





# FCC Test Report

FCC ID	:	VW3FAST5566
Equipment	:	Home Hub
Brand Name	:	BELL CANADA
Model Name	:	FAST5566
Applicant	:	SAGEMCOM BROADBAND SAS 250 Route de l'Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE
Manufacturer	:	SAGEMCOM BROADBAND SAS 250 Route de l'Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE
Standard	:	47 CFR FCC Part 15.247

The product was received on Apr. 21, 2019, and testing was started from Apr. 30, 2019 and completed on May 13, 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.

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



## **Table of Contents**

HISTO	RY OF THIS TEST REPORT	3
SUMM	IARY OF TEST RESULT	4
1	GENERAL DESCRIPTION	5
1.1	Information	5
1.2	Testing Applied Standards	7
1.3	Testing Location Information	7
1.4	Measurement Uncertainty	8
2	TEST CONFIGURATION OF EUT	9
2.1	Test Condition	9
2.2	The Worst Case Measurement Configuration	9
2.3	Accessories	10
2.4	Support Equipment	10
2.5	Test Setup Diagram	11
3	TRANSMITTER TEST RESULT	12
3.1	Emissions in Restricted Frequency Bands	12
4	TEST EQUIPMENT AND CALIBRATION DATA	15
APPE	NDIX A. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS	
APPE	NDIX B. TEST RESULTS OF RADIATED EMISSION CO-LOCATION	
APPE	NDIX C. TEST PHOTOS	
PHOT	OGRAPHS OF EUT V01	



## History of this test report

Report No.	Version	Description	Issued Date
FR9N2208-01AC	01	Initial issue of report	Jan. 14, 2021



## 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(d)	Emissions in Restricted Frequency Bands	PASS	-

#### **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:**

None

#### Reviewed by: Sam Tsai

Report Producer: Michelle Tsai



## **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)	2412-2462	1-11 [11]
2400-2483.5	n (HT40)	2422-2452	3-9 [7]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	4TX
2.4-2.4835GHz	802.11n HT20	20	4TX

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.

• BWch is the nominal channel bandwidth.

### 1.1.2 Antenna Information

Ant.	Ant. Location	Brand	Part Number	Antenna Type	Connector	Remark
1	Ant 5Q3_2B0	Ethertronics	W3P35x8F04	PIFA	I-Pex	Dual Band Ant.
2	Ant 2B1	Ethertronics	-	PCB	Murata	-
3	Ant 2B2	Ethertronics	-	PCB	Murata	-
4	Ant 5B0_2B3	Ethertronics	W3P35x8F04	PIFA	I-Pex	Dual Band Ant.
5	Ant 5B1	Ethertronics	W2P15x7F04	PIFA	I-Pex	-
6	Ant 5B2	Ethertronics	-	PCB	Murata	-
7	Ant 5B3	Ethertronics	-	PCB	Murata	-
8	Ant 5Q0	Ethertronics	N5x20BA2	PCB	Murata	-
9	Ant 5Q1	Ethertronics	N5x20BA2	PCB	Murata	-
10	Ant 5Q2	Ethertronics	W2P15x7F04	PIFA	I-Pex	-



	Gain (dBi)								
Ant.	2.4G	5G							
		UNII-1	UNII-2A	UNII-2C	UNII-3				
1	2.3	-	-	5	5				
2	4.9	-	-	-	-				
3	4	-	-	-	-				
4	2.3	5	5	-	-				
5	-	5	5	-	-				
6	-	5	5	-	-				
7	-	5	5	-	-				
8	-	-	-	1.9	1.9				
9	-	-	-	3.3	3.3				
10	-	-	-	4.1	4.1				

Note 1: The EUT has ten antennas.

#### For 2.4GHz function:

For IEEE 802.11 b/g/n mode (4TX/4RX):

Ant. 1, Ant. 2, Ant. 3 and Ant. 4 can be used as transmitting/receiving antenna.

#### For 5GHz function:

For IEEE 802.11a/n/ac mode (4TX/4RX):

Ant. 4, Ant. 5, Ant. 6 and Ant. 7 can be used as transmitting/receiving antenna for UNII-1 and UNII-2A.

Ant. 8, Ant. 9, Ant. 10 and Ant. 1 can be used as transmitting/receiving antenna for UNII-2C and UNII-3.

#### 1.1.3 EUT Information

	Operational Condition						
EUT	Γ Power T	уре	Fro	m AC Adapter			
EUT	<b>Functio</b>	า	$\boxtimes$	Point-to-multipo	int [		Point-to-point
Bea	mforming	g Function		With beamform	ing [	$\boxtimes$	Without beamforming
					Type of	EU	т
$\boxtimes$	Stand-alo	ne					
	Combine	d (EUT where	e the	radio part is fully	y integra	ated	within another device)
	Combined Equipment - Brand Name / Model No.:						
	Plug-in radio (EUT intended for a variety of host systems)						
	Host Syst	em - Brand I	Nam	e / Model No.:			
	Other:						



#### 1.1.4 Table for Permissive Change

This product is an extension of original one reported under FCC ID: VW3FAST5566

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

Modifications	Performance Checking
Antenna 1, 4, 5, and 10 gain were replaced	1.The worst case of radiated emission data above 1GHz for each frequency band was evaluated. 2.Photographs of EUT.

## 1.2 Testing Applied 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:

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

## **1.3 Testing Location Information**

	Testing Location						
$\boxtimes$	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		
	Test site Designation No. TW1190 with FCC.						
	JHUBEI ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)						
		TEL	:	886-3-656-9065	FAX : 886-3-656-9085		
				Test site Designation	on No. TW0006 with FCC.		
	Wen Shan ADD : No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)						
		TEL	:	886-3-318-0787	FAX : 886-3-318-0287		
	Test site Designation No. TW1097 with FCC.						

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date	
Radiated	03CH03-HY	Jeff Lin	19.8~25.7°C/51~65%	30/Apr/2020~13/May/2020	



## **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 (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%



## 2 Test Configuration of EUT

## 2.1 Test Condition

RF Conducted	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	120V

## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests							
Tests Item	Emissions in Restricted Frequency Banc	ls					
Test Condition	Radiated measurement f EUT consist of multiple antenna assembly (multiple antenna are used in EUT egardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.						
Operating Mode > 1GHz	СТХ						
1	Adapter Mode						
	X Plane	Z Plane					
Orthogonal Planes of EUT							
Worst Planes of EUT	V						

The Worst Case Mode for Following Conformance Tests						
Tests Item	Simultaneous Transmission Analysis					
Test Condition Radiated measurement						
Operating Mode	СТХ					
1	2.4G + 5G(UNII-1 and UNII-2A)					
2	2.4G + 5G(UNII-2C and UNII-3)					
Refer to Sporton Test Report No.: FA9N2208-01 for Co-location RF Exposure Evaluation and Appendix B for Radiated Emission Co-location.						



## 2.3 Accessories

Accessories								
	Brand Name	SAGEMCOM	Model Name	MSA-Z5000IS12.0-60A-P				
AC Adapter	Power Rating	I/P: 100-120Vac,1500mA, O/P:12Vdc, 5000mA						
	Power Cord	1.0 meter, non-shielded cable, with w/o ferrite core						
Bower Cable	Brand Name	SAGEMCOM	Model Name	MSA-Z5000IS12.0-60A-P				
Power Caple	Power Cord	1.0 meter, non-shielded cable, w/o ferrite core						

Reminder: Regarding to more detail and other information, please refer to user manual.

## 2.4 Support Equipment

Support Equipment – Radiated									
No.	Equipment	Brand Name	Model Name	FCC ID	Remark				
1	AC adapter	SaGeMCOM	MSA-Z5000IS 12.0-60A-P	-	Note 1				

Note 1: Support equipment was provided by customer.



## 2.5 Test Setup Diagram





## 3 Transmitter Test Result

## 3.1 Emissions in Restricted Frequency Bands

### 3.1.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit								
re Distance (m)								
300								
30								
30								
3								
3								
3								
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.

#### 3.1.2 Measuring Instruments

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



### 3.1.3 Test Procedures

<ul> <li>The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].</li> <li>Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest fre channel and highest frequency channel within the allowed operating band.</li> <li>For the transmitter unwanted emissions shall be measured using following options below:         <ul> <li>Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.</li> </ul> </li> </ul>	Juency
<ul> <li>Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest fre channel and highest frequency channel within the allowed operating band.</li> <li>For the transmitter unwanted emissions shall be measured using following options below:         <ul> <li>Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.</li> </ul> </li> </ul>	quency
<ul> <li>For the transmitter unwanted emissions shall be measured using following options below:</li> <li>Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.</li> </ul>	diotod
Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.	vdiatad
	vdiatad
For the transmitter band-edge emissions shall be measured using following options below:	valiated
<ul> <li>Refer as KDB 558074 clause 8.7.1, When the performing peak or average measurements, emissions within 2 MHz of the authorized band edge may be measured us marker-delta method described below.</li> </ul>	ing the
<ul> <li>Refer as KDB 558074, clause 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta meth band-edge measurements.</li> </ul>	od for
<ul> <li>Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the power and summing the spectral levels.</li> </ul>	e band
<ul> <li>Use the following spectrum analyzer settings:</li> </ul>	
<ul> <li>Set RBW=100 kHz for f &lt; 1 GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.</li> </ul>	
<ul> <li>Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.</li> <li>For average measurement, refer as 1.1.4.</li> </ul>	
<ul> <li>KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.</li> </ul>	
<ul> <li>Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer the specified in regulations; however, an attempt should be made to avoid making measurem the near field.</li> </ul>	an that ents in
<ul> <li>Open-field site and chamber correlation testing had been performed and chamber measures result is the worst case test result.</li> </ul>	ed test

#### 3.1.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)



### 3.1.5 Test Setup



#### 3.1.6 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

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

### 3.1.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix A



## 4 Test Equipment and Calibration Data

#### Instrument for Radiated Test

Instrument	Manufacturer/ Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz~18GHz 3m	30/Aug/2019	29/Aug/2020
Microwave System Preamplifier	KEYSIGHT	83017A	MY53270196	1GHz~26.5GHz	09/Sep/2019	08/Sep/2020
Signal Analyzer	R&S	FSP40	100305	9kHz~40GHz	10/Jun/2019	09/Jun/2020
RF CABLE 6m	HUBER+SUHNER	SUOFLEX 104	SN 805801/4	1GHz~40GHz	21/Mar/2019	20/Mar/2020
RF CABLE	HUBER+SUHNER	SUOFLEX 104	SN 804300/4	1GHz~40GHz	17/Jun/2019	16/Jun/2020
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	18GHz~40GHz	13/Mar/2020	12/Mar/2021
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz~40GHz	10/Mar/2020	09/Mar/2021
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1531	1GHz~18GHz	26/Mar/2020	25/Mar/2021



#### 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	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_4TX	Pass	AV	4.87403G	47.62	54.00	-6.38	3	Vertical	155	2.55	-



#### Result

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-	-
2437MHz	Pass	AV	2.3898G	44.69	54.00	-9.31	3	Vertical	47	2.36	-
2437MHz	Pass	AV	2.4378G	112.97	Inf	-Inf	3	Vertical	47	2.36	-
2437MHz	Pass	AV	2.4835G	45.05	54.00	-8.95	3	Vertical	47	2.36	-
2437MHz	Pass	PK	2.3542G	57.65	74.00	-16.35	3	Vertical	47	2.36	-
2437MHz	Pass	PK	2.4366G	116.13	Inf	-Inf	3	Vertical	47	2.36	-
2437MHz	Pass	PK	2.4835G	57.90	74.00	-16.10	3	Vertical	47	2.36	-
2437MHz	Pass	AV	2.347G	44.39	54.00	-9.61	3	Horizontal	246	1.44	-
2437MHz	Pass	AV	2.4378G	109.45	Inf	-Inf	3	Horizontal	246	1.44	-
2437MHz	Pass	AV	2.485G	44.83	54.00	-9.17	3	Horizontal	246	1.44	-
2437MHz	Pass	PK	2.3502G	57.62	74.00	-16.38	3	Horizontal	246	1.44	-
2437MHz	Pass	PK	2.4378G	111.94	Inf	-Inf	3	Horizontal	246	1.44	-
2437MHz	Pass	PK	2.4914G	58.48	74.00	-15.52	3	Horizontal	246	1.44	-
2437MHz	Pass	AV	4.87403G	47.62	54.00	-6.38	3	Vertical	155	2.55	-
2437MHz	Pass	PK	4.87399G	52.26	74.00	-21.74	3	Vertical	155	2.55	-
2437MHz	Pass	AV	4.87401G	41.48	54.00	-12.52	3	Horizontal	318	1.57	-
2437MHz	Pass	PK	4.87397G	48.84	74.00	-25.16	3	Horizontal	318	1.57	-



















## Appendix B

#### Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	
Mode 1	Pass	AV	4.974G	44.30	54.00	-9.70	8.86	Vertical
Mode 2	Pass	AV	11.56377G	47.98	54.00	-6.02	19.44	Horizontal

### Mode Configure

Mode	Configure
Mode 1	2.4G+5G (B1+B2)
Mode 2	2.4G+5G (B3+B4)











## Appendix B





## Appendix B

