

FCC Test Report

Report No.: AGC00688201209FE02

FCC ID	0	
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Type-A Receiver
BRAND NAME		SANWA
MODEL NAME	:	SANWA RC5
APPLICANT	:	SANWA LIMITED
DATE OF ISSUE	©	Mar. 26, 2021
STANDARD(S)	:	FCC Part 15.247
REPORT VERSION	:	V1.0





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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0		Mar. 26, 2021	Valid	Initial Release

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1. VERIFICATION OF COMPLIANCE

Applicant	SANWA LIMITED	
Address Room 1005, 10/F., Tower 2, Silvercord, 30 Canton Road, Tsim Sha Tsu Kowloon, Hong Kong		
Manufacturer	Shenzhen Hangshi Technology Co., Ltd	
Address	Hangshi Technology Park, Democracy West Industry Area, Shajing Town, Bao'an District, Shenzhen, China.	
Factory	Shenzhen Hangshi Technology Co., Ltd	
Address	Hangshi Technology Park, Democracy West Industry Area, Shajing Town, Bao'an District, Shenzhen, China.	
Product Designation	Designation Type-A Receiver	
Brand Name SANWA		
Test Model SANWA RC5		
Date of test Mar. 18, 2021 to Mar. 26, 2021		
Deviation	No any deviation from the test method	
Condition of Test Sample Normal		
Test Result Pass		
Report Template	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

well chang

Cool Cheng (Project Engineer)

Mar. 26, 2021

Max Zhang

Reviewed By

Max Zhang (Reviewer)

Mar. 26, 2021

Approved By

fore

Forrest Lei (Authorized Officer)

Mar. 26, 2021

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as a "Type-A Receiver". 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	2.405 GHz to 2.470GHz
RF Output Power	-0.310dBm (Max)
Modulation	GFSK
Number of channels	8 Channel
Antenna Designation PCB Antenna (Comply with requirements of the FCC part 15.203)	
Antenna Gain	-1.66dBi
Hardware Version	V1.1
Software Version	V1.0
Power Supply	DC 5V by USB

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	01	2405 MHz
	02	2413 MHz
	03	2422 MHz
2400 2482 EMH-	04	2430 MHz
2400~2483.5MHz	05	2440 MHz
	06	2450 MHz
	07	2460 MHz
	08	2470 MHz

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

This submittal(s) (test report) is intended for FCC ID: 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 = ±4.0 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, $Uc = \pm 2.7 \text{ dB}$
- 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 (2405 MHz)
2	Middle channel TX (2430 MHz)
3	High channel TX (2470 MHz)

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.

	Software Se	etting	
HID_Tool			X
VID: 248a	PID: 8566	CONNECT	CLEAR
PARING			
	PARING		
CMD_SET			
		2 B1 B0	SENT
EMI			
	<u>.</u> .		1 1 1
	x Carry CD R	-	
2430MHz	2470MHz		2405MHz
	TEST		DATA SENT

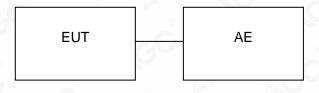
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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:

EUT	AE

5.2. EQUIPMENT USED IN TESTED SYSTEM

ltem	Equipment	Model No.	ID or Specification	Remark
1	Type-A Receiver	SANWA RC5		EUT
2	Control Box	N/A	USB-TTL	AE
3	PC	16301-01	N/A	AE
4	PC Adapter	ADC6501TM	N/A	AE

Note: "AE" means that EUT does not have its own spare parts. All spare parts are by AGC laboratory.

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	Tonscend	JS32-RE (Ver.2.5)	C N/A	N/A	N/A

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7. PEAK OUTPUT POWER

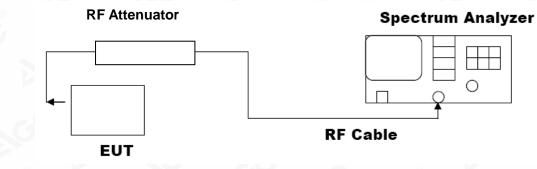
7.1. MEASUREMENT PROCEDURE

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



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7.3. LIMITS AND MEASUREMENT RESULT

	PEAK OUTPUT POWER MEASURE		
	FOR GFSK MOUDULAT		
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.405	-0.310	30	Pass
2.430	-1.359	30	Pass
2.470	-0.424	30	Pass

CH01

Keysight Spectrum Analyzer - Swept SA					
α RL RF 50 Ω AC Center Freq 2.405000000	CORREC GHZ PNO: Fast ↔	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	04:52:32 PM Mar 19, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
10 dB/div Ref 20.00 dBm	IFGain:Low	Atten: 30 dB	Mkr1	2.404 615 GHz -0.310 dBm	Auto Tune
10.0		▲ ¹			Center Fred 2.405000000 GH
0.00					Start Free 2.402500000 GH
30.0					Stop Fre 2.407500000 GH
40.0					CF Ste 500.000 kH <u>Auto</u> Ma
60.0					Freq Offse 0 H
70.0 Center 2.405000 GHz #Res BW 1.5 MHz	#VBW	5.0 MHz	Sweep_1	Span 5.000 MHz .000 ms (1001 pts)	
ISG			STATUS		

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CH04



CH08

🚺 Keysight Spectrum Analyzer - Swept SA					- 7 ×
X RL RF 50 Ω AC Center Freq 2.470000000	GHz	Avg Type	: Log-Pwr TRA	M Mar 19, 2021 CE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dBm	PNO: Fast + Trig: Free IFGain:Low Atten: 30		Mkr1 2.470 4	550 GHz	Auto Tune
10.0		×1			Center Free 2.470000000 GH:
0.00					Start Fre 2.467500000 GH
20.0 and a second secon					Stop Fre 2.472500000 GH
40.0					CF Ste 500.000 kH Auto Ma
-60.0					Freq Offse 0 H
-70.0 Center 2.470000 GHz			Span (5.000 MHz	
#Res BW 1.5 MHz	#VBW 5.0 MHz		Sweep 1.000 ms	(TOUT PLS)	

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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 \ge 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 MEASUR	REMENT RESULT	
Applicable Limite		Applicable Limits	
Applicable Limits	Test Data	(kHz)	Criteria
S S	Low Channel	1384	PASS
>500KHZ	Middle Channel	1514	PASS
	High Channel	1362	PASS

04:52:20 PM Mar 19, 2021 Radio Std: None Center Freq: 2.405000000 GHz Trig: Free Run Avg|Ho Frequency 2 405000000 GHz Center Avg|Hold: 100/100 #Atten: 30 dB Radio Device: BTS #IFGain:Low Ref 20.00 dBm Center Freq 2.405000000 GHz Span 5 MHz Center 2.405 GHz CF Step #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms 500.000 k Auto Mar **Total Power** 8.01 dBm Occupied Bandwidth 2.2584 MHz Freq Offset 0 H; **Transmit Freq Error** 83.163 kHz **OBW Power** 99.00 % x dB Bandwidth 1.384 MHz -6.00 dB x dB

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.

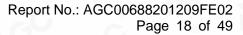
9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEA	SUREMENT RESULT	
Applicable Limite	Measurement Re	sult
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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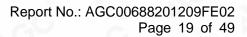






TEST RESULT FOR ENTIRE FREQUENCY RANGE GFSK MODULATION IN LOW CHANNEL

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				yzer - Sw													
LXI RI			RF		2 AC	: COF 000 G	RREC		SE	NSE:INT	Av		ALIGN AUTO e: Log-Pwr		M Mar 19, 202: CE 1 2 3 4 5		Frequency
Gen			15.			Р	NO: Fast Gain:Lov		Trig: Free Atten: 30				: 10/10	cr1 4.80	9 5 GH		Auto Tune
10 dE	3/div	R	ef 2	0.00	dBm	h								-41.1	71 dBn		
Log 10.0 0.00 -10.0																	Center Freq 13.741750000 GHz
-20.0 -30.0 -40.0			1												-21.43 dBr	2	Start Freq 2.483500000 GHz
-50.0 -60.0 -70.0	AL ARM			di sin													Stop Freq 25.00000000 GHz
#Re:	t 2.48 s BW	/ 100	0 kH	z			#\	/BW	300 kHz					2.152 s (3	25.00 GHz 80000 pts)	CF Step 2.251650000 GHz <u>Auto</u> Man
	NODE T			_		× 4.809	5 GHz		Y -41.171 di		JNCTION	FUN	NCTION WIDTH	FUNCTION	ON VALUE	î.	
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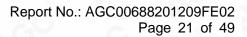
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 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



Keysight Spectrum Analyzer - Sv RL RF 50 G		SENSE:INT	ALIGN AUTO	04:57:17 PM Mar 19, 2021	
Center Freq 2.4300		T	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 123456 TYPE MWWWWW DET PNNNNN	Frequency
			Mkr1 2.	430 181 42 GHz	Auto Tune
10 dB/div Ref 20.00	dBm			-3.708 dBm	
10.0					Center Free
0.00		∳ 1			2.43000000 GH
-10.0		and the second of the second second	Martin Martine Contraction of the second sec		
-20.0					Start Free
-30.0					2.427500000 GH
-40.0					
-50.0					Stop Free
-60.0					2.432500000 GH
Center 2.430000 GHz #Res BW 100 kHz		N 300 kHz	Sweep 2.	Span 5.000 MHz 000 ms (30000 pts)	CF Step 500.000 kH Auto Mar
MKR MODE TRC SCL	× 2.430 181 42 GHz	Y -3.708 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
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4 5				E	0 H:
6					
8					
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11 <		m			
MSG			STATU	S	
Keysight Spectrum Analyzer - Sv		orner wit			
₩ RL RF 50 Ω Center Freq 1.2150		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	04:57:26 PM Mar 19, 2021 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 10/10		
			Mkr	1 2.278 34 GHz	Auto Tune
10 dB/div Ref 20.00	dBm			-56.367 dBm	
10.0					
0.00					Center Fred
-10.0					
-10.0				-23.71 dBm	1.215000000 GH:
-20.0				-23.7† dBm	1.215000000 GH: Start Free
-20.0				-23.71 dBm	1.215000000 GH: Start Free
-20.0				-23.71 dBg	1.215000000 GH; Start Free 30.000000 MH; Stop Free
-20.0				2371 dBm	1.215000000 GH; Start Free 30.000000 MH; Stop Free
-20.0 -30.0 -40.0 -50.0 -60.0 -70.0					1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH;
-20.0 -30.0 -40.0 -60.0 -7		N 300 kHz	Sween 22	11 5	1.21500000 GH; Start Free 30.000000 MH; Stop Free 2.40000000 GH; CF Step
-20.0 -30.0 -40.0 -50.0 -70.0 Start 30 MHz #Res BW 100 kHz	₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩	V 300 kHz	Sweep 22	11 Stop 2.400 GHz 28.0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; CF Step 237.000000 MH;
-20.0				11 Stop 2.400 GHz 28.0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; CF Step 237.000000 MH;
-20.0 -30.0 -40.0 -50.0	Х	Y		11 Stop 2.400 GHz 28.0 ms (30000 pts)	1.215000000 GH: Start Free 30.000000 MH: Stop Free 2.400000000 GH: CF Step 237.000000 MH: <u>Auto</u> Mar Free Offse
-20.0 -30.0 -40.0 -60.0 -7	Х	Y		11 Stop 2.400 GHz 28.0 ms (30000 pts)	1.215000000 GH: Start Free 30.000000 MH: Stop Free 2.400000000 GH: CF Step 237.000000 MH: <u>Auto</u> Mar Free Offse
-20.0 -30.0 -30.0 -40.0 -50.0	Х	Y		11 Stop 2.400 GHz 28.0 ms (30000 pts)	1.21500000 GH: Start Free 30.000000 MH: Stop Free 2.400000000 GH: CF Step 237.000000 MH: <u>Auto</u> Mar Free Offset
-20.0 -30.0 -40.0 -50.0	Х	Y		11 Stop 2.400 GHz 28.0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; CF Step 237.000000 MH; <u>Auto</u> Mar Free Offset
-20.0 -30.0 -40.0 -50.0	Х	Y		11 Stop 2.400 GHz 28.0 ms (30000 pts)	Center Fred 1.21500000 GH; Start Fred 30.000000 MH; Stop Fred 2.400000000 GH; CF Step 237.000000 MH; Auto Mar Freq Offset 0 H;
-20.0 -30.0 -30.0 -40.0 -50.0	Х	Y		Stop 2.400 GHz 8.0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; CF Step 237.000000 MH; <u>Auto</u> Mar Free Offset

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	pectrum Analyzer -										x
Center F	RF 50 Freq 13.74′			SEN	ISE:INT		ALIGN AUTO e: Log-Pwr		M Mar 19, 2021	Frequency	
Center	11eq 15.74	1750000	PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 30		Avg Hold:	: 10/10	TYF DE		Auto Tur	
10 dB/div	Ref 20.00	0 dBm					Mk		1 7 GHz 97 dBm	Autoru	IC
Log 10.00 0.00										Center Fre 13.741750000 GF	- 11
-20.0 -30.0 -40.0		1							-23.71 dBm	Start Fre 2.483500000 GH	
-50.0 -60.0										Stop Fre 25.000000000 GF	
Start 2.44 #Res BW	V 100 kHz	X	#VB\	W 300 kHz Y	FUNC		Sweep 2	2.152 s (3	5.00 GHz 0000 pts)	CF Ste 2.251650000 GH <u>Auto</u> Ma	
1 N 2 3 4 5 6 7 7 8 9 10	1 f	7.29	91 7 GHz	-39.497 dB						Freq Offs 0 F	
11 MSG				ш			STATUS	6			

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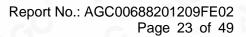
 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

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



Be		SK MODULATI			
Keysight Spectrum Analyze	r - Swept SA 50 Ω AC CORREC	C SENSE:IN	T ALIGN AUTO	05:00:02 PM Mar 19, 2021	
Center Freq 2.47	0000000 GHz	T	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
	IFGair	wide the second		DET P NNNN	
			Mkr1 2.4	169 589 07 GHz	Auto Tune
10 dB/div Ref 20.	00 dBm			-2.451 dBm	
Log					
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-20.0					Start Free
-30.0	m /		\ \ \ \ \ \ _		2.467500000 GH
-40.0				V ~	
-50.0					
-60.0					Stop Free
					2.472500000 GH
-70.0					
Center 2.470000 G	GHz			Span 5.000 MHz	CF Ster
#Res BW 100 kHz		#VBW 300 kHz	Sweep 2.	000 ms (30000 pts)	500.000 kH
MKR MODE TRC SCL	х	Y	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
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4 5					0 H:
6				4×*	
7 8					
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MSG			STATU	3	
MSG	r - Swept SA		STATU	3	
Keysight Spectrum Analyze	50 Ω AC CORREC	C SENSE:1N	T ALIGN AUTO	05:00:11 PM Mar 19, 2021	
Keysight Spectrum Analyze	50 Ω AC CORREC 5000000 GHz	T-1	T ALIGN AUTO Avg Type: Log-Pwr	05:00:11 PM Mar 19, 2021 TRACE 1 2 3 4 5 6 TVPE MMAAAAAAAA	ि की 론
Keysight Spectrum Analyze	50 Ω AC CORREC 5000000 GHz	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr	05:00:11 PM Mar 19, 2021 TRACE 123456	Frequency
Keysight Spectrum Analyze	50 Ω AC CORREC 5000000 GHz PNO:	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency
Keysight Spectrum Analyze RL RF Center Freq 1.21 10 dB/div Ref 20.	50 Ω AC CORREC 5000000 GHz PNO:	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 123456 TYPE MWWWWW DET PNNNN	Frequency
Keysight Spectrum Analyze R RL RF Center Freq 1.21 10 dB/div Ref 20.	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune
Keysight Spectrum Analyze W RL RF Center Freq 1.21	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune Center Free
Keysight Spectrum Analyze R RL RF Center Freq 1.21 10 dB/div Ref 20.	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune Center Free
Keysight Spectrum Analyze W RL RF Center Freq 1.21	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune Center Free
Keysight Spectrum Analyze Q RL RF Center Freq 1.21	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune Center Free 1.215000000 GH
Keysight Spectrum Analyze Q RL RF Center Freq 1.21 10 dB/div Ref 20. 10 0 10 0 10 0 10 0	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune Center Free 1.21500000 GH2 Start Free
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Keysight Spectrum Analyze R L RF Center Freq 1.21 10 dB/div Ref 20. 00	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast 🔸 Trig: Free Run	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19, 2021 TRACE 2 3 4 5 6 TYPE MWWWW DET P NN NN N 1 1.928 83 GHz	Frequency Auto Tune Center Free 1.21500000 GH Start Free
Keysight Spectrum Analyze R keysight Spectrum Analyze Center Freq 1.21 10 dB/div Ref 20. 00 00 10 0 00 0.00 00 -10 0 00 -30 0 00 -40 0 00	50 0 AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19,2021 TRACE 1 23 45 6 TYPE M.WWWW DET PN NINN N 1 1.928 83 GHz -54.889 dBm	Frequency Auto Tune Center Free 1.215000000 GH Start Free 30.000000 MH Stop Free
Keysight Spectrum Analyze R keysight Spectrum Analyze Center Freq 1.21 10 dB/div Ref 20. 0 0 Ref 20.	50 Ω AC CORRE 5000000 GHz PNO: IFGain	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19,2021 TRACE 1 23 45 6 TYPE M.WWWW DET PN NINN N 1 1.928 83 GHz -54.889 dBm	Frequency Auto Tune Center Free 1.215000000 GH Start Free 30.000000 MH Stop Free
Keysight Spectrum Analyze R keysight Spectrum Analyze Center Freq 1.21 10 dB/div Ref 20. 00 00 10 0 00 0.00 00 -10 0 00 -30 0 00 -40 0 00	50 0 AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:00:11 PM Mar 19,2021 TRACE 1 23 45 6 TYPE M.WWWW DET PN NINN N 1 1.928 83 GHz -54.889 dBm	Frequency Auto Tune Center Free 1.215000000 GH Start Free 30.000000 MH Stop Free
Keysight Spectrum Analyze R keysight Spectrum Analyze Center Freq 1.21 10 dB/div Ref 20. 0 0 Ref 20.	50 0 AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10 MKr	05:00:11 PM Mar 19,2021 TRACE [] 2 3 4 5 6 TYPE M MARINE DET P NANNAN 1 1.928 83 GHz -54.889 dBm -2246 dBm -2246 dBm 1 Le hash out on a million out of the stop 2.400 GHz	Frequency Auto Tune Center Free 1.215000000 GH Start Free 30.000000 MH Stop Free 2.400000000 GH
Keysight Spectrum Analyze Q RL RF Center Freq 1.21 10 dB/div Ref 20. 0 0 0.00 10 0 0.00 <th10 0<="" th=""></th10>	50 0 AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10 MKr	05:00:11 PM Mar 19,2021 TRACE 1 23 45 6 TYPE MANNAN DET PHANNAN 1 1.928 83 GHz -54.889 dBm -2245 dBm -2245 dBm 1	Frequency Auto Tune Center Freq 1.21500000 GH: Start Freq 30.00000 MH: Stop Freq 2.40000000 GH: CF Step 237.00000 MH:
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Keysight Spectrum Analyze Result RF Center Freq 1.21 O dB/div Ref 20. Start 30 MHz Res BW 100 kHz MKR MODE TRC SCL N 1 1 N 1 1 1	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1 23 45 6 TYPE M.W.W.W. OET P.N.WIN N 1 1.928 83 GHz -54.889 dBm -22.45 dBm -23.45 dBm	Frequency Auto Tune Center Freq 1.215000000 GH Start Freq 30.000000 MH Stop Freq 2.400000000 GH CF Step 237.000000 MH Auto
Keysight Spectrum Analyze Result RF Center Freq 1.21 O dB/div Ref 20. O g Image: Center Freq 1.21 O dB/div Ref 20. O g Image: Center Freq 1.21 Image: Center Freq 1.21 Image: Center Freq 1.21 Image: Center Freq 1.21 <td>50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm</td> <td>Fast → Trig: Free Run Atten: 30 dB</td> <td>T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr</td> <td>05:00:11 PM Mar 19, 2021 TRACE 1, 23 4, 5 6 TYPE MANNANA DET NINKIN N 1 1.928 83 GHz -54.889 dBm -0245/dbm -0245/dbm 1 -0245/dbm 1 -0245/dbm -</td> <td>Frequency Auto Tune Center Free 1.21500000 GH Start Free 30.000000 MH Stop Free 2.40000000 GH CF Step 237.00000 MH Auto Mar</td>	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1, 23 4, 5 6 TYPE MANNANA DET NINKIN N 1 1.928 83 GHz -54.889 dBm -0245/dbm -0245/dbm 1 -0245/dbm 1 -0245/dbm -	Frequency Auto Tune Center Free 1.21500000 GH Start Free 30.000000 MH Stop Free 2.40000000 GH CF Step 237.00000 MH Auto Mar
Keysight Spectrum Analyze R keysight Spectrum Analyze Q RL RF Center Freq 1.21 10 dB/div Ref 20. 10 0	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1 23 45 6 TYPE M.W.W.W. OET P.N.WIN N 1 1.928 83 GHz -54.889 dBm -22.45 dBm -23.45 dBm	Frequency Auto Tune Center Free 1.21500000 GH Start Free 30.000000 MH Stop Free 2.40000000 GH CF Step 237.00000 MH Auto Mar
Keysight Spectrum Analyze Q RL RF Center Freq 1.21 10 dB/div Ref 20. 0 0	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1, 23 4, 5 6 TYPE MANNANA DET NINKIN N 1 1.928 83 GHz -54.889 dBm -0245/dbm -0245/dbm 1 -0245/dbm 1 -0245/dbm -	Frequency Auto Tune Center Free 1.21500000 GH Start Free 30.000000 MH Stop Free 2.40000000 GH CF Step 237.00000 MH Auto Mar
Keysight Spectrum Analyze R keysight Spectrum Analyze Q RL RF Center Freq 1.21 10 dB/div Ref 20. 10 0	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1, 23 4, 5 6 TYPE MANNANA DET NINKIN N 1 1.928 83 GHz -54.889 dBm -0245/dbm -0245/dbm 1 -0245/dbm 1 -0245/dbm -	Frequency Auto Tune Center Free 1.21500000 GH Start Free 30.000000 MH Stop Free 2.40000000 GH CF Step 237.00000 MH Auto Mar
Keysight Spectrum Analyze Q RL RF Center Freq 1.21 10 dB/div Ref 20. 0 0	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1, 23 4, 5 6 TYPE MANNANA DET NINKIN N 1 1.928 83 GHz -54.889 dBm -0245/dbm -0245/dbm 1 -0245/dbm 1 -0245/dbm -	Frequency Auto Tune Center Free 1.215000000 GH: Start Free 30.000000 MH: Stop Free 2.400000000 GH: Auto Mar Freq Offse
Keysight Spectrum Analyze Qr RL RF Center Freq 1.21 10 dB/div Ref 20. 00	50 Ω AC CORREC 5000000 GHz PNO: IFGain 00 dBm	Fast → Trig: Free Run Atten: 30 dB	T ALIGN AUTO Avg Type: Log-Pwr Avg/Hold: 10/10 MKr	05:00:11 PM Mar 19, 2021 TRACE 1, 23 4, 5 6 TYPE MANNANA DET NINKIN N 1 1.928 83 GHz -54.889 dBm -0245/dbm -0245/dbm 1 -0245/dbm 1 -0245/dbm -	Frequency Auto Tune Center Freq 1.21500000 GH2 Start Freq 30.00000 MH2 Stop Freq 2.40000000 GH2 CF Step 237.00000 MH2

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	ght Spect		nalyzer - Sw												
(X) RL Cente	ar Ere	RF	50 Ω 3.750	AC			SEN	ISE:INT	Ava		LIGN AUTO		M Mar 19, 202 E 1 2 3 4 5		Frequency
Gente		-4	5.7500	50000	PNO: Fast IFGain:Lov		Trig: Free Atten: 30			Hold:		TYP		₩	
10 dB/	div	Ref	20.00	dBm							Mk	r1 7.41 -36.6	1 9 GH 35 dBr	z n	Auto Tune
Log - 10.00 - -10.00 -															Center Freq 13.750000000 GHz
-20.0 - -30.0 - -40.0 -				• ¹ -									-22.45 dB	Bm	Start Freq 2.500000000 GHz
-50.0															Stop Freq 25.00000000 GHz
Start #Res	BW 1	00		X	#\	/BW :	300 kHz	EUI			Sweep 2	2.152 s (3	5.00 GH 0000 pt DN VALUE		CF Step 2.25000000 GHz <u>Auto</u> Man
1 2 3 4 5 6 7 8 9 10 11		f			411 9 GHz		36.635 dE					PONCIN		m +	Freq Offset 0 Hz
MSG											STATUS	3			

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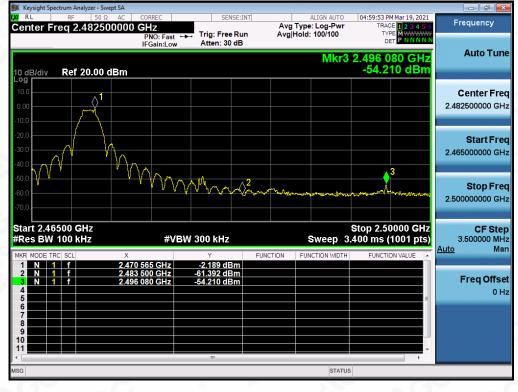
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com





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 8.4 was used in this testing.

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

Refer to Section 7.2.

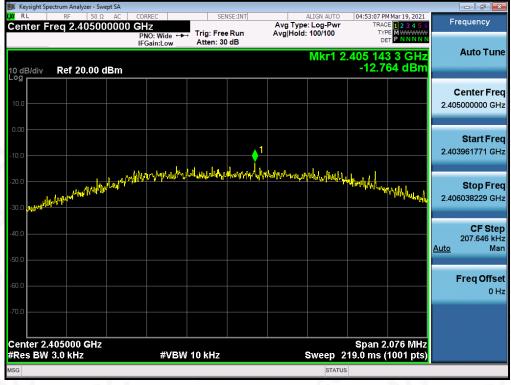
10.3. MEASUREMENT EQUIPMENT USED

Refer to Section 6.

10.4. LIMITS AND MEASUREMENT RESULT

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	-12.764	8	Pass
Middle Channel	-12.227	8	Pass
High Channel	-13.197	8	Pass

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



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TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

W Keysight Spectrum Analyzer - Swer M RL RF 50 Ω Center Freq 2.47000	AC CORREC	SENSE:INT	ALIGN AUTO	04:59:29 PM Mar 19, 2021 TRACE 123456	Frequency
10 dB/div Ref 20.00 d	PNO: Wide ↔ IFGain:Low	- Trig: Free Run Atten: 30 dB	Avg Hold: 100/100	.470 394 3 GHz -13.197 dBm	Auto Tune
10.0					Center Free 2.470000000 GH
-10.0			1		Start Fre 2.468978564 GH
-20.0	graph Anall Martin Angen	endelidereten afgefaten af sidereten af der	Milleding have a first free along the second of the second	and the second of the second o	Stop Fre 2.471021436 GH
-40.0					CF Ste 204.287 kH <u>Auto</u> Ma
-60.0					Freq Offse 0 H
Center 2.470000 GHz #Res BW 3.0 kHz	#VBM	/ 10 kHz	Sweep 2	Span 2.043 MHz 15.4 ms (1001 pts)	
MSG			STATUS	3	

TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

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11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

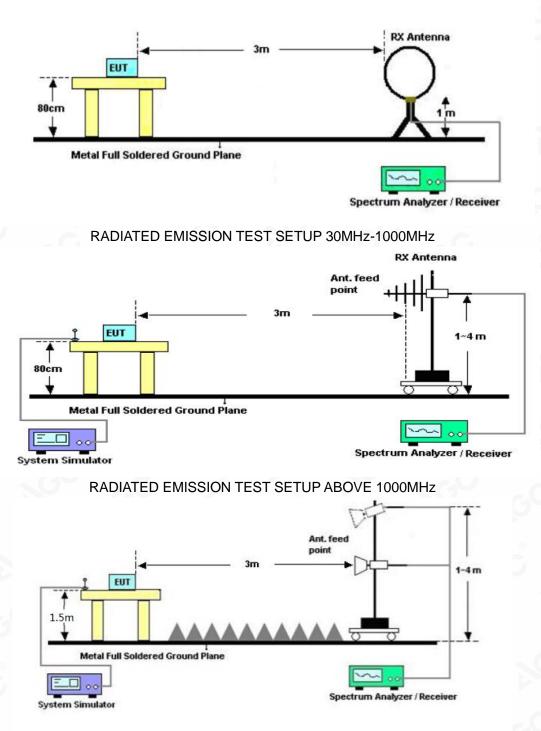
- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated 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



Radiated Emission Test-Setup Frequency Below 30MHz

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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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EUT		Type-A F	Receiver		Model N	ame	SAN	WA RC5	
Temperature		25° C	5	8	Relative	Humidity	55.4%	55.4%	
Pressure		960hPa)hPa			age	Norm	al Voltage	
Test Mode		Mode 1		20	Antenna	1	Horiz	ontal	
66.9	dBuV/m						Limit: Margin		
27	Mandahal		3 Malanamat	M. C. Marine	man marine	m.m. Sus	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-13	00 127.00	224.00	321.00 418.			9.00 806.0	0	1000.00 MHz	
N	o. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	
	1 16	2.5667	-0.99	18.93	17.94	43.50	-25.56	peak	
-0	2 29	1.9000	-1.12	19.66	18.54	46.00	-27.46	peak	
	2 20				10.01				
		0.0333	-0.69	24.19	23.50	46.00	-22.50	peak	
	3 46		-0.69 -0.39			46.00 46.00	-22.50 -18.56	peak peak	
• _	3 46 4 67	0.0333		24.19	23.50				

RADIATED EMISSION BELOW 1GHZ

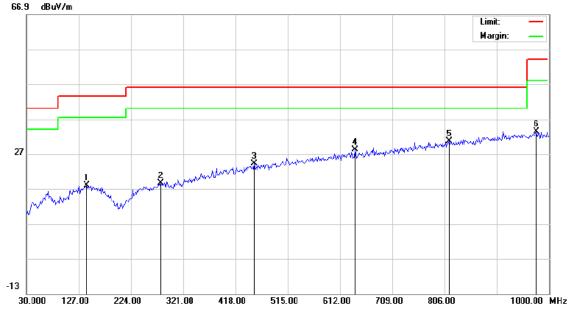
RESULT: PASS

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EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		141.5500	-1.28	19.23	17.95	43.50	-25.55	peak
2		278.9667	-1.20	19.86	18.66	46.00	-27.34	peak
3		451.9500	0.10	24.02	24.12	46.00	-21.88	peak
4		639.4833	0.86	27.42	28.28	46.00	-17.72	peak
5	*	814.0833	-0.05	30.59	30.54	46.00	-15.46	peak
6		975.7500	1.06	32.35	33.41	54.00	-20.59	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	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value i ype
43.94	0.08	44.02	74	-29.98	peak
35.41	0.08	35.49	54	-18.51	AVG
38.76	2.21	40.97	74	-33.03	peak
31.55	2.21	33.76	54 💿	-20.24	AVG
ß			- 6	8	
				-	
				00	20
	43.94 35.41 38.76 31.55	43.94 0.08 35.41 0.08 38.76 2.21 31.55 2.21	43.94 0.08 44.02 35.41 0.08 35.49 38.76 2.21 40.97	43.94 0.08 44.02 74 35.41 0.08 35.49 54 38.76 2.21 40.97 74 31.55 2.21 33.76 54	43.94 0.08 44.02 74 -29.98 35.41 0.08 35.49 54 -18.51 38.76 2.21 40.97 74 -33.03 31.55 2.21 33.76 54 -20.24

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

EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
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
4810.000	44.87	0.08	44.95	74	-29.05	peak
4810.000	34.75	0.08	34.83	54	-19.17	AVG
7215.000	38.13	2.21	40.34	74	-33.66	peak
7215.000	30.42	2.21	32.63	54	-21.37	AVG
		Ğ	6			60

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EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4860.000	44.85	0.14			peak	
4860.000	35.12	0.14	35.26	54	-18.74	AVG
7290.000	39.74	2.36	42.10 74		-31.9	peak
7290.000	31.26	2.36	33.62	54	-20.38	AVG
0				9		
	8				0	
emark:	- 6	8		10	- 61	8
actor = Anter	na Factor + Cable	Loss – Pre-	amplifier.			- 6

EUT Type-A Receiver **Model Name** SANWA RC5 Temperature 25° C **Relative Humidity** 55.4% 960hPa Normal Voltage Pressure **Test Voltage Test Mode** Mode 2 Vertical Antenna

Frequency	Meter Reading	Reading Factor Emission		Limits	Margin		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type	
4860.000			42.28	74	-31.72	peak	
4860.000	38.23	0.14	38.37	54	-15.63	AVG	
7290.000	40.58	2.36	42.94	74	-31.06	peak	
7290.000	32.77	2.36	35.13	54	-18.87	AVG	
		-C	®				
				3			

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

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EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4940.000	45.17	0.22			peak	
4940.000	35.29	0.22	35.51	54	-18.49	AVG
7410.000	38.69	2.64	41.33	74	-32.67	peak
7410.000	29.45	2.64	32.09	54	-21.91	AVG
0				9		
	0				8	
emark:	- 6	8		<u> </u>	- 6	8
actor = Anter	nna Factor + Cable	Loss – Pre-	amplifier.			- 6

EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor Emission Level Limits		Margin 💿		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m) (dBµV/m) (dB) 42.98 74 -31.02 34.46 54 -19.54 41.26 74 -32.74	Value Type	
4940.000	42.76	0.22	42.98	74	-31.02	peak
4940.000	34.24	0.22	34.46	54	-19.54	AVG
7410.000	38.62	2.64	41.26	74	-32.74	peak
7410.000	30.05	2.64	32.69	54	-21.31	AVG
		<u> </u>	6			60
mark:						

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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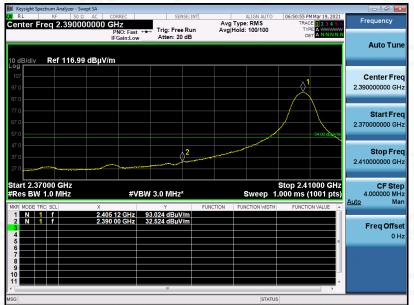
EUT	Type-A Receiver	Model Name	SANWA RC5	
Temperature	25° C	Relative Humidity	55.4%	
Pressure	960hPa	Test Voltage	Normal Voltage	
Test Mode	Mode 1	Antenna	Horizontal	

FEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

PK



AV



RESULT: PASS

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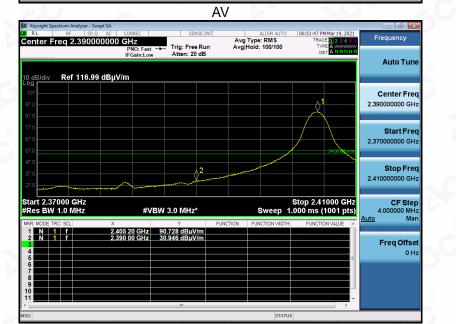
Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/



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EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical
	DI		





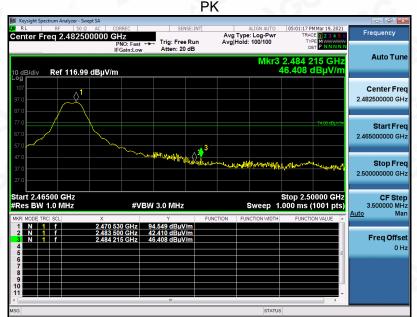
RESULT: PASS

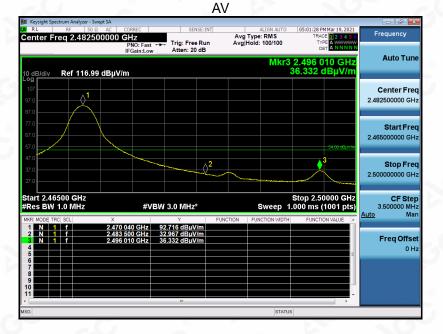
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EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal





RESULT: PASS

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EUT	Type-A Receiver	Model Name	SANWA RC5
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical
		PK	





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

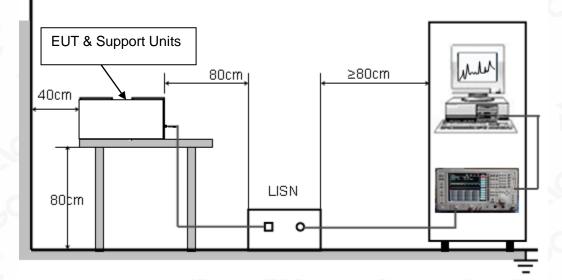
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Fromionou	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 5V 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.

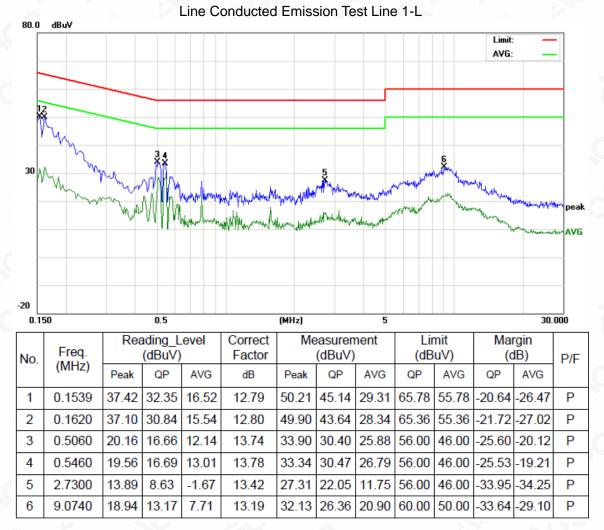
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

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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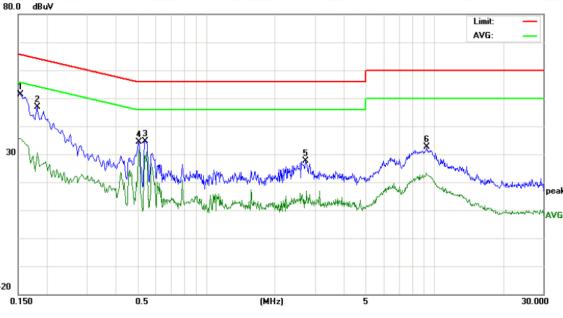


12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

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Line Conducted Emission Test Line 2-N

No.	Freq.	Reading_Level (dBuV)		Correct Measurement Factor (dBuV)		Limit (dBuV)		Margin (dB)		P/F			
	(MHz)	Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG	
1	0.1547	39.26	33.81	18.31	12.79	52.05	46.60	31.10	65.74	55.74	-19.14	-24.64	Р
2	0.1819	34.15	28.12	13.64	12.83	46.98	40.95	26.47	64.39	54.39	-23.44	-27.92	Р
3	0.5420	20.93	18.82	14.67	13.77	34.70	32.59	28.44	56.00	46.00	-23.41	-17.56	Р
4	0.5100	20.72	18.51	15.54	13.75	34.47	32.26	29.29	56.00	46.00	-23.74	-16.71	Р
5	2.7340	14.16	9.54	-0.81	13.42	27.58	22.96	12.61	56.00	46.00	-33.04	-33.39	Р
6	9.2779	19.47	14.50	8.33	13.11	32.58	27.61	21.44	60.00	50.00	-32.39	-28.56	Р

RESULT: PASS

Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

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