TEST REPORT							
Report No.:	SHE22110054-02CE		Date:	2023-04-18	Page 1 of 39		
Applicant Address of Ap	oplicant	:	SIMCo		Limited ling, Building 3, No.289 istrict, Shanghai,China		
Product Name)	:	Wi-Fi 8	BT Module			
Brand Name		:	SIMCo	m			
Model Name	a iti a manafa a al	:	W58	Olivert			
Sample Acqui Sample No.	sition Method	:	-	y Client 0054-01#05			
Sample No.		•		0054-01#05 0054-01#08			
FCC ID		:	24 1711	-8PYA00C			
ISED Number		:		8PYA010			
Standards		:	FCC C	FR47 Part 15, Subpa	rt C		
				en (Issue 5, Amd.2-F	,		
			RSS-24	47 (Issue 2, February	2017)		
Date of Receip	ot	:	2023-0	2-15			
Date of Test		:		3-13 ~ 2023-04-17			

Remark:

Date of Issue

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

2023-04-18

Prepared by: (Erik Yang) Reviewed by: Jensifer Zhoul (Jennifer Zhou) Approved by: (Authorized signatory: Guoyou Chi)

:

Report No.: SHE22110054-02CE Date: 2

2023-04-18

Page 2 of 39

Contents

1	GENERAL INFORMATION	3
1.1	TESTING LABORATORY	3
1.2	DETAILS OF APPLICATION	3
1.3	DETAILS OF EUT	3
1.4	TEST METHODOLOGY	4
1.5	TEST SUMMARY	5
2	TEST CONDITION	6
2.1	ENVIRONMENTAL CONDITIONS	6
2.2	EQUIPMENT LIST	6
2.3	Measurement Uncertainty	7
3	TEST SET-UP AND OPERATION MODES	8
3.1	DETAILS OF TEST MODE	8
3.2	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	9
3.3	SUPPORT SOFTWARE	9
3.4	TEST SETUP DIAGRAM	9
4	TEST RESULTS	. 11
4.1	TRANSMITTER REQUIREMENT & TEST SUITES	. 11
4.1	1 Antenna Requirement	. 11
4.1	2 Maximum peak conducted output power and E.I.R.P	. 12
4.1	.3 6dB Bandwidth and 99% Bandwidth	. 15
4.1	4 Maximum conducted output power spectral density	. 19
4.1	5 Conducted Spurious Emission & Authorized-band band-edge	. 22
4.1		
4.1		
4.2	MAINS EMISSIONS	
4.2	1 Conducted Emission on AC Mains	. 31
5	APPENDIXES	. 34
5.1	PHOTOGRAPHS OF THE SAMPLE	. 34
-	SET-UP FOR CONDUCTED EMISSIONS	
	SET-UP FOR CONDUCTED RF TEST AT ANTENNA PORT	
	SET-UP FOR SPURIOUS EMISSIONS BELOW 1GHZ.	
5.5	SET-UP FOR SPURIOUS EMISSIONS ABOVE 1GHZ	. 39

Report No.: SHE22110054-02CE Date:

2023-04-18

Page 3 of 39

1 General Information

1.1 Testing Laboratory

ISED CAB identifier #	CN0081		
Company Name	ICAS Testing Technology Service (Shanghai) Co., Ltd.		
Address	No.1298 Pingan Rd, Minhang District, Shanghai, China		
Telephone	0086 21-51682999		
Fax	0086 21-54711112		
Нотераде	www.icasiso.com		

1.2 Details of Application

Applicant Company Name	SIMCom Wireless Solutions Limited			
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China			
Contact Person	Yongsheng Li			
Telephone	+86 21 3252 3134			
Email	yongsheng.li@simcom.com			
Manufacturer Company Name	SIMCom Wireless Solutions Limited			
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China			
Factory Company Name	SIMCom Wireless Solutions Limited			
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China			

1.3 Details of EUT

Product Name	Wi-Fi & BT Module	
Brand Name	SIMCom	
Test Model Name	W58	
FCC ID	2AJYU-8PYA00C	
ISED Number	23761-8PYA010	
Mode of Operation	Bluetooth BLE Version 4.0	
Frequency Range	2402MHz ~ 2480MHz	
Number of Channels	40 (at intervals of 1 MHz)	
Modulation Type	GFSK	
Antenna Type	External Antenna	
Antenna Gain	2.97dBi	
Extreme Temperature Range	-40℃~ +85℃	
Test Voltage	DC 3.3V	
Hardware Version	W58_V2.02_PCB	

Report No.: SHE22110054-02CE Date:

2023-04-18

Page 4 of 39

Software Version	LE20B01V04SIM7600G22_MIFI2
Test SW Version	BL410_R; BL410_E
RF power setting in TEST SW	QRCT_Power level setting_Default

Note:

1. The above information was declared by the manufacture.

2. For more details, please refer to the User's manual of the EUT.

Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2.402GHz	14	2.430GHz	28	2.458GHz
1	2.404GHz	15	2.432GHz	29	2.460GHz
2	2.406GHz	16	2.434GHz	30	2.462GHz
3	2.408GHz	17	2.436GHz	31	2.464GHz
4	2.410GHz	18	2.438GHz	32	2.466GHz
5	2.412GHz	19	2.440GHz	33	2.468GHz
6	2.414GHz	20	2.442GHz	34	2.470GHz
7	2.416GHz	21	2.444GHz	35	2.472GHz
8	2.418GHz	22	2.446GHz	36	2.474GHz
9	2.420GHz	23	2.448GHz	37	2.476GHz
10	2.422GHz	24	2.450GHz	38	2.478GHz
11	2.424GHz	25	2.452GHz	39	2.480GHz
12	2.426GHz	26	2.454GHz		
13	2.428GHz	27	2.456GHz		

1.4 Test Methodology

47 CFR Part 15, Subpart C	Telecommunication-Radio Frequency Devices-Intentional Radiators		
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.		
RSS-Gen (Issue 5, Amd.2-Feb 2021)	General Requirements for Compliance of Radio Apparatus		
RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs)		
R33-247 (Issue 2, February 2017)	and Licence-Exempt Local Area Network (LE-LAN) Devices		
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices		

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 5 of 39

1.5 Test Summary

Test Item	FCC Rules	ISED Rules	Result
Antenna Requirement	FCC Part 15.247(b)(4), Part 15.203	RSS-247 5.4(f) RSS-GEN 6.8	PASS
Maximum peak conducted output power and E.I.R.P	FCC Part 15.247(b)(3)	RSS-247 5.4(d)	PASS
6dB Bandwidth and 99% Bandwidth	FCC Part 15.247(a)(2)	RSS-247 5.2(a) RSS-Gen 6.7	PASS
Maximum conducted output power spectral density	FCC Part 15.247(e)	RSS-247 5.2(b)	PASS
Conducted Spurious Emission & Authorized-band band-edge	FCC Part 15.247(d)	RSS-247 5.5	PASS
Radiated Emission	FCC Part 15.247(d), 15.205, 15.209	RSS-GEN 8.9	PASS
Band Edge (Restricted-band band-edge)	FCC Part 15.247(d), 15.205, 15.209	RSS-GEN 8.10	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	RSS-Gen 8.8	PASS

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 6 of 39

2 Test Condition

2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2022-08-02	2023-08-01
Spectrum Analyzer	Keysight	N9020A	MY54101709	2022-08-02	2023-08-01
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2022-06-10	2023-06-09
Signal Generator	Rohde & Schwarz	SMR27	100184	2022-08-02	2023-08-01
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2022-06-10	2023-06-09
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2022-06-10	2023-06-09
V-network	SCHWARZBECK	NSLK8127	8127-902	2022-06-10	2023-06-09
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2023-06-07
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1775	2021-06-08	2023-06-07
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2022-06-10	2023-06-09
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2022-06-10	2023-06-09
EMC chamber 9*6*6(L*W*H)	CHANGNING	966	N/A	2022-06-10	2023-06-09
Shielded Enclosure 8*5*4(L*W*H)	CHANGNING	854	N/A	2022-06-10	2023-06-09
Test Software	BL	BL410_E	Version:1.0.0.117	N/A	N/A
Test Software	BL	BL410_R	Version:2.1.1.409	N/A	N/A

Report No.: SHE22110054-02CE Date:

2023-04-18

Page 7 of 39

2.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by CISPR and ANSI. 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 95.45%.

Parameter	Uncertainty	
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
Antenna Fort Conducted Emission	> 1GHz	± 1.5 dB
	9KHz – 30MHz	± 3.42 dB
Radiated Emission	30 MHz – 1GHz	± 5.00 dB
	> 1GHz	± 4.88 dB
Conducted Emission on AC Mains	150kHz-30MHz	± 2.68 dB
Occupied Channel Bandwidth		±5 %

Report No.: SHE22110054-02CE Date: 24

2023-04-18

Page 8 of 39

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

Channel	Frequency
The lowest channel(CH0)	2402MHz
The middle channel(CH19)	2440MHz
The Highest channel(CH39)	2480MHz

The basic operation modes are:

- A. On
 - 1. BLE mode
 - a. Transmitting
 - i. Low Channel
 - ii. Middle Channel
 - iii. High Channel
 - b. Receiving
 - 2. Normal working with Bluetooth on
- B. Standby
- C. Off

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 9 of 39

3.2 Special Accessories and Auxiliary Equipment

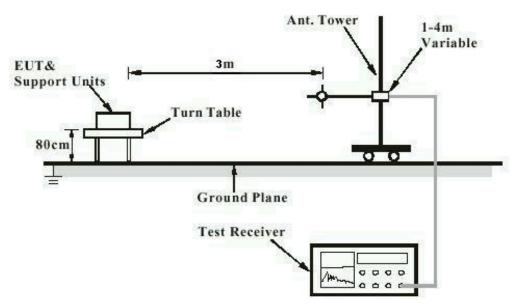
Description	Manufacturer	Model Name	Serial No.
Laptop	Lenovo	TP00083A	PF-0PRDGN 17/03
Adapter	Something High Electric(Xiamen) Company Inc.	P-050B-050200EU	N/A
EVB Debug Board	SIMCom	8PYA00-SIMCOM-EVB_V1.02	N/A
USB Cable	SIMCom	N/A	1.00m Unshielded

3.3 Support Software

Description	Manufacturer	Software Name
Software	Qualcomm	QRCT Version 4.0.00166.0

3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 10 of 39

Diagram of Measurement Configuration for Conduction Test

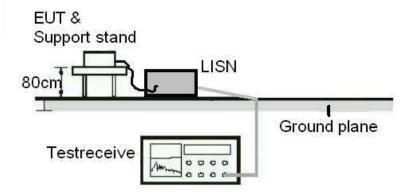
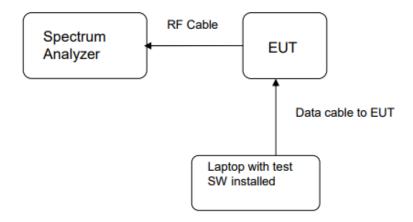


Diagram of Measurement Configuration for Transmitter Test



Report No.: SHE22110054-02CE Date:

2023-04-18

Page 11 of 39

4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement		
RESULT:	PA	ASS
Test standard	: FCC Part 15.247(b)(4), Part 15.203	
	RSS-247 5.4(f), RSS-GEN 6.8	
Requirement	: The use of approved antennas only with direction	onal
	gains that do not exceed 6dBi	

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 2.97dBi. The antenna is external antenna with no possibility of replacement with a non-approved antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

TEST REPORT				
Report No.:	SHE22110054-02CE	Date:	2023-04-18	Page 12 of 39
4.1.2 Maxim	um peak conducted or	utput pow	er and E.I.R.P	
RESULT:				PASS
Test standard		: FCC	Part 15.247(b)(3), RSS-247 5.	4(d)
Requirement		: ANS	C63.10-2013 clause 11.9.1.1,	
		KDB	558074 clause 8.3.1.1	
Kind of test site		: Shie	ded room	
Test setup				
Test Channel		: Low/	Middle/High	

Operation Mode	:	A.1.a
Ambient temperature	:	20.8°C
Relative humidity	:	51%

Table 1: Maximum peak conducted output power

Test Mode Test Channel		Maximum peak conc	Limit	
Test Mode	(MHz)	(dBm)	(mW)	(W)
	2402	-1.417	0.722	
BLE	2440	0.722	1.181	< 1
	2480	-0.358	0.921	

Table 2: E.I.R.P

Test Mode Test Channel		E.I.	Limit	
Test Mode	(MHz)	(dBm)	(mW)	(W)
	2402	1.553	1.430	
BLE	2440	3.692	2.340	< 4
	2480	2.612	1.825	

Note: The antenna gain is 2.97dBi

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 13 of 39



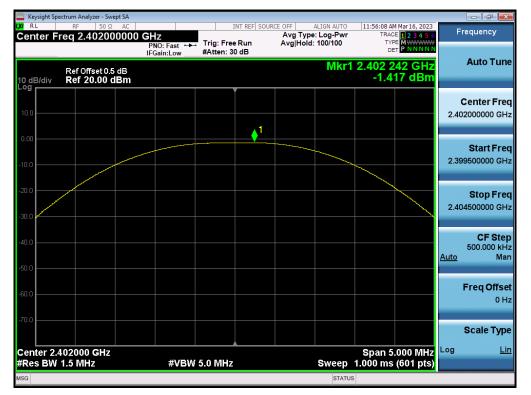


Figure 2: The plots of Peak Conducted Output Power, 2440MHz, BLE

Keysight Spe	ctrum Analyzer - Swept SA RF 50 Ω AC		INT REF SOU	JRCE OFF	11:59:47 AM Mar16, 2023	
	req 2.4400000		Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast ↔↔ IFGain:Low	#Atten: 30 dB			Auto Tune
10 dB/div Log	Ref Offset 0.5 dB Ref 20.00 dBm	1		Mkr1	2.440 067 GHz 0.722 dBm	Auto Func
			ľ			Center Freq
10.0			↓ ¹			2.440000000 GHz
0.00						Start Freq
-10.0						2.437500000 GHz
-20.0						Stop Freq
-30.0						2.442500000 GHz
						CF Step
-40.0						500.000 kHz Auto Man
-50.0						
-60.0						Freq Offset 0 Hz
-70.0						
						Scale Type
Center 2.4 #Res BW	40000 GHz	#\/B\\/	5.0 MHz	Sween	Span 5.000 MHz 1.000 ms (601 pts)	Log <u>Lin</u>
MSG		#4014		STATU		

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 14 of 39

Figure 3: The plots of Peak Conducted Output Power, 2480MHz, BLE



TEST	REPORT

Report No.: SHE22110054-02CE Date: 20

2023-04-18

PASS

4.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:	
Test standard	: FCC Part 15.247(a)(2), RSS-247 5.2(a) RSS-Gen 6.7
Requirement	: ANSI C63.10-2013 clause 11.8.1,
	KDB 558074 clause 8.2
Kind of test site	: Shielded room
Test setup	
Test Channel	: Low/Middle/High
Operation Mode	: A.1.a
Ambient temperature	: 20.8°C

: 51%

Table 3: 6dB Bandwidth and 99% Bandwidth

Relative humidity

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	6dB Bandwidth Limit
	2402	0.6462	1.0584	
BLE	2440	0.6430	1.0655	>0.5 MHz
	2480	0.6515	1.0652	

Report No.: SHE22110054-02CE Date: 20

2023-04-18

Page 16 of 39





Figure 5: The plots of 99% Bandwidth, 2402MHz, BLE



Report No.: SHE22110054-02CE Date: 2

2023-04-18

Page 17 of 39



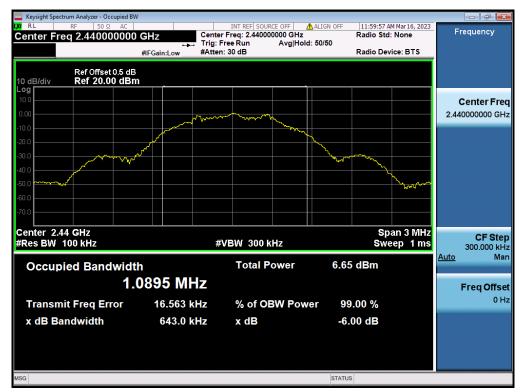


Figure 7: The plots of 99% Bandwidth, 2440MHz, BLE



Report No.: SHE22110054-02CE Date: 2

2023-04-18

Page 18 of 39





Figure 9: The plots of 99% Bandwidth, 2480MHz, BLE



TEST REPORT											
Report No.:	SHE22110054-02CE	Da	ate:	2023-04-18	Page 19 of 39						
4.1.4 Maxim	um conducted output	powe	er sp	ectral density							
RESULT:					PASS						
Test standard		:	FCC	Part 15.247(e), RSS-247 5.2(b)							
Requirement		:	ANS	l C63.10-2013 clause 11.10.2,							
			KDB	558074 clause 8.4							
Kind of test site		:	Shiel	ded room							
Test setup											
Test Channel		:	Low/	Middle/High							
Operation Mode		:	A.1.a	ì							
Ambient tempera	iture	:	20.8	°C							
Relative humidity	1	:	51%								

Table 4: Maximum conducted output power spectral density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)		
	2402	-16.083			
BLE	2440	-13.904	8		
	2480	-15.016			

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 20 of 39



Figure 10: The plots of Power Spectral Density, 2402MHz, BLE

Figure 11: The plots of Power Spectral Density, 2440MHz, BLE



Report No.: SHE22110054-02CE Date: 20

2023-04-18

Page 21 of 39





TEST REPORT											
Report No.:	SHE22110054-02CE	Da	te:	2023-04-18	Page 22 of 39						
4.1.5 Conduc	cted Spurious Emissi	on & A	Auth	orized-band band-edg	je						
RESULT:					PASS						
Test standard		:	FCC	Part 15.247(d), RSS-247 5.	5						
Requirement		:	ANSI	C63.10-2013 clause 11.11,							
			KDB	558074 clause 8.5							
Kind of test site		:	Shiel	ded room							
Test setup											
Test Channel		:	Low/N	Niddle/High for spurious, Lo	w/High for Band						
			Edge								
Operation Mode		:	A.1.a								
Ambient tempera	ture	:	20.8°	С							
Relative humidity	,	:	51%								

For details refer to following test plot.

Report No.: SHE22110054-02CE Date: 20

2023-04-18

Figure 13: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE, Carrier Level



Figure 14: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE, Band Edge

	ectrum Analyzer - S										
Center E	RF 50 req 2.4000		GHZ	11	IT REF SOUR		ALIGN OFF		M Mar 16, 2023	F	requency
	leq 2.4000	500000	PNO: Wide IFGain:Low	↔ Trig: Free #Atten: 30			id: 100/100	TYP			Auto Tune
10 dB/div Log	Ref Offset Ref 20.00								98 dBm		
10.0											Center Freq
0.00						^	$\sim \sim $			2.4	00000000 GHz
-10.0						- /					
-20.0											Start Freq
-40.0					/	\sim	<u>۲</u>	λ		2.3	95000000 GHz
-50.0				_	1			- Long			Oton Erog
	Marter Contraction	hor was a fear	᠕ᠰᢇᢑ᠕ᡙ	And the	N			<u> </u>	ᢣᡊᢛᡀᠴᠲᠾ᠇ᡐᡇ	2.4	Stop Freq 05000000 GHz
-70.0											
Center 2. #Res BW	400000 GH 100 kHz	z	#VI	300 kHz			Sweep	Span 1 1.000 ms	0.00 MHz (601 pts)		CF Step 1.000000 MHz
MKR MODE TR		Х		Y	FUN	CTION F	UNCTION WIDTH		DN VALUE	<u>Auto</u>	Man
1 N 1 2	f	2.400	000 GHz	-57.698 dB	m						
3 4											Freq Offset 0 Hz
5 6									E		
7 8											Scale Type
9 10										Log	Lin
11 <u> </u>				Ш							
MSG							STATU	S			

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 24 of 39

Figure 15: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE, Conducted spurious emissions 30MHz-3GHz

Keysight Spectrum Analyzer - Swept SA					
Marker 1 2.40303000000		Avg Type:	100/100 TYPE	123456 MWWWW	eak Search
Ref Offset 0.5 dB 10 dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30		Mkr2 1.515 -61.39	0 GHz	NextPeak
10.0 0.00 			¹	N	ext Pk Right
-20.0				21.58.dBm	Next Pk Left
-50.0 -60.0 -70.0	natha transportage bartan Managaman ang Park	2	No. durilyanturn		/larker Delta
Start 0.030 GHz #Res BW 100 kHz MKR MODE TRC SCL X	#VBW 300 kHz	FUNCTION FUNC	Stop 3.0 weep 283.9 ms (1 TION WIDTH FUNCTION	001 pts)	Mkr→CF
2 N 1 f 1. 3 - - - - 4 - - - - 5 - - - - 6 - - - - -	403 0 GHz -1.454 dBi 515 0 GHz -61.397 dBi				/lkr→RefLvl
7 8 9 10 11					More 1 of 2
MSG			STATUS		

Figure 16: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE, Conducted spurious emissions 2GHz-25GHz

🔤 Keysight Spectrum Analyzer - Swept SA						
KI RF 50 Ω AC Marker 1 2.402500000000			ALIGN OFF	TRACE	Mar 16, 2023	Peak Search
Ref Offset 0.5 dB 10 dB/div Ref 20.00 dBm		Free Run Avg H h: 30 dB	old: 10/10 Mkr	DET	PNNNNN	NextPeak
Log 10.0 0.00 -1 -10.0						Next Pk Right
-20.0					-21.58 dBm	Next Pk Left
-50.0 -60.0 -70.0	ny i je na sladisi dani shi ya safi ya shi ya s			, service,	A CALLER AND A CAL	Marker Delta
Start 2.00 GHz #Res BW 100 kHz MKR MODE TRC SCL X	#VBW 300 ki	FUNCTION	Sweep	Stop 25 2.198 s (4 FUNCTIO		Mkr→CF
	02 50 GHz -3.354 35 25 GHz -48.190				=	Mkr→RefLvi
8 9 10 11						More 1 of 2
MSG			STATUS			

Report No.: SHE22110054-02CE Date: 20

2023-04-18

Figure 17: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE, Carrier Level



Figure 18: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE, Conducted spurious emissions 30MHz-3GHz

	ectrum Analyzer -								
Marker 1	RF 50 2.438670	Ω AC	Hz	INT	REF SOURCE OFF	ALIGN OFF	TRA	M Mar 16, 2023	Peak Search
		F IF	NO: Fast ← Gain:Low	 Trig: Free R #Atten: 30 d 		Hold: 100/100	TY D		NextPeak
10 dB/div	Ref Offset Ref 20.00							59 dBm	
10.0 0.00							↓ 1		Next Pk Right
-10.0								-19.34 dBm	
-30.0									Next Pk Left
-40.0									
-50.0									
-60.0	and and a software	and a surger of the story	and the second states	and the state of t	Monal Harrison and the	Anne water water and	when	work work was not been	Marker Delta
-70.0									
Start 0.03							Eton 2	.000 GHz	
#Res BW			#VB	W 300 kHz		Sweep	283.9 ms ((1001 pts)	Mkr→CF
MKR MODE TH		х		Y	FUNCTION	FUNCTION WIDTH		ON VALUE 🔺	
1 N 1 2 N 1	1 f 1 f		7 GHz 0 GHz	0.783 dBm -60.759 dBm					
3									Mkr→RefLvl
5								E	
7									
9									More 1 of 2
10 11									1012
•				III				•	
MSG						STATU	JS		

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 26 of 39

Figure 19: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE, Conducted spurious emissions 2GHz-25GHz



Figure 20: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE, Carrier Level

🔤 Keysight Spectrum Analyzer - Swept SA						x
KL RF 50 Ω AC Center Freq 2.480000000 G		INT REF SOURCE O	ALIGN OFF	12:03:14 PM Mar 16, 2023 TRACE 1 2 3 4 5		
	PNO:Wide ↔ Irig:r		vg Hold: 100/100	2.480 010 GHz		ne
Ref Offset 0.5 dB 10 dB/div Ref 20.00 dBm				-0.478 dBm		
Log 10.0 .00 -10.0		1			Center Fre 2.480000000 GF	
-20.0					Start Fre 2.478500000 GF	
-50.0					Stop Fre 2.481500000 GF	
Center 2.480000 GHz #Res BW 100 kHz	#VBW 300 ki		· · ·	Span 3.000 MHz 1.000 ms (601 pts)	300.000 kl Auto Ma	
MKR MODE TRC SCI X 1 N 1 f 2,430.0 2 3 - - 4 - - - 5 - - - 6 - - - -	Y 10 GHz -0.478	FUNCTION	N FUNCTION WIDTH	FUNCTION VALUE	Freq Offs	set Hz
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					Scale Typ	ре _{Lin}
MSG			STATU	s		

Report No.: SHE22110054-02CE Date: 202

2023-04-18

Figure 21: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE, Band Edge



Figure 22: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE, Conducted spurious emissions 30MHz-3GHz

🔤 Keysight Spectrum Analyzer - Swept SA					
KL RF 50 Ω AC Marker 1 2.480250000000			E: Log-Pwr TRA		eak Search
Ref Offset 0.5 dB	PNO: Fast +++ Trig: Free IFGain:Low #Atten: 30		: 100/100 T		Next Peak
Log 10.0 0.00 -10.0			≬ 1		lext Pk Right
-20.0				-20.48 dBm	Next Pk Left
-50.0 -60.0 -70.0	n-ad-sound and a former as a strange former	2	an and the factor of the facto	**************************************	Marker Delta
Start 0.030 GHz #Res BW 100 kHz	#VBW 300 kHz	FUNCTION FUI	Sweep 283.9 ms	3.000 GHz (1001 pts)	Mkr→CF
	480 3 GHz -0.328 dE 515 0 GHz -61.240 dE			=	Mkr→RefLvi
7 8 9 10 11 11 4	III				More 1 of 2
MSG			STATUS		

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 28 of 39

Figure 23: The plots of Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE, Conducted spurious emissions 2GHz-25GHz

	ght Spec		Analyzer - Sv												
<mark>txi</mark> RL Marke	er 1 '	RF 2.47	ء _{50 2} 72500		GHz			NT REF SO			ALIGN OFF		M Mar 16, 20 CE <mark>1 2 3 4</mark>		Peak Search
			Offset 0		PNO: Fast IFGain:Lov		Trig: Free #Atten: 3		Avg	Hold:	10/10 Mkr	۲۷ D 1 2.477			Next Peak
10 dB/	div		20.00									-0.4	52 dBi	n	
Log 10.0	1-														Next Pk Right
-10.0															
-20.0													-20.48 d	Эm	
-30.0															Next Pk Left
-40.0												<mark>2</mark>			
-50.0								شر ہ		مەنبىرىدە	وملاينة يستجمعوننا	www.	party Autom		
-60.0 🐖	al wella	** ** **	مري ^{يد} وغالواو في		matingatedistan	*****	ويتنقله القوياط	and a second							Marker Delta
-70.0															
Start : #Res					#\	/BW	300 kHz				Sweep	Stop 2 2.198 s (5.00 GH 4001 pt		Mkr→CF
MKR MO	DE TR	SCL		X			Y		NCTION	FUN	CTION WIDTH	FUNCTI	ON VALUE	-	
1 N 2 N	1	f			77 25 GHz 89 00 GHz		-0.452 dE								
3															Mkr→RefLvl
5														E	
7 8															
9															More
10														-	1 of 2
•							III						•		
MSG											STATU	5			

TEST REPORT											
Report No.:	SHE22110054-02CE	D	ate:	2023-04-18	Page 29 of 39						
4.1.6 Radiate	d Emission										
RESULT:					PASS						
Test standard		:		Part 15.247(d), 15.205, 15.209 -GEN 8.9							
Requirement		:		l C63.10-2013 clause 11.12, 558074 clause 8.6							
Kind of test site		:	3m \$	Semi-Anechoic Chamber							
Test setup											
Test Channel		:	Low	/Middle/High							
Operation Mode		:	A.1.a	a							
Ambient temperat	ure	:	21°C	>							
Relative humidity		:	51%								

Notes

Test plots please refer to the annex document "SHE22110054-02CE DATA BLE-TX EXHIBIT A".

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported. In addition, During 30MHz to 1GHz test frequency range, only the worst mode data was reported in this report.

2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.

3. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement -X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

	TEST REPORT											
Report No.:	SHE22110054-02CE	D	ate:	2023-04-18		Page 30 of 39						
4.1.7 Band E	Edge (Restricted-band	band	d-edg	e)								
RESULT:						PASS						
Test standard		:		Part 15.247(d), 15.205, 15.209 GEN 8.10)							
Requirement		:		C63.10-2013 clause 11.13, 558074 clause 8.7								
Kind of test site		:	3m Se	emi-Anechoic Chamber								
Test setup												
Test Channel		:	Low/H	ligh								
Operation Mode		:	A.1.a									
Ambient tempera	ature	:	21°C									
Relative humidity	/	:	51%									

Notes

Test plots please refer to the annex document "SHE22110054-02CE DATA BLE-TX EXHIBIT A".

Report No.: SHE22110054-02CE Date:

2023-04-18

PASS

4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT:

Earthing

Ambient temperature Relative humidity

Test standard	:	FCC Part 15.207(a), RSS-Gen 8.8
Requirement	:	ANSI C63.10-2013 clause 6.2
Kind of test site	:	Shielded room
Test setup		
Input Voltage	:	which received AC 120V, 60Hz Power
Operation Mode	:	A.1.a

: Not Connected

: 23.2°C

: 52%

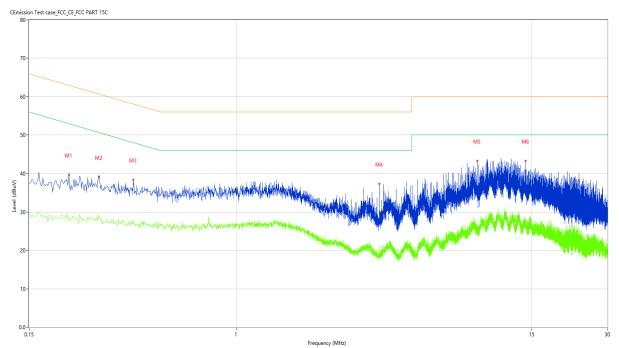
For details refer to following test plot.

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 32 of 39

Note: The all configurations were tested respectively, but only the worst configuration(Transmitting-low channel) shown here.

Figure 24: Conducted Emission on AC Mains, L Phase

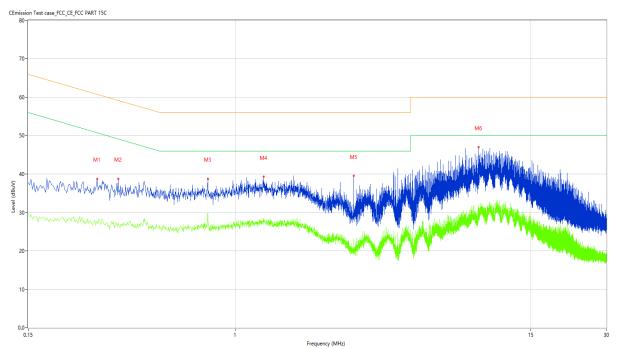


No.	Frequency	Results (dBuV)	Factor	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
	(MHz)		(dB)					
1	0.216	39.64	10.20	62.97	23.33	Peak	L	Pass
1**	0.216	28.61	10.20	52.97	24.36	AV	L	Pass
2	0.284	39.13	10.23	60.70	21.57	Peak	L	Pass
2**	0.284	28.30	10.23	50.70	22.40	AV	L	Pass
3	0.390	38.39	10.23	58.06	19.67	Peak	L	Pass
3**	0.390	26.89	10.23	48.06	21.17	AV	L	Pass
4	3.708	37.28	10.26	56.00	18.72	Peak	L	Pass
4**	3.708	20.78	10.26	46.00	25.22	AV	L	Pass
5	9.110	43.28	10.48	60.00	16.72	Peak	L	Pass
5**	9.110	26.80	10.48	50.00	23.20	AV	L	Pass
6	14.192	43.26	10.68	60.00	16.74	Peak	L	Pass
6**	14.192	28.67	10.68	50.00	21.33	AV	L	Pass

Report No.: SHE22110054-02CE Date: 2023-04-18

Page 33 of 39

Figure 25: Conducted Emission on AC Mains, N Phase



No.	Frequency	Results (dBuV)	Factor	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
	(MHz)		(dB)					
1	0.282	38.69	10.25	60.76	22.07	Peak	N	Pass
1**	0.282	27.77	10.25	50.76	22.99	AV	N	Pass
2	0.342	38.70	10.26	59.15	20.45	Peak	N	Pass
2**	0.342	27.39	10.26	49.15	21.76	AV	N	Pass
3	0.778	38.70	10.34	56.00	17.30	Peak	N	Pass
3**	0.778	29.84	10.34	46.00	16.16	AV	N	Pass
4	1.296	39.25	10.22	56.00	16.75	Peak	N	Pass
4**	1.296	28.49	10.22	46.00	17.51	AV	N	Pass
5	2.960	39.49	10.18	56.00	16.51	Peak	N	Pass
5**	2.960	23.11	10.18	46.00	22.89	AV	N	Pass
6	9.290	46.99	10.39	60.00	13.01	Peak	N	Pass
6**	9.290	31.16	10.39	50.00	18.84	AV	N	Pass

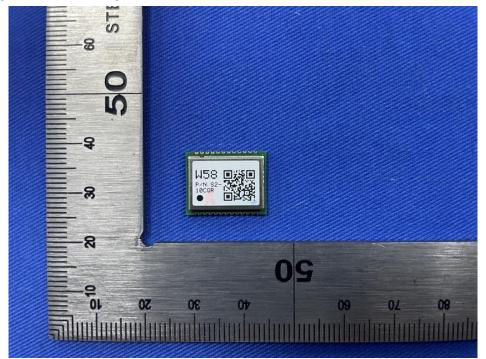
Report No.: SHE22110054-02CE Date:

2023-04-18

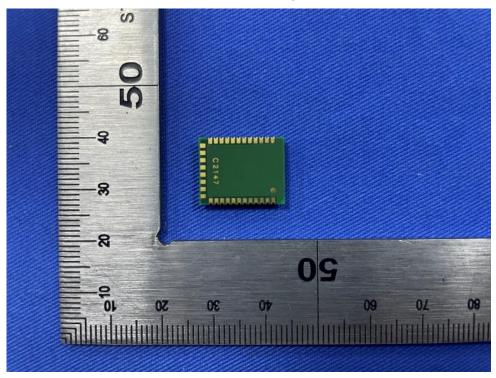
Page 34 of 39

5 Appendixes

5.1 Photographs of the Sample



Front of the sample

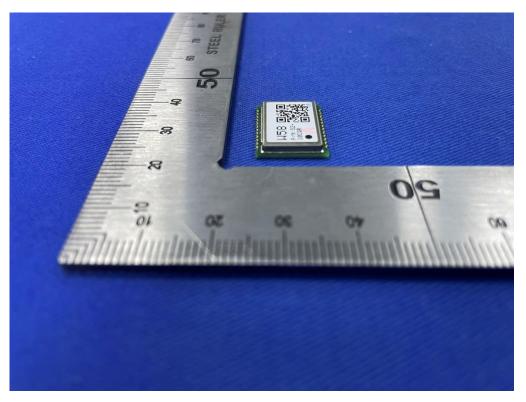


Rear of the sample

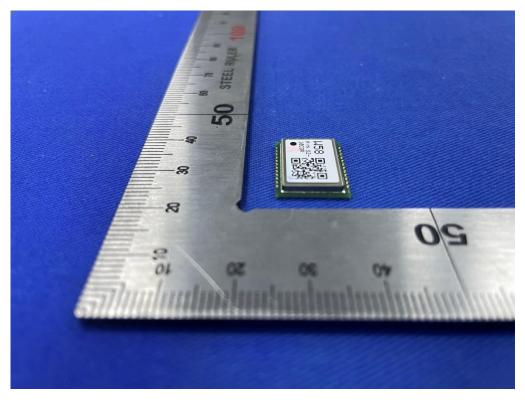
Report No.:

SHE22110054-02CE

Date: 2023-04-18 Page 35 of 39



Left of the sample



Right of the sample

Date:

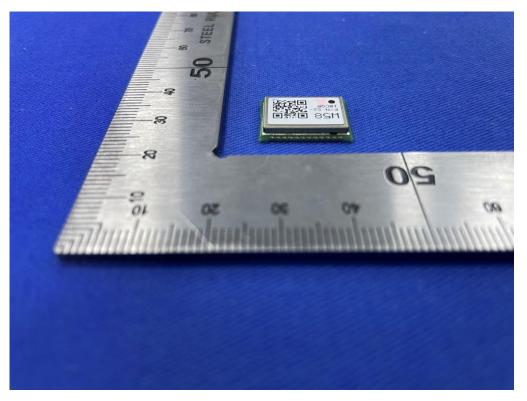
SHE22110054-02CE

Report No.:

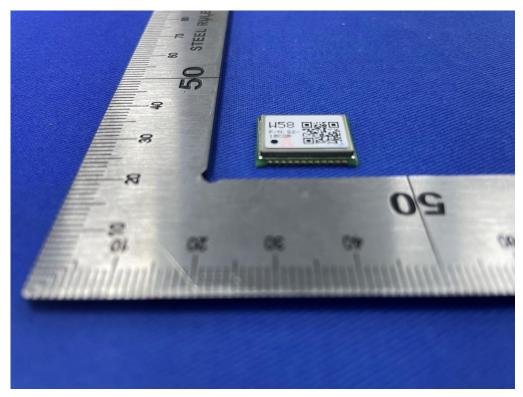
TEST REPORT

2023-04-18

Page 36 of 39



Top of the sample



Bottom of the sample

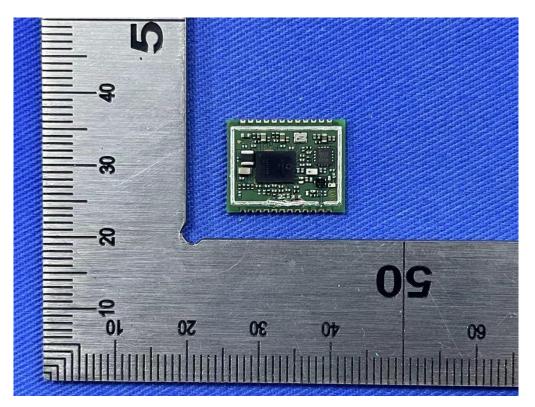
Report No.:

SHE22110054-02CE

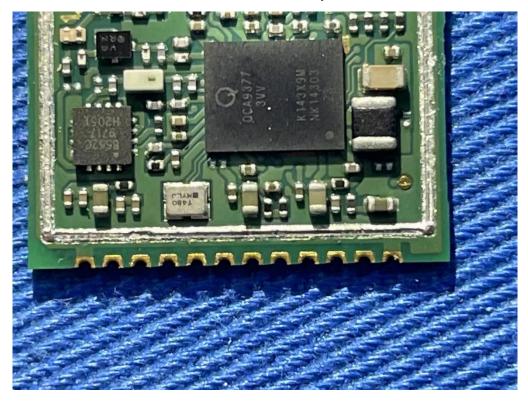
Date:

2023-04-18

Page 37 of 39



Internal-1 of the sample



Internal-2 of the sample

Report No.: SHE22110054-02CE Date: 20

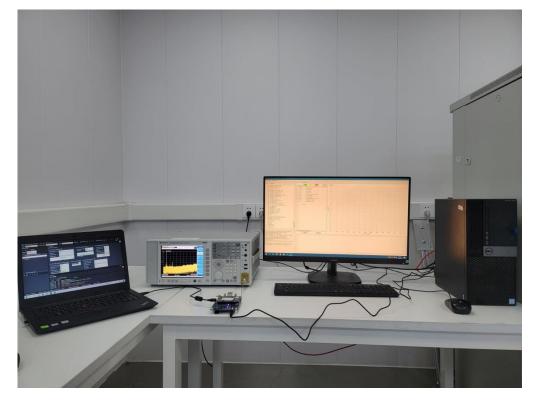
2023-04-18

Page 38 of 39

5.2 Set-up for Conducted Emissions

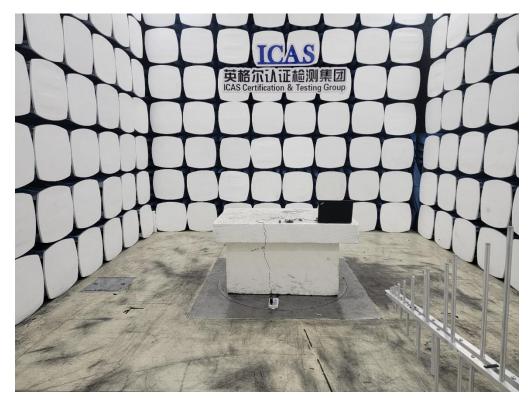


5.3 Set-up for Conducted RF test at Antenna Port



Report No.: SHE22110054-02CE Date: 2023-04-18

5.4 Set-up for Spurious Emissions below 1GHz



5.5 Set-up for Spurious Emissions above 1GHz



End of the report