FCC/ISED EMC TEST REPORT

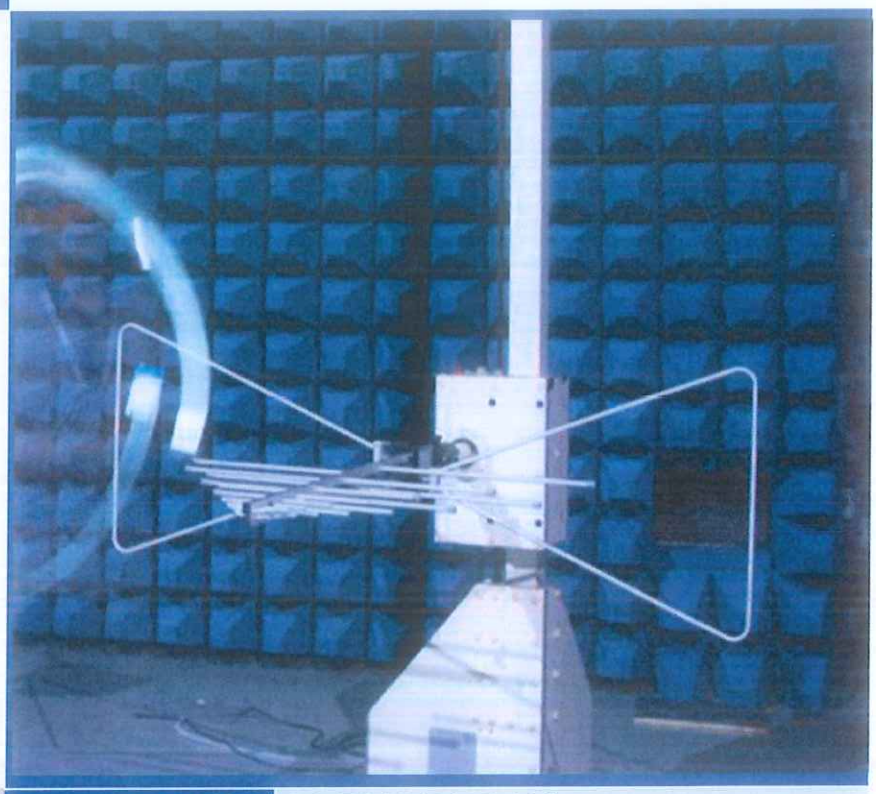
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Rugged Tablet

ISSUED TO
Shenzhen UniStrong Science & Technology Co., Ltd.

B, 4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen, China



Report No.:	BL-EC1840167-401
EUT Name:	Rugged Tablet
Model Name:	UT30
Brand Name:	UniStrong
Test Standard:	47 CFR Part 15 Subpart B
	ICES-003 (Issue 6, January 2016)
FCC ID:	2AOPD-UT30
ISED Number:	11546A-UT30
Test Conclusion:	Pass
Test Date:	Apr. 09, 2018 ~ Jun. 27, 2018
Date of Issue:	Jul. 09, 2018

Tested by: Xia Long
Xia Long
(Engineer)
Date Jul. 09. 2018

Approved by:
Liao Jianming
(Technical Director)
Date Jul. 09. 2018

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jul. 09, 2018	Initial Issue

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co.,Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co.,Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organizatin accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20℃ to 25℃
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

(1) The test report refer to the BALUN report mode v1.2.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Shenzhen UniStrong Science & Technology Co., Ltd.
Address	B, 4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen, China

2.2 Manufacturer Information

Manufacturer	Shenzhen UniStrong Science & Technology Co., Ltd.
Address	B, 4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Rugged Tablet
Under Test Model Name	UT30
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	UT30_V103
Software Version	UT30_V1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	SJYEnergy
	Model No.	BA820
	Serial No.	N/A
	Capacity	8200 mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	4.35 V
Ancillary Equipment 2	Adapter	
	Brand Name	N/A
	Model No.	ASUC71W
	Serial No.	N/A
	Rated Input	100-240 V~, 0.7 A, 50/60 Hz
	Rated Output	5 V⎓ 3 A
Ancillary Equipment 3	USB Cable	
	Length (Approx.)	1.0 m

2.6 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EDGE 850/900/1800/1900 MHz 3G Network WCDMA/HSDPA/HSUPA Band 1/2/5/8 CDMA Band Class 0 EVDO Rel. 0/Rev. A Band Class 0 4G Network FDD LTE Band 1/2/3/4/5/7/8/12/13/17/20/25/28 TDD LTE Band 38/39/40/41 Bluetooth, WIFI, 5.8G SRD, NFC, GPS, GLONASS, BDS

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 15 Subpart B (10-1-16 Edition)	Unintentional Radiators
2	ICES-003 (Issue 6, January 2016)	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement
3	ANSI C63.4-2014	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

3.2 Verdict

No.	Description	FCC Rule	ISED Rule	Test Verdict	Result
1	Radiated Emission	15.109	ICES-003 6.1	Pass	Annex A .1
2	Conducted Emission, AC Ports	15.107	ICES-003 6.2	Pass	Annex A .2

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	3.23 dB
Radiated emissions (30 MHz-1 GHz)	4.30 dB
Radiated emissions (1 GHz-18 GHz)	4.81 dB
Radiated emissions (18 GHz-40 GHz)	5.71 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	23°C to 25°C	AC 120 V/60 Hz or DC 3.8 V from Battery	50% to 55%	100 kPa to 102 kPa

4.2 Test Equipment List

Radiated Emission Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2017.11.08	2018.11.07	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2017.07.22	2019.07.21	☒
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2016.07.12	2018.07.11	☒
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2019.02.20	☒

Conducted Emission Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2018.06.13.	2019.06.12	☒
LISN	SCHWARZBECK	NSLK 8127	8127-687	2018.06.13.	2019.06.12	☒
LISN	SCHWARZBECK	NNLK 8129	8129-462	2017.11.08	2018.11.07	☐
AMN	SCHWARZBECK	NNBM8124	8124-509	2018.06.13.	2019.06.12	☐
AMN	SCHWARZBECK	NNBM8124	8124-510	2018.06.13.	2019.06.12	☐
ISN	TESEQ	ISN T800	34449	2017.12.05	2018.12.04	☐
Shielded Enclosure	ChangNing	CN-130701	130703	N/A	N/A	☒

4.3 Test Enclosure list

Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	Dell	015K3N	N/A	N/A	Special Handled	☐
Laptop	Apple	A1465	N/A	N/A	N/A	☒
Printer	HP	DESKJET 1000	N/A	N/A	N/A	☐
Keyboard	Logitech	Y-BP62a	N/A	N/A	N/A	☐
Mouse	Logitech	M100	N/A	N/A	N/A	☐
USB disk	Kingston	N/A	N/A	N/A	N/A	☐
TF Card	Kingston	N/A	N/A	N/A	N/A	☒
VGA Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
HDMI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
DVI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
Coaxial video cable	N/A	N/A	N/A	2.0 m	Shielded with core	☐
iPhone	Apple	A1586	N/A	N/A	N/A	☐
Phone	MI	M4	N/A	N/A	N/A	☐
Bluetooth Earphone	SAMSUNG	Gear Circle	N/A	N/A	N/A	☒
Wireless Communications Test Set	R&S	CMW500	142028	N/A	Cal. Due 2018.06.11	☒
WIFI Router	TP-LINK	TL-WDR7500	N/A	N/A	N/A	☒
Earphone	N/A	OPPO	N/A	1.1 m	N/A	☒
Car Battery	Camel	55530	N/A	N/A	12 V/55 Ah	☐
Artificial load	N/A	N/A	N/A	N/A	2.5 Ω/100 W	☐
Artificial load	N/A	N/A	N/A	N/A	5 Ω/100 W	☐
Electronic Load	ITECH	IT8511	N/A	N/A	N/A	☐
USB Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
DC Power Supply	ITECH	IT6863A	600014010687210006	N/A	N/A	☐
LCD Monitor	SAMSUNG	UA32C4000P	N/A	N/A	N/A	☐
LCD Monitor	Dell	U241HB	N/A	N/A	N/A	☐
RJ45 Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
IC Card	N/A	N/A	N/A	N/A	N/A	☒

4.4 Test Configurations

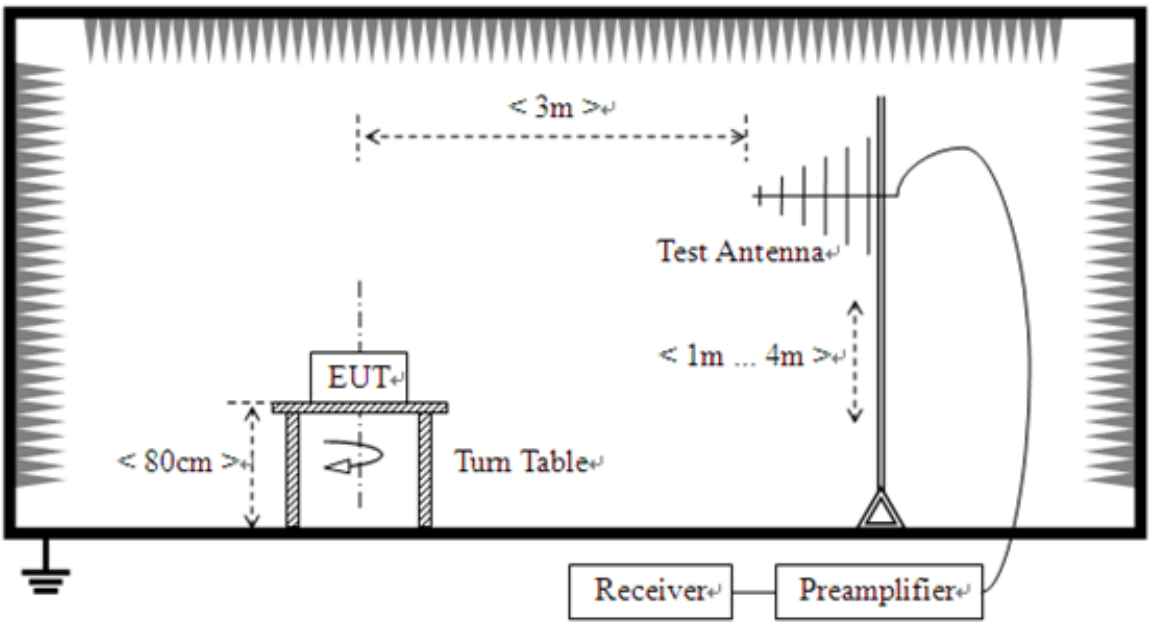
Test Configurations (TC) No.	Description
Traffic Test Mode	
TC01	The GSM 850 MHz Test Mode GSM 850 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC02	The EDGE 850 MHz Test Mode EDGE 850 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC03	The GSM 850 MHz Test Mode with internal speaker GSM 850 Link + Adapter + USB Cable + Battery + BT Link + BT Link + WIFI Link + BDS RX
TC04	The GSM 900 MHz Test Mode GSM 900 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC05	The EDGE 900 MHz Test Mode EDGE 900 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC06	The GSM 1800 MHz Test Mode GSM 1800 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC07	The EDGE 1800 MHz Test Mode EDGE 1800 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC08	The GSM 1900 Test Mode GSM 1900 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC09	The EDGE 1900 MHz Test Mode EDGE 1900 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC10	The WCDMA Band 1 Test Mode WCDMA Band 1 + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC11	The WCDMA Band 2 Test Mode WCDMA Band 2 + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC12	The WCDMA Band 5 Test Mode WCDMA Band 5 + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC13	The WCDMA Band 8 Test Mode WCDMA Band 8 + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC14	The CDMA Band Class 0 Test Mode

	CDMA Band Class 0 + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC15	The EVDO Band Class 0 Test Mode EVDO Band Class 0 + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC16	The FDD LTE Band 1 Test Mode FDD LTE Band 1 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC17	The FDD LTE Band 2 Test Mode FDD LTE Band 2 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC18	The FDD LTE Band 3 Test Mode FDD LTE Band 3 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC19	The FDD LTE Band 4 Test Mode FDD LTE Band 4 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC20	The FDD LTE Band 5 Test Mode FDD LTE Band 5 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC21	The FDD LTE Band 7 Test Mode FDD LTE Band 7 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC22	The FDD LTE Band 8 Test Mode FDD LTE Band 8 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC23	The FDD LTE Band 12 Test Mode FDD LTE Band 12 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC24	The FDD LTE Band 13 Test Mode FDD LTE Band 5 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC25	The FDD LTE Band 17 Test Mode FDD LTE Band 17 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC26	The FDD LTE Band 20 Test Mode FDD LTE Band 20 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC27	The FDD LTE Band 25 Test Mode FDD LTE Band 25 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC28	The FDD LTE Band 28 Test Mode FDD LTE Band 28 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC29	The TDD LTE Band 38 Test Mode TDD LTE Band 38 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI

	Link + GLONASS RX
TC30	The TDD LTE Band 39 Test Mode TDD LTE Band 39 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + BDS RX
TC31	The TDD LTE Band 40 Test Mode TDD LTE Band 40 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GPS RX
TC32	The TDD LTE Band 41 Test Mode TDD LTE Band 41 Link + Adapter + USB Cable + Battery + Earphone + BT Link + WIFI Link + GLONASS RX
TC33	The Idle Test Mode GSM 850(Idle) + Adapter + USB Cable + Battery + Earphone
Amusement Test Mode	
TC34	The Camera Test Mode EUT + Adapter + USB Cable + Battery + Earphone + TF Card
TC35	The Video Play Test Mode EUT + Adapter + USB Cable + Battery + Earphone + TF Card
TC36	The USB Test Mode EUT + Laptop + USB Cable + Battery + Earphone + TF Card
TC37	The NFC Test Mode EUT + Adapter + USB Cable + Battery + NFC Link+ IC Card

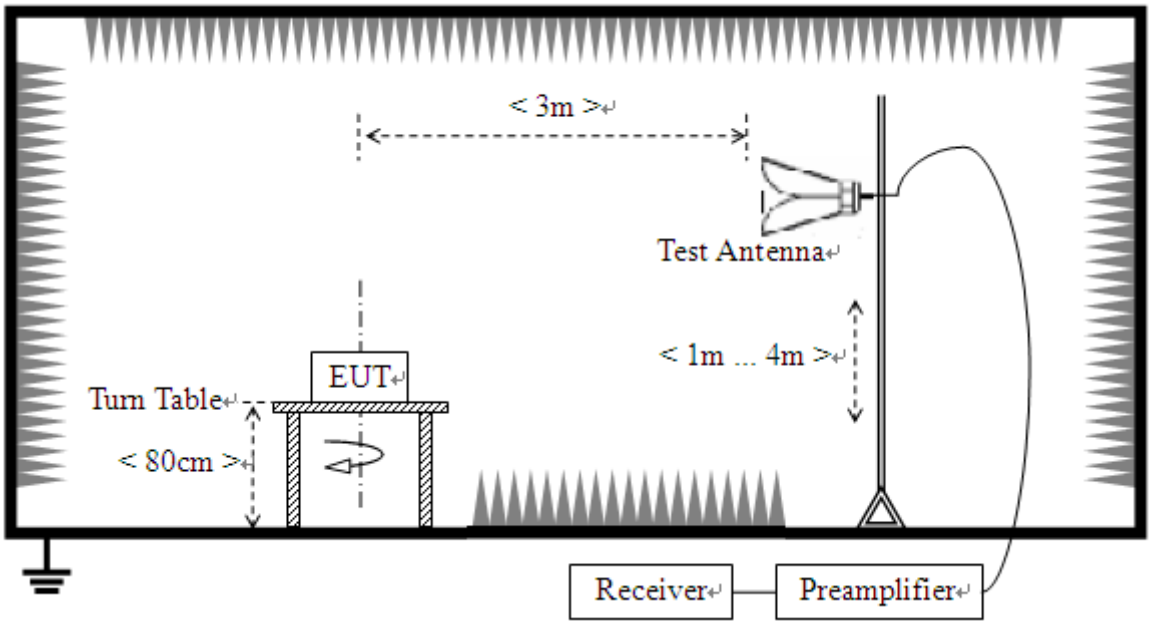
4.5 Test Setups

Test Setup 1



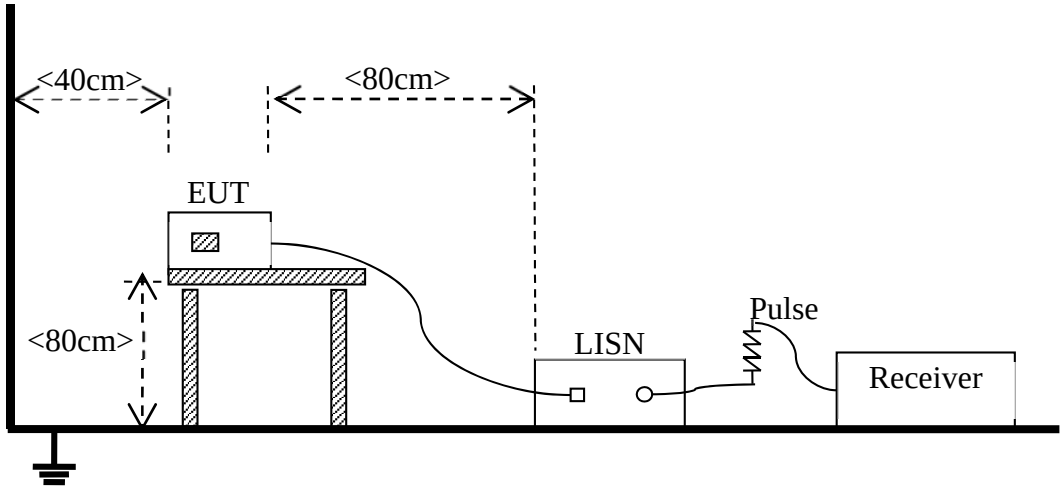
(For Radiated Emission Test (30 MHz-1 GHz))

Test Setup 2



(For Radiated Emission Test (above 1 GHz))

Test Setup 3



(For Conducted Emission, AC Ports Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1&2
	Test Configuration	TC01~TC37 Note
Conducted Emission, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 3
	Test Configuration	TC01~TC37 Note
Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report. The GSM 850 MHz Test Mode is the worst mode in this report.		

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Class B (at 3 m)		Class B (at 10 m)	Class A (at 10 m)	
	Field Strength (μV/m)	Field Strength (dBμV/m)	Field Strength (dBμV/m)	Field Strength (μV/m)	Field Strength (dBμV/m)
30 - 88	100	40	30	90	39
88 - 216	150	43.5	33.5	150	43.5
216 - 960	200	46	36	210	46.4
Above 960	500	54	44	300	49.5

NOTE:

1) Field Strength (dBμV/m) = 20*log [Field Strength (μV/m)].
2) In the emission tables above, the tighter limit applies at the band edges.
3) The limits using ANSI C63.4.

5.1.1.2 Test Setup

Refer to 4.5 section (test setup 1 to test setup 2) for radiated emission test, the photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

The test employing the methods of measurement described in the publication referenced in Section 3(b) (ANSI C63.4);

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

5.1.1.4 Test Result

Please refer to ANNEX A.1.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

Frequency range (MHz)	Class A	
	Quasi-peak (dBμV)	Average (dBμV)
0.15 - 0.50	79	66
0.50 - 30	73	60

Frequency range (MHz)	Class B	
	Quasi-peak (dBμV)	Average (dBμV)
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

1) The lower limit shall apply at the band edges.
2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.
3) The limit using ANSI C63.4.

5.1.2.2 Test Setup

Refer to 4.5 section test (test setup 3) for conducted emission, the photo of test setup please refer to ANNEX B.

5.1.2.3 Test Procedure

The test employing the methods of measurement described in the publication referenced in Section 3(b) (ANSI C63.4);

The EUT is connected to the power mains through a LISN which provides 50 Ω/50 μH of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.1.2.4 Test Result

Please refer to ANNEX A.2.

ANNEX A TEST RESULTS

A.1 Radiated Emission

Note 1: The symbol of “--” in the table which means not application.

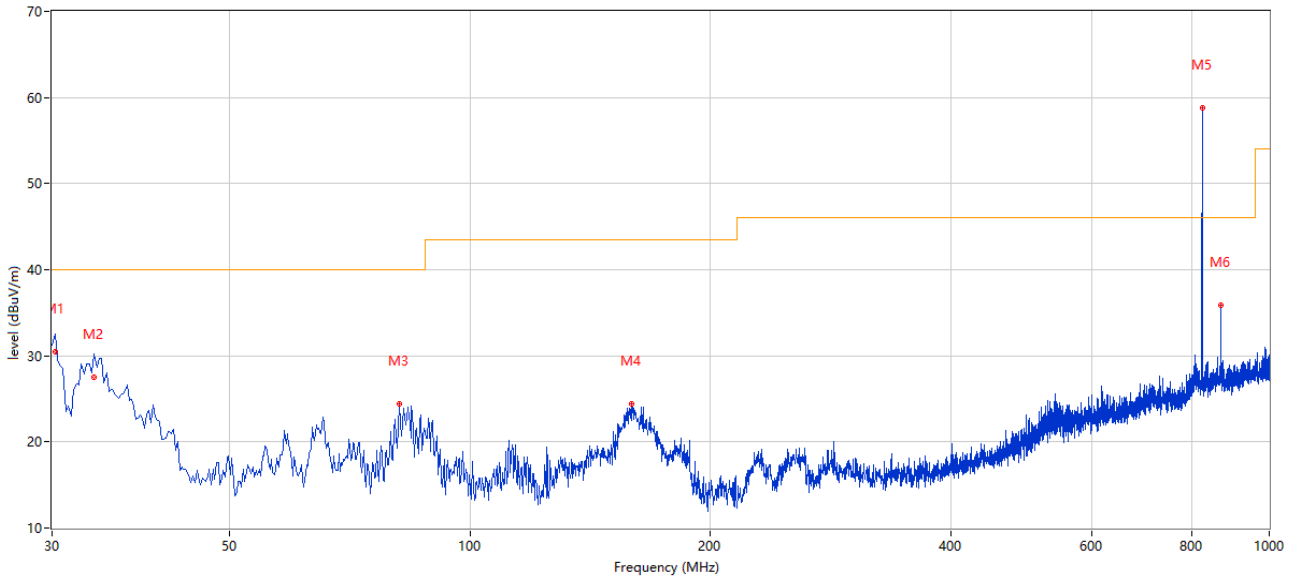
Note 2: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: This frequency which near 850 MHz with circle should be ignored because they are MS and SS carrier frequency.

Test Data and Plots

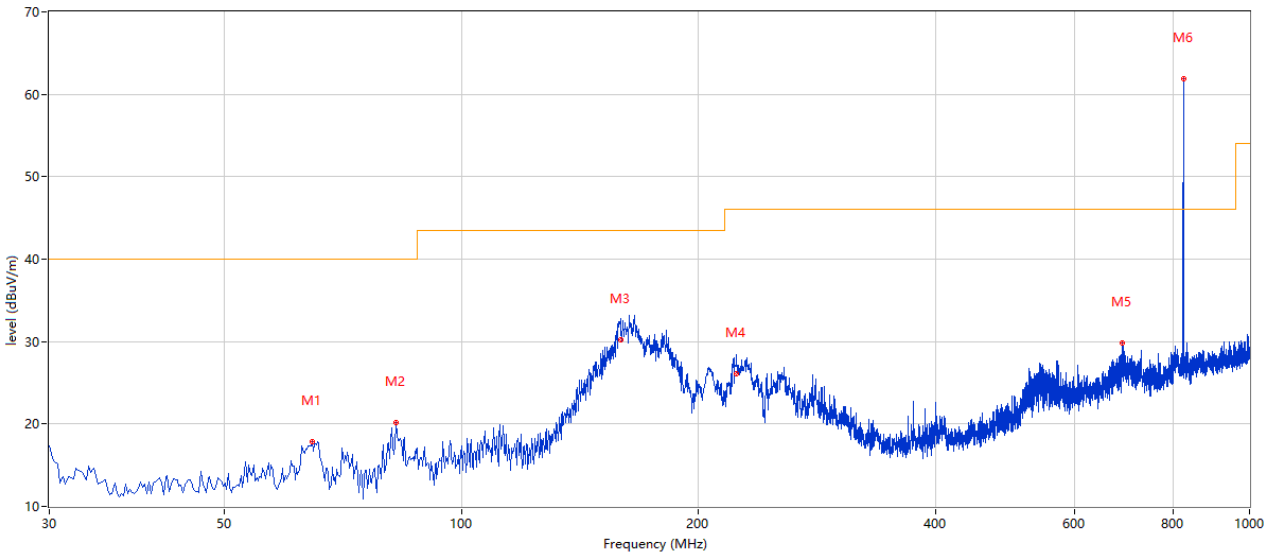
The GSM 850 MHz Test Mode

A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



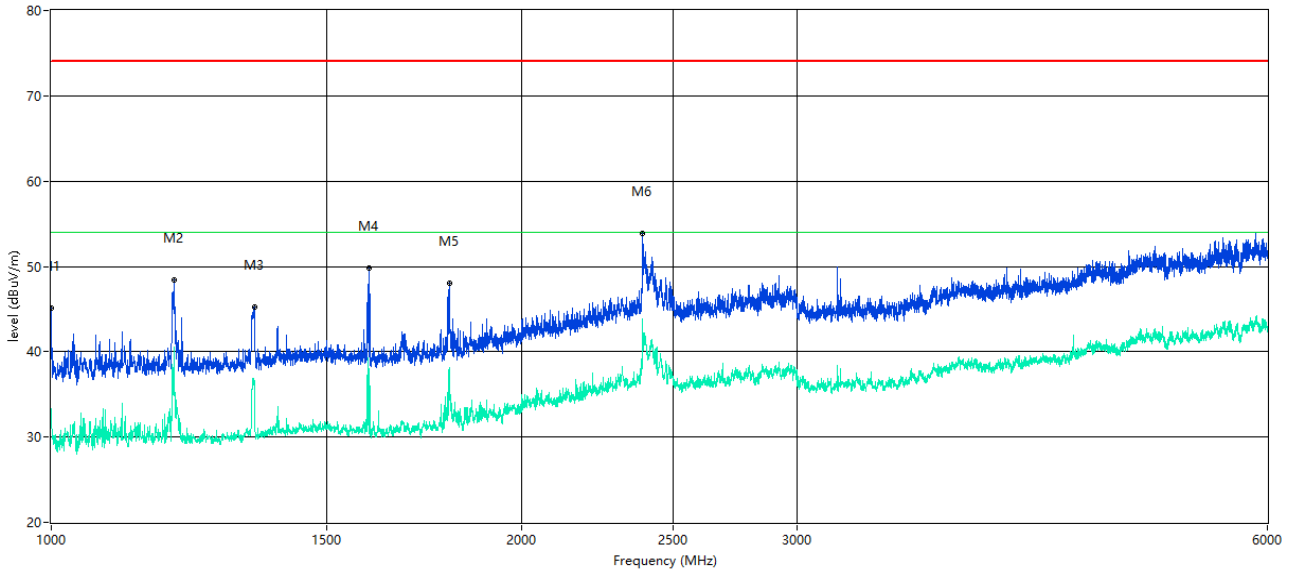
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
30.242	32.58	30.53	--	-28.48	--	40.0	--	9.47	295.60	100	Vertical	Pass
33.879	30.20	27.45	--	-28.69	--	40.0	--	12.55	295.60	100	Vertical	Pass
81.640	24.48	--	--	-32.45	--	40.0	--	15.52	62.90	100	Vertical	Pass
159.220	24.48	--	--	-31.05	--	43.5	--	19.02	360.00	100	Vertical	Pass
823.989	58.83	--	--	-13.10	--	46.0	--	-12.83	269.20	100	Vertical	N.A
869.083	35.90	--	--	-13.06	--	46.0	--	10.10	150.10	100	Vertical	N.A

A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



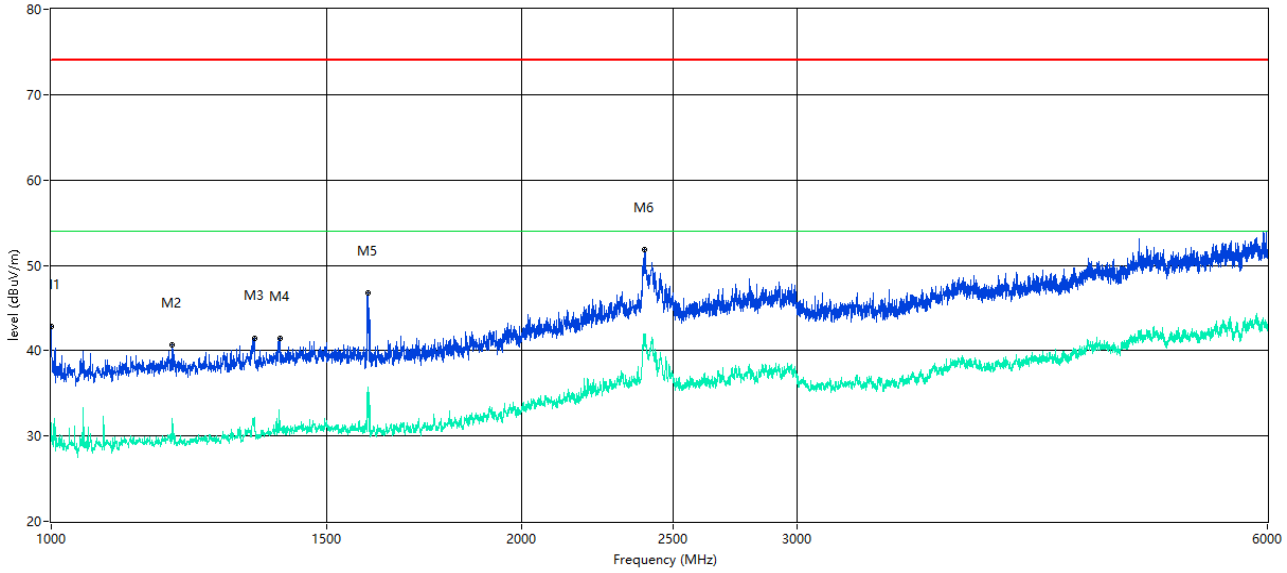
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
64.669	17.89	--	--	-28.72	--	40.0	--	22.11	69.60	100	Horizontal	Pass
82.609	20.20	--	--	-32.25	--	40.0	--	19.80	0.00	100	Horizontal	Pass
159.220	32.82	30.19	--	-31.05	--	43.5	--	13.31	58.00	100	Horizontal	Pass
223.467	28.37	26.06	--	-27.97	--	46.0	--	19.94	215.90	100	Horizontal	Pass
689.678	29.85	--	--	-17.19	--	46.0	--	16.15	359.40	100	Horizontal	Pass
824.231	61.85	--	--	-13.10	--	46.0	--	-15.85	119.30	100	Horizontal	N.A

A.1.3 Test Antenna Vertical, 1 GHz – 6 GHz



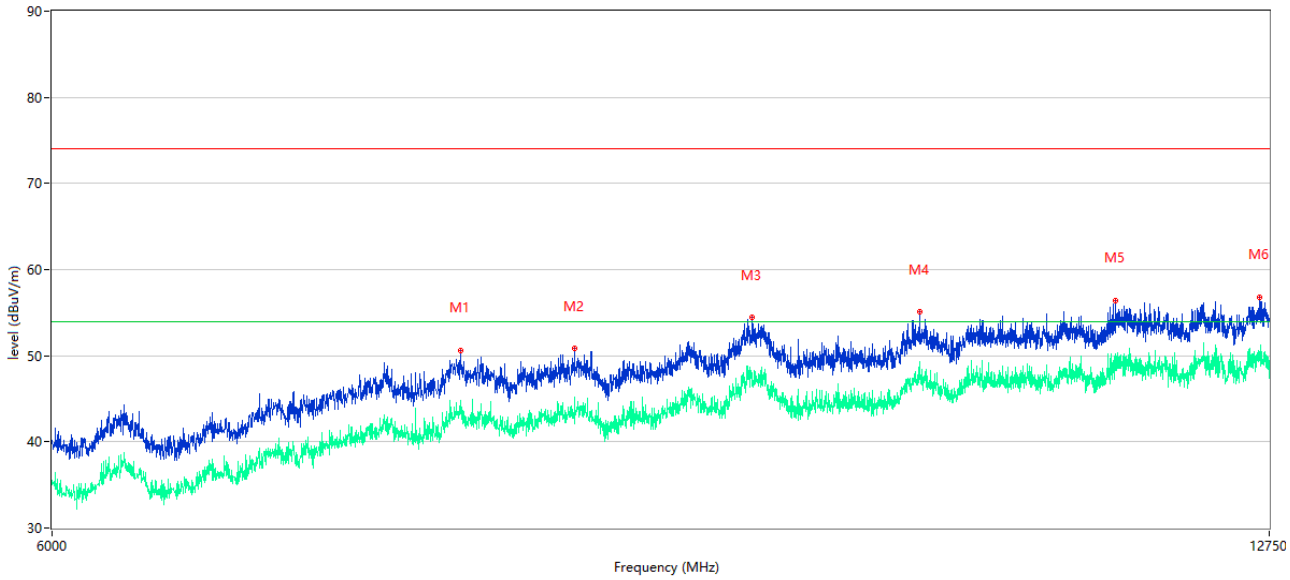
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1000.000	45.14	--	33.4	-11.35	74.0	--	54.0	20.60	221.80	100	Vertical	Pass
1197.951	48.38	--	40.6	-12.17	74.0	--	54.0	13.40	32.50	100	Vertical	Pass
1348.413	45.24	--	36.3	-12.19	74.0	--	54.0	17.70	151.40	100	Vertical	Pass
1597.351	49.78	--	38.0	-12.40	74.0	--	54.0	16.00	74.50	100	Vertical	Pass
1797.801	48.00	--	38.1	-10.76	74.0	--	54.0	15.90	38.90	100	Vertical	Pass
2390.152	53.83	--	43.2	-1.28	74.0	--	54.0	10.80	138.50	100	Vertical	Pass

A.1.4 Test Antenna Horizontal, 1 GHz – 6 GHz



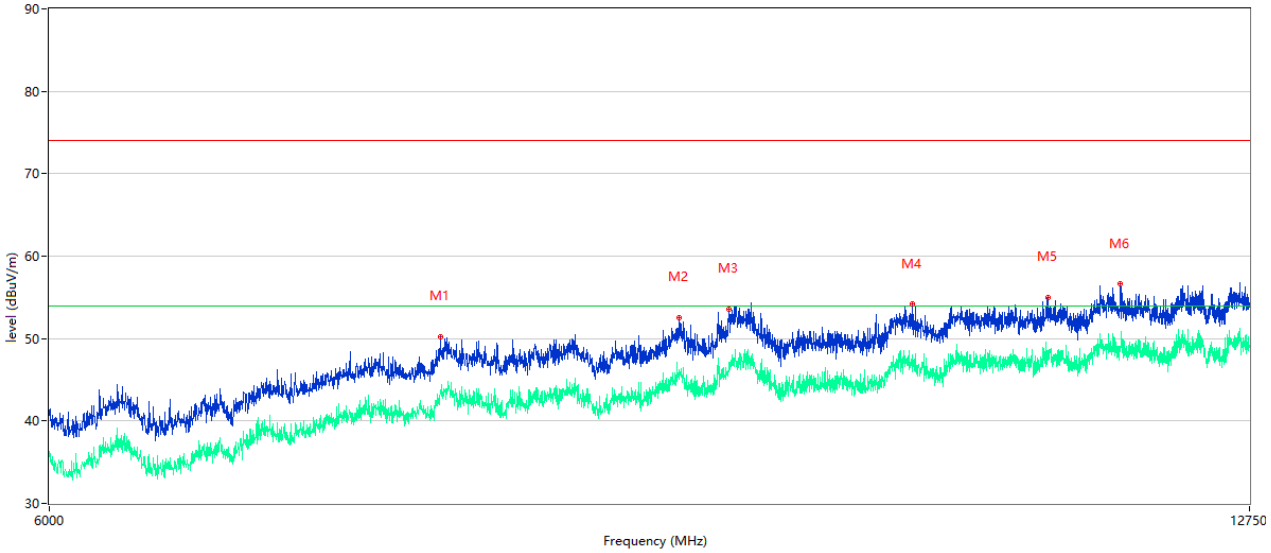
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1000.000	42.83	--	31.6	-11.35	74.0	--	54.0	22.40	0.50	100	Horizontal	Pass
1194.451	40.62	--	32.1	-12.15	74.0	--	54.0	21.90	88.40	100	Horizontal	Pass
1348.413	41.49	--	32.2	-12.19	74.0	--	54.0	21.80	78.50	100	Horizontal	Pass
1399.900	41.40	--	30.7	-11.81	74.0	--	54.0	23.30	75.60	100	Horizontal	Pass
1593.852	46.73	--	35.7	-12.00	74.0	--	54.0	18.30	49.60	100	Horizontal	Pass
2398.150	51.79	--	41.8	-0.03	74.0	--	54.0	12.20	314.50	100	Horizontal	Pass

A.1.5 Test Antenna Vertical, 6 GHz – 12.75 GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7727.568	50.56	--	44.8	-7.75	74.0	--	54.0	9.20	360.30	100	Vertical	Pass
8292.739	50.80	--	45.3	-6.80	74.0	--	54.0	8.70	285.80	100	Vertical	Pass
9257.748	54.41	--	47.8	-4.29	74.0	--	54.0	6.20	22.90	100	Vertical	Pass
10266.621	55.06	--	49.4	-2.17	74.0	--	54.0	4.60	355.90	100	Vertical	Pass
11592.664	56.36	--	50.3	-0.90	74.0	--	54.0	3.70	355.90	100	Vertical	Pass
12672.394	56.73	--	49.9	0.17	74.0	--	54.0	4.10	268.50	100	Vertical	Pass

A.1.6 Test Antenna Horizontal, 6 GHz – 12.75 GHz

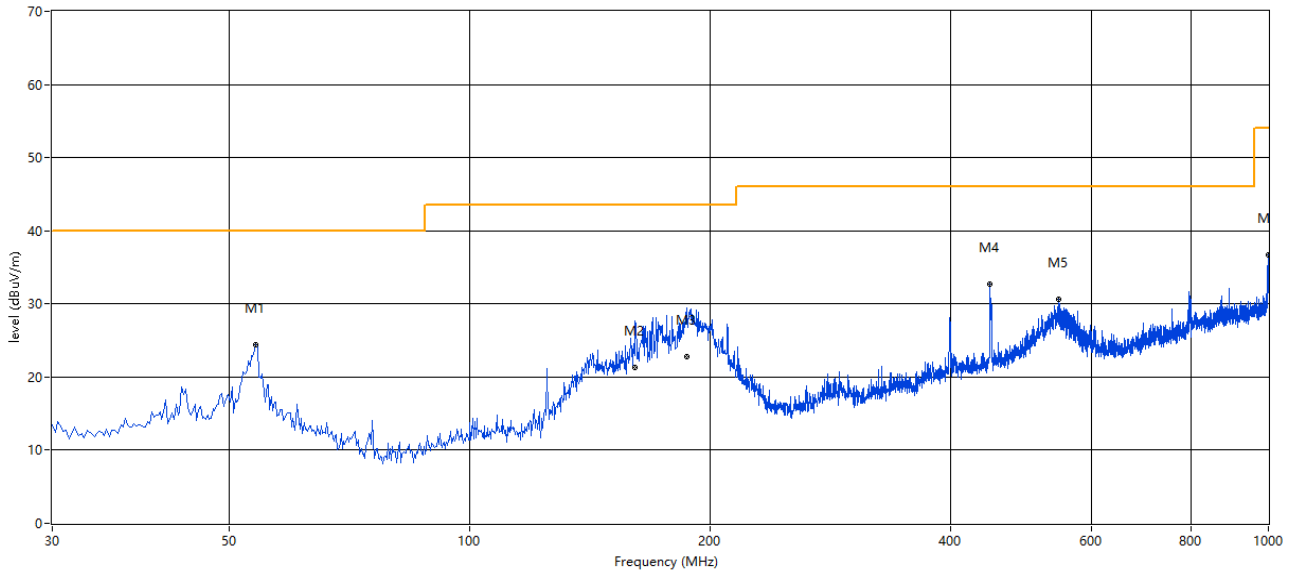


Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7670.207	50.23	--	43.4	-8.31	74.0	--	54.0	10.60	306.00	100	Horizontal	Pass
8913.584	52.52	--	46.3	-5.23	74.0	--	54.0	7.70	3.80	100	Horizontal	Pass
9193.639	53.62	--	47.1	-5.04	74.0	--	54.0	6.90	56.20	100	Horizontal	Pass
10313.859	54.15	--	48.0	-2.22	74.0	--	54.0	6.00	200.20	100	Horizontal	Pass
11231.630	55.02	--	47.6	-1.78	74.0	--	54.0	6.40	148.10	100	Horizontal	Pass
11757.998	56.60	--	49.1	-1.07	74.0	--	54.0	4.90	310.20	100	Horizontal	Pass

Test Data and Plots

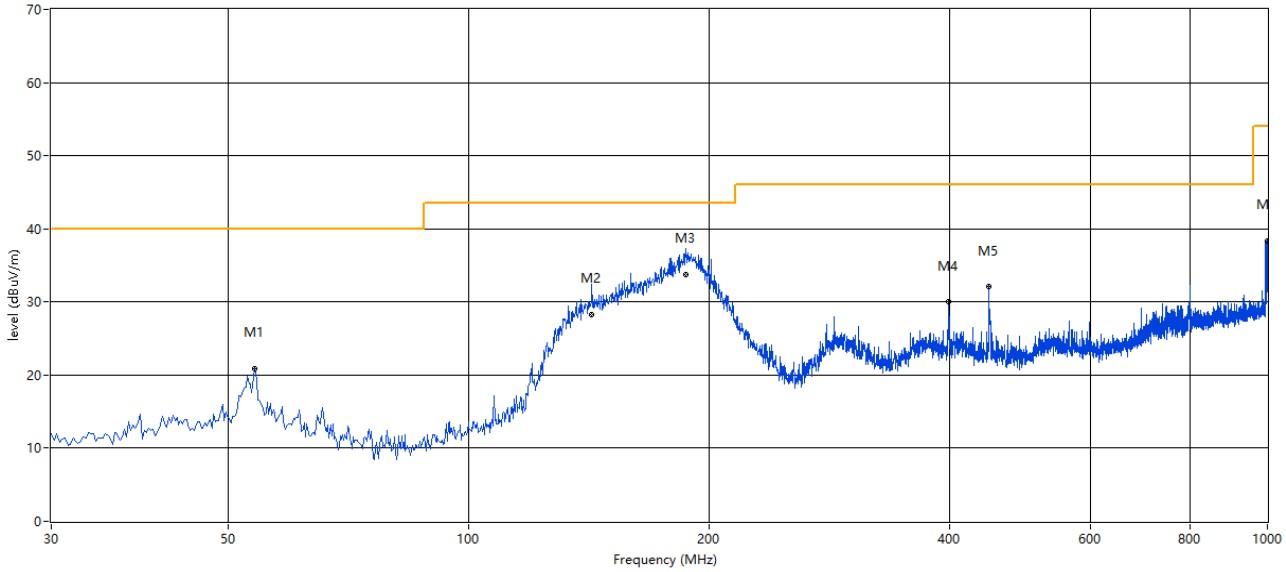
The USB Test Mode

A.1.7 Test Antenna Vertical, 30 MHz – 1 GHz



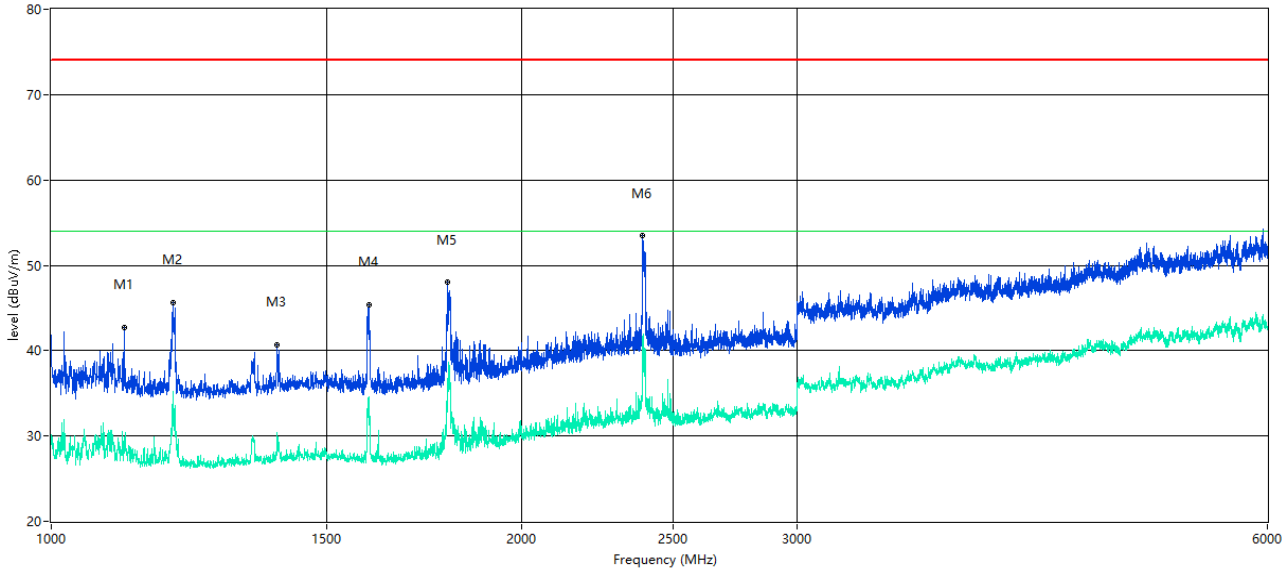
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
54.001	24.43	--	--	-26.80	--	40.0	--	15.57	102.80	100	Vertical	Pass
161.160	27.74	21.24	--	-30.97	--	43.5	--	22.26	360.00	200	Vertical	Pass
187.101	29.46	22.86	--	-29.44	--	43.5	--	20.64	63.60	200	Vertical	Pass
447.723	32.68	--	--	-22.64	--	46.0	--	13.32	37.90	200	Vertical	Pass
546.881	30.62	--	--	-20.12	--	46.0	--	15.38	352.60	100	Vertical	Pass
998.788	36.78	--	--	-11.54	--	54.0	--	17.22	357.60	100	Vertical	Pass

A.1.8 Test Antenna Horizontal, 30 MHz – 1 GHz



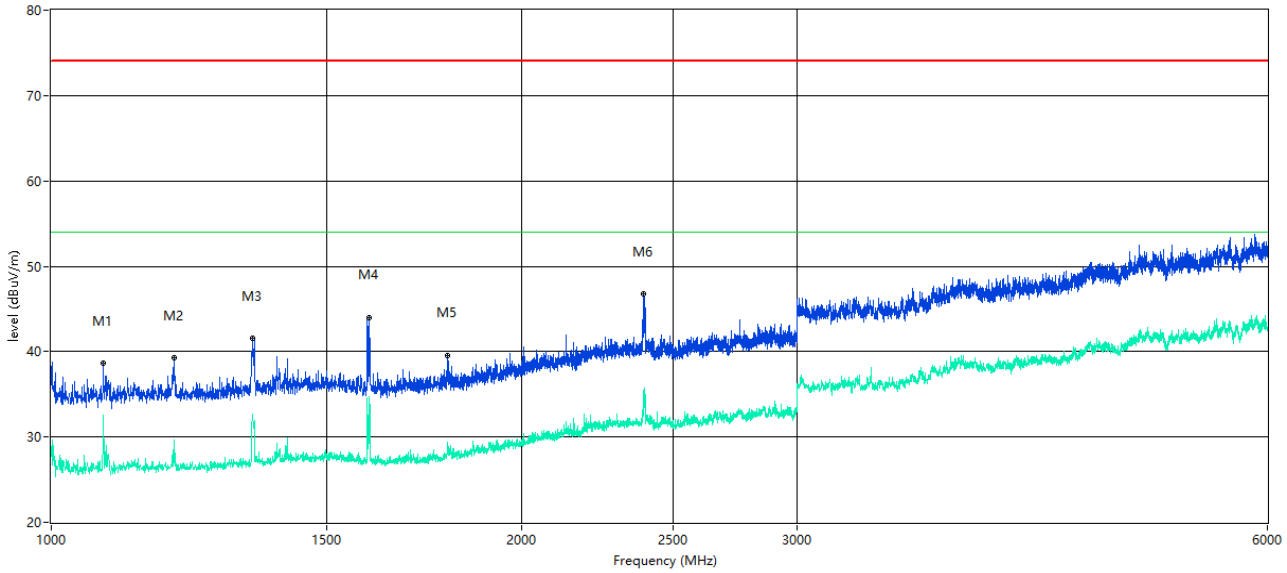
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
54.001	20.90	--	--	-26.80	--	40.0	--	19.10	358.80	200	Horizontal	Pass
142.492	32.41	28.22	--	-31.80	--	43.5	--	15.28	349.90	200	Horizontal	Pass
186.908	37.74	33.75	--	-29.44	--	43.5	--	9.75	360.00	179	Horizontal	Pass
398.993	29.99	--	--	-23.54	--	46.0	--	16.01	252.80	100	Horizontal	Pass
447.723	32.05	--	--	-22.64	--	46.0	--	13.95	356.80	100	Horizontal	Pass
999.515	38.33	--	--	-11.52	--	54.0	--	15.67	30.70	200	Horizontal	Pass

A.1.9 Test Antenna Vertical, 1 GHz – 6 GHz



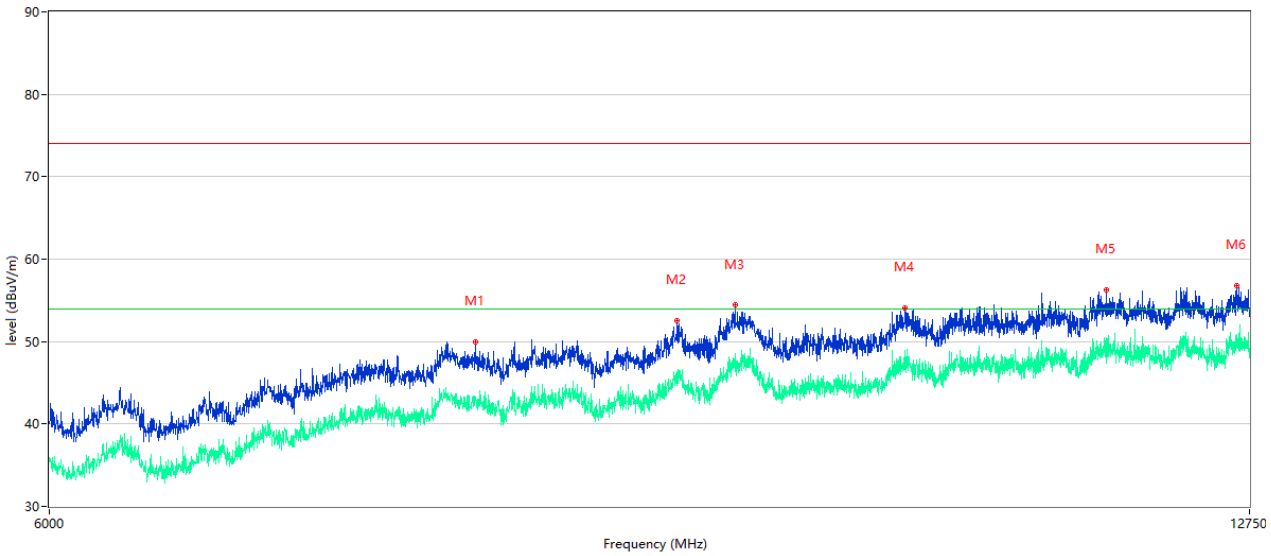
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1112.972	42.74	--	29.9	-14.67	74.0	--	54.0	24.10	213.00	100	Vertical	Pass
1195.951	45.64	--	35.2	-15.05	74.0	--	54.0	18.80	4.00	100	Vertical	Pass
1394.901	40.70	--	30.4	-15.23	74.0	--	54.0	23.60	44.70	100	Vertical	Pass
1596.851	45.39	--	34.6	-15.50	74.0	--	54.0	19.40	10.10	100	Vertical	Pass
1792.802	47.99	--	36.3	-14.68	74.0	--	54.0	17.70	28.90	100	Vertical	Pass
2389.653	53.48	--	40.5	-9.29	74.0	--	54.0	13.50	64.00	100	Vertical	Pass

A.1.10 Test Antenna Horizontal, 1 GHz – 6 GHz



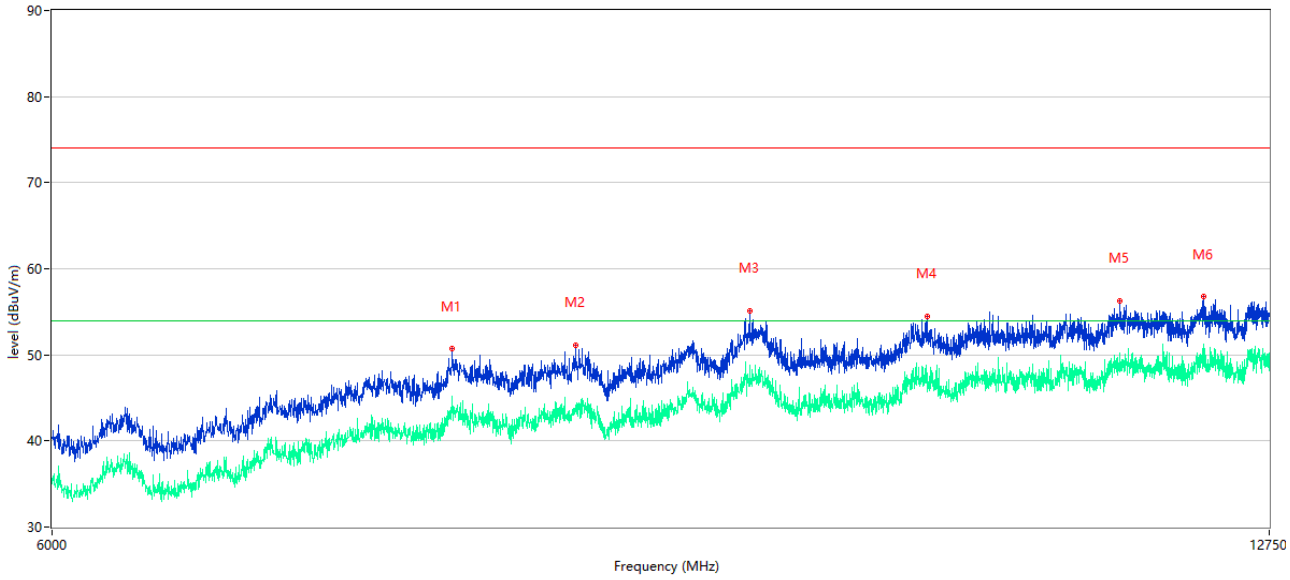
Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1079.480	38.62	--	32.5	-14.50	74.0	--	54.0	21.50	107.50	100	Horizontal	Pass
1198.950	39.22	--	29.6	-15.12	74.0	--	54.0	24.40	358.90	100	Horizontal	Pass
1345.914	41.56	--	32.6	-15.42	74.0	--	54.0	21.40	352.60	100	Horizontal	Pass
1597.351	44.00	--	34.7	-15.50	74.0	--	54.0	19.30	25.50	100	Horizontal	Pass
1793.802	39.56	--	29.2	-14.68	74.0	--	54.0	24.80	139.10	100	Horizontal	Pass
2393.652	46.76	--	35.5	-9.50	74.0	--	54.0	18.50	123.10	100	Horizontal	Pass

A.1.11 Test Antenna Vertical, 6 GHz – 12.75 GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7840.602	49.92	--	43.3	-8.54	74.0	--	54.0	10.70	243.20	100	Vertical	Pass
8900.087	52.57	--	46.3	-4.86	74.0	--	54.0	7.70	169.90	100	Vertical	Pass
9229.068	54.41	--	48.5	-4.64	74.0	--	54.0	5.50	234.60	100	Vertical	Pass
10271.682	54.11	--	48.9	-2.20	74.0	--	54.0	5.10	239.00	100	Vertical	Pass
11656.773	56.25	--	50.4	-0.87	74.0	--	54.0	3.60	292.20	100	Vertical	Pass
12648.775	56.76	--	50.9	0.20	74.0	--	54.0	3.10	4.30	100	Vertical	Pass

A.1.12 Test Antenna Horizontal, 6 GHz – 12.75 GHz



Frequency (MHz)	Peak Level (dBuV/m)	Q-peak Level (dBuV/m)		Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
7688.765	50.68	--		44.1	-7.92	74.0	--	54.0	9.90	360.00	100	Horizontal	Pass
8296.113	51.07	--		44.1	-6.74	74.0	--	54.0	9.90	282.10	100	Horizontal	Pass
9242.564	55.14	--		48.8	-4.55	74.0	--	54.0	5.20	49.60	100	Horizontal	Pass
10313.859	54.52	--		47.9	-2.22	74.0	--	54.0	6.10	120.00	100	Horizontal	Pass
11626.406	56.22	--		50.2	-0.80	74.0	--	54.0	3.80	172.90	100	Horizontal	Pass
12245.564	56.83	--		50.0	-0.42	74.0	--	54.0	4.00	80.70	100	Horizontal	Pass

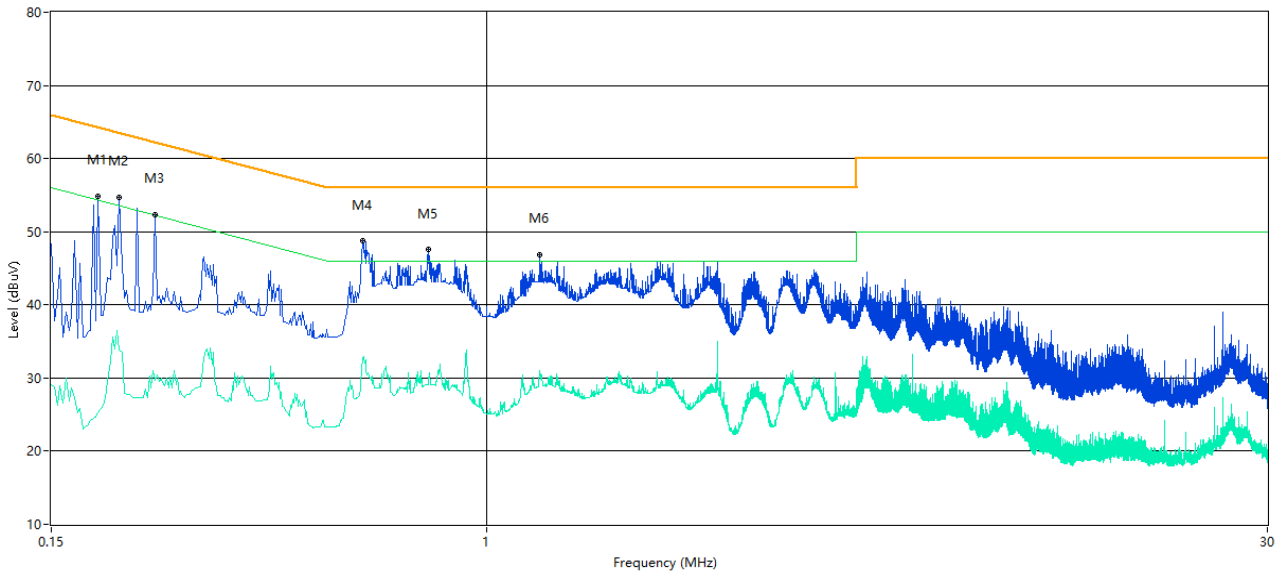
A.2 Conducted Emission

Test Data and Plots

The GSM 850 MHz Test Mode

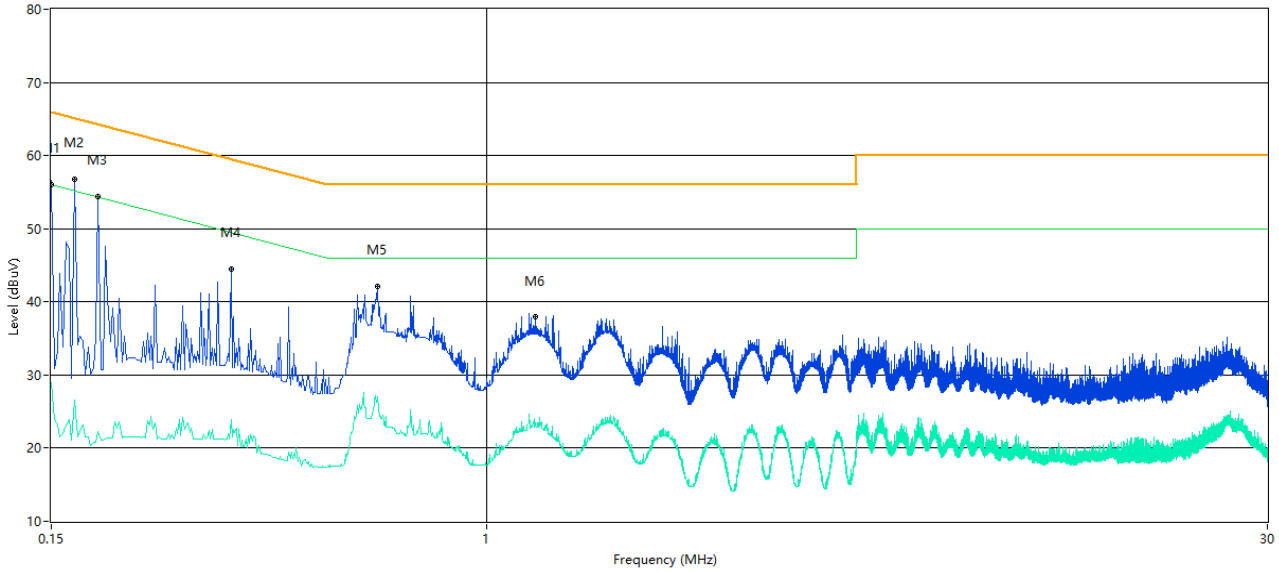
Note: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

A.2.1 L Phase



Frequency (MHz)	Peak Level (dBuV)	Q-peak Level (dBuV)	Average Level (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.184	58.05	39.98	22.23	10.01	64.3	54.3	24.32	L Line	Pass
0.202	57.34	43.62	34.31	10.01	63.5	53.5	19.19	L Line	Pass
0.236	53.80	38.26	30.08	10.01	62.2	52.2	22.12	L Line	Pass
0.582	49.60	45.66	32.39	10.02	56.0	46.0	10.34	L Line	Pass
0.774	47.44	42.15	29.43	10.03	56.0	46.0	13.85	L Line	Pass
1.260	46.77	42.66	30.53	10.04	56.0	46.0	13.34	L Line	Pass

A.2.2 N Phase

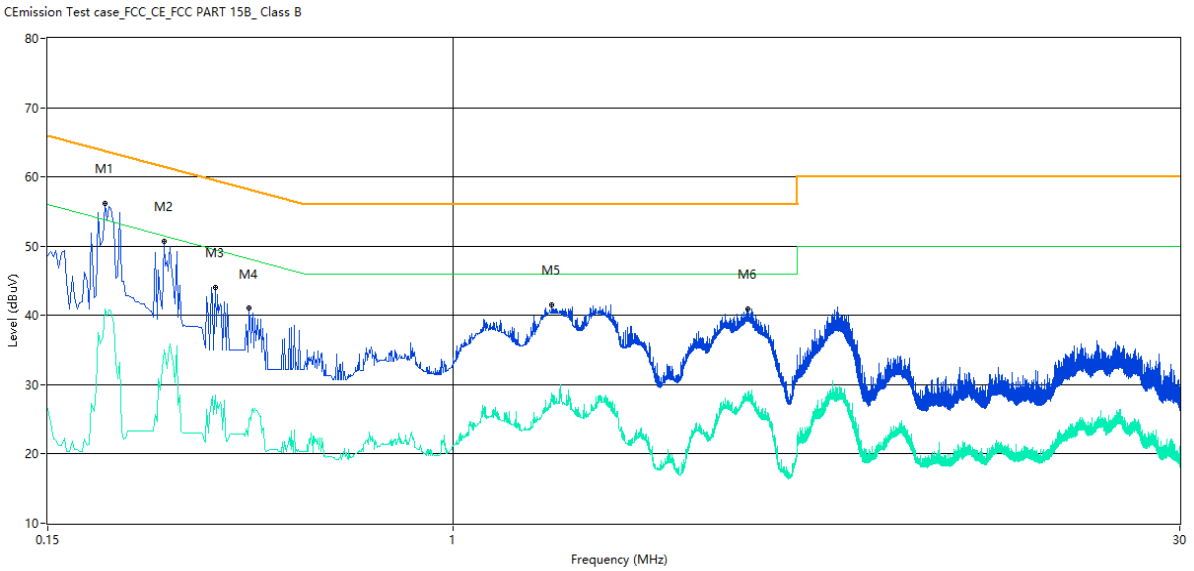


Frequency (MHz)	Peak Level (dBuV)	Q-peak Level (dBuV)	Average Level (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.150	56.7	--	28.9	10.00	66.0	56.0	9.30	N Line	Pass
0.166	56.8	--	26.6	10.01	65.2	55.2	8.40	N Line	Pass
0.184	54.3	--	22.3	10.01	64.3	54.3	10.00	N Line	Pass
0.328	44.5	--	23.8	10.01	59.5	49.5	15.00	N Line	Pass
0.622	42.1	--	27.1	10.02	56.0	46.0	13.90	N Line	Pass
1.238	37.9	--	23.2	10.04	56.0	46.0	18.10	N Line	Pass

Test Data and Plots

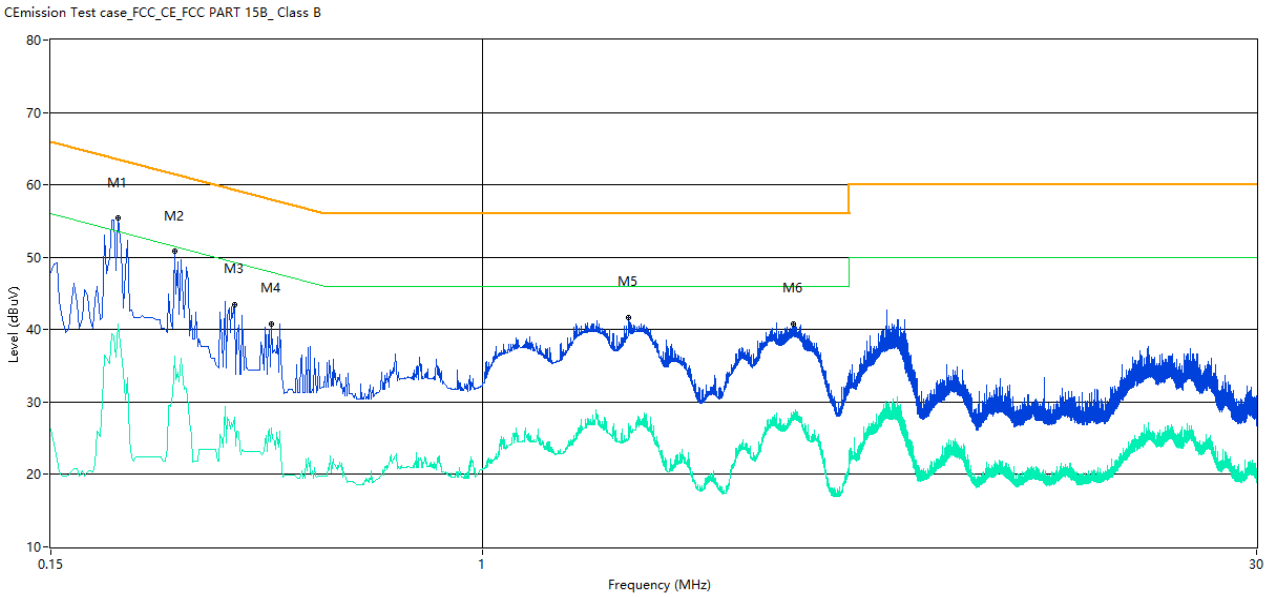
The USB Test Mode

A.2.3 L Phase



Frequency (MHz)	Peak Level (dBuV)	Q-peak Level (dBuV)	Average Level (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.196	56.10	52.45	39.67	10.01	63.8	53.8	11.35	L Line	Pass
0.258	50.74	46.31	34.08	10.01	61.5	51.5	15.19	L Line	Pass
0.328	43.95	39.63	27.65	10.01	59.5	49.5	19.87	L Line	Pass
0.384	41.65	36.01	25.14	10.01	58.2	48.2	22.19	L Line	Pass
1.588	41.93	38.13	28.44	10.05	56.0	46.0	17.56	L Line	Pass
3.970	41.57	36.48	28.28	10.13	56.0	46.0	17.72	L Line	Pass

A.2.4 N Phase



Frequency (MHz)	Peak Level (dBuV)	Q-peak Level (dBuV)	Average Level (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.202	56.40	51.91	39.17	10.01	63.5	53.5	11.59	N Line	Pass
0.258	50.74	46.46	33.51	10.01	61.5	51.5	15.04	N Line	Pass
0.336	43.38	38.79	26.82	10.01	59.3	49.3	20.51	N Line	Pass
0.396	42.02	36.17	25.69	10.01	57.9	47.9	21.73	N Line	Pass
1.902	41.56	36.66	25.81	10.06	56.0	46.0	19.34	N Line	Pass
3.912	41.36	36.52	28.22	10.13	56.0	46.0	17.78	N Line	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-EC1840167-AE.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-EC1840167-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-EC1840167-AI.PDF”.

--END OF REPORT--