APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Wizard Creation Inc

Speaker

Model No.: S10

FCC ID: 2AV8N-S10

Prepared for	:	Wizard Creation Inc
Address	:	2765 W CYPRESS CREEK RD. SUITE B, FORT LAUDERDALE, FL 33309-1747 USA
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Report No.	:	ATE20200393
Date of Test	:	April 23, 2020-April 28, 2020
Date of Report	:	April 29, 2020

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Test Report Certification

Applicant	:	Wizard Creation Inc
Address	:	2765 W CYPRESS CREEK RD. SUITE B, FORT LAUDERDALE, FL 33309-1747 USA
Manufacturer	:	Lovo consulting limited
Address	:	Xianqi Street, Wuzhong district, Suzhou, Jiangsu Province, China
Product	:	Speaker
Model No.	:	S10
Trade name	:	N/A

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

The device described above is tested by SHENZHEN ACCURATE TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and SHENZHEN ACCURATE TECHNOLOGY CO., LTD. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of SHENZHEN ACCURATE TECHNOLOGY CO., LTD.

Date of Test : April 23, 2020--April 28, 2020
Date of Report : April 29, 2020

Prepared by :

(Tin Zhang, Engineer)

Approve & Authorized Signer :

(Martin Lü, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Speaker
Model Number	:	S10
Bluetooth version	:	BT V5.0
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	-0.58dBi
Antenna type	:	Integral Antenna
Trade Name	:	N/A
Rating	:	DC 3.7V (Powered by Battery) or DC 5V (Powered by adapter)
Modulation mode	:	GFSK, π/4 DQPSK
Applicant	:	Wizard Creation Inc
Address	:	2765 W CYPRESS CREEK RD. SUITE B, FORT LAUDERDALE, FL 33309-1747 USA
Manufacturer	:	Lovo consulting limited
Address	:	Xianqi Street, Wuzhong district, Suzhou, Jiangsu Province, China
Date of sample received	:	April 22, 2020
Date of Test	:	April 23, 2020-April 28, 2020

1.2.Accessory and Auxiliary Equipment

PC	Manufacturer: LENOVO M/N: 4290-RT8 S/N: R9-FW93G 11/08
Adapter	Manufacturer: N/A INPUT: 100-240V 50/60Hz OUTPUT: DC 12V 5A

1.3.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISEDC) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.4.Measurement Uncertainty

Conducted Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	=	2.72dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	2.66dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.28dB, k=2
Radiated emission expanded uncertainty (1G-18GHz)	=	4.98dB, k=2
Radiated emission expanded uncertainty (18G-26.5GHz)	=	5.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 04, 2020	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 04, 2020	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 04, 2020	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 04, 2020	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 04, 2020	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 04, 2020	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 04, 2020	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 04, 2020	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 04, 2020	1 Year
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 04, 2020	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 04, 2020	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 04, 2020	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 04, 2020	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 04, 2020	1 Year
RF Coaxial Cable (Conducted Emission)	SUHNER	N-2m	No.2	Jan. 04, 2020	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.3	Jan. 04, 2020	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.4	Jan. 04, 2020	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.5	Jan. 04, 2020	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.6	Jan. 04, 2020	1 Year
Conducted Emission Measurement Software: ES-K1 V1.71					
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode
Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz
Hopping

3.2.Configuration and peripherals

EUT

Figure 1 Setup: Transmitting mode

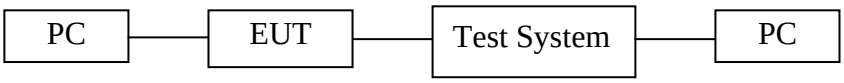
(EUT: Speaker)

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Conducted Emission Test	Compliant
Section 15.247(a)(1)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(a)(1)(iii)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(iii)	Dwell Time Test	Compliant
Section 15.247(b)(1)	Maximum Peak Output Power Test	Compliant
Section 15.247(d) Section 15.209	Radiated Emission Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: Speaker)

5.2.The Requirement For Section 15.247(a)(1)

Section 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.

5.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.

5.5.3.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

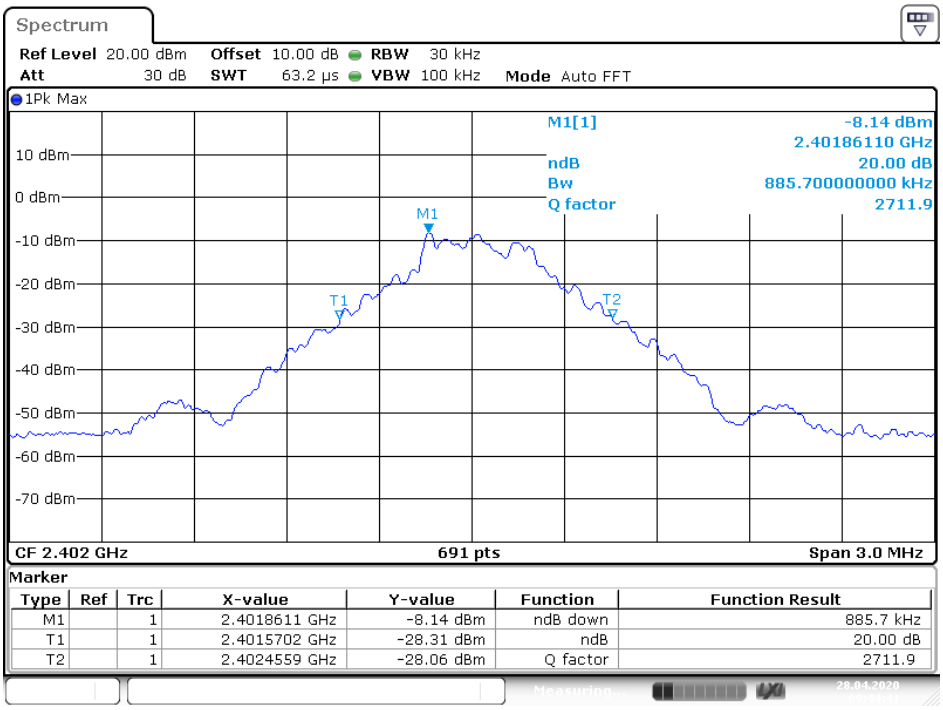
5.6.Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4 DQPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.8857	1.2764	Pass
Middle	2441	0.8857	1.2764	Pass
High	2480	0.8857	1.2851	Pass

The spectrum analyzer plots are attached as below.

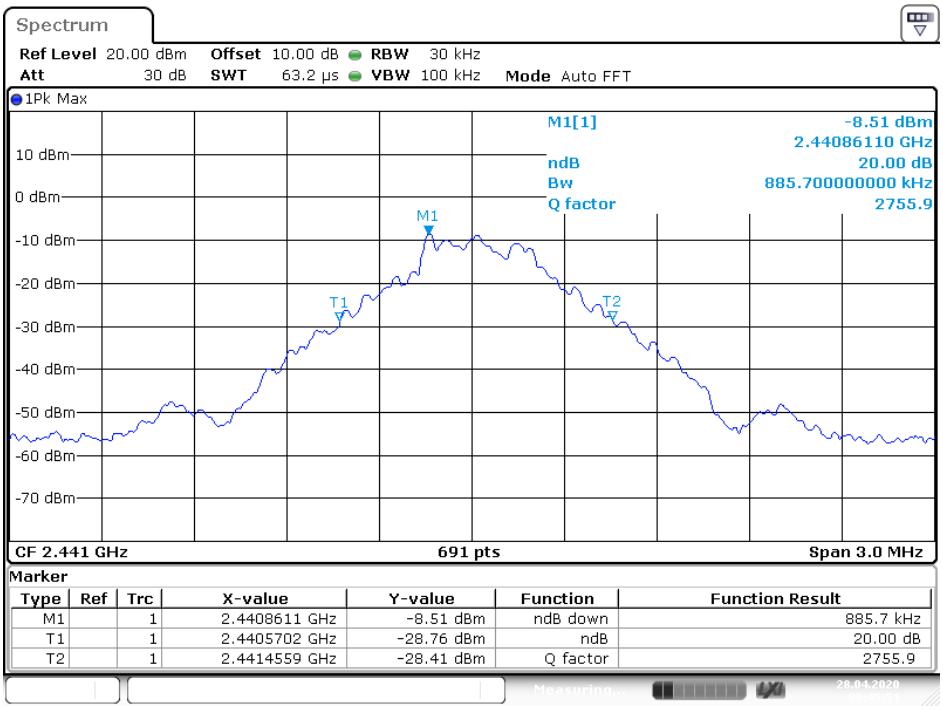
GFSK Mode

Low channel



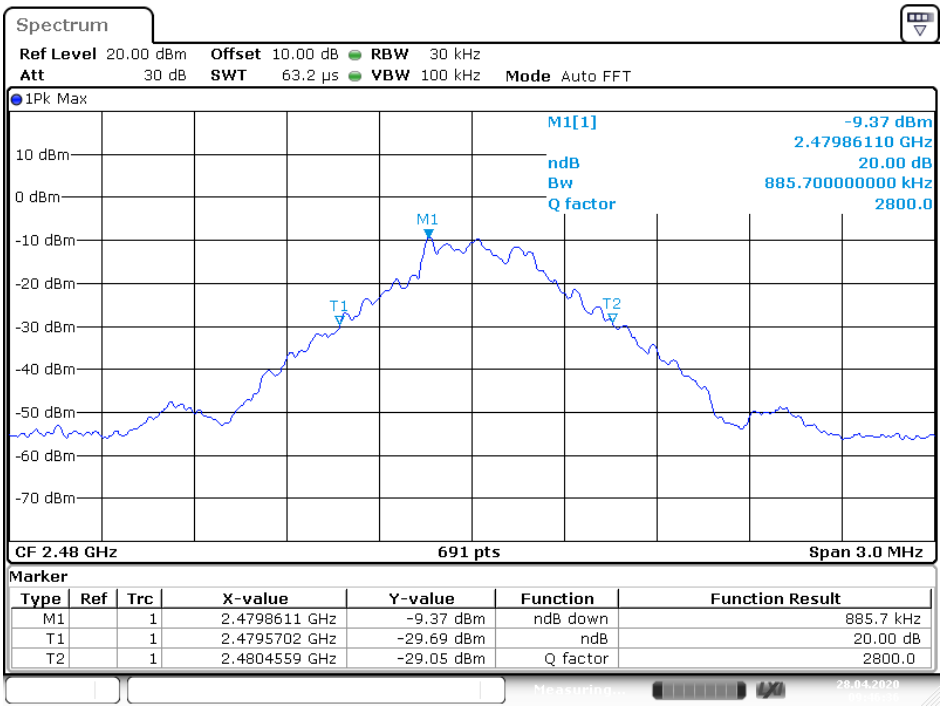
Date: 28.APR.2020 09:44:41

Middle channel



Date: 28.APR.2020 09:45:52

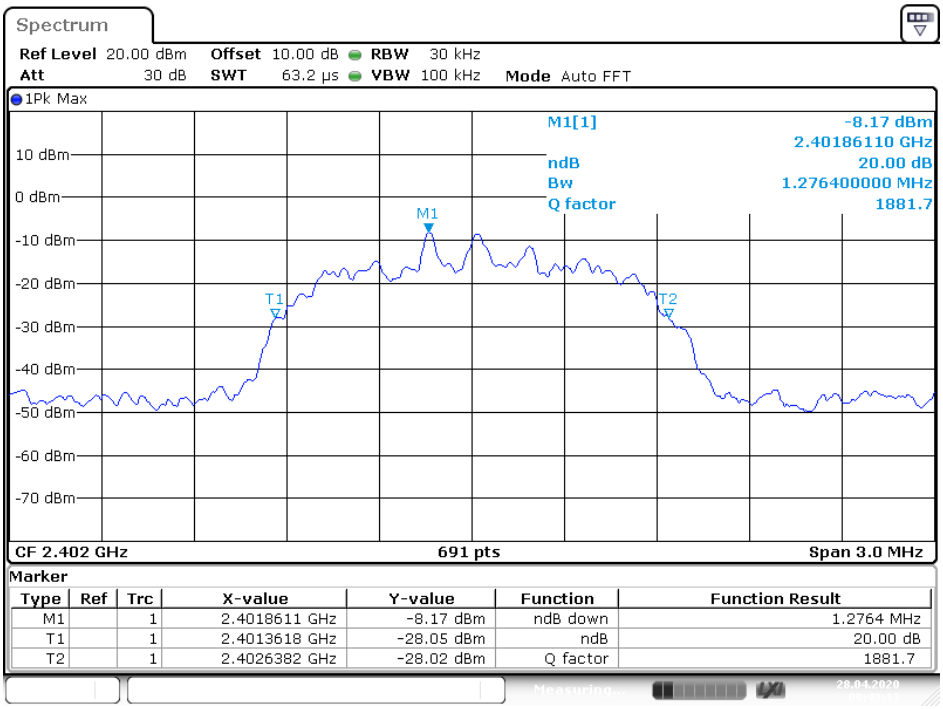
High channel



Date: 28.APR.2020 09:46:37

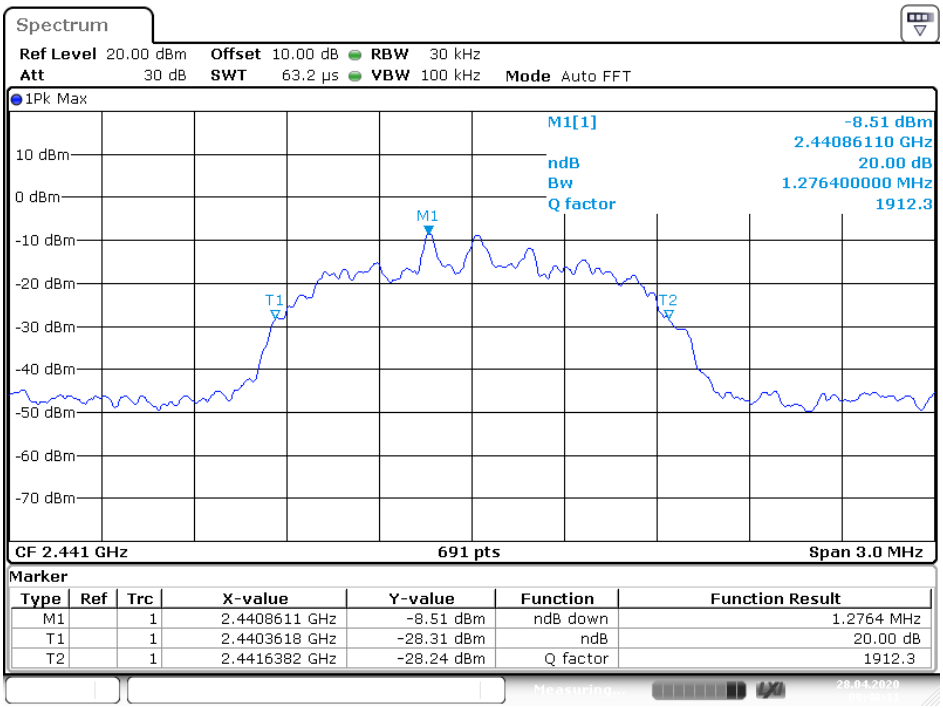
π /4 DQPSK Mode

Low channel



Date: 28.APR.2020 09:49:13

Middle channel

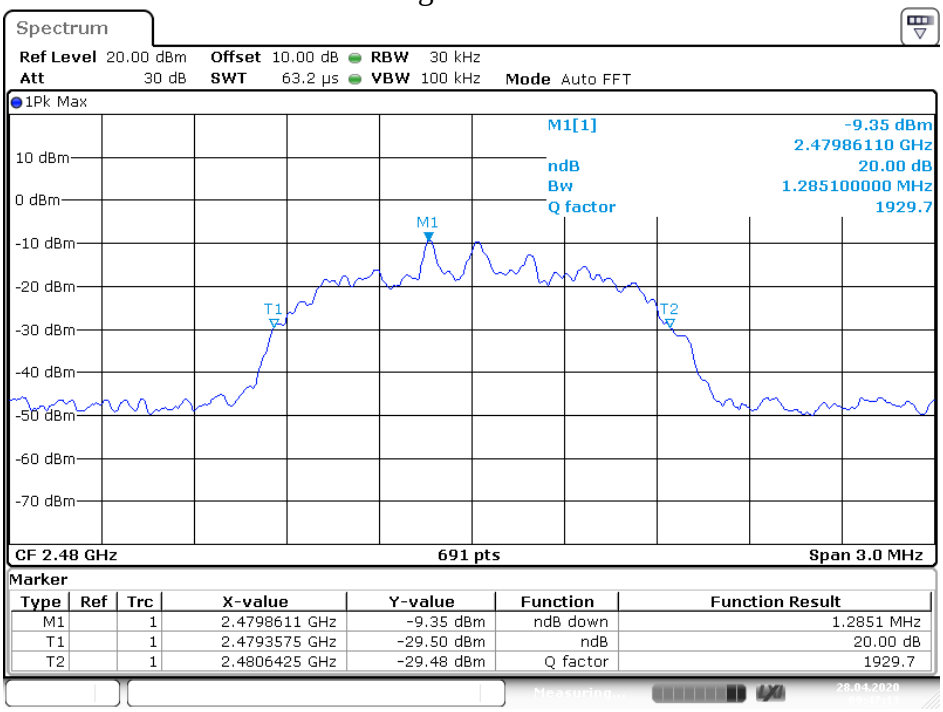


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4408611 GHz	-8.51 dBm	ndB down	1.2764 MHz
T1		1	2.4403618 GHz	-28.31 dBm	ndB	20.00 dB
T2		1	2.4416382 GHz	-28.24 dBm	Q factor	1912.3

Date: 28.APR.2020 09:48:11

High channel



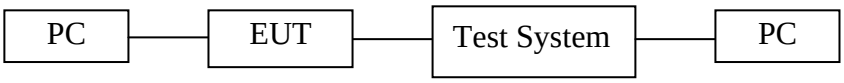
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4798611 GHz	-9.35 dBm	ndB down	1.2851 MHz
T1		1	2.4793575 GHz	-29.50 dBm	ndB	20.00 dB
T2		1	2.4806425 GHz	-29.48 dBm	Q factor	1929.7

Date: 28.APR.2020 09:47:14

6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: Speaker)

6.2.The Requirement For Section 15.247(a)(1)

Section 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 2MHz.

6.5.3.Set the adjacent channel of the EUT Maxhold another trace.

6.5.4.Measurement the channel separation

6.6.Test Result

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0029	25KHz or 0.590MHz	PASS
	2403			
Middle	2440	1.0029	25KHz or 0.590MHz	PASS
	2441			
High	2479	1.0029	25KHz or 0.590MHz	PASS
	2480			

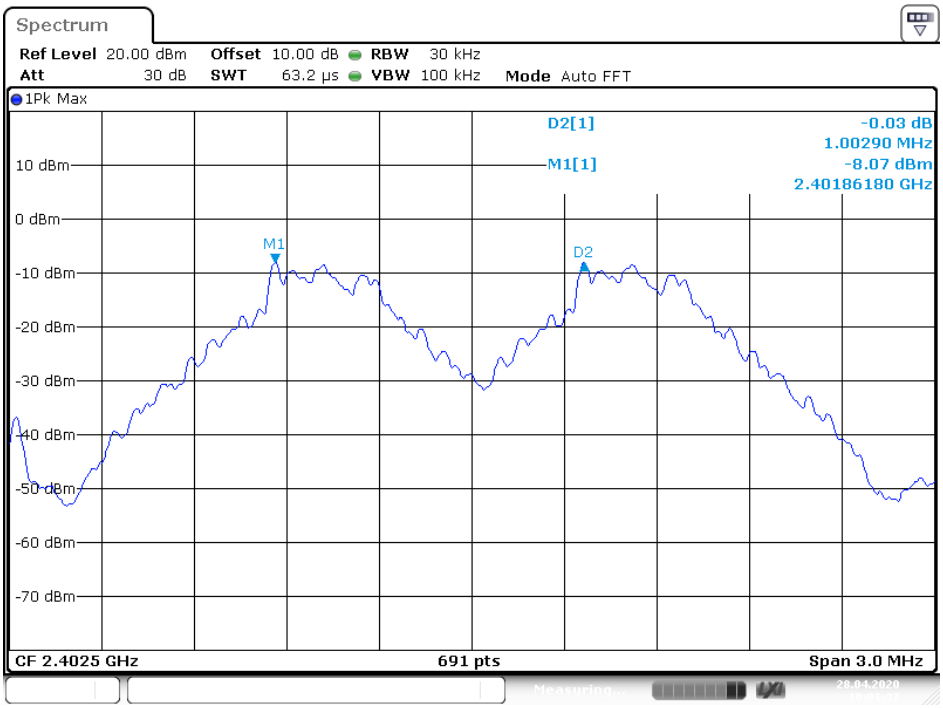
Π/4 DQPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0029	25KHz or 0.851MHz	PASS
	2403			
Middle	2440	1.0029	25KHz or 0.851MHz	PASS
	2441			
High	2479	1.0029	25KHz or 0.857MHz	PASS
	2480			

The spectrum analyzer plots are attached as below.

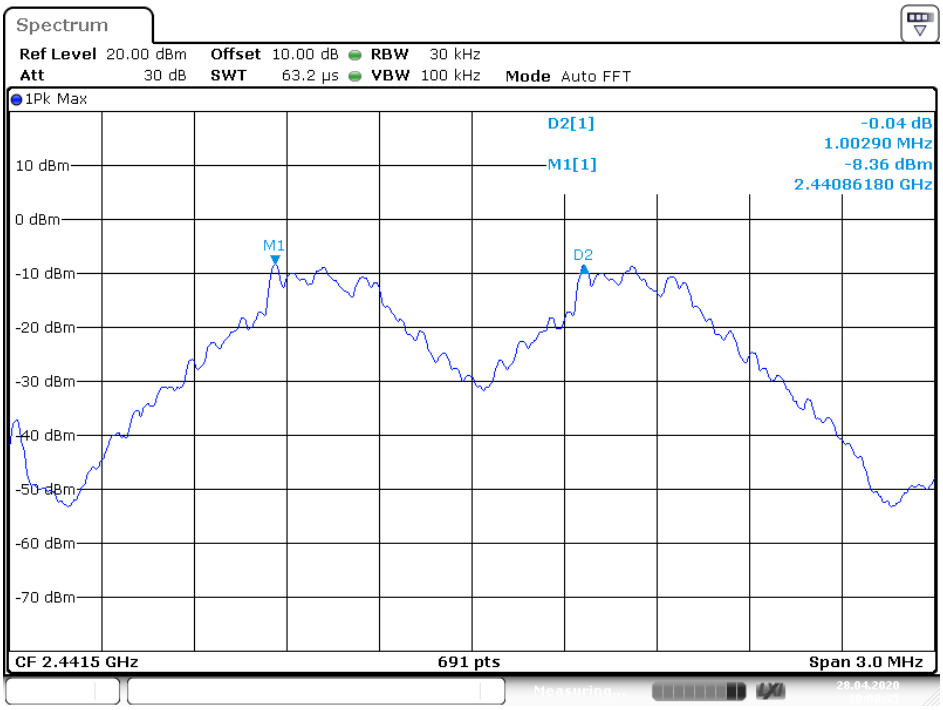
GFSK Mode

Low channel



Date: 28.APR.2020 10:01:37

Middle channel



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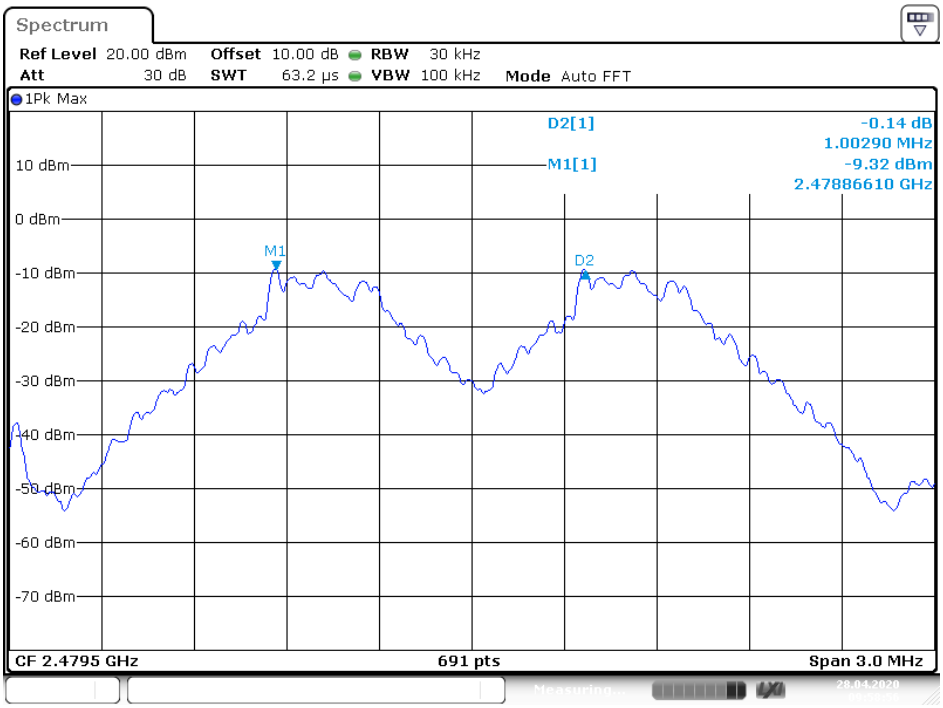
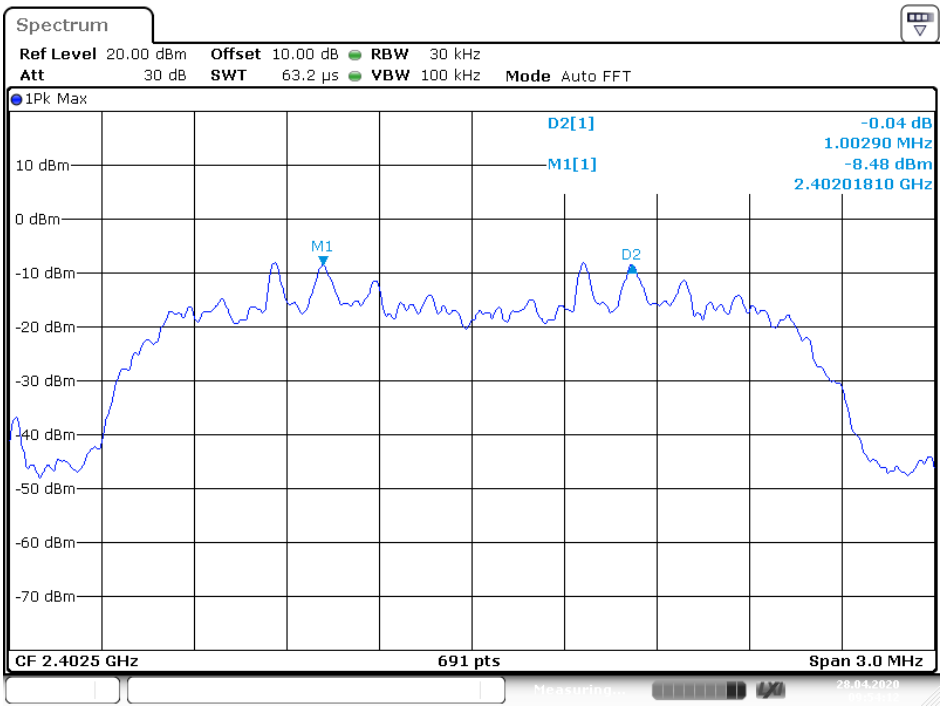
High channel



Date: 28.APR.2020 09:58:57

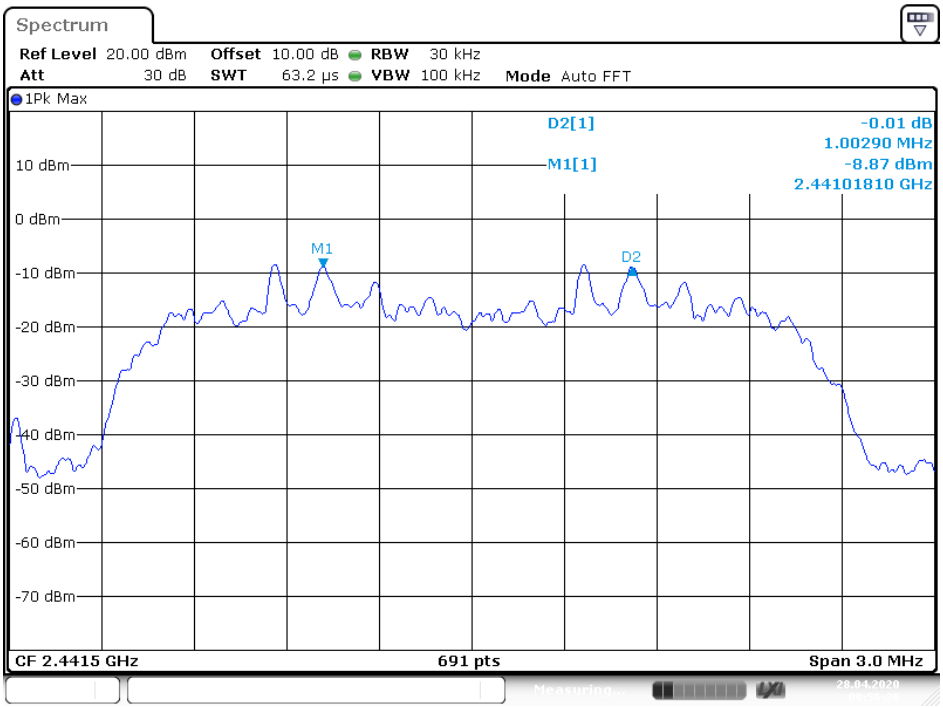
π /4 DQPSK Mode

Low channel



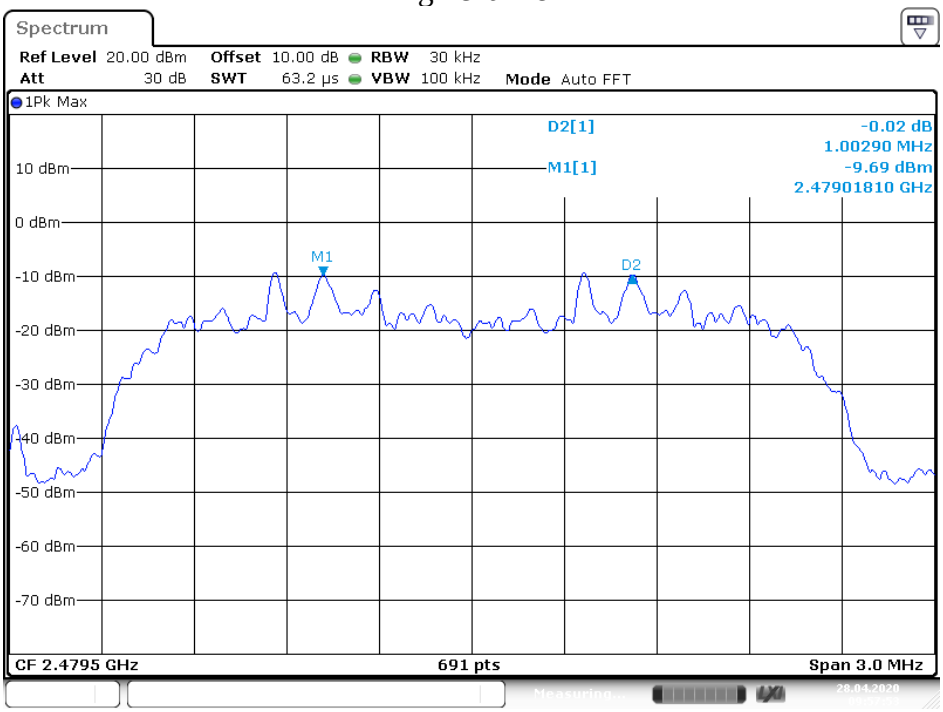
Date: 28.APR.2020 09:54:12

Middle channel



Date: 28.APR.2020 09:56:26

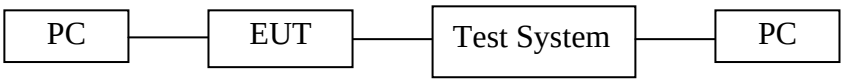
High channel



Date: 28.APR.2020 09:57:53

7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: Speaker)

7.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

7.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.

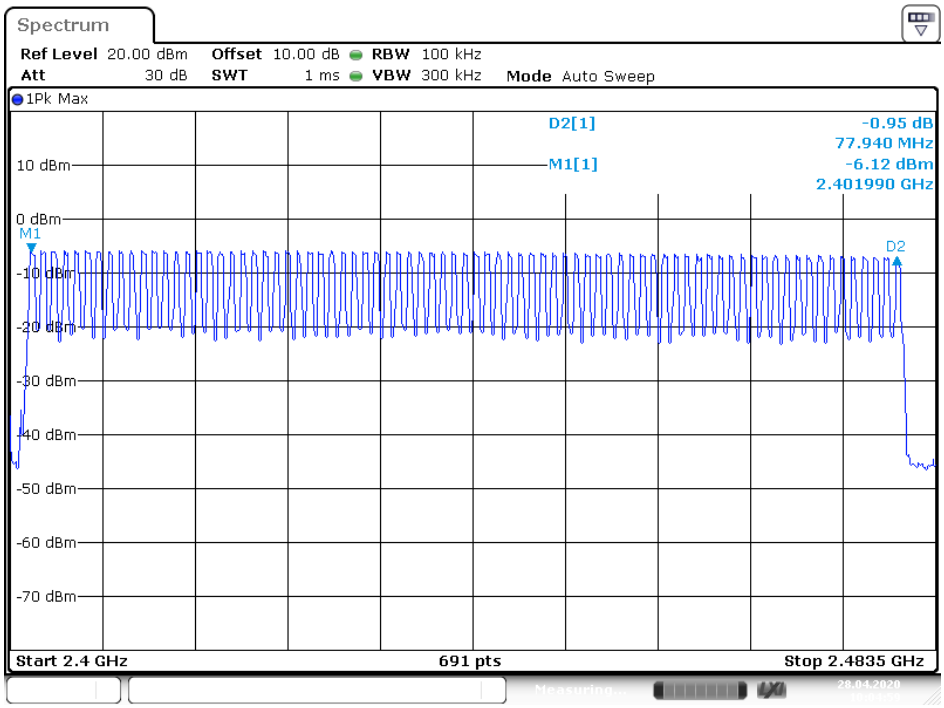
7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	≥ 15

The spectrum analyzer plots are attached as below.

Number of hopping channels(GFSK)



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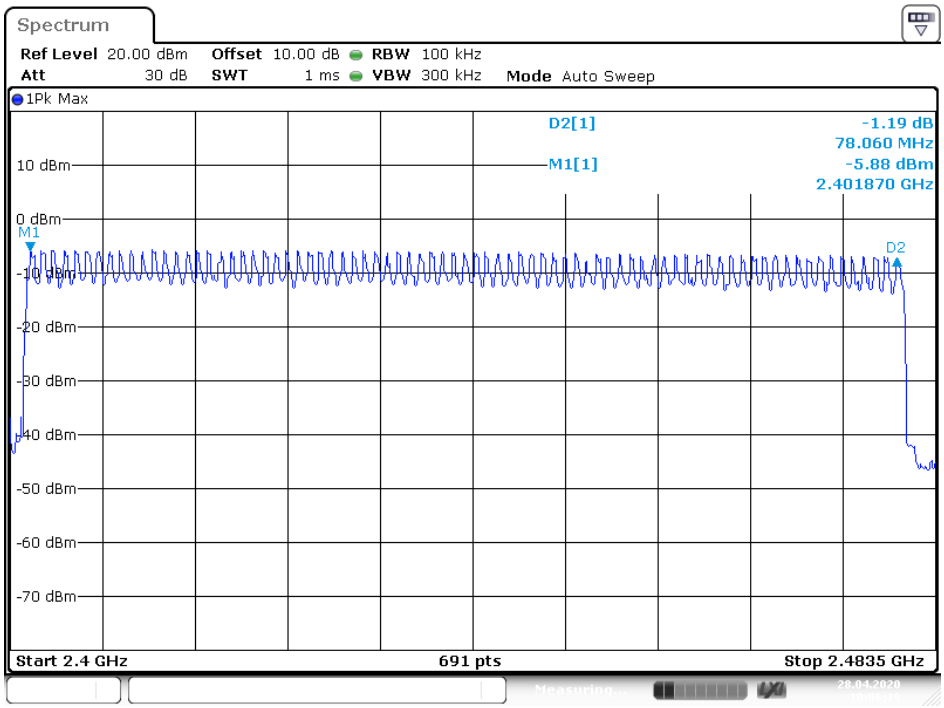
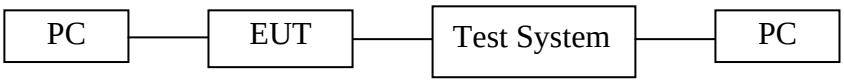
Number of hopping channels(π /4 DQPSK)



Date: 28.APR.2020 10:06:19

8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: Speaker)

8.2.The Requirement For Section 15.247(a)(1)(iii)

Section 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.

8.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

8.5.Test Procedure

8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2.Set center frequency of spectrum analyzer = operating frequency.

8.5.3.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.

8.5.4.Repeat above procedures until all frequency measured were complete.

8.6.Test Result

GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.3913	125.216	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2441	1.6667	266.672	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2441	2.9130	310.720	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

π /4 DQPSK

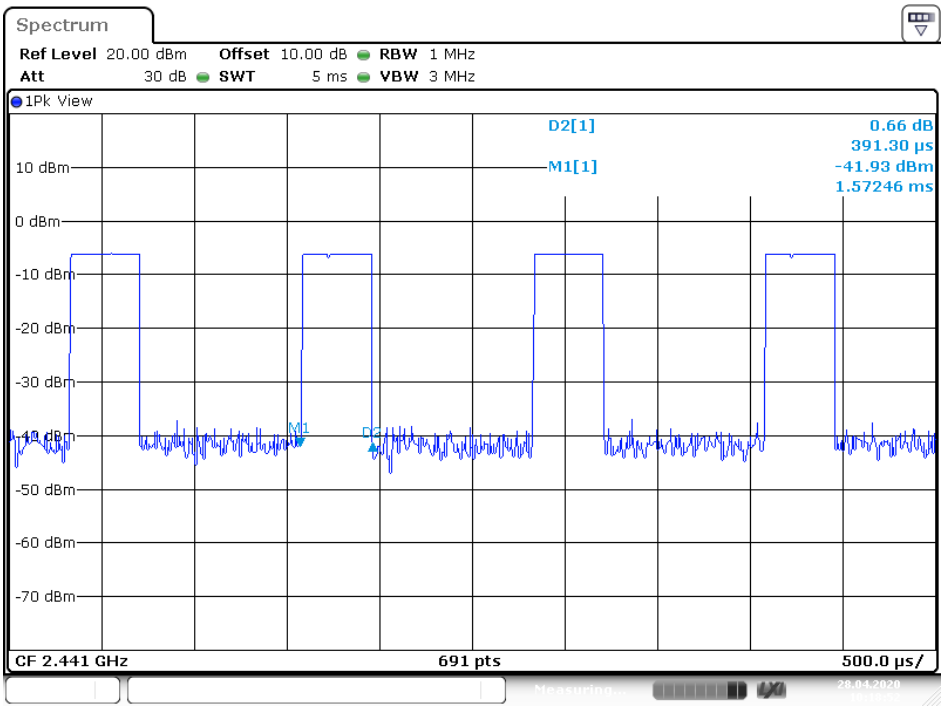
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
2DH1	2441	0.4058	129.856	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
2DH3	2441	1.6667	266.672	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
2DH5	2441	2.9348	313.045	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

Note: We tested GFSK mode and π /4 DQPSK mode and recorded the worst case data for all test mode.

The spectrum analyzer plots are attached as below.

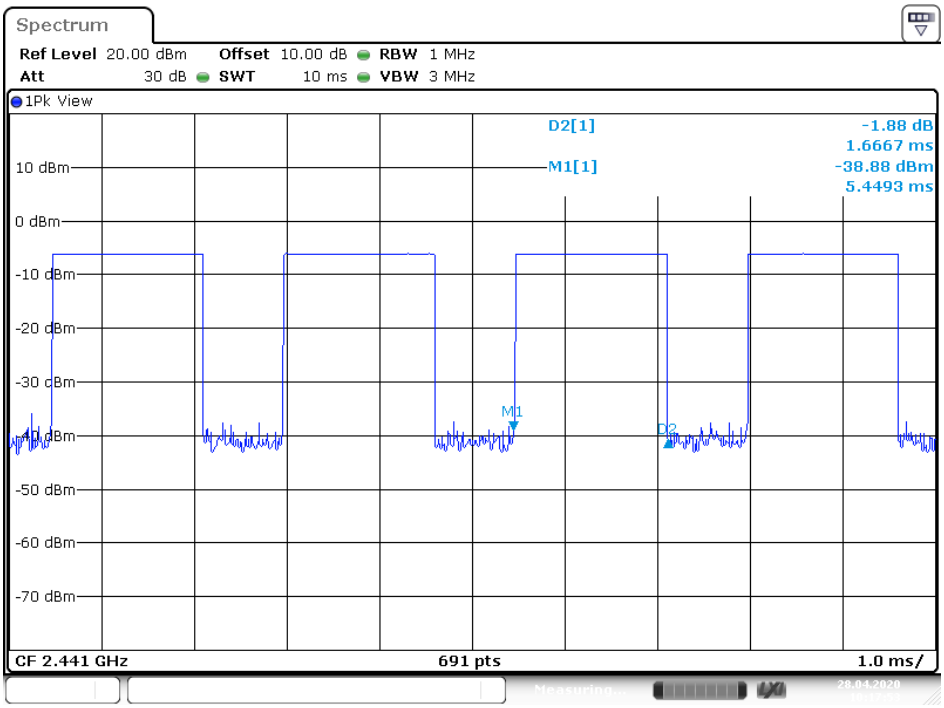
GFSK Mode

DH1 Middle channel



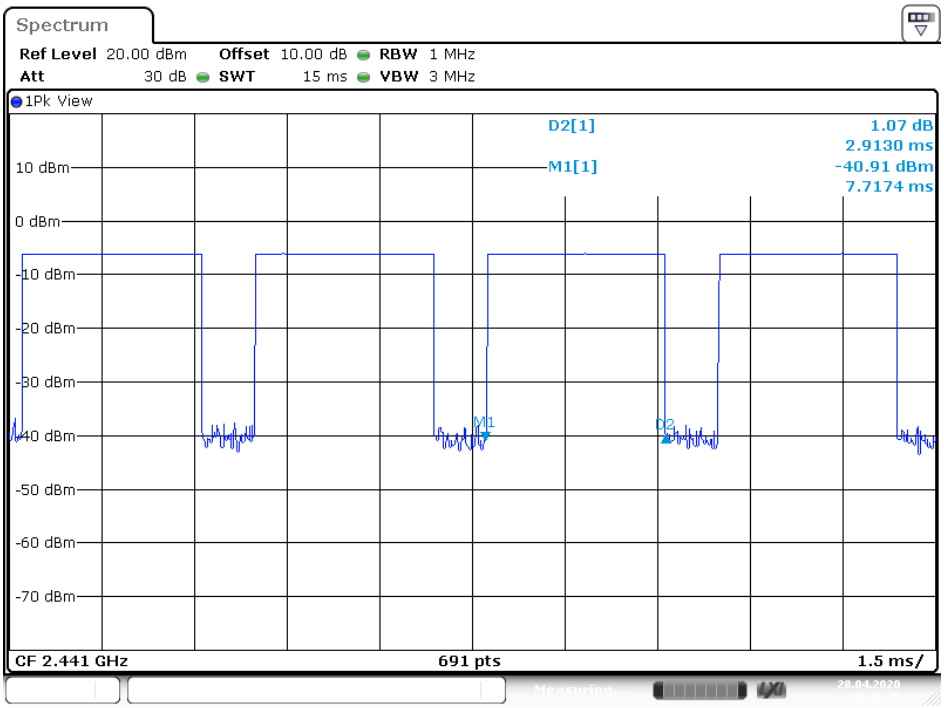
Date: 28.APR.2020 10:18:53

DH3 Middle channel



Date: 28.APR.2020 10:17:53

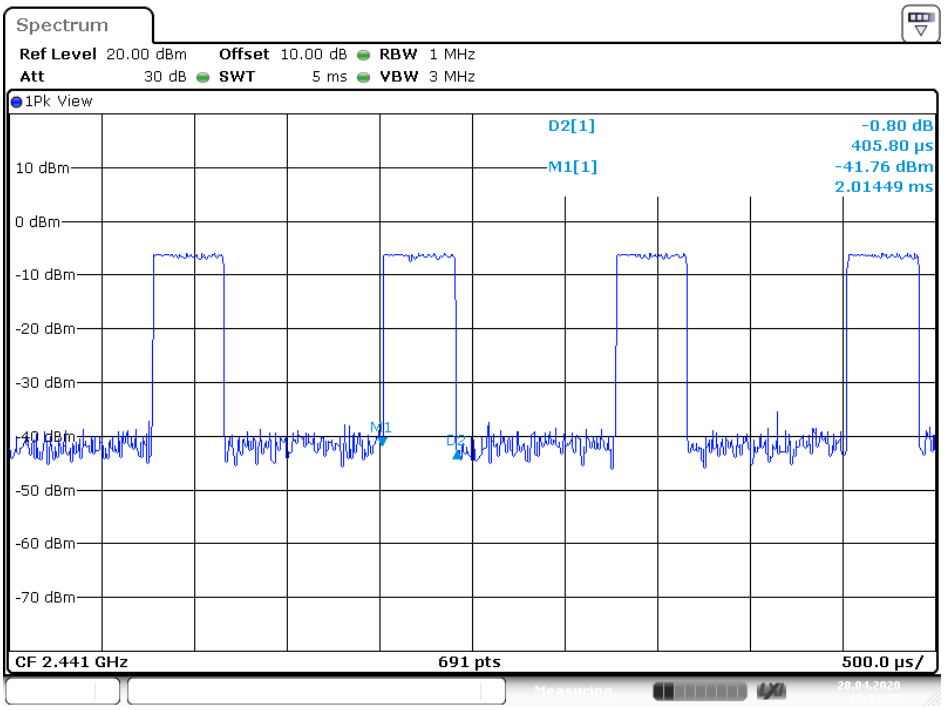
DH5 Middle channel



Date: 28.APR.2020 10:16:46

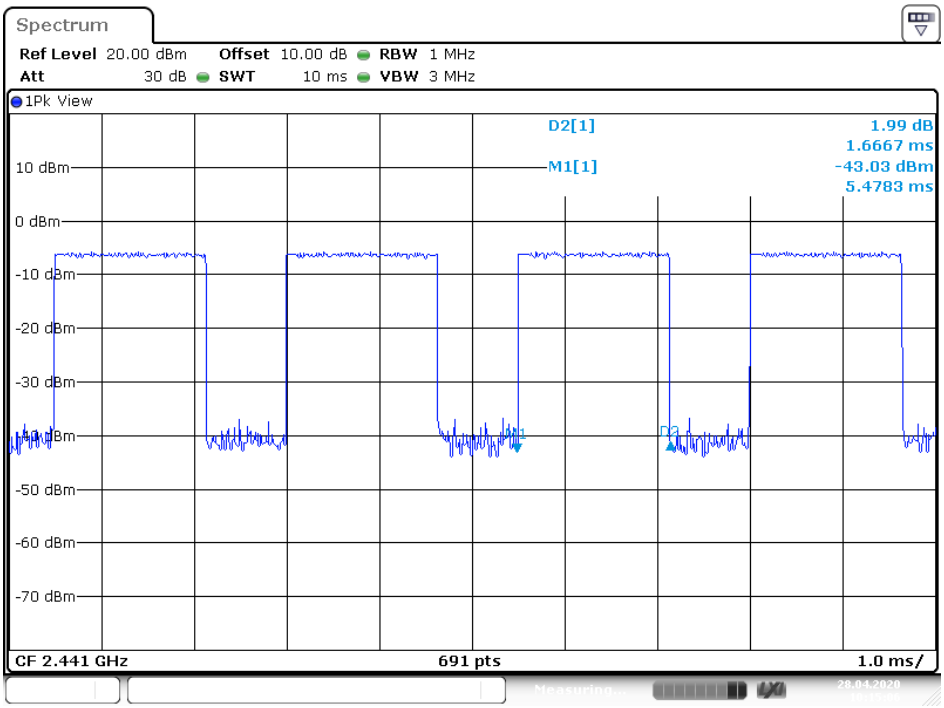
π /4 DQPSK Mode

2DH1 Middle channel



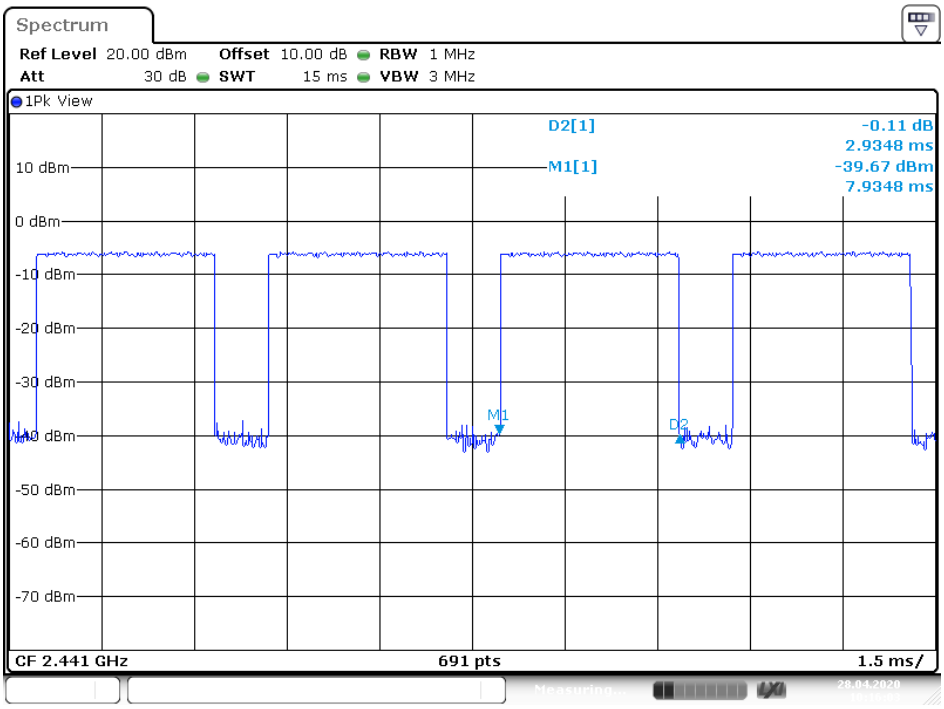
Date: 28.APR.2020 10:13:55

2DH3 Middle channel



Date: 28.APR.2020 10:15:06

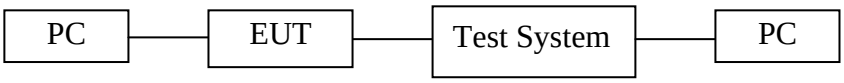
2DH5 Middle channel



Date: 28.APR.2020 10:16:04

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: Speaker)

9.2.The Requirement For Section 15.247(b)(1)

Section 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.

9.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4.Operating Condition of EUT

9.4.1.Setup the EUT and simulator as shown as Section 9.1.

9.4.2.Turn on the power of all equipment.

9.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

9.5.Test Procedure

9.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz for GFSK mode

9.5.3.Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz for π /4 DQPSK mode

9.5.4.Measurement the maximum peak output power.

9.6.Test Result

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-5.32/0.00029	21 / 0.125
Middle	2441	-5.57/0.00028	21 / 0.125
High	2480	-6.39/0.00023	21 / 0.125

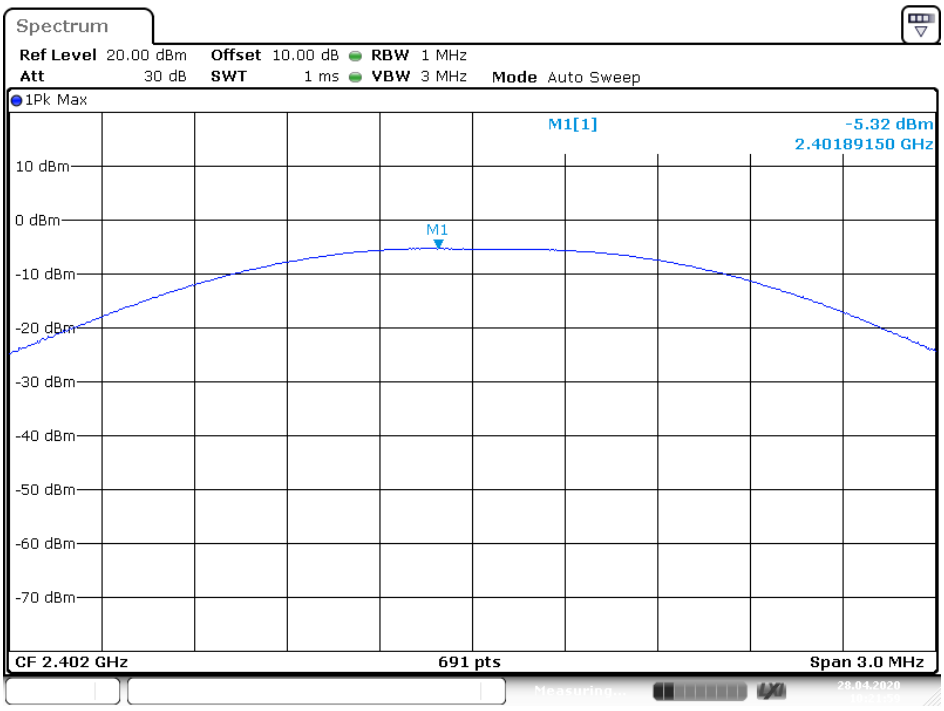
π /4 DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-4.54/0.00035	21 / 0.125
Middle	2441	-4.84/0.00033	21 / 0.125
High	2480	-5.66/0.00027	21 / 0.125

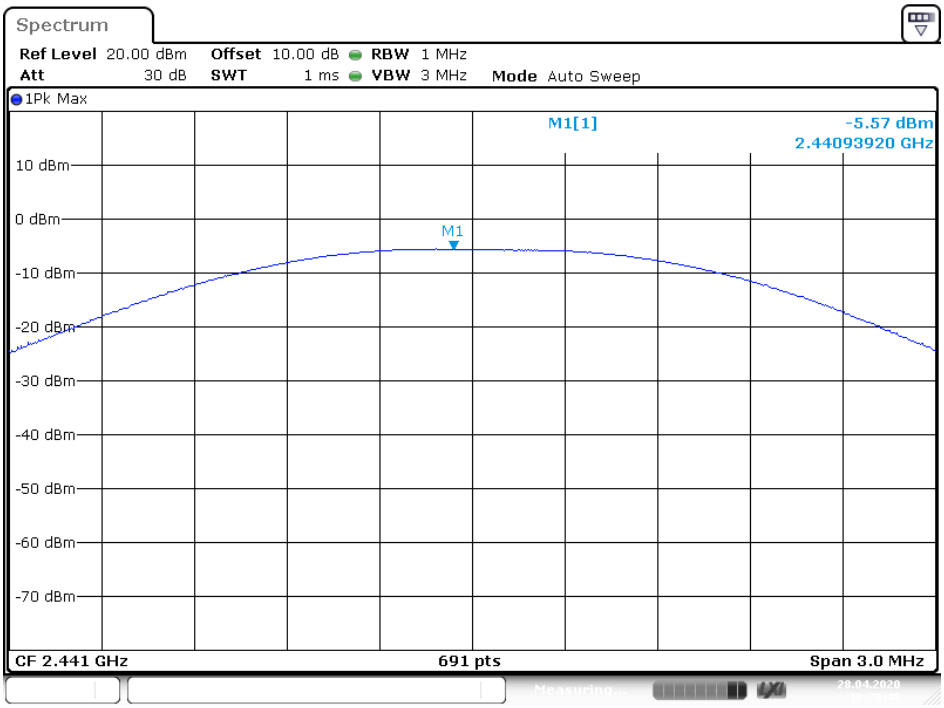
The spectrum analyzer plots are attached as below.

GFSK Mode

Low channel

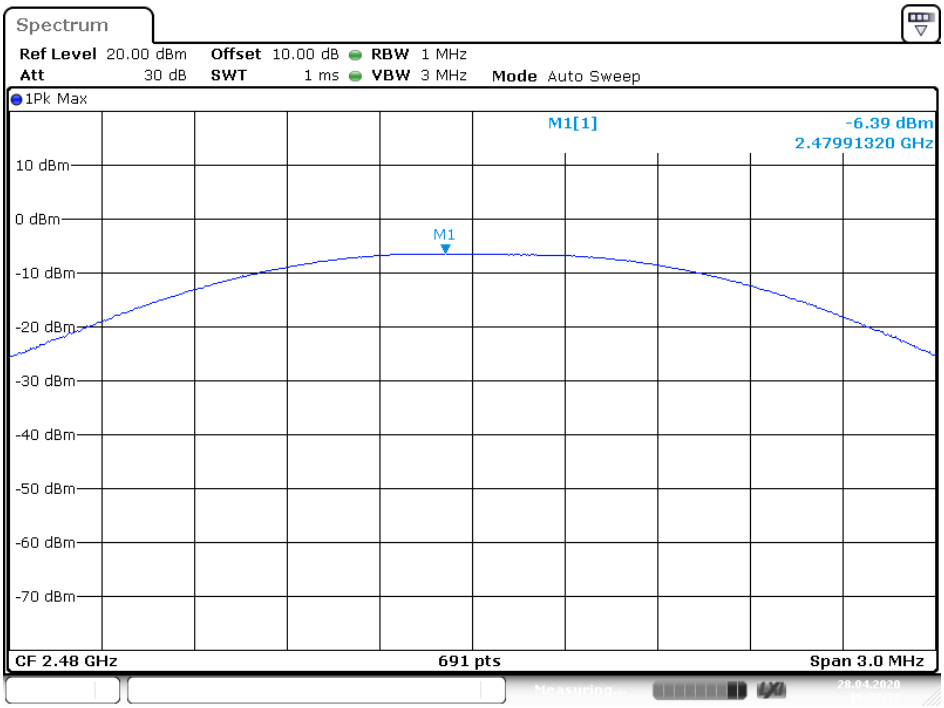


Middle channel



Date: 28.APR.2020 10:20:48

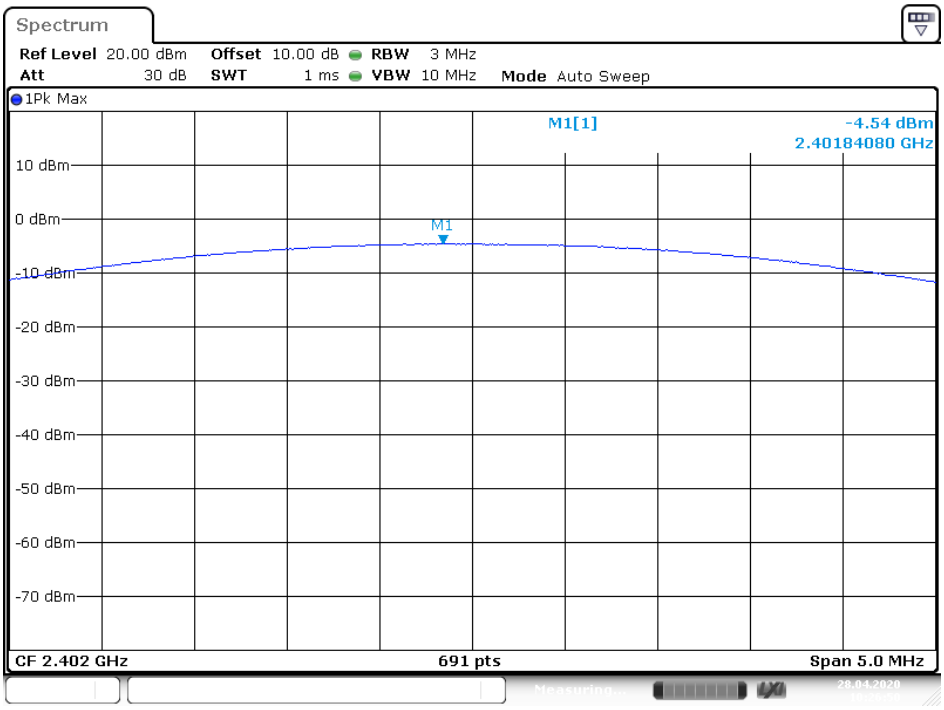
High channel



Date: 28.APR.2020 10:22:33

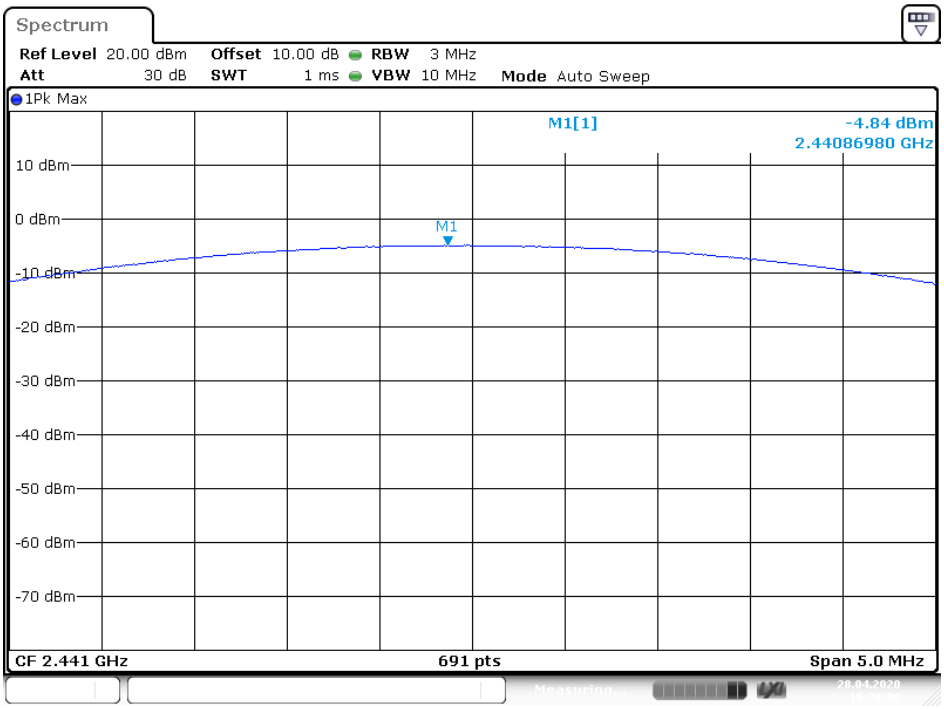
π /4 DQPSK Mode

Low channel



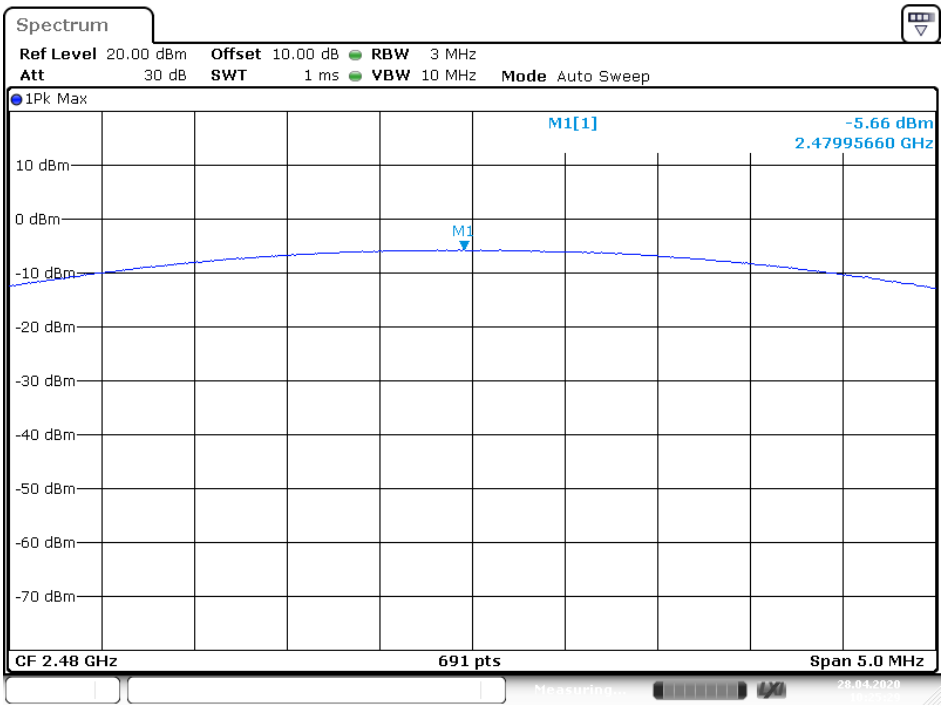
Date: 28.APR.2020 10:26:50

Middle channel



Date: 28.APR.2020 10:26:08

High channel



Date: 28.APR.2020 10:25:30

10.RADIATED EMISSION TEST

10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

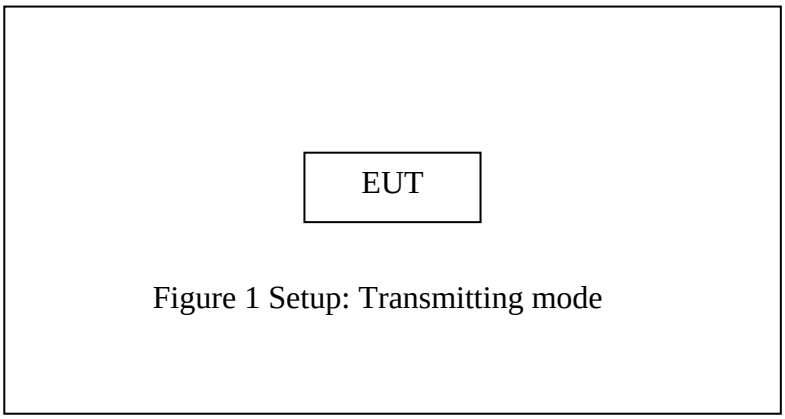
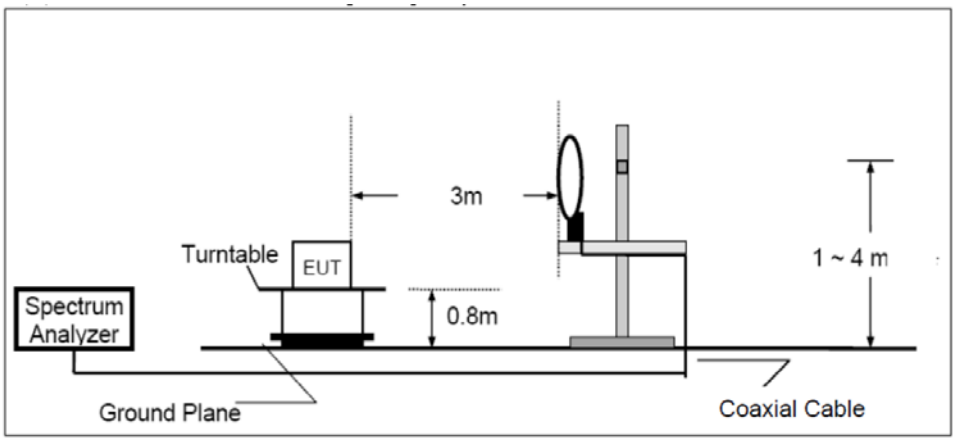


Figure 1 Setup: Transmitting mode

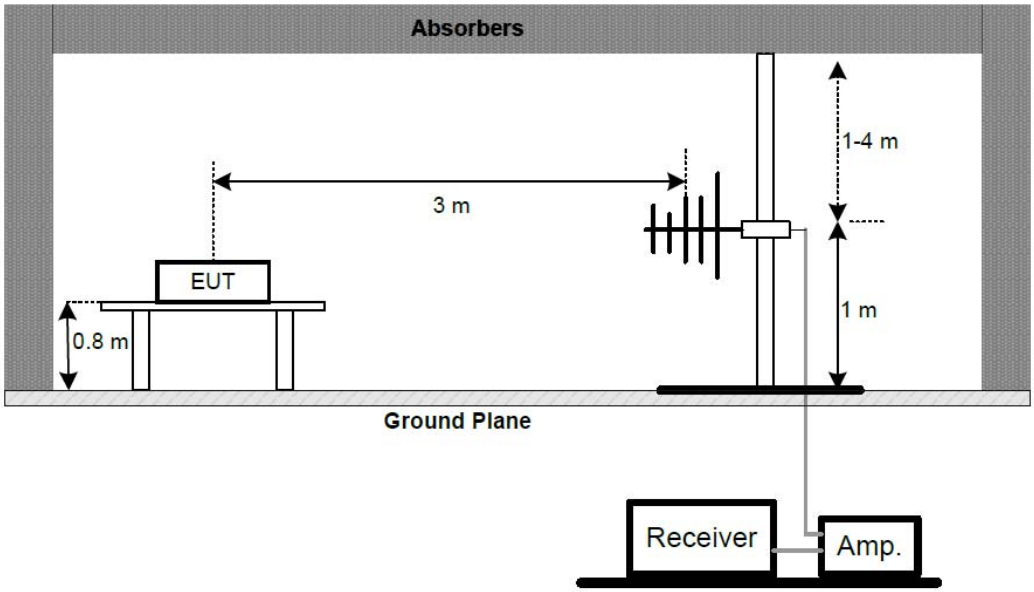
(EUT: Speaker)

10.1.2.Semi-Anechoic Chamber Test Setup Diagram

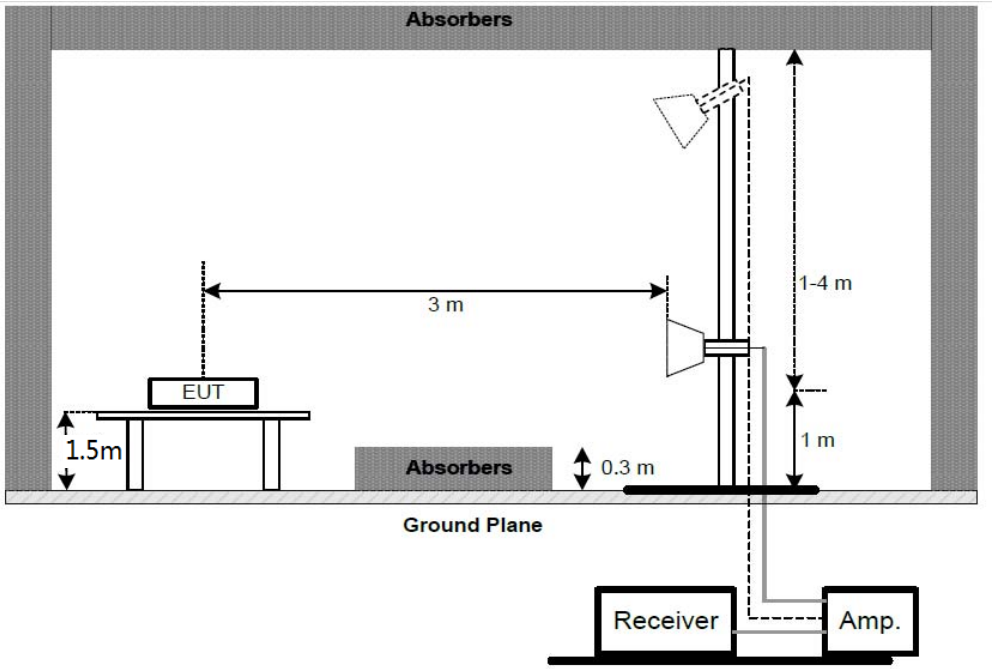
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1GHz



Above 1GHz:



10.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

10.3.Restricted bands of operation

10.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

10.4.Configuration of EUT on Measurement

The equipment is installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

10.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

10.6.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	28.66	-15.19	13.47	40.0	-26.53	QP

Frequency(MHz) = Emission frequency in MHz
Reading(dBμv) = Uncorrected Analyzer/Receiver reading
Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain
Result(dBμv/m) = Reading(dBμv) + Factor(dB/m)
Limit (dBμv/m) = Limit stated in standard
Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

Calculation Formula:
Margin(dB) = Result (dBμV/m)–Limit(dBμV/m)
Result(dBμV/m)= Reading(dBμV)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

10.7.The Field Strength of Radiation Emission Measurement Results

Note: 1.We tested GFSK mode and π /4 DQPSK Mode and recorded the worst case data (GFSK mode) from 30MHz-1GHz.

2.We tested GFSK mode and π /4 DQPSK Mode and recorded the worst case data(π /4 DQPSK mode) from 1GHz-25GHz.

3. The test frequency is from 9KHz to 25GHz, The radiation emission from 9KHz-30MHz and 18-25GHz are not reported, because the levels are too low against the limit.

Below 1GHz

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Site: 1# Chamber
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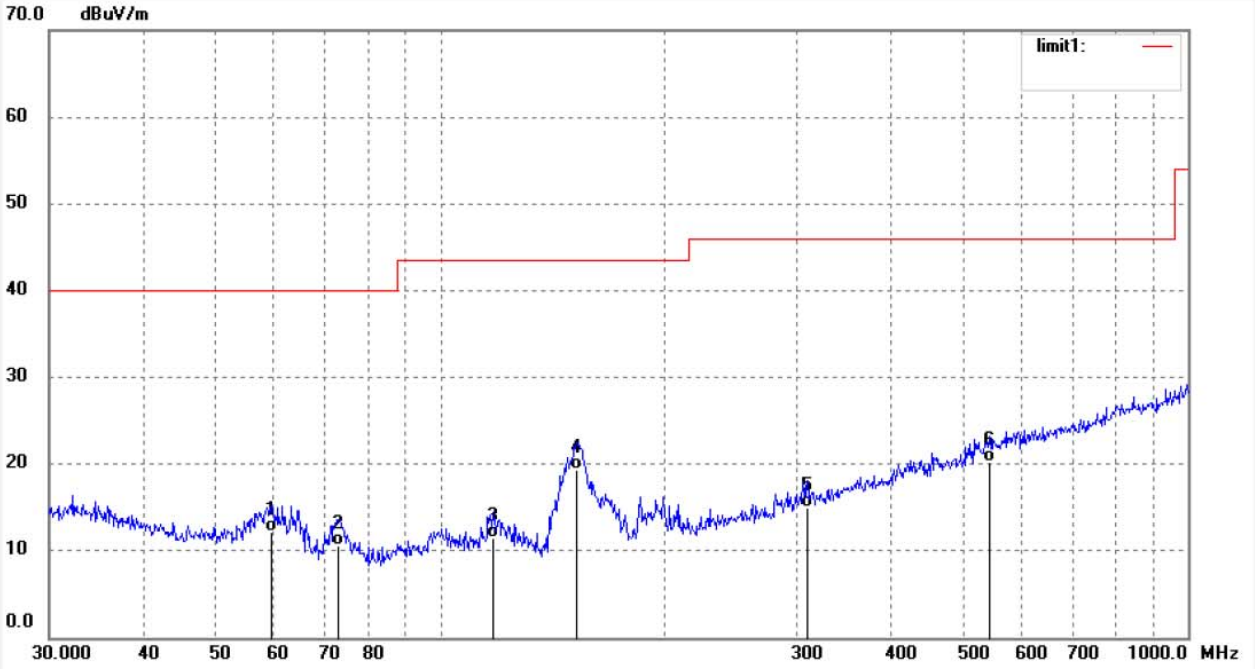
Fax:+86-0755-26503396

Job No.: LGW2020 #173	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/16/30
EUT: Speaker	Engineer Signature: WADE
Mode: Charging	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	59.4405	27.08	-14.83	12.25	40.00	-27.75	QP	200	147	
2	73.1025	28.08	-17.52	10.56	40.00	-29.44	QP	200	329	
3	117.7724	25.52	-14.14	11.38	43.50	-32.12	QP	200	213	
4	152.1297	35.54	-16.14	19.40	43.50	-24.10	QP	200	35	
5	309.9977	25.05	-10.02	15.03	46.00	-30.97	QP	200	120	
6	543.2741	24.97	-4.80	20.17	46.00	-25.83	QP	200	231	

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Site: 1# Chamber
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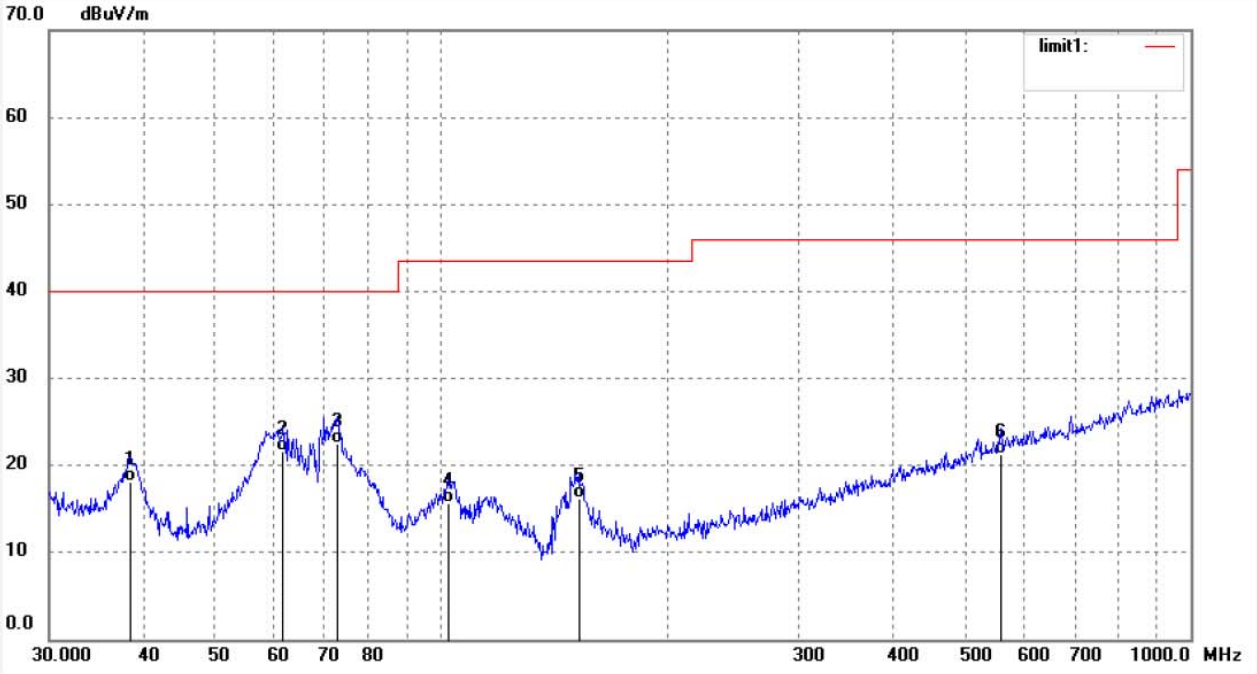
Fax:+86-0755-26503396

Job No.: LGW2020 #172	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/15/23
EUT: Speaker	Engineer Signature: WADE
Mode: Charging	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	38.4808	30.32	-12.21	18.11	40.00	-21.89	QP	100	54	
2	61.5617	37.09	-15.49	21.60	40.00	-18.40	QP	100	98	
3	72.8465	40.03	-17.48	22.55	40.00	-17.45	QP	100	331	
4	102.3597	30.23	-14.51	15.72	43.50	-27.78	QP	100	254	
5	152.6640	32.29	-16.13	16.16	43.50	-27.34	QP	100	241	
6	558.7301	25.71	-4.47	21.24	46.00	-24.76	QP	100	33	

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Site: 1# Chamber
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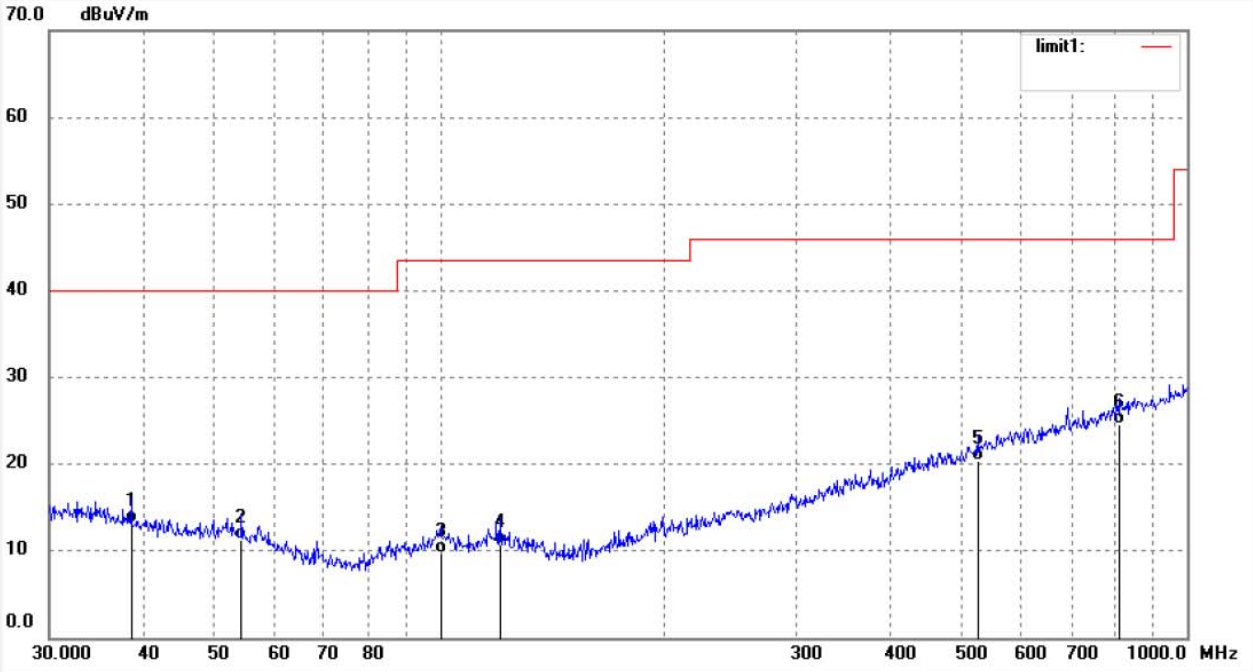
Fax:+86-0755-26503396

Job No.: LGW2020 #166	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/05/49
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	38.6160	25.45	-12.23	13.22	40.00	-26.78	QP	200	351	
2	54.2610	25.25	-13.92	11.33	40.00	-28.67	QP	200	245	
3	100.2286	23.95	-14.16	9.79	43.50	-33.71	QP	200	360	
4	120.2766	25.02	-14.18	10.84	43.50	-32.66	QP	200	128	
5	524.5540	25.64	-5.27	20.37	46.00	-25.63	QP	200	351	
6	813.1115	25.30	-0.77	24.53	46.00	-21.47	QP	200	45	

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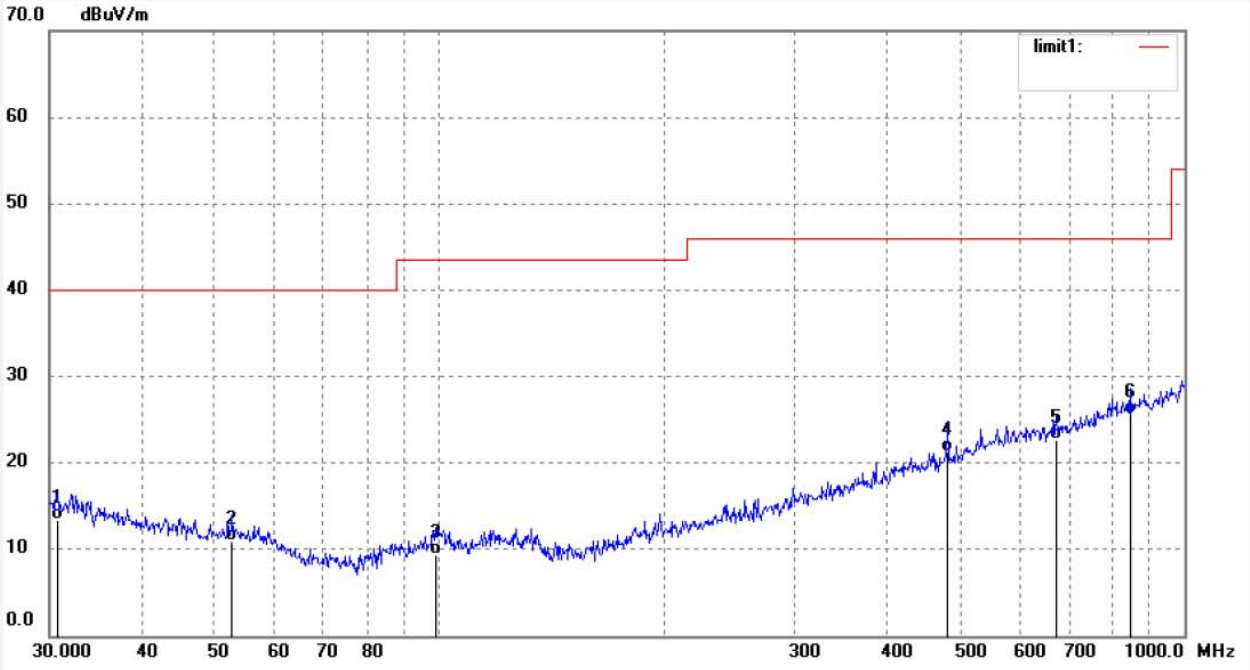
Fax:+86-0755-26503396

Job No.: LGW2020 #167	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/07/11
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.7454	23.61	-10.15	13.46	40.00	-26.54	QP	100	329	
2	52.7599	24.80	-13.81	10.99	40.00	-29.01	QP	100	123	
3	98.8324	23.94	-14.51	9.43	43.50	-34.07	QP	100	241	
4	480.5276	27.68	-6.34	21.34	46.00	-24.66	QP	100	354	
5	672.8444	25.71	-3.10	22.61	46.00	-23.39	QP	100	266	
6	845.0878	25.99	-0.31	25.68	46.00	-20.32	QP	100	247	

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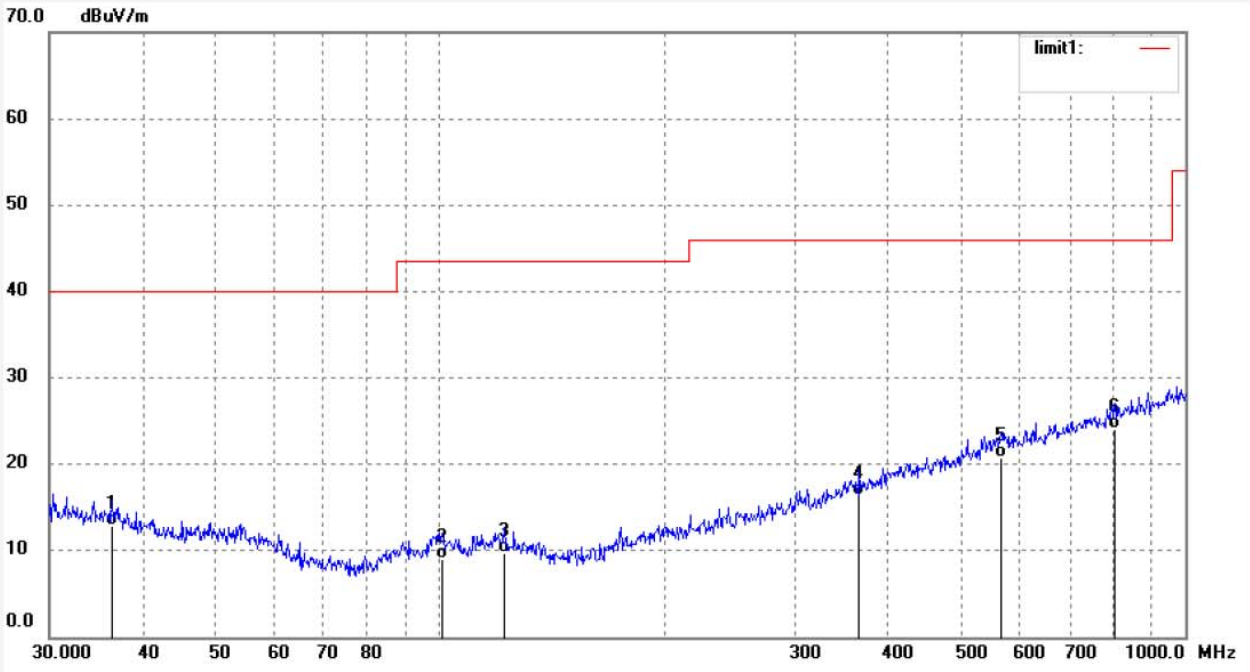
Job No.: LGW2020 #169	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/09/37
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2441MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.3813	24.57	-11.73	12.84	40.00	-27.16	QP	200	214	
2	100.9339	23.21	-14.28	8.93	43.50	-34.57	QP	200	120	
3	121.9754	24.01	-14.38	9.63	43.50	-33.87	QP	200	239	
4	365.5391	24.91	-8.56	16.35	46.00	-29.65	QP	200	31	
5	566.6221	25.16	-4.37	20.79	46.00	-25.21	QP	200	81	
6	804.6028	24.95	-0.89	24.06	46.00	-21.94	QP	200	114	

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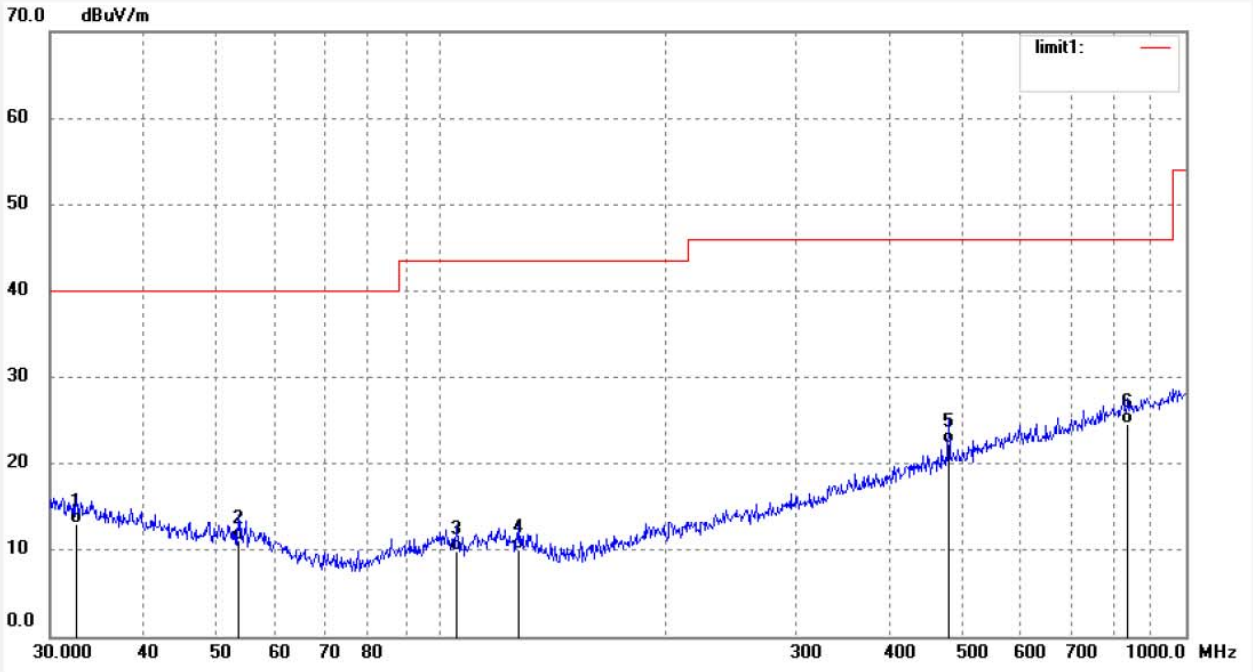
Job No.: LGW2020 #168	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/08/32
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2441MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.5197	23.79	-10.68	13.11	40.00	-26.89	QP	100	324	
2	53.6931	24.92	-13.88	11.04	40.00	-28.96	QP	100	243	
3	105.2717	24.75	-14.95	9.80	43.50	-33.70	QP	100	274	
4	127.6645	24.88	-14.80	10.08	43.50	-33.42	QP	100	124	
5	480.5276	28.58	-6.34	22.24	46.00	-23.76	QP	100	341	
6	836.2441	24.92	-0.38	24.54	46.00	-21.46	QP	100	323	

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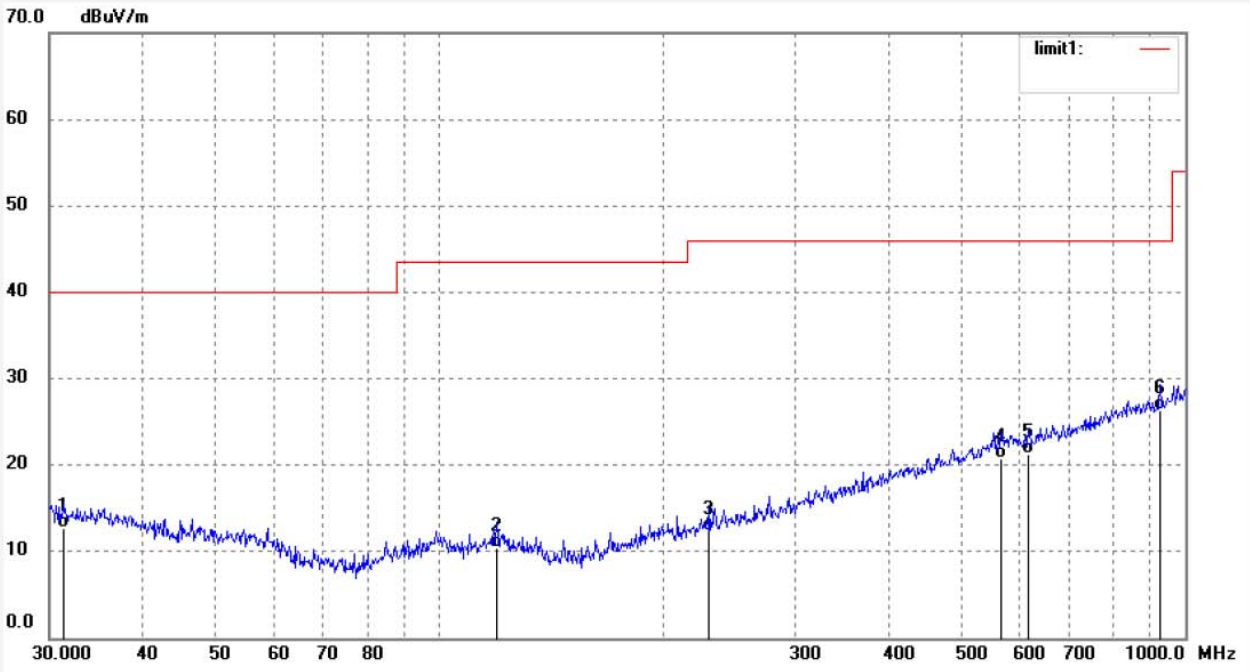
Job No.: LGW2020 #170	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/10/41
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.3992	23.76	-11.06	12.70	40.00	-27.30	QP	200	128	
2	119.4360	24.49	-14.15	10.34	43.50	-33.16	QP	200	121	
3	230.0985	24.60	-12.32	12.28	46.00	-33.72	QP	200	91	
4	566.6221	25.19	-4.37	20.82	46.00	-25.18	QP	200	119	
5	616.3718	24.94	-3.74	21.20	46.00	-24.80	QP	200	241	
6	925.7563	25.59	0.74	26.33	46.00	-19.67	QP	200	53	

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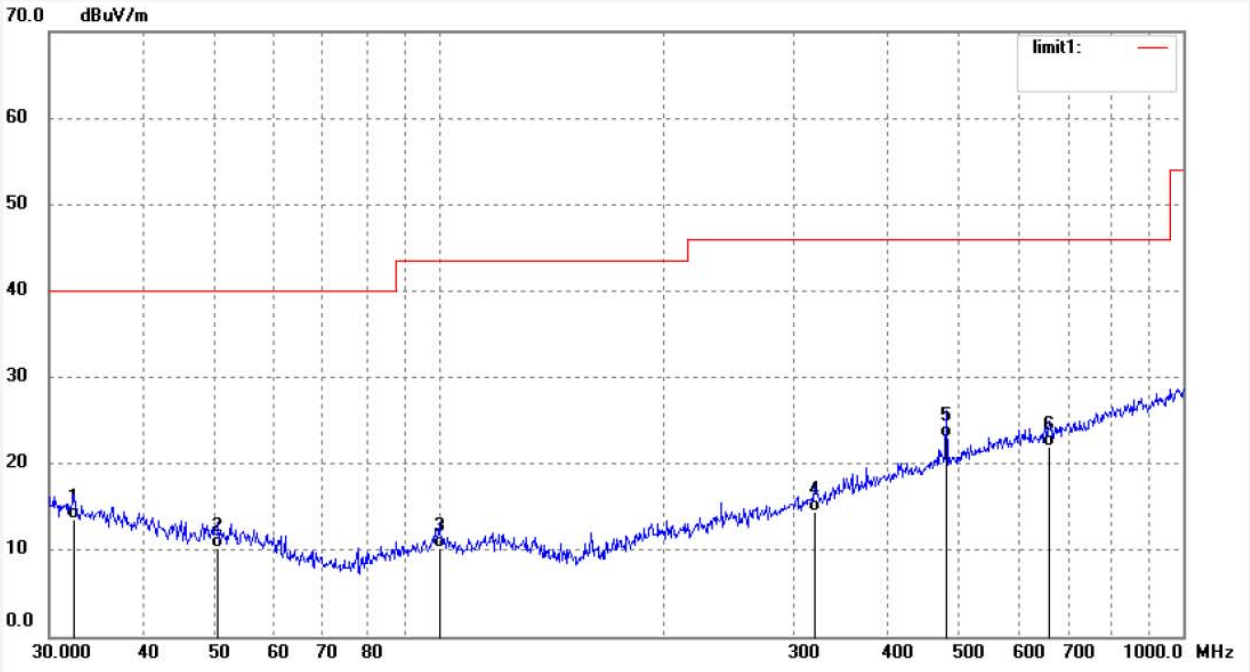
Job No.: LGW2020 #171	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/11/53
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.4059	24.15	-10.65	13.50	40.00	-26.50	QP	100	24	
2	50.5859	23.80	-13.64	10.16	40.00	-29.84	QP	100	245	
3	100.2286	24.35	-14.16	10.19	43.50	-33.31	QP	100	145	
4	319.9370	24.16	-9.75	14.41	46.00	-31.59	QP	100	324	
5	480.5276	29.44	-6.34	23.10	46.00	-22.90	QP	100	57	
6	661.1504	25.18	-3.24	21.94	46.00	-24.06	QP	100	86	

Above 1GHz

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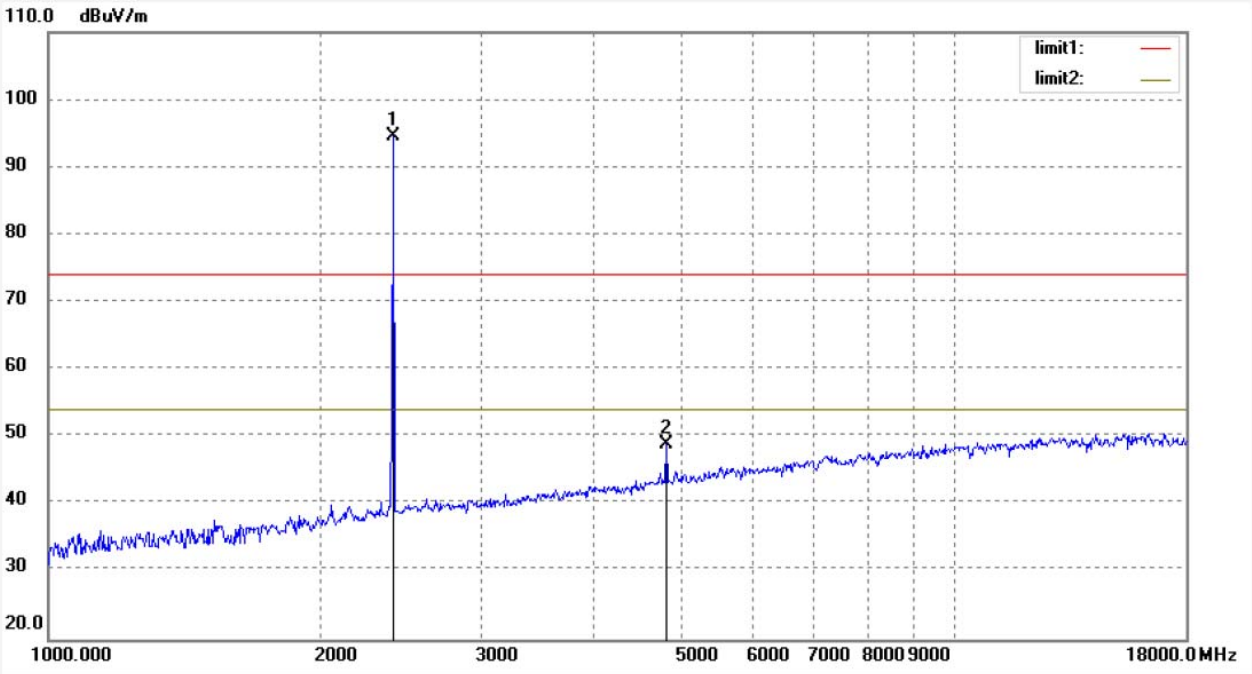
Job No.: LGW2020 #150	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/31/36
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	93.59	0.89	94.48			peak	150	241	
2	4804.000	41.43	7.40	48.83	74.00	-25.17	peak	200	321	

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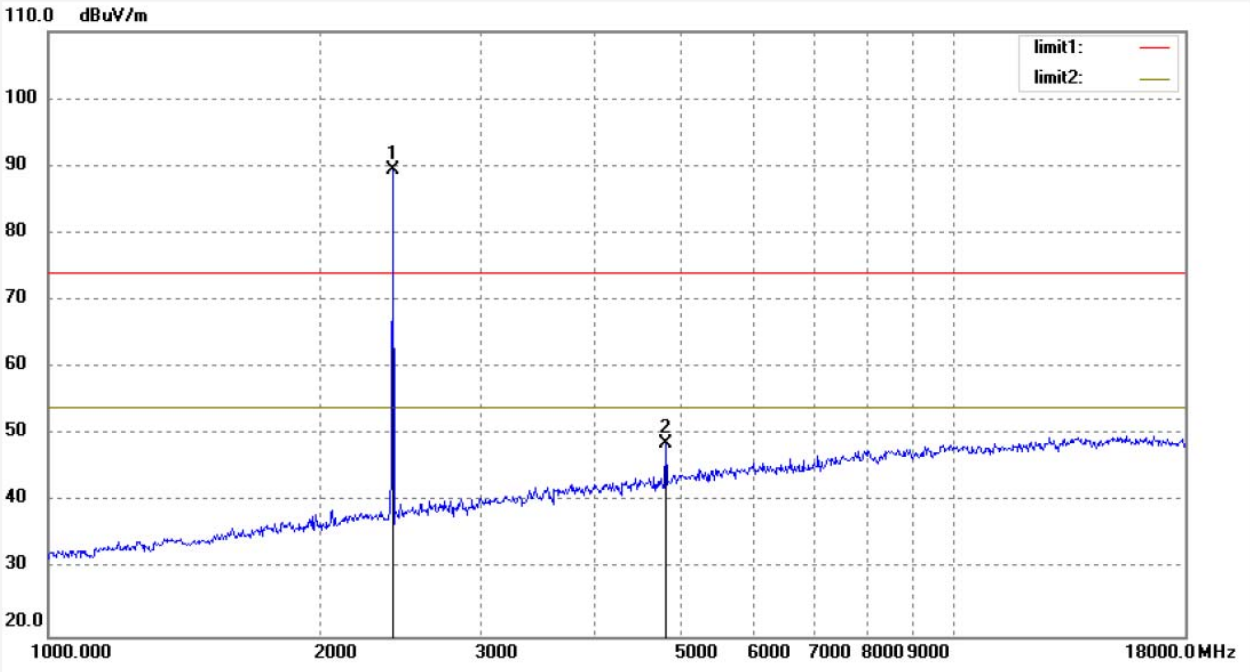
Job No.: LGW2020 #151	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/32/45
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	88.53	0.89	89.42			peak	150	12	
2	4804.000	41.35	7.40	48.75	74.00	-25.25	peak	200	285	

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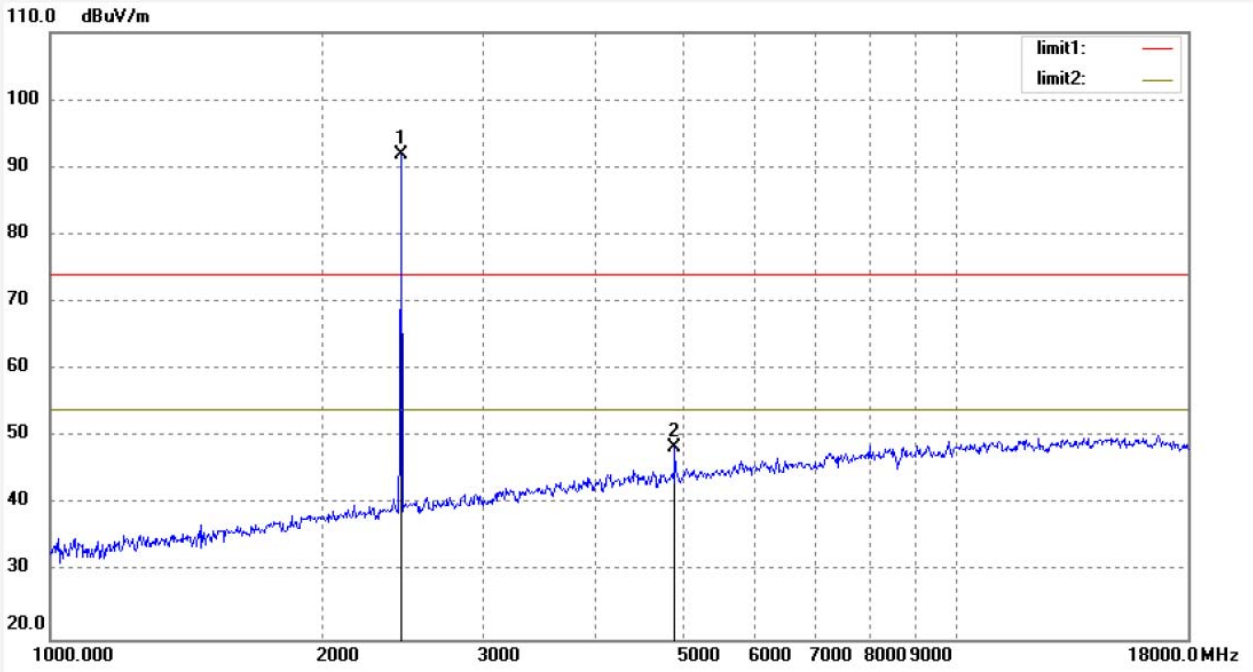
Job No.: LGW2020 #153	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/35/59
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 TX 2441MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	90.89	1.06	91.95			peak	150	311	
2	4882.000	40.26	8.11	48.37	74.00	-25.63	peak	200	241	

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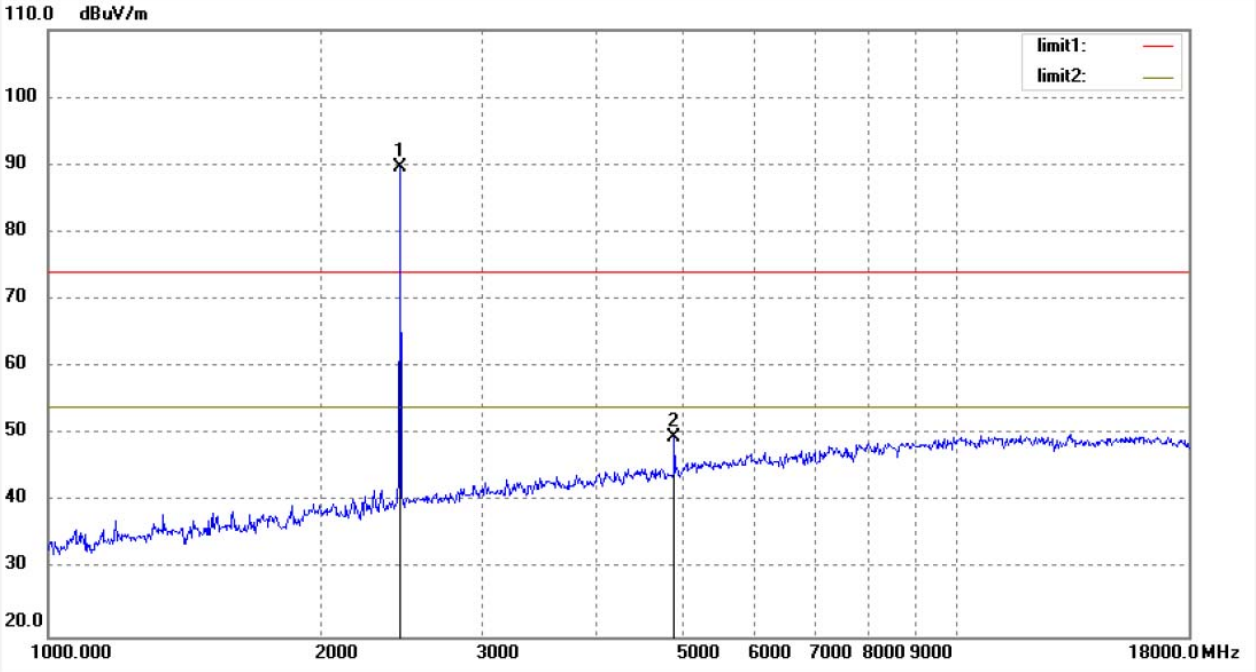
Job No.: LGW2020 #152	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/34/52
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 TX 2441MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	88.54	1.06	89.60			peak	200	351	
2	4882.000	41.55	8.11	49.66	74.00	-24.34	peak	250	214	

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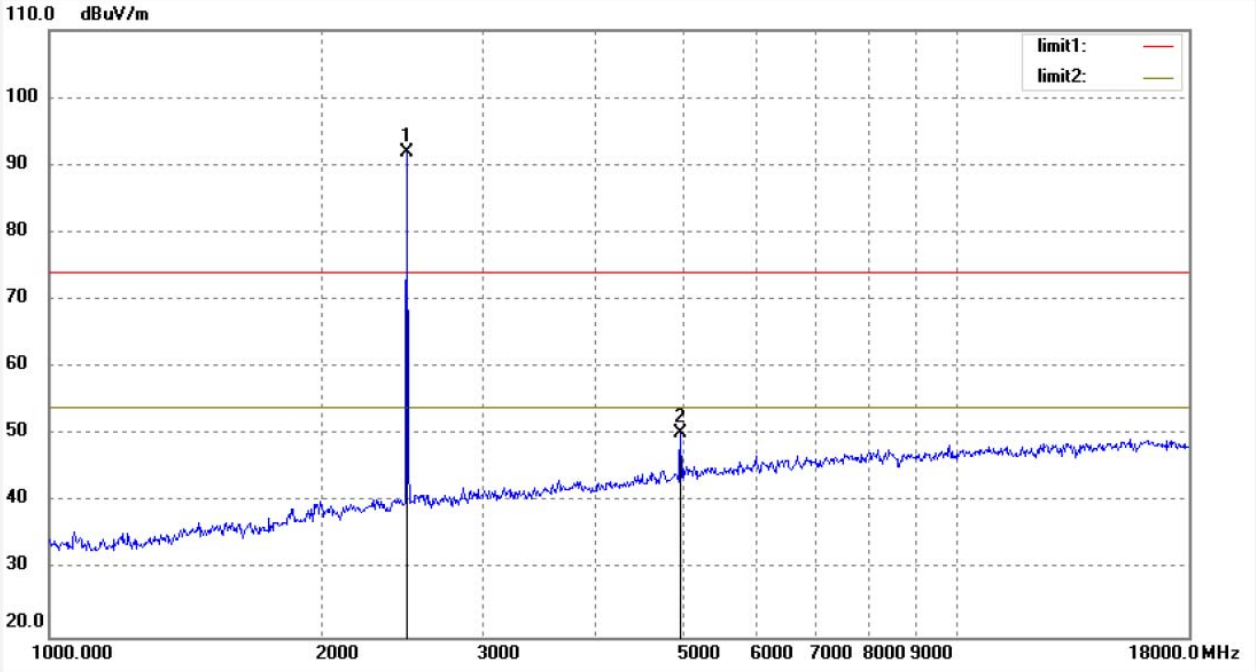
Job No.: LGW2020 #154	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/37/57
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	90.85	1.10	91.95			peak	150	241	
2	4960.000	41.63	8.60	50.23	74.00	-23.77	peak	150	35	

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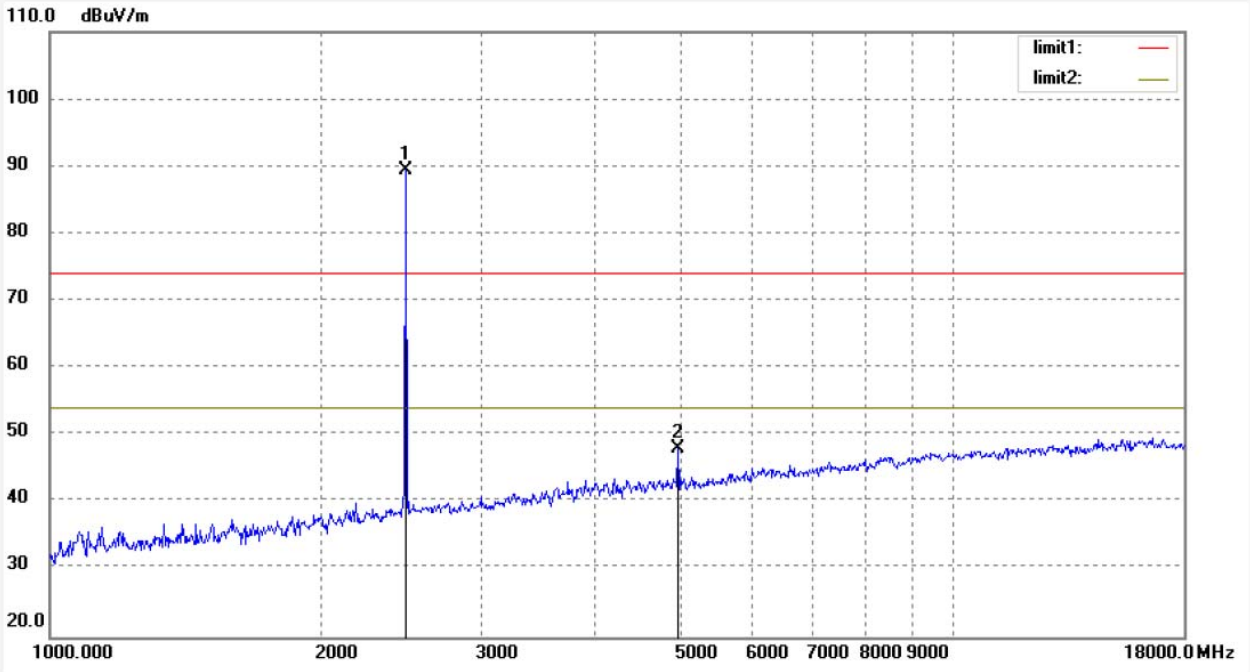
Job No.: LGW2020 #155	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/39/06
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

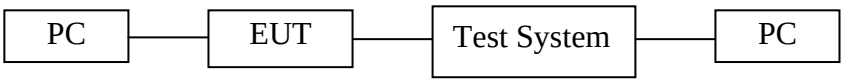
Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	88.33	1.10	89.43			peak	150	231	
2	4960.000	39.50	8.60	48.10	74.00	-25.90	peak	200	45	

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: Speaker)

11.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

11.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 11.1.

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

11.5.Test Procedure

11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

11.5.3.The band edges was measured and recorded.

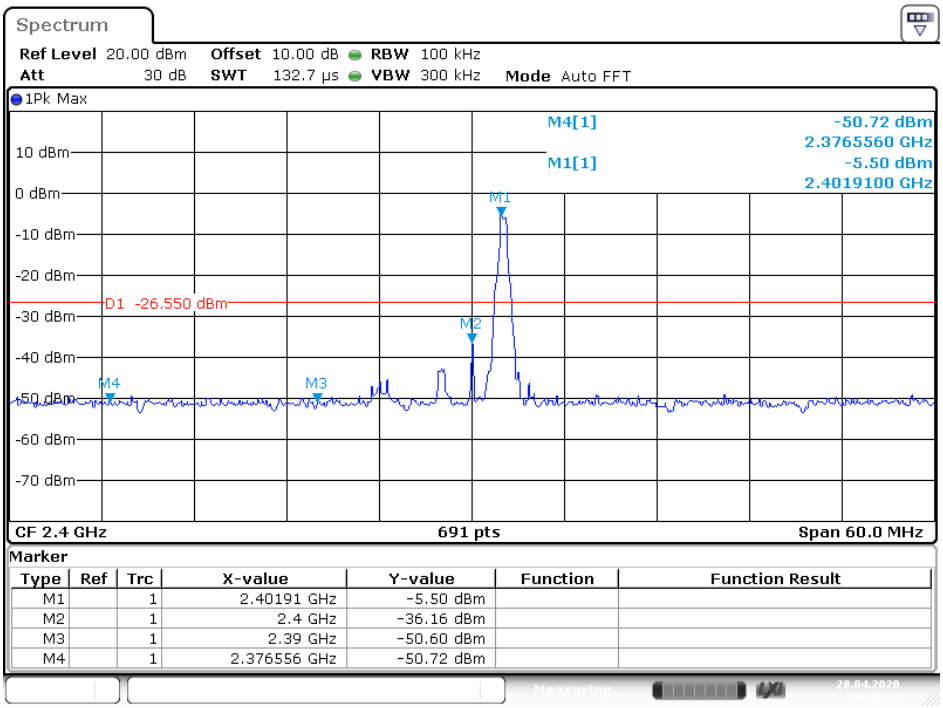
11.6.Test Result

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK		
2400.00	30.66	> 20dBc
2483.50	43.27	> 20dBc
π /4 DQPSK Mode		
2400.00	30.69	> 20dBc
2483.50	43.27	> 20dBc

Note: Both hopping-on mode and hopping-off mode had been pre-tested, and only the worst case was recorded in the test report.

The spectrum analyzer plots are attached as below.

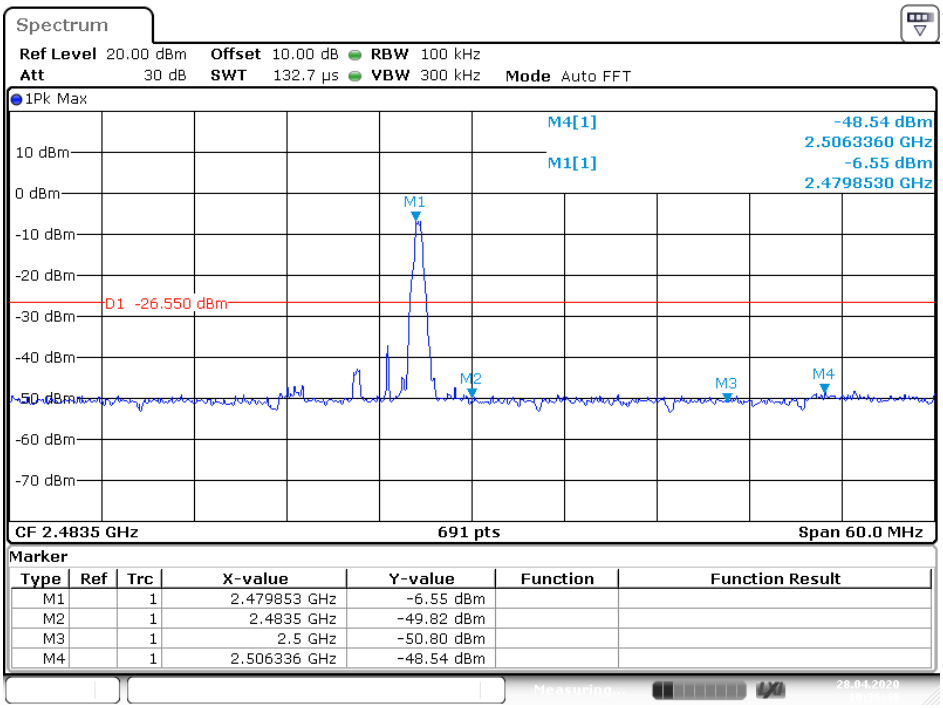
GFSK Mode



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40191 GHz	-5.50 dBm		
M2		1	2.4 GHz	-36.16 dBm		
M3		1	2.39 GHz	-50.60 dBm		
M4		1	2.376556 GHz	-50.72 dBm		

Date: 28.APR.2020 10:38:14

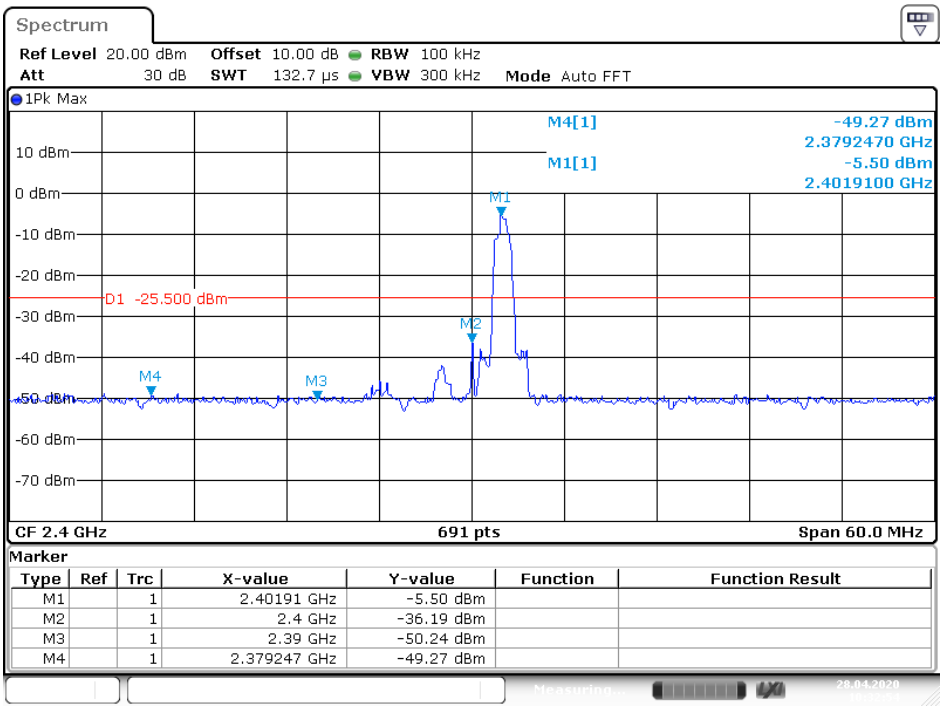


Marker

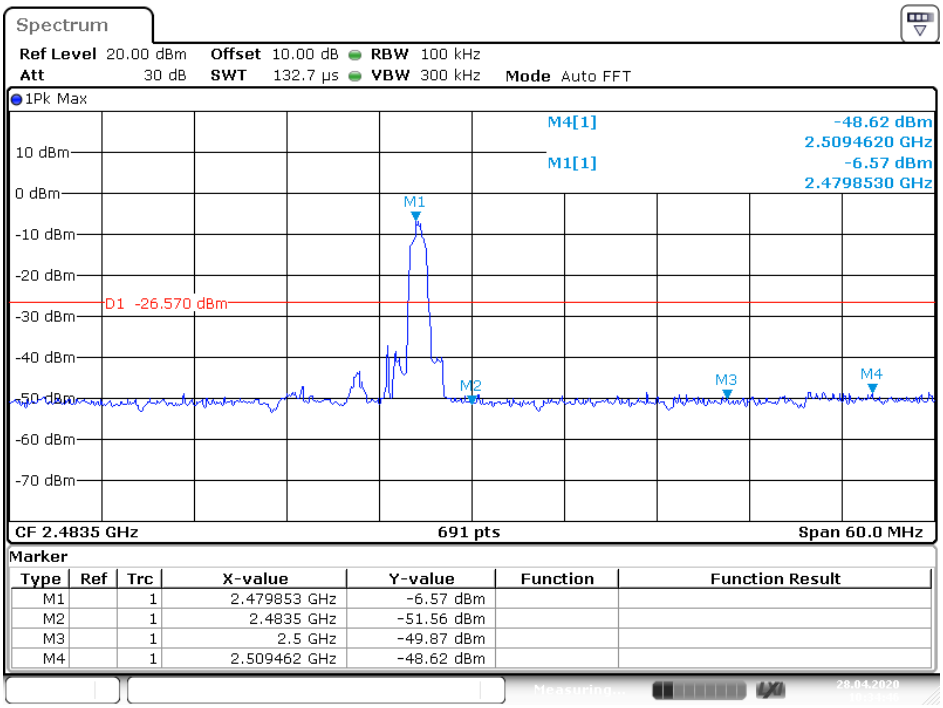
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479853 GHz	-6.55 dBm		
M2		1	2.4835 GHz	-49.82 dBm		
M3		1	2.5 GHz	-50.80 dBm		
M4		1	2.506336 GHz	-48.54 dBm		

Date: 28.APR.2020 10:36:46

π /4 DQPSK Mode



Date: 28.APR.2020 10:32:54



Date: 28.APR.2020 10:34:46

Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Test Procedure:

The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

Let the EUT work in TX (Hopping off, Hopping on) modes measure it.
We select 2402MHz, 2480MHz TX frequency to transmit(Hopping off mode).
We select 2402-2480MHz TX frequency to transmit(Hopping on mode).

During the radiated emission test, the spectrum analyzer was set with the following configurations:
1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
3.All modes of operation were investigated and the worst-case emissions are reported.

Note:

1.We tested GFSK mode and π /4 DQPSK Mode and recorded the worst case data

(π /4 DQPSK mode) for hopping mode.

Non-hopping mode

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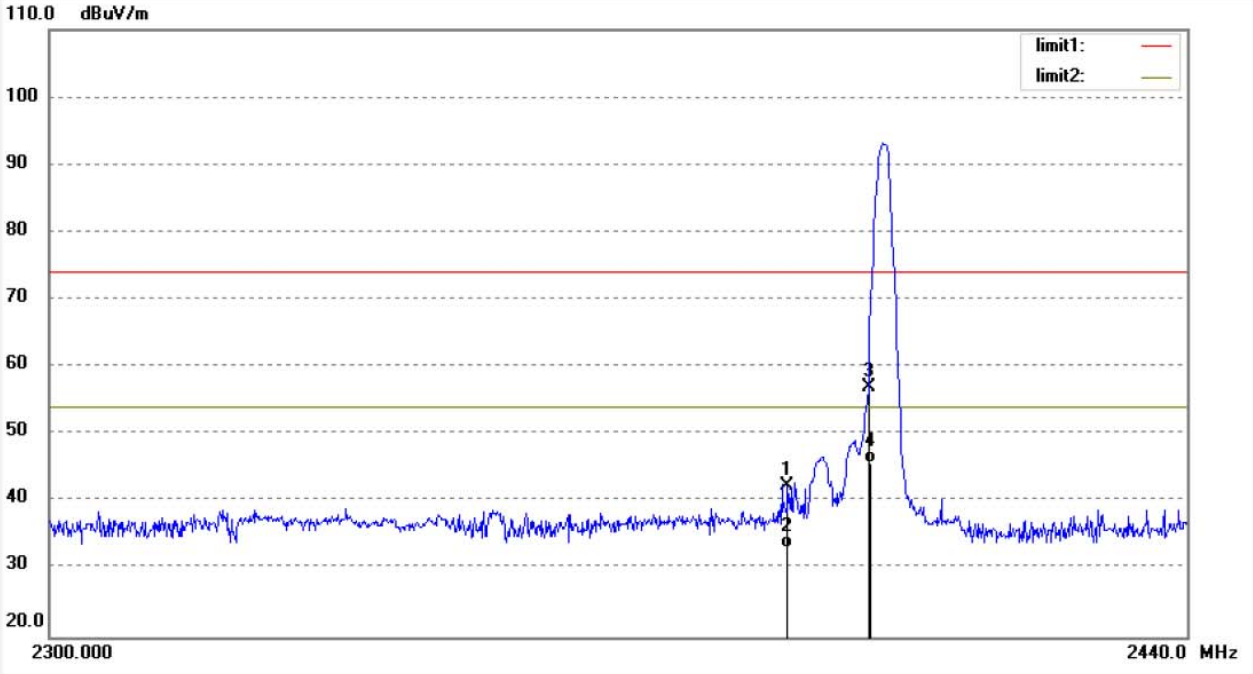
Job No.: LGW2020 #157	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/43/07
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	41.55	0.79	42.34	74.00	-31.66	peak	250	254	
2	2390.000	32.48	0.79	33.27	54.00	-20.73	AVG	250	157	
3	2400.000	56.11	0.88	56.99	74.00	-17.01	peak	200	241	
4	2400.000	44.78	0.88	45.66	54.00	-8.34	AVG	200	351	

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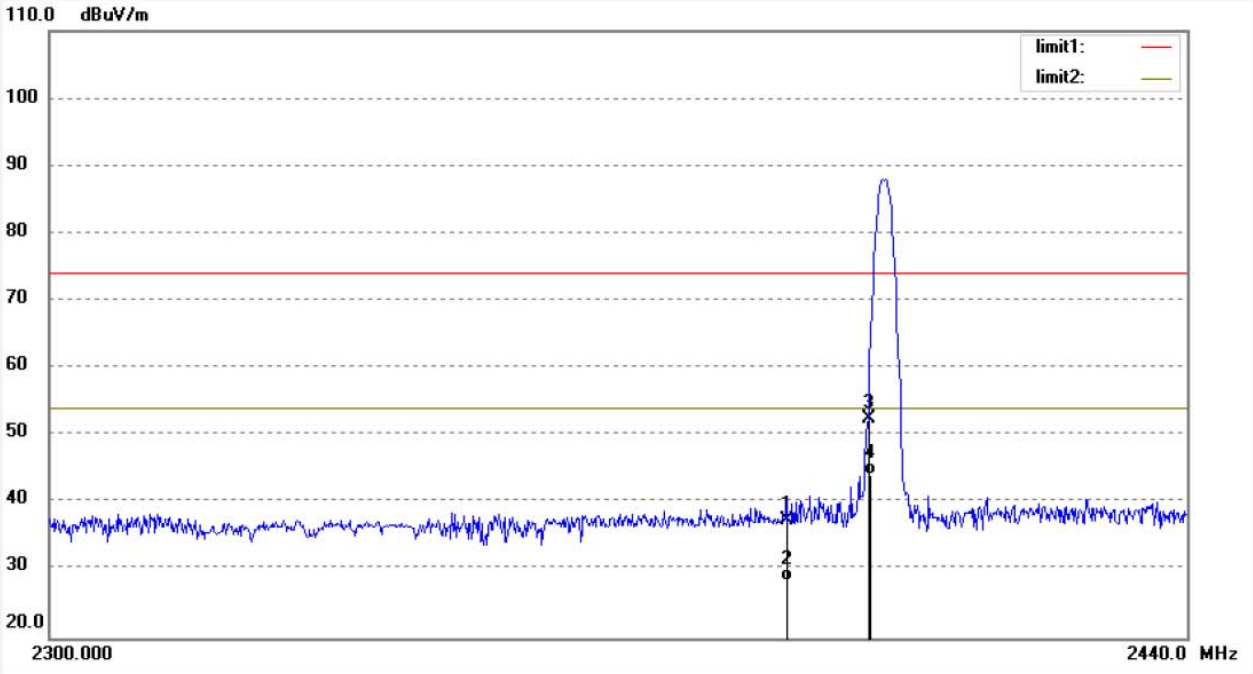
Job No.: LGW2020 #156	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/42/00
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	36.57	0.79	37.36	74.00	-36.64	peak	150	341	
2	2390.000	27.55	0.79	28.34	54.00	-25.66	AVG	150	258	
3	2400.000	51.68	0.88	52.56	74.00	-21.44	peak	200	147	
4	2400.000	43.35	0.88	44.23	54.00	-9.77	AVG	200	240	

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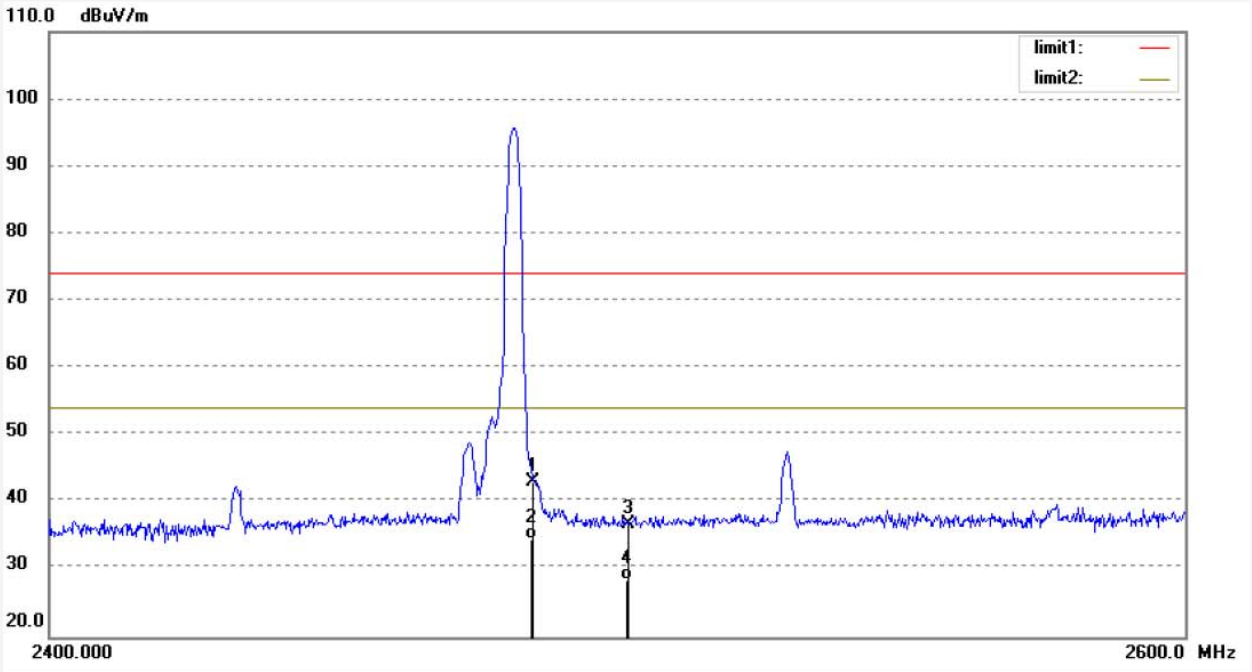
Job No.: LGW2020 #158	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/45/14
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	42.02	1.10	43.12	74.00	-30.88	peak	150	234	
2	2483.500	33.46	1.10	34.56	54.00	-19.44	AVG	150	241	
3	2500.000	35.65	1.10	36.75	74.00	-37.25	peak	150	234	
4	2500.000	27.24	1.10	28.34	54.00	-25.66	AVG	150	224	

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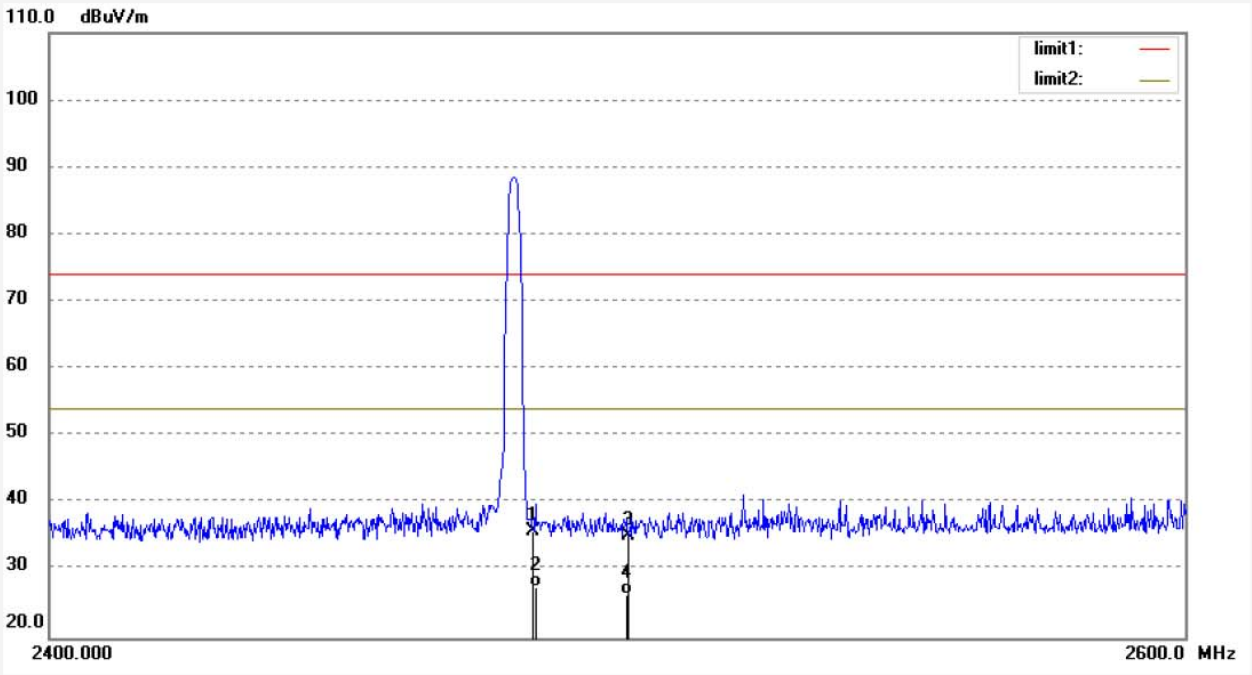
Job No.: LGW2020 #159	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/46/34
EUT: Speaker	Engineer Signature: WADE
Mode: 1-DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	34.77	1.10	35.87	74.00	-38.13	peak	200	241	
2	2483.500	26.46	1.10	27.56	54.00	-26.44	AVG	200	212	
3	2500.000	33.99	1.10	35.09	74.00	-38.91	peak	250	245	
4	2500.000	25.24	1.10	26.34	54.00	-27.66	AVG	250	24	

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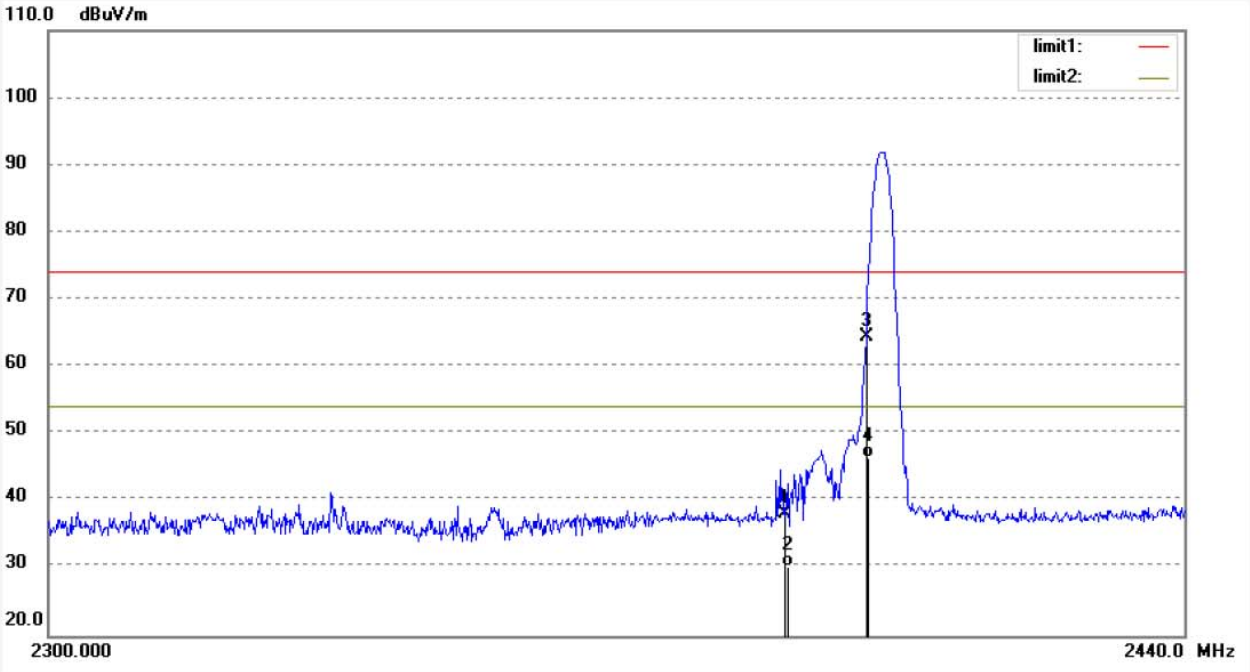
Job No.: LGW2020 #161	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/49/47
EUT: Speaker	Engineer Signature: WADE
Mode: 2-DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	37.36	0.79	38.15	74.00	-35.85	peak	250	258	
2	2390.000	29.45	0.79	30.24	54.00	-23.76	AVG	250	245	
3	2400.000	63.46	0.88	64.34	74.00	-9.66	peak	150	145	
4	2400.000	45.46	0.88	46.34	54.00	-7.66	AVG	150	35	

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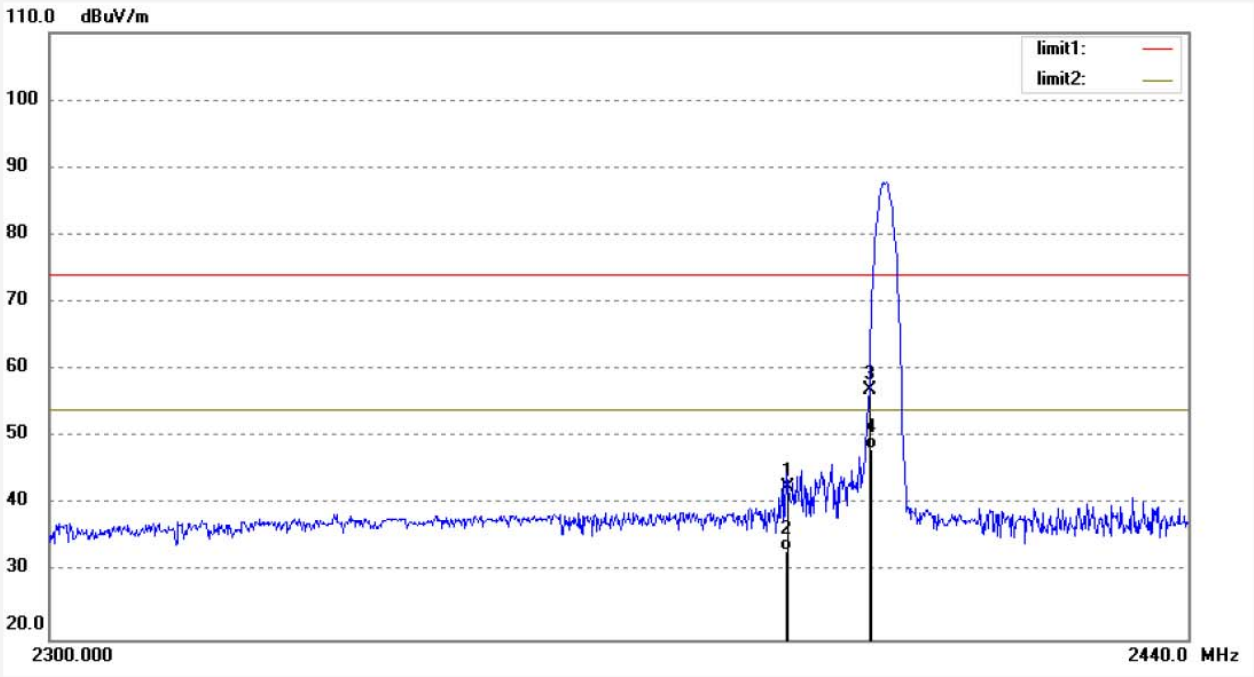
Job No.: LGW2020 #160	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/48/38
EUT: Speaker	Engineer Signature: WADE
Mode: 2-DH1 TX 2402MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	41.80	0.79	42.59	74.00	-31.41	peak	150	241	
2	2390.000	32.45	0.79	33.24	54.00	-20.76	AVG	150	24	
3	2400.000	56.19	0.88	57.07	74.00	-16.93	peak	150	124	
4	2400.000	47.46	0.88	48.34	54.00	-5.66	AVG	150	341	

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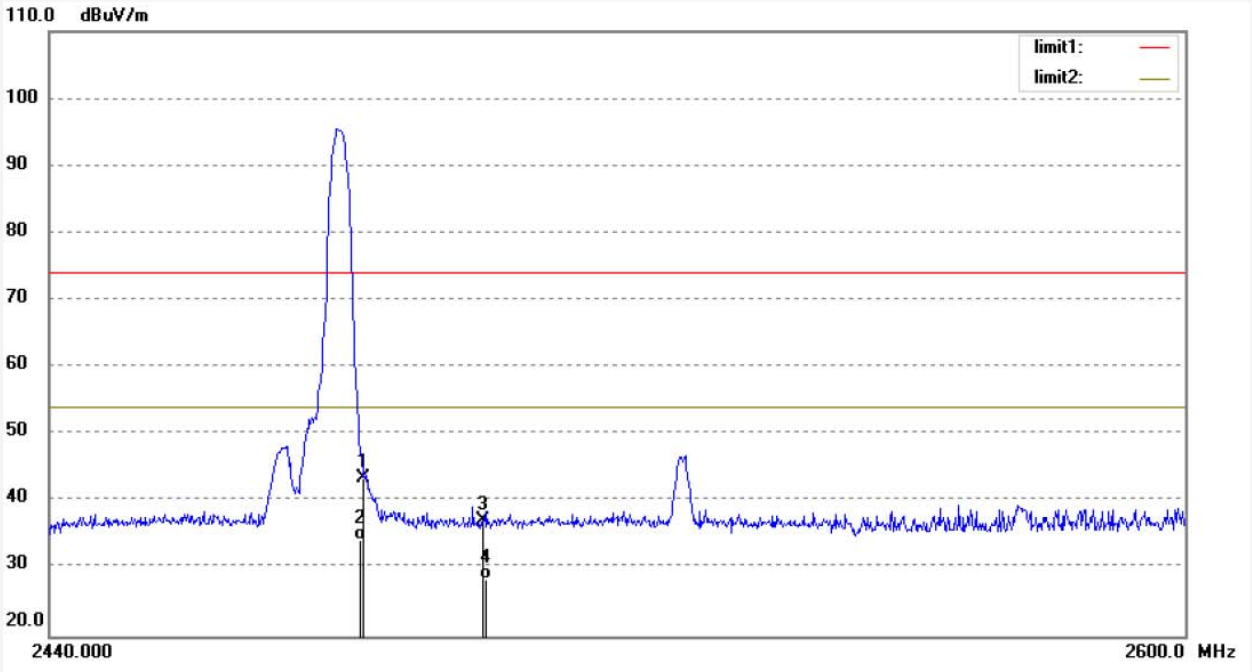
Job No.: LGW2020 #162	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/51/42
EUT: Speaker	Engineer Signature: WADE
Mode: 2-DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	42.47	1.10	43.57	74.00	-30.43	peak	200	147	
2	2483.500	33.25	1.10	34.35	54.00	-19.65	AVG	200	244	
3	2500.000	36.06	1.10	37.16	74.00	-36.84	peak	200	345	
4	2500.000	27.35	1.10	28.45	54.00	-25.55	AVG	200	142	

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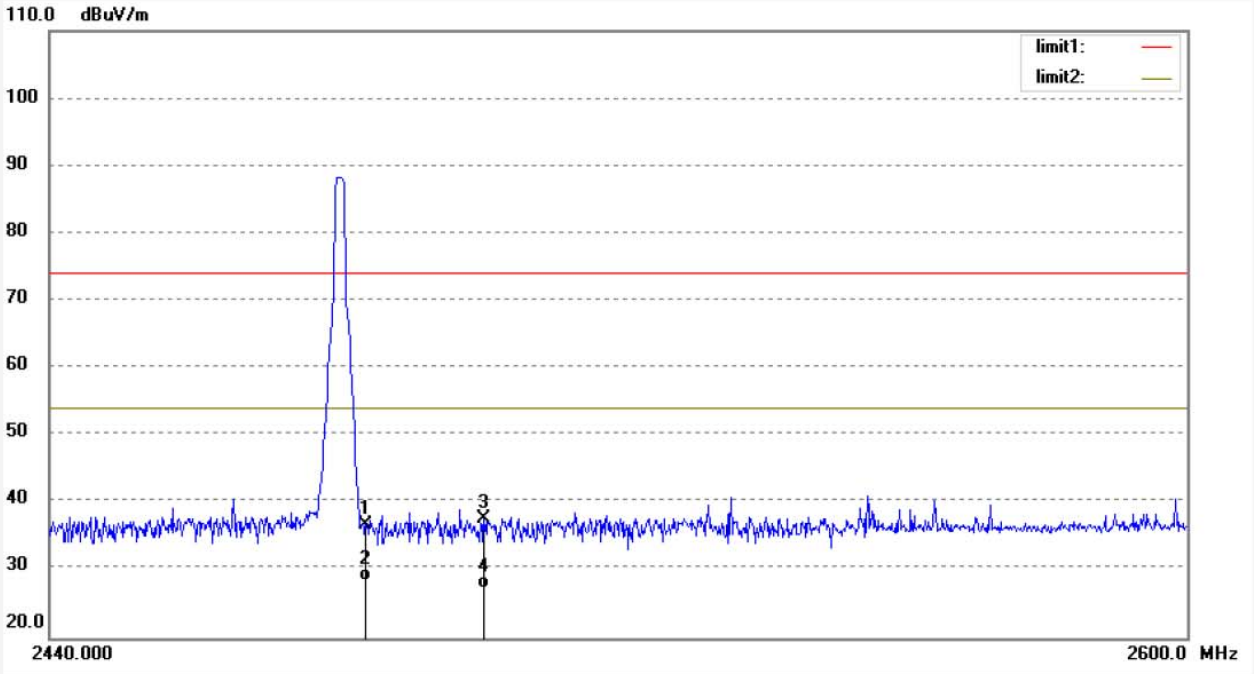
Job No.: LGW2020 #163	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/53/28
EUT: Speaker	Engineer Signature: WADE
Mode: 2-DH1 TX 2480MHz	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	35.67	1.10	36.77	74.00	-37.23	peak	250	124	
2	2483.500	27.24	1.10	28.34	54.00	-25.66	AVG	250	258	
3	2500.000	36.52	1.10	37.62	74.00	-36.38	peak	250	354	
4	2500.000	26.26	1.10	27.36	54.00	-26.64	AVG	250	215	

Hopping mode

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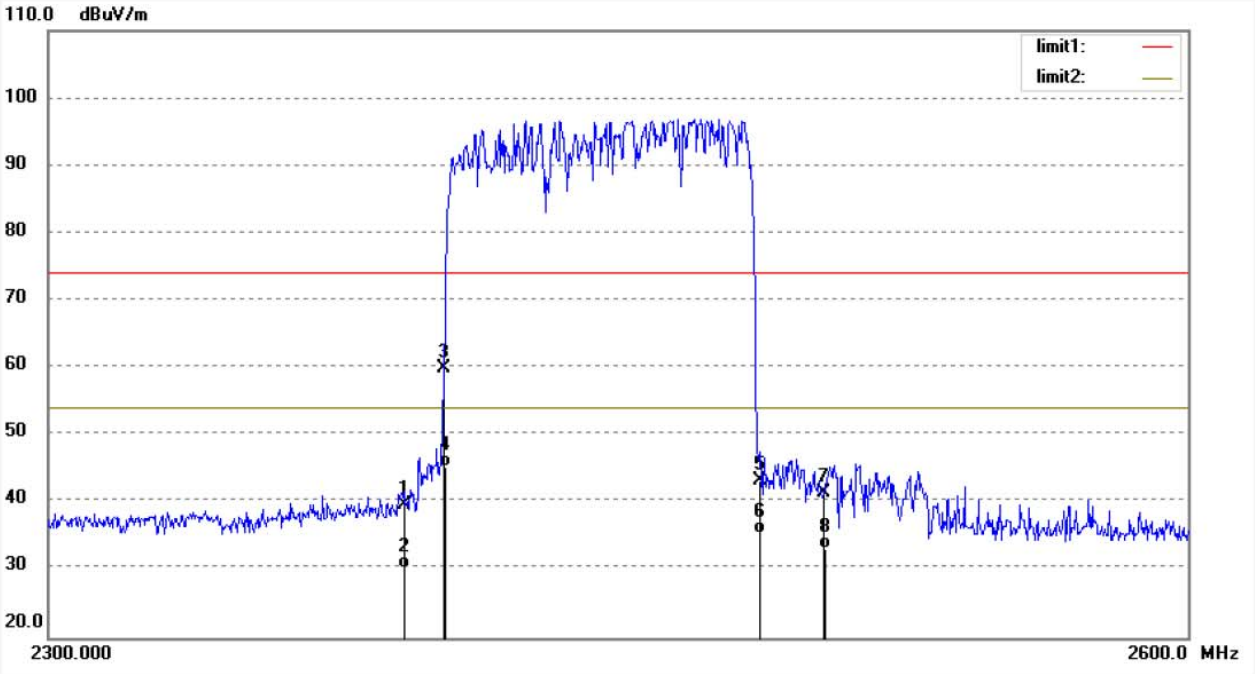
Job No.: LGW2020 #165
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Speaker
Mode: 2DH1 HOPPING
Model: S10
Manufacturer: Lovo consulting limited

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2020/04/26/
Time: 8/59/14
Engineer Signature: WADE
Distance: 3m

Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	38.98	0.79	39.77	74.00	-34.23	peak	200	167	
2	2390.000	29.45	0.79	30.24	54.00	-23.76	AVG	200	265	
3	2400.000	58.98	0.88	59.86	74.00	-14.14	peak	200	321	
4	2400.000	44.46	0.88	45.34	54.00	-8.66	AVG	200	94	
5	2483.500	42.12	1.10	43.22	74.00	-30.78	peak	200	258	
6	2483.500	34.29	1.10	35.39	54.00	-18.61	AVG	200	147	
7	2500.000	40.48	1.10	41.58	74.00	-32.42	peak	200	57	
8	2500.000	32.14	1.10	33.24	54.00	-20.76	AVG	200	234	

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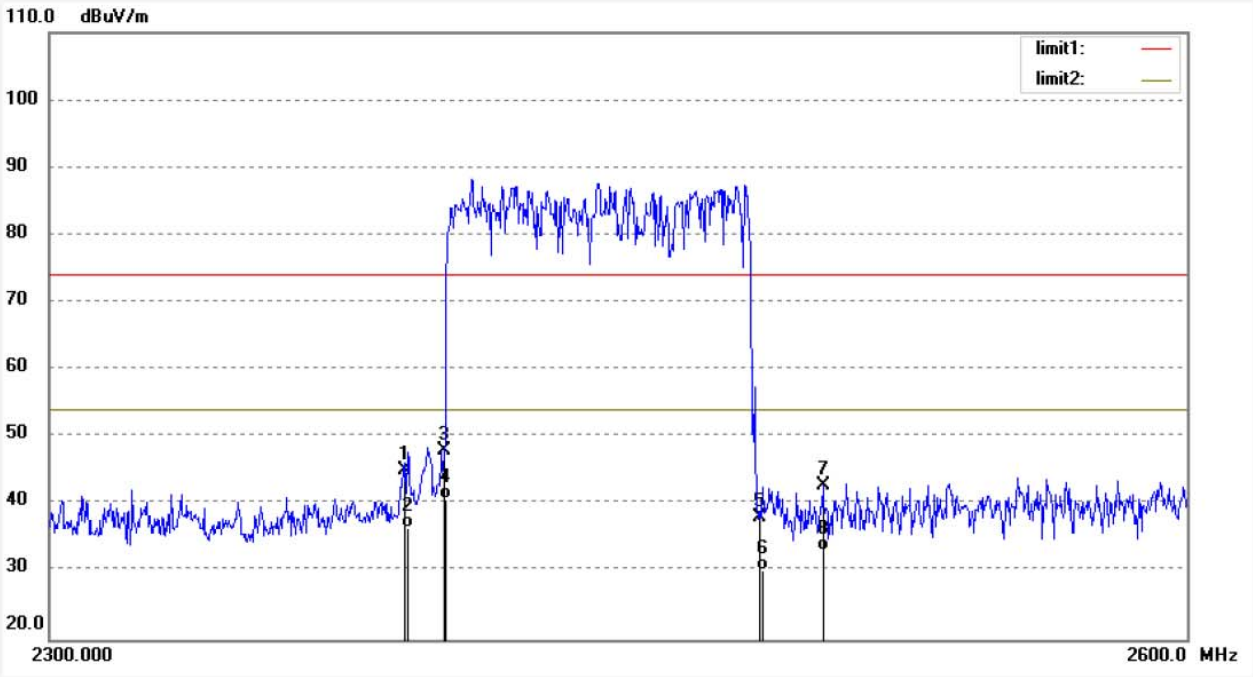
Job No.: LGW2020 #164	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2020/04/26/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 8/56/45
EUT: Speaker	Engineer Signature: WADE
Mode: 2DH1 HOPPING	Distance: 3m
Model: S10	
Manufacturer: Lovo consulting limited	

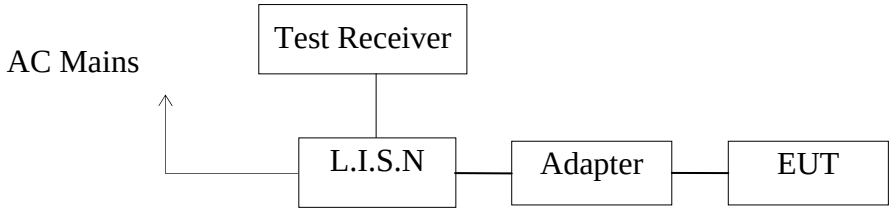
Note: Report NO.:ATE20200393



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	44.32	0.79	45.11	74.00	-28.89	peak	200	61	
2	2390.000	35.73	0.79	36.52	54.00	-17.48	AVG	200	68	
3	2400.000	47.14	0.88	48.02	74.00	-25.98	peak	200	135	
4	2400.000	39.86	0.88	40.74	54.00	-13.26	AVG	200	241	
5	2483.500	36.92	1.10	38.02	74.00	-35.98	peak	200	360	
6	2483.500	29.14	1.10	30.24	54.00	-23.76	AVG	200	256	
7	2500.000	41.69	1.10	42.79	74.00	-31.21	peak	200	48	
8	2500.000	32.14	1.10	33.24	54.00	-20.76	AVG	200	131	

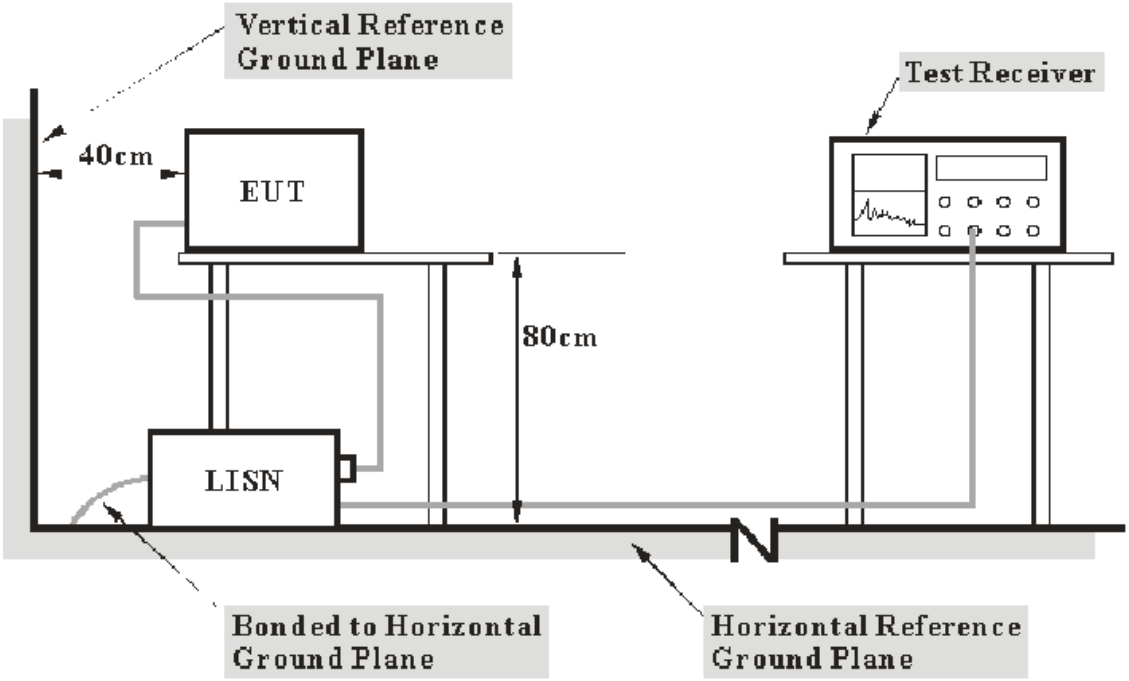
12. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

12.1. Block Diagram of Test Setup



(EUT: Speaker)

12.2. Test System Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

12.3.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

12.4.Configuration of EUT on Measurement

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

12.5.Operating Condition of EUT

12.5.1.Setup the EUT and simulator as shown as Section 12.1.

12.5.2.Turn on the power of all equipment.

12.5.3.Let the EUT work in test mode and measure it.

12.6.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.
The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

12.7.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.5	51.1	34.2	56.0	46.0	4.9	11.8	Pass

Frequency(MHz) = Emission frequency in MHz
Transducer value(dB) = Insertion loss of LISN + Cable Loss
Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value
Limit (dBμV) = Limit stated in standard
Margin = Limit (dBμV) - Level (dBμV)

Calculation Formula:
Margin = Limit (dBμV) - Level (dBμV)

12.8.Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.
Maximizing procedure was performed on the six (6) highest emissions of the EUT.
Emissions attenuated more than 20 dB below the permissible value are not reported.
We tested the conducted emission of high and low voltage mode and recorded the worst mode data. All data was recorded in the Quasi-peak and average detection mode.

Test mode : CHARGING (AC 120V/60Hz)

MEASUREMENT RESULT: "J-0428-2_fin"

2020-4-28 10:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	38.30	10.8	65	26.2	QP	N	GND
0.540000	38.40	11.0	56	17.6	QP	N	GND
1.126000	27.60	11.2	56	28.4	QP	N	GND
2.405000	28.30	11.3	56	27.7	QP	N	GND
5.975000	25.30	11.5	60	34.7	QP	N	GND
21.225000	36.00	11.7	60	24.0	QP	N	GND

MEASUREMENT RESULT: "J-0428-2_fin2"

2020-4-28 10:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.316000	21.20	10.9	50	28.6	AV	N	GND
0.538000	32.80	11.0	46	13.2	AV	N	GND
1.034000	24.20	11.1	46	21.8	AV	N	GND
2.495000	22.00	11.3	46	24.0	AV	N	GND
6.050000	16.50	11.5	50	33.5	AV	N	GND
21.235000	24.40	11.7	50	25.6	AV	N	GND

MEASUREMENT RESULT: "J-0428-1_fin"

2020-4-28 10:51

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.172000	39.50	10.8	65	25.4	QP	L1	GND
0.560000	39.80	11.0	56	16.2	QP	L1	GND
1.164000	32.10	11.2	56	23.9	QP	L1	GND
3.220000	31.50	11.4	56	24.5	QP	L1	GND
6.040000	24.20	11.5	60	35.8	QP	L1	GND
21.675000	29.90	11.7	60	30.1	QP	L1	GND

MEASUREMENT RESULT: "J-0428-1_fin2"

2020-4-28 10:51

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.154000	27.20	10.8	56	28.6	AV	L1	GND
0.562000	29.80	11.0	46	16.2	AV	L1	GND
1.118000	25.40	11.2	46	20.6	AV	L1	GND
2.325000	22.40	11.3	46	23.6	AV	L1	GND
5.840000	15.50	11.5	50	34.5	AV	L1	GND
21.205000	22.30	11.7	50	27.7	AV	L1	GND

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

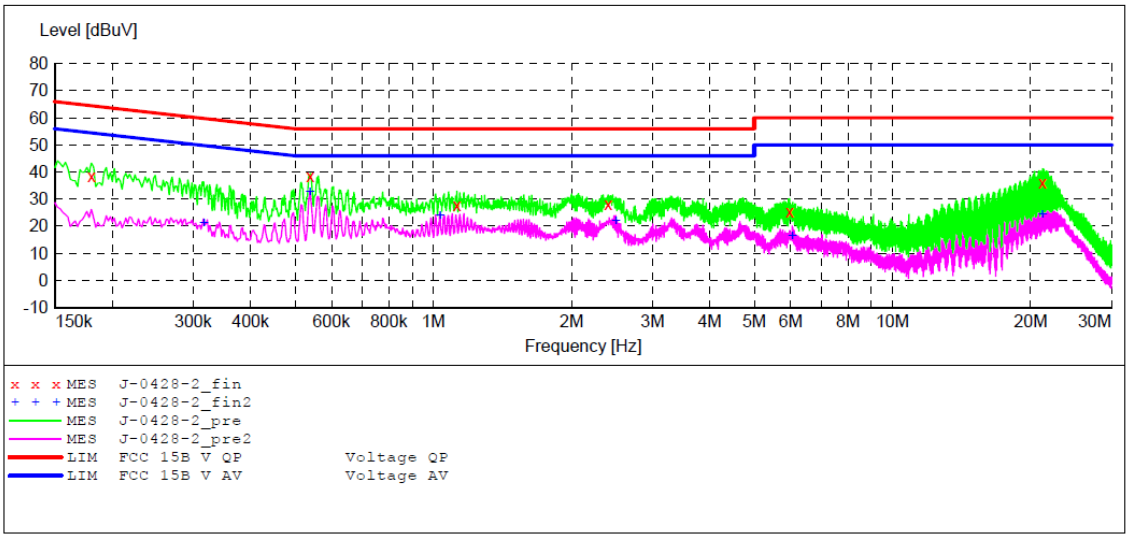
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  Speaker M/N:S10
Manufacturer:         Lovo consulting limited
Operating Condition:  Charging
Test Site:            1#Shielding Room
Operator:             WADE
Test Specification:   N 120V/60Hz
Comment:              Report NO.:ATE20200393
Start of Test:        2020-4-28 / 10:51:57
```

SCAN TABLE: "V 150K-30MHz fin"

```
Short Description:              SUB STD VTERM2 1.70
Start      Stop       Step       Detector   Meas.     IF       Transducer
Frequency  Frequency  Width                 Time      Bandw.
150.0 kHz  30.0 MHz   4.5 kHz    QuasiPeak  1.0 s     9 kHz    NSLK8126 2008
                                 Average
```



MEASUREMENT RESULT: "J-0428-2_fin"

2020-4-28 10:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	38.30	10.8	65	26.2	QP	N	GND
0.540000	38.40	11.0	56	17.6	QP	N	GND
1.126000	27.60	11.2	56	28.4	QP	N	GND
2.405000	28.30	11.3	56	27.7	QP	N	GND
5.975000	25.30	11.5	60	34.7	QP	N	GND
21.225000	36.00	11.7	60	24.0	QP	N	GND

MEASUREMENT RESULT: "J-0428-2_fin2"

2020-4-28 10:53

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.316000	21.20	10.9	50	28.6	AV	N	GND
0.538000	32.80	11.0	46	13.2	AV	N	GND
1.034000	24.20	11.1	46	21.8	AV	N	GND
2.495000	22.00	11.3	46	24.0	AV	N	GND
6.050000	16.50	11.5	50	33.5	AV	N	GND
21.235000	24.40	11.7	50	25.6	AV	N	GND

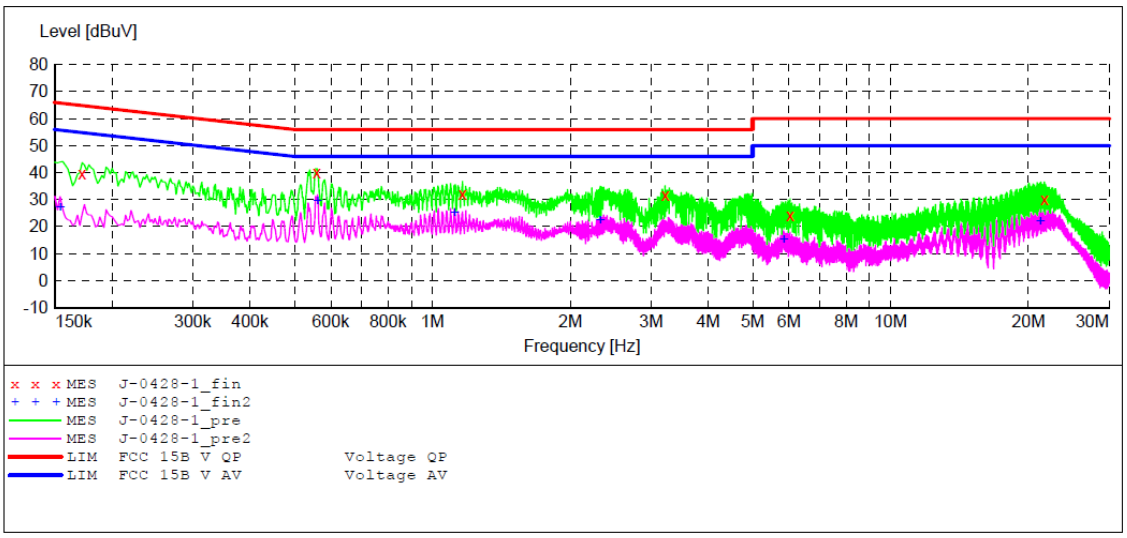
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                    Speaker M/N:S10
Manufacturer:           Lovo consulting limited
Operating Condition:    Charging
Test Site:              1#Shielding Room
Operator:               WADE
Test Specification:     L 120V/60Hz
Comment:                Report NO.:ATE20200393
Start of Test:          2020-4-28 / 10:49:25
```

SCAN TABLE: "V 150K-30MHz fin"

```
Short Description:              SUB STD VTERM2 1.70
Start      Stop       Step       Detector   Meas.     IF       Transducer
Frequency  Frequency  Width                 Time      Bandw.
150.0 kHz  30.0 MHz   4.5 kHz    QuasiPeak  1.0 s     9 kHz    NSLK8126 2008
                                 Average
```



MEASUREMENT RESULT: "J-0428-1_fin"

2020-4-28 10:51

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.172000	39.50	10.8	65	25.4	QP	L1	GND
0.560000	39.80	11.0	56	16.2	QP	L1	GND
1.164000	32.10	11.2	56	23.9	QP	L1	GND
3.220000	31.50	11.4	56	24.5	QP	L1	GND
6.040000	24.20	11.5	60	35.8	QP	L1	GND
21.675000	29.90	11.7	60	30.1	QP	L1	GND

MEASUREMENT RESULT: "J-0428-1_fin2"

2020-4-28 10:51

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.154000	27.20	10.8	56	28.6	AV	L1	GND
0.562000	29.80	11.0	46	16.2	AV	L1	GND
1.118000	25.40	11.2	46	20.6	AV	L1	GND
2.325000	22.40	11.3	46	23.6	AV	L1	GND
5.840000	15.50	11.5	50	34.5	AV	L1	GND
21.205000	22.30	11.7	50	27.7	AV	L1	GND

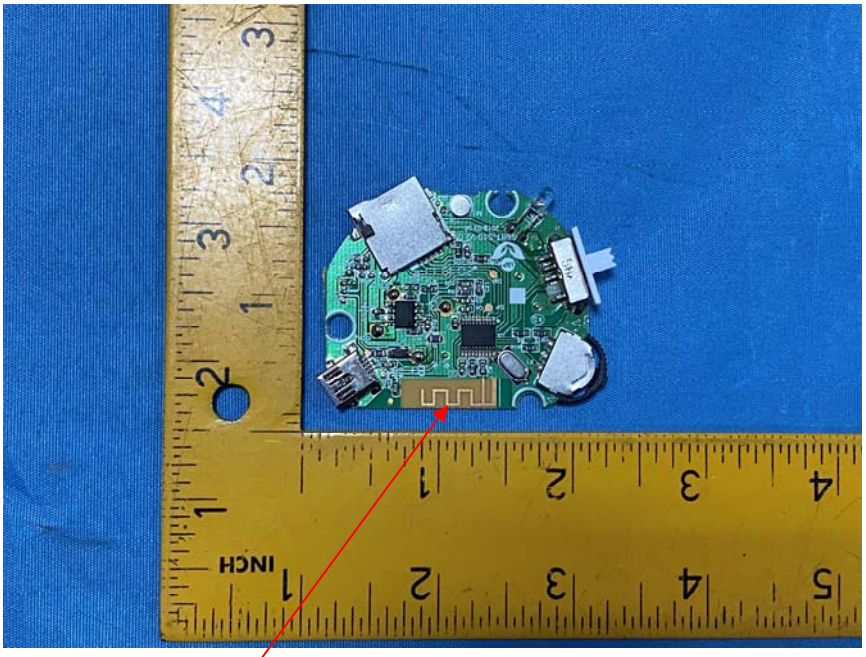
13. ANTENNA REQUIREMENT

13.1. The Requirement

According to 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.

13.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is -0.58dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna