# CERTIFICATION TEST REPORT

**Report Number. :** 4790406782-E1V3

| | | |
|---|---|---|
| **Applicant** | : | SAMSUNG ELECTRONICS CO., LTD.<br>129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,<br>GYEONGGI-DO, 16677, KOREA |
| **Model** | : | SM-A236M/DSN, SM-A236M/N |
| **FCC ID** | : | A3LSMA236MN |
| **EUT Description** | : | GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC. |
| **Test Standard(s)** | : | FCC 47 CFR PART 15 SUBPART B |

**Date Of Issue:**
2022-07-13

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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V1 | 2022-07-01 | Initial issue | Yeonhee Lim |
| V2 | 2022-07-11 | Updated to address TCB's question | Yeonhee Lim |
| V3 | 2022-07-13 | Updated to address TCB's question | Yeonhee Lim |


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# 1. ATTESTATION OF TEST RESULTS

| | |
|---|---|
| **COMPANY NAME:** | SAMSUNG ELECTRONICS CO., LTD. |
| **EUT DESCRIPTION:** | GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC. |
| **MODEL NUMBER:** | SM-A236M/DSN, SM-A236M/N |
| **SERIAL NUMBER:** | R3CT506TWAN (RADIATED) |
| **DATE TESTED:** | 2022-06-13 ~ 2022-06-28; |

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| FCC PART 15B | Complies |

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

Seokhwan Hong
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Yeonhee Lim
Suwon Lab Engineer
UL Korea, Ltd.

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. ANSI C63.4-2014

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 218 Maeyeong-ro |
|---|
| ☒ Chamber 1(3m semi-anechoic chamber) |
| ☒ Chamber 2(3m semi-anechoic chamber) |
| ☐ Chamber 3(3m semi-anechoic chamber) |
| ☐ Chamber 4(3m Full-anechoic chamber) |
| ☐ Chamber 5(3m Full-anechoic chamber) |

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

28.9 dBuV/m = 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Conducted Disturbance, 0.15 to 30 MHz | 3.02 dB |
| Radiated Disturbance, 30 MHz to 1 GHz | 4.05 dB |
| Radiated Disturbance, 1 GHz to 18 GHz | 5.78 dB |

Uncertainty figures are valid to a confidence level of 95%.

## 4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2007.

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.
This test report addresses the WWAN operational mode.

This report covers the Samsung models SM-A236M/DSN, SM-A236M/N.
These models are identical in hardware except SM-A236M/DSN is supported dual SIM tray and SM-A236M/N has single SIM tray.

All series model was same hardware thus, SM-A236M/DSN was set for final test.

## 5.2. TEST MODE

| Mode | RX Frequency range (MHz) | Description |
|---|---|---|
| GSM850 | 869.2 – 893.8 | Communicating with Call simulator(CMW500) |
| WCDMA BAND 5 | 869 – 894 | Communicating with Call simulator(CMW500) |
| LTE BAND 12 | 729 – 746 | Communicating with Call simulator(CMW500) |
| LTE BAND 13 | 746 – 756 | Communicating with Call simulator(CMW500) |
| LTE BAND 26 | 859 – 894 | Communicating with Call simulator(CMW500) |


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## 5.3. WORST-CASE ORIENTATION AND MODE

The fundamental and radiated spurious emission were investigated in three orthogonal orientations X and Y, it was determined that below orientation was worst-case orientation for each band.

i. Worst Axis Condition

| Band | Worst Case | | |
|---|---|---|---|
| | X | Y | Z |
| GSM 850 | - | - | O |
| WCDMA B5 | - | - | O |
| LTE B12 | - | - | O |
| LTE B13 | - | - | O |
| LTE B26 | - | - | O |

**WCDMA Band5**
WCDMA Band 5(Rx Frequncy range: 869-894 MHz) is covered by GSM 850(Rx Frequency range: 869-894 MHz) due to same frequency range and maximum tune-up limit is higher than WCDMA Band5. Therefore, only Mid channel was checked.

**LTE Band 5**
LTE Band 5(Rx Frequency range: 869-894 MHz) is covered by LTE Band 26(Rx Frequency range: 859-894 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**LTE Band 17**
LTE Band 17(Rx Frequency range: 734-746 MHz) is covered by LTE Band 12(Rx Frequency range: 729-746 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

**5G NR Band n5**
5G NR BAND n5 (Rx Frequncy range: 869-894 MHz) is covered by GSM 850(Rx Frequency range: 869-894 MHz) due to same frequency range and maximum tune-up limit is higher than 5G NR BAND n5.

Note : The EUT is continuously communicated with the call box during the tests. Also attached with travel adapter for the worst case condition.

## 5.4. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacture** | **Model** | **Serial Number** | **FCC ID** |
| Charger | SAMSUNG | EP-TA800 | R37MANQ1E72SE3 | N/A |
| Data Cable | SAMSUNG | EP-DN980 | GH39-02115A BWE | N/A |
| Earphone | SAMSUNG | GH59-15055A | EHS64AVFWE | N/A |

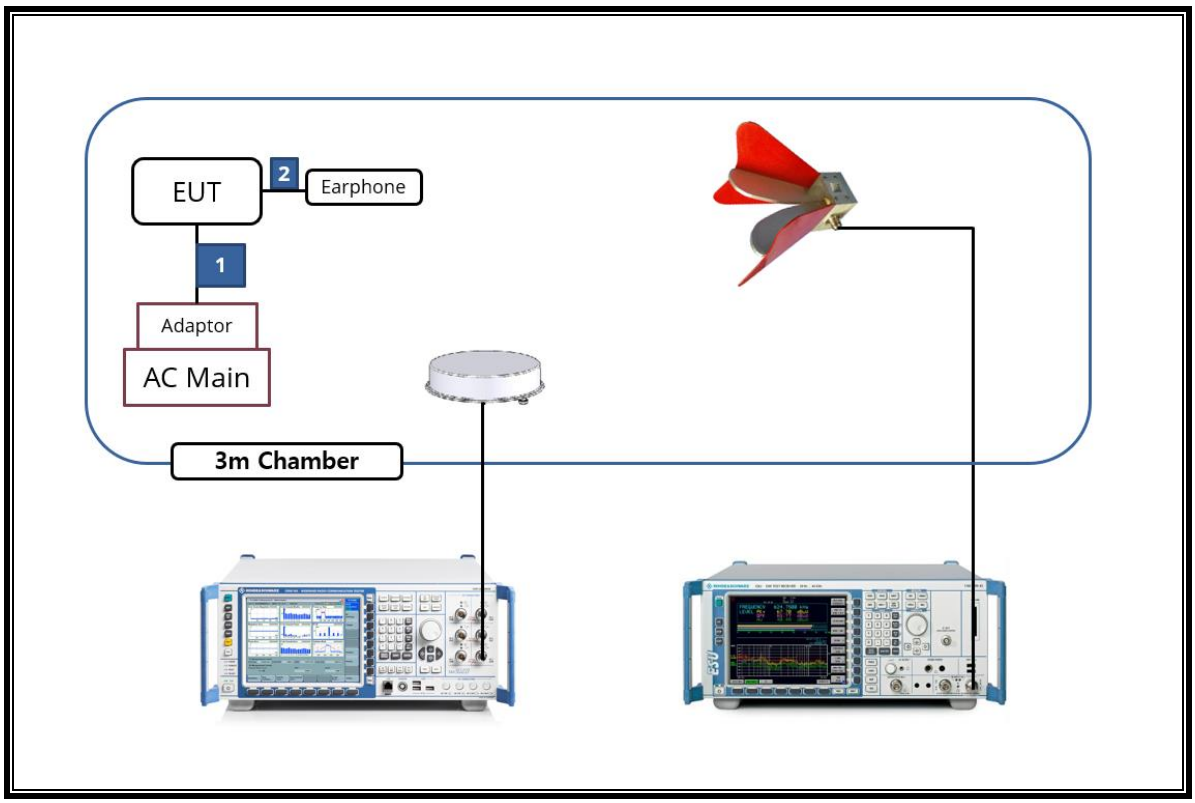
**I/O CABLE**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | DC Power | 1 | C Type | Shielded | 1.0 m | N/A |
| 2 | Audio | 2 | Mini-Jack | Unshielded | 0.7 m | N/A |

**TEST SETUP**

The EUT is continuously communicated with the call box during the tests.

**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Test Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **S/N** | **Cal Due** |
| Antenna, Tuned Dipole 400~1000 MHz | ETS | 3121D DB4 | 00164753 | 2023-02-08 |
| Directional Antenna | Cobham | FPA3-0.8-6.0R/1329 | 110367-0003 | N/A |
| Directional Antenna | Cobham | FPA3-0.8-6.0R/1329 | 80108-0004 | N/A |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 750 | 2022-08-19 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 845 | 2022-08-13 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 749 | 2022-08-13 |
| Antenna, Horn, 18 GHz | ETS | 3115 | 00167211 | 2022-07-27 |
| Antenna, Horn, 18 GHz | ETS | 3115 | 00161451 | 2022-08-15 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168724 | 2022-07-27 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168717 | 2022-08-15 |
| Communications Test Set | R&S | CMW500 | 169796 | 2023-01-07 |
| DC Power Supply | Agilent / HP | E3640A | MY54226395 | 2022-08-02 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 341282 | 2022-08-02 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 370599 | 2022-08-02 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 351741 | 2022-08-02 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1876511 | 2022-08-02 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 2029168 | 2022-08-02 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1896138 | 2022-08-02 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54170614 | 2022-08-04 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54490312 | 2022-08-04 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100439 | 2022-08-02 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100457 | 2022-08-02 |
| High Pass Filter 1.2GHz | Micro-Tronics | HPM50108-02 | G005 | 2022-08-03 |
| High Pass Filter 1.2GHz | Micro-Tronics | HPM50108-02 | G006 | 2022-08-02 |
| High Pass Filter 2.8GHz | Micro-Tronics | HPM50111-02 | 010 | 2022-08-03 |
| High Pass Filter 2.8GHz | Micro-Tronics | HPM50111-02 | 011 | 2022-08-02 |
| High Pass Filter 4GHz | Micro-Tronics | HPM50118-02 | G001 | 2022-08-03 |
| High Pass Filter 4GHz | Micro-Tronics | HPM50118-02 | G002 | 2022-08-02 |
| Attenuator | PASTERNACK | PE7087-10 | A009 | 2022-08-03 |
| Attenuator | PASTERNACK | PE7087-10 | A001 | 2022-08-03 |
| Attenuator | PASTERNACK | PE7087-10 | A008 | 2022-08-03 |
| Attenuator | PASTERNACK | PE7004-10 | 2 | 2022-08-02 |
| Attenuator | PASTERNACK | PE7395-10 | A011 | 2022-08-03 |
| Temperature Chamber | ESPEC | SH-642 | 93001109 | 2022-08-02 |
| Power Splitter | MINI-CIRCUITS | WA1534 | UL003 | 2023-01-11 |
| Power Splitter | MINI-CIRCUITS | WA1534 | UL004 | 2023-01-11 |
| **UL Software** | | | | |
| **Description** | **Manufacturer** | **Model** | **Version** | |
| Antenna port test software | UL | CLT | Ver 3.4 | |
| Radiated software | UL | UL EMC | Ver 9.5 | |

# 7. APPLICABLE LIMITS AND TEST RESULTS

## 7.1. RADIATED EMISSIONS

**TEST PROCEDURE**

ANSI C63.4-2014

**LIMIT**

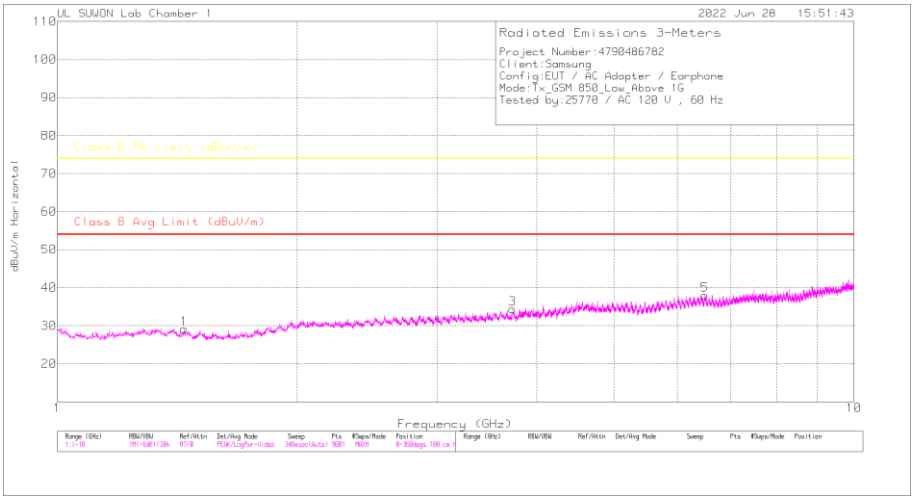
§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Limits for radiated disturbance of Class B ITE at measuring distance of 3 m | |
|---|---|
| Frequency range (MHz) | Quasi-peak limits (dBµV/m) |
| 30 to 88 | 40 |
| 88 to 216 | 43.5 |
| 216 to 960 | 46 |
| Above 960 MHz | 54 |
| Note: The lower limit shall apply at the transition frequency. | |

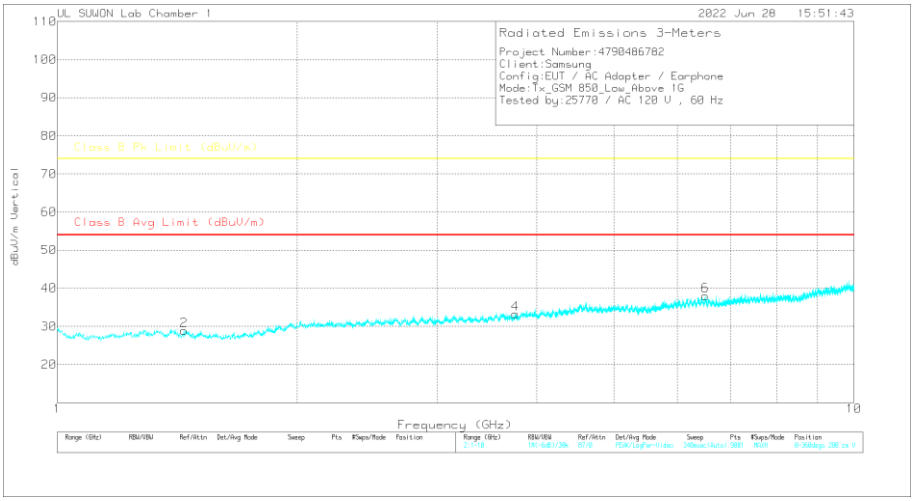
## 7.1.1. Above 1 GHz in the GSM850

**LOW CHANNEL(869.2 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

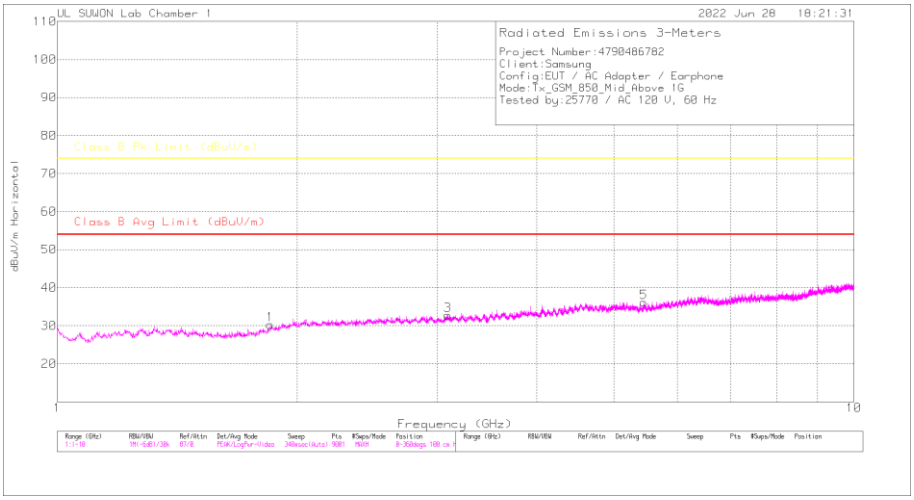
Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Margin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.443 | 42.98 | Pk | 29.2 | -36.8 | .8 | 36.18 | - | - | 74 | -37.82 | 0 | 100 | H |
| 1.443 | 30.67 | Ca | 29.2 | -36.8 | .8 | 23.87 | 54 | -30.13 | - | - | 0 | 100 | H |
| 1.442 | 42.68 | Pk | 29.2 | -36.8 | .8 | 35.88 | - | - | 74 | -38.12 | 0 | 100 | V |
| 1.442 | 30.66 | Ca | 29.2 | -36.8 | .8 | 23.86 | 54 | -30.14 | - | - | 0 | 100 | V |
| 3.728 | 41.4 | Pk | 33 | -33.2 | .3 | 41.5 | - | - | 74 | -32.5 | 0 | 100 | H |
| 3.728 | 28.8 | Ca | 33 | -33.2 | .3 | 28.9 | 54 | -25.1 | - | - | 0 | 100 | H |
| 3.757 | 38.78 | Pk | 33.1 | -33.1 | .4 | 39.18 | - | - | 74 | -34.82 | 0 | 100 | V |
| 3.757 | 26.71 | Ca | 33.1 | -33.1 | .4 | 27.11 | 54 | -26.89 | - | - | 0 | 100 | V |
| 6.495 | 39.35 | Pk | 35.4 | -29.4 | .6 | 45.95 | - | - | 74 | -28.05 | 0 | 100 | H |
| 6.495 | 26.63 | Ca | 35.4 | -29.4 | .6 | 33.23 | 54 | -20.77 | - | - | 0 | 100 | H |
| 6.503 | 39.08 | Pk | 35.4 | -29.3 | .6 | 45.78 | - | - | 74 | -28.22 | 0 | 100 | V |
| 6.503 | 26.92 | Ca | 35.4 | -29.3 | .6 | 33.62 | 54 | -20.38 | - | - | 0 | 100 | V |

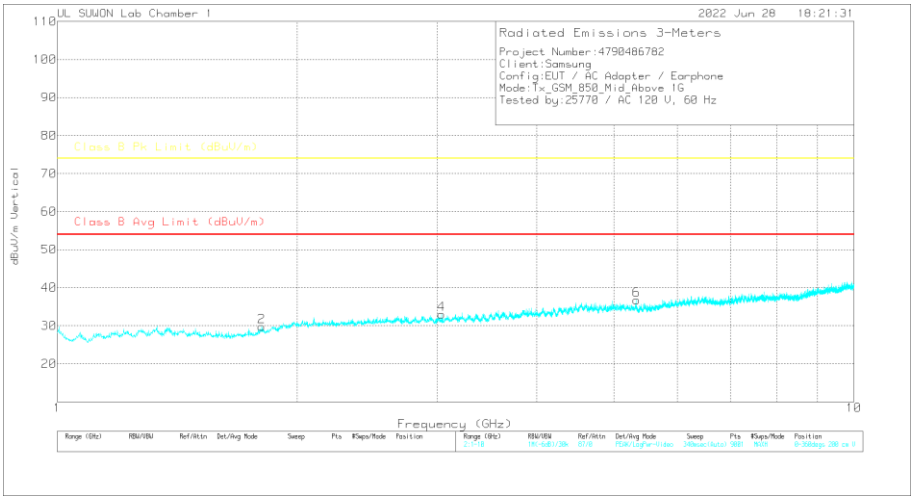
Pk - Peak detector
Ca - CISPR average detection

**MID CHANNEL(881.6 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

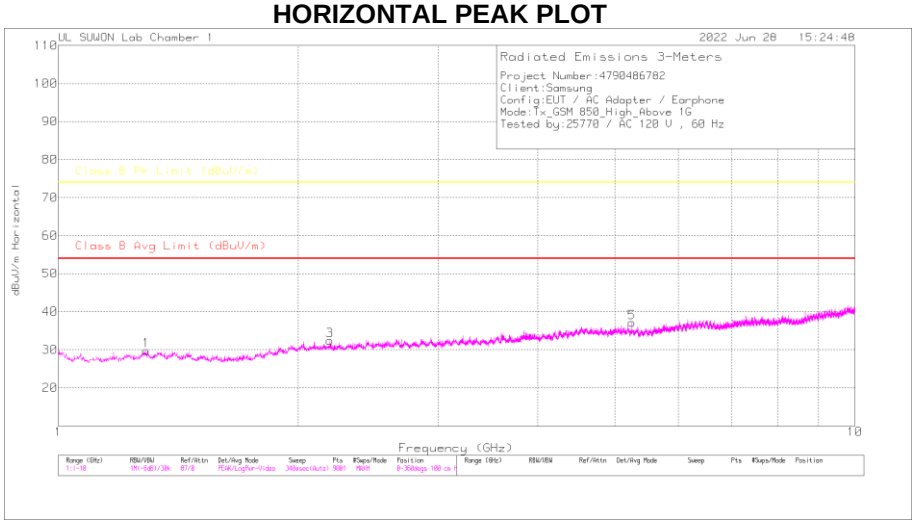
Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Marg in (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.851 | 42.22 | Pk | 30.2 | -36 | .6 | 37.02 | - | - | 74 | -36.98 | 360 | 100 | H |
| 1.851 | 30.14 | Ca | 30.2 | -36 | .6 | 24.94 | 54 | -29.06 | - | - | 360 | 100 | H |
| 1.806 | 42.45 | Pk | 29.6 | -36.2 | .6 | 36.45 | - | - | 74 | -37.55 | 360 | 100 | V |
| 1.806 | 30.44 | Ca | 29.6 | -36.2 | .6 | 24.44 | 54 | -29.56 | - | - | 360 | 100 | V |
| 3.09 | 40.88 | Pk | 32.5 | -33.8 | .6 | 40.18 | - | - | 74 | -33.82 | 360 | 100 | H |
| 3.09 | 28.44 | Ca | 32.5 | -33.8 | .6 | 27.74 | 54 | -26.26 | - | - | 360 | 100 | H |
| 3.036 | 39.82 | Pk | 32.4 | -33.8 | .4 | 38.82 | - | - | 74 | -35.18 | 360 | 100 | V |
| 3.036 | 27.94 | Ca | 32.4 | -33.8 | .4 | 26.94 | 54 | -27.06 | - | - | 360 | 100 | V |
| 5.447 | 38.92 | Pk | 34.5 | -31.2 | .5 | 42.72 | - | - | 74 | -31.28 | 360 | 100 | H |
| 5.447 | 26.86 | Ca | 34.5 | -31.2 | .5 | 30.66 | 54 | -23.34 | - | - | 360 | 100 | H |
| 5.335 | 40.94 | Pk | 34.5 | -31.4 | .4 | 44.44 | - | - | 74 | -29.56 | 360 | 100 | V |
| 5.335 | 27.62 | Ca | 34.5 | -31.4 | .4 | 31.12 | 54 | -22.88 | - | - | 360 | 100 | V |

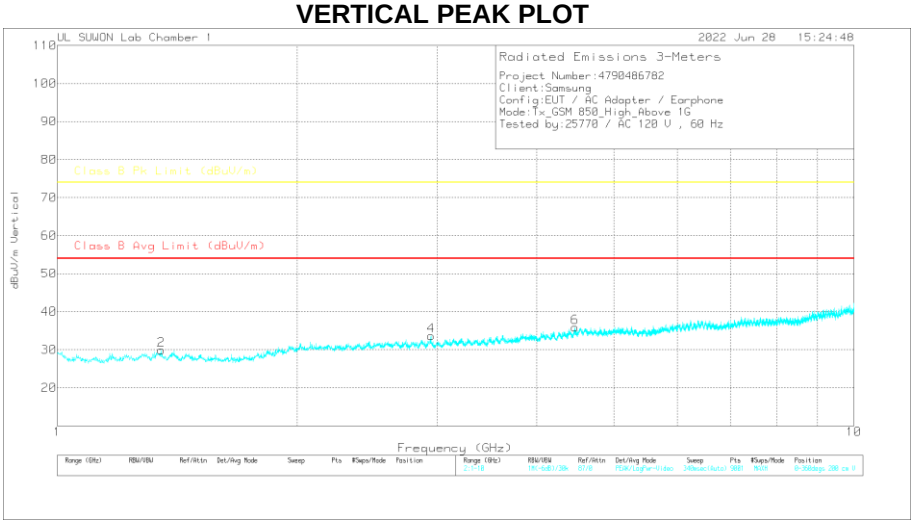
Pk - Peak detector
Ca - CISPR average detection

**HIGH CHANNEL(893.8 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

## Radiated Emissions

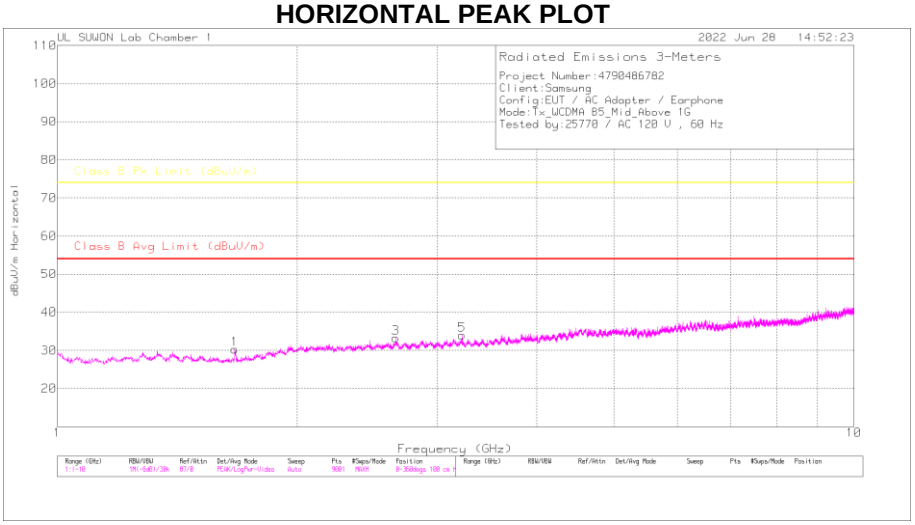
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Marg in (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.289 | 43.27 | Pk | 29.3 | -37.2 | 1 | 36.37 | - | - | 74 | -37.63 | 0 | 100 | H |
| 1.289 | 31.32 | Ca | 29.3 | -37.2 | 1 | 24.42 | 54 | -29.58 | - | - | 0 | 100 | H |
| 1.351 | 42.78 | Pk | 29.5 | -37 | .9 | 36.18 | - | - | 74 | -37.82 | 0 | 100 | V |
| 1.351 | 30.87 | Ca | 29.5 | -37 | .9 | 24.27 | 54 | -29.73 | - | - | 0 | 100 | V |
| 2.194 | 42.08 | Pk | 31.5 | -35.4 | .6 | 38.78 | - | - | 74 | -35.22 | 0 | 100 | H |
| 2.194 | 29.58 | Ca | 31.5 | -35.4 | .6 | 26.28 | 54 | -27.72 | - | - | 0 | 100 | H |
| 2.945 | 40.27 | Pk | 32.3 | -34 | .7 | 39.27 | - | - | 74 | -34.73 | 0 | 100 | V |
| 2.945 | 28.59 | Ca | 32.3 | -34 | .7 | 27.59 | 54 | -26.41 | - | - | 0 | 100 | V |
| 5.251 | 39.38 | Pk | 34.4 | -31.4 | .5 | 42.88 | - | - | 74 | -31.12 | 0 | 100 | H |
| 5.251 | 27.5 | Ca | 34.4 | -31.4 | .5 | 31 | 54 | -23 | - | - | 0 | 100 | H |
| 4.467 | 39.82 | Pk | 34.2 | -32.2 | .5 | 42.32 | - | - | 74 | -31.68 | 0 | 100 | V |
| 4.467 | 28.21 | Ca | 34.2 | -32.2 | .5 | 30.71 | 54 | -23.29 | - | - | 0 | 100 | V |

Pk - Peak detector
Ca - CISPR average detection

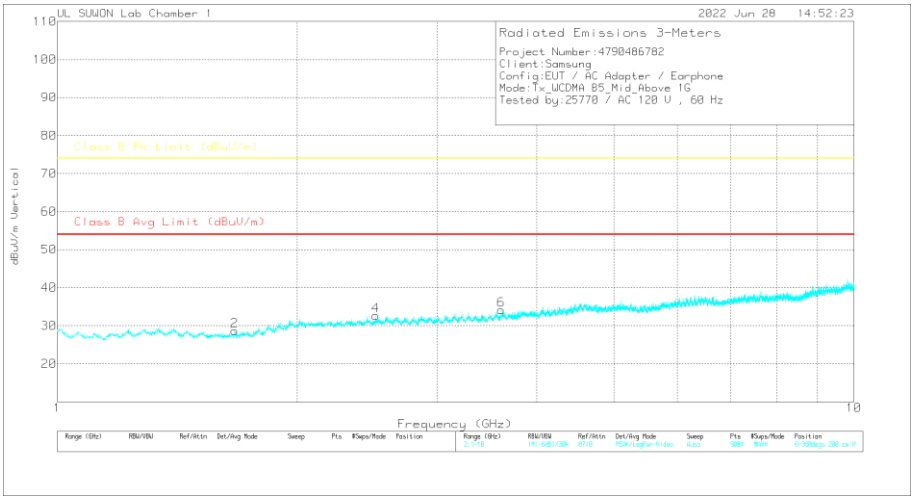
## 7.1.2. Above 1 GHz in the WCDMA Band 5

**MID CHANNEL(881.6 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Radiated Emissions

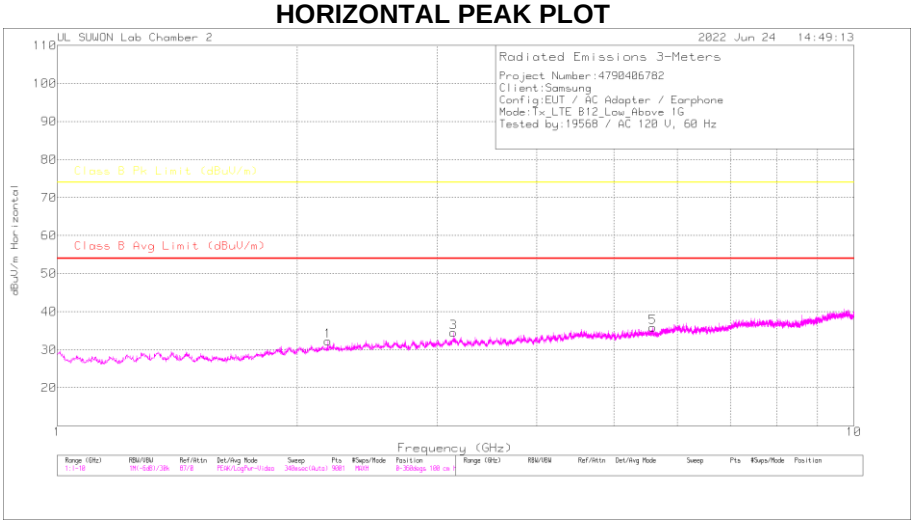
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Marg in (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.671 | 43.71 | Pk | 28.5 | -36.4 | .7 | 36.51 | - | - | 74 | -37.49 | 0 | 100 | H |
| 1.671 | 31.18 | Ca | 28.5 | -36.4 | .7 | 23.98 | 54 | -30.02 | - | - | 0 | 100 | H |
| 1.671 | 42.79 | Pk | 28.5 | -36.4 | .7 | 35.59 | - | - | 74 | -38.41 | 0 | 100 | V |
| 1.671 | 30.72 | Ca | 28.5 | -36.4 | .7 | 23.52 | 54 | -30.48 | - | - | 0 | 100 | V |
| 2.659 | 41.12 | Pk | 32.1 | -34.5 | .8 | 39.52 | - | - | 74 | -34.48 | 0 | 100 | H |
| 2.659 | 29.09 | Ca | 32.1 | -34.5 | .8 | 27.49 | 54 | -26.51 | - | - | 0 | 100 | H |
| 2.512 | 41.05 | Pk | 32 | -34.7 | .7 | 39.05 | - | - | 74 | -34.95 | 0 | 100 | V |
| 2.512 | 28.87 | Ca | 32 | -34.7 | .7 | 26.87 | 54 | -27.13 | - | - | 0 | 100 | V |
| 3.22 | 39.69 | Pk | 32.7 | -33.7 | .6 | 39.29 | - | - | 74 | -34.71 | 0 | 100 | H |
| 3.22 | 28.32 | Ca | 32.7 | -33.7 | .6 | 27.92 | 54 | -26.08 | - | - | 0 | 100 | H |
| 3.607 | 40.47 | Pk | 33.1 | -33.2 | .6 | 40.97 | - | - | 74 | -33.03 | 0 | 100 | V |
| 3.607 | 28.46 | Ca | 33.1 | -33.2 | .6 | 28.96 | 54 | -25.04 | - | - | 0 | 100 | V |

Pk - Peak detector
Ca - CISPR average detection

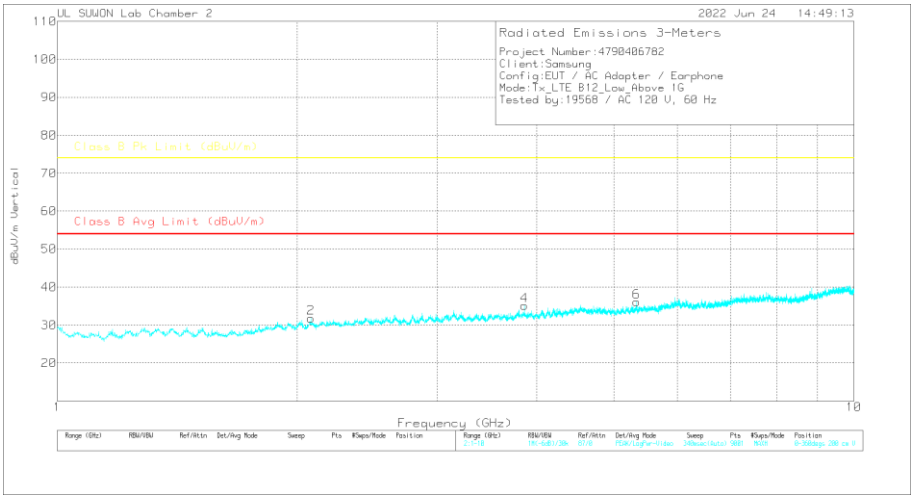
## 7.1.3. Above 1 GHz in the LTE Band 12

**LOW CHANNEL(731.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

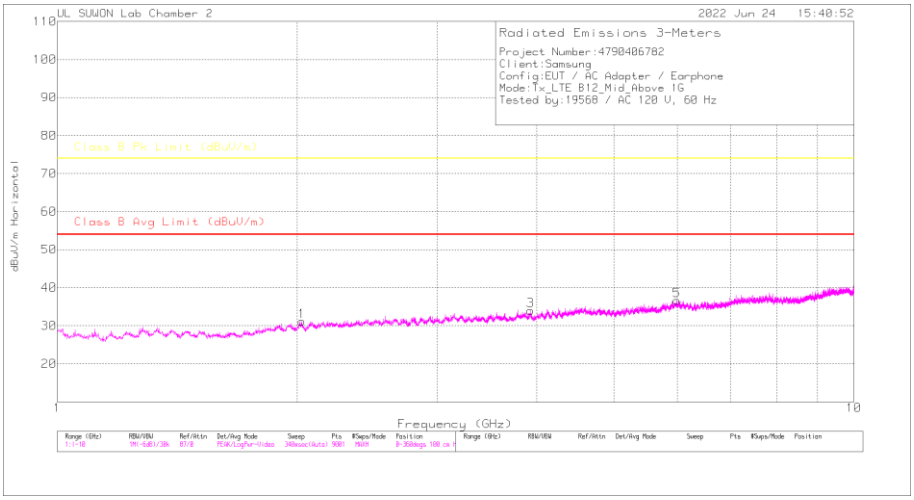
Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016872 4 | 1-18GHz[dB] | 1GHz HPF[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Mar gin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.186 | 35.49 | Pk | 31.7 | -30.4 | .7 | 37.49 | - | - | 74 | -36.51 | 360 | 100 | H |
| 2.186 | 23.99 | Ca | 31.7 | -30.4 | .7 | 25.99 | 54 | -28.01 | - | - | 360 | 100 | H |
| 2.082 | 36.9 | Pk | 31.5 | -30.5 | .6 | 38.5 | - | - | 74 | -35.5 | 360 | 100 | V |
| 2.082 | 24.64 | Ca | 31.5 | -30.5 | .6 | 26.24 | 54 | -27.76 | - | - | 360 | 100 | V |
| 3.143 | 35.96 | Pk | 33 | -29.6 | .7 | 40.06 | - | - | 74 | -33.94 | 360 | 100 | H |
| 3.143 | 24.14 | Ca | 33 | -29.6 | .7 | 28.24 | 54 | -25.76 | - | - | 360 | 100 | H |
| 3.859 | 36.11 | Pk | 33.4 | -29.2 | .6 | 40.91 | - | - | 74 | -33.09 | 360 | 100 | V |
| 3.859 | 24.12 | Ca | 33.4 | -29.2 | .6 | 28.92 | 54 | -25.08 | - | - | 360 | 100 | V |
| 5.594 | 35.34 | Pk | 34.6 | -27.9 | .5 | 42.54 | - | - | 74 | -31.46 | 360 | 100 | H |
| 5.594 | 22.97 | Ca | 34.6 | -27.9 | .5 | 30.17 | 54 | -23.83 | - | - | 360 | 100 | H |
| 5.335 | 36.24 | Pk | 34.5 | -28.4 | .5 | 42.84 | - | - | 74 | -31.16 | 360 | 100 | V |
| 5.335 | 23.96 | Ca | 34.5 | -28.4 | .5 | 30.56 | 54 | -23.44 | - | - | 360 | 100 | V |

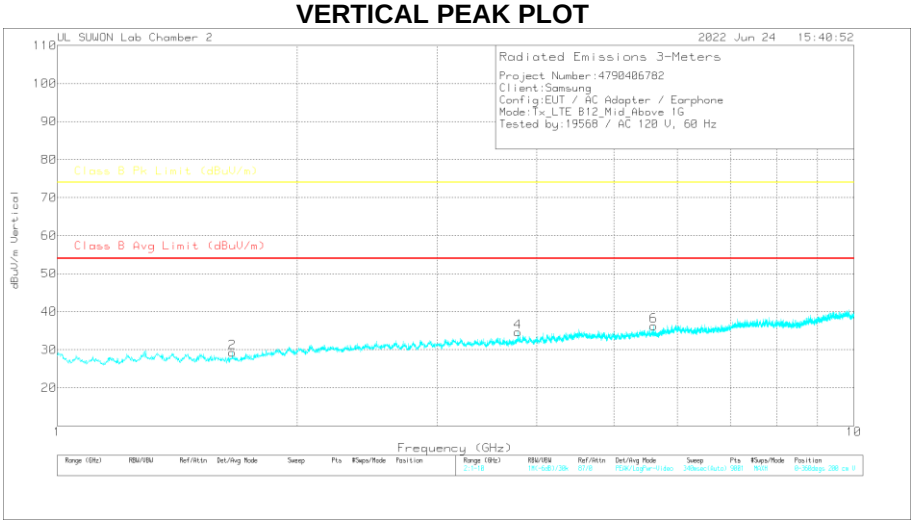
Pk - Peak detector
Ca - CISPR average detection

**MID CHANNEL(737.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

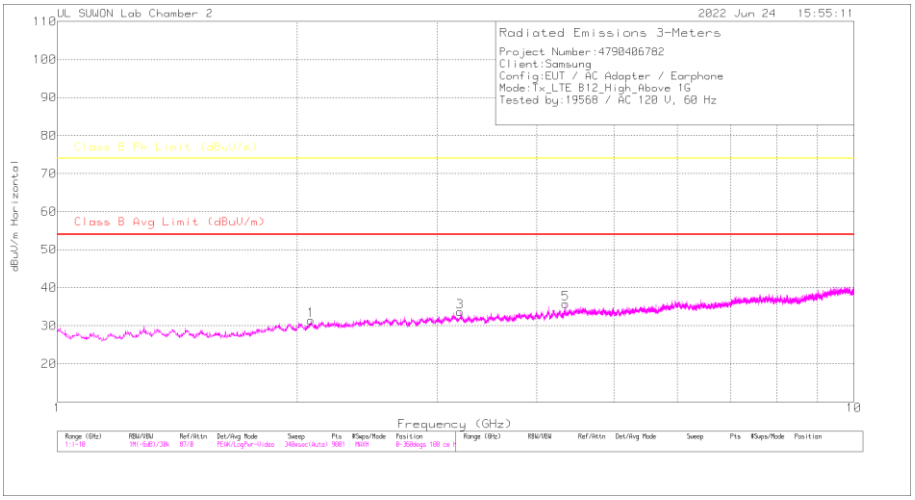
Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016872 4 | 1-18GHz[dB] | 1GHz HPF[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Mar gin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.029 | 36.35 | Pk | 31.3 | -30.6 | .5 | 37.55 | - | - | 74 | -36.45 | 360 | 100 | H |
| 2.029 | 24.54 | Ca | 31.3 | -30.6 | .5 | 25.74 | 54 | -28.26 | - | - | 360 | 100 | H |
| 1.659 | 38.84 | Pk | 28.6 | -31 | .8 | 37.24 | - | - | 74 | -36.76 | 360 | 100 | V |
| 1.659 | 25.26 | Ca | 28.6 | -31 | .8 | 23.66 | 54 | -30.34 | - | - | 360 | 100 | V |
| 3.927 | 35.84 | Pk | 33.5 | -29.5 | .6 | 40.44 | - | - | 74 | -33.56 | 360 | 100 | H |
| 3.927 | 24.22 | Ca | 33.5 | -29.5 | .6 | 28.82 | 54 | -25.18 | - | - | 360 | 100 | H |
| 3.787 | 36.25 | Pk | 33.3 | -29.3 | .5 | 40.75 | - | - | 74 | -33.25 | 360 | 100 | V |
| 3.787 | 24.37 | Ca | 33.3 | -29.3 | .5 | 28.87 | 54 | -25.13 | - | - | 360 | 100 | V |
| 5.991 | 35.61 | Pk | 35.1 | -27.5 | .5 | 43.71 | - | - | 74 | -30.29 | 360 | 100 | H |
| 5.991 | 23.47 | Ca | 35.1 | -27.5 | .5 | 31.57 | 54 | -22.43 | - | - | 360 | 100 | H |
| 5.608 | 35.42 | Pk | 34.6 | -27.8 | .4 | 42.62 | - | - | 74 | -31.38 | 360 | 100 | V |
| 5.608 | 23.25 | Ca | 34.6 | -27.8 | .4 | 30.45 | 54 | -23.55 | - | - | 360 | 100 | V |

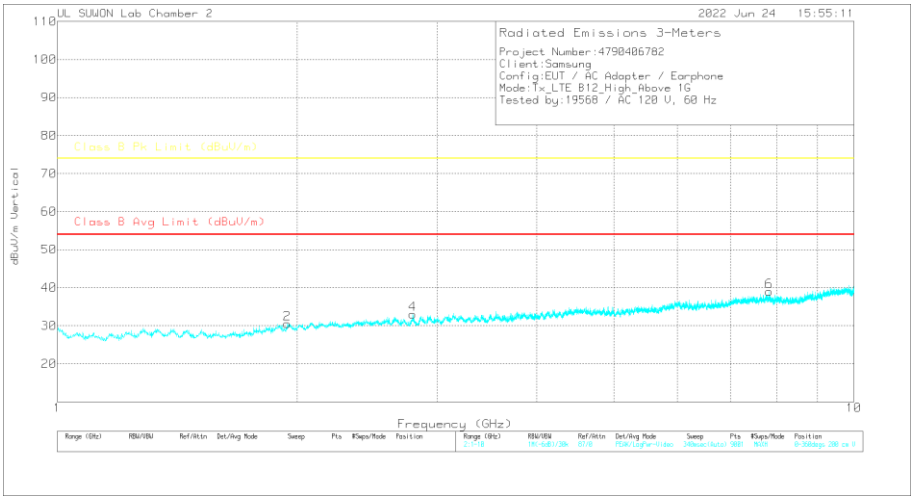
Pk - Peak detector
Ca - CISPR average detection

**HIGH CHANNEL(743.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Radiated Emissions

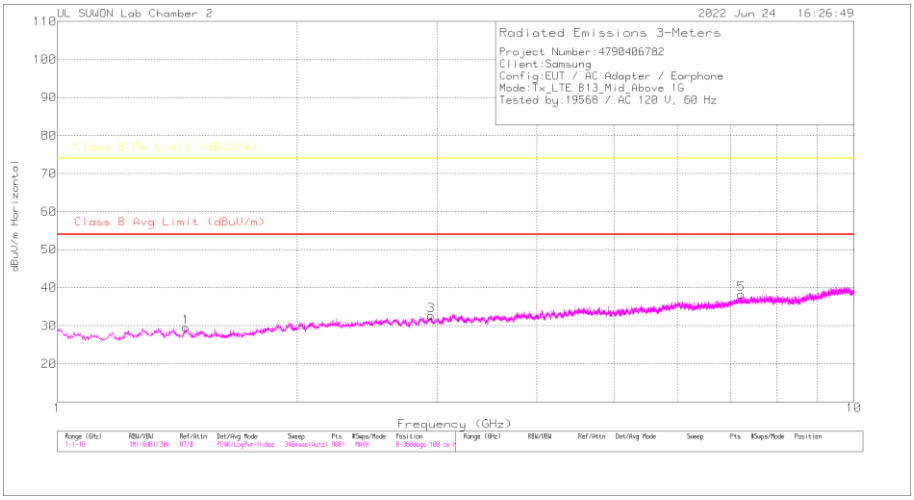
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016872 4 | 1-18GHz[dB] | 1GHz HPF[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Mar gin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.081 | 37.92 | Pk | 31.5 | -30.5 | .6 | 39.52 | - | - | 74 | -34.48 | 360 | 100 | H |
| 2.081 | 24.67 | Ca | 31.5 | -30.5 | .6 | 26.27 | 54 | -27.73 | - | - | 360 | 100 | H |
| 1.945 | 36.93 | Pk | 31 | -30.8 | .7 | 37.83 | - | - | 74 | -36.17 | 360 | 100 | V |
| 1.945 | 24.71 | Ca | 31 | -30.8 | .7 | 25.61 | 54 | -28.39 | - | - | 360 | 100 | V |
| 3.204 | 36.64 | Pk | 33 | -29.6 | .7 | 40.74 | - | - | 74 | -33.26 | 360 | 100 | H |
| 3.204 | 23.96 | Ca | 33 | -29.6 | .7 | 28.06 | 54 | -25.94 | - | - | 360 | 100 | H |
| 2.795 | 36.76 | Pk | 32.2 | -29.7 | .7 | 39.96 | - | - | 74 | -34.04 | 360 | 100 | V |
| 2.795 | 24.32 | Ca | 32.2 | -29.7 | .7 | 27.52 | 54 | -26.48 | - | - | 360 | 100 | V |
| 4.345 | 36.12 | Pk | 33.6 | -28.9 | .5 | 41.32 | - | - | 74 | -32.68 | 360 | 100 | H |
| 4.345 | 24.45 | Ca | 33.6 | -28.9 | .5 | 29.65 | 54 | -24.35 | - | - | 360 | 100 | H |
| 7.824 | 34.7 | Pk | 36 | -24.4 | .5 | 46.8 | - | - | 74 | -27.2 | 360 | 100 | V |
| 7.824 | 21.73 | Ca | 36 | -24.4 | .5 | 33.83 | 54 | -20.17 | - | - | 360 | 100 | V |

Pk - Peak detector
Ca - CISPR average detection

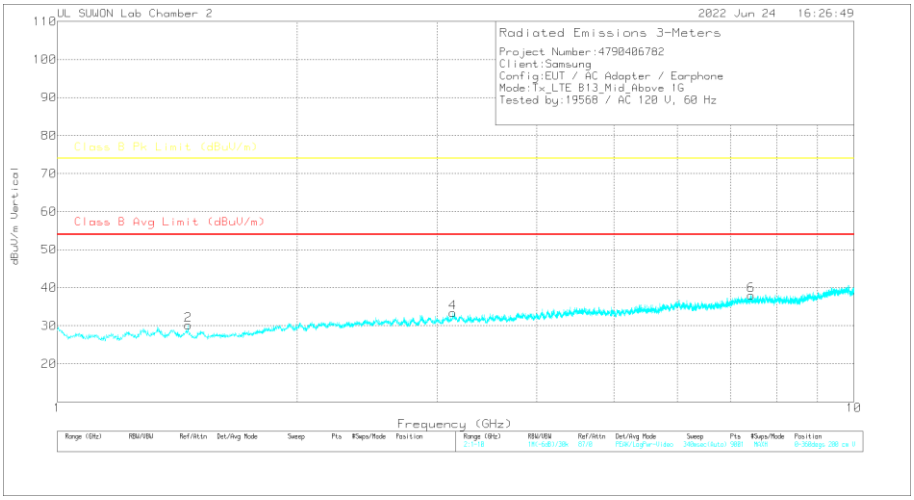
## 7.1.4. Above 1 GHz in the LTE Band 13

**MID CHANNEL(751.0 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Radiated Emissions

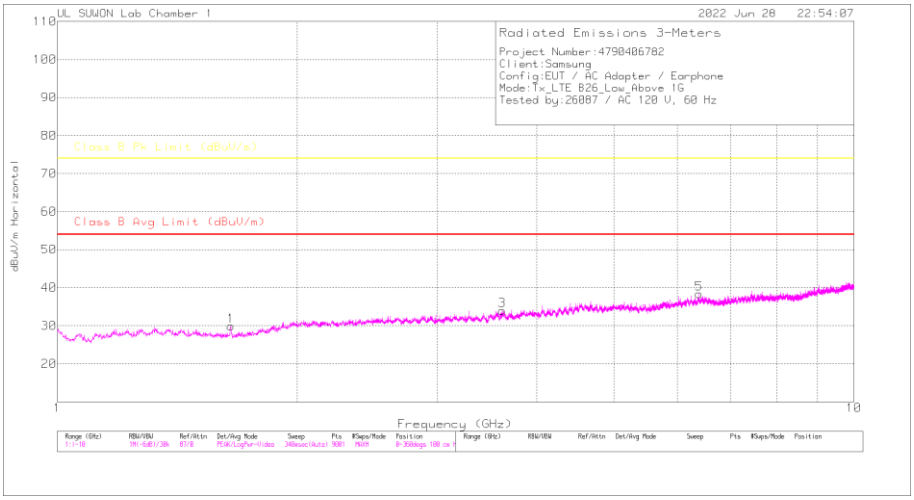
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016872 4 | 1-18GHz[dB] | 1GHz HPF[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Margin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.451 | 37.89 | Pk | 29.2 | -31.3 | .8 | 36.59 | - | - | 74 | -37.41 | 360 | 100 | H |
| 1.451 | 25.61 | Ca | 29.2 | -31.3 | .8 | 24.31 | 54 | -29.69 | - | - | 360 | 100 | H |
| 1.46 | 37.9 | Pk | 29.2 | -31.3 | .8 | 36.6 | - | - | 74 | -37.4 | 360 | 100 | V |
| 1.46 | 25.47 | Ca | 29.2 | -31.3 | .8 | 24.17 | 54 | -29.83 | - | - | 360 | 100 | V |
| 2.948 | 35.87 | Pk | 32.5 | -30.2 | .7 | 38.87 | - | - | 74 | -35.13 | 360 | 100 | H |
| 2.948 | 24.29 | Ca | 32.5 | -30.2 | .7 | 27.29 | 54 | -26.71 | - | - | 360 | 100 | H |
| 3.139 | 35.52 | Pk | 33 | -29.6 | .7 | 39.62 | - | - | 74 | -34.38 | 360 | 100 | V |
| 3.139 | 24.05 | Ca | 33 | -29.6 | .7 | 28.15 | 54 | -25.85 | - | - | 360 | 100 | V |
| 7.22 | 34.1 | Pk | 36.2 | -25.8 | .4 | 44.9 | - | - | 74 | -29.1 | 360 | 100 | H |
| 7.22 | 22.29 | Ca | 36.2 | -25.8 | .4 | 33.09 | 54 | -20.91 | - | - | 360 | 100 | H |
| 7.435 | 34.03 | Pk | 36 | -25 | .4 | 45.43 | - | - | 74 | -28.57 | 360 | 100 | V |
| 7.435 | 22.13 | Ca | 36 | -25 | .4 | 33.53 | 54 | -20.47 | - | - | 360 | 100 | V |

Pk - Peak detector
Ca - CISPR average detection

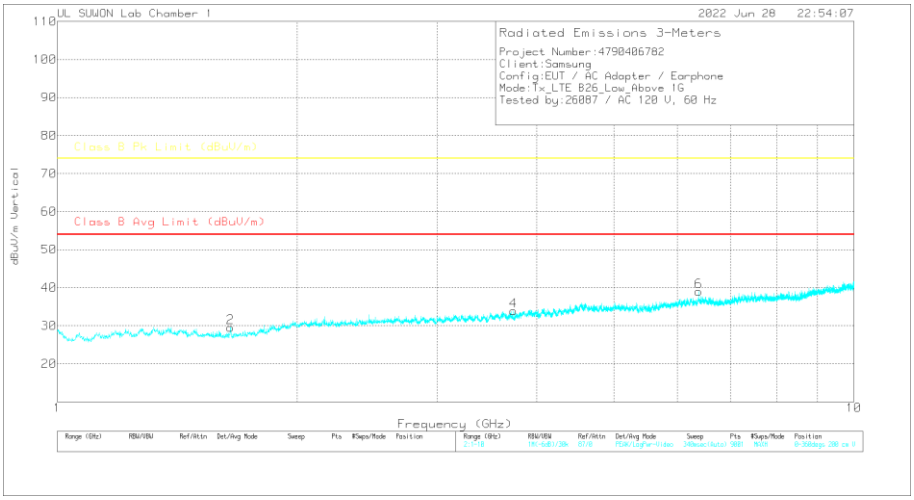
## 7.1.5. Above 1GHz in the LTE Band 26

**LOW CHANNEL(866.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

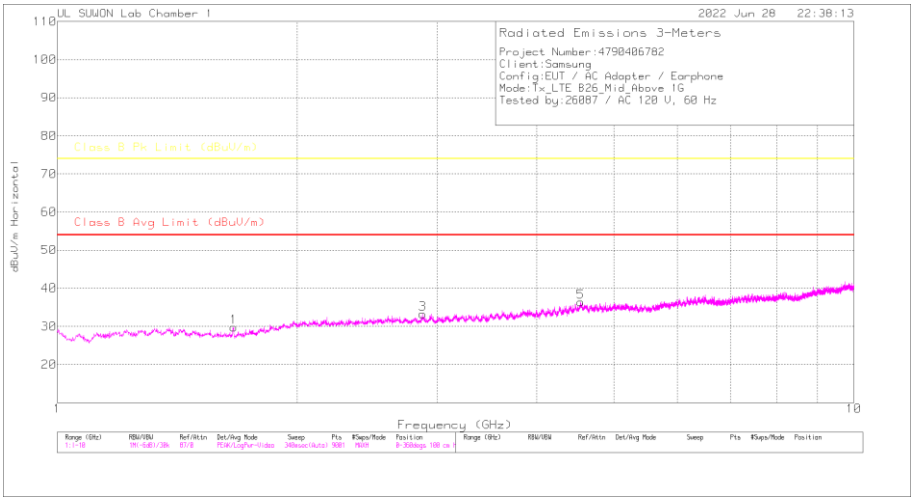
Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Mar gin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.651 | 44.16 | Pk | 28.4 | -36.5 | .7 | 36.76 | - | - | 74 | -37.24 | 0 | 100 | H |
| 1.651 | 31.45 | Ca | 28.4 | -36.5 | .7 | 24.05 | 54 | -29.95 | - | - | 0 | 100 | H |
| 1.649 | 42.18 | Pk | 28.4 | -36.4 | .7 | 34.88 | - | - | 74 | -39.12 | 0 | 100 | V |
| 1.649 | 30.4 | Ca | 28.4 | -36.4 | .7 | 23.1 | 54 | -30.9 | - | - | 0 | 100 | V |
| 3.62 | 40.73 | Pk | 33.1 | -33.2 | .6 | 41.23 | - | - | 74 | -32.77 | 0 | 100 | H |
| 3.62 | 28.61 | Ca | 33.1 | -33.2 | .6 | 29.11 | 54 | -24.89 | - | - | 0 | 100 | H |
| 3.738 | 40.1 | Pk | 33 | -33.1 | .4 | 40.4 | - | - | 74 | -33.6 | 0 | 100 | V |
| 3.738 | 28.11 | Ca | 33 | -33.1 | .4 | 28.41 | 54 | -25.59 | - | - | 0 | 100 | V |
| 6.393 | 37.87 | Pk | 35.5 | -29.7 | .6 | 44.27 | - | - | 74 | -29.73 | 0 | 100 | H |
| 6.393 | 26.1 | Ca | 35.5 | -29.7 | .6 | 32.5 | 54 | -21.5 | - | - | 0 | 100 | H |
| 6.383 | 38.18 | Pk | 35.5 | -29.7 | .5 | 44.48 | - | - | 74 | -29.52 | 0 | 100 | V |
| 6.383 | 26.24 | Ca | 35.5 | -29.7 | .5 | 32.54 | 54 | -21.46 | - | - | 0 | 100 | V |

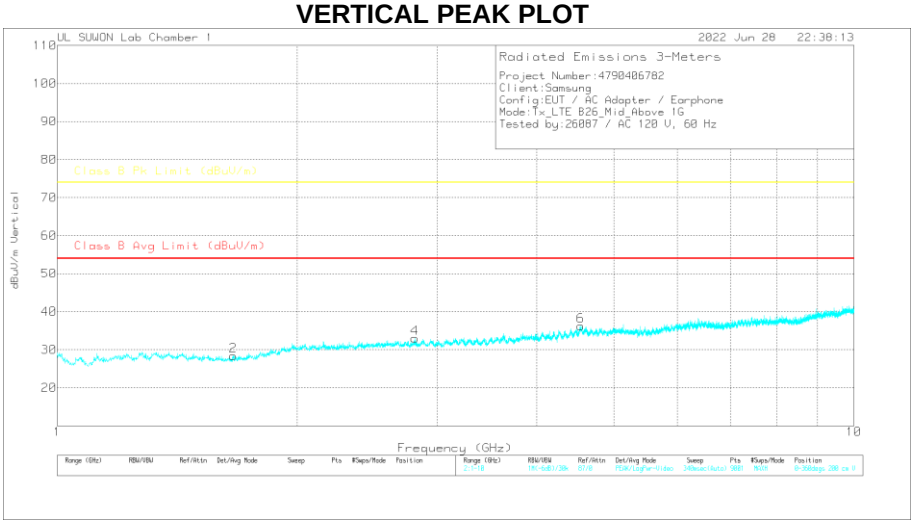
Pk - Peak detector
Ca - CISPR average detection

**MID CHANNEL(876.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

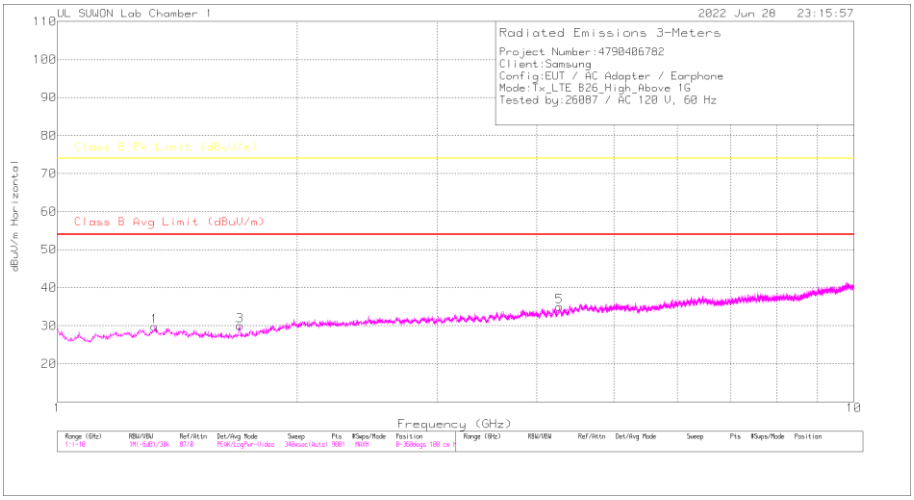
Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Marg in (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.665 | 43.18 | Pk | 28.4 | -36.4 | .7 | 35.88 | - | - | 74 | -38.12 | 0 | 100 | H |
| 1.665 | 31.33 | Ca | 28.4 | -36.4 | .7 | 24.03 | 54 | -29.97 | - | - | 0 | 100 | H |
| 1.663 | 44.42 | Pk | 28.4 | -36.4 | .7 | 37.12 | - | - | 74 | -36.88 | 0 | 100 | V |
| 1.663 | 30.38 | Ca | 28.4 | -36.4 | .7 | 23.08 | 54 | -30.92 | - | - | 0 | 100 | V |
| 2.876 | 40.6 | Pk | 32.3 | -33.9 | .7 | 39.7 | - | - | 74 | -34.3 | 0 | 100 | H |
| 2.876 | 28.8 | Ca | 32.3 | -33.9 | .7 | 27.9 | 54 | -26.1 | - | - | 0 | 100 | H |
| 2.811 | 40.77 | Pk | 32.2 | -34.2 | .6 | 39.37 | - | - | 74 | -34.63 | 0 | 100 | V |
| 2.811 | 28.91 | Ca | 32.2 | -34.2 | .6 | 27.51 | 54 | -26.49 | - | - | 0 | 100 | V |
| 4.538 | 39.82 | Pk | 34.2 | -32 | .7 | 42.72 | - | - | 74 | -31.28 | 0 | 100 | H |
| 4.538 | 27.87 | Ca | 34.2 | -32 | .7 | 30.77 | 54 | -23.23 | - | - | 0 | 100 | H |
| 4.543 | 40.54 | Pk | 34.2 | -32.1 | .6 | 43.24 | - | - | 74 | -30.76 | 0 | 100 | V |
| 4.543 | 28.11 | Ca | 34.2 | -32.1 | .6 | 30.81 | 54 | -23.19 | - | - | 0 | 100 | V |

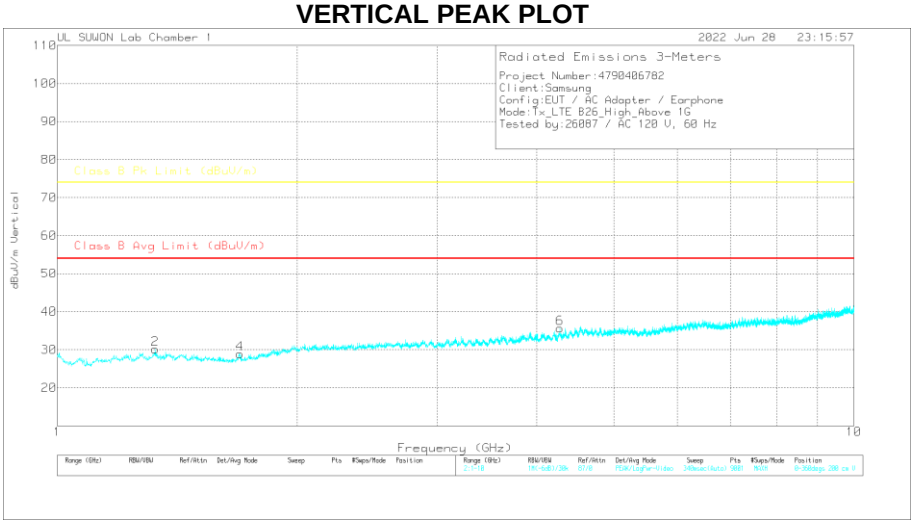
Pk - Peak detector
Ca - CISPR average detection

**HIGH CHANNEL(886.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Radiated Emissions

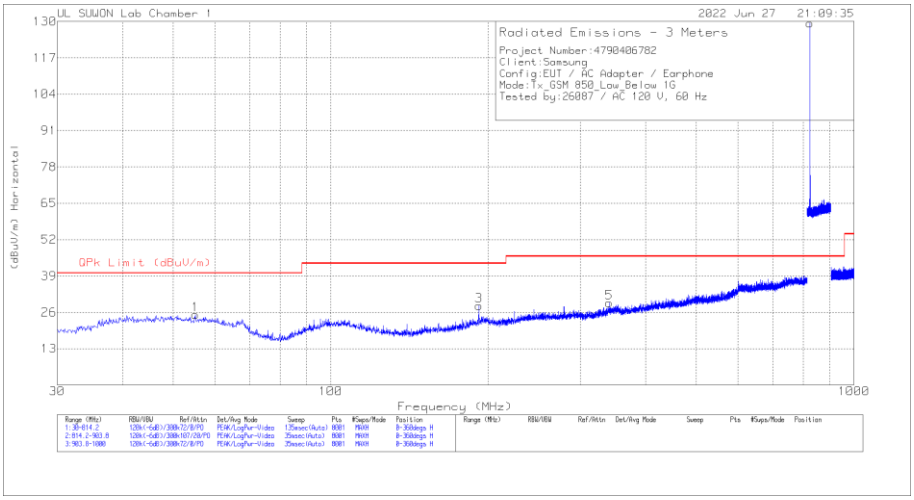
| Frequency (GHz) | Meter Reading (dBuV) | Det | 3117_0016871 7 | 1-18GHz[dB] | 1GHz_HP[dB] | Corrected Reading dBuV/m | Class B Avg Limit (dBuV/m) | Av(CISPR)Margin (dB) | Class B Pk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.326 | 43.14 | Pk | 29.5 | -37.1 | .9 | 36.44 | - | - | 74 | -37.56 | 0 | 100 | H |
| 1.326 | 31.21 | Ca | 29.5 | -37.1 | .9 | 24.51 | 54 | -29.49 | - | - | 0 | 100 | H |
| 1.328 | 43.37 | Pk | 29.5 | -37.1 | .9 | 36.67 | - | - | 74 | -37.33 | 0 | 100 | V |
| 1.328 | 31.24 | Ca | 29.5 | -37.1 | .9 | 24.54 | 54 | -29.46 | - | - | 0 | 100 | V |
| 1.695 | 43.26 | Pk | 28.6 | -36.3 | .6 | 36.16 | - | - | 74 | -37.84 | 0 | 100 | H |
| 1.695 | 31.33 | Ca | 28.6 | -36.3 | .6 | 24.23 | 54 | -29.77 | - | - | 0 | 100 | H |
| 1.695 | 43.45 | Pk | 28.6 | -36.3 | .6 | 36.35 | - | - | 74 | -37.65 | 0 | 100 | V |
| 1.695 | 30.66 | Ca | 28.6 | -36.3 | .6 | 23.56 | 54 | -30.44 | - | - | 0 | 100 | V |
| 4.268 | 40.64 | Pk | 33.7 | -32.4 | .7 | 42.64 | - | - | 74 | -31.36 | 0 | 100 | H |
| 4.268 | 28.74 | Ca | 33.7 | -32.4 | .7 | 30.74 | 54 | -23.26 | - | - | 0 | 100 | H |
| 4.276 | 41.54 | Pk | 33.7 | -32.5 | .7 | 43.44 | - | - | 74 | -30.56 | 0 | 100 | V |
| 4.276 | 28.73 | Ca | 33.7 | -32.5 | .7 | 30.63 | 54 | -23.37 | - | - | 0 | 100 | V |

Pk - Peak detector
Ca - CISPR average detection

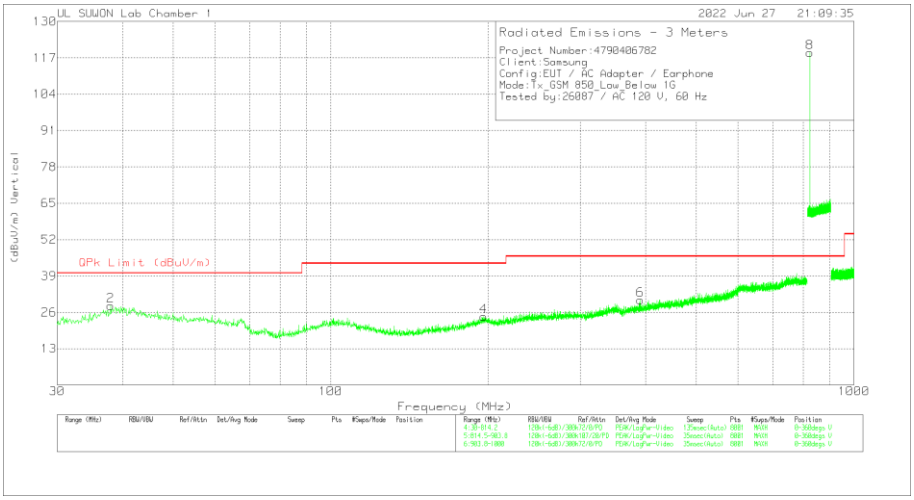
## 7.1.6. Below 1 GHz in the GSM850

**LOW CHANNEL(869.2 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

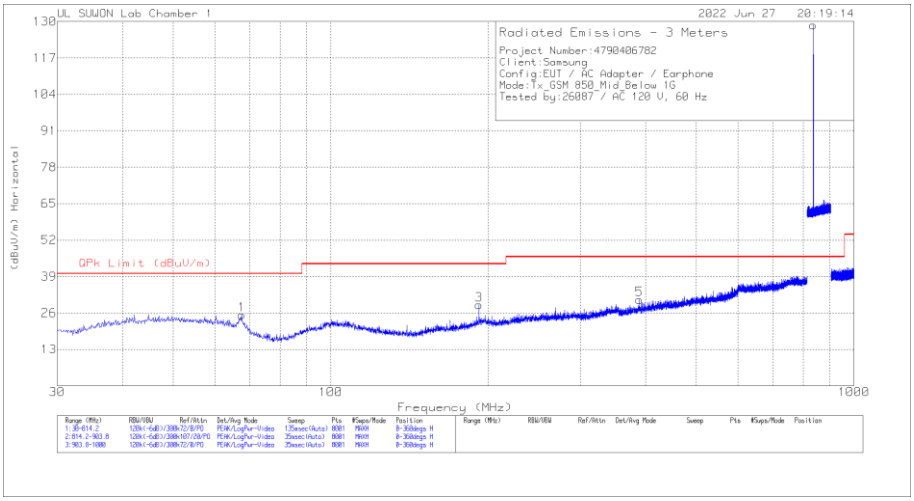
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 55.0944 | 4.29 | Pk | 19.4 | 1.5 | 25.19 | 40 | -14.81 | 0-360 | 200 | H |
| 3 | 191.9373 | 8.6 | Pk | 16.8 | 2.9 | 28.3 | 43.52 | -15.22 | 0-360 | 100 | H |
| 5 | 340.2491 | 5.15 | Pk | 20.5 | 3.8 | 29.45 | 46.02 | -16.57 | 0-360 | 100 | H |
| 7 | 824.2016 | 96.35 | Pk | 27.1 | 5.9 | 129.35 | **46.02** | **83.33** | 0-360 | 200 | H |
| 2 | 37.94 | 9.22 | Pk | 17.9 | 1.3 | 28.42 | 40 | -11.58 | 0-360 | 200 | V |
| 4 | 195.8583 | 4.14 | Pk | 17.5 | 2.9 | 24.54 | 43.52 | -18.98 | 0-360 | 300 | V |
| 6 | 390.9281 | 5.15 | Pk | 21.2 | 4.1 | 30.45 | 46.02 | -15.57 | 0-360 | 200 | V |
| 8 | 824.2006 | 85.92 | Pk | 27.1 | 5.9 | 118.92 | **46.02** | **72.9** | 0-360 | 100 | V |

Pk - Peak detector

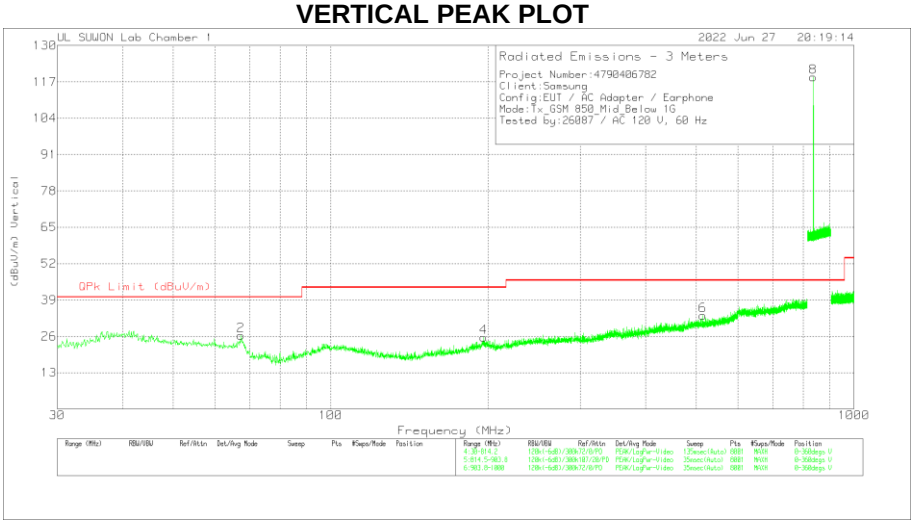
Note: Unwanted emissions captured from 824MHz to 849MHz and from 869MHz to 894MHz were the TX and RX signals generated from the call-simulator.

**MID CHANNEL(881.6 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

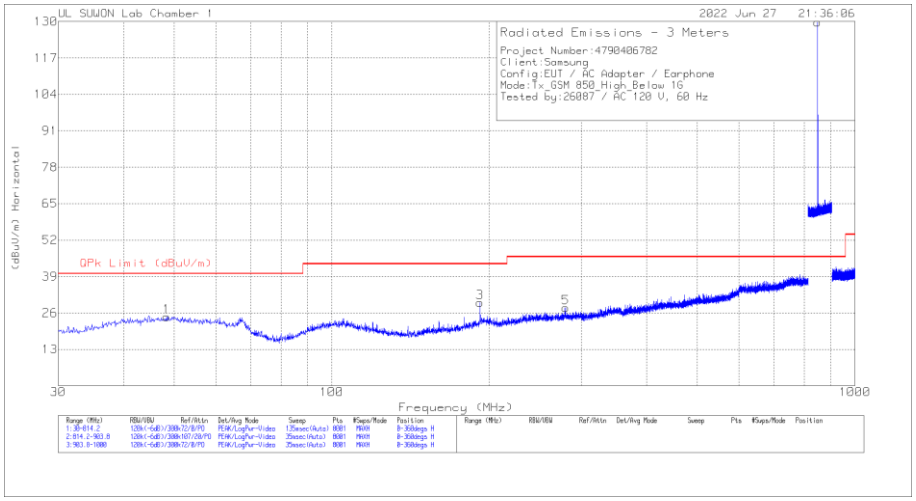
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass[ dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 67.5436 | 7.16 | Pk | 16.4 | 1.7 | 25.26 | 40 | -14.74 | 0-360 | 300 | H |
| 3 | 191.9373 | 9.19 | Pk | 16.8 | 2.9 | 28.89 | 43.52 | -14.63 | 0-360 | 100 | H |
| 5 | 389.2616 | 5.52 | Pk | 21.2 | 4.1 | 30.82 | 46.02 | -15.2 | 0-360 | 100 | H |
| 7 | 836.656 | 95.65 | Pk | 27.1 | 6 | 128.75 | **46.02** | **82.73** | 0-360 | 200 | H |
| 2 | 67.2495 | 8.18 | Pk | 16.5 | 1.7 | 26.38 | 40 | -13.62 | 0-360 | 300 | V |
| 4 | 195.8583 | 5.33 | Pk | 17.5 | 2.9 | 25.73 | 43.52 | -17.79 | 0-360 | 400 | V |
| 6 | 514.4396 | 5.41 | Pk | 23.3 | 4.7 | 33.41 | 46.02 | -12.61 | 0-360 | 400 | V |
| 8 | 836.5246 | 85.62 | Pk | 27.1 | 6 | 118.72 | **46.02** | **72.7** | 0-360 | 100 | V |

Pk - Peak detector

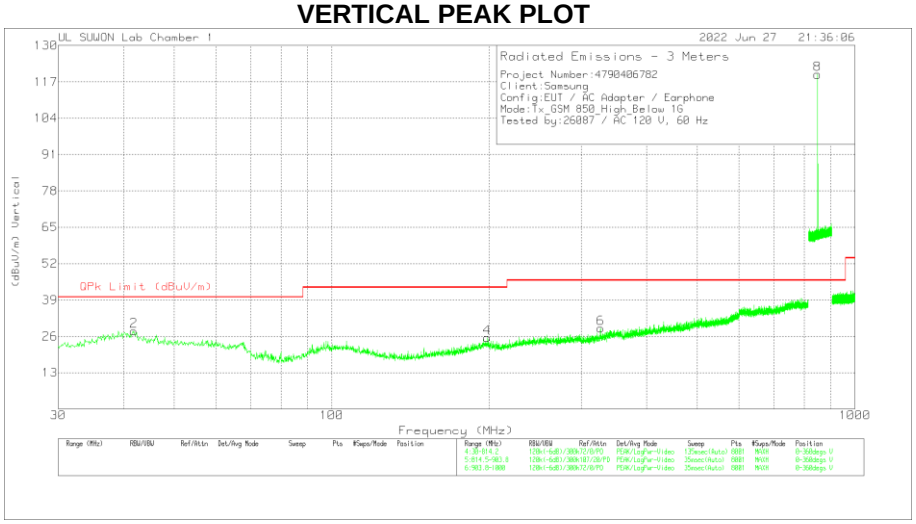
Note: Unwanted emissions captured from 824MHz to 849MHz and from 869MHz to 894MHz were the TX and RX signals generated from the call-simulator.

**HIGH CHANNEL(893.8 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 48.3307 | 3.4 | Pk | 19.9 | 1.4 | 24.7 | 40 | -15.3 | 0-360 | 200 | H |
| 3 | 192.0353 | 10.1 | Pk | 16.8 | 2.9 | 29.8 | 43.52 | -13.72 | 0-360 | 100 | H |
| 5 | 279.6697 | 5.49 | Pk | 18.8 | 3.5 | 27.79 | 46.02 | -18.23 | 0-360 | 100 | H |
| 7 | 848.8416 | 96.25 | Pk | 27.4 | 6 | 129.65 | **46.02** | **83.63** | 0-360 | 200 | H |
| 2 | 41.861 | 7.54 | Pk | 19.1 | 1.3 | 27.94 | 40 | -12.06 | 0-360 | 200 | V |
| 4 | 197.9168 | 5.21 | Pk | 17.4 | 2.9 | 25.51 | 43.52 | -18.01 | 0-360 | 400 | V |
| 6 | 326.3296 | 5.24 | Pk | 19.9 | 3.7 | 28.84 | 46.02 | -17.18 | 0-360 | 200 | V |
| 8 | 848.8597 | 86.23 | Pk | 27.4 | 6 | 119.63 | **46.02** | **73.61** | 0-360 | 100 | V |

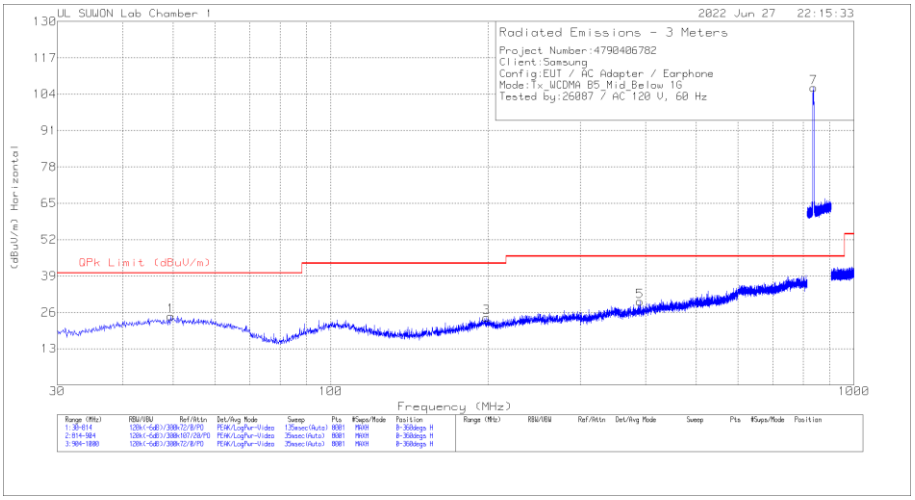
Pk - Peak detector

Note: Unwanted emissions captured from 824MHz to 849MHz and from 869MHz to 894MHz were the TX and RX signals generated from the call-simulator.

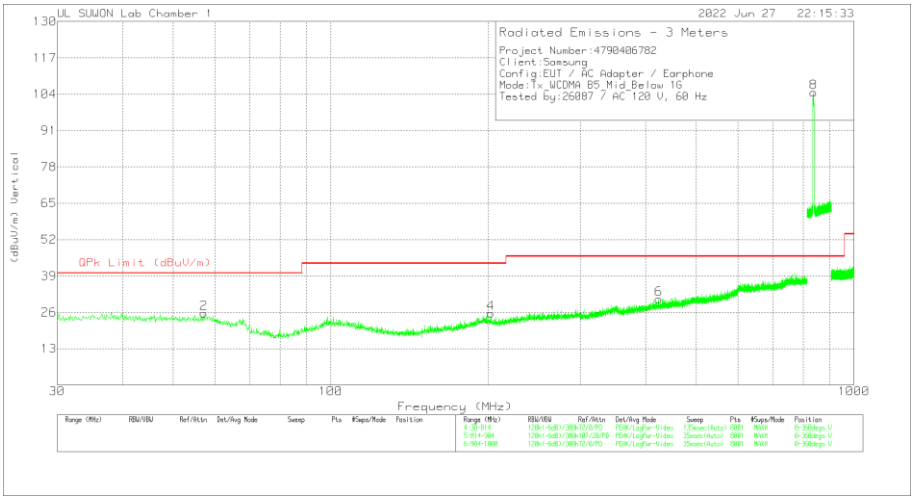
## 7.1.7. Below 1 GHz in the WCDMA Band 5

**MID CHANNEL(881.6 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 49.502 | 3.18 | Pk | 19.9 | 1.5 | 24.58 | 40 | -15.42 | 0-360 | 100 | H |
| 3 | 198.658 | 3.92 | Pk | 17.3 | 2.9 | 24.12 | 43.52 | -19.4 | 0-360 | 100 | H |
| 5 | 390.052 | 4.62 | Pk | 21.2 | 4.1 | 29.92 | 46.02 | -16.1 | 0-360 | 100 | H |
| 7 | 838.1538 | 73.2 | Pk | 27.1 | 6 | 106.3 | **46.02** | **60.28** | 0-360 | 100 | H |
| 2 | 57.244 | 4.84 | Pk | 19.2 | 1.6 | 25.64 | 40 | -14.36 | 0-360 | 100 | V |
| 4 | 202.382 | 5.91 | Pk | 16.9 | 2.9 | 25.71 | 43.52 | -17.81 | 0-360 | 200 | V |
| 6 | 423.47 | 4.45 | Pk | 22 | 4.3 | 30.75 | 46.02 | -15.27 | 0-360 | 100 | V |
| 8 | 836.815 | 71.47 | Pk | 27.1 | 6 | 104.57 | **46.02** | **58.55** | 0-360 | 300 | V |

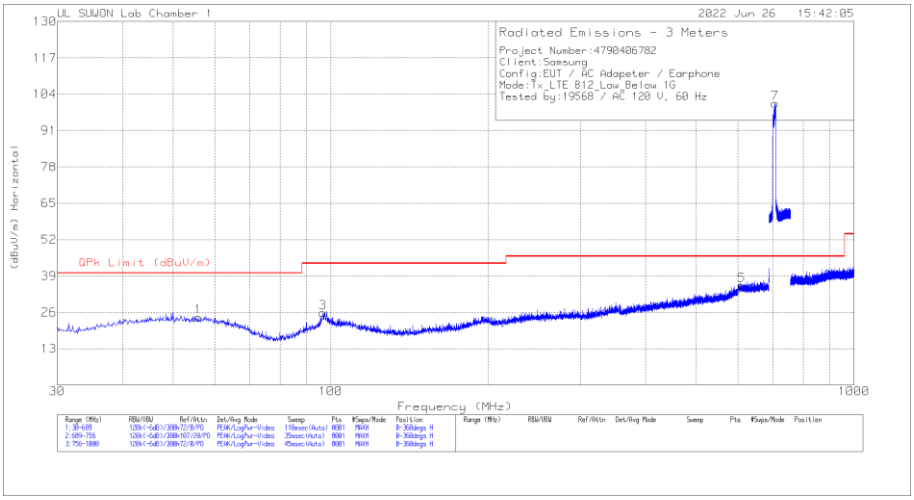
Pk - Peak detector

Note: Unwanted emissions captured from 824MHz to 849MHz and from 869MHz to 894MHz were the TX and RX signals generated from the call-simulator.

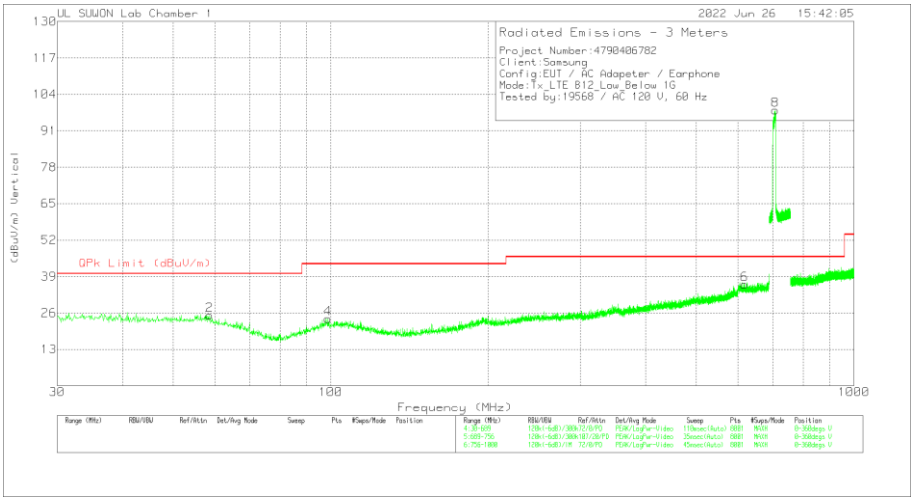
## 7.1.8. Below 1 GHz in the LTE Band 12

**LOW CHANNEL(731.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

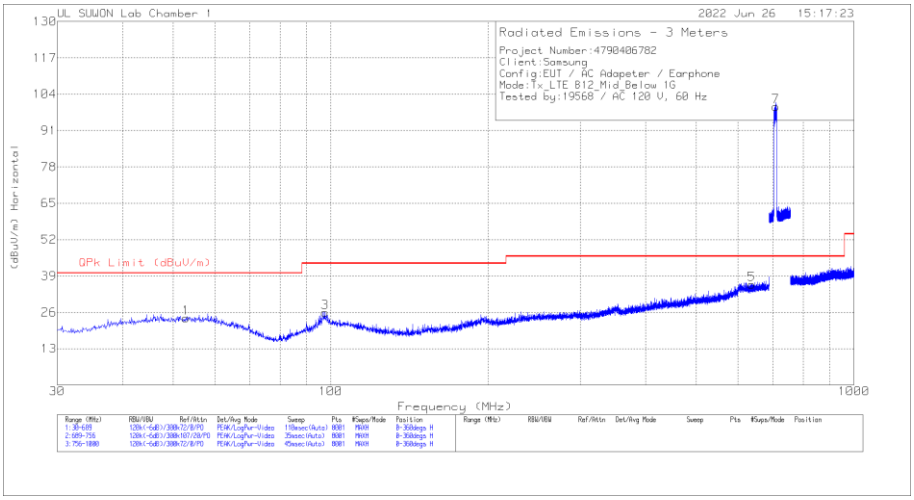
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 55.7834 | 3.42 | Pk | 19.3 | 1.5 | 24.22 | 40 | -15.78 | 0-360 | 300 | H |
| 3 | 96.4766 | 6.89 | Pk | 16.9 | 2 | 25.79 | 43.52 | -17.73 | 0-360 | 200 | H |
| 5 | 610.6614 | 5.34 | Pk | 25.2 | 5.1 | 35.64 | 46.02 | -10.38 | 0-360 | 300 | H |
| 7 | 706.7969 | 69.68 | Pk | 25.6 | 5.5 | 100.78 | **46.02** | **54.76** | 0-360 | 200 | H |
| 2 | 58.6665 | 4.67 | Pk | 18.9 | 1.6 | 25.17 | 40 | -14.83 | 0-360 | 400 | V |
| 4 | 98.7831 | 4.5 | Pk | 17.4 | 2.1 | 24 | 43.52 | -19.52 | 0-360 | 400 | V |
| 6 | 617.9928 | 5.84 | Pk | 25.2 | 5.1 | 36.14 | 46.02 | -9.88 | 0-360 | 400 | V |
| 8 | 706.9476 | 67.33 | Pk | 25.6 | 5.5 | 98.43 | **46.02** | **52.41** | 0-360 | 100 | V |

Pk - Peak detector

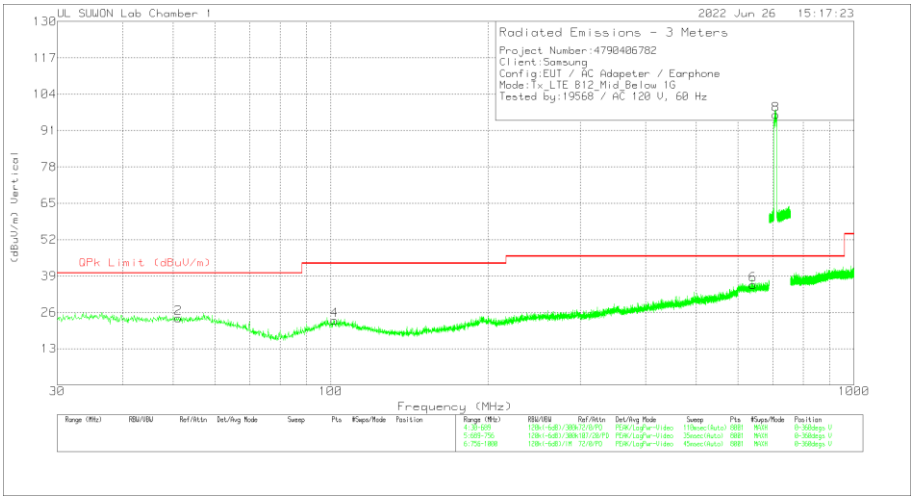
Note: Unwanted emissions captured from 699MHz to 716MHz and from 729MHz to 746MHz were the TX and RX signals generated from the call-simulator.

**MID CHANNEL(737.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

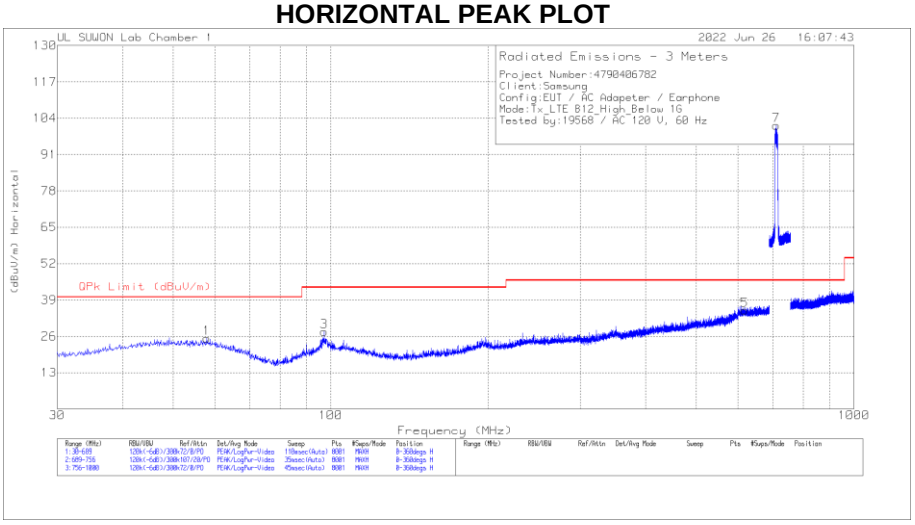
Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 52.8179 | 2.93 | Pk | 19.6 | 1.5 | 24.03 | 40 | -15.97 | 0-360 | 300 | H |
| 3 | 97.5475 | 6.8 | Pk | 17.2 | 2 | 26 | 43.52 | -17.52 | 0-360 | 100 | H |
| 5 | 637.2685 | 5.66 | Pk | 25.1 | 5.2 | 35.96 | 46.02 | -10.06 | 0-360 | 300 | H |
| 7 | 708.7315 | 68.3 | Pk | 25.7 | 5.5 | 99.5 | **46.02** | **53.48** | 0-360 | 200 | H |
| 2 | 51.1704 | 2.7 | Pk | 19.8 | 1.5 | 24 | 40 | -16 | 0-360 | 400 | V |
| 4 | 101.6663 | 3.26 | Pk | 17.7 | 2.1 | 23.06 | 43.52 | -20.46 | 0-360 | 200 | V |
| 6 | 641.8815 | 5.58 | Pk | 25.1 | 5.2 | 35.88 | 46.02 | -10.14 | 0-360 | 200 | V |
| 8 | 708.5221 | 65.47 | Pk | 25.7 | 5.5 | 96.67 | **46.02** | **50.65** | 0-360 | 100 | V |

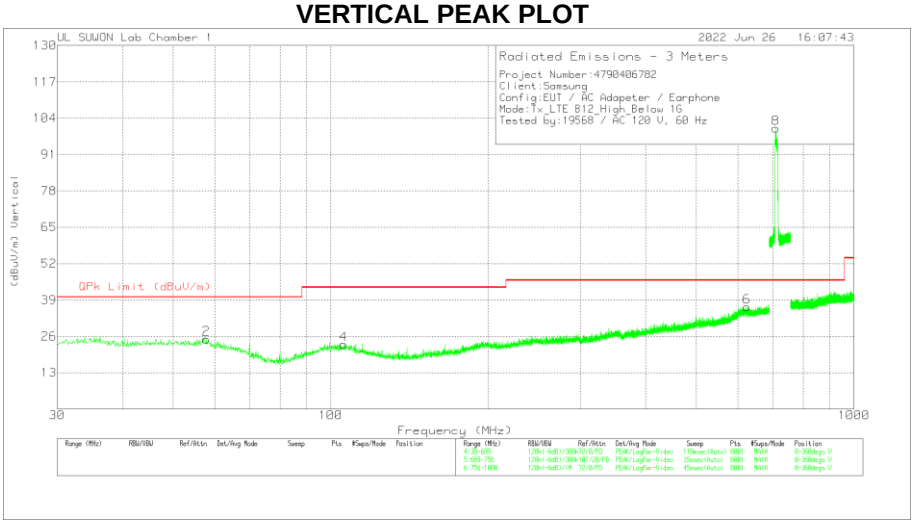
Pk - Peak detector

**HIGH CHANNEL(743.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 57.9251 | 4.7 | Pk | 19 | 1.6 | 25.3 | 40 | -14.7 | 0-360 | 300 | H |
| 3 | 97.1356 | 8.53 | Pk | 17.1 | 2 | 27.63 | 43.52 | -15.89 | 0-360 | 200 | H |
| 5 | 617.4985 | 5.02 | Pk | 25.2 | 5.1 | 35.32 | 46.02 | -10.7 | 0-360 | 300 | H |
| 7 | 710.3898 | 70.27 | Pk | 25.7 | 5.5 | 101.47 | **46.02** | **55.45** | 0-360 | 200 | H |
| 2 | 57.8428 | 4.46 | Pk | 19 | 1.6 | 25.06 | 40 | -14.94 | 0-360 | 200 | V |
| 4 | 105.785 | 3.37 | Pk | 17.7 | 2.1 | 23.17 | 43.52 | -20.35 | 0-360 | 400 | V |
| 6 | 624.6651 | 6.26 | Pk | 25.1 | 5.2 | 36.56 | 46.02 | -9.46 | 0-360 | 300 | V |
| 8 | 708.5808 | 69.18 | Pk | 25.7 | 5.5 | 100.38 | **46.02** | **54.36** | 0-360 | 100 | V |

Pk - Peak detector

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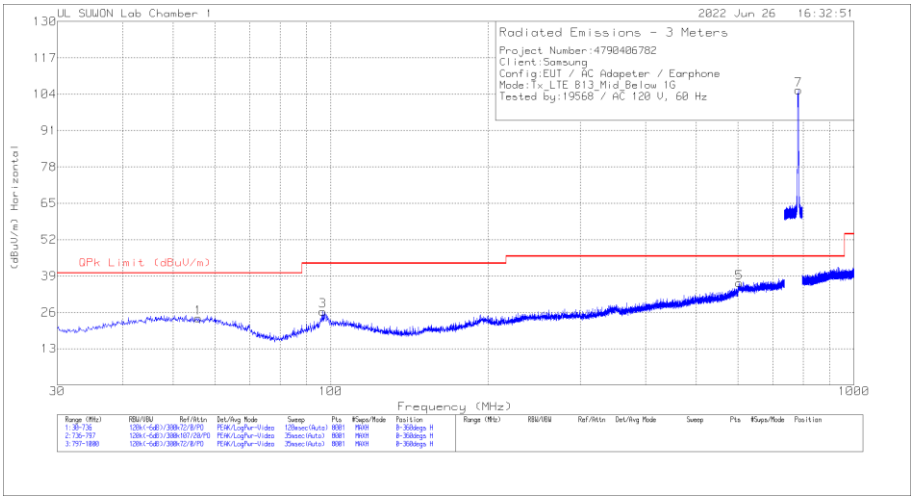
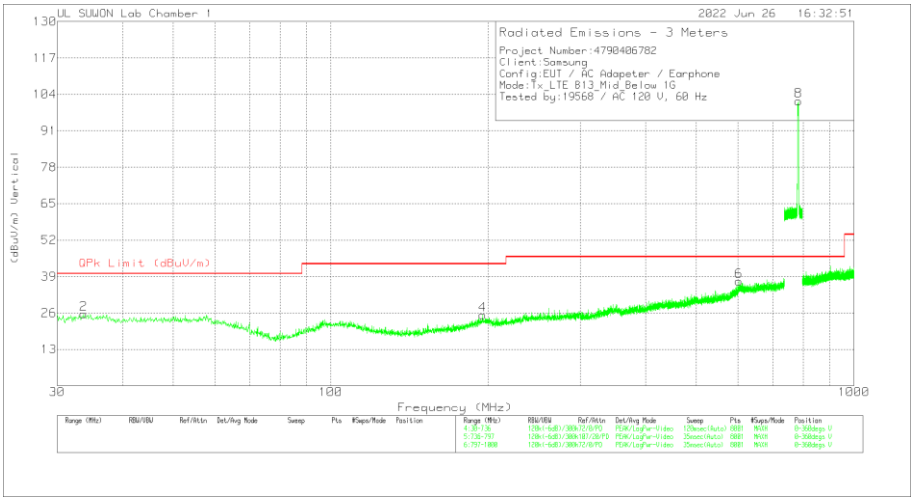
## 7.1.9. Below 1 GHz in the LTE Band 13

**MID CHANNEL(751.0 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

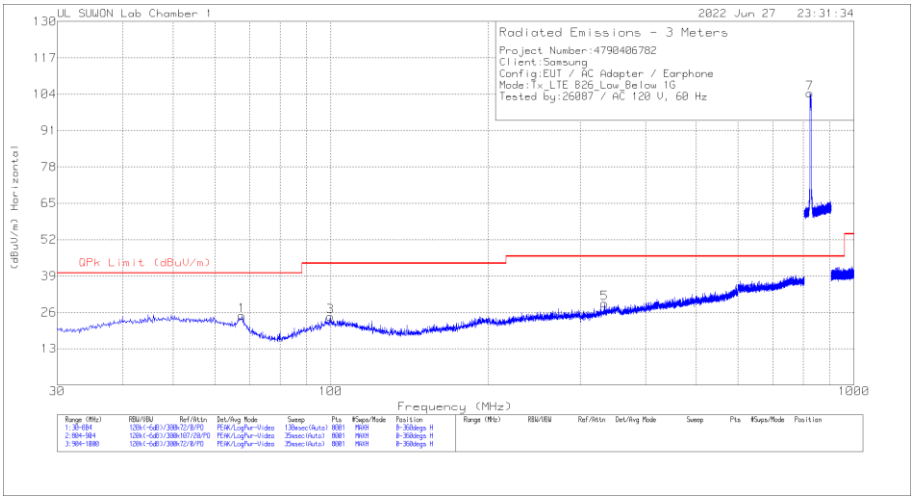
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 55.8573 | 3.23 | Pk | 19.3 | 1.5 | 24.03 | 40 | -15.97 | 0-360 | 200 | H |
| 3 | 96.5405 | 7.42 | Pk | 17 | 2 | 26.42 | 43.52 | -17.1 | 0-360 | 100 | H |
| 5 | 603.625 | 6.19 | Pk | 25.2 | 5.1 | 36.49 | 46.02 | -9.53 | 0-360 | 100 | H |
| 7 | 783.3208 | 73.04 | Pk | 26.6 | 5.8 | 105.44 | **46.02** | **59.42** | 0-360 | 200 | H |
| 2 | 33.7065 | 8.32 | Pk | 16.1 | 1.2 | 25.62 | 40 | -14.38 | 0-360 | 200 | V |
| 4 | 195.0275 | 5.09 | Pk | 17.4 | 2.9 | 25.39 | 43.52 | -18.13 | 0-360 | 400 | V |
| 6 | 603.0955 | 7.1 | Pk | 25.2 | 5.1 | 37.4 | 46.02 | -8.62 | 0-360 | 200 | V |
| 8 | 783.7554 | 69.26 | Pk | 26.6 | 5.8 | 101.66 | **46.02** | **55.64** | 0-360 | 100 | V |

Pk - Peak detector

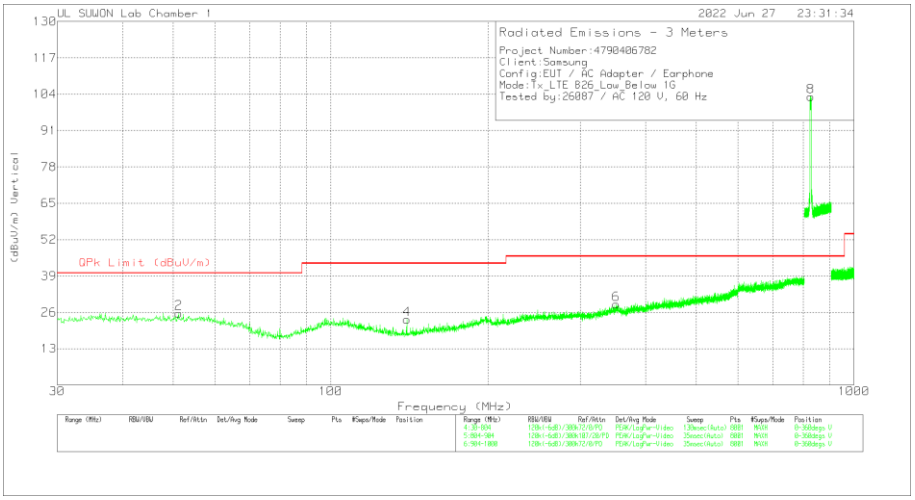
## 7.1.10.Below 1 GHz in the LTE Band 26

**LOW CHANNEL(860.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

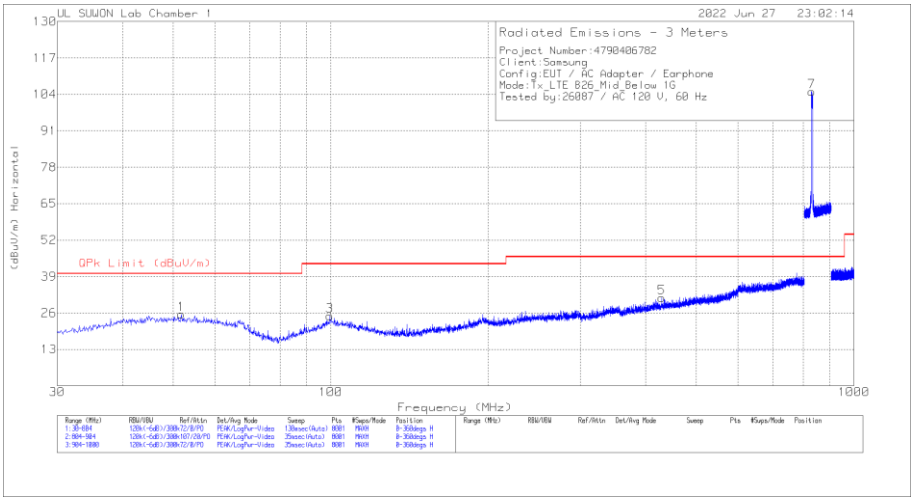
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 67.6358 | 6.84 | Pk | 16.3 | 1.7 | 24.84 | 40 | -15.16 | 0-360 | 300 | H |
| 3 | 99.7568 | 4.94 | Pk | 17.5 | 2.1 | 24.54 | 43.52 | -18.98 | 0-360 | 300 | H |
| 5 | 333.795 | 5.14 | Pk | 20.2 | 3.8 | 29.14 | 46.02 | -16.88 | 0-360 | 300 | H |
| 7 | 824.3875 | 71.22 | Pk | 27.1 | 5.9 | 104.22 | **46.02** | **58.2** | 0-360 | 200 | H |
| 2 | 51.1883 | 4.44 | Pk | 19.8 | 1.5 | 25.74 | 40 | -14.26 | 0-360 | 200 | V |
| 4 | 139.8113 | 7.26 | Pk | 13.8 | 2.4 | 23.46 | 43.52 | -20.06 | 0-360 | 300 | V |
| 6 | 351.21 | 3.92 | Pk | 21 | 3.9 | 28.82 | 46.02 | -17.2 | 0-360 | 200 | V |
| 8 | 826.525 | 70.03 | Pk | 27.1 | 5.9 | 103.03 | **46.02** | **57.01** | 0-360 | 100 | V |

Pk - Peak detector

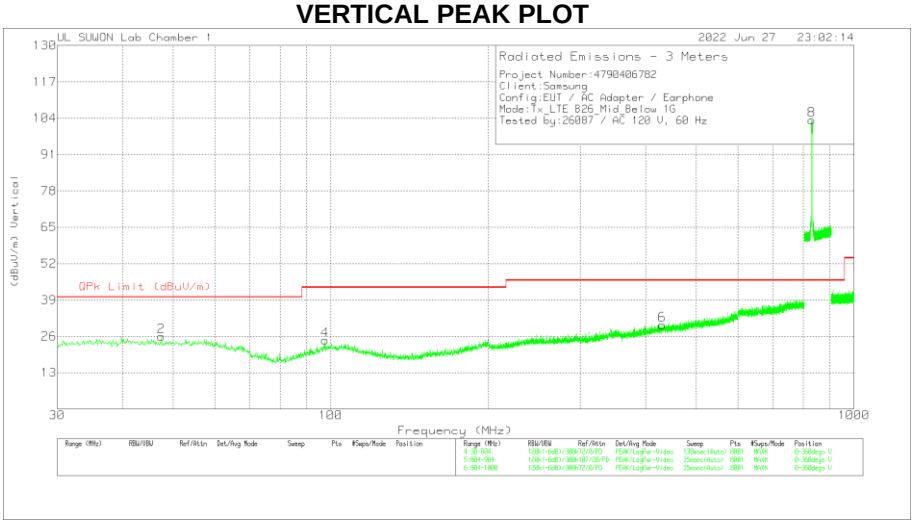
Note: Unwanted emissions captured from 814MHz to 849MHz and from 849MHz to 859MHz were the TX and RX signals generated from the call-simulator.

**MID CHANNEL(876.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

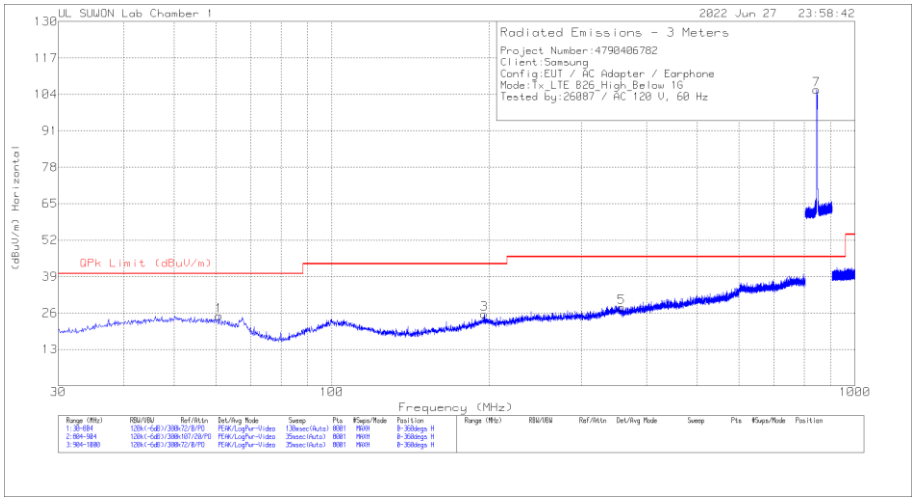
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 51.7688 | 4.21 | Pk | 19.7 | 1.5 | 25.41 | 40 | -14.59 | 0-360 | 200 | H |
| 3 | 99.5633 | 5.35 | Pk | 17.5 | 2.1 | 24.95 | 43.52 | -18.57 | 0-360 | 100 | H |
| 5 | 429.1905 | 4.98 | Pk | 22.1 | 4.3 | 31.38 | 46.02 | -14.64 | 0-360 | 100 | H |
| 7 | 829.8875 | 72.12 | Pk | 27 | 5.9 | 105.02 | **46.02** | **59** | 0-360 | 200 | H |
| 2 | 47.415 | 4.7 | Pk | 19.9 | 1.4 | 26 | 40 | -14 | 0-360 | 400 | V |
| 4 | 97.5315 | 5.46 | Pk | 17.2 | 2 | 24.66 | 43.52 | -18.86 | 0-360 | 200 | V |
| 6 | 429.8678 | 3.74 | Pk | 22.1 | 4.3 | 30.14 | 46.02 | -15.88 | 0-360 | 400 | V |
| 8 | 830.9875 | 70.45 | Pk | 27 | 5.9 | 103.35 | **46.02** | **57.33** | 0-360 | 100 | V |

Pk - Peak detector

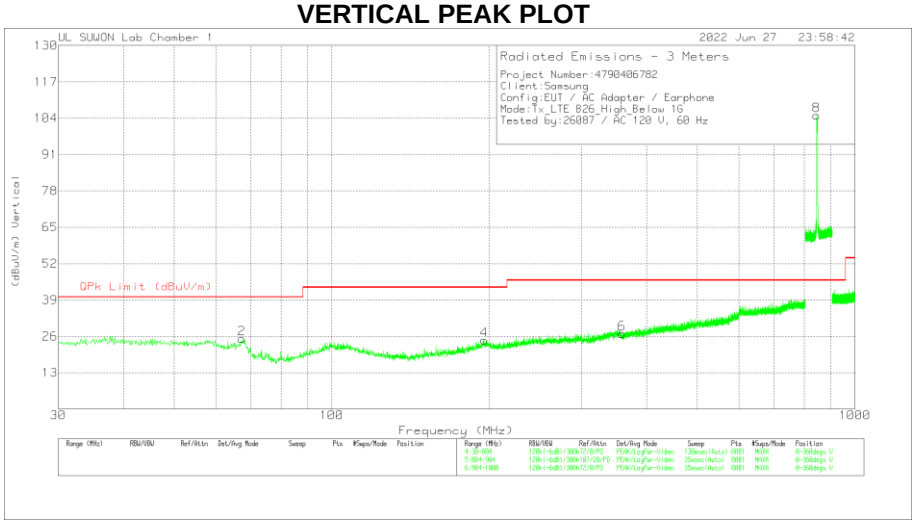
Note: Unwanted emissions captured from 814MHz to 849MHz and from 849MHz to 859MHz were the TX and RX signals generated from the call-simulator.

**HIGH CHANNEL(892.5 MHz)**

**HORIZONTAL PEAK PLOT**




**VERTICAL PEAK PLOT**




**DATA**

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163_750 | Below_1G_Bypass [dB] | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60.96 | 4.92 | Pk | 18.4 | 1.6 | 24.92 | 40 | -15.08 | 0-360 | 300 | H |
| 3 | 195.4425 | 5.29 | Pk | 17.4 | 2.9 | 25.59 | 43.52 | -17.93 | 0-360 | 100 | H |
| 5 | 357.789 | 3.75 | Pk | 20.4 | 3.9 | 28.05 | 46.02 | -17.97 | 0-360 | 300 | H |
| 7 | 845.05 | 72.33 | Pk | 27.3 | 6 | 105.63 | **46.02** | **59.61** | 0-360 | 200 | H |
| 2 | 67.2488 | 6.96 | Pk | 16.5 | 1.7 | 25.16 | 40 | -14.84 | 0-360 | 300 | V |
| 4 | 195.4425 | 4.3 | Pk | 17.4 | 2.9 | 24.6 | 43.52 | -18.92 | 0-360 | 400 | V |
| 6 | 358.4663 | 2.72 | Pk | 20.3 | 3.9 | 26.92 | 46.02 | -19.1 | 0-360 | 300 | V |
| 8 | 844.8125 | 71.67 | Pk | 27.3 | 6 | 104.97 | **46.02** | **58.95** | 0-360 | 100 | V |

Pk - Peak detector

Note: Unwanted emissions captured from 814MHz to 849MHz and from 849MHz to 859MHz were the TX and RX signals generated from the call-simulator.

# 7.2. CONDUCTED EMISSIONS

**TEST PROCEDURE**

ANSI C63.4-2014

**LIMIT**

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

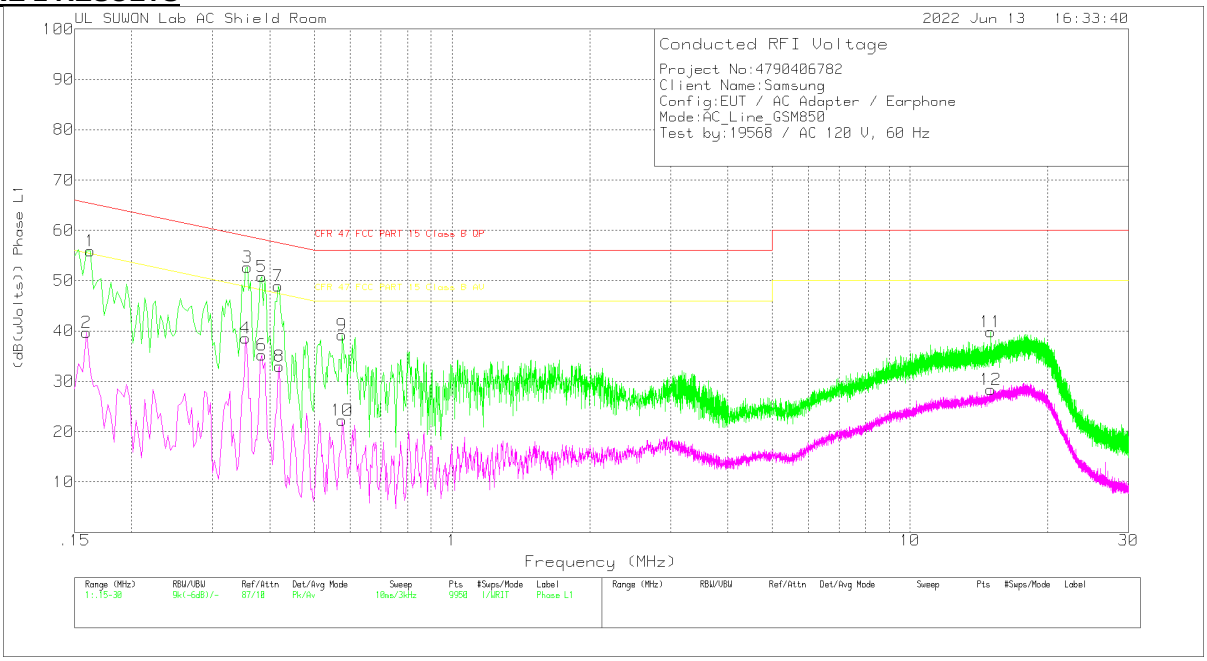
| Frequency range (MHz) | Limits (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |
| Notes:<br>1. The lower limit shall apply at the transition frequencies<br>2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. | | |

## 7.2.1 CONDUCTED EMISSIONS

**6 WORST EMISSIONS(GSM850 + Rear camera on)**

**Line-L1 .15 – 30 MHz**

**LINE 1 RESULTS**




## Trace Markers

Range 1: Phase L1 .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101836_Wit h EX_L1[dB] | CABLELOS S(dB) | Corrected Reading (dB(uVolts)) | CFR 47 FCC PART 15 Class B QP | Margin (dB) | CFR 47 FCC PART 15 Class B AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .162 | 45.93 | Pk | 9.9 | .1 | 55.93 | 65.36 | -9.43 | - | - |
| 2 | .159 | 29.81 | Av | 9.8 | .1 | 39.71 | - | - | 55.52 | -15.81 |
| 3 | .357 | 42.66 | Pk | 9.8 | .2 | 52.66 | 58.8 | -6.14 | - | - |
| 4 | .354 | 28.57 | Av | 9.8 | .2 | 38.57 | - | - | 48.87 | -10.3 |
| 5 | .384 | 40.8 | Pk | 9.8 | .2 | 50.8 | 58.19 | -7.39 | - | - |
| 6 | .384 | 25.17 | Av | 9.8 | .2 | 35.17 | - | - | 48.19 | -13.02 |
| 7 | .417 | 38.98 | Pk | 9.8 | .2 | 48.98 | 57.51 | -8.53 | - | - |
| 8 | .42 | 22.96 | Av | 9.8 | .2 | 32.96 | - | - | 47.45 | -14.49 |
| 9 | .576 | 29.27 | Pk | 9.8 | .2 | 39.27 | 56 | -16.73 | - | - |
| 10 | .576 | 12.29 | Av | 9.8 | .2 | 22.29 | - | - | 46 | -23.71 |
| 11 | 15.003 | 29.41 | Pk | 10 | .4 | 39.81 | 60 | -20.19 | - | - |
| 12 | 15 | 17.98 | Av | 10 | .4 | 28.38 | - | - | 50 | -21.62 |

Pk - Peak detector
Av - Average detection

## Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

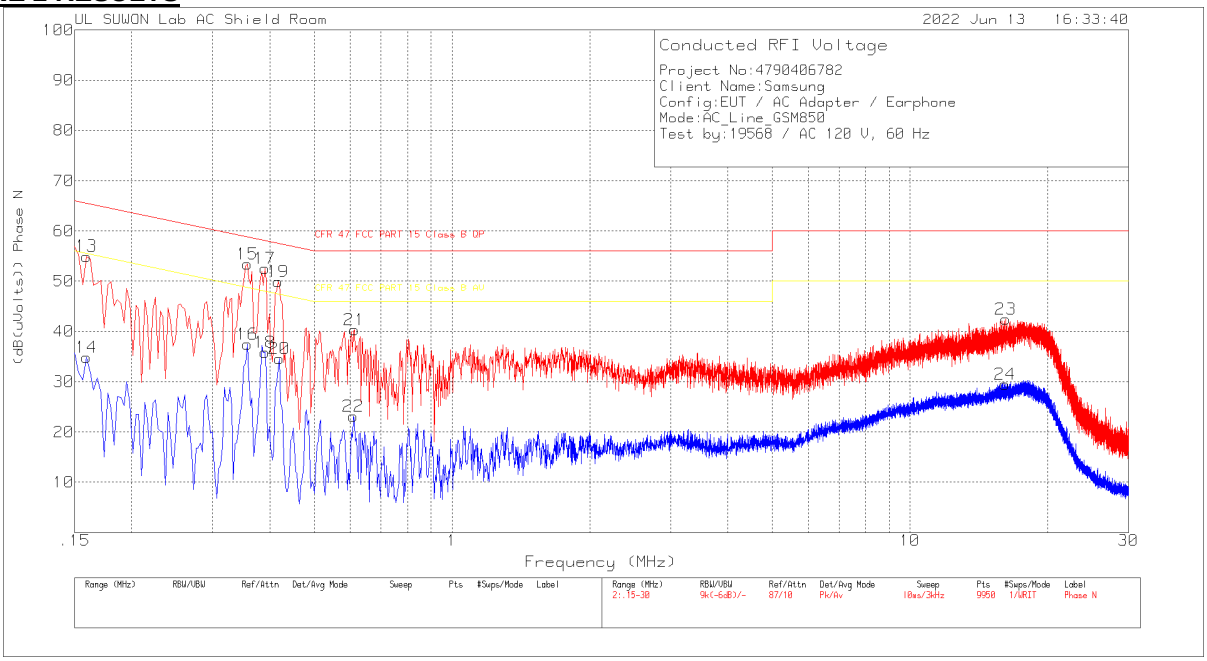
| Frequency (MHz) | Meter Reading (dBuV) | Det | 101836_Wit h EX_L1[dB] | CABLELOS S(dB) | Corrected Reading (dB(uVolts)) | CFR 47 FCC PART 15 Class B QP | Margin (dB) | CFR 47 FCC PART 15 Class B AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .16125 | 44.99 | Qp | 9.9 | .1 | 54.99 | 65.4 | -10.41 | - | - |
| .35625 | 40.31 | Qp | 9.8 | .2 | 50.31 | 58.82 | -8.51 | - | - |
| .38475 | 38.46 | Qp | 9.8 | .2 | 48.46 | 58.18 | -9.72 | - | - |
| .41775 | 36.93 | Qp | 9.8 | .2 | 46.93 | 57.49 | -10.56 | - | - |

Qp - Quasi-Peak detector

## 6 WORST EMISSIONS(GSM850 + Rear camera on)

**Line-L2 .15 – 30 MHz**

## LINE 2 RESULTS




### Trace Markers

Range 2: Phase N .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101836_With EX_N[dB] | CABLELOSS(dB) | Corrected Reading (dB(uVolts)) | CFR 47 FCC PART 15 Class B QP | Margin (dB) | CFR 47 FCC PART 15 Class B AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | .159 | 45.08 | Pk | 9.8 | .1 | 54.98 | 65.52 | -10.54 | - | - |
| 14 | .159 | 24.91 | Av | 9.8 | .1 | 34.81 | - | - | 55.52 | -20.71 |
| 15 | .357 | 43.39 | Pk | 9.8 | .2 | 53.39 | 58.8 | -5.41 | - | - |
| 16 | .357 | 27.44 | Av | 9.8 | .2 | 37.44 | - | - | 48.8 | -11.36 |
| 17 | .39 | 42.6 | Pk | 9.8 | .2 | 52.6 | 58.06 | -5.46 | - | - |
| 18 | .39 | 25.88 | Av | 9.8 | .2 | 35.88 | - | - | 48.06 | -12.18 |
| 19 | .417 | 39.94 | Pk | 9.8 | .2 | 49.94 | 57.51 | -7.57 | - | - |
| 20 | .42 | 24.6 | Av | 9.8 | .2 | 34.6 | - | - | 47.45 | -12.85 |
| 21 | .612 | 30.36 | Pk | 9.8 | .2 | 40.36 | 56 | -15.64 | - | - |
| 22 | .609 | 13.12 | Av | 9.8 | .2 | 23.12 | - | - | 46 | -22.88 |
| 23 | 16.194 | 31.92 | Pk | 10.1 | .4 | 42.42 | 60 | -17.58 | - | - |
| 24 | 16.155 | 19.01 | Av | 10.1 | .4 | 29.51 | - | - | 50 | -20.49 |

Pk - Peak detector
Av - Average detection

### Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | 101836_With EX_N[dB] | CABLELOSS(dB) | Corrected Reading (dB(uVolts)) | CFR 47 FCC PART 15 Class B QP | Margin (dB) | CFR 47 FCC PART 15 Class B AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .35625 | 41.4 | Qp | 9.8 | .2 | 51.4 | 58.82 | -7.42 | - | - |
| .38925 | 40.16 | Qp | 9.8 | .2 | 50.16 | 58.08 | -7.92 | - | - |
| .41775 | 37.81 | Qp | 9.8 | .2 | 47.81 | 57.49 | -9.68 | - | - |

Qp - Quasi-Peak detector

# END OF TEST REPORT



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