

FCC Test Report

Report No.: AGC04138210302FE03

FCC ID	: 2AAXO-SML2350
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: MP3+G KARAOKE PLAYER WITH BLUETOOTH
BRAND NAME	: singing machine
MODEL NAME	SML2350, SML2350XX(XX means unit color, it can be A to Z or N/A)
APPLICANT	: The Singing Machine Company Inc.
DATE OF ISSUE	: Mar. 25, 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. 25, 2021	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	The Singing Machine Company Inc.
Address	6301 NW 5th Way, Suite 2900, Fort Lauderdale, FL, 33309, U.S.A.
Manufacturer	The Singing Machine Company Inc.
Address	6301 NW 5th Way, Suite 2900, Fort Lauderdale, FL, 33309, U.S.A.
Factory	Shenzhen Junlan Electronic Ltd
Address	No.277 PingKui Road, Shijing Community, Pingshan New District, Shenzhen China.
Product Designation	MP3+G KARAOKE PLAYER WITH BLUETOOTH
Brand Name	singing machine
Test Model	SML2350
Series Model	SML2350XX(XX means unit color, it can be A to Z or N/A)
Difference Description	All the same except for the model name and appearance color
Date of test	Mar. 04, 2021 to Mar. 25, 2021
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/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

John Zerrog

John Zeng **Project Engineer**

Mar. 25, 2021

Max Zhan

Reviewed By

Max Zhang Reviewer

Mar. 25, 2021

Approved By

Forrest Lei

Authorized Officer

Mar. 25, 2021

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "MP3+G KARAOKE PLAYER WITH BLUETOOTH". It is designed by way of utilizing the GFSK, Pi/4 DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

2.402 GHz to 2.480 GHz
-4.253dBm (Max)
V5.0
BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
79
V1.0
1.0
PCB Antenna (Comply with requirements of the FCC part 15.203)
0dBi
DC 12V by adapter
BLE.

Adapter 1

Model Name	JY012120100BD-UL
Rating Input	AC 100-240V 50/60Hz 0.5A Max
Rating Output	DC 12V1.0A

Adapter 2

Model Name	GKYZA0100120US	
Rating Input	AC 100-240V 50/60Hz 0.5A Max	
Rating Output	DC 12V===1000mA	



2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
	0 ⁻ 0 ⁻	2403 MHz
	38	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
	77	2479 MHz
	78	2480 MHz



2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHz, in every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single of multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a hopping sequence in data mode: 40, 21, 44, 23, 04, 15, 66, 56, 19, 78, 07, 28, 69, 55, 36, 45, 05, 13, 43, 74, 57, 35, 67, 76, 02, 34, 54, 63, 42, 11, 30, 06, 64, 25, 75, 48, 17, 33, 58, 01, 29, 14, 51, 72, 03, 31, 50, 61, 77, 18, 10, 47, 12, 68, 08, 49, 20, 00, 73, 09, 16, 60, 71, 41, 24, 53, 38, 26, 46, 37, 65, 32, 70, 52, 27, 59, 22, 62, 39

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection.

2. Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24MSB's of the 48BD_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For behavior action with other units only offset is used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30). In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire. LAP (24 bits),4LSB's(4bits) (Input 1) and the 27MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.



The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer (and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

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

This submittal(s) (test report) is intended for **FCC ID: 2AAXO-SML2350** filing to comply with the FCC PART 15.247 requirements.

2.7. 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.

2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.10. 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.



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 spurious emissions, conducted, Uc = ±2.7dB
- Uncertainty of Occupied Channel Bandwidth: Uc = ±2 %
- Uncertainty of Dwell Time: Uc = ± 2 %
- Uncertainty of Frequency: $Uc = \pm 2 \%$

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION		
1	Low channel GFSK		
2	Middle channel GFSK		
3	High channel GFSK		
4	Low channel π/4-DQPSK		
5	Middle channel π/4-DQPSK		
6	High channel π/4-DQPSK		
7	Low channel 8DPSK		
8	Middle channel 8DPSK		
9	High channel 8DPSK		
10	Hopping mode GFSK		
11	Hopping mode π/4-DQPSK		
12	Hopping mode 8DPSK		

Note:

1. For battery operated equipment, the equipment tests are performed using a new battery.

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 Setting

COM Port		Connect Select		
COM7 ~	Close	NonConnect_BT	~	Connect
Generate and Ser	ad CMD			
l.Hopping Type		Mode Select in NonConnect	Г	
Single Frequer	icy 🗸	● BT-TX ○ BT-RX		
2. Frequency				SEND
2480	✓ MHz	TX Power		SEND
3. Package Type		0 dBm ~		
DHS	~		l	
Connect_BLE_Test	er			
-BLE Mode		Frequency (BLE Tester)	~	
⊖ ble−tx	BLE-RX	Received Packet Number:		START

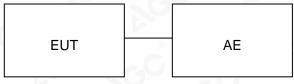
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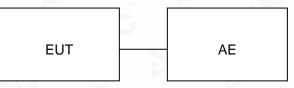
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



5.2. EQUIPMENT USED IN TESTED SYSTEM

ltem	Equipment	Model No.	ID or Specification	Remark
	MP3+G KARAOKE			
1	PLAYER WITH	SML2350	2AAXO-SML2350	EUT
G	BLUETOOTH			
2	Control Box	N/A	USB-TTL	AE
3	Adapter	N/A	1.45m unshielded	Accessory

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT			
15.247 (b)(1)	Peak Output Power	Compliant			
15.247 (a)(1)	247 (a)(1) 20 dB Bandwidth				
15.247 (d)	15.247 (d) Conducted Spurious Emission				
15.209	Radiated Emission	Compliant			
15.247 (a)(1)(iii)	5.247 (a)(1)(iii) Number of Hopping Frequency				
15.247 (a)(1)(iii)	Time of Occupancy	Compliant			
15.247 (a)(1)	Frequency Separation	Compliant			
15.207	Conducted Emission	Compliant			

Note: The EUT has two type of adapters. Both of adapters and battery mode had been test. Only the result of the worst case was recorded in the report, if no other cases.



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	FARA	EZ-EMC (Ver.AGC-CON03A1)	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-0 3A)	N/A	N/A	N/A



7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

For peak power test:

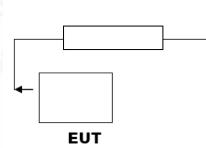
- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW \geq RBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

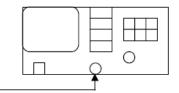
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

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

RF Attenuator

PEAK POWER TEST SETUP





Spectrum Analyzer

RF Cable

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7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT							
FOR GFSK MOUDULATION Frequency (GHz) Peak Power (dBm) Applicable Limits (dBm) Pass or Fail							
2.402	-4.253	21	Pass				
2.441	-4.986	21	Pass				
2.480	-6.065	21	Pass				

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PEAK OUTPUT POWER MEASUREMENT RESULT								
	FOR Π/4-DQPSK MODULATION							
FrequencyPeak PowerApplicable Limits(GHz)(dBm)(dBm)								
2.402	-4.323	21	Pass					
2.441	-5.037	21	Pass					
2.480 -6.111 21								

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PEAK OUTPUT POWER MEASUREMENT RESULT FOR 8-DPSK MODULATION								
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail								
2.402	-4.346	21	Pass					
2.441	-5.091	21	Pass					
2.480	-6.125	21	Pass					

CH0



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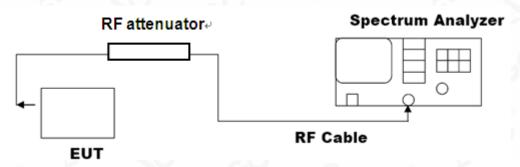


8. 20DB BANDWIDTH

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 Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

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



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8.3. LIMITS AND MEASUREMENT RESULTS

MEASUREMENT RESULT FOR GFSK MOUDULATION						
Appliachta Limita	Measurement Result					
Applicable Limits	Test Data	Criteria				
	Low Channel	0.954	PASS			
N/A	Middle Channel	0.973	PASS			
	High Channel	0.960	PASS			

05:03:24 PM Mar 23, 2021 Radio Std: None Frequency Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hold: 100/100 402000000 GH #Atten: 30 dB Radio Device: BTS Ref 20.00 dBm **Center Freq** 2.402000000 GHz Center 2.402 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms **CF** Step #VBW 100 kHz 300.000 kH <u>Auto</u> Ma Occupied Bandwidth **Total Power** 3.56 dBm 898.96 kHz Freq Offset 0 Hz 40.757 kHz **Transmit Freq Error OBW Power** 99.00 % x dB Bandwidth 954.4 kHz x dB -20.00 dB

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





MEASUREMENT RESULT FOR II /4-DQPSK MODULATION							
		Measurement Result					
Applicable Limits	Test Data	(MHz)	Criteria				
	Low Channel	1.305	PASS				
N/A	Middle Channel	1.314	PASS				
	High Channel	1.315	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





MEASUREMENT RESULT FOR 8-DPSK MODULATION							
Measurement Result							
Applicable Limits	Test Dat	Test Data (MHz)					
	Low Channel	1.301	PASS				
N/A	Middle Channel	1.298	PASS				
-C	High Channel	1.301	PASS				

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL







TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





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.
- Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
 RBW = 100 kHz; VBW= 300 kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

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

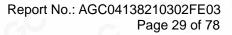
The same as described in section 8.2

9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

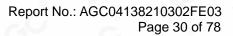
LIMITS AND MEAS	SUREMENT RESULT				
Annlinghing Limite	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS			
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. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS			





TEST RESULT FOR ENTIRE FREQUENCY RANGE TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF GFSK MODULATION IN LOW CHANNEL







	ım Analyzer - Swep	ot SA								
LXI R	RF 50		RREC	SENSE			ALIGN AUTO		4 Mar 23, 2021	Frequency
Center F	req 13.741	750000 G	HZ NO: Fast ↔	. Trig: Free R		Avg iype \valHold:	: Log-Pwr 10/10	TY	E 123456 MWWWWW	,
			Gain:Low	Atten: 30 dE				D		
							Mkr	1 24 84	3 1 GHz	Auto Tune
	B-6 00 00						IVINI	_/10 5	31 dBm	
10 dB/div Log	Ref 20.00	dBm						-40.0	or abiii	
10.0										Center Freq
										13.741750000 GHz
0.00										13.741750000 GHZ
-10.0										
-20.0									-24.54 dBm	Start Freq
-30.0									-211011 (12)11	
										2.483500000 GHz
-40.0									<u> </u>	
-50.0							alle and the second statement	and the second	and the state of t	Oton Eron
-60.0	and the second second	and the state of the sec	Auge and the	de la state de la		and the second second	and the second secon	And the second statistics of the second statis	and a state of the second second	Stop Freq
-70.0										25.00000000 GHz
-70.0										
Start 2.48	GH7				I			Stop 2	5.00 GHz	CF Step
#Res BW			#VBW	/ 300 kHz			Sweep 2		0000 pts)	2.251650000 GHz
								,		<u>Auto</u> Man
MKR MODE T		× 24.846	1 CH-	۲ -49.581 dBm	FUNCTIO	N FUN	ICTION WIDTH	FUNCTIO	N VALUE	
2		24.640	IGHZ	-49.561 uBili						E
3										Freq Offset
4 5										0 Hz
6										
7										
8										
10										
11									 _	
<u> </u>										
MSG							STATUS	5		

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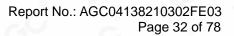
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com

Web: http://cn.agc-cert.com/





TEST PLOT OF OUT OF BAND EMISSIONS OF GFSK MODULATION IN MIDDLE CHANNEL





Agilent Spectrum Ar	nalyzer - Swept SA								
	RF 50 Ω AC	CORREC	SENSE:IN		ALIGNAUTO Type: Log-Pwr	05:11:40 PM Mar 2		Frequency	
Center Free	q 13.7417500	000 GHZ PN0: Fast ↔	Trig: Free Run		lype:Log-Pwr Hold:10/10	TRACE 12 TYPE MA DET PN	3456		
		IFGain:Low	Atten: 30 dB			DET PN	NNNN		
Mkr1 24.765 1 GHz								Auto Tune	
40 10/10	Ref 20.00 dBm				IVINI	-48.946 (Bm		
10 dB/div						40.040 (
10.0								Center Freq	
0.00								13.741750000 GHz	
								13.741750000 GHz	
-10.0									
-20.0						-2	5.25 dBm	Start Freq	
-30.0								2.483500000 GHz	
-40.0							4	2.485500000 GHZ	
-50.0				والمربيانين بيلونين والم	والأفريقة فروياتهم وأطلوه وتعرون			Stop Freq	
-60.0 Hiterory		a distanta di setta sec		And Address of the Ad	a second a literative state of the		1411.1	25.000000000 GHz	
-70.0								25.00000000 GH2	
Start 2.48 G	Hz					Stop 25.00	GHz	CF Step	
#Res BW 10	10 kHz	#VBV	V 300 kHz		Sweep 2	2.152 s (3000) pts)	2.251650000 GHz	
MKR MODE TRC S	sal	<	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VAL	IF 🔺	<u>Auto</u> Man	
1 N 1		24.765 1 GHz	-48.946 dBm						
2								Freq Offset	
3							_	0 Hz	
5								0112	
6							_		
8									
9									
10									
							Ŀ		
MSG					STATUS	5			

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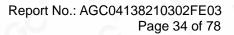
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 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



Agilent Spectrum Analyzer - Swept SA LXI R RF 50 Ω AC CC			05:12:36 PM Mar 23, 2021	
Center Freq 2.480000000 G		ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
10 dB/div Ref 20.00 dBm		Mkr1 2.4	480 203 9 GHz -6.323 dBm	Auto Tune
10.0 -10.0		1		Center Freq 2.480000000 GHz
-20.0				Start Freq 2.478500000 GHz
-300 -400 -600 -600 -700				Stop Freq 2.481500000 GHz
Center 2.480000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 2.00	Span 3.000 MHz 00 ms (30000 pts)	CF Step 300.000 kHz <u>Auto</u> Man
MKR MODE TRC SCL X 1 N 1 f 2.480 203 2 4 4		UNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset
5 6 7 8				UHZ
9 10 11				
MSG		STATUS		
Agilent Spectrum Analyzer - Swept SA				
	NO: Fast + Trig: Free Run	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 10/10	05:12:45 PM Mar 23, 2021 TRACE 123456 TYPE MWWWW DET PNNNNN	Frequency
Image: Window R RF 50.0 AC CC Center Freq 1.215000000 G Image: Context	HZ PNO: Fast ↔ Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 10/10	05:12:45 PM Mar 23, 2021 TRACE 2 3 4 5 6 TYPE MUMUMU DET P NUNUU 2.384 20 GHz -53.063 dBm	Frequency Auto Tune
XX R FF 50.9 AC CC Center Freq 1.215000000 G F <	NO: Fast + Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 123456 TYPE MWWWW DET P NNNNN 2.384 20 GHZ	
Image: Window Ref FF 50.0 AC CC Center Freq 1.215000000 G F	NO: Fast + Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 123456 TYPE MWWWW DET P NNNNN 2.384 20 GHZ	Auto Tune Center Freq
Image: Weight of the second	NO: Fast + Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 10/10 Mkr1	TRACE 123456 TYPE MWWWWW DET PINNINN 2.384 20 GHz -53.063 dBm	Auto Tune Center Freq 1.21500000 GHz Start Freq
DXI R RF 50.9 AC CC Center Freq 1.215000000 G F	NO: Fast + Trig: Free Run	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 12 3 4 5 G TYPE WANNAN 2.384 20 GHz -53.063 dBm -26.32 dBm -26.32 dBm	Auto Tune Center Freq 1.21500000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz
Image: Non-Section of the section of the se	HZ NO: Fast →→ Gain:Low Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 10/10 Mkr1	TRACE 12.34 5 G TYPE WANNAN 2.384 20 GHz -53.063 dBm -26.32 dB	Auto Tune Center Freq 1.21500000 GHz Start Freq 30.000000 MHz Stop Freq
Image: Non-Section of the section of the se	HZ NO: Fast →→ Gain:Low Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 12.3.4.5 G TYPE MANNAN 2.384 20 GHz -53.063 dBm -26.3.084 -26.5.084 -2	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz 2.400000000 GHz 2.400000000 GHz 237.000000 MHz Auto Man
IXI RF 50.9 AC CC Center Freq 1.215000000 G F	HZ NO: Fast → Gain:Low Trig: Free Run Atten: 30 dB United States HZ HZ HZ HZ HZ HZ HZ HZ HZ HZ	Avg Type: Log-Pwr Avg Hold: 10/10 Mkr1	TRACE 12.34 5 G TYPE WANNAN 2.384 20 GHz -53.063 dBm -26.32 dB	Start Freq 30.00000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz Auto Man
Image: Non-Action of the state of	HZ NO: Fast → Gain:Low Trig: Free Run Atten: 30 dB United States HZ HZ HZ HZ HZ HZ HZ HZ HZ HZ	Avg Type: Log-Pwr Avg Hold: 10/10 Mkr1	TRACE 12.34 5 G TYPE WANNAN 2.384 20 GHz -53.063 dBm -26.32 dB	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz 2.400000000 GHz 2.400000000 GHz 237.000000 MHz Auto Man

TEST PLOT OF OUT OF BAND EMISSIONS OF GFSK MODULATION IN HIGH CHANNEL





	Agilent Spectrum Analyzer - Swept SA											
<mark>⊯</mark> R Cen	ter F	_{RF} req	00.1	000000					ALIGNAUTO ype: Log-Pwr old: 10/10	TRA	M Mar 23, 2021 E 1 2 3 4 5 6 PE M M M M M M	Frequency
10 d	B/div	Pa	f 20.00	IF	PNO: Fast ↔ FGain:Low	Atten: 30				□ 1 24.85	^{PNNNNN} 15GHz 05dBm	Auto Tune
10.0 10.0 0.00			1 20.00	ubiii								Center Freq 13.750000000 GHz
-20.0 -30.0 -40.0											-26.32 dBm	Start Freq 2.50000000 GHz
-50.0 -60.0 -70.0					<u></u>							Stop Freq 25.00000000 GHz
#Re	1 2.50 s BW	100 RC SCI	kHz	X		W 300 kHz	FUN	CTION	Sweep 2	2.152 s (3	5.00 GHz 0000 pts) N VALUE	CF Step 2.250000000 GHz <u>Auto</u> Man
1 2 3 4 5 6 7 8 9 10 11				24,851	1 5 GHz	-48.805 di	3m					Freq Offset 0 Hz
MSG									STATUS	5		

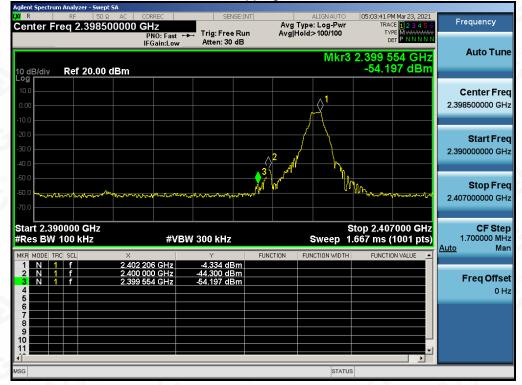
Note: The GFPSK modulation is the worst case and only those data recorded in the report.



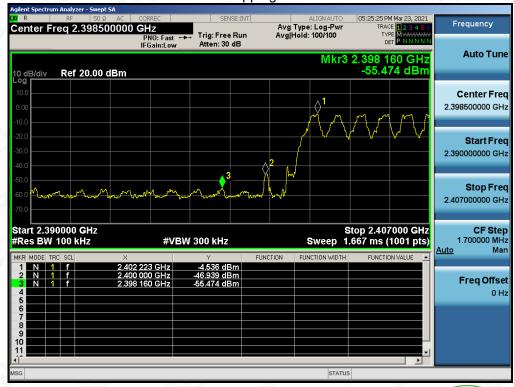
TEST RESULT FOR BAND EDGE

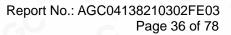
GFSK MODULATION IN LOW CHANNEL

Hopping off

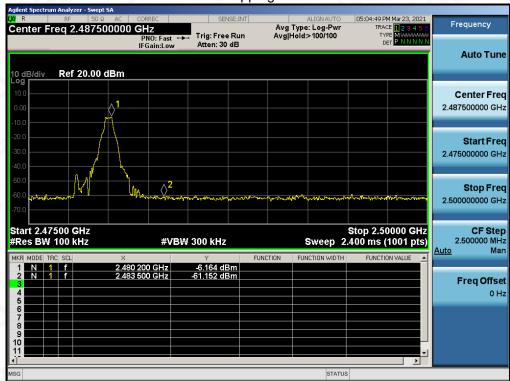


Hopping on





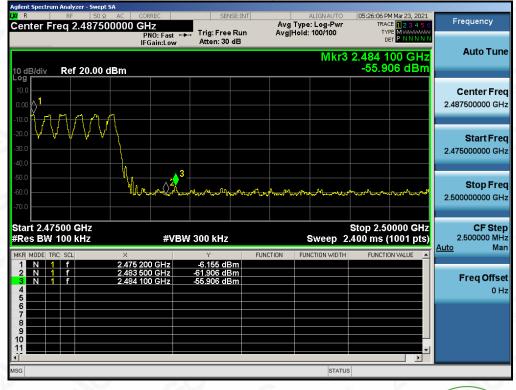




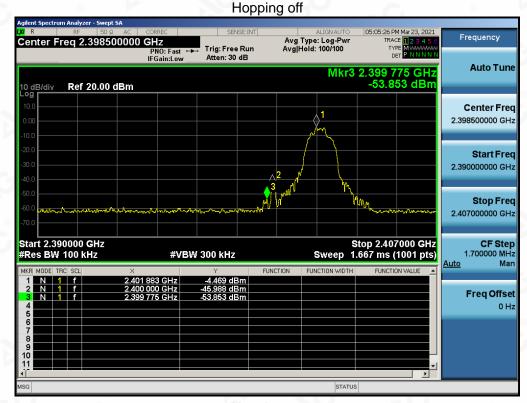
GFSK MODULATION IN HIGH CHANNEL

Hopping off

Hopping on

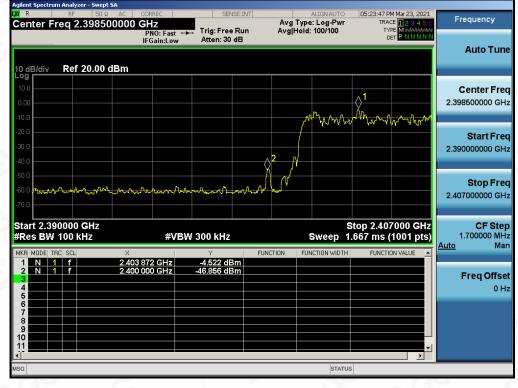






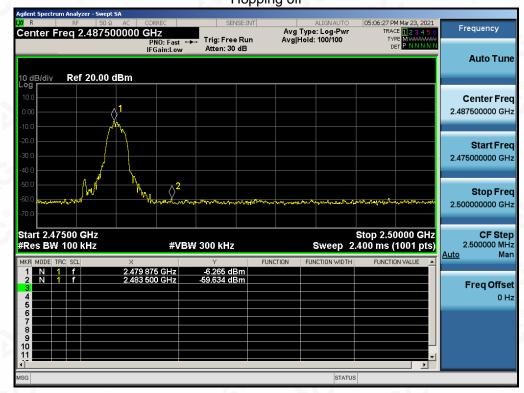
π /4-DQPSK MODULATION IN LOW CHANNEL

Hopping on



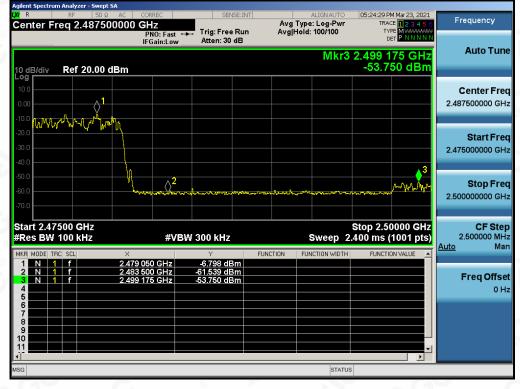
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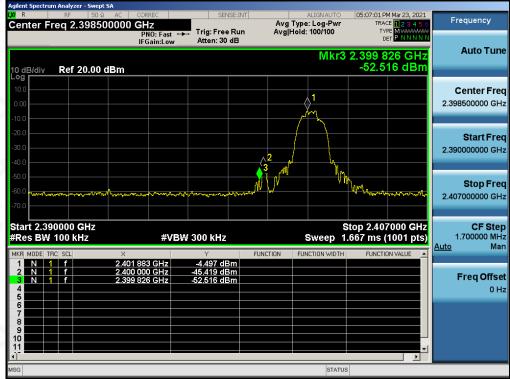
π /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off

Hopping on



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8-DPSK MODULATION IN LOW CHANNEL

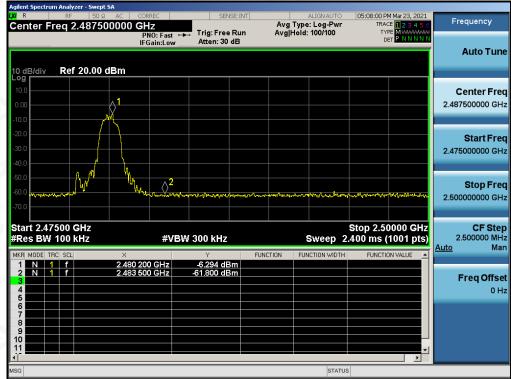
Hopping off

Hopping on



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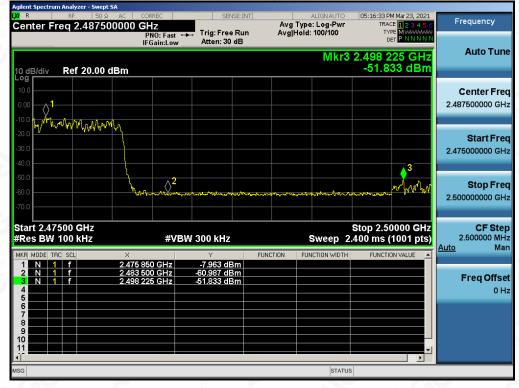




8-DPSK MODULATION IN HIGH CHANNEL

Hopping off

Hopping on



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10. RADIATED EMISSION

10.1. 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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The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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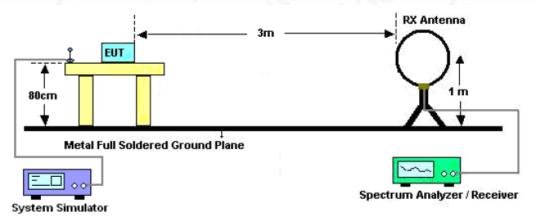
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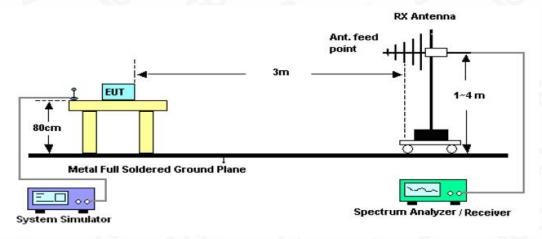


10.2. TEST SETUP

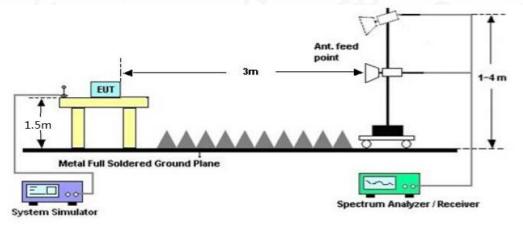
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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10.3. 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.

10.4. 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.

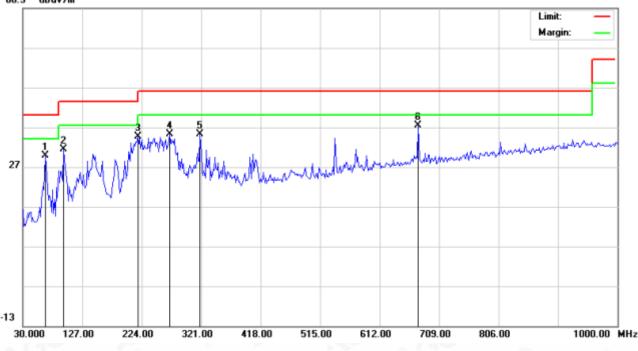
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RADIATED EMISSION BELOW 1GHz

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

66.9 dBu¥/m



Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
	67.1833	13.06	16.76	29.82	40.00	-10.18	peak
	96.2833	15.81	15.63	31.44	43.50	-12.06	peak
	217.5333	19.57	14.97	34.54	46.00	-11.46	peak
	269.2667	16.05	19.07	35.12	46.00	-10.88	peak
	319.3833	15.00	20.15	35.15	46.00	-10.85	peak
*	675.0500	9.61	27.85	37.46	46.00	-8.54	peak
		MHz 67.1833 96.2833 217.5333 269.2667 319.3833	Mk. Freq. Level MHz dBuV 67.1833 13.06 96.2833 15.81 217.5333 19.57 269.2667 16.05 319.3833 15.00	Mk. Freq. Level Factor MHz dBuV dB 67.1833 13.06 16.76 96.2833 15.81 15.63 217.5333 19.57 14.97 269.2667 16.05 19.07 319.3833 15.00 20.15	Mk. Freq. Level Factor ment MHz dBuV dB dBuV/m 67.1833 13.06 16.76 29.82 96.2833 15.81 15.63 31.44 217.5333 19.57 14.97 34.54 269.2667 16.05 19.07 35.12 319.3833 15.00 20.15 35.15	Mk. Freq. Level Factor ment Limit MHz dBuV dB dBuV/m dBuV/m 67.1833 13.06 16.76 29.82 40.00 96.2833 15.81 15.63 31.44 43.50 217.5333 19.57 14.97 34.54 46.00 269.2667 16.05 19.07 35.12 46.00 319.3833 15.00 20.15 35.15 46.00	Mk. Freq. Level Factor ment Limit Over MHz dBuV dB dBuV/m dBuV/m dB 67.1833 13.06 16.76 29.82 40.00 -10.18 96.2833 15.81 15.63 31.44 43.50 -12.06 217.5333 19.57 14.97 34.54 46.00 -11.46 269.2667 16.05 19.07 35.12 46.00 -10.88 319.3833 15.00 20.15 35.15 46.00 -10.85

RESULT: PASS

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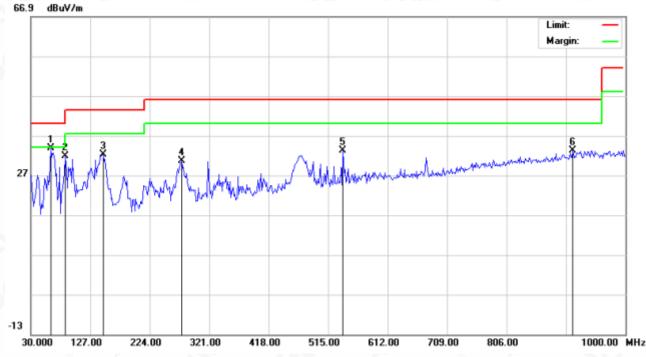
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Report No.: AGC04138210302FE03 Page 46 of 78

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
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	*	62.3333	17.73	16.16	33.89	40.00	-6.11	peak
2		86.5833	16.75	14.97	31.72	40.00	-8.28	peak
3		148.0167	13.01	19.21	32.22	43.50	-11.28	peak
4	2	275.7333	10.99	19.59	30.58	46.00	-15.42	peak
5	(539.2500	7.50	25.76	33.26	46.00	-12.74	peak
6	9	914.3167	1.34	31.82	33.16	46.00	-12.84	peak

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 1 is the worst case and recorded in the report.

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RADIATED EMISSION ABOVE 1GHz

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
Temperature	25°C	Relative Humidity	55.4%
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	45.35	0.08	45.43	74	-28.57	peak
4804.000	36.57	0.08	36.65	54	-17.35	AVG
7206.000	41.67	2.21	43.88	74	-30.12	peak
7206.000	32.69	2.21	34.9	54	-19.1	AVG
~69	C .	8		~60		8
		C	0			
emark:			8			0
octor - Antor	ana Eactor I Cable	Loco Dro	amplifior			

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

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Value Type
peak
AVG
peak
AVG

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

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EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
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 Trees
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	- Value Type
4882.000	46.37	0.14	46.51	74	-27.49	peak
4882.000	35.49	0.14	35.63	54	-18.37	AVG
7323.000	42.66	2.36	45.02	74	-28.98	peak
7323.000	33.41	2.36	35.77	54	-18.23	AVG
e.G	8			e.G	8	
emark:						

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

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
Temperature	25°C	Relative Humidity	55.4%
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
4882.000	45.36	0.14	45.5	74	-28.5	peak
4882.000	36.24	0.14	36.38	54	-17.62	AVG
7323.000	43.52	2.36	45.88	74	-28.12	peak
7323.000	33.82	2.36	36.18	54	-17.82	AVG
3						
1						

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

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Report No.: AGC04138210302FE03 Page 49 of 78

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
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 Trees
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	- Value Type
4960.000	45.87	0.22	46.09	74	-27.91	peak
4960.000	36.24	0.22	36.46	54	-17.54	AVG
7440.000	43.16	2.64	45.8	74	-28.2	peak
7440.000	34.46	2.64	37.1	54	-16.9	AVG
- G					8	
emark:						

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

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
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	Value Tree
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	- Value Type
4960.000	46.06	0.22	46.28	74	-27.72	peak
4960.000	34.61	0.22	34.83	54	-19.17	AVG
7440.000	44.28	2.64	46.92	74	-27.08	🔍 peak
7440.000	30.79	2.64	33.43	54	-20.57	AVG
8						
					0	

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.

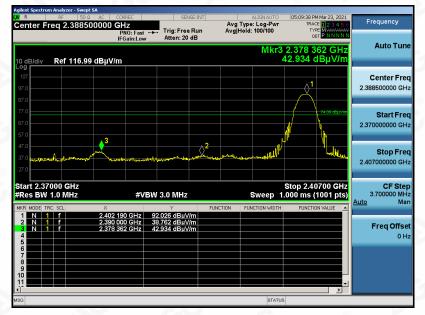
All test modes had been tested. The GFSK modulation is the worst case and recorded in the report.

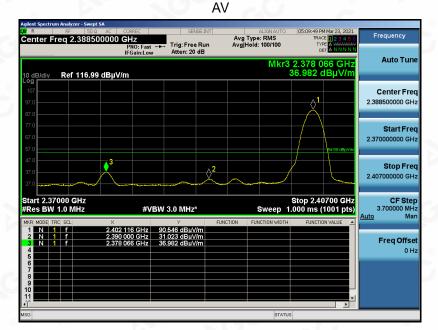
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EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350	
Temperature	25°C	Relative Humidity	55.4%	
Pressure	960hPa	Test Voltage	Normal Voltage	
Test Mode	Mode 1	Antenna	Horizontal	

TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

ΡK





RESULT: PASS

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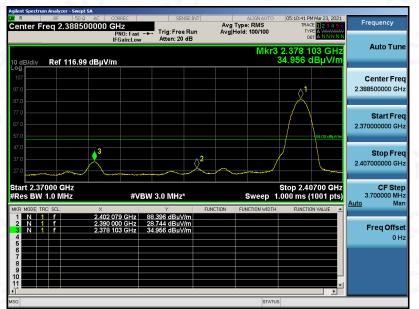
Report No.: AGC04138210302FE03 Page 51 of 78

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

PK

Frequency enter Freq 2.388500000 GHz PN0: Fast → IFGain:Low Atten: 20 dB Avg Type: Log-Pwi Avg|Hold: 100/100 Auto Tun Ref 116.99 dBµV/m Center Fred 2.388500000 GH; Start Freq 2.370000000 GH \Diamond^2 Stop Freq 2.40700000 GH Stop 2.40700 GHz Sweep 1.000 ms (1001 pts) tart 2.37000 GHz Res BW 1.0 MHz CF Step 3.700000 MH; #VBW 3.0 MHz ۹uto Ma Freq Offse 0 H;

AV



RESULT: PASS

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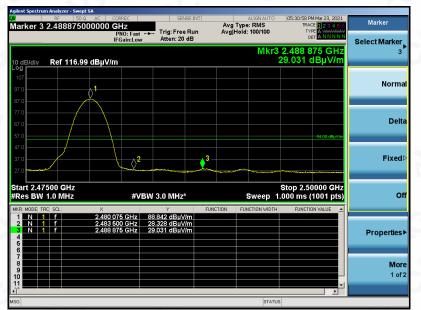
Report No.: AGC04138210302FE03 Page 52 of 78

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

PK

Alent Spectrum Analyzer - www. R RF 50.0 AC CORREL enter Freq 2.487500000 GHz PK0: fast -----IFGain:Low Atten: 20 dB Frequency Avg Type: Log-Pwi Avg|Hold: 100/100 Auto Tun Ref 116.99 dBµV/m Center Fred 2.487500000 GH Start Freq 2.475000000 GH Stop Freq 2.50000000 GH Stop 2.50000 GHz Sweep 1.000 ms (1001 pts) CF Step 2.500000 MH tart 2.47500 GHz Res BW 1.0 MHz #VBW 3.0 MHz ۹uto Freq Offse 0 H;

AV



RESULT: PASS

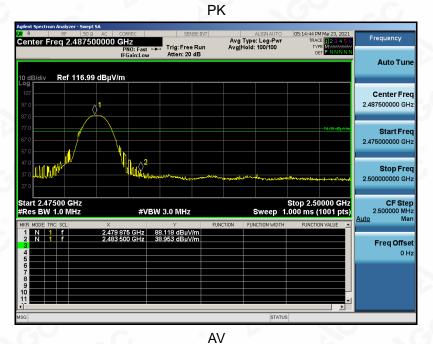
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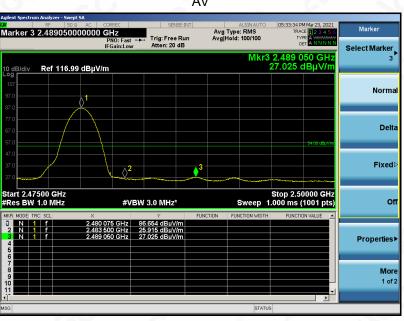
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Report No.: AGC04138210302FE03 Page 53 of 78

EUT	MP3+G KARAOKE PLAYER WITH BLUETOOTH	Model Name	SML2350
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. The GFSK modulation is the worst case and recorded in the report.

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11. NUMBER OF HOPPING FREQUENCY

11.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.

2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

3. VBW \geq RBW. Sweep: Auto. Detector function: Peak. Trace: Max hold.

4. Allow the trace to stabilize.

11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

11.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

11.4. LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	>=15	79	PASS

:52 PM Mar 23, 2021 Frequency Center Freq 2.441750000 GHz Avg Type: Log-Pwi Avg|Hold: 100/100 Trig: Free Run Atten: 30 dB Auto Tune 10 dB/div Ref 20.00 dBm Center Fred 2.441750000 GHz Start Fred 2.40000000 GHz Stop Freq 2.483500000 GHz CF Ster 8.350000 MH <u>Auto</u> Ma **Freq Offset** 0 Hz Start 2.40000 GHz #Res BW 200 kHz Stop 2.48350 GHz Sweep 2.000 ms (1001 pts) #VBW 620 kHz

TEST PLOT FOR NO. OF TOTAL CHANNELS

Note: The GFSK modulation is the worst case and recorded in the report.

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12. TIME OF OCCUPANCY (DWELL TIME)

12.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.

2. RBW shall be \leq channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.

3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.

4. Detector function: Peak. Trace: Max hold.

5. Use the marker-delta function to determine the transmit time per hop.

6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) \times (period specified in the requirements / analyzer sweep time)

7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

12.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

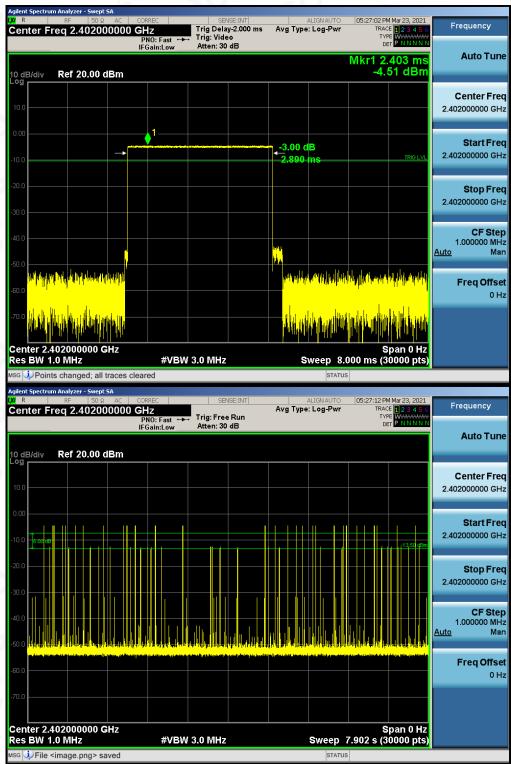
12.4. LIMITS AND MEASUREMENT RESULT

Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Sweep Time (ms)	Limit (ms)
Low	2.890	29*4	335.289	400
Middle	2.890	27*4	312.120	400
High	2.891	26*4	300.664	400

Note: The GFSK modulation is the worst case and recorded in the report.

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TEST PLOT OF LOW CHANNEL

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