



FCC 47 CFR PART 15 SUBPART B

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Tablet + BT/BLE and DTS b/g/n

MODEL NUMBER : SM-T285M

FCC ID: A3LSMT285M

REPORT NUMBER: 16K22923-E5V1

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Prepared for

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

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	03/02/16	Initial issue	Junwhan Lee

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. SAMPLE CALCULATION	5
4.3. MEASUREMENT UNCERTAINTY	6
5. EQUIPMENT UNDER TEST	7
5.1. DESCRIPTION OF EUT	7
5.2. PRELIMINARY TEST CONFIGURATIONS	7
5.3. MODE(S) OF OPERATION INVESTIGATED	7
5.4. MODIFICATIONS	7
5.5. DETAILS OF TESTED SYSTEM	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. APPLICABLE LIMITS AND TEST RESULTS	11
7.1. RADIATED EMISSIONS	11
7.2. AC MAINS LINE CONDUCTED EMISSIONS	16
8. SETUP PHOTOS	21

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Tablet + BT/BLE and DTS b/g/n
MODEL NUMBER: SM-T285M
SERIAL NUMBER: R32H1008EWR
DATE TESTED: FEB 28, 2016 - FEB 29, 2016

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:



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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
☒	Chamber 1
☐	Chamber 2

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 GSM/WCDMA/LTE Tablet + BT/BLE and DTS b/g/n.

GENERAL INFORMATION

AC Adapter Power Requirements	100-240 VAC / 50-60 Hz, 1.5 A
List of frequencies generated or used by the EUT	1.5 GHz (CPU Clock Frequency)

5.2. PRELIMINARY TEST CONFIGURATIONS

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

5.3. MODE(S) OF OPERATION INVESTIGATED

Mode	Description
Data transfer	Copy files from EUT to PC

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
Laptop	Lenovo	20095	WB06117060	Doc
Earphone	SAMSUNG	EHS61ASFWE	N/A	N/A
AC Adapter	DELTA Electronics	ADP-65KH B	11S36001929ZZ30023M1N8	N/A
Mouse	HP	SM-2022	FCMHH0C9Z6ZFJ5	Doc
Keyboard	HP	KB-1156	BDMGF0CGA5M2P6	Doc

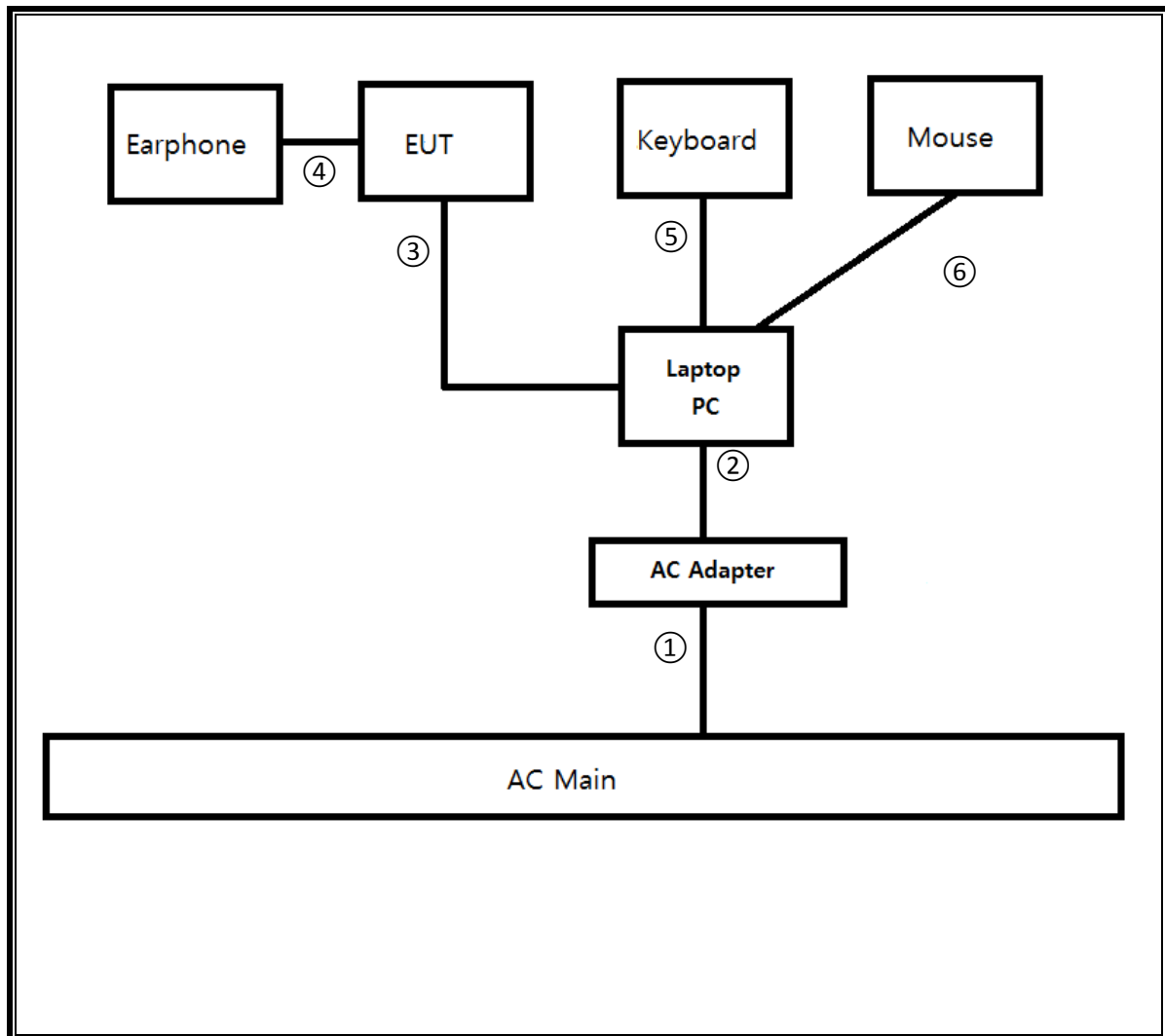
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC Power	1	Power	Unshielded	1.0m	N/A
2	DC Power	1	Power	Unshielded	1.5m	N/A
3	USB	1	Mini-USB	Shielded	0.8m	N/A
4	Audio	1	Mini-Jack	Unshielded	1.0m	N/A
5	Keyboard	1	USB	Unshielded	1.2m	N/A
6	Mouse	1	USB	Shielded	1.2m	N/A

TEST SETUP

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

TEST SETUP DIAGRAM



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	09-23-16
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	08-24-17
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-18-16
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-18-16
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-18-16
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-18-16
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-19-16
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-19-16
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-19-16
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
LISN	R&S	ENV-216	101836	08-19-16
LISN	R&S	ENV-216	101837	08-19-16

7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4: 2009

The highest clock frequency generated or used in the EUT is 1.0GHz therefore the frequency range was investigated from 30 MHz to 18 GHz.

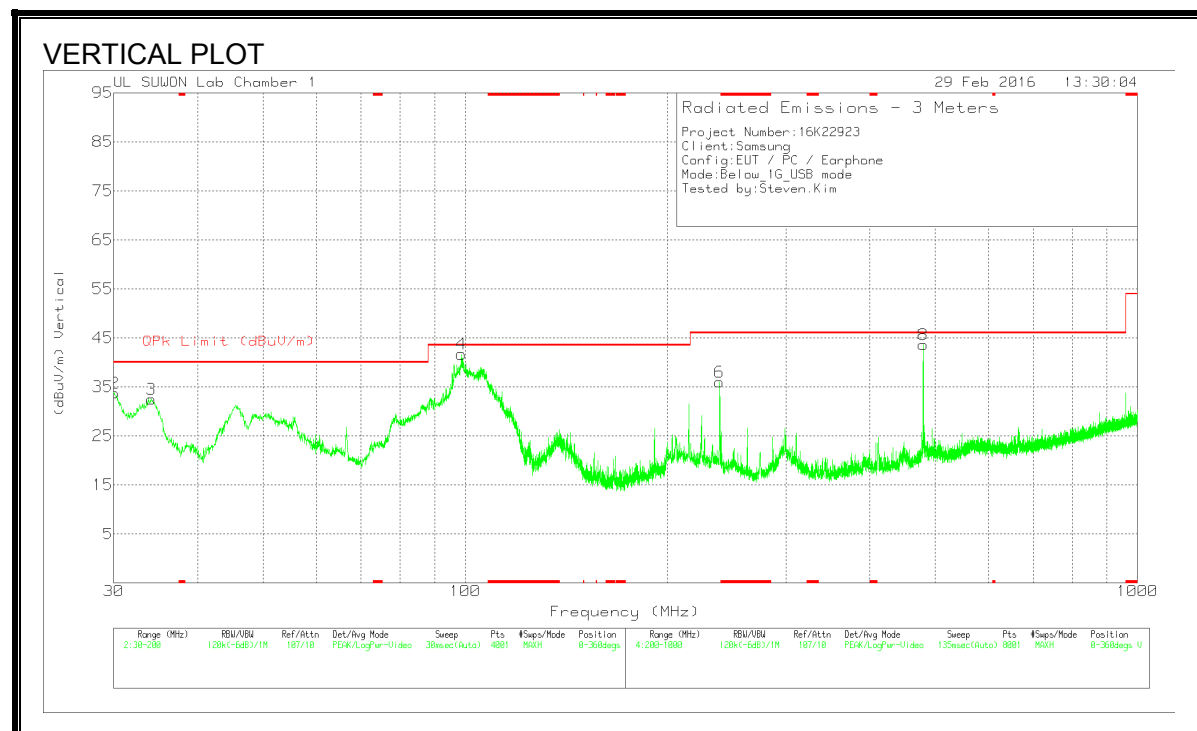
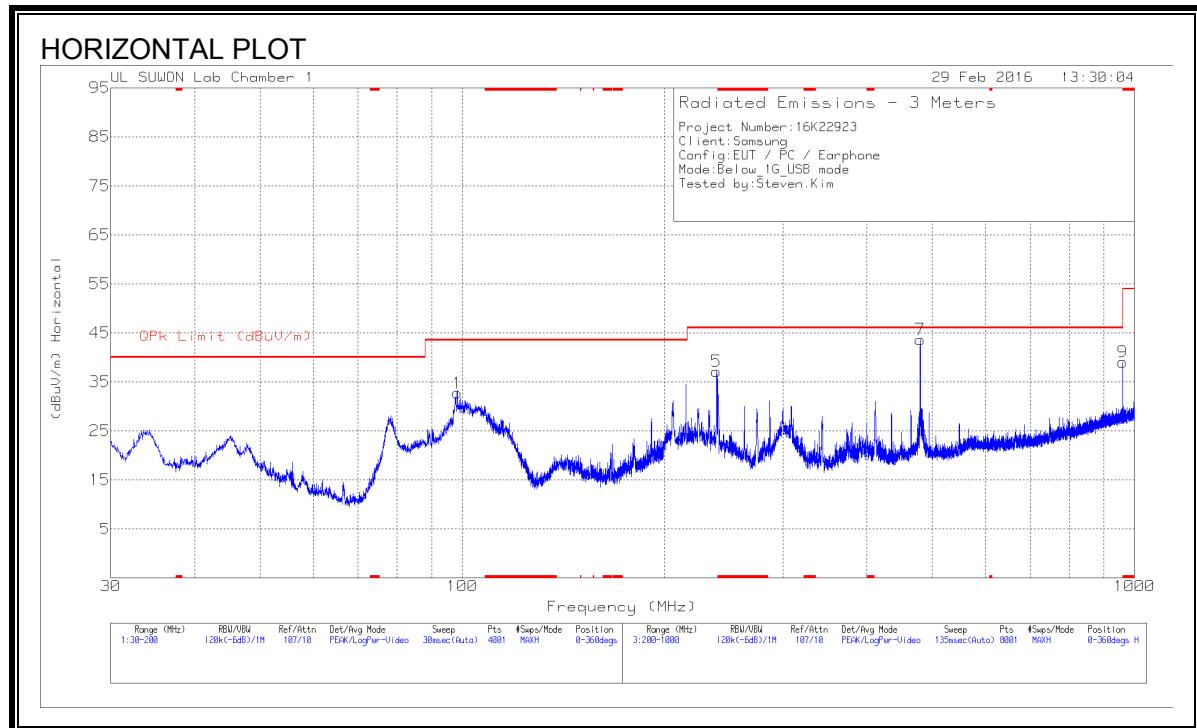
LIMIT

§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 μ 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 (WORST-CASE CONFIGURATION)



HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-750	Bi-Log	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	98.3825	50.83	Pk	11.2	-29.3	32.73	43.52	-10.79	0-360	300	H
2	30.085	53.92	Pk	10.3	-30.5	33.72	40	-6.28	0-360	101	V
3	34.1225	52.46	Pk	10.4	-30.4	32.46	40	-7.54	0-360	101	V
4	98.68	59.68	Pk	11.3	-29.3	41.68	43.52	-1.84	0-360	101	V
5	238.9	52.96	Pk	12.1	-27.9	37.16	46.02	-8.86	0-360	199	H
7	480	53.25	Pk	16.7	-26.3	43.65	46.02	-2.37	0-360	100	H
9	* 960	39.76	Pk	22.3	-23	39.06	46.02	-6.96	0-360	100	H
6	239	51.78	Pk	12.1	-27.9	35.98	46.02	-10.04	0-360	200	V
8	480	53.18	Pk	16.7	-26.3	43.58	46.02	-2.44	0-360	100	V

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

Pk - Peak detector

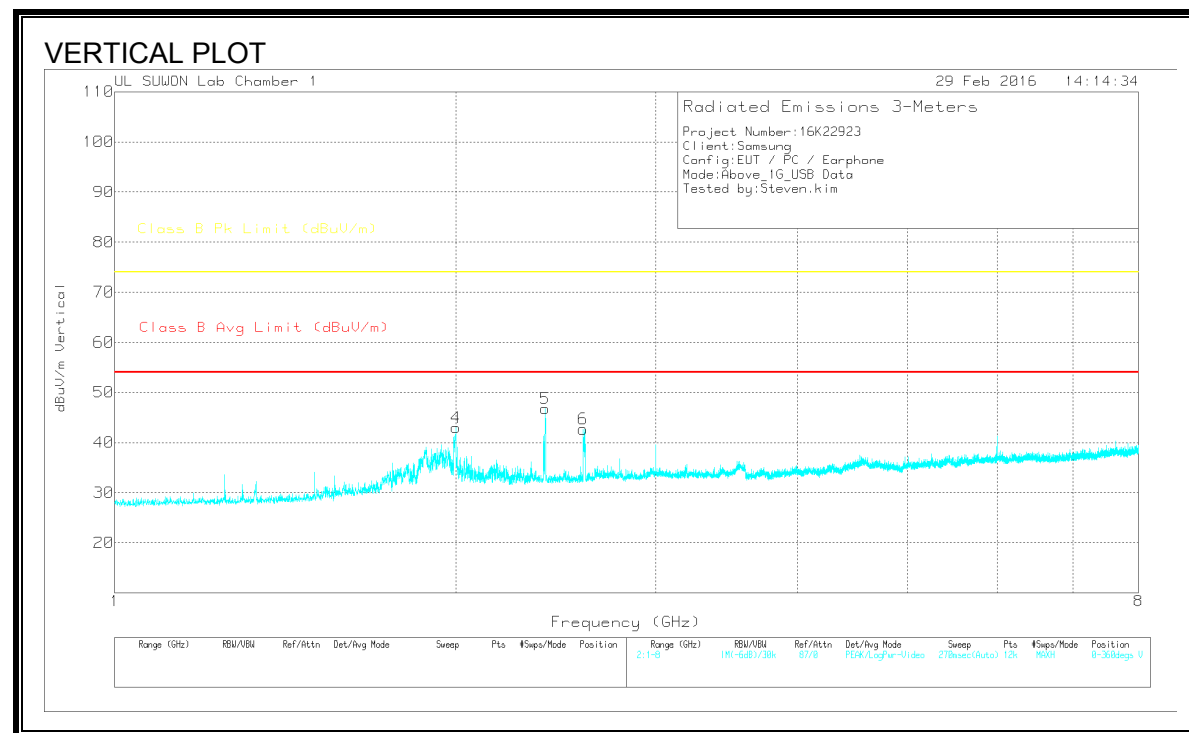
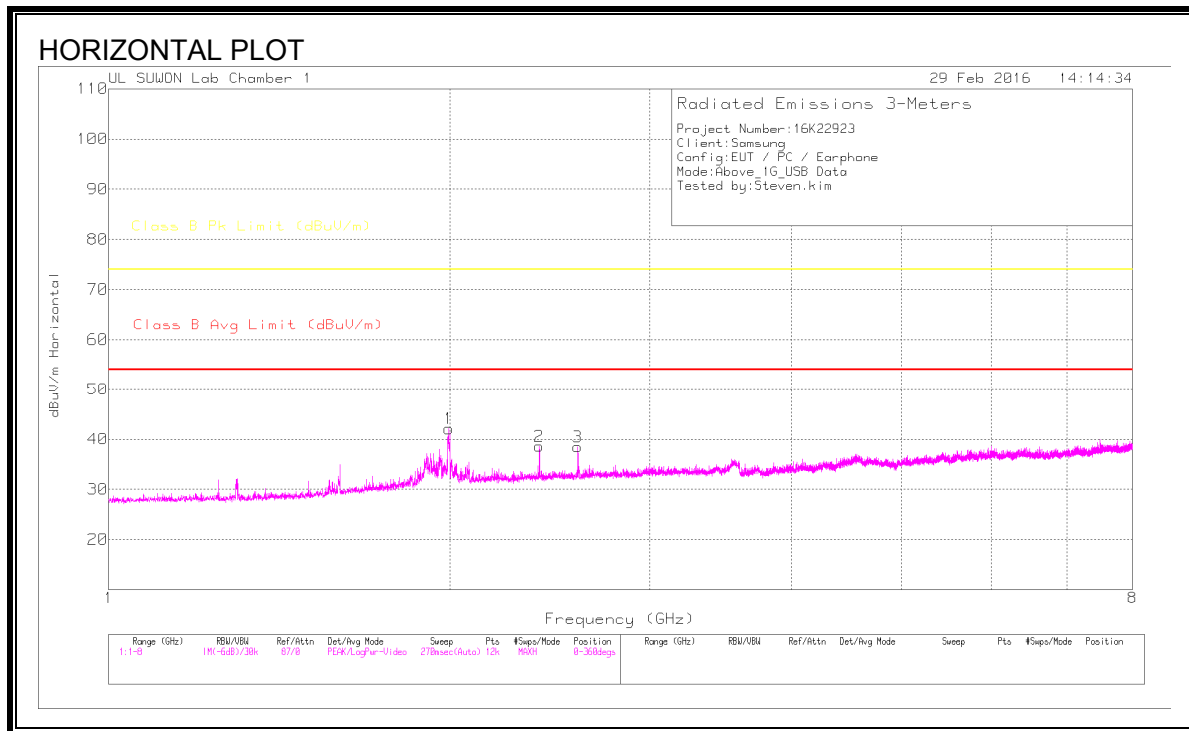
Radiated Emissions

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
98.68	54.72	Qp	11.3	-29.3	36.72	43.52	-6.8	283	107	V
479.9783	51.67	Qp	16.7	-26.2	42.17	46.02	-3.85	343	248	H
479.9783	51.63	Qp	16.7	-26.2	42.13	46.02	-3.89	193	119	V

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

Qp - Quasi-Peak detector

RADIATED EMISSIONS 1GHz to 18GHz (WORST-CASE CONFIGURATION)



HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	Path_1	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	1.994	49.89	PK	31.1	-38.9	42.09	-	-	74	-31.91	0-360	200	H
2	2.398	45.26	PK	31.8	-38.5	38.56	-	-	74	-35.44	0-360	100	H
3	2.592	44.74	PK	32.1	-38.4	38.44	-	-	74	-35.56	0-360	200	H
4	1.999	50.8	PK	31.1	-38.9	43	-	-	74	-31	0-360	200	V
5	2.398	53.44	PK	31.8	-38.5	46.74	-	-	74	-27.26	0-360	100	V
6	2.589	48.89	PK	32.1	-38.3	42.69	-	-	74	-31.31	0-360	100	V

PK – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117(0016 8717)_150 619	Path_1	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
1.994	51.47	Pk	31.1	-38.9	43.67	-	-	74	-30.33	308	218	H
1.994	36.03	Ca	31.1	-38.9	28.23	54	-25.77	-	-	308	218	H
2.397	43.29	Pk	31.8	-38.5	36.59	-	-	74	-37.41	265	184	H
2.397	26.48	Ca	31.8	-38.5	19.78	54	-34.22	-	-	265	184	H
2.592	48.01	Pk	32.1	-38.4	41.71	-	-	74	-32.29	281	153	H
2.592	25.86	Ca	32.1	-38.4	19.56	54	-34.44	-	-	281	153	H
1.999	54.69	Pk	31.1	-38.9	46.89	-	-	74	-27.11	349	362	V
1.999	35.06	Ca	31.1	-38.9	27.26	54	-26.74	-	-	349	362	V
2.397	48.5	Pk	31.8	-38.5	41.8	-	-	74	-32.2	36	389	V
2.397	31.84	Ca	31.8	-38.5	25.14	54	-28.86	-	-	36	389	V
2.589	47.7	Pk	32.1	-38.3	41.5	-	-	74	-32.5	51	123	V
2.589	26.64	Ca	32.1	-38.3	20.44	54	-33.56	-	-	51	123	V

Pk - Peak detector

Ca - CISPR average detection

7.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4: 2009

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 μ 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.

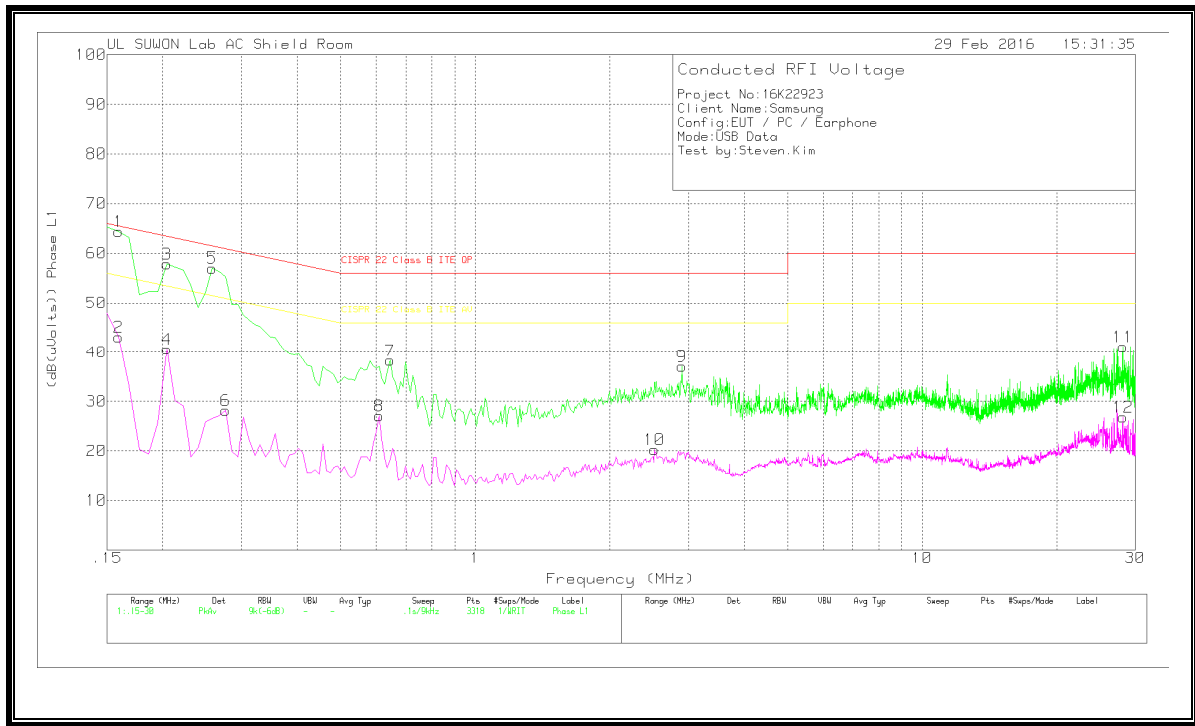
Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

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

Line-L1 .15 - 30MHz



LINE 1 RESULTS

Trace Markers

Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex- cord_L1	CE Shield Room	Corrected Reading (dB(uVolts)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.159	54.36	Pk	10	0	64.36	65.52	-1.16	-	-
2	.159	33.09	Av	10	0	43.09	-	-	55.52	-12.43
3	.204	47.93	Pk	9.9	0	57.83	63.45	-5.62	-	-
4	.204	30.73	Av	9.9	0	40.63	-	-	53.45	-12.82
5	.258	47.25	Pk	9.8	0	57.05	61.5	-4.45	-	-
6	.276	18.35	Av	9.8	0	28.15	-	-	50.94	-22.79
7	.645	28.16	Pk	10.1	0	38.26	56	-17.74	-	-
8	.609	16.93	Av	10.1	0	27.03	-	-	46	-18.97
9	2.904	27.18	Pk	9.8	.1	37.08	56	-18.92	-	-
10	2.517	10.36	Av	9.8	.1	20.26	-	-	46	-25.74
11	28.113	30.1	Pk	10.7	.3	41.1	60	-18.9	-	-
12	28.149	15.82	Av	10.7	.3	26.82	-	-	50	-23.18

Pk - Peak detector

Av - Average detection

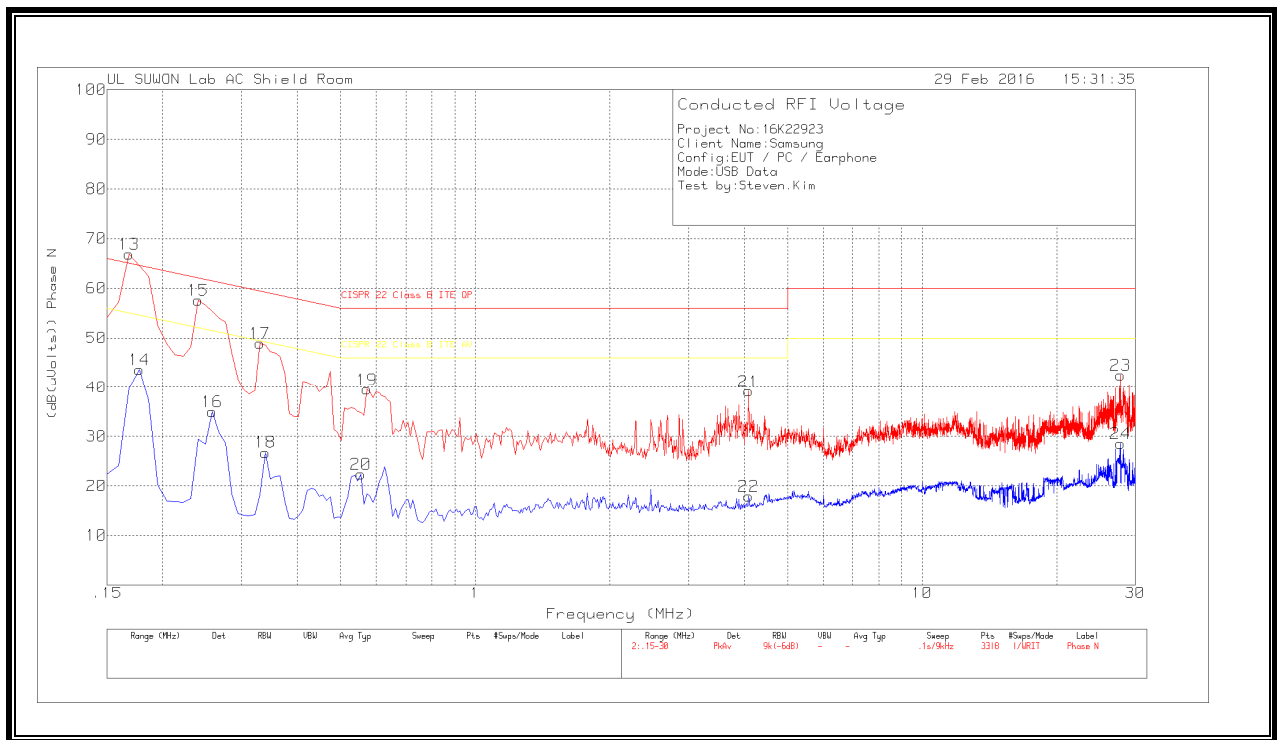
Quasi-Peak Emissions

Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_wit h ex-cord_L1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
.1563	52.69	Qp	10	0	62.69	65.66	-2.97	-	-
.2022	32.14	Qp	9.9	0	42.04	63.52	-21.48	-	-
.2535	39.54	Qp	9.7	0	49.24	61.64	-12.4	-	-

Qp – Quasi-Peak detector

Line-L2 .15 - 30MHz



LINE 2 RESULTS

Trace Markers

Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex-cord_N	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.168	56.68	Pk	10.2	0	66.88	65.06	1.82	-	-
14	.177	33.58	Av	10.1	0	43.68	-	-	54.63	-10.95
15	.24	47.88	Pk	9.7	0	57.58	62.1	-4.52	-	-
16	.258	25.24	Av	9.7	0	34.94	-	-	51.5	-16.56
17	.33	38.9	Pk	10	0	48.9	59.45	-10.55	-	-
18	.339	16.75	Av	10	0	26.75	-	-	49.23	-22.48
19	.573	29.4	Pk	10.1	0	39.5	56	-16.5	-	-
20	.555	12.31	Av	10.1	0	22.41	-	-	46	-23.59
21	4.092	29.31	Pk	9.8	.1	39.21	56	-16.79	-	-
22	4.092	8.02	Av	9.8	.1	17.92	-	-	46	-28.08
23	27.807	31.3	Pk	10.9	.3	42.5	60	-17.5	-	-
24	27.807	17.32	Av	10.9	.3	28.52	-	-	50	-21.48

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101837_wit h ex-cord_N	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
.168	51.42	Qp	10.2	0	61.62	65.06	-3.44	-	-
.2355	41.32	Qp	9.8	0	51.12	62.25	-11.13	-	-

Qp – Quasi-Peak detector