

Report No.: KSCR220900171502 Page: 1 of 61

TEST REPORT

Application No.:	KSCR2209001715AT		
FCC ID:	2AVYF-IPC-F3XMI		
Applicant:	Hangzhou Huacheng Network Technology Co.,Ltd.		
Address of Applicant:	13th Floor, Building 3, 1399 Binxing Road, Changhe Street, Binjiang District, Hangzhou, China (Zhejiang) Pilot Free Trade Zone		
Manufacturer:	Hangzhou Huacheng Network Technology Co.,Ltd.		
Address of Manufacturer:	13th Floor, Building 3, 1399 Binxing Road, Changhe Street, Binjiang District, Hangzhou, China (Zhejiang) Pilot Free Trade Zone		
Equipment Under Test (EUT):		
EUT Name:	CONSUMER CAMERA		
Model No.:	IPC-F32MIN; IPC-F32MIP; IPC-F32MIP-0360B-imou; IPC-F32MIN-0360B- imou; IPC-F32MIP-0360B; IPC-F32MIN-0360 ♣		
	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.		
Standard(s) :	47 CFR Part 15, Subpart C 15.247		
Date of Receipt:	2022-09-09		
Date of Test:	2022-09-27 to 2022-09-30		
Date of Issue:	2022-10-12		
Test Result:	Pass*		

* In the configuration tested, the EUT complied with the standards specified above.

Enin fri

Eric Lin Laboratory Manager



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Report No.: KSCR220900171502 Page: 2 of 61

Revision Record			
Version	Description	Date	Remark
00	Original	2022-10-12	/

Authorized for issue by:			
	Ceril Lin		
	Eric_Liu/Project Engineer		
	Enie fri	-	
	Eric Lin /Reviewer		



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Report No.: KSCR220900171502 Page: 3 of 61

2 Test Summary

Radio Spectrum Technical Requirement					
Item Standard Method Requirement Resu					
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass	

Radio Spectrum Matt	Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result	
Conducted Emissions at AC Power Line (150kHz-30MHz)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass	
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass	
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass	
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass	
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass	
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass	
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the Identical in electrical and electronic characters. Only the model IPC-F32MIP was tested since their differences were the model number and appearance.



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Report No.: KSCR220900171502 Page: 4 of 61

3 Contents

1 COVER PAGE 1 2 TEST SUMMARY 3 3 CONTENTS 4 4 GENERAL INFORMATION 6 4.1 DETAILS OF E.U.T. 6 4.2 DESCRIPTION OF SUPPORT UNITS. 6 4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST LOCATION 8 4.5 TEST FACILITY 8 4.5 TEST FACILITY 8 4.6 DEVIATION FROM STANDARDS. 8 4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 CONCLUSION. 11 7.1 TEST RAGUIRTE TEST RESULTS. 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.2 CONDUCTED PEAK OUTPUT POWER 15 7.2.1 EU T. Operation 15			Page
3 CONTENTS 4 4 GENERAL INFORMATION 6 4.1 DETAILS OF E. U.T. 6 4.2 DESCRIPTION OF SUPPORT UNITS 6 4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST LOCATION 8 4.5 TEST FACILITY 8 4.6 DEVIATION FROM STANDARDS 8 4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1.1 ANTENNA REQUIREMENT 10 6.1.1 ANTENNA REQUIREMENT 10 6.1.2 Conclusion 10 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KH2-30MHz) 11 7.1.1 EULT Operation 11 7.1.2 Test Setup Diagram 12 7.1.4 Measurement Proceedure and Data 12 7.2.1 EULT Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.4 Measurement Proceedure and Data </th <th>1</th> <th>1 COVER PAGE</th> <th>1</th>	1	1 COVER PAGE	1
3 CONTENTS 4 4 GENERAL INFORMATION 6 4.1 DETAILS OF E. U.T. 6 4.2 DESCRIPTION OF SUPPORT UNITS 6 4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST LOCATION 8 4.5 TEST FACILITY 8 4.6 DEVIATION FROM STANDARDS 8 4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1.1 ANTENNA REQUIREMENT 10 6.1.1 ANTENNA REQUIREMENT 10 6.1.2 Conclusion 10 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KH2-30MHz) 11 7.1.1 EULT Operation 11 7.1.2 Test Setup Diagram 12 7.1.4 Measurement Proceedure and Data 12 7.2.1 EULT Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.4 Measurement Proceedure and Data </th <th>2</th> <th>2 TEST SUMMARY</th> <th></th>	2	2 TEST SUMMARY	
4 GENERAL INFORMATION 6 4.1 DETAILS OF E.U.T. 6 4.2 DESCRIPTION OF SUPPORT UNITS 6 4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST FACILITY 8 4.5 TEST FACILITY 8 4.6 DEVIATION FROM STANDARDS 8 4.7 ABNORMALTIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.2.4 Measurement Procedure and Data 12 7.2.1 Full Ober Description 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement P	-		
4.1 DETAILS OF E.U.T. 6 4.2 DESCRIPTION OF SUPPORT UNITS 6 4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST LOCATION 8 4.5 TEST FACILITY 8 4.6 DEVIATION FROM STANDARDS 8 4.7 ABNORMALITIES FROM STANDARDS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1.1 ANTENNA REQUIREMENT 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 EUT. Operation 11 7.1.2 Test Mode Description 11 7.1.4 Measurement Procedure and Data 12 7.2.1 Test Setup Diagram 12 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Proceedure and Data 16 7.2.4 Measurement Proceedure and Data 16 7.2	3	3 CONTENTS	4
4.1 DETAILS OF E.U.T. 6 4.2 DESCRIPTION OF SUPPORT UNITS 6 4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST LOCATION 8 4.5 TEST FACILITY 8 4.6 DEVIATION FROM STANDARDS 8 4.7 ABNORMALITIES FROM STANDARDS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1.1 ANTENNA REQUIREMENT 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 EUT. Operation 11 7.1.2 Test Mode Description 11 7.1.4 Measurement Procedure and Data 12 7.2.1 Test Setup Diagram 12 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Proceedure and Data 16 7.2.4 Measurement Proceedure and Data 16 7.2	4	4 GENERAL INFORMATION	
4.2 DESCRIPTION OF SUPPORT UNITS			
4.3 MEASUREMENT UNCERTAINTY 7 4.4 TEST LOCATION. 8 4.5 TEST FACILITY. 8 4.6 DEVIATION FROM STANDARDS. 8 4.7 ABNORMALITIES FROM STANDARD CONDITIONS. 8 5 EQUIPMENT LIST. 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS. 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Mode Description 15 7.2.4 Measurement Procedure and Data 16 7.3 MINIMUM 6DB BANDWIDTH 17 7.3			
4.4 TEST LOCATION			
4.5 TEST FACILITY. 8 4.6 DEVIATION FROM STANDARDS. 8 4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST. 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS. 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.2.4 Measurement Procedure and Data. 12 7.2.3 Test Mode Description 15 7.2.3 Test Mode Description 15 7.2.4 Measurement Procedure and Data. 16 7.2.4 Measurement Procedure and Data. 16 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Da			
4.6 DEVIATION FROM STANDARDS 8 4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.4 Measurement Procedure and Data 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.4 Measurement Procedure and Data 16 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data 16 7.3.4 Measurement Procedure and Data 17 7.3.3 Test Setup Diagram 17			
4.7 ABNORMALITIES FROM STANDARD CONDITIONS 8 5 EQUIPMENT LIST 9 6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.4 Measurement Procedure and Data 16 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data 17 7.3.4 Measurement Procedure and Data 17 7.3.4 Measurement Procedure and Data 17 7.4 POWER SPECTRUM DENSITY 1			
6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS. 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data. 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 15 7.2.4 Measurement Procedure and Data. 16 7.3 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.4 POWER SPECTRUM DENSITY. 1			
6 RADIO SPECTRUM TECHNICAL REQUIREMENT 10 6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS. 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data. 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 15 7.2.4 Measurement Procedure and Data. 16 7.3 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.4 POWER SPECTRUM DENSITY. 1	5	5 FOLIIPMENT LIST	q
6.1 ANTENNA REQUIREMENT 10 6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 15 7.2.4 Measurement Procedure and Data 16 7.3 Test Setup Diagram 15 7.2.3 Test Setup Diagram 16 7.3 Test Setup Diagram 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data 17 7.4 POWER SPECTRUM DENSITY 18 7.4	Ŭ		
6.1.1 Test Requirement: 10 6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ). 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data. 12 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 15 7.2.4 Measurement Procedure and Data. 16 7.2.5 Test Mode Description 15 7.2.2 Test Mode Description 16 7.2.3 Test Setup Diagram 16 7.3.4 Measurement Procedure and Data. 17 7.3.5 Test Mode Description 17 7.3.6 Test Mode Description 17 7.3.7 Test Mode Description 17 7.3.3 Test Mode Description 17 7.3.4 Measurement Procedure and Data. 17 <	6	6 RADIO SPECTRUM TECHNICAL REQUIREMENT	10
6.1.2 Conclusion 10 7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150kHz-30MHz) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.2 CONDUCTED PEAK OUTPUT POWER 15 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Mode Description 15 7.2.4 Measurement Procedure and Data 16 7.2.7 Test Mode Description 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.3.4 Measurement Procedure and Data 16 7.3.5 Test Mode Description 17 7.3.1 E.U.T. Operation 17 7.3.3 Test Mode Description 17 7.3.4 Measurement Procedure and Data 17 7.4 POWER SPECTRUM DENSITY 18 <		6.1 ANTENNA REQUIREMENT	10
7 RADIO SPECTRUM MATTER TEST RESULTS 11 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHz-30MHz) 11 7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.2 CONDUCTED PEAK OUTPUT POWER 15 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.3 Test Setup Diagram 16 7.3 Test Setup Diagram 16 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 16 7.3 Test Setup Diagram 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.4 Power Spectrum Density 18 7.4.1 E.U.T. Operation 18 7.4.2			
7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150kHz-30MHz)		6.1.2 Conclusion	
7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.1.4 Measurement Procedure and Data 12 7.2 CONDUCTED PEAK OUTPUT POWER 15 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data 16 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data 16 7.3 Test Mode Description 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data 17 7.4 POWER SPECTRUM DENSITY 18 7.4.1 E.U.T. Operation 18 7.4.2 Test Mode Description 18 7.4.3 Test Setup Diagram 18 7.4.4 <td>7</td> <td>7 RADIO SPECTRUM MATTER TEST RESULTS</td> <td>11</td>	7	7 RADIO SPECTRUM MATTER TEST RESULTS	11
7.1.1 E.U.T. Operation 11 7.1.2 Test Mode Description 11 7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data 12 7.1.4 Measurement Procedure and Data 12 7.2 CONDUCTED PEAK OUTPUT POWER 15 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data 16 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data 16 7.3 Test Mode Description 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data 17 7.4 POWER SPECTRUM DENSITY 18 7.4.1 E.U.T. Operation 18 7.4.2 Test Mode Description 18 7.4.3 Test Setup Diagram 18 7.4.4 <td></td> <td>7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150kHz-30MHz)</td> <td>11</td>		7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150kHz-30MHz)	11
7.1.3 Test Setup Diagram 12 7.1.4 Measurement Procedure and Data. 12 7.2 CONDUCTED PEAK OUTPUT POWER 15 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data. 16 7.2.5 Test Setup Diagram 16 7.2.6 MINIMUM 6DB BANDWIDTH 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data. 17 7.4 POWER SPECTRUM DENSITY 18 7.4.1 E.U.T. Operation 18 7.4.2 Test Mode Description 18 7.4.3 Test Mode Description 18 7.4.4 Measurement Procedure and Data. 18			
7.1.4 Measurement Procedure and Data. 12 7.2 CONDUCTED PEAK OUTPUT POWER. 15 7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data. 16 7.3 MINIMUM 6DB BANDWIDTH 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.4 POWER SPECTRUM DENSITY 18 7.4.1 E.U.T. Operation 18 7.4.2 Test Mode Description 18 7.4.3 Test Mode Description 18 7.4.4 Measurement Procedure and Data. 18 7.4.3 Test Setup Diagram 18 7.4.4 Measurement Procedure and Data. 18 7.4.4 Measurement Procedure and Data. 18		7.1.2 Test Mode Description	
7.2 CONDUCTED PEAK OUTPUT POWER. 15 7.2.1 E.U.T. Operation. 15 7.2.2 Test Mode Description. 15 7.2.3 Test Setup Diagram. 16 7.2.4 Measurement Procedure and Data. 16 7.3 MINIMUM 6DB BANDWIDTH. 17 7.3.1 E.U.T. Operation. 17 7.3.2 Test Mode Description. 17 7.3.3 Test Setup Diagram. 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.4 POWER SPECTRUM DENSITY. 18 7.4.1 E.U.T. Operation. 18 7.4.2 Test Mode Description. 18 7.4.3 Test Setup Diagram. 18 7.4.4 Measurement Procedure and Data. 18		7.1.3 Test Setup Diagram	
7.2.1 E.U.T. Operation 15 7.2.2 Test Mode Description 15 7.2.3 Test Setup Diagram 16 7.2.4 Measurement Procedure and Data. 16 7.3 MINIMUM 6DB BANDWIDTH. 17 7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data. 17 7.3.4 Measurement Procedure and Data. 17 7.4 POWER SPECTRUM DENSITY. 18 7.4.1 E.U.T. Operation 18 7.4.2 Test Mode Description 18 7.4.3 Test Setup Diagram 18 7.4.4 Measurement Procedure and Data. 18 7.4.4 Measurement Procedure and Data. 18			
7.2.2Test Mode Description157.2.3Test Setup Diagram167.2.4Measurement Procedure and Data167.3MINIMUM 6DB BANDWIDTH177.3.1E.U.T. Operation177.3.2Test Mode Description177.3.3Test Setup Diagram177.3.4Measurement Procedure and Data177.4POWER SPECTRUM DENSITY187.4.1E.U.T. Operation187.4.2Test Mode Description187.4.3Test Setup Diagram187.4.4Measurement Procedure and Data187.4.4Measurement Procedure and Data18			
7.2.3 Test Setup Diagram167.2.4 Measurement Procedure and Data167.3 MINIMUM 6DB BANDWIDTH177.3.1 E.U.T. Operation177.3.2 Test Mode Description177.3.3 Test Setup Diagram177.3.4 Measurement Procedure and Data177.4 POWER SPECTRUM DENSITY187.4.1 E.U.T. Operation187.4.2 Test Mode Description187.4.3 Test Setup Diagram187.4.4 Measurement Procedure and Data187.4.4 Measurement Procedure and Data187.4.4 Measurement Procedure and Data187.4.4 Measurement Procedure and Data187.4.4 Measurement Procedure and Data18			
7.2.4Measurement Procedure and Data.167.3MINIMUM 6DB BANDWIDTH.177.3.1E.U.T. Operation.177.3.2Test Mode Description.177.3.3Test Setup Diagram.177.3.4Measurement Procedure and Data.177.4POWER SPECTRUM DENSITY.187.4.1E.U.T. Operation.187.4.2Test Mode Description.187.4.3Test Setup Diagram.187.4.4Measurement Procedure and Data.187.4.4Measurement Procedure and Data.18		•	
7.3 MINIMUM 6DB BANDWIDTH		1 5	
7.3.1 E.U.T. Operation 17 7.3.2 Test Mode Description 17 7.3.3 Test Setup Diagram 17 7.3.4 Measurement Procedure and Data 17 7.4 POWER SPECTRUM DENSITY 18 7.4.1 E.U.T. Operation 18 7.4.2 Test Mode Description 18 7.4.3 Test Setup Diagram 18 7.4.4 Measurement Procedure and Data 18 7.4.4 Measurement Procedure and Data 18			
7.3.2Test Mode Description177.3.3Test Setup Diagram177.3.4Measurement Procedure and Data177.4POWER SPECTRUM DENSITY187.4.1E.U.T. Operation187.4.2Test Mode Description187.4.3Test Setup Diagram187.4.4Measurement Procedure and Data187.4.4Measurement Procedure and Data18			
7.3.3Test Setup Diagram177.3.4Measurement Procedure and Data177.4POWER SPECTRUM DENSITY187.4.1E.U.T. Operation187.4.2Test Mode Description187.4.3Test Setup Diagram187.4.4Measurement Procedure and Data187.4.4Measurement Procedure and Data18			
7.3.4Measurement Procedure and Data		•	
7.4 POWER SPECTRUM DENSITY			
7.4.1E.U.T. Operation187.4.2Test Mode Description187.4.3Test Setup Diagram187.4.4Measurement Procedure and Data18			
7.4.2Test Mode Description187.4.3Test Setup Diagram187.4.4Measurement Procedure and Data18			
7.4.3 Test Setup Diagram			
7.4.4 Measurement Procedure and Data18			



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Report No.: KSCR220900171502 Page: 5 of 61

7.5.1	E.U.T. Operation	
7.5.2	Test Mode Description	
7.5.3		
7.5.4	Measurement Procedure and Data	
7.6	CONDUCTED SPURIOUS EMISSIONS	
7.6.1	E.U.T. Operation	
7.6.2	Test Mode Description	
7.6.3		
7.6.4		
7.7	RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	
7.7.1	E.U.T. Operation	23
7.7.2		
7.7.3		
7.7.4		
7.8	RADIATED SPURIOUS EMISSIONS BELOW 1GHZ	
7.8.1		
7.8.2		
7.8.3		
7.8.4		
	RADIATED SPURIOUS EMISSIONS ABOVE 1GHz	
7.9.1	=:•···••p•····	
7.9.2		
7.9.3		
7.9.4	Measurement Procedure and Data	
8 TEST	SETUP PHOTO	45
9 EUT	CONSTRUCTIONAL DETAILS (EUT PHOTOS)	45
10 APPE	ENDIX	



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Report No.: KSCR220900171502 Page: 6 of 61

4 General Information

4.1 Details of E.U.T.

DC 12V,1A
2402MHz to 2480MHz
V5.0 LE
GFSK
40
2MHz
Dipole Antenna
4.01dBi (Provided by the manufacturer)

4.2 Description of Support Units

Description	otion Manufacturer Model No.		Serial No.
Notebook	LENOVO	K27	EB24537645



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Report No.: KSCR220900171502 Page: 7 of 61

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 ⁻⁸
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	PE Padiated Dower	5.2dB (Below 1GHz)
0	RF Radiated Power	5.9dB (Above 1GHz)
		4.2dB (Below 30MHz)
9	Dedicted Sourious Emission Test	4.5dB (30MHz-1GHz)
9	Radiated Spurious Emission Test	5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

4.3 Measurement Uncertainty

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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Report No.: KSCR220900171502 Page: 8 of 61

4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China. Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS

Compliance Certification Services (Kunshan) Inc. is accredited by the China National Accreditation Service for Conformity Assessment (CNAS). Registration No. CNAS L4354

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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Report No.: KSCR220900171502 Page: 9 of 61

5 Equipment List

ltem	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Condu	icted Emission at Mains Ter	minals (150kHz-30M	1Hz)			
1	EMI Test Receive	R&S	ESCI	KS301101	01/22/2022	01/21/2023
2	LISN	R&S	ENV216	KS301197	01/22/2022	01/21/2023
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/22/2022	01/21/2023
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	01/22/2022	01/21/2023
5	CE test Cable	Thermax	/	CZ301102	11/14/2021	11/13/2022
6	Test Software	Farad	EZ-EMC	/	N.C.R	N.C.R
RF Co	nducted Test			<u> </u>		
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	08/22/2022	08/21/2023
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	08/22/2022	08/21/2023
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/22/2022	01/21/2023
4	Signal Generator	R&S	SMW200A	KSEM020-1	08/22/2022	08/21/2023
5	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/22/2022	08/21/2023
6	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/22/2022	08/21/2023
7	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	04/01/2022	03/31/2023
8	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	08/22/2022	08/21/2023
9	Switcher	CCSRF	FY562	KUS2001M001-3	08/22/2022	08/21/2023
10	AC Power Source	EXTECH	6605	KS301178	N.C.R	N.C.R
11	DC Power Supply	Aglient	E3632A	KS301180	N.C.R	N.C.R
12	Conducted Test Cable	Thermax	RF01-RF04	CZ301111- CZ301120	01/16/2022	01/15/2023
13	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	04/01/2021	03/31/2023
14	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	04/14/2022	04/13/2023
15	Software	BST	TST-PASS	/	N/A	N/A
RF Ra	diated Test					
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/22/2022	08/21/2023
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	04/01/2022	03/31/2023
3	Signal Generator	Agilent	E8257C	KS301066	08/22/2022	08/21/2023
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	04/13/2021	04/12/2023
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2021	06/28/2023
6	Bilog Antenna	SCHWARZBECK	VULB9160	CZ301016	04/13/2021	04/12/2024
7	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	04/02/2022	04/01/2024
8	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	KS301186	02/22/2021	02/21/2023
9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	03/17/2022	03/16/2023
10	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/22/2022	01/21/2023
11	Amplifier(18~40GHz)	COM-POWER	PAM-840A	KUS1710E001	01/22/2022	01/21/2023
12	RE Test Cable	REBES MICROWAVE	/	CZ301097	11/14/2021	11/13/2022
13	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	01/04/2022	31/03/2023
14	Software	Faratronic	EZ_EMC-v 3A1	/	N/A	N/A



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Test Report Form Version: Rev01



Report No.: KSCR220900171502 Page: 10 of 61

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Dipole Antenna and no consideration of replacement. The best case gain of the antenna is 4.01 dBi.

Antenna location: Refer to internal photo.



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Report No.: KSCR220900171502 Page: 11 of 61

Radio Spectrum Matter Test Results 7

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement Test Method:

47 CFR Part 15, Subpart C 15.207 ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of	Conducted limit(dBµV)			
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.				
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz				

7.1.1 E.U.T. Operation

Operating Environment:						
Temperature:	26.7 °C	Humidity:	32.4 % RH	Atmospheric Pressure:	1010	mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



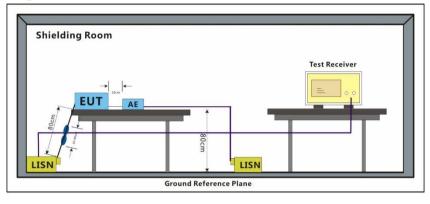
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Report No.: KSCR220900171502 Page: 12 of 61

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50 μ H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor



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Report No.: KSCR220900171502 Page: 13 of 61

80.0 dBuV QP: AVG: 6 40 vily vily wild have w. white the month of the states peak AVG 0.0 0.150 0.5 (MHz) 5 30.000

Test Mode: 01; Line: Live line

No.	Frequency	QuasiPeak	Average	Correction	QuasiPeak	Average	QuasiPeak	Average	QuasiPeak	Average	Remark
		reading	reading	factor	result	result	limit	limit	margin	margin	
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.4864	18.40	10.61	19.56	37.96	30.17	56.23	46.23	-18.27	-16.06	Pass
2	1.0371	15.12	5.83	19.60	34.72	25.43	56.00	46.00	-21.28	-20.57	Pass
3	1.3002	16.13	6.67	19.61	35.74	26.28	56.00	46.00	-20.26	-19.72	Pass
4	1.4660	15.93	6.43	19.62	35.55	26.05	56.00	46.00	-20.45	-19.95	Pass
5	2.1424	14.21	4.88	19.65	33.86	24.53	56.00	46.00	-22.14	-21.47	Pass
6	2.7111	14.78	5.58	19.69	34.47	25.27	56.00	46.00	-21.53	-20.73	Pass

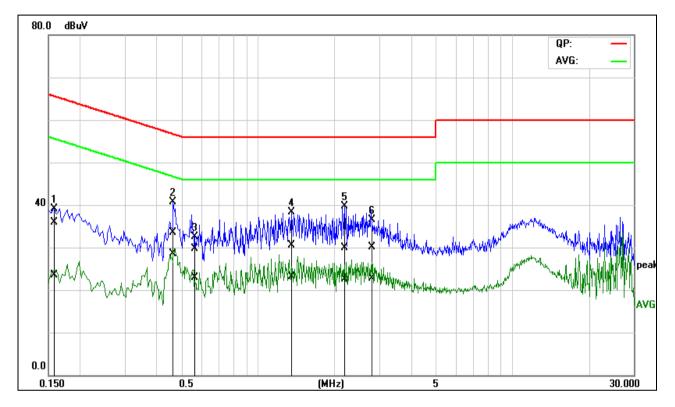


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Report No.: KSCR220900171502 Page: 14 of 61



Test Mode: 01; Line: Neutral Line

No.	Frequency	QuasiPeak	Average	Correction	QuasiPeak	Average	QuasiPeak	Average	QuasiPeak	Average	Remark
		reading	reading	factor	result	result	limit	limit	margin	margin	
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1591	16.49	4.06	19.48	35.97	23.54	65.51	55.51	-29.54	-31.97	Pass
2*	0.4625	13.87	8.94	19.55	33.42	28.49	56.65	46.65	-23.23	-18.16	Pass
3	0.5674	10.06	3.25	19.56	29.62	22.81	56.00	46.00	-26.38	-23.19	Pass
4	1.3362	10.92	3.40	19.62	30.54	23.02	56.00	46.00	-25.46	-22.98	Pass
5	2.2034	10.24	2.87	19.65	29.89	22.52	56.00	46.00	-26.11	-23.48	Pass
6	2.8211	10.36	3.00	19.70	30.06	22.70	56.00	46.00	-25.94	-23.30	Pass



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Report No.: KSCR220900171502 Page: 15 of 61

7.2 Conducted Peak Output Power

Test Requirement	47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method:	ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.2.1 E.U.T. Operation

Operating Environment:

Temperature:	26.7 °C	Humidity:	32.4 % RH	Atmospheric Pressure:	1010	mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



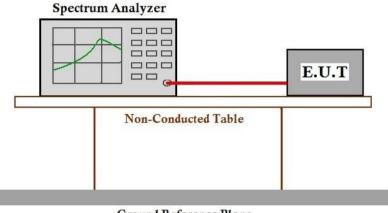
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Report No.: KSCR220900171502 Page: 16 of 61

7.2.3 Test Setup Diagram



Ground Reference Plane

7.2.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details



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Report No.: KSCR220900171502 Page: 17 of 61

7.3 Minimum 6dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2013) Section 11.8.1

Limit:

≥500 kHz

7.3.1 E.U.T. Operation

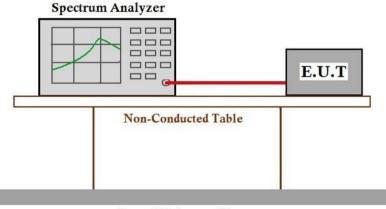
Operating Environment:

Temperature:	26.7 °C	Humidity:	32.3 % RH	Atmospheric Pressure:	1010	mbar
--------------	---------	-----------	-----------	-----------------------	------	------

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.3.3 Test Setup Diagram



Ground Reference Plane

7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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Report No.: KSCR220900171502 Page: 18 of 61

7.4 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

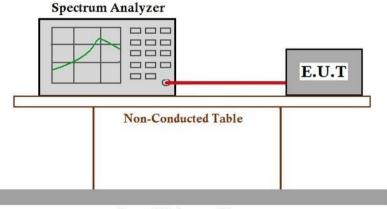
7.4.1 E.U.T. Operation

Operating Enviro	onment:						
Temperature:	26.7 °C	Humidity:	32.3 % RH	Atmospheric Pressure:	Atmospheric I	1010	mbar

7.4.2 Test Mode Description

	scan / I test	Mode Code	Description
Fina	l test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.4.3 Test Setup Diagram



Ground Reference Plane

7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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Test Report Form Version: Rev01



Report No.: KSCR220900171502 Page: 19 of 61

7.5 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.5.1 E.U.T. Operation

Operating Environment: Temperature: 26.7 °C

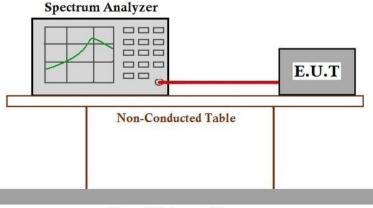
Humidity: 32.3 % RH

Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.5.3 Test Setup Diagram



Ground Reference Plane



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Report No.: KSCR220900171502 Page: 20 of 61

7.5.4 Measurement Procedure and Data

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Report No.: KSCR220900171502 Page: 21 of 61

7.6 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.6.1 E.U.T. Operation

Operating Environment: Temperature: 26.7 °C

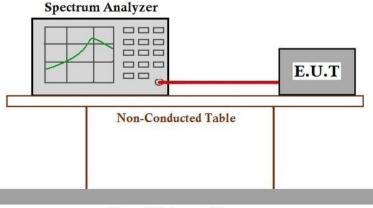
Humidity: 32.3 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.6.3 Test Setup Diagram



Ground Reference Plane



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7.6.4 Measurement Procedure and Data

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Report No.: KSCR220900171502 Page: 23 of 61

7.7 Radiated Emissions which fall in the restricted bands

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.10.5
Measurement Distance:	3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.7.1 E.U.T. Operation

Operating Environment:						
Temperature:	23.8 °C	Humidity:	57.9 % RH	Atmospheric Pressure:	1010	mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



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7.7.3 Test Setup Diagram

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Report No.: KSCR220900171502 Page: 24 of 61

3m or 10m antenna Tower 1 antenna Tower 1 Turntable Ground Reference Plane Test Receiver method 1 Test Receiver <td



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Report No.: KSCR220900171502 Page: 25 of 61

7.7.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

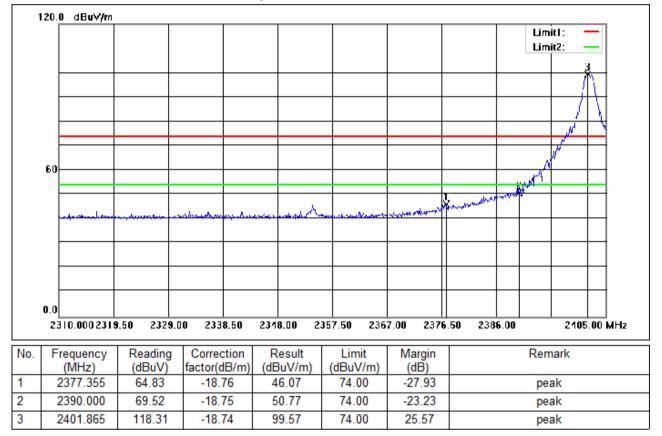


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Report No.: KSCR220900171502 Page: 26 of 61





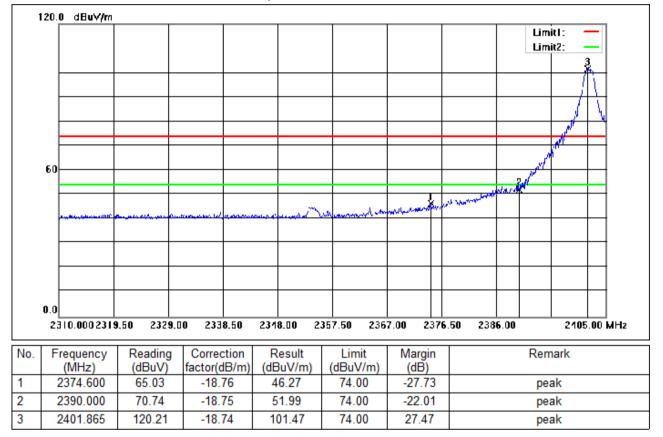


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Report No.: KSCR220900171502 Page: 27 of 61







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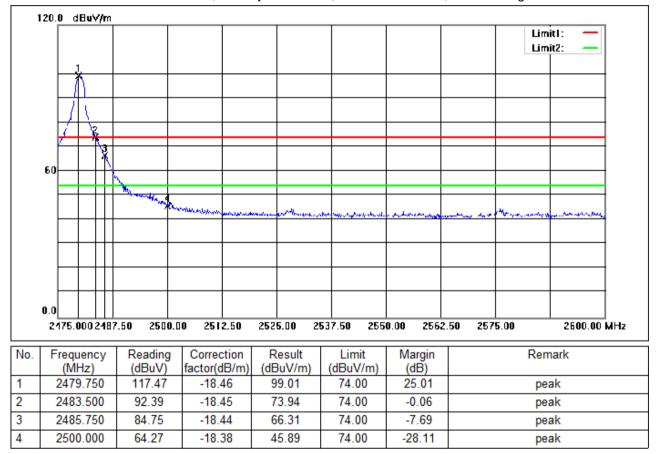
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Report No.: KSCR220900171502 Page: 28 of 61



Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



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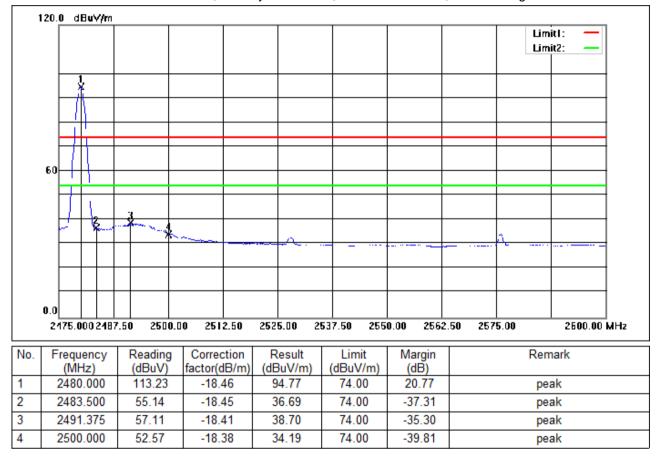
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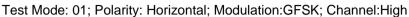
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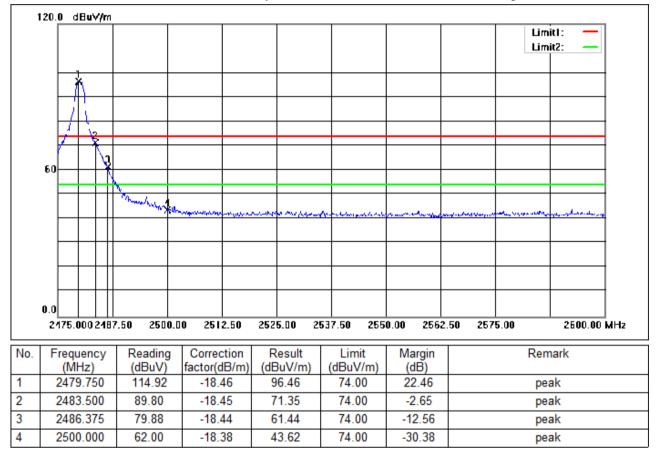
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Report No.: KSCR220900171502 Page: 30 of 61



Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High

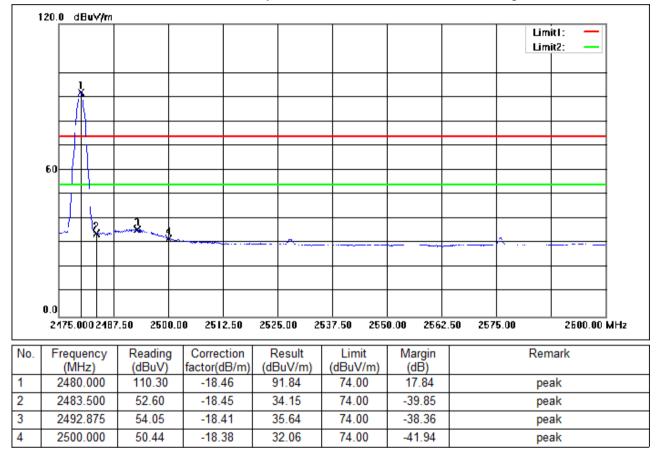


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Report No.: KSCR220900171502 Page: 32 of 61

7.8 Radiated Spurious Emissions Below 1GHz

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.4,6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(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
960-1000	500	3

7.8.1 E.U.T. Operation

Operating Environment:

Temperature:	23.5 °C	Humidity:	59.5 % RH	Atmospheric Pressure:	1010	mbar
•		,				

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

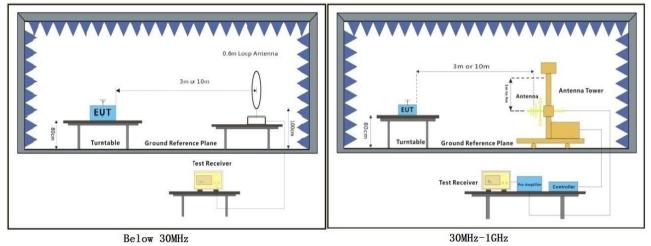


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Report No.: KSCR220900171502 Page: 33 of 61



7.8.3 Test Setup Diagram



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Report No.: KSCR220900171502 Page: 34 of 61

7.8.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



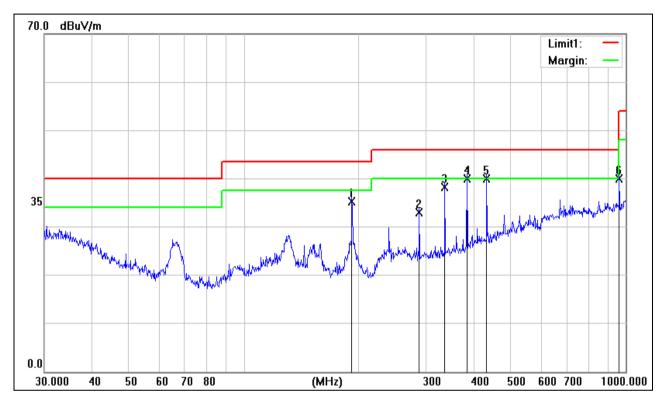
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Report No.: KSCR220900171502 Page: 35 of 61

Test Mode: 01; Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	191.7450	18.86	16.36	35.22	43.50	-8.28	200	336	QP
2	287.9904	12.47	20.45	32.92	46.00	-13.08	200	159	QP
3	336.0352	16.94	21.36	38.30	46.00	-7.70	100	329	QP
4	383.9318	17.42	22.60	40.02	46.00	-5.98	200	331	QP
5	432.5457	16.03	23.98	40.01	46.00	-5.99	100	318	QP
6	962.1623	37.44	2.56	40.00	54.00	-14.00	100	360	QP



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Report No.: KSCR220900171502 Page: 36 of 61

70.0 dBuV/m Limit1: Margin: 3 5 35 * A Contraction of the Annalism ulau shell ê Walker John May 1. Martin and and the most AN. 0.0 30.000 70 80 600 700 1000.000 40 50 60 (MHz) 300 400 500

Toet	Mode.	01.	Polarity:	Vertical
resi	woue.	υι,	Folanty.	ventical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	31.6202	2.06	25.14	27.20	40.00	-12.80	200	38	QP
2	66.7325	9.97	15.28	25.25	40.00	-14.75	100	356	QP
3	336.0352	19.54	21.36	40.90	46.00	-5.10	100	196	QP
4	383.9318	10.67	22.60	33.27	46.00	-12.73	200	0	QP
5	739.6604	32.03	2.38	34.41	46.00	-11.59	100	15	QP
6	962.1623	38.43	2.56	40.99	54.00	-13.01	100	48	QP



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Test Report Form Version: Rev01



Report No.: KSCR220900171502 Page: 37 of 61

7.9 Radiated Spurious Emissions Above 1GHz

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

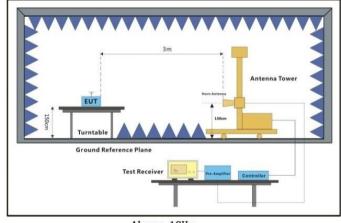
7.9.1 E.U.T. Operation

Operating Environment:					
Temperature:	23.7 °C	Humidity:	58.6 % RH	Atmospheric Pressure: 1010	mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.9.3 Test Setup Diagram



Above 1GHz



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Test Report Form Version: Rev01



Report No.: KSCR220900171502 Page: 38 of 61

7.9.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

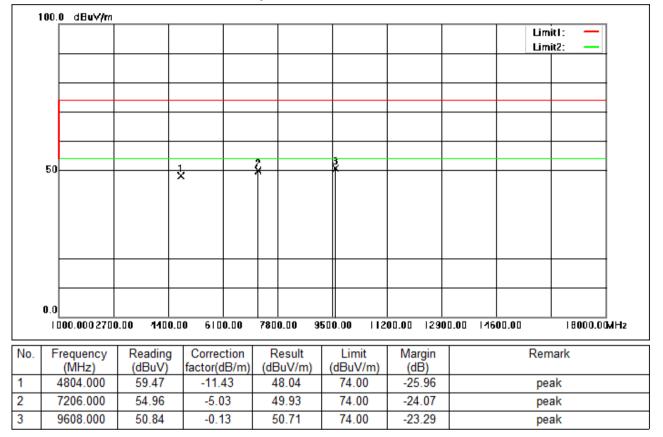


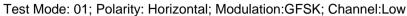
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Report No.: KSCR220900171502 Page: 39 of 61





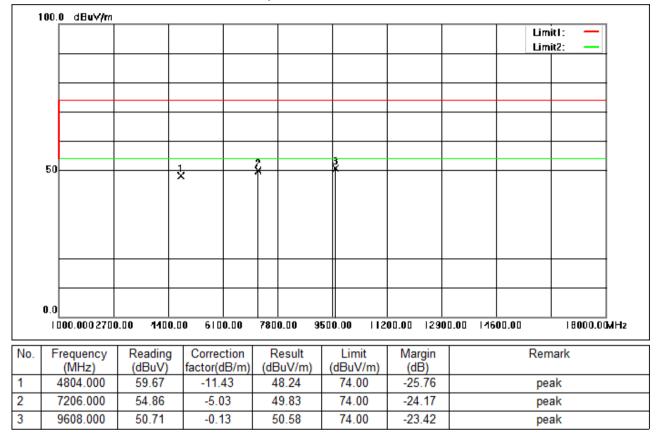


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Report No.: KSCR220900171502 Page: 40 of 61



Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low

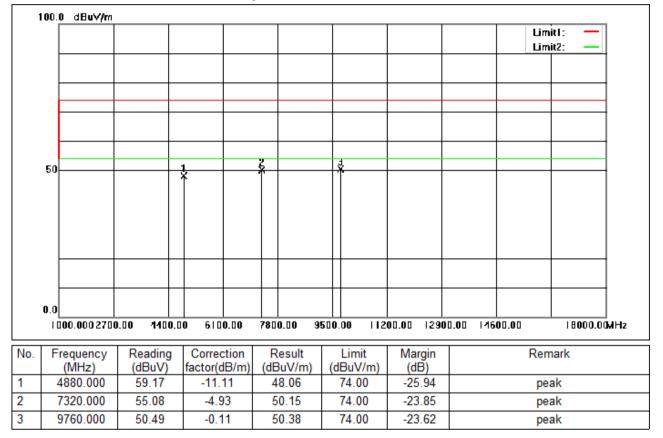


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Report No.: KSCR220900171502 Page: 41 of 61



Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



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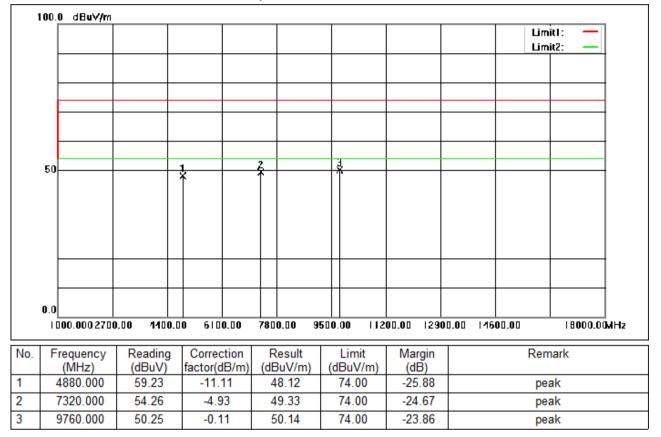
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Report No.: KSCR220900171502 Page: 42 of 61







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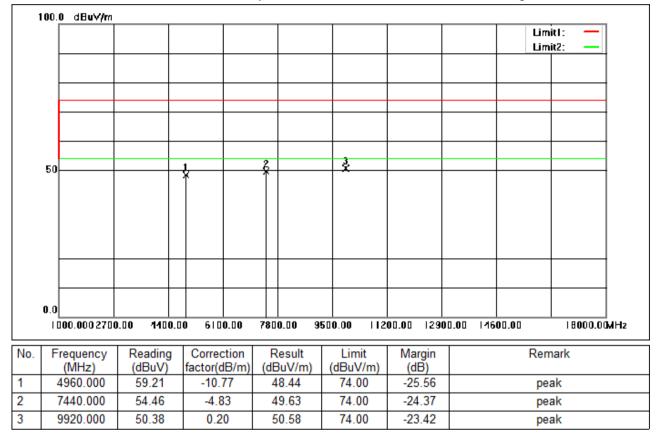
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Report No.: KSCR220900171502 Page: 43 of 61



Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



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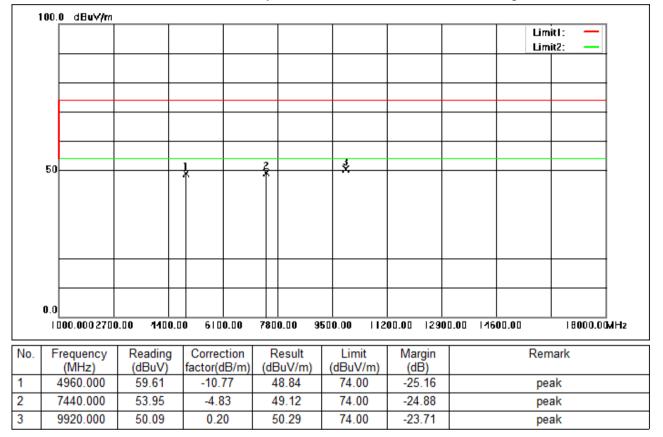
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Report No.: KSCR220900171502 Page: 44 of 61



Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



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Report No.: KSCR220900171502 Page: 45 of 61

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2209001715AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2209001715AT



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Report No.: KSCR220900171502 Page: 46 of 61

10 Appendix

Appendix for KSCR2209001715AT-BLE

Channel	BLE
Channel	1M
0	79
19	79
39	79

1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

	Ant1								
Mode	ТХ Туре	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)		
		2402	0.380	0.625	60.80	2.16	0.00		
1M	SISO	2440	0.380	0.625	60.80	2.16	0.00		
		2480	0.380	0.625	60.80	2.16	0.00		

1.1.2 Test Graph

1M_LCH_2402MHz_Ant1_NTNV

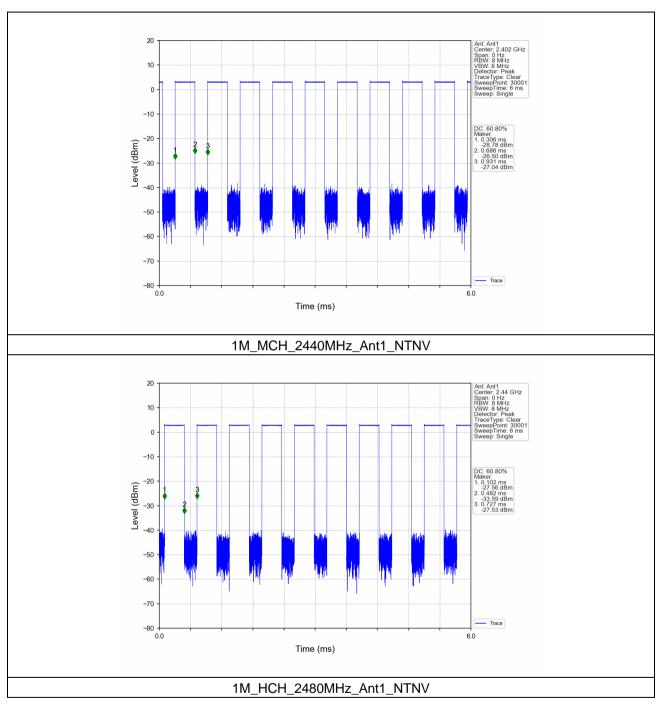


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Report No.: KSCR220900171502 Page: 47 of 61



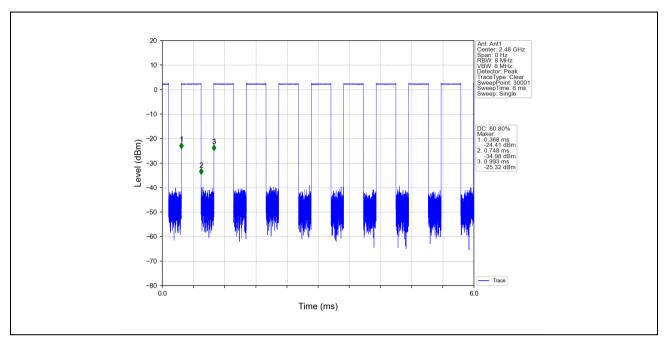


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Report No.: KSCR220900171502 Page: 49 of 61

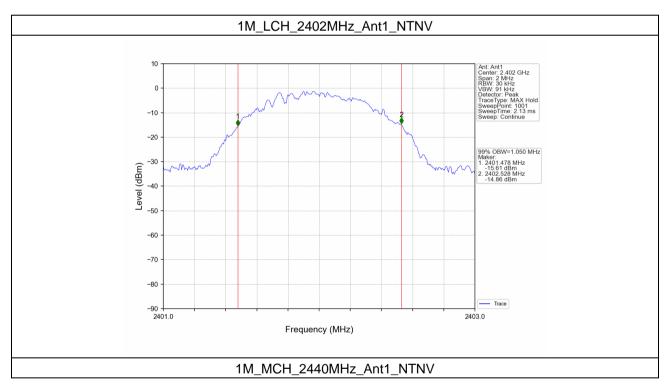
2. Bandwidth

2.1 OBW

2.1.1 Test Result

Mada	ТΧ	Frequency	ΔΝΙΤ	99% Occupied Bandwidth (MHz)	Vordict
Mode	Туре	(MHz)	Hz) ANT	Result	Verdict
		2402	1	1.050	Pass
1M	SISO	2440	1	1.051	Pass
		2480	1	1.047	Pass

2.1.2 Test Graph

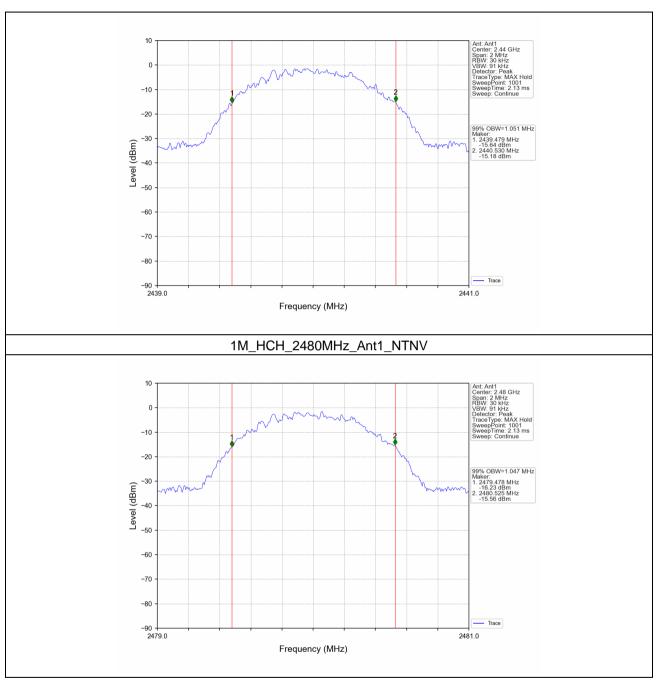




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Report No.: KSCR220900171502 Page: 50 of 61





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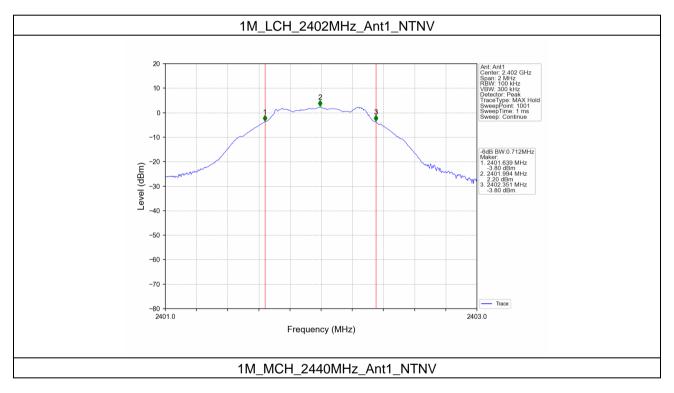
Report No.: KSCR220900171502 Page: 51 of 61

2.2 6dB BW

2.2.1 Test Result

Mada	ТΧ	Frequency (MHz) ANT		6dB Bandv	Vordict	
Mode	Туре			Result	Limit	Verdict
		2402	1	0.712	>=0.5	Pass
1M	SISO	2440	1	0.698	>=0.5	Pass
		2480	1	0.708	>=0.5	Pass

2.2.2 Test Graph

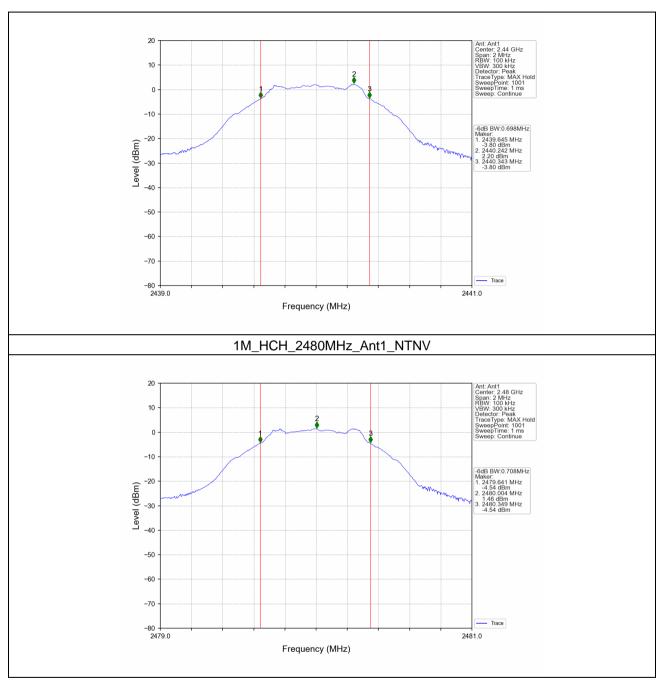




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Report No.: KSCR220900171502 Page: 52 of 61





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Report No.: KSCR220900171502 Page: 53 of 61

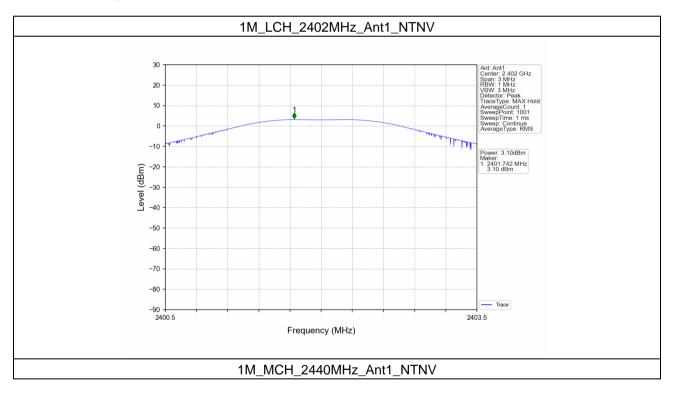
3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mada TX		Frequency	Maximum Peak Conduc	Vordiot			
Mode	Туре	(MHz)	ANT1	Limit	Verdict		
		2402	3.10	<=30	Pass		
1M	SISO	2440	2.87	<=30	Pass		
		2480	2.32	<=30	Pass		
Note1: Ant	Note1: Antenna Gain: Ant1: 4.01dBi;						

3.1.2 Test Graph

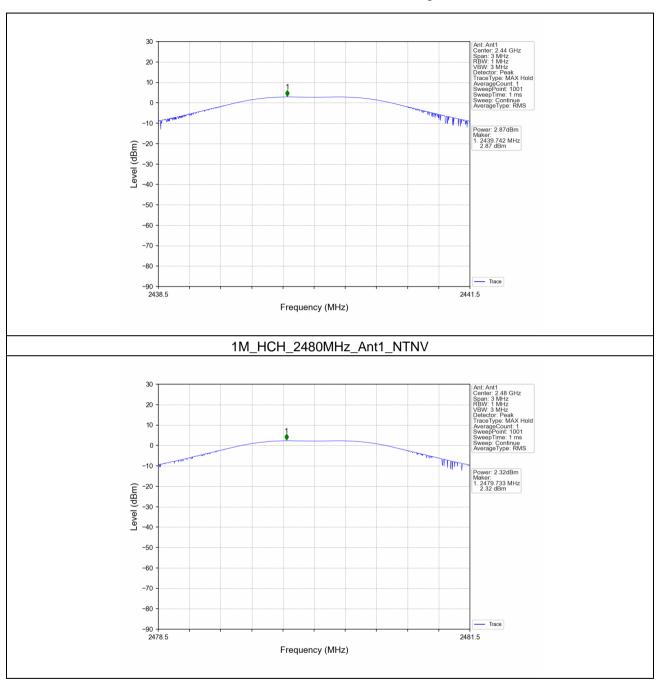




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Report No.: KSCR220900171502 Page: 54 of 61





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Report No.: KSCR220900171502 Page: 55 of 61

4. Maximum Power Spectral Density

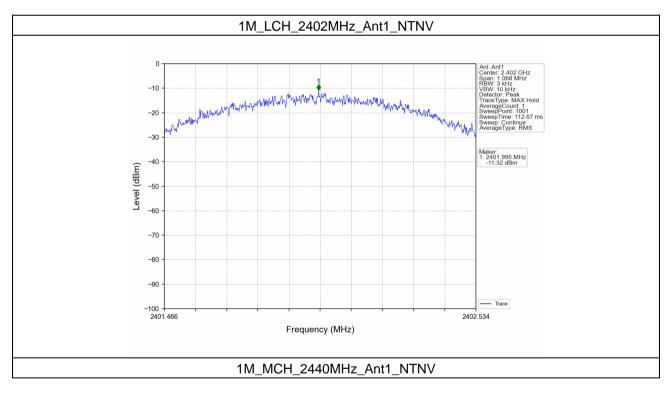
4.1 PSD

4.1.1 Test Result

Mada	Mada TX	Frequency	Maximum PS	Vardiat		
Mode Type		(MHz)	ANT1	Limit	Verdict	
		2402	-11.32	<=8	Pass	
1M	SISO	2440	-11.97	<=8	Pass	
		2480	-12.06	<=8	Pass	
Note1: Antenna Gain: Ant1: 4 01dBi:						

Note1: Antenna Gain: Ant1: 4.01dE

4.1.2 Test Graph





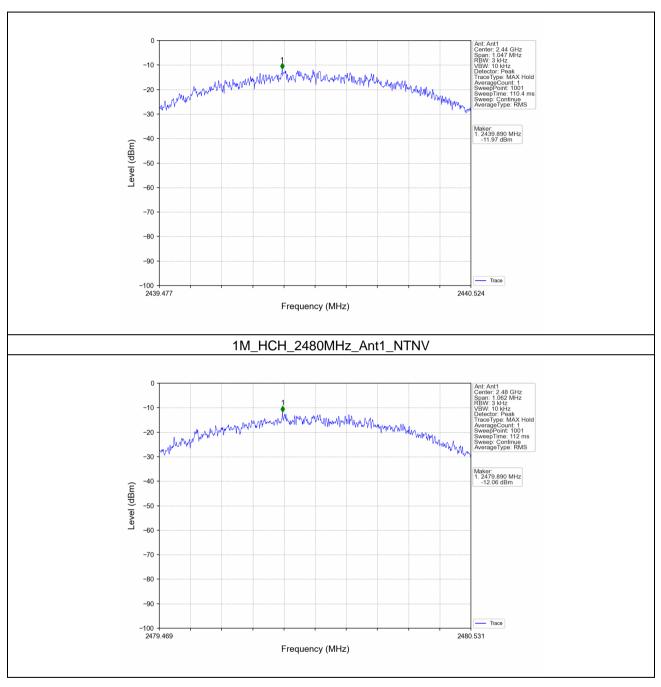
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Report No.: KSCR220900171502 Page: 56 of 61





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Report No.: KSCR220900171502 Page: 57 of 61

5. Unwanted Emissions InStandard Non-restricted Frequency Bands

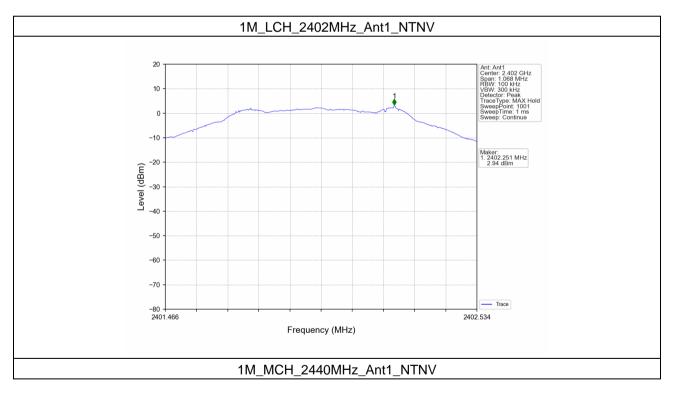
5.1 Ref

5.1.1 Test Result

Mode	ТХ Туре	Frequency (MHz)	ANT	Level of Reference (dBm)
		2402	1	2.94
1M	SISO	2440	1	2.16
		2480	1	1.99
				tains the second second population

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

5.1.2 Test Graph

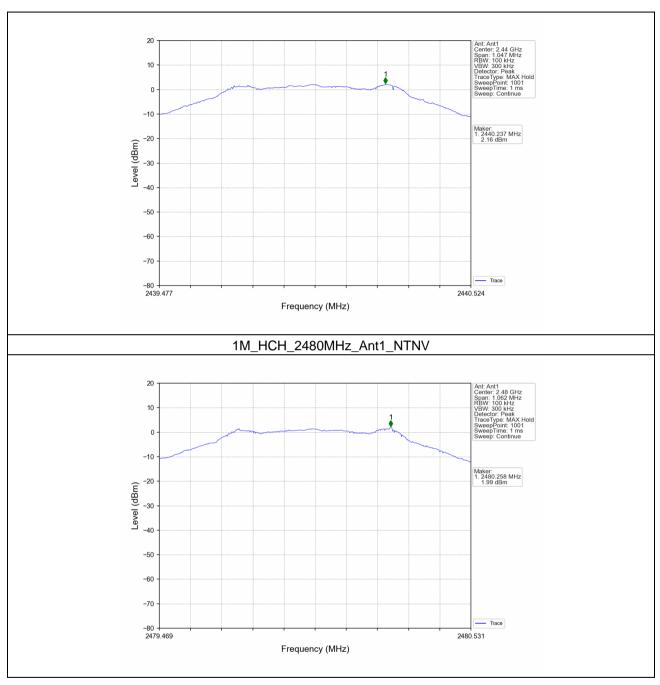




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Report No.: KSCR220900171502 Page: 58 of 61





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Test Report Form Version: Rev01



Report No.: KSCR220900171502 Page: 59 of 61

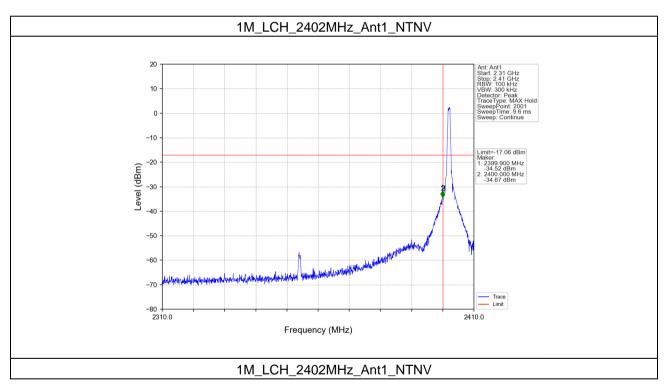
5.2 CSE

5.2.1 Test Result

Mode	ТХ Туре	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict	
		2402	1	2.94	-17.06	Pass	
1M	SISO	2440	1	2.94	-17.06	Pass	
		2480	1	2.94	-17.06	Pass	
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level							

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

5.2.2 Test Graph

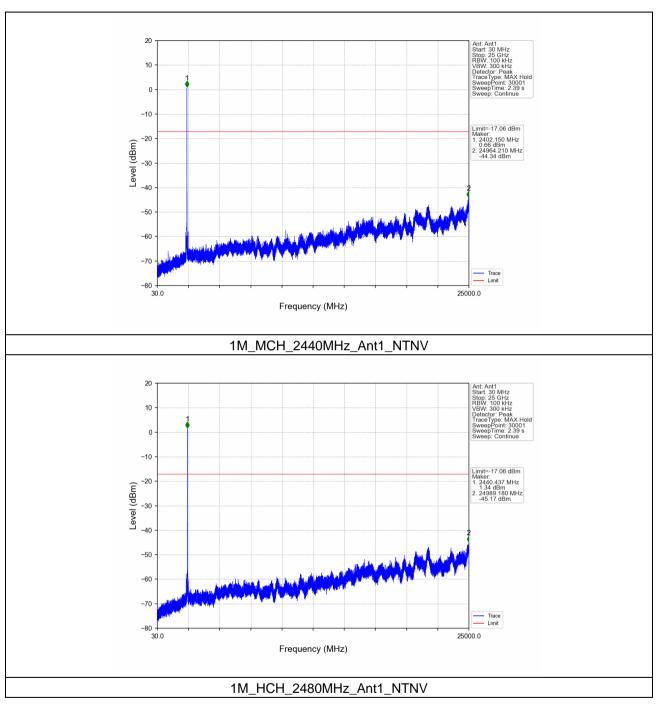




Test Report Form Version: Rev01



Report No.: KSCR220900171502 Page: 60 of 61

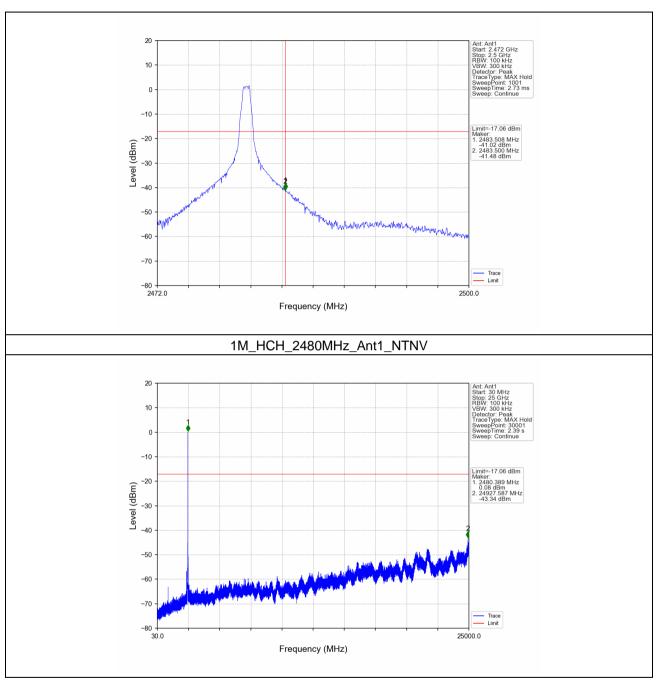




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Report No.: KSCR220900171502 Page: 61 of 61



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