



TEST REPORT

No. I23Z70141-EMC01

for

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE Phone with Bluetooth, WLAN

Model Name: SM-A057F/DS, SM-A057F

with

FCC ID: ZCASMA057F

Hardware Version: REV1.0

Software Version: A057F.001

Issued Date: 2023-08-10

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

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

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23Z70141-EMC01	Rev.0	1 st edition	2023-08-10

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

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 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 (ISED#: 24849). The detail accreditation scope can be found on NVLAP 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: 2023-07-24

Testing End Date: 2023-08-03

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)

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: Sunghoon Cho
Contact Email: ggobi.cho@samsung.com
Telephone: +82-10-2722-4159
Fax:

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

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE Phone with Bluetooth, WLAN
Model name	SM-A057F/DS, SM-A057F
FCC ID	ZCASMA057F

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
UT07a	2370141UT07a	REV1.0	A057F.001
UT08a	2370141UT08a	REV1.0	A057F.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	SLC-51	Ningde Amperex Technology Limited
AE2	Adapter	EP-TA800	SoluM Co.,Ltd.
AE3-1	Date Cable1 C-C	EP-DN980BWE	Guangxi Broad Telecommunication Co.,Ltd.
AE3-2	Date Cable2 C-C	EP-DN980BWE	CRESYN HANOI Co., Ltd
AE4	Date Cable3 A-C	EP-DR140AWE	/
AE5	Headset	ESH61ASFWE	/
AE6	PC	/	/
AE7	SD card	/	/
AE8	MHD	/	/

* The USB cables are shielded.

*AE2, AE4 and AE5 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.

3.4. General Description

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

Description	Multi-band GSM/WCDMA/LTE Phone with Bluetooth, WLAN	
Model name	SM-A057F/DS, SM-A057F	
Marketing name	/	
Brand name	SAMSUNG	
Cellular Bands	☒ GSM	Bands 850/900/1800MHz
	☐ CDMA	/
	☒ WCDMA	Bands 1/5/8
	☒ LTE	Bands 1/3/5/7/8/20/28/38/40/41
	☐ 5G NR SA	/
	☐ 5G NR NSA	/
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	☒ BR ☒ 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	3.6V	
Extreme High Voltage	4.1V	

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA Band 5, and LTE Band 5.

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.

3.5. EUT set-ups

Set-up

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	UT14a + AE2 + AE3-1 +AE5	Adapter + cable+ headset
Set.2	UT14a + AE2 + AE3-1	Adapter + cable
Set.3	UT14a + AE2 + AE3-2 +AE5	Adapter + cable+ headset
Set.4	UT14a + AE3-1/2 + UT15a +AE5	EUT+EUT+ headset
Set.5	UT14a + AE3-1/2 + HD	EUT+HD+ headset
Set.6	UT14a + AE3-1/2 + AE5 +PC	Type C communication with PC
Set.7	UT14a + AE4 + AE5 +PC+SD	USB communication with PC+SD

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	FM(Low/Mid/High channel)	RE, CE
mode.5	OTG Phone to Phone	RE only
mode.6	OTG + Mobile HD+MP4	RE only
mode.7	USB DATA (TYPE C)	RE, CE
mode.8	USB DATA (USB, SD TO PC)	RE, CE
mode.9	CXX RX mode	GSM850, WCDMA Band 5, LTE Band 5 (Low/Mid/High channel)

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.

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	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
	BR	Re-use test data from basic model report.

6.1. Summary of Test Results

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)

6.2. Statements

According to the product declaration provided by the applicant, the only difference between SM-A057F/DS, and SM-A057F was Dual SIM tray and Single SIM tray, the tests were mainly performed on SM-A057F/DS, and SM-A057F shared SM-A057F/DS results.

7. Test Equipments Utilized

Test Equipment

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURER	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	R&S	2023-09-22	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	01177	Schwarzbeck	2023-08-03	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	Signal Generator	SMBV100A	260613	R&S	2024-02-14	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

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 MS is operating in the USB mode, charging mode, MP3, MP4, CAMERA, OTG, SD, FM 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.

The FM radio mode radiated testing was performed with the Low/Mid/High channel. Only the worst cases 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.

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:

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

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Measurement uncertainty (worst case): 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.

Set.1+Mode3, Adapter+ Rear Camera+ Headset,

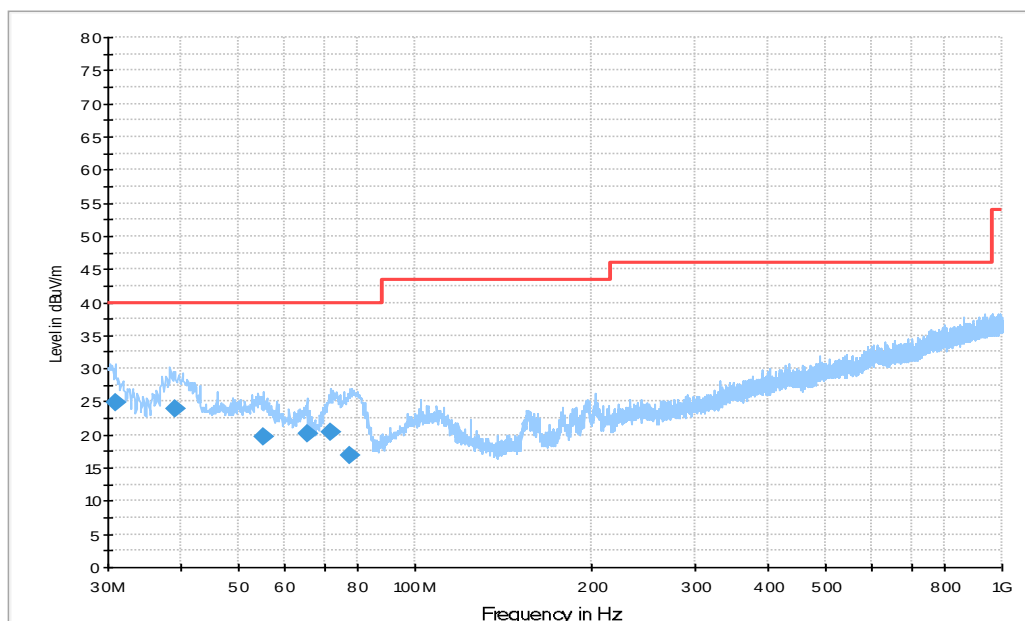


Figure A.1 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.291000	26.9	100.0	V	115.0	-3.6	13.1	40.0
37.760000	25.1	100.0	V	115.0	-1.9	14.9	40.0
41.834000	19.5	100.0	V	-32.0	-0.7	20.5	40.0
54.444000	19.7	113.0	V	135.0	-0.1	20.3	40.0
63.077000	19.9	100.0	V	0.0	-2.0	20.1	40.0
200.42900	20.6	100.0	H	0.0	-1.1	22.9	43.5

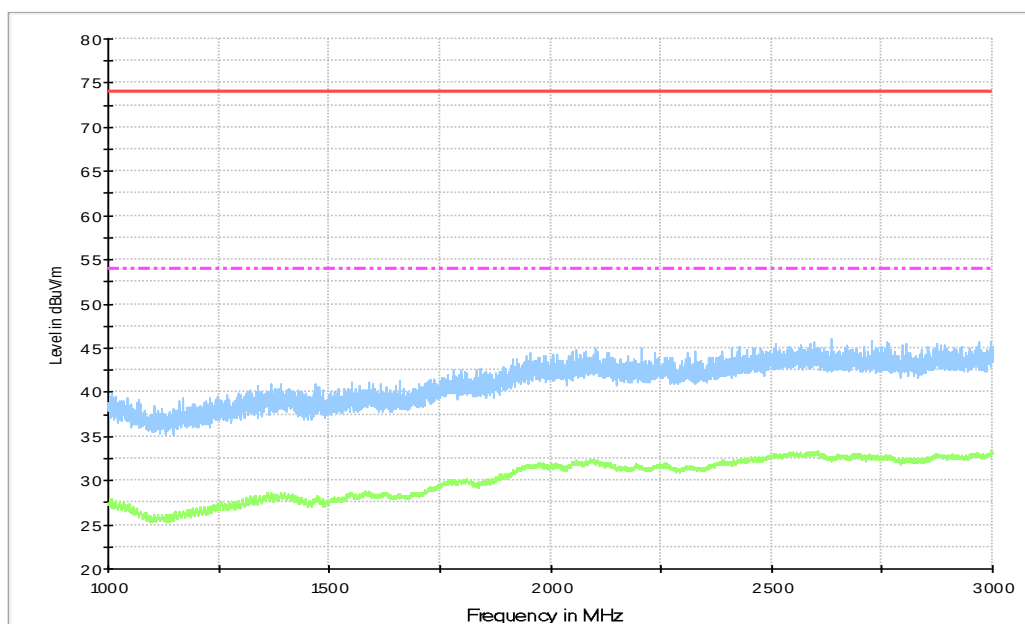


Figure A.2 Radiated Emission from 1GHz to 3GHz

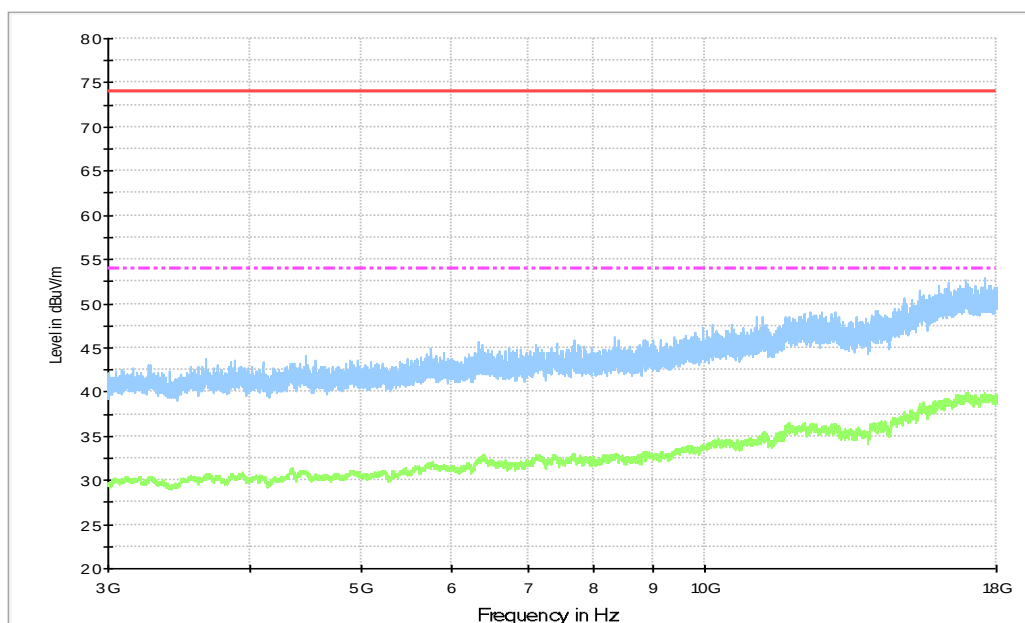


Figure A.3 Radiated Emission from 3GHz to 18GHz

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)
16928.000	39.91	-24.6	41.2	23.30	54.0	14.1	H
16929.000	39.91	-24.6	41.2	23.30	54.0	14.1	H
16922.000	39.89	-24.7	41.3	23.30	54.0	14.1	H
16930.000	39.89	-24.6	41.2	23.28	54.0	14.1	H
17612.000	39.89	-23.7	40.6	23.02	54.0	14.1	H
16946.000	39.89	-24.6	41.2	23.26	54.0	14.1	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)
17607.000	53.0	-23.7	40.6	36.10	74.0	21.0	H
16930.000	52.7	-24.6	41.2	36.08	74.0	21.3	H
17554.500	52.5	-23.9	40.6	35.75	74.0	21.5	H
16944.500	52.3	-24.6	41.2	35.70	74.0	21.7	H
16330.000	52.3	-25.3	41.0	36.66	74.0	21.7	V
16986.500	52.2	-24.6	41.1	35.68	74.0	21.8	H

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

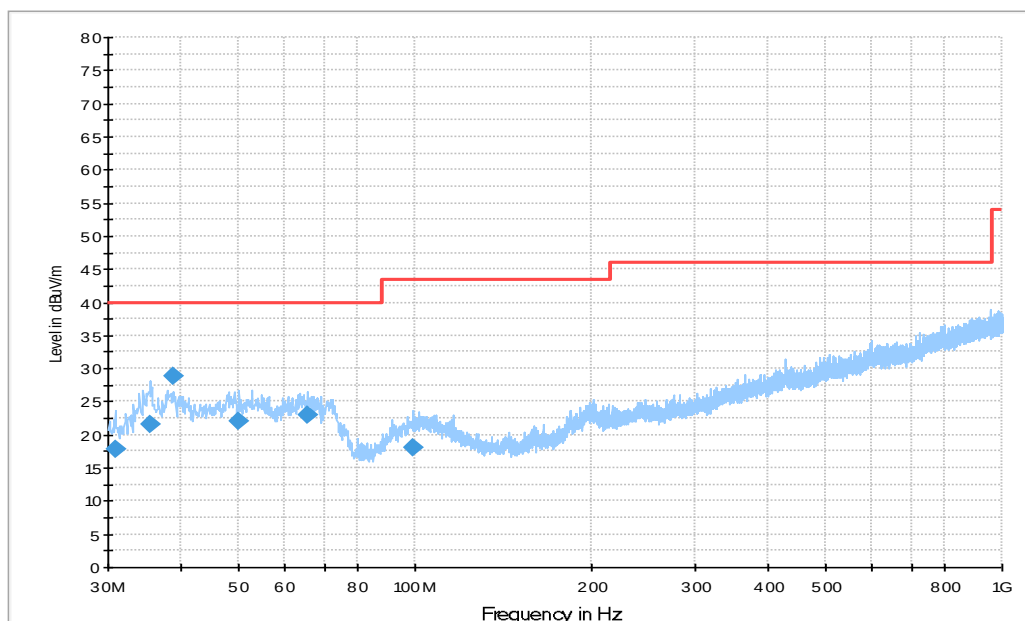


Figure A.4 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.873000	17.7	113.0	V	315.0	-3.7	22.3	40.0
35.432000	21.6	100.0	V	225.0	-2.8	18.4	40.0
38.730000	28.8	100.0	V	296.0	-1.6	11.2	40.0
50.176000	22.2	125.0	V	186.0	0.2	17.8	40.0
65.599000	23.1	100.0	V	77.0	-2.6	16.9	40.0
99.064000	18.0	125.0	H	25.0	-1.7	25.5	43.5

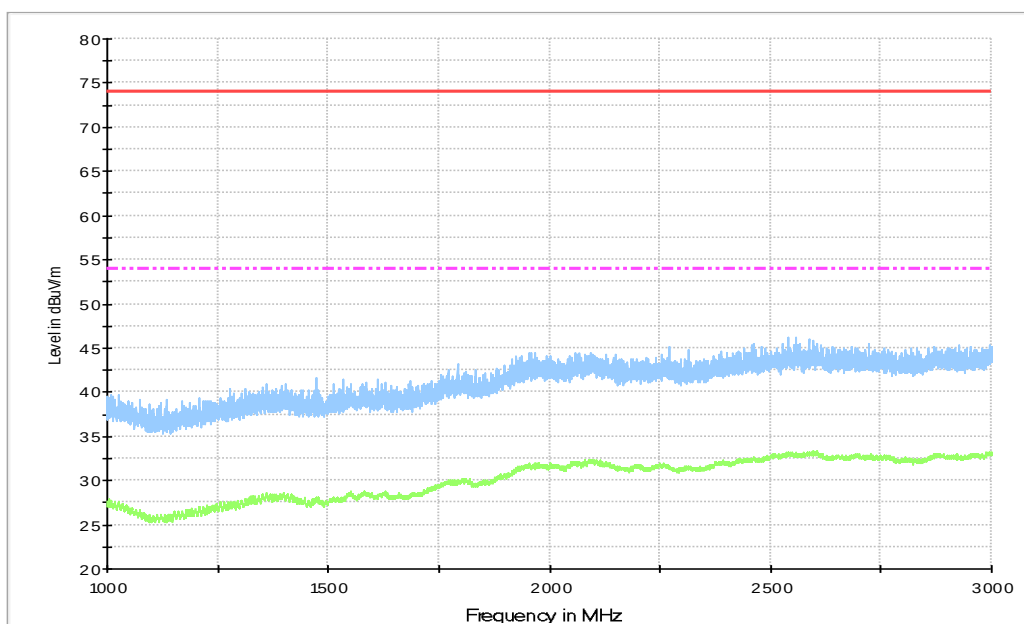


Figure A.5 Radiated Emission from 1GHz to 3GHz

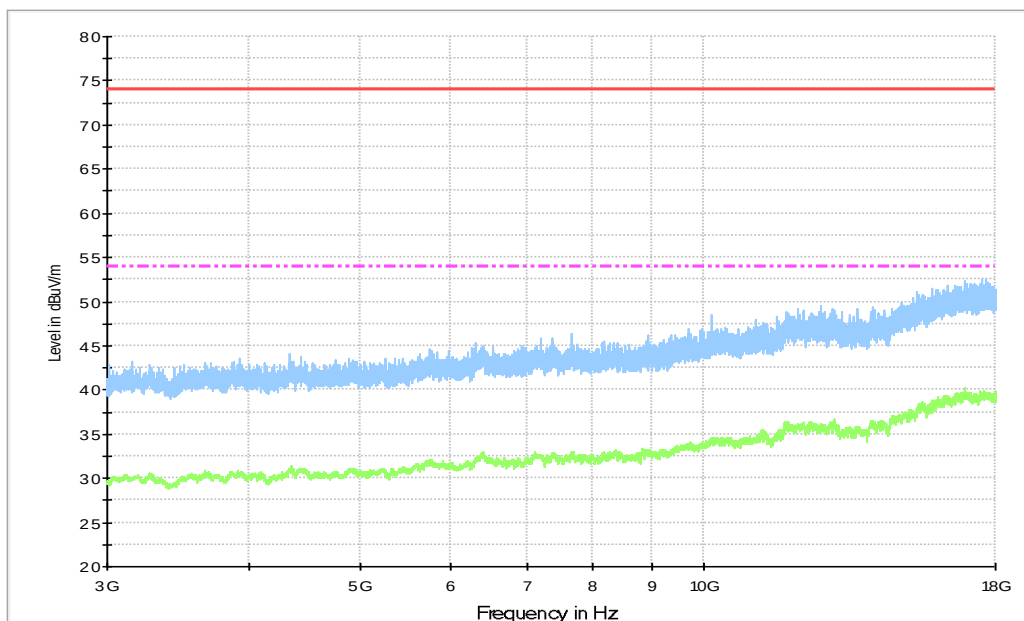


Figure A.6 Radiated Emission from 3GHz to 18GHz

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)
16927.500	40.16	-24.6	41.2	23.56	54.0	13.8	H
16928.500	40.09	-24.6	41.2	23.49	54.0	13.9	H
16921.000	40.04	-24.7	41.3	23.44	54.0	14.0	H
16924.500	39.96	-24.7	41.3	23.36	54.0	14.0	H
16923.500	39.92	-24.7	41.3	23.33	54.0	14.1	H
16925.500	39.91	-24.6	41.2	23.31	54.0	14.1	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)
17522.000	52.6	-23.9	40.6	35.95	74.0	21.4	H
17667.500	52.5	-23.7	40.6	35.58	74.0	21.5	V
16900.500	52.4	-24.7	41.3	35.81	74.0	21.6	H
17636.500	52.3	-23.7	40.6	35.41	74.0	21.7	H
17746.000	52.2	-23.6	40.6	35.31	74.0	21.8	H
17443.000	52.1	-24.1	40.7	35.52	74.0	21.9	H

Set.3+Mode2, Adapter + Headset +Front C

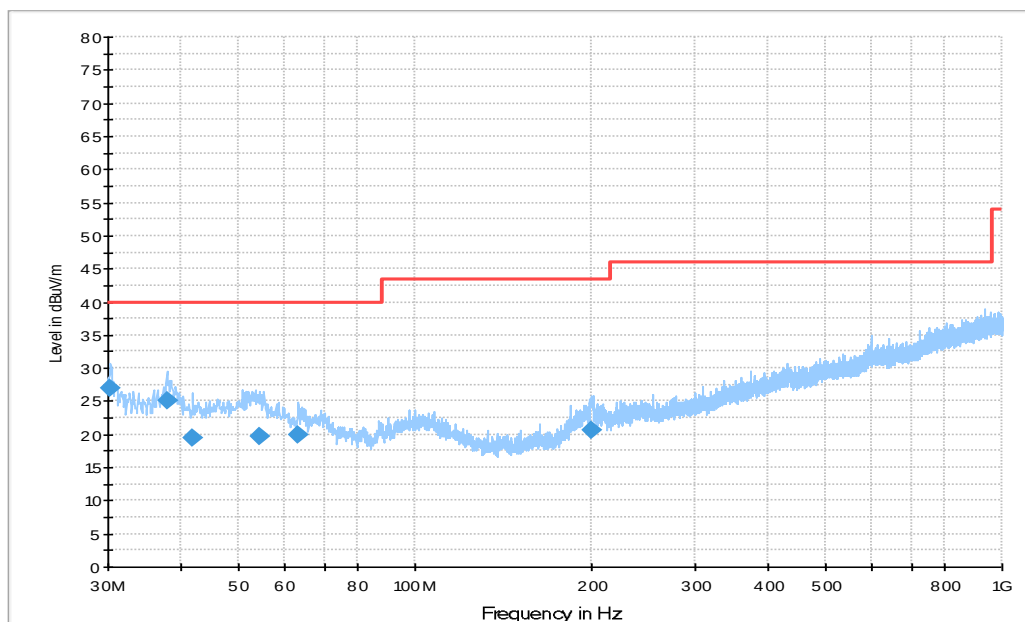


Figure A.7 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.291000	26.9	100.0	V	115.0	-3.6	13.1	40.0
37.760000	25.1	100.0	V	115.0	-1.9	14.9	40.0
41.834000	19.5	100.0	V	-32.0	-0.7	20.5	40.0
54.444000	19.7	113.0	V	135.0	-0.1	20.3	40.0
63.077000	19.9	100.0	V	0.0	-2.0	20.1	40.0
200.42900	20.6	100.0	H	0.0	-1.1	22.9	43.5

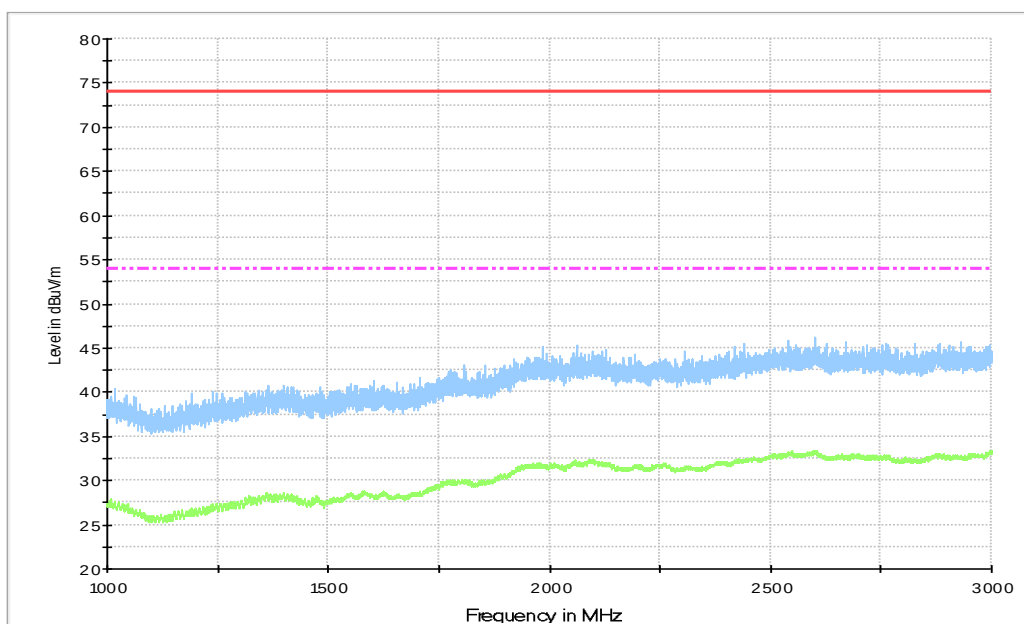


Figure A.8 Radiated Emission from 1GHz to 3GHz

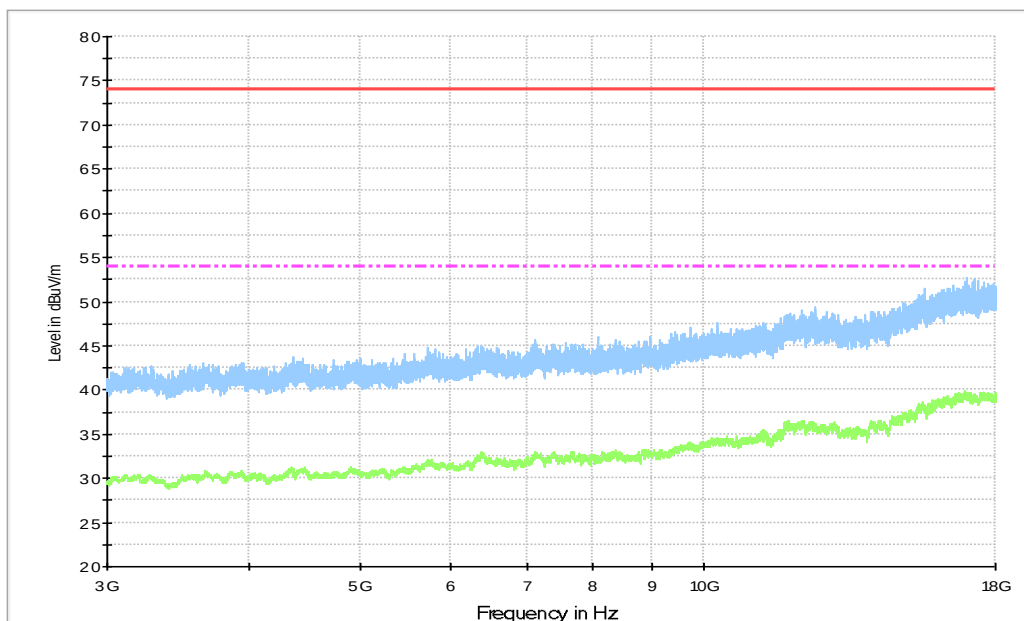


Figure A.9 Radiated Emission from 3GHz to 18GHz

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)
16930.000	39.95	-24.6	41.2	23.34	54.0	14.0	H
16936.500	39.89	-24.6	41.2	23.28	54.0	14.1	H
16938.500	39.85	-24.6	41.2	23.23	54.0	14.2	H
16928.500	39.83	-24.6	41.2	23.22	54.0	14.2	H
16912.500	39.82	-24.7	41.3	23.24	54.0	14.2	H
16926.500	39.81	-24.6	41.2	23.21	54.0	14.2	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)
16977.500	52.7	-24.6	41.1	36.18	74.0	21.3	H
17268.000	52.5	-24.3	40.8	35.99	74.0	21.5	H
17361.000	52.3	-24.2	40.7	35.76	74.0	21.7	H
16925.500	52.3	-24.6	41.2	35.66	74.0	21.7	H
17608.500	52.2	-23.7	40.6	35.38	74.0	21.8	V
16927.000	52.1	-24.6	41.2	35.54	74.0	21.9	H

Set.4 +Mode4 +Mode5, OTG + +FM

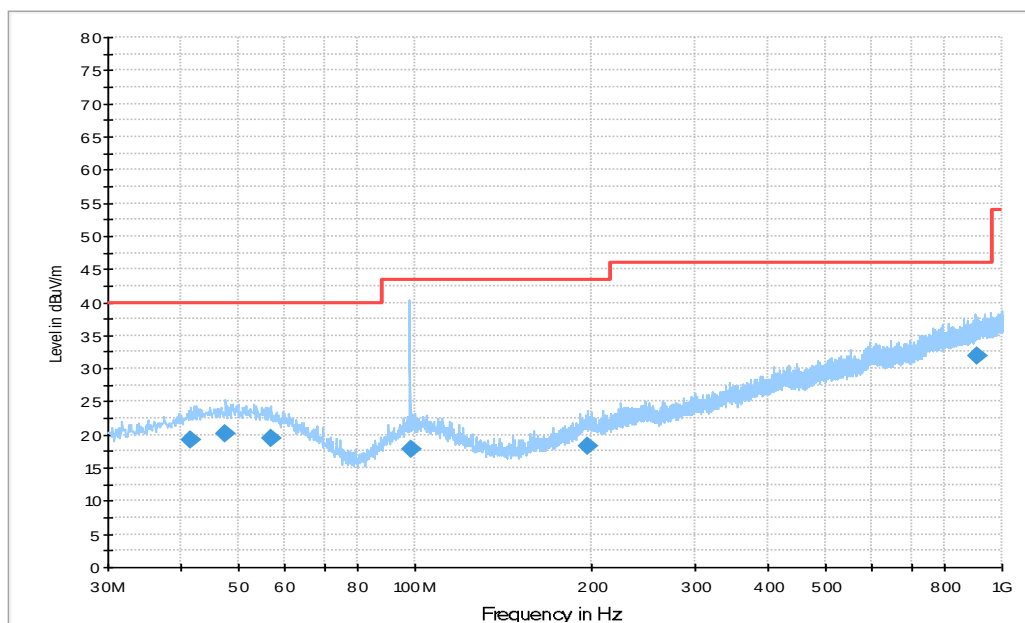


Figure A.10 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
41.446000	19.3	125.0	V	231.0	-0.8	20.7	40.0
47.654000	20.1	125.0	H	76.0	-0.1	19.9	40.0
56.675000	19.4	100.0	H	135.0	-0.5	20.6	40.0
98.870000	17.9	100.0	H	295.0	-1.7	25.6	43.5
197.32500	18.3	100.0	H	0.0	-0.9	25.2	43.5
903.67900	31.9	100.0	V	135.0	12.8	14.1	46.0

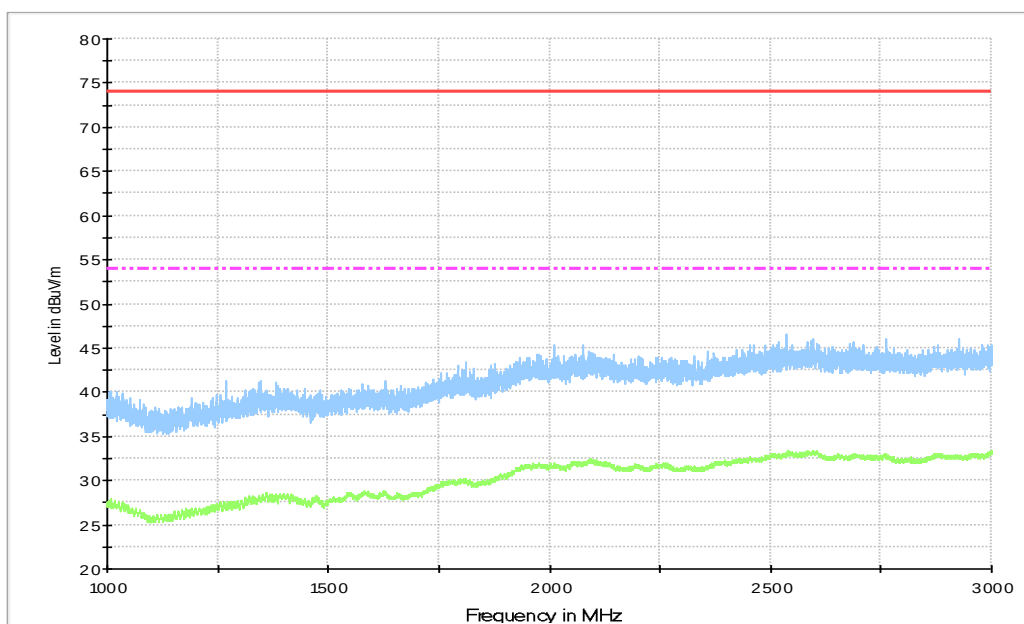


Figure A.11 Radiated Emission from 1GHz to 3GHz

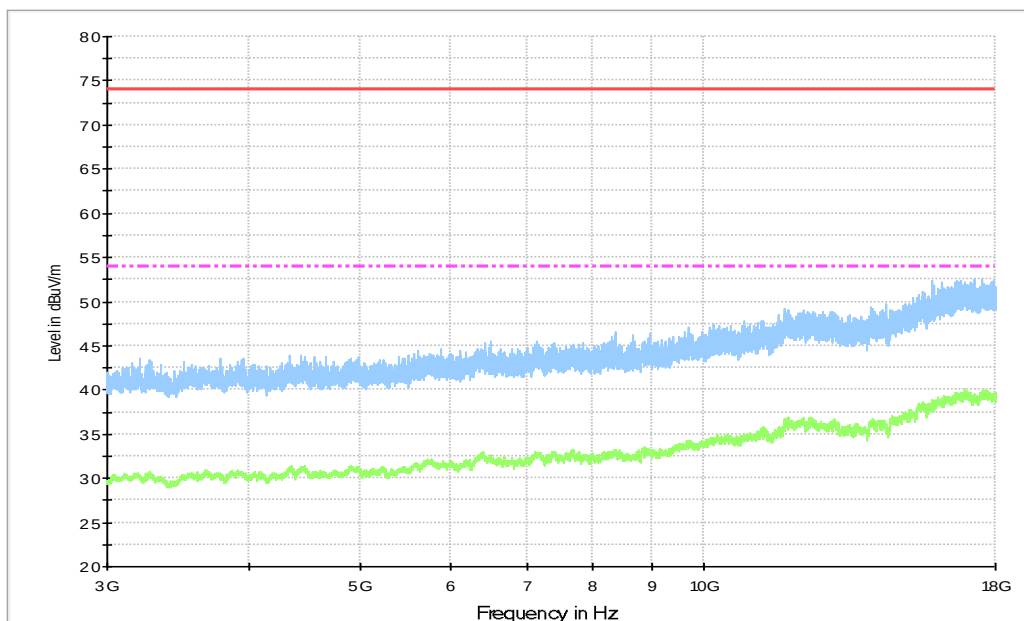


Figure A.12 Radiated Emission from 3GHz to 18GHz

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)
16930.500	40.13	-24.6	41.2	23.42	54.0	13.9	V
16926.500	40.02	-24.6	41.2	23.42	54.0	14.0	V
16927.500	40.01	-24.6	41.2	23.41	54.0	14.0	V
16924.500	39.99	-24.7	41.3	23.39	54.0	14.0	V
16938.000	39.99	-24.6	41.2	23.37	54.0	14.0	V
17603.500	39.98	-23.8	40.6	23.13	54.0	14.0	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)
17257.000	52.6	-24.3	40.8	36.08	74.0	21.4	V
17501.500	52.5	-24.0	40.6	35.92	74.0	21.5	H
17923.500	52.5	-23.4	40.5	35.34	74.0	21.5	H
16803.000	52.4	-25.1	41.3	36.20	74.0	21.6	V
15822.500	52.4	-26.5	40.9	37.98	74.0	21.6	H
16688.000	52.3	-25.3	41.5	36.10	74.0	21.7	V

Set.5+Mode6+Mode9, OTG +MP4 +RX W850

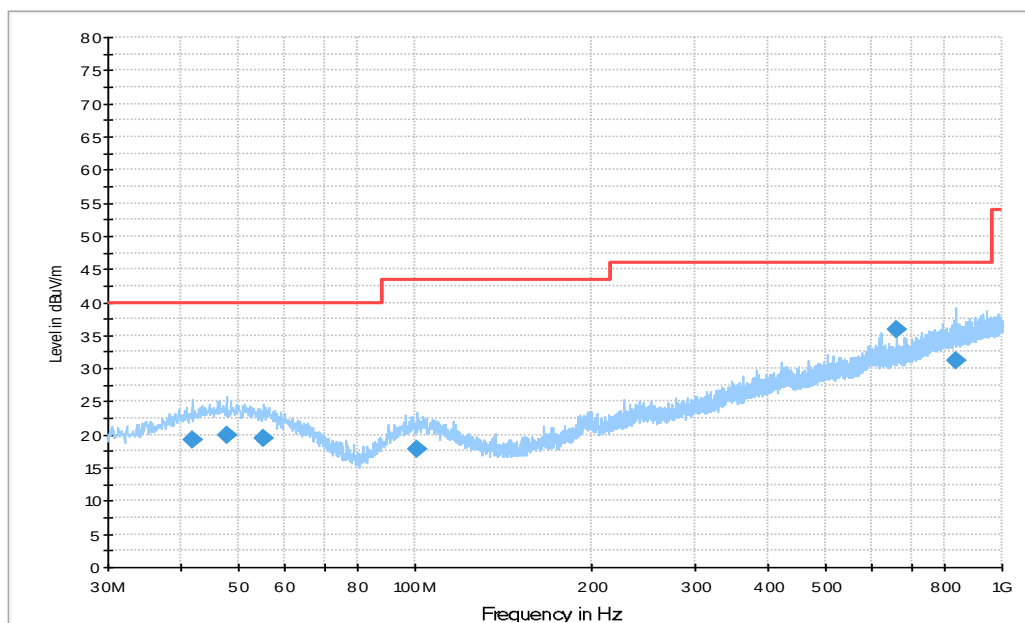


Figure A.13 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
41.737000	19.2	100.0	H	-20.0	-0.7	20.8	40.0
47.751000	20.0	125.0	H	199.0	-0.1	20.0	40.0
55.123000	19.4	100.0	H	231.0	-0.2	20.6	40.0
101.10100	17.7	125.0	H	179.0	-1.3	25.8	43.5
660.11200	35.8	125.0	H	82.0	9.4	10.2	46.0
832.28700	31.3	113.0	H	90.0	11.7	14.7	46.0

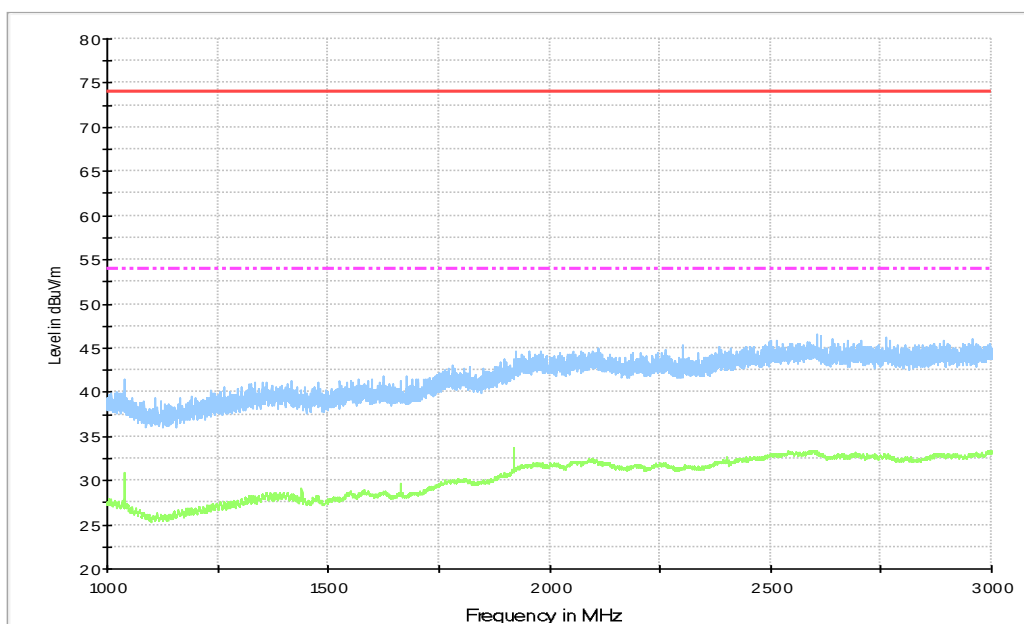


Figure A.14 Radiated Emission from 1GHz to 3GHz

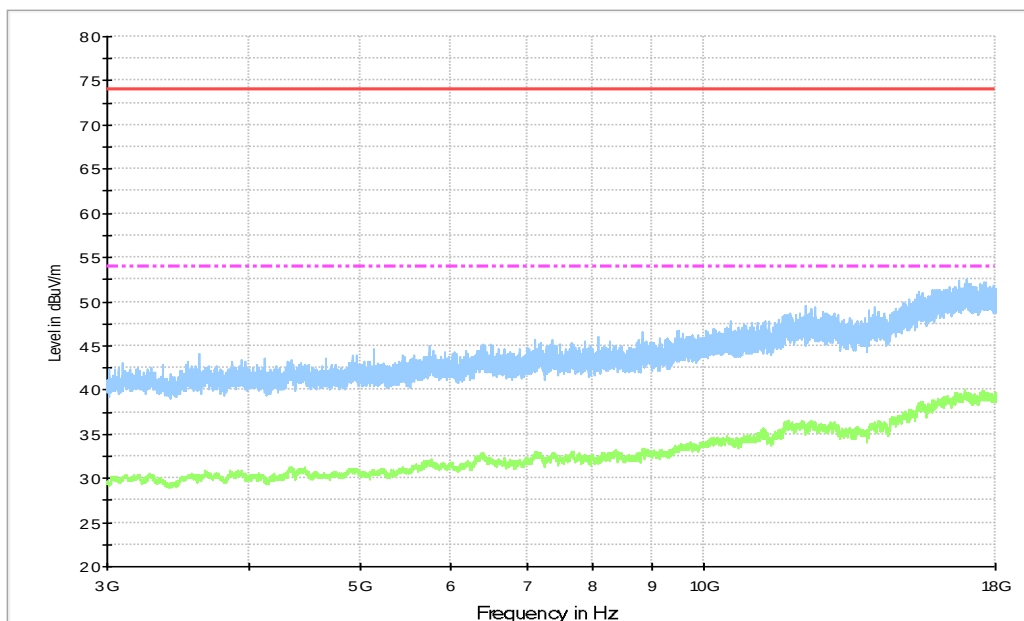


Figure A.15 Radiated Emission from 3GHz to 18GHz

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)
1040.000	30.89	-38.2	28.5	40.61	54.0	23.1	V
1440.000	29.20	-37.4	28.3	38.37	54.0	24.8	H
1664.600	29.63	-37.0	28.3	38.36	54.0	24.4	H
1920.400	33.37	-36.8	30.9	39.31	54.0	20.6	H
16933.000	39.87	-24.6	41.2	23.26	54.0	14.1	H
16927.000	39.87	-24.6	41.2	23.26	54.0	14.1	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)
17010.500	52.6	-24.6	41.1	36.15	74.0	21.4	H
16974.500	52.5	-24.6	41.2	36.00	74.0	21.5	H
16744.000	52.3	-25.2	41.4	36.12	74.0	21.7	V
17600.500	52.2	-23.8	40.6	35.38	74.0	21.8	V
17672.500	52.2	-23.7	40.6	35.27	74.0	21.8	V
16923.000	52.1	-24.7	41.3	35.47	74.0	21.9	V

Set.7+Mode8+Mode9, USB mode (SD) + Headset + RX LTE Band5

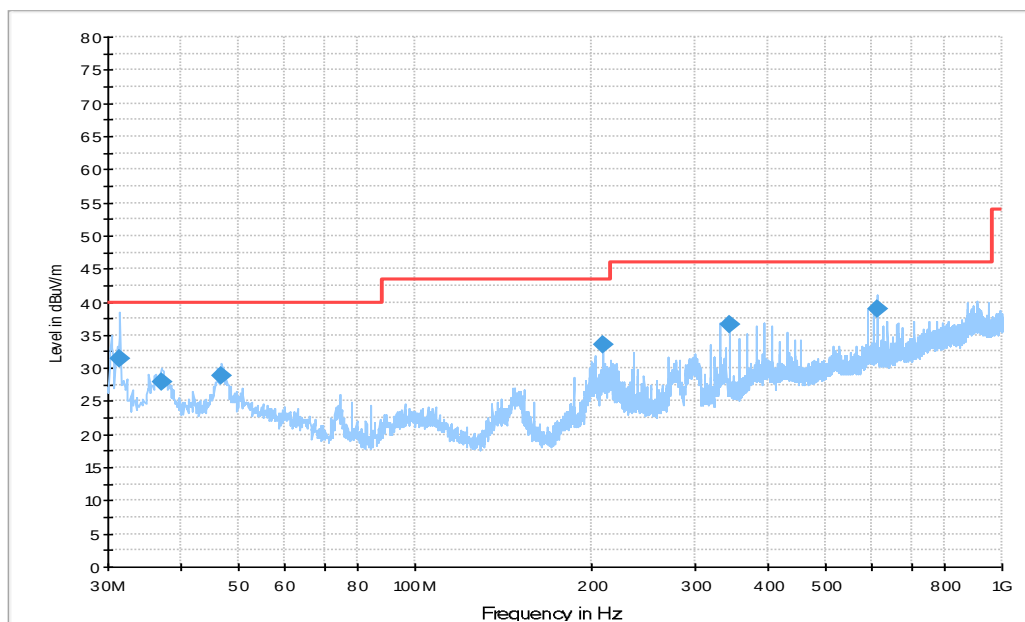


Figure A.16 Radiated Emission from 30MHz to 1GHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
31.455000	31.5	100.0	V	45.0	-3.7	8.5	40.0
36.984000	28.0	100.0	V	191.0	-2.2	12.0	40.0
46.878000	28.8	125.0	V	57.0	0.0	11.2	40.0
208.86800	33.5	113.0	H	76.0	-1.5	10.0	43.5
344.08600	36.6	100.0	H	126.0	3.5	9.4	46.0
614.42500	39.0	100.0	V	192.0	9.2	7.0	46.0

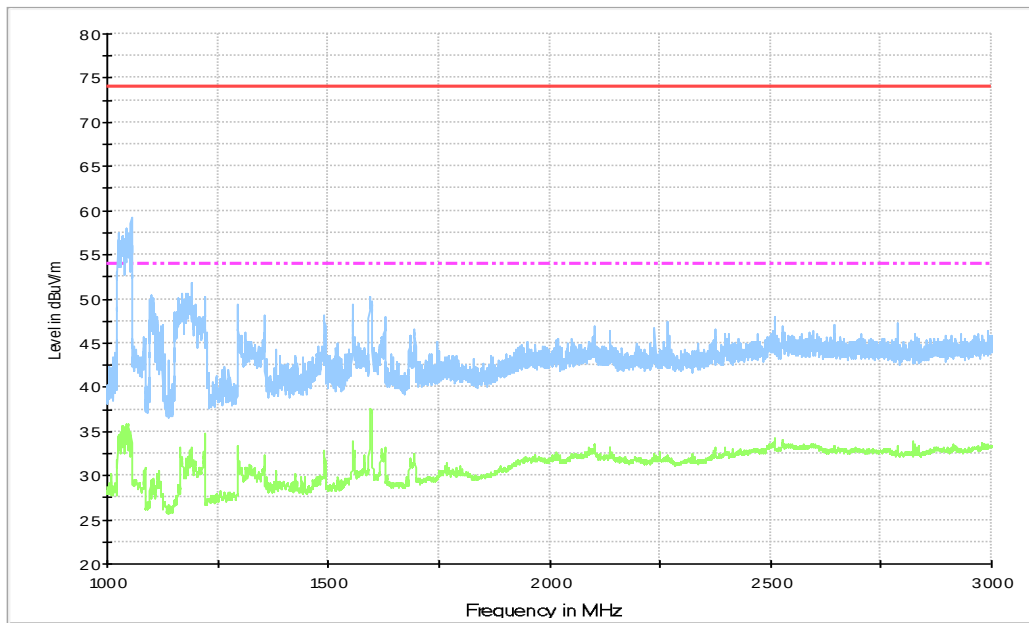


Figure A.17 Radiated Emission from 1GHz to 3GHz

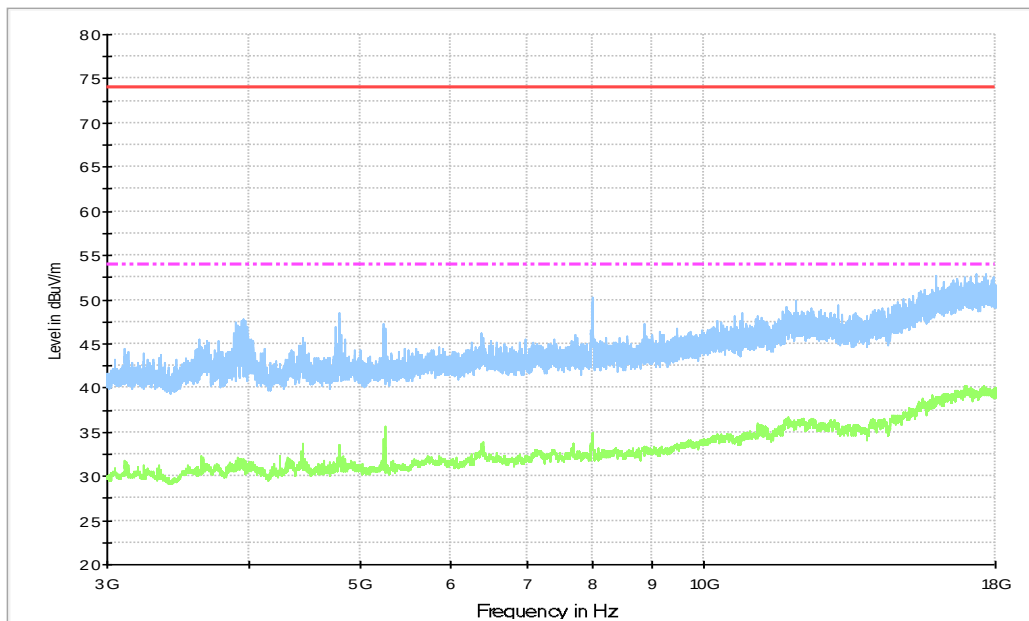


Figure A.18 Radiated Emission from 3GHz to 18GHz

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)
1045.800	35.88	-38.3	28.4	45.83	54.0	18.1	V
1220.400	34.77	-38.0	27.9	44.90	54.0	19.2	V
1295.600	33.29	-37.8	28.4	42.70	54.0	20.7	V
1596.400	37.60	-37.0	28.5	46.07	54.0	16.4	V
5250.000	35.60	-35.0	34.2	36.38	54.0	18.4	V
7989.000	34.88	-32.8	35.8	31.97	54.0	19.1	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	59.2	-38.4	28.2	69.39	74.0	14.8	V
1189.400	51.8	-38.0	27.6	62.14	74.0	22.2	V
1295.800	48.8	-37.8	28.4	58.26	74.0	25.2	V
1594.000	50.2	-37.0	28.5	58.63	74.0	23.8	V
5245.500	47.3	-34.9	34.2	48.02	74.0	26.7	H
7989.500	60.2	-32.8	35.8	57.29	74.0	13.8	V

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 MS is operating in the USB mode, charging mode, MP3, MP4, CAMERA, SD, FM 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

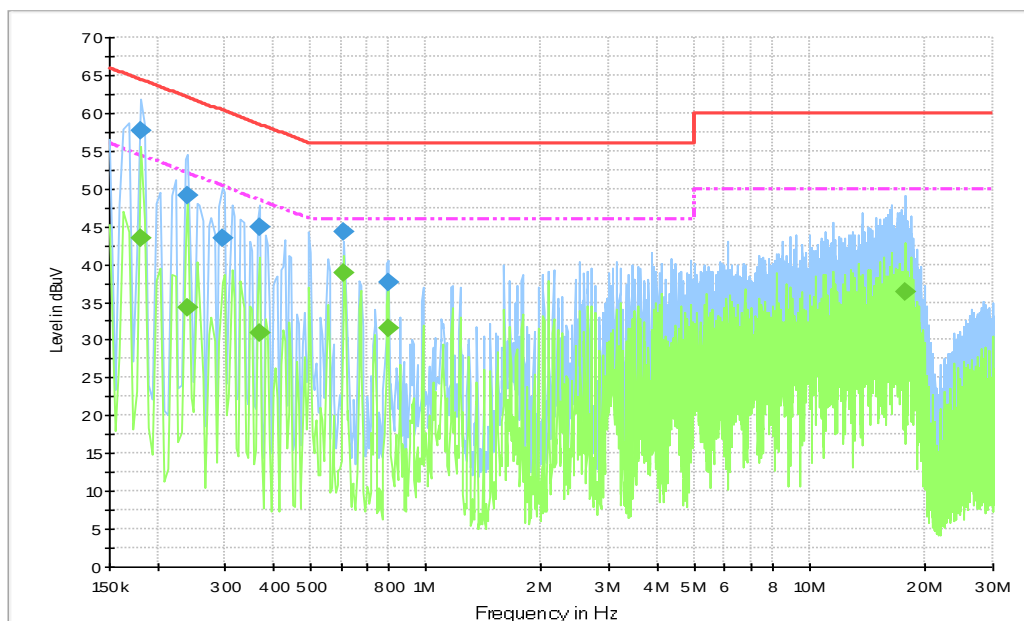
RBW/IF bandwidth	Sweep Time(s)
9kHz	1

A.2.5 Measurement Results

Measurement uncertainty: $U = 3.10 \text{ dB}$, $k=2$.

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.19 Conducted Emission

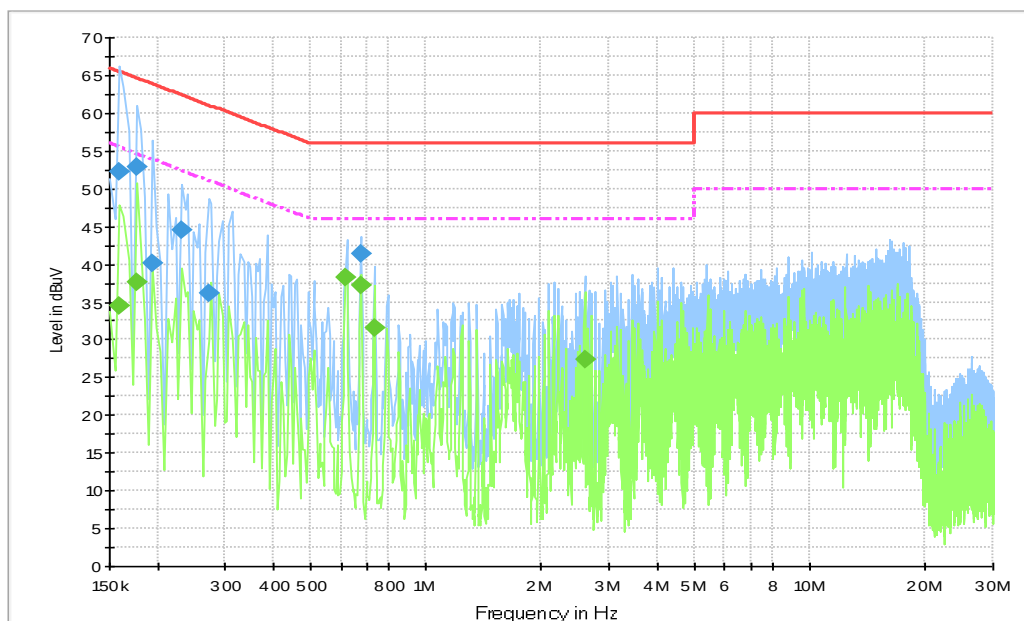
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	57.7	2000.0	9.000	On	N	22.7	6.7	64.4
0.240000	49.2	2000.0	9.000	On	N	19.7	12.9	62.1
0.294000	43.5	2000.0	9.000	On	N	19.7	16.9	60.4
0.370500	44.9	2000.0	9.000	On	L1	19.8	13.6	58.5
0.613500	44.3	2000.0	9.000	On	N	19.7	11.7	56.0
0.798000	37.6	2000.0	9.000	On	L1	19.7	18.4	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	43.5	2000.0	9.000	On	N	22.7	10.9	54.4
0.240000	34.3	2000.0	9.000	On	L1	19.7	17.8	52.1
0.370500	31.0	2000.0	9.000	On	L1	19.8	17.5	48.5
0.613500	39.0	2000.0	9.000	On	N	19.7	7.0	46.0
0.798000	31.6	2000.0	9.000	On	N	19.7	14.4	46.0
17.803500	36.3	2000.0	9.000	On	N	19.9	13.7	50.0

Set.2+Model1



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

Figure A.20 Conducted Emission

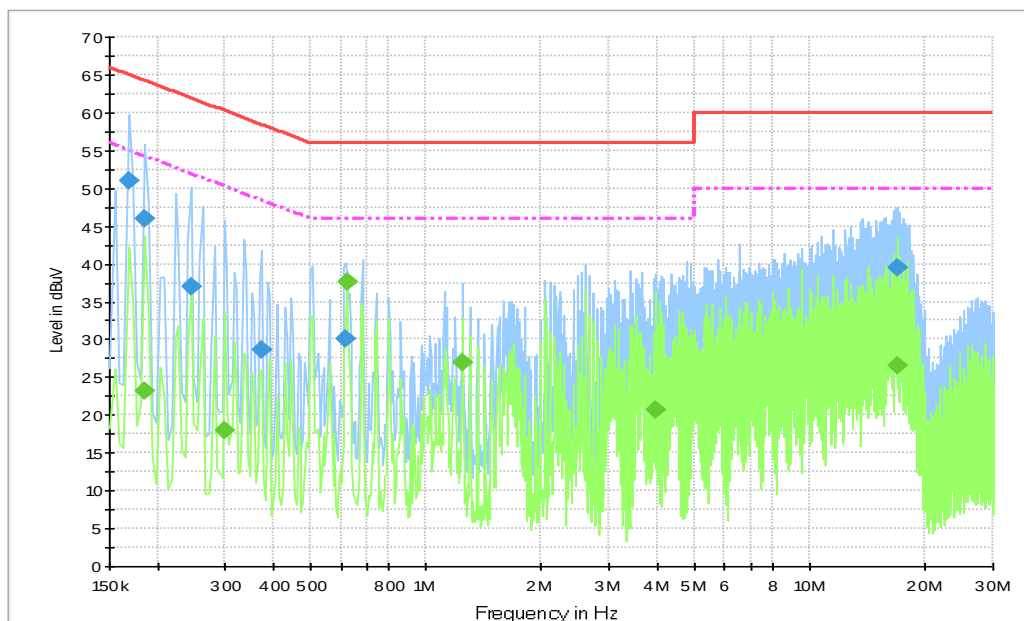
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	52.3	2000.0	9.000	On	L1	26.8	13.2	65.5
0.177000	52.8	2000.0	9.000	On	N	23.5	11.9	64.6
0.195000	40.2	2000.0	9.000	On	N	20.5	23.6	63.8
0.231000	44.5	2000.0	9.000	On	N	19.7	17.9	62.4
0.271500	36.1	2000.0	9.000	On	N	19.7	25.0	61.1
0.676500	41.5	2000.0	9.000	On	N	19.7	14.5	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	34.4	2000.0	9.000	On	L1	26.8	21.1	55.5
0.177000	37.6	2000.0	9.000	On	N	23.5	17.0	54.6
0.618000	38.3	2000.0	9.000	On	L1	19.7	7.7	46.0
0.676500	37.2	2000.0	9.000	On	N	19.7	8.8	46.0
0.735000	31.5	2000.0	9.000	On	N	19.7	14.5	46.0
2.589000	27.4	2000.0	9.000	On	L1	19.6	18.6	46.0

Set.3+Mode2



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

Figure A.21 Conducted Emission

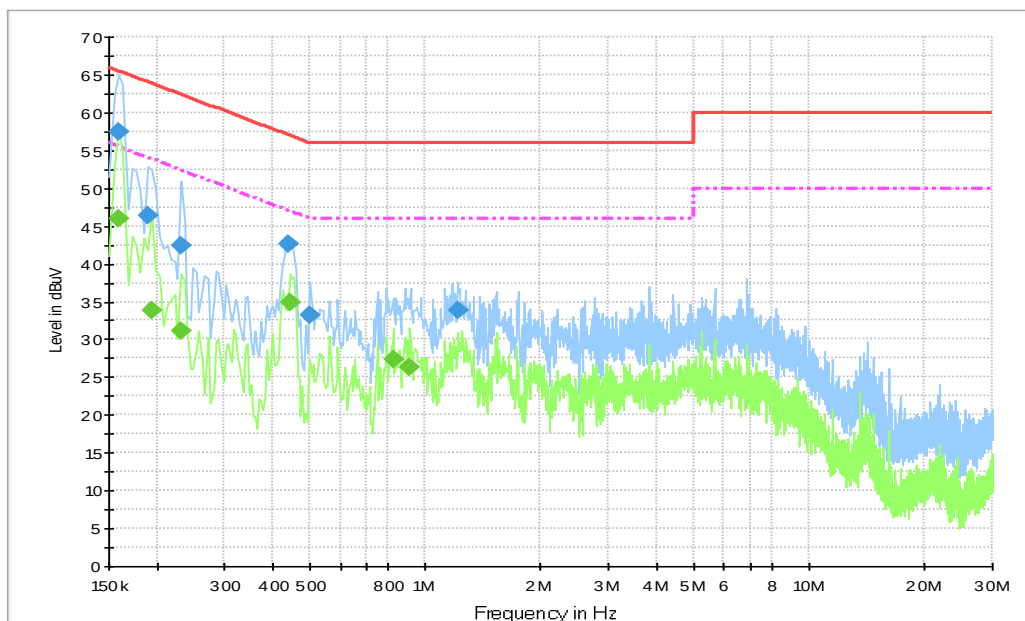
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.168000	50.9	2000.0	9.000	On	L1	25.1	14.1	65.1
0.186000	45.9	2000.0	9.000	On	L1	22.0	18.3	64.2
0.244500	36.9	2000.0	9.000	On	L1	19.7	25.0	61.9
0.375000	28.6	2000.0	9.000	On	L1	19.8	29.8	58.4
0.618000	30.0	2000.0	9.000	On	L1	19.7	26.0	56.0
16.876500	39.5	2000.0	9.000	On	L1	19.9	20.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.186000	23.2	2000.0	9.000	On	L1	22.0	31.0	54.2
0.298500	17.9	2000.0	9.000	On	L1	19.7	32.4	50.3
0.622500	37.7	2000.0	9.000	On	N	19.7	8.3	46.0
1.248000	27.0	2000.0	9.000	On	N	19.6	19.0	46.0
3.975000	20.7	2000.0	9.000	On	L1	19.6	25.3	46.0
16.989000	26.5	2000.0	9.000	On	L1	19.9	23.5	50.0

Set.6+Mode4+Mode7,



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

Figure A.22 Conducted Emission

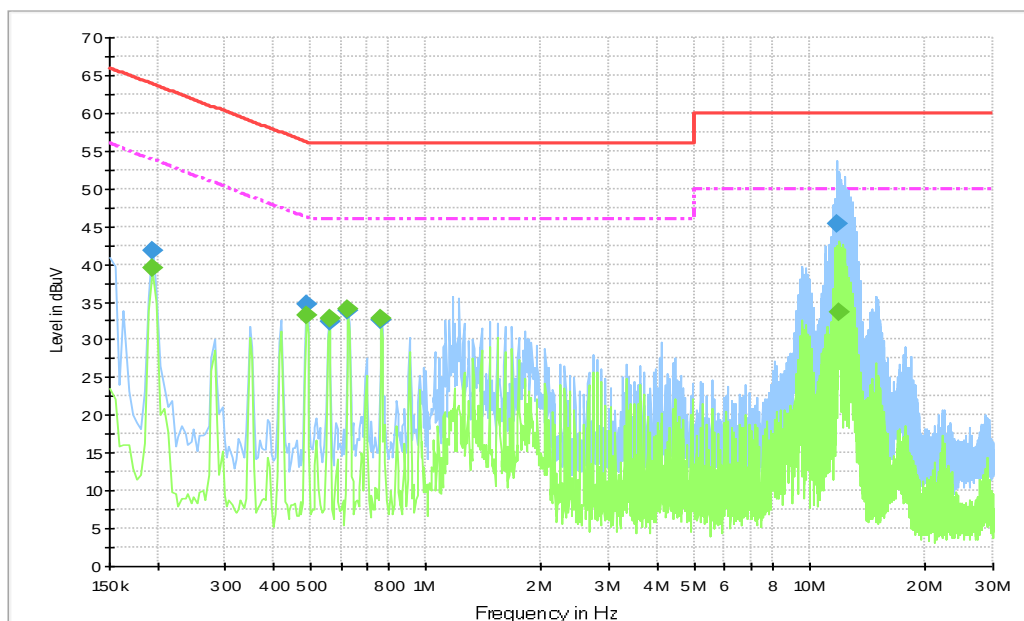
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	57.4	2000.0	9.000	On	N	26.8	8.1	65.5
0.190500	46.3	2000.0	9.000	On	N	21.2	17.7	64.0
0.231000	42.4	2000.0	9.000	On	L1	19.7	20.0	62.4
0.442500	42.5	2000.0	9.000	On	N	19.8	14.5	57.0
0.501000	33.1	2000.0	9.000	On	N	19.8	22.9	56.0
1.212000	33.9	2000.0	9.000	On	N	19.6	22.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	46.1	2000.0	9.000	On	N	26.8	9.4	55.5
0.195000	33.8	2000.0	9.000	On	N	20.5	20.0	53.8
0.231000	31.0	2000.0	9.000	On	L1	19.7	21.4	52.4
0.447000	34.9	2000.0	9.000	On	N	19.8	12.0	46.9
0.825000	27.4	2000.0	9.000	On	N	19.7	18.6	46.0
0.910500	26.2	2000.0	9.000	On	L1	19.7	19.8	46.0

Set.7+Mode8+Mode9



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

Figure A.23 Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.195000	41.8	2000.0	9.000	On	N	20.5	22.0	63.8
0.487500	34.6	2000.0	9.000	On	N	19.8	21.6	56.2
0.559500	32.5	2000.0	9.000	On	N	19.8	23.5	56.0
0.627000	33.9	2000.0	9.000	On	L1	19.7	22.1	56.0
0.766500	32.6	2000.0	9.000	On	N	19.7	23.4	56.0
11.791500	45.3	2000.0	9.000	On	L1	19.8	14.7	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.195000	39.4	2000.0	9.000	On	L1	20.5	14.4	53.8
0.487500	33.3	2000.0	9.000	On	N	19.8	12.9	46.2
0.559500	32.7	2000.0	9.000	On	N	19.8	13.3	46.0
0.627000	34.1	2000.0	9.000	On	L1	19.7	11.9	46.0
0.766500	32.7	2000.0	9.000	On	N	19.7	13.3	46.0
11.863500	33.7	2000.0	9.000	On	L1	19.8	16.3	50.0

ANNEX B: Persons involved in this testing

Test Item	Tester
Radiated Emission	Zhao Wenhui
Conducted Emission	Guo Qian

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