000000 MH:
-25.0	Man gate and being a gate and	mannen	man Manana Ma	www.shener	and and the state of the state	and and a surface of the surface of	Stop Free
-45.0							854.000000 MH
Start 850. #Res BW	.000 MHz 100 kHz	#VB\	N 300 kHz			Stop 854.000 MHz .000 ms (1001 pts)	400.000 kH
MKR MODE TF		0.000 MHz	۲ -26.82 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
2 N 1 3 4 5		0.001 MHz	-26.82 dBm -26.82 dBm				Freq Offse 0 H
6 7 8							
9 10 11						~	
SG					STATU	s	





lgilent Spectrum Analyzer - Swept SA				
XIRL RF 50Ω AC	SENSE:IN	T ALIGN OFF	04:13:37 PM Aug 09, 2016	
Start Freg 1.845000000 GHz		#Avg Type: RMS	TRACE 1 2 3 4 5 6	Frequency
	Fast Trig: Free Run n:Low #Atten: 32 dB			
Ref Offset 19.19 dB 10 dB/div Ref 35.00 dBm		Mkr2	1.848 978 GHz -17.48 dBm	Auto Tun
6 g 25.0 15.0 5.00				Center Fre 1.847000000 G⊦
5.00 			-13.00 c 2 c	Start Fre 1.845000000 GH
45.0				Stop Fre 1.849000000 GH
Start 1.845000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz		top 1.849000 GHz 1.000 s (1001 pts)	CF Ste 400.000 kł Auto Ma
MKR MODE TRC SCL X 1 N 1 f 1.849 000 G		FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
2 N 1 f 1.848 978 G 3 4 5	Hz -17.48 dBm			Freq Offs 0 F
6 7 8 9 9				
			~	
SG		STATUS		



gilent Spectr											
RL	RF	50 Ω AC	7	SENS	E:INT	#Ava T	ALIGN OFF		M Aug 09, 2016	Fre	quency
	q 1.911(A PNO: Fast FGain:Low	Trig: Free #Atten: 32			yperrane	TY			
0 dB/div	Ref Offs Ref 35.	et 19.27 dB .00 dBm					Mkr2	1.911 0 -19.4	05 GHz 41 dBm	Auto Tu	
- og 25.0 15.0 5.00											enter Fre 000000 G⊦
5.00 15.0 25.0									-13.00 dBm		Start Fre
35.0 45.0 55.0											Stop Fr 000000 G
tart 1.91 Res BW			#VB	W 3.0 MHz			s #Sweep	top 1.91: 1.000 s (5000 GHz 1001 pts)		CF St 400.000 k
IKR MODE TR	RC SCL	× 1.911 0	00 GHz	Y -19.09 dBi		TION	FUNCTION WIDTH	FUNCTIO	ON VALUE	<u>Auto</u>	М
2 N 1 3 4 5 6		1.9110	05 GHz	-19.41 dB						F	req Offs 0
7 8 9 0											
1									∼		
G							STATUS	5			





	um Analyzer - S										
d RL Start Free	RF 50 Ω AC q 1.845000000 GHz			SENSE	#.	Avg Type:	ALIGN OFF : RMS	TRA	M Aug 09, 2016	Fr	equency
		P IF	NO: Fast C Gain:Low	Trig: Free F #Atten: 32 d				D			Auto Tune
10 dB/div	Ref Offset Ref 35.00							Mkr2 1.848 97 -18.0			
25.0										C	Center Free
15.0 5.00										1.84	7000000 GH:
-5.00									-13.00 ° 2 4		Start Free
-15.0									-13.001	1.84	5000000 GH:
-35.0											Stop Free
-45.0										1.84	9000000 GH:
	5000 GHz						5	ton 1 849	9000 GHz		CF Step
#Res BW			#VB	W 3.0 MHz		#			1001 pts)	Auto	400.000 kH
MKR MODE TF	f	× 1.848 99		۲ <u>-17.41 dBn</u>	FUNCTION 1	N FUNC	CTION WIDTH	FUNCTI	ON VALUE	Auto	Ivial
2 N 1 3	f	1.848 97	4 GHz	-18.01 dBn	<u>1</u>						Freq Offse
5 6									=		0 H
8											
10									~		
< ISG							STATUS	3			



Agilent Spectr															
Kart Free	RF 50 Ω AC g 1.911000000 GHz				SENSE:INT			ALIGN		01:42:36 PM Aug 09, 2016 TRACE 123456			Frequency		
		Trig: Free Run #Atten: 32 dB								Auto Tune					
10 dB/div	Ref Of Ref 3	fset 19.2 5.00 dl	?7 dB Bm					IVIKTZ			2 1.911 001 GHz -18.37 dBm				
25.0														Center Freq	
15.0 5.00														.913000000 GH2	
-5.00												-13.00 dBr	1	Start Freq 911000000 GHz	
-25.0						*		,							
-45.0													1	Stop Freq .915000000 GHz	
-55.0 Start 1.91	1000 0	<u>ч</u>									top 1.91:				
#Res BW				#V	BW 3.0 MH	lz			#Sw		1.000 s (CF Step 400.000 kHz to Man	
MKR MODE TF			× 1.911 0	00 GHz	۲ -18.37		FUNC	TION	FUNCTION	WIDTH	FUNCTIO	ON VALUE			
2 N 1 3 4			1.911 0	01 GHZ	-18.37	dBm								Freq Offset	
5 6 7													3	011	
8 9 10															
11												, ,			
MSG										STATUS					