



**FCC CFR47 PART 15 SUBPART C**

**Bluetooth**

**C2PC CERTIFICATION TEST REPORT**

**FOR**

**GSM Phone + BT/BLE, DTS b/g/n**

**MODEL NUMBER : SM-J105H, SM-J105H/DD, SM-J105H/DS, SM-J106H/DS**

**FCC ID: A3LSMJ105H**

**REPORT NUMBER: 15K23808-E3V2**

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*Prepared for*

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Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u>                         | <u>Revised By</u> |
|-------------|-------------------|------------------------------------------|-------------------|
| V1          | 09/12/16          | Initial issue                            | SungGil Park      |
| V2          | 09/30/16          | Revised report to address TCB's question | SungGil Park      |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** GSM Phone + BT/BLE, DTS b/g/n  
**MODEL NUMBER:** SM-J105H, SM-J105H/DD, SM-J105H/DS, SM-J106H/DS  
**SERIAL NUMBER:** R31H80008PB (RADIATED); R31H80007AM (CONDUCTED)  
**DATE TESTED:** AUG 23, 2016 - SEP 12, 2016

| 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.

## 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                     |           |
|-------------------------------------|-----------|
| <input checked="" type="checkbox"/> | Chamber 1 |
| <input checked="" type="checkbox"/> | Chamber 2 |

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable} \\ &\text{Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 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%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is GSM Phone + BT/BLE, DTS b/g/n.  
This test report addresses the DSS (BT) operational mode.

SM-J105H and SM-J105H/DS are same hardware, but for different number of SIM card slot.  
SM-J105H has one slot. SM-J105H/DS is dual SIM version.  
SM-J105H/DS and SM-J106H/DS are same hardware, but for different memory capacity and flash LED.  
SM-J106H/DS was used for this C2PC test.

### 5.2. MAXIMUM OUTPUT POWER

Please refer to the BT test report(15K22503-E3V1) of FCC ID: A3LSMJ105H

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 0.4 dBi.

### 5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

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

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |            |                |        |
|------------------------|--------------|------------|----------------|--------|
| Description            | Manufacturer | Model      | Serial Number  | FCC ID |
| Charger                | SAMSUNG      | EP-TA60EBE | R37G6HL0KJ1SC3 | N/A    |
| Earphone               | SAMSUNG      | EHS61ASFWE | N/A            | N/A    |

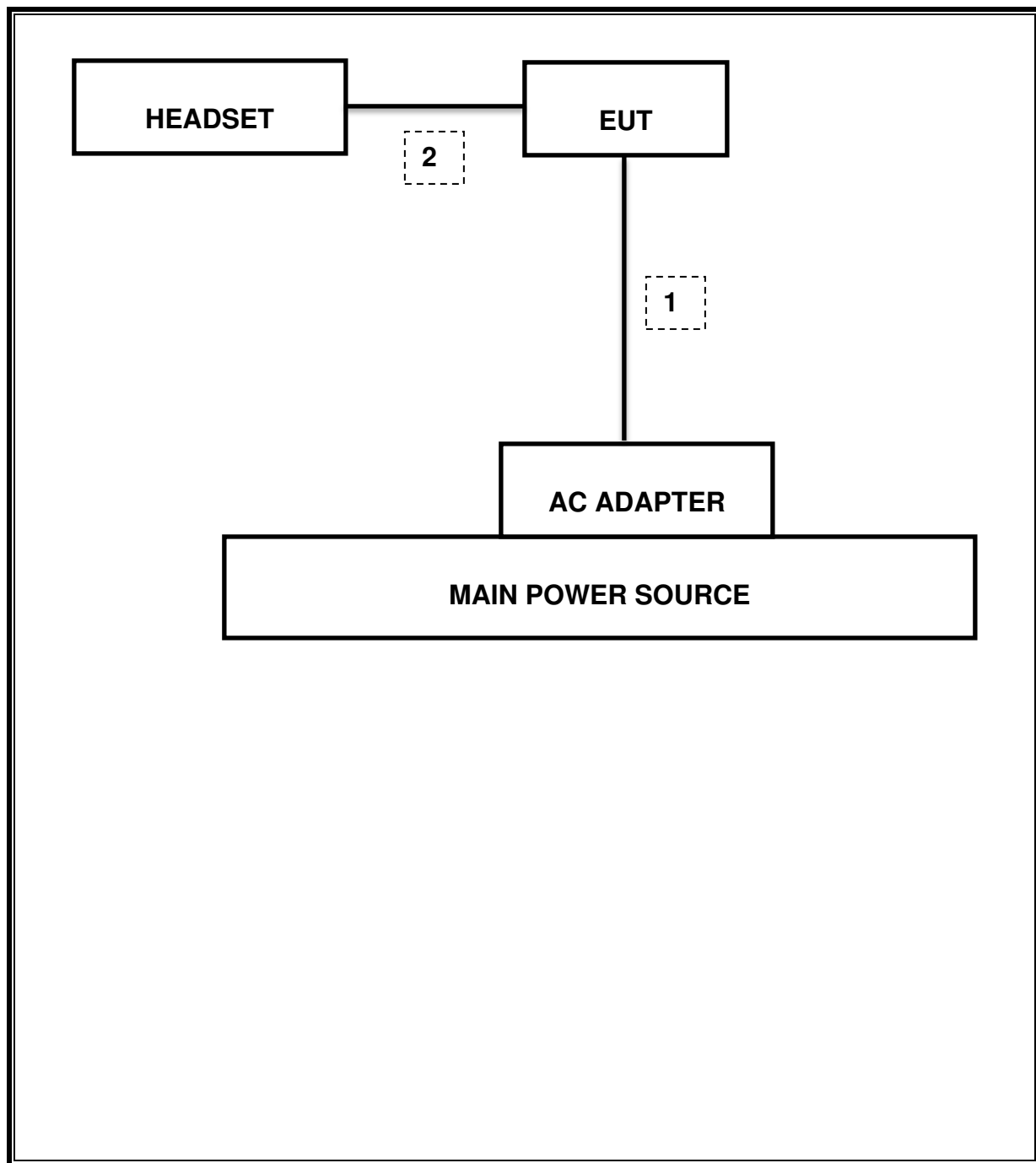
### I/O CABLES

| 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     |
| 1              | Audio    | 1                    | Mini-Jack      | Unshielded | 1.0m             | N/A     |

### TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests.  
EUT was set in the Hidden menu mode to enable BT communications.

**SETUP DIAGRAM FOR TESTS**



## 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               | 750         | 11-17-16 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK   | VULB9163               | 749         | 04-25-17 |
| Antenna, Horn, 18 GHz      | ETS           | 3115                   | 00167211    | 09-20-16 |
| Antenna, Horn, 18 GHz      | ETS           | 3115                   | 00161451    | 05-17-17 |
| Antenna, Horn, 18 GHz      | ETS           | 3117                   | 00168724    | 06-17-17 |
| Antenna, Horn, 18 GHz      | ETS           | 3117                   | 00168717    | 06-17-17 |
| Antenna, Horn, 40 GHz      | ETS           | 3116C                  | 00166155    | 11-30-17 |
| Antenna, Horn, 40 GHz      | ETS           | 3116C-PA               | 00168841    | 12-15-17 |
| Antenna, Loop, 9kHz-30MHz  | R&S           | HFH2-Z2                | 100418      | 11-25-17 |
| Preamplifier, 1000 MHz     | Sonoma        | 310N                   | 341282      | 08-17-17 |
| Preamplifier, 1000 MHz     | Sonoma        | 310N                   | 351741      | 08-16-17 |
| Preamplifier               | ETS           | 3115-PA                | 00167475    | 08-17-17 |
| Preamplifier, 18 GHz       | Miteq         | AFS42-00101800-25-S-42 | 1896138     | 08-16-17 |
| Spectrum Analyzer, 44 GHz  | Agilent / HP  | N9030A                 | MY54170614  | 08-17-17 |
| Spectrum Analyzer, 44 GHz  | Agilent / HP  | N9030A                 | MY54490312  | 08-16-17 |
| Bluetooth Tester           | TESCOM        | TC-3000C               | 3000C000546 | 08-18-17 |
| Average Power Sensor       | R&S           | NRZ-Z91                | 102681      | 08-16-17 |
| Average Power Sensor       | Agilent / HP  | U2000                  | MY54270007  | 08-17-17 |
| EMI Test Receive, 40 GHz   | R&S           | ESU40                  | 100439      | 08-17-17 |
| EMI Test Receive, 40 GHz   | R&S           | ESU40                  | 100457      | 08-16-17 |
| EMI Test Receive, 3 GHz    | R&S           | ESR3                   | 101832      | 08-16-17 |
| Attenuator / Switch driver | HP            | 11713A                 | 3748A04272  | N/A      |
| Low Pass Filter 5GHz       | Micro-Tronics | LPS17541               | 009         | 08-17-17 |
| Low Pass Filter 5GHz       | Micro-Tronics | LPS17541               | 015         | 08-16-17 |
| High Pass Filter 3GHz      | Micro-Tronics | HPM17543               | 010         | 08-17-17 |
| High Pass Filter 3GHz      | Micro-Tronics | HPM17543               | 015         | 08-16-17 |
| High Pass Filter 6GHz      | Micro-Tronics | HPM17542               | 009         | 08-17-17 |
| High Pass Filter 6GHz      | Micro-Tronics | HPM17542               | 016         | 08-16-17 |
| LISN                       | R&S           | ENV-216                | 101836      | 08-16-17 |
| LISN                       | R&S           | ENV-216                | 101837      | 08-16-17 |
| Attenuator                 | PASTERNAK     | PE7087-10              | A009        | 08-16-17 |

## 7. SUMMARY TABLE

C2PC Reason: Please see SM-J106B C2PC description for details.

: The only changes of this C2PC model are memory capacity and flash LED (minor circuitry for non-transmitter portions), so we tested only radiated items.

The other items, please refer to the DTS test report(15K22503-E2V1) of FCC ID: A3LSMJ105H

| FCC Part Section   | Test Description                        | Test Limit                            | Test Condition       | Test Result  |
|--------------------|-----------------------------------------|---------------------------------------|----------------------|--------------|
| 2.1049             | Occupied Band width (99%)               | N/A                                   | Conducted            | See Original |
| 2.1051, 15.247 (d) | Band Edge / Conducted Spurious Emission | -20dBc                                |                      | See Original |
| 15.247 (b)(1)      | TX conducted output power               | <21dBm                                |                      | See Original |
| 15.247 (a)(1)      | Hopping frequency separation            | > 25KHz                               |                      | See Original |
| 15.247 (a)(1)(iii) | Number of Hopping channels              | More than 15 non-overlapping channels |                      | See Original |
| 15.247 (a)(1)(iii) | Avg Time of Occupancy                   | < 0.4sec                              |                      | See Original |
| 15.207 (a)         | AC Power Line conducted emissions       | Section 10                            | Power Line conducted | See Original |
| 15.205, 15.209     | Radiated Spurious Emission              | < 40dBuV/m                            | Radiated             | Pass         |

## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

| Limits for radiated disturbance of an intentional radiator |                 |                          |
|------------------------------------------------------------|-----------------|--------------------------|
| Frequency range (MHz)                                      | Limits (µV/m)   | Measurement Distance (m) |
| 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.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements. (Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.)

For band edge measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 1/T (on time) for average measurement.

$GFSK = 1/T = 1 / 0.0029S = 350Hz$ .

The minimum VBW was 350Hz, but test receiver(ESU40) couldn't set value 350Hz. Due to this reason, testing VBW was set to 500Hz(Worst cases).

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.  
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).  
Per FCC part 15.31(o), test results were not reported.

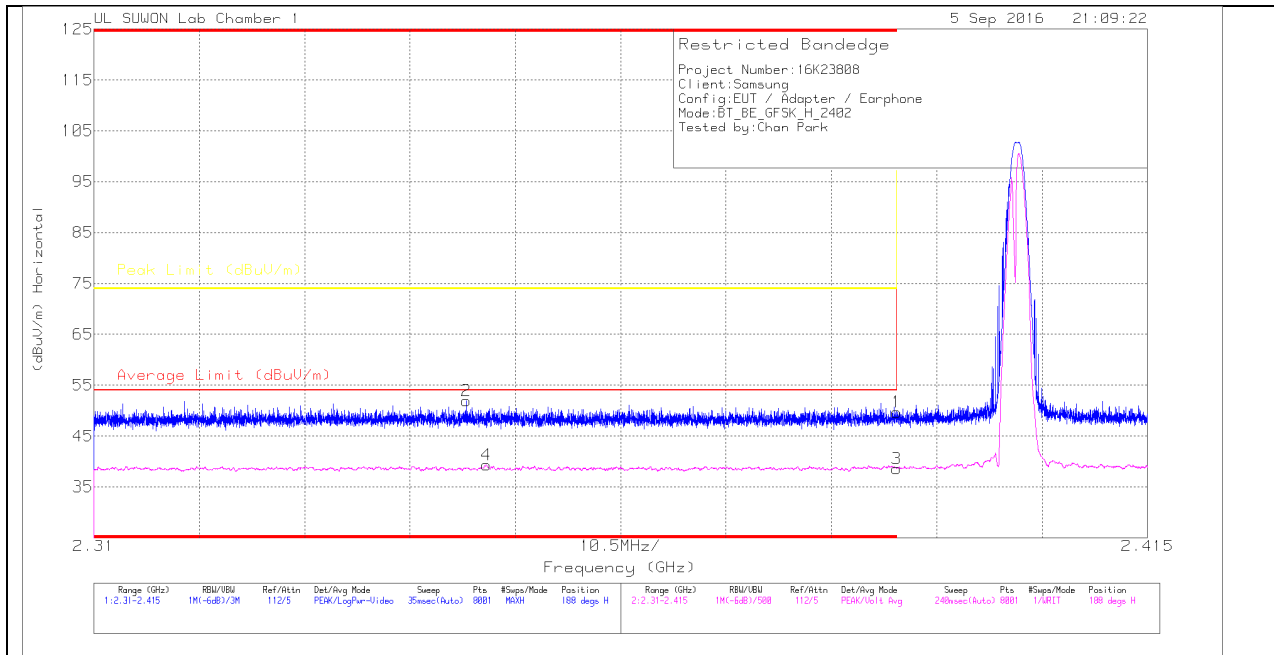
Formula for converting the field strength from  $\mu V/m$  to  $dB\mu V/m$  is:  
 $Limit (dB\mu V/m) = 20 \log limit (\mu V/m)$

## 8.1. TRANSMITTER ABOVE 1 GHz

### 8.1.1. BASIC DATA RATE GFSK MODULATION

#### RESTRICTED BANDEDGE (LOW CHANNEL)

##### HORIZONTAL PEAK AND AVERAGE PLOT



##### HORIZONTAL DATA

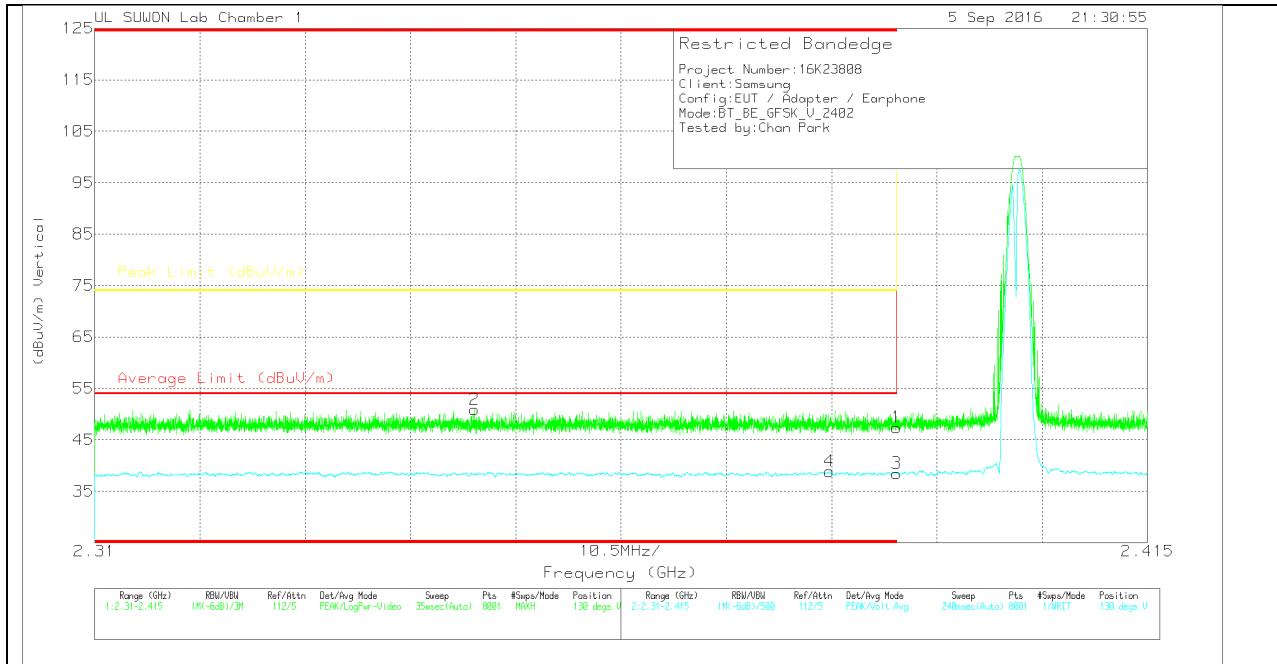
##### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 3117(0016 8717)_150 619 | Path_2 | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y | Marker |
|--------|-----------------|----------------------|------|-------------------------|--------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1      | * 2.39          | 46.85                | PK   |                         | -29    | 49.65                      | -                      | -           | 74                  | -24.35         | 188            | 111         | H         | 1      |
| 2      | * 2.347         | 49.26                | PK   |                         | -29    | 51.96                      | -                      | -           | 74                  | -22.04         | 188            | 111         | H         | 2      |
| 3      | * 2.39          | 35.82                | VA1T |                         | -29    | 38.62                      | 54                     | -15.38      | -                   | -              | 188            | 111         | H         | 3      |
| 4      | * 2.349         | 36.64                | VA1T |                         | -29    | 39.34                      | 54                     | -14.66      | -                   | -              | 188            | 111         | H         | 4      |

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

PK - Peak detector

## VERTICAL PEAK AND AVERAGE PLOT



## VERTICAL DATA

### Trace Markers

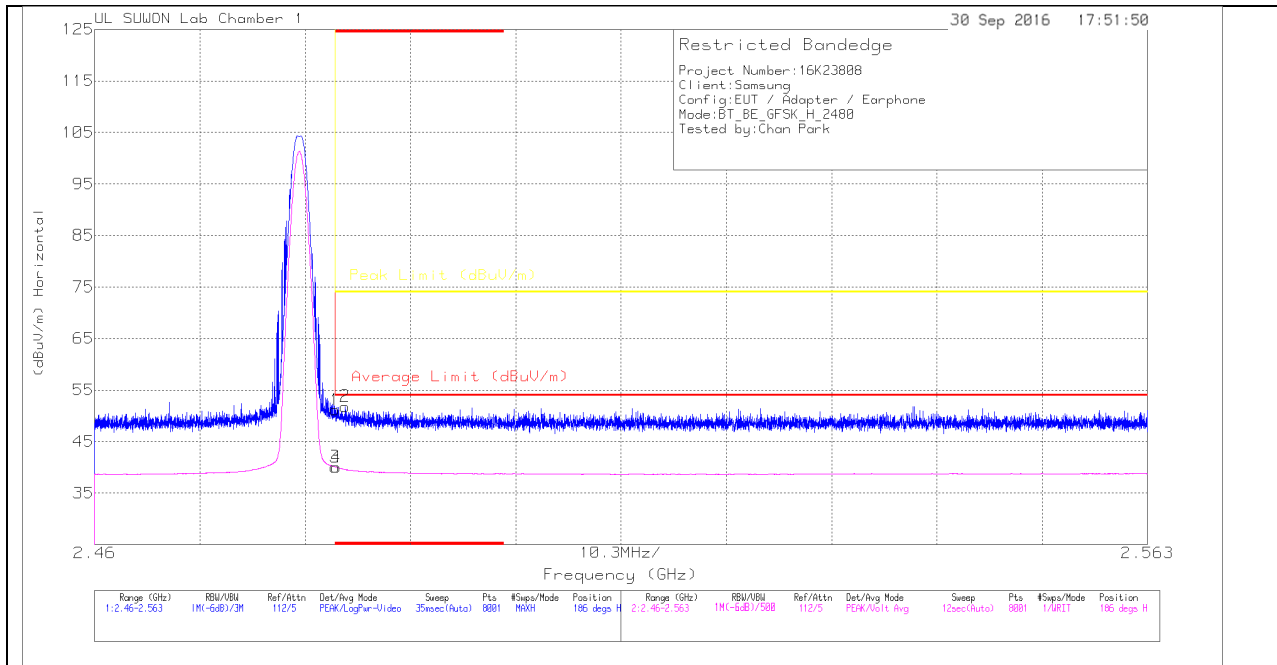
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 3117(0016 8717)_150 619 | Path_2 | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y | Marker |
|--------|-----------------|----------------------|------|-------------------------|--------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1      | * 2.39          | 44.59                | Pk   | 31.8                    | -29    | 47.39                      | -                      | -           | 74                  | -26.61         | 130            | 244         | V         | 1      |
| 2      | * 2.348         | 48.17                | Pk   | 31.7                    | -29    | 50.87                      | -                      | -           | 74                  | -23.13         | 130            | 244         | V         | 2      |
| 3      | * 2.39          | 35.68                | VA1T | 31.8                    | -29    | 38.48                      | 54                     | -15.52      | -                   | -              | 130            | 244         | V         | 3      |
| 4      | * 2.383         | 36.07                | VA1T | 31.8                    | -29    | 38.87                      | 54                     | -15.13      | -                   | -              | 130            | 244         | V         | 4      |

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

Pk - Peak detector

## AUTHORIZED BANDEDGE (HIGH CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

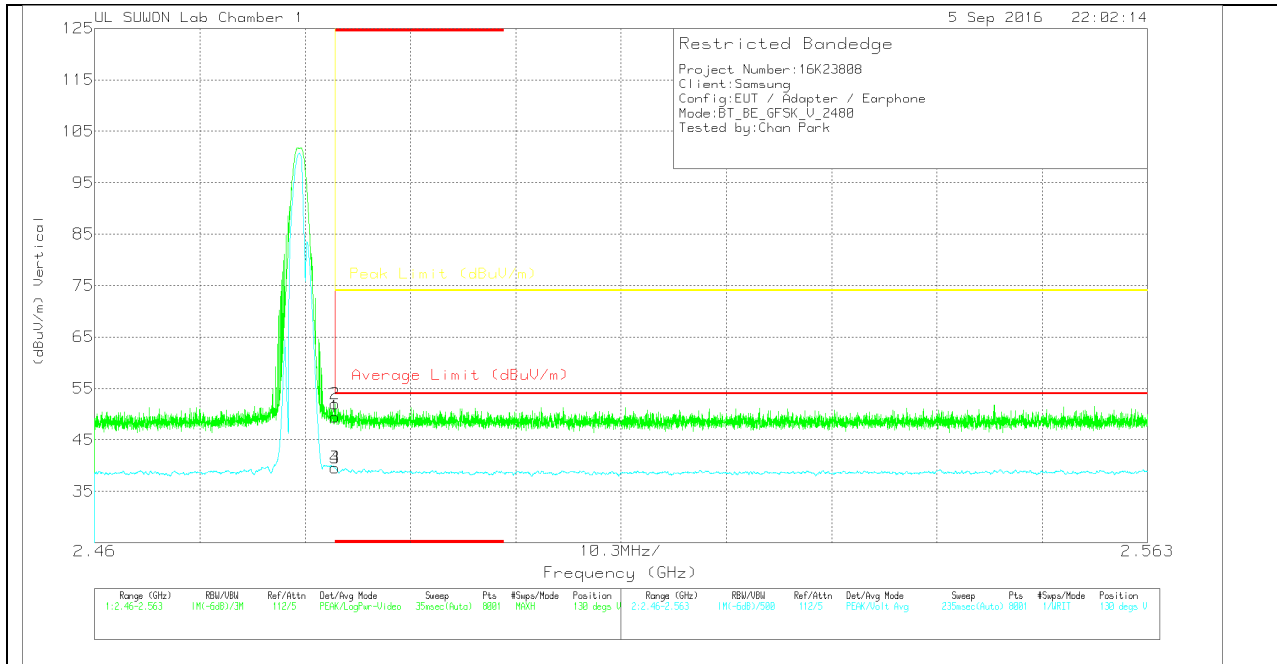
#### Trace Markers

| Marker | Frequenc<br>y<br>(GHz) | Meter<br>Reading<br>(dBuV) | Det  | 3117(0016<br>8717)_150<br>619 | Path_2 | Corrected<br>Reading<br>(dBuV/m) | Average<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Peak<br>Limit<br>(dBuV/<br>m) | PK Margin<br>(dB) | Azimuth<br>(Degs) | Height<br>(cm) | Polarit<br>y |
|--------|------------------------|----------------------------|------|-------------------------------|--------|----------------------------------|------------------------------|----------------|-------------------------------|-------------------|-------------------|----------------|--------------|
| 1      | * 2.484                | 48.06                      | Pk   | 32                            | -28.9  | 51.16                            | -                            | -              | 74                            | -22.84            | 186               | 104            | H            |
| 2      | * 2.485                | 48.71                      | Pk   | 32                            | -28.9  | 51.81                            | -                            | -              | 74                            | -22.19            | 186               | 104            | H            |
| 3      | * 2.484                | 36.98                      | VA1T | 32                            | -28.9  | 40.08                            | 54                           | -13.92         | -                             | -                 | 186               | 104            | H            |
| 4      | * 2.484                | 36.89                      | VA1T | 32                            | -28.9  | 39.99                            | 54                           | -14.01         | -                             | -                 | 186               | 104            | H            |

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

Pk - Peak detector

## VERTICAL PEAK AND AVERAGE PLOT



## VERTICAL DATA

### Trace Markers

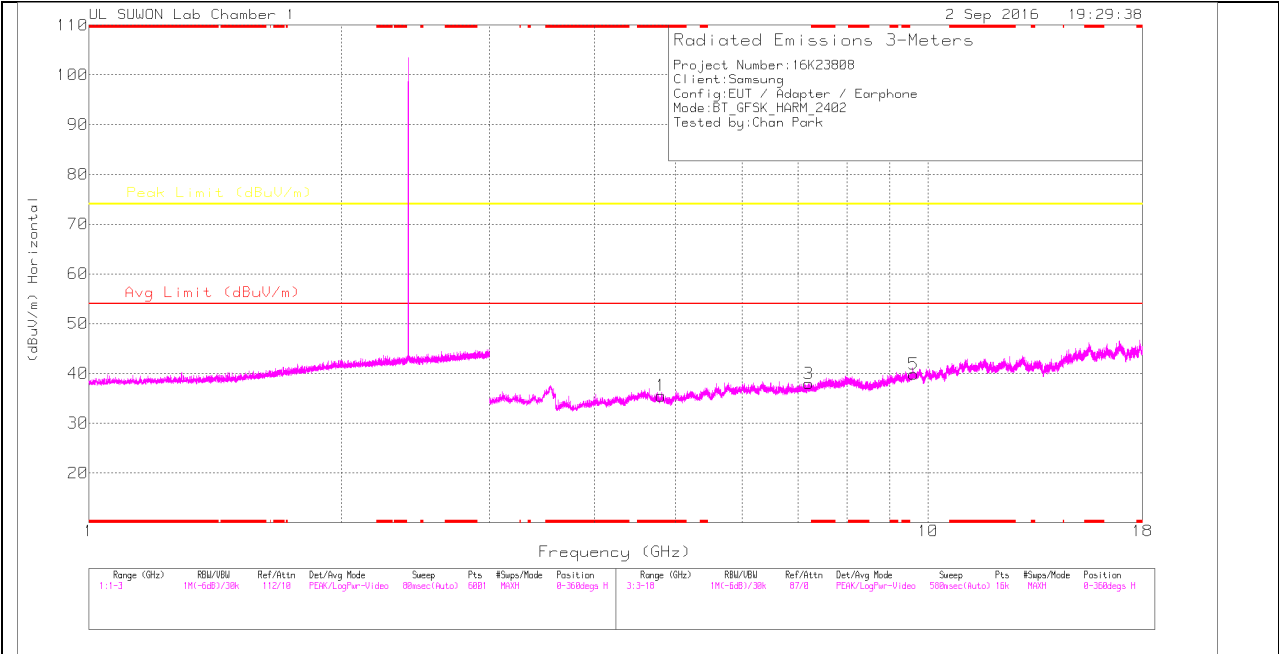
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 3117(0016 8717)_150 619 | Path_2 | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y | Marker |
|--------|-----------------|----------------------|------|-------------------------|--------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1      | * 2.484         | 46.38                | Pk   | 32                      | -28.9  | 49.48                      | -                      | -           | 74                  | -24.52         | 130            | 234         | V         | 1      |
| 2      | * 2.484         | 48.89                | Pk   | 32                      | -28.9  | 51.99                      | -                      | -           | 74                  | -22.01         | 130            | 234         | V         | 2      |
| 3      | * 2.484         | 36.48                | VA1T | 32                      | -28.9  | 39.58                      | 54                     | -14.42      | -                   | -              | 130            | 234         | V         | 3      |
| 4      | * 2.484         | 36.47                | VA1T | 32                      | -28.9  | 39.57                      | 54                     | -14.43      | -                   | -              | 130            | 234         | V         | 4      |

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

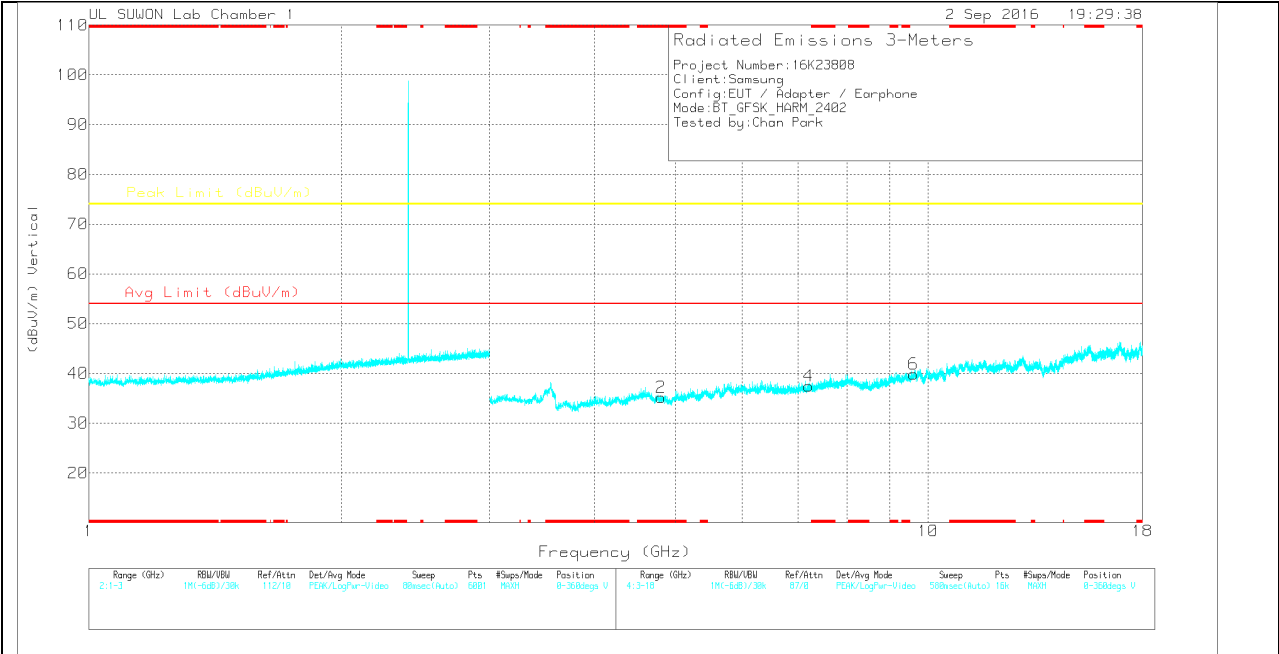
Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

## LOW CHANNEL DATA

### Trace Markers

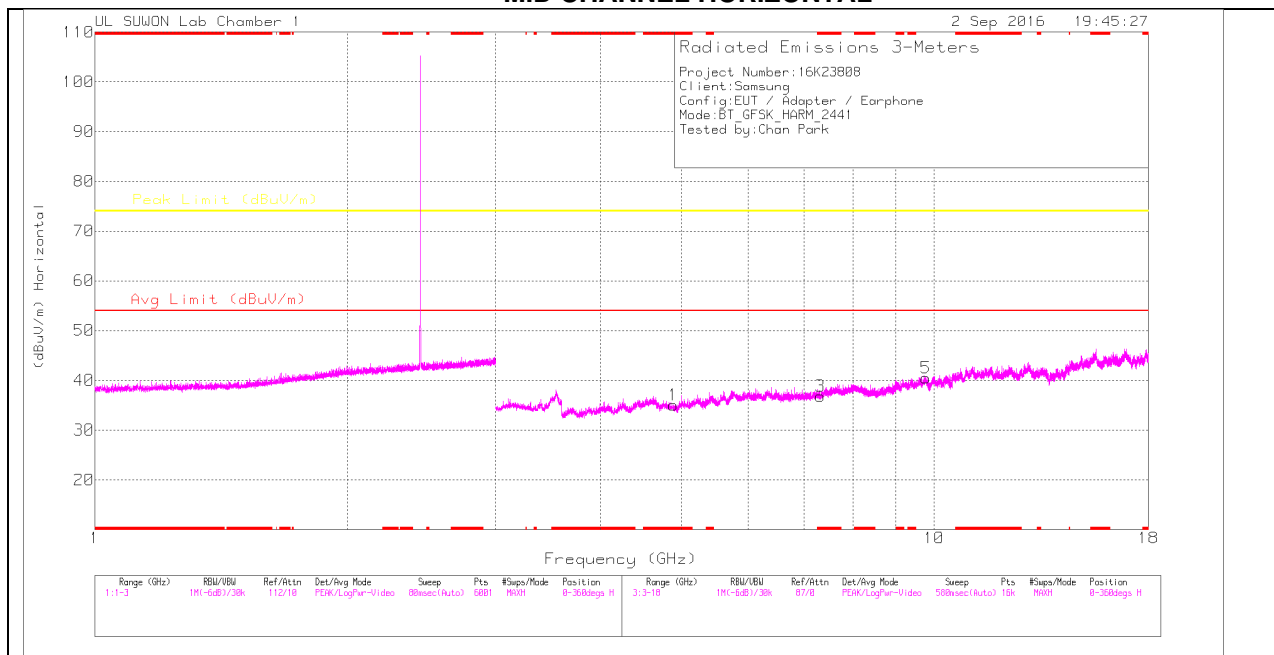
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 4.807         | 35.3                 | PK  | 34                      | -33.8  | 35.5                       | -                  | -           | 74                  | -38.5       | 0-360          | 100         | H        |
| 3      | 7.208           | 33.08                | PK  | 35.7                    | -30.8  | 37.98                      | -                  | -           | 74                  | -36.02      | 0-360          | 100         | H        |
| 5      | 9.607           | 30.16                | PK  | 37                      | -27.3  | 39.86                      | -                  | -           | 74                  | -34.14      | 0-360          | 100         | H        |
| 2      | * 4.805         | 34.95                | PK  | 34                      | -33.8  | 35.15                      | -                  | -           | 74                  | -38.85      | 0-360          | 200         | V        |
| 4      | 7.208           | 32.54                | PK  | 35.7                    | -30.8  | 37.44                      | -                  | -           | 74                  | -36.56      | 0-360          | 100         | V        |
| 6      | 9.61            | 30.2                 | PK  | 37                      | -27.3  | 39.9                       | -                  | -           | 74                  | -34.1       | 0-360          | 100         | V        |

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

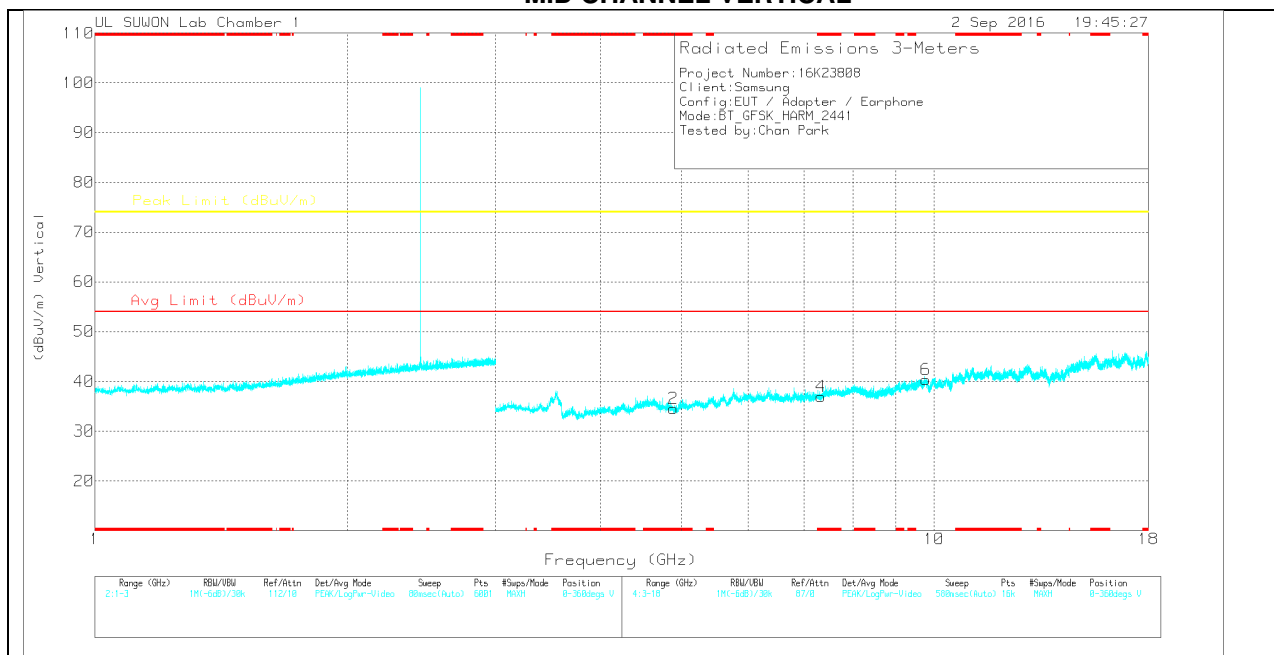
PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

### MID CHANNEL HORIZONTAL



### MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

## MID CHANNEL DATA

### Trace Markers

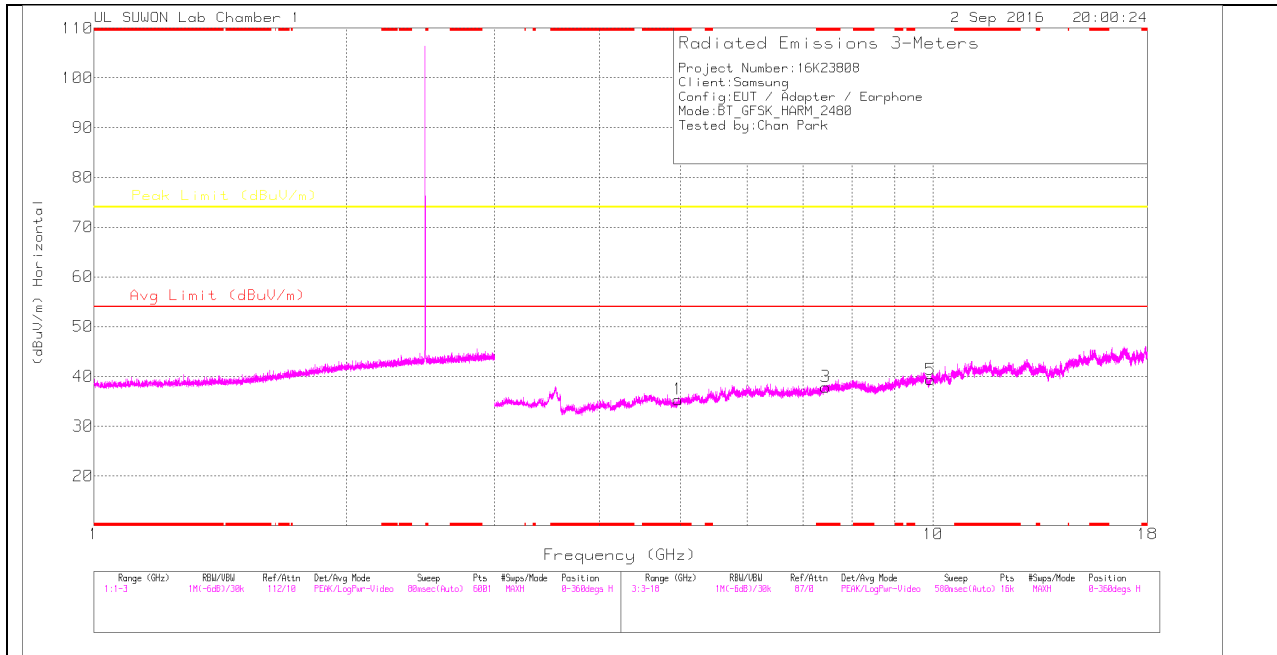
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 4.89          | 35.1                 | PK  | 34                      | -34    | 35.1                       | -                  | -           | 74                  | -38.9       | 0-360          | 100         | H        |
| 3      | * 7.321         | 31.92                | PK  | 35.8                    | -30.9  | 36.82                      | -                  | -           | 74                  | -37.18      | 0-360          | 200         | H        |
| 5      | 9.767           | 29.74                | PK  | 37.2                    | -26.5  | 40.44                      | -                  | -           | 74                  | -33.56      | 0-360          | 200         | H        |
| 2      | * 4.89          | 34.51                | PK  | 34                      | -34    | 34.51                      | -                  | -           | 74                  | -39.49      | 0-360          | 100         | V        |
| 4      | * 7.323         | 32.1                 | PK  | 35.8                    | -30.9  | 37                         | -                  | -           | 74                  | -37         | 0-360          | 100         | V        |
| 6      | 9.766           | 29.71                | PK  | 37.2                    | -26.6  | 40.31                      | -                  | -           | 74                  | -33.69      | 0-360          | 100         | V        |

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

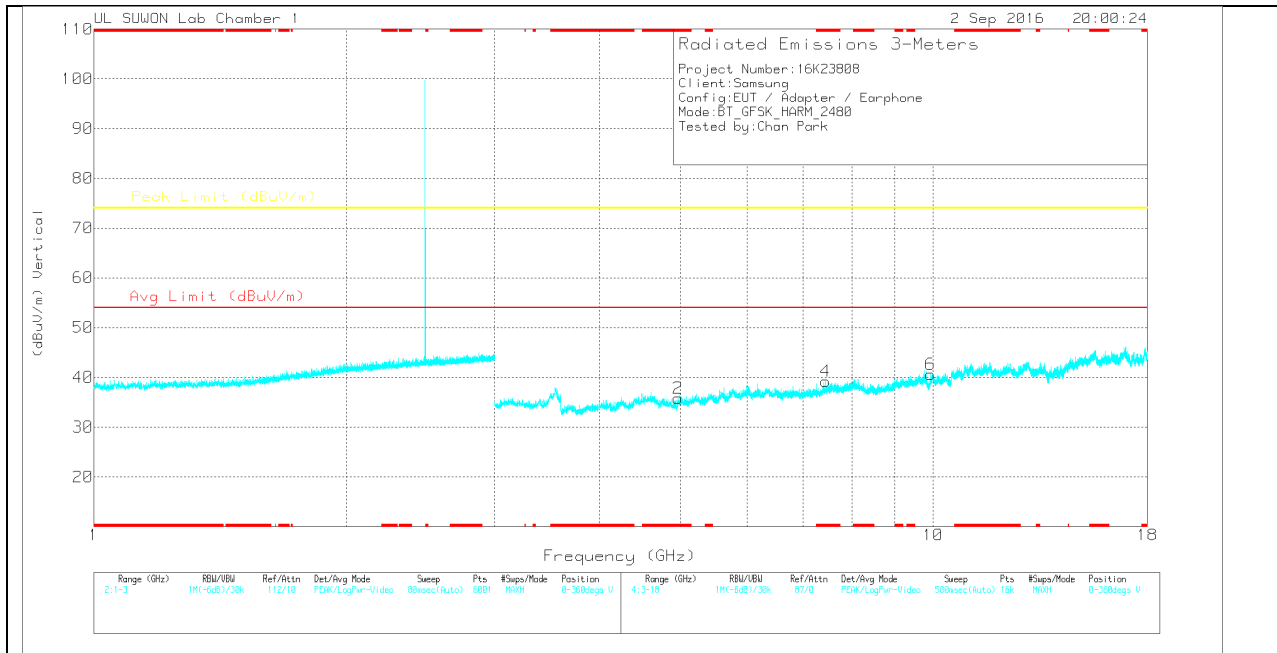
PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

### HIGH CHANNEL HORIZONTAL



### HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

## HIGH CHANNEL DATA

### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 4.961         | 35.37                | PK  | 34                      | -34    | 35.37                      | -                  | -           | 74                  | -38.63      | 0-360          | 100         | H        |
| 3      | * 7.441         | 32.8                 | PK  | 35.8                    | -30.7  | 37.9                       | -                  | -           | 74                  | -36.1       | 0-360          | 200         | H        |
| 5      | 9.92            | 29.13                | PK  | 37.4                    | -27.2  | 39.33                      | -                  | -           | 74                  | -34.67      | 0-360          | 100         | H        |
| 2      | * 4.961         | 35.85                | PK  | 34                      | -34    | 35.85                      | -                  | -           | 74                  | -38.15      | 0-360          | 100         | V        |
| 4      | * 7.439         | 34.11                | PK  | 35.8                    | -30.7  | 39.21                      | -                  | -           | 74                  | -34.79      | 0-360          | 100         | V        |
| 6      | 9.926           | 30.35                | PK  | 37.4                    | -27.1  | 40.65                      | -                  | -           | 74                  | -33.35      | 0-360          | 100         | V        |

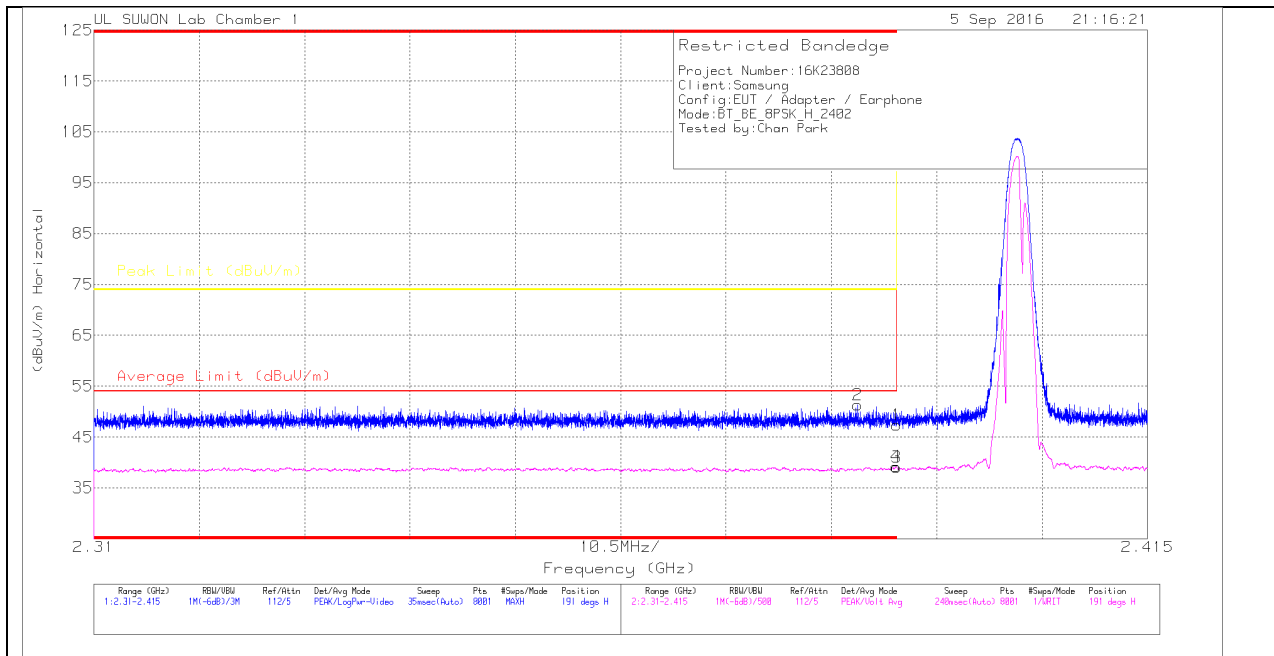
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

## 8.1.2. ENHANCED DATA RATE 8PSK MODULATION RESTRICTED BANDEDGE (LOW CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

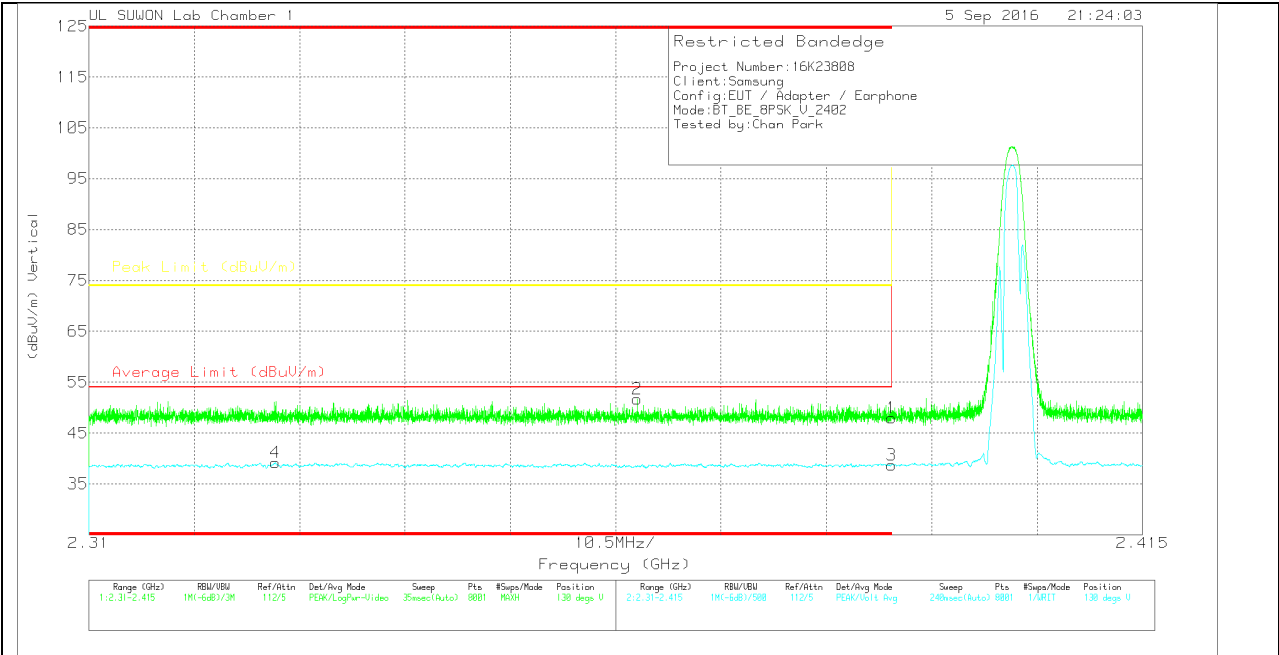
#### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 3117(0016 8717)_150 619 | Path_2 | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y | Marker |
|--------|-----------------|----------------------|------|-------------------------|--------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1      | * 2.39          | 44.59                | Pk   | 31.8                    | -29    | 47.39                      | -                      | -           | 74                  | -26.61         | 191            | 109         | H         | 1      |
| 2      | * 2.386         | 48.52                | Pk   | 31.8                    | -29    | 51.32                      | -                      | -           | 74                  | -22.68         | 191            | 109         | H         | 2      |
| 3      | * 2.39          | 36.24                | VA1T | 31.8                    | -29    | 39.04                      | 54                     | -14.96      | -                   | -              | 191            | 109         | H         | 3      |
| 4      | * 2.39          | 36.36                | VA1T | 31.8                    | -29    | 39.16                      | 54                     | -14.84      | -                   | -              | 191            | 109         | H         | 4      |

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

Pk - Peak detector

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

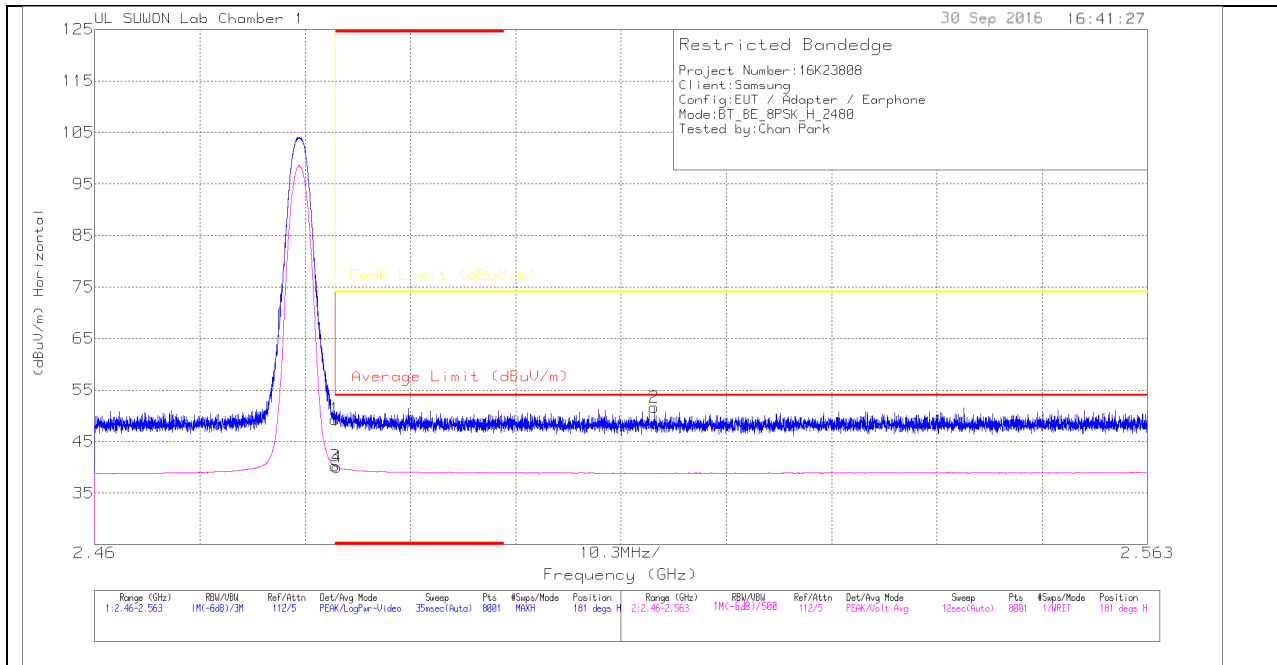
| Marker | Frequenc<br>y (GHz) | Meter<br>Reading<br>(dBuV) | Det  | 3117(0016<br>8717)_150<br>619 | Path_2 | Corrected<br>Reading<br>(dBuV/m) | Average<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Peak<br>Limit<br>(dBuV/<br>m) | PK Margin<br>(dB) | Azimuth<br>(Degs) | Height<br>(cm) | Polarit<br>y | Marker |
|--------|---------------------|----------------------------|------|-------------------------------|--------|----------------------------------|------------------------------|----------------|-------------------------------|-------------------|-------------------|----------------|--------------|--------|
| 1      | * 2.39              | 45.14                      | Pk   | 31.8                          | -29    | 47.94                            | -                            | -              | 74                            | -26.06            | 130               | 245            | V            | 1      |
| 2      | * 2.365             | 48.86                      | Pk   | 31.8                          | -29    | 51.66                            | -                            | -              | 74                            | -22.34            | 130               | 245            | V            | 2      |
| 3      | * 2.39              | 35.95                      | VA1T | 31.8                          | -29    | 38.75                            | 54                           | -15.25         | -                             | -                 | 130               | 245            | V            | 3      |
| 4      | * 2.329             | 36.45                      | VA1T | 31.7                          | -29    | 39.15                            | 54                           | -14.85         | -                             | -                 | 130               | 245            | V            | 4      |

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

Pk - Peak detector

## AUTHORIZED BANDEDGE (HIGH CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

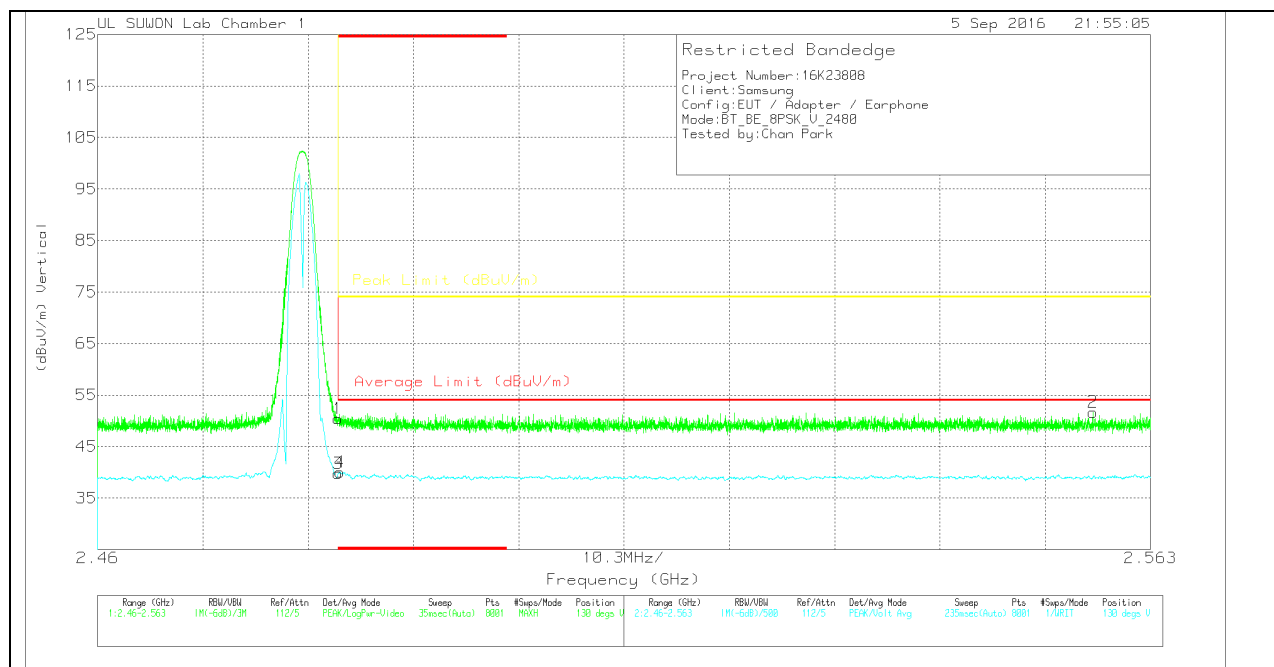
#### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 3117(0016 8717)_150 619 | Path_2 | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y | Marker |
|--------|-----------------|----------------------|------|-------------------------|--------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1      | * 2.484         | 46.27                | Pk   | 32                      | -28.9  | 49.37                      | -                      | -           | 74                  | -24.63         | 181            | 104         | H         | 1      |
| 2      | 2.515           | 48.53                | Pk   | 32                      | -28.9  | 51.63                      | -                      | -           | 74                  | -22.37         | 181            | 104         | H         | 2      |
| 3      | * 2.484         | 37.18                | VA1T | 32                      | -28.9  | 40.28                      | 54                     | -13.72      | -                   | -              | 181            | 104         | H         | 3      |
| 4      | * 2.484         | 36.95                | VA1T | 32                      | -28.9  | 40.05                      | 54                     | -13.95      | -                   | -              | 181            | 104         | H         | 4      |

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

Pk - Peak detector

## VERTICAL PEAK AND AVERAGE PLOT



## VERTICAL DATA

### Trace Markers

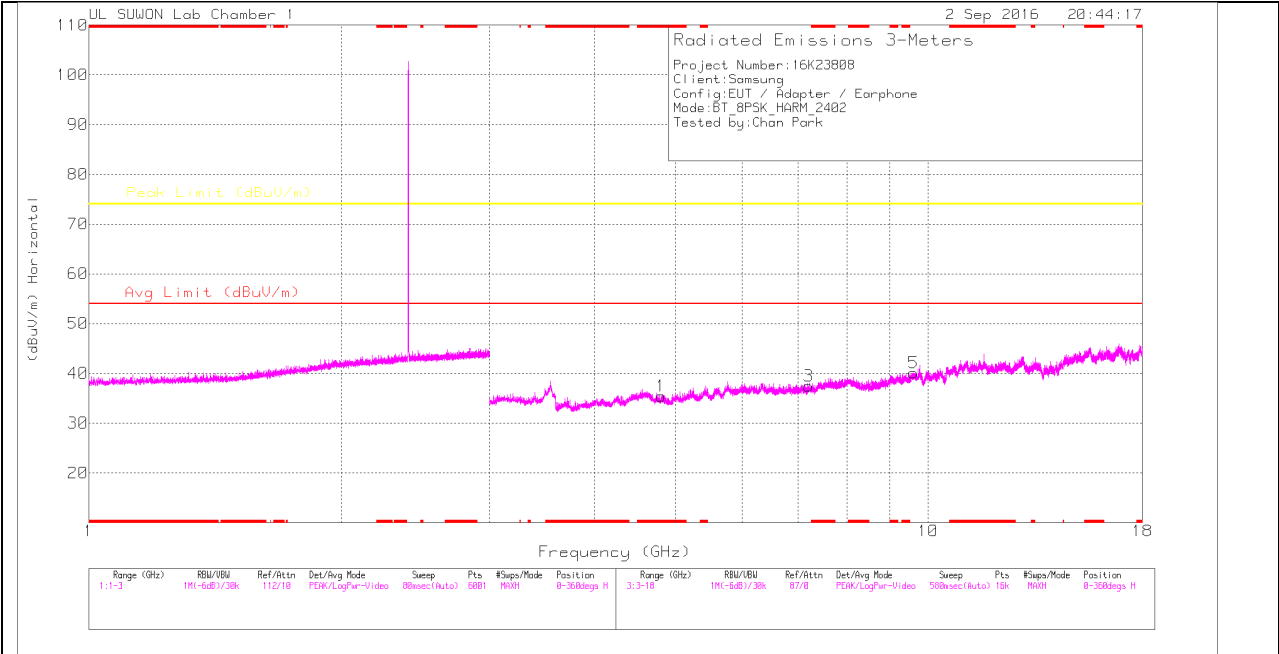
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | 3117/0016 8717_150 619 | Path_2 | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y | Marker |
|--------|-----------------|----------------------|------|------------------------|--------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|-----------|--------|
| 1      | * 2.484         | 47.32                | Pk   | 32                     | -28.9  | 50.42                      | -                      | -           | 74                  | -23.58         | 130            | 233         | V         | 1      |
| 2      | 2.557           | 48.47                | Pk   | 32                     | -28.8  | 51.67                      | -                      | -           | 74                  | -22.33         | 130            | 233         | V         | 2      |
| 3      | * 2.484         | 36.65                | VA1T | 32                     | -28.9  | 39.75                      | 54                     | -14.25      | -                   | -              | 130            | 233         | V         | 3      |
| 4      | * 2.484         | 36.9                 | VA1T | 32                     | -28.9  | 40                         | 54                     | -14         | -                   | -              | 130            | 233         | V         | 4      |

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

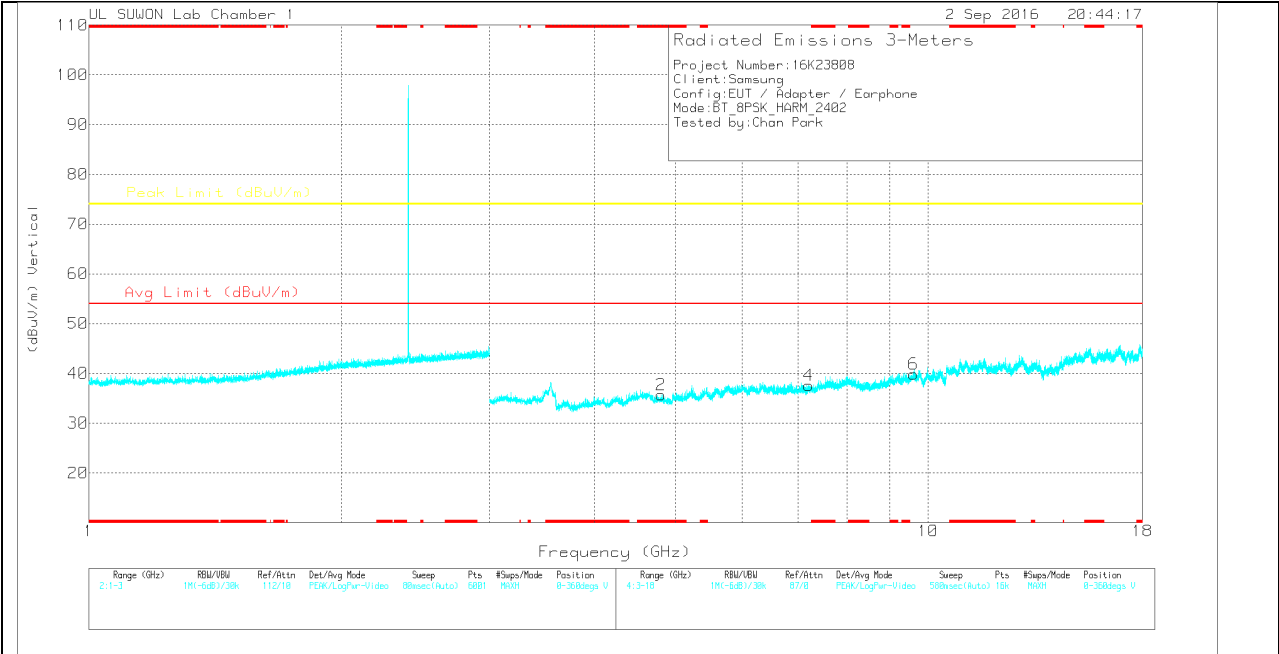
Pk - Peak detector

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

## LOW CHANNEL DATA

### Trace Markers

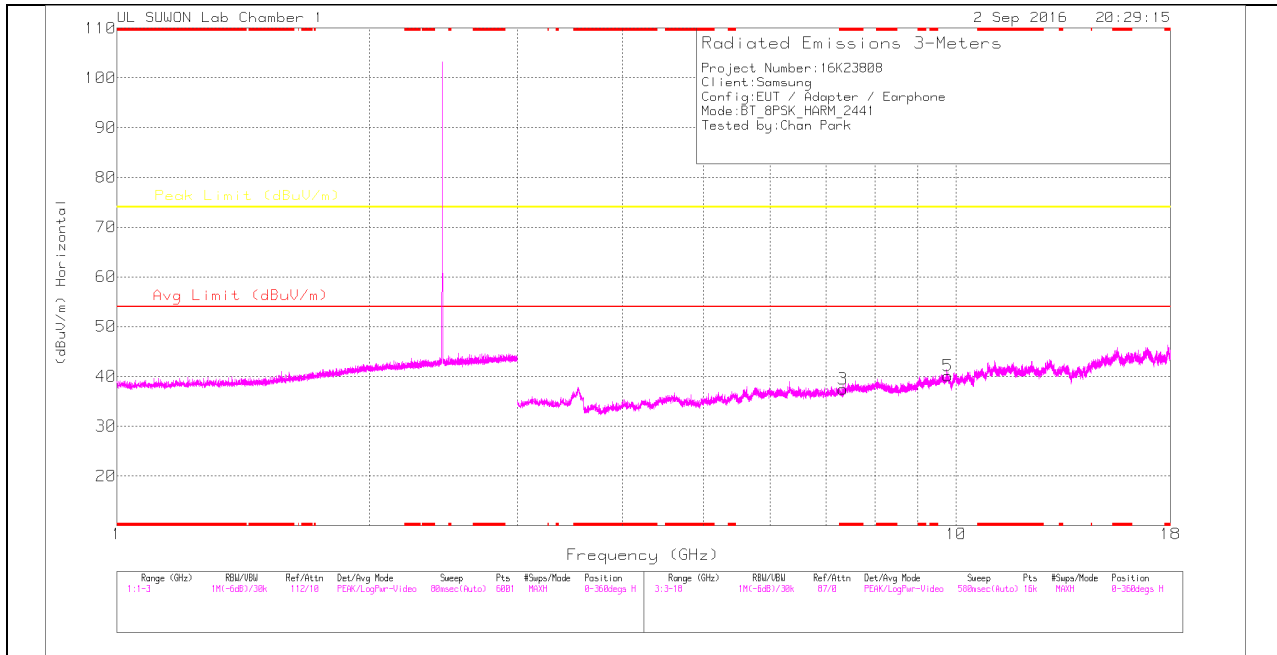
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 4.807         | 35.19                | PK  | 34                      | -33.8  | 35.39                      | -                  | -           | 74                  | -38.61      | 0-360          | 100         | H        |
| 3      | 7.205           | 32.56                | PK  | 35.7                    | -30.8  | 37.46                      | -                  | -           | 74                  | -36.54      | 0-360          | 100         | H        |
| 5      | 9.61            | 30.45                | PK  | 37                      | -27.3  | 40.15                      | -                  | -           | 74                  | -33.85      | 0-360          | 200         | H        |
| 2      | * 4.805         | 35.53                | PK  | 34                      | -33.8  | 35.73                      | -                  | -           | 74                  | -38.27      | 0-360          | 200         | V        |
| 4      | 7.203           | 32.63                | PK  | 35.7                    | -30.8  | 37.53                      | -                  | -           | 74                  | -36.47      | 0-360          | 100         | V        |
| 6      | 9.607           | 30.18                | PK  | 37                      | -27.3  | 39.88                      | -                  | -           | 74                  | -34.12      | 0-360          | 100         | V        |

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

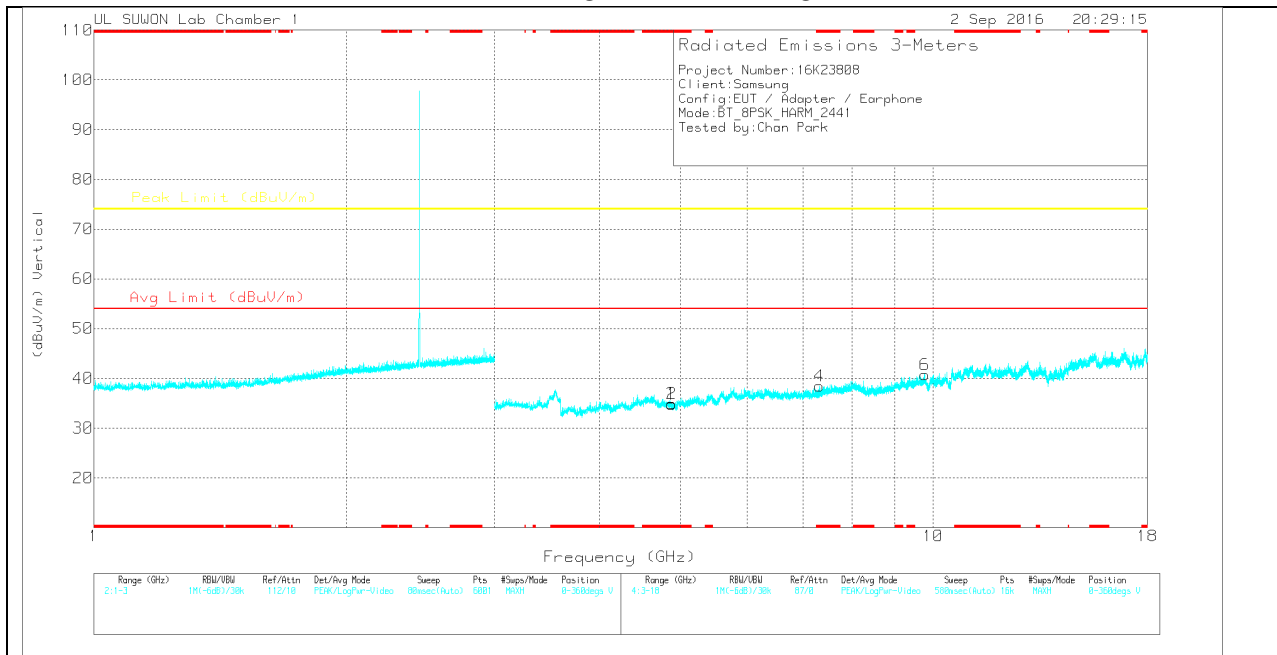
PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

### MID CHANNEL HORIZONTAL



### MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

## MID CHANNEL DATA

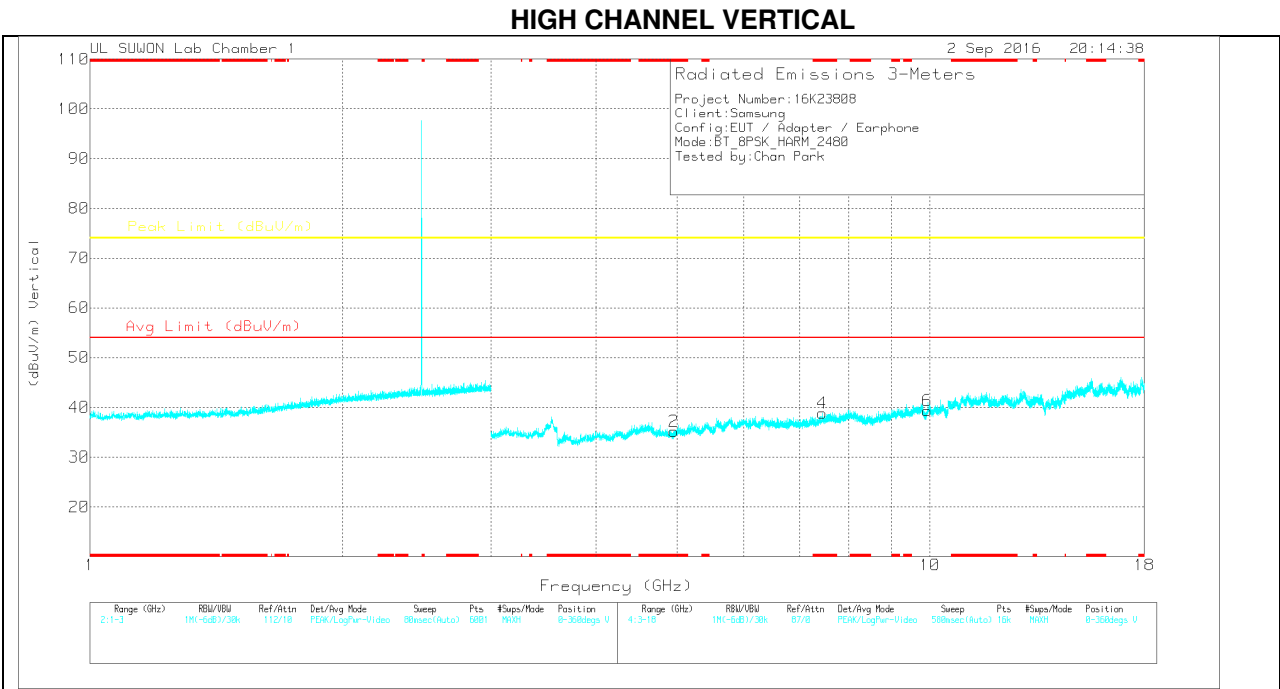
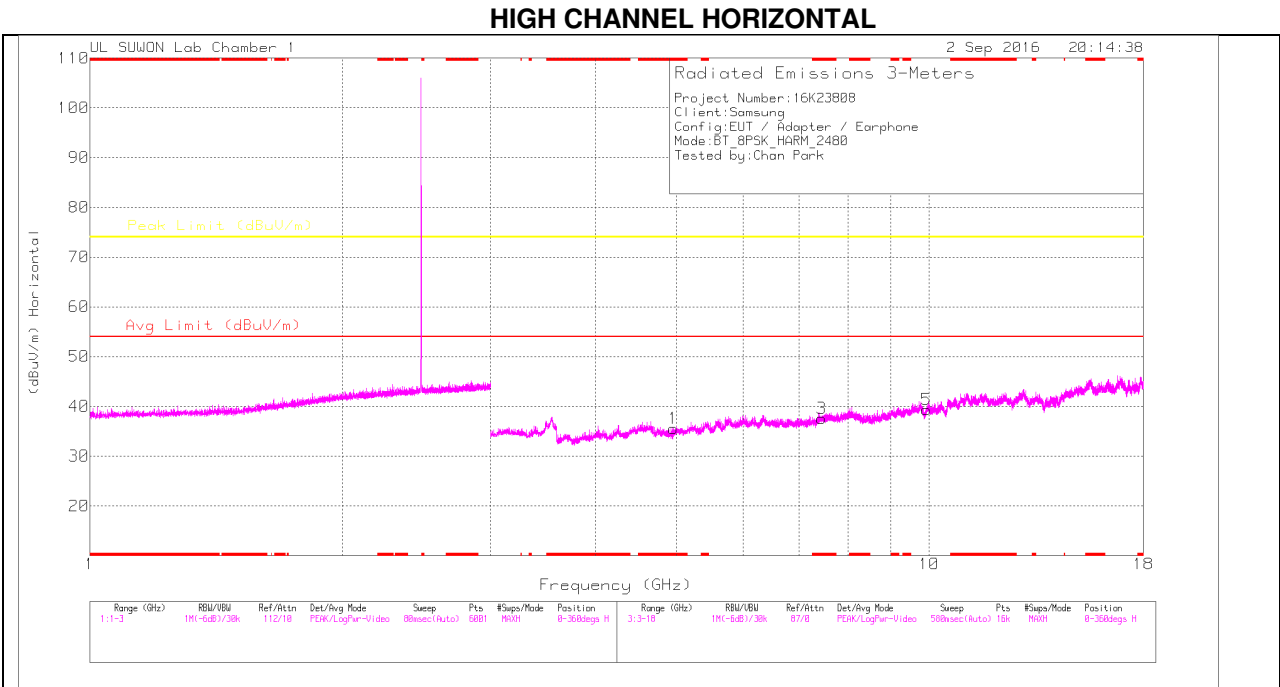
### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 3      | * 7.331         | 32.49                | PK  | 35.8                    | -30.8  | 37.49                      | -                  | -           | 74                  | -36.51      | 0-360          | 100         | H        |
| 5      | 9.768           | 29.46                | PK  | 37.2                    | -26.5  | 40.16                      | -                  | -           | 74                  | -33.84      | 0-360          | 100         | H        |
| 1      | * 4.881         | 34.86                | PK  | 34                      | -34    | 34.86                      | -                  | -           | 74                  | -39.14      | 0-360          | 100         | V        |
| 2      | * 4.878         | 34.93                | PK  | 34                      | -34    | 34.93                      | -                  | -           | 74                  | -39.07      | 0-360          | 200         | V        |
| 4      | * 7.323         | 33.54                | PK  | 35.8                    | -30.9  | 38.44                      | -                  | -           | 74                  | -35.56      | 0-360          | 200         | V        |
| 6      | 9.766           | 30.17                | PK  | 37.2                    | -26.6  | 40.77                      | -                  | -           | 74                  | -33.23      | 0-360          | 200         | V        |

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

PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

## HIGH CHANNEL DATA

### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | 3117(0016 8717)_150 619 | Path_3 | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------------|--------|----------------------------|--------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 4.96          | 35.6                 | PK  | 34                      | -34    | 35.6                       | -                  | -           | 74                  | -38.4       | 0-360          | 200         | H        |
| 3      | * 7.44          | 32.49                | PK  | 35.8                    | -30.7  | 37.59                      | -                  | -           | 74                  | -36.41      | 0-360          | 200         | H        |
| 5      | 9.92            | 29.16                | PK  | 37.4                    | -27.2  | 39.36                      | -                  | -           | 74                  | -34.64      | 0-360          | 100         | H        |
| 2      | * 4.957         | 35.23                | PK  | 34                      | -34    | 35.23                      | -                  | -           | 74                  | -38.77      | 0-360          | 100         | V        |
| 4      | * 7.44          | 33.75                | PK  | 35.8                    | -30.7  | 38.85                      | -                  | -           | 74                  | -35.15      | 0-360          | 200         | V        |
| 6      | 9.919           | 29.13                | PK  | 37.4                    | -27.2  | 39.33                      | -                  | -           | 74                  | -34.67      | 0-360          | 100         | V        |

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

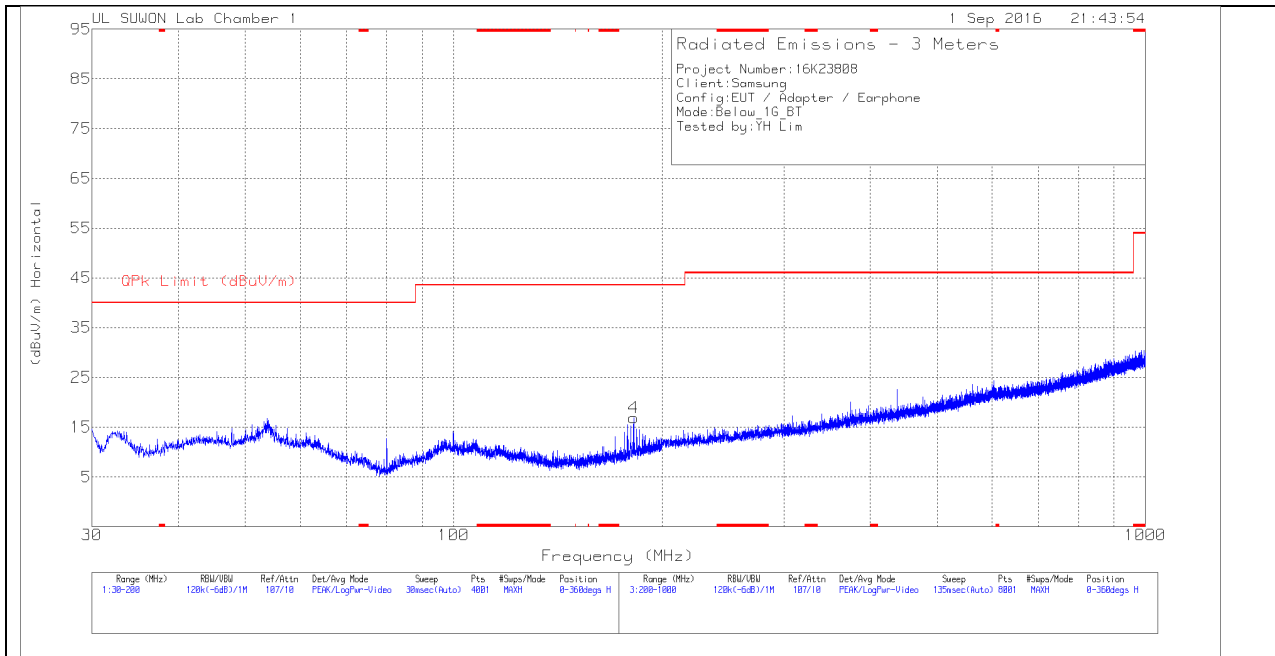
PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

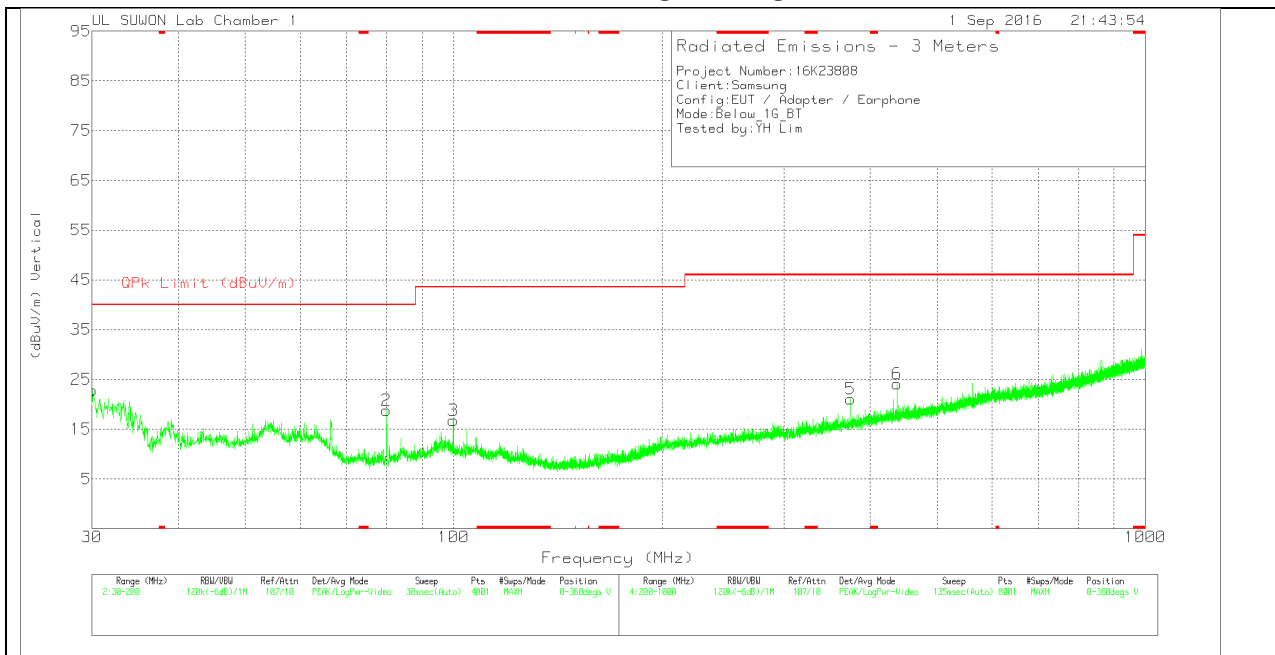
## 8.2. WORST-CASE BELOW 1 GHz

### GFSK SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

#### HORIZONTAL PLOT



#### VERTICAL PLOT



## 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 |
|--------|-----------------|----------------------|-----|--------------|--------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 4      | 182.0225        | 35.63                | Pk  | 9.6          | -28.3  | 16.93                      | 43.52              | -26.59      | 0-360          | 200         | H        |
| 1      | 30.085          | 43.01                | Pk  | 10.3         | -30.5  | 22.81                      | 40                 | -17.19      | 0-360          | 100         | V        |
| 2      | 79.98           | 41.51                | Pk  | 6.9          | -29.6  | 18.81                      | 40                 | -21.19      | 0-360          | 200         | V        |
| 3      | 99.8913         | 34.58                | Pk  | 11.5         | -29.3  | 16.78                      | 43.52              | -26.74      | 0-360          | 100         | V        |
| 5      | 375             | 33                   | Pk  | 15           | -26.9  | 21.1                       | 46.02              | -24.92      | 0-360          | 100         | V        |
| 6      | 437.5           | 34.61                | Pk  | 16.1         | -26.6  | 24.11                      | 46.02              | -21.91      | 0-360          | 100         | V        |

Pk - Peak detector