TEST REPORT

Product Name	:	Wireless Speaker
Brand Mark	:	N/A
Model No.	:	YOYO03
Extension model	:	XBOOM
Report Number	:	BLA-EMC-202312-A3001
FCC ID	:	N7KYOYO03
Date of Sample Receipt	:	2023/12/13
Date of Test	:	2023/12/13 to 2023/12/26
Date of Issue	:	2023/12/26
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

KINGTA TECHNOLOGY CO., LTD
Floor 6, Building C, Futing industrial zone, Zhucun, Guanlan, Longhua, Shenzhen, China

Prepared by:

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Compiled by: Jozu

Review by: Sweely

Approved by: Blue.Zheng

Date: 2023/12/26

BLA BlueAsia of Technical Services(Shenzhen) Co., Ltd.

REPORT REVISE RECORD

Version No.	Date	Description
00	2023/12/26	Original

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass

2 GENERAL INFORMATION

Applicant	KINGTA TECHNOLOGY CO., LTD
Address	Floor 6, Building C, Futing industrial zone, Zhucun, Guanlan, Longhua, Shenzhen, China
Manufacturer	KINGTA TECHNOLOGY CO., LTD
Address	Floor 6, Building C, Futing industrial zone, Zhucun, Guanlan, Longhua, Shenzhen, China
Factory	N/A
Address	N/A
Product Name	Wireless Speaker
Test Model No.	YOYO03
Extension model	XBOOM
Note	All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are model name for commercial purpose.

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	N/A
Software Version	N/A

Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK, pi/4DQPSK, 8-DPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	PCB Antenna
Antenna Gain:	1.7dBi (Provided by the applicant)

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	3.7Vdc

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation. (hopping and non hopping mode all have been tested, non hopping mode is worse case for RE)
Remark: Full battery is used during all test except ac conducted emission, DH1,DH3, DH5 all have been tested, during the test, GFSK, Pi/4QPSK, 8-DPSK modulation were all pre-scanned only GFSK worse case is reported.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %
Unwanted Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB
Unwanted Radiated Emission (1GHz ~ 18GHz)	±4.44 dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
AC Adapter	UGREEN	CD112	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber 1	SKET	966	N/A	2021/11/10	2024/11/9
Chamber 2	SKET	966	N/A	2022/07/20	2024/11/9
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29
Receiver	R&S	ESR7	101199	2023/08/30	2024/08/29
Receiver	R&S	ESPI7	101477	2023/07/07	2024/07/06
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2022/10/12	2025/10/11
Horn Antenna	Schwarzbeck	BBHA9120D	01892 P:00331	2022/09/13	2025/09/12
Horn Antenna	Schwarzbeck	BBHA 9170	1106	2022/04/24	2024/04/23
Amplifier	SKET	LNPA_30M01G-30	SK2021060801	2023/07/07	2024/07/06
Amplifier	SKET	PA-000318G-45	N/A	2023/08/30	2024/08/29
Amplifier	SKET	LNPA_18G40G-50	SK2022071301	2023/07/14	2024/07/13
Filter group	SKET	2.4G/5G Filter group r	N/A	2023/07/07	2024/07/06
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2022/09/14	2025/09/13
1kHZ calibration audio source	SKET	MCS-ABT-C35	N/A	2023/09/04	2024/09/03
Free Field Microphone	SKET	MGS MP 663	0414	2023/09/04	2024/09/03
Audio shielding box	SKET	SB-ABT-C35	N/A	2023/03/30	2024/03/29
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A
Signal Generator DTV	ECREDIX	DSG-1000	N/A	N/A	N/A

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Shield room	SKET	833	N/A	2020/11/25	2023/11/24
Receiver	R&S	ESPI3	101082	2023/08/30	2024/08/29
LISN	R&S	ENV216	3560.6550.15	2023/08/30	2024/08/29
LISN	AT	AT166-2	AKK1806000003	2023/08/30	2024/08/29
ISN	TESEQ	ISNT8-cat6	53580	2023/08/30	2024/08/29
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01045	2023/07/07	2024/07/06
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01075	2023/07/07	2024/07/06
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

Test Equipment Of RF Conducted Test					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29
Spectrum	Agilent	N9020A	MY49100060	2023/08/30	2024/08/29
Spectrum	Agilent	N9020A	MY54420161	2023/08/30	2024/08/29
Signal Generator	Agilent	N5182A	MY47420955	2023/08/30	2024/08/29
Signal Generator	Agilent	N5181A	MY46240904	2023/07/07	2024/07/06
Signal Generator	R&S	CMW500	132429	2023/08/30	2024/08/29
BluetoothTester	Anritsu	MT8852B	06262047872	2023/08/30	2024/08/29
Power probe	DARE	RPR3006W	14I00889SN042	2023/09/01	2024/08/31
Power detection box	CDKMV	MW100-PSB	MW201020JYT	2023/07/07	2024/07/06
DCPowersupply	zhaoxin	KXN-305D	20K305D1221363	2023/08/30	2024/08/29
DCPowersupply	zhaoxin	RXN-1505D	19R1505D050168	2023/08/30	2024/08/29
2.4GHz/5GHz RF Test software	MTS	MTS 8310	Version 2.0.0.0	N/A	N/A
Audio Analyzer	Audio Precision	ATS-1	ATS141094	2023/07/07	2024/07/06

10 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

10.1 CONCLUSION

Standard Requirement:
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. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.7dBi.

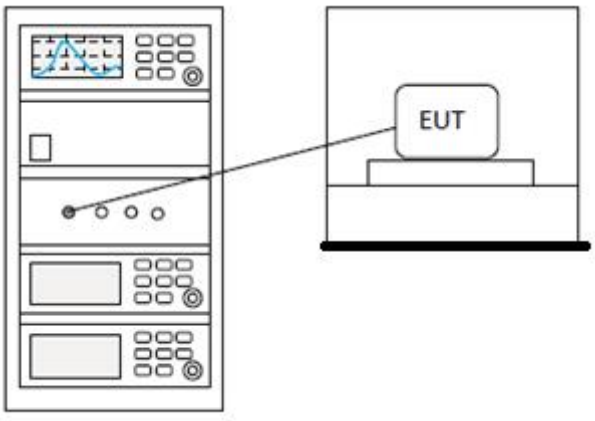
11 CONDUCTED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

11.1 LIMITS

Limit:	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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

11.2 BLOCK DIAGRAM OF TEST SETUP



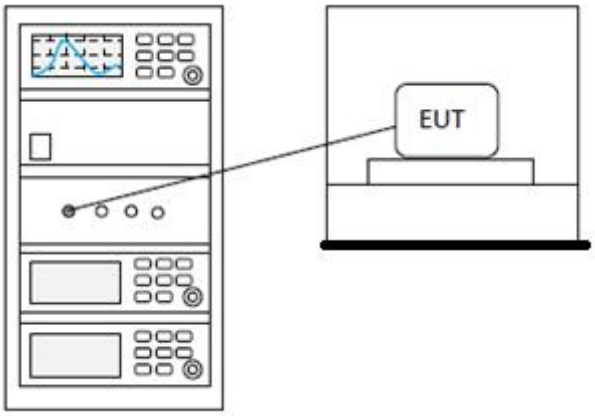
11.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

12 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.7
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

12.1 BLOCK DIAGRAM OF TEST SETUP



12.2 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

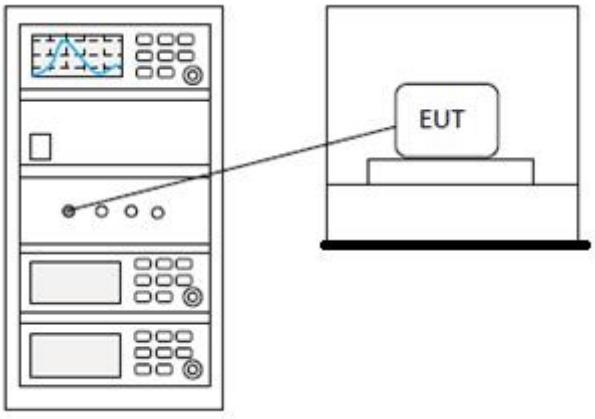
13 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

13.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

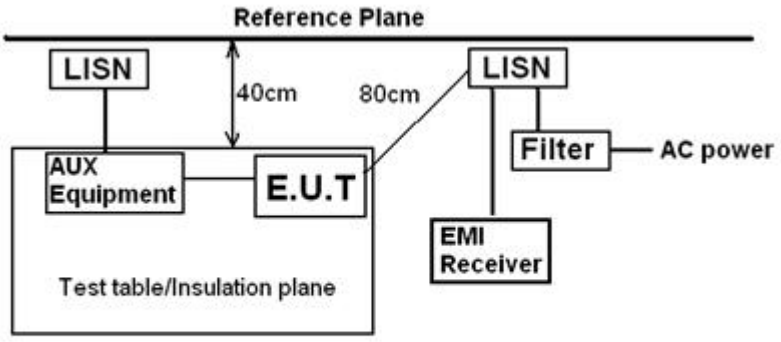
14 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX mode
Test Mode (Final Test)	TX mode
Tester	Jozu
Temperature	25℃
Humidity	60%

14.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

14.2 BLOCK DIAGRAM OF TEST SETUP



Remark
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

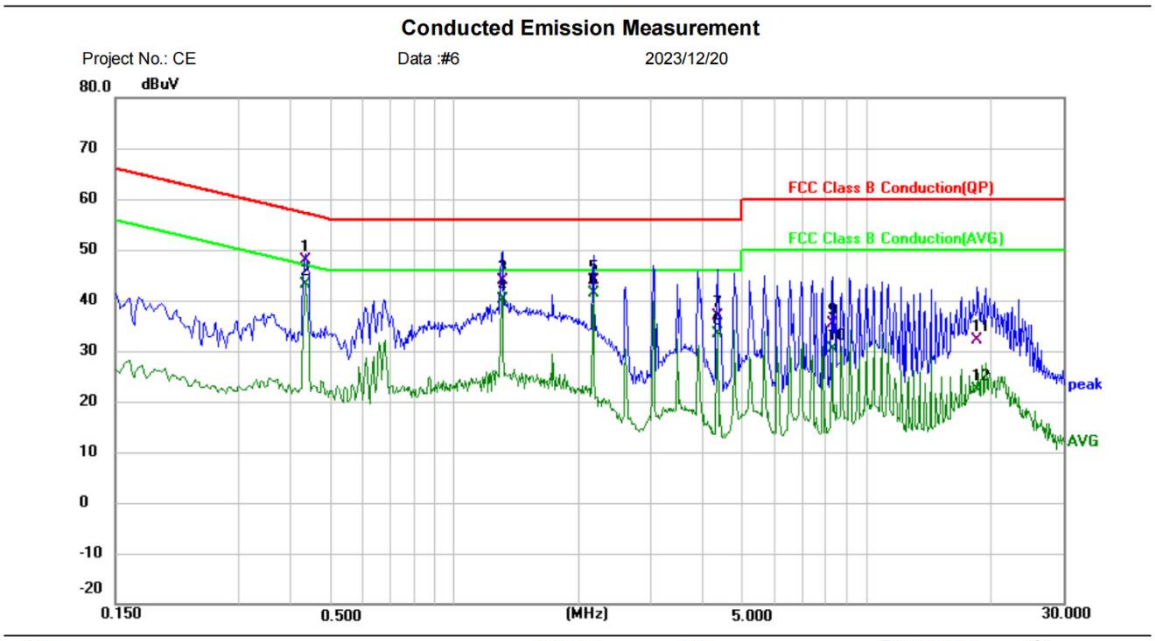
14.3 PROCEDURE

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Remark: LISN=Read Level+ Cable Loss+ LISN Factor

14.4 TEST DATA

[TestMode: TX]; [Line: Line] ;[Power:AC120V/60Hz]



Site	Phase:	*L1*	Temperature: (C)
Limit: FCC Class B Conduction(QP)	Power:		Humidity: %RH
EUT: Wireless Speaker	Distance:	RBW: 9 KHz	
M/N: YOYO03		VBW: 30 KHz	Sweep Time: 10 ms
Mode: TX mode			
Note:			

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.4340	37.99	9.93	47.92	57.18	-9.26	QP			
2	*	0.4340	33.15	9.93	43.08	47.18	-4.10	AVG			
3		1.3060	34.09	9.90	43.99	56.00	-12.01	QP			
4		1.3060	30.17	9.90	40.07	46.00	-5.93	AVG			
5		2.1700	33.65	10.13	43.78	56.00	-12.22	QP			
6		2.1700	31.32	10.13	41.45	46.00	-4.55	AVG			
7		4.3500	26.82	10.06	36.88	56.00	-19.12	QP			
8		4.3500	23.39	10.06	33.45	46.00	-12.55	AVG			
9		8.2540	24.12	11.14	35.26	60.00	-24.74	QP			
10		8.2540	19.33	11.14	30.47	50.00	-19.53	AVG			
11		18.5580	17.78	14.30	32.08	60.00	-27.92	QP			
12		18.5580	8.11	14.30	22.41	50.00	-27.59	AVG			

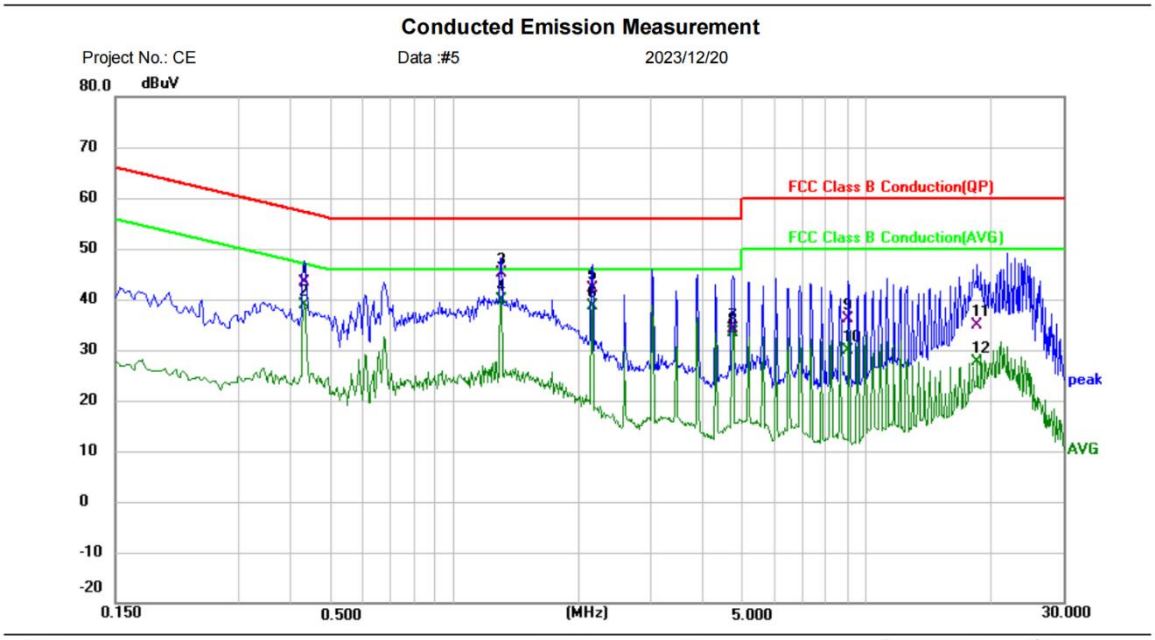
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESPI_1 Spectrum Analyzer: ESPI

L.I.S.N: Engineer Signature:

Test Result: Pass

[TestMode: TX]; [Line: Nutral] ;[Power:AC120V/60Hz]



Site	Phase: N	Temperature: (C)
Limit: FCC Class B Conduction(QP)	Power:	Humidity: %RH
EUT: Wireless Speaker	Distance:	RBW: 9 KHz
M/N: YOYO03		VBW: 30 KHz Sweep Time: 10 ms
Mode: TX mode		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.4300	33.61	9.81	43.42	57.25	-13.83	QP			
2		0.4300	29.13	9.81	38.94	47.25	-8.31	AVG			
3		1.2980	35.23	9.91	45.14	56.00	-10.86	QP			
4	*	1.2980	30.05	9.91	39.96	46.00	-6.04	AVG			
5		2.1619	32.17	10.02	42.19	56.00	-13.81	QP			
6		2.1619	28.68	10.02	38.70	46.00	-7.30	AVG			
7		4.7460	23.76	10.29	34.05	56.00	-21.95	QP			
8		4.7460	23.20	10.29	33.49	46.00	-12.51	AVG			
9		9.0420	24.93	11.32	36.25	60.00	-23.75	QP			
10		9.0420	18.63	11.32	29.95	50.00	-20.05	AVG			
11		18.5620	20.70	14.19	34.89	60.00	-25.11	QP			
12		18.5620	13.39	14.19	27.58	50.00	-22.42	AVG			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESPI_1 Spectrum Analyzer: ESPI

L.I.S.N: Engineer Signature:

Test Result: Pass

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss.

15 RADIATED SPURIOUS EMISSIONS

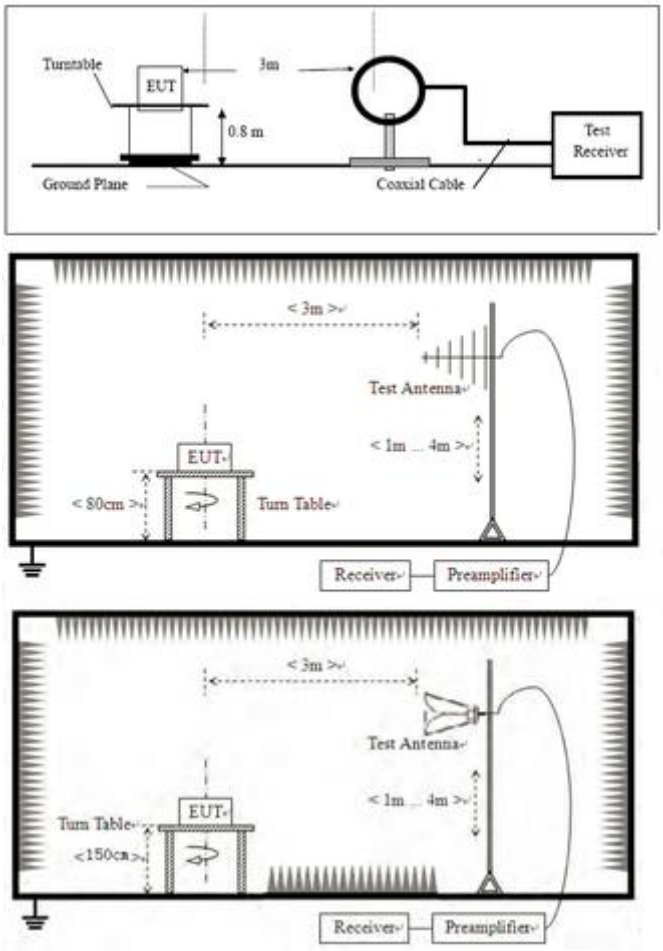
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

15.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 PROCEDURE

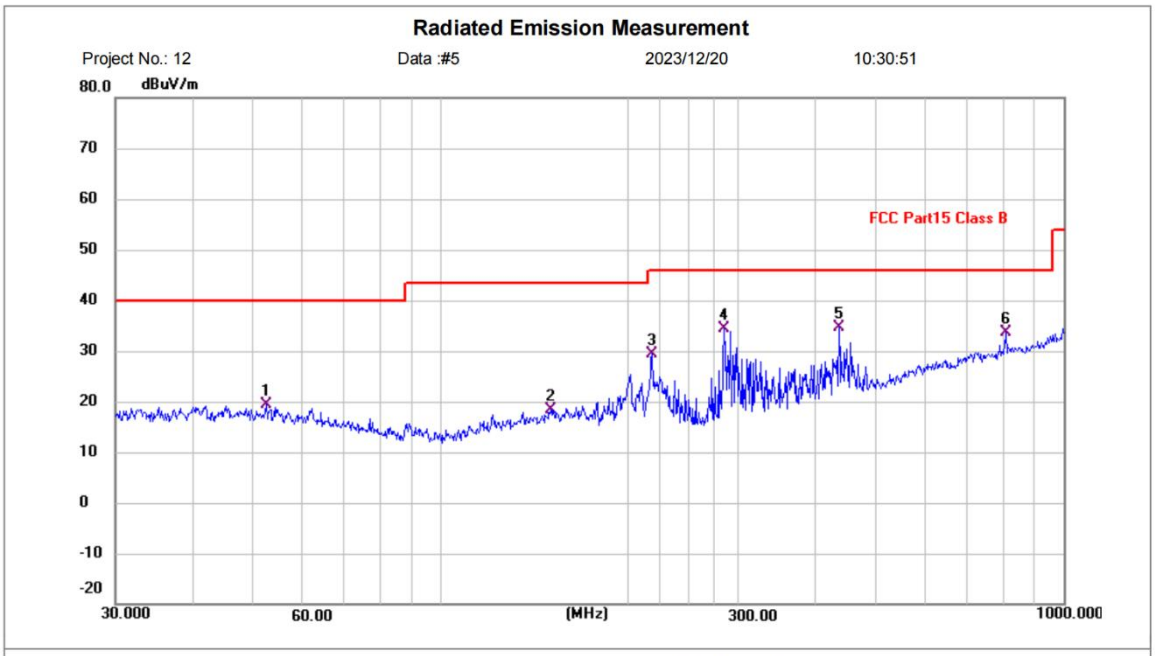
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.

Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.fundamental frequency is blocked by filter, and only spurious emission is shown.
4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

15.4 TEST DATA

[TestMode: TX below 1G]; [Polarity: Horizontal]



Site
Limit: FCC Part15 Class B
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX mode
Note:

Polarization: *Horizontal*
Power:

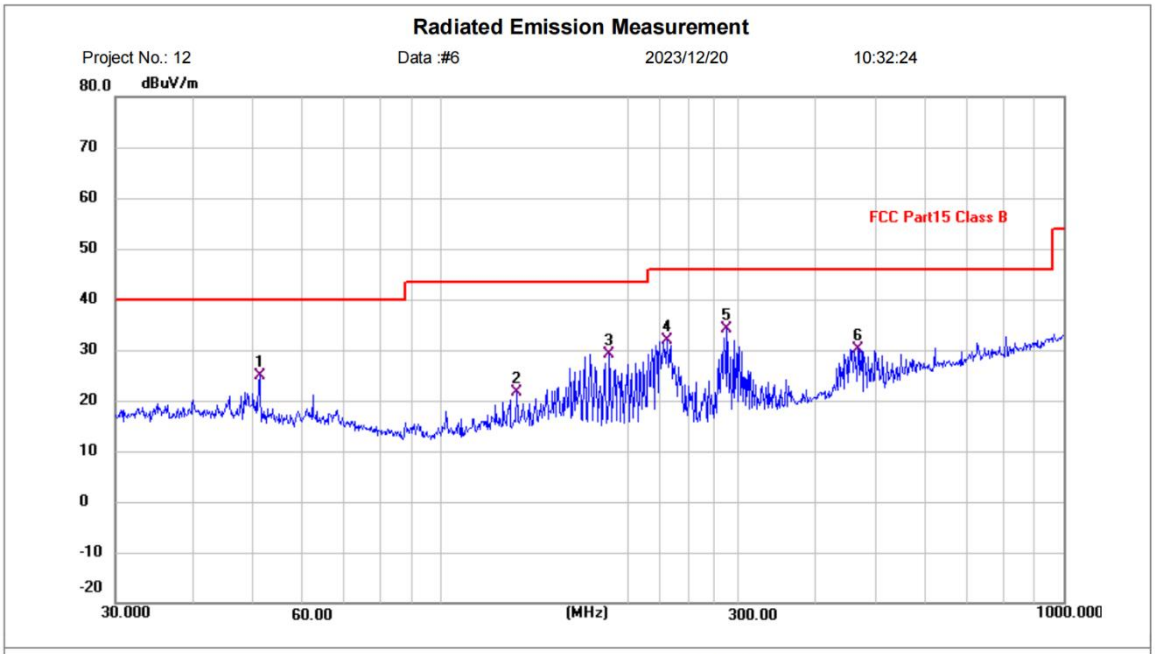
Temperature: (C)
Humidity: %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	52.3912	0.18	19.21	19.39	40.00	-20.61	QP	P	
2	150.0108	-1.11	19.56	18.45	43.50	-25.05	QP	P	
3	218.3084	13.46	15.81	29.27	46.00	-16.73	QP	P	
4	284.9767	15.59	18.67	34.26	46.00	-11.74	QP	P	
5 *	435.5898	11.88	22.73	34.61	46.00	-11.39	QP	P	
6	807.4290	3.83	29.84	33.67	46.00	-12.33	QP	P	

*:Maximum data x:Over limit !:over margin

Test Result: Pass

[TestMode: TX below 1G]; [Polarity: Vertical]



Site
Limit: FCC Part15 Class B
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX mode
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

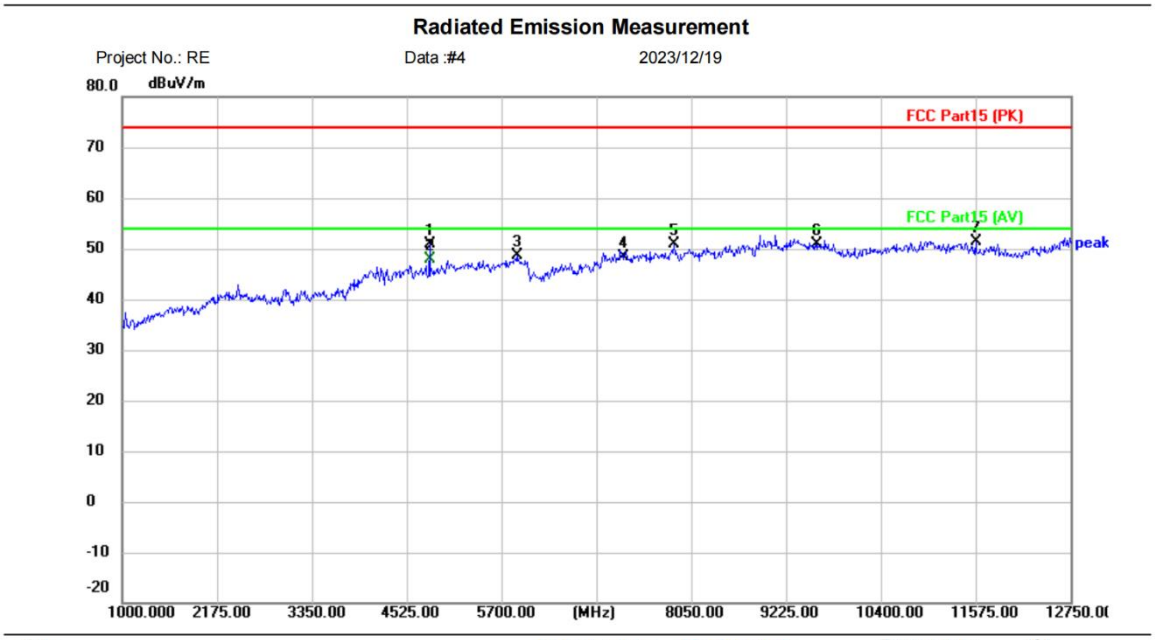
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	51.1209	5.23	19.56	24.79	40.00	-15.21	QP	P	
2	132.2206	3.48	18.17	21.65	43.50	-21.85	QP	P	
3	186.4409	12.12	17.10	29.22	43.50	-14.28	QP	P	
4	230.9068	15.57	16.42	31.99	46.00	-14.01	QP	P	
5 *	287.9904	15.56	18.62	34.18	46.00	-11.82	QP	P	
6	467.2349	6.58	23.63	30.21	46.00	-15.79	QP	P	

*:Maximum data x:Over limit !:over margin

Test Result: Pass

Above 1GHz:

[TestMode: TX low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2402
Note:

Polarization: *Horizontal*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	45.30	5.64	50.94	74.00	-23.06	peak	
2	*	4807.000	42.18	5.64	47.82	54.00	-6.18	AVG	
3		5888.000	39.93	8.60	48.53	74.00	-25.47	peak	
4		7206.000	39.04	9.24	48.28	74.00	-25.72	peak	
5		7838.500	41.01	9.86	50.87	74.00	-23.13	peak	
6		9608.000	38.62	12.31	50.93	74.00	-23.07	peak	
7		11575.00	39.09	12.25	51.34	74.00	-22.66	peak	

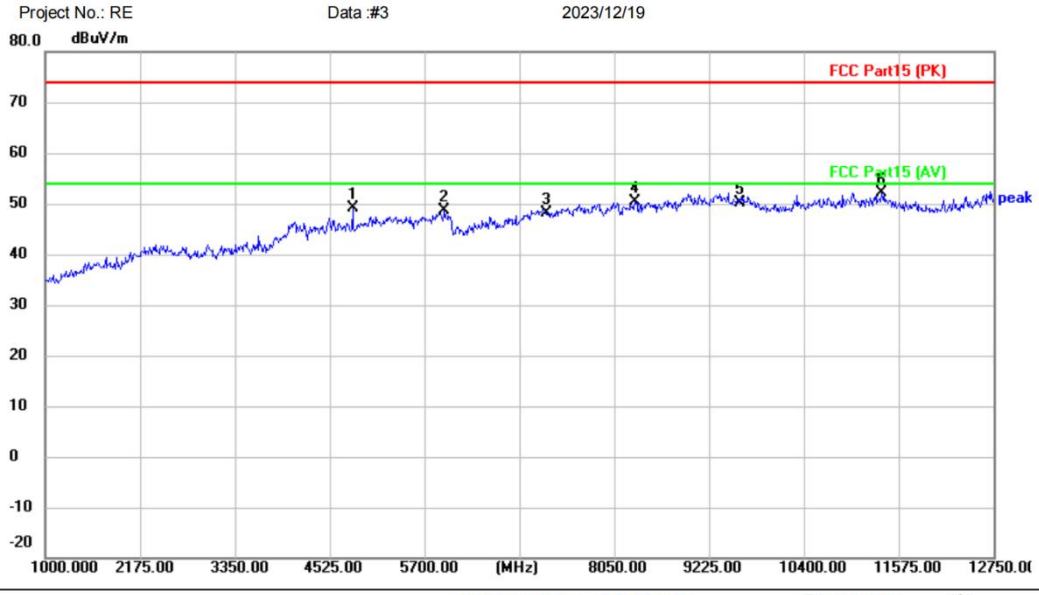
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2402
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	43.55	5.64	49.19	74.00	-24.81	peak	
2		5946.750	39.97	8.71	48.68	74.00	-25.32	peak	
3		7206.000	38.97	9.24	48.21	74.00	-25.79	peak	
4		8308.500	40.14	10.24	50.38	74.00	-23.62	peak	
5		9608.000	37.76	12.31	50.07	74.00	-23.93	peak	
6	*	11363.50	39.43	12.65	52.08	74.00	-21.92	peak	

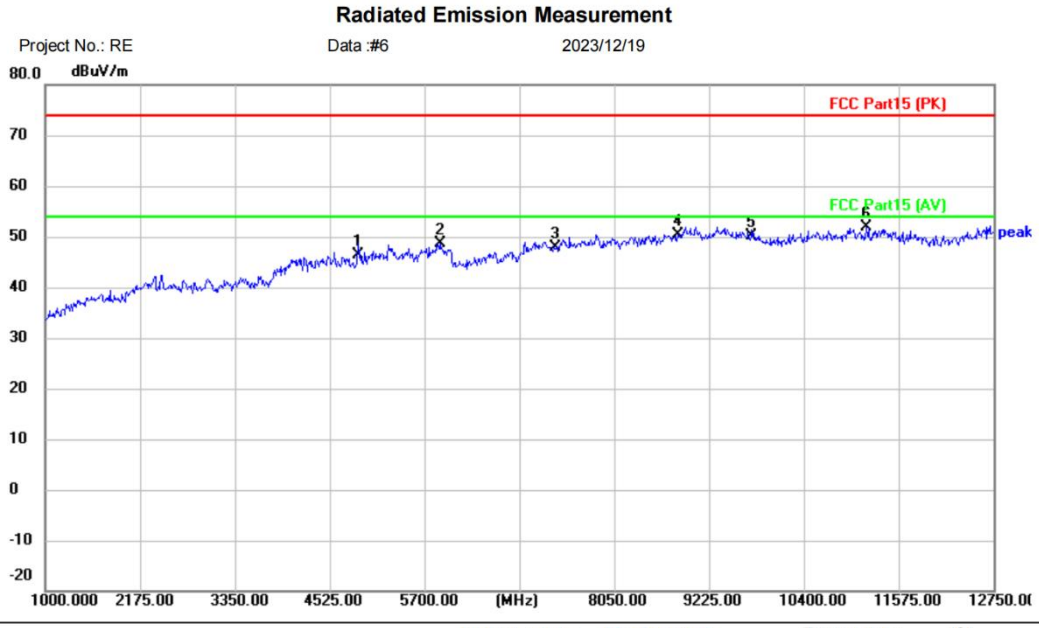
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2441
Note:

Polarization: *Horizontal*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	40.55	5.73	46.28	74.00	-27.72	peak	
2		5888.000	40.10	8.60	48.70	74.00	-25.30	peak	
3		7323.000	38.47	9.43	47.90	74.00	-26.10	peak	
4		8837.250	38.59	11.75	50.34	74.00	-23.66	peak	
5		9764.000	37.97	12.21	50.18	74.00	-23.82	peak	
6	*	11175.50	39.14	12.72	51.86	74.00	-22.14	peak	

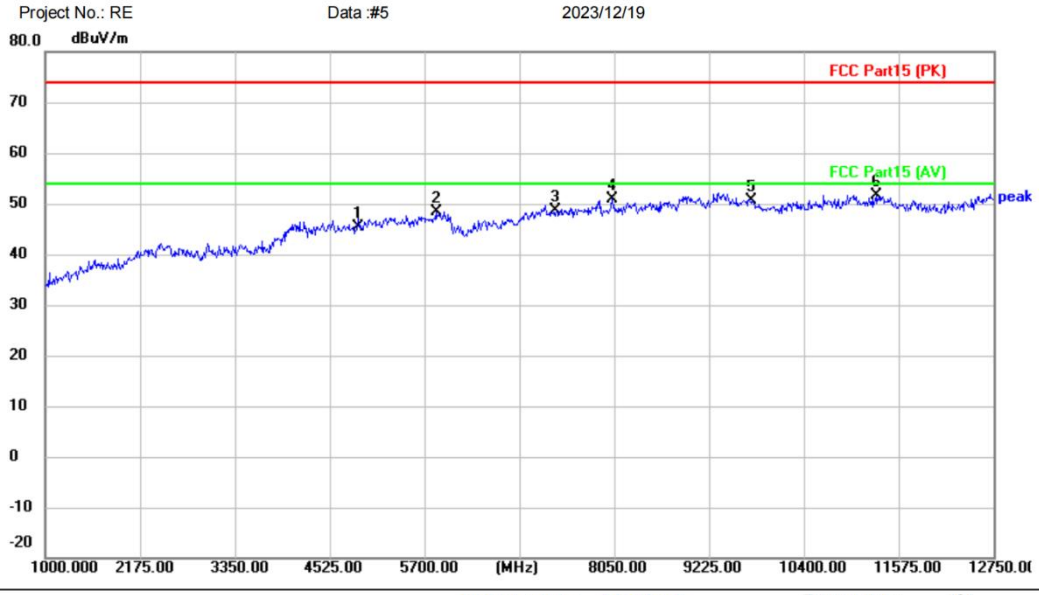
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2441
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	39.56	5.73	45.29	74.00	-28.71	peak	
2		5841.000	40.17	8.31	48.48	74.00	-25.52	peak	
3		7323.000	39.31	9.43	48.74	74.00	-25.26	peak	
4		8026.500	40.99	9.84	50.83	74.00	-23.17	peak	
5		9764.000	38.46	12.21	50.67	74.00	-23.33	peak	
6	*	11293.00	38.99	12.70	51.69	74.00	-22.31	peak	

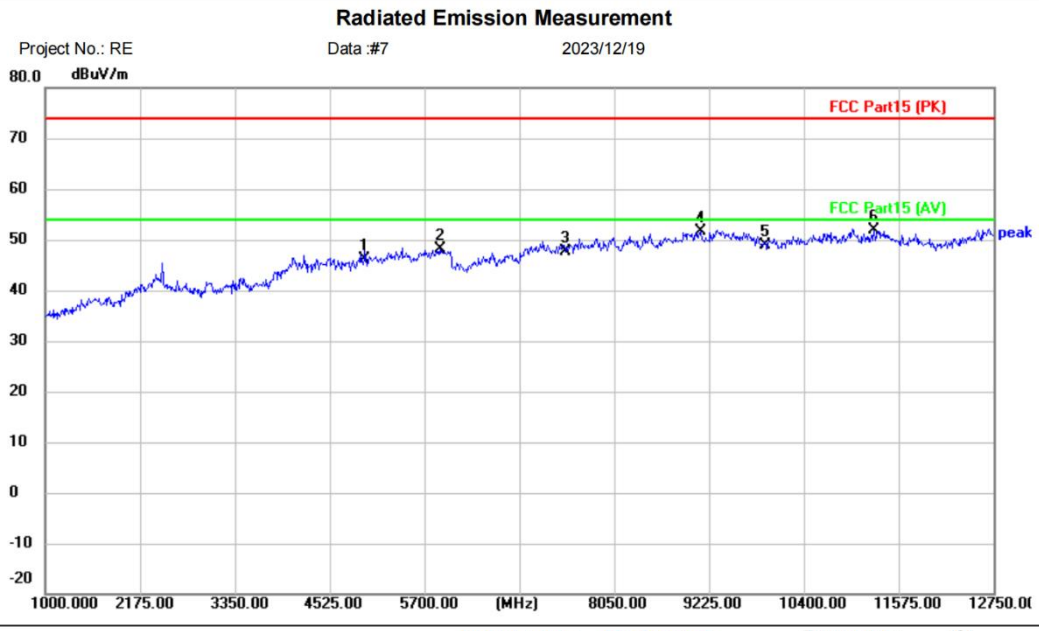
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2480
Note:

Polarization: *Horizontal*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	39.57	6.60	46.17	74.00	-27.83	peak	
2		5888.000	39.57	8.60	48.17	74.00	-25.83	peak	
3		7440.000	37.98	9.64	47.62	74.00	-26.38	peak	
4		9119.250	39.12	12.54	51.66	74.00	-22.34	peak	
5		9920.000	36.65	12.14	48.79	74.00	-25.21	peak	
6	*	11269.50	39.18	12.70	51.88	74.00	-22.12	peak	

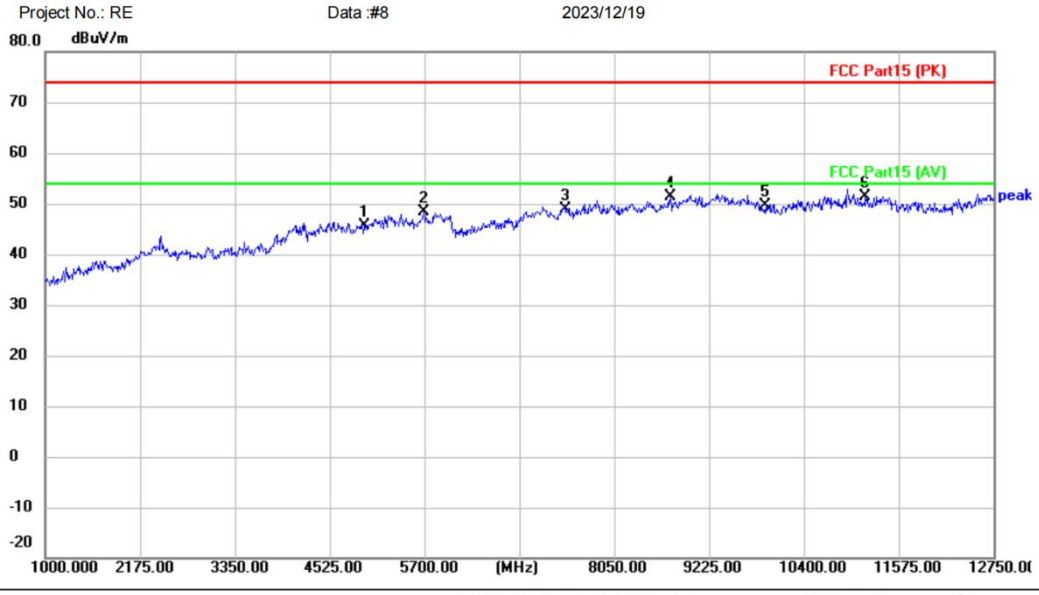
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2480
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	39.08	6.60	45.68	74.00	-28.32	peak	
2		5688.250	40.46	7.96	48.42	74.00	-25.58	peak	
3		7440.000	39.23	9.64	48.87	74.00	-25.13	peak	
4	*	8743.250	39.84	11.57	51.41	74.00	-22.59	peak	
5		9920.000	37.44	12.14	49.58	74.00	-24.42	peak	
6		11163.75	38.68	12.73	51.41	74.00	-22.59	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

Remark:

1. Final Level =Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

16 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

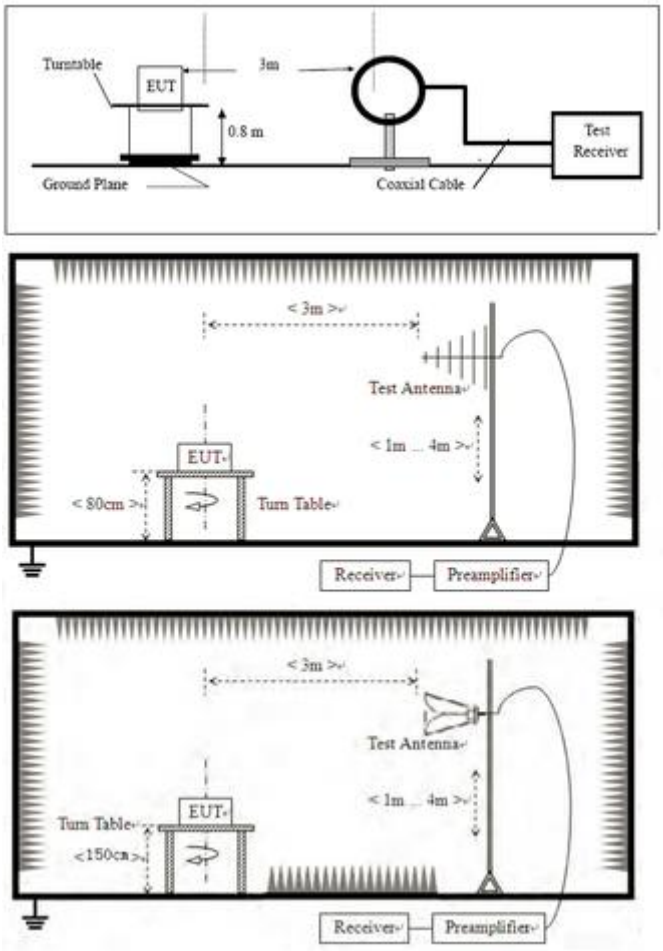
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

16.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

16.2 BLOCK DIAGRAM OF TEST SETUP



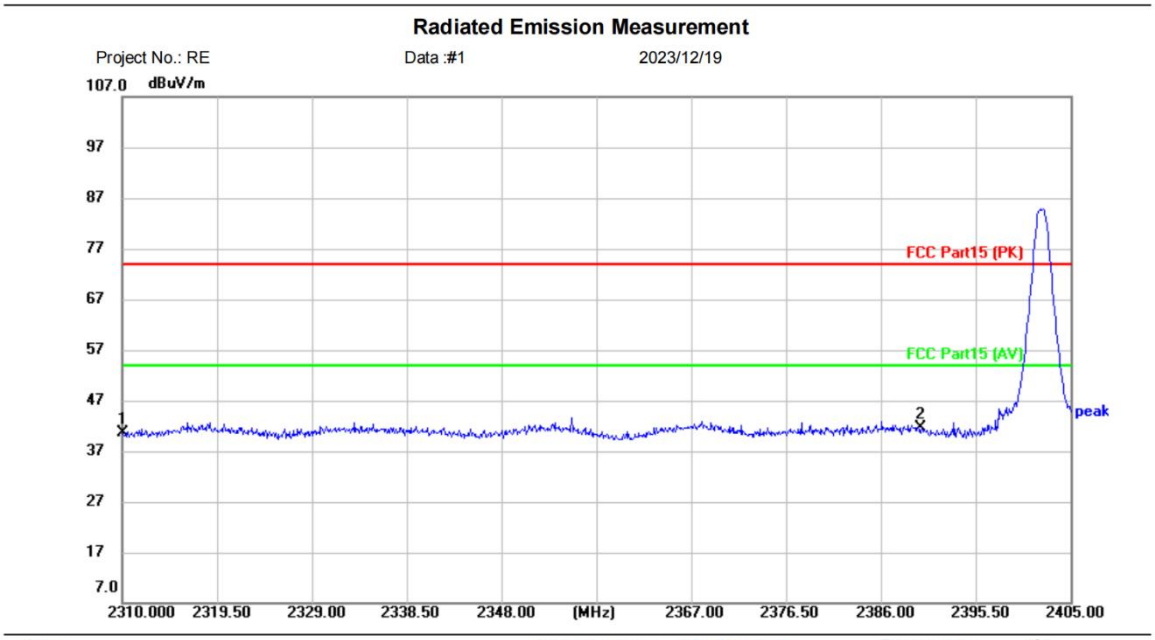
16.3 PROCEDURE

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

16.4 TEST DATA

[TestMode: TX low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2402
Note:

Polarization: *Horizontal*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	43.57	-2.89	40.68	74.00	-33.32	peak	
2	*	2390.000	44.41	-2.70	41.71	74.00	-32.29	peak	

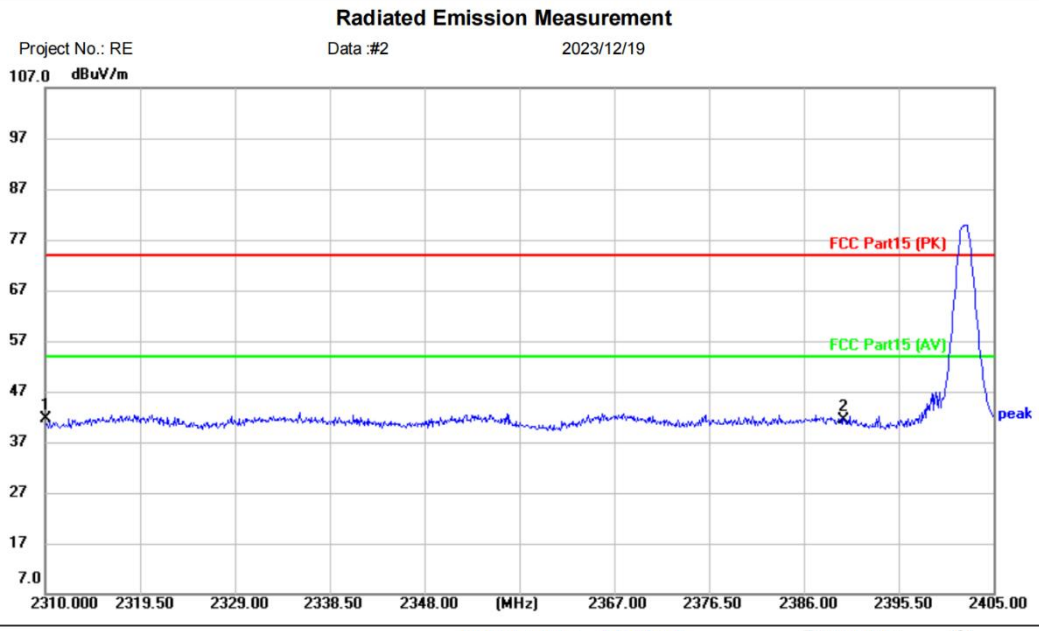
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2402
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

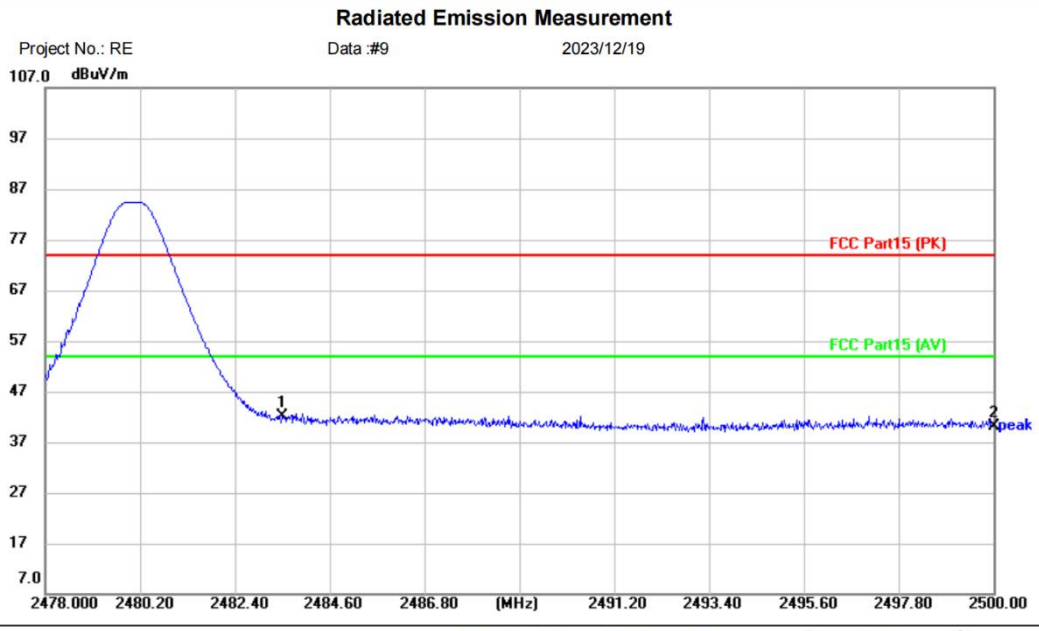
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2310.000	44.42	-2.89	41.53	74.00	-32.47	peak	
2		2390.000	43.98	-2.70	41.28	74.00	-32.72	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G
Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2480
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	45.01	-2.91	42.10	74.00	-31.90	peak	
2		2500.000	43.13	-3.00	40.13	74.00	-33.87	peak	

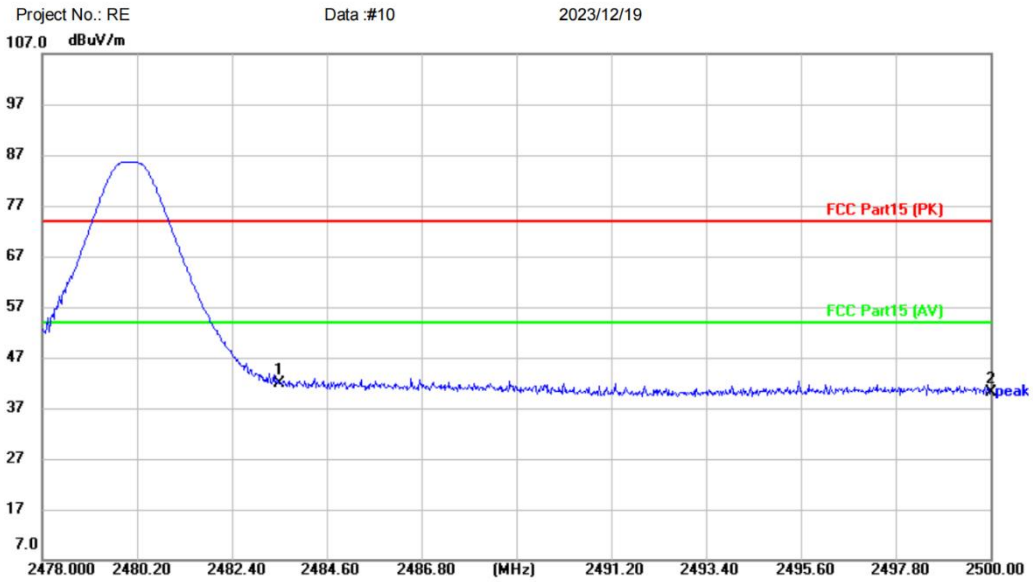
*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Wireless Speaker
M/N: YOYO03
Mode: TX-2480
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	44.88	-2.91	41.97	74.00	-32.03	peak	
2		2500.000	43.20	-3.00	40.20	74.00	-33.80	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1
Antenna: EZ 9120D 1G-18G

Spectrum Analyzer: FSP40
Engineer Signature:

Test Result: Pass

Remark:

1. Final Level =Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

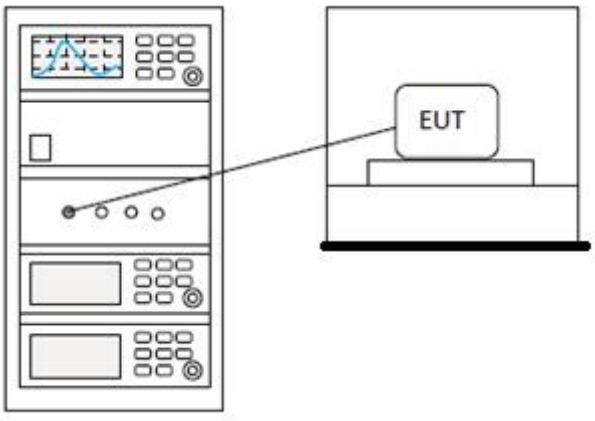
17 CONDUCTED BAND EDGES MEASUREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

17.1 LIMITS

Limit:	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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

17.2 BLOCK DIAGRAM OF TEST SETUP



17.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

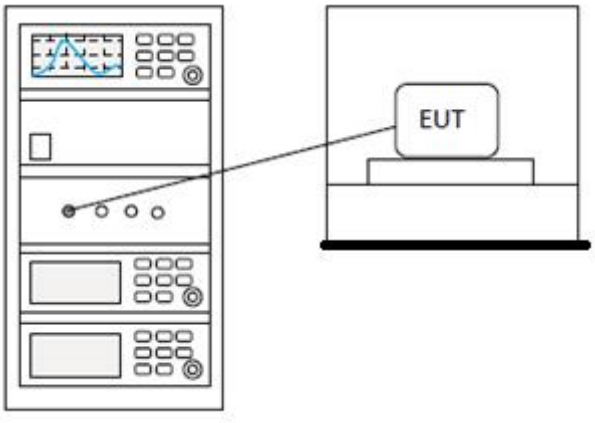
18 DWELL TIME

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.4
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

18.1 LIMITS

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

18.2 BLOCK DIAGRAM OF TEST SETUP



18.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

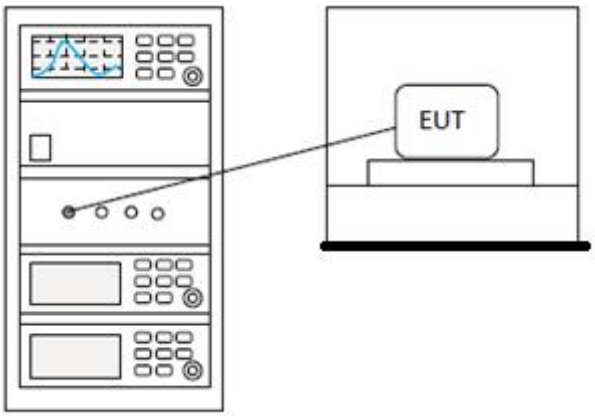
19 HOPPING CHANNEL NUMBER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.3
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

19.1 LIMITS

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

19.2 BLOCK DIAGRAM OF TEST SETUP



19.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

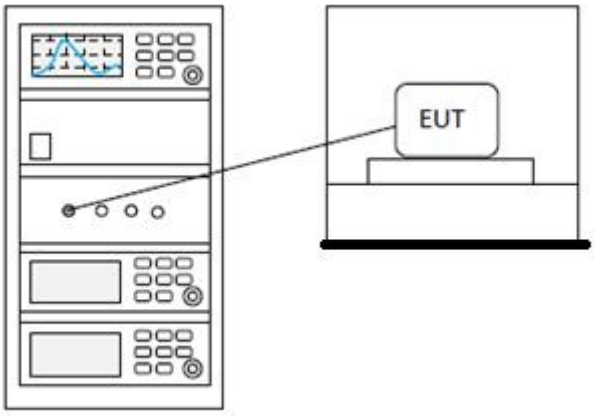
20 CARRIER FREQUENCIES SEPARATION

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

20.1 LIMITS

Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

20.2 BLOCK DIAGRAM OF TEST SETUP



20.3 TEST DATA

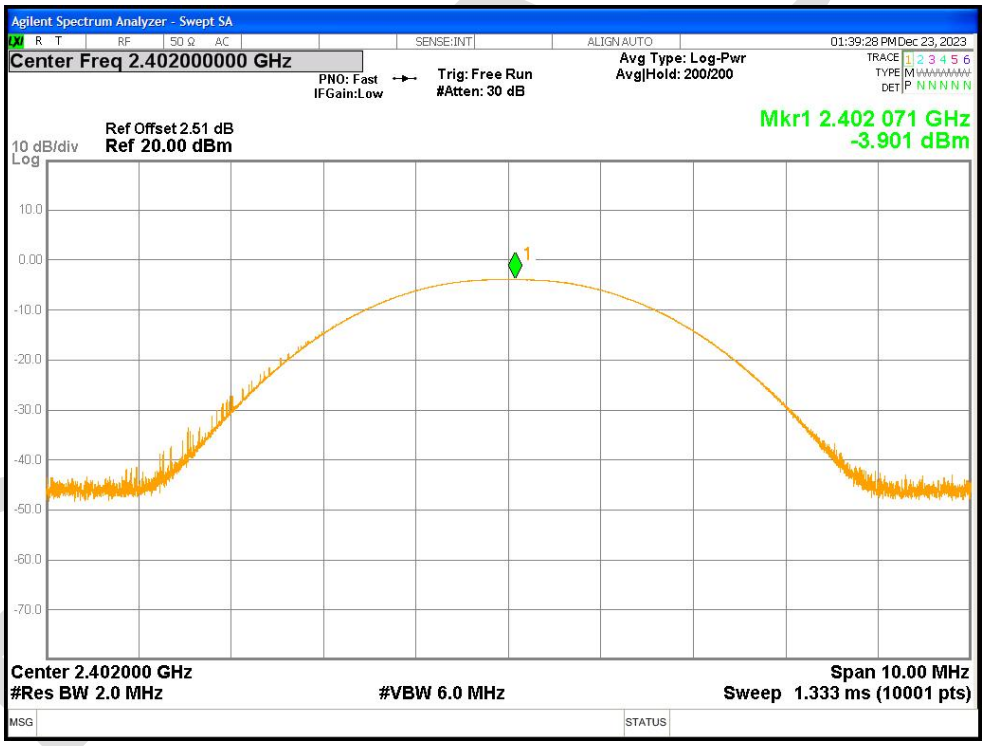
Pass: Please Refer To Appendix: Appendix1 For Details

21 APPENDIX1

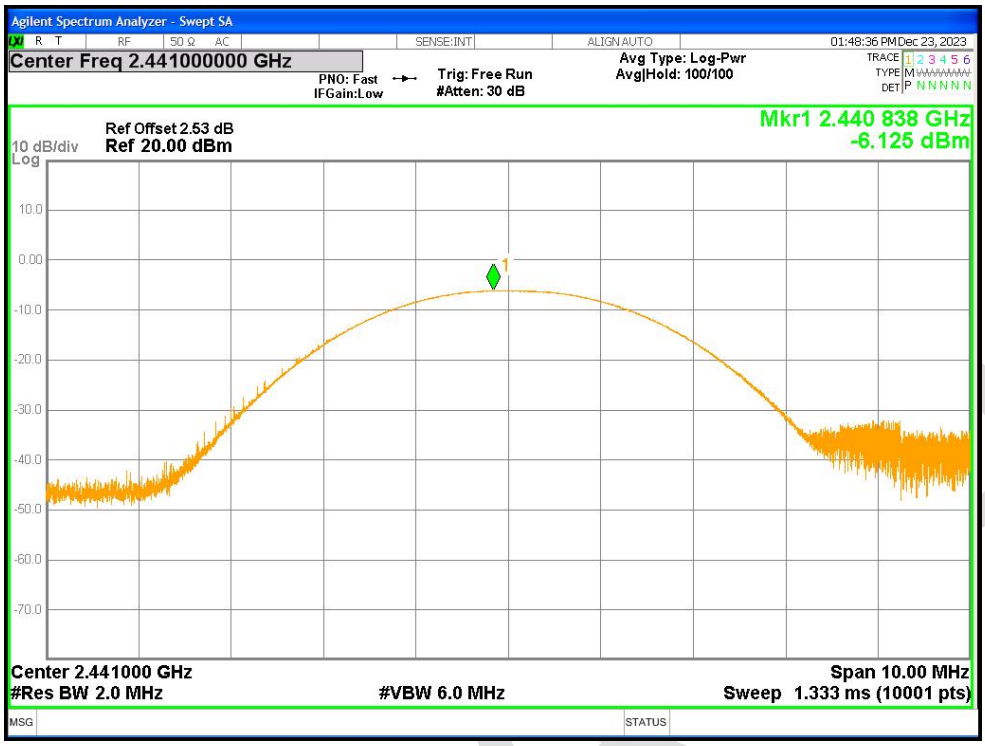
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	Ant1	-3.901	21	Pass
NVNT	1-DH1	2441	Ant1	-6.125	21	Pass
NVNT	1-DH1	2480	Ant1	-7.36	21	Pass
NVNT	2-DH1	2402	Ant1	-2.148	21	Pass
NVNT	2-DH1	2441	Ant1	-3.942	21	Pass
NVNT	2-DH1	2480	Ant1	-5.68	21	Pass
NVNT	3-DH1	2402	Ant1	-1.3	21	Pass
NVNT	3-DH1	2441	Ant1	-3.633	21	Pass
NVNT	3-DH1	2480	Ant1	-5.052	21	Pass

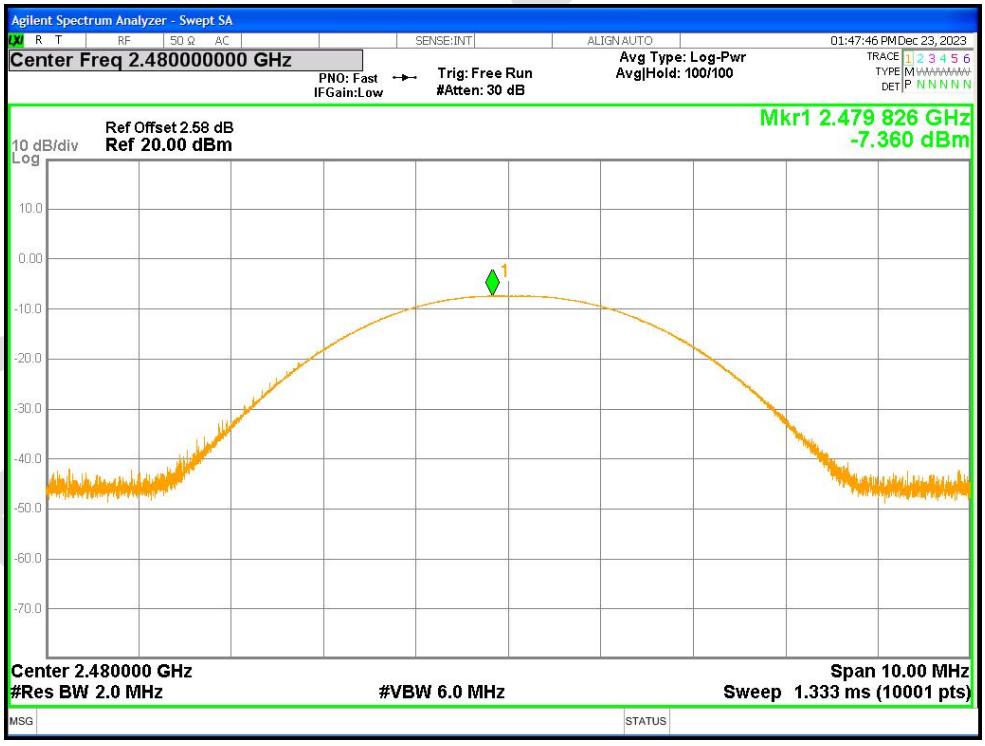
Power NVNT 1-DH1 2402MHz Ant1



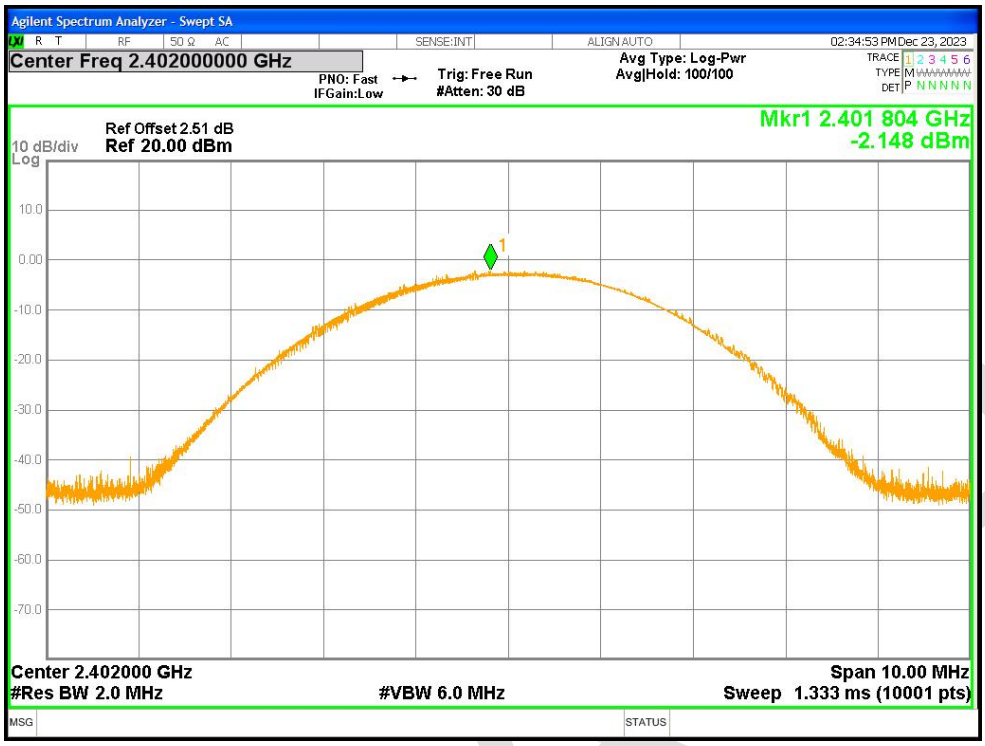
Power NVNT 1-DH1 2441MHz Ant1



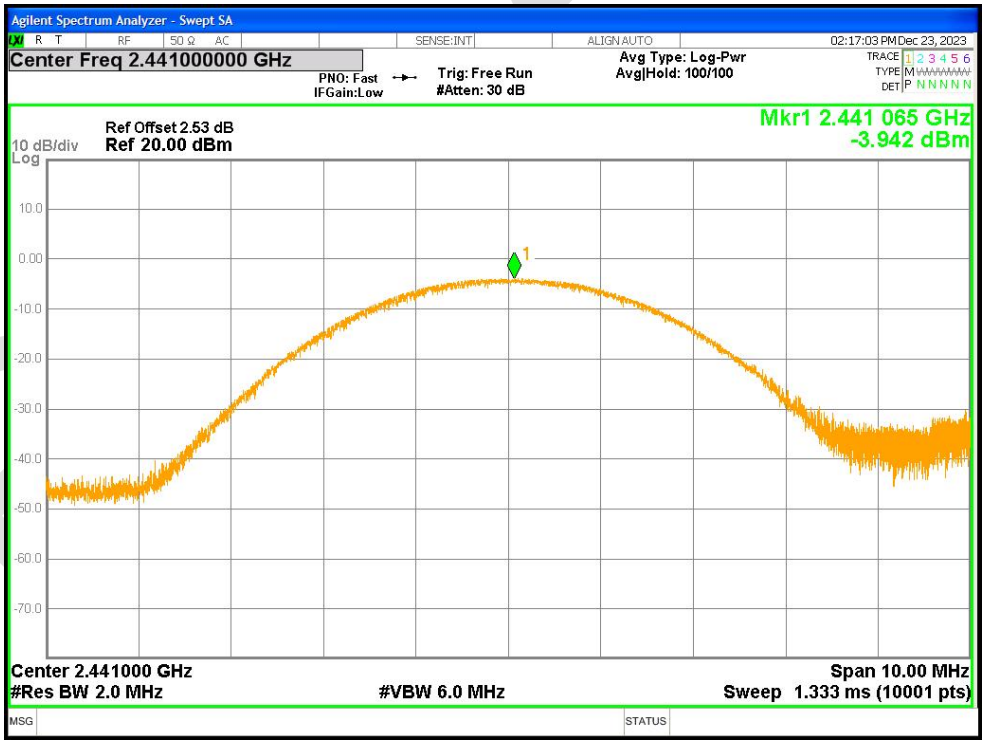
Power NVNT 1-DH1 2480MHz Ant1



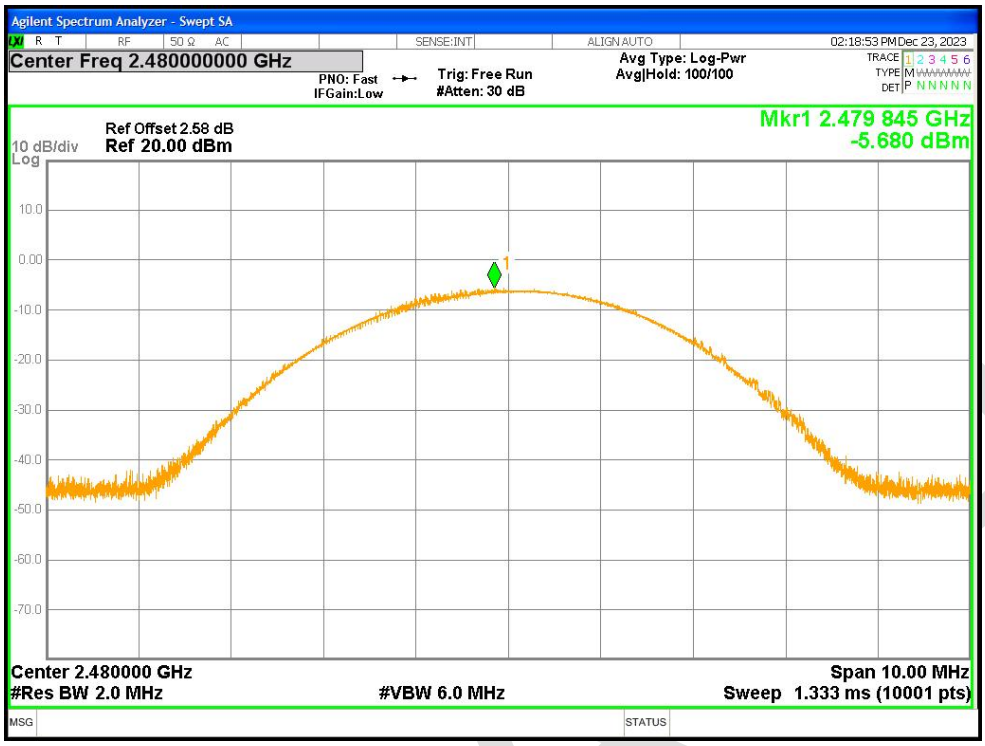
Power NVNT 2-DH1 2402MHz Ant1



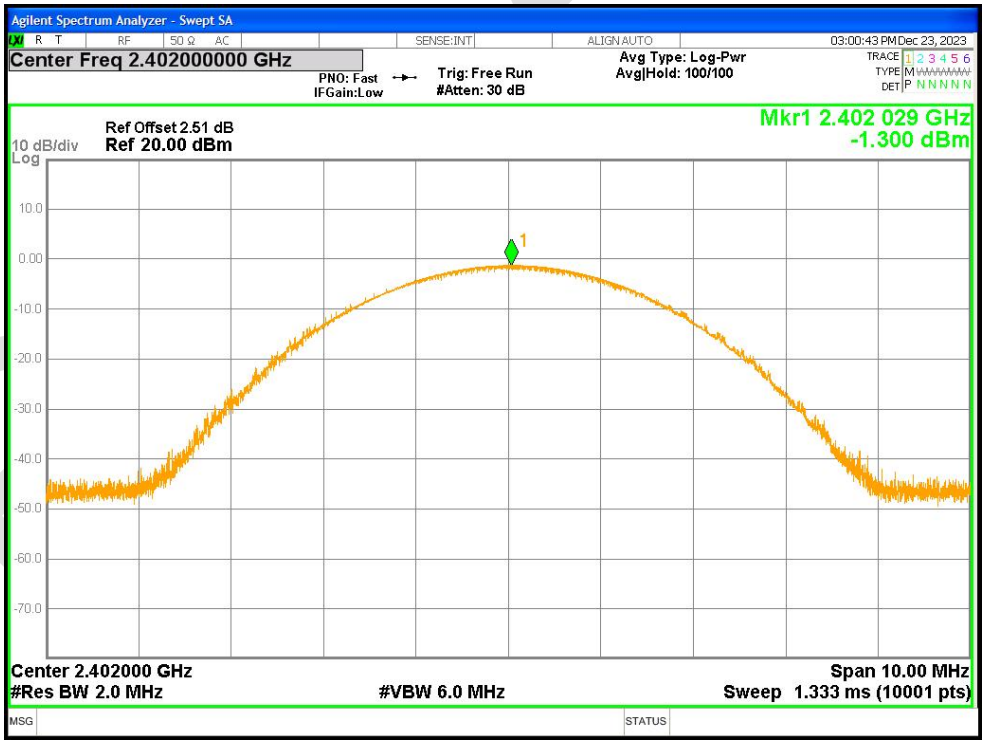
Power NVNT 2-DH1 2441MHz Ant1



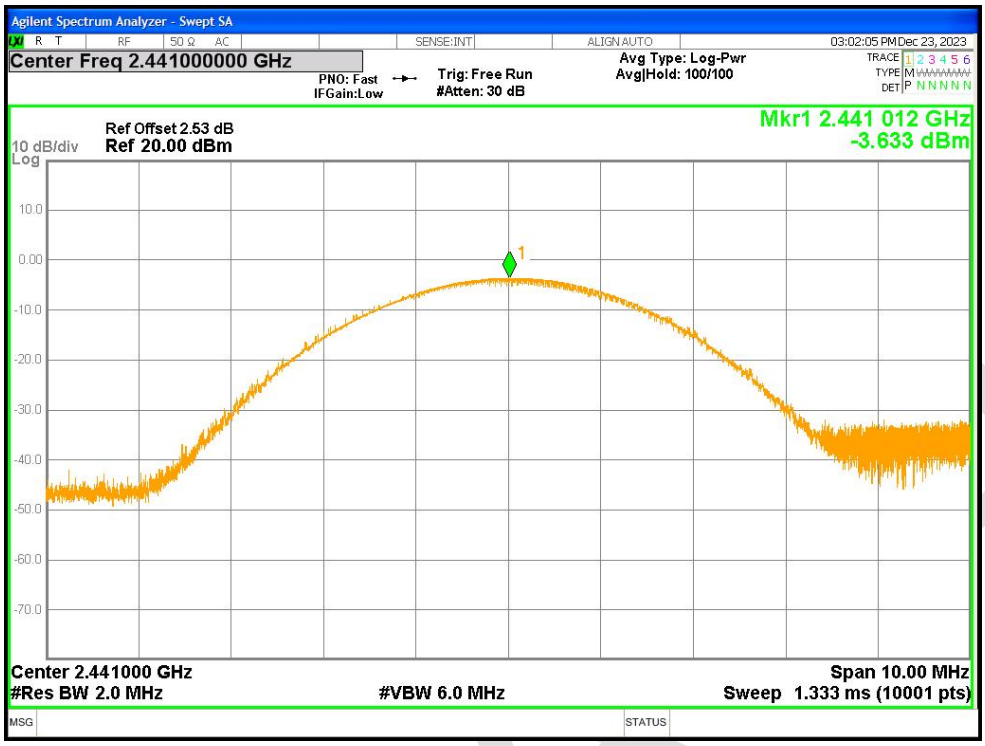
Power NVNT 2-DH1 2480MHz Ant1



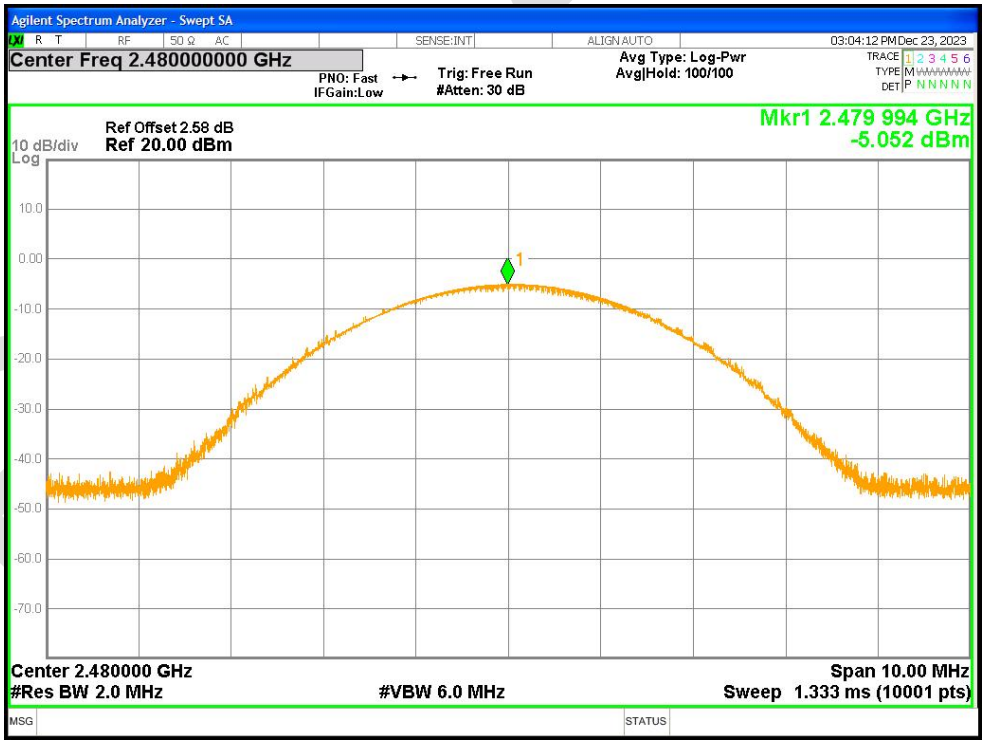
Power NVNT 3-DH1 2402MHz Ant1



Power NVNT 3-DH1 2441MHz Ant1



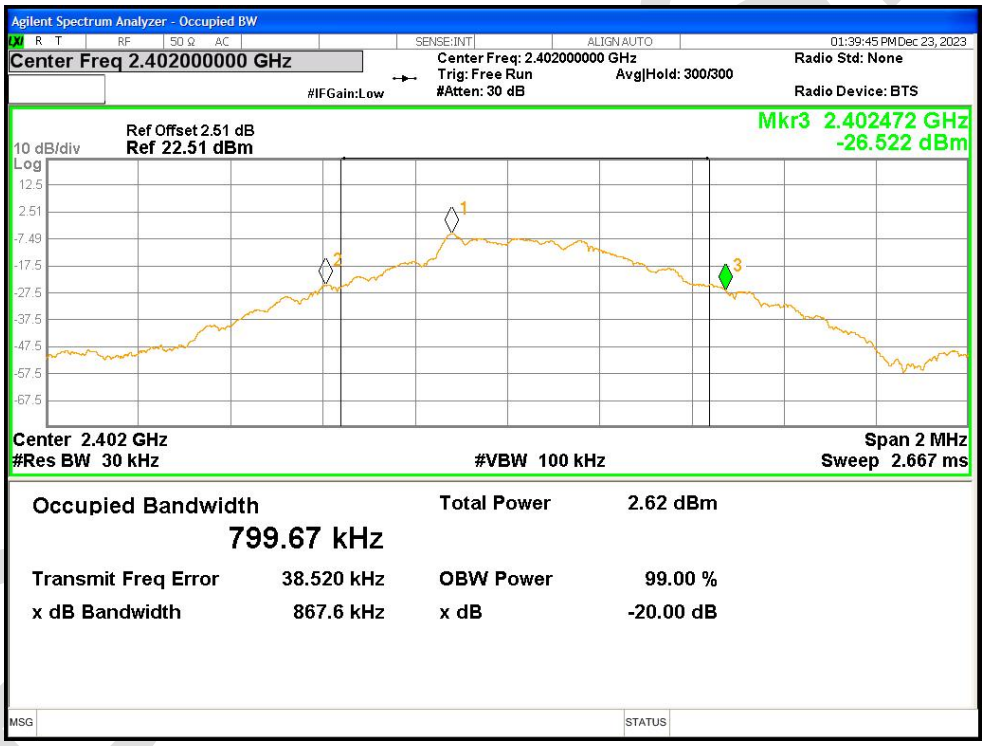
Power NVNT 3-DH1 2480MHz Ant1



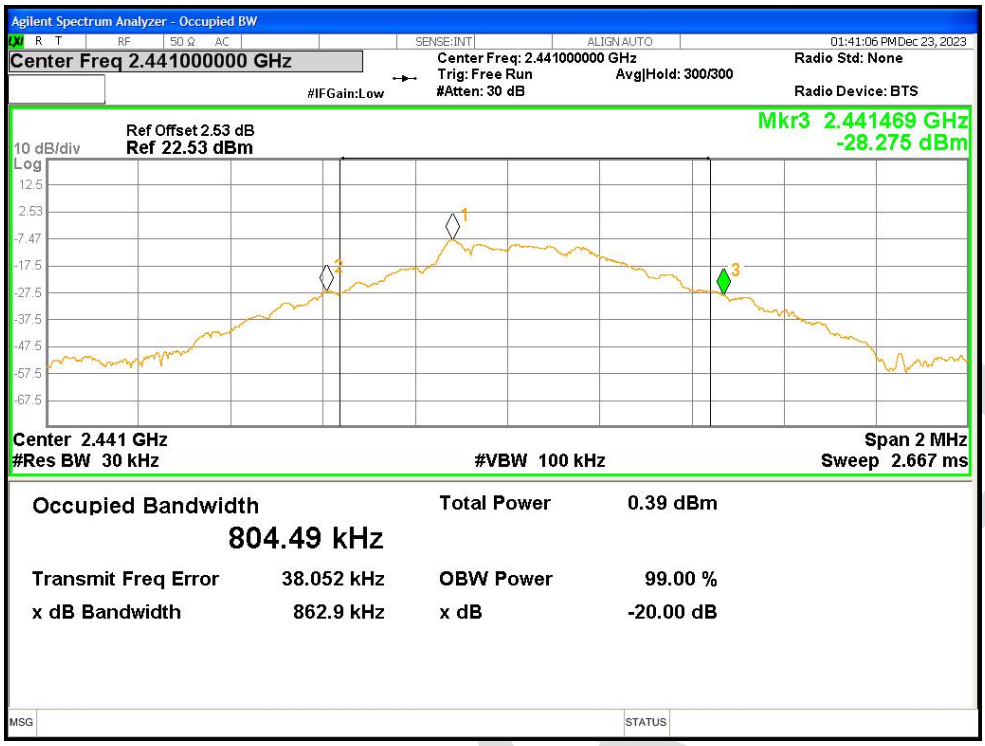
-20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant1	0.868	N/A	Pass
NVNT	1-DH1	2441	Ant1	0.863	N/A	Pass
NVNT	1-DH1	2480	Ant1	0.864	N/A	Pass
NVNT	2-DH1	2402	Ant1	1.252	N/A	Pass
NVNT	2-DH1	2441	Ant1	1.264	N/A	Pass
NVNT	2-DH1	2480	Ant1	1.29	N/A	Pass
NVNT	3-DH1	2402	Ant1	1.272	N/A	Pass
NVNT	3-DH1	2441	Ant1	1.272	N/A	Pass
NVNT	3-DH1	2480	Ant1	1.271	N/A	Pass

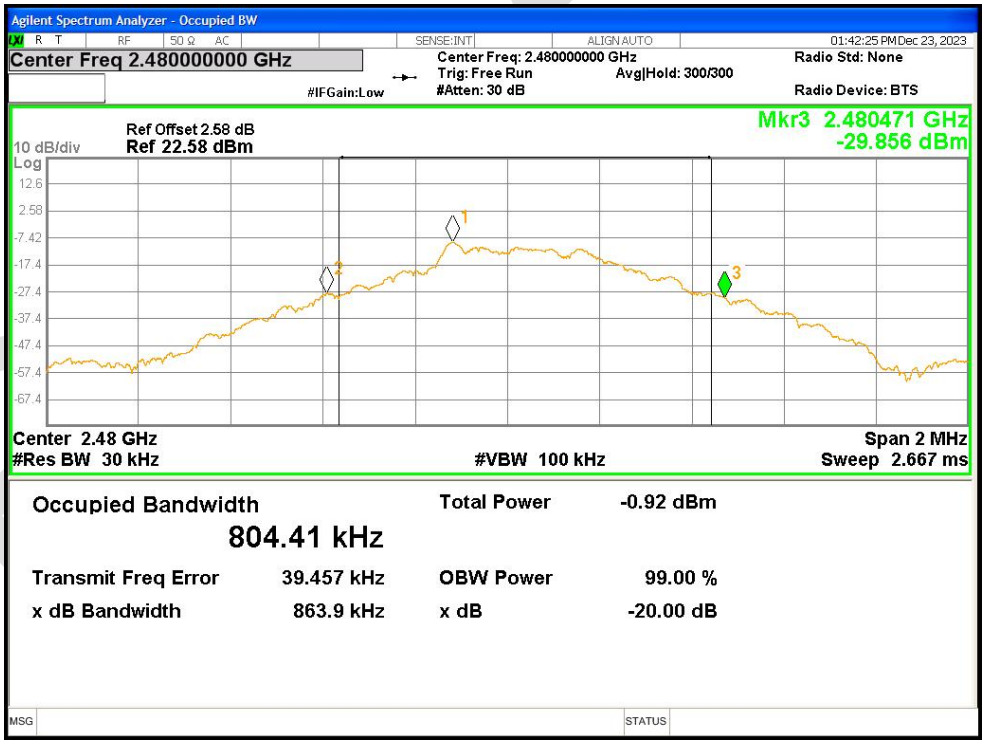
-20dB Bandwidth NVNT 1-DH1 2402MHz Ant1



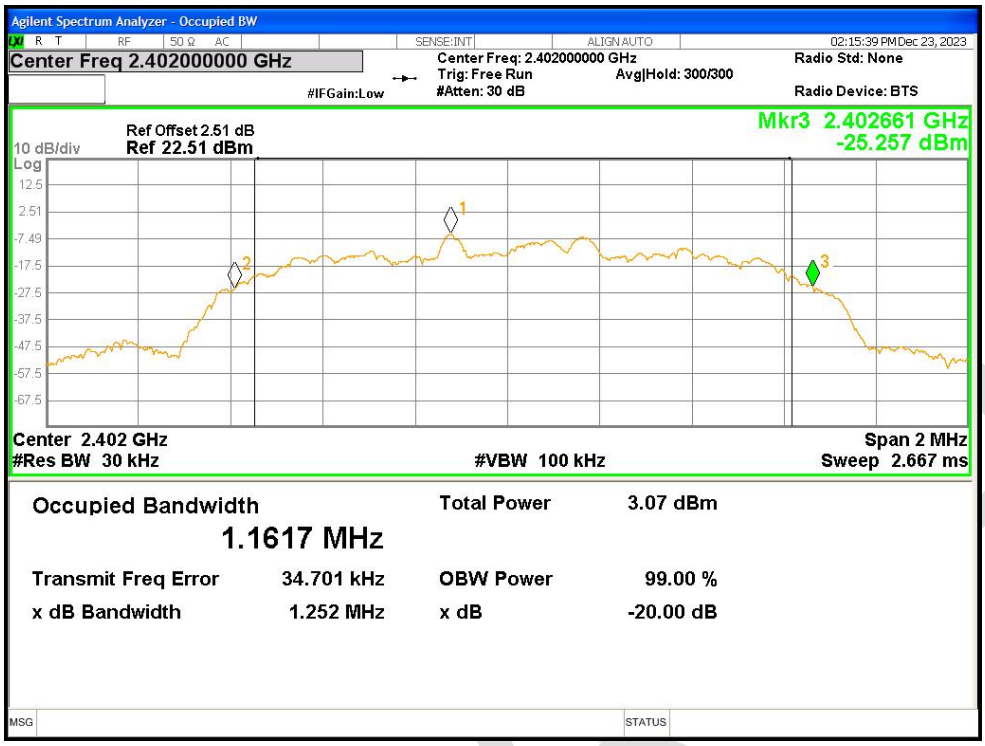
-20dB Bandwidth NVNT 1-DH1 2441MHz Ant1



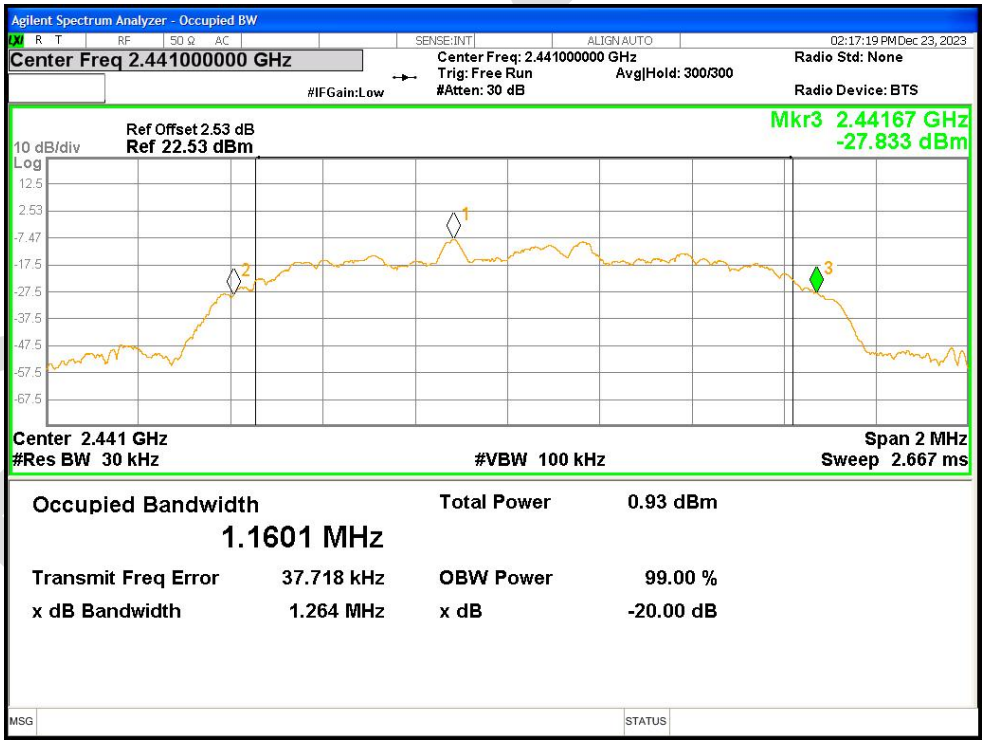
-20dB Bandwidth NVNT 1-DH1 2480MHz Ant1



-20dB Bandwidth NVNT 2-DH1 2402MHz Ant1



-20dB Bandwidth NVNT 2-DH1 2441MHz Ant1



-20dB Bandwidth NVNT 2-DH1 2480MHz Ant1