



TEST REPORT

No. I22Z62554-EMC01

for

TCL Communication Ltd.

GSM/UMTS/LTE /NR Mobile phone

Model Name: T609V

FCC ID: 2ACCJH168

with

Hardware Version: 04

Software Version: QYS1

Issued Date: 2023-02-13

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z62554-EMC01	Rev.0	1 st edition	2023-02-13

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



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1. Test Laboratory

1.1. Testing Location

CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,

P. R. China 100191

1.2. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2023-02-10

Testing End Date: 2023-02-13

1.4. Signature



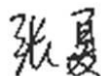
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2. Client Information

2.1. Applicant Information

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

3.1. About EUT

Description	GSM/UMTS/LTE /NR Mobile phone
Model Name	T609V
FCC ID:	2ACCJH168

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
UT12a	016391000001151	/	/

*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
AE1	Battery
AE2	Battery
AE3	USB Cable
AE4	Charger

AE1

Model	TLp048AA (CAC4850009CA)
Manufacturer	TIANMAO

AE2

Model	TLp048D7 (CAC4850007C7)
Manufacturer	VEKEN

AE3

Model	CDA0000198C1
Manufacturer	Juwei
Length of cable	/

AE4

Model	QC13US (CBA0064BGTC1)
Manufacturer	BYD
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 + AE1/2 + AE3 + AE4	Charger1+REAR Camera+GSM 850 idle
Set.2	EUT1 + AE1/2 + AE3 + AE4	Charger1+MP4+WCDMA 850 idle
Set.3	EUT1 + AE1/2 + AE3 + AE4	Charger1+ front camera + LTE idle
Set.4	EUT1 + AE1/2 + AE4 + Headset	USB+FM +NR idle

Note:

Equipment Under Test (EUT) is a model of GSM/UMTS/LTE /NR Mobile phone with integrated antenna.

It supports

GSM Band	GSM 850/900/1800/1900
UMTS Band	FDD Band I(W2100) /FDD Band II(W1900) /FDD Band IV(W1700)/FDD Band V(W850)/FDD Band VIII(W900)
LTE Band	FDD2/3/4/5/7/12/13/20/25/26/28/66/71, TDD 41/48
NR Band	n2/n5/n25/n41/n66/n71, n30/n77 only support NSA.

It has Camera, MP3, Bluetooth V5.1, Wi-Fi (802.11a/b/g/n/ac, 802.11n supports 20MHz and 40MHz bandwidth,802.11ac supports 20MHz , 40MHz and 80MHz bandwidth) and GNSS functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM 850, WCDMA850, LTE Band 5/12/13/26/71,NR band n5/n71. All licensed band receivers that tune in the range of 30MHz-960MHz are investigated. Only the worst-case emissions are reported.

NOTE: The model T609V is a variant model based on T609DL, according to the declaration of changes, the following test items and test modes were performed:

Test Item	Mode or Feature	EUT Set-up
Radiated Continuous Emission	Charging mode & USB mode	Set.1/2/3/4

Only the worst-case emissions are reported.

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	ESW44	103015	R&S	2024-01-11	1 year
2	LISN	ENV216	101200	R&S	2023-06-29	1 year
3	Universal Radio Communication Tester	CMW500	167943	R&S	2023-04-13	1 year
4	Test Receiver	ESCI 7	100344	R&S	2023-03-21	1 Year
5	EMI Antenna	VULB 9163	01223	SCHWARZBECK	2023-07-25	1 year
6	EMI Antenna	3115	00167250	ETS-Lindgren	2023-06-20	1 year
7	Software	EMC32	/	R&S	/	/

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/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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): $U = 5.54 \text{ dB}$, $k=2$.

Measurement results for Set.1:

Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB $\mu\text{V}/\text{m}$)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μV)	Limit (dB $\mu\text{V}/\text{m}$)	Margin (dB)	Antenna Pol. (H/V)
17991.160	41.60	-29.06	46.66	24.00	54.00	12.40	V
17953.760	41.20	-28.94	46.66	23.48	54.00	12.80	H
17997.960	41.10	-29.06	46.66	23.50	54.00	12.90	V
17980.280	41.10	-29.06	46.66	23.50	54.00	12.90	H
17530.460	40.80	-29.32	44.35	25.77	54.00	13.20	V
17998.980	40.80	-29.06	46.66	23.20	54.00	13.20	H

Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB $\mu\text{V}/\text{m}$)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μV)	Limit (dB $\mu\text{V}/\text{m}$)	Margin (dB)	Antenna Pol. (H/V)
17496.460	51.80	-29.77	44.35	37.22	74.00	22.20	H
17973.140	51.60	-29.06	46.66	34.00	74.00	22.40	H
17508.020	51.60	-29.26	44.35	36.50	74.00	22.40	V
17886.100	51.50	-29.53	45.95	35.08	74.00	22.50	H
17594.380	51.40	-29.70	45.25	35.85	74.00	22.60	H
17883.040	51.40	-29.53	45.95	34.98	74.00	22.60	V

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)
17969.060	40.90	-29.06	46.66	23.30	54.00	13.10	V
17977.220	40.90	-29.06	46.66	23.30	54.00	13.10	V
17543.380	40.80	-29.49	44.35	25.93	54.00	13.20	H
17999.320	40.70	-29.06	46.66	23.10	54.00	13.30	V
17995.240	40.70	-29.06	46.66	23.10	54.00	13.30	V
17976.880	40.60	-29.06	46.66	23.00	54.00	13.40	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)
17953.420	52.20	-28.94	46.66	34.48	74.00	21.80	V
17522.640	51.50	-29.32	44.35	36.47	74.00	22.50	V
17637.560	51.40	-29.40	45.25	35.55	74.00	22.60	V
17922.820	51.40	-29.40	46.66	34.14	74.00	22.60	V
17957.840	51.30	-28.94	46.66	33.58	74.00	22.70	V
17510.740	51.20	-29.26	44.35	36.10	74.00	22.80	V

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)
17999.320	40.90	-29.06	46.66	23.30	54.00	13.10	V
17893.240	40.80	-29.53	45.95	24.38	54.00	13.20	H
17901.400	40.70	-29.33	45.95	24.07	54.00	13.30	V
17979.940	40.70	-29.06	46.66	23.10	54.00	13.30	H
17957.840	40.70	-28.94	46.66	22.98	54.00	13.30	H
17993.200	40.70	-29.06	46.66	23.10	54.00	13.30	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)
17542.020	51.60	-29.49	44.35	36.73	74.00	22.40	H
17993.200	51.50	-29.06	46.66	33.90	74.00	22.50	H
17975.860	51.40	-29.06	46.66	33.80	74.00	22.60	V
17496.800	51.20	-29.77	44.35	36.62	74.00	22.80	V
17356.040	51.10	-29.97	43.36	37.71	74.00	22.90	V
17972.120	51.10	-29.06	46.66	33.50	74.00	22.90	H

Measurement results for Set.4:
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)
17540.320	41.80	-29.49	44.35	26.93	54.00	12.20	H
17967.700	41.70	-29.06	46.66	24.10	54.00	12.30	H
17996.600	41.70	-29.06	46.66	24.10	54.00	12.30	H
17914.320	41.40	-29.33	46.66	24.07	54.00	12.60	H
17898.000	41.40	-29.53	45.95	24.98	54.00	12.60	H
17922.820	41.30	-29.40	46.66	24.04	54.00	12.70	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)
17993.880	53.40	-29.06	46.66	35.80	74.00	20.60	V
17382.900	52.50	-29.83	43.36	38.97	74.00	21.50	H
17403.640	52.40	-29.44	44.35	37.49	74.00	21.60	V
17910.580	52.30	-29.33	45.95	35.67	74.00	21.70	H
17526.040	52.20	-29.32	44.35	37.17	74.00	21.80	V
17982.660	52.00	-29.06	46.66	34.40	74.00	22.00	V

Measurement results for Set.1:

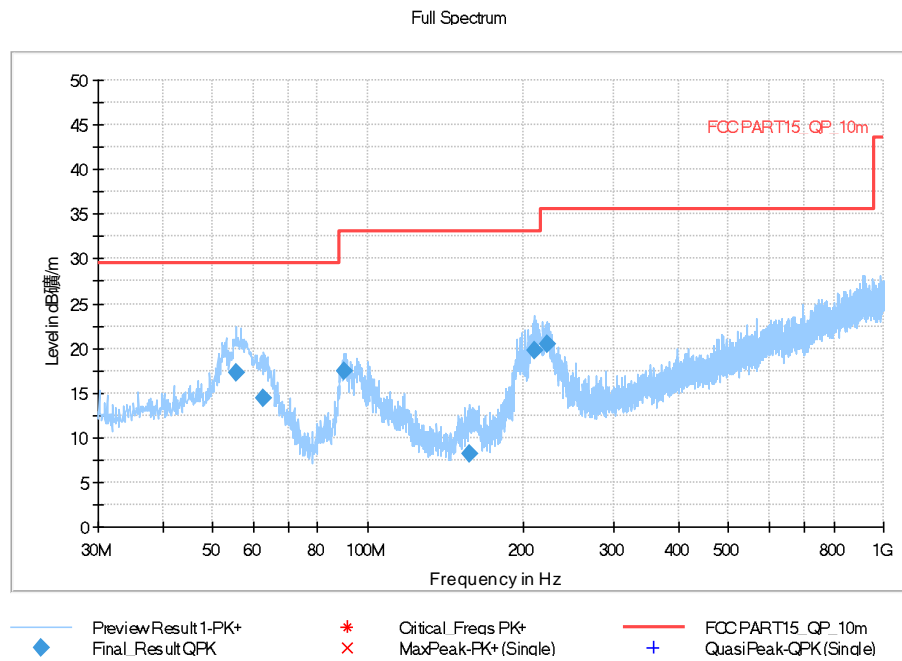


Fig A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
55.511000	17.25	29.54	12.29	120.000	325.0	V	226.0	-11.2
62.883000	14.48	29.54	15.06	120.000	125.0	V	266.0	-12.8
89.946000	17.49	33.06	15.57	120.000	125.0	V	-44.0	-14.6
157.555000	8.27	33.06	24.79	120.000	100.0	V	176.0	-15.2
209.741000	19.69	33.06	13.37	120.000	125.0	V	162.0	-12.2
222.060000	20.54	35.56	15.02	120.000	116.0	V	59.0	-11.4

Full Spectrum

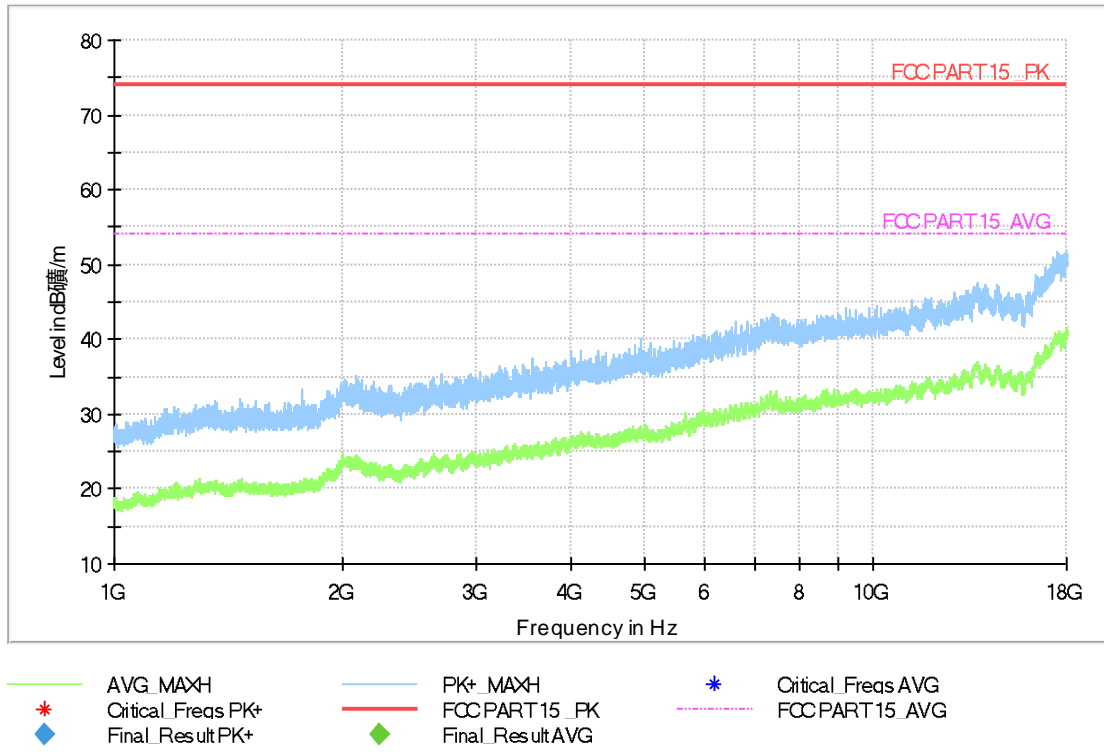


Fig A.2 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.2:

Full Spectrum

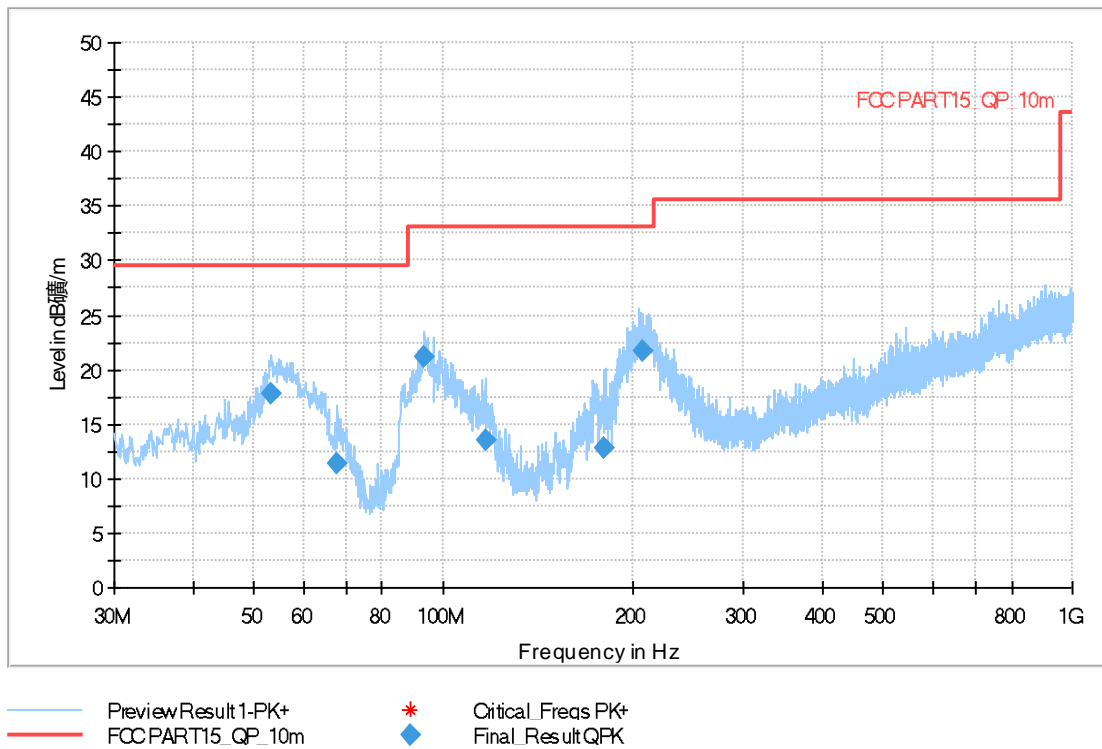


Fig A.3 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.377000	17.88	29.54	11.66	120.000	100.0	V	99.0	-11.1
67.927000	11.45	29.54	18.09	120.000	283.0	V	278.0	-14.2
93.438000	21.25	33.06	11.81	120.000	275.0	V	-18.0	-13.6
116.524000	13.54	33.06	19.52	120.000	125.0	V	175.0	-13.7
179.865000	12.76	33.06	20.30	120.000	100.0	V	252.0	-13.9
207.898000	21.79	33.06	11.27	120.000	100.0	V	252.0	-12.2

Full Spectrum

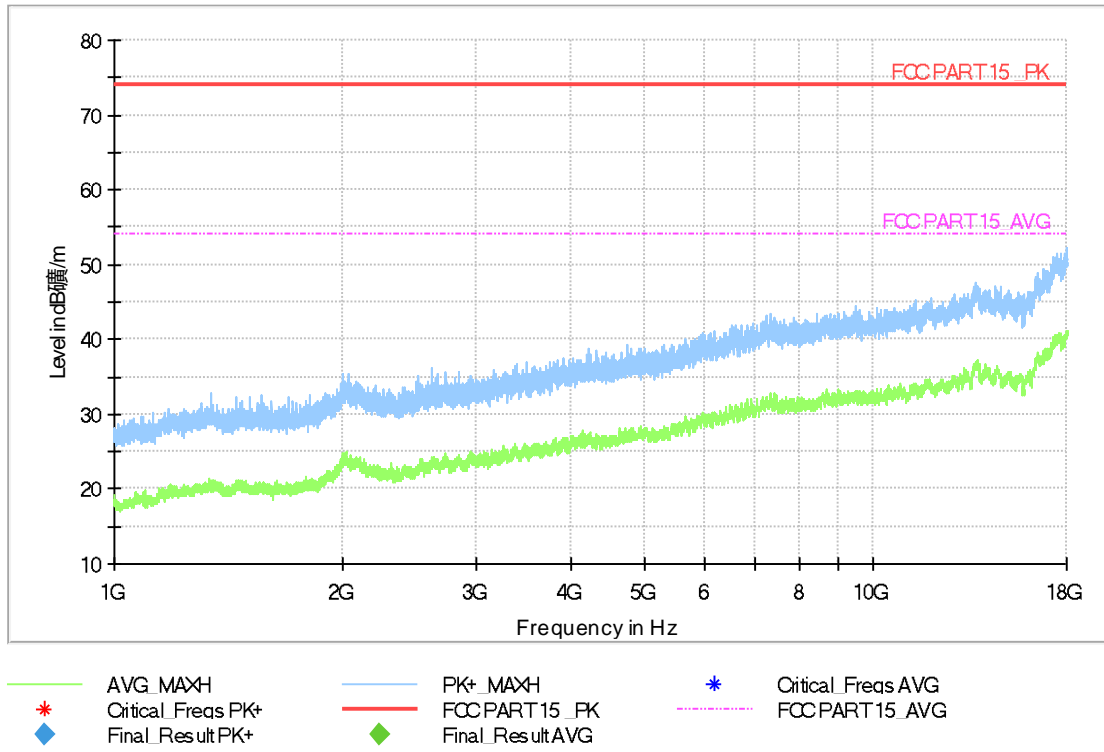
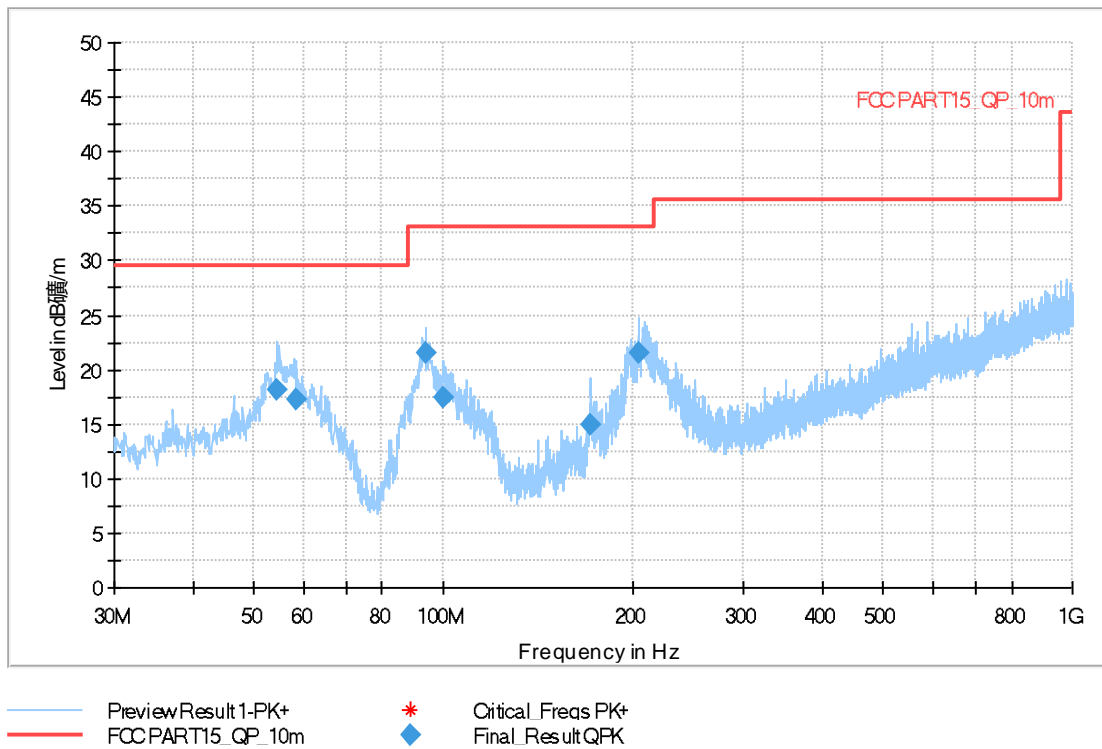


Fig A.4 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.3:

Full Spectrum


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

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.541000	18.19	29.54	11.35	120.000	108.0	V	292.0	-11.1
58.227000	17.21	29.54	12.33	120.000	283.0	V	315.0	-11.7
93.729000	21.52	33.06	11.54	120.000	125.0	V	-18.0	-13.5
100.228000	17.40	33.06	15.66	120.000	125.0	V	-45.0	-12.4
171.717000	14.93	33.06	18.13	120.000	108.0	V	77.0	-14.5
204.018000	21.57	33.06	11.49	120.000	125.0	V	59.0	-12.1

Full Spectrum

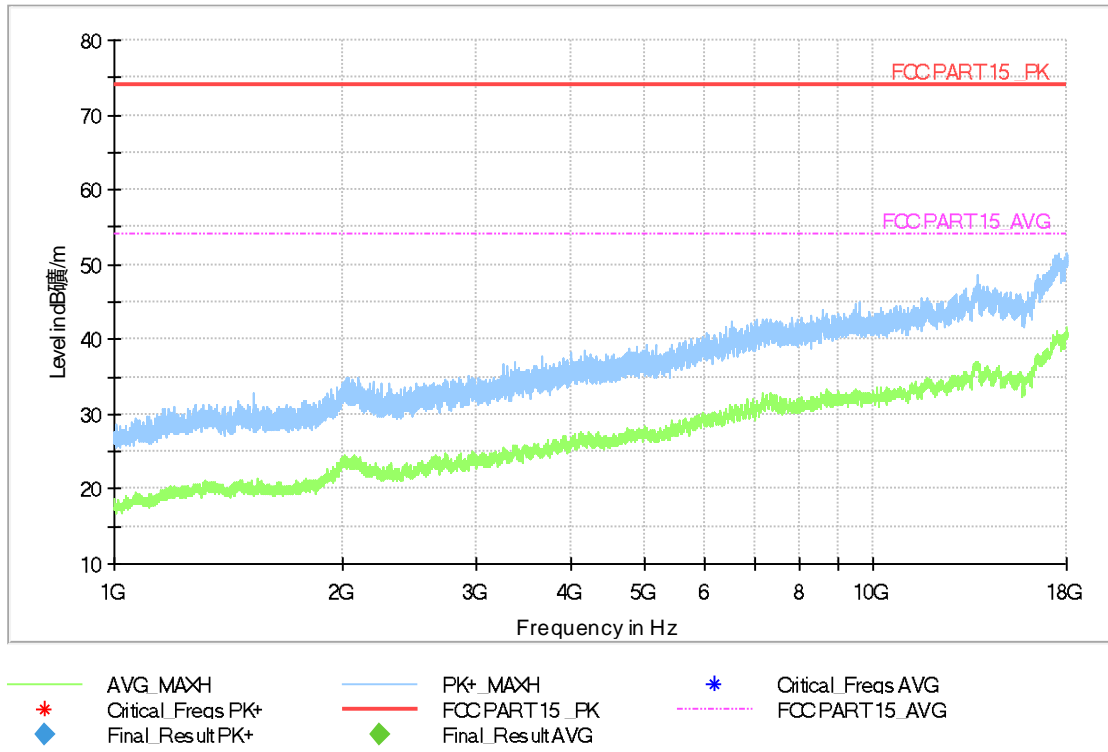
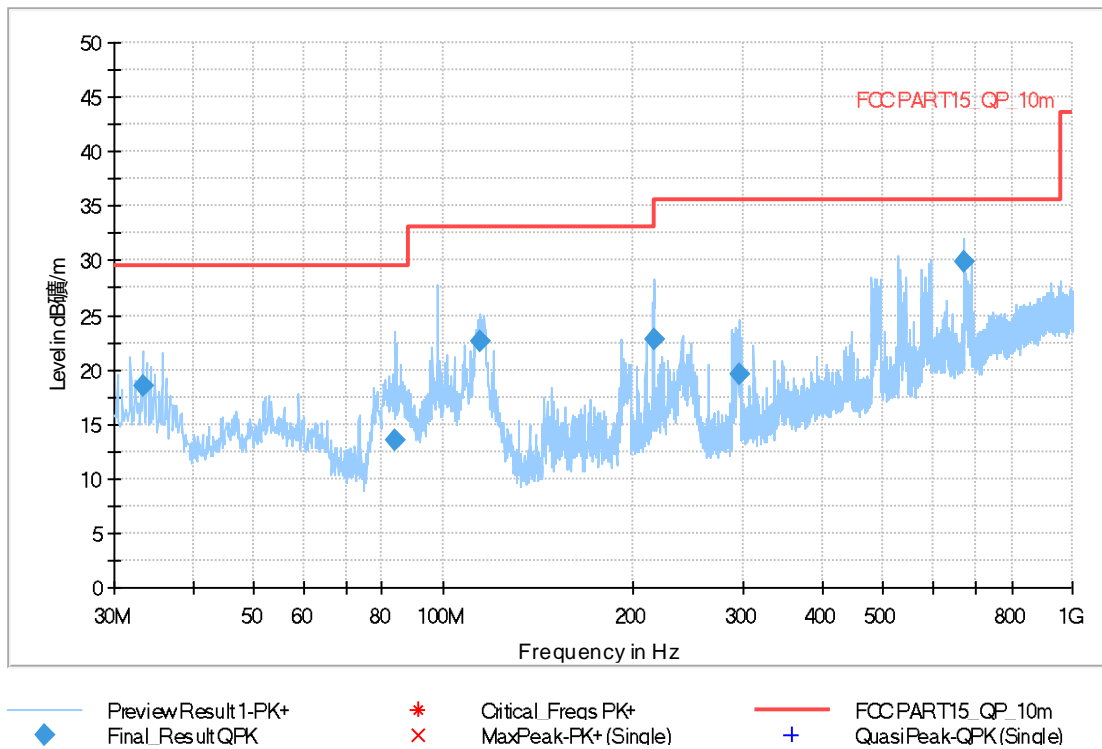


Fig A.6 Radiated Emission from 1GHz to 18GHz

Measurement results for Set.4:

Full Spectrum


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

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.298000	18.53	29.54	11.01	120.000	100.0	V	225.0	-14.8
83.835000	13.58	29.54	15.96	120.000	125.0	V	225.0	-16.9
114.099000	22.67	33.06	10.39	120.000	100.0	V	23.0	-13.3
215.949000	22.72	33.06	10.34	120.000	302.0	H	22.0	-11.9
294.907000	19.56	35.56	16.00	120.000	108.0	V	176.0	-9.0
672.237000	29.95	35.56	5.61	120.000	203.0	V	-31.0	0.0

Full Spectrum

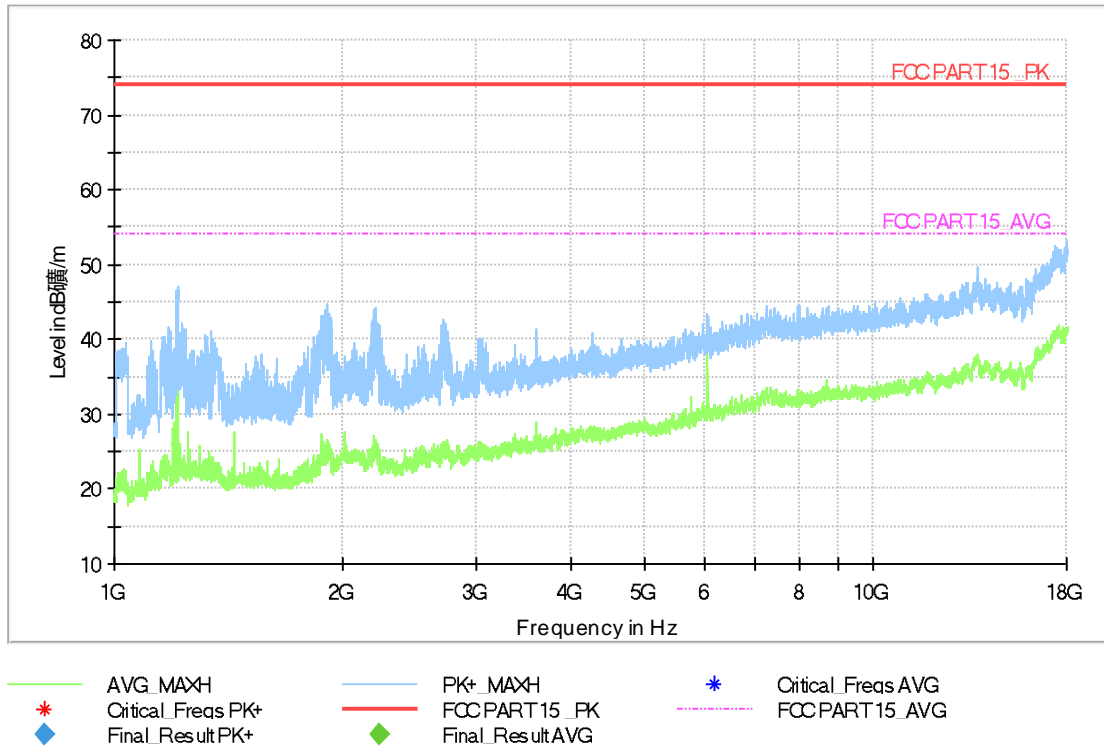


Fig A.8 Radiated Emission from 1GHz to 18GHz

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