

FCC Radio Partial Test Report

FCC ID: VRQ-GT-200

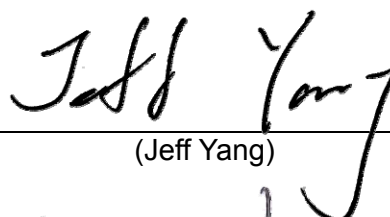
This report concerns (check one): ☒ Original Grant ☐ Class II Change

Project No. : 1601041
Equipment : 3G GPS Tracker
Model Name : GT-200, GT-200AP, GT-200BP, GT-200CP,
GT-200DP, GT-200HP, GT-200MP, GT-200UP,
GT-200VP
Applicant : Navisys Technology Corp.
Address : 2F, No.56, Park Ave.II, Science-Based Industrial
Park, Hsinchu 30844, Taiwan

Date of Receipt : Mar. 29, 2016
Date of Test : Mar. 29, 2016 ~ May 10, 2016
Issued Date : May 11, 2016
Tested by : BTL Inc.

Technical Manager

:


(Jeff Yang)

Authorized Signatory

:


(Sean Chen)

B T L I N C .

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

| Issued No. | Description | Issued Date |
|--------------------|-----------------|--------------|
| BTL-FCCP-1-1601041 | Original Issue. | May 11, 2016 |

1. CERTIFICATION

Equipment : 3G GPS Tracker
Brand Name : Navisys
Model Name : GT-200, GT-200AP, GT-200BP, GT-200CP, GT-200DP, GT-200HP, GT-200MP, GT-200UP, GT-200VP
Applicant : Navisys Technology Corp.
Manufacturer : Uong Xing Technology Co., LTD
Address : No.416, Sec.1, Beising Rd., Jhudong Township, Hsinchu Country 310, Taiwan
Date of Test : Mar. 29, 2016 ~ May 10, 2016
Test Sample : Engineering Sample
Standard(s) : 47 CFR FCC Part 22 Subpart H
47 CFR FCC Part 2
ANSI/TIA-603-D-2010
KDB 971168 D01 Power Meas License Digital Systems v02r02

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1601041) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test result included in this report is only for the WCDMA Band V part.

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

| FCC Part 22 Subpart H & Part 2 | | | |
|--------------------------------|-----------------------------|----------|-----------|
| Standard(s) Section | Test Item | Judgment | Tested By |
| 2.1046 22.913(a) | Radiated power | PASS | Kay Wu |
| 2.1046 24.232(c) | Conducted Output Power | PASS | Kay Wu |
| 2.1053 22.917(a) | Radiated Spurious Emissions | PASS | Kay Wu |
| - | Peak To Average Ratio | PASS | Kay Wu |
| 2.1055 22.355 | Frequency Stability | PASS | Kay Wu |

NOTE:

- (1) "N/A" denotes test is not applicable to this device.
- (2) Due to the Cinterion Wireless Module PHS8-P (Report Number: MDE_CINTE_1108_FCCa, MDE_CINTE_1108_FCCd and MDE_CINTE_1108_FCCe and model: PHS8-P) of this 3G GPS Tracker has been certified (FCC ID: QIPPHS8-P), above test items were criticized and reconfirmed in this report.

2.1 TEST FACILITY

Conducted Test:

TR03: (FCC RN:949005; FCC DN:TW1082)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Below 1 GHz):

CB11: (FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test (Above 1 GHz):

CB11: (FCC RN:949005; FCC DN:TW1082; IC Assigned Code:20088)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

2.2 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. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

A. Radiated emission test:

| Test Site | Method | Measurement Frequency Range | Ant. H / V | U, (dB) |
|--------------|--------|-----------------------------|------------|---------|
| CB11 (3m) | CISPR | 30 MHz ~ 200 MHz | V | 3.06 |
| | | 30 MHz ~ 200 MHz | H | 2.58 |
| | | 200 MHz ~ 1,000 MHz | V | 3.50 |
| | | 200 MHz ~ 1,000 MHz | H | 3.10 |

| Test Site | Method | Measurement Frequency Range | Ant. H / V | U, (dB) |
|--------------|--------|-----------------------------|------------|---------|
| CB11 (3m) | CISPR | 1GHz ~ 6GHz | V | 4.14 |
| | | 1GHz ~ 6GHz | H | 4.14 |

| Test Site | Method | Measurement Frequency Range | Ant. H / V | U, (dB) |
|-----------|--------|-----------------------------|------------|---------|
| CB11 | CISPR | 6GHz ~ 18GHz | V | 5.34 |
| | | 6GHz ~ 18GHz | H | 5.34 |

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | | |
|---------------------|--|--------------------------------|
| Equipment | 3G GPS Tracker | |
| Brand Name | Navisys | |
| Model Name | GT-200, GT-200AP, GT-200BP, GT-200CP, GT-200DP, GT-200HP, GT-200MP, GT-200UP, GT-200VP | |
| Model Difference | All models are identical to each other except model designation. | |
| Modulation Type | WCDMA | Uplink: BPSK Downlink: QPSK |
| | WCDMA(HSDPA/HSUPA) | 16QAM/64QAM |
| Operation Frequency | WCDMA | 826.4 ~ 846.6 MHz |
| Max. ERP Power | WCDMA | 21.07 dBm |
| Antenna Type | Fixed Internal Antenna | |
| Antenna Gain | -1 dBi | |
| Hardware Version | V05 | |
| Software Version | V20 | |
| Power Source | #1 Supplied from USB port. #2 Supplied from rechargeable Li-Polymer battery. | |
| Power Rating | #1 I/P: DC 4.5 - 5.5V, 1.0 - 1.5A #2 I/P: DC 3.15 - 4.3V, 1430mAh | |
| HSPA features | 3GPP Release 6 | |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

3.2 DESCRIPTION OF TEST MODES AND TEST CONDITION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports
The worst case was found when positioned on Y-plane for ERP and Y-axis for radiated emission.
Following channel(s) was (were) selected for the final test as listed below:

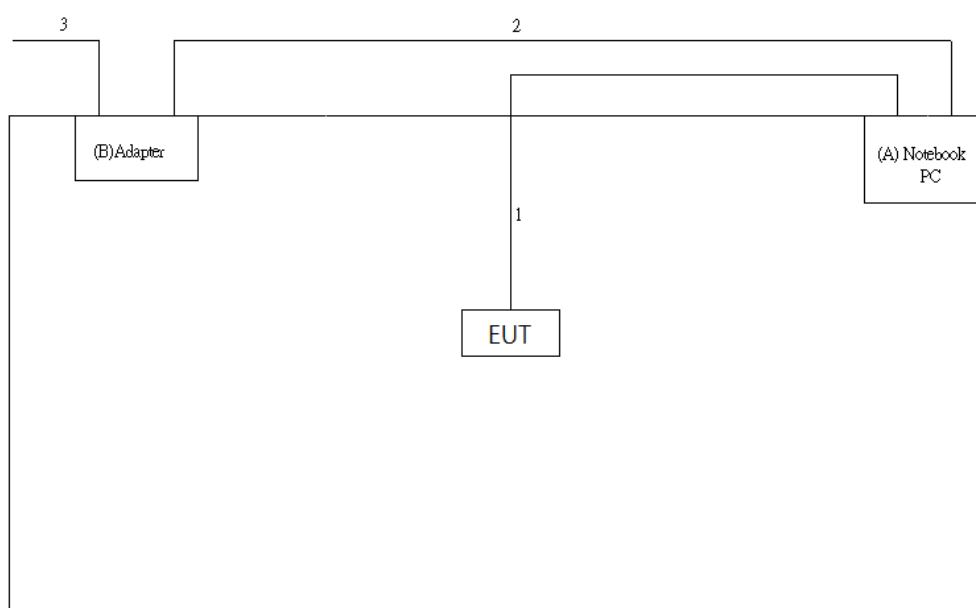
| WCDMA MODE | | | |
|------------------------|-------------------|------------------|-------|
| Test Item | Available Channel | Tested Channel | Mode |
| ERP | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| Conducted Output Power | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| Radiated Emission | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| Peak to Average Ratio | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| Frequency Stability | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in **BPSK** modulation.

EUT TEST CONDITIONS:

| Test Item | Environmental Conditions | Test Voltage |
|------------------------|--------------------------|----------------|
| ERP | 25°C, 45%RH | DC 3.7V |
| Conducted Output Power | 25°C, 45%RH | DC 3.7V |
| Radiated Emission | 25°C, 45%RH | DC 3.7V |
| Peak to Average Ratio | 25°C, 45%RH | DC 3.7V |
| Frequency Stability | 25°C, 45%RH | DC 3.15 - 4.3V |

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID | Series No. |
|------|-------------|-----------|----------------|--------|------------------------|
| A | Notebook PC | ACER | MS2392 | DOC | NXMPFTA0014380598B6600 |
| B | Adapter | ACER | PA-1450-26 | DOC | KP0450300143102875PE01 |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|-------------|
| 1 | NO | NO | 0.45m | USB Cable |
| 2 | NO | NO | 1m | Power Cable |
| 3 | NO | NO | 1.8m | Power Cable |

Note: EUT is battery supplied, so after set up, the Notebook PC is removed.

4. TEST RESULT

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMIT

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 TEST PROCEDURE

EIRP/ERP:

1. All measurements were done at low, middle and high operational frequency range. RBW and VBW setting:
Set the $RBW \geq OBW$.
Set $VBW \geq 3 \times RBW$.
Set $span \geq 2 \times RBW$
Sweep time=auto couple
Detector=peak
Ensure that the number of measurement points $\geq span/RBW$
Trace mode=max hold
Allow trace to fully stabilize
Use the peak marker function to determine the peak amplitude level
2. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
3. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
5. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of Integral, E.R.P power=E.I.P.R power-2.15dBi.

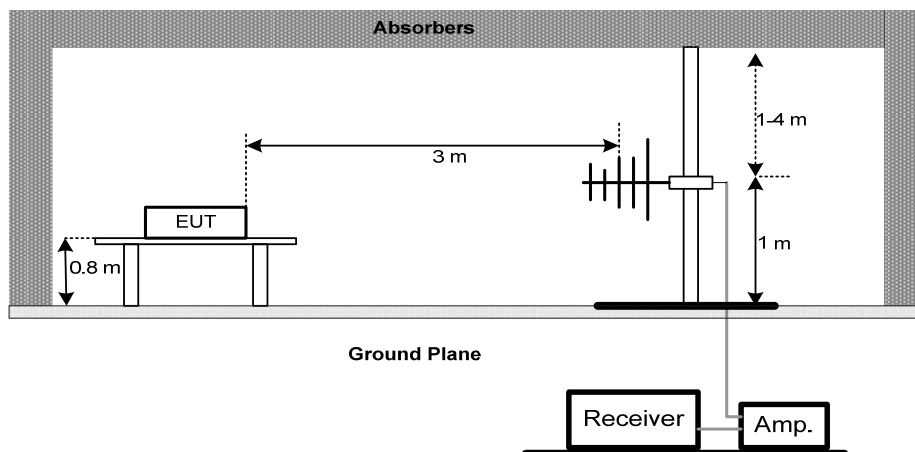
Conducted Power:

The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

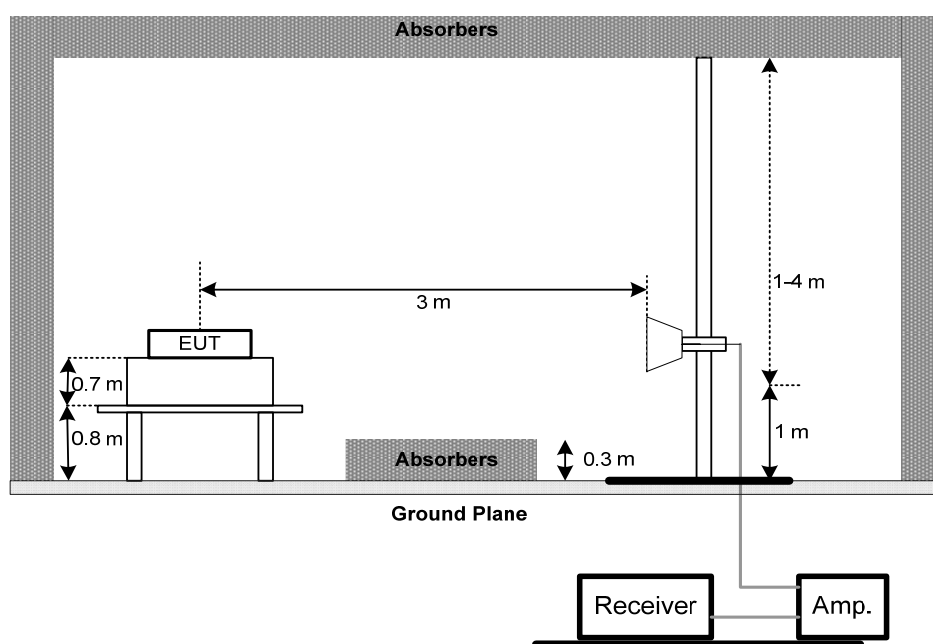
4.1.3 TESTSETUP LAYOUT

ERP Power Measurement

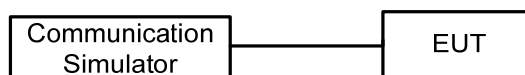
Below 1G



Above 1G



Conducted Power Measurement



4.1.4 TEST DEVIATION

No deviation

4.1.5 TEST RESULTS

Please refer to the Attachment A.

4.2 RADIATED EMISSIONS MEASUREMENT

4.2.1 LIMIT

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 $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm.

4.2.2 TEST PROCEDURES

1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.2.3 TESTSETUP LAYOUT

This test setup layout is the same as that shown in **section 4.1.3**.

4.2.4 TESTDEVIATION

No deviation

4.2.5 TEST RESULTS

Please refer to the Attachment B.

4.3 PEAK TO AVERAGE RATIO MEASUREMENT

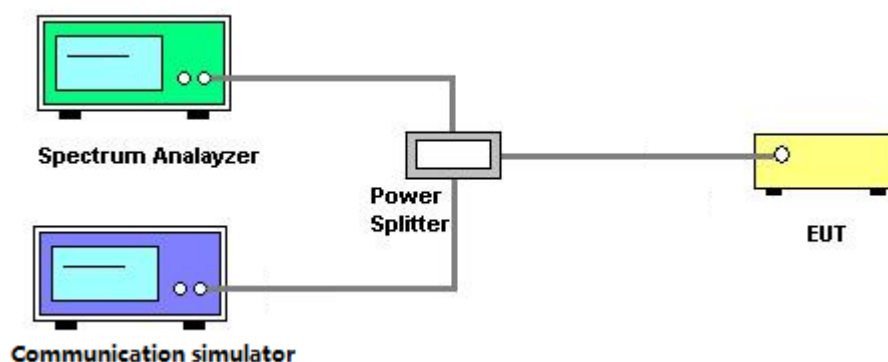
4.3.1 LIMIT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.3.2 TEST PROCEDURES

1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.3.3 TESTSETUP LAYOUT



4.3.4 TESTDEVIATION

No deviation

4.3.5 TEST RESULTS

Please refer to the Attachment C.

4.4 FREQUENCY STABILITY MEASUREMENT

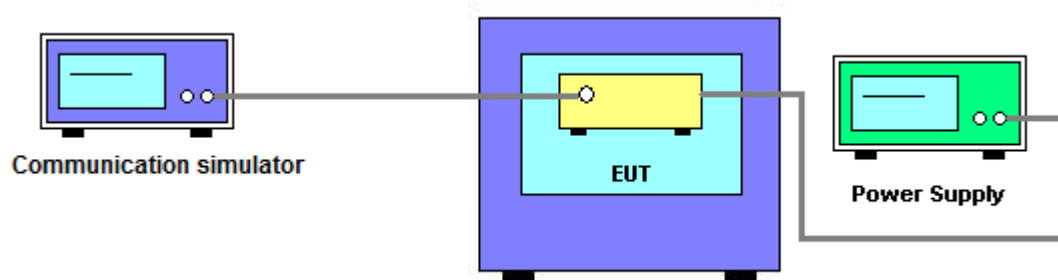
4.4.1 LIMIT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.4.2 TEST PROCEDURES

1. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
2. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

4.4.3 TESTSETUP LAYOUT



4.4.4 TESTDEVIATION

No deviation

4.4.5 TEST RESULTS

Please refer to the Attachment D.

5. LIST OF MEASUREMENT EQUIPMENTS

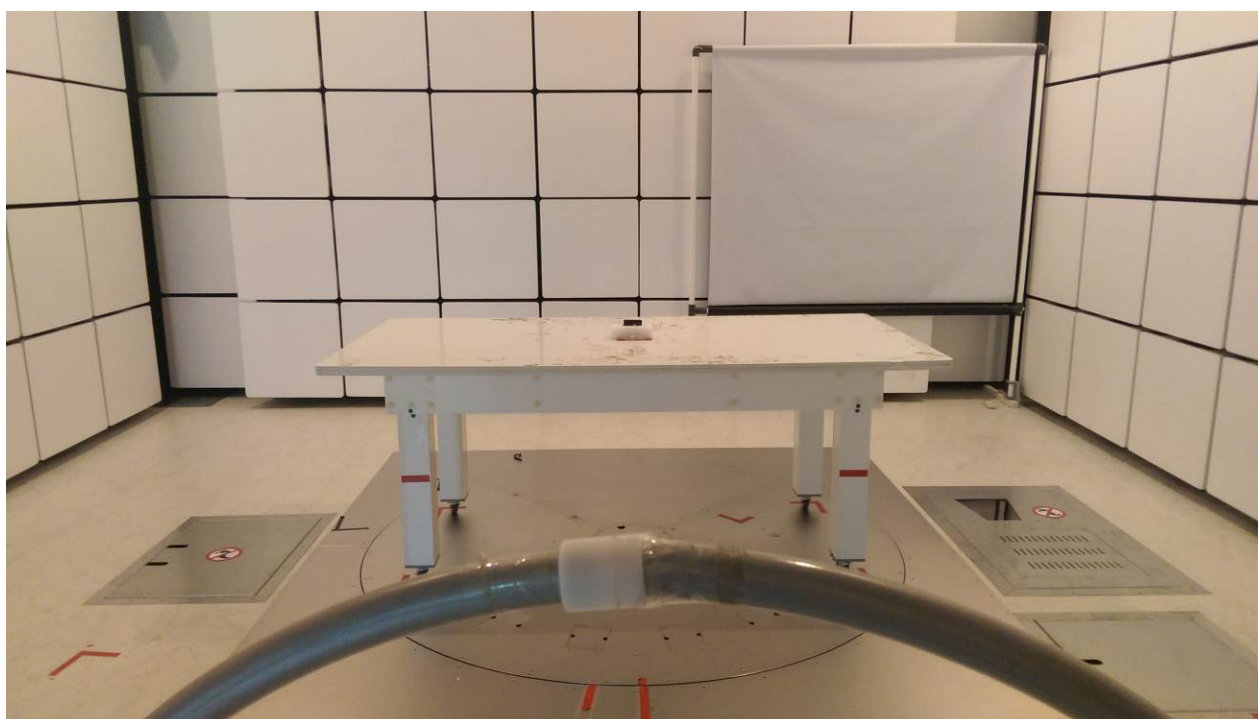
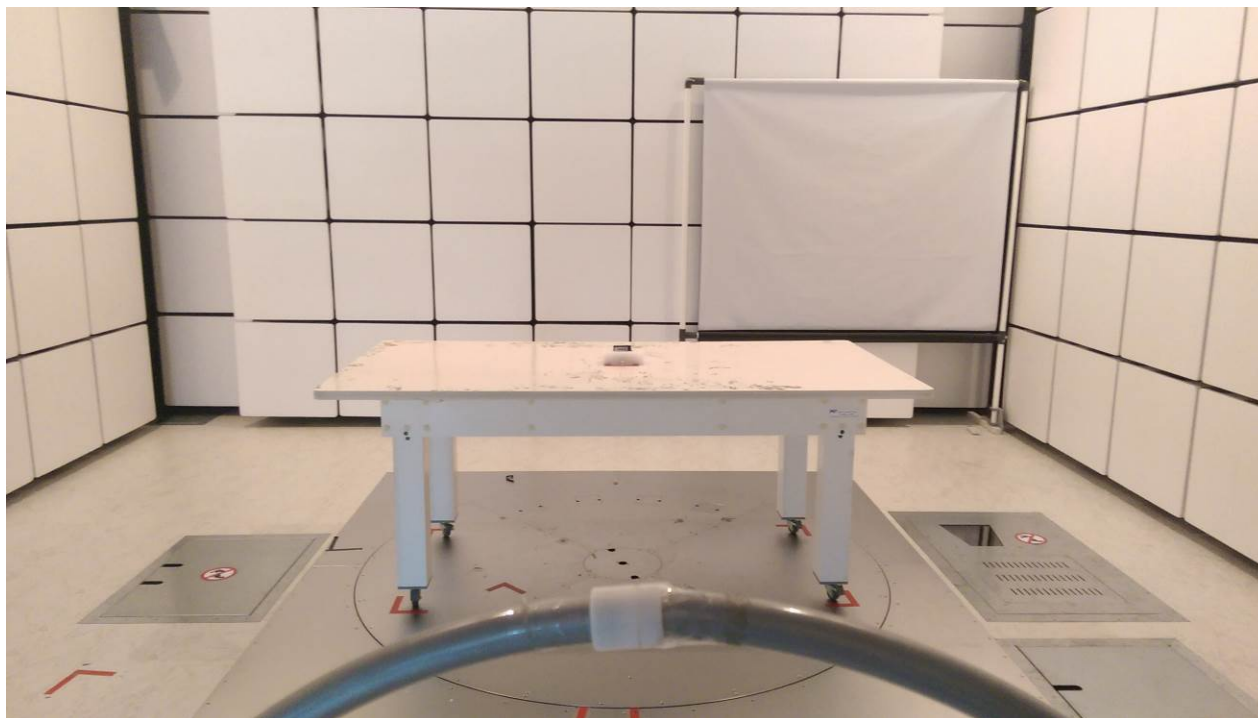
| Radiated Emission & ERP or EIRP Measurement | | | | | |
|---|---------------------------|--------------|-----------------------|------------|------------------|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1 | Spectrum Analyzer | Agilent | N9038A | MY51210215 | Jun. 07, 2016 |
| 2 | Horn Antenna | Schwarzbeck | BBHA 9120 | D 546 | Nov. 04, 2016 |
| 3 | Microwave Pre-amplifier | HP | 8447D | 2944A08891 | Mar. 08, 2017 |
| 4 | Test Cable | EMCI | EMC104-SM-S M-5000 | 150302 | Mar. 08, 2017 |
| 5 | Test Cable | EMCI | EMC104-SM-S M-800 | 150305 | Mar. 08, 2017 |
| 6 | Test Cable | EMCI | EMC104-SM-S M-2500 | 150306 | Mar. 08, 2017 |
| 7 | Test Cable | EMCI | EMC8D-NM-NM -8000 | 150301 | Mar. 08, 2017 |
| 8 | Test Cable | EMCI | EMC8D-NM-NM -2500 | 150303 | Mar. 08, 2017 |
| 9 | Test Cable | EMCI | EMC8D-NM-NM -1000 | 150304 | Mar. 08, 2017 |
| 10 | Pre-Amplifier | Agilent | 8449B | 3008A02331 | Jan. 23, 2017 |
| 11 | Trilog-Broadband Antenna | Schwarzbeck | VULB9168 | 9168-364 | Feb. 03, 2017 |
| 12 | Preamplifier With Adaptor | EMC | EMC2654045 | 980030 | Feb. 15, 2017 |
| 13 | Loop Antenna | EMCO | 6502 | 00042960 | Nov. 15, 2016 |
| 14 | Broad-Band Horn Antenna | SCHWARZBECK | BBHA 9120D | 9120D-1333 | May 31, 2017 |
| 15 | Trilog-Broadband Antenna | Schwarzbeck | VULB9168-352 | 9168-352 | Jul. 30, 2016 |

| Frequency Stability Measurement | | | | | |
|---------------------------------|-------------------|--------------|----------------------|------------|------------------|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1 | Spectrum Analyzer | R&S | FSP-40 | 100129 | Jan. 17, 2017 |
| 2 | Thermal Chamber | HOLINK | CHOLINK/H-T-1 F-D | BA03101701 | Jun. 08, 2016 |

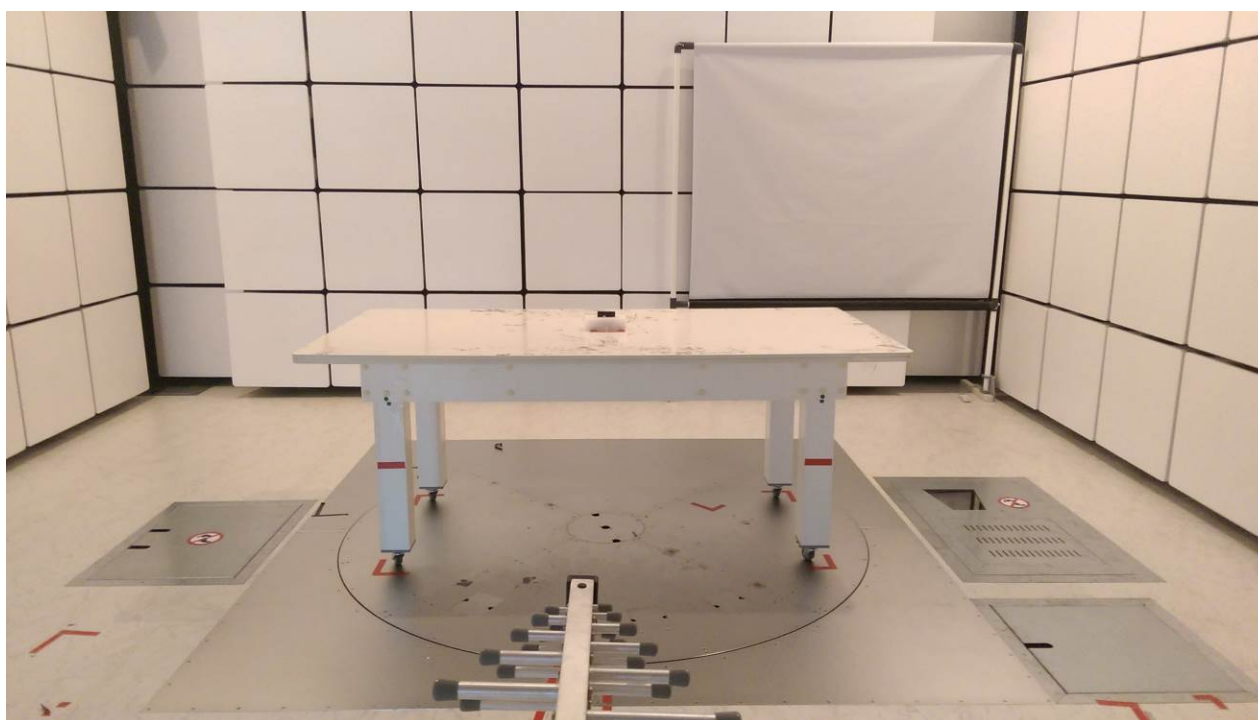
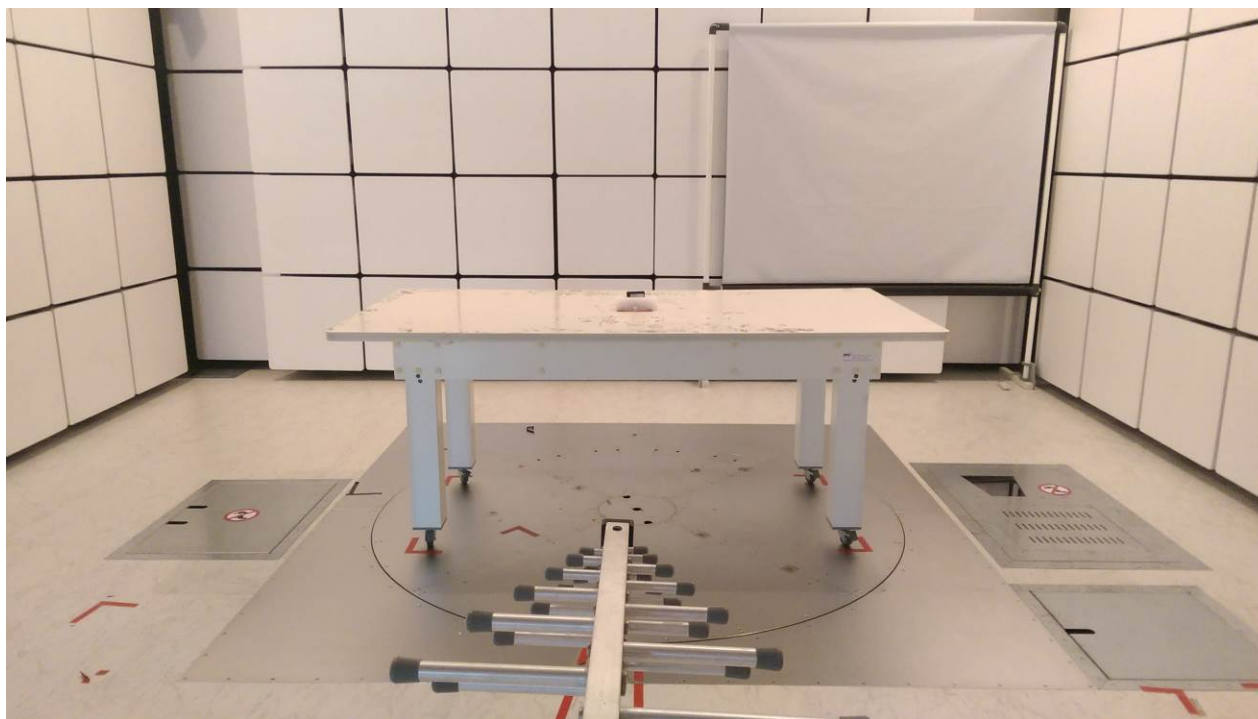
Remark: "N/A" denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

6. EUT TEST PHOTO

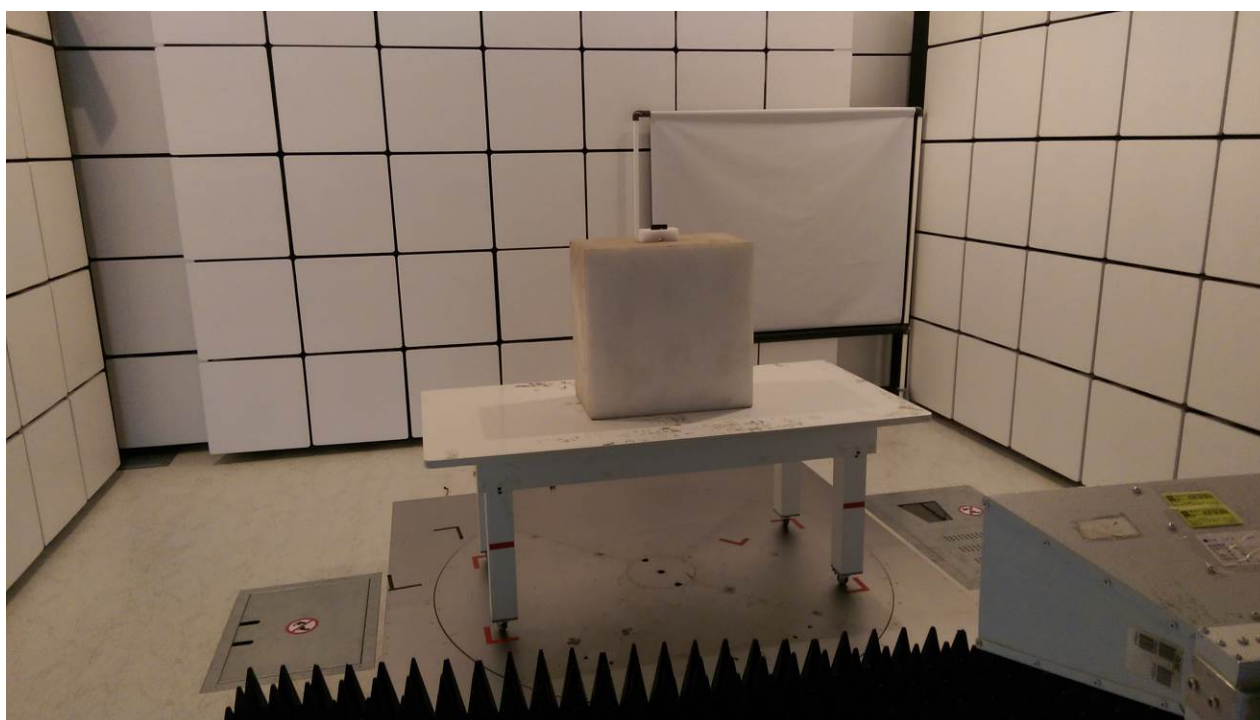
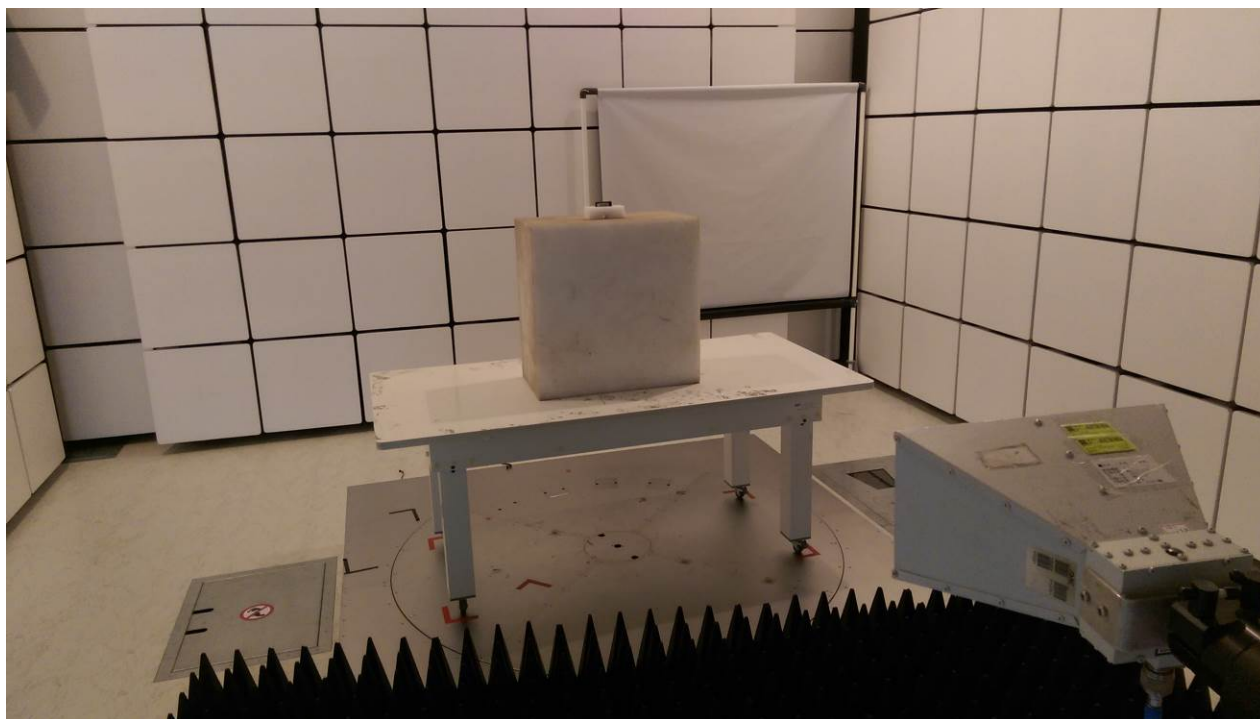
Radiated Measurement Photos 9KHz to 30MHz



Radiated Measurement Photos Below 1G



**Radiated Measurement Photos
Above 1G**



ATTACHMENT A - OUTPUT POWER

Conducted Power:

| Band | WCDMA V(Capsensor Off) | | | |
|-----------------|-------------------------|----------|----------|----------|
| Tx Channel | Max. Tune-up Peak Power | 4132CH | 4182CH | 4233CH |
| Rx Channel | | 4357CH | 4407CH | 4458CH |
| Frequency | | 826.4MHz | 836.4MHz | 846.6MHz |
| AMR | 24.00 | 23.49 | 23.35 | 23.52 |
| RMC 12.2K | 24.00 | 23.56 | 23.41 | 23.60 |
| HSDPA Subtest-1 | 23.50 | 23.24 | 23.12 | 23.27 |
| HSDPA Subtest-2 | 22.50 | 22.33 | 22.21 | 22.36 |
| HSDPA Subtest-3 | 23.00 | 22.88 | 22.76 | 22.91 |
| HSDPA Subtest-4 | 23.00 | 22.91 | 22.79 | 22.94 |
| HSUPA Subtest-1 | 22.50 | 22.42 | 22.30 | 22.45 |
| HSUPA Subtest-2 | 22.00 | 21.95 | 21.83 | 21.98 |
| HSUPA Subtest-3 | 22.00 | 21.97 | 21.85 | 22.00 |
| HSUPA Subtest-4 | 22.00 | 21.79 | 21.67 | 21.82 |
| HSUPA Subtest-5 | 23.50 | 23.39 | 23.27 | 23.42 |

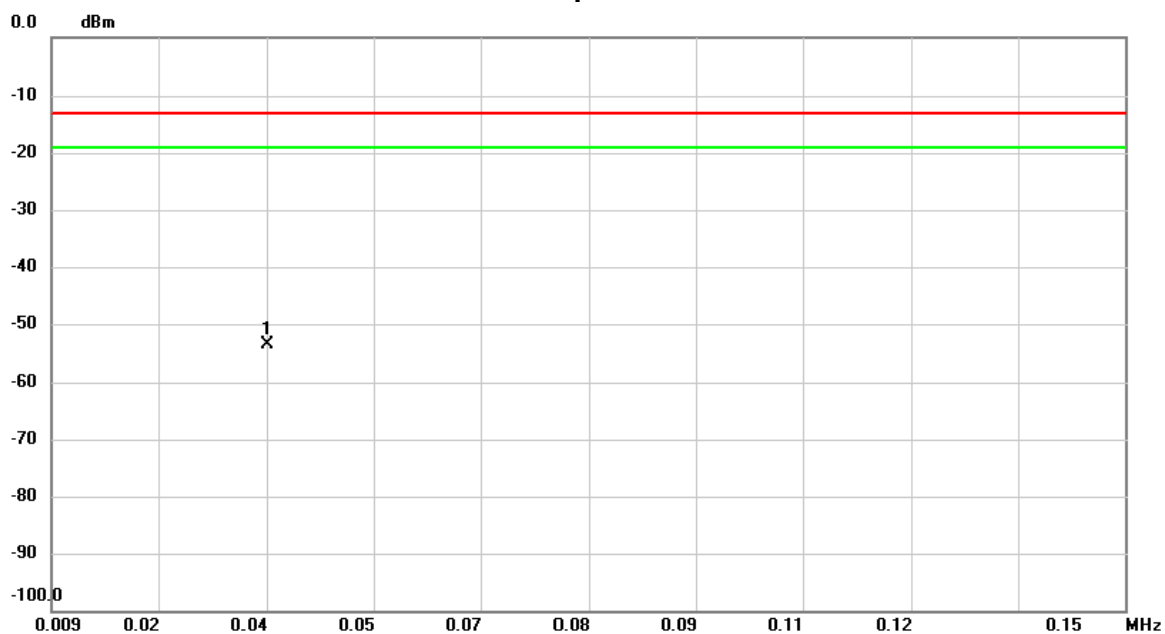
E. R.P Power

| WCDMA Band V | | | | | |
|--------------|---------|-----------------|-----------------------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | Correction Factor(dB) | ERP(dBm) | Polarization (H/V) |
| Y | 4132 | 826.4 | 36.96 | 20.98 | H |
| | 4182 | 836.4 | 37.07 | 21.07 | H |
| | 4233 | 846.6 | 37.16 | 20.71 | H |
| | 4132 | 826.4 | 36.98 | 19.44 | V |
| | 4182 | 836.4 | 37.17 | 19.17 | V |
| | 4233 | 846.6 | 37.34 | 19.29 | V |

ATTACHMENT B - RADIATED EMISSION

Test Mode: WCDMA Band V_TX CH4132

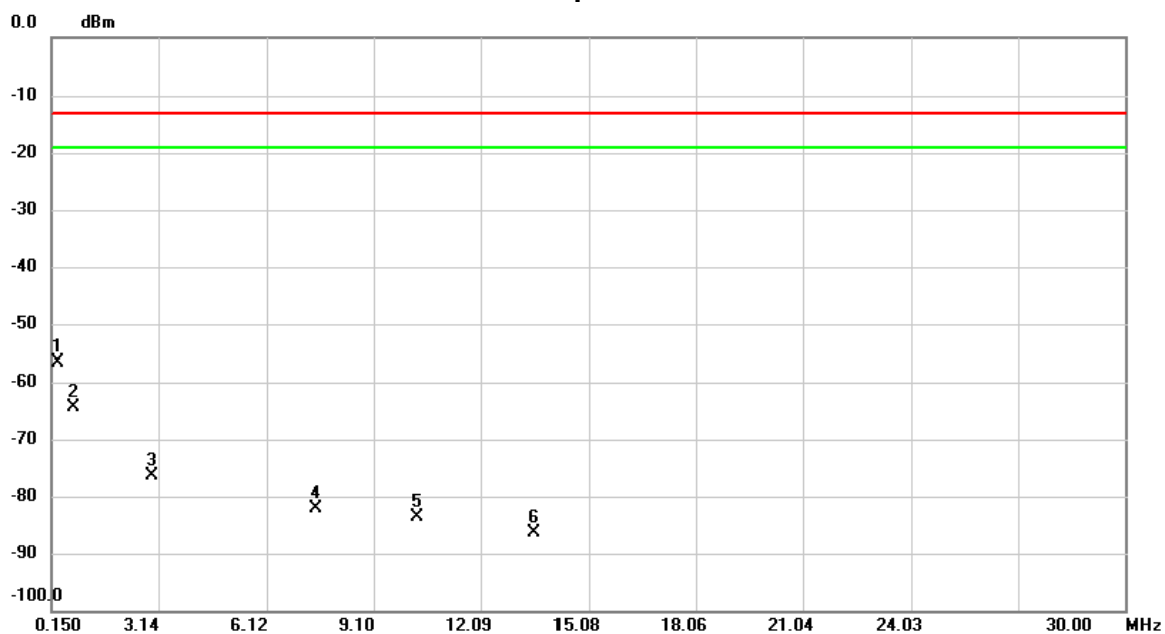
Open



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.0372 | -68.00 | 14.28 | -53.72 | -13.00 | -40.72 | peak | |

Test Mode: WCDMA Band V_TX CH4132

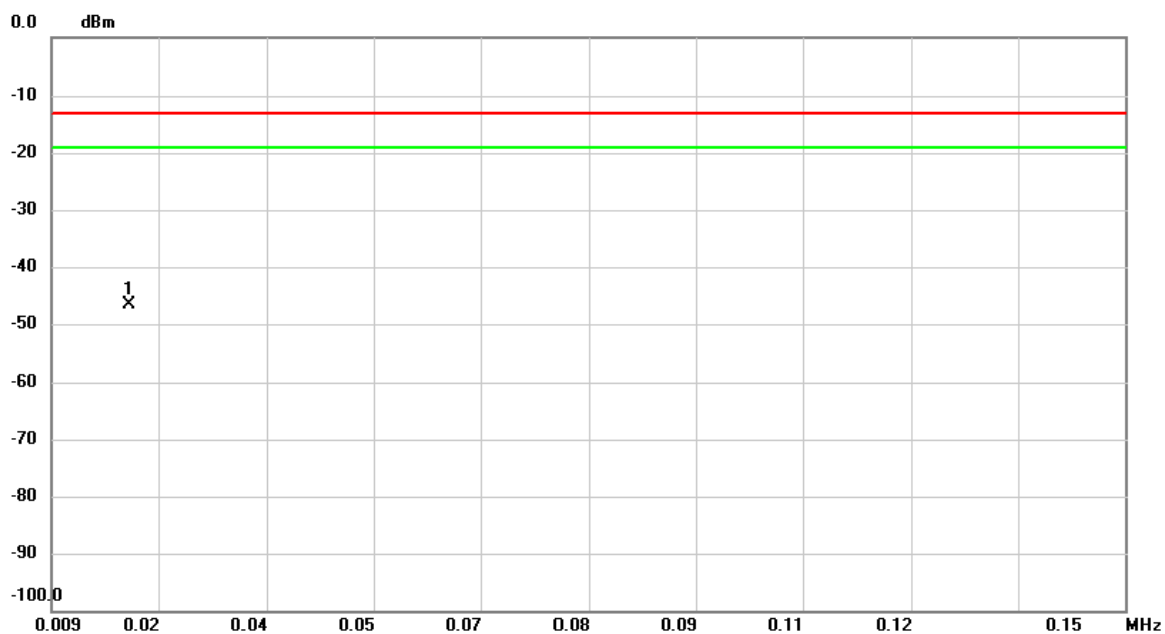
Open



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.3092 | -68.38 | 11.80 | -56.58 | -13.00 | -43.58 | peak | |
| 2 | | 0.7867 | -76.21 | 11.91 | -64.30 | -13.00 | -51.30 | peak | |
| 3 | | 2.9360 | -87.52 | 11.13 | -76.39 | -13.00 | -63.39 | peak | |
| 4 | | 7.4732 | -93.40 | 11.35 | -82.05 | -13.00 | -69.05 | peak | |
| 5 | | 10.2990 | -94.98 | 11.29 | -83.69 | -13.00 | -70.69 | peak | |
| 6 | | 13.5626 | -97.49 | 11.19 | -86.30 | -13.00 | -73.30 | peak | |

Test Mode: WCDMA Band V_TX CH4132

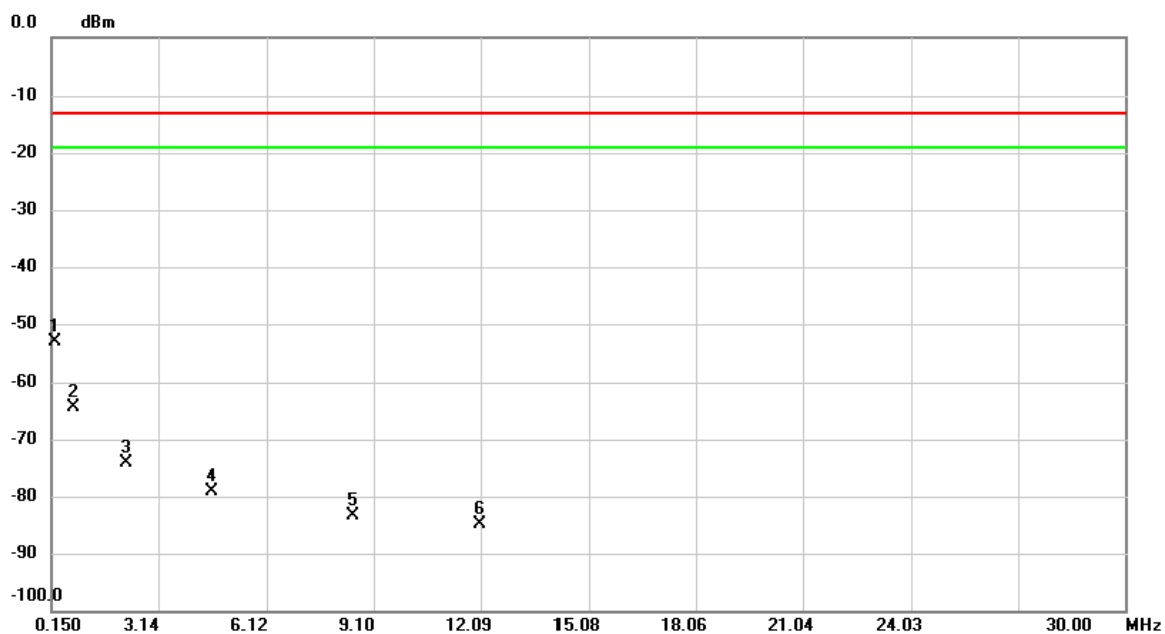
Close



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.0192 | -64.56 | 17.97 | -46.59 | -13.00 | -33.59 | peak | |

Test Mode: WCDMA Band V_TX CH4132

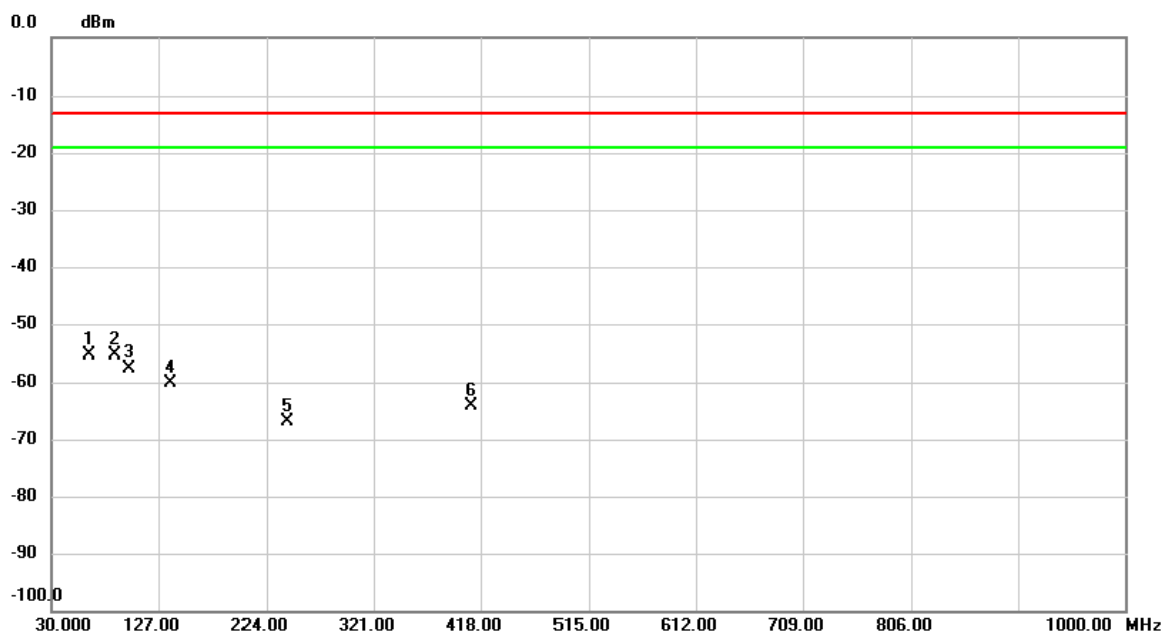
Close



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.2296 | -64.96 | 11.91 | -53.05 | -13.00 | -40.05 | peak | |
| 2 | | 0.7867 | -76.25 | 11.91 | -64.34 | -13.00 | -51.34 | peak | |
| 3 | | 2.2196 | -85.45 | 11.45 | -74.00 | -13.00 | -61.00 | peak | |
| 4 | | 4.6076 | -90.35 | 11.34 | -79.01 | -13.00 | -66.01 | peak | |
| 5 | | 8.5477 | -94.79 | 11.33 | -83.46 | -13.00 | -70.46 | peak | |
| 6 | | 12.0502 | -96.22 | 11.24 | -84.98 | -13.00 | -71.98 | peak | |

Test Mode: WCDMA Band V_TX CH4132

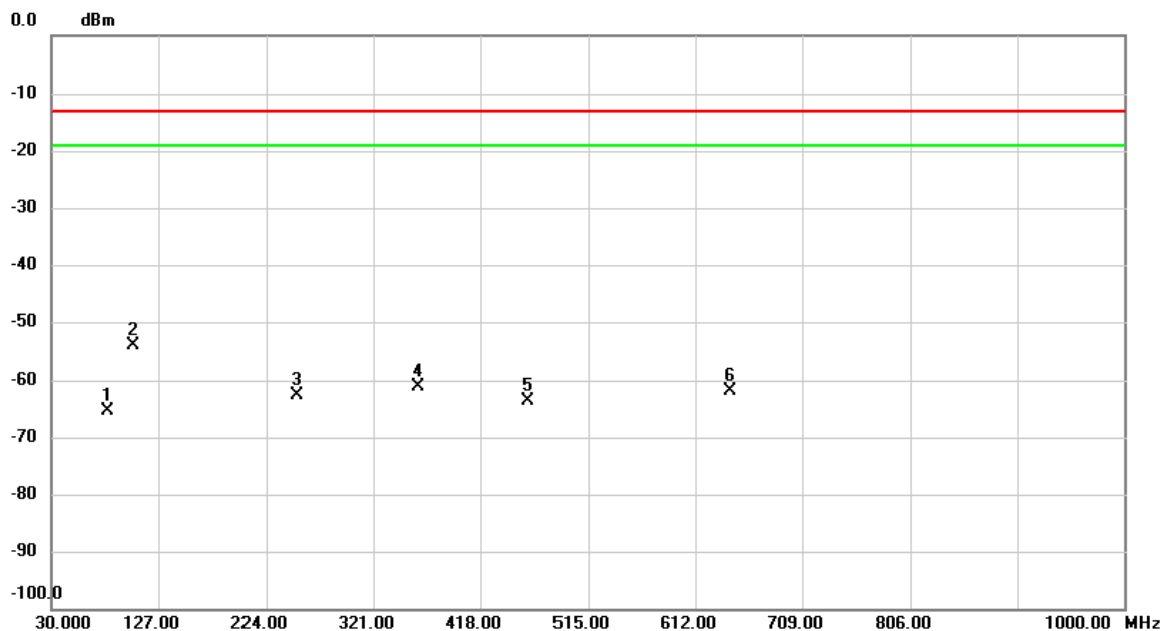
Vertical



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 63.6267 | -51.35 | -4.00 | -55.35 | -13.00 | -42.35 | peak | |
| 2 | | 86.9067 | -51.32 | -4.10 | -55.42 | -13.00 | -42.42 | peak | |
| 3 | | 99.8400 | -55.00 | -2.61 | -57.61 | -13.00 | -44.61 | peak | |
| 4 | | 138.6400 | -58.76 | -1.33 | -60.09 | -13.00 | -47.09 | peak | |
| 5 | | 242.1067 | -62.93 | -3.91 | -66.84 | -13.00 | -53.84 | peak | |
| 6 | | 408.9467 | -66.53 | 2.44 | -64.09 | -13.00 | -51.09 | peak | |

Test Mode: WCDMA Band V_TX CH4132

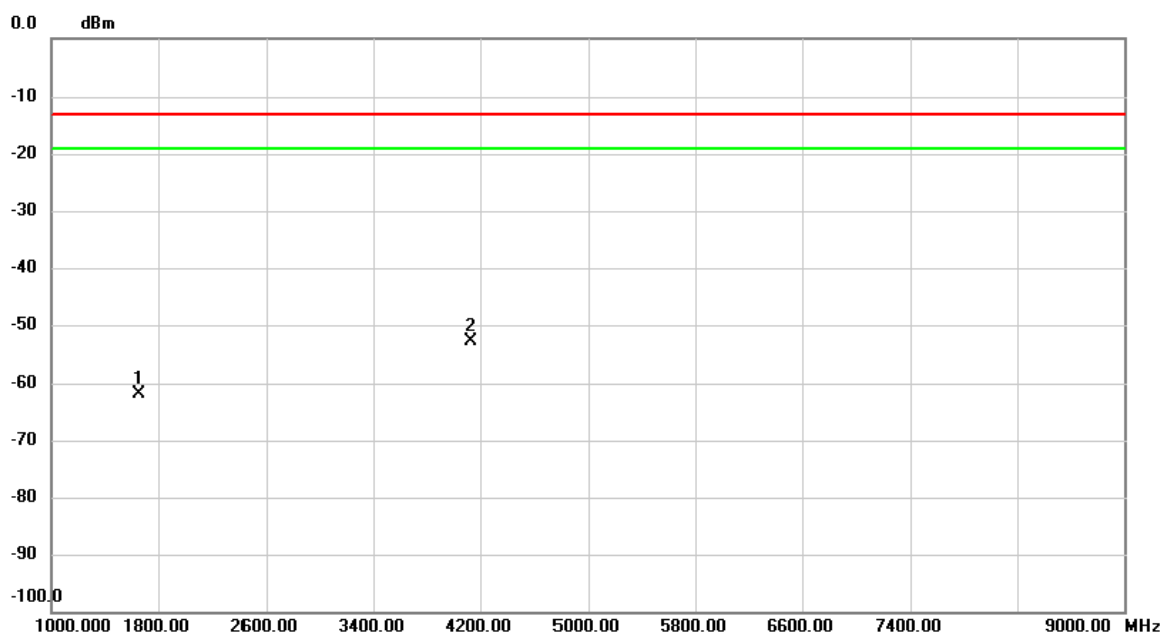
Horizontal



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | | 81.7333 | -60.16 | -5.21 | -65.37 | -13.00 | -52.37 | peak | |
| 2 | * | 103.7200 | -51.07 | -3.06 | -54.13 | -13.00 | -41.13 | peak | |
| 3 | | 252.4533 | -58.87 | -3.68 | -62.55 | -13.00 | -49.55 | peak | |
| 4 | | 362.3866 | -62.18 | 1.15 | -61.03 | -13.00 | -48.03 | peak | |
| 5 | | 461.9733 | -67.09 | 3.46 | -63.63 | -13.00 | -50.63 | peak | |
| 6 | | 643.0400 | -67.66 | 5.81 | -61.85 | -13.00 | -48.85 | peak | |

Test Mode: WCDMA Band V_TX CH4132

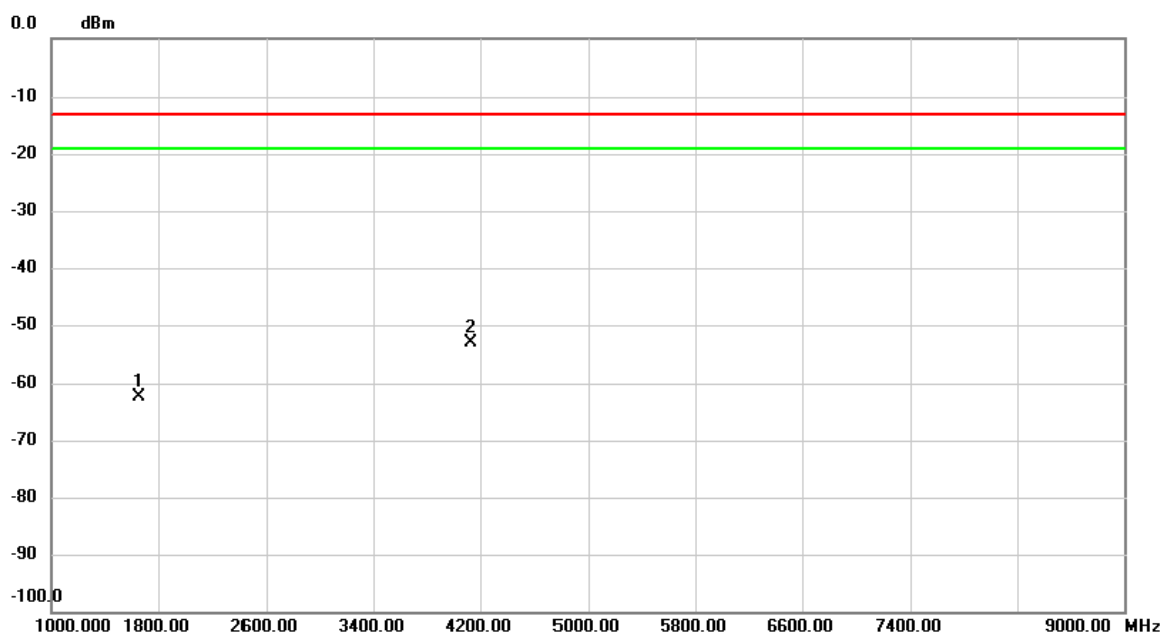
Vertical



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | | 1652.800 | -51.43 | -10.54 | -61.97 | -13.00 | -48.97 | peak | |
| 2 | * | 4132.000 | -52.06 | -0.92 | -52.98 | -13.00 | -39.98 | peak | |

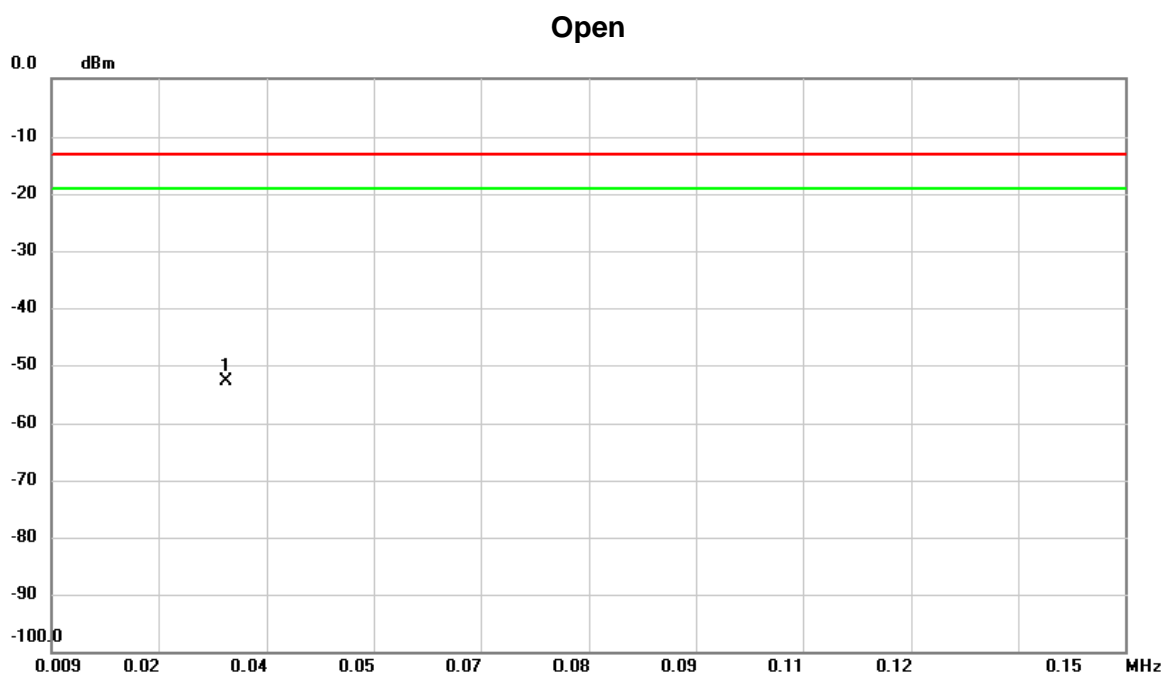
Test Mode: WCDMA Band V_TX CH4132

Horizontal



| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | | |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
| | | MHz | Level | Factor | ment | | | Detector | Comment |
| | | | dBm | dB | dBm | dBm | dB | | |
| 1 | | 1652.800 | -51.74 | -10.54 | -62.28 | -13.00 | -49.28 | peak | |
| 2 | * | 4132.000 | -52.21 | -0.92 | -53.13 | -13.00 | -40.13 | peak | |

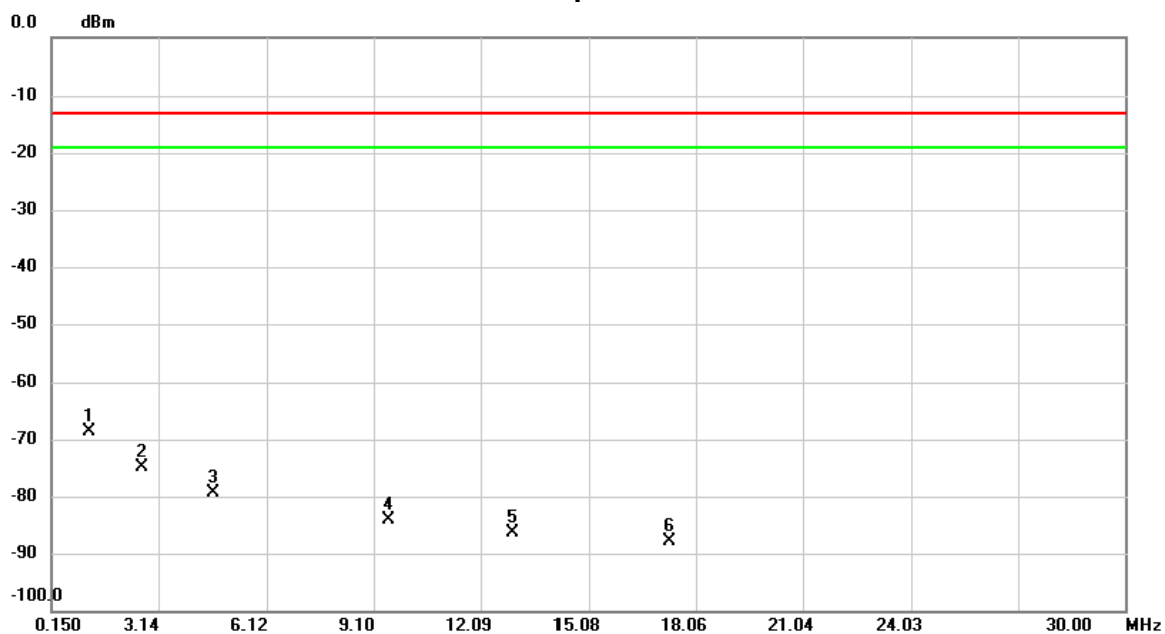
| | |
|------------|------------------------|
| Test Mode: | WCDMA Band V_TX CH4182 |
|------------|------------------------|



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.0321 | -67.71 | 14.79 | -52.92 | -13.00 | -39.92 | peak | |

Test Mode: WCDMA Band V_TX CH4182

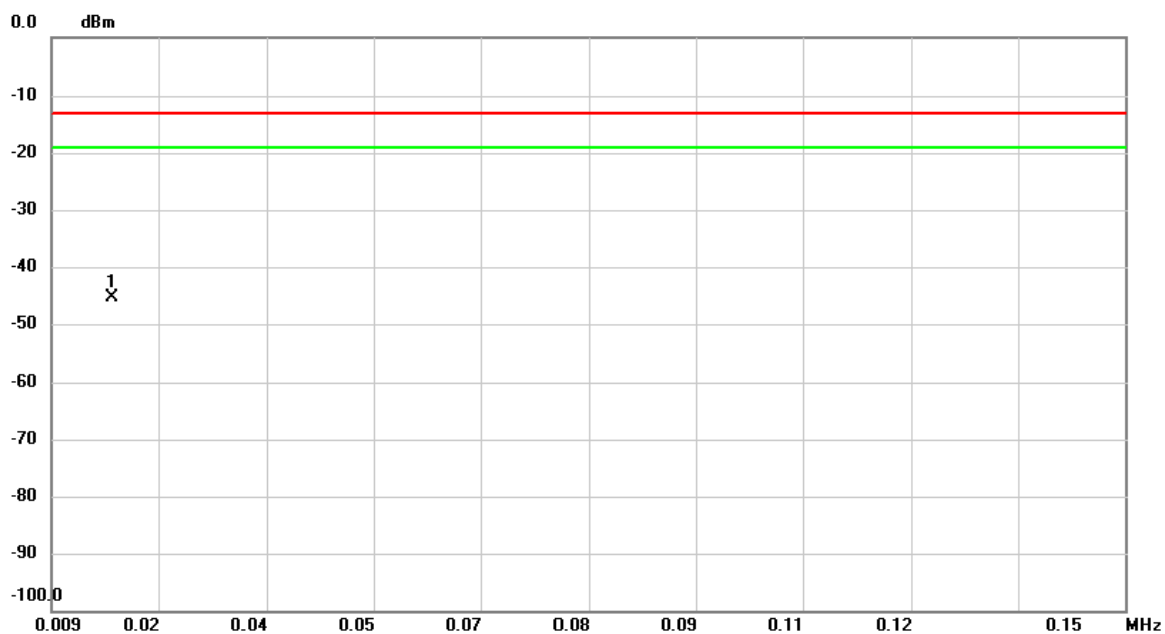
Open



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 1.1848 | -80.53 | 11.92 | -68.61 | -13.00 | -55.61 | peak | |
| 2 | | 2.6574 | -86.06 | 11.25 | -74.81 | -13.00 | -61.81 | peak | |
| 3 | | 4.6474 | -90.66 | 11.35 | -79.31 | -13.00 | -66.31 | peak | |
| 4 | | 9.5030 | -95.54 | 11.31 | -84.23 | -13.00 | -71.23 | peak | |
| 5 | | 12.9656 | -97.57 | 11.21 | -86.36 | -13.00 | -73.36 | peak | |
| 6 | | 17.3038 | -98.84 | 11.08 | -87.76 | -13.00 | -74.76 | peak | |

Test Mode: WCDMA Band V_TX CH4182

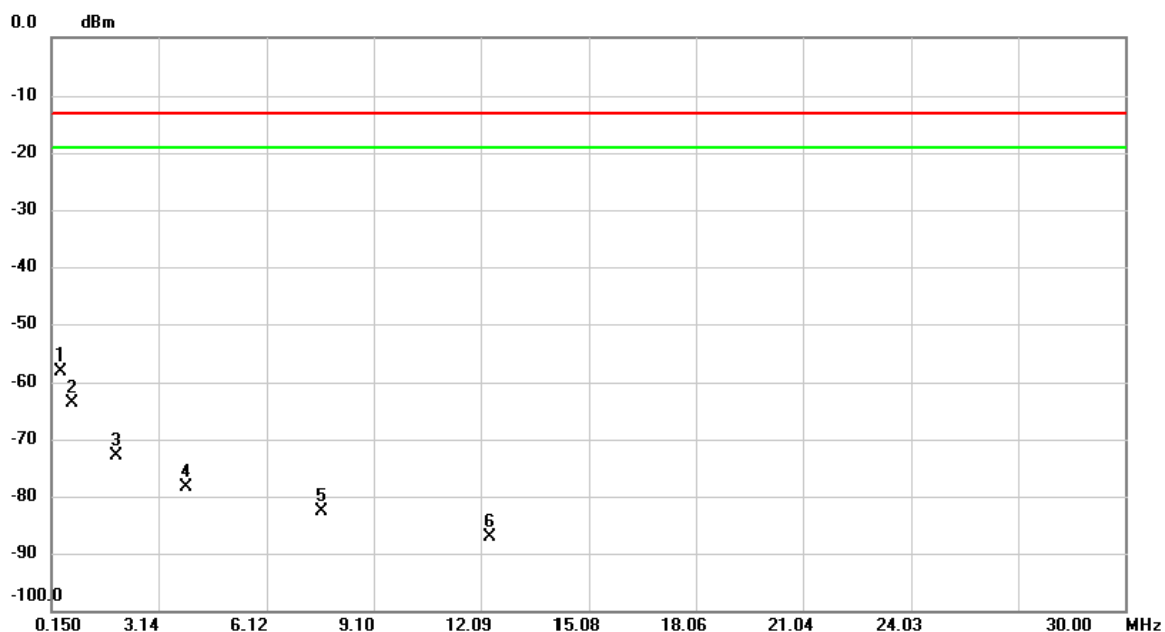
Close



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.0170 | -63.89 | 18.57 | -45.32 | -13.00 | -32.32 | peak | |

Test Mode: WCDMA Band V_TX CH4182

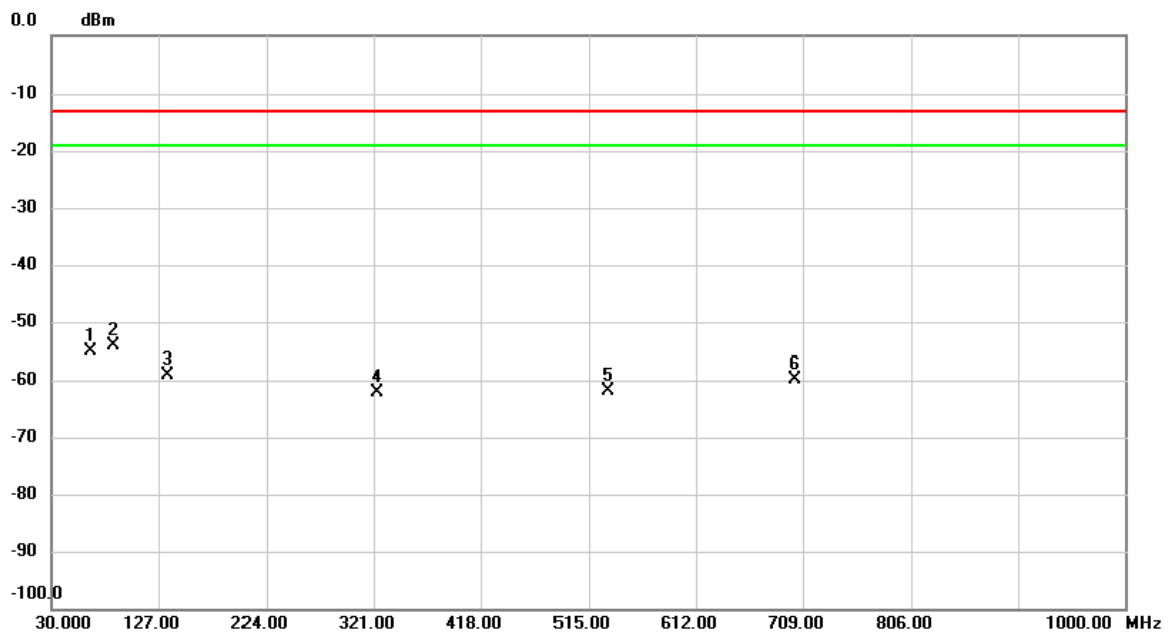
Close



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.3888 | -70.01 | 11.80 | -58.21 | -13.00 | -45.21 | peak | |
| 2 | | 0.7072 | -75.60 | 11.88 | -63.72 | -13.00 | -50.72 | peak | |
| 3 | | 1.9410 | -84.45 | 11.58 | -72.87 | -13.00 | -59.87 | peak | |
| 4 | | 3.8912 | -89.50 | 11.23 | -78.27 | -13.00 | -65.27 | peak | |
| 5 | | 7.6324 | -94.02 | 11.35 | -82.67 | -13.00 | -69.67 | peak | |
| 6 | | 12.3288 | -98.36 | 11.23 | -87.13 | -13.00 | -74.13 | peak | |

Test Mode: WCDMA Band V_TX CH4182

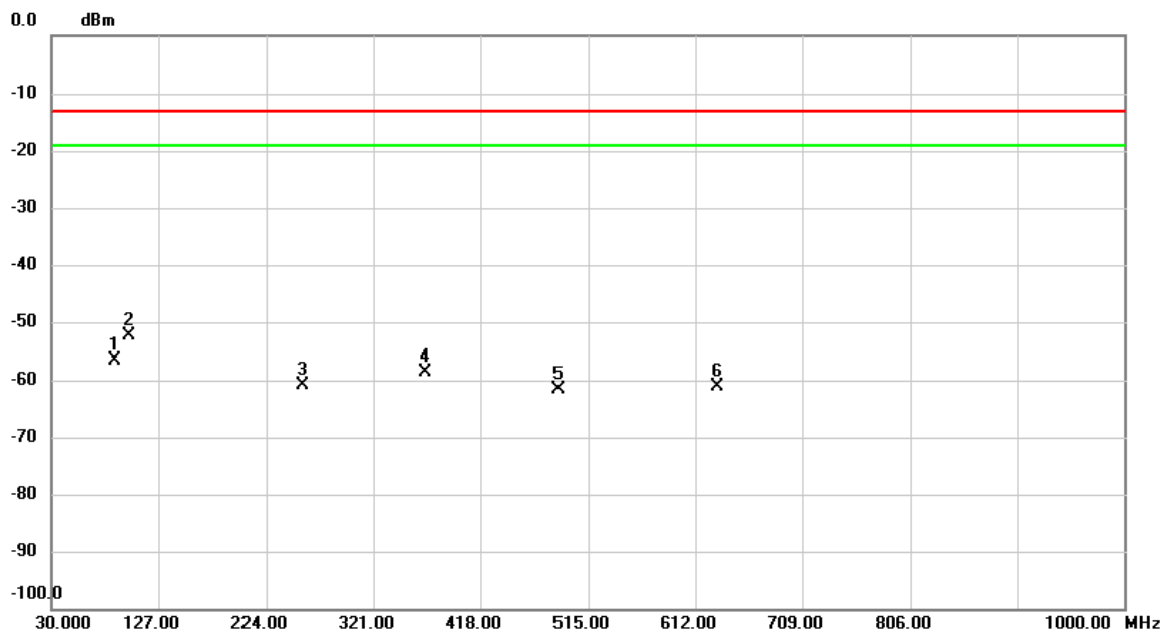
Vertical



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | | 64.9200 | -50.78 | -4.36 | -55.14 | -13.00 | -42.14 | peak | |
| 2 | * | 86.2600 | -49.98 | -4.23 | -54.21 | -13.00 | -41.21 | peak | |
| 3 | | 135.7300 | -57.35 | -1.86 | -59.21 | -13.00 | -46.21 | peak | |
| 4 | | 323.9100 | -61.80 | -0.41 | -62.21 | -13.00 | -49.21 | peak | |
| 5 | | 532.4600 | -66.16 | 4.18 | -61.98 | -13.00 | -48.98 | peak | |
| 6 | | 701.2400 | -66.92 | 6.94 | -59.98 | -13.00 | -46.98 | peak | |

Test Mode: WCDMA Band V_TX CH4182

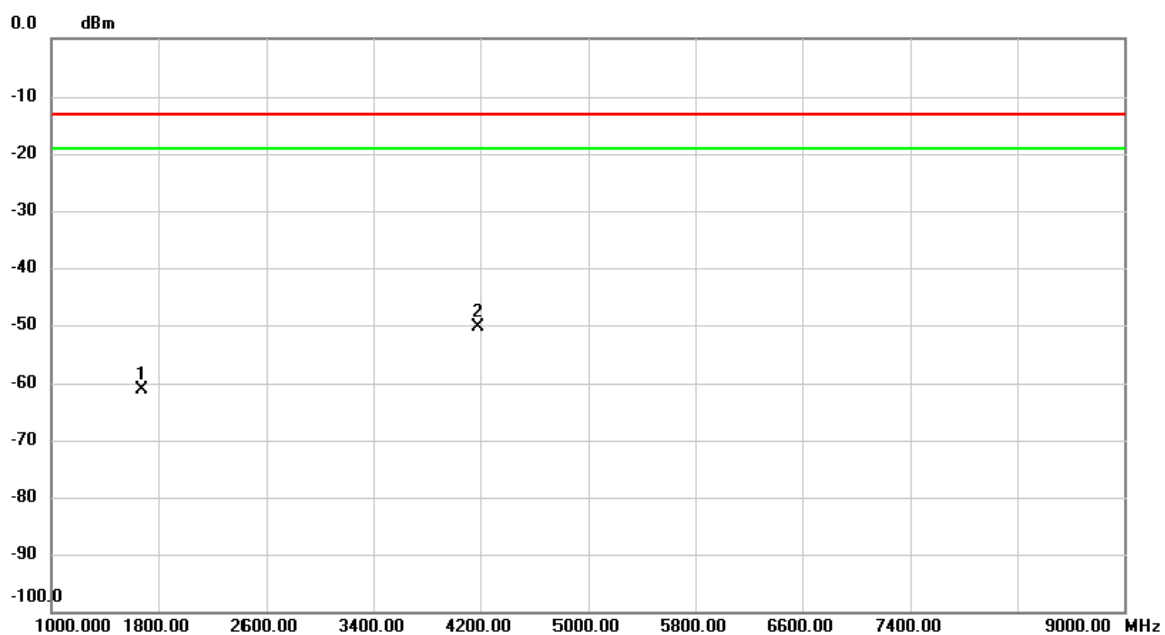
Horizontal



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | | 87.2300 | -52.69 | -4.03 | -56.72 | -13.00 | -43.72 | peak | |
| 2 | * | 100.8100 | -49.65 | -2.70 | -52.35 | -13.00 | -39.35 | peak | |
| 3 | | 256.9800 | -57.15 | -3.70 | -60.85 | -13.00 | -47.85 | peak | |
| 4 | | 367.5600 | -59.86 | 1.30 | -58.56 | -13.00 | -45.56 | peak | |
| 5 | | 488.8100 | -65.33 | 3.76 | -61.57 | -13.00 | -48.57 | peak | |
| 6 | | 631.4000 | -66.81 | 5.77 | -61.04 | -13.00 | -48.04 | peak | |

Test Mode: WCDMA Band V_TX CH4182

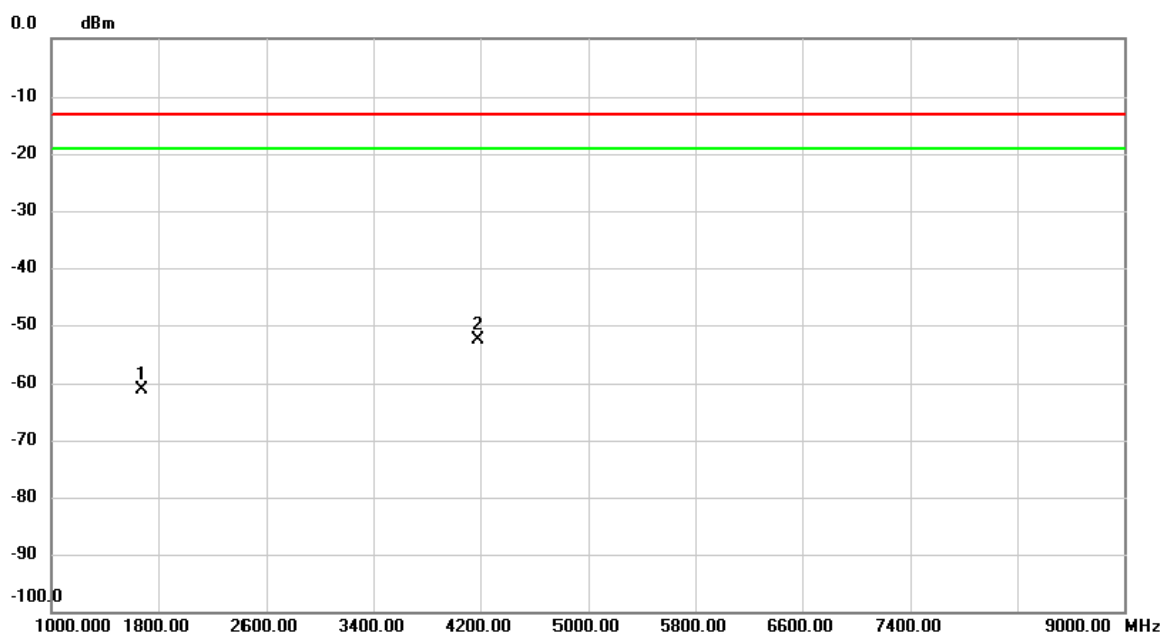
Vertical



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|-----|-----|----------|---------------|----------------|--------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | | 1672.800 | -50.65 | -10.46 | -61.11 | -13.00 | -48.11 | peak | |
| 2 | * | 4182.000 | -49.47 | -0.94 | -50.41 | -13.00 | -37.41 | peak | |

Test Mode: WCDMA Band V_TX CH4182

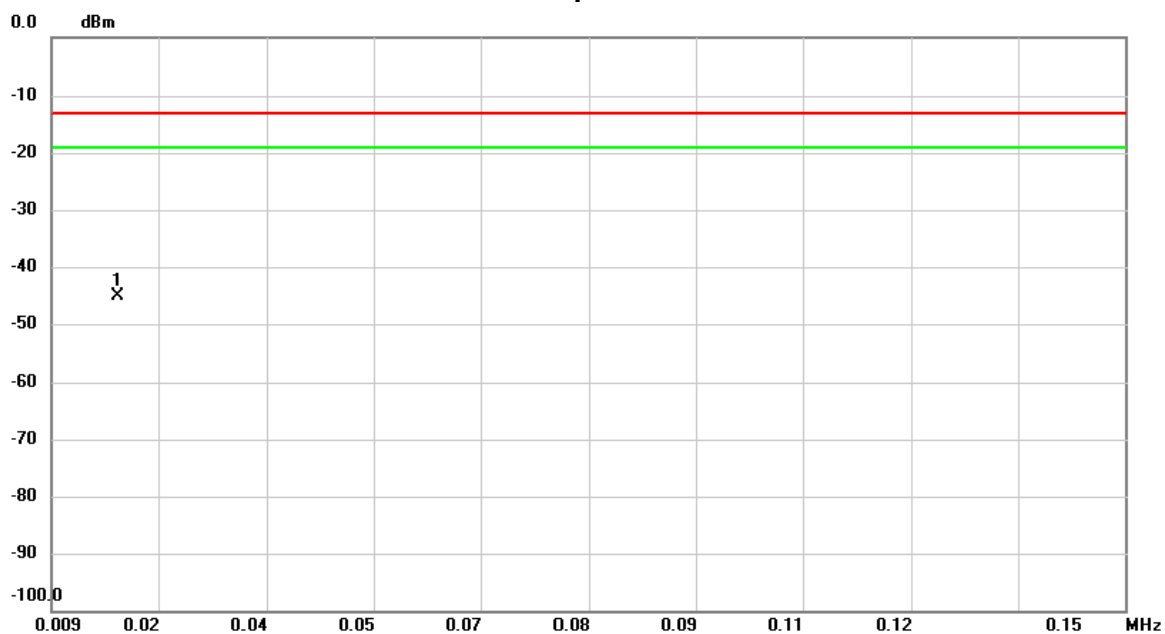
Horizontal



| No. | Mk. | Freq. MHz | Reading Level dBm | Correct Factor dB | Measure- ment dBm | Limit dBm | Over dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|------------|----------|---------|
| 1 | | 1672.800 | -50.70 | -10.46 | -61.16 | -13.00 | -48.16 | peak | |
| 2 | * | 4182.000 | -51.62 | -0.94 | -52.56 | -13.00 | -39.56 | peak | |

Test Mode: WCDMA Band V_TX CH4233

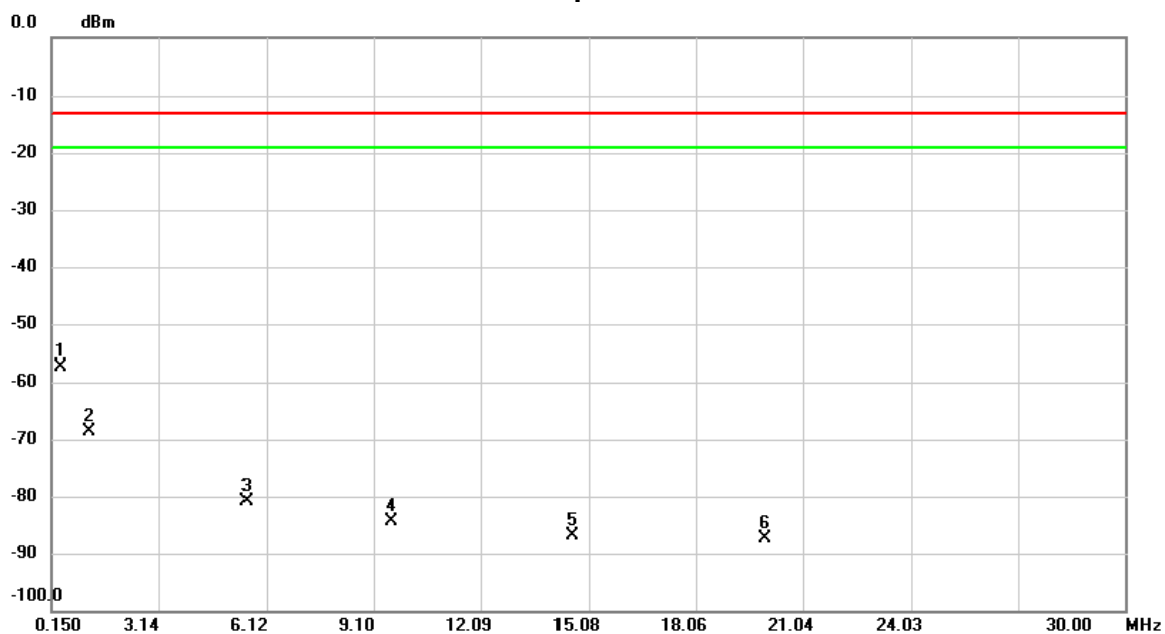
Open



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.0177 | -63.52 | 18.38 | -45.14 | -13.00 | -32.14 | peak | |

Test Mode: WCDMA Band V_TX CH4233

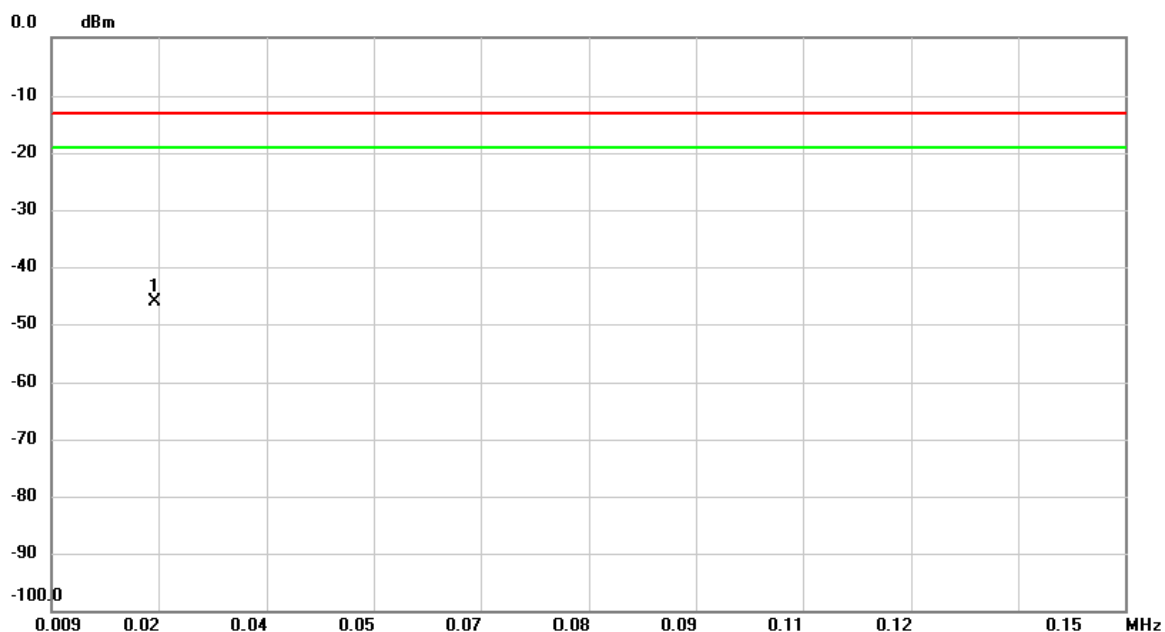
Open



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.3888 | -69.20 | 11.80 | -57.40 | -13.00 | -44.40 | peak | |
| 2 | | 1.1848 | -80.53 | 11.92 | -68.61 | -13.00 | -55.61 | peak | |
| 3 | | 5.5628 | -92.38 | 11.39 | -80.99 | -13.00 | -67.99 | peak | |
| 4 | | 9.5826 | -95.65 | 11.31 | -84.34 | -13.00 | -71.34 | peak | |
| 5 | | 14.5974 | -98.08 | 11.16 | -86.92 | -13.00 | -73.92 | peak | |
| 6 | | 19.9704 | -98.35 | 11.00 | -87.35 | -13.00 | -74.35 | peak | |

Test Mode: WCDMA Band V_TX CH4233

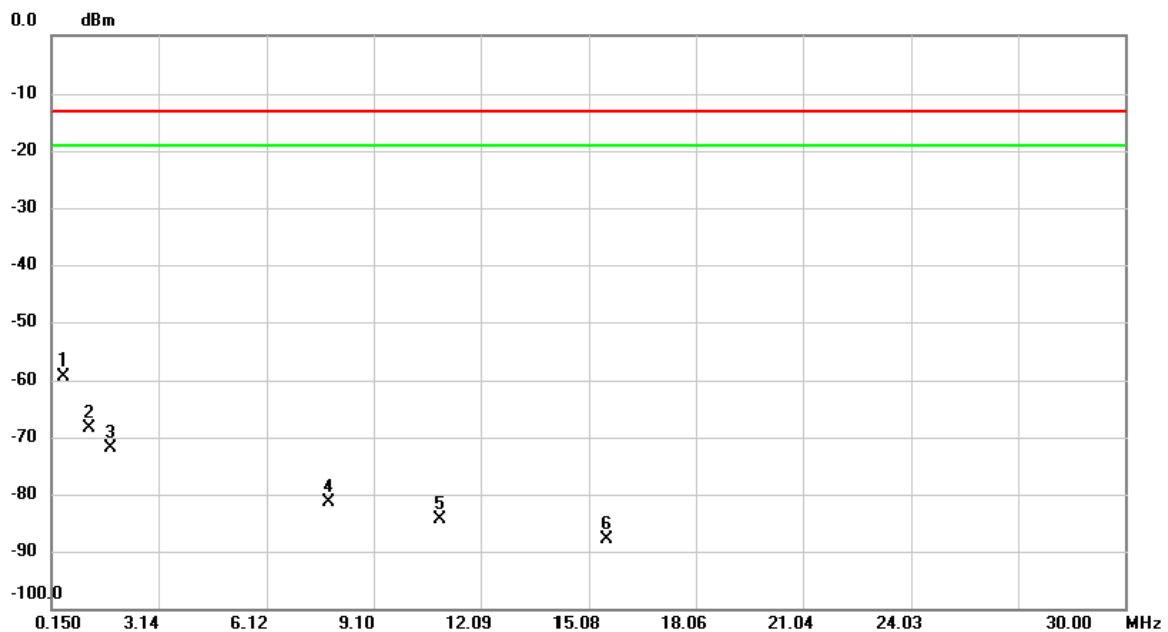
Close



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.0227 | -63.06 | 17.01 | -46.05 | -13.00 | -33.05 | peak | |

Test Mode: WCDMA Band V_TX CH4233

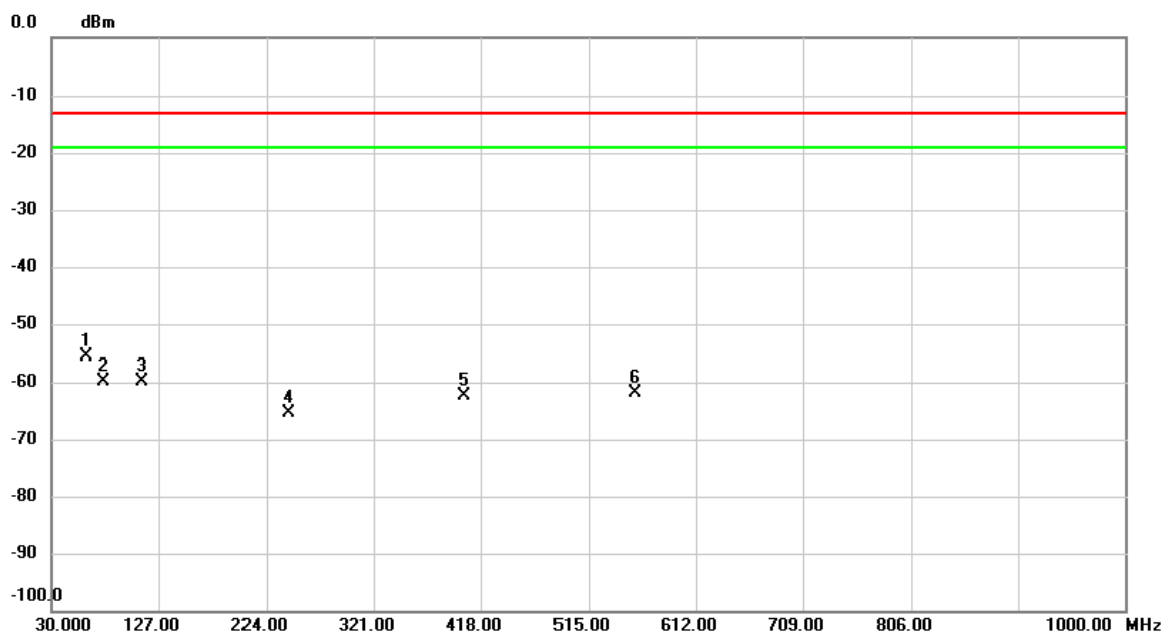
Close



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 0.4684 | -71.13 | 11.80 | -59.33 | -13.00 | -46.33 | peak | |
| 2 | | 1.1848 | -80.18 | 11.92 | -68.26 | -13.00 | -55.26 | peak | |
| 3 | | 1.7818 | -83.55 | 11.65 | -71.90 | -13.00 | -58.90 | peak | |
| 4 | | 7.8513 | -92.66 | 11.34 | -81.32 | -13.00 | -68.32 | peak | |
| 5 | | 10.9358 | -95.57 | 11.27 | -84.30 | -13.00 | -71.30 | peak | |
| 6 | | 15.5526 | -99.10 | 11.13 | -87.97 | -13.00 | -74.97 | peak | |

Test Mode: WCDMA Band V_TX CH4233

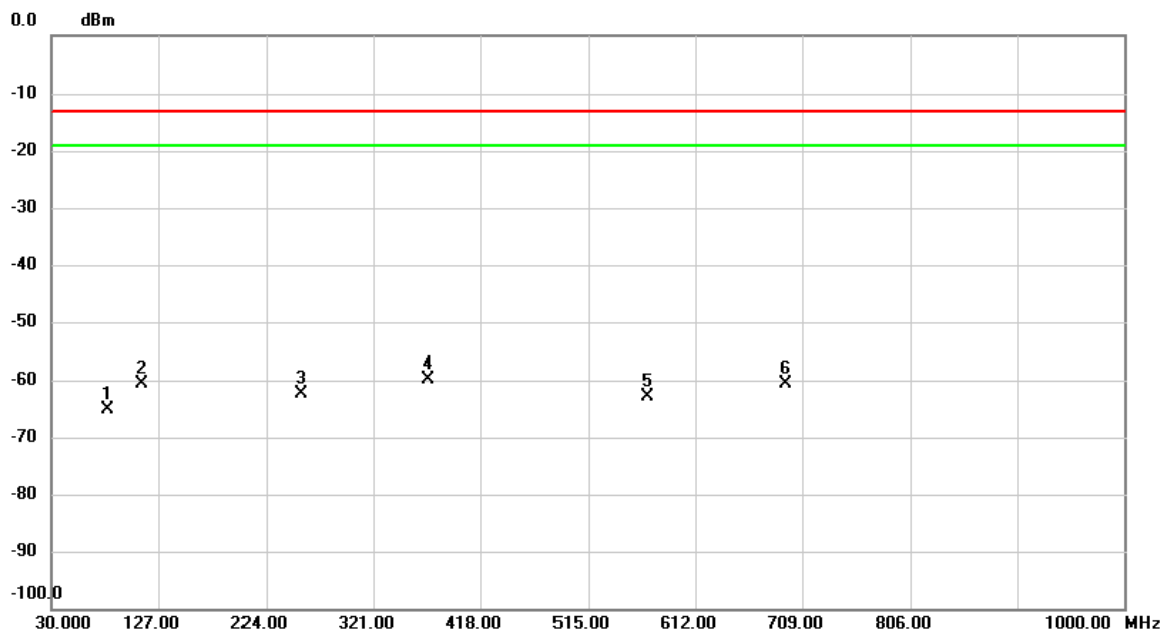
Vertical



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | * | 62.3333 | -52.06 | -3.64 | -55.70 | -13.00 | -42.70 | peak | |
| 2 | | 77.8533 | -54.31 | -5.62 | -59.93 | -13.00 | -46.93 | peak | |
| 3 | | 111.4800 | -56.23 | -3.66 | -59.89 | -13.00 | -46.89 | peak | |
| 4 | | 243.4000 | -61.61 | -3.87 | -65.48 | -13.00 | -52.48 | peak | |
| 5 | | 403.7732 | -64.62 | 2.32 | -62.30 | -13.00 | -49.30 | peak | |
| 6 | | 557.6800 | -66.30 | 4.54 | -61.76 | -13.00 | -48.76 | peak | |

Test Mode: WCDMA Band V_TX CH4233

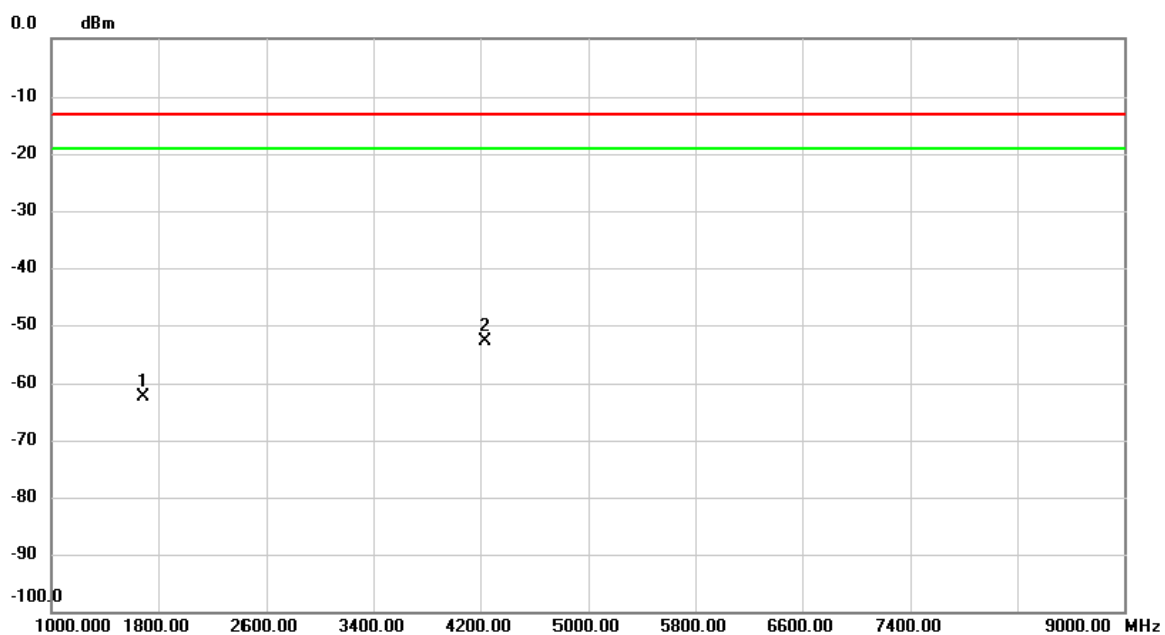
Horizontal



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
| | | MHz | dBm | dB | dBm | dBm | dB | Detector | Comment |
| 1 | | 80.4400 | -59.64 | -5.49 | -65.13 | -13.00 | -52.13 | peak | |
| 2 | | 112.7733 | -57.18 | -3.50 | -60.68 | -13.00 | -47.68 | peak | |
| 3 | | 255.0400 | -58.61 | -3.69 | -62.30 | -13.00 | -49.30 | peak | |
| 4 | * | 370.1467 | -61.23 | 1.37 | -59.86 | -13.00 | -46.86 | peak | |
| 5 | | 568.0267 | -67.77 | 4.81 | -62.96 | -13.00 | -49.96 | peak | |
| 6 | | 693.4800 | -67.45 | 6.77 | -60.68 | -13.00 | -47.68 | peak | |

Test Mode: WCDMA Band V_TX CH4233

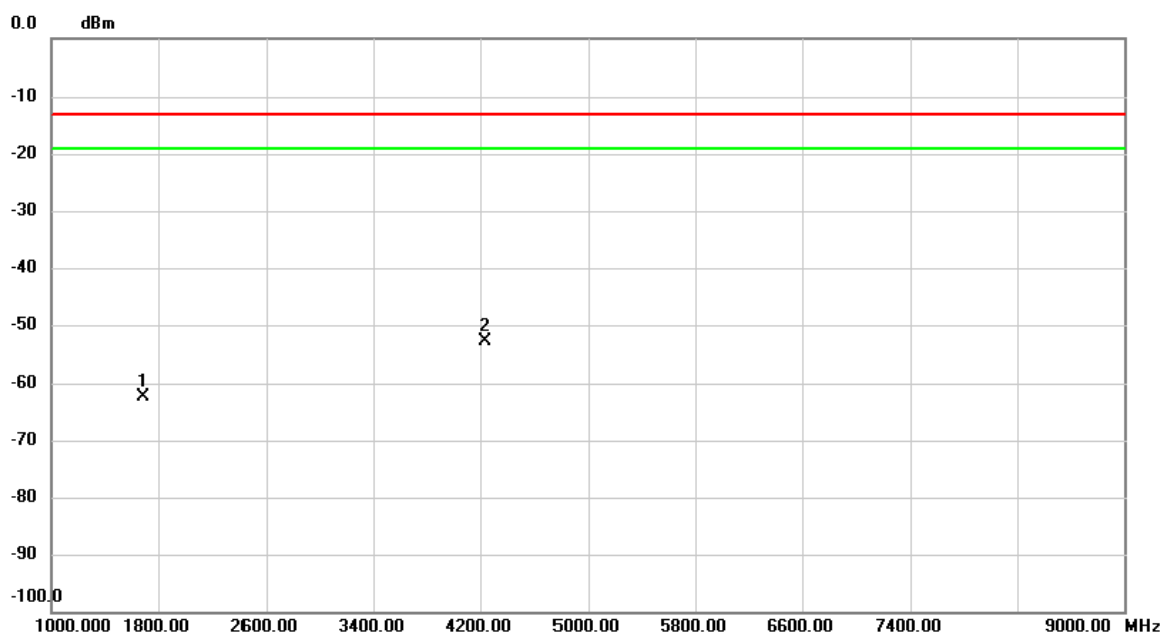
Vertical



| No. | Mk. | Freq. MHz | Reading Level dBm | Correct Factor dB | Measure- ment dBm | Limit dBm | Over dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|------------|----------|---------|
| 1 | | 1693.200 | -52.03 | -10.38 | -62.41 | -13.00 | -49.41 | peak | |
| 2 | * | 4233.000 | -51.99 | -0.96 | -52.95 | -13.00 | -39.95 | peak | |

Test Mode: WCDMA Band V_TX CH4233

Horizontal

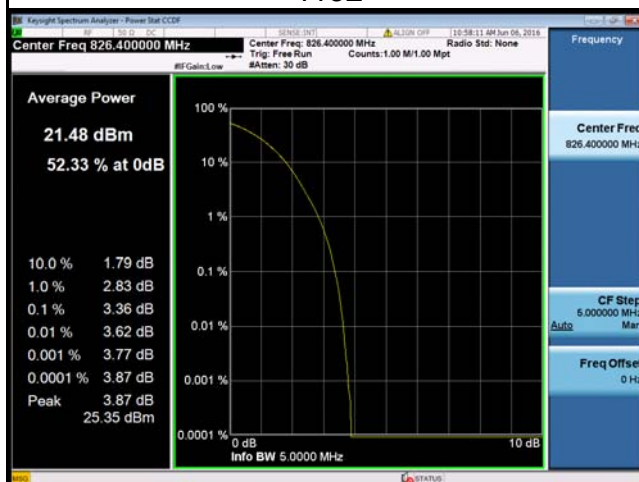


| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | | |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
| | | MHz | Level | Factor | ment | | | Detector | Comment |
| | | | dBm | dB | dBm | dBm | dB | | |
| 1 | | 1693.200 | -52.03 | -10.38 | -62.41 | -13.00 | -49.41 | peak | |
| 2 | * | 4233.000 | -52.01 | -0.96 | -52.97 | -13.00 | -39.97 | peak | |

ATTACHMENT C – PEAK TO AVERAGE RATIO

WCDMA Band V Spectrum Plot

4132



4182



4233



-

ATTACHMENT D - FREQUENCY STABILITY

| | |
|------------|---------------------|
| Test Mode: | WCDMA Band V_CH4132 |
|------------|---------------------|

Operation temperature: -20~60°C

Operation voltage: DC 3.15 - 4.3V

Temperature vs. Frequency Stability

| Temperature(°C) | Frequency Error (Hz) | Frequency Error (ppm) | Limit(ppm) |
|----------------------|----------------------|-----------------------|------------|
| -20 | 1.22 | 0.001 | 2.5 |
| -10 | 4.3 | 0.005 | 2.5 |
| 0 | -0.09 | 0.000 | 2.5 |
| 10 | -2.22 | -0.003 | 2.5 |
| 20 | -1.93 | -0.002 | 2.5 |
| 30 | -2.44 | -0.003 | 2.5 |
| 40 | -4.85 | -0.006 | 2.5 |
| 50 | 3.16 | 0.004 | 2.5 |
| 55 | 4.72 | 0.006 | 2.5 |
| 60 | 0.89 | 0.001 | 2.5 |
| Max. Deviation (ppm) | -4.85 | -0.006 | 2.5 |

Voltage vs. Frequency Stability

| Voltage(Volts) | Frequency Error (Hz) | Frequency Error (ppm) | Limit(ppm) |
|----------------------|----------------------|-----------------------|------------|
| 3.15 | -0.88 | -0.001 | 2.5 |
| 3.7 | 3.7 | 0.004 | 2.5 |
| 4.3 | 3.47 | 0.004 | 2.5 |
| Max. Deviation (ppm) | 3.7 | 0.004 | 2.5 |

Note: The USB power is for battery charging, so only the battery supplied voltage range is used for testing.

| | |
|------------|---------------------|
| Test Mode: | WCDMA Band V_CH4182 |
|------------|---------------------|

Operation temperature: -20~60°C

Operation voltage: DC 3.15 - 4.3V

Temperature vs. Frequency Stability

| Temperature(°C) | Frequency Error (Hz) | Frequency Error (ppm) | Limit(ppm) |
|----------------------|----------------------|-----------------------|------------|
| -20 | 1.32 | 0.002 | 2.5 |
| -10 | 2.26 | 0.003 | 2.5 |
| 0 | -1.47 | -0.002 | 2.5 |
| 10 | -2.47 | -0.003 | 2.5 |
| 20 | -1.43 | -0.002 | 2.5 |
| 30 | -2.30 | -0.003 | 2.5 |
| 40 | -2.80 | -0.003 | 2.5 |
| 50 | 2.10 | 0.003 | 2.5 |
| 55 | 2.33 | 0.003 | 2.5 |
| 60 | 2.53 | 0.003 | 2.5 |
| Max. Deviation (ppm) | -2.80 | -0.003 | 2.5 |

Voltage vs. Frequency Stability

| Voltage(Volts) | Frequency Error (Hz) | Frequency Error (ppm) | Limit(ppm) |
|----------------------|----------------------|-----------------------|------------|
| 3.15 | -1.43 | -0.002 | 2.5 |
| 3.7 | 2.22 | 0.003 | 2.5 |
| 4.3 | 3.49 | 0.004 | 2.5 |
| Max. Deviation (ppm) | 3.49 | 0.004 | 2.5 |

Note: The USB power is for battery charging, so only the battery supplied voltage range is used for testing.

| | |
|------------|---------------------|
| Test Mode: | WCDMA Band V_CH4233 |
|------------|---------------------|

Operation temperature: -20~60°C

Operation voltage: DC 3.15 - 4.3V

Temperature vs. Frequency Stability

| Temperature(°C) | Frequency Error (Hz) | Frequency Error (ppm) | Limit(ppm) |
|----------------------|----------------------|-----------------------|------------|
| -20 | 2.15 | 0.003 | 2.5 |
| -10 | 2.27 | 0.003 | 2.5 |
| 0 | 0.85 | 0.001 | 2.5 |
| 10 | -1.56 | -0.002 | 2.5 |
| 20 | -4.30 | -0.005 | 2.5 |
| 30 | 2.77 | 0.003 | 2.5 |
| 40 | 0.68 | 0.001 | 2.5 |
| 50 | -3.00 | -0.004 | 2.5 |
| 55 | 2.10 | 0.002 | 2.5 |
| 60 | -0.93 | -0.001 | 2.5 |
| Max. Deviation (ppm) | -4.30 | -0.005 | 2.5 |

Voltage vs. Frequency Stability

| Voltage(Volts) | Frequency Error (Hz) | Frequency Error (ppm) | Limit(ppm) |
|----------------------|----------------------|-----------------------|------------|
| 3.15 | 1.00 | 0.001 | 2.5 |
| 3.7 | 1.25 | 0.001 | 2.5 |
| 4.3 | 1.79 | 0.002 | 2.5 |
| Max. Deviation (ppm) | 1.79 | 0.002 | 2.5 |

Note: The USB power is for battery charging, so only the battery supplied voltage range is used for testing.