



FCC AND ISED CERTIFICATION TEST REPORT

Applicant	:	Edifier International Limited
Address of Applicant	:	P. O. Box 6264 General Post Office Hong Kong
Manufacturer	:	Beijing Edifier Technology Co., Ltd.
Address of Manufacturer	:	815, Floor 8, Shuangqiao Building, No.68, North Fourth Ring West Road, Haidian District, Beijing 100080, P.R.China
Equipment under Test	:	Tabletop Wireless Speaker
Model No.	:	EDF100080
FCC ID	:	Z9G-EDF227
IC	:	10004A-EDF227
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023, ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021)
Report No.	:	DDT-RE23121803-2E03
Issue Date	:	2024/01/16
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd.
Address of Laboratory	:	Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

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Test Report Declare

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Address of Manufacturer	:	815, Floor 8, Shuangqiao Building, No.68, North Fourth Ring West Road, Haidian District, Beijing 100080, P.R.China

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023.

Test Procedure Used:

ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018, Amendment 2 (February 2021), 558074 D01
15.247 Meas Guidance v05r02, 662911 D01 Multiple Transmitter Output v02r01

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above standards.

Report No.:	DDT-RE23121803-2E03		
Date of Receipt:	2023/12/20	Date of Test:	2023/12/20-2024/01/16

Prepared By:**Approved By:****Johnson Huang/Engineer****Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2024/01/16	

1. Summary of Test Results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Results
6dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247(a)(2) RSS-247 Issue 2 clause 5.2(a)	PASS
Conducted Output Power	FCC Part 15: 15.247(b)(3) RSS-247 Issue 2 clause 5.4(d)	PASS
Power Spectral Density	FCC Part 15: 15.247(e) RSS-247 Issue 2 clause 5.2(b)	PASS
Band-edge and Spurious Emissions (Conducted)	FCC Part 15: 15.247(d) RSS-247 Issue 2 clause 5.5	PASS
Radiated Spurious Emissions	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-247 Issue 2 clause 5.5 RSS-Gen Issue 5 clause 8.9	PASS
Radiated Band Edge Compliance	FCC Part 15: 15.205 FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-247 Issue 2 clause 5.5 RSS-Gen Issue 5 clause 8.9	PASS
Power Line Conducted Emission	FCC Part 15: 15.207(a) RSS-Gen Issue 5 clause 8.8	PASS
Antenna requirement	FCC Part 15: 15.203 RSS-Gen Issue 5 clause 6.8	PASS

2. General Test Information

2.1. Description of EUT

EUT Name	: Tabletop Wireless Speaker
Model Number	: EDF100080
EUT Function Description	: Please reference user manual of this device
Power Supply	: AC 100-240V, 50/60Hz, 0.5A or powered by a 7.4V built-in lithium battery
Radio Specification	: Bluetooth (BR/EDR/LE), WLAN (2.4 GHz): IEEE 802.11g/n WLAN (5 GHz): IEEE 802.11n
Operation Frequency	: Bluetooth (BR/EDR/LE): 2402 MHz-2480 MHz IEEE 802.11g/n: 2412 MHz to 2462 MHz, IEEE 802.11n: 5180 MHz to 5240 MHz, 5260 MHz to 5320 MHz, 5500 MHz to 5720 MHz, 5745 MHz to 5825 MHz
Modulation	: Bluetooth BR/EDR: GFSK, $\pi/4$ -DQPSK, 8DPSK Bluetooth LE: GFSK IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: IEEE 802.11g: up to 54 Mbps IEEE 802.11n HT20: up to 144.4 Mbps
Operating mode	: ☐ Master ☒ Client Without Radar Detection ☐ Client with Radar Detection
TPC function	: ☐ With TPC ☒ Without TPC
Antenna Type	: FPC antenna, Maximum PK gain: 3.0 dBi

Note 1: EUT is the abbreviation of equipment under test.

Note 2: “☒” means to be chosen or applicable; “☐” means don't to be chosen or not applicable; This note applies to entire report.

Note 3: This report only for WLAN (2.4 GHz): IEEE 802.11g/n

Channel information					
CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447	/	/

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
N/A	N/A	N/A	N/A	N/A

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
N/A	N/A	N/A	N/A	N/A

2.4. Block diagram of EUT configuration for test



Test software: SSCOM V5.13.1

The test software was used to control EUT work in Continuous Tx mode and select test channel, wireless mode as below table.

The pathloss of external cable: 0.5dB (According to the manufacturer's claims)

Tested mode, channel, and data rate information				
Mode	Setting Tx Power	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
	ANT			
IEEE 802.11g	13	6	LCH: CH1	2412
	13	6	MCH: CH6	2437
	13	6	HCH: CH11	2462
IEEE 802.11n HT20	13	MCS 0	LCH: CH1	2412
	13	MCS 0	MCH: CH6	2437
	13	MCS 0	HCH: CH11	2462
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.				

2.5. Deviations of test standard

No Deviation

2.6. Test environment conditions

Temperature range:	+15°C to +35 °C
Humidity range:	20% to 75%
Pressure range:	86 kPa to 106 kPa

2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.8. Measurement uncertainty

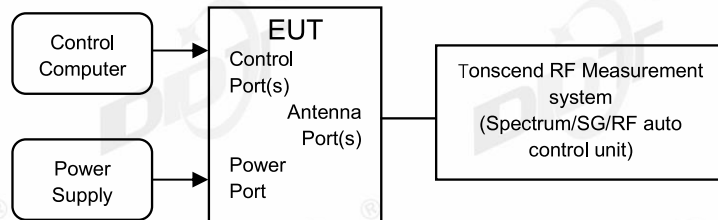
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz)
	4.40 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑RF Connected Test (RF Measurement System 3#)				
SIGNAL ANALYZER	R&S	FSV40	101407	2024/07/11
Wideband Radio Communication Tester	R&S	CMW500	117491	2024/04/26
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY62153058	2024/07/11
MXG Vector Signal Generator	Agilent	N5182A	MY48180912	2024/04/22
RF Control Unit	Tonscend	JS0806-2	20C8060230	2024/04/26
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2024/05/14
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A

4. 6dB Bandwidth

4.1. Block diagram of test setup



4.2. Limits

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz

4.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.8.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously
- (4) Use the following spectrum analyzer settings for 6 dB Bandwidth:

RBW:	100 kHz
VBW:	$\geq [3 \times \text{RBW}]$
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

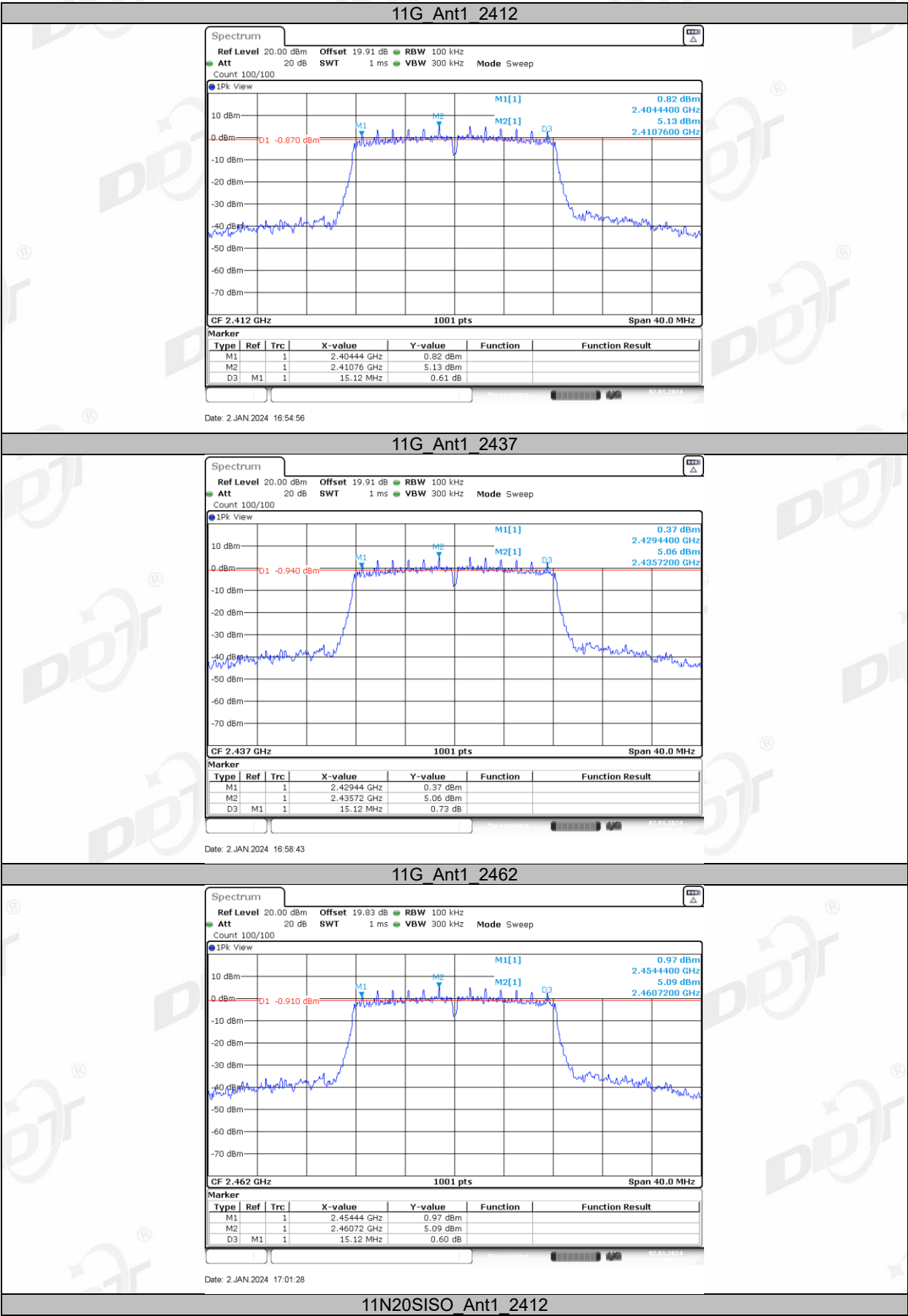
Allow the trace to stabilize, measure the 6 dB bandwidth of signal, and record the results in the report

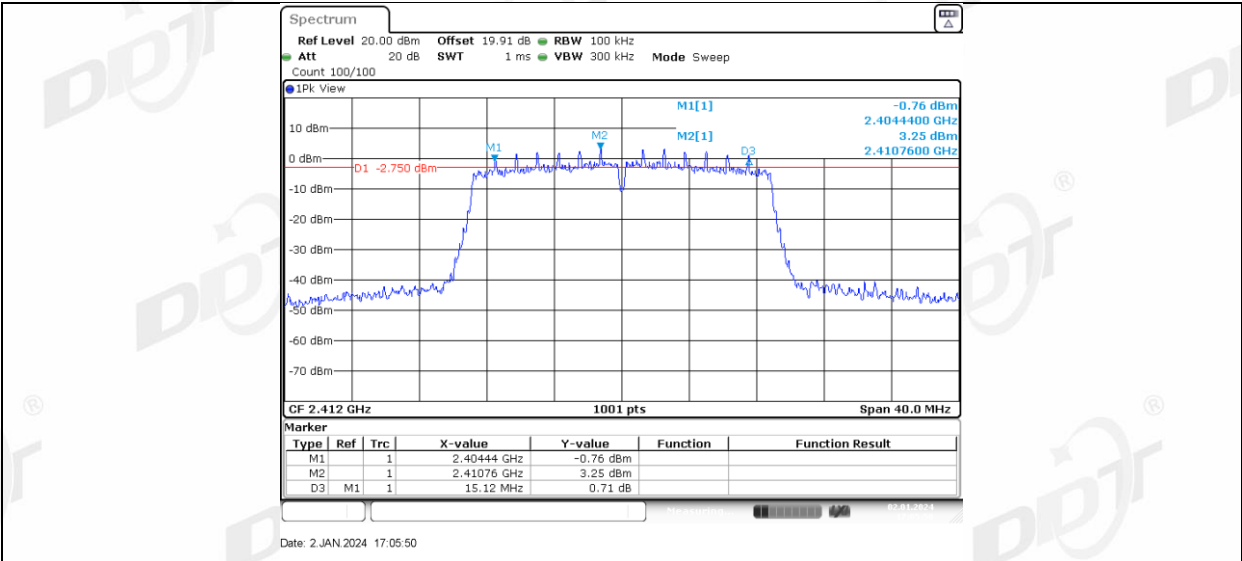
4.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

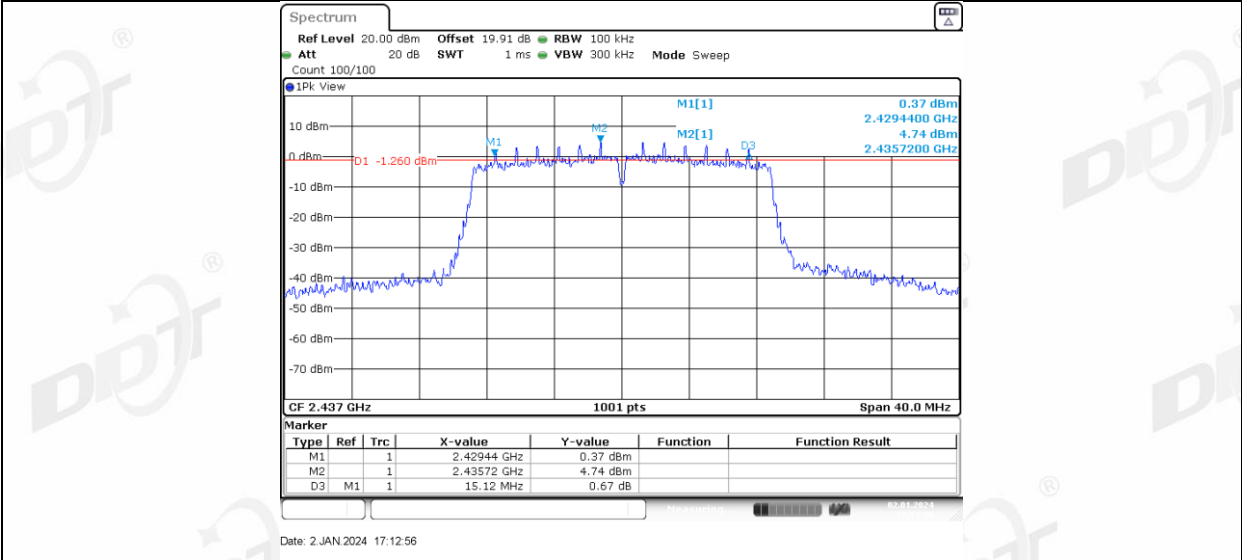
Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
11G	Ant1	2412	15.12	2404.44	2419.56	0.5	PASS
		2437	15.12	2429.44	2444.56	0.5	PASS
		2462	15.12	2454.44	2469.56	0.5	PASS
11N20SISO	Ant1	2412	15.12	2404.44	2419.56	0.5	PASS
		2437	15.12	2429.44	2444.56	0.5	PASS
		2462	15.12	2454.44	2469.56	0.5	PASS

4.5. Test graphs

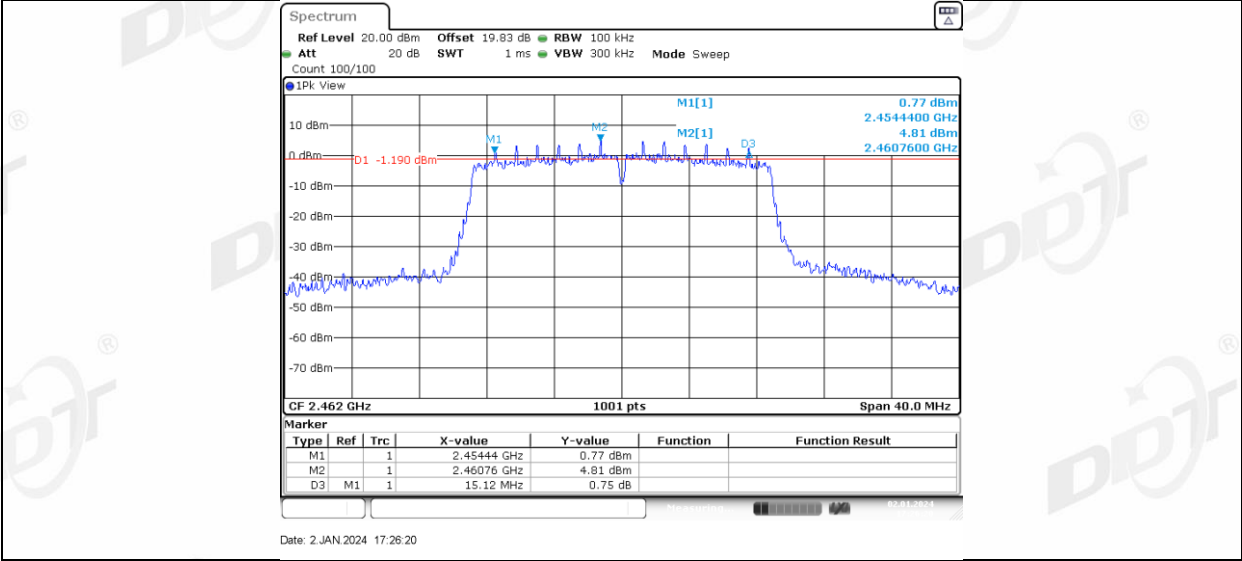




11N20SISO_Ant1_2437

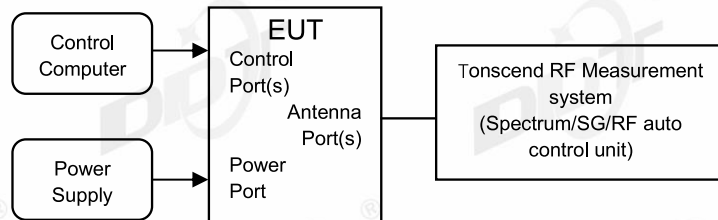


11N20SISO_Ant1_2462



5. 99% Bandwidth

5.1. Block diagram of test setup



5.2. Limits

Just for Report.

5.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 6.9.3.
- (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously
- (4) Use the following spectrum analyzer settings for the 99% Bandwidth:

RBW:	1% to 5% of the OBW
VBW:	approximately three times RBW
Span:	between 1.5 times and 5.0 times the OBW
Detector Mode:	peak
Sweep time:	auto
Trace mode	max hold

Allow the trace to stabilize, measure the 99% bandwidth of signal, and record the results in the report.

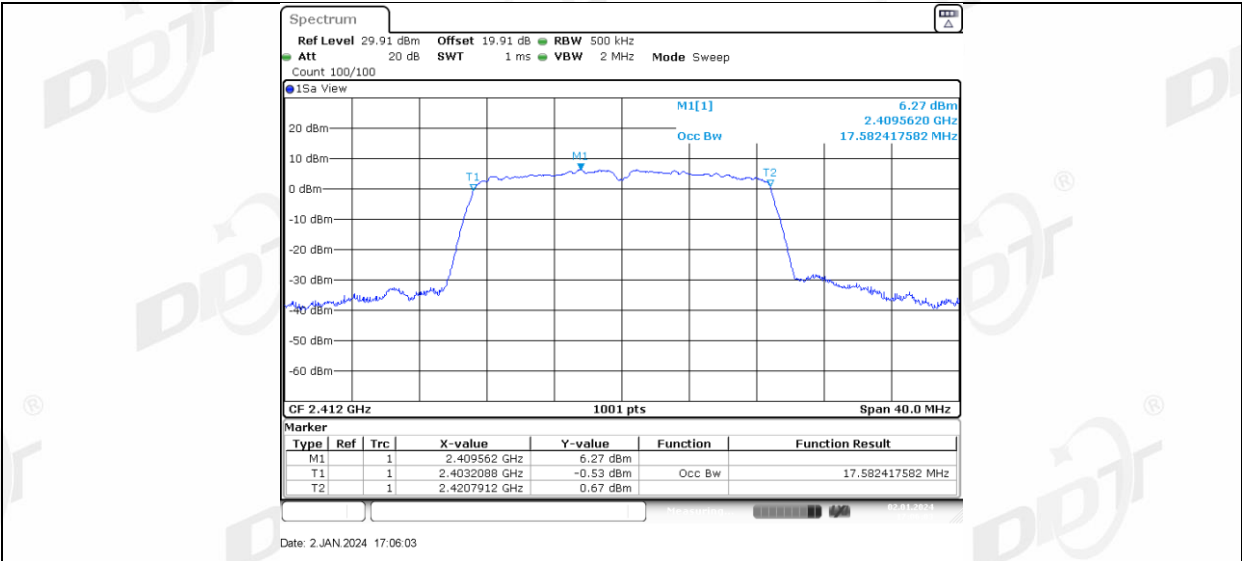
5.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

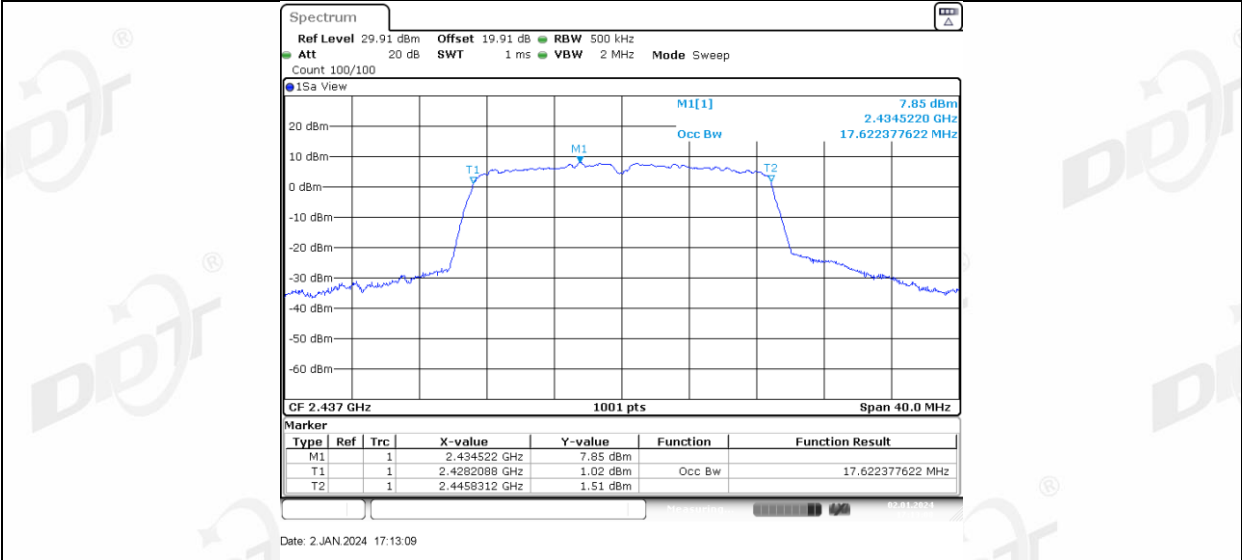
TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11G	Ant1	2412	16.424	2403.7682	2420.1918	---	---
		2437	16.424	2428.7682	2445.1918	---	---
		2462	16.424	2453.7682	2470.1918	---	---
11N20SISO	Ant1	2412	17.582	2403.2088	2420.7912	---	---
		2437	17.622	2428.2088	2445.8312	---	---
		2462	17.622	2453.2088	2470.8312	---	---

5.5. Test graphs

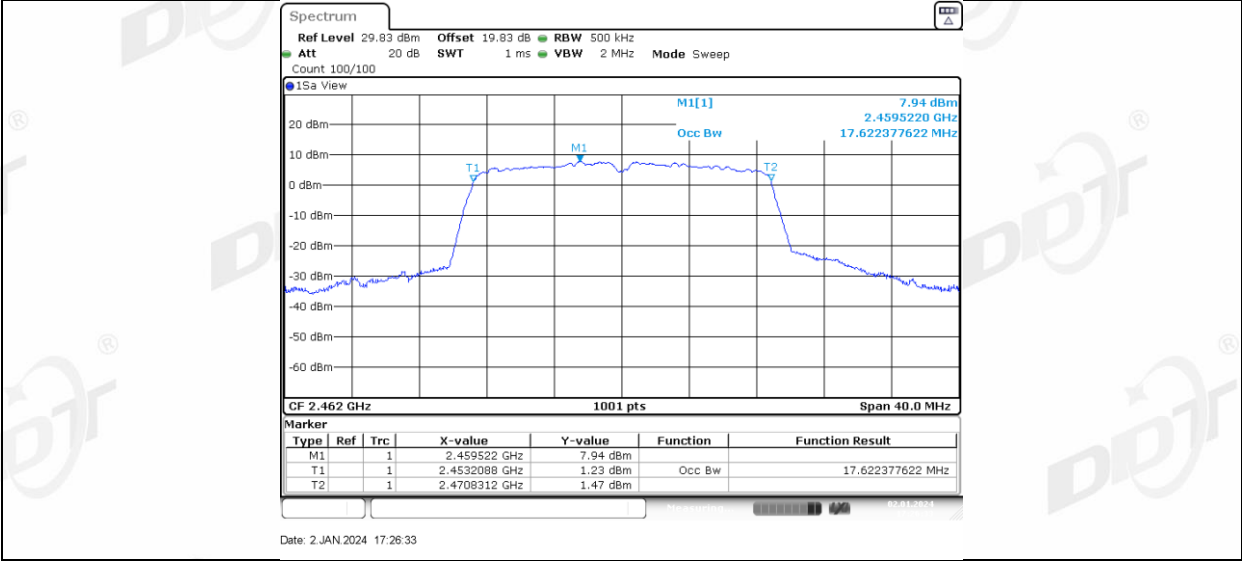




11N20SISO_Ant1_2437

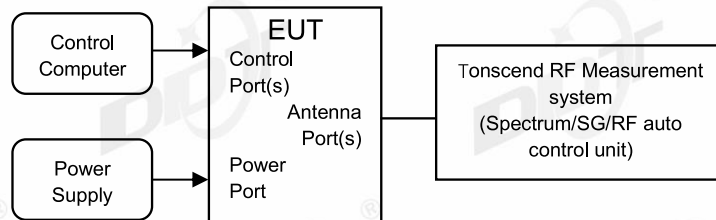


11N20SISO_Ant1_2462



6. Conducted Output Power

6.1. Block diagram of test setup



6.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. 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 as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.9.2.3.
- (2) Connect EUT's antenna output to RF power meter by RF cable, the path loss was compensated to the results.
- (3) Set the EUT as maximum power setting and enable the EUT transmit continuously, If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal.
- (4) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
- (5) Adjust the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle.
- (6) Record the RF average power of each antenna port.

6.4. Test result average

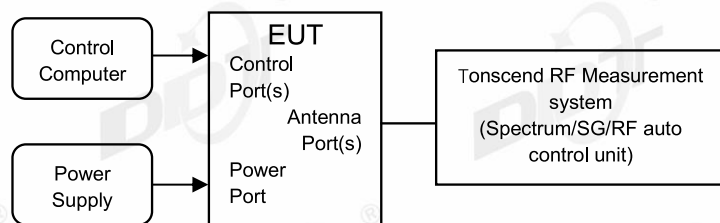
Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

Test Mode	Antenna	Frequency [MHz]	Average power [dBm]	Duty Cycle [%]	DC Factor [dB]	Result [dBm]	Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11G	Ant1	2412	14.43	88.89	0.51	14.94	≤30.00	17.94	≤36.00	PASS
		2437	14.86	92.31	0.35	15.21	≤30.00	18.21	≤36.00	PASS
		2462	14.98	92.31	0.35	15.33	≤30.00	18.33	≤36.00	PASS
11N20SISO	Ant1	2412	14.38	92.86	0.32	14.70	≤30.00	17.70	≤36.00	PASS
		2437	14.71	93.10	0.31	15.02	≤30.00	18.02	≤36.00	PASS
		2462	14.87	92.86	0.32	15.19	≤30.00	18.19	≤36.00	PASS

Note: EIRP (dBm)=Conducted Output Power (dBm)+ Antenna Gain (dBi)

7. Power Spectral Density

7.1. Block diagram of test setup



7.2. Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3. Test procedure

- (1) The test according to ANSI C63.10-2013 clause 11.10.5.
 - (2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
 - (3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
 - (4) Use the following spectrum analyzer settings for Power Spectral Density measurement:

Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	RMS
Sweep time:	auto
Trace mode	max hold
	Employ trace averaging (rms)
Trace	mode over a minimum of 100 traces.
 - (5) Add $[10 \log (1 / D)]$, where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

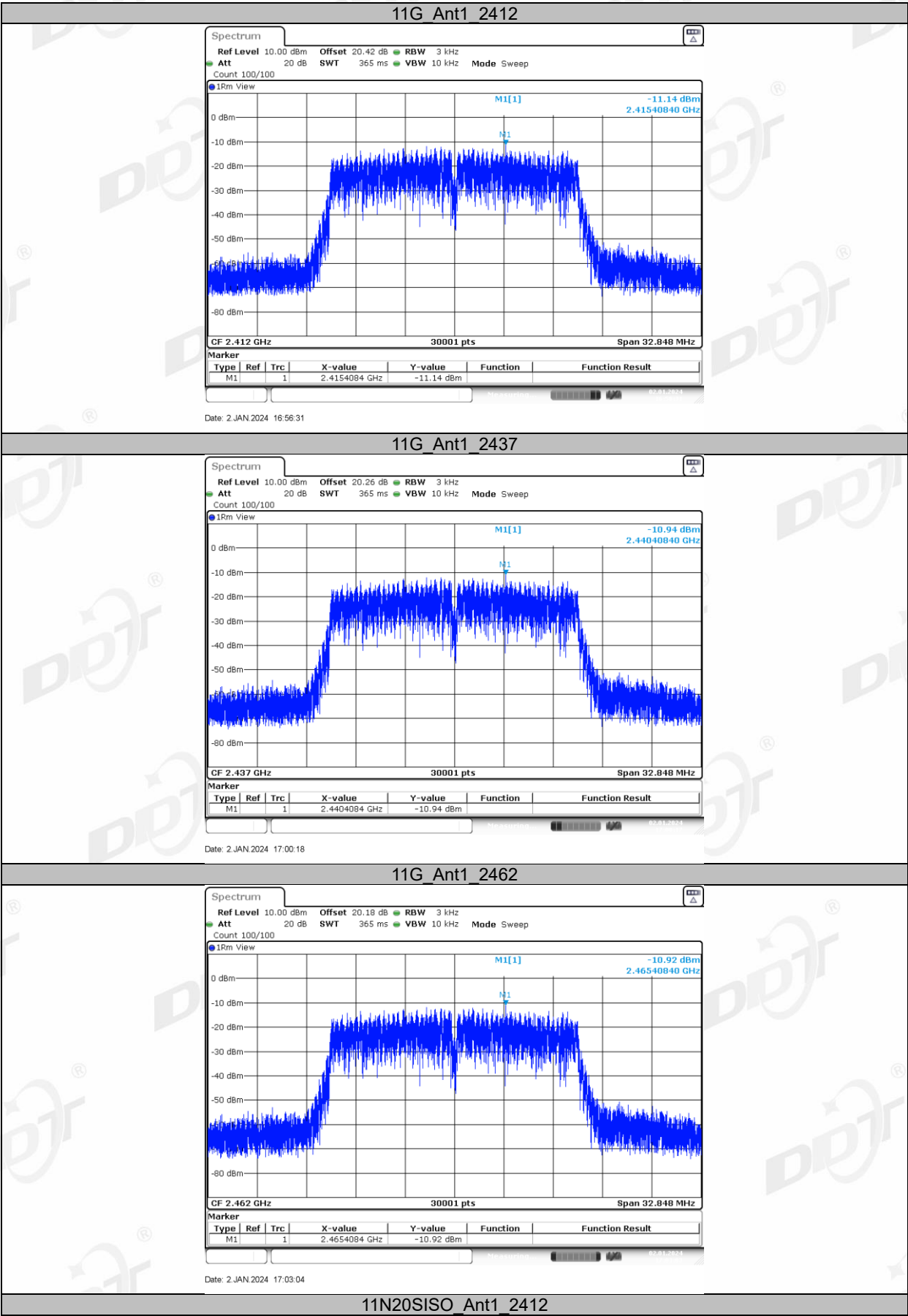
7.4. Test result

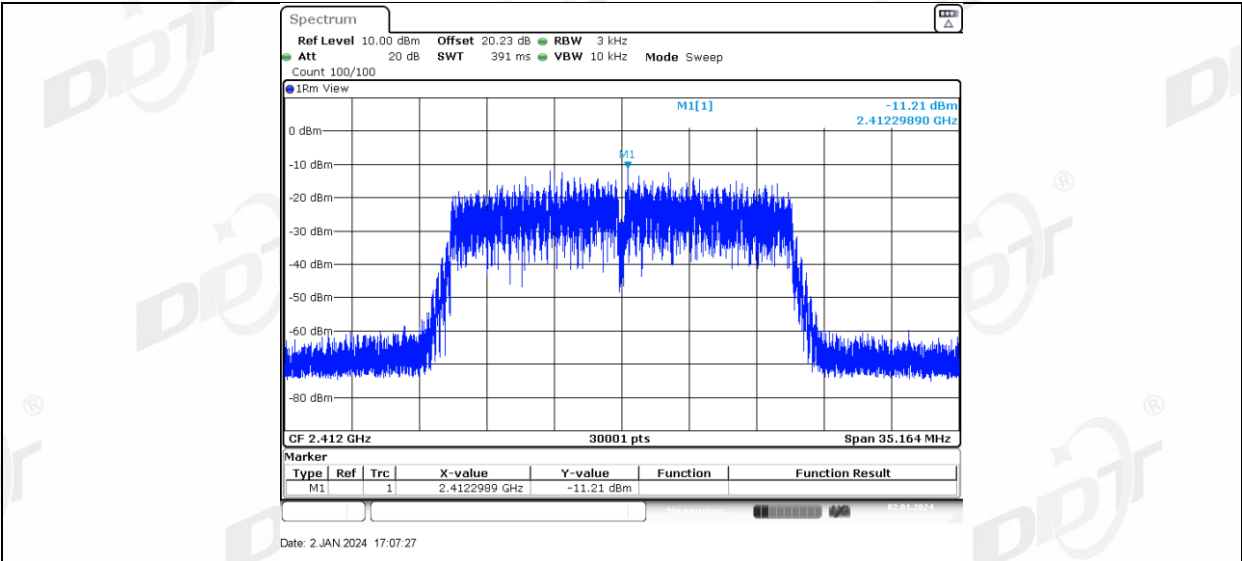
Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

Test Mode	Antenna	Frequency [MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11G	Ant1	2412	-11.14	≤8.00	PASS
		2437	-10.94	≤8.00	PASS
		2462	-10.92	≤8.00	PASS
11N20SISO	Ant1	2412	-11.21	≤8.00	PASS
		2437	-9.63	≤8.00	PASS
		2462	-9.46	≤8.00	PASS

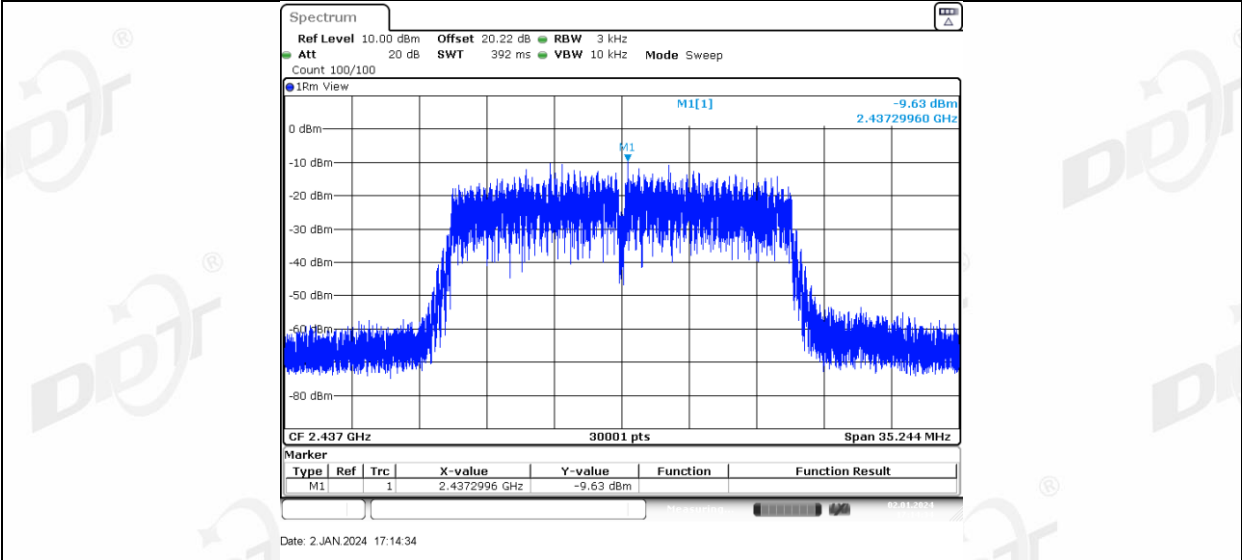
Note: The Duty Cycle Factor is compensated in the graph.

7.5. Test graphs

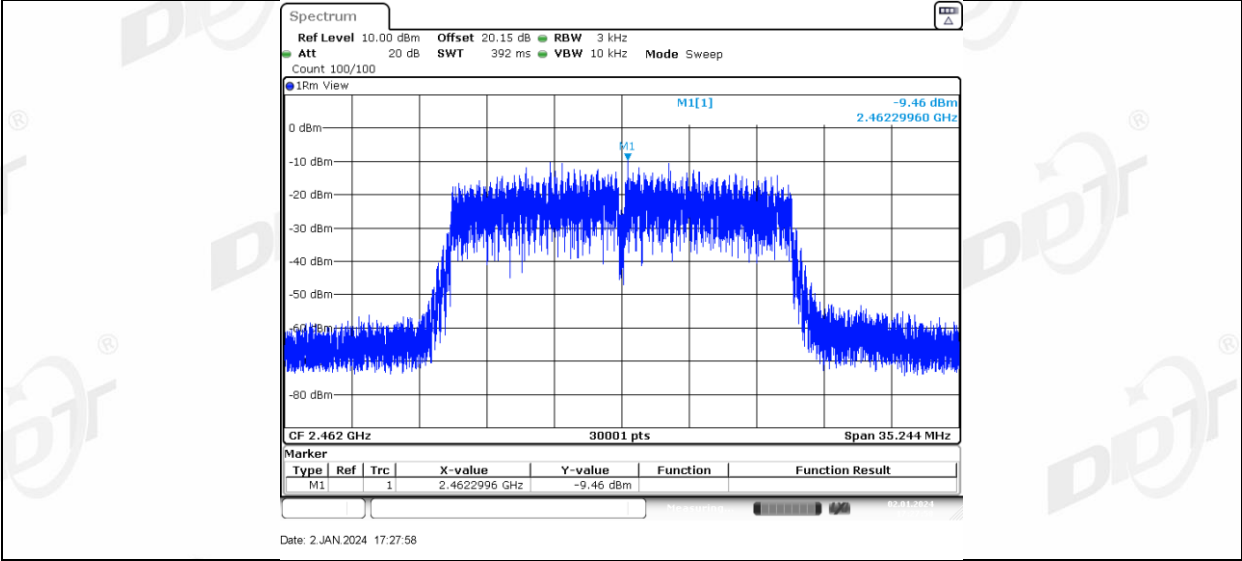




11N20SISO_Ant1_2437

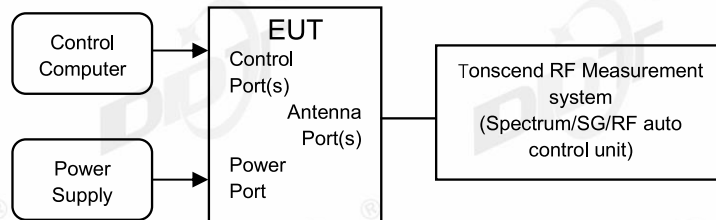


11N20SISO_Ant1_2462



8. Band Edge Compliance (Conducted Method)

8.1. Block diagram of test setup



8.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

8.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

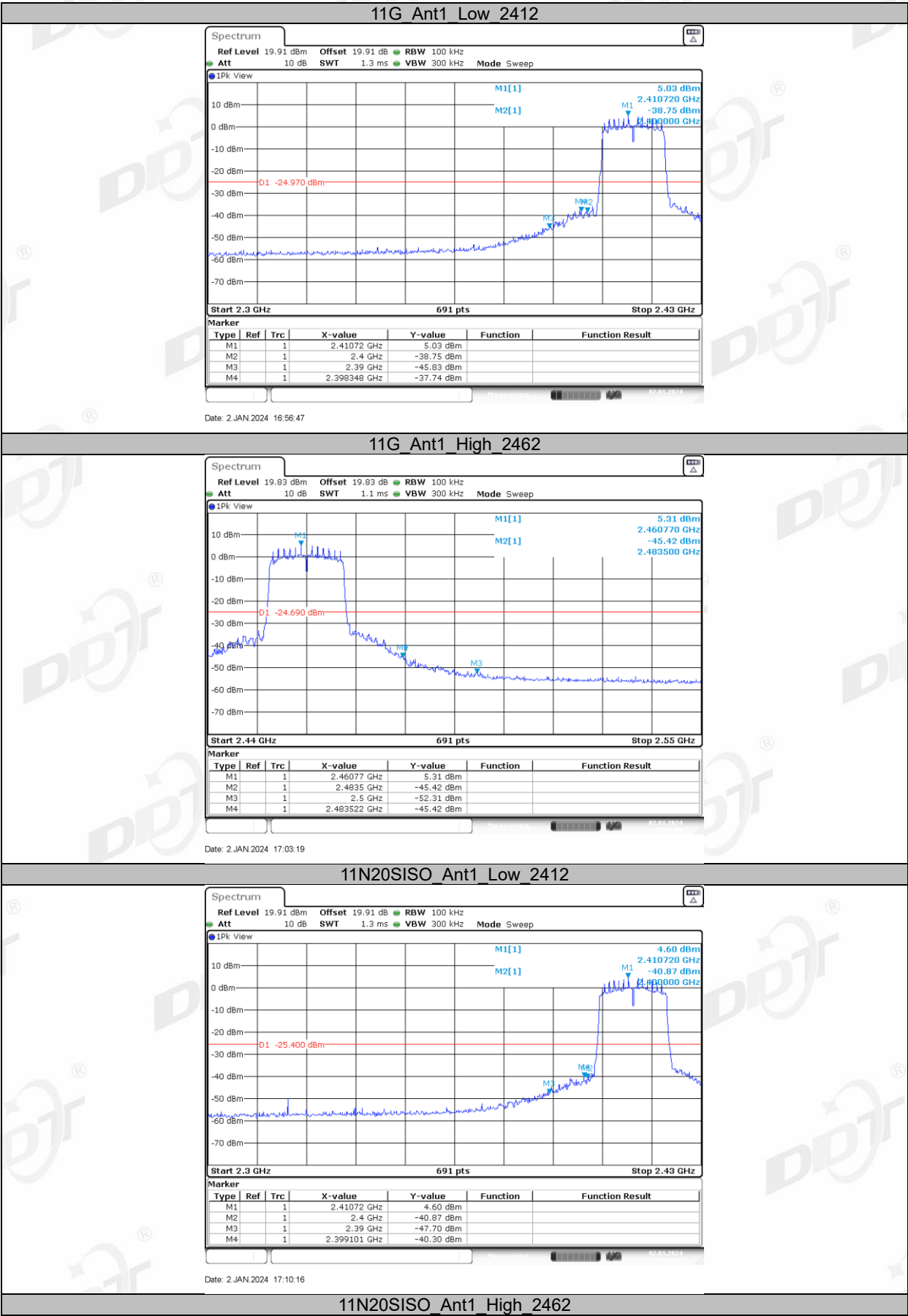
Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

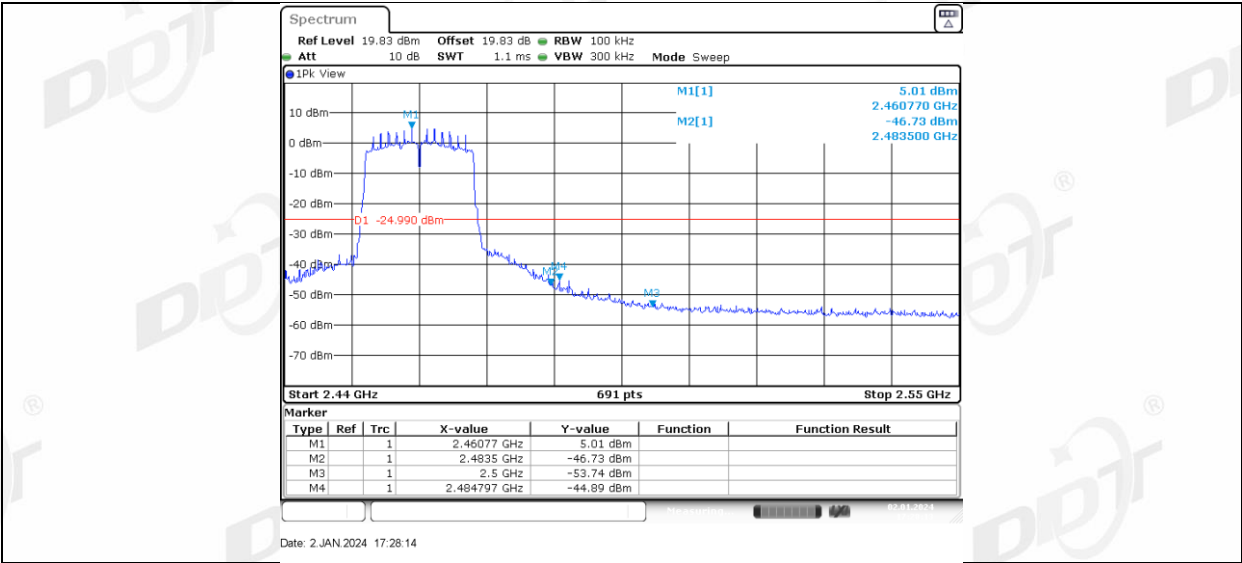
8.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

EUT Set Mode	CH or Frequency	Result(dBm)	EUT Set Mode	CH or Frequency	Result (dBm)
11g	CH1	Pass	11n HT 20	CH1	Pass
	CH11	Pass		CH11	Pass

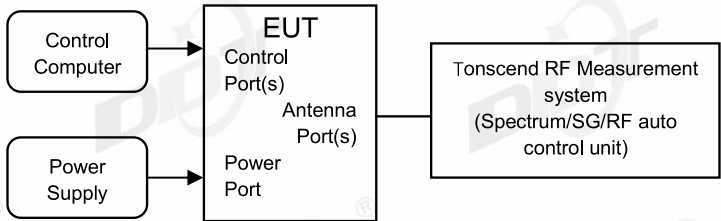
8.5. Test graphs





9. RF Conducted Spurious Emissions

9.1. Block diagram of test setup



9.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

9.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

Center frequency	Test frequency
RBW:	100 kHz
VBW:	300 kHz
Span	Wide enough to capture the peak level of the in-band emission
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold
- (3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
- (4) Set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{Span}/\text{RBW}$
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

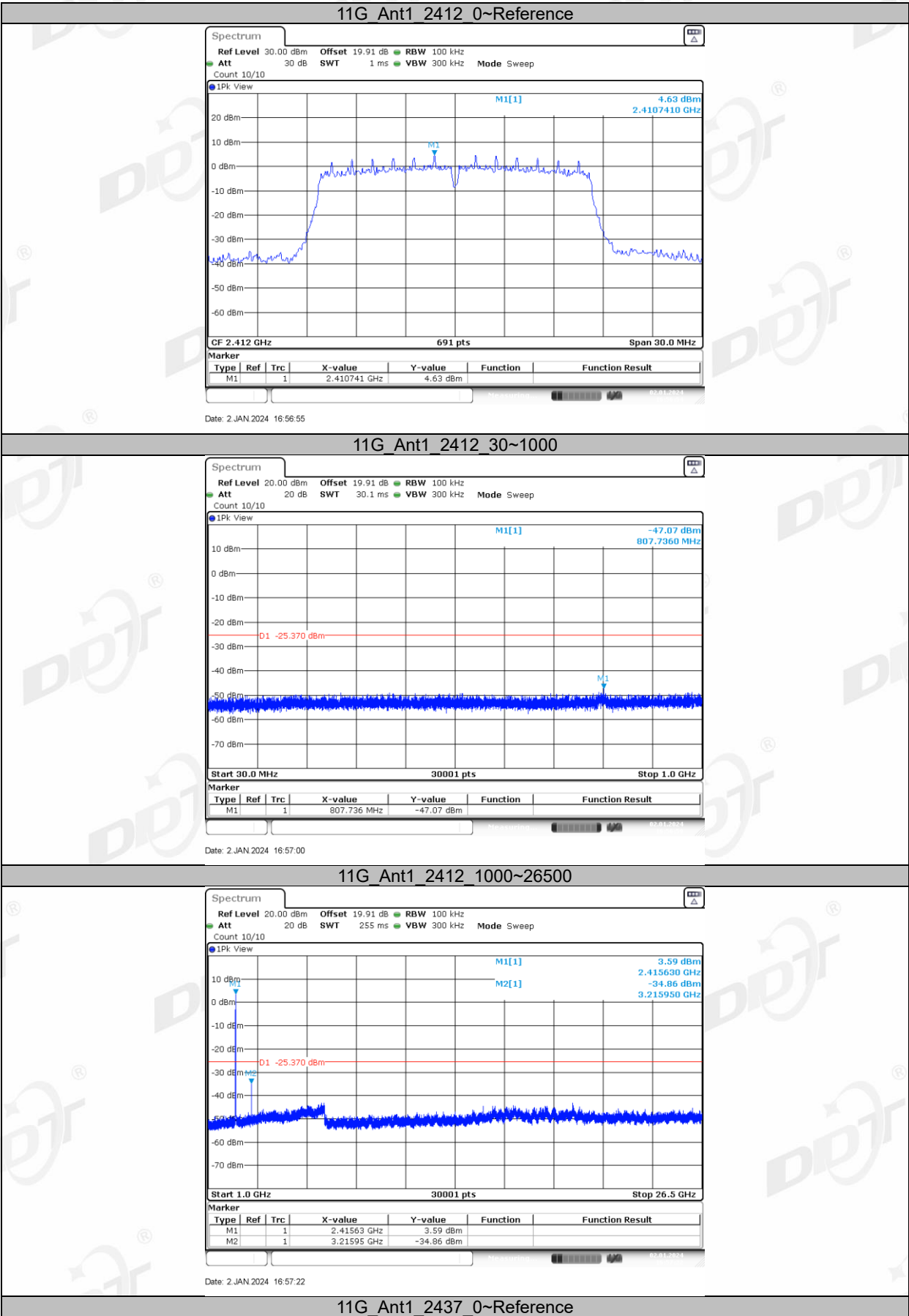
(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

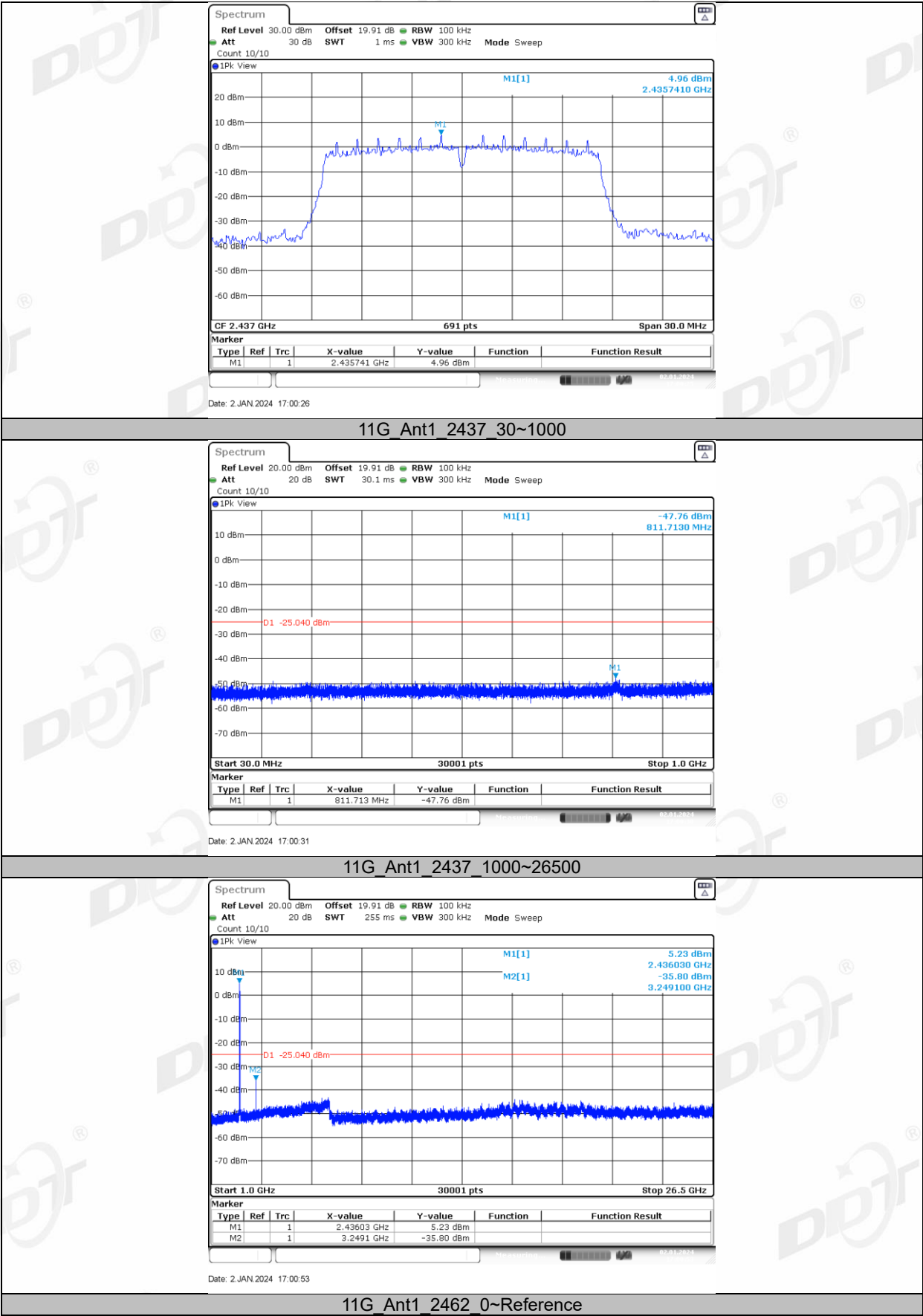
9.4. Test result

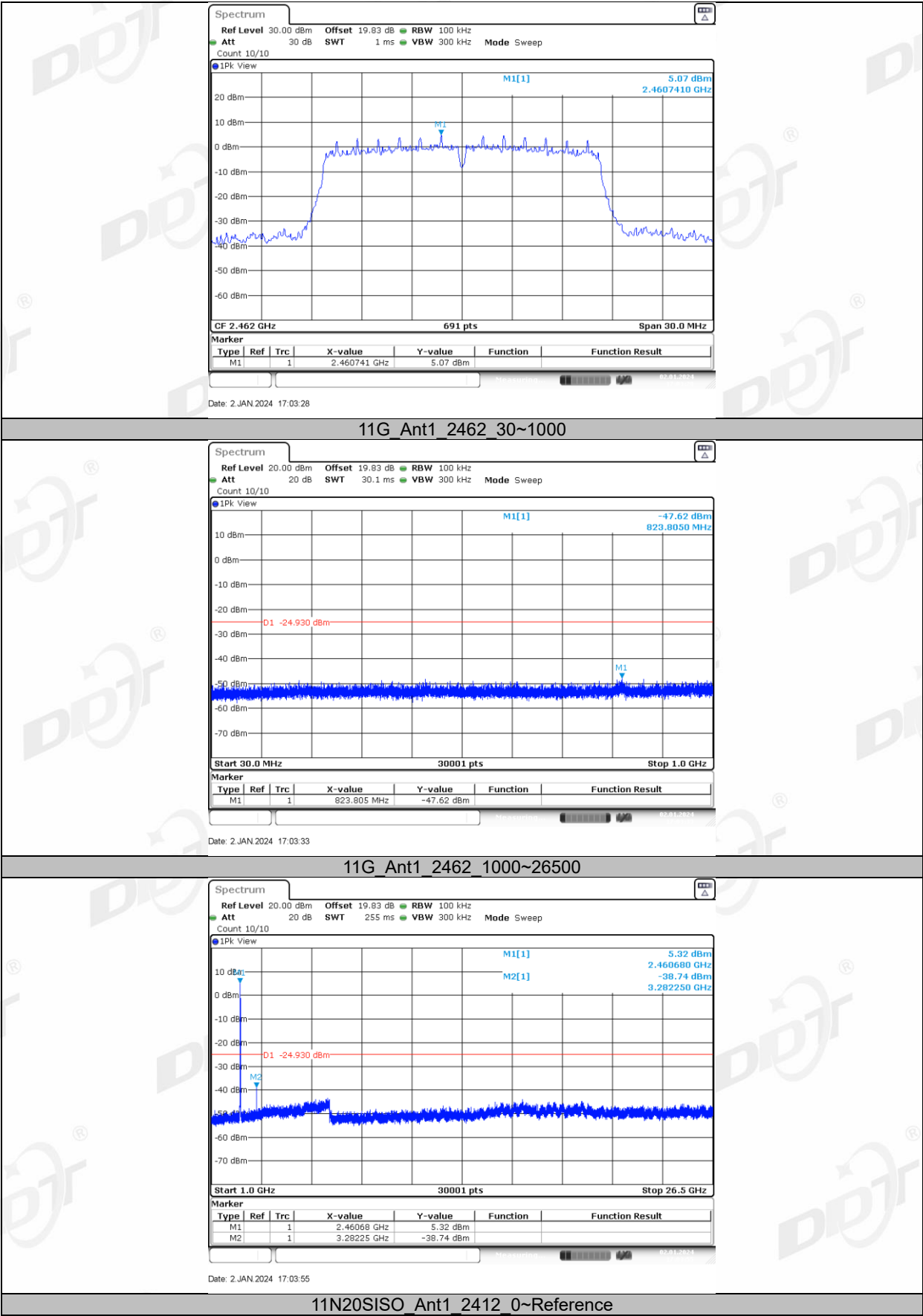
Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

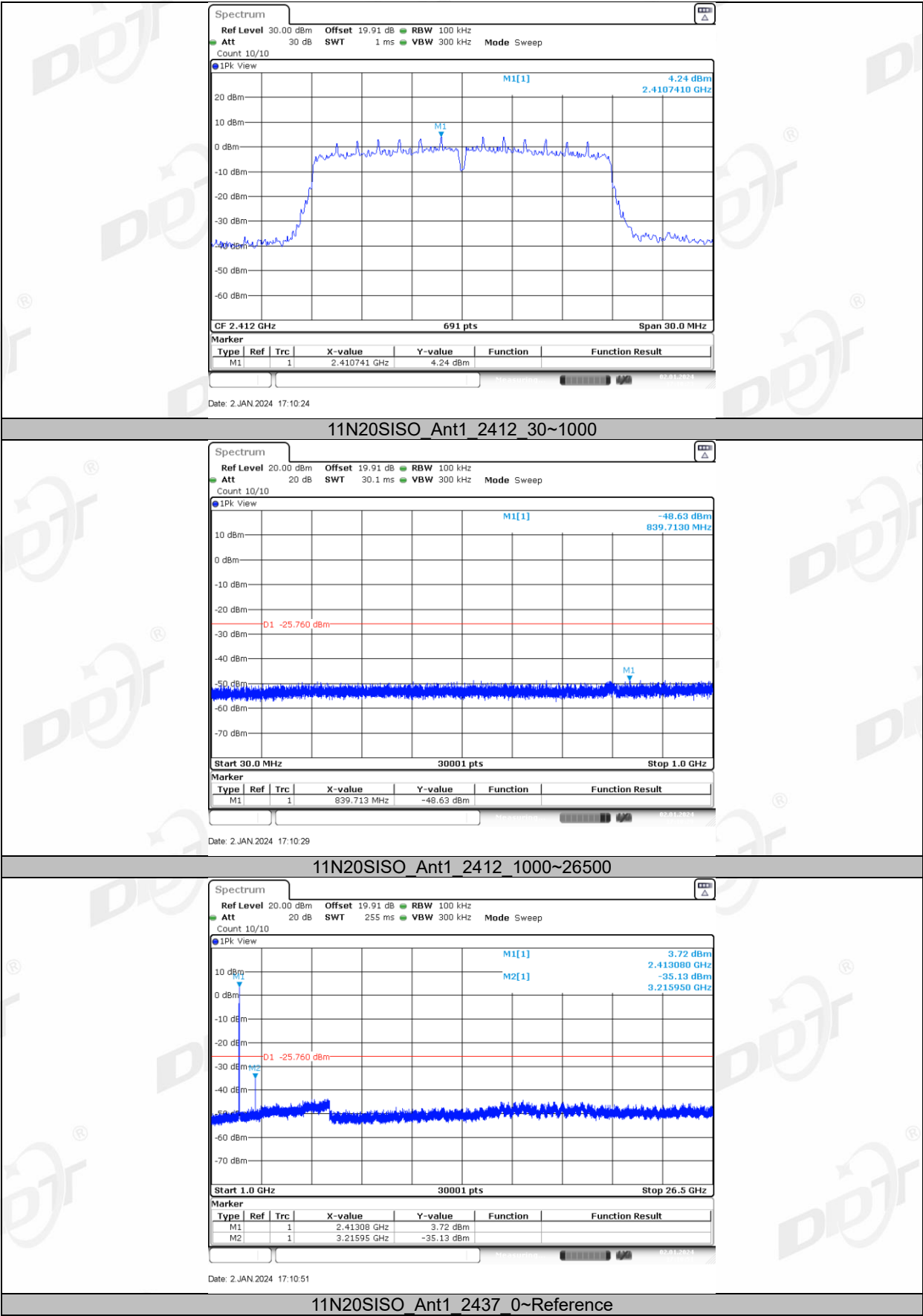
EUT Set Mode	CH or Frequency	Result(dBm)	EUT Set Mode	CH or Frequency	Result (dBm)
11g	CH1	Pass	11n HT 20	CH1	Pass
	CH11	Pass		CH11	Pass

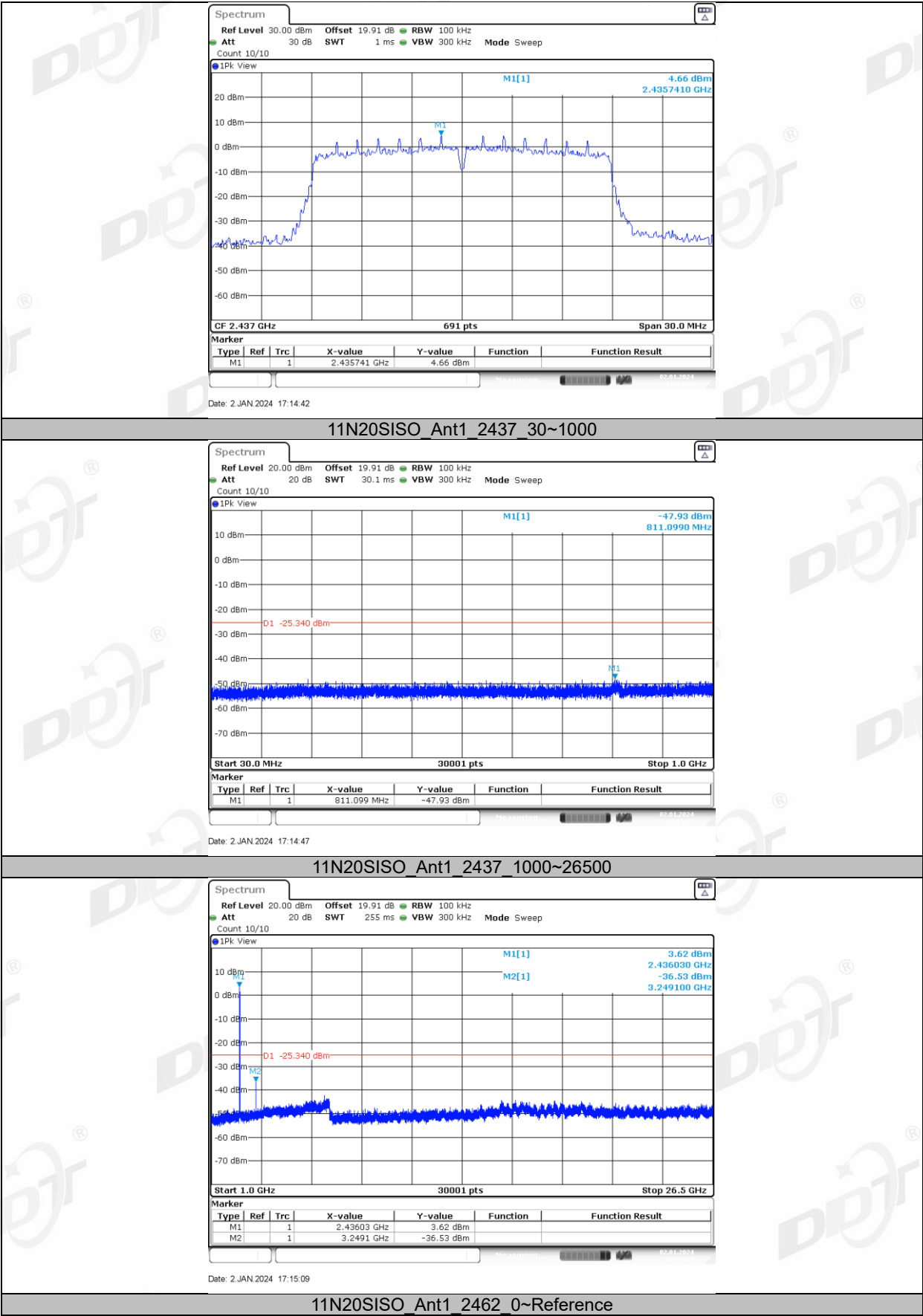
9.5. Test graphs

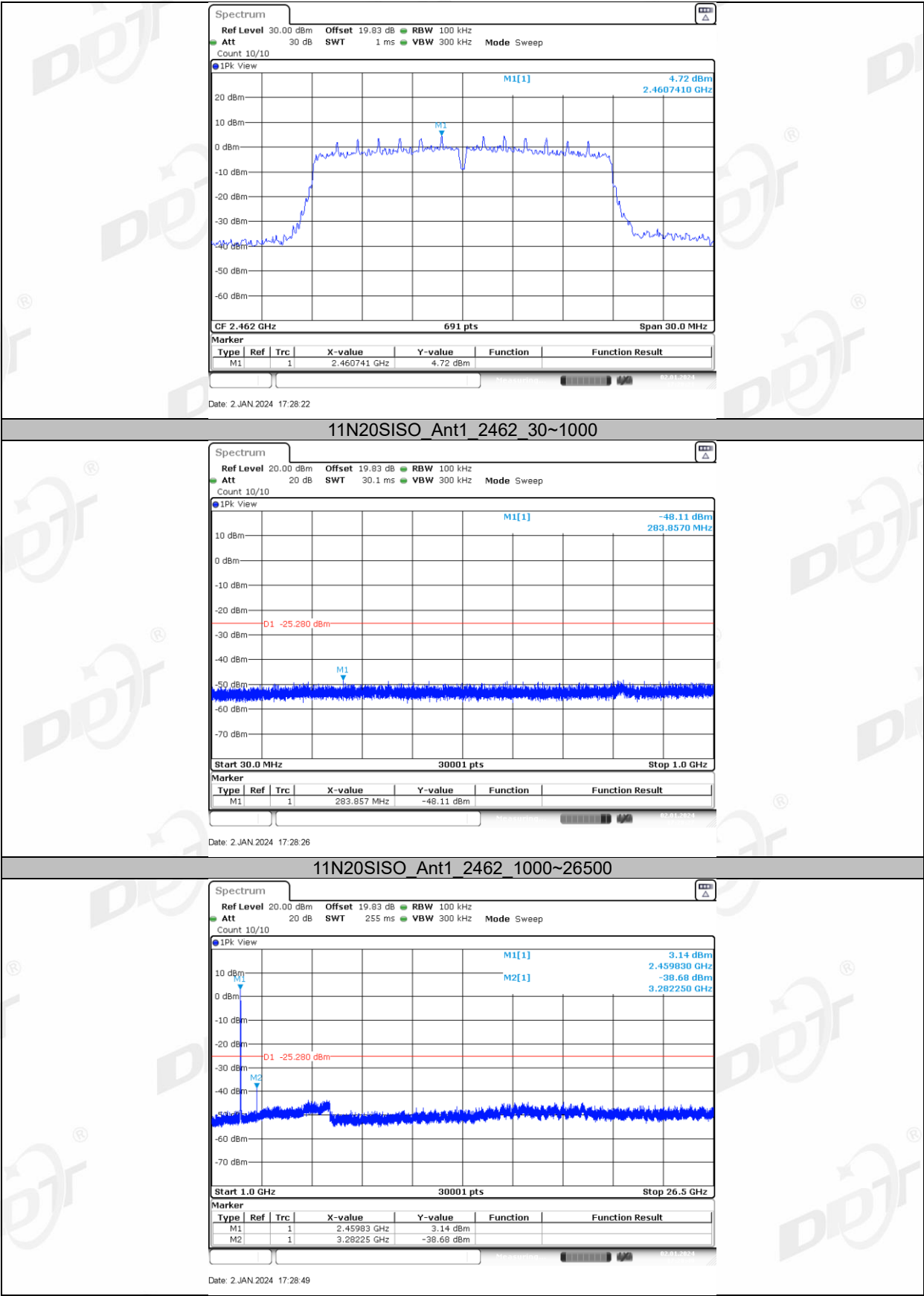






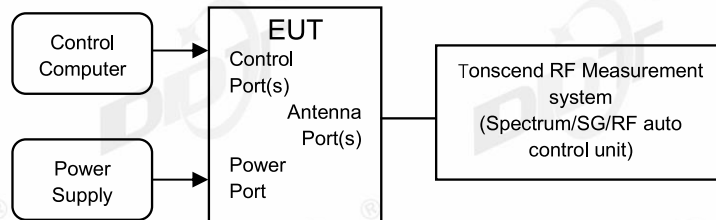






10. Duty Cycle

10.1. Block diagram of test setup



10.2. Limit

Just for Report.

10.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset. set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the middle hopping channel.

Resolution BW: 10 MHz.

Video BW: 10 MHz.

Span: Zero span.

Detector: Peak.

Trace Mode: Clear Write.

Sweep: Video Trigger

- (2) When the trace is complete, measure the sending time of 1 burst and the duty cycle of 1 burst cycle.
- (3) Calculate dwell time follow below formula:
$$\text{Duty cycle} = \text{Pulse's on time} / \text{Burst cycle}$$

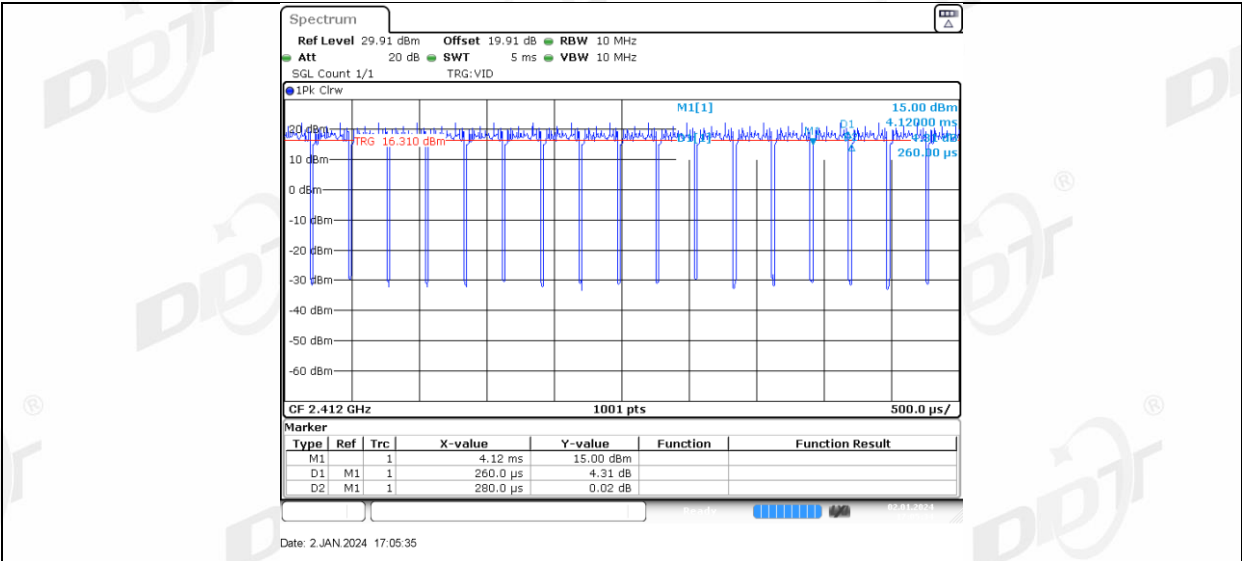
10.4. Test result

Test Engineer:	Zoe	Test Site:	RF Measurement System 3#
Ambient Condition:	21.3℃,40.5%RH	Test Date:	2024.01.02
Test Power Supply:	Battery	EUT:	Tabletop Wireless Speaker
Sample Number:	S23113018-02	Model No.:	EDF100080

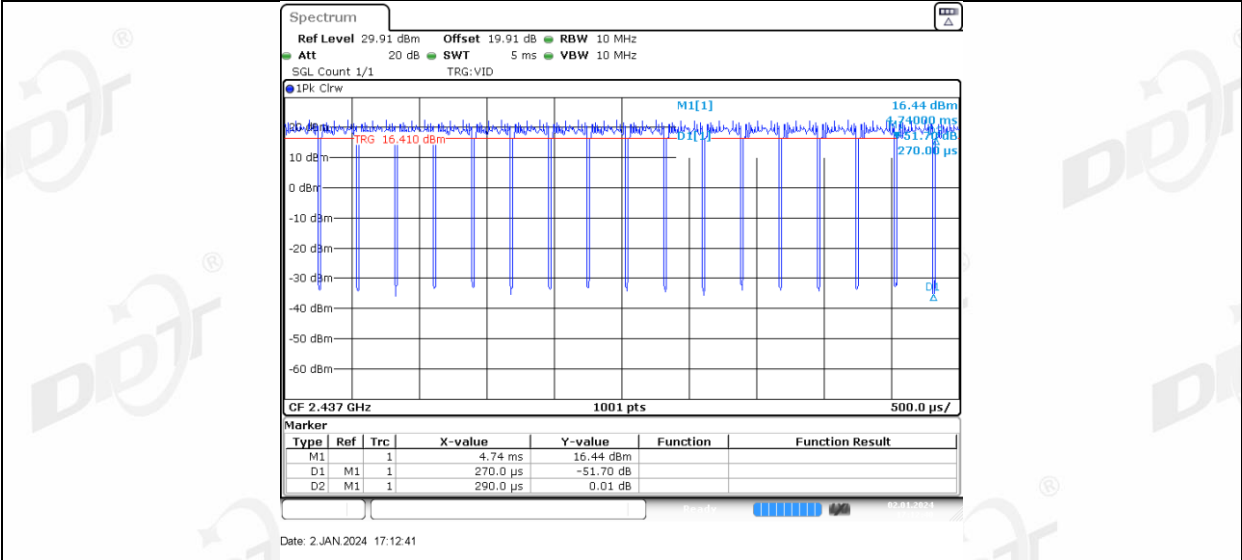
Test Mode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11G	Ant1	2412	0.24	0.27	88.89
		2437	0.24	0.26	92.31
		2462	0.24	0.26	92.31
11N20SISO	Ant1	2412	0.26	0.28	92.86
		2437	0.27	0.29	93.10
		2462	0.26	0.28	92.86

10.5. Test graphs

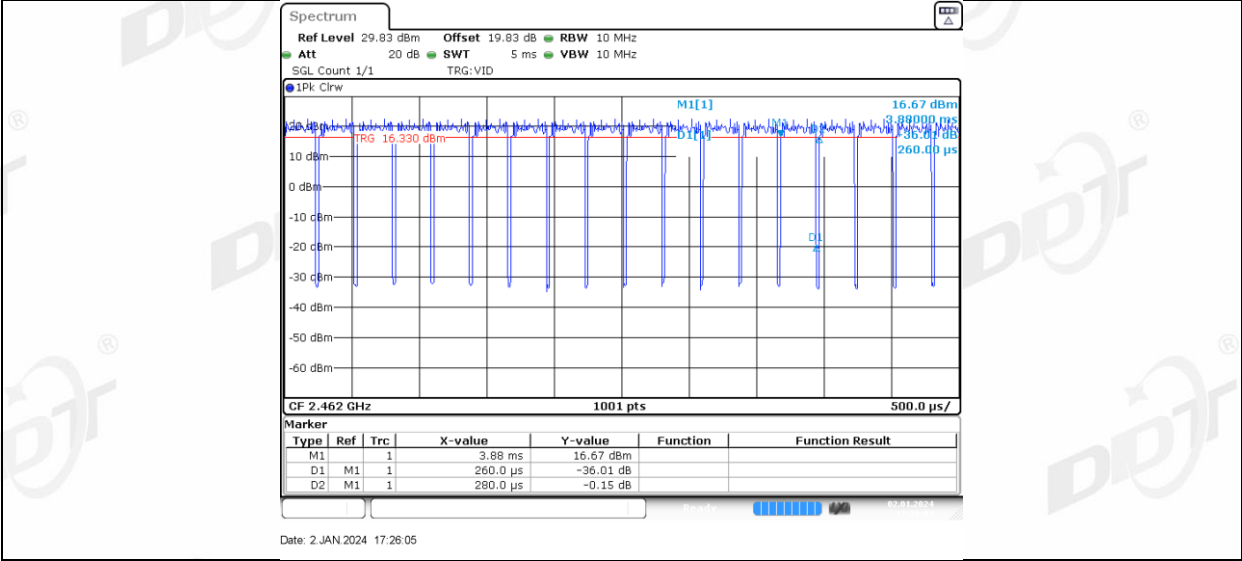




11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



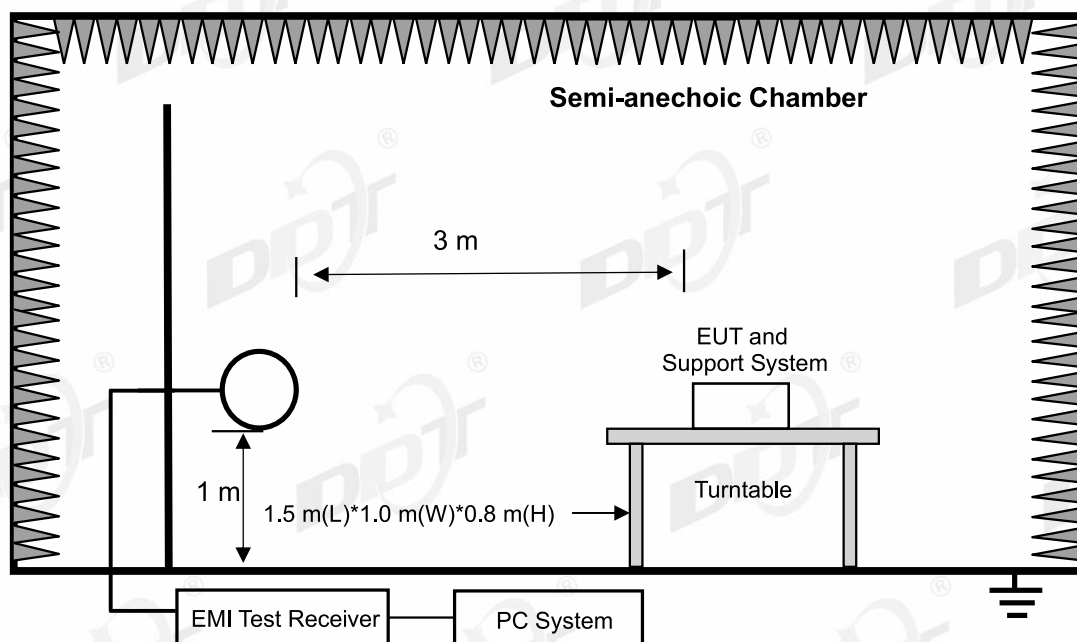
11. Radiated Spurious Emissions

11.1. Test equipment

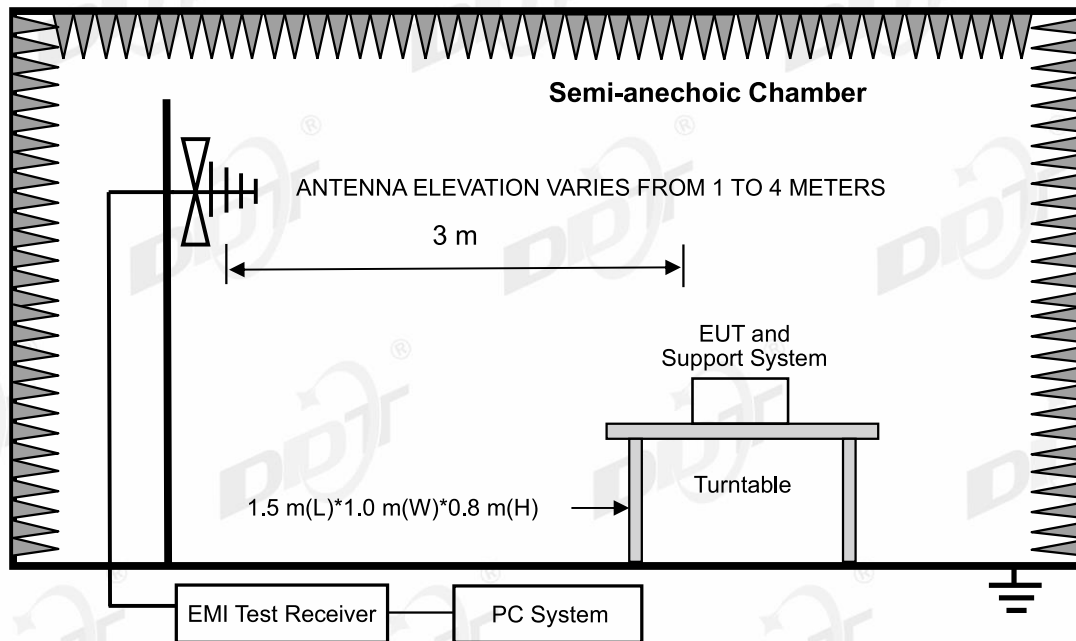
Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑Radiation 3#Chamber				
EMI TEST RECEIVER	R&S	ESU26	100472	2024/04/22
PSA Series Spectrum Analyzer	Agilent	E4447A	MY50180031	2024/04/22
Active Loop Antenna	Schwarzbeck	FMZB-1519	1519-038	2024/09/10
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	01429	2024/07/11
Double Ridged Horn Antenna	Schwarzbeck	BBHA 9120 D	02468	2024/09/17
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	2024/04/25
Pre-amplifier	COM-POWER	PAM-118A	18040084	2024/07/14
Pre-amplifier	COM-POWER	PAM-840A	461369	2024/04/26
RE Cable	N/A	W23.02 CP1-X2 + W23.09 AP1-X8+ JCT26S-NJ-NJ- 1.5M	4.5M+8M+1.5 M	2024/04/20
RF Cable	Yuhu	JCTB810-NJ-NJ- 9M+ ZT26S- SMAJ-SMAJ-1M	21123964	2024/04/22
Band Reject Filter(2400-2500 MHz)	REBES	BRM50702	G555	N/A
Test Software	Tonscend	JS32-RE	V 5.0.0.1	N/A

11.2. Block diagram of test setup

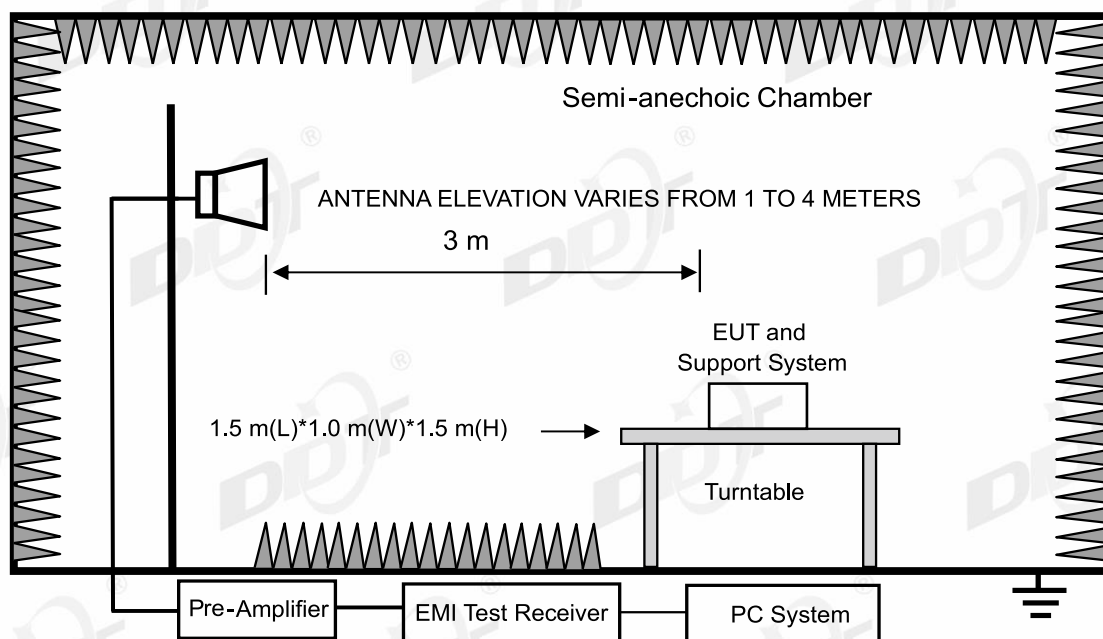
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:



Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

11.3. Limit

(1) FCC 15.205 Restricted frequency band:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹⁰ 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
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&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			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

RSS-Gen section 8.10 Restricted frequency bands*

MHz	MHz	MHz	GHz
0.090-0.110	12.51975-12.52025	240-285	3.5-4.4
0.495-0.505	12.57675-12.57725	322-335.4	4.5-5.15
2.1735-2.1905	13.36-13.41	399.9-410	5.35-5.46
3.020-3.026	16.42-16.423	608-614	7.25-7.75
4.125-4.128	16.69475-16.69525	960-1427	8.025-8.5
4.1772&4.17775	16.80425-16.80475	1435-1626.5	9.0-9.2
4.2072&4.20775	25.5-25.67	1645.5-1646.5	9.3-9.5
5.677-5.683	37.5-38.25	1660-1710	10.6-12.7
6.215-6.218	73-74.6	1718.8-1722.2	13.25-13.4
6.26775-6.26825	74.8-75.2	2200-2300	14.47-14.5
6.31175-6.31225	108-138	2310-2390	15.35-16.2
8.291-8.294	149.9-150.05	2483.5-2500	17.7-21.4
8.362-8.366	156.52475-156.52525	2655-2900	22.01-23.12
8.37625-8.38675	156.7-156.9	3260-3267	23.6-24.0
8.41425-8.41475	162.0125-167.17	3332-3339	31.2-31.8
12.29-12.293	167.72-173.2	3345.8-3358	36.43-36.5
			Above 38.6

* Certain frequency bands listed in table and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

(2) FCC 15.209 Limit.

Frequency (MHz)	Measurement distance (meters)	Field strength limit	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V/m})$
0.009 ~ 0.490	300	$2400/\text{F(kHz)}$	$67.6-20\log(\text{F})$
0.490 ~ 1.705	30	$24000/\text{F(kHz)}$	$87.6-20\log(\text{F})$
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V/m})$ (Peak), 54.0 $\text{dB}(\mu\text{V/m})$ (Average)	

Note:

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below

formula:

$$\text{Limit}_{3m}(\text{dBuV/m}) = \text{Limit}_{30m}(\text{dBuV/m}) + 40\text{Log}(30m/3m)$$

(3) Limit for this EUT

The emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, and the emissions appearing within RSS-Gen section 8.10 Restricted frequency bands shall not exceed the limits shown in RSS-Gen section 8.9, all the other emissions shall be at least 20 dB below the fundamental emissions or comply with 15.209 limits and RSS-Gen section 8.9 limits.

11.4. Test procedure

(1) EUT height should be 0.8 m for below 1 GHz at a semi - anechoic chamber while EUT height should be 1.5 m for above 1 GHz at full chamber or semi - anechoic chamber ground with absorbers.

(2) The antenna used as below table.

Test frequency range	Test antenna used	Test antenna distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna (1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna (18GHz-40GHz)	1m

According ANSI C63.10:2013 clause 6.4.6 and 6.5.3, for measurements below 30 MHz, Antenna was located 3 m from EUT, the loop antenna was positioned in three antenna orientations (parallel, perpendicular, and round-parallel), for each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable, and the lowest height of the magnetic antenna shall be 1 m above the ground. For measurement above 30MHz, the trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT through three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18GHz to 25GHz, so below final test was performed with frequency range from 9kHz to 18GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2013 on Radiated Emission test.

(5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz, for emissions from 9 kHz-90 kHz, 110 kHz-490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9 kHz-150 kHz	200 Hz
150 kHz-30 MHz	9 kHz
30 MHz-1 GHz	120 kHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; RMS detector RBW 1 MHz VBW 10 Hz for Average measure (according ANSI C63.10:2013 clause 4.2.3.2.3 procedure for average measure).

(8) For portable device, X axis, Y axis, Z axis are tested, and worse axis is reported.

11.5. Test result

Pass. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limits and RSS-Gen section 8.9 limits.

Note 1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

Note 2: 30 MHz ~ 25 GHz: (Scan with all mode, the worst case is 802.11n HT20 mode)

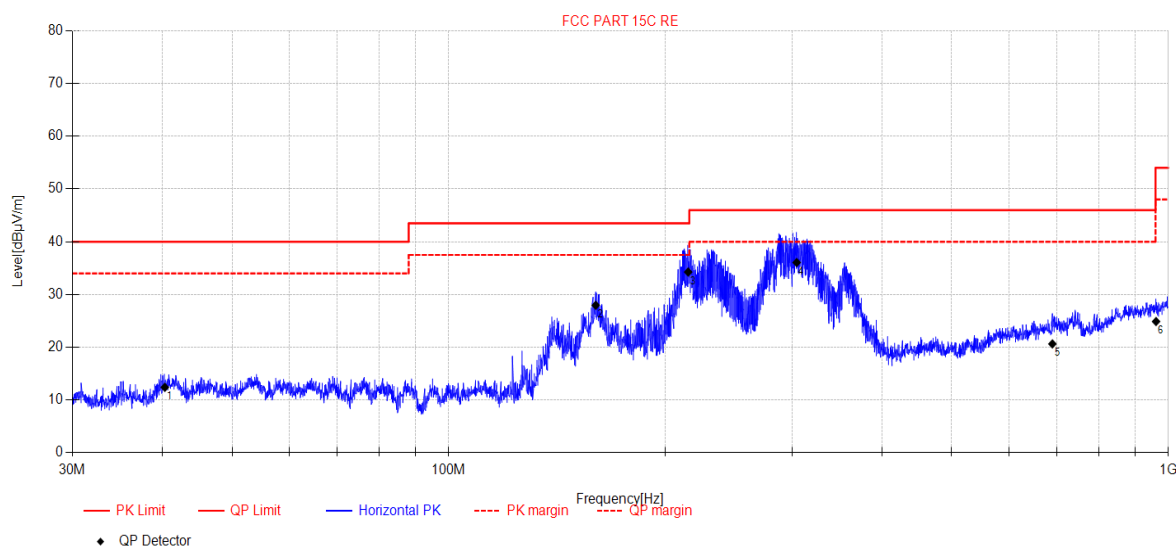
Note 3: For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in 802.11n HT20, Tx 2412 MHz mode.

Note 4: For emissions above 1 GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit, only recorded the worst case in this report.

Radiated Emission test (below 1GHz)

TR-4-E-009 Radiated Emission Test Result

Test Date: 2023-12-29 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: WIFI2.4G MODE **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC BELOW 1G\20231229-224010_H
Memo: Sample Number:S23113018-01 Power Setting:NA



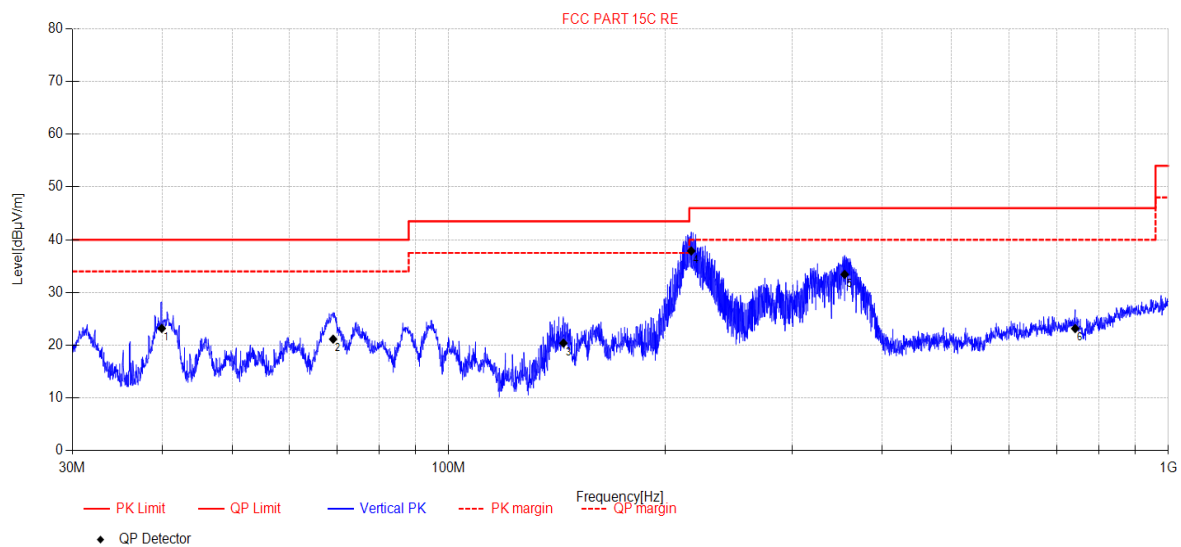
Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	AMP [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	40.33	26.52	12.13	4.60	-30.85	12.40	40.00	27.60	QP	Horizontal
2	160.07	44.37	8.90	5.40	-30.72	27.95	43.50	15.55	QP	Horizontal
3	215.18	48.31	10.71	5.79	-30.55	34.26	43.50	9.24	QP	Horizontal
4	304.47	46.48	13.70	6.17	-30.29	36.06	46.00	9.94	QP	Horizontal
5	690.10	23.32	19.50	7.72	-29.90	20.64	46.00	25.36	QP	Horizontal
6	961.50	22.66	22.11	8.56	-28.45	24.88	54.00	29.12	QP	Horizontal

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2023-12-29 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: WIFI2.4G MODE **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC BELOW 1G\20231229-224054_V
Memo: Sample Number:S23113018-01 Power Setting:NA



Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable Loss [dB]	AMP [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	39.94	37.48	11.97	4.60	-30.85	23.20	40.00	16.80	QP	Vertical
2	69.10	36.51	10.43	4.79	-30.57	21.16	40.00	18.84	QP	Vertical
3	144.39	36.89	8.99	5.29	-30.77	20.40	43.50	23.10	QP	Vertical
4	217.31	51.78	10.84	5.80	-30.55	37.87	46.00	8.13	QP	Vertical
5	355.00	41.67	15.50	6.45	-30.19	33.43	46.00	12.57	QP	Vertical
6	742.30	25.32	19.89	7.85	-29.90	23.16	46.00	22.84	QP	Vertical

Note:

1. Result Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Radiated Emission test (above 1GHz)

TR-4-E-009 Radiated Emission Test Result

Test Date:

2024-01-10

Tested By:

Junchang Du

EUT:

Tabletop Wireless Speaker

Model Number:

EDF100080

Test Mode:

11N20 TX 2412MHz

Power Supply:

AC 120V/60Hz

Condition:

Temp:21.4°C;Humi:54.5%

Test Site:

DDT 3# Chamber

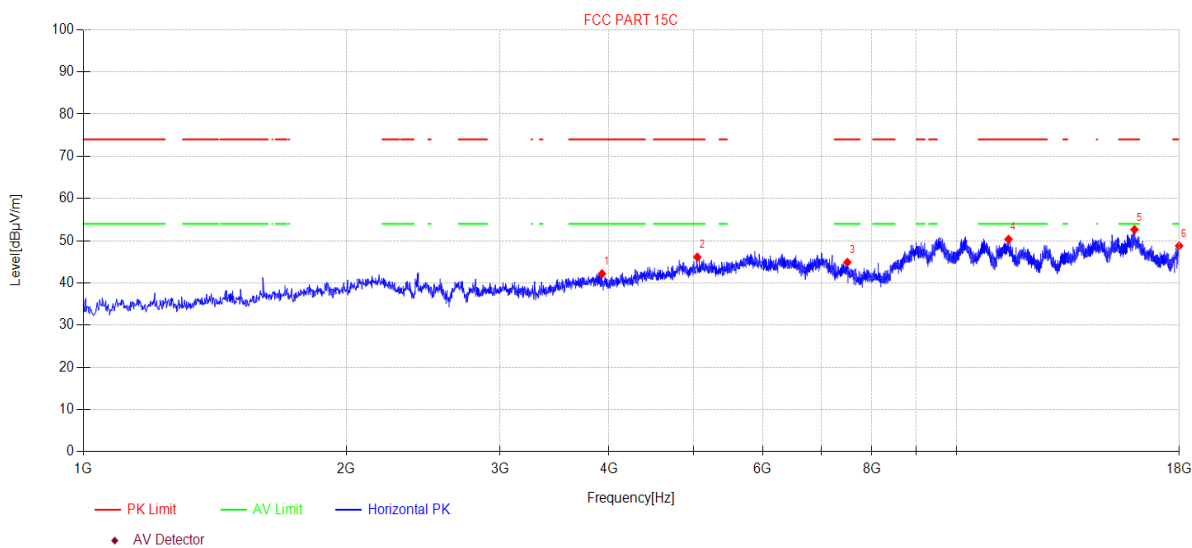
File Path:

d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\53

Memo:

Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	3927.40	45.61	31.15	5.83	-40.41	42.18	74.00	31.82	PK	Horizontal
2	5049.40	44.96	33.30	7.94	-40.07	46.13	74.00	27.87	PK	Horizontal
3	7500.80	42.69	36.50	7.65	-41.95	44.89	74.00	29.11	PK	Horizontal
4	11472.00	40.36	39.23	10.07	-39.31	50.35	74.00	23.65	PK	Horizontal
5	15994.00	38.14	38.01	15.85	-39.36	52.64	74.00	21.36	PK	Horizontal
6	17989.80	35.70	42.35	13.12	-42.38	48.79	74.00	25.21	PK	Horizontal

Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP

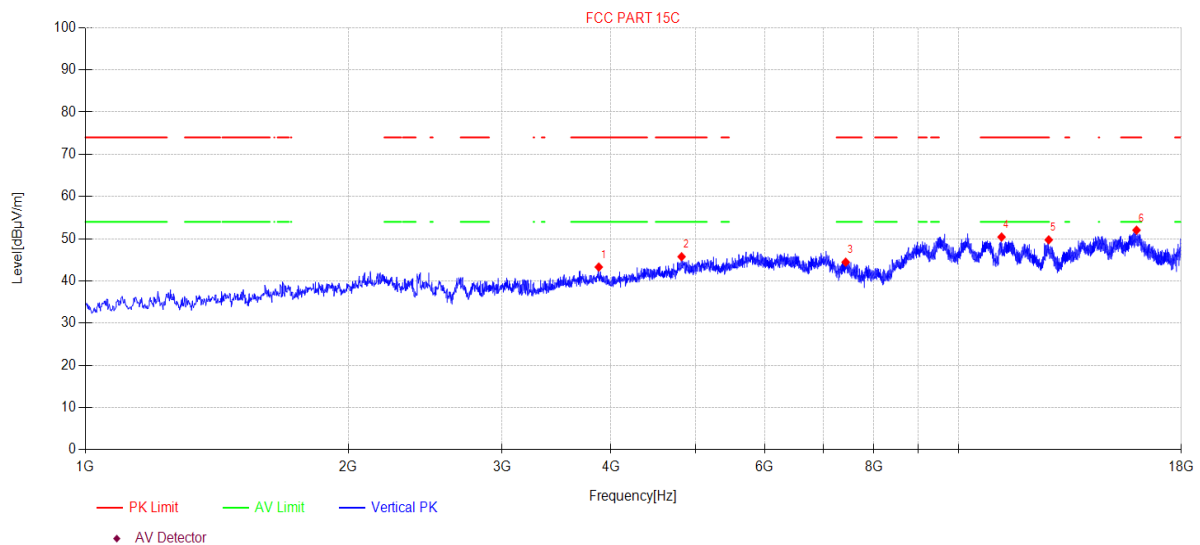
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2412MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\54
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	3873.00	46.80	31.04	5.82	-40.37	43.29	74.00	30.71	PK	Vertical
2	4818.20	45.42	32.97	7.50	-40.15	45.74	74.00	28.26	PK	Vertical
3	7427.70	41.94	36.64	7.64	-41.77	44.45	74.00	29.55	PK	Vertical
4	11203.40	40.56	39.20	9.83	-39.19	50.40	74.00	23.60	PK	Vertical
5	12687.50	39.44	39.58	10.54	-39.83	49.73	74.00	24.27	PK	Vertical
6	15994.00	37.52	38.01	15.85	-39.36	52.02	74.00	21.98	PK	Vertical

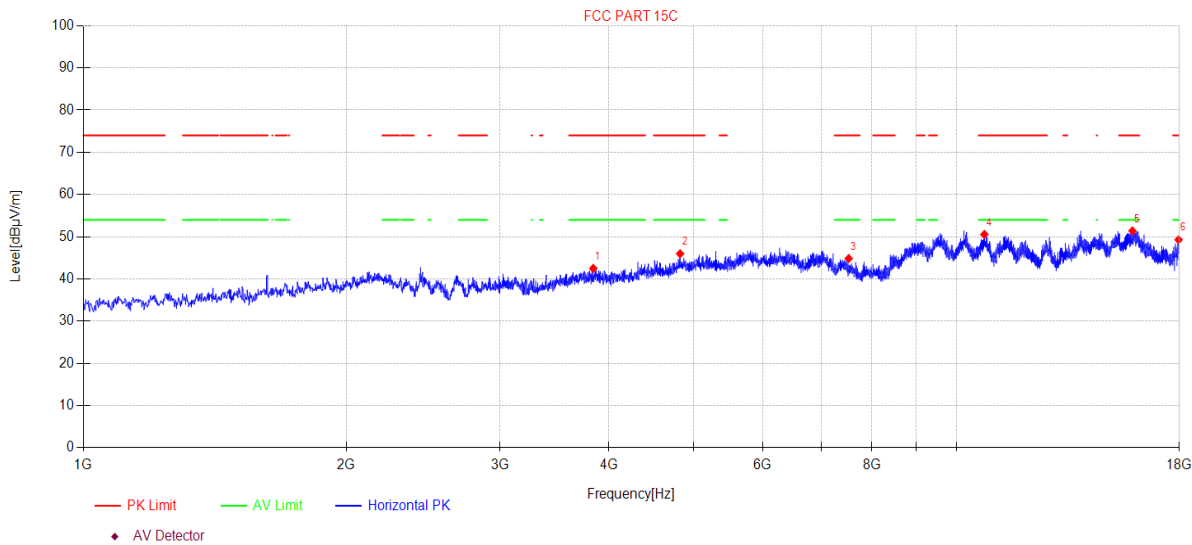
Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 Tested By: Junchang Du
EUT: Tabletop Wireless Speaker Model Number: EDF100080
Test Mode: 11N20 TX 2437MHz Power Supply: AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% Test Site: DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\55
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



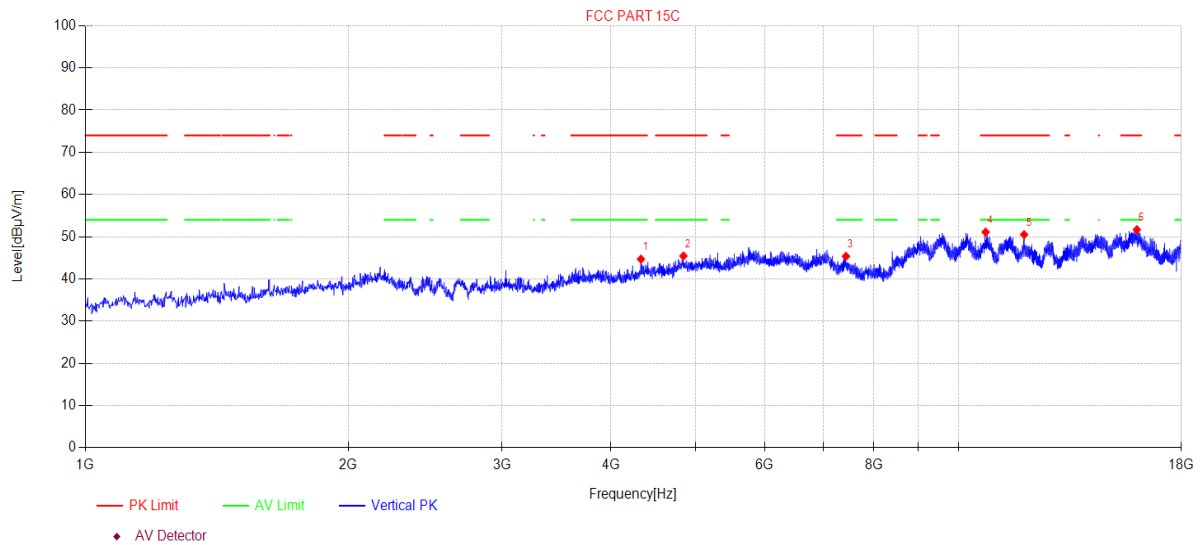
Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	3837.30	46.19	30.85	5.81	-40.35	42.50	74.00	31.50	PK	Horizontal
2	4825.00	45.44	33.15	7.52	-40.14	45.97	74.00	28.03	PK	Horizontal
3	7526.30	42.76	36.45	7.65	-42.02	44.84	74.00	29.16	PK	Horizontal
4	10763.10	40.67	39.40	9.48	-39.00	50.55	74.00	23.45	PK	Horizontal
5	15905.60	37.14	38.09	15.45	-39.30	51.38	74.00	22.62	PK	Horizontal
6	17966.00	36.29	42.23	13.09	-42.32	49.29	74.00	24.71	PK	Horizontal

Note:
1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2437MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\56
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	4328.60	46.91	31.60	6.51	-40.33	44.69	74.00	29.31	PK	Vertical
2	4842.00	44.44	33.59	7.55	-40.14	45.44	74.00	28.56	PK	Vertical
3	7432.80	42.87	36.63	7.64	-41.78	45.36	74.00	28.64	PK	Vertical
4	10742.70	41.22	39.40	9.47	-38.99	51.10	74.00	22.90	PK	Vertical
5	11890.20	40.67	38.90	10.44	-39.51	50.50	74.00	23.50	PK	Vertical
6	16009.30	37.22	37.99	15.84	-39.37	51.68	74.00	22.32	PK	Vertical

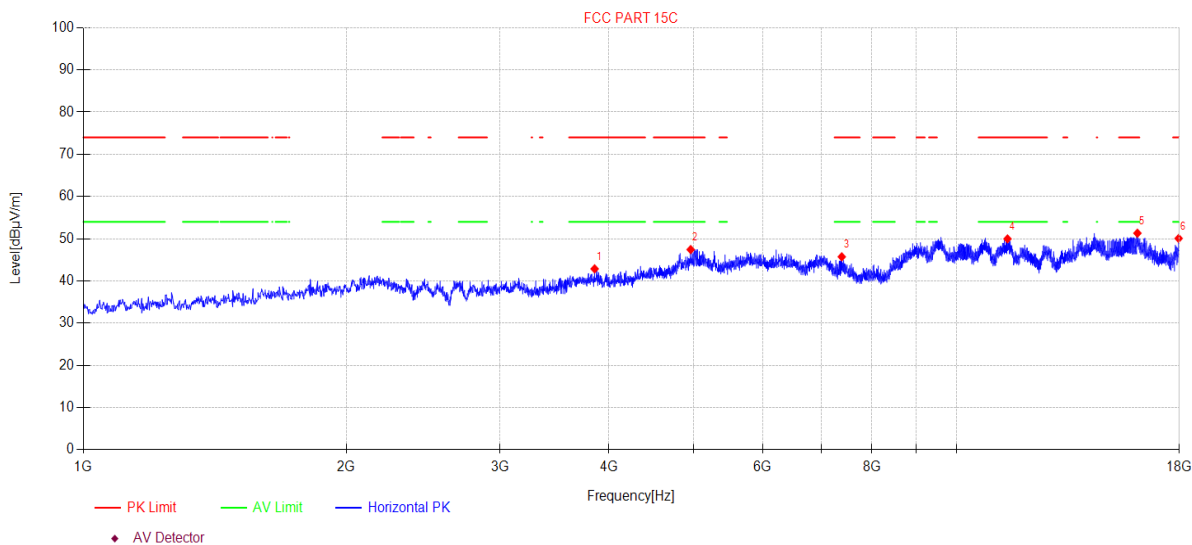
Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2462MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\57
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	3850.90	46.50	30.91	5.82	-40.36	42.87	74.00	31.13	PK	Horizontal
2	4961.00	46.61	33.12	7.79	-40.09	47.43	74.00	26.57	PK	Horizontal
3	7390.30	43.04	36.72	7.64	-41.68	45.72	74.00	28.28	PK	Horizontal
4	11441.40	39.97	39.26	10.04	-39.30	49.97	74.00	24.03	PK	Horizontal
5	16116.40	37.46	37.88	15.42	-39.45	51.31	74.00	22.69	PK	Horizontal
6	17967.70	37.07	42.24	13.09	-42.33	50.07	74.00	23.93	PK	Horizontal

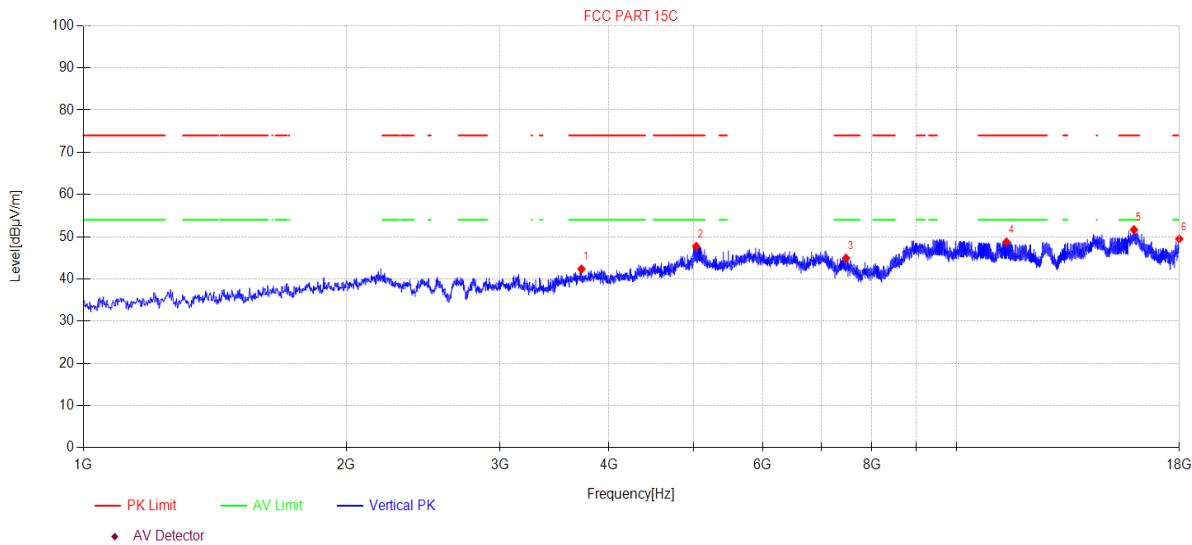
Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 Tested By: Junchang Du
EUT: Tabletop Wireless Speaker Model Number: EDF100080
Test Mode: 11N20 TX 2462MHz Power Supply: AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% Test Site: DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\58
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	3720.00	46.40	30.44	5.79	-40.28	42.35	74.00	31.65	PK	Vertical
2	5034.10	46.62	33.27	7.92	-40.08	47.73	74.00	26.27	PK	Vertical
3	7473.60	42.61	36.55	7.64	-41.88	44.92	74.00	29.08	PK	Vertical
4	11409.10	38.72	39.29	10.01	-39.28	48.74	74.00	25.26	PK	Vertical
5	15968.50	37.24	38.03	15.74	-39.34	51.67	74.00	22.33	PK	Vertical
6	17996.60	36.36	42.38	13.13	-42.39	49.48	74.00	24.52	PK	Vertical

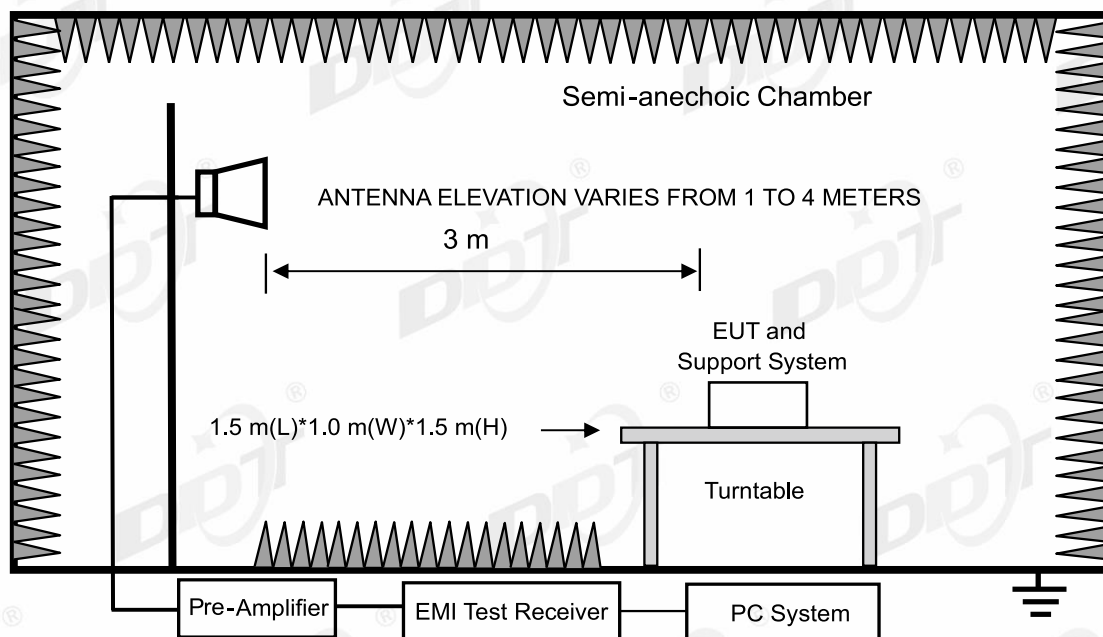
Note:
1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

12. Radiated Band Edge Compliance

12.1. Test equipment

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑Radiation 3#Chamber				
EMI TEST RECEIVER	R&S	ESU26	100472	2024/04/22
Double Ridged Horn Antenna	Schwarzbeck	BBHA 9120 D	02468	2024/09/17
Pre-amplifier	COM-POWER	PAM-118A	18040084	2024/07/14
RF Cable	Yuhu	JCTB810-NJ-NJ-9M+ ZT26S-SMAJ-SMAJ-1M	21123964	2024/04/22
Test Software	Tonscend	JS32-RE	V 5.0.0.1	N/A

12.2. Block diagram of test setup



12.3. Limit

All restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400 MHz to 2483.5 MHz shall be at least 20dB below the fundamental emissions or comply with RSS-Gen Issue 5 clause 6.13.2 (Same as FCC 15.209) limits.

12.4. Test procedure

Same with Radiated Spurious Emissions except change investigated frequency range from 2310 MHz to 2430 MHz and 2445 MHz to 2500 MHz.

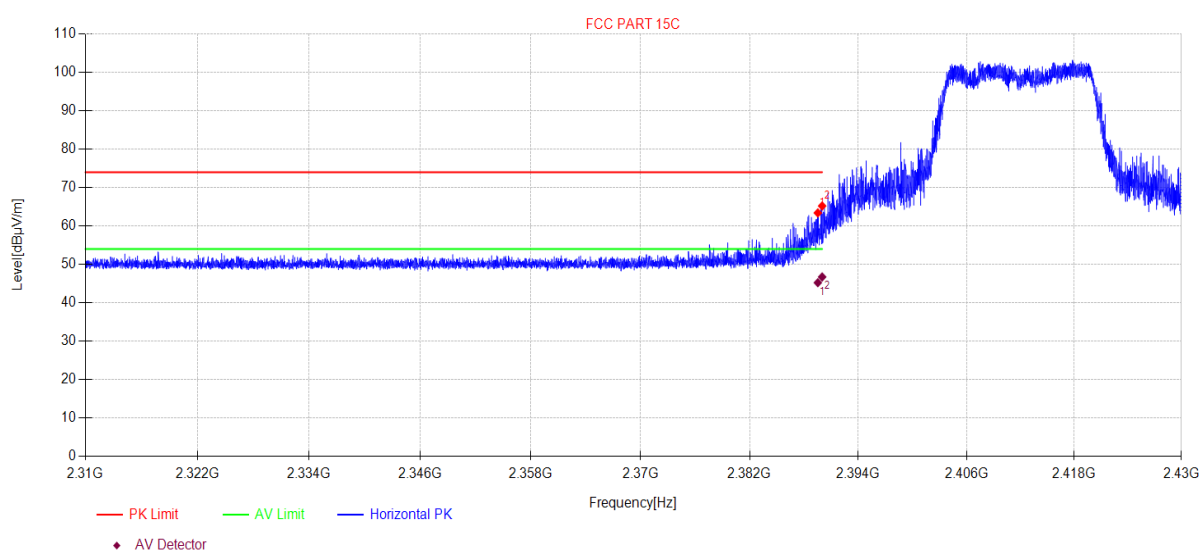
12.5. Test result

Pass. (See below detailed test result)

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11G TX 2412MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\45
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.52	60.37	27.26	3.87	-28.11	63.39	74.00	10.61	PK	Horizontal
2	2390.00	62.18	27.26	3.87	-28.11	65.20	74.00	8.80	PK	Horizontal

Data List										
N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.52	42.21	27.26	3.87	-28.11	45.23	54.00	8.77	AV	Horizontal
2	2390.00	43.71	27.26	3.87	-28.11	46.73	54.00	7.27	AV	Horizontal

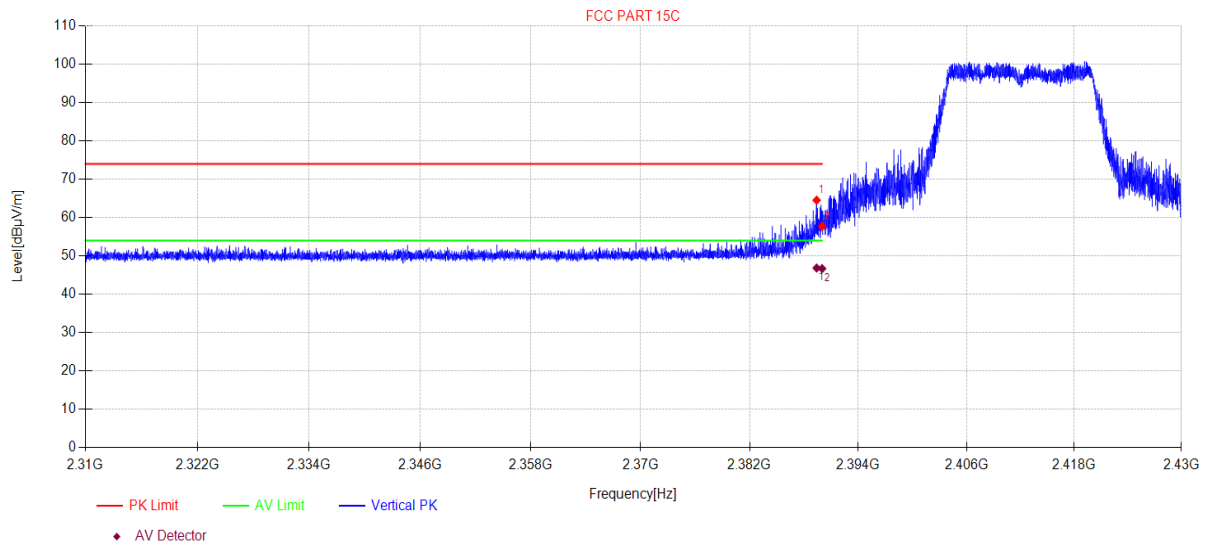
Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11G TX 2412MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\46
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.39	61.50	27.26	3.87	-28.11	64.52	74.00	9.48	PK	Vertical
2	2390.00	54.69	27.26	3.87	-28.11	57.71	74.00	16.29	PK	Vertical

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.39	43.82	27.26	3.87	-28.11	46.84	54.00	7.16	AV	Vertical
2	2390.00	43.67	27.26	3.87	-28.11	46.69	54.00	7.31	AV	Vertical

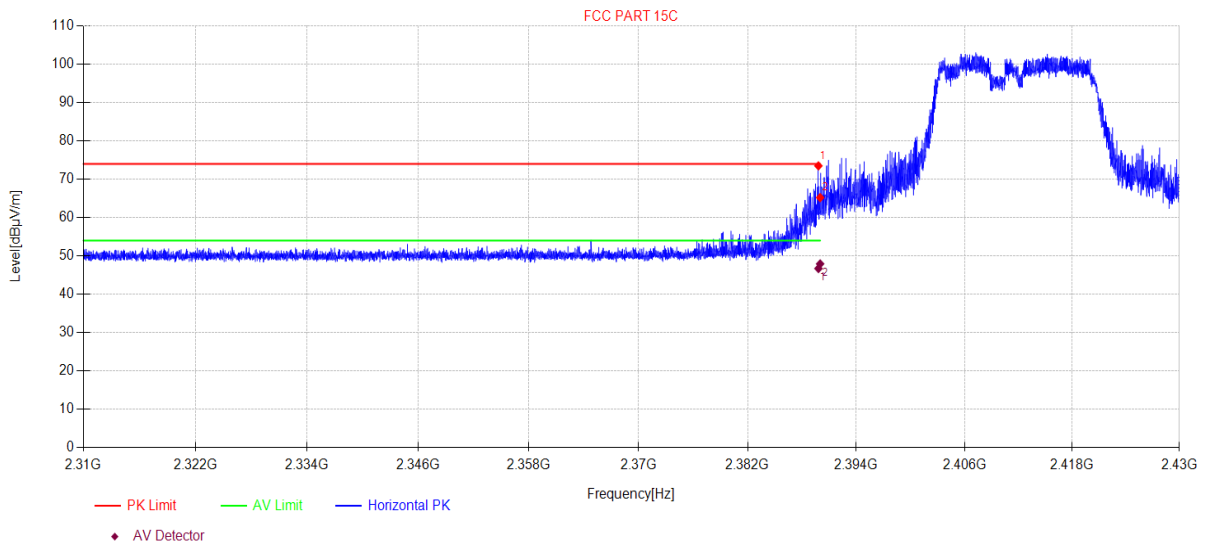
Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2412MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\47
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.81	70.45	27.26	3.87	-28.11	73.47	74.00	0.53	PK	Horizontal
2	2390.00	62.18	27.26	3.87	-28.11	65.20	74.00	8.80	PK	Horizontal

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.81	43.70	27.26	3.87	-28.11	46.72	54.00	7.28	AV	Horizontal
2	2390.00	44.91	27.26	3.87	-28.11	47.93	54.00	6.07	AV	Horizontal

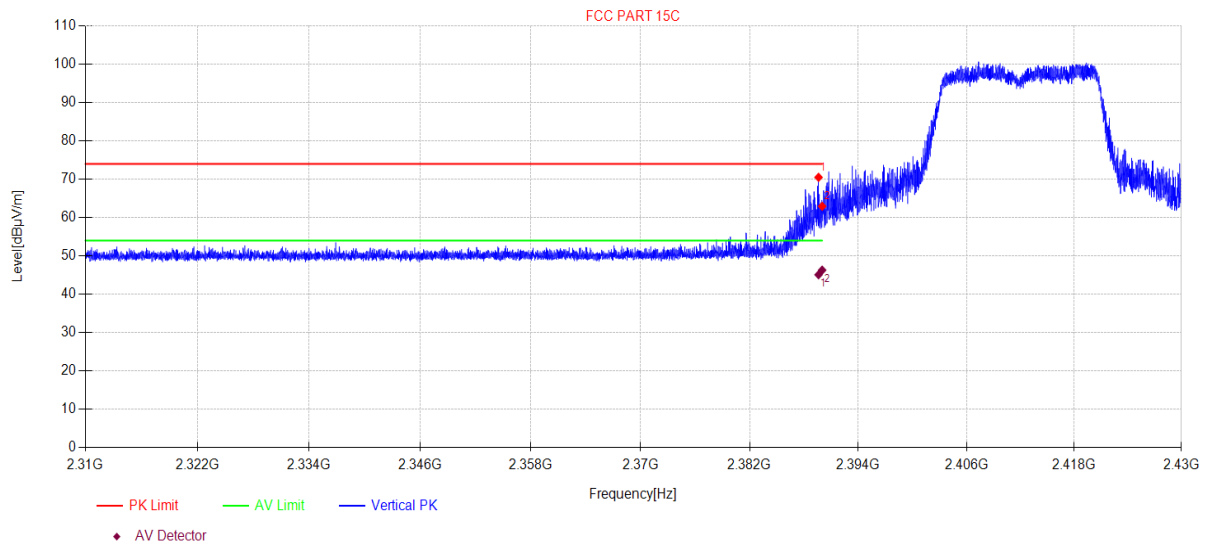
Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2412MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\48
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.61	67.46	27.26	3.87	-28.11	70.48	74.00	3.52	PK	Vertical
2	2390.00	59.91	27.26	3.87	-28.11	62.93	74.00	11.07	PK	Vertical

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2389.61	42.08	27.26	3.87	-28.11	45.10	54.00	8.90	AV	Vertical
2	2390.00	43.27	27.26	3.87	-28.11	46.29	54.00	7.71	AV	Vertical

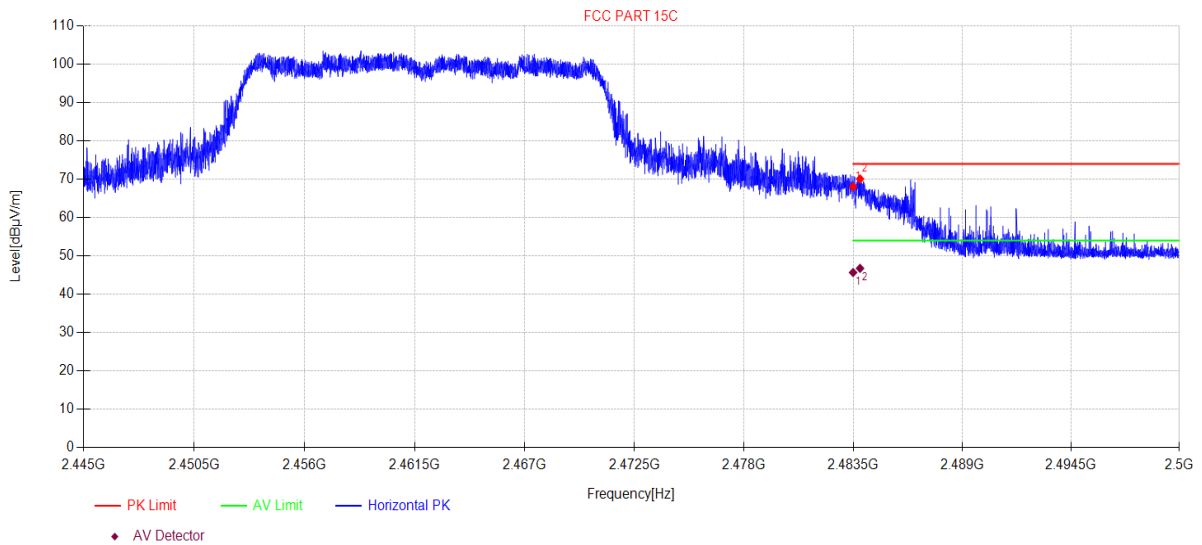
Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2462MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\49
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	64.93	27.53	3.94	-28.38	68.02	74.00	5.98	PK	Horizontal
2	2483.85	66.96	27.54	3.94	-28.38	70.06	74.00	3.94	PK	Horizontal

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	42.58	27.53	3.94	-28.38	45.67	54.00	8.33	AV	Horizontal
2	2483.85	43.66	27.54	3.94	-28.38	46.76	54.00	7.24	AV	Horizontal

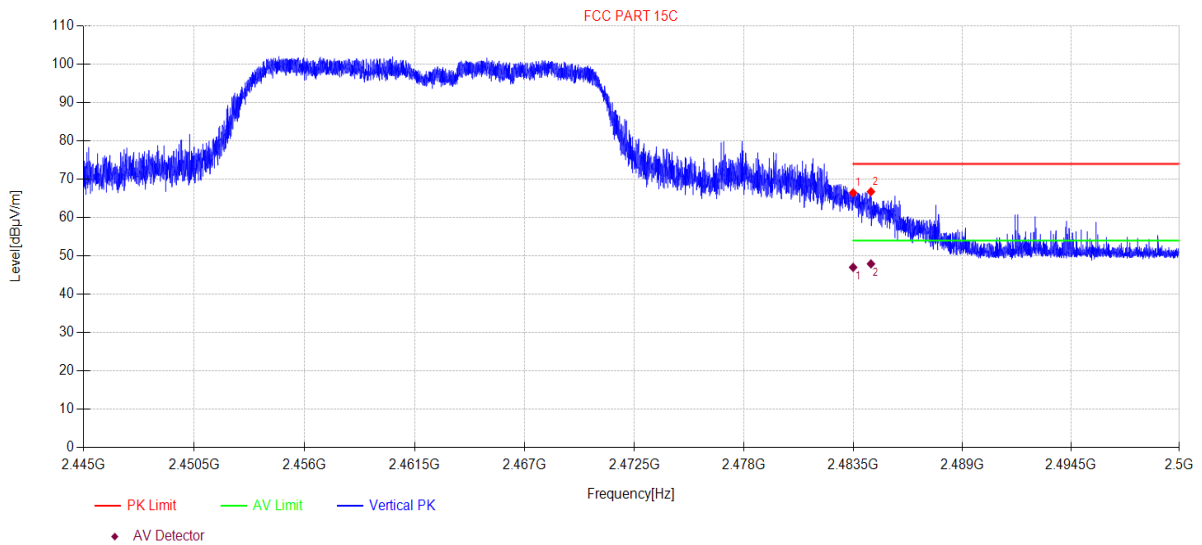
Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11N20 TX 2462MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\50
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	63.34	27.53	3.94	-28.38	66.43	74.00	7.57	PK	Vertical
2	2484.40	63.64	27.54	3.94	-28.38	66.74	74.00	7.26	PK	Vertical

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	43.93	27.53	3.94	-28.38	47.02	54.00	6.98	AV	Vertical
2	2484.40	44.83	27.54	3.94	-28.38	47.93	54.00	6.07	AV	Vertical

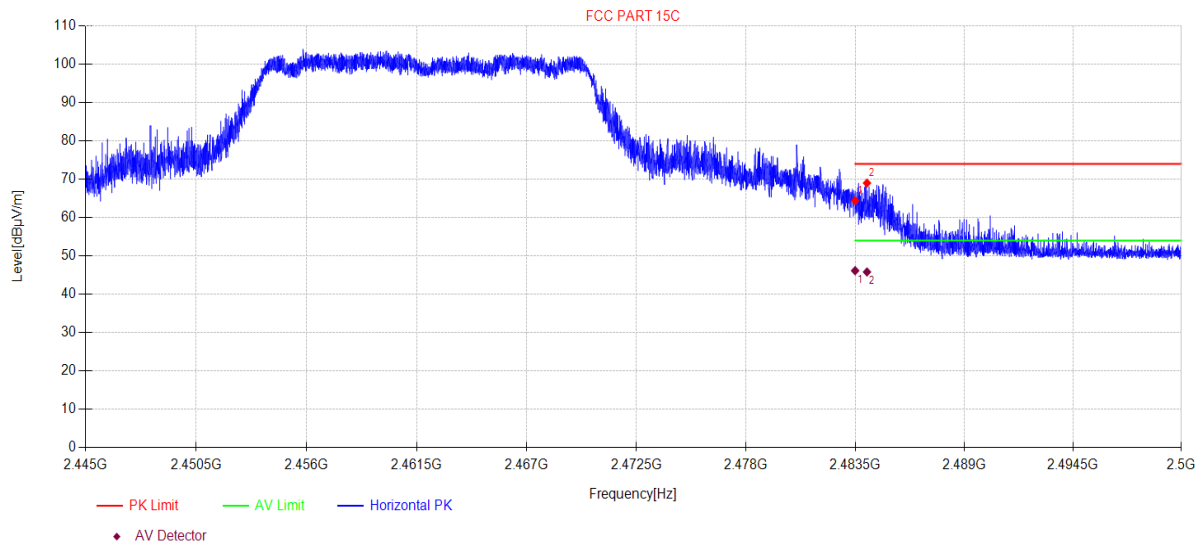
Note:

- Level = Reading + Cable loss + Antenna Factor + AMP
- If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11G TX 2462MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\51
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	61.31	27.53	3.94	-28.38	64.40	74.00	9.60	PK	Horizontal
2	2484.10	65.88	27.54	3.94	-28.38	68.98	74.00	5.02	PK	Horizontal

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	43.06	27.53	3.94	-28.38	46.15	54.00	7.85	AV	Horizontal
2	2484.10	42.72	27.54	3.94	-28.38	45.82	54.00	8.18	AV	Horizontal

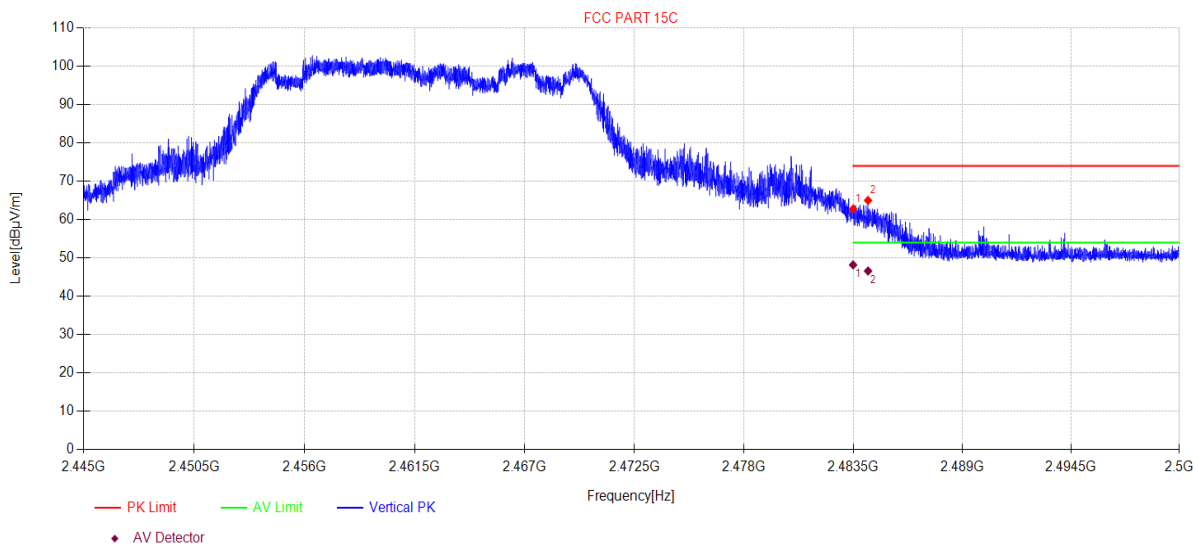
Note:

1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Date: 2024-01-10 **Tested By:** Junchang Du
EUT: Tabletop Wireless Speaker **Model Number:** EDF100080
Test Mode: 11G TX 2462MHz **Power Supply:** AC 120V/60Hz
Condition: Temp:21.4°C;Humi:54.5% **Test Site:** DDT 3# Chamber
File Path: d:\ts\2023 report data\Q23121803-2E EDF100080\FCC ABOVE 1G\52
Memo: Sample Number:S23113018-01 Power Setting:NA

Test Graph



Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	59.68	27.53	3.94	-28.38	62.77	74.00	11.23	PK	Vertical
2	2484.25	61.89	27.54	3.94	-28.38	64.99	74.00	9.01	PK	Vertical

Data List

N O.	Freq. [MHz]	Reading [dBμV/m]	Antenna Factor [dB]	Cable loss [dB]	AMP [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Polarity
1	2483.50	45.09	27.53	3.94	-28.38	48.18	54.00	5.82	AV	Vertical
2	2484.25	43.49	27.54	3.94	-28.38	46.59	54.00	7.41	AV	Vertical

Note:

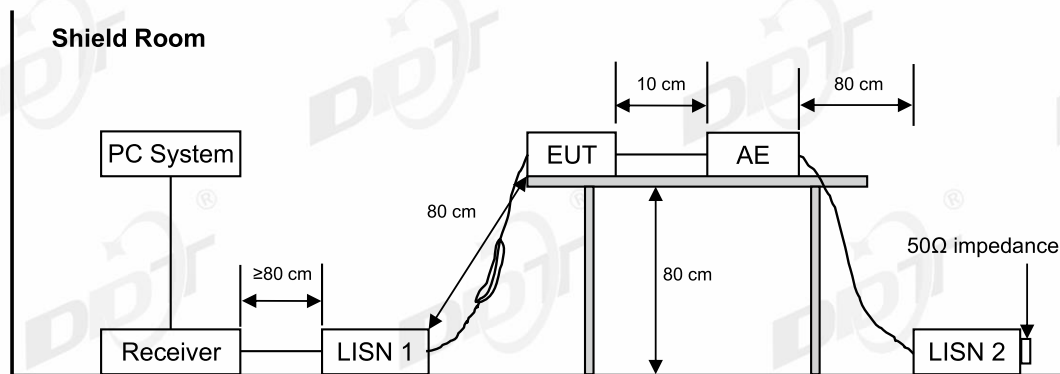
1. Level = Reading + Cable loss + Antenna Factor + AMP
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

13. Power Line Conducted Emission

13.1. Test equipment

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☑Power Line Conducted Emissions Test 1#				
Test Receiver	R&S	ESCI	100551	2024/07/10
LISN 1	R&S	ENV216	101109	2024/07/10
LISN 2	R&S	ESH2-Z5	100309	2024/07/11
Pulse Limiter	R&S	ESH3-Z2	101242	2024/07/14
CE Cable 1	HUBSER	N/A	W10.01	2024/07/14
Test software	Audix	E3	V 6.11111b	N/A

13.2. Block diagram of test setup



13.3. Power Line Conducted Emission Limits

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150 kHz ~ 500 kHz	66 ~ 56*	56 ~ 46*
500 kHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

13.4. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

13.5. Test result

Pass. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

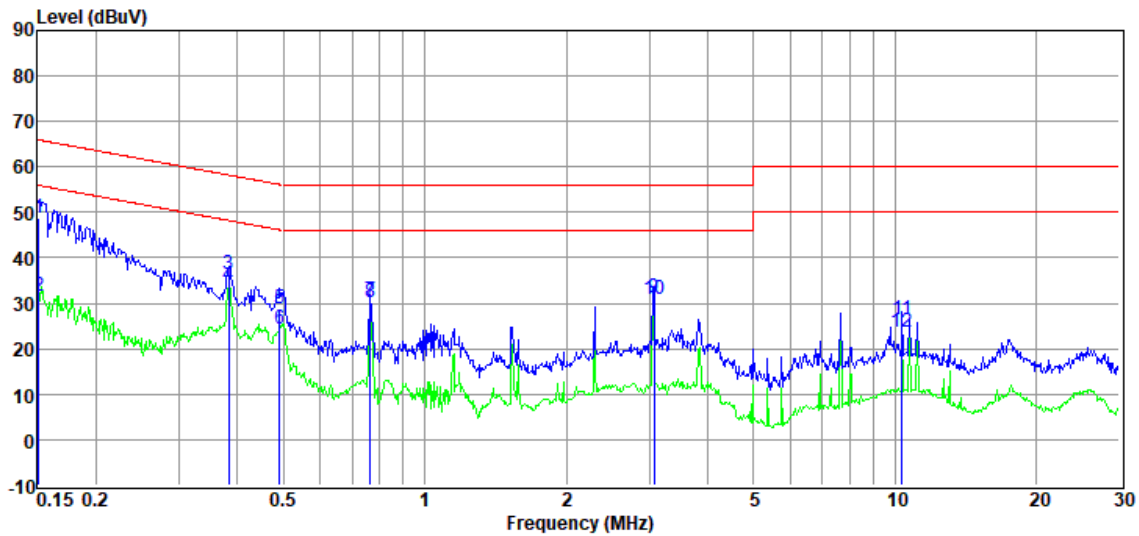
Note2: “-----” means peak detection; “-----” means average detection

Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/60Hz, recorded worse case.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **D:\2023 CE report data\Q23121803-2E\FCC CE.EM6**
Test Date : 2024-01-15 **Tested By** : Junchang Du
EUT : Tabletop Wireless Speaker **Model Number** : EDF100080
Power Supply : AC 120V/60Hz **Test Mode** : 2.4G WIFI TX
Condition : TEMP:26.2°C, RH:58.9% **LISN** : 2023 1# ENV216/NEUTRAL
Memo : Sample Number:S23113018-10

Data: 14



Item	Freq.	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.15	28.27	9.83	0.92	9.68	48.70	65.96	-17.26	QP	NEUTRAL
2	0.15	11.31	9.83	0.92	9.68	31.74	55.96	-24.22	Average	NEUTRAL
3	0.38	16.04	9.71	0.85	9.71	36.31	58.21	-21.90	QP	NEUTRAL
4	0.38	13.71	9.71	0.85	9.71	33.98	48.21	-14.23	Average	NEUTRAL
5	0.49	8.62	9.79	0.86	9.71	28.98	56.14	-27.16	QP	NEUTRAL
6	0.49	3.90	9.79	0.86	9.71	24.26	46.14	-21.88	Average	NEUTRAL
7	0.77	10.36	9.82	0.75	9.72	30.65	56.00	-25.35	QP	NEUTRAL
8	0.77	9.79	9.82	0.75	9.72	30.08	46.00	-15.92	Average	NEUTRAL
9	3.07	11.20	9.71	0.59	9.77	31.27	56.00	-24.73	QP	NEUTRAL
10	3.07	10.69	9.71	0.59	9.77	30.76	46.00	-15.24	Average	NEUTRAL
11	10.34	6.55	9.78	0.19	9.82	26.34	60.00	-33.66	QP	NEUTRAL
12	10.34	4.03	9.78	0.19	9.82	23.82	50.00	-26.18	Average	NEUTRAL

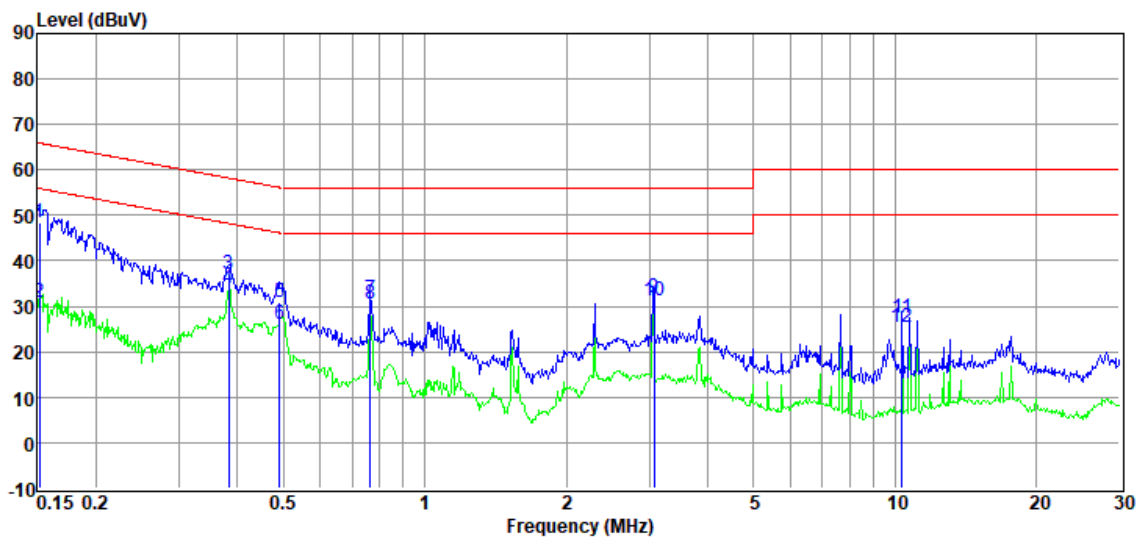
Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **D:\2023 CE report data\Q23121803-2E\FCC CE.EM6**
Test Date : 2024-01-15 **Tested By** : Junchang Du
EUT : Tabletop Wireless Speaker **Model Number** : EDF100080
Power Supply : AC 120V/60Hz **Test Mode** : 2.4G WIFI TX
Condition : TEMP:26.2°C, RH:58.9% **LISN** : 2023 1# ENV216/LINE
Memo : Sample Number:S23113018-10

Data: 16



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Result Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector	Phase
1	0.15	27.84	9.84	0.92	9.68	48.28	65.91	-17.63	QP	LINE
2	0.15	10.44	9.84	0.92	9.68	30.88	55.91	-25.03	Average	LINE
3	0.38	16.91	9.75	0.85	9.71	37.22	58.21	-20.99	QP	LINE
4	0.38	13.52	9.75	0.85	9.71	33.83	48.21	-14.38	Average	LINE
5	0.49	10.52	9.81	0.86	9.71	30.90	56.14	-25.24	QP	LINE
6	0.49	5.73	9.81	0.86	9.71	26.11	46.14	-20.03	Average	LINE
7	0.77	11.17	9.79	0.75	9.72	31.43	56.00	-24.57	QP	LINE
8	0.77	10.25	9.79	0.75	9.72	30.51	46.00	-15.49	Average	LINE
9	3.07	11.88	9.63	0.59	9.77	31.87	56.00	-24.13	QP	LINE
10	3.07	11.17	9.63	0.59	9.77	31.16	46.00	-14.84	Average	LINE
11	10.34	7.72	9.82	0.19	9.82	27.55	60.00	-32.45	QP	LINE
12	10.34	5.60	9.82	0.19	9.82	25.43	50.00	-24.57	Average	LINE

Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

14. Antenna Requirements

14.1. Limit

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 transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For intentional device, according to RSS-Gen issue 5 section 6.8.

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

14.2. Result

The device support 1T1R, the antennas both used for this product are FPC antennas and no antenna other than that furnished by the responsible party shall be used with the device, maximum antenna gain is 3 dBi

16. Photos of the EUT

Please refer to appendix I.

END OF REPORT