FCC Part 15.247

TEST REPORT

For

Winmate Inc.

9F, No. 111-6, Shing-De Rd., San-Chung District, New Taipei City 241, Taiwan

FCC ID: PX9M700MT6625A

Report Type:	**Product Type:**
Original Report	Rugged Tablet PC

Report Producer: Kaylee Chiang

Report Number: RTWA170511001-00D

Report Date: 2017-09-13

Reviewed By: Jerry Chang

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REVISION HISTORY

Revision	Issue Date	Description
1.0	2017.09.13	Original

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1 General Information

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	Winmate Inc. 9F, No. 111-6, Shing-De Rd., San-Chung District, New Taipei City 241, Taiwan
Manufacturer:	Winmate Inc. 9F, No. 111-6, Shing-De Rd., San-Chung District, New Taipei City 241, Taiwan
Product:	Rugged Tablet PC
Main Model:	M700DM8
Series Model:	M700XXX (X can be any combination of "A~Z", "a~z", "0~9" or blank, exclude model: M700DM8)
Trade Name:	WINMATE
Frequency Range:	BLE: 2402 ~ 2480 MHz IEEE 802.11b/g/n HT20 Mode: 2412 ~ 2462 MHz IEEE 802.11n HT40 Mode: 2422 ~ 2452 MHz
Transmit Power:	BLE Mode: -1.34dBm (0.0007W) IEEE 802.11b Mode: 18.29dBm (0.0674W) IEEE 802.11g Mode: 23.05dBm (0.2018W) IEEE 802.11n HT20 Mode: 22.98dBm (0.1986W) IEEE 802.11n HT40 Mode: 22.04dBm (0.1599W)
Modulation Technique:	BLE: GFSK IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n HT20 Mode: OFDM IEEE 802.11n HT40 Mode: OFDM
Transmit Data Rate:	BLE: 1Mbps IEEE 802.11b Mode: 11, 5.5, 2, 1 Mbps IEEE 802.11g Mode: 54, 48, 36, 24, 18, 12, 11 , 9, 6Mbps IEEE 802.11n HT 20 MHz mode: 6.5 - 72.2Mbps IEEE 802.11n HT 40 MHz mode: 13.5 - 150 Mbps
Number of Channels:	BLE: 40 Channels IEEE 802.11b/g / IEEE 802.11n HT20 Mode: 11 Channels IEEE 802.11n HT40 Mode: 7 Channels
Antenna Specification:	PCB Antenna / Gain: 2.12 dBi
Voltage Range:	1) Adapter: I/P: 100-240Vac, 50/60Hz, 0.6A O/P: 5Vdc, 3.0A 2) Battery: 3.7Vdc
Date of Test:	May 22, 2017 ~ Aug 15, 2017

**All measurement and test data in this report was gathered from production sample identifier: 170511001 (Assigned by BACL, Taiwan) The EUT supplied by the applicant was received on 2017-05-11.*

Mode difference: The electrical and mechanical constructions of series models are identical to the basic model, except different marketing purpose. The model, M700DM8 is the testing sample, and the final test data are shown on this test report.

1.2 Objective

This report is prepared on behalf of *Winmate Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

The objective is to determine compliance with FCC Part 15.247 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, Power Spectral Density, 100 kHz Bandwidth of Band Edges Measurement, Conducted and Radiated Spurious Emissions.

1.3 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart E, Equipment UNII with FCC ID: PX9M700MT6625A

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on
☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.
☒68-3, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (Taiwan) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3180) and the FCC designation No.TW3180 under the Mutual Recognition Agreement (MRA) in FCC Test. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 974454. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

2 System Test Configuration

2.1 Description of Test Configuration

For WIFI mode, there are totally 11 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

For 802.11 b/g/n20 Modes were testd with channel 1, 6 and 11
For 802.11n40 Mode were testd with channel 3, 6 and 9

For BLE mode, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	20	2440
2	2404	21	2442
3	2406	-	-
-	-	38	2476
-	-	39	2478
19	2438	40	2480

For BLE Modes were testd with channel 1, 20 and 40

2.2 Equipment Modifications

No modification was made to the EUT

2.3 EUT Exercise Software

Used "SP_META" software.

WIFI

Test Software Version		Engineering Mode		
Test Frequency		Low	Mid	High
Power Level Setting	B Mode	15	17	19
	G Mode	19	19	19
	N20 Mode	19	19	18
	N40 Mode	15	19	16

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.
The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

BLE: 1 Mbps
802.11b: 1Mbps
802.11g: 6Mbps
802.11n ht20: MCS0
802.11n ht40: MCS0

2.4 Support Equipment List and Details

Description	Manufacturer	Model Number	FCC ID / DOC	S/N
Tablet	Winmate	E430RM4	DOC	C160802-012-001-001

2.5 External Cable List and Details

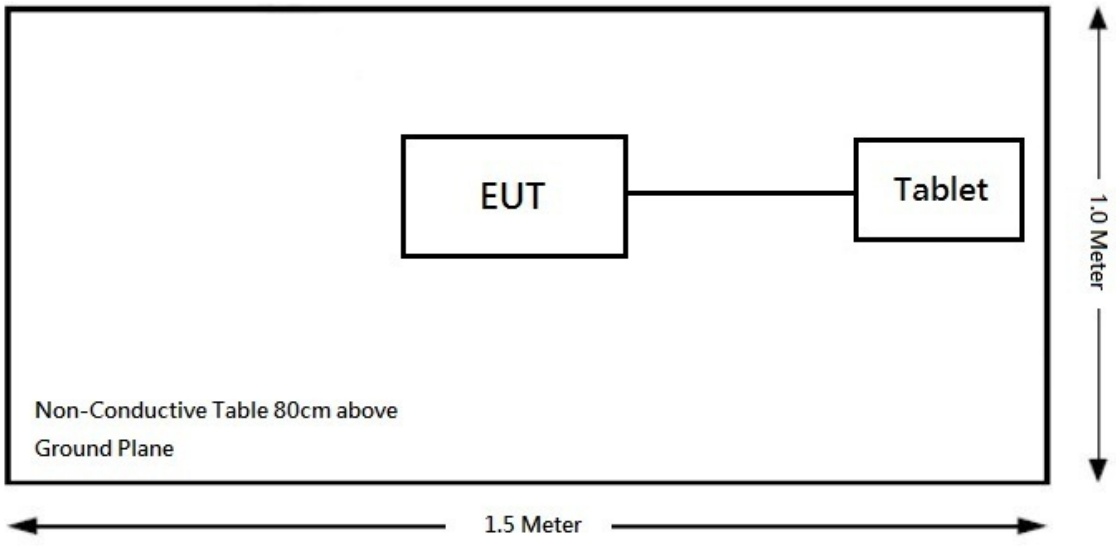
Cable Description	Length (m)	From	To
Micro USB Cable	1.5	NB	EUT

2.6 Block Diagram of Test Setup

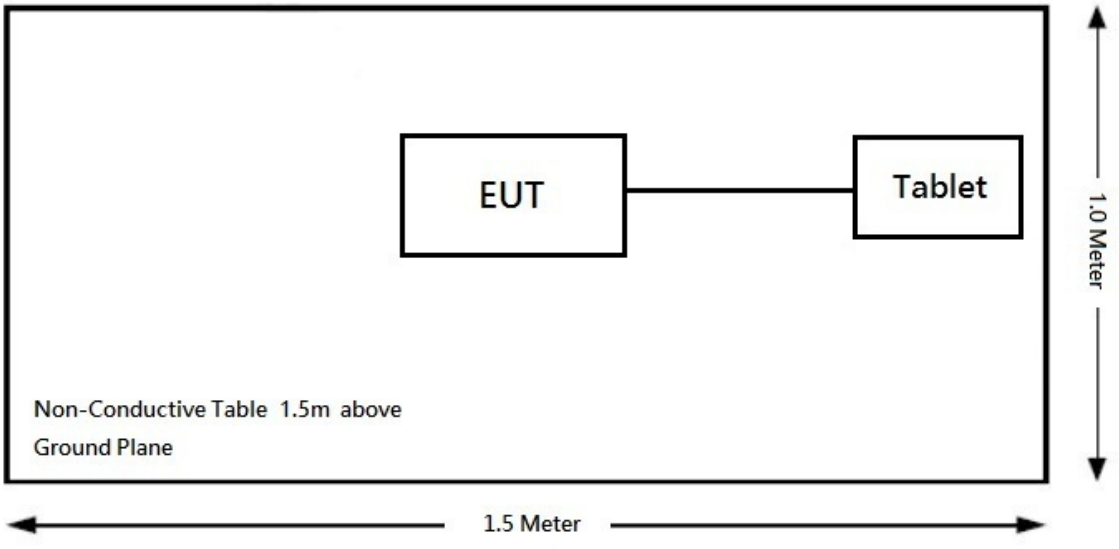
See test photographs attached in Exhibit A for the actual connections between EUT and support equipment.

Radiation:

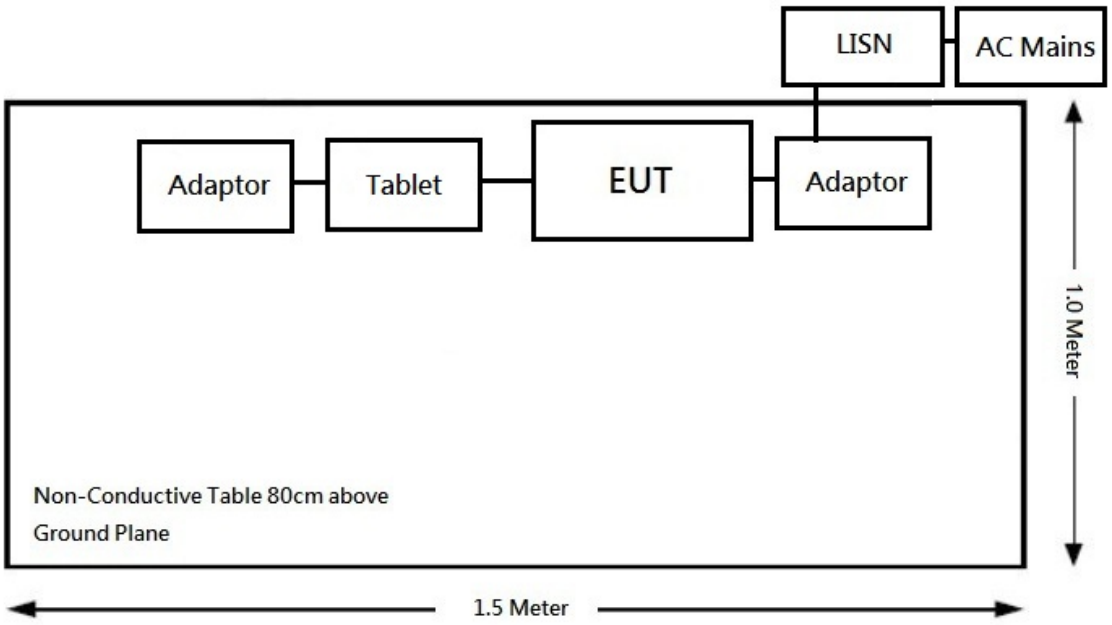
Below 1GHz:



Above 1GHz:



Conduction:


LISN
AC Mains
Adaptor
Tablet
EUT
Adaptor
1.0 Meter
Non-Conductive Table 80cm above
Ground Plane
1.5 Meter

2.7 Duty Cycle

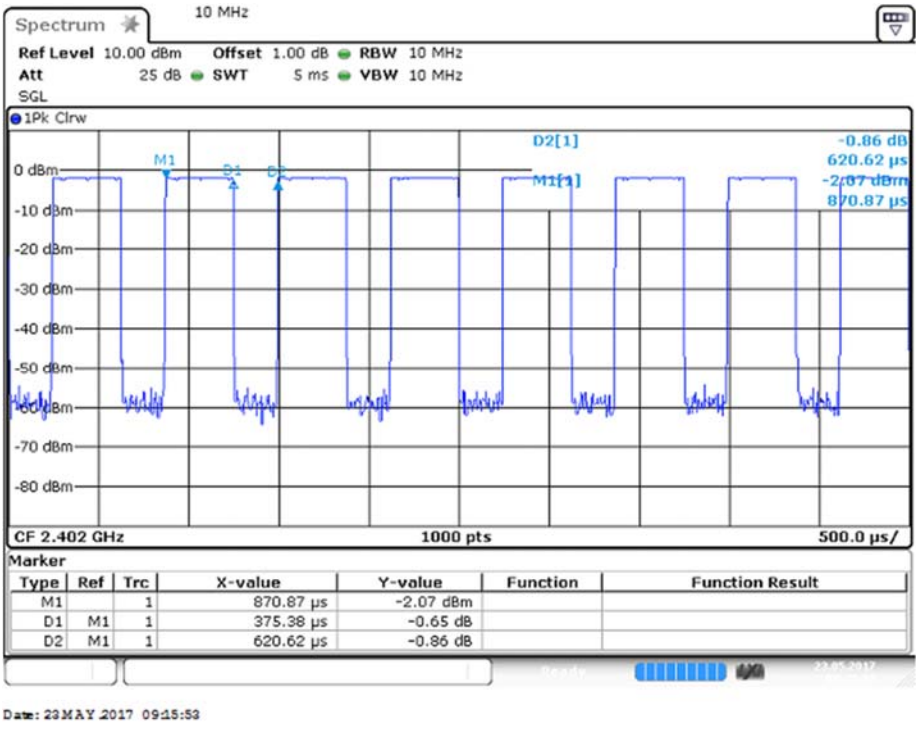
According to KDB 558074 D01 DTS Meas Guidance v04 section 6.0:

All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximumpower transmission duration, T, are required for each tested mode of operation.

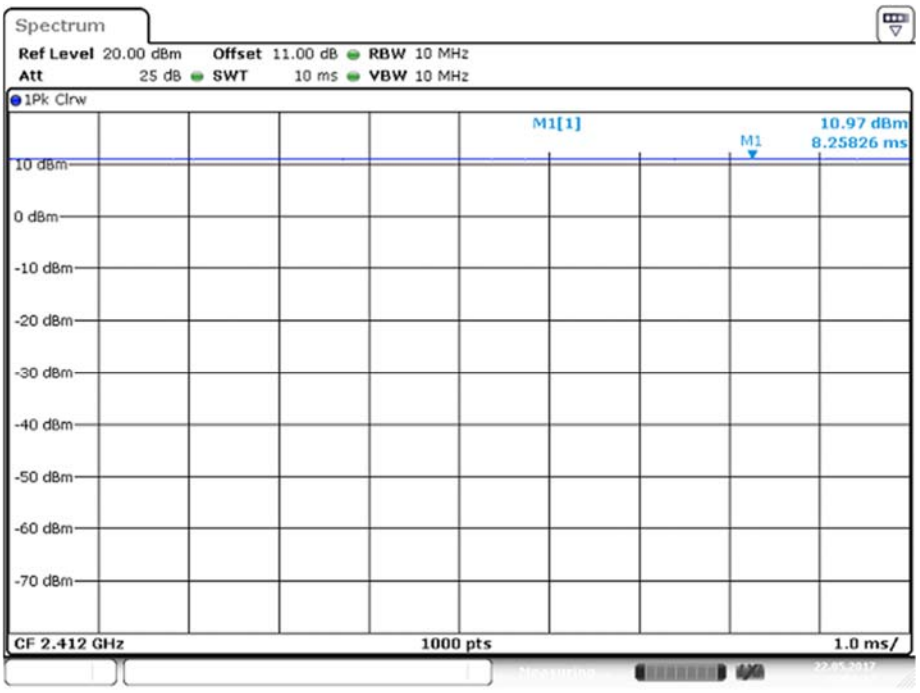
Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
BLE	0.375	0.620	60	2.22
802.11b	10	10	100	0
802.11g	10	10	100	0
802.11n20	10	10	100	0
802.11n40	10	10	100	0

Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

BLE Mode



B Mode



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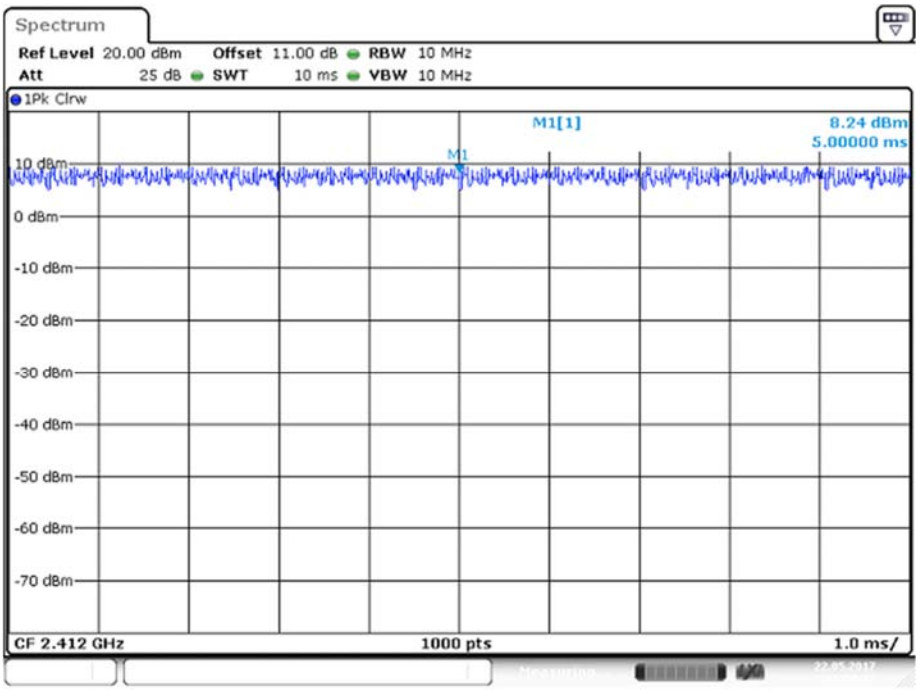
G Mode



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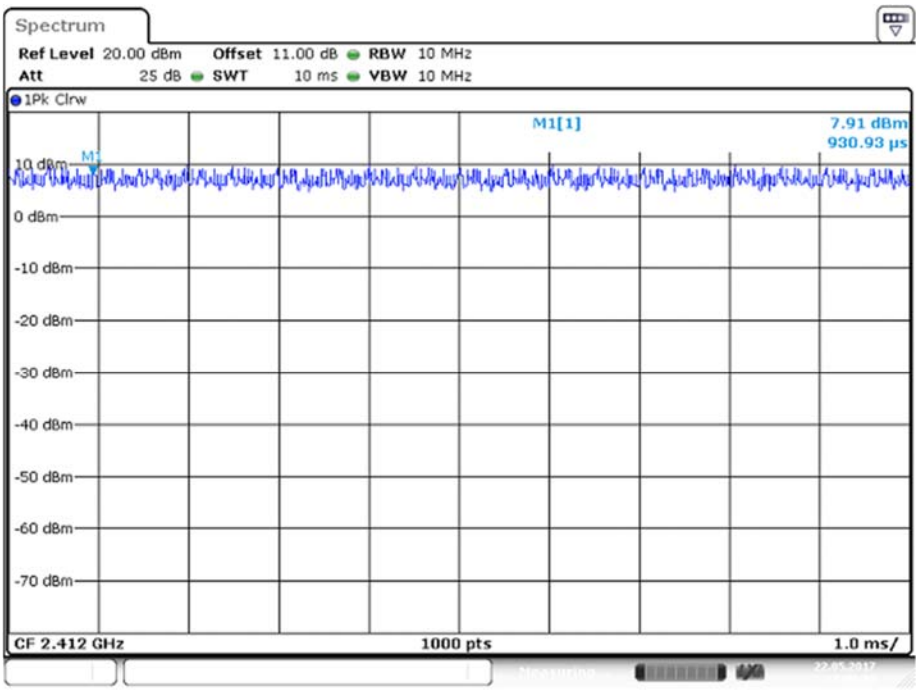
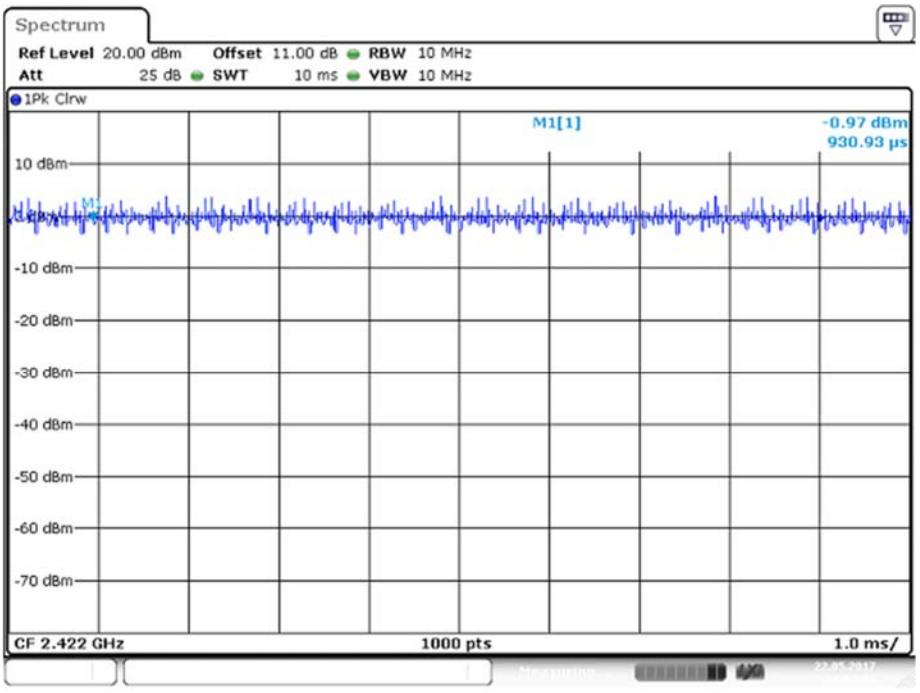
N20 Mode



N40 Mode



3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance*
§15.207(a)	AC Line Conducted Emissions	Compliance*
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance*
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance*
§15.247(b)(3)	Maximum Peak Output Power	Compliance*
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance*
§15.247(e)	Power Spectral Density	Compliance*

Note:
Compliance*: Refer to RTWA170511001-00A Report with FCC ID: PX9M700MT6625.

4 FCC §15.247(i), §2.1093 - RF EXPOSURE

4.1 Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v06
The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·
[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

4.2 Measurement Result

For WiFi Mode:

Please refer to the SAR report, report No.: RTWA170511001-23A.

For BLE Mode:

Frequency (MHz)	Tunp-up Power		Evaluation Distrance (mm)	SAR Excluion Result	Extremity SAR Exclusion Limit (1g SAR)
	(dBm)	(mW)			
2480	-1	0.794	5	0.3	3

So the stand-alone SAR evaluation for BLE is not necessary.

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