





Full

TEST REPORT

No. I18D00198-SRD02

For

Client: Hisense International Co., Ltd.

Production: Mobile Phone

Model Name: Hisense F23 PLUS

FCC ID: 2ADOBF23PLUS

Hardware Version: YK736-MB-V0.2

Software Version: Hisense_F17_4G_10_S01_20180118

Issued date: 2018-10-12

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.: I18D00198-SRD02

Report Number	Revision	Date	Memo
I18D00198-SRD02	00	2018-10-12	Initial creation of test report

East China Institute of Telecommunications Page Number : 2 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



Report No.: I18D00198-SRD02

Page Number : 3 of 34 Report Issued Date : Oct.12.2018

CONTENTS

1.	TEST LABORATORY	5
1.1.	TESTING LOCATION	5
1.2.	TESTING ENVIRONMENT	5
1.3.	PROJECT DATA	5
1.4.	SIGNATURE	5
2.	CLIENT INFORMATION	6
2.1.	APPLICANT INFORMATION	6
2.2.	MANUFACTURER INFORMATION	6
3.	EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	7
3.1.	ABOUT EUT	7
3.2.	INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	7
3.3.	INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	7
4.	REFERENCE DOCUMENTS	8
4.1.	REFERENCE DOCUMENTS FOR TESTING	8
5.	SUMMARY OF TEST RESULTS	9
5.1.	NOTES	10
5.2.	STATEMENTS	10
6.	TEST RESULT	11
6.1.	PEAK OUTPUT POWER-CONDUCTED	11
6.2.	PEAK POWER SPECTRAL DENSITY	13
6.3.	6DB BANDWIDTH	15
6.4.	FREQUENCY BAND EDGES-CONDUCTED	17
6.5.	CONDUCTED EMISSION	19
6.6.	RADIATED EMISSION	22
6.7.	AC POWERLINE CONDUCTED EMISSION	28



RF Test Report Report No.: I18D00198-SRD02 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS......30 7. 8. TEST ENVIRONMENT......31 DEVIATIONS FROM PRESCRIBED TEST METHODS......33 ANNEX A. ACCREDITATION CERTIFICATE......34 ANNEX B.

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number

: 4 of 34

Report Issued Date : Oct.12.2018



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:	-30/+50℃
Relative Humidity:	20-75%

1.3. Project data

Project Leader:	Xu Yuting
Testing Start Date:	2018-09-17
Testing End Date:	2018-10-11

1.4. Signature

Yang Dejun
(Prepared this test report)

杨德君

Shi Hongqi (Reviewed this test report)

施切旗

Report No.: I18D00198-SRD02

Zheng Zhongbin (Approved this test report)

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 5 of 34 Report Issued Date : Oct.12.2018



Address:

RF Test Report No.: I18D00198-SRD02

2. Client Information

2.1. Applicant Information

Company Name: Hisense International Co., Ltd.

Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071,

China

Postcode: 266010

Telephone: /

2.2. Manufacturer Information

Company Name: Hisense Communications Co., Ltd.

Address: 218 Qianwangang Road, Economic & Technological Development

Zone, Qingdao, Shandong Province, P.R. China

Postcode: 266510

Telephone: /

East China Institute of Telecommunications Page Number : 6 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018

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

Report No.: I18D00198-SRD02

3.1. About EUT

EUT Description	Mobile Phone
Model name	Hisense F23 PLUS
BLE Frequency	2402MHz-2480MHz
BLE Channel	Channel0-Channel39
BLE Modulation	GFSK;
Extreme Temperature	-30/+50℃
Nominal Voltage	3.8V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.5V

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
N09(mai	861854039320062	YK736-MB-V0.	Hisense_F17_4G_10_	2018-01-24
n supply)		2	S01_20180118	
N08(mai	N/A	YK736-MB-V0.	Hisense_F17_4G_10_	2018-01-24
n supply)		2	S01_20180118	
N14(sec	861854039320062	YK736-MB-V0.	Hisense_F17_4G_10_	2018-02-08
ondary		2	S01_20180118	
supply)				
N05	932147715394898	YK736-MB-V0.	Hisense_F17_4G_10_	2018-09-13
		2	S01_20180118	

^{*}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.

East China Institute of Telecommunications Page Number : 7 of 34
TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018





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.	2017
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless 2013 Devices	

Report No.: I18D00198-SRD02

East China Institute of Telecommunications Page Number: 8 of 34
TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date: Oct.12.2018



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	Р

Report No.: I18D00198-SRD02

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

Tool Condition	
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

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 9 of 34 Report Issued Date : Oct.12.2018



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:

Report No.: I18D00198-SRD02

: 10 of 34

Temperature	Tnom	22°C
Voltage	Vnom	3.8V
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 was set in DH1.
- 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.

5.2. Statements

The Hisense F23 PLUS, supporting GSM/GPRS/EDGE/WCDMA/LTE/WLAN/BT/BLE, manufactured by Hisense Communications Co., Ltd, is a variant product for testing. The content of these changes are LCD Module /camera(back and front)/fingerprint module. Only the RSE is tested in this report. For the other test cases we quote the data of report No: I18D00020-SRD02, which was prepared by East China Institute of Telecommunications.

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

Peak Output Power-Conducted

6.1.1 Measurement Limit

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

Report No.: I18D00198-SRD02

: 11 of 34

6.1.2 Test Condition:

BT-LE	RBW	VBW	Span	Sweeptime
DTS	3MHz	10MHz	9MHz	Auto

6.1.3 Test procedure

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

- 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.
- Measure the conducted output power and record the results it.

6.1.4 Measurement Results:

For GFSK

Channel	Ch0 2402	Ch19 2440	CH39 2480	Conclusion
Chamilei	MHz	MHz	MHz	Conclusion
Peak Conducted	3.959	4.432	4.593	Р
Output Power (dBm)	Fig.1	Fig.2	Fig.3	Г

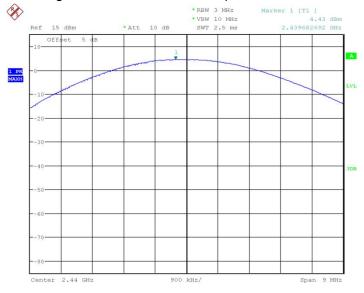
Conclusion: PASS Test graphs an below





Date: 2.FEB.2018 11:12:35

Fig.1 Peak Conducted Output Power CH0, DH1



Date: 2.FEB.2018 11:12:55

Fig.2 Peak Conducted Output Power CH19, DH1

Page Number

: 12 of 34

Report Issued Date : Oct.12.2018



Report No.: I18D00198-SRD02



Date: 2.FEB.2018 11:13:12

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.

- 1. 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.

East China Institute of Telecommunications Page Number : 13 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



Report No.: I18D00198-SRD02

6.2.3 Measurement Uncertainty:

	0.75.10
Measurement Uncertainty	0.75dB
	1

6.2.4 Measurement Results:

Mode	Channel	Power Sp Density(dBı		Conclusion
	00	Fig.4	-12.12	Р
BT-LE	19	Fig.5	-11.642	Р
	39	Fig.6	-11.568	Р

Test figure as below:

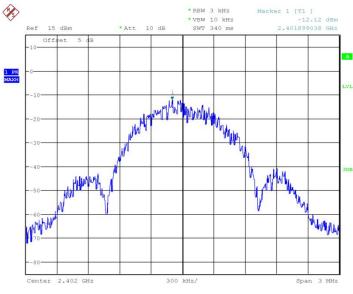


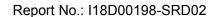
Fig.4 Power spectral density: CH0

Page Number

: 14 of 34

Report Issued Date : Oct.12.2018

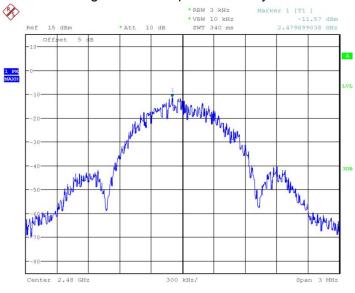
Date: 2.FEB.2018 13:59:09





Date: 2.FEB.2018 14:00:24

Fig.5 Power spectral density: CH19



Date: 2.FEB.2018 14:02:07

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)	≥500k

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 15 of 34 Report Issued Date : Oct.12.2018

RF Test Report Report No.: I18D00198-SRD02

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 DTS channel center frequency.
- 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=6dB.
- 7. Record the results.

Measurement Result:

For GFSK

Channel	6dB Bandv	6dB Bandwidth (KHz)	
0	Fig.7	707	Р
39	Fig.8	712	Р
78	Fig.9	716	Р

Conclusion: PASS Test graphs as below:

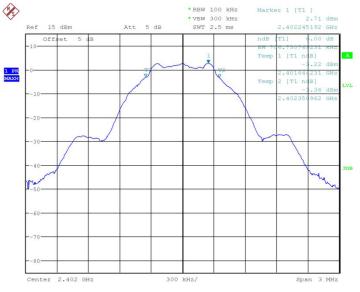
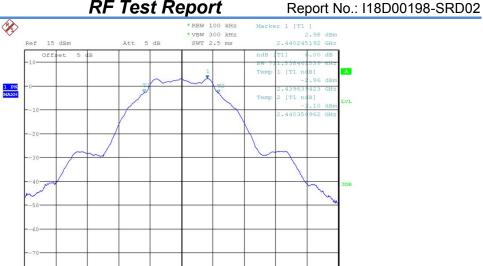


Fig.7 6dB Bandwidth: Ch0

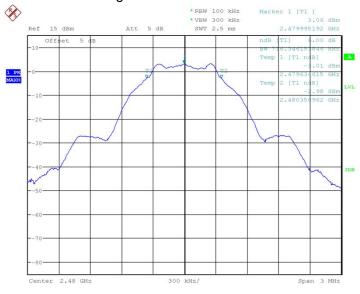
Date: 2.FEB.2018 14:09:28

East China Institute of Telecommunications Page Number : 16 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



Date: 2.FEB.2018 14:10:02

Fig.8 6dB Bandwidth: Ch19



Date: 2.FEB.2018 14:10:34

6dB Bandwidth: Ch39 Fig.9

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

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 17 of 34 Report Issued Date : Oct.12.2018

Report No.: I18D00198-SRD02

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

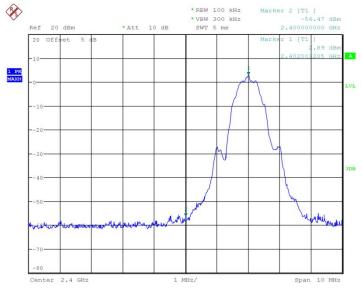
- 1. Connect the EUT to spectrum analyzer.
- 2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
- 3. Detector =peak, sweep time=auto couple, trace mode=max hold.
- 4. Allow sweep to continue until the trace stabilizes.

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

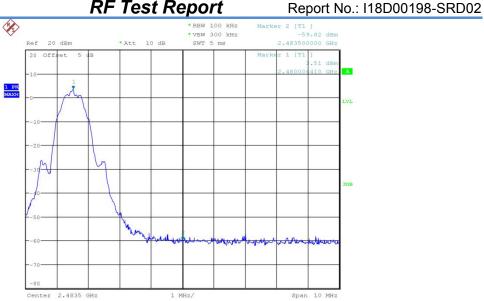


Date: 2.FEB.2018 13:55:10

Fig.10 Frequency Band Edge: GFSK, Ch0

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 18 of 34 Report Issued Date : Oct.12.2018





Date: 2.FEB.2018 13:55:40

Fig.11 Frequency Band Edge: GFSK, Ch39

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 00 47 01 KT ait13.247 (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:

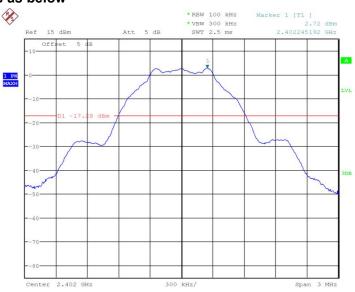
Channel	Frequency Range	Test Results	Conclusion
Ch0 240284U-	Center Freq.	Fig.12	Р
Ch0 2402MHz	30MHz~26GHz	Fig.13	Р
Ch40 2440MH-	Center Freq.	Fig.14	Р
Ch19 2440MHz	30MHz~26GHz	Fig.15	Р
Ch39 2480MHz	Center Freq.	Fig.16	Р

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 19 of 34 Report Issued Date : Oct.12.2018



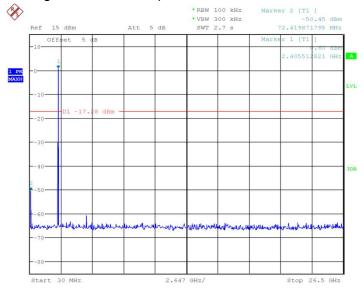
Report No.: I18D00198-SRD02 30MHz~26GHz Fig.17 Ρ

Conclusion: PASS Test graphs as below



Date: 2.FEB.2018 14:05:35

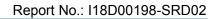
Fig.12 Conducted spurious emission: Ch0, 2402MHz

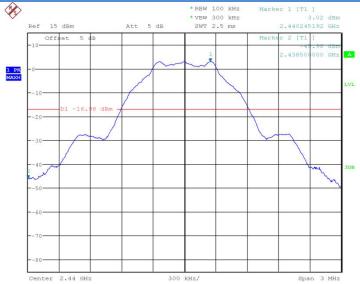


Date: 2.FEB.2018 14:05:58

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

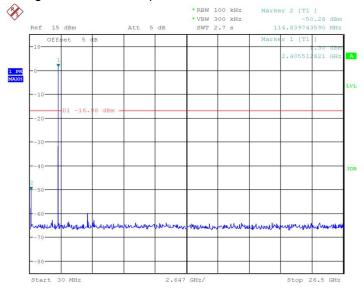
: 20 of 34





Date: 2.FEB.2018 14:06:29

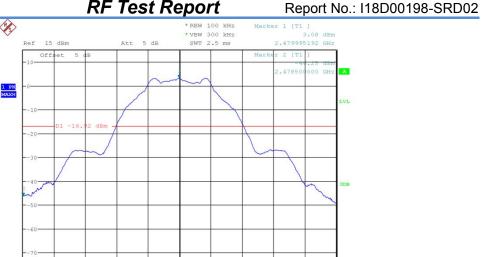
Fig.14 Conducted spurious emission: Ch19, 2440MHz



Date: 2.FEB.2018 14:06:53

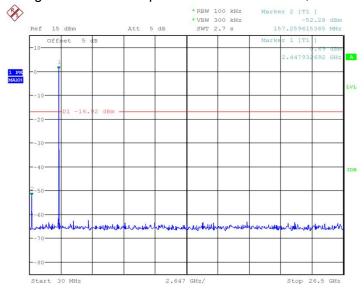
Fig.15 Conducted spurious emission: Ch19, 30MHz~26GHz

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 21 of 34 Report Issued Date : Oct.12.2018



Date: 2.FEB.2018 14:07:58

Fig.16 Conducted spurious emission: Ch39, 2480MHz



Date: 2.FEB.2018 14:08:22

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),

East China Institute of Telecommunications Page Number : 22 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



Report No.: I18D00198-SRD02

must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

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

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 C63.10-2013 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

East China Institute of Telecommunications Page Number : 23 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



Report No.: I18D00198-SRD02

 $Result = P_{Mea} + A_{Rpi}$

Channel	Frequency Range	Test Results	Conclusion
	30MH~1GHz	Fig.18	Р
Ch39 2480MHz	1GHz~3GHz	Fig.19	Р
	3GHz~18GHz	Fig.20	Р
Power(low)	2.31GHz~2.5GHz	Fig.21	Р
Power(high)	2.31GHz~2.5GHz	Fig.22	Р

RSE-CH39-30M-1G

Frequency (MHz)	Result (dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Polarity
33.3	11.55	-22	33.55	V
34.6	13.35	-22	35.35	V
35.5	13.97	-21.8	35.77	V
48.1	11.84	-20	31.84	Н
73.7	13.63	-25.9	39.53	V
105.3	8.59	-23.4	31.99	Н

RSE-CH39-1G-3G (Peak)

Frequency (MHz)	Result (dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Polarity
2516.7	53.4	7	46.4	٧
2593.2	54.29	7.3	46.99	V
2708.0	54.26	7.9	46.36	V
2805.1	55.73	7.9	47.83	V
2891.9	54.98	8.8	46.18	Н
2979.9	55.35	8.9	46.45	Н

RSE-CH39-1G-3G (Average)

Frequency (MHz)	Result (dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Polarity
2593.2	41.85	7.3	34.55	V
2708.0	42.27	7.9	34.37	V

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 24 of 34 Report Issued Date : Oct.12.2018



RF Test Report Report No.: I18D00198-SRD02

2805.1	42.43	7.9	34.53	V
2891.9	43.26	8.8	34.46	Н
2979.9	43.26	8.9	34.36	Н

RSE-CH39-3G-18G (Peak)

Frequency (MHz)	Result (dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Polarity
12912.0	53.69	17	36.69	Н
13614.6	53.73	18	35.73	Н
14318.8	54.9	20.5	34.4	Н
15998.8	58.9	25.4	33.5	V
16803.8	59.52	27.2	32.32	V
17835.9	59.78	28	31.78	V

RSE-CH39-3G-18G (Average)

Frequency (MHz)	Result (dBµV/m)	ARpl (dB)	PMea (dBµV/m)	Polarity
14318.8	42.9	20.5	22.4	Н
15998.8	47.11	25.4	21.71	V
16803.8	47.79	27.2	20.59	V
17835.9	47.85	28	19.85	V

Note: Only the worst case is written in the report.

Conclusion: PASS

Test graphs as below:

East China Institute of Telecommunications Page Number : 25 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



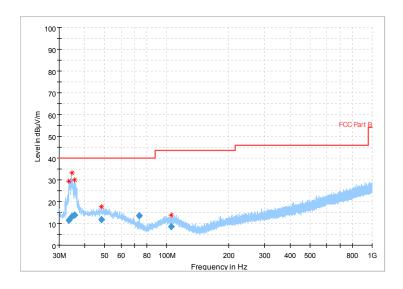


Fig.18 Radiated emission: Ch39, 30MHz~1GHz

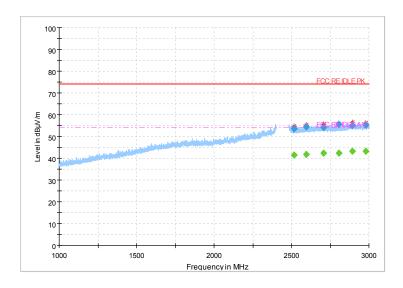
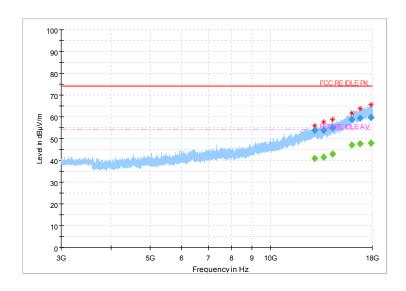


Fig.19 Radiated emission: Ch39, 1GHz~3GHz



Page Number : 26 of 34 Report Issued Date : Oct.12.2018

: 27 of 34

Report Issued Date : Oct.12.2018

Page Number

Fig.20 Radiated emission: Ch39, 3GHz~18GHz

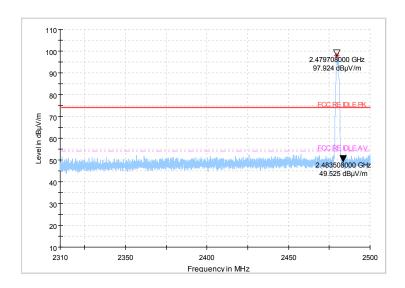


Fig.21 Bandedge PK:ch39

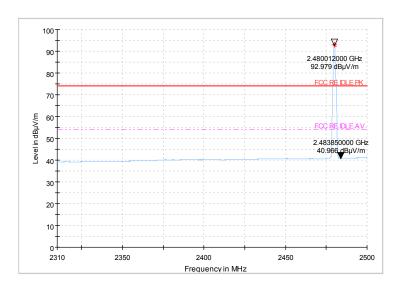
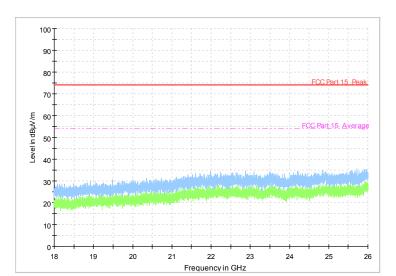


Fig.22 Bandedge AV:ch39





Report No.: I18D00198-SRD02

ALL Channel 18GHz~26GHz

6.7. AC Powerline Conducted Emission

Method of Measurement: See ANSI C63.10-2013-clause 6.2

- 1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.
- 2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.
- The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.
- If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those

measurements.36 Record the six highest EUT emissions relative to the limit of each of the

Page Number

Report Issued Date : Oct.12.2018

current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dΒμV)	Average Limit (dBμV)	Result (dBμV) With charger	Conclusion
			BLE	
0.15 to 0.5	66 to 56	56 to 46		
0.5 to 5	56	46	Fig.23	P
5 to 30	60	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Conclusion: Pass

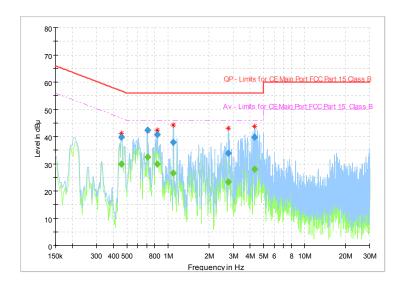


Fig.23AC Powerline Conducted Emission

Report No.: I18D00198-SRD02





The test equipment and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacture r	Calibration Date	Cal.
1	Vector Signal Analyser	FSQ40	200063	Rohde&Schw arz	2017-12-17	1 Year
2	USB Wideband Power Senser	U2021X A	MY56410 005	KEYSIGHT	2018-02-26	1 Year
3	Simultaneous Sampling DQA	U2531A	TW56183 514	KEYSIGHT	2018-02-26	1 Year
4	Wireless communication comprehensive tester	CMW50 0	148904	Rohde&Schw arz	2018-08-20	1 Year

Climate chamber

No.	Equipment	Model	Serial Number	Manufactur er	Calibratio n Date	Cal. interval
1	Climate chamber	SH-641	92012011	ESPEC	2017-12-2 5	2 Year

Radiated emission test system

No	Equipment	Model	Serial Number	Manufacture r	Calibratio n Date	Cal. interva I
1	EMI Test Receiver	ESU40	100307	R&S	2018-05-11	1 Year
2	TRILOG Broadband Antenna	VULB916 3	VULB9163- 515	Schwarzbeck	2017-02-2 5	3 Year
3	Double-ridged Waveguide Horn	ETS-311 7	00135890	ETS	2017-01-11	3 Year

Software

East China Institute of Telecommunications Page Number : 30 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



ECIT	RF Test Repo	Report No.: I18D00198-SRD02	
Name		Version	
Eagle CE BLE Auto test system		V3.0	
EMC32		V9.15	

Anechoic chamber

Fully anechoic chamber by Frankonia German.

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:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 k
Ground system resistance	< 0.5

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 k
Ground system resistance	< 0.5

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 31 of 34 Report Issued Date : Oct.12.2018



RF Test Report Report No.: I18D00198-SRD02

VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

East China Institute of Telecommunications Page Number : 32 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



ANNEX A. Deviations from Prescribed Test Methods

Report No.: I18D00198-SRD02

No deviation from Prescribed Test Methods.

East China Institute of Telecommunications Page Number : 33 of 34 TEL: +86 21 63843300 FAX: +86 21 63843301 Report Issued Date : Oct.12.2018



ANNEX B. Accreditation Certificate



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

East China Institute of Telecommunications TEL: +86 21 63843300 FAX: +86 21 63843301 Page Number : 34 of 34 Report Issued Date : Oct.12.2018

Report No.: I18D00198-SRD02