REPORT No.: SZ21110116W03

TEST REPORT

APPLICANT	:	Anker Innovations Limited
PRODUCT NAME	:	eufy SECURITY 4G Starlight Camera
MODEL NAME	:	T8150
BRAND NAME	:	eufy SECURITY
FCC ID	:	2AOKB-T8150
STANDARD(S)	:	47 CFR Part 2 47 CFR Part 90, Subpart R
RECEIPT DATE	:	2021-12-27
TEST DATE	:	2022-01-18 to 2022-01-26
ISSUE DATE	:	2022-01-28

Edited by: Zeng Xiaoying (Rapporteur)

Approved by: Shen Junsheng (Supervisor)

MORLAB
Shenzhen Morlab Communications Technology Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

DIRECTORY

Change History		
Version	**Date**	**Reason for change**
1.0	2022-01-28	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Anker Innovations Limited
Applicant Address:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong
Manufacturer:	Anker Innovations Limited
Manufacturer Address:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong

1.2. Equipment Under Test (EUT) Description

Product Name:	eufy SECURITY 4G Starlight Camera	
Sample No.:	10#	
Hardware Version:	V0.4	
Software Version:	V1.0	
Modulation Type:	QPSK, 16QAM	
Operation Band:	Band 14	
Frequency Range:	Tx: 788MHz–798MHz	
	Rx: 758MHz–768MHz	
Channel Bandwidth	5MHz, 10MHz	
Antenna Type:	Fixed Internal Antenna	
Antenna Gain:	5.0dBi	
Accessory Information:	Battery	
	Brand Name:	N/A
	Model No.:	INR18650F1L(1INR19/66-4)
	Serial No.:	N/A
	Capacity:	13000mAh
	Rated Voltage:	3.63V
	Charge Limit:	4.25V
	Manufacturer:	Anker Innovations Limited

Note 1: According to the certificate holder, they declared that for model number: T8150 (FCC ID: 2AOKB-T8150), apply to use the conducted data of the RF module (FCC ID: XMR202008EC25AFXD, model: EC25-AFXD). Their RF modules are the same. Only the antenna used by the radio frequency module and the antenna gain are different.

Note 2: The test results of all conducted test items please refer to the module FCC test report (FCC ID: XMR202008EC25AFXD, Report No.: R2007A0434-R4), which issued on Aug 07, 2020 by TA Technology (Shanghai) Co.,Ltd. We only recorded the radiated test result in this report.

For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Maximum E.R.P.

LTE Band 14	Maximum E.R.P. (W)	
BW(MHz)	QPSK	16QAM
10	0.468	0.420
5	0.473	0.352

1.4. Test Standards and Results

The objective of the report is to perform testing according to Part 2 and Part 90 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 90	Miscellaneous Wireless Communications Services

Test detailed items/section required by FCC rules and results are as below:

Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
2.1046, 90.542(a)(7)	Transmitter Conducted Output Power	N/A	N/A	N/A_{Note1}	N/A
2.1046, 90.542(a)(7)	Transmitter Radiated Power (EIPR/E.R.P.)	Jan 26, 2022	Li Huaijie	PASS	No deviation
2.1049, 90.209	Occupied Bandwidth	N/A	N/A	N/A_{Note1}	N/A
2.1055	Frequency Stability	N/A	N/A	N/A_{Note1}	N/A
2.1051, 90.543(e)(f)	Conducted Spurious Emissions	N/A	N/A	N/A_{Note1}	N/A
2.1051, 90.543(e)(f)	Band Edge	N/A	N/A	N/A_{Note1}	N/A
2.1051, 90.543(e)(f)	Radiated Spurious Emissions	Jan 18&19, 2022	Gao Jianrou	PASS	No deviation

Note 1: The test results of all conducted test items please refer to the module FCC test report (FCC ID: XMR202008EC25AFXD, Report No.: R2007A0434-R4), which issued on Aug 07, 2020 by TA Technology (Shanghai) Co.,Ltd. We only recorded the radiated test result in this report.

Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method

determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table. **Note 3:** When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR Part 2, Part 90R Requirements

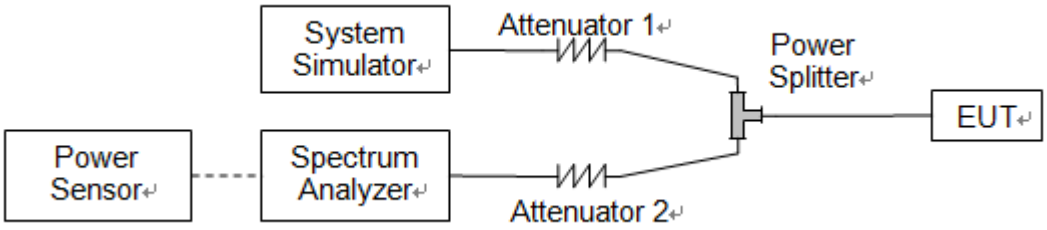
2.1. E.R.P.

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

According to FCC section 90.542(a)(7) for LTE Band 14, portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

2.1.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.1.3. Test procedure

KDB 971168 D01v03 Section 5.2 and ANSI/TIA-603-E-2016.

EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)
ERP (dBm) = EIPR (dBm) - 2.15

2.1.4. Result

Effective Radiated Power:

LTE Band 14				Measured E.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				/		23330		/	
Frequency (MHz)				/		793		/	
				/	/	dBm	W	/	/
10	QPSK	1	0	/	/	26.58	0.455	/	/
10	QPSK	1	25	/	/	26.70	0.468	/	/
10	QPSK	1	49	/	/	26.38	0.435	/	/
10	QPSK	25	0	/	/	25.69	0.371	/	/
10	QPSK	25	12	/	/	25.63	0.366	/	/
10	QPSK	25	25	/	/	25.67	0.369	/	/
10	QPSK	50	0	/	/	25.68	0.370	/	/
10	16QAM	1	0	/	/	25.55	0.359	/	/
10	16QAM	1	25	/	/	26.23	0.420	/	/
10	16QAM	1	49	/	/	25.70	0.372	/	/
10	16QAM	25	0	/	/	24.49	0.281	/	/
10	16QAM	25	12	/	/	24.65	0.292	/	/
10	16QAM	25	25	/	/	24.61	0.289	/	/
10	16QAM	50	0	/	/	24.62	0.290	/	/

LTE Band 14				Measured E.R.P.					
BW [MHz]	Modulation	RB Size	RB Offset	Low Ch. / Freq.		Middle Ch. / Freq.		High Ch. / Freq.	
Channel				23205		23230		23255	
Frequency (MHz)				779.5		782		784.5	
				dBm	W	dBm	W	dBm	W
5	QPSK	1	0	26.66	0.463	26.44	0.441	26.44	0.441
5	QPSK	1	12	26.49	0.446	26.69	0.467	26.60	0.457
5	QPSK	1	24	26.53	0.450	26.73	0.471	26.75	0.473
5	QPSK	12	0	25.68	0.370	25.68	0.370	25.60	0.363
5	QPSK	12	7	25.62	0.365	25.65	0.367	25.56	0.360
5	QPSK	12	13	25.67	0.369	25.70	0.372	25.62	0.365
5	QPSK	25	0	25.74	0.375	25.61	0.364	25.58	0.361
5	16QAM	1	0	25.35	0.343	25.32	0.340	25.27	0.337
5	16QAM	1	12	25.23	0.333	25.46	0.352	25.39	0.346
5	16QAM	1	24	25.06	0.321	25.42	0.348	25.07	0.321
5	16QAM	12	0	24.50	0.282	24.53	0.284	24.59	0.288
5	16QAM	12	7	24.69	0.294	24.44	0.278	24.70	0.295
5	16QAM	12	13	24.52	0.283	24.35	0.272	24.50	0.282
5	16QAM	25	0	24.62	0.290	24.58	0.287	24.54	0.284

2.2. Radiated Spurious Emissions

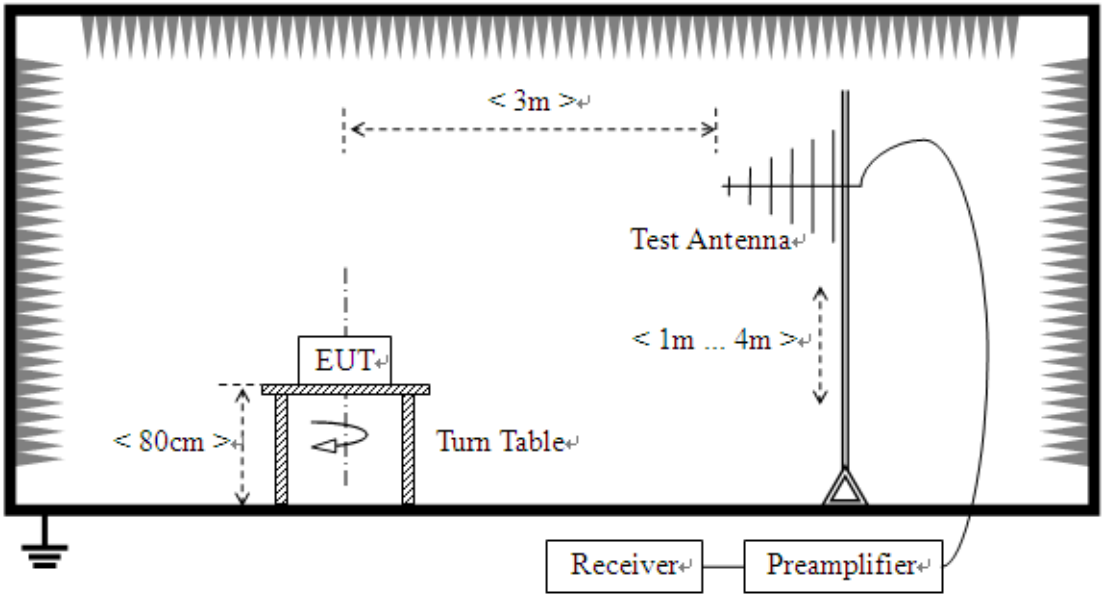
2.2.1. Requirement

According to FCC section 2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

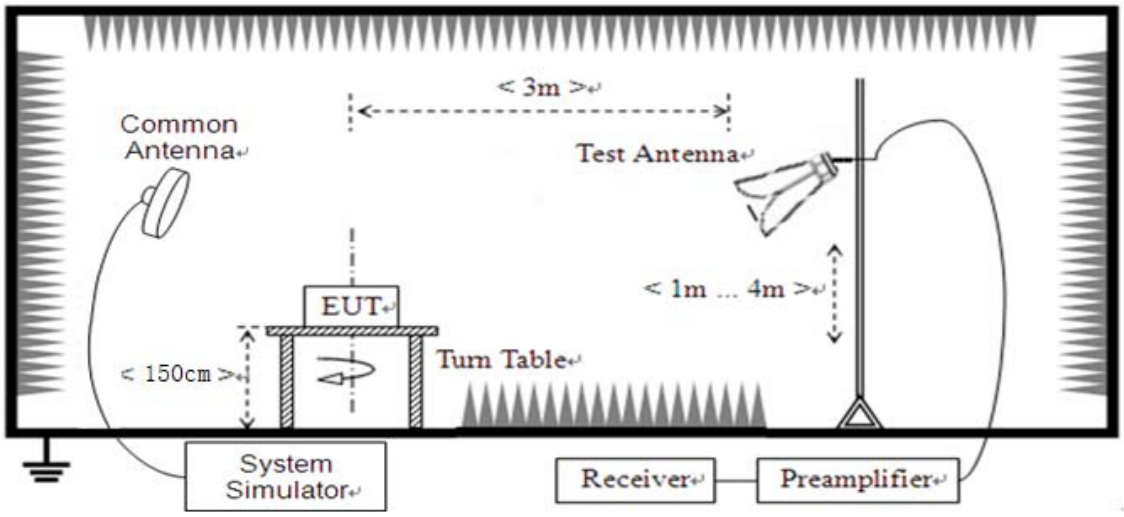
Additional requirement for Band 14

According to FCC section 90.543(f), for operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. This calculated to be -40dBm.

2.2.2. Test Description



(For the test frequency from 30MHz to1GHz)



(For the test frequency above 1GHz)

The EUT is located in a 3m Full-Anechoic Chamber, the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading. A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power, and only the test result of the maximum output power was recorded.
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360°to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.

Note: when doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.2.3. Test procedure

KDB 971168 D01v03 Section 5.8 and ANSI/TIA-603-E-2016.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements.

2.2.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST\_TX\_ANT}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of A_{TOT}.

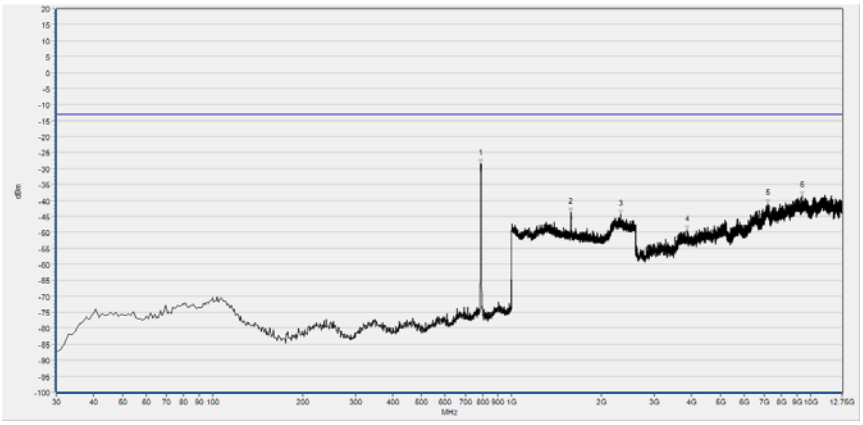
Note 1: The power of the EUT transmitting frequency should be ignored.

Note 2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

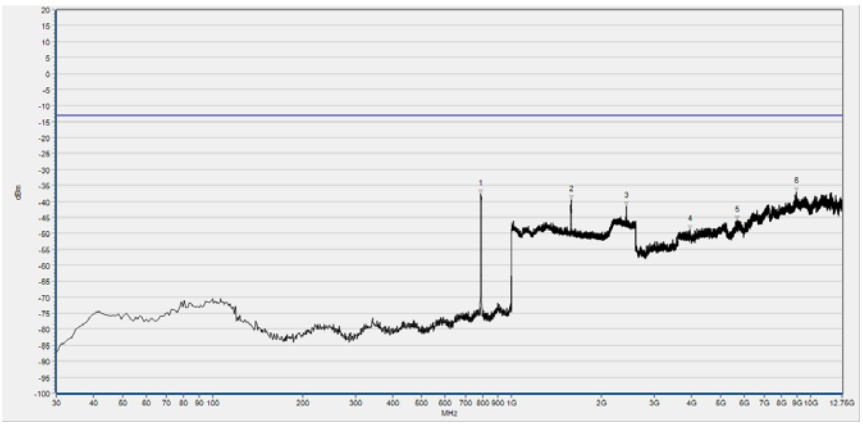
Note 3: All bandwidth and modulation were considered and evaluated respectively by performing full test for each band, only the worst cases (Max Bandwidth and QPSK mode) were recorded in this test report.

Note 4: N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.

LTE Band 14, 5MHz BW, Low Channel, QPSK

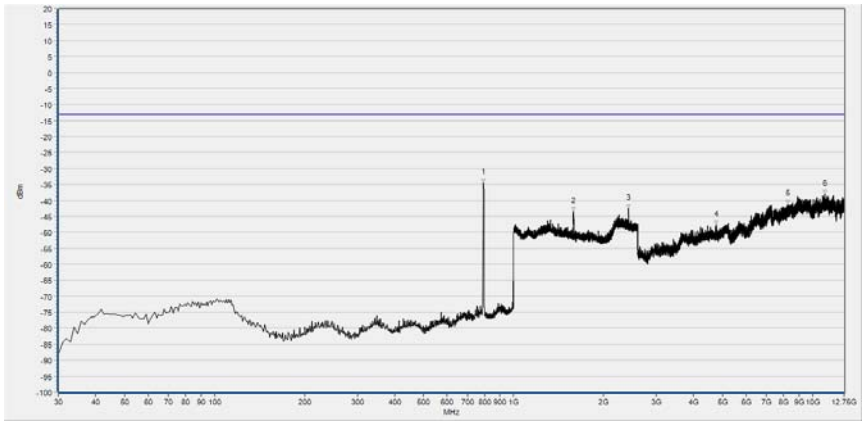


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	788.540	-28.57	-13.00	Horizontal	N/A
2	1580.072	-43.64	-13.00	Horizontal	PASS
3	2313.806	-44.28	-13.00	Horizontal	PASS
4	3864.366	-49.18	-13.00	Horizontal	PASS
5	7203.401	-40.90	-13.00	Horizontal	PASS
6	9394.354	-38.55	-13.00	Horizontal	PASS

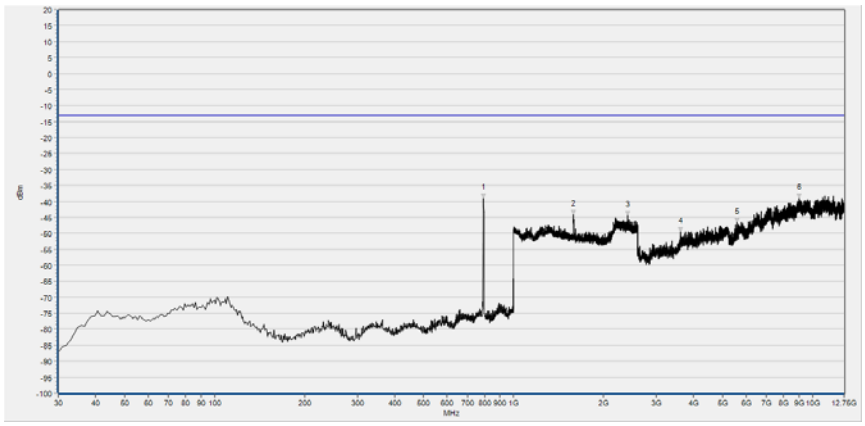


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	788.540	-37.61	-13.00	Vertical	N/A
2	1580.712	-39.39	-13.00	Vertical	PASS
3	2425.850	-41.46	-13.00	Vertical	PASS
4	3960.347	-48.78	-13.00	Vertical	PASS
5	5688.007	-45.85	-13.00	Vertical	PASS
6	8977.205	-36.95	-13.00	Vertical	PASS

LTE Band 14, 5MHz BW, Mid Channel, QPSK

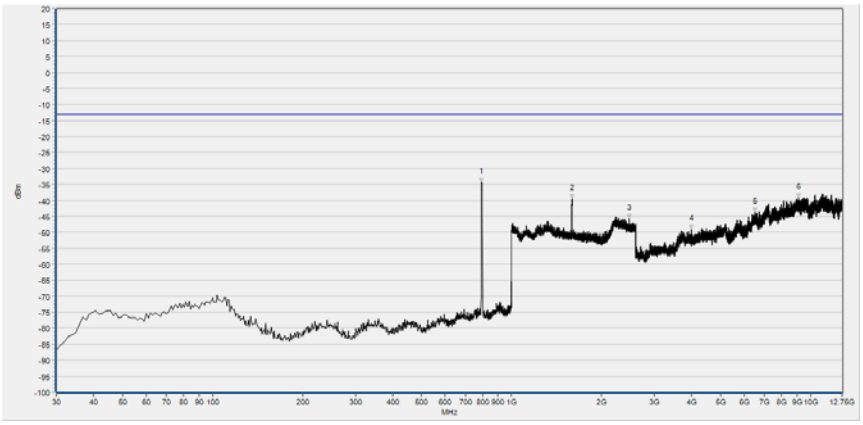


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	791.450	-34.62	-13.00	Horizontal	N/A
2	1585.194	-43.39	-13.00	Horizontal	PASS
3	2426.491	-42.66	-13.00	Horizontal	PASS
4	4754.037	-47.73	-13.00	Horizontal	PASS
5	8246.272	-41.31	-13.00	Horizontal	PASS
6	10978.041	-38.11	-13.00	Horizontal	PASS

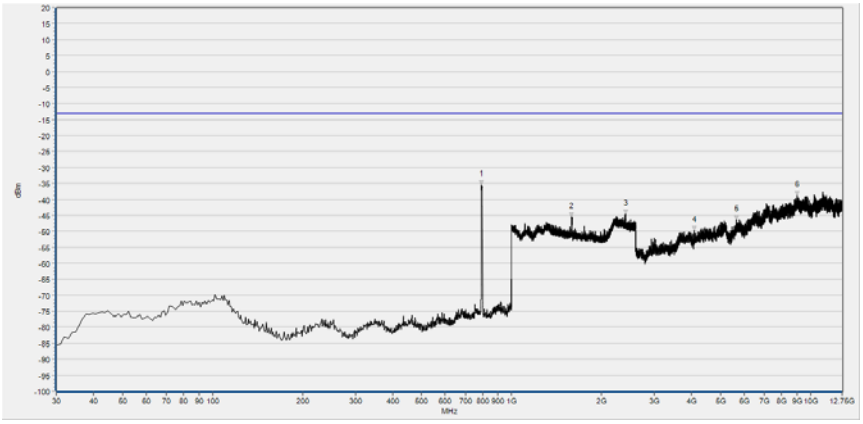


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	791.450	-38.94	-13.00	Vertical	N/A
2	1583.914	-44.09	-13.00	Vertical	PASS
3	2401.521	-44.27	-13.00	Vertical	PASS
4	3615.185	-49.58	-13.00	Vertical	PASS
5	5599.409	-46.55	-13.00	Vertical	PASS
6	9012.275	-38.95	-13.00	Vertical	PASS

LTE Band 14, 5MHz BW, High Channel, QPSK

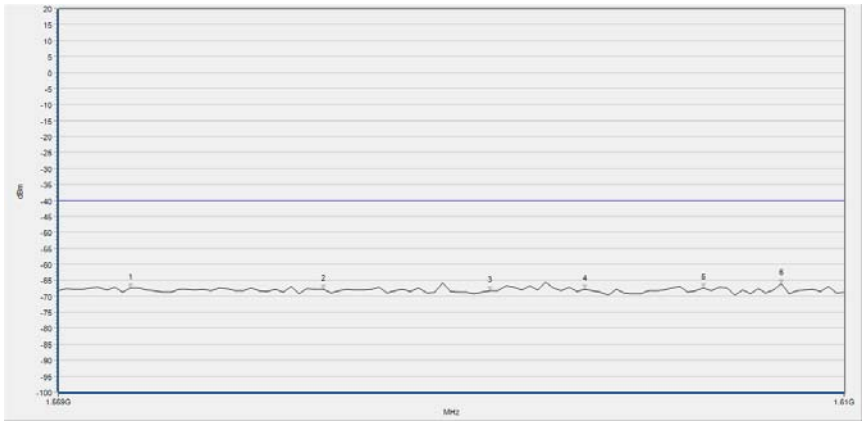


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	794.360	-34.29	-13.00	Horizontal	N/A
2	1590.956	-39.50	-13.00	Horizontal	PASS
3	2472.589	-45.81	-13.00	Horizontal	PASS
4	3997.263	-49.06	-13.00	Horizontal	PASS
5	6509.384	-43.73	-13.00	Horizontal	PASS
6	9093.490	-39.30	-13.00	Horizontal	PASS

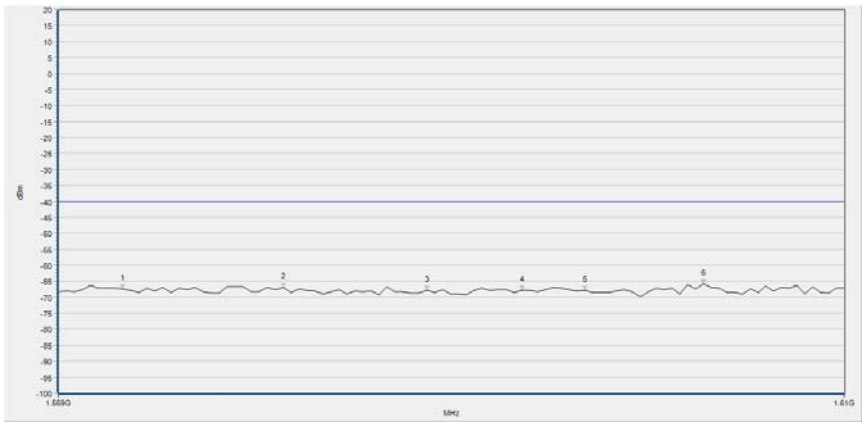


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	793.390	-35.38	-13.00	Vertical	N/A
2	1587.755	-45.39	-13.00	Vertical	PASS
3	2401.521	-44.66	-13.00	Vertical	PASS
4	4091.398	-49.80	-13.00	Vertical	PASS
5	5640.016	-46.42	-13.00	Vertical	PASS
6	9008.583	-38.70	-13.00	Vertical	PASS

LTE Band 14,1559MHz-1610MHz, 5MHz BW, Mid Channel, QPSK



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1563.636	-67.39	-40.00	Horizontal	PASS
2	1576.000	-67.76	-40.00	Horizontal	PASS
3	1586.818	-68.27	-40.00	Horizontal	PASS
4	1593.000	-67.86	-40.00	Horizontal	PASS
5	1600.727	-67.46	-40.00	Horizontal	PASS
6	1605.879	-66.11	-40.00	Horizontal	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	1563.121	-67.47	-40.00	Vertical	PASS
2	1573.424	-66.99	-40.00	Vertical	PASS
3	1582.697	-67.87	-40.00	Vertical	PASS
4	1588.879	-67.75	-40.00	Vertical	PASS
5	1593.000	-67.74	-40.00	Vertical	PASS
6	1600.727	-65.90	-40.00	Vertical	PASS

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test Items	Uncertainty
Equivalent Isotropic Radiated Power	±2.22 dB
Radiated Spurious Emissions	±6 dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

4. Test Equipments Utilized

4.1 List of Software Used

Description	Manufacturer	Software Version
MORLAB EMCR V1.2	MORLAB	V1.0

4.2 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2021.10.21	2022.10.20
System Simulator	6200995016	MT8820C	Anritsu	2021.10.21	2022.10.20
Receiver	MY54130016	N9038A	Agilent	2021.07.16	2022.07.15
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.24	2022.05.23
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2019.07.26	2022.07.25
Test Antenna - Horn	01774	BBHA 9120D	Schwarzbeck	2019.07.26	2022.07.25
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-40GHz)	CB05	EMC05	Morlab	N/A	N/A
1-18GHz pre-Amplifier	61171/61172	S020180L3203	Tonscend	2021.07.16	2022.07.15
18-26.5GHz pre-Amplifier	46732	S10M100L3802	Tonscend	2021.07.16	2022.07.15
26-40GHz pre-Amplifier	56774	S40M400L4002	Tonscend	2021.07.16	2022.07.15
Notch Filter	N/A	WRCGV -LTE B14	Wainwright	2021.07.16	2022.07.15
Anechoic Chamber	N/A	9m*6m*6m	CRT	2019.07.13	2022.07.12

END OF REPORT