

OnePlus Technology (Shenzhen) Co., Ltd.

OnePlus Bullets Wireless 2
E302A

In accordance with FCC Part 15 Subpart B and
ICES-003 Issue 6



China

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Prepared for: OnePlus Technology (Shenzhen) Co., Ltd.
18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe
Avenue North, Futian District, Shenzhen China

COMMERCIAL-IN-CONFIDENCE

Report Number: 68.714.19.0003.01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Approved by	Phoebe Hu	5/5/2019	
Prepared by	Mark Chen	5/5/2019	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with FCC Part 15 Subpart B, 10-1-2017, Edition and ICES-003 Issue 6 — Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement.

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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	5/5/2019

1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	OnePlus Technology (Shenzhen) Co., Ltd.
Address	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen China
Manufacturer	OnePlus Technology (Shenzhen) Co., Ltd.
Address	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen China
Factory	Goertek Intelligence Technology Co., Ltd.
Address	Building#3, No.3 Industrial West Road, High Tech Industrial Development Zone of Songshan Lake, Dongguan City, Guangdong, China
Model Number(s)	E302A
Product Type	OnePlus Bullets Wireless 2
Test Specification	FCC Part 15 Subpart B,10-1-2017 Edition and ICES-003 Issue 6
Date of Receipt of EUT	1/9/2019
Start of Test	1/9/2019
Finish of Test	2/25/2019
Name of Engineer(s)	Mark Chen

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart B/ICES-003 is shown below.

Specification	Clause	Test Description	Result	Comments/Base Standard
FCC Part 15 Subpart B,10-1-2017 Edition. ICES-003 Issue 6	§15.107	Conducted Emission	Pass	ANSI C63.4-2014
FCC Part 15 Subpart B,10-1-2017 Edition. ICES-003 Issue 6	§15.109	Radiated Emission	Pass	ANSI C63.4-2014

***: Because the highest frequency of the internal sources of the EUT is less than 108MHz, the measurement only is made up to 1GHz.



1.4 Product Information

1.4.1 Technical Description

Rated input : 3.85VDC, 129mAh (Supplied by rechargeable Li-ion battery)
 5VDC (Charged by USB port)

1.4.2 Test Configuration

Configuration	Description
DC Powered	3.85VDC for battery, 5VDC for USB port

1.4.3 Modes of Operation

Mode	Description
Charging	The EUT was Charging
BT Link	The EUT was BT Link

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 Test Location

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
 Address:

Building 12&13, Zhiheng Wisdomland Business Park,
 Nantou Checkpoint Road 2, Nantou, Nanshan District,
 Shenzhen Guangdong China 518052

Test Name	Name of Engineer(s)
Conducted Emission	Adam Yang
Radiated Emission	Tim Yue

2 Test Details

2.1 Conducted Emission

2.1.1 Specification Reference

FCC Part 15 Subpart B, 10-1-2017 Edition, § 15.107

2.1.2 Equipment Under Test

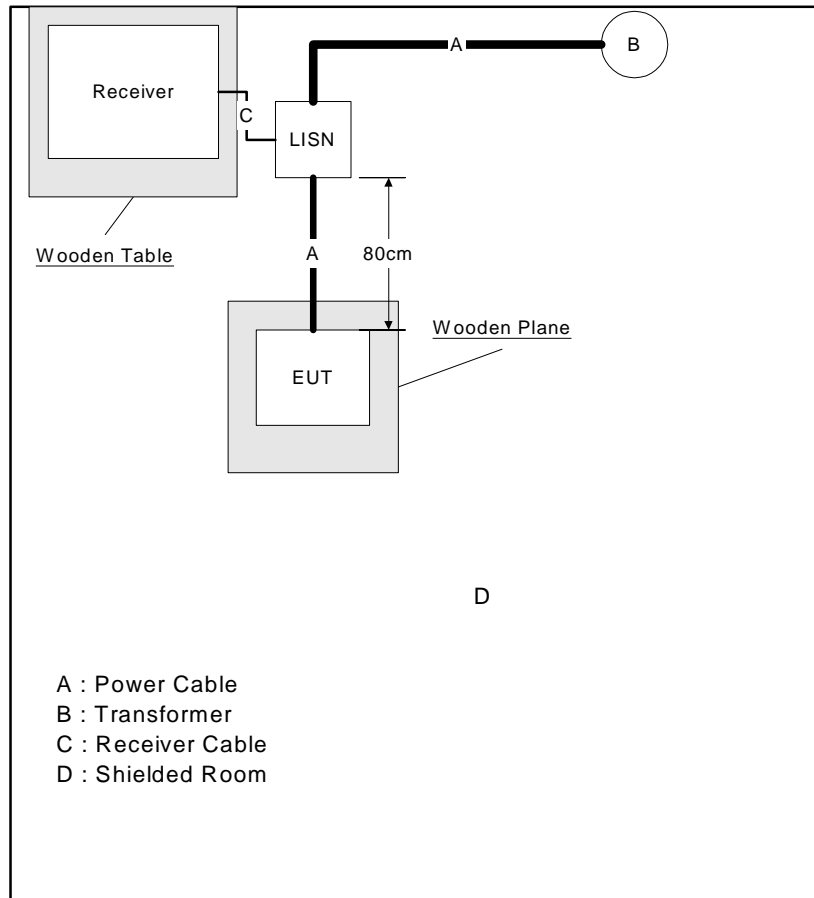
E302A

2.1.3 Date of Test

2/19/2019

2.1.4 Test Method

The conducted emission shall be measured at the main terminals of the DECT Link equipment by means of the arrangement described in Figure 5 and 6 for the relevant type of equipment. The output terminals of the artificial mains network (V-network) and the terminals a-b shall be positioned $0,8\text{m} \pm 20\%$ apart and shall be connected by the two power conductors of a flexible three-core cable of 0,8m length.



2.1.5 Environmental Conditions

Ambient Temperature	23.9°C
Relative Humidity	59.8%
Atmospheric Pressure	1019.0 mbar

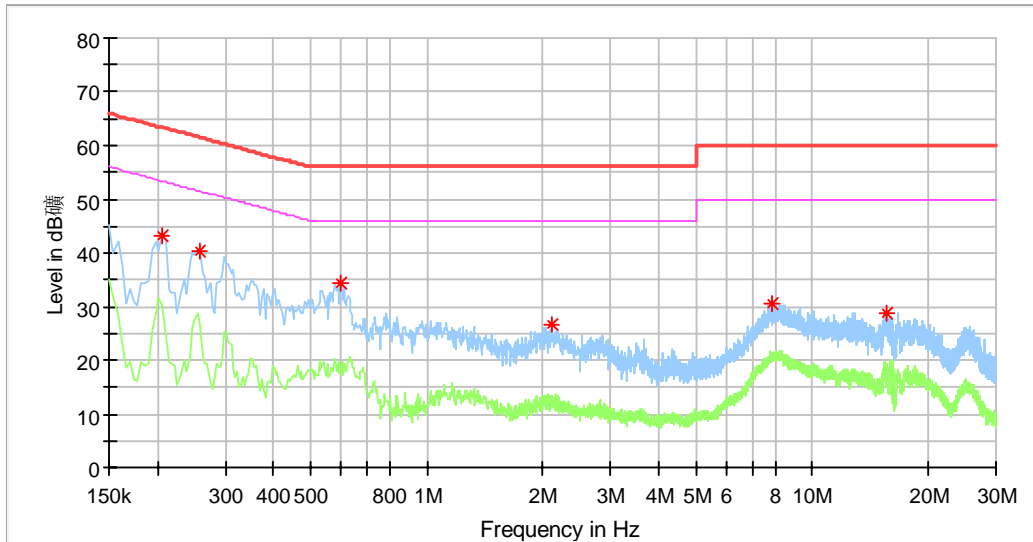
2.1.6 Specification Limits

Conducted Emissions Limits		
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56 (Note 2)	56 to 46 (Note 2)
0.5-5	56	46
5-30	60	50

Note 1: The more stringent limit applies at transition frequencies.
 Note 2: The limit level in dBμV decreases linearly with the logarithm of frequency.

2.1.7 Test Results

M/N: E302A
 Op Cond.: Charging
 Test Spec: Power Line, Live
 Comment: 5VDC for USB Port Charging

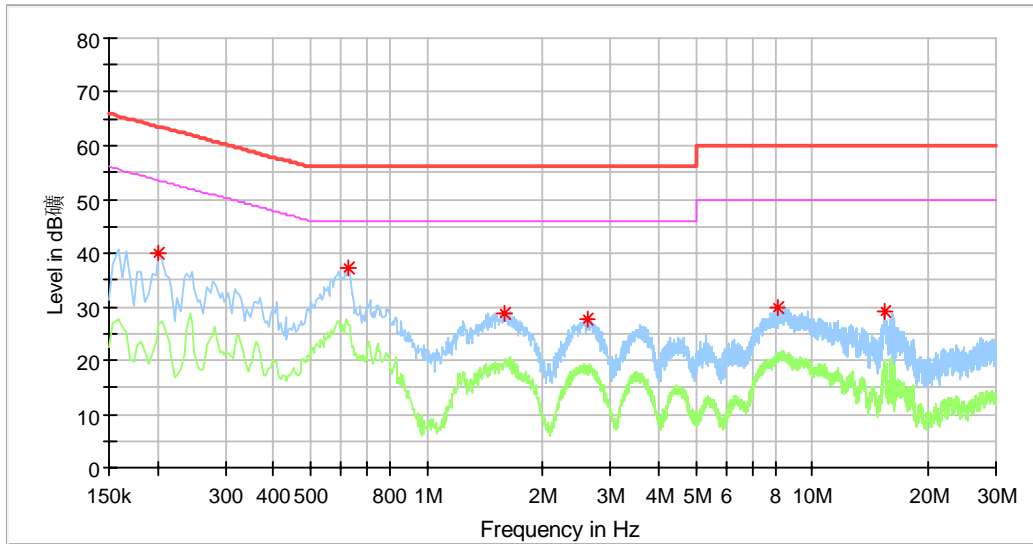


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.206000	43.04	---	63.37	20.32	L1	10.2
0.258000	40.23	---	61.50	21.27	L1	10.2
0.598000	34.49	---	56.00	21.51	L1	10.3
2.098000	26.81	---	56.00	29.19	L1	10.3
7.854000	30.47	---	60.00	29.53	L1	10.6
15.550000	28.94	---	60.00	31.06	L1	10.8

Remark: Corrector factor = LISN Factor + Cable Loss

M/N: E302A
 Op Cond.: Charging
 Test Spec: Power Line, Neutral
 Comment: 5VDC for USB Port Charging



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.202000	40.08	---	63.53	23.45	N	10.2
0.626000	37.11	---	56.00	18.89	N	10.3
1.594000	28.62	---	56.00	27.38	N	10.3
2.610000	27.67	---	56.00	28.33	N	10.3
8.142000	29.99	---	60.00	30.01	N	10.6
15.454000	29.14	---	60.00	30.86	N	10.9

Remark: Corrector factor = LISN Factor + Cable Loss

2.2 Radiated Emission

2.2.1 Specification Reference

FCC Part 15 Subpart B, 10-1-2017 Edition, § 15.109

2.2.2 Equipment Under Test

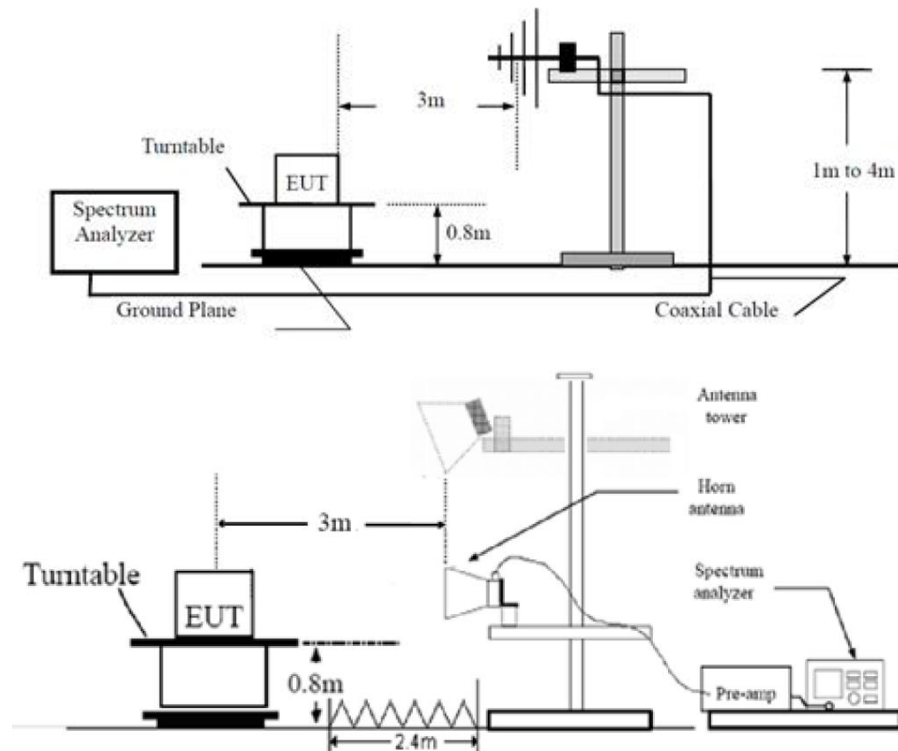
E302A

2.2.3 Date of Test

2/20/2019

2.2.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8m above a reference ground plane. A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.



2.2.5 Environmental Conditions

Ambient Temperature	22.5 °C
Relative Humidity	58.7%
Atmospheric Pressure	1013.0 mbar

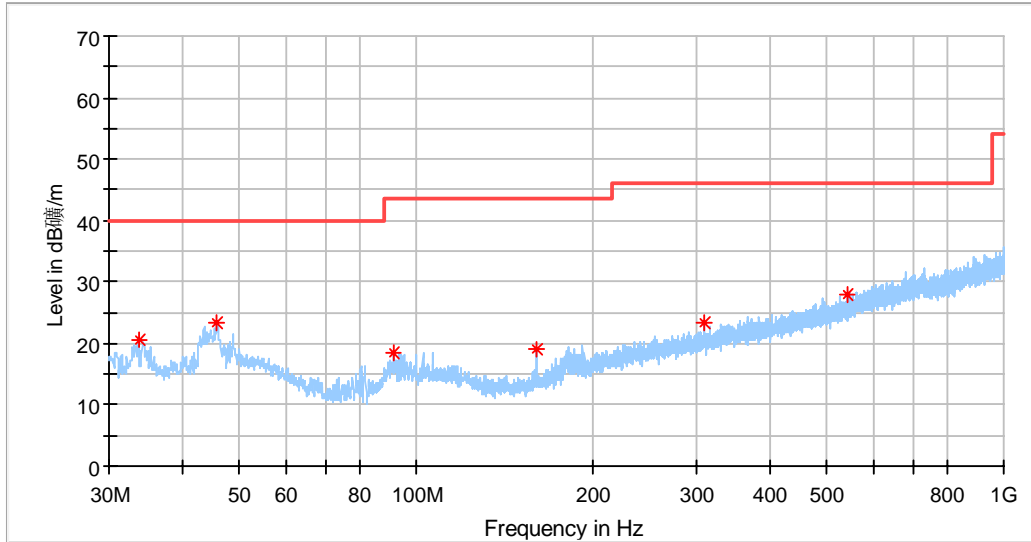
2.2.6 Specification Limits

Radiated emission limits in the frequency range 30MHz to 1000MHz at a measuring distance of 3 m	
Frequency range MHz	Quasi-peak limits dB(μV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Radiated emission limits in the frequency range 1000MHz to 6000MHz at a measuring distance of 3 m	
Frequency range MHz	Quasi-peak limits dB(μV/m)
1000-18000	74
Frequency range MHz	AV limits dB(μV/m)
1000-18000	54

2.2.7 Test Results

M/N: E302A
 Op Cond: Charging
 Test Spec: Horizontal
 Comment: 5VDC for USB Port Charging

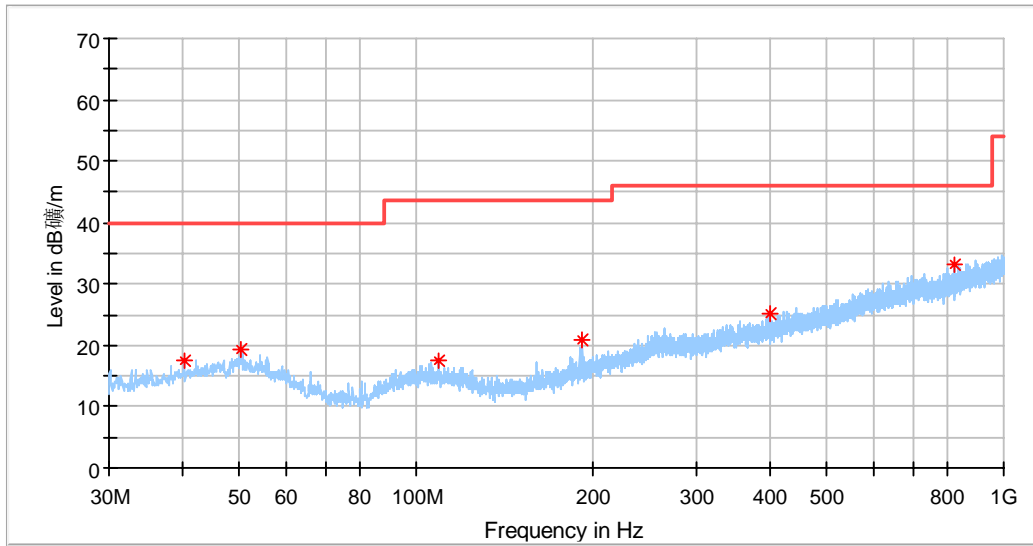


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	PoI	Azimuth (deg)	Corr. (dB)
33.637500	20.65	40.00	19.35	100.0	H	314.0	14.8
45.823125	23.19	40.00	16.81	100.0	H	0.0	17.4
91.413125	18.31	43.50	25.19	100.0	H	260.0	14.4
159.980000	18.88	43.50	24.62	200.0	H	356.0	14.1
310.087500	23.23	46.00	22.77	200.0	H	258.0	20.2
542.099375	27.98	46.00	18.02	200.0	H	93.0	24.9

Remark: Corrector factor = Antenna Factor + Cable Loss

M/N: E302A
 Op Cond: Charging
 Test Spec: Vertical
 Comment: 5VDC for USB Port Charging



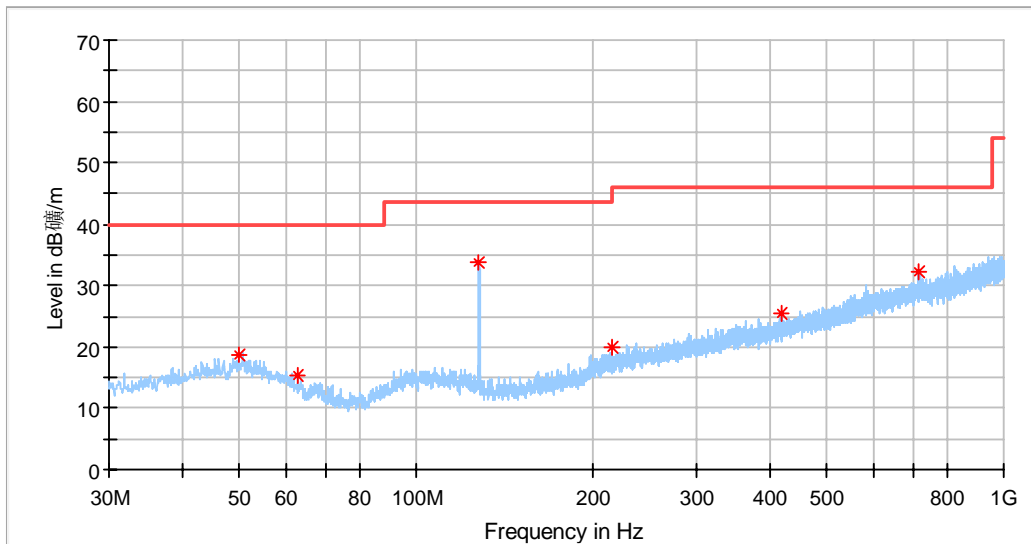
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.245625	17.63	40.00	22.37	100.0	V	0.0	16.2
50.430625	19.22	40.00	20.78	100.0	V	37.0	18.1
109.055000	17.61	43.50	25.89	200.0	V	187.0	15.5
191.990000	20.95	43.50	22.55	200.0	V	0.0	15.3
401.388750	25.23	46.00	20.77	100.0	V	1.0	22.3
822.550625	33.21	46.00	12.79	200.0	V	328.0	28.8

Remark: Corrector factor = Antenna Factor + Cable Loss



M/N: E302A
 Op Cond: BT Link
 Test Spec: Horizontal
 Comment: 3.85VDC



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
50.006250	18.65	40.00	21.35	200.0	H	358.0	18.2
62.919375	15.22	40.00	24.78	200.0	H	0.0	14.9
127.970000	33.80	43.50	9.70	200.0	H	0.0	13.8
215.815625	19.99	43.50	23.51	200.0	H	306.0	17.0
419.212500	25.38	46.00	20.62	100.0	H	5.0	22.6
719.973125	32.38	46.00	13.62	200.0	H	355.0	27.6

Remark: Corrector factor = Antenna Factor + Cable Loss

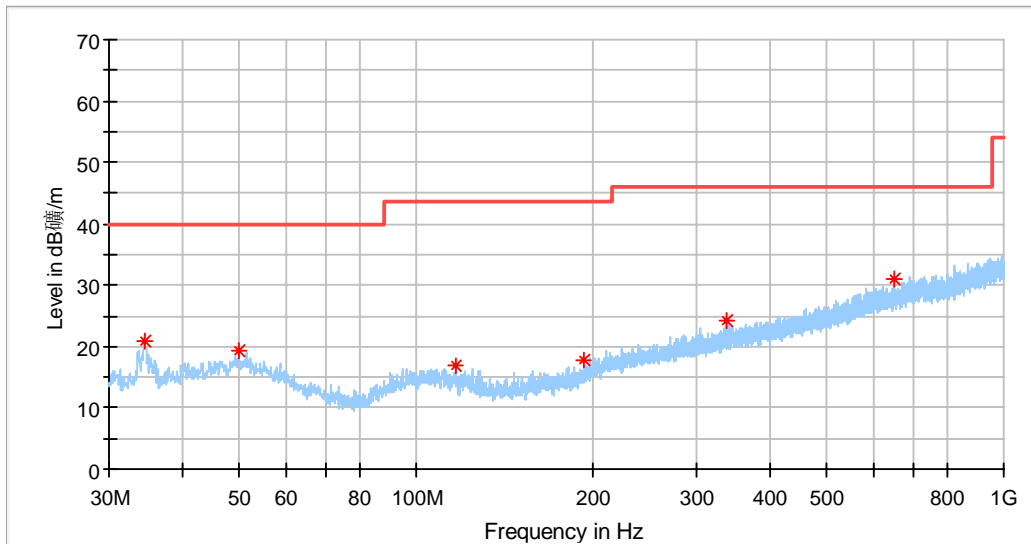
1GHz Above

Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2457.041667	63.00	---	74.00	11.00	100.0	H	136.0	-8.3
4915.666667	49.67	---	74.00	24.33	100.0	H	91.0	0.0
7355.875000	51.11	---	74.00	22.89	100.0	H	172.0	3.2
9820.875000	50.16	---	74.00	23.84	100.0	H	0.0	5.9
14736.000000	50.76	---	74.00	23.24	100.0	H	329.0	14.5
17963.875000	51.24	---	74.00	22.76	100.0	H	195.0	19.9



M/N: E302A
 Op Cond: BT Link
 Test Spec: Vertical
 Comment: 3.85VDC



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
34.425625	20.94	40.00	19.06	100.0	V	142.0	14.9
49.945625	19.48	40.00	20.52	200.0	V	213.0	18.2
116.330000	16.89	43.50	26.61	200.0	V	229.0	15.1
193.263125	17.84	43.50	25.66	200.0	V	345.0	15.5
338.581250	24.29	46.00	21.71	200.0	V	291.0	21.0
650.496875	31.15	46.00	14.85	100.0	V	9.0	26.9

Remark: Corrector factor = Antenna Factor + Cable Loss

1GHz Above

Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4916.375000	55.49	---	74.00	18.51	100.0	V	255.0	0.0
7254.583333	54.87	---	74.00	19.13	100.0	V	0.0	2.6
7361.541667	67.69	---	74.00	6.31	100.0	V	0.0	3.2
9692.666667	56.45	---	74.00	17.55	100.0	V	11.0	6.0
9899.500000	56.12	---	74.00	17.88	100.0	V	32.0	5.7
12229.916667	59.42	---	74.00	14.58	100.0	V	0.0	8.6
12232.041667	56.06	---	74.00	17.94	100.0	V	0.0	8.6
17086.958333	61.21	---	74.00	12.79	100.0	V	133.0	16.1
17222.250000	56.53	---	74.00	17.47	100.0	V	77.0	16.5

2.2.8 Test Location

This test was carried out in 3m anechoic chamber.

3 Test Equipment Information

Radiated Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102294	2019-6-28
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2019-7-6
Attenuator	Agilent	8491A	MY39264334	2019-7-6
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

Conducted Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2019-7-6
LISN	Rohde & Schwarz	ENV4200	100249	2019-7-6
LISN	Rohde & Schwarz	ENV432	101318	2019-7-6
LISN	Rohde & Schwarz	ENV216	100326	2019-7-6
ISN	Rohde & Schwarz	ENY81	100177	2019-7-6
ISN	Rohde & Schwarz	ENY81-CA6	101664	2019-7-6
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-584	2019-6-30
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2019-6-30
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2019-7-6
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-18000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.21dB