



Certificate Number: 5055.02

# TEST REPORT FOR RF TESTING

Report No.: SRTC2021-9004(F)-21110103(C)

Product Name: Mobile Phone

Product Model: HLTE235E

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Specification: FCC Part 2, Part 24E, Part 22H, Part 27, Part 90S (2020)

FCC ID: 2ADOBHLTE235E

The State Radio\_monitoring\_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District, Beijing, P.R.China

Tel: 86-10-57996183 Fax: 86-10-57996388



# **CONTENTS**

1. GENERAL INFORMATION	2
1.1 Notes of the test report	2
1.3 Applicant's details	2
2 DESCRIPTION OF THE EQUIPMENT UNDER TEST	4
2.1 Final Equipment Build Status  2.2 Support Equipment	
3 REFERENCE SPECIFICATION	6
4 KEY TO NOTES AND RESULT CODES	6
5 RESULT SUMMARY	7
6 TEST RESULT	8
6.1 RF Power Output 6.2 Effective Radiated Power and Effective Isotropic Radiated Power 6.3 Occupied Bandwidth 6.4 Emission Bandwidth 6.5 Peak-Average Ratio 6.6 Spurious Emissions at antenna terminal 6.7 Band Edges Compliance 6.8 Frequency Stability 6.9 Radiated Spurious Emissions	9 12 13 14 15
7 MEASUREMENT UNCERTAINTIES	20
8 TEST EQUIPMENTS	21
APPENDIX A – TEST DATA OF CONDUCTED EMISSION	21
APPENDIX B – TEST DATA OF RADIATED EMISSION	21

Fax: 86-10-57996388

# 1. GENERAL INFORMATION

#### 1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio monitoring center Testing Center (SRTC). The test results relate only to individual items of the samples which have been tested. The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

#### 1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
City:	Beijing
Country or Region:	P.R.China
Contacted person:	Liu Jia
Tel:	+86 10 57996183
Fax:	+86 10 57996388
Email:	liujiaf@srtc.org.cn
Designation Number:	CN1267
Registration number:	239125

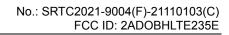
#### 1.3 Applicant's details

Company:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China

#### 1.4 Manufacturer's details

Company:	Hisense Communications Co., Ltd.	
Address:	218 Qianwangang Road, Qingdao Economic& Technological Development Zone, Qingdao, China	

Page number: 2 of 379 Tel: 86-10-57996183 Fax: 86-10-57996388 V3.0.0





## 1.5 Test Environment

Date of Receipt of test sample at SRTC:	2021-11-01
Testing Start Date:	2021-11-03
Testing End Date:	2021-11-18

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient:	25	40
Maximum Extreme:	50	
Minimum Extreme:	-30	

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.35
Minimum Extreme Supply Voltage (V d.c.):	3.55

Page number: 4 of 379



# **2 DESCRIPTION OF THE EQUIPMENT UNDER TEST**

## 2.1 Final Equipment Build Status

Frequency Range:	LTE Band 2: Tx:1850~1910MHz Rx:1930~1990MHz LTE Band 4: Tx:1710~1755MHz Rx:2110~2155MHz LTE Band 5: Tx:824~849 MHz Rx:869 ~894MHz LTE Band 7: Tx:2500~2570MHz Rx:2620~2690MHz LTE Band 12: Tx:699~716MHz Rx:729~746MHz LTE Band 26: Tx:824~849 MHz Rx:869 ~894MHz		
Modulation Type:	QPSK/16QAM/64QAM		
Antenna Type:	LTE B2/4: PIFA ( FPC ) LTE B5/7/12/26: SH-KS235-GSM-V5 (LDS) loop antenna		
Antenna Gain:	LTE B2: -0.58dBi  LTE B4: -0.65dBi  LTE B5: -1.04dBi  LTE B7: -1.27dBi  LTE B12: -1.41dBi  LTE B26: -1.04dBi  ERP = EIRP(Power+Gain) – 2.15 (dB)		
Power Supply:	Charger		
Software Revision: Hisense_HLTE235E_S03_01_01_MX05			
Hardware Revision:	A563-MB-V1.2A		
IMEI:	866850050002295		

No.: SRTC2021-9004(F)-21110103(C) 規电監測中心检測中心

Note: The equipments have two supplies, are different on the supplier of memory / battery / Camera. These differences don't affect RF performance

#### Main Supply

Part Name	Model	Supplier(Brand)	Description
FLASH	E64GDSAA2ABE00	SCY	Separate
FLASH	KM110SA1064GxA-AAA00WT	Kimtigo	memory
FLASH	E32GCYNB1ABE00	SCY	Separate
FLASH	RS512M32LZ4D4ANP-75BT	RAYSON	memory
Battery	LPN385450	Shenzhen Aerospace Electronic Co., Ltd.	
Front camera	LH-CFKS235-5MFF-V1	Union Image	GC5035
The rear main camera	H9B13-KS230BA	Hunan Kingcome Optoelectronic Co., Ltd	HI1336
Rear Camera2	LH-CFKS235-5MBF-V1	Union Image	GC5035
Rear Camera3	LH-CFKS235-2MBF-V2	Union Image	GC02M1

Secondary Supply

Part Name	Model Name	supplier	Remark
FLASH	RS512M32LZ4D4ANP-75BT	RAYSON	Separate
FLASH	D4A16G32D2V-DC	SCY	memory
FLASH	KM110SA1032GXA-AAA00WT	Kimtigo	Separate
FLASH	D4A16G32D2V-DC	SCY	memory
Battery	LPN385450	Shenzhen Powercome	
Dallery	LFN365450	Electronics Co., Ltd.	
Front camera	BM15640 V0	Luzhou Imaging	GC5035
T TOTIL Carriera	DIVI 13040 V0	Technology Co., Ltd	GC3033
The rear main	BM1A365 V4	Luzhou Imaging	GC13053
camera	BW 1A303 V4	Technology Co., Ltd	GC 13033
Rear Camera2	BM15634 V2	Luzhou Imaging	GC5035
ixeai Caillelaz	DIVI13034 V2	Technology Co., Ltd	GC3035
Rear Camera3	BC12635 V0	Luzhou Imaging	GC02M1
iveai Callielas		Technology Co., Ltd	GCUZIVIT

#### 2.2 Support Equipment

The following support equipment was used to exercise the EUT during testing: N/A



# **3 REFERENCE SPECIFICATION**

Specification	Version	Title
FCC Part 2	2020	Frequency allocations and radio treaty matters; general rules and regulations
FCC Part 22	2020	Public mobile services
FCC Part 24	2020	Personal communications services
FCC Part 27	2020	Miscellaneous wireless communications services
FCC Part 90	2020	Private Land Mobile Radio Services
ANSI C63.26	2015	American national standard for compliance testing of transmitters used in licensed radio services
KDB 971168	April 9,	Measurement guidance for certification of licensed digital
D01	2018	transmitters
TIA-603-E-2016	March	Land Mobile FM or PM Communications Equipment
11A-003-L-2010	2016	Measurement and Performance Standards

# **4 KEY TO NOTES AND RESULT CODES**The following are the definition of the test result.

Code	Meaning	
PASS	Test result shows that the requirements of the relevant specification have been met.	
FAIL	Test result shows that the requirements of the relevant specification have not been met.	
NT	Normal Temperature	
NV	Nominal voltage	
HV	High voltage	
LV	Low voltage	



# **5 RESULT SUMMARY**

No.	Test case	FCC reference	Verdict
1	RF Power Output	2.1046	Pass
2	Effective Radiated Power and Effective Isotropic Radiated Power	22.913(a)(5), 24.232(c), 27.50(b)(10), 27.50(c)(10), 27.50(h)(2), 27.50(d)(4), 27.50(a)(3),90.635(b)	Pass
3	Occupied Bandwidth	2.1049,90.209(a)	Pass
4	Peak-Average Ratio	24.232(d), 27.50(d)(5),KDB 971168 D01 – 5.7	Pass
5	Emission Bandwidth	2.1049	Pass
6	Spurious Emissions at antenna terminals	2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a),90.691	Pass
7	Band Edges Compliance	2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a) ,90.691	Pass
8	Frequency Stability	2.1055, 22.355, 24.235, 27.54,90.213	Pass
9	Radiated Spurious Emissions	2.1053, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(f), 27.53(a), 27.53(m), 90.691	Pass

This Test Report Is Issued by:	Checked by:
Mr. Peng Zhen	Mr. Li Bin 🔑 I
彭振	(A MK)
Tested by:	Issued date:
Mr. Liu Ce	
刘策	20211119

Fax: 86-10-57996388

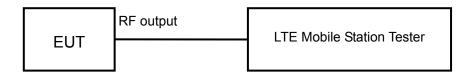


Page number: 8 of 379

## 6 TEST RESULT 6.1 RF Power Output

Rule Part(s) FCC: 2.1046

Test Setup:



#### Test procedure:

After a radio link has been established between EUT and Tester, the output power of the cell signal of the testing equipment will be decreased until the output power of the EUT reach a maximum value. Then the test data can be read at the tester screen. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

Limits: No RF Power Output requirements in part 2.1046.

#### Test result:

The test results are shown in Appendix A.

Tel: 86-10-57996183 Fax: 86-10-57996388 V3.0.0



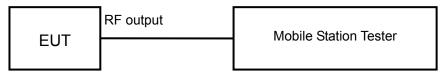
Page number: 9 of 379

#### 6.2 Effective Radiated Power and Effective Isotropic Radiated Power

Rule Part(s)

FCC: 22.913(a) (5), 24.232(c), 27.50(b) (10), 27.50(c) (10), 27.50(h) (2), 27.50(d) (4), 27.50(a) (3),90.635(b)

Test setup:



Test procedure:

KDB 971168 D01 v03r01 - Section 5.6

**Test Settings** 

Subclause 5.2.5.5 of ANSI C63.26-2015 is applicable, along with the following provisions. For personal/portable radios utilizing an integral antenna, the factor LC is typically negligible. However, in a fixed station transmit system that utilizes a long cable run between the transmitter and the transmitting antenna, this factor can be significant. The minimum cable loss should be used in this equation.

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:

ERP/EIRP = PMeas - LC + GT

Where:

ERP/EIRP = effective or equivalen radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

#### **ERP/EIRP LIMIT**

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

22.913(a) (5)

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts. 24.232(c)

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications. 27.50(b) (10)

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

27.50(c) (10)

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP. 27.50(h) (2)

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

27.50(d) (4)

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and

Tel: 86-10-57996183 Fax: 86-10-57996388 V3.0.0



mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

27.50(a) (3)

Mobile and portable stations (i) For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth.

#### Test result:

The test results are shown in Appendix B.

Fax: 86-10-57996388

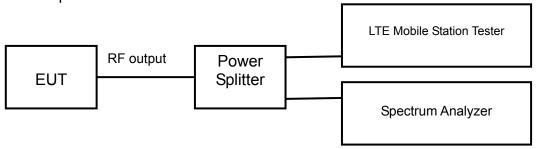
Page number: 10 of 379

#### 6.3 Occupied Bandwidth

Rule Part(s)

FCC: 2.1049,90.209(a)

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 - Section 4.2

#### Test Setting:

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Limits: No specific occupied bandwidth requirements in part 2.1049

#### Test result:

The test results are shown in Appendix A.

Page number: 11 of 379 Tel: 86-10-57996183 Fax: 86-10-57996388 V3.0.0

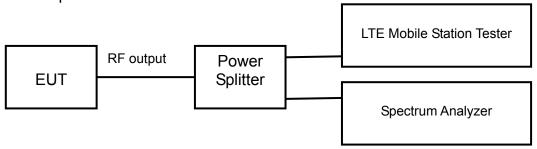
V3.0.0



#### 6.4 Emission Bandwidth

Rule Part(s) FCC: 2.1049

#### Test Setup:



Test procedure:

KDB 971168 D01 v03r01 - Section 4.2

#### Test Setting:

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2-7 were repeated after changing the RBW such that it would be within 1 – 5% of 26dB bandwidth observed in Step 7

Limits: No specific emission bandwidth requirements in part 2.1049.

#### Test result:

Fax: 86-10-57996388

The test results are shown in Appendix A.

The State Radio\_monitoring\_center Testing Center (SRTC) Page number: 12 of 379 Tel: 86-10-57996183

V3.0.0

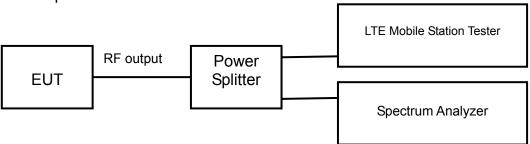


#### 6.5 Peak-Average Ratio

Rule Part(s)

FCC: 24.232(d), 27.50(d) (5)

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 - Section 5.7.1

#### **Test Setting:**

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW ≥ OBW or specified reference bandwidth
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

#### Limits

24.232(d), 27.50(d) (5)

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### Test result:

The test results are shown in Appendix A.

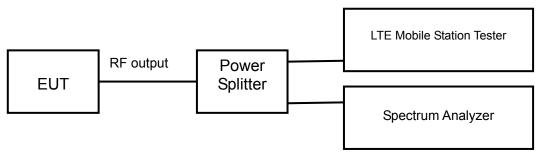
The State Radio\_monitoring\_center Testing Center (SRTC) Page number: 13 of 379 Tel: 86-10-57996183 Fax: 86-10-57996388

#### 6.6 Spurious Emissions at antenna terminal

Rule Part(s)

FCC: 2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a), 90.691

#### Test Setup:



Test procedure:

KDB 971168 D01 v03r01 - Section 6.0

#### Test Setting:

- 1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency
- 2. Detector = RMS
- 3. RBW=1MHz
- 4. VBW=3MHz
- 5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

#### Limits

The minimum permissible attenuation level of any spurious emission is 43 + log10 (P [Watts]), where P is the transmitter power in Watts.

For Band 30, the minimum permissible attenuation level of any spurious emission <2288MHz and >2365MHz is 70 + log10 (P [Watts]).

For Band 7 and 41, the minimum permissible attenuation level of any spurious emission is 55 + log10 (P [Watts]).

#### Test result:

The test results are shown in Appendix A.

Page number: 14 of 379 Tel: 86-10-57996183 Fax: 86-10-57996388 V3.0.0

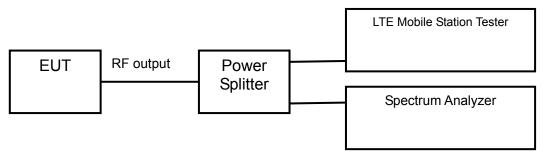
Page number: 15 of 379

#### 6.7 Band Edges Compliance

Rule Part(s)

FCC: 2.1051, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(m), 27.53(a), 90.691

Test Setup:



Test procedure:

KDB 971168 D01 v03r01 - Section 6.0

### Test Setting:

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- 4. VBW > 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Limits

The minimum permissible attenuation level of any spurious emission is 43 + log10 (P [Watts]), where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 30 is > 43 + 10log10 (P [Watts] at 2300-2305MHz & 2345-2360MHz, > 55 + 10log10 (P [Watts]) at 2320-2324MHz & 2341-2345MHz, > 61 + 10log10 (P [Watts]) at 2324-2328MHz & 2337-2341MHz, > 67 + 10log10 (P [Watts]) at 2288-2292MHz & 2328- 2337MHz, and > 70 + 10log10 (P [Watts]) at frequencies < 2288MHz &>2365MHz.

Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Tel: 86-10-57996183 Fax: 86-10-57996388 V3.0.0

Page number: 16 of 379

Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 - 775MHz and 793 - 805MHz band, the FCC limit per 27.53(c)(4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.

Per 27.53(a)(5) in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5MHz.

#### Test result:

The test results are shown in Appendix A.

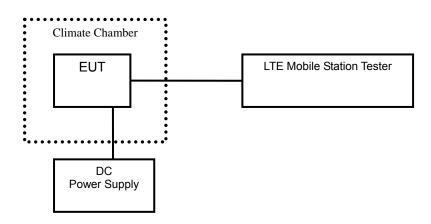


#### 6.8 Frequency Stability

Rule Part(s)

FCC: 2.1055, 22.355, 24.235, 27.54,90.213

#### Test setup:



Test Procedure: ANSI/TIA-603-E-2016

#### **Test Settings**

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C (The temperature range can be declared by the manufacturer). A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

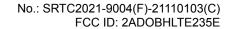
Limits: For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test result:

The test results are shown in Appendix A.

**The State Radio\_monitoring\_center Testing Center (SRTC)**Page number: 17 of 379
Tel: 86-10-57996183

Fax: 86-10-57996388



Page number: 18 of 379



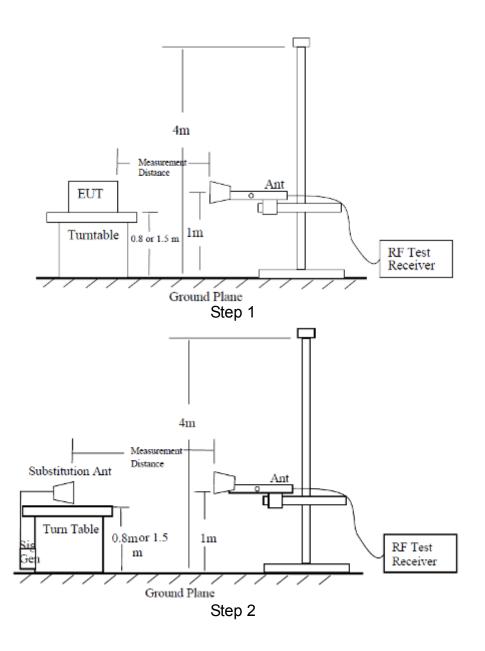
## 6.9 Radiated Spurious Emissions

Rule Part(s)

FCC: 2.1053, 22.917(a), 24.238(a), 27.53(c), 27.53(g), 27.53(h), 27.53(f), 27.53(a),

27.53(m),90.691

#### Test Setup:





#### Test procedure:

The measurements procedures in TIA-603-E-2016 are used.

The spectrum was scanned from 30MHz to the 10th harmonic of the highest frequency generated within the equipment.

#### Step 1:

The measurement is carried out in the chamber. EUT was placed on a 0.8m (f<1GHz)/1.5m (f>1GHz) high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. The height of receiving antenna from 1m to 4m and varies in certain range to find the maximum power value. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used and RBW is set to 100 kHz (f<1GHz)/1MHz (f>1GHz). 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 power value on spectrum analyzer or receiver. The spectrum analyzer scans from 30MHz to 10th harmonic of the carrier. A notch filter is necessary in the band near to the carrier frequency. A high pass filter is needed to avoid the distortion of the testing equipment in the band above the carrier frequency.

#### Step 2:

A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

A power (Pmea) is applied to the input of the substitution antenna, and adjusts the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (Pmea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

A "reference path loss" should be calculated after test. The attenuation of "reference path loss" is the cable loss between the Signal Source with the Substitution Antenna (Pca) and the Substitution Antenna Gain (Ga).

Calculation procedure:

The data of cable loss and antenna gain has been calibrated in full testing frequency range before the testing.

The power of the Radiated Spurious Emissions is calculated by adding the cable loss and antenna gain. The basic equation with a sample calculation is as followed:

Power (EIRP) = Pmea+ Pca + Ga

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP – 2.15 (dB).

Assumed the power of signal source record is -20dBm. A cable loss of -30dB, and an antenna gain of 11dB are added.

P=Pmea+Pca+Ga=(-20dBm)+(-30dB)+(11dB)= -39dBm

Note: We tested both horizontal and vertical polarization, but only the largest numerical polarity of the two polarities was recorded in the final report.

#### Test result:

The test results are shown in Appendix B.

The State Radio\_monitoring\_center Testing Center (SRTC)

Tel: 86-10-57996183

Fax: 86-10-57996388

Page number: 19 of 379

V3.0.0

Page number: 20 of 379



# **7 MEASUREMENT UNCERTAINTIES**

Items	Uncertainty			
RF Power Output	0.6 dB			
Effective Radiated Power and Effective Isotropic Radiated Power	0.6 dB			
Occupied Bandwidth	3kHz			
Emission Bandwidth	3kHz			
Peak-Average Ratio	0.8dB			
Frequency Stability	48Hz			
Band Edges Compliance	1.2dB			
	9kHz~2GHz	1.2dB		
Spurious Emissions at antonna terminal	2G~3.6GHz	1.4dB		
Spurious Emissions at antenna terminal	3.6G~8GHz	2.2dB		
	8G~12.75GHz	2.7dB		
	30MHz∼200MHz	4.88dB		
Dadiated Emission Massurement	200MHz∼1GHz	4.87dB		
Radiated Emission Measurement	1GHz∼18GHz	4.58dB		
	18GHz~40GHz	4.35dB		

Page number: 21 of 379



## **8 TEST EQUIPMENTS**

No.	Name/Model	Manufacturer	S/N	Calibration Date	Calibration Due Date
1	Mobile Station Tester / MT8820C	Anritsu	6201300660	2021.06.21	2022.06.20
2	Radio Communication Station / CMW500	R&S	161702	2021.06.21	2022.06.20
3	Spectrum Analyzer / FSV40	R&S	101065	2021.06.21	2022.06.20
4	Spectrum Analyzer / N9020A	Agilent	MY48010771	2021.05.18	2022.05.17
5	Power Divider / 11667A	HP	19632	2021.06.21	2022.06.20
6	DC Power Supply / E3645A	Agilent	MY40000741	2021.04.22	2022.04.21
7	Temperature chamber / SH241	ESPEC	92013758	2021.06.21	2022.06.20
8	Fully-Anechoic Chamber / 12.65m×8.03m×7.50m	FRANKONIA			
9	Semi-Anechoic/Chamber / 23.18m×16.88m×9.60m	FRANKONIA			
10	Turn table Diameter:1m	FRANKONIA			
11	Turn table Diameter:5m	FRANKONIA			
12	Antenna master FAC(MA4.0)	MATURO			
13	Antenna master SAC(MA4.0)	MATURO			
14	Shielding room / 9.080m×5.255m×3.525m	FRANKONIA			
15	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100512	2021.06.21	2022.06.20
16	Double-Ridged Waveguide Horn Antenna / HF 907	R&S	100513	2021.06.21	2022.06.20
17	Ultra log antenna / HL562	R&S	100016	2021.06.21	2022.06.20
18	Receive antenna /3160-09	SCHWARZ-BECK	002058-002	2021.06.21	2022.06.20
19	EMI test receiver / ESI 40	R&S	100015	2021.06.21	2022.06.20
20	EMI test receiver / ESCS30	R&S	100029	2021.06.21	2022.06.20
21	Receive antenna / HL562	R&S	100167	2021.06.21	2022.06.20
22	AMN / ENV216	R&S	3560.6550.12	2021.06.21	2022.06.20

# <u>APPENDIX A – TEST DATA OF CONDUCTED EMISSION</u>

Please refer to the attachment.

# **APPENDIX B – TEST DATA OF RADIATED EMISSION**

Please refer to the attachment.