



TEST REPORT

No. I17Z60505-EMC01

for

TCL Communication Ltd.

GSM Quad-band /UMTS Quad-band CDMA/EVDO Tri-band /LTE 13

bands mobile phone

Model Name: 6060S

FCC ID: 2ACCJA024

with

Hardware Version: 04

Software Version: v4E1W

Issued Date: 2017-05-15

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.

Test Laboratory:

FCC 2.948 Listed: No.525429

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I17Z60505-EMC01	Rev.0	1 st edition	2017-05-15

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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℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2017-05-11

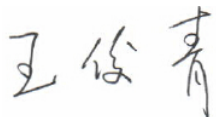
Testing End Date: 2017-05-15

1.4. Signature



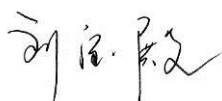
Zhang Ying

(Prepared this test report)



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(Reviewed this test report)



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(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech
Park, Pudong Area, Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
Contact Person: Zhizhou Gong
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address /Post: 5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech
Park, Pudong Area, Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

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

3.1. About EUT

Description	GSM Quad-band /UMTS Quad-band CDMA/EVDO Tri-band /LTE 13 bands mobile phone
Model Name	6060S
FCC ID	2ACCJA024
Extreme vol. Limits	3.55VDC 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, Academy of Telecommunication Research, MIIT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT5	014909000007951	04	v4E1W

*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	Travel charger	/	1760505CH005/004/008
AE4	USB Cable	/	1760505DC005
AE5	USB Cable	/	1760505DC011
AE6	USB Cable	/	1760505DC003

AE1

Model	CAC2560001CJ
Manufacturer	COSLIGHT
Capacitance	2560 mAh
Nominal voltage	3.85V

AE2

Model	CAC2560002C1
Manufacturer	BYD
Capacitance	2560 mAh
Nominal voltage	3.85V

AE3

Model	CBA0059AGAC2
Manufacturer	Tenpao
Length of cable	/

AE4

Model	CDA0000078CF
Manufacturer	LUXSHARE



Length of cable	/
AE5	
Model	CDA0000078C1
Manufacturer	juwei
Length of cable	/
AE6	
Model	CDA0000103CF
Manufacturer	LUXSHARE
Length of cable	/

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

Note: The USB cables are shielded.

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.3	EUT5 + AE1 + AE3 + AE4	Charger
Set.4	EUT5 + AE1 + AE4	USB
Set.5	EUT4 + AE1 + AE5	USB
Set.6	EUT4 + AE1 + AE6	USB

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	10-1-15 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low - Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters×17meters×10meters) 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, 10 m 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 3000 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	huayuan North Road
2	Conducted Emission	15.107(a)	B.2	P	huayuan North Road

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTUR E	CAL DUE DATE	CALIBRATI ON INTERVAL
1	Test Receiver	ESCI	100344	R&S	2018-02-15	1 year
2	Universal Radio Communication Tester	CMW500	155415	R&S	2018-01-11	1 year
3	LISN	ENV216	101200	R&S	2017-07-10	1 year
4	EMI Antenna	VULB 9163	9163-301	Schwarzbeck	2017-12-16	3 years
5	EMI Antenna	3115	6914	ETS-Lindgren	2017-12-15	3 years
7	PC	OPTIPLEX 380	2X1YV2X	DELL	N/A	N/A
8	Printer	P1606dn	VNC3L52122	HP	N/A	N/A
9	Keyboard	L100	CN0RH6596589 07ATOI40	DELL	N/A	N/A
10	Mouse	M-UAE119	LZ935220ZRC	Lenovo	N/A	N/A
	Test Receiver	ESU26	100235	R&S	2017-12-16	1 year
	Universal Radio Communication Tester	CMU200	109914	R&S	2018-03-12	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 10 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. 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 model of the PC is DELL OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. 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 ($\mu\text{V/m}$)		
	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/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): $U = 5.26\text{dB}$, $k=2$.

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

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17953.533	44.0	-17.7	45.6	16.100	H
17947.300	44.0	-17.7	45.6	16.100	H
17954.100	44.0	-17.7	45.6	16.100	H
17968.833	44.0	-17.7	45.6	16.100	H
17941.633	43.9	-17.7	45.6	16.000	H
17925.767	43.9	-17.7	45.6	16.000	H

Charging Mode/Peak detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17938.800	55.4	-17.7	45.6	27.500	H
17852.100	55.1	-18.5	45.6	28.000	H
17921.800	55.1	-17.7	45.6	27.200	H
17876.467	55.0	-18.5	45.6	27.900	H
17833.967	55.0	-18.5	45.6	27.900	H
17873.067	54.9	-18.5	45.6	27.800	H

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

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17969.967	43.9	-17.7	45.6	16.000	H
17944.467	43.8	-17.7	45.6	15.900	H
17954.667	43.8	-17.7	45.6	15.900	H
17934.267	43.7	-17.7	45.6	15.800	H
17959.200	43.7	-17.7	45.6	15.800	H
17925.767	43.7	-17.7	45.6	15.800	H

USB Mode /Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17934.267	55.4	-17.7	45.6	27.500	H
17877.033	54.8	-18.5	45.6	27.700	H
17899.133	54.6	-18.5	45.6	27.500	H
17935.967	54.4	-17.7	45.6	26.500	H
17958.067	54.3	-17.7	45.6	26.400	H
17935.400	54.3	-17.7	45.6	26.400	H

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

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17935.967	44.0	-17.7	45.6	16.1	H
17942.200	43.8	-17.7	45.6	15.9	H
17950.133	43.8	-17.7	45.6	15.9	H
17954.667	43.8	-17.7	45.6	15.9	H
17964.300	43.7	-17.7	45.6	15.8	H
17882.700	43.7	-18.5	45.6	16.6	H

USB Mode /Peak detector

Frequency(MHz)	Result(dB μ V/m)	G _{PL} (dB)	G _A (dB/m)	P _{Mea} (dB μ V)	Polarity
17846.433	55.3	-18.5	45.6	28.2	H
17954.667	55.0	-17.7	45.6	27.1	H
17953.533	54.8	-17.7	45.6	26.9	H
17839.067	54.4	-18.5	45.6	27.3	H
17879.300	54.4	-18.5	45.6	27.3	H
17881.000	54.2	-18.5	45.6	27.1	H

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

Frequency(MHz)	Result(dBμV/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dBμV)	Polarity
17913.300	43.9	-18.5	45.6	16.8	H
17958.067	43.7	-17.7	45.6	15.8	H
17924.067	43.7	-17.7	45.6	15.8	H
17862.867	43.7	-18.5	45.6	16.6	H
17955.233	43.7	-17.7	45.6	15.8	H
17925.767	43.7	-17.7	45.6	15.8	H

USB Mode/ Peak detector

Frequency(MHz)	Result(dBμV/m)	G _{PL} (dB)	G _A (dB/m)	P _{mea} (dBμV)	Polarity
17856.633	55.8	-18.5	45.6	28.7	H
17966.000	55.1	-17.7	45.6	27.2	H
17857.200	54.7	-18.5	45.6	27.6	H
17942.767	54.5	-17.7	45.6	26.6	H
17905.933	54.4	-18.5	45.6	27.3	H
17821.500	54.3	-18.5	45.6	27.2	H

Note: The measurement results of Set.3, Set.4, Set.5 and Set.6 showed here are worst cases of the combinations of different batteries and USB cables.

Charging Mode, Set.3

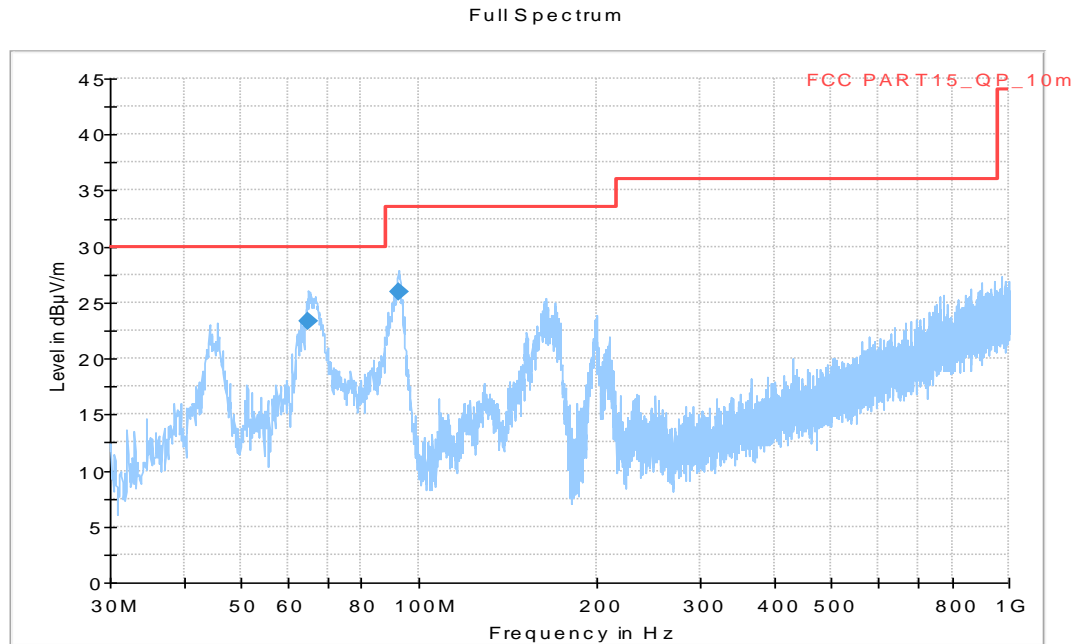


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
64.994000	23.31	30.00	6.69	100.0	V	210.0
92.251000	26.00	33.50	7.52	117.0	V	67.0

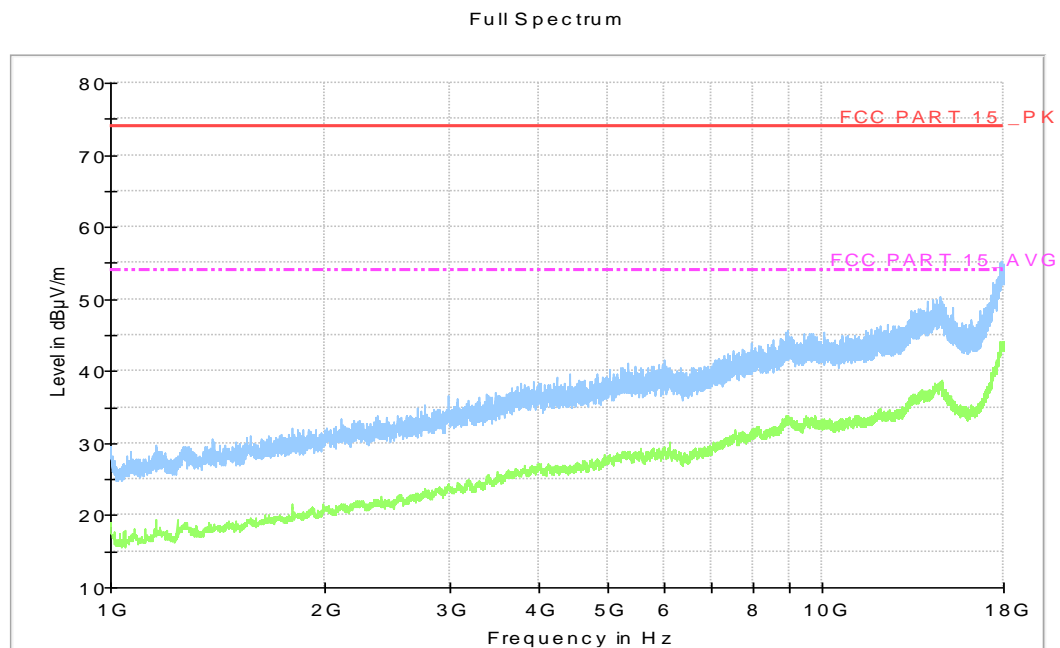


Figure A.2 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.4

Full Spectrum

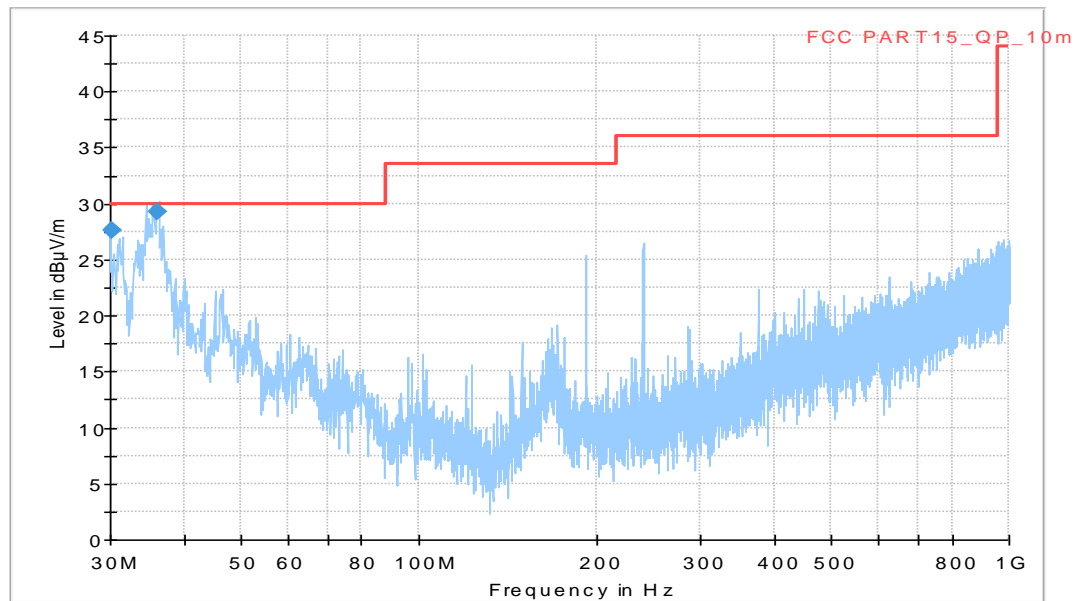


Figure A.3 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.120000	27.60	30.00	2.40	1000.0	120.000	300.0
36.065000	29.29	30.00	0.71	1000.0	120.000	150.0

Full Spectrum

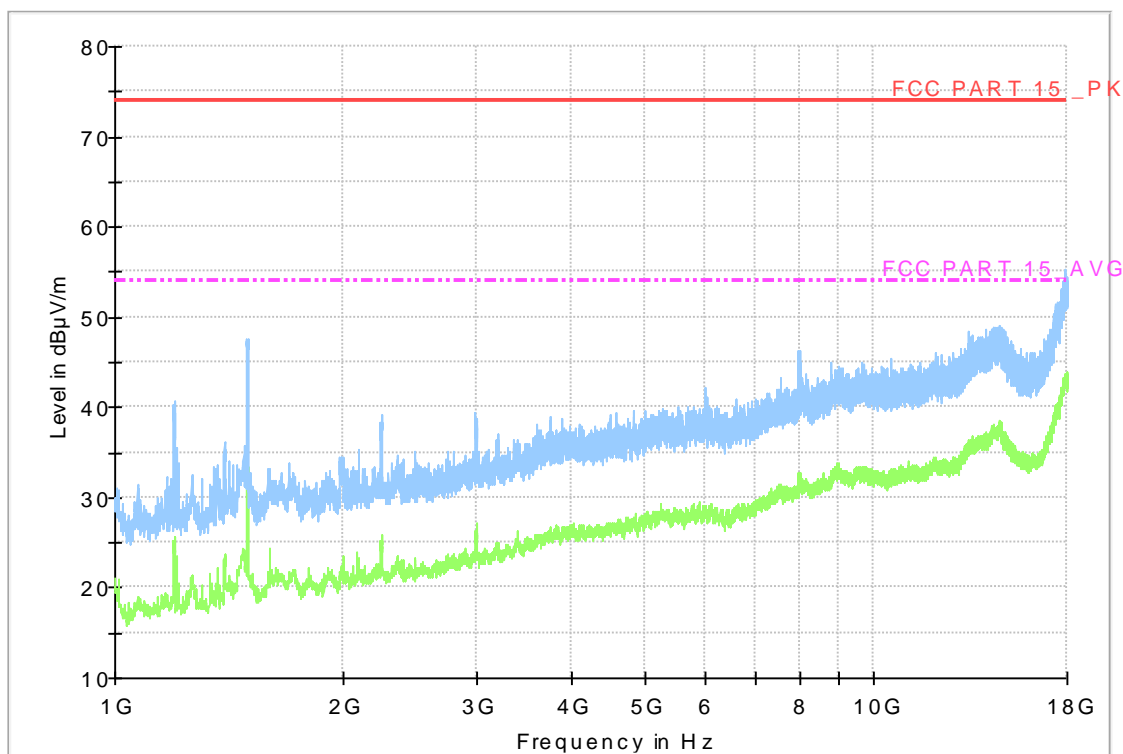


Figure A.4 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.5

Full Spectrum

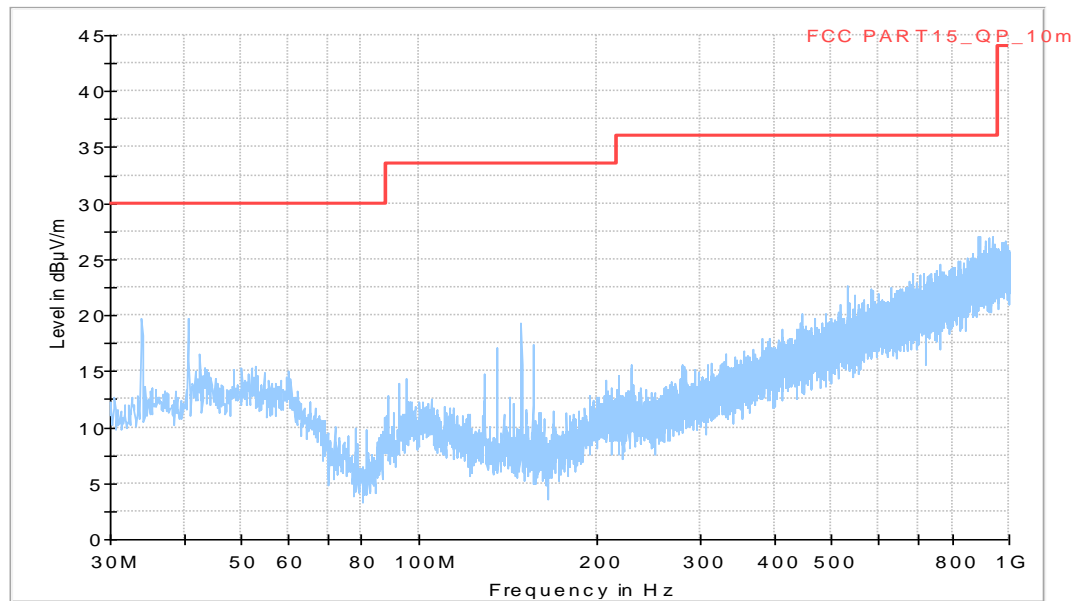


Figure A.5 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.804000	27.31	30.00	2.69	1000.0	120.000	220.0
36.074000	27.84	30.00	2.16	1000.0	120.000	132.0

Full Spectrum

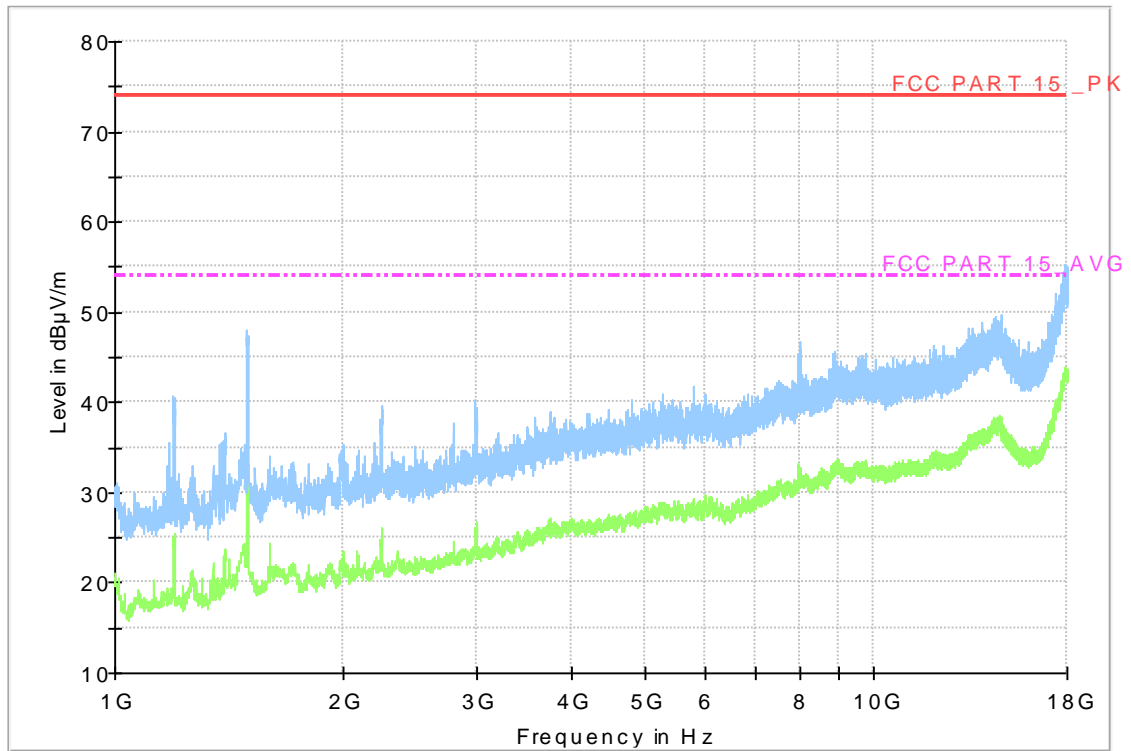


Figure A.6 Radiated Emission from 1GHz to 18GHz

USB Mode, Set.6

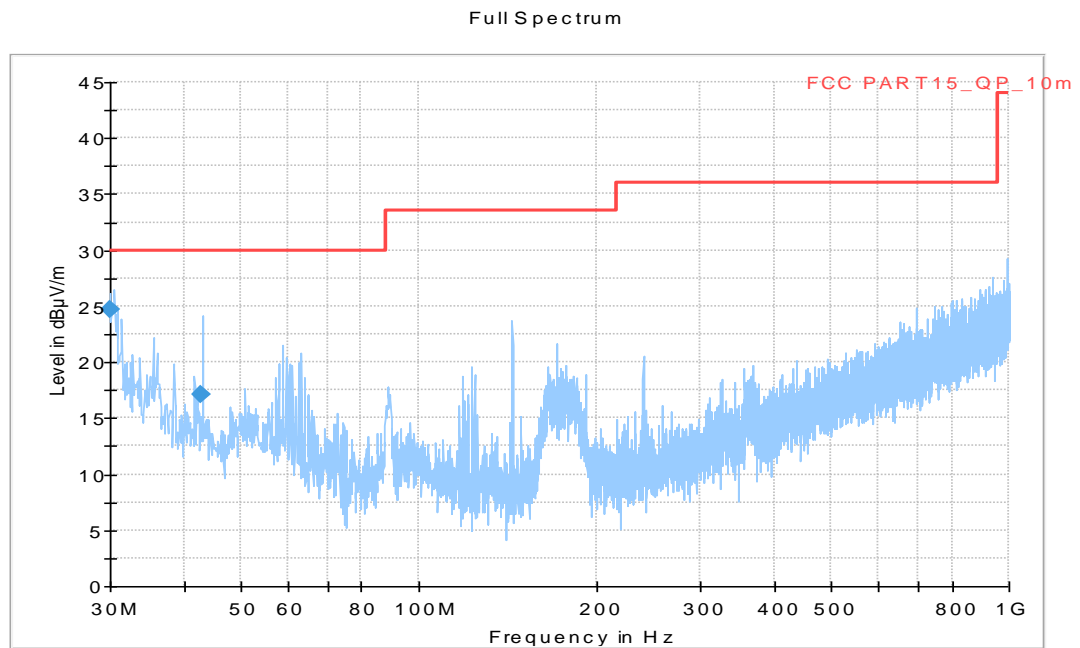


Figure A.7 Radiated Emission from 30MHz to 1GHz

Final_Result

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.120000	27.60	30.00	2.40	1000.0	120.000	200.0
36.065000	29.29	30.00	0.71	1000.0	120.000	137.0

Full Spectrum

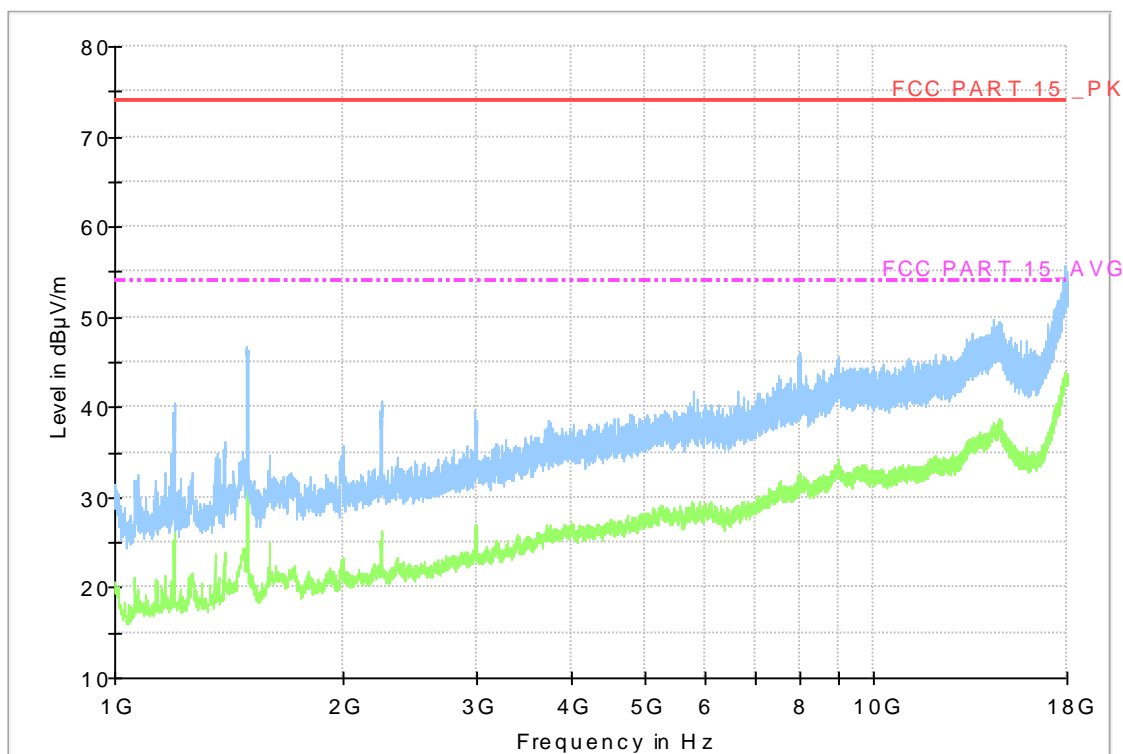


Figure A.8 Radiated Emission from 1GHz to 18GHz

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 OPTIPLEX 380, and the serial number of the PC is 2X1YV2X. 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

A.2.5 Measurement Results

Measurement uncertainty: $U = 3.38\text{dB}$, $k=2$.

Charging Mode, Set.3

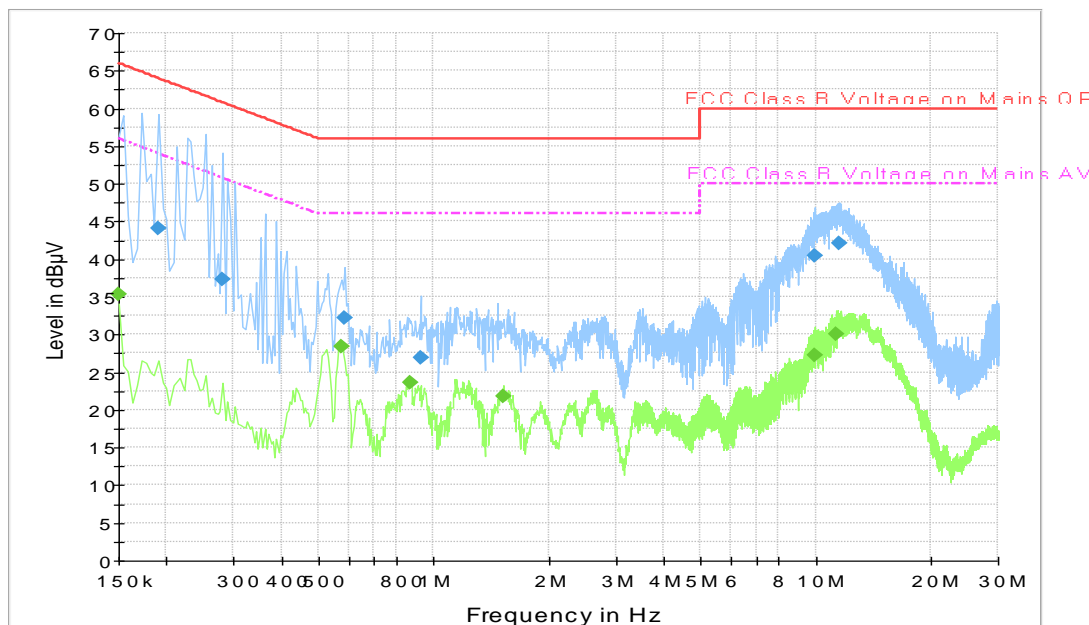


Figure A.9 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190500	44.1	N	19.8	19.9	64.0
0.280500	37.2	L1	19.8	23.6	60.8
0.586500	32.2	N	19.8	23.8	56.0
0.924000	27.0	L1	19.8	29.0	56.0
9.978000	40.5	L1	19.7	19.5	60.0
11.476500	42.1	L1	19.7	17.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	35.4	L1	20.2	20.6	56.0
0.573000	28.3	N	19.9	17.7	46.0
0.865500	23.7	N	19.8	22.3	46.0
1.518000	21.9	N	19.7	24.1	46.0
9.978000	27.2	L1	19.7	22.8	50.0
11.314500	30.1	N	19.7	19.9	50.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.

USB Mode, Set.4

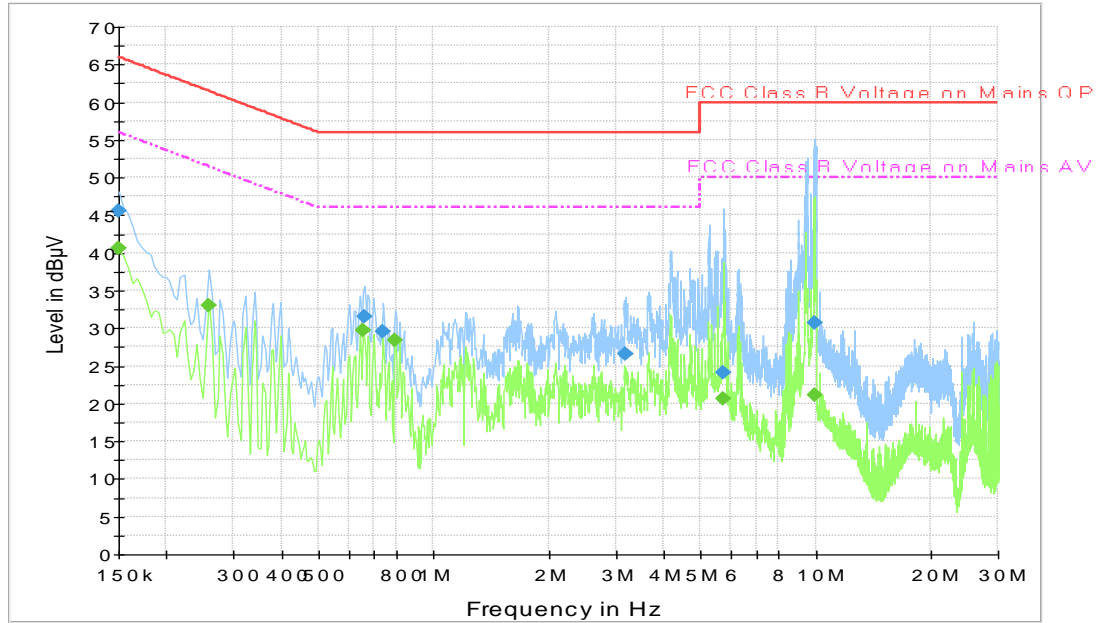


Figure A.10 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	45.6	L1	20.2	20.4	66.0
0.658500	31.5	N	19.8	24.5	56.0
0.739500	29.5	N	19.8	26.5	56.0
3.169500	26.6	L1	19.3	29.4	56.0
5.743500	24.1	L1	19.6	35.9	60.0
9.906000	30.8	L1	19.7	29.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	40.7	N	20.2	15.3	56.0
0.258000	33.0	N	19.8	18.5	51.5
0.654000	29.7	L1	19.8	16.3	46.0
0.793500	28.4	N	19.8	17.6	46.0
5.730000	20.6	L1	19.6	29.4	50.0
9.906000	21.2	L1	19.7	28.8	50.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.

USB Mode, Set.5

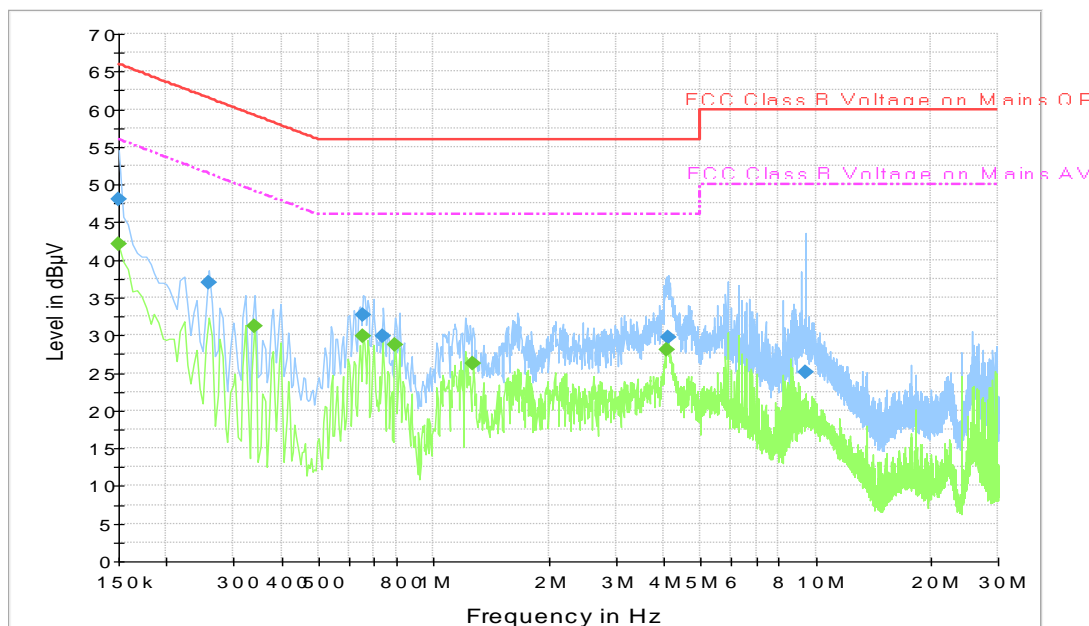


Figure A.11 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	48.0	N	20.2	18.0	66.0
0.258000	37.0	L1	19.8	24.5	61.5
0.654000	32.8	L1	19.8	23.2	56.0
0.739500	29.9	L1	19.8	26.1	56.0
4.105500	29.7	N	19.6	26.3	56.0
9.406500	25.2	N	19.8	34.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	42.0	L1	20.2	14.0	56.0
0.339000	31.1	L1	19.9	18.1	49.2
0.654000	29.8	N	19.8	16.2	46.0
0.793500	28.8	L1	19.8	17.2	46.0
1.270500	26.3	L1	19.7	19.7	46.0
4.065000	28.0	L1	19.6	18.0	46.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.

USB Mode, Set.6

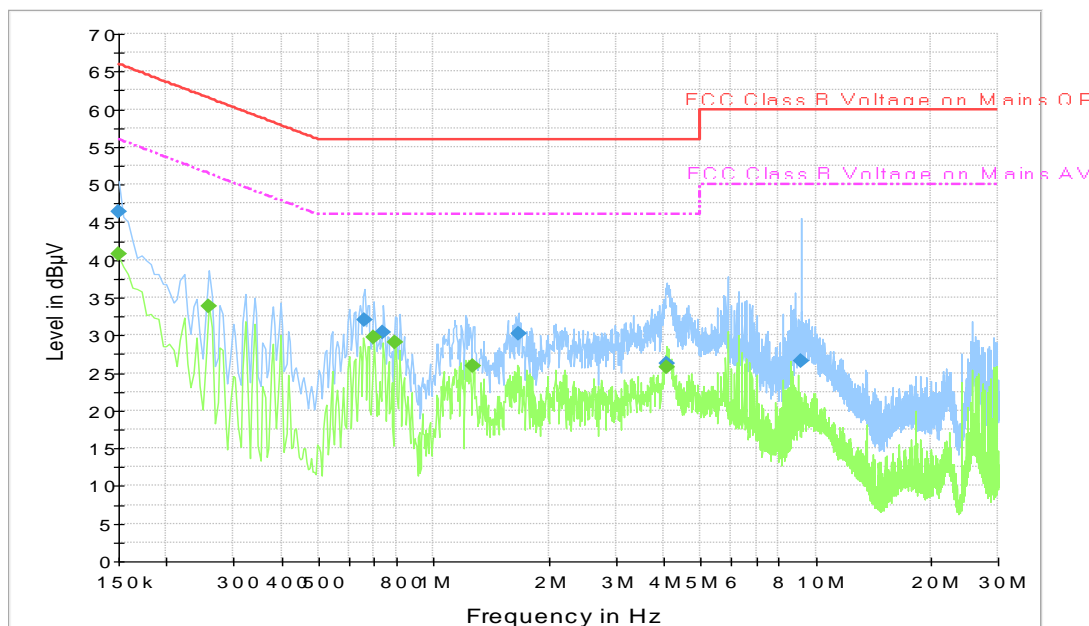


Figure A.12 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	46.4	L1	20.2	19.6	66.0
0.658500	32.1	N	19.8	23.9	56.0
0.739500	30.4	N	19.8	25.6	56.0
1.666500	30.2	N	19.7	25.8	56.0
4.083000	26.2	L1	19.6	29.8	56.0
9.141000	26.7	L1	19.7	33.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	40.8	L1	20.2	15.2	56.0
0.258000	33.8	L1	19.8	17.7	51.5
0.699000	29.7	L1	19.8	16.3	46.0
0.793500	29.1	L1	19.8	16.9	46.0
1.270500	26.0	L1	19.7	20.0	46.0
4.083000	25.8	L1	19.6	20.2	46.0

Note: The measurement results showed here are worst cases of the combinations of different batteries and USB cables.

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