

FCC /ISED Test Report

Product Name : Module
Trade Name : AirPrime
Model No. : EM7411
FCC ID : N7NEM74B
IC : 2417C-EM74B

Applicant : SIERRA WIRELESS, INC.
Address : 13811 Wireless Way, Richmond, BC, Canada V6V 3A4
Canada

Date of Receipt : Jun. 30, 2020
Issued Date : Nov. 19, 2020
Report No. : 2061278R-E3042110011
Report Version : V1.0



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Test Report Certification


Issued Date: Nov. 19, 2020
Report No.: 2061278R-E3042110011




Product Name : Module
 Applicant : SIERRA WIRELESS, INC.
 Address : 13811 Wireless Way, Richmond, BC, Canada V6V 3A4
 Canada
 Manufacturer : SIERRA WIRELESS, INC.
 Trade Name : AirPrime
 Model No. : EM7411
 FCC ID : N7NEM74B
 IC : 2417C-EM74B
 EUT Voltage : DC 3.7V
 Testing Voltage : DC 3.7V
 Applicable Standard : FCC CFR Title 47 Part 22 Subpart H
 FCC CFR Title Part 24 Subpart E
 FCC CFR Title Part 27 Subpart M
 ISED RSS-GEN Issue 5,
 ISED RSS-132 Issue 3
 ISED RSS-133 Issue 6,
 ISED RSS-139 Issue 3,
 ANSI/TIA-603-E-2016
 Test Lab : Hsin Chu Laboratory
 Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu
 County 310, Taiwan, R.O.C.
 TEL: +886-3-582-8001 / FAX: +886-3-582-8958
 Test Result : Complied

Documented By : 

 (Demi Chang / Senior Engineering Adm. Specialist)

Tested By : 

 (Max Chang / Engineer)

Approved By : 

 (Louis Hsu / Deputy Manager)

Revision History

| Version | Description | Issued Date |
|----------------|-------------------------|--------------------|
| V1.0 | Initial issue of report | Nov. 19, 2020 |
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1. General Information

1.1. EUT Description

| | |
|---------------------------------------|---|
| Product Name | Module |
| Trade Name | AirPrime |
| Model No. | EM7411 |
| Tx Frequency Range/ Channel number | WCDMA Band 2: 1852.4-1907.6 MHz WCDMA Band 4: 1712.4-1752.6 MHz WCDMA Band 5: 826.4-846.6 MHz |
| Rx Frequency Range/ Channel number | WCDMA Band 2: 1932.4-1987.6 MHz WCDMA Band 4: 2112.4-2152.6 MHz WCDMA Band 5: 871.4-891.6 MHz |
| Type of Modulation | WCDMA: QPSK (Uplink); HSDPA: QPSK (Uplink); HSUPA: QPSK (Uplink) |
| HW Version | 1.0 |
| SW Version | SWI9X50C_01.13.02.00 22fdf9 |
| IMEI No. | 356280110001130 |

| Antenna Information | |
|---------------------|---|
| Trade Name | PANORAMA ANTENNAS |
| Model No. | PWB-7-60 |
| Antenna Type | Dipole Antenna |
| Antenna Gain | 698-960MHz / 2.4-2.7GHz: 4dBi 1710-2170MHz: 2dBi |

Note:

1. This EM7411 supports WCDMA Band 2/4/5, LTE Band 2/4/5/7/12/13/14/25/26/41/66/71 and CA Band 5B, 7C, 41C.
2. The EUT description is from the customer declaration.
3. This device was tested under all bandwidths, RB configurations and modulations.
The worst case was found in RMC mode and show the worst case in the test report.

1.2. Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

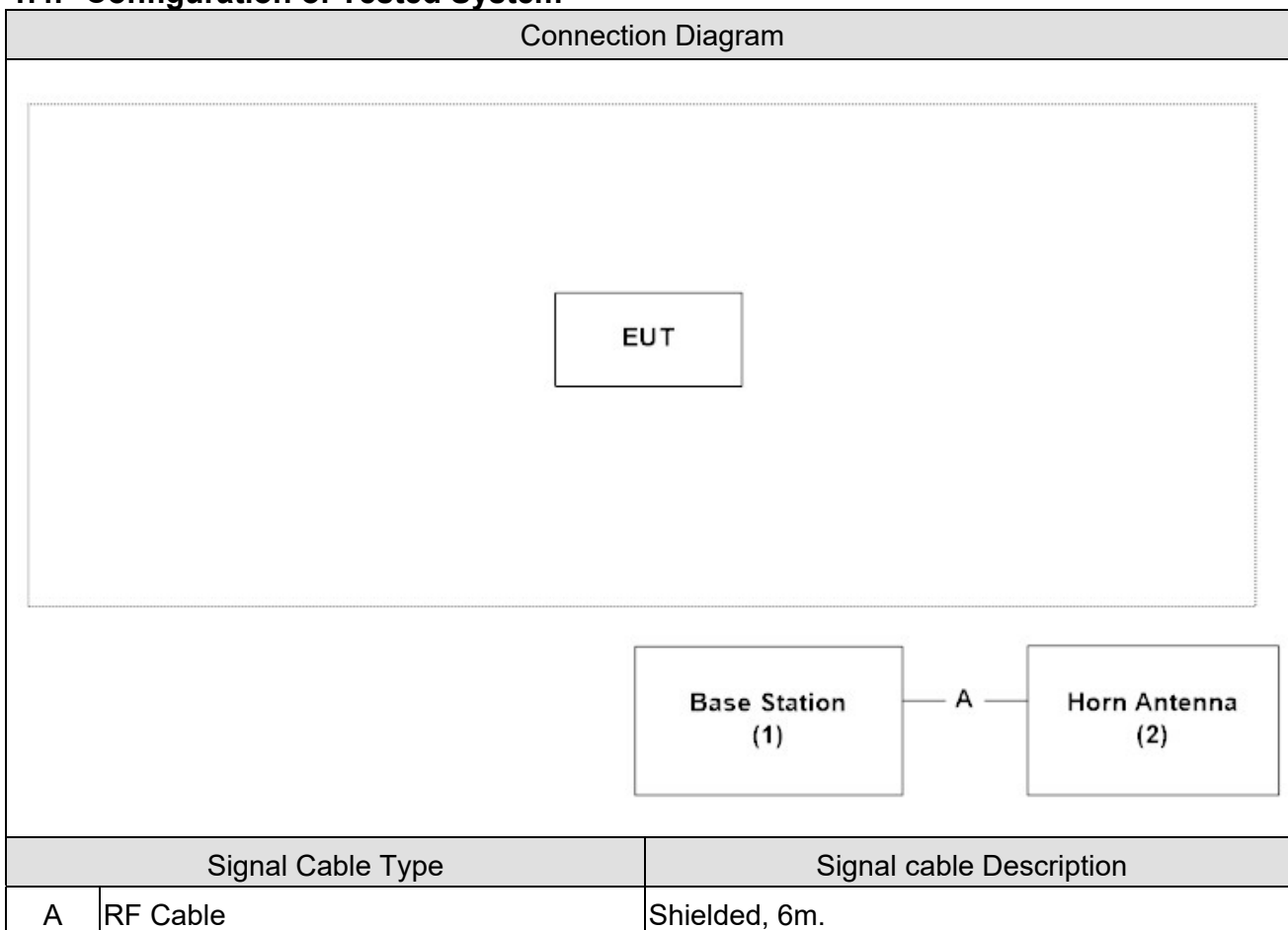
| Test Mode |
|----------------------|
| Mode 1: WCDMA Band 2 |
| Mode 2: WCDMA Band 4 |
| Mode 3: WCDMA Band 5 |

1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | Manufacturer | Model No. | Serial No. | FCC ID | Power Cord |
|------------------|--------------|------------|------------|--------|------------------|
| 1 Base Station | R&S | CMW500 | 157118 | DoC | Non-Shielded, 2m |
| 2 Horn Antenna | Schwarzbeck | BBHA 9120D | 1640 | DoC | -- |

1.4. Configuration of Tested System



1.5. EUT Exercise Software

| | |
|---|---|
| 1 | Setup the EUT and simulators as shown on. |
| 2 | Turn on the power of all equipment. |
| 3 | The EUT will continue receive the signal from WCDMA function. |
| 4 | Repeat the above procedure. |

1.6. Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

2. Technical Test

2.1. Summary of Test Result

- No deviations from the test standards
- Deviations from the test standards as below description:

For WCDMA Band 2

(FCC Part 24 Subpart E, Industry Canada RSS-133, Issue 6, Industry Canada RSS-GEN)

| Performed Item | FCC Rule | IC Rule | Limit | Result |
|-----------------------|-------------------------------|--------------|----------------|--------|
| RF Output Power | §2.1033 §2.1046 §24.232 | §6.4 | < 2 Watts EIRP | Pass |
| Occupied Bandwidth | §2.1049 | RSS-GEN §4.2 | N/A | Pass |
| Peak To Average Ratio | §24.232(d) | §6.4 | ≤ 13dB | Pass |
| Conducted Band Edge | §27.238 | §6.5 | < -13dBm | Pass |
| Spurious Emission | §2.1053 §24.238 | §6.5 | < -13dBm | Pass |
| Frequency Stability | §2.1055 §24.235 | §6.3 | < 2.5 ppm | Pass |

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For WCDMA Band 4**(FCC Part 27 Subpart M, Industry Canada RSS-139, Issue 3, Industry Canada RSS-GEN)**

| Performed Item | FCC Rule | IC Rule | Limit | Result |
|-----------------------|-----------------------------|----------------|----------------|--------|
| RF Output Power | §2.1046 § 27.50(h)(2) | §6.5 | < 1 Watts EIRP | Pass |
| Occupied Bandwidth | § 2.1049 § 27.53(l)(6) | RSS - Gen §6.6 | N/A | Pass |
| Peak To Average Ratio | §27.50(b) | §6.5 | ≤ 13dB | Pass |
| Conducted Band Edge | § 2.1051 §27.53(l)(4)(6) | §6.6 | < -13 dBm | Pass |
| Spurious Emission | § 2.1051 §27.53(l)(4)(6) | §6.6 | < -25 dBm | Pass |
| Frequency Stability | §2.1055(a)(l) § 27.54 | §6.4 | < 2.5 ppm | Pass |

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For WCDMA Band 5**(FCC Part 22 Subpart H, Industry Canada RSS-132, Issue 3, Industry Canada RSS-GEN)**

| Performed Item | FCC Rule | IC Rule | Limit | Result |
|-----------------------|-------------------------------|--------------|---------------|--------|
| RF Output Power | §2.1033 §2.1046 §22.913 | §5.4 | < 7 Watts ERP | Pass |
| Occupied Bandwidth | §2.1049 | RSS-GEN §4.2 | N/A | Pass |
| Peak To Average Ratio | §22.913(d) | §5.4 | ≤ 13dB | Pass |
| Conducted Band Edge | §22.917 | §5.5 | < -13dBm | Pass |
| Spurious Emission | §2.1053 §22.917 | §5.5 | < -13dBm | Pass |
| Frequency Stability | §2.1055 §22.335 | §5.3 | < 2.5 ppm | Pass |

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.2. Test Environment

| Items | Test Item | Required | Test Site |
|------------------|-----------------------|----------|-----------|
| Temperature (°C) | RF Output Power | 15-35 | 2 |
| Humidity (%RH) | | 25-75 | |
| Temperature (°C) | Occupied Bandwidth | 15-35 | 2 |
| Humidity (%RH) | | 25-75 | |
| Temperature (°C) | Peak To Average Ratio | 15-35 | 2 |
| Humidity (%RH) | | 25-75 | |
| Temperature (°C) | Conducted Band Edge | 15-35 | 2 |
| Humidity (%RH) | | 25-75 | |
| Temperature (°C) | Spurious Emission | 15-35 | 2 |
| Humidity (%RH) | | 25-75 | |
| Temperature (°C) | Frequency Stability | 15-35 | 2 |
| Humidity (%RH) | | 25-75 | |

Note: Test Site information refers to Laboratory Information.

Laboratory Information

USA : **FCC Registration Number: TW3024**
Canada : **IC Registration Number: 22397-1 / 22397-2 / 22397-3**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <http://www.dekra.com.tw>

If you have any comments, please don't hesitate to contact us. Our test sites as below:

| | |
|-----------------|---|
| Test Laboratory | DEKRA Testing and Certification Co., Ltd. |
| Address | <ol style="list-style-type: none"> 1. No. 75-2, 3rd Lin, WangYe Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 3. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. |
| Phone number | <ol style="list-style-type: none"> 1. +886-3-592-8858 2. +886-3-582-8001 3. +886-3-582-8001 |
| Fax number | <ol style="list-style-type: none"> 1. +886-3-592-8859 2. +886-3-582-8958 3. +886-3-582-8958 |
| E mail address | info.tw@dekra.com |
| Website | http://www.dekra.com.tw |

2.3. List of Test Equipment

RF Output Power / SR12-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-----------|------------|------------|----------------|
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Spectrum Analyzer | Keysight | N9030B | MY57140404 | 2020/06/03 | 2021/06/02 |
| Spectrum Analyzer | Keysight | N9010B | MY57110159 | 2020/04/15 | 2021/04/14 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |

Occupied Bandwidth / SR12-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-----------|------------|------------|----------------|
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Spectrum Analyzer | Keysight | N9030B | MY57140404 | 2020/06/03 | 2021/06/02 |
| Spectrum Analyzer | Keysight | N9010B | MY57110159 | 2020/04/15 | 2021/04/14 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |

Peak To Average Ratio / SR12-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-----------|------------|------------|----------------|
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Spectrum Analyzer | Keysight | N9030B | MY57140404 | 2020/06/03 | 2021/06/02 |
| Spectrum Analyzer | Keysight | N9010B | MY57110159 | 2020/04/15 | 2021/04/14 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |

Conducted Band Edge / SR12-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-----------|------------|------------|----------------|
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Spectrum Analyzer | Keysight | N9030B | MY57140404 | 2020/06/03 | 2021/06/02 |
| Spectrum Analyzer | Keysight | N9010B | MY57110159 | 2020/04/15 | 2021/04/14 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |

Conducted Spurious Emissions / SR12-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-----------|------------|------------|----------------|
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Spectrum Analyzer | Keysight | N9030B | MY57140404 | 2020/06/03 | 2021/06/02 |
| Spectrum Analyzer | Keysight | N9010B | MY57110159 | 2020/04/15 | 2021/04/14 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |

Radiated Spurious Emissions / CB2-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-------------|------------|------------|----------------|
| Horn Antenna | Schwarzbeck | BBHA 9120D | 639 | 2020/06/04 | 2021/06/03 |
| Bilog Antenna | Teseq | CBL6112D | 23191 | 2020/06/12 | 2021/06/11 |
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Signal Analyzer | R&S | FSVA40 | 101455 | 2019/10/21 | 2020/10/20 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | 202 | 2019/12/27 | 2020/12/26 |
| Pre-Amplifier | DEKRA | AP-400C | 201801231 | 2019/12/03 | 2020/12/02 |
| Pre-Amplifier | EMCI | EMC11830I | 980366 | 2019/12/03 | 2020/12/02 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 01656 | 2019/10/25 | 2020/10/24 |
| Pre-Amplifier | DEKRA | AP-025C | 12183122 | 2020/09/03 | 2021/09/02 |
| Signal Analyzer | R&S | FSV40 | 101435 | 2020/06/24 | 2021/06/23 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Coaxial Cable(13m) | Huber+Suhner | SF104 | CB2-H | 2020/07/25 | 2021/07/24 |
| EMI system | DEKRA | Version 1.0 | CB2-H | NA | NA |

Frequency Stability / SR12-H

| Instrument | Manufacturer | Model No. | Serial No. | Cal. Date | Next Cal. Date |
|-------------------------------------|--------------|-----------|------------|------------|----------------|
| Signal & Spectrum Analyzer | R&S | FSV40 | 101049 | 2020/03/30 | 2021/03/29 |
| EXA Signal Analyzer | Keysight | N9010A | MY51440132 | 2020/02/21 | 2021/02/20 |
| Spectrum Analyzer | Keysight | N9030B | MY57140404 | 2020/06/03 | 2021/06/02 |
| Spectrum Analyzer | Keysight | N9010B | MY57110159 | 2020/04/15 | 2021/04/14 |
| Wireless Conn. Tseter | R&S | CMW500 | 157118 | 2020/07/23 | 2021/07/22 |
| Wideband Radio Communication Tester | R&S | CMW500 | 106071 | 2020/02/03 | 2021/02/02 |

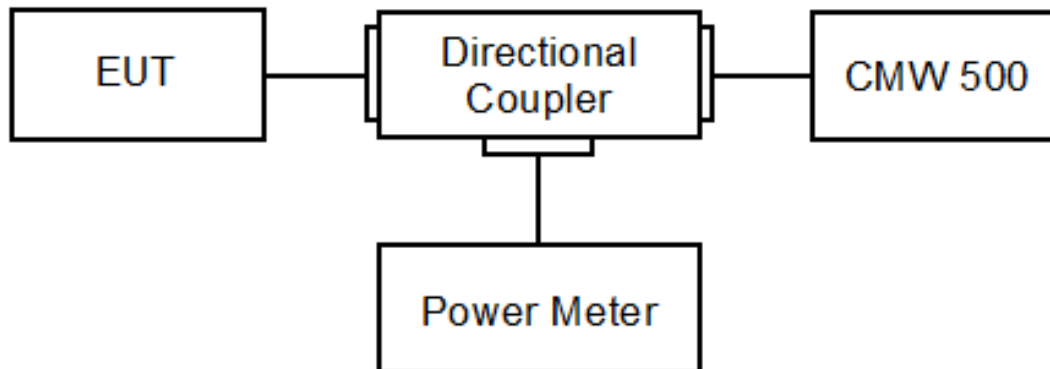
Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.4. Measurement Uncertainty

| Test Item | Uncertainty |
|-----------------------|--|
| RF Output Power | ± 1.27 dB |
| Occupied Bandwidth | ± 10 Hz |
| Peak To Average Ratio | 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. |
| Conducted Band Edge | ± 1.2 dB |
| Spurious Emissions | The measurement uncertainty is defined as ± 1.27 dB for Conducted Measurement. The measurement uncertainty is defined as ± 3.2 dB for Radiated Measurement. |
| Frequency Stability | ± 10 Hz |

3. RF Output Power

3.1. Test Setup



3.2. Test Procedure

- a) The RF output of the transmitter was connected to base station simulator.
- b) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- c) Set EUT at maximum average power by base station simulator.
- d) Measure lowest, middle, and highest channels for each bandwidth and different modulation.

Effective Isotropic Radiated Power = Conducted Power(dBm) + Antenna Gain(dBi)

Effective Radiated Power = Conducted Power(dBm) + Antenna Gain(dBi) - 2.15dB

The conversion of dBm to watts is given by the formula:

$$P_{(W)} = 1W \times \frac{10^{\left(\frac{P_{(dBm)}}{10}\right)}}{1000} = 10^{((P_{(dBm)} - 30)/10)}$$

3.3. Test Method

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 5.2.4

ANSI C63.26-2015 Sub-clause 5.2.4.2

3.4. Test Result

| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | RF Output Power | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Test Mode | Frequency (MHz) | Reading Level (dBm) | Antenna Gain (dBi) | Measure Level (dBm) | Measure Level (W) | Limit (EIRP) (W) |
|-----------------|-----------------|---------------------|--------------------|---------------------|-------------------|------------------|
| RMC | 1852.4 | 21.45 | 4 | 25.450 | 0.351 | 2 |
| | 1880 | 21.60 | 4 | 25.600 | 0.363 | 2 |
| | 1907.6 | 21.29 | 4 | 25.290 | 0.338 | 2 |
| HSUPA Subtest 1 | 1852.4 | 20.40 | 4 | 24.400 | 0.275 | 2 |
| | 1880 | 20.58 | 4 | 24.580 | 0.287 | 2 |
| | 1907.6 | 20.29 | 4 | 24.290 | 0.269 | 2 |
| HSUPA Subtest 2 | 1852.4 | 19.95 | 4 | 23.950 | 0.248 | 2 |
| | 1880 | 20.11 | 4 | 24.110 | 0.258 | 2 |
| | 1907.6 | 19.81 | 4 | 23.810 | 0.240 | 2 |
| HSUPA Subtest 3 | 1852.4 | 20.40 | 4 | 24.400 | 0.275 | 2 |
| | 1880 | 20.65 | 4 | 24.650 | 0.292 | 2 |
| | 1907.6 | 20.38 | 4 | 24.380 | 0.274 | 2 |
| HSUPA Subtest 4 | 1852.4 | 20.44 | 4 | 24.440 | 0.278 | 2 |
| | 1880 | 20.63 | 4 | 24.630 | 0.290 | 2 |
| | 1907.6 | 20.30 | 4 | 24.300 | 0.269 | 2 |
| HSUPA Subtest 5 | 1852.4 | 20.47 | 4 | 24.470 | 0.280 | 2 |
| | 1880 | 20.64 | 4 | 24.640 | 0.291 | 2 |
| | 1907.6 | 20.31 | 4 | 24.310 | 0.270 | 2 |
| HSDPA Subtest 1 | 1852.4 | 20.02 | 4 | 24.020 | 0.252 | 2 |
| | 1880 | 20.18 | 4 | 24.180 | 0.262 | 2 |
| | 1907.6 | 19.87 | 4 | 23.870 | 0.244 | 2 |
| HSDPA Subtest 2 | 1852.4 | 19.95 | 4 | 23.950 | 0.248 | 2 |
| | 1880 | 20.18 | 4 | 24.180 | 0.262 | 2 |
| | 1907.6 | 19.85 | 4 | 23.850 | 0.243 | 2 |
| HSDPA Subtest 3 | 1852.4 | 19.96 | 4 | 23.960 | 0.249 | 2 |
| | 1880 | 20.13 | 4 | 24.130 | 0.259 | 2 |
| | 1907.6 | 19.81 | 4 | 23.810 | 0.240 | 2 |
| HSDPA Subtest 4 | 1852.4 | 19.97 | 4 | 23.970 | 0.249 | 2 |
| | 1880 | 20.18 | 4 | 24.180 | 0.262 | 2 |
| | 1907.6 | 19.85 | 4 | 23.850 | 0.243 | 2 |

Note: Measure Level (EIRP) = Reading Level (dBm) + Antenna Gain (dBi)

| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | RF Output Power | | |
| Test Mode | Mode 2: WCDMA Band 4 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Test Mode | Frequency (MHz) | Reading Level (dBm) | Antenna Gain (dBi) | Measure Level (dBm) | Measure Level (W) | Limit (EIRP) (W) |
|-----------------|-----------------|---------------------|--------------------|---------------------|-------------------|------------------|
| RMC | 1712.4 | 21.37 | 4 | 25.370 | 0.344 | 1 |
| | 1732.6 | 21.54 | 4 | 25.540 | 0.358 | 1 |
| | 1752.6 | 21.57 | 4 | 25.570 | 0.361 | 1 |
| HSUPA Subtest 1 | 1712.4 | 20.32 | 4 | 24.320 | 0.270 | 1 |
| | 1732.6 | 20.52 | 4 | 24.520 | 0.283 | 1 |
| | 1752.6 | 20.57 | 4 | 24.570 | 0.286 | 1 |
| HSUPA Subtest 2 | 1712.4 | 19.87 | 4 | 23.870 | 0.244 | 1 |
| | 1732.6 | 20.05 | 4 | 24.050 | 0.254 | 1 |
| | 1752.6 | 20.09 | 4 | 24.090 | 0.256 | 1 |
| HSUPA Subtest 3 | 1712.4 | 20.32 | 4 | 24.320 | 0.270 | 1 |
| | 1732.6 | 20.59 | 4 | 24.590 | 0.288 | 1 |
| | 1752.6 | 20.66 | 4 | 24.660 | 0.292 | 1 |
| HSUPA Subtest 4 | 1712.4 | 20.36 | 4 | 24.360 | 0.273 | 1 |
| | 1732.6 | 20.57 | 4 | 24.570 | 0.286 | 1 |
| | 1752.6 | 20.58 | 4 | 24.580 | 0.287 | 1 |
| HSUPA Subtest 5 | 1712.4 | 20.39 | 4 | 24.390 | 0.275 | 1 |
| | 1732.6 | 20.58 | 4 | 24.580 | 0.287 | 1 |
| | 1752.6 | 20.59 | 4 | 24.590 | 0.288 | 1 |
| HSDPA Subtest 1 | 1712.4 | 19.94 | 4 | 23.940 | 0.248 | 1 |
| | 1732.6 | 20.12 | 4 | 24.120 | 0.258 | 1 |
| | 1752.6 | 20.15 | 4 | 24.150 | 0.260 | 1 |
| HSDPA Subtest 2 | 1712.4 | 19.87 | 4 | 23.870 | 0.244 | 1 |
| | 1732.6 | 20.12 | 4 | 24.120 | 0.258 | 1 |
| | 1752.6 | 20.13 | 4 | 24.130 | 0.259 | 1 |
| HSDPA Subtest 3 | 1712.4 | 19.88 | 4 | 23.880 | 0.244 | 1 |
| | 1732.6 | 20.07 | 4 | 24.070 | 0.255 | 1 |
| | 1752.6 | 20.09 | 4 | 24.090 | 0.256 | 1 |
| HSDPA Subtest 4 | 1712.4 | 19.89 | 4 | 23.890 | 0.245 | 1 |
| | 1732.6 | 20.12 | 4 | 24.120 | 0.258 | 1 |
| | 1752.6 | 20.13 | 4 | 24.130 | 0.259 | 1 |

Note: Measure Level (ERP) = Reading Level (dBm) + Antenna Gain (dBi)

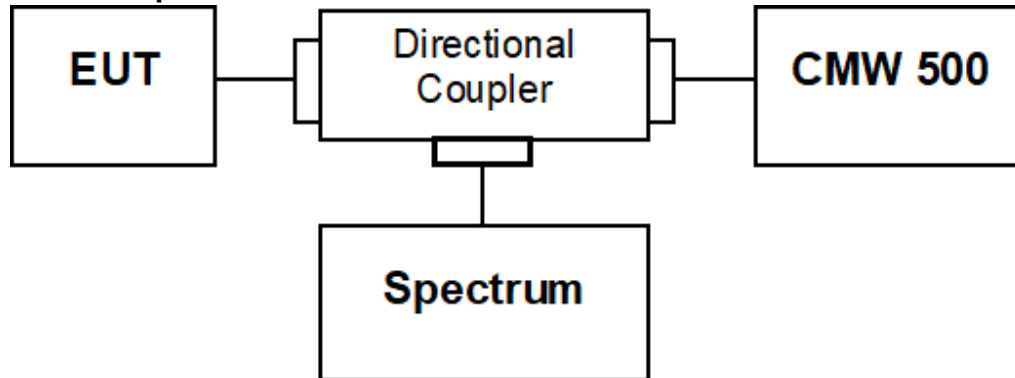
| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | RF Output Power | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Test Mode | Frequency (MHz) | Reading Level (dBm) | Antenna Gain (dBi) | Measure Level (dBm) | Measure Level (W) | Limit (ERP) (W) |
|-----------------|-----------------|---------------------|--------------------|---------------------|-------------------|-----------------|
| RMC | 826.4 | 22.50 | 2 | 22.350 | 0.172 | 7 |
| | 836.6 | 22.49 | 2 | 22.340 | 0.171 | 7 |
| | 846.6 | 22.54 | 2 | 22.390 | 0.173 | 7 |
| HSUPA Subtest 1 | 826.4 | 21.96 | 2 | 21.810 | 0.152 | 7 |
| | 836.6 | 22.08 | 2 | 21.930 | 0.156 | 7 |
| | 846.6 | 22.02 | 2 | 21.870 | 0.154 | 7 |
| HSUPA Subtest 2 | 826.4 | 21.51 | 2 | 21.360 | 0.137 | 7 |
| | 836.6 | 21.61 | 2 | 21.460 | 0.140 | 7 |
| | 846.6 | 21.54 | 2 | 21.390 | 0.138 | 7 |
| HSUPA Subtest 3 | 826.4 | 21.96 | 2 | 21.810 | 0.152 | 7 |
| | 836.6 | 22.15 | 2 | 22.000 | 0.158 | 7 |
| | 846.6 | 22.11 | 2 | 21.960 | 0.157 | 7 |
| HSUPA Subtest 4 | 826.4 | 22.00 | 2 | 21.850 | 0.153 | 7 |
| | 836.6 | 22.13 | 2 | 21.980 | 0.158 | 7 |
| | 846.6 | 22.03 | 2 | 21.880 | 0.154 | 7 |
| HSUPA Subtest 5 | 826.4 | 22.03 | 2 | 21.880 | 0.154 | 7 |
| | 836.6 | 22.14 | 2 | 21.990 | 0.158 | 7 |
| | 846.6 | 22.04 | 2 | 21.890 | 0.155 | 7 |
| HSDPA Subtest 1 | 826.4 | 21.58 | 2 | 21.430 | 0.139 | 7 |
| | 836.6 | 21.68 | 2 | 21.530 | 0.142 | 7 |
| | 846.6 | 21.60 | 2 | 21.450 | 0.140 | 7 |
| HSDPA Subtest 2 | 826.4 | 21.51 | 2 | 21.360 | 0.137 | 7 |
| | 836.6 | 21.68 | 2 | 21.530 | 0.142 | 7 |
| | 846.6 | 21.58 | 2 | 21.430 | 0.139 | 7 |
| HSDPA Subtest 3 | 826.4 | 21.52 | 2 | 21.370 | 0.137 | 7 |
| | 836.6 | 21.63 | 2 | 21.480 | 0.141 | 7 |
| | 846.6 | 21.54 | 2 | 21.390 | 0.138 | 7 |
| HSDPA Subtest 4 | 826.4 | 21.53 | 2 | 21.380 | 0.137 | 7 |
| | 836.6 | 21.68 | 2 | 21.530 | 0.142 | 7 |
| | 846.6 | 21.58 | 2 | 21.430 | 0.139 | 7 |

Note: Measure Level (ERP) = Reading Level (dBm) + Antenna Gain (dBi) -2.15

4. Occupied Bandwidth

4.1. Test Setup



4.2. Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The 26 dB bandwidth and 99% occupied bandwidth of the low & middle & high channel for the highest RF powers were measured.

4.3. Test Method

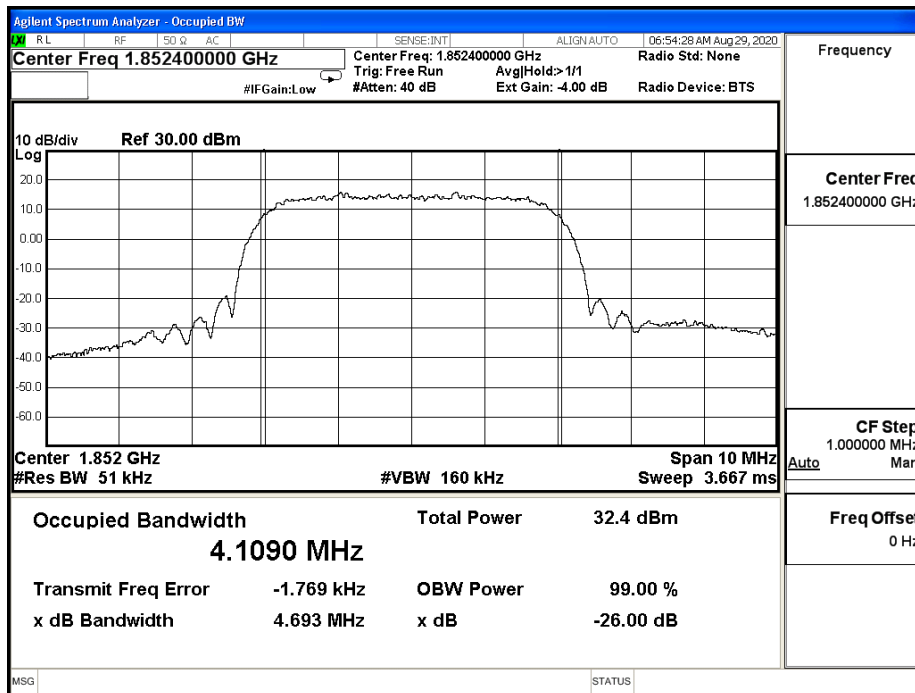
KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 4.2 & 4.3
ANSI C63.26-2015 Sub-clause 5.4.3 & 5.4.4

4.4. Test Result

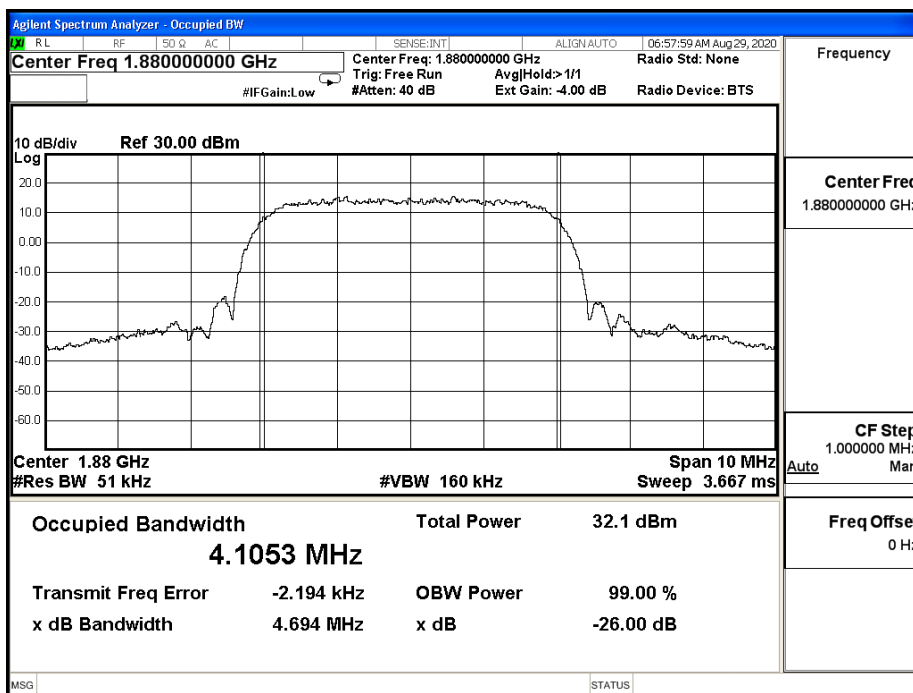
| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Occupied Bandwidth | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Modulation | Channel | Frequency (MHz) | Measure Level (MHz) | | Limit (MHz) |
|------------|---------|-----------------|---------------------|--------|-------------|
| | | | 26dB BW | 99% BW | |
| RMC | 9262 | 1852.4 | 4.693 | 4.109 | N/A |
| | 9400 | 1880 | 4.694 | 4.1053 | N/A |
| | 9538 | 1907.6 | 4.687 | 4.1127 | N/A |

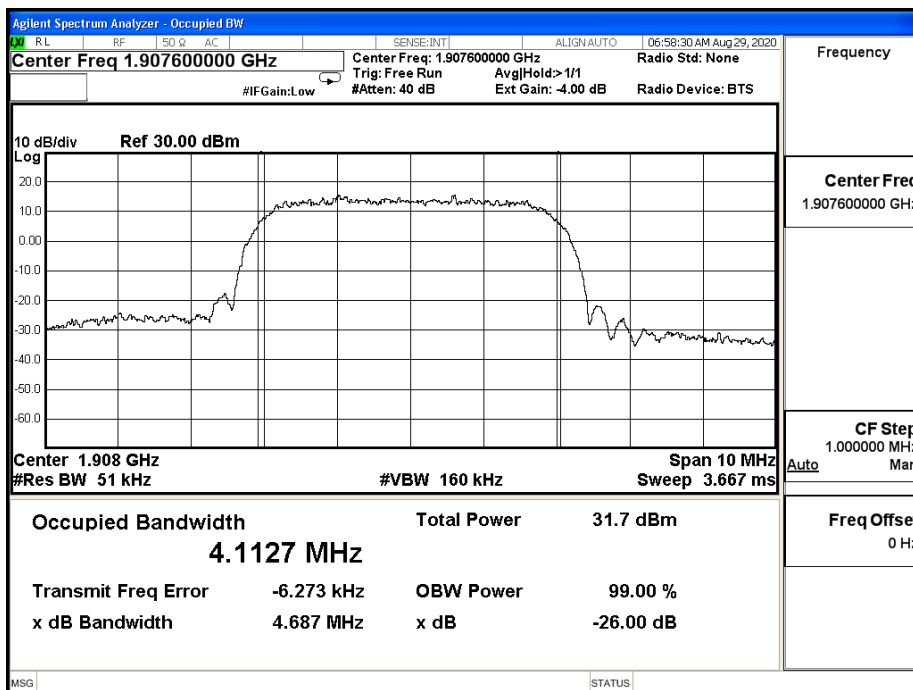
WCDMA_Band 2_RMC_1852.4MHz_26dB BW



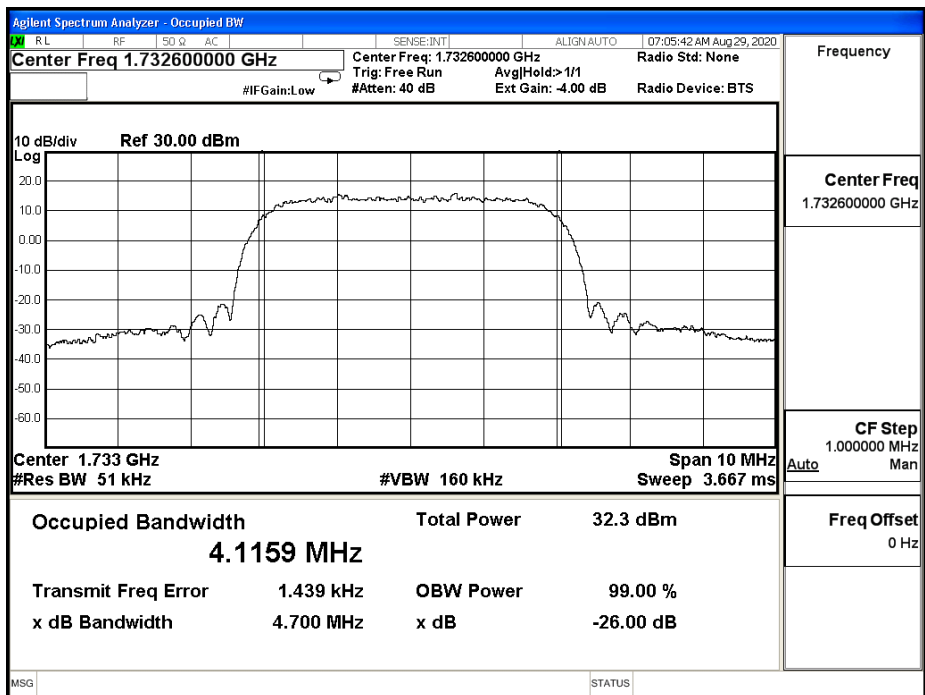
WCDMA_Band 2_RMC_1880.0MHz_26dB BW



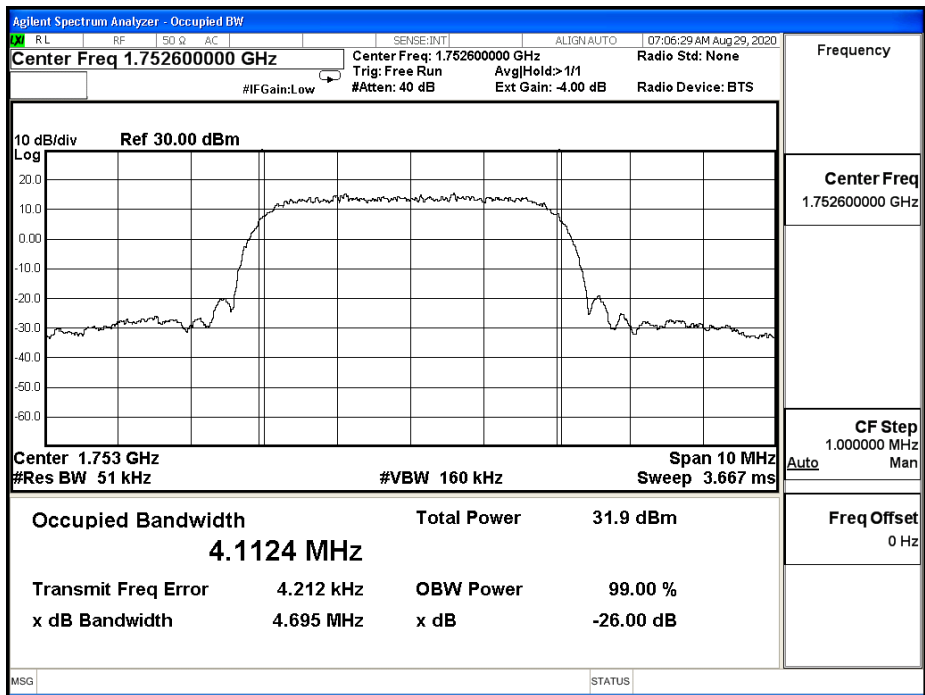
WCDMA_Band 2_RMC_1907.6MHz_26dB BW



WCDMA_Band 4_RMC_1732.6MHz_26dB BW



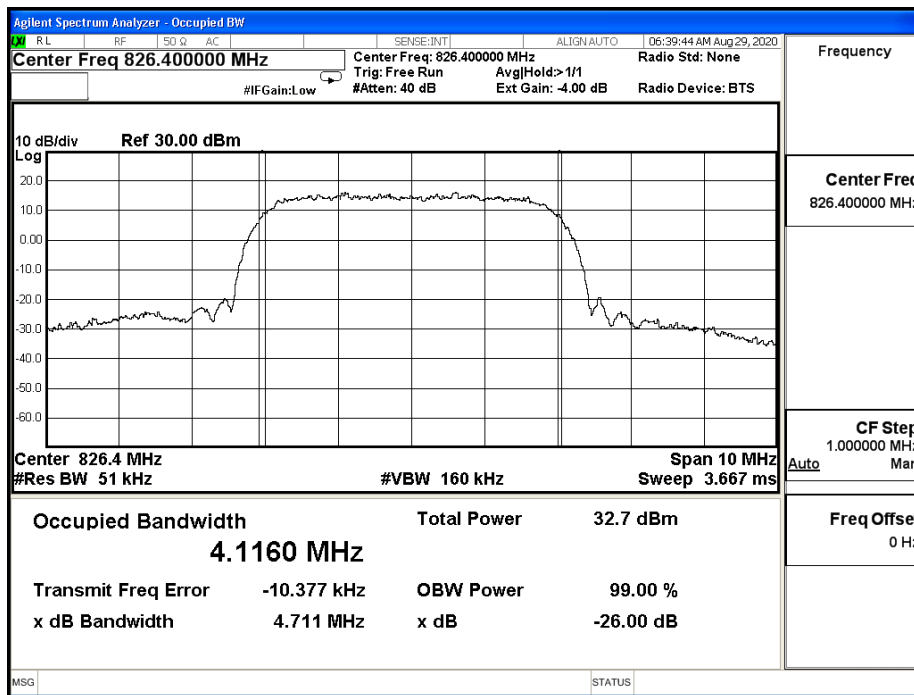
WCDMA_Band 4_RMC_1752.6MHz_26dB BW



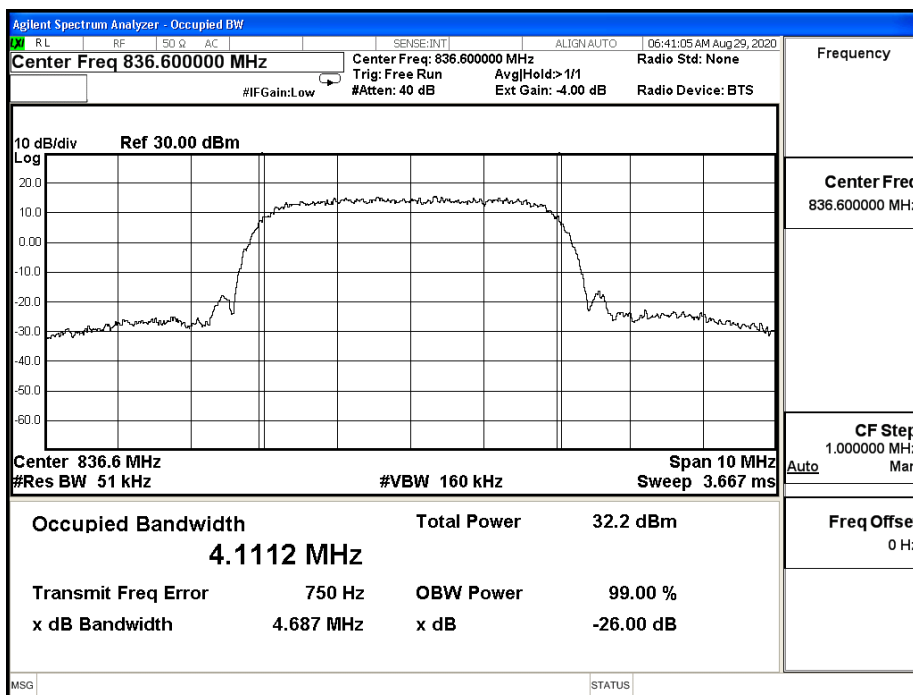
| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Occupied Bandwidth | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Modulation | Channel | Frequency (MHz) | Measure Level (MHz) | | Limit (MHz) |
|------------|---------|-----------------|---------------------|--------|-------------|
| | | | 26dB BW | 99% BW | |
| RMC | 4132 | 826.4 | 4.711 | 4.116 | N/A |
| | 4183 | 836.6 | 4.687 | 4.1112 | N/A |
| | 4233 | 846.6 | 4.668 | 4.1105 | N/A |

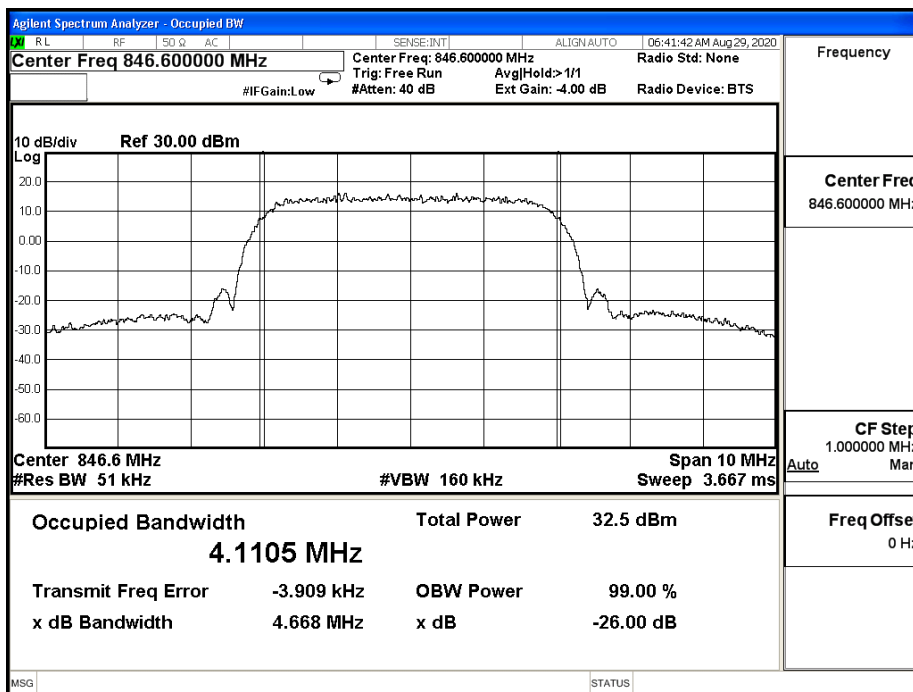
WCDMA_Band 5_RMC_826.4MHz_26dB BW



WCDMA_Band 5_RMC_836.6MHz_26dB BW

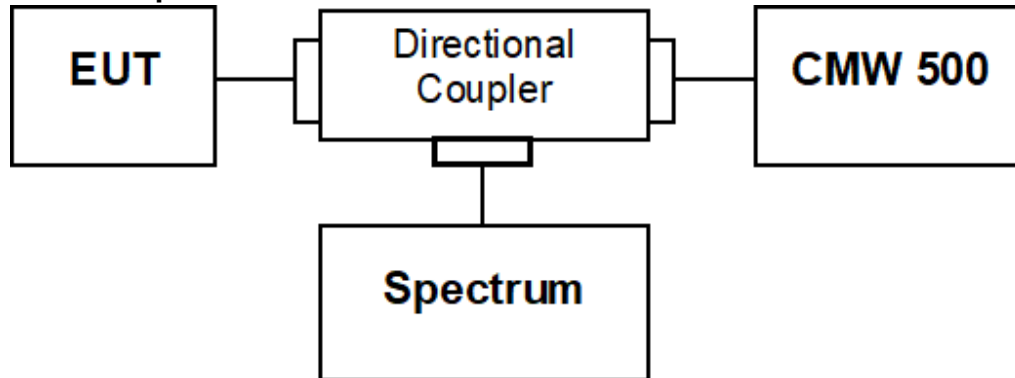


WCDMA_Band 5_RMC_846.6MHz_26dB BW



5. Peak To Average Ratio

5.1. Test Setup



5.2. Test Procedure

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 %.

5.3. Test Method

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 5.7.2

ANSI C63.26-2015 Sub-clause 5.2.3.4

5.4. Test Result

| | | | |
|-----------------|-----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Peak To Average Ratio | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Ch | Freq. (MHz) | Modulation | Peak (dBm) | Average (dBm) | PAPR (dB) |
|------|-------------|------------|------------|---------------|-----------|
| 9262 | 1852.4 | RMC | 24.86 | 21.43 | 3.09 |
| 9400 | 1880 | | 25.04 | 21.50 | 3.17 |
| 9538 | 1907.6 | | 24.78 | 21.36 | 3.09 |

WCDMA_Band 2_RMC_1852.4MHz



Date: 1.SEP.2020 00:10:46

WCDMA_Band 2_RMC_1880.0MHz



Date: 1.SEP.2020 00:11:12

WCDMA_Band 2_RMC_1907.6MHz



Date: 1.SEP.2020 00:14:26

| | | | |
|-----------------|-----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Peak To Average Ratio | | |
| Test Mode | Mode 2: WCDMA Band 4 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Ch | Freq. (MHz) | Modulation | Peak (dBm) | Average (dBm) | PAPR (dB) |
|------|-------------|------------|------------|---------------|-----------|
| 1312 | 1712.4 | RMC | 24.48 | 21.30 | 2.89 |
| 1413 | 1732.6 | | 24.71 | 21.38 | 3.04 |
| 1513 | 1752.6 | | 24.82 | 21.30 | 3.20 |

WCDMA_Band 4_RMC_1712.4MHz

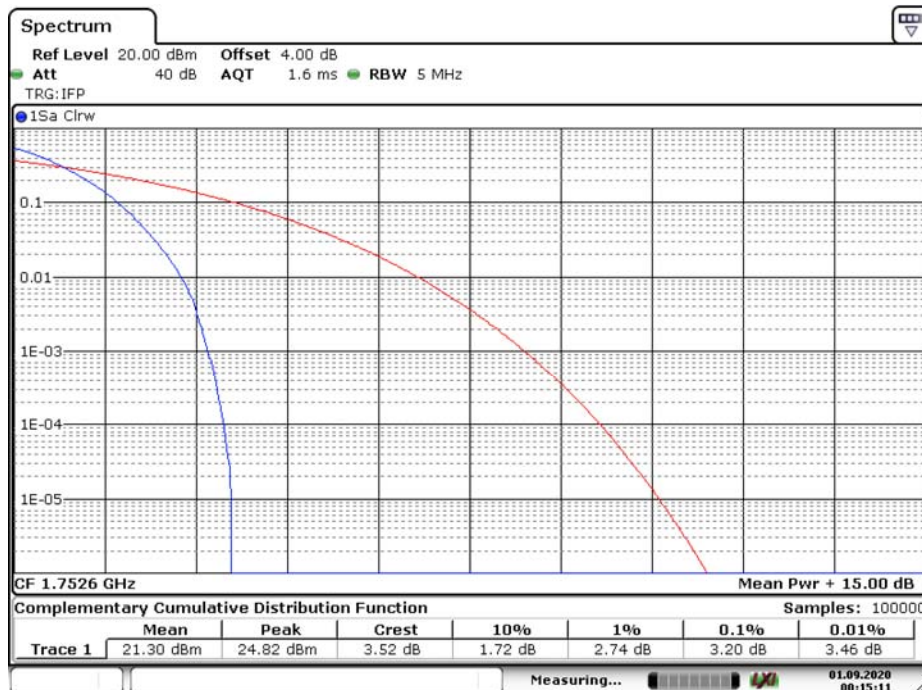


WCDMA_Band 4_RMC_1732.6MHz



Date: 1.SEP.2020 00:15:49

WCDMA_Band 4_RMC_1752.6MHz

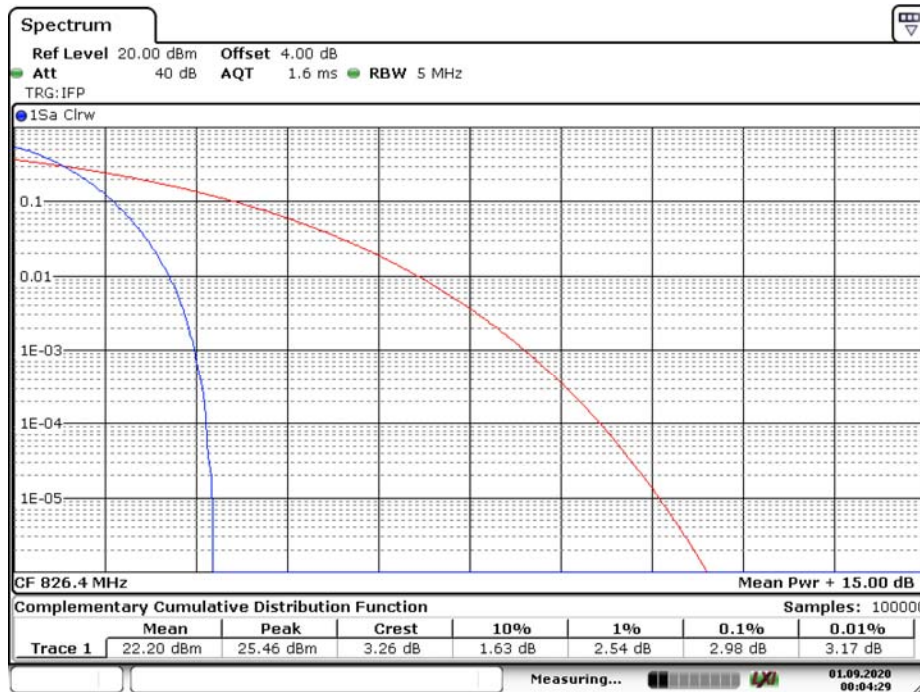


Date: 1.SEP.2020 00:15:11

| | | | |
|-----------------|-----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Peak To Average Ratio | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

| Ch | Freq. (MHz) | Modulation | Peak (dBm) | Average (dBm) | PAPR (dB) |
|------|-------------|------------|------------|---------------|-----------|
| 4132 | 826.4 | RMC | 25.46 | 22.20 | 2.98 |
| 4183 | 836.6 | | 25.90 | 22.21 | 3.30 |
| 4233 | 846.6 | | 26.09 | 22.27 | 3.46 |

WCDMA_Band 5_RMC_826.4MHz



Date: 1.SEP.2020 00:04:29

WCDMA_Band 5_RMC_836.6MHz



Date: 1.SEP.2020 00:05:32

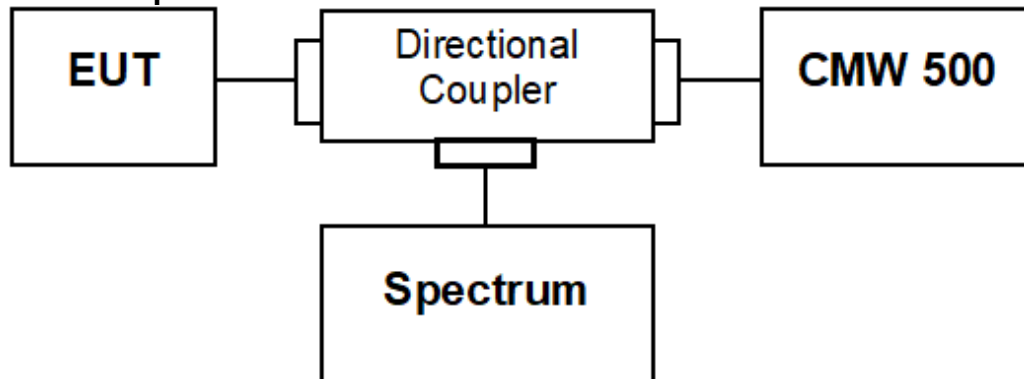
WCDMA_Band 5_RMC_846.6MHz



Date: 1.SEP.2020 00:07:29

6. Conducted Band Edge

6.1. Test Setup



6.2. Test Procedure

1. The EUT was connected to spectrum analyzer and System Simulator via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The conducted spurious emission for the whole frequency range was taken.
4. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

6.3. Test Method

Conducted Spurious Measurement:

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 6.1

ANSI C63.26: 2015 Sub-clause 5.7

Radiated Spurious Measurement:

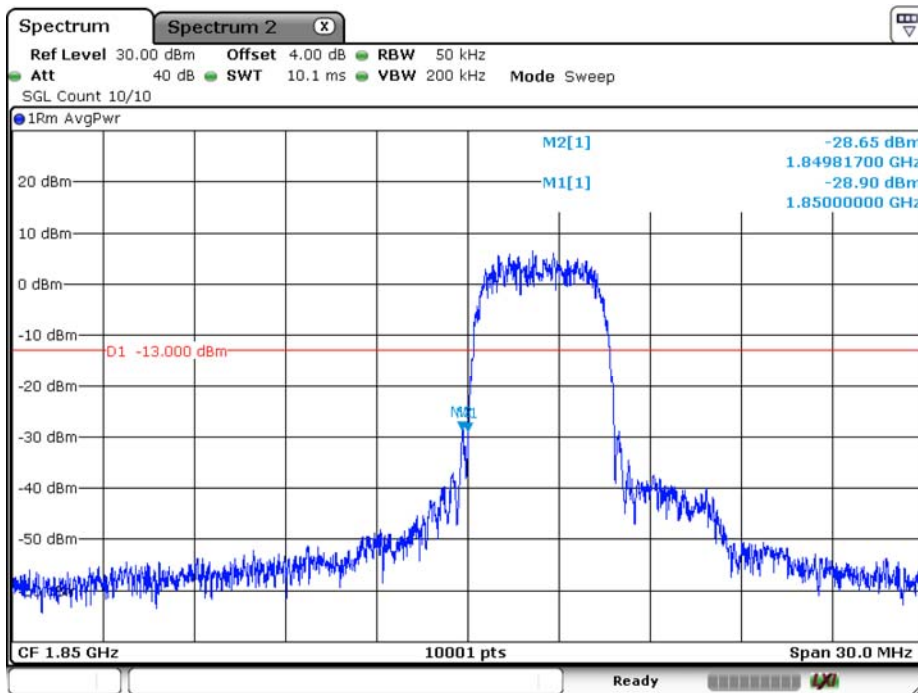
KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 5.8

ANSI C63.26: 2015 Sub-clause 5.5.3.2

6.4. Test Result

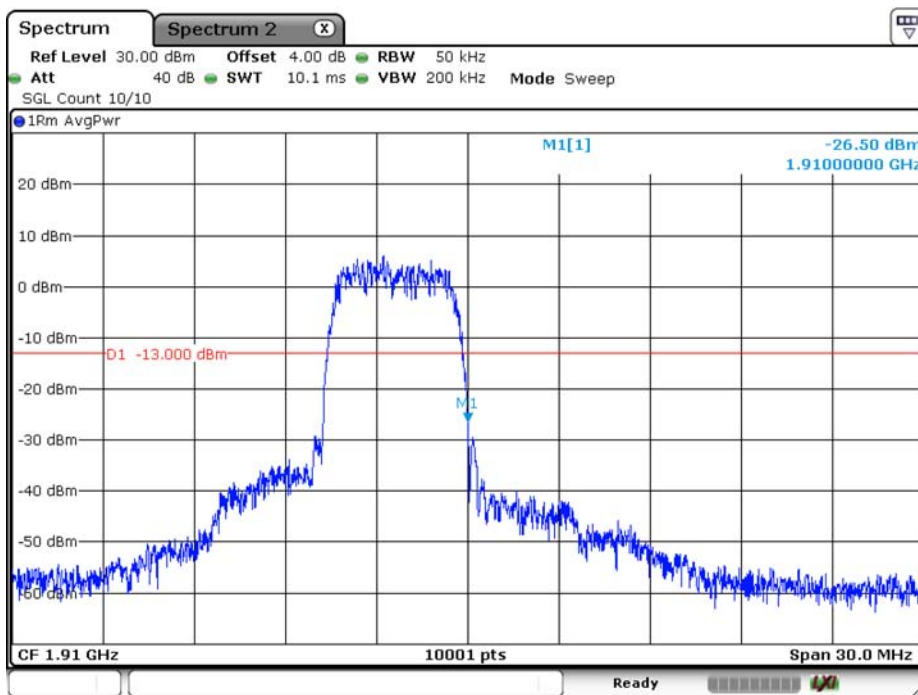
| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Conducted Band Edge | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

WCDMA_Band 2_RMC_1852.4



Date: 1.SEP.2020 02:14:14

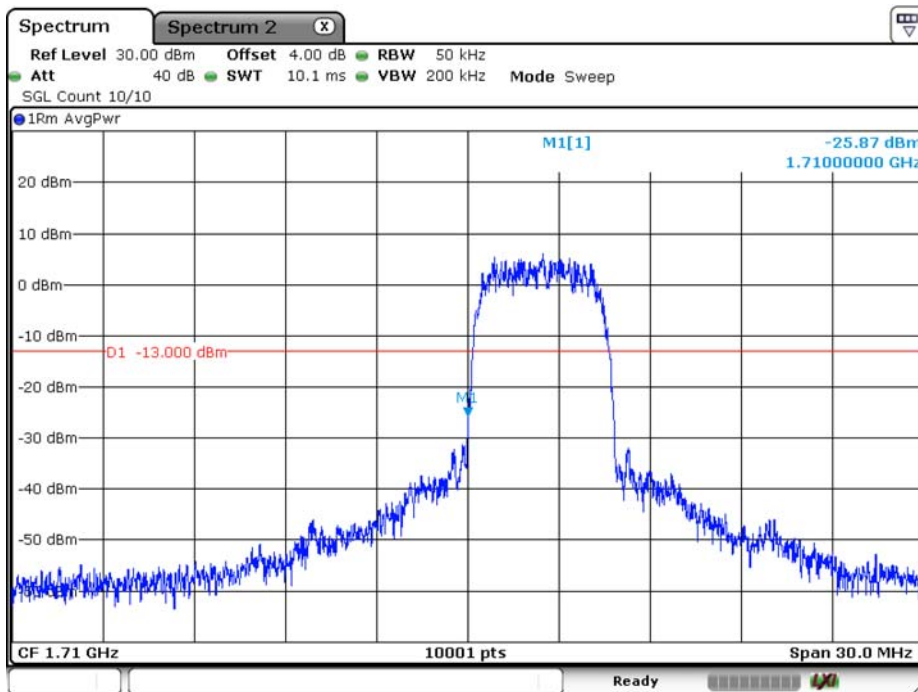
WCDMA_Band 2_RMC_1907.6



Date: 1.SEP.2020 02:15:28

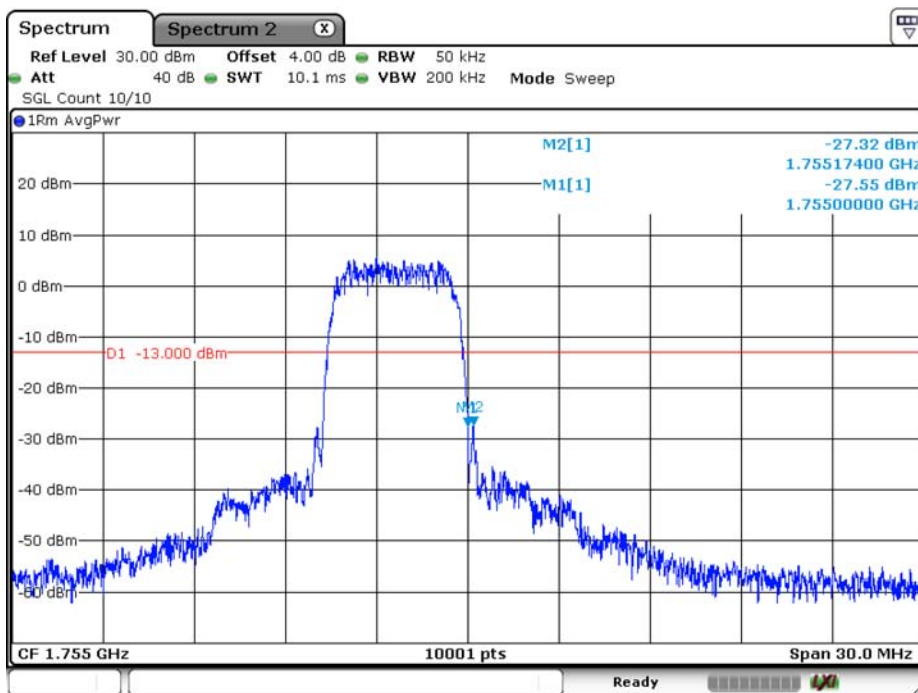
| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Conducted Band Edge | | |
| Test Mode | Mode 2: WCDMA Band 4 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

WCDMA_Band 4_RMC_1712.4



Date: 1.SEP.2020 02:12:27

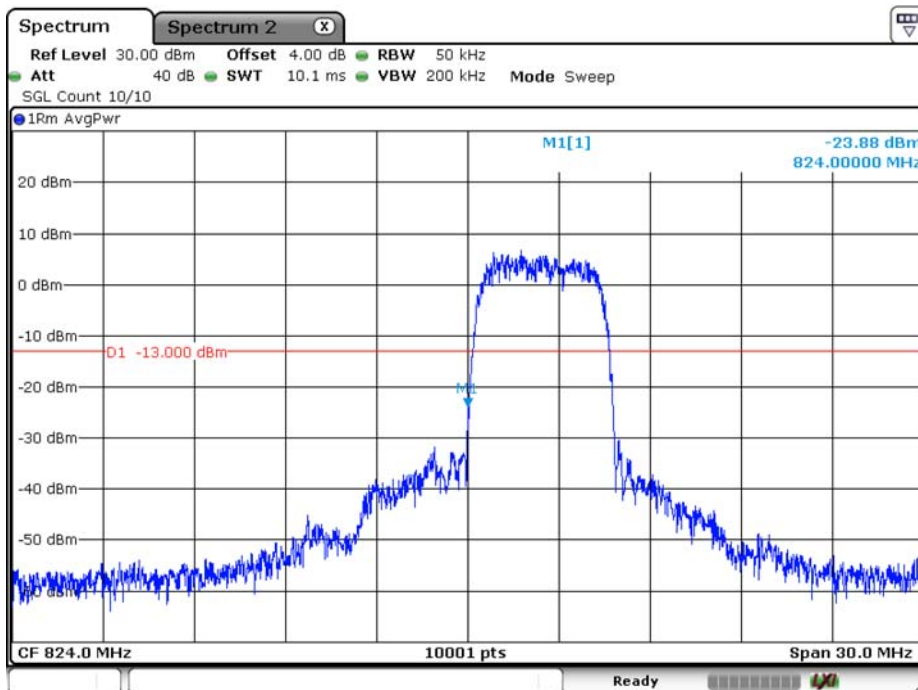
WCDMA_Band 4_RMC_1752.6



Date: 1.SEP.2020 02:10:34

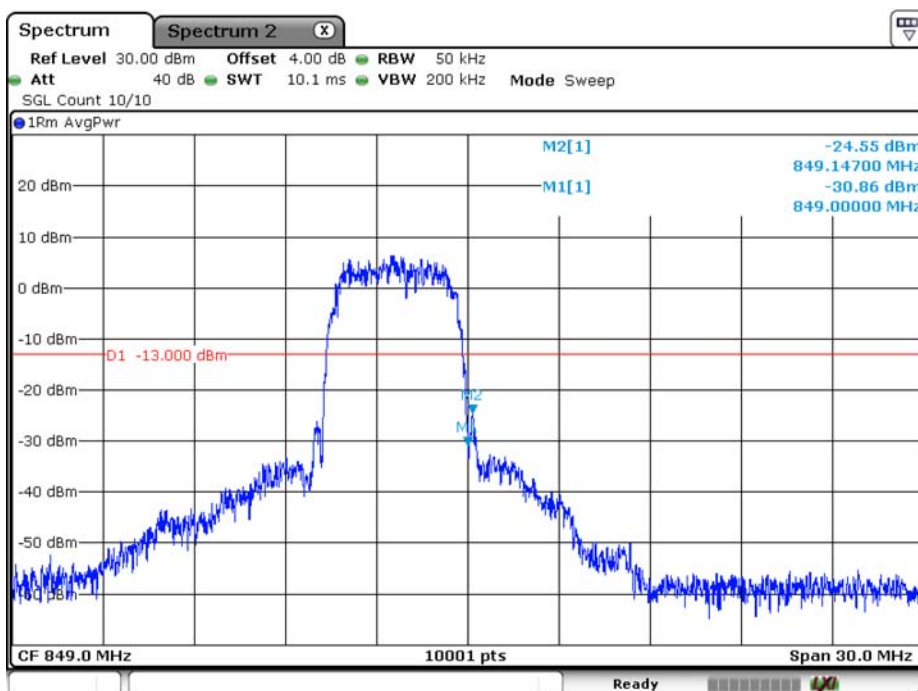
| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Conducted Band Edge | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

WCDMA_Band 5_RMC_826.4



Date: 1.SEP.2020 02:08:40

WCDMA_Band 5_RMC_846.6

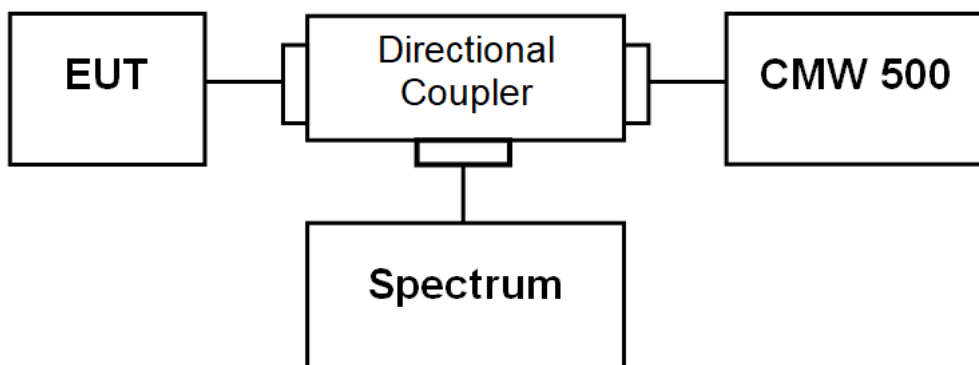


Date: 1.SEP.2020 02:03:56

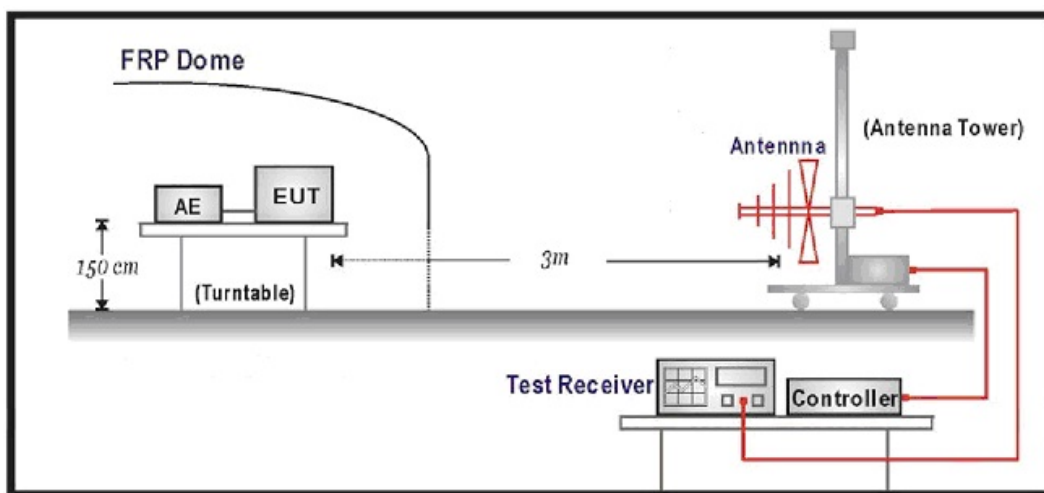
7. Spurious Emission

7.1. Test Setup

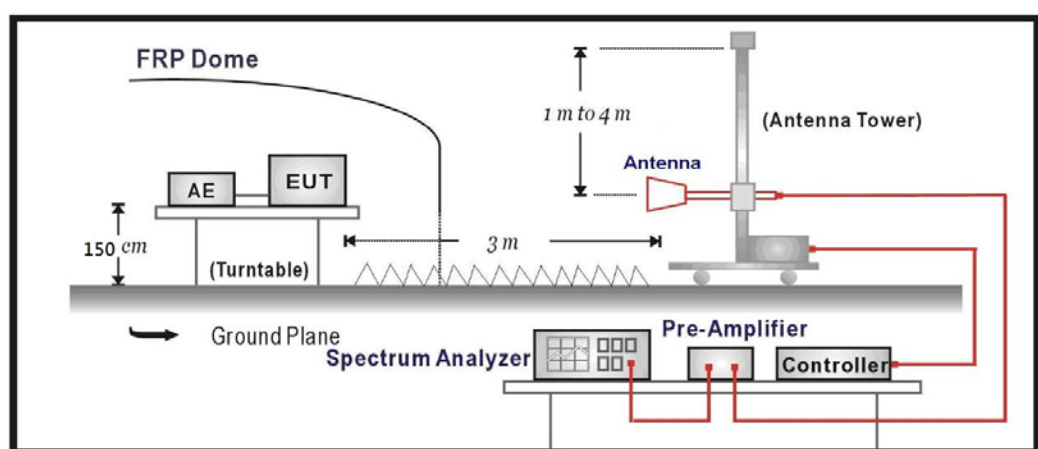
Conducted Spurious Measurement (below 1GHz)



Radiated Spurious Measurement (below 1GHz)



Radiated Spurious Measurement (above 1GHz)



7.2. Test Procedure

Conducted Spurious Measurement:

- a) Place the EUT on a bench and set it in transmitting mode.
- b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- c) EUT Communicate with CMW500, then selects a channel for testing.
- d) Add a correction factor to the display of spectrum, and then test.
- e) The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

Radiated Spurious Measurement:

- a) The EUT was placed on a rotatable wooden table with 1.5 meter above ground.
- b) The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- c) The table was rotated 360 degrees to determine the position of the highest spurious emission.
- d) The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
- e) Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 1MHz, Sweep 500ms, Taking the record of maximum spurious emission.
- f) A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- g) Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- h) Taking the record of output power at antenna port
- i) Repeat step 7 to step 8 for another polarization.
- j) $EIRP = SG - \text{Cable loss} + \text{Antenna Gain}$

7.3. Test Method

Conducted Spurious Measurement:

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 6.1
ANSI C63.26-2015 Sub-clause 5.7

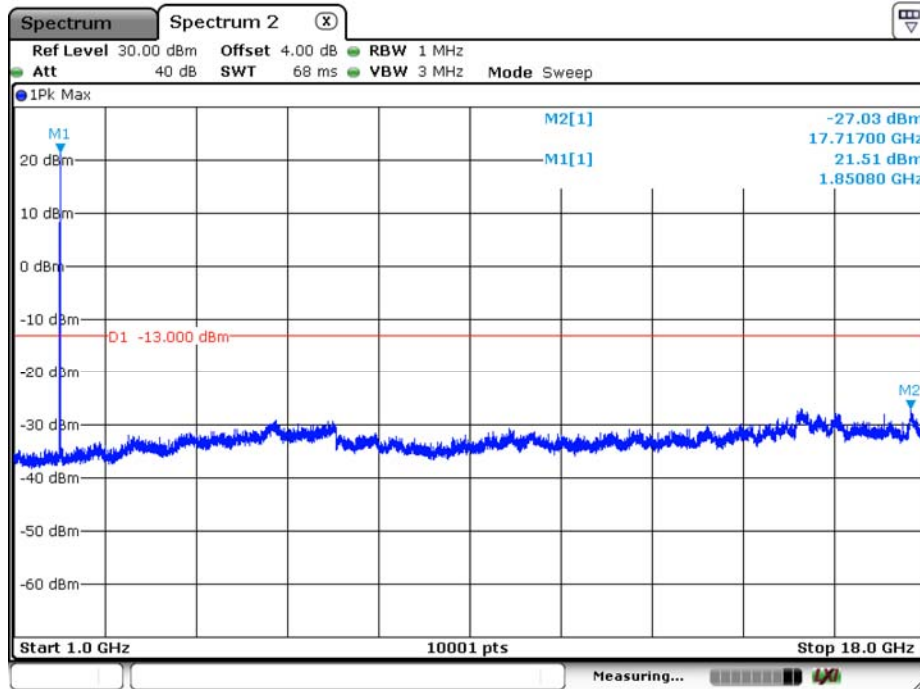
Radiated Spurious Measurement:

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 5.8
ANSI C63.26-2015 Sub-clause 5.5.3.2

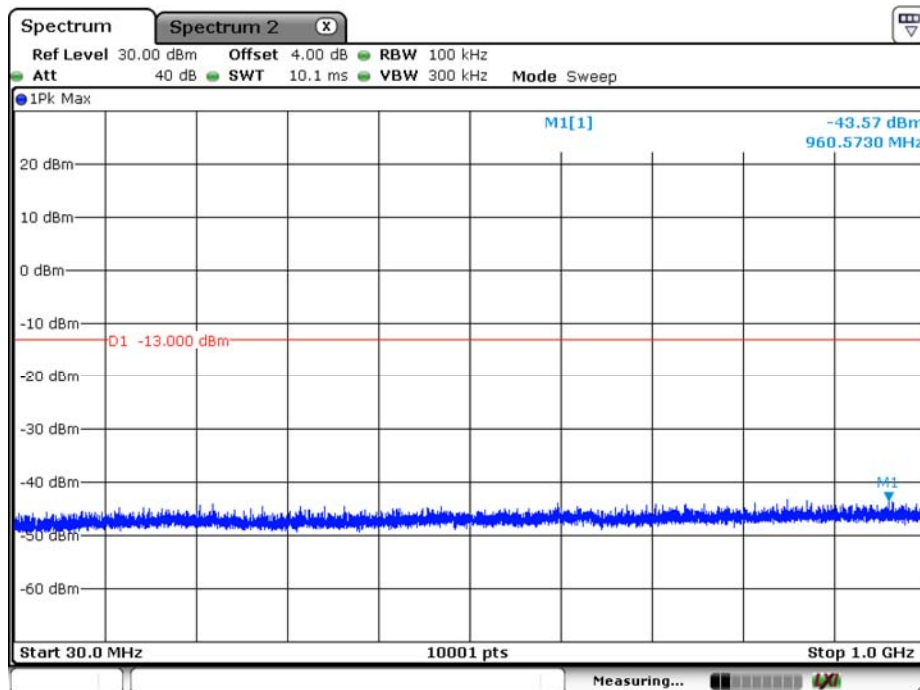
7.4. Test Result

| | | | |
|-----------------|-----------------------------|----------------|--------|
| Product | Module | | |
| Test Item | Conducted Spurious Emission | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

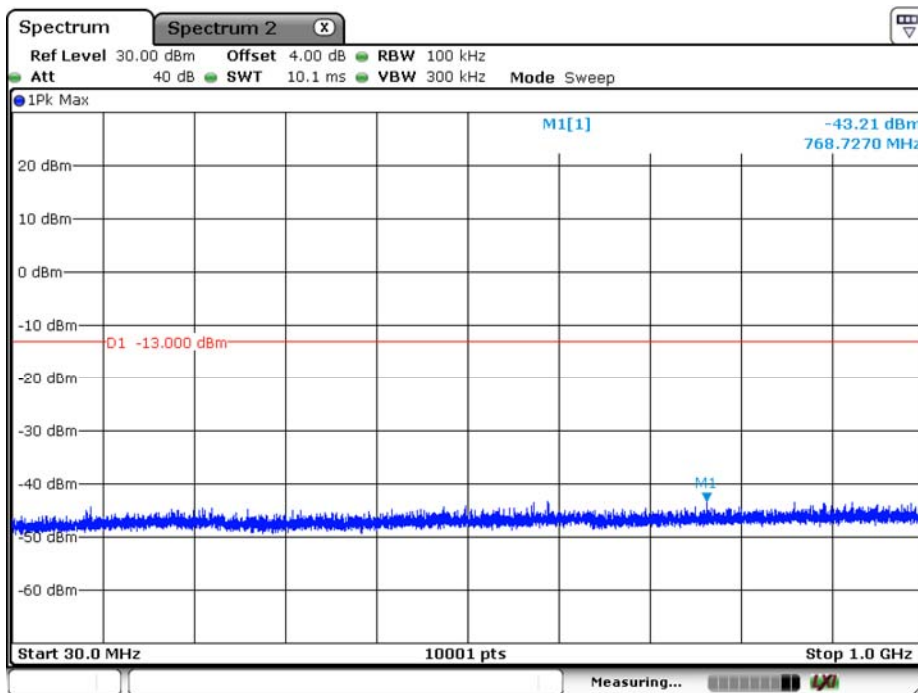
WCDMA_B2_CH9262_RMC_above 1G



WCDMA_B2_CH9262_RMC_under 1G

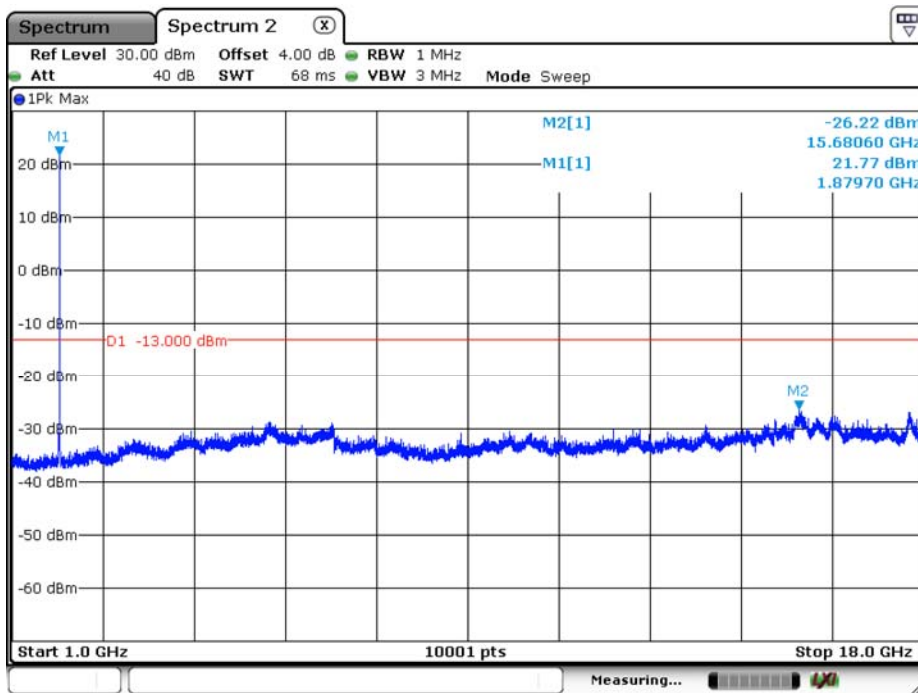


WCDMA_B2_CH9400_RMC_above 1G



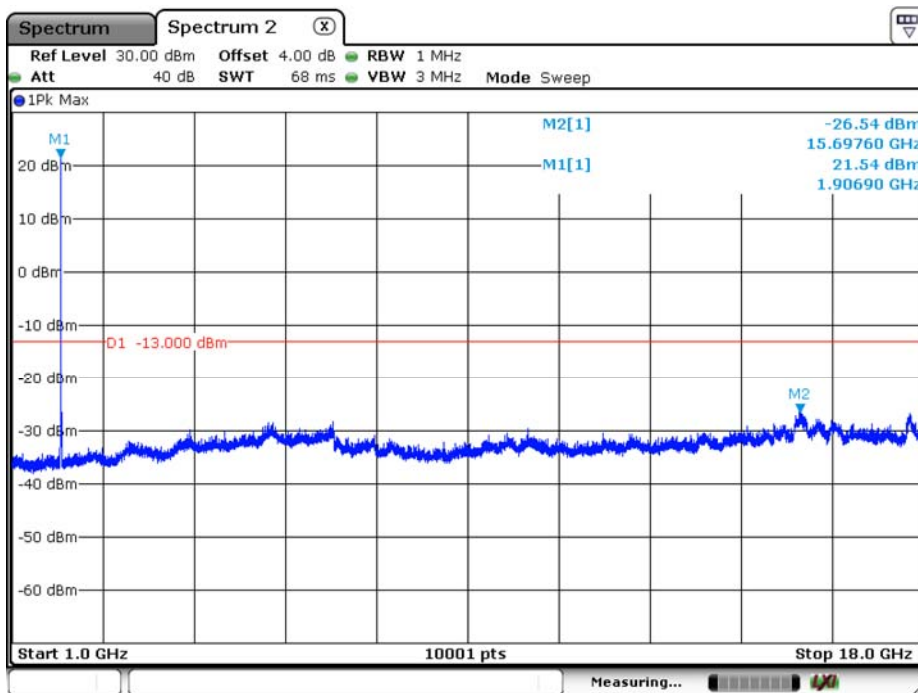
Date: 1.SEP.2020 01:38:09

WCDMA_B2_CH9400_RMC_under 1G



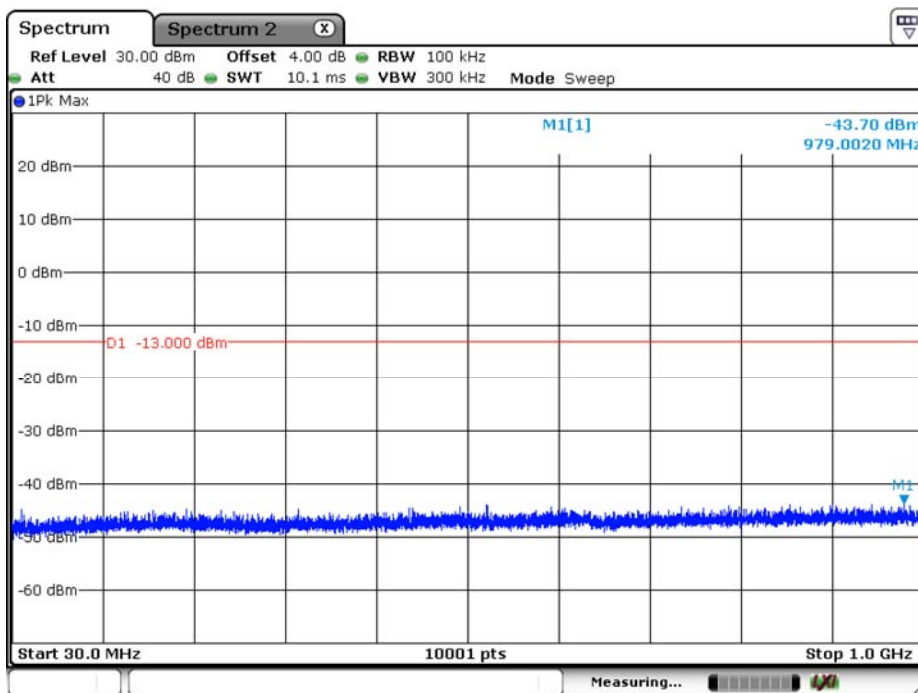
Date: 1.SEP.2020 01:39:17

WCDMA_B2_CH9538_RMC_above 1G



Date: 1.SEP.2020 01:35:42

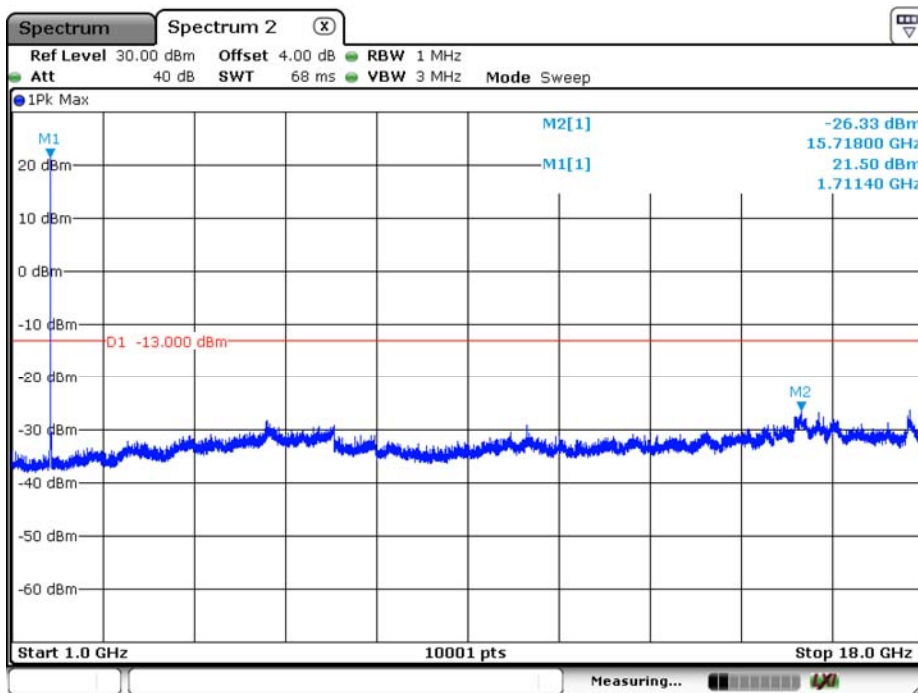
WCDMA_B2_CH9538_RMC_under 1G



Date: 1.SEP.2020 01:36:55

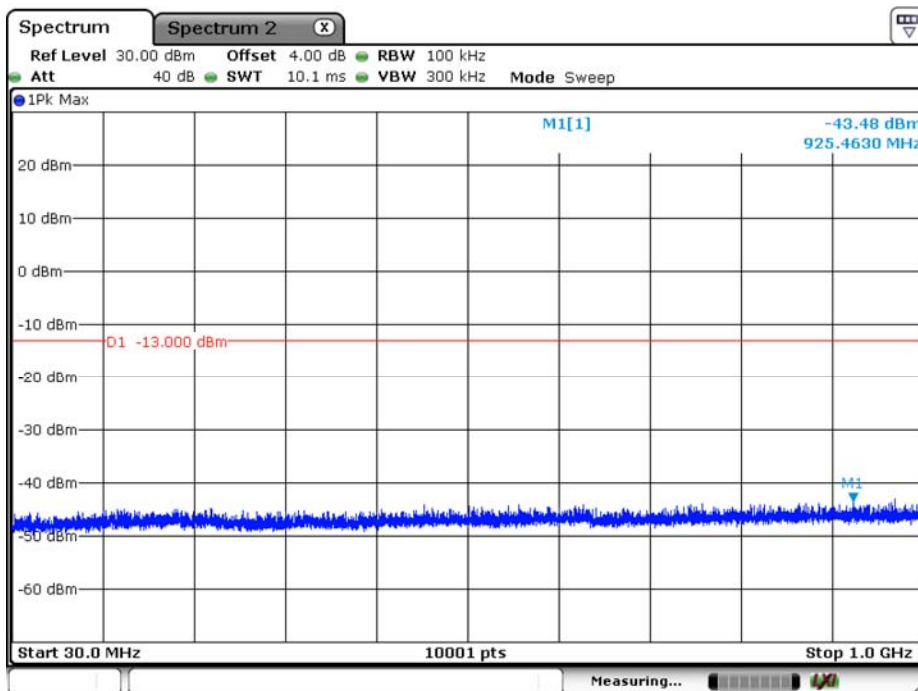
| | | | |
|-----------------|-----------------------------|----------------|--------|
| Product | Module | | |
| Test Item | Conducted Spurious Emission | | |
| Test Mode | Mode 2: WCDMA Band 4 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

WCDMA_B4_CH1312_RMC_above 1G



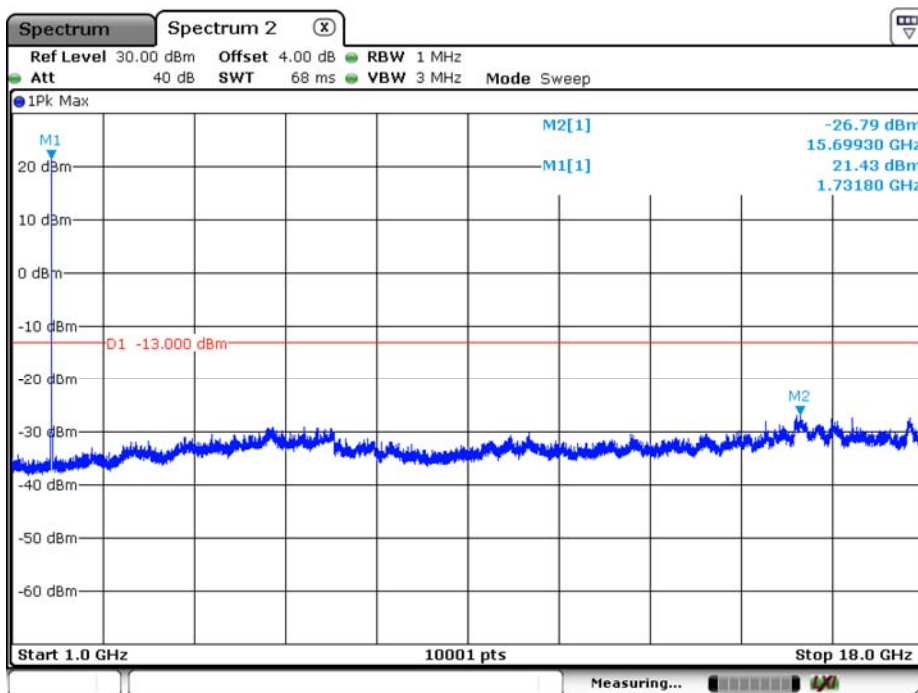
Date: 1.SEP.2020 01:42:05

WCDMA_B4_CH1312_RMC_under 1G



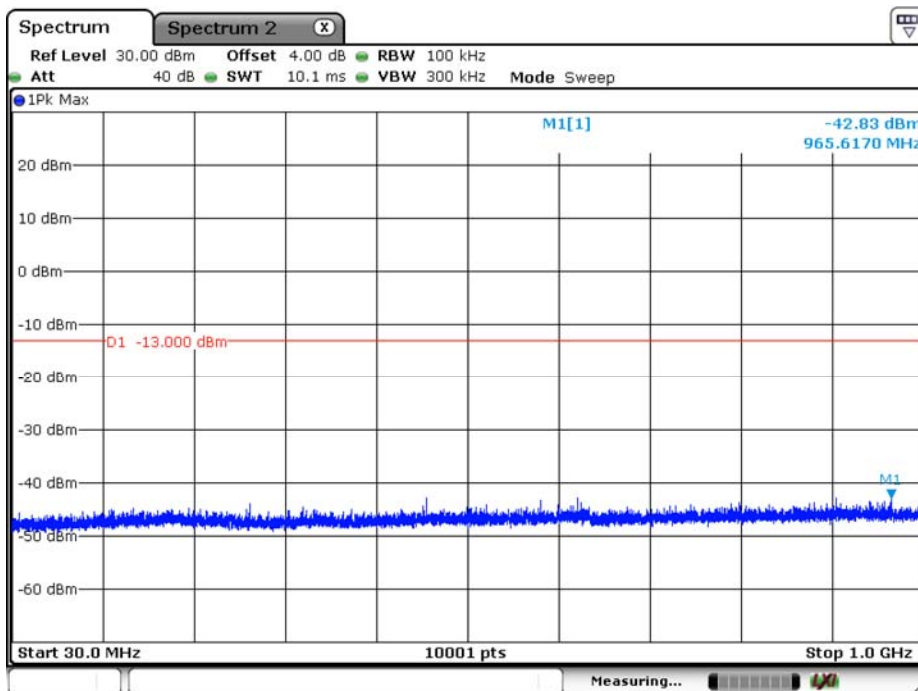
Date: 1.SEP.2020 01:43:01

WCDMA_B4_CH1413_RMC_above 1G



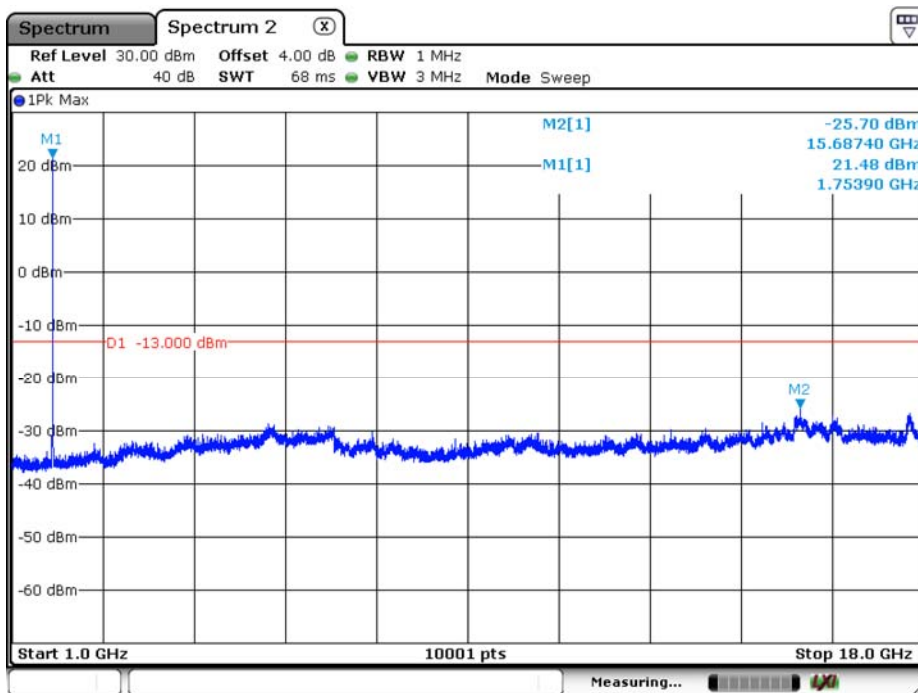
Date: 1.SEP.2020 01:54:13

WCDMA_B4_CH1413_RMC_under 1G



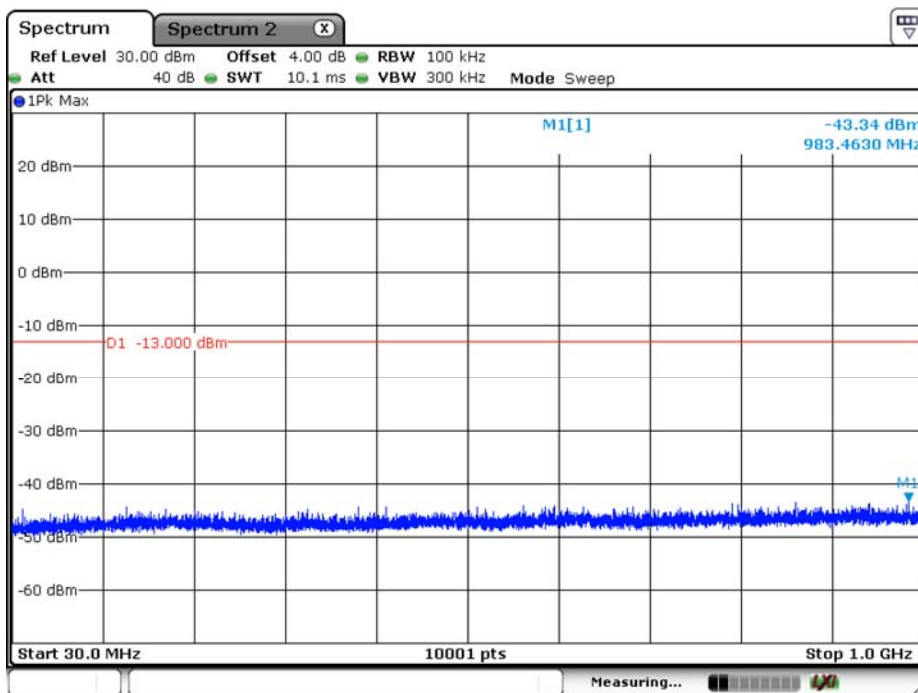
Date: 1.SEP.2020 01:53:18

WCDMA_B4_CH1513_RMC_above 1G



Date: 1.SEP.2020 01:55:43

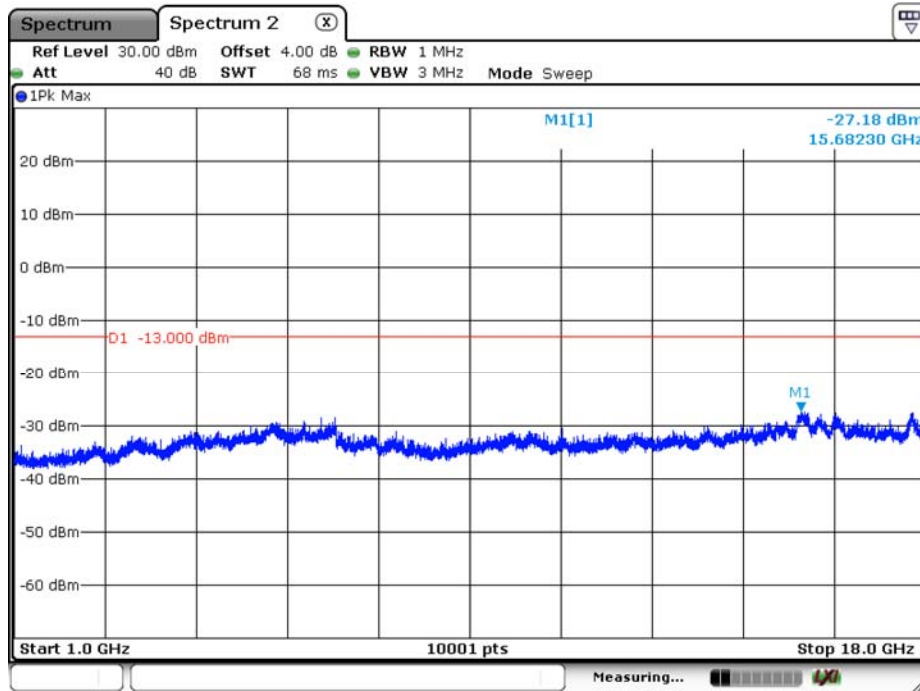
WCDMA_B4_CH1513_RMC_under 1G



Date: 1.SEP.2020 01:56:13

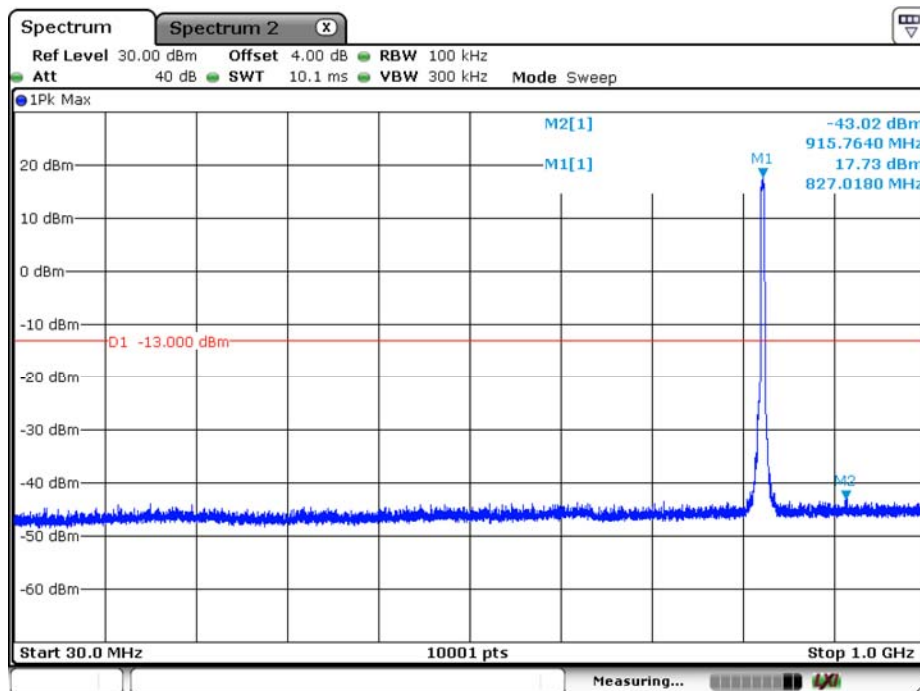
| | | | |
|-----------------|-----------------------------|----------------|--------|
| Product | Module | | |
| Test Item | Conducted Spurious Emission | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 69 |

WCDMA_B5_CH4132_RMC_above 1G



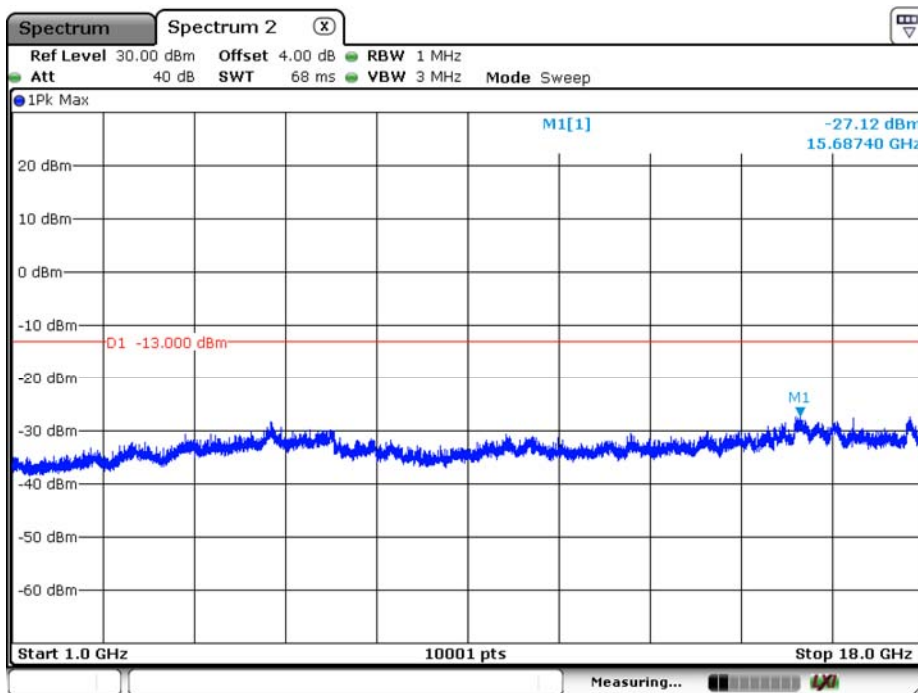
Date: 1.SEP.2020 01:25:03

WCDMA_B5_CH4132_RMC_under 1G



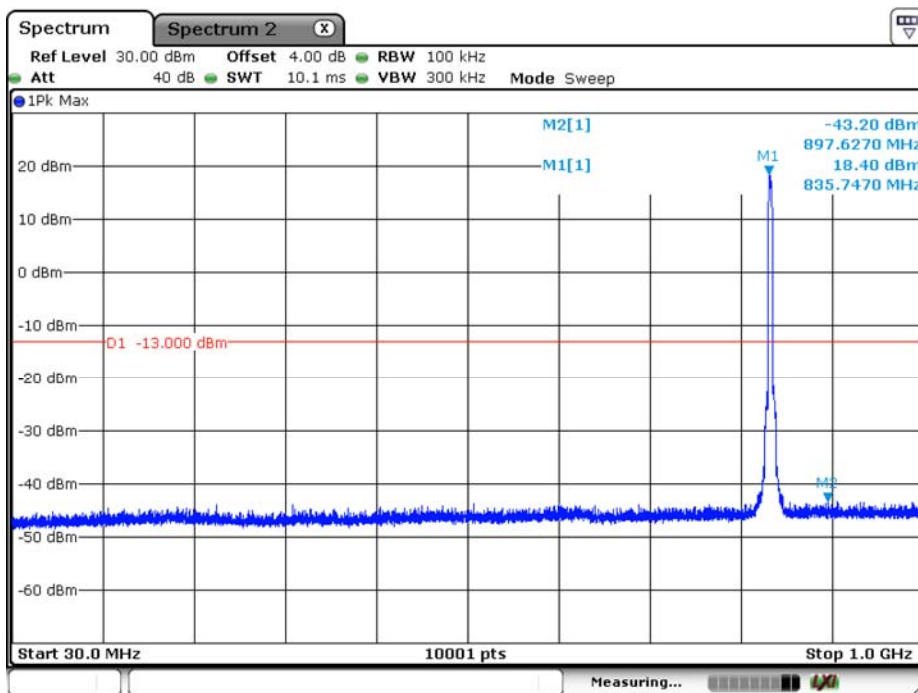
Date: 1.SEP.2020 01:23:40

WCDMA_B5_CH4183_RMC_above 1G



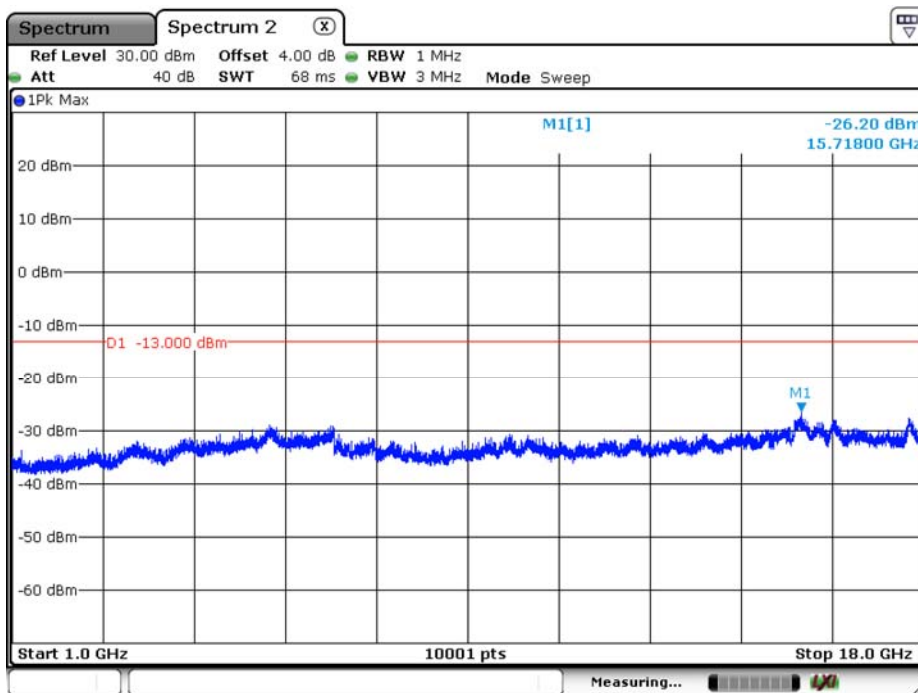
Date: 1.SEP.2020 01:25:51

WCDMA_B5_CH4183_RMC_under 1G



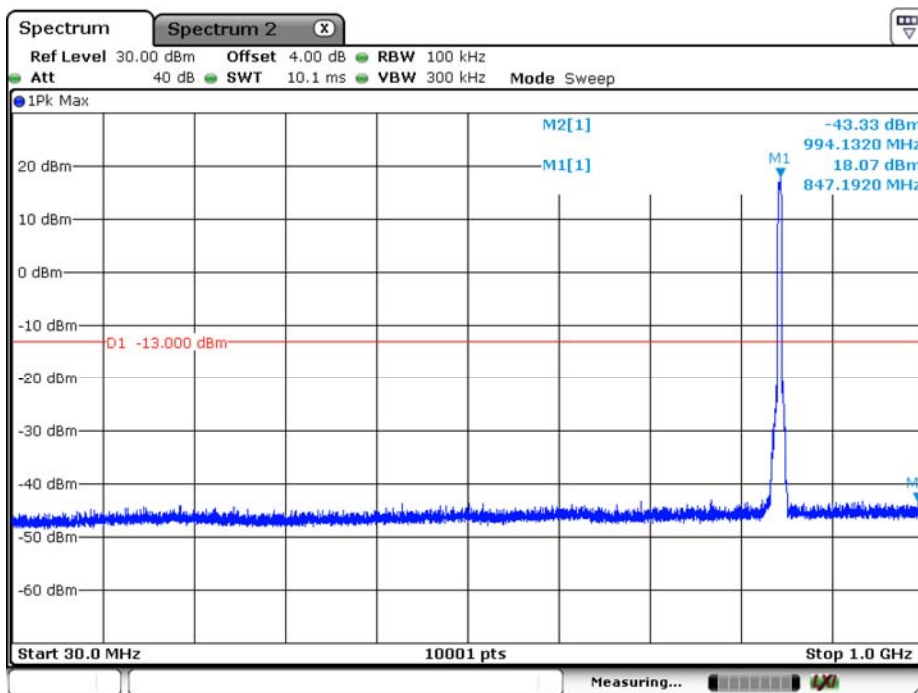
Date: 1.SEP.2020 01:28:10

WCDMA_B5_CH4233_RMC_above 1G



Date: 1.SEP.2020 01:32:13

WCDMA_B5_CH4233_RMC_under 1G



Date: 1.SEP.2020 01:30:48

| | | | |
|-----------------|----------------------------|----------------|-------|
| Product | Module | | |
| Test Item | Radiated Spurious Emission | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | CB2-H |
| Temperature(°C) | 25 | Humidity (%RH) | 56 |

RMC_CH 9262_WCDMA_Band 2

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 3704.800 | -42.49 | -13 | -29.49 | -50.58 | 12.61 | 4.51 |
| | 5557.200 | -43.10 | -13 | -30.10 | -50.55 | 13.12 | 5.67 |
| | 7409.600 | -40.05 | -13 | -27.05 | -44.76 | 11.31 | 6.60 |
| V | 3704.800 | -41.68 | -13 | -28.68 | -49.77 | 12.61 | 4.51 |
| | 5557.200 | -38.19 | -13 | -25.19 | -45.64 | 13.12 | 5.67 |
| | 7409.600 | -37.05 | -13 | -24.05 | -41.76 | 11.31 | 6.60 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

RMC_CH 9400_WCDMA_Band 2

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 3760.000 | -46.25 | -13 | -33.25 | -54.32 | 12.60 | 4.54 |
| | 5640.000 | -48.06 | -13 | -35.06 | -55.46 | 13.10 | 5.70 |
| | 7520.000 | -40.09 | -13 | -27.09 | -44.71 | 11.24 | 6.61 |
| V | 3760.000 | -37.69 | -13 | -24.69 | -45.76 | 12.60 | 4.54 |
| | 5640.000 | -48.05 | -13 | -35.05 | -55.45 | 13.10 | 5.70 |
| | 7520.000 | -36.49 | -13 | -23.49 | -41.11 | 11.24 | 6.61 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

RMC_CH 9538_WCDMA_Band 2

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 3815.200 | -46.44 | -13 | -33.44 | -54.48 | 12.60 | 4.57 |
| | 5722.800 | -44.59 | -13 | -31.59 | -51.94 | 13.08 | 5.73 |
| | 7630.400 | -36.49 | -13 | -23.49 | -41.13 | 11.24 | 6.60 |
| V | 3815.200 | -37.59 | -13 | -24.59 | -45.63 | 12.60 | 4.57 |
| | 5722.800 | -41.48 | -13 | -28.48 | -48.83 | 13.08 | 5.73 |
| | 7630.400 | -32.51 | -13 | -19.51 | -37.15 | 11.24 | 6.60 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

| | | | |
|-----------------|----------------------------|----------------|-------|
| Product | Module | | |
| Test Item | Radiated Spurious Emission | | |
| Test Mode | Mode 2: WCDMA Band 4 | | |
| Date of Test | 2020/09/01 | Test Site | CB2-H |
| Temperature(°C) | 25 | Humidity (%RH) | 56 |

RMC_CH 1312_WCDMA_Band 4

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 3424.800 | -44.31 | -13 | -31.31 | -52.40 | 12.45 | 4.36 |
| | 5137.200 | -42.02 | -13 | -29.02 | -49.41 | 12.78 | 5.39 |
| | 6849.600 | -42.14 | -13 | -29.14 | -47.60 | 11.83 | 6.37 |
| V | 3424.800 | -38.77 | -13 | -25.77 | -46.86 | 12.45 | 4.36 |
| | 5137.200 | -32.57 | -13 | -19.57 | -39.96 | 12.78 | 5.39 |
| | 6849.600 | -40.56 | -13 | -27.56 | -46.02 | 11.83 | 6.37 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

RMC_CH 1413_WCDMA_Band 4

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 3465.200 | -47.56 | -13 | -34.56 | -55.71 | 12.53 | 4.38 |
| | 5197.800 | -36.41 | -13 | -23.41 | -43.82 | 12.84 | 5.43 |
| | 6930.400 | -43.75 | -13 | -30.75 | -49.02 | 11.73 | 6.46 |
| V | 3465.200 | -41.56 | -13 | -28.56 | -49.71 | 12.53 | 4.38 |
| | 5197.800 | -25.14 | -13 | -12.14 | -32.55 | 12.84 | 5.43 |
| | 6930.400 | -42.16 | -13 | -29.16 | -47.43 | 11.73 | 6.46 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

RMC_CH 1513_WCDMA_Band 4

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 3505.200 | -45.26 | -13 | -32.26 | -53.46 | 12.61 | 4.41 |
| | 5257.800 | -38.15 | -13 | -25.15 | -45.58 | 12.90 | 5.48 |
| | 7010.400 | -43.32 | -13 | -30.32 | -48.42 | 11.64 | 6.54 |
| V | 3505.200 | -43.02 | -13 | -30.02 | -51.22 | 12.61 | 4.41 |
| | 5257.800 | -27.01 | -13 | -14.01 | -34.44 | 12.90 | 5.48 |
| | 7010.400 | -41.63 | -13 | -28.63 | -46.73 | 11.64 | 6.54 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

| | | | |
|-----------------|----------------------------|----------------|-------|
| Product | Module | | |
| Test Item | Radiated Spurious Emission | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | CB2-H |
| Temperature(°C) | 25 | Humidity (%RH) | 56 |

RMC_CH 4132_WCDMA_Band 5

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 1652.800 | -43.69 | -13 | -30.69 | -50.00 | 9.30 | 2.99 |
| | 2479.200 | -46.21 | -13 | -33.21 | -53.11 | 10.59 | 3.69 |
| | 3305.600 | -51.35 | -13 | -38.35 | -59.27 | 12.19 | 4.27 |
| V | 1652.800 | -29.74 | -13 | -16.74 | -36.05 | 9.30 | 2.99 |
| | 2479.200 | -41.02 | -13 | -28.02 | -47.92 | 10.59 | 3.69 |
| | 3305.600 | -50.69 | -13 | -37.69 | -58.61 | 12.19 | 4.27 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

RMC_CH 4183_WCDMA_Band 5

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 1673.200 | -43.62 | -13 | -30.62 | -49.97 | 9.36 | 3.01 |
| | 2509.800 | -45.42 | -13 | -32.42 | -52.33 | 10.62 | 3.71 |
| | 3346.400 | -50.65 | -13 | -37.65 | -58.63 | 12.28 | 4.30 |
| V | 1673.200 | -29.02 | -13 | -16.02 | -35.37 | 9.36 | 3.01 |
| | 2509.800 | -40.79 | -13 | -27.79 | -47.70 | 10.62 | 3.71 |
| | 3346.400 | -50.49 | -13 | -37.49 | -58.47 | 12.28 | 4.30 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

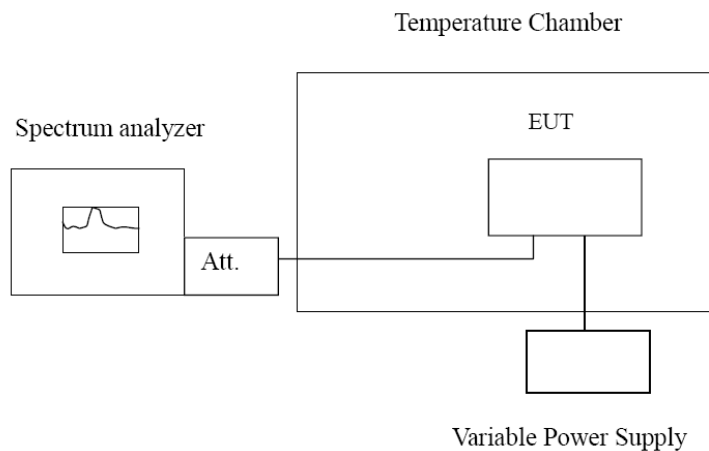
RMC_CH 4233_WCDMA_Band 5

| Antenna Polarity | Frequency (MHz) | Emission Level (dBm) | Limit (dBm) | Margin (dB) | SG Level (dBm) | Antenna Gain (dBi) | Cable Loss (dB) |
|------------------|-----------------|----------------------|-------------|-------------|----------------|--------------------|-----------------|
| H | 1693.200 | -39.02 | -13 | -26.02 | -45.41 | 9.42 | 3.03 |
| | 2539.800 | -41.53 | -13 | -28.53 | -48.47 | 10.67 | 3.73 |
| | 3386.400 | -51.32 | -13 | -38.32 | -59.36 | 12.36 | 4.33 |
| V | 1693.200 | -25.41 | -13 | -12.41 | -31.80 | 9.42 | 3.03 |
| | 2539.800 | -36.28 | -13 | -23.28 | -43.22 | 10.67 | 3.73 |
| | 3386.400 | -48.56 | -13 | -35.56 | -56.60 | 12.36 | 4.33 |

Emission Level=SG(Signal Generator) Level+Antenna Gain-Cable Loss.

8. Frequency Stability

8.1. Test Setup



8.2. Test Procedure

Frequency Stability under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

8.3. Test Method

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 9

ANSI C63.26-2015 Sub-clause 5.6

8.4. Test Result

| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Frequency Stability | | |
| Test Mode | Mode 1: WCDMA Band 2 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 56 |

WCDMA Band 2 – 1852.4MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 3.22 | -0.0017 |
| 3.7 | 5.53 | -0.0030 |
| 3.33 | 2.48 | -0.0013 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 4.03 | -0.0022 |
| -20 | 6.93 | -0.0037 |
| -10 | 7.95 | -0.0043 |
| 0 | 7.56 | -0.0041 |
| 10 | 3.93 | -0.0021 |
| 20 | 6.59 | -0.0036 |
| 30 | 6.46 | -0.0035 |
| 40 | 6.27 | -0.0034 |
| 50 | 3.54 | -0.0019 |
| 60 | 9.98 | -0.0054 |
| 70 | 9.31 | -0.0050 |

WCDMA Band 2 – 1880MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 6.48 | -0.0035 |
| 3.7 | 2.35 | -0.0013 |
| 3.33 | 7.94 | -0.0043 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 3.28 | -0.0018 |
| -20 | 5.32 | -0.0029 |
| -10 | 5.92 | -0.0032 |
| 0 | 5.08 | -0.0027 |
| 10 | 3.54 | -0.0019 |
| 20 | 4.90 | -0.0026 |
| 30 | 8.66 | -0.0047 |
| 40 | 9.87 | -0.0053 |
| 50 | 6.51 | -0.0035 |
| 60 | 5.46 | -0.0029 |
| 70 | 9.27 | -0.0050 |

WCDMA Band 2 – 1907.6MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 6.84 | -0.0036 |
| 3.7 | 6.59 | -0.0035 |
| 3.33 | 4.17 | -0.0022 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 8.11 | -0.0043 |
| -20 | 3.52 | -0.0018 |
| -10 | 9.53 | -0.0050 |
| 0 | 4.87 | -0.0026 |
| 10 | 7.33 | -0.0038 |
| 20 | 2.84 | -0.0015 |
| 30 | 9.87 | -0.0052 |
| 40 | 4.12 | -0.0022 |
| 50 | 7.56 | -0.0040 |
| 60 | 6.83 | -0.0036 |
| 70 | 2.60 | -0.0014 |

| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Frequency Stability | | |
| Test Mode | Mode 2: WCDMA Band 4 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 56 |

WCDMA Band 4 – 1712.4MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 9.48 | -0.0055 |
| 3.7 | 4.10 | -0.0024 |
| 3.33 | 7.65 | -0.0045 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 5.57 | -0.0033 |
| -20 | 5.37 | -0.0031 |
| -10 | 5.19 | -0.0030 |
| 0 | 6.58 | -0.0038 |
| 10 | 7.46 | -0.0044 |
| 20 | 4.35 | -0.0025 |
| 30 | 7.67 | -0.0045 |
| 40 | 9.78 | -0.0057 |
| 50 | 6.26 | -0.0037 |
| 60 | 6.42 | -0.0037 |
| 70 | 2.30 | -0.0013 |

WCDMA Band 4 – 1732.6MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 4.54 | -0.0026 |
| 3.7 | 9.17 | -0.0053 |
| 3.33 | 9.96 | -0.0057 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 2.47 | -0.0014 |
| -20 | 8.60 | -0.0050 |
| -10 | 9.27 | -0.0054 |
| 0 | 2.28 | -0.0013 |
| 10 | 4.99 | -0.0029 |
| 20 | 7.65 | -0.0044 |
| 30 | 2.83 | -0.0016 |
| 40 | 4.17 | -0.0024 |
| 50 | 4.41 | -0.0025 |
| 60 | 8.98 | -0.0052 |
| 70 | 6.32 | -0.0036 |

WCDMA_Band 4_1752.6MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 6.92 | -0.0039 |
| 3.7 | 6.94 | -0.0040 |
| 3.33 | 5.99 | -0.0034 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 7.97 | -0.0045 |
| -20 | 6.33 | -0.0036 |
| -10 | 8.05 | -0.0046 |
| 0 | 6.18 | -0.0035 |
| 10 | 2.73 | -0.0016 |
| 20 | 2.30 | -0.0013 |
| 30 | 6.02 | -0.0034 |
| 40 | 9.39 | -0.0054 |
| 50 | 6.52 | -0.0037 |
| 60 | 7.16 | -0.0041 |
| 70 | 2.54 | -0.0014 |

| | | | |
|-----------------|----------------------|----------------|--------|
| Product | Module | | |
| Test Item | Frequency Stability | | |
| Test Mode | Mode 3: WCDMA Band 5 | | |
| Date of Test | 2020/09/01 | Test Site | SR12-H |
| Temperature(°C) | 23 | Humidity (%RH) | 56 |

WCDMA_Band 5_826.4MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.07 | 8.40 | -0.0029 |
| 3.7 | 8.96 | -0.0025 |
| 3.33 | 5.72 | -0.0026 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 7.17 | -0.0027 |
| -20 | 3.89 | -0.0025 |
| -10 | 7.01 | -0.0028 |
| 0 | 7.47 | -0.0030 |
| 10 | 2.18 | -0.0027 |
| 20 | 2.47 | -0.0030 |
| 30 | 9.07 | -0.0029 |
| 40 | 5.71 | -0.0031 |
| 50 | 3.53 | -0.0024 |
| 60 | 9.04 | -0.0033 |
| 70 | 3.48 | -0.0033 |

WCDMA_Band 5_836.6MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.4 | 6.14 | 0.0004 |
| 3.7 | 3.56 | 0.0007 |
| 3.135 | 9.93 | -0.0002 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 6.38 | 0.0005 |
| -20 | 2.68 | 0.0004 |
| -10 | 6.01 | 0.0003 |
| 0 | 3.09 | 0.0004 |
| 10 | 4.35 | 0.0002 |
| 20 | 7.03 | 0.0008 |
| 30 | 5.27 | 0.0001 |
| 40 | 9.08 | 0.0005 |
| 50 | 4.82 | 0.0003 |
| 60 | 7.81 | 0.0003 |
| 70 | 4.55 | 0.0007 |

WCDMA_Band 5_846.6MHz

Voltage

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---------------|----------------------|-----------------------|
| 4.4 | 4.97 | 0.0014 |
| 3.7 | 4.33 | 0.0012 |
| 3.135 | 7.77 | 0.0012 |

Temperature

| Temperature | Frequency Error (Hz) | Frequency Error (ppm) |
|-------------|----------------------|-----------------------|
| -30 | 9.82 | 0.0011 |
| -20 | 8.26 | 0.0011 |
| -10 | 8.64 | 0.0014 |
| 0 | 5.07 | 0.0004 |
| 10 | 8.21 | 0.0008 |
| 20 | 6.75 | 0.0012 |
| 30 | 9.29 | 0.0009 |
| 40 | 3.45 | 0.0003 |
| 50 | 3.59 | 0.0009 |
| 60 | 8.51 | 0.0014 |
| 70 | 8.07 | 0.0013 |