



# **CERTIFICATION TEST REPORT**

**Report Number.** : 4789582668-E7V2

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

**Model** : SC-54A, SCG07

**FCC ID** : A3LSMA516JPN

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

**Test Standard(s)** : FCC 47 CFR PART 15 SUBPART C

**Date Of Issue:**  
August 28, 2020

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	08/26/20	Initial issue	Sungeun Lee
V2	08/28/20	Updated to address TCB's question	Sungeun Lee

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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/ac, ANT+ and NFC

**MODEL NUMBER:** SC-54A, SCG07

**SERIAL NUMBER:** R38CN709MKFY (CONDUCTED)  
R3CN709MX2E, R3CN709MWJE (RADIATED);

**DATE TESTED:** AUG 25, 2020

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:

Tested By:



Junwhan Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

Sungeun Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. TEST METHODOLOGY

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

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. ANSI C63.10-2013.

## 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 checked="" 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

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

This report covers the Samsung models SC-54A and SCG07. These models are identical in hardware. Basic model SC-54A was set for test. (see the PED document for details).

### 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+	89.77	55.80	3.00

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.  
Therefore this E.U.T Complies with the requirement of §15.203.**

ANT+ operates on single antenna.  
The radio utilizes an internal antenna, with a maximum gain of -2.82 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 Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z 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	Manufacture	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA200	R37MEFL0WRDK3	N/A
Data Cable	SAMSUNG	EP-DR140ABE	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

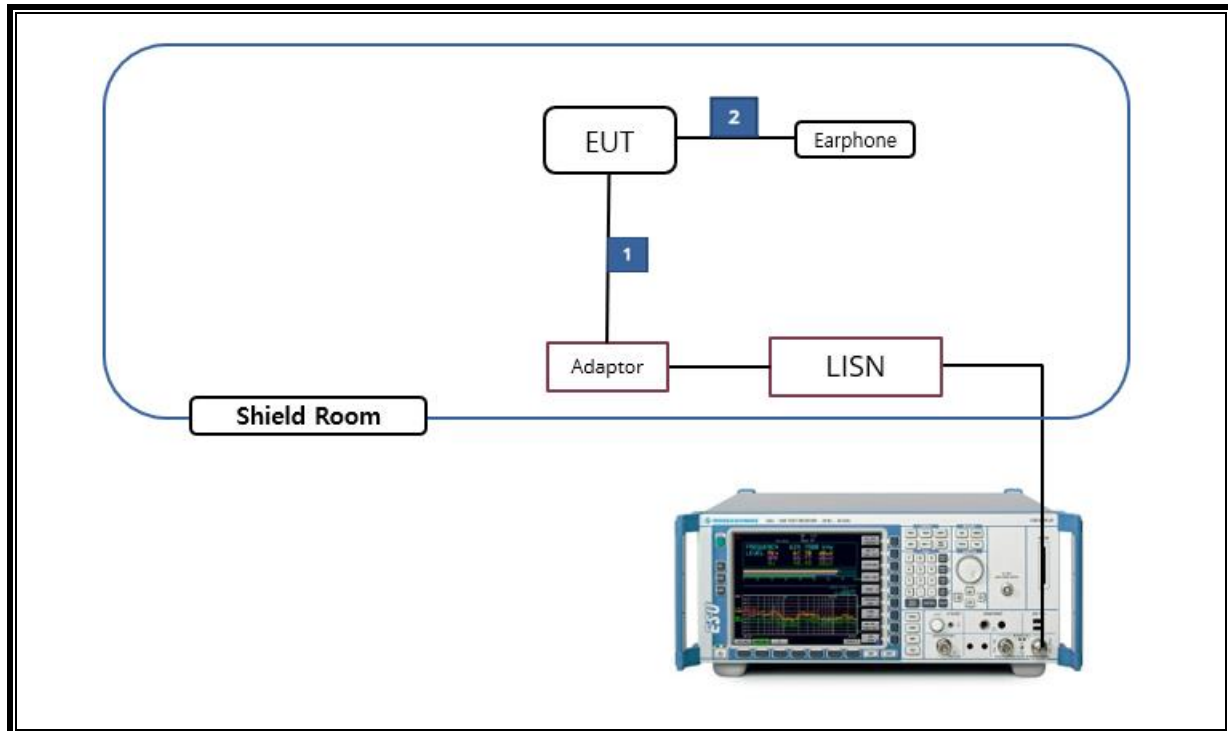
### I/O CABLE

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	1.1m	N/A

### TEST SETUP

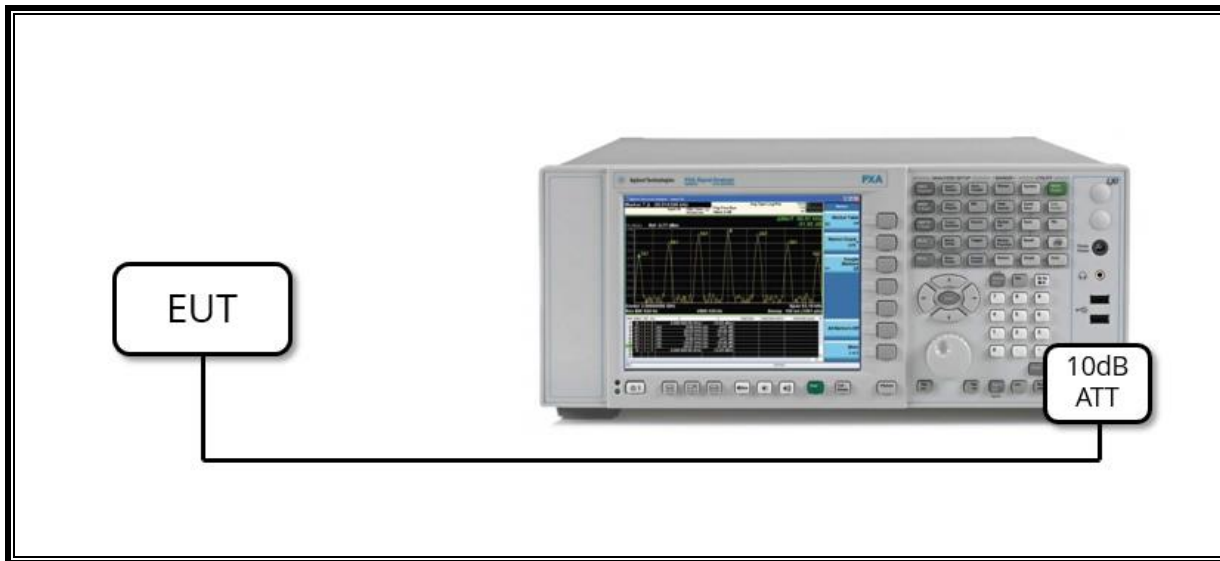
The EUT is set to continuously transmit in ANT + test mode.  
 Test software in hidden menu exercised the EUT to enable ANT+ mode.

### SETUP DIAGRAM FOR TESTS (AC Line Conducted)

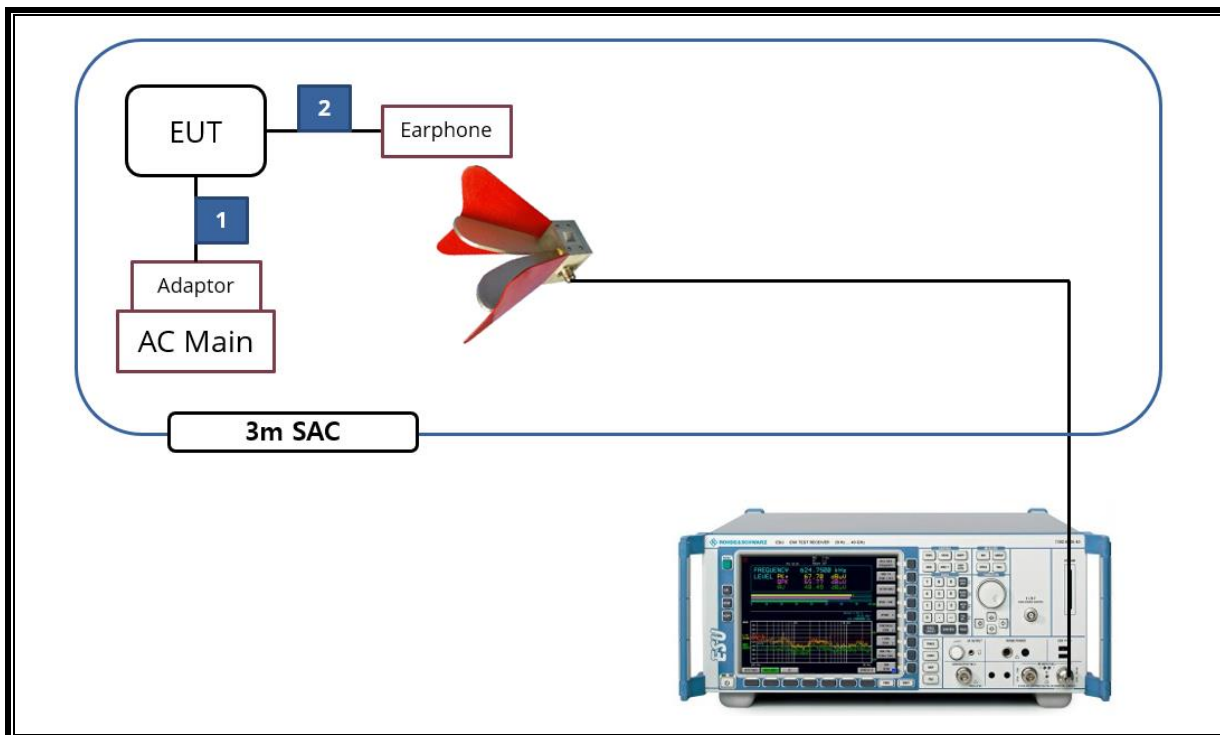




**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**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	Next Cal. Date	
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-04-20	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-04-20	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	08-04-20	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	08-04-20	07-27-22
Antenna, Horn, 40 GHz	ETS	3116C	00166155	08-13-20	08-04-22
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21	
Preamplifier	ETS	3116C-PA	00168841	08-08-20	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-05-20	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-05-20	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-06-20	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-06-20	08-03-21
Spectrum Analyzer, 44 GHz	Keysight	N9030B	MY57143717	01-20-21	
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-06-20	08-05-21
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-06-20	08-05-21
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-09-20	08-05-21
Attenuator	PASTERNAK	PE7087-10	A001	08-08-20	08-03-21
Attenuator	PASTERNAK	PE7087-10	A008	08-08-20	08-03-21
Attenuator	PASTERNAK	PE7087-10	A007	08-08-20	08-03-21
Attenuator	PASTERNAK	PE7087-10	A009	08-08-20	08-05-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-06-20	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-06-20	08-03-21
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-05-20	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-06-20	08-03-21
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-06-20	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-06-20	08-03-21
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-06-20	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-06-20	08-03-21
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-06-20	08-03-21
LISN	R&S	ENV216	101837	08-09-20	08-06-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21	
UL Software					
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

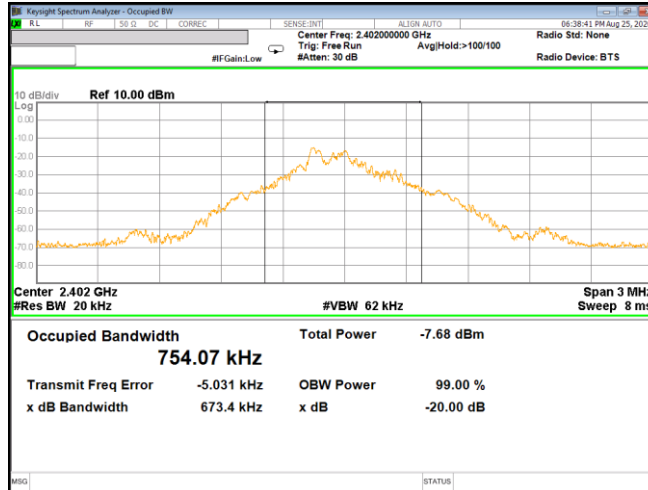
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### RESULTS

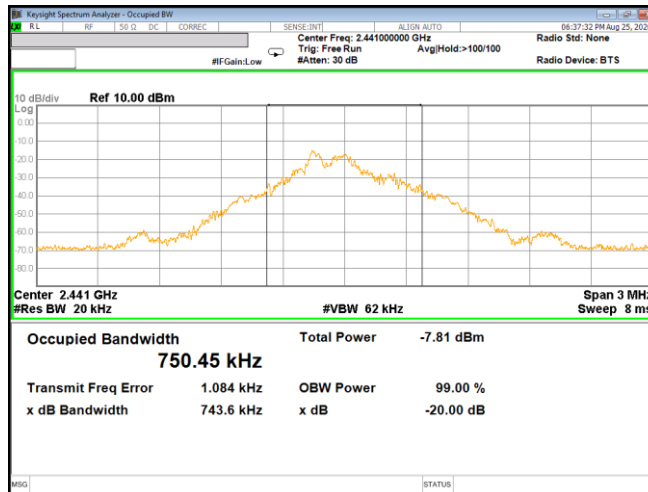
Channel	Frequency [MHz]	99% Bandwidth [kHz]	20 dB Bandwidth [kHz]
Low	2402	754.1	673.4
Mid	2441	750.5	743.6
High	2480	762.7	661.1
Worst		762.7	743.6

**99% BANDWIDTH PLOTS**

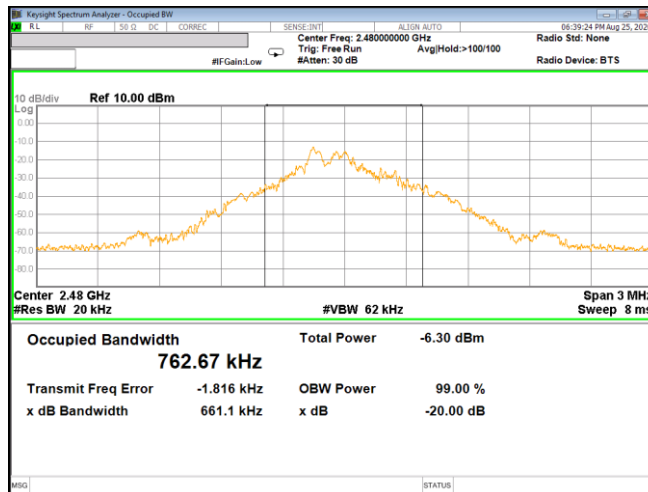
**LOW CHANNEL**



**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

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.

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits ( $\mu\text{V/m}$ )	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

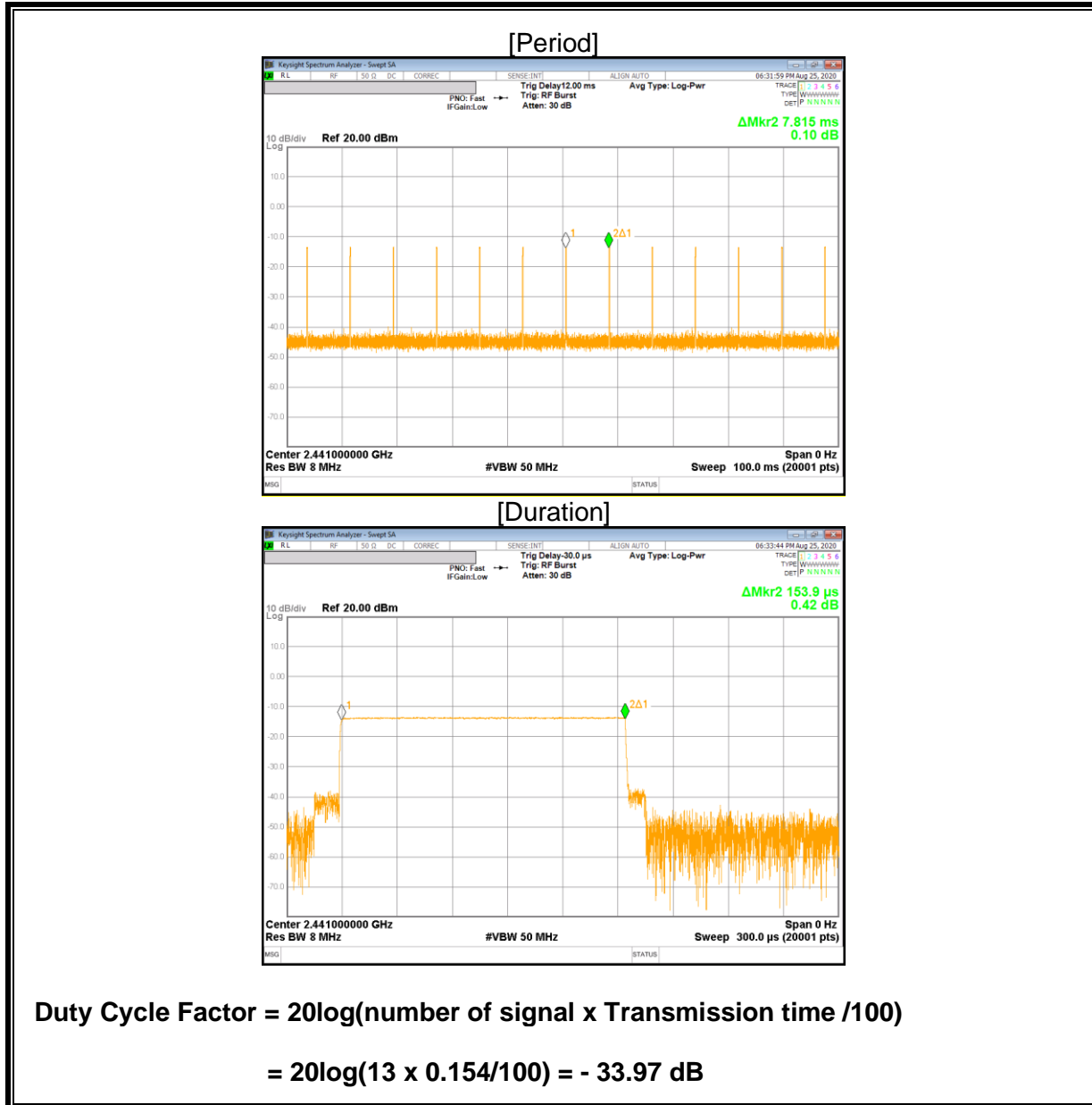
\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

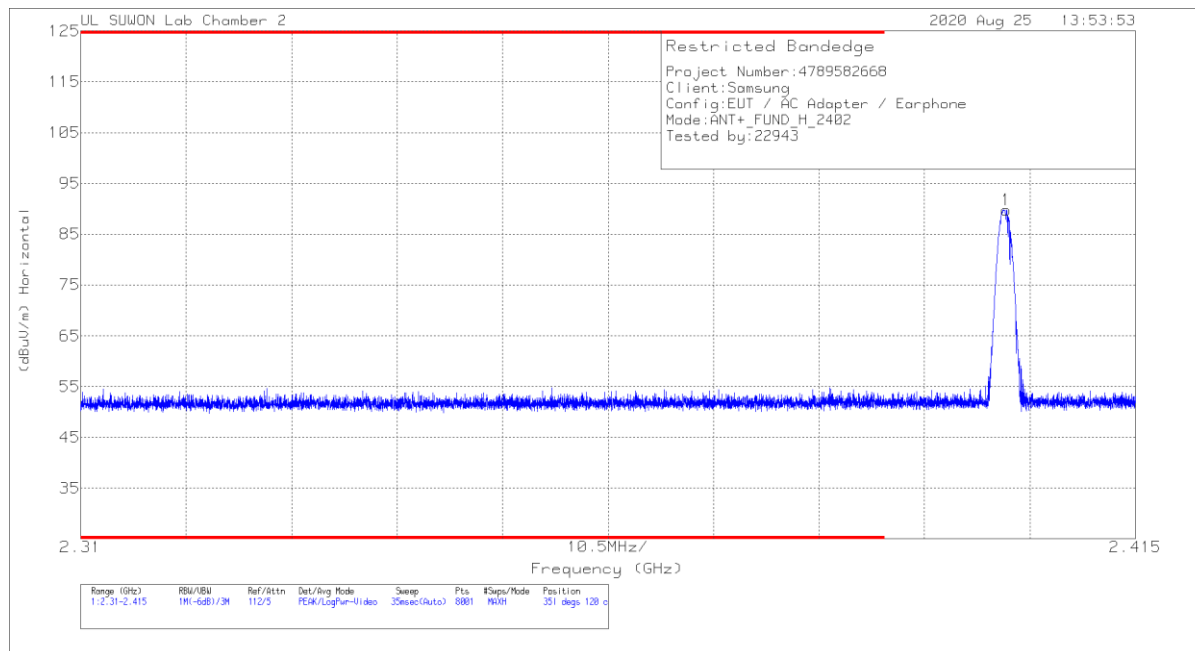
**RESULTS**

**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	2.40216	78.47	Pk	31.9	-20.6	89.77	351	120	H

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

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
89.77	114	24.23

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

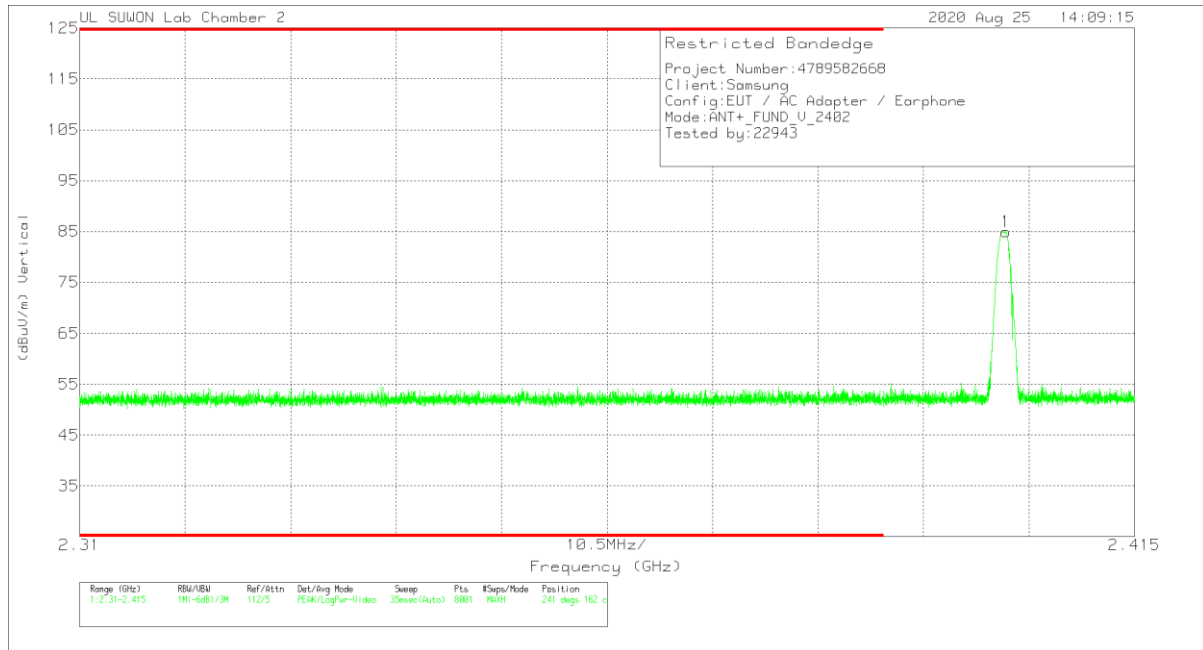
DCCF = -33.97

Corrected AV reading = Peak Reading + DCCF

= 89.77 + -33.97 = 55.8 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 38.2 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	2.40222	73.68	PK	31.9	-20.6	84.98	241	162	V

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
84.98	114	29.02

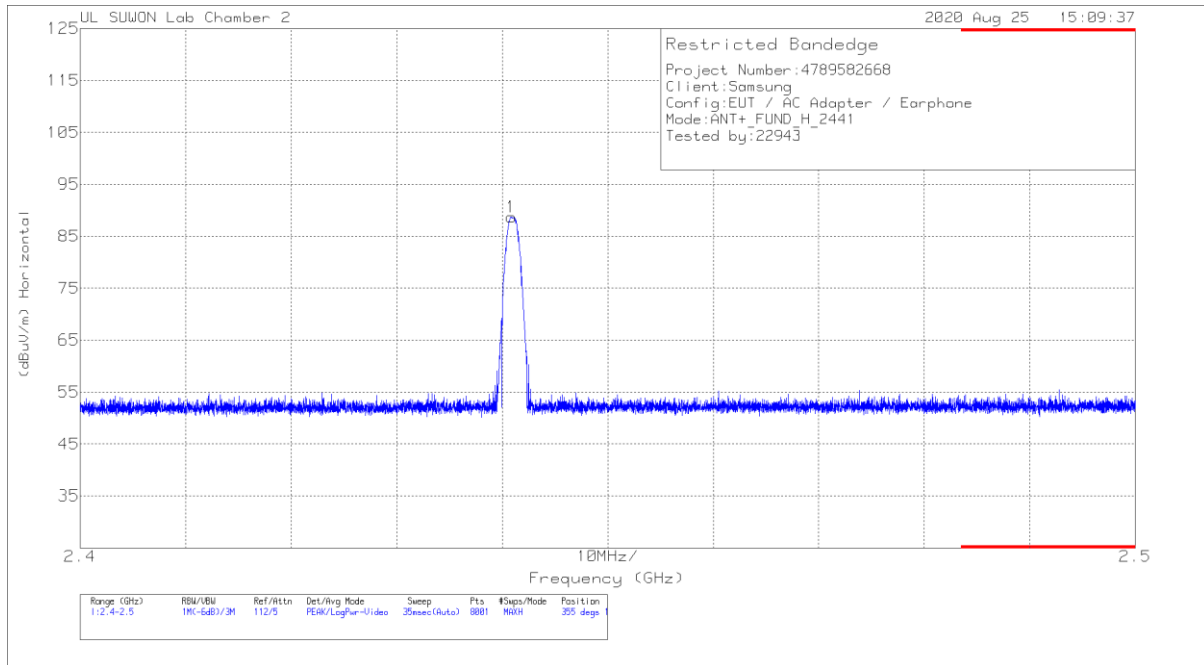
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.97

Corrected AV reading = Peak Reading + DCCF

= 84.98 + -33.97 = 51.01 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 42.99 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	2.44088	77.2	Pk	32	-20.5	88.7	355	120	H

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
88.7	114	25.3

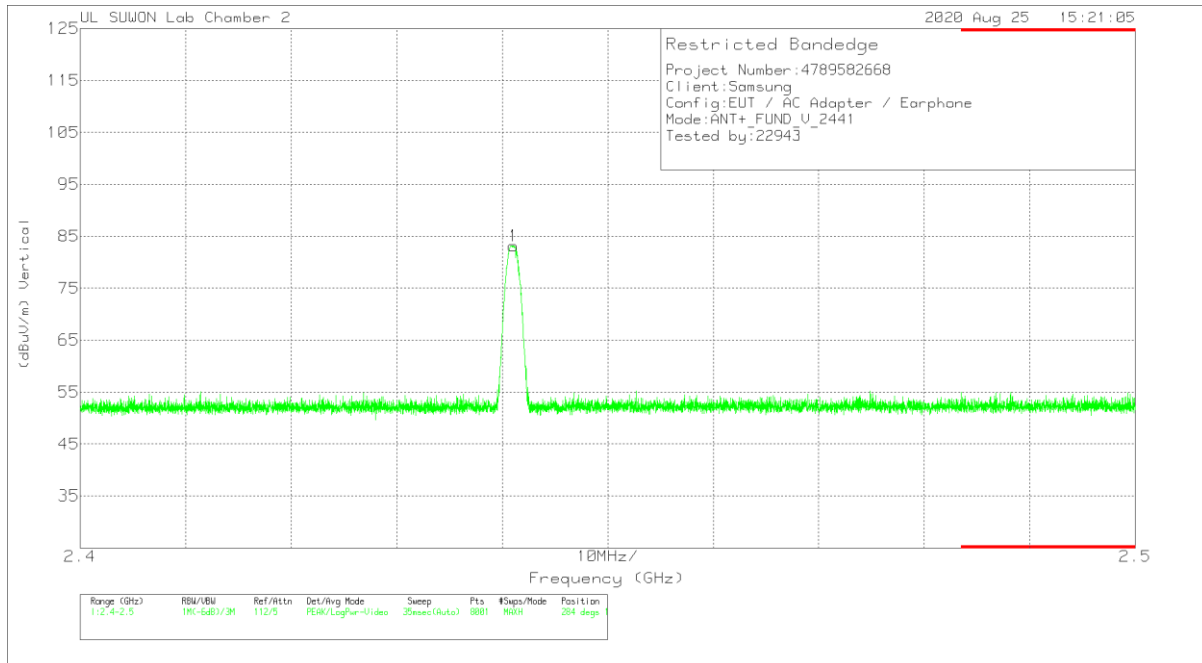
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.97

Corrected AV reading = Peak Reading + DCCF

= 88.7 + -33.97 = 54.73 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 39.27 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	2.44106	71.64	PK	32	-20.5	83.14	284	110	V

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
83.14	114	30.86

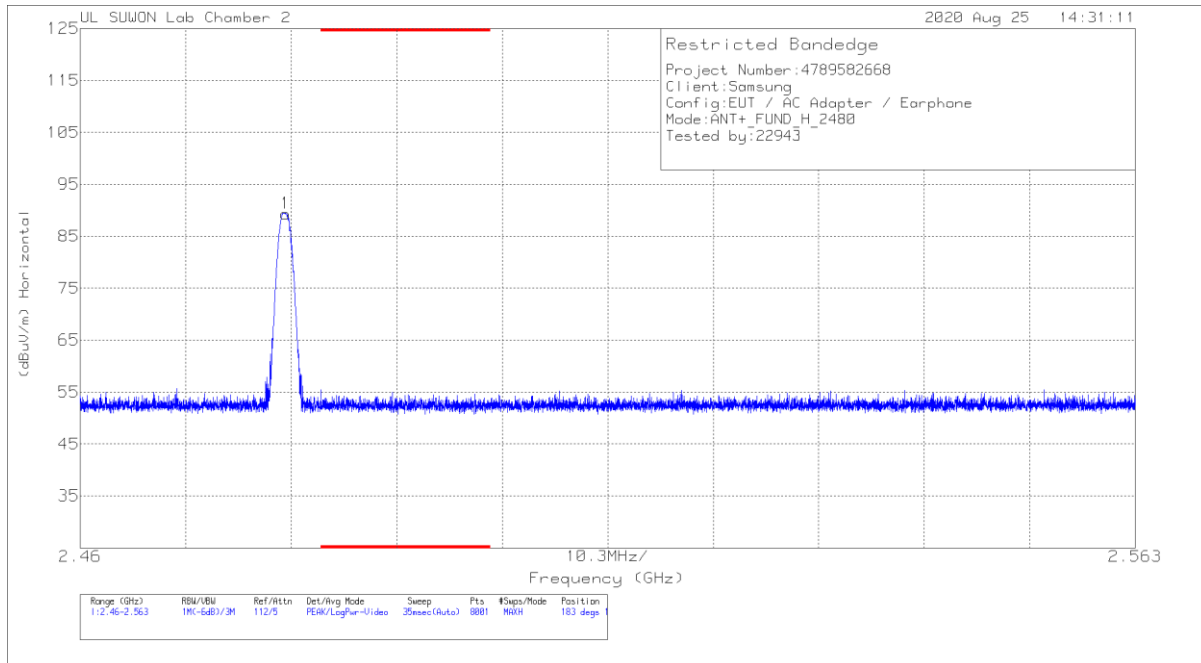
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.97

Corrected AV reading = Peak Reading + DCCF

= 83.14 + -33.97 = 49.17 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 44.83 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	2.48004	77.86	PK	32	-20.5	89.36	183	118	H

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

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
89.36	114	24.64

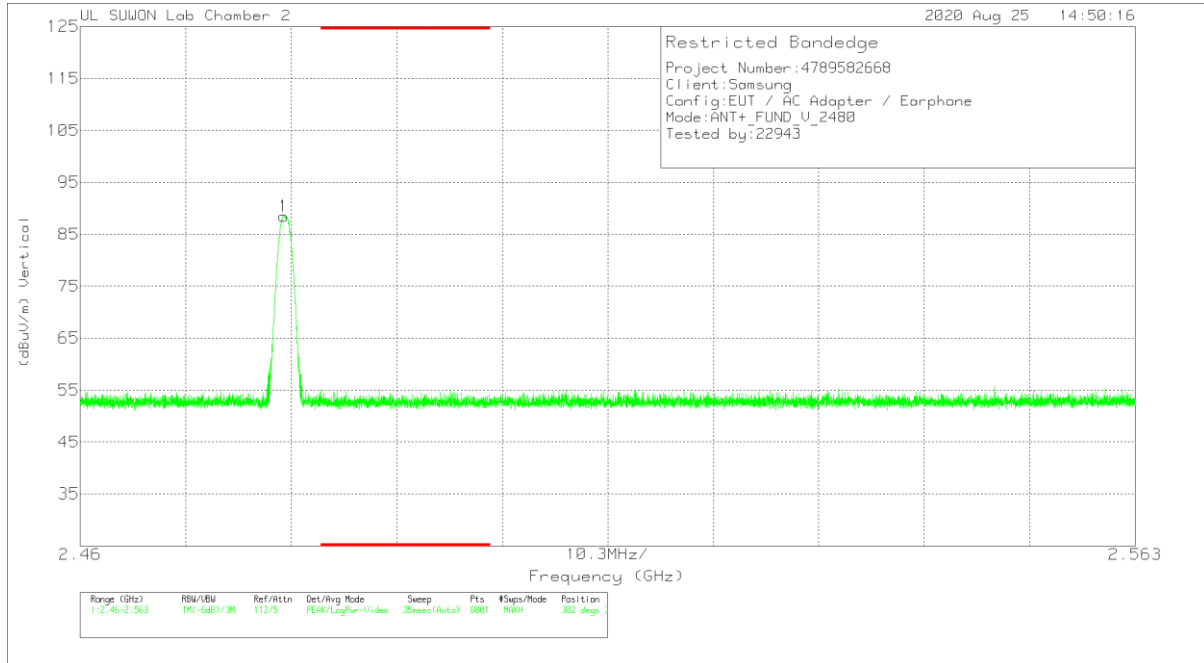
\*\* For marker 1 used the following method to do averaging:

DCCF = -33.97

Corrected AV reading = Peak Reading + DCCF

= 89.36 + -33.97 = 55.39 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 38.61 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	2.47988	76.94	PK	32	-20.5	88.44	302	356	V

Pk - Peak detector

Peak reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)
88.44	114	25.56

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

DCCF = -33.97

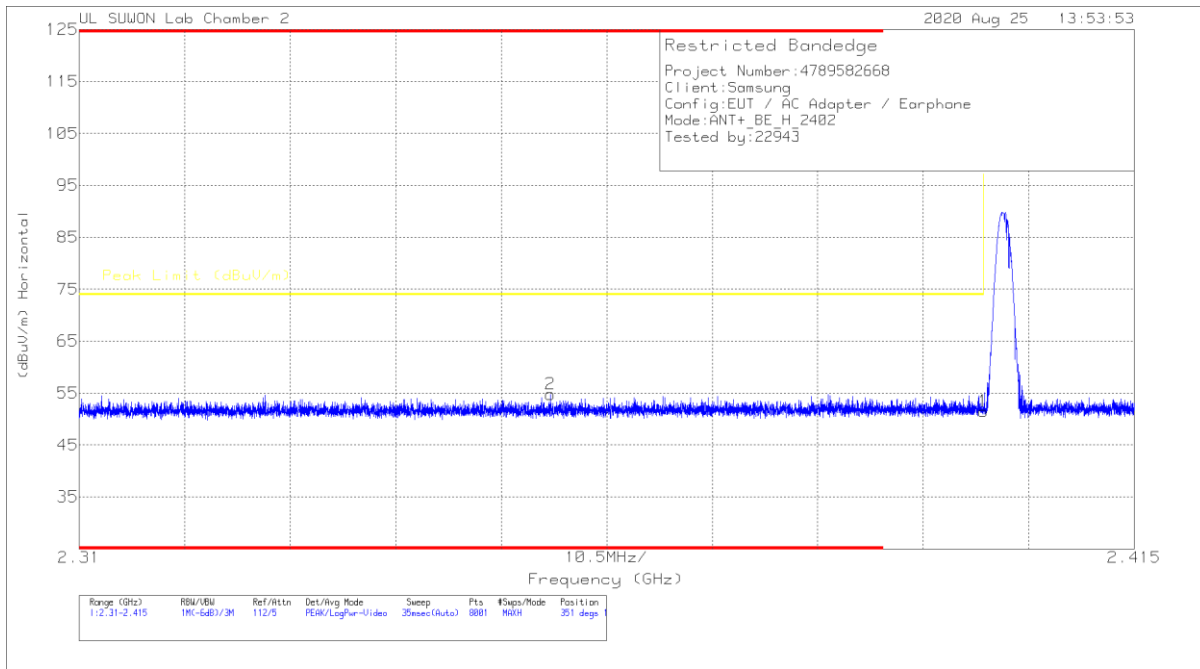
Corrected AV reading = Peak Reading + DCCF

= 88.44 + -33.97 = 54.47 dBuV/m [AVG Limit : 94 dBuV/m, Margin : 39.53 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_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4	40.18	Pk	31.9	-20.6	51.48	74	-22.52	351	120	H
2	* 2.35691	43.69	Pk	31.8	-20.7	54.79	74	-19.21	351	120	H

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

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

$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{51.48} \text{ dBuV/m}$$

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

$$= 51.48 + -33.97 = \underline{17.51} \text{ dBuV/m} \quad [\text{AVG Limit : 54 dBuV/m, Margin : 36.49 dB}]$$

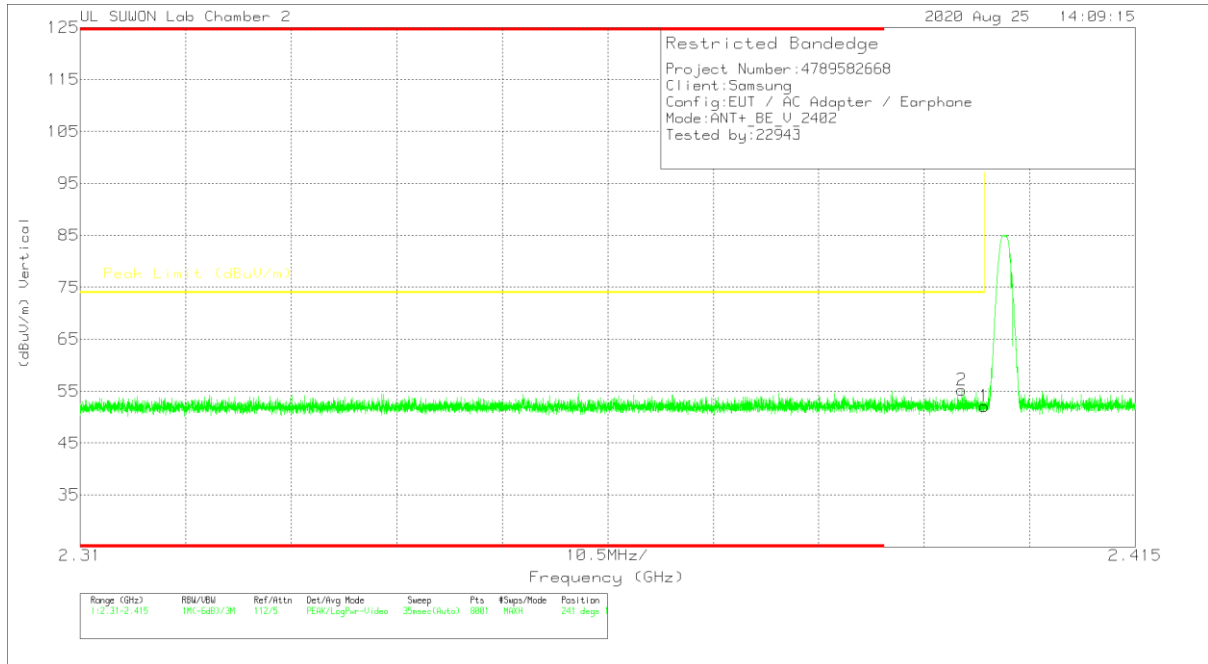
\* For marker 2 used the following method to do averaging:

$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{54.79} \text{ dBuV/m}$$

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

$$= 54.79 + -33.97 = \underline{20.82} \text{ dBuV/m} \quad [\text{AVG Limit : 54 dBuV/m, Margin : 33.18 dB}]$$

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4	40.79	Pk	31.9	-20.6	52.09	74	-21.91	241	162	V
2	2.39775	43.92	Pk	31.9	-20.6	55.22	74	-18.78	241	162	V

Pk - Peak detector

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

$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{52.09} \text{ dBuV/m}$$

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

$$= 52.09 + -33.97 = \underline{18.12} \text{ dBuV/m} \quad [\text{AVG Limit : 54 dBuV/m, Margin : } \underline{35.88} \text{ dB}]$$

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

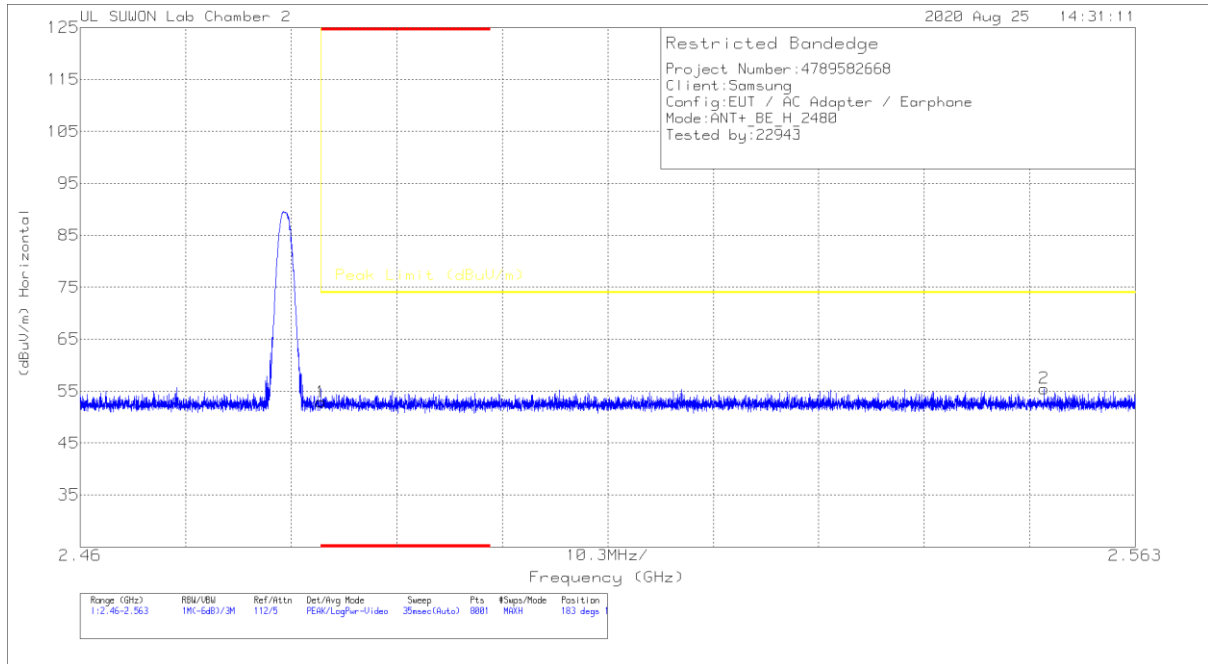
$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{55.22} \text{ dBuV/m}$$

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

$$= 55.22 + -33.97 = \underline{21.25} \text{ dBuV/m} \quad [\text{AVG Limit : 54 dBuV/m, Margin : } \underline{32.75} \text{ dB}]$$

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.29	Pk	32	-20.4	52.89	74	-21.11	183	118	H
2	2.55409	43.7	Pk	32.2	-20.4	55.5	74	-18.5	183	118	H

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

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

$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{52.89} \text{ dBuV/m}$$

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

$$= 52.89 + -33.97 = \underline{18.92} \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 35.08 dB]}$$

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

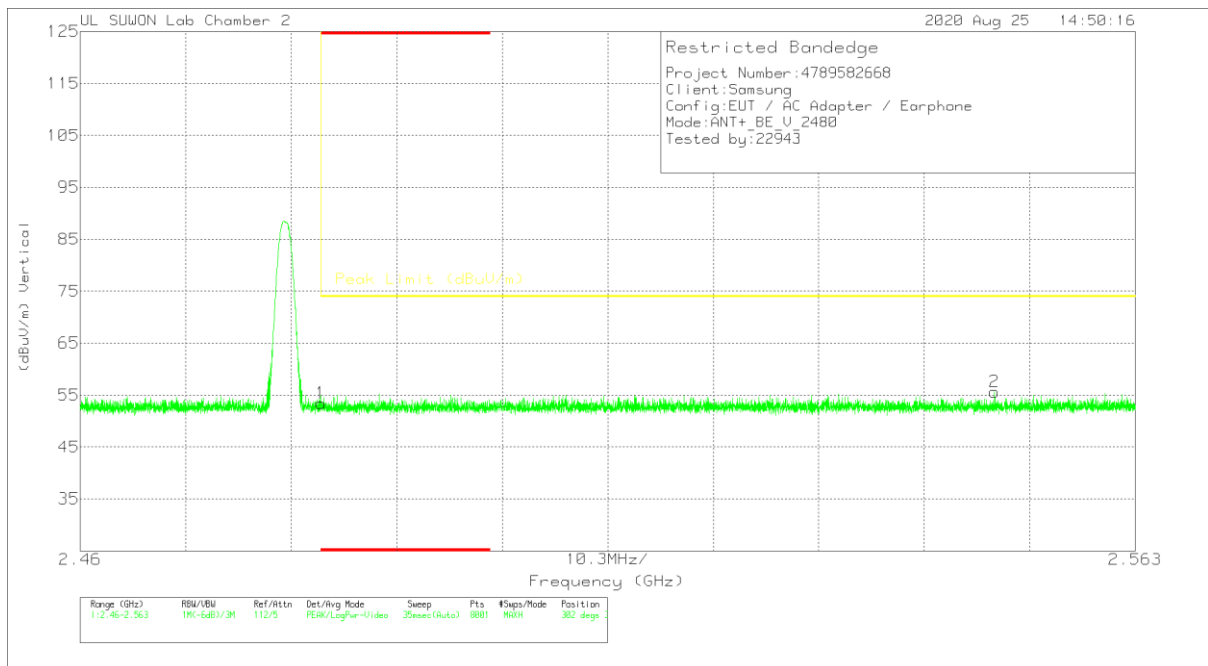
$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{55.5} \text{ dBuV/m}$$

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

$$= 55.5 + -33.97 = \underline{21.53} \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 32.47 dB]}$$



**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.81	Pk	32	-20.4	53.41	74	-20.59	302	356	V
2	2.54925	44.05	Pk	32.1	-20.5	55.65	74	-18.35	302	356	V

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

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

$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{53.41} \text{ dBuV/m}$$

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

$$= 53.41 + -33.97 = \underline{19.44} \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 34.56 dB]}$$

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

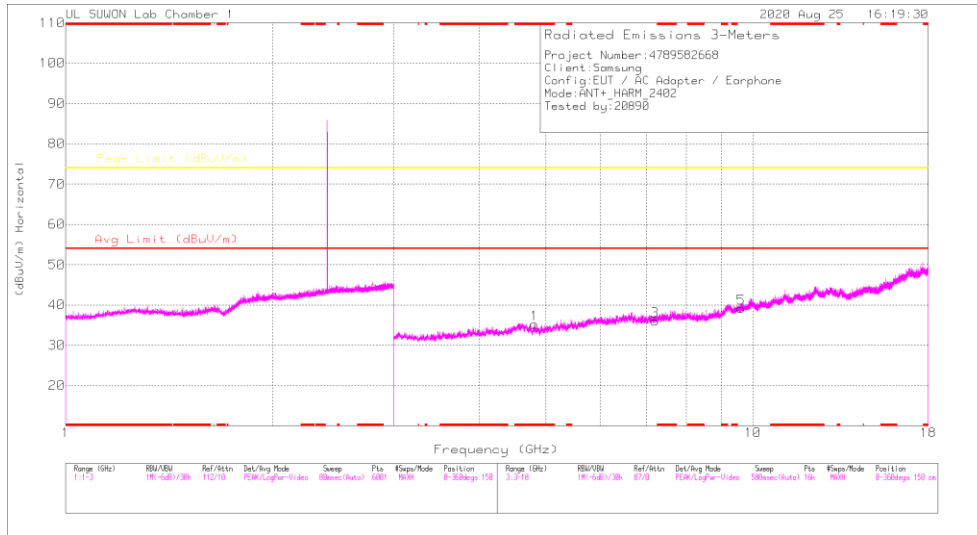
$$DCCF = -33.97 \quad / \quad \text{Peak Reading} = \underline{55.65} \text{ dBuV/m}$$

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

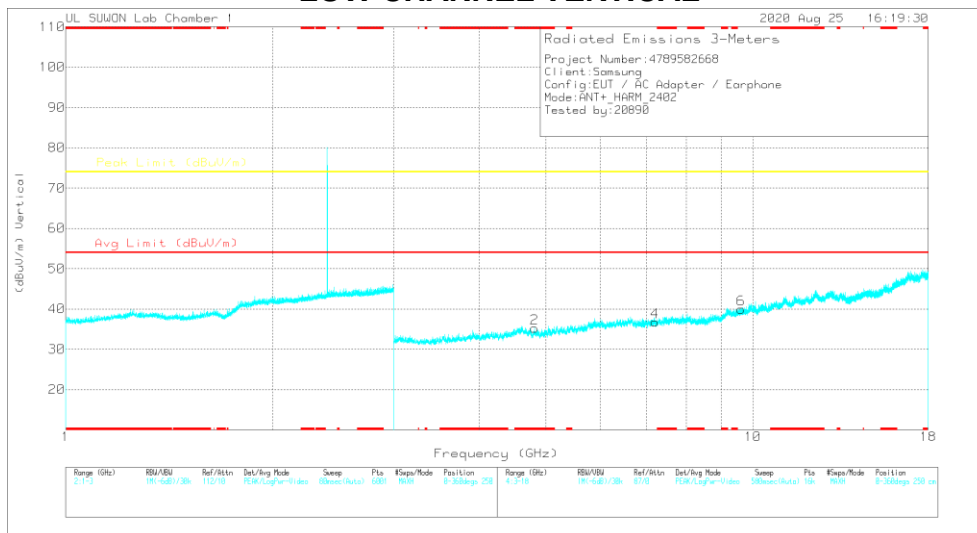
$$= 55.65 + -33.97 = \underline{21.68} \text{ dBuV/m [AVG Limit : 54 dBuV/m, Margin : 32.32 dB]}$$

### 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.

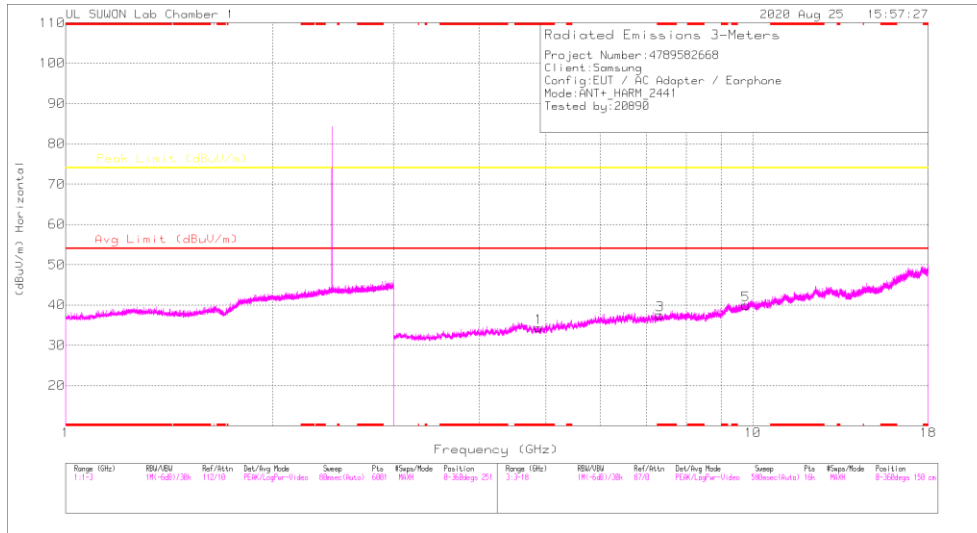
#### LOW CHANNEL DATA

##### Radiated Emissions

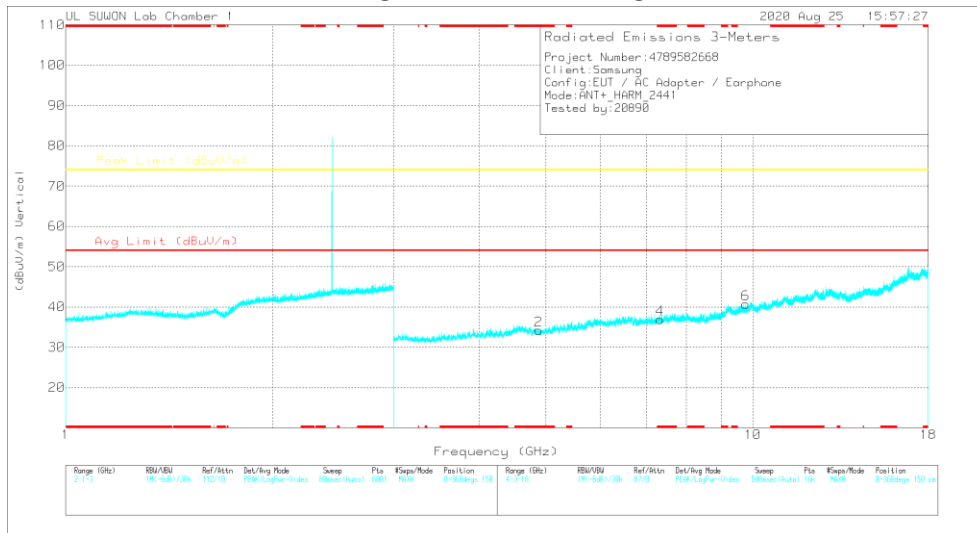
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80459	41.95	PK2	34.2	-31.5	44.65	-	-	74	-29.35	360	100	H
* 4.80558	41.04	PK2	34.2	-31.5	43.74	-	-	74	-30.26	360	100	V
7.21234	37.47	PK2	35.9	-27.9	45.47	-	-	74	-28.53	360	100	H
7.20038	37.36	PK2	35.9	-27.8	45.46	-	-	74	-28.54	360	100	V
9.61661	34.98	PK2	36.8	-23.2	48.58	-	-	74	-25.42	360	100	H
9.60632	35.18	PK2	36.8	-23.3	48.68	-	-	74	-25.32	360	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak

### 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

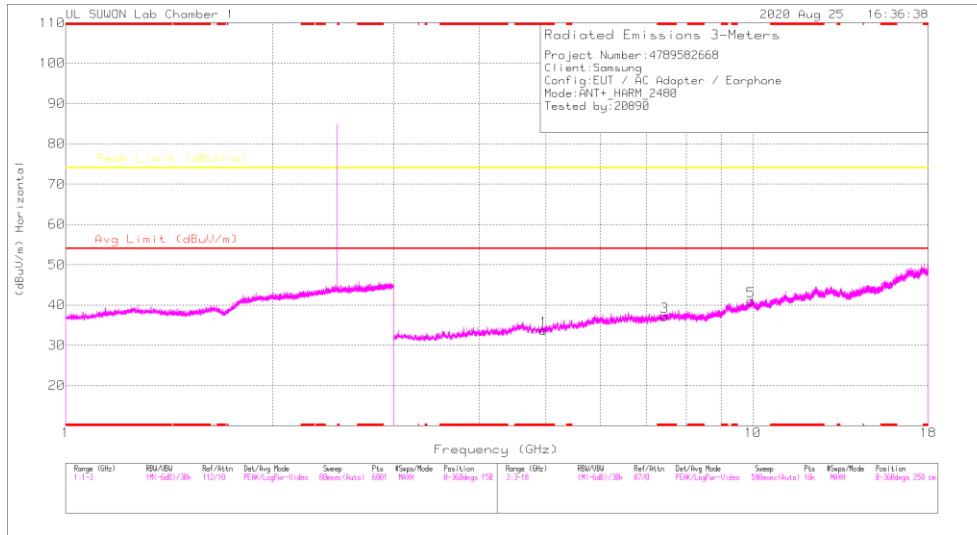
#### Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.87103	40.5	PK2	34.2	-31.5	43.2	-	-	74	-30.8	360	100	H
* 4.87456	40.29	PK2	34.2	-31.6	42.89	-	-	74	-31.11	360	100	V
* 7.3294	37.81	PK2	35.9	-27.3	46.41	-	-	74	-27.59	360	100	H
* 7.32129	37.6	PK2	35.9	-27.2	46.3	-	-	74	-27.7	360	100	V
9.75416	34.63	PK2	37	-23.8	47.83	-	-	74	-26.17	360	100	H
9.76307	35.55	PK2	37	-23.9	48.65	-	-	74	-25.35	360	100	V

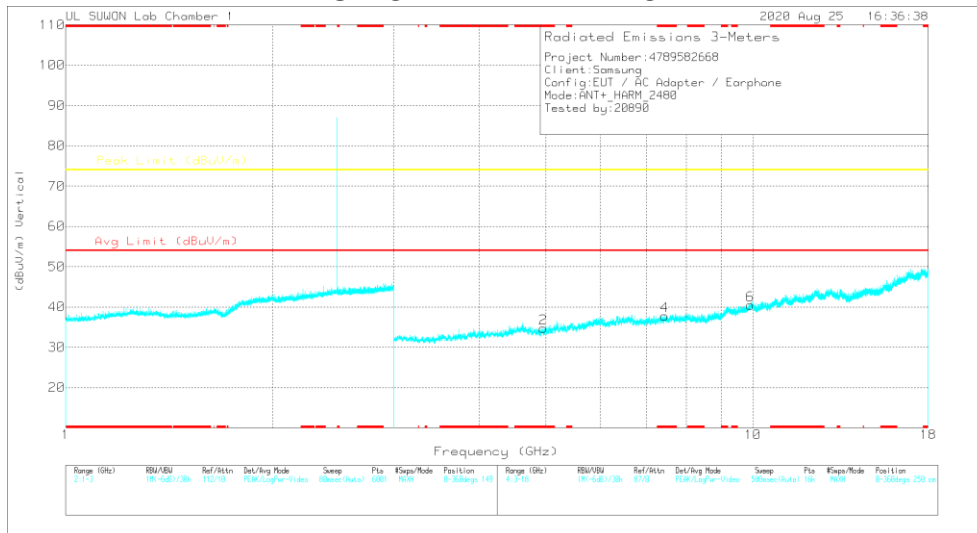
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

### 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

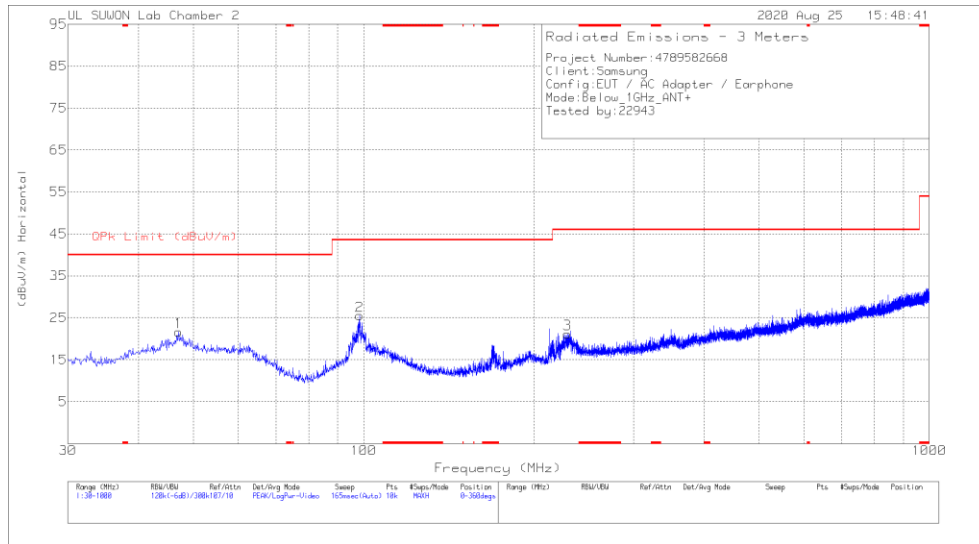
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00218957	3GHz_HP[dB]	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.95672	40.63	PK2	34.1	-31.6	43.13	-	-	74	-30.87	360	100	H
* 4.95917	40.51	PK2	34.1	-31.6	43.01	-	-	74	-30.99	360	100	V
* 7.44438	37.63	PK2	35.9	-27	46.53	-	-	74	-27.47	360	100	H
* 7.44557	37.88	PK2	35.9	-27	46.78	-	-	74	-27.22	360	100	V
9.93155	33.63	PK2	37.3	-21.5	49.43	-	-	74	-24.57	360	100	H
9.92438	33.96	PK2	37.2	-21.9	49.26	-	-	74	-24.74	360	100	V

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

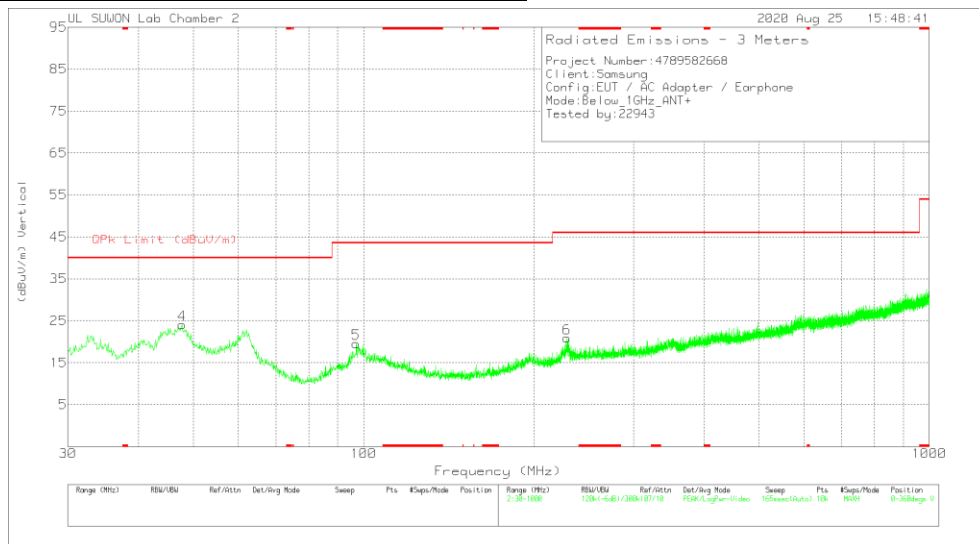
PK2 - KDB558074 Method: Maximum Peak

### 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	47.072	33.67	Pk	19.8	-31.8	21.67	40	-18.33	0-360	300	H
2	98.385	39.61	Pk	17.2	-31.3	25.51	43.52	-18.01	0-360	300	H
3	229.335	34.27	Pk	17.6	-30.7	21.17	46.02	-24.85	0-360	100	H
4	47.751	36	Pk	19.9	-31.8	24.1	40	-15.9	0-360	100	V
5	97.027	34	Pk	17	-31.4	19.6	43.52	-23.92	0-360	100	V
6	228.947	33.98	Pk	17.5	-30.6	20.88	46.02	-25.14	0-360	200	V

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.

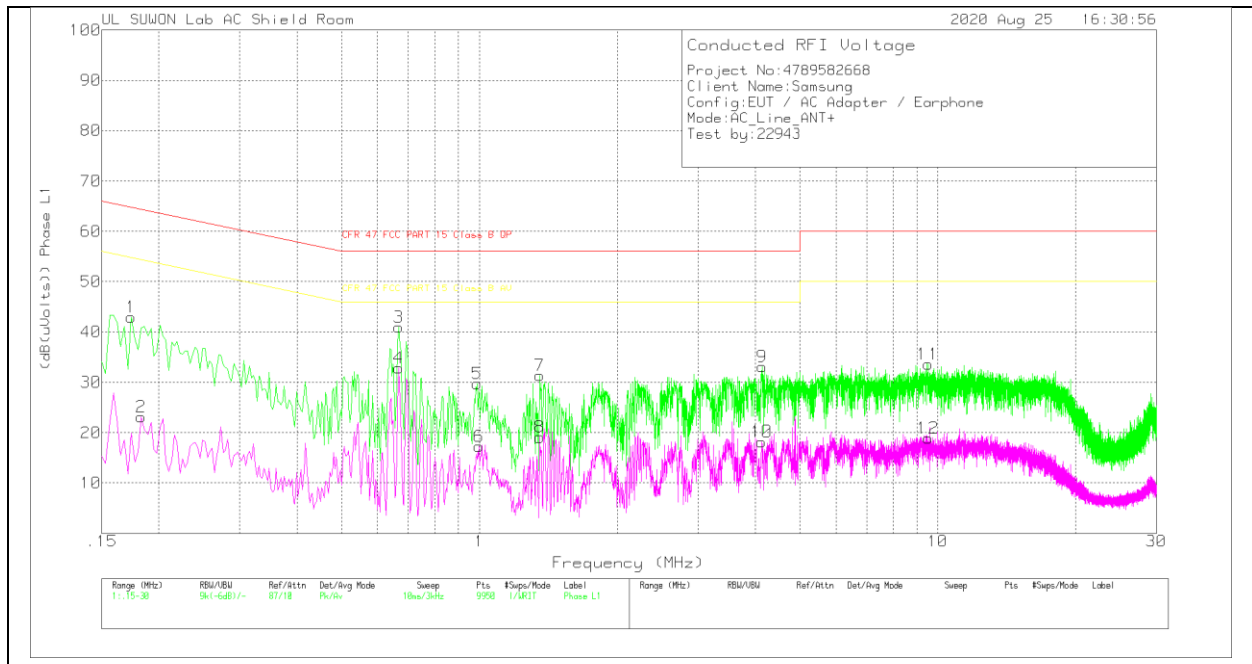
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

**RESULTS**

**6 WORST EMISSIONS**

**LINE 1 PLOT**



**LINE 1 RESULTS**

**Trace Markers**

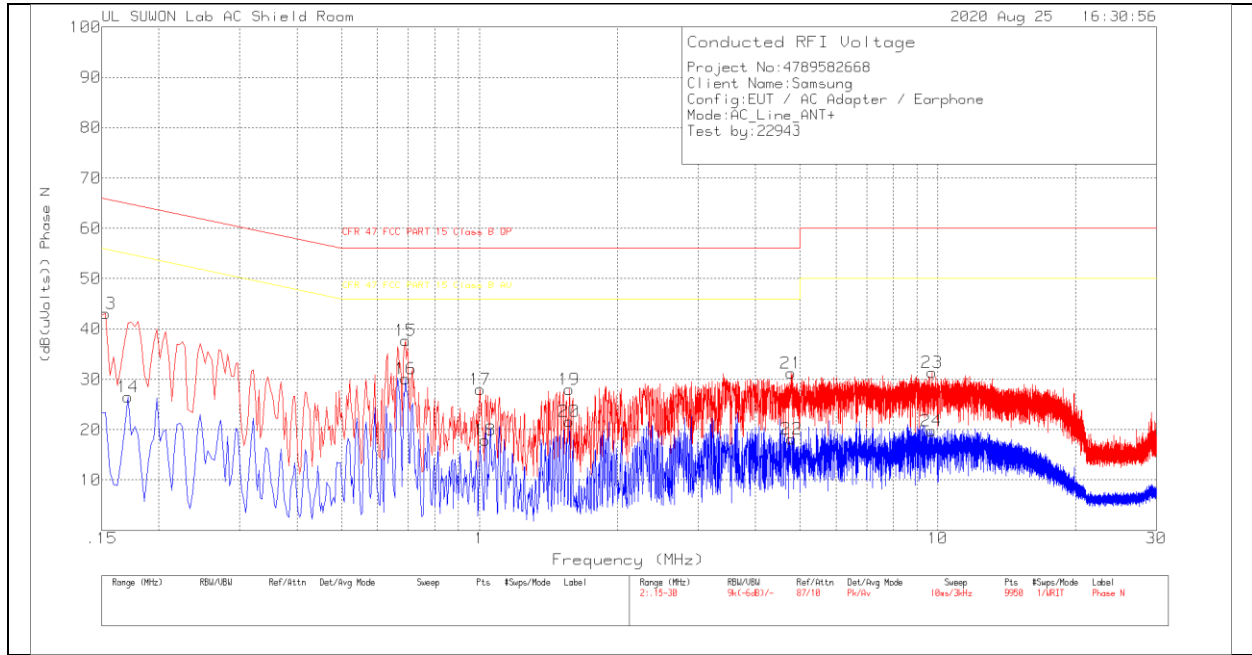
Range 1: Phase L1 .15 - 30MHz

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	.174	32.8	Pk	10	.2	43	64.77	-21.77	-	-
2	.183	12.89	Av	10	.2	23.09	-	-	54.35	-31.26
3	.666	30.82	Pk	9.9	.2	40.92	56	-15.08	-	-
4	.666	22.75	Av	9.9	.2	32.85	-	-	46	-13.15
5	.987	19.6	Pk	9.8	.3	29.7	56	-26.3	-	-
6	.999	7.18	Av	9.8	.3	17.28	-	-	46	-28.72
7	1.356	21.3	Pk	9.8	.3	31.4	56	-24.6	-	-
8	1.356	8.99	Av	9.8	.3	19.09	-	-	46	-26.91
9	4.14	23.03	Pk	9.8	.3	33.13	56	-22.87	-	-
10	4.125	8.11	Av	9.8	.3	18.21	-	-	46	-27.79
11	9.522	23.26	Pk	9.9	.4	33.56	60	-26.44	-	-
12	9.522	8.65	Av	9.9	.4	18.95	-	-	50	-31.05

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	.153	33.2	Pk	9.8	.1	43.1	65.84	-22.74	-	-
14	.171	16.18	Av	10.1	.2	26.48	-	-	54.91	-28.43
15	.69	27.59	Pk	9.9	.2	37.69	56	-18.31	-	-
16	.69	20	Av	9.9	.2	30.1	-	-	46	-15.9
17	1.005	17.92	Pk	9.8	.3	28.02	56	-27.98	-	-
18	1.029	7.81	Av	9.8	.3	17.91	-	-	46	-28.09
19	1.572	17.91	Pk	9.8	.3	28.01	56	-27.99	-	-
20	1.572	11.54	Av	9.8	.3	21.64	-	-	46	-24.36
21	4.791	21.1	Pk	9.8	.3	31.2	56	-24.8	-	-
22	4.8	8.01	Av	9.8	.3	18.11	-	-	46	-27.89
23	9.711	21.02	Pk	9.9	.4	31.32	60	-28.68	-	-
24	9.699	9.5	Av	9.9	.4	19.8	-	-	50	-30.2

Pk - Peak detector  
 Av - Average detection

**END OF TEST REPORT**