



CERTIFICATION TEST REPORT

Report Number. : 4790136529-E1V2

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

Model : SM-N985F1/DS, SM-N985F1

FCC ID : A3LSMN985F1

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

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

Date Of Issue:

2021-11-19

Prepared by:

UL Korea, Ltd.

26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL Korea, Ltd. Suwon Laboratory

218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea

TEL: (031) 337-9902

FAX: (031) 213-5433



ACCREDITED

Testing Laboratory

TL-637

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2021-11-05	Initial issue	Steven(Sangyun) Kim
V1	2021-11-19	Updated to address TCB's question	Steven(Sangyun) Kim

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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/ax, NFC, WPT and UWB
MODEL NUMBER: SM-N985F1/DS, SM-N985F1
SERIAL NUMBER: R38R900W1GJ (RADIATED);
DATE TESTED: 2021-11-02 ~ 2021-11-05;

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15B	Complies

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:



Seokhwan Hong
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Steven(Sangyun) Kim
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 C63.4-2014

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 <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.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:

$EIRP = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$

$ERP = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)}$

(Path loss = Signal generator output – PSA reading with substitution antenna)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Disturbance, 30 MHz to 1 GHz	4.05 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.78 dB
Radiated Disturbance, Above 18 GHz	5.58 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 2, Clause 4.4.3 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB

This report covers the Samsung models SM-N985F1/DS, SM-N985F.

These models are identical in hardware except SM-N985F1/DS is supported dual SIM tray and SM-N985F has single SIM tray.

All series model was same hardware thus, SM-N985F1/DS(Dual SIM tray) was set for final test.

GENERAL INFORMATION

Type of device	Class B personal computers and peripherals Other Class B digital devices & peripherals
Personal Computer power requirements	100-240 VAC / 50-60 Hz, 1.8 A
Travel Adapter power requirements	100-240 VAC / 50-60 Hz, 0.7 A
List of frequencies generated or used by the EUT	40 GHz (5th harmonic of the frequency 8 GHz UWB)
Test Voltage	120 Vac / 60 Hz

5.2. TEST MODE

Mode	Description
Test Case 1	Camera(Front) + Charging
Test Case 2	Video and Audio Play + Earphone
Test Case 3	Video and Audio Play + Display Out
Test Case 4	USB Data Communication with PC

Note: All descriptions were tested under simultaneous operation.

Receiver Mode (Licensed Band within 30-960MHz) test result refer to FCC Report Receiver mode(CXX).

5.3. WORST-CASE ORIENTATION AND MODE

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.

5.1. MODIFICATIONS

No modifications were made during testing.

5.2. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID/DoC
Laptop PC	Lenovo	T480s	PC0VHHJR	DoC
AC/DC Adapter	Lenovo	ADLX65YDC3A	8SSA10M13946D1SG862021R	N/A
Mouse	SAMSUNG	AA-MW1D5WB	CN57BA5904489BDV8JN9W1756	N/A
Data Cable	SAMSUNG	EP-DG980	GH39-0206ABBE	N/A
Charger	SAMSUNG	EP-TA800	R37R38J4A28SE3	N/A
Earphone	SAMSUNG	-	GH59-15252A	N/A
Micro SD Card	SAMSUNG	MB-MC256GA	-	-
Monitor	DELL	U2417H	CN-0767T7-WS200-74M-C4SL-A03	N/A

I/O CABLES

[DIAGRAM 1]

I/O Cable List						
Cable No	Port	# of identical ports	Connect or Type	Cable Type	Cable Length(m)	Remarks
1	AC Power	1	Power	-	Direct	From AC/DC Adapter to AC Main
2	Type C	1	Power	Unshielded	0.7m	From AD/DC Adapter to EUT
3	Micro SD Slot	1	-	-	Direct	Fitted In EUT

[DIAGRAM 2]

I/O Cable List						
Cable No	Port	# of identical ports	Connect or Type	Cable Type	Cable Length(m)	Remarks
1	Earphone	1	Type C	Shielded	0.7m	From Earphone to EUT
2	Micro SD Slot	1	-	-	Direct	Fitted In EUT

* Radiated Test Only

[DIAGRAM 3]

I/O Cable List						
Cable No	Port	# of identical ports	Connect or Type	Cable Type	Cable Length(m)	Remarks
1	Type C	1	DP	Shielded	1.5m	From LCD Monitor to EUT
2	Micro SD Slot	1	-	-	Direct	Fitted In EUT

* Radiated Test Only

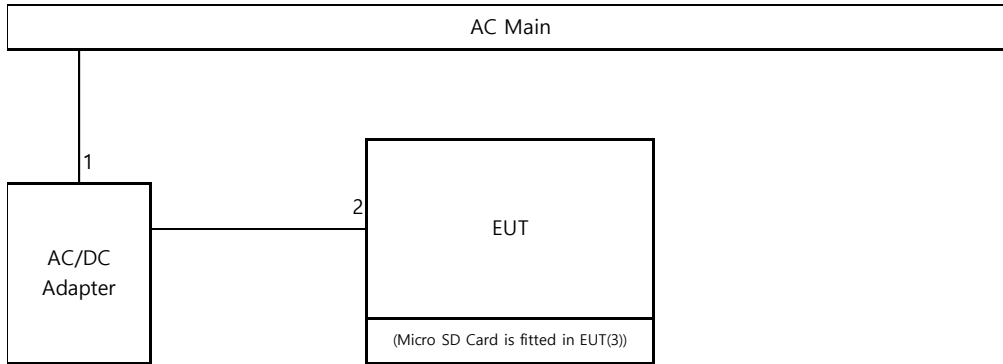
[DIAGRAM 4]

I/O Cable List						
Cable No	Port	# of identical ports	Connect or Type	Cable Type	Cable Length(m)	Remarks
1	AC Power	1	Power	Unshielded	1.5m	From AD/DC Adapter to AC Main
2	DC Power	1	Type C	Shielded	0.7m	From Laptop to AC/DC Adapter
3	USB	1	USB	Shielded	1.5m	From Laptop to EUT
4	AC Power	1	Type C	Unshielded	1.0m	From Mouse to Laptop
5	Micro SD Slot	1	-	-	Direct	Fitted In EUT
6	Ethernet	1	RJ45	Unshielded	1.5m	From Laptop to Router in out of test site

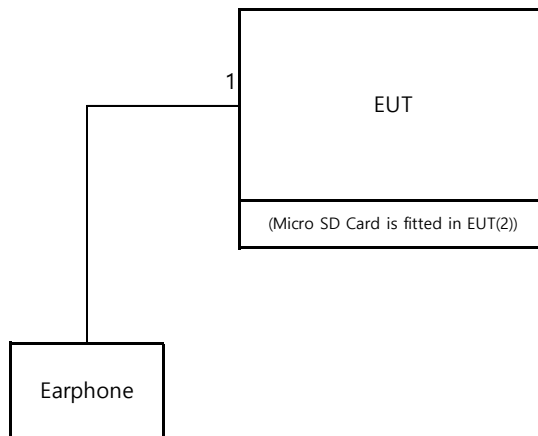
TEST SETUP

The EUT is installed in a typical configuration. Copy files from PC to EUT fitted Micro sd card.
Video and sound on EUT send to the LCD Monitor from DP cable.

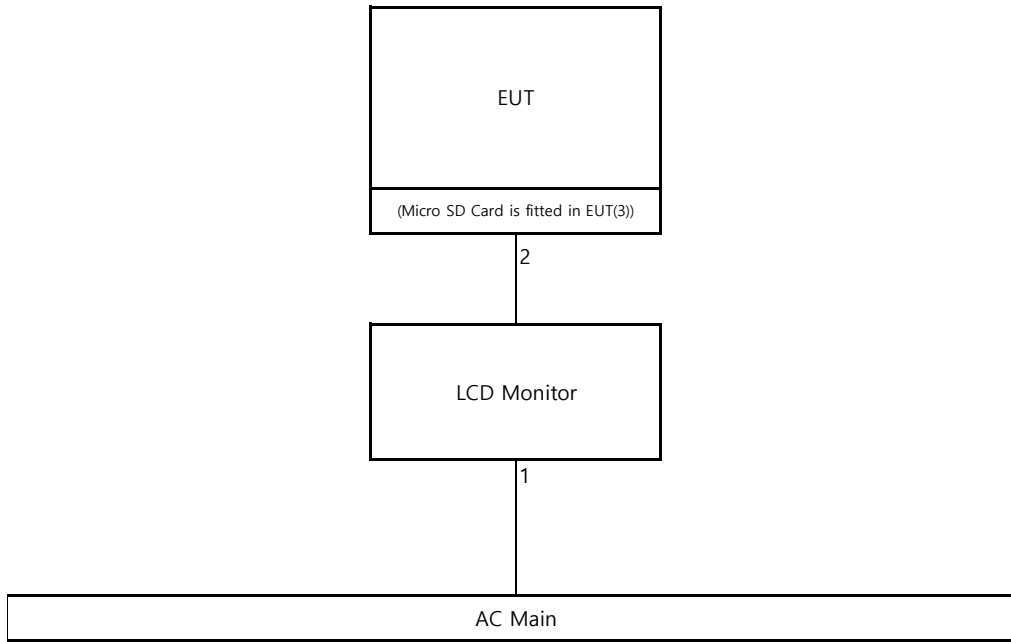
TEST SETUP DIAGRAM 1 for Test Case 1



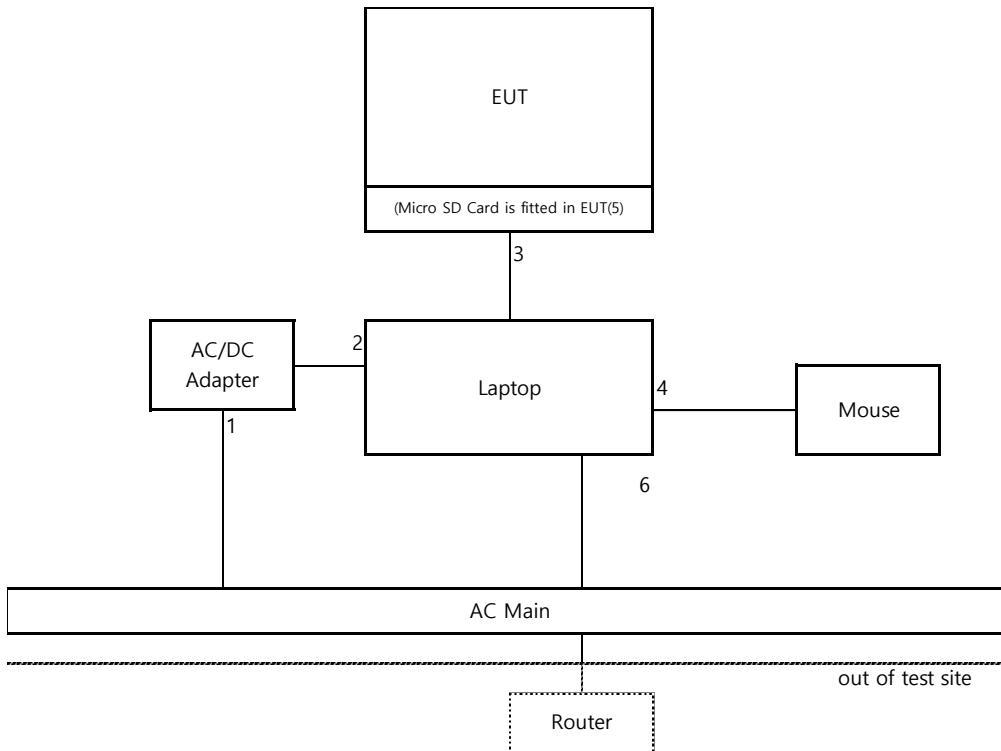
TEST SETUP DIAGRAM 2 for Test Case 2



TEST SETUP DIAGRAM 3 for Test case 3



TEST SETUP DIAGRAM 4 for Test case 4



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, Horn, 40 GHz	ETS	3116C	00166155	2022-08-04
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2022-08-04
Preamplifier	ETS	3116C-PA	00168841	2022-08-04
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2022-08-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2022-08-13
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2022-08-13
Antenna, Horn, 18 GHz	ETS	3115	00167211	2022-07-27
Antenna, Horn, 18 GHz	ETS	3115	00161451	2022-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168724	2022-07-27
Antenna, Horn, 18 GHz	ETS	3117	00168717	2022-08-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	2022-08-02
Preamplifier, 1000 MHz	Sonoma	310N	370599	2022-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029168	2022-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2022-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2022-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2022-08-02
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2022-08-02
LISN	R&S	ENV-216	101836	2022-08-05
LISN	R&S	ENV-216	101837	2022-08-05
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. TEST RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4-2014

The highest clock frequency generated or used in the EUT is 40 GHz therefore the frequency range was investigated from 30 MHz to 40 GHz.

LIMIT

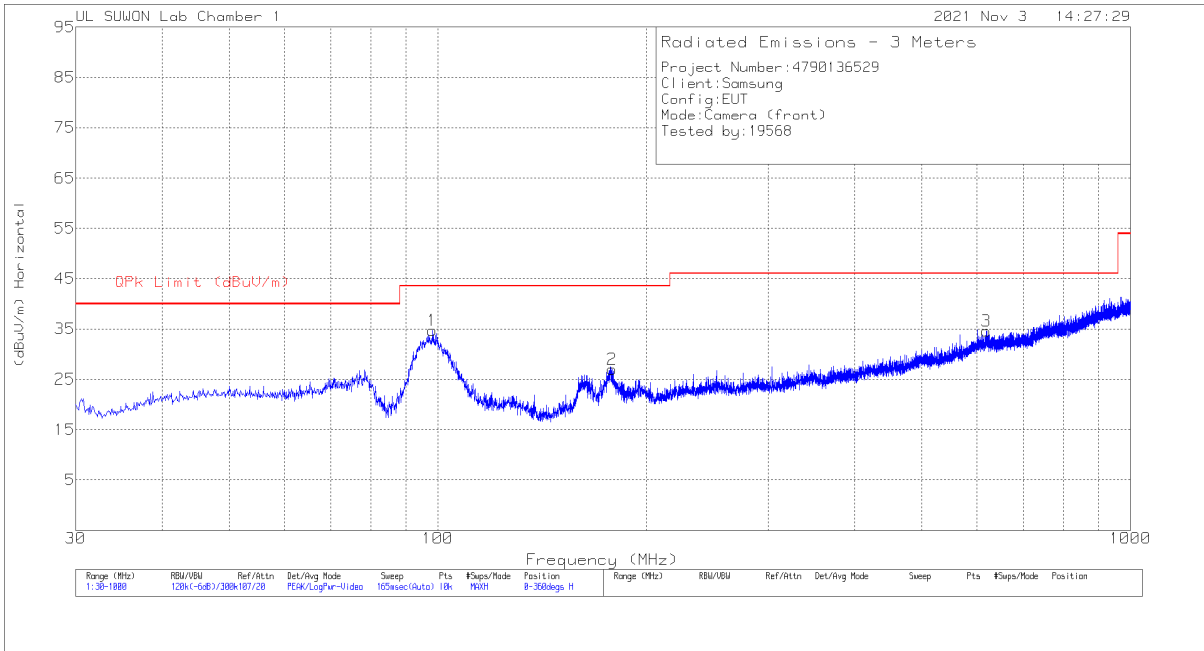
§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

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

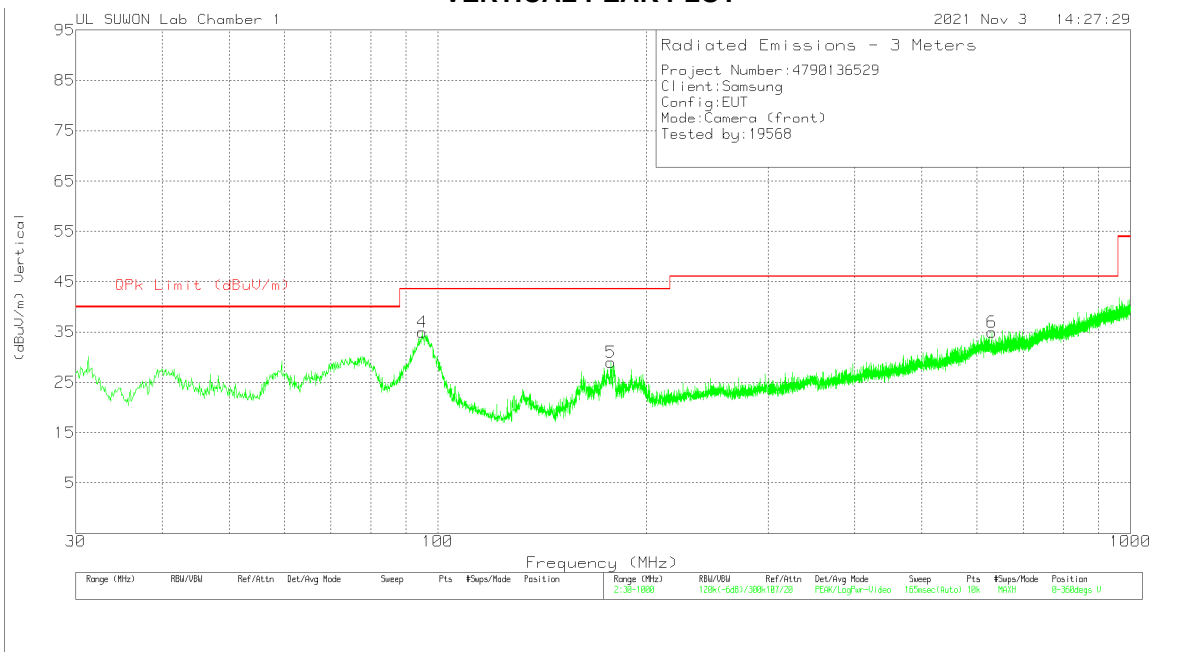
Note: The lower limit shall apply at the transition frequency.

7.1.1. RADIATED EMISSIONS 30 TO 1000 MHz [Test case 1]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



DATA

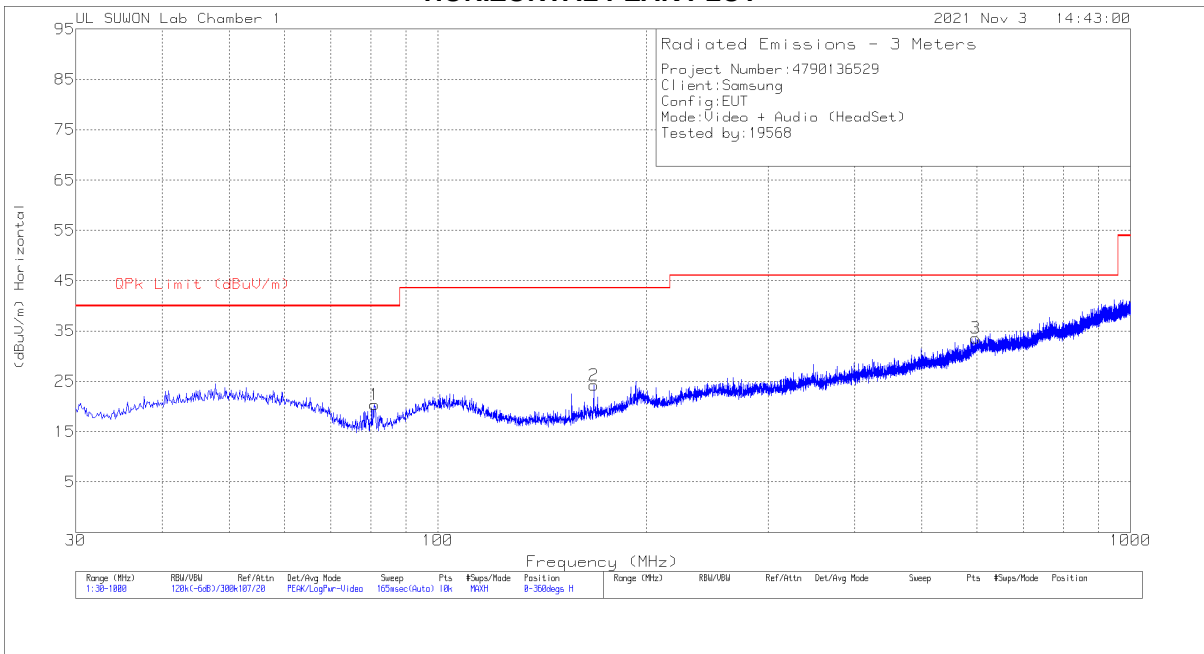
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	98.191	47.22	Pk	17.8	-30.3	34.72	43.52	-8.8	0-360	200	H
2	178.313	41.04	Pk	15.4	-29.5	26.94	43.52	-16.58	0-360	100	H
3	618.693	36.23	Pk	25.5	-27.1	34.63	46.02	-11.39	0-360	100	H
4	94.99	47.93	Pk	17.3	-30.3	34.93	43.52	-8.59	0-360	200	V
5	177.634	43.23	Pk	15.3	-29.5	29.03	43.52	-14.49	0-360	200	V
6	631.012	36.72	Pk	25.2	-27	34.92	46.02	-11.1	0-360	200	V

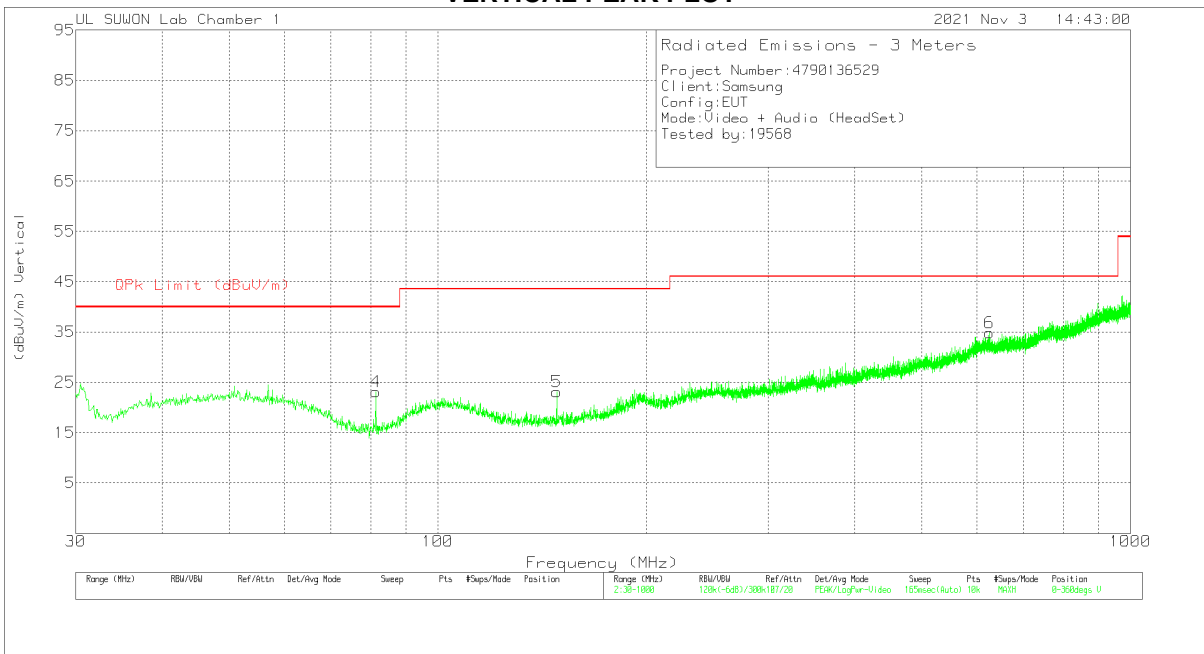
Pk - Peak detector

[Test case 2]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



DATA

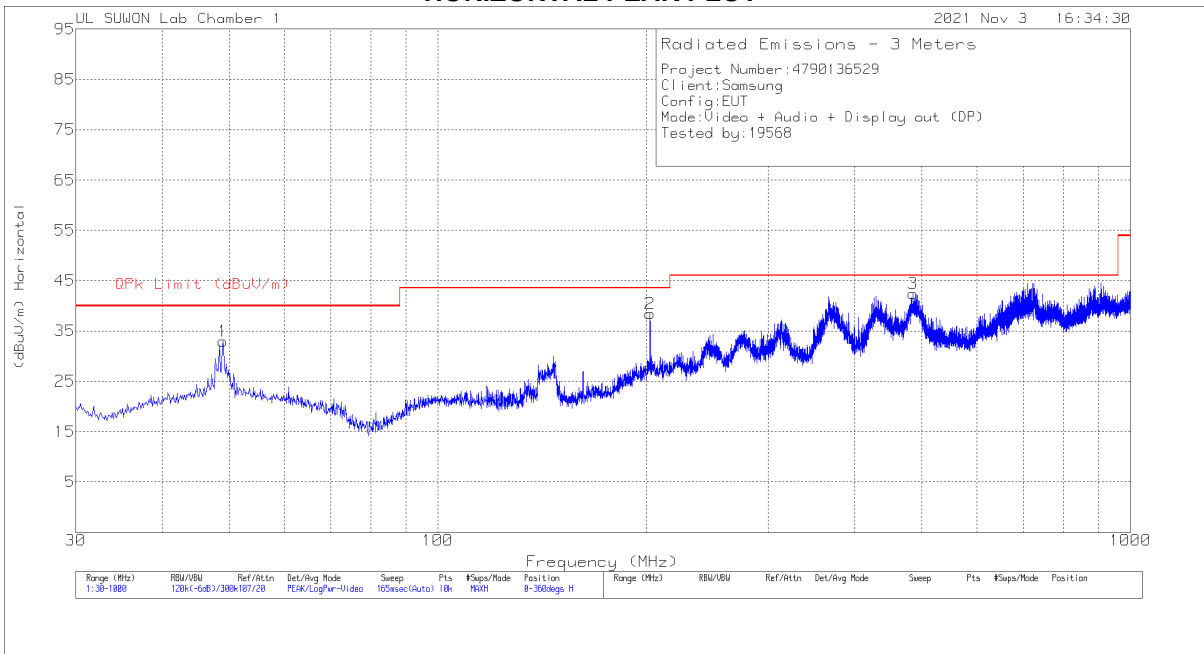
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	81.022	37.95	Pk	12.7	-30.3	20.35	40	-19.65	0-360	300	H
2	167.934	39.08	Pk	14.8	-29.6	24.28	43.52	-19.24	0-360	100	H
3	597.353	35.52	Pk	25.3	-27.2	33.62	46.02	-12.4	0-360	200	H
4	81.313	40.92	Pk	12.8	-30.6	23.12	40	-16.88	0-360	200	V
5	148.437	38.79	Pk	14	-29.7	23.09	43.52	-20.43	0-360	200	V
6	625.58	36.48	Pk	25.4	-27	34.88	46.02	-11.14	0-360	200	V

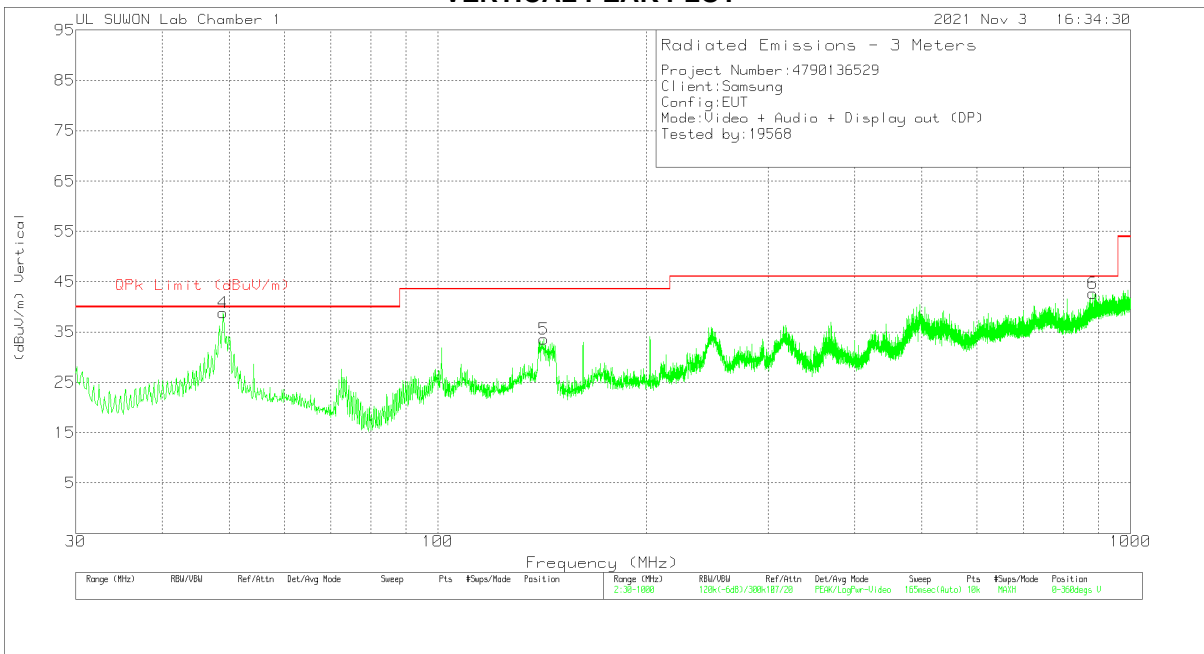
Pk - Peak detector

[Test case 3]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	48.915	44.12	Pk	19.8	-31	32.92	40	-7.08	0-360	300	H
2	202.466	50.36	Pk	17.3	-29.2	38.46	43.52	-5.06	0-360	100	H
3	485.318	47.29	Pk	22.8	-27.6	42.49	46.02	-3.53	0-360	100	H
4	48.915	50	Pk	19.8	-31	38.8	40	-1.2	0-360	200	V
5	142.229	49.11	Pk	14.2	-29.7	33.61	43.52	-9.91	0-360	200	V
6	882.533	39.89	Pk	28.1	-25.3	42.69	46.02	-3.33	0-360	200	V

Pk - Peak detector

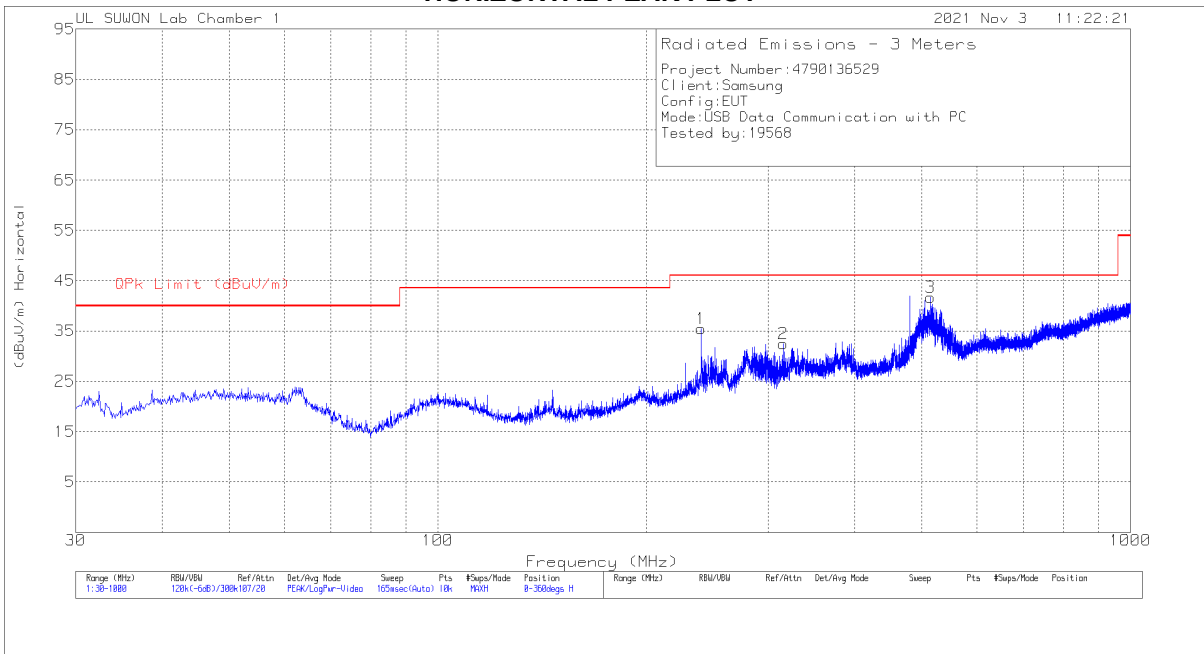
Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
485.318	43.09	Qp	22.8	-27.6	38.29	46.02	-7.73	118	100	H
48.9868	47.76	Qp	19.8	-31	36.56	40	-3.44	88	100	V
882.533	34.82	Qp	28.1	-25.3	37.62	46.02	-8.4	294	109	V

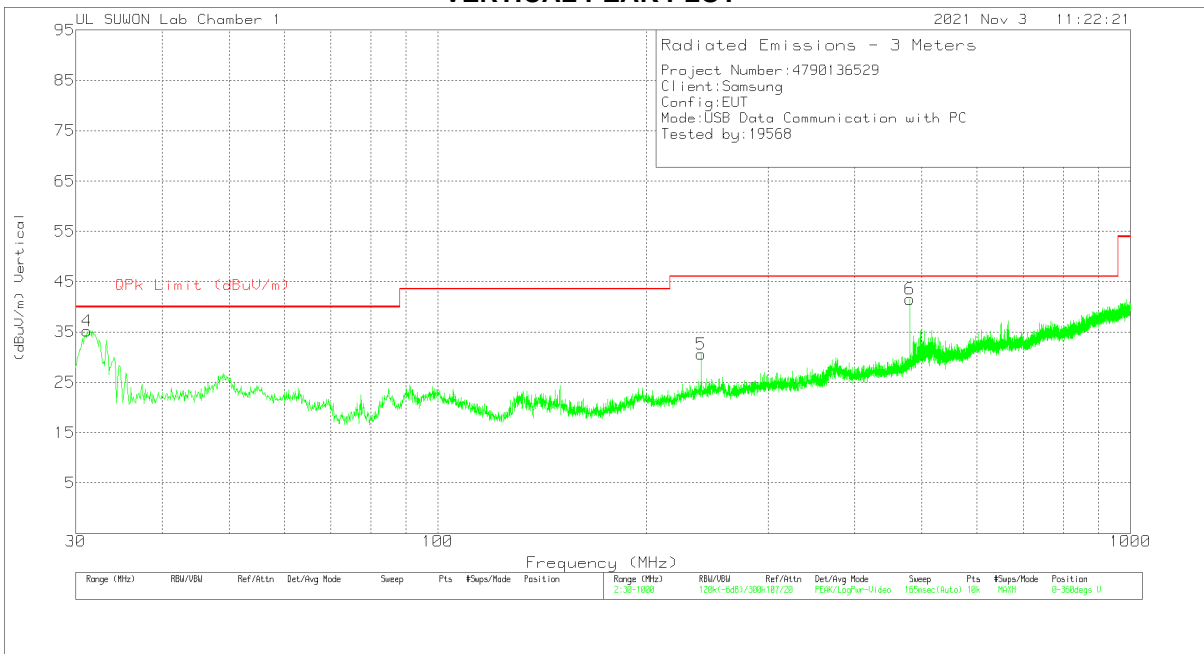
Qp - Quasi-Peak detector

[Test case 4]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	240.005	45.72	Pk	18.6	-28.9	35.42	46.02	-10.6	0-360	100	H
2	315.18	41.39	Pk	19.6	-28.5	32.49	46.02	-13.53	0-360	100	H
3	514.03	45.89	Pk	23.3	-27.5	41.69	46.02	-4.33	0-360	100	H
4	31.164	50.71	Pk	15.7	-31.2	35.21	40	-4.79	0-360	200	V
5	240.005	40.9	Pk	18.6	-28.9	30.6	46.02	-15.42	0-360	200	V
6	479.983	46.41	Pk	22.7	-27.6	41.51	46.02	-4.51	0-360	200	V

Pk - Peak detector

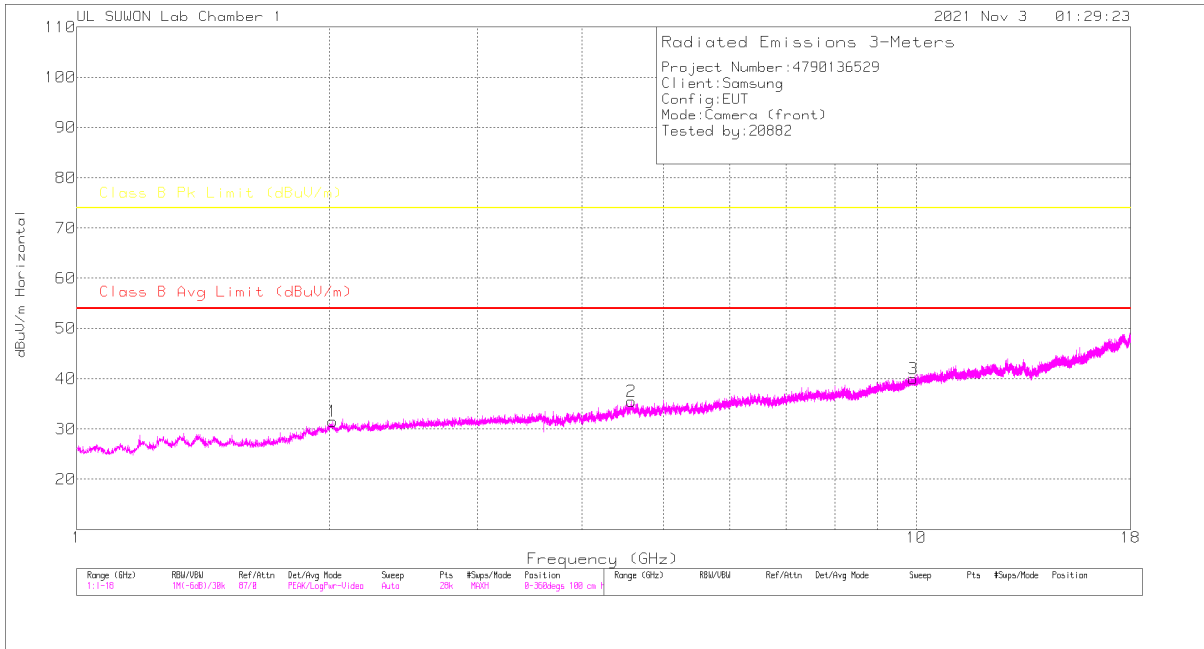
Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
514.03	32.48	Qp	23.3	-27.5	28.28	46.02	-17.74	350	207	H
31.164	45.72	Qp	15.7	-31.2	30.22	40	-9.78	283	101	V
479.983	46.41	Qp	22.7	-27.6	41.51	46.02	-4.51	131	101	V

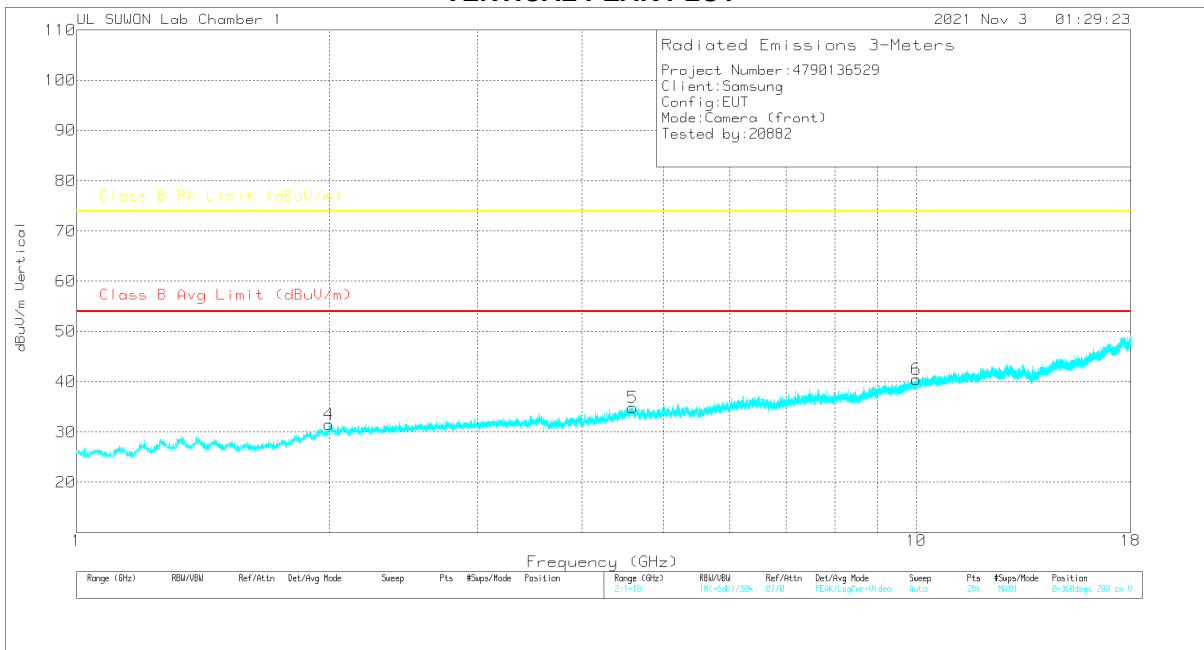
Qp - Quasi-Peak detector

7.1.2. RADIATED EMISSIONS 1 GHz to 18 GHz [Test case 1]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz[dB]	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.01807	35.66	PK	31.5	-35.7	31.46	-	-	74	-42.54	0-360	100	H
2	4.57994	33.21	PK	34.2	-31.9	35.51	-	-	74	-38.49	0-360	100	H
3	9.91433	26.14	PK	37.7	-23.8	40.04	-	-	74	-33.96	0-360	100	H
4	1.99804	35.83	PK	31.4	-35.7	31.53	-	-	74	-42.47	0-360	200	V
5	4.59269	32.53	PK	34.2	-31.9	34.83	-	-	74	-39.17	0-360	200	V
6	9.9975	25.94	PK	37.8	-23.3	40.44	-	-	74	-33.56	0-360	200	V

PK – Peak Detector

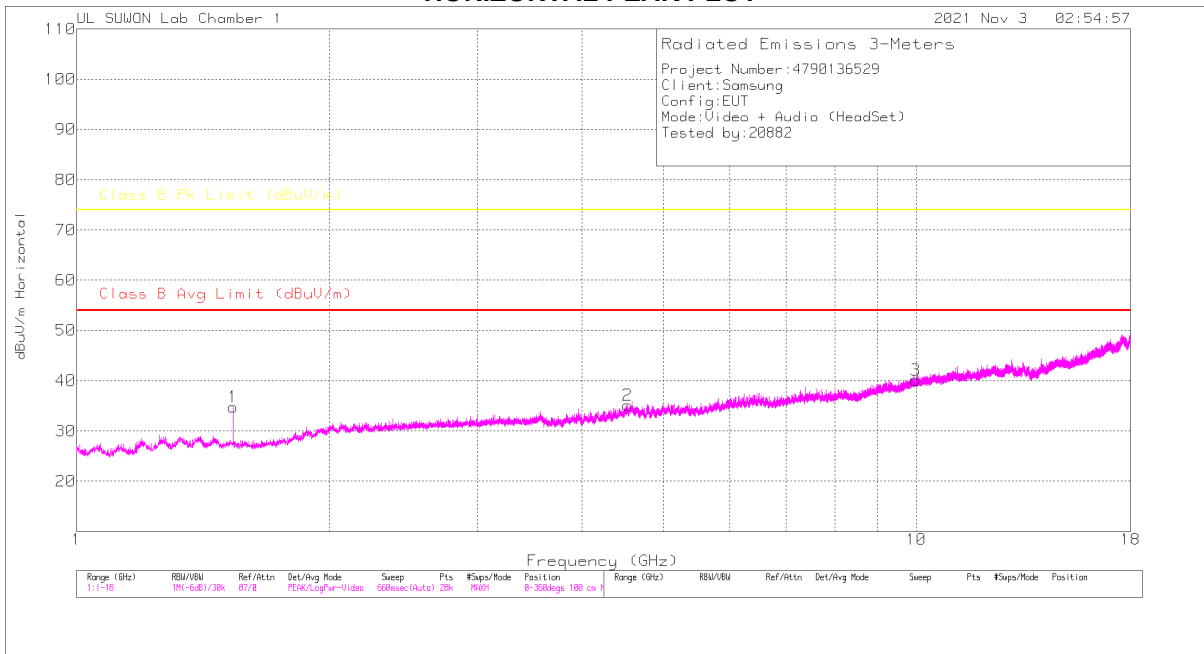
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz[dB]	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.01807	37.3	Pk	31.5	-35.7	33.1	-	-	74	-40.9	0	100	H
4.57994	31.53	Pk	34.2	-31.9	33.83	-	-	74	-40.17	0	100	H
9.91433	27.04	Pk	37.7	-23.8	40.94	-	-	74	-33.06	0	100	H
2.01807	36.58	Pk	31.5	-35.7	32.38	-	-	74	-41.62	0	100	V
4.57994	35.52	Pk	34.2	-31.9	37.82	-	-	74	-36.18	0	100	V
9.91433	27.11	Pk	37.7	-23.8	41.01	-	-	74	-32.99	0	100	V

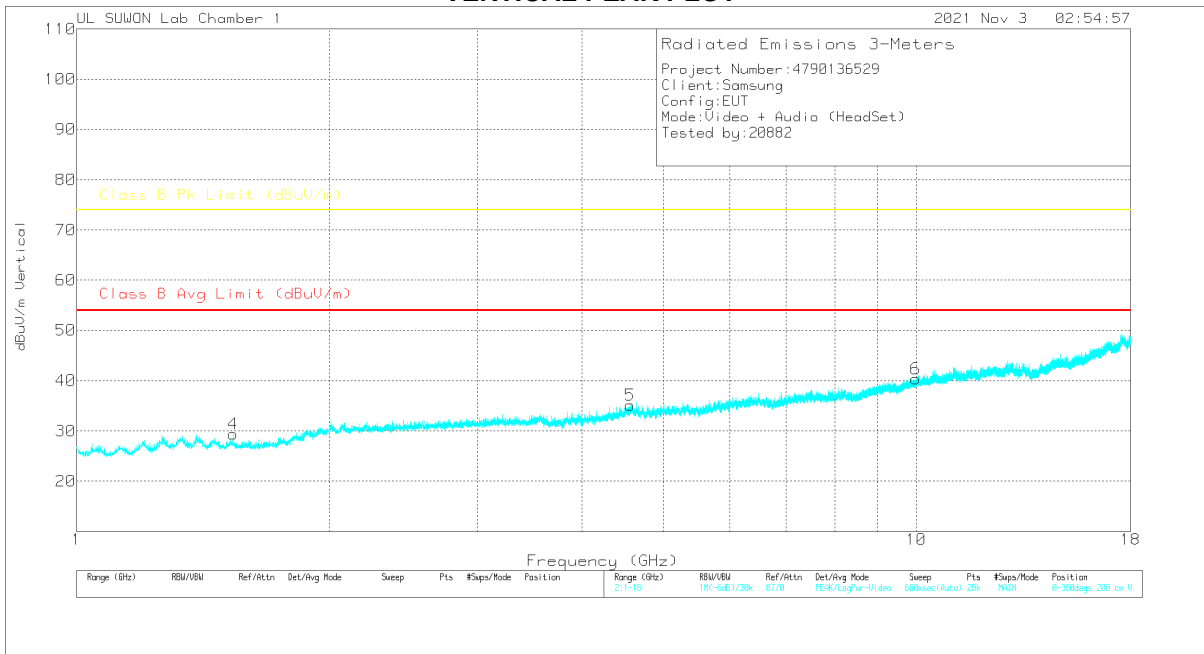
Pk - Peak detector

[Test case 2]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz(dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.53544	42.68	PK	28.7	-36.6	34.78	-	-	74	-39.22	0-360	100	H
2	4.53502	32.97	PK	34.2	-32	35.17	-	-	74	-38.83	0-360	100	H
3	9.99265	26.63	PK	37.8	-23.3	40.13	-	-	74	-33.87	0-360	100	H
4	1.53544	37.29	PK	28.7	-36.6	29.39	-	-	74	-44.61	0-360	200	V
5	4.56598	32.97	PK	34.2	-32	35.17	-	-	74	-38.83	0-360	200	V
6	9.9805	26.01	PK	37.8	-23.4	40.41	-	-	74	-33.59	0-360	200	V

PK – Peak Detector

Radiated Emissions

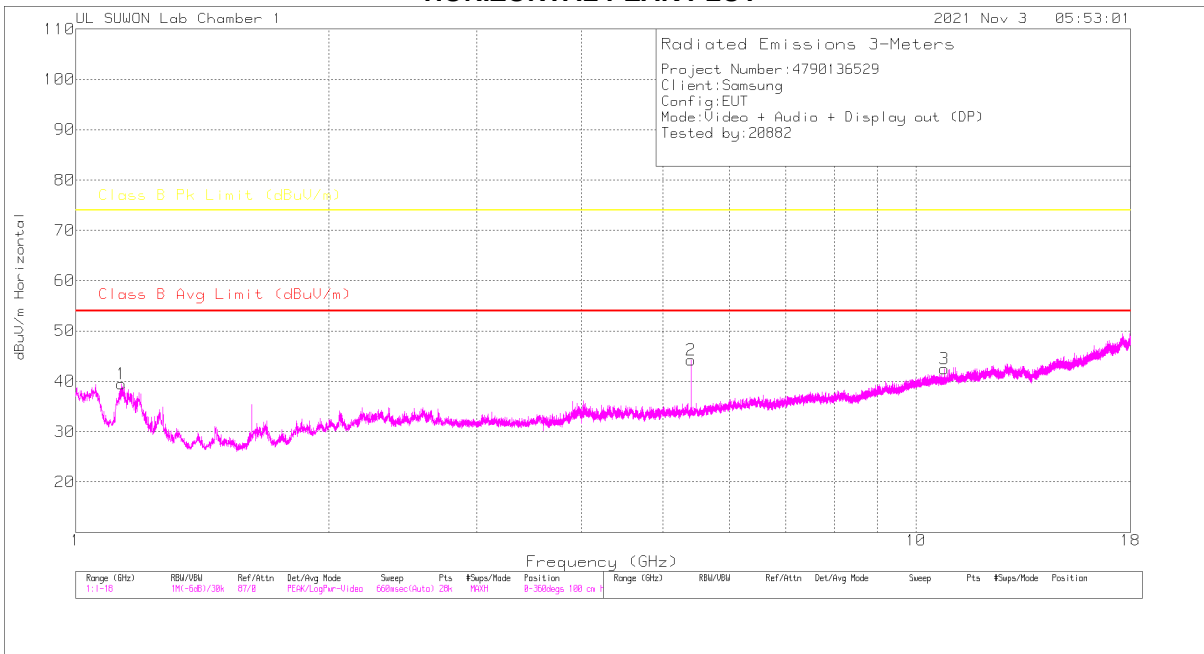
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz(dB)	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.53544	45.89	Pk	28.7	-36.6	37.99	-	-	74	-36.01	18	109	H
1.53544	35.09	Ca	28.7	-36.6	27.19	54	-26.81	-	-	18	109	H
4.53502	38.89	Pk	34.2	-32	41.09	-	-	74	-32.91	0	100	H
9.99265	26.75	Pk	37.8	-23.3	41.25	-	-	74	-32.75	0	100	H
1.53544	43.9	Pk	28.7	-36.6	36	-	-	74	-38	0	100	V
4.53502	33.07	Pk	34.2	-32	35.27	-	-	74	-38.73	0	100	V
9.99265	29.24	Pk	37.8	-23.3	43.74	-	-	74	-30.26	0	100	V

Pk - Peak detector

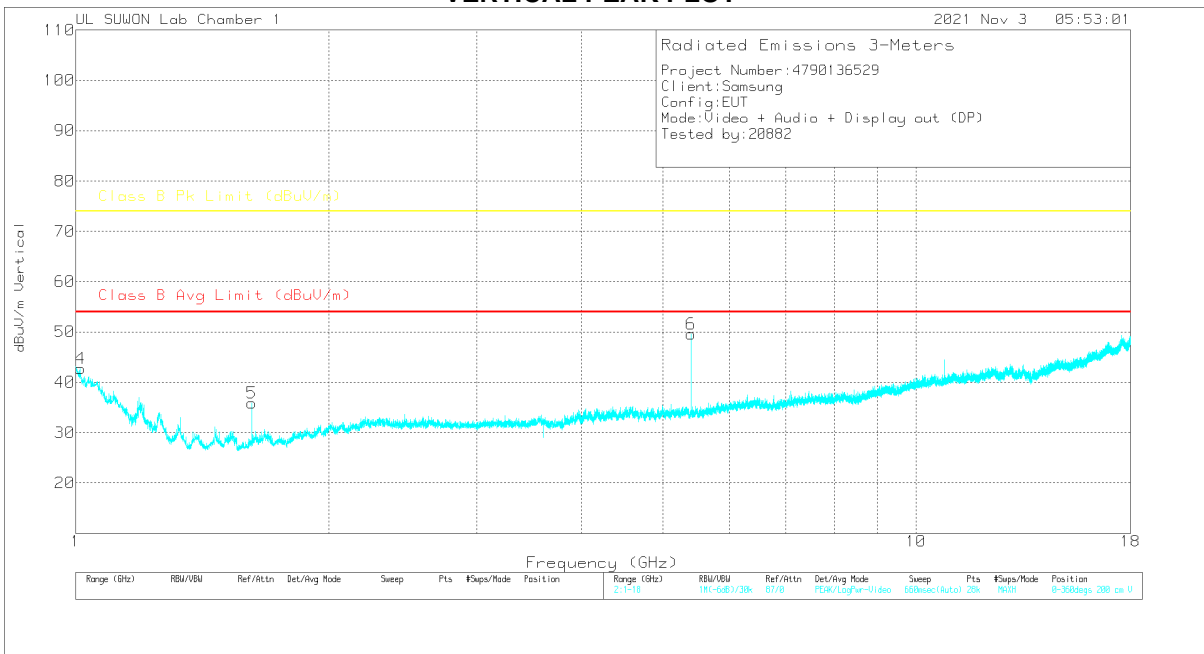
Ca - CISPR average detection

[Test case 3]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz[dB]	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.13416	49.16	PK	27.8	-37.5	39.46	-	-	74	-34.54	0-360	100	H
2	5.40071	40.78	PK	34.5	-31.1	44.18	-	-	74	-29.82	0-360	100	H
3	10.80188	26.85	PK	38.1	-22.5	42.45	-	-	74	-31.55	0-360	100	H
4	1.01275	52.57	PK	28.1	-37.9	42.77	-	-	74	-31.23	0-360	200	V
5	1.61983	43.93	PK	28.4	-36.5	35.83	-	-	74	-38.17	0-360	200	V
6	5.40071	46.17	PK	34.5	-31.1	49.57	-	-	74	-24.43	0-360	200	V

PK – Peak Detector

Radiated Emissions

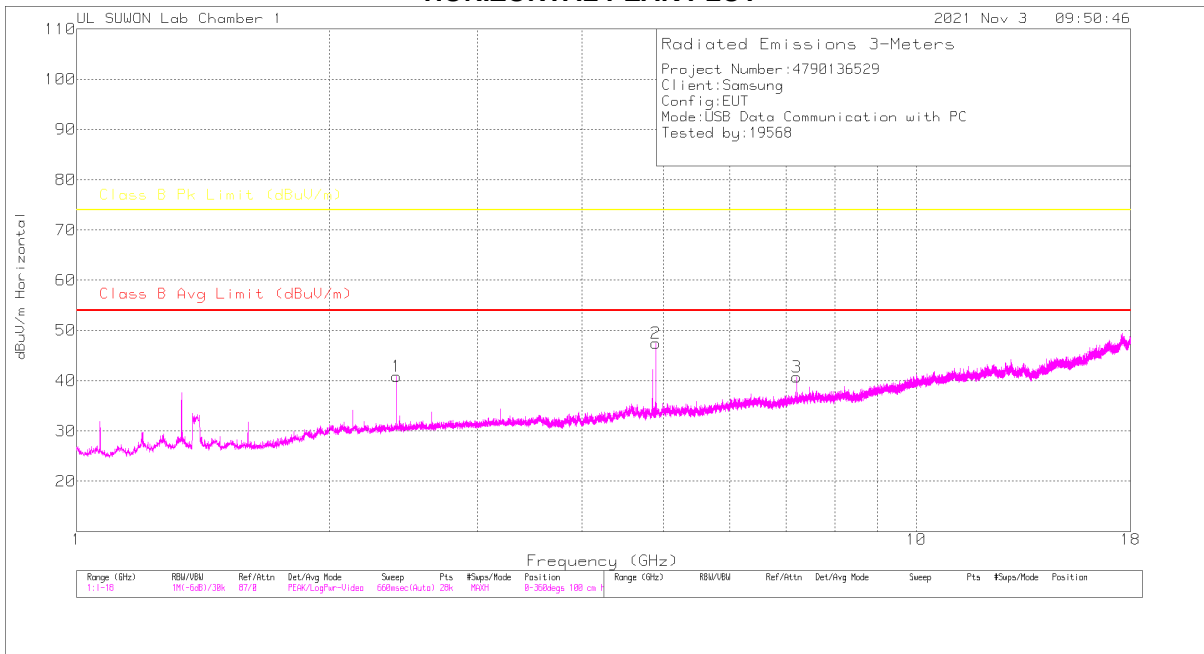
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz[dB]	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.13416	40.92	Pk	27.8	-37.5	31.22	-	-	74	-42.78	0	100	H
5.40071	46.24	Pk	34.5	-31.1	49.64	-	-	74	-24.36	159	100	H
5.40071	40.27	Ca	34.5	-31.1	43.67	54	-10.33	-	-	159	100	H
10.80188	24	Pk	38.1	-22.5	39.6	-	-	74	-34.4	0	100	H
1.13416	43.47	Pk	27.8	-37.5	33.77	-	-	74	-40.23	0	100	V
1.61983	49.18	Pk	28.4	-36.5	41.08	-	-	74	-32.92	225	291	V
1.61983	41.94	Ca	28.4	-36.5	33.84	54	-20.16	-	-	225	291	V
5.40071	50.4	Pk	34.5	-31.1	53.8	-	-	74	-20.2	192	115	V
5.40071	46.85	Ca	34.5	-31.1	50.25	54	-3.75	-	-	192	115	V

Pk - Peak detector

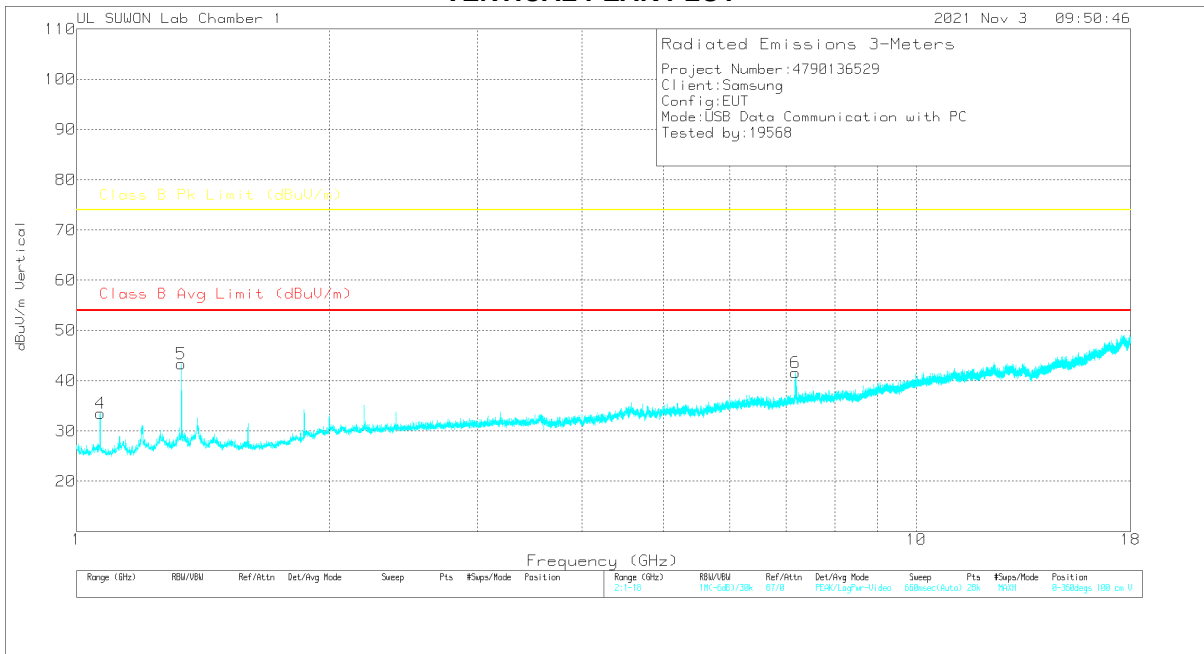
Ca - CISPR average detection

[Test case 4]

HORIZONTAL PEAK PLOT



VERTICAL PEAK PLOT



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz[dB]	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.40478	44.05	PK	31.8	-35	40.85	-	-	74	-33.15	0-360	100	H
2	4.8938	45.05	PK	34.1	-31.7	47.45	-	-	74	-26.55	0-360	100	H
3	7.20616	32.7	PK	35.9	-27.9	40.7	-	-	74	-33.3	0-360	100	H
4	1.06678	43.56	PK	27.6	-37.7	33.46	-	-	74	-40.54	0-360	100	V
5	1.33268	51	PK	29.5	-37.1	43.4	-	-	74	-30.6	0-360	100	V
6	7.17884	33.58	PK	35.9	-27.9	41.58	-	-	74	-32.42	0-360	100	V

PK – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	1-18GHz[dB]	Corrected Reading dBuV/m	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2.40278	3.53	Pk	31.8	-35	.33	-	-	74	-73.67	9	280	H
2.40278	-5.3	Ca	31.8	-35	-8.5	54	-62.5	-	-	9	280	H
4.8938	.68	Pk	34.1	-31.7	3.08	-	-	74	-70.92	223	151	H
4.8938	-7.83	Ca	34.1	-31.7	-5.43	54	-59.43	-	-	223	151	H
7.20616	-2.2	Pk	35.9	-27.9	5.8	-	-	74	-68.2	47	159	H
7.20616	-11.35	Ca	35.9	-27.9	-3.35	54	-57.35	-	-	47	159	H
1.06678	52.06	Pk	27.6	-37.7	41.96	-	-	74	-32.04	37	328	V
1.06678	31.98	Ca	27.6	-37.7	21.88	54	-32.12	-	-	37	328	V
1.33268	53.57	Pk	29.5	-37.1	45.97	-	-	74	-28.03	54	100	V
1.33268	32.06	Ca	29.5	-37.1	24.46	54	-29.54	-	-	54	100	V
7.17884	38.65	Pk	35.9	-27.9	46.65	-	-	74	-27.35	284	103	V
7.17884	24.82	Ca	35.9	-27.9	32.82	54	-21.18	-	-	284	103	V

Pk - Peak detector

Ca - CISPR average detection

7.2. 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 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.

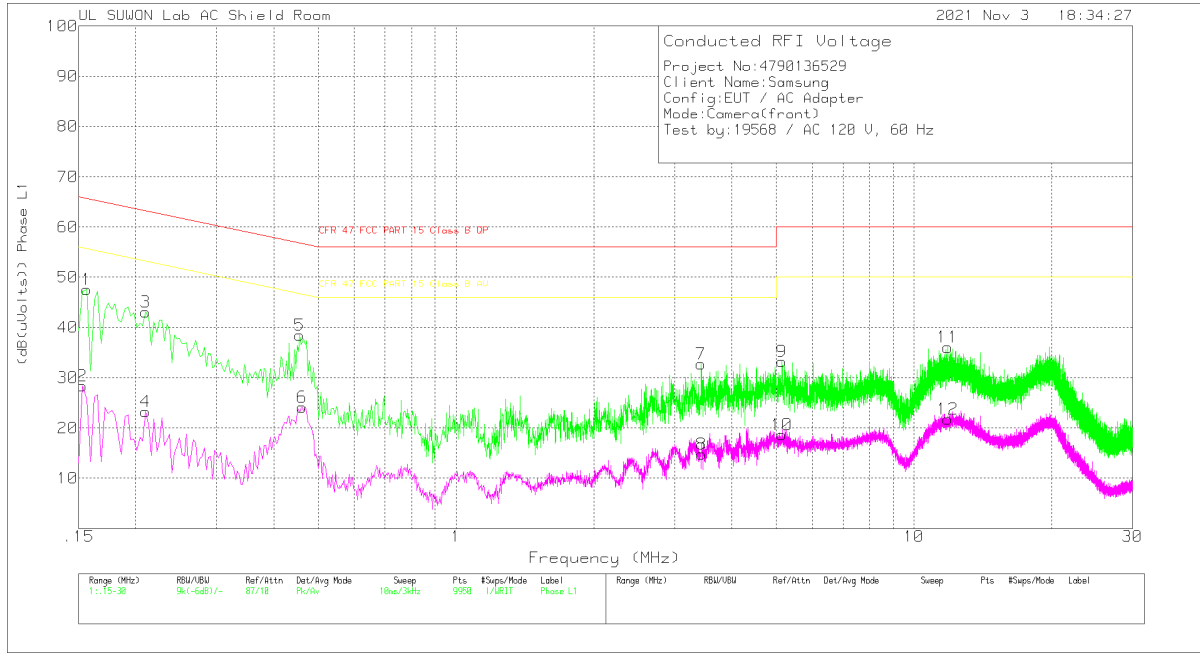
7.2.1. CONDUCTED EMISSIONS

[Test case 1]

6 WORST EMISSIONS

Line-L1 .15 – 30 MHz

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

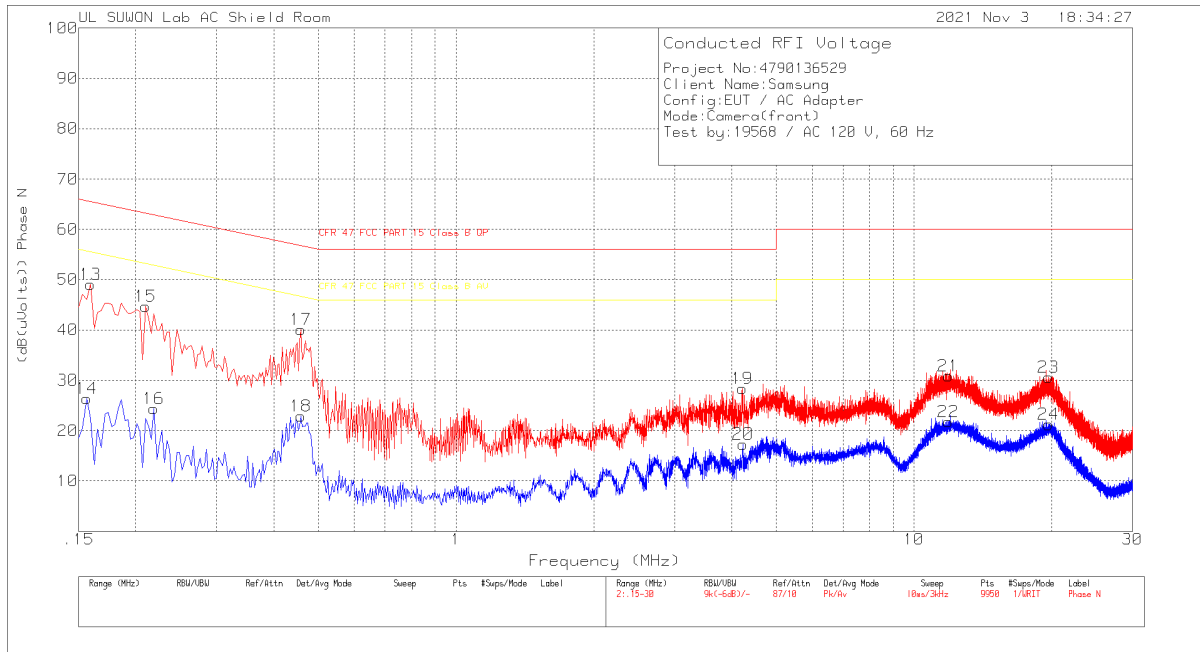
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1[dB]	CABLELOS S(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.156	37.69	Pk	9.8	.1	47.59	65.67	-18.08	-	-
2	.153	18.48	Av	9.8	.1	28.38	-	-	55.84	-27.46
3	.21	33.06	Pk	9.8	.2	43.06	63.21	-20.15	-	-
4	.21	13.23	Av	9.8	.2	23.23	-	-	53.21	-29.98
5	.456	28.37	Pk	9.9	.2	38.47	56.77	-18.3	-	-
6	.462	14.02	Av	9.9	.2	24.12	-	-	46.66	-22.54
7	3.432	22.72	Pk	9.7	.3	32.72	56	-23.28	-	-
8	3.435	4.76	Av	9.7	.3	14.76	-	-	46	-31.24
9	5.145	23.21	Pk	9.7	.3	33.21	60	-26.79	-	-
10	5.151	8.7	Av	9.7	.3	18.7	-	-	50	-31.3
11	11.844	25.84	Pk	9.9	.3	36.04	60	-23.96	-	-
12	11.844	11.57	Av	9.9	.3	21.77	-	-	50	-28.23

Pk - Peak detector

Av - Average detection

Line-L2 .15 – 30 MHz

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOSS(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	.159	39.13	Pk	9.8	.1	49.03	65.52	-16.49	-	-
14	.156	16.51	Av	9.8	.1	26.41	-	-	55.67	-29.26
15	.21	34.65	Pk	9.8	.2	44.65	63.21	-18.56	-	-
16	.219	14.42	Av	9.8	.2	24.42	-	-	52.86	-28.44
17	.459	29.93	Pk	9.9	.2	40.03	56.71	-16.68	-	-
18	.459	12.79	Av	9.9	.2	22.89	-	-	46.71	-23.82
19	4.224	18.36	Pk	9.7	.3	28.36	56	-27.64	-	-
20	4.23	7.34	Av	9.7	.3	17.34	-	-	46	-28.66
21	11.871	20.52	Pk	10	.3	30.82	60	-29.18	-	-
22	11.871	11.52	Av	10	.3	21.82	-	-	50	-28.18
23	19.692	20.04	Pk	10.2	.4	30.64	60	-29.36	-	-
24	19.677	10.61	Av	10.2	.4	21.21	-	-	50	-28.79

Pk - Peak detector

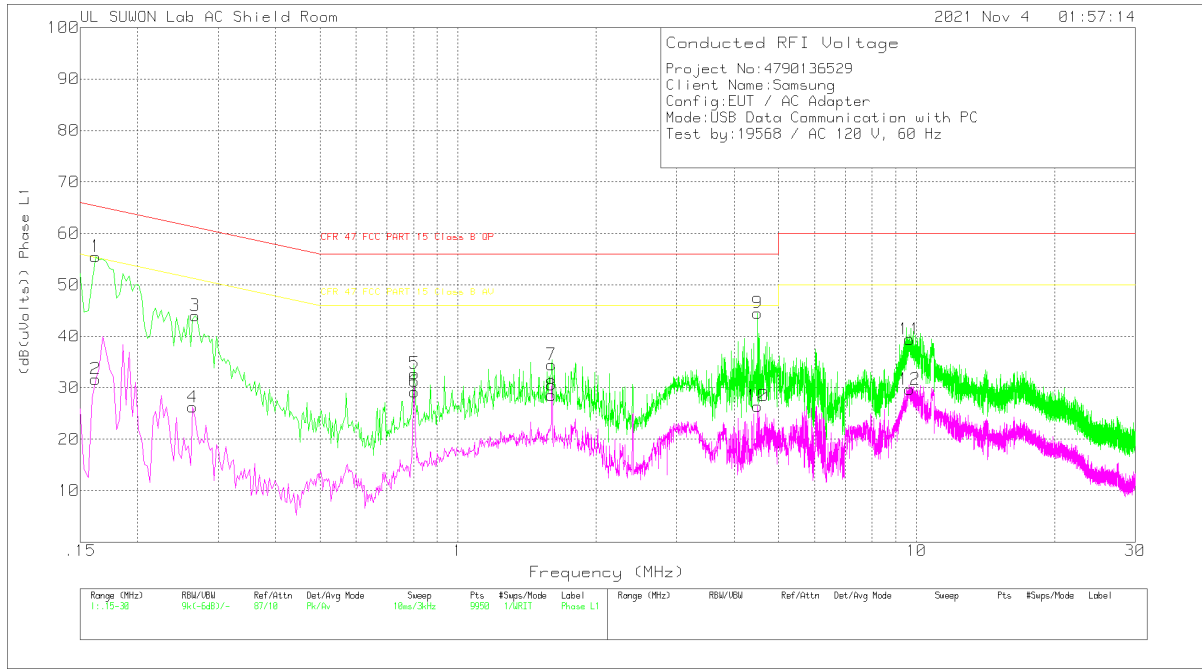
Av - Average detection

[Test case 4]

6 WORST EMISSIONS

Line-L1 .15 – 30 MHz

LINE 1 RESULTS



Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_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	.162	45.61	Pk	9.8	.1	55.51	65.36	-9.85	-	-
2	.162	21.8	Av	9.8	.1	31.7	-	-	55.36	-23.66
3	.267	34.22	Pk	9.6	.2	44.02	61.21	-17.19	-	-
4	.264	16.44	Av	9.6	.2	26.24	-	-	51.3	-25.06
5	.804	22.89	Pk	9.7	.2	32.79	56	-23.21	-	-
6	.804	19.35	Av	9.7	.2	29.25	-	-	46	-16.75
7	1.599	24.59	Pk	9.6	.3	34.49	56	-21.51	-	-
8	1.599	18.65	Av	9.6	.3	28.55	-	-	46	-17.45
9	4.506	34.64	Pk	9.6	.3	44.54	56	-11.46	-	-
10	4.506	16.54	Av	9.6	.3	26.44	-	-	46	-19.56
11	9.666	29.32	Pk	9.7	.4	39.42	60	-20.58	-	-
12	9.657	19.59	Av	9.7	.4	29.69	-	-	50	-20.31

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

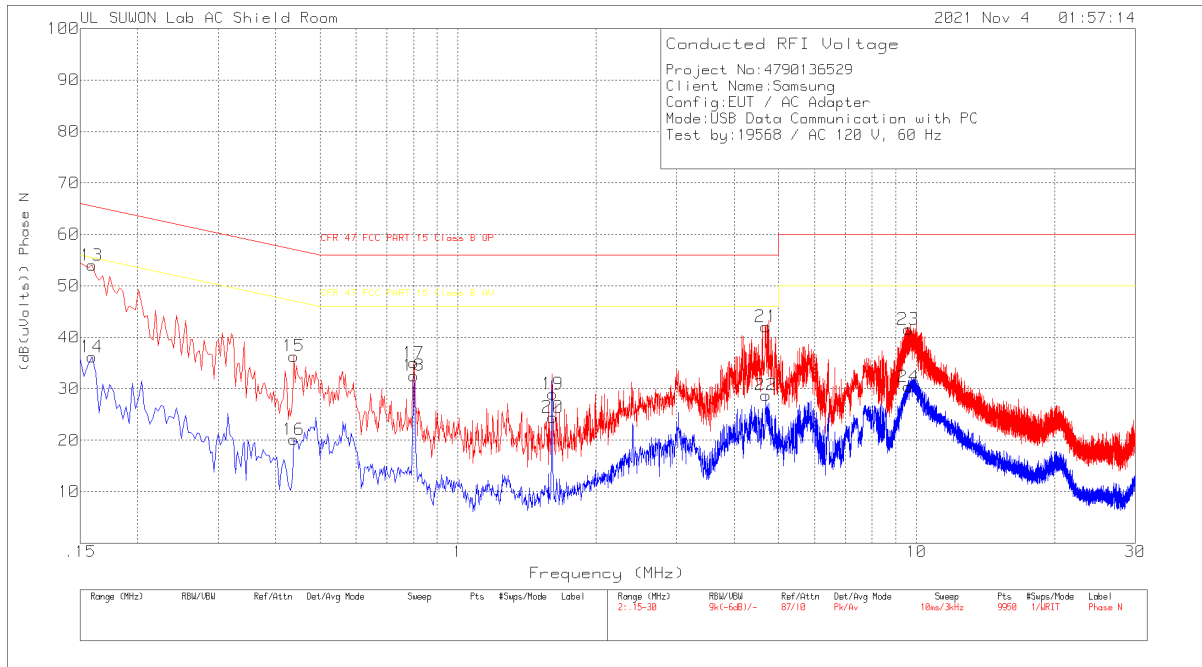
Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_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)
.16215	39.42	Qp	9.8	.1	49.32	65.35	-16.03	-	-

Qp - Quasi-Peak detector

Line-L2 .15 – 30 MHz

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_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	.159	44.09	Pk	9.8	.1	53.99	65.52	-11.53	-	-
14	.159	26.28	Av	9.8	.1	36.18	-	-	55.52	-19.34
15	.438	26.34	Pk	9.8	.2	36.34	57.1	-20.76	-	-
16	.438	10.13	Av	9.8	.2	20.13	-	-	47.1	-26.97
17	.801	25.16	Pk	9.7	.2	35.06	56	-20.94	-	-
18	.801	22.65	Av	9.7	.2	32.55	-	-	46	-13.45
19	1.608	19.09	Pk	9.6	.3	28.99	56	-27.01	-	-
20	1.608	14.57	Av	9.6	.3	24.47	-	-	46	-21.53
21	4.695	32.18	Pk	9.6	.3	42.08	56	-13.92	-	-
22	4.695	18.87	Av	9.6	.3	28.77	-	-	46	-17.23
23	9.591	31.45	Pk	9.7	.4	41.55	60	-18.45	-	-
24	9.597	20.32	Av	9.7	.4	30.42	-	-	50	-19.58

Pk - Peak detector

Av - Average detection

END OF TEST REPORT