TEST REPORT

Product Name	:	Bluetooth Remote Control
Brand Mark	:	TZ BOX
Model No.	:	TrezorBOX
Extension model	:	OMNIVERSE plus
Report Number	:	BLA-EMC-202403-A11502
FCC ID	:	2BFM3-TZB041R3
Date of Sample Receipt	:	2024/4/1
Date of Test	:	2024/4/1 to 2024/4/11
Date of Issue	:	2024/4/11
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

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

REPORT REVISE RECORD

Version No.	Date	Description
00	2024/4/11	Original

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TABLE OF CONTENTS

1 TEST SUMMARY 5

2 GENERAL INFORMATION 6

3 GENERAL DESCRIPTION OF E.U.T. 6

4 TEST ENVIRONMENT 8

5 TEST MODE 8

6 MEASUREMENT UNCERTAINTY 8

7 DESCRIPTION OF SUPPORT UNIT 9

8 TEST FACILITY 9

9 LABORATORY LOCATION 9

10 TEST INSTRUMENTS LIST 10

11 CONDUCTED BAND EDGES MEASUREMENT 12

11.1 LIMITS 12
11.2 BLOCK DIAGRAM OF TEST SETUP 12
11.3 TEST DATA 12

12 RADIATED SPURIOUS EMISSIONS 13

12.1 LIMITS 13
12.2 BLOCK DIAGRAM OF TEST SETUP 14
12.3 PROCEDURE 14
12.4 TEST DATA 16

13 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS 25

13.1 LIMITS 25
13.2 BLOCK DIAGRAM OF TEST SETUP 26
13.3 PROCEDURE 26
13.4 TEST DATA 28

14 CONDUCTED SPURIOUS EMISSIONS 33

14.1 LIMITS 33
14.2 BLOCK DIAGRAM OF TEST SETUP 33
14.3 TEST DATA 33

15 POWER SPECTRUM DENSITY 34

BlueAsia

15.1 LIMITS 34
15.2 BLOCK DIAGRAM OF TEST SETUP 34
15.3 TEST DATA 34

16 CONDUCTED PEAK OUTPUT POWER 35

16.1 LIMITS 35
16.2 BLOCK DIAGRAM OF TEST SETUP 35
16.3 TEST DATA 35

17 MINIMUM 6DB BANDWIDTH 36

17.1 LIMITS 36
17.2 BLOCK DIAGRAM OF TEST SETUP 36
17.3 TEST DATA 36

18 ANTENNA REQUIREMENT 37

18.1 CONCLUSION 37

19 APPENDIX1 38

APPENDIX A: PHOTOGRAPHS OF TEST SETUP 66

APPENDIX B: PHOTOGRAPHS OF EUT 67

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
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	N/A
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
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 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
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	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
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Remark:

N/A: Not Applicable

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2 GENERAL INFORMATION

Applicant	SHENZHEN Newglee Technology Co.,Ltd.
Address	Room E601,UNIS Harbour, Langshan Rd, North High-Tech Park, Nanshan District, Shenzhen, China
Manufacturer	SHENZHEN Newglee Technology Co.,Ltd.
Address	Room E601,UNIS Harbour, Langshan Rd, North High-Tech Park, Nanshan District, Shenzhen, China
Factory	Dongguan Huayun Industrial Co.,Ltd.
Address	No.8 Xiangrong Road, Songmushan Village, Dalang Town, Dongguan,China
Product Name	Bluetooth Remote Control
Test Model No.	TrezorBOX
Extension model	OMNIVERSE plus
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	HW001
Software Version	SW001

Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Rate data:	1Mbps, 2Mbps
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	PCB Antenna
Antenna Gain:	1.5dBi (Provided by the applicant)

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Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

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	2442MHz
The Highest channel	2480MHz

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4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	3.0Vdc

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation.

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

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7 DESCRIPTION OF SUPPORT UNIT

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

8 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:
● FCC — Designation No.: CN1252
BlueAsia of Technical Services(Shenzhen) Co., Ltd has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Designation CN1252.
●ISED — CAB identifier No.: CN0028

BlueAsia of Technical Services(Shenzhen) Co., Ltd has been registered by Certification and Engineering

Bureau of ISED for radio equipment testing with CAB identifier CN0028.

9 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

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10 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber 1	SKET	966	N/A	2023/11/16	2026/11/15
Chamber 2	SKET	966	N/A	2021/07/20	2024/07/19
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

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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

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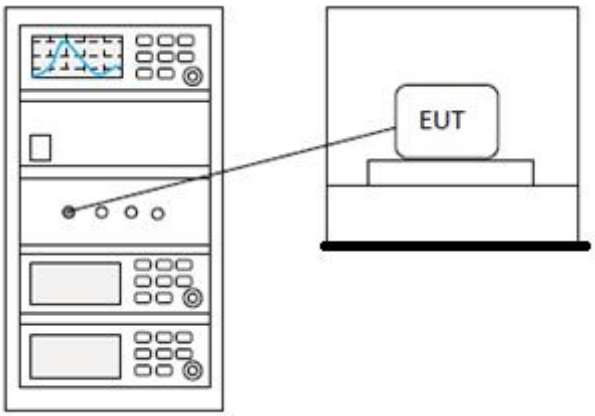
11 CONDUCTED BAND EDGES MEASUREMENT

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%

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 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%

12.1 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.

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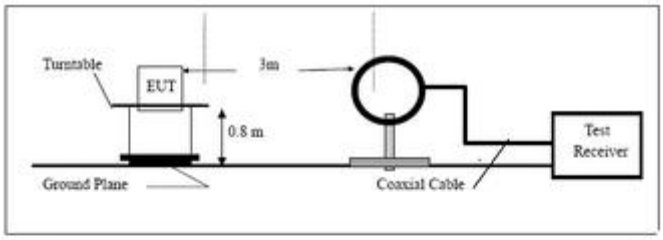
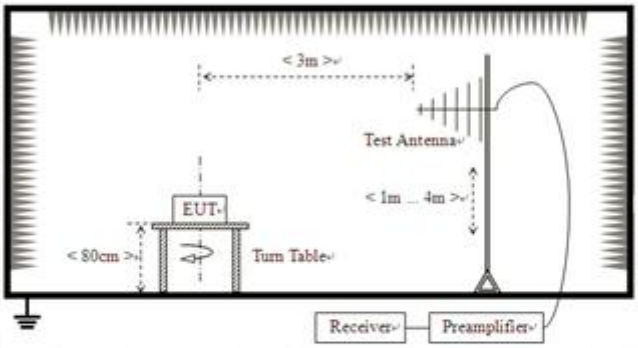
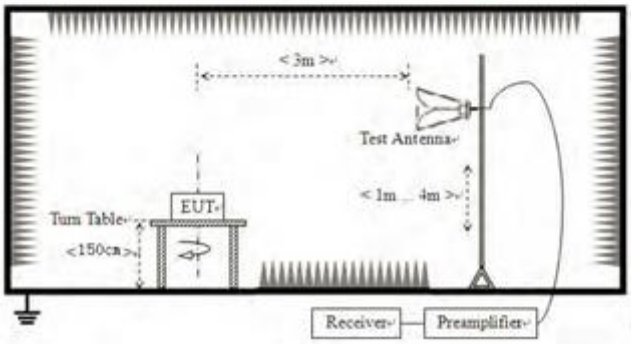
12.2 BLOCK DIAGRAM OF TEST SETUP







12.3 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.

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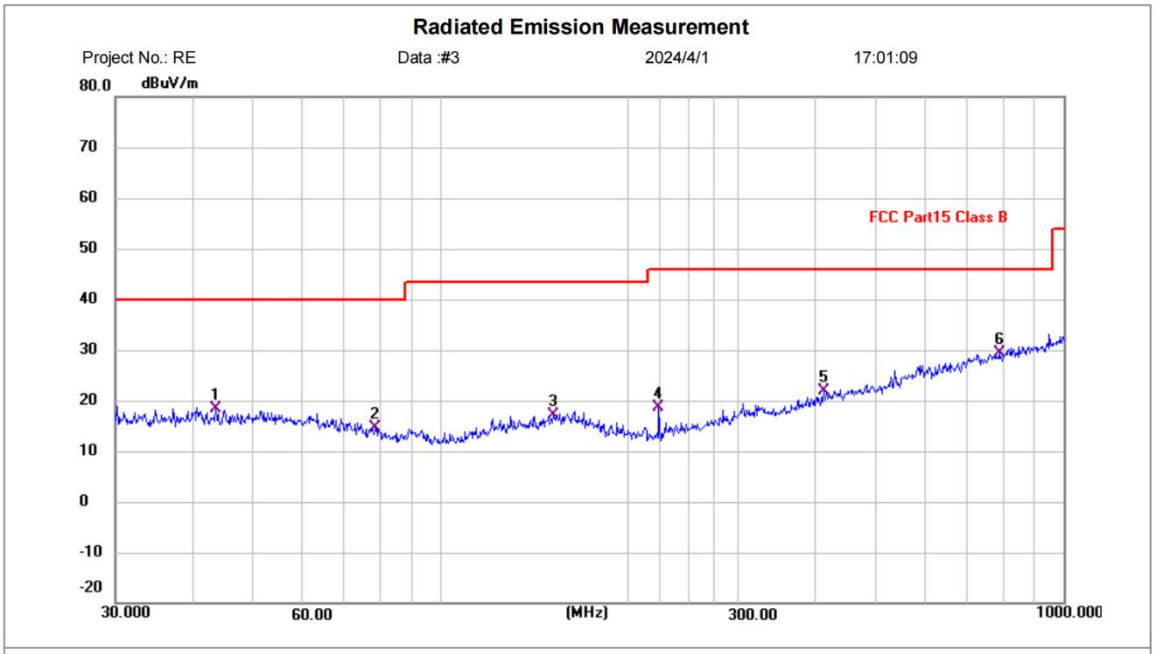
12.4 TEST DATA

Remark: During the test, pre-scan the BLE 1M, BLE 2M, and found the BLE 1M which it is worse case.

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



Site
Limit: FCC Part15 Class B
EUT: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX mode
Note:

Polarization: ***Horizontal***
Power:

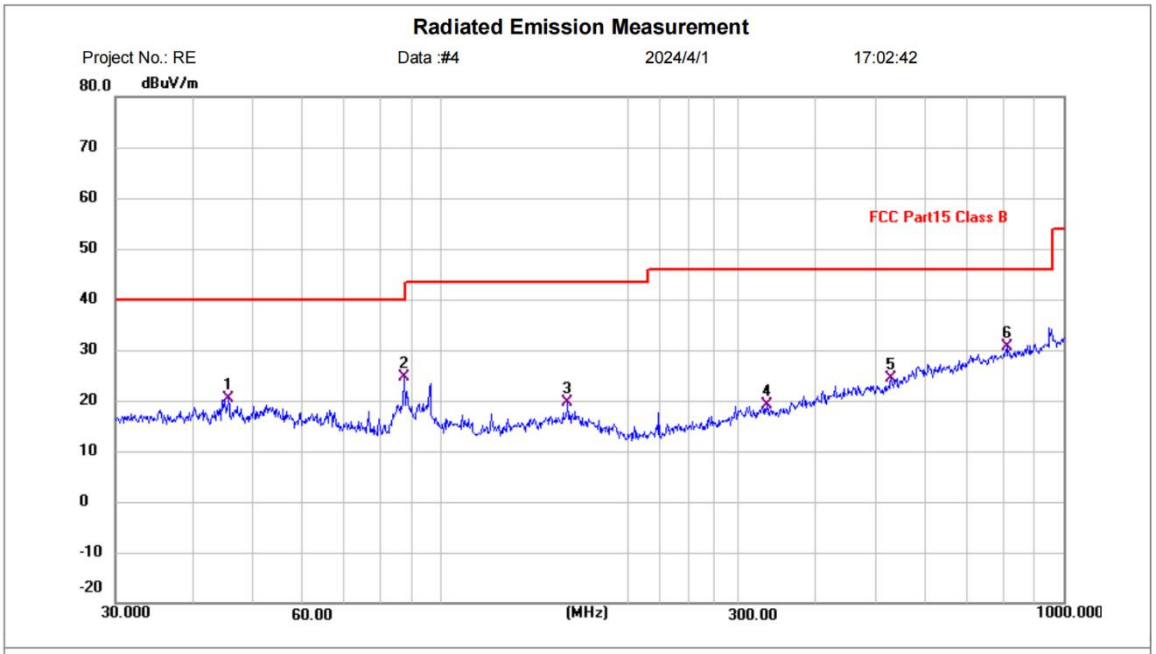
Temperature: (C)
Humidity: %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	43.5057	-0.53	18.87	18.34	40.00	-21.66	QP	P	
2	78.4133	-0.38	15.13	14.75	40.00	-25.25	QP	P	
3	151.5972	-2.28	19.43	17.15	43.50	-26.35	QP	P	
4	223.7333	2.93	15.62	18.55	46.00	-27.45	QP	P	
5	411.8240	-0.41	22.34	21.93	46.00	-24.07	QP	P	
6 *	787.8512	-0.35	29.82	29.47	46.00	-16.53	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: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX mode
Note:

Polarization: ***Vertical***
Power:

Temperature: (C)
Humidity: %RH

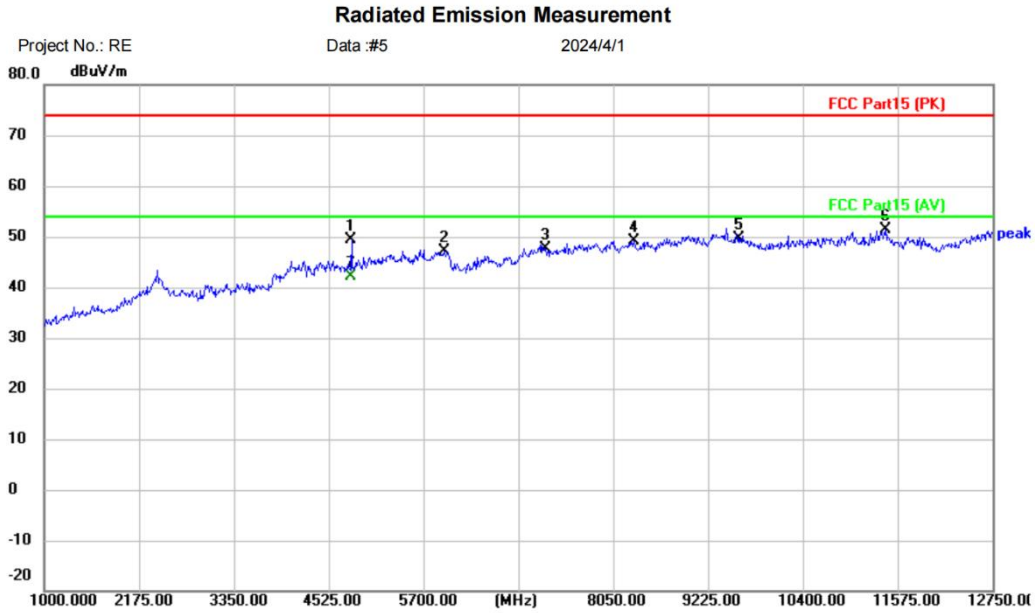
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	45.5348	1.11	19.31	20.42	40.00	-19.58	QP	P	
2 *	87.4176	9.82	14.84	24.66	40.00	-15.34	QP	P	
3	159.7844	0.22	19.47	19.69	43.50	-23.81	QP	P	
4	333.6867	-0.91	20.03	19.12	46.00	-26.88	QP	P	
5	528.2458	-0.15	24.44	24.29	46.00	-21.71	QP	P	
6	813.1115	0.26	30.27	30.53	46.00	-15.47	QP	P	

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

Test Result: Pass

Remark: During the test, pre-scan the BLE 1M, BLE 2M, and found the BLE 1M which it is worse case.

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



Site
Limit: FCC Part15 (PK)
EUT: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX-2402
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

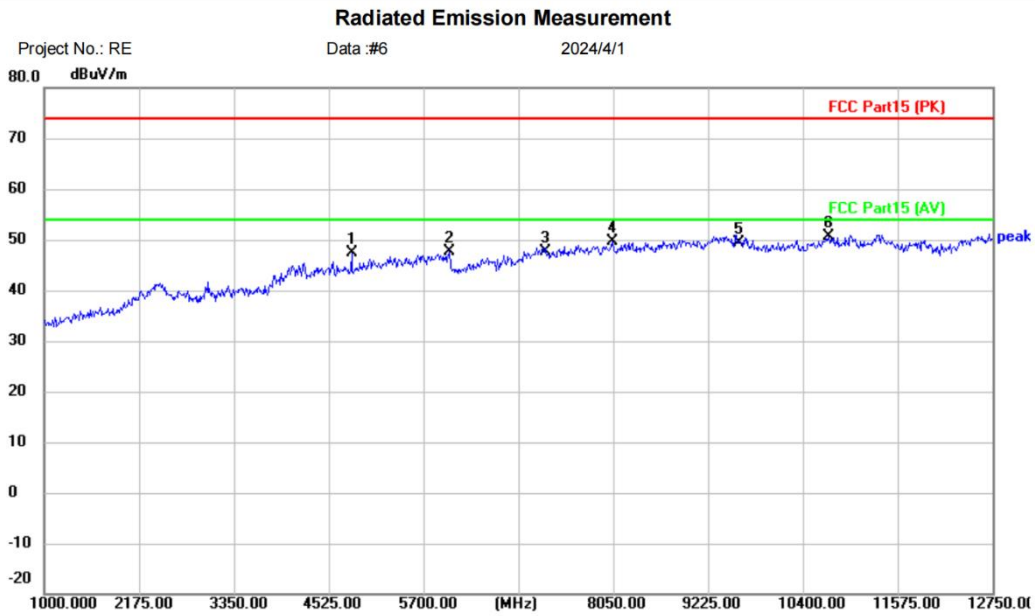
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	43.84	5.64	49.48	74.00	-24.52	peak	
2		5958.500	38.34	8.72	47.06	74.00	-26.94	peak	
3		7206.000	38.36	9.24	47.60	74.00	-26.40	peak	
4		8308.500	39.01	10.24	49.25	74.00	-24.75	peak	
5		9608.000	37.35	12.31	49.66	74.00	-24.34	peak	
6		11422.25	38.72	12.61	51.33	74.00	-22.67	peak	
7	*	4804.000	36.52	5.64	42.16	54.00	-11.84	AVG	

*: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: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX-2402
Note:

Polarization: ***Vertical***
Power:

Temperature: (C)
Humidity: %RH

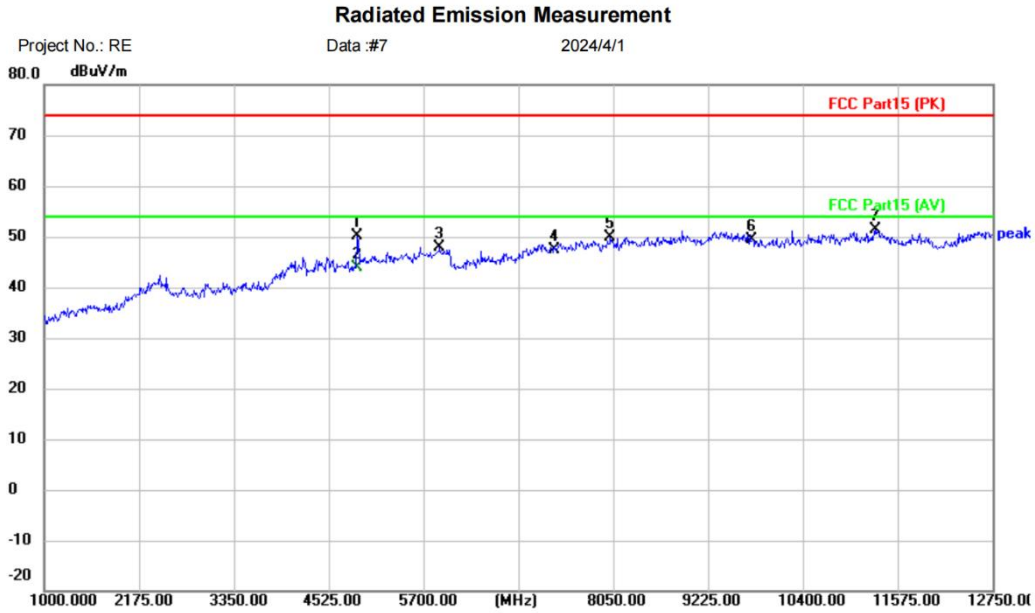
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	41.84	5.64	47.48	74.00	-26.52	peak	
2		6017.250	42.08	5.63	47.71	74.00	-26.29	peak	
3		7206.000	38.50	9.24	47.74	74.00	-26.26	peak	
4		8038.250	39.82	9.82	49.64	74.00	-24.36	peak	
5		9608.000	37.09	12.31	49.40	74.00	-24.60	peak	
6	*	10717.25	37.46	13.08	50.54	74.00	-23.46	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: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX-2442
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

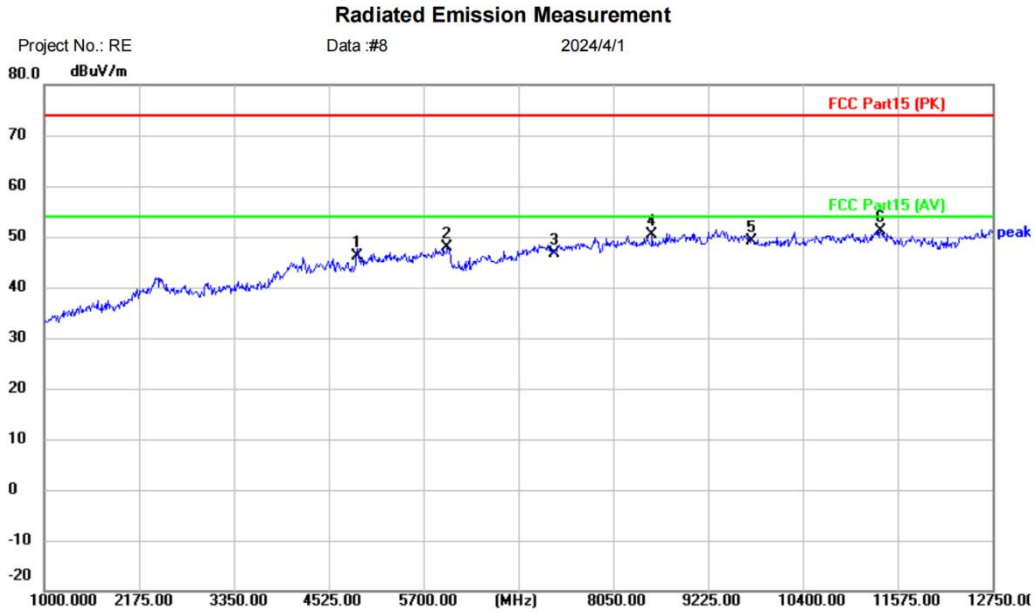
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4877.500	44.42	5.72	50.14	74.00	-23.86	peak	
2	*	4877.500	38.12	5.72	43.84	54.00	-10.16	AVG	
3		5899.750	39.20	8.66	47.86	74.00	-26.14	peak	
4		7326.000	37.97	9.43	47.40	74.00	-26.60	peak	
5		8014.750	40.01	9.87	49.88	74.00	-24.12	peak	
6		9768.000	37.27	12.22	49.49	74.00	-24.51	peak	
7		11293.00	38.73	12.70	51.43	74.00	-22.57	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: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX-2442
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

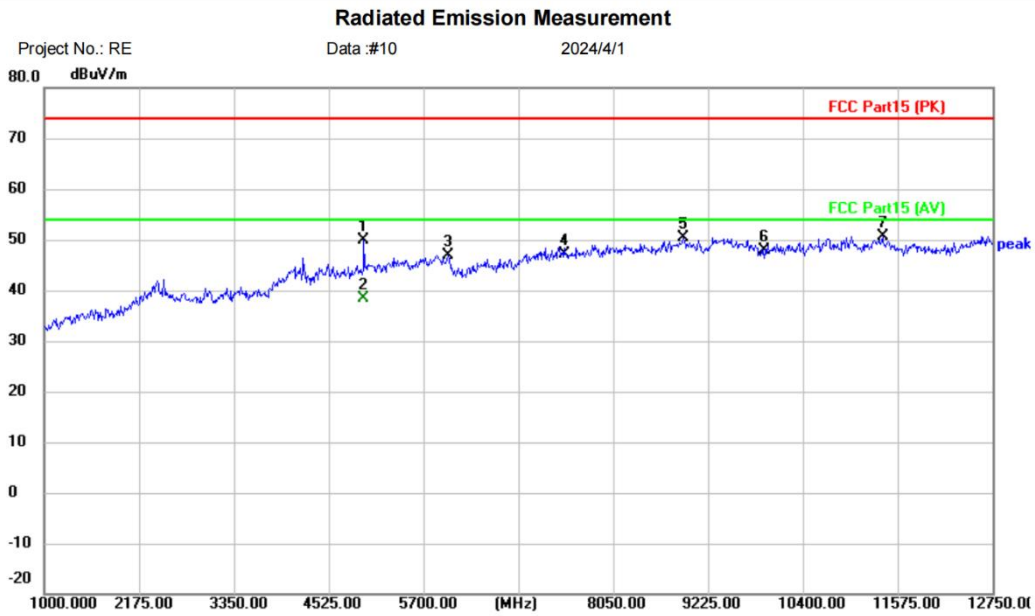
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4884.000	40.35	5.75	46.10	74.00	-27.90	peak	
2		5993.750	39.13	8.75	47.88	74.00	-26.12	peak	
3		7326.000	37.30	9.43	46.73	74.00	-27.27	peak	
4		8531.750	39.28	11.12	50.40	74.00	-23.60	peak	
5		9768.000	36.94	12.22	49.16	74.00	-24.84	peak	
6	*	11363.50	38.55	12.65	51.20	74.00	-22.80	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

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



Site
Limit: FCC Part15 (PK)
EUT: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX-2480
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

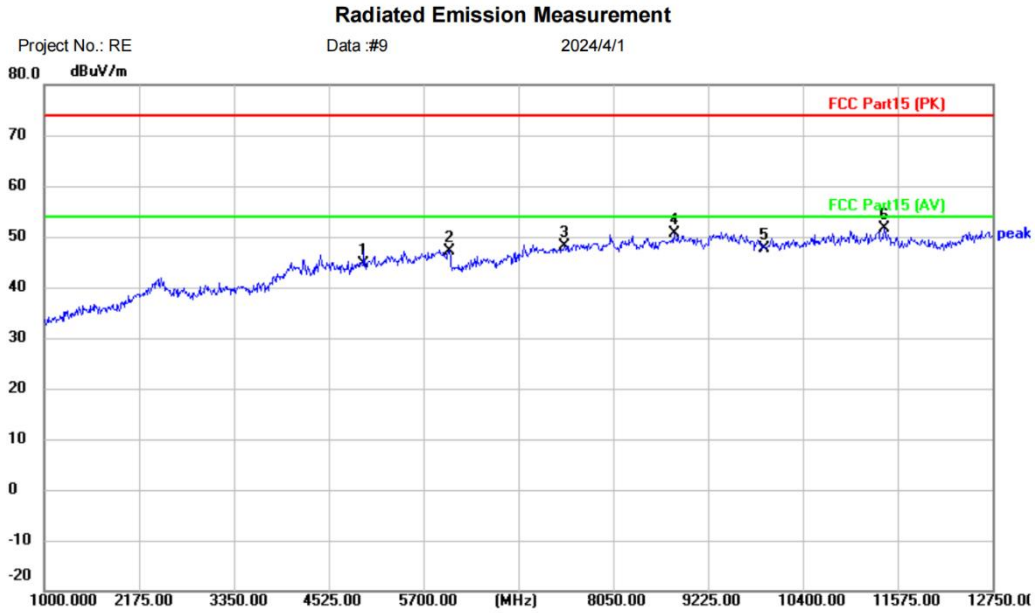
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.750	43.27	6.60	49.87	74.00	-24.13	peak	
2	*	4959.750	31.77	6.60	38.37	54.00	-15.63	AVG	
3		6005.500	41.20	5.61	46.81	74.00	-27.19	peak	
4		7440.000	37.54	9.64	47.18	74.00	-26.82	peak	
5		8919.500	38.14	12.14	50.28	74.00	-23.72	peak	
6		9920.000	35.81	12.14	47.95	74.00	-26.05	peak	
7		11387.00	37.88	12.63	50.51	74.00	-23.49	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: Bluetooth Remote Control
M/N: TrezorBOX
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	38.12	6.60	44.72	74.00	-29.28	peak	
2		6017.250	41.62	5.63	47.25	74.00	-26.75	peak	
3		7440.000	38.46	9.64	48.10	74.00	-25.90	peak	
4		8802.000	38.88	11.68	50.56	74.00	-23.44	peak	
5		9920.000	35.49	12.14	47.63	74.00	-26.37	peak	
6	*	11410.50	39.10	12.61	51.71	74.00	-22.29	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

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.

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13 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%

13.1 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.

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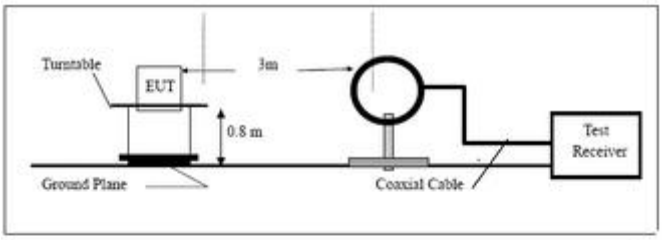
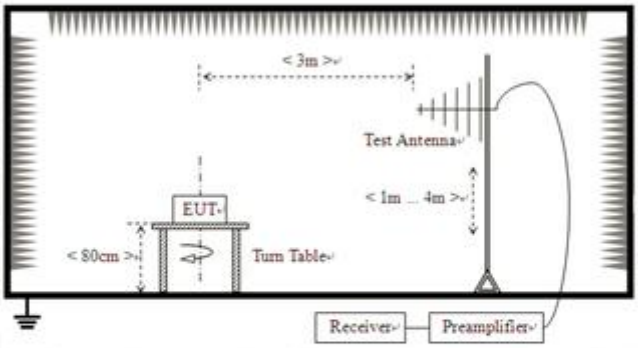
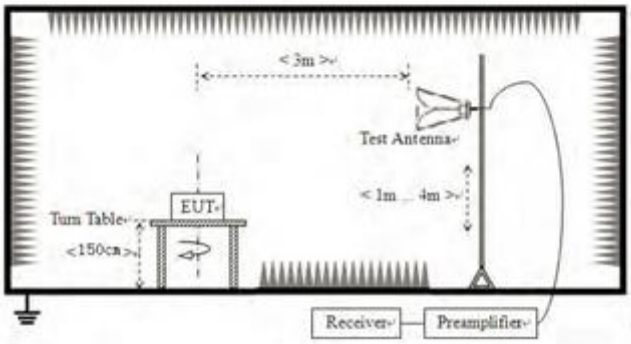
13.2 BLOCK DIAGRAM OF TEST SETUP







13.3 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.

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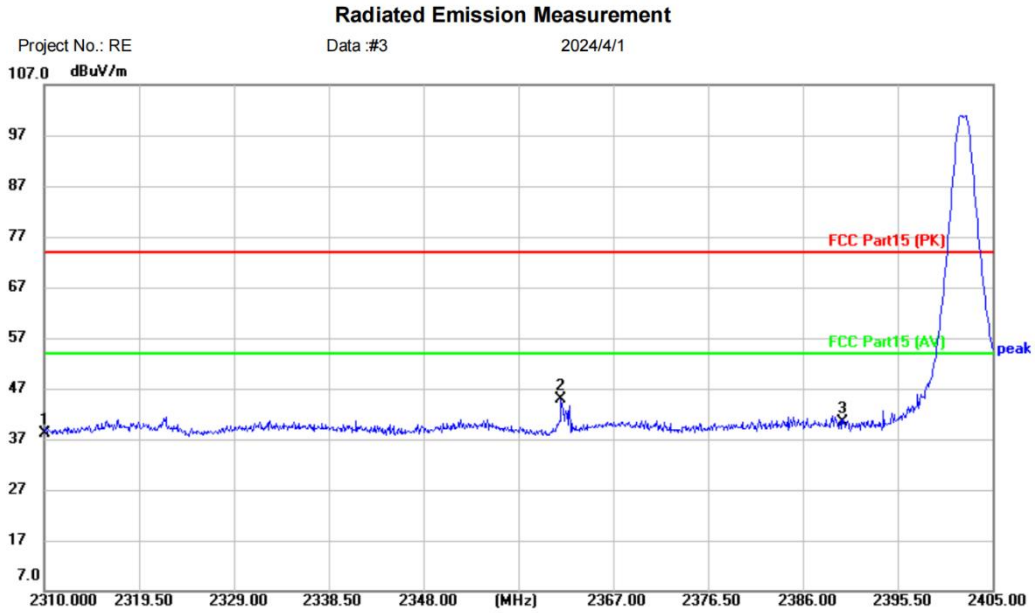
13.4 TEST DATA

Remark: During the test, pre-scan the BLE 1M, BLE 2M, and found the BLE 1M which it is worse case.

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



Site
Limit: FCC Part15 (PK)
EUT: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TM1
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	41.01	-2.89	38.12	74.00	-35.88	peak	
2	*	2361.775	47.72	-2.75	44.97	74.00	-29.03	peak	
3		2390.000	42.99	-2.70	40.29	74.00	-33.71	peak	

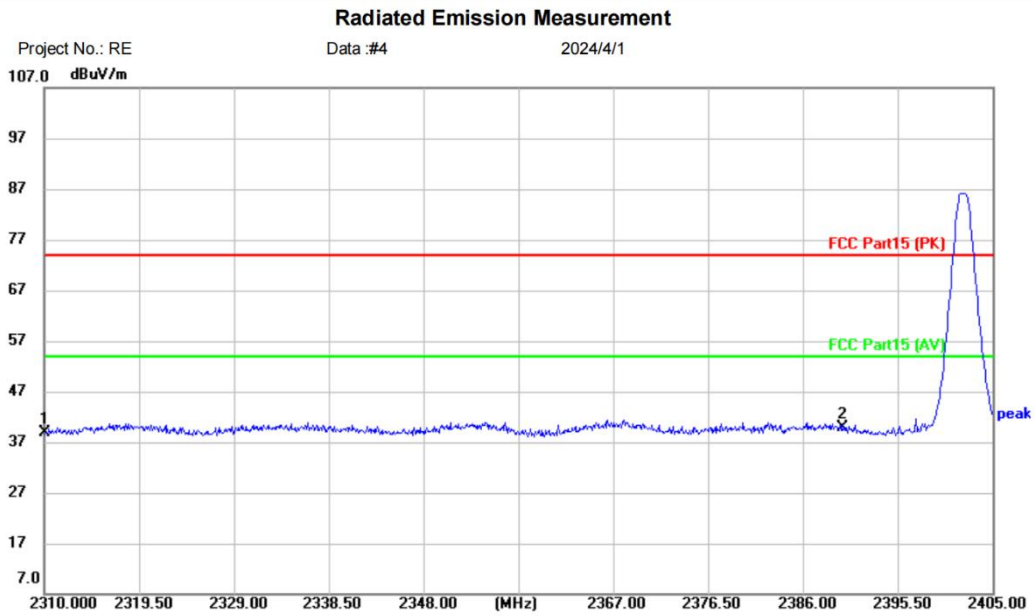
*:Maximum data x:Over limit !:over margin 〈Reference Only

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: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TM1
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	41.88	-2.89	38.99	74.00	-35.01	peak	
2	*	2390.000	42.47	-2.70	39.77	74.00	-34.23	peak	

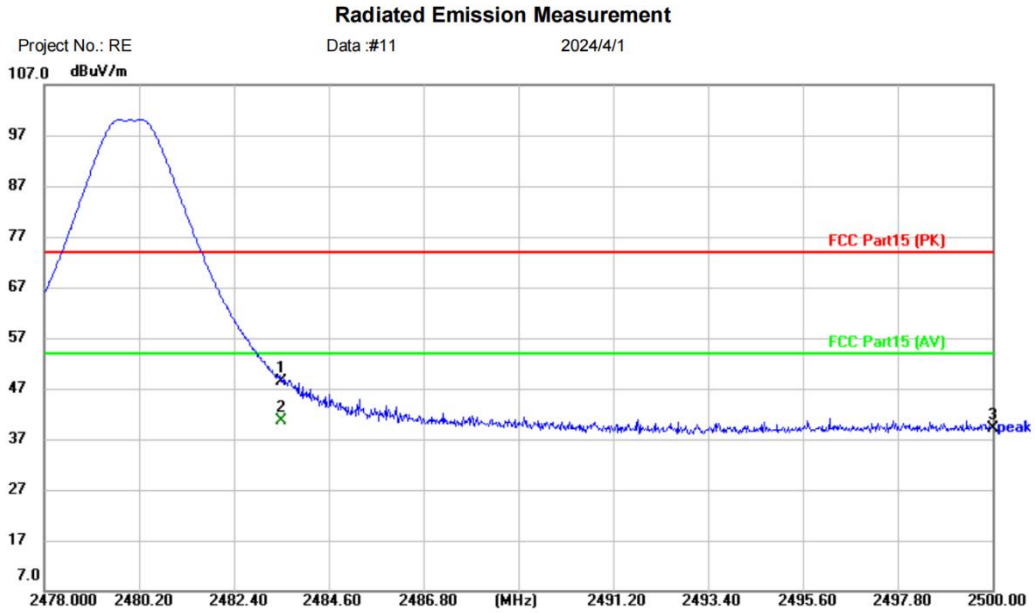
*:Maximum data x:Over limit !:over margin 〈Reference Only

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: Bluetooth Remote Control
M/N: TrezorBOX
Mode: TX-2480
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

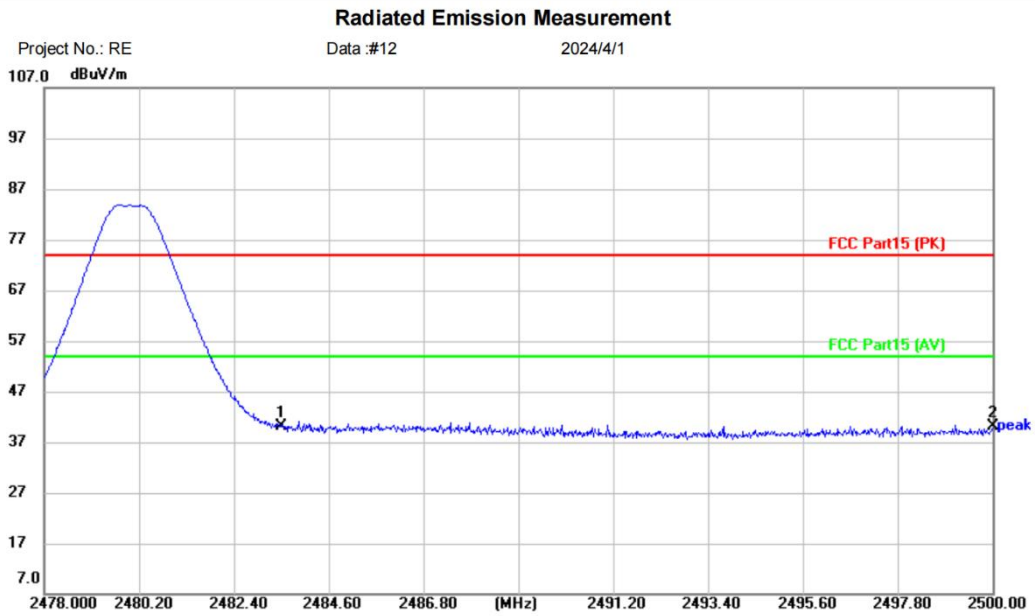
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2483.500	51.26	-2.91	48.35	74.00	-25.65	peak	
2	*	2483.500	43.50	-2.91	40.59	54.00	-13.41	AVG	
3		2500.000	42.20	-3.00	39.20	74.00	-34.80	peak	

*: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

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



Site
Limit: FCC Part15 (PK)
EUT: Bluetooth Remote Control
M/N: TrezorBOX
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	43.13	-2.91	40.22	74.00	-33.78	peak	
2	*	2500.000	43.25	-3.00	40.25	74.00	-33.75	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.

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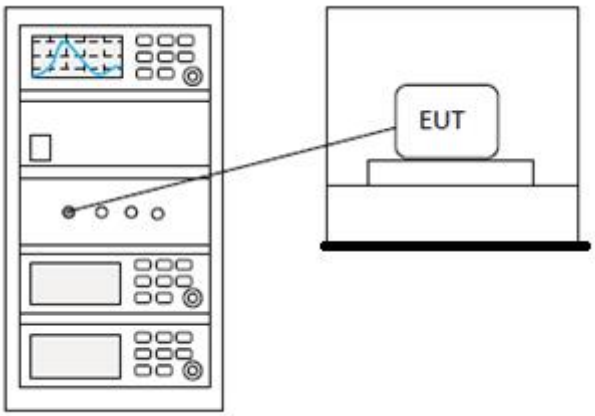
14 CONDUCTED SPURIOUS EMISSIONS

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%

14.1 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)).

14.2 BLOCK DIAGRAM OF TEST SETUP



14.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

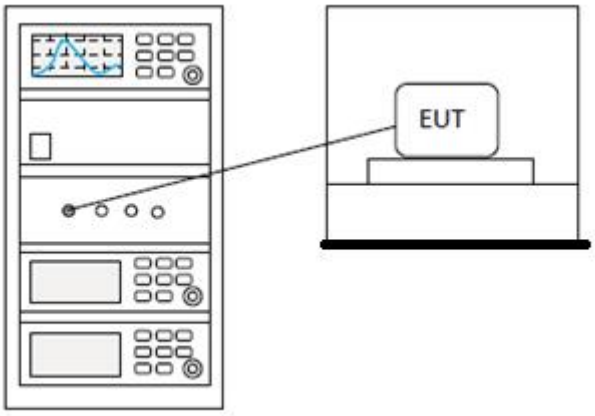
15 POWER SPECTRUM DENSITY

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.10.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

15.1 LIMITS

Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

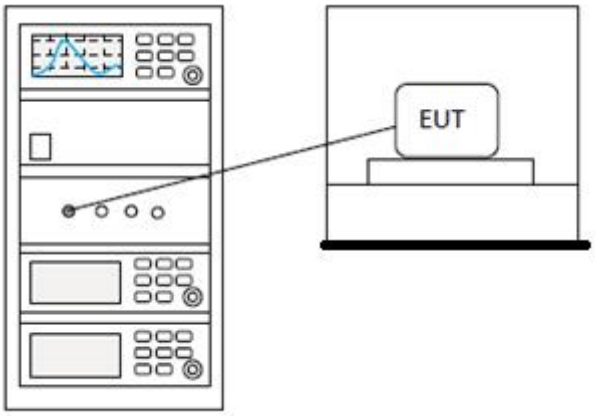
16 CONDUCTED PEAK OUTPUT POWER

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%

16.1 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

16.2 BLOCK DIAGRAM OF TEST SETUP



16.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

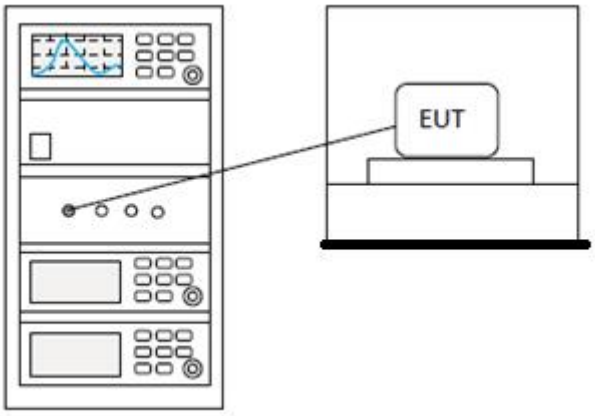
17 MINIMUM 6DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.8.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

17.1 LIMITS

Limit:	≥500 kHz

17.2 BLOCK DIAGRAM OF TEST SETUP



17.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

18 ANTENNA REQUIREMENT

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

18.1 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 best case gain of the antenna is 1.5dBi.

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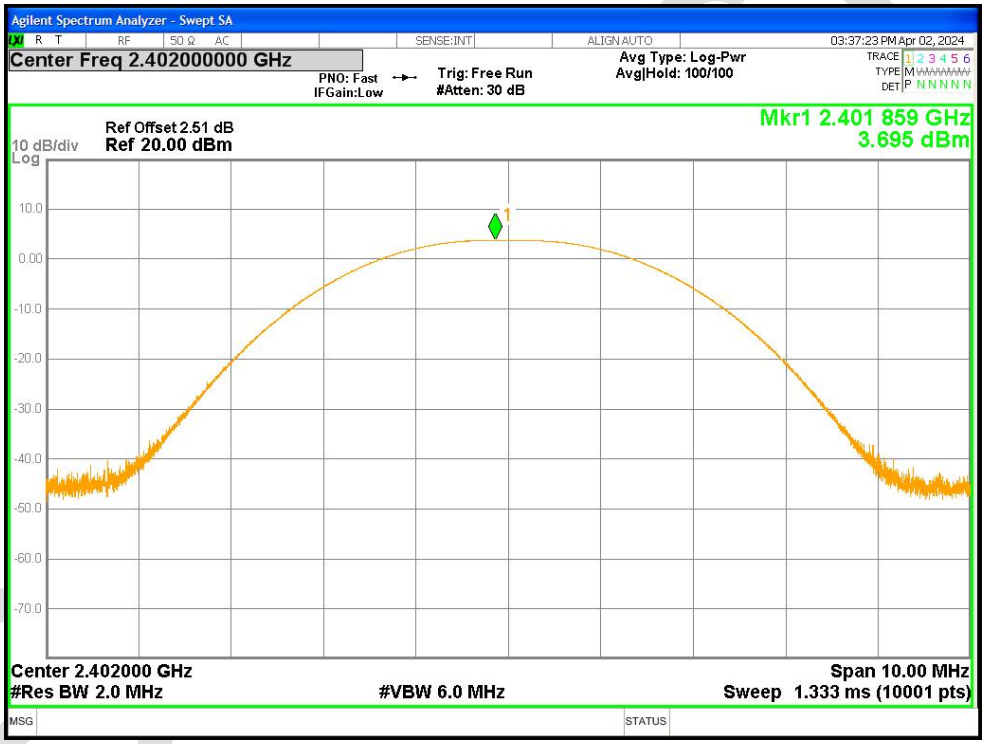
19 APPENDIX1

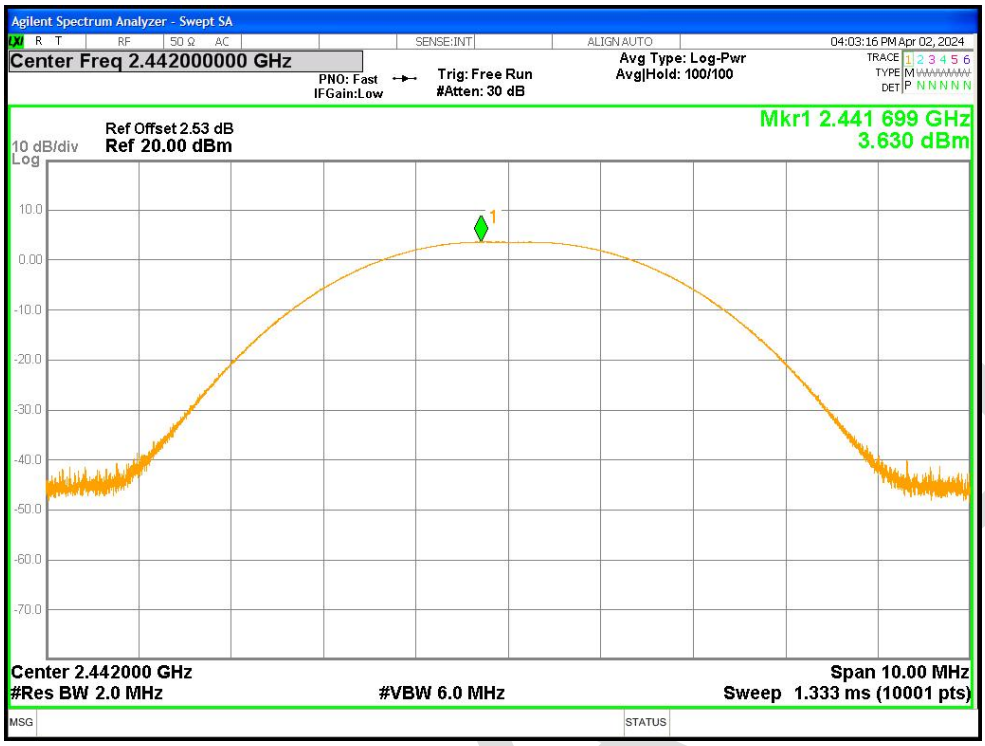
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	3.695	30	Pass
NVNT	BLE 1M	2442	Ant1	3.63	30	Pass
NVNT	BLE 1M	2480	Ant1	4.136	30	Pass
NVNT	BLE 2M	2402	Ant1	3.874	30	Pass
NVNT	BLE 2M	2442	Ant1	3.619	30	Pass
NVNT	BLE 2M	2480	Ant1	4.168	30	Pass

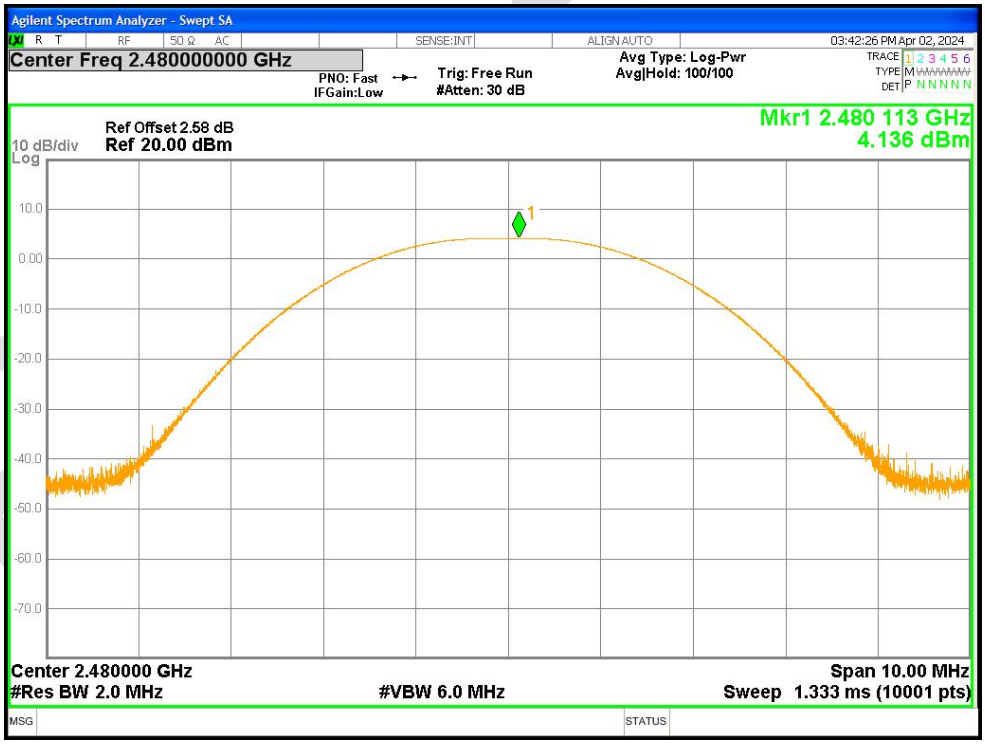
Power NVNT BLE 1M 2402MHz Ant1



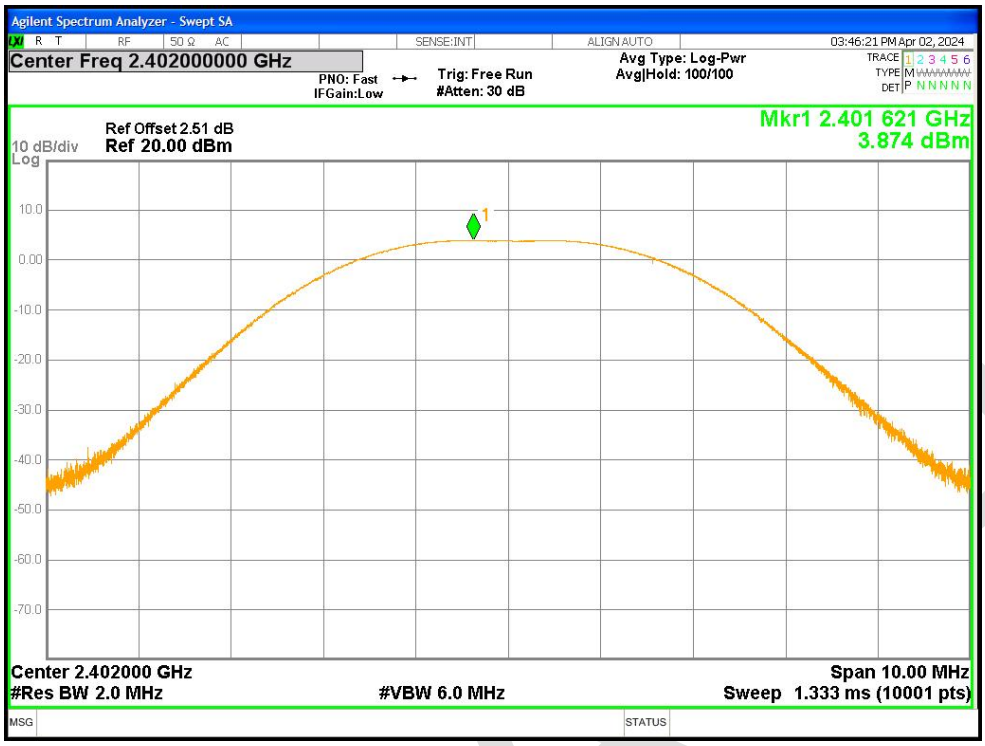
Power NVNT BLE 1M 2442MHz Ant1



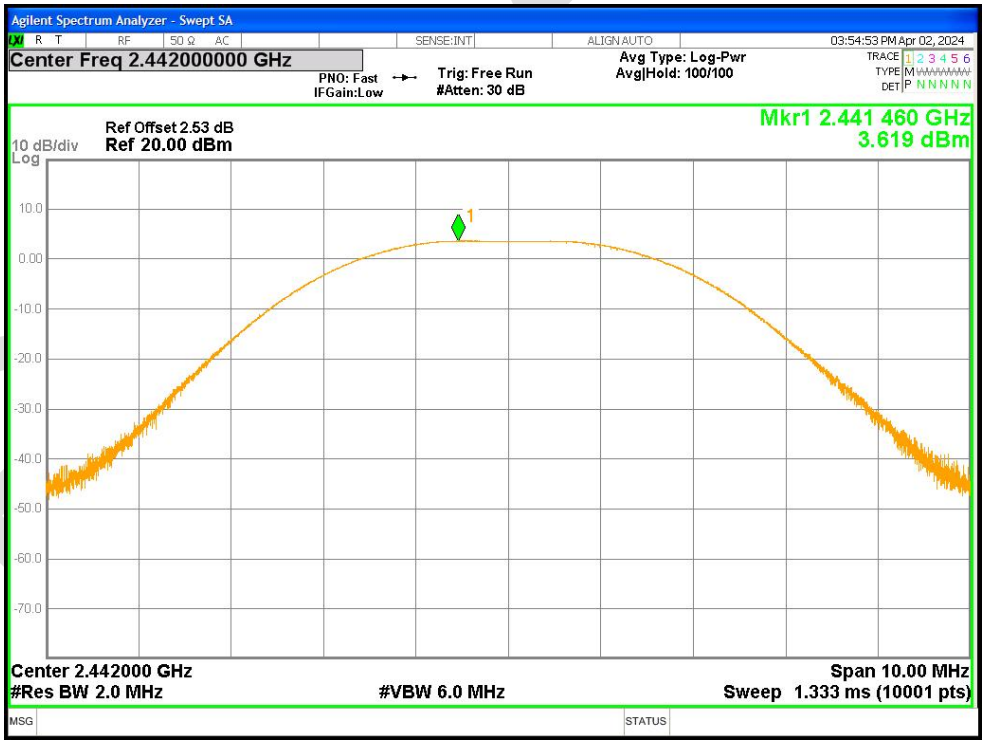
Power NVNT BLE 1M 2480MHz Ant1



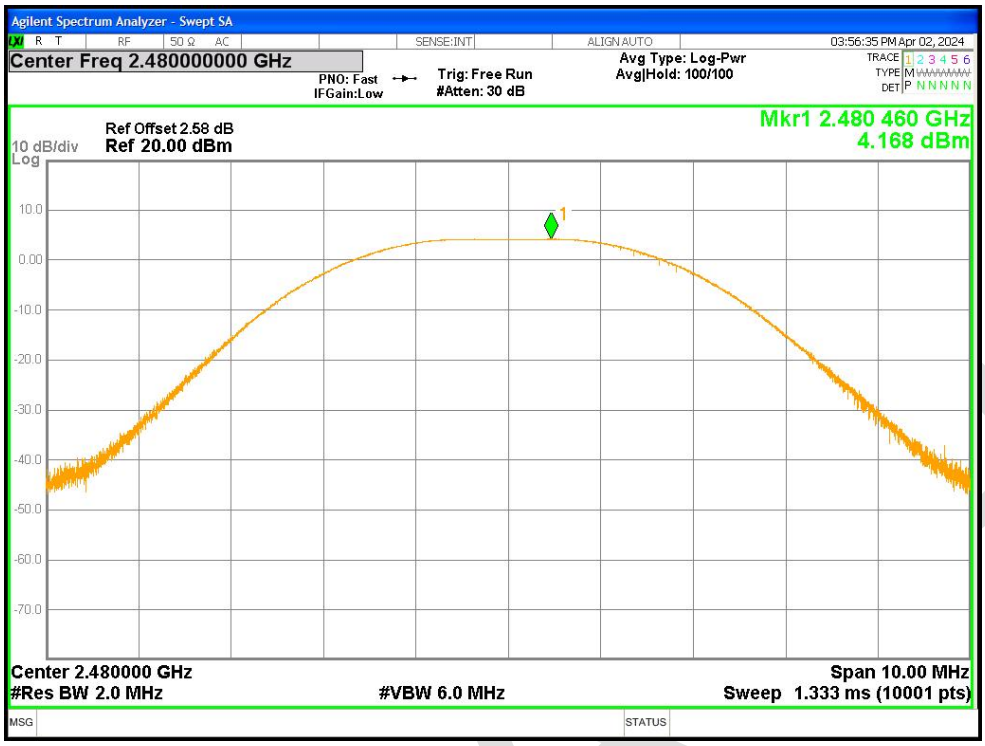
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2442MHz Ant1



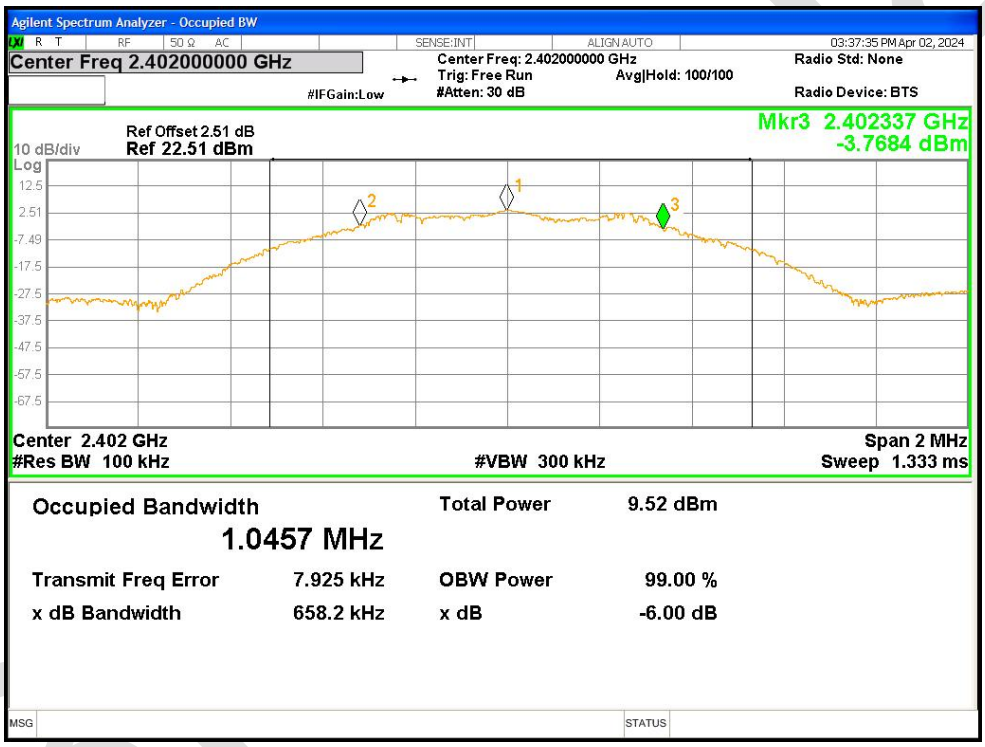
Power NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
03:56:35 PM Apr 02, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480 460 GHz
4.168 dBm
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 10.00 MHz
Sweep 1.333 ms (10001 pts)

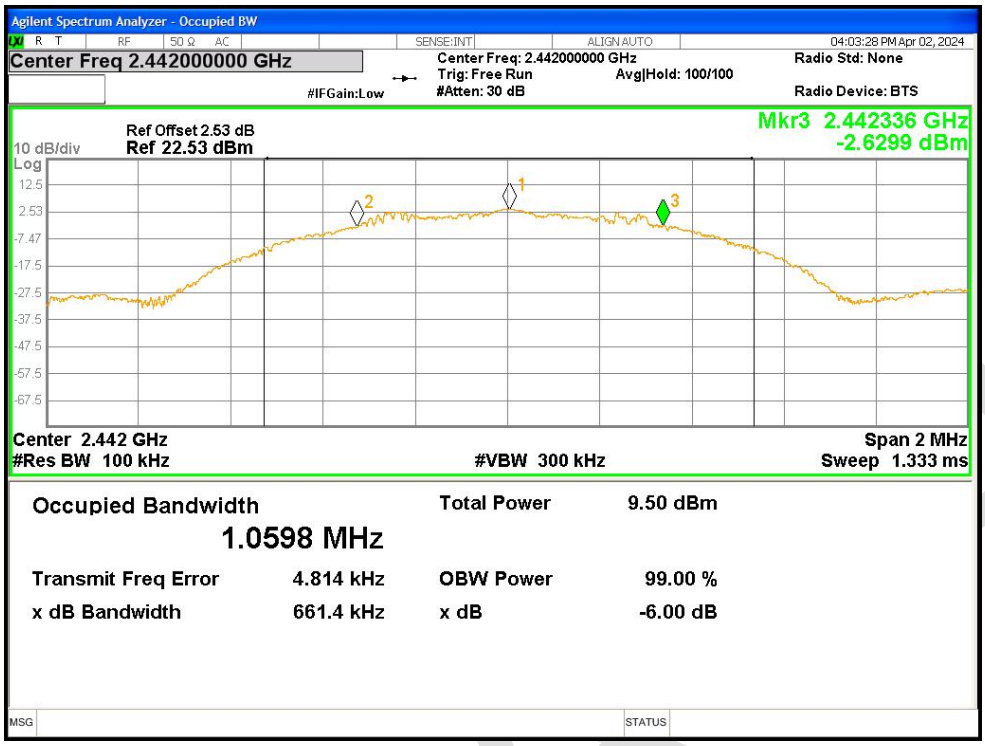
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.658	0.5	Pass
NVNT	BLE 1M	2442	Ant1	0.661	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.672	0.5	Pass
NVNT	BLE 2M	2402	Ant1	0.92	0.5	Pass
NVNT	BLE 2M	2442	Ant1	1.078	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.047	0.5	Pass

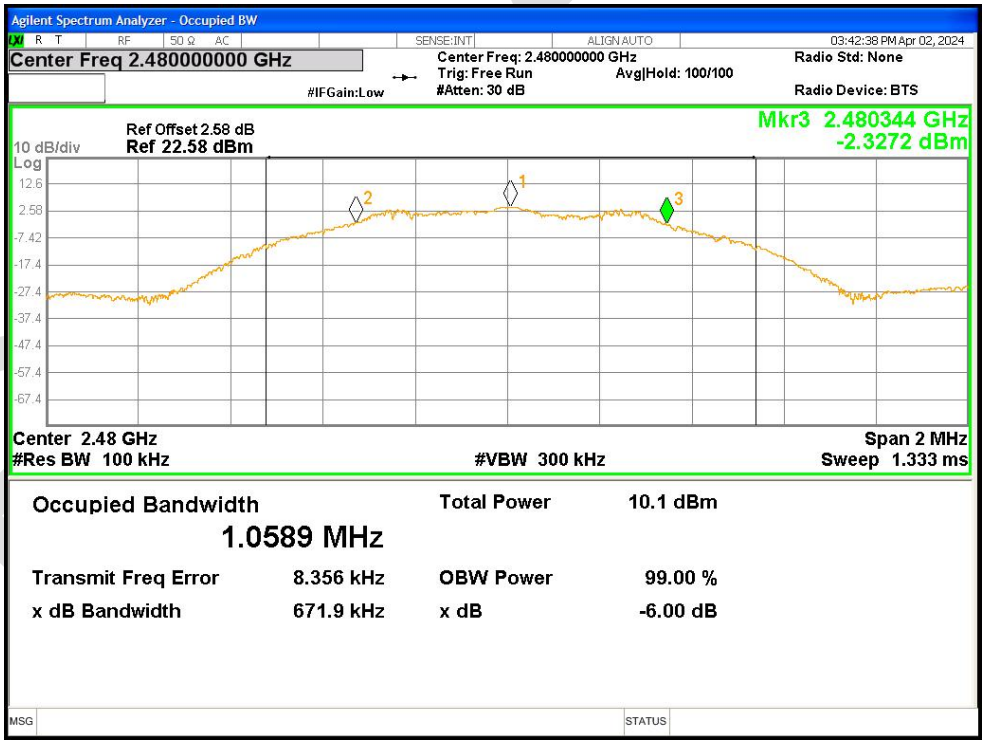
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



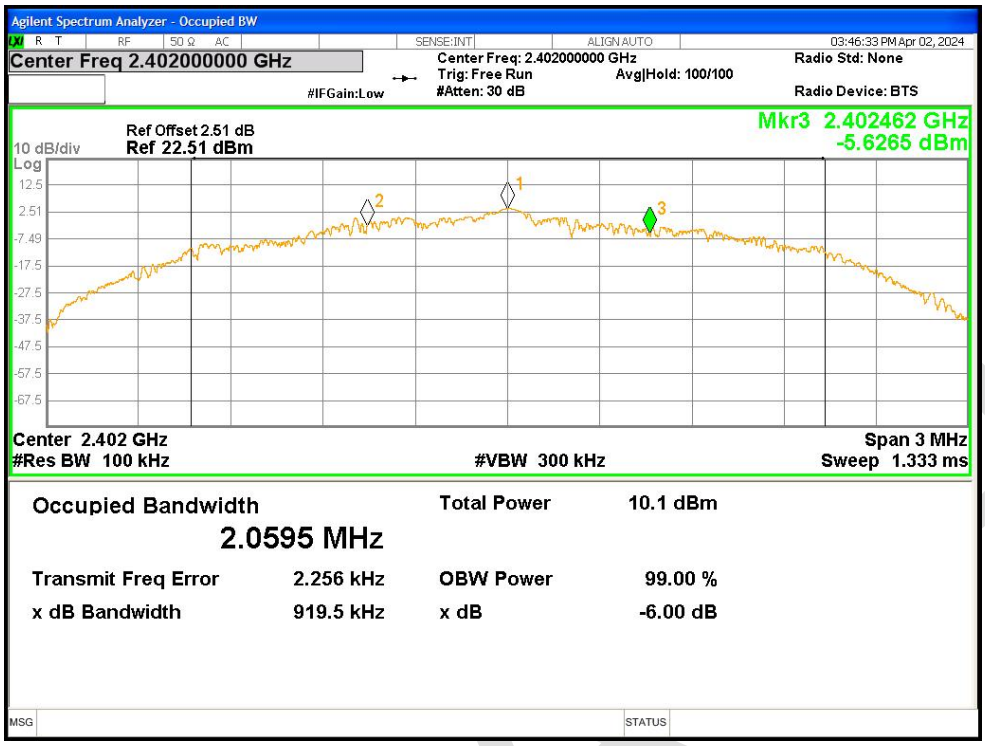
-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



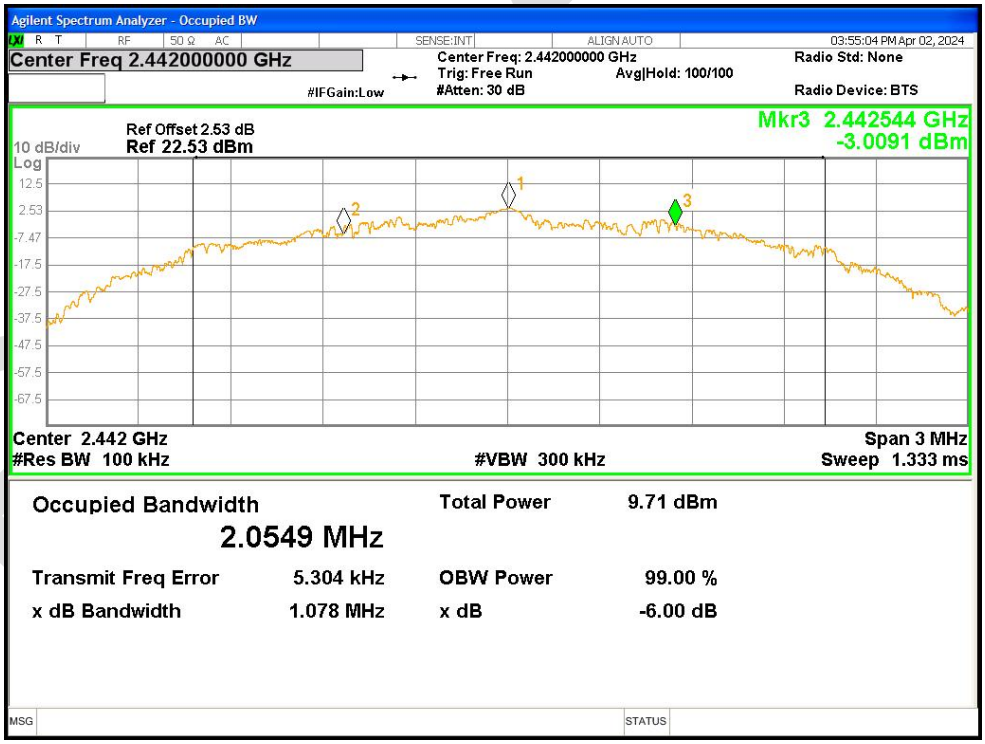
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



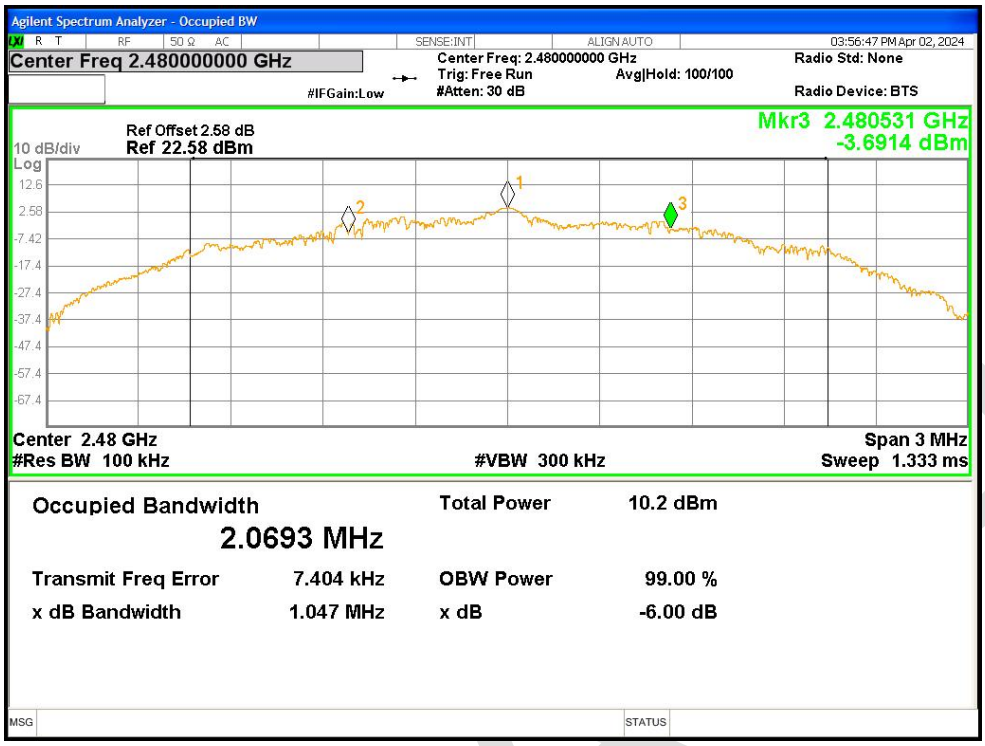
-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2442MHz Ant1



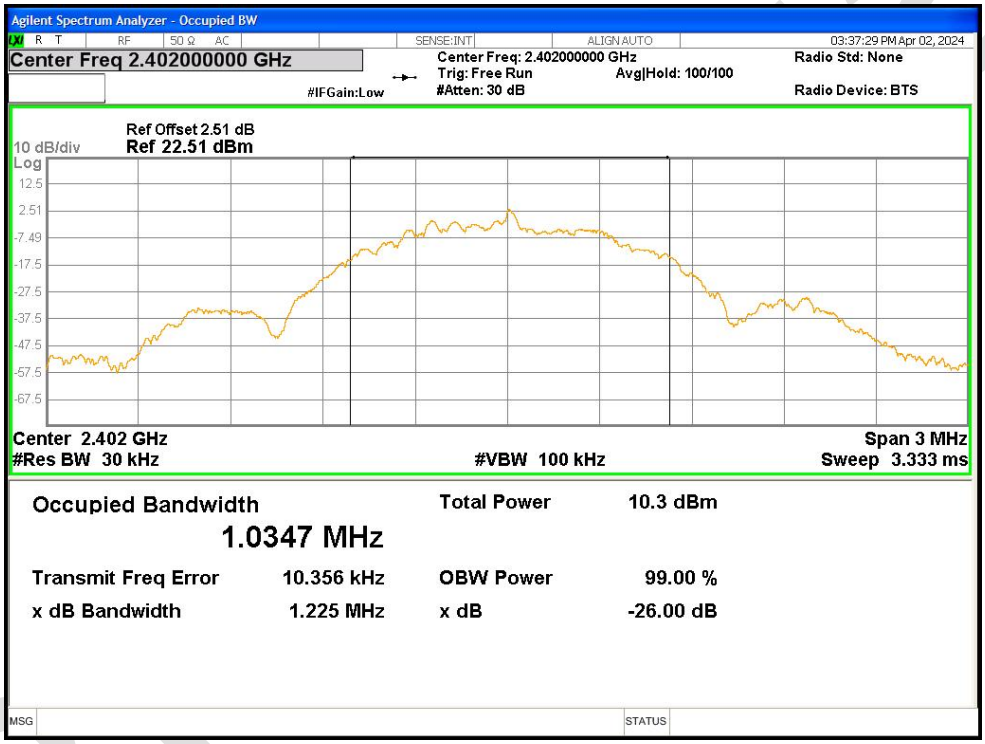
-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
03:56:47 PM Apr 02, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Log
Mkr3 2.480531 GHz
-3.6914 dBm
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1.333 ms
Occupied Bandwidth
2.0693 MHz
Total Power 10.2 dBm
Transmit Freq Error 7.404 kHz
OBW Power 99.00 %
x dB Bandwidth 1.047 MHz
x dB -6.00 dB
MSG
STATUS

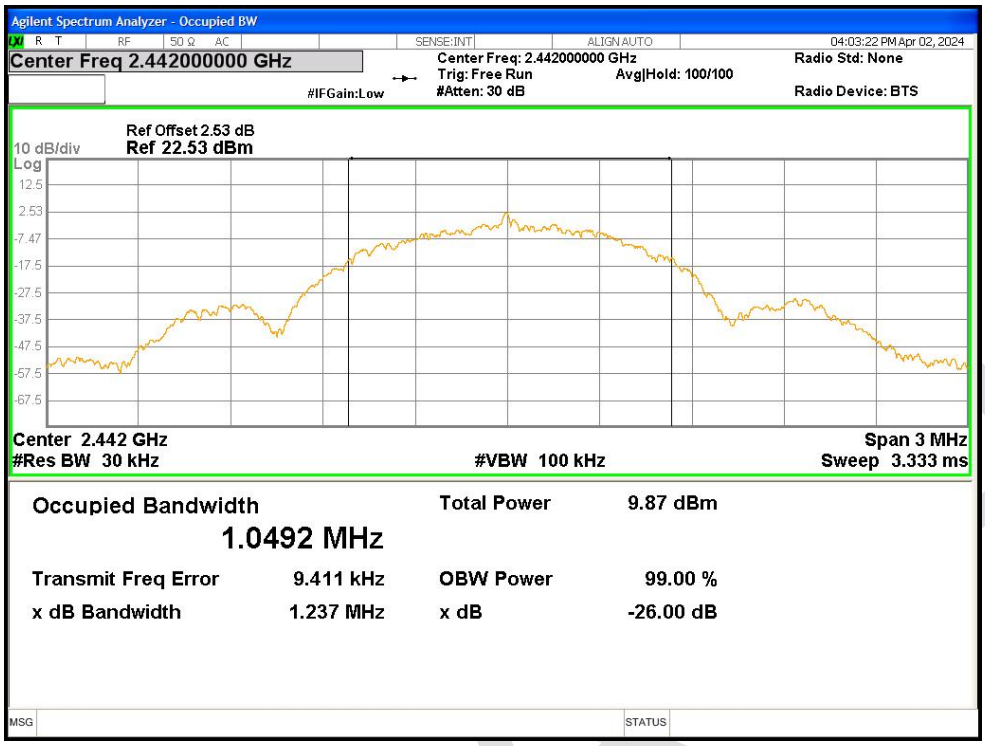
Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.0347
NVNT	BLE 1M	2442	Ant1	1.0492
NVNT	BLE 1M	2480	Ant1	1.0331
NVNT	BLE 2M	2402	Ant1	2.0327
NVNT	BLE 2M	2442	Ant1	2.0205
NVNT	BLE 2M	2480	Ant1	2.0357

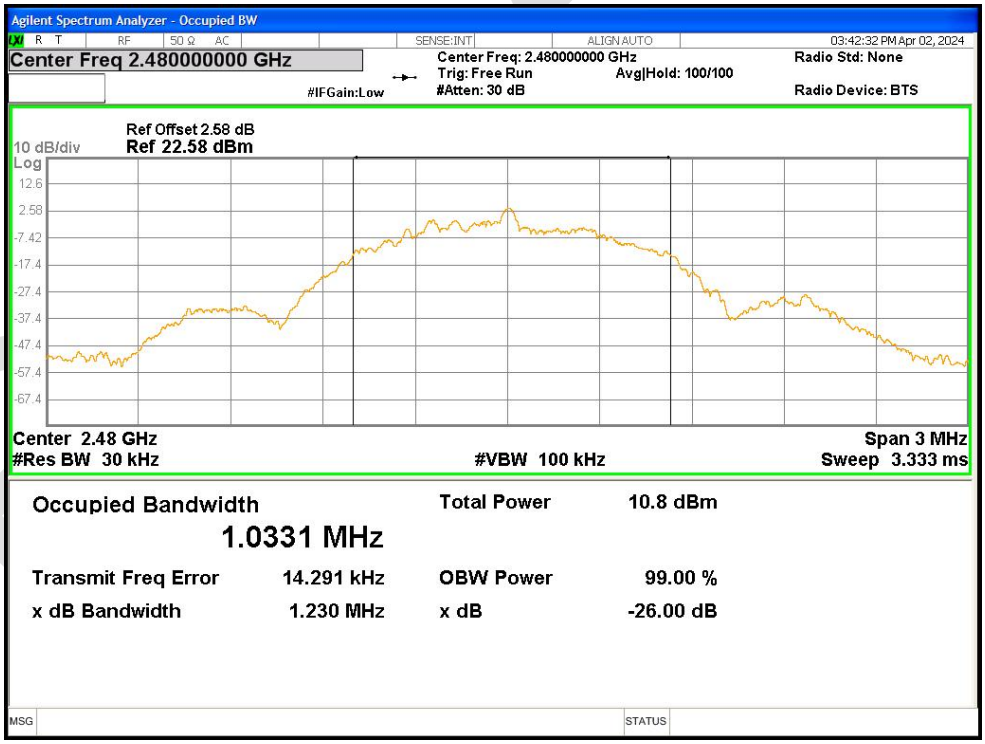
OBW NVNT BLE 1M 2402MHz Ant1



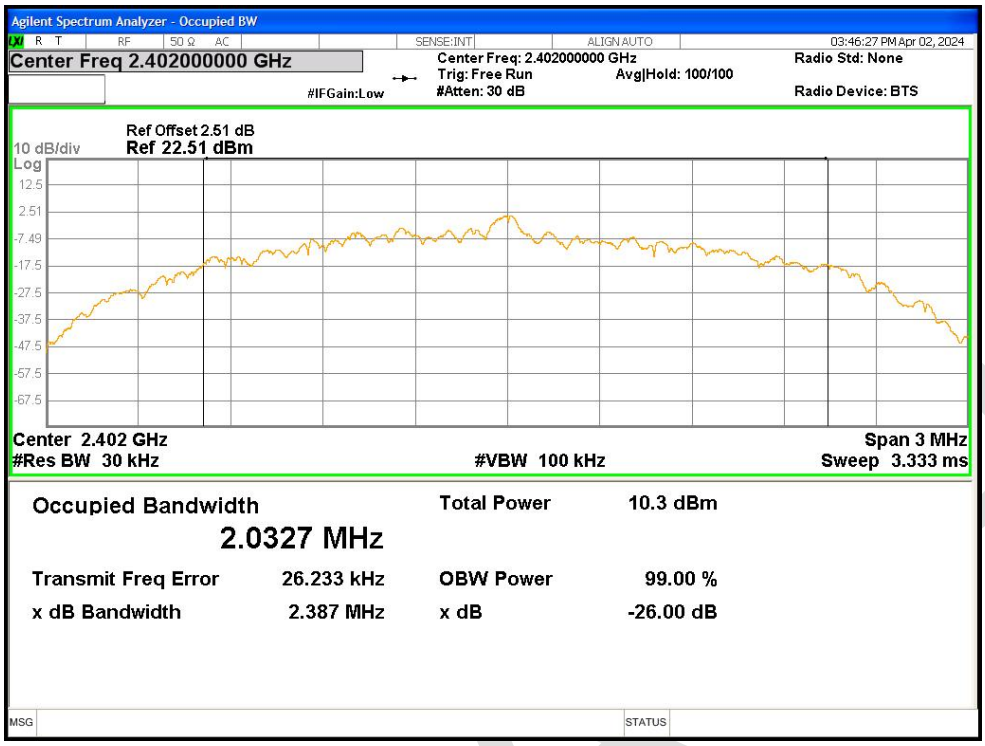
OBW NVNT BLE 1M 2442MHz Ant1



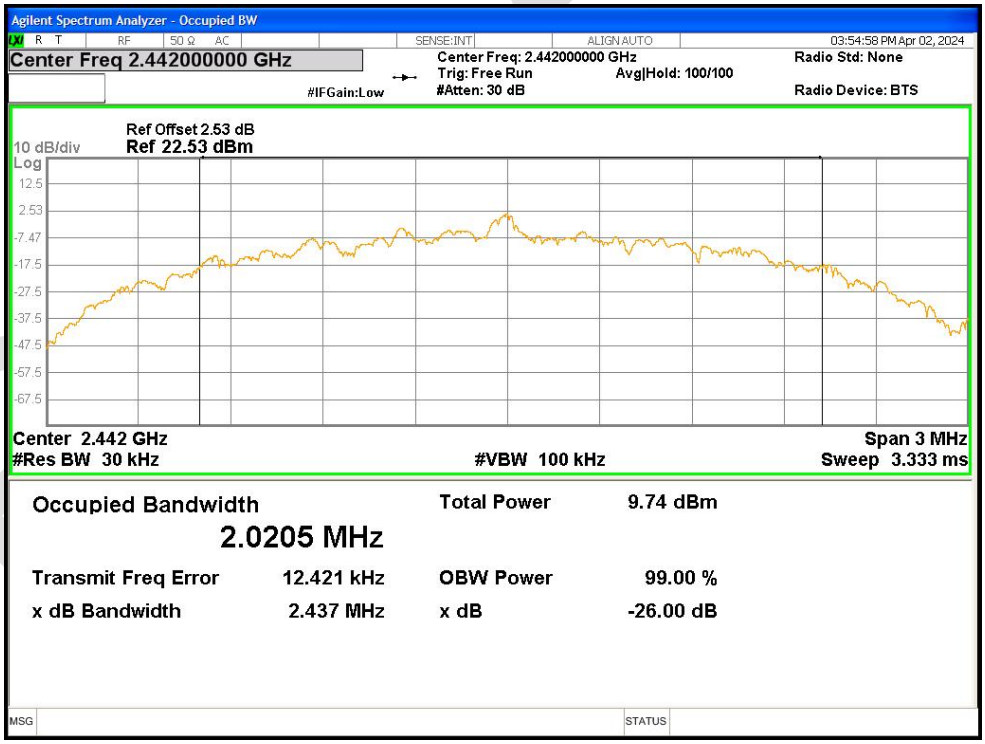
OBW NVNT BLE 1M 2480MHz Ant1



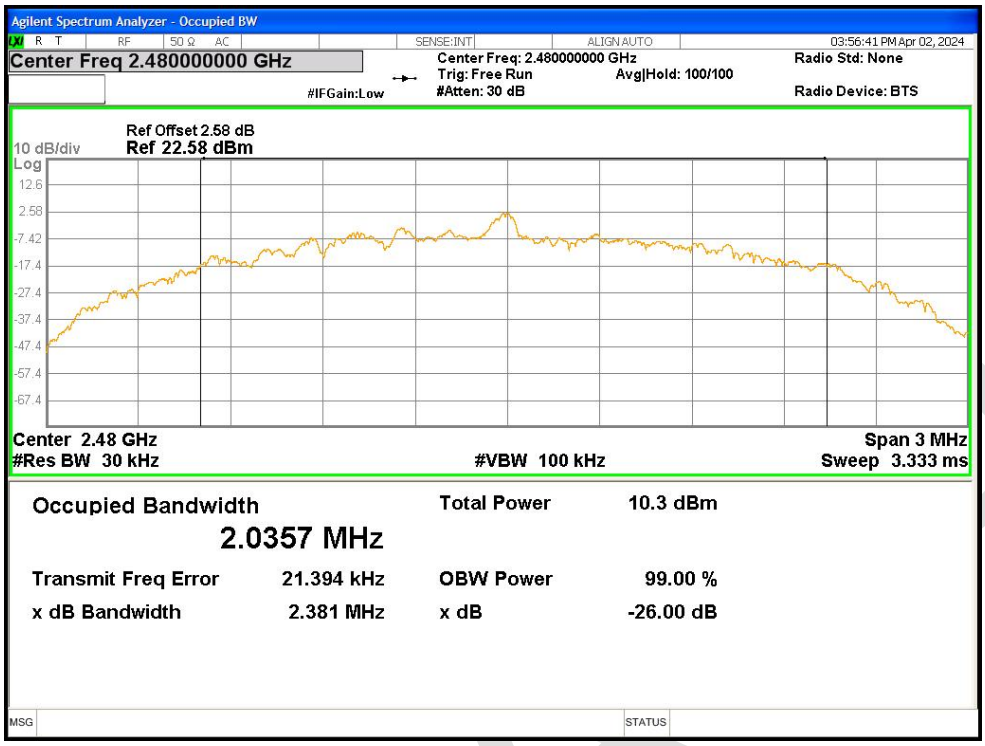
OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2442MHz Ant1



OBW NVNT BLE 2M 2480MHz Ant1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Radio Std: None
Radio Device: BTS
03:56:41 PM Apr 02, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Log
12.6
2.58
-7.42
-17.4
-27.4
-37.4
-47.4
-57.4
-67.4
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.333 ms
Occupied Bandwidth
2.0357 MHz
Total Power 10.3 dBm
Transmit Freq Error 21.394 kHz
OBW Power 99.00 %
x dB Bandwidth 2.381 MHz
x dB -26.00 dB
MSG
STATUS