



Report No.: FCC 1910196 File Reference No.: 2019-11-05

Applicant: L10 TRADING SRL

Product: Speaker

Model No.: MP009CI, MP009MO, MP009SA, MP009SS

Trademark: MOJIPOWER

Test Standards: FCC Part 15.247

Test Result: It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10, FCC Part 15.247 for

the evaluation of electromagnetic compatibility

Approved By

# Jack Chung

Jack Chung

Manager

Dated: November 05, 2019

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

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# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

# Industry Canada (IC) — Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

#### **A2LA** (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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# **Test Report Conclusion**

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#### 1.0 General Details

#### 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688 Fax: (755) 83442996

Site Listed with Federal Communications commission (FCC)

Registration Number: 744189 For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A

For 3m Anechoic Chamber

#### 1.2 Applicant Details

Applicant: L10 TRADING SRL

Address: Via Gian Giacomo Mora 11/A, 20123 Milan (MI), Italy

Telephone: -Fax: --

#### 1.3 Description of EUT

Product: Speaker

Manufacturer: China World Connection(HK)Co.,Ltd.

Address: Room 608, Bantian Group Business Center Building, West Changfa Rd., Bantian,

Longgang Dist., Shenzhen 518129, China

Brand Name: MOJIPOWER Model Number: MP009CI

Additional Model Number: MP009MO, MP009SA, MP009SS

Type of Modulation GFSK, 月/4DQPSK, 8DPSK for Bluetooth

Frequency range 2402-2480MHz for Bluetooth

Channel Spacing 1MHz for Bluetooth

Frequency Selection By software

Channel Number 79 channel for Bluetooth

Antenna: PCB antenna used. The gain of the antennas is 0dBi

Input: Built-in 3.7V, 230mAh Li-ion battery

# 1.4 Submitted Sample: 1 Samples

The report refers only to the sample tested and does not apply to the bulk.

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1.5 Test Duration 2019-10-30 to 2019-11-05

Test Uncertainty

Conducted Emissions Uncertainty = 3.6dB Radiated Emissions below 1GHz Uncertainty =4.7dB Radiated Emissions above 1GHz Uncertainty =6.0dB Conducted Power Uncertainty =6.0dB Occupied Channel Bandwidth Uncertainty =5%

1.7 Test Engineer

Terry Tang The sample tested by

Print Name: Terry Tang

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2019-06-21	2020-06-20
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2019-06-21	2020-06-20
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2019-06-21	2020-06-20
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2019-06-21	2020-06-20
Loop Antenna	EMCO	6507	00078608	2020-06-20	2020-06-20
Spectrum	R&S	FSIQ26	100292	2019-06-21	2020-06-20
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2019-06-21	2020-06-20
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-07-09	2021-07-08
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2021-07-03
9*6*6 Anechoic			N/A	2018-02-07	2021-02-06
EMI Test Receiver	RS	ESVB	826156/011	2019-06-21	2020-06-20
EMI Test Receiver	RS	ESH3	860904/006	2019-06-21	2020-06-20
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2019-06-21	2020-06-20
Spectrum	HP/Agilent	E4407B	MY50441392	2019-06-21	2020-06-20
Spectrum	RS	FSP	1164.4391.38	2019-01-20	2020-01-19
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA		2019-06-21	2020-06-20
RF Cable	Zhengdi	7m		2019-06-21	2020-06-20
RF Switch	EM	EMSW18	060391	2019-06-21	2020-06-20
Pre-Amplifier	Schwarebeck	BBV9743	#218	2019-06-21	2020-06-20
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2019-06-21	2020-06-20
LISN	SCHAFFNER	NNB42	00012	2019-01-08	2020-01-07

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#### 3.0 **Technical Details**

#### 3.1 **Summary of test results**

The EUT has been tested according to the following specifications:

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	PASS	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	PASS	Complies
Carrier Frequency Separation	15.247(a)(1)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	PASS	Complies
Spurious Emission, Band Edge, and Restricted bands	15.247(d),15.205(a), 15.209 (a),15.109	PASS	Complies
Conducted Emissions	15.207(a), 15.107	PASS	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

#### 3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

#### 4.0 **EUT Modification**

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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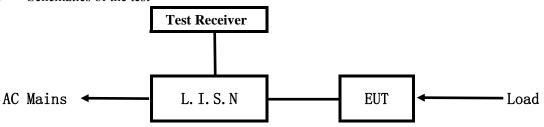
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#### 5. Power Line Conducted Emission Test

#### 5.1 Schematics of the test

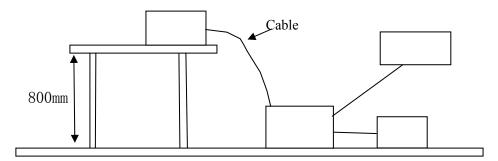


EUT: Equipment Under Test

#### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2013.

Test Voltage: 120V~60Hz Block diagram of Test setup



# 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

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#### A. EUT

Device	Manufacturer	Model	FCC ID
Smooken Would Compostion/IIV/Co. Ltd.		MP009CI, MP009MO,	2AU43-MOJI
Speaker	World Connection(HK)Co.,Ltd	MP009SA, MP009SS	2AU45-MUJI

#### B. Internal Device

Device	Manufacturer	Model Rating		

# C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply	h.TV	S012BES0500200	Input: 100-240V~, 50/60Hz, 0.5A;
			Output: DC5V, 2A

# 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

# 5.5 Power line conducted Emission Limit according to Paragraph 15.107, 15.207

Freque	ency	Class A Lim	its (dB µ V)	Class B Limits (dB µ V)		
(MHz)		Quasi-peak Level Average Lev		Quasi-peak Level	Average Level	
0.15 ~ (	0.50	79.0	66.0	66.0~56.0*	56.0~46.0*	
$0.50 \sim 3$	5.00	73.0	60.0	56.0	46.0	
$5.00 \sim 3$	30.00	73.0	60.0	60.0	50.0	

Notes:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

#### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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#### A: Conducted Emission on Live Terminal (150kHz to 30MHz)

**EUT Operating Environment** 

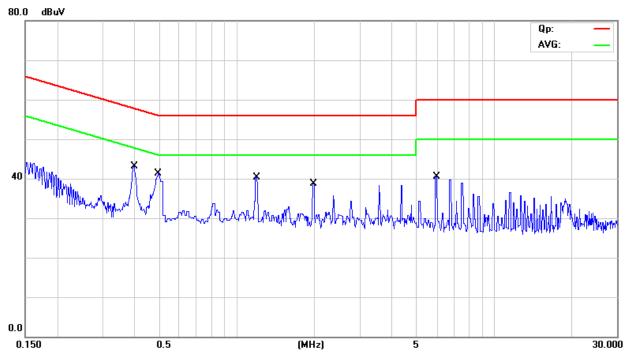
Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C

**EUT set Condition: Keep Bluetooth Transmitting** 

**Equipment Level: Class B** 

**Results: PASS** 

Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1	0.3938	30.00	9.76	39.76	57.98	-18.22	QP	
2	0.3938	25.30	9.76	35.06	47.98	-12.92	AVG	
3	0.4958	28.10	9.77	37.87	56.07	-18.20	QP	
4	0.4958	15.50	9.77	25.27	46.07	-20.80	AVG	
5	1.1885	28.50	9.79	38.29	56.00	-17.71	QP	
6 *	1.1885	24.40	9.79	34.19	46.00	-11.81	AVG	
7	1.9838	24.50	9.80	34.30	56.00	-21.70	QP	
8	1.9838	18.80	9.80	28.60	46.00	-17.40	AVG	
9	5.9515	27.00	9.97	36.97	60.00	-23.03	QP	
10	5.9515	19.10	9.97	29.07	50.00	-20.93	AVG	

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#### B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

**EUT Operating Environment** 

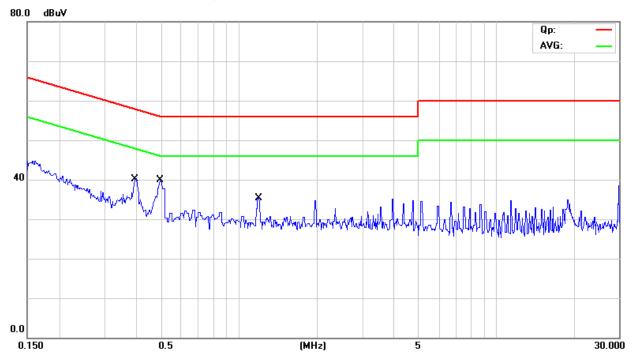
Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C

**EUT set Condition: Keep Bluetooth Transmitting** 

**Equipment Level: Class B** 

**Results: Pass** 

Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∨	dB	dBu∀	dBu∀	dB	Detector	Comment
1	0.3948	25.80	9.76	35.56	57.96	-22.40	QP	
2	0.3948	21.70	9.76	31.46	47.96	-16.50	AVG	
3	0.4875	24.90	9.77	34.67	56.21	-21.54	QP	
4	0.4875	17.20	9.77	26.97	46.21	-19.24	AVG	
5	1.1864	23.90	9.79	33.69	56.00	-22.31	QP	
6 *	1.1864	20.20	9.79	29.99	46.00	-16.01	AVG	

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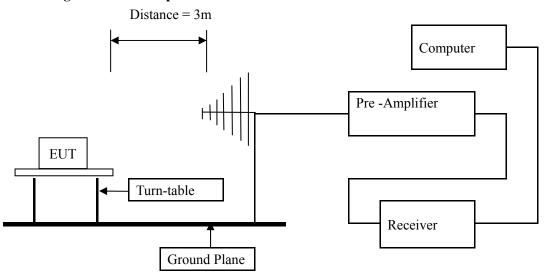
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#### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

#### **Block diagram of Test setup**



- 6.2 Configuration of The EUT
  Same as section 5.3 of this report
- 6.3 EUT Operating Condition
  Same as section 5.4 of this report.

The report refers only to the sample tested and does not apply to the bulk.

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#### 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

# Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109 and RSS-210

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. GFSK was the worse case because it has highest output power

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#### Test result

# General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/Vertical (30MHz----1000MHz)

**EUT set Condition:** Keep Bluetooth Transmitting

**Results: Pass** 

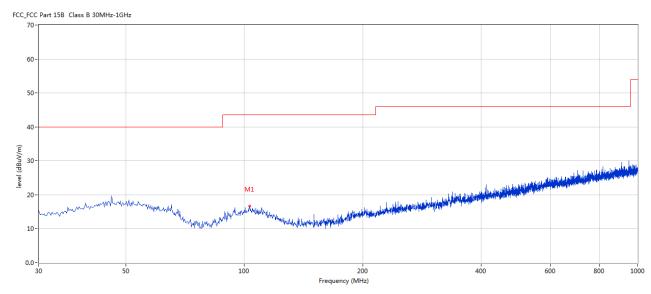
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# Test Figure:

H



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	103.217	16.66	-13.37	43.5	-26.84	Peak	220.00	100	Н	Pass

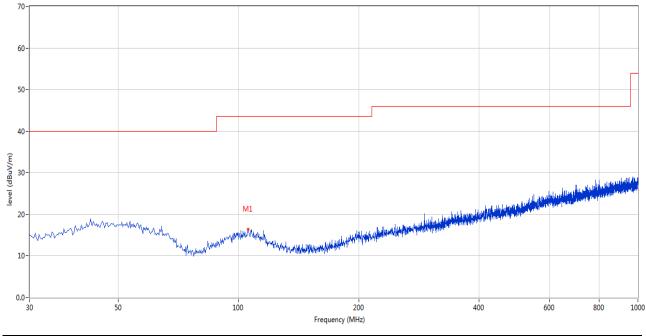
# Test Figure:

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No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	105.641	16.37	-13.27	43.5	-27.13	Peak	345.00	100	V	Pass

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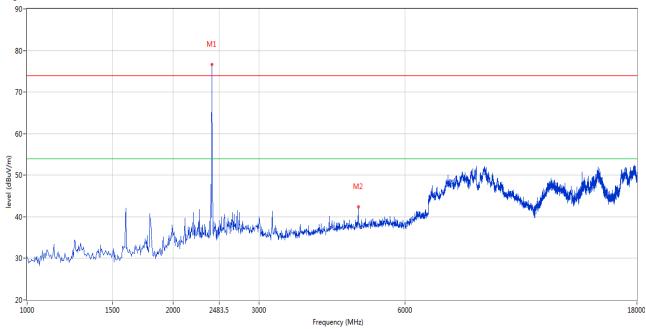


# Test Figures and data above 1GHz:

Please refer to the following test plots for details:

#### **Low Channel: Vertical**

FCC\_FCC Part 15B Class B 1GHz-18GHz - 2



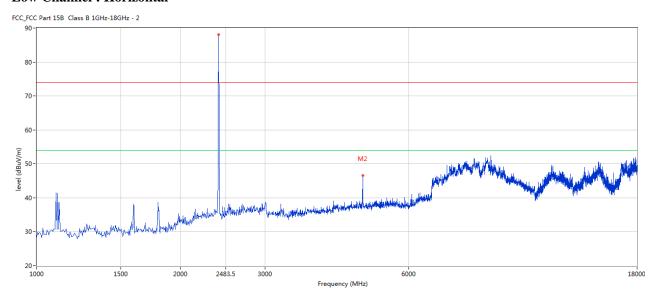
No.	Frequency	Results	Factor (dB)	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)		(o)	(cm)		
2	4802.799	42.38	3.12	54.0	-11.62	Peak	277.00	100	V	Pass

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# **Low Channel: Horizontal**



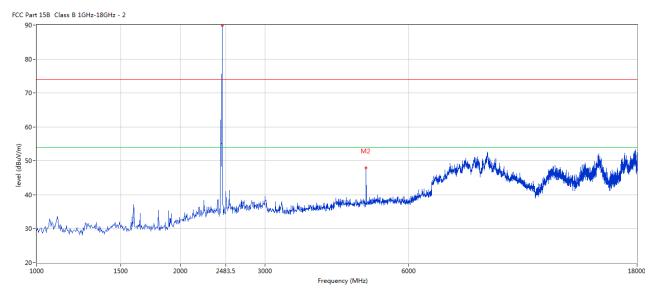
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4802.799	46.52	3.12	54.0	-7.48	Peak	270.00	100	Н	Pass

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#### **Middle Channel: Horizontal**



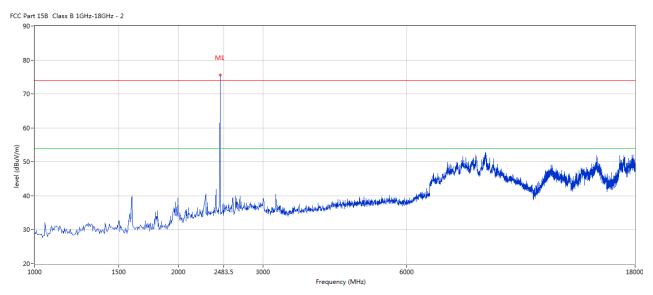
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4883.529	47.91	3.20	54.0	-6.09	Peak	14.00	100	Н	Pass

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#### **Middle Channel: Vertical**

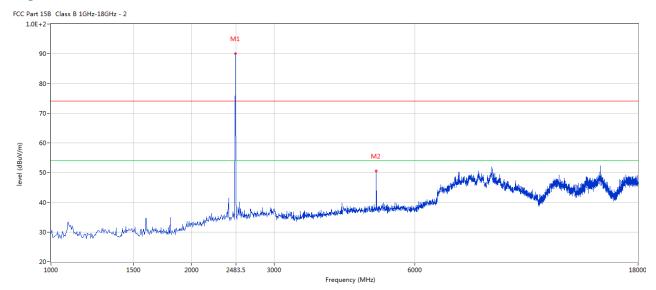


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# **High Channel: Horizontal**



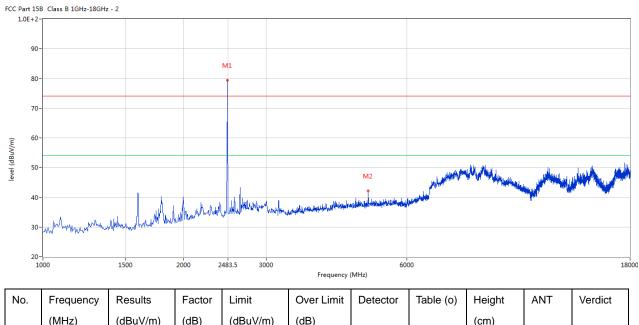
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4960.010	50.55	3.36	54.0	-3.45	Peak	32.00	100	Н	Pass

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# **High Channel: Vertical**



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4960.010	42.13	3.36	74.0	-31.87	Peak	274.00	100	V	Pass

Note: 1. for the radiated emissions above 18G, it is the floor noise.

2. Final Level = Reading + AF + Cable - Preamp

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#### 7.0 20dB Bandwidth Measurement

# 7.1 Regulation

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

# 7.2 Limits of 20dB Bandwidth Measurement

N/A

#### 7.3 Test Procedure.

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span =3MHz, RBW =30 kHz, VBW=100 kHz, Sweep = auto Detector function = peak, Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results. 6. Repeat above procedures until all frequencies measured were complete.

#### 7.4 Test Result

#### **Type of Modulation: GFSK**

Type of Modulation, GLEM								
EUT		Speaker	Model	MP009CI				
Mode	Ke	ep Transmitting	Input Voltage	DC3.7V				
Temperat	ure	24 deg. C,	Humidity	56% RH				
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass/ Fail				
Low	2402	1076		Pass				
Middle	2441 1070			Pass				
High	2480	1070		Pass				

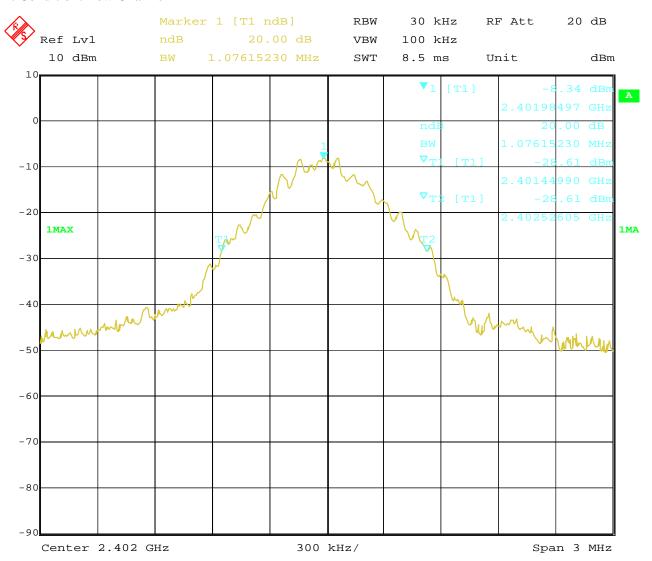
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# Test Figure:

# 1. Condition: Low Channel

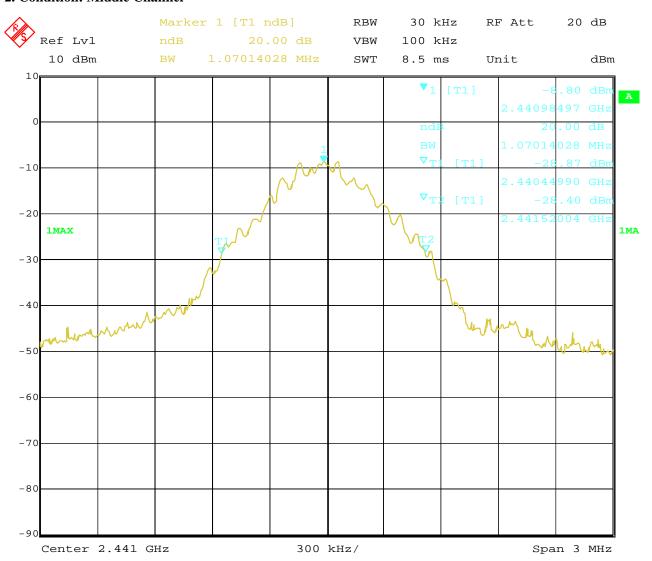


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#### 2. Condition: Middle Channel

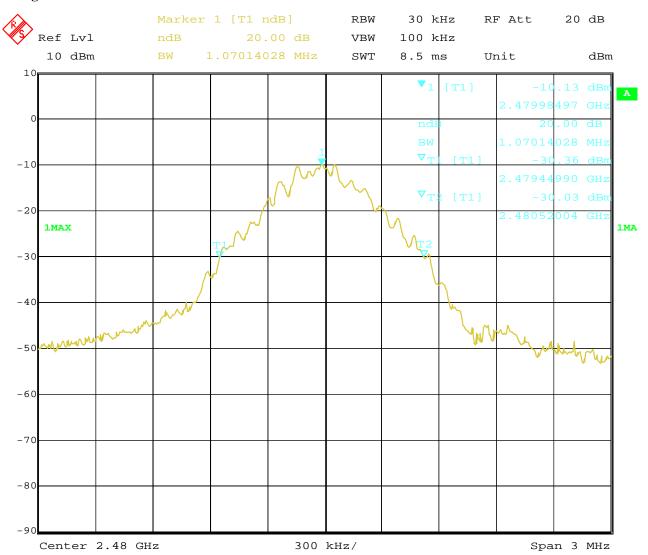


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# 3. High Channel



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# **Test Result**

Type of Modulation: Л/4DQPSK

EUT		Speaker Model		MP009CI
Mode	K	eep Transmitting	Input Voltage	DC3.7V
Temperat	emperature 24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz) 20 dB Bandwidth (kHz)		Maximum Limit (kHz)	Pass/ Fail
Low	2402	1305		Pass
Middle	2441 1305			Pass
High	High 2480 1305			Pass

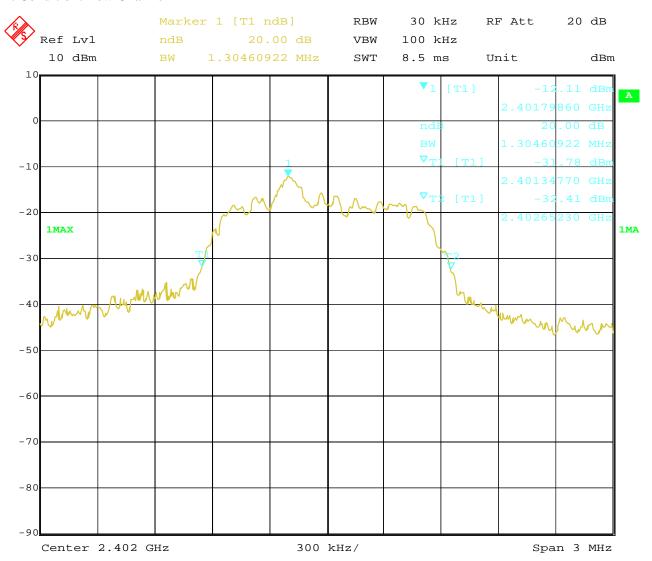
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# Test Figure:

# 1. Condition: Low Channel

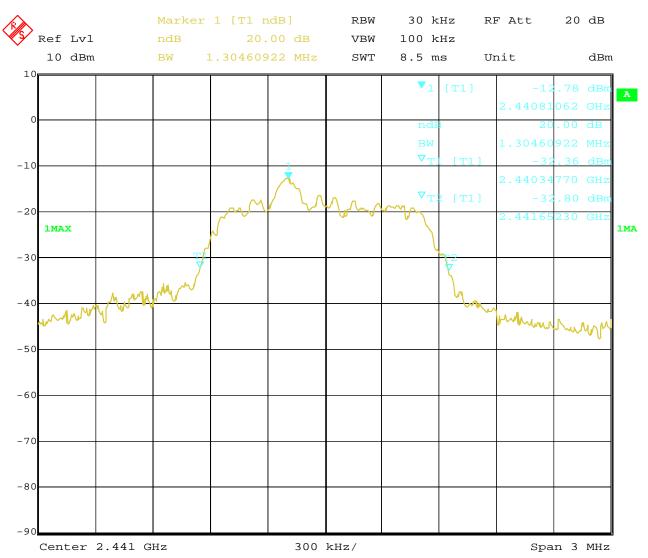


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#### 2. Condition: Middle Channel

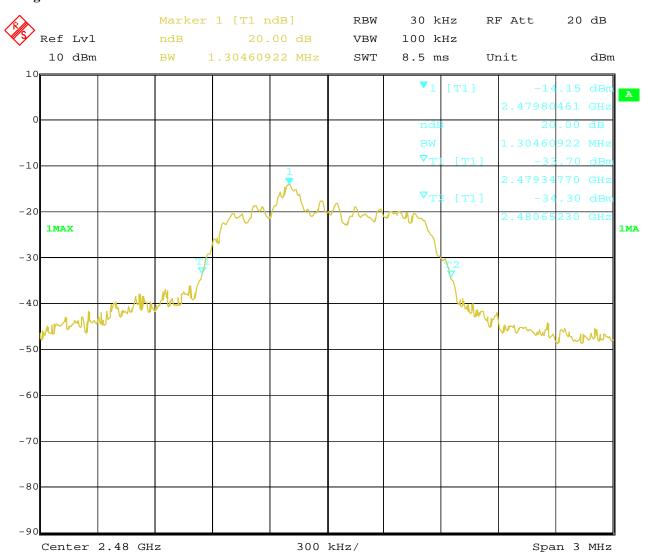


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# 3. High Channel



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#### **Test Result**

**Type of Modulation: 8DPSK** 

EUT		Speaker	Model	MP009CI
Mode	Mode Keep Transmitting		Input Voltage	DC3.7V
Temperati	ure	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	y 20 dB Bandwidth Maximum L (kHz) (kHz)		Pass/ Fail
Low	2402 1311			Pass
Middle	2441 1311			Pass
High	High 2480 1305			Pass

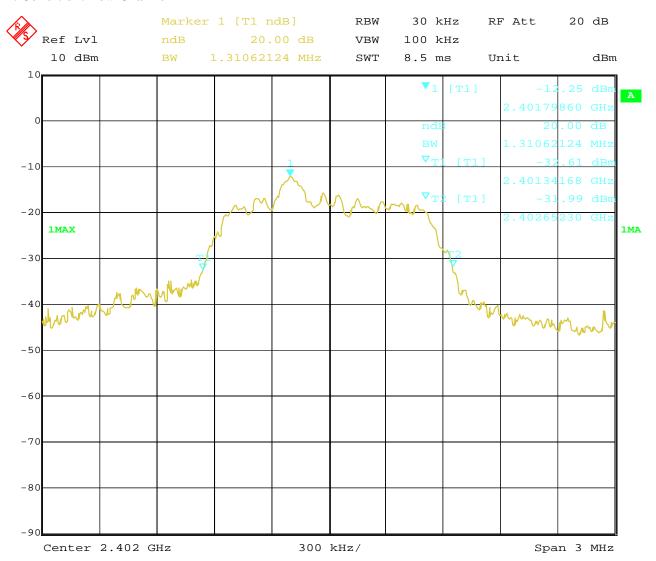
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# Test Figure:

# 1. Condition: Low Channel

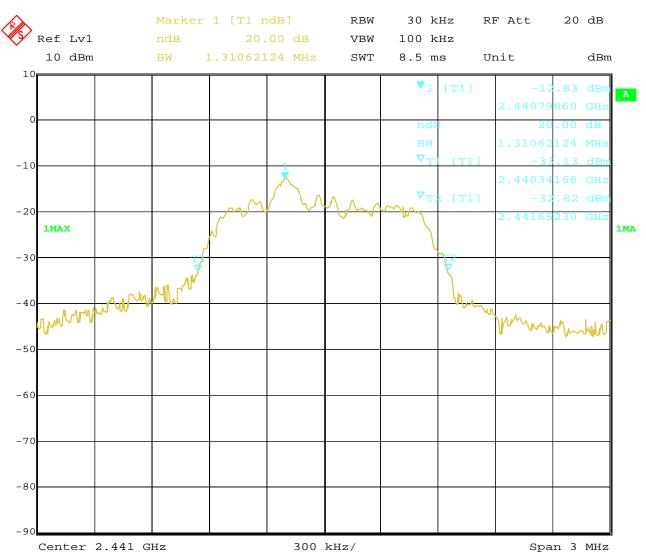


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#### 2. Condition: Middle Channel

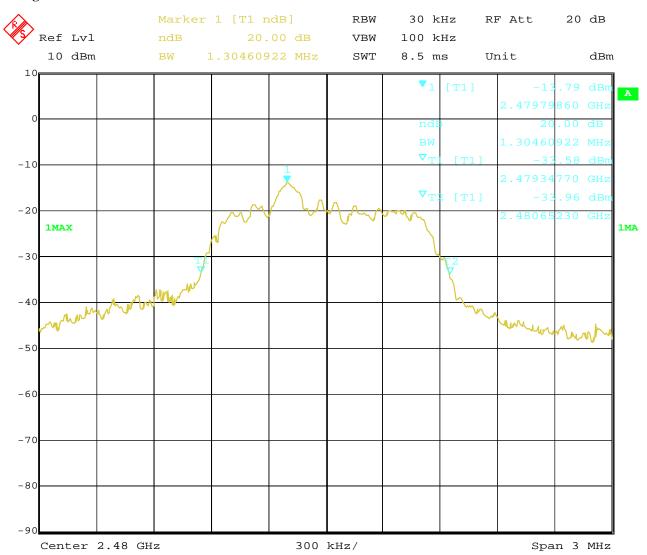


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# 3. High Channel



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# 8. Maximum Output Power

# 8.1 Regulation

According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band:0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **8.2 Limits of Maximum Output Power**

The Maximum Output Power Measurement is 30dBm.

#### **8.3 Test Procedure**

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel; RBW > the 20 dB bandwidth of the emission being measured; VBW =3MHz, RBW=10MHz; Sweep = 60s; Detector function = Peak; Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
- 4. Repeat above procedures until all frequencies measured were complete.

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#### **8.4Test Results**

# Type of Modulation: GFSK

EUT		Speaker			MP009CI
Mode	Ke	Keep Transmitting			DC3.7V
Temperature	е	24 deg. C,			56% RH
Channel	Channel Frequency (MHz)	Max. Power Output (dBm	Max. Power Output (dBm)		Pass/ Fail
Low	2402	-5.09		(dBm) 30	Pass
Middle	2441	-5.58		30	Pass
High	2480	-6.87		30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The Peak power was measured

# Type of Modulation: Л/4DQPSK

EUT		Speaker			MP009CI
Mode	K	Keep Transmitting			DC3.7V
Temperature	e	24 deg. C,			56% RH
Channel	Channel Frequency	Max. Power Output (dBm	Max. Power Output (dBm)		Pass/ Fail
	(MHz)	Peak		Limit (dBm)	
Low	2402	-5.09		30	Pass
Middle	2441	2441 -5.70		30	Pass
High	2480	-7.01		30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The Peak power was measured

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### **Type of Modulation: 8DPSK**

EUT		Speaker		Model	MP009CI
Mode	Ke	ep Transmitting	Input Voltage		DC3.7V
Temperature	e	24 deg. C,		umidity	56% RH
Channel	Channel Frequency (MHz)	Max. Power Output (dBm	)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-5.21		30	Pass
High	2441	-5.70		30	Pass
High	2480	-7.01		30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The Peak power was measured

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### 9. Carrier Frequency Separation

### 9.1 Regulation

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

## 9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25 kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

#### 9.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span; Video (or Average) Bandwidth (VBW)  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.

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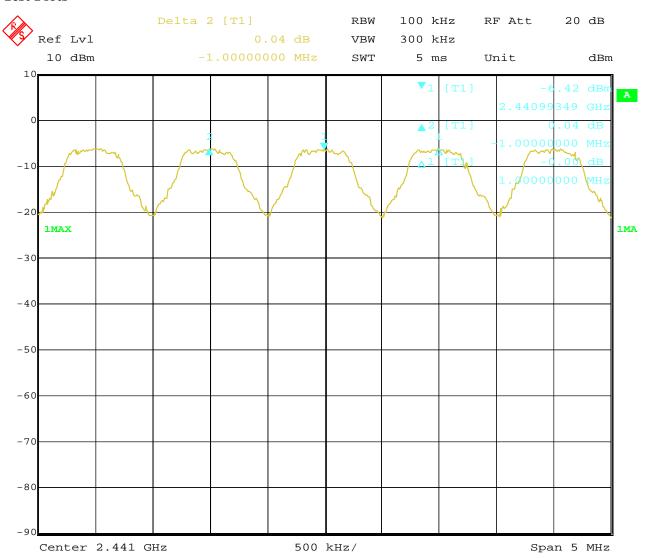


#### 9.4Test Result

#### Type of Modulation: GFSK

EUT	Speaker		Model	MP009CI	
Mode	Hopping On I		Input Voltage	DC3.7V	
Temperature	24 deg. C,		Humidity	56% RH	
Carrier Frequency Separation		Limit			Pass/ Fail
1.000MHz		≥ 25 kHz or 2/3 of the 20 dB bandwidth			Pass

#### **Test Plots**



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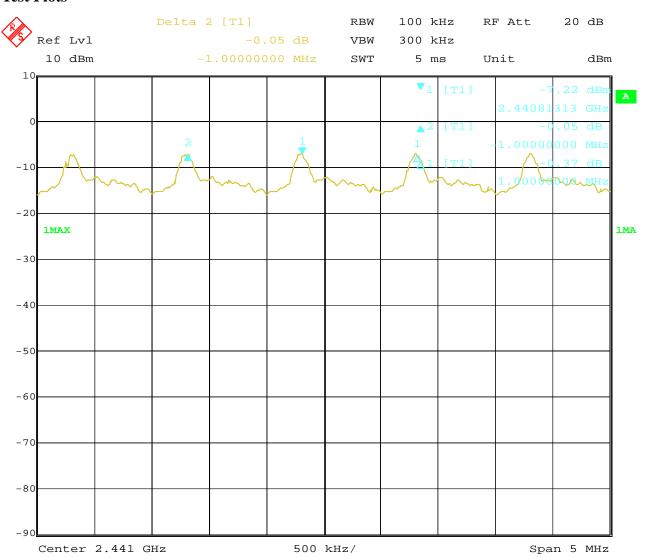
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### Type of Modulation: Л/4DQPSK

EUT	Speaker		Model		MP009CI
Mode	Hopping On I		Input Voltage	DC3.7V	
Temperature	24 deg. C,		Humidity	56% RH	
Carrier Frequency Separation		Limit			Pass/ Fail
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		width	Pass

#### **Test Plots**



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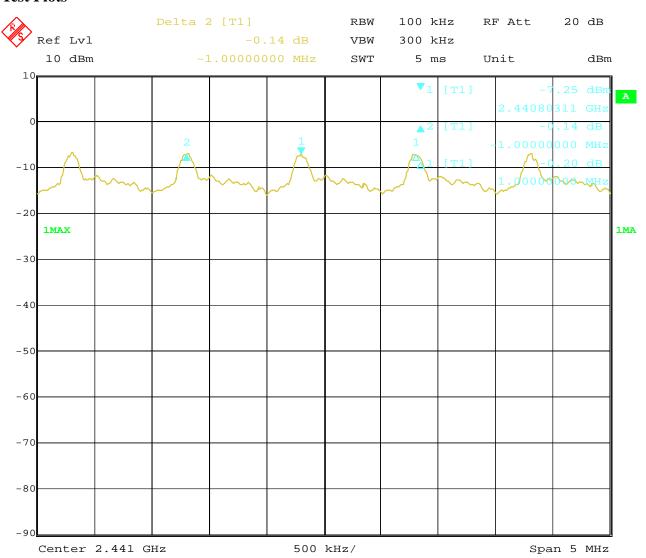
Date: 2019-11-05



#### **Type of Modulation: 8DPSK**

EUT	Speaker		Model	-	MP009CI
Mode	Hopping On In		Input Voltage		DC3.7V
Temperature	24 deg. C,	24 deg. C,		56% RH	
Carrier Frequency Separation		Limit			Pass/ Fail
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		vidth	Pass

#### **Test Plots**



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# 10. Number of Hopping Channels

#### 10.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

#### 10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

#### **10.3 Test Procedure**

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW=100 kHz, VBW=300 kHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Record the number of hopping channels.

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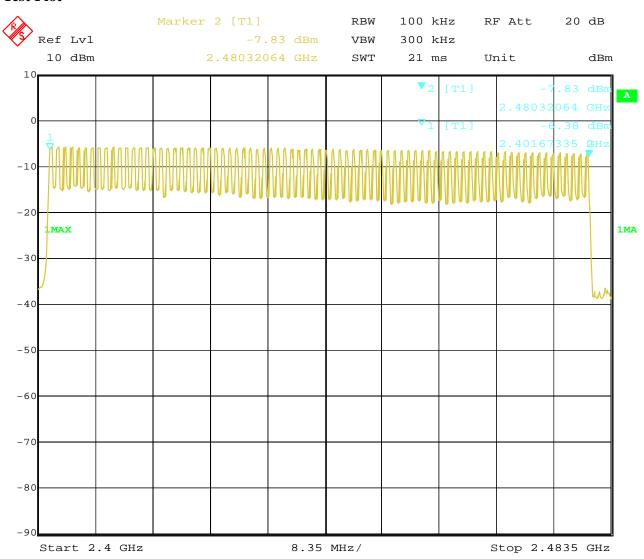


#### 10.4Test Result

#### Type of Modulation: GFSK

EUT	Speaker		Model	MP009CI	
Mode	Hopping On		Input Voltage	DC3.7V	
Temperature	24 deg. C,		Humidity	56% RH	
Operating Frequency		Number of hopping channels		Limit	Pass/ Fail
2402-2480MHz		79		≥ 15	Pass

#### **Test Plot**



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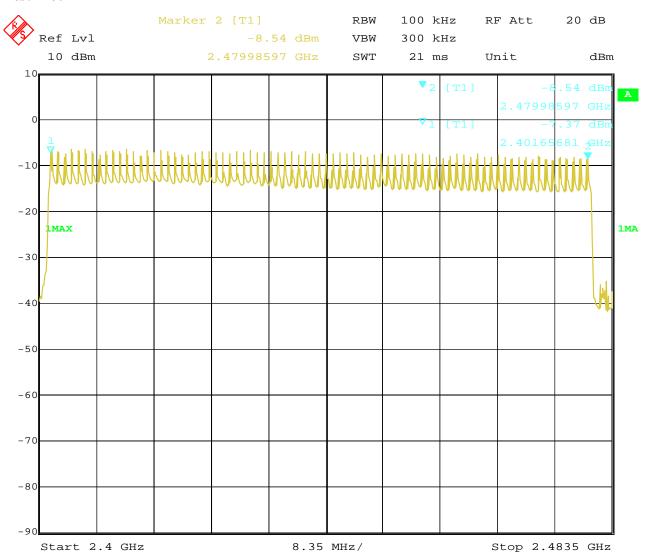
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#### Type of Modulation: $\sqrt{J/4DQPSK}$

EUT	Speaker		Model	I	MP009CI
Mode	Hopping On		Input Voltage	DC3.7V	
Temperature		24 deg. C,	Humidity	56% RH	
Operating Frequency		Number of hopping channels	Limit		Pass/ Fail
2402-2480MHz		79	≥ 15		Pass

#### **Test Plot**



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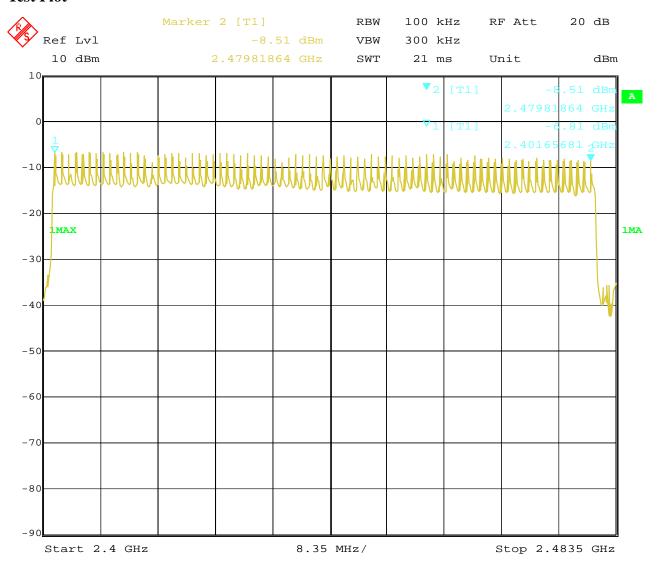
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### **Type of Modulation: 8DPSK**

EUT	Speaker		M	odel		MP009CI
Mode	Hopping On		Input	Voltage		DC3.7V
Temperature	24 deg. C,		Humi	dity	56% RH	
Operating Frequency		Number of hopping channels	ng	Liı	mit	Pass/ Fail
2402-2480MHz		79		≥ 15		Pass

#### **Test Plot**



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### 11. Time of Occupancy (Dwell Time)

#### 11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

#### 11.2 Limits of Carrier Frequency Separation

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

#### 11.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold
- 3. Measure the dwell time using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.
- 5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

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#### 11.4 Test Result

Type of Modulation: GFSK

EUT	Sp	Speaker		MP009CI			
Mode	Keep Tı	Keep Transmitting		120V~			
Temperatur	re 24 o	leg. C,	Humidity	5	66% RH		
Channel	Reading	Hoping	g Rate	Actual	Limit		
DH5							
Low	3.006ms	266.667	266.667 hop/s		0.4s		

Actual = Reading  $\times$  (Hopping rate / Number of channels)  $\times$  Test period, Test period = 0.4 [seconds / channel]  $\times$  79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 $\mu$ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

Note: DH5 was the worst case.

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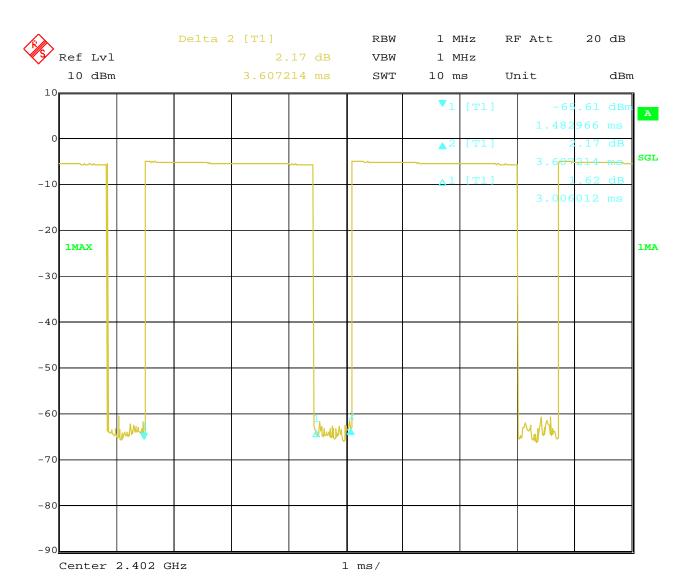
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Test Plots:

DH5



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### **Test Result**

Type of Modulation: Л/4DQPSK

<u> </u>							
EUT	Sp	Speaker		MP009CI			
Mode	Keep Tr	Keep Transmitting		120V~			
Temperatur	e 24 d	leg. C,	Humidity	5	56% RH		
Channel	Reading	Hoping	g Rate	Actual	Limit		
DH5							
Middle	3.006ms	266.667 hop/s		0.321s	0.4s		

Actual = Reading  $\times$  (Hopping rate / Number of channels)  $\times$  Test period, Test period = 0.4 [seconds / channel]  $\times$  79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 $\mu$ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

Note: 2DH5 was the worst case.

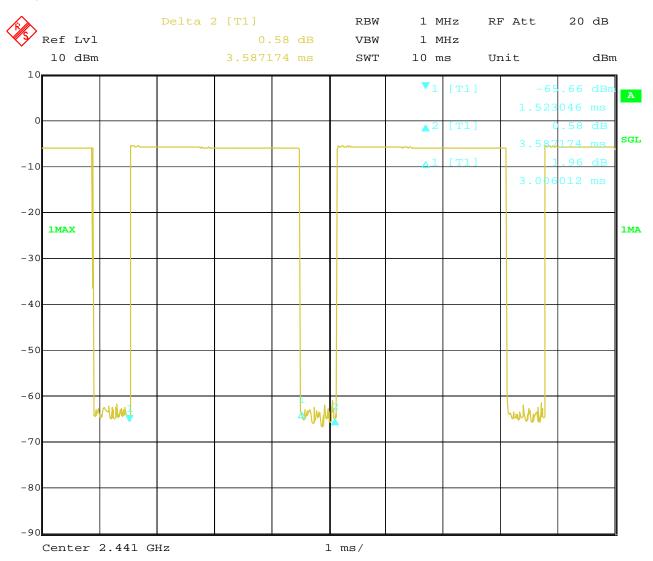
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Test Plots:

#### **2DH5**



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#### Type of Modulation: 8DPSK

EUT	Sp	Speaker		MP009CI			
Mode	Keep Tr	Keep Transmitting Input		120V~			
Temperatur	re 24 c	leg. C,	Humidity	56% RH			
Channel	Reading	Hoping	g Rate	Actual	Limit		
	DH5						
High	3.026ms	266.667 hop/s		0.323s	0.4s		

Actual = Reading  $\times$  (Hopping rate / Number of channels)  $\times$  Test period, Test period = 0.4 [seconds / channel]  $\times$  79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 $\mu$ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

Note: 3DH5 was the worst case.

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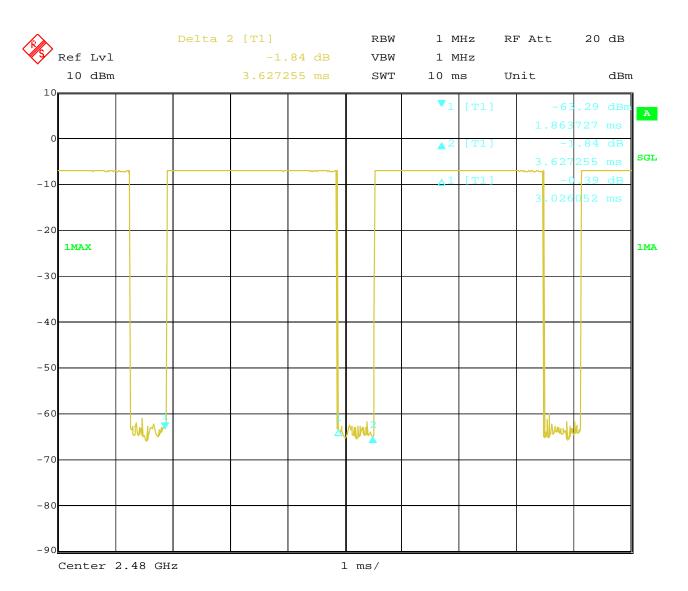
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Test Plots:

#### **3DH5**



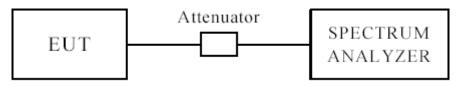
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## 12 Out of Band Measurement

## 12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

#### 12.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

#### 12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector.

For bandage test, the spectrum set as follows: RBW=100 kHz, VBW=300 kHz. A conducted measurement used

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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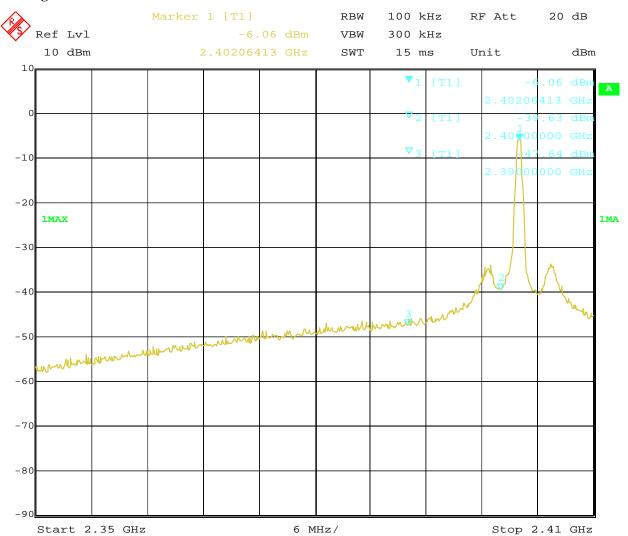
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#### Type of Modulation: GFSK

#### Band Edge Test Result 12.4

Product:	Speaker	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC3.7V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK



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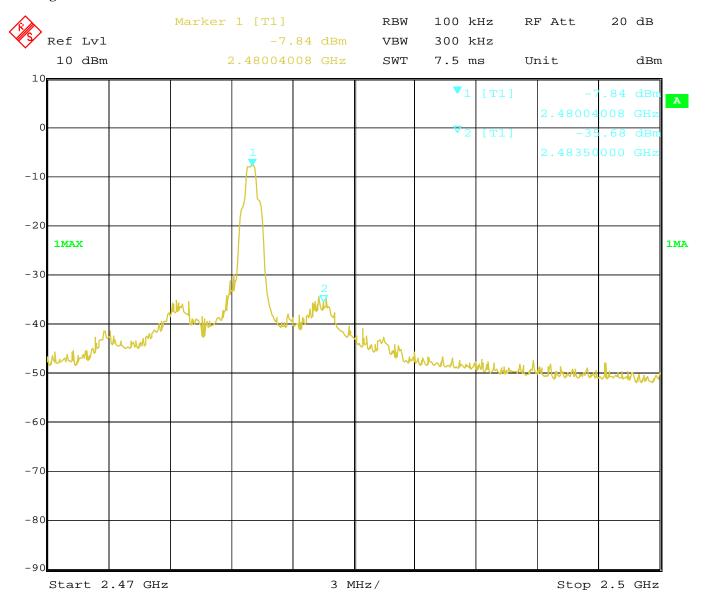
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### Type of Modulation: GFSK

#### 12.4 Band Edge Test Result

Product:	Speaker	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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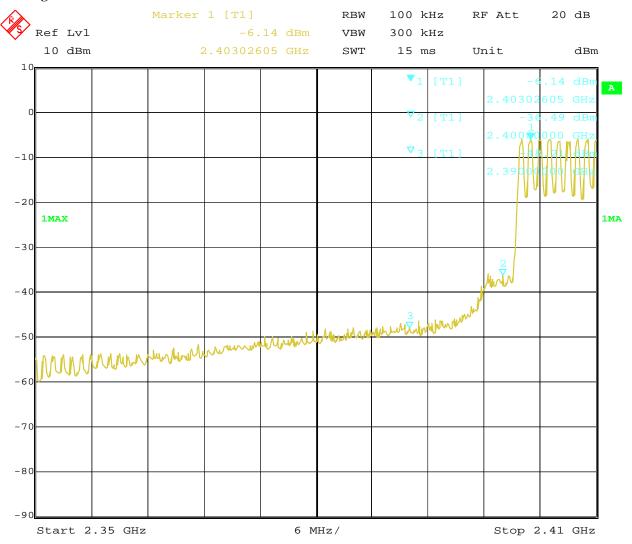
Date: 2019-11-05



### Type of Modulation: GFSK

## Band Edge Test Result

Product:	Speaker	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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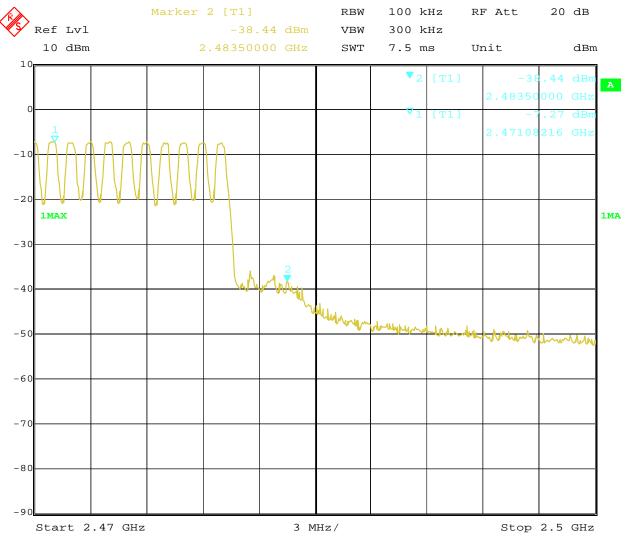
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#### Type of Modulation: GFSK

## Band Edge Test Result

Product:	Speaker	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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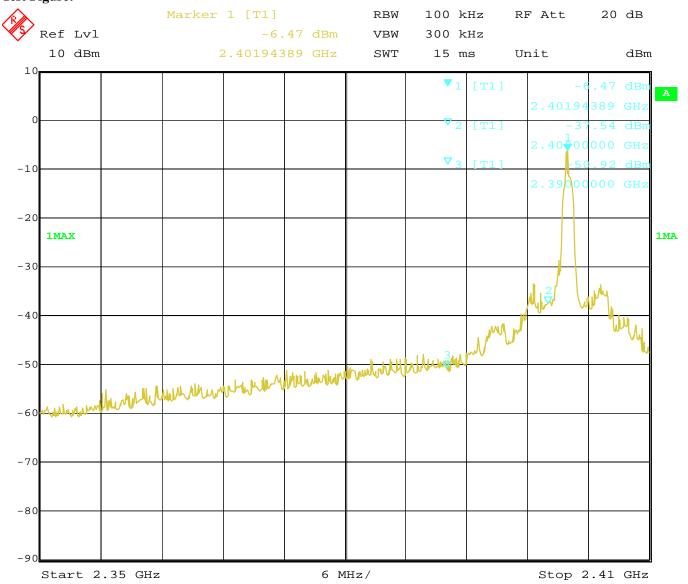
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### Type of Modulation: Л/4DQPSK

#### 12.4 Out of Band Test Result

Product:	Speaker	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC3.7V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK



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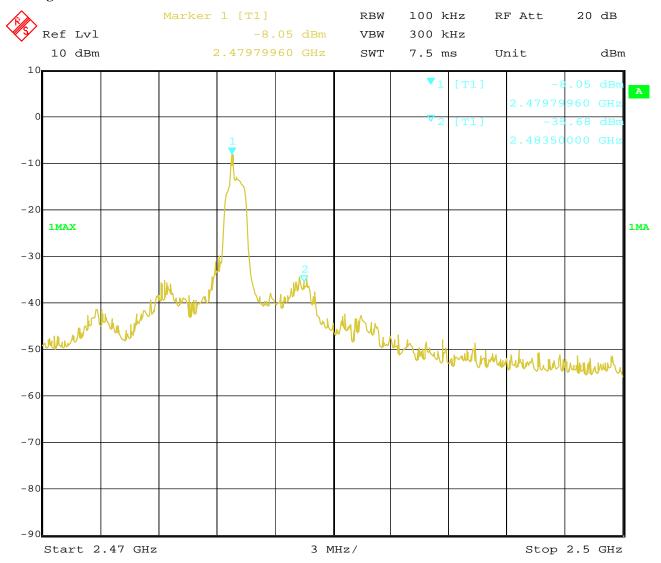
Date: 2019-11-05



#### Type of Modulation: Л/4DQPSK

#### Band Edge Test Result 12.4

Product:	Speaker	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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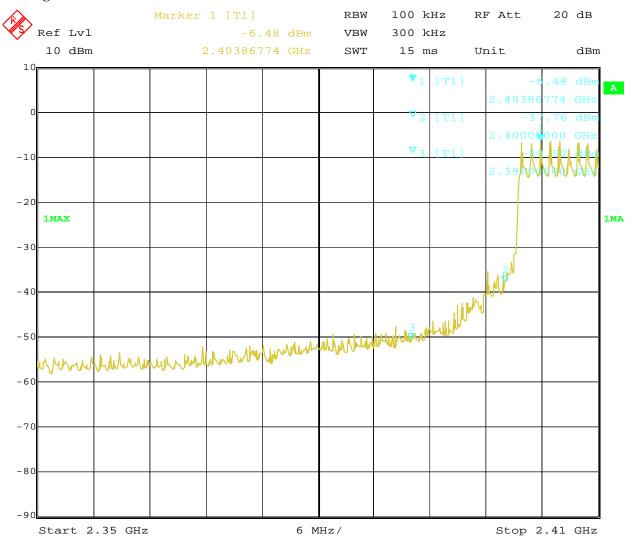
Date: 2019-11-05



### Type of Modulation: Л/4DQPSK

#### 12.4 Out of Band Test Result

Product:	Speaker	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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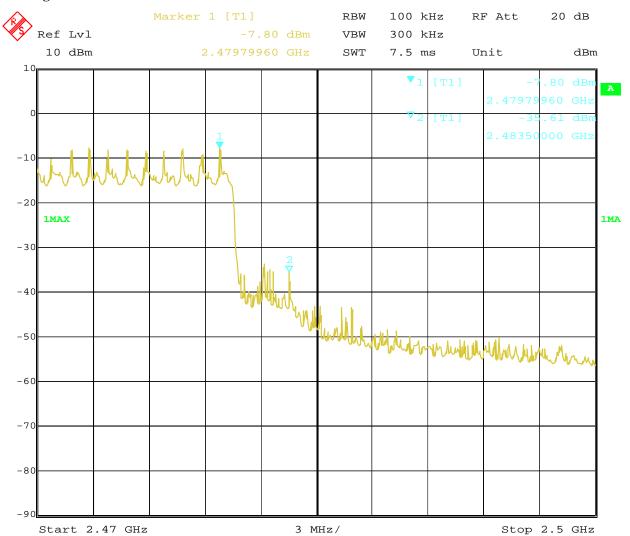
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### Type of Modulation: Л/4DQPSK

## Out of Band Test Result

Product:	Speaker	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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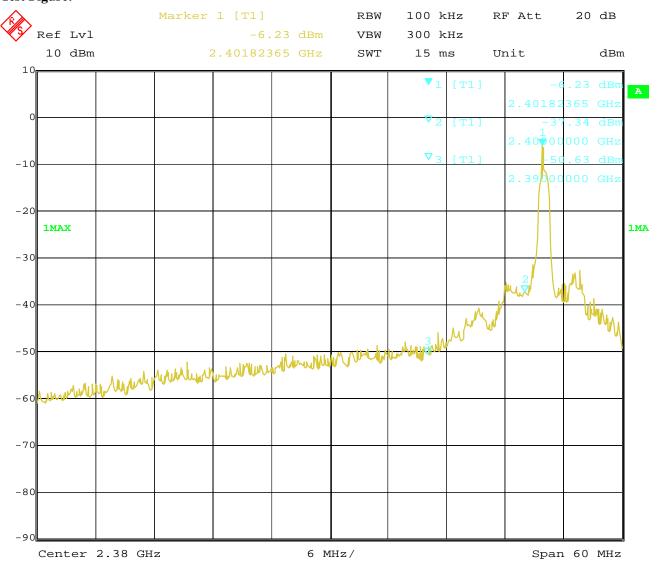
Date: 2019-11-05



#### **Type of Modulation: 8DPSK**

#### 12.4 Band Edge Test Result

Product:	Speaker	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC3.7V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK



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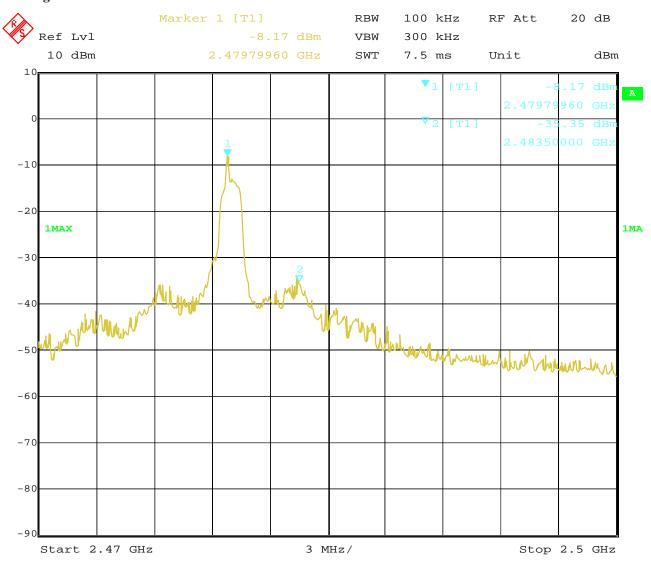
Date: 2019-11-05



#### **Type of Modulation: 8DPSK**

#### Band Edge Test Result 12.4

Product:		Speaker	Test Mode:	High Channel
Mode	Kee	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	PK
The Max. FS in	PK (dBμV/m)	44.8		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2483.5MHz				



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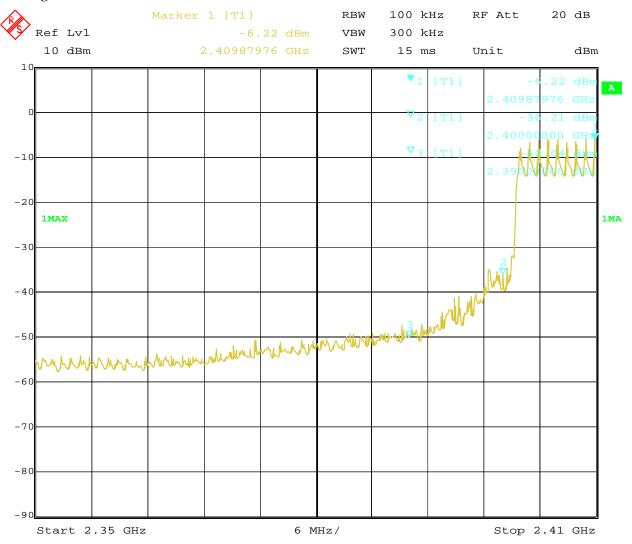
Date: 2019-11-05



#### **Type of Modulation: 8DPSK**

## Band Edge Test Result

Product:	Speaker	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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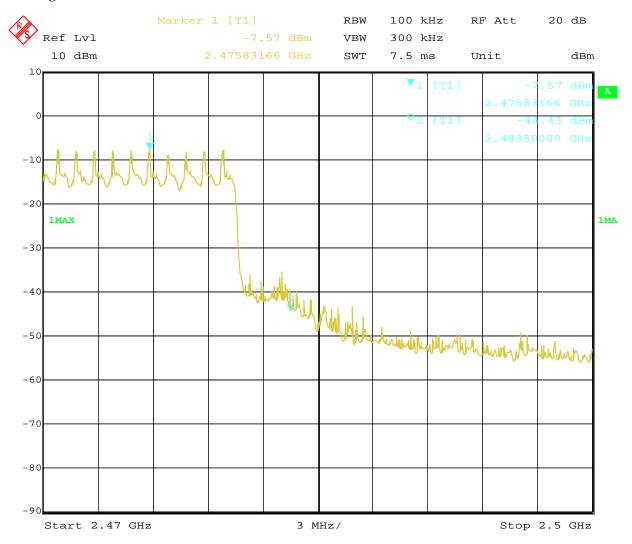
Date: 2019-11-05



#### **Type of Modulation: 8DPSK**

## Band Edge Test Result

Product:	Speaker	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK



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#### 12.4 Restrict Band Measurement

	EUT		Spea	ıker		Mode	el		MP009	9CI		
	Mode	Keep Transmitting Input Voltage		Keep Transmitting		Keep Transmitting Input Voltage		Keep Transmitting Input Voltage		1		7V
Ter	nperature	ure 24 deg. C, Humidity					56% F	RH				
Test Result:			Pa	SS	N	Modulation	n Type		GFSI	K		
	5B Class B 1GHz-18GH:	z - 2			•							
80-									/h-			
70-								/				
60-								$ \frown                                   $		\		
60- 100- 100- 100- 100- 100- 100- 100- 1												
40-	والمراجعة	والمرادية المعاللة والمراددة	an dha da da dhalan	le ludart vidle del palacide	Nagorija ca jela produkturalna je							
30-			Hilliam to make Labba	A CANADA MARIENTA DE LA CANADA D	tikan jajalita ja ja sai mpa ke tajai nya mat	हरनाम्यकारम्	100			निर्म		
30- 2360					Frequency (N	1Hz)						
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict		
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)				
1**	2400	43.83	-3.57	54.0	-10.17	AV	264.00	100	Н	Pass		
1	2400	66.61	-3.57	74.0	-7.39	Peak	264.00	100	Н	Pass		
	2390	46.99	-3.53	54.0	-7.01	Peak	204.00	100	Н	Pass		

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#### 12.4 Restrict Band Measurement

	EUT		Spea	ker		Model		M	P009CI	
	Mode	K	eep Tran	smitting	Inp	ut Voltage		Г	C3.7V	
Te	mperature	re 24 deg. C, Humidity			56% RH					
Te	st Result:		Pas	SS	Modu	ulation Typ	е	(	GFSK	
	5B Class B 1GHz-18GHz	z - 2								
90-										
80-										
								/	Any	
70-										
<del>-</del> 60-										
<u>.</u>										
n/(dBu//n										
(m//ng/m)						ldil				
			1.1	Accordance	. A rahir say a rahiri					Malan II.
س/مgpn اوموا (dgnn/س					4.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00					
40-		atifikasikan istorikan kanga		Water Charles	i indiana kana kana kana kana kana kana kana					Work of the Land o
					Frequency (MHz			N		would be born on the
40-	Frequency	Results	Factor	Limit	Frequency (MHz	Detector	Table (o)	Height	ANT	Verdict
30- 2360	ı		Factor (dB)		1	T	Table (o)	Height (cm)	ANT	1
30- 2360	Frequency	Results (dBuV/m)		Limit (dBuV/m)	Over Limit	T	Table (o)	_	ANT	1
30- 2360	Frequency				Over Limit	T	Table (o)	_	ANT	1
30- 2360	Frequency (MHz)	(dBuV/m)	(dB)	(dBuV/m)	Over Limit (dB)	Detector		(cm)		Verdict

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#### 12.4 Restrict Band Measurement

	EUT		Spea	ker		Mod	el		MP009	CI	
	Mode	k	Keep Transmitting			Input Voltage		DC3.7V			
T	emperature		24 deg. C,			Humidity			56% RH		
Т	est Result:		Pass			Modulation Type			GFSK		
C Part	: 15B Class B 1GHz-:	8GHz - 2			•						
	90-										
	80-										
	70-										
	60-										
	50-										
	40-	darri di dibassari wa diki disabi wiki	What of water					the distribution of			
	30- <del> </del> 2460				Frequency (	2483.5 MHz)				2	
No.	Frequen	cy Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict	
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)			
1**	2483.5	37.43	-3.57	54.0	-16.57	AV	246.00	100	Н	Pass	
	2483.5	55.00	-3.57	74.0	-19.00	Peak	246.00	100	Н	Pass	

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#### 12.4 Restrict Band Measurement

	F	EUT		Spe	aker		Mod	el		MP0	09CI	
	N	Mode	Keep Transmitting				Input Voltage			DC3.7V		
,	Гетј	perature		24 deg. C,			Humidity		56% RH			
	Test Result:			Pass			Modulation Type			GFSK		
	art 15B .0E+2-	Class B 1GHz-18GH:	z - 2									
	90-											
	80-	10-										
	70-											
level (dBuV/m)	60-											
-												
level (	50-					$\sqrt{}$						
level (	50-	had he had white	alishadilah da dilapinah	filosop dajiba	AND THE RESERVE OF THE PERSON		land, so				lapitiya ji kirinda ayak da	
) level		oo oo	distantial de distantial de la constantial de la	This way the state of the state	A STATE OF THE STA	Frequence	2483.5 y (MHz)				hadilika ja	
No	40- 30- 246	Frequency	Results	Factor	Limit	Frequency Over Limit		Table (o)	Height	ANT	Verdict	
	30- 246		Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	1	y (MHz)	Table (o)	Height (cm)	ANT		

Note: For Restricted band test, only the worst case was reported.

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### 13.0 Antenna Requirement

### 13.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 13.2 Antenna Connected constructions

PCB antenna used. The gain of the antennas is 0.58dBi.

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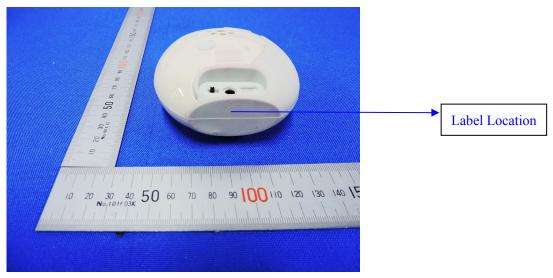


#### 14.0 FCC ID Label

#### FCC ID: 2AU43-MOJI

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

#### **Mark Location:**



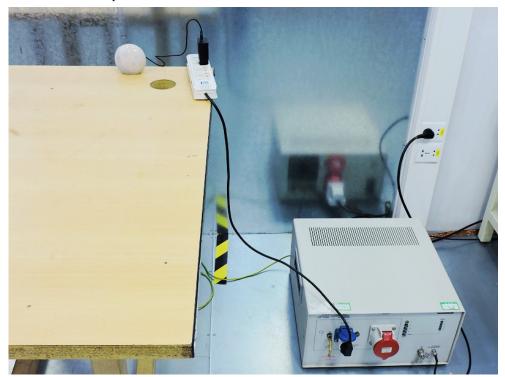
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#### **15.0** Photo of testing

Conducted Emission Test Setup:



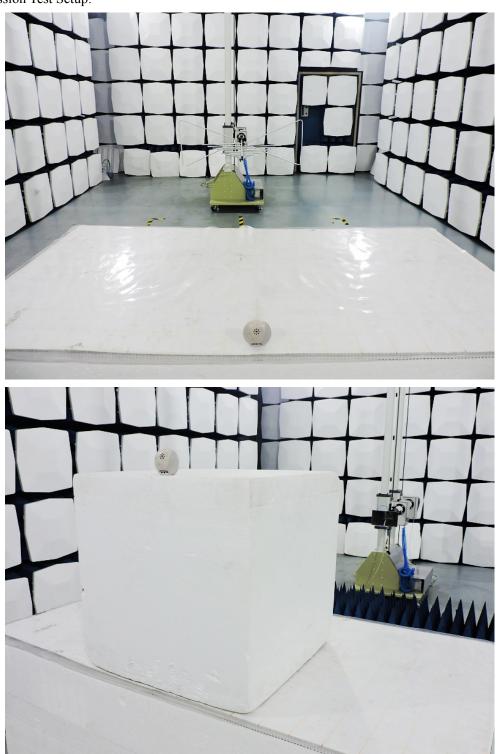
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## Radiated Emission Test Setup:



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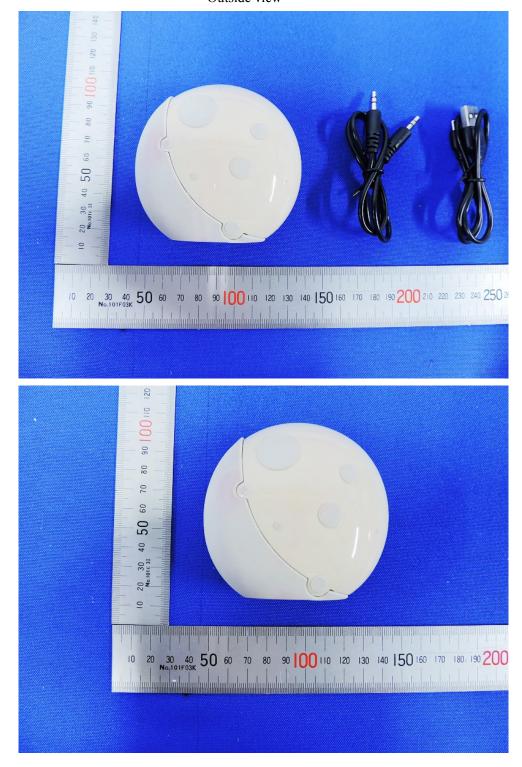
adopt any other remedies which may be appropriate.

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## Photographs - EUT

Outside view



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Outside view





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Outside view



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Outside view



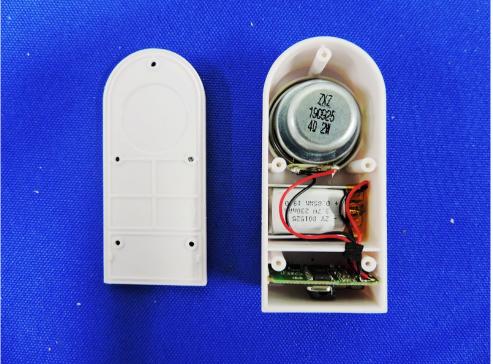
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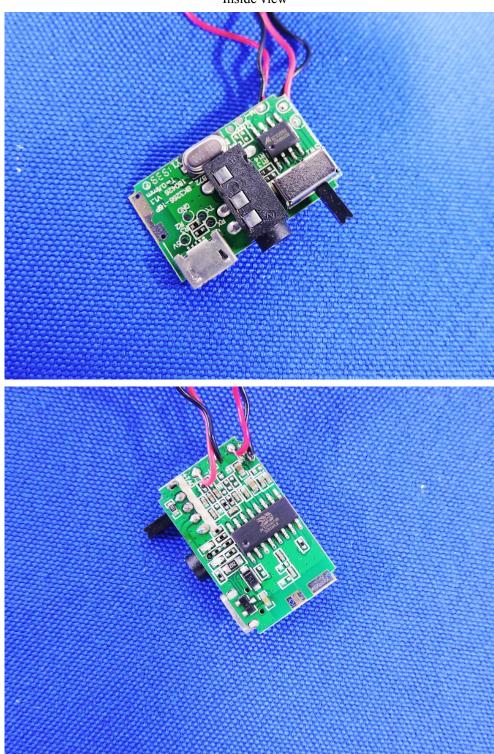
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Inside view



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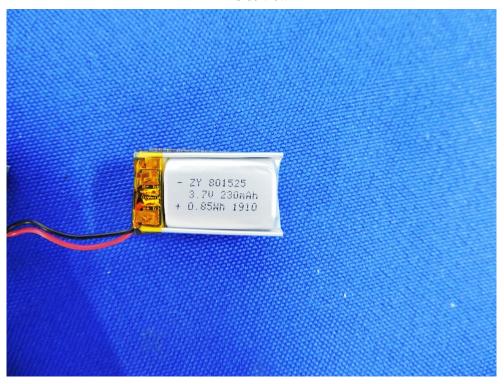
adopt any other remedies which may be appropriate.

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Inside view



-- End of Report--