



# CERTIFICATION TEST REPORT

**Report Number.** : 4789354110-E5V2

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

**Model** : SM-P610

**FCC ID** : A3LSMP610  
**IC** : 649E-SMP610

**EUT Description** : DTS/UNII a/b/g/n/ac Tablet + BT/BLE and ANT+

**Test Standard(s)** : FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 Issue 10  
INDUSTRY CANADA RSS-GEN Issue 5

**Date Of Issue:**

March 23, 2020

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ACCREDITED

Testing Laboratory

TL-637

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	03/19/20	Initial issue	Yeonhee Lim
V2	03/23/20	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:** DTS/UNII a/b/g/n/ac Tablet + BT/BLE and ANT+  
**MODEL NUMBER:** SM-P610  
**SERIAL NUMBER:** R52N10VDXDW (CONDUCTED)  
R52N10VDV5Y (RADIATED);  
**DATE TESTED:** MAR 16, 2020 – MAR 18, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 10	Pass
INDUSTRY CANADA RSS-GEN Issue 5	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:



Junwhan Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Yeonhee Lim  
Suwon Lab Technician  
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. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. IC RSS-210 Issue 10.
5. IC RSS-GEN Issue 5
6. ANSI C63.10-2013.

## 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 type="checkbox"/>	Chamber 2
<input type="checkbox"/>	Chamber 3

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

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

### 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	2.35 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 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 1, Clause 4.4.2 in IEC Guide 115:2007.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

DTS/UNII a/b/g/n/ac Tablet + BT/BLE and ANT+  
This test report addresses the ANT+ operational mode.

### 5.2. MAXIMUM E-FIELD STRENGTH

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 +	91.72	58.15	3.00

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antenna, with a maximum gain of -6 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.

Note : All radiated and power line conducted tests were performed attached with travel adapter for the worst case condition mode.

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA50EWE	R37N19P1472HM3	N/A
Data Cable	SAMSUNG	EP-DR140AWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

### I/O CABLE

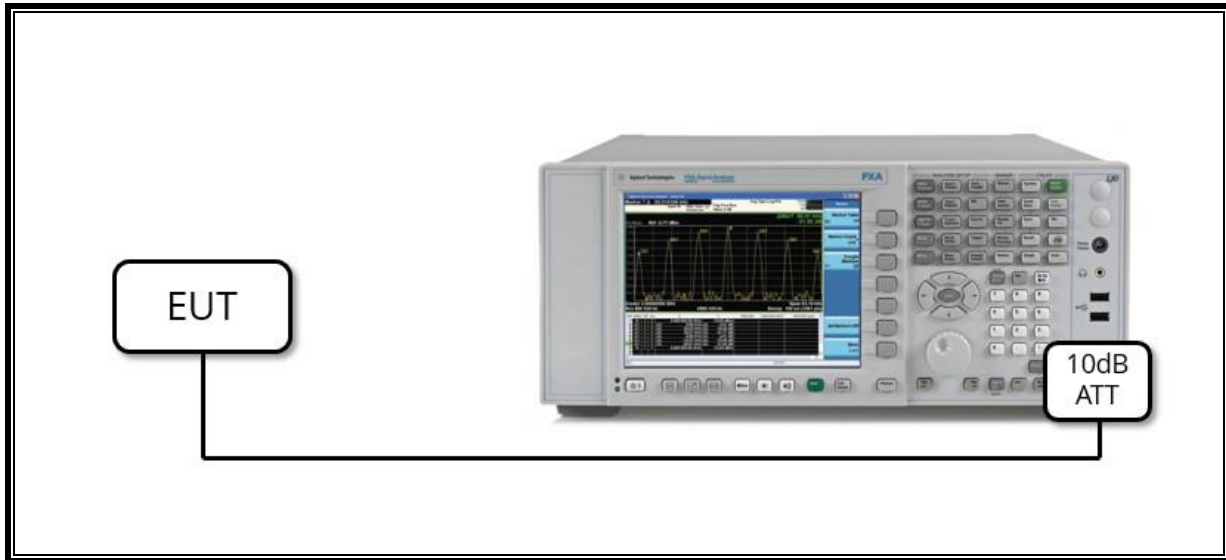
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0m	N/A
2	Audio	2	Mini-Jack	Unshielded	1.2m	N/A

### TEST SETUP

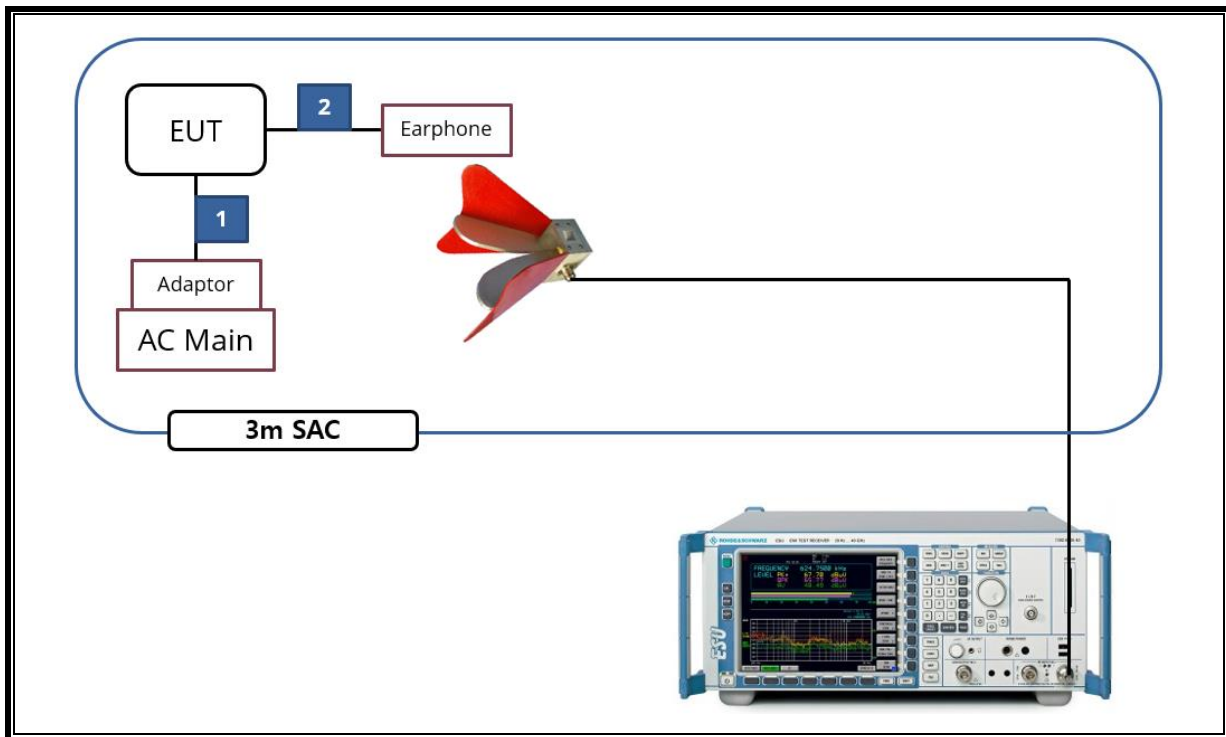
The EUT is set to continuously transmit in ANT + test mode.  
Test software in hidden menu exercised the EUT to enable ANT+ mode.



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



**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	New Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	08-04-20
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-14-20
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Preamplifier	ETS	3116C-PA	00168841	08-08-20
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-05-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20
Spectrum Analyzer, 43.5 GHz	R&S	FSW43	104089	08-06-20
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-09-20
Attenuator	PASTERNAK	PE7087-10	A001	08-08-20
Attenuator	PASTERNAK	PE7087-10	A008	08-08-20
Attenuator	PASTERNAK	PE7004-10	2	08-06-20
Attenuator	PASTERNAK	PE7087-10	A009	08-08-20
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-05-20
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-06-20
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-06-20
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-06-20
LISN	R&S	ENV-216	101837	08-09-20
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
<b>Antenna, Loop, 9kHz-30MHz</b>				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

## 7. LIMITS AND RESULTS

### 7.1. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

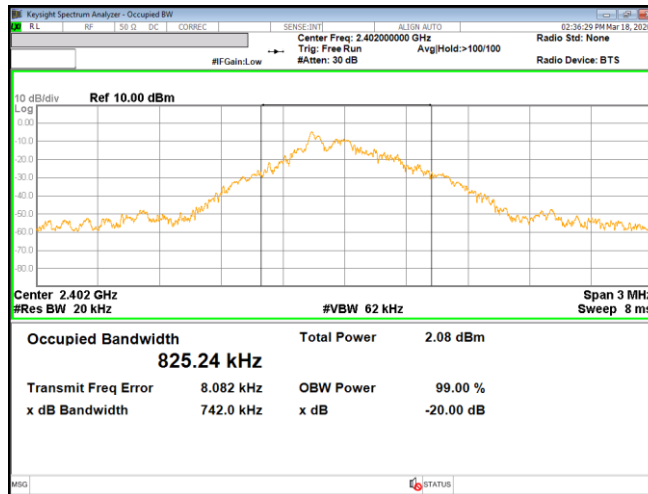
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### RESULTS

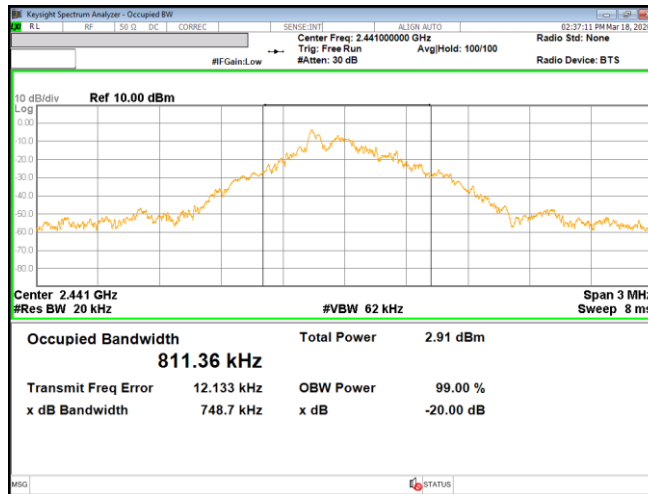
Channel	Frequency [MHz]	99% Bandwidth [kHz]	20 dB Bandwidth [kHz]
Low	2402	825.2	742.0
Mid	2441	811.4	748.7
High	2480	807.4	747.5
Worst		825.2	748.7

**99% BANDWIDTH PLOTS**

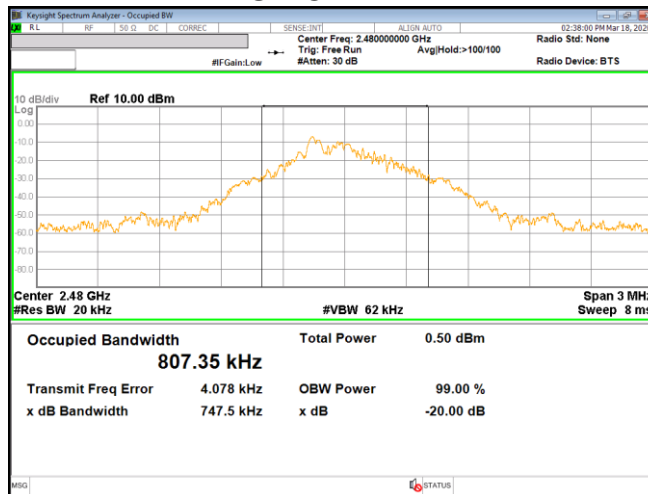
**LOW CHANNEL**



**MID CHANNEL**



**HIGH CHANNEL**



## 7.2. TRANSMITTER RADIATED EMISSIONS

### TEST PROCEDURE

ANSI C63.10: 2013

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. 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, then the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average 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.

### LIMIT

FCC §15.249  
IC RSS-210, B.10  
IC RSS-GEN Clause 8.9 (Transmitter)  
IC RSS-GEN Clause 7 (Receiver)

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.

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

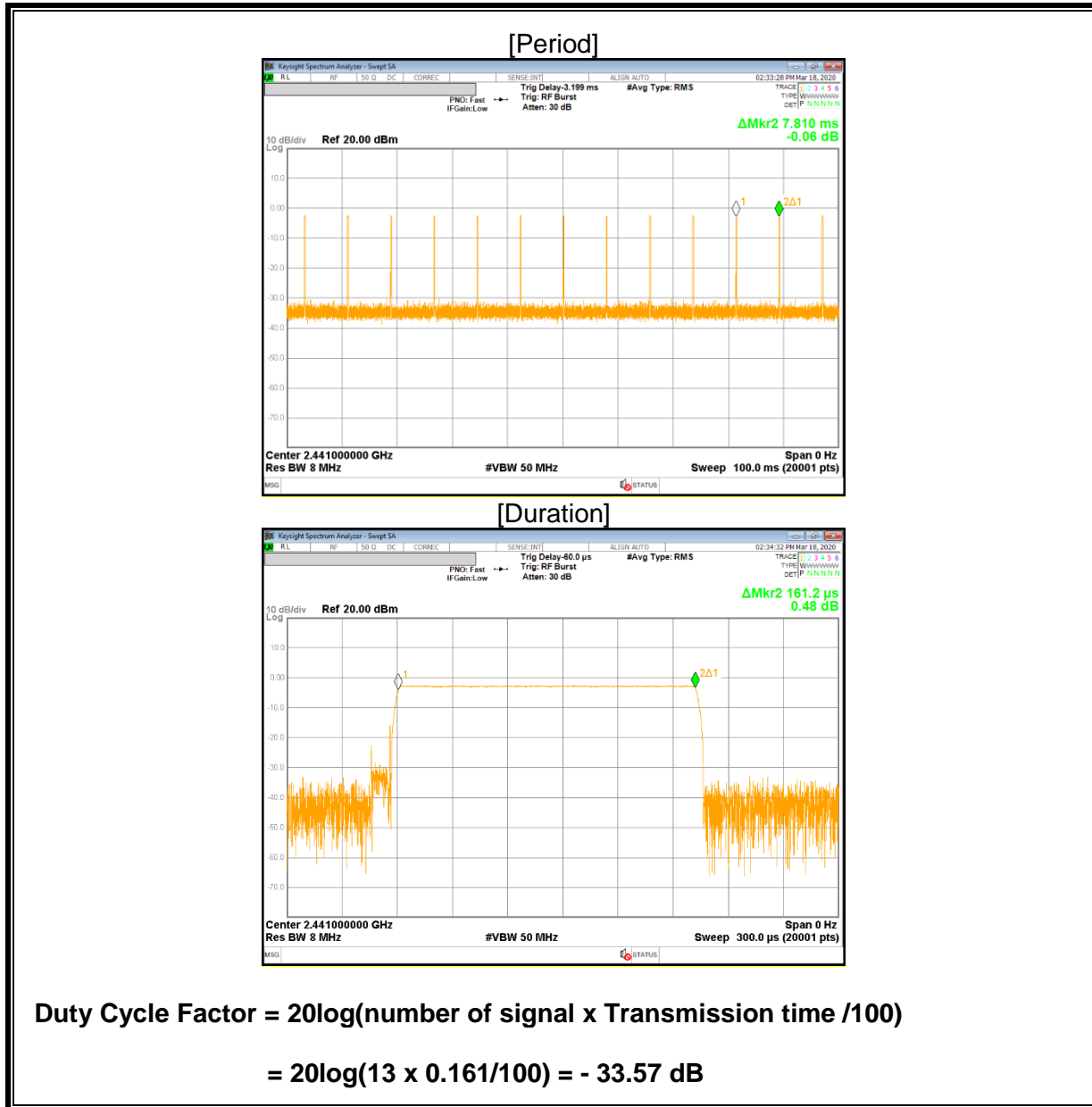
\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

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.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.  
 Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

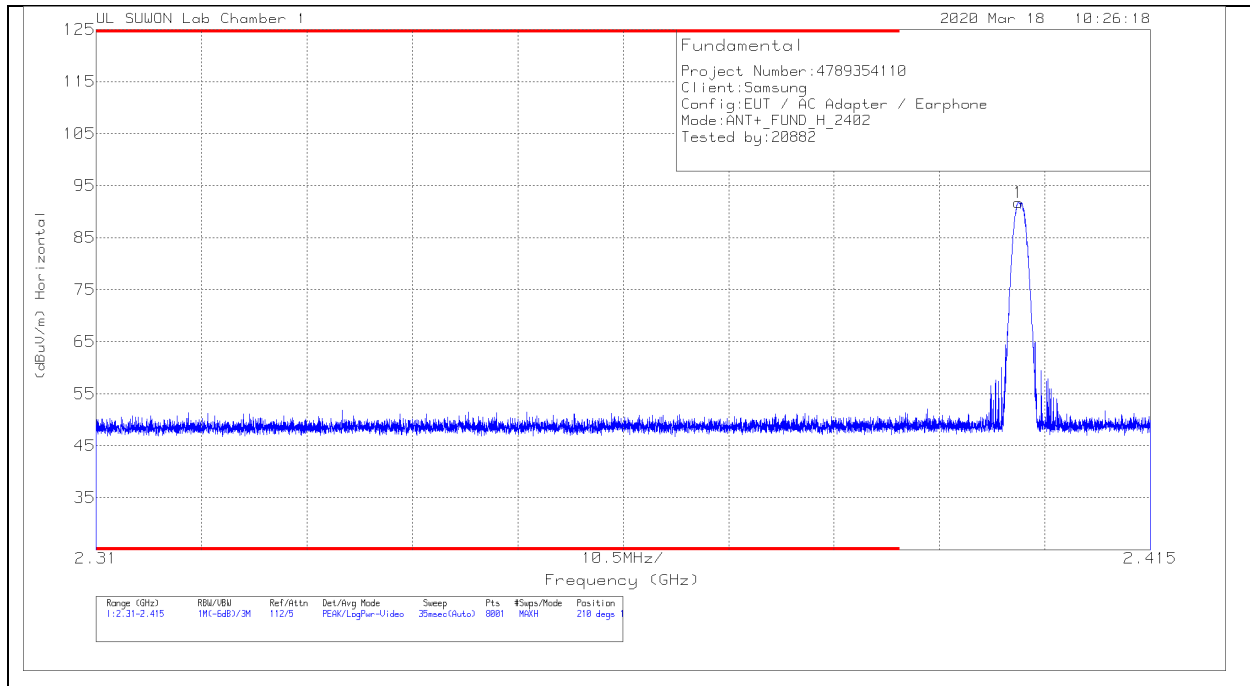
**RESULTS**

**7.2.1. DUTY CYCLE**



## 7.2.2. FUNDAMENTAL FIELD STRENGTH LEVEL

### LOW CHANNEL, HORIZONTAL



### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Azimuth (Degs)	Height (cm)	Polarity
1	2.40188	85.42	Pk	31.7	-25.4	91.72	210	129	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
91.72	114	22.28

\*\* For marker 1 used the following method to do averaging:

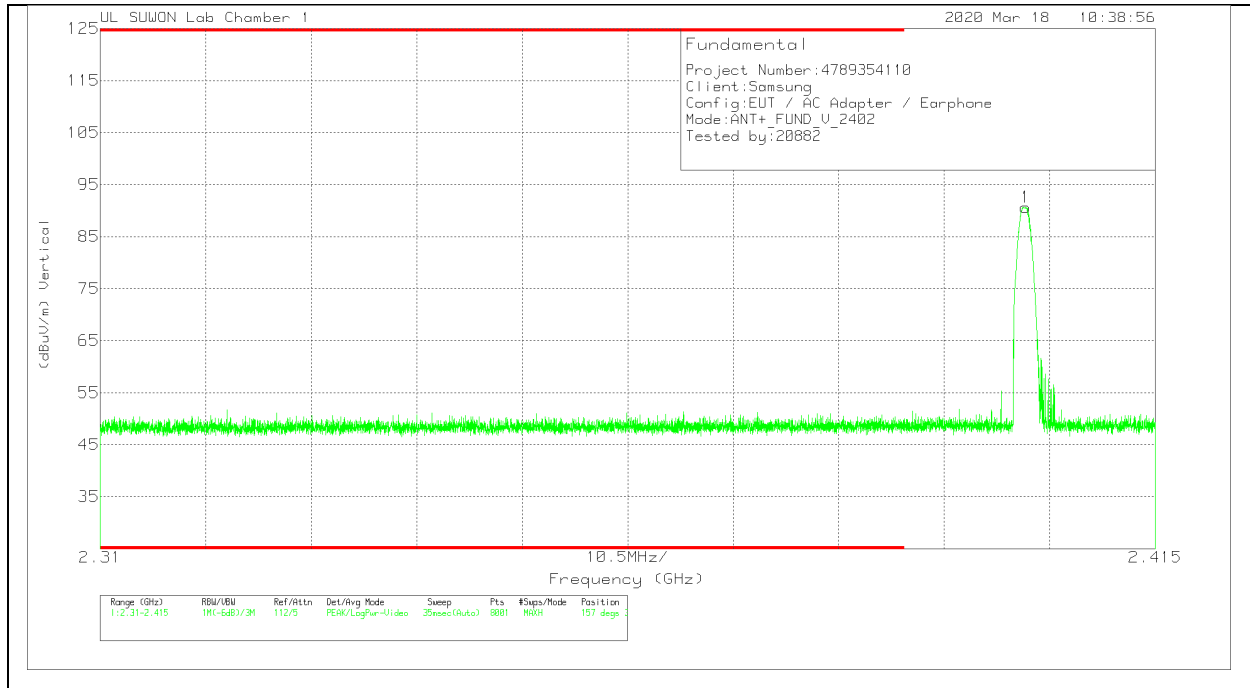
$$DCCF = -33.57$$

$$\text{Corrected AV reading} = \text{Peak Reading} + DCCF$$

$$= 91.72 + -33.57 = 58.15 \text{ dBuV/m [AVG Limit : 94 dBuV/m, Margin : 35.85 dB]}$$



**LOW CHANNEL, VERTICAL**



**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Azimuth (Degs)	Height (cm)	Polarity
1	2.40209	84.31	Pk	31.7	-25.4	90.61	157	376	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
90.61	114	23.39

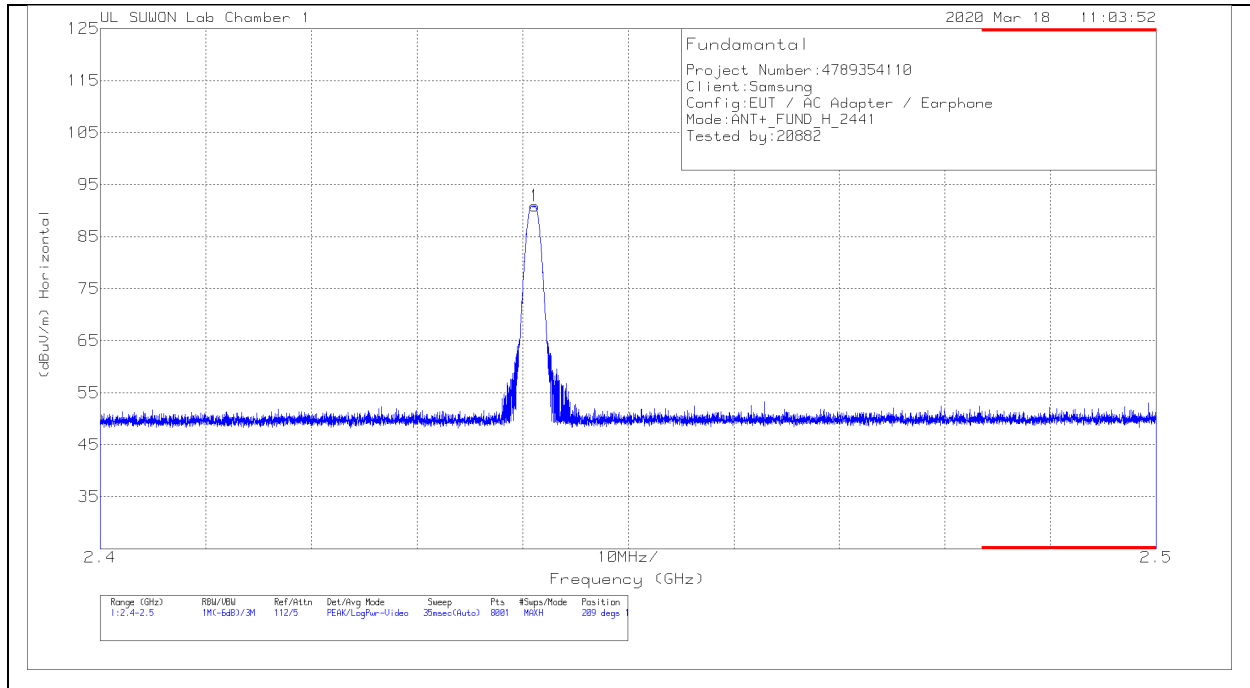
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.57

Corrected AV reading = Peak Reading + DCCF

= 90.61 + -33.57 = 57.04 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 36.96 dB]

**MID CHANNEL, HORIZONTAL**



**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Azimuth (Degs)	Height (cm)	Polarity
1	2.44114	84.49	PK	31.8	-25.4	90.89	209	132	H

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
90.89	114	23.11

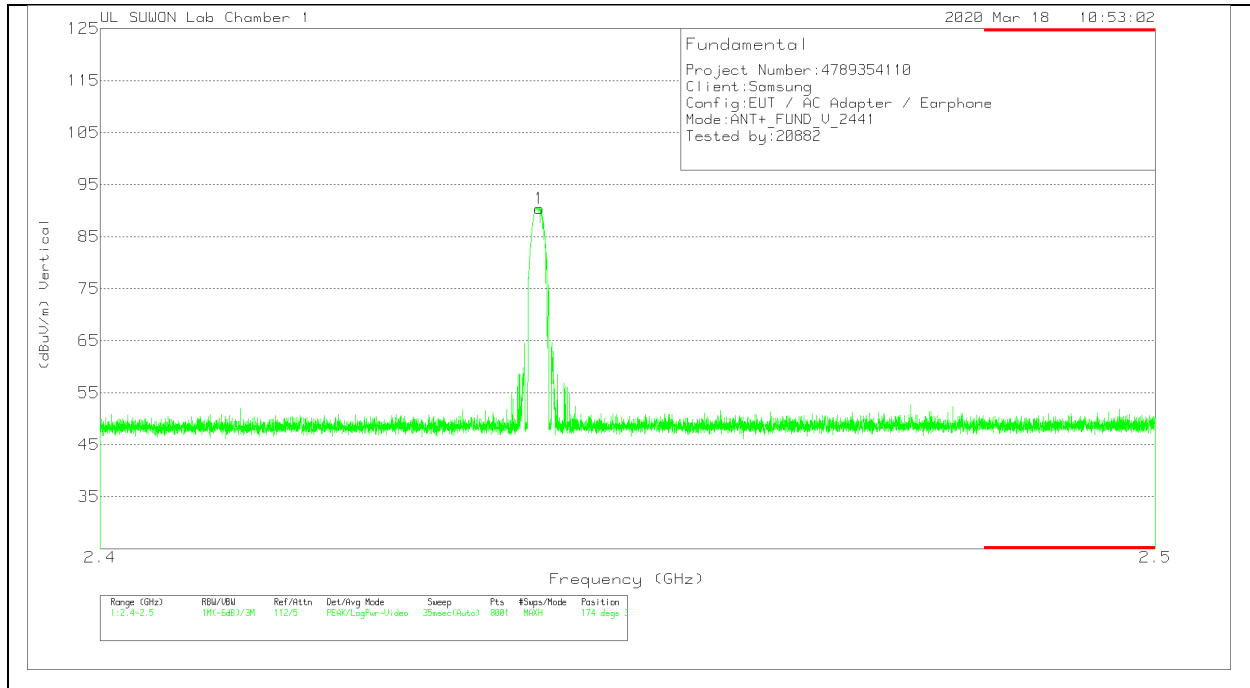
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.57

Corrected AV reading = Peak Reading + DCCF

= 90.89 + -33.57 = 57.32 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 36.68 dB]

**MID CHANNEL, VERTICAL**



**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Azimuth (Degs)	Height (cm)	Polarity
1	2.44111	83.98	PK	31.8	-25.4	90.38	174	358	V

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
90.38	114	23.62

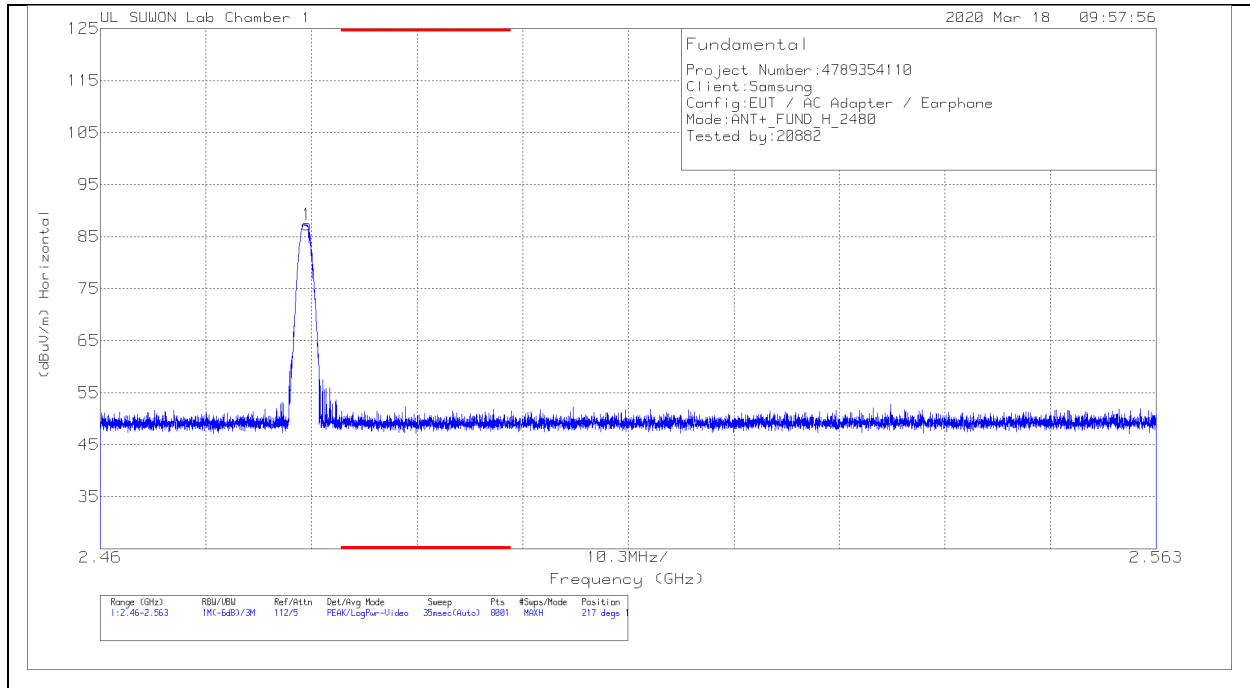
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.57

Corrected AV reading = Peak Reading + DCCF

= 90.38 + -33.57 = 56.81 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 37.19 dB]

**HIGH CHANNEL, HORIZONTAL**



**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48016	80.78	Pk	31.9	-25.4	87.28	217	125	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
87.28	114	26.72

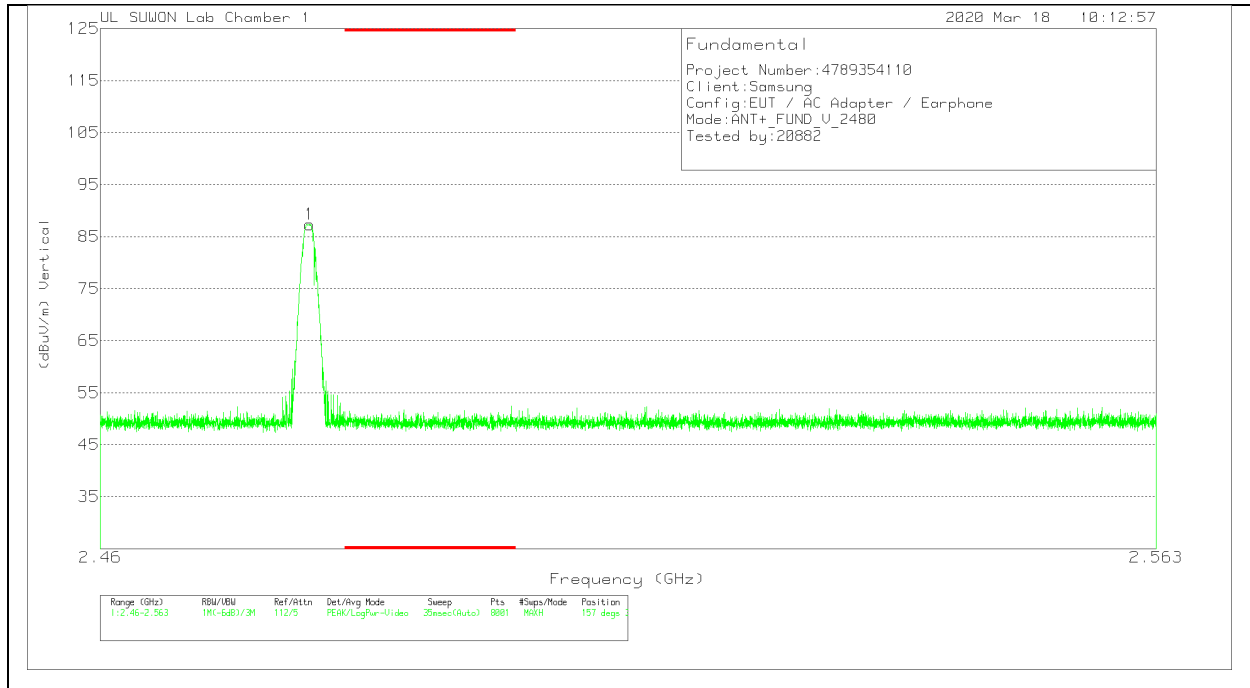
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.57

Corrected AV reading = Peak Reading + DCCF

= 87.28 + -33.57 = 53.71 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 40.29 dB]

**HIGH CHANNEL, VERTICAL**



**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48007	80.83	PK	31.9	-25.4	87.33	157	347	V

PK - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
87.33	114	26.67

\*\* For marker 1 used the following method to do averaging:

DCCF = -33.57

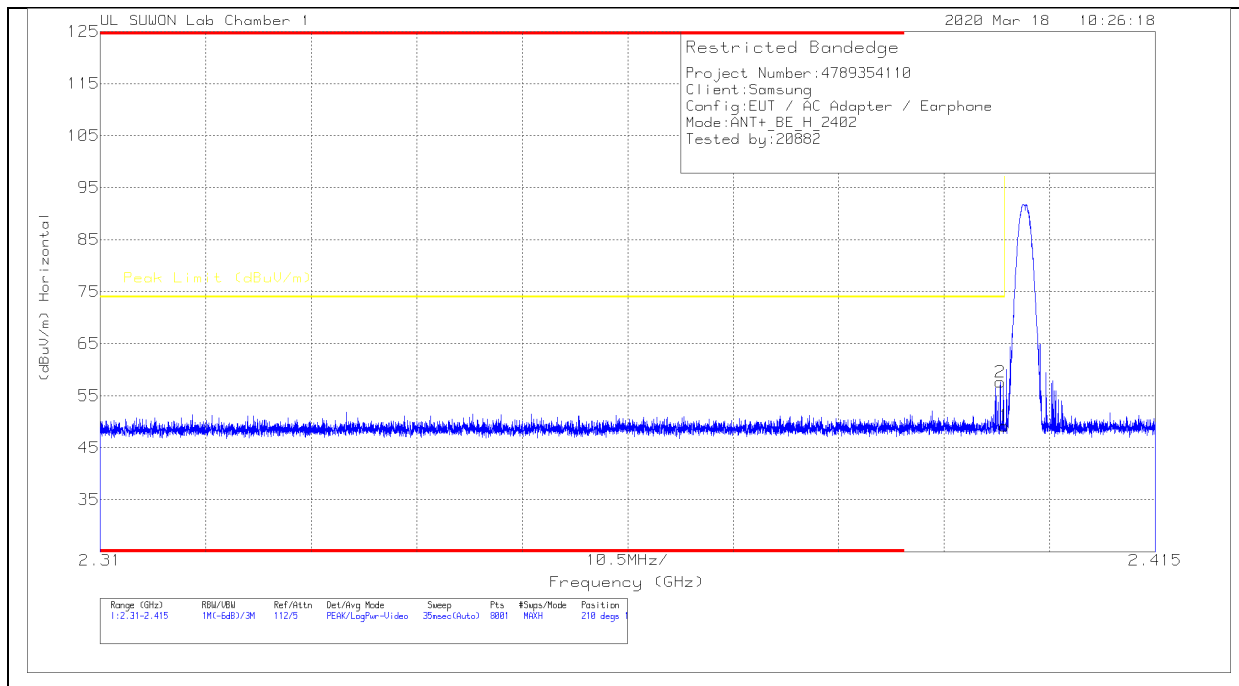
Corrected AV reading = Peak Reading + DCCF

= 87.33 + -33.57 = 53.76 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 40.24 dB]

### 7.2.3. TRANSMITTER BAND EDGES

#### AUTHORIZED BANDEDGE (LOW CHANNEL)

##### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

##### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4	42.99	Pk	31.7	-25.5	49.19	74	-24.81	210	129	H
2	2.39958	51.42	Pk	31.7	-25.5	57.62	74	-16.38	210	129	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector

\* For marker 1 used the following method to do averaging:

$$DCCF = -33.57 \quad / \quad \text{Peak Reading} = 49.19 \text{ dBuV/m}$$

$$\text{Corrected AV reading} = \text{Peak Reading} + DCCF$$

$$= 49.19 + -33.57 = 15.62 \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 38.38 dB]}$$

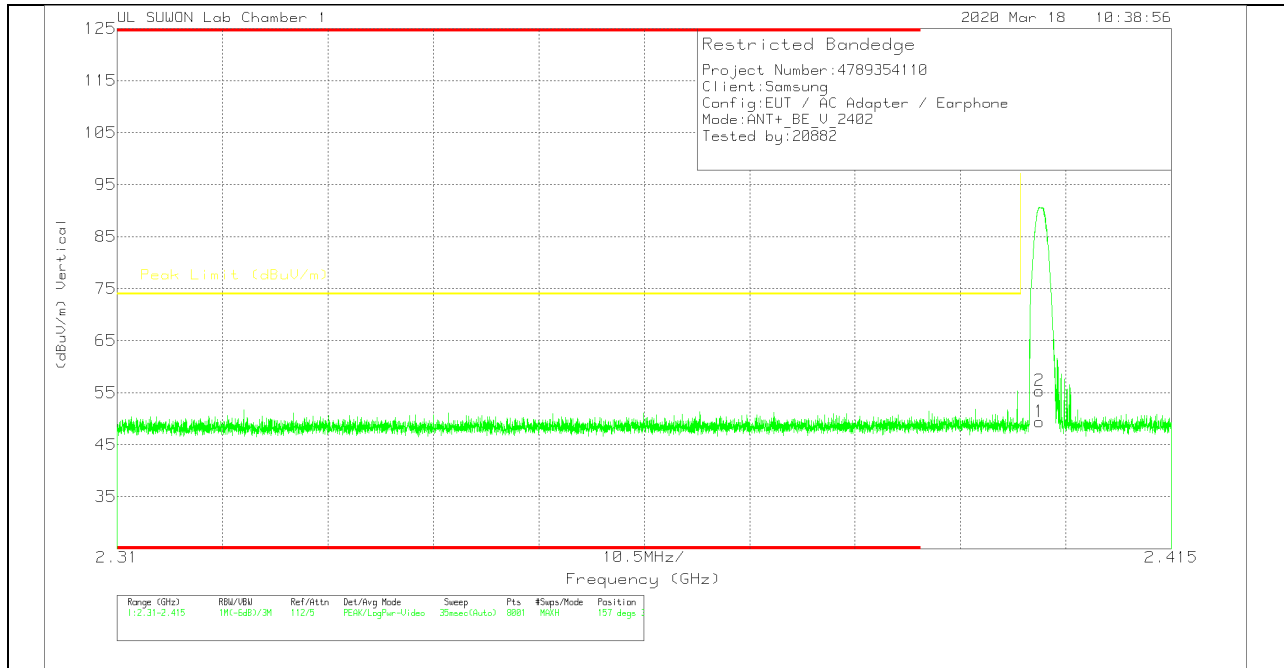
\* For marker 2 used the following method to do averaging:

$$DCCF = -33.57 \quad / \quad \text{Peak Reading} = 57.62 \text{ dBuV/m}$$

$$\text{Corrected AV reading} = \text{Peak Reading} + DCCF$$

$$= 57.62 + -33.57 = 24.05 \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 29.95 dB]}$$

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.40188	43.14	Pk	31.7	-25.4	49.44	-	-	157	376	V
2	2.40188	49.09	Pk	31.7	-25.4	55.39	-	-	157	376	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector

\* For marker 1 used the following method to do averaging:

DCCF = -33.57 / Peak Reading = 49.44 dBuV/m

Corrected AV reading = Peak Reading + DCCF

= 49.44 + -33.57 = 15.87 dBuV/m [AVG Limit : 54 dBuV/m, Margin : 38.13 dB]

\* For marker 2 used the following method to do averaging:

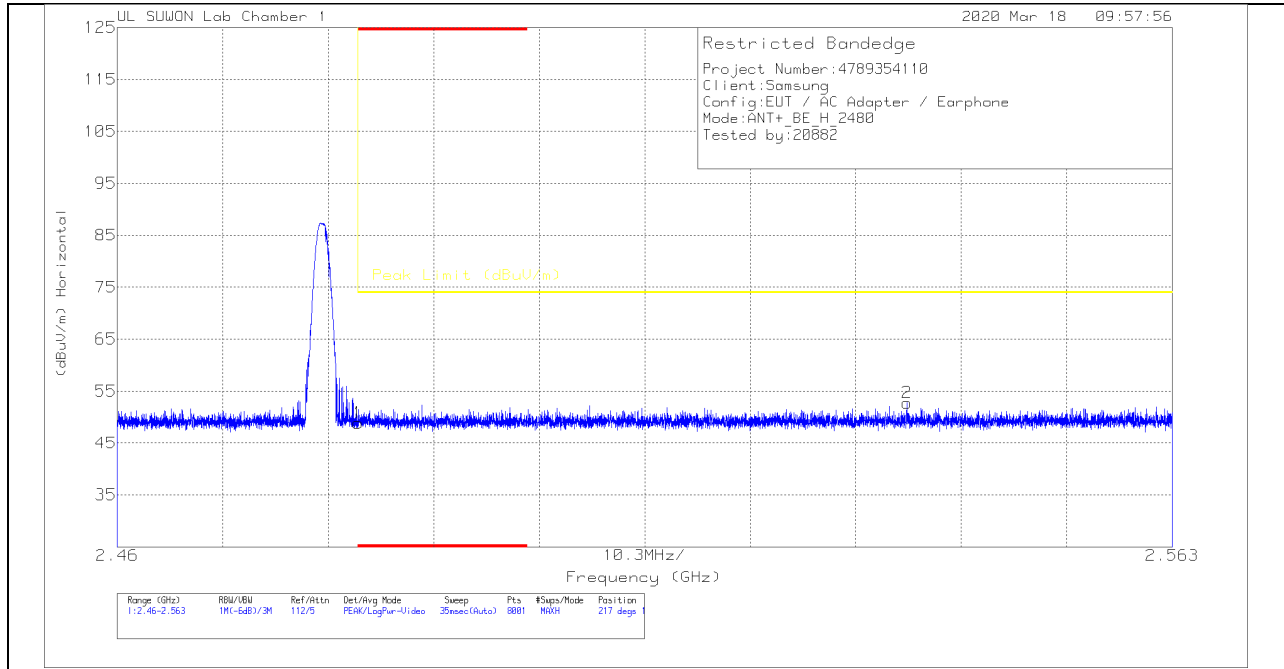
DCCF = -33.57 / Peak Reading = 55.39 dBuV/m

Corrected AV reading = Peak Reading + DCCF

= 55.39 + -33.57 = 21.82 dBuV/m [AVG Limit : 54 dBuV/m, Margin : 32.18 dB]

## AUTHORIZED BANDEGE (HIGH CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.18	Pk	31.9	-25.2	48.88	74	-25.12	217	125	H
2	2.53708	45.95	Pk	32	-25.2	52.75	74	-21.25	217	125	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector

\* For marker 1 used the following method to do averaging:

$$DCCF = -33.57 \quad / \quad \text{Peak Reading} = 48.88 \text{ dBuV/m}$$

$$\text{Corrected AV reading} = \text{Peak Reading} + DCCF$$

$$= 48.88 + -33.57 = 15.31 \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 38.69 dB]}$$

\* For marker 2 used the following method to do averaging:

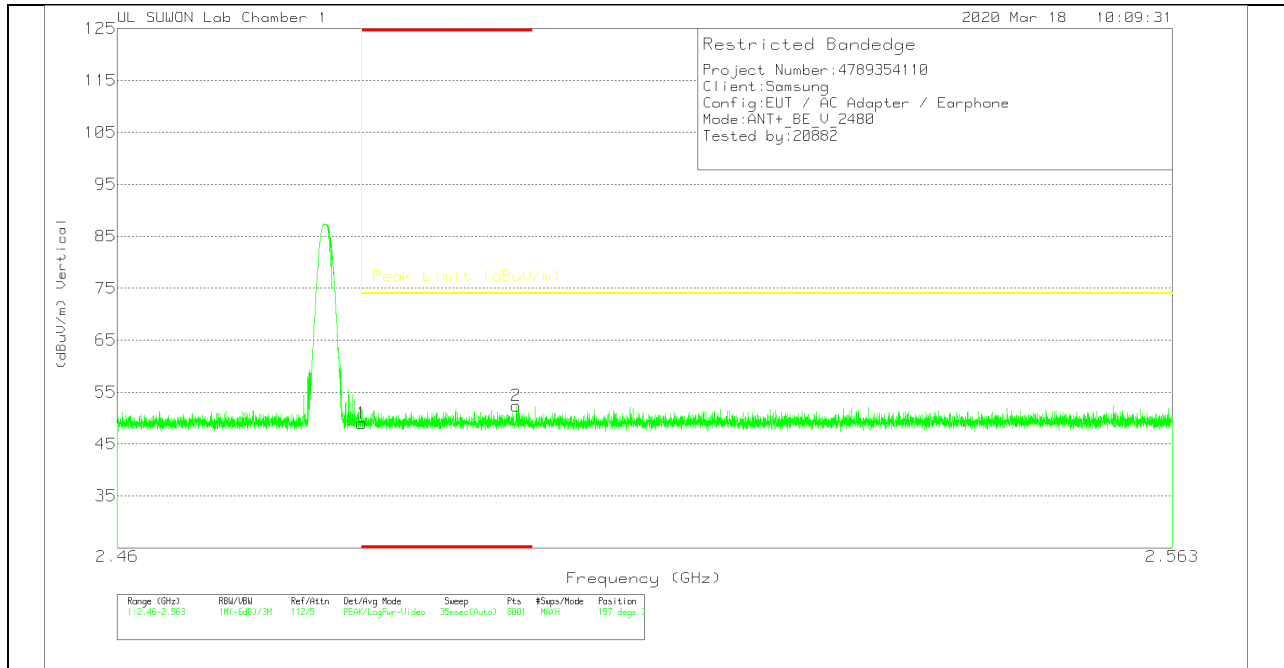
$$DCCF = -33.57 \quad / \quad \text{Peak Reading} = 52.75 \text{ dBuV/m}$$

$$\text{Corrected AV reading} = \text{Peak Reading} + DCCF$$

$$= 52.75 + -33.57 = 19.18 \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 34.82 dB]}$$



**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	42.3	Pk	31.9	-25.2	49	74	-25	157	347	V
2	* 2.49847	45.68	Pk	31.9	-25.2	52.38	74	-21.62	157	347	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector

\* For marker 1 used the following method to do averaging:

DCCF = -33.57 / Peak Reading = 49 dBuV/m

Corrected AV reading = Peak Reading + DCCF

= 49 + -33.57 = 15.43 dBuV/m [AVG Limit : 54 dBuV/m, Margin : 38.57 dB]

\* For marker 2 used the following method to do averaging:

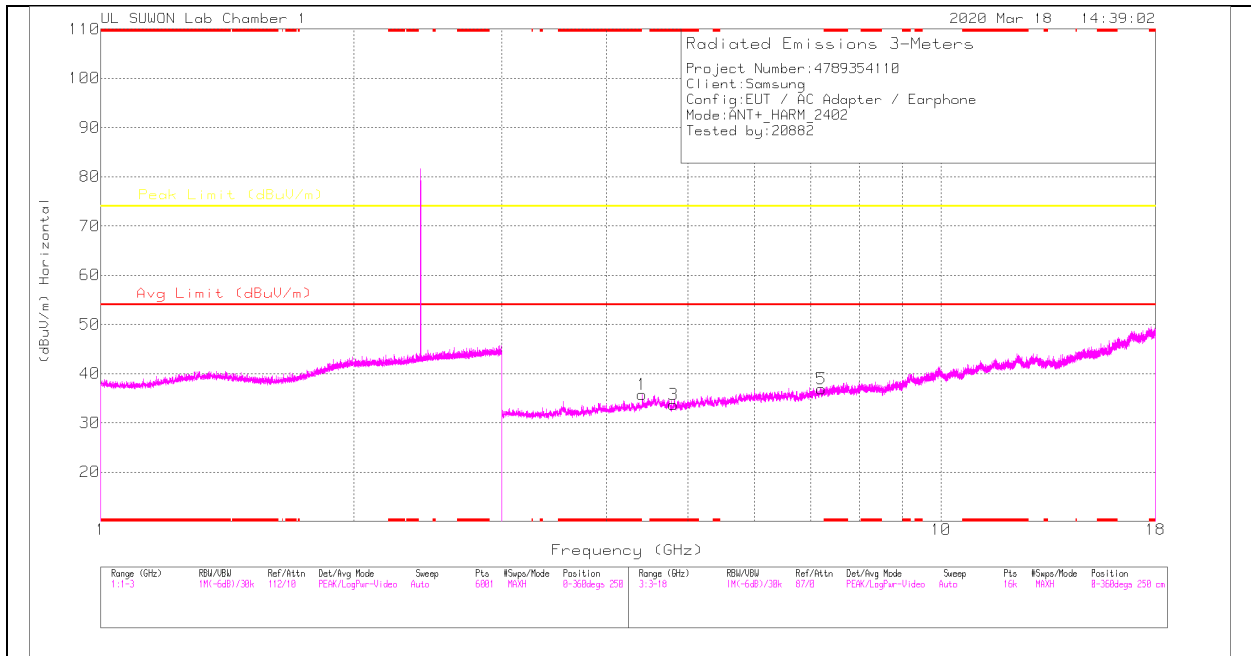
DCCF = -33.57 / Peak Reading = 52.38 dBuV/m

Corrected AV reading = Peak Reading + DCCF

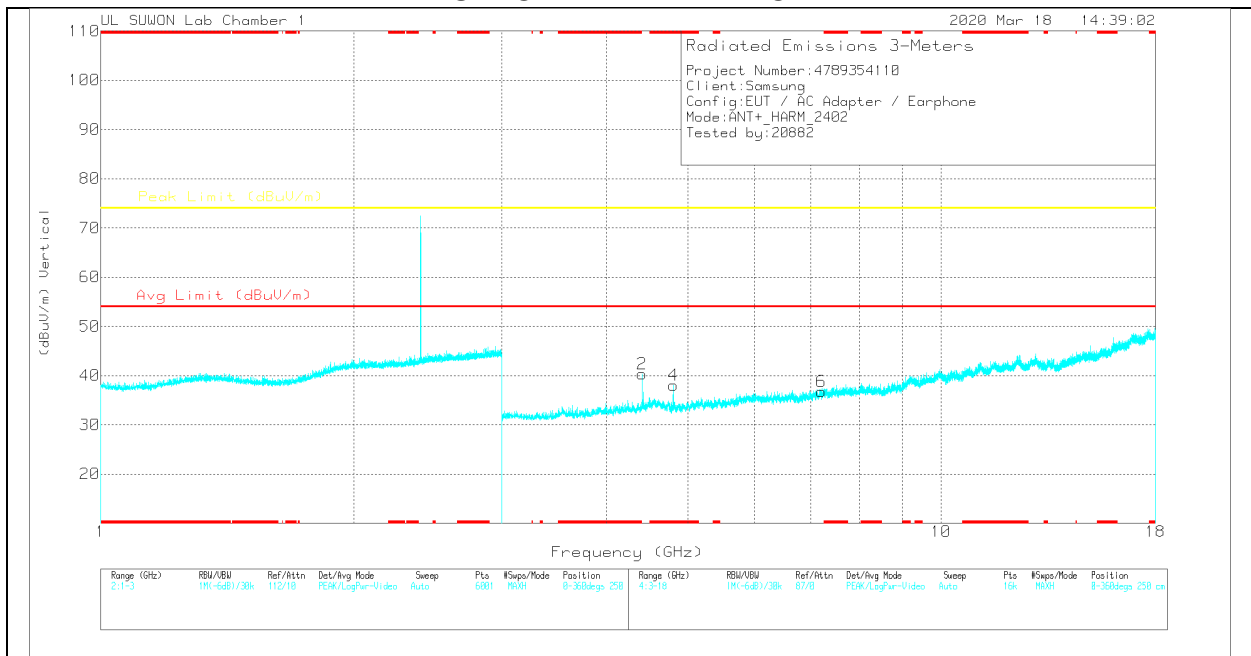
= 52.38 + -33.57 = 18.81 dBuV/m [AVG Limit : 54 dBuV/m, Margin : 35.19 dB]

### 7.2.4. 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

### Radiated Emissions

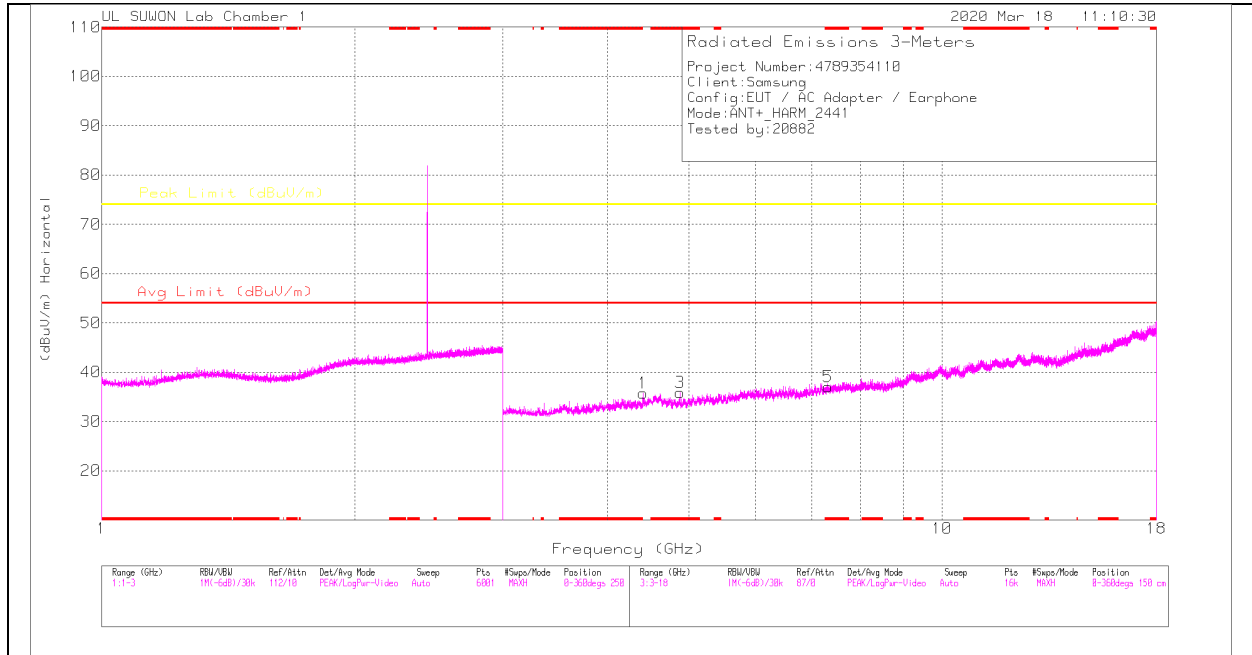
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.41097	42.96	PK2	34.1	-32.3	44.76	-	-	74	-29.24	189	330	H
4.41116	44.8	PK2	34.1	-32.3	46.6	-	-	74	-27.4	136	100	V
* 4.8041	46.59	PK2	34.2	-31.5	49.29	-	-	74	-24.71	186	399	H
* 4.80407	46.97	PK2	34.2	-31.5	49.67	-	-	74	-24.33	234	113	V
7.19861	37.14	PK2	35.8	-27.7	45.24	-	-	74	-28.76	360	100	H
7.20705	37.87	PK2	35.8	-27.8	45.87	-	-	74	-28.13	360	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

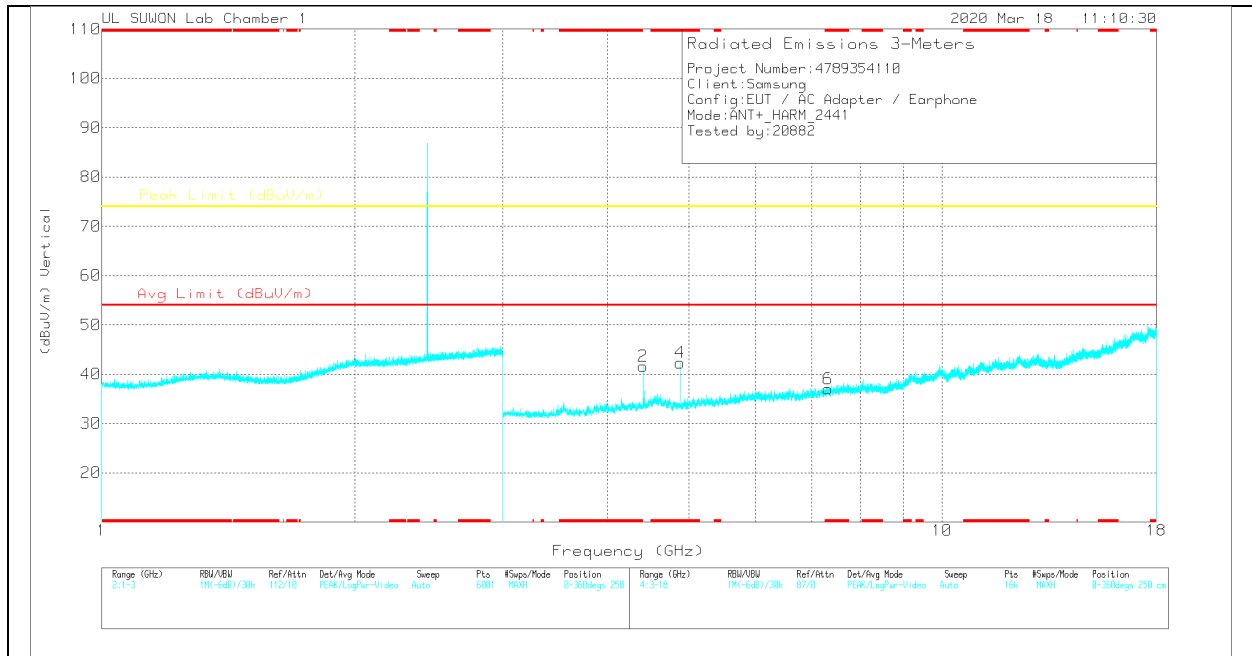
PK2 - KDB558074 Method: Maximum Peak

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**

**Radiated Emissions**

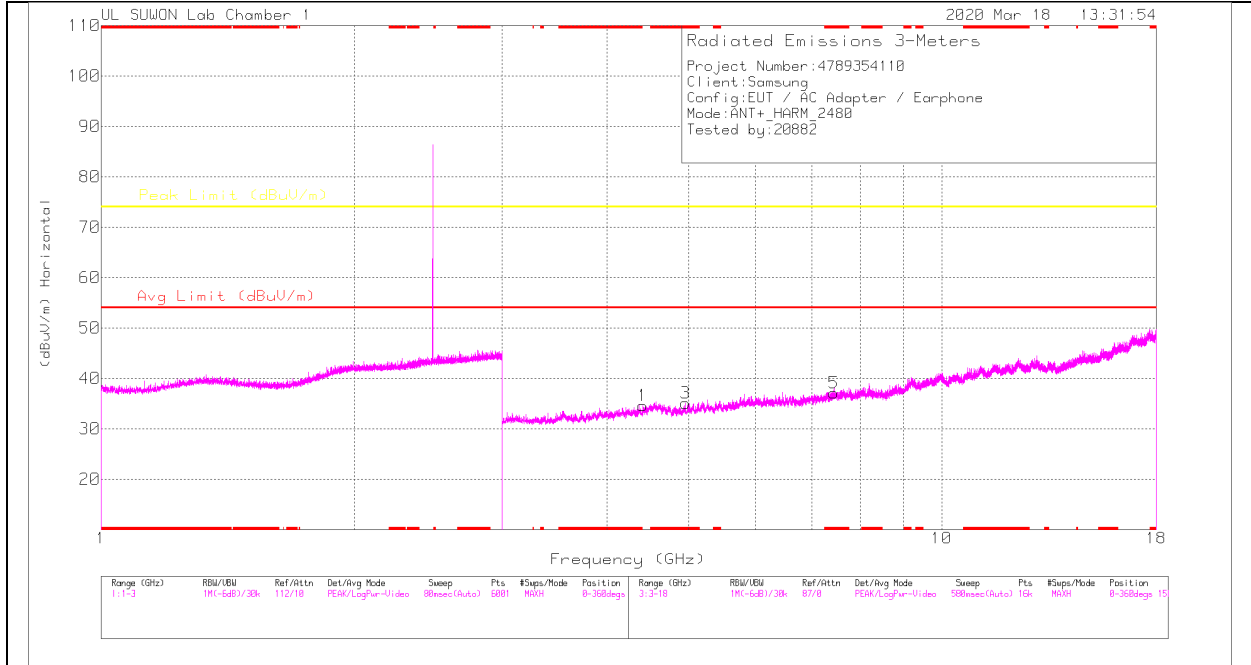
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.41122	43.63	PK2	34.1	-32.3	45.43	-	-	74	-28.57	190	376	H
4.41142	44.43	PK2	34.1	-32.3	46.23	-	-	74	-27.77	137	103	V
* 4.88212	45.83	PK2	34.2	-31.6	48.43	-	-	74	-25.57	188	390	H
* 4.88198	47.36	PK2	34.2	-31.6	49.96	-	-	74	-24.04	235	108	V
* 7.32461	37.05	PK2	35.8	-27.3	45.55	-	-	74	-28.45	360	100	H
* 7.32478	37.79	PK2	35.8	-27.3	46.29	-	-	74	-27.71	360	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

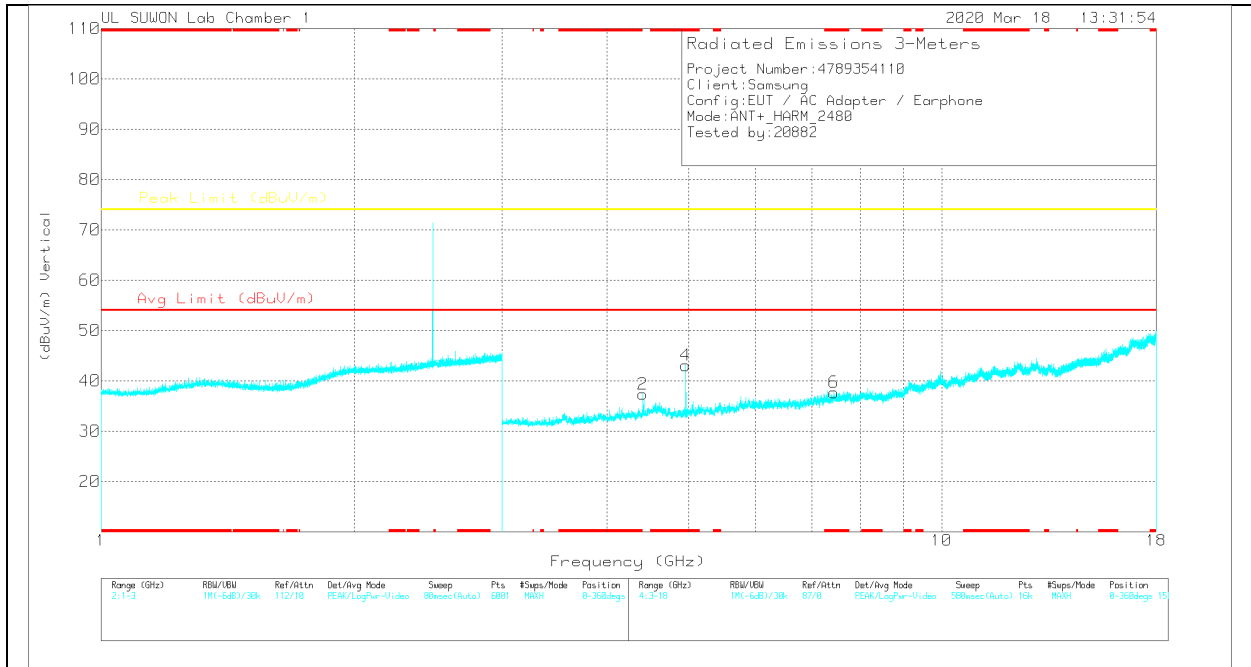
PK2 - KDB558074 Method: Maximum Peak

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

### Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016871 7	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4.41195	43.97	PK2	34.1	-32.3	45.77	-	-	74	-28.23	188	376	H
4.41214	44.06	PK2	34.1	-32.3	45.86	-	-	74	-28.14	138	101	V
* 4.95995	46.79	PK2	34.2	-31.6	49.39	-	-	74	-24.61	187	396	H
* 4.95988	47.05	PK2	34.2	-31.6	49.65	-	-	74	-24.35	233	100	V
* 7.43963	37.75	PK2	35.8	-27.1	46.45	-	-	74	-27.55	360	100	H
* 7.44046	37.3	PK2	35.8	-27.1	46	-	-	74	-28	360	100	V

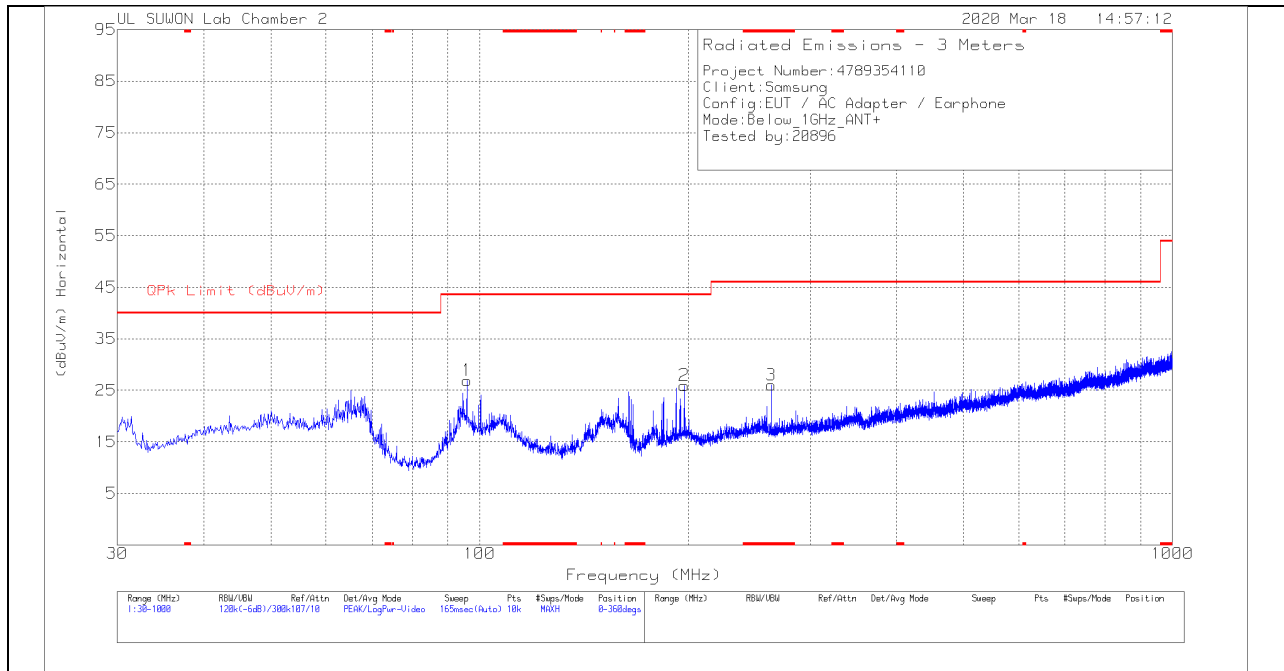
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

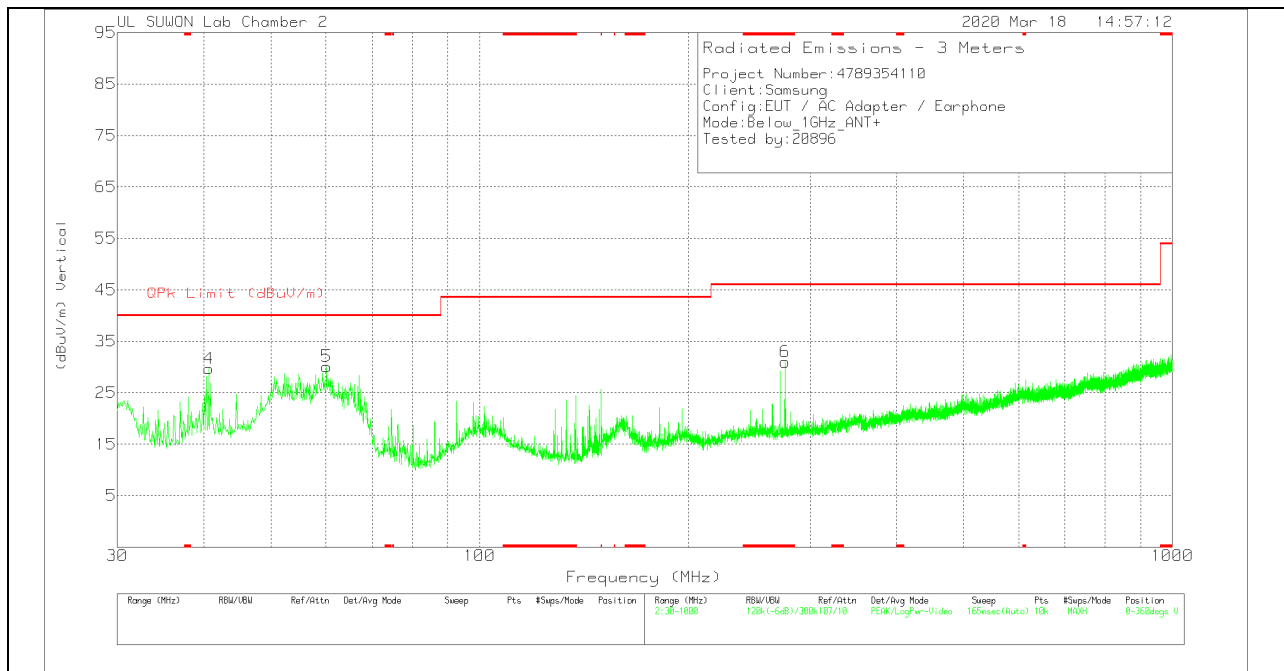
Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

### 7.2.5. SPURIOUS BELOW 1 GHz

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



#### SPURIOUS EMISSIONS 30 TO 1000 MHz (VERTICAL)





### BELOW 1 GHz TABLE

#### Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	95.96	40.82	Pk	17.4	-31.3	26.92	43.52	-16.6	0-360	100	H
2	197.519	38.42	Pk	18.3	-30.8	25.92	43.52	-17.6	0-360	200	H
3	* 263.673	37.92	Pk	18.6	-30.5	26.02	46.02	-20	0-360	200	H
4	40.67	42.58	Pk	18.9	-31.8	29.68	40	-10.32	0-360	100	V
5	60.167	43.28	Pk	18.5	-31.7	30.08	40	-9.92	0-360	100	V
6	* 275.992	42.71	Pk	18.7	-30.4	31.01	46.02	-15.01	0-360	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

## 8. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)  
IC RSS-GEN Clause 8.8

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

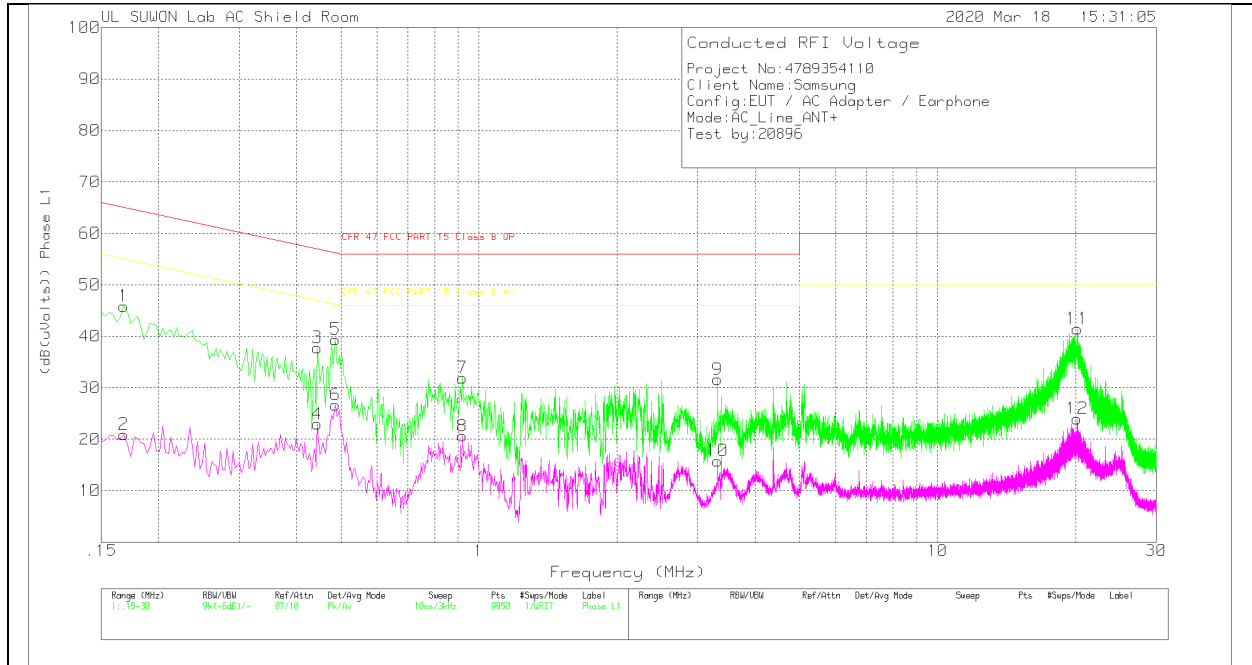
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**

**6 WORST EMISSIONS**

**LINE 1 PLOT**



**LINE 1 RESULTS**

Trace Markers

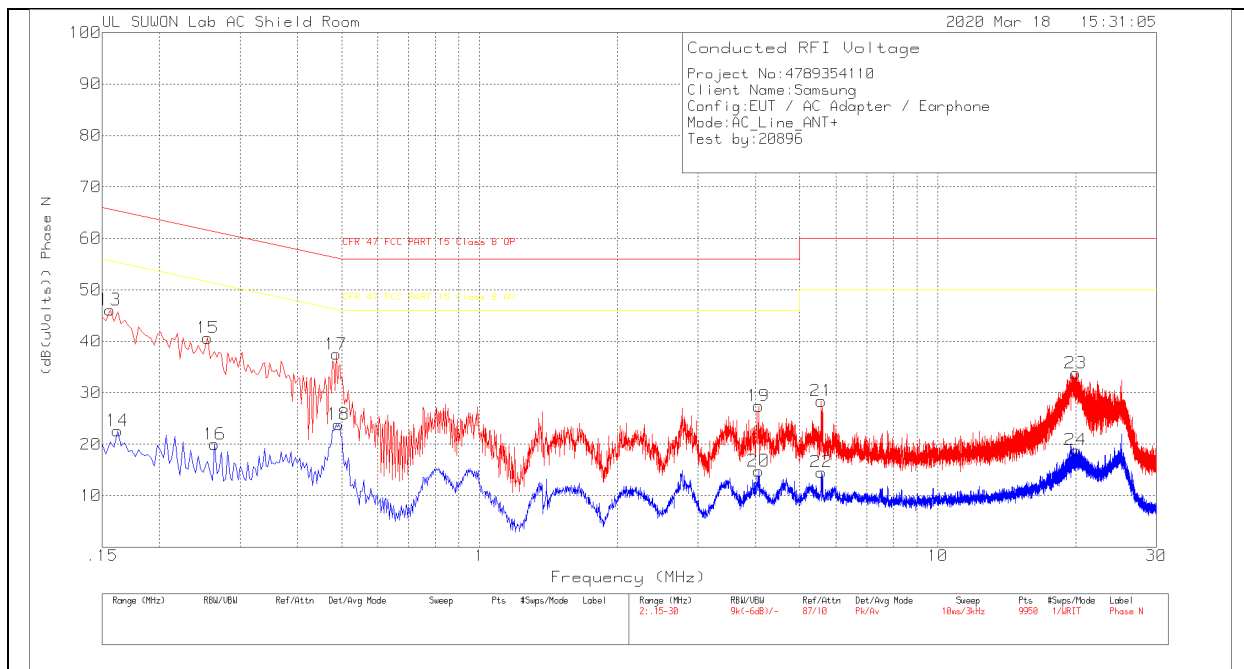
Range 1: Phase L1 .15 - 30MHz

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	.168	35.76	Pk	10	.1	45.86	65.06	-19.2	-	-
2	.168	10.81	Av	10	.1	20.91	-	-	55.06	-34.15
3	.444	27.68	Pk	9.9	.2	37.78	56.99	-19.21	-	-
4	.444	12.85	Av	9.9	.2	22.95	-	-	46.99	-24.04
5	.486	29.29	Pk	9.9	.2	39.39	56.24	-16.85	-	-
6	.486	16.58	Av	9.9	.2	26.68	-	-	46.24	-19.56
7	.921	21.83	Pk	9.8	.3	31.93	56	-24.07	-	-
8	.921	10.51	Av	9.8	.3	20.61	-	-	46	-25.39
9	3.315	21.51	Pk	9.8	.3	31.61	56	-24.39	-	-
10	3.312	5.7	Av	9.8	.3	15.8	-	-	46	-30.2
11	20.19	30.77	Pk	10.3	.4	41.47	60	-18.53	-	-
12	20.172	13.29	Av	10.3	.4	23.99	-	-	50	-26.01

Pk - Peak detector

Av - Average detection

### LINE 2 PLOT



### LINE 2 RESULTS

#### Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[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)
13	.156	36.09	Pk	9.9	.1	46.09	65.67	-19.58	-	-
14	.162	12.51	Av	10	.1	22.61	-	-	55.36	-32.75
15	.255	30.74	Pk	9.7	.2	40.64	61.59	-20.95	-	-
16	.264	10.09	Av	9.7	.2	19.99	-	-	51.3	-31.31
17	.486	27.4	Pk	9.9	.2	37.5	56.24	-18.74	-	-
18	.492	13.75	Av	9.9	.2	23.85	-	-	46.13	-22.28
19	4.062	17.33	Pk	9.8	.3	27.43	56	-28.57	-	-
20	4.062	4.7	Av	9.8	.3	14.8	-	-	46	-31.2
21	5.568	18.31	Pk	9.8	.3	28.41	60	-31.59	-	-
22	5.571	4.48	Av	9.8	.3	14.58	-	-	50	-35.42
23	20.001	23.09	Pk	10.3	.4	33.79	60	-26.21	-	-
24	20.007	8.16	Av	10.3	.4	18.86	-	-	50	-31.14

Pk - Peak detector

Av - Average detection

## END OF TEST REPORT