

FCC Test Report (Part 96)

Report No.: RF191018C26

FCC ID: 2AAGMCB410L

Test Model: CB410L

Received Date: Oct. 18, 2019

Test Date: Dec. 30, 2019 ~ Jan. 02, 2020

Issued Date: Jan. 16, 2020

Applicant: SEQUANS Communications

Address: 15/55 boulevard Charles De Gaulle 92700 Colombes - FRANCE

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

**FCC Registration/
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

| | |
|---|-----------|
| Release Control Record | 4 |
| 1 Certificate of Conformity | 5 |
| 2 Summary of Test Results | 6 |
| 2.1 Measurement Uncertainty | 6 |
| 2.2 Modification Record | 6 |
| 3 General Information | 7 |
| 3.1 General Description of EUT | 7 |
| 3.2 Test Mode Applicability and Tested Channel Detail | 8 |
| 3.3 Description of Support Units | 10 |
| 3.3.1 Configuration of System under Test | 10 |
| 3.4 General Description of Applied Standards | 10 |
| 4 Test Types and Results | 11 |
| 4.1 Maximum Output Power Measurement | 11 |
| 4.1.1 Limits of Maximum Output Power Measurement | 11 |
| 4.1.2 Test Setup..... | 11 |
| 4.1.3 Test Instruments | 12 |
| 4.1.4 Test Procedures..... | 13 |
| 4.1.5 Deviation from Test Standard | 13 |
| 4.1.6 EUT Operating Conditions..... | 13 |
| 4.1.7 Test Results | 14 |
| 4.2 Modulation Characteristics Measurement..... | 22 |
| 4.2.1 Limits of Modulation Characteristics..... | 22 |
| 4.2.2 Test Procedure | 22 |
| 4.2.3 Test Setup..... | 22 |
| 4.2.4 Test Results | 22 |
| 4.3 Frequency Stability Measurement..... | 23 |
| 4.3.1 Limits of Frequency Stability Measurement..... | 23 |
| 4.3.2 Test Procedure | 23 |
| 4.3.3 Test Setup..... | 23 |
| 4.3.4 Test Results | 24 |
| 4.4 Emission Bandwidth Measurement..... | 26 |
| 4.4.1 Emission Bandwidth Measurement..... | 26 |
| 4.4.2 Test Setup..... | 26 |
| 4.4.3 Test Instruments | 26 |
| 4.4.4 Test Procedure | 26 |
| 4.4.5 Deviation from Test Standard | 26 |
| 4.4.6 EUT Operating Conditions..... | 26 |
| 4.4.7 Test Result (-26dB Bandwidth)..... | 27 |
| 4.4.8 Test Result (Occupied Bandwidth) | 29 |
| 4.5 Peak to Average Ratio Measurement | 31 |
| 4.5.1 Limits of Peak to Average Ratio Measurement | 31 |
| 4.5.2 Test Setup..... | 31 |
| 4.5.3 Test Procedures..... | 31 |
| 4.5.4 Test Results | 32 |
| 4.6 Conducted Spurious Emissions | 34 |
| 4.6.1 Limits of Conducted Spurious Emissions Measurement..... | 34 |
| 4.6.2 Test Setup..... | 34 |
| 4.6.3 Test Procedure | 34 |
| 4.6.4 Test Results | 35 |
| 4.7 Radiated Emission Measurement | 55 |
| 4.7.1 Limits of Radiated Emission Measurement..... | 55 |
| 4.7.2 Test Instruments | 55 |

| | |
|---|-----------|
| 4.7.3 Test Procedures..... | 55 |
| 4.7.4 Deviation from Test Standard | 55 |
| 4.7.5 Test Set Up | 56 |
| 4.7.6 Test Results | 57 |
| 5 Pictures of Test Arrangements..... | 65 |
| Appendix – Information of the Testing Laboratories | 66 |

Release Control Record

| Issue No. | Description | Date Issued |
|-------------|-------------------|---------------|
| RF191018C26 | Original release. | Jan. 16, 2020 |

1 Certificate of Conformity

Product: CB410L

Brand: SEQUANS Communications

Test Model: CB410L

Sample Status: Engineering sample

Applicant: SEQUANS Communications

Test Date: Dec. 30, 2019 ~ Jan. 02, 2020

Standards: 47 CFR FCC Part 96

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen , **Date:** Jan. 16, 2020
Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Jan. 16, 2020
Bruce Chen / Senior Project Engineer

2 Summary of Test Results

| 47 CFR FCC Part 96 | | | |
|--------------------|--------------------------------|--------|---|
| FCC Clause | Test Item | Result | Remarks |
| 2.1046 96.41(b) | Maximum Peak Output Power | Pass | Meet the requirement of limit. |
| 2.1047 96.41(a) | Modulation Characteristics | Pass | Meet the requirement |
| 2.1046 96.41(b) | Maximum Power Spectral Density | Pass | Meet the requirement of limit. |
| 96.41(g) | Peak to Average Ration | Pass | Meet the requirement of limit. |
| 2.1049 | Emission Bandwidth | Pass | Meet the requirement of limit. |
| 2.1055 | Frequency Stability | Pass | Meet the requirement of limit. |
| 2.1051 96.41(e) | Conducted Spurious Emissions | Pass | Meet the requirement of limit. |
| 2.1053 96.41(e) | Radiated Spurious Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -0.2dB at 7105.00MHz. |

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expanded Uncertainty (k=2) (±) |
|--------------------------------|--------------------|-----------------------------------|
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30MHz | 3.04 dB |
| | 30 MHz ~ 200 MHz | 3.59 dB |
| | 200 MHz ~ 1000 MHz | 3.60 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 2.29 dB |
| | 18 GHz ~ 40 GHz | 2.29 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | | | | |
|---------------------|----------------------------------|-------------------------|--|-------------------------|
| Product | CB410L | | | |
| Brand | SEQUANS Communications | | | |
| Test Model | CB410L | | | |
| Status of EUT | Engineering sample | | | |
| Modulation Type | QPSK, 16QAM | | | |
| Operating Frequency | LTE Band 48 | Channel Bandwidth 5MHz | TX: 3552.5 ~ 3697.5 MHz RX: 3552.5 ~ 3697.5 MHz | |
| | | Channel Bandwidth 10MHz | TX: 3555 ~ 3695 MHz RX: 3555 ~ 3695 MHz | |
| | | Channel Bandwidth 15MHz | TX: 3557.5 ~ 3692.5 MHz RX: 3557.5 ~ 3692.5 MHz | |
| | | Channel Bandwidth 20MHz | TX: 3560 ~ 3690 MHz RX: 3560 ~ 3690 MHz | |
| | | | | |
| Max. EIRP Power | LTE Band 48 | | QPSK | 16QAM |
| | | Per 10M | | |
| | | Channel Bandwidth 5MHz | 122.180mW (20.87dBm) | 117.220mW (20.69dBm) |
| | | Channel Bandwidth 10MHz | 113.240mW (20.54dBm) | 111.173mW (20.46dBm) |
| | | Channel Bandwidth 15MHz | 97.949mW (19.91dBm) | 102.094mW (20.09dBm) |
| | | Channel Bandwidth 20MHz | 126.474mW (21.02dBm) | 117.761mW (20.71dBm) |
| | | Full Power | | |
| | | Channel Bandwidth 5MHz | 122.180mW (20.87dBm) | 117.220mW (20.69dBm) |
| | | Channel Bandwidth 10MHz | 113.240mW (20.54dBm) | 111.173mW (20.46dBm) |
| | | Channel Bandwidth 15MHz | 99.083mW (19.96dBm) | 102.094mW (20.09dBm) |
| | | Channel Bandwidth 20MHz | 127.938mW (21.07dBm) | 118.577mW (20.74dBm) |
| Emission Designator | LTE Band 48 | Channel Bandwidth 5MHz | 4M46G7D | 4M47D7W |
| | | Channel Bandwidth 10MHz | 8M93G7D | 8M90D7W |
| | | Channel Bandwidth 15MHz | 13M4G7D | 13M4D7W |
| | | Channel Bandwidth 20MHz | 17M9G7D | 17M9D7W |
| Antenna Type | Dipole Antenna with 0.14dBi gain | | | |
| Accessory Device | NA | | | |
| Data Cable Supplied | NA | | | |

Note:

1. The EUT uses following adapter. (Support unit)

| | |
|--------------|--------------------------|
| Adapter | |
| Brand | Liteon |
| Model | PA-1050-39 |
| Input Power | 100-240Vac~50/60Hz 0.25A |
| Output Power | 5.2Vdc / 1A |

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports

The worst case was found when positioned on X-plane. Following channel(s) was (were) selected for the final test as listed below:

| Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation |
|----------------------------|-------------------|---|-------------------|-------------|
| Maximum Output Power | 55265 to 56715 | 55265 (3552.5MHz), 55990 (3625.0MHz), 56715 (3697.5MHz) | 5MHz | QPSK, 16QAM |
| | 55290 to 56690 | 55290 (3555.0MHz), 55990 (3625.0MHz), 56690 (3695.0MHz) | 10MHz | QPSK, 16QAM |
| | 55315 to 56665 | 55315 (3557.5MHz), 55990 (3625.0MHz), 56665 (3692.5MHz) | 15MHz | QPSK, 16QAM |
| | 55340 to 56640 | 55340 (3560.0MHz), 55990 (3625.0MHz), 56640 (3690.0MHz) | 20MHz | QPSK, 16QAM |
| Modulation Characteristics | 55340 to 56640 | 55990 (3625.0MHz) | 20MHz | QPSK, 16QAM |
| Frequency Stability | 55265 to 56715 | 55265 (3552.5MHz), 56715 (3697.5MHz) | 5MHz | QPSK |
| | 55290 to 56690 | 55290 (3555.0MHz), 56690 (3695.0MHz) | 10MHz | QPSK |
| | 55315 to 56665 | 55315 (3557.5MHz), 56665 (3692.5MHz) | 15MHz | QPSK |
| | 55340 to 56640 | 55340 (3560.0MHz), 56640 (3690.0MHz) | 20MHz | QPSK |
| Occupied Bandwidth | 55265 to 56715 | 55265 (3552.5MHz), 55990 (3625.0MHz), 56715 (3697.5MHz) | 5MHz | QPSK, 16QAM |
| | 55290 to 56690 | 55290 (3555.0MHz), 55990 (3625.0MHz), 56690 (3695.0MHz) | 10MHz | QPSK, 16QAM |
| | 55315 to 56665 | 55315 (3557.5MHz), 55990 (3625.0MHz), 56665 (3692.5MHz) | 15MHz | QPSK, 16QAM |
| | 55340 to 56640 | 55340 (3560.0MHz), 55990 (3625.0MHz), 56640 (3690.0MHz) | 20MHz | QPSK, 16QAM |
| Peak to Average Ratio | 55265 to 56715 | 55265 (3552.5MHz), 55990 (3625.0MHz), 56715 (3697.5MHz) | 5MHz | QPSK, 16QAM |
| | 55290 to 56690 | 55290 (3555.0MHz), 55990 (3625.0MHz), 56690 (3695.0MHz) | 10MHz | QPSK, 16QAM |
| | 55315 to 56665 | 55315 (3557.5MHz), 55990 (3625.0MHz), 56665 (3692.5MHz) | 15MHz | QPSK, 16QAM |
| | 55340 to 56640 | 55340 (3560.0MHz), 55990 (3625.0MHz), 56640 (3690.0MHz) | 20MHz | QPSK, 16QAM |

| Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation |
|---------------------------------|-------------------|---|-------------------|------------|
| Conducted Emission | 55265 to 56715 | 55265 (3552.5MHz), 55990 (3625.0MHz), 56715 (3697.5MHz) | 5MHz | QPSK |
| | 55290 to 56690 | 55290 (3555.0MHz), 55990 (3625.0MHz), 56690 (3695.0MHz) | 10MHz | QPSK |
| | 55315 to 56665 | 55315 (3557.5MHz), 55990 (3625.0MHz), 56665 (3692.5MHz) | 15MHz | QPSK |
| | 55340 to 56640 | 55340 (3560.0MHz), 55990 (3625.0MHz), 56640 (3690.0MHz) | 20MHz | QPSK |
| Radiated Emission Below 1GHz | 55265 to 56715 | 55265 (3552.5MHz) | 5MHz | QPSK |
| | 55340 to 56640 | 55340 (3560.0MHz) | 20MHz | QPSK |
| Radiated Emission Above 1GHz | 55265 to 56715 | 55265 (3552.5MHz), 55990 (3625.0MHz), 56715 (3697.5MHz) | 5MHz | QPSK |
| | 55340 to 56640 | 55340 (3560.0MHz), 55990 (3625.0MHz), 56640 (3690.0MHz) | 20MHz | QPSK |

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. For radiated emission below 1GHz, low, mid and high channels were pre-tested in chamber. Low channel was found to be the worst case and therefore had been chosen for all final tests.
3. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.

Test Condition:

| Test Item | Environmental Conditions | Input Power | Tested By |
|----------------------------|--------------------------|--------------|--------------|
| Maximum Output Power | 25deg. C, 63%RH | 120Vac, 60Hz | Matthew Yang |
| Modulation characteristics | 25deg. C, 63%RH | 120Vac, 60Hz | Matthew Yang |
| Frequency Stability | 25deg. C, 63%RH | 120Vac, 60Hz | Matthew Yang |
| Occupied Bandwidth | 25deg. C, 63%RH | 120Vac, 60Hz | Matthew Yang |
| Peak to Average Ratio | 25deg. C, 63%RH | 120Vac, 60Hz | Matthew Yang |
| Condcudeted Emission | 25deg. C, 63%RH | 120Vac, 60Hz | Matthew Yang |
| Radiated Emission | 22deg. C, 66%RH | 120Vac, 60Hz | Han Wu |

3.3 Description of Support Units

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

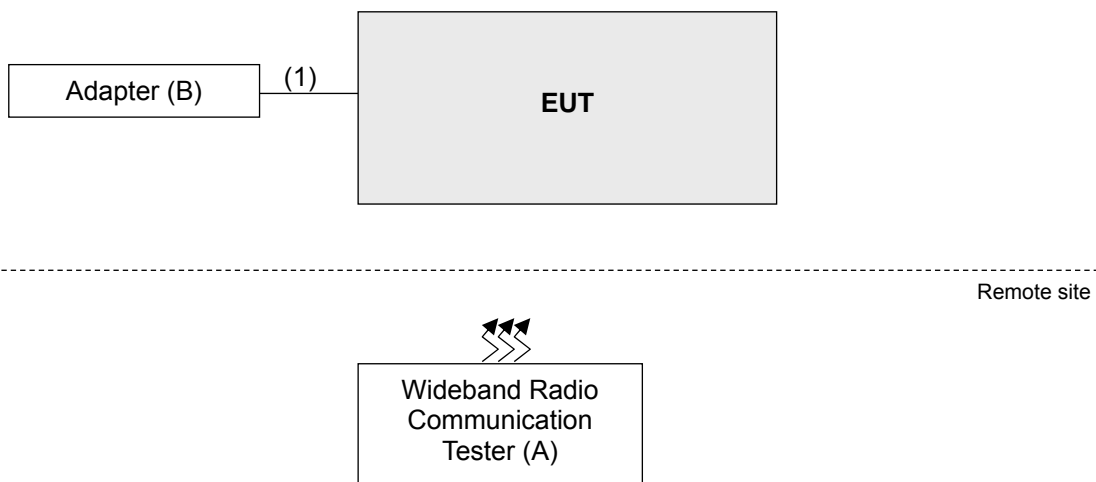
| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|-------------------------------------|--------|------------|------------|--------|---------|
| A. | Wideband Radio Communication Tester | R&S | CMW500 | 151084 | NA | - |
| B. | Adapter | Liteon | PA-1050-39 | NA | NA | |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A acted as communication partners to transfer data.

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|-----------------|------|------------|--------------------|--------------|---------|
| 1. | Micro USB Cable | 1 | 0.9 | Y | 0 | - |

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 96

KDB 971168 D01 Power Meas License Digital Systems v02r02

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 940660 D01 Part 96 CBRS Eqpt v02

ANSI/TIA/EIA-603-D-2010

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

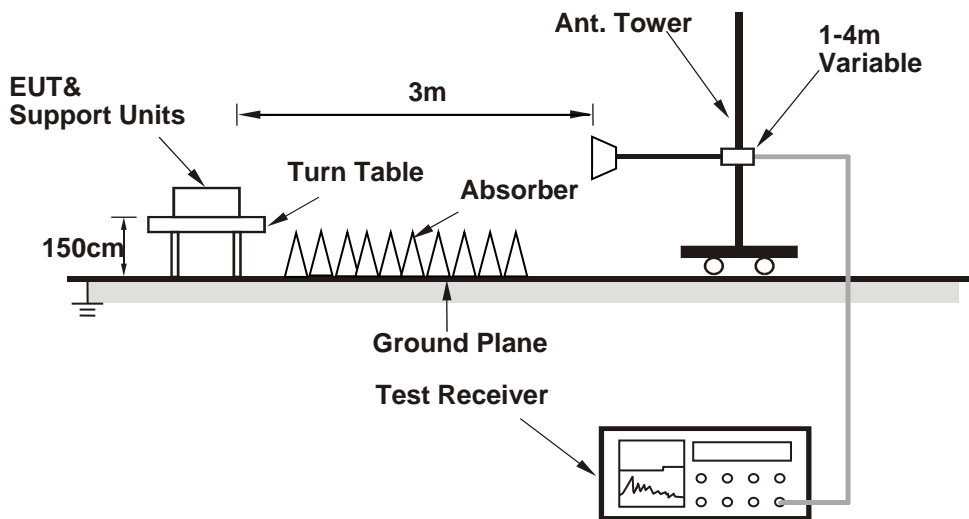
4.1 Maximum Output Power Measurement

4.1.1 Limits of Maximum Output Power Measurement

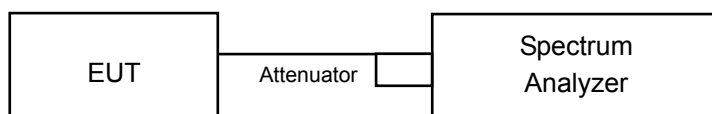
| Device | | Maximum Output Power (dBm/10 MHz) |
|-------------------------------------|-----------------|--------------------------------------|
| <input checked="" type="checkbox"/> | End User Device | 23 |
| <input type="checkbox"/> | Category A CBSD | 30 |
| <input type="checkbox"/> | Category B CBSD | 47 |

4.1.2 Test Setup

Radiated Measurement Method



Conducted Measurement Method



4.1.3 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|---|--|---------------------------------|---------------------|-------------------------|
| Test Receiver KEYSIGHT | N9038A | MY55420137 | Apr. 15, 2019 | Apr. 14, 2020 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100269 | Jun. 04, 2019 | Jun. 03, 2020 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-160 | Nov. 07, 2019 | Nov. 06, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-1169 | Nov. 24, 2019 | Nov. 23, 2020 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170241 | Nov. 24, 2019 | Nov. 23, 2020 |
| Loop Antenna TESEQ | HLA 6121 | 45745 | Jul. 01, 2019 | Jun. 30, 2020 |
| Preamplifier Agilent (Below 1GHz) | 8447D | 2944A10638 | Jul. 11, 2019 | Jul. 10, 2020 |
| Preamplifier Agilent (Above 1GHz) | 8449B | 3008A02367 | Feb. 19, 2019 | Feb. 18, 2020 |
| RF signal cable HUBER+SUHNER&EMCI | SUCOFLEX 104 & EMC104-SM-SM80 00 | CABLE-CH9-02 (248780+171006) | Jan. 19, 2019 | Jan. 18, 2020 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | CABLE-CH9-(250795 /4) | Jul. 11, 2019 | Jul. 10, 2020 |
| RF signal cable Woken | 8D-FB | Cable-CH9-01 | Jul. 30, 2019 | Jul. 29, 2020 |
| Software BV ADT | ADT_Radiated_ V7.6.15.9.5 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn BV ADT | AT100 | AT93021705 | NA | NA |
| Turn Table BV ADT | TT100 | TT93021705 | NA | NA |
| Turn Table Controller BV ADT | SC100 | SC93021705 | NA | NA |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |
| WIT Standard Temperature And Humidity Chamber | TH-4S-C | W981030 | Jun. 03, 2019 | Jun. 02, 2020 |
| JFW 20dB attenuation | 50HF-020-SMA | NA | NA | NA |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 9.

4.1.4 Test Procedures

Radiated Measurement Method

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to peak and/or average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
6. EIRP = Output power level of S.G + Correction Factor (including Cable loss, Antenna gain, etc...)

Conducted Measurement Method

1. Connect the DUT transmitter output to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
2. Set span to at least 1.5 times the OBW.
3. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
4. Set VBW $\geq 3 \times$ RBW.
5. Set number of points in sweep $\geq 2 \times$ span / RBW.
6. Sweep time = auto-couple.
7. Detector = RMS (power averaging).
8. If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
9. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
10. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
11. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

Conducted Output Power (dBm) / Per 10M

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|------------------------|----------------------|------------------------|------------------------|----------------------|------------------------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55265 3552.5 MHz | 55990 3625 MHz | 56715 3697.5 MHz | 55265 3552.5 MHz | 55990 3625 MHz | 56715 3697.5 MHz |
| 48 / 5M | 1 | 0 | 20.48 | 20.04 | 19.85 | 20.15 | 20.03 | 19.55 |
| | 1 | 12 | 20.73 | 20.19 | 19.96 | 20.55 | 20.37 | 19.90 |
| | 1 | 24 | 20.55 | 20.08 | 19.87 | 20.24 | 19.98 | 19.58 |
| | 12 | 0 | 20.35 | 19.92 | 19.75 | 20.36 | 20.21 | 19.72 |
| | 12 | 6 | 20.38 | 19.88 | 19.77 | 20.47 | 20.30 | 19.85 |
| | 12 | 13 | 20.26 | 19.95 | 19.72 | 20.33 | 20.16 | 19.71 |
| | 25 | 0 | 20.43 | 19.96 | 19.76 | 20.38 | 20.14 | 19.73 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55290 3555 MHz | 55990 3625 MHz | 56690 3695 MHz | 55290 3555 MHz | 55990 3625 MHz | 56690 3695 MHz |
| 48 / 10M | 1 | 0 | 20.29 | 19.81 | 19.66 | 19.63 | 19.15 | 18.97 |
| | 1 | 24 | 20.40 | 19.95 | 19.78 | 20.32 | 19.99 | 19.78 |
| | 1 | 49 | 20.33 | 19.87 | 19.72 | 19.59 | 19.20 | 19.00 |
| | 25 | 0 | 20.36 | 19.98 | 19.85 | 20.08 | 19.63 | 19.45 |
| | 25 | 12 | 20.33 | 19.96 | 19.84 | 20.30 | 19.85 | 19.65 |
| | 25 | 25 | 20.38 | 19.98 | 19.90 | 20.05 | 19.67 | 19.49 |
| | 50 | 0 | 20.36 | 19.94 | 19.84 | 19.99 | 19.61 | 19.43 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|------------------------|----------------------|------------------------|------------------------|----------------------|------------------------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55315 3557.5 MHz | 55990 3625 MHz | 56665 3692.5 MHz | 55315 3557.5 MHz | 55990 3625 MHz | 56665 3692.5 MHz |
| 48 / 15M | 1 | 0 | 19.28 | 18.93 | 18.72 | 18.96 | 18.63 | 18.39 |
| | 1 | 37 | 19.77 | 19.05 | 18.80 | 19.23 | 19.79 | 19.51 |
| | 1 | 74 | 19.33 | 18.99 | 18.83 | 18.92 | 18.66 | 18.44 |
| | 36 | 0 | 19.46 | 19.43 | 19.02 | 19.60 | 19.32 | 19.05 |
| | 36 | 19 | 19.41 | 19.44 | 19.15 | 19.95 | 19.67 | 19.39 |
| | 36 | 39 | 19.42 | 19.41 | 19.13 | 19.57 | 19.30 | 19.06 |
| | 75 | 0 | 18.39 | 18.06 | 17.92 | 18.35 | 18.05 | 17.95 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55340 | 55990 | 56640 | 55340 | 55990 | 56640 |
| | | | 3560 | 3625 | 3690 | 3560 | 3625 | 3690 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 20M | 1 | 0 | 20.88 | 20.44 | 20.26 | 20.57 | 20.08 | 19.95 |
| | 1 | 50 | 20.71 | 20.24 | 20.22 | 19.97 | 19.62 | 19.44 |
| | 1 | 99 | 20.62 | 20.29 | 20.17 | 20.55 | 20.00 | 19.97 |
| | 50 | 0 | 20.33 | 19.87 | 19.62 | 20.21 | 19.91 | 19.52 |
| | 50 | 25 | 20.18 | 19.82 | 19.72 | 20.04 | 19.62 | 19.55 |
| | 50 | 50 | 20.25 | 19.81 | 19.70 | 20.26 | 19.79 | 19.71 |
| | 100 | 0 | 17.55 | 17.16 | 17.02 | 17.55 | 17.16 | 17.04 |

EIRP Power / Per 10M

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55265 | 55990 | 56715 | 55265 | 55990 | 56715 |
| | | | 3552.5 | 3625 | 3697.5 | 3552.5 | 3625 | 3697.5 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 5M | 1 | 0 | 20.62 | 20.18 | 19.99 | 20.29 | 20.17 | 19.69 |
| | 1 | 12 | 20.87 | 20.33 | 20.10 | 20.69 | 20.51 | 20.04 |
| | 1 | 24 | 20.68 | 20.22 | 20.01 | 20.38 | 20.12 | 19.72 |
| | 12 | 0 | 20.49 | 20.06 | 19.89 | 20.50 | 20.35 | 19.86 |
| | 12 | 6 | 20.52 | 20.02 | 19.91 | 20.61 | 20.44 | 19.99 |
| | 12 | 13 | 20.40 | 20.09 | 19.86 | 20.47 | 20.30 | 19.85 |
| | 25 | 0 | 20.57 | 20.10 | 19.90 | 20.52 | 20.28 | 19.87 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55290 | 55990 | 56690 | 55290 | 55990 | 56690 |
| | | | 3555 | 3625 | 3695 | 3555 | 3625 | 3695 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 10M | 1 | 0 | 20.43 | 19.95 | 19.80 | 19.77 | 19.29 | 19.11 |
| | 1 | 24 | 20.54 | 20.09 | 19.92 | 20.46 | 20.13 | 19.92 |
| | 1 | 49 | 20.47 | 20.01 | 19.86 | 19.73 | 19.34 | 19.14 |
| | 25 | 0 | 20.50 | 20.12 | 19.99 | 20.22 | 19.77 | 19.59 |
| | 25 | 12 | 20.47 | 20.10 | 19.98 | 20.44 | 19.99 | 19.79 |
| | 25 | 25 | 20.52 | 20.12 | 20.04 | 20.19 | 19.81 | 19.63 |
| | 50 | 0 | 20.50 | 20.08 | 19.98 | 20.13 | 19.75 | 19.57 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55315 | 55990 | 56665 | 55315 | 55990 | 56665 |
| | | | 3557.5 | 3625 | 3692.5 | 3557.5 | 3625 | 3692.5 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 15M | 1 | 0 | 19.42 | 19.07 | 18.86 | 19.10 | 18.77 | 18.53 |
| | 1 | 37 | 19.91 | 19.19 | 18.94 | 19.37 | 19.93 | 19.65 |
| | 1 | 74 | 19.47 | 19.13 | 18.97 | 19.06 | 18.80 | 18.58 |
| | 36 | 0 | 19.60 | 19.57 | 19.16 | 19.74 | 19.46 | 19.19 |
| | 36 | 19 | 19.55 | 19.58 | 19.29 | 20.09 | 19.81 | 19.53 |
| | 36 | 39 | 19.56 | 19.55 | 19.27 | 19.71 | 19.44 | 19.20 |
| | 75 | 0 | 18.53 | 18.20 | 18.06 | 18.49 | 18.19 | 18.09 |

*EIRP = Conducted + antenna gain.

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55340 | 55990 | 56640 | 55340 | 55990 | 56640 |
| | | | 3560 | 3625 | 3690 | 3560 | 3625 | 3690 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 20M | 1 | 0 | 21.02 | 20.58 | 20.40 | 20.71 | 20.22 | 20.09 |
| | 1 | 50 | 20.85 | 20.38 | 20.36 | 20.11 | 19.76 | 19.58 |
| | 1 | 99 | 20.76 | 20.43 | 20.31 | 20.69 | 20.14 | 20.11 |
| | 50 | 0 | 20.47 | 20.01 | 19.76 | 20.35 | 20.05 | 19.66 |
| | 50 | 25 | 20.32 | 19.96 | 19.86 | 20.18 | 19.76 | 19.69 |
| | 50 | 50 | 20.39 | 19.95 | 19.84 | 20.40 | 19.93 | 19.85 |
| | 100 | 0 | 17.69 | 17.30 | 17.16 | 17.69 | 17.30 | 17.18 |

*EIRP = Conducted + antenna gain.

Conducted Output Power (dBm) / Full Power

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|------------------------|----------------------|------------------------|------------------------|----------------------|------------------------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55265 3552.5 MHz | 55990 3625 MHz | 56715 3697.5 MHz | 55265 3552.5 MHz | 55990 3625 MHz | 56715 3697.5 MHz |
| 48 / 5M | 1 | 0 | 20.48 | 20.04 | 19.85 | 20.15 | 20.03 | 19.55 |
| | 1 | 12 | 20.73 | 20.19 | 19.96 | 20.55 | 20.37 | 19.90 |
| | 1 | 24 | 20.54 | 20.08 | 19.87 | 20.24 | 19.98 | 19.58 |
| | 12 | 0 | 20.35 | 19.92 | 19.75 | 20.36 | 20.21 | 19.72 |
| | 12 | 6 | 20.38 | 19.88 | 19.77 | 20.47 | 20.30 | 19.85 |
| | 12 | 13 | 20.26 | 19.95 | 19.72 | 20.33 | 20.16 | 19.71 |
| | 25 | 0 | 20.43 | 19.96 | 19.76 | 20.38 | 20.14 | 19.73 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55290 3555 MHz | 55990 3625 MHz | 56690 3695 MHz | 55290 3555 MHz | 55990 3625 MHz | 56690 3695 MHz |
| 48 / 10M | 1 | 0 | 20.29 | 19.81 | 19.66 | 19.63 | 19.15 | 18.97 |
| | 1 | 24 | 20.40 | 19.95 | 19.78 | 20.32 | 19.99 | 19.78 |
| | 1 | 49 | 20.33 | 19.87 | 19.72 | 19.59 | 19.20 | 19.00 |
| | 25 | 0 | 20.36 | 19.98 | 19.85 | 20.08 | 19.63 | 19.45 |
| | 25 | 12 | 20.33 | 19.96 | 19.84 | 20.30 | 19.85 | 19.65 |
| | 25 | 25 | 20.38 | 19.98 | 19.90 | 20.05 | 19.67 | 19.49 |
| | 50 | 0 | 20.36 | 19.94 | 19.84 | 19.99 | 19.61 | 19.43 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|------------------------|----------------------|------------------------|------------------------|----------------------|------------------------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55315 3557.5 MHz | 55990 3625 MHz | 56665 3692.5 MHz | 55315 3557.5 MHz | 55990 3625 MHz | 56665 3692.5 MHz |
| 48 / 15M | 1 | 0 | 19.68 | 18.93 | 18.72 | 18.96 | 18.63 | 18.39 |
| | 1 | 37 | 19.82 | 19.11 | 18.99 | 19.25 | 19.79 | 19.51 |
| | 1 | 74 | 19.77 | 19.02 | 18.83 | 18.92 | 18.66 | 18.44 |
| | 36 | 0 | 19.52 | 19.43 | 19.02 | 19.60 | 19.32 | 19.05 |
| | 36 | 19 | 19.44 | 19.77 | 19.01 | 19.95 | 19.67 | 19.39 |
| | 36 | 39 | 19.60 | 19.41 | 18.89 | 19.57 | 19.30 | 19.06 |
| | 75 | 0 | 19.52 | 19.46 | 19.05 | 19.56 | 19.32 | 19.04 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55340 | 55990 | 56640 | 55340 | 55990 | 56640 |
| | | | 3560 | 3625 | 3690 | 3560 | 3625 | 3690 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 20M | 1 | 0 | 20.93 | 20.50 | 20.32 | 20.60 | 20.15 | 19.98 |
| | 1 | 50 | 20.82 | 20.33 | 20.16 | 20.01 | 19.68 | 19.50 |
| | 1 | 99 | 20.88 | 20.35 | 20.25 | 20.59 | 20.06 | 20.07 |
| | 50 | 0 | 20.35 | 19.94 | 19.67 | 20.23 | 19.85 | 19.60 |
| | 50 | 25 | 20.26 | 19.87 | 19.66 | 20.09 | 19.69 | 19.60 |
| | 50 | 50 | 20.22 | 19.85 | 19.74 | 20.30 | 19.81 | 19.72 |
| | 100 | 0 | 20.26 | 19.92 | 19.71 | 20.24 | 19.87 | 19.70 |

EIRP Power / Full Power

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55265 | 55990 | 56715 | 55265 | 55990 | 56715 |
| | | | 3552.5 | 3625 | 3697.5 | 3552.5 | 3625 | 3697.5 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 5M | 1 | 0 | 20.62 | 20.18 | 19.99 | 20.29 | 20.17 | 19.69 |
| | 1 | 12 | 20.87 | 20.33 | 20.10 | 20.69 | 20.51 | 20.04 |
| | 1 | 24 | 20.68 | 20.22 | 20.01 | 20.38 | 20.12 | 19.72 |
| | 12 | 0 | 20.49 | 20.06 | 19.89 | 20.50 | 20.35 | 19.86 |
| | 12 | 6 | 20.52 | 20.02 | 19.91 | 20.61 | 20.44 | 19.99 |
| | 12 | 13 | 20.40 | 20.09 | 19.86 | 20.47 | 20.30 | 19.85 |
| | 25 | 0 | 20.57 | 20.10 | 19.90 | 20.52 | 20.28 | 19.87 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55290 | 55990 | 56690 | 55290 | 55990 | 56690 |
| | | | 3555 | 3625 | 3695 | 3555 | 3625 | 3695 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 10M | 1 | 0 | 20.43 | 19.95 | 19.80 | 19.77 | 19.29 | 19.11 |
| | 1 | 24 | 20.54 | 20.09 | 19.92 | 20.46 | 20.13 | 19.92 |
| | 1 | 49 | 20.47 | 20.01 | 19.86 | 19.73 | 19.34 | 19.14 |
| | 25 | 0 | 20.50 | 20.12 | 19.99 | 20.22 | 19.77 | 19.59 |
| | 25 | 12 | 20.47 | 20.10 | 19.98 | 20.44 | 19.99 | 19.79 |
| | 25 | 25 | 20.52 | 20.12 | 20.04 | 20.19 | 19.81 | 19.63 |
| | 50 | 0 | 20.50 | 20.08 | 19.98 | 20.13 | 19.75 | 19.57 |

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55315 | 55990 | 56665 | 55315 | 55990 | 56665 |
| | | | 3557.5 | 3625 | 3692.5 | 3557.5 | 3625 | 3692.5 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 15M | 1 | 0 | 19.82 | 19.07 | 18.86 | 19.10 | 18.77 | 18.53 |
| | 1 | 37 | 19.96 | 19.25 | 19.13 | 19.39 | 19.93 | 19.65 |
| | 1 | 74 | 19.91 | 19.16 | 18.97 | 19.06 | 18.80 | 18.58 |
| | 36 | 0 | 19.66 | 19.57 | 19.16 | 19.74 | 19.46 | 19.19 |
| | 36 | 19 | 19.58 | 19.91 | 19.15 | 20.09 | 19.81 | 19.53 |
| | 36 | 39 | 19.74 | 19.55 | 19.03 | 19.71 | 19.44 | 19.20 |
| | 75 | 0 | 19.66 | 19.60 | 19.19 | 19.70 | 19.46 | 19.18 |

*EIRP = Conducted + antenna gain.

| Band / BW | RB Size | RB Offset | QPSK | | | 16QAM | | |
|-----------|---------|-----------|--------|--------|---------|--------|--------|---------|
| | | | Low CH | Mid CH | High CH | Low CH | Mid CH | High CH |
| | | | 55340 | 55990 | 56640 | 55340 | 55990 | 56640 |
| | | | 3560 | 3625 | 3690 | 3560 | 3625 | 3690 |
| | | | MHz | MHz | MHz | MHz | MHz | MHz |
| 48 / 20M | 1 | 0 | 21.07 | 20.64 | 20.46 | 20.74 | 20.29 | 20.12 |
| | 1 | 50 | 20.96 | 20.47 | 20.30 | 20.15 | 19.82 | 19.64 |
| | 1 | 99 | 21.02 | 20.49 | 20.39 | 20.73 | 20.20 | 20.21 |
| | 50 | 0 | 20.49 | 20.08 | 19.81 | 20.37 | 19.99 | 19.74 |
| | 50 | 25 | 20.40 | 20.01 | 19.80 | 20.23 | 19.83 | 19.74 |
| | 50 | 50 | 20.36 | 19.99 | 19.88 | 20.44 | 19.95 | 19.86 |
| | 100 | 0 | 20.40 | 20.06 | 19.85 | 20.38 | 20.01 | 19.84 |

*EIRP = Conducted + antenna gain.

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

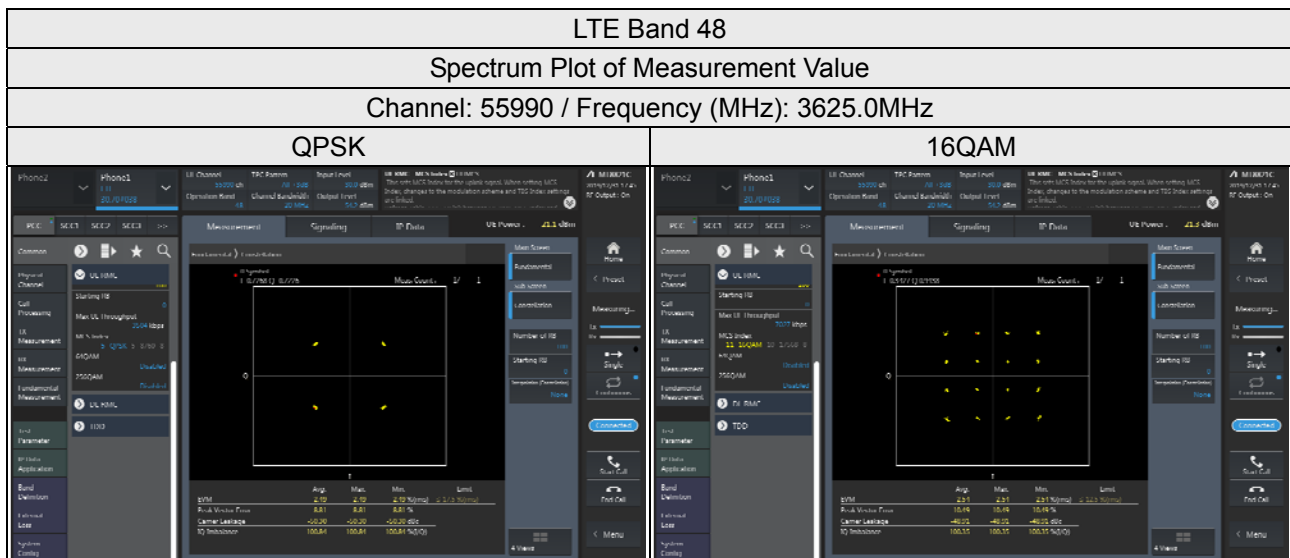
4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup



4.2.4 Test Results



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

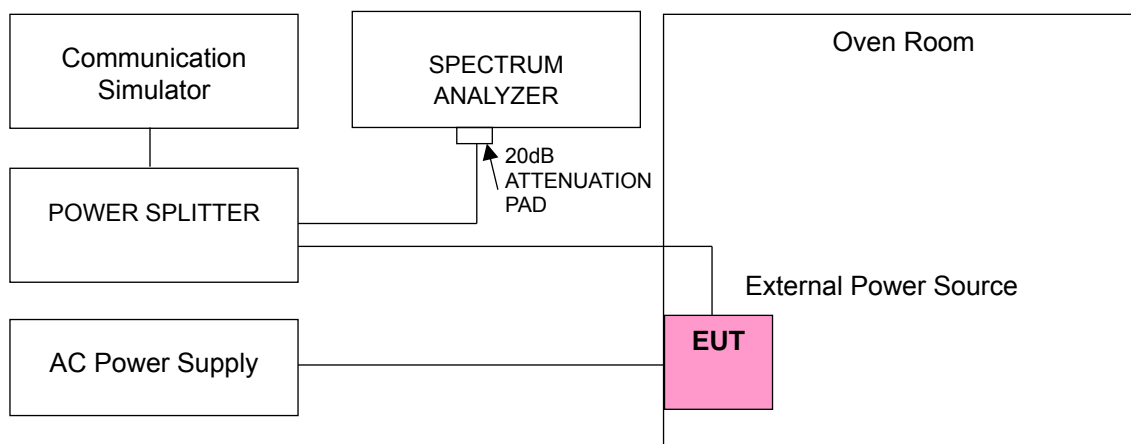
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency band.

4.3.2 Test Procedure

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 48, Channel Bandwidth: 5MHz | | | |
|------------|--------------------------------------|-----------------------|-----------------|-----------------------|
| | Low Channel | | High Channel | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30 | 3552.500004 | 0.001 | 3697.500003 | 0.001 |
| -20 | 3552.500004 | 0.001 | 3697.500002 | 0.001 |
| -10 | 3552.500004 | 0.001 | 3697.500004 | 0.001 |
| 0 | 3552.500004 | 0.001 | 3697.500001 | 0.000 |
| 10 | 3552.500001 | 0.000 | 3697.500002 | 0.000 |
| 20 | 3552.499999 | 0.000 | 3697.499998 | -0.001 |
| 30 | 3552.499998 | 0.000 | 3697.499996 | -0.001 |
| 40 | 3552.499999 | 0.000 | 3697.499997 | -0.001 |
| 50 | 3552.499999 | 0.000 | 3697.499998 | -0.001 |
| 60 | 3552.499997 | -0.001 | 3697.499996 | -0.001 |

| Temp. (°C) | LTE Band 48, Channel Bandwidth: 10MHz | | | |
|------------|---------------------------------------|-----------------------|-----------------|-----------------------|
| | Low Channel | | High Channel | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30 | 3555.000001 | 0.000 | 3695.000001 | 0.000 |
| -20 | 3555.000003 | 0.001 | 3695.000003 | 0.001 |
| -10 | 3555.000001 | 0.000 | 3695.000003 | 0.001 |
| 0 | 3555.000002 | 0.001 | 3695.000002 | 0.001 |
| 10 | 3555.000002 | 0.001 | 3695.000002 | 0.001 |
| 20 | 3554.999997 | -0.001 | 3694.999998 | -0.001 |
| 30 | 3554.999998 | -0.001 | 3694.999998 | -0.001 |
| 40 | 3554.999998 | -0.001 | 3694.999997 | -0.001 |
| 50 | 3554.999996 | -0.001 | 3694.999998 | -0.001 |
| 60 | 3554.999999 | 0.000 | 3694.999998 | 0.000 |

| Temp. (°C) | LTE Band 48, Channel Bandwidth: 15MHz | | | |
|------------|---------------------------------------|-----------------------|-----------------|-----------------------|
| | Low Channel | | High Channel | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30 | 3557.500001 | 0.000 | 3692.500003 | 0.001 |
| -20 | 3557.500002 | 0.001 | 3692.500003 | 0.001 |
| -10 | 3557.500002 | 0.001 | 3692.500001 | 0.000 |
| 0 | 3557.500003 | 0.001 | 3692.500004 | 0.001 |
| 10 | 3557.500003 | 0.001 | 3692.500004 | 0.001 |
| 20 | 3557.499998 | -0.001 | 3692.499998 | -0.001 |
| 30 | 3557.499999 | 0.000 | 3692.499999 | 0.000 |
| 40 | 3557.499998 | -0.001 | 3692.499997 | -0.001 |
| 50 | 3557.499997 | -0.001 | 3692.499997 | -0.001 |
| 60 | 3557.499999 | 0.000 | 3692.499998 | 0.000 |

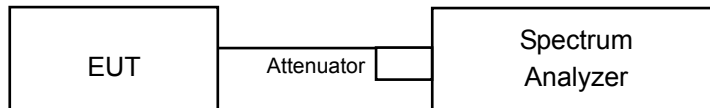
| Temp. (°C) | LTE Band 48, Channel Bandwidth: 20MHz | | | |
|------------|---------------------------------------|-----------------------|-----------------|-----------------------|
| | Low Channel | | High Channel | |
| | Frequency (MHz) | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30 | 3560.000003 | 0.001 | 3690.000001 | 0.000 |
| -20 | 3560.000002 | 0.001 | 3690.000003 | 0.001 |
| -10 | 3560.000003 | 0.001 | 3690.000001 | 0.000 |
| 0 | 3560.000001 | 0.000 | 3690.000003 | 0.001 |
| 10 | 3560.000001 | 0.000 | 3690.000002 | 0.000 |
| 20 | 3559.999999 | 0.000 | 3689.999999 | 0.000 |
| 30 | 3559.999997 | -0.001 | 3689.999999 | 0.000 |
| 40 | 3559.999999 | 0.000 | 3689.999998 | -0.001 |
| 50 | 3559.999998 | -0.001 | 3689.999997 | -0.001 |
| 60 | 3559.999997 | -0.001 | 3689.999997 | -0.001 |

4.4 Emission Bandwidth Measurement

4.4.1 Emission Bandwidth Measurement

Reference only

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.4.4 Test Procedure

Occupied Bandwidth:

All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

26dBc Bandwidth:

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW =51 kHz (5 MHz bandwidth), 100 kHz (10 MHz bandwidth), 150 kHz (15 MHz bandwidth), 200 kHz (20 MHz bandwidth). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

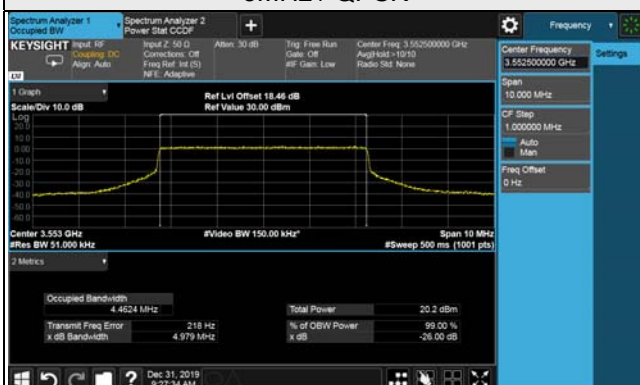
4.4.7 Test Result (-26dB Bandwidth)

LTE Band 48

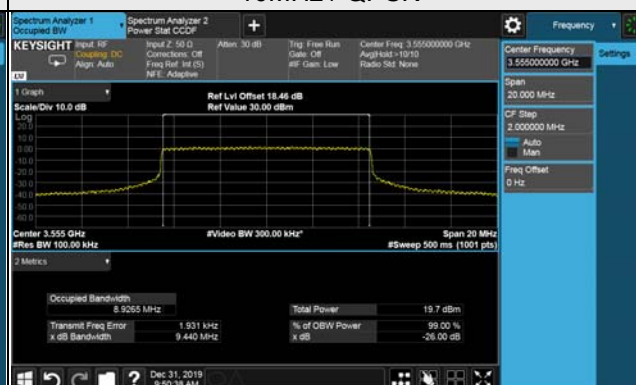
| LTE Band 48, Channel Bandwidth 5MHz | | | |
|--------------------------------------|-----------------|----------------------|-------|
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55265 | 3552.5 | 4.98 | 4.90 |
| 55990 | 3625.0 | 4.96 | 4.90 |
| 56715 | 3697.5 | 4.90 | 4.84 |
| LTE Band 48, Channel Bandwidth 10MHz | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55290 | 3555.0 | 9.44 | 9.40 |
| 55990 | 3625.0 | 9.38 | 9.41 |
| 56690 | 3695.0 | 9.40 | 9.34 |
| LTE Band 48, Channel Bandwidth 15MHz | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55315 | 3557.5 | 14.00 | 13.91 |
| 55990 | 3625.0 | 13.95 | 13.90 |
| 56665 | 3692.5 | 13.94 | 13.92 |
| LTE Band 48, Channel Bandwidth 20MHz | | | |
| Channel | Frequency (MHz) | 26dB Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55340 | 3560.0 | 18.59 | 18.57 |
| 55990 | 3625.0 | 18.60 | 18.60 |
| 56640 | 3690.0 | 18.53 | 18.56 |

Spectrum Plot of Worst Value

5MHz / QPSK



10MHz / QPSK



15MHz / QPSK



20MHz / QPSK

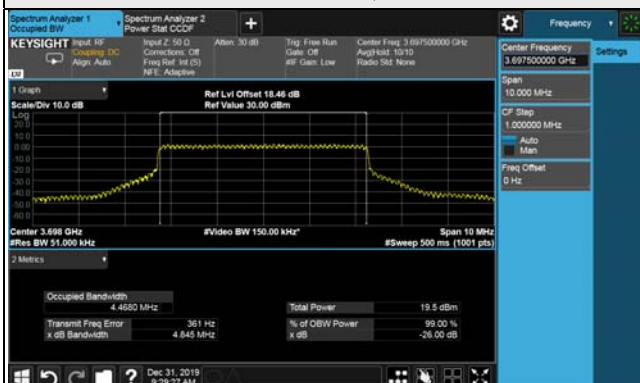


4.4.8 Test Result (Occupied Bandwidth)

| LTE Band 48, Channel Bandwidth 5MHz | | | |
|--------------------------------------|-----------------|------------------------------|-------|
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55265 | 3552.5 | 4.46 | 4.45 |
| 55990 | 3625.0 | 4.46 | 4.46 |
| 56715 | 3697.5 | 4.46 | 4.47 |
| LTE Band 48, Channel Bandwidth 10MHz | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55290 | 3555.0 | 8.93 | 8.90 |
| 55990 | 3625.0 | 8.91 | 8.90 |
| 56690 | 3695.0 | 8.92 | 8.89 |
| LTE Band 48, Channel Bandwidth 15MHz | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55315 | 3557.5 | 13.35 | 13.35 |
| 55990 | 3625.0 | 13.33 | 13.37 |
| 56665 | 3692.5 | 13.33 | 13.37 |
| LTE Band 48, Channel Bandwidth 20MHz | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM |
| 55340 | 3560.0 | 17.88 | 17.83 |
| 55990 | 3625.0 | 17.83 | 17.83 |
| 56640 | 3690.0 | 17.83 | 17.85 |

Spectrum Plot of Worst Value

5MHz / 16QAM



10MHz / QPSK



15MHz / 16QAM



20MHz / QPSK

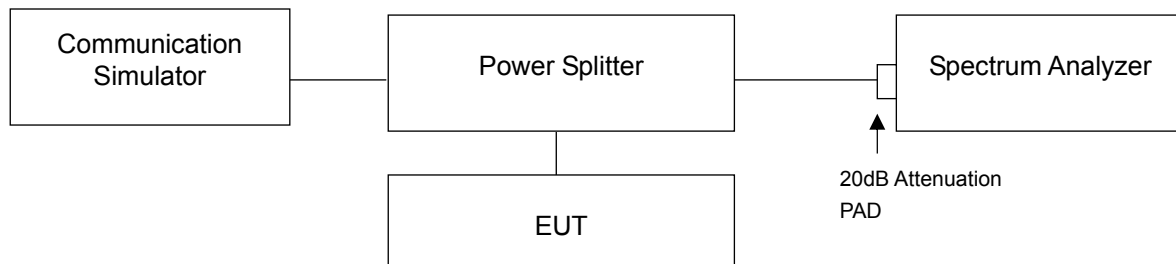


4.5 Peak to Average Ratio Measurement

4.5.1 Limits of Peak to Average Ratio Measurement

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

4.5.2 Test Setup



4.5.3 Test Procedures

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

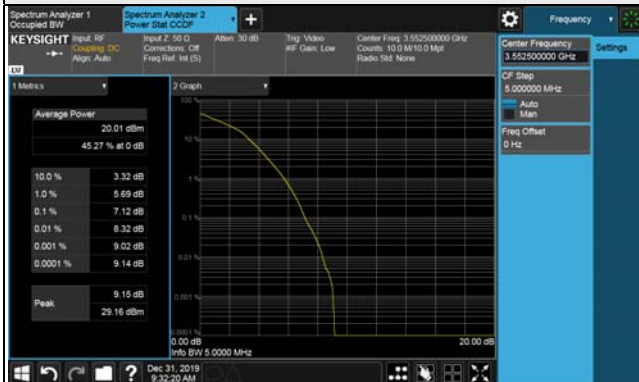
4.5.4 Test Results

LTE Band 48

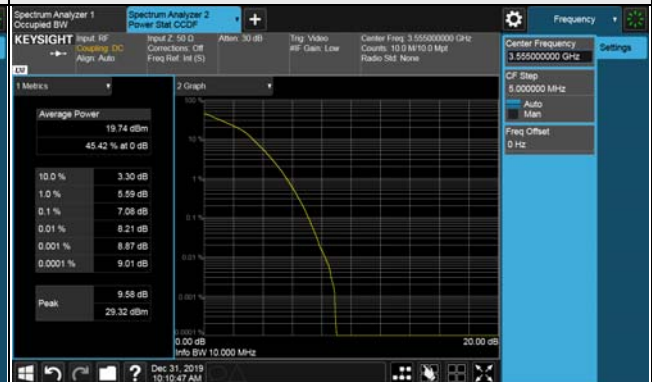
| LTE Band 48, Channel Bandwidth 5MHz | | | |
|--------------------------------------|-----------------|----------------------------|-------|
| Channel | Frequency (MHz) | Peak To Average Ratio (dB) | |
| | | QPSK | 16QAM |
| 55265 | 3552.5 | 7.12 | 6.45 |
| 55990 | 3625.0 | 6.93 | 6.29 |
| 56715 | 3697.5 | 6.87 | 6.31 |
| LTE Band 48, Channel Bandwidth 10MHz | | | |
| Channel | Frequency (MHz) | Peak To Average Ratio (dB) | |
| | | QPSK | 16QAM |
| 55290 | 3555.0 | 7.08 | 6.33 |
| 55990 | 3625.0 | 6.78 | 6.17 |
| 56690 | 3695.0 | 6.91 | 6.16 |
| LTE Band 48, Channel Bandwidth 15MHz | | | |
| Channel | Frequency (MHz) | Peak To Average Ratio (dB) | |
| | | QPSK | 16QAM |
| 55315 | 3557.5 | 7.08 | 6.20 |
| 55990 | 3625.0 | 6.84 | 5.99 |
| 56665 | 3692.5 | 6.90 | 6.00 |
| LTE Band 48, Channel Bandwidth 20MHz | | | |
| Channel | Frequency (MHz) | Peak To Average Ratio (dB) | |
| | | QPSK | 16QAM |
| 55340 | 3560.0 | 7.14 | 6.54 |
| 55990 | 3625.0 | 6.93 | 6.23 |
| 56640 | 3690.0 | 6.85 | 6.26 |

Spectrum Plot of Worst Value

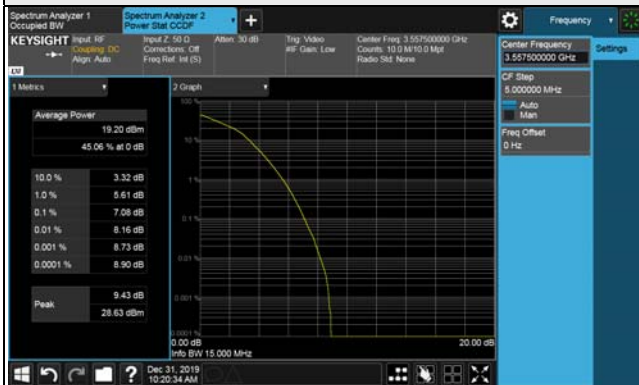
5MHz / QPSK



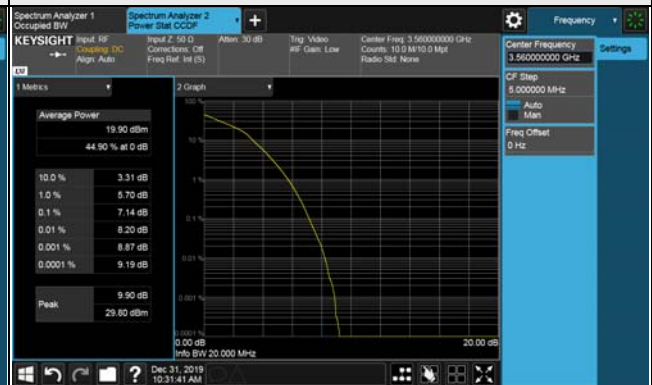
10MHz / QPSK



15MHz / QPSK



20MHz / QPSK

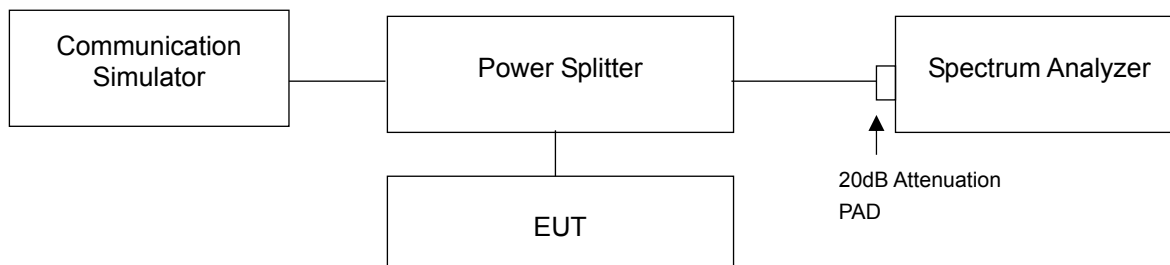


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

| Power of any emissions outside the Fundamental | Limit |
|---|-------------|
| Within 0-10MHz above the Assigned Channel | -13 dBm/MHz |
| Within 0-10MHz below the Assigned Channel | |
| Greater than 0-10MHz above the Assigned Channel | -25 dBm/MHz |
| Greater than 0-10MHz below the Assigned Channel | |
| Power of any emission below 3530MHz | -40 dBm/MHz |
| Power of any emission above 3720MHz | |

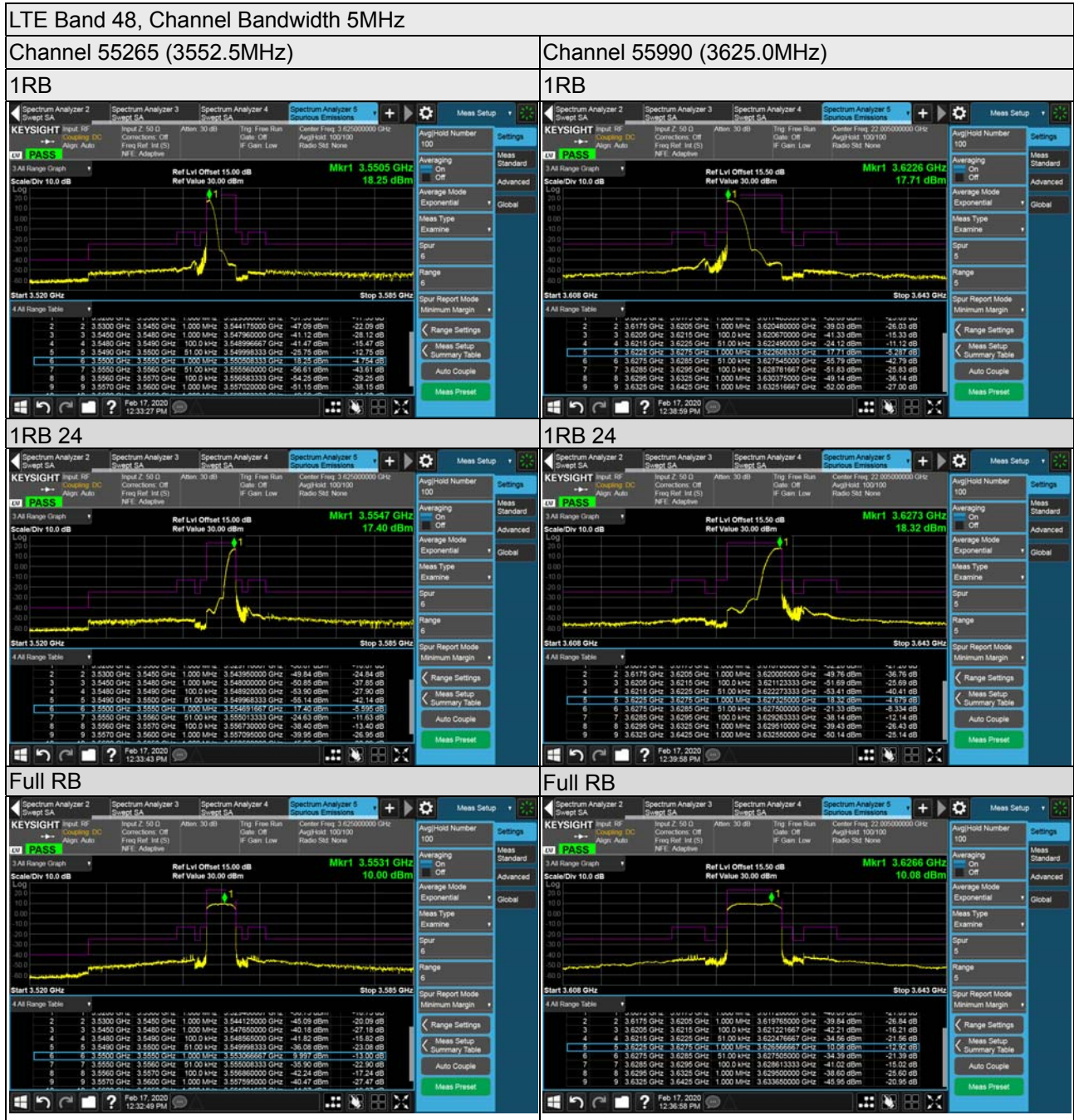
4.6.2 Test Setup



4.6.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 37 GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.
- Measuring frequency band edge, 20dB attenuation pad is connected with spectrum. 1% of the fundamental emission bandwidth is used for conducted emission measurement.
- For 5MHz channel BW mode, extend the 1% range from 1M to 2M above and below the channel edge and then reduce the limit further by $10 \log(1000/51) = 13\text{dB}$ (i.e. total $-13 + -13 = -26\text{dB}$) to compensate for the integration from 51k to 1M.

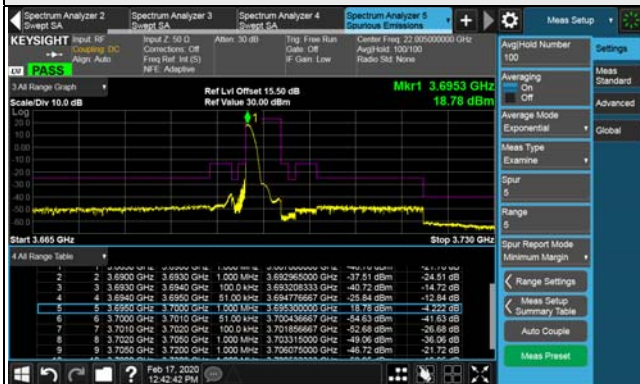
4.6.4 Test Results



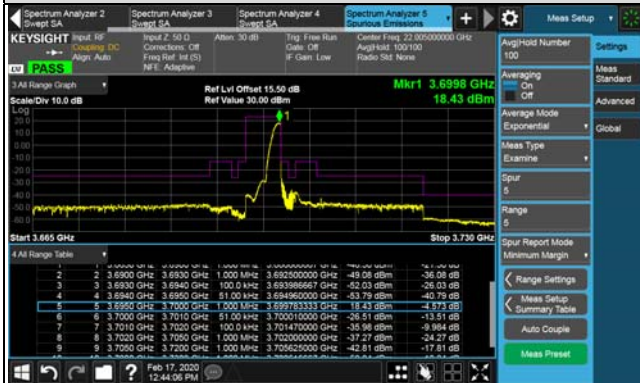
LTE Band 48, Channel Bandwidth 5MHz

Channel 56715 (3697.5MHz)

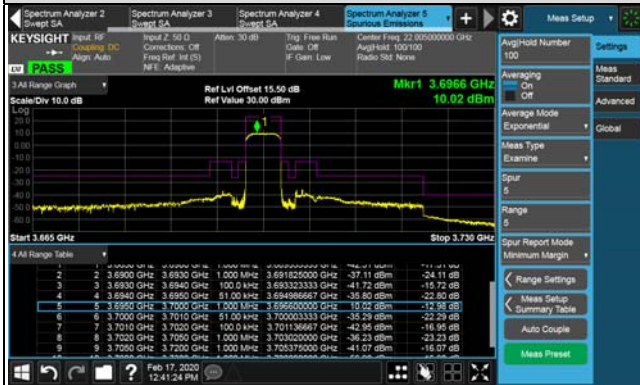
1RB



1RB 24



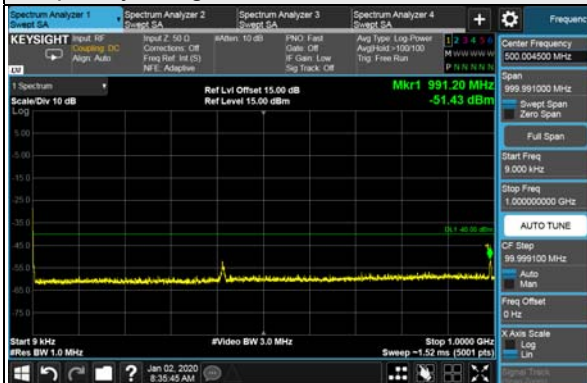
Full RB



LTE Band 48, Channel Bandwidth 5MHz

Channel 55265 (3552.5MHz)

Frequency Range : 9kHz~1GHz



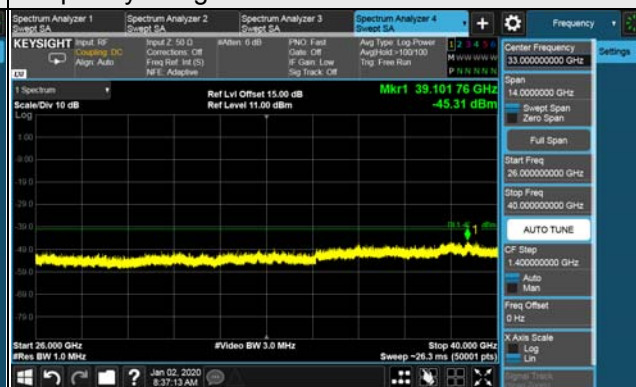
Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



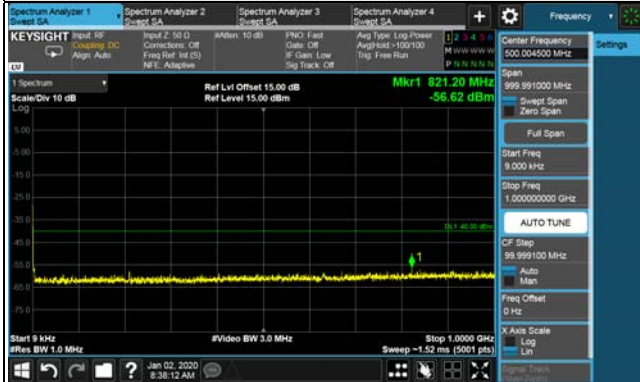
Frequency Range : 26.5GHz~40GHz



LTE Band 48, Channel Bandwidth 5MHz

Channel 55990 (3625.0MHz)

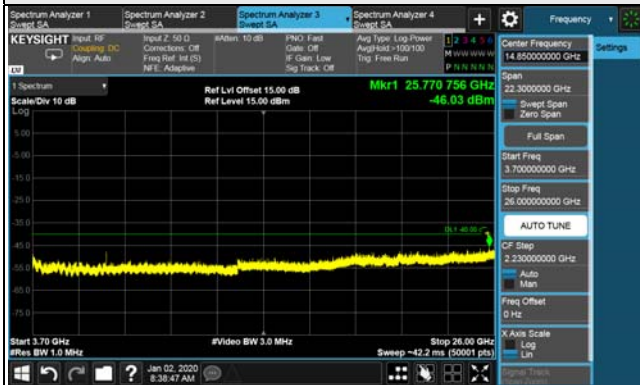
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



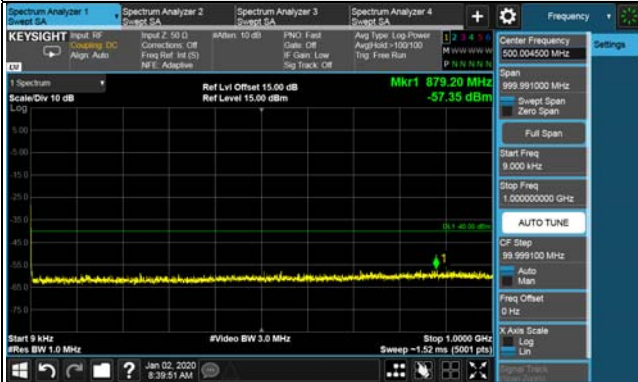
Frequency Range : 26.5GHz~40GHz



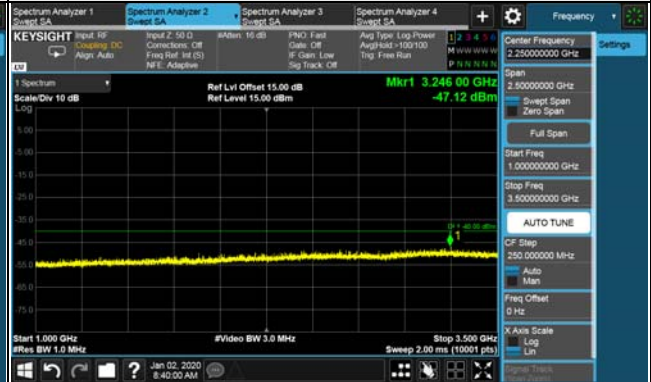
LTE Band 48, Channel Bandwidth 5MHz

Channel 56715 (3697.50MHz)

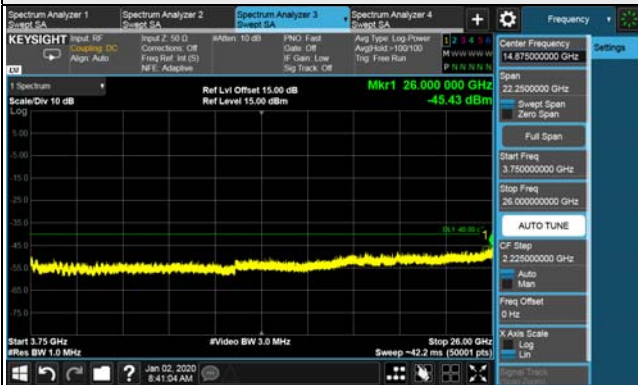
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz

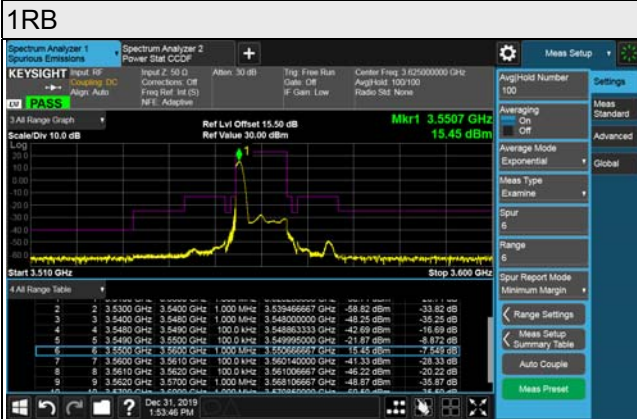


Frequency Range : 26.5GHz~40GHz

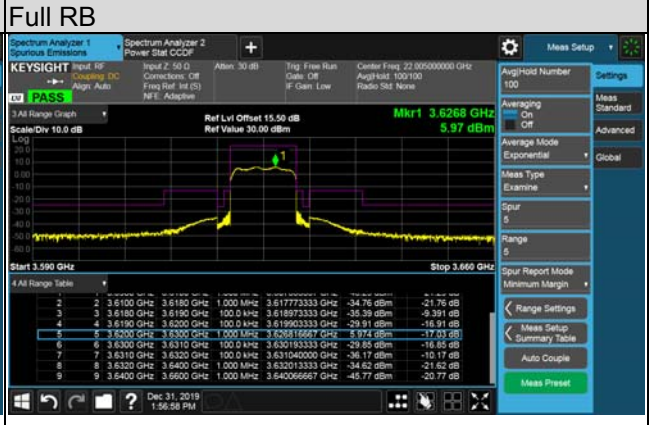
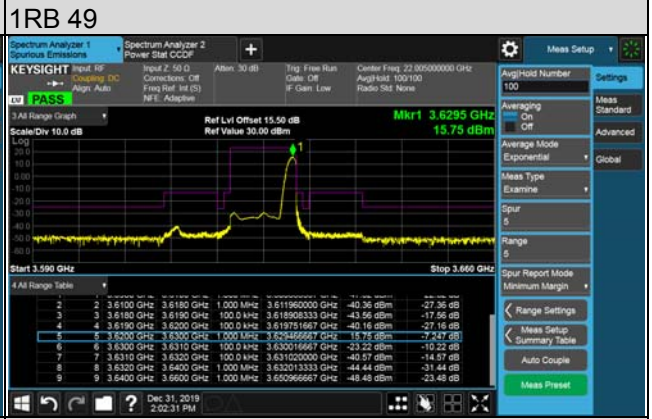
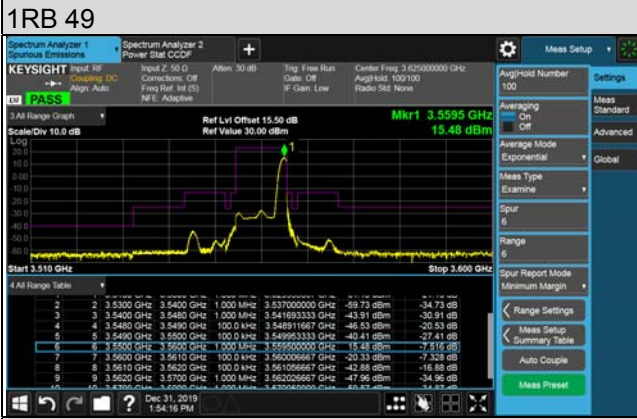
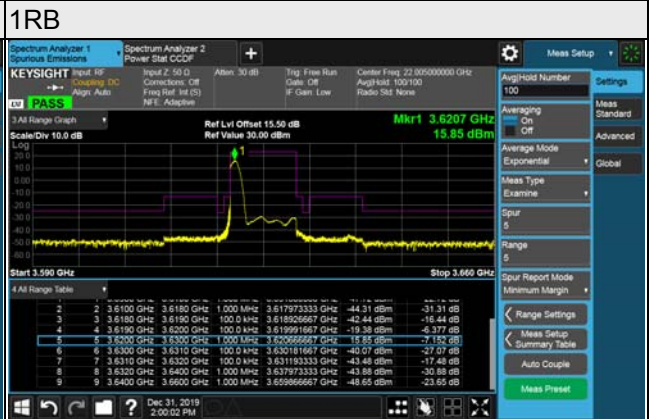


LTE Band 48, Channel Bandwidth 10MHz

Channel 55290 (3555.0MHz)



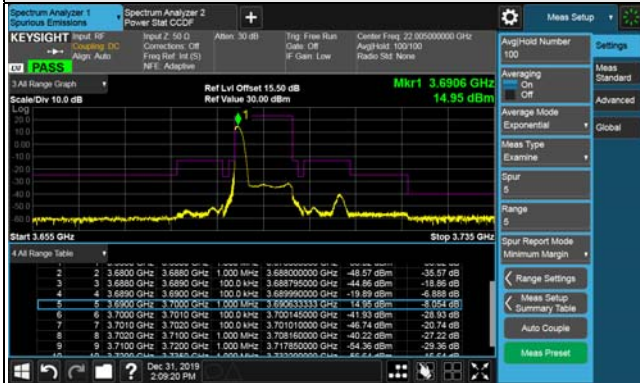
Channel 55990 (3625.0MHz)



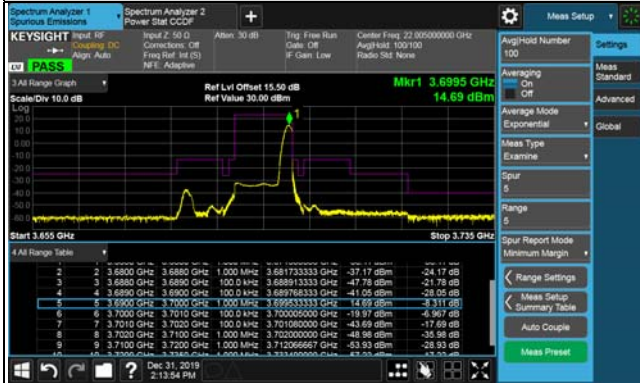
LTE Band 48, Channel Bandwidth 10MHz

Channel 56690 (3695.0MHz)

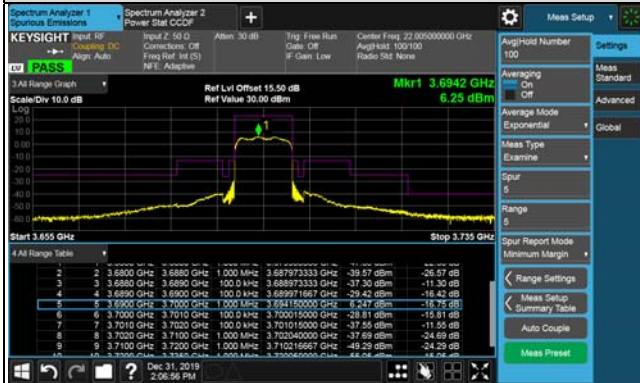
1RB



1RB 49



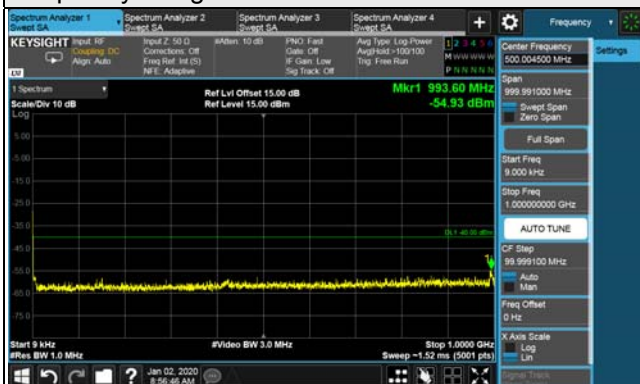
Full RB



LTE Band 48, Channel Bandwidth 10MHz

Channel 55290 (3555.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



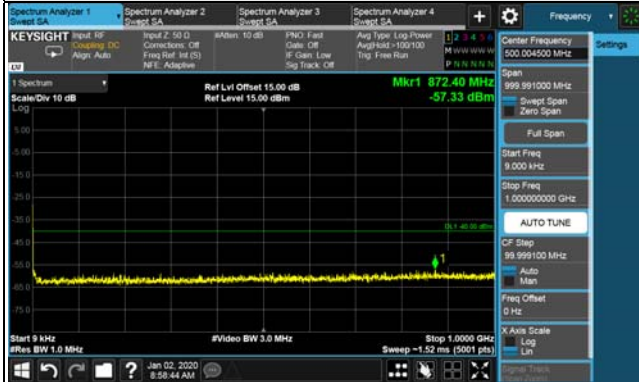
Frequency Range : 26.5GHz~40GHz



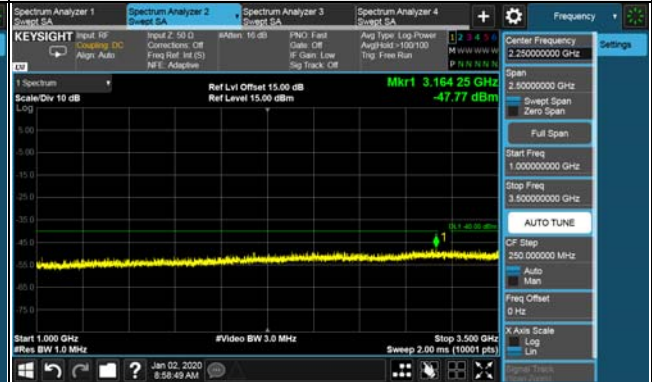
LTE Band 48, Channel Bandwidth 10MHz

Channel 55990 (3625.00MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



Frequency Range : 26.5GHz~40GHz



LTE Band 48, Channel Bandwidth 10MHz

Channel 56690 (3695.0MHz)

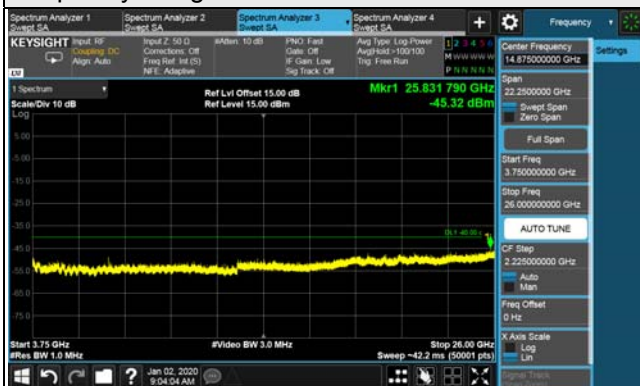
Frequency Range : 9kHz~1GHz



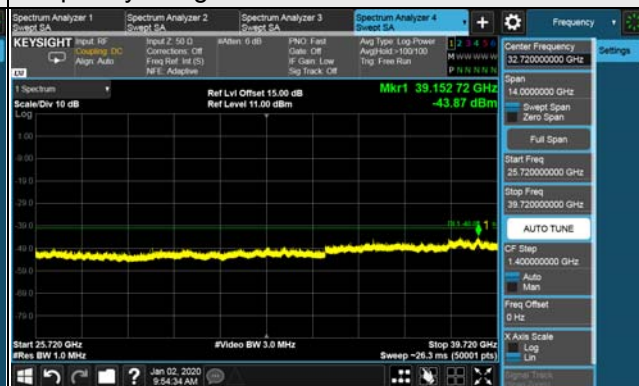
Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz

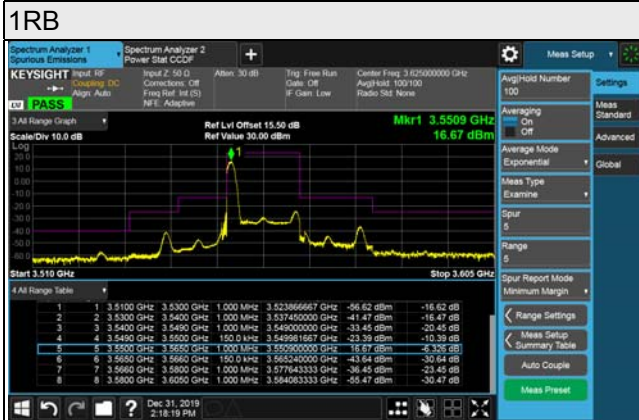


Frequency Range : 26.5GHz~40GHz

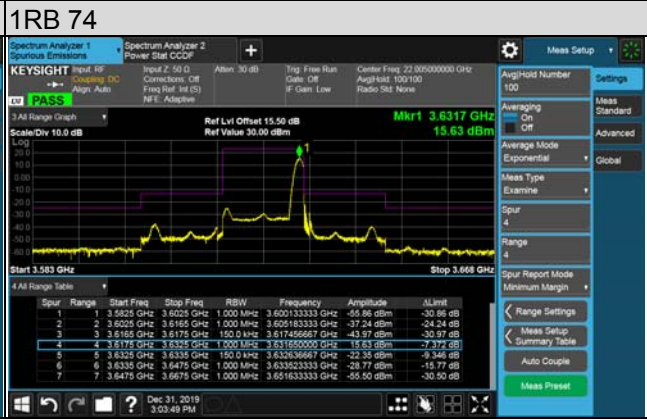
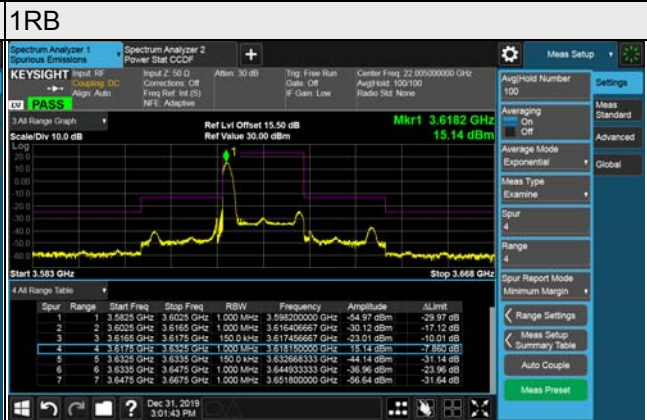


LTE Band 48, Channel Bandwidth 15MHz

Channel 55315 (3557.50MHz)



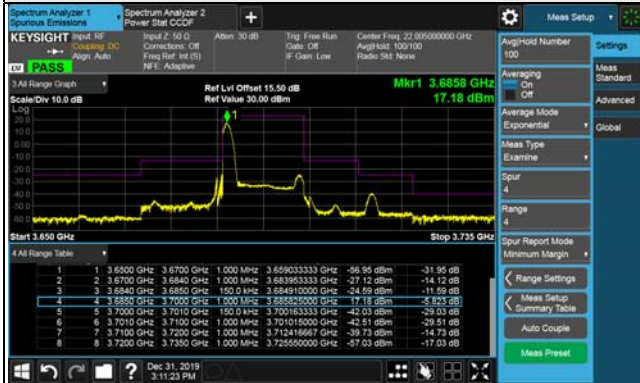
Channel 55990 (3625.0MHz)



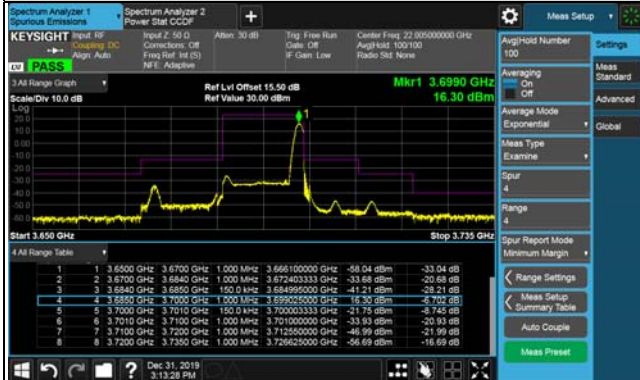
LTE Band 48, Channel Bandwidth 15MHz

Channel 56665 (3692.5MHz)

1RB



1RB 74



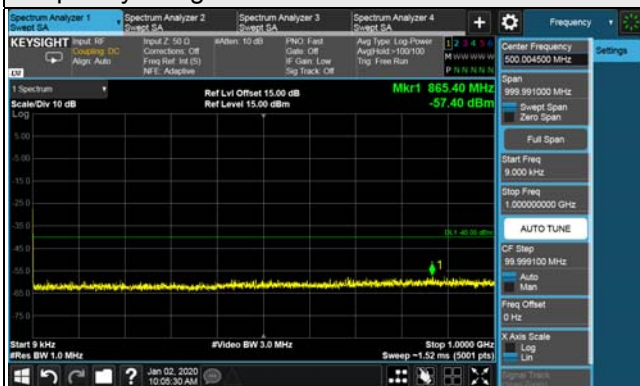
Full RB



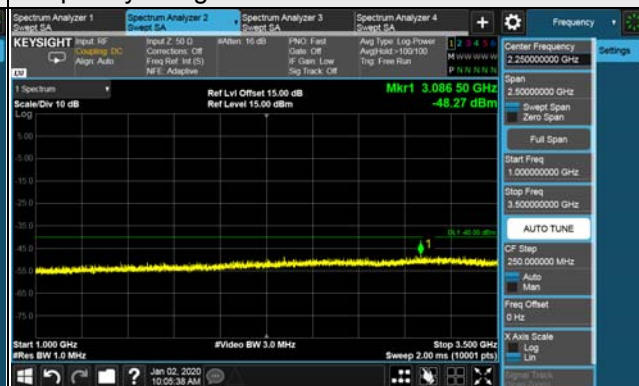
LTE Band 48, Channel Bandwidth 15MHz

Channel 55315 (3557.50MHz)

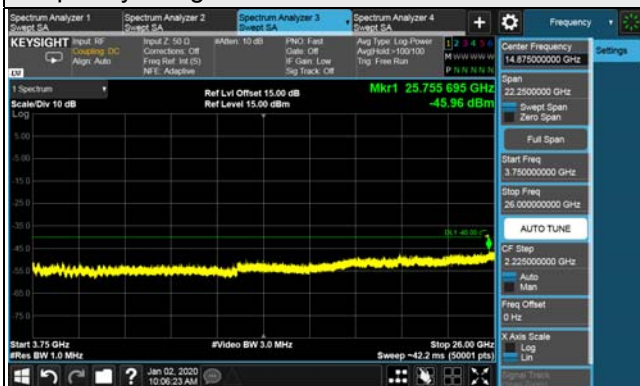
Frequency Range : 9kHz~1GHz



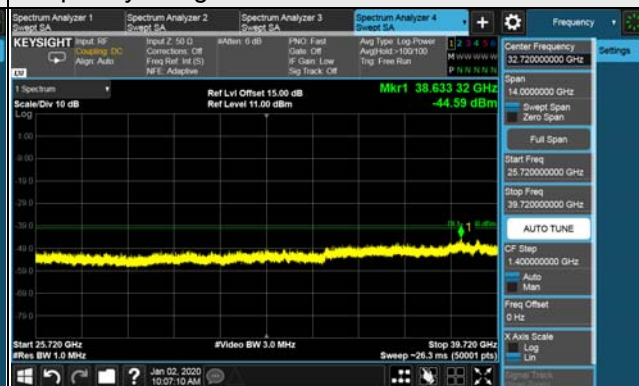
Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



Frequency Range : 26.5GHz~40GHz



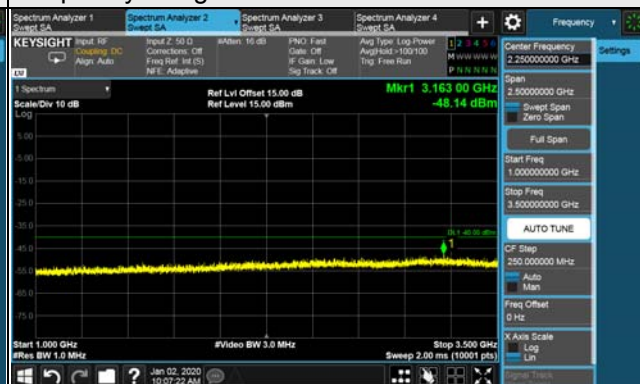
LTE Band 48, Channel Bandwidth 15MHz

Channel 55990 (3625.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



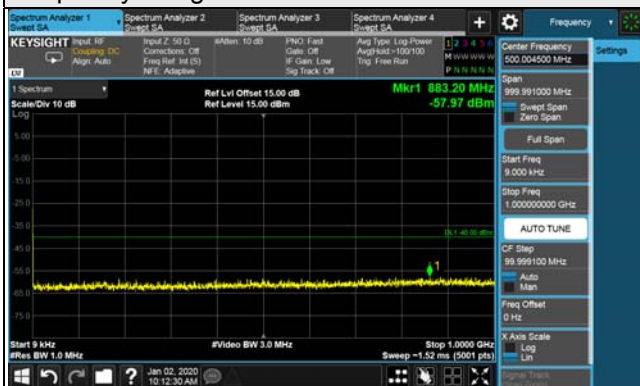
Frequency Range : 26.5GHz~40GHz



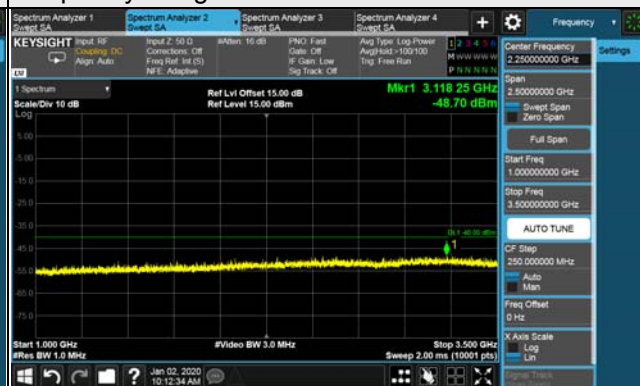
LTE Band 48, Channel Bandwidth 15MHz

Channel 56665 (3692.50MHz)

Frequency Range : 9kHz~1GHz



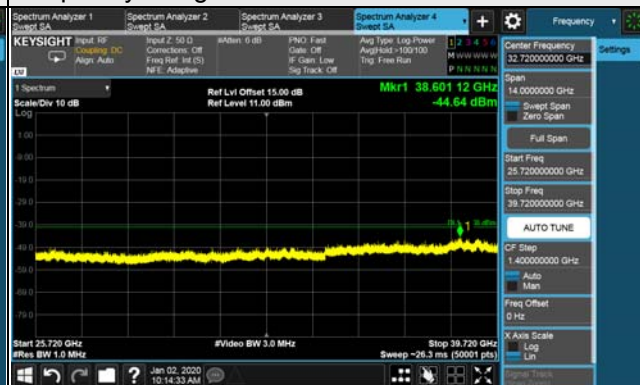
Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz

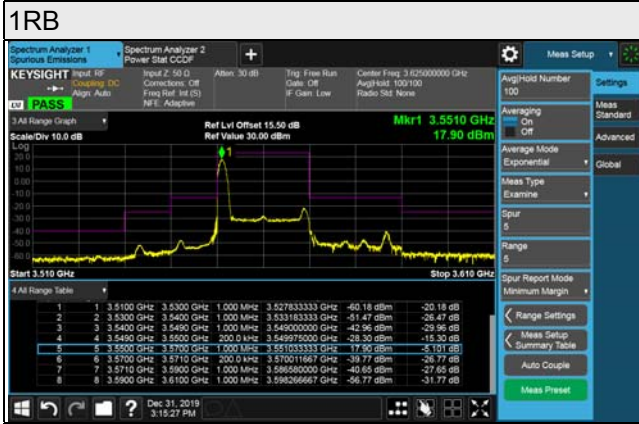


Frequency Range : 26.5GHz~40GHz

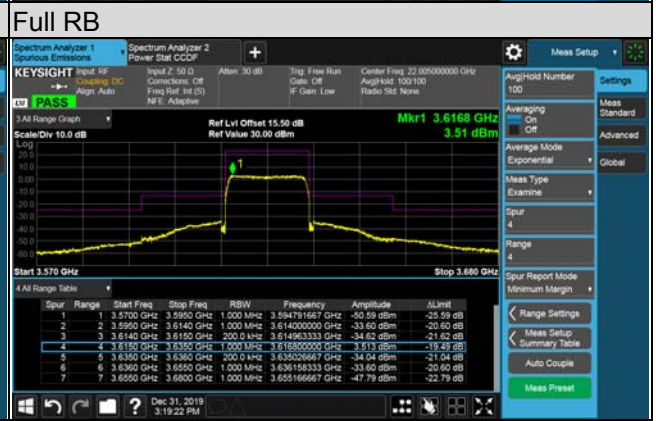
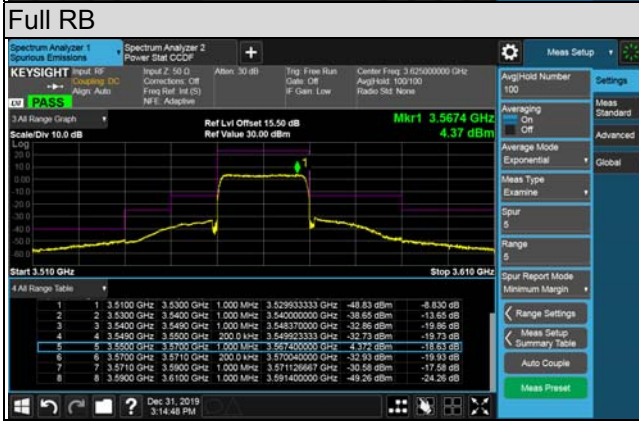
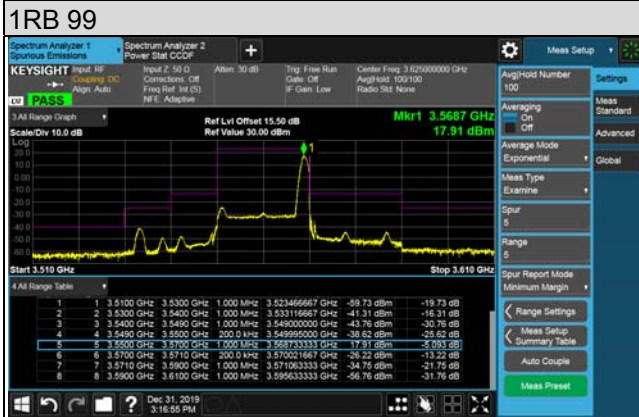
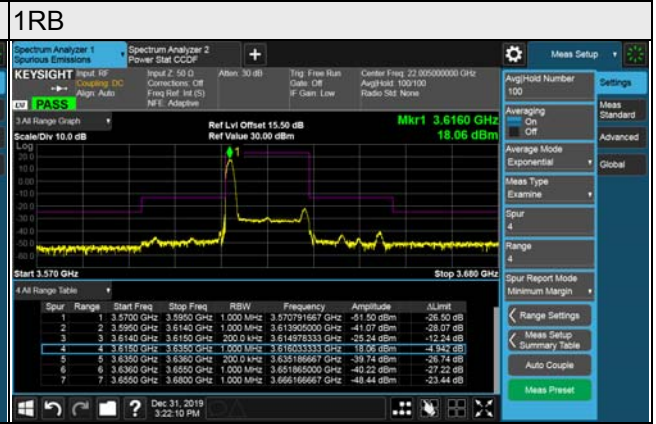


LTE Band 48, Channel Bandwidth 20MHz

Channel 55340 (3560.0MHz)



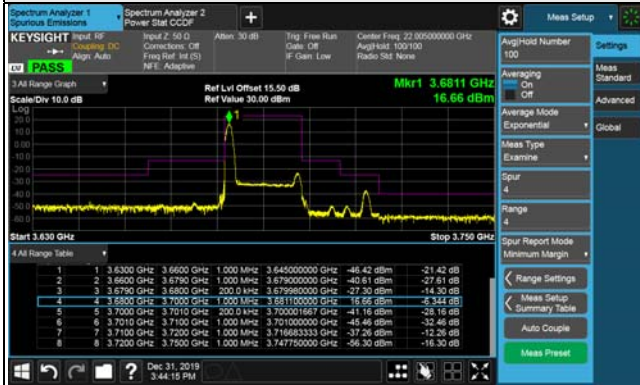
Channel 55990 (3625.0MHz)



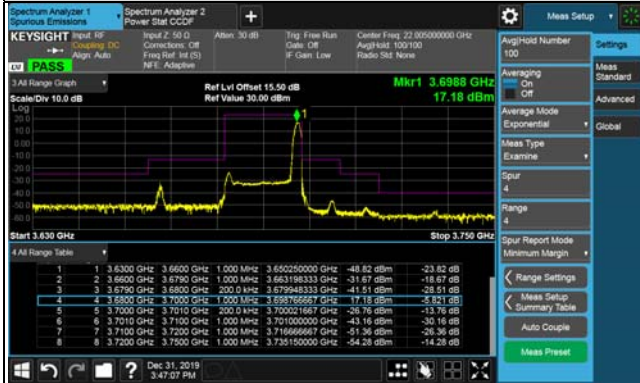
LTE Band 48, Channel Bandwidth 20MHz

Channel 56640 (3690.0MHz)

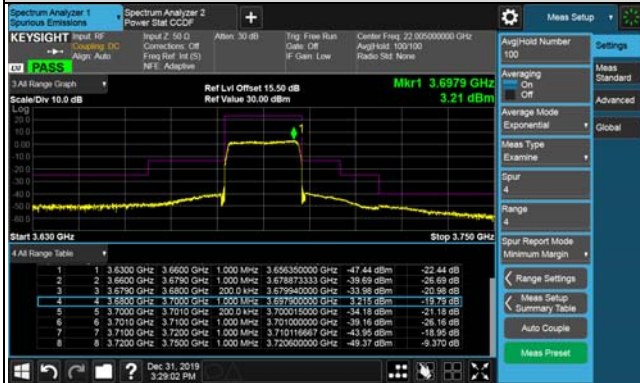
1RB



1RB 99



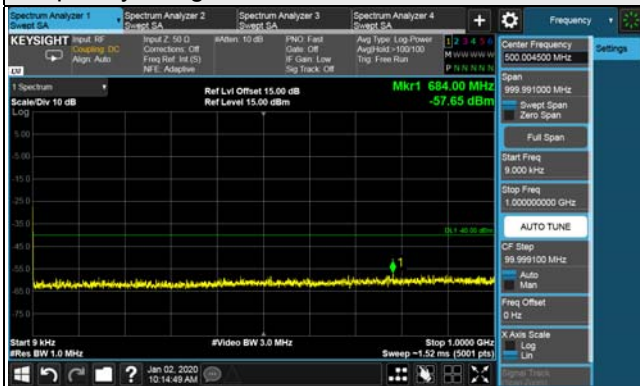
Full RB



LTE Band 48, Channel Bandwidth 20MHz

Channel 55340 (3560.0MHz)

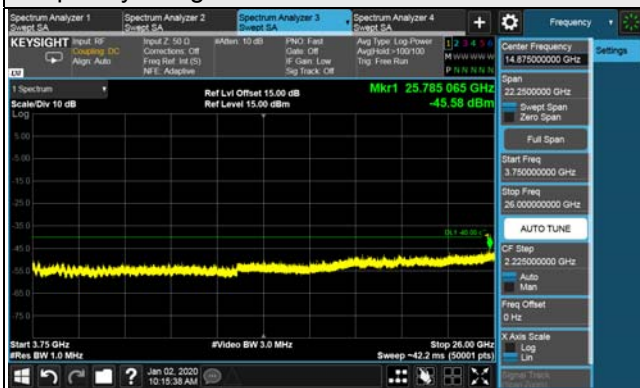
Frequency Range : 9kHz~1GHz



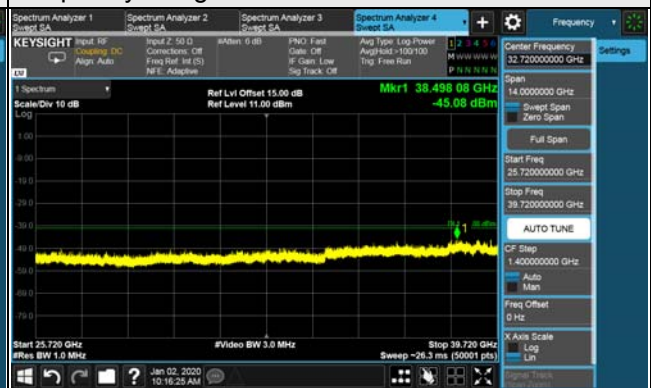
Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



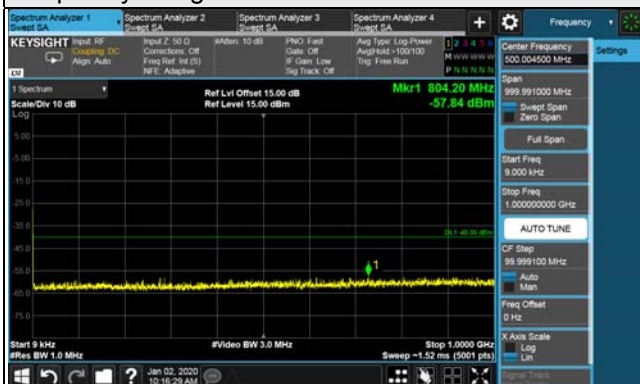
Frequency Range : 26.5GHz~40GHz



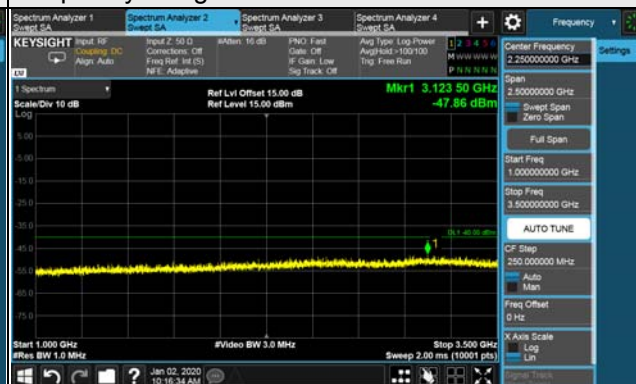
LTE Band 48, Channel Bandwidth 20MHz

Channel 55990 (3625.0MHz)

Frequency Range : 9kHz~1GHz



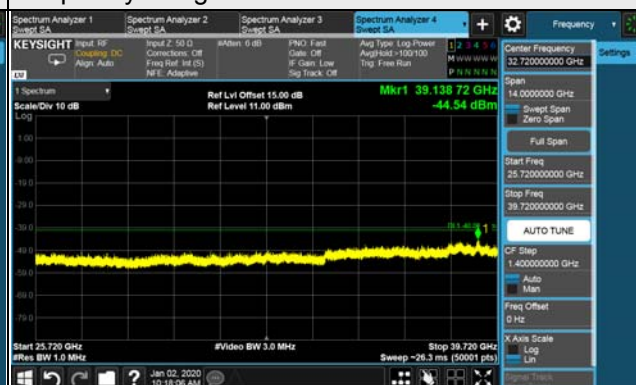
Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



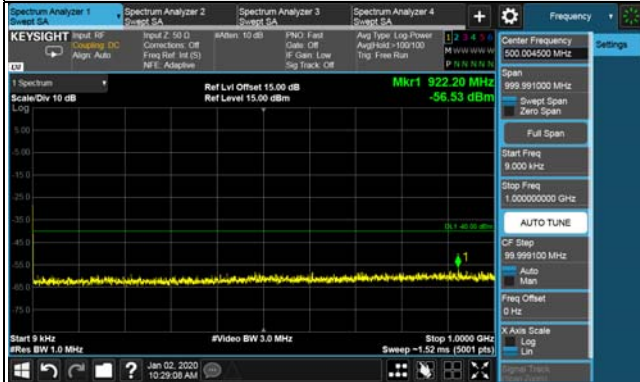
Frequency Range : 26.5GHz~40GHz



LTE Band 48, Channel Bandwidth 20MHz

Channel 56640 (3690.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3.5GHz



Frequency Range : 3.75GHz~26.5GHz



Frequency Range : 26.5GHz~40GHz



4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz .

4.7.2 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.7.3 Test Procedures

- a. Substitution method is used for EIRP measurement. In the semi-anechoic chamber, EUT placed on the 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- c. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. ERP power can be calculated form EIRP power by subtracting the gain of dipole, $\text{ERP power} = \text{EIRP power} - 2.15\text{dBi}$.

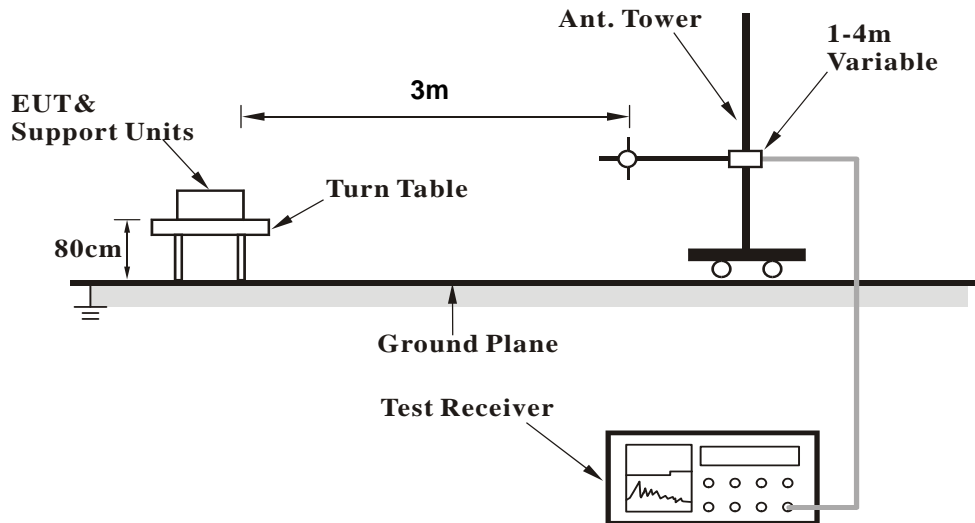
Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.4 Deviation from Test Standard

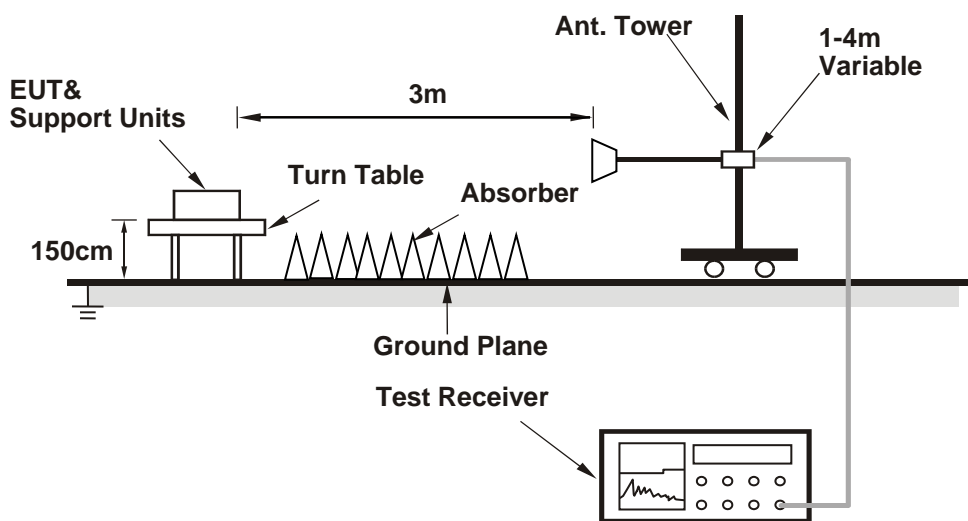
No deviation.

4.7.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.6 Test Results

Test was done with 50ohm terminator on antenna port.

Below 1GHz Data :

LTE Band 48

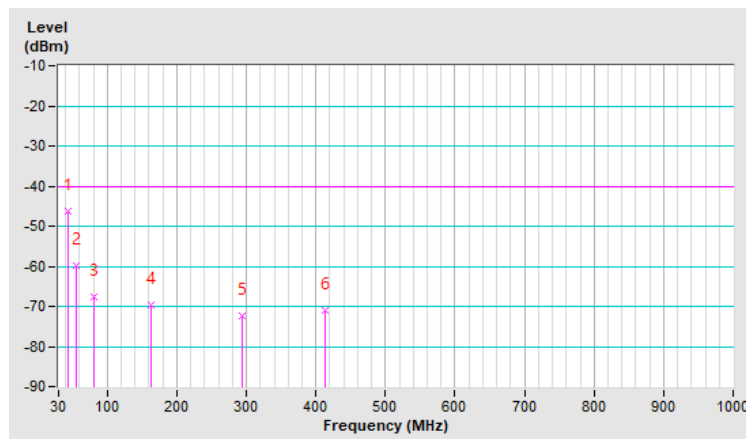
Channel Bandwidth: 5 MHz / QPSK

| | | | |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode | TX channel 55265 (3552.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 44.55 | -47.7 | -35.5 | -10.9 | -46.4 | -40.0 | -6.4 |
| 2 | 55.22 | -57.3 | -54.5 | -5.4 | -59.9 | -40.0 | -19.9 |
| 3 | 81.41 | -62.5 | -68.1 | 0.5 | -67.6 | -40.0 | -27.6 |
| 4 | 162.89 | -63.8 | -66.7 | -2.9 | -69.6 | -40.0 | -29.6 |
| 5 | 293.84 | -69.1 | -70.5 | -1.8 | -72.3 | -40.0 | -32.3 |
| 6 | 414.12 | -71.0 | -74.5 | 3.4 | -71.1 | -40.0 | -31.1 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

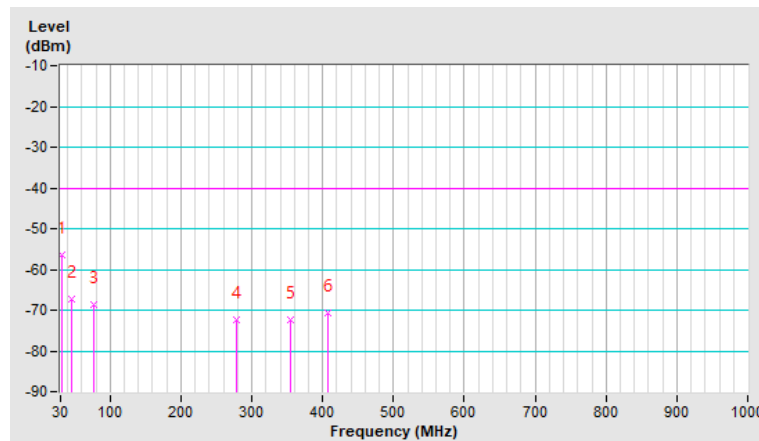


| | | | |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode | TX channel 55265 (3552.5MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 31.94 | -46.0 | -38.2 | -18.3 | -56.5 | -40.0 | -16.5 |
| 2 | 45.52 | -59.0 | -56.9 | -10.4 | -67.3 | -40.0 | -27.3 |
| 3 | 76.56 | -63.1 | -69.1 | 0.3 | -68.8 | -40.0 | -28.8 |
| 4 | 279.29 | -75.8 | -70.9 | -1.6 | -72.5 | -40.0 | -32.5 |
| 5 | 353.98 | -72.1 | -76.4 | 3.9 | -72.5 | -40.0 | -32.5 |
| 6 | 408.30 | -70.1 | -73.9 | 3.2 | -70.7 | -40.0 | -30.7 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



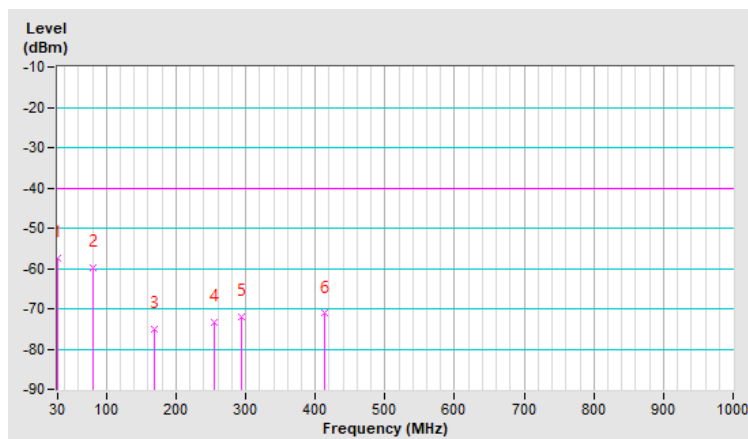
Channel Bandwidth: 20 MHz / QPSK

| | | | |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode | TX channel 55340 (3560.0MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 30.00 | -61.3 | -37.9 | -19.4 | -57.3 | -40.0 | -17.3 |
| 2 | 80.44 | -54.8 | -60.2 | 0.5 | -59.7 | -40.0 | -19.7 |
| 3 | 168.71 | -68.2 | -72.2 | -2.8 | -75.0 | -40.0 | -35.0 |
| 4 | 254.07 | -68.0 | -72.1 | -1.4 | -73.5 | -40.0 | -33.5 |
| 5 | 294.81 | -68.9 | -70.2 | -1.8 | -72.0 | -40.0 | -32.0 |
| 6 | 414.12 | -71.1 | -74.6 | 3.4 | -71.2 | -40.0 | -31.2 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



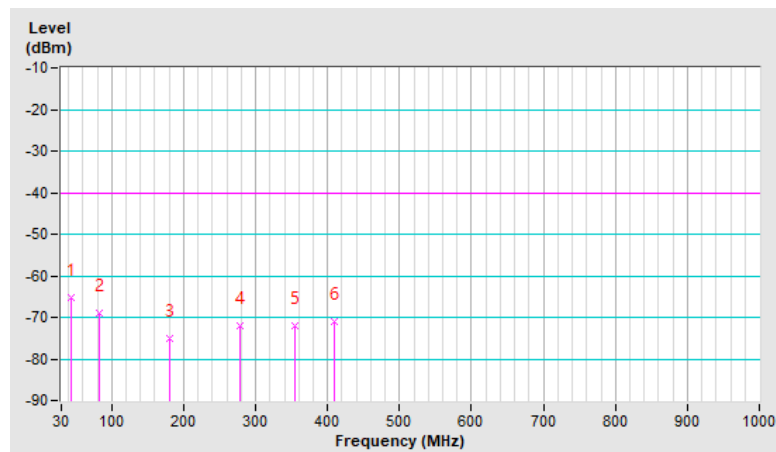
| | | | |
|--------------------------|---------------------------------|-----------------|----------------|
| Mode | TX channel 55340 (3560.0MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1 | 44.55 | -56.7 | -54.2 | -10.9 | -65.1 | -40.0 | -25.1 |
| 2 | 82.38 | -64.5 | -69.4 | 0.4 | -69.0 | -40.0 | -29.0 |
| 3 | 180.35 | -71.7 | -72.2 | -2.9 | -75.1 | -40.0 | -35.1 |
| 4 | 279.29 | -75.5 | -70.6 | -1.6 | -72.2 | -40.0 | -32.2 |
| 5 | 353.98 | -71.5 | -75.8 | 3.9 | -71.9 | -40.0 | -31.9 |
| 6 | 409.27 | -70.5 | -74.2 | 3.2 | -71.0 | -40.0 | -31.0 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz

LTE Band 48, Channel Bandwidth 5MHz

| | | | |
|--------------------------|---------------------------------|-----------------|--------------|
| Mode | TX channel 55265 (3552.5MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7105.00 | -59.0 | -40.9 | 0.7 | -40.2 | -40.0 | -0.2 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | |
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7105.00 | -58.7 | -41.0 | 0.7 | -40.3 | -40.0 | -0.3 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

| | | | |
|--------------------------|---------------------------------|-----------------|--------------|
| Mode | TX channel 55990 (3625.0MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7250.00 | -65.0 | -47.2 | 0.9 | -46.3 | -40.0 | -6.3 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | |
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7250.00 | -62.6 | -44.7 | 0.9 | -43.8 | -40.0 | -3.8 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

| | | | |
|--------------------------|---------------------------------|-----------------|--------------|
| Mode | TX channel 56715 (3697.5MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7395.00 | -68.8 | -50.2 | 0.9 | -49.3 | -40.0 | -9.3 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | |
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7395.00 | -64.4 | -46.7 | 0.9 | -45.8 | -40.0 | -5.8 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 48, Channel Bandwidth 20MHz

| | | | |
|--------------------------|---------------------------------|-----------------|--------------|
| Mode | TX channel 55340 (3560.0MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1 | 7120.00 | -59.4 | -41.4 | 0.7 | -40.7 | -40.0 | -0.7 |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1 | 7120.00 | -59.0 | -41.3 | 0.7 | -40.6 | -40.0 | -0.6 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

| | | | |
|--------------------------|----------------------------------|-----------------|--------------|
| Mode | TX channel 55990 (3625.00MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

Antenna Polarity & Test Distance: Horizontal at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1 | 7250.00 | -65.4 | -47.6 | 0.9 | -46.7 | -40.0 | -6.7 |

Antenna Polarity & Test Distance: Vertical at 3 M

| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|-----|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| 1 | 7250.00 | -63.2 | -45.3 | 0.9 | -44.4 | -40.0 | -4.4 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

| | | | |
|--------------------------|----------------------------------|-----------------|--------------|
| Mode | TX channel 56640 (3690.00MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 22deg. C, 66%RH | Input Power | 120Vac, 60Hz |
| Tested By | Han Wu | | |

| Antenna Polarity & Test Distance: Horizontal at 3 M | | | | | | | |
|---|-------------|---------------|-----------------------|------------------------|------------|-------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7380.00 | -69.5 | -51.0 | 0.9 | -50.1 | -40.0 | -10.1 |
| Antenna Polarity & Test Distance: Vertical at 3 M | | | | | | | |
| No. | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 1 | 7380.00 | -65.4 | -47.7 | 0.9 | -46.8 | -40.0 | -6.8 |

Remarks:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---