FCC RF Test Report

APPLICANT : Vantiva USA LLC

EQUIPMENT: DOCSIS 3.1

BRAND NAME : Vantiva

MODEL NAME : CGM4981COM2

FCC ID : G954981X2

STANDARD : 47 CFR Part 15 Subpart C §15.247 CLASSIFICATION : (DTS) Digital Transmission System

TEST DATE(S) : Nov. 28, 2023 ~ Dec. 05, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

JasonJia

Approved by: Jason Jia





Report No.: FR391301B

Sporton International Inc. (Kunshan)

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

Sporton International Inc. (Kunshan)

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR391301B	Rev. 01	Initial issue of report	Dec. 18, 2023

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report Only	-
3.2	15.247(b)(3)	Output Power	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges and Spurious Emission	≤ 20dBc	Pass	-
3.5	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.17 dB at 9330.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 19.13 dB at 2.736 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Conformity Assessment Condition:

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

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The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits
or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of
non-compliance that may potentially occur if measurement uncertainty is taken into account.

^{2.} The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

1 General Description

1.1 Applicant

Vantiva USA LLC

4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

1.2 Manufacturer

Vantiva USA LLC

4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

1.3 Product Feature of Equipment Under Test

Product Feature				
Equipment	DOCSIS 3.1			
Brand Name	Vantiva			
Model Name	CGM4981COM2			
FCC ID	G954981X2			
HW Version	FGR1			
SW Version	6.2p30s1			
EUT Stage	Identical Prototype			

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification			
Tx/Rx Frequency Range	2405 MHz ~ 2480 MHz		
Number of Channels	16		
Channel Spacing	5 MHz		
Carrier Frequency of Each Channel	2405 MHz, 2410MHz,, 2480MHz		
Maximum Output Power to Antenna	20.35 dBm (0.1084 W)		
Antenna Type / Gain	PCB Antenna with gain 5.26 dBi		
Type of Modulation	O-QPSK		

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

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1.6 Specification of Accessory

Specification of Accessory					
AC Adapter 1	Brand Name	Netbit	Model Name	NBC56A120460VU	
AC Adapter 2	Brand Name	Netbit	Model Name	NBC56B120460VU	
AC Adapter 3	Brand Name	Acbel	Model Name	ADK002	

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)				
Test Site Location No. 1098, Pengxi North Road, Kunshar Jiangsu Province 215300 People's Rep TEL: +86-512-57900158					
	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.		
Test Site No.	CO01-KS 03CH06-KS TH01-KS	CN1257	314309		

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH06-KS	AUDIX	E3	210616
3.	CO01-KS	AUDIX	E3	6.2009-8-24

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05
- ANSI C63.10-2013

Remark:

- All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

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2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	11	2405	19	2445
	12	2410	20	2450
	13	2415	21	2455
2400-2483.5 MHz	14	2420	22	2460
2400-2403.3 IVITZ	15	2425	23	2465
	16	2430	24	2470
	17	2435	25	2475
	18	2440	26	2480

2.2 Test Mode

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z, and Wall installation plane. The worst cases (Wall installation plane, the wall is non-metal panels) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

	Summary table of Test Cases				
Took Itom	Data Rate / Modulation				
Test Item	250kbps / Zigbee				
Conducted TCs	Mode 1: Zigbee Tx CH11_2405 MHz Mode 2: Zigbee Tx CH19_2445 MHz Mode 3: Zigbee Tx CH25_2475 MHz Mode 4: Zigbee Tx CH26_2480 MHz				
Radiated TCs	Mode 1: Zigbee Tx CH11_2405 MHz Mode 2: Zigbee Tx CH19_2445 MHz Mode 3: Zigbee Tx CH25_2475 MHz Mode 4: Zigbee Tx CH26_2480 MHz				
AC Conducted Emission	Mode 1: ZigBee Tx + WLAN Tx(2.4G) + BLE Tx + Power from Adapter				
Remark: For R	Remark: For Radiated TCs, the tests were performance with Adapter and RJ45/RJ11/Coaxial Cable.				

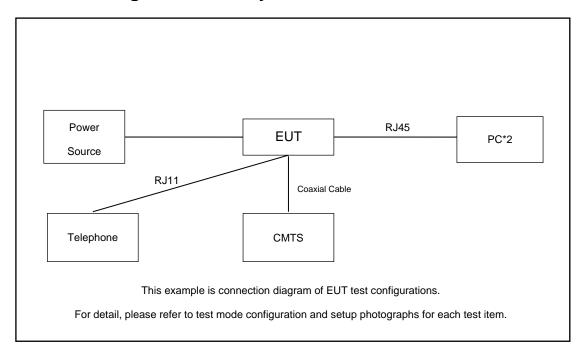
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2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	PC	Lenovo	Yangtian M4900c	Fcc DoC	N/A	Unshielded,1.8m
2.	(USB)Mouse	Lenovo	OEUUOA	Fcc DoC	Shielded, 1.8m	N/A
3.	(USB)Keyboard	Lenovo	SK-8821	Fcc DoC	Shielded, 1.8m	N/A
4.	Monitor	Lenovo	LS2033wA	Fcc DoC	N/A	Unshielded,1.8m
5.	PC	Dell	D12M	Fcc DoC	N/A	Unshielded,1.8m
6.	(USB)Mouse	Dell	MS111-P	Fcc DoC	Shielded, 1.8m	N/A
7.	(USB)Keyboard	Dell	SK-8120	Fcc DoC	Shielded, 1.8m	N/A
8.	Telephone	bubugao	HCD007(6082)TSD	N/A	N/A	N/A
9.	RJ45 Cable	N/A	N/A	N/A	N/A	N/A
10.	RJ11 Cable	N/A	N/A	N/A	N/A	N/A
11.	CMTS	TOPISION	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For ZigBee function, the engineering test program was provided and enabled to make EUT continuous transmit.

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2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.30 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
=
$$2.30 + 10 = 12.30$$
 (dB)

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3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

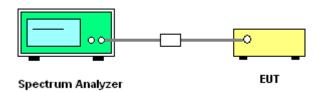
3.1.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.1.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 11.8
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
- 5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 30kHz and set the Video bandwidth (VBW) = 100kHz.
- 6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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3.2 Output Power Measurement

3.2.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

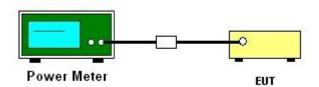
3.2.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.2.3 Test Procedures

- The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1
 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

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3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

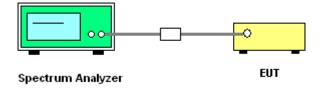
3.3.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.3.3 Test Procedures

- The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
- 5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
- 6. Measure and record the results in the test report.
- 7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

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3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

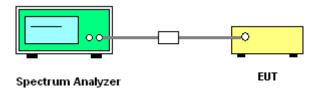
3.4.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.4.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 11.13
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
- 5. Measure and record the results in the test report.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



3.4.5 Test Result of Conducted Band Edges Plots

Please refer to Appendix A.

3.4.6 Test Result of Conducted Spurious Emission Plots

Please refer to Appendix A.

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3.5 Spurious Emission Measurement in the Restricted Band

3.5.1 Limit of Spurious Emission Measurement in the Restricted Band

Emissions which fall in the restricted bands must also comply with the limits as below.

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.5.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

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3.5.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
- 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
- 3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 5. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 6. For conducted spurious emission measurement in the restricted band, the RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 7. For measurement below 1GHz, if the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- 8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \ge 1$ GHz for peak measurement. For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

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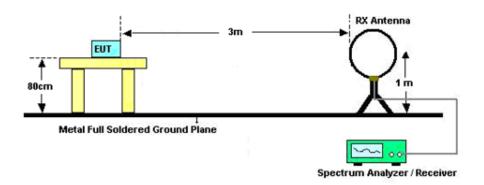
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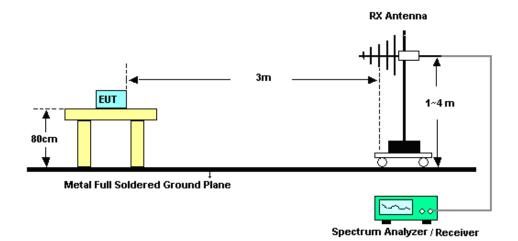
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3.5.4 Test Setup

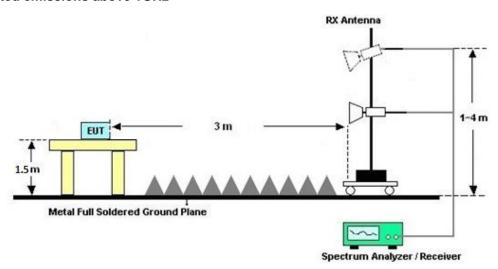
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

3.5.6 Test Results of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Test Result of Cabinet Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.

3.5.8 Duty Cycle

Please refer to Appendix D.

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3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MUz)	Conducted limit (dBμV)				
Frequency of emission (MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			

^{*}Decreases with the logarithm of the frequency.

3.6.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.6.3 Test Procedures

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- 8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

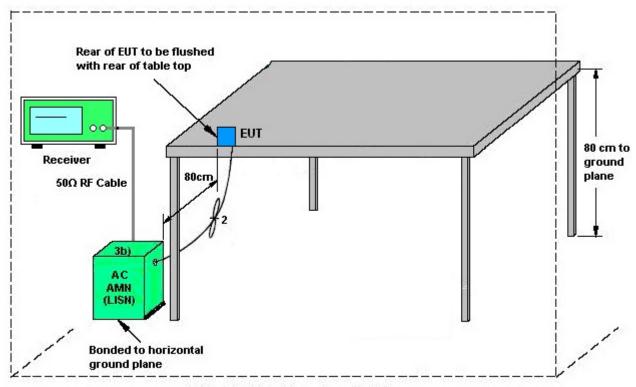
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3.6.4 Test Setup



AMN = Artificial mains network (LISN)

AE = Associated equipment

EUT = Equipment under test

ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

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3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

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List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Dec 05, 2023	Oct. 10, 2024	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GH z	Jan. 05, 2023	Dec 05, 2023	Jan. 04, 2024	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2023	Dec 05, 2023	Jan. 04, 2024	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY564000 04	3Hz~8.5GHz;M ax 30dBm	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY602421 26	10Hz-44GHz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	Apr. 09, 2023	Nov. 28, 2023	Apr. 08, 2024	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 06, 2023	Nov. 28, 2023	Apr. 05, 2024	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Jan. 08, 2023	Nov. 28, 2023	Jan. 07, 2024	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	380827	9KHz ~1GHZ	Jul. 06, 2023	Nov. 28, 2023	Jul. 05, 2024	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 05, 2023	Nov. 28, 2023	Jan. 04, 2024	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2082395	1Ghz-18Ghz	Jan. 05, 2023	Nov. 28, 2023	Jan. 04, 2024	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY532703 19	500MHz~26.5G Hz	Oct. 10, 2023	Nov. 28, 2023	Oct. 09, 2024	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Nov. 28, 2023	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 28, 2023	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 28, 2023	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 16, 2023	Dec. 01, 2023	May 15, 2024	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 11, 2023	Dec. 01, 2023	Oct. 10, 2024	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 16, 2023	Dec. 01, 2023	May 15, 2024	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 11, 2023	Dec. 01, 2023	Oct. 10, 2024	Conduction (CO01-KS)

NCR: No Calibration Required

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5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Conducted Spurious Emission & Bandedge	±2.26 dB
Occupied Channel Bandwidth	±0.1%
Conducted Power	±0.46 dB
Conducted Power Spectral Denstiy	±0.88 dB
Frequency	±0.4 Hz

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence	2.94dB
of 95% (U = 2Uc(y))	2.9406

<u>Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)</u>

Measuring Uncertainty for a Level of Confidence	0.00 ID
of 95% (U = 2Uc(y))	3.32dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence	6.26dB
of 95% (U = 2Uc(y))	0.20dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence	= aa !=
1	5.02dB
of 95% (U = 2Uc(y))	

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence	5,26dB	
of 95% (U = 2Uc(y))	5.20 0 B	

----- THE END -----

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Appendix A. Conducted Test Results

Sporton International Inc. (Kunshan)TEL: +86-512-57900158

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 Ambient Condition: 25 ℃, 45 %RH

 Test Date: 2023/12/05
 Test Engineer: Jiang Jun

DTS Bandwidth

Test Result

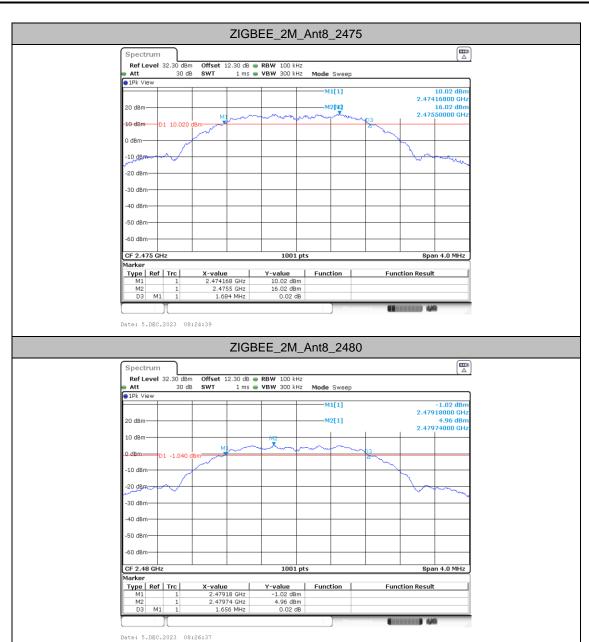
TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
ZIGBEE_2M		2405	1.66	2404.18	2405.84	0.5	PASS
	Ant8	2445	1.65	2444.18	2445.83	0.5	PASS
		2475	1.68	2474.17	2475.85	0.5	PASS
		2480	1.66	2479.18	2480.84	0.5	PASS

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Test Graphs



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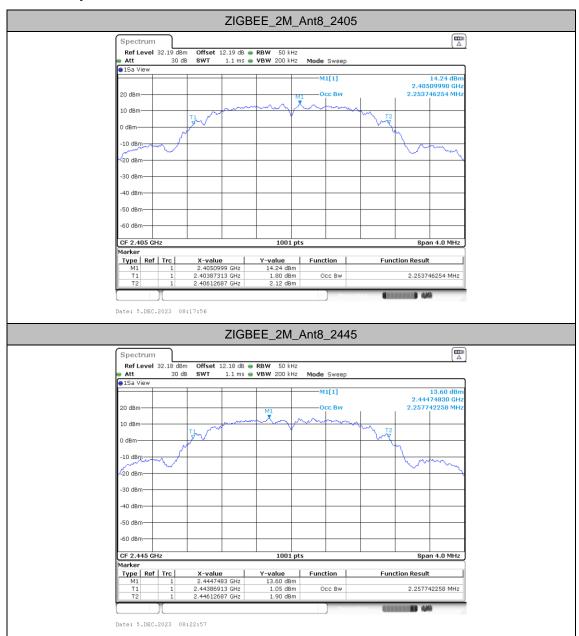
Occupied Channel Bandwidth

Test Result

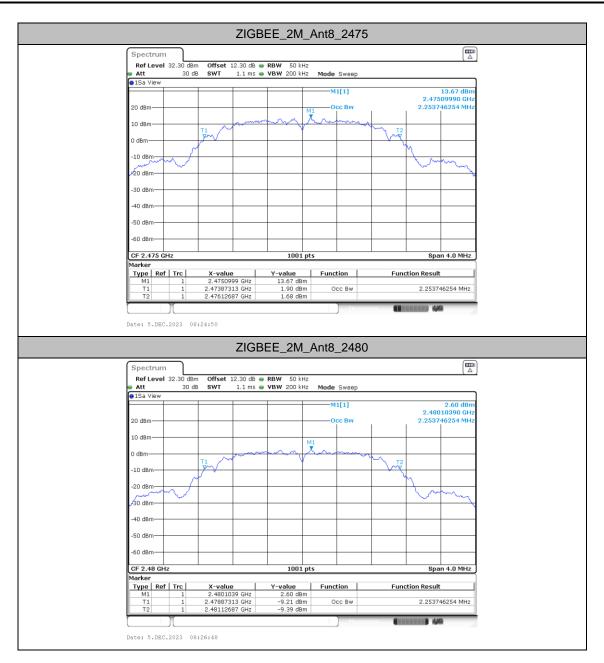
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
ZIGBEE_2M Ant8		2405	2.254	2403.8731	2406.1269		
	A n+O	2445	2.258	2443.8691	2446.1269		
	Anto	2475	2.254	2473.8731	2476.1269		
		2480	2.254	2478.8731	2481.1269		

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Test Graphs



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Maximum conducted output power

Test Result Peak

TestMode	Antenna	CH.	Setting	Peak Conducted Power (dBm)	Conducted Power Limit	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit	Pass/Fail
		11	0	20.35	30.00	5.26	25.61	36.00	Pass
Zighaa	Ant8	19	0	20.08	30.00	5.26	25.34	36.00	Pass
Zigbee Ar	Anto	25	0	19.88	30.00	5.26	25.14	36.00	Pass
		26	-8	7.90	30.00	5.26	13.16	36.00	Pass

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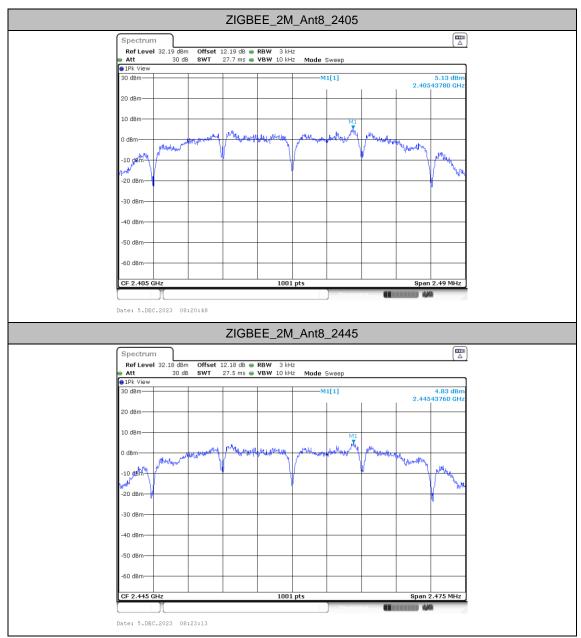
Maximum power spectral density

Test Result

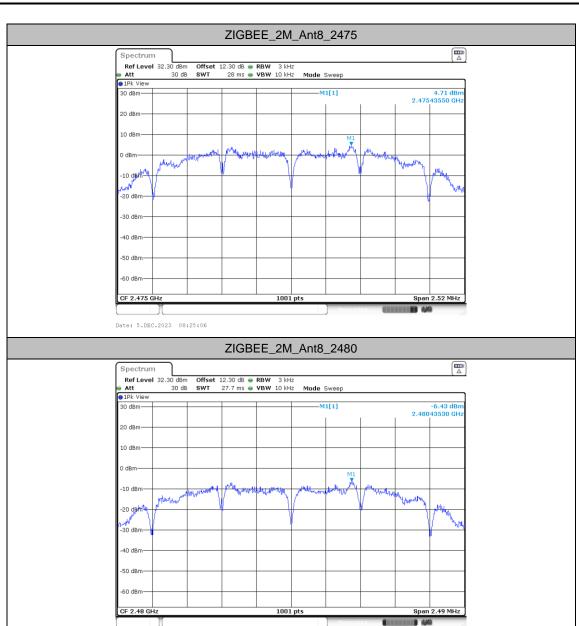
TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
		2405	5.13	≤8.00	PASS
ZIGBEE_2M Ant8	Λn+O	2445	4.83	≤8.00	PASS
	2475	4.71	≤8.00	PASS	
	2480	-6.43	≤8.00	PASS	

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Test Graphs



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Date: 5.DEC.2023 08:27:04

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Reference level measurement

Test Result

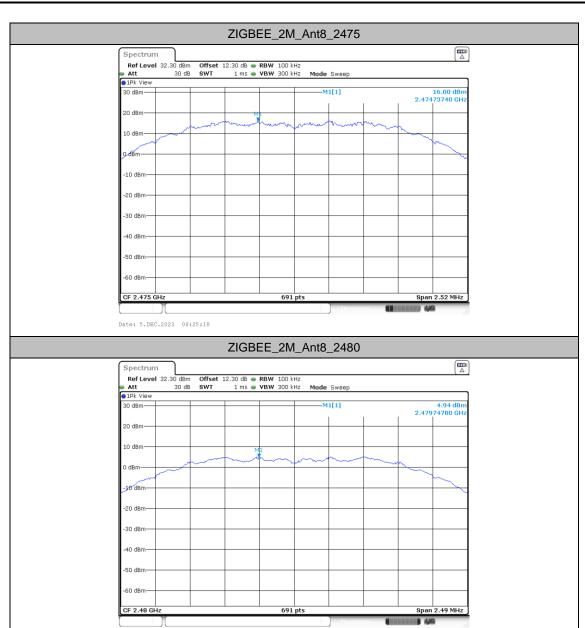
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm/100KHz]
ZIGBEE_2M	Ant8	2405	2404.74	16.52
		2445	2444.74	16.34
		2475	2474.74	16.00
		2480	2479.75	4.94

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Test Graphs



TEL: +86-512-57900158 FCC ID: G954981X2 : A12 of A21



Date: 5.DEC.2023 08:27:16

TEL: +86-512-57900158 FCC ID: G954981X2

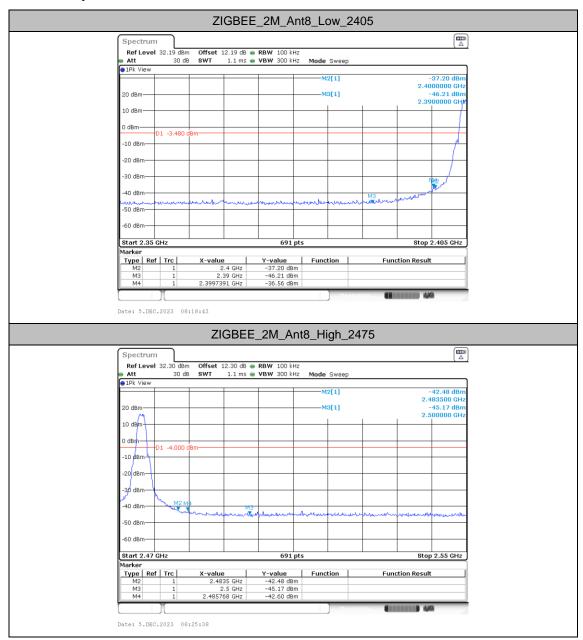
Band edge measurements

Test Result

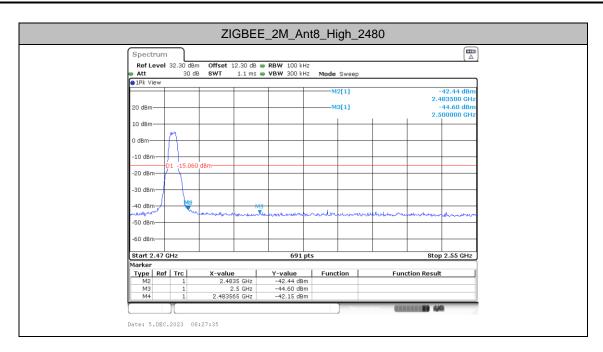
TestMode	Antonno	Antenna	Antonno	Antonno	Antonno	ChName	Freq	RefLevel	Result	Limit	Verdict
restivioue	Antenna	Cilivaille	(MHz)	[dBm/100KHz]	[dBm/100KHz]	[dBm/100KHz]	verdict				
		Low	2405	16.52	-36.56	≤-3.48	PASS				
ZIGBEE_2M	Ant8	Lliab	2475	16.00	-42.6	≤-4	PASS				
		High	2480	4.94	-42.15	≤-15.06	PASS				

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Test Graphs



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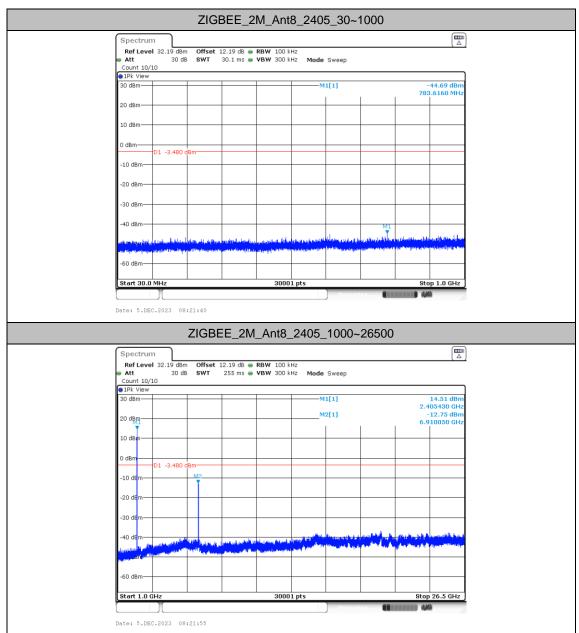
Conducted Spurious Emission

Test Result

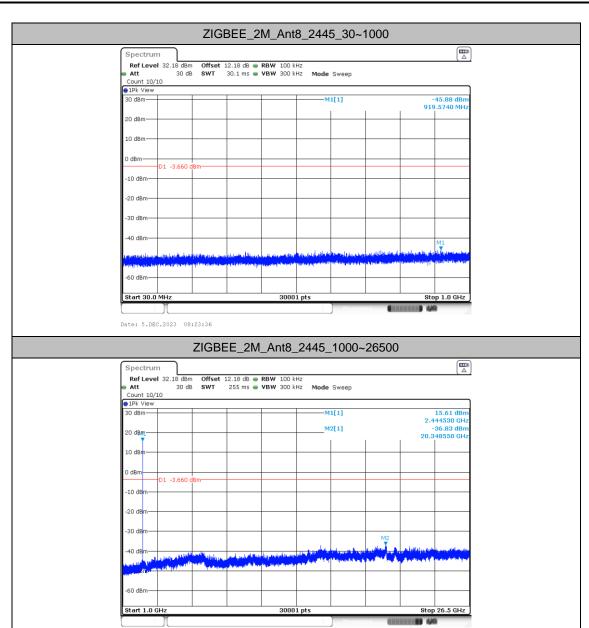
TestMode	Antonno		FreqRange	RefLevel	Result	Limit	Verdict
restiviode	Antenna	Freq(MHz)	[MHz] [dBm/100KHz] [dBm/100KHz] [dBm/1		[dBm/100KHz]	Verdict	
		2405	30~1000	16.52	-44.69	≤-3.48	PASS
		2405	1000~26500	16.52	-12.75	≤-3.48	PASS
	A ==40	2445	30~1000	16.34	-45.88	≤-3.66	PASS
ZIGBEE 2M			1000~26500	16.34	-36.83	≤-3.66	PASS
ZIGBEE_ZIVI	Ant8	2475	30~1000	16.00	-44.76	≤-4	PASS
		2475	1000~26500	16.00	-36.32	≤-4	PASS
		2480	30~1000	4.94	-45.58	≤-15.06	PASS
			1000~26500	4.94	-36.66	≤-15.06	PASS

TEL: +86-512-57900158 FCC ID: G954981X2

Test Graphs

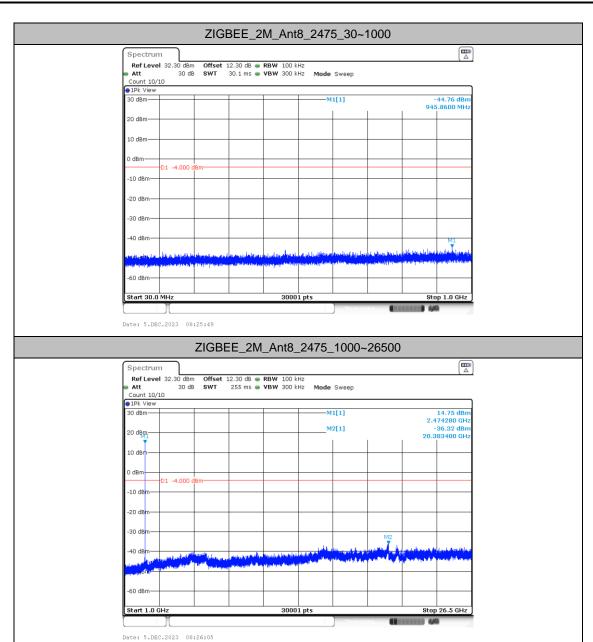


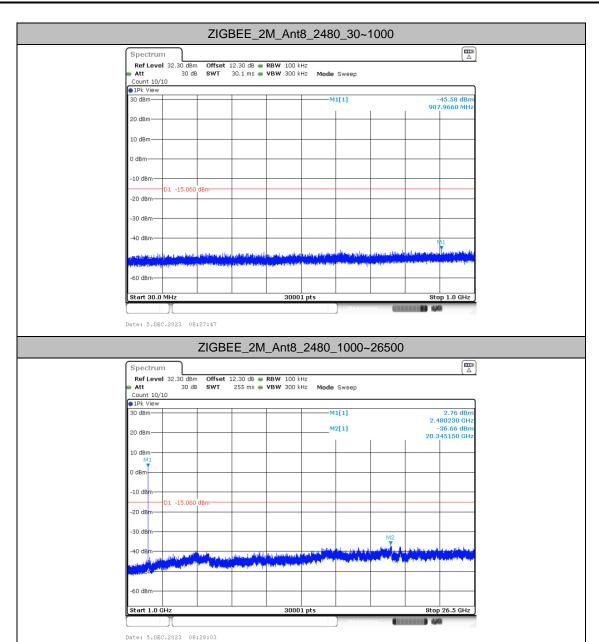
TEL: +86-512-57900158 FCC ID: G954981X2



Date: 5.DEC.2023 08:23:51

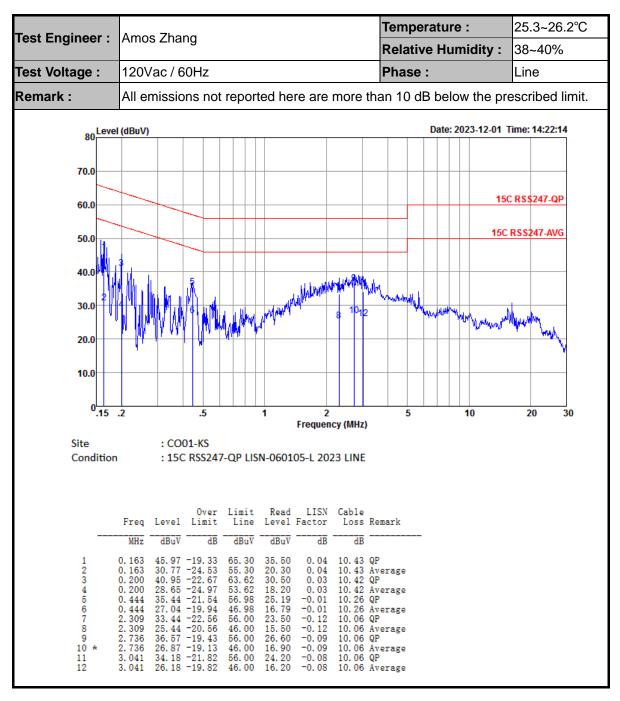
TEL: +86-512-57900158 FCC ID: G954981X2





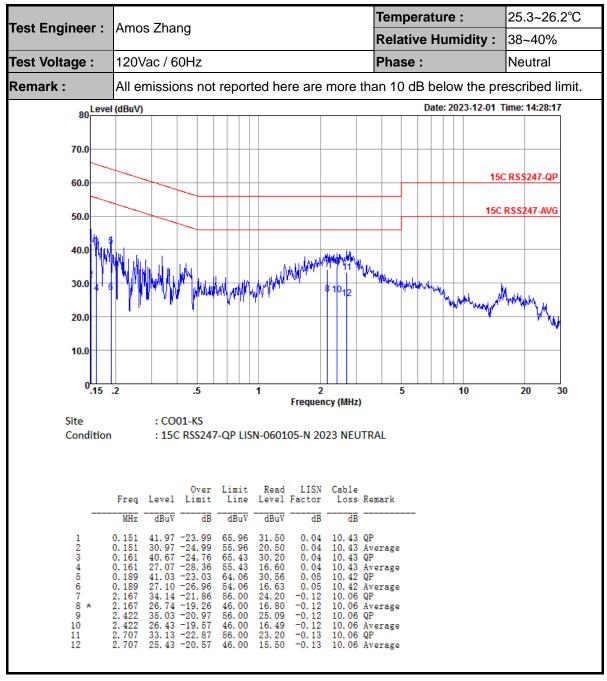
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Appendix B. AC Conducted Emission Test Results



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FCC RF Test Report



Note:

- 1. Level($dB\mu V$) = Read Level($dB\mu V$) + LISN Factor(dB) + Cable Loss(dB)
- 2. Over Limit(dB) = Level(dB μ V) Limit Line(dB μ V)

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Appendix C. Radiated Spurious Emission

Test Engineer :	Ryan Xu	Relative Humidity :	41~42%	
rest Engineer.	Ryan Au	Temperature :	22~23℃	

Report No.: FR391301B

Radiated Spurious Emission Test Modes

Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 25	2400-2483.5	8	ZIGBEE	11	2405	250kbps	-	-
Mode 26	2400-2483.5	8	ZIGBEE	19	2445	250kbps	-	-
Mode 27	2400-2483.5	8	ZIGBEE	26	2480	250kbps	-	-
Mode 32	2400-2483.5	8	ZIGBEE	25	2475	250kbps	-	-

Summary of each worse mode

Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
25	ZIGBEE	11	2366.16	46.96	54.00	-7.04	Н	AVERAGE	Pass	Band Edge
25	ZIGBEE	11	9330.00	51.32	54.00	-2.68	V	AVERAGE	Pass	Harmonic
26	ZIGBEE	19	2484.10	44.58	54.00	-9.42	Н	AVERAGE	Pass	Band Edge
20	ZIGBEE	19	9330.00	51.49	54.00	-2.51	Н	AVERAGE	Pass	Harmonic
27	ZIGBEE	26	2483.50	52.47	54.00	-1.53	V	AVERAGE	Pass	Band Edge
21	ZIGBEE	26	9330.00	51.55	54.00	-2.45	V	AVERAGE	Pass	Harmonic
32	ZIGBEE	25	2483.50	49.13	54.00	-4.87	Н	AVERAGE	Pass	Band Edge
32	ZIGBEE	25	9330.00	52.83	54.00	-1.17	V	AVERAGE	Pass	Harmonic
32	ZIGBEE	25	399.57	30.92	46.00	-15.08	Н	PEAK	Pass	LF

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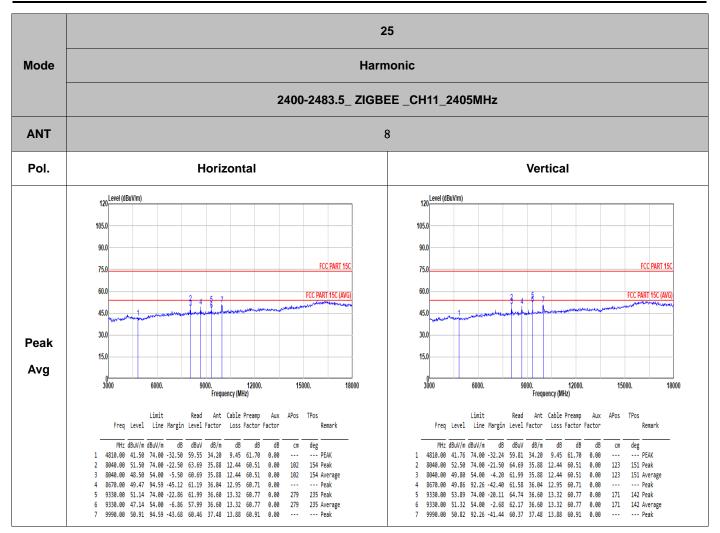
TEL: +86-512-57900158 FCC ID: G954981X2

25 **Band Edge** Mode 2400-2483.5_ ZIGBEE _CH11_2405MHz **ANT** 8 Pol. Horizontal **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 FCC PART 150 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2336. 2414. 1400. 1800. 2600. 3000 2388. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2366.29 57.67 74.00 -16.33 46.27 31.73 6.57 32.90 6.00 1 2405.00 120.06 ----- 108.02 32.24 6.63 32.83 6.00 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 81.3 81.3 65.0 65.0 48.8 48.8 Avg 32.5 32.5 16.3 16.3 1000 2336. 2440 1400. 3000 2388. 1800. 2200. Frequency (MHz) Frequency (MHz) Limit Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2366.16 46.96 54.00 -7.04 35.56 31.73 6.57 32.90 6.00 111 360 AVERAGE 1 2405.00 116.65 ----- 104.61 32.24 6.63 32.83 6.00 111 360 AVERAGE

TEL: +86-512-57900158 FCC ID: G954981X2

25 **Band Edge** Mode 2400-2483.5_ ZIGBEE _CH11_2405MHz **ANT** 8 Pol. Vertical **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 FCC PART 150 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2336. 2414. 1400. 1800. 2600. 3000 2388. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2389.82 56.11 74.00 -17.89 44.31 32.06 6.60 32.86 6.00 1 2405.00 117.36 ----- 105.32 32.24 6.63 32.83 6.00 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 81.3 81.3 65.0 65.0 48.8 48.8 Avg 32.5 32.5 16.3 16.3 1000 2336. 2440 1400. 3000 2388. 1800. 2200. Frequency (MHz) Frequency (MHz) Limit Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2366.03 44.53 54.00 -9.47 33.14 31.72 6.57 32.90 6.00 296 47 AVERAGE 1 2405.00 113.88 ----- 101.84 32.24 6.63 32.83 6.00 296 47 AVERAGE

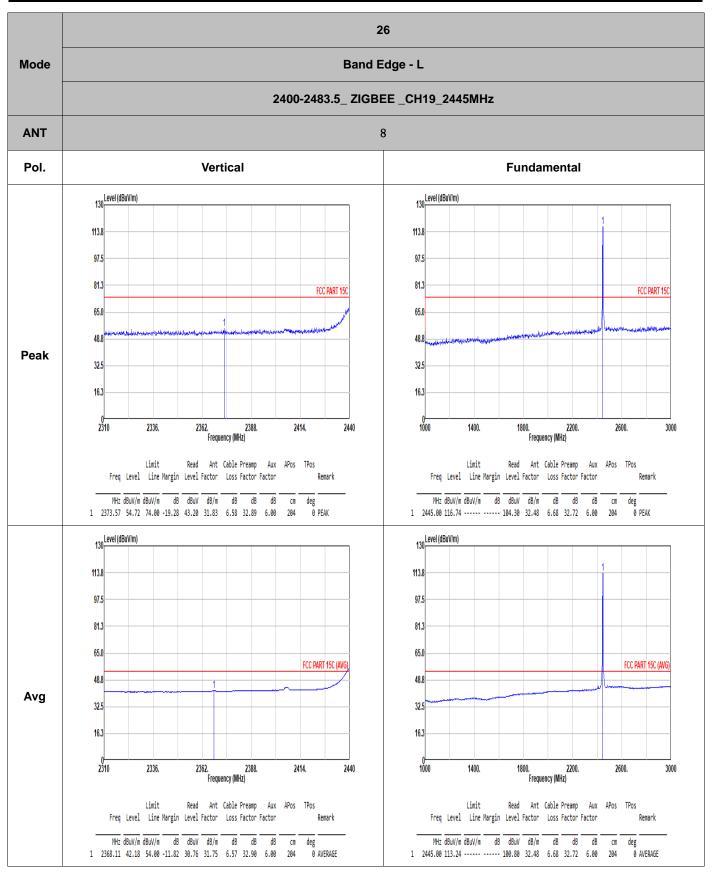
TEL: +86-512-57900158 FCC ID: G954981X2



26 Band Edge - L Mode 2400-2483.5_ ZIGBEE _CH19_2445MHz **ANT** 8 Pol. Horizontal **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 FCC PART 15 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2336. 1400. 2600. 2388. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2367.59 54.63 74.00 -19.37 43.21 31.75 6.57 32.90 6.00 1 2445.00 117.75 ----- 105.31 32.48 6.68 32.72 6.00 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 81.3 81.3 65.0 65.0 48.8 48.8 Avg 32.5 32.5 16.3 16.3 1000 2336. 2440 3000 2388. 1800. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Limit Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2367.85 42.79 54.00 -11.21 31.37 31.75 6.57 32.90 6.00 100 349 AVERAGE 1 2445.00 114.26 ----- 101.82 32.48 6.68 32.72 6.00 100 349 AVERAGE

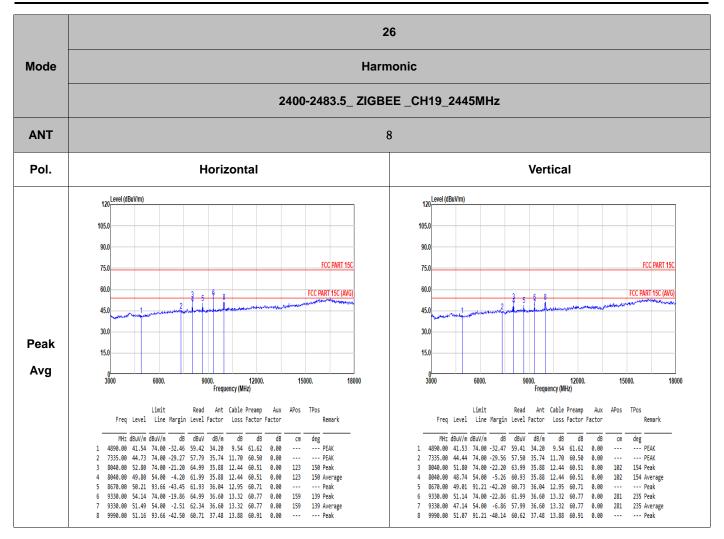
TEL: +86-512-57900158 FCC ID: G954981X2

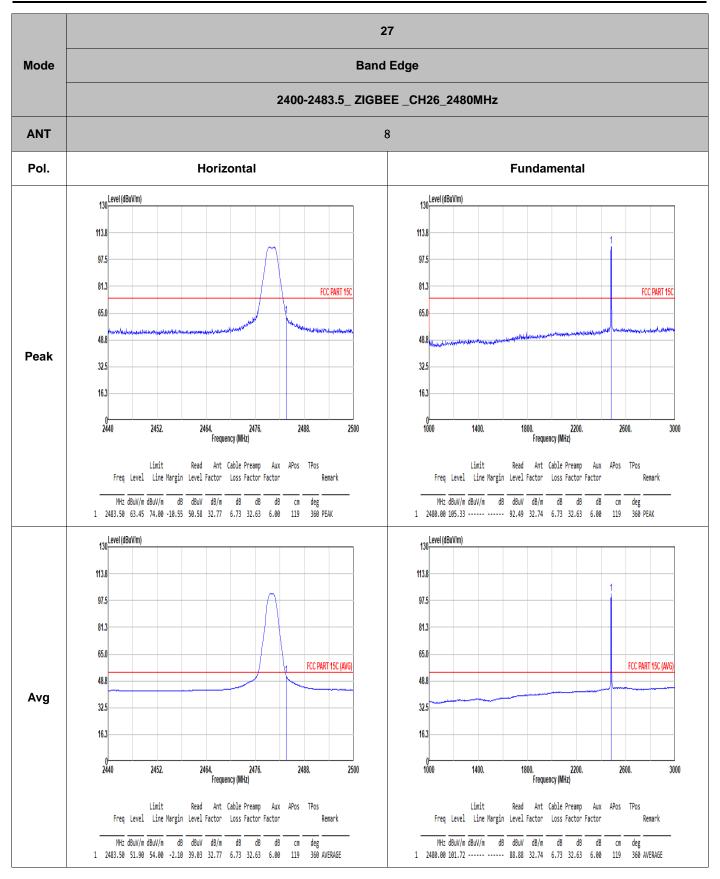
	26							
Mode	Band Edge - R							
	2400-2483.5_ ZIGBEE _CH19_2445MHz							
ANT	8							
Pol.	Horizontal	Fundamental						
Peak	130 evel (dBuV/m) 138 FCC PART 15C 16.3 FCC PART 15C 16.3 Frequency (MHz) Frequency (M	Blank						
Avg	13.8 97.5 81.3 65.0 248.0 2476. 2488. 2500 Frequency (MHz) Limit Freq Level Line Margin Level Factor Level Factor Level Factor Limit Read Ant Cable Preamp Aux APos TPos Remark MHz MHz MHz MHz MHz MHz MHz MH	Blank						

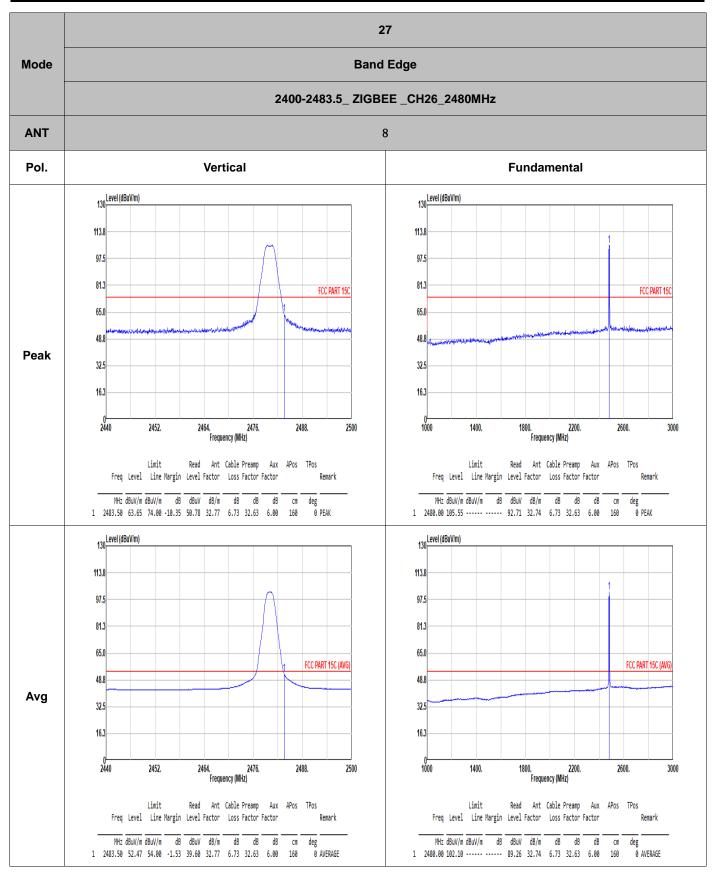


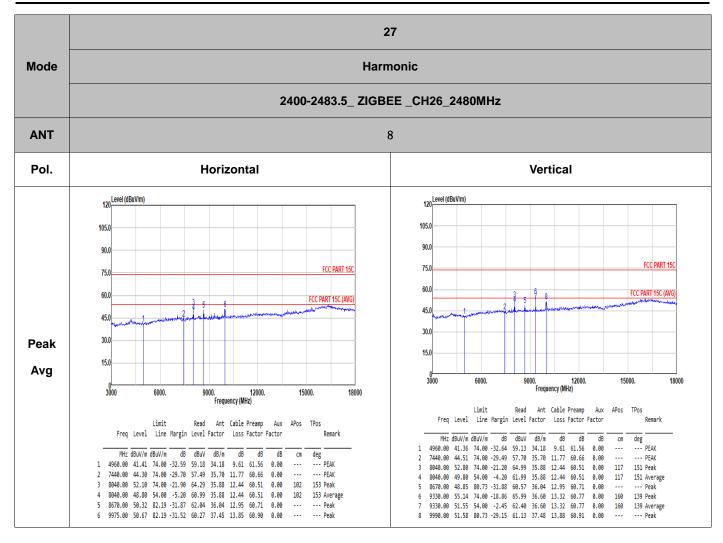
26 Mode Band Edge - R 2400-2483.5_ ZIGBEE _CH19_2445MHz **ANT** 8 Pol. Vertical **Fundamental** 130 Level (dBuV/m) 113.8 97.5 81.3 FCC PART 150 65.0 48.8 **Peak Blank** 32.5 16.3 2452. 2476. 2488. 2500 Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2486.08 56.04 74.00 -17.96 43.13 32.79 6.74 32.62 6.00 130 Level (dBuV/m) 113.8 81.3 65.0 48.8 Avg **Blank** 32.5 16.3 7. 2476. Frequency (MHz) 2440 2452. 2500 Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2484.16 44.54 54.00 -9.46 31.66 32.77 6.73 32.62 6.00 204 0 AVERAGE

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32 **Band Edge** Mode 2400-2483.5_ ZIGBEE _CH25_2475MHz **ANT** 8 Pol. Horizontal **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 FCC PART 150 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2452. 1400. 1800. 2600. 2476. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2483.74 61.52 74.00 -12.48 48.64 32.77 6.73 32.62 6.00 1 2475.00 118.10 ----- 105.32 32.71 6.72 32.65 6.00 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 81.3 81.3 65.0 65.0 FCC PART 15C (AVG 48.8 48.8 Avg 32.5 32.5 16.3 16.3 2440 1000 2452. 3000 2464. 2476. 1800. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Limit Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2483.50 49.13 54.00 -4.87 36.26 32.77 6.73 32.63 6.00 100 335 AVERAGE 1 2475.00 114.10 ----- 101.32 32.71 6.72 32.65 6.00 100 335 AVERAGE

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32 **Band Edge** Mode 2400-2483.5_ ZIGBEE _CH25_2475MHz **ANT** 8 Pol. Vertical **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 FCC PART 150 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2452. 2488. 1400. 1800. 2600. 3000 2476. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg cm deg 1 2483.50 59.79 74.00 -14.21 46.92 32.77 6.73 32.63 6.00 1 2475.00 114.79 ----- 102.03 32.69 6.72 32.65 6.00 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 81.3 81.3 65.0 65.0 FCC PART 15C (AVG 48.8 48.8 Avg 32.5 32.5 16.3 16.3 2440 1000 2452. 3000 2464. 2476. 1800. 2200. Frequency (MHz) Frequency (MHz) Read Ant Cable Preamp Aux APos TPos Limit Read Ant Cable Preamp Aux APos TPos Limit Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 1 2483.50 47.61 54.00 -6.39 34.74 32.77 6.73 32.63 6.00 266 160 AVERAGE 1 2475.00 110.60 ----- 97.82 32.71 6.72 32.65 6.00 266 160 AVERAGE

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32 Mode **Harmonic** 2400-2483.5_ ZIGBEE _CH25_2475MHz **ANT** 8 Pol. Horizontal Vertical 120 Level (dBuV/m) 120 Level (dBuV/m) 105.0 105.0 90.0 90.0 FCC PART 150 FCC PART 15C 75.0 75.0 60.0 60.0 FCC PART 15C (AV FCC PART 15C (AV) 45.0 45.0 30.0 **Peak** 15.0 15.0 Avg 3000 6000. 9000. 12000. Frequency (MHz) 9000. 12000. Frequency (MHz) 18000 Ant Cable Preamp Limit Read Ant Cable Preamp Freq Level Line Margin Level Factor Loss Factor Factor Freq Level Line Margin Level Factor Loss Factor Factor Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB 4950.00 41.62 74.00 -32.38 59.39 34.20 9.60 61.57 0.00 MHz dBuV/m dBuV/m dB dBuV dB/m cm deg --- PEAK cm deg --- PEAK dB 4950.00 42.20 74.00 -31.80 59.97 34.20 9.60 61.57 0.00 7425.00 44.96 74.00 -29.04 58.14 35.70 11.76 60.64 8055.00 51.34 74.00 -22.66 63.52 35.90 12.44 60.52 7425.00 45.19 74.00 -28.81 58.37 35.70 11.76 60.64 0.00 8055.00 51.30 74.00 -22.70 63.48 35.90 12.44 60.52 0.00 0.00 --- PEAK --- PEAK 155 Peak 138 Peak 0.00 8855.00 50.19 54.00 -3.81 62.37 35.90 12.44 60.52 8670.00 48.59 89.84 -41.25 60.31 36.04 12.95 60.71 9330.00 53.93 74.00 -20.07 64.78 36.60 13.32 60.77 8055.00 50.48 54.00 -3.52 62.66 35.90 12.44 60.52 0.00 155 Average 138 Average 8670.00 49.03 92.76 -43.73 60.75 36.04 12.95 60.71 0.00 --- Peak 0.00 --- Peak 9330.00 49.86 74.00 -24.14 60.71 36.60 13.32 60.77 217 Peak 138 Peak 217 Average 9330.00 52.83 54.00 -1.17 63.68 36.60 13.32 60.77 9330.00 48.13 54.00 -5.87 58.98 36.60 13.32 60.77 0.00 300 0.00 138 Average 9960.00 51.33 92.76 -41.43 60.98 37.42 13.83 60.90 10005.00 51.22 89.84 -38.62 60.75 37.49 13.89 60.91 120 Level (dBuV/m) 120 Level (dBuV/m) 105.0 105.0 90.0 90.0 FCC PART 15C FCC PART 15C 75.0 60.0 60.0 FCC PART 15C (AVG 45.0 45.0 30.0 30.0 15.0 15.0 18000 19700. 24800. 25000 21400. 23100. 18000 19700. 24800. 21400. 25000 Frequency (MHz) Frequency (MHz)

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32 Mode LF 2400-2483.5_ ZIGBEE _CH25_2475MHz **ANT** 8 Pol. Horizontal Vertical 70.0 60.0 60.0 FCC PART 150 FCC PART 150 50.0 50.0 40.0 30.0 30.0 20.0 20.0 10.0 10.0 **Peak** QΡ -10.0 -10.0 200. 200. 400. 500. 600. 800. 400. 500. 600. Frequency (MHz) Frequency (MHz) A/Pos T/Pos Remark Over Limit ReadAntenna Cable Preamp A/Pos T/Pos Over Limit ReadAntenna Cable Preamp Freq Level Limit Line Level Factor Loss Factor Freq Level Limit Line Level Factor Remark Loss Factor MHz dBuV/m dB dBuV/m dBuV dB/m dB MHz dBuV/m dB dBuV/m dBuV dB/m dB deg deg 31.94 21.83 -18.17 40.00 29.62 24.04 0.48 32.31 --- Peak 30.97 21.99 -18.01 40.00 29.26 24.57 0.46 32.30 --- Peak
 183.26
 19.74
 -23.76
 43.50
 35.88
 15.91

 359.10
 29.06
 -16.94
 46.00
 38.55
 20.50

 399.57
 30.92
 -15.08
 46.00
 38.57
 21.90

 728.40
 28.72
 -17.28
 46.00
 29.73
 27.55
 --- Peak --- Peak 114.39 20.09 -23.41 43.50 33.56 17.27 250.19 21.88 -24.12 46.00 32.90 19.02 350.10 22.98 -23.02 46.00 32.17 20.50 600.36 28.56 -17.44 46.00 31.83 25.80 --- Peak
--- Peak
--- Peak
--- Peak
--- Peak
--- Peak 1.82 32.17 2.52 32.21 1.43 32.17 2.13 32.17 2.52 32.21 3.31 32.38 ---2.70 32.25 --- Peak --- Peak 3.65 32.21 970.90 32.28 -21.72 54.00 28.02 30.83 987.39 32.31 -21.69 54.00 27.96 30.70 4.24 30.59

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Appendix D. Duty Cycle Plots

Mode	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Zigbee	100	-	-	10Hz

Zigbee 250kbps

