

Full

TEST REPORT

No. I1500083-BLE

For

Client: Suzhou Mobilead Eletronic Technology

Co.,Ltd

Production: WCDMA wireless data terminal

Model Name: Mobilead M80

FCC ID: 2AFBBM80

Hardware Version: V01

Software Version: M80.01.01.20150526

Issued date: 2015-07-30

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

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Revision Version

Report No.: I15D00083-BLE

Report Number	Revision	Date	Memo
I15D00083-BLE	00	2015-07-30	Initial creation of test report

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ANNEX A. DEVIATIONS FROM PRESCRIBED TEST METHODS.......34

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1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications	
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District,	
	Shanghai, P. R. China	
Postal Code:	200001	
Telephone:	(+86)-021-63843300	
Fax:	(+86)-021-63843301	

1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%

1.3. Project data

Project Leader:	Lan Yaqin
Testing Start Date:	2015-06-08
Testing End Date:	2015-07-04

1.4. Signature

Wang Daming

(Prepared this test report)

Liu Jianquan

(Reviewed this test report)

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Zheng Zhongbin

Director of the laboratory (Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name: Suzhou Mobilead Eletronic Technology Co.,Ltd

Room 1503, building G1, No.88, Dongchang Road, SIP, Suzhou,

Report No.: I15D00083-BLE

Address: **PRC**

Telephone: 18014912125

Postcode: 215000

2.2. Manufacturer Information

MOBIWIRE MOBILES (NINGBO) CO.,LTD Company Name:

Address: No.999, Dacheng East Road, Fenghua City, Zhejiang

Telephone: 0574 59550618

Postcode: 315500

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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

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3.1. About EUT

EUT Description	WCDMA wireless data terminal
Model name	Mobilead M80
UMTS Frequency Band	WCDMA BandII and V
GSM Frequency Band	GSM850/900/1800/1900
WLAN Frequency	2412MHz-2472MHz
WLAN Channel	Channel1-Channel13
WLAN type of modulation	802.11b:DSSS
	802.11g/n: OFDM
Extreme Temperature	-10/+55℃
Nominal Voltage	3.9V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.6V

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	867762020000193	V01	M80.01.01.201505	2015-06-09
			26	

^{*}EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	
AE2		

^{*}AE ID: is used to identify the test sample in the lab internally.

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4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2014
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless 2013 Devices	

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5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

Measurement Items	Sub-clause of Part15C	Sub-claus e of IC	Verdict
Maximum Peak Output Power	15.247(b)	1	Р
Peak Power Spectral Density	15.247(e)	1	Р
6dB Occupied Bandwidth	15.247(a)	1	Р
Band Edges Compliance	15.247(d)	1	Р
Transmitter Spurious Emission-Conducted	15.247	1	Р
Transmitter Spurious Emission-Radiated	15.247	1	Р
AC Powerline Conducted Emission	15.107,15.207	1	NA

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Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

Р	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

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For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

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Temperature	Tnom	22 °C
Voltage	Vnom	3.7V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

Note:

- a. All the test data for each data were verified, but only the worst case was reported.
- b.The GFSK, π /4 DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for π /4 DQPSK, 3-DH1 for 8DPSK.
- c.The DC and low frequency voltages' measurement uncertainty is ±2%.

5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

5.2. Statements

The product name Mobilead M80, supporting GSM/GPRS/WCDMA/HSDPA/HSUPA/HSPA+/WLAN/BT/BLE/GPS, manufactured by MOBIWIRE MOBILES (NINGBO) CO.,LTD is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

6. Test result

6.1. Peak Output Power-Conducted

6.1.1 Measurement Limit

Standard	Limit (dBm)
FCC Part 15.247(b)(1)	< 30

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6.1.2 Test Condition:

Hopping Mode	RBW	VBW	Span	Sweeptime
Hopping OFF	3MHz	10MHz	9MHz	Auto

6.1.3 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.5.

- 1. The output power of EUT was connected to the spectrum analyzer by cable. The path loss was compensated to the results for each measurement.
- 2. Enable EUT transmitter maximum power continuously.
- 3. Measure the conducted output power and record the results it.

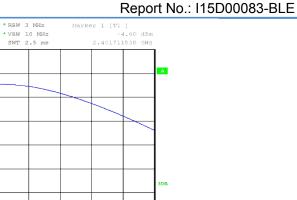
6.1.4 Measurement Results:

For GFSK

Channel	Ch0 2402 MHz	Ch19 2440 MHz	CH39 2480 MHz	Conclusion
Peak Conducted	-4.60	-4.40	-4.33	P
Output Power (dBm)	Fig.1	Fig.2	Fig.3	Г

Conclusion: PASS
Test graphs an below

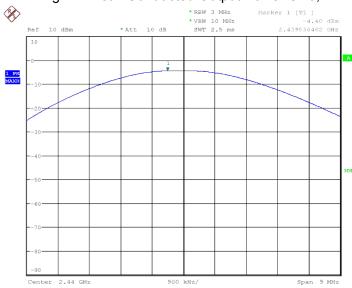
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Date: 10.JUN.2015 13:24:40

Center 2.402 GHz

Fig.1 Peak Conducted Output Power CH0, DH1



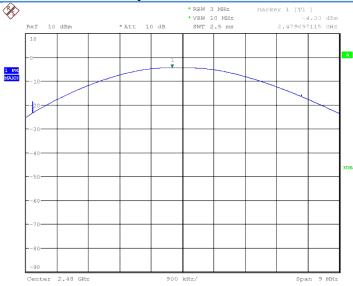
Date: 10.JUN.2015 13:26:53

Fig.2 Peak Conducted Output Power CH19, DH1

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Fig.3 Peak Conducted Output Power CH39, DH1

6.2. Peak Power Spectral Density

6.2.1 Measurement Limit:

Standard	Limit
FCC CFR Part 15.247(e)	< 8dBm/3 KHz

6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

- The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
- 2. Enable EUT transmitter maximum power continuously.
- 3. Set analyzer center frequency to DTS channel center frequency.
- 4. Set the span to 1.5 times the DTS bandwidth.
- 5. Set the RBW to 3 kHz \leq RBW \leq 100 kHz.
- 6. Set the VBW \geq [3 \times RBW].
- 7. Detector = peak.
- 8. Sweep time = auto couple.
- 9. Trace mode = max hold.
- 10. Allow trace to fully stabilize.
- 11. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

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6.2.3 Measurement Uncertainty:

Measurement Uncertainty	\pm 0.75dB
-	

6.2.4 Measurement Results:

802.11b/g mode

Mode	Channel	Power Sp Density(dBı		Conclusion
	00	Fig.4	-20.35	Р
BT4.0	19	Fig.5	-19.93	Р
	39	Fig.6	-20.17	Р

Test figure as below:

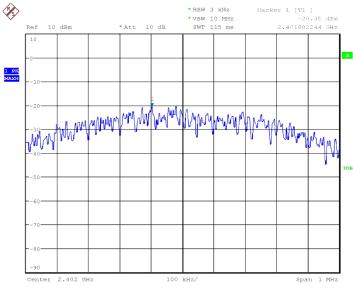
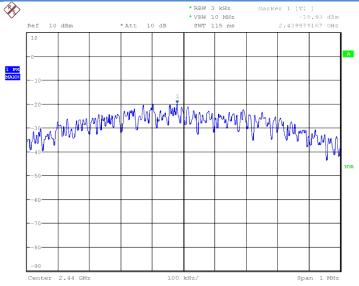


Fig.4 Power spectral density: CH0

Date: 10.JUN.2015 14:09:17

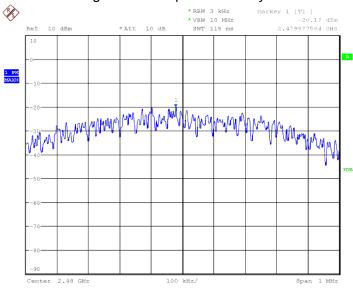
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Date: 10.JUN.2015 14:11:54

Fig.5 Power spectral density: CH19



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Fig.6 Power spectral density: CH39

6.3. 6dB Bandwidth

6.3.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (a) (1)	N/A

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6.3.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.7

- 1. Connect the EUT through cable and divide with CBT32 and spectrum analyzer.
- 2. Enable the EUT transmit maximum power.
- 3. Set the spectrum analyzer as
- 4. Span: two or five times of OBW
- 5. RBW= 1% to 5% of the OBW; VBW≥3RBW; Max Hold.
- 6. Select the max peak, and N DB DOWN=20dB.
- 7. Record the results.

Measurement Result:

For GFSK

Channel	20dB Bandwidth (KHz)		Conclusion
0	Fig.7	685.897	Р
39	Fig.8	692.307	Р
78	Fig.9	682.692	Р

Conclusion: PASS Test graphs as below:

Date: 10.JUN.2015 14:26:39

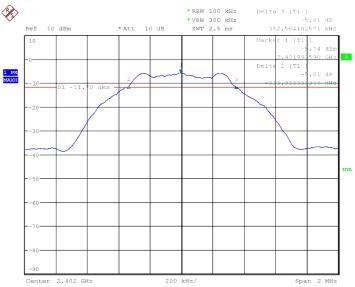
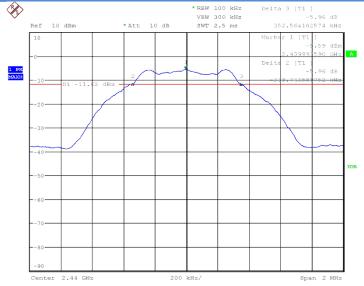


Fig.7 6dB Bandwidth: Ch0

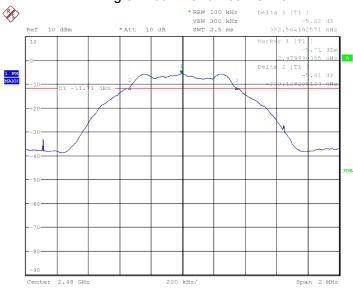
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Fig.8 6dB Bandwidth: Ch19



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Fig.9 6dB Bandwidth: Ch39

6.4. Frequency Band Edges-Conducted

6.4.1 Measurement Limit:

Standard	Limited(dBc)
FCC 47 CFR Part 15.247(d)	>20

6.4.2 Test procedure

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The measurement is according to ANSI C63.10 clause 7.8.6.

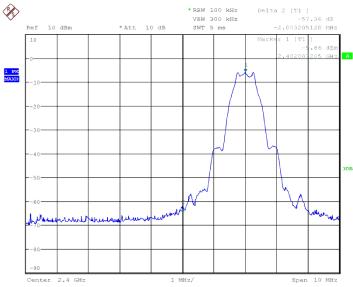
- 1. Connect the EUT to spectrum analyzer.
- 2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
- 3. Detector =peak, sweep time=auto couple, trace mode=max hold.
- 4. Allow sweep to continue until the trace stabilizes.

6.4.3 Measurement results

For GFSK

Channel	Band Edge Power (dBc)	Conclusion
00	Fig.10	Р
39	Fig.11	Р

Conclusion: PASS
Test graphs an below

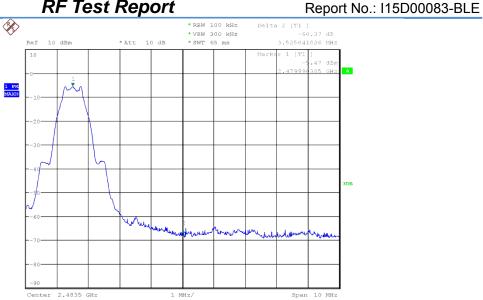


Date: 10.JUN.2015 14:56:58

Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

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Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

6.5. Conducted Emission

6.5.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz
1 CC 47 CT X Fait13.247 (u)	bandwidth

6.5.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.8.

- 1. Connect the EUT to spectrum analyzer.
- 2. Set RBW=100KHz, VBW=300KHz.
- 3. Detector =peak, sweep time=auto couple, trace mode=max hold.

6.5.3 Measurement Results:

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MU-	Center Freq.	Fig.12	Р
Ch0 2402MHz	30MHz~26GHz	Fig.13	Р
Ch40 2440MU-	Center Freq.	Fig.14	Р
Ch19 2440MHz	30MHz~26GHz	Fig.15	Р
Ch39 2480MHz	Center Freq.	Fig.16	Р

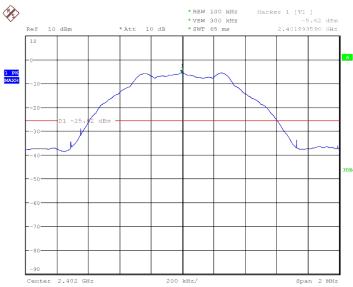
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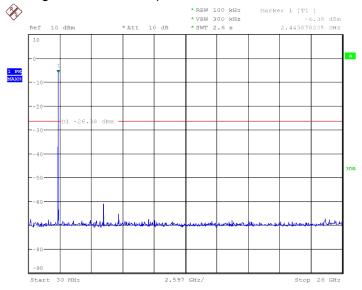
Report No.: I15D00083-BLE 30MHz~26GHz Fig.17 Ρ

Conclusion: PASS Test graphs as below



Date: 10.JUN.2015 15:20:43

Fig.12 Conducted spurious emission: Ch0, 2402MHz



Date: 10.JUN.2015 15:26:24

Fig.13 Conducted spurious emission: Ch0, 30MHz~26GHz

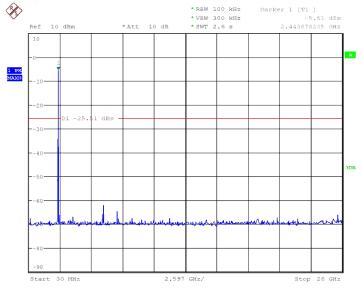
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Date: 10.JUN.2015 15:23:16

Fig.14 Conducted spurious emission: Ch19, 2441MHz



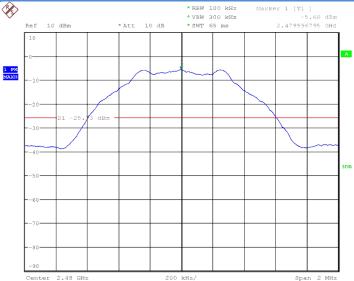
Date: 10.JUN.2015 15:28:11

Fig.15 Conducted spurious emission: Ch19, 30MHz~26GHz

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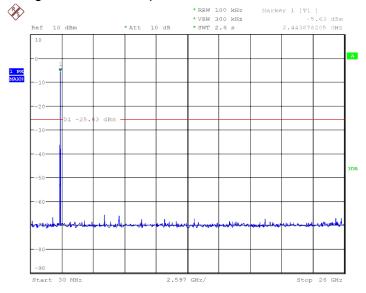
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Date: 10.JUN.2015 15:24:14

Fig.16 Conducted spurious emission: Ch39, 2480MHz



Date: 10.JUN.2015 15:29:08

Fig.17 Conducted spurious emission: Ch39, 30MHz~26GHz

6.6. Radiated Emission

6.6.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

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Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

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6.6.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2009 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

6.6.3 Measurement Results:

A "reference path loss" is established and A_{Rpi} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

A_{Rpi} = Cable loss + Antenna Gain-Preamplifier gain

Result=P_{Mea} + A_{Rpi}

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Channel	Frequency Range	Test Results	Conclusion
	30MH~1GHz	30MH~1GHz Fig.18	
Ch0 2402MHz	1GHz~3GHz	Fig.19	Р
	3GHz~18GHz	Fig.20	Р
Power	2.38GHz~2.4GHz	Fig.21	Р
Power	2.45GHz~2.5GHz	Fig.22	Р

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Channel	Frequency Range	Test Results	Conclusion
	30MH~1GHz	Fig.23	Р
Ch0 2480MHz	1GHz~3GHz	Fig.24	Р
	3GHz~18GHz	Fig.25	Р
All channels	18GHz~26GHz	Fig.26	Р

Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
32.869296	9.65	-26	35.65	V
34.755212	10.06	-25.9	35.96	V
66.305852	4.99	-27.2	32.19	V
248.571492	9.79	-22.2	31.99	Н
675.994152	25.07	-11.7	36.77	V
908.741772	21.42	-7.5	28.92	Н

Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2550.599423	52	8.4	43.6	٧
2698.956154	57.72	9.7	48.02	V
2752.653654	53.57	10.1	43.47	Н

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2804.010769	53.9	10.6	43.3	н
2885.040192	55.18	11.4	43.78	Н
2990.254808	56.51	13.4	43.11	Н

Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13064.5846	52.95	16.8	36.15	V
14202.19567	53.68	19.4	34.28	V
15298.37267	56.84	21.8	35.04	Н
16012.00447	59.51	25.3	34.21	Н
17114.31253	60	27.1	32.9	V
17866.8904	62.46	29.3	33.16	Н

Ch39 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.6243	10.85	-25.9	36.75	V
53.235992	8.19	-25	33.19	V
171.151888	4.48	-25.9	30.38	V
676.00616	25.33	-11.7	37.03	V
816.817748	19.64	-9.6	29.24	Н
937.745252	21.79	-7.2	28.99	V

Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2589.839423	51.69	8.7	42.99	V
2687.084807	53.11	9.7	43.41	V
2789.14	53.93	10.5	43.43	Н
2877.659231	55.15	11.4	43.75	Н
2950.729807	55.09	12.3	42.79	V

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	0-		40.75	
2985.160577	57.05	13.3	43.75	Н

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Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13405.82107	53.98	17.7	36.28	V
14285.8282	55.14	20.6	34.54	Н
14915.47333	55.67	22.1	33.57	Н
15831.69433	58.28	24.7 33.58		Н
16502.84827	59.6	26.9 32.7		V
17655.5952	62.53	29	33.53	Н

All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19525.786000	49.0	6.97 42.03		V
20684.980000	47.7	6.97	40.73	Н
22119.789000	45.3	3.05	42.05	V
23627.899000	43.8	3.05	40.75	Н
24606.319000	43.4	3.05	40.35	V
25244.558000	43.6	3.05	40.55	Н

Note: all the test data shown was peak detected.

Conclusion: PASS
Test graphs as below:

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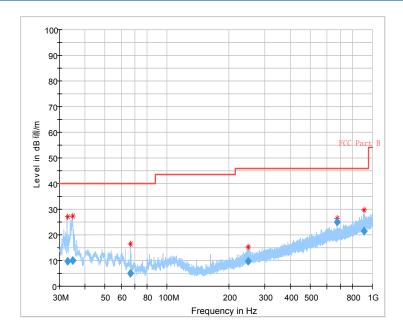


Fig.18 Radiated emission: Ch0, 30MHz~1GHz

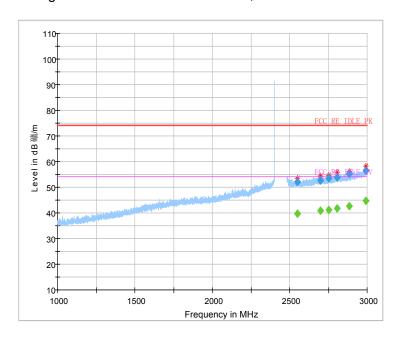


Fig.19 Radiated emission: Ch0, 1GHz~3GHz

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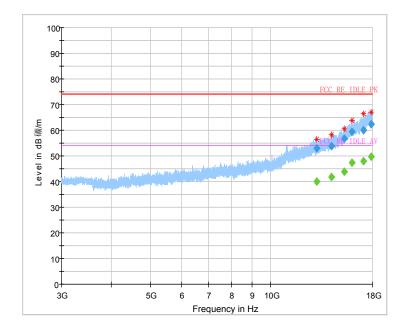


Fig.20 Radiated emission: Ch0, 3GHz~18GHz

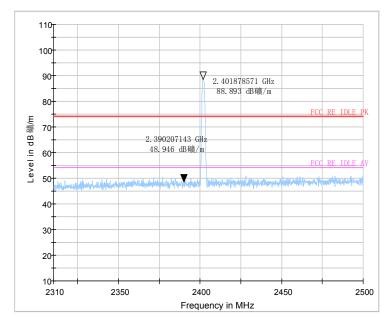


Fig.21 Radiated emission (Power): low channel

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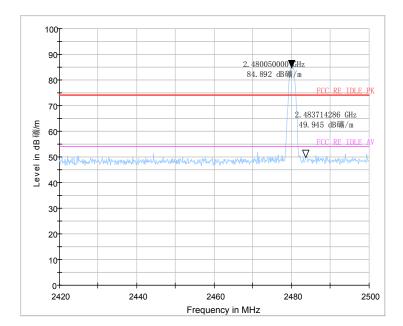


Fig.22 Radiated emission (Power): high channel

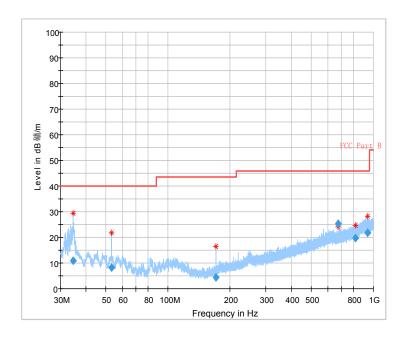


Fig.23 Radiated emission: Ch39, 30MHz~1GHz

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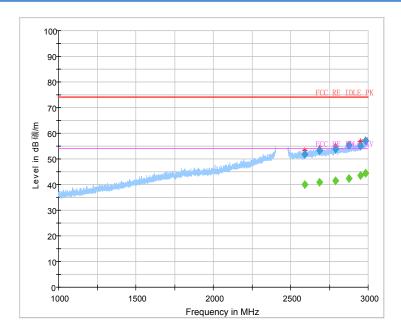


Fig.24 Radiated emission: Ch39, 1GHz~3GHz

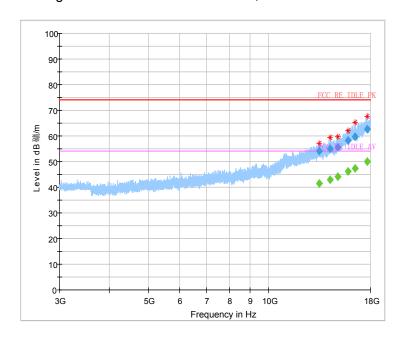


Fig.25 Radiated emission: Ch39, 3GHz~18GHz

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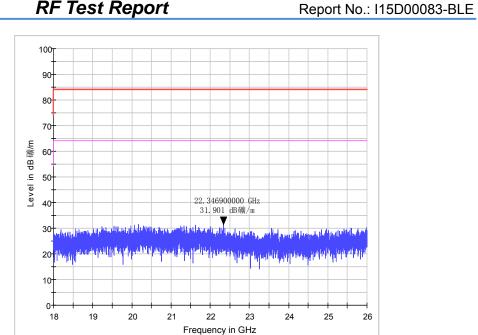


Fig.26 Radiated emission: 18 GHz - 26 GHz

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7. Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.interva
1	Vector Signal Analyser	FSQ26	101096	Rohde&Schw arz	2015-05-13	1
2	Bluetooth Tester	CBT32	100785	Rohde&Schw arz	2015-05-13	1
3	DC Power Supply	ZUP60-14	LOC-220Z006 -0007	TDL-Lambda	2015-05-13	1

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Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibratio n Date	Cal.interv al
1	Universal Radio Communicati	CMU200	123126	R&S	2015-05-1 3	1
2	Test Receiver	ESU40	100307	R&S	2015-05-1 3	1
3	Trilog Antenna	VULB916 3	VULB9163-51 5	Schwarzbeck	2014-11-0 5	3
4	Double Ridged Guide Antenna	ETS-311 7	00135885	ETS	2014-05-0 6	3
5	2-Line V-Network	ENV216	101380	R&S	2015-05-1 3	1

Anechoic chamber

Fully anechoic chamber by Frankonia German.

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8. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

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Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 $^{\circ}$ C, Max. = 30 $^{\circ}$ C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Fully-anechoic chamber2 (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C , Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %

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Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 30MHz to

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ANNEX A. Deviations from Prescribed Test Methods



********End The Report*******

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