	YER	n I I A S
	FCC Test Report (Sub-GHz)	
Report No.:	RF190711E04-3	
FCC ID:	2APLE18300399	
Test Model:	VMB4540	
PCBA Rev:	V005	
Received Date:	July 11, 2019	
Test Date:	July 22 to Aug. 02, 2019	
Issued Date:	Aug. 21, 2019	
Applicant:	Arlo Technologies, Inc.	
Address:	2200 Faraday Ave. Suite 150, Carlsbad, CA 92008	
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory	
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.	
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.	
FCC Registration / Designation Number:	723255 / TW2022	



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



Table of Contents

1 Certificate of Conformity	R	Release Control Record 4					
2.1 Medification Record 6 2 Medification Record 6 3 General Information 7 3.1 General Description of EUT (Sub-GHz) 7 3.2 Description of Test Modes 9 3.3 Test Mode Applicability and Tested Channel Detail 10 3.3 Dity Cycle of Test Signal 12 3.4 Description of Support Units 13 3.4.1 Configuration of System under Test 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Test Instruments 17 4.1.3 Test Hostuments 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 19 4.1.6 Toperating Conditions 20 4.1.7 Test Results 21 4.1.4 Deviation from Test Standard 26 4.2.2 Test Results 27 4.2.4 Deviation from Test Standard 2	1	C	ertificate of Conformity	5			
2.2 Modification Record 6 3 General Information 7 3.1 General Description of EUT (Sub-GHz) 7 3.2 Description of Test Modes 9 3.3 Dity Cycle of Test Modes 9 3.4 Description of Support Units 12 3.4 Description of Support Units 13 3.4.1 Configuration of Applied Standards 14 3.5 General Description of Applied Standards 16 4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 4.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Results 20 4.1.7 Test Results 21 4.1.2 Conducted Emission Measurement 26 4.2.2 Test Instruments 26 4.2.3 Test Nocdured 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Instruments	2	S	ummary of Test Results	6			
3.1 General Description of EUT (Sub-GHz) 7 3.2 Description of Test Mode Applicability and Tested Channel Detail 10 3.3 Duty Cycle of Test Signal 12 3.4 Description of Support Units 13 3.4.1 Configuration of System under Test 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1.1 Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 1.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 EUT Operating Conditions 20 4.1.7 Test Results 21 4.1.8 Eviation from Test Standard 19 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Test Instruments 26 4.2.2 Test Instruments 26 4.2.3 Test Test Vipe and Resurement 26 4.2.4 Deviation from Test Standard 27 4.2.5							
3.1 General Description of Test Modes. 9 3.2 Description of Test Mode Applicability and Tested Channel Detail. 10 3.3 Duty Cycle of Test Signal. 12 3.4 Description of Support Units 13 3.4.1 Configuration of System under Test. 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1.1 Radiated Emission and Bandedge Measurement. 16 4.1.2 Test Instruments 17 1.1.3 Test Setup. 19 4.1.4 Deviation from Test Standard 19 4.1.5 Test Results 20 4.1.7 Test Instruments 20 4.1.8 Deviation from Test Standard 19 4.1.6 EUT Operating Conditions. 20 4.1.7 Test Results 21 4.2 Test Instruments 26 4.2.2 Test Instruments 26 4.2.2 Test Instruments 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results </th <th>3</th> <th>G</th> <th>eneral Information</th> <th> 7</th>	3	G	eneral Information	7			
3.2 Description of Test Modes 9 3.2.1 Test Mode Applicability and Tested Channel Detail 10 3.3 Duty Cycle of Test Signal 12 3.4 Description of Support Units 13 3.4.1 Configuration of System under Test 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1.1 Radiated Emission and Bandedge Measurement 16 4.1.2 Test travements 17 4.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 21 4.1.6 U Operating Conditions 20 4.1.7 Test Results 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 27 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results 27 4.2.6 UT Operating Conditions 27 4.2.6 Test Results <t< th=""><th></th><th>31</th><th>General Description of FUT (Sub-GHz)</th><th>7</th></t<>		31	General Description of FUT (Sub-GHz)	7			
3.2.1 Test Mode Applicability and Tested Channel Detail 10 3.3 Duty Cycle of Test Signal 12 3.4 Description of Support Units 13 3.4.1 Configuration of System under Test 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Linits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 4.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Results 20 4.1.7 Test Results 20 4.1.7 Test Results 21 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 20 4.1.7 Test Results 26 4.2.1 Units of Conducted Emission Measurement 26 4.2.2 Test Results 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results							
3.3 Duty Cycle of Test Signal 12 3.4 Description of System under Test 13 3.4.1 Configuration of System under Test 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Limits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 4.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Results 21 14.1 Test Results 21 14.1 Deviation from Test Standard 19 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results 28 3.6 Bandwidth Measurement 30 3.1 Limits of 6dB Bandwidth Measuremen		-	Test Mode Applicability and Tested Channel Detail	10			
3.4.1 Configuration of System under Test 14 3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Limits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 14.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 20 4.1.7 Test Results 21 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 3.3 GBB Bandwidth Measurement 30 3.3.1 Limits of GdB Bandwidth Measurement		3.3	Duty Cycle of Test Signal	12			
3.5 General Description of Applied Standards 15 4 Test Types and Results 16 4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Linits of Radiated Emission and Bandedge Measurement 16 4.1.1 Linits of Radiated Emission and Bandedge Measurement 16 4.1.1 Linits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 4.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 21 4.1.6 EUT Operating Conditions 20 4.2 Conducted Emission Measurement 26 4.2.1 Linits of Conducted Emission Measurement 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures 27 2.4 Deviation from Test Standard 27 4.2.5 Test Setup 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Result 30 4.3.1 Linits of 6dB Bandwidth Measurement 30		3.4					
4 Test Types and Results 16 4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Limits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 4.1.3 Test Instruments 17 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 20 4.1.7 Test Results 21 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 4.3 GB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.2 Test Procedure 30 4.3.3 Deviation from Test Standard 30 </td <td></td> <td></td> <td></td> <td></td>							
4.1 Radiated Emission and Bandedge Measurement 16 4.1.1 Limits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 19 4.1.5 Test Setup 19 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 4.3 6dB Bandwidth Measurement 30 4.3.1 Limits of Coducted Cutput Measurement 30 4.3.2 Test Setup 30 4.3.3 Test Instruments 30 4.3.4 Test Setup 30 4							
4.1.1 Limits of Radiated Emission and Bandedge Measurement 16 4.1.2 Test Instruments 17 4.1.3 Test Procedures. 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup. 19 4.1.6 EUT Operating Conditions. 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement. 26 4.2.1 Limits of Conducted Emission Measurement. 26 4.2.2 Test Instruments 26 4.2.1 Test Procedures. 27 4.2.4 Limits of Conditions. 27 4.2.5 Test Procedures. 27 4.2.6 EUT Operating Conditions. 27 4.2.7 Test Results 28 3.3 GdB Bandwidth Measurement. 30 4.3.1 Limits of GB Bandwidth Measurement. 30 4.3.2 Test Setup. 30 4.3.3 Test Nesults. 28 4.3 6dB Bandwidth Measurement. 30 4.3.4 Test Setup. 30 4.3.5 </th <th>4</th> <th>т</th> <th>est Types and Results</th> <th>16</th>	4	т	est Types and Results	16			
4.1.2 Test Instruments 17 4.1.3 Test Procedures. 18 4.1.4 Deviation from Test Standard 19 4.1.6 EUT Operating Conditions. 20 4.1.7 Test Results 21 4.1.6 EUT Operating Conditions. 20 4.1.7 Test Results 21 4.1.2 Conducted Emission Measurement. 26 4.2.1 Limits of Conducted Emission Measurement. 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures. 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup. 27 4.2.6 EUT Operating Conditions. 27 4.2.7 Test Results 28 4.3 GdB Bandwidth Measurement. 30 4.3.1 Limits of 6dB Bandwidth Measurement. 30 4.3.2 Test Setup. 30 4.3.3 Test Instruments 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 31 4.4.4 Test Procedure							
4.1.3 Test Procedures 18 4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup. 19 4.1.6 EUT Operating Conditions 20 4.1.7 Test Setup. 20 4.1.7 Test Setup. 20 4.1.7 Test Setup. 20 4.1.7 Test Setup. 20 4.1.7 Test Results 20 4.1.7 Test Results 21 4.2. Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results 28 4.3 6dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.2 Test Setup. 30 4.3.3 Test Instruments 30 4.3.4 Test Network 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 </td <td></td> <td></td> <td></td> <td></td>							
4.1.4 Deviation from Test Standard 19 4.1.5 Test Setup 19 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 4.3 6dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.2 Test Instruments 30 4.3.3 Test Instruments 30 4.3.4 EV Cocedure 30 4.3.5 Deviation from Test Standard 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measurement 32 4.4 Test Procedure 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measu							
4.1.5 Test Setup. 19 4.1.6 EUT Operating Conditions 20 4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.1 Test Instruments 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Results 28 4.3 6dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.1 Test Setup. 30 4.3.3 Test Nesults 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measurement 32 4.4.1 Limits of Con							
4.1.6 EUT Operating Conditions. 20 4.1.7 Test Results. 21 4.2 Conducted Emission Measurement. 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Procedures. 26 4.2.3 Test Procedures. 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup. 27 4.2.6 EUT Operating Conditions. 27 4.2.7 Test Results 28 3 6dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement. 30 4.3.3 Test Instruments 30 4.3.4 Test Setup. 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions. 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measurement 32 4.3.6 EUT Operating Conditions. 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measurement 32 <t< td=""><td></td><td></td><td></td><td></td></t<>							
4.1.7 Test Results 21 4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 4.3 6dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.3 Test Netruments 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 30 4.3.6							
4.2 Conducted Emission Measurement 26 4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup. 27 4.2.6 EUT Operating Conditions 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 6 dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.2 Test Setup 30 4.3.3 Test Instruments 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measurement 32 4.4.1 Limits of Conducted Output Power Measurement 32 4.4.1 Limits of Conducted Output Power Measurement 32 <							
4.2.1 Limits of Conducted Emission Measurement 26 4.2.2 Test Instruments 26 4.2.3 Test Procedures 27 4.2.4 Deviation from Test Standard 27 4.2.5 Test Setup 27 4.2.6 EUT Operating Conditions 27 4.2.7 Test Results 28 4.3 6dB Bandwidth Measurement 30 4.3.1 Limits of 6dB Bandwidth Measurement 30 4.3.3 Test Results 30 4.3.4 Test Setup 30 4.3.5 Deviation from Test Standard 30 4.3.4 Test Procedure 30 4.3.5 Deviation from Test Standard 30 4.3.6 EUT Operating Conditions 30 4.3.7 Test Result 31 4.4 Conducted Output Power Measurement 32 4.4.1 Limits of Conducted Output Power Measurement 32 4.4.2 Test Instruments 32 4.4.4 Test Procedures 32 4.4.5 Deviation from Test Standard 32							
4.2.2 Test Instruments264.2.3 Test Procedures.274.2.4 Deviation from Test Standard274.2.5 Test Setup.274.2.6 EUT Operating Conditions274.2.7 Test Results284.3 6dB Bandwidth Measurement304.3.1 Limits of 6dB Bandwidth Measurement304.3.3 Test Instruments304.3.4 Test Procedure304.3.5 Deviation from Test Standard304.3.6 EUT Operating Conditions304.3.7 Test Result304.3.8 Test Instruments304.3.9 Test Setup304.3.1 East Setup304.3.5 Deviation from Test Standard304.3.6 EUT Operating Conditions304.3.7 Test Result314.4Conducted Output Power Measurement324.4.1 Limits of Conducted Output Power Measurement324.4.3 Test Instruments324.4.4 Test Procedures324.4.5 Deviation from Test Standard324.4.6 EUT Operating Conditions324.4.7 Test Results334.5 Deviation from Test Standard324.4.6 EUT Operating Conditions324.4.7 Test Results334.5 Procedures344.5.1 Limits of Power Spectral Density Measurement344.5.2 Test Setup344.5.3 Test Instruments344.5.5 Deviation from Test Standard344.5.5 Deviation from Test Standard34							
4.2.3 Test Procedures274.2.4 Deviation from Test Standard274.2.5 Test Setup274.2.6 EUT Operating Conditions274.2.7 Test Results283 6dB Bandwidth Measurement304.3.1 Limits of 6dB Bandwidth Measurement304.3.2 Test Setup304.3.3 Test Instruments304.3.4 Test Procedure304.3.5 Deviation from Test Standard304.3.6 EUT Operating Conditions304.3.7 Test Result304.3.6 EUT Operating Conditions304.3.7 Test Result314.4 Conducted Output Power Measurement324.4.1 Limits of Conducted Output Power Measurement324.4.2 Test Setup324.4.3 Test Instruments324.4.4 Test Procedures324.4.5 Deviation from Test Standard324.4.6 EUT Operating Conditions324.4.7 Test Results324.4.8 Test Procedures324.4.9 Deviation from Test Standard324.4.1 Limits of Power Spectral Density Measurement344.5.1 Limits of Power Spectral Density Measurement344.5.1 Test Results334.5.7 Test Results344.5.4 Test Procedure344.5.5 Deviation from Test Standard344.5.5 Deviation from Test Standard344.5.5 Deviation from Test Standard344.5.5 Deviation from Test Standard34							
4.2.4Deviation from Test Standard274.2.5Test Setup.274.2.6EUT Operating Conditions.274.2.7Test Results.284.36dB Bandwidth Measurement.304.3.1Limits of 6dB Bandwidth Measurement.304.3.2Test Setup.304.3.3Test Instruments.304.3.4Test Procedure304.3.5Deviation from Test Standard.304.3.6EUT Operating Conditions.304.3.7Test Result.304.3.8Eut Operating Conditions.304.3.9Test Result.314.4Conducted Output Power Measurement.324.4.1Limits of Conducted Output Power Measurement.324.4.3Test Instruments.324.4.4Test Procedures.324.4.5Deviation from Test Standard.324.4.6EUT Operating Conditions.324.4.7Test Results.324.4.8Test Procedures.324.4.4Test Procedures.324.4.5Deviation from Test Standard.324.4.6EUT Operating Conditions.324.4.7Test Results.334.5Power Spectral Density Measurement.344.5.1Limits of Power Spectral Density Measurement.344.5.3Test Instruments.344.5.4Test Procedure344.5.5Deviation from Test Standard344							
4.2.6EUT Operating Conditions274.2.7Test Results284.36dB Bandwidth Measurement304.3.1Limits of 6dB Bandwidth Measurement304.3.2Test Setup304.3.3Test Instruments304.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result304.3.8EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup324.4.3Test Instruments324.4.4Test Instruments324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Standard344.5.5Deviation from Test Standard34							
4.2.7Test Results284.36dB Bandwidth Measurement304.3.1Limits of 6dB Bandwidth Measurement304.3.2Test Setup304.3.3Test Instruments304.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.3Test Instruments324.4.4Test Setup324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results333.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard344.5.5Deviation from Test Standard34		4.2.5	Test Setup	27			
4.36dB Bandwidth Measurement304.3.1Limits of 6dB Bandwidth Measurement304.3.2Test Setup304.3.3Test Instruments304.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup324.4.3Test Instruments324.4.4Test Instruments324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results333.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard344.5.5Deviation from Test Standard344.5.5Deviation from Test Standard34							
4.3.1Limits of 6dB Bandwidth Measurement304.3.2Test Setup304.3.3Test Instruments304.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup324.4.3Test Instruments324.4.4Test Procedures324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.3.2Test Setup.304.3.3Test Instruments304.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup324.4.3Test Instruments324.4.4Test Procedures324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results324.4.8Forerating Conditions324.4.9Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.2Test Instruments344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34		-					
4.3.3Test Instruments304.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Instruments324.4.3Test Instruments324.4.4Test Procedures324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results324.4.8Fore Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.2Test Instruments344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.3.4Test Procedure304.3.5Deviation from Test Standard304.3.6EUT Operating Conditions.304.3.7Test Result314.4Conducted Output Power Measurement.324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup.324.4.3Test Instruments324.4.4Test Procedures.324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions.324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard344.5.5Deviation from Test Standard34							
4.3.5Deviation from Test Standard304.3.6EUT Operating Conditions304.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup324.4.3Test Instruments324.4.4Test Procedures324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.3.6EUT Operating Conditions.304.3.7Test Result.314.4Conducted Output Power Measurement.324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup.324.4.3Test Instruments324.4.4Test Procedures.324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions.324.4.7Test Results334.5Power Spectral Density Measurement.344.5.1Limits of Power Spectral Density Measurement.344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.3.7Test Result314.4Conducted Output Power Measurement324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup324.4.3Test Instruments324.4.4Test Procedures324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.4Conducted Output Power Measurement.324.4.1Limits of Conducted Output Power Measurement324.4.2Test Setup.324.4.3Test Instruments324.4.4Test Procedures.324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions.324.4.7Test Results334.5Power Spectral Density Measurement.344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.4.2Test Setup.324.4.3Test Instruments324.4.4Test Procedures.324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions.324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.4.3Test Instruments324.4.4Test Procedures324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.2Test Setup344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34		4.4.1	Limits of Conducted Output Power Measurement	32			
4.4.4Test Procedures.324.4.5Deviation from Test Standard324.4.6EUT Operating Conditions.324.4.7Test Results334.5Power Spectral Density Measurement.344.5.1Limits of Power Spectral Density Measurement344.5.2Test Setup.344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.4.5Deviation from Test Standard324.4.6EUT Operating Conditions324.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.2Test Setup344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.4.6EUT Operating Conditions							
4.4.7Test Results334.5Power Spectral Density Measurement344.5.1Limits of Power Spectral Density Measurement344.5.2Test Setup344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.5Power Spectral Density Measurement.344.5.1Limits of Power Spectral Density Measurement344.5.2Test Setup.344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.5.1Limits of Power Spectral Density Measurement344.5.2Test Setup344.5.3Test Instruments344.5.4Test Procedure344.5.5Deviation from Test Standard34							
4.5.2Test Setup		-					
4.5.3Test Instruments							
4.5.4 Test Procedure344.5.5 Deviation from Test Standard34							
4.5.5 Deviation from Test Standard							
		4.5.6	EUT Operating Condition	34			



A	opend	ix – Information of the Testing Laboratories	. 39
5	Ρ	ictures of Test Arrangements	. 38
	4.6.7	Test Results	. 36
		EUT Operating Condition	
	4.6.5	Deviation from Test Standard	. 36
	4.6.4	Test Procedure	. 36
		Test Instruments	
	4.6.2	Test Setup	. 36
	4.6.1	Limits of Conducted Out of Band Emission Measurement	. 36
		Conducted Out of Band Emission Measurement	
	4.5.7	Test Results	. 35



	Release Control Record	
Issue No.	Description	Date Issued
RF190711E04-3	Original release.	Aug. 21, 2019



Certificate of Co-iformityProduct:Arlo Pro 3 SmartHubBrand:ArloBrand:VMB4540PCBA Rev:V005Sample Status:ENGINEERING SAMPLEApplicant:Arlo Technologies, Inc.Test Date:July 22 to Aug. 02, 2019Standards:47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

1

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :	Wondy	, Date	e: Aug. 21, 2019	
	Wendy Wu / Spec	ialist		
Approved by :	\mathcal{M}	, Date	e: Aug. 21, 2019	
	May Chen / Mana	ager		



2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)							
FCC Clause	Test Item	Result	Remarks				
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.21dB at 21.16797MHz.				
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -2.6dB at 3660.00MHz.				
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.				
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.				
15.247(b)	Conducted power	PASS	Meet the requirement of limit.				
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.				
15.203	Antenna Requirement	PASS	No antenna connector is used.				

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
	1GHz ~ 6GHz	5.1 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT (Sub-GHz)

Product	Arlo Pro 3 SmartHub
Brand	Arlo
Test Model	VMB4540
PCBA Rev	V005
S/N	A081957BA0091
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	O-QPSK
Modulation Technology	DSSS
Transfer Rate	100kbps
Operating Frequency	915MHz
Number of Channel	1
Output Power	112.98mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	RJ45 cable x 1 (Unshielded, 1.8m)

Note:

1. There are WLAN, Z-Wave, Zigbee and Sub-GHz technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN 2.4GHz	Z-Wave	Zigbee	Sub-GHz

2. Simultaneously transmission condition.

Condition	Technology							
1	WLAN 2.4GHz Z-Wave Zigbee Sub-GHz							
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.								

3. The EUT must be supplied with a power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	Spec.	Color				
1	Arlo	2AAJ018F1	Input: 100-120Vac, 0.6A, 50/60Hz Output: 12V, 1.5A	Black/White				
1	AIIU	ZAAJUTOFT	DC output cable (Unshielded, 1.8m)	DIACK/WITILE				
			Input: 100-240Vac, 0.6A, 50/60Hz					
2	Arlo	2AAJ018FC	Output: 12V, 1.5A	Black/White				
			DC output cable (Unshielded, 1.8m)					
			Input: 100-120Vac, 0.56A, 50/60Hz					
3	Arlo	AD2076F10	Output: 12V, 1.5A	Black/White				
			DC output cable (Unshielded, 1.8m)					
Note: From the above models, the worst radiated emission and AC power conducted emission test was								

found in Adapter 3. Therefore only the test data of the modes were recorded in this report.



	WLAN							
Ant . No.	Antenna Net Gain (dBi)	Fre	quency rang (GHz)	Antenr	a type	Connector ty	pe	Cable Length (mm)
1	2.8	2	.4~2.4835	Dip	ole	i-pex (MHF)	65
2	2.5	2	.4~2.4835	Dip	ole	i-pex (MHF)	85
				Sub-GH	z			
Ant No.	Antenna Gain (dBi)		Frequency rang (MHz)		Ante	Antenna type		Connector type
1	1		860~93	30		PIFA	NA	
				Z-Wave				
Ant No.	Antenna Gain Frequency rang (dBi) (MHz)		-	Ante	enna type		Connector type	
1	1		860~93	30		PIFA		NA
				Zigbee				
Ant No.	Antenna Gain (dBi)		Frequency rang (GHz)		Ante	enna type		Connector type
1	3		2.4~2.48	335		Chip		NA

4. The antennas provided to the EUT, please refer to the following table:

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



3.2 Description of Test Modes

1 channel is provided to this EUT:

Channel	Frequency (MHz)
1	915



3.2.1 Test Mode Applicability and Tested Channel Detail

CONFIGURE MODE		APPLIC	DECODIDITION						
	RE≥1G	RE<1G	PLC	APCM	DESCRIPTION				
- V V V -									
Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz									
Radiated Err	ission Test (/	Above 1GHz):							
Pre-Scan between architectu	has been con available modu re).	ducted to dete ulations, data r	rmine the worst-cas ates and antenna po cted for the final test	orts (if EUT	with antenna				
AVAILABLE	TESTE	D CHANNEL	MODULATION TECHNOLOGY		ULATION TYPE	DATA RATE (kbps)			
1		1	DSSS		O-QPSK	100			
architectu	re). channel(s) wa :	as (were) selec	ates and antenna po cted for the final test MODULATION	as listed b	elow.	-			
	:		MODULATION						
CHANNEL	IESIE	D CHANNEL	TECHNOLOGY DSSS		ULATION TYPE	DATA RATE (kbps)			
 Power Line Conducted Emission Test: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below. 									
Pre-Scan between architectu	available modu re).	ulations, data r	ates and antenna po	orts (if EUT	with antenna o				
Pre-Scan between architectu	available modu re). channel(s) wa	ulations, data r	ates and antenna po	orts (if EUT	with antenna o				



Antenna Port Conducted Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL TESTED CHANNEL		MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (kbps)
1	1	DSSS	O-QPSK	100

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY	
RE≥1G	20deg. C, 70%RH	120Vac, 60Hz	Ryan Du	
RE<1G	21deg. C, 70%RH 24deg. C, 65%RH	120Vac, 60Hz	Ryan Du	
PLC	23deg. C, 76%RH	120Vac, 60Hz	Andy Ho	
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin	



3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

_						
				RBW 10 MHz VBW 10 MHz SWT 100 ms	(T1) MP VIEW	
41-	Ref 41 dBm	Att 30 dB		SW1 100 ms		
	Offset 21 dB					
30-						
20-						
10-						
0-						
-10-						
-20 -						
-30 -						
-40 -						
-50 -						
-59 -	Center 915 MHz	1 1	1 1 10 ms/	1 1	I	BUREAU



3.4 Description of Support Units

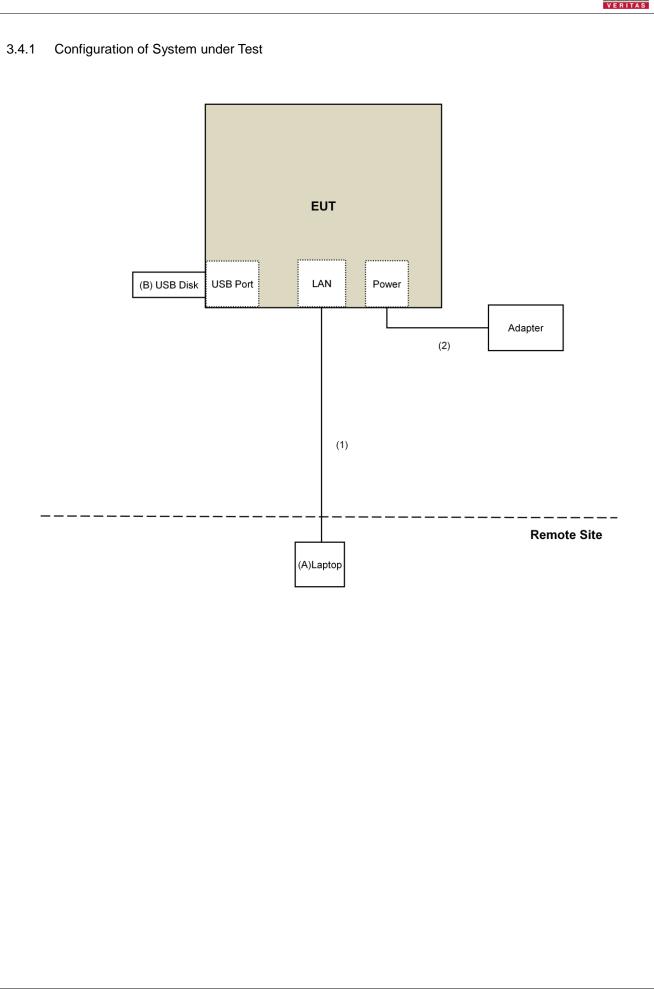
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product Brand Model No.		Model No.	Serial No.	FCC ID	Remarks
Α.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
В.	USB Disk	SanDisk	USB 3.0 Flash Drive	NA	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	DC Cable	1	1.8	No	0	Supplied by client





3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247) KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.



4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (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

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

- 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 2. The test was performed in 966 Chamber No. 4.
- 3. Loop antenna was used for all emissions below 30 MHz.
- 4. Tested Date: July 22 to Aug. 02, 2019



4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 height of antenna 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

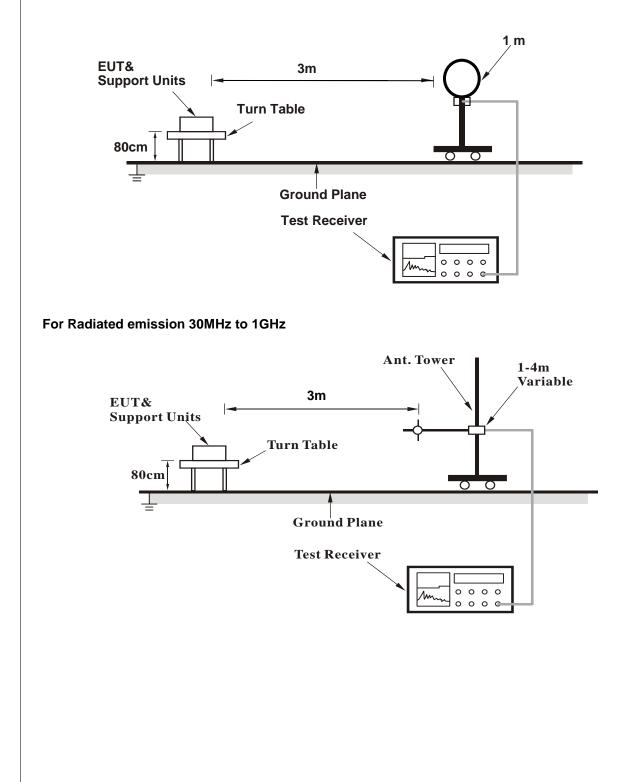


4.1.4 Deviation from Test Standard

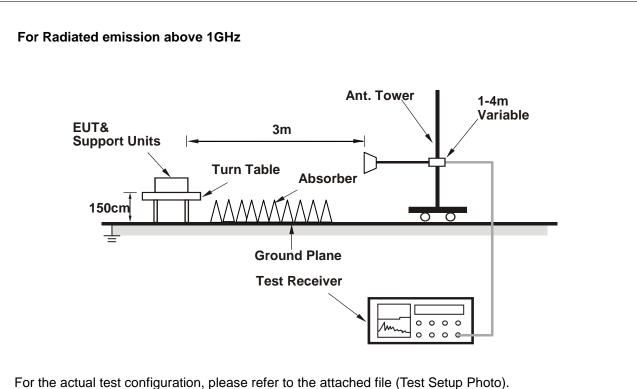
No deviation.

4.1.5 Test Setup

For Radiated emission below 30MHz







- 4.1.6 EUT Operating Conditions
- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (HyperTerminal paste 115200 SubGig.txt) has been activated to set the EUT under transmission condition continuously at specific channel frequency.



4.1.7 Test Results

Above 1GHz Data:

CHANNEL	TX Channel 1	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz	FUNCTION	Average (AV)

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2745.00	49.5 PK	74.0	-24.5	1.77 H	322	50.8	-1.3
2	2745.00	41.9 AV	54.0	-12.1	1.77 H	322	43.2	-1.3
3	3660.00	52.4 PK	74.0	-21.6	1.02 H	119	52.4	0.0
4	3660.00	50.9 AV	54.0	-3.1	1.02 H	119	50.9	0.0
5	4575.00	45.4 PK	74.0	-28.6	1.32 H	154	43.5	1.9
6	4575.00	40.2 AV	54.0	-13.8	1.32 H	154	38.3	1.9
		ANTENNA		& TEST DI	STANCE: V	ERTICAL A	Т 3 М	
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2745.00	50.1 PK	74.0	-23.9	1.12 V	2	51.4	-1.3
2	2745.00	42.3 AV	54.0	-11.7	1.12 V	2	43.6	-1.3
3	3660.00	52.7 PK	74.0	-21.3	2.96 V	244	52.7	0.0
4	3660.00	51.4 AV	54.0	-2.6	2.96 V	244	51.4	0.0
5	4575.00	46.1 PK	74.0	-27.9	1.55 V	73	44.2	1.9
6	4575.00	40.8 AV	54.0	-13.2	1.55 V	73	38.9	1.9
	ADIZO.							

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value



Below 1GHz Data:

CHANNEL	TX Channel 1	DETECTOR FUNCTION	
FREQUENCY RANGE	9kHz ~ 1GHz		Quasi-Peak (QP)

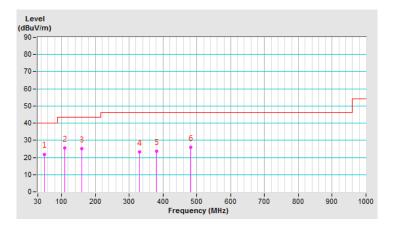
	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)			
1	50.15	21.9 QP	40.0	-18.1	1.50 H	299	30.0	-8.1			
2	108.71	25.6 QP	43.5	-17.9	1.50 H	143	36.3	-10.7			
3	160.39	25.2 QP	43.5	-18.3	2.00 H	244	33.3	-8.1			
4	329.87	23.2 QP	46.0	-22.8	1.00 H	234	29.3	-6.1			
5	380.45	23.6 QP	46.0	-22.4	1.50 H	121	28.4	-4.8			
6	481.81	25.8 QP	46.0	-20.2	2.50 H	153	27.9	-2.1			

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
- 5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



r			
CHANNEL	TX Channel 1	DETECTOR	
FREQUENCY RANGE	9kHz ~ 1GHz	FUNCTION	Quasi-Peak (QP)

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M											
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)				
1	36.06	27.3 QP	40.0	-12.7	1.00 V	84	36.3	-9.0				
2	105.72	29.7 QP	43.5	-13.8	2.00 V	219	40.9	-11.2				
3	164.56	24.7 QP	43.5	-18.8	1.50 V	198	32.8	-8.1				
4	277.14	20.7 QP	46.0	-25.3	1.00 V	147	28.4	-7.7				
5	372.09	22.8 QP	46.0	-23.2	1.00 V	178	27.8	-5.0				
6	413.87	23.8 QP	46.0	-22.2	1.00 V	215	27.7	-3.9				

REMARKS:

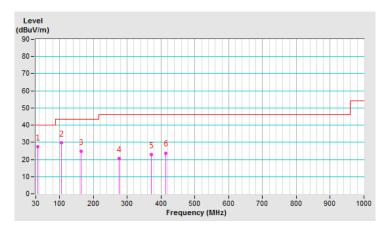
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.

5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

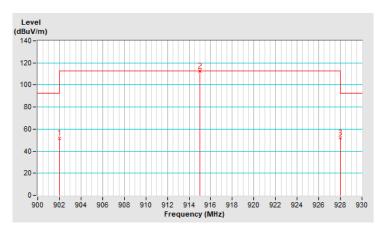


CHANNEL	TX Channel 1	DETECTOR	Overi Deek (OD)
FREQUENCY RANGE	900MHz ~ 930MHz	FUNCTION	Quasi-Peak (QP)

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)			
1	902.00	51.7 QP	92.5	-40.8	1.00 H	354	45.5	6.2			
2	*915.00	112.5 QP			1.00 H	354	106.1	6.4			
3	928.00	52.2 QP	92.5	-40.3	1.00 H	354	45.5	6.7			

REMARKS:

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
- 5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
- 5. " * ": Fundamental frequency.

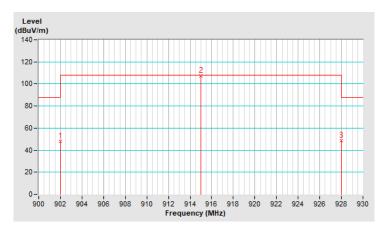


CHANNEL	TX Channel 1	DETECTOR	
FREQUENCY RANGE	900MHz ~ 930MHz	FUNCTION	Quasi-Peak (QP)

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)			
1	902.00	48.2 QP	87.7	-39.5	1.25 V	62	42.0	6.2			
2	*915.00	107.7 QP			1.25 V	62	101.3	6.4			
3	928.00	48.7 QP	87.7	-39.0	1.25 V	62	42.0	6.7			

REMARKS:

- 1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- 2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) Pre-Amplifier Factor(dB)
- 3. Margin value = Emission Level Limit value
- 4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
- 5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
- 5. " * ": Fundamental frequency.





4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

	Conducted Limit (dBuV)			
Frequency (MHz)	Quasi-peak	Average		
0.15 - 0.5	66 - 56	56 - 46		
0.50 - 5.0	56	46		
5.0 - 30.0	60	50		

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

- 1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- 2. The test was performed in Conduction 1.
- 3 Tested Date: July 31, 2019



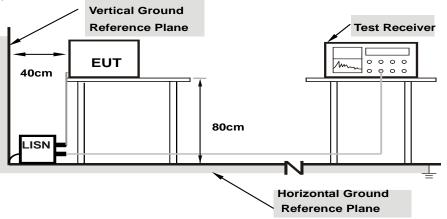
4.2.3 Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit 20dB) was not recorded.
- **Note:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.



4.2.7 Test Results

Phase			Line (L)			Detector Function Quasi- Average			Peak (QP) / e (AV)	
	Free	Corr.	Readin	g Value	Emissi	on Level	Lir	nit	Margin	
No	Freq.	Factor	[dB	(uV)]	[dB	[dB (uV)]		[dB (uV)]		3)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.96	38.26	19.16	48.22	29.12	66.00	56.00	-17.78	-26.88
2	0.17344	9.97	34.65	15.55	44.62	25.52	64.79	54.79	-20.17	-29.27
3	0.29063	9.97	24.26	14.66	34.23	24.63	60.51	50.51	-26.28	-25.88
4	0.36484	9.98	28.28	23.16	38.26	33.14	58.62	48.62	-20.36	-15.48
5	10.51563	10.68	22.00	15.06	32.68	25.74	60.00	50.00	-27.32	-24.26
6	21.16797	11.39	25.37	24.40	36.76	35.79	60.00	50.00	-23.24	-14.21

Remarks:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission level Limit value
- 4. Correction factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value



_											
Phase Neutral (N)			D	Detector Function Quasi-Po Average			Peak (QP) je (AV)	/			
_ Cor		Corr.	Readin	g Value	Emissi	Emission Level		Limit		gin	
Ν	No Freq.		Freq. Factor		[dB (uV)]		(uV)]	[dB (uV)]		(dB)	
		[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15000	9.94	38.12	18.09	48.06	28.03	66.00	56.00	-17.94	-27.97
	2	0.16172	9.95	38.06	22.69	48.01	32.64	65.38	55.38	-17.37	-22.74
	3	0.18516	9.95	33.67	18.25	43.62	28.20	64.25	54.25	-20.63	-26.05
	4	0.22031	9.95	28.16	11.21	38.11	21.16	62.81	52.81	-24.70	-31.65
4	5	9.50000	10.52	21.43	15.33	31.95	25.85	60.00	50.00	-28.05	-24.15
	6	16.46094	10.90	21.78	19.85	32.68	30.75	60.00	50.00	-27.32	-19.25

Remarks:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission level Limit value
- 4. Correction factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) \ge 3 x RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

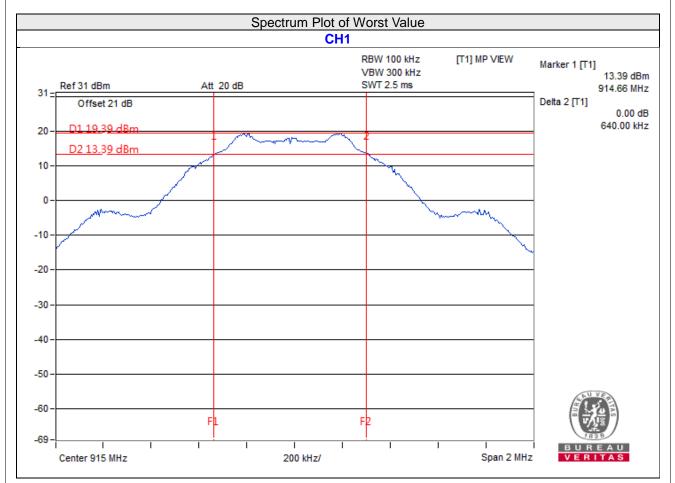
4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



4.3.7 Test Result

Channel	Channel Frequency (MHz)		Minimum Limit (MHz)	Pass / Fail
1	915	0.64	0.5	Pass



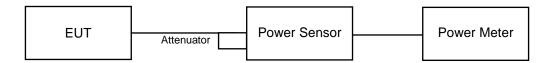


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.



4.4.7 Test Results

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	915	112.98	20.53	30.00	Pass

FOR AVERAGE POWER

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	915	112.46	20.51



4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set the VBW \geq 3 × RBW.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

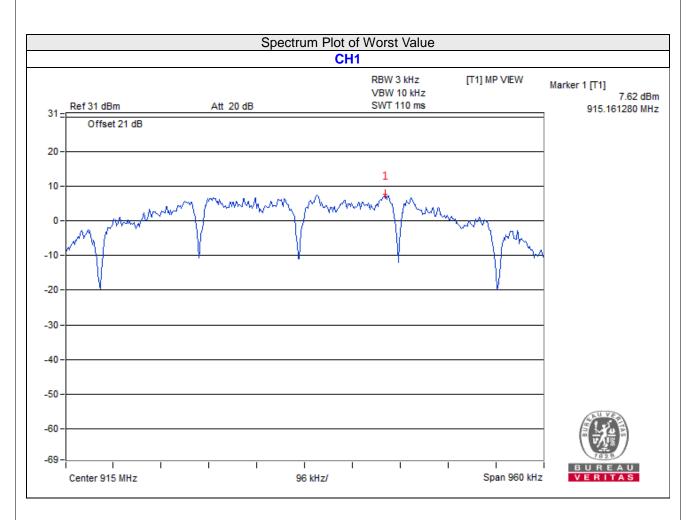
4.5.6 EUT Operating Condition

Same as Item 4.3.6



4.5.7 Test Results

Channel	Frequency	PSD	Limit	Pass
	(MHz)	(dBm/3kHz)	(dBm/3kHz)	/Fail
1	915	7.62	8	Pass





4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

- 1. Set the RBW = 100 kHz.
- 2. Set the VBW \geq 300 kHz.
- 3. Detector = peak.
- 4. Sweep time = auto couple.
- 5. Trace mode = max hold.
- 6. Allow trace to fully stabilize.
- 7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

- 1. Set RBW = 100 kHz.
- 2. Set VBW ≥ 300 kHz.
- 3. Detector = peak.
- 4. Sweep = auto couple.
- 5. Trace Mode = max hold.
- 6. Allow trace to fully stabilize.
- 7. Use the peak marker function to determine the maximum amplitude level.
- 4.6.5 Deviation from Test Standard

No deviation.

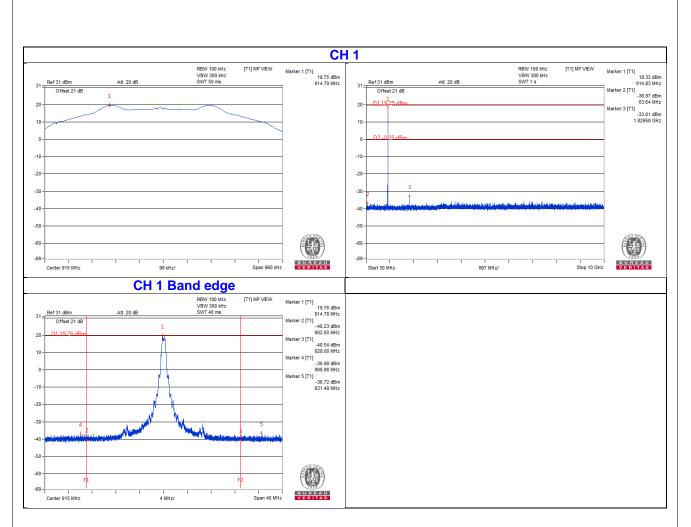
4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.







5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).



Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF/Telecom Lab Tel: 886-3-6668565 Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab Tel: 886-3-3183232 Fax: 886-3-3270892

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

The address and road map of all our labs can be found in our web site also.

--- END ---