

FCC Test Report

Report No.: AGC10798201201FE03

FCC ID	® :	HBOSB2027
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	2.0 Mini Sound Bar
BRAND NAME	:	КМОИК
MODEL NAME	:	KM-HSB001
APPLICANT	5:	SHENZHEN FENDA TECHNOLOGY CO., LTD.
DATE OF ISSUE	® :	Dec. 16, 2020
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	. /	Dec. 16, 2020	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	SHENZHEN FENDA TECHNOLOGY CO., LTD.		
Address	Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China		
Manufacturer	Shenzhen YaFex E-Commerce Co., LTD		
Address	102,23 Baili Road, Bantian Street, Longgang District, Shenzhen, China		
Factory	SHENZHEN FENDA TECHNOLOGY CO., LTD.		
Address	Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China		
Product Designation	2.0 Mini Sound Bar		
Brand Name	KMOUK		
Test Model	KM-HSB001		
Date of test	Dec. 07, 2020 to Dec. 15, 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

Eddy · Liu

Eddy Liu (Project Engineer)

Dec. 15, 2020

Max Zhang

Max Zhang (Reviewer)

Dec. 16, 2020

Approved By

Reviewed By

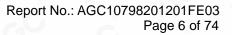
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Forrest Lei (Authorized Officer)

Dec. 16, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "2.0 Mini Sound Bar". 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

Operation Frequency	2.402 GHz to 2.480 GHz
RF Output Power	1.676dBm (Max)
Bluetooth Version	V5.0
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels	79
Hardware Version	V01
Software Version	V01
Antenna Designation	PCB Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	1.98dBi
Power Supply(by adapter)	MODEL: NBS30D150200HU INPUT: 100-240V~50/60Hz, 0.8A OUTPUT: 15.0V 2.0A
Note: The EUT doesn't support	BLE.

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency		
	0	2402 MHz		
	GY C	2403 MHz		
30 20				
	38	2440 MHz		
2402~2480MHz	39	2441 MHz		
	40	2442 MHz		
e e e e e e e e e e e e e e e e e e e	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, 79, 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: HBOSB2027** 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 $y \pm U$, 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: $Uc = \pm 2\%$
- 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

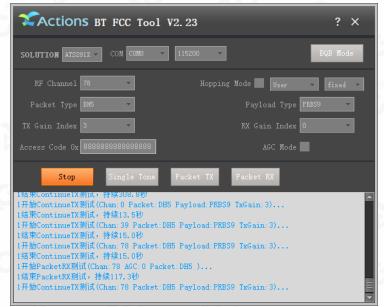
Note:

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



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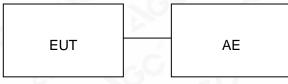
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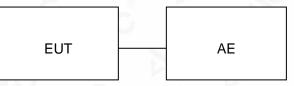
5. SYSTEM TEST CONFIGURATION

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
1	2.0 Mini Sound Bar	KM-HSB001	HBOSB2027	EUT
2	Control Box	N/A	USB-TTL	AE
3	AUX IN	N/A 1.8m unshielded/ 1.65m unshielded		Accessory
4	Adapter	N/A	1.55m unshielded	Accessory
5	OPTICAL	N/A	1m 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)	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)	a)(1) Frequency Separation		
15.207	Conducted Emission	Compliant	

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6. TEST FACILITY

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

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

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

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST R&S		ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 07, 2020	Dec. 21, 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)	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, 2020	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

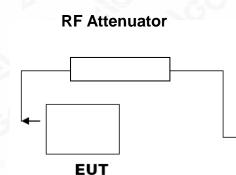
For peak power test:

- 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.

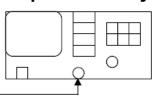
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

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

	PEAK OUTPUT POWER MEA FOR GFSK MOUL						
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or Fail							
2.402	-3.807	21	Pass				
2.441	-2.874	21	Pass				
2.480	-1.496	21	Pass				

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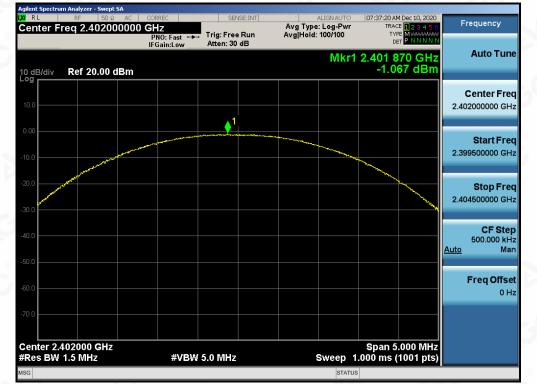


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PEAK OUTPUT POWER MEASUREMENT RESULT FOR II/4-DQPSK MODULATION							
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass or							
2.402	-1.067	21	Pass				
2.441	-0.215	21	Pass				
2.480	1.312	21	Pass				



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Report No.: AGC10798201201FE03 Page 18 of 74

PEAK OUTPUT POWER MEASUREMENT RESULT FOR 8-DPSK MODULATION							
Frequency (GHz)Peak Power (dBm)Applicable Limits (dBm)Pass of							
2.402	-0.856	21	Pass				
2.441	0.158	21	Pass				
2.480	1.676	21	Pass				



CH0

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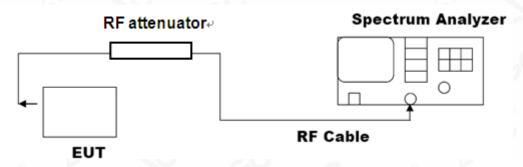


8. 20DB BANDWIDTH

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						
Applicable Limite		Measurement Result				
Applicable Limits	Test Data	Criteria				
	Low Channel	0.934	PASS			
N/A	Middle Channel	0.932	PASS			
	High Channel	0.934	PASS			

07:51:28 AM Dec 10, 2020 Radio Std: None Frequency Center Freq: 2.40200000 GHz Trig: Free Run Avg|Hold>100/100 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** 3.79 dBm 849.40 kHz Freq Offset 0 Hz -31.228 kHz **Transmit Freq Error OBW Power** 99.00 % x dB Bandwidth 934.2 kHz x dB -20.00 dB

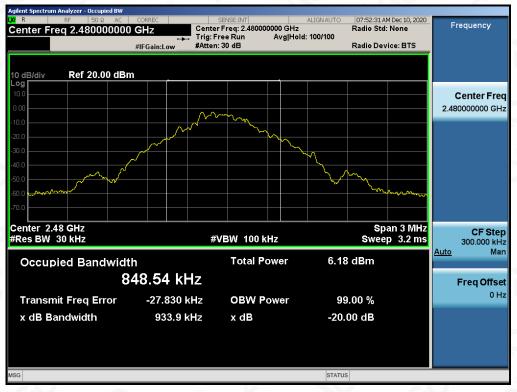
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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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						
Measurement Result						
Applicable Limits	Test Data	Test Data (MHz)				
N/A	Low Channel	1.281	PASS			
	Middle Channel	1.282	PASS			
	High Channel	1.283	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

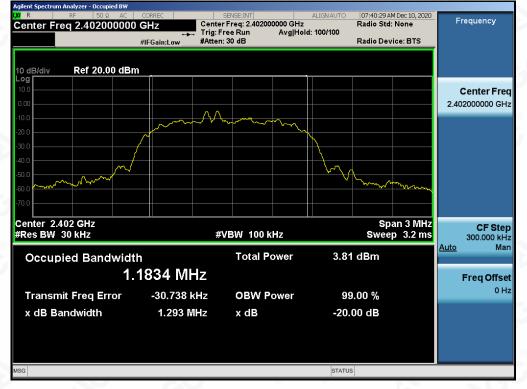


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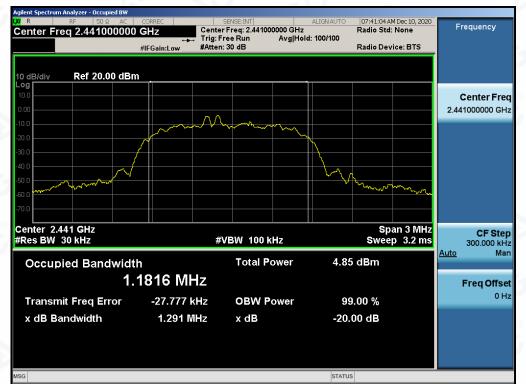


MEASUREMENT RESULT FOR 8-DPSK MODULATION							
Measurement Result							
Applicable Limits	Test Data	Test Data (MHz)					
	Low Channel	1.293	PASS				
N/A	Middle Channel	1.291	PASS				
	High Channel	1.293	PASS				

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

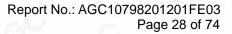
9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

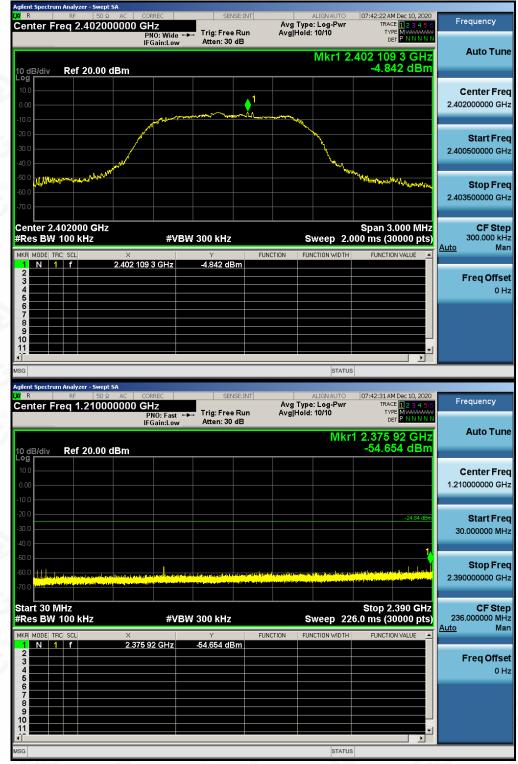
LIMITS AND MEA	SUREMENT RESULT				
Annlinghta Limita	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM 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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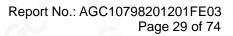




TEST RESULT FOR ENTIRE FREQUENCY RANGE TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL



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Agilent Spectrum Analyzer - Swept SA					
X R RF 50 Ω AC		SENSE:INT	ALIGNAUTO	07:42:56 AM Dec 10, 2020 TRACE 1 2 3 4 5 6	Frequency
Center Freq 13.74175000	PNO: Fast +++ Trig		g Hold: 10/10		
	IFGain:Low Atte	en: 30 dB		DET PNNNN	
			Mk	r1 4.803 5 GHz	Auto Tune
10 dB/div Ref 20.00 dBm				-42.932 dBm	
Log					
10.0					Center Freq
0.00					13.741750000 GHz
-10.0					
-20.0					
-30.0				-24.84 dBm	Start Freq
					2.483500000 GHz
-40.0					
-50.0		· · · · · · · · · · · · · · · · · · ·	and the second		Stop Freq
-60.0	and the second secon		and the second		25.000000000 GHz
-70.0					
Start 2.48 GHz			_	Stop 25.00 GHz	CF Step 2.251650000 GHz
#Res BW 100 kHz	#VBW 300	KHZ	Sweep 4	2.152 s (30000 pts)	Auto Man
MKR MODE TRC SCL X	Y		FUNCTION WIDTH	FUNCTION VALUE	<u>intere</u>
1 N 1 f 4	.803 5 GHz -42.9	32 dBm			
3					Freq Offset
5					0 Hz
6					
7 8					
9					
10					
				v	
MSG			STATUS	3	

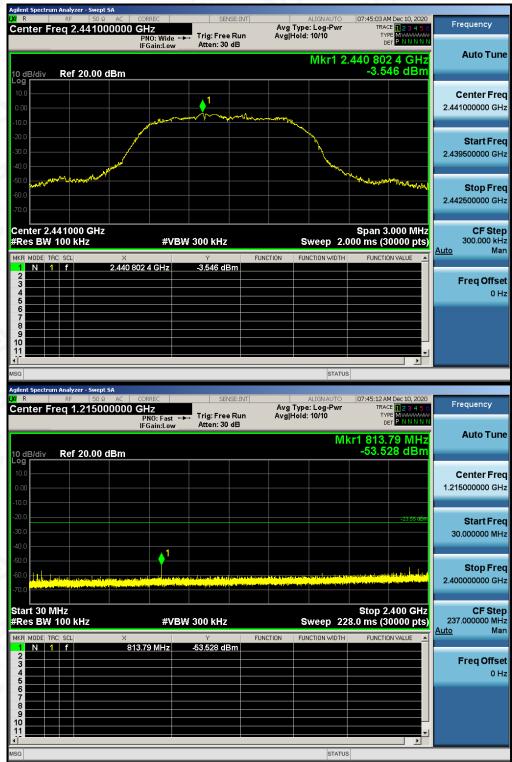
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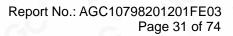
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com
 Web: http://cn.agc-cert.com/





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

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Agilent Spectru	m Analyzer - Swe	ept SA								
LXI R		Ω AC	CORREC	SEN	ISE:INT		ALIGN AUTO		M Dec 10, 2020	Frequency
Center F	req 13.74	1/50000	PNO: Fast +	Trig: Free	Run	Avg Ty Avg Ho	pe: Log-Pwr Id: 10/10	TY		· · · · · · · · · · · · · · · · · · ·
			IFGain:Low	Atten: 30				C		
	Mkr1 4.882 3 GH:						23647	Auto Tune		
	D-6 00 0	0.40						_44 9	92 dBm	
10 dB/div Log	Ref 20.0	UDIII						1 1 1		
10.0										Center Freq
0.00										13.741750000 GHz
										13.741750000 GHz
-10.0										
-20.0									-23.55 dBm	Start Freq
-30.0										2.483500000 GHz
-40.0	1									2.40000000000112
	N									
-50.0					فليتراد والمسال		a platta planta a statu	dinate all in the	A second in the stand	Stop Freq
-60.0 <mark>a</mark>		Neigh all a	iti dhala			and and and	and the second			25.000000000 GHz
-70.0	Min			<u> </u>						23.000000000 8112
Start 2.48									5.00 GHz	CF Step
#Res BW	100 kHz		#VB	W 300 kHz			Sweep	2.152 s (3	0000 pts)	2.251650000 GHz
MKR MODE TH	RCİ SCLİ	×		Y	FUN	CTION F	UNCTION WIDTH	FUNCTI	ON VALUE	<u>Auto</u> Man
1 N 1		4.8	82 3 GHz	-44.992 dE	3m					
2										Freq Offset
3										0 Hz
5										0112
6										
8										
9										
10									-	
MSG							STATU	5		

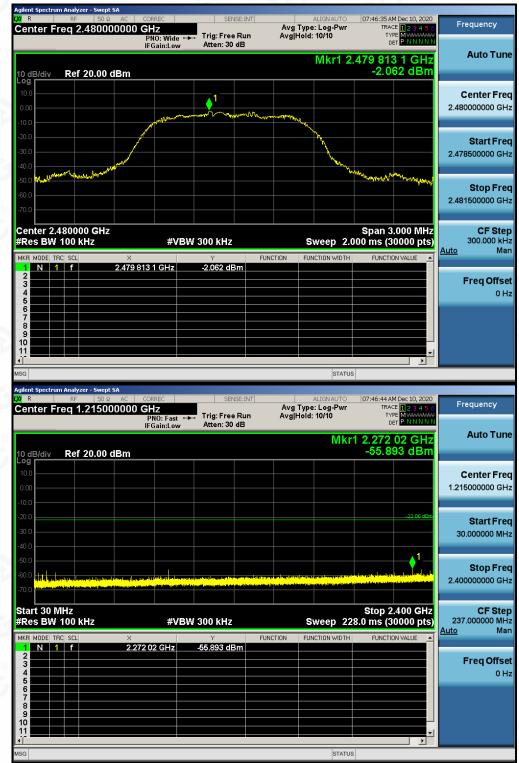
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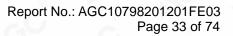
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com
 Web: http://cn.agc-cert.com/





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

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Agilent Spectrum Analyzer - Swe						
Center Freq 13.750		SENSE:INT		ALIGNAUTO : Log-Pwr 10/10	07:47:09 AM Dec 10, 20 TRACE 12 3 4 TYPE MANNW	Frequency
10 dB/div Ref 20.00	IFGain:Low				r1 4.960 1 GH -42.770 dB	Auto Tune
Log 10.0 0.00						Center Freq 13.750000000 GHz
-20.0					-22.06 c	Start Freq 2.500000000 GHz
-50.0 -60.0 -70.0				a Maria Mana Malak Maria Maria Malak	ten General in hy Annual y program that is not him to be	Stop Freq 25.000000000 GHz
Start 2.50 GHz #Res BW 100 kHz	×	BW 300 kHz	FUNCTION FU	Sweep 2	Stop 25.00 GI 2.152 s (30000 p FUNCTION VALUE	Hz CF Step 2.250000000 GHz Auto Man
1 N 1 f 2	4.960 1 GHz	-42.770 dBm		STATUS		Freq Offset 0 Hz

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

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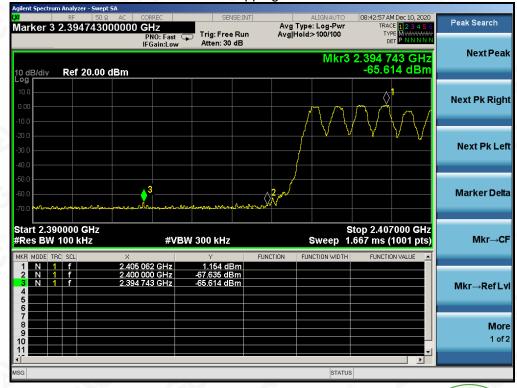
TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL

Hopping off



Hopping on



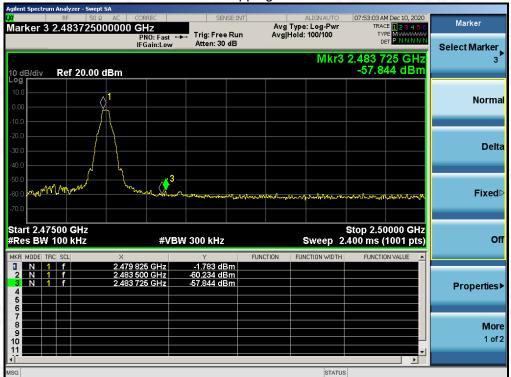
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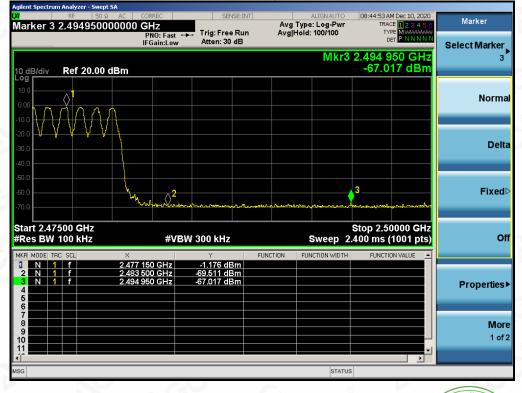




GFSK MODULATION IN HIGH CHANNEL

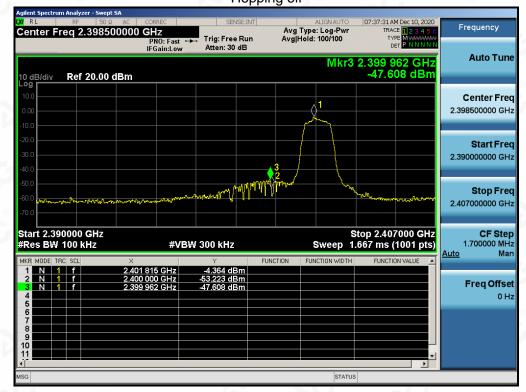
Hopping off

Hopping on



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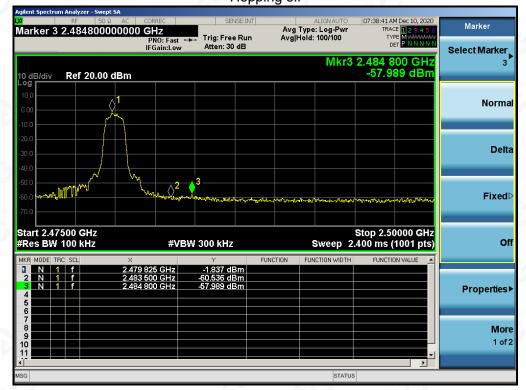
π /4-DQPSK MODULATION IN LOW CHANNEL Hopping off

Hopping on



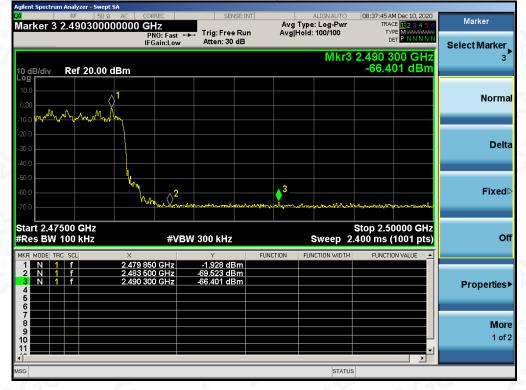
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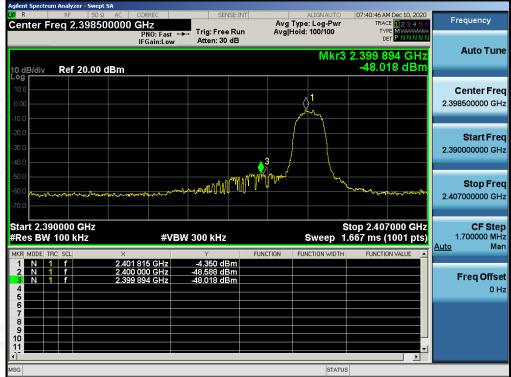
π /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off

Hopping on



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8-DPSK MODULATION IN LOW CHANNEL

Hopping off

Hopping on



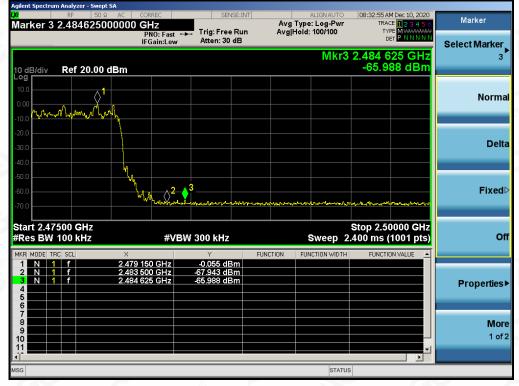
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larker 3 2	RF 50 2.4843000	000000 G					ALIGN AUTO ype: Log-Pwr old: 100/100	TRA	M Dec 10, 2020 CE 123456 PE M 444444	Marker
			NO: Fast Gain:Low	Atten: 3		A YUN		D	et <mark>P N N N N N</mark>	Select Marker
	Ref 20.00	dBm					Mkr3	2.484 3	800 GHz 82 dBm	3
- og 10.0		<u></u>								Norm
0.00		<u>An</u>								NOTIN
10.0 20.0										
30.0										Del
40.0 50.0	rest.	- Long		2						
50.0 60.0	unn lunn	کس	hrund and	Warth- will the work	ماليماتكم	<u>ำ เกาะเส</u> าริสไระที	man and the second second second second second second second second second second second second second second s		A	Fixed
									, Arrell a Southerfolding allow	
70.0	00 GHz							Stop 2.5	0000 GHz	
70.0 Start 2.475 Res BW 1	00 GHz 00 kHz		#VE	SW 300 kHz			Sweep 2	Stop 2.5 .400 ms (0000 GHz (1001 pts)	c
70.0 Res BW 1 KR MODE TRC N 1	00 GHz 00 kHz	× 2.479 82 2 483 50	25 GHz	300 kHz -1.944 d	FU Bm	NCTION		Stop 2.5 .400 ms (0000 GHz	c
70.0 Start 2.475 Res BW 1 KR MODE TRC 1 N 1 2 N 1 3 N 1 4	00 GHz 00 kHz SCL		25 GHz 00 GHz	SW 300 kHz Y	FU Bm Bm		Sweep 2	Stop 2.5 .400 ms (0000 GHz (1001 pts)	
70.0 Res BW 1 KR MODE TRC 0 N 1 2 N 1 3 N 1	00 GHz 00 kHz SCL	2.479 82 2.483 50	25 GHz 00 GHz	W 300 kHz -1.944 d -60.869 d	FU Bm Bm		Sweep 2	Stop 2.5 .400 ms (0000 GHz (1001 pts)	
70.0 Start 2.475 Res BW 1 KR MODE TRC 1 N 1 2 N 1 3 N 1 4 5 6 7 8	00 GHz 00 kHz SCL	2.479 82 2.483 50	25 GHz 00 GHz	W 300 kHz -1.944 d -60.869 d	FU Bm Bm		Sweep 2	Stop 2.5 .400 ms (0000 GHz (1001 pts)	Properties
70.0	00 GHz 00 kHz SCL	2.479 82 2.483 50	25 GHz 00 GHz	W 300 kHz -1.944 d -60.869 d	FU Bm Bm		Sweep 2	Stop 2.5 .400 ms (0000 GHz (1001 pts)	C Properties Mo 1 of

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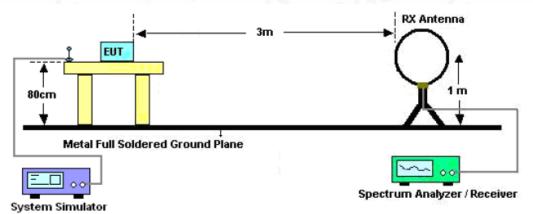
 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

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

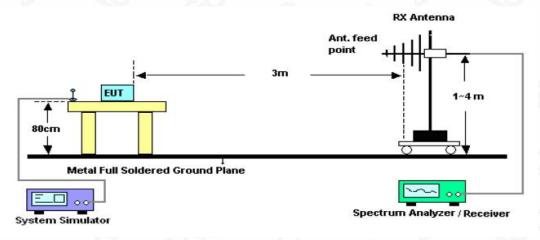


10.2. TEST SETUP

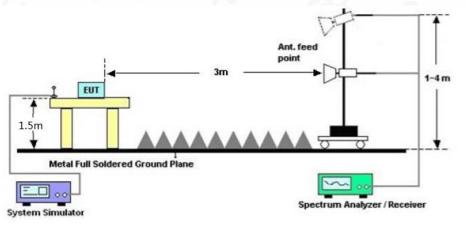
Radiated Emission Test-Setup Frequency Below 30MHz



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

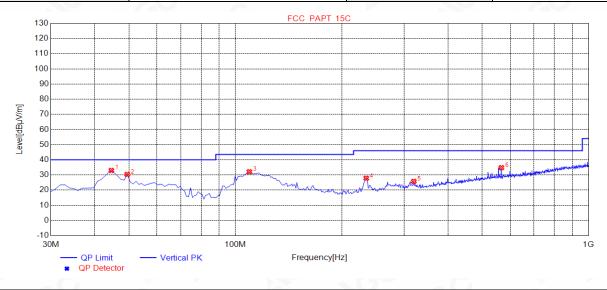
The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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RADIATED EMISSION BELOW 1GHz

EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.5500	32.99	11.82	40.00	7.01	100	253	Vertical
2	49.4000	30.36	11.69	40.00	9.64	100	257	Vertical
3	109.5400	32.11	12.37	43.50	11.39	100	11	Vertical
4	234.6700	27.84	14.40	46.00	18.16	100	1	Vertical
5	320.0300	25.76	16.69	46.00	20.24	100	283	Vertical
6	566.4100	34.81	23.59	46.00	11.19	100	357	Vertical

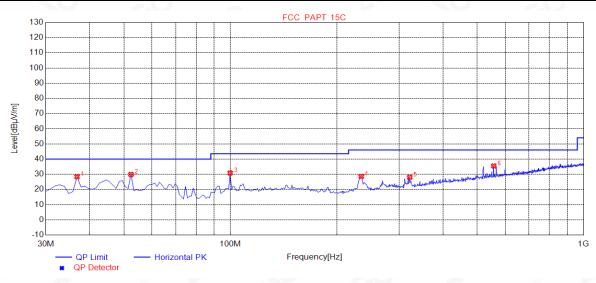
RESULT: PASS

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EUT	2.0 Mini Sound Bar	Model Name KM-HSB001	
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7900	28.36	11.16	40.00	11.64	100	359	Horizontal
2	52.3100	29.89	11.49	40.00	10.11	100	45	Horizontal
3	99.8400	30.84	11.30	43.50	12.66	100	116	Horizontal
4	234.6700	28.56	14.40	46.00	17.44	100	0	Horizontal
5	321.9700	28.01	16.77	46.00	17.99	100	325	Horizontal
6	556.7100	35.50	23.38	46.00	10.50	100	150	Horizontal

RESULT: PASS

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

2. All test modes had been pre-tested. The mode 9 is the worst case and recorded in the report.

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RADIATED EMISSION ABOVE 1GHz

EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
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	45.14	0.08	45.22	74	-28.78	peak
4804.000	37.46	0.08	37.54	54	-16.46	AVG
7206.000	40.58	2.21	42.79	74	-31.21	peak
7206.000	32.07	2.21	34.28	54	-19.72	AVG
	20				20	
emark:			0			
actor = Anter	na Factor + Cable	Loss – Pre-	amplifier.	8		

EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

Meter Reading	Factor	Emission Level	Limits	Margin	VI. T
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	- Value Type
44.64	0.08	44.72	74	-29.28	peak
36.75	0.08	36.83	54	-17.17	AVG
39.55	2.21	41.76	74	-32.24	peak
30.47	2.21	32.68	54	-21.32	AVG
8			0		
			2		8
	(dBµV) 44.64 36.75 39.55 30.47	(dBµV) (dB) 44.64 0.08 36.75 0.08 39.55 2.21 30.47 2.21	(dBµV) (dB) (dBµV/m) 44.64 0.08 44.72 36.75 0.08 36.83 39.55 2.21 41.76 30.47 2.21 32.68	(dBµV) (dB) (dBµV/m) (dBµV/m) 44.64 0.08 44.72 74 36.75 0.08 36.83 54 39.55 2.21 41.76 74 30.47 2.21 32.68 54	(dBµV) (dB) (dBµV/m) (dBµV/m) (dBµV/m) 44.64 0.08 44.72 74 -29.28 36.75 0.08 36.83 54 -17.17 39.55 2.21 41.76 74 -32.24

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

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EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Horizontal

Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
45.63	0.14	45.77	74	-28.23	peak
38.24	0.14	38.38	54	-15.62	AVG
41.41	2.36	43.77	74	-30.23	peak
34.95	2.36	37.31	54	-16.69	AVG
			8		
	8		- GG	8	
	(dBµV) 45.63 38.24 41.41	(dBµV) (dB) 45.63 0.14 38.24 0.14 41.41 2.36	(dBµV) (dB) (dBµV/m) 45.63 0.14 45.77 38.24 0.14 38.38 41.41 2.36 43.77	(dBµV) (dB) (dBµV/m) (dBµV/m) 45.63 0.14 45.77 74 38.24 0.14 38.38 54 41.41 2.36 43.77 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 45.63 0.14 45.77 74 -28.23 38.24 0.14 38.38 54 -15.62 41.41 2.36 43.77 74 -30.23

EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Vertical

Meter Reading	Factor	Emission Level	Limits	Margin	Malus Trees
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	- Value Type
45.87	0.14	46.01	74	-27.99	peak
37.34	0.14	37.48	54	-16.52	🛛 AVG
40.52	2.36	42.88	74	-31.12	peak
31.18	2.36	33.54	54	-20.46	AVG
©		10	0		
	(dBµV) 45.87 37.34 40.52	(dBµV) (dB) 45.87 0.14 37.34 0.14 40.52 2.36	(dBµV) (dB) (dBµV/m) 45.87 0.14 46.01 37.34 0.14 37.48 40.52 2.36 42.88	(dBµV) (dB) (dBµV/m) (dBµV/m) 45.87 0.14 46.01 74 37.34 0.14 37.48 54 40.52 2.36 42.88 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 45.87 0.14 46.01 74 -27.99 37.34 0.14 37.48 54 -16.52 40.52 2.36 42.88 74 -31.12

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EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
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	46.74	0.22	46.96	74	-27.04	peak
4960.000	38.11	0.22	38.33	54	-15.67	AVG
7440.000	41.25	2.64	43.89	74	-30.11	peak
7440.000	32.39	2.64	35.03	54	-18.97	AVG
0	0			0	8	
emark:	- 6	8			- 6	8
ctor = Anter	na Factor + Cable	Loss – Pre-	amplifier.			- 61

Tactor – Anterina Factor + Cable Loss – Fre-ampliner.

EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
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	46.06	0.22	46.28	74	-27.72	peak
4960.000	38.12	0.22	38.34	54	-15.66	AVG
7440.000	41.85	2.64	44.49	74	-29.51	peak
7440.000	33.71	2.64	36.35	54	-17.65	AVG
-		100		0		C.
emark:			100	C	8	

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

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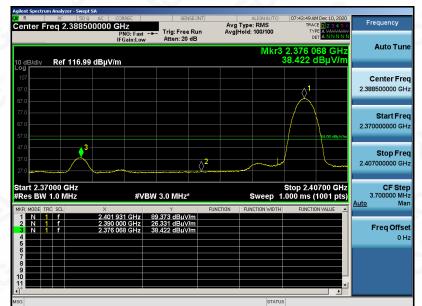
EUT	2.0 Mini Sound Bar	Model Name KM-HSB001			
Temperature	25°C	Relative Humidity	55.4%		
Pressure	960hPa	Test Voltage	Normal Voltage		
Test Mode	Mode 7	Antenna	Horizontal		

TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

PK



AV



RESULT: PASS

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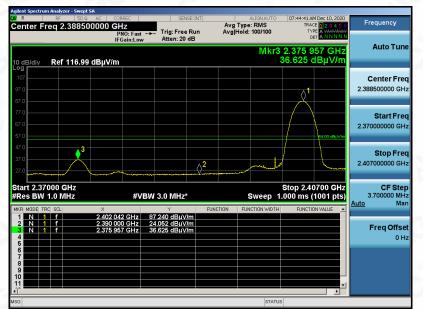
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EUT	2.0 Mini Sound Bar	Model Name	KM-HSB001
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

PK



AV



RESULT: PASS

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