



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 22H, PART 24E
MEASUREMENT AND TEST REPORT

For

HONG KONG IPRO TECHNOLOGY CO., LIMITED

12/F 3 LOCKHART ROAD WANCHAI HK

FCC ID: PQ4IPROAMBER8S

| | |
|--|---|
| Report Type: Original Report | Product Type: Smart Phone |
| Report Number: | RDG200914001-00D |
| Report Date: | 2020-10-21 |
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GENERAL INFORMATION**Product Description for Equipment under Test (EUT)**

| | | |
|-----------------------------|---|-------------------------------|
| EUT Name: | Smart Phone | |
| EUT Model: | Amber8S | |
| Operation modes: | GSM Voice, GPRS Data WCDMA(R99 (Voice/Data), HSDPA/HSUPA/HSPA+) | |
| Operation Frequency: | GSM 850: 824-849 MHz(TX), 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX), 1930-1990 MHz(RX) WCDMA Band 2: 1850-1910 MHz(TX), 1930-1990 MHz(RX) WCDMA Band 5: 824-849 MHz(TX), 869-894 MHz(RX) | |
| Modulation Type: | GMSK,BPSK, QPSK, 16QAM | |
| Rated Input Voltage: | DC 3.8V from battery or DC 5V from Adapter | |
| Adapter Information | Model: | NTR-S01 |
| | Input: | AC 100V-240V, 50Hz/60Hz 0.15A |
| | Output: | DC 5.0V, 1000mA |
| Serial Number: | RDG200914001-RF-S1 | |
| EUT Received Date: | 2020.09.11 | |
| EUT Received Status: | Good | |

Objective

This report is prepared on behalf of **HONG KONG IPRO TECHNOLOGY CO.,LIMITED** in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E of the Federal Communications Commission's rules.

The objective is to determine compliance with FCC Rules for output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS, DTS submissions with FCC ID: PQ4IPROAMBER8S

FCC Part 15B JBP submissions with FCC ID: PQ4IPROAMBER8S

Test Methodology

All tests and measurements indicated in this document were performed in accordance with:

the Code of federal Regulations Title 47, Part 2, Part 22, Part 24

ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

| Parameter | Measurement Uncertainty |
|-------------------------------|-------------------------|
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±0.61dB |
| Unwanted Emissions, radiated | ±3.62 dB |
| Unwanted Emissions, conducted | ±2.47 dB |
| Temperature | ±1 °C |
| Humidity | ±5% |
| DC and low frequency voltages | ±0.4% |
| Duty Cycle | 1% |

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “Δ”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to ANSI C63.26-2015.

The test items were performed with the EUT operating at testing mode. The device operates on GSM/WCDMA Bands, test was performed with channels as below table:

| Frequency Bands | Bandwidth (MHz) | Test Frequency(MHz) | | |
|-----------------|-----------------|---------------------|--------|--------|
| | | Low | Middle | High |
| GSM/GPRS 850 | 0.25 | 824.2 | 836.6 | 848.8 |
| GSM/GPRS 1900 | 0.25 | 1850.2 | 1880 | 1909.8 |
| WCDMA Band 2 | 4.2 | 1852.4 | 1880 | 1907.6 |
| WCDMA Band 5 | 4.2 | 826.4 | 836.6 | 846.6 |

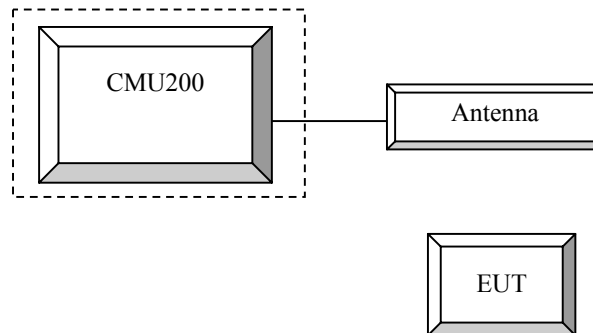
Equipment Modifications

No modification was made to the EUT.

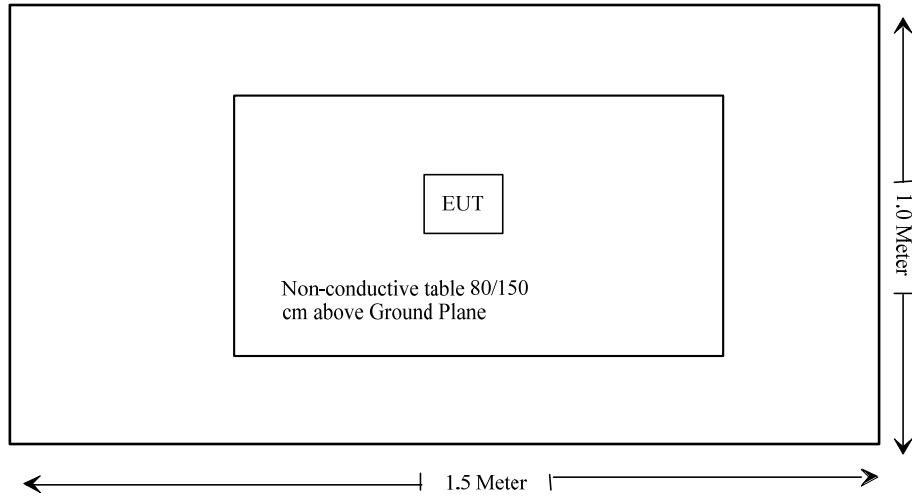
Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|--------------------------------------|---------|---------------|
| R&S | Universal Radio Communication Tester | CMU200 | 106 891 |
| Unknown | ANTENNA | Unknown | ANTENNA001 |

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|--|--|----------------|
| §1.1310, §2.1093 | RF Exposure | Compliance |
| §2.1046; § 22.913 (a); § 24.232 (c); | RF Output Power | Compliance |
| § 2.1047 | Modulation Characteristics | Not Applicable |
| § 2.1049; § 22.905 § 22.917; § 24.238 | Occupied Bandwidth | Compliance |
| § 2.1051, § 22.917 (a); § 24.238 (a) | Spurious Emissions at Antenna Terminal | Compliance |
| § 2.1053 § 22.917 (a); § 24.238 (a) | Spurious Radiation Emissions | Compliance |
| § 22.917 (a); § 24.238 (a) | Out of band emission, Band Edge | Compliance |
| § 2.1055 § 22.355; § 24.235 | Frequency stability vs. temperature Frequency stability vs. voltage | Compliance |

FCC §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RDG200914001-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §24.232 (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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.

Test Procedure

GSM/GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900

Press Connection control to choose the different menus

Press RESET > choose all the reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM + GPRS or GSM + EGSM

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850

> 30 dBm for GPRS 1900

> 27 dBm for EGPRS 850

> 26 dBm for EGPRS 1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stable)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off

P0 > 4 dB

Slot Config > Unchanged (if already set under MS signal)

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3

Network Coding Scheme > CS4 (GPRS) and MCS5 (EGPRS)

Bit Stream > 2E9-1 PSR Bit Stream

AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input

Connection Press Signal on to turn on the signal and change settings

WCDMA-Release 99

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification. The EUT has a nominal maximum output power of 24dBm (+1.7/-3.7).

| | | |
|-----------------------------------|--|--------------|
| WCDMA General Settings | Loopback Mode | Test Mode 1 |
| | Rel99 RMC | 12.2kbps RMC |
| | Power Control Algorithm | Algorithm2 |
| | β_c / β_d | 8/15 |

WCDMA HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

| | Mode | HSDPA | HSDPA | HSDPA | HSDPA |
|------------------------------------|-------------------------------|--------------|-------|-------|-------|
| | Subset | 1 | 2 | 3 | 4 |
| WCDMA General Settings | Loopback Mode | Test Mode 1 | | | |
| | Rel99 RMC | 12.2kbps RMC | | | |
| | HSDPA FRC | H-Set1 | | | |
| | Power Control Algorithm | Algorithm2 | | | |
| | β_c | 2/15 | 12/15 | 15/15 | 15/15 |
| | β_d | 15/15 | 15/15 | 8/15 | 4/15 |
| | β_d (SF) | 64 | | | |
| | β_c / β_d | 2/15 | 12/15 | 15/8 | 15/4 |
| | β_{hs} | 4/15 | 24/15 | 30/15 | 30/15 |
| | MPR(dB) | 0 | 0 | 0.5 | 0.5 |
| HSDPA Specific Settings | DACK | 8 | | | |
| | DNAK | 8 | | | |
| | DCQI | 8 | | | |
| | Ack-Nack repetition factor | 3 | | | |
| | CQI Feedback | 4ms | | | |
| | CQI Repetition Factor | 2 | | | |
| | $A_{hs}=\beta_{hs} / \beta_c$ | 30/15 | | | |

WCDMA HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

| | Mode | HSUPA | HSUPA | HSUPA | HSUPA | HSUPA |
|--------------------------------|----------------------------------|--|--|--|--|--------------|
| | Subset | 1 | 2 | 3 | 4 | 5 |
| WCDMA General Settings | Loopback Mode | Test Mode 1 | | | | |
| | Rel99 RMC | 12.2kbps RMC | | | | |
| | HSDPA FRC | H-Set1 | | | | |
| | HSUPA Test | HSUPA Loopback | | | | |
| | Power Control Algorithm | Algorithm2 | | | | |
| | β_c | 11/15 | 6/15 | 15/15 | 2/15 | 15/15 |
| | β_d | 15/15 | 15/15 | 9/15 | 15/15 | 0 |
| | β_{ec} | 209/225 | 12/15 | 30/15 | 2/15 | 5/15 |
| | β_c/β_d | 11/15 | 6/15 | 15/9 | 2/15 | - |
| | β_{hs} | 22/15 | 12/15 | 30/15 | 4/15 | 5/15 |
| | CM(dB) | 1.0 | 3.0 | 2.0 | 3.0 | 1.0 |
| MPR(dB) | 0 | 2 | 1 | 2 | 0 | |
| HSDPA Specific Settings | DACK | 8 | | | | |
| | DNAK | 8 | | | | |
| | DCQI | 8 | | | | |
| | Ack-Nack repetition factor | 3 | | | | |
| | CQI Feedback | 4ms | | | | |
| | CQI Repetition Factor | 2 | | | | |
| | $A_{hs}=\beta_{hs}/\beta_c$ | 30/15 | | | | |
| HSUPA Specific Settings | DE-DPCCH | 6 | 8 | 8 | 5 | 7 |
| | DHARQ | 0 | 0 | 0 | 0 | 0 |
| | AG Index | 20 | 12 | 15 | 17 | 21 |
| | ETFCI | 75 | 67 | 92 | 71 | 81 |
| | Associated Max UL Data Rate kbps | 242.1 | 174.9 | 482.8 | 205.8 | 308.9 |
| | Reference E_FCIs | E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27 | E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18 | E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18 | E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27 | |

HSPA+

The following tests were conducted according to the test requirements in Table C.11.1.4 of 3GPP TS 34.121-1

| Sub-test | β_c (Note3) | β_d | β_{HS} (Note1) | β_{ec} | β_{ed} (2xSF2) (Note 4) | β_{ed} (2xSF4) (Note 4) | CM (dB) (Note 2) | MPR (dB) (Note 2) | AG Index (Note 4) | E-TFCI (Note 5) | E-TFCI (boost) |
|----------|----------------------|-----------|-------------------------|--------------|--|--|------------------------|-------------------------|-------------------------|--------------------|-------------------|
| 1 | 1 | 0 | 30/15 | 30/15 | β_{ed1} : 30/15 β_{ed2} : 30/15 | β_{ed3} : 24/15 β_{ed4} : 24/15 | 3.5 | 2.5 | 14 | 105 | 105 |

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

DC-HSDPA

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

Table C.8.1.12: Fixed Reference Channel H-Set 12

| Parameter | Unit | Value |
|---|-----------|-------|
| Nominal Avg. Inf. Bit Rate | kbps | 60 |
| Inter-TTI Distance | TTI's | 1 |
| Number of HARQ Processes | Processes | 6 |
| Information Bit Payload (N_{INF}) | Bits | 120 |
| Number Code Blocks | Blocks | 1 |
| Binary Channel Bits Per TTI | Bits | 960 |
| Total Available SML's in UE | SML's | 19200 |
| Number of SML's per HARQ Proc. | SML's | 3200 |
| Coding Rate | | 0.15 |
| Number of Physical Channel Codes | Codes | 1 |
| Modulation | | QPSK |
| <p>Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.</p> <p>Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.</p> | | |

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------------|--------------------------------------|---------------|---------------|------------------|----------------------|
| ERP/EIRP Test | | | | | |
| Sunol Sciences | Antenna | JB3 | A060611-2 | 2020-08-25 | 2023-08-25 |
| R&S | EMI Test Receiver | ESCI | 100224 | 2020-09-12 | 2021-09-12 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-1000-01 | 2020-09-05 | 2021-09-05 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0400-02 | 2020-09-05 | 2021-09-05 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0530-01 | 2020-09-24 | 2021-09-24 |
| EMCO | Adjustable Dipole Antenna | 3121C | 9109-753 | N/A | N/A |
| Agilent | Signal Generator | E8247C | MY43321350 | 2019-12-10 | 2020-12-10 |
| ETS-Lindgren | Horn Antenna | 3115 | 000 527 35 | 2018-10-12 | 2021-10-12 |
| Agilent | Spectrum Analyzer | E4440A | SG43360054 | 2020-07-07 | 2021-07-07 |
| Unknown | Coaxial Cable | C-SJSJ-50 | C-0800-01 | 2020-09-05 | 2021-09-05 |
| TDK RF | Horn Antenna | HRN-0118 | 130 084 | 2018-10-12 | 2021-10-12 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0200-02 | 2020-09-05 | 2021-09-05 |
| Conducted Output Power Test | | | | | |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005011 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005012 | Each time | N/A |
| E-Microwave | Coaxial Attenuators | EMCA10-5RN-6 | OE01203239 | Each time | N/A |
| R&S | Universal Radio Communication Tester | CMU200 | 106 891 | 2020-09-12 | 2021-09-12 |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

| Test Items | Radiation Below 1GHz | Radiation Above 1GHz | Conducted Output Power |
|---------------------------|----------------------|----------------------|------------------------|
| Temperature: | 22.9°C | 25°C | 26.5~27.1°C |
| Relative Humidity: | 37% | 50% | 45~48% |
| ATM Pressure: | 100.7kPa | 101kPa | 100.9~101.2kPa |
| Tester: | Asa Chen | Felix Wang | James Chen |
| Test Date: | 2020-09-27 | 2020-10-13 | 2020-10-15~2020-10-20 |

Test Result: Compliance

Conducted Output Power:

Cellular Band & PCS Band

| Band | Channel No. | Conducted Peak Output Power (dBm) | | | | |
|----------|-------------|-----------------------------------|--------------------|--------------------|--------------------|--------------------|
| | | GSM | GPRS 1 uplink slot | GPRS 2 uplink slot | GPRS 3 uplink slot | GPRS 4 uplink slot |
| Cellular | 128 | 26.8 | 26.86 | 25.78 | 23.39 | 22.02 |
| | 190 | 25.3 | 25.43 | 24.26 | 21.66 | 20.29 |
| | 251 | 23.9 | 23.79 | 22.55 | 19.79 | 18.49 |
| PCS | 512 | 24.7 | 24.71 | 24.32 | 22.94 | 22.08 |
| | 661 | 24.1 | 24.18 | 24.02 | 22.38 | 21.51 |
| | 810 | 23.2 | 23.34 | 22.92 | 21.41 | 20.47 |

WCDMA Band 2

| Mode | 3GPP Sub Test | Low Channel | | Middle Channel | | High Channel | |
|---------------|---------------|------------------|----------|------------------|----------|------------------|----------|
| | | Ave. Power (dBm) | PAR (dB) | Ave. Power (dBm) | PAR (dB) | Ave. Power (dBm) | PAR (dB) |
| Rel 99 | 1 | 17.29 | 2.92 | 16.89 | 3.04 | 18.07 | 3.08 |
| HSDPA | 1 | 14.82 | 5.10 | 14.94 | 3.97 | 15.13 | 4.33 |
| | 2 | 14.80 | 5.12 | 14.62 | 3.89 | 15.40 | 4.49 |
| | 3 | 14.82 | 4.75 | 14.87 | 3.81 | 15.22 | 4.33 |
| | 4 | 14.82 | 4.90 | 14.90 | 3.85 | 14.97 | 3.88 |
| HSUPA | 1 | 14.45 | 4.23 | 14.54 | 4.94 | 15.30 | 6.41 |
| | 2 | 14.45 | 4.07 | 14.54 | 4.78 | 15.24 | 6.56 |
| | 3 | 14.42 | 4.27 | 14.75 | 4.84 | 15.31 | 6.56 |
| | 4 | 14.50 | 4.29 | 14.66 | 4.90 | 15.24 | 6.39 |
| | 5 | 14.38 | 3.96 | 14.63 | 5.02 | 15.48 | 6.41 |
| DC-HSDPA | 1 | 14.40 | 3.95 | 14.58 | 4.90 | 15.40 | 6.61 |
| | 2 | 14.36 | 3.87 | 14.70 | 4.86 | 15.21 | 6.50 |
| | 3 | 14.28 | 4.03 | 14.45 | 4.96 | 15.55 | 6.65 |
| | 4 | 14.43 | 4.29 | 14.50 | 4.94 | 15.24 | 6.41 |
| HSPA+ (16QAM) | 1 | 14.38 | 4.08 | 14.35 | 5.02 | 15.48 | 6.33 |

WCDMA Band 5

| Mode | 3GPP Sub Test | Low Channel | | Middle Channel | | High Channel | |
|---------------|---------------|------------------|----------|------------------|----------|------------------|----------|
| | | Ave. Power (dBm) | PAR (dB) | Ave. Power (dBm) | PAR (dB) | Ave. Power (dBm) | PAR (dB) |
| Rel 99 | 1 | 20.89 | 2.56 | 20.25 | 2.98 | 17.24 | 2.63 |
| HSDPA | 1 | 18.40 | 4.10 | 18.32 | 5.54 | 15.22 | 4.39 |
| | 2 | 18.36 | 3.65 | 18.23 | 5.99 | 15.24 | 4.51 |
| | 3 | 18.40 | 4.10 | 18.32 | 5.78 | 15.34 | 4.33 |
| | 4 | 18.31 | 4.08 | 18.64 | 5.79 | 14.97 | 4.54 |
| HSUPA | 1 | 18.38 | 6.60 | 19.37 | 6.41 | 19.51 | 4.33 |
| | 2 | 18.31 | 6.54 | 19.37 | 6.73 | 19.50 | 4.17 |
| | 3 | 18.44 | 6.53 | 19.37 | 5.96 | 19.51 | 3.98 |
| | 4 | 18.38 | 6.28 | 19.57 | 6.31 | 19.30 | 4.23 |
| | 5 | 18.65 | 6.36 | 19.37 | 6.47 | 19.51 | 4.24 |
| DC-HSDPA | 1 | 18.24 | 6.48 | 19.65 | 6.50 | 19.51 | 4.68 |
| | 2 | 18.07 | 6.34 | 19.21 | 6.81 | 19.50 | 4.17 |
| | 3 | 18.69 | 6.85 | 19.37 | 6.04 | 19.51 | 3.92 |
| | 4 | 18.28 | 6.01 | 19.27 | 6.49 | 19.42 | 4.02 |
| HSPA+ (16QAM) | 1 | 18.45 | 5.96 | 19.46 | 6.56 | 19.30 | 3.84 |

ERP & EIRP:

| Frequency (MHz) | Polar (H/V) | Receiver Reading (dBμV) | Substituted Method | | | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|--|-------------|-------------------------|-------------------------|------------------------|-----------------|----------------------|-------------|-------------|
| | | | Substituted Level (dBm) | Antenna Gain (dBd/dBi) | Cable Loss (dB) | | | |
| GSM 850 Low Channel | | | | | | | | |
| 824.20 | H | 91.68 | 17.26 | 0.00 | 0.49 | 16.77 | 38.45 | 21.68 |
| 824.20 | V | 98.75 | 27.25 | 0.00 | 0.49 | 26.76 | 38.45 | 11.69 |
| GSM 850 Middle Channel | | | | | | | | |
| 836.60 | H | 92.71 | 18.48 | 0.00 | 0.50 | 17.98 | 38.45 | 20.47 |
| 836.60 | V | 98.79 | 27.53 | 0.00 | 0.50 | 27.03 | 38.45 | 11.42 |
| GSM 850 High Channel | | | | | | | | |
| 848.80 | H | 92.67 | 18.64 | 0.00 | 0.50 | 18.14 | 38.45 | 20.31 |
| 848.80 | V | 98.87 | 27.85 | 0.00 | 0.50 | 27.35 | 38.45 | 11.10 |
| WCDMA R99 Band 5 Low channel | | | | | | | | |
| 826.40 | H | 84.65 | 10.26 | 0.00 | 0.50 | 9.76 | 38.45 | 28.69 |
| 826.40 | V | 91.52 | 20.06 | 0.00 | 0.50 | 19.56 | 38.45 | 18.89 |
| WCDMA R99 Band 5 middle channel | | | | | | | | |
| 836.60 | H | 84.23 | 10.00 | 0.00 | 0.50 | 9.50 | 38.45 | 28.95 |
| 836.60 | V | 90.99 | 19.73 | 0.00 | 0.50 | 19.23 | 38.45 | 19.22 |
| WCDMA R99 Band 5 High channel | | | | | | | | |
| 846.60 | H | 82.65 | 8.58 | 0.00 | 0.50 | 8.08 | 38.45 | 30.37 |
| 846.60 | V | 89.66 | 18.60 | 0.00 | 0.50 | 18.10 | 38.45 | 20.35 |
| PCS 1900 Low Channel | | | | | | | | |
| 1850.20 | H | 87.74 | 14.82 | 11.45 | 0.85 | 25.42 | 33.00 | 7.58 |
| 1850.20 | V | 83.49 | 10.49 | 11.45 | 0.85 | 21.09 | 33.00 | 11.91 |
| PCS 1900 Middle Channel | | | | | | | | |
| 1880.00 | H | 87.61 | 15.00 | 11.66 | 0.95 | 25.71 | 33.00 | 7.29 |
| 1880.00 | V | 83.29 | 10.82 | 11.66 | 0.95 | 21.53 | 33.00 | 11.47 |
| PCS 1900 High Channel | | | | | | | | |
| 1909.80 | H | 87.99 | 15.64 | 11.82 | 1.03 | 26.43 | 33.00 | 6.57 |
| 1909.80 | V | 84.69 | 12.64 | 11.82 | 1.03 | 23.43 | 33.00 | 9.57 |
| WCDMA R99 Band 2 low channel | | | | | | | | |
| 1852.40 | H | 81.98 | 9.08 | 11.47 | 0.86 | 19.69 | 33.00 | 13.31 |
| 1852.40 | V | 76.89 | 3.93 | 11.47 | 0.86 | 14.54 | 33.00 | 18.46 |
| WCDMA R99 Band 2 middle channel | | | | | | | | |
| 1880.00 | H | 81.23 | 8.62 | 11.66 | 0.95 | 19.33 | 33.00 | 13.67 |
| 1880.00 | V | 76.81 | 4.34 | 11.66 | 0.95 | 15.05 | 33.00 | 17.95 |
| WCDMA R99 Band 2 high channel | | | | | | | | |
| 1907.60 | H | 81.58 | 9.22 | 11.82 | 1.03 | 20.01 | 33.00 | 12.99 |
| 1907.60 | V | 77.89 | 5.82 | 11.82 | 1.03 | 16.61 | 33.00 | 16.39 |

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

Note 2: Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit - Absolute Level

FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

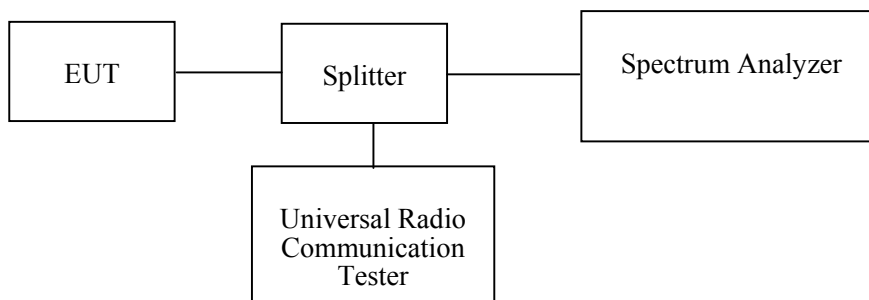
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|---------------------|---------------|---------------|------------------|----------------------|
| R&S | EMI Test Receiver | ESCI | 100035 | 2020-09-12 | 2021-09-12 |
| E-Microwave | Two-way Splitter | ODP-1-6-2S | OE0120142 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005011 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005012 | Each time | N/A |
| E-Microwave | Coaxial Attenuators | EMCA10-5RN-6 | OE01203239 | Each time | N/A |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

| | |
|---------------------------|-----------------------|
| Temperature: | 26.5~27.1°C |
| Relative Humidity: | 45~48% |
| ATM Pressure: | 100.9~101.2kPa |
| Tester: | James Chen |
| Test Date: | 2020-10-15~2020-10-20 |

Test Mode: Transmitting

Test Result: Compliance. *Please refer to the following table and plots.*

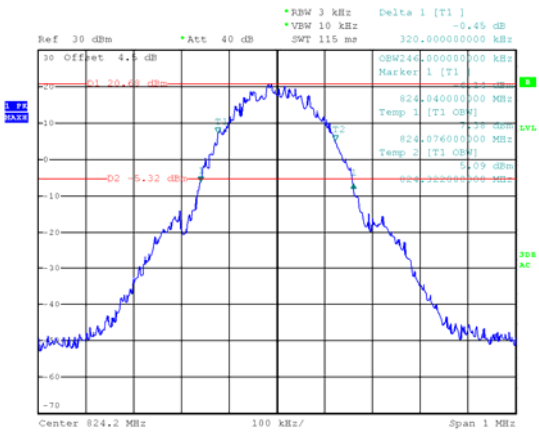
GSM:

| Band | Operation Mode | 99% Occupied Bandwidth (MHz) | | | 26 dB Occupied Bandwidth (MHz) | | |
|----------|----------------|------------------------------|----------------|--------------|--------------------------------|----------------|--------------|
| | | Low Channel | Middle Channel | High Channel | Low Channel | Middle Channel | High Channel |
| Cellular | GSM | 0.25 | 0.25 | 0.25 | 0.32 | 0.32 | 0.32 |
| PCS | GSM | 0.25 | 0.24 | 0.25 | 0.32 | 0.32 | 0.32 |

WCDMA:

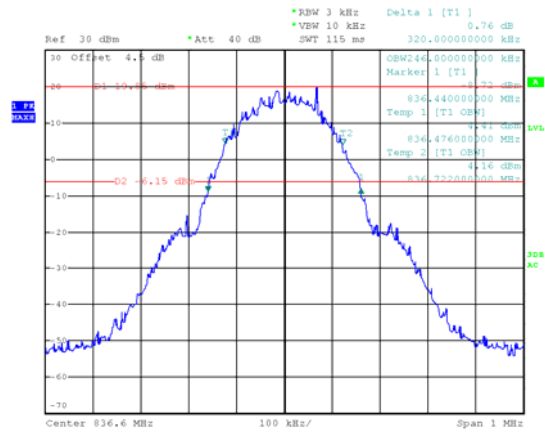
| Band | Operation Mode | 99% Occupied Bandwidth (MHz) | | | 26 dB Occupied Bandwidth (MHz) | | |
|--------------|----------------|------------------------------|----------------|--------------|--------------------------------|----------------|--------------|
| | | Low Channel | Middle Channel | High Channel | Low Channel | Middle Channel | High Channel |
| WCDMA Band 2 | Rel 99 | 4.18 | 4.15 | 0.25 | 4.73 | 4.73 | 0.32 |
| | HSDPA | 4.18 | 4.17 | 0.25 | 4.73 | 4.73 | 0.32 |
| | HSUPA | 4.17 | 4.18 | 4.17 | 4.70 | 4.73 | 4.73 |
| WCDMA Band 5 | Rel 99 | 4.18 | 4.17 | 4.17 | 4.73 | 4.72 | 4.75 |
| | HSDPA | 4.18 | 4.17 | 4.17 | 4.73 | 4.74 | 4.71 |
| | HSUPA | 4.15 | 4.17 | 4.20 | 4.69 | 4.71 | 4.75 |

Cellular 850 Band, GSM, Low Channel



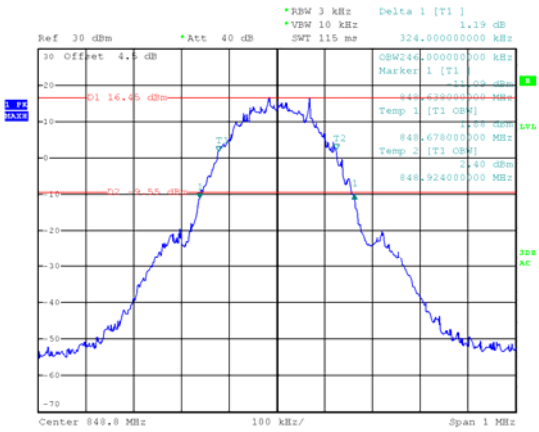
Date: 15.OCT.2020 10:55:53

Cellular 850 Band, GSM, Middle Channel



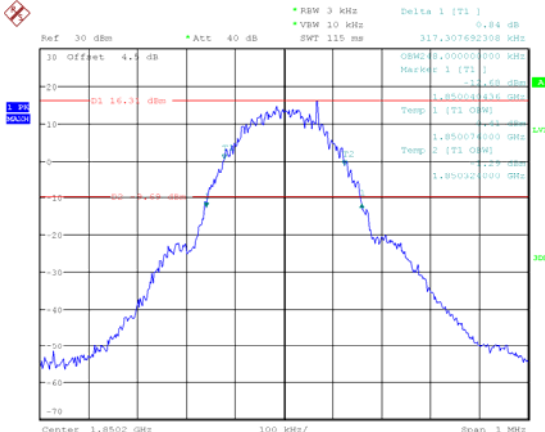
Date: 15.OCT.2020 10:50:49

Cellular 850 Band, GSM, High Channel



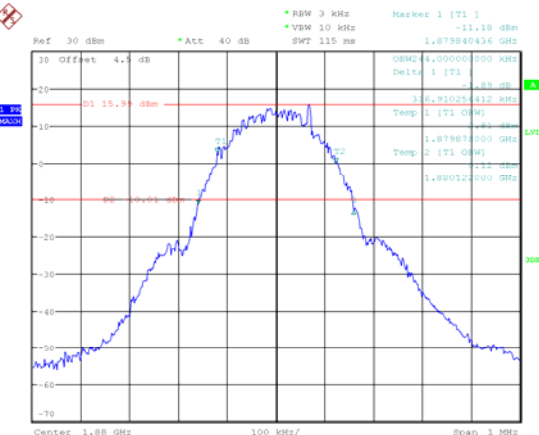
Date: 15.OCT.2020 11:04:33

PCS 1900 Band, GSM, Low Channel



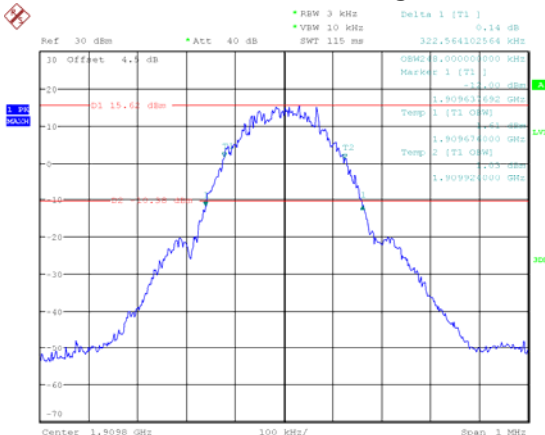
Date: 20.OCT.2020 11:22:56

PCS 1900 Band, GSM, Middle Channel



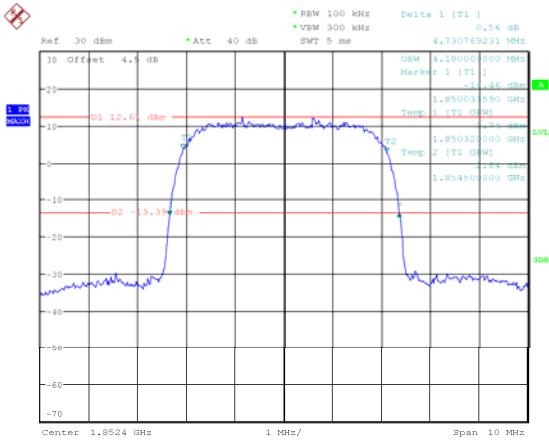
Date: 20.OCT.2020 11:25:33

PCS 1900 Band, GSM, High Channel



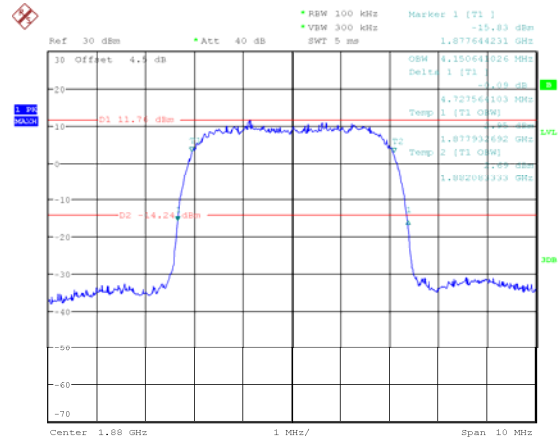
Date: 20.OCT.2020 11:38:11

WCDMA Band II, Rel99, Low Channel



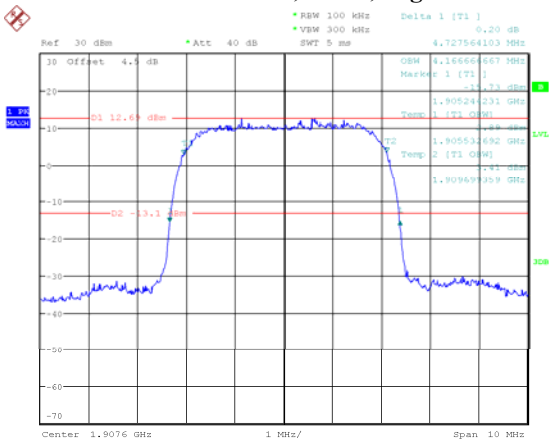
Date: 20.OCT.2020 13:18:27

WCDMA Band II, Rel99, Middle Channel



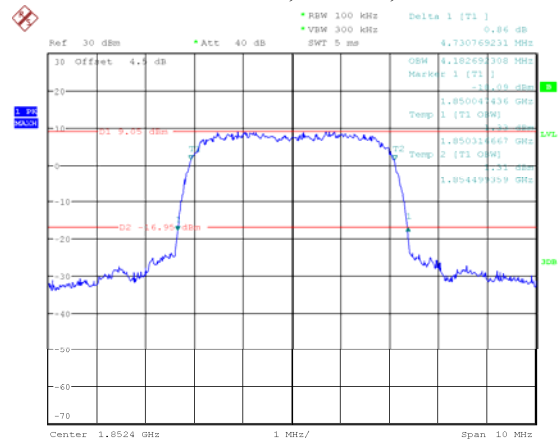
Date: 20.OCT.2020 13:29:02

WCDMA Band II, Rel99, High Channel



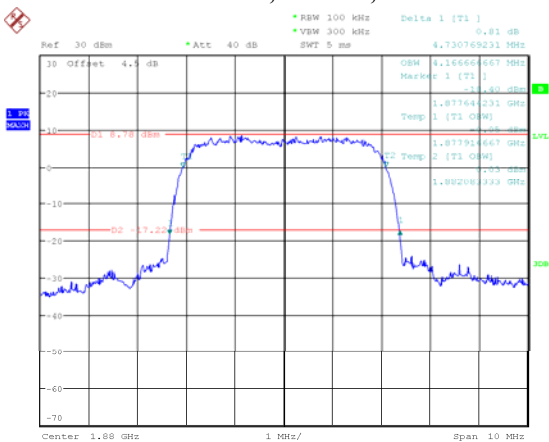
Date: 20.OCT.2020 13:32:47

WCDMA Band II, HSDPA, Low Channel



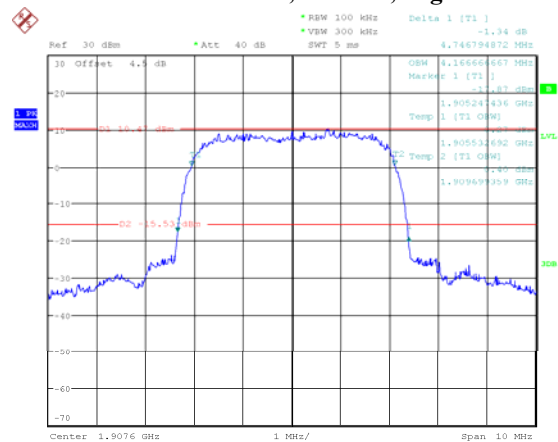
Date: 20.OCT.2020 14:44:49

WCDMA Band II, HSDPA, Middle Channel



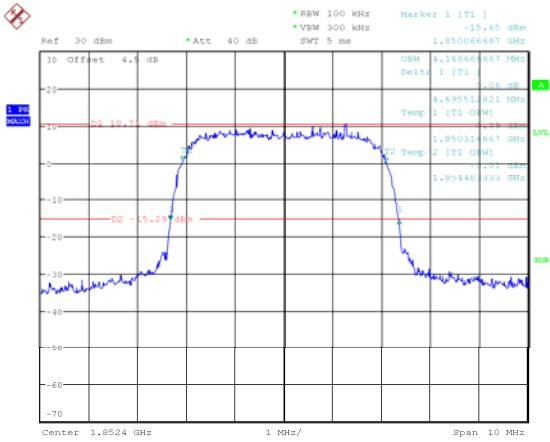
Date: 20.OCT.2020 14:52:17

WCDMA Band II, HSDPA, High Channel



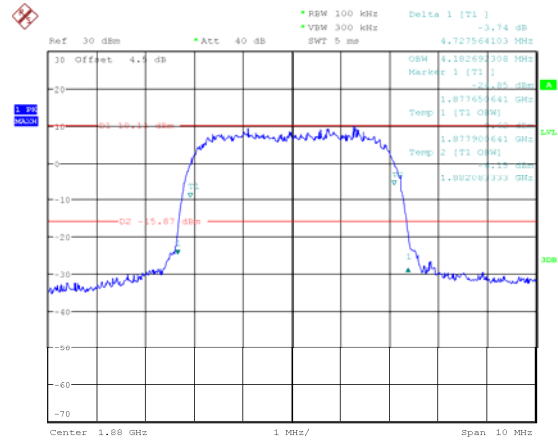
Date: 20.OCT.2020 14:57:18

WCDMA Band II, HSUPA, Low Channel



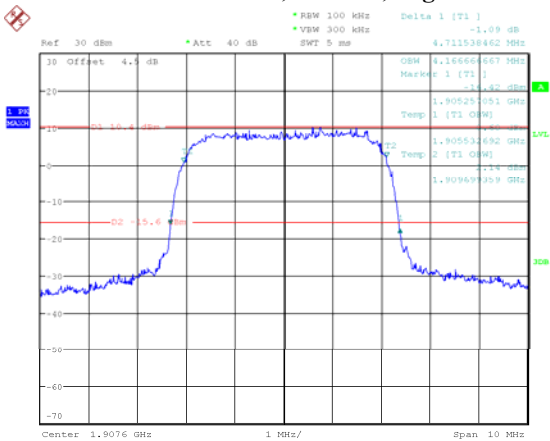
Date: 20.OCT.2020 16:28:21

WCDMA Band II, HSUPA, Middle Channel



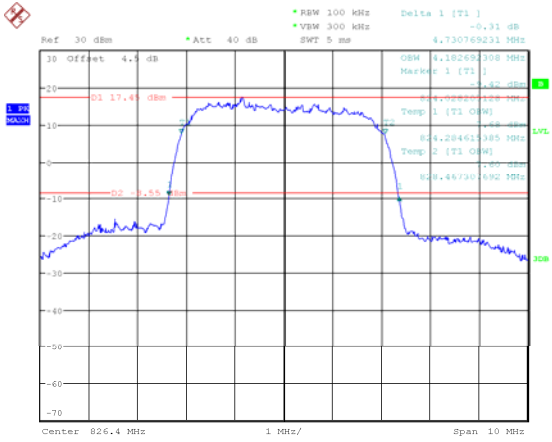
Date: 20.OCT.2020 16:24:42

WCDMA Band II, HSUPA, High Channel



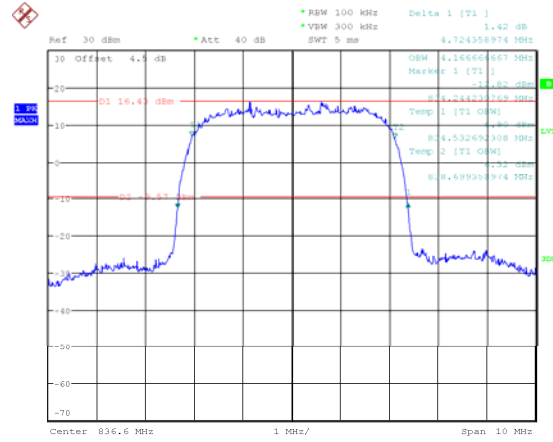
Date: 20.OCT.2020 15:52:20

WCDMA Band V, Rel99, Low Channel



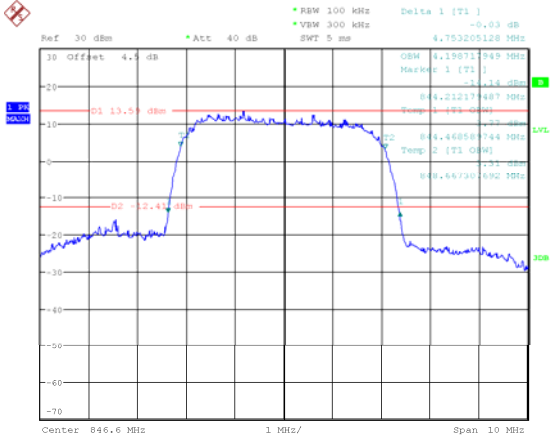
Date: 20.OCT.2020 13:39:39

WCDMA Band V, Rel99, Middle Channel



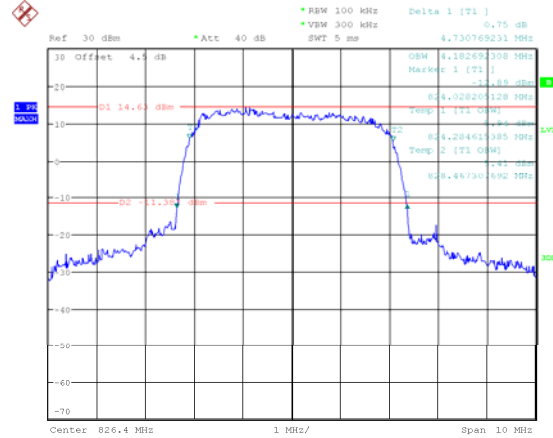
Date: 20.OCT.2020 13:46:54

WCDMA Band V, Rel99, High Channel



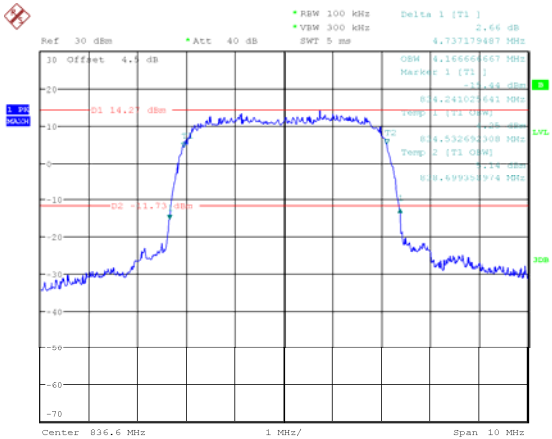
Date: 20.OCT.2020 13:49:35

WCDMA Band V, HSDPA, Low Channel



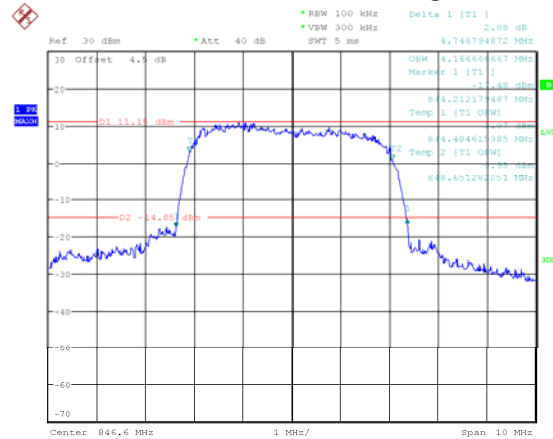
Date: 20.OCT.2020 15:03:31

WCDMA Band V, HSDPA, Middle Channel



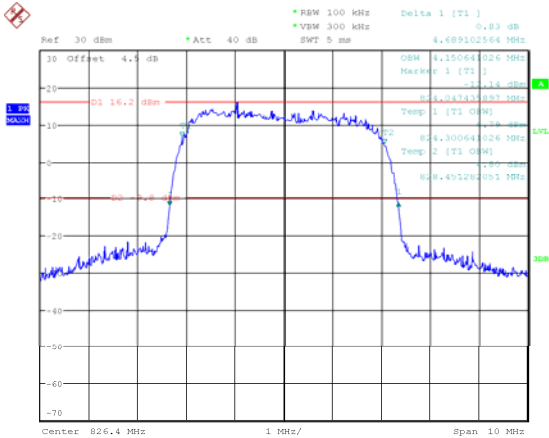
Date: 20.OCT.2020 15:09:02

WCDMA Band V, HSDPA, High Channel



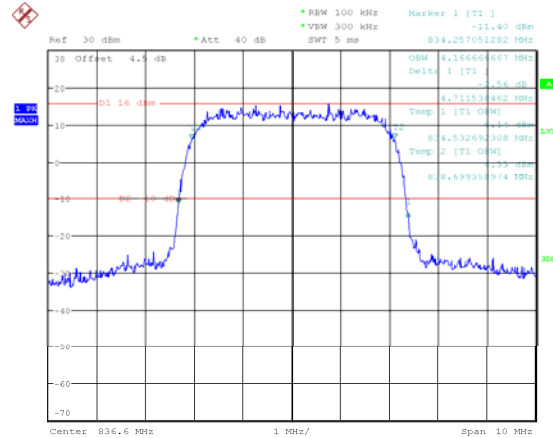
Date: 20.OCT.2020 15:11:54

WCDMA Band V, HSUPA, Low Channel



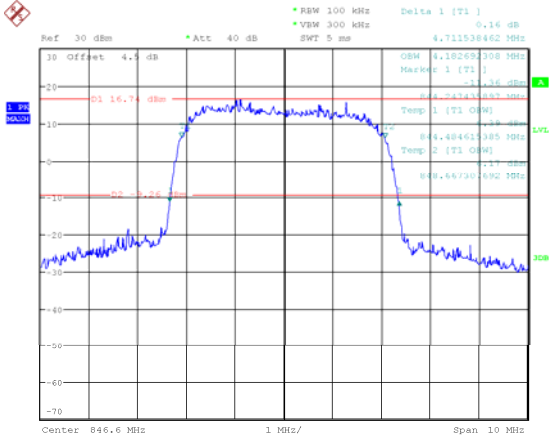
Date: 20.OCT.2020 15:59:58

WCDMA Band V, HSUPA, Middle Channel



Date: 20.OCT.2020 16:07:09

WCDMA Band V, HSUPA, High Channel



Date: 20.OCT.2020 16:11:04

FCC §2.1051, §22.917(a) & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

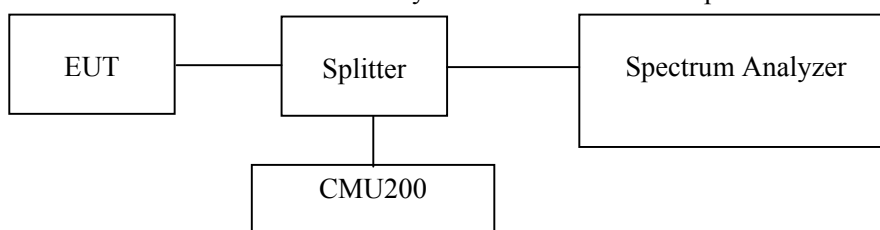
Applicable Standard

FCC §2.1051, §22.917(a) , §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|---------------------|---------------|---------------|------------------|----------------------|
| R&S | EMI Test Receiver | ESCI | 100035 | 2020-09-12 | 2021-09-12 |
| E-Microwave | Two-way Splitter | ODP-1-6-2S | OE0120142 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005011 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005012 | Each time | N/A |
| E-Microwave | Coaxial Attenuators | EMCA10-5RN-6 | OE01203239 | Each time | N/A |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

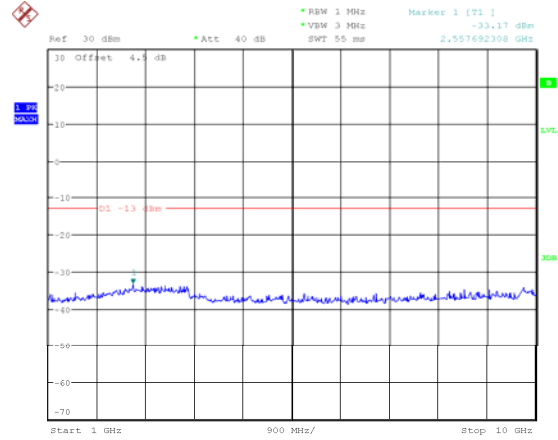
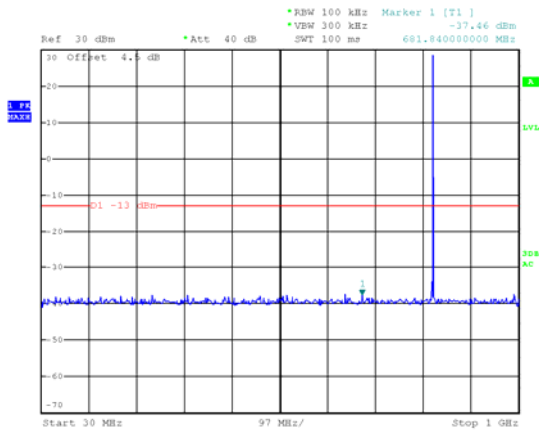
Environmental Conditions

| | |
|---------------------------|-----------------------|
| Temperature: | 26.5~27.1°C |
| Relative Humidity: | 45~48% |
| ATM Pressure: | 100.9~101.2kPa |
| Tester: | James Chen |
| Test Date: | 2020-10-15~2020-10-20 |

Test mode: Transmitting

Test Result: Compliance. Please refer to the following plots:

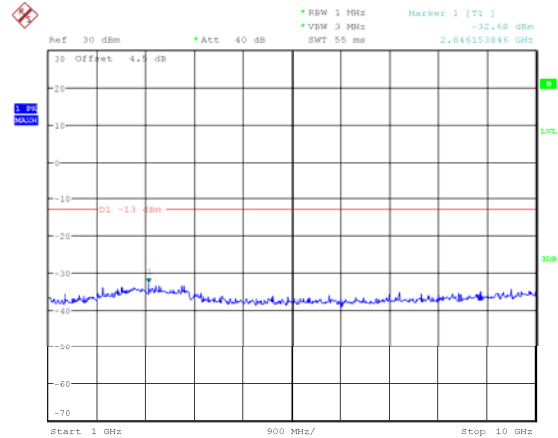
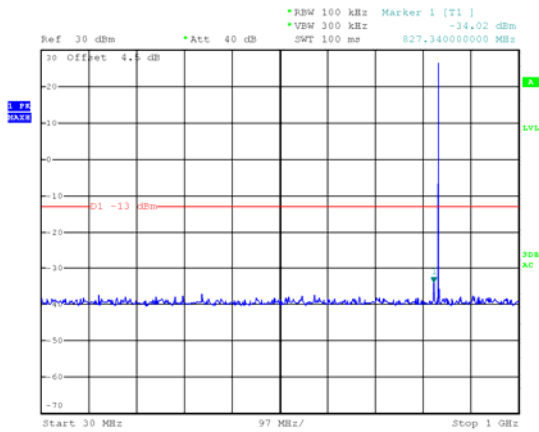
Cellular 850 Band, GSM, Low Channel



Date: 15.OCT.2020 10:53:38

Date: 20.OCT.2020 11:34:19

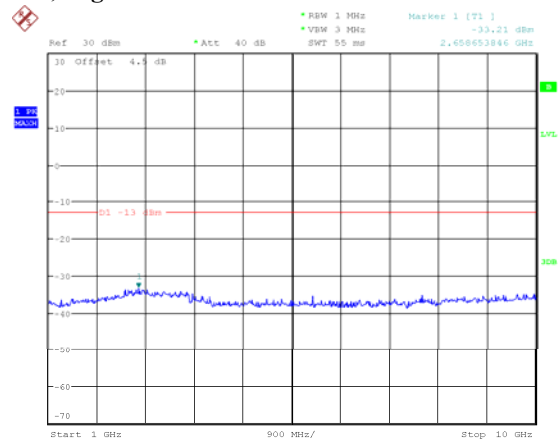
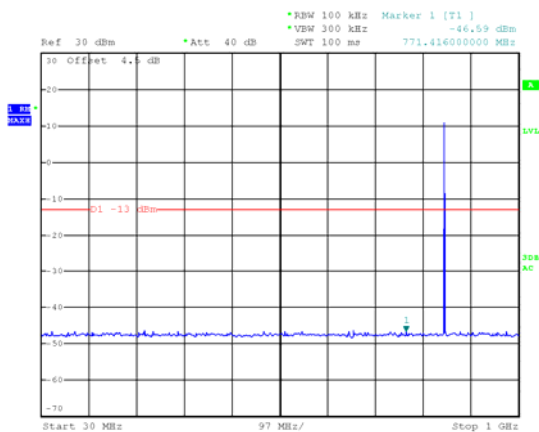
Cellular 850 Band, GSM, Middle Channel



Date: 15.OCT.2020 10:52:14

Date: 20.OCT.2020 11:35:10

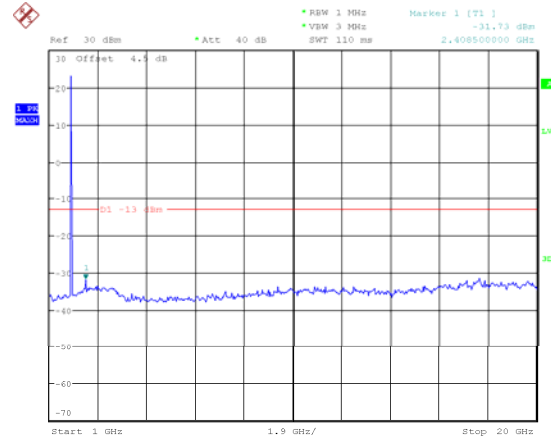
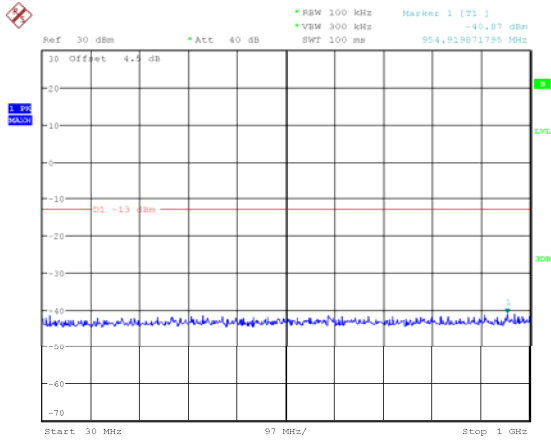
Cellular 850 Band, GSM, High Channel



Date: 15.OCT.2020 11:05:55

Date: 20.OCT.2020 11:35:37

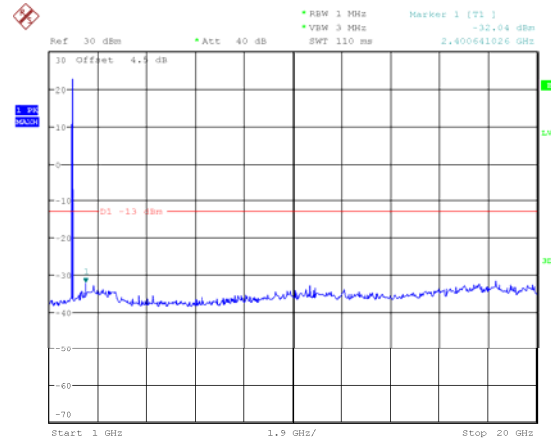
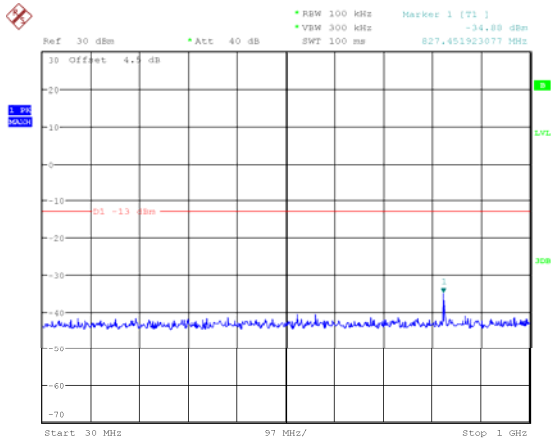
PCS 1900 Band, GSM, Low Channel



Date: 20.OCT.2020 11:17:35

Date: 20.OCT.2020 11:16:50

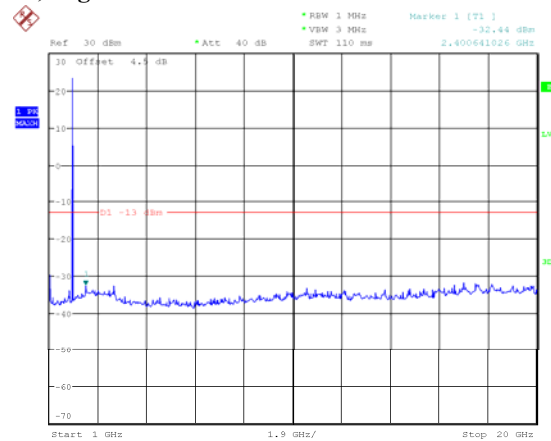
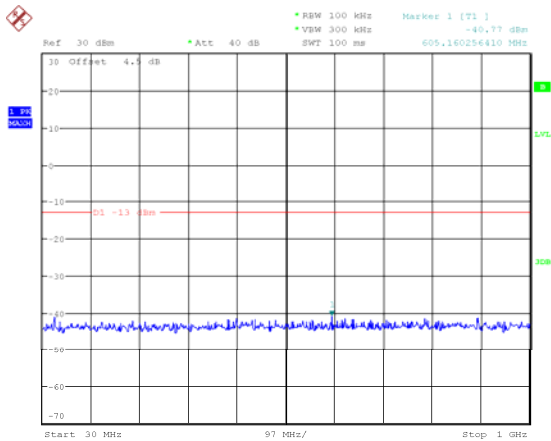
PCS 1900 Band, GSM, Middle Channel



Date: 20.OCT.2020 11:26:46

Date: 20.OCT.2020 11:27:17

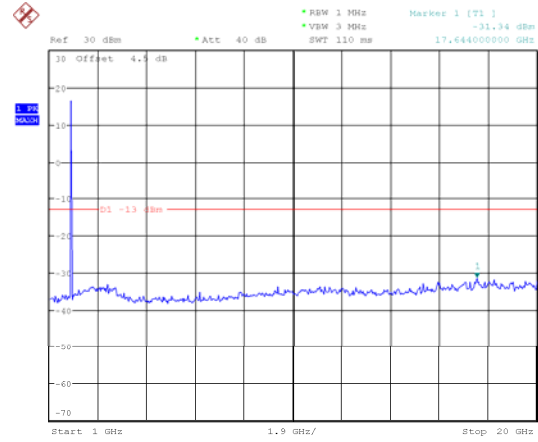
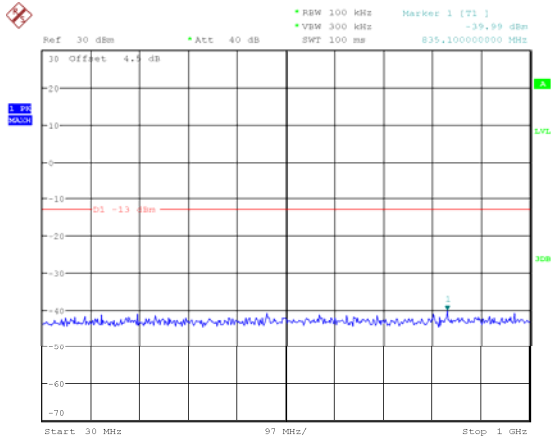
PCS 1900 Band, GSM, High Channel



Date: 20.OCT.2020 11:28:21

Date: 20.OCT.2020 11:27:58

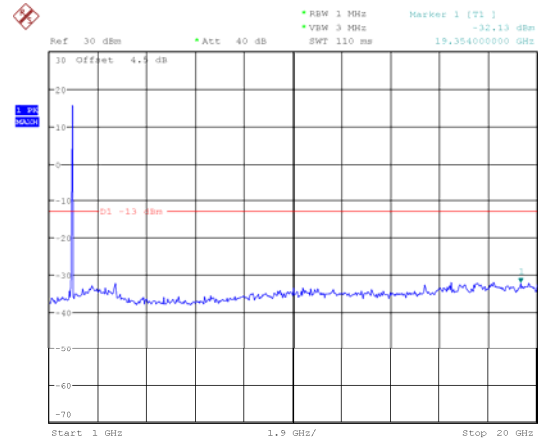
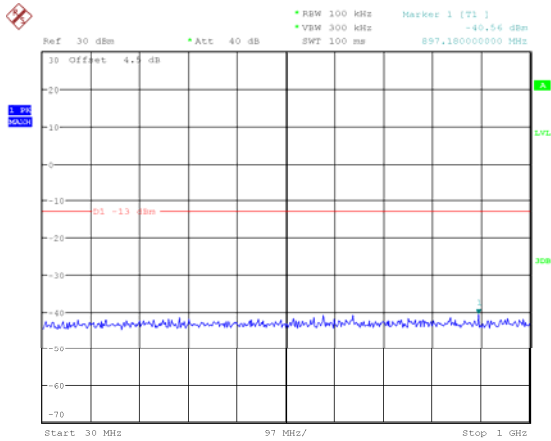
WCDMA Band II, R99, Low Channel



Date: 20.OCT.2020 13:22:50

Date: 20.OCT.2020 13:23:49

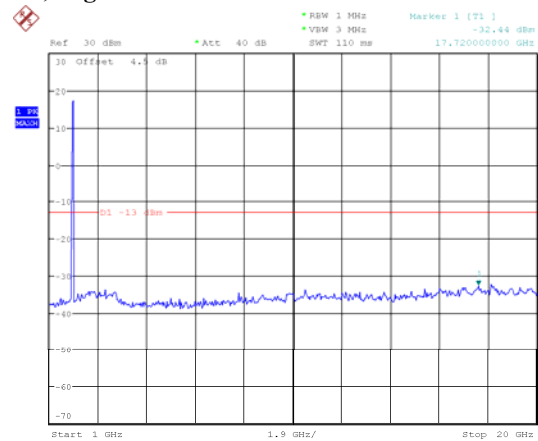
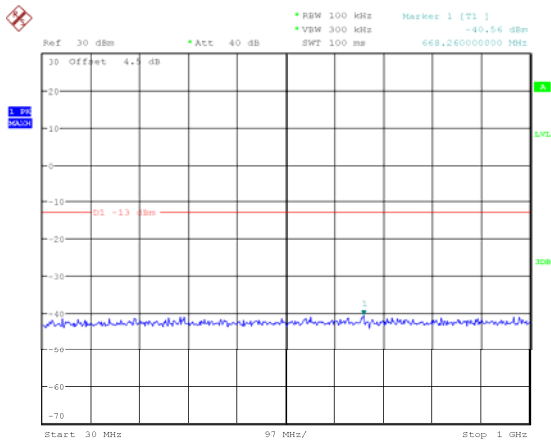
WCDMA Band II, R99, Middle Channel



Date: 20.OCT.2020 13:25:37

Date: 20.OCT.2020 13:25:08

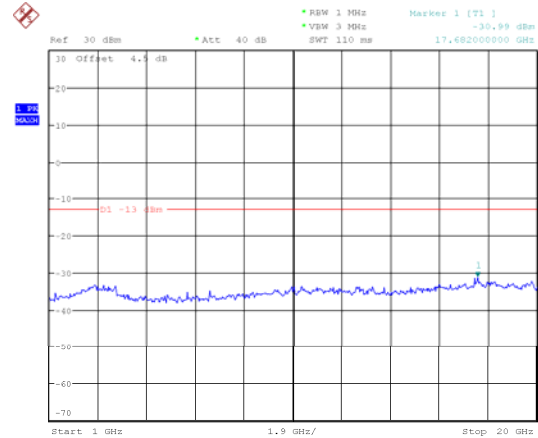
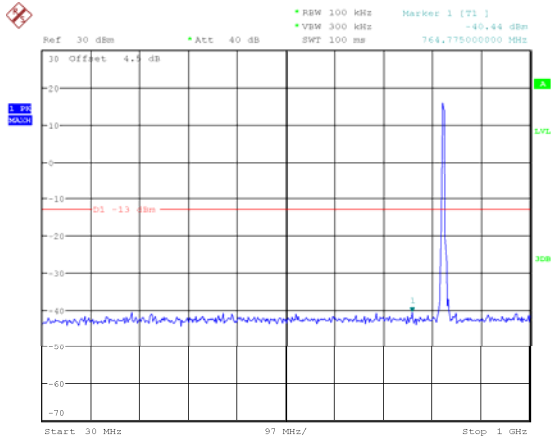
WCDMA Band II, R99, High Channel



Date: 20.OCT.2020 13:34:39

Date: 20.OCT.2020 13:35:02

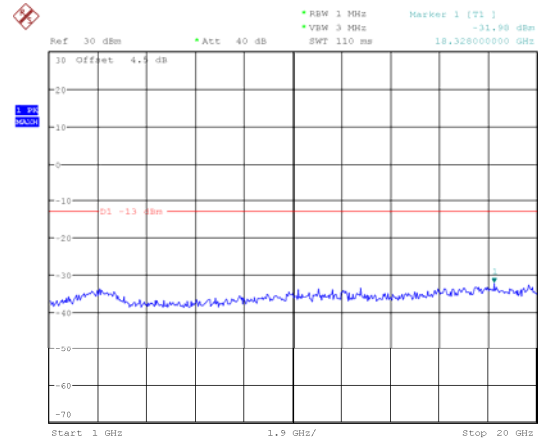
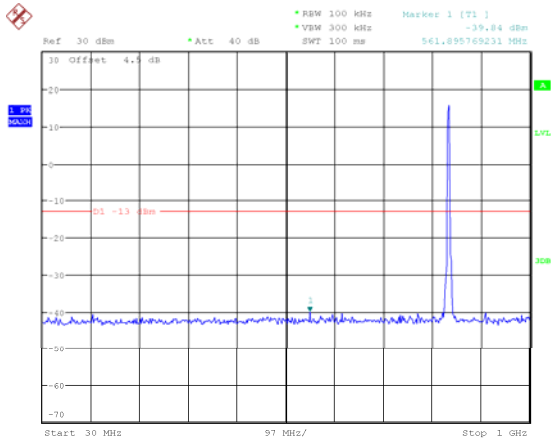
WCDMA Band V, R99, Low Channel



Date: 20.OCT.2020 13:41:35

Date: 20.OCT.2020 13:41:00

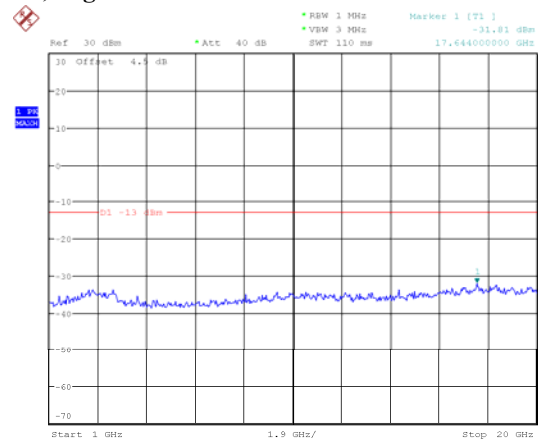
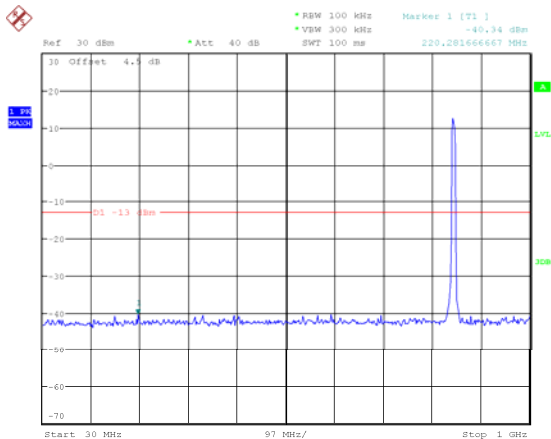
WCDMA Band V, R99, Middle Channel



Date: 20.OCT.2020 13:45:13

Date: 20.OCT.2020 13:45:35

WCDMA Band V, R99, High Channel



Date: 20.OCT.2020 13:51:02

Date: 20.OCT.2020 13:50:10

FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg(\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \text{Log}_{10}(\text{power out in Watts})$

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-------------------------|---------------------------|-------------------------|--------------------|------------------|----------------------|
| Radiation Below 1G Test | | | | | |
| Sunol Sciences | Antenna | JB3 | A060611-2 | 2020-08-25 | 2023-08-25 |
| R&S | EMI Test Receiver | ESCI | 100224 | 2020-09-12 | 2021-09-12 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-1000-01 | 2020-09-05 | 2021-09-05 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0400-02 | 2020-09-05 | 2021-09-05 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0530-01 | 2020-09-24 | 2021-09-24 |
| Sonoma | Amplifier | 310N | 185914 | 2019-10-13 | 2020-10-13 |
| EMCO | Adjustable Dipole Antenna | 3121C | 9109-753 | N/A | N/A |
| Agilent | Signal Generator | E8247C | MY43321350 | 2019-12-10 | 2020-12-10 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0200-02 | 2020-09-05 | 2021-09-05 |
| Radiation Above 1G Test | | | | | |
| ETS-Lindgren | Horn Antenna | 3115 | 000 527 35 | 2018-10-12 | 2021-10-12 |
| TDK RF | Horn Antenna | HRN-0118 | 130 084 | 2018-10-12 | 2021-10-12 |
| Ducommun Technologies | Horn Antenna | ARH-4223-02 | 1007726-01 1304 | 2017-12-06 | 2020-12-05 |
| Ducommun Technologies | Horn Antenna | ARH-4223-02 | 1007726-02 1304 | 2017-12-06 | 2020-12-05 |
| Agilent | Spectrum Analyzer | E4440A | SG43360054 | 2020-07-07 | 2021-07-07 |
| Unknown | Coaxial Cable | C-SJSJ-50 | C-0800-01 | 2020-09-05 | 2021-09-05 |
| Unknown | Coaxial Cable | C-2.4J2.4J-50 | C-0700-02 | 2020-06-27 | 2021-06-27 |
| Mini-Circuit | Amplifier | ZVA-213-S+ | 54201245 | 2020-09-05 | 2021-09-05 |
| Quinstar | Amplifier | QLW-18405536-JO | 15964001001 | 2020-06-27 | 2021-06-27 |
| Sinoscite | Band-stop filter | BSF1850-1910MS-0935V2 | 0935V2 | 2020-06-16 | 2021-06-16 |
| Sinoscite | Band-stop filter | BSF2500-2750MS-1439-001 | 1437001 | 2020-06-16 | 2021-06-16 |
| Agilent | Signal Generator | E8247C | MY43321350 | 2019-12-10 | 2020-12-10 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0200-02 | 2020-09-05 | 2021-09-05 |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

| Test Items | Radiation Below 1GHz | Radiation Above 1GHz |
|---------------------------|----------------------|----------------------|
| Temperature: | 22.9°C | 25°C |
| Relative Humidity: | 37% | 50% |
| ATM Pressure: | 100.7kPa | 101kPa |
| Tester: | Asa Chen | Felix Wang |
| Test Date: | 2020-09-27 | 2020-10-13 |

Test Mode: Transmitting

Test Result: Compliance. Please refer to the following tables:

Cellular Band (PART 22H)**30 MHz-10 GHz:**

| Frequency (MHz) | Polar (H/V) | Receiver Reading (dB μ V) | Substituted Method | | | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|---|-------------|-------------------------------|-------------------------|------------------------|-----------------|----------------------|-------------|-------------|
| | | | Substituted Level (dBm) | Antenna Gain (dBd/dBi) | Cable Loss (dB) | | | |
| Cellular 850 Band, GSM, Low Channel | | | | | | | | |
| 1648.40 | H | 54.53 | -49.65 | 10.44 | 0.71 | -39.92 | -13.00 | 26.92 |
| 1648.40 | V | 51.13 | -53.65 | 10.44 | 0.71 | -43.92 | -13.00 | 30.92 |
| 2472.60 | H | 53.09 | -49.69 | 12.88 | 1.25 | -38.06 | -13.00 | 25.06 |
| 2472.60 | V | 46.71 | -56.12 | 12.88 | 1.25 | -44.49 | -13.00 | 31.49 |
| 3296.80 | H | 36.88 | -62.90 | 13.60 | 1.59 | -50.89 | -13.00 | 37.89 |
| 3296.80 | V | 36.05 | -63.74 | 13.60 | 1.59 | -51.73 | -13.00 | 38.73 |
| 877.78 | H | 55.78 | -40.47 | 0.00 | 0.51 | -40.98 | -13.00 | 27.98 |
| 383.08 | V | 60.12 | -44.49 | 0.00 | 0.37 | -44.86 | -13.00 | 31.86 |
| Cellular 850 Band, GSM, Middle Channel | | | | | | | | |
| 1673.20 | H | 54.50 | -49.44 | 10.61 | 0.73 | -39.56 | -13.00 | 26.56 |
| 1673.20 | V | 53.08 | -51.46 | 10.61 | 0.73 | -41.58 | -13.00 | 28.58 |
| 2509.80 | H | 53.91 | -49.00 | 13.11 | 1.25 | -37.14 | -13.00 | 24.14 |
| 2509.80 | V | 49.41 | -53.53 | 13.11 | 1.25 | -41.67 | -13.00 | 28.67 |
| 3346.40 | H | 36.76 | -62.92 | 13.83 | 1.61 | -50.70 | -13.00 | 37.70 |
| 3346.40 | V | 37.18 | -62.54 | 13.83 | 1.61 | -50.32 | -13.00 | 37.32 |
| 877.76 | H | 55.67 | -40.58 | 0.00 | 0.51 | -41.09 | -13.00 | 28.09 |
| 383.04 | V | 59.98 | -44.64 | 0.00 | 0.37 | -45.01 | -13.00 | 32.01 |
| Cellular 850 Band, GSM, High Channel | | | | | | | | |
| 1697.60 | H | 51.90 | -51.80 | 10.78 | 0.75 | -41.77 | -13.00 | 28.77 |
| 1697.60 | V | 51.20 | -53.10 | 10.78 | 0.75 | -43.07 | -13.00 | 30.07 |
| 2546.40 | H | 56.66 | -46.29 | 13.15 | 1.27 | -34.41 | -13.00 | 21.41 |
| 2546.40 | V | 49.77 | -53.32 | 13.15 | 1.27 | -41.44 | -13.00 | 28.44 |
| 3395.20 | H | 36.81 | -62.71 | 14.08 | 1.64 | -50.27 | -13.00 | 37.27 |
| 3395.20 | V | 36.46 | -63.16 | 14.08 | 1.64 | -50.72 | -13.00 | 37.72 |
| 877.78 | H | 56.04 | -40.21 | 0.00 | 0.51 | -40.72 | -13.00 | 27.72 |
| 383.12 | V | 60.34 | -44.27 | 0.00 | 0.37 | -44.64 | -13.00 | 31.64 |

PCS Band (PART 24E)

30 MHz-20 GHz:

| Frequency (MHz) | Polar (H/V) | Receiver Reading (dBµV) | Substituted Method | | | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|---|-------------|-------------------------|-------------------------|------------------------|-----------------|----------------------|-------------|-------------|
| | | | Substituted Level (dBm) | Antenna Gain (dBd/dBi) | Cable Loss (dB) | | | |
| PCS 1900 Band, GSM, Low Channel | | | | | | | | |
| 3700.40 | H | 49.87 | -48.12 | 14.00 | 1.83 | -35.95 | -13.00 | 22.95 |
| 3700.40 | V | 45.01 | -52.96 | 14.00 | 1.83 | -40.79 | -13.00 | 27.79 |
| 5550.60 | H | 42.35 | -51.62 | 13.95 | 1.27 | -38.94 | -13.00 | 25.94 |
| 5550.60 | V | 39.86 | -53.96 | 13.95 | 1.27 | -41.28 | -13.00 | 28.28 |
| 299.66 | H | 45.62 | -63.03 | 0.00 | 0.31 | -63.34 | -13.00 | 50.34 |
| 701.12 | V | 55.38 | -42.13 | 0.00 | 0.38 | -42.51 | -13.00 | 29.51 |
| PCS 1900 Band, GSM, Middle Channel | | | | | | | | |
| 3760.00 | H | 45.89 | -51.75 | 13.76 | 1.63 | -39.62 | -13.00 | 26.62 |
| 3760.00 | V | 44.98 | -52.52 | 13.76 | 1.63 | -40.39 | -13.00 | 27.39 |
| 5640.00 | H | 43.49 | -50.10 | 14.02 | 1.31 | -37.39 | -13.00 | 24.39 |
| 5640.00 | V | 40.30 | -53.18 | 14.02 | 1.31 | -40.47 | -13.00 | 27.47 |
| 299.64 | H | 45.38 | -63.27 | 0.00 | 0.31 | -63.58 | -13.00 | 50.58 |
| 701.14 | V | 55.46 | -42.05 | 0.00 | 0.38 | -42.43 | -13.00 | 29.43 |
| PCS 1900 Band, GSM, High Channel | | | | | | | | |
| 3819.60 | H | 42.05 | -55.20 | 13.56 | 1.50 | -43.14 | -13.00 | 30.14 |
| 3819.60 | V | 43.51 | -53.56 | 13.56 | 1.50 | -41.50 | -13.00 | 28.50 |
| 5640.00 | H | 35.93 | -57.66 | 14.02 | 1.31 | -44.95 | -13.00 | 31.95 |
| 5640.00 | V | 34.69 | -58.79 | 14.02 | 1.31 | -46.08 | -13.00 | 33.08 |
| 299.66 | H | 45.68 | -62.97 | 0.00 | 0.31 | -63.28 | -13.00 | 50.28 |
| 701.12 | V | 55.72 | -41.79 | 0.00 | 0.38 | -42.17 | -13.00 | 29.17 |

Cellular Band (PART 22H)

30 MHz-10 GHz:

| Frequency (MHz) | Polar (H/V) | Receiver Reading (dBµV) | Substituted Method | | | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------------------------|-------------|-------------------------|-------------------------|------------------------|-----------------|----------------------|-------------|-------------|
| | | | Substituted Level (dBm) | Antenna Gain (dBd/dBi) | Cable Loss (dB) | | | |
| WCDMA Band 5 Frequency:826.4 MHz | | | | | | | | |
| 1652.80 | H | 40.72 | -63.41 | 10.47 | 0.72 | -53.66 | -13.00 | 40.66 |
| 1652.80 | V | 40.62 | -64.11 | 10.47 | 0.72 | -54.36 | -13.00 | 41.36 |
| 2479.20 | H | 37.47 | -65.34 | 12.93 | 1.25 | -53.66 | -13.00 | 40.66 |
| 2479.20 | V | 37.43 | -65.42 | 12.93 | 1.25 | -53.74 | -13.00 | 40.74 |
| 3305.60 | H | 36.39 | -63.41 | 13.63 | 1.59 | -51.37 | -13.00 | 38.37 |
| 3305.60 | V | 37.21 | -62.60 | 13.63 | 1.59 | -50.56 | -13.00 | 37.56 |
| 299.66 | H | 45.68 | -62.97 | 0.00 | 0.31 | -63.28 | -13.00 | 50.28 |
| 701.25 | V | 54.73 | -42.77 | 0.00 | 0.38 | -43.15 | -13.00 | 30.15 |
| WCDMA Band 5 Frequency:836.6MHz | | | | | | | | |
| 1673.20 | H | 38.42 | -65.52 | 10.61 | 0.73 | -55.64 | -13.00 | 42.64 |
| 1673.20 | V | 40.38 | -64.16 | 10.61 | 0.73 | -54.28 | -13.00 | 41.28 |
| 2509.80 | H | 38.24 | -64.67 | 13.11 | 1.25 | -52.81 | -13.00 | 39.81 |
| 2509.80 | V | 37.51 | -65.43 | 13.11 | 1.25 | -53.57 | -13.00 | 40.57 |
| 3346.40 | H | 36.76 | -62.92 | 13.83 | 1.61 | -50.70 | -13.00 | 37.70 |
| 3346.40 | V | 36.81 | -62.91 | 13.83 | 1.61 | -50.69 | -13.00 | 37.69 |
| 299.64 | H | 45.66 | -62.99 | 0.00 | 0.31 | -63.30 | -13.00 | 50.30 |
| 701.24 | V | 56.47 | -41.03 | 0.00 | 0.38 | -41.41 | -13.00 | 28.41 |
| WCDMA Band 5 Frequency:846.6MHz | | | | | | | | |
| 1693.20 | H | 43.07 | -60.68 | 10.75 | 0.75 | -50.68 | -13.00 | 37.68 |
| 1693.20 | V | 43.90 | -60.45 | 10.75 | 0.75 | -50.45 | -13.00 | 37.45 |
| 2539.80 | H | 37.20 | -65.74 | 13.14 | 1.27 | -53.87 | -13.00 | 40.87 |
| 2539.80 | V | 37.89 | -65.17 | 13.14 | 1.27 | -53.30 | -13.00 | 40.30 |
| 3386.40 | H | 36.68 | -62.87 | 14.03 | 1.63 | -50.47 | -13.00 | 37.47 |
| 3386.40 | V | 36.64 | -63.00 | 14.03 | 1.63 | -50.60 | -13.00 | 37.60 |
| 299.66 | H | 46.87 | -61.78 | 0.00 | 0.31 | -62.09 | -13.00 | 49.09 |
| 701.24 | V | 55.10 | -42.40 | 0.00 | 0.38 | -42.78 | -13.00 | 29.78 |

PCS Band (PART 24E)**30 MHz-20 GHz:**

| Frequency (MHz) | Polar (H/V) | Receiver Reading (dB μ V) | Substituted Method | | | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|-------------------------------------|-------------|-------------------------------|-------------------------|------------------------|-----------------|----------------------|-------------|-------------|
| | | | Substituted Level (dBm) | Antenna Gain (dBd/dBi) | Cable Loss (dB) | | | |
| WCDMA Band II, Frequency:1852.4 MHz | | | | | | | | |
| 3704.80 | H | 50.74 | -47.22 | 13.98 | 1.81 | -35.05 | -13.00 | 22.05 |
| 3704.80 | V | 49.76 | -48.17 | 13.98 | 1.81 | -36.00 | -13.00 | 23.00 |
| 5557.20 | H | 51.48 | -42.41 | 13.97 | 1.27 | -29.71 | -13.00 | 16.71 |
| 5557.20 | V | 46.26 | -47.48 | 13.97 | 1.27 | -34.78 | -13.00 | 21.78 |
| 299.66 | H | 45.10 | -63.55 | 0.00 | 0.31 | -63.86 | -13.00 | 50.86 |
| 701.24 | V | 55.67 | -41.83 | 0.00 | 0.38 | -42.21 | -13.00 | 29.21 |
| WCDMA Band II, Frequency:1880 MHz | | | | | | | | |
| 3760.00 | H | 52.77 | -44.87 | 13.76 | 1.63 | -32.74 | -13.00 | 19.74 |
| 3760.00 | V | 51.85 | -45.65 | 13.76 | 1.63 | -33.52 | -13.00 | 20.52 |
| 5640.00 | H | 50.95 | -42.64 | 14.02 | 1.31 | -29.93 | -13.00 | 16.93 |
| 5640.00 | V | 48.69 | -44.79 | 14.02 | 1.31 | -32.08 | -13.00 | 19.08 |
| 299.63 | H | 45.37 | -63.28 | 0.00 | 0.31 | -63.59 | -13.00 | 50.59 |
| 701.25 | V | 56.01 | -41.49 | 0.00 | 0.38 | -41.87 | -13.00 | 28.87 |
| WCDMA Band II, Frequency:1907.6MHz | | | | | | | | |
| 3815.20 | H | 52.83 | -44.45 | 13.57 | 1.50 | -32.38 | -13.00 | 19.38 |
| 3815.20 | V | 53.72 | -43.38 | 13.57 | 1.50 | -31.31 | -13.00 | 18.31 |
| 5722.80 | H | 52.23 | -41.53 | 13.95 | 1.32 | -28.90 | -13.00 | 15.90 |
| 5722.80 | V | 49.77 | -43.95 | 13.95 | 1.32 | -31.32 | -13.00 | 18.32 |
| 299.36 | H | 46.03 | -62.63 | 0.00 | 0.31 | -62.94 | -13.00 | 49.94 |
| 701.26 | V | 55.86 | -41.64 | 0.00 | 0.38 | -42.02 | -13.00 | 29.02 |

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

FCC §22.917(a) & §24.238(a)- BAND EDGES

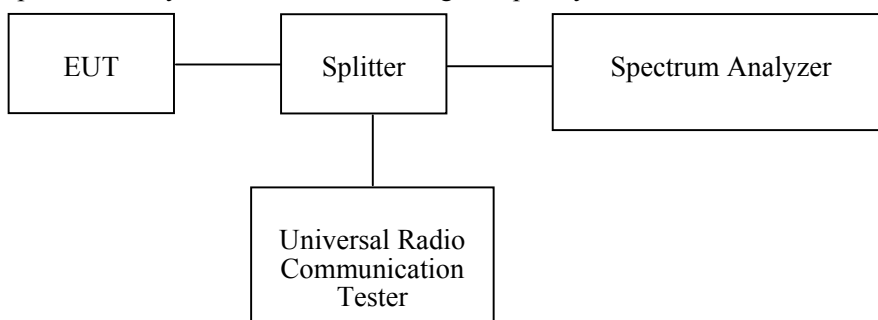
Applicable Standard

FCC § 2.1053, §22.917, § 24.238.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.



Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|---------------------|---------------|---------------|------------------|----------------------|
| R&S | EMI Test Receiver | ESCI | 100035 | 2020-09-12 | 2021-09-12 |
| E-Microwave | Two-way Splitter | ODP-1-6-2S | OE0120142 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005011 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005012 | Each time | N/A |
| E-Microwave | Coaxial Attenuators | EMCA10-5RN-6 | OE01203239 | Each time | N/A |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

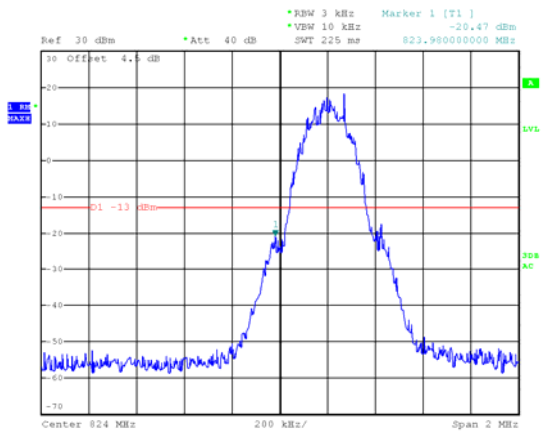
Environmental Conditions

| | |
|---------------------------|-----------------------|
| Temperature: | 26.5~27.1°C |
| Relative Humidity: | 45~48% |
| ATM Pressure: | 100.9~101.2kPa |
| Tester: | James Chen |
| Test Date: | 2020-10-15~2020-10-20 |

Test Mode: Transmitting

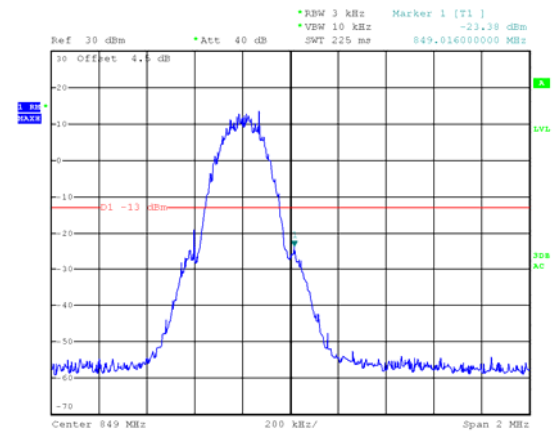
Test Result: Compliance. Please refer to the following plots.

Cellular 850 Band, GSM, Left Band Edge



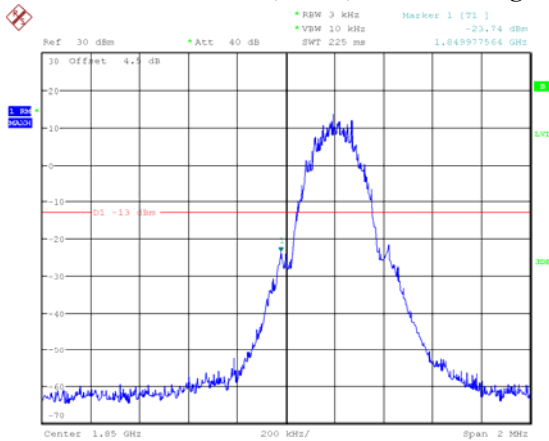
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Cellular 850 Band, GSM, Right Band Edge



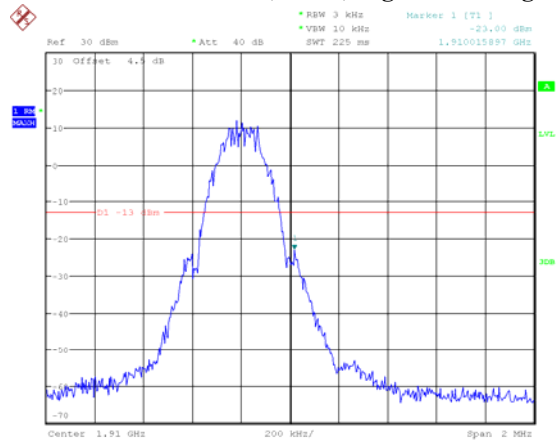
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PCS 1900 Band, GSM, Left Band Edge



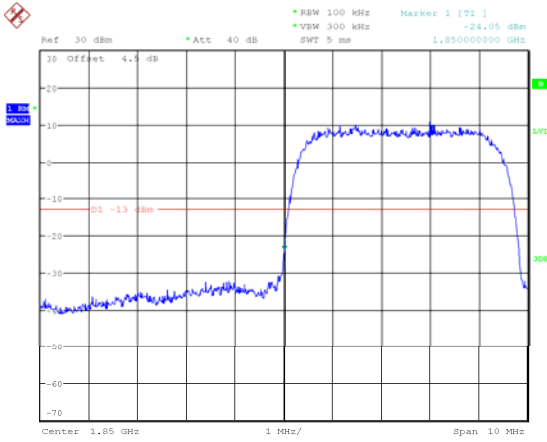
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PCS 1900 Band, GSM, Right Band Edge



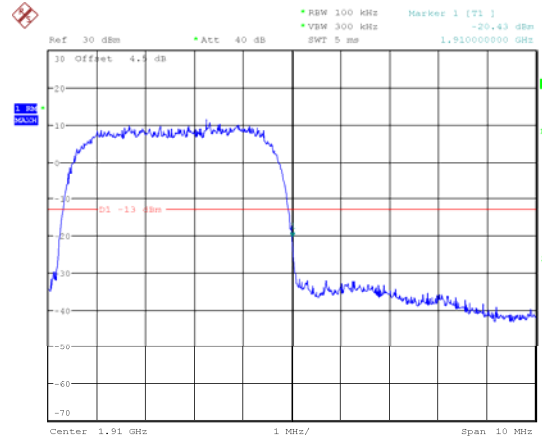
Date: 20.OCT.2020 11:31:46

WCDMA Band II,Rel99, Left Band Edge



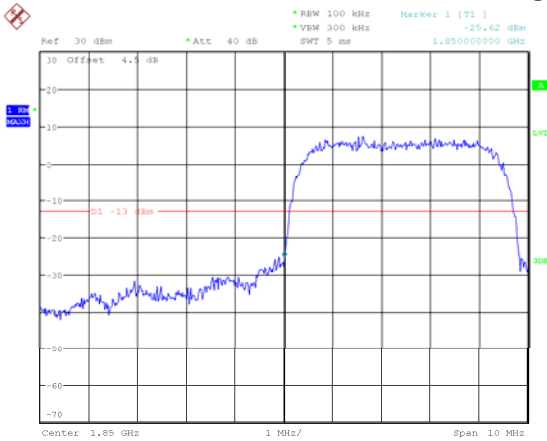
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WCDMA Band II,Rel99, Right Band Edge



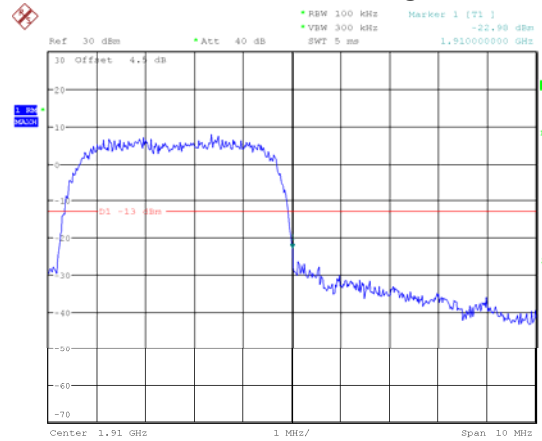
Date: 20.OCT.2020 13:33:34

WCDMA Band II,HSDPA, Left Band Edge



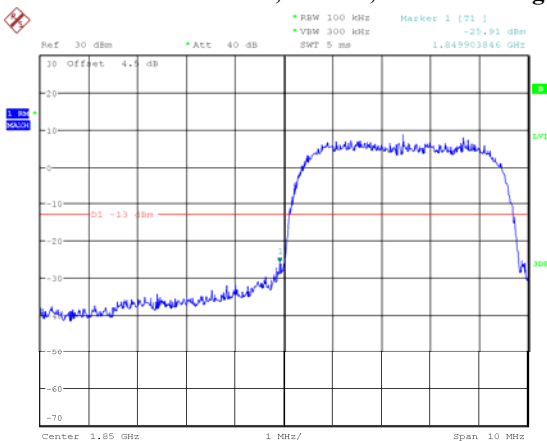
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WCDMA Band II,HSDPA,Right Band Edge



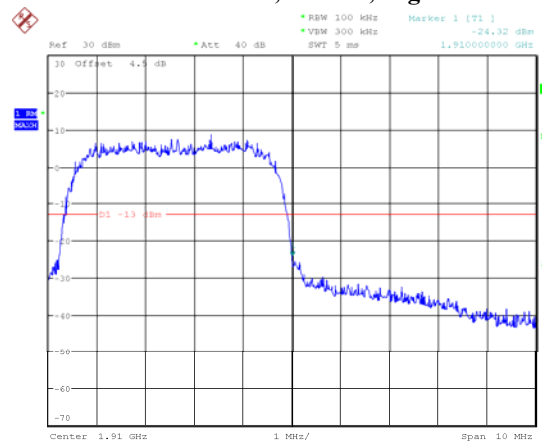
Date: 20.OCT.2020 14:58:18

WCDMA Band II,HSUPA, Left Band Edge



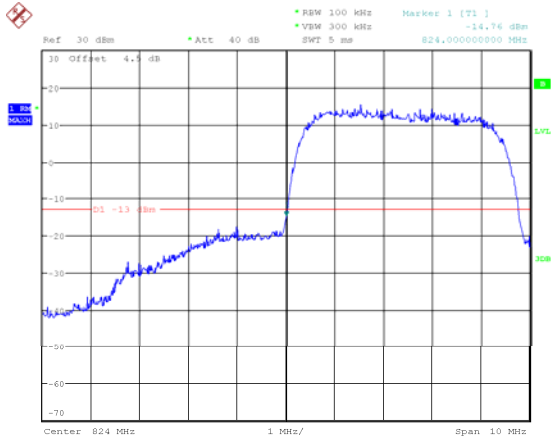
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WCDMA Band II,HSUPA, Right Band Edge



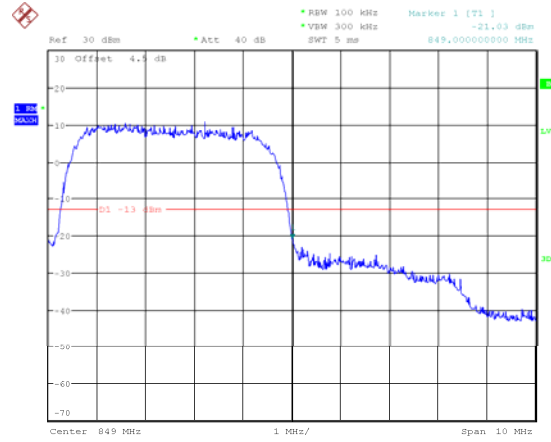
Date: 20.OCT.2020 15:50:38

WCDMA Band V, Rel99, Left Band Edge



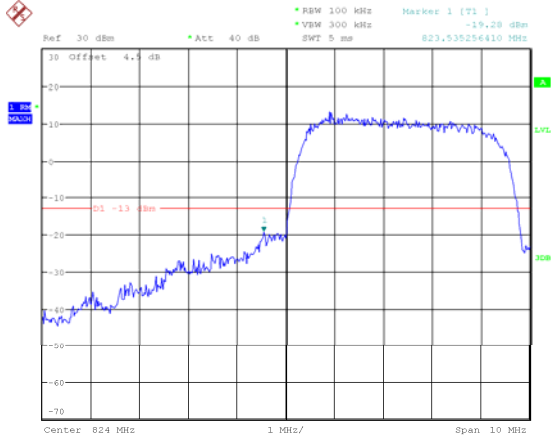
Date: 20.OCT.2020 13:36:50

WCDMA Band V, Rel99, Right Band Edge



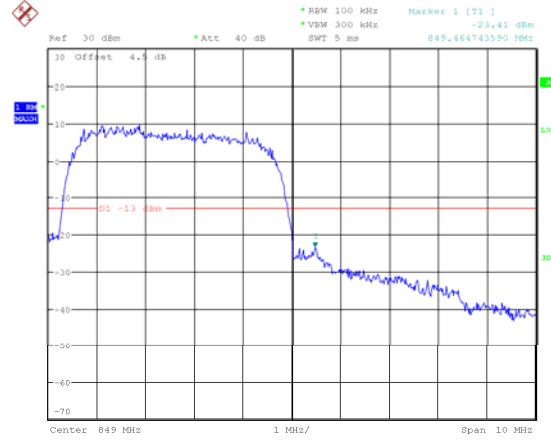
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WCDMA Band V, HSDPA, Left Band Edge



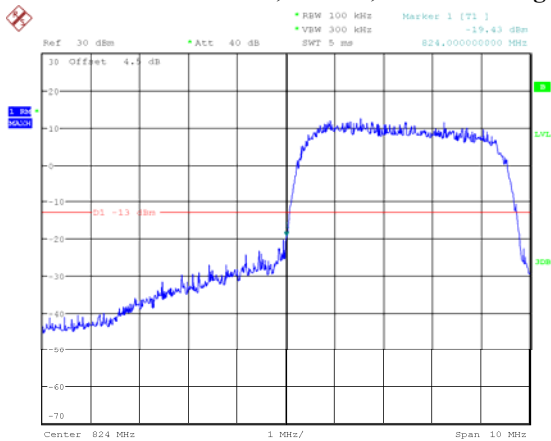
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WCDMA Band V, HSDPA, Right Band Edge



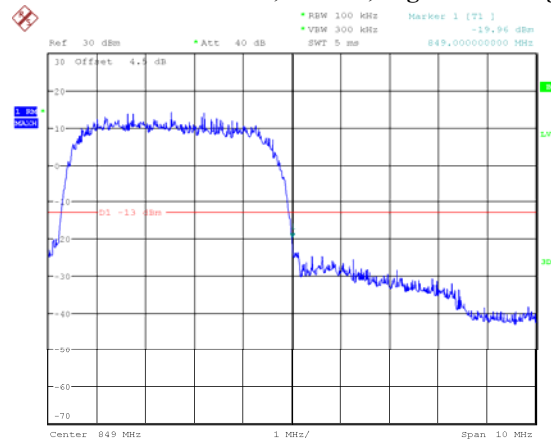
Date: 20.OCT.2020 15:13:18

WCDMA Band V, HSUPA, Left Band Edge



Date: 20.OCT.2020 16:00:26

WCDMA Band V, HSUPA, Right Band Edge



Date: 20.OCT.2020 16:11:25

FCC §2.1055, §22.355 & §24.235 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

| Frequency Range (MHz) | Base, fixed (ppm) | Mobile > 3 watts (ppm) | Mobile ≤ 3 watts (ppm) |
|-----------------------|-------------------|------------------------|------------------------|
| 25 to 50 | 20.0 | 20.0 | 50.0 |
| 50 to 450 | 5.0 | 5.0 | 50.0 |
| 450 to 512 | 2.5 | 5.0 | 5.0 |
| 821 to 896 | 1.5 | 2.5 | 2.5 |
| 928 to 929. | 5.0 | N/A | N/A |
| 929 to 960. | 1.5 | N/A | N/A |
| 2110 to 2220 | 10.0 | N/A | N/A |

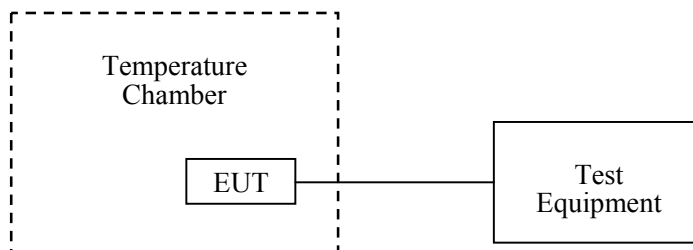
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|----------------|--|---------------|---------------|------------------|----------------------|
| ESPEC | Constant temperature and humidity Tester | ESX-4CA | 018 463 | 2020-03-10 | 2021-03-09 |
| UNI-T | Multimeter | UT39A | M130199938 | 2020-07-24 | 2021-07-24 |
| Pro instrument | DC Power Supply | pps3300 | 3300012 | N/A | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005011 | Each time | N/A |
| yzjingcheng | Coaxial Cable | KTRFBU-141-50 | 41005012 | Each time | N/A |
| E-Microwave | Coaxial Attenuators | EMCA10-5RN-6 | OE01203239 | Each time | N/A |
| R&S | Universal Radio Communication Tester | CMU200 | 106 891 | 2020-09-12 | 2021-09-12 |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

| | |
|---------------------------|------------|
| Temperature: | 27.1°C |
| Relative Humidity: | 48% |
| ATM Pressure: | 101.2kPa |
| Tester: | James Chen |
| Test Date: | 2020-10-20 |

Test Mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

Cellular Band

| GMSK, Middle Channel, $f_c = 836.6$ MHz | | | | |
|---|-----------------|-----------------|-----------------|-------|
| Temperature | Voltage | Frequency Error | Frequency Error | Limit |
| °C | V _{DC} | Hz | ppm | ppm |
| -30 | 3.8 | 9 | 0.01076 | 2.5 |
| -20 | | 8 | 0.00956 | |
| -10 | | 8 | 0.00956 | |
| 0 | | 7 | 0.00837 | |
| 10 | | 9 | 0.01076 | |
| 20 | | 9 | 0.01076 | |
| 30 | | 9 | 0.01076 | |
| 40 | | 7 | 0.00837 | |
| 50 | | 6 | 0.00717 | |
| 20 | | 3.6 | 11 | |
| 20 | 4.35 | 13 | 0.01554 | |

PCS Band

| GMSK, Middle Channel, $f_c = 1880.0$ MHz | | | | |
|--|-----------------|-----------------|-----------------|---------|
| Temperature | Voltage | Frequency Error | Frequency Error | Results |
| °C | V _{DC} | Hz | ppm | |
| -30 | 3.8 | 13 | 0.00691 | Pass |
| -20 | | 13 | 0.00691 | |
| -10 | | 12 | 0.00638 | |
| 0 | | 12 | 0.00638 | |
| 10 | | 11 | 0.00585 | |
| 20 | | 11 | 0.00585 | |
| 30 | | 11 | 0.00585 | |
| 40 | | 11 | 0.00585 | |
| 50 | | 11 | 0.00585 | |
| 20 | | 3.6 | 14 | |
| 20 | 4.35 | 12 | 0.00638 | |

WCDMA Band II: R99

| Middle Channel, $f_c = 1880.0$ MHz | | | | |
|------------------------------------|-----------------|-----------------|-----------------|--------|
| Temperature | Voltage | Frequency Error | Frequency Error | Result |
| °C | V _{DC} | Hz | ppm | |
| -30 | 3.8 | 15 | 0.00798 | Pass |
| -20 | | 12 | 0.00638 | |
| -10 | | 13 | 0.00691 | |
| 0 | | 12 | 0.00638 | |
| 10 | | 12 | 0.00638 | |
| 20 | | 12 | 0.00638 | |
| 30 | | 12 | 0.00638 | |
| 40 | | 13 | 0.00691 | |
| 50 | | 13 | 0.00691 | |
| 20 | | 3.6 | 15 | |
| 20 | 4.35 | 14 | 0.00745 | |

WCDMA Band V: R99

| Middle Channel, $f_c = 836.6$ MHz | | | | |
|-----------------------------------|-----------------|-----------------|-----------------|--------------|
| Temperature | Voltage | Frequency Error | Frequency Error | Limits (ppm) |
| °C | V _{DC} | Hz | ppm | |
| -30 | 3.8 | 11 | 0.01315 | 2.5 |
| -20 | | 12 | 0.01434 | |
| -10 | | 10 | 0.01195 | |
| 0 | | 9 | 0.01076 | |
| 10 | | 9 | 0.01076 | |
| 20 | | 9 | 0.01076 | |
| 30 | | 9 | 0.01076 | |
| 40 | | 10 | 0.01195 | |
| 50 | | 9 | 0.01076 | |
| 20 | | 3.6 | 12 | |
| 20 | 4.35 | 9 | 0.01076 | |

***** END OF REPORT *****