

TEST REPORT

Product Name: Tablet PC
FCC ID: 2AT2F-ML1009P
Trademark: POWER KNOWLEDGE
Model Number: ML1009P
Prepared For: ShenzhenAdreamerEliteCo.,Ltd.
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Sample Received Date: Mar. 06, 2023
Sample tested Date: Mar. 06, 2023 to Mar. 16, 2023
Issue Date: Mar. 16, 2023
Report No.: CTB230316004RFX
Test Standards: FCC Part 2, 22, 24E, 27
Test Results: PASS
Remark: This is LTE radio test report.

Compiled by:

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Reviewed by:

Arron Liu

Approved by:

Bin Mei / 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
CTB230316004RFX	Mar. 16, 2023	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 D01v03r01	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v03r01	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

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 chamber 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°C
frequency	1×10 ⁻⁷

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s): ML1009P

Model Description: N/A

Hardware Version: E30A_V2.0X

Software Version: ML1009P_E863D_KidsPad10_V1.0

Operation Frequency: FDD-LTE BAND 2:1850-1910MHz
 FDD-LTE BAND 12:699-716MHz
 FDD-LTE BAND 17:704-716MHz
 TDD-LTE BAND 66:1710-1780MHz

Max. RF output power: FDD-LTE BAND 2: 21.76dBm
 FDD-LTE BAND 12: 22.95dBm
 FDD-LTE BAND 17: 22.76dBm
 TDD-LTE BAND 66: 22.24dBm

Type of Modulation: QPSK, 16QAM

Antenna installation: FPC antenna

Antenna Gain: FDD-LTE BAND 2: 3.86dBi
 FDD-LTE BAND 12: 0.38dBi
 FDD-LTE BAND 17: 0.38dBi
 TDD-LTE BAND 66: 3.55dBi

Ratings: Input: DC 5V --- 2A
 DC 3.8V by battery

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 12	Low, Middle, High Channels
TM3	FDD-LTE BAND 17	Low, Middle, High Channels
TM4	TDD-LTE BAND 66	Low, Middle, High Channels

4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.8V
Normal Temperature(°C)	23
Low Temperature(°C)	0
High Temperature(°C)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinh Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, 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

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	2023.07.19
2	Power Sensor	Agilent	U2021XA	MY56120032	2023.07.19
3	Power Sensor	Agilent	U2021XA	MY56120034	2023.07.19
4	Communication test set	R&S	CMW500	108058	2023.07.19
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2023.07.19
6	Signal Generator	Agilent	N5181A	MY50140365	2023.07.19
7	Vector signal generator	Agilent	N5182A	MY47420195	2023.07.19
8	Communication test set	Agilent	E5515C	MY50102567	2023.07.19
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	2023.07.19
10	5 GHz Filter	Shenxiang	MSF5150-5850 MS-1155	20181015001	2023.07.19
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	2023.07.19
12	BT&WI-FI Automatic test software	Microwave	MTS8000	Ver. 2.0.0.0	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	2023.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	2023.07.19
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/
16	966 chamber	C.R.T.	966	/	2024.08.11
17	Receiver	R&S	ESPI	100362	2023.07.19
18	Amplifier	HP	8447E	2945A02747	2023.07.19
19	Amplifier	Agilent	8449B	3008A01838	2023.07.19
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	2023.07.22

21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	2023.07.22
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	2023.07.23
24	loop antenna	ZHINAN	ZN30900A	GTS534	/
25	40G Horn antenna	A/H/System	SAS-574	588	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	2024.10.30

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.

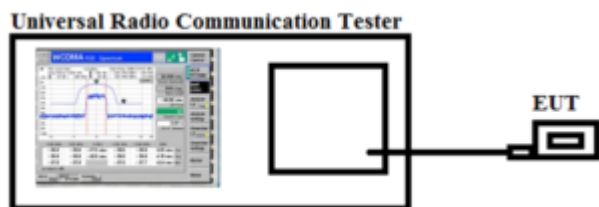
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.50	<33.00	PASS
		H	21.23		
	MCH	V	19.58		PASS
		H	19.73		
	HCH	V	19.90		PASS
		H	20.77		
16QAM	LCH	V	21.45	<33.00	PASS
		H	20.83		
	MCH	V	21.43		PASS
		H	20.34		
	HCH	V	21.39		PASS
		H	21.14		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.76	<33.00	PASS
		H	21.11		
	MCH	V	21.07		PASS
		H	19.93		
	HCH	V	20.21		PASS
		H	20.49		
16QAM	LCH	V	21.19	<33.00	PASS
		H	20.49		
	MCH	V	19.58		PASS
		H	20.13		
	HCH	V	19.29		PASS
		H	21.08		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.16	<33.00	PASS
		H	19.83		
	MCH	V	20.68		PASS
		H	19.75		
	HCH	V	19.30		PASS
		H	19.23		
16QAM	LCH	V	20.65	<33.00	PASS
		H	20.17		
	MCH	V	20.82		PASS
		H	19.90		
	HCH	V	20.64		PASS
		H	19.38		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.77	<33.00	PASS
		H	21.02		
	MCH	V	19.75		PASS
		H	21.17		
	HCH	V	20.12		PASS
		H	21.05		
16QAM	LCH	V	19.43	<33.00	PASS
		H	20.26		
	MCH	V	19.56		PASS
		H	19.86		
	HCH	V	20.61		PASS
		H	21.01		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.35	<33.00	PASS
		H	19.96		
	MCH	V	19.56		PASS
		H	20.83		
	HCH	V	20.24		PASS
		H	21.09		
16QAM	LCH	V	21.24	<33.00	PASS
		H	21.10		
	MCH	V	20.07		PASS
		H	21.49		
	HCH	V	20.65		PASS
		H	19.83		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.76	<33.00	PASS
		H	20.51		
	MCH	V	20.07		PASS
		H	20.98		
	HCH	V	20.89		PASS
		H	21.13		
16QAM	LCH	V	20.40	<33.00	PASS
		H	19.39		
	MCH	V	19.90		PASS
		H	19.97		
	HCH	V	19.57		PASS

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.93	<34.77	PASS
		H	21.56		
	MCH	V	21.34		PASS
		H	22.34		
	HCH	V	21.09		PASS
		H	22.17		
16QAM	LCH	V	21.56	<34.77	PASS
		H	22.46		
	MCH	V	20.58		PASS
		H	20.72		
	HCH	V	21.42		PASS
		H	22.08		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.09	<34.77	PASS
		H	22.30		
	MCH	V	22.00		PASS
		H	22.65		
	HCH	V	21.31		PASS
		H	22.93		
16QAM	LCH	V	21.10	<34.77	PASS
		H	21.62		
	MCH	V	22.86		PASS
		H	22.64		
	HCH	V	22.07		PASS
		H	22.93		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	20.94	<34.77	PASS
		H	22.28		
	MCH	V	20.82		PASS
		H	21.48		
	HCH	V	21.90		PASS
		H	21.95		
16QAM	LCH	V	21.12	<34.77	PASS
		H	22.47		
	MCH	V	21.42		PASS
		H	20.64		
	HCH	V	20.85		PASS
		H	21.56		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.95	<34.77	PASS
		H	22.19		
	MCH	V	22.65		PASS
		H	22.41		
	HCH	V	21.73		PASS
		H	22.42		
16QAM	LCH	V	21.38	<34.77	PASS
		H	22.07		
	MCH	V	22.90		PASS
		H	21.31		
	HCH	V	22.38		PASS
		H	21.35		

FDD-LTE Band 17

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.22	<34.77	PASS
		H	21.89		
	MCH	V	22.45		PASS
		H	21.52		
	HCH	V	21.73		PASS
		H	22.49		
16QAM	LCH	V	21.09	<34.77	PASS
		H	22.07		
	MCH	V	20.59		PASS
		H	21.17		
	HCH	V	20.87		PASS
		H	21.53		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.76	<34.77	PASS
		H	22.60		
	MCH	V	21.97		PASS
		H	21.49		
	HCH	V	22.25		PASS
		H	21.17		
16QAM	LCH	V	21.57	<34.77	PASS
		H	21.48		
	MCH	V	22.04		PASS
		H	21.61		
	HCH	V	22.33		PASS
		H	22.36		

TDD-LTE Band 66

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.66	<30.00	PASS
		H	21.76		
	MCH	V	21.61		PASS
		H	21.04		
	HCH	V	21.33		PASS
		H	21.83		
16QAM	LCH	V	21.41	<30.00	PASS
		H	20.84		
	MCH	V	22.15		PASS
		H	20.57		
	HCH	V	21.61		PASS
		H	20.32		
Channel Bandwidth: 3 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.16	<30.00	PASS
		H	20.64		
	MCH	V	20.63		PASS
		H	21.36		
	HCH	V	21.47		PASS
		H	19.55		
16QAM	LCH	V	20.51	<30.00	PASS
		H	20.28		
	MCH	V	20.76		PASS
		H	21.04		
	HCH	V	20.66		PASS
		H	20.12		

Channel Bandwidth: 5 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.28	<30.00	PASS
		H	19.57		
	MCH	V	19.40		PASS
		H	20.85		
	HCH	V	20.50		PASS
		H	20.57		
16QAM	LCH	V	20.24	<30.00	PASS
		H	20.41		
	MCH	V	20.69		PASS
		H	20.90		
	HCH	V	19.63		PASS
		H	19.24		
Channel Bandwidth: 10 MHz					
Modulation	Channel	Antenna Polar	ERP [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	21.05	<30.00	PASS
		H	19.72		
	MCH	V	20.61		PASS
		H	20.16		
	HCH	V	20.98		PASS
		H	21.37		
16QAM	LCH	V	21.09	<30.00	PASS
		H	19.95		
	MCH	V	20.62		PASS
		H	19.95		
	HCH	V	21.22		PASS
		H	20.05		

Channel Bandwidth: 15 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	19.49	<30.00	PASS
		H	19.17		
	MCH	V	19.85		PASS
		H	20.48		
	HCH	V	20.04		PASS
		H	20.65		
16QAM	LCH	V	19.44	<30.00	PASS
		H	19.60		
	MCH	V	20.80		PASS
		H	19.69		
	HCH	V	20.25		PASS
		H	19.78		
Channel Bandwidth: 20 MHz					
Modulation	Channel	Antenna Polar	E.i.r.p [dBm]	Limit (dBm)	Verdict
QPSK	LCH	V	22.24	<30.00	PASS
		H	20.75		
	MCH	V	20.57		PASS
		H	20.65		
	HCH	V	21.49		PASS
		H	21.23		
16QAM	LCH	V	20.23	<30.00	PASS
		H	21.38		
	MCH	V	19.68		PASS
		H	20.75		
	HCH	V	19.72		PASS

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

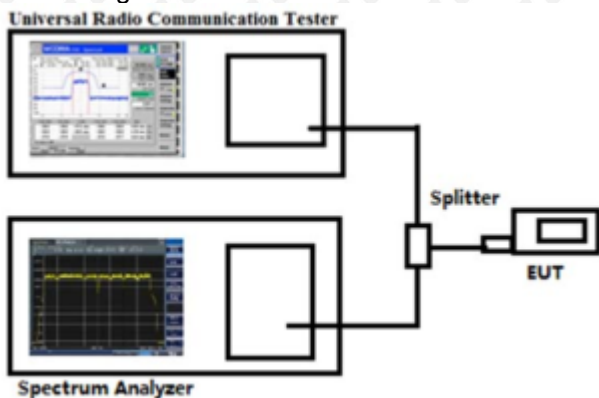
corresponding to the highest PAPR expected during periods of continuous transmission.

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.

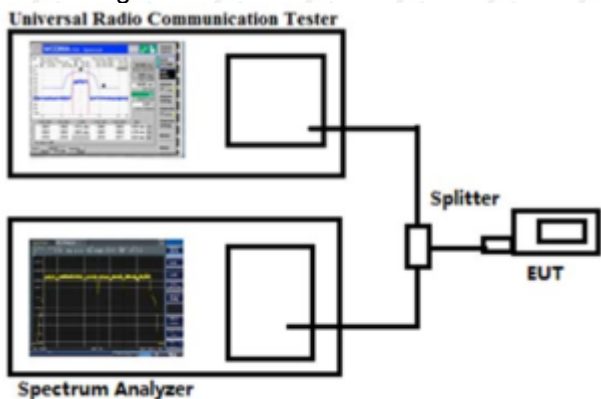
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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 $43 + 10 \log_{10}(P)$ dB.

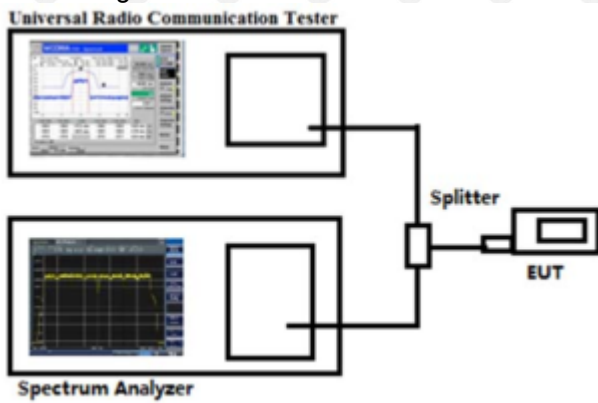
According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ 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 than $43 + 10 \log(P)$ 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 $43 + 10 \log_{10}(P)$ 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 = $43 + 10 \log_{10}(\text{power out in Watts})$

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 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1309.10	149	134	-55.39	-13	-42.39	Pass	H
1744.00	151	30	-54.37	-13	-41.37	Pass	H
3931.61	152	48	-49.07	-13	-36.07	Pass	H
5936.76	147	228	-44.96	-13	-31.96	Pass	H
6599.08	150	89	-41.70	-13	-28.70	Pass	H
8159.04	145	288	-47.10	-13	-34.10	Pass	H
1198.79	146	58	-54.04	-13	-41.04	Pass	V
1442.82	151	103	-58.09	-13	-45.09	Pass	V
3537.84	145	266	-53.66	-13	-40.66	Pass	V
3850.80	148	315	-47.72	-13	-34.72	Pass	V
5695.54	150	56	-43.13	-13	-30.13	Pass	V
6525.98	153	154	-50.83	-13	-37.83	Pass	V

Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1499.29	154	154	-52.39	-13	-39.39	Pass	H
1754.36	153	110	-51.78	-13	-38.78	Pass	H
3794.84	148	83	-49.65	-13	-36.65	Pass	H
5939.90	153	2	-49.09	-13	-36.09	Pass	H
6382.31	149	78	-45.88	-13	-32.88	Pass	H
8143.03	149	23	-44.52	-13	-31.52	Pass	H
1294.20	149	219	-53.64	-13	-40.64	Pass	V
1346.06	155	45	-59.67	-13	-46.67	Pass	V
3447.44	149	333	-53.15	-13	-40.15	Pass	V
3861.65	155	112	-52.94	-13	-39.94	Pass	V
5896.46	151	249	-43.06	-13	-30.06	Pass	V
6632.49	148	188	-51.79	-13	-38.79	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1231.20	149	265	-50.65	-13	-37.65	Pass	H
1679.75	152	298	-47.66	-13	-34.66	Pass	H
4023.60	152	335	-47.04	-13	-34.04	Pass	H
6018.38	148	287	-47.51	-13	-34.51	Pass	H
6445.17	149	200	-46.96	-13	-33.96	Pass	H
7919.46	154	156	-44.66	-13	-31.66	Pass	H
1230.26	147	18	-58.48	-13	-45.48	Pass	V
1381.11	153	291	-60.06	-13	-47.06	Pass	V
3551.67	153	24	-46.55	-13	-33.55	Pass	V
3939.68	149	71	-46.19	-13	-33.19	Pass	V
5813.52	146	108	-43.57	-13	-30.57	Pass	V
6536.74	155	45	-52.68	-13	-39.68	Pass	V

16QAM

Band 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1180.76	148	16	-54.63	-13	-41.63	Pass	H
1682.86	152	162	-48.35	-13	-35.35	Pass	H
3865.47	148	351	-47.16	-13	-34.16	Pass	H
5943.21	153	27	-41.63	-13	-28.63	Pass	H
6548.59	154	118	-47.40	-13	-34.40	Pass	H
8014.78	153	286	-51.65	-13	-38.65	Pass	H
1265.80	145	101	-56.27	-13	-43.27	Pass	V
1388.03	149	93	-60.96	-13	-47.96	Pass	V
3438.26	149	40	-52.79	-13	-39.79	Pass	V
3743.65	145	83	-46.07	-13	-33.07	Pass	V
5731.10	152	152	-49.53	-13	-36.53	Pass	V
6585.30	146	126	-49.91	-13	-36.91	Pass	V

Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.52	155	301	-55.25	-13	-42.25	Pass	H
1708.72	148	123	-49.65	-13	-36.65	Pass	H
3767.18	152	233	-46.06	-13	-33.06	Pass	H
5971.08	153	257	-45.12	-13	-32.12	Pass	H
6442.90	145	140	-46.31	-13	-33.31	Pass	H
8095.06	150	317	-43.97	-13	-30.97	Pass	H
1241.92	151	256	-51.37	-13	-38.37	Pass	V
1289.24	149	274	-53.88	-13	-40.88	Pass	V
3646.73	152	294	-50.92	-13	-37.92	Pass	V
3849.92	146	229	-48.61	-13	-35.61	Pass	V
5805.89	154	73	-47.70	-13	-34.70	Pass	V
6558.59	150	175	-52.93	-13	-39.93	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1448.27	153	318	-56.81	-13	-43.81	Pass	H
1856.45	151	152	-45.12	-13	-32.12	Pass	H
3921.10	149	120	-47.45	-13	-34.45	Pass	H
6002.28	150	273	-43.07	-13	-30.07	Pass	H
6558.93	153	297	-44.69	-13	-31.69	Pass	H
8001.66	149	217	-44.95	-13	-31.95	Pass	H
1108.81	146	104	-53.12	-13	-40.12	Pass	V
1472.06	150	320	-54.37	-13	-41.37	Pass	V
3534.28	155	332	-45.88	-13	-32.88	Pass	V
3989.27	154	320	-49.36	-13	-36.36	Pass	V
5728.25	152	55	-43.27	-13	-30.27	Pass	V
6592.89	152	227	-51.81	-13	-38.81	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 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

QPSK

Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1448.38	147	290	-57.91	-13	-44.91	Pass	H
1735.05	149	8	-47.88	-13	-34.88	Pass	H
3838.41	153	338	-47.59	-13	-34.59	Pass	H
5986.70	151	342	-45.67	-13	-32.67	Pass	H
6538.90	153	36	-46.37	-13	-33.37	Pass	H
8030.85	146	176	-43.59	-13	-30.59	Pass	H
1152.75	147	52	-57.76	-13	-44.76	Pass	V
1330.45	154	52	-62.75	-13	-49.75	Pass	V
3473.07	147	336	-52.44	-13	-39.44	Pass	V
3726.52	151	343	-49.29	-13	-36.29	Pass	V
5847.66	148	228	-40.79	-13	-27.79	Pass	V
6589.57	155	340	-48.67	-13	-35.67	Pass	V

Band 12 23095 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1481.05	154	111	-55.53	-13	-42.53	Pass	H
1642.00	146	279	-55.54	-13	-42.54	Pass	H
3840.83	152	7	-51.44	-13	-38.44	Pass	H
5767.82	154	256	-47.24	-13	-34.24	Pass	H
6415.37	153	158	-48.56	-13	-35.56	Pass	H
7920.56	147	309	-44.41	-13	-31.41	Pass	H
1185.06	146	1	-56.90	-13	-43.90	Pass	V
1486.80	152	163	-58.85	-13	-45.85	Pass	V
3716.71	154	18	-51.92	-13	-38.92	Pass	V
3879.89	146	307	-45.24	-13	-32.24	Pass	V
5702.46	145	119	-42.16	-13	-29.16	Pass	V
6652.88	154	164	-51.97	-13	-38.97	Pass	V

Band 12 23173 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1370.67	151	29	-54.09	-13	-41.09	Pass	H
1807.10	148	198	-49.78	-13	-36.78	Pass	H
3992.26	145	53	-43.97	-13	-30.97	Pass	H
6037.46	151	240	-39.67	-13	-26.67	Pass	H
6621.13	148	149	-43.27	-13	-30.27	Pass	H
7906.53	153	154	-50.23	-13	-37.23	Pass	H
1059.91	149	72	-59.31	-13	-46.31	Pass	V
1634.76	151	166	-54.20	-13	-41.20	Pass	V
3522.23	154	158	-51.26	-13	-38.26	Pass	V
3797.86	153	358	-51.96	-13	-38.96	Pass	V
5760.45	145	201	-52.43	-13	-39.43	Pass	V
6647.94	155	326	-44.18	-13	-31.18	Pass	V

16QAM

Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1364.68	150	263	-52.73	-13	-39.73	Pass	H
1662.33	152	155	-49.94	-13	-36.94	Pass	H
3961.26	146	69	-47.55	-13	-34.55	Pass	H
5882.63	147	81	-44.18	-13	-31.18	Pass	H
6638.92	149	97	-45.44	-13	-32.44	Pass	H
8098.61	149	99	-46.81	-13	-33.81	Pass	H
1241.00	150	328	-50.69	-13	-37.69	Pass	V
1415.96	151	272	-58.93	-13	-45.93	Pass	V
3607.34	149	69	-47.85	-13	-34.85	Pass	V
3653.90	154	148	-49.93	-13	-36.93	Pass	V
5950.82	153	3	-52.69	-13	-39.69	Pass	V
6549.18	149	36	-45.17	-13	-32.17	Pass	V

Band 12 23095 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1364.35	148	133	-55.81	-13	-42.81	Pass	H
1569.63	149	228	-44.62	-13	-31.62	Pass	H
3745.67	145	296	-47.19	-13	-34.19	Pass	H
5906.37	148	163	-44.00	-13	-31.00	Pass	H
6677.25	154	104	-43.82	-13	-30.82	Pass	H
8188.84	148	64	-45.16	-13	-32.16	Pass	H
1325.61	149	270	-54.29	-13	-41.29	Pass	V
1357.63	151	282	-61.02	-13	-48.02	Pass	V
3664.05	150	20	-49.99	-13	-36.99	Pass	V
3894.90	153	170	-49.77	-13	-36.77	Pass	V
5760.56	151	354	-45.46	-13	-32.46	Pass	V
6440.21	146	308	-43.80	-13	-30.80	Pass	V

Band 12 23173 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1484.33	148	23	-37.34	-13	-24.34	Pass	H
1617.66	153	126	-30.70	-13	-17.70	Pass	H
3836.55	154	116	-25.35	-13	-12.35	Pass	H
5883.05	152	3	-27.13	-13	-14.13	Pass	H
6463.48	148	249	-33.53	-13	-20.53	Pass	H
8051.99	152	316	-31.63	-13	-18.63	Pass	H
1156.45	147	164	-39.71	-13	-26.71	Pass	V
1475.54	152	185	-48.28	-13	-35.28	Pass	V
3568.09	152	106	-34.60	-13	-21.60	Pass	V
3838.83	153	212	-37.29	-13	-24.29	Pass	V
5802.10	149	265	-31.93	-13	-18.93	Pass	V
6696.91	154	251	-31.71	-13	-18.71	Pass	V

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=DC4.5V; High Voltage HV=DC5.5V

Please refer to Appendix F: Frequency Stability

Test result: Pass

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