



FCC Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2165-1, XT2165-2
FCC ID : IHDT56ZP4
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Sep. 13, 2021 ~ Sep. 14, 2021

We, Sporton International (ShenZhen) Inc., 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC170628-08	Rev. 01	Initial issue of report	Oct. 09, 2021

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 12.49 dB at 768.170 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

Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.2. Manufacturer

Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2165-1, XT2165-2
FCC ID	IHDT56ZP4
IMEI Code	Radiation: 357571280018622
HW Version	DVT2
SW Version	RRQ31.Q3-51
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two models, the two models are for different markets and no other difference.
3. This is a variant report for XT2165-1, XT2165-2. The change note could be referred to the XT2165-1, XT2165-2_Operational Description of Product Equality Declaration which is exhibit separately. Based on the similarity between current and previous project, only the related test cases from original test report (Sporton Report Number FC170628-01) were verified for the differences.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850MHz ~ 1910MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV : 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 14 : 788 MHz ~ 798 MHz LTE Band 30 : 2305 MHz ~ 2315 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz 802.11b/g/n: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz 5725 MHz ~ 5850 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Rx Frequency	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz WCDMA Band II: 1930 MHz ~ 1990 MHz WCDMA Band IV : 2110 MHz ~ 2155 MHz WCDMA Band V: 869 MHz ~ 894 MHz LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 14 : 758 MHz ~ 768 MHz LTE Band 30 : 2350 MHz ~ 2360 MHz LTE Band 66 : 2110 MHz~ 2200 MHz 802.11b/g/n: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz 5725 MHz ~ 5850 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz GNSS : 1559 MHz ~ 1610 MHz FM : 88 MHz ~ 108 MHz
Antenna Type	WWAN : Fixed Internal Antenna WLAN : FPC Antenna Bluetooth : FPC Antenna GNSS: FPC Antenna FM : External Earphone Antenna
Type of Modulation	GSM/GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : BPSK HSDPA/DC-HSDPA : QPSK HSUPA : QPSK HSPA+ : 16QAM

	DC-HSDPA : 64QAM LTE: QPSK / 16QAM / 64QAM 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n/ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK GNSS : BPSK FM
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Note: GNSS = GLONASS + GPS

1.5. Modification of EUT

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

1.6. Test Location

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

Test Firm	Sporton International (Shenzhen) Inc.		
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	6.2009-8-24a1

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.

1.9. Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Motorola(AOHAI)	Model Name	MC-101
AC Adapter 2	Brand Name	Motorola(Salcomp)	Model Name	MC-101
AC Adapter 3	Brand Name	Motorola(Chenyang)	Model Name	MC-101
Battery	Brand Name	Motorola (ATL)	Model Name	JK50
USB Cable 1	Brand Name	Motorola (Cabletech)	Model Name	SC18C49697
USB Cable 2	Brand Name	Motorola (Saibao)	Model Name	SC18C24367
USB Cable 3	Brand Name	Motorola (Luxshare)	Model Name	SC18C24368
USB Cable 4	Brand Name	Motorola (Saibao)	Model Name	SC18D22297
USB Cable 5	Brand Name	Motorola (Luxshare)	Model Name	SC18D22299
USB Cable 6	Brand Name	Motorola (Cabletech)	Model Name	SC18D22298

2. Test Configuration of Equipment Under Test

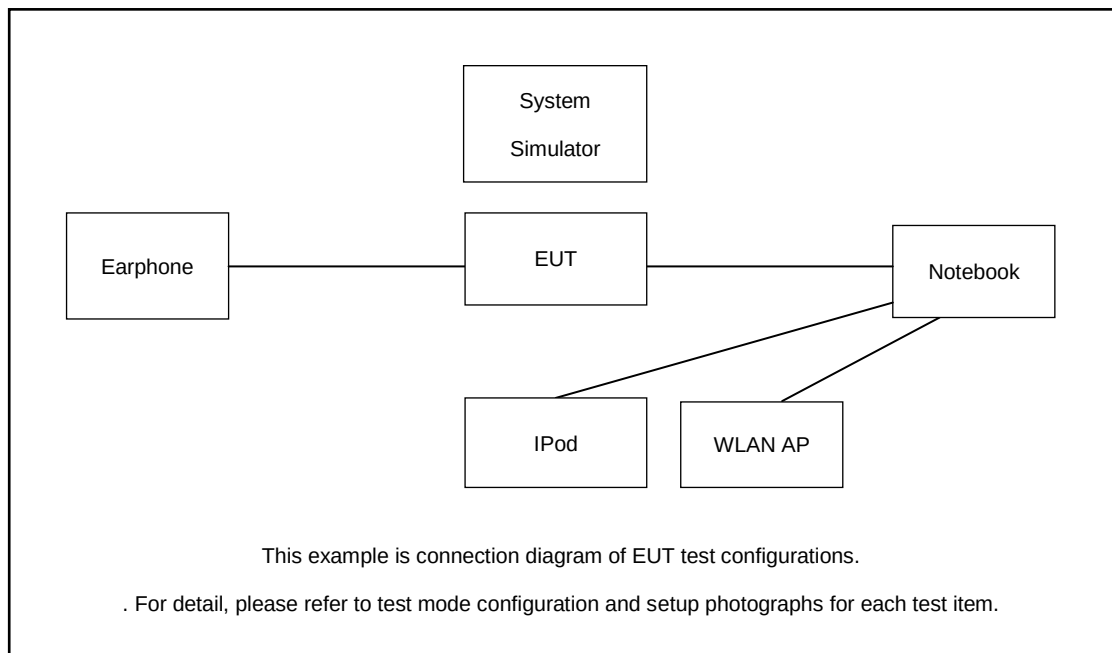
2.1. Test Mode

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: radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
Radiated Emissions	Mode 1 : WCDMA Band V Idle(High CH) + USB Cable 5(Data Link with Notebook) + Earphone + Battery + H-Pattern + SD Card Link for Sample 3
Remark: Data Link with Notebook means data application transferred mode between EUT and Notebook	

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	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	ASUSTek	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,2.7m with Core
3.	Notebook	DELL	Inspiron 15-7570	Fcc DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	iPod	Apple	MC525 ZP/A	N/A	Shielded,1.2m	N/A
5.	Earphone	Apple	N/A	N/A	Shielded,1.2m	N/A

2.4. EUT Operation Test Setup

The EUT was in WCDMA idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between notebook and EUT via USB cable.
2. Execute "H Pattern" to show H Pattern via USB Cable on the Notebook.

3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. 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

3.1.2. Measuring Instruments

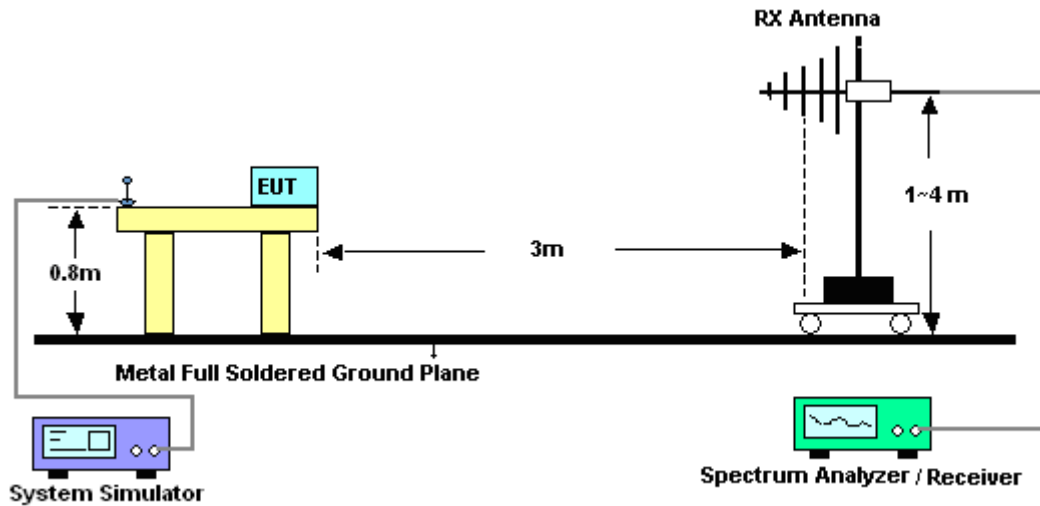
The measuring equipment is listed in the section 4 of this test report.

3.1.3. Test Procedures

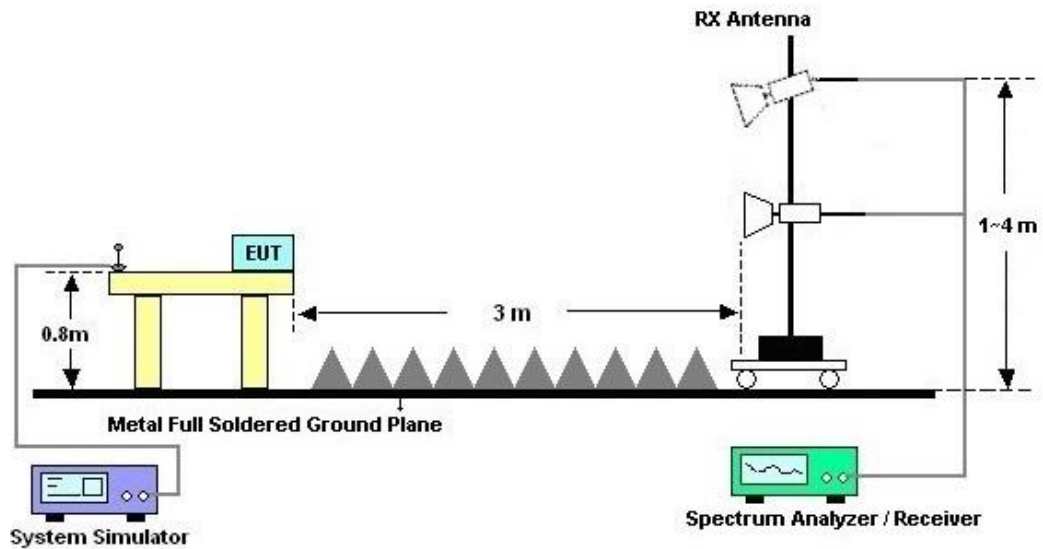
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.1.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

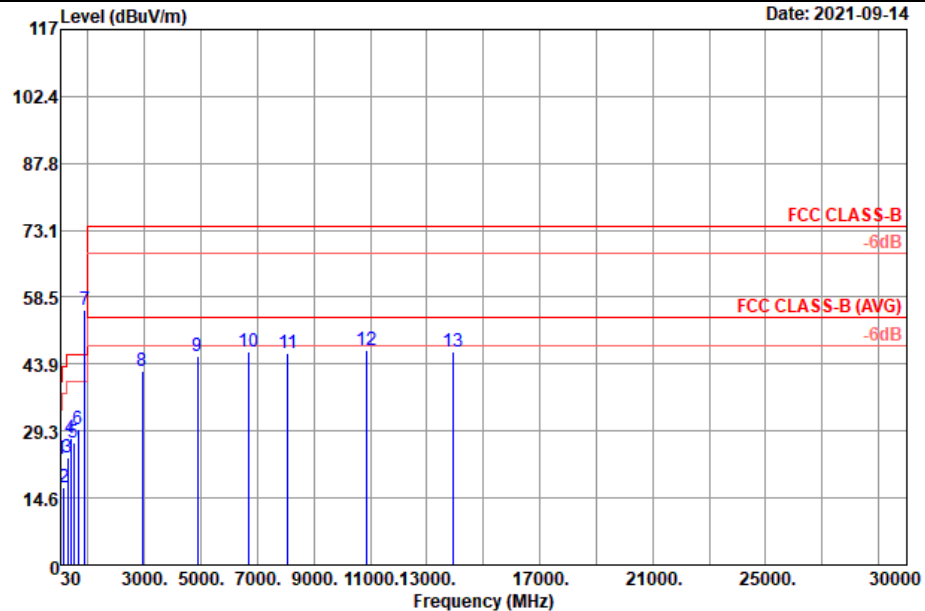


For radiated emissions above 1GHz



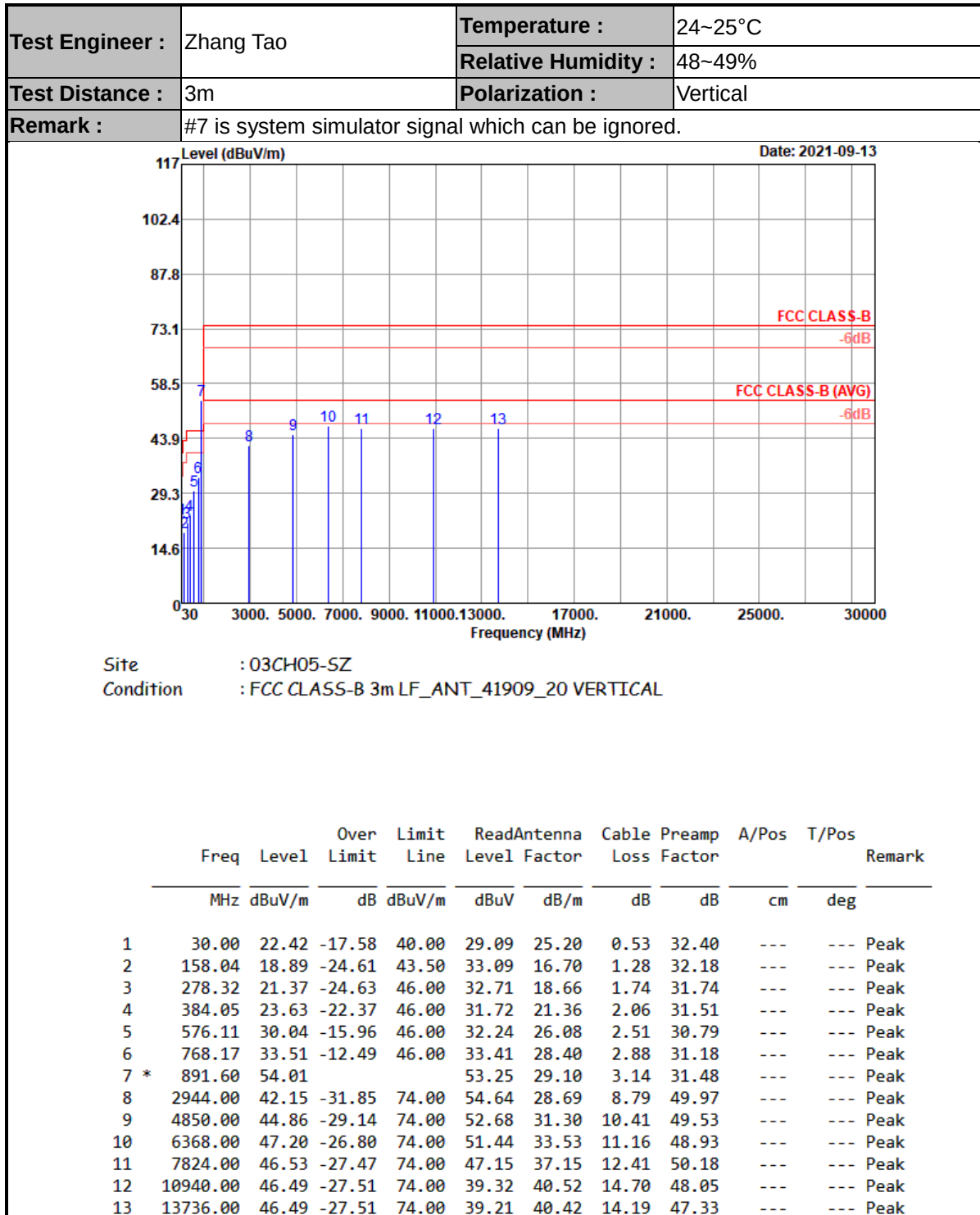
3.1.5. Test Result of Radiated Emission

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



Site : 03CH05-SZ
Condition : FCC CLASS-B 3m VULB9168-01001 HORIZONTAL

	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	30.97	23.17	-16.83	40.00	37.38	18.91	1.88	35.00	---	Peak
2	158.04	16.89	-26.61	43.50	30.10	19.31	2.58	35.10	---	Peak
3	273.47	23.41	-22.59	46.00	36.30	19.05	3.01	34.95	---	Peak
4	384.05	27.57	-18.43	46.00	37.35	21.77	3.28	34.83	---	Peak
5	480.08	26.59	-19.41	46.00	34.35	23.54	3.40	34.70	---	Peak
6	661.47	29.63	-16.37	46.00	33.76	26.45	3.92	34.50	---	Peak
7 *	891.60	55.58			56.64	29.01	4.23	34.30	---	Peak
8	2920.00	42.46	-31.54	74.00	55.08	28.64	8.74	50.00	---	Peak
9	4888.00	45.57	-28.43	74.00	53.34	31.30	10.45	49.52	---	Peak
10	6704.00	46.63	-27.37	74.00	50.02	34.55	11.49	49.43	---	Peak
11	8076.00	46.33	-27.67	74.00	46.29	37.42	12.57	49.95	---	Peak
12	10870.00	47.06	-26.94	74.00	40.42	40.42	14.32	48.10	---	Peak
13	13949.00	46.75	-27.25	74.00	38.96	40.89	14.53	47.63	---	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 Test Receiver	R&S	ESR7	102261	9kHz~7GHz	May 21, 2021	Sep. 13, 2021~ Sep. 14, 2021	May 20, 2022	Radiation (03CH05-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071191	10Hz~44GHz	Apr. 07, 2021	Sep. 13, 2021~ Sep. 14, 2021	Apr. 06, 2022	Radiation (03CH05-SZ)
Log-periodic Antenna	SCHWARZBECK	VULB 9168	01001	20MHz~1.5GHz	Mar. 25, 2021	Sep. 13, 2021~ Sep. 14, 2021	Mar. 24, 2022	Radiation (03CH05-SZ)
Amplifier	EM Electronics	EM330	060756	0.01Hz ~3000MHz	Apr. 07, 2021	Sep. 13, 2021~ Sep. 14, 2021	Apr. 06, 2022	Radiation (03CH05-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-2206	1GHz~18GHz	Apr. 11, 2021	Sep. 13, 2021~ Sep. 14, 2021	Apr. 10, 2022	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM01G18GA	060781	1GHz~18GHz	Apr. 07, 2021	Sep. 13, 2021~ Sep. 14, 2021	Apr. 06, 2022	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM18G40G	060778	18GHz~40GHz	Apr. 07, 2021	Sep. 13, 2021~ Sep. 14, 2021	Apr. 06, 2022	Radiation (03CH05-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	00983	15GHz~40GHz	Apr. 11, 2021	Sep. 13, 2021~ Sep. 14, 2021	Apr. 10, 2022	Radiation (03CH05-SZ)
AC Power Source	APC	AFV-S-600	F119050013	N/A	NCR	Sep. 13, 2021~ Sep. 14, 2021	NCR	Radiation (03CH05-SZ)
Turn Table	EMEC	T-200-S-1	060925-T	0~360 degree	NCR	Sep. 13, 2021~ Sep. 14, 2021	NCR	Radiation (03CH05-SZ)
Antenna Mast	EMEC	MBS-400-1	060927	1 m~4 m	NCR	Sep. 13, 2021~ Sep. 14, 2021	NCR	Radiation (03CH05-SZ)

NCR: No Calibration Required

5. Uncertainty of Evaluation

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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