



EMC TEST REPORT

Applicant	MOBILE DEVICES INGENIERIE
FCC ID	A6GC4D-4GMUSV6
Product	TELEMATICS EMBEDDED SYSTEMS
Brand	MOBILE DEVICES INGENIERIE
Model	C4D-4MUSAA_V6, C4D-4MUSAB_V6
Marketing	C4D-4MUSAA_V6, C4D-4MUSAB_V6
Report No.	R1804A0153-E1V2
Issue Date	June 12, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2017)/ ANSI C63.4 (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Wei Liu

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Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	15.107, ANSI C63.4-2014	NA
Test Date: April 11, 2018 ~ April 17, 2018			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
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City: Shanghai
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2 General Description of Equipment under Test

2.1 Client Information

Applicant	MOBILE DEVICES INGENIERIE
Applicant address	100 AVENUE DE STALINGRAD VILLEJUIF / France
Manufacturer	MOBILE DEVICES INGENIERIE
Manufacturer address	100 AVENUE DE STALINGRAD VILLEJUIF / France

2.2 General information

EUT Description			
Device Type:	Movable Device		
Model Number:	C4D-4MUSAA_V6, C4D-4MUSAB_V6		
IMEI:	355154080329739		
HW Version:	SAP00335+SAP00387+SAP00388 SAP00328+SAP00341+SAP00387		
SW Version:	V2075		
Antenna Type:	Internal Antenna		
Frequency:	Band	TX:	RX:
	LTE Band 2:	1850MHz~ 1910MHz	1930MHz~ 1990MHz
	LTE Band 4:	1710MHz~ 1755MHz	2110MHz~ 2170MHz
	LTE Band 12:	699MHz~ 716MHz	729MHz~ 746MHz
Modulation:	LTE: QPSK / 16QAM		
Test Mode:	Transfer Data Mode		
EUT Accessory			
Battery	Manufacturer: HOWELL Model: 552535H LION POLYMER		
Note: The information of the EUT is declared by the manufacturer.			

Model	C4D-4MUSAA_V6	C4D-4MUSAB_V6
SN	SAP00335+SAP00387+SAP00388	SAP00328+SAP00341+SAP00387
Difference	additional multiplexed OBD	/
Other	The same	The same

Note: Customer declaration, The difference between C4D-4MUSAA_V6 and C4D-4MUSAB_V6 is the additional multiplexed OBD for C4D-4MUSAA_V6. There are more than one models, each one should be applied throughout the compliance test respectively, however, only the worst case (C4D-4MUSAA_V6) will be recorded in this report.



2.3 Applied Standards

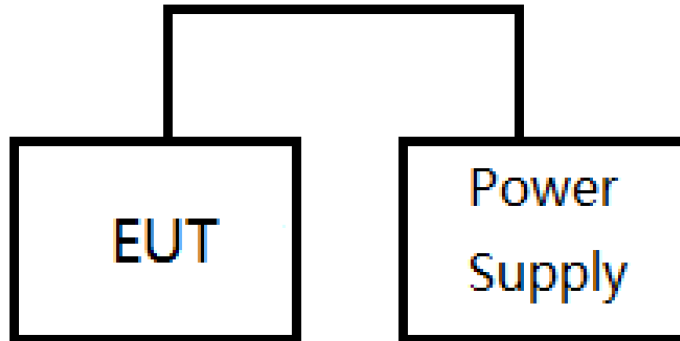
According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

FCC Code CFR47 Part15B (2017)

ANSI C63.4 (2014)

2.4 Test Mode



3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

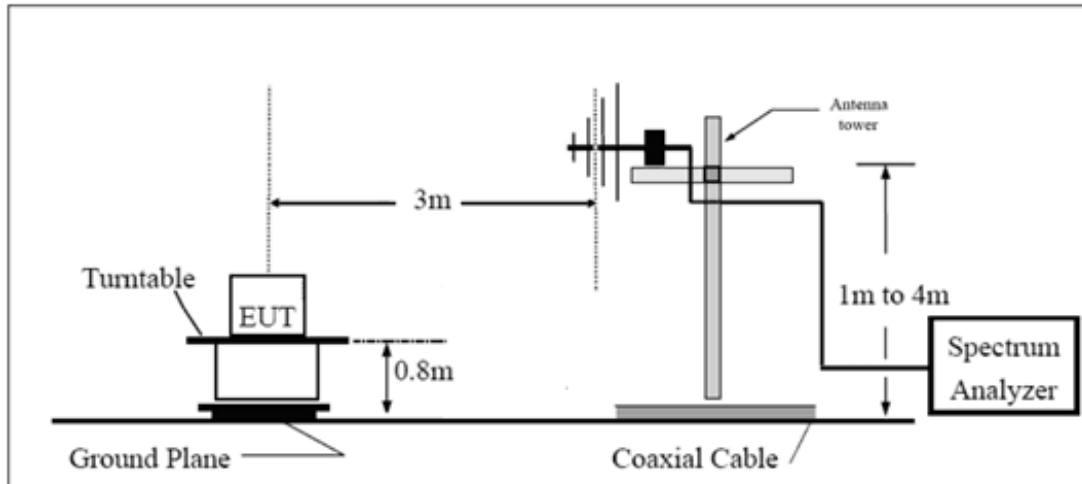
(b) AVERAGE: RBW=1MHz / VBW=1Hz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

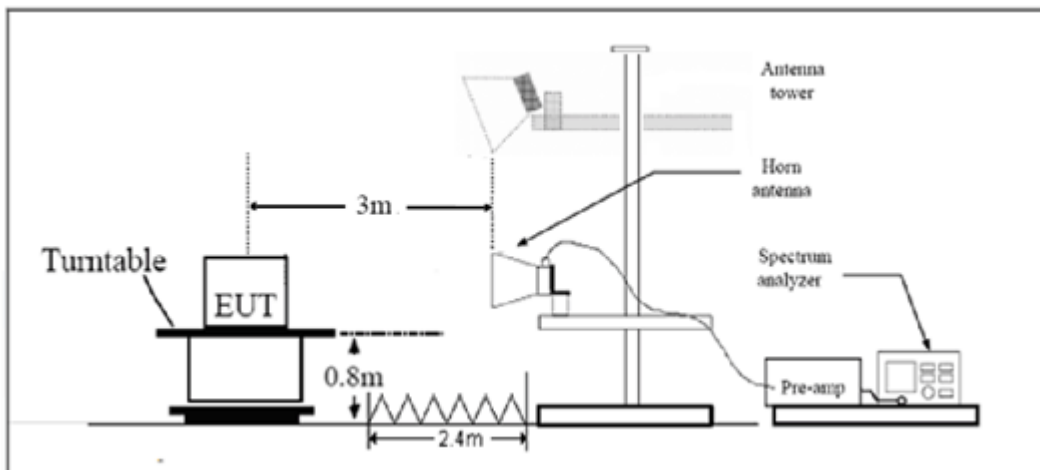
During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup

Below 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

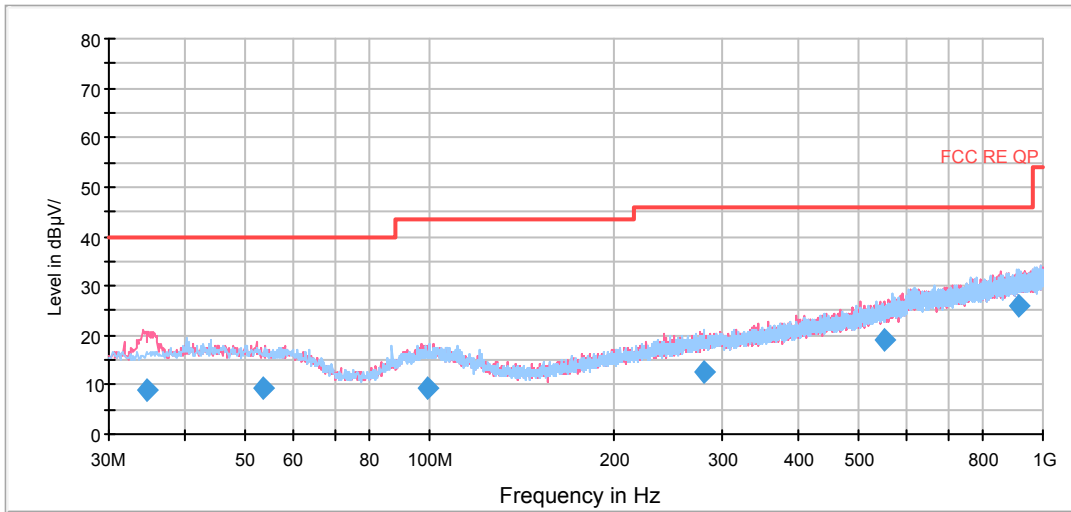
Frequency (MHz)	Field Strength (dB μ V/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5 th harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 3.704$ dB.

Test Results

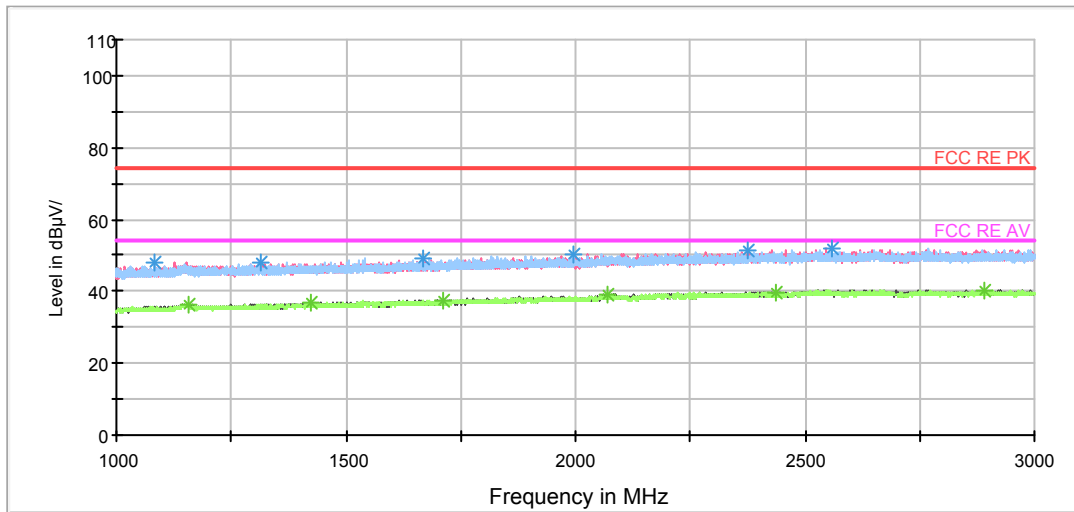
The following graphs display the maximum values of horizontal and vertical by software.
 For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.



Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
34.602500	8.9	-3.0	100.0	V	116.0	11.9	31.1	40.0
53.366250	9.5	-3.3	200.0	V	236.0	12.8	30.5	40.0
99.602500	9.3	-3.9	175.0	H	188.0	13.2	34.2	43.5
279.980000	12.4	-2.9	225.0	H	223.0	15.3	33.6	46.0
550.966250	19.0	-2.6	175.0	V	11.0	21.6	27.0	46.0
911.365000	25.9	-1.1	189.0	H	176.0	27.0	20.1	46.0

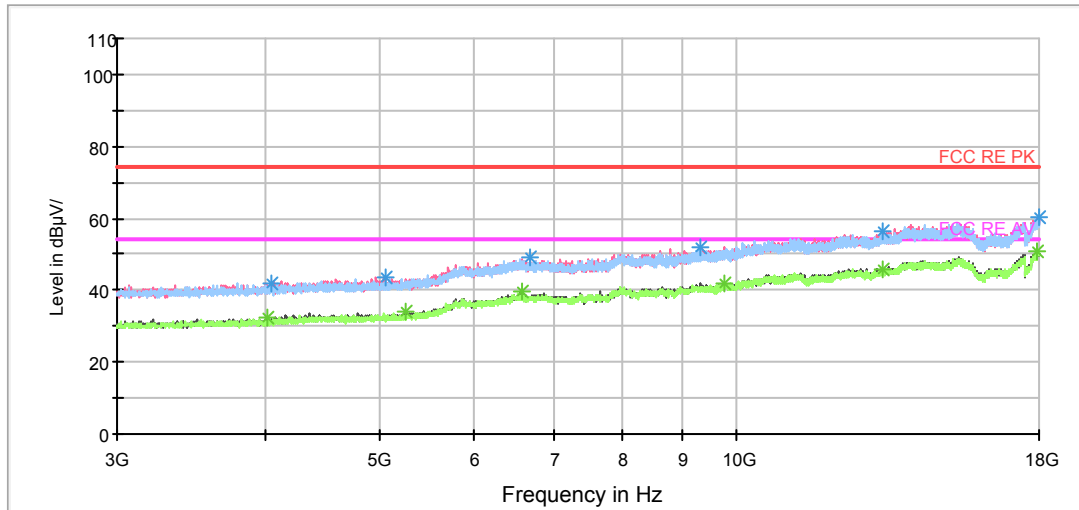
- Remark:**
1. Quasi-Peak = Reading value + Correction factor
 2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
 3. Margin = Limit – Quasi-Peak



Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1084.000000	47.9	45.8	200.0	H	0.0	2.1	26.1	74
1314.250000	48.1	45.3	100.0	H	289.0	2.8	25.9	74
1666.000000	49.2	45.2	100.0	H	2.0	4.0	24.8	74
1996.250000	50.1	44.9	100.0	H	14.0	5.2	23.9	74
2375.500000	51.4	44.7	100.0	V	162.0	6.7	22.6	74
2559.500000	51.9	44.7	100.0	H	338.0	7.2	22.1	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1157.750000	36.4	34.1	200.0	H	312.0	2.3	17.6	54
1425.750000	36.9	33.8	100.0	V	258.0	3.1	17.1	54
1711.500000	37.5	33.3	200.0	V	314.0	4.2	16.5	54
2068.000000	39.0	33.5	200.0	V	3.0	5.5	15.0	54
2437.250000	39.8	32.9	100.0	V	244.0	6.9	14.2	54
2891.750000	40.3	32.8	100.0	V	244.0	7.5	13.7	54



Radiated Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4042.500000	41.9	41.3	200.0	V	45.0	0.6	32.1	74
5055.000000	43.6	41.8	100.0	V	358.0	1.8	30.4	74
6703.125000	49.1	42.0	100.0	V	349.0	7.1	24.9	74
9333.750000	52.1	41.1	100.0	H	58.0	11.0	21.9	74
13288.125000	56.2	40.6	100.0	V	353.0	15.6	17.8	74
17992.500000	60.6	38.6	100.0	V	260.0	22.0	13.4	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4025.625000	32.2	31.4	100.0	V	106.0	0.8	21.8	54
5261.250000	34.1	32.0	100.0	V	353.0	2.1	19.9	54
6585.000000	39.4	32.0	100.0	V	233.0	7.4	14.6	54
9763.125000	42.1	30.7	200.0	H	359.0	11.4	11.9	54
13288.125000	45.9	30.3	200.0	V	284.0	15.6	8.1	54
17962.500000	50.6	29.0	200.0	V	58.0	21.6	3.4	54

3.2 Conducted Emission

Ambient condition

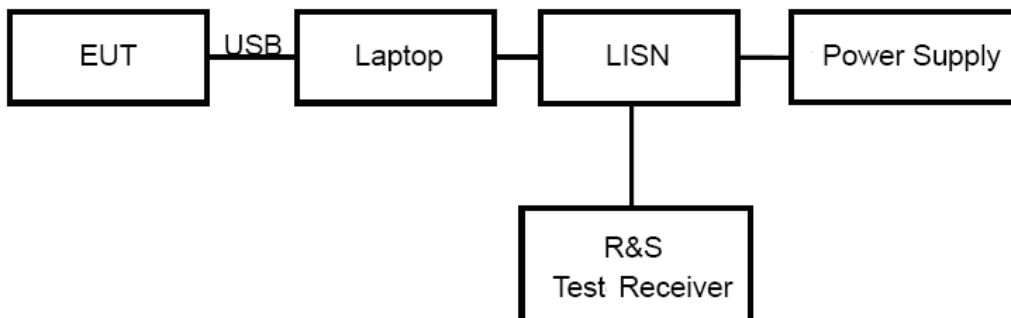
Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

Limits

Frequency (MHz)	Conducted Limits(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.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$. $U = 2.57$ dB.



Test Results

The equipment doesn't connected to public network, therefore this requirement does not apply.



4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Last Cal.	Cal. Due Date
Signal Analyzer	R&S	FSV30	100815	2017-12-17	2018-12-16
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-02-18	2019-02-17
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2020-01-29
EMI Test Receiver	R&S	ESR	101667	2017-09-06	2018-09-05
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Bore Sight Antenna mast	ETS	2171B	00058752	NA	NA
Test software	EMC32	R&S	V9.26.0	NA	NA

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

ANNEX A: The EUT Appearance and Test Configuration

A.1 EUT Appearance



Front Side



Back Side

Picture 1 EUT

A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

Picture 2 Radiated Emission Test Setup