TEST REPORT

Product Name:	4G Trail Camera
FCC ID:	2A5ARHC810PRO
Trademark:	SUNTEKCAM
Model Number:	HC-810Pro, HC-940Pro, HC-900Pro, HC-801Pro, HC-910Pro, HC-812Pro
Prepared For:	Shenzhen Suntek Intelligent Technology Co., Ltd
Address:	10/F, Building2, Xinlikang Industrial Park, No.6 Lianli East Road, Xialilang Community, Longgang,Shenzhen, China
Manufacturer:	Shenzhen Suntek Intelligent Technology Co., Ltd
Address:	10/F, Building2, Xinlikang Industrial Park, No.6 Lianli East Road, Xialilang Community, Longgang,Shenzhen, China
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, China.
Sample Received Date:	Jul. 07, 2022
Sample tested Date:	Jul. 07, 2022 to Jul. 22, 2022
Issue Date:	Jul. 22, 2022
Report No.:	CTB220721002RFX
Test Standards	FCC Part 2, 22, 24E, 27
Test Results	PASS
Remark:	This is LTE radio test report.

Compiled by:	Reviewed by:	Approved by:
Arron Liu	Bin Mei	Rita Xiao / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB220721002RFX	Jul. 22, 2022	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v02r02	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v02r02	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v02r02	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS

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3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63℃
frequency	1×10-7

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	HC-810Pro, HC-940Pro, HC-900Pro, HC-801Pro, HC-910Pro, HC-812Pro
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: HC-810Pro
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	FDD-LTE BAND 2: 1850-1910MHz FDD-LTE BAND 4:1710-1755MHz FDD-LTE BAND 5:824-849MHz FDD-LTE BAND 12: 699-716MHz FDD-LTE BAND 13: 779.5-784.5MHz FDD-LTE BAND 66: 1701-1780MHz
Max. RF output power:	FDD-LTE BAND 2: 23.06 dBm FDD-LTE BAND 4: 23.52 dBm FDD-LTE BAND 5: 23.76dBm FDD-LTE BAND 12: 23.94 dBm FDD-LTE BAND 13: 23.95 dBm FDD-LTE BAND 66: 23.75dBm
Type of Modulation:	QPSK, 16QAM
Antenna Gain:	FDD-LTE BAND 2: 1.0 dBi FDD-LTE BAND 4: 1.0 dBi FDD-LTE BAND 5: 1.0 dBi FDD-LTE BAND 12: 1.0 dBi FDD-LTE BAND 13: 1.0 dBi FDD-LTE BAND 66: 1.0 dBi
Antenna installation:	Dipole antenna
Antenna Gain:	1.0dBi
Ratings:	DC 12V

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
/	/	/	/	/	/

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Test Mode

Test Mode List		
Test Mode	Description	Remark
TM1	FDD-LTE BAND 2	Low, Middle, High Channels
TM2	FDD-LTE BAND 4	Low, Middle, High Channels
TM3	FDD-LTE BAND 5	Low, Middle, High Channels
TM4	FDD-LTE BAND 12	Low, Middle, High Channels
TM5	FDD-LTE BAND 13	Low, Middle, High Channels
TM6	FDD-LTE BAND 66	Low, Middle, High Channels

4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	12V
Normal Temperature(℃)	23
Low Temperature(℃)	0
High Temperature(℃)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated date	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2021.09.27	2022.08.05
2	Power Sensor	Agilent	U2021XA	MY56120032	2021.09.27	2022.08.05
3	Power Sensor	Agilent	U2021XA	MY56120034	2021.09.27	2022.08.05
4	Communication test set	R&S	CMW500	108058	2021.09.27	2022.08.05
5	Spectrum Analyzer	R&S	FSP40	100550	2021.09.27	2022.08.05
6	Signal Generator	Agilent	N5181A	MY49060920	2021.09.27	2022.08.16
7	Signal Generator	Agilent	N5182A	MY47420195	2021.09.27	2022.08.05
8	Communication test set	Agilent	E5515C	MY50102567	2021.09.27	2022.08.16
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2021.09.27	2022.08.05
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	2021.09.27	2022.08.05
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	2021.09.27	2022.08.05
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	2021.09.27	2022.08.05
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2021.09.27	2022.08.05
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2021.09.27	2022.08.05
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	2021.09.27	2022.08.05
16	966 chamber	C.R.T.	966 Room	966	2021.09.27	2024.08.11
17	Receiver	R&S	ESPI	100362	2021.09.27	2022.08.05
18	Amplifier	HP	8447E	2945A02747	2021.09.27	2022.08.05
19	Amplifier	Agilent	8449B	3008A01838	2021.09.27	2022.08.05

20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	2021.09.27	2022.08.07
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2021.09.27	2022.08.08
22	Software	Fala	EZ-EMC	FA-03A2 RE	2021.09.27	2022.08.05
23	3-Loop Antenna	Daze	ZN30401	17014	2021.09.27	2022.08.05
24	loop antenna	ZHINAN	ZN30900A	/	2021.09.27	2022.08.05
25	Horn antenna	A/H/System	SAS-574	588	2021.09.27	2022.08.05
26	Amplifier	AEROFLEX	/	S/N/ 097	2021.09.27	2022.08.05

6. RF EXPOSURE

6.1 Standard Applicable

According to §1.1307 and§2.1091,§2.1093, the portable transmitter must comply the RF exposure requirements.

6.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure report.

7. RF OUTPUT POWER

7.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

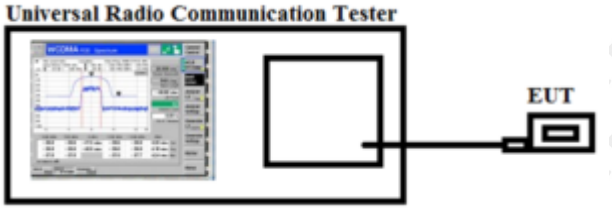
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

According to §27.50(c)(10), portable stations (hand-held devices) in the 698-746 MHz band are limited to 3 watts ERP.

7.2 Test Procedure

Conducted output power test method:



Radiated power test method:
1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

7.3 Summary of Test Results/Plots

Max. Radiated Power:
FDD-LTE Band 2

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.59	<33.0	PASS
		H	20.21		
	MCH	V	21.33		PASS
		H	21.02		
	HCH	V	20.16		PASS
		H	19.76		
16QAM	LCH	V	21.04	<33.0	PASS
		H	21.12		
	MCH	V	21.30		PASS
		H	21.47		
	HCH	V	21.14		PASS
		H	21.51		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.20	<33.0	PASS
		H	21.49		
	MCH	V	21.15		PASS
		H	20.91		
	HCH	V	19.71		PASS
		H	21.27		
16QAM	LCH	V	20.79	<33.0	PASS
		H	20.12		
	MCH	V	21.37		PASS
		H	20.61		
	HCH	V	19.57		PASS
		H	20.48		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.87	<33.0	PASS
		H	19.46		
	MCH	V	20.10		PASS
		H	19.57		
	HCH	V	19.18		PASS
		H	19.77		
16QAM	LCH	V	19.73	<33.0	PASS
		H	19.35		
	MCH	V	19.74		PASS
		H	19.83		
	HCH	V	19.80		PASS
		H	20.08		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.29	<33.0	PASS
		H	21.77		
	MCH	V	21.12		PASS
		H	22.09		
	HCH	V	21.72		PASS
		H	20.96		
16QAM	LCH	V	20.99	<33.0	PASS
		H	21.14		
	MCH	V	21.49		PASS
		H	21.03		
	HCH	V	21.89		PASS
		H	21.24		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.96	<33.0	PASS
		H	21.11		
	MCH	V	21.90		PASS
		H	21.80		
	HCH	V	20.69		PASS
		H	21.55		
16QAM	LCH	V	22.01	<33.0	PASS
		H	20.20		
	MCH	V	21.70		PASS
		H	20.42		
	HCH	V	21.20		PASS
		H	20.82		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.14	<33.0	PASS
		H	20.86		
	MCH	V	20.17		PASS
		H	20.52		
	HCH	V	20.25		PASS
		H	20.36		
16QAM	LCH	V	21.99	<33.0	PASS
		H	20.95		
	MCH	V	20.48		PASS
		H	20.80		
	HCH	V	20.50		PASS
		H	20.64		

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.22	<30.0	PASS
		H	21.04		
	MCH	V	20.77		PASS
		H	20.86		
	HCH	V	21.18		PASS
		H	21.19		
16QAM	LCH	V	21.93	<30.0	PASS
		H	20.60		
	MCH	V	21.43		PASS
		H	21.84		
	HCH	V	22.10		PASS
		H	22.20		

Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.99	<30.0	PASS
		H	20.85		
	MCH	V	19.59		PASS
		H	20.60		
	HCH	V	20.71		PASS
		H	21.36		
16QAM	LCH	V	21.10	<30.0	PASS
		H	19.54		
	MCH	V	19.73		PASS
		H	20.17		
	HCH	V	20.28		PASS
		H	19.75		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.17	<30.0	PASS
		H	19.73		
	MCH	V	19.81		PASS
		H	19.78		
	HCH	V	20.55		PASS
		H	19.88		
16QAM	LCH	V	20.28	<30.0	PASS
		H	20.43		
	MCH	V	20.25		PASS
		H	19.67		
	HCH	V	20.32		PASS
		H	19.63		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.81	<30.0	PASS
		H	21.65		
	MCH	V	20.90		PASS
		H	20.31		
	HCH	V	21.29		PASS
		H	21.36		
16QAM	LCH	V	21.06	<30.0	PASS
		H	21.53		
	MCH	V	20.28		PASS
		H	21.50		
	HCH	V	20.46		PASS
		H	20.78		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.04	<30.0	PASS
		H	21.70		
	MCH	V	20.43		PASS
		H	20.25		
	HCH	V	20.83		PASS
		H	20.66		
16QAM	LCH	V	21.73	<30.0	PASS
		H	21.22		
	MCH	V	21.93		PASS
		H	22.22		
	HCH	V	21.68		PASS
		H	20.55		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.20	<30.0	PASS
		H	22.00		
	MCH	V	20.96		PASS
		H	22.29		
	HCH	V	21.94		PASS
		H	20.91		
16QAM	LCH	V	21.32	<30.0	PASS
		H	20.53		
	MCH	V	22.26		PASS
		H	21.23		
	HCH	V	22.06		PASS
		H	21.90		

FDD-LTE Band 5

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.50	<38.45	PASS
		H	21.09		
	MCH	V	21.11		PASS
		H	22.17		
	HCH	V	22.30		PASS
		H	22.20		
16QAM	LCH	V	21.89	<38.45	PASS
		H	21.46		
	MCH	V	21.48		PASS
		H	21.98		
	HCH	V	21.08		PASS
		H	21.07		

Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.02	<38.45	PASS
		H	20.65		
	MCH	V	20.30		PASS
		H	21.13		
	HCH	V	21.32		PASS
		H	21.73		
16QAM	LCH	V	20.08	<38.45	PASS
		H	20.91		
	MCH	V	21.06		PASS
		H	20.10		
	HCH	V	21.48		PASS
		H	20.97		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.65	<38.45	PASS
		H	21.09		
	MCH	V	20.59		PASS
		H	21.03		
	HCH	V	21.30		PASS
		H	21.35		
16QAM	LCH	V	21.06	<38.45	PASS
		H	20.96		
	MCH	V	20.79		PASS
		H	21.28		
	HCH	V	21.18		PASS
		H	21.48		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.53	<38.45	PASS
		H	21.38		
	MCH	V	21.21		PASS
		H	21.82		
	HCH	V	21.83		PASS
		H	20.69		
16QAM	LCH	V	21.07	<38.45	PASS
		H	20.29		
	MCH	V	21.99		PASS
		H	21.94		
	HCH	V	20.75		PASS
		H	20.66		

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.21	<34.77	PASS
		H	21.47		
	MCH	V	22.28		PASS
		H	22.75		
	HCH	V	21.11		PASS
		H	22.22		
16QAM	LCH	V	22.33	<34.77	PASS
		H	22.23		
	MCH	V	21.16		PASS
		H	22.00		
	HCH	V	21.54		PASS
		H	21.32		

Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.51	<34.77	PASS
		H	20.84		
	MCH	V	20.18		PASS
		H	21.14		
	HCH	V	20.96		PASS
		H	20.72		
16QAM	LCH	V	21.50	<34.77	PASS
		H	20.19		
	MCH	V	19.69		PASS
		H	19.50		
	HCH	V	20.32		PASS
		H	21.43		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.70	<34.77	PASS
		H	22.29		
	MCH	V	22.11		PASS
		H	22.42		
	HCH	V	21.86		PASS
		H	22.06		
16QAM	LCH	V	22.16	<34.77	PASS
		H	22.00		
	MCH	V	22.54		PASS
		H	21.84		
	HCH	V	22.06		PASS
		H	21.89		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.62	<34.77	PASS
		H	21.41		
	MCH	V	22.80		PASS
		H	22.60		
	HCH	V	22.62		PASS
		H	21.44		
16QAM	LCH	V	21.50	<34.77	PASS
		H	21.96		
	MCH	V	22.08		PASS
		H	22.50		
	HCH	V	21.57		PASS
		H	21.97		

FDD-LTE Band 13

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.81	<34.77	PASS
		H	21.55		
	MCH	V	21.16		PASS
		H	21.15		
	HCH	V	20.90		PASS
		H	21.41		
16QAM	LCH	V	21.09	<34.77	PASS
		H	21.29		
	MCH	V	20.80		PASS
		H	20.84		
	HCH	V	20.59		PASS
		H	21.15		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.58	<34.77	PASS
		H	21.50		
	MCH	V	20.69		PASS
		H	21.99		
	HCH	V	22.31		PASS
		H	20.89		
16QAM	LCH	V	22.15	<34.77	PASS
		H	22.13		
	MCH	V	20.61		PASS
		H	21.99		
	HCH	V	21.20		PASS
		H	22.08		

FDD-LTE Band 66

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.54	<33.0	PASS
		H	22.17		
	MCH	V	22.27		PASS
		H	22.19		
	HCH	V	21.29		PASS
		H	22.44		
16QAM	LCH	V	20.62	<33.0	PASS
		H	20.73		
	MCH	V	21.46		PASS
		H	21.47		
	HCH	V	20.79		PASS
		H	21.49		

Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.69	<33.0	PASS
		H	20.77		
	MCH	V	21.65		PASS
		H	21.60		
	HCH	V	21.18		PASS
		H	21.35		
16QAM	LCH	V	21.59	<33.0	PASS
		H	21.40		
	MCH	V	20.35		PASS
		H	20.38		
	HCH	V	20.37		PASS
		H	22.13		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.64	<33.0	PASS
		H	21.91		
	MCH	V	22.41		PASS
		H	22.06		
	HCH	V	22.19		PASS
		H	22.31		
16QAM	LCH	V	21.51	<33.0	PASS
		H	21.40		
	MCH	V	21.77		PASS
		H	21.81		
	HCH	V	21.68		PASS
		H	21.09		

Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.71	<33.0	PASS
		H	21.55		
	MCH	V	22.31		PASS
		H	20.63		
	HCH	V	20.56		PASS
		H	20.83		
16QAM	LCH	V	21.76	<33.0	PASS
		H	20.77		
	MCH	V	21.26		PASS
		H	21.51		
	HCH	V	20.76		PASS
		H	21.88		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.33	<33.0	PASS
		H	20.57		
	MCH	V	20.10		PASS
		H	19.93		
	HCH	V	19.68		PASS
		H	19.99		
16QAM	LCH	V	21.35	<33.0	PASS
		H	21.44		
	MCH	V	19.56		PASS
		H	19.63		
	HCH	V	21.41		PASS
		H	19.79		

Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.73	<33.0	PASS
		H	21.97		
	MCH	V	21.13		PASS
		H	20.52		
	HCH	V	21.10		PASS
		H	21.14		
16QAM	LCH	V	21.24	<33.0	PASS
		H	21.99		
	MCH	V	20.76		PASS
		H	20.31		
	HCH	V	20.17		PASS
		H	20.73		

Max. Conducted Output Power
Please refer to Appendix A: Average Power Output Data
Test result: Pass

8. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER

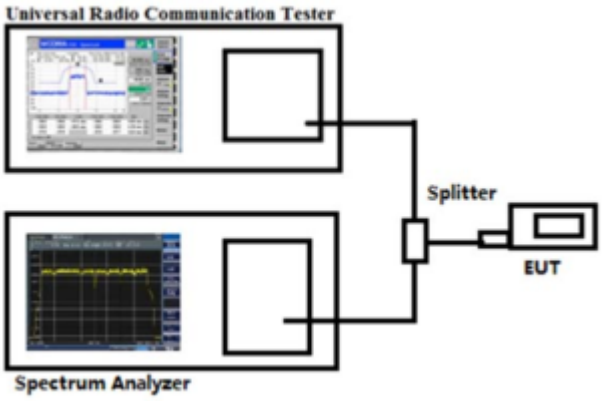
8.1 Standard Applicable

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, 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.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal
corresponding to the highest PAPR expected during periods of continuous transmission.

8.2 Test Procedure

According with KDB 971168
1. The signal analyzer’ s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
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
Test Configuration for the emission bandwidth testing:



8.3 Summary of Test Results

Please refer to Appendix B: Peak-to-Average Ratio

Test result: Pass

9. EMISSION BANDWIDTH

9.1 Standard Applicable

According to §22.917(b), 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.

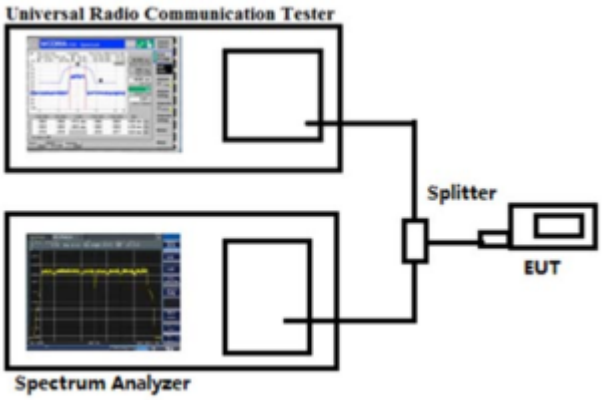
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, 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.

9.2 Test Procedure

According to § 22.917(b), 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.

Test Configuration for the emission bandwidth testing:



9.3 Summary of Test Results/Plots

Please refer to Appendix C: 26dB Bandwidth and Occupied Bandwidth
Test result: Pass

10. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

10.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), 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.

According to §27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

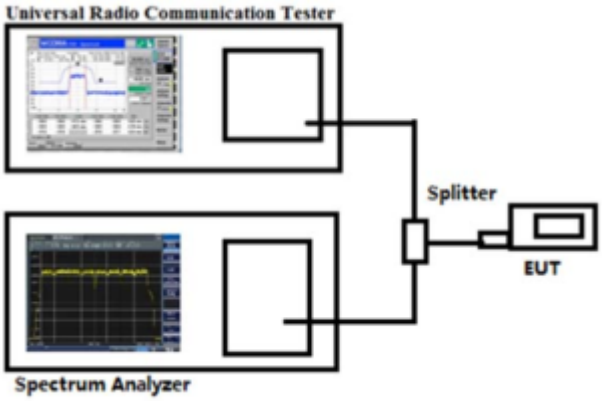
According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.
According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

According to §27.53(m)(4), for mobile digital stations, 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 as defined in paragraph (m)(6) of this section. 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 2490.5 MHz.

10.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10 th harmonic.

Test Configuration for the out of band emissions testing:



10.3 Summary of Test Results/Plots

Please refer to Appendix D & E: Band Edge & Conducted Spurious Emission
Test result: Pass

11. SPURIOUS RADIATED EMISSIONS

11.1 Standard Applicable

According to § 22.917(a), the power of any emissions 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.

According to § 24.238(a), 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.

According to § 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to § 27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to § 27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

According to § 27.53(g) the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

11.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-E and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =43+10 Log 10 (power out in Watts)

11.3 Summary of Test Results/Plots

Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was reported.
2. All test modes (different bandwidth and different modulation) are performed, but only the worst case is recorded in this report.

Test Data:

QPSK

Band 5 20407 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1292.27	142	164	-56.31	-13	-43.31	Pass	H
1637.40	147	325	-50.51	-13	-37.51	Pass	H
3815.98	148	95	-49.54	-13	-36.54	Pass	H
5764.85	144	293	-46.41	-13	-33.41	Pass	H
6402.71	155	316	-43.50	-13	-30.50	Pass	H
8017.13	156	147	-47.96	-13	-34.96	Pass	H
1227.07	152	31	-55.42	-13	-42.42	Pass	V
1456.83	148	321	-57.19	-13	-44.19	Pass	V
3659.49	146	149	-52.46	-13	-39.46	Pass	V
3887.60	148	291	-47.83	-13	-34.83	Pass	V
5842.51	153	87	-45.88	-13	-32.88	Pass	V
6590.77	144	68	-49.09	-13	-36.09	Pass	V

Band 5 20525 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1202.29	150	54	-56.49	-13	-43.49	Pass	H
1745.71	146	52	-50.46	-13	-37.46	Pass	H
3817.13	150	299	-52.53	-13	-39.53	Pass	H
5937.09	146	292	-45.44	-13	-32.44	Pass	H
6441.36	149	224	-48.10	-13	-35.10	Pass	H
7935.09	151	106	-48.64	-13	-35.64	Pass	H
1172.39	149	242	-56.07	-13	-43.07	Pass	V
1327.37	148	175	-56.60	-13	-43.60	Pass	V
3506.05	147	4	-56.69	-13	-43.69	Pass	V
3989.52	148	220	-52.70	-13	-39.70	Pass	V
5818.63	150	257	-51.50	-13	-38.50	Pass	V
6595.56	150	41	-45.82	-13	-32.82	Pass	V

Band 5 20643 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1340.71	149	130	-56.73	-13	-43.73	Pass	H
1669.90	147	179	-52	-13	-39	Pass	H
3845.50	154	225	-45.66	-13	-32.66	Pass	H
5906.91	151	198	-40.96	-13	-27.96	Pass	H
6531.65	153	106	-42.47	-13	-29.47	Pass	H
8000.07	146	154	-44.74	-13	-31.74	Pass	H
1257.63	149	282	-56.49	-13	-43.49	Pass	V
1403.18	153	282	-56.84	-13	-43.84	Pass	V
3525.24	146	124	-52.79	-13	-39.79	Pass	V
3912.13	154	137	-48.59	-13	-35.59	Pass	V
5788.31	155	165	-43.05	-13	-30.05	Pass	V
6576.29	150	270	-47.76	-13	-34.76	Pass	V

16QAM

Band 5 20407 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1342.90	151	4	-59.82	-13	-46.82	Pass	H
1756.00	147	65	-45.80	-13	-32.80	Pass	H
3788.62	152	291	-48.39	-13	-35.39	Pass	H
5897.32	146	121	-45.08	-13	-32.08	Pass	H
6579.20	148	243	-43.75	-13	-30.75	Pass	H
7949.28	155	188	-44.88	-13	-31.88	Pass	H
1255.95	145	32	-52.52	-13	-39.52	Pass	V
1358.13	155	170	-58.45	-13	-45.45	Pass	V
3689.16	147	145	-48.70	-13	-35.70	Pass	V
3915.56	154	167	-53.09	-13	-40.09	Pass	V
5822.68	151	68	-47.32	-13	-34.32	Pass	V
6640.14	147	346	-48.78	-13	-35.78	Pass	V

Band 5 20525 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1325.33	154	281	-56.59	-13	-41.45	Pass	H
1701.78	146	266	-49.06	-13	-37.85	Pass	H
3906.53	150	301	-47.62	-13	-35.2	Pass	H
5883.20	150	317	-43.82	-13	-30.39	Pass	H
6420.74	146	358	-42.56	-13	-32.24	Pass	H
7987.93	146	72	-39.31	-13	-30.22	Pass	H
1290.56	155	85	-55.47	-13	-44.9	Pass	V
1448.73	147	123	-59.16	-13	-43.63	Pass	V
3578.19	148	218	-50.53	-13	-35.94	Pass	V
3901.69	154	294	-46.89	-13	-36.01	Pass	V
5793.04	153	290	-43.11	-13	-33.75	Pass	V
6446.36	145	267	-43.24	-13	-32.41	Pass	V

Band 5 20643 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1367.15	152	48	-54.40	-13	-41.40	Pass	H
1764.14	149	269	-50.02	-13	-37.02	Pass	H
3833.63	146	86	-43.41	-13	-30.41	Pass	H
5795.20	149	243	-39.93	-13	-26.93	Pass	H
6506.14	147	216	-42.23	-13	-29.23	Pass	H
8072.33	151	294	-48.65	-13	-35.65	Pass	H
1281.37	152	207	-54.96	-13	-41.96	Pass	V
1491.61	155	185	-61.99	-13	-48.99	Pass	V
3573.01	151	327	-52.75	-13	-39.75	Pass	V
3863.56	153	250	-47.27	-13	-34.27	Pass	V
5733.27	148	193	-51.78	-13	-38.78	Pass	V
6458.09	153	327	-45.58	-13	-32.58	Pass	V

Note:

1) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

2) Tested with all kind of bandwidth,RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

12. FREQUENCY STABILITY

12.1 Standard Applicable

According to §22.355, §24.235, §27.54 the limit is 2.5ppm.

12.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

12.3 Summary of Test Results/Plots

Note: 1.Normal Voltage NV=DC12V; Low Voltage LV=DC10.8V; High Voltage HV=DC13.2V
Please refer to Appendix F: Frequency Stability
Test result: Pass

※※※※※ END OF REPORT ※※※※※