

FCC Test Report

Report No.: AGC02728201102FE03

FCC ID	: AUSCR3037B
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: Multifunctional FM Radio Speaker
BRAND NAME	: CROSLEY
MODEL NAME	: CR3037B, CR3037B-WS, CR3037B-XX, CS-2026
APPLICANT	: Modern Marketing Concepts, Inc.
DATE OF ISSUE	: Dec. 24, 2020
STANDARD(S)	: FCC Part 15.247
REPORT VERSION	: V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	. /	Dec. 24, 2020	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	Modern Marketing Concepts, Inc.	
Address	1220 East Oak St, Louisville KY, United States. 40204	
Manufacturer	SHENZHEN GXTSONIC TECHNOLOGY CO., LTD	
Address	1F,Building 3,Tianxin Shuichan Industrial Park, Gushu Village, Xixiang Town, Bao`an District, Shenzhen, CHINA	
Factory	SHENZHEN GXTSONIC TECHNOLOGY CO., LTD	
Address	1F,Building 3,Tianxin Shuichan Industrial Park, Gushu Village, Xixiang Town, Bao`an District, Shenzhen, CHINA	
Product Designation	Multifunctional FM Radio Speaker	
Brand Name	CROSLEY	
Test Model	CR3037B	
Series Model	CR3037B-WS, CR3037B-XX, CS-2026	
Difference Description	Above models are identical in schematic and structure. XX represent the color code, they can be replaced by letters from A to Z or blank, Therefore the test performed on the model CR3037B.	
Date of test	Nov. 24, 2020 to Dec. 24, 2020	
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

Then Hunny

Thea Huang Project Engineer

Dec. 24, 2020

Max Zhan

Reviewed By

Max Zhang Reviewer

Dec. 24, 2020

Approved By

Forrest Lei Authorized Officer

Dec. 24, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "Multifunctional FM Radio Speaker". It is designed by way of utilizing the GFSK, π /4-DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480 GHz
RF Output Power	-2.741dBm (Max)
Bluetooth Version	V 2.1+EDR
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels	79
Hardware Version	1.0
Software Version	1.0
Antenna Designation	PCB Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	0dBi
Power Supply	AC 120V/60Hz

Note: The EUT doesn't support BLE.

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
	-C 1	2403 MHz
~ C _ C	38	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
	77	2479 MHz
	78	2480 MHz

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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.

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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: AUSCR3037B 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.

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3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±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 = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 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: $Uc = \pm 2\%$
- 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. 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 Setting

AppoTech RF Control Kit V3.62			×
IC Model CW6639 -	Send		on (1) check FIX_RX_24xx (2) check channel to set channel number (1) uncheck FIX RX 24xx
COM port: COM5 - Baud Rate: 921600		LIX IX MODE	(2) check channel to set channel number (3) check power to set TX signal amplitude (4) Modulation Enable OFF
-RF Trim □ Fix_RX_24xx □ SingleTone	OK Hopping: OFF	TX Modulation mode	 (1) uncheck FIX_RX_24xx (2) check channel to set channel number (3) check power to set TX signal amplitude (4) Modulation Enable ON (5) select Packet Type
	odulation: ON 💌 et Type: 3DH5 💌	Hopping mode	(1)uncheck FIX_RX_24xx (2)uncheck channel to enable Hopping ON and TX Modulation OFF
Test scenario 3 Transmitter tes	t-1010 pattern 💌	语言	(3)check power (4)select Packet Type

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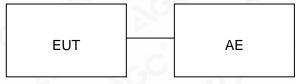
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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT 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	Multifunctional FM Radio Speaker	CR3037B	AUSCR3037B	EUT
2	Adapter	BSY012U100100U N/A		AE
3	Charger line	N/A	N/A	AE
4	Control Box	N/A	USB-TTL	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	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	LISN R&S		LISN R&S ESH2-Z5 100086		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	Aglient N9010A		Dec. 12, 2019	Dec. 11, 2020	
EXA Signal 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 N/A		N/A	
Horn antenna	Horn antenna SCHWARZBECK		#768	Sep. 09, 2019	Sep. 08, 2021	
Active loop antenna (9K-30MHz)	antenna ZHINAN		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. 03,20		Sep. 02,2022	
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021	
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A	

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7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

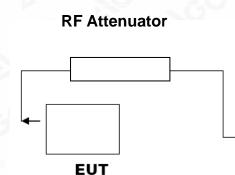
For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. 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.

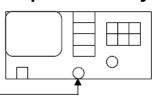
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

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

PEAK POWER TEST SETUP



Spectrum Analyzer



RF Cable

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7.3. LIMITS AND MEASUREMENT RESULT

FOR GFSK MOUDULATION						
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail			
2.402	-4.402	21	Pass			
2.441	-4.806	21	Pass			
2.480	-5.133	21	Pass			

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PEAK OUTPUT POWER MEASUREMENT RESULT FOR Π/4-DQPSK MODULATION							
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail							
2.402	-3.232	21	Pass				
2.441	-3.547	21	Pass				
2.480	-3.845	21	Pass				



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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	-2.741	21	Pass					
2.441	-3.083	21	Pass					
2.480	-3.516	21	Pass					





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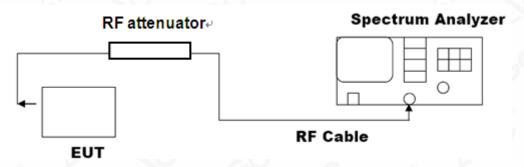


8. 20DB BANDWIDTH

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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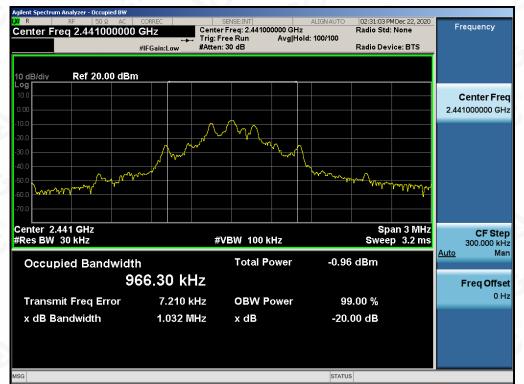
8.3. LIMITS AND MEASUREMENT RESULTS

MEASUREMENT RESULT FOR GFSK MOUDULATION						
Annliachta Limita	Measurement Result					
Applicable Limits	Test Data	Criteria				
	Low Channel	1.032	PASS			
N/A	Middle Channel	1.032	PASS			
	High Channel	1.034	PASS			

02:29:48 PM Dec 22, 2020 Radio Std: None Frequency Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hold: 100/100 2.402000000 GHz Trig: Free Run #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** -0.47 dBm 963.17 kHz Freq Offset 0 Hz 8.989 kHz **Transmit Freq Error OBW Power** 99.00 % x dB Bandwidth 1.032 MHz x dB -20.00 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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MEASUREMENT RESULT FOR II /4-DQPSK MODULATION						
Applicable Limite		Measurement Result				
Applicable Limits	Test Data	Test Data (MHz)				
N/A	Low Channel	1.074	PASS			
	Middle Channel	1.067	PASS			
	High Channel	1.069	PASS			

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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MEASUREMENT RESULT FOR 8-DPSK MODULATION							
Measurement Result							
Applicable Limits	Test Data	Test Data (MHz)					
	Low Channel	1.068	PASS				
N/A	Middle Channel	1.109	PASS				
	High Channel	1.103	PASS				

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- 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

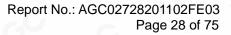
9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT								
Annlinghta Limita	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						

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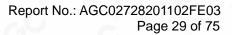




TEST RESULT FOR ENTIRE FREQUENCY RANGE TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL



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Agilent Spectrum Ana								
	13.74175000		SENSE:IN	Avg 1	ALIGNAUTO ype: Log-Pwr	TRACI	Dec 22, 2020	Frequency
		PNO: Fast ↔ IFGain:Low	Trig: Free Rui Atten: 30 dB	n Avg H	old: 10/10	TYP DE		Auto Tune
	ef 20.00 dBm				Mk	r1 4.804 -46.08	3 GHz 6 dBm	Auto Tune
Log 10.0 0.00								Center Freq 13.741750000 GHz
-20.0 -30.0 -40.0	1						-23:47 dBm	Start Freq 2.483500000 GHz
-50.0 -60.0 <mark></mark>					and her being a state of the state of the			Stop Freq 25.00000000 GHz
Start 2.48 GH #Res BW 100 MKR MODE TRC SO	D kHz	#VBW	300 kHz -46.086 dBm	FUNCTION	Sweep 2	2.152 s (30		CF Step 2.251650000 GHz <u>Auto</u> Man
1 N 1 f 2	4.	804 3 GHz	-46.086 dBm					Freq Offset 0 Hz
MSG					STATUS	5		

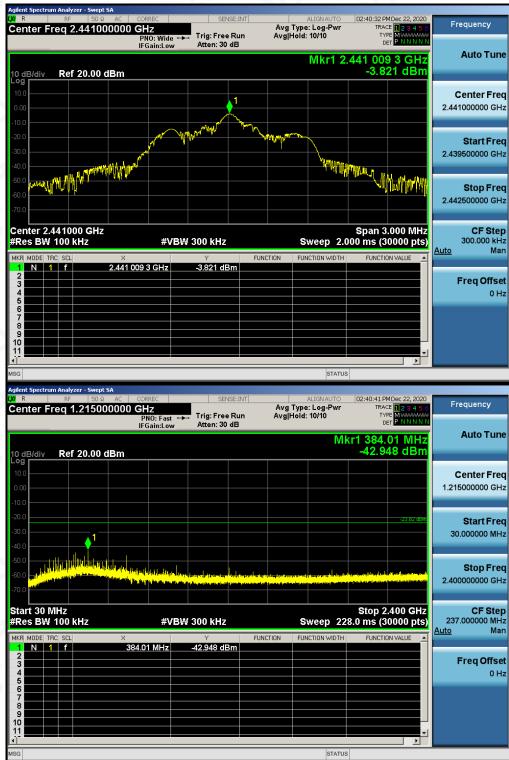
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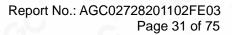
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com





TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

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	m Analyzer - Swep	t SA								
(X/R Center Er	RF 50 Ω	2 AC CORRE 750000 GH		SENS	BE:INT	Avg Tvp	ALIGNAUTO e: Log-Pwr		MDec 22, 2020	Frequency
Contor II	09 10.741	PNO	:Fast ↔►→ in:Low	Trig: Free Atten: 30		Avg Hold	: 10/10	TY	ET P N N N N N	
		1.04					Mk	r1 4.88	2 3 GHz	Auto Tune
10 dB/div	Ref 20.00	dBm							40 dBm	
Log 10.0										Center Freq
0.00										13.741750000 GHz
-10.0										
-20.0									-23.82 dBm	Otort From
-30.0										Start Freq 2.483500000 GHz
-40.0	1									2.400000000000
-50.0							adan, and in all the	and the second se		
-60.0 starb task		and the state of the	All the set	a dirette da				Mar Chanter		Stop Freq 25.00000000 GHz
-70.0										25.00000000 GHZ
Start 2.48								0 4+++ 2	5.00.011-	OF Oton
#Res BW			#VBW	300 kHz			Sweep 2	5:0p 2 2.152 s (3	5.00 GHz 0000 pts)	CF Step 2.251650000 GHz
MKR MODE TF		×		Y	ELINO	TION FU	NCTION WIDTH		IN VALUE	<u>Auto</u> Man
1 N 1		4.882 3 (GHz	-47.240 dB	m					
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MSG							STATUS	3		

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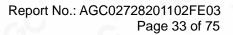
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com





TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL

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Agilent Spectrum Analyzer - Swept SA														
<mark>IXI</mark> R Cent	or Er	RF		Ω AC C			SEN	NSE:INT	Ava		ALIGN AUTO		MDec 22, 2020	Frequency
Cent	GLIII	eq	15.750		PNO: Fast		rig: Free			Hold:		TYI	PE MWWWWW ET P N N N N N	
	IFGaintow Auen. 30 dB													Auto Tune
	Mkr1 23.761 0 GHz													Actoratio
10 dE	10 dB/div Ref 20.00 dBm -48.452 dBm													
10.0														Center Freq
0.00														13.75000000 GHz
					هد									13.75000000 GHz
-10.0														
-20.0					کے ک								-24.59 dBm	Start Freq
-30.0														2.50000000 GHz
-40.0													1_	
-50.0													and some the second second	
-60.0	and succession	الريس	and a stream		A Andrew	and the set					والفريد واربا			Stop Freq
-70.0	Alexandra and a	1			<u>المرا</u> لا									25.00000000 GHz
-7010														
Star	t 2.50	GH	z									Stop 2	5.00 GHz	CF Step
#Res BW 100 kHz #VB						BW 30	0 kHz				Sweep 2	2.152 s (3	0000 pts)	2.25000000 GHz
MKR M	10DE TR	C SCI	-	×		_	Y	FU	NCTION	FUN	ICTION WIDTH	FUNCTIO	ON VALUE	<u>Auto</u> Man
	N 1	f		23.76	61 0 GHz	-48	3.452 dE	3m						
23					I									Freq Offset
4														0 Hz
6														
7														
9														
10														
MSG											STATUS	3		

Note: The 8DPSK modulation is the worst case and only those data recorded in the report.

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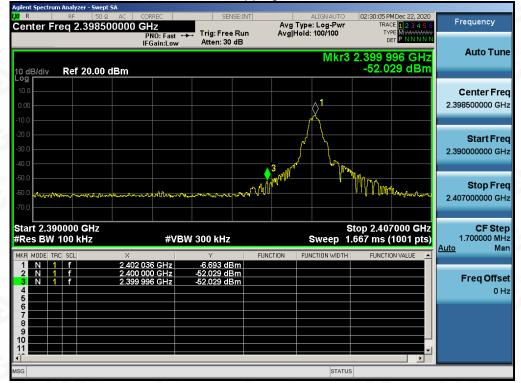
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



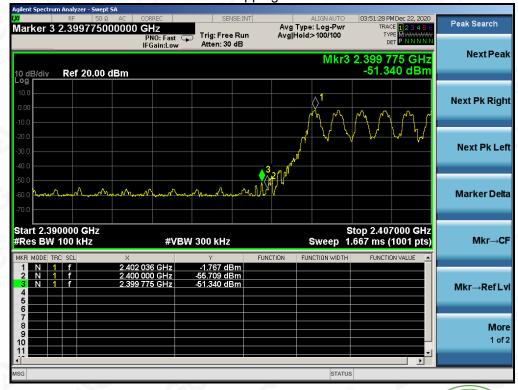
TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL

Hopping off

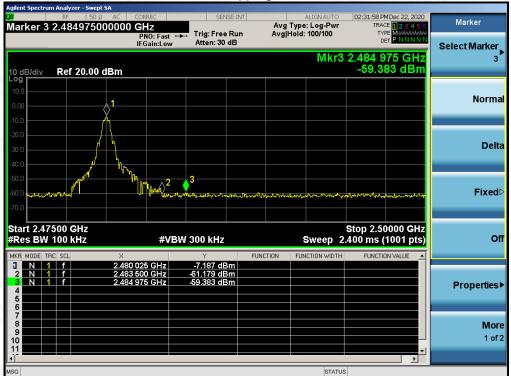


Hopping on



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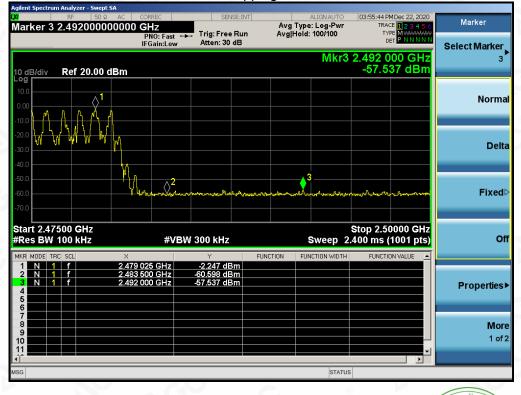




GFSK MODULATION IN HIGH CHANNEL

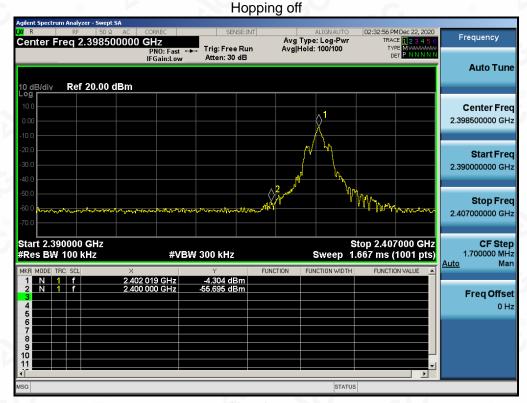
Hopping off

Hopping on



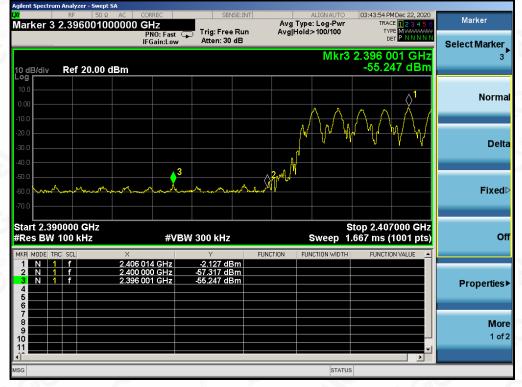
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π /4-DQPSK MODULATION IN LOW CHANNEL

Hopping on



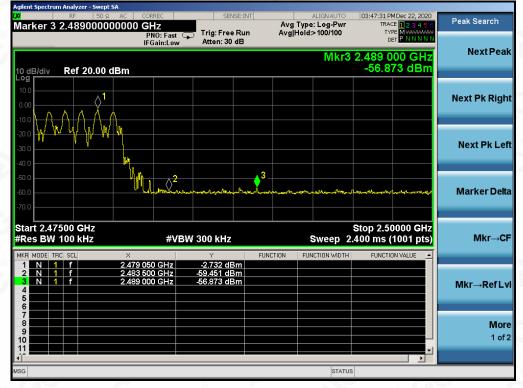
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π /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off

Hopping on



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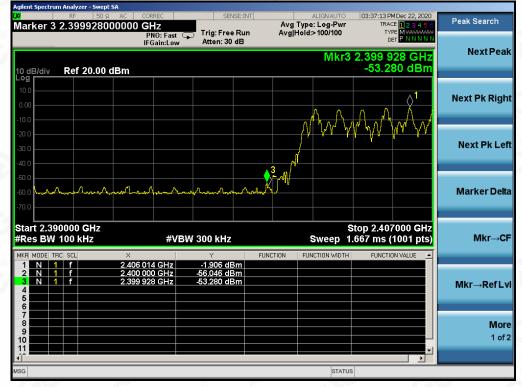




8-DPSK MODULATION IN LOW CHANNEL

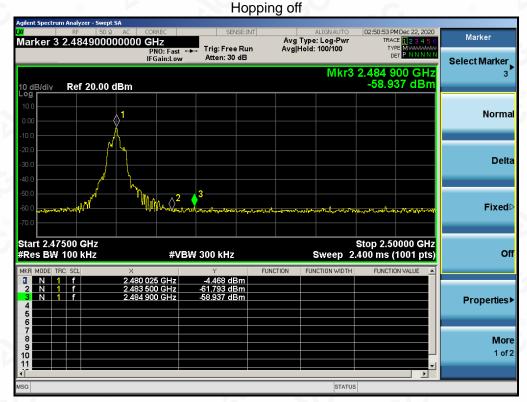
Hopping off

Hopping on



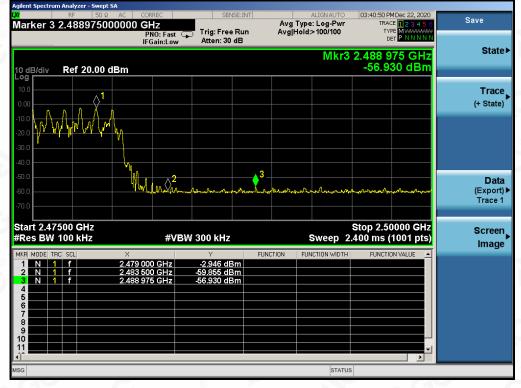
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8-DPSK MODULATION IN HIGH CHANNEL

Hopping 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.

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



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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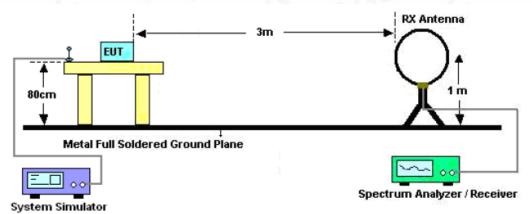
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 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com
 Web: http://cn.agc-cert.com/

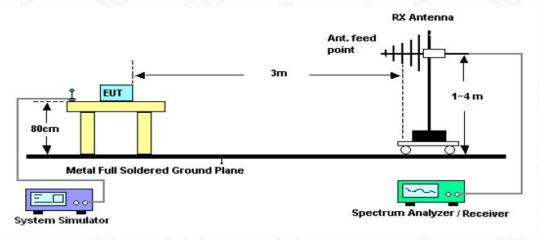


10.2. TEST SETUP

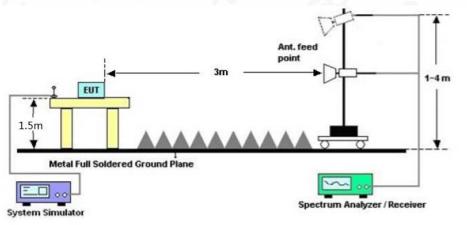
Radiated Emission Test-Setup Frequency Below 30MHz



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

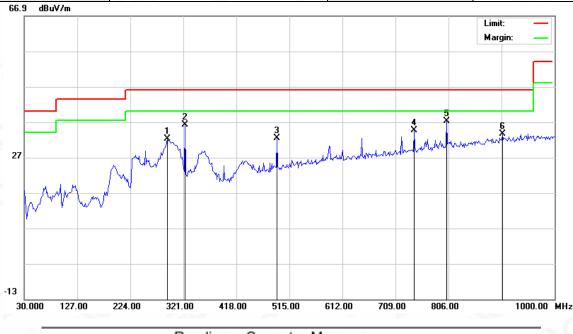
The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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RADIATED EMISSION BELOW 1GHz

EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		291.9000	11.37	20.85	32.22	46.00	-13.78	peak
2		324.2333	14.88	21.35	36.23	46.00	-9.77	peak
3		492.3667	7.75	24.68	32.43	46.00	-13.57	peak
4		742.9500	5.50	29.12	34.62	46.00	-11.38	peak
5	*	802.7667	6.83	30.45	37.28	46.00	-8.72	peak
6		904.6167	1.77	31.74	33.51	46.00	-12.49	peak

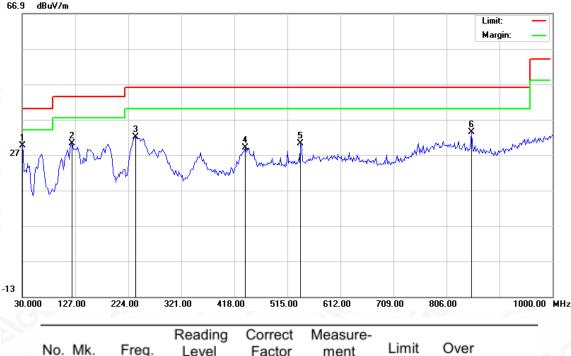
RESULT: PASS

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EUT Multifunctional FM Radio Speaker Model		Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical



No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	30.0000	17.35	12.17	29.52	40.00	-10.48	peak
2		120.5333	12.30	18.00	30.30	43.50	-13.20	peak
3		236.9333	13.85	18.14	31.99	46.00	-14.01	peak
4		437.4000	5.28	23.73	29.01	46.00	-16.99	peak
5		539.2500	4.53	25.76	30.29	46.00	-15.71	peak
6		851.2667	4.37	29.02	33.39	46.00	-12.61	peak

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Over= Measurement –Limit.

2. All test modes had been pre-tested. The mode 7 is the worst case and recorded in the report.

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RADIATED EMISSION ABOVE 1GHz

EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4804.000	46.58	0.08	46.66	74	-27.34	peak
4804.000	36.32	0.08	36.4	54	-17.6	AVG
7206.000	39.64	2.21	41.85	74	-32.15	peak
7206.000	32.41	2.21	34.62	54	-19.38	AVG
	. C	8				8
			8		-0-	
emark:						

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

EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	45.48	0.08	45.56	74	-28.44	peak
4804.000	35.95	0.08	36.03	54	-17.97	AVG
7206.000	39.76	2.21	41.97	74	-32.03	peak
7206.000	31.34	2.21	33.55	54	-20.45	AVG
<u> </u>	20	0		2	0	
emark:		-C	0			
ator - Antor	ana Factor I Cabl	aloga Dra	omplifior			

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

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EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4882.000	47.67	0.14	47.81	74	-26.19	peak
4882.000	36.48	0.14	36.62	54	-17.38	AVG
7323.000	40.15	2.36	· 42.51	74	-31.49	peak
7323.000	33.29	2.36	35.65	54	-18.35	AVG
mark:			1,04		0	6

Multifunctional FM Radio EUT **Model Name** CR3037B Speaker 25°C **Relative Humidity** Temperature 55.4% 960hPa **Test Voltage** Normal Voltage Pressure **Test Mode** Vertical Mode 8 Antenna

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Tree
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4882.000	47.42	0.14	47.56	74	-26.44	peak
4882.000	39.35	0.14	39.49	54	-14.51	AVG
7323.000	41.27	2.36	43.63	74	-30.37	peak
7323.000	33.26	2.36	35.62	54	-18.38	AVG
	(?)		G	. Ca	©	
				2		8
emark:	~ GV					
ctor = Anter	na Factor + Cable	Loss – Pre-a	mplifier.			

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EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	45.84	0.22	46.06	74	-27.94	peak
4960.000	36.56	0.22	36.78	54	-17.22	AVG
7440.000	39.47	2.64	42.11	74	-31.89	peak
7440.000	30.62	2.64	33.26	54	-20.74	AVG
			104	- G	0	
emark:					20	
ctor = Anter	nna Factor + Cable	Loss – Pre-	amplifier.			

EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	45.89	0.22	46.11	74 💿	-27.89	peak
4960.000	35.32	0.22	35.54	54	-18.46	AVG
7440.000	39.56	2.64	42.2	74	-31.8	peak
7440.000	30.46	2.64	33.1	54	-20.9	AVG
®			0		0	
emark:					0	6
actor = Anter	nna Factor + Cab	le 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, Margin= Level -Limit.

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

All test modes had been tested. The 8DPSK modulation is the worst case and recorded in the report.

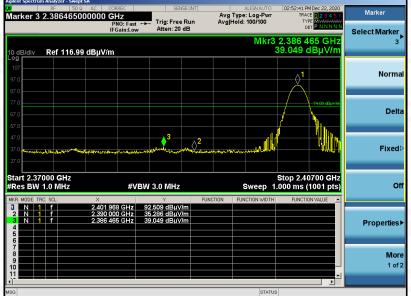
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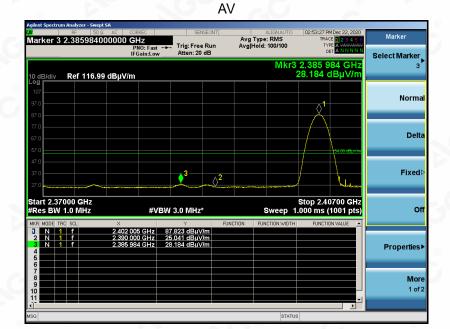


EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal

TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

PK





RESULT: PASS

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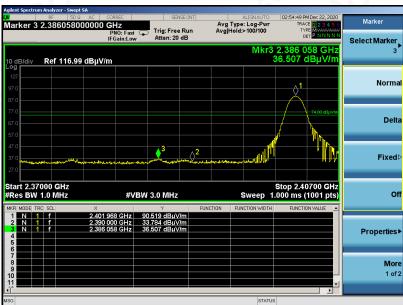
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



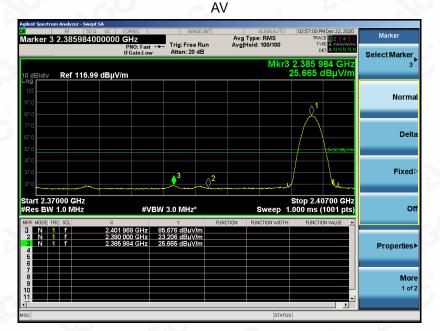
Report No.: AGC02728201102FE03 Page 50 of 75

EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

PK



. . .



RESULT: PASS

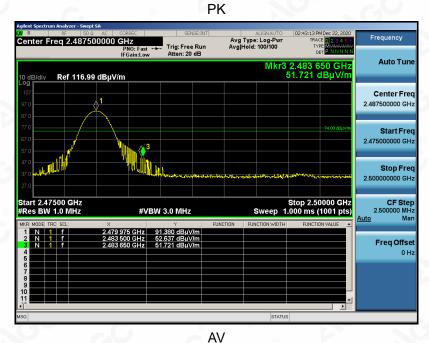
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EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal







RESULT: PASS

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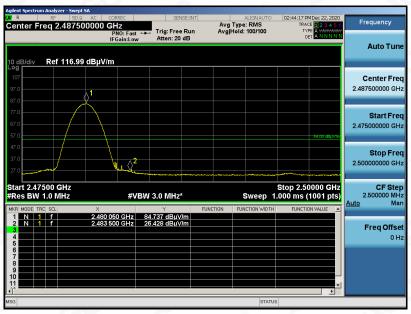


Report No.: AGC02728201102FE03 Page 52 of 75

EUT	Multifunctional FM Radio Speaker	Model Name	CR3037B
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical



AV



RESULT: PASS

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer. The 8DPSK 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)

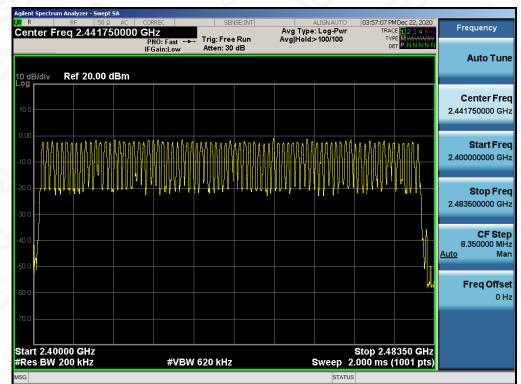
Same as described in section 8.2

11.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

11.4. LIMITS AND MEASUREMENT RESULT

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



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) × (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

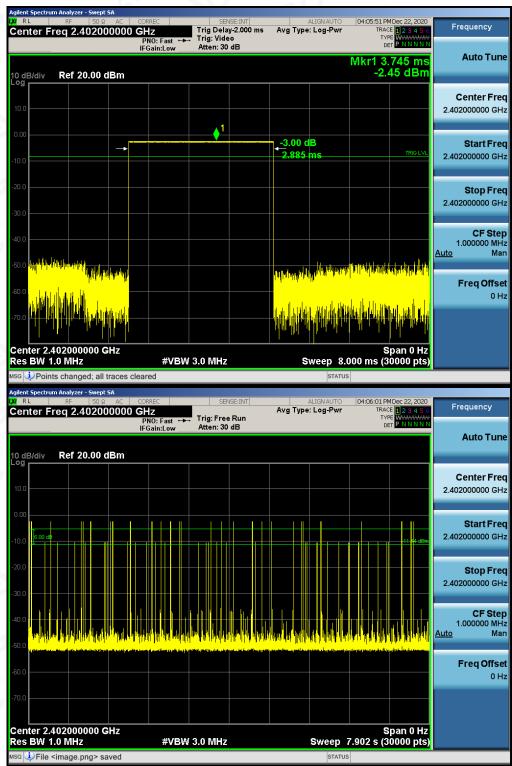
12.4. LIMITS AND MEASUREMENT RESULT

Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Sweep Time (ms)	Limit (ms)
Low	2.885	28*4	323.120	400
Middle	2.886	28*4	323.232	400
High	2.886	26*4	300.144	400

Note: The 8DPSK modulation is the worst case and recorded in the report.

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TEST PLOT OF LOW CHANNEL

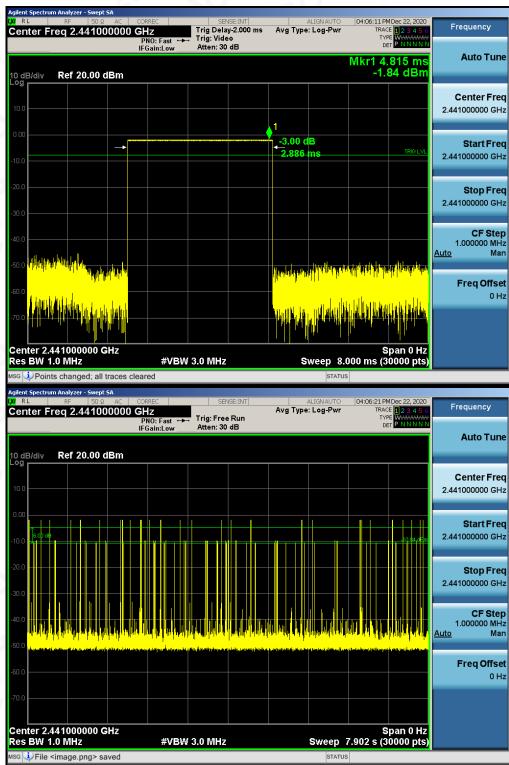
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TEST PLOT OF MIDDLE CHANNEL

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