FCC RADIO TEST REPORT

Report No. : FR9D0510-02AA



FCC RADIO TEST REPORT

FCC ID	:	MSQ-RTAXI600
Equipment	:	Wireless-AX5700 Dual-band Gigabit Router
Brand Name	:	ASUS
Model Name	:	RT-AX86U/RT-AX5700
Applicant	;	ASUSTeK COMPUTER INC.
		1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Manufacturer (1)	:	Compal Networking(KunShan) CO., LTD.
		No.520,Nan Bang RD., Economic & Technical Development Zone, KunShan,JiangSu,China
Manufacturer (2)	÷	ARCADYAN TECHNOLOGY (VIETNAM) CO., LTD.
		Ba Thien Industrial Park, Ba Hien commune, Binh Xuyen district, Vinh Phuc Province
Standard	:	47 CFR FCC Part 15.247

The product was received on Mar. 18, 2020, and testing was started from Mar. 18, 2020 and completed on Sep.08, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Mas

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

TEL : 886-3-656-9065 FAX : 886-3-656-9085 Report Template No.: CB-A10_10 Ver1.0 Page Number: 1 of 28Issued Date: Oct. 12, 2020Report Version: 01



Table of Contents

Histor	story of this test report3				
Sumn	nary of Test Result	4			
1	General Description	5			
1.1	Information	5			
1.2	Applicable Standards	9			
1.3	Testing Location Information	9			
1.4	Measurement Uncertainty	9			
2	Test Configuration of EUT	10			
2.1	Test Channel Mode	10			
2.2	The Worst Case Measurement Configuration	11			
2.3	EUT Operation during Test	12			
2.4	Accessories	12			
2.5	Support Equipment	13			
2.6	Test Setup Diagram	14			
3	Transmitter Test Result	17			
3.1	DTS Bandwidth	17			
3.2	Maximum Conducted Output Power	18			
3.3	Power Spectral Density	20			
3.4	Emissions in Non-restricted Frequency Bands	22			
3.5	Emissions in Restricted Frequency Bands	23			
4	Test Equipment and Calibration Data	27			
Apper	ndix A. Test Results of DTS Bandwidth				
Apper	ndix B. Test Results of Maximum Conducted Output Power				
Apper	ndix C. Test Results of Power Spectral Density				
Apper	ndix D. Test Results of Emissions in Non-restricted Frequency Bands				
Apper	ndix E. Test Results of Emissions in Restricted Frequency Bands				
Apper	ndix F. Test Photos				
Photo	ographs of EUT v01				



History of this test report

Report No.	Version	Description	Issued Date
FR9D0510-02AA	01	Initial issue of report	Oct. 12, 2020



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.247(a)	DTS Bandwidth	PASS	-
3.2	15.247(b)	Maximum Conducted Output Power	PASS	-
3.3	15.247(e)	Power Spectral Density	PASS	-
3.4	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.5	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-
Reference	to Sporton Pro	oject No.: 9D0510-01.		

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

- 1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
- 2. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen Report Producer: Cindy Peng



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz) IEEE Std. 802.11		Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20), VHT20, ax (HEW20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40), VHT40, ax (HEW40)	2422-2452	3-9 [7]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	3TX
2.4-2.4835GHz	802.11g	20	3TX
2.4-2.4835GHz	802.11n HT20	20	3TX
2.4-2.4835GHz	802.11n HT20-BF	20	3TX
2.4-2.4835GHz	VHT20	20	3TX
2.4-2.4835GHz	VHT20-BF	20	3TX
2.4-2.4835GHz	802.11ax HEW20	20	3TX
2.4-2.4835GHz	802.11ax HEW20-BF	20	3TX
2.4-2.4835GHz	802.11n HT40	40	3TX
2.4-2.4835GHz	802.11n HT40-BF	40	3TX
2.4-2.4835GHz	VHT40	40	3TX
2.4-2.4835GHz	VHT40-BF	40	3TX
2.4-2.4835GHz	802.11ax HEW40	40	3TX
2.4-2.4835GHz	802.11ax HEW40-BF	40	3TX

Note:

- 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- HEW20, HEW40 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.



1.1.2 Antenna Information

	Por		Port					Antenna Gain (dBi)							
Set	Ant.	2.4	5	Brand	P/N	Туре	Connector	2 4011-	5GHz	5GHz	5GHz	5GHz			
		GHz	GHz					2.4GHZ	Band 1	Band 2	Band 3	Band 4			
	1	1	1												
	2	2	3	WHA YU	C660-510490-A	Dipole	Reversed-SMA	1.66	1.86	1.86	1.90	1.84			
1	3	3	4												
	4	-	2	WHA YU	C660-510390-A	PCB	I-PEX	-	2.90	2.90	3.00	2.52			
	1	-	-												
2	2	-	-	WHA YU	C660-510492-A	Dipole	Reversed-SMA	1.52	1.41	1.45	1.72	1.74			
2 ;	3	-	-												
	4	-	-	WHA YU	C660-510390-A	PCB	I-PEX	-	2.90	2.90	3.00	2.52			
	1	-	-												
	2	-	-	WHLSIN	CDL D000	Dipole	Reversed-SMA	1.52 1.66	1.66	1.76 1.82	1.82	1.65			
3	3	-	-		SBLBOUZ										
	4	-	-	WHLSIN	RFPCA302603I M5B301	PCB	I-PEX	-	2.17	2.30	2.20	2.49			

	Directional Gain (dBi)						
Set	2.4GHz	5GHz Band 1	5GHz Band 2	5GHz Band 3	5GHz	z Band 4	
	Nss1	Nss1	Nss1	Nss1	Nss1	Nss2	
1	6.43	6.63	6.63	6.67	6.61	4.85	

Note1: The above information was declared by manufacturer.

Note2: The EUT has three sets of antenna, and each set contains four antennas.

For 2.4GHz function (3TX/3RX):

Only the higher gain antenna "Set 1" was tested. Port 1, Port 2 and Port 3 could transmit/receive simultaneously.

For 5GHz function (4TX/4RX):

Only the higher gain antenna "Set 1" was tested.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

Note3: 5GHz Band with four antennas and device designed the three dipole antennas are used in the vertical position, the other one PCB antenna is used in the horizontal position.

So array gain only calculation 10log(3).



1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.949	0.23	12.419m	100
802.11g	0.947	0.24	2.065m	1k
802.11ax HEW20-BF	0.941	0.26	2.926m	1k
802.11ax HEW40-BF	0.915	0.39	4.358m	300

Note:

DC is Duty Cycle.

DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From power adapter					
	With beamforming Image: Without beamforming					
Beamforming Function	The product has beamforming function for n/VHT/ax in 2.4GHz and n/ac/ax in 5GHz.					
Function	Point-to-multipoint D Point-to-point					
Test Software Version	Mtool V3.2.0.0					

Note: The above information was declared by manufacturer.

1.1.5 Table for EUT Supports Functions

Function	Support Type
AP Router	Master
Bridge	Client without radar detection
Repeater	Master
Mesh	Master

After evaluating, for "AP Router" and "Mesh" were performed for AC power-line conducted emissions test and recorded in this report.

1.1.6 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description	
RT-AX86U	There is nothing different of two model names just for different marketing use	
RT-AX5700	There is nothing different of two model names, just for different marketing use.	

From the above models, model: RT-AX86U was selected as representative model for the test and its data was recorded in this report.



1.1.7 Table for SKU Information

EUT	2.4G FEM		
EOI	Brand Name	Model Name	
SKU 1	Qorvo	QPF4216B	
SKU 2	SKYWORKS	SKY85331-11	

Note: The SKU 2 is same as SKU 1 except for the 2.4G FEM.

1.1.8 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR9D0510-0AA

Below is the table for the change of the product with respect to the original one.

	Modifications	Performance Checking
1.	Adding LED Light PCB Board for the SKU 1.	Emissions in Restricted Frequency Bands Below 1GHz.
2.	Adding SKU 2 (The SKU 2 is same as SKU 1 except for the 2.4G FEM)	 DTS Bandwidth. Maximum Conducted Output Power. Power Spectral Density. Emissions in Non-restricted Frequency Bands. Emissions in Restricted Frequency Bands.
3. 4.	Changing the applicant address to "1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan" from "4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan". Updating adapter 3 label (Adding BSMI Labeling information)	Do not affect the test results.



1.2 Applicable Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 558074 D01 v05r02
- FCC KDB 662911 D01 v02r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

	Testing Location						
	HWA YA	ADD	:	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)			
		TEL	:	886-3-327-3456 FAX : 886-3-327-0973			
\boxtimes	JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.			
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH02-CB	Lance Wu	24.1~25.2°C / 53~58%	Aug. 27, 2020-Sep. 01, 2020
Radiated Below 1GHz for mode 1	03CH04-CB	Eason Chen	21.1~22.5°C / 46~49%	Mar. 18, 2020
Radiated Below 1GHz for mode 2	03CH05-CB	Stim Sung	24.7~25.7°C / 55~58%	Aug. 26, 2020~Sep.08, 2020
Radiated Above 1GHz	03CH06-CB	Stim Sung	24.4~25.3°C / 53~57%	Aug. 26, 2020~Sep.08, 2020

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Radiated Emission (30MHz ~ 1,000MHz) for mode 1	4.3 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz) for mode 2	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.6 dB	Confidence levels of 95%
Conducted Emission	2.8 dB	Confidence levels of 95%
Output Power Measurement	1.4 dB	Confidence levels of 95%
Power Density Measurement	2.8 dB	Confidence levels of 95%
Bandwidth Measurement	0.39%	Confidence levels of 95%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11b_Nss1,(1Mbps)_3TX	-
2412MHz	95
2437MHz	100
2462MHz	100
802.11g_Nss1,(6Mbps)_3TX	-
2412MHz	76
2417MHz	83
2437MHz	100
2457MHz	84
2462MHz	78
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	-
2412MHz	71
2417MHz	83
2437MHz	100
2457MHz	83
2462MHz	71
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	-
2422MHz	67
2427MHz	72
2437MHz	83
2447MHz	76
2452MHz	71

Note:

٠

There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for n/VHT/ax in 2.4GHz and n/ac/ax in 5GHz. Only beamforming mode has been tested and recorded in this test report.



2.2 The Worst Case Measurement Configuration

Th	The Worst Case Mode for Following Conformance Tests			
Tests Item DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands				
Test Condition	Conducted measurement at transmit chains			
Test Mode	SKU 2 - Antenna Set 1			

The Worst Case Mode for Following Conformance Tests				
Tests Item	Emissions in Restricted Frequency Bands			
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.			
Operating Mode < 1GHz	СТХ			
 The EUT was performed at Adapter 1 ~ Adapter 3, the worst case was found at Adapter 3. So the measurement will follow this same test configuration. The EUT has two operate mode as below: 1. WLAN 2.4GHz 2. WLAN 5GHz And, from above the worst case was found at WLAN 2.4GHz. So the measurement will follow this same test configuration. 				
1	SKU 1 - WLAN 2.4GHz + Adapter 3 + Antenna Set 1			
2 SKU 2 - WLAN 2.4GHz + Adapter 3 + Antenna Set 1				
For operating mode 1 is the worst case and it was record in this test report.				
Operating Mode > 1GHz	СТХ			
Test Mode	SKU 2 - Antenna Set 1			

The Worst Case Mode for Following Conformance Tests				
Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation				
Operating Mode	Operating Mode			
1 WLAN 2.4GHz + WLAN 5GHz + Antenna Set 1				
Refer to Sporton Test Report No.: FA9D0510-02 for Co-location RF Exposure Evaluation.				

Note: The EUT can only be used at Y axis position.



2.3 EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

- 1. During the test, the EUT operation to normal function.
- 2. Executed command fixed test channel under Telnet.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX Device and

transmit duty cycle no less than 98%.

2.4 Accessories

	Accessories						
No.	Equipment Name	Brand Name	Model Name	Rating	Remark		
1	Adapter 1	DELTA	ADP-45ZE B	INPUT: 100-240V ~ 50-60Hz, 1.2A OUTPUT: 19V, 2.37A	With the DC cable: Non-shielded, 1.8m		
2	Adapter 2	DELTA	ADP-45FE F	INPUT: 100-240V ~1.2A, 50-60Hz OUTPUT: 19V, 2.37A	With the DC cable: Non-shielded, 1.5m		
3	Adapter 3	AcBel	ADH011	INPUT: 100-240V ~1.4A, 50-60Hz OUTPUT: 19.5V, 2.31A, 45W MAX	With the DC cable: Non-shielded, 1.5m		
No.	Others						
4	Power cable*1: Non-shielded, 0.9m						
5	RJ-45 cable*1: Non-shielded, 1.5m						



2.5 Support Equipment

For RF Conducted and Radiated (below 1GHz):

	Support Equipment					
No.	o. Equipment Brand Name Model Name FCC ID					
А	NB	DELL	E4300	N/A		

For Radiated (above 1GHz):

For non-beamforming mode:

	Support Equipment						
No. Equipment Brand Name Model Name FCC ID							
А	A NB DELL E4300 N/A						

For beamforming mode:

Support Equipment							
No. Equipment Brand Name Model Name FCC ID							
А	NB	DELL	E4300	N/A			
В	NB	DELL	E4300	N/A			
С	RX Device	ASUS	RT-AX86U	MSQ-RTAXI600			



2.6 Test Setup Diagram













3 Transmitter Test Result

3.1 DTS Bandwidth

3.1.1 6dB Bandwidth Limit

6dB Bandwidth Limit

Systems using digital modulation techniques:

6 dB bandwidth ≥ 500 kHz.

3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

	Test Method						
•	For	the emission bandwidth shall be measured using one of the options below:					
	\square	Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.					
		Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.					
		Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.					

3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A



3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit

•	If $G_{TX} \le 6$ dBi, then $P_{Out} \le 30$ dBm (1 W)
---	--

•	Point-to-multipoint systems	(P2M): If G _{TX} :	> 6 dBi, then	$P_{Out} = 30 - ($	G _{TX} – 6) dBm
---	-----------------------------	-----------------------------	---------------	--------------------	--------------------------

- Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
- Smart antenna system (SAS):
 - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3 + 8$ dB dBm

 P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.

3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

	Test Method						
•	Max	imum Peak Conducted Output Power					
		Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).					
		Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).					
•	Max	imum Conducted Output Power					
	[dut	y cycle ≥ 98% or external video / power trigger]					
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.					
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-1A. (alternative)					
	duty	cycle < 98% and average over on/off periods with duty factor					
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.					
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)					
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3					
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)					
	Mea	surement using a power meter (PM)					
		Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using an RF average power meter).					
		Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (using an gate RF average power meter).					



•	For conducted measurement.						
	 If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. 						
	 If multiple transmit chains, EIRP calculation could be following as methods: P_{total} = P₁ + P₂ + + P_n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP_{total} = P_{total} + DG 						

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B



3.3 **Power Spectral Density**

3.3.1 Power Spectral Density Limit

Power Spectral Density Limit

■ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

	Test Method							
•	Peal outp the c conc of th PSD	k power spectral density procedures that the same method as used to determine the conducted ut power. If maximum peak conducted output power was measured to demonstrate compliance to putput power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum ducted output power was measured to demonstrate compliance to the output power limit, then one e average PSD procedures shall be used, as applicable based on the following criteria (the peak procedure is also an acceptable option).						
	\square	Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.2 Method PKPSD.						
	[duty	/ cycle ≥ 98% or external video / power trigger]						
		Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.3 Method AVGPSD-1.						
		Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.5 Method AVGPSD-2.						
		Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.7 Method AVGPSD-3.						
	duty	cycle < 98% and average over on/off periods with duty factor						
		Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.4 Method AVGPSD-1A. (alternative).						
		Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.6 Method AVGPSD-2A. (alternative)						
		Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10.8 Method AVGPSD-3A. (alternative)						
•	For	conducted measurement.						
		If The EUT supports multiple transmit chains using options given below:						
		Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.						
		Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,						
TEI								



Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Refer as Appendix C



3.4 Emissions in Non-restricted Frequency Bands

3.4.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit					
RF output power procedure Limit (dBc)					
Peak output power procedure	20				
Average output power procedure	30				

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method

Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.

3.4.4 Test Setup



3.4.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D



3.5 Emissions in Restricted Frequency Bands

3.5.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit						
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)			
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300			
0.490~1.705	24000/F(kHz)	33.8 - 23	30			
1.705~30.0	30	29	30			
30~88	100	40	3			
88~216	150	43.5	3			
216~960	200	46	3			
Above 960	500	54	3			

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.



3.5.3 Test Procedures

	Test Method							
•	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].							
•	 Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. 							
•	For the transmitter unwanted emissions shall be measured using following options below:							
	 Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands. 							
	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle ≥98%).							
	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).							
	☑ Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T).							
	□ Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW \ge 1/T, where T is pulse time.							
	Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.							
	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.							
•	For the transmitter band-edge emissions shall be measured using following options below:							
	 Refer as FCC KDB 558074 clause 8.7 & C63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below. 							
	 Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements. 							
	 Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz). 							
	 For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB 							
	 For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred. 							



3.5.4 Test Setup







3.5.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.5.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.5.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix E



Test Equipment and Calibration Data 4

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH04-CB)
BILOG ANTENNA with 6 dB attenuator	SCHAFFNER / EMCI	22021 / AT-N0607	CBL 6112B / N-6-06	30MHz~1GHz	Oct. 12, 2019	Oct. 11, 2020	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	310N	187291	30MHz~1GHz	Mar. 20, 2019	Mar. 19, 2020	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Dec. 18, 2019	Dec. 17, 2020	Radiation (03CH04-CB
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH04-CB)
Low Cable	WOKEN	RG402	Low Cable-03+22	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)
Test Software	Audix	E3	6.120210d	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH05-CB)
BILOG ANTENNA with 6 dB attenuator	Teseq / EMCI	CBL 6112D / N-6-06	35236 / AT-N0610	30MHz~1GHz	Mar. 27, 2020	Mar. 26, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	30MHz~1GHz	Apr. 28, 2020	Apr. 27, 2021	Radiation (03CH05-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	May 12, 2020	May 11, 2021	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH05-CB)
Low Cable	WOKEN	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
Horn Antenna	SCHWAEZBE CK	BBHA 9120 D	BBHA 9120 D-1292	1GHz~18GHz	Jul. 22, 2020	Jul. 21, 2021	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA91702 52	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH06-CB)
Pre-Amplifier	AGILENT	83017A	MY53270064	1GHz~26.5GHz	May 07, 2020	May 06, 2021	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
High Cable	WOKEN	RG402	High Cable-05	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
High Cable	WOKEN	RG402	High Cable-05+24	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)

Page Number : 27 of 28

: Oct. 12, 2020 Issued Date

Report Version : 01



Report No. : FR9D0510-02AA

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	101027	9kHz~40GHz	Jul. 27, 2020	Jul. 26, 2021	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-01	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-3	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Sep. 11, 2019	Sep. 10, 2020	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Sep. 11, 2019	Sep. 10, 2020	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

Note: Calibration Interval of instruments listed above is one year.



Summary

,,						
Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW	
	(Hz)	(Hz)		(Hz)	(Hz)	
2.4-2.4835GHz	-	-	-	-	-	
802.11b_Nss1,(1Mbps)_3TX	7.55M	10.47M	10M5G1D	6.55M	10.22M	
802.11g_Nss1,(6Mbps)_3TX	16.425M	16.917M	16M9D1D	15.7M	16.692M	
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	19M	19.115M	19M1D1D	16.975M	19.04M	
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	37.6M	37.631M	37M6D1D	35.4M	37.231M	

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth; Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth;



EBW Result

Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	Port 3-N dB	Port 3-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_3TX	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	7.05M	10.37M	7.55M	10.345M	7.525M	10.345M
2437MHz	Pass	500k	6.55M	10.27M	7M	10.22M	7.025M	10.445M
2462MHz	Pass	500k	7M	10.395M	7.05M	10.445M	7.05M	10.47M
802.11g_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	16.325M	16.742M	16.35M	16.767M	16.325M	16.692M
2437MHz	Pass	500k	16.075M	16.917M	16.275M	16.742M	15.7M	16.767M
2462MHz	Pass	500k	16.425M	16.817M	16.375M	16.892M	16.35M	16.692M
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	18.975M	19.04M	18.975M	19.04M	18.95M	19.09M
2437MHz	Pass	500k	18.2M	19.09M	18.7M	19.04M	16.975M	19.09M
2462MHz	Pass	500k	18.975M	19.04M	19M	19.115M	18.85M	19.115M
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-
2422MHz	Pass	500k	37.6M	37.581M	36.75M	37.481M	36.9M	37.631M
2437MHz	Pass	500k	35.45M	37.281M	35.5M	37.281M	35.4M	37.231M
2452MHz	Pass	500k	36.7M	37.431M	36.35M	37.481M	36.25M	37.231M

Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;





















802.11ax HEW20-BF_Nss1,(MCS0)_3TX

EBW









802.11ax HEW40-BF_Nss1,(MCS0)_3TX











802.11ax HEW40-BF_Nss1,(MCS0)_3TX

EBW




Summary

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_3TX	29.66	0.92470
802.11g_Nss1,(6Mbps)_3TX	29.66	0.92470
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	29.51	0.89331
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	25.44	0.34995



Appendix B

Result

Mode	Result	DG	Port 1	Port 2	Port 3	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_3TX	-	-	-	-	-	-	-
2412MHz	Pass	1.66	23.80	23.48	23.57	28.39	30.00
2437MHz	Pass	1.66	24.79	24.90	24.97	29.66	30.00
2462MHz	Pass	1.66	24.35	24.59	24.88	29.38	30.00
802.11g_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-
2412MHz	Pass	1.66	18.95	18.40	18.69	23.46	30.00
2417MHz	Pass	1.66	20.66	20.18	20.55	25.24	30.00
2437MHz	Pass	1.66	24.86	24.95	24.85	29.66	30.00
2457MHz	Pass	1.66	20.36	20.28	20.95	25.31	30.00
2462MHz	Pass	1.66	18.83	18.74	19.31	23.74	30.00
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
2412MHz	Pass	6.43	17.78	17.61	17.73	22.48	29.57
2417MHz	Pass	6.43	20.90	20.50	20.57	25.43	29.57
2437MHz	Pass	6.43	24.69	24.71	24.83	29.51	29.57
2457MHz	Pass	6.43	20.64	20.38	20.83	25.39	29.57
2462MHz	Pass	6.43	17.35	17.48	17.49	22.21	29.57
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
2422MHz	Pass	6.43	16.93	16.85	17.10	21.73	29.57
2427MHz	Pass	6.43	18.00	17.75	18.08	22.72	29.57
2437MHz	Pass	6.43	20.46	20.60	20.92	25.44	29.57
2447MHz	Pass	6.43	18.84	18.55	18.99	23.57	29.57
2452MHz	Pass	6.43	17.42	17.51	17.63	22.29	29.57

DG = Directional Gain; **Port X** = Port X output power



Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	· ·
802.11b_Nss1,(1Mbps)_3TX	5.30
802.11g_Nss1,(6Mbps)_3TX	4.57
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	2.48
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	-3.35

RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;



Result

Mode	Result	DG	Port 1	Port 2	Port 3	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11b_Nss1,(1Mbps)_3TX	-	-	-	-	-	-	-
2412MHz	Pass	6.43	0.21	1.36	1.51	4.25	7.57
2437MHz	Pass	6.43	2.20	1.43	3.13	5.17	7.57
2462MHz	Pass	6.43	0.16	2.32	2.74	5.30	7.57
802.11g_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-
2412MHz	Pass	6.43	-7.05	-8.12	-6.77	-2.69	7.57
2437MHz	Pass	6.43	-0.97	-0.30	0.53	4.57	7.57
2462MHz	Pass	6.43	-7.17	-7.86	-6.29	-2.65	7.57
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
2412MHz	Pass	6.43	-8.56	-7.20	-7.95	-3.10	7.57
2437MHz	Pass	6.43	-1.97	-0.55	-2.22	2.48	7.57
2462MHz	Pass	6.43	-8.17	-6.70	-11.20	-4.10	7.57
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-
2422MHz	Pass	6.43	-12.59	-13.16	-12.47	-8.29	7.57
2437MHz	Pass	6.43	-8.15	-8.60	-7.31	-3.35	7.57
2452MHz	Pass	6.43	-10.91	-10.36	-10.67	-5.87	7.57

DG = Directional Gain; **RBW** = 500 kHz for 5.725-5.85GHz band / 1MHz for other band; **PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;



















CSE(Non-restricted Band) Result

Appendix D

Summary

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_3TX	Pass	2.43649G	16.71	-13.29	30.29M	-42.78	2.39904G	-37.56	2.4G	-42.33	2.48468G	-48.41	23.51093G	-46.01	3
802.11g_Nss1,(6Mbps)_3TX	Pass	2.44451G	13.47	-16.53	30M	-42.12	2.39974G	-36.31	2.4G	-36.78	2.4839G	-51.81	15.06539G	-44.97	1
802.11ax HEW20-BF_Nss1,(MCS0)_3TX	Pass	2.442G	13.25	-16.75	2.10079G	-52.91	2.39986G	-33.77	2.4G	-37.11	2.48404G	-51.75	23.4126G	-46.14	1
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	Pass	2.44196G	6.96	-23.04	38.3M	-52.63	2.39948G	-38.69	2.4G	-41.76	2.48658G	-46.80	24.44189G	-46.43	2



CSE(Non-restricted Band) Result

Appendix D

Result

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11b_Nss1,(1Mbps)_3TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43649G	16.71	-13.29	31.75M	-43.27	2.39848G	-39.71	2.4G	-42.62	2.48358G	-50.26	15.01481G	-46.25	1
2412MHz	Pass	2.43649G	16.71	-13.29	32.62M	-44.22	2.39802G	-39.27	2.4G	-42.98	2.4875G	-51.83	24.90167G	-45.61	2
2412MHz	Pass	2.43649G	16.71	-13.29	30.29M	-42.78	2.39904G	-37.56	2.4G	-42.33	2.48468G	-48.41	23.51093G	-46.01	3
2437MHz	Pass	2.43649G	16.71	-13.29	38.45M	-45.32	2.39858G	-46.76	2.4G	-47.25	2.485G	-50.40	15.05977G	-45.68	1
2437MHz	Pass	2.43649G	16.71	-13.29	31.17M	-43.31	2.39964G	-45.98	2.4G	-49.52	2.4835G	-48.94	15.34915G	-46.22	2
2437MHz	Pass	2.43649G	16.71	-13.29	33.2M	-44.20	2.3987G	-49.05	2.4G	-48.32	2.48394G	-49.42	16.28755G	-45.78	3
2462MHz	Pass	2.43649G	16.71	-13.29	32.33M	-43.18	2.39772G	-47.13	2.4835G	-47.02	2.48374G	-46.00	24.50271G	-45.93	1
2462MHz	Pass	2.43649G	16.71	-13.29	30.29M	-42.40	2.39592G	-46.49	2.4835G	-47.35	2.4845G	-45.43	15.05415G	-44.40	2
2462MHz	Pass	2.43649G	16.71	-13.29	30.29M	-40.95	2.39916G	-47.58	2.4835G	-45.14	2.48398G	-44.84	24.57295G	-46.28	3
802.11g_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.44451G	13.47	-16.53	30M	-42.12	2.39974G	-36.31	2.4G	-36.78	2.4839G	-51.81	15.06539G	-44.97	1
2412MHz	Pass	2.44451G	13.47	-16.53	31.17M	-44.33	2.39988G	-36.72	2.4G	-38.84	2.48554G	-52.30	15.04853G	-44.42	2
2412MHz	Pass	2.44451G	13.47	-16.53	38.45M	-44.49	2.3998G	-37.50	2.4G	-37.63	2.4842G	-51.61	21.45995G	-46.24	3
2417MHz															
2437MHz	Pass	2.44451G	13.47	-16.53	31.75M	-42.09	2.39762G	-39.32	2.4G	-44.24	2.48368G	-46.96	16.84665G	-45.00	1
2437MHz	Pass	2.44451G	13.47	-16.53	32.04M	-41.91	2.39764G	-43.74	2.4G	-45.61	2.4851G	-49.71	16.34936G	-45.91	2
2437MHz	Pass	2.44451G	13.47	-16.53	30M	-41.10	2.3986G	-40.85	2.4G	-43.57	2.48538G	-48.19	24.50271G	-45.80	3
2457MHz															
2462MHz	Pass	2.44451G	13.47	-16.53	30.58M	-44.44	2.39698G	-49.60	2.4835G	-45.94	2.48402G	-41.81	15.33511G	-45.35	1
2462MHz	Pass	2.44451G	13.47	-16.53	49.81M	-45.31	2.3951G	-49.29	2.4835G	-46.42	2.48386G	-44.15	23.1485G	-45.77	2
2462MHz	Pass	2.44451G	13.47	-16.53	39.03M	-43.75	2.39884G	-50.54	2.4835G	-46.47	2.48358G	-43.00	24.87076G	-45.38	3
802.11ax HEW20-BF_Nss1,(MCS0)_3TX		-		-	-	-	-	-	-	-	-		-	-	
2412MHz	Pass	2.442G	13.25	-16.75	2.10079G	-52.91	2.39986G	-33.77	2.4G	-37.11	2.48404G	-51.75	23.4126G	-46.14	1
2412MHz	Pass	2.442G	13.25	-16.75	31.75M	-52.01	2.3999G	-36.86	2.4G	-36.55	2.5034G	-51.08	24.82581G	-45.59	2
2412MHz	Pass	2.442G	13.25	-16.75	37.28M	-52.99	2.39988G	-35.10	2.4G	-35.25	2.48354G	-51.73	24.89886G	-44.85	3
2417MHz															
2437MHz	Pass	2.442G	13.25	-16.75	49.81M	-45.46	2.39996G	-38.58	2.4G	-39.54	2.48374G	-42.71	15.07663G	-45.63	1
2437MHz	Pass	2.442G	13.25	-16.75	38.45M	-45.71	2.39796G	-43.29	2.4G	-44.38	2.48456G	-48.04	17.68952G	-45.88	2
2437MHz	Pass	2.442G	13.25	-16.75	32.62M	-52.81	2.39954G	-42.45	2.4G	-44.74	2.48468G	-46.21	16.6865G	-44.88	3
2457MHz															
2462MHz	Pass	2.442G	13.25	-16.75	38.74M	-53.57	2.39716G	-49.58	2.4835G	-51.31	2.48376G	-44.17	24.84828G	-46.10	1
2462MHz	Pass	2.442G	13.25	-16.75	30.58M	-52.67	2.398G	-49.46	2.4835G	-45.26	2.48368G	-44.11	15.03729G	-45.68	2
2462MHz	Pass	2.442G	13.25	-16.75	30.58M	-51.41	2.39736G	-50.26	2.4835G	-47.19	2.4836G	-44.27	15.01201G	-45.17	3
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.44196G	6.96	-23.04	30M	-48.93	2.39824G	-44.25	2.4G	-45.74	2.48682G	-51.99	24.94671G	-46.11	1
2422MHz	Pass	2.44196G	6.96	-23.04	33.44M	-52.73	2.39992G	-41.50	2.4G	-44.58	2.48358G	-52.71	15.05502G	-46.08	2
2422MHz	Pass	2.44196G	6.96	-23.04	31.72M	-51.47	2.3988G	-42.52	2.4G	-44.79	2.48426G	-52.29	15.2906G	-45.86	3
2427MHz															
2437MHz	Pass	2.44196G	6.96	-23.04	31.15M	-53.25	2.3996G	-38.78	2.4G	-42.10	2.48418G	-45.04	16.93408G	-45.94	1
2437MHz	Pass	2.44196G	6.96	-23.04	38.3M	-52.63	2.39948G	-38.69	2.4G	-41.76	2.48658G	-46.80	24.44189G	-46.43	2
2437MHz	Pass	2.44196G	6.96	-23.04	2.17373G	-53.12	2.39956G	-39.45	2.4G	-43.02	2.48702G	-44.56	24.88501G	-45.94	3
2447MHz															
2452MHz	Pass	2.44196G	6.96	-23.04	33.44M	-51.42	2.39988G	-50.11	2.4G	-50.56	2.48354G	-47.79	24.52603G	-46.01	1
2452MHz	Pass	2.44196G	6.96	-23.04	32M	-51.47	2.39988G	-49.84	2.4G	-48.34	2.48386G	-48.18	17.69692G	-45.72	2
2452MHz	Pass	2.44196G	6.96	-23.04	32M	-47.95	2.39676G	-50.46	2.4835G	-49.78	2.4851G	-47.02	15.05502G	-46.03	3





























Vertical 30 MHz to 1,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	CableA Loss	ntenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	36.79	35.04	40.00	-4.96	46.20	0.74	20.31	32.21	100	113	QP	VERTICAL
2	43.58	35.09	40.00	-4.91	49.96	0.80	16.54	32.21	125	291	Peak	VERTICAL
3	49.40	30.21	40.00	-9.79	47.54	0.89	13.96	32.18	100	180	Peak	VERTICAL
4	73.65	29.61	40.00	-10.39	48.52	1.00	12.22	32.13	150	175	Peak	VERTICAL
5	76.56	29.45	40.00	-10.55	48.22	1.00	12.36	32.13	150	64	Peak	VERTICAL
6	102.75	29.66	43.50	-13.84	43.53	1.22	16.98	32.07	300	204	Peak	VERTICAL



Horizontal 30 MHz to 1,000 MHz

	Freq	Level	Limit Line	Over Limit	Read Level	CableA Loss	ntenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	150.28	27.57	43.50	-15.93	41.71	1.46	16.54	32.14	200	253	Peak	HORIZONTAL
2	390.84	28.34	46.00	-17.66	36.48	2.36	21.55	32.05	125	150	Peak	HORIZONTAL
3	451.95	27.69	46.00	-18.31	34.16	2.51	22.87	31.85	100	14	Peak	HORIZONTAL
4	695.42	29.07	46.00	-16.93	32.30	3.18	25.50	31.91	200	181	Peak	HORIZONTAL
5	804.06	31.12	46.00	-14.88	33.43	3.32	26.02	31.65	150	51	Peak	HORIZONTAL
6	852.56	31.63	46.00	-14.37	33.40	3.51	26.32	31.60	300	232	Peak	HORIZONTAL



Appendix E.2

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW40-BF_Nss1,(MCS0)_3TX	Pass	AV	2.39G	53.90	54.00	-0.10	3	Vertical	360	1.61	-







































Inf

110.66

-Inf

79.10

3

AV

2.4094G

4.00

27.56



352

1.66

Vertical













Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA	
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
PK	2.39G	72.75	74.00	-1.25	41.15	3	Vertical	353	1.59	-	27.60	4.00	-	
AV	2.39G	53.55	54.00	-0.45	21.95	3	Vertical	353	1.59	-	27.60	4.00	-	
PK	2.4196G	121.11	Inf	-Inf	89.58	3	Vertical	353	1.59	-	27.52	4.01	-	
AV	2.4192G	113.38	Inf	-Inf	81.85	3	Vertical	353	1.59	-	27.52	4.01	-	

















Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA	
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
РК	2.4526G	122.69	Inf	-Inf	91.26	3	Vertical	268	1.80	-	27.40	4.03	-	
AV	2.4522G	113.55	Inf	-Inf	82.12	3	Vertical	268	1.80	-	27.40	4.03	-	
РК	2.4835G	72.93	74.00	-1.07	41.49	3	Vertical	268	1.80	-	27.40	4.04	-	
AV	2.4838G	53.39	54.00	-0.61	21.95	3	Vertical	268	1.80	-	27.40	4.04	-	




Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA	
(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
2.4594G	120.03	Inf	-Inf	88.60	3	Vertical	330	1.58	-	27.40	4.03	-	
2.4586G	111.16	Inf	-Inf	79.73	3	Vertical	330	1.58	-	27.40	4.03	-	
2.4836G	71.20	74.00	-2.80	39.76	3	Vertical	330	1.58	-	27.40	4.04	-	
2.4835G	53.64	54.00	-0.36	22.20	3	Vertical	330	1.58	-	27.40	4.04	-	
	Freq (Hz) 2.4594G 2.4586G 2.4836G 2.4835G	Freq Level (Hz) (dBuV/m) 2.4594G 120.03 2.4586G 111.16 2.4836G 71.20 2.4835G 53.64	Freq Level Limit (Hz) (dBuV/m) (dBuV/m) 2.4594G 120.03 Inf 2.4586G 111.16 Inf 2.4836G 71.20 74.00 2.4835G 53.64 54.00	Freq Level Limit Margin (Hz) (dBuV/m) (dBuV/m) (dB) 2.4594G 120.03 Inf -Inf 2.4586G 111.16 Inf -2.80 2.4835G 53.64 54.00 -0.36	Freq Level Limit Margin Raw (Hz) (dBuV/m) (dBuV/m) (dBuV) 2.4594G 120.03 Inf -Inf 88.00 2.4586G 111.16 Inf -Inf 97.73 2.4836G 71.20 74.00 -2.80 39.76 2.4835G 53.64 54.00 -0.36 22.20	Freq Level Limit Margin Raw Dist (Hz) (dBuV/m) (dBuV/m) (dB) (dBuV) (m) 2.4594G 120.03 Inf -Inf 8.60 3 2.4586G 111.16 Inf -Inf 79.73 3 2.4836G 71.20 74.00 -2.80 39.76 3 2.4835G 53.64 54.00 -0.36 22.20 3	Freq Level Limit Margin Raw Dist Condition (Hz) (dBuV/m) (dBuV (dBuV) (m) 2.4594G 120.03 Inf -Inf 88.60 3 Vertical 2.4586G 111.16 Inf -Inf 79.73 3 Vertical 2.4836G 71.20 74.00 -2.80 39.76 3 Vertical 2.4835G 53.64 54.00 -0.36 22.20 3 Vertical	Freq Level Limit Margin Raw Dist Condition Azimuth (Hz) (dBuV/m) (dBuV/m) (dBu (dBuV) (m) (*) (*) 2.4594G 120.03 Inf -Inf 88.60 3 Vertical 330 2.4586G 111.16 Inf -Inf 79.73 3 Vertical 330 2.4836G 71.20 74.00 -2.80 39.76 3 Vertical 330 2.4835G 53.64 54.00 -0.36 22.20 3 Vertical 330	Freq Level Limit Margin Raw Dist Condition Azimuth Height (Hz) (dBuV/m) (dBuV/m) (dB (dBuV) (m) (m) (m) 2.4594G 120.03 Inf -Inf 88.60 3 Vertical 300 1.58 2.4586G 111.16 Inf -Inf 79.73 3 Vertical 300 1.58 2.4836G 71.20 74.00 -2.80 39.76 3 Vertical 30.0 1.58 2.4835G 53.64 54.00 -0.36 22.20 3 Vertical 33.0 1.58	Freq Level Limit Margin Raw Dist Condition Azimuth Height Comment (Hz) (dBuV/m) (dBuV) (dBuV) (m) (°) (m) ° 24594G 120.03 Inf -Inf 88.06 3 Vertical 330 1.58 - 2.4586G 111.6 Inf -2.80 39.76 3 Vertical 330 1.58 - 2.48356 53.64 54.00 -0.36 22.20 3 Vertical 330 1.58 -	Freq Level Limit Margin Raw Dist Condition Azimuth Height Comment AF (Hz) (dBu/m) (dBu/m) (dBu (dBu/m) (m) (n) (m)	Freq Level Limit Margin Raw Dist Condition Azimuth Height Comment AF CL (Hz) (dBu/m) (dBu/m) (dBu/m) (dBu/m) (m) (m) (m) (m) (dB) (dB) (dB) 24594G 120.03 Inf -Inf 88.00 3 Vertical 330 1.58 - 27.40 4.03 2.4586G 111.60 Inf 79.73 3 Vertical 330 1.58 - 27.40 4.03 2.4836G 71.20 74.00 -2.80 39.76 3 Vertical 330 1.58 - 27.40 4.04 2.4835G 53.64 54.00 -0.36 22.20 3 Vertical 330 1.58 - 27.40 4.04	Freq Level Limit Margin Raw Dist Condition Azimuth Height Comment AF CL PA (H2) (dBuV/m) (dBuV/m) (dBu (dBuV/m) (dBuV/m) (dBuV/m) (dBuV/m) (dBuV/m) (dBuV/m) (dBuV/m) (m) (m) (m) (dBuV/m) (dBuV/m) (dBuV/m) (dBuV/m) (dBuV/m) (m) (m) (dBuV/m) <td< td=""></td<>































































































