



FCC PART 15B TEST REPORT

No. I20Z61941-EMC04

for

TCL Communication Ltd.

LTE/WCDMA/GSM mobile phone

Model Name: 6025D

FCC ID: 2ACCJB147

with

Hardware Version: PIO

Software Version: 9M57

Issued Date: 2021-01-22

Note:

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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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z61941-EMC04	Rev.0	1 st edition	2021-01-22

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

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

CTTL (huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35° C
Relative Humidity: 20-75%


1.4. Project data

Testing Start Date: 2021-01-11
Testing End Date: 2021-01-18


1.5. Signature



Wang Xue
(Prepared this test report)



Zhang Ying
(Reviewed this test report)



Zhang Xia
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
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Contact Email zhizhou.gong@tcl.com
Telephone: 0086-755-36611722
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2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person Gong Zhizhou
Contact Email zhizhou.gong@tcl.com
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Fax: 0086-755-36612000-81722

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

3.1. About EUT

Description	LTE/WCDMA/GSM mobile phone
Model Name	6025D
FCC ID	2ACCJB147
Extreme vol. Limits	3.6VDC to 4.4VDC (nominal: 3.85VDC)

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*	SN or IMEI	HW Version	SW Version
EUT1	358435220202077/01	PIO	9M57
	358435220202085/01		

*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*	Description	SN	Remarks
AE1	Battery	/	/
AE2	Battery	/	/
AE3	Charger1	/	
AE4	Charger2	/	
AE5	Charger3	/	
AE6	Charger4	/	
AE7	USB Cable	/	
AE8	USB Cable	/	
AE9	Headset1	/	
AE10	Headset2	/	
AE11	Headset3	/	
AE12	Headset4	/	

AE1

Model	CAC3860024C1
Manufacturer	BYD
Capacitance	3860mAh
Nominal voltage	

AE2

Model	CAC3860025C7
Manufacturer	VEKEN
Capacitance	3860mAh
Nominal voltage	/

AE3

Model	CBA0059AAAC5
Manufacturer	PUAN



AE4		
Model	CBA0059AAAC7	
Manufacturer	CHENYANG	
AE5		
Model	CBA0059ABAC5	
Manufacturer	PUAN	
AE6		
Model	CBA0059ABAC7	
Manufacturer	CHENYANG	
AE7		
Model	CDA0000024C8	
Manufacturer	PUAN	
Length of cable	/	
AE8		
Model	CDA0000024C2	
Manufacturer	JUWEI	
Length of cable	/	
AE9		
Model	CCB0046A10C1	
Manufacturer	JUWEI	
Length of cable	/	
AE10		
Model	CCB0046A10C4	
Manufacturer	MEIHAO	
Length of cable	/	
AE11		
Model	CCB0049A10C1	
Manufacturer	JUWEI	
Length of cable	/	
AE12		
Model	CCB0049A10C4	
Manufacturer	MEIHAO	
Length of cable	/	

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

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1/AE2 + AE3/AE4+ AE5	Charger1+REAR Camera+GSM 850 idle
Set.2	EUT1+ AE1/AE2 + AE3/AE4+ AE6	Charger2+MP4+WCDMA 850 idle
Set.3	EUT1+ AE1/AE2 + AE3/AE4+ AE7	Charger3+REAR Camera+GSM 850 idle
Set.4	EUT1+ AE1/AE2 + AE3/AE4+ AE8	Charger4+REAR Camera+GSM 850 idle
Set.5	EUT1+ AE1/AE2 + AE3/AE4+ AE9	USB+Headset1+front camera +LTE B5 idle +FM98
Set.6	EUT1+ AE1/AE2 + AE3/AE4+ AE10	USB+Headset2+front camera +LTE B5 idle +FM98
Set.7	EUT1+ AE1/AE2 + AE3/AE4+ AE11	USB+Headset3+front camera +LTE B5 idle +FM98
Set.8	EUT1+ AE1/AE2 + AE3/AE4+ AE12	USB+Headset4+front camera +LTE B5 idle +FM98

Note:

The device supports GSM/GPRS/EGPRS 850/900/1800/1900, UMTS FDD Band 1/2/4/5; LTE FDD Band 1/3/5/7/8/20/28/38/40/41. It has WLAN (802.11b/g/n), Bluetooth (EDR, BLE) and GNSS (GPS&GLONASS&BDS& GALILEO) functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850 and LTE Band 5. All licensed band receivers that tune in the range of 30MHz-960MHz are investigated.

4. Reference Documents

4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2019
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.

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (10 meters×6.7meters×6.1meters) 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
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 6GHz
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	0.014MHz-1MHz, >60dB; 1MHz—1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL(huayuan North Road)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(huayuan North Road)

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100235	R&S	2021-03-02	1 Year
2	LISN	ENV216	101200	R&S	2021-05-19	1 year
3	Universal Radio Communication Tester	CMW500	116588	R&S	2022-01-07	1 year
4	Test Receiver	ESCI 7	100344	R&S	2021-02-26	1 Year
5	EMI Antenna	VULB 9163	9163-1223	Schwarzbeck	2021-03-18	1 year
6	EMI Antenna	3115	00167250	ETS-Lindgren	2021-05-14	1 year
7	Signal Generator	SMBV100A	106247	R&S	2021-05-18	1 year
8	Signal Generator	SMB100A	102063	R&S	2021-03-31	1 year

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 (USB mode of MS and charging mode of MS) at distances of 3 meters 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. The measurement antenna was placed at a distance of 3/10 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. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.1.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging 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 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.

The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. 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.1.3 Measurement Limit

Frequency range (MHz)	Field strength limit ($\mu\text{V}/\text{m}$)		
	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. 10 meters' limit is got by converting.

A.1.4 Test Condition

Frequency range (MHz)	RBW/BW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/1MHz	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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 4.74 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
18000.000	48.6	-29.2	47.0	30.84	54.00	23.16	H
17979.600	47.7	-29.1	46.7	30.10	54.00	23.90	H
17858.333	47.7	-29.3	46.0	31.08	54.00	22.92	V
17995.467	47.5	-29.1	46.7	29.90	54.00	24.10	H
17992.633	47.4	-29.1	46.7	29.80	54.00	24.20	V
17894.033	47.4	-29.5	46.0	30.98	54.00	23.02	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17989.800	56.9	-29.1	46.7	39.30	74.00	34.70	V
17962.033	56.5	-29.1	46.7	38.90	74.00	35.10	H
17938.233	55.9	-29.4	46.7	38.64	74.00	35.36	H
17911.600	55.9	-29.3	46.0	39.27	74.00	34.73	H
17995.467	55.9	-29.1	46.7	38.30	74.00	35.70	V
17934.267	55.8	-29.4	46.7	38.54	74.00	35.46	H

Measurement results for Set.2:
Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17980.167	48.2	-29.1	46.7	30.60	54.00	23.40	V
17911.600	48.1	-29.3	46.0	31.47	54.00	22.53	V
17997.733	48.0	-29.1	46.7	30.40	54.00	23.60	H
17926.900	47.9	-29.4	46.7	30.64	54.00	23.36	V
17994.333	47.8	-29.1	46.7	30.20	54.00	23.80	H
17956.367	47.8	-28.9	46.7	30.08	54.00	23.92	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17968.833	55.8	-29.1	46.7	38.20	74.00	35.80	H
17994.333	55.8	-29.1	46.7	38.20	74.00	35.80	H
17799.967	55.8	-29.9	46.0	39.73	74.00	34.27	H
17972.800	55.7	-29.1	46.7	38.10	74.00	35.90	H
17980.167	55.7	-29.1	46.7	38.10	74.00	35.90	V
17945.033	55.7	-28.9	46.7	37.98	74.00	36.02	H

Measurement results for Set. 3:
Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17998.300	48.0	-29.1	46.7	30.40	54.00	23.60	H
17967.700	48.0	-29.1	46.7	30.40	54.00	23.60	V
17926.900	48.0	-29.4	46.7	30.74	54.00	23.26	H
17988.667	48.0	-29.1	46.7	30.40	54.00	23.60	H
17964.300	47.9	-29.1	46.7	30.30	54.00	23.70	V
17932.000	47.8	-29.4	46.7	30.54	54.00	23.46	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17932.000	56.5	-29.4	46.7	39.24	74.00	34.76	H
17926.900	56.4	-29.4	46.7	39.14	74.00	34.86	H
17983.567	56.2	-29.1	46.7	38.60	74.00	35.40	H
17980.167	56.1	-29.1	46.7	38.50	74.00	35.50	H
17990.933	56.0	-29.1	46.7	38.40	74.00	35.60	V
17931.433	55.9	-29.4	46.7	38.64	74.00	35.36	H

Measurement results for Set.4:
Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17985.267	48.9	-29.1	46.7	31.30	54.00	22.70	H
17993.200	48.4	-29.1	46.7	30.80	54.00	23.20	H
18000.000	48.3	-29.2	47.0	30.54	54.00	23.46	H
17952.967	48.2	-28.9	46.7	30.48	54.00	23.52	H
17837.367	48.0	-29.7	46.0	31.72	54.00	22.28	H
17988.100	47.9	-29.1	46.7	30.30	54.00	23.70	V

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17903.667	56.5	-29.3	46.0	39.87	74.00	34.13	V
17992.067	56.2	-29.1	46.7	38.60	74.00	35.40	H
17943.333	56.2	-28.9	46.7	38.48	74.00	35.52	V
17842.467	56.2	-29.3	46.0	39.58	74.00	34.42	H
17993.200	56.2	-29.1	46.7	38.60	74.00	35.40	H
17967.700	56.1	-29.1	46.7	38.50	74.00	35.50	V

Measurement results for Set. 5:
USB Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17990.933	47.9	-29.1	46.7	30.30	54.00	23.70	H
17980.733	47.8	-29.1	46.7	30.20	54.00	23.80	H
17955.800	47.7	-28.9	46.7	29.98	54.00	24.02	V
17896.300	47.6	-29.5	46.0	31.18	54.00	22.82	H
17996.600	47.6	-29.1	46.7	30.00	54.00	24.00	H
17943.900	47.5	-28.9	46.7	29.78	54.00	24.22	V

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17973.933	57.5	-29.1	46.7	39.90	74.00	34.10	H
17992.067	57.4	-29.1	46.7	39.80	74.00	34.20	H
17979.600	56.9	-29.1	46.7	39.30	74.00	34.70	V
17892.333	55.9	-29.5	46.0	39.48	74.00	34.52	V
17970.533	55.8	-29.1	46.7	38.20	74.00	35.80	H
17886.100	55.7	-29.5	46.0	39.28	74.00	34.72	H

Measurement results for Set. 6:
USB Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17955.800	49.4	-28.9	46.7	31.68	54.00	22.32	V
17980.167	48.9	-29.1	46.7	31.30	54.00	22.70	V
17986.967	48.0	-29.1	46.7	30.40	54.00	23.60	H
17837.367	47.9	-29.7	46.0	31.62	54.00	22.38	V
17991.500	47.9	-29.1	46.7	30.30	54.00	23.70	H
17893.467	47.8	-29.5	46.0	31.38	54.00	22.62	H

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17956.933	57.4	-28.9	46.7	39.68	74.00	34.32	V
17980.167	57.0	-29.1	46.7	39.40	74.00	34.60	H
17955.800	56.5	-28.9	46.7	38.78	74.00	35.22	V
17989.800	56.5	-29.1	46.7	38.90	74.00	35.10	H
17945.600	56.1	-28.9	46.7	38.38	74.00	35.62	H
17994.333	56.1	-29.1	46.7	38.50	74.00	35.50	H

Measurement results for Set. 7:
USB Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17980.167	48.7	-29.1	46.7	31.10	54.00	22.90	V
17870.233	48.7	-29.4	46.0	32.14	54.00	21.86	V
17950.133	48.3	-28.9	46.7	30.58	54.00	23.42	H
17990.933	48.1	-29.1	46.7	30.50	54.00	23.50	H
17954.667	48.0	-28.9	46.7	30.28	54.00	23.72	H
17997.167	47.9	-29.1	46.7	30.30	54.00	23.70	H

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17975.633	57.4	-29.1	46.7	39.80	74.00	34.20	H
17986.967	57.0	-29.1	46.7	39.40	74.00	34.60	H
17997.167	56.8	-29.1	46.7	39.20	74.00	34.80	H
17974.500	56.6	-29.1	46.7	39.00	74.00	35.00	V
17992.067	56.5	-29.1	46.7	38.90	74.00	35.10	H
17875.333	56.3	-29.4	46.0	39.74	74.00	34.26	H

Measurement results for Set. 8:
USB Mode/Average detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17990.933	48.3	-29.1	46.7	30.70	54.00	23.30	H
17898.567	47.8	-29.5	46.0	31.38	54.00	22.62	H
17957.500	47.7	-28.9	46.7	29.98	54.00	24.02	V
17989.800	47.7	-29.1	46.7	30.10	54.00	23.90	H
17989.233	47.6	-29.1	46.7	30.00	54.00	24.00	V
17888.933	47.5	-29.5	46.0	31.08	54.00	22.92	H

USB Mode/Peak detector

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17990.933	57.0	-29.1	46.7	39.40	74.00	34.60	H
17939.933	56.9	-29.4	46.7	39.64	74.00	34.36	V
17968.267	55.9	-29.1	46.7	38.30	74.00	35.70	V
17962.033	55.7	-29.1	46.7	38.10	74.00	35.90	H
17922.367	55.7	-29.4	46.7	38.44	74.00	35.56	V
17921.800	55.6	-29.4	46.7	38.34	74.00	35.66	H

Measurement results for Set.1:

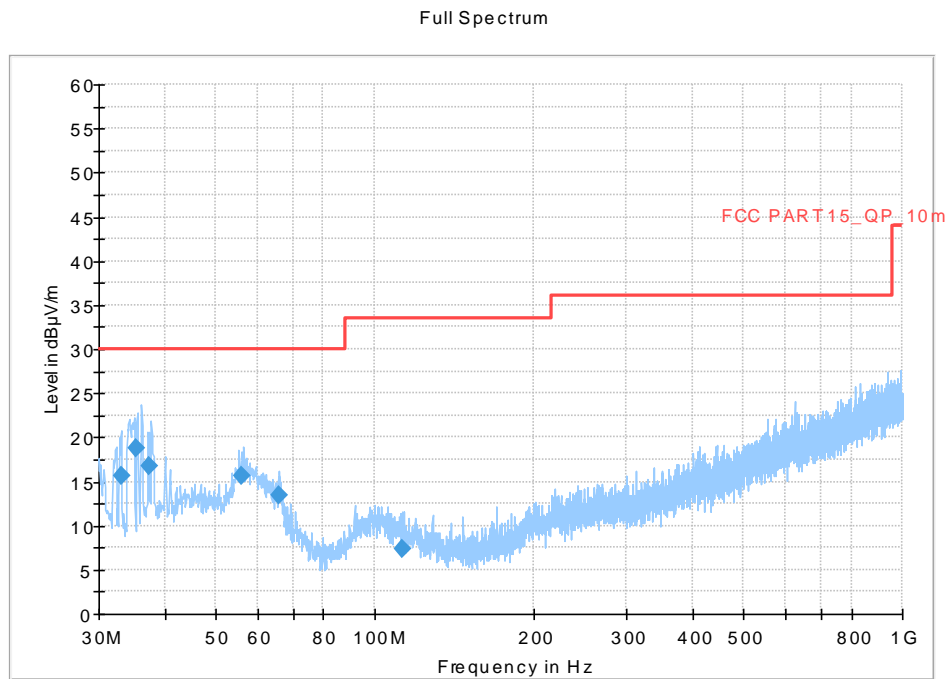


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
33.233000	15.73	30.00	14.27	1000.0	120.000	225.0	V	161.0
35.427000	18.73	30.00	11.27	1000.0	120.000	285.0	V	60.0
37.280000	16.71	30.00	13.29	1000.0	120.000	102.0	V	161.0
56.061000	15.62	30.00	14.38	1000.0	120.000	118.0	V	247.0
65.807000	13.42	30.00	16.58	1000.0	120.000	102.0	V	-30.0
112.746000	7.42	33.50	26.10	1000.0	120.000	120.0	V	-28.0

Full Spectrum

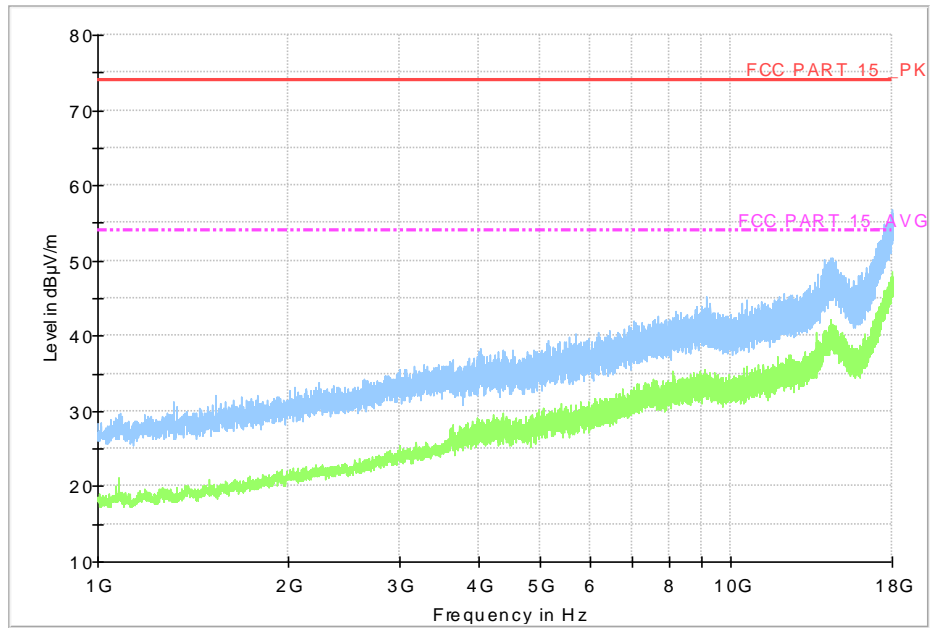


Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set. 2:

Full Spectrum

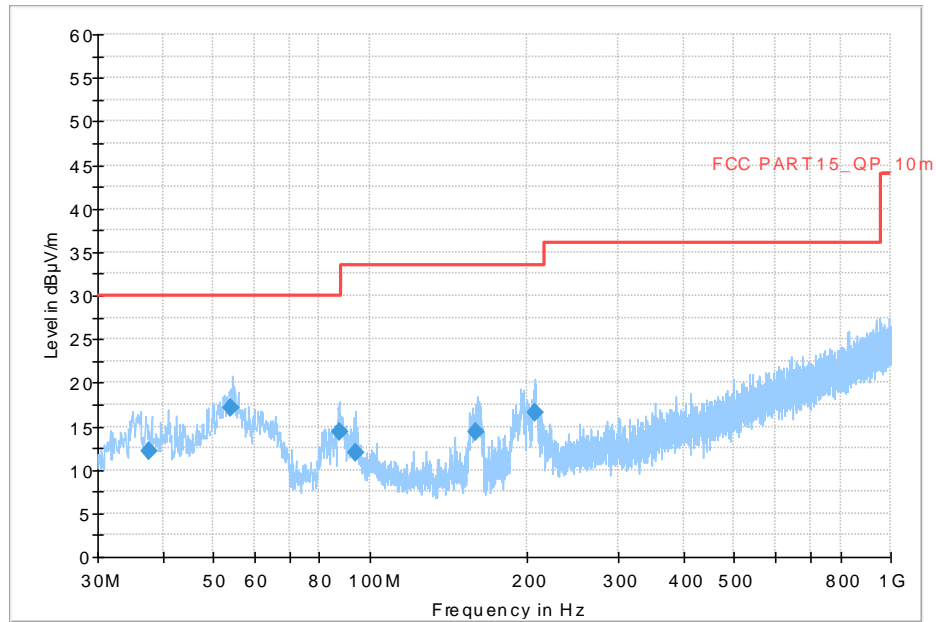


Fig A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
37.511000	12.15	30.00	17.85	1000.0	120.000	119.0	V	1.0
54.001000	17.17	30.00	12.83	1000.0	120.000	104.0	V	210.0
87.193000	14.40	30.00	15.60	1000.0	120.000	182.0	V	249.0
93.609000	12.02	33.50	21.50	1000.0	120.000	215.0	V	250.0
160.045000	14.29	33.50	19.23	1000.0	120.000	125.0	V	-17.0
207.621000	16.49	33.50	17.03	1000.0	120.000	125.0	V	164.0

Full Spectrum

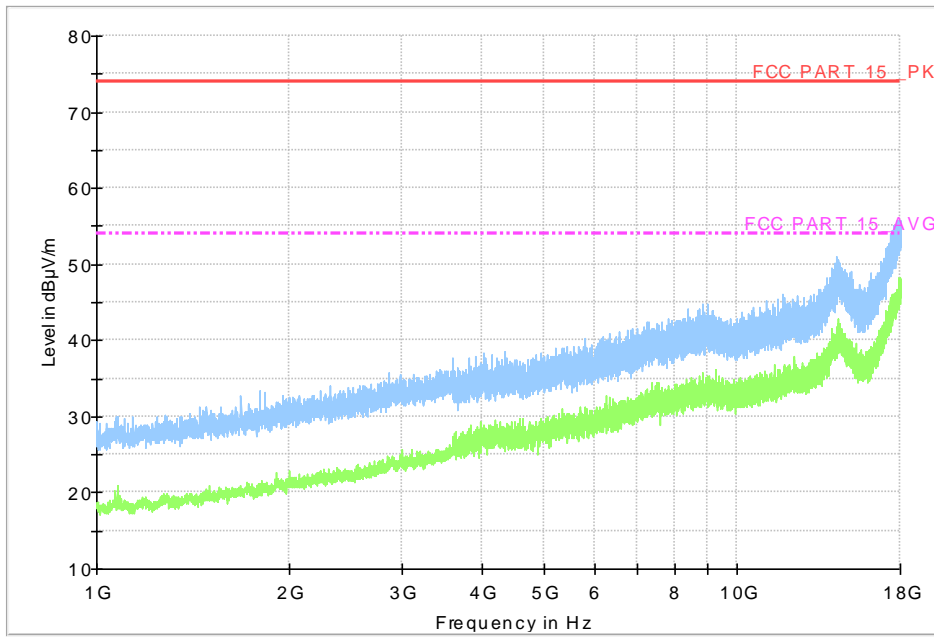


Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3:

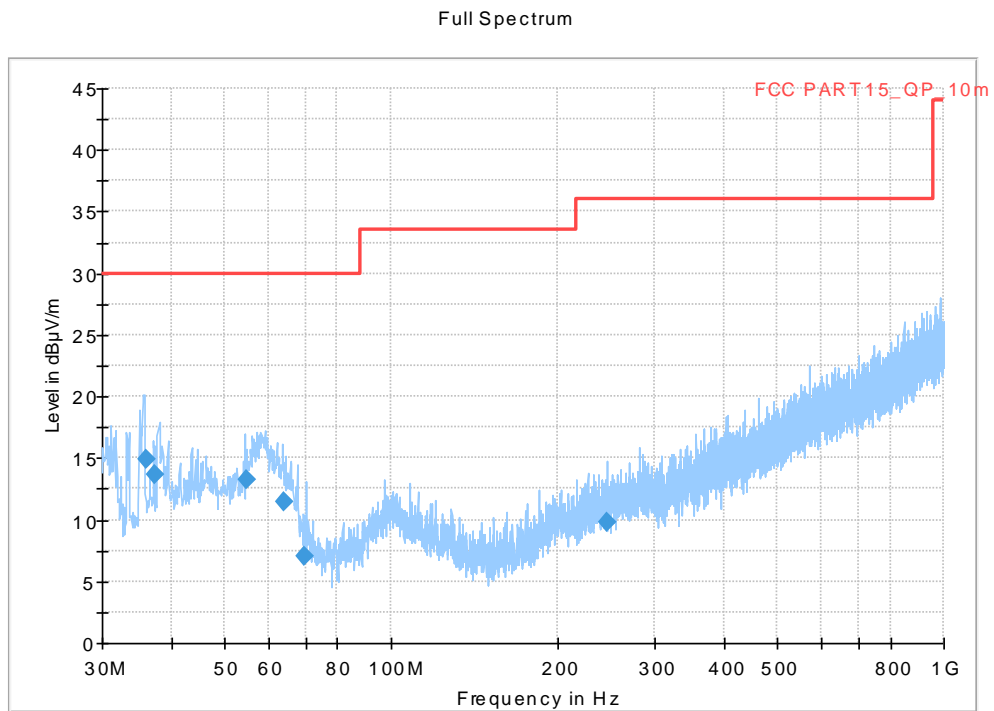


Fig A.5 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
35.963000	14.91	30.00	15.09	1000.0	120.000	312.0	V	-30.0
37.451000	13.72	30.00	16.28	1000.0	120.000	108.0	V	300.0
54.947000	13.26	30.00	16.74	1000.0	120.000	111.0	V	6.0
64.019000	11.49	30.00	18.51	1000.0	120.000	278.0	V	150.0
69.558000	7.02	30.00	22.98	1000.0	120.000	125.0	V	100.0
245.843000	9.81	36.00	26.21	1000.0	120.000	125.0	V	202.0

Full Spectrum

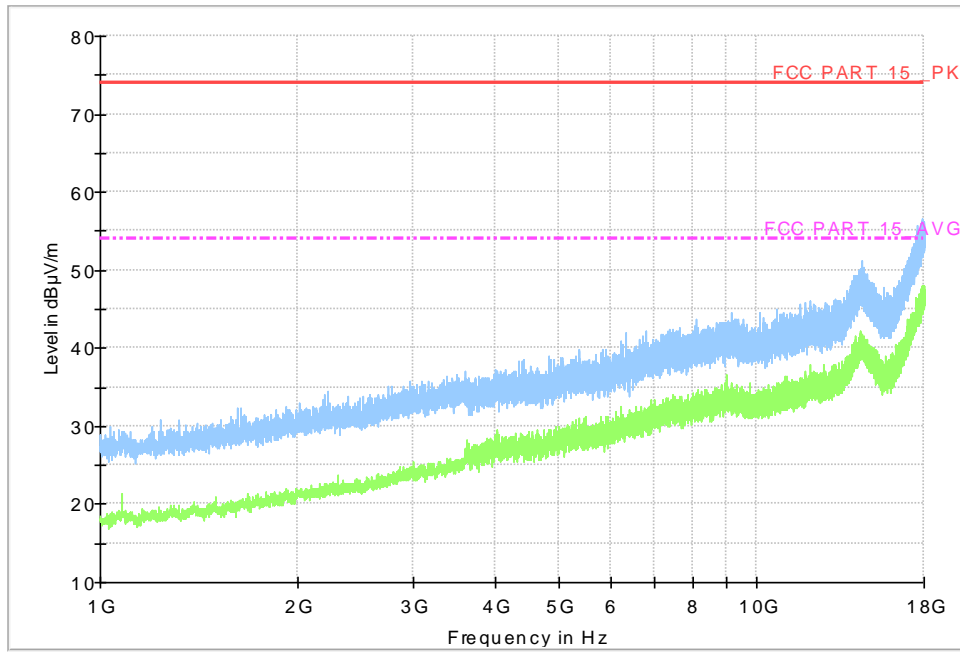


Fig A.6 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.4:

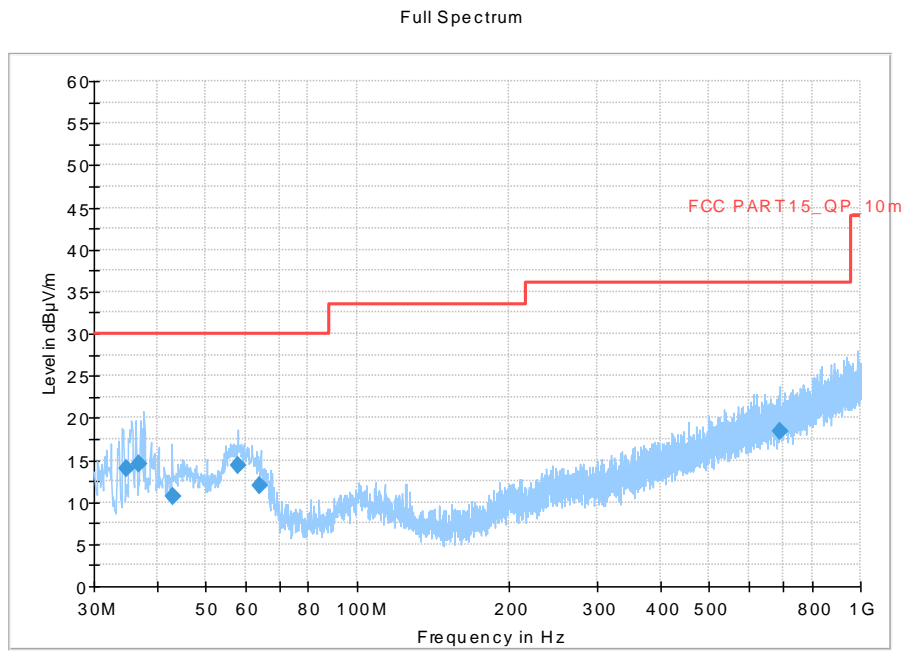


Fig A.7 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.868000	13.90	30.00	16.10	1000.0	120.000	106.0	V	210.0
36.832000	14.51	30.00	15.49	1000.0	120.000	297.0	V	269.0
42.961000	10.63	30.00	19.37	1000.0	120.000	125.0	V	30.0
57.913000	14.29	30.00	15.71	1000.0	120.000	105.0	V	243.0
63.918000	11.92	30.00	18.08	1000.0	120.000	178.0	V	-22.0
692.681000	18.49	36.00	17.53	1000.0	120.000	325.0	H	205.0

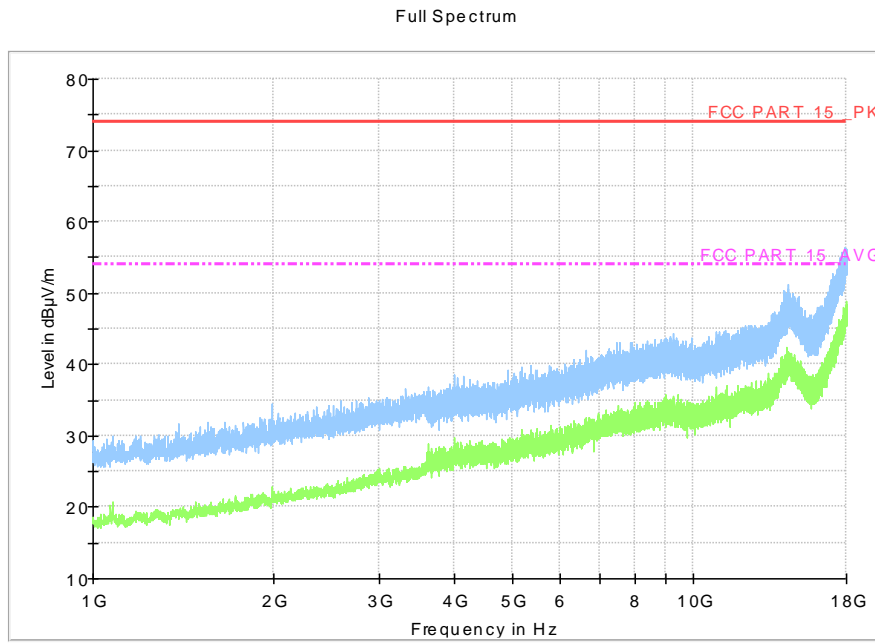


Fig A.8 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.5:

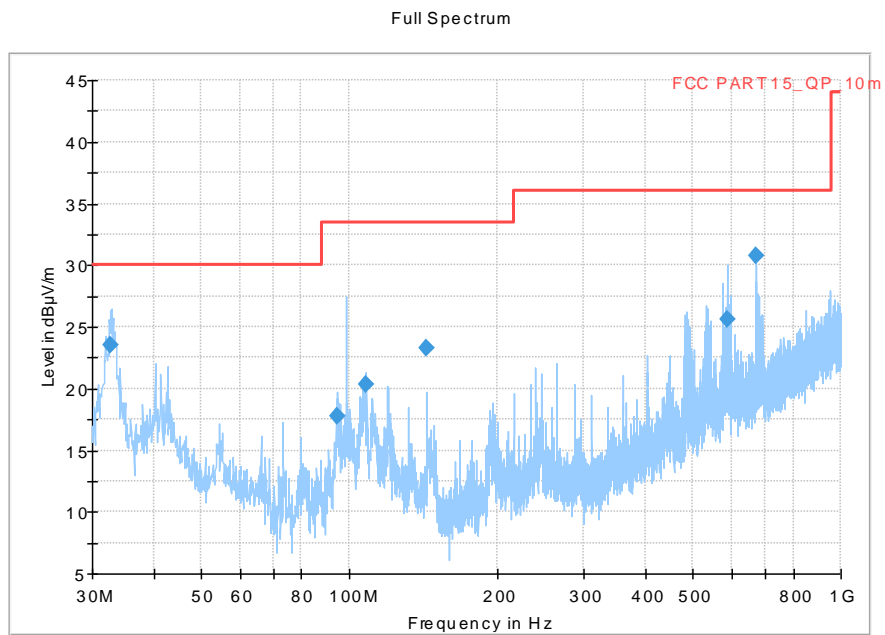


Fig A.9 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.693000	23.49	30.00	6.51	1000.0	120.000	307.0	V	12.0
94.348000	17.71	33.50	15.81	1000.0	120.000	103.0	V	30.0
107.854000	20.34	33.50	13.18	1000.0	120.000	192.0	V	80.0
143.721000	23.25	33.50	10.27	1000.0	120.000	325.0	H	8.0
588.526000	25.61	36.00	10.41	1000.0	120.000	197.0	V	264.0
673.147000	30.72	36.00	5.30	1000.0	120.000	190.0	V	269.0

Full Spectrum

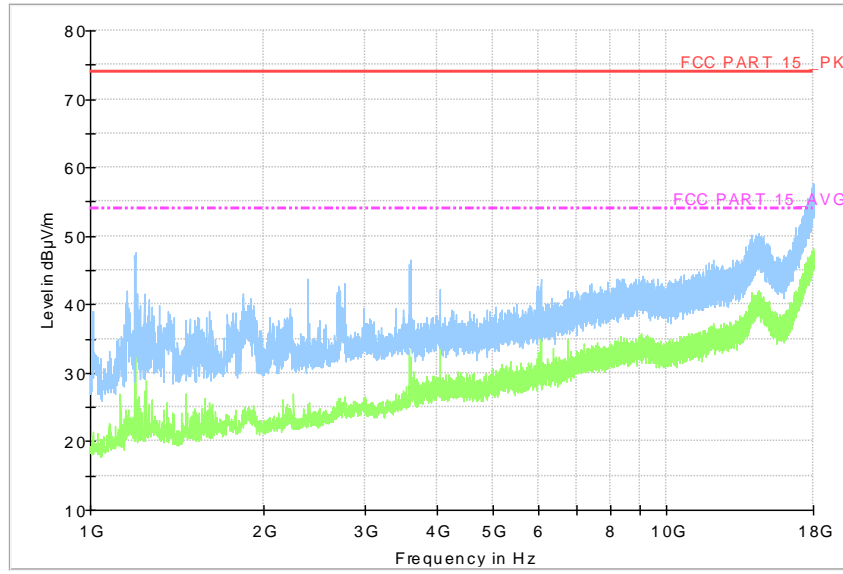


Fig A.10 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.6:

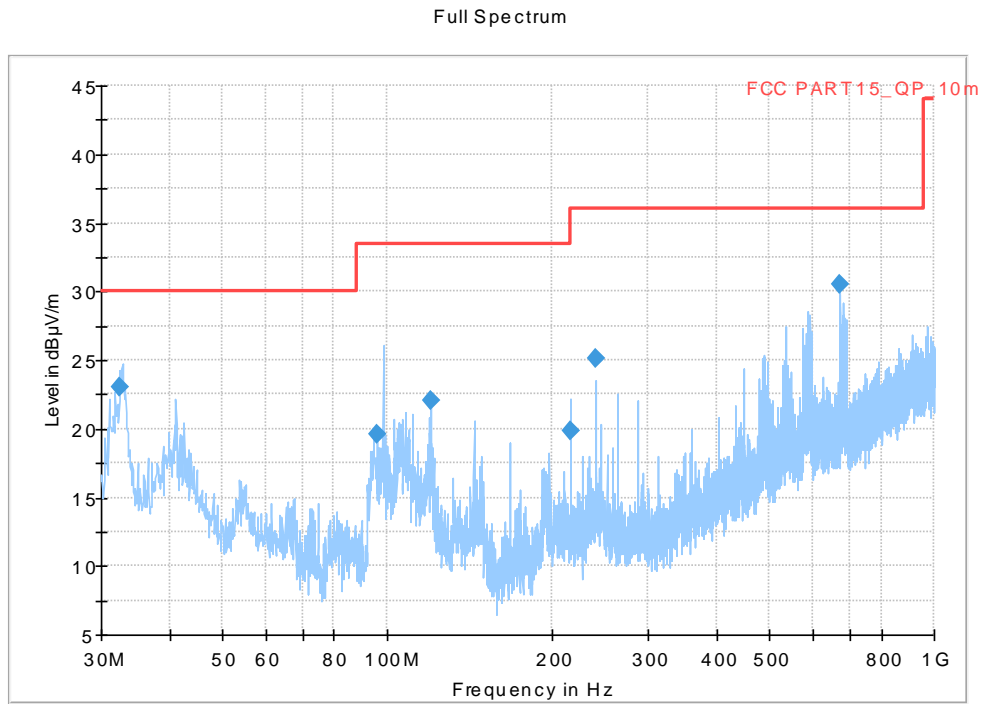


Fig A.11 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.513000	23.06	30.00	6.94	1000.0	120.000	287.0	V	195.0
96.057000	19.61	33.50	13.91	1000.0	120.000	225.0	V	19.0
120.076000	22.07	33.50	11.45	1000.0	120.000	325.0	H	185.0
215.986000	19.79	33.50	13.73	1000.0	120.000	177.0	V	187.0
240.139000	25.11	36.00	10.91	1000.0	120.000	306.0	H	272.0
673.115000	30.48	36.00	5.54	1000.0	120.000	177.0	V	263.0

Full Spectrum

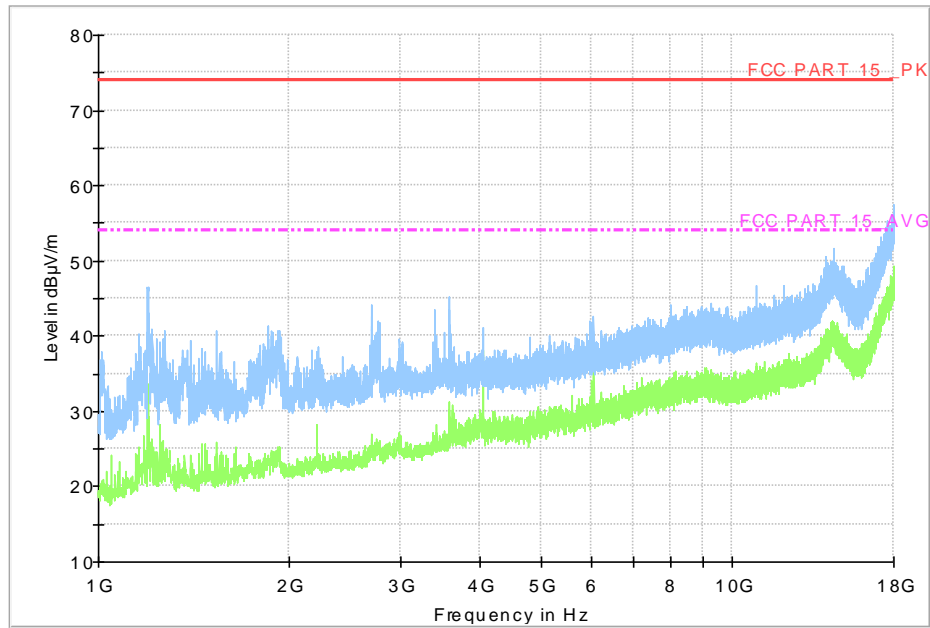


Fig A.12 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.7:

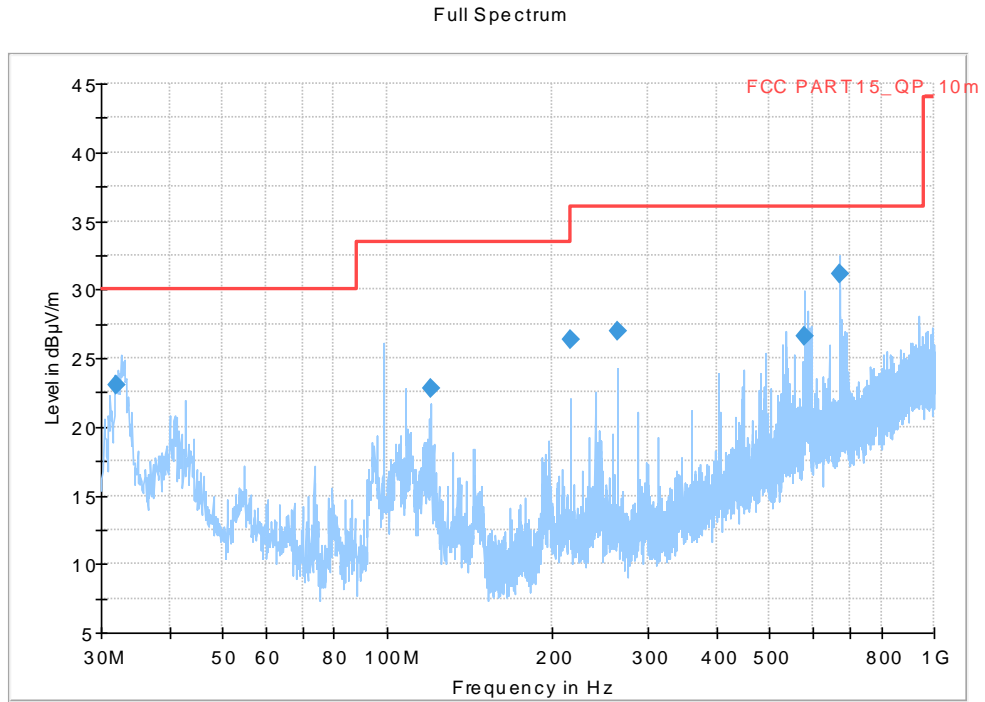


Fig A.13 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.019000	23.08	30.00	6.92	1000.0	120.000	196.0	V	-6.0
120.016000	22.78	33.50	10.74	1000.0	120.000	325.0	H	172.0
216.009000	26.29	36.00	9.73	1000.0	120.000	282.0	H	60.0
264.061000	26.99	36.00	9.03	1000.0	120.000	319.0	H	9.0
577.838000	26.65	36.00	9.37	1000.0	120.000	210.0	V	253.0
673.110000	31.19	36.00	4.83	1000.0	120.000	189.0	V	260.0

Full Spectrum

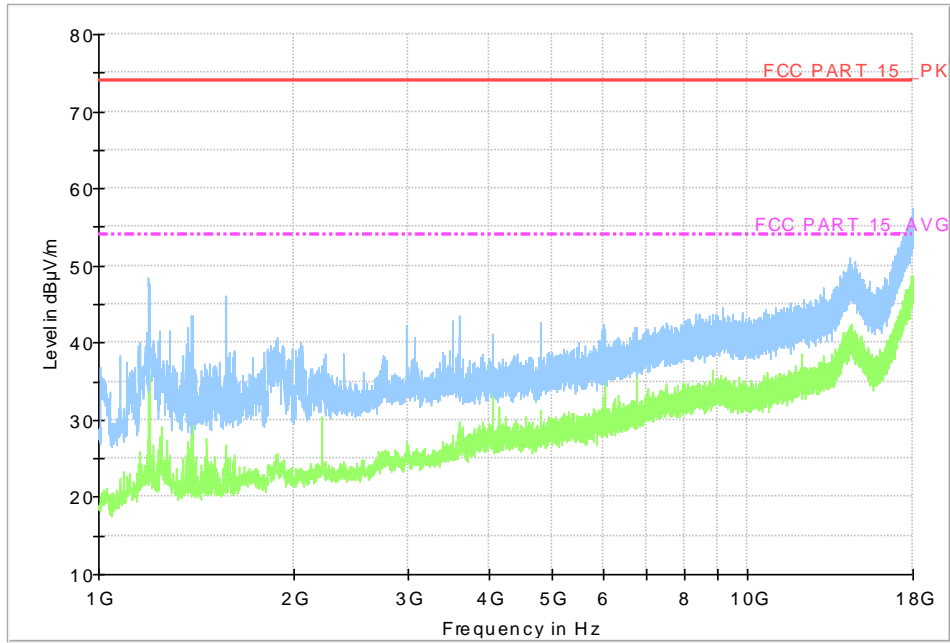


Fig A.14 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.8:

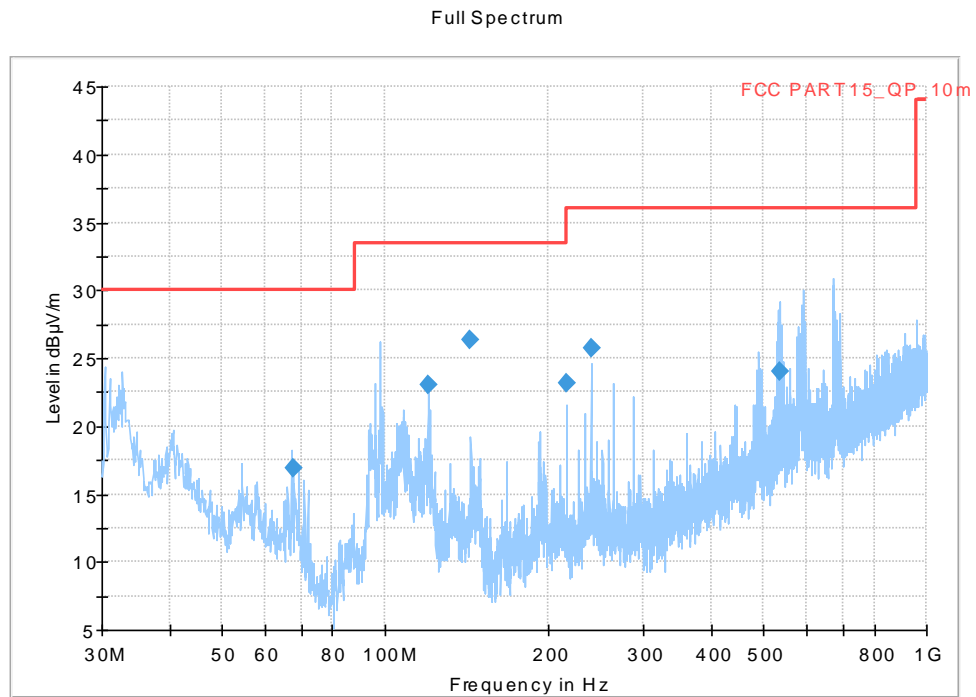


Fig A.15 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
67.534000	16.89	30.00	13.11	1000.0	120.000	282.0	V	11.0
120.016000	23.04	33.50	10.48	1000.0	120.000	325.0	H	180.0
144.035000	26.37	33.50	7.15	1000.0	120.000	325.0	H	190.0
215.986000	23.11	33.50	10.41	1000.0	120.000	325.0	H	240.0
240.065000	25.69	36.00	10.33	1000.0	120.000	325.0	H	273.0
535.190000	23.98	36.00	12.04	1000.0	120.000	219.0	V	269.0

Full Spectrum

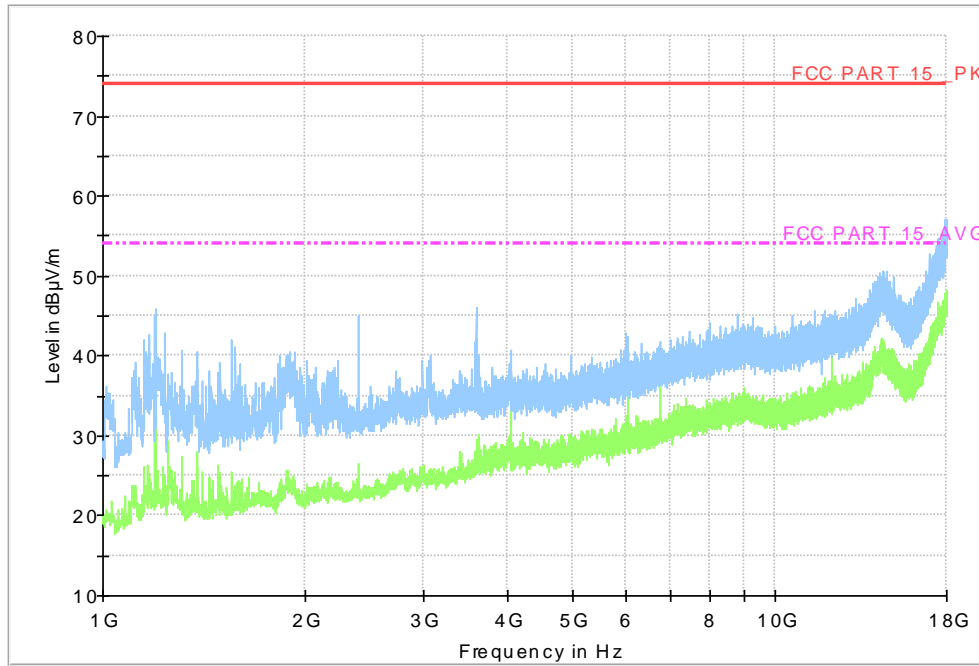


Fig A.16 Radiated Emission from 1GHz to 18GHz

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.

A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL M4000E-17, and the serial number of the PC is M706GWXD. 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 (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency

A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

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

A.2.5 Measurement Results

Measurement uncertainty: $U= 3.1$ dB, $k=2$.

Charging Mode, Set.1:

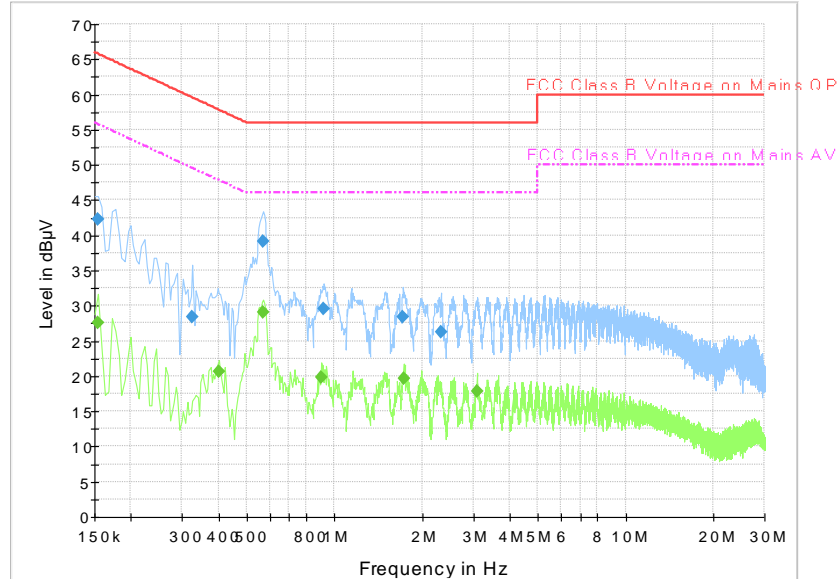


Fig A.17 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	42.3	1000.0	9.000	On	L1	19.7	23.5	65.8	
0.325500	28.4	1000.0	9.000	On	L1	19.6	31.1	59.6	
0.568500	39.2	1000.0	9.000	On	L1	19.6	16.8	56.0	
0.919500	29.6	1000.0	9.000	On	L1	19.6	26.4	56.0	
1.720500	28.5	1000.0	9.000	On	L1	19.6	27.6	56.0	
2.319000	26.3	1000.0	9.000	On	N	19.6	29.7	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	27.6	1000.0	9.000	On	L1	19.7	28.1	55.8	
0.402000	20.6	1000.0	9.000	On	L1	19.6	27.2	47.8	
0.568500	29.0	1000.0	9.000	On	N	19.5	17.0	46.0	
0.901500	19.8	1000.0	9.000	On	L1	19.6	26.2	46.0	
1.725000	19.6	1000.0	9.000	On	L1	19.5	26.4	46.0	
3.079500	17.8	1000.0	9.000	On	L1	19.6	28.2	46.0	

Charging Mode, Set.2:

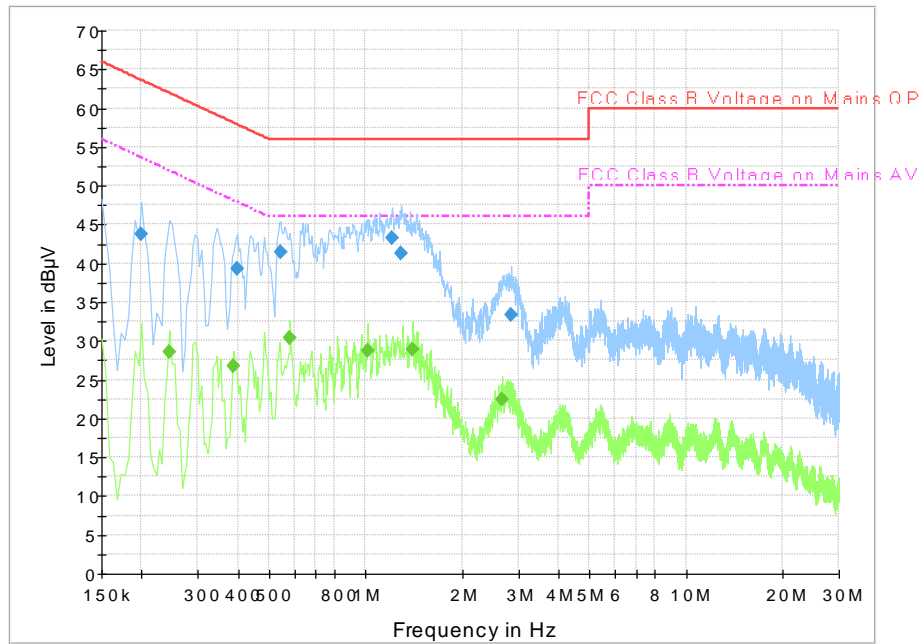


Fig A.18 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.199500	43.8	1000.0	9.000	On	L1	19.6	19.8	63.6	
0.397500	39.3	1000.0	9.000	On	N	19.6	18.6	57.9	
0.541500	41.5	1000.0	9.000	On	N	19.5	14.5	56.0	
1.207500	43.2	1000.0	9.000	On	L1	19.6	12.8	56.0	
1.293000	41.3	1000.0	9.000	On	N	19.6	14.7	56.0	
2.845500	33.3	1000.0	9.000	On	L1	19.6	22.7	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.244500	28.6	1000.0	9.000	On	L1	19.6	23.4	51.9	
0.388500	26.8	1000.0	9.000	On	L1	19.6	21.3	48.1	
0.582000	30.4	1000.0	9.000	On	L1	19.6	15.6	46.0	
1.014000	28.8	1000.0	9.000	On	L1	19.6	17.2	46.0	
1.405500	28.9	1000.0	9.000	On	L1	19.6	17.1	46.0	
2.665500	22.4	1000.0	9.000	On	L1	19.6	23.6	46.0	

Charging Mode, Set.3:

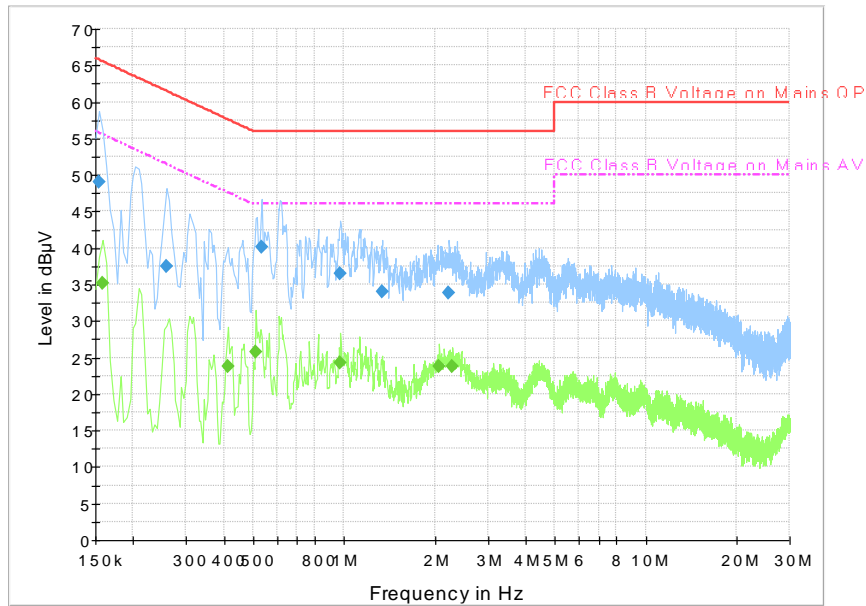


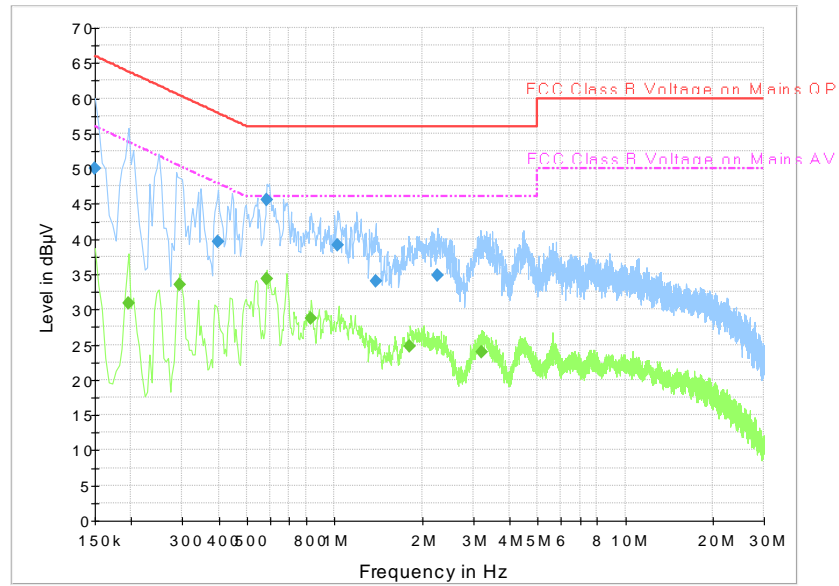
Fig A.19 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	49.1	1000.0	9.000	On	L1	19.7	16.6	65.8	
0.258000	37.5	1000.0	9.000	On	L1	19.6	24.0	61.5	
0.532500	40.2	1000.0	9.000	On	L1	19.6	15.8	56.0	
0.973500	36.5	1000.0	9.000	On	N	19.6	19.5	56.0	
1.338000	34.0	1000.0	9.000	On	L1	19.6	22.0	56.0	
2.229000	33.8	1000.0	9.000	On	L1	19.6	22.2	56.0	

Final Result 2

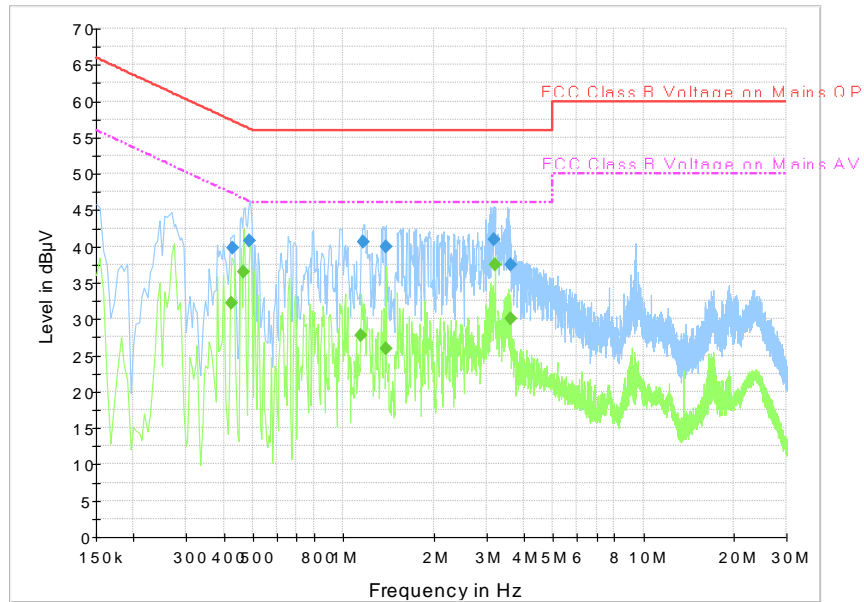
Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.159000	35.1	1000.0	9.000	On	L1	19.7	20.4	55.5	
0.411000	23.8	1000.0	9.000	On	L1	19.6	23.8	47.6	
0.510000	25.7	1000.0	9.000	On	N	19.5	20.3	46.0	
0.973500	24.2	1000.0	9.000	On	N	19.6	21.8	46.0	
2.071500	23.8	1000.0	9.000	On	N	19.5	22.2	46.0	
2.292000	23.7	1000.0	9.000	On	L1	19.6	22.3	46.0	

Charging Mode, Set.4:

Fig A.20 Radiated Emission from 30MHz to 1GHz
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	50.0	1000.0	9.000	On	L1	19.6	16.0	66.0	
0.397500	39.6	1000.0	9.000	On	L1	19.6	18.3	57.9	
0.586500	45.6	1000.0	9.000	On	L1	19.6	10.4	56.0	
1.023000	39.1	1000.0	9.000	On	N	19.6	16.9	56.0	
1.387500	34.0	1000.0	9.000	On	N	19.6	22.0	56.0	
2.256000	34.9	1000.0	9.000	On	L1	19.6	21.1	56.0	

Final Result 2

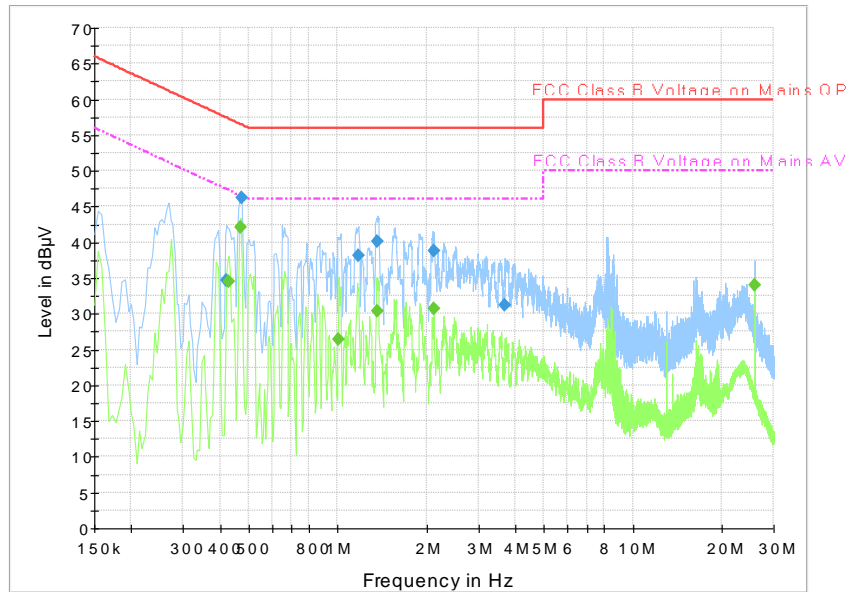
Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.195000	30.9	1000.0	9.000	On	L1	19.7	22.9	53.8	
0.294000	33.5	1000.0	9.000	On	N	19.6	16.9	50.4	
0.586500	34.3	1000.0	9.000	On	L1	19.6	11.7	46.0	
0.829500	28.8	1000.0	9.000	On	N	19.5	17.2	46.0	
1.819500	24.8	1000.0	9.000	On	L1	19.5	21.2	46.0	
3.201000	24.0	1000.0	9.000	On	L1	19.7	22.0	46.0	

USB Mode, Set.5:

Fig A.21 Radiated Emission from 30MHz to 1GHz
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.429000	40.5	1000.0	9.000	On	N	19.6	16.8	57.3	
0.474000	44.5	1000.0	9.000	On	L1	19.6	11.9	56.4	
1.171500	40.3	1000.0	9.000	On	N	19.6	15.7	56.0	
1.365000	41.7	1000.0	9.000	On	L1	19.6	14.3	56.0	
2.130000	38.1	1000.0	9.000	On	L1	19.5	17.9	56.0	
8.227500	26.0	1000.0	9.000	On	N	19.7	34.0	60.0	

Final Result 2

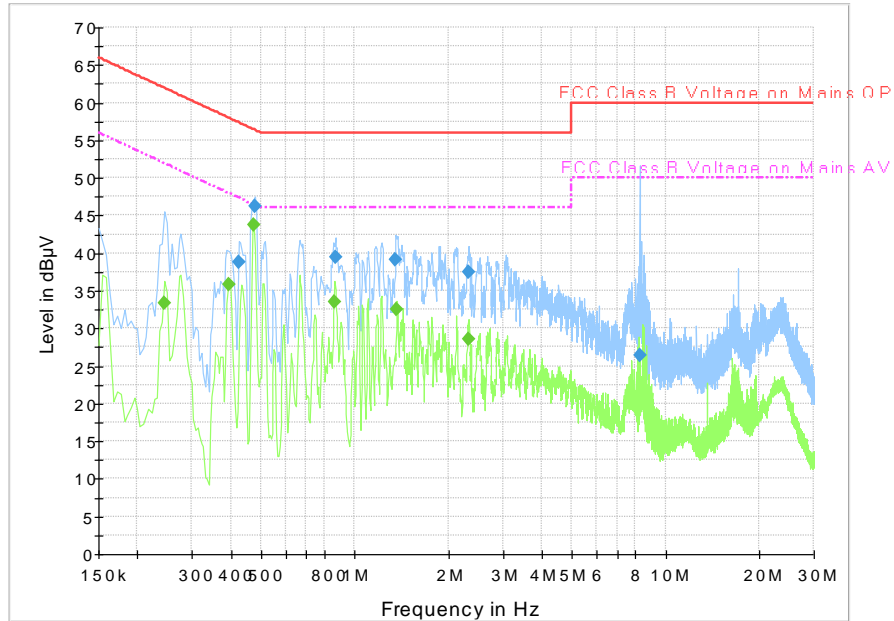
Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	38.2	1000.0	9.000	On	N	19.5	17.6	55.8	
0.429000	38.3	1000.0	9.000	On	L1	19.6	8.9	47.3	
0.465000	41.6	1000.0	9.000	On	L1	19.6	5.0	46.6	
1.171500	32.6	1000.0	9.000	On	N	19.6	13.4	46.0	
1.360500	33.8	1000.0	9.000	On	L1	19.6	12.2	46.0	
2.283000	29.0	1000.0	9.000	On	N	19.6	17.0	46.0	

USB Mode, Set.6:

Fig A.22 Radiated Emission from 30MHz to 1GHz
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.420000	34.7	1000.0	9.000	On	N	19.6	22.8	57.4	
0.474000	46.2	1000.0	9.000	On	L1	19.6	10.3	56.4	
1.176000	38.1	1000.0	9.000	On	N	19.6	17.9	56.0	
1.369500	40.2	1000.0	9.000	On	N	19.6	15.8	56.0	
2.125500	38.7	1000.0	9.000	On	N	19.5	17.3	56.0	
3.678000	31.2	1000.0	9.000	On	N	19.6	24.8	56.0	

Final Result 2

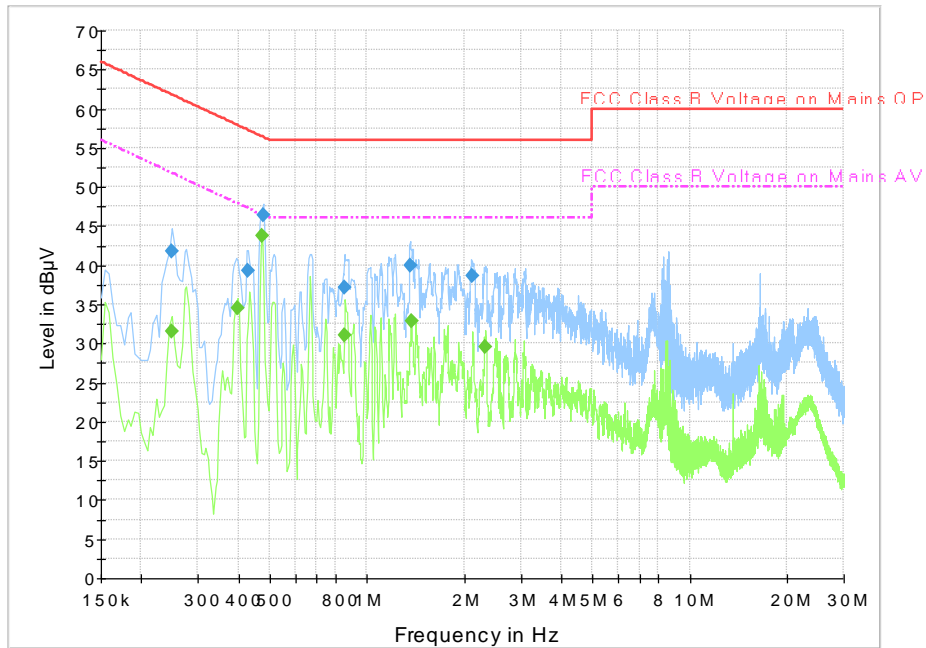
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429000	34.5	1000.0	9.000	On	L1	19.6	12.7	47.3	
0.469500	42.0	1000.0	9.000	On	L1	19.6	4.5	46.5	
1.009500	26.4	1000.0	9.000	On	L1	19.6	19.6	46.0	
1.365000	30.3	1000.0	9.000	On	N	19.6	15.7	46.0	
2.125500	30.8	1000.0	9.000	On	L1	19.5	15.2	46.0	
26.002500	34.0	1000.0	9.000	On	L1	20.1	16.0	50.0	

USB Mode, Set.7:

Fig A.23 Radiated Emission from 30MHz to 1GHz
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.424500	38.7	1000.0	9.000	On	L1	19.6	18.6	57.4	
0.478500	46.2	1000.0	9.000	On	N	19.6	10.2	56.4	
0.865500	39.5	1000.0	9.000	On	N	19.5	16.5	56.0	
1.356000	39.2	1000.0	9.000	On	L1	19.6	16.8	56.0	
2.328000	37.4	1000.0	9.000	On	N	19.6	18.6	56.0	
8.241000	26.4	1000.0	9.000	On	N	19.7	33.6	60.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.244500	33.4	1000.0	9.000	On	L1	19.6	18.5	51.9	
0.393000	35.8	1000.0	9.000	On	L1	19.6	12.2	48.0	
0.474000	43.7	1000.0	9.000	On	L1	19.6	2.8	46.4	
0.861000	33.5	1000.0	9.000	On	N	19.5	12.5	46.0	
1.369500	32.5	1000.0	9.000	On	L1	19.6	13.5	46.0	
2.332500	28.6	1000.0	9.000	On	N	19.6	17.4	46.0	

USB Mode, Set.8:

Fig A.24 Radiated Emission from 30MHz to 1GHz
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.249000	41.7	1000.0	9.000	On	L1	19.6	20.1	61.8	
0.429000	39.3	1000.0	9.000	On	N	19.6	18.0	57.3	
0.478500	46.4	1000.0	9.000	On	L1	19.6	10.0	56.4	
0.852000	37.2	1000.0	9.000	On	N	19.5	18.8	56.0	
1.360500	39.9	1000.0	9.000	On	N	19.6	16.1	56.0	
2.125500	38.7	1000.0	9.000	On	N	19.5	17.3	56.0	

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.249000	31.5	1000.0	9.000	On	L1	19.6	20.3	51.8	
0.397500	34.5	1000.0	9.000	On	N	19.6	13.4	47.9	
0.474000	43.8	1000.0	9.000	On	L1	19.6	2.7	46.4	
0.856500	31.1	1000.0	9.000	On	N	19.5	14.9	46.0	
1.374000	32.9	1000.0	9.000	On	L1	19.6	13.1	46.0	
2.328000	29.6	1000.0	9.000	On	L1	19.6	16.4	46.0	



ANNEX B: PERSONS INVOLVED IN THIS TESTING

Test Item	Test Software and Version	Software Vendor	Test operator
Conducted Emission	EMC32 V8.5.2	R&S	Yang Mengke
Radiated Emission	EMC32 V9.01.00	R&S	Wang Huan

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