



FCC Test Report

APPLICANT : Bullitt Group
EQUIPMENT : Messaging Device
BRAND NAME : Motorola
MODEL NAME : BM3A01
FCC ID : ZL5BM3A01
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Jan. 30, 2023 ~ Feb. 08, 2023

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC2N2305-01	Rev. 01	Initial issue of report	Mar. 23, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 8.14 dB at 0.150 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 12.11 dB at 59.100 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1. General Description

1.1. Applicant

Bullitt Group

One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR, United Kingdom

1.2. Manufacturer

Bullitt Mobile Limited

One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR, United Kingdom

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Messaging Device
Brand Name	Motorola
Model Name	BM3A01
FCC ID	ZL5BM3A01
EUT supports Radios application	Bluetooth LE GNSS MES
SN Code	Radiation: BM3A01301070350 Conduction: BM3A01301070416
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz Band 23 : 2000 MHz ~ 2020 MHz Band 255 : 1626.6 MHz ~ 1660 MHz
Rx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz GNSS : 1559 MHz ~ 1610 MHz Band 23 : 2180 MHz ~ 2200 MHz Band 255 : 1525.1 MHz ~1558.5 MHz
Antenna Type	Bluetooth : PIFA Antenna GNSS: PIFA Antenna MES: PIFA Antenna
Type of Modulation	Bluetooth LE : GFSK GNSS : BPSK MES: BPSK/QPSK

1.5. Modification of EUT

No modifications are made to the EUT during all test items.

1.6. Test Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH05-SZ	CN1256	421272

1.7. Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH05-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

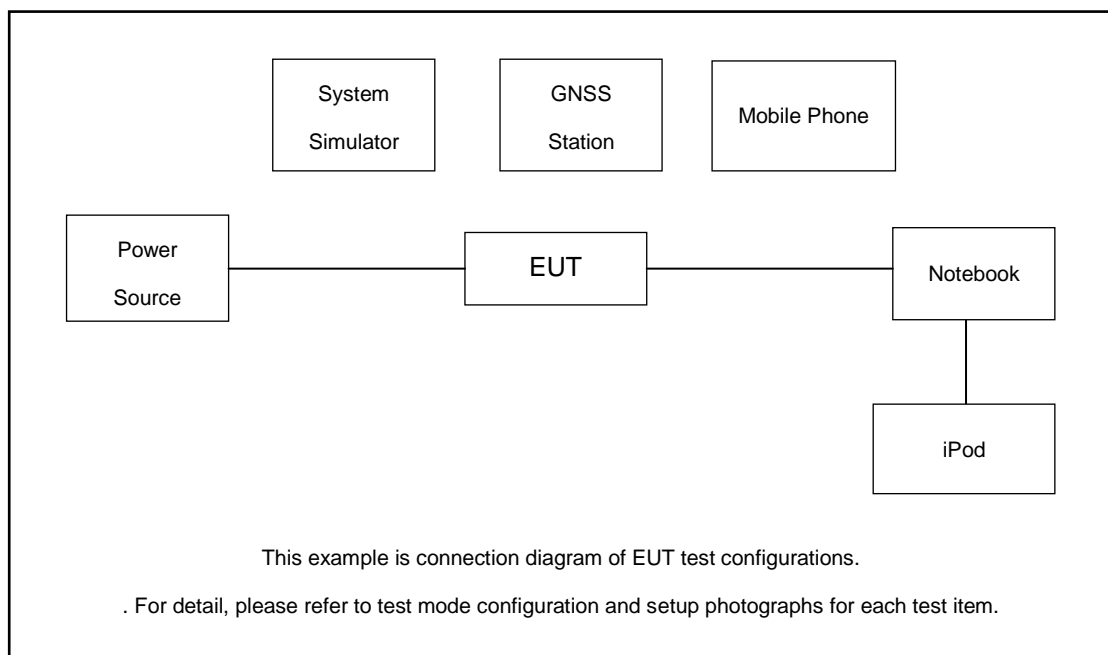
2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1: Band 23 Idle(Middle CH) + Bluetooth Idle + GNSS RX + Battery + USB Cable (Charging from Adapter)+ E-SIM
	Mode 2: Band 23 Idle(Middle CH) + Bluetooth Idle + GNSS RX + Battery + USB Cable (Charging from Notebook)+ E-SIM
Radiated Emissions	Mode 1: Band 23 Idle(Middle CH) + Bluetooth Idle + GNSS RX + Battery1 + USB Cable 1(Charging from Adapter)+ E-SIM
	Mode 2: Band 23 Idle(Middle CH) + Bluetooth Idle + GNSS RX + Battery1 + USB Cable 1(Charging from NB)+ E-SIM
Remark: <ol style="list-style-type: none">1. The worst case of AC is mode 2; only the test data of this mode is reported.2. The worst case of RE is mode 1; only the test data of this mode is reported.3. Pre-scanned Low/Middle/High channel, the worst channel was recorded in this report.	

2.2.Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	R&S	CMW 500	N/A	N/A	Unshielded,1.8 m
2.	GNSS Station	ADIVIC	MP9000	N/A	N/A	Unshielded,1.8m
3.	Phone	Oneplus	N/A	N/A	N/A	N/A
4.	Ipod	Apple	MC525 ZP/A	Fcc DoC	Shielded, 1.0m	N/A
5.	Notebook	DELL	Inspiron 15-7570	Fcc DoC	N/A	shielded cable DC O/P 1.8m Unshielded AC I/P cable 1.8m
6.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
7.	Phone	iPhone5	N/A	A1530	N/A	N/A
8.	Adapter	N/A	N/A	N/A	N/A	N/A



2.4. EUT Operation Test Setup

At the same time, the EUT was attached to the Mobile phone via Bluetooth function, and the following programs installed in the EUT were programmed during the test.

1. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.
2. MES band Idle with base-station.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

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 in the following table.

<Class B Limit>

Frequency of emission (MHz)	Conducted limit (dBuV)	
	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.

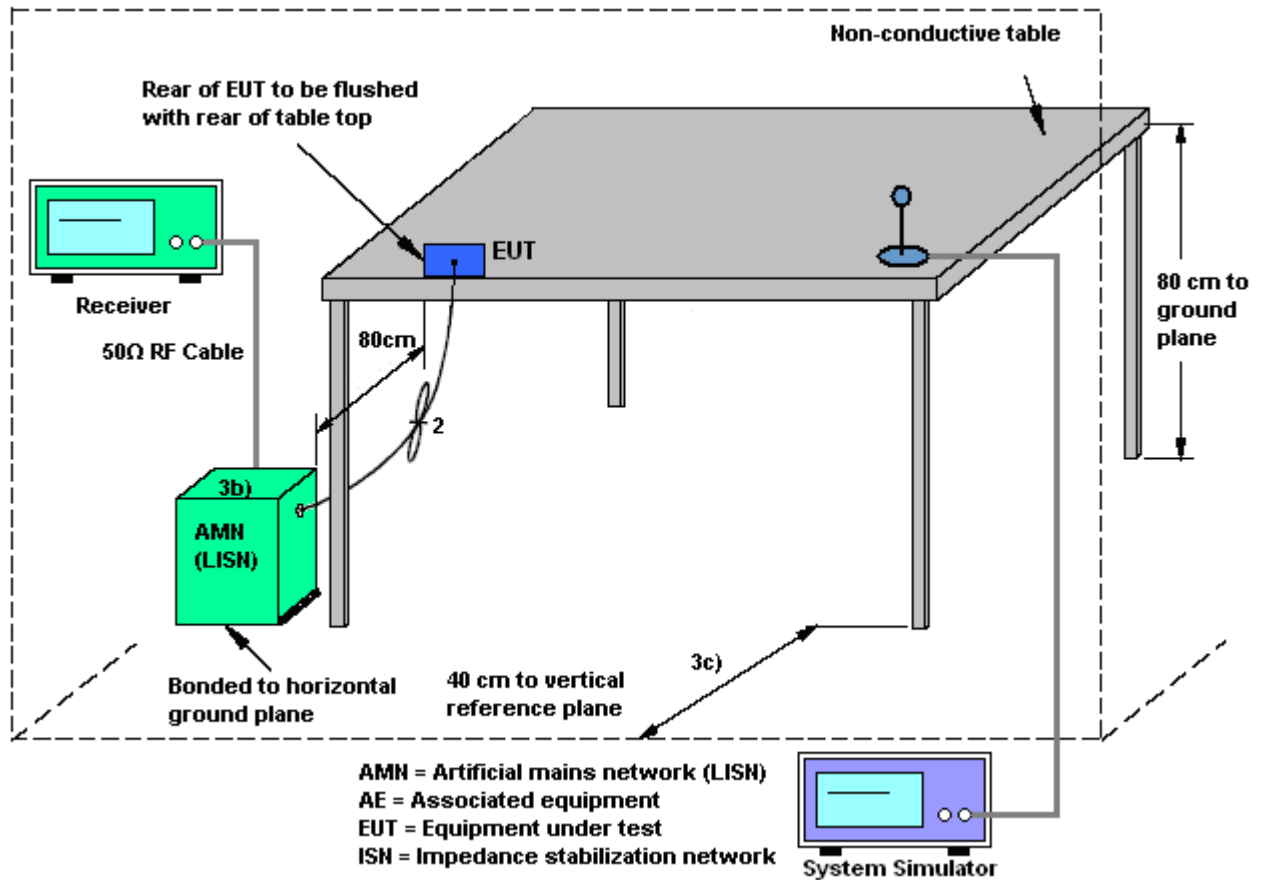
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

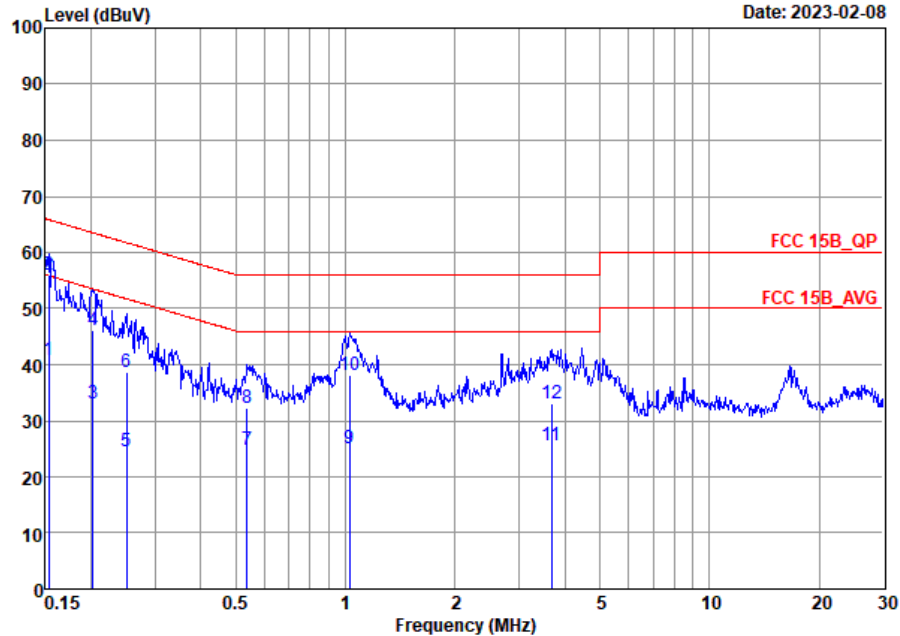
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

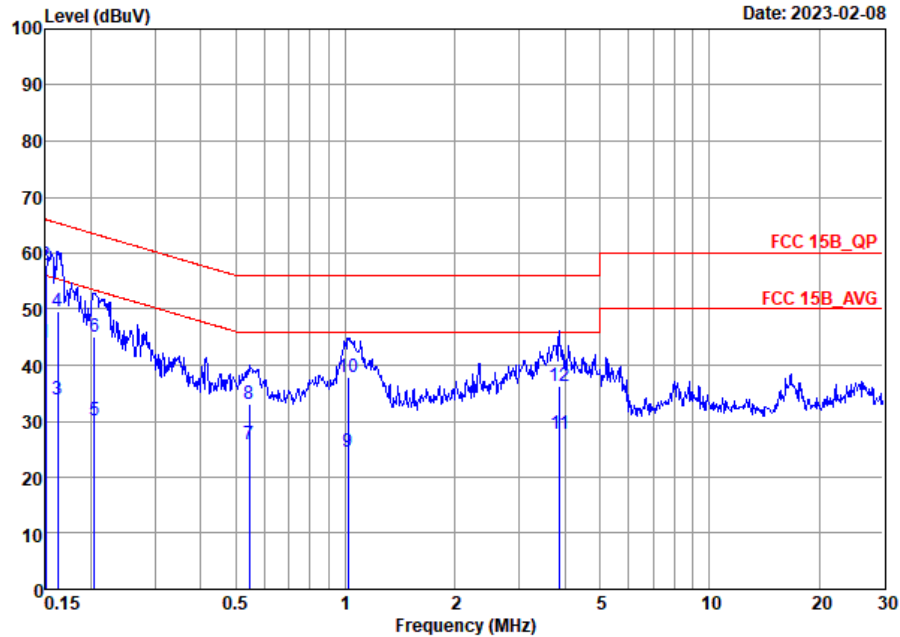
Test Engineer :	Lily Qiu	Temperature :	22~24°C
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15B_QP LISN_20220811_ L LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	40.91	-14.91	55.82	19.90	10.20	10.81	Average
2 *	0.15	55.91	-9.91	65.82	34.90	10.20	10.81	QP
3	0.20	33.18	-20.31	53.49	12.80	10.20	10.18	Average
4	0.20	46.08	-17.41	63.49	25.70	10.20	10.18	QP
5	0.25	24.45	-27.28	51.73	3.70	10.18	10.57	Average
6	0.25	38.55	-23.18	61.73	17.80	10.18	10.57	QP
7	0.54	24.70	-21.30	46.00	2.90	10.11	11.69	Average
8	0.54	32.20	-23.80	56.00	10.40	10.11	11.69	QP
9	1.03	24.95	-21.05	46.00	4.60	10.12	10.23	Average
10	1.03	38.15	-17.85	56.00	17.80	10.12	10.23	QP
11	3.68	25.47	-20.53	46.00	5.20	10.03	10.24	Average
12	3.68	32.97	-23.03	56.00	12.70	10.03	10.24	QP

Test Engineer :	Lily Qiu	Temperature :	22~24°C
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15B_QP LISN_20220811_N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.15	43.96	-12.04	56.00	22.80	10.31	10.85	Average
2 *	0.15	57.86	-8.14	66.00	36.70	10.31	10.85	QP
3	0.16	33.96	-21.38	55.34	13.00	10.31	10.65	Average
4	0.16	49.56	-15.78	65.34	28.60	10.31	10.65	QP
5	0.20	30.07	-23.38	53.45	9.59	10.28	10.20	Average
6	0.20	45.17	-18.28	63.45	24.69	10.28	10.20	QP
7	0.54	25.86	-20.14	46.00	4.00	10.21	11.65	Average
8	0.54	33.16	-22.84	56.00	11.30	10.21	11.65	QP
9	1.02	24.45	-21.55	46.00	4.00	10.22	10.23	Average
10	1.02	37.95	-18.05	56.00	17.50	10.22	10.23	QP
11	3.88	27.79	-18.21	46.00	7.40	10.15	10.24	Average
12	3.88	36.19	-19.81	56.00	15.80	10.15	10.24	QP

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

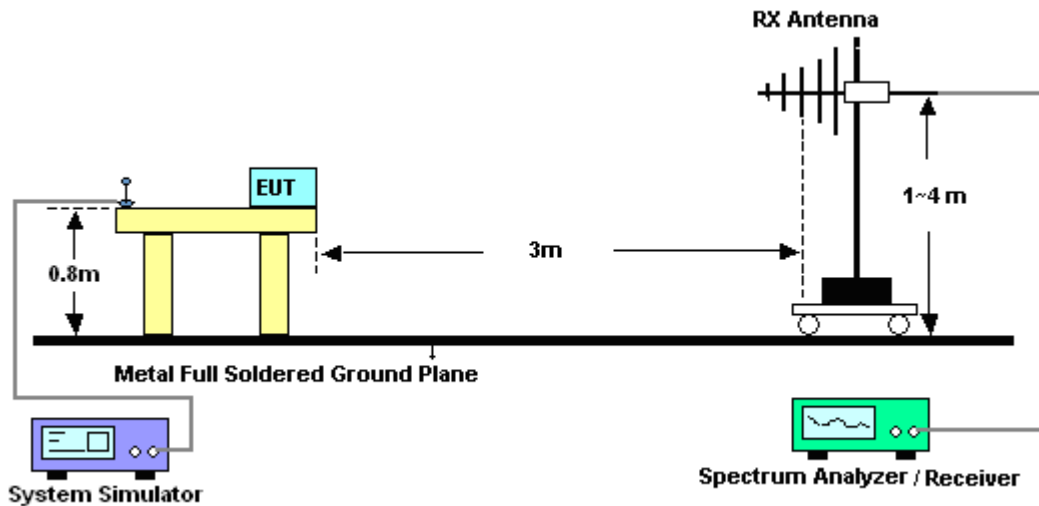
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

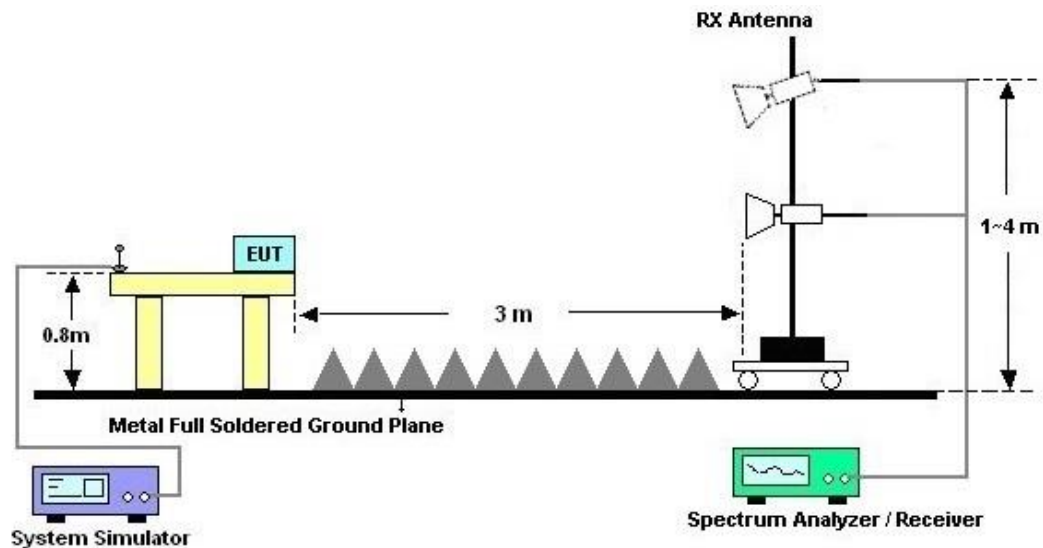
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

3.2.4. Test Setup of Radiated Emission

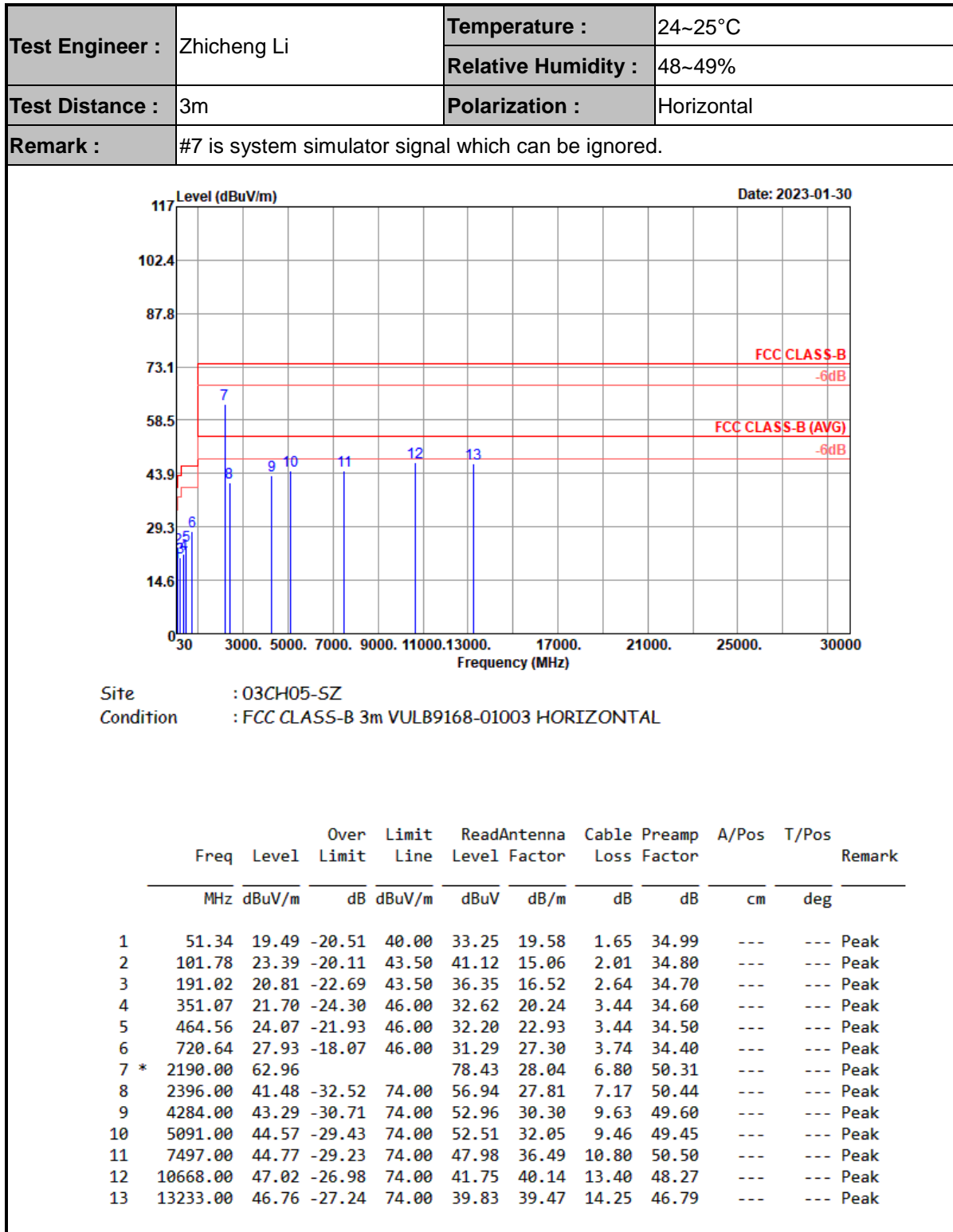
For radiated emissions from 30MHz to 1GHz



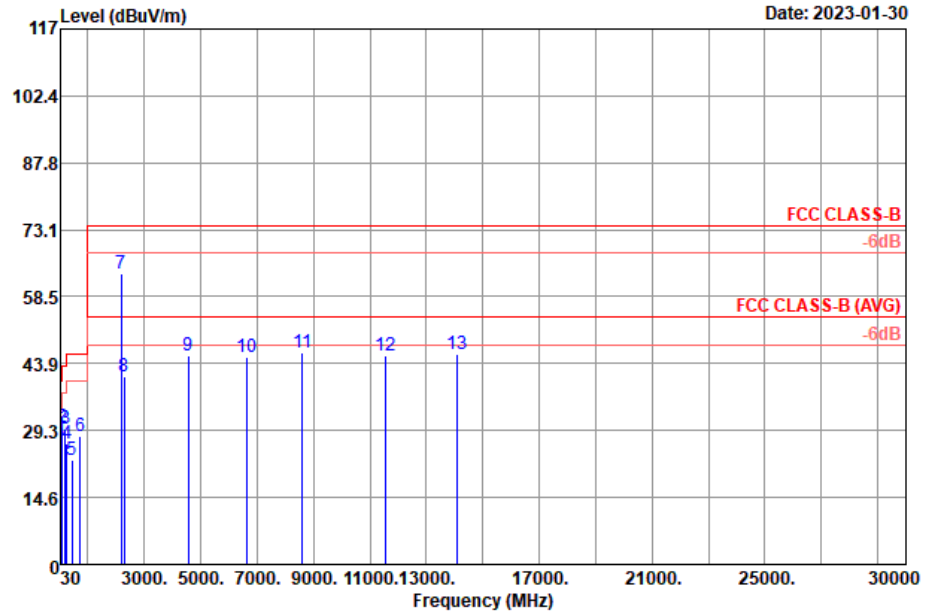
For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission



Test Engineer :	Zhicheng Li	Temperature :	24~25°C
		Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH05-SZ
Condition : FCC CLASS-B 3m VULB9168-01003 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	59.10	27.89	-12.11	40.00	42.12	18.94	1.74	34.91	---	---	Peak
2	100.81	30.07	-13.43	43.50	47.88	14.98	2.01	34.80	---	---	Peak
3	190.05	29.54	-13.96	43.50	45.04	16.58	2.62	34.70	---	---	Peak
4	246.31	26.56	-19.44	46.00	40.82	17.45	2.99	34.70	---	---	Peak
5	437.40	22.82	-23.18	46.00	31.47	22.42	3.43	34.50	---	---	Peak
6	720.64	28.05	-17.95	46.00	31.41	27.30	3.74	34.40	---	---	Peak
7 *	2190.00	63.59			79.06	28.04	6.80	50.31	---	---	Peak
8	2294.00	41.21	-32.79	74.00	56.64	28.00	6.95	50.38	---	---	Peak
9	4575.00	45.67	-28.33	74.00	55.13	30.85	9.27	49.58	---	---	Peak
10	6636.00	45.42	-28.58	74.00	49.45	34.40	10.82	49.25	---	---	Peak
11	8616.00	46.27	-27.73	74.00	46.47	37.16	12.29	49.65	---	---	Peak
12	11556.00	45.71	-28.29	74.00	39.71	40.34	13.55	47.89	---	---	Peak
13	14067.00	45.93	-28.07	74.00	38.17	41.19	14.63	48.06	---	---	Peak

Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 07, 2022	Feb. 08, 2023	Jul. 06, 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Feb. 08, 2023	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2022	Feb. 08, 2023	Oct. 16, 2023	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Feb. 08, 2023	Jul. 06, 2023	Conduction (CO01-SZ)
EMI Test Receiver	R&S	ESR7	102261	9kHz~7GHz	May 20, 2022	Jan. 30, 2023	May 19, 2023	Radiation (03CH05-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071191	10Hz~44GHz	Apr. 06, 2022	Jan. 30, 2023	Apr. 05, 2023	Radiation (03CH05-SZ)
Log-periodic Antenna	SCHWARZBECK	VULB 9168	01001	20MHz~1.5GHz	May 24, 2022	Jan. 30, 2023	May 23, 2023	Radiation (03CH05-SZ)
Amplifier	EM Electronics	EM330	060756	0.01Hz ~3000MHz	Apr. 06, 2022	Jan. 30, 2023	Apr. 05, 2023	Radiation (03CH05-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-2206	1GHz~18GHz	Apr. 10, 2022	Jan. 30, 2023	Apr. 09, 2023	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM01G18GA	060781	1GHz~18GHz	Apr. 06, 2022	Jan. 30, 2023	Apr. 05, 2023	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM18G40G	060778	18GHz~40GHz	Apr. 06, 2022	Jan. 30, 2023	Apr. 05, 2023	Radiation (03CH05-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	00983	15GHz~40GHz	Apr. 10, 2022	Jan. 30, 2023	Apr. 09, 2023	Radiation (03CH05-SZ)
AC Power Source	APC	AFV-S-600	F119050013	N/A	Nov. 10, 2022	Jan. 30, 2023	Nov. 09, 2023	Radiation (03CH05-SZ)
Turn Table	EMEC	T-200-S-1	060925-T	0~360 degree	NCR	Jan. 30, 2023	NCR	Radiation (03CH05-SZ)
Antenna Mast	EMEC	MBS-400-1	060927	1 m~4 m	NCR	Jan. 30, 2023	NCR	Radiation (03CH05-SZ)

NCR: No Calibration Required

5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.2dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.2dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.1dB
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