

Product Name: Body Worn Camera	Report No: FCC022022-0616RF5(a)
Product Model: FirstVu PRO	Security Classification: Open
Version: V1.0	Total Page: 48

TIRT Testing Report

Prepared By:	Checked By:	Approved By:	
Stone Tang	Randy Lv	Daniel Chen	
Stone Tang	Randy Lv	Daniel Chen	

RF TEST REPORT

FCC ID: WPZ-FVPRO

According to

47 CFR FCC Part 15, Subpart C(Section 15.247)

ANSI C63.10:2013

Equipment : Body Worn Camera
Model No. : FirstVu PRO
Trademark : Digital Ally
Product No. : 202202180019774
Applicant : Digital Ally, Inc.
14001 Marshall Drive Lenexa, Kansas 66215 United States

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.
- Test Date: 2022.02.07-2022.03.16
- Receipt date: 2022.02.07

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen
Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street,
Pingshan District, Shenzhen, China
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History of this test report

Original Report Issue Date: 2022.04.22

- ☒ No additional attachment
- ☐ Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General Information

1.1 Applicant

Digital Ally, Inc.

14001 Marshall Drive Lenexa, Kansas 66215 United States

1.2 Manufacturer

Digital Ally, Inc.

14001 Marshall Drive Lenexa, Kansas 66215 United States

1.3 Factory

Digital Ally, Inc.

14001 Marshall Drive Lenexa, Kansas 66215 United States

1.4 Basic Description of Equipment Under Test

Items	Description	
Equipment Name	Body Worn Camera	
Model Number	FirstVu PRO	
Trademark	Digital Ally	
Power Supply	Adapter Model: AS1201A-0502000USU Input: 100-240V~50/60Hz 0.35A MAX Output: 5V 2000mA	
	Battery Model: A213A 3.8V 3450mAh 13.11Wh	
Operating Temperature	-30~50℃	
EUT Stage	☐ Product Unit	☒ Final-Sample
Radio Type	BLE	
Modulation Type	GFSK	
Frequency Range	2402-2480 MHz	
Data Rate	1 Mbps	
Number of Operated Channel	40	

40 channels are provided for BLE(1M)

Channel No.	Frequency (MHz)	Channel No.	Frequency
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

1.5 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PIFA	N/A	-1.2

2. Summary of Test Results

2.1 Summary of Test Items

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Test item	FCC Clause	Results	Remarks
AC Power Conducted Emission	15.207	Pass	Meet the requirement of the limit
Radiated Emission and Band Edge Measurement	15.205/15.209 /15.247(d)	Pass	Meet the requirement of the limit
Spurious Emission at Antenna Port	15.247(d)	Pass	Meet the requirement of the limit
6dB Bandwidth	15.247(a)(2)	Pass	Meet the requirement of the limit
Conducted Power	15.247(b)	Pass	Meet the requirement of the limit
Power Spectral Density	15.247(e)	Pass	Meet the requirement of the limit
Antenna Requirements	15.203	Compliance	The EUT has one internal antenna arrangement for WiFi which was permanently attached and the antenna gain is -1.2 dBi, Impedance is 50Ω fulfill the requirement of this section. Please refer to the product photos.
Note: NA denotes Not Applicable in this part			

2.2 Application of Standard

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10:2013

2.3 Test Instruments

No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Receiver	Rohde&Schwarz	ESCI	1166.5950.03	2022/11/16
2	AMN	Rohde&Schwarz	ENV216	3560.6550.05	2022/11/09
3	AMN	Schwarzbeck	NSLK8127	#829	2022/11/09
4	ECSI RF IN RF Cable	Rohde&Schwarz	RP-X1	\	2022/11/18
5	ECSI RF IN RF Cable	Rohde&Schwarz	Sapre sm	\	2022/11/09
6	EMI Receiver	Rohde&Schwarz	ESR7	102013	2022/11/09
7	Spectrum analyzer	Rohde&Schwarz	FSV30	103741	2022/11/09
8	Spectrum analyzer	KEYSIGHT	N9010A-44	MY51440158	2022/11/09
9	Integral Antenna	Schwarzbeck	VULB 9163	VULB 9163-361	2022/11/09
10	Integral Antenna	Schwarzbeck	BBHA 9120D	BBHA 9120D 1201	2022/11/09
11	Integral Antenna	Schwarzbeck	BBHA 9170	9170#685	2022/11/09
12	Preamplifier	CD Systems Inc	PAP-03036-30	85060000	2022/11/09
13	Preamplifier	Schwarzbeck	BBV9721	9721-019	2022/11/09
14	Preamplifier	emci	EMC01264 5SE	980417	2022/11/09
15	ECSI RF IN RF Cable	Rohde&Schwarz	AP-X1	\	2022/11/09
16	Spectrum Analyzer	Agilent	N9010A	MY52221119	2022/11/09
17	Power Collection Unit	Tonscend	JS0806-2	188060134	2022/09/12
18	Tonscend Test System	Tonscend	2.6.77.0518	NA	NA
19	Temp&Humidity Recorder	Anymetre	JR900	NA	2022/11/03

2.4 Test Mode and Channel

Frequency Range : 2402-2480 MHz				
Test Items	Mode	Data Rate	Channel	Antenna
AC Power Conducted Emission	BLE(1M)	1Mbps	01/19/39	1
Radiated Emission and Band Edge Measurement	BLE(1M)	1 Mbps	01/19/39	1
Spurious Emission at Antenna Port	BLE(1M)	1 Mbps	01/19/39	1
6dB Bandwidth	BLE(1M)	1 Mbps	01/19/39	1
Conducted Power	BLE(1M)	1 Mbps	01/19/39	1
Power Spectral Density	BLE(1M)	1 Mbps	01/19/39	1

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Conducted Emission	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
Radiated Emission and Band Edge Measurement	24.2°C, 55 % RH	120Vac, 60Hz	Stone Tang
Spurious Emission at Antenna Port	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
6dB Bandwidth	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
Conducted Power	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang
Power Spectral Density	24.6°C, 56 % RH	120Vac, 60Hz	Stone Tang

The applicant declare the operating environment of EUT as below:

Normal conditions: 3.8V DC ,15~35°C

Extreme conditions:3.6V DC~4.35V DC, -30°C ~50°C

2.6 Duty Cycle of Test Signal

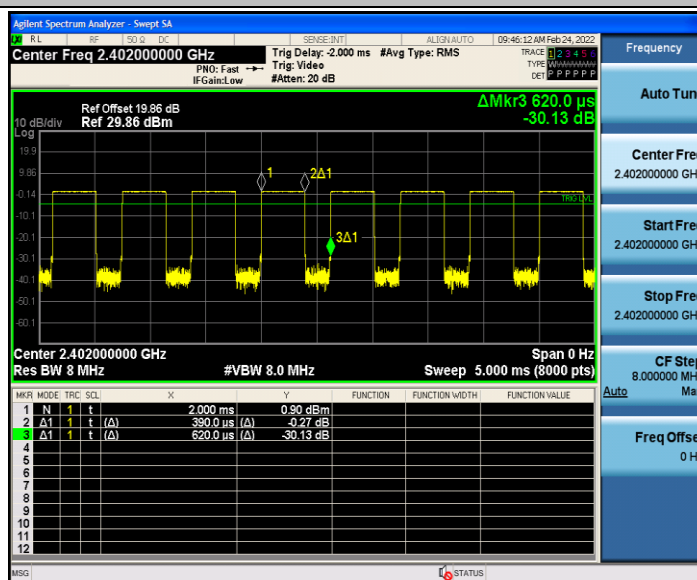
If duty cycle is $\geq 98\%$, duty factor is not required.

If duty cycle is $< 98\%$, duty factor shall be considered.

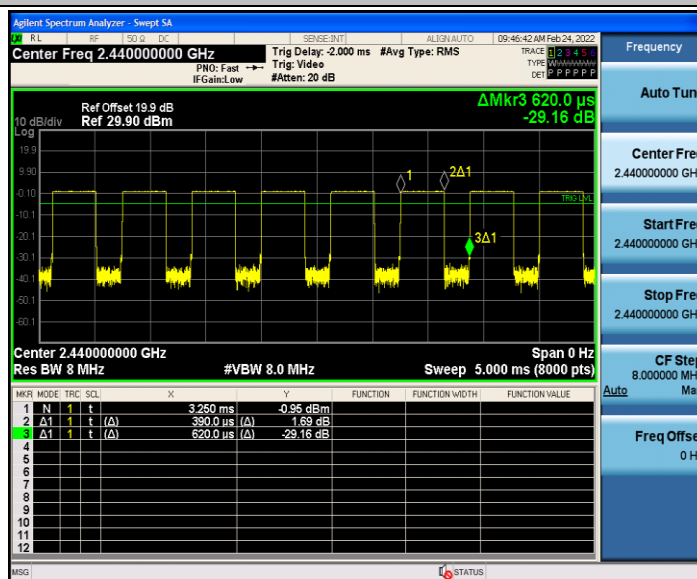
So all the duty factor of other test mode shall be considered.

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Factor
BLE_1M	Ant1	2402	0.39	0.62	62.90	2.01
		2440	0.39	0.62	62.90	2.01
		2480	0.39	0.62	62.90	2.01

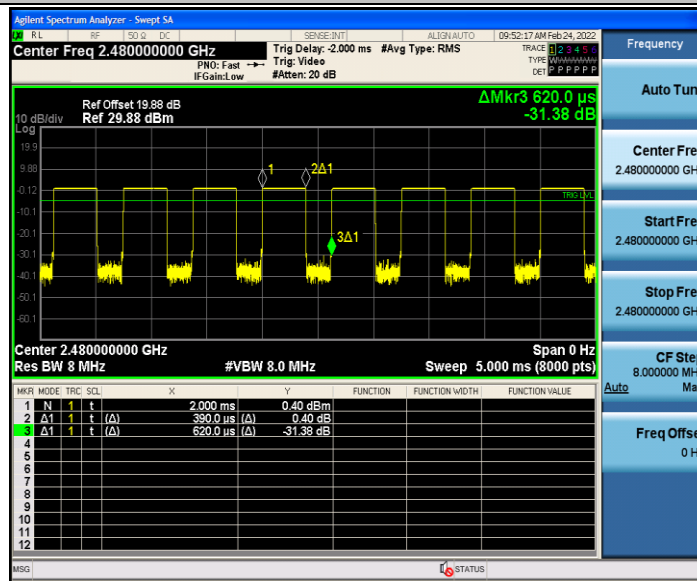
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



2.7 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	± 142.12 KHz
RF power conducted	± 0.74 dB
RF power radiated	± 3.25 dB
Spurious emissions, conducted	± 1.78 dB
Spurious emissions, radiated (30MHz~1GHz)	± 4.6 dB
Spurious emissions, radiated (1GHz ~ 18GHz)	± 4.9 dB
Conduction Emissions(150kHz~30MHz)	± 3.1 dB
Humidity	$\pm 4.6\%$
Temperature	$\pm 0.7^{\circ}\text{C}$
Time	$\pm 1.25\%$

2.8 Test Location

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number	6049.01
Telephone:	+86-0755-27087573

2.9 Deviation from Standards

None

2.10 Abnormalities from Standard Conditions

None

3. Test Procedure And Results

3.1 AC Power Line Conducted Emission

3.1.1 Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

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

3.1.2 Test Peripherals

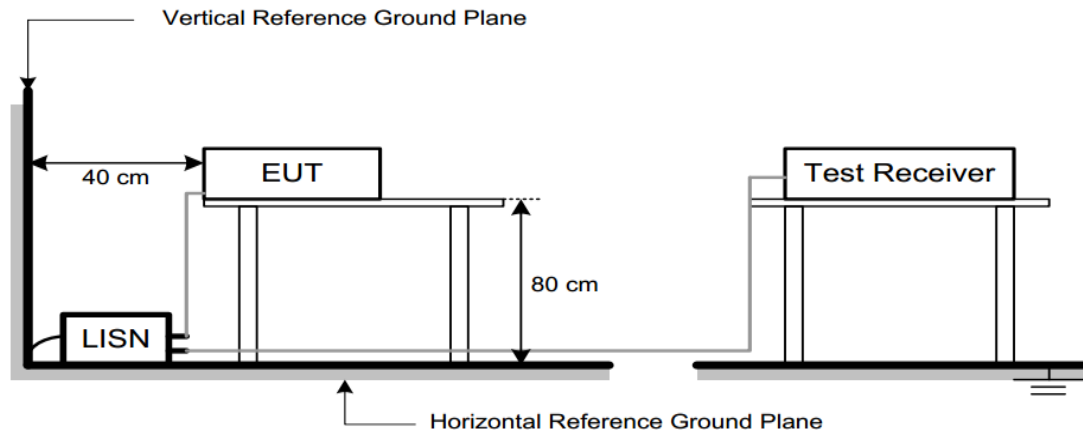
Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	AWM	E101344	0.9m, No Shielding
2	Adaptor	FUSHIGANG	AS1201A-0502000 USU	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.1.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☐ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

3.1.4 Test Setup



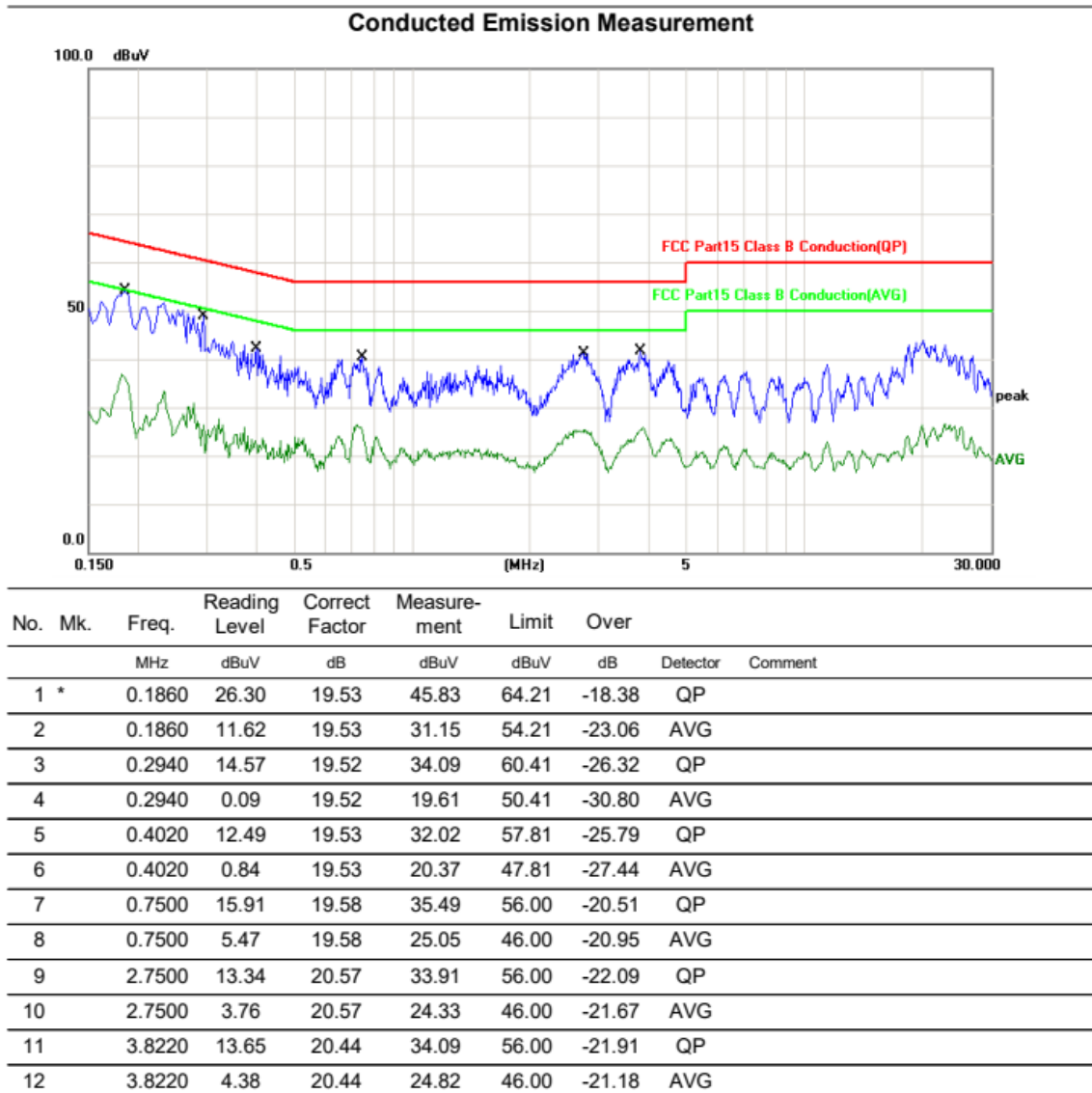
3.1.5 Test Result

Note:

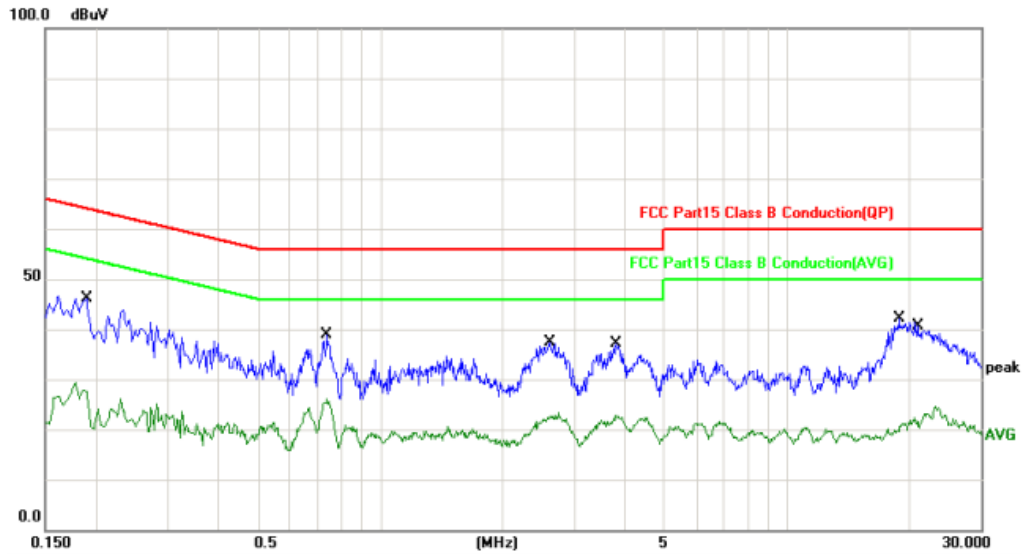
1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement - Limit

150kHz~30MHz	Worst Case Operating Mode: CH0
--------------	--------------------------------

Line



Conducted Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	11.62	19.70	31.32	64.04	-32.72	QP	
2		0.1900	-1.07	19.70	18.63	54.04	-35.41	AVG	
3		0.7420	12.61	19.80	32.41	56.00	-23.59	QP	
4	*	0.7420	5.55	19.80	25.35	46.00	-20.65	AVG	
5		2.6100	7.78	20.52	28.30	56.00	-27.70	QP	
6		2.6100	0.68	20.52	21.20	46.00	-24.80	AVG	
7		3.8020	9.05	20.28	29.33	56.00	-26.67	QP	
8		3.8020	1.76	20.28	22.04	46.00	-23.96	AVG	
9		18.9140	12.29	20.41	32.70	60.00	-27.30	QP	
10		18.9140	-0.68	20.41	19.73	50.00	-30.27	AVG	
11		20.9340	8.09	20.35	28.44	60.00	-31.56	QP	
12		20.9340	-1.26	20.35	19.09	50.00	-30.91	AVG	

3.2 Radiated Emission and Band Edge

3.2.1 Limit

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency (MHz)	Distance Meters(m)	Field Strength Limit	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 – 0.49	300	2400/F(kHz)	-
0.490 – 1.705	30	24000/F(kHz)	-
1.705 – 30	30	30	-
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note: (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	AWM	E101344	0.9m, No Shielding
2	Adaptor	FUSHIGANG	AS1201A-0502000 USU	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

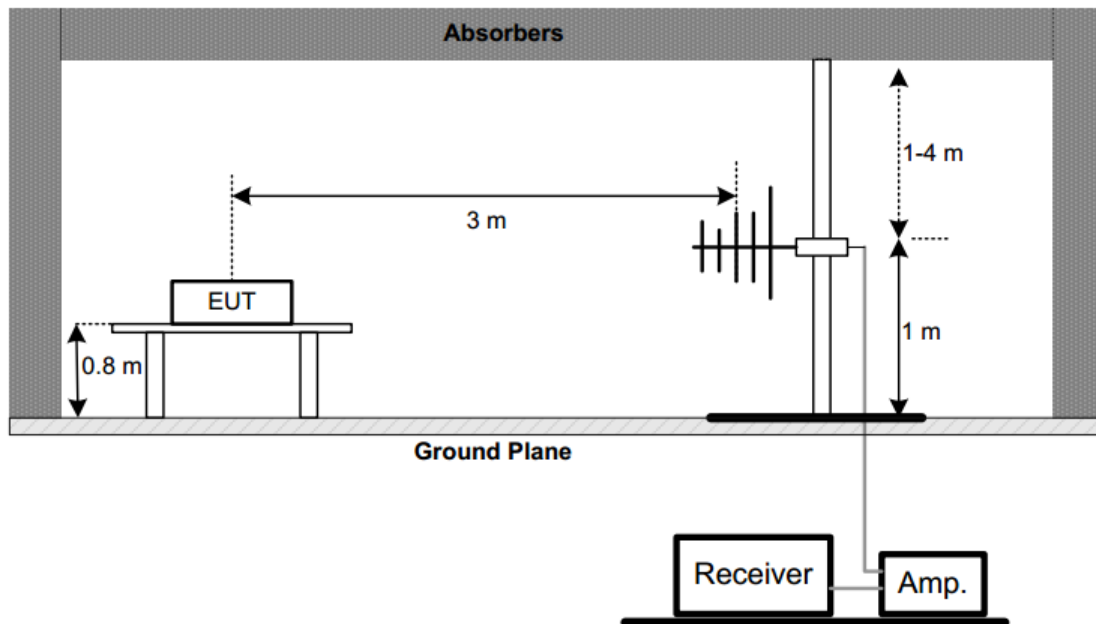
3.2.3 Test Procedure

Test Method	
☐ Conducted Measurement	☒ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

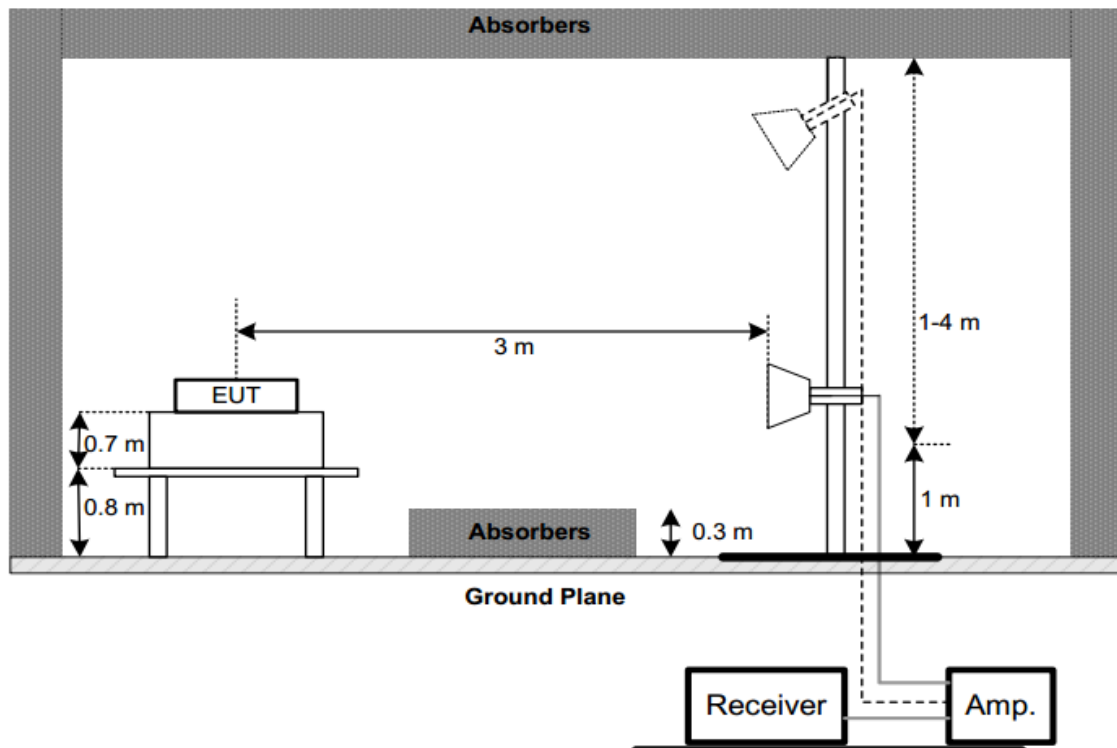
- a) The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b) The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c) The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e) The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- f) The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g) All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1 GHz)
- h) All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1 GHz)
- i) For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.2.4 Test Setup

(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



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



3.2.5 Test Result

1) Radiated emission: 9KHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

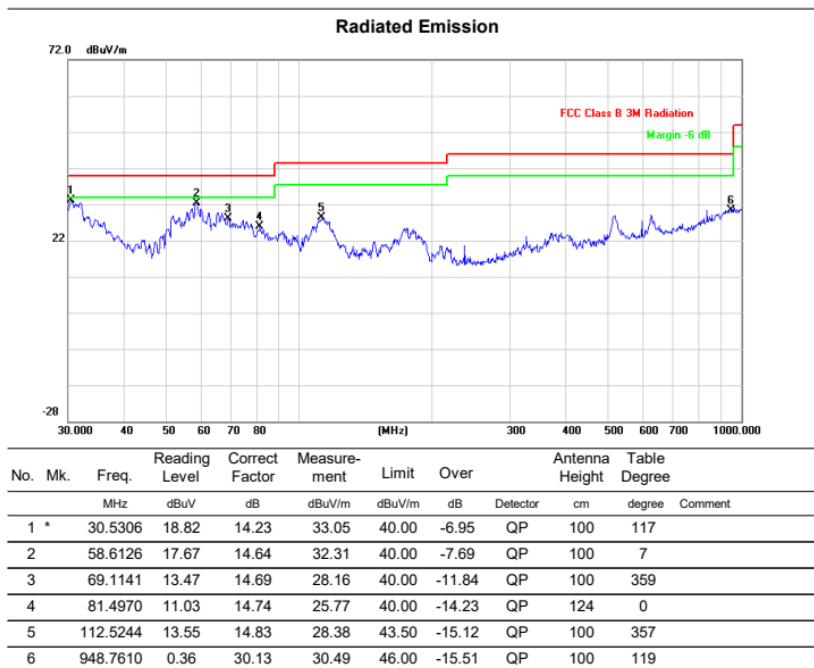
2) Radiated emission: 30MHz-1G

Note:

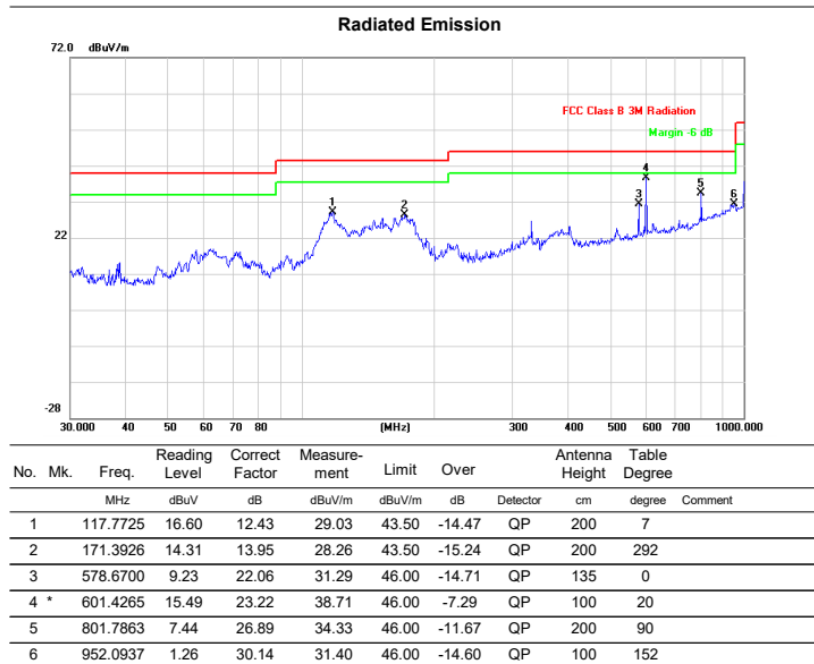
1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

Below 1G (30MHz~1GHz)	Test mode:BLE_1M	Test Channel:19
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VERTICAL



HORIZONTAL



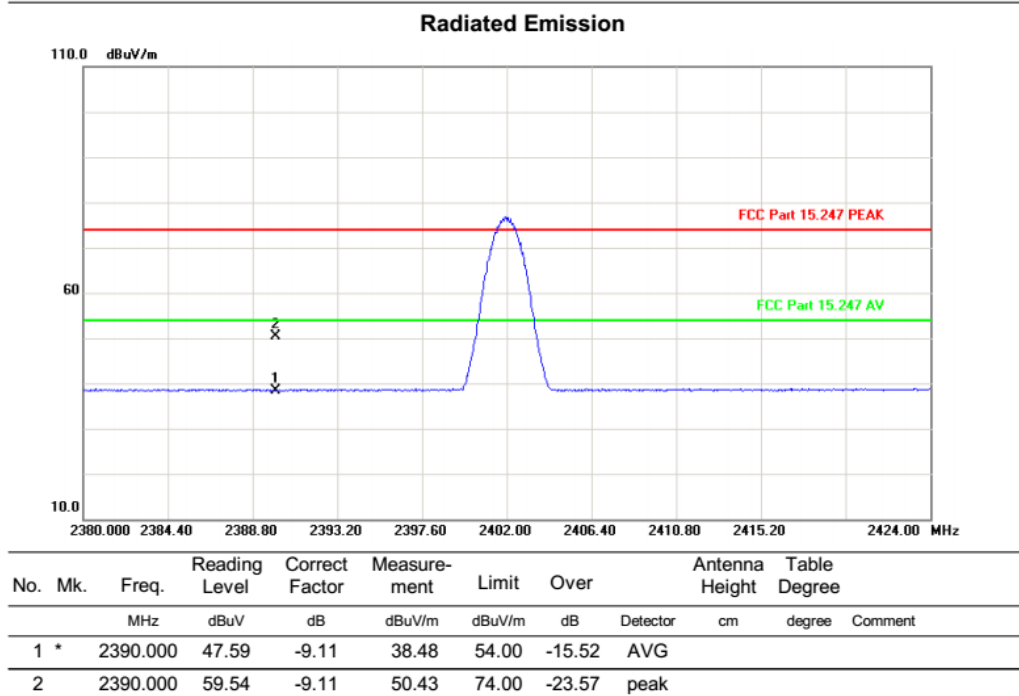
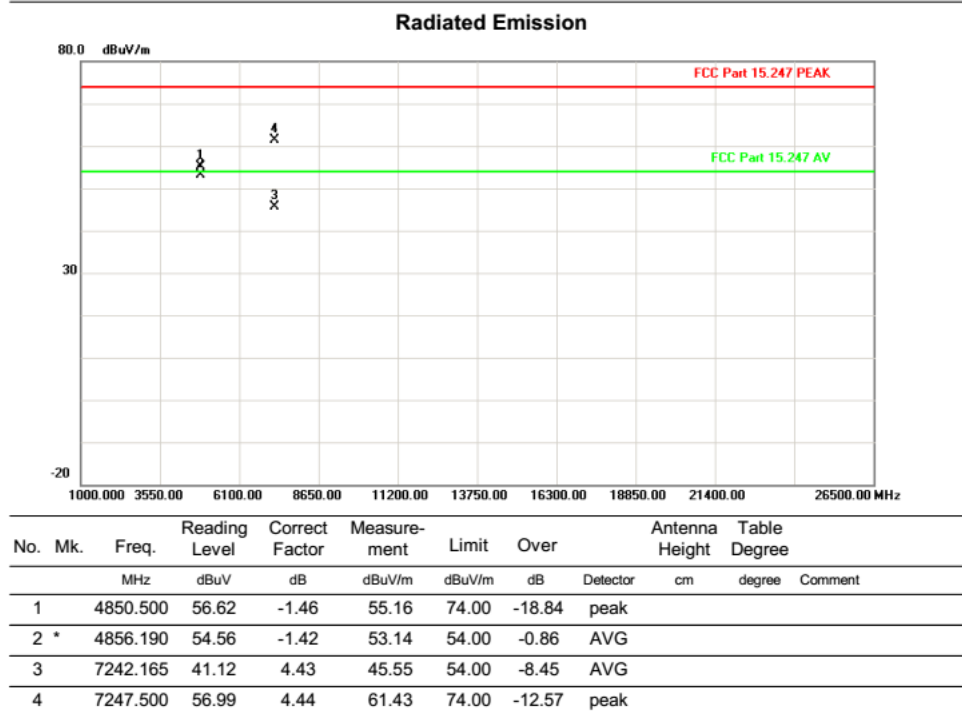
3) Radiated emission: Above 1G

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

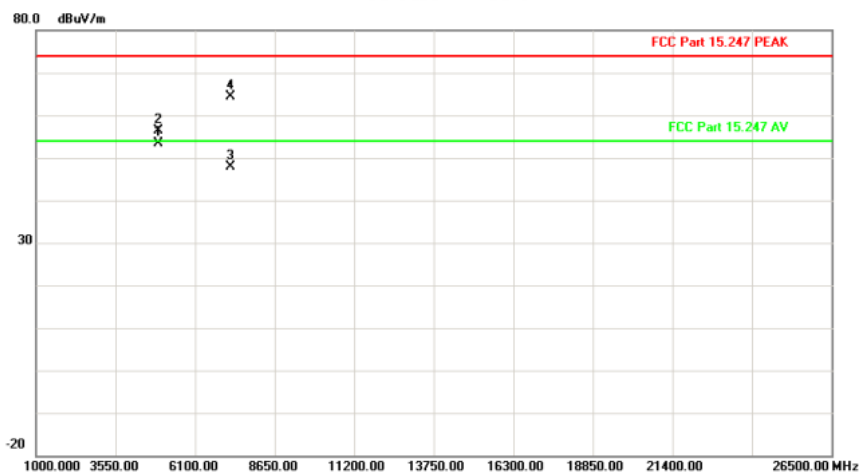
Above 1G (1GHz~26.5GHz)	Test mode:BLE_1M	Test Channel:0
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VERTICAL



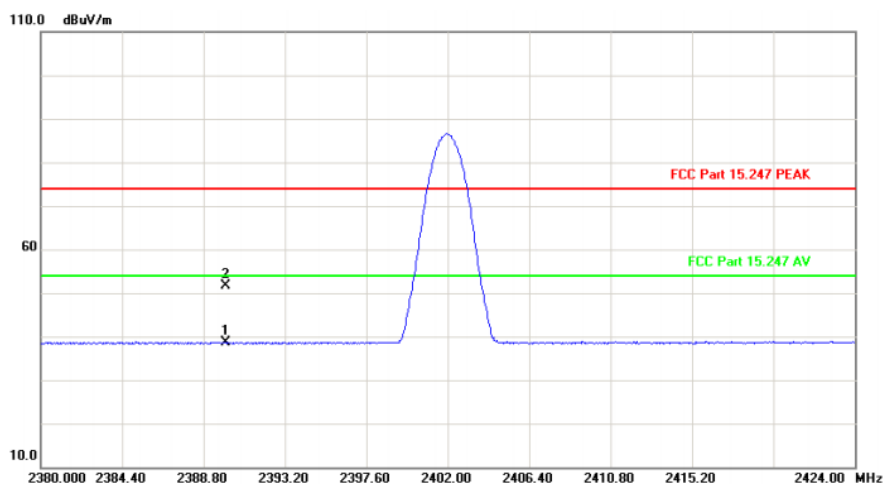
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	4912.210	54.51	-1.07	53.44	54.00	-0.56	AVG		
2		4927.000	57.40	-0.97	56.43	74.00	-17.57	peak		
3		7242.600	43.53	4.43	47.96	54.00	-6.04	AVG		
4		7247.500	60.03	4.44	64.47	74.00	-9.53	peak		

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2390.000	47.68	-9.11	38.57	54.00	-15.43	AVG		
2		2390.000	60.78	-9.11	51.67	74.00	-22.33	peak		

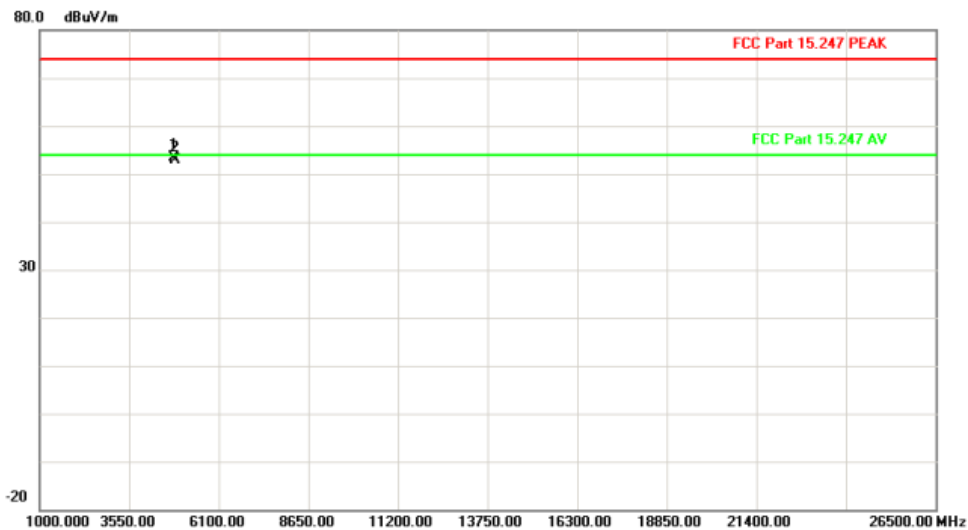
Above 1G (1GHz~26.5GHz)

Test mode:BLE_1M

Test Channel:19

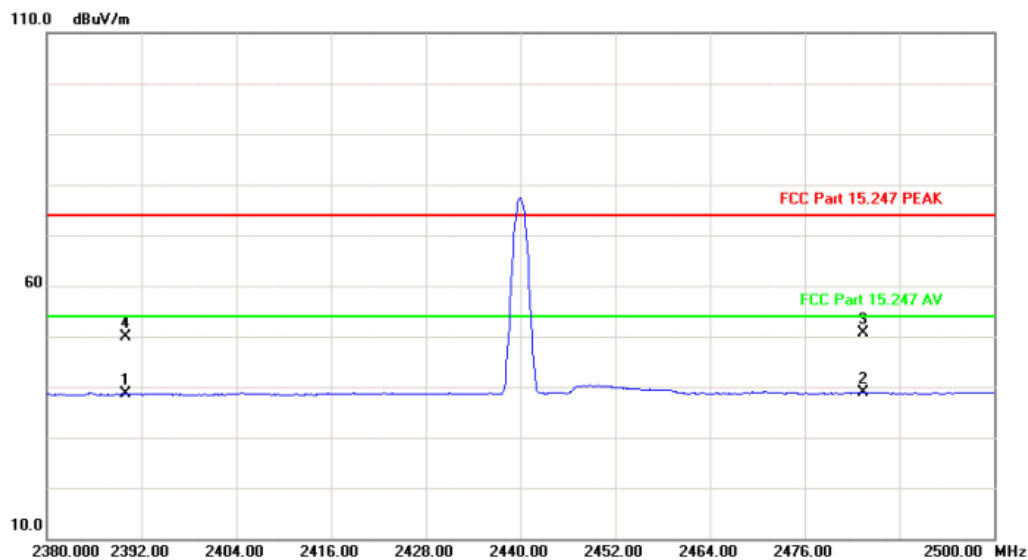
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4825.000	55.11	-1.62	53.49	74.00	-20.51	peak		
2 *		4856.270	54.42	-1.42	53.00	54.00	-1.00	AVG		

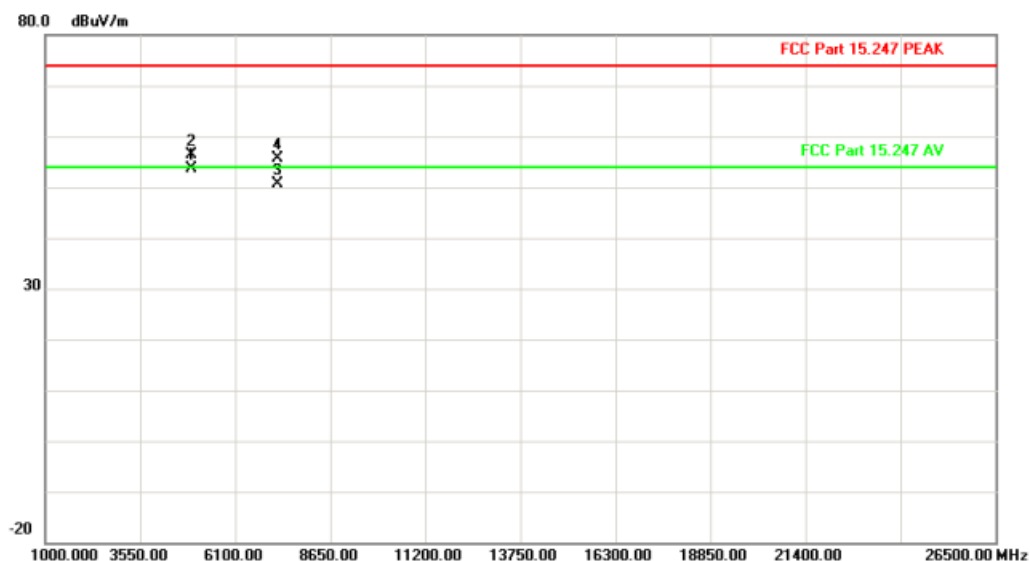
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2390.000	47.66	-9.11	38.55	54.00	-15.45	AVG		
2 *		2483.500	47.96	-9.08	38.88	54.00	-15.12	AVG		
3		2483.500	59.59	-9.08	50.51	74.00	-23.49	peak		
4		2390.000	59.09	-9.11	49.98	74.00	-24.02	peak		

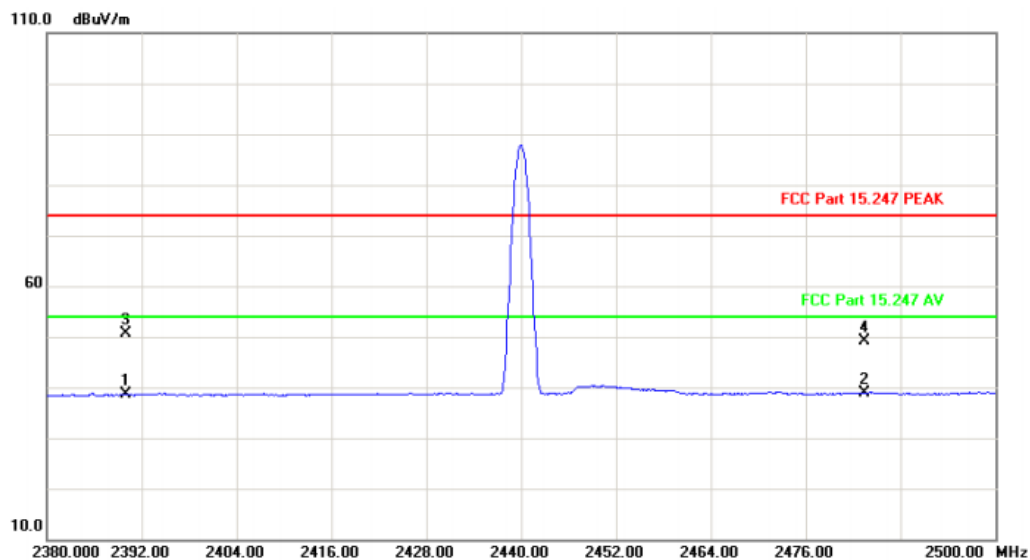
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	4912.210	54.76	-1.07	53.69	54.00	-0.31	AVG		
2		4927.000	57.30	-0.97	56.33	74.00	-17.67	peak		
3		7242.165	46.09	4.43	50.52	54.00	-3.48	AVG		
4		7247.500	51.10	4.44	55.54	74.00	-18.46	peak		

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2390.000	47.73	-9.11	38.62	54.00	-15.38	AVG		
2	*	2483.500	47.95	-9.08	38.87	54.00	-15.13	AVG		
3		2390.000	59.83	-9.11	50.72	74.00	-23.28	peak		
4		2483.500	58.30	-9.08	49.22	74.00	-24.78	peak		

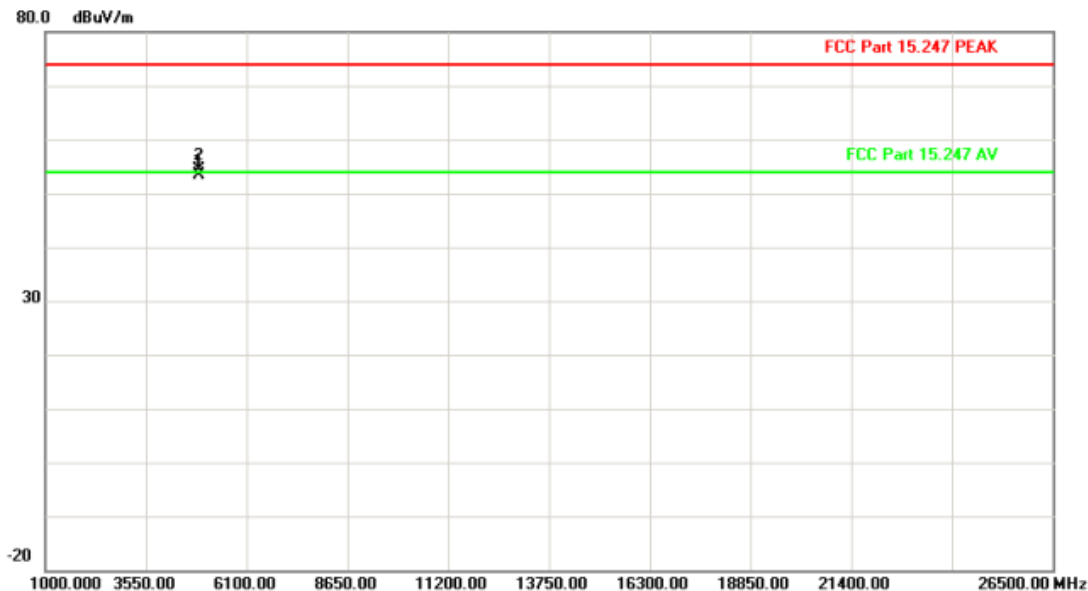
Above 1G (1GHz~26.5GHz)

Test mode:BLE_1M

Test Channel:39

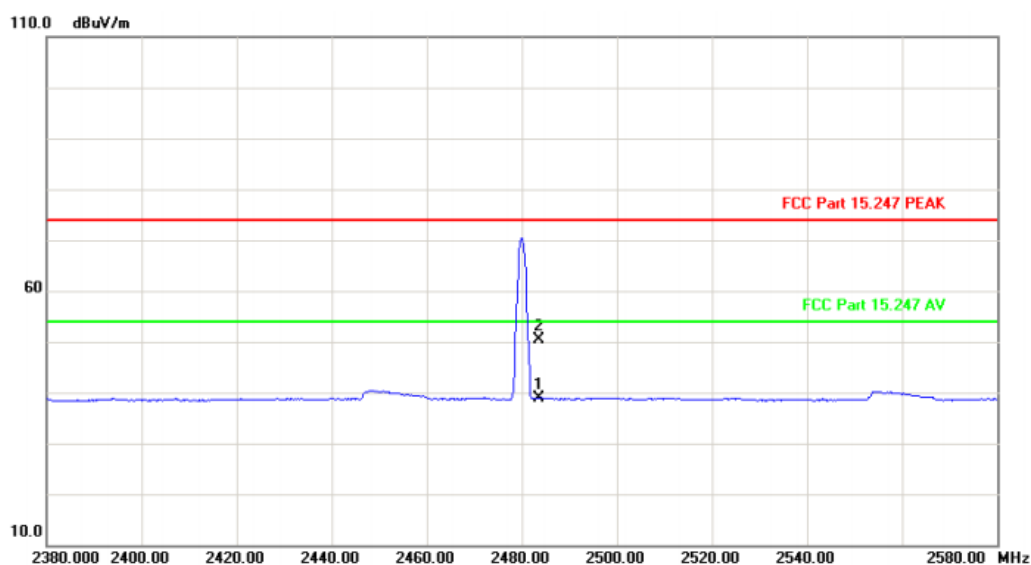
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	4888.210	54.57	-1.22	53.35	54.00	-0.65	AVG		
2		4901.500	55.62	-1.14	54.48	74.00	-19.52	peak		

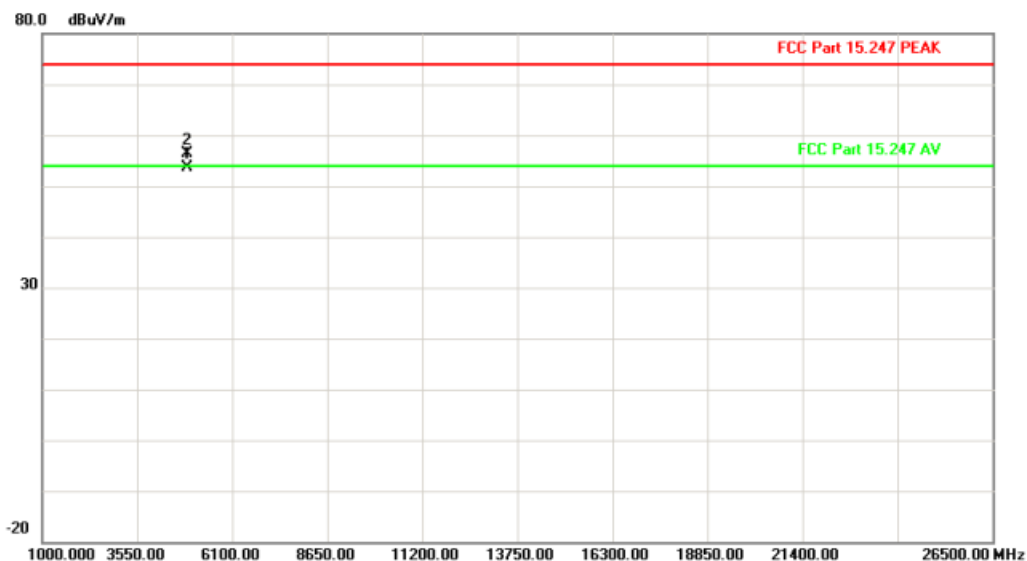
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	47.98	-9.08	38.90	54.00	-15.10	AVG		
2		2483.500	59.56	-9.08	50.48	74.00	-23.52	peak		

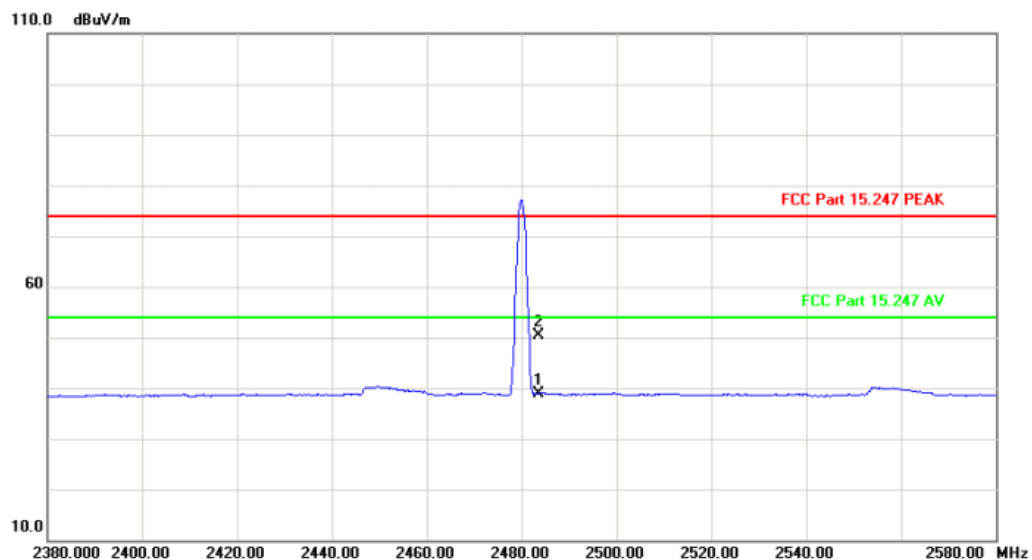
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	4896.365	54.81	-1.17	53.64	54.00	-0.36	AVG		
2		4901.500	57.47	-1.14	56.33	74.00	-17.67	peak		

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	48.08	-9.08	39.00	54.00	-15.00	AVG		
2		2483.500	59.48	-9.08	50.40	74.00	-23.60	peak		

3.3 Spurious Emission at Antenna Port

3.3.1 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 Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

3.3.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	AWM	E101344	0.9m, No Shielding
2	Adaptor	FUSHIGANG	AS1201A-0502000 USU	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.3.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b) Spectrum Setting as below:

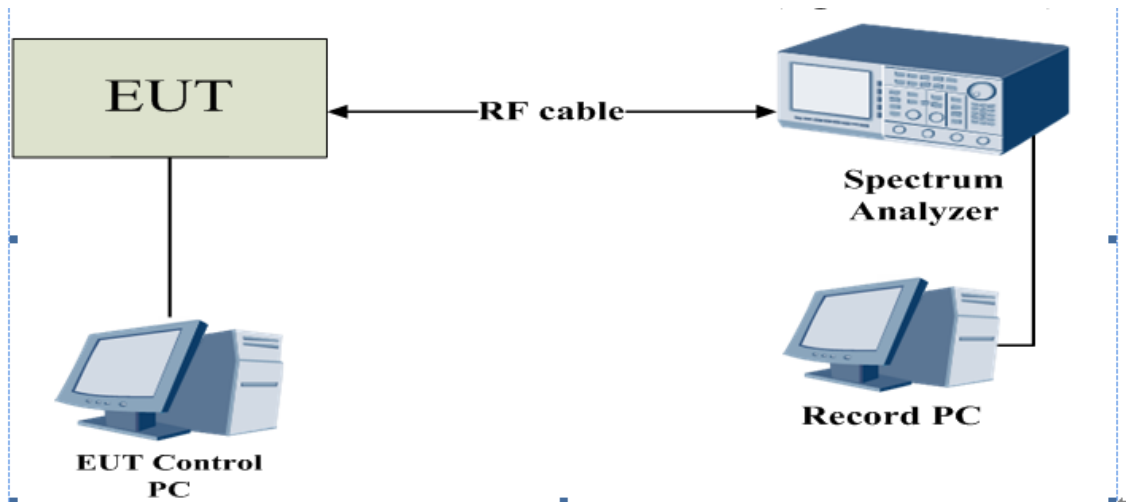
Centre Frequency	The centre frequency of the channel under test
RBW	100 kHz
VBW	300 kHz
Frequency span	2 x Nominal Channel Bandwidth
Detector Mode	Peak

Trace Mode	Max Hold
Sweep Time	Auto Couple

Allow trace to full stabilize.

c) Use the peak marker function to determine the maximum power level in any 100kHz band segment within the fundamental EBW.

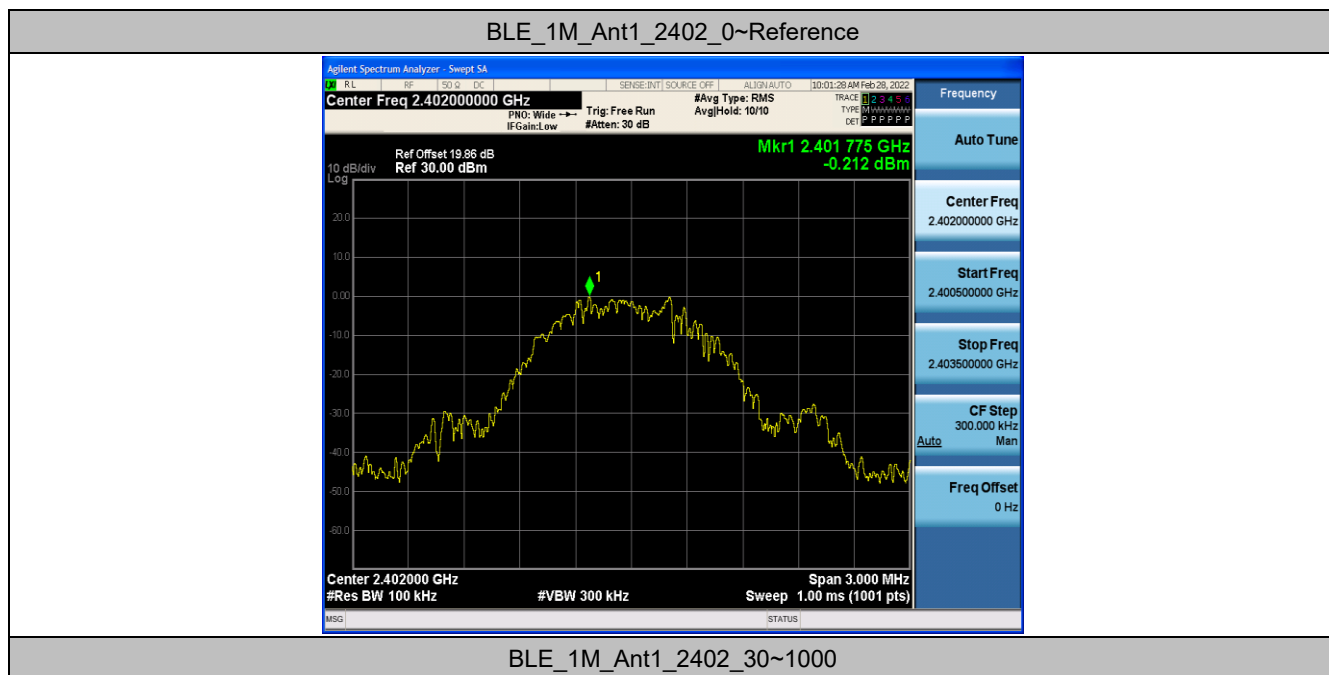
3.3.4 Test Setup

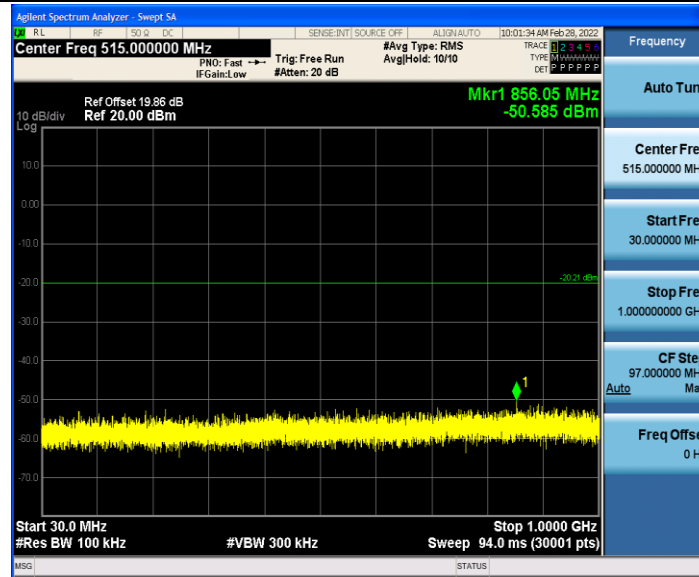


3.3.5 The Result

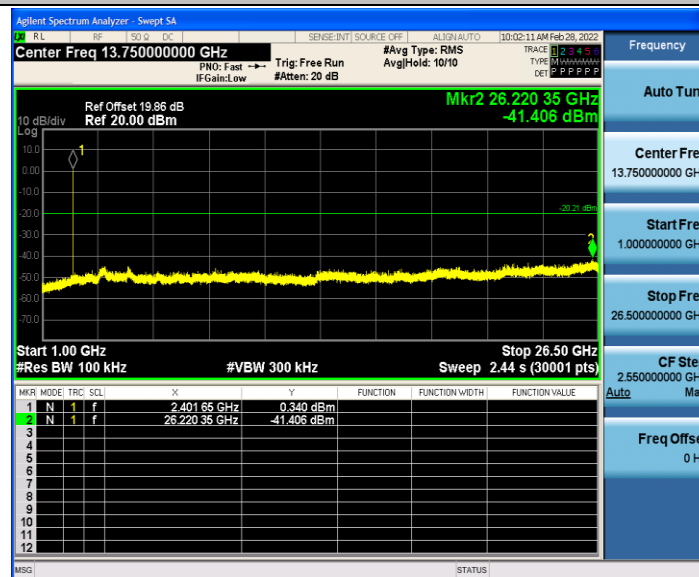
3.3.5.1. Conducted Spurious Emission

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-0.21	-0.21	---	PASS
			30~1000	-0.21	-50.59	≤ -20.21	PASS
			1000~26500	-0.21	-41.41	≤ -20.21	PASS
		2440	Reference	-1.65	-1.65	---	PASS
			30~1000	-1.65	-51.28	≤ -21.65	PASS
			1000~26500	-1.65	-42.12	≤ -21.65	PASS
		2480	Reference	-0.46	-0.46	---	PASS
			30~1000	-0.46	-51.9	≤ -20.46	PASS
			1000~26500	-0.46	-41.05	≤ -20.46	PASS





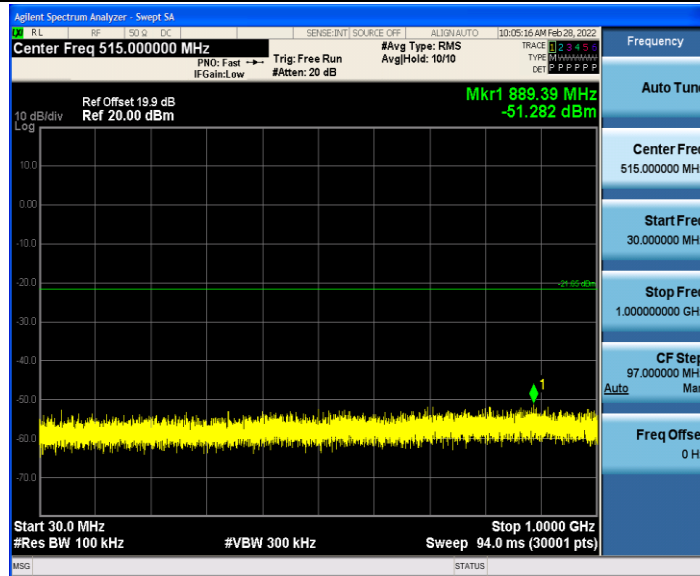
BLE_1M_Ant1_2402_1000~26500



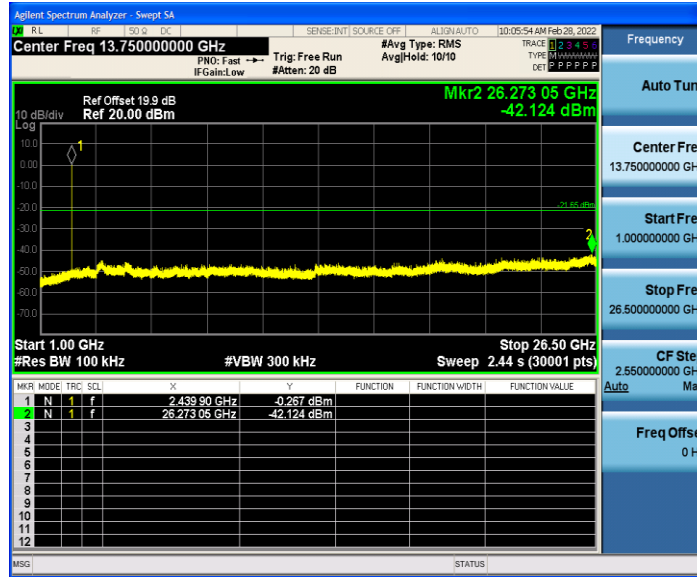
BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



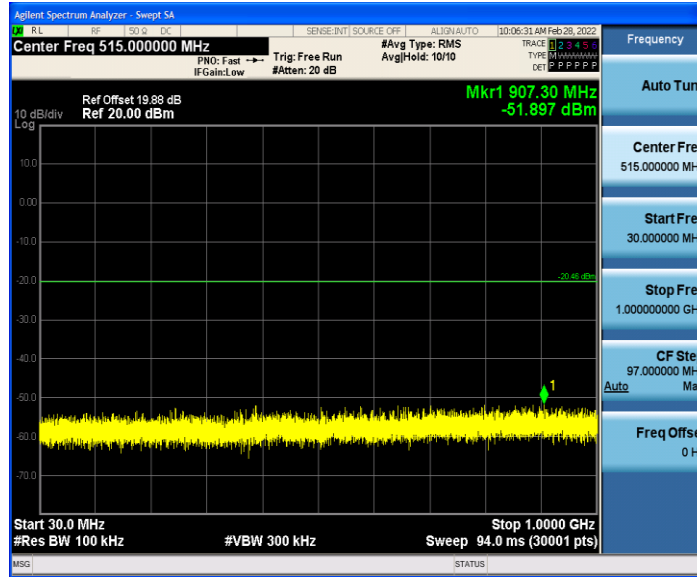
BLE_1M_Ant1_2440_1000~26500



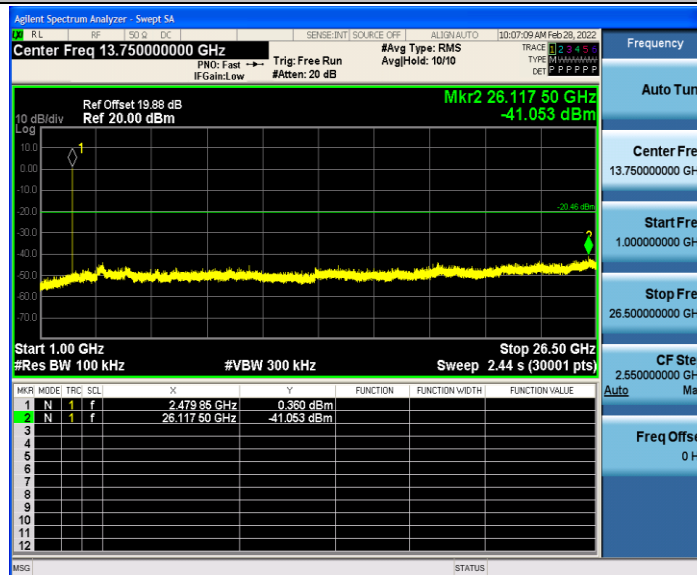
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



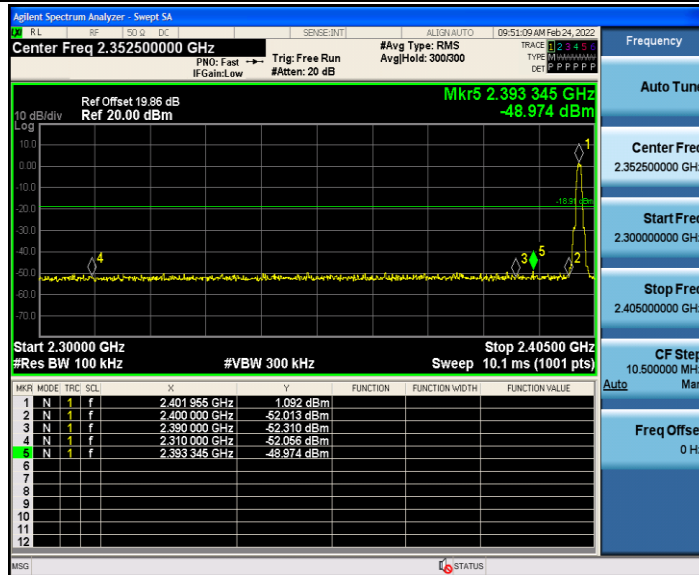
BLE_1M_Ant1_2480_1000~26500



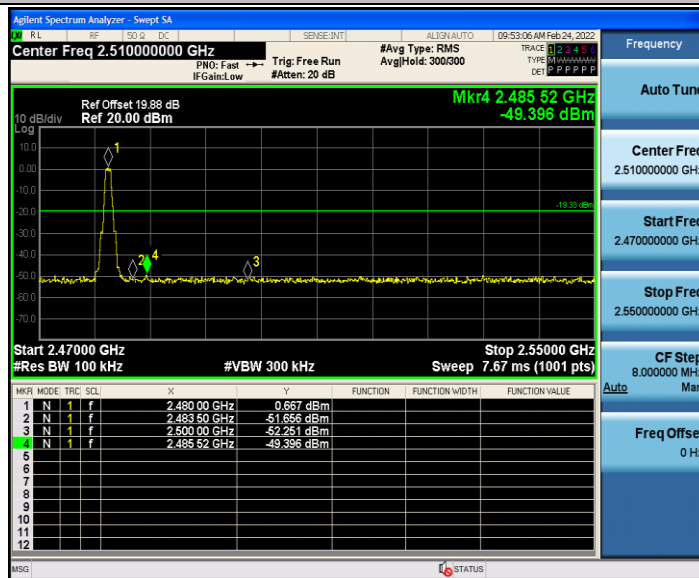
3.3.5.2. Band edge measurements

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	1.09	-48.97	≤-18.91	PASS
		High	2480	0.67	-49.4	≤-19.33	PASS

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



3.4 6dB Bandwidth

3.4.1 Limit

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

3.4.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	AWM	E101344	0.9m, No Shielding
2	Adaptor	FUSHIGANG	AS1201A-0502000 USU	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.4.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

a) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

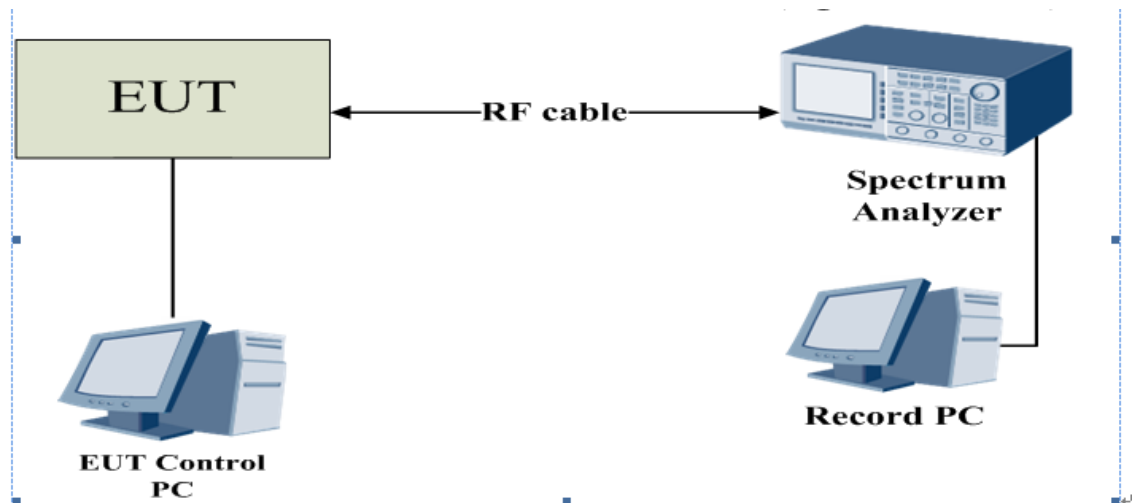
Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) Wait for the trace to stabilize then find the peak value of the trace and place the analyser marker on this peak.

c) Use the -6dB bandwidth function of the spectrum analyser to measure the 6dB Bandwidth of the EUT. This value shall be recorded.

d) Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

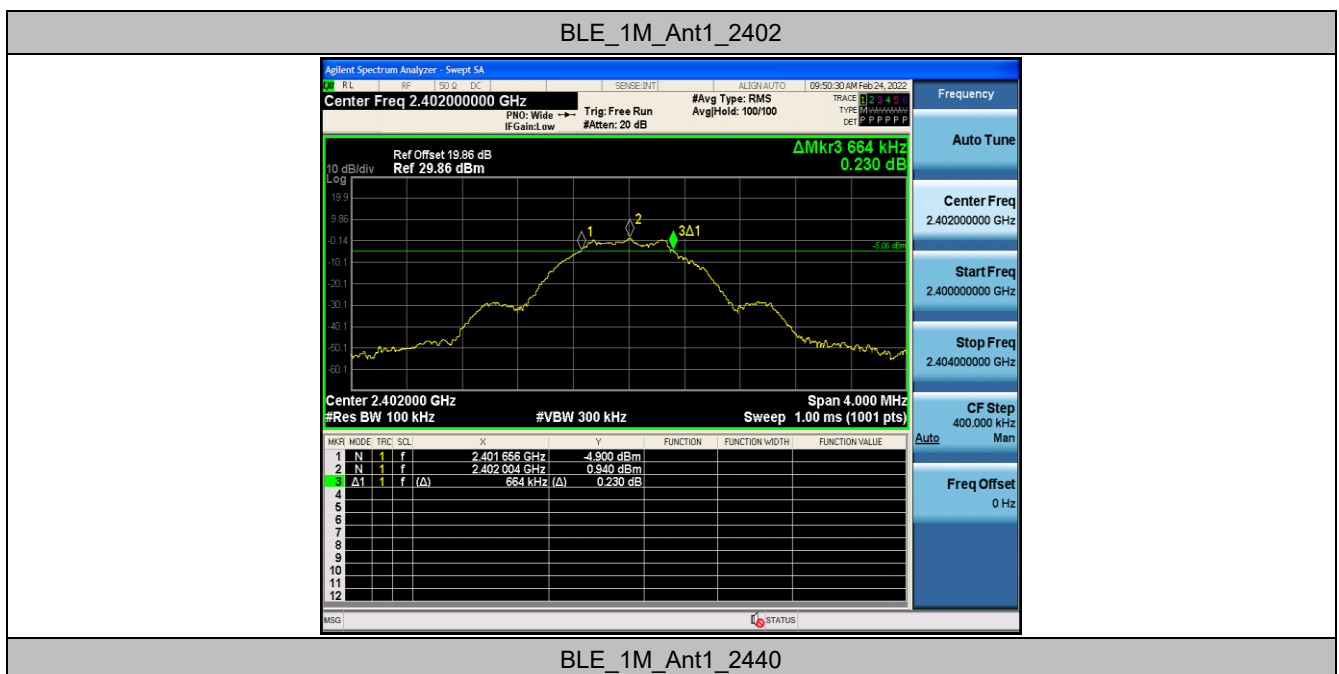
3.4.4 Test Setup

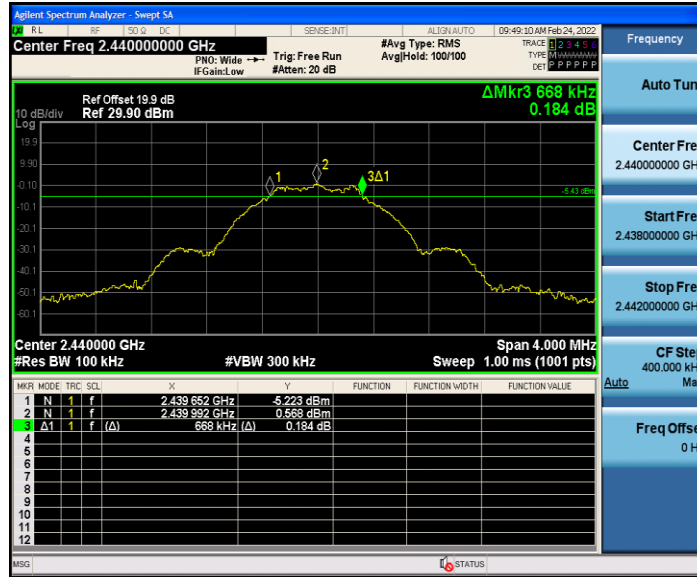


3.4.5 Test Result

6dB Bandwidth

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.656	2402.320	0.5	PASS
		2440	0.668	2439.652	2440.320	0.5	PASS
		2480	0.720	2479.632	2480.352	0.5	PASS





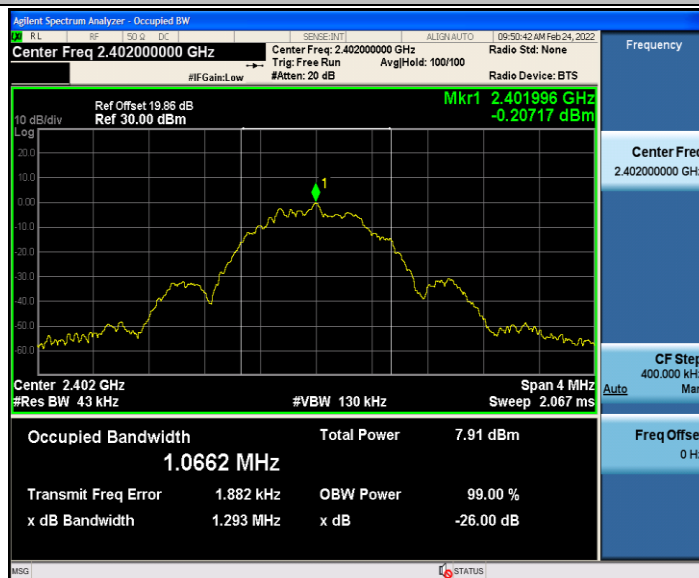
BLE_1M_Ant1_2480



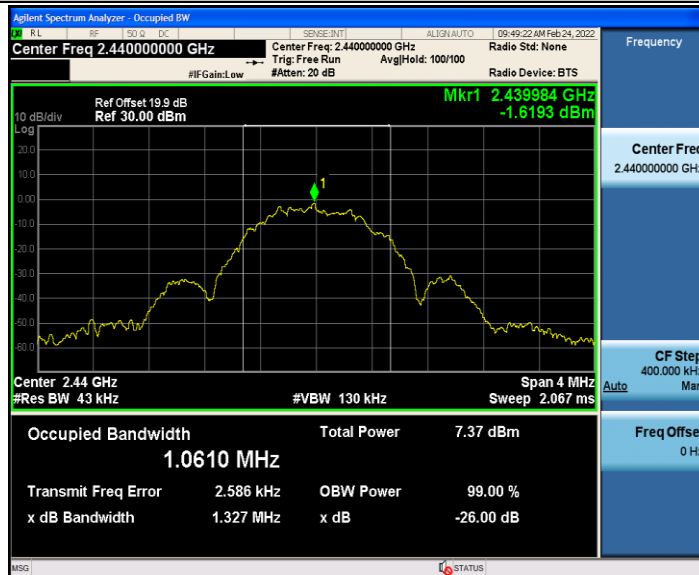
Occupied Channel Bandwidth

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0662	2401.469	2402.535	---	---
		2440	1.0610	2439.472	2440.533	---	---
		2480	1.0596	2479.473	2480.532	---	---

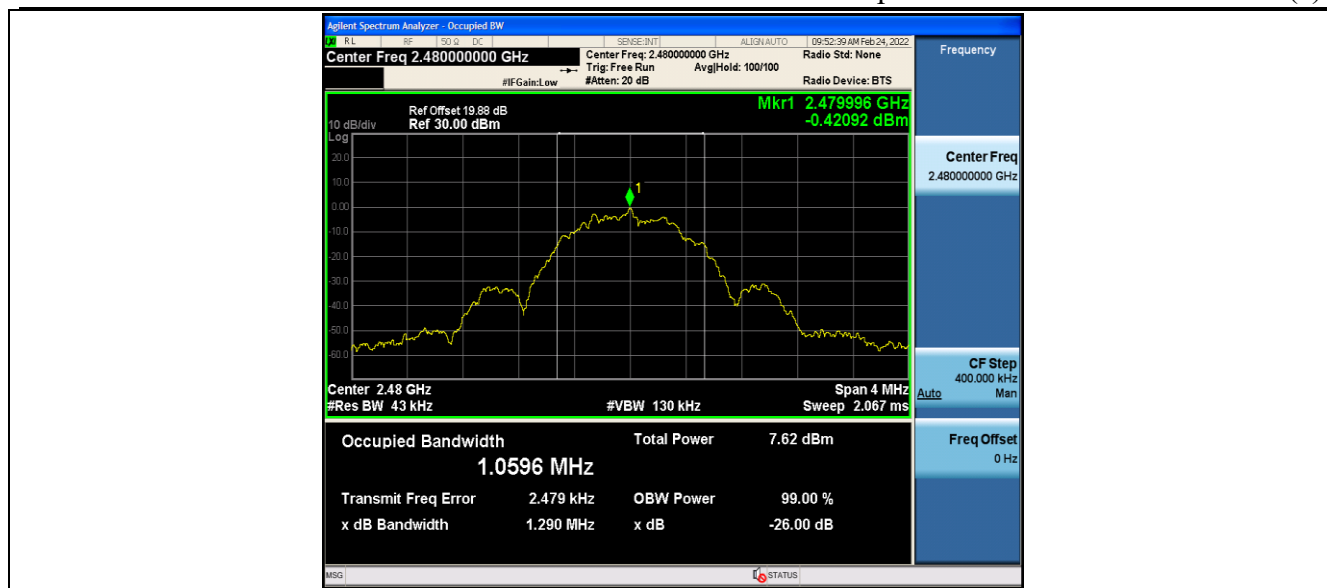
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



3.5 Conducted Output Power

3.5.1 Limit

For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

3.5.2 Test Peripherals

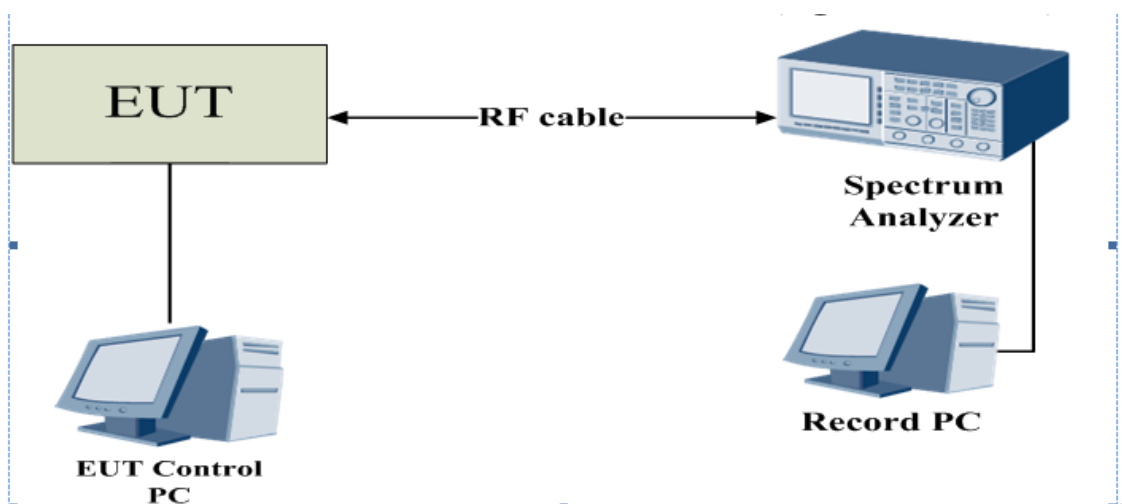
Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	AWM	E101344	0.9m, No Shielding
2	Adaptor	FUSHIGANG	AS1201A-0502000 USU	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.5.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

- a) The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- b) The maximum output power was performed in accordance with method 11.9.2.3 of ANSI C63.10.

3.5.4 Test Setup



3.5.5 Table of Parameters of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

For Power Setting value

Test Software Version	Command		
Frequency (MHz)	2402	2440	2480
BLE(1M)	Default	Default	Default

3.5.6 The Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	1.2	≤30	PASS
		2440	0.88	≤30	PASS
		2480	0.97	≤30	PASS

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

3.6 Power Spectral Density

3.6.1 Limit

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

3.6.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Type-C Cable	AWM	E101344	0.9m, No Shielding
2	Adaptor	FUSHIGANG	AS1201A-0502000 USU	NA
3	Record PC	Lenovo	M4500T	NA
4	Control PC	Lenovo	M4500T	NA

3.6.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

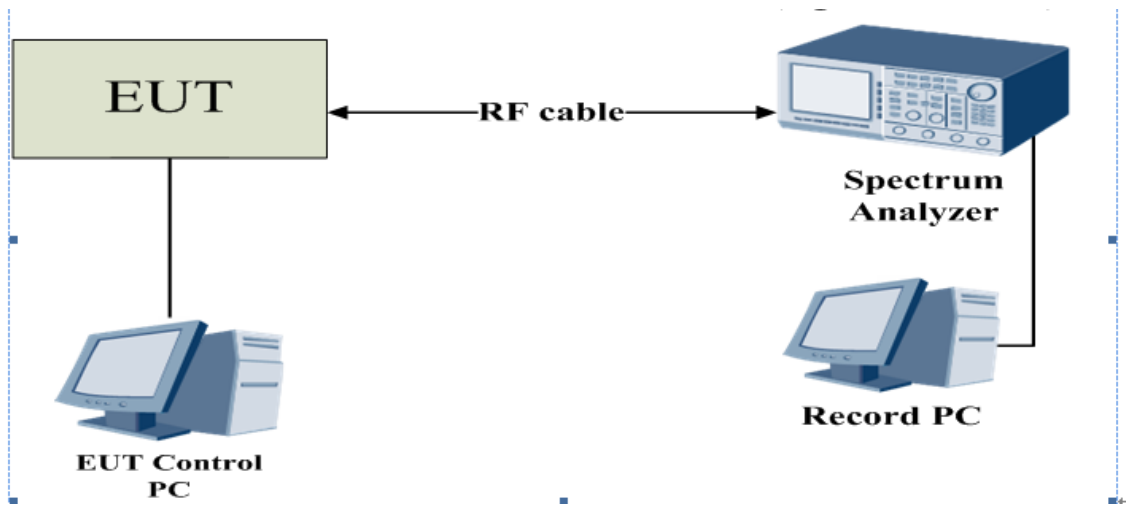
a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below. Spectrum analyser settings as following:

RBW	3 kHz
VBW	10 kHz
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto

b) Wait for the trace to stabilize. Use the peak marker function to determine the maximum amplitude level within the RBW.

c) The value defined in step b shall be compared to the limits and be recorded .

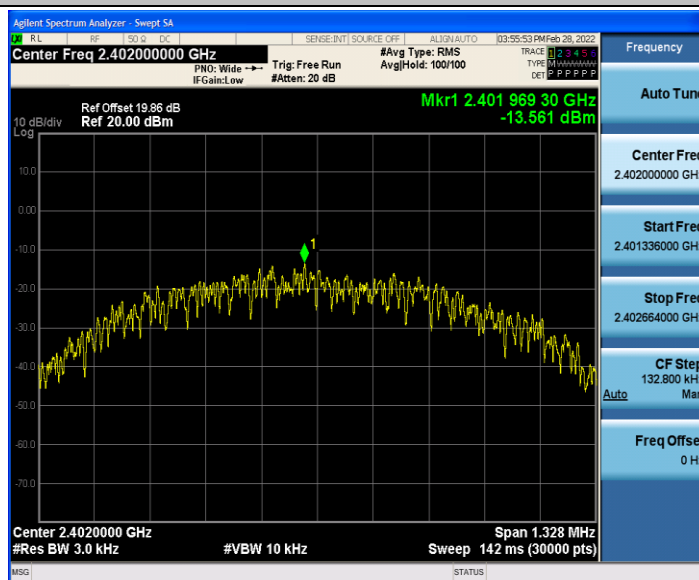
3.6.4 Test Setup



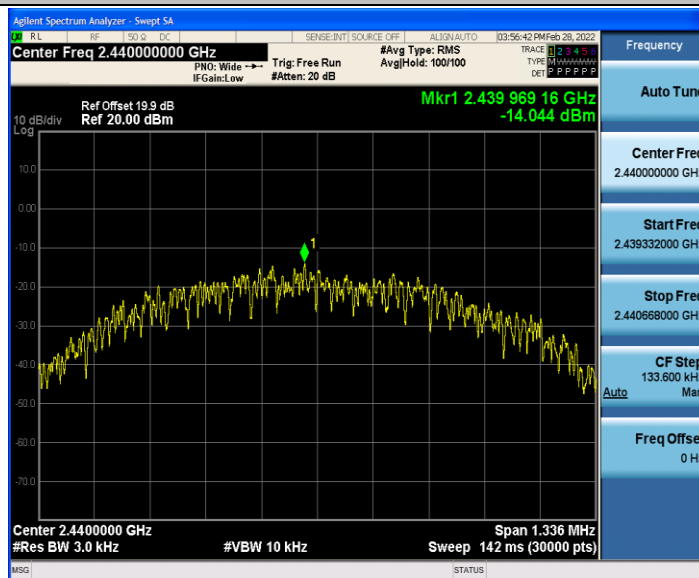
3.6.5 The Result

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-13.56	≤8.00	PASS
		2440	-14.04	≤8.00	PASS
		2480	-14	≤8.00	PASS

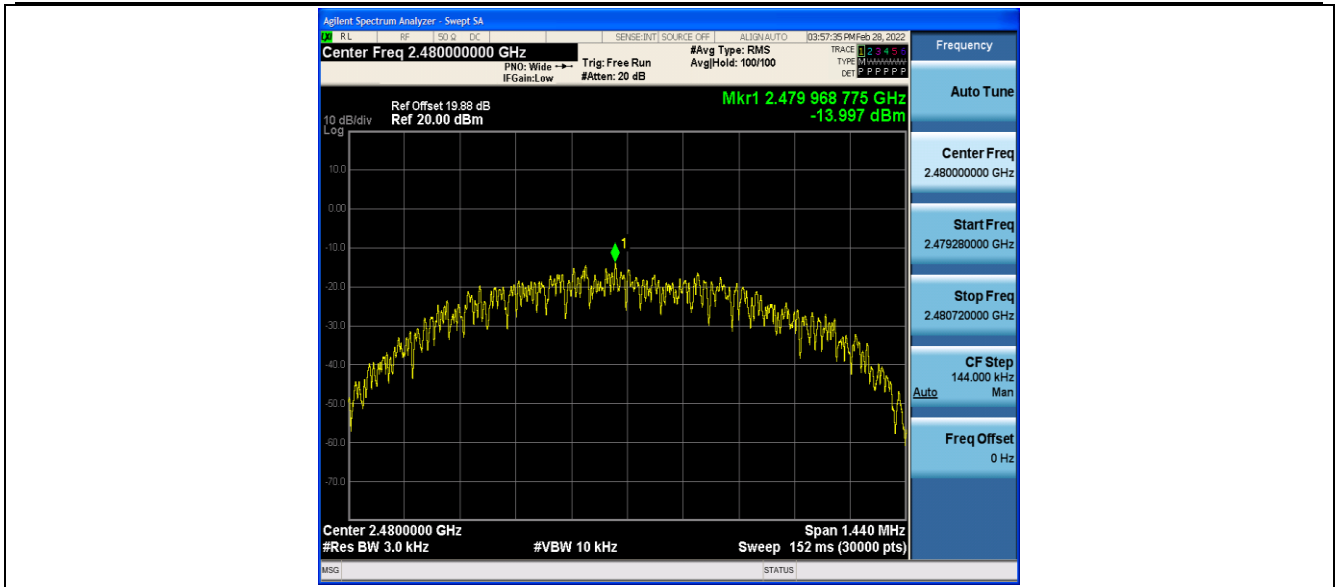
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



(END OF REPORT)