TEST REPORT

Product Name	:	BT module
Brand Mark	:	RF-star
Model No.	:	RF-BM-2652P2
Extension model	:	RF-BM-2652P2I
Report Number	:	BLA-EMC-202203-A4603
FCC ID	:	2ABN2-BM2652P2
Date of Sample Receipt	:	2022/3/9
Date of Test	:	2022/3/9 to 2022/6/30
Date of Issue	:	2022/6/30
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

ShenZhen RF-STAR Technology CO.,LTD
2F,BLDG.8,Zone A,BaoAn Internet Industry Base, BaoYuan Road,XiXiang, BaoAn DIST, ShenZhen China

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
TEL: +86-755-23059481

Compiled by: Review by:

Approved by: Date: 2022/6/30

REPORT REVISE RECORD

Version No.	Date	Description
00	2022/6/30	Original

TABLE OF CONTENTS

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	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
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	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

2 GENERAL INFORMATION

Applicant	ShenZhen RF-STAR Technology CO.,LTD
Address	2F,BLDG.8,Zone A,BaoAn Internet Industry Base, BaoYuan Road,XiXiang, BaoAn DIST,ShenZhen China
Manufacturer	ShenZhen RF-STAR Technology CO.,LTD
Address	2F,BLDG.8,Zone A,BaoAn Internet Industry Base, BaoYuan Road,XiXiang, BaoAn DIST,ShenZhen China
Factory	ShenZhen RF-STAR Technology CO.,LTD
Address	2F, BLDG.8, Zone A,BaoAn Internet Industry Base, BaoYuan Road, XiXiang, BaoAn DIST, ShenZhen China
Product Name	BT module
Test Model No.	RF-BM-2652P2
Extension model	RF-BM-2652P2I
Note	All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are Different types of antennas

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V1.0
Software Version	V1.0

Operation Frequency:	2405MHz-2480MHz
Modulation Type:	OQPSK
Channel Spacing:	5MHz
Number of Channels:	16
Antenna Type:	RF-BM-2652P2: PCB antenna RF-BM-2652P2I: integral antenna
Antenna Gain:	RF-BM-2652P2 :0dBi RF-BM-2652P2I:4dBi Note: Provided by the applicant

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25℃	DC3.3V

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%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	N/A	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

No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

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	25/11/2020	24/11/2023
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022
LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

Test Equipment Of Conducted Band Edges Measurement					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Radiated Spurious Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber	SKET	966	N/A	10/11/2020	9/11/2023

Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022

Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Conducted Spurious Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Power Spectrum Density					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Conducted Peak Output Power					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Minimum 6dB Bandwidth					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

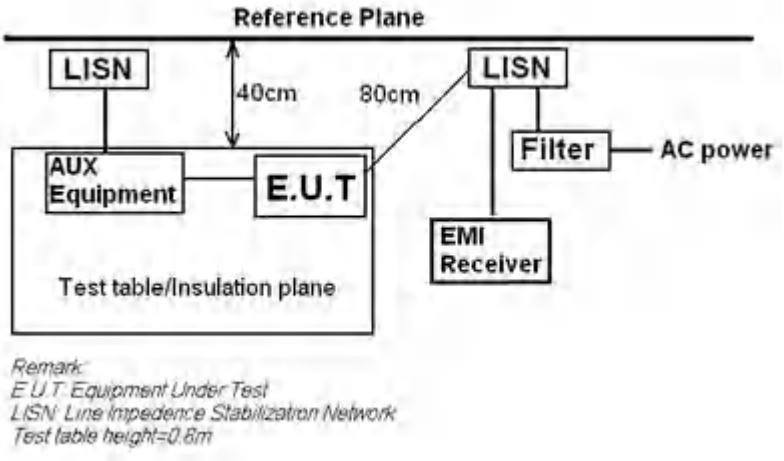
10 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

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

10.1 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.		

10.2 BLOCK DIAGRAM OF TEST SETUP



10.3 PROCEDURE

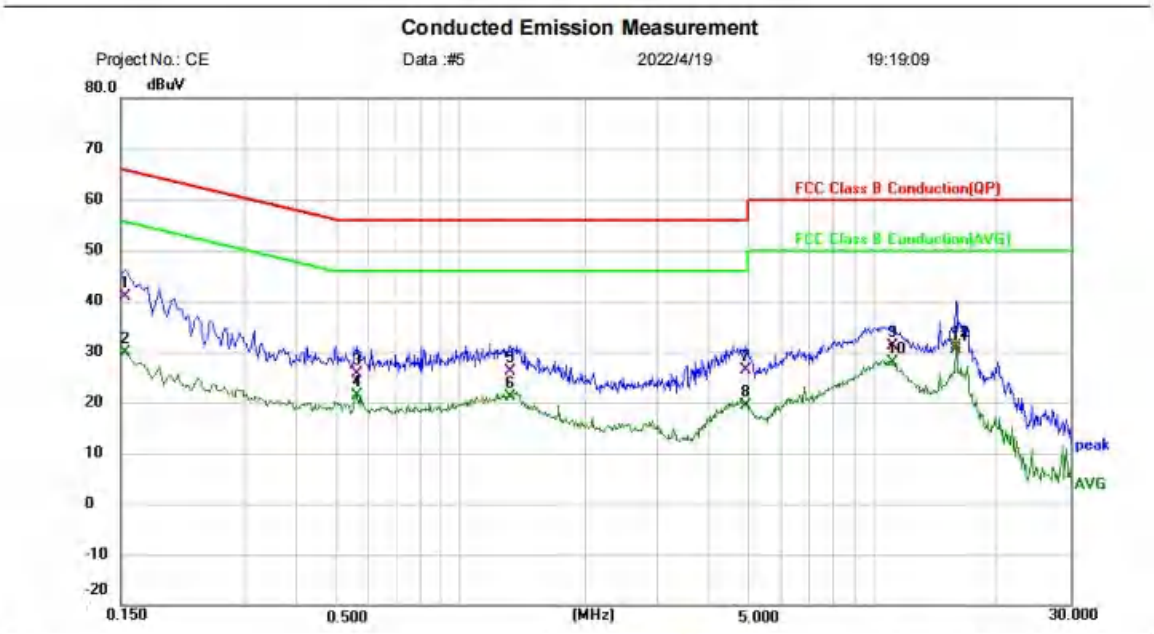
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second 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

10.4 TEST DATA

Remark: During the test, pre-scan the RF-BM-2652P2, RF-BM-2652P2l type, and found the RF-BM-2652P2 type which it is worse case.

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



Site
Limit: FCC Class B Conduction(QP)
EUT: BT module
M/N: RF-BW-2652P2
Mode: zigbee-TX-mode
Note:

Phase: N
Power:

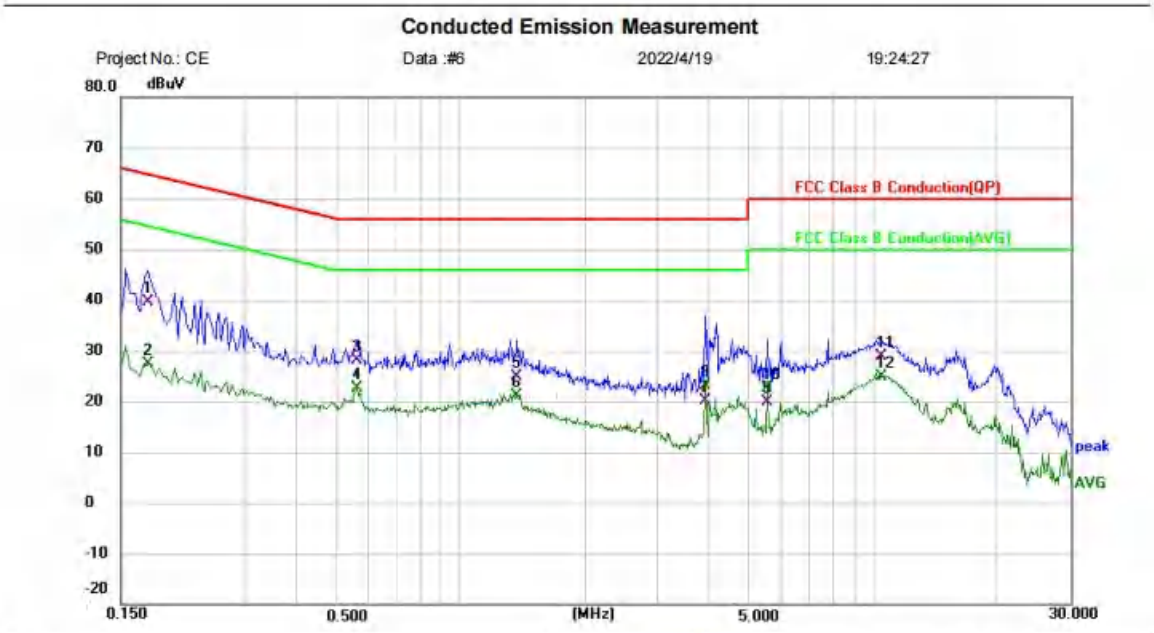
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	30.79	10.03	40.82	65.79	-24.97	QP	
2		0.1539	19.96	10.03	29.99	55.79	-25.80	AVG	
3		0.5620	15.84	9.80	25.64	56.00	-30.36	QP	
4		0.5620	11.64	9.80	21.44	46.00	-24.56	AVG	
5		1.3220	16.31	9.85	26.16	56.00	-29.84	QP	
6		1.3220	11.25	9.85	21.10	46.00	-24.90	AVG	
7		4.9140	16.36	9.95	26.31	56.00	-29.69	QP	
8		4.9140	9.53	9.95	19.48	46.00	-26.52	AVG	
9		11.1620	21.04	10.19	31.23	60.00	-28.77	QP	
10		11.1620	17.68	10.19	27.87	50.00	-22.13	AVG	
11		15.8820	20.07	10.30	30.37	60.00	-29.63	QP	
12	*	15.8820	20.89	10.30	31.19	50.00	-18.81	AVG	

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

Test Result: Pass

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



Site
Limit: FCC Class B Conduction(QP)
EUT: BT module
M/N: RF-BW-2652P2
Mode: zigbee-TX-mode
Note:

Phase: L1
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1740	29.54	10.16	39.70	64.77	-25.07	QP	
2		0.1740	17.19	10.16	27.35	54.77	-27.42	AVG	
3		0.5580	18.14	9.87	28.01	56.00	-27.99	QP	
4		0.5580	12.81	9.87	22.68	46.00	-23.32	AVG	
5		1.3700	14.90	9.93	24.83	56.00	-31.17	QP	
6		1.3700	11.21	9.93	21.14	46.00	-24.86	AVG	
7		3.9060	10.23	9.89	20.12	56.00	-35.88	QP	
8	*	3.9060	13.26	9.89	23.15	46.00	-22.85	AVG	
9		5.5300	9.89	10.04	19.93	60.00	-40.07	QP	
10		5.5300	12.60	10.04	22.64	50.00	-27.36	AVG	
11		10.4900	18.60	10.22	28.82	60.00	-31.18	QP	
12		10.4900	14.75	10.22	24.97	50.00	-25.03	AVG	

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

Test Result: Pass

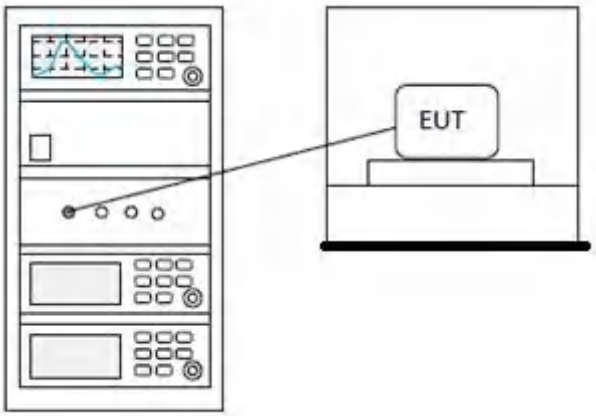
11 CONDUCTED BAND EDGES MEASUREMENT

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 ANTENNA REQUIREMENT

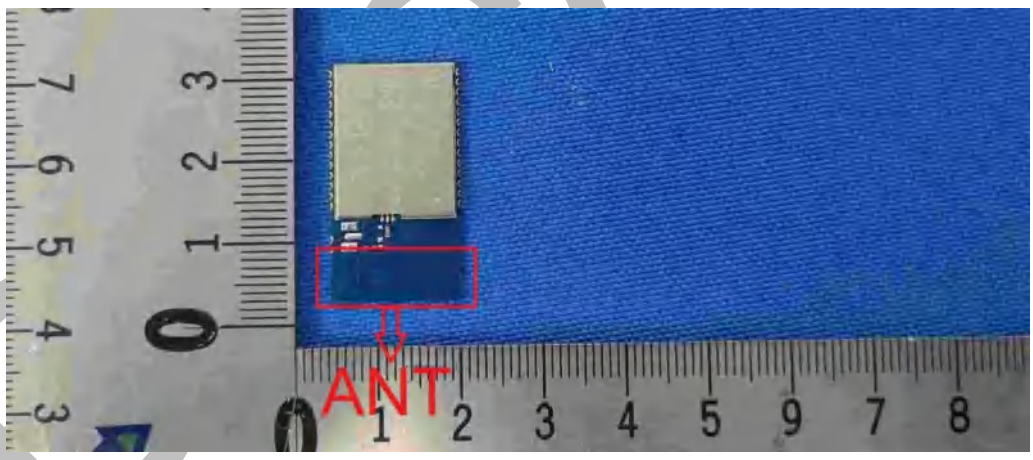
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

12.1 CONCLUSION

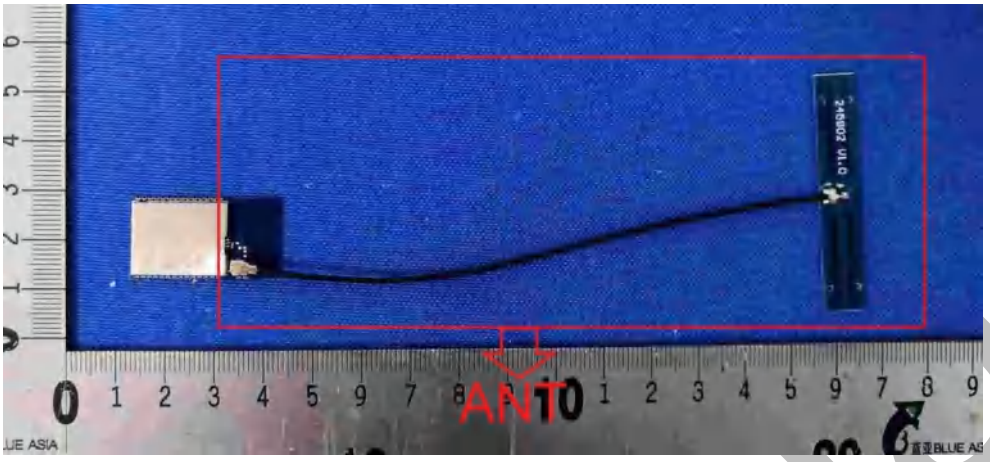
Standard Requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached 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 0dBi (RF-BM-2652P2), 4dBi (RF-BM-2652P2I).

RF-BM-2652P2:



RF-BM-2652P2I:



13 RADIATED SPURIOUS EMISSIONS

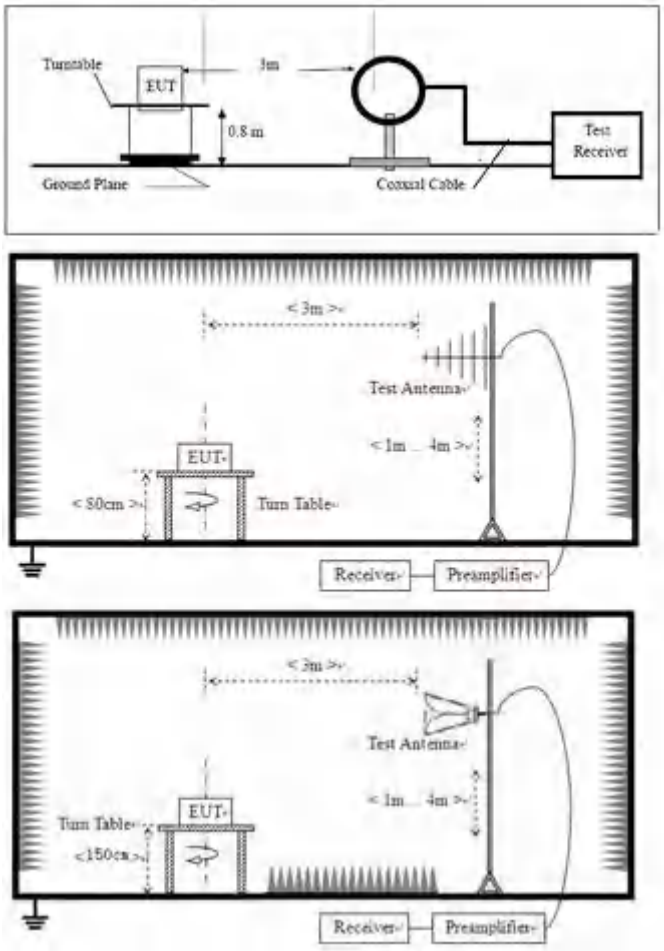
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

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.

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.

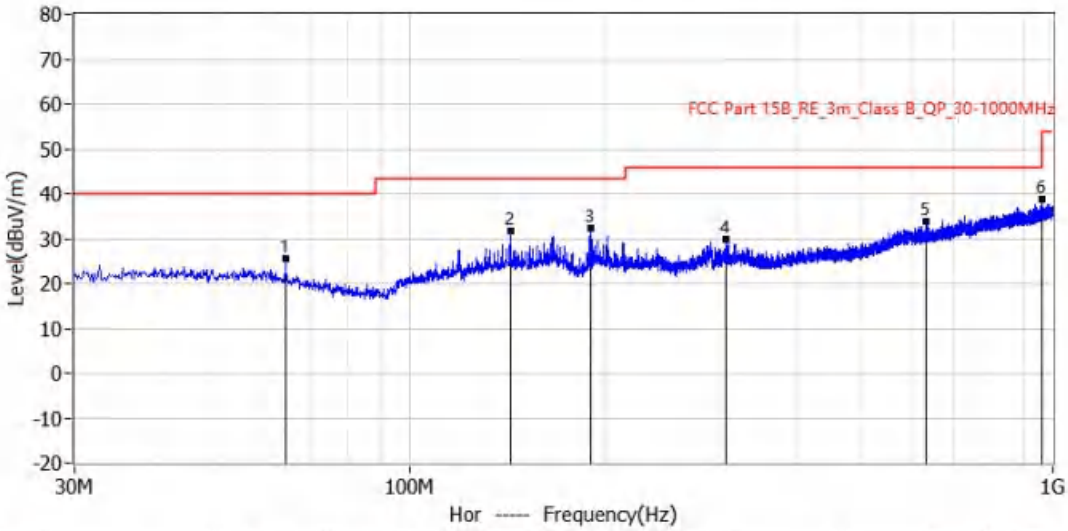
Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final 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.

13.4 TEST DATA

RF-BM-2652P2:

[TestMode: TX mode (SE) below 1G]; [Polarity: Horizontal]

Test Lab: BlueAsia EMC Lab（RE #1）	Project: BLA-EMC-202203-A46
EUT: BT module	Test Engineer: charlie
M/N: RF-BM-2652P2	Temperature:
S/N:	Humidity:
Test Mode: working mode	Test Voltage:
Note:	Test Data: 2022-06-20 10:29:27

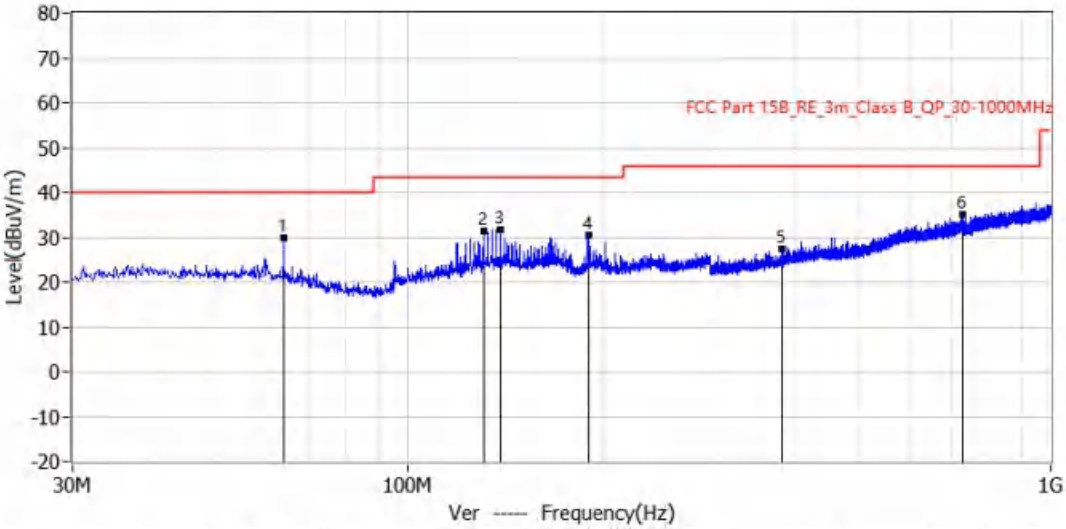


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	63.950MHz	40.0	25.4	-14.6	2.7	22.7	QP	Hor	100.0	100.0
2*	143.005MHz	43.5	31.8	-11.7	8.2	23.6	QP	Hor	100.0	10.0
3*	190.414MHz	43.5	32.3	-11.2	11.3	21.0	QP	Hor	100.0	0.0
4*	309.724MHz	46.0	29.8	-16.2	5.4	24.4	QP	Hor	100.0	104.0
5*	634.916MHz	46.0	33.7	-12.3	2.2	31.5	QP	Hor	100.0	38.0
6*	959.988MHz	46.0	38.8	-7.2	3.1	35.7	QP	Hor	100.0	0.0

Test Result: Pass

[TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]

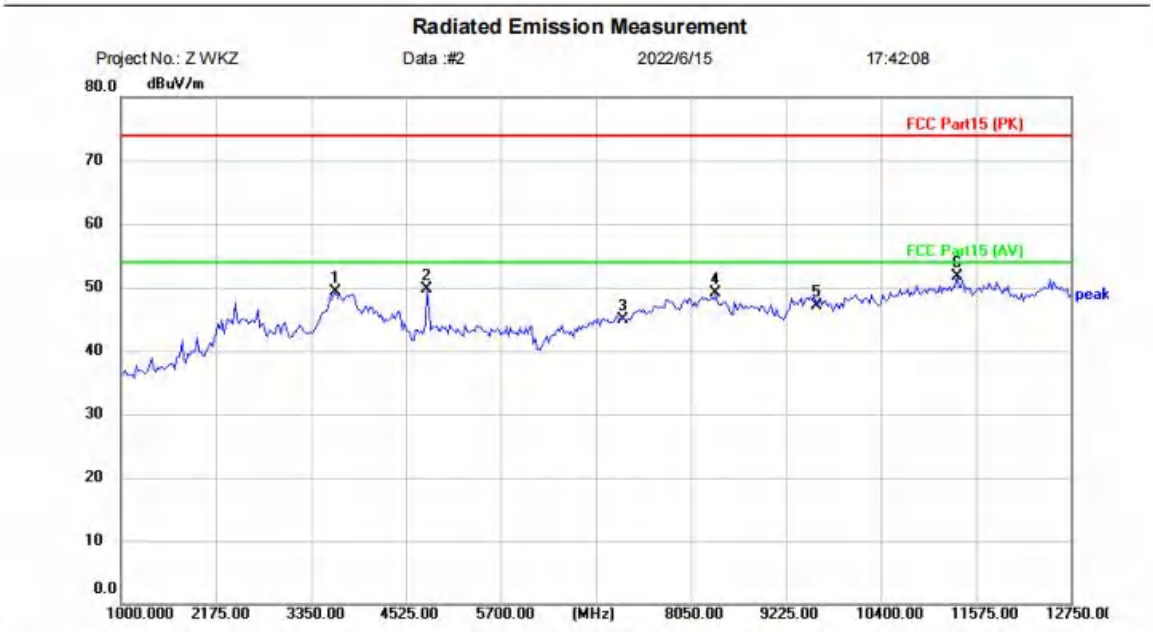
Test Lab: BlueAsia EMC Lab（RE #1）	Project: BLA-EMC-202203-A46
EUT: BT module	Test Engineer: charlie
M/N: RF-BM-2652P2	Temperature:
S/N:	Humidity:
Test Mode: working mode	Test Voltage:
Note:	Test Data: 2022-06-20 10:32:13



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	63.950MHz	40.0	29.8	-10.2	7.1	22.7	QP	Ver	100.0	95.0
2*	130.759MHz	43.5	31.3	-12.2	8.0	23.3	QP	Ver	100.0	336.0
3*	138.883MHz	43.5	31.8	-11.7	8.2	23.6	QP	Ver	100.0	0.0
4*	190.414MHz	43.5	30.5	-13.0	9.5	21.0	QP	Ver	100.0	199.0
5*	381.140MHz	46.0	27.4	-18.6	0.7	26.7	QP	Ver	100.0	316.0
6*	727.915MHz	46.0	35.2	-10.8	2.6	32.6	QP	Ver	100.0	101.0

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-L
Note:

Polarization: *Horizontal*
Power:

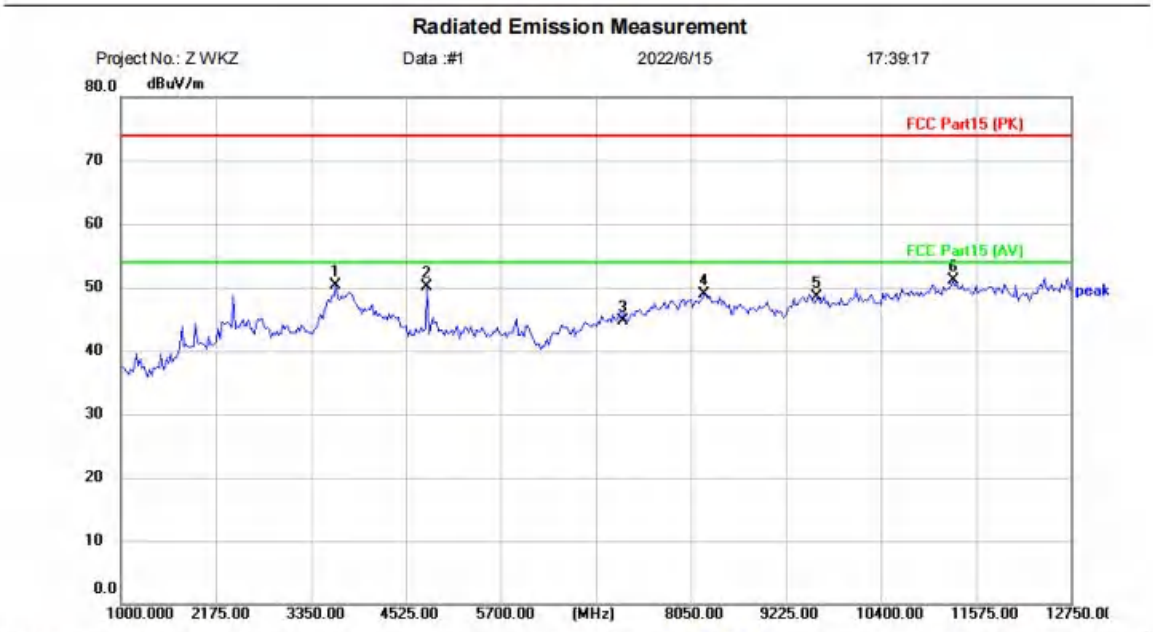
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3655.500	41.45	7.76	49.21	74.00	-24.79	peak	
2		4783.500	46.21	3.47	49.68	74.00	-24.32	peak	
3		7215.000	38.85	5.99	44.84	74.00	-29.16	peak	
4		8355.500	40.81	8.27	49.08	74.00	-24.92	peak	
5		9620.000	37.86	9.32	47.18	74.00	-26.82	peak	
6	*	11340.000	39.80	11.85	51.65	74.00	-22.35	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-L
Note:

Polarization: *Vertical*
Power:

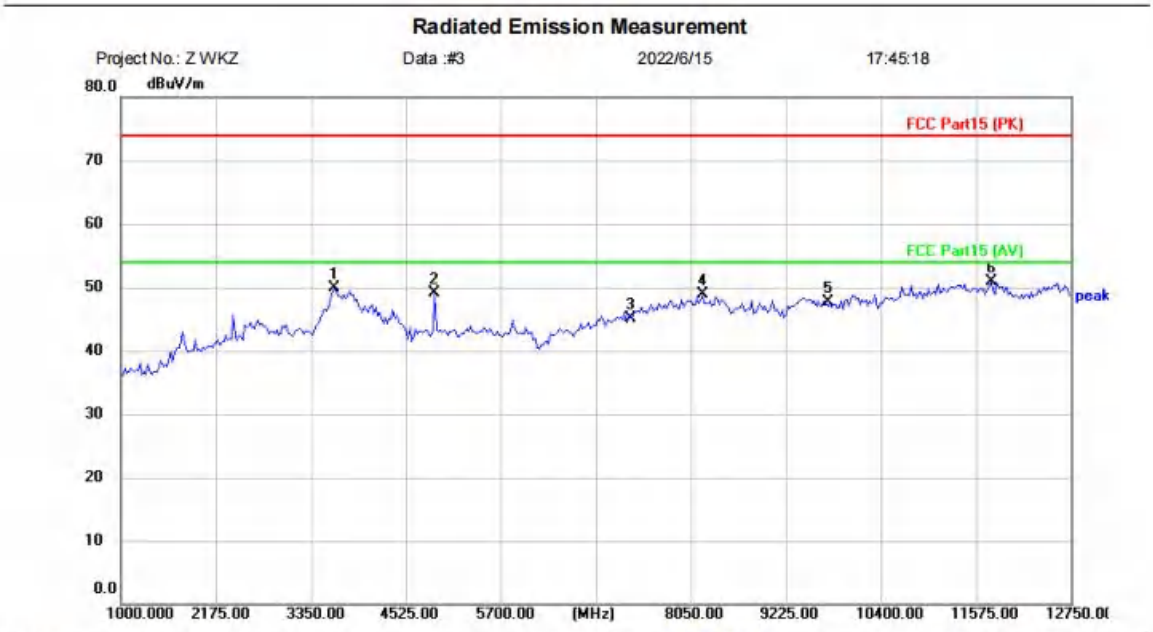
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3655.500	42.58	7.76	50.34	74.00	-23.66	peak	
2		4783.500	46.61	3.47	50.08	74.00	-23.92	peak	
3		7215.000	38.76	5.99	44.75	74.00	-29.25	peak	
4		8214.500	40.65	8.21	48.86	74.00	-25.14	peak	
5		9620.000	39.17	9.32	48.49	74.00	-25.51	peak	
6	*	11293.000	39.16	11.91	51.07	74.00	-22.93	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-M
Note:

Polarization: *Vertical*
Power:

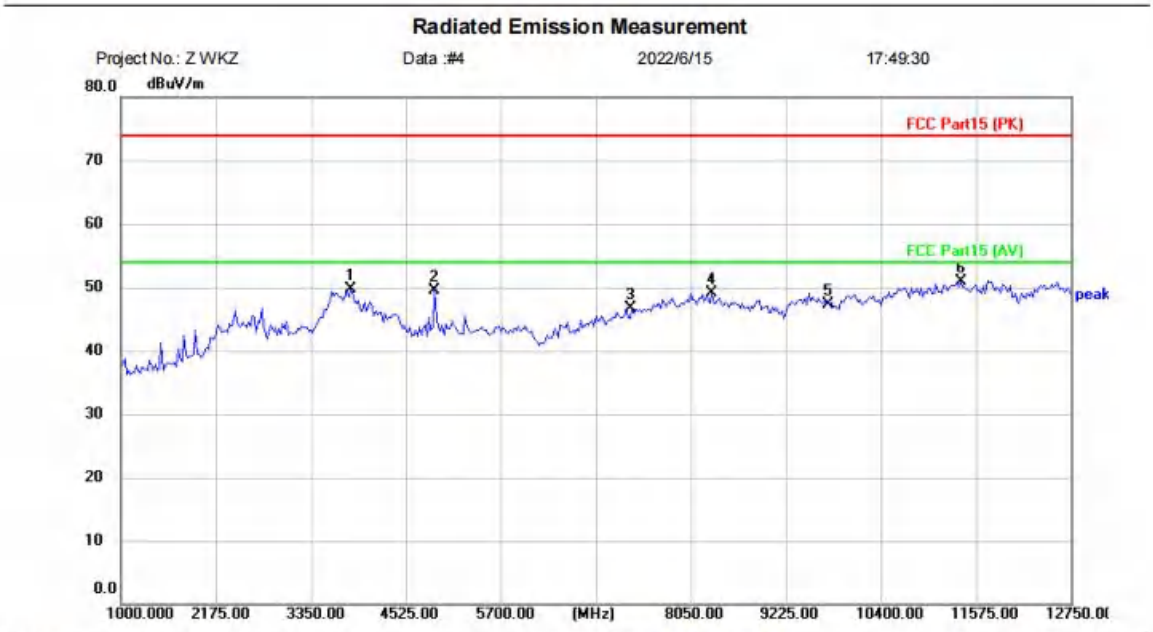
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3632.000	42.14	7.77	49.91	74.00	-24.09	peak	
2		4877.500	45.69	3.37	49.06	74.00	-24.94	peak	
3		7320.000	38.60	6.41	45.01	74.00	-28.99	peak	
4		8191.000	40.62	8.20	48.82	74.00	-25.18	peak	
5		9760.000	37.99	9.62	47.61	74.00	-26.39	peak	
6	*	11763.000	39.29	11.63	50.92	74.00	-23.08	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-M
Note:

Polarization: *Horizontal*
Power:

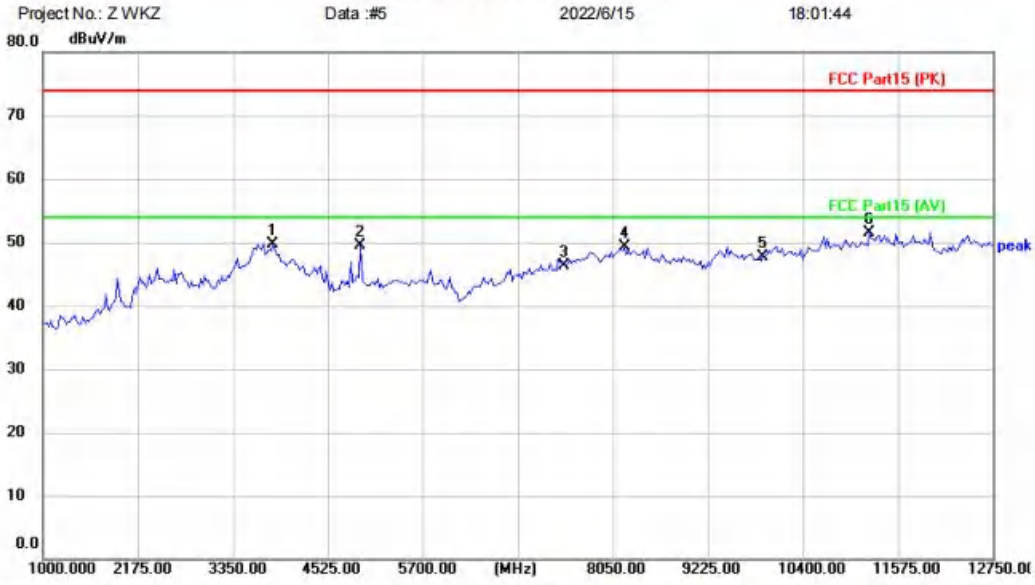
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3843.500	42.68	7.12	49.80	74.00	-24.20	peak	
2		4877.500	46.18	3.37	49.55	74.00	-24.45	peak	
3		7320.000	40.31	6.41	46.72	74.00	-27.28	peak	
4		8308.500	40.91	8.25	49.16	74.00	-24.84	peak	
5		9760.000	37.68	9.62	47.30	74.00	-26.70	peak	
6	*	11387.000	39.08	11.78	50.86	74.00	-23.14	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-H
Note:

Polarization: *Horizontal*
Power:

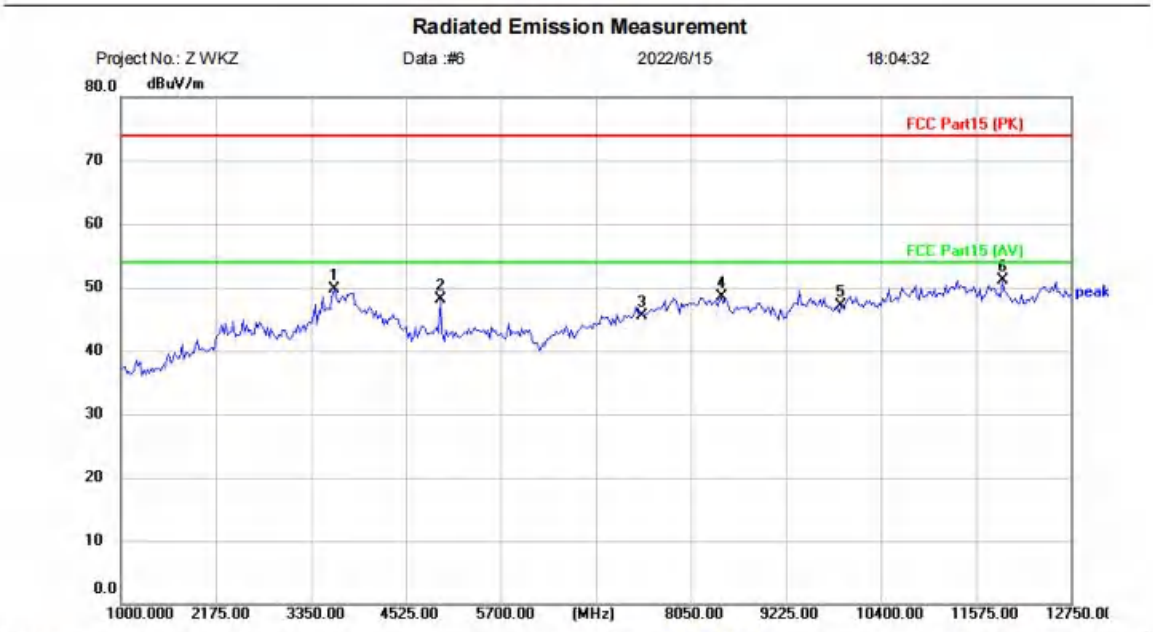
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3843.500	42.64	7.12	49.76	74.00	-24.24	peak	
2		4924.500	45.96	3.47	49.43	74.00	-24.57	peak	
3		7440.000	39.51	6.86	46.37	74.00	-27.63	peak	
4		8191.000	41.03	8.20	49.23	74.00	-24.77	peak	
5		9920.000	37.50	10.16	47.66	74.00	-26.34	peak	
6	*	11222.500	39.44	12.01	51.45	74.00	-22.55	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-H
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3632.000	41.92	7.77	49.69	74.00	-24.31	peak	
2		4948.000	44.44	3.65	48.09	74.00	-25.91	peak	
3		7440.000	38.70	6.86	45.56	74.00	-28.44	peak	
4		8426.000	40.32	8.24	48.56	74.00	-25.44	peak	
5		9920.000	36.89	10.16	47.05	74.00	-26.95	peak	
6	*	11904.000	39.76	11.42	51.18	74.00	-22.82	peak	

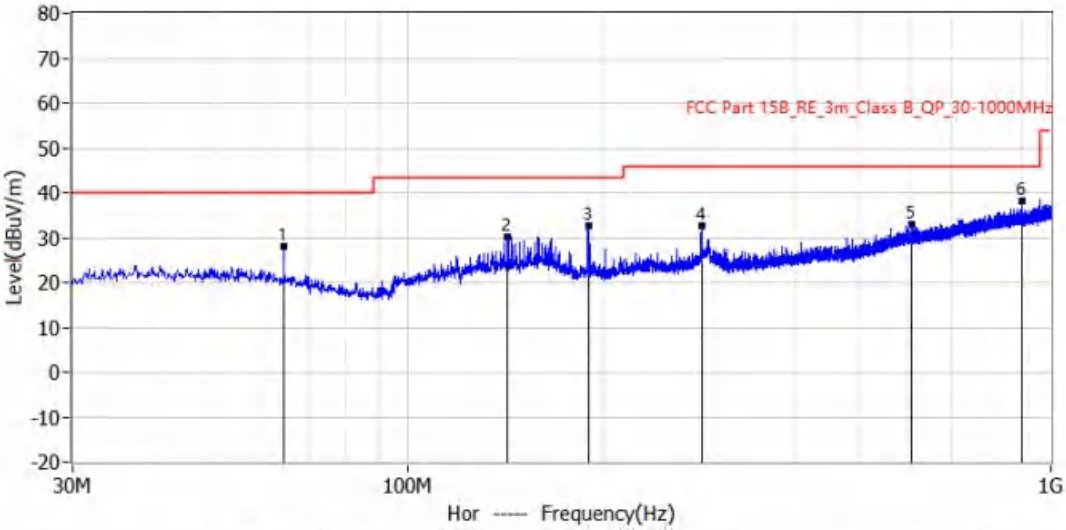
*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

RF-BM-2652P2I:

[TestMode: TX mode (SE) below 1G]; [Polarity: Horizontal]

Test Lab: BlueAsia EMC Lab（RE #1）	Project: BLA-EMC-202203-A46
EUT: BT module	Test Engineer: charlie
M/N: RF-BM-2652P2I	Temperature:
S/N:	Humidity:
Test Mode: working mode	Test Voltage:
Note:	Test Data: 2022-06-20 10:40:42

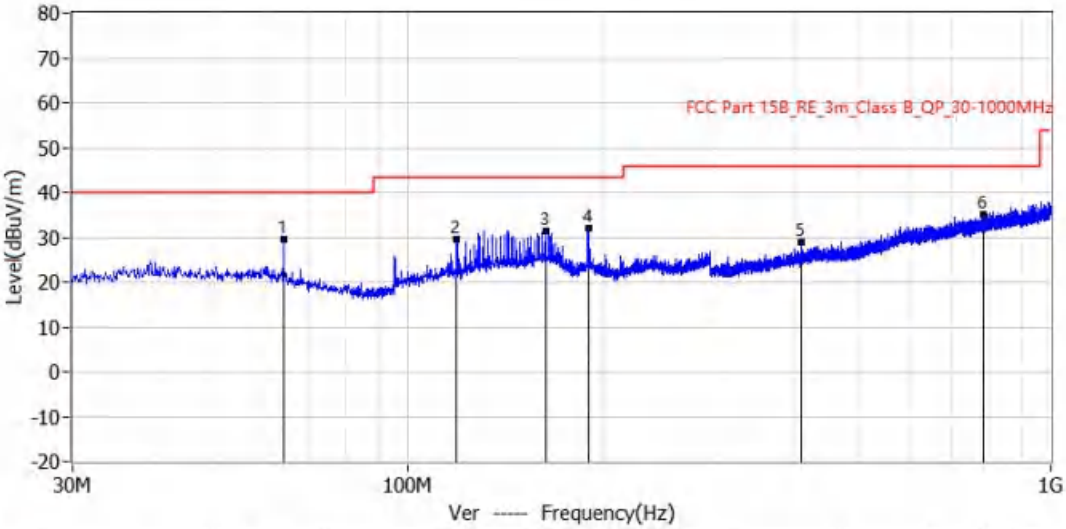


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	63.950MHz	40.0	28.0	-12.0	5.3	22.7	QP	Hor	100.0	40.0
2*	142.763MHz	43.5	30.3	-13.2	6.7	23.6	QP	Hor	100.0	360.0
3*	190.414MHz	43.5	32.7	-10.8	11.7	21.0	QP	Hor	100.0	0.0
4*	285.595MHz	46.0	32.7	-13.3	9.0	23.7	QP	Hor	100.0	99.0
5*	605.938MHz	46.0	32.8	-13.2	1.5	31.3	QP	Hor	100.0	152.0
6*	899.484MHz	46.0	38.2	-7.8	3.2	35.0	QP	Hor	100.0	249.0

Test Result: Pass

[TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]

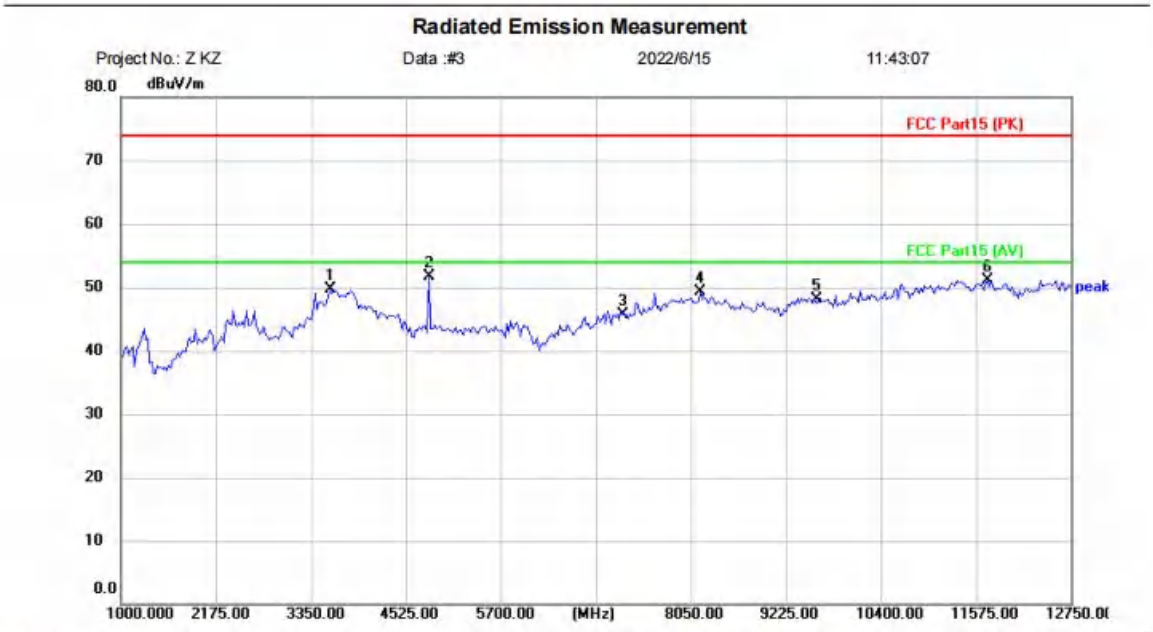
Test Lab: BlueAsia EMC Lab（RE #1）	Project: BLA-EMC-202203-A46
EUT: BT module	Test Engineer: charlie
M/N: RF-BM-2652P2l	Temperature:
S/N:	Humidity:
Test Mode: working mode	Test Voltage:
Note:	Test Data: 2022-06-20 10:38:58



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	63.950MHz	40.0	29.4	-10.6	6.7	22.7	QP	Ver	100.0	70.0
2*	118.876MHz	43.5	29.5	-14.0	6.9	22.6	QP	Ver	100.0	30.0
3*	163.254MHz	43.5	31.5	-12.0	8.5	23.0	QP	Ver	100.0	176.0
4*	190.293MHz	43.5	31.9	-11.6	10.9	21.0	QP	Ver	100.0	189.0
5*	407.936MHz	46.0	29.0	-17.0	1.6	27.4	QP	Ver	100.0	5.0
6*	784.175MHz	46.0	35.0	-11.0	1.2	33.8	QP	Ver	100.0	45.0

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-L
Note:

Polarization: *Horizontal*
Power:

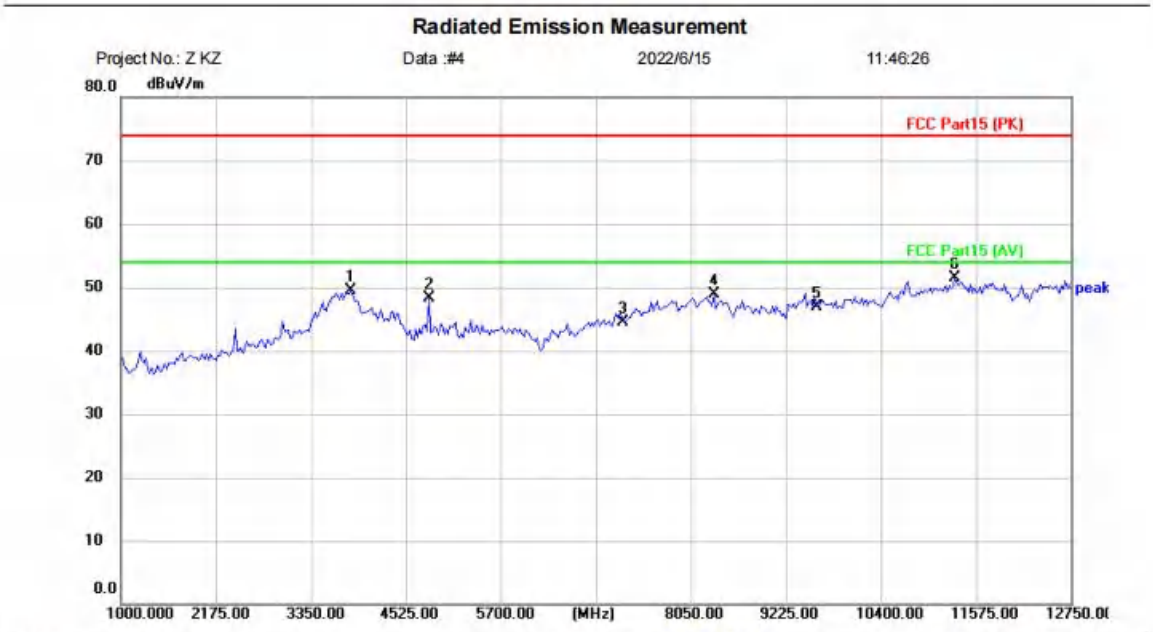
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3585.000	42.33	7.29	49.62	74.00	-24.38	peak	
2	*	4807.000	47.97	3.71	51.68	74.00	-22.32	peak	
3		7215.000	39.73	5.99	45.72	74.00	-28.28	peak	
4		8167.500	41.05	8.17	49.22	74.00	-24.78	peak	
5		9620.000	38.78	9.32	48.10	74.00	-25.90	peak	
6		11716.000	39.43	11.76	51.19	74.00	-22.81	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-L
Note:

Polarization: *Vertical*
Power:

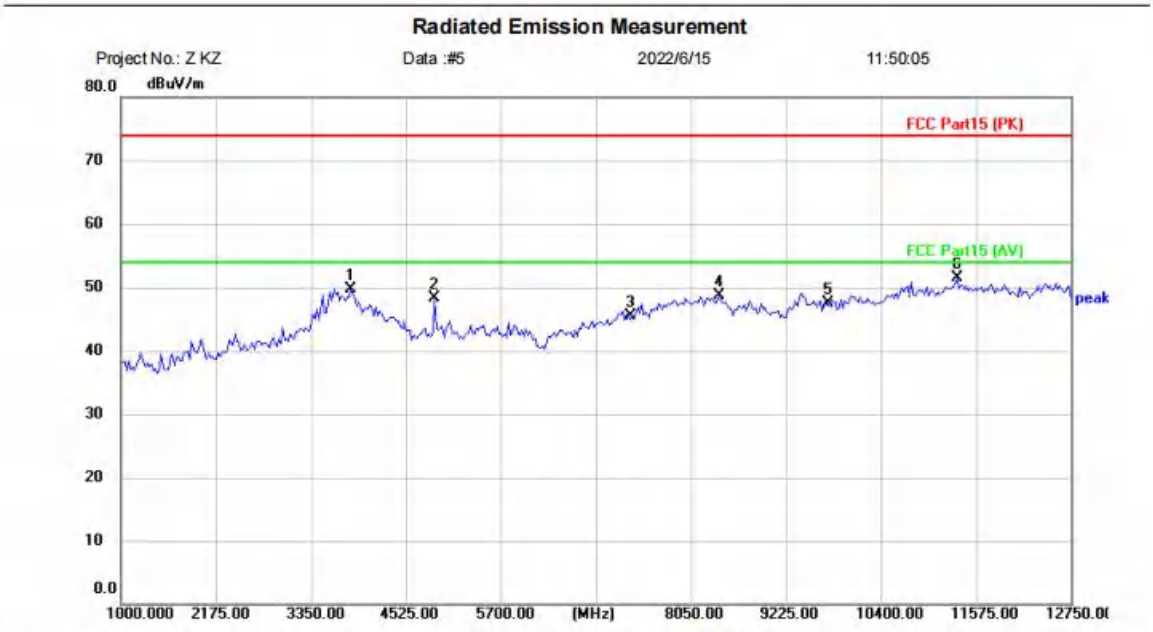
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3843.500	42.37	7.12	49.49	74.00	-24.51	peak	
2		4807.000	44.51	3.71	48.22	74.00	-25.78	peak	
3		7215.000	38.60	5.99	44.59	74.00	-29.41	peak	
4		8332.000	40.61	8.26	48.87	74.00	-25.13	peak	
5		9620.000	37.61	9.32	46.93	74.00	-27.07	peak	
6	*	11316.500	39.69	11.88	51.57	74.00	-22.43	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-M
Note:

Polarization: *Vertical*
Power:

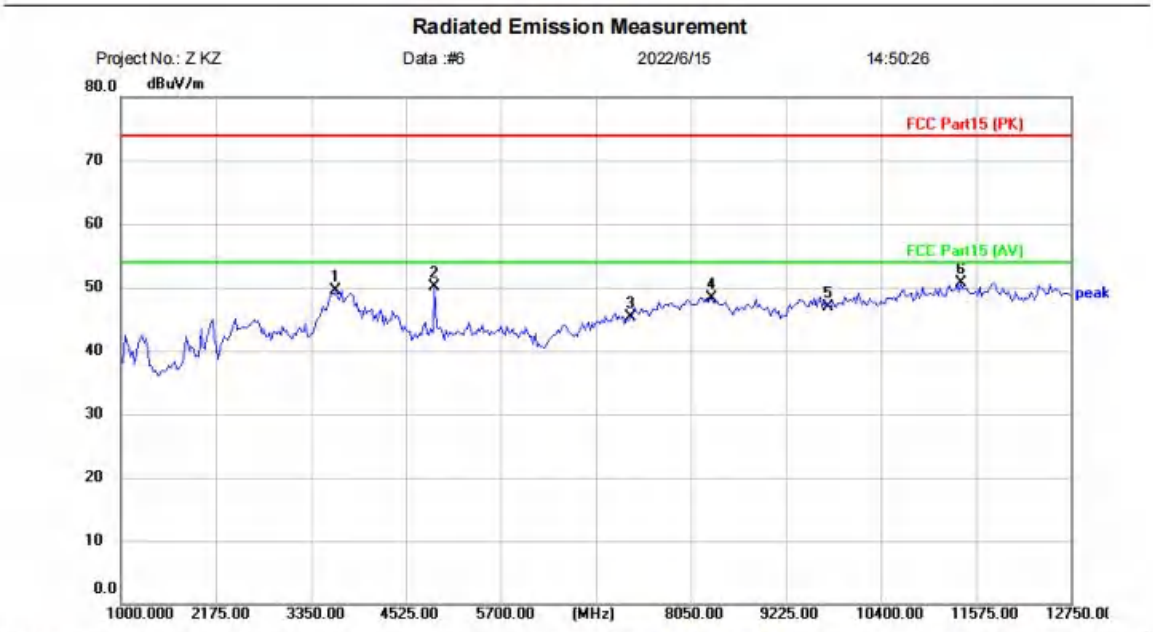
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3843.500	42.60	7.12	49.72	74.00	-24.28	peak	
2		4877.500	44.91	3.37	48.28	74.00	-25.72	peak	
3		7320.000	39.15	6.41	45.56	74.00	-28.44	peak	
4		8402.500	40.50	8.28	48.78	74.00	-25.22	peak	
5		9760.000	37.94	9.62	47.56	74.00	-26.44	peak	
6	*	11340.000	39.61	11.85	51.46	74.00	-22.54	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-M
Note:

Polarization: *Horizontal*
Power:

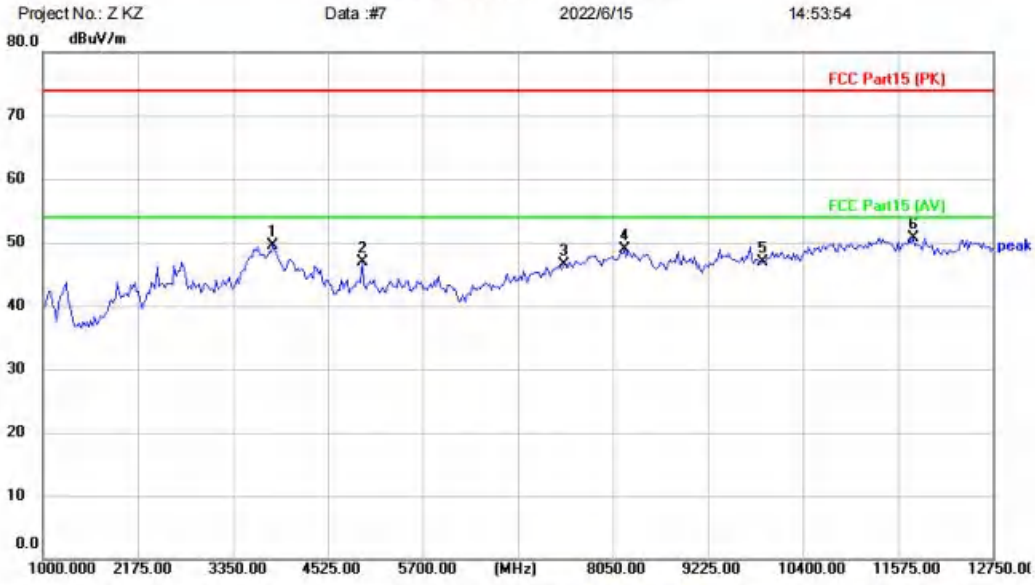
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3655.500	41.78	7.76	49.54	74.00	-24.46	peak	
2		4877.500	46.78	3.37	50.15	74.00	-23.85	peak	
3		7320.000	38.82	6.41	45.23	74.00	-28.77	peak	
4		8308.500	40.12	8.25	48.37	74.00	-25.63	peak	
5		9760.000	37.30	9.62	46.92	74.00	-27.08	peak	
6	*	11387.000	38.95	11.78	50.73	74.00	-23.27	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-H
Note:

Polarization: *Horizontal*
Power:

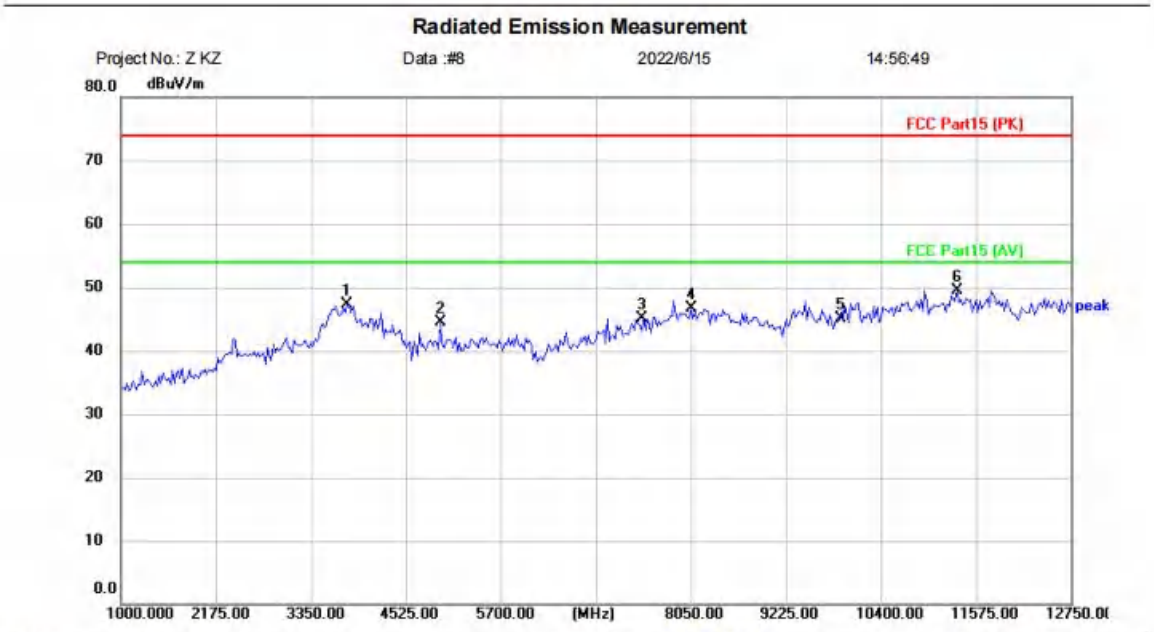
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3843.500	42.43	7.12	49.55	74.00	-24.45	peak	
2		4948.000	43.35	3.65	47.00	74.00	-27.00	peak	
3		7440.000	39.55	6.86	46.41	74.00	-27.59	peak	
4		8191.000	40.75	8.20	48.95	74.00	-25.05	peak	
5		9920.000	36.72	10.16	46.88	74.00	-27.12	peak	
6	*	11763.000	39.12	11.63	50.75	74.00	-23.25	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-H
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		3796.500	39.71	7.65	47.36	74.00	-26.64	peak	
2		4948.000	40.85	3.65	44.50	74.00	-29.50	peak	
3		7440.000	38.32	6.86	45.18	74.00	-28.82	peak	
4		8050.000	38.62	8.01	46.63	74.00	-27.37	peak	
5		9920.000	34.98	10.16	45.14	74.00	-28.86	peak	
6	*	11340.000	37.61	11.85	49.46	74.00	-24.54	peak	

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

Test Result: Pass

14 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

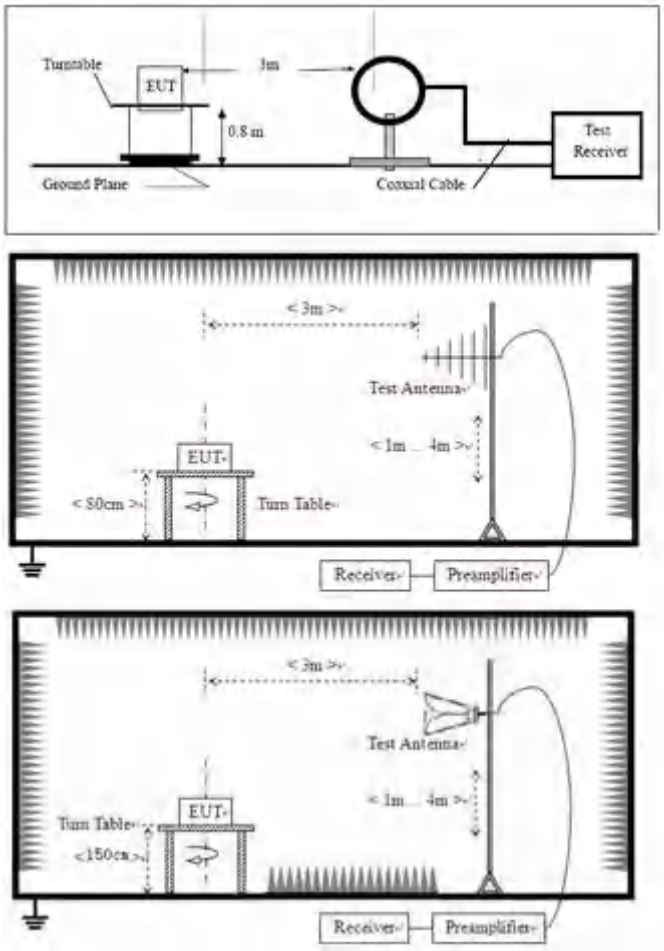
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

14.1 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.

14.2 BLOCK DIAGRAM OF TEST SETUP



14.3 PROCEDURE

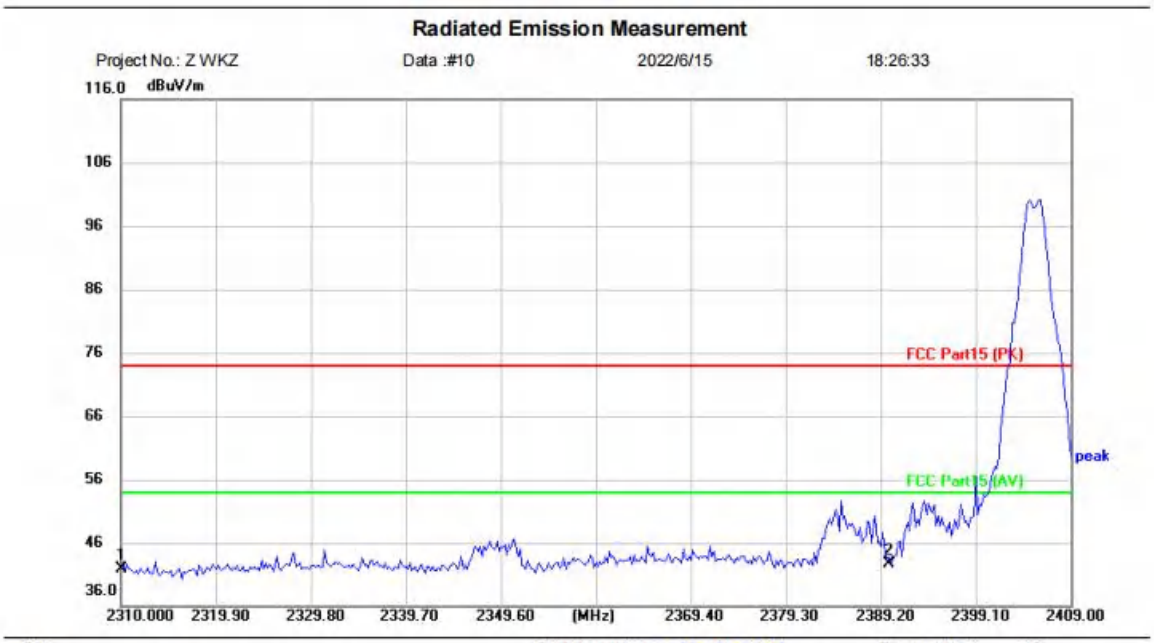
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters 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.

14.4 TEST DATA

RF-BM-2652P2:

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-L
Note:

Polarization: *Horizontal*
Power:

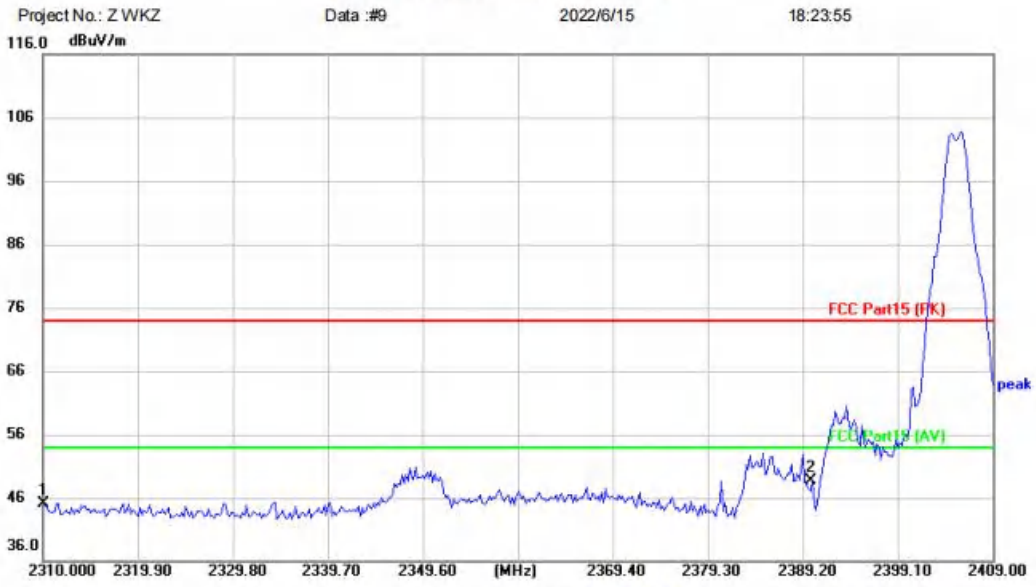
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	45.88	-3.93	41.95	74.00	-32.05	peak	
2	*	2390.000	46.31	-3.58	42.73	74.00	-31.27	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-L
Note:

Polarization: *Vertical*
Power:

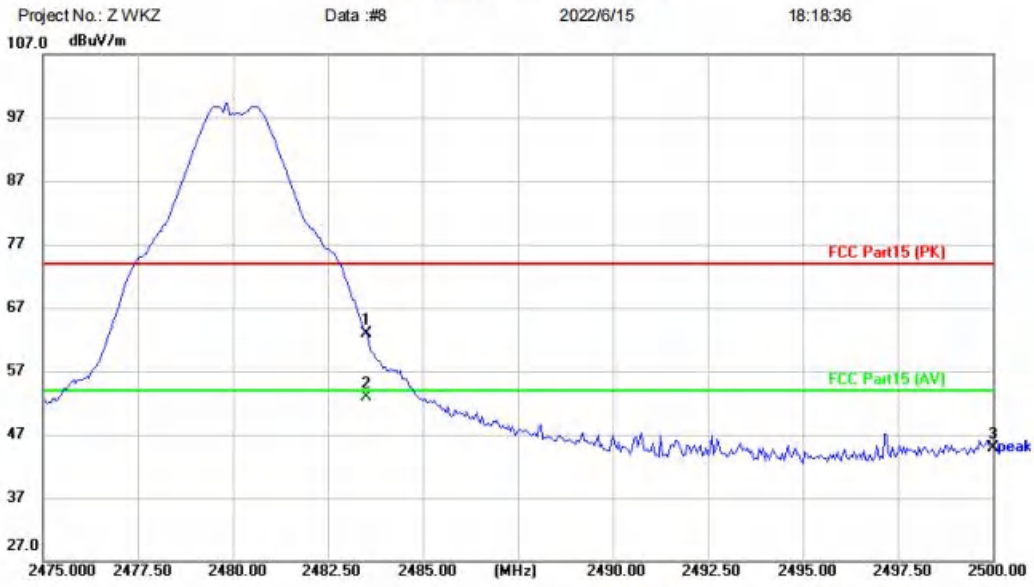
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	49.10	-3.93	45.17	74.00	-28.83	peak	
2	*	2390.000	52.28	-3.58	48.70	74.00	-25.30	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-H
Note:

Polarization: *Horizontal*
Power:

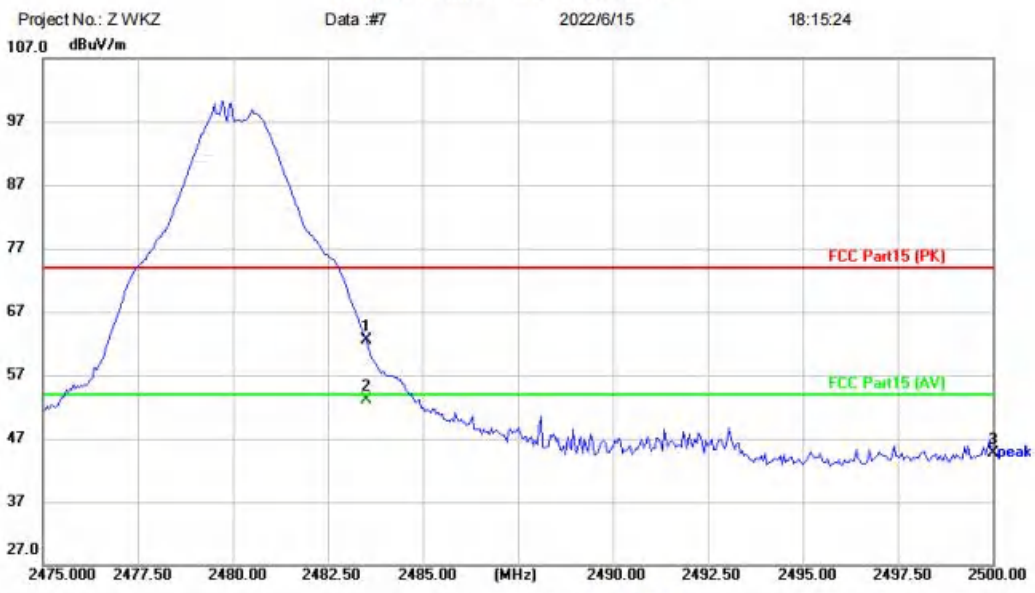
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2483.500	66.14	-3.14	63.00	74.00	-11.00	peak	
2	*	2483.500	56.10	-3.14	52.96	54.00	-1.04	AVG	
3		2500.000	48.02	-3.08	44.94	74.00	-29.06	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2
Mode: TX-H
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

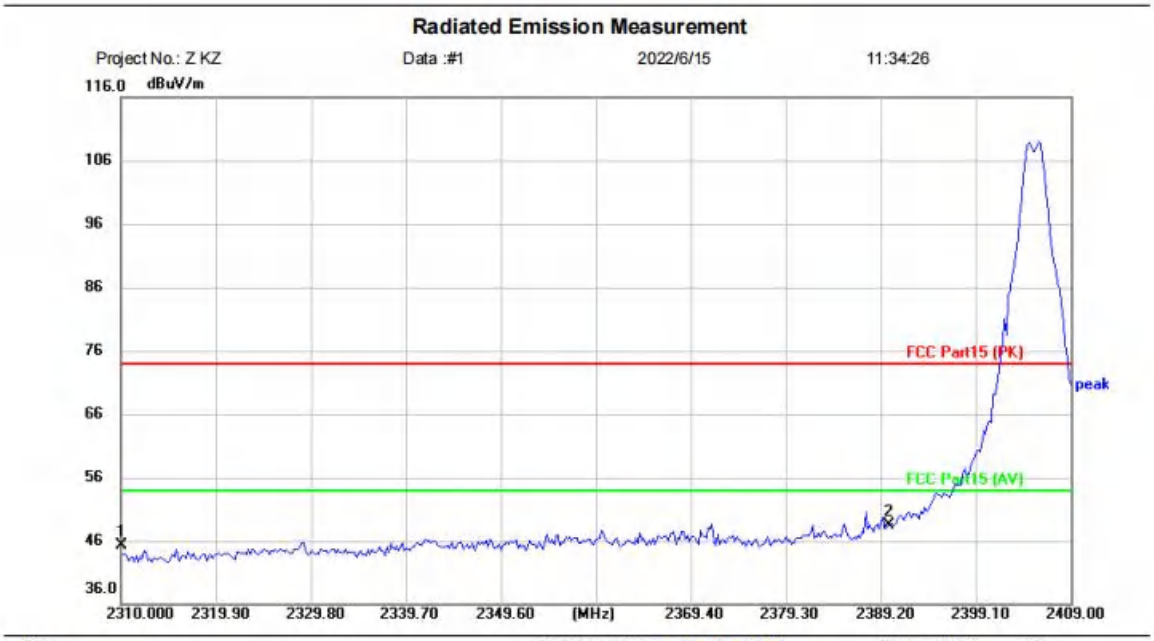
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2483.500	65.66	-3.14	62.52	74.00	-11.48	peak	
2	*	2483.500	56.32	-3.14	53.18	54.00	-0.82	AVG	
3		2500.000	47.81	-3.08	44.73	74.00	-29.27	peak	

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

Test Result: Pass

RF-BM-2652P2I:

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-L
Note:

Polarization: *Horizontal*
Power:

Temperature: (C)
Humidity: %RH

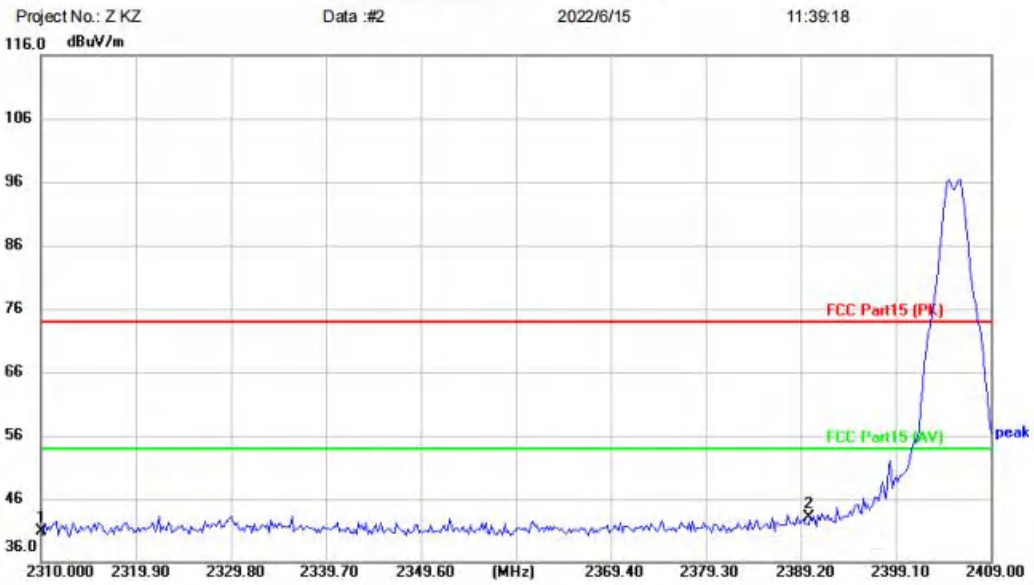
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	49.19	-3.93	45.26	74.00	-28.74	peak	
2	*	2390.000	52.13	-3.58	48.55	74.00	-25.45	peak	

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

Test Result: Pass

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

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-L
Note:

Polarization: *Vertical*
Power:

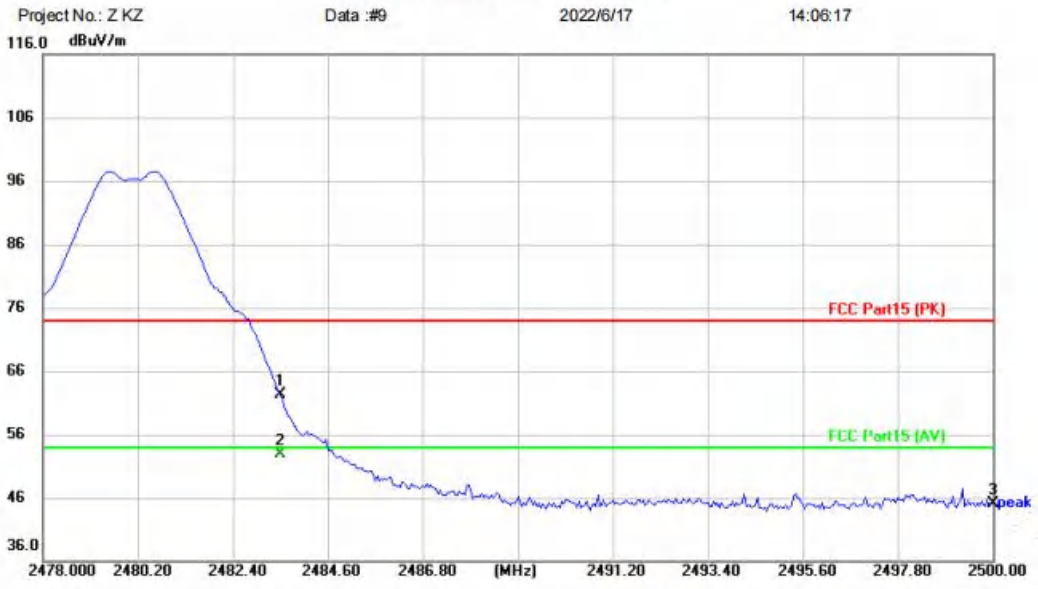
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	44.78	-3.93	40.85	74.00	-33.15	peak	
2	*	2390.000	46.74	-3.58	43.16	74.00	-30.84	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-H
Note:

Polarization: *Horizontal*
Power:

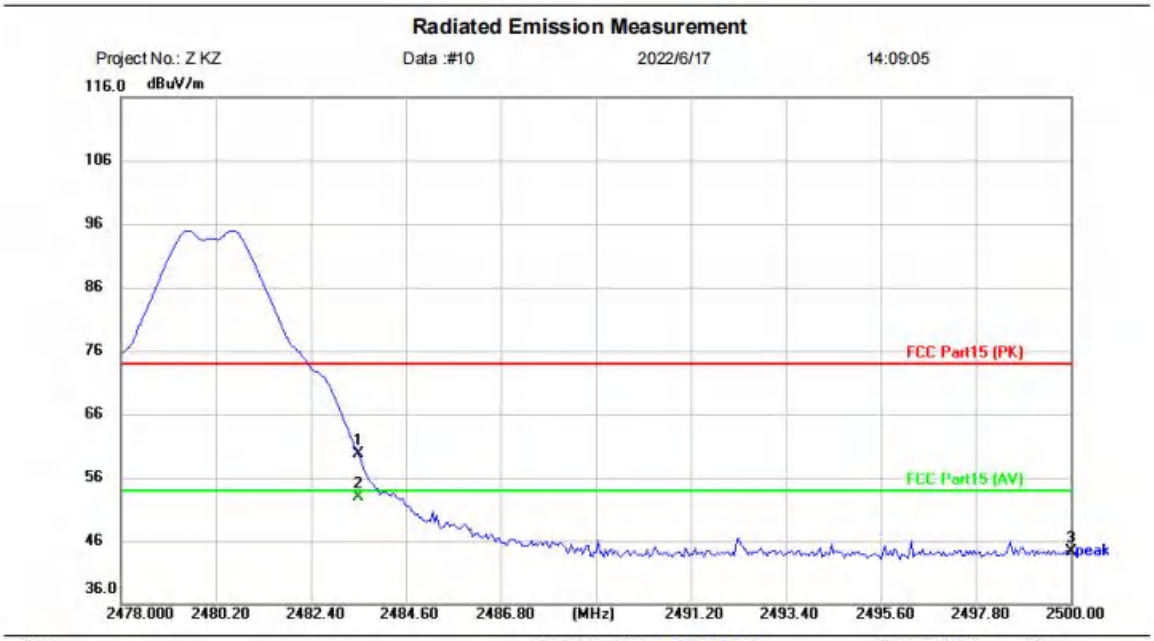
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2483.500	65.49	-3.14	62.35	74.00	-11.65	peak	
2	*	2483.500	56.10	-3.14	52.96	54.00	-1.04	AVG	
3		2500.000	48.12	-3.08	45.04	74.00	-28.96	peak	

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

Test Result: Pass

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



Site
Limit: FCC Part15 (PK)
EUT: BT modle
M/N: RF-BM-2652P2I
Mode: TX-H
Note:

Polarization: *Vertical*
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2483.500	62.89	-3.14	59.75	74.00	-14.25	peak	
2	*	2483.500	56.06	-3.14	52.92	54.00	-1.08	AVG	
3		2500.000	47.39	-3.08	44.31	74.00	-29.69	peak	

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

Test Result: Pass

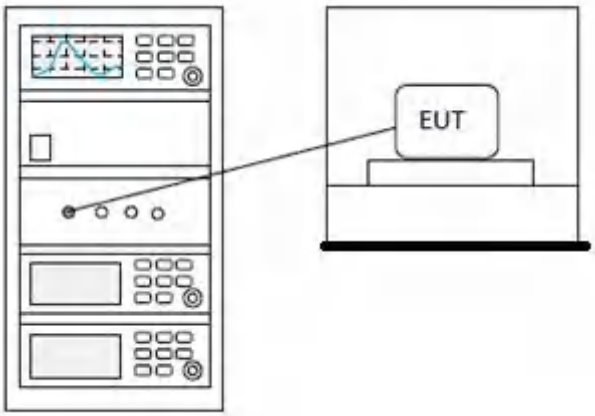
15 CONDUCTED SPURIOUS EMISSIONS

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%

15.1 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)).

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

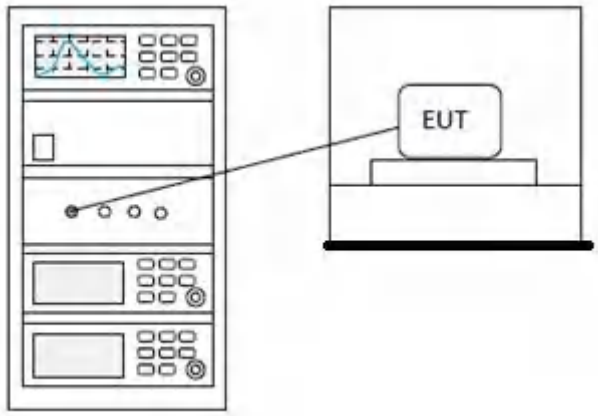
16 POWER SPECTRUM DENSITY

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%

16.1 LIMITS

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

16.2 BLOCK DIAGRAM OF TEST SETUP



16.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

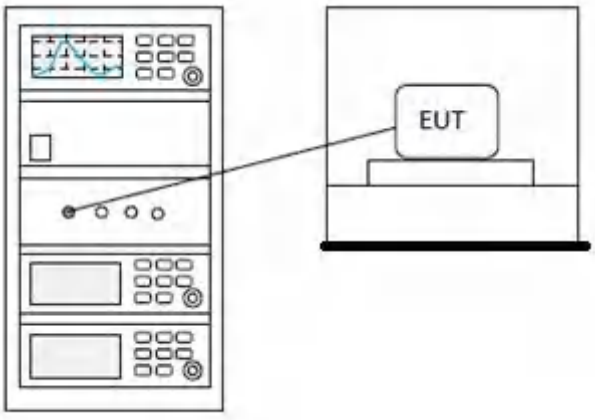
17 CONDUCTED PEAK OUTPUT POWER

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%

17.1 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

17.2 BLOCK DIAGRAM OF TEST SETUP



17.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

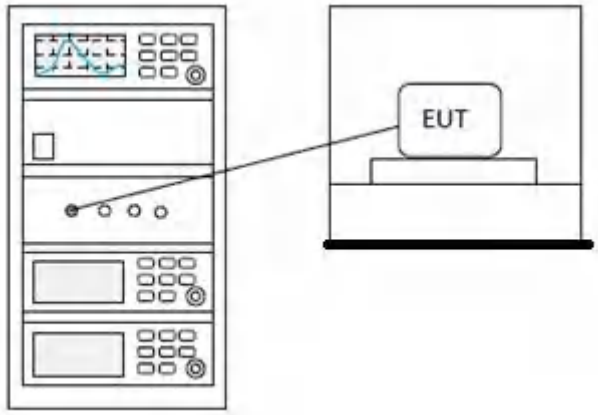
18 MINIMUM 6DB BANDWIDTH

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%

18.1 LIMITS

Limit:	≥500 kHz

18.2 BLOCK DIAGRAM OF TEST SETUP



18.3 TEST DATA

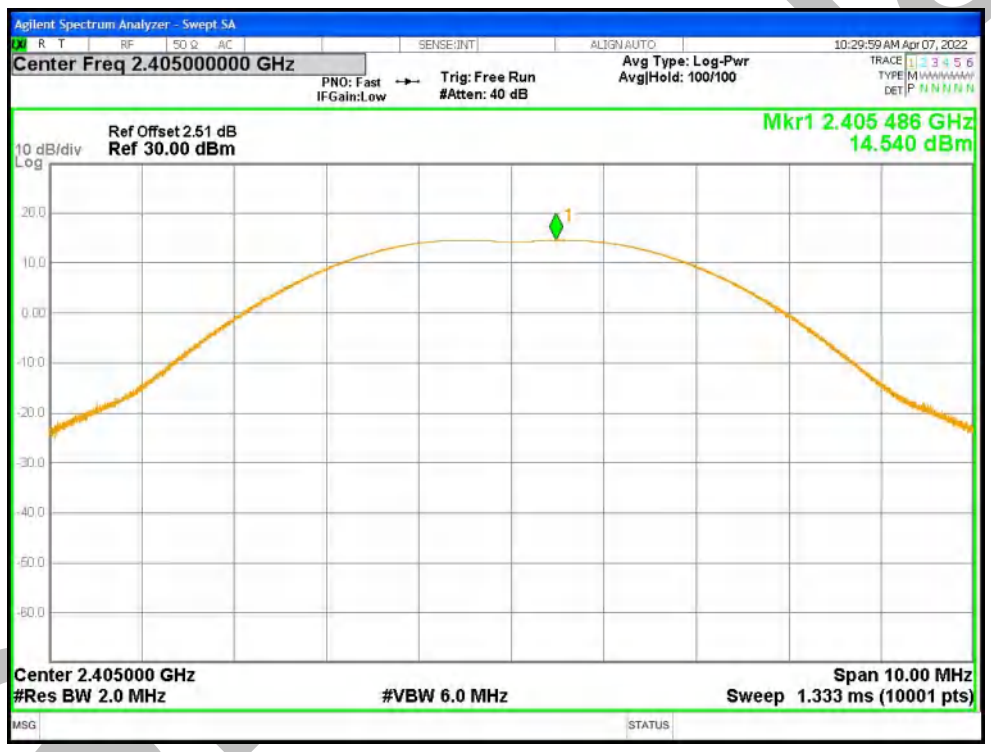
Pass: Please Refer To Appendix: Appendix1 For Details

19 APPENDIX

Maximum Conducted Output Power

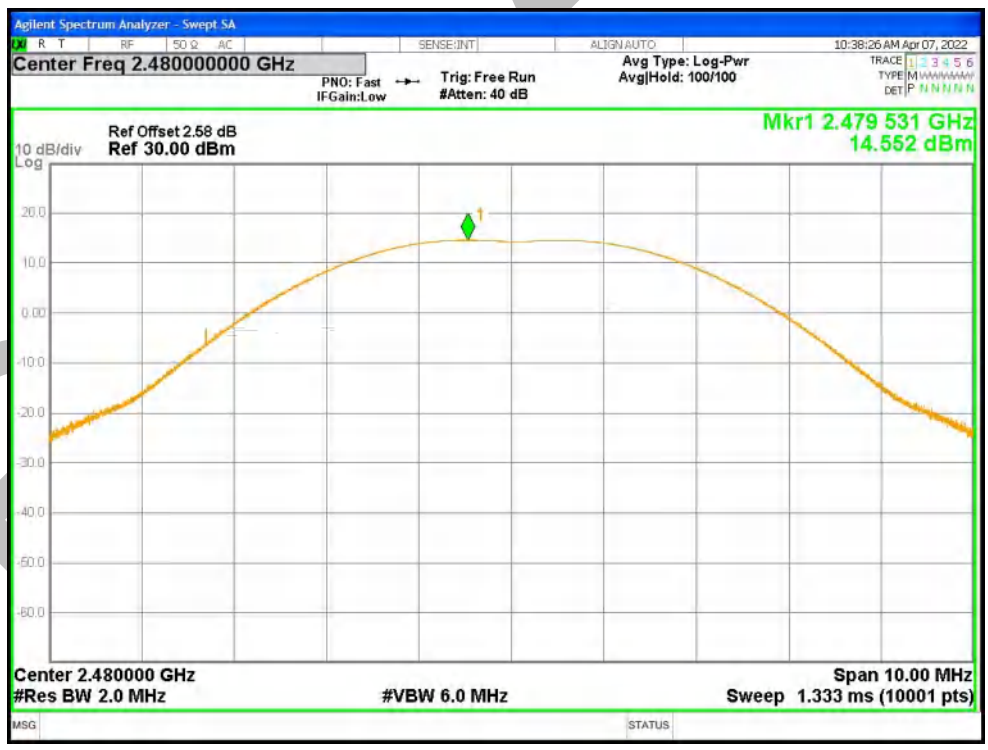
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	ZIGBEE	2405	Ant1	14.54	30	Pass
NVNT	ZIGBEE	2440	Ant1	14.781	30	Pass
NVNT	ZIGBEE	2480	Ant1	14.552	30	Pass

Power NVNT ZIGBEE 2405MHz Ant1



Power NVNT ZIGBEE 2440MHz Ant1

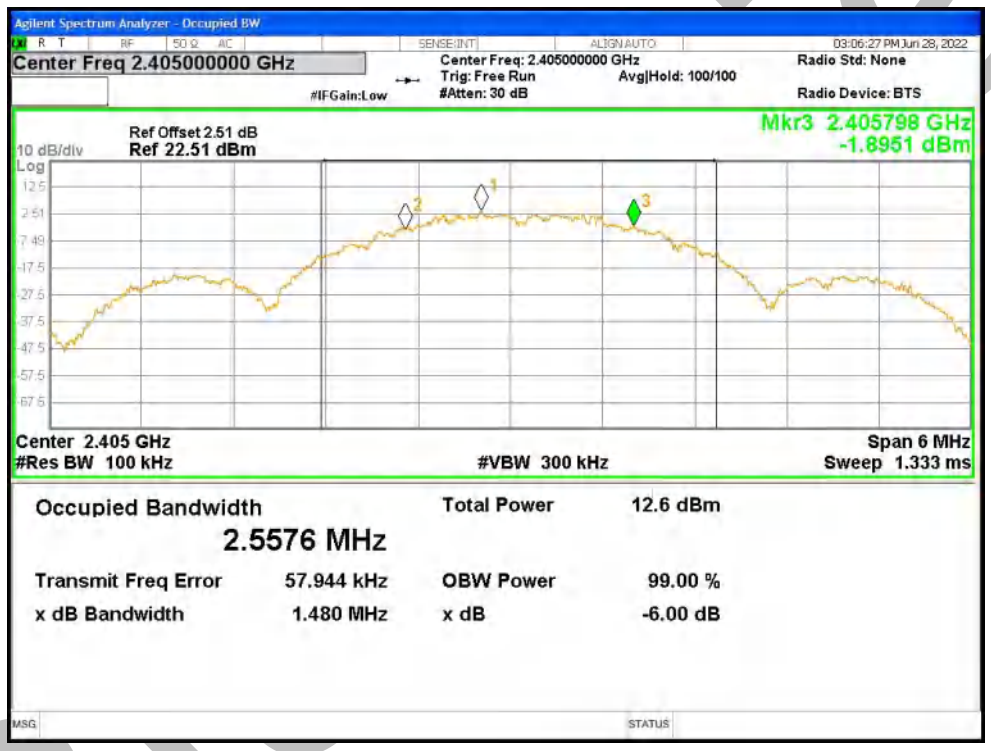
Power NVNT ZIGBEE 2480MHz Ant1



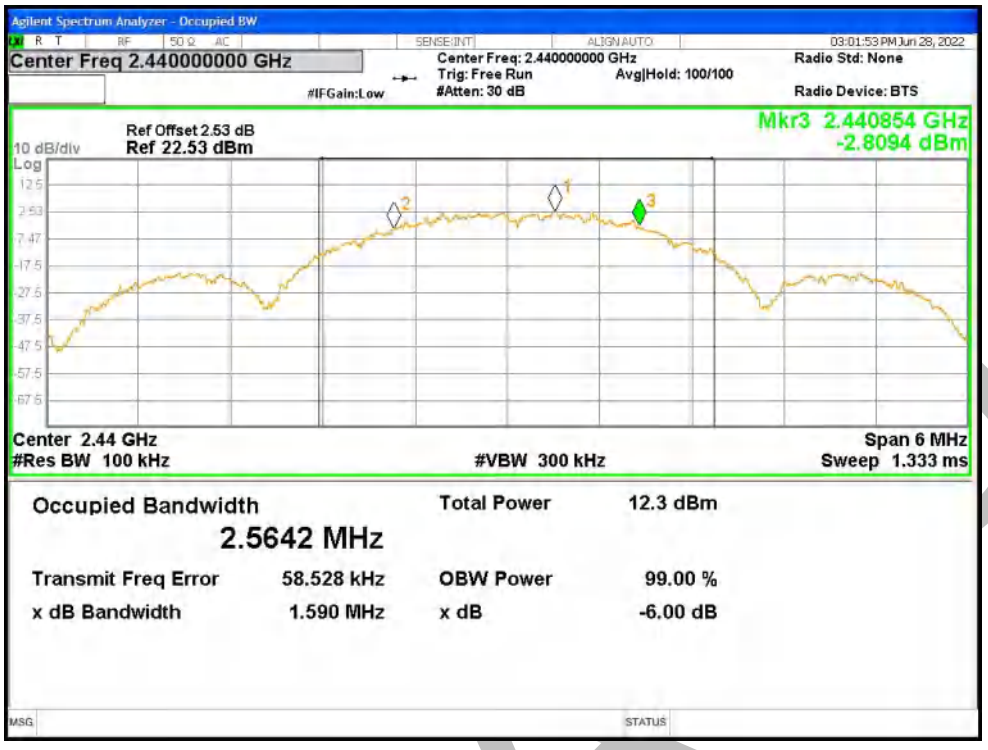
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	ZIGBEE	2405	Ant1	1.48	0.5	Pass
NVNT	ZIGBEE	2440	Ant1	1.59	0.5	Pass
NVNT	ZIGBEE	2480	Ant1	1.62	0.5	Pass

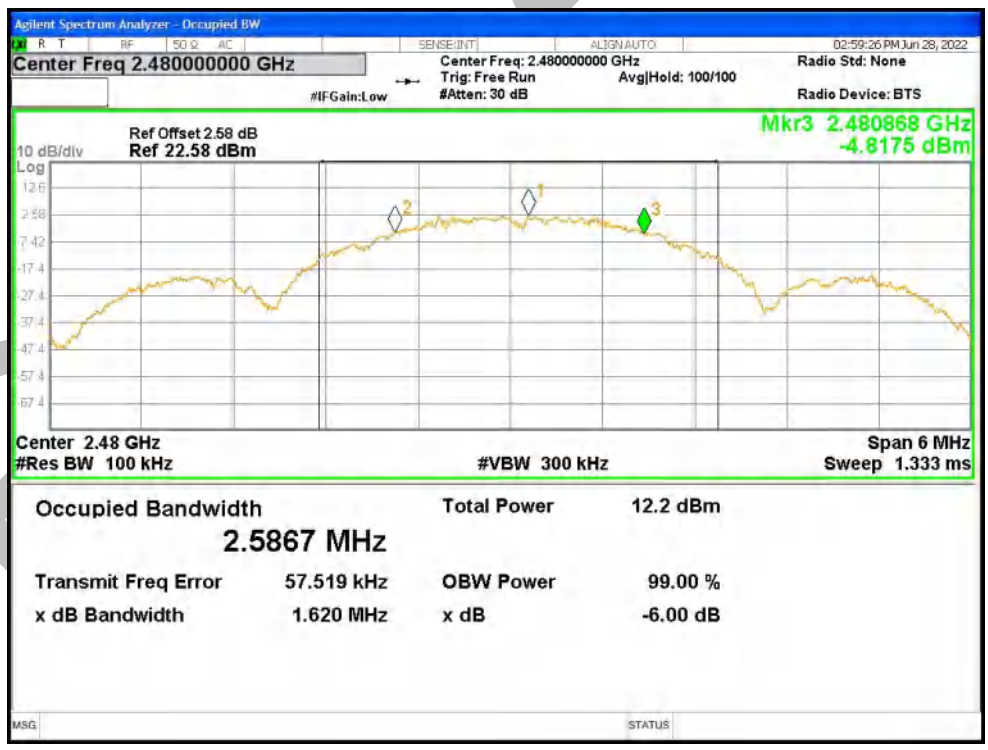
-6dB Bandwidth NVNT ZIGBEE 2405MHz Ant1



-6dB Bandwidth NVNT ZIGBEE 2440MHz Ant1



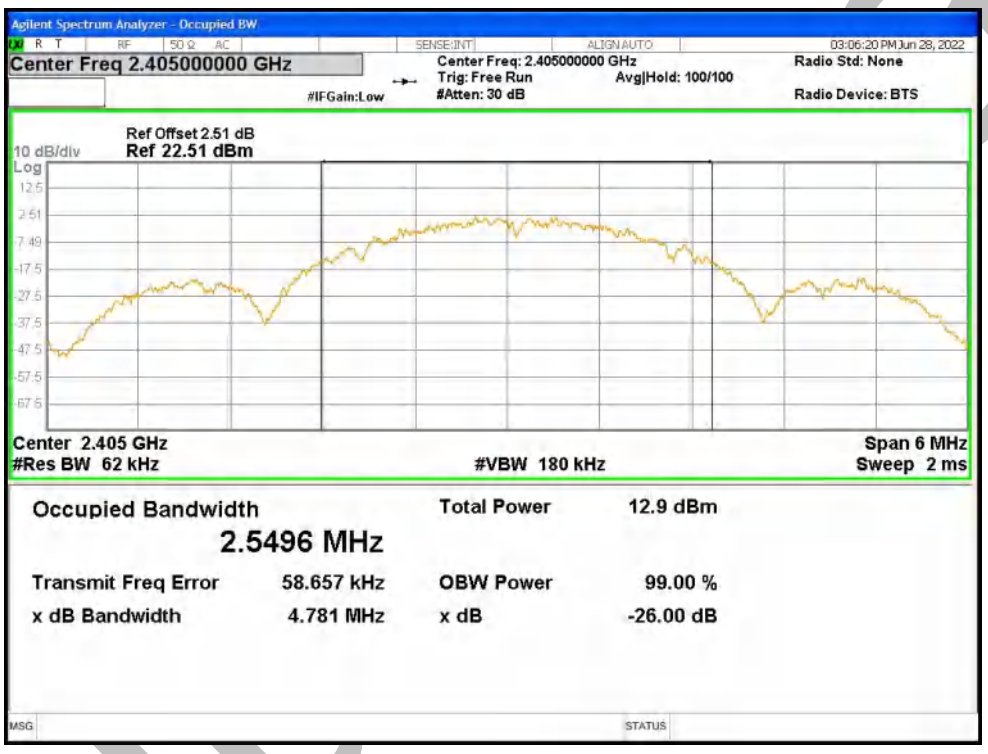
-6dB Bandwidth NVNT ZIGBEE 2480MHz Ant1



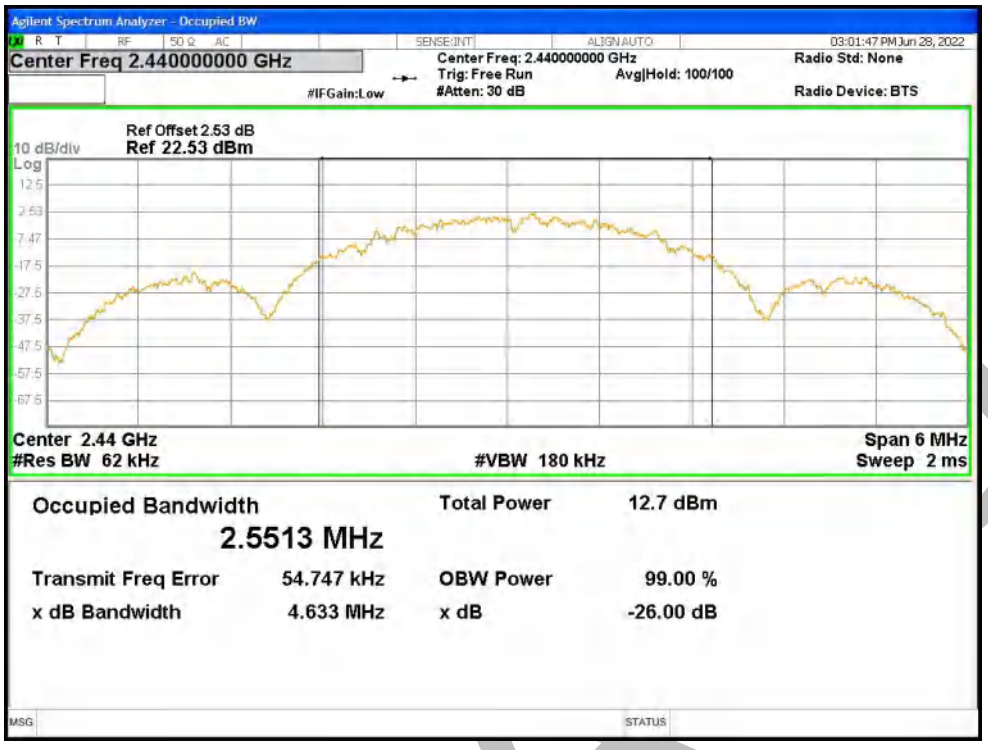
Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	ZIGBEE	2405	Ant1	2.549637811
NVNT	ZIGBEE	2440	Ant1	2.551341256
NVNT	ZIGBEE	2480	Ant1	2.557167469

OBW NVNT ZIGBEE 2405MHz Ant1



OBW NVNT ZIGBEE 2440MHz Ant1



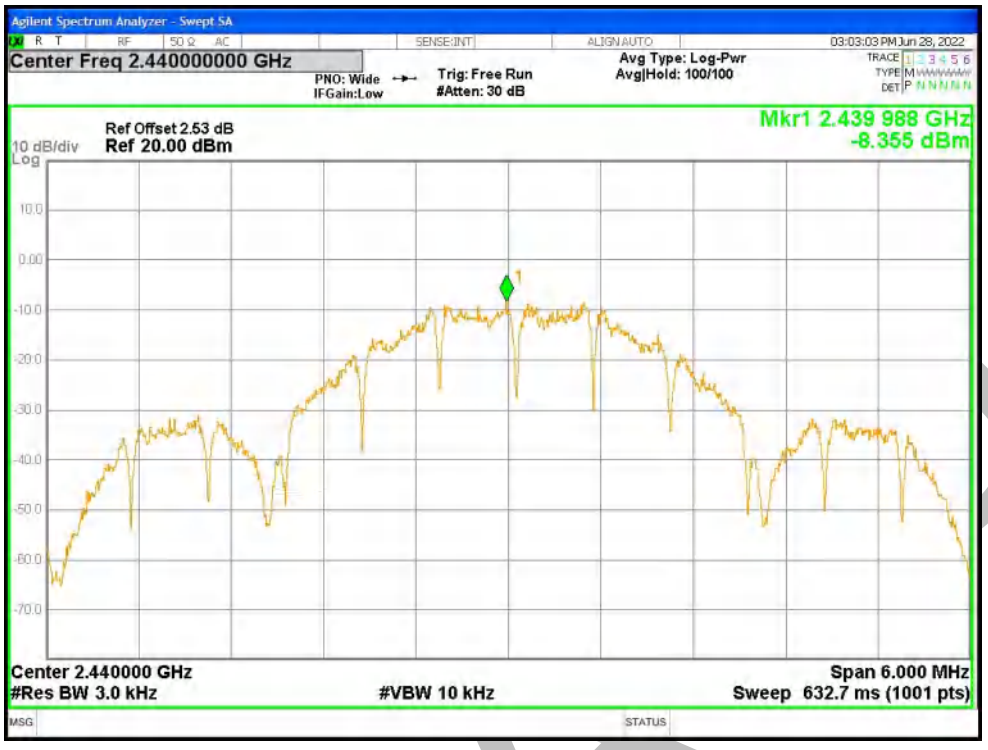
OBW NVNT ZIGBEE 2480MHz Ant1

Maximum Power Spectral Density Level

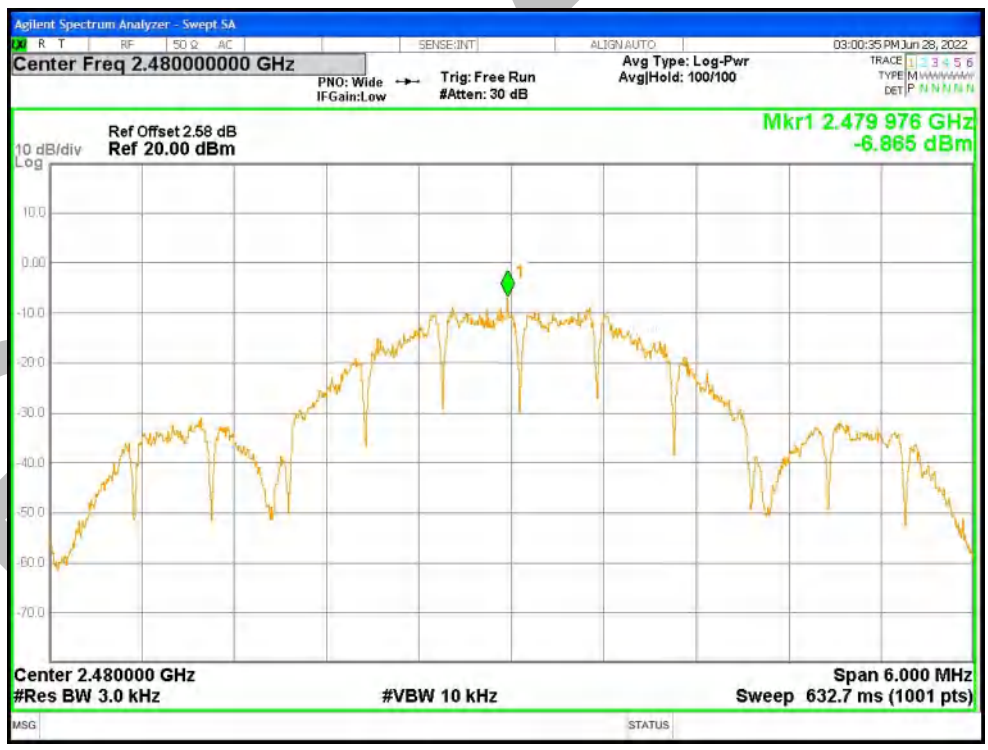
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	ZIGBEE	2405	Ant1	-8.449	8	Pass
NVNT	ZIGBEE	2440	Ant1	-8.355	8	Pass
NVNT	ZIGBEE	2480	Ant1	-6.865	8	Pass

PSD NVNT ZIGBEE 2405MHz Ant1

PSD NVNT ZIGBEE 2440MHz Ant1



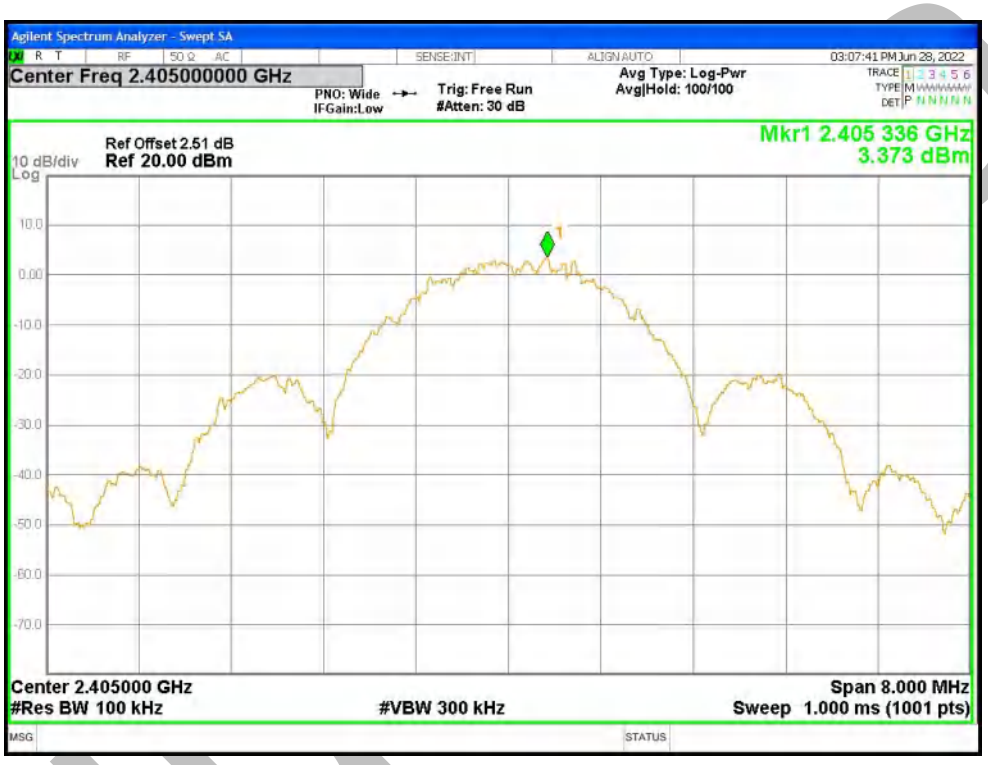
PSD NVNT ZIGBEE 2480MHz Ant1



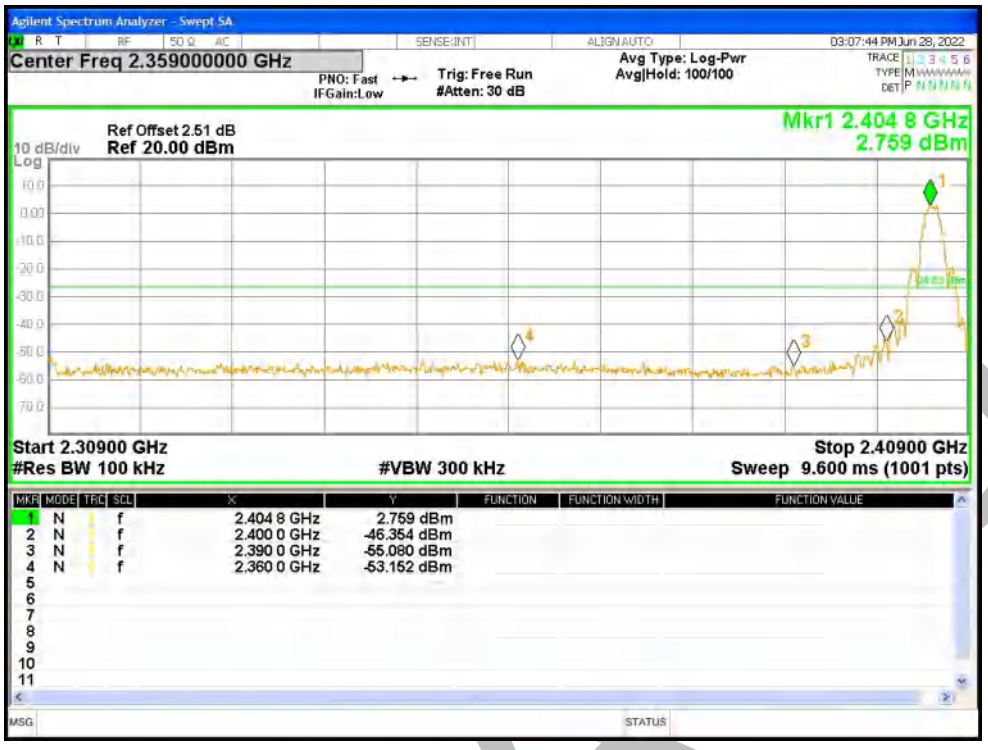
Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	ZIGBEE	2405	Ant1	-56.52	-30	Pass
NVNT	ZIGBEE	2480	Ant1	-43.78	-30	Pass

Band Edge NVNT ZIGBEE 2405MHz Ant1 Ref

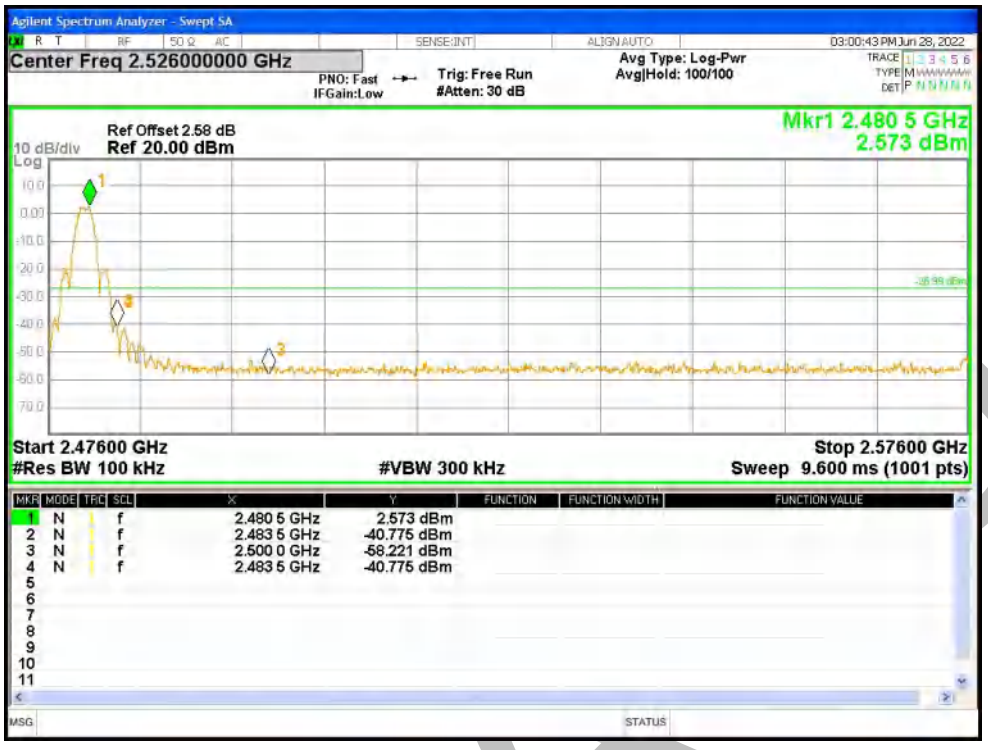


Band Edge NVNT ZIGBEE 2405MHz Ant1 Emission



Band Edge NVNT ZIGBEE 2480MHz Ant1 Ref

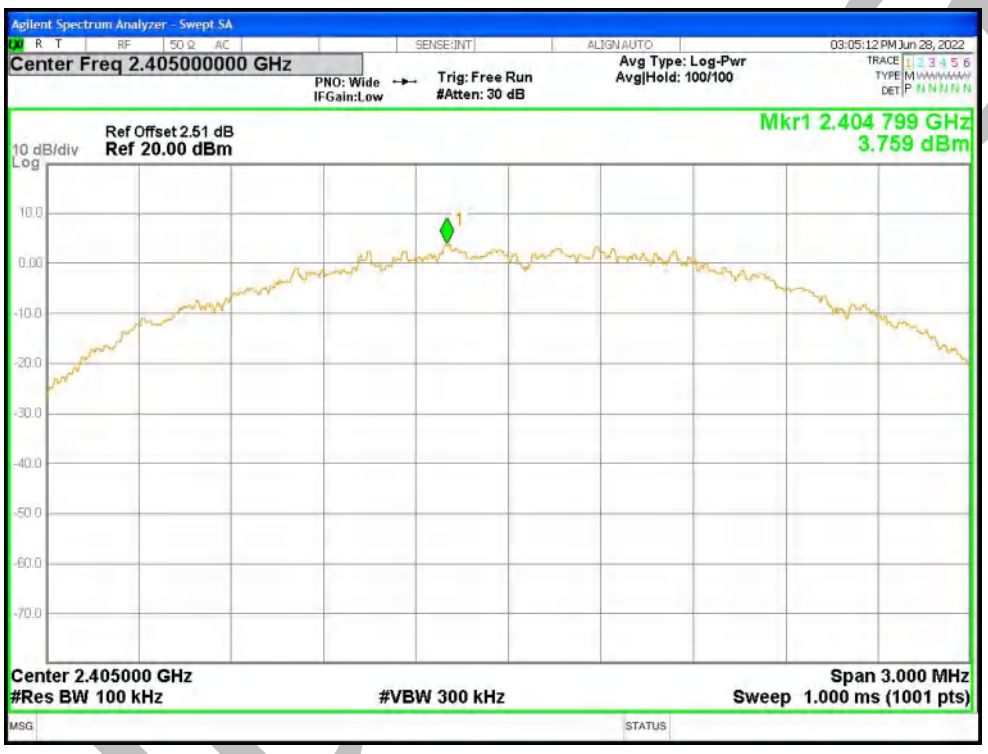
Band Edge NVNT ZIGBEE 2480MHz Ant1 Emission


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.526000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
03:00:43 PM Jun 28, 2022
Ref Offset 2.58 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 5 GHz
2.573 dBm
Start 2.47600 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.57600 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.480 5 GHz 2.573 dBm
2 N 1 f 2.483 5 GHz -40.775 dBm
3 N 1 f 2.500 0 GHz -58.221 dBm
4 N 1 f 2.483 5 GHz -40.775 dBm
MSG
STATUS

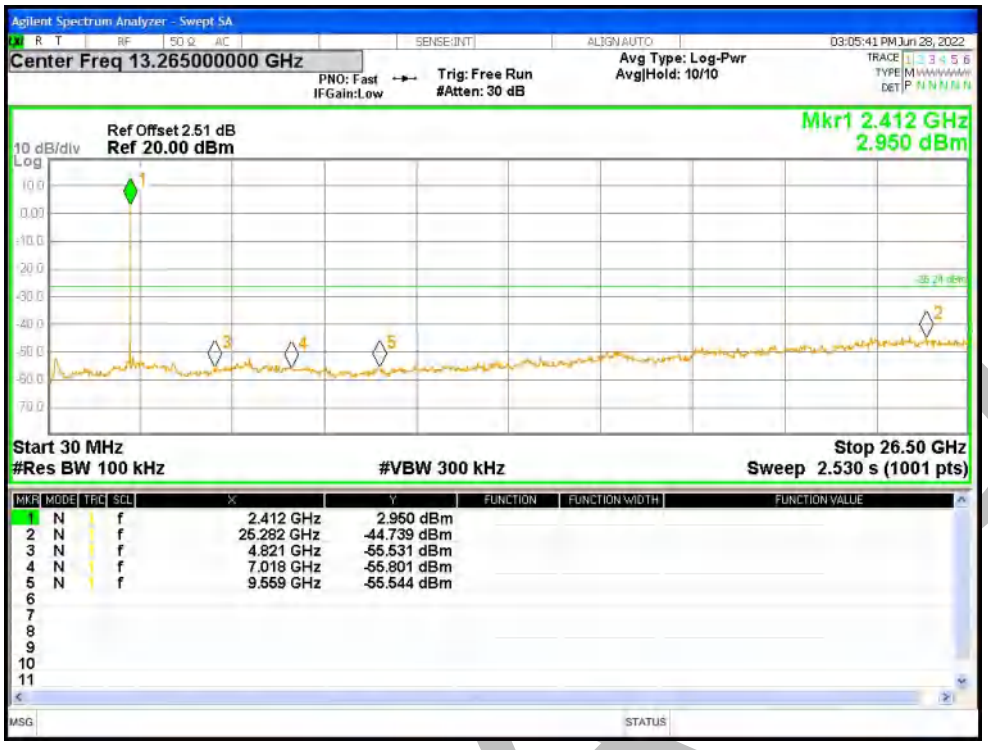
Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	ZIGBEE	2405	Ant1	-48.49	-30	Pass
NVNT	ZIGBEE	2440	Ant1	-47.98	-30	Pass
NVNT	ZIGBEE	2480	Ant1	-47.72	-30	Pass

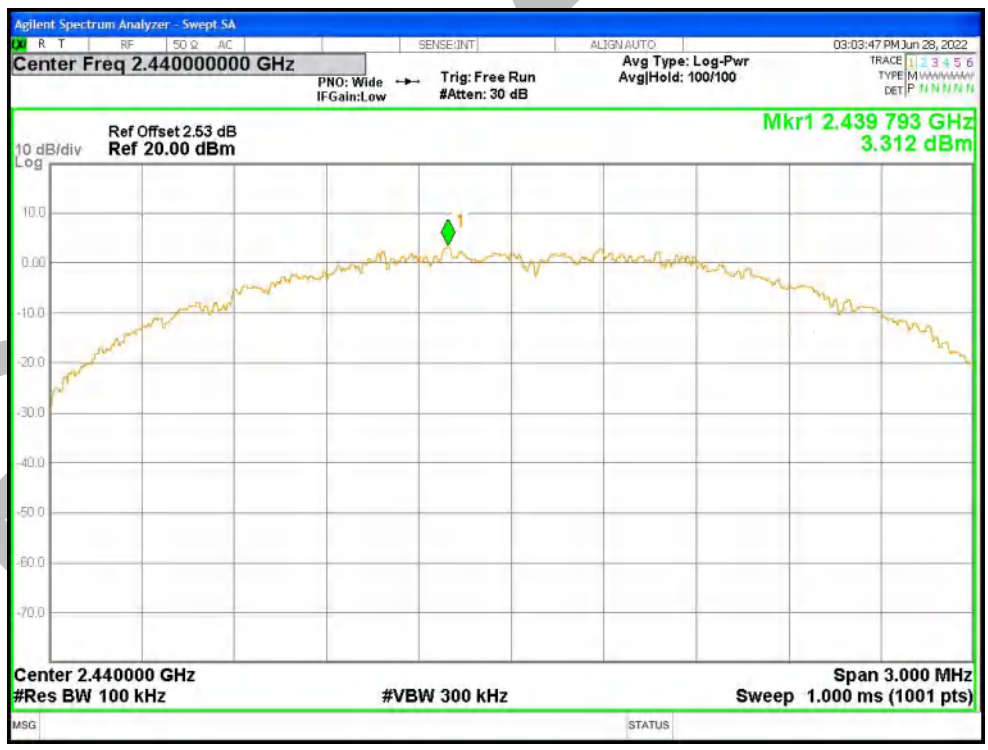
Tx. Spurious NVNT ZIGBEE 2405MHz Ant1 Ref



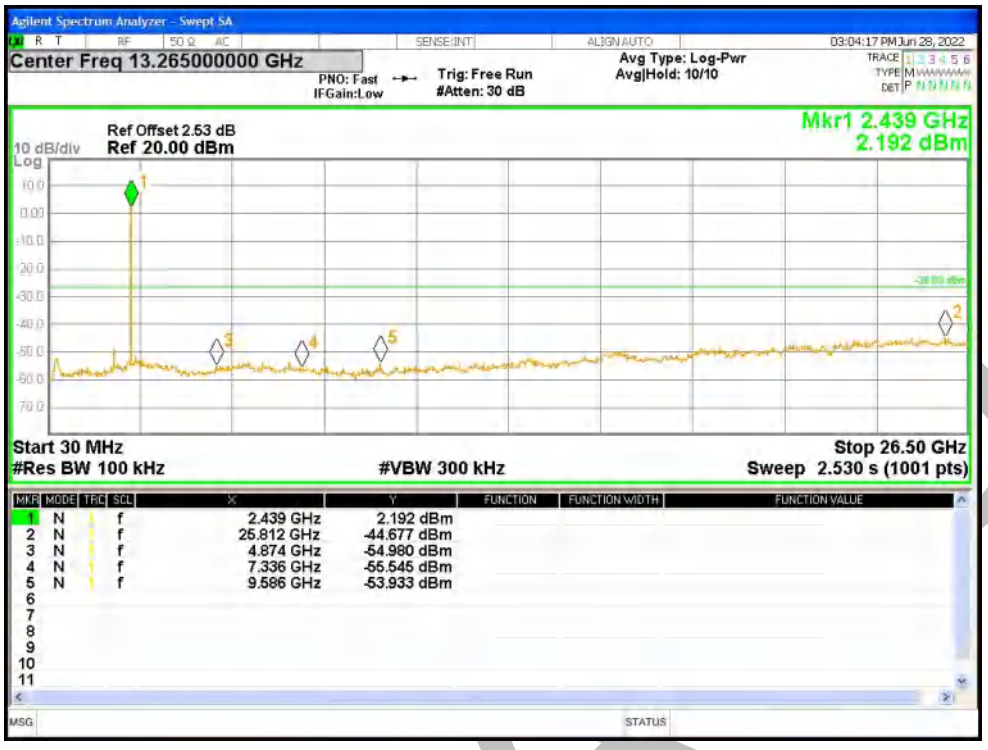
Tx. Spurious NVNT ZIGBEE 2405MHz Ant1 Emission



Tx. Spurious NVNT ZIGBEE 2440MHz Ant1 Ref

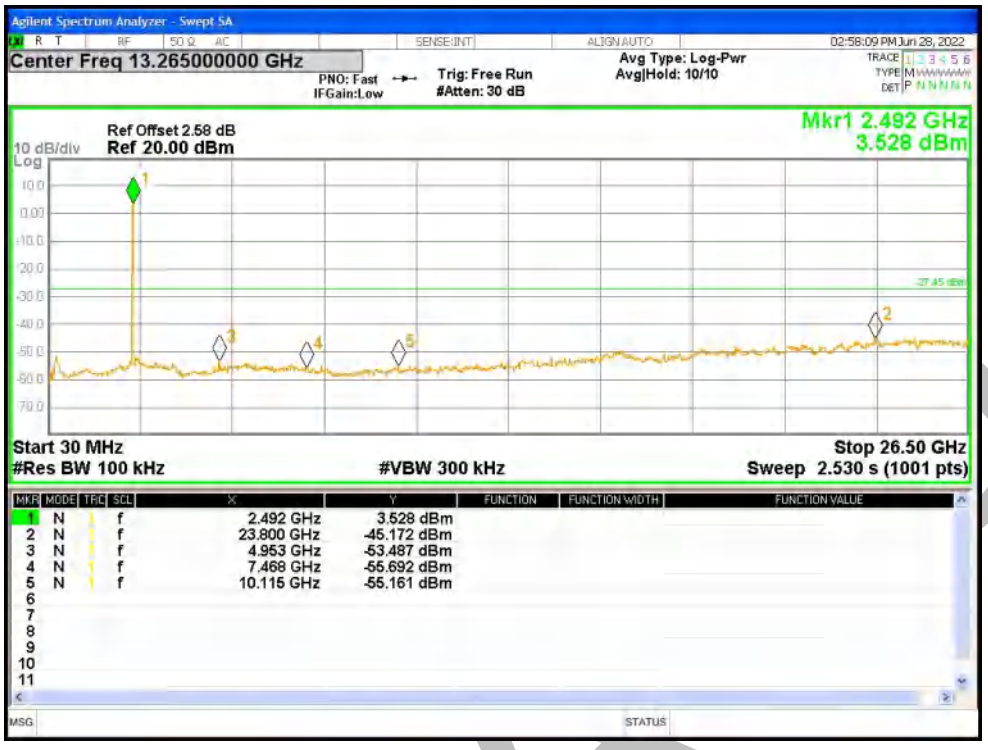


Tx. Spurious NVNT ZIGBEE 2440MHz Ant1 Emission



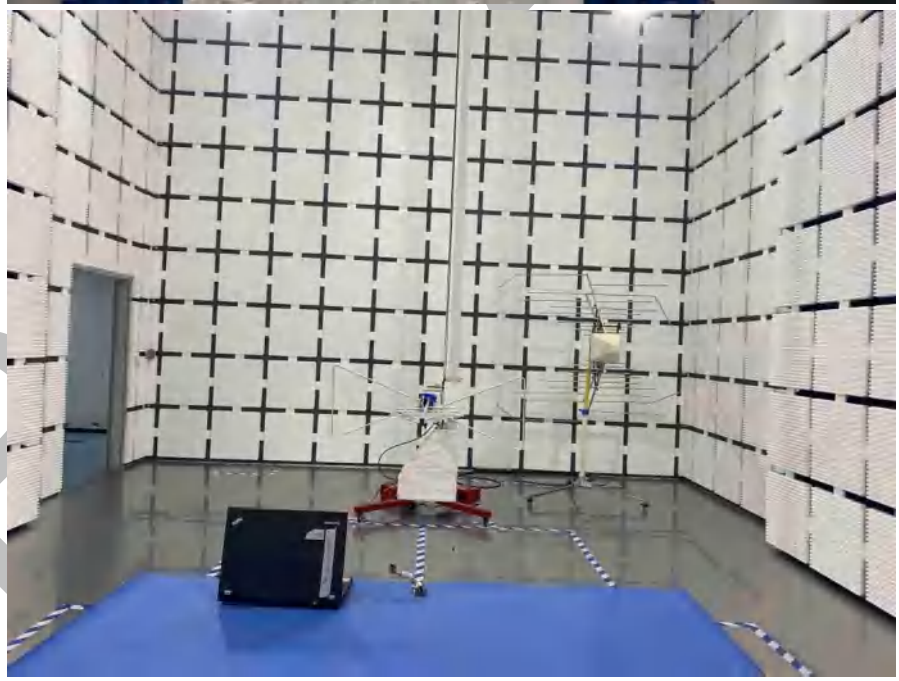
Tx. Spurious NVNT ZIGBEE 2480MHz Ant1 Ref

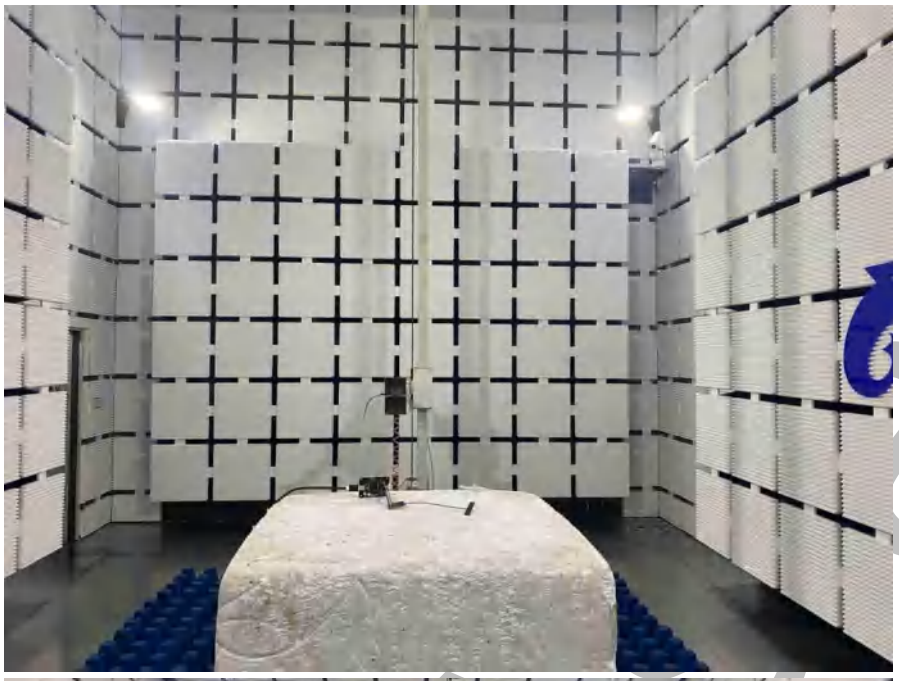
Tx. Spurious NVNT ZIGBEE 2480MHz Ant1 Emission

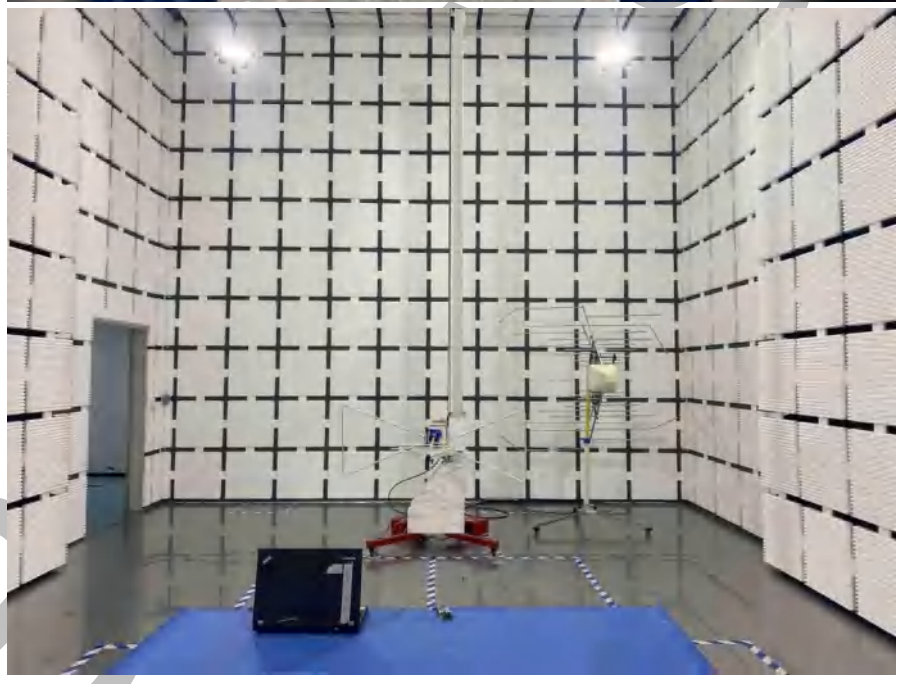

Agilent Spectrum Analyzer - Swept SA
Center Freq 13.265000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
02:58:09 PM Jun 28, 2022
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.492 GHz
3.528 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.530 s (1001 pts)
1 N 1 f 2.492 GHz 3.528 dBm
2 N 1 f 23.800 GHz -45.172 dBm
3 N 1 f 4.953 GHz -53.487 dBm
4 N 1 f 7.468 GHz -55.692 dBm
5 N 1 f 10.115 GHz -55.161 dBm
MSG
STATUS

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

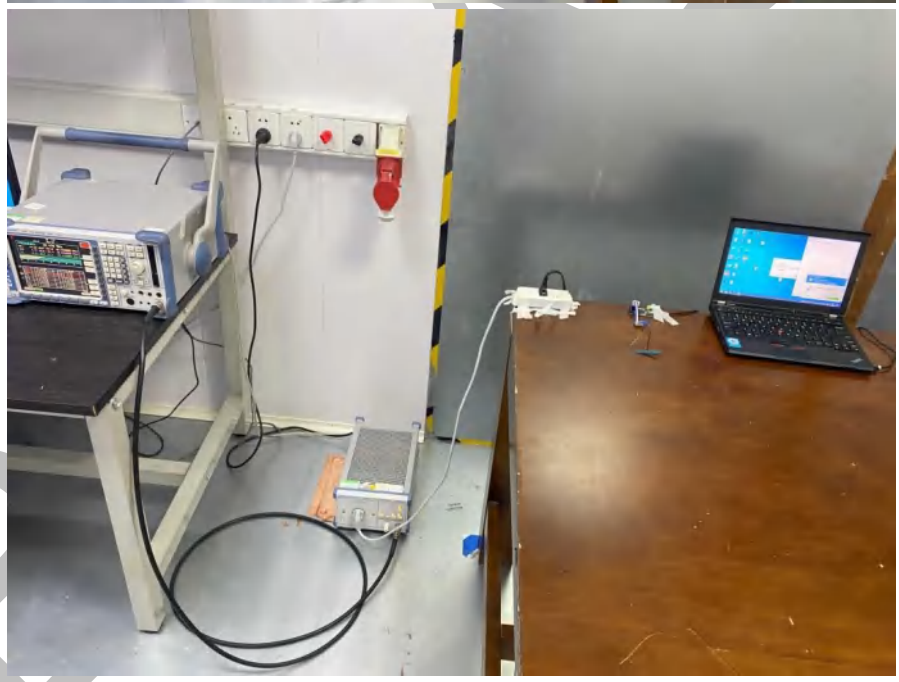
Radiated Spurious Emissions







Conducted Emissions at AC Power Line (150kHz-30MHz)



APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-202203-A4601

----END OF REPORT----