TEST REPORT

Product Name:	NB-IoT module
FCC ID:	2ATPO-EC-01
Trademark:	B&T 博安通 / Ai 安信可科技 Ai-Thinker
Model Number:	EC-01F, EC-01, EC-01G
Prepared For:	Shenzhen Ai-Thinker Technology Co., Ltd
Address:	410, Block C, Huafeng Smart Innovation Port. Gushu 2nd Road, Gushu Community, Xixiang Street, Baoan District, Shenzhen, China
Manufacturer:	Shenzhen Ai-Thinker Technology Co., Ltd
Address:	410, Block C, Huafeng Smart Innovation Port. Gushu 2nd Road, Gushu Community, Xixiang Street, Baoan District, 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:	Sep. 1, 2021
Sample tested Date:	Sep. 1, 2021 to Oct. 27, 2021
Issue Date:	Oct. 27, 2021
Report No.:	CTB210910025RFX
Test Standards	FCC Part 2, 22
Test Results	PASS
Remark:	This is LTE radio test report.

Compiled by:	Reviewed by:	Approved by:
He Xiaona	Arron Liu	Bin Mei / Director

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.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB210910025RFX	Oct. 27, 2021	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)	KDB 971168 D01v02r02	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	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)	KDB 971168 D01v02r02	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v02r02	PASS
Frequency stability	Part 2.1055/Part 27.54	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):	EC-01F, EC-01, EC-01G
Model Description:	All the model are the same circuit and RF module, only for model name. Test sample model: EC-01F
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	FDD-LTE BAND 5: 824-849MHz
Max. RF output power:	FDD-LTE BAND 5: 23.02dBm
Type of Modulation:	BPSK, QPSK
Antenna installation:	SMA antenna
Antenna Gain:	FDD-LTE BAND 5: 1.0 dBi
Ratings:	DC 5.0V powering from PC

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
1	Tabel PC	ASUA	U33	N/A	

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	TDD-LTE BAND 5	Low, Middle, High Channels

LTE BAND 5

Test Mode	Test Frequency ID	Number [UL]	Frequency of Uplink(MHz)
LTE band 5	Low Range	20401	824.1
	Mid Range	20525	836.5
	High Range	20649	848.9

Test items	Modes	Deployment mode	Subcarrier Spacing (kHz)		Modulation		Test Channel		
		Stand-alone	3.75	15	BPSK	QPSK	L	M	H
RF Power Output	LTE 5	o	o	o	o	o	o	o	o
Effective Isotropic Radiated power	LTE 5	o	-	o	o	o	o	o	o
Occupied Bandwidth	LTE 5	o	o	o	o	o	o	o	o
Band edge Compliance	LTE 5	o	o	o	o	o	o	-	o
Peak-to-Average Power Ratio	LTE 5	o	o	o	o	o	-	o	-
Frequency Stability	LTE 5	o	-	o	o	o	o	o	o
Conducted Spurious Emissions	LTE 5	o	o	-	o	o	o	o	o
Radiates Spurious Emission	LTE 5	o	o	-	o	o	o	o	o

4.5 Test Environment

Humidity (%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	5V
Normal Temperature(℃)	25
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 until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2022.09.27
2	Power Sensor	Agilent	U2021XA	MY56120032	2022.09.27
3	Power Sensor	Agilent	U2021XA	MY56120034	2022.09.27
4	Communication test set	R&S	CMW500	108058	2022.09.27
5	Spectrum Analyzer	R&S	FSP40	100550	2022.09.27
6	Signal Generator	Agilent	N5181A	MY49060920	2022.09.27
7	Signal Generator	Agilent	N5182A	MY47420195	2022.09.27
8	Communication test set	Agilent	E5515C	MY50102567	2022.09.27
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	2018101500 1	2022.09.27
10	band rejection filter	Shenxiang	MSF5150-5850 MS-1155	2018101500 1	2021.09.27
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	2022.09.27
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	2022.09.27
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2022.09.27
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2022.09.27
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	2022.09.27
16	966 chamber	C.R.T.	966 Room	966	2022.09.27
17	Receiver	R&S	ESPI	100362	2022.09.27
18	Amplifier	HP	8447E	2945A02747	2022.09.27
19	Amplifier	Agilent	8449B	3008A01838	2022.09.27
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	2022.09.27

21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	2022.09.27
22	Software	Fala	EZ-EMC	FA-03A2 RE	2022.09.27
23	3-Loop Antenna	Daze	ZN30401	17014	2022.09.27
24	loop antenna	ZHINAN	ZN30900A	/	2022.09.27
25	Horn antenna	A/H/System	SAS-574	588	2022.09.27
26	Amplifier	AEROFLEX	/	S/N/ 097	2022.09.27

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.

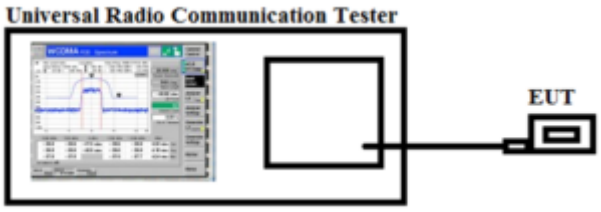
According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

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

According to §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.

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 5
QPSK

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.1	21.72	1.50	0.00	H	1.50	1.00	21.22	33.00
824.1	21.50	1.50	0.00	V	1.50	1.00	21.00	33.00
Middle Channel								
836.5	21.87	1.50	0.00	H	1.50	1.00	21.37	33.00
836.5	21.97	1.50	0.00	V	1.50	1.00	21.47	33.00
High Channel								
848.9	21.88	1.50	0.00	H	1.50	1.00	21.38	33.00
848.9	21.72	1.50	0.00	V	1.50	1.00	21.22	33.00

BPSK

Frequency	Substitude SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
824.1	21.80	1.50	0.00	H	1.50	1.00	21.30	33.00
824.1	21.99	1.50	0.00	V	1.50	1.00	21.49	33.00
Middle Channel								
836.5	21.70	1.50	0.00	H	1.50	1.00	21.20	33.00
836.5	21.40	1.50	0.00	V	1.50	1.00	20.90	33.00
High Channel								
848.9	22.38	1.50	0.00	H	1.50	1.00	21.88	33.00
848.9	21.90	1.50	0.00	V	1.50	1.00	21.40	33.00

Max. Conducted Output Power
Please refer to Appendix : 1 Conducted output power

Test result: Pass

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

8.1 Standard Applicable

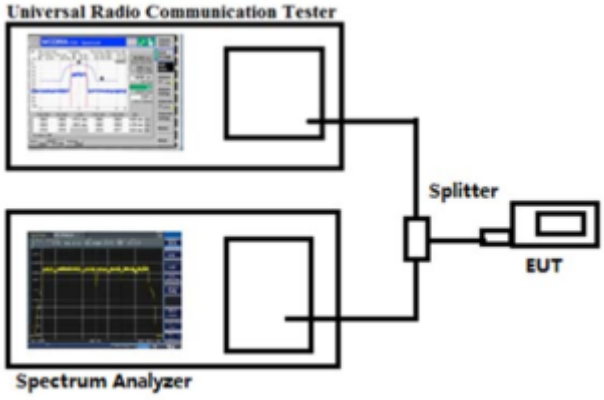
According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in 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 : 2 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.

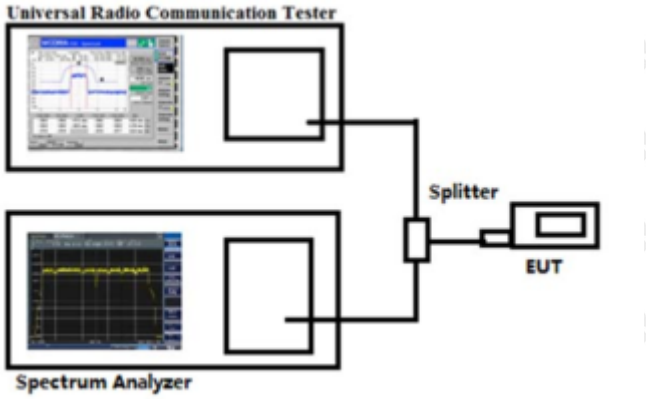
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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 : 3 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

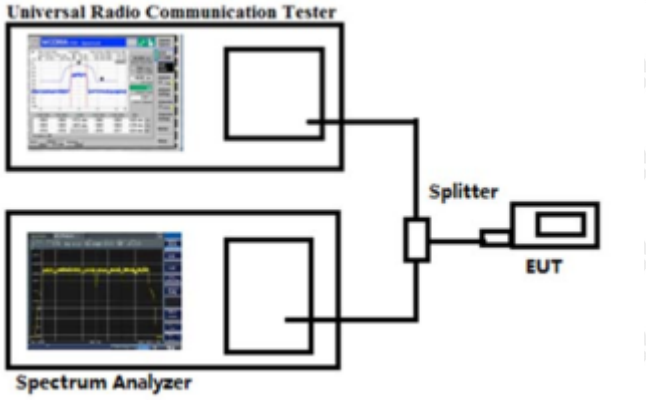
attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

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: 4 Band edge & 5 Out-of-band emissions
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:
BPSK

Band 5 20401 channel/ (lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.524	150	78	-58.98	-13	-45.98	Pass	H
1726.222	149	291	-48.48	-13	-35.48	Pass	H
3901.995	151	213	-48.51	-13	-35.51	Pass	H
5856.822	150	89	-46.50	-13	-33.50	Pass	H
6497.806	151	329	-44.89	-13	-31.89	Pass	H
7998.507	148	138	-45.02	-13	-32.02	Pass	H
1218.021	149	99	-58.15	-13	-45.15	Pass	V
1438.276	148	217	-57.86	-13	-44.86	Pass	V
3570.825	150	12	-49.73	-13	-36.73	Pass	V
3835.217	150	137	-51.15	-13	-38.15	Pass	V
5802.438	146	356	-45.67	-13	-32.67	Pass	V
6554.050	146	95	-58.98	-13	-45.98	Pass	V

Band 5 20525 channel/ (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1295.437	150	142	-56.74	-13	-43.74	Pass	H
1715.587	146	280	-49.14	-13	-36.14	Pass	H
3877.322	150	330	-48.97	-13	-35.97	Pass	H
5865.869	146	194	-44.29	-13	-31.29	Pass	H
6457.705	149	260	-45.43	-13	-32.43	Pass	H
8020.750	151	31	-44.70	-13	-31.70	Pass	H
1235.481	149	4	-56.09	-13	-43.09	Pass	V
1396.094	148	257	-63.70	-13	-50.70	Pass	V
3590.054	147	55	-54.46	-13	-41.46	Pass	V
3913.387	148	273	-52.60	-13	-39.60	Pass	V
5827.844	150	136	-46.48	-13	-33.48	Pass	V
6515.895	150	16	-46.81	-13	-33.81	Pass	V

Band 5 20649 channel/ (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1342.206	149	156	-58.69	-13	-45.69	Pass	H
1668.021	149	170	-51.40	-13	-38.40	Pass	H
3841.862	149	127	-48.72	-13	-35.72	Pass	H
5908.354	146	42	-40.59	-13	-27.59	Pass	H
6532.012	147	69	-44.46	-13	-31.46	Pass	H
7998.656	151	110	-44.67	-13	-31.67	Pass	H
1255.755	148	61	-57.03	-13	-44.03	Pass	V
1401.256	147	266	-56.55	-13	-43.55	Pass	V
3523.464	148	303	-52.85	-13	-39.85	Pass	V
3907.092	149	195	-49.61	-13	-36.61	Pass	V
5789.106	147	323	-42.80	-13	-29.80	Pass	V
6577.212	146	325	-48.58	-13	-35.58	Pass	V

QPSK

Band 5 20401 channel/ (lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1336.047	147	256	-60.47	-13	-47.47	Pass	H
1686.086	147	243	-46.94	-13	-33.94	Pass	H
3869.598	148	259	-50.40	-13	-37.40	Pass	H
5927.153	149	28	-47.69	-13	-34.69	Pass	H
6556.274	148	108	-43.61	-13	-30.61	Pass	H
8000.472	147	328	-43.44	-13	-30.44	Pass	H
1180.323	150	16	-55.03	-13	-42.03	Pass	V
1428.365	148	117	-55.53	-13	-42.53	Pass	V
3597.437	147	325	-51.51	-13	-38.51	Pass	V
3899.327	149	302	-49.05	-13	-36.05	Pass	V
5849.938	147	15	-45.87	-13	-32.87	Pass	V
6579.274	147	280	-48.35	-13	-35.35	Pass	V

Band 5 20525 channel/ (middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.981	151	14	-53.19	-13	-40.19	Pass	H
1724.730	147	71	-50.95	-13	-37.95	Pass	H
3853.572	150	318	-47.18	-13	-34.18	Pass	H
5927.050	147	56	-42.13	-13	-29.13	Pass	H
6505.163	147	216	-43.64	-13	-30.64	Pass	H
8058.547	151	79	-41.68	-13	-28.68	Pass	H
1191.658	151	65	-56.25	-13	-43.25	Pass	V
1382.513	146	225	-61.37	-13	-48.37	Pass	V
3536.066	149	47	-47.20	-13	-34.20	Pass	V
3855.156	150	73	-50.77	-13	-37.77	Pass	V
5820.359	147	168	-47.07	-13	-34.07	Pass	V
6519.743	150	28	-46.54	-13	-33.54	Pass	V

Band 5 20649 channel/ (highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1334.220	149	165	-56.824	-13	-43.82	Pass	H
1701.637	146	208	-46.570	-13	-33.57	Pass	H
3901.033	146	4	-44.282	-13	-31.28	Pass	H
5890.155	150	198	-42.666	-13	-29.67	Pass	H
6509.753	146	341	-41.512	-13	-28.51	Pass	H
8080.788	150	235	-43.215	-13	-30.22	Pass	H
1205.148	146	292	-54.583	-13	-41.58	Pass	V
1459.802	150	158	-56.797	-13	-43.80	Pass	V
3542.006	149	55	-52.482	-13	-39.48	Pass	V
3830.447	150	319	-50.001	-13	-37.00	Pass	V
5802.053	146	118	-46.970	-13	-33.97	Pass	V
6557.117	150	155	-47.180	-13	-34.18	Pass	V

Note:

1)Scan from 9kHz to 40GHz, 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 5.0MHz 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=DC5V; Low Voltage LV=DC5.72V; High Voltage HV=DC5.18V

Please refer to Appendix: 6 Frequency stability

Test result: Pass

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