



**FCC 47 CFR PART 15 SUBPART B**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Tablet + Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+**

**MODEL NUMBER : SM-T825C**

**FCC ID: A3LSMT825C**

**REPORT NUMBER: 4787821324-E7V1**

**ISSUE DATE: MAR 10, 2017**

*Prepared for*

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*Prepared by*

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**ACCREDITED  
TL-637**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	03/10/17	Initial issue	Steven Kim

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** GSM/WCDMA/LTE Tablet + Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+  
**MODEL NUMBER:** SM-T825C  
**SERIAL NUMBER:** R22HC00QNBB  
**DATE TESTED:** MAR 09, 2017


APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	Pass

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For  
UL Korea, Ltd. By:

Tested By:



SungGil Park  
Suwon Lab Engineer  
UL Korea, Ltd.

Steven Kim  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2014, 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 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:

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

### 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 a GSM/WCDMA/LTE Tablet + Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+

#### GENERAL INFORMATION

Type of device	Class B personal computers and peripherals
AC adapter power requirements	100-240 VAC / 50-60 Hz, 0.3 A
List of frequencies generated or used by the EUT	30 GHz (5 <sup>th</sup> harmonic of the frequency of 5.8GHz WLAN)

### 5.2. PRELIMINARY TEST CONFIGURATIONS

The system was configured for testing in a typical fashion that a customer would normally use.

### 5.3. MODE(S) OF OPERATION INVESTIGATED

Mode	Description
Data transfer	USB Mode (Data Communication)

### 5.4. MODIFICATIONS

No modifications were made during testing.

## 5.5. DETAILS OF TESTED SYSTEM

### SUPPORT EQUIPMENT & PERIPHERALS

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID/DoC
USB Cable	SAMSUNG	EP-DN930CWE	N/A	N/A
Headset	SAMSUNG	EO-EG920BW	N/A	N/A
Desktop	HP	C8N27AV	CZC4125J25	DoC
Micro SD Card	SAMSUNG	16G	N/A	N/A
LCD Monitor	HP	C9V75AA	3CQ4250CNN	DoC
Mouse	LOGITECH	U0026	1451HS05S6G8	DoC
Keyboard	LOGITECH	Y-U0009	1410MG00RVY8	DoC
Keyboard	SAMSUNG	EJ-FT820	N/A	N/A

### I/O CABLES

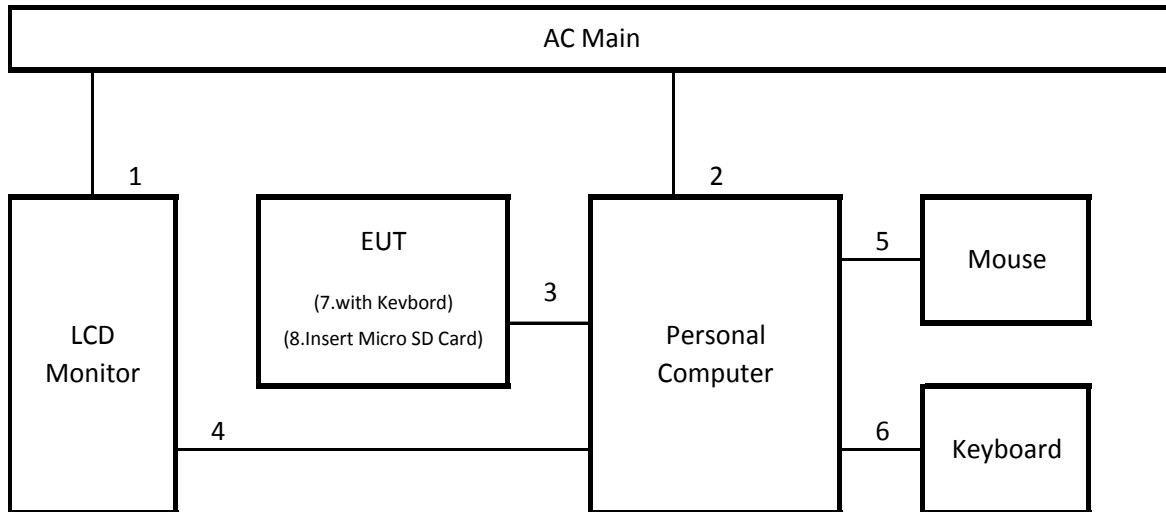
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC Power	1	Power	Unshielded	1.8m	For LCD Monitor
2	AC Power	1	Power	Unshielded	1.8m	For Personal Computer
3	USB	1	C-type	Shielded	1.2m	From EUT to Personal Computer
4	D-SUB	1	D-SUB	Shielded	1.5m	From Desktop to LCD Monitor
5	Mouse	1	USB	Shielded	1.5m	From Desktop to Mouse
6	Keyboard	1	USB	Shielded	1.5m	From Desktop to Keyboard
7	Keyboard	1	-	-	Direct	From EUT to Keyboard
8	SD Card	1	-	-	Direct	From EUT to Micro SD Card

### TEST SETUP

The EUT is installed in a typical configuration. Test software exercised the EUT.

**TEST SETUP DIAGRAM**

- USB Mode



**6. TEST AND MEASUREMENT EQUIPMENT**

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

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-25-17
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
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
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
LISN	R&S	ENV-216	101836	08-16-17
LISN	R&S	ENV-216	101837	08-16-17
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

Note: The testing was performed in accordance with ANSI C63.4-2014.  
 C63.4:2014 requires measurement antennas to be calibrated in accordance with C63.5: 2006.  
 The antenna calibration was done in accordance with C63.5: 2006.

## 7. APPLICABLE LIMITS AND TEST RESULTS

### 7.1. RADIATED EMISSIONS

#### TEST PROCEDURE

ANSI C63.4: 2014

The highest clock frequency generated or used in the EUT is 5.8GHz therefore the frequency range was investigated from 30 MHz to 30 GHz.

#### LIMIT

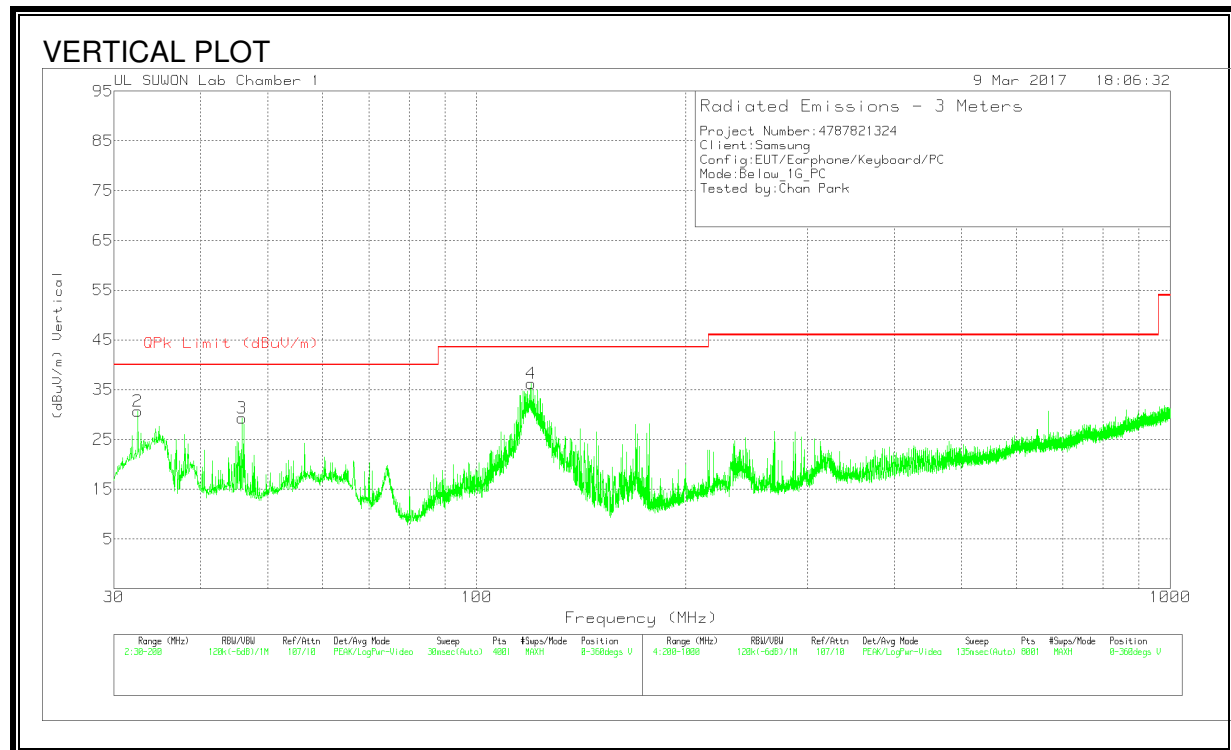
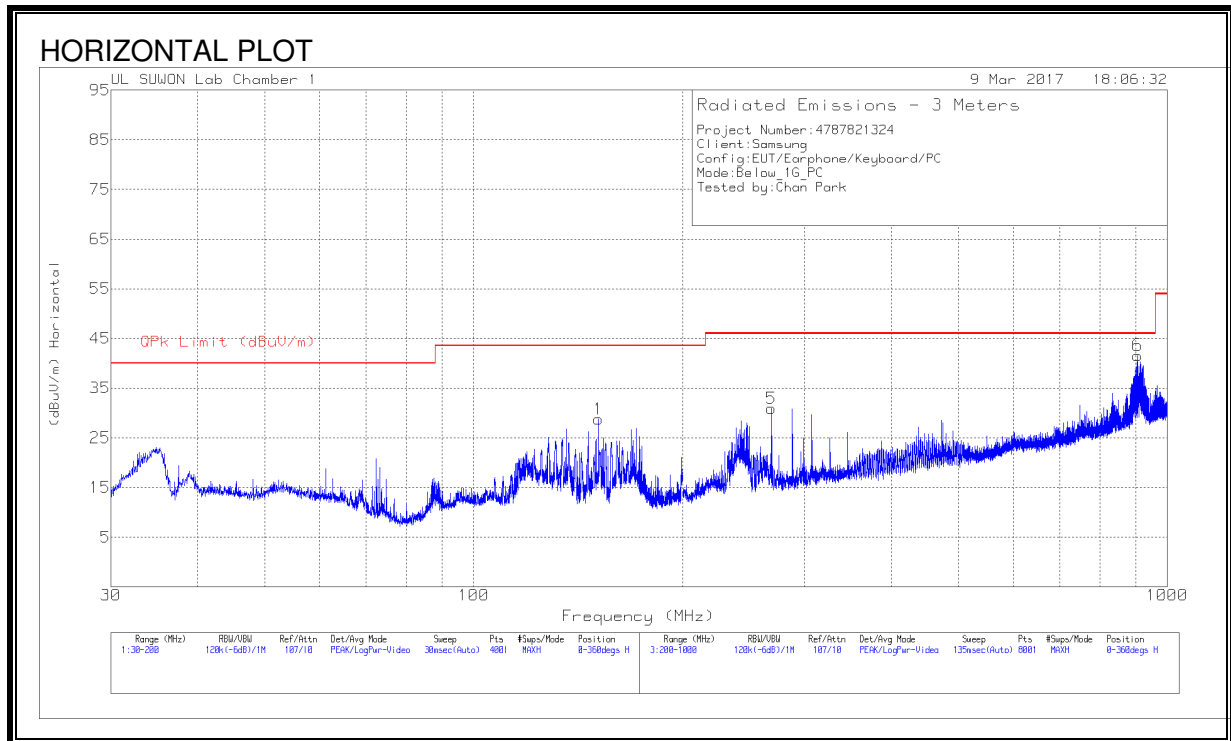
§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB $\mu$ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54

Note: The lower limit shall apply at the transition frequency.

**RESULTS**

**RADIATED EMISSIONS 30 TO 1000 MHz (Charging Mode)**



**HORIZONTAL AND VERTICAL DATA**

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750(dB)	30-1000MHz(dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	151.465	47.59	Pk	7.9	-26.7	28.79	43.52	-14.73	0-360	200	H
2	32.465	48.53	Pk	10.5	-28.3	30.73	40	-9.27	0-360	100	V
3	45.895	43.71	Pk	13.7	-28.1	29.31	40	-10.69	0-360	100	V
4	119.7175	53.23	Pk	9.9	-26.9	36.23	43.52	-7.29	0-360	100	V
5	268.8	44.39	Pk	12.7	-26.2	30.89	46.02	-15.13	0-360	100	H
6	905.9	41.11	Pk	22	-21.5	41.61	46.02	-4.41	0-360	100	H

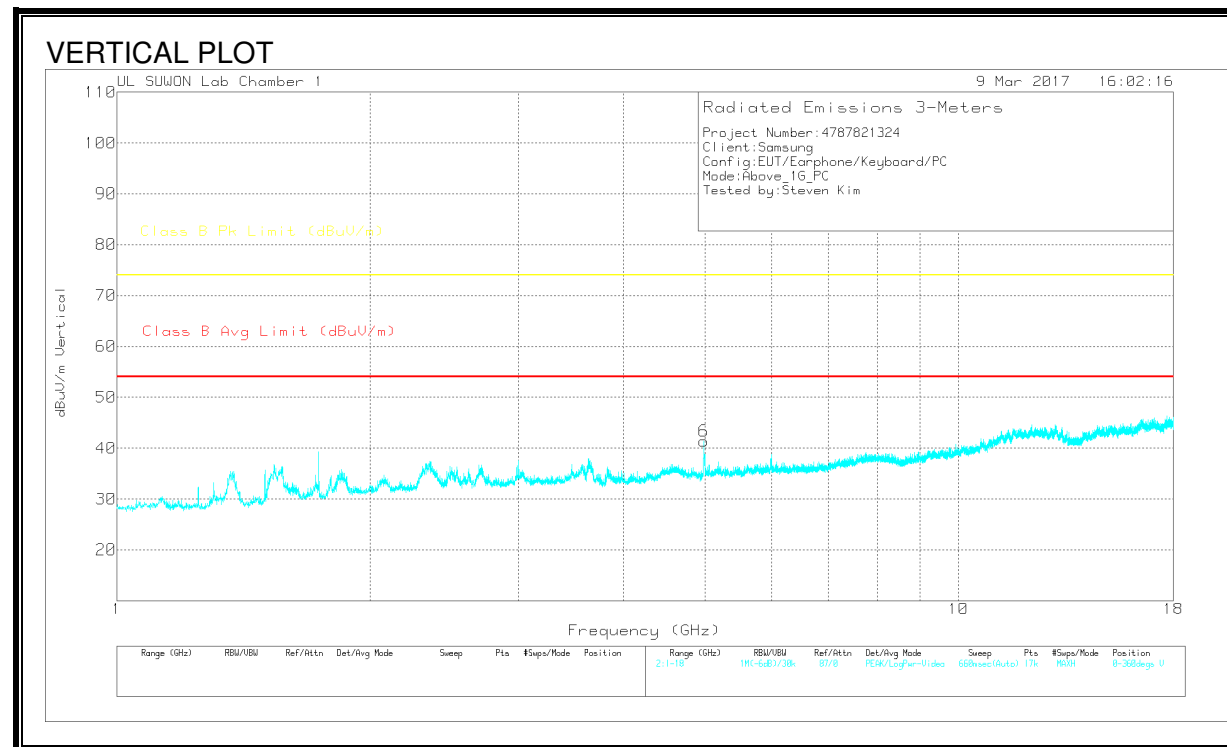
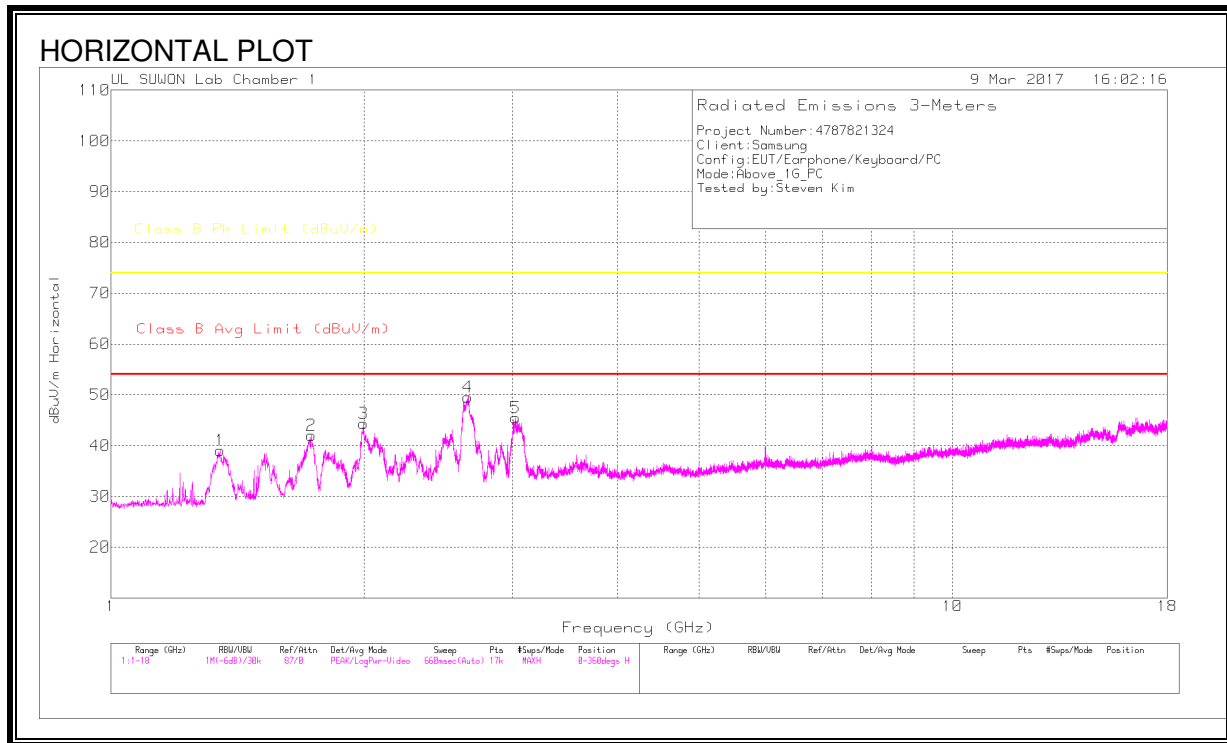
Pk - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750(dB)	30-1000MHz(dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
152.00555	41.03	Qp	7.9	-26.7	22.23	43.52	-21.29	342	129	H
34.93	40.42	Qp	10.7	-28.6	22.52	40	-17.48	331	100	V
45.91	21.03	Qp	13.7	-28.1	6.63	40	-33.37	262	100	V
119.66062	46.22	Qp	10	-26.9	29.32	43.52	-14.2	25	100	V
268.80438	44.12	Qp	12.7	-26.2	30.62	46.02	-15.4	122	112	H
905.9	34.97	Qp	22	-21.5	35.47	46.02	-10.55	330	200	H

Qp - Quasi-Peak detector

**RADIATED EMISSIONS 1GHz to 18GHz (Charging Mode)**



**HORIZONTAL AND VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	1-18G(dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.348	50.48	Pk	28.4	-39.8	39.08	-	-	74	-34.92	0-360	200	H
2	1.731	51.53	Pk	29.8	-39.3	42.03	-	-	74	-31.97	0-360	200	H
3	1.996	52.16	Pk	31.1	-38.9	44.36	-	-	74	-29.64	0-360	200	H
4	2.653	55.99	Pk	32.1	-38.5	49.59	-	-	74	-24.41	0-360	200	H
5	3.028	50.78	Pk	32.5	-37.8	45.48	-	-	74	-28.52	0-360	200	H
6	4.978	41.54	Pk	34.1	-34.2	41.44	-	-	74	-32.56	0-360	100	V

Pk – Peak detector

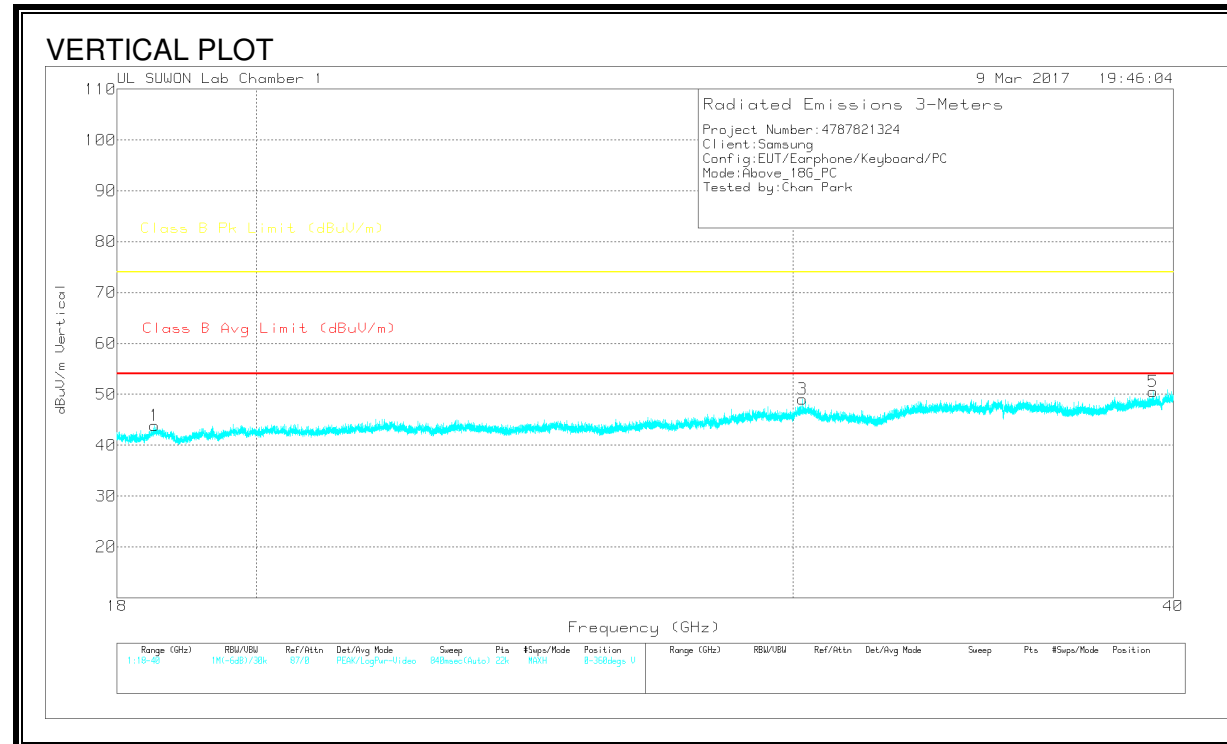
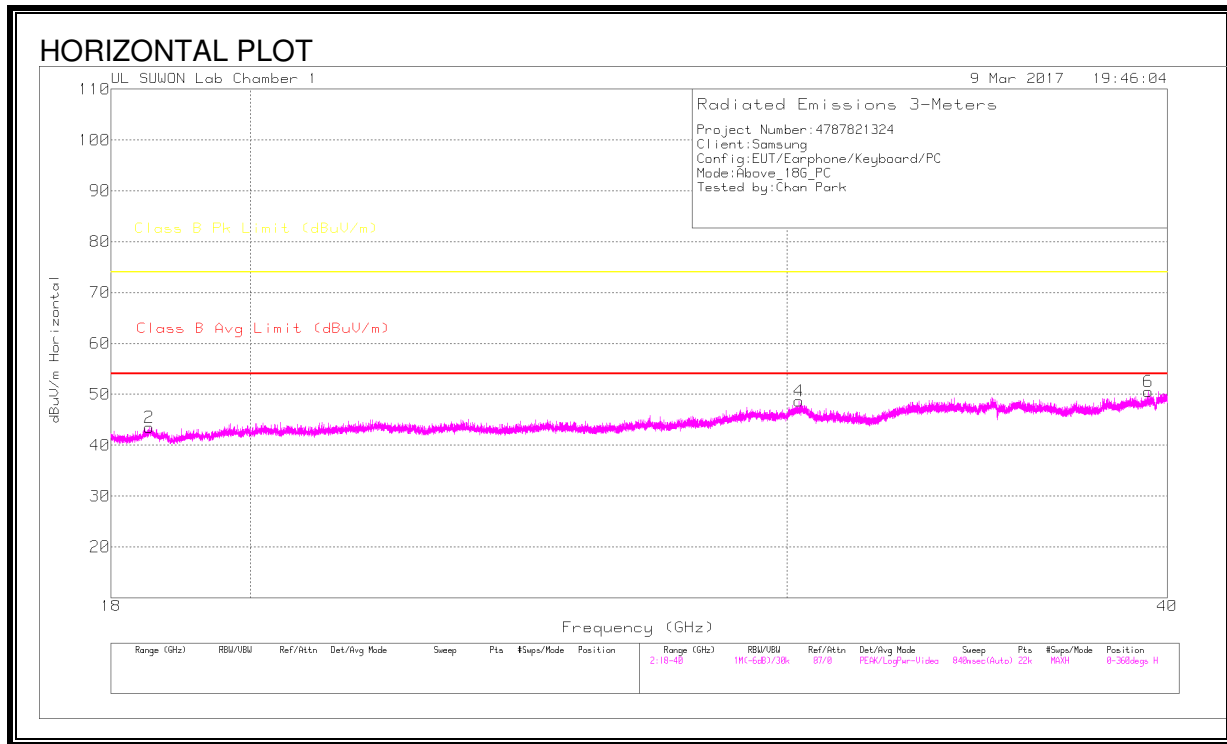
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	1-18G(dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.348	60.67	Pk	28.4	-39.8	49.27	-	-	74	-24.73	351	169	H
1.348	50.6	Ca	28.4	-39.8	39.2	54	-14.8	-	-	351	169	H
1.731	55.39	Pk	29.8	-39.3	45.89	-	-	74	-28.11	237	140	H
1.731	43.26	Ca	29.8	-39.3	33.76	54	-20.24	-	-	237	140	H
1.996	74	Pk	31.1	-38.9	66.2	-	-	74	-7.8	307	152	H
1.996	47.36	Ca	31.1	-38.9	39.56	54	-14.44	-	-	307	152	H
2.653	66.13	Pk	32.1	-38.5	59.73	-	-	74	-14.27	297	185	H
2.653	51.77	Ca	32.1	-38.5	45.37	54	-8.63	-	-	297	185	H
3.028	59.89	Pk	32.5	-37.8	54.59	-	-	74	-19.41	112	267	H
3.028	39.38	Ca	32.5	-37.8	34.08	54	-19.92	-	-	112	267	H
4.978	51.21	Pk	34.1	-34.2	51.11	-	-	74	-22.89	6	130	V
4.978	33.11	Ca	34.1	-34.2	33.01	54	-20.99	-	-	6	130	V

Pk - Peak detector

Ca - CISPR average detection

**RADIATED EMISSIONS 18GHz to 30GHz (Charging Mode)**



**HORIZONTAL AND VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3116PA(dB )	18-40GHz(dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	18.522	22.88	Pk	5	16	43.88	-	-	74	-30.12	0-360	100	V
3	30.217	14.58	Pk	14.1	20.4	49.08	-	-	74	-24.92	0-360	100	V
5	39.391	14.84	Pk	12.8	22.9	50.54	-	-	74	-23.46	0-360	100	V
2	18.529	22.46	Pk	5	16	43.46	-	-	74	-30.54	0-360	100	H
4	30.275	14.08	Pk	14.1	20.5	48.68	-	-	74	-25.32	0-360	100	H
6	39.43	14.8	Pk	12.8	22.9	50.5	-	-	74	-23.5	0-360	100	H

Pk – Peak detector

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

**AC MAINS LINE CONDUCTED EMISSIONS**

**TEST PROCEDURE**

ANSI C63.4: 2014

**LIMIT**

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

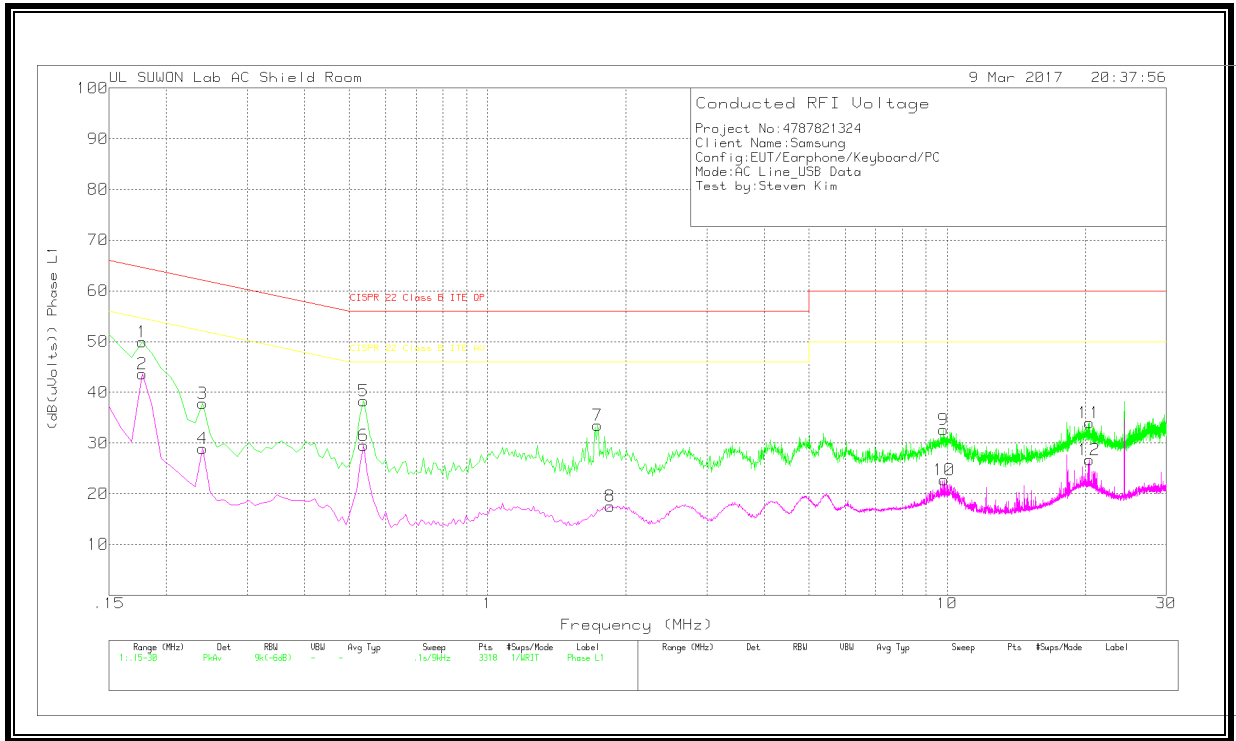
Frequency range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:  
1. The lower limit shall apply at the transition frequencies  
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

**RESULTS**

**6 WORST EMISSIONS(Charging Mode)**

**Line-L1 .15 - 30MHz**



**LINE 1 RESULTS**

Trace Markers

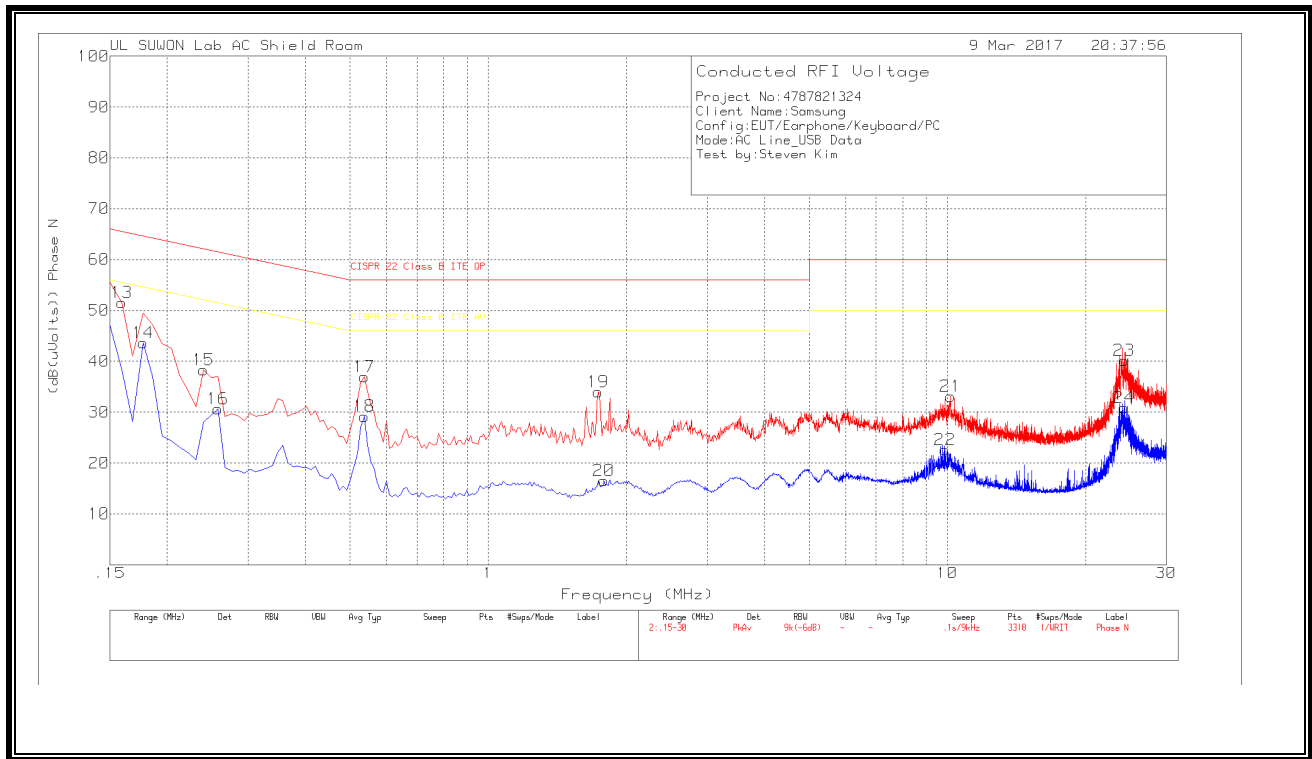
Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_L 1	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.177	39.79	Pk	10	.2	49.99	64.63	-14.64	-	-
2	.177	33.42	Av	10	.2	43.62	-	-	54.63	-11.01
3	.24	27.94	Pk	9.7	.2	37.84	62.1	-24.26	-	-
4	.24	19.01	Av	9.7	.2	28.91	-	-	52.1	-23.19
5	.537	28.16	Pk	9.9	.2	38.26	56	-17.74	-	-
6	.537	19.42	Av	9.9	.2	29.52	-	-	46	-16.48
7	1.734	23.49	Pk	9.7	.3	33.49	56	-22.51	-	-
8	1.851	7.59	Av	9.7	.3	17.59	-	-	46	-28.41
9	9.825	22.23	Pk	10	.4	32.63	60	-27.37	-	-
10	9.861	12.32	Av	10	.4	22.72	-	-	50	-27.28
11	20.382	23.07	Pk	10.5	.4	33.97	60	-26.03	-	-
12	20.382	15.77	Av	10.5	.4	26.67	-	-	50	-23.33

Pk - Peak detector

Av - Average detection

**Line-L2 .15 - 30MHz**



**LINE 2 RESULTS**

Trace Markers

Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_N	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.159	41.63	Pk	9.8	.1	51.53	65.52	-13.99	-	-
14	.177	33.44	Av	10	.2	43.64	-	-	54.63	-10.99
15	.24	28.47	Pk	9.7	.2	38.37	62.1	-23.73	-	-
16	.258	20.7	Av	9.7	.2	30.6	-	-	51.5	-20.9
17	.537	26.83	Pk	9.9	.2	36.93	56	-19.07	-	-
18	.537	19.12	Av	9.9	.2	29.22	-	-	46	-16.78
19	1.734	23.98	Pk	9.7	.3	33.98	56	-22.02	-	-
20	1.788	6.54	Av	9.7	.3	16.54	-	-	46	-29.46
21	10.167	22.75	Pk	10	.4	33.15	60	-26.85	-	-
22	9.897	12.18	Av	10	.4	22.58	-	-	50	-27.42
23	24.288	29.29	Pk	10.5	.4	40.19	60	-19.81	-	-
24	24.288	19.98	Av	10.5	.4	30.88	-	-	50	-19.12

Pk - Peak detector

Av - Average detection