

TEST REPORT

| Report No.: | EM20 | 1200143-1 | Application | No.: | ZJ00014008 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------|-------------|--------------|------------|
| Client: | ADC Telecommunications, INC | | | | |
| Address: | P.O. B | ox 1101, Minneapolis, I | Minnesota | | |
| Sample Description: | InterRe | each Fusion 850 MHz a | nd 1900 MHz | Multi-Band | |
| Model: | FSN-8 | 519-1 | | | |
| Test Location: | EMC Laboratory of Guangzhou GRG Metrology and Test Co., Ltd. | | | st Co., Ltd. | |
| Test Specification: | FCC PART 22& FCC PART 24 | | | | |
| Issue Date: | 2012-0 | 5-22 | | | |
| Test Result: | Pass. | | | | |
| Prepared By: | | Reviewed By: | | Approved | By: |
| Jane Cao / Test Engine | eer | Angel Liu / Engineer | | Gavin Wu / | / Manager |
| Junelas | | Angel . him | | Cravi | n Wu |
| Date:2012-05-22 | Date:2012-05-22 Date:2012-05-22 | | | 05-22 | |
| Other Aspects: | | | | | |
| None | | | | | |
| Abbreviations: $ok / P = passed; fail / F = failed; n.a. / N = not applicable$ | | | | | |
| The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT. | | | | | |
| GRG Metrology and Test Co., Ltd. | RG Metrology and Test Co., Ltd. Address: 163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, P.R. China | | | | |

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 Email: emc@grg.net.cn
 http://www.grgtest.com
 Ver.:2.0/ 01. Jan. 2011

DIRECTIONS OF TEST

- **1.** This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.
- 2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.
- **3.** If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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1. TEST SUMMARY

| Test Item | Test Requirement | Test Method | Result |
|---------------------|------------------|-----------------|--------|
| Output Power | FCC part 22.913 | FCC part 2.1046 | PASS |
| | FCC part 24.232 | 2-11-04/EAB/RF | |
| | | TIA/EIA 603C | |
| Conducted | FCC part 22.917 | FCC part 2.1051 | PASS |
| Spurious Emission | FCC part 24.238 | 2-11-04/EAB/RF | |
| | | TIA/EIA 603C | |
| Band Edge | FCC part 22.917 | FCC part 2.1051 | PASS |
| | FCC part 24.238 | 2-11-04/EAB/RF | |
| | | TIA/EIA 603C | |
| Radiated Spurious | FCC part 22.917 | FCC part 2.1053 | PASS |
| Emission | FCC part 24.238 | 2-11-04/EAB/RF | |
| | | TIA/EIA 603C | |
| Occupied | 2-11-04/EAB/RF | FCC part 2.1049 | PASS |
| Bandwidth | | 2-11-04/EAB/RF | |
| | | TIA/EIA 603C | |
| Intermodulation | FCC part 22.917 | 2-11-04/EAB/RF | PASS |
| | FCC part 24.238 | TIA/EIA 603C | |
| | | | |
| Out of Band | 2-11-04/EAB/RF | 2-11-04/EAB/RF | PASS |
| Rejection | | TIA/EIA 603C | |
| Frequency Stability | FCC part 22.355 | FCC part 2.1055 | PASS |
| | FCC part 24.235 | TIA/EIA 603C | |
| | | | |

Remark:

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

2. GENERAL INFORMATION

2.1 CLIENT INFORMATION

| Name: | ADC Telecommunications, INC |
|-------|-----------------------------|
|-------|-----------------------------|

Address: P.O. Box 1101, Minneapolis, Minnesota

2.2 MANUFACTURER

Name:FLEXTRONICS TECH. (SHANGHAI) CO LTDAddress:NO.77, YONG SHENG, JIADING ROAD, MALU, JIADING, SHANGHAI,
CHINA 201801

2.3 BASIC DESCRIPTION OF EUT

| Equipment: Model No.: | InterReach Fusion 850 MHz and 1900 MHz Multi-Band FSN-8519-1 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Power Supply: | AC 100V-240V 50-60Hz |
| Adapter | N/A |
| Power Cord | 1.5m unscrewed AC power cord |
| Type of Modulation | GSM,EDGE,CDMA2000,WCDMA,LTE for Celluar Band GSM,EDGE,CDMA2000,WCDMA,LTE for PCS Band |
| Frequency Band | Celluar Band:869MHz-894MHz downlink,824MHz-849MHz uplink PCS Band:1930MHz-1990MHz downlink ,1850MHz - 1910MHz uplink |

Antenna Type N/A

2.4 STANDARDS APPLICABLE FOR TESTING

The standard used FCC part 22& FCC part 24& FCC part 27

2.5 TEST LOCATION

The tests and measurements refer to this report were performed by Guangzhou GRG Metrology and Test Technology Co., Ltd.

| Add. : | 163 Pingyun Rd, West of Huangpu Ave, Guangzhou, 510656, P. R. China |
|------------|---------------------------------------------------------------------|
| Telephone: | +86-20-38699959, 38699960, 38699961 |
| Fax : | +86-20-38695185 |

2.6 ACCREDITATION

Our laboratories are accredited and approved by the following approval agencies according to

ISO/IEC 17025.

| USA | FCC Listed Lab No. 688188 |
|--------|---------------------------|
| China | CNAS NO.L0446 |
| China | DILAC No.DL175 |
| Canada | Registration No.:8355A-1 |

2.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER

N/A

3. EQUIPMENTS USED DURING TEST

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|------------------------|-----------------|-----------|---------------|-----------------|
| Radiated Spurious Emis | sion | | | |
| Spectrum Analyzer | R&S | ESU40 | 100106 | 2012-09-26 |
| Biconical antenna | ELECTRO-METRICS | BIA-30S | 166 | 2012-10-14 |
| log-periodical antenna | ELECTRO-METRICS | LPA-30 | 383 | 2012-07-30 |
| Horn antenna | ETS.LINDGREN | 3117 | 00075824 | 2012-08-20 |
| Horn antenna | SCHWARZBECK | BBHA9120D | D752 | 2013-10-14 |
| Signal Generator | R&S | SML03 | 103002 | 2012-09-02 |
| FILTER | TELONIC | TTR95-3EE | 50076 | 2012-09-06 |

| Output Power/ Conducted Spurious Emission / Occupied Bandwidth/ Out of Band Rejection | | | | |
|---------------------------------------------------------------------------------------|-------------|-----------|---------|------------|
| Spectrum Analyzer | R&S | ESU40 | 100106 | 2012-09-26 |
| L.I.S.N | SCHWARZBECK | NSLK 8127 | 8127450 | 2012-08-21 |
| Signal Generator | R&S | SML03 | 103002 | 2012-09-02 |

| Intermodulation/ Band Edge | | | | |
|----------------------------|---------|--------|------------|------------|
| signal generator | Agilent | N5182A | MY50141210 | 2012-09-26 |
| signal generator | Agilent | E4438C | MY47272315 | 2012-09-26 |
| Spectrum Analyzer | Agilent | E4408B | MY49652135 | 2012-09-26 |
| Power splitter | Agilent | 11667A | MY42254304 | 2012-09-02 |

| Frequency Stability | | | | |
|----------------------------------------------|--------|---------------|--------|------------|
| Constant temperature& humidity chamber | CEPREI | CEEC-MSJ-60BE | 11015 | 2013-05-15 |
| Spectrum Analyzer | R&S | ESU40 | 100106 | 2013-02-05 |
| Signal Generator | R&S | SML03 | 103002 | 2012-09-02 |

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4. TEST RESULTS

4.1 EUT OPERATION

| Power supply: | AC 120V 60Hz |
|-----------------------|--------------|
| Temperature: | 25.0 °C |
| Humidity: | 50 % RH |
| Atmospheric Pressure: | 1005mbar |
| Test requirement | Fiber-optic |

Fiber-optic distribution systems are a type of in-building radiation system that receives RF signals from an antenna, distributes the signal over fiber-optic cable, and then retransmits at another location for example within a building or tunnel. Most fiber-optic systems are signal boosters; however, some may be repeaters. These systems generally have two enclosures typically called host (or local or donor unit) and remote. Some systems may also have an optional expander box for fan-out to remotes. The system transmits downlink multiple signals from the remote unit to handsets, portables, or clients, and transmits uplink signals via from the host unit. Usually but not always the uplink goes through an intermediate amplifier to a "donor" antenna. Therefore both uplink and downlink must be tested, unless filing effectively documents how connection of uplink to donor antenna with or without an intermediate amplifier will be prevented, such as for always only a cabled connection to a base station. Fiber-optic systems are not amplifiers (AMP equipment class) - they are equipment class TNB or PCB. The same approval procedures also apply for multiple-enclosure systems connected by coax cable.

1) host unit

a) transmits uplink to base station via antenna thru coax, passive interface unit, or active interface unit (amplifier)

b) sends base-station downlink via fiber-optic or coax to remote

c) receives handset uplink via fiber-optic or coax from remote

d) optional connection to expansion unit via fiber-optic

e) separate FCC ID from remote, unless electrically identical

FCC ID: NOO-F0850-011

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f) non-transmitting host unit

i) connects directly to a base station via coax cable but does not connect to antenna or amplifier

ii) Part 15 digital device subject to Verification, no FCC ID

2) remote unit

a) receives base-station downlink via fiber-optic or coax from host, transmits via antenna to handsets

b) returns handset uplink via fiber-optic or coax to host

c) separate FCC ID from remote, unless electrically identical

- 3) expansion unit
- a) fiber-optic or coax from host

b) fiber-optic or coax fan-out to remote(s)

c) Part 15 digital device subject to Verification, no FCC ID

4) passive interface unit

a) contains attenuators, splitters, combiners

b) coax cable connection between host and base-station

c) passive device, no FCC ID

5) active interface unit

a) amplifies uplink signal from host unit for transmit by donor antenna

b) attenuates downlink from donor antenna

c) coax cable connection between host and active interface unit

d) usually has separate FCC ID; in some cases could be combined/included with host as one enclosure

The following three general definitions follow from those stated in the Part 22, 24, and 90 rule sections as listed above. Two of the definitions replace previous EAB internal definitions given for booster, repeater and extender. The general term "extender" is the same as booster, but booster should be used rather than extender. The general term "translator" is the same as repeater, but repeater should be used rather than translator.

External radio frequency power amplifier (ERFPA) - any device which, (1) when used in conjunction with a radio transmitter signal source, is capable of amplification of that signal, and (2) is not an integral part of a radio transmitter as

FCC ID: NOO-F0850-011

manufactured. The EAS equipment class AMP is used only for an ERFPA device inserted between a transmitter (TNB/PCB) and an antenna (has only one antenna port) Booster is a device that automatically reradiates signals from base transmitters without channel translation, for the purpose of improving the reliability of existing service by increasing the signal strength in dead spots. An "in-building radiation system" is a signal booster. These devices are not intended to extend the size of coverage from the originating base station. A booster can be either single or multiple channels.

Repeater is a device that retransmits the signals of other stations. Repeaters are different from boosters in that they can include frequency translation and can extend coverage beyond the design of the original base station. A repeater is typically single channel but can also be multiple channels.

ERFPA (AMP) and boosters/repeaters (TNB/PCB) can generally be authorized for all rule parts except15 and 18.

Tests should be done with each typical signal. e.g., for F3E emissions use 2500 Hz with 2.5 or 5 kHz deviation. Use of CW signal for some tests is acceptable in lieu of actual emission, in some cases when CW signal gives worst case.

The EUT include Host unit, expansion unit and remote unit.

Only remote unit need FCC ID, Host unit and expansion nit do not need separate FCC ID. The EUT belongs to repeater(PCB)class.

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4.2 TEST PROCEDURE & MEASUREMENT DATA

4.2.1 RF OUTPUT POWER

| Test Date: Test Method: | 05 May, 2012 FCC part 2.1046 2-11-04/EAB/RF |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC part 22.913(a)& FCC part 24.232(a)&FCC 27.50 22.913(a): Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. 24.232(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB. 27.50 the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 1000 Watts. |
| EUT Operation: | The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by software through the manufacture |
| Status: | Normal |
| Conditions: | 850MHz DL and UL ports, 1900MHz DL and UL ports |

Test configuration:

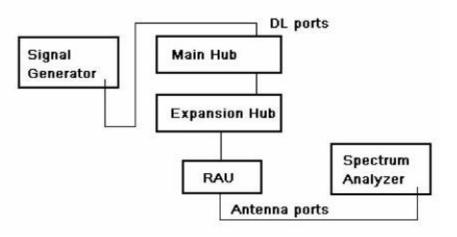
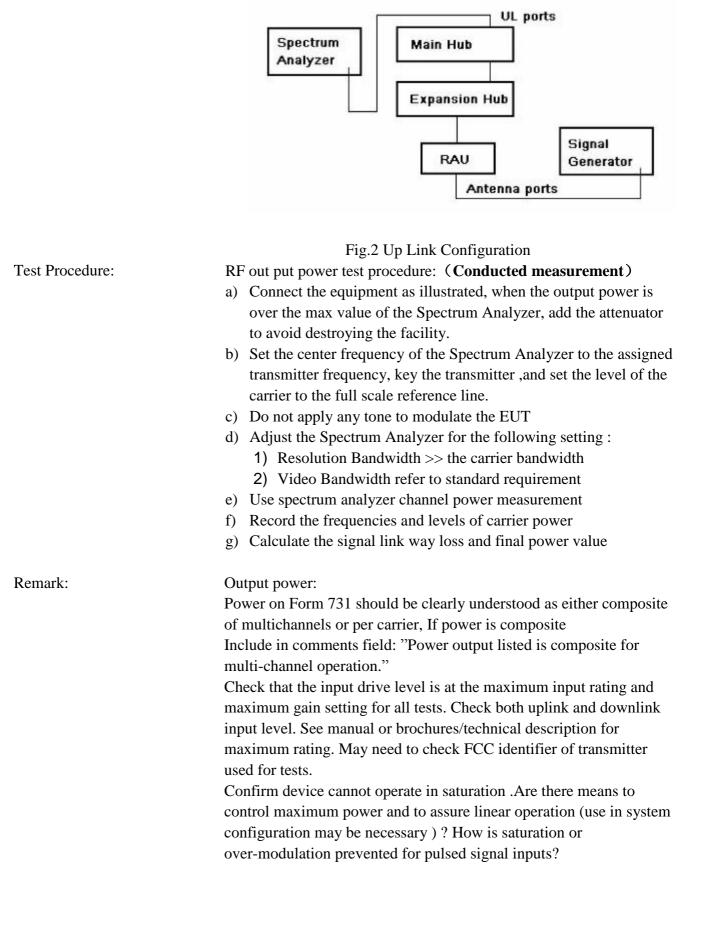


Fig.1 Down Link Configuration



4.2.1.1 MEASUREMENT RECORD **850MHz Band:**

| Down Link | | | | |
|-----------------------------------------------------------------|-------|-------|----------|-------|
| | GSM | EDGE | CDMA2000 | WCDMA |
| Frequency Band (869MHz-894MHz), Measure Max Out put power (dBm) | | | | |
| 869 MHz | 24.92 | 26.02 | 20.46 | 23.41 |
| 881.5MHz | 24.96 | 26.46 | 22.02 | 23.99 |
| 894 MHz | 25.43 | 27.05 | 20.75 | 23.98 |
| Max value in W | | | | |
| Cellular Band | 0.35 | 0.51 | 0.16 | 0.25 |

| Down Link | | | |
|-----------------------------------------------------------------|-------|-------|-------|
| | LTE | | |
| Frequency Band (869MHz-894MHz), Measure Max Out put power (dBm) | | | |
| | QPSK | 16QAM | 64QAM |
| 869MHz | 27.25 | 26.88 | 27.11 |
| 881.5 MHz | 29.43 | 28.12 | 28.31 |
| 894MHz | 27.58 | 27.49 | 27.44 |
| Max value in W | | | |
| Cellular Band | 0.88 | 0.65 | 0.68 |

| Down Link | | | | |
|-------------------------------------------------------------------|-------|-------|----------|-------|
| | GSM | EDGE | CDMA2000 | WCDMA |
| Frequency Band (1930MHz-1995MHz), Measure Max Out put power (dBm) | | | | |
| 1930MHz | 26.07 | 25.24 | 23.54 | 25.26 |
| 1960MHz | 26.83 | 27.25 | 25.39 | 26.26 |
| 1990MHz | 25.71 | 26.16 | 22.68 | 24.73 |
| Max value in W | | | | |
| PCS Band | 0.48 | 0.53 | 0.35 | 0.42 |

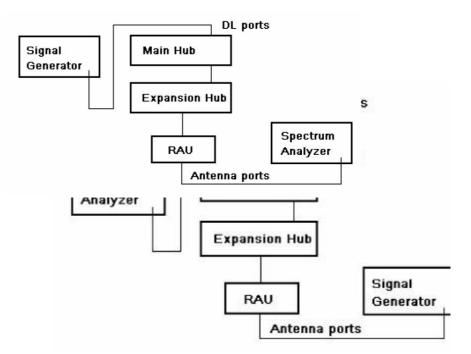
1900MHz Band :

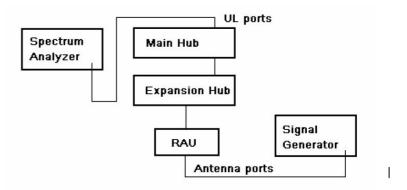
| Down Link | | | |
|-------------------------------------------------------------------|-------|-------|-------|
| LTE | | | |
| Frequency Band (1930MHz-1955MHz), Measure Max Out put power (dBm) | | | |
| | QPSK | 16QAM | 64QAM |
| 1930MHz | 27.58 | 27.50 | 27.53 |
| 1960 MHz | 29.70 | 29.12 | 29.56 |
| 1990MHz | 29.30 | 29.40 | 29.46 |
| Max value in W | | | |
| PCS Band | 0.93 | 0.87 | 0.90 |

Remark: test in single channel status, output power is test in full amplifying status

4.2.2 CONDUCTED SPURIOUS EMISSIONS

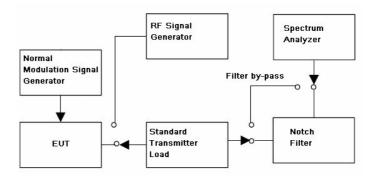
| Test Date: | 05 May, 2012 |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Method: | FCC part 2.1051 |
| Test Requirement: | FCC part 22.917(a)& FCC part 24.238(a)&FCC 27.53 22.917(a): The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log (P) dB. 24.238(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB. 27.53 The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB. |
| Status | The output power of EUT be set to maximum value, the gain of EUT be set to maximum value by software through the manufacture |
| Conditions | Normal |
| Application | 850MHz DL and UL ports, 1900MHz DL and UL ports |
| Test configuration | |







Test Procedure:



Conducted Emission test procedure:

a)Connect the equipment as illustrated, when the output power is over the max value of the Spectrum Analyzer ,add the attenuator to avoid destroying the facility.

b)Set the center frequency of the Spectrum Analyzer to the assigned transmitter frequency ,key the transmitter ,and set the level of the carrier to the full scale reference line.

c)Do not apply any tone to modulate the EUT

d)Adjust the Spectrum Analyzer for the following setting :

 Resolution Bandwidth, (base the standard, apply the different set).her is 100KHZ for frequency band less than1GHZ ,1MHz for frequency over 1GHz;

2)Video Bandwidth refer to standard requirement

e)Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

Use spectrum analyzer channel power measurement

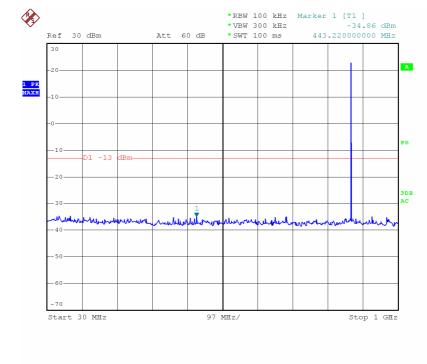
1)the lowest radio frequency generated in the equipment ,it can be 9KHZ base the test method ,here select 30MHz as lowest frequency start point;

2) the highest radio frequency shall higher than 10 times of carrier frequency.

f)Record the frequencies and levels of carrier power

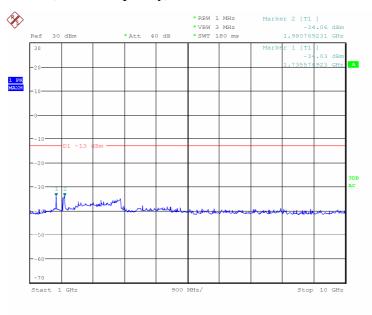
Remark The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought it. When the EUT fundamental carrier is not enough to make the status ,the notch filter could be not used.

4.2.2.1 MEASUREMENT RECORD



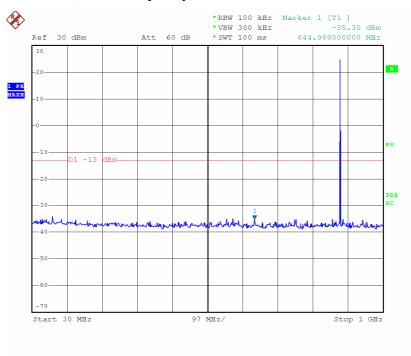
Cellular-GSM downlink (lowest frequency) 30MHz-1GHz

Cellular-GSM downlink (lowest frequency) Above 1GHz



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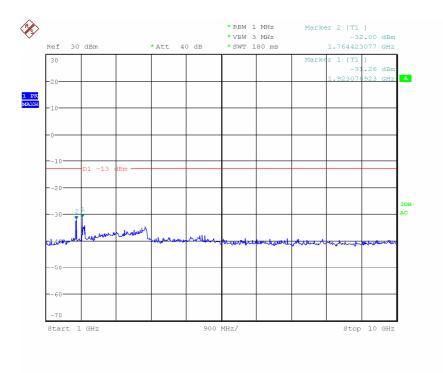
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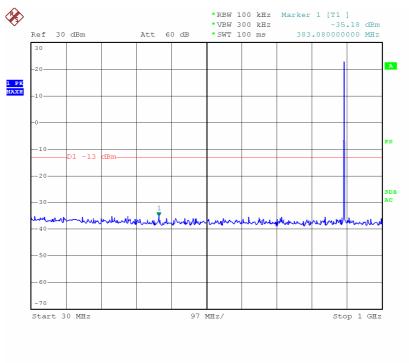
Cellular-GSM downlink (middle frequency) 30MHz-1GHz

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Cellular-GSM downlink (middle frequency) Above 1GHz



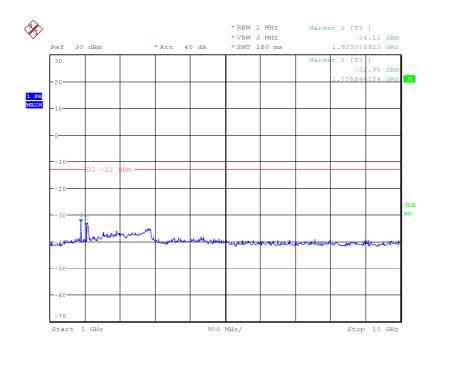
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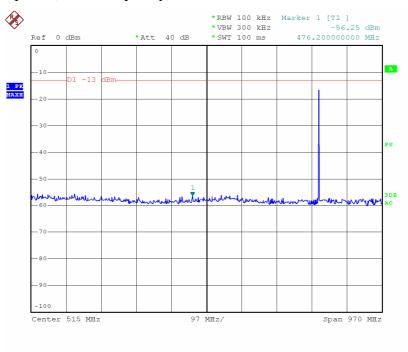
Cellular-GSM downlink (highest frequency) 30MHz-1GHz

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Cellular-GSM downlink (highest frequency) Above 1GHz



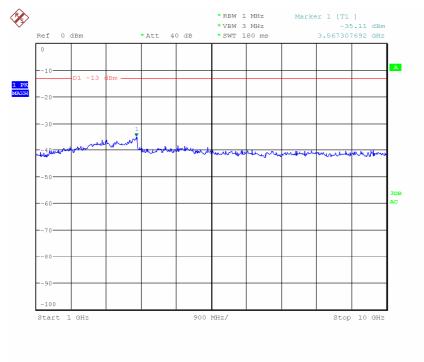
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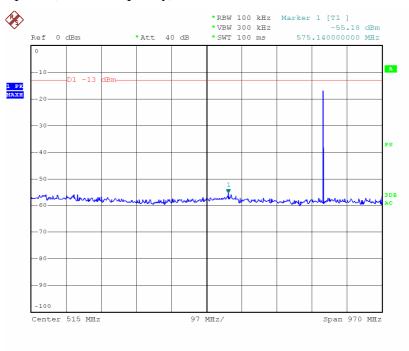
Cellular-GSM uplink (lowest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:22:47

Cellular-GSM uplink (lowest frequency) Above 1GHz



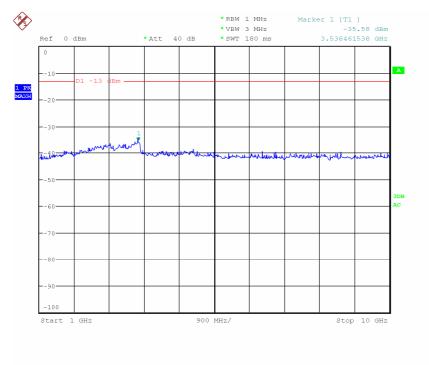
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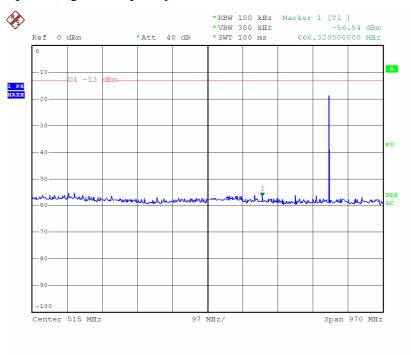
Cellular-GSM uplink (middle frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:22:20

Cellular-GSM uplink(middle frequency) Above 1GHz



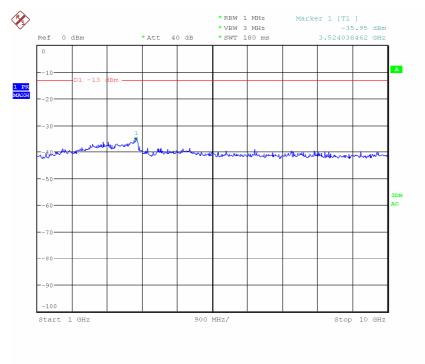
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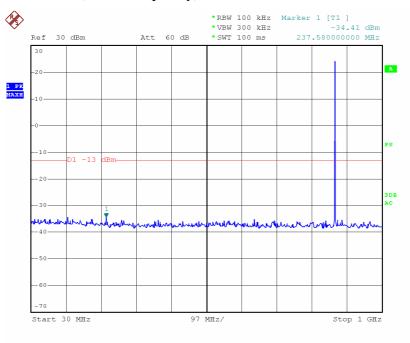
Cellular-GSM uplink (highest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:21:53

Cellular-GSM uplink (highest frequency) Above 1GHz

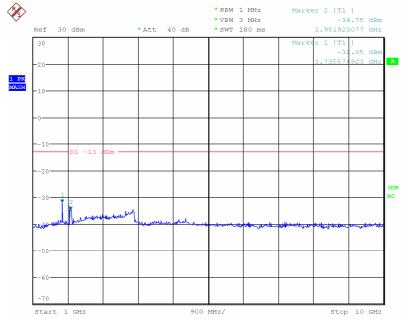


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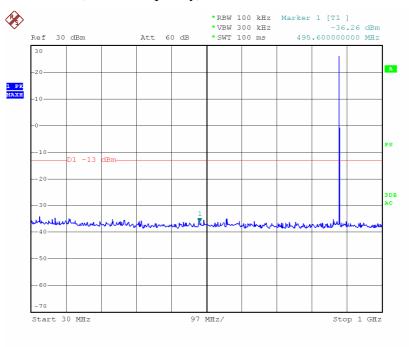
Cellular-EDGE downlink (lowest frequency) 30MHz-1GHz

Cellular-EDGE downlink (lowest frequency) Above 1GHz



Date: 7.JUN.2012 20:17:24

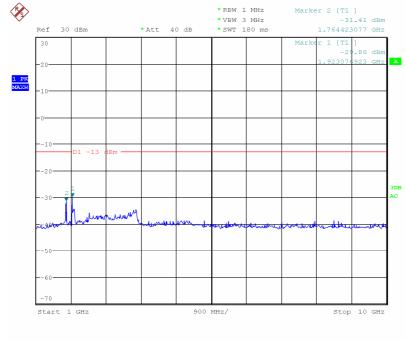
Date: 7.MAY.2012 19:48:00



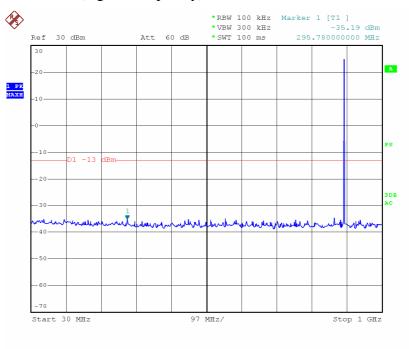
Cellular-EDGE downlink (middle frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:47:34

Cellular-EDGE downlink (middle frequency) Above 1GHz



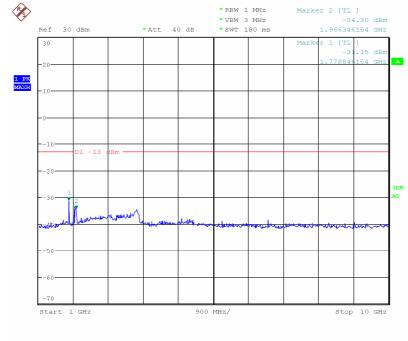
Date: 7.JUN.2012 20:16:51



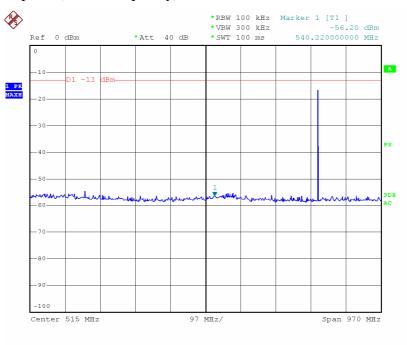
Cellular-EDGE downlink (highest frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:47:09

Cellular-EDGE downlink (highest frequency) Above 1GHz

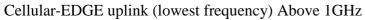


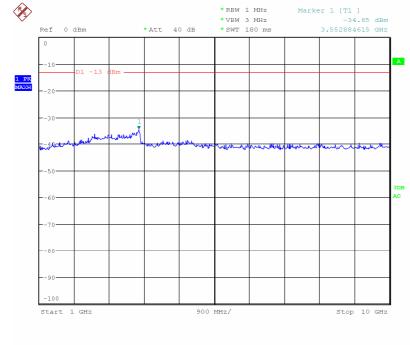
Date: 7.JUN.2012 20:16:18

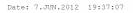


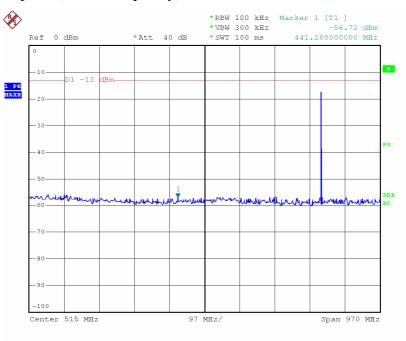
Cellular-EDGE uplink (lowest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:20:09



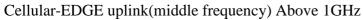


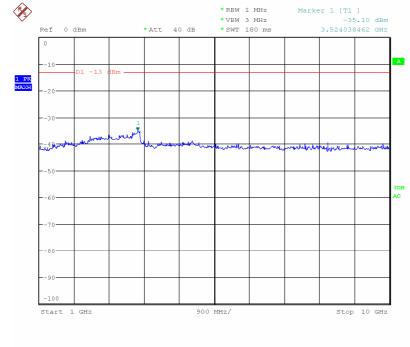




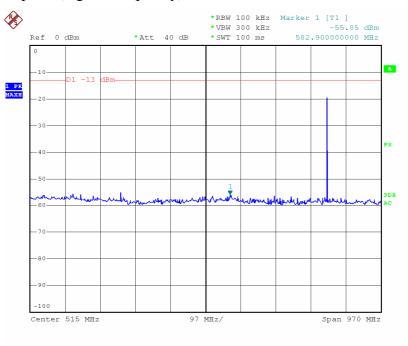
Cellular-EDGE uplink (middle frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:20:38



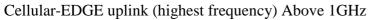


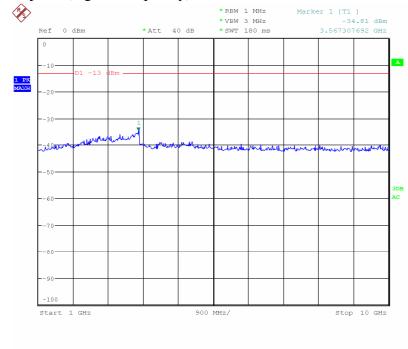
Date: 7.JUN.2012 19:37:34



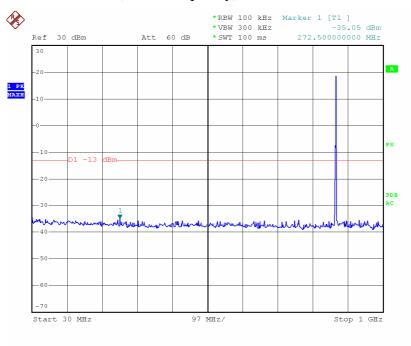
Cellular-EDGE uplink (highest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:21:09



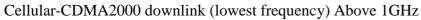


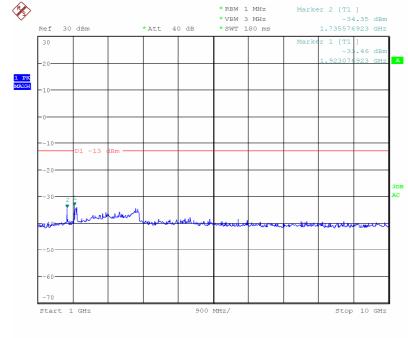
Date: 7.JUN.2012 19:37:55



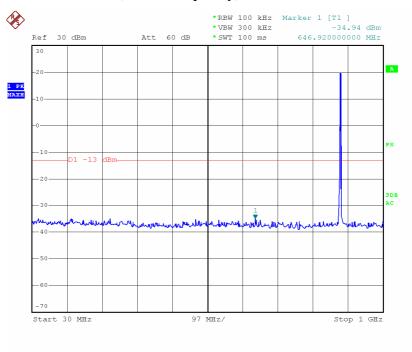
Cellular-CDMA2000 downlink (lowest frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:45:07





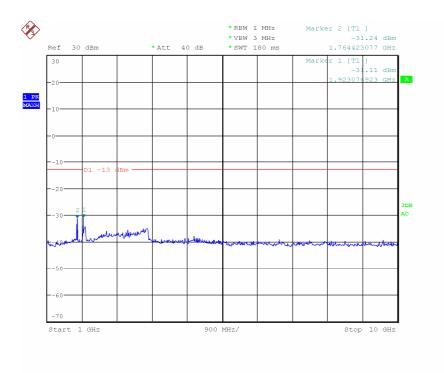
Date: 7.JUN.2012 20:14:13



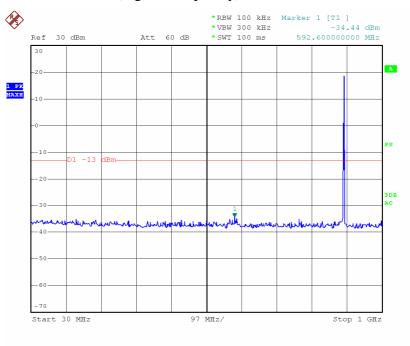
Cellular-CDMA2000 downlink (middle frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:44:44

Cellular-CDMA2000 downlink (middle frequency) Above 1GHz



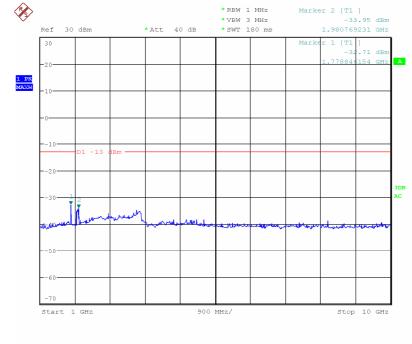
Date: 7.JUN.2012 20:13:47



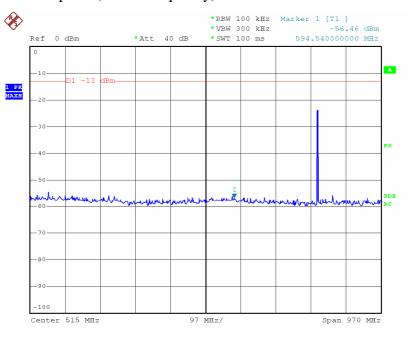
Cellular-CDMA2000 downlink (highest frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:44:13

Cellular-CDMA2000 downlink (highest frequency) Above 1GHz

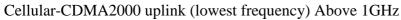


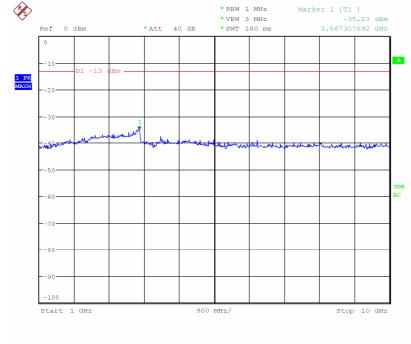
Date: 7.JUN.2012 20:13:14



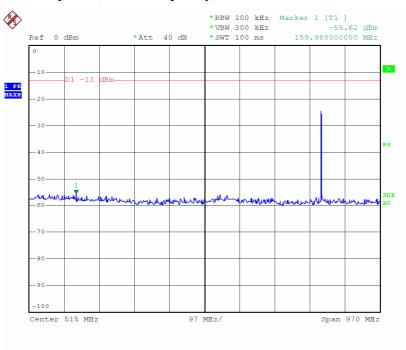
Cellular-CDMA2000 uplink (lowest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:24:15



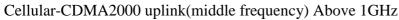


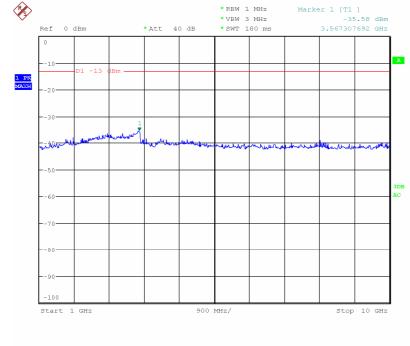
Date: 7.JUN.2012 19:40:01



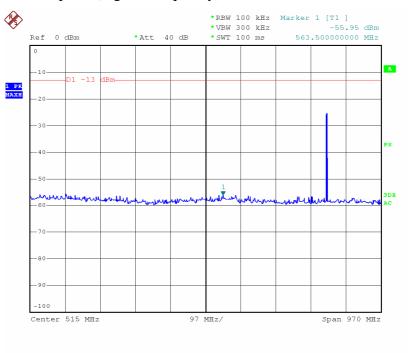
Cellular-CDMA2000 uplink (middle frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:24:39



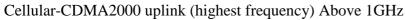


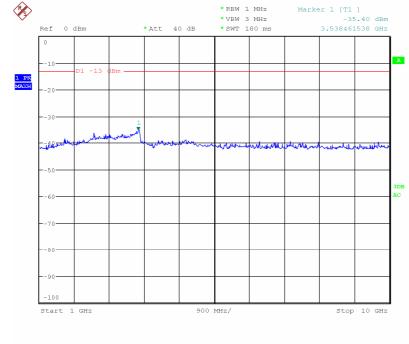
Date: 7.JUN.2012 19:40:24



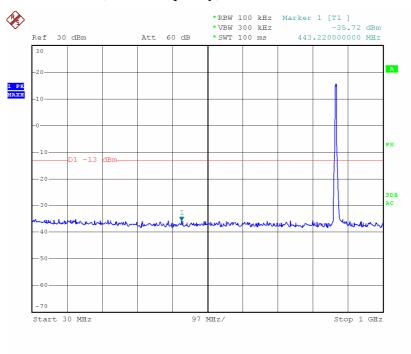
Cellular-CDMA2000 uplink (highest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:25:05



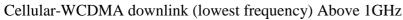


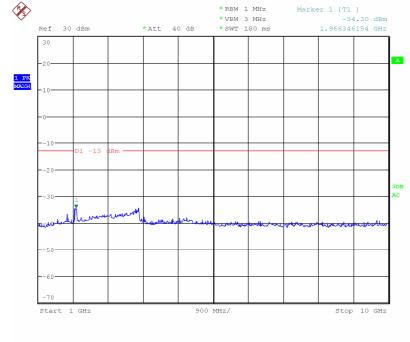




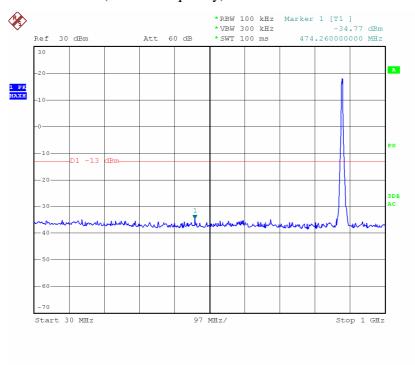
Cellular-WCDMA downlink (lowest frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:41:52





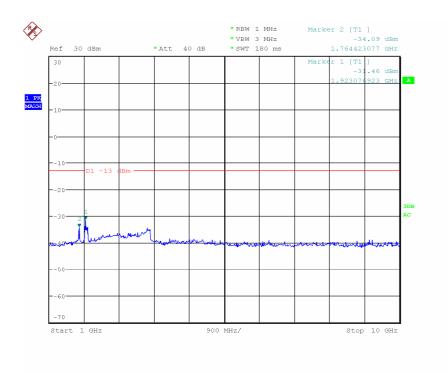
Date: 7.JUN.2012 20:11:17



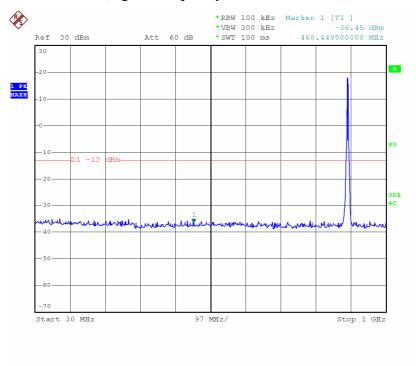
Cellular-WCDMA downlink (middle frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:42:33

Cellular-WCDMA downlink (middle frequency) Above 1GHz



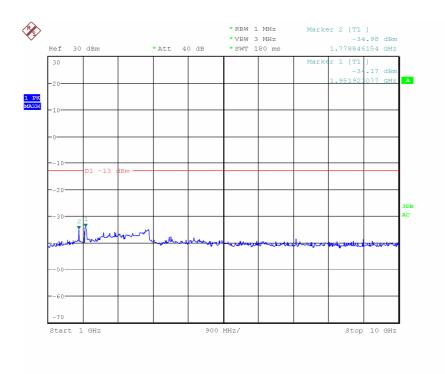
Date: 7.JUN.2012 20:12:00



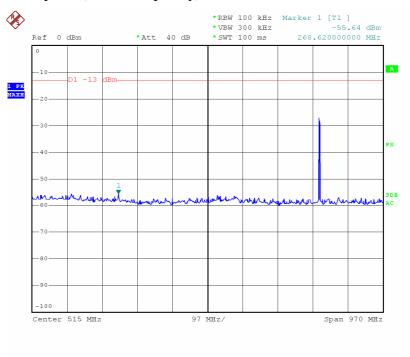
Cellular-WCDMA downlink (highest frequency) 30MHz-1GHz

Date: 7.MAY.2012 19:42:59

Cellular-WCDMA downlink (highest frequency) Above 1GHz



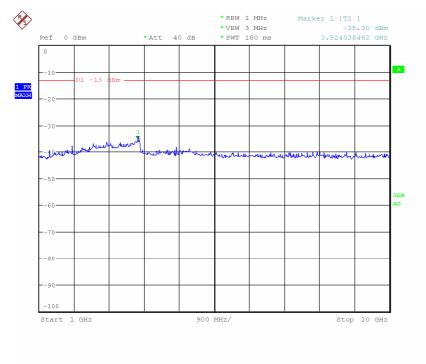
Date: 7.JUN.2012 20:12:33



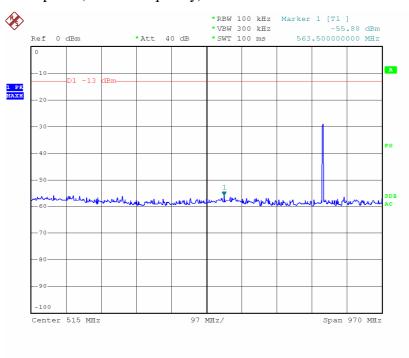
Cellular-WCDMA uplink (lowest frequency) 30MHz-1GHz

Date: 9.MAY.2012 16:26:54

Cellular-WCDMA uplink (lowest frequency) Above 1GHz



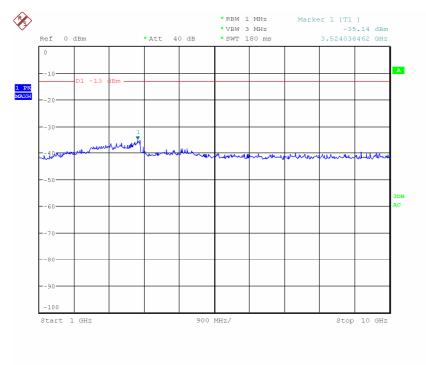
Date: 7.JUN.2012 19:42:10



Cellular-WCDMA uplink (middle frequency) 30MHz-1GHz

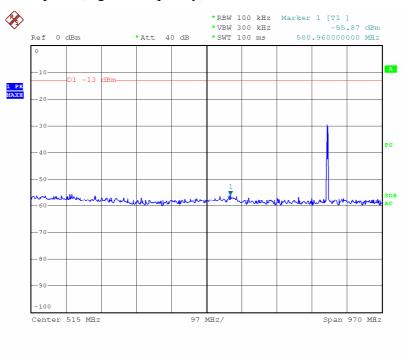
Date: 9.MAY.2012 16:26:33

Cellular-WCDMA uplink(middle frequency) Above 1GHz



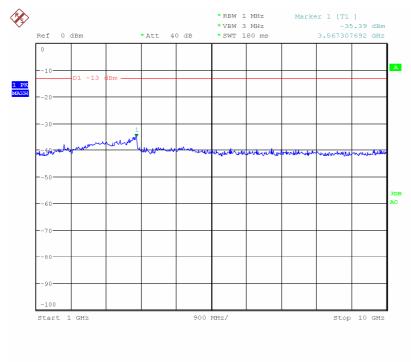
Date: 7.JUN.2012 19:41:51

Cellular-WCDMA uplink (highest frequency) 30MHz-1GHz



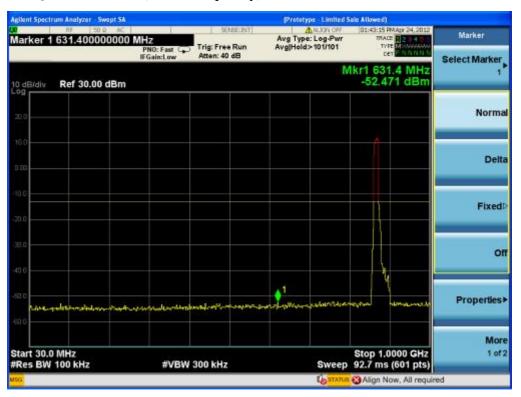
Date: 9.MAY.2012 16:26:12

Cellular-WCDMA uplink (highest frequency) Above 1GHz



Date: 7.JUN.2012 19:41:29

Cellular-LTE-QPSK downlink (lowest frequency) 30MHz-1GHz



Cellular-LTE-QPSK downlink (lowest frequency) Above 1GHz



Cellular-LTE-QPSK downlink (middle frequency) 30MHz-1GHz

| | Allowed) | Limited Sale | Prototy | | | Analyzer Swept SA | gilent Spectru |
|---------------|----------------------------------------------|---------------|-----------------------|--------------------------------|----------------------|-------------------|--------------------|
| Marker | 01:44:06 PMApr 24, 2012 TRACE 1 2 4, 4012 | | Avg Type | SEMBELINT] | | RF 50.9 AC | |
| Select Marker | TYPE MUMUPANO | | AvgiHold: | Trig: Free Run Atten: 40 dB | PNO: Fast C | 5.000000000 N | larker 1 |
| 1 | 1 515.0 MHz -54.629 dBm | Mk | | | | ef 30.00 dBm | dB/div |
| Norm | | | | | | | 0.0 |
| | | | | | | | 0.0 |
| Del | | | | | | | |
| Fixed | | | | | | | |
| | | | | | | | 10 |
| 0 | | | | | | | |
| Properties | and more admos | يد إمرود إدار | ويعردوا سيبالدينه ليس | 1- | المراجع والمحاور الم | umanus fortundat | 10 |
| | | | | | | | 0.0 |
| Mo 1 o | top 1.0000 GHz 2.7 ms (601 pts) | Sweep 9 | | 300 kHz | #VBW : | | art 30.0 Res BW |
| 1 | Align Now, All required | | | 500 KH2 | "YDIT | 0 KHZ | G DIV |

Cellular-LTE-QPSK downlink (middle frequency) Above 1GHz



Cellular-LTE -QPSK downlink (highest frequency) 30MHz-1GHz



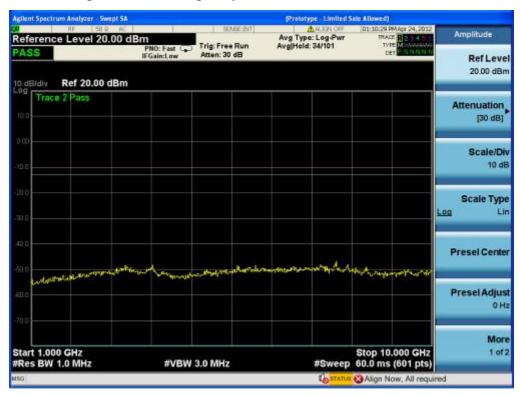
Cellular-LTE-QPSK downlink (highest frequency) Above 1GHz



Cellular-LTE-QPSK uplink (lowest frequency) 30MHz-1GHz

| Marker 1 495.600 ASS 0 dB/div Ref 30. | PNC IFGa | | : Free Run en: 40 dB | | Log-Pwr > 101/101 | 01:24:32 PM | REAL PROPERTY | Marker |
|---------------------------------------------|-------------|-----------------|-------------------------|---------------|----------------------|-------------------------|------------------------|---------------|
| ASS dB/div Ref 30. | PNC IFGa | | | | | INTALE | 123450 | |
| D.C. | 00 dBm | | | | | DET | PNNNN | Select Marker |
| Trace 1 Pare | uu abiii | | | | e M | lkr1 495. -51.92 | 6 MHz 1 dBm | 1 |
| 0.0 | | | | | | | | Norm |
| 0.0 | | | | | | | | |
| | | | | | | | | Delt |
| | | | | | | | | Fixed |
| 10 | | | | | | Л | | |
| 0.0 | | | | | | | | 0 |
| 20 Rungent Martin (Harte | metaller | prendensinadaly | 1 when when | alorequestion | yarmachi | l'approvate | And and a start of the | Properties |
| | | | | | | | | Mo |
| tart 30.0 MHz Res BW 100 kHz | | #VBW 300 | kHz | | | Stop 1.00 60.0 ms (I | 601 pts) | 1 of |

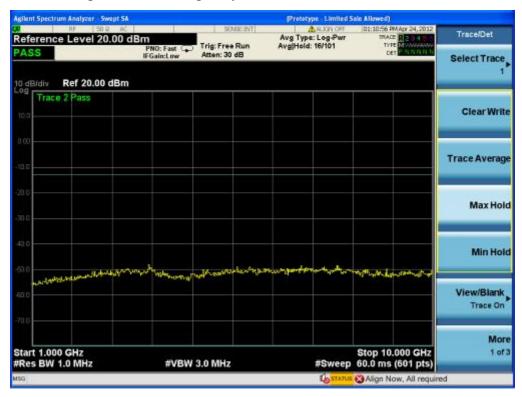
Cellular-LTE-QPSK uplink (lowest frequency) Above 1GHz



Cellular-LTE-QPSK uplink (middle frequency) 30MHz-1GHz

| plent Spectrum Analyzer - Swept SA | | | (Prototype - Limited | Sale Allowed) | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------|----------------------------------------|---------------------------------------------------------------------------------|--------------|
| arker 1 620.083333333 ASS | MH2 PN0: Fast C | Trig: Free Run Atten: 40 dB | Avg Type: Log-Pwr Avg Hold>101/101 | 01:24:01 PMAgr 24, 2012 TRACE 2 2 4 5 1 TYPE MUSACHINE DET 2 A N 414 4 | Peak Search |
| Bidiv Ref 30.00 dBm | a cannea | | 1 | Mkr1 620.1 MHz -51.650 dBm | Next Pea |
| Trace 1 Pass | | | | | Next Pk Righ |
| 0.0 | | | | | Next Pk Le |
| 0.0 0.0 | | | | | Marker Delt |
| | | | | | Mkr→C |
| 00 haran an the states of the | man | lose that the providence | 1 Jaylalaharitikaanayaharatikayaray | and the second of the second of the | Mkr→RefL |
| tart 30.0 MHz Res BW 100 kHz | #VBW | 300 kHz | #Sweep | Stop 1.0000 GHz 60.0 ms (601 pts) | Mor 1 of |

Cellular-LTE-QPSK uplink(middle frequency) Above 1GHz



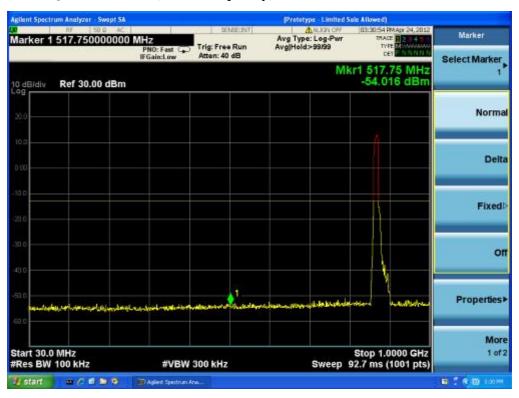
Cellular-LTE-QPSK uplink (highest frequency) 30MHz-1GHz



Cellular-LTE-QPSK uplink (highest frequency) Above 1GHz



Cellular-LTE-16QAM downlink (lowest frequency) 30MHz-1GHz



Cellular-LTE-16QAM downlink (lowest frequency) Above 1GHz



Cellular-LTE-16QAM downlink (middle frequency) 30MHz-1GHz

| plent Spectrum Analyzer Swept SA | | (Prototype - Limited S | ale Allowed) | |
|----------------------------------------------------------|---------------------------------------------------|-------------------------------------|-------------------------------------------------------------|--------------------|
| larker 1 505.140000000 MHz | SEMSE::NT ast C Trig: Free Run Atten: 40 dB | Avg Type: Log-Pwr Avg Hold: 6299 | 03:32:04 PMAgr 24, 2012 TRACE 2 2 4 5 0 TYPE MINAGRAM | Marker |
| dB/div Ref 30.00 dBm | nw Atten: 40 db | M | r1 505.14 MHz -55.398 dBm | Select Marker 1 |
| 20 0.0 | | | | Norm |
| 0.0 | | | | Del |
| 80 80 | | | | Fixed |
| 10 | | | | C |
| 20 - เราะรับระบารใช้ได้สุดาร์ไม่ประการเองสุดาร์กระบัง | normal allowed and the | martheres and a sound from | nineral constraints | Properties |
| tart 30.0 MHz | #VBW 300 kHz | Sweep | Stop 1.0000 GHz 92.7 ms (1001 pts) | Mor 1 of |

Cellular-LTE-16QAM downlink (middle frequency) Above 1GHz



Cellular-LTE -16QAM downlink (highest frequency) 30MHz-1GHz



Cellular-LTE-16QAM downlink (highest frequency) Above 1GHz



Avg Type: Log-Pwr Avg[Hold>99/99 Marker Marker 1 794.360000000 MHz Trig: Free Run PND: Fast CP Atten: 30 dB Select Marker Mkr1 794.36 MHz -53.232 dBm Ref 20.00 dBm 10 dBrdiv Normal Delta **Fixed** Off **Properties** WHILM WHILM almonth and many and a state of the and the last More Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 92.7 ms (1001 pts) 1 of 2 #VBW 300 kHz 1 Now. All required

Cellular-LTE-16QAM uplink (lowest frequency) 30MHz-1GHz

Cellular-LTE-16QAM uplink (lowest frequency) Above 1GHz



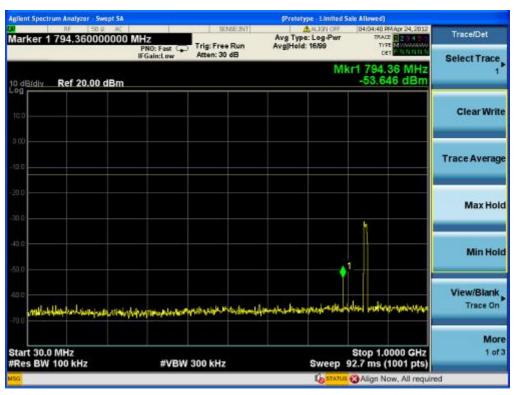
Cellular-LTE-16QAM uplink (middle frequency) 30MHz-1GHz

| ilent Spectrum Analyzer - Swept SA | | | (Prototype - Limiter | Sale Allowed) | |
|------------------------------------------|-------------|--------------------------------|---------------------------------|---------------------------------------|------------------------|
| NF 50.9 AC | | BENBELINT | Avg Type: Log-Pwr | | Trace/Det |
| arker 1 794.360000000 I | PNO: Fast C | Trig: Free Run Atten: 30 dB | Avg Hold: 16/99 | TYPE MUNICIPALITY OF THE TYPE | Select Trace |
| dBidiv Ref 20.00 dBm | | | N | lkr1 794.36 MHz -52.665 dBm | 1 |
| 9.0 | | | | | Clear Writ |
| 0 | | | | | Trace Averag |
| 10 | | | | | Max Ho |
| 10 | | | | | Min Ho |
| ก เหลือสุขันระบบริเมาะให้เราที่สามาระ | adamantal | allender over an | n dan eer wij stad frijwer wies | l-gray polymetrikyaas-al-daar | View/Blank Trace Or |
| art 30.0 MHz Res BW 100 kHz | #VBW : | 300 kHz | Sweep | Stop 1.0000 GHz 92.7 ms (1001 pts) | Mo 1 of |

Cellular-LTE-16QAM uplink(middle frequency) Above 1GHz



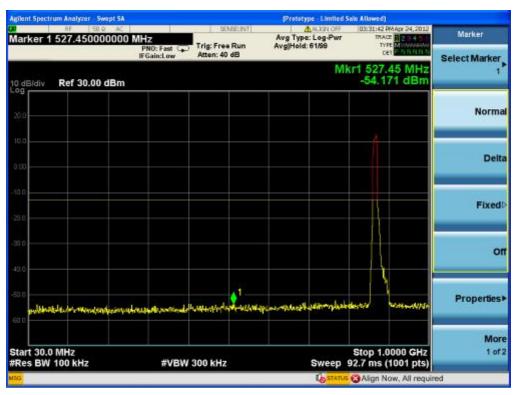
Cellular-LTE-16QAM uplink (highest frequency) 30MHz-1GHz



Cellular-LTE-16QAM uplink (highest frequency) Above 1GHz



Cellular-LTE-64QAM downlink (lowest frequency) 30MHz-1GHz



Cellular-LTE-64QAM downlink (lowest frequency) Above 1GHz



Cellular-LTE-64QAM downlink (middle frequency) 30MHz-1GHz

| | i i | sie Allowed) | ype Limited S | Protot | | | alyzer Swept SA | gilent Spectrum | | | |
|--------------|----------------------------------------------------------------------------|------------------|-----------------------|---------------------|---------------------------------------------------------|------------------------------|-----------------------------------------|-----------------|--|--|--|
| Marker | PMApr 24, 2012 | | ALKIN OFF | | SENSE: INT | | 50 Q 1C | | | | |
| Select Marke | ACE 1 2 3 4 5 0 YPE MANAGAMA CET P N N N N N | TY D | e: Log-Pwr 1:89/99 | Avg Typ Avg Hole | Trig: Free Run Atten: 40 dB | PNO: Fast C | rker 1 428.510000000 MHz PNI IFGI | | | | |
| | .51 MHz 011 dBm | r1 428. -54.0 | Mk | | | | dBidiv Ref 30.00 dBm | | | | |
| Norm | | | | | | | | 0.0 | | | |
| | | | | | | | | 0.0 | | | |
| Del | | | | | | | | 00 10 | | | |
| Fixed | | Ä | | | | | | 10 | | | |
| c | | | | | | | | 10 | | | |
| Properties | winder | weiter | لمعادمهما | usulad philista | 1 ประชาชาตระการการการการการการการการการการการการการก | بولوية البوريد الولارد رمادر | montesting | 10 | | | |
| Мо | | | | | | | | 0.0 | | | |
| 1.0 | 0.0 MHz Stop 1.0000 GHz W 100 kHz #VBW 300 kHz Sweep 92.7 ms (1001 pts) | | | | | | tart 30.0 M Res BW 1 | | | | |

Cellular-LTE-64QAM downlink (middle frequency) Above 1GHz



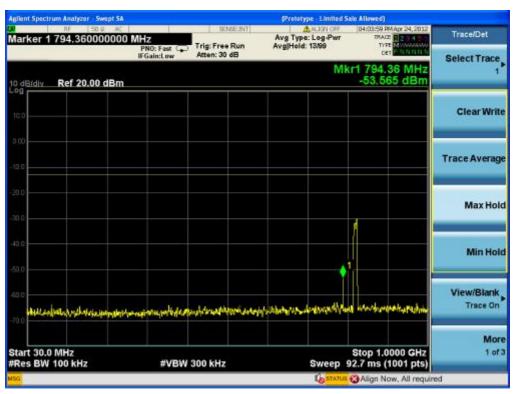
Cellular-LTE -64QAM downlink (highest frequency) 30MHz-1GHz



Cellular-LTE-64QAM downlink (highest frequency) Above 1GHz



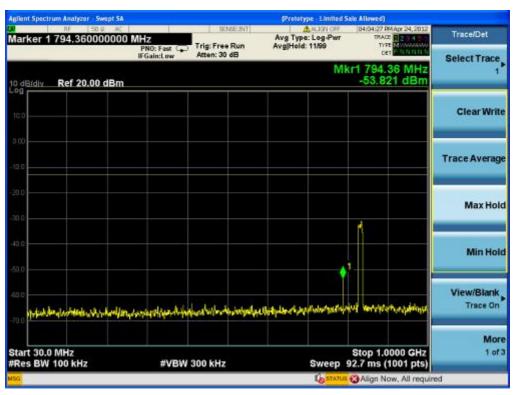
Cellular-LTE-64QAM uplink (lowest frequency) 30MHz-1GHz



Cellular-LTE-64QAM uplink (lowest frequency) Above 1GHz



Cellular-LTE-64QAM uplink (middle frequency) 30MHz-1GHz



Cellular-LTE-64QAM uplink(middle frequency) Above 1GHz



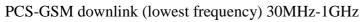
Cellular-LTE-64QAM uplink (highest frequency) 30MHz-1GHz

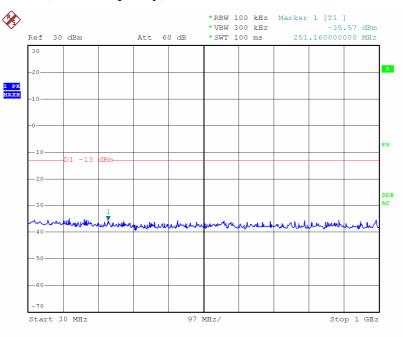
| ilent Spectrum Analyzer Swept SA | | | Prototype - Limited ! | iale Allowed) | |
|-----------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------|--------------------------|------------------------------|------------------|
| arker 1 794.36000000 | | SEMSE:PVT | Avg Type: Log-Pwr | 04:04:52 PMApr 24, 2012 | Trace/Det |
| arker 1794.3000000 | PNO: Fast C | Trig: Free Run Atten: 30 dB | Avg Hold: 13/99 | TYPE MANNAN M | Select Trace |
| Bidly Ref 20.00 dBm | | | M | r1 794.36 MHz -54.164 dBm | 1 |
| | | | | | |
| 20 | | | | | Clear Writ |
| | | | | | |
| 10 | | | | | Trace Averag |
| io | | | | | |
| | | | | | Max Ho |
| 10 | | | | | |
| 10 | | | | | Min Ho |
| 10 | | | | 1 | - |
| 10 | | | | | View/Blank |
| the second and the second s | and any property sector of | estables in a stability of the second | work where many shall be | wind her Mayarumanana | Trace Or |
| | | | | | Mo 1 o |
| art 30.0 MHz Stop 1.0000 GHz tes BW 100 kHz #VBW 300 kHz Sweep 92.7 ms (1001 pts) | | | | | |
| | | | COSTATUS | Align Now, All require | ed |

Cellular-LTE-64QAM uplink (highest frequency) Above 1GHz



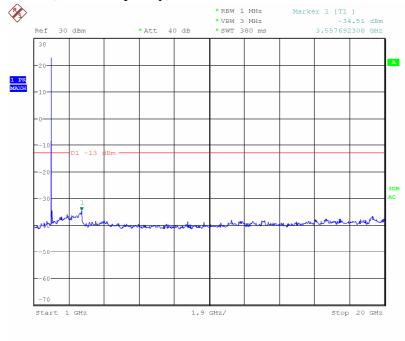
PCS Band





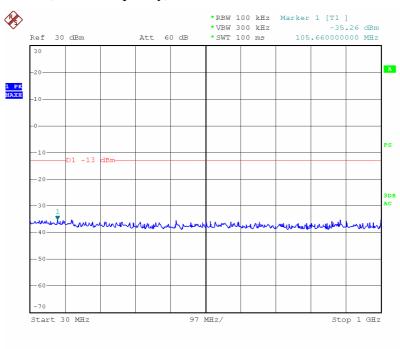
Date: 7.MAY.2012 19:37:24

PCS-GSM downlink (lowest frequency) Above 1GHz



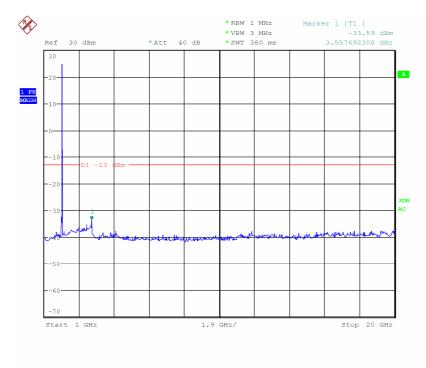
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PCS-GSM downlink (middle frequency) 30MHz-1GHz



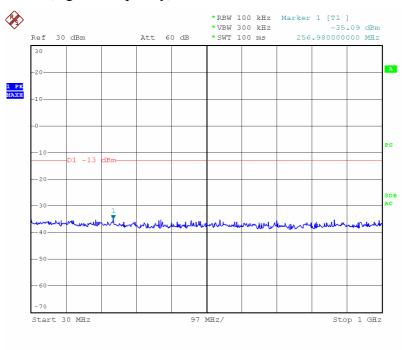
Date: 7.MAY.2012 19:37:03

PCS-GSM downlink (middle frequency) Above 1GHz



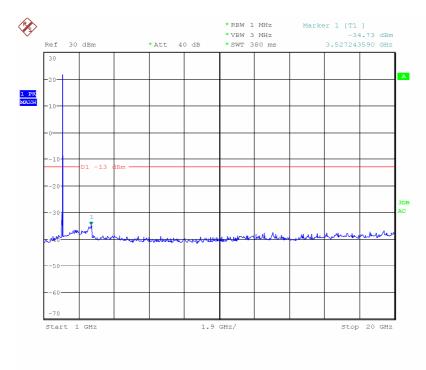
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Date: 7.JUN.2012 20:01:08
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PCS-GSM downlink (highest frequency) 30MHz-1GHz



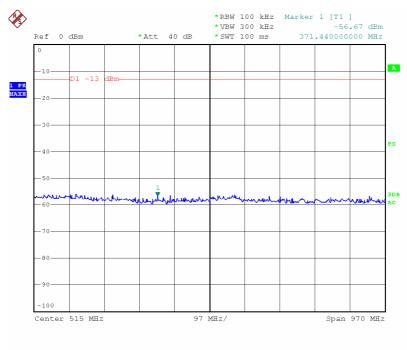
Date: 7.MAY.2012 19:36:40

PCS-GSM downlink (highest frequency) Above 1GHz



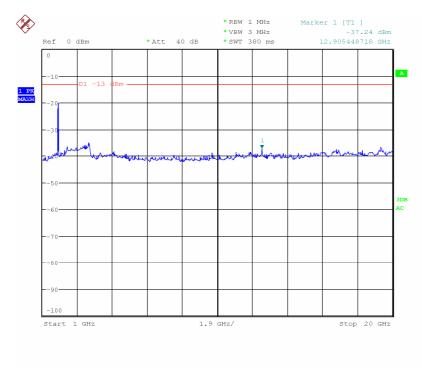
Date: 7.JUN.2012 20:00:42

PCS-GSM uplink (lowest frequency) 30MHz-1GHz



Date: 9.MAY.2012 16:33:08

PCS-GSM uplink (lowest frequency) Above 1GHz



Date: 7.JUN.2012 19:49:08