TEST REPORT

No. 23T04Z70506-01

for

Samsung Electronics Co., Ltd.

Multi-band WCDMA/LTE/5GNR Tablet with Bluetooth, WLAN

Model Name: SM-X218U

with

FCC ID: ZCASMX218U

Hardware Version: REV1.0

Software Version: X218U.001

Issued Date: 2023-11-09

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

©Copyright. All rights reserved by CTTL.

REPORT HISTORY

Report Number	Revision	Description	Issue Date
23T04Z70506-01	Rev.0	1st edition	2023-10-30
23T04Z70506-01	Rev.1	Deleted description of GSM 850 in Page 7&8	2023-11-09

Note: the latest revision of the test report supersedes all previous versions.

©Copyright. All rights reserved by CTTL.

CONTENTS

1. TEST LABORATORY 4
1.1. INTRODUCTION & ACCREDITATION 4
1.2. TESTING LOCATION 4
1.3. TESTING ENVIRONMENT 4
1.4. PROJECT DATA 4
1.5. SIGNATURE 4
2. CLIENT INFORMATION 5
2.1. APPLICANT INFORMATION 5
2.2. MANUFACTURER INFORMATION 5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 6
3.1. ABOUT EUT 6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST 6
3.4. GENERAL DESCRIPTION 7
3.5. EUT SET-UPS 8
4. REFERENCE DOCUMENTS 9
4.1. DOCUMENTS SUPPLIED BY APPLICANT 9
4.2. REFERENCE DOCUMENTS FOR TESTING 9
5. LABORATORY ENVIRONMENT 10
6. SUMMARY OF TEST RESULTS 11
7. TEST EQUIPMENTS UTILIZED 12
ANNEX A: MEASUREMENT RESULTS 13
ANNEX B: PERSONS INVOLVED IN THIS TESTING 35

©Copyright. All rights reserved by CTTL.

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

CTTL (BDA)

Address: No. 18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, 100176, P.R. China

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2023-09-25

Testing End Date: 2023-10-20

1.5. Signature

Li Yan

(Prepared this test report)

Zhang Ying

(Reviewed this test report)

Zhang Xia

Deputy Director of the laboratory

(Approved this test report)

©Copyright. All rights reserved by CTTL.

2. Client Information

2.1. Applicant Information

Company Name:	Samsung Electronics Co., Ltd.
Address:	19 Chapin Rd.,Building D Pine Brook, NJ 07058
City:	/
Postal Code:	/
Country:	/
Contact Person:	Jenni Chun
Contact Email	j1.chun@samsung.com
Telephone:	+1-201-937-4203
Fax	/

2.2. Manufacturer Information

Company Name:	Samsung Electronics. Co., Ltd.
Address:	Samsung R5, Maetan dong 129, Samsung ro Youngtong gu, Suwon city 443 742, Korea
City:	/
Postal Code:	/
Country:	/
Contact Person:	JP KIM
Contact Email	jp426.kim@samsung.com
Telephone:	+82-10-4376-0326
Fax	/

©Copyright. All rights reserved by CTTL.

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Multi-band WCDMA/LTE/5GNR Tablet with Bluetooth, WLAN
Model name	SM-X218U
FCC ID	ZCASMX218U

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI/SN	HW Version	SW Version
UT21a	2370506UT21a	REV1.0	X218U.001
UT22a	2370506UT22a	REV1.0	X218U.001

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Name	Model	Manufacturer
AE1	Battery	WT-S-W11	SCUD (Fujian) Electronics Co., Ltd.
AE2*	Adapter	EP-T1510	DONGGUAN DONGWON ELECTRONICS CO.,LTD.
AE3-1	Date Cable1 C-C	EP-DN980BWE	Guangxi Broad Telecommunication Co.,Ltd.
AE3-2	Date Cable2 C-C	EP-DN980BWE	RFTECH Co., Ltd.
AE3-3	Date Cable3 C-C	EP-DN980BWE	CRESYN HANOI Co., Ltd
AE4*	Date Cable4 A-C	EP-DR140AWE	Samsung Electronics Co.,Ltd
AE5*	Headset	ESH61ASFWE	/
AE6*	PC	/	/
AE7*	SD card	/	/
AE8*	MHD	/	/
AE9*	Keyboard	/	Samsung Electronics Co.,Ltd

* AE ID: is used to identify the test sample in the lab internally.

* The USB cables are shielded.

*AE2, AE4, AE5 and AE9 are not the AE for EUT, provided by the client for relevant tests.

*AE6, AE7 and AE8 are not the AE for EUT, provided by the Lab for relevant tests.

©Copyright. All rights reserved by CTTL.

3.4. General Description

Equipment under Test (EUT) is a model of Multi-band WCDMA/LTE/5GNR Tablet with Bluetooth, WLAN with integrated antenna.

Description	Multi-band WCDMA/LTE/5GNR Tablet with Bluetooth, WLAN	
Model name	SM-X218U	
Marketing name	Galaxy Tab A9+	
Brand name	SAMSUNG	
Cellular Bands	☐GSM	/
	☐CDMA	/
	☒WCDMA	Bands 1/2/4/5/8
	☒LTE	Bands 1/2/3/4/5/7/12/13/14/20/25/26/28/29/30/40/41/66/71
	☒5G NR SA	Bands 2/5/25/26/29/30/41/66/70/71/77/78
	☒5G NR NSA	Refer to the manufacturer's specifications
Unlicensed Radio	☒Wi-Fi 2.4GHz	802.11b/g/n(20MHz)
	☒Wi-Fi 5GHz	802.11a/n(20MHz,40MHz)/ac(20MHz,40MHz,80MHz)
	☒Wi-Fi 5.8GHz	802.11a/n(20MHz,40MHz)/ac(20MHz,40MHz,80MHz)
	☒Bluetooth	☒EDR ☐BLE4 ☒BLE5
Other	☒GNSS	☒GPS ☐BDS ☒Gallileo ☒Glonass
	☐FM ☒MP3 ☒MP4 ☒Camera ☒USB ☒External memory	
Temperature	-10-55℃	
Normal Voltage	3.85V	
Extreme Low Voltage	3.55V	
Extreme High Voltage	4.4V	

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: WCDMA Band 5, LTE Band 5, LTE Band 12, LTE Band 13, LTE Band 14, LTE Band 26, and LTE Band 71, 5G NR Band5, NR Band26, and NR Band71.

Samples undergoing test were selected by the client.

Manual and specifications of the EUT were provided to fulfil the test.

For more EUT information please refers to the manufacturer's specifications or user's manual.

©Copyright. All rights reserved by CTTL.

3.5. EUT set-ups

Set-up

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	UT21a + AE2 + AE3-1 +AE5	Adapter + cable1
Set.2	UT21a + AE2 + AE3-2 +AE5	Adapter + cable2+ headset
Set.3	UT21a + AE2 + AE3-3 +AE5	Adapter + cable3+ headset
Set.4	UT21a + AE3-1/2/3 + UT22a +AE5	EUT+EUT+ headset
Set.5	UT21a + AE3-1/2/3 + HD	EUT+HD+ headset
Set.6	UT22a + AE3-1/2/3 + AE5 +PC	Type C communication with PC
Set.7	UT21a + AE4 + AE5 + PC + SD	USB communication with PC+SD
Set.8	UT21a + AE2 + AE3 + AE5 + AE9	EUT+ Keyboard

Test mode

Mode No.	Operating mode	Remarks
mode.1	MP4 Play	RE, CE
mode.2	Front Camera	RE, CE
mode.3	Rear Camera	RE, CE
mode.4	OTG Phone to Phone	RE only
mode.5	OTG + Mobile HD+MP4	RE only
mode.6	USB DATA (TYPE C)	RE, CE
mode.7	USB DATA (USB, SD TO PC)	RE, CE
mode.8	Keyboard input	RE, CE
mode.9	CXX RX mode	WCDMA Band 5, LTE Band 5, LTE Band 12, LTE Band 13, LTE Band 17, LTE Band 26, 5G NR Band5, NR Band26, and NR Band71 (Low/Mid/High channel)

©Copyright. All rights reserved by CTTL.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters are supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC 47 CFR Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2021
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

Note: The test methods have no deviation with standards.

©Copyright. All rights reserved by CTTL.

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

Shielded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness Electrical insulation	0.014MHz-1MHz, >60dB; 1MHz－1000MHz, >90dB. > 2 MΩ
Ground system resistance	< 4 Ω
Temperature	Min. = 15 ˚C, Max. = 35 ˚C

©Copyright. All rights reserved by CTTL.

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail
	BR	Re-use test data from basic model report.

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	A.1	P	**CTTL(BDA)**
2	Conducted Emission	15.107(a)	A.2	P	**CTTL(BDA)**

©Copyright. All rights reserved by CTTL.

7. Test Equipments Utilized

Test Equipment

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURER	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	R&S	2024-06-29	1 year
2	Test Receiver	ESCI	100766	R&S	2024-02-29	1 year
3	LISN	ENV216	101459	R&S	2024-03-30	1 year
4	BiLog Antenna	VULB9163	01223	Schwarzbeck	2024-08-18	1 year
5	EMI Antenna	3115	00119021	ETS-Lindgren	2024-06-24	1 year
6	Universal Radio Communication Tester	CMW500	159408	R&S	2024-04-26	1 year
7	Universal Radio Communication Tester	SP9500	20482	StarPoint	2023-11-30	1 Year
8	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
9	Keyboard	KU-1601	2048361	Lenovo	N/A	N/A
10	Mouse	EMS-537A	8021S3MC	Lenovo	N/A	N/A
11	PC	M4000e-17	M706RMW2	Lenovo	N/A	N/A
12	PC	T14S	PC-1RP0TY	Lenovo	N/A	N/A

Test Software

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V8.53.0	R&S
Conducted Emission	EMC32 V8.53.0	R&S

©Copyright. All rights reserved by CTTL.

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission

Reference

FCC: CFR Part 15.109(a).

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator at distances of 3 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) is tested. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.

The EUT was placed on a non-conductive table and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

For the test setup photographs please see the test setup photos document.

A.1.2 EUT Operating Mode

The EUT is operating in the USB mode, charging mode, MP3, MP4, CAMERA, OTG, SD, Keyboard and cellular RX mode.

The EUT was tested while operating in licensed band RX mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in the Section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

Note：I/O information：Printer – USB, Mouse – PS/2, Keyboard – USB.

A.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit (μV/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance.

©Copyright. All rights reserved by CTTL.

A.1.4 Test Condition

Voltage（V）	Frequency（Hz）
120	60

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/3MHz	15	Peak, Average

A.1.5 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”. It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

Result = $P_{Mea} + A_{Rpl} = P_{Mea} + G_A + G_{PL}$

Where

G_A: Antenna factor of receive antenna

G_{PL}: Path Loss

P_{Mea}: Measurement result on receiver.

Measurement uncertainty (worst case): 30MHz-1GHz：5.73dB, 1GHz-18GHz: 5.58dB, *k*=2.

Note: all the set-up and operating mode list in section 3.5 were tested, only the worst test data are showed in this section.

©Copyright. All rights reserved by CTTL.

Set.1+Mode3, Rear Camera

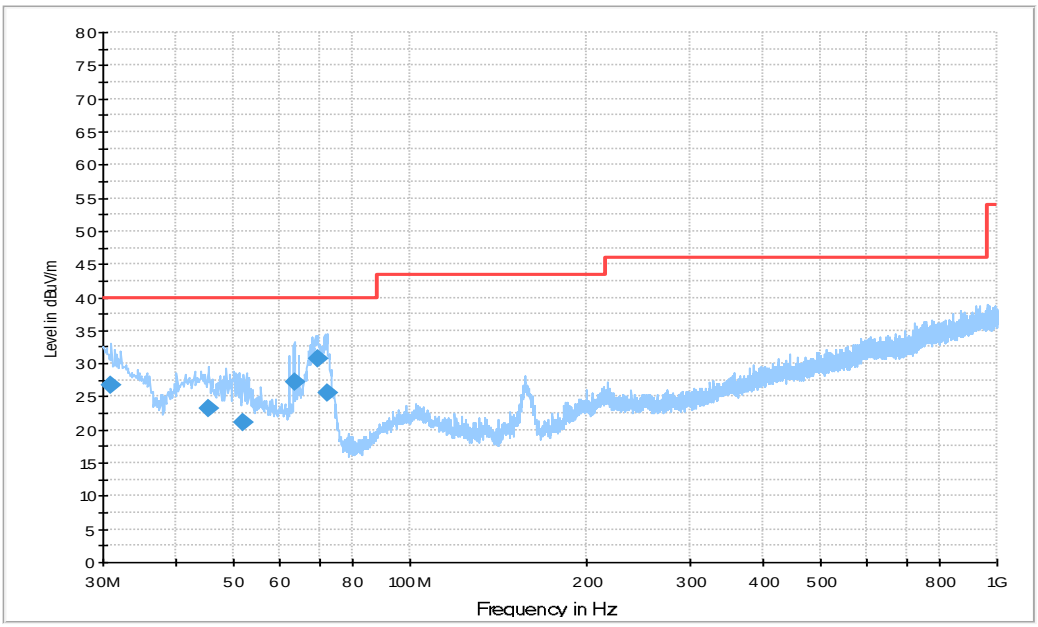


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
30.970000	26.7	113.0	V	231.0	-3.5	13.3	40.0
45.326000	23.3	100.0	V	30.0	0.5	16.7	40.0
52.019000	21.2	125.0	V	63.0	0.4	18.8	40.0
63.465000	27.3	100.0	V	83.0	-1.6	12.7	40.0
69.673000	30.8	100.0	V	281.0	-3.8	9.2	40.0
72.195000	25.6	100.0	V	288.0	-4.7	14.4	40.0

©Copyright. All rights reserved by CTTL.

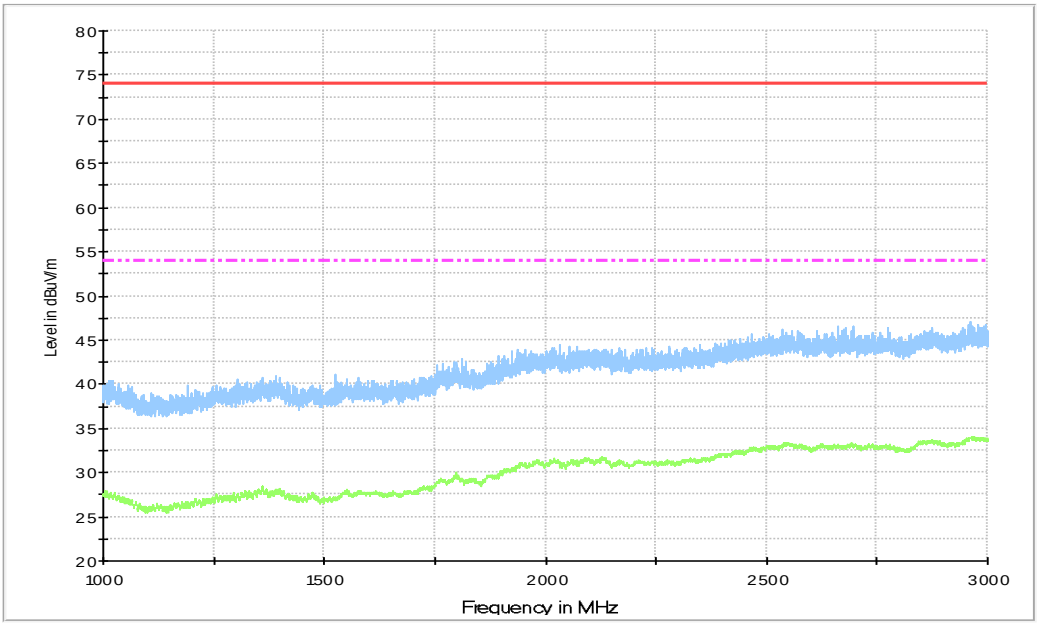


Figure A.2 Radiated Emission from 1GHz to 3GHz

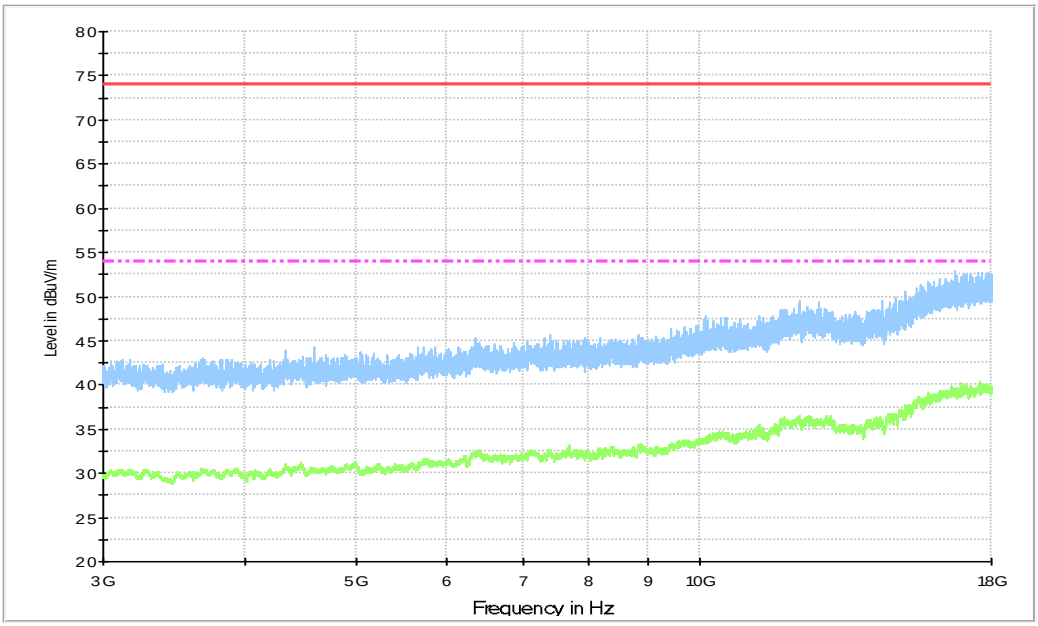


Figure A.3 Radiated Emission from 3GHz to 18GHz

©Copyright. All rights reserved by CTTL.

Average detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17606.000	40.15	-23.7	40.6	23.29	54.0	13.85	H
16933.500	40.13	-24.6	41.2	23.51	54.0	13.87	H
17695.500	40.09	-23.7	40.6	23.15	54.0	13.91	H
17600.000	40.07	-23.8	40.6	23.23	54.0	13.93	H
16928.000	40.06	-24.6	41.2	23.46	54.0	13.94	H
16932.500	40.05	-24.6	41.2	23.44	54.0	13.95	H

Peak detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17634.500	53.5	-23.7	40.6	36.55	74.0	20.53	H
17003.500	52.7	-24.6	41.1	36.23	74.0	21.29	V
17014.000	52.7	-24.6	41.1	36.23	74.0	21.32	H
16907.500	52.7	-24.7	41.3	36.09	74.0	21.34	H
16632.500	52.6	-25.3	41.4	36.54	74.0	21.37	V
16842.000	52.5	-24.9	41.3	36.14	74.0	21.49	H

©Copyright. All rights reserved by CTTL.

Set.2+Mode1+Mode9, MP4 +RX LTE B5

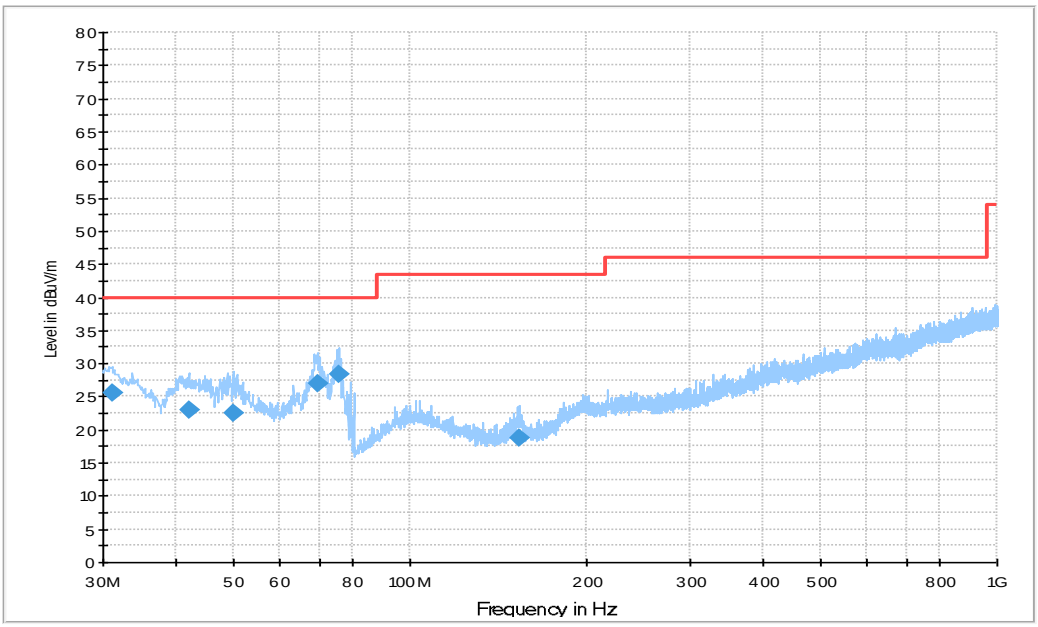


Figure A.4 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
30.873000	25.4	100.0	V	315.0	-3.3	14.6	40.0
34.268000	22.2	125.0	V	-39.0	-2.8	17.8	40.0
42.804000	23.3	100.0	V	31.0	-0.2	16.7	40.0
46.005000	23.1	100.0	V	-1.0	0.5	16.9	40.0
68.315000	22.0	113.0	H	135.0	-3.2	18.0	40.0
150.95900	17.8	100.0	V	211.0	-4.5	25.7	43.5

©Copyright. All rights reserved by CTTL.

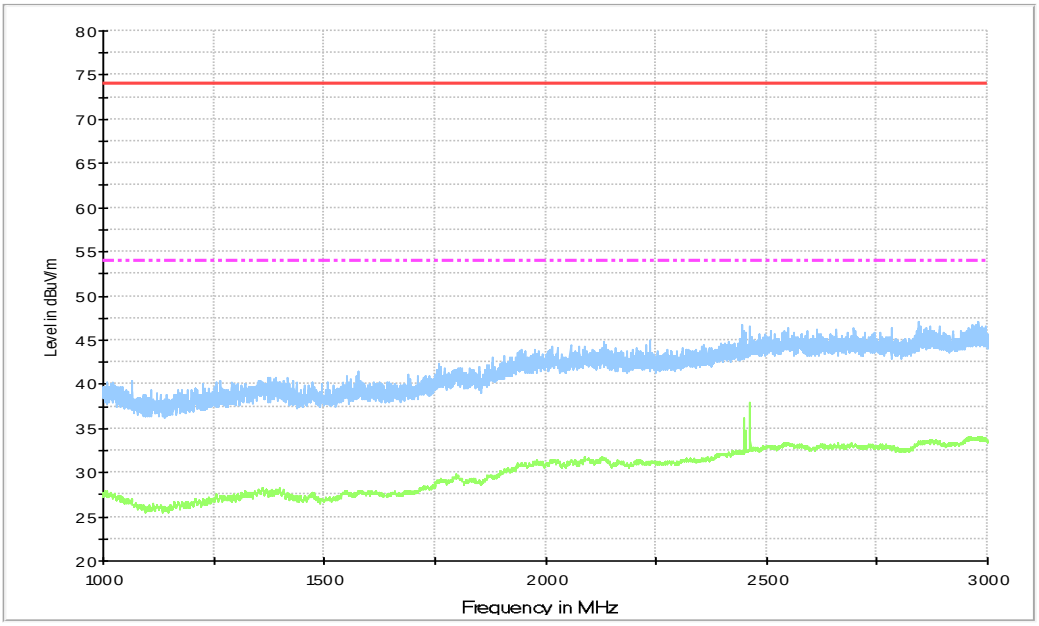


Figure A.5 Radiated Emission from 1GHz to 3GHz

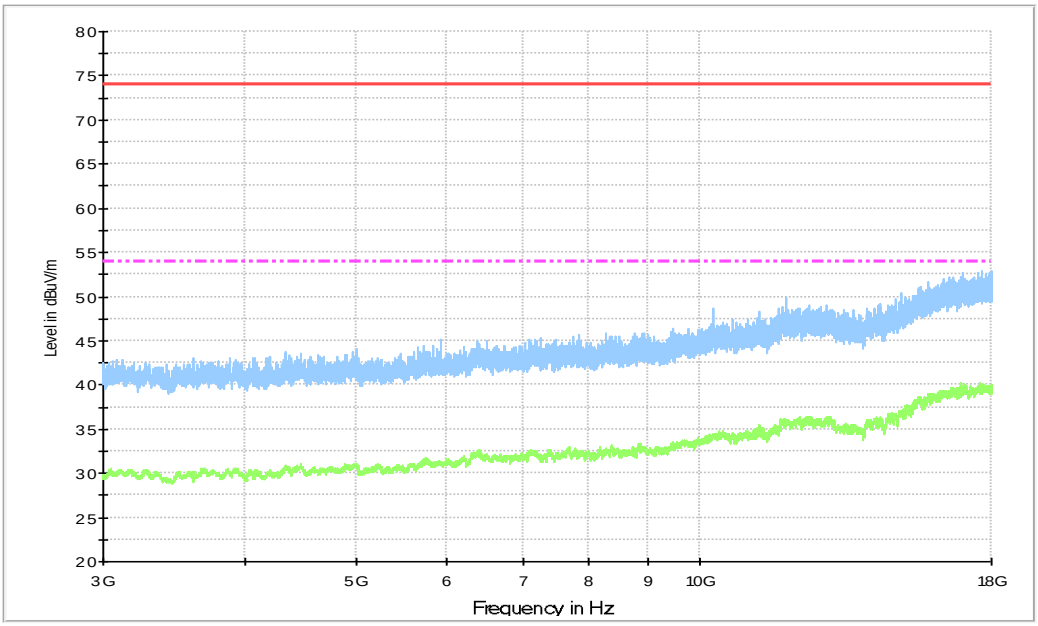


Figure A.6 Radiated Emission from 3GHz to 18GHz

©Copyright. All rights reserved by CTTL.

Average detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
16931.500	40.18	-24.6	41.2	23.58	54.0	13.82	V
17608.500	40.18	-23.7	40.6	23.32	54.0	13.82	V
16930.500	40.16	-24.6	41.2	23.56	54.0	13.84	V
16926.000	40.16	-24.6	41.2	23.56	54.0	13.84	V
16918.500	40.13	-24.7	41.3	23.54	54.0	13.87	V
17615.000	40.09	-23.7	40.6	23.21	54.0	13.91	V

Peak detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17633.500	53.0	-23.7	40.6	36.05	74.0	21.04	V
17999.000	52.8	-23.4	40.6	35.62	74.0	21.18	V
17014.500	52.8	-24.6	41.1	36.34	74.0	21.21	V
17495.500	52.7	-24.0	40.6	36.09	74.0	21.31	V
17896.000	52.6	-23.5	40.5	35.62	74.0	21.35	V
17813.500	52.6	-23.6	40.5	35.72	74.0	21.40	V

©Copyright. All rights reserved by CTTL.

Set.5+Mode5+Mode9, OTG + MP4 + RX WCDMA Band 5

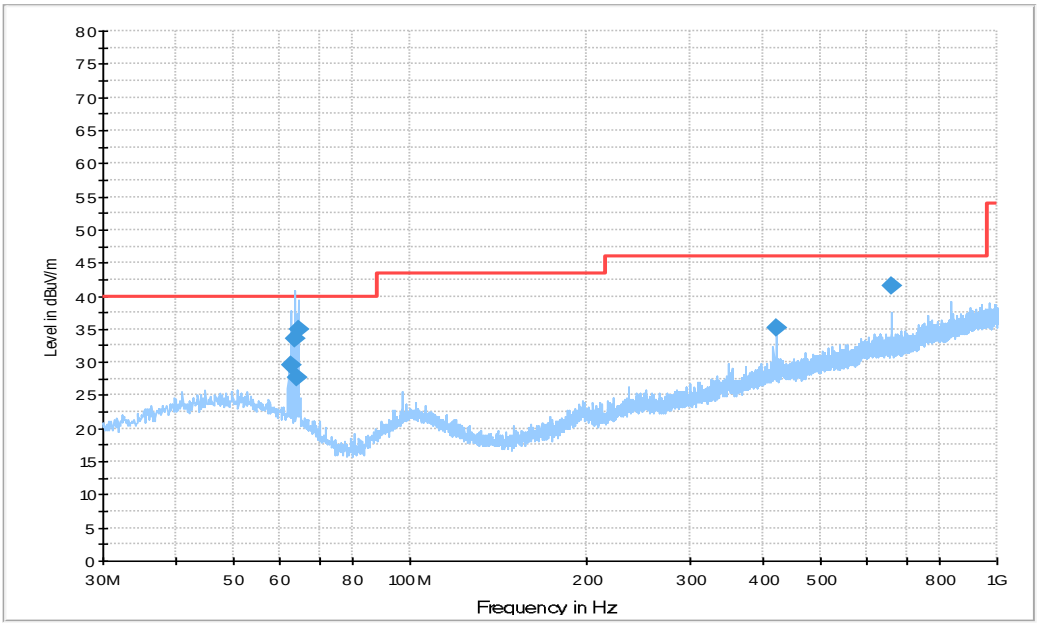


Figure A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
62.689000	29.5	125.0	H	96.0	-1.4	10.5	40.0
63.756000	33.5	125.0	H	96.0	-1.7	6.5	40.0
64.241000	27.7	113.0	V	0.0	-1.8	12.3	40.0
64.435000	34.9	125.0	H	-45.0	-1.9	5.1	40.0
420.03700	35.2	100.0	H	270.0	6.0	10.8	46.0
660.11200	41.4	125.0	H	308.0	9.9	4.6	46.0

©Copyright. All rights reserved by CTTL.

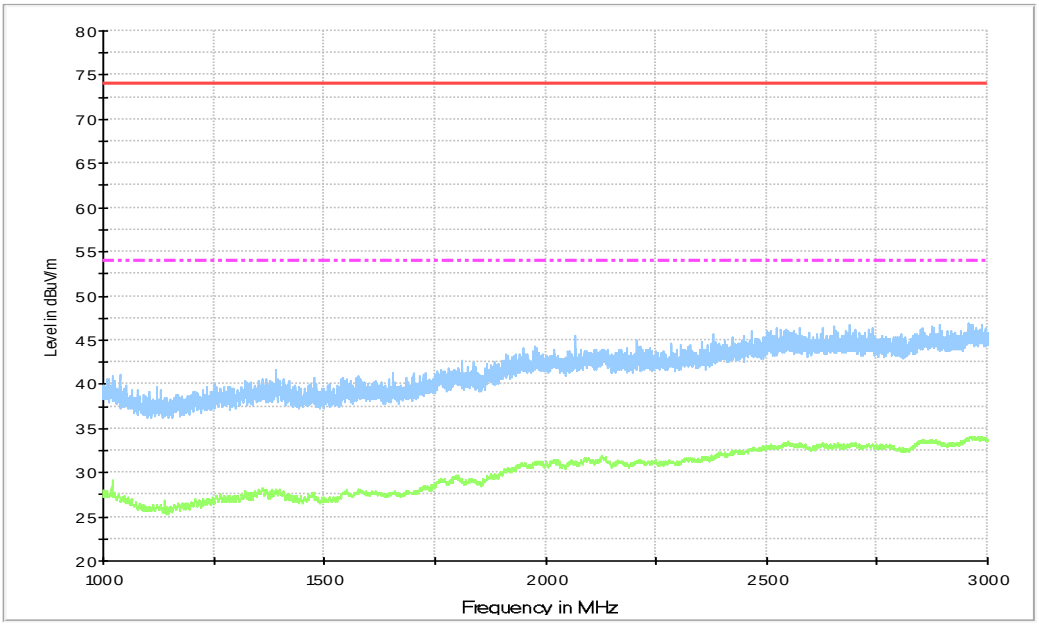


Figure A.8 Radiated Emission from 1GHz to 3GHz

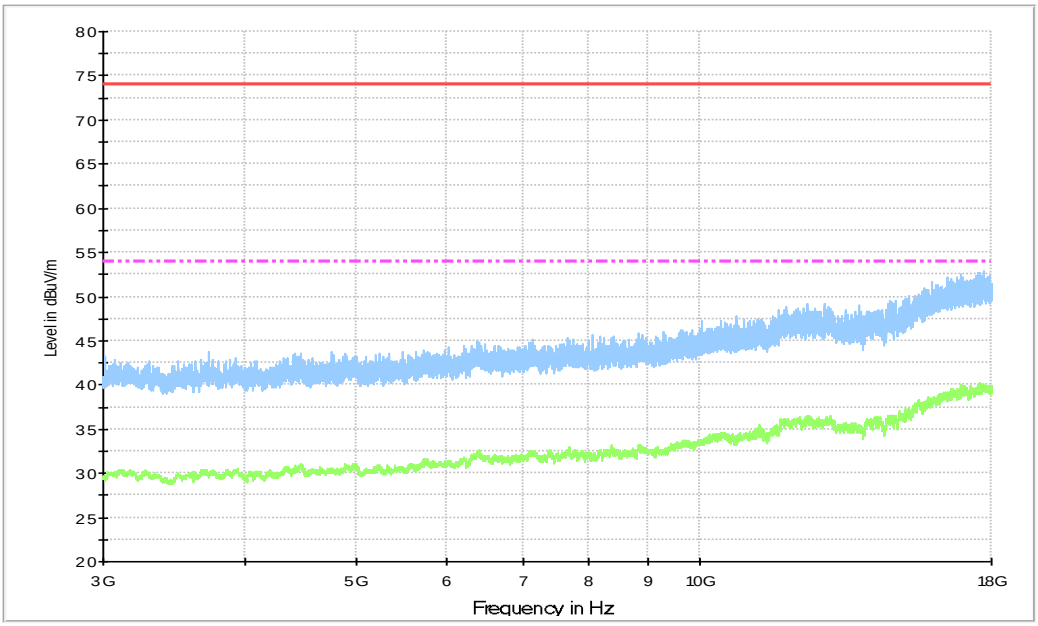


Figure A.9 Radiated Emission from 3GHz to 18GHz

©Copyright. All rights reserved by CTTL.

Average detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17713.000	39.63	-23.7	40.6	22.70	54.0	14.37	H
17614.000	39.91	-23.7	40.6	23.04	54.0	14.09	H
17569.500	39.08	-23.8	40.6	22.31	54.0	14.92	H
16447.500	38.57	-25.6	41.1	23.07	54.0	15.43	H
16792.000	39.03	-25.1	41.3	22.82	54.0	14.97	H
17860.500	39.46	-23.5	40.5	22.49	54.0	14.54	H

Peak detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17713.000	52.8	-23.7	40.6	35.91	74.0	21.16	H
17609.500	52.8	-23.7	40.6	35.91	74.0	21.22	V
17487.000	52.7	-24.0	40.6	36.11	74.0	21.31	H
16909.500	52.5	-24.7	41.3	35.94	74.0	21.48	H
17614.000	52.5	-23.7	40.6	35.59	74.0	21.54	V
17917.500	52.4	-23.4	40.5	35.35	74.0	21.56	V

©Copyright. All rights reserved by CTTL.

Set.7+Mode7+Mode9, USB (SD TO PC) +RX LTE Band26

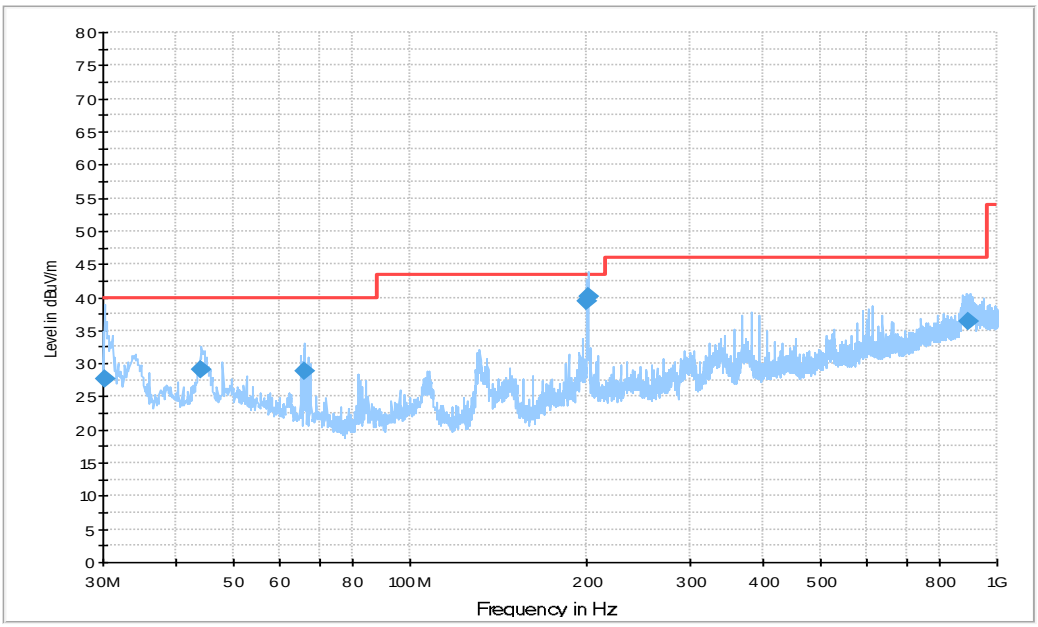


Figure A.10 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
30.194000	27.7	113.0	V	-26.0	-3.5	12.3	40.0
44.162000	29.2	100.0	V	64.0	0.4	10.8	40.0
66.181000	28.8	125.0	H	89.0	-2.6	11.2	40.0
200.04100	39.5	125.0	H	166.0	-0.7	**4.0**	43.5
201.59300	40.1	125.0	H	187.0	-0.8	**3.4**	43.5
896.11300	36.3	100.0	V	12.0	13.1	9.7	46.0

©Copyright. All rights reserved by CTTL.

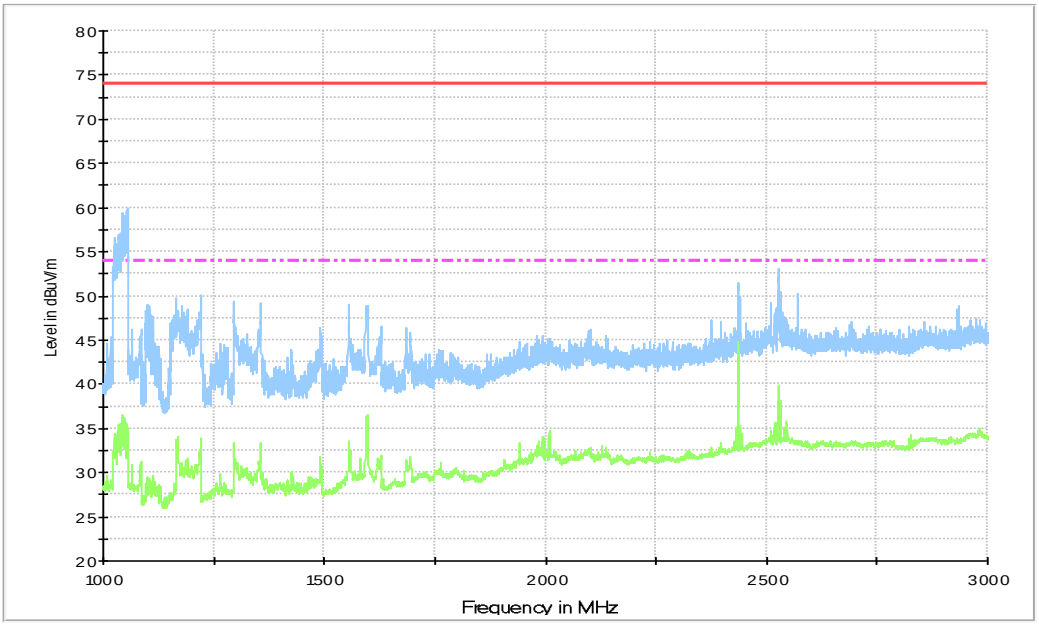


Figure A.11 Radiated Emission from 1GHz to 3GHz

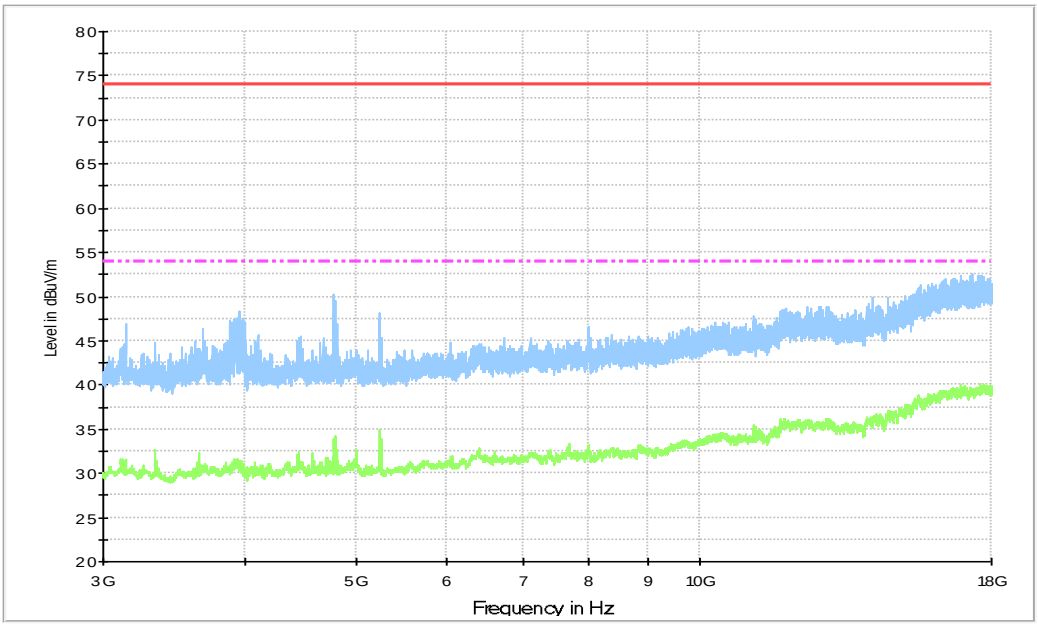


Figure A.12 Radiated Emission from 3GHz to 18GHz

©Copyright. All rights reserved by CTTL.

Average detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
1044.400	36.55	-38.5	28.4	46.58	54.0	17.45	V
1598.600	36.36	-37.7	28.5	45.55	54.0	17.64	V
2435.200	44.84	-36.7	32.0	49.57	54.0	9.16	V
3327.500	32.76	-35.5	32.9	35.34	54.0	21.25	H
4784.500	34.12	-35.1	34.0	35.23	54.0	19.88	V
5246.000	34.99	-35.0	34.2	35.76	54.0	19.01	V

Peak detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
1054.400	59.9	-38.4	28.2	70.09	74.0	14.14	V
2435.400	51.5	-36.7	32.0	56.19	74.0	22.55	V
2528.600	53.1	-36.6	32.5	57.22	74.0	20.87	V
3952.000	48.4	-35.2	33.1	50.40	74.0	25.65	H
4781.500	50.2	-35.1	34.0	51.30	74.0	23.82	V
5246.000	48.2	-35.0	34.2	48.94	74.0	25.83	V

©Copyright. All rights reserved by CTTL.

Set.8+Mode8+Mode9, Keyboard + RX NR Band5

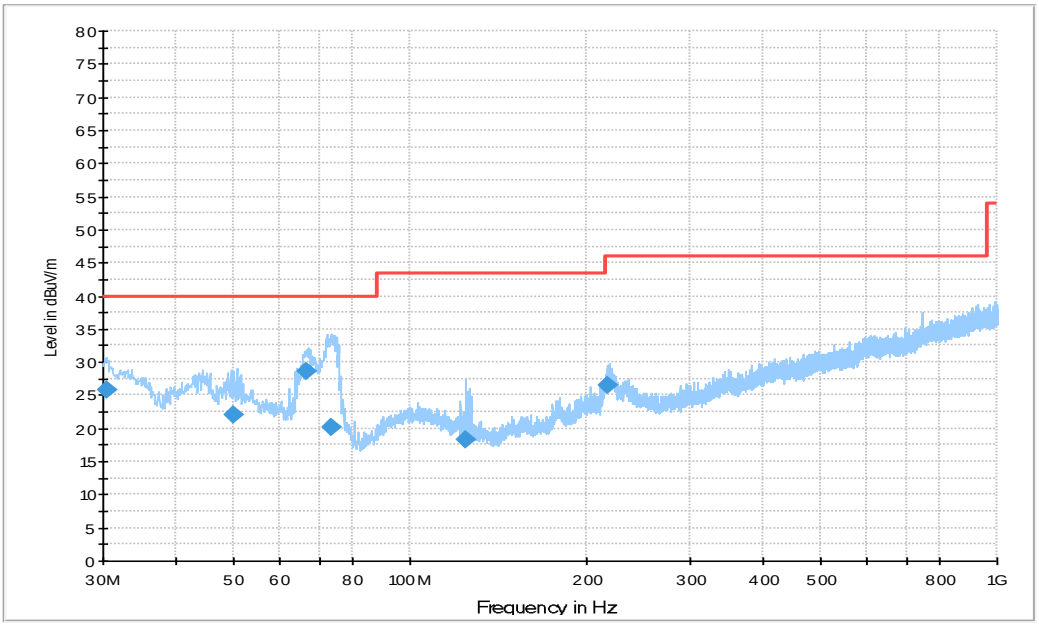


Figure A.13 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
30.388000	25.7	100.0	V	32.0	-3.5	14.3	40.0
50.079000	22.1	100.0	V	288.0	0.7	17.9	40.0
66.666000	28.6	100.0	V	102.0	-2.7	11.4	40.0
73.650000	20.2	100.0	V	-45.0	-5.3	19.8	40.0
124.67200	18.2	125.0	V	51.0	-3.7	25.3	43.5
217.11300	26.4	125.0	H	-20.0	-0.7	19.6	46.0

©Copyright. All rights reserved by CTTL.

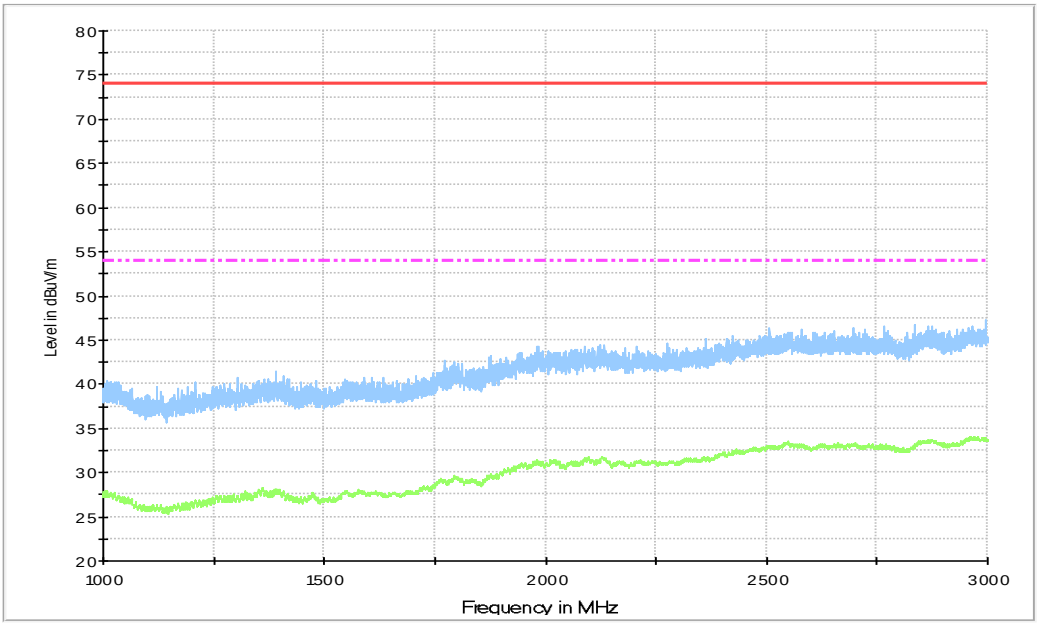


Figure A.14 Radiated Emission from 1GHz to 3GHz

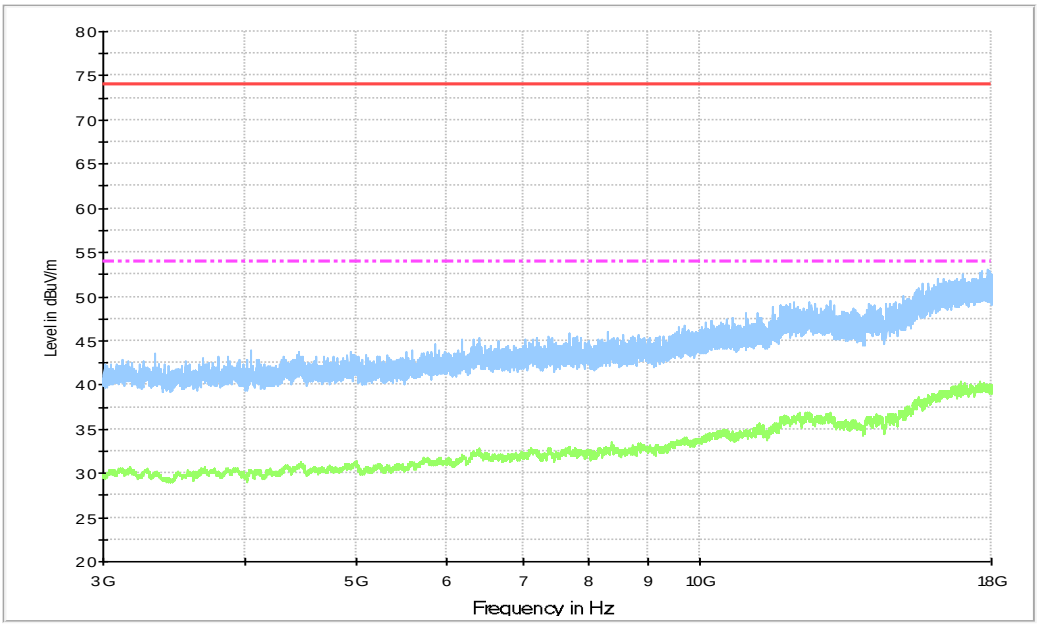


Figure A.15 Radiated Emission from 3GHz to 18GHz

©Copyright. All rights reserved by CTTL.

Average detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
16933.000	40.36	-24.6	41.2	23.75	54.0	13.64	V
17603.500	40.33	-23.8	40.6	23.48	54.0	13.67	V
16925.500	40.31	-24.6	41.2	23.71	54.0	13.69	V
17605.000	40.31	-23.7	40.6	23.46	54.0	13.69	V
17609.500	40.31	-23.7	40.6	23.45	54.0	13.69	V
17612.500	40.31	-23.7	40.6	23.44	54.0	13.69	V

Peak detector result

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17872.000	53.0	-23.5	40.5	36.01	74.0	21.01	H
17939.000	52.9	-23.4	40.5	35.71	74.0	21.14	V
17630.000	52.8	-23.7	40.6	35.90	74.0	21.18	V
17606.500	52.7	-23.7	40.6	35.88	74.0	21.26	V
17981.500	52.6	-23.3	40.6	35.35	74.0	21.37	V
17605.000	52.6	-23.7	40.6	35.73	74.0	21.41	V

©Copyright. All rights reserved by CTTL.

A.2 Conducted Emission

Reference

FCC: CFR Part 15.107(a).

A.2.1 Method of measurement

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. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

For the test setup photographs please see the test setup photos document.

A.2.2 EUT Operating Mode

The EUT is operating in the USB mode, charging mode, MP3, MP4, CAMERA, SD, Keyboard and cellular RX mode.

The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note：I/O information：Printer – USB, Mouse – PS/2, Keyboard – USB.

A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dBµV)	
	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		

A.2.4 Test Condition in charging mode

Voltage（V）	Frequency（Hz）
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

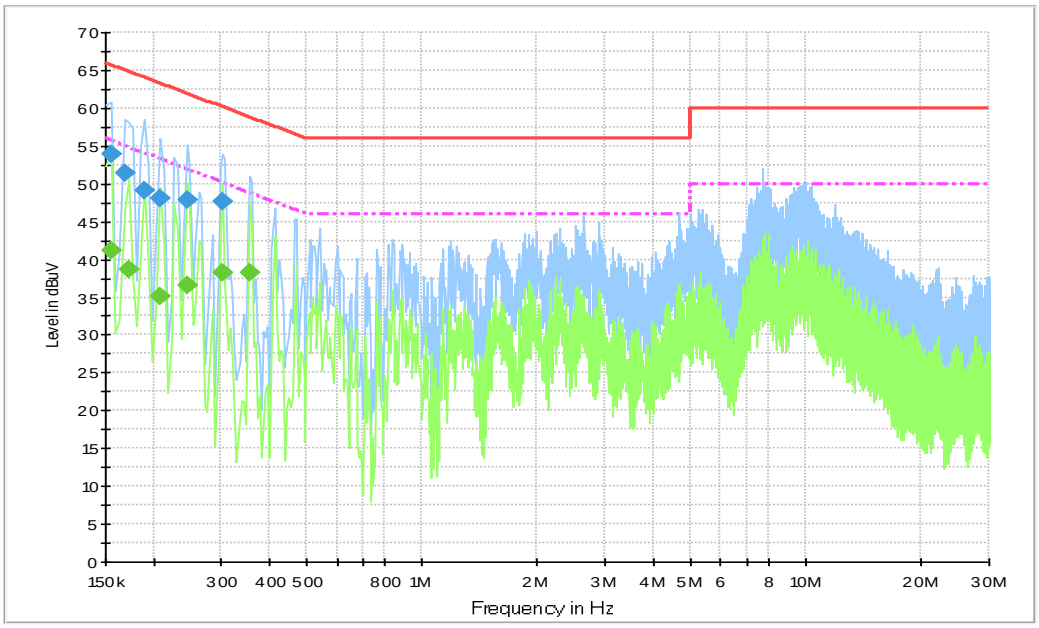
©Copyright. All rights reserved by CTTL.

A.2.5 Measurement Results

Measurement uncertainty: *U*= 3.10 dB, *k*=2.

Note: all the set-up and operating mode list in section 3.5 were tested, only the worst test data are showed in this section.

Set.1+Mode3



Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Figure A.16 Conducted Emission

Final Result 1

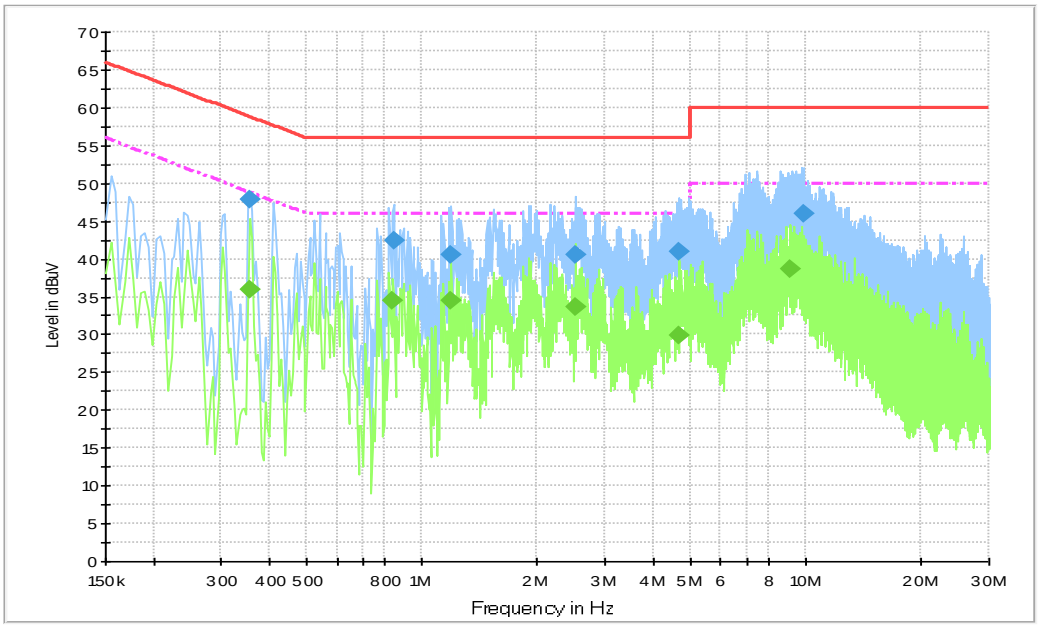
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	53.8	2000.0	9.000	L1	19.4	11.9	65.8
0.168000	51.4	2000.0	9.000	L1	19.5	13.7	65.1
0.190500	49.1	2000.0	9.000	N	19.5	14.9	64.0
0.208500	48.1	2000.0	9.000	N	19.4	15.2	63.3
0.244500	47.9	2000.0	9.000	L1	19.5	14.0	61.9
0.303000	47.5	2000.0	9.000	N	19.4	12.6	60.2

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	41.1	2000.0	9.000	L1	19.4	14.6	55.8
0.172500	38.7	2000.0	9.000	N	19.4	16.1	54.8
0.208500	35.2	2000.0	9.000	N	19.4	18.1	53.3
0.244500	36.7	2000.0	9.000	N	19.5	15.3	51.9
0.303000	38.2	2000.0	9.000	L1	19.4	11.9	50.2
0.357000	38.3	2000.0	9.000	L1	19.4	10.5	48.8

©Copyright. All rights reserved by CTTL.

Set.2+Mode1+ Mode9



Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Figure A.17 Conducted Emission

Final Result 1

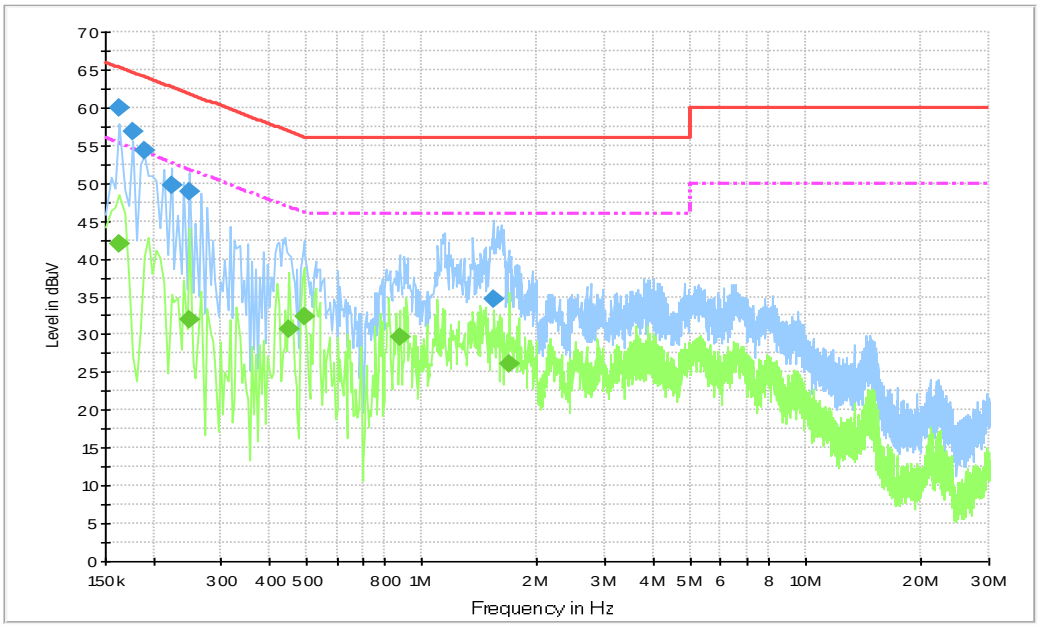
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.357000	47.8	2000.0	9.000	L1	19.4	11.0	58.8
0.843000	42.3	2000.0	9.000	L1	19.5	13.7	56.0
1.194000	40.6	2000.0	9.000	N	19.4	15.4	56.0
2.521500	40.6	2000.0	9.000	N	19.5	15.4	56.0
4.650000	40.9	2000.0	9.000	N	19.6	15.1	56.0
9.865500	45.9	2000.0	9.000	L1	19.7	14.1	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.357000	36.0	2000.0	9.000	N	19.4	12.8	48.8
0.838500	34.6	2000.0	9.000	L1	19.5	11.4	46.0
1.194000	34.5	2000.0	9.000	L1	19.4	11.5	46.0
2.521500	33.5	2000.0	9.000	L1	19.5	12.5	46.0
4.650000	29.8	2000.0	9.000	N	19.6	16.2	46.0
9.141000	38.7	2000.0	9.000	L1	19.7	11.3	50.0

©Copyright. All rights reserved by CTTL.

Set.7+Mode7+Mode9



Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Figure A.18 Conducted Emission

Final Result 1

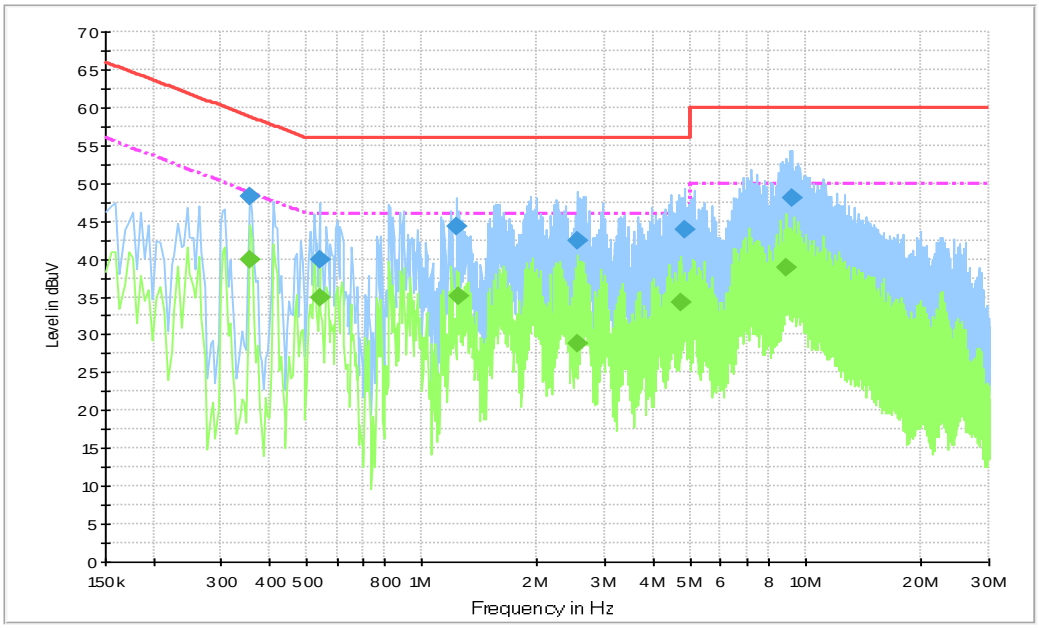
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	59.9	2000.0	9.000	L1	19.5	5.4	65.3
0.177000	56.9	2000.0	9.000	L1	19.4	7.8	64.6
0.190500	54.3	2000.0	9.000	L1	19.5	9.7	64.0
0.222000	49.8	2000.0	9.000	N	19.5	12.9	62.7
0.249000	48.9	2000.0	9.000	N	19.4	12.9	61.8
1.531500	34.7	2000.0	9.000	L1	19.5	21.3	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	41.9	2000.0	9.000	N	19.5	13.4	55.3
0.249000	31.9	2000.0	9.000	L1	19.4	19.8	51.8
0.451500	30.7	2000.0	9.000	N	19.5	16.1	46.8
0.492000	32.3	2000.0	9.000	N	19.5	13.8	46.1
0.874500	29.6	2000.0	9.000	N	19.5	16.4	46.0
1.684500	26.1	2000.0	9.000	L1	19.5	19.9	46.0

©Copyright. All rights reserved by CTTL.

Set.8+Mode8+Mode9



Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Figure A.19 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.357000	48.2	2000.0	9.000	L1	19.4	10.6	58.8
0.541500	40.0	2000.0	9.000	N	19.5	16.0	56.0
1.230000	44.3	2000.0	9.000	L1	19.5	11.7	56.0
2.544000	42.5	2000.0	9.000	L1	19.5	13.5	56.0
4.816500	43.9	2000.0	9.000	L1	19.6	12.1	56.0
9.217500	48.1	2000.0	9.000	L1	19.7	11.9	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.357000	40.0	2000.0	9.000	L1	19.4	8.8	48.8
0.541500	35.0	2000.0	9.000	L1	19.5	11.0	46.0
1.248000	35.2	2000.0	9.000	L1	19.5	10.8	46.0
2.557500	28.9	2000.0	9.000	N	19.5	17.1	46.0
4.749000	34.3	2000.0	9.000	L1	19.6	11.7	46.0
8.889000	38.9	2000.0	9.000	L1	19.7	11.1	50.0

.

©Copyright. All rights reserved by CTTL.

ANNEX B: Persons involved in this testing

Test Item	Tester
Radiated Emission	Sun Tianyuan
Conducted Emission	Yan Xaorui

*****END OF REPORT*****

©Copyright. All rights reserved by CTTL.