



TEST REPORT

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|---|--|---|
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|---|--|---|

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2020-04-24

2. Use of Report : Certification

3. Name of Product / Model : Tablet PC / SM-T976B

4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. FCC ID : A3LSMT976B

6. Date of Test : 2020-05-09 to 2020-06-22

7. Location of Test : Permanent Testing Lab On Site Testing (Address: Address of testing location)

8. Test method used : FCC Part 2
 FCC Part 22 Subpart H
 FCC Part 24 Subpart E
 FCC Part 27 Subpart C

9. Test Results : Refer to the test result in the test report

| | | |
|--------------------|---|--|
| <p>Affirmation</p> | <p>Tested by Name : Taeyoung Kim </p> | <p>Technical Manager Name : Seungyong Kim </p> |
|--------------------|---|--|

2020-07-02

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

REPORT REVISION HISTORY

| Date | Revision | Page No |
|------------|-------------------|---------|
| 2020-06-24 | Originally issued | - |
| 2020-07-02 | Updated | 4,5 |
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Note. The report No. KR20-SRF0153 is superseded by the report No. KR20-SRF0153-A.

General remarks for test reports

Nothing significant to report.



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1. General information

Client : Samsung Electronics Co., Ltd.
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677,
Rep. of Korea
Manufacturer : Samsung Electronics Co., Ltd.
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677,
Rep. of Korea
Factory : Samsung Electronics Vietnam Thai Nguyen Co., Ltd
Address : Yen binh Industrial Zone Pho Ten Dist., Thai Nguyen Province, Vietnam
Laboratory : KCTL Inc.
Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132
VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
Industry Canada Registration No. : 8035A
KOLAS No.: KT231

2. Device information

Equipment under test : Tablet PC
Model : SM-T976B
Modulation technique : Bluetooth(BDR/EDR)_GFSK, $\pi/4$ DQPSK, 8DPSK
Bluetooth(BLE)_GFSK
WIFI(802.11a/b/g/n/ac/ax)_DSSS, OFDM, OFDMA
WPT_AM
LTE_QPSK, 16QAM, 64QAM, 256QAM
WCDMA_QPSK
GSM_GMSK, 8-PSK
Number of channels : Bluetooth(BDR/EDR)_79 ch / Bluetooth(BLE)_40 ch
802.11b/g/n/ac/ax_HT20/VHT20/HE20 : 13 ch
UNII-1: 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)
UNII-2A: 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)
UNII-2C: 12 ch (20 MHz), 6 ch (40 MHz), 3 ch (80 MHz)
UNII-3: 5 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)
WPT_1 ch
Power source : DC 3.86 V
Antenna specification : LTE/WCDMA_Metal Antenna
WIFI/Bluetooth(BDR/EDR/BLE)_ Metal Antenna
Loop Coil Antenna_Flat type (WPT)
Antenna gain : WIFI/Bluetooth(BDR/EDR/BLE)_ ANT 1 : -5.71 dBi, ANT 2 : -6.52 dBi
UNII-1 ANT 1 : -8.45 dBi, ANT 2 : -8.84 dBi
UNII-2A ANT 1 : -6.15 dBi, ANT 2 : -8.46 dBi

| | |
|------------------------|---|
| Frequency range | : UNII-2C ANT 1 : -6.05 dBi, ANT 2 : -8.57 dBi UNII-3 ANT 1 : -8.65 dBi, ANT 2 : -7.70 dBi Bluetooth(BDR/EDR/BLE)_2 402 MHz ~ 2 480 MHz 2 412 MHz ~ 2 472 MHz (802.11b/g/n/ac/ax_HT20/VHT20/HE20) UNII-1: 5 180 MHz ~ 5 240 MHz (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-1: 5 190 MHz ~ 5 230 MHz (802.11n/ac/ax_HT40/VHT40/HE40) UNII-1: 5 210 MHz (802.11ac/ax_VHT80/HE80) UNII-2A: 5 260 MHz ~ 5 320 MHz (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-2A: 5 270 MHz ~ 5 310 MHz (802.11n/ac/ax_HT40/VHT40/HE40) UNII-2A: 5 290 MHz (802.11ac/ax_VHT80/HE80) UNII-2C: 5 500 MHz ~ 5 720 MHz (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-2C: 5 510 MHz ~ 5 710 MHz (802.11n/ac/ax_HT40/VHT40/HE40) UNII-2C: 5 530 MHz ~ 5 690 MHz (802.11ac/ax_VHT80/HE80) UNII-3: 5 745 MHz ~ 5 825 MHz (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-3: 5 755 MHz ~ 5 795 MHz (802.11n/ac/ax_HT40/VHT40/HE40) UNII-3: 5 775 MHz (802.11ac/ax_VHT80/HE80) LTE Band 2_1 850.7 MHz ~ 1909.3 MHz LTE Band 4_1 710.7 MHz ~ 1754.3 MHz LTE Band 5_824.7 MHz ~ 848.3 MHz LTE Band 12_699.7 MHz ~ 715.3 MHz LTE Band 13_779.5 MHz ~ 784.5 MHz LTE Band 25_1850.7 MHz ~ 1914.3 MHz LTE Band 26_824.7 MHz ~ 848.3 MHz, 814.7 MHz ~ 824.0 MHz LTE Band 41_2 498.5 MHz ~ 2 687.5 MHz LTE Band 66_1 710.7 MHz ~ 1779.3 MHz GSM 850_824.2 MHz ~ 848.8 MHz GSM 1900_1 850.2 MHz ~ 1 909.8 MHz WCDMA 850_826.4 MHz ~ 846.6 MHz WCDMA 1700_1 712.4 MHz ~ 1752.6 MHz WCDMA 1900_1 852.4 MHz ~ 1907.6 MHz WPT_530 kHz ~ 600 kHz |
| Software version | : T976B.001 |
| Hardware version | : REV0.4 |
| Test device serial No. | : Conducted(4264ec94771d7ece), Radiated(R32N500LKZT) |
| Operation temperature | : -30 °C ~ 50 °C |

2.1. Accessory information

| Equipment | Manufacturer | Model | Serial No. | Power source | FCC ID |
|-------------------|------------------------------|-------------|------------|---|------------|
| Travel Adapter | Samsung Electronics Co., Ltd | EP-TA800 | - | Input : 100-240V, 50-60Hz Output : (PDO) 5.0V, 3A or 9.0V, 2.77A (PPS) 3.3-5.9V, 3A or 3.3-11.0V, 2.25A | - |
| Data Cable | Samsung Electronics Co., Ltd | EP-DT725BBE | - | - | - |
| Stylus Pen | Samsung Electronics Co., Ltd | EJ-PT870 | - | DC 2.75 V | A3LEJPT870 |
| Earphone | Samsung Electronics Co., Ltd | EHS64 | - | - | - |
| External Keyboard | Samsung Electronics Co., Ltd | EF-DT970 | - | DC 3.30 V | - |

2.2. Frequency/channel operations

This device contains the following capabilities:

WIFI(802.11a/b/g/n/ac/ax), Bluetooth(BDR/EDR/BLE), WPT,
 LTE Band 2, LTE Band 4, LTE Band 5, LTE Band 12, LTE Band 13, LTE Band 25, LTE Band 26,
 LTE Band 41, LTE Band 66, GSM 850, GSM 1900, WCDMA 850, WCDMA 1700, WCDMA 1900

GSM 850

| Ch. | Frequency (MHz) |
|-----|-----------------|
| 128 | 824.2 |
| 190 | 836.6 |
| 251 | 848.8 |

Table 2.2.1.
GSM/GPRS/EDGE

GSM 1900

| Ch. | Frequency (MHz) |
|-----|-----------------|
| 512 | 1 850.2 |
| 661 | 1 880.0 |
| 810 | 1 909.8 |

Table 2.2.2.
GSM/GPRS/EDGE

WCDMA 850

| Ch. | Frequency (MHz) |
|------|-----------------|
| 4132 | 826.4 |
| 4183 | 836.6 |
| 4233 | 846.6 |

Table 2.2.3.
RMC/HSDPA/HSUPA/
DC-HSDPA

WCDMA 1700

| Ch. | Frequency (MHz) |
|------|-----------------|
| 1312 | 1 712.4 |
| 1412 | 1 732.4 |
| 1513 | 1 752.6 |

Table 2.2.4.
RMC/HSDPA/HSUPA/
DC-HSDPA

WCDMA 1900

| Ch. | Frequency (MHz) |
|------|-----------------|
| 9262 | 1 852.4 |
| 9400 | 1 880.0 |
| 9538 | 1 907.6 |

Table 2.2.5.
RMC/HSDPA/HSUPA/
DC-HSDPA

3. Maximum ERP/EIRP power**GSM 850**

| Mode | Tx frequency (MHz) | Emission designator | ERP | |
|----------------|--------------------|---------------------|------------------|----------------|
| | | | Max. power (dBm) | Max. power (W) |
| GSM 850 (GSM) | 824.2 ~ 848.8 | 246KGXW | 32.96 | 1.977 |
| GSM 850 (EDGE) | 824.2 ~ 848.8 | 250KG7W | 32.73 | 1.875 |

GSM 1900

| Mode | Tx frequency (MHz) | Emission designator | EIRP | |
|-----------------|--------------------|---------------------|------------------|----------------|
| | | | Max. power (dBm) | Max. power (W) |
| GSM 1900 (GSM) | 1 850.2 ~ 1 909.8 | 248KGXW | 29.88 | 0.973 |
| GSM 1900 (EDGE) | 1 850.2 ~ 1 909.8 | 244KG7W | 29.27 | 0.845 |

WCDMA 850

| Mode | Tx frequency (MHz) | Emission designator | ERP | |
|-----------|--------------------|---------------------|------------------|----------------|
| | | | Max. power (dBm) | Max. power (W) |
| WCDMA 850 | 826.4 ~ 846.6 | 4M17F9W | 24.15 | 0.260 |

WCDMA 1700 / WCDMA 1900

| Mode | Tx frequency (MHz) | Emission designator | EIRP | |
|------------|--------------------|---------------------|------------------|----------------|
| | | | Max. power (dBm) | Max. power (W) |
| WCDMA 1700 | 1 712.4 ~ 1 752.6 | 4M17F9W | 22.58 | 0.181 |
| WCDMA 1900 | 1 852.4 ~ 1 907.6 | 4M15F9W | 23.09 | 0.204 |

4. Summary of tests

| FCC Part Section(s) | Parameter | Test Limit | Test Condition | Test results |
|--|---|----------------------------------|----------------|--------------|
| 2.1046 | Conducted Output Power | N/A | Conducted | Pass |
| 2.1049 | Occupied Bandwidth & 26 dB Bandwidth | N/A | | Pass |
| 2.1051 22.917(a) 24.238(a) 27.53(h) | Band Edge Emissions at Antenna Terminal | $< 43 + 10\text{Log}_{10}(P)$ dB | | Pass |
| | Spurious Emissions at Antenna Terminal | | | Pass |
| 24.232(d) 27.50(d)(5) | Peak to Average Power Ratio | < 13 dB | | Pass |
| 2.1055 22.355 24.235 27.54 | Frequency stability | < 2.5 ppm | | Pass |
| | | Emission must remain in band | | |
| 22.913(a)(5) | Effective Radiated Power | < 7 Watts max. ERP | Radiated | Pass |
| 24.232(c) | Equivalent Isotropic Radiated Power | < 2 Watts max. EIRP | | Pass |
| 27.50(d)(4) | | < 1 Watts max. EIRP | | Pass |
| 2.1053 22.917(a) 24.238(a) 27.53(h) | Radiated Spurious Emissions | $< 43 + 10\text{Log}_{10}(P)$ dB | | Pass |

Notes:

1. The test procedure(s) in this report were performed in accordance as following.
 - ◆ ANSI C63.26-2015
 - ◆ ANSI/TIA-603-E-2016
 - ◆ KDB 971168 D01 v03r01

4.1. Worst case orientation

1. All modes of operation were investigated and the worst case emissions are reported with the EUT positioning, modulations and paging service configurations in the test data.
2. For **GSM850 and WCDMA 850**, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **Z** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Z** orientation.
3. For **GSM1900 and WCDMA 1900**, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation.
4. For **WCDMA 1700**, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **Y** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Y** orientation.
5. All the radiated tests have been performed several case.
 (Stand-alone, with accessories (keyboard, earphone, etc.))
 Worst case : Stand-alone

| Test condition | Modulation | Mode |
|----------------------|---------------|--------------------------------|
| Radiated | GMSK | GSM (Voice) |
| Conducted | GMSK 8-PSK | GSM (Voice) & EDGE (1 Tx Slot) |
| Radiated & Conducted | QPSK | RMC (12.2 kbps) |

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

| Parameter | Expanded uncertainty (\pm) | |
|------------------------------|--------------------------------|--------|
| Conducted RF power | 1.3 dB | |
| Conducted spurious emissions | 1.3 dB | |
| Radiated spurious emissions | 30 MHz ~ 1 GHz | 3.7 dB |
| | Above 1 GHz | 5.7 dB |

6. Measurement results explanation example

| Frequency (MHz) | Factor(dB) | Frequency (MHz) | Factor(dB) |
|-----------------|------------|-----------------|------------|
| 30 | 5.77 | 11 000 | 7.10 |
| 50 | 5.78 | 12 000 | 7.22 |
| 100 | 5.76 | 13 000 | 7.52 |
| 200 | 5.76 | 14 000 | 7.57 |
| 300 | 5.82 | 15 000 | 8.17 |
| 400 | 5.84 | 16 000 | 8.48 |
| 500 | 5.88 | 17 000 | 8.50 |
| 600 | 5.87 | 18 000 | 8.52 |
| 700 | 5.74 | 19 000 | 8.57 |
| 800 | 5.77 | 20 000 | 8.57 |
| 900 | 6.03 | 21 000 | 8.80 |
| 1 000 | 6.15 | 22 000 | 8.82 |
| 2 000 | 6.37 | 23 000 | 8.79 |
| 3 000 | 6.47 | 24 000 | 8.95 |
| 4 000 | 6.49 | 25 000 | 9.10 |
| 5 000 | 6.50 | 26 000 | 9.13 |
| 6 000 | 6.38 | 26 500 | 9.12 |
| 7 000 | 6.49 | 27 000 | 9.23 |
| 8 000 | 6.60 | 28 000 | 9.25 |
| 9 000 | 6.70 | 29 000 | 9.30 |
| 10 000 | 7.31 | 30 000 | 9.31 |

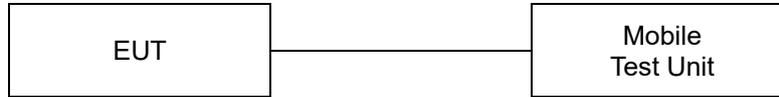
Note.

Offset(dB) = RF cable loss(dB) + Divider (dB)

7. Test results

7.1. Conducted output power

Test setup



Test procedure

971168 D01 v03r01 – Section 5.2
ANSI C63.26-2015 – Section 5.2.4.2
CFR 47, - Section §2.1046
RSS-GEN – Section 6.12

Test settings

When an average power meter is used to perform RF output power measurements, the fundamental condition that measurement be performed only over durations of active transmissions at maximum output power level applies. Thus, an average power meter can always be used to perform the measurement when the EUT can be configured to transmit continuously.

If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98%), then the following options can be implemented to facilitate measurement of the average power with an average power meter:

- a) A gated average power meter can be used to perform the measurement if the gating parameters can be adjusted such that the power is measured only during active transmission bursts at maximum output power levels.
- b) A conventional average power meter with no signal gating capability can also be used if the measured burst duty cycle is constant (i.e., duty cycle variations are less than or equal to $\pm 2\%$) by performing the measurement over the on/off burst cycles and then correcting (increasing) the measured level by a factor equal to $[10\log (1/\text{duty cycle})]$. See 5.2.4.3.4 for guidance with respect to measuring the transmitter duty cycle.

See item r) of 4.1 for more information regarding power meter functional requirements and limitations, and consult the instrumentation-specific application literature for proper set-up and use.

Notes:

1. Offset(dB) = RF cable loss(dB)

Test results

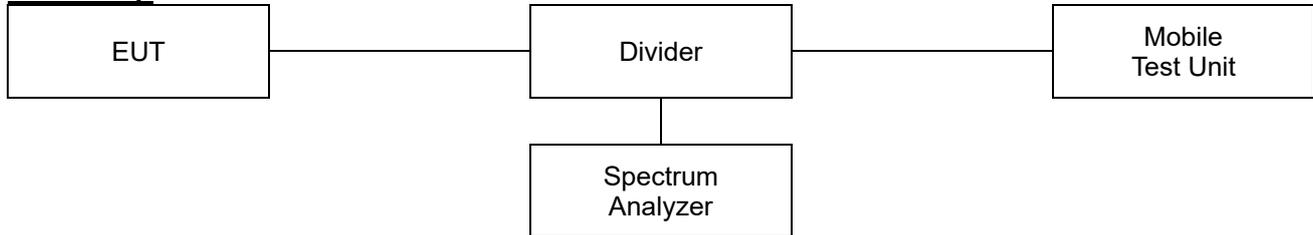
| Maximum Burst-Average Output Power (dBm) | | | | | | | | | | |
|--|---------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Test Band | Channel | GSM | GPRS | | | | EDGE | | | |
| | | Voice | 1Tx | 2Tx | 3Tx | 4Tx | 1Tx | 2Tx | 3Tx | 4Tx |
| GSM850 | 128 | 32.95 | 32.94 | 32.11 | 30.02 | 28.06 | 27.11 | 25.64 | 23.65 | 22.59 |
| | 190 | 33.40 | 33.40 | 32.26 | 30.23 | 28.30 | 27.47 | 25.94 | 23.93 | 22.91 |
| | 251 | 33.24 | 33.23 | 31.90 | 29.82 | 27.95 | 27.26 | 25.74 | 23.72 | 22.60 |
| GSM1900 | 512 | 29.47 | 29.43 | 28.47 | 26.98 | 24.92 | 26.17 | 24.58 | 22.52 | 20.67 |
| | 661 | 29.82 | 29.82 | 28.96 | 27.45 | 25.46 | 26.58 | 24.94 | 22.74 | 21.19 |
| | 810 | 29.66 | 29.64 | 28.55 | 26.99 | 25.03 | 26.26 | 24.61 | 22.50 | 20.65 |

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| Test Band | Test mode | Average Conducted Power (dBm) | | | 3GPP MPR (dB) |
|---------------|--------------------|-------------------------------|--------------|--------------|------------------|
| | | Frequency (MHz) | | | |
| | | Low | Middle | High | |
| WCDMA 850 | RMC | 23.35 | 23.49 | 23.49 | - |
| | HSDPA-Subtest 1 | 22.26 | 22.43 | 22.46 | 0 |
| | HSDPA-Subtest 2 | 21.63 | 21.78 | 21.64 | 0 |
| | HSDPA-Subtest 3 | 21.07 | 21.10 | 21.18 | 0.5 |
| | HSDPA-Subtest 4 | 21.01 | 21.06 | 21.05 | 0.5 |
| | HSUPA-Subtest 1 | 22.38 | 22.51 | 22.49 | 0 |
| | HSUPA-Subtest 2 | 20.40 | 20.49 | 20.51 | 2 |
| | HSUPA-Subtest 3 | 21.34 | 21.56 | 21.47 | 1 |
| | HSUPA-Subtest 4 | 20.34 | 20.53 | 20.44 | 2 |
| | HSUPA-Subtest 5 | 22.36 | 22.58 | 22.54 | 0 |
| | DC-HSDPA-Subtest 1 | 22.41 | 22.53 | 22.54 | 0 |
| | DC-HSDPA-Subtest 2 | 22.36 | 22.50 | 22.53 | 0 |
| | DC-HSDPA-Subtest 3 | 21.83 | 22.02 | 22.04 | 0.5 |
| | DC-HSDPA-Subtest 4 | 21.85 | 22.02 | 22.07 | 0.5 |
| WCDMA 1700 | RMC | 22.86 | 22.71 | 23.08 | - |
| | HSDPA-Subtest 1 | 21.56 | 21.36 | 21.82 | 0 |
| | HSDPA-Subtest 2 | 20.88 | 20.69 | 21.14 | 0 |
| | HSDPA-Subtest 3 | 20.21 | 20.02 | 20.44 | 0.5 |
| | HSDPA-Subtest 4 | 20.20 | 20.00 | 20.41 | 0.5 |
| | HSUPA-Subtest 1 | 21.67 | 21.46 | 21.83 | 0 |
| | HSUPA-Subtest 2 | 19.67 | 19.45 | 19.84 | 2 |
| | HSUPA-Subtest 3 | 19.58 | 19.59 | 19.67 | 1 |
| | HSUPA-Subtest 4 | 19.49 | 19.22 | 19.68 | 2 |
| | HSUPA-Subtest 5 | 21.66 | 21.44 | 21.88 | 0 |
| | DC-HSDPA-Subtest 1 | 20.63 | 21.48 | 21.90 | 0 |
| | DC-HSDPA-Subtest 2 | 21.64 | 21.44 | 21.88 | 0 |
| | DC-HSDPA-Subtest 3 | 21.12 | 20.99 | 21.40 | 0.5 |
| | DC-HSDPA-Subtest 4 | 21.11 | 20.93 | 21.38 | 0.5 |
| WCDMA 1900 | RMC | 22.85 | 23.09 | 22.96 | - |
| | HSDPA-Subtest 1 | 21.71 | 21.98 | 21.72 | 0 |
| | HSDPA-Subtest 2 | 21.07 | 21.15 | 21.04 | 0 |
| | HSDPA-Subtest 3 | 20.19 | 20.70 | 20.37 | 0.5 |
| | HSDPA-Subtest 4 | 20.35 | 20.65 | 20.33 | 0.5 |
| | HSUPA-Subtest 1 | 21.75 | 22.06 | 21.78 | 0 |
| | HSUPA-Subtest 2 | 19.79 | 20.10 | 19.77 | 2 |
| | HSUPA-Subtest 3 | 20.80 | 21.09 | 20.82 | 1 |
| | HSUPA-Subtest 4 | 19.79 | 20.10 | 19.84 | 2 |
| | HSUPA-Subtest 5 | 21.83 | 22.09 | 21.77 | 0 |
| | DC-HSDPA-Subtest 1 | 20.83 | 22.07 | 21.77 | 0 |
| | DC-HSDPA-Subtest 2 | 21.79 | 22.08 | 21.79 | 0 |
| | DC-HSDPA-Subtest 3 | 21.30 | 21.56 | 21.32 | 0.5 |
| | DC-HSDPA-Subtest 4 | 21.33 | 21.59 | 21.29 | 0.5 |

7.2. 99% Occupied Bandwidth & 26dB Bandwidth

Test setup



Limit

According to §2.1049, 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 radiated by a given emission shall be measured.

Test procedure

971168 D01 v03r01 – Section 4.2 and 4.3
ANSI C63.26-2015 – Section 5.4.3 and 5.4.4

Test settings

◆ 26dB Bandwidth

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- f) Determine the reference value by either of the following:
 - 1) Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
 - 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
- g) Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).

- i) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
- j) The spectral envelope can cross the “-X dB amplitude” at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the “-X dB amplitude.”
- k) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

◆ 99% Occupied Bandwidth

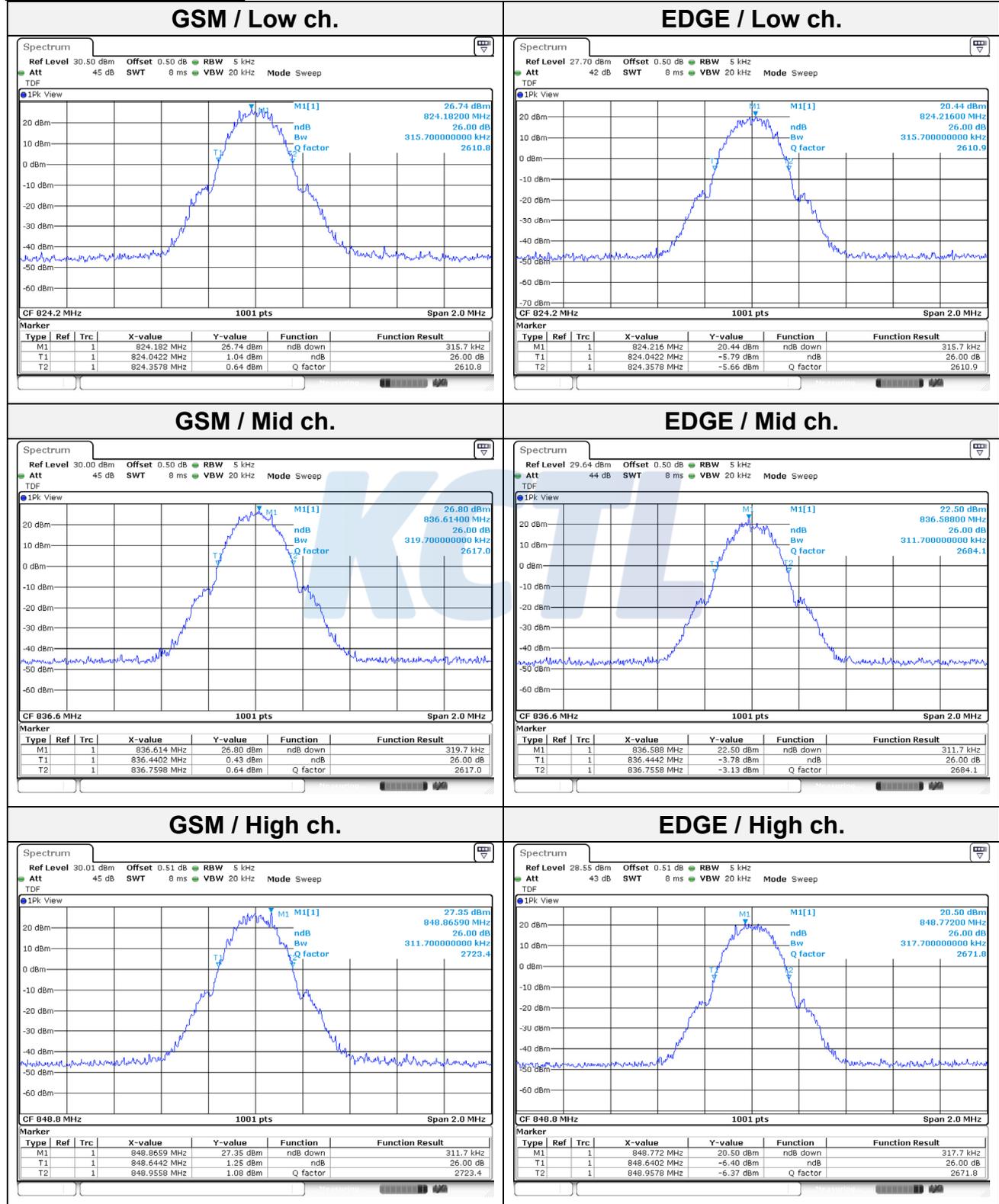
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d) Set the detection mode to peak, and the trace mode to max-hold.
- e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.
- f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

Test results

| Test mode | | Frequency (MHz) | 26 dB bandwidth (MHz) | 99 % bandwidth (MHz) |
|------------|------|--------------------|--------------------------|-------------------------|
| GSM 850 | GSM | 824.2 | 0.316 | 0.242 |
| | | 836.6 | 0.320 | 0.246 |
| | | 848.8 | 0.312 | 0.242 |
| | EDGE | 824.2 | 0.316 | 0.250 |
| | | 836.6 | 0.312 | 0.250 |
| | | 848.8 | 0.318 | 0.244 |
| GSM 1900 | GSM | 1 850.2 | 0.316 | 0.246 |
| | | 1 880.0 | 0.316 | 0.248 |
| | | 1 909.8 | 0.316 | 0.242 |
| | EDGE | 1 850.2 | 0.320 | 0.242 |
| | | 1 880.0 | 0.310 | 0.244 |
| | | 1 909.8 | 0.314 | 0.244 |
| WCDMA 850 | RMC | 826.4 | 4.74 | 4.14 |
| | | 836.6 | 4.74 | 4.17 |
| | | 846.6 | 4.71 | 4.15 |
| WCDMA 1700 | RMC | 1 712.4 | 4.72 | 4.15 |
| | | 1 732.4 | 4.74 | 4.15 |
| | | 1 752.6 | 4.74 | 4.17 |
| WCDMA 1900 | RMC | 1 852.4 | 4.71 | 4.15 |
| | | 1 880.0 | 4.72 | 4.15 |
| | | 1 907.6 | 4.71 | 4.15 |

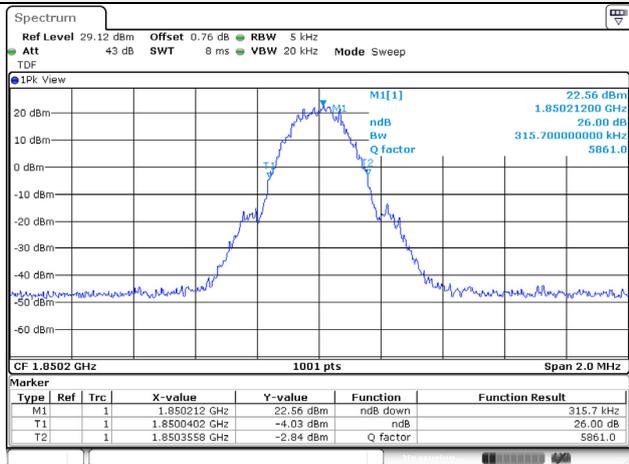
26dB Bandwidth

Test mode: GSM 850

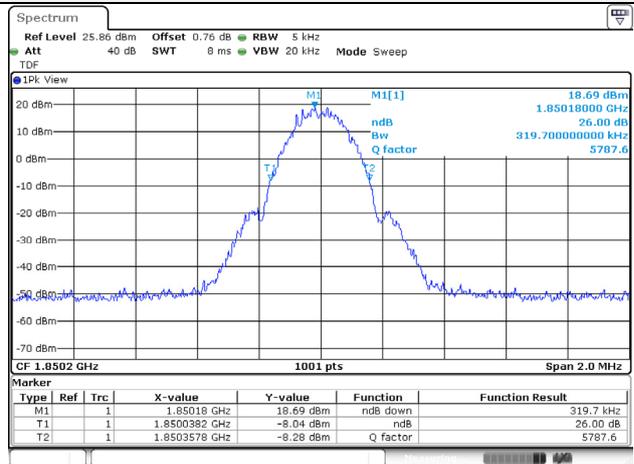


Test mode: GSM 1900

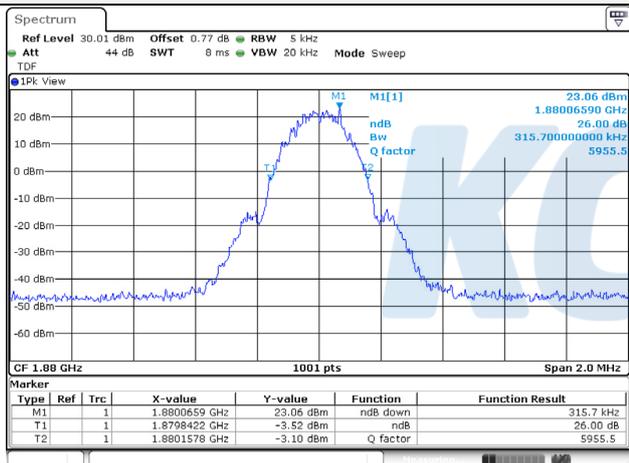
GSM / Low ch.



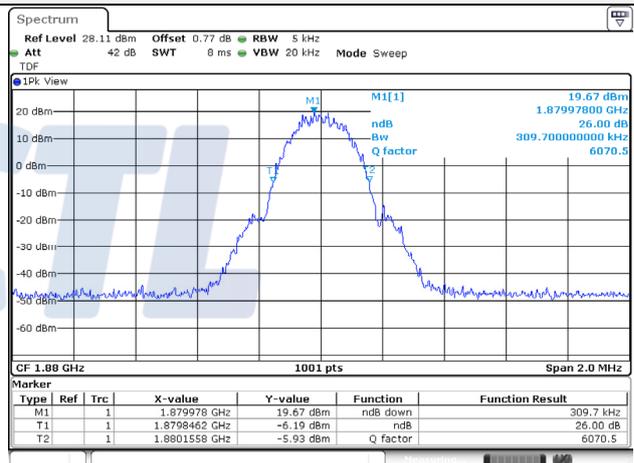
EDGE / Low ch.



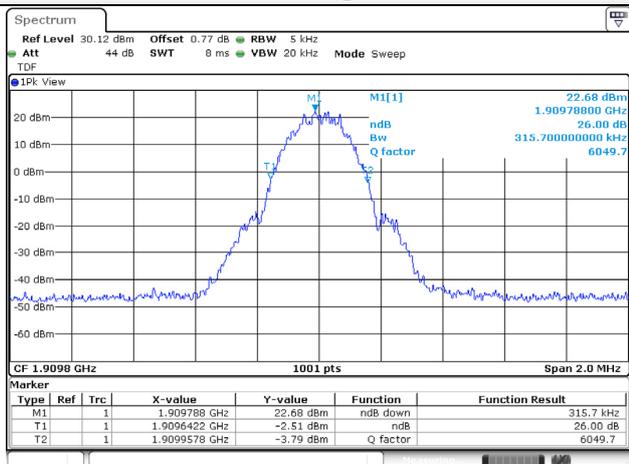
GSM / Mid ch.



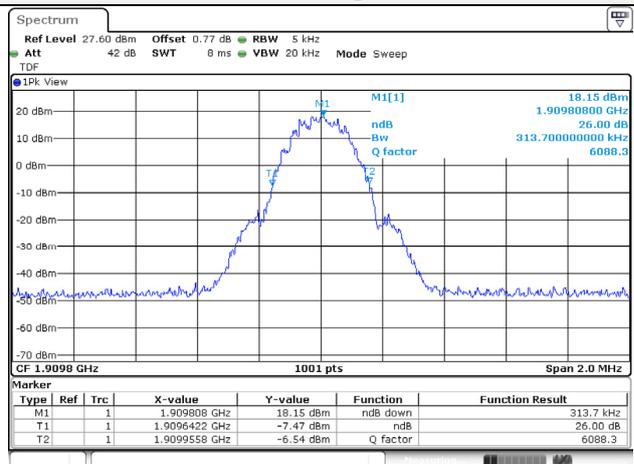
EDGE / Mid ch.



GSM / High ch.

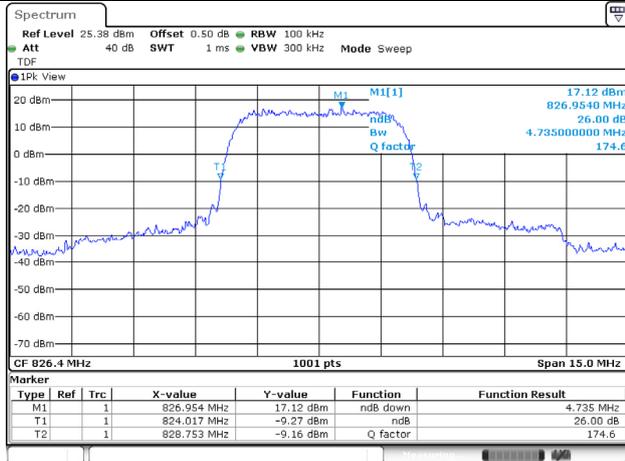


EDGE / High ch.

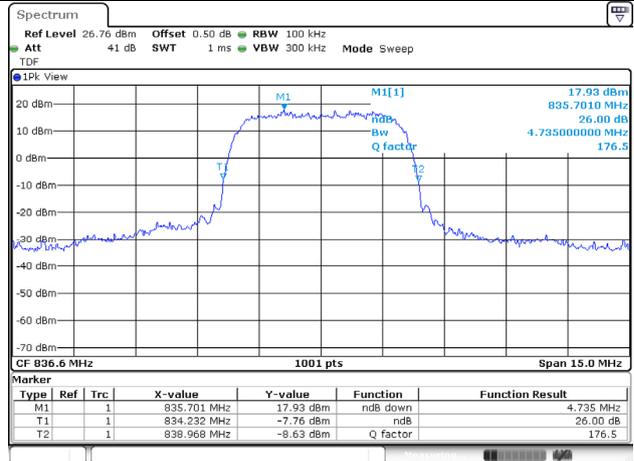


Test mode: WCDMA 850

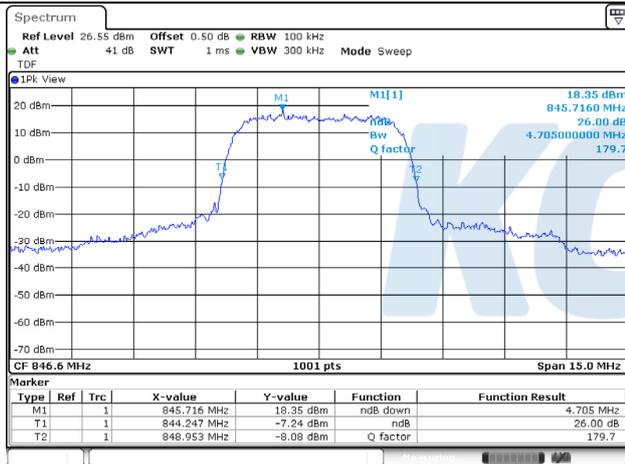
RMC Low ch.



RMC Mid ch.



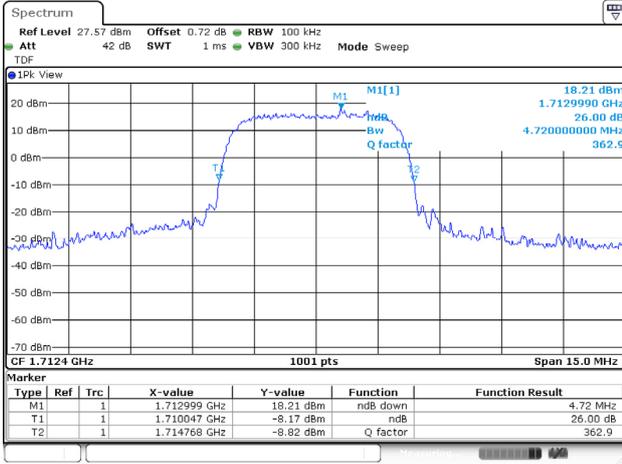
RMC High ch.



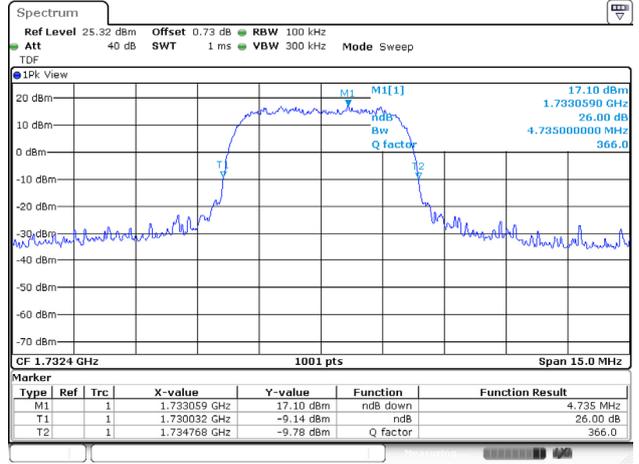
Blank

Test mode: WCDMA 1700

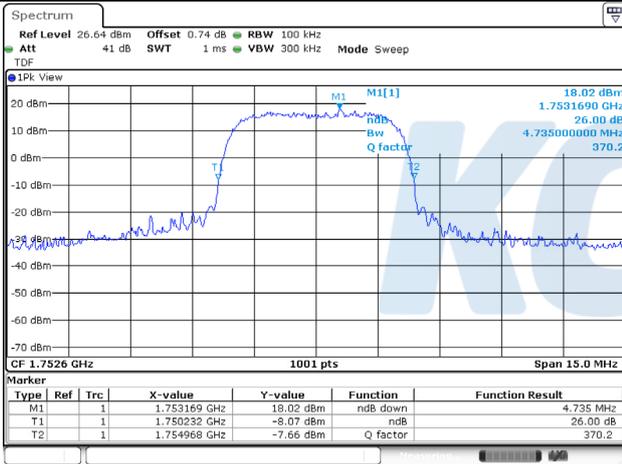
RMC Low ch.



RMC Mid ch.



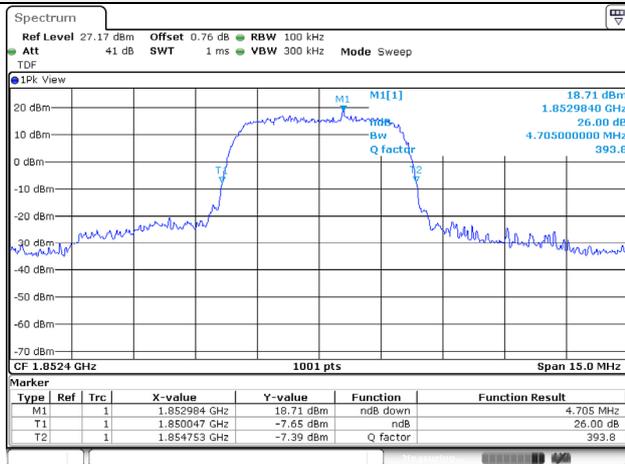
RMC High ch.



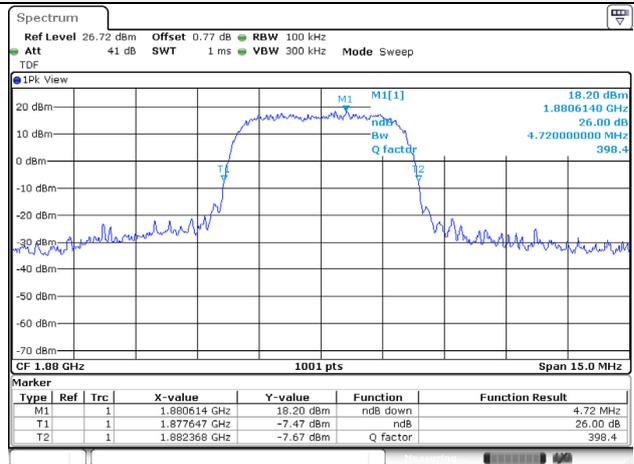
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Test mode: WCDMA 1900

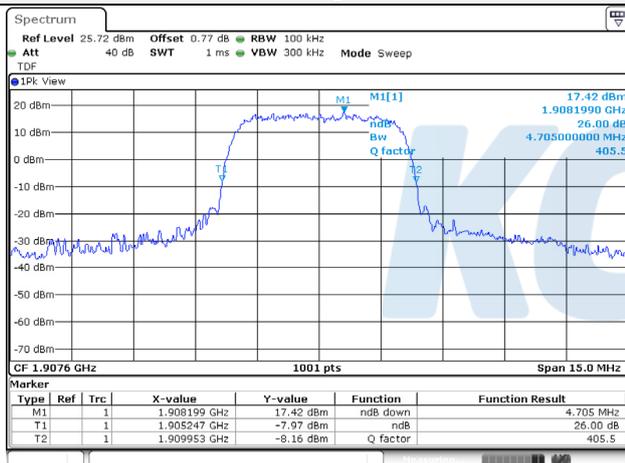
RMC Low ch.



RMC Mid ch.



RMC High ch.



Blank

99% Occupied Bandwidth

Test mode: GSM 850

