

# **FCC Test Report**

# Report No.: AGC01040210301FE02

FCC ID	© .	2ACN7BC200
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Bike Computer
BRAND NAME	:	N/A
MODEL NAME	÷	BC200, BC201
APPLICANT		ShenZhen Fitcare Electronics Co., LTD
DATE OF ISSUE	© •	Mar. 09, 2021
STANDARD(S)	:	FCC Part 15.247
REPORT VERSION	:	V1.0



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#### Report No.: AGC01040210301FE02 Page 2 of 54

## **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0		Mar. 09, 2021	Valid	Initial Release

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# **1. VERIFICATION OF COMPLIANCE**

ShenZhen Fitcare Electronics Co., LTD	
6th floor(south), Building A, Dingxin Science Park Honglang North 2nd Road, Bao'an, Shenzhen, China	
ShenZhen Fitcare Electronics Co., LTD	
6th floor(south), Building A, Dingxin Science Park Honglang North 2nd Road, Bao'an, Shenzhen, China	
ShenZhen Fitcare Electronics Co., LTD	
6th floor(south), Building A, Dingxin Science Park Honglang North 2nd Road, Bao'an, Shenzhen, China	
Bike Computer	
N/A	
BC200	
BC201	
All the series models are the same as the test model except for the model names.	
Mar. 03, 2021 to Mar. 09, 2021	
No any deviation from the test method	
Normal	
Pass	
AGCRT-US-BLE/RF	

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

Prepared By

Eddy Lin

Eddy Liu (Project Engineer)

Mar. 09, 2021

Max Zhan

Reviewed By

Max Zhang (Reviewer)

Mar. 09, 2021

Approved By

Forrest Lei (Authorized Officer)

Mar. 09, 2021

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# 2. GENERAL INFORMATION

# 2.1. PRODUCT DESCRIPTION

The EUT is designed as a "Bike Computer". It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	-3.346dBm (Max)
Bluetooth Version	V5.0
Modulation	BR
Number of channels	40 Channel
Antenna Designation	Integral Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	0dBi
Hardware Version	V5.4
Software Version	V1.4.5
Power Supply	DC 5V by adapter

# 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
	1	2404 MHz
2400~2483.5MHz		G C C C
	38	2478 MHz
	39	2480 MHz

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#### 2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2ACN7BC200** filing to comply with the FCC Part 15.247 requirements.

#### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

#### **2.6. EQUIPMENT MODIFICATIONS**

Not available for this EUT intended for grant.

#### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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# 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y  $\pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, Uc = ±3.1 dB
- Uncertainty of Radiated Emission below 1GHz,  $Uc = \pm 4.0 \text{ dB}$
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of total RF power, conducted,  $Uc = \pm 0.8 dB$
- Uncertainty of RF power density, conducted, Uc = ±2.6 dB
- Uncertainty of spurious emissions, conducted,  $Uc = \pm 2.7 dB$
- Uncertainty of Occupied Channel Bandwidth:  $Uc = \pm 2 \%$

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# 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION	
1	Low channel TX(2402MHz)	
2	Middle channel TX(2440MHz)	
3	High channel TX(2480MHz)	

Note:

- 1. Only the result of the worst case was recorded in the report, if no other cases.
- 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- 3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

NRFgo Studio - Direct Test Mode U	ART interface	
File View nRF8001 Setup Help		
Features RX constant carrier/LO leak. TX/RX channel sweep RX sensitivity Bluetooth nRF8001 Configuration Dispatcher Trace Translator Direct Test Mode nRF8002 Device Manager Motherboards nRF51 Programming Bootloaders	X     Direct Test Mode UART interface       Set up on     Y       Com port COMB     Refresh list of com ports       Mode     Image: Channel       Image: Im	
Log (c) Nordic Semiconductor ASA 2008-2(	13	

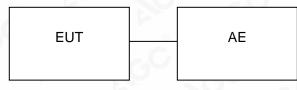
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# **5. SYSTEM TEST CONFIGURATION**

# **5.1. CONFIGURATION OF TESTED SYSTEM**

Radiated Emission Configure:



Conducted Emission Configure:

EUT	AE

# 5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Bike Computer	BC200	2ACN7BC200	EUT
2	Adapter	TY0500100E1MN	DC 5V	AE
3	Charger line	G258	N/A	AE

# **5.3. SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(3)	Peak Output Power	Compliant
15.247 (a)(2)	6 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.247 (e)	Maximum Conducted Output Power Density	Compliant
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	Compliant

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# 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA

# TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03, 2020	Jul. 02, 2021
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

# TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 07, 2020	Dec. 06, 2021
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 08, 2021	Jan. 07, 2023
Test software	FARA	EZ-EMC (Ver RA-03A)	N/A	N/A	N/A

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# 7. PEAK OUTPUT POWER

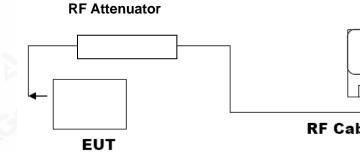
# 7.1. MEASUREMENT PROCEDURE

For peak power test:

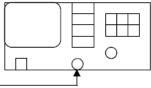
- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. RBW≥DTS bandwidth
- 3. VBW≥3\*RBW.
- 4. SPAN≥VBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

# 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) PEAK POWER TEST SETUP







**RF** Cable

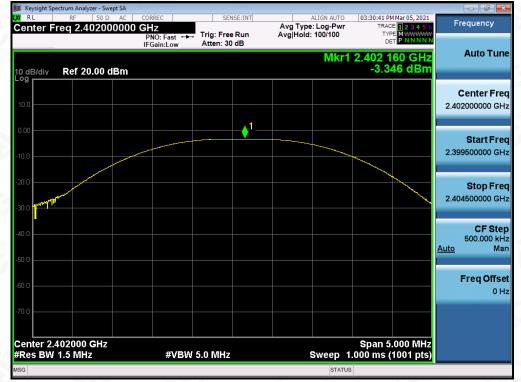
Compliances Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by th g/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the writter aphorization of AGE presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance he test results the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



#### 7.3. LIMITS AND MEASUREMENT RESULT

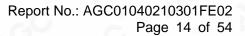
	PEAK OUTPUT POWER MEASUREMENT RESULT									
	FOR GFSK MOUDULA	ΓΙΟΝ								
Frequency (GHz)										
2.402	-3.346	30	Pass							
2.440	-3.396	30	Pass							
2.480	-3.360	30	Pass							

CH0



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CH39

💓 Keysight Spectrum Analyzer - Swept SA				- F
ເ₩ RL RF 50Ω AC Center Freq 2.480000000		: Log-Pwr TR/	PM Mar 05, 2021 ACE 1 2 3 4 5 6	Frequency
	PNO: Fast +++ Trig: Free IFGain:Low Atten: 30	100/100 T		
	IFGam:Low Atten: or	Mkr1 2.479	895 GHZ	Auto Tune
10 dB/div Ref 20.00 dBm		-3.3	360 dBm	
Log				
49.9				Center Freq
10.0				2.480000000 GHz
0.00	1			
	V	 		Start Freq
-10.0				2.477500000 GHz
-20.0				Stop Freq
and the second second			a second	2.482500000 GHz
-30.0				
-40.0				CF Step
				500.000 kHz Auto Man
-50.0				<u>rato</u> mari
				Freq Offset
-60.0				0 Hz
-70.0				
Center 2.480000 GHz		Span	5.000 MHz	
#Res BW 1.5 MHz	#VBW 5.0 MHz	Sweep 1.000 ms	(1001 pts)	
MSG		 STATUS		

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# 8.6 DB BANDWIDTH

#### 8.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW≥3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

#### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

#### **8.3. LIMITS AND MEASUREMENT RESULTS**

LIMITS AND MEASUREMENT RESULT										
Applicable Limite	Applicable Limits									
Applicable Limits	Test Data	Criteria								
	Low Channel	691.4	PASS							
>500KHZ	Middle Channel	690.9	PASS							
0	High Channel	692.5	PASS							

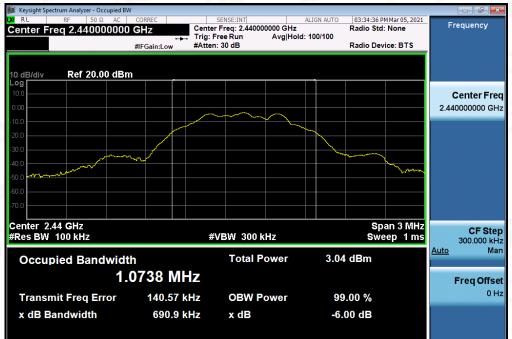


## TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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## TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

## TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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# 9. CONDUCTED SPURIOUS EMISSION

#### 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

#### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

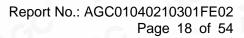
#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

#### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT										
	Measurement Result									
Applicable Limits	Test Data	Criteria								
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the reference level	PASS								

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🚺 Keysight Spectrum Analyzer - Sw					
Center Freq 2.4020		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	03:31:44 PM Mar 05, 2021 TRACE 1 2 3 4 5 6	Frequency
Center Tred 2.4020	PNO: Wide ↔ IFGain:Low	<ul> <li>Trig: Free Run Atten: 30 dB</li> </ul>	Avg Hold: 10/10	TYPE MWWWWW DET P NNNNN	
10 dB/div Ref 20.00		Atten: 30 dB	Mkr1 2	.402 130 3 GHz -3.440 dBm	Auto Tune
Log 10.0 0.00 -10.0					Center Freq 2.402000000 GHz
-10.0 -20.0 -30.0 -40.0					Start Freq 2.400500000 GHz
-50.0					<b>Stop Freq</b> 2.403500000 GHz
Center 2.402000 GHz #Res BW 100 kHz		/ 300 kHz	Sweep 2.	Span 3.000 MHz 000 ms (30000 pts)	CF Step 300.000 kHz
MKR MODE TRC SCL	Х		INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 2 3 4 4 5	2.402 130 3 GHz	-3.440 dBm			Freq Offset 0 Hz
6 7 8 9 10					
11		m			
MSG			STATUS	3	
📜 Keysight Spectrum Analyzer - Sw	vept SA				
ໝ RL RF 50 Ω Center Freq 1.2100		Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	03:31:53 PM Mar 05, 2021 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
10 dB/div <b>Ref 20.00</b>			Mkr	1 1.849 94 GHz -57.993 dBm	Auto Tune
10.0 0.00					Center Freq 1.210000000 GHz
-20.0				-23.44 dBm	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0	a de galera de se a companya de la c	a da a ser a tama para ser a ser		a yang dan panan tan kila dan di <mark>kang kina kanan kanan</mark>	<b>Stop Freq</b> 2.39000000 GHz
Start 30 MHz #Res BW 100 kHz	#VBW	/ 300 kHz	Sweep 22	Stop 2.390 GHz 6.0 ms (30000 pts)	<b>CF Step</b> 236.000000 MHz
MKR MODE TRC SCL	Х		INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 2 3 4 4 4 5	1.849 94 GHz	-57.993 dBm			<b>Freq Offset</b> 0 Hz
6 7 8 9 10					

# TEST RESULT FOR ENTIRE FREQUENCY RANGE GFSK MODULATION IN LOW CHANNEL

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# Report No.: AGC01040210301FE02 Page 19 of 54



💓 Key	ysight S	pectrur	n An	alyzer - S	wept SA		_	_									
LXI R	L		RF	50	Ω AC	: CC	ORREC		SEI	NSE:INT	A		ALIGN AUTO		M Mar 05, 2021		Frequency
Cen	ter	-rec	1.	3.741	750	000 0	GHZ PNO: Fas	t i i i i i i i i i i i i i i i i i i i	Trig: Fre	e Run			: 10/10	TY	DE 12345 PE MWWWW	¥	
		_					Gain:Lo		Atten: 30	) dB				D	P NNNN		
													Mkr	1 23.46	4 3 GHz		Auto Tune
<u>1</u> 0 dl	B/div	R	ef∶	20.00	dBn	n								-48.5	71 dBm		
Log			Γ														
10.0																	Center Freq
0.00																	13.741750000 GHz
-10.0	$\vdash$																
-20.0															-23.44 dBm		Start Freq
-30.0	<u> </u>																2.483500000 GHz
-40.0	L														1		
-50.0																	
-60.0		100			مريا . مريا	alter from the second	Junior Martin		ute ditte for deren		i ti ga se di						Stop Freq
-70.0	and the second sec			an an Albert St		Marshan	a caracter	and the second second	interesting and the second								25.00000000 GHz
-70.0																	
Star	t 2.4	8 GI	z											Stop 2	5.00 GHz		CF Step
#Re	s BV	V 10	0 k	Hz			#\	/BW	300 kHz				Sweep 2	2.152 s (3	0000 pts		2.251650000 GHz
MKR	MODE .	TRC S	CL			х			Y	F	UNCTION	FUN	ICTION WIDTH	FUNCTI	DN VALUE	-	<u>Auto</u> Man
1	Ν	1 1				23.464	3 GHz		-48.571 di	Bm							
23																	Freq Offset
4 5																	0 Hz
6																	
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9																	
10																	
11									III	_					-		
MSG			-										STATUS	5			

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#### GFSK MODULATION IN MIDDLE CHANNEL

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# Report No.: AGC01040210301FE02 Page 21 of 54



🊺 Key	/sight Sp	ectrum	Analyzer -	- Swept SA									
LXI RI		RF		0Ω AC			SEI	NSE:INT	A T	ALIGN AUTO		M Mar 05, 2021	Frequency
Cen	ter	req	13.74	1/50	000 GH	Z :Fast ↔	, Trig: Fre	Run	Avg Typ Avg Hol	be: Log-Pwr d: 10/10	TYP	DE 123456 PE MWWWW	
		_				in:Low	Atten: 30	) dB			DE		
										Mkr	1 23.65	6 5 GHz	Auto Tune
10 di	3/div	Re	f 20.0	0 dBn	n						-48.0	06 dBm	
Log													
10.0													Center Freq
0.00	<u> </u>												13.741750000 GHz
-10.0	<u> </u>												
-20.0												-23:47 dBm	Otort From
-30.0													Start Freq
-40.0												. 1	2.483500000 GHz
-50.0								A STATE OF COMPANY	and and a start of the start	والاخر والدوادة فالمحالية والد	a han ininina		Stop Fred
-60.0										and the second secon			25.00000000 GHz
-70.0	Ė												
-										<u> </u>	<b>C</b> ( <b>a a c</b>		
		8 GH: 100				#\/B\A	/ 300 kHz			Sween		5.00 GHz 0000 pts)	CF Step 2.251650000 GHz
						27 V V V					•	4	Auto Man
MKR I	Mode T	RC SCI			× 23.656 5 (	CU-	Y -48.006 di		TION FU	JNCTION WIDTH	FUNCTIO	DN VALUE	
2	N				23.000 5	GHZ	-40.000 at	5111					
3													Freq Offset
5												=	0 Hz
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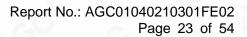
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#### 🚺 Keysight Spectrum An ALIGN AUTO Avg Type: Log-Pwr Avg|Hold: 10/10 Frequency Center Freq 2.480000000 GHz Trig: Free Run Atten: 30 dB PNO: Wide IFGain:Low Auto Tune Mkr1 2.480 133 4 GHz -3.431 dBm Ref 20.00 dBm **Center Frea** 2.480000000 GHz Start Freq 2.478500000 GHz Stop Freq 2.481500000 GHz Span 3.000 MHz Sweep 2.000 ms (30000 pts) Center 2.480000 GHz #Res BW 100 kHz CF Step 300.000 kHz #VBW 300 kHz Auto Mar 2.480 133 4 GHz -3.431 dBn Ν **Freq Offset** 0 Hz STATUS 📕 Keysight Spectrum Analyzer - Swept SA ALIGN AUTO ALIGN AUTO Avg Type: Log-Pwr Avg|Hold: 10/10 Frequency Center Freq 1.215000000 GHz PNO: Fast ↔ IFGain:Low Trig: Free Run Atten: 30 dB TYP DE Auto Tune Mkr1 2.379 93 GHz -57.183 dBm Ref 20.00 dBm **Center Frea** 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.40000000 GHz Start 30 MHz #Res BW 100 kHz Stop 2.400 GHz Sweep 228.0 ms (30000 pts) CF Step #VBW 300 kHz 237.000000 MHz Auto Mar FUNCTION FUNCTION 2.379 93 GHz -57.183 dBm Freq Offset 0 Hz STATUS

#### **GFSK MODULATION IN HIGH CHANNEL**

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	ght Spect		nalyzer - Swo												- 6 -
IXI RL	ar Ero	RF	50 Ω 3.7500				SEI	NSE:INT	Ava		IGN AUTO		M Mar 05, 202 CE 1 2 3 4 5		Frequency
Cente		iq 1	5.7500		PN	0: Fast ain:Lov	Trig: Free Atten: 30			Hold: 1	0/10	TY D		NN NN	Auto Tune
10 dB/ Log ┏	div	Ref	20.00 (	lBm				1			MKr	1 24.23 -47.5	6 5 GH 55 dBr		
10.0 - 0.00 - -10.0 -															Center Freq 13.750000000 GHz
-20.0 -30.0 -40.0													-23.43 dB		<b>Start Freq</b> 2.500000000 GHz
-50.0	<b></b>														<b>Stop Freq</b> 25.00000000 GHz
Start #Res		00 k	Hz	X			300 kHz Y	FUI	NCTION		weep	2.152 s (3	25.00 GH 0000 pt	s)	<b>CF Step</b> 2.25000000 GHz <u>Auto</u> Man
1 N 2 3 4 5 6 7 8 9 10 11		f		2	4.236 5	GHZ	-47.555 dB	3m							Freq Offset 0 Hz
MSG											STATUS	5			

Note: The peak emissions without marker on the above plots are fundamental wave and need not to compare with the limit.

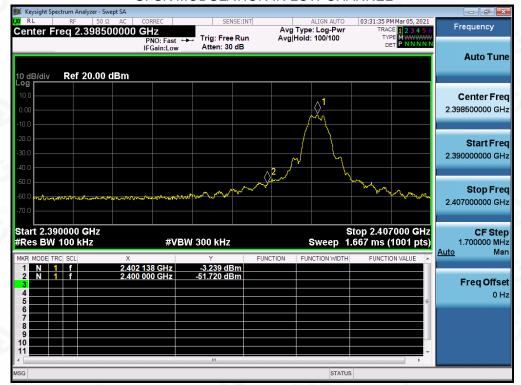
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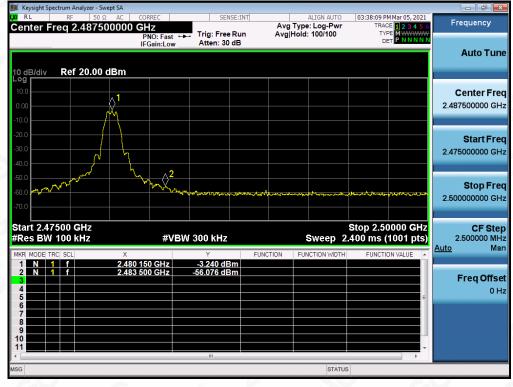
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com





# TEST RESULT FOR BAND EDGE GFSK MODULATION IN LOW CHANNEL

#### **GFSK MODULATION IN HIGH CHANNEL**



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# **10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY**

#### **10.1. MEASUREMENT PROCEDURE**

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set the SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the KDB 558074 item 10.2 was used in this testing.

# **10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)**

Refer to Section 7.2.

#### **10.3. MEASUREMENT EQUIPMENT USED**

Refer to Section 6.

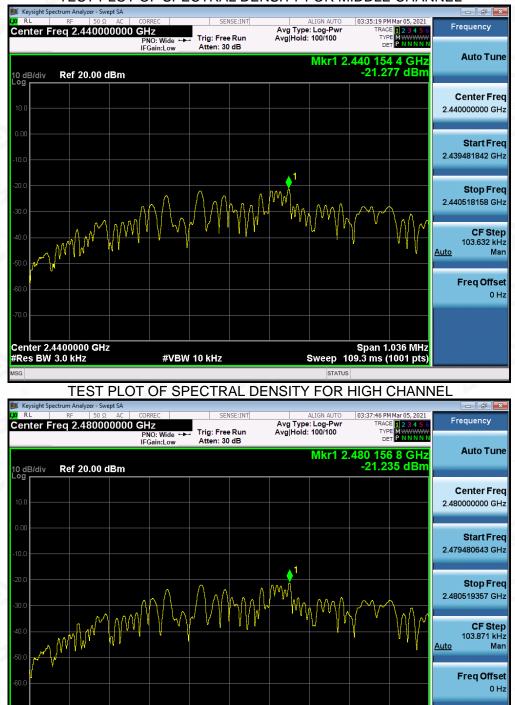
#### **10.4. LIMITS AND MEASUREMENT RESULT**

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	-21.331	8	Pass
Middle Channel	-21.277	8	Pass
High Channel	-21.235	8	Pass

# TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



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## TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

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#VBW 10 kHz

Span 1.039 MHz Sweep 109.5 ms (1001 pts)

STATUS

Center 2.4800000 GHz #Res BW 3.0 kHz



# **11. RADIATED EMISSION**

#### **11.1. MEASUREMENT PROCEDURE**

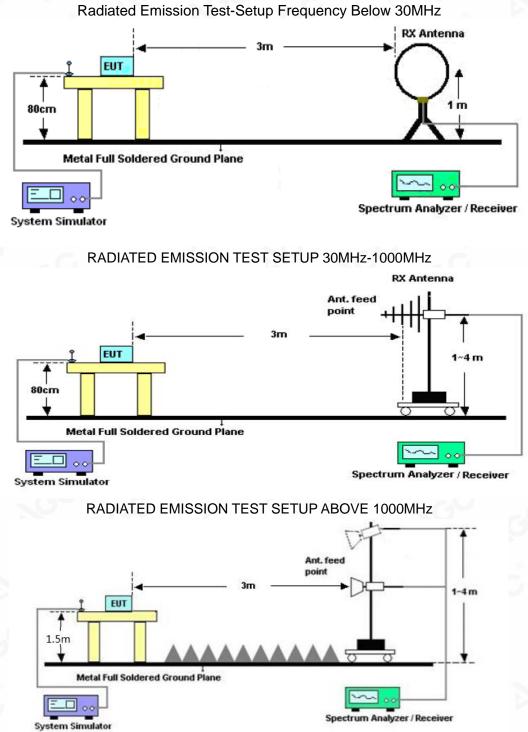
- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

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#### 11.2. TEST SETUP



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# **11.3. LIMITS AND MEASUREMENT RESULT**

15.209 Limit in the below table has to be followed

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

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

# 11.4. TEST RESULT

# **RADIATED EMISSION BELOW 30MHz**

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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#### **RADIATED EMISSION BELOW 1GHZ**

UT			Bike C	omputer		Model N	Name	BC	200		
emperatur	e		25° C	.C	6	Relative	e Humidit	<b>y</b> 58%	58%		
ressure			960hP	a G	SGC - C		Itage	Nor	Normal Voltage		
est Mode			Mode	1	20	Antenn	а	Hor	Horizontal		
66.9 dBu∀/n	m				ĺ		ĺ		Limit:		
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3	27.00		00 32	1.00 418.00 Reading	515.00 Correct	612.00 Measure-	709.00			1000.00 MI	
3			00 32 Freq.	1.00 418.00 Reading Level	515.00 Correct Factor	612.00 Measure- ment	709.00 Limit	Over		Ő	
3	27.00 No.	Mk.	00 32 Freq. MHz	1.00 418.00 Reading Level dBuV	515.00 Correct Factor dB	612.00 Measure- ment dBuV/m	709.00 Limit dBuV/m	Over dB	Detector	Ő	
3	27.00 No.	Mk. 1	00 32 Freq. MHz 39.9333	1.00 418.00 Reading Level dBuV -0.28	515.00 Correct Factor dB 19.23	612.00 Measure- ment dBuV/m 18.95	709.00 Limit dBuV/m 43.50	Over dB -24.55	peak	° V	
3	27.00 No.	Mk. 1	00 32 Freq. MHz	1.00 418.00 Reading Level dBuV -0.28	515.00 Correct Factor dB	612.00 Measure- ment dBuV/m	709.00 Limit dBuV/m	Over dB		° V	
3	27.00 No.	Mk. 1 2	00 32 Freq. MHz 39.9333	1.00 418.00 Reading Level dBuV -0.28	515.00 Correct Factor dB 19.23	612.00 Measure- ment dBuV/m 18.95	709.00 Limit dBuV/m 43.50	Over dB -24.55	peak	° V	
3	27.00 No.	Mk. 1 2 4	00 32 Freq. MHz 39.9333	1.00 418.00 Reading Level dBuV -0.28 -0.67	515.00 Correct Factor dB 19.23 19.81	612.00 Measure- ment dBuV/m 18.95 19.14	709.00 Limit dBuV/m 43.50 46.00	Over dB -24.55 -26.86	peak peak		
3	27.00 No.	Mk. 1 2 4 6	00 32 Freq. MHz 39.9333 85.4333 45.4833	1.00 418.00 Reading Level dBuV -0.28 -0.67 0.58	515.00 515.00 Correct Factor dB 19.23 19.81 23.89	612.00 Measure- ment dBuV/m 18.95 19.14 24.47	709.00 Limit dBuV/m 43.50 46.00 46.00	Over dB -24.55 -26.86 -21.53	peak peak peak	20	

## **RESULT: PASS**

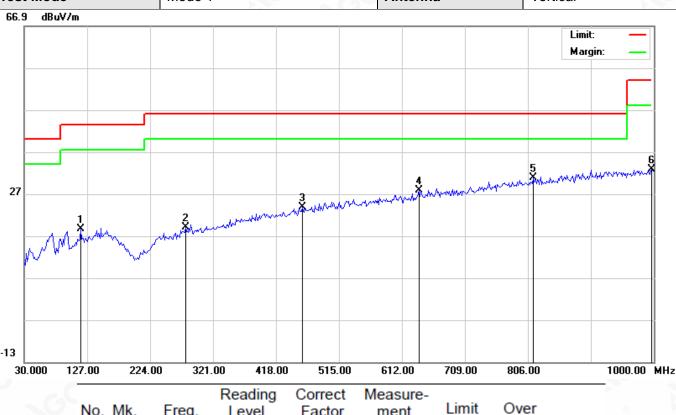
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EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



No.	Mk	Freq.	Level	Factor	ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	
1		117.3000	0.80	17.71	18.51	43.50	-24.99	peak	
2		278.9667	-0.87	19.86	18.99	46.00	-27.01	peak	
3		458.4167	-0.44	24.15	23.71	46.00	-22.29	peak	
4		637.8667	0.46	27.40	27.86	46.00	-18.14	peak	
5	*	814.0833	0.12	30.59	30.71	46.00	-15.29	peak	
6		996.7667	0.20	32.53	32.73	54.00	-21.27	peak	

#### RESULT: PASS Note:

- 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
- 2. All test modes had been tested. The mode 1 is the worst case and recorded in the report.

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# **RADIATED EMISSION ABOVE 1GHZ**

EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	45.36	0.08	45.44	74	-28.56	peak
4804.000	36.49	0.08	36.57	54	-17.43	AVG
7206.000	41.02	2.21	43.23	74	-30.77	peak
7206.000	30.56	2.21	32.77	54	-21.23	AVG
- 64	0			- C	0	
						8

EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	45.26	0.08	45.34	74	-28.66	peak
4804.000	36.18	0.08	36.26	54 💿	-17.74	AVG
7206.000	40.54	2.21	42.75	74	-31.25	peak
7206.000	30.49	2.21	32.7	54	-21.3	AVG
			0			
emark:			2.0	0		

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

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EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Aeter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits	Margin	Value Type
,	(dB)	(dBuV/m)	(dD,)//ma)		
45.00		(abp vill)	(dBµV/m)	(dB)	value Type
45.29	0.14	45.43	74	<sup>©</sup> -28.57	peak
36.17	0.14	36.31	54	-17.69	AVG
40.22	2.36	42.58	74	-31.42	peak
29.48	2.36	31.84	54	-22.16	AVG
		· · · ·	®		
8			C.		
	8			- 6	8
Factor + Cable	Loss – Pre-	amplifier.			
F	36.17 40.22 29.48	36.17         0.14           40.22         2.36           29.48         2.36	36.17         0.14         36.31           40.22         2.36         42.58	36.17         0.14         36.31         54           40.22         2.36         42.58         74           29.48         2.36         31.84         54	36.17         0.14         36.31         54         -17.69           40.22         2.36         42.58         74         -31.42           29.48         2.36         31.84         54         -22.16

EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4880.000	46.38	0.14	46.52	74	-27.48	peak
4880.000	37.42	0.14	37.56	54	-16.44	AVG
7320.000	40.16	2.36	42.52	74	-31.48	peak
7320.000	31.59	2.36	33.95	54	-20.05	AVG
		- 6	(3)			
				8		

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

	Mater Development	E. star	Enderland and	1 June Mar	Manufa	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	44.29	0.22	44.51	74	-29.49	peak
4960.000	35.18	0.22	35.4	54	-18.6	AVG
7440.000	39.42	2.64	42.06	74	-31.94	peak
7440.000	28.43	2.64	31.07	54	-22.93	AVG
3				®		
	8				0	
emark:	- 6	8		<u> </u>	- 6	0
actor = Anter	na Factor + Cable	Loss – Pre-	amplifier.			- C

EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	43.16	0.22	43.38	74	-30.62	peak
4960.000	32.58	0.22	32.8	54	-21.2	AVG
7440.000	38.46	2.64	41.1	74	-32.9	peak
7440.000	28.77	2.64	31.41	54	-22.59	AVG
		- G	(Å)		6	20
emark:				0		6

Factor = Antenna Factor + Cable Loss – Pre-amplifier

# RESULT: PASS

#### Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

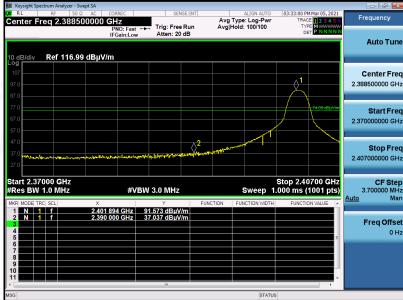
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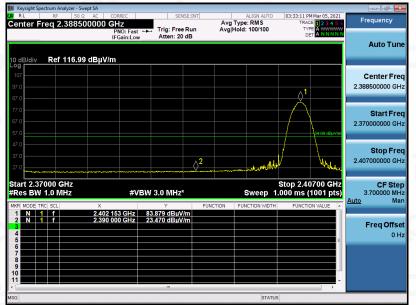
EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

## **FEST RESULT FOR RESTRICTED BANDS REQUIREMENTS**

PK



AV



**RESULT: PASS** 

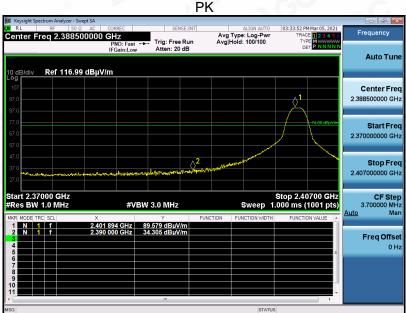
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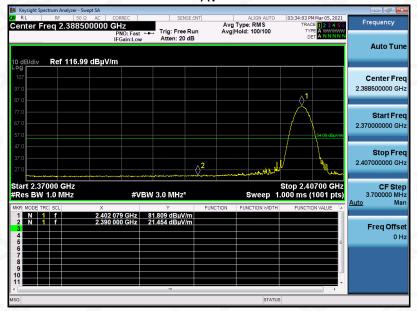


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EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical
		DI/	



AV



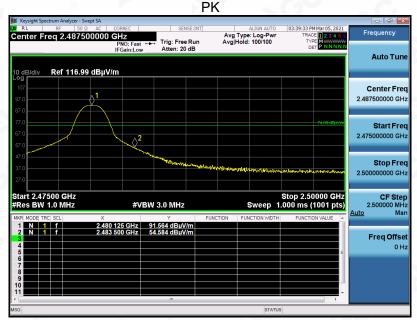
**RESULT: PASS** 

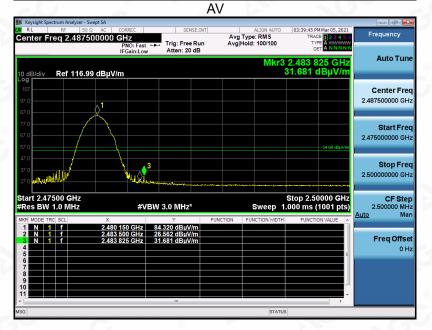
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EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal





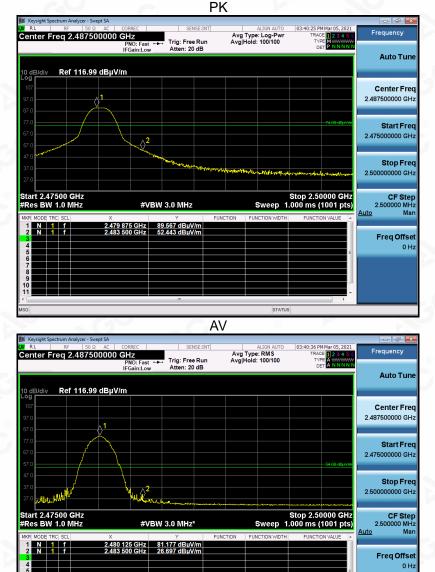
**RESULT: PASS** 

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EUT	Bike Computer	Model Name	BC200
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical



# RESULT: PASS

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

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# **12. FCC LINE CONDUCTED EMISSION TEST**

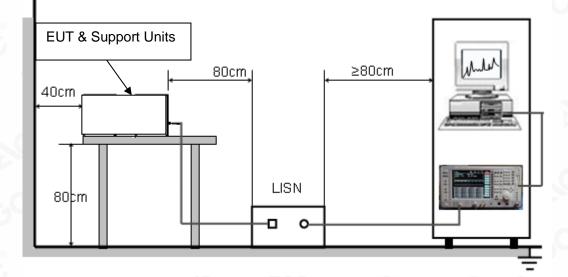
# **12.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Franciscov	Maximum RF Line Voltage			
Frequency	Q.P.( dBuV)	Average( dBuV)		
150kHz~500kHz	66-56	56-46		
500kHz~5MHz	56	46		
5MHz~30MHz	60	50		

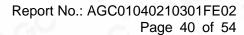
Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

# 12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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# 12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipment received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC 12V power from adapter which received AC120V/60Hz power from a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

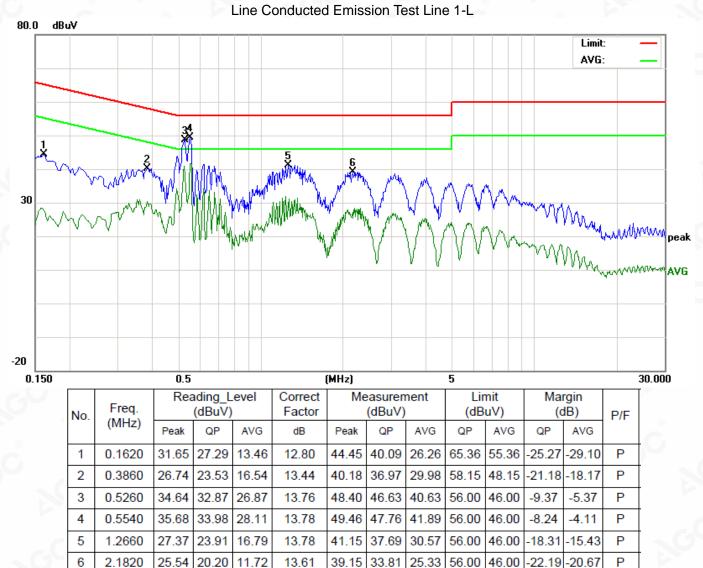
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

# 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

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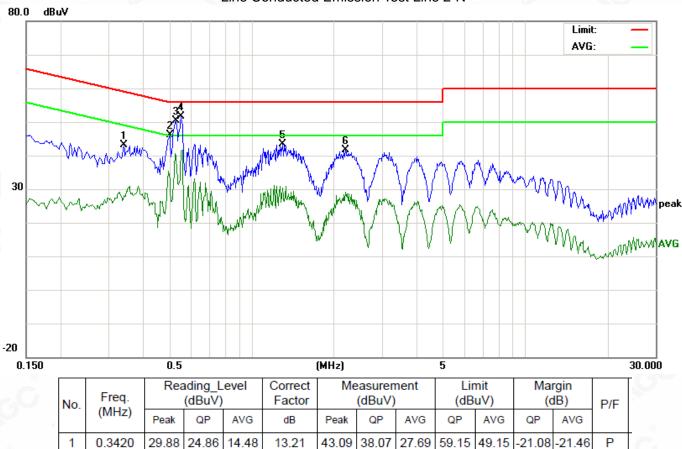


#### 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

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Line Conducted Emission Test Line 2-N

RESULT: PASS

2

3

4

5

6

0.5020

0.5299

0.5580

1.3020

2.2060

32.28

36.64

36.33

29.51

27.94

28.30

34.21

34.62

26.21

24.65

18.30

25.13

27.90

15.94

14.82

13.74

13.76

13.79

13.77

13.61

46.02

50.40

50.12

43.28

41.55

42.04

47.97

48.41

39.98

38.26

32.04

38.89

41.69

29.71

28.43

56.00

56.00

56.00

56.00

56.00

46.00

46.00

46.00

46.00

46.00

-13.96 -13.96

-7.11

-4.31

-16.29

-17.57

-8.03

-7.59

-16.02

-17.74

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# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHZ



RADIATED EMISSION TEST SETUP ABOVE 1GHZ



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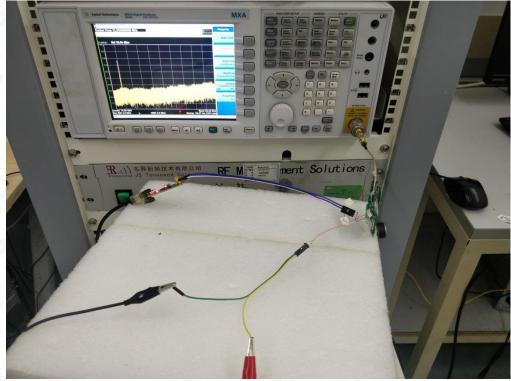


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CONDUCTED EMISSION TEST SETUP

CONDUCTED TEST SETUP



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