**FCC CFR47 PART 15 SUBPART C**

**ANT+**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC**

**MODEL NUMBER : SM-A510F/DS, SM-A510F**

**FCC ID: A3LSMA510F**

**REPORT NUMBER: 15K22047-E5**

**ISSUE DATE: NOV 26, 2015**

*Prepared for*
**SAMSUNG ELECTRONICS CO., LTD.**
**129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,**
**GYEONGGI-DO, 16677, KOREA**

*Prepared by*
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**218 Maeyeong-ro, Yeongtong-gu,**
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ACCREDITED
TL-637

## Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| -- | 11/26/15 | Initial issue | SungGil Park |


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# TABLE OF CONTENTS

**1. ATTESTATION OF TEST RESULTS ..... 4**

**2. TEST METHODOLOGY ..... 5**

**3. FACILITIES AND ACCREDITATION ..... 5**

**4. CALIBRATION AND UNCERTAINTY ..... 5**

*4.1. MEASURING INSTRUMENT CALIBRATION ..... 5*

*4.2. SAMPLE CALCULATION ..... 5*

*4.3. MEASUREMENT UNCERTAINTY ..... 5*

**5. EQUIPMENT UNDER TEST ..... 6**

*5.1. DESCRIPTION OF EUT ..... 6*

*5.2. MAXIMUM OUTPUT POWER ..... 6*

*5.3. DESCRIPTION OF AVAILABLE ANTENNAS ..... 6*

*5.4. WORST-CASE CONFIGURATION AND MODE ..... 6*

*5.5. DESCRIPTION OF TEST SETUP ..... 7*

**6. TEST AND MEASUREMENT EQUIPMENT ..... 9**

**7. LIMITS AND RESULTS ..... 10**

*7.1. 99% BANDWIDTH ..... 10*

*7.2. TRANSMITTER RADIATED EMISSIONS ..... 14*

7.2.1. DUTY CYCLE ..... 15
7.2.2. FUNDAMENTAL FREQUENCY RADIATED EMISSION ..... 16
7.2.3. TRANSMITTER RESTRICTED BAND EDGES ..... 17
7.2.4. SPURIOUS BELOW 1 GHz ..... 22

**8. AC POWER LINE CONDUCTED EMISSIONS ..... 24**

**9. SETUP PHOTOS ..... 29**



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# 1. ATTESTATION OF TEST RESULTS

| | |
|---|---|
| **COMPANY NAME:** | SAMSUNG ELECTRONICS CO., LTD. |
| **EUT DESCRIPTION:** | GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC |
| **MODEL NUMBER:** | SM-A510F/DS |
| **SERIAL NUMBER:** | R38FA0JNM9W/ 330091e6a336920d (RADIATED); 3300228292a67257 (CONDUCTED) |
| **DATE TESTED:** | OCT 19, 2015 - NOV 26, 2015 |

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart C | Pass |

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:

CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

SungGil Park
Suwon Lab Engineer
UL Korea, Ltd.


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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

# 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 |
| ☒ Chamber 2 |

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# 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)

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

## 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 | 2.32 dB |
| Radiated Disturbance, Below 1GHz | 4.14 dB |
| Radiated Disturbance, Above 1 GHz | 5.97 dB |

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


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# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

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

## 5.2. MAXIMUM OUTPUT POWER

The ANT+ mode has maximum output fundamental field strength as follows:

| Frequency Range [MHz] | Mode | Peak E-field Strength [dBuV/m] | Avg E-field Strength [dBuV/m] | Distance [m] |
|---|---|---|---|---|
| 2402 - 2480 | ANT+ | 84.60 | 47.53 | 3.00 |

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a maximum gain of -1.19 dBi.

## 5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.


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## 5.5. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| Charger | SAMSUNG | EP-TA20UWE | R37G9EN04S1DK3 | N/A |
| Data Cable | SAMSUNG | ECB-DU4AWE | N/A | N/A |
| Earphone | SAMSUNG | GH59-11720H | N/A | N/A |

**I/O CABLES**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | DC Power | 1 | Mini-USB | Shielded | 0.8m | N/A |
| 2 | Audio | 1 | Mini-Jack | Unshielded | 1.0m | N/A |

**TEST SETUP**

The EUT is set to continuously transmit in ANT + test mode.


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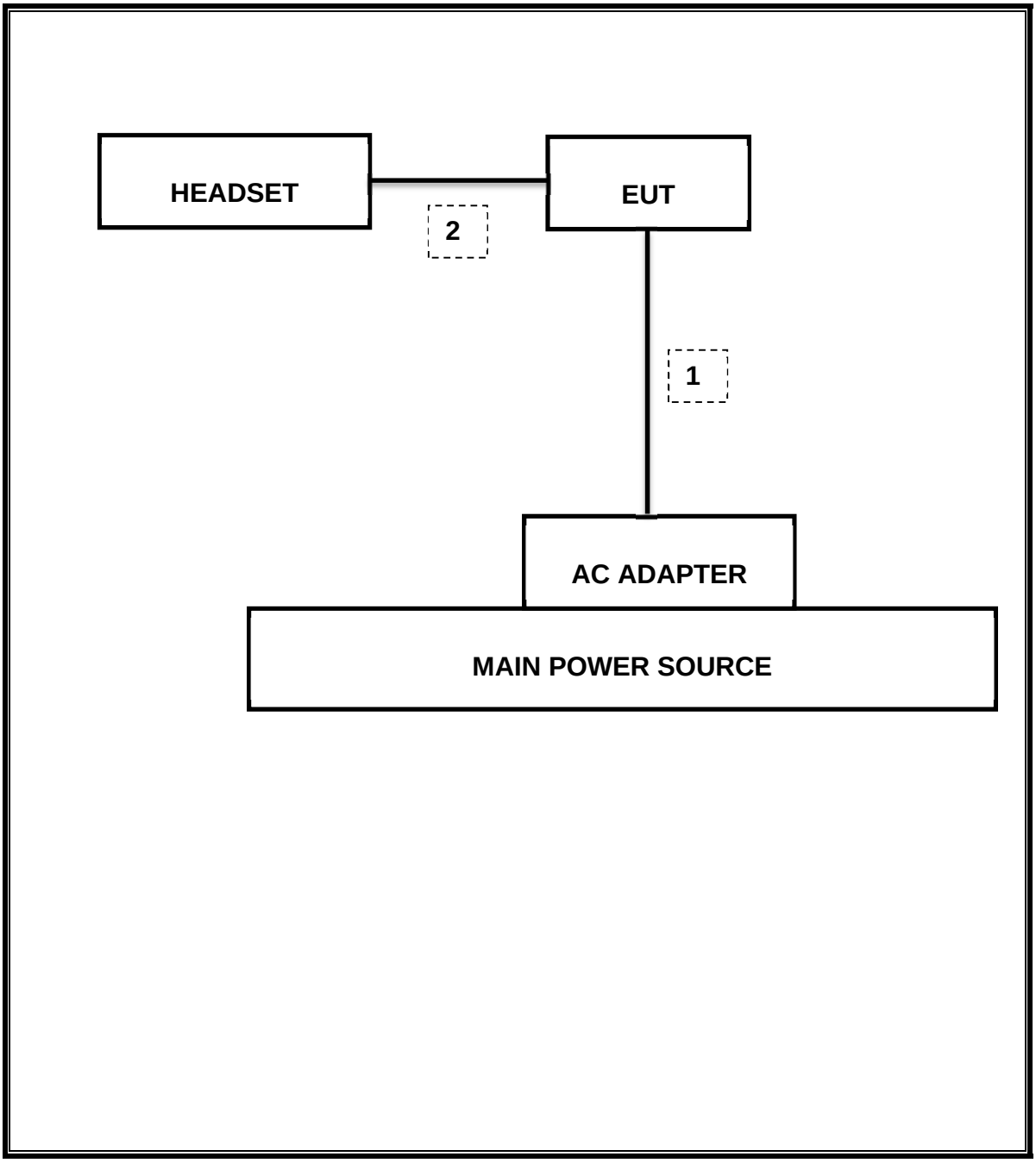
**SETUP DIAGRAM FOR TESTS**





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# 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, Bilog, 30MHz-1GHz | SCHWARZBECK | VULB9163 | 749 | 04-25-16 |
| Antenna, Horn, 18 GHz | ETS | 3115 | 00161451 | 05-17-16 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168724 | 06-17-16 |
| Antenna, Horn, 18 GHz | ETS | 3117 | 00168717 | 06-17-16 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 341282 | 08-18-16 |
| Preamplifier, 1000 MHz | Sonoma | 310N | 351741 | 08-18-16 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1876511 | 08-18-16 |
| Preamplifier, 18 GHz | Miteq | AFS42-00101800-25-S-42 | 1896138 | 08-18-16 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54170614 | 08-19-16 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | N9030A | MY54490312 | 08-19-16 |
| Bluetooth Tester | TESCOM | TC-3000C | 3000C000546 | 08-18-16 |
| Average Power Sensor | R&S | NRZ-Z91 | 102681 | 08-18-16 |
| Average Power Sensor | Agilent / HP | U2000 | MY54270007 | 08-18-16 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100439 | 08-19-16 |
| EMI Test Receive, 40 GHz | R&S | ESU40 | 100457 | 08-19-16 |
| EMI Test Receive, 3 GHz | R&S | ESR3 | 101832 | 08-19-16 |
| Attenuator / Switch driver | HP | 11713A | 3748A04272 | N/A |
| Low Pass Filter 3GHz | Micro-Tronics | LPS17541 | 009 | 08-18-16 |
| Low Pass Filter 3GHz | Micro-Tronics | LPS17541 | 015 | 08-18-16 |
| High Pass Filter 5GHz | Micro-Tronics | HPS17542 | 009 | 08-18-16 |
| High Pass Filter 6GHz | Micro-Tronics | HPM17543 | 010 | 08-18-16 |
| High Pass Filter 5GHz | Micro-Tronics | HPS17542 | 016 | 08-18-16 |
| High Pass Filter 6GHz | Micro-Tronics | HPM17543 | 015 | 08-18-16 |
| LISN | R&S | ENV-216 | 101836 | 08-19-16 |
| LISN | R&S | ENV-216 | 101837 | 08-19-16 |


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# 7. LIMITS AND RESULTS

## 7.1. 99% BANDWIDTH

**LIMITS**

None; for reporting purposes only.

**TEST PROCEDURE**

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

**RESULTS**

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---|---|---|
| Low | 2402 | 1.012 |
| Mid | 2441 | 1.014 |
| High | 2480 | 1.014 |
| Worst | | 1.014 |


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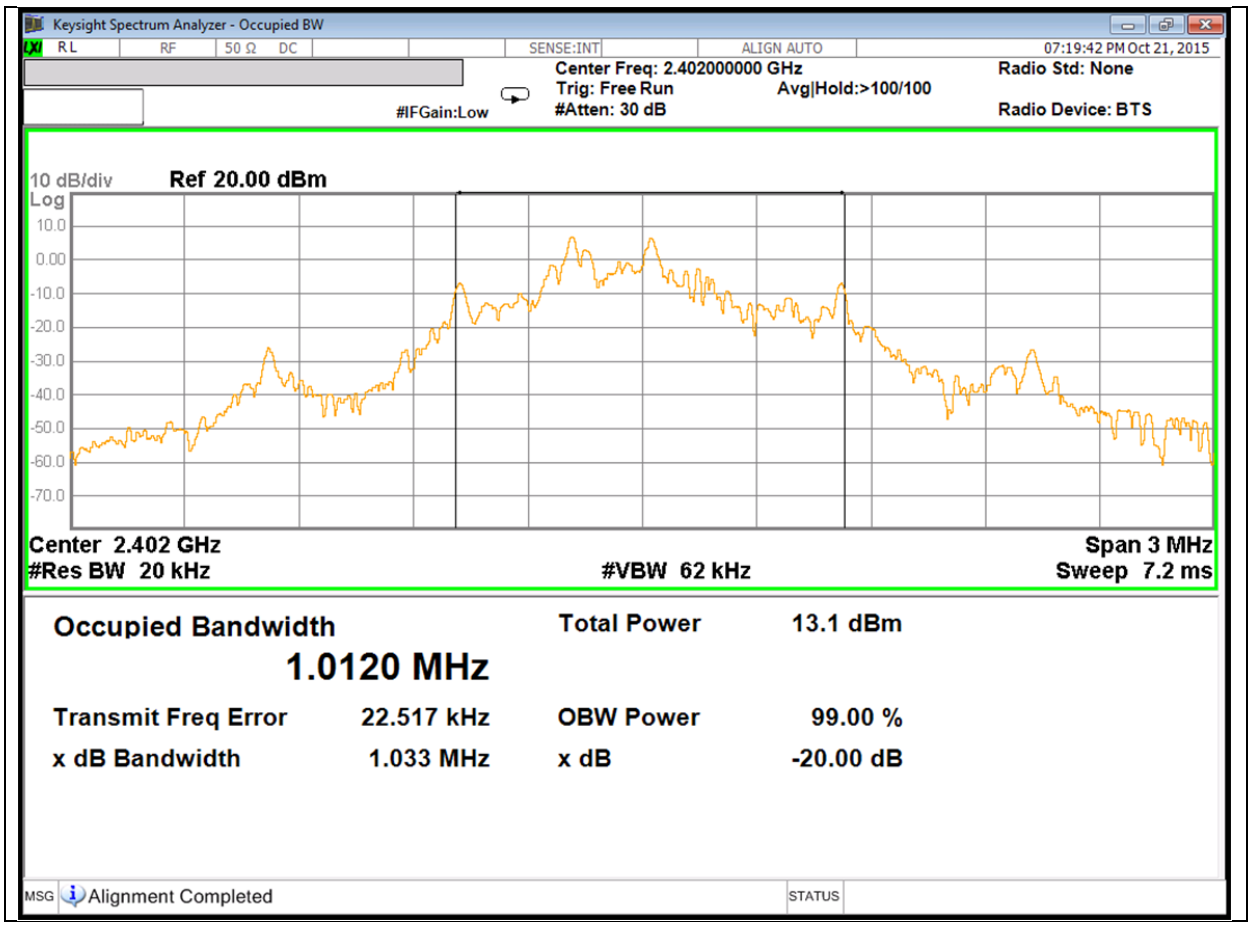
**99% BANDWIDTH PLOTS**

## LOW CHANNEL





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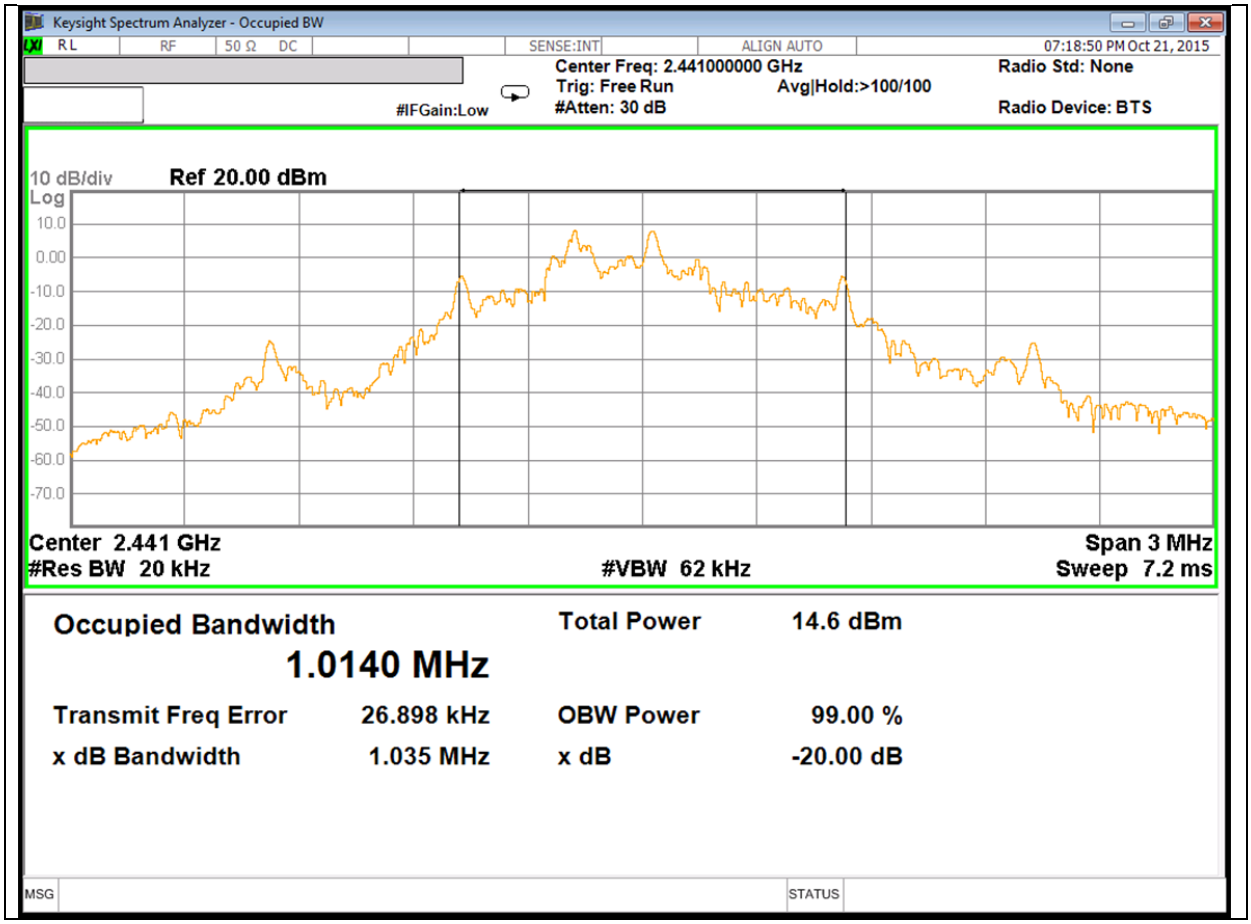
## MID CHANNEL





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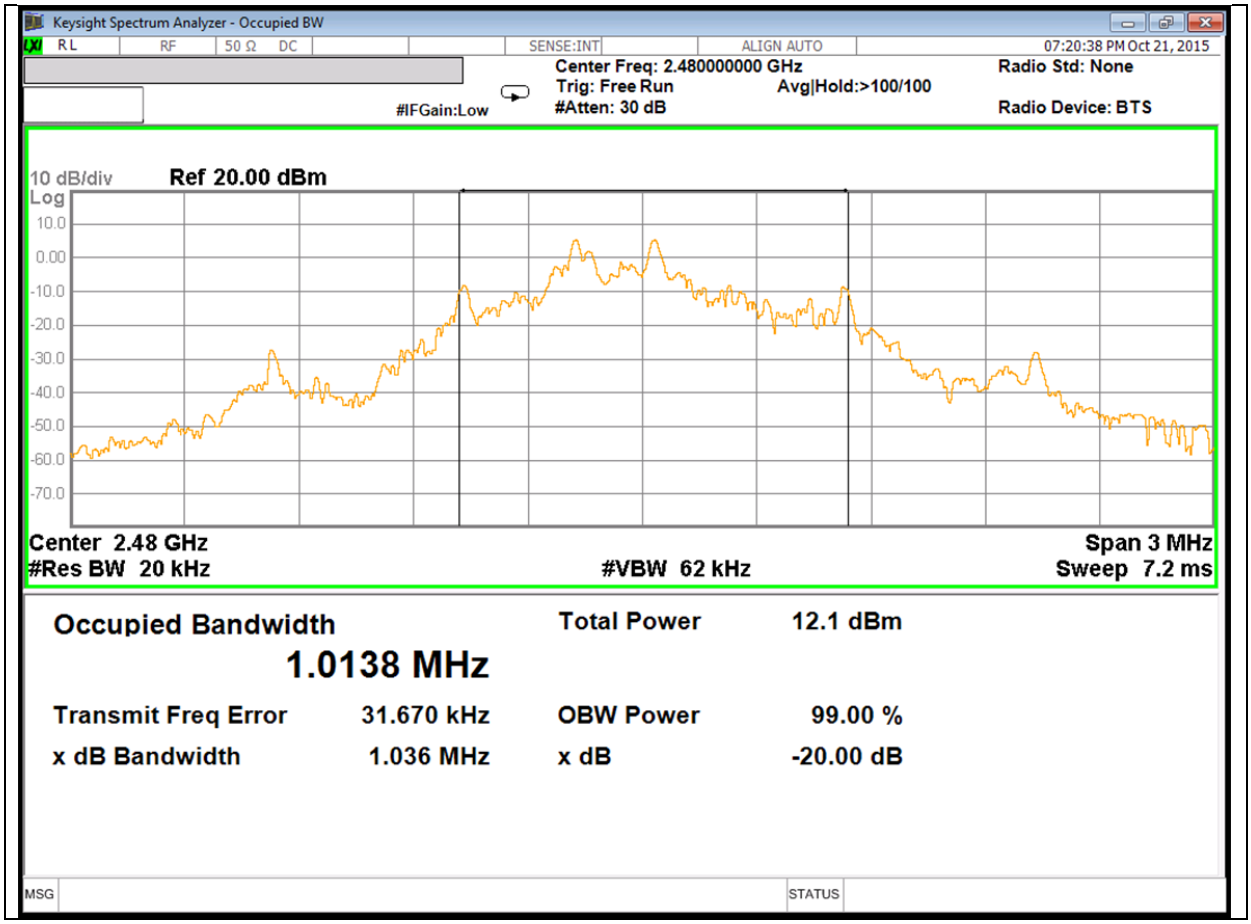
## HIGH CHANNEL





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## 7.2. TRANSMITTER RADIATED EMISSIONS

**TEST PROCEDURE**

ANSI C63.10: 2009

**LIMIT**

FCC 15.249
IC RSS-210, A2.9

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.
(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|---|---|---|
| 902–928 MHz | 50 | 500 |
| 2400–2483.5 MHz | 50 | 500 |
| 5725–5875 MHz | 50 | 500 |
| 24.0–24.25 GHz | 250 | 2500 |

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

(e) As shown in Sec. 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 0.009–0.490 | 2400/F(kHz) | 300 |
| 0.490–1.705 | 24000/F(kHz) | 30 |
| 1.705–30.0 | 30 | 30 |
| 30–88 | 100 ** | 3 |
| 88–216 | 150 ** | 3 |
| 216–960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.


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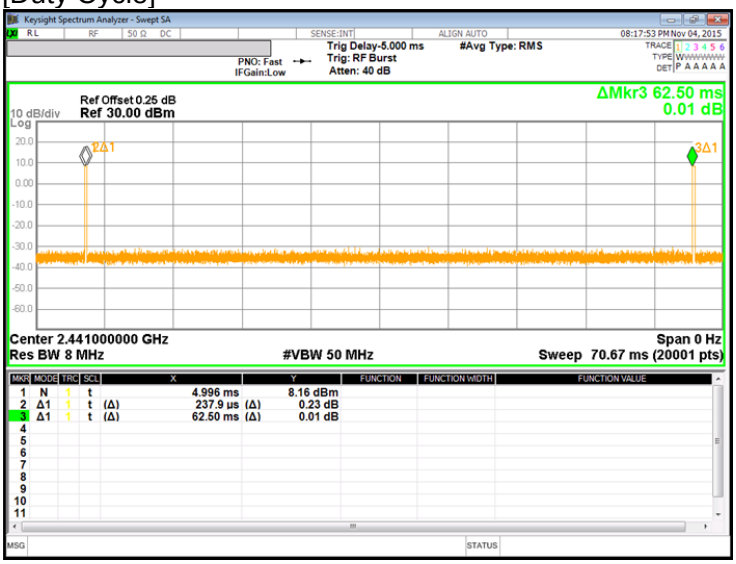
**RESULTS**

## 7.2.1. DUTY CYCLE

[Duty Cycle]




[Duration Time]

**Duty Cycle = ON time / Period = 0.238 / 62.50 = 0.38%**
**Duty Cycle Factor= 20log(0.0038) = -48.40 dB**
**VBW=1/(0.238ms)= 4.202 kHz**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## 7.2.2. FUNDAMENTAL FREQUENCY RADIATED EMISSION

FCC
UL SUWON LAB
Chamber 1

| | |
|---|---|
| Project #: | 15K22047 |
| Report #: | 15K22047 |
| Date& Time: | 2015-10-26 |
| Test Engr: | Steven.Kim |

| | |
|---|---|
| Company: | Samsung |
| EUT Description: | GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS/b/g/n, NFC and ANT+ |
| Test Configuration : | Z POSITION |
| Type of Test: | FCC |
| Mode of Operation: | Transmitting : ANT+ mode |

M% = ((t1+t2+t3+…)/T) * 66.83% = 0.38%

| | |
|---|---|
| Av Reading = Pk Reading + 20*log(M%) | |
| 20 * log (M%) = | -48.40 |

| Freq. (MHz) | Pk Rdg (dBuV) | Av Rdg (dBuV) | AF (dB) | Closs (dB) | Pre-amp (dB) | Pk Level (dBuV/m) | Av Level (dBuV/m) | Pk Limit FCC_B | Av Limit FCC_B | Pk Margin (dB) | Avg Margin (dB) | Pol (H/V) | Az (Deg) | Height (Meter) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low channel | | | | | | | | | | | | | | |
| 2402.00 | 105.12 | 56.72 | 27.85 | -38.39 | 0.00 | 94.58 | 46.18 | 114.00 | 94.00 | -19.42 | -47.82 | 3mV | 0.00 | 1.00 |
| 2402.00 | 105.90 | 57.50 | 27.85 | -38.39 | 0.00 | 95.36 | 46.96 | 114.00 | 94.00 | -18.64 | -47.04 | 3mH | 0.00 | 2.00 |
| Mid channel | | | | | | | | | | | | | | |
| 2442.00 | 106.20 | 57.80 | 27.85 | -38.39 | 0.00 | 95.66 | 47.26 | 114.00 | 94.00 | -18.34 | -46.74 | 3mV | 0.00 | 1.00 |
| 2442.00 | 106.47 | 58.07 | 27.85 | -38.39 | 0.00 | 95.93 | 47.53 | 114.00 | 94.00 | -18.07 | -46.47 | 3mH | 0.00 | 2.00 |
| High channel | | | | | | | | | | | | | | |
| 2480.00 | 102.96 | 54.56 | 27.85 | -38.39 | 0.00 | 92.42 | 44.02 | 114.00 | 94.00 | -21.58 | -49.98 | 3mV | 0.00 | 1.00 |
| 2480.00 | 104.28 | 55.88 | 27.85 | -38.39 | 0.00 | 93.74 | 45.34 | 114.00 | 94.00 | -20.26 | -48.66 | 3mH | 0.00 | 2.00 |

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet


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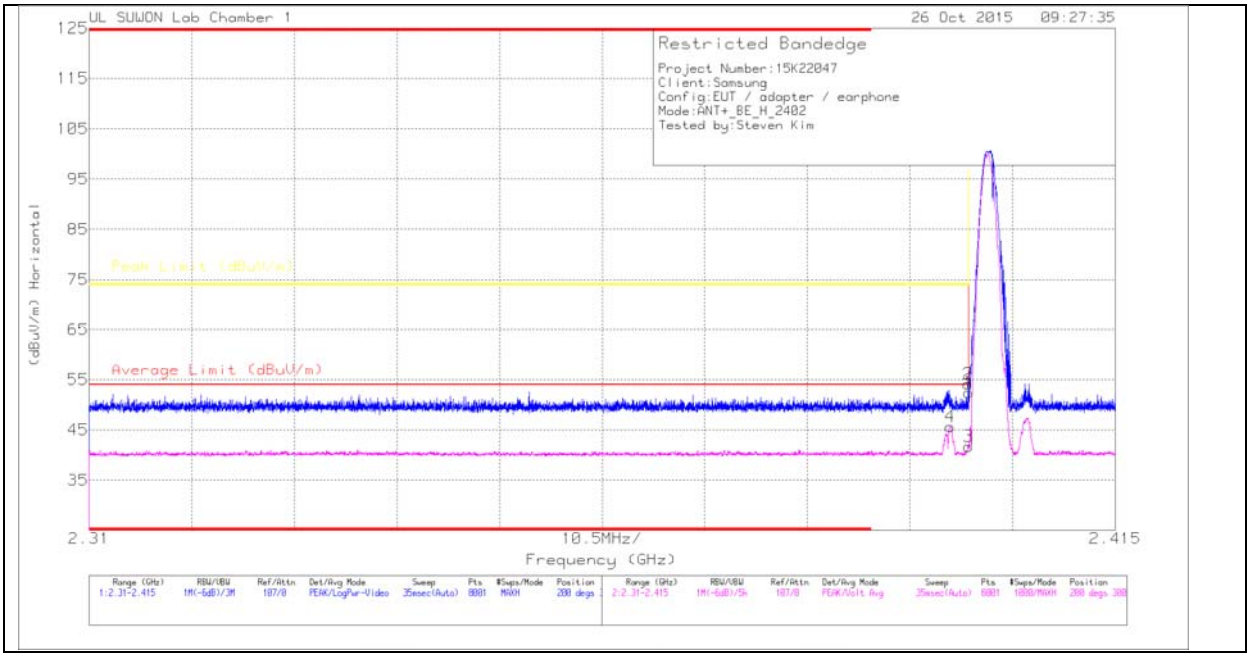
## 7.2.3. TRANSMITTER RESTRICTED BAND EDGES

**BANDEDGE (LOW CHANNEL, HORIZONTAL)**




**HORIZONTAL DATA**

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.4 | 49.06 | Pk | 31.8 | -28.4 | 52.46 | - | - | 74 | -21.54 | 200 | 300 | H |
| 2 | 2.4 | 50.75 | Pk | 31.8 | -28.4 | 54.15 | - | - | 74 | -19.85 | 200 | 300 | H |
| 3 | 2.4 | 38.35 | V1TV | 31.8 | -28.4 | 41.75 | 54 | -12.25 | - | - | 200 | 300 | H |
| 4 | 2.398 | 42.26 | V1TV | 31.8 | -28.4 | 45.66 | 54 | -8.34 | - | - | 200 | 300 | H |

Pk - Peak detector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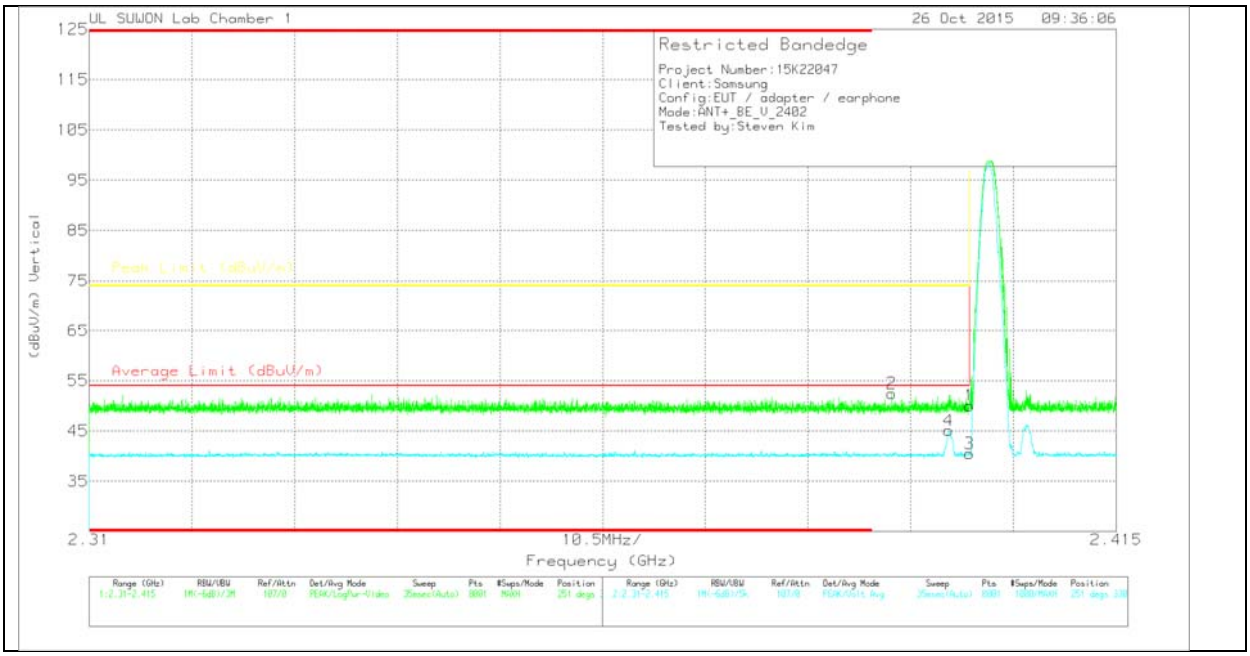
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.4 | 46.66 | Pk | 31.8 | -28.4 | 50.06 | - | - | 74 | -23.94 | 251 | 330 | V |
| 2 | 2.392 | 49.07 | Pk | 31.8 | -28.4 | 52.47 | - | - | 74 | -21.53 | 251 | 330 | V |
| 3 | 2.4 | 37.13 | V1TV | 31.8 | -28.4 | 40.53 | 54 | -13.47 | - | - | 251 | 330 | V |
| 4 | 2.398 | 41.74 | V1TV | 31.8 | -28.4 | 45.14 | 54 | -8.86 | - | - | 251 | 330 | V |

Pk - Peak detector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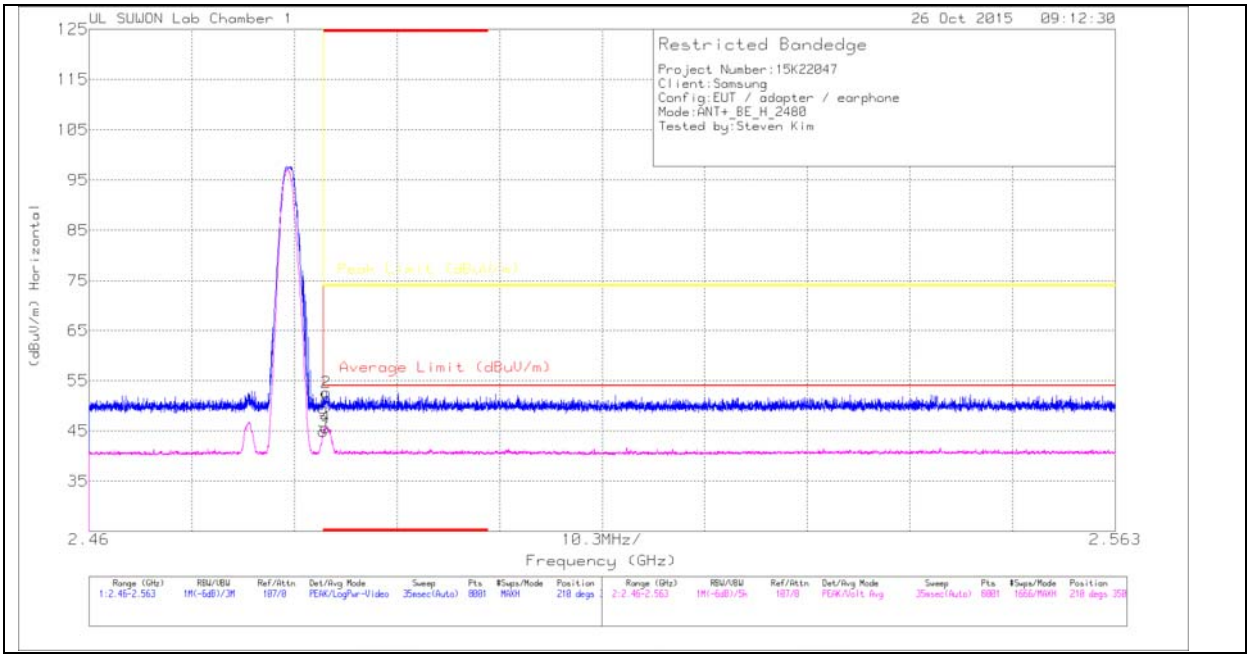
# AUTHORIZED BANDEDGE (HIGH CHANNEL)

## HORIZONTAL PEAK AND AVERAGE PLOT




## HORIZONTAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 45.78 | Pk | 32 | -28.3 | 49.48 | - | - | 74 | -24.52 | 210 | 350 | H |
| 2 | * 2.484 | 48.96 | Pk | 32 | -28.3 | 52.66 | - | - | 74 | -21.34 | 210 | 350 | H |
| 3 | * 2.484 | 41.19 | V1TV | 32 | -28.3 | 44.89 | 54 | -9.11 | - | - | 210 | 350 | H |
| 4 | * 2.484 | 41.97 | V1TV | 32 | -28.3 | 45.67 | 54 | -8.33 | - | - | 210 | 350 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector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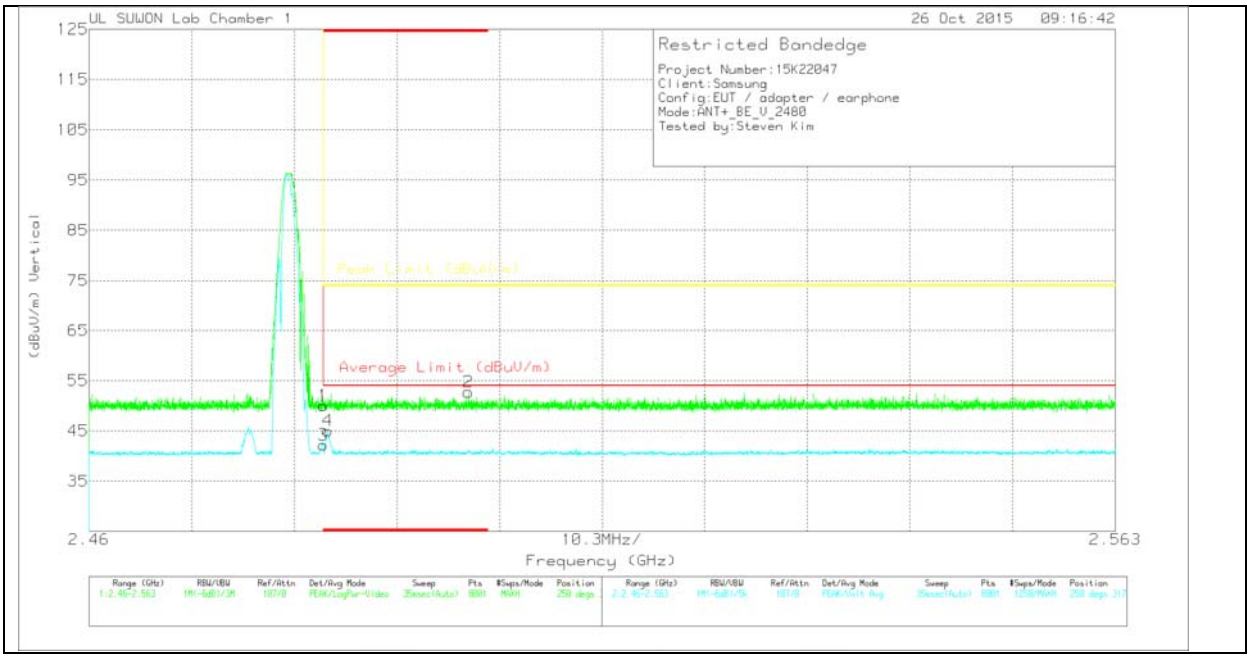
## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(00168717)_150619 | Path_2_10 dB | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 46.32 | Pk | 32 | -28.3 | 50.02 | - | - | 74 | -23.98 | 250 | 317 | V |
| 2 | * 2.498 | 49.04 | Pk | 32 | -28.3 | 52.74 | - | - | 74 | -21.26 | 250 | 317 | V |
| 3 | * 2.484 | 38.55 | V1TV | 32 | -28.3 | 42.25 | 54 | -11.75 | - | - | 250 | 317 | V |
| 4 | * 2.484 | 41.36 | V1TV | 32 | -28.3 | 45.06 | 54 | -8.94 | - | - | 250 | 317 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector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## HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

HARMONICS

FCC
UL SUWON LAB
Chamber 1

| | |
|---|---|
| Project #: | 15K22047 |
| Report #: | 15K22047 |
| Date& Time: | 2015-10-26 |
| Test Engr: | Steven.Kim |

| | |
|---|---|
| Company: | Samsung |
| EUT Description: | GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS/b/g/n/, NFC and ANT+ |
| Test Configuration : | Z POSITION |
| Type of Test: | FCC |
| Mode of Operation: | Transmitting : ANT+ mode |

M% = ((t1+t2+t3+...)/T) * 66.83% = 0.38%

| | |
|---|---|
| Av Reading = Pk Reading + 20*log(M%) | |
| 20 * log (M%) = | -48.40 |

| Freq. (MHz) | Pk Rdg (dBuV) | Av Rdg (dBuV) | AF (dB) | Closs (dB) | Pre-amp (dB) | Pk Level (dBuV/m) | Av Level (dBuV/m) | Pk Limit FCC_B | Av Limit FCC_B | Pk Margin (dB) | Avg Margin (dB) | Pol (H/V) | Az (Deg) | Height (Meter) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low channel | | | | | | | | | | | | | | |
| 4804.00 | 46.69 | 38.69 | 32.00 | -33.07 | 0.00 | 45.62 | 37.62 | 74.00 | 54.00 | -28.38 | -16.38 | 3mV | 0.00 | 1.00 |
| 4804.00 | 46.25 | 38.45 | 32.00 | -33.07 | 0.00 | 45.18 | 37.38 | 74.00 | 54.00 | -28.82 | -16.62 | 3mH | 0.00 | 2.00 |
| Mid channel | | | | | | | | | | | | | | |
| 4884.00 | 47.59 | 37.75 | 32.00 | -33.07 | 0.00 | 46.52 | 36.68 | 74.00 | 54.00 | -27.48 | -17.32 | 3mV | 0.00 | 1.00 |
| 4884.00 | 47.12 | 37.14 | 32.00 | -33.07 | 0.00 | 46.05 | 36.07 | 74.00 | 54.00 | -27.95 | -17.93 | 3mH | 0.00 | 2.00 |
| High channel | | | | | | | | | | | | | | |
| 4960.00 | 46.25 | 38.06 | 32.00 | -33.07 | 0.00 | 45.18 | 36.99 | 74.00 | 54.00 | -28.82 | -17.01 | 3mV | 0.00 | 1.00 |
| 4960.00 | 46.65 | 37.85 | 32.00 | -33.07 | 0.00 | 45.58 | 36.78 | 74.00 | 54.00 | -28.42 | -17.22 | 3mH | 0.00 | 2.00 |
| | | | | | | | | | | | | | | |

AVG VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet


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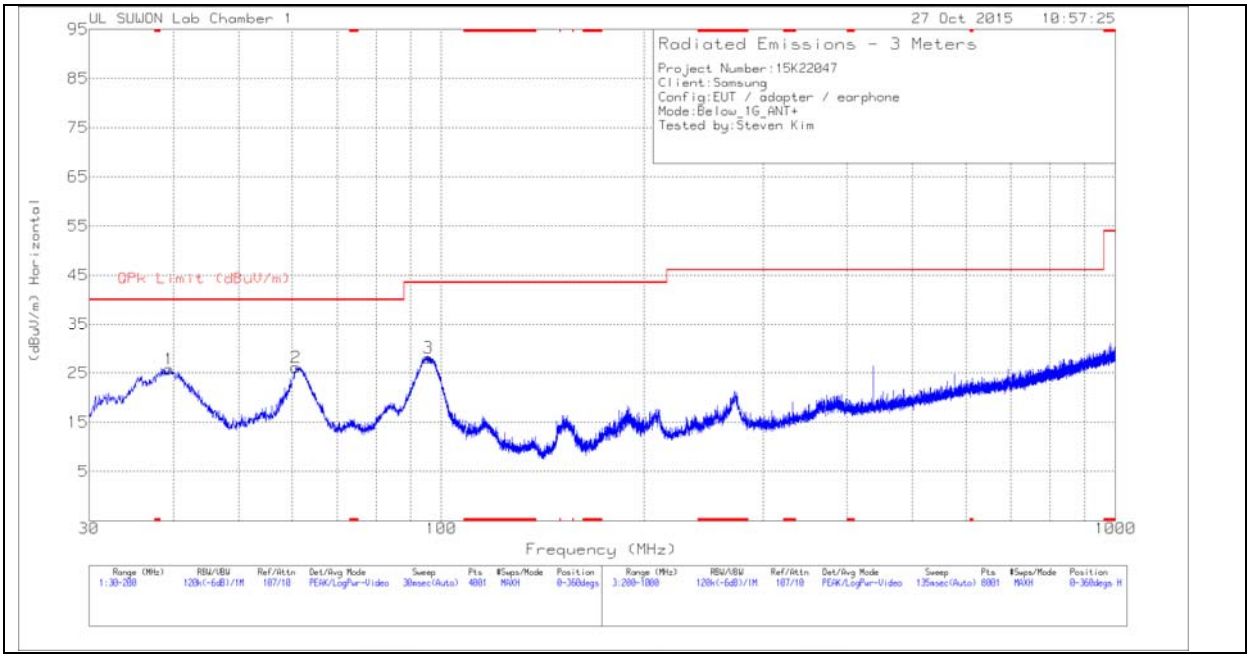
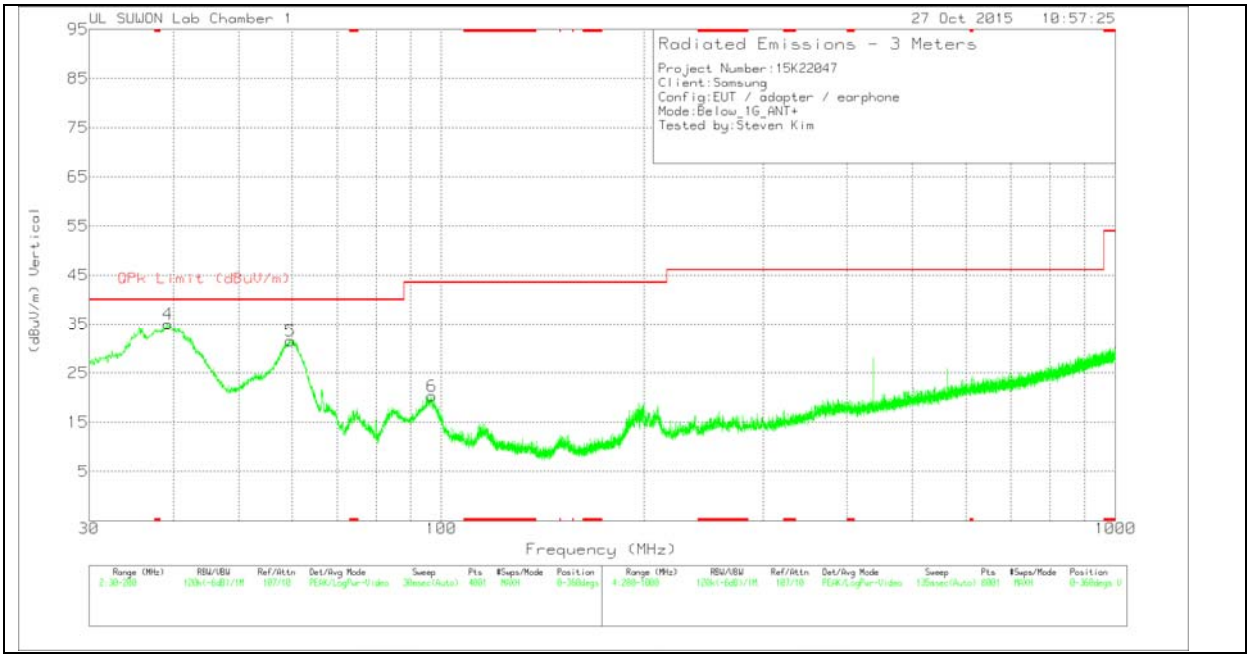
### 7.2.4. SPURIOUS BELOW 1 GHz

**SPURIOUS EMISSIONS 30 TO 1000 MHz (HORIZONTAL)**




**VERTICAL PLOT**





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# BELOW 1 GHz TABLE

Trace Markers

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | VULB9163-750 | Bi-Log | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 39.4775 | 43.78 | Pk | 12.3 | -30.3 | 25.78 | 40 | -14.22 | 0-360 | 300 | H |
| 2 | 60.855 | 43.67 | Pk | 12.4 | -29.9 | 26.17 | 40 | -13.83 | 0-360 | 400 | H |
| 3 | 95.6625 | 46.68 | Pk | 10.7 | -29.3 | 28.08 | 43.52 | -15.44 | 0-360 | 300 | H |
| 4 | 39.265 | 53.14 | Pk | 12.2 | -30.3 | 35.04 | 40 | -4.96 | 0-360 | 100 | V |
| 5 | 59.7075 | 48.75 | Pk | 12.7 | -29.9 | 31.55 | 40 | -8.45 | 0-360 | 100 | V |
| 6 | 96.81 | 38.71 | Pk | 10.9 | -29.3 | 20.31 | 43.52 | -23.21 | 0-360 | 200 | V |

Pk - Peak detector


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# 8. AC POWER LINE CONDUCTED EMISSIONS

**LIMITS**

FCC §15.207 (a)
IC RSS-GEN §8.8

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

**TEST PROCEDURE**

ANSI C63.10 - 2009


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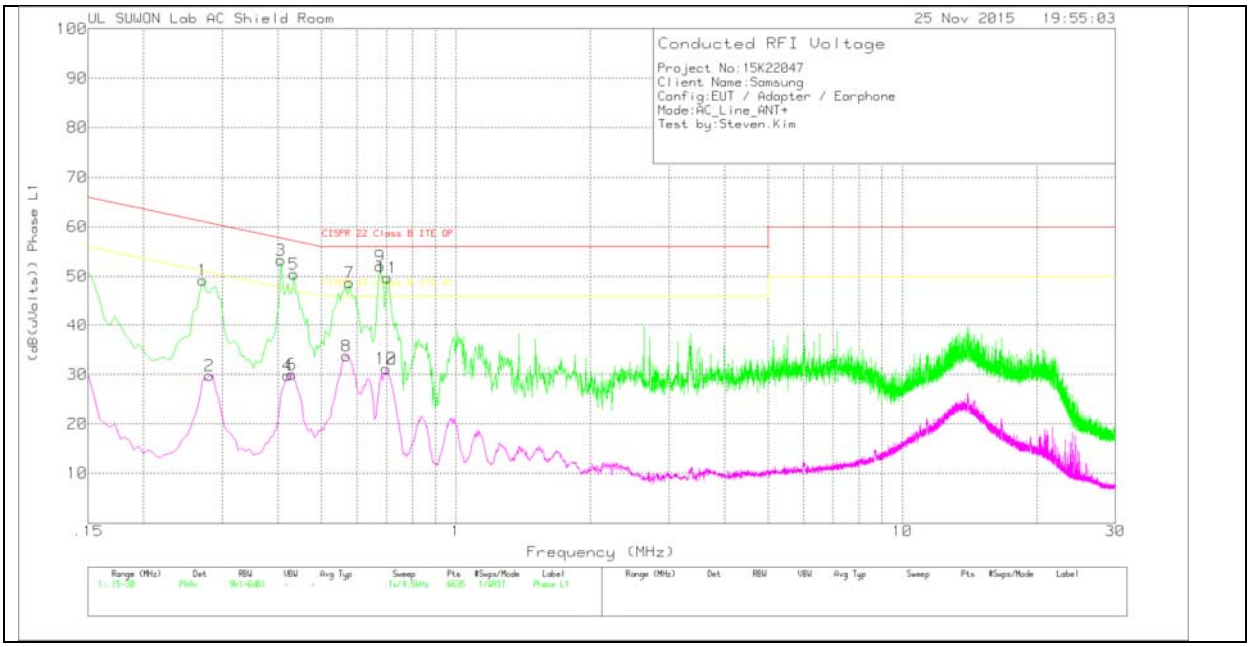
**RESULTS**

**6 WORST EMISSIONS**

## LINE 1 PLOT





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# LINE 1 RESULTS

Phase L1 .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_L1 | CE Shield Room | Corrected Reading (dBuV) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .2715 | 39.4 | Pk | 9.8 | 0 | 49.2 | 61.07 | -11.87 | - | - |
| 2 | .2805 | 20.01 | Av | 9.8 | 0 | 29.81 | - | - | 50.8 | -20.99 |
| 3 | .4065 | 43.21 | Pk | 10.1 | 0 | 53.31 | 57.72 | -4.41 | - | - |
| 4 | .42 | 19.69 | Av | 10.1 | 0 | 29.79 | - | - | 47.45 | -17.66 |
| 5 | .4335 | 40.31 | Pk | 10.1 | 0 | 50.41 | 57.19 | -6.78 | - | - |
| 6 | .429 | 19.95 | Av | 10.1 | 0 | 30.05 | - | - | 47.27 | -17.22 |
| 7 | .5775 | 38.64 | Pk | 10.1 | 0 | 48.74 | 56 | -7.26 | - | - |
| 8 | .5685 | 23.66 | Av | 10.1 | 0 | 33.76 | - | - | 46 | -12.24 |
| 9 | .6765 | 41.96 | Pk | 10.1 | 0 | 52.06 | 56 | -3.94 | - | - |
| 10 | .699 | 21.1 | Av | 10.1 | 0 | 31.2 | - | - | 46 | -14.8 |
| 11 | .7035 | 39.55 | Pk | 10.1 | 0 | 49.65 | 56 | -6.35 | - | - |
| 12 | .699 | 21.1 | Av | 10.1 | 0 | 31.2 | - | - | 46 | -14.8 |

Pk - Peak detector

Av - Average detection

## Quasi-Peak Emissions

Phase L1 .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_L1 | CE Shield Room | Corrected Reading (dB(uVolts)) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .2751 | 34.05 | Qp | 9.8 | 0 | 43.85 | 60.96 | -17.11 | - | - |
| .4029 | 29.67 | Qp | 10.1 | 0 | 39.77 | 57.79 | -18.02 | - | - |
| .4326 | 31.85 | Qp | 10.1 | 0 | 41.95 | 57.2 | -15.25 | - | - |
| .5802 | 32.11 | Qp | 10.1 | 0 | 42.21 | 56 | -13.79 | - | - |
| .6747 | 26.39 | Qp | 10.1 | 0 | 36.49 | 56 | -19.51 | - | - |
| .7053 | 26.47 | Qp | 10.1 | 0 | 36.57 | 56 | -19.43 | - | - |

Qp - Quasi-Peak detector


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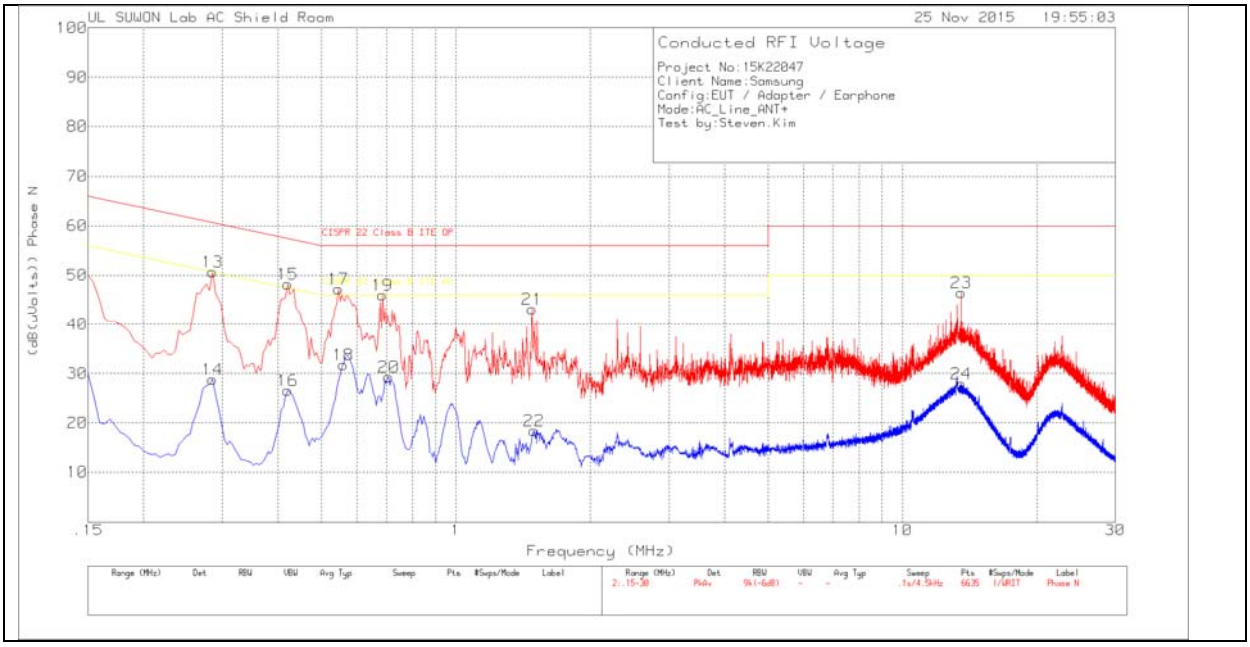
## LINE 2 PLOT





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## LINE 2 RESULTS

Phase N .15 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_N | CE Shield Room | Corrected Reading (dB(uVolts)) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13 | .285 | 40.9 | Pk | 9.8 | 0 | 50.7 | 60.67 | -9.97 | - | - |
| 14 | .285 | 19.03 | Av | 9.8 | 0 | 28.83 | - | - | 50.67 | -21.84 |
| 15 | .42 | 38.08 | Pk | 10.1 | 0 | 48.18 | 57.45 | -9.27 | - | - |
| 16 | .42 | 16.44 | Av | 10.1 | 0 | 26.54 | - | - | 47.45 | -20.91 |
| 17 | .546 | 37.07 | Pk | 10.1 | 0 | 47.17 | 56 | -8.83 | - | - |
| 18 | .5595 | 21.68 | Av | 10.1 | 0 | 31.78 | - | - | 46 | -14.22 |
| 19 | .6855 | 36 | Pk | 10 | 0 | 46 | 56 | -10 | - | - |
| 20 | .708 | 19.26 | Av | 10 | 0 | 29.26 | - | - | 46 | -16.74 |
| 21 | 1.482 | 33.27 | Pk | 9.8 | .1 | 43.17 | 56 | -12.83 | - | - |
| 22 | 1.4955 | 8.52 | Av | 9.8 | .1 | 18.42 | - | - | 46 | -27.58 |
| 23 | 13.5555 | 36.07 | Pk | 10.2 | .2 | 46.47 | 60 | -13.53 | - | - |
| 24 | 13.5555 | 17.47 | Av | 10.2 | .2 | 27.87 | - | - | 50 | -22.13 |

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Phase N .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | 101837_with ex-cord_N | CE Shield Room | Corrected Reading (dB(uVolts)) | CISPR 22 Class B ITE QP | Margin (dB) | CISPR 22 Class B ITE AV | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .2832 | 34.92 | Qp | 9.8 | 0 | 44.72 | 60.72 | -16 | - | - |
| .4209 | 32.75 | Qp | 10.1 | 0 | 42.85 | 57.43 | -14.58 | - | - |
| .5505 | 30.43 | Qp | 10.1 | 0 | 40.53 | 56 | -15.47 | - | - |
| .6873 | 27.14 | Qp | 10 | 0 | 37.14 | 56 | -18.86 | - | - |
| 1.4775 | 14.23 | Qp | 9.8 | .1 | 24.13 | 56 | -31.87 | - | - |
| 13.5564 | 22.44 | Qp | 10.2 | .2 | 32.84 | 60 | -27.16 | - | - |

Qp - Quasi-Peak detector


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