



Certificate # 2861.01

GRGTEST

Page 1 of 57

Verified code: 854989

Test Report

Report No.: E202205133248-1

Customer: Guangdong Bestcore Internet of Things Technology Co.,Ltd

Address: Room 1011, 10F, ShuMao Building, 6 Xiangxing Road, Torch Development District Zhongshan, China

Sample Name: Bluetooth module

Sample Model: BC213

Receive Sample Date: May.16,2022

Test Date: May.16,2022 ~ Jun.14,2022

Reference Document: CFR 47, FCC Part 15 Subpart C
RADIO FREQUENCY DEVICES: Subpart C—Intentional Radiators

Test Result: Pass

Prepared by: Huang Lifang

Reviewed by:

Jiang Tao

Approved by: Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2022-06-28

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E202205133248-1	Original Issue	2022-06-14

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1. TEST RESULT SUMMARY

Technical Requirements		
FCC 47 CFR Part 15 Subpart C 15.247		
ANSI C63.10-2013		
KDB 558074 D01 15.247 measurement guidance v05r02		
Limit / Severity	Item	Result
§15.203	Antenna Requirement	Pass
§15.207(a)	Conducted Emission	Not Applicable
§15.247(d) & 15.205 & 15.209	Radiated Spurious Emission	Pass
§15.247(b)(3)	Maximum Peak Output Power	Pass
§15.247(e)	Power Spectral Density	Pass
§15.247(a)(2)	6dB bandwidth	Pass
§15.247(d)	Conducted band edges and Spurious Emission	Pass
§15.247(d) & 15.205 & 15.209	Restricted bands of operation	Pass

Note:1) Not Applicable, the EUT is powered by DC 3.3V.

2)The antenna is Ceramic antenna. The max gain of antenna is 1dBi,which accordance 15.203.is considered sufficient to comply with the provisions of this section.

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: Guangdong Bestcore Internet of Things Technology Co.,Ltd
Address: Room 1011, 10F, ShuMao Building,6 Xiangxing Road,Torch Development District
Zhongshan,China

2.2 MANUFACTURER

Name: Guangdong Bestcore Internet of Things Technology Co.,Ltd
Address: Room 1011, 10F, ShuMao Building,6 Xiangxing Road,Torch Development District
Zhongshan,China

2.3 FACTORY

Name: Guangdong Bestcore Internet of Things Technology Co.,Ltd
Address: Room 1011, 10F, ShuMao Building,6 Xiangxing Road,Torch Development District
Zhongshan,China

2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Bluetooth module
Model No.: BC213
Adding Model: /
Models discrepancy: /
Trade Name: Best-core
FCC ID: 2AW3Q-BC213
Power supply: DC 3.3V
Frequency Band: 2402-2480MHz
Transmit Power: BLE_1MHz:1.28dBm
Modulation type: GFSK
Channel space: 2MHz
Antenna
Specification: Ceramic antenna with 1dBi gain (Max.)
Temperature Range: -20°C ~ +85°C
Hardware Version: 1.0
Software Version: 1.0
Sample No: E202205133248-0002,E202205133248-0003
Note: /

2.5 CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
*00	2402	10	2422	20	2442	30	2462
01	2404	11	2424	21	2444	31	2464
02	2406	12	2426	22	2446	32	2466
03	2408	13	2428	23	2448	33	2468
04	2410	14	2430	24	2450	34	2470
05	2412	15	2432	25	2452	35	2472
06	2414	16	2434	26	2454	36	2474
07	2416	17	2436	27	2456	37	2476
08	2418	18	2438	28	2458	38	2478
09	2420	*19	2440	29	2460	*39	2480

* is the test frequency

2.6 TEST OPERATION MODE

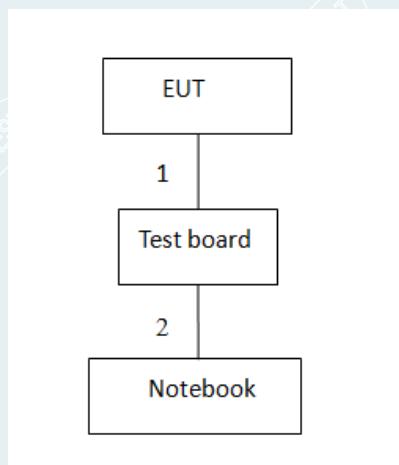
Mode No.	Description of the modes
1	Bluetooth BLE fixed frequency transmitting

2.7 LOCAL SUPPORTIVE

Name of equipment	Manufacturer	Model	Serial number	Note
Notebook	LENOVO	TianYi 310-14ISK	MP18DLC6	/
Test board	/	/	/	/
Cable				
1	DC cable	/	/	Unshielded 0.15m
2	USB extension cable	/	/	Unshielded 1m

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2.8 CONFIGURATION OF SYSTEM UNDER TEST



Test software:

Software version	Test level
RFTester	0dBm

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2.9 DUTY CYCLE

Environment: 24.5°C/52%RH/101.0kPa

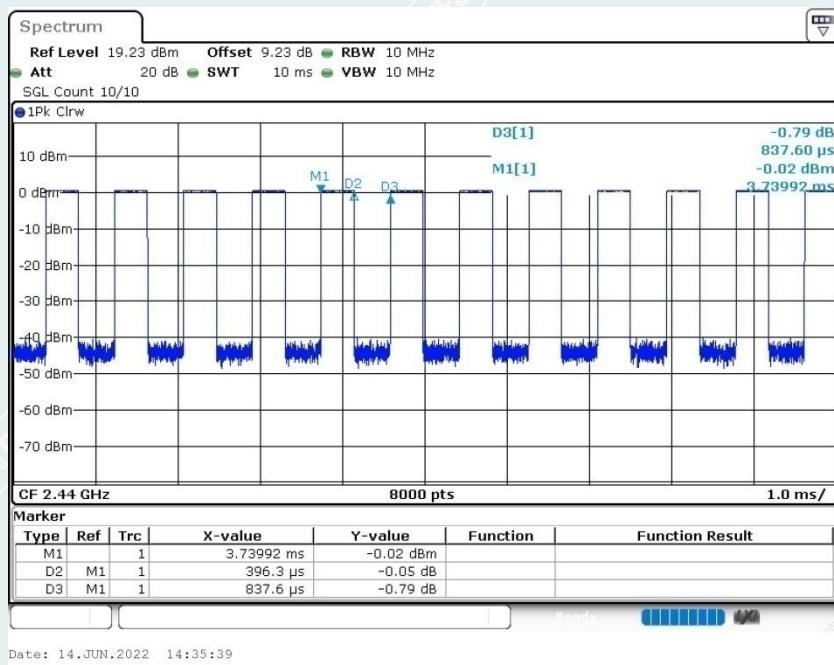
Tested By: Huang Lifang

Voltage: DC 3.3V

Date: 2022-06-14

Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	DC [%]	T [s]
BLE_1M	Ant1	2440	0.3963	0.8376	47.31	0.0003963

BLE_1M_2440 MHz



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3. LABORATORY AND ACCREDITATIONS AND MEASUREMENT UNCERTAINTY

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China

P.C.: 518110

Tel : 0755-61180008

Fax: 0755-61180008

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	A2LA(Certificate #2861.01)
The measuring facility of laboratories has been authorized or registered by the following approval agencies.	
Canada	ISED (Company Number: 24897, CAB identifier:CN0069)
USA	FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.grgtest.com>

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3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	9kHz~30MHz	4.5dB
		30MHz~1000MHz	4.3dB
		1GHz~18GHz	5.6dB
		18GHz~26.5GHz	3.7dB
	Vertical	9kHz~30MHz	4.4dB
		30MHz~1000MHz	4.3dB
		1GHz~18GHz	5.6dB
		18GHz~26.5GHz	3.7dB

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.8dB
Occupied channel bandwidth	0.4dB
Unwanted emission, conducted	0.7dB
Humidity	6%
Temperature	2°C

This uncertainty represents an expanded uncertainty factor of $k=2$.

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4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Radiated Spurious Emission & Restricted bands of operation				
Test S/W	EZ	CCS-03A1		
Test Receiver	R&S	ESR7	102444	2022-09-21
Preamplifier	EMEC	EM330	I00426	2023-03-05
Bi-log Antenna	Schwarzbeck	VULB9160	VULB9160-3401	2022-10-27
Loop Antenna	TESEQ	HLA6121	52599	2023-04-02
Spectrum Analyzer	KEYSIGHT	N9020B	MY57120179	2022-08-08
Horn Antenna	Schwarzbeck	BBHA 9120D	02143	2022-10-22
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-497	2022-10-16
Amplifier	Tonscend	TAP01018048	AP20E8060075	2023-05-05
Amplifier	Tonscend	TAP184050	AP20E806071	2023-05-05
Test S/W	Tonscend	JS36-RE/2.5.1.5		
6dB Bandwidth & Conducted band edges and Spurious Emission & Power Spectral Density				
Spectrum Analyzer	R&S	FSV30	104381	2022-12-10
BT/WIFI System	Tonscend	JS1120-3		
Maximum Peak Output Power				
Pulse power sensor	Anritsu	MA2411B	1126150	2023-03-01
Power meter	Anritsu	ML2495A	1204003	2023-02-28

Note: The calibration interval of the above test instruments is 12 months.

5. RADIATED SPURIOUS EMISSIONS

5.1 LIMITS

In any 100kHz 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 20dB below that in the 100kHz 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 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak(μ V/m)	Measurement distance(m)	Quasi-peak(dB μ V/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE:

- (1) The emission limits for the ranges 9-90kHz and 110-490kHz are based on measurements employing a linear average detector.
- (2) The lower limit shall apply at the transition frequencies.
- (3) Above 18GHz test distance is 1m, so the Peak Limit=74+20*log(3/1)=83.54 (dB μ V/m).
The Avg Limit=54+20*log(3/1)=63.54 (dB μ V/m).

5.2 TEST PROCEDURES

1) Sequence of testing 9kHz to 30MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0 ° to 360 °.
- The antenna height is 1.0 meter.
- The antenna is polarized X, Y and Z.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- Identified emissions during the pre measurement the software maximizes by rotating the turntable

position (0 ° to 360 °) and by rotating the elevation axes (0 ° to 360 °).

- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30MHz to 1GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0 ° to 360 °.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 4 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of pre measurement the software maximize the peaks by changing turntable rotates from 0 ° to 360 ° and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1GHz to 18GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0 ° to 360 °.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 4 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of pre measurement the software maximize the peaks by changing turntable rotates from 0 ° to 360 ° and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18GHz**Setup:**

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

Pre measurement:

- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the pre measurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

NOTE:

- (a).The frequency from 9kHz to 150kHz, Set RBW=300Hz(for Peak & AVG), VBW=300Hz(for Peak & AVG). The frequency from 150kHz to 30MHz, Set RBW=9kHz, VBW=9kHz, (for QP Detector).
- (b).The frequency from 30MHz to 1GHz, Set RBW=120kHz, VBW=300kHz, (for QP Detector).
- (c).The frequency above 1GHz, for Peak detector: Set RBW=1MHz, VBW=3MHz.
- (d). The frequency above 1GHz, for Avg detector: Set RBW=1MHz, if the EUT is configured to transmit with duty cycle $\geq 98\%$, set $VBW \leq RBW/100$ (i.e., 10kHz) but not less than 10 Hz. If the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$, Where T is defined in section 2.9.

5.3 TEST SETUP

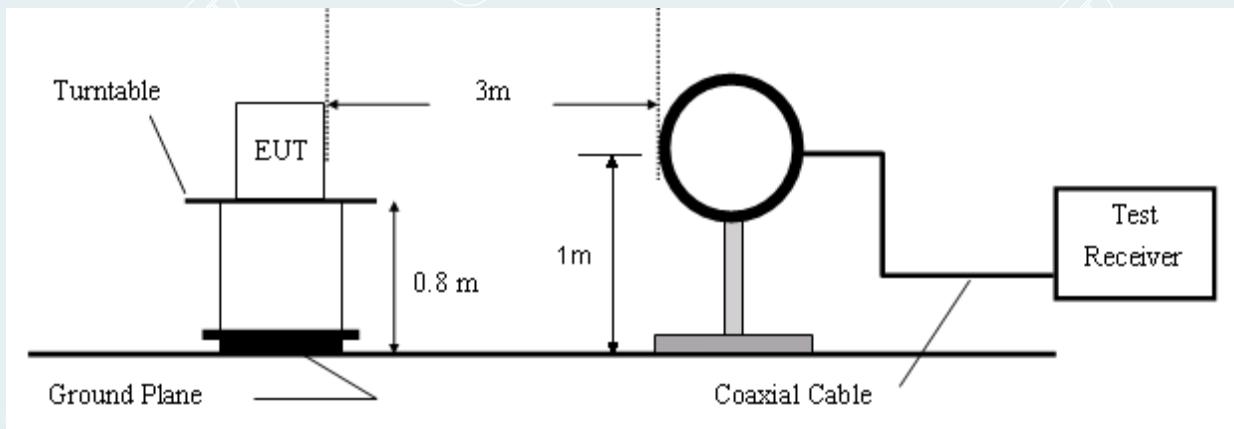


Figure 1. 9kHz to 30MHz radiated emissions test configuration

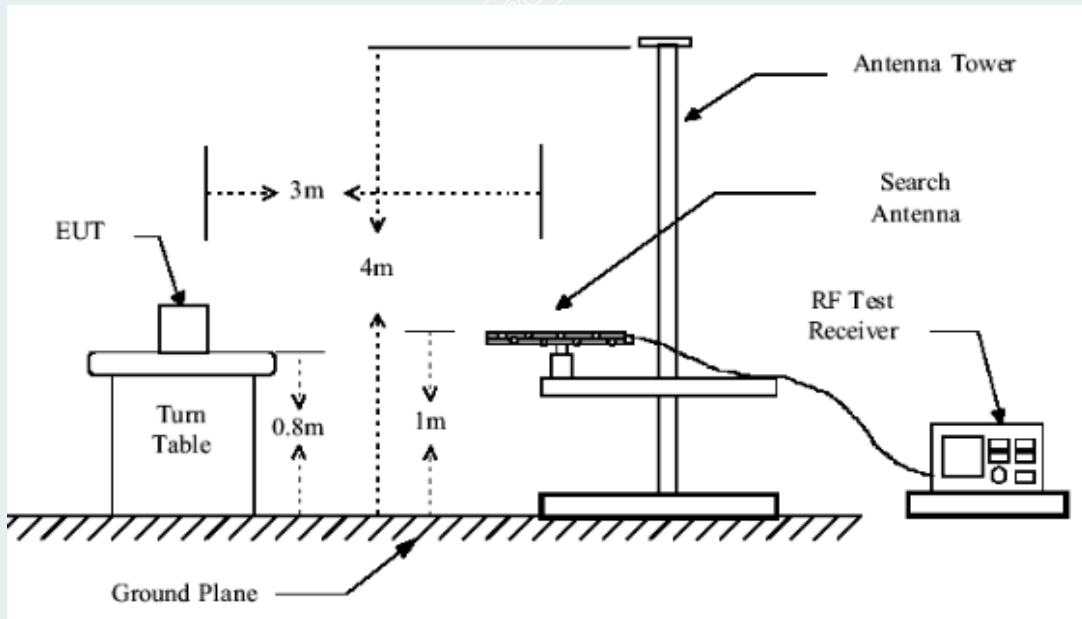


Figure 2. 30MHz to 1GHz radiated emissions test configuration

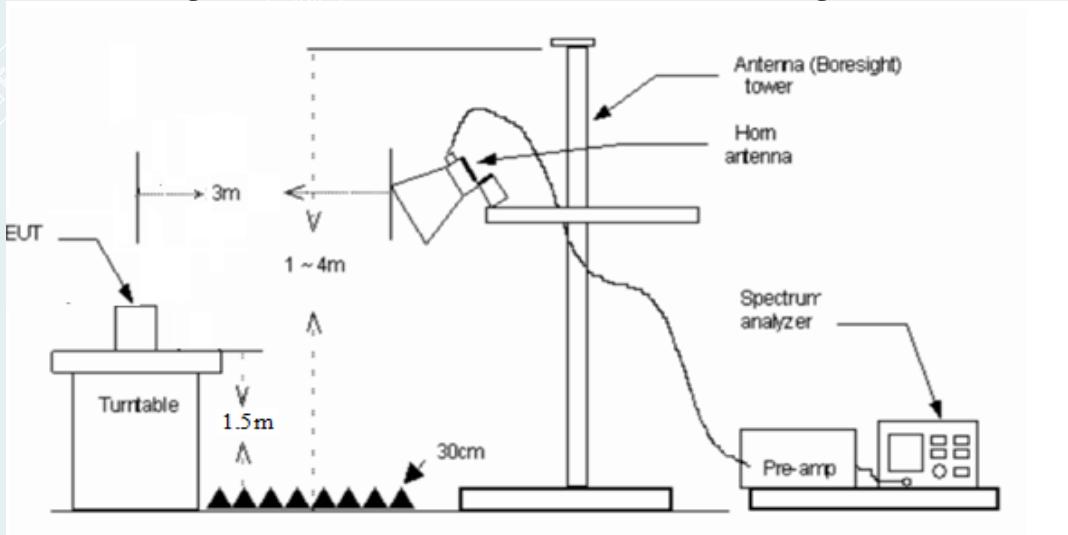


Figure 3. 1GHz to 18GHz radiated emissions test configuration

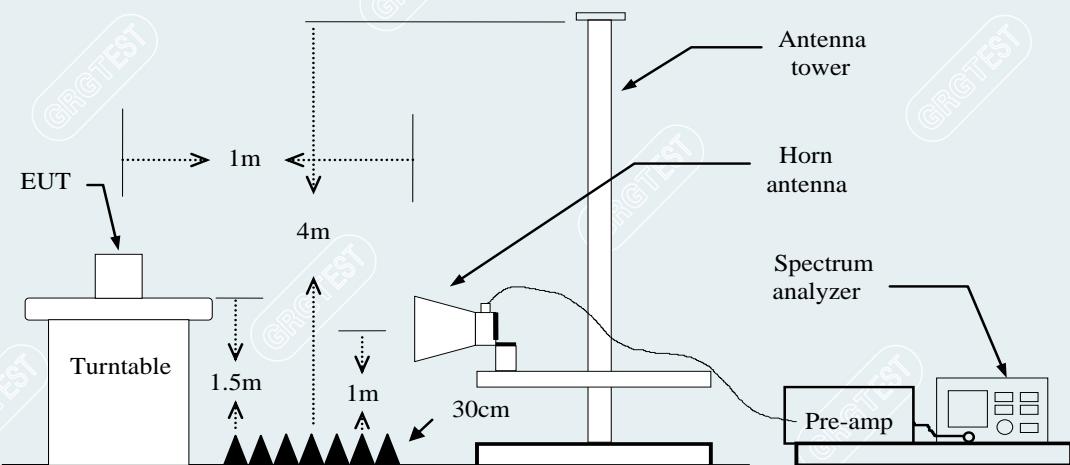


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

5.4 DATA SAMPLE

30MHz to 1GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	37.06	-15.48	21.58	40.00	-18.42	QP	Vertical

1GHz to 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	65.45	-11.12	54.33	74.00	-19.67	Peak	Vertical
xxx	xxx	63.00	-11.12	51.88	54.00	-2.12	AVG	Vertical

Above 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	68.86	57.66	-11.20	83.54	25.88	peak	Vertical
xxx	xxx	68.89	-11.20	57.69	63.54	5.85	AVG	Vertical

Frequency (MHz)

= Emission frequency in MHz

Ant.Pol. (H/V)

= Antenna polarization

Reading (dBuV)

= Uncorrected Analyzer / Receiver reading

Correction Factor (dB/m)

= Antenna factor + Cable loss - Amplifier gain

Result (dBuV/m)

= Reading (dBuV) + Correction Factor (dB/m)

Limit (dBuV/m)

= Limit stated in standard

Margin (dB)

= Remark Result (dBuV/m) - Limit (dBuV/m)

Peak

= Peak Reading

QP

= Quasi-peak Reading

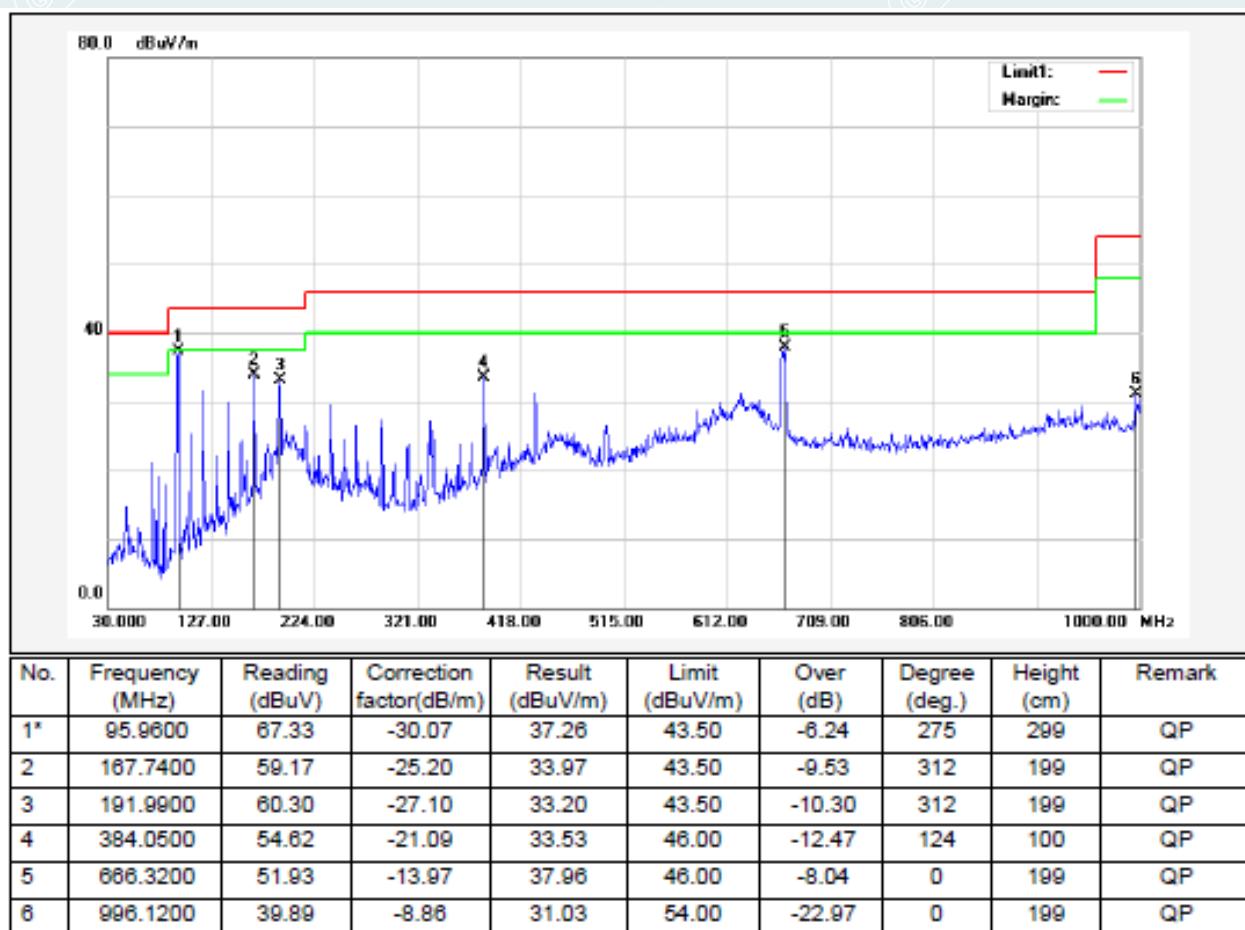
AVG

= Average Reading

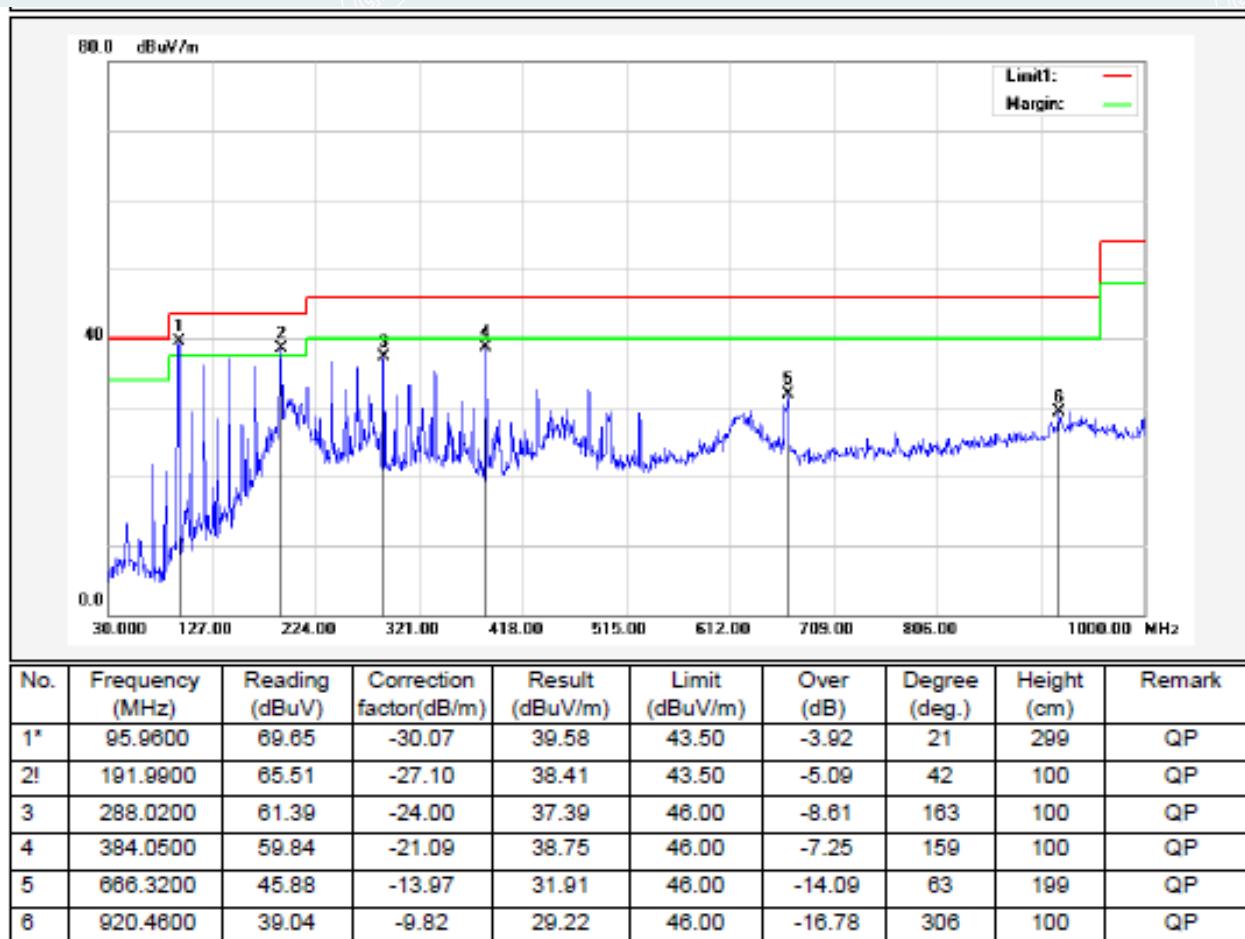
5.5 TEST RESULTS

Below 1GHz

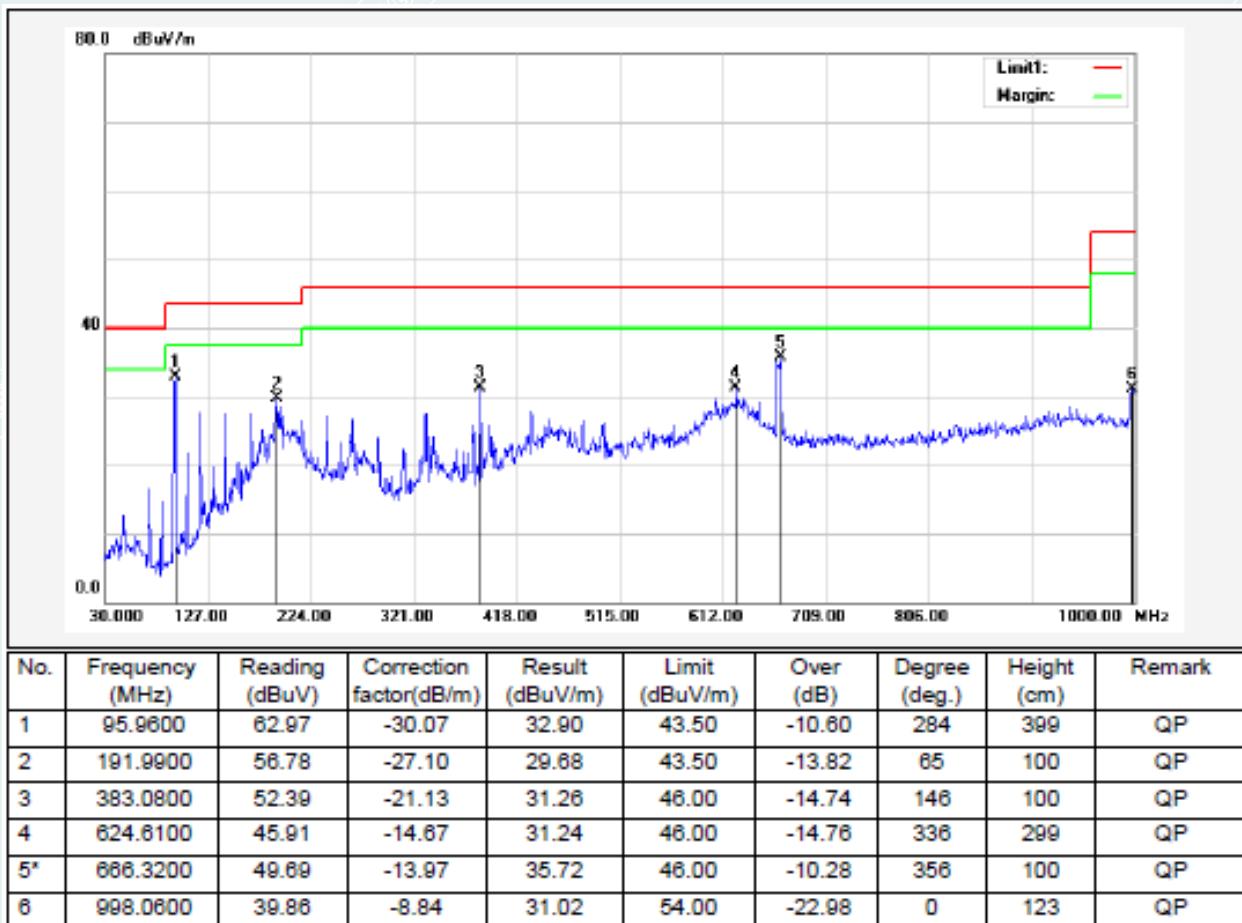
EUT Name	Bluetooth module	Model	BC213
Environmental Conditions	23.9 °C/51%RH/101.0kPa	Test Voltage	DC 3.3V
Test Mode	TX/ BLE_1M (2402MHz)	Polarity	Vertical
Tested By	Wang Xinyuan	Tested Date	2022-06-14



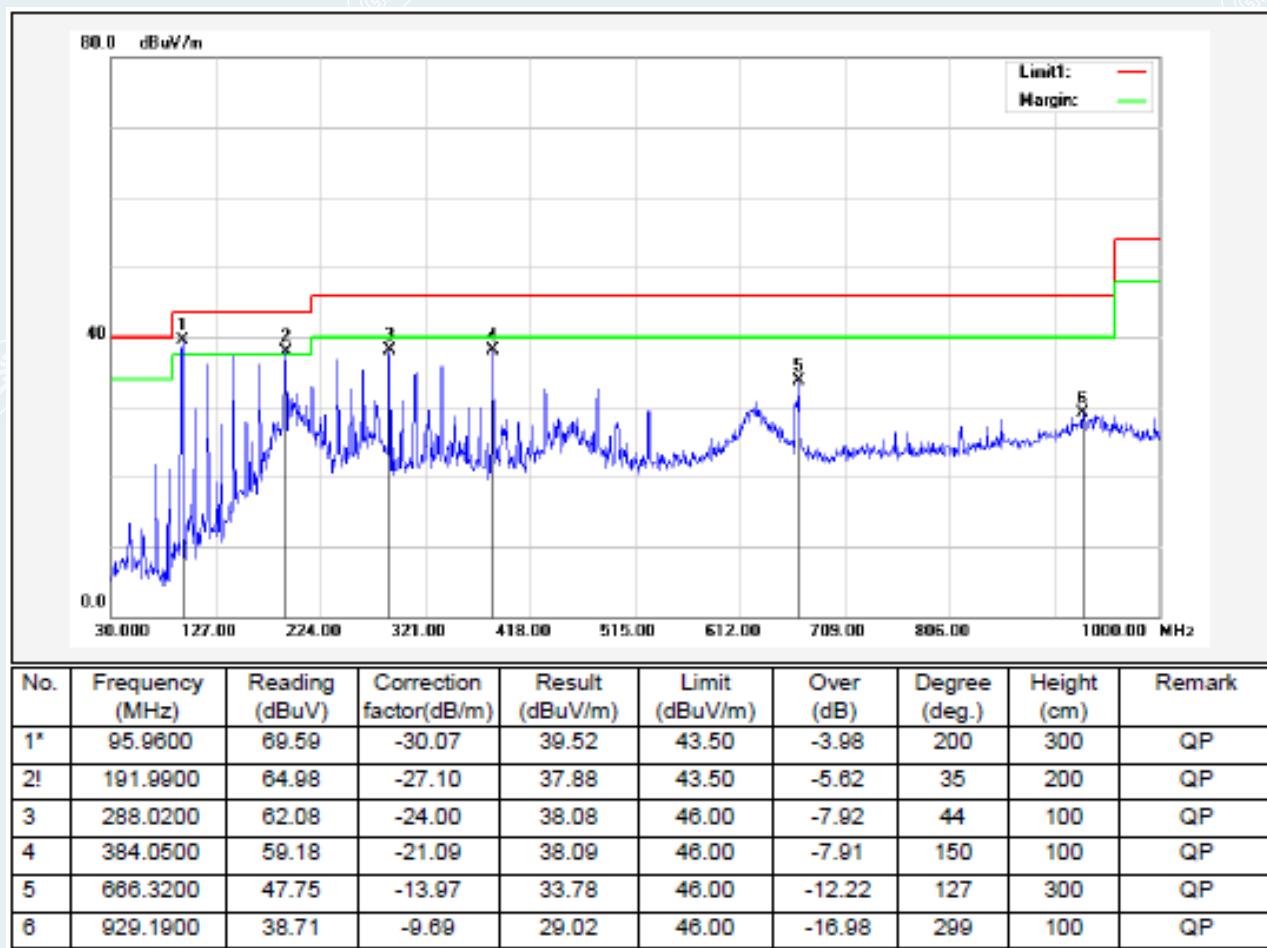
EUT Name	Bluetooth module	Model	BC213
Environmental Conditions	23.9 °C/51%RH/101.0kPa	Test Voltage	DC 3.3V
Test Mode	TX/ BLE_1M (2402MHz)	Polarity	Horizontal
Tested By	Wang Xinyuan	Tested Date	2022-06-14



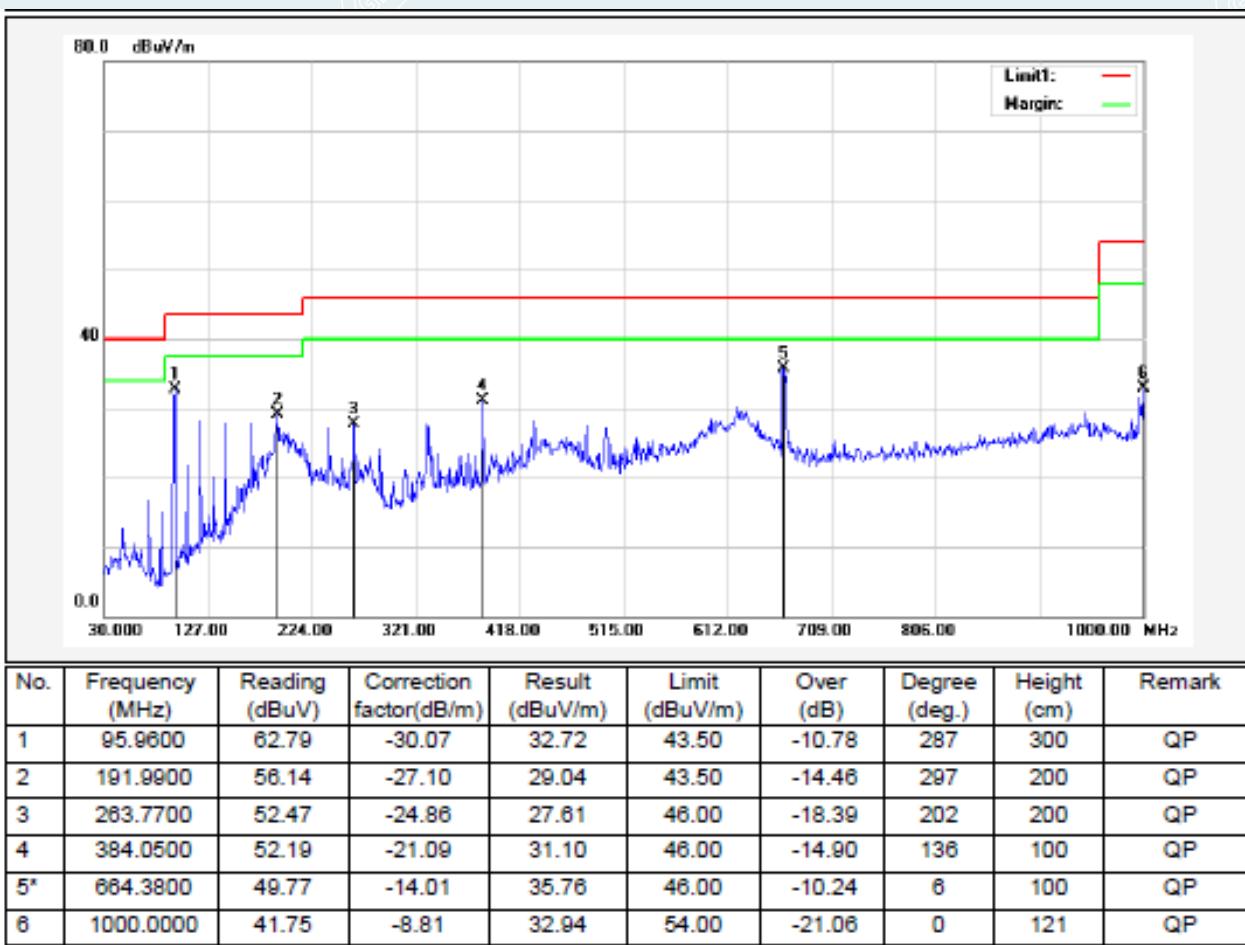
EUT Name	Bluetooth module	Model	BC213
Environmental Conditions	23.9 °C/51%RH/101.0kPa	Test Voltage	DC 3.3V
Test Mode	TX/ BLE_1M (2440MHz)	Polarity	Vertical
Tested By	Wang Xinyuan	Tested Date	2022-06-14



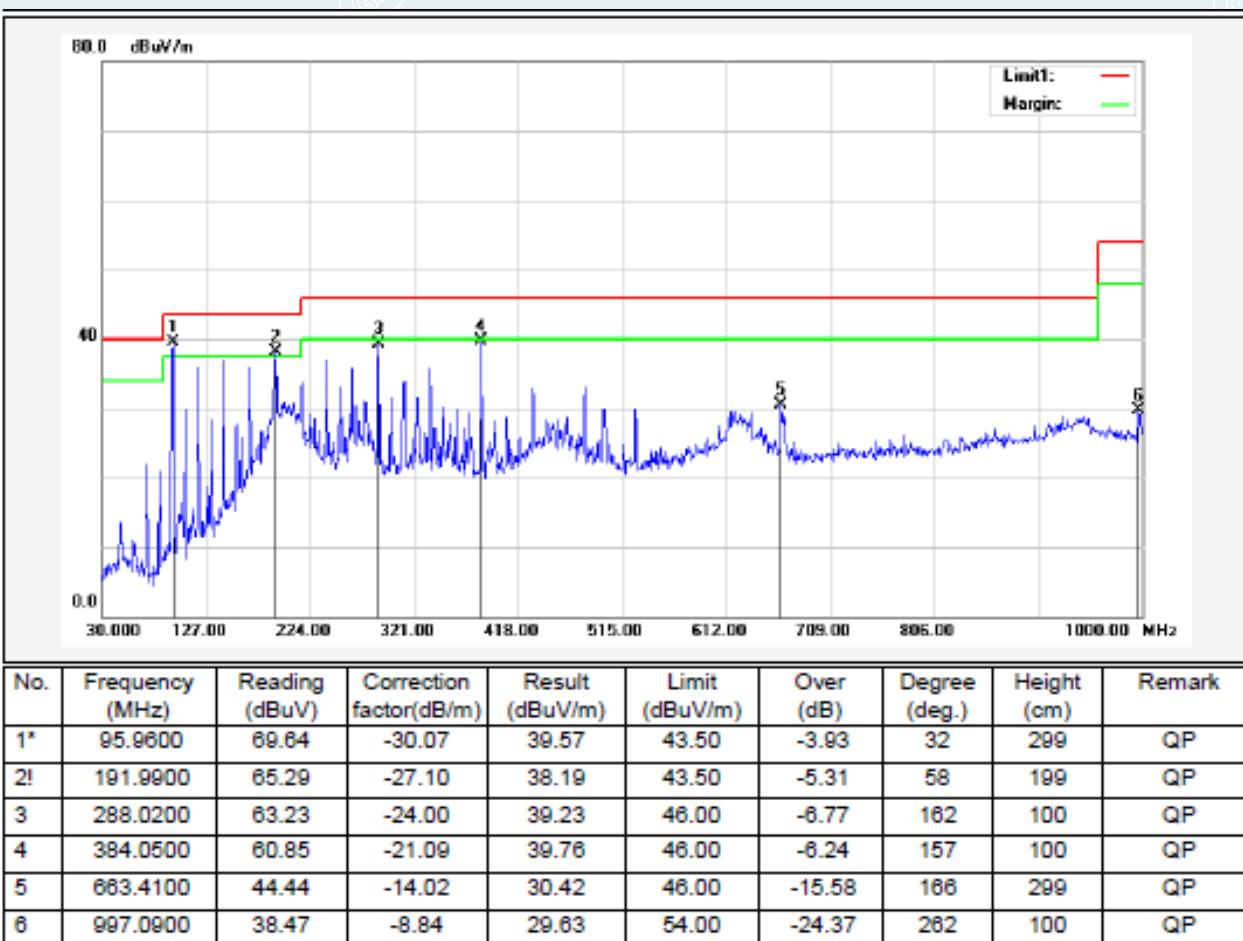
EUT Name	Bluetooth module	Model	BC213
Environmental Conditions	23.9 °C/51%RH/101.0kPa	Test Voltage	DC 3.3V
Test Mode	TX/ BLE_1M (2440MHz)	Polarity	Horizontal
Tested By	Wang Xinyuan	Tested Date	2022-06-14



EUT Name	Bluetooth module	Model	BC213
Environmental Conditions	23.9 °C/51%RH/101.0kPa	Test Voltage	DC 3.3V
Test Mode	TX/ BLE_1M (2480MHz)	Polarity	Vertical
Tested By	Wang Xinyuan	Tested Date	2022-06-14



EUT Name	Bluetooth module	Model	BC213
Environmental Conditions	23.9 °C/51%RH/101.0kPa	Test Voltage	DC 3.3V
Test Mode	TX/ BLE_1M (2480MHz)	Polarity	Horizontal
Tested By	Wang Xinyuan	Tested Date	2022-06-14

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 9kHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.

1GHz-18 GHz:

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Mode: TX/ BLE_1M

Lowest Frequency (2402MHz)

Environment: 24.8°C/49%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 3.3V

Date: 2022-06-10

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1225.0281	55.11	32.35	-22.76	74.00	41.65	100	320	Horizontal
2	1894.8619	55.32	34.60	-20.72	74.00	39.40	200	300	Horizontal
3	2803.2254	53.78	36.50	-17.28	74.00	37.50	200	106	Horizontal
4	4803.9755	61.82	49.19	-12.63	74.00	24.81	200	290	Horizontal
5	5929.1161	50.14	40.17	-9.97	74.00	33.83	200	356	Horizontal
6	7209.9012	47.16	42.65	-4.51	74.00	31.35	200	293	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4804.5039	-12.63	58.38	45.75	54.00	8.25	170	287.9	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1107.5134	55.30	33.31	-21.99	74.00	40.69	100	24	Vertical
2	1358.2948	54.82	33.27	-21.55	74.00	40.73	200	320	Vertical
3	2018.6273	53.44	33.32	-20.12	74.00	40.68	200	326	Vertical
4	3052.5066	53.09	36.83	-16.26	74.00	37.17	200	357	Vertical
5	4803.9755	62.52	49.60	-12.92	74.00	24.40	100	122	Vertical
6	7200.5251	47.76	44.42	-3.34	74.00	29.58	100	34	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4804.4559	-12.92	58.32	45.40	54.00	8.60	129	116.2	Vertical

Mode: TX/ BLE_1M
 Middle Frequency (2440MHz)
 Environment: 24.8°C/49%RH/101.0kPa
 Tested By: Zhang Zishan

Voltage: DC 3.3V
 Date: 2022-06-10

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1294.7868	58.45	36.26	-22.19	74.00	37.74	100	197	Horizontal
2	2182.1478	57.25	38.82	-18.43	74.00	35.18	200	271	Horizontal
3	2504.1880	58.74	40.96	-17.78	74.00	33.04	100	134	Horizontal
4	4880.8601	66.69	54.59	-12.10	74.00	19.41	100	345	Horizontal
5	9023.2529	45.49	45.09	-0.40	74.00	28.91	100	252	Horizontal
6	11254.7818	41.84	46.02	4.18	74.00	27.98	100	2	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4880.2744	-12.10	54.47	42.37	54.00	11.63	151	48.3	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1086.2608	57.21	35.17	-22.04	74.00	38.83	200	175	Vertical
2	2032.6291	57.06	37.05	-20.01	74.00	36.95	100	181	Vertical
3	4880.8601	62.94	50.89	-12.05	74.00	23.11	200	319	Vertical
4	6602.3253	49.15	41.93	-7.22	74.00	32.07	100	195	Vertical
5	11699.2124	43.93	47.68	3.75	74.00	26.32	100	289	Vertical
6	14768.9711	39.97	47.67	7.70	74.00	26.33	100	139	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4880.3232	-12.05	50.90	38.85	54.00	15.15	148	319.8	Vertical

Mode: TX/ BLE_1M

Highest Frequency (2480MHz)

Environment: 24.8 °C/49%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 3.3V

Date: 2022-06-10

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1232.279	54.75	32.21	-22.54	74.00	41.79	100	186	Horizontal
2	1872.359	53.34	32.10	-21.24	74.00	41.90	100	196	Horizontal
3	2810.9764	53.72	36.45	-17.27	74.00	37.55	200	111	Horizontal
4	4959.62	62.26	50.99	-11.27	74.00	23.01	200	282	Horizontal
5	7204.2755	47.02	42.68	-4.34	74.00	31.32	100	22	Horizontal
6	9458.3073	44.86	45.37	0.51	74.00	28.63	100	7	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.5127	-11.27	58.24	46.97	54.00	7.03	139	280.1	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1091.0114	55.83	33.91	-21.92	74.00	40.09	100	226	Vertical
2	1369.2962	54.65	33.14	-21.51	74.00	40.86	200	170	Vertical
3	2023.1279	53.23	33.14	-20.09	74.00	40.86	200	24	Vertical
4	3436.9296	60.79	43.86	-16.93	74.00	30.14	200	249	Vertical
5	4959.62	60.63	49.68	-10.95	74.00	24.32	100	129	Vertical
6	7198.6498	46.44	43.07	-3.37	74.00	30.93	100	311	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.4631	-10.95	56.40	45.45	54.00	8.55	136	127.1	Vertical

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- 3 Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- 4 Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

18GHz to 26.5GHz

Mode: TX/ BLE_1M

Lowest Frequency (2402MHz)

Environment: 24.8°C/49%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 3.3V

Date: 2022-06-13

Suspected Data List

NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	20556.0000	33.75	23.30	-10.45	83.54	60.24	150	353	Horizontal
2	21218.6250	35.79	25.75	-10.04	83.54	57.79	150	22	Horizontal
3	21791.2500	36.02	26.26	-9.76	83.54	57.28	150	340	Horizontal
4	23229.0000	36.13	27.42	-8.71	83.54	56.12	150	154	Horizontal
5	24684.7500	38.59	31.00	-7.59	83.54	52.54	150	27	Horizontal
6	25301.2500	39.67	32.48	-7.19	83.54	51.06	150	41	Horizontal

Suspected Data List

NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18914.6250	32.12	20.27	-11.85	83.54	63.27	150	236	Vertical
2	20682.0000	34.50	24.33	-10.17	83.54	59.21	150	212	Vertical
3	21170.2500	36.97	27.00	-9.97	83.54	56.54	150	206	Vertical
4	23211.0000	36.13	27.51	-8.62	83.54	56.03	150	69	Vertical
5	24678.0000	38.48	30.96	-7.52	83.54	52.58	150	320	Vertical
6	25286.6250	39.03	31.94	-7.09	83.54	51.60	150	262	Vertical

----- The following blanks -----

Mode: TX/ BLE_1M
 Middle Frequency (2440MHz)
 Environment: 24.8°C/49%RH/101.0kPa
 Tested By: Zhang Zishan

Voltage: DC 3.3V
 Date: 2022-06-13

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	19419.7500	32.51	21.03	-11.48	83.54	62.51	150	130	Horizontal
2	21205.1250	36.19	26.14	-10.05	83.54	57.40	150	170	Horizontal
3	21846.3750	36.13	26.36	-9.77	83.54	57.18	150	176	Horizontal
4	23212.1250	35.86	27.16	-8.70	83.54	56.38	150	304	Horizontal
5	24685.8750	38.04	30.45	-7.59	83.54	53.09	150	120	Horizontal
6	25245.0000	38.88	31.75	-7.13	83.54	51.79	150	250	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	19258.8750	33.20	21.60	-11.60	83.54	61.94	150	120	Vertical
2	20682.0000	34.50	24.33	-10.17	83.54	59.21	150	212	Vertical
3	21299.6250	35.94	26.06	-9.88	83.54	57.48	150	37	Vertical
4	23211.0000	36.13	27.51	-8.62	83.54	56.03	150	69	Vertical
5	24466.5000	36.84	29.01	-7.83	83.54	54.53	150	196	Vertical
6	25290.0000	39.06	31.97	-7.09	83.54	51.57	150	116	Vertical

Mode: TX/ BLE_1M

Highest Frequency (2480MHz)

Environment: 24.8°C/49%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 3.3V

Date: 2022-06-13

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	19279.1250	32.13	20.55	-11.58	83.54	62.99	150	123	Horizontal
2	21277.1250	36.08	26.09	-9.99	83.54	57.45	150	170	Horizontal
3	21846.3750	36.13	26.36	-9.77	83.54	57.18	150	176	Horizontal
4	22380.7500	35.07	25.74	-9.33	83.54	57.80	150	254	Horizontal
5	23212.1250	35.86	27.16	-8.70	83.54	50.68	150	304	Horizontal
6	25245.0000	38.88	31.75	-7.13	83.54	46.09	150	250	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	19373.6250	32.90	21.39	-11.51	83.54	62.15	150	150	Vertical
2	20543.6250	34.88	24.54	-10.34	83.54	59.00	150	51	Vertical
3	21285.0000	35.88	25.99	-9.89	83.54	57.55	150	168	Vertical
4	23232.3750	36.36	27.74	-8.62	83.54	57.80	150	4	Vertical
5	24598.1250	36.70	29.06	-7.64	83.54	54.48	150	134	Vertical
6	25232.6250	38.64	31.62	-7.02	83.54	51.92	150	161	Vertical

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6. 6dB BANDWIDTH

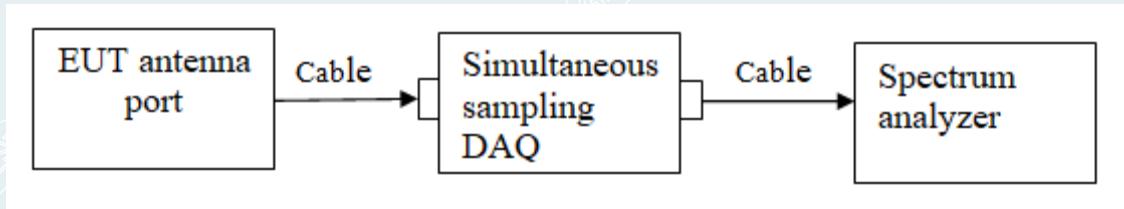
6.1 LIMITS

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

6.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Set resolution bandwidth (RBW) = 100kHz. Set the video bandwidth (VBW) $\geq 3 \times$ RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize, record 6dB bandwidth value.
- 3) Repeat above procedures until all frequencies measured were complete.

6.3 TEST SETUP



6.4 TEST RESULTS

Environment: 24.5°C/52%RH/101.0kPa

Voltage: DC 3.3V

Tested By: Huang Lifang

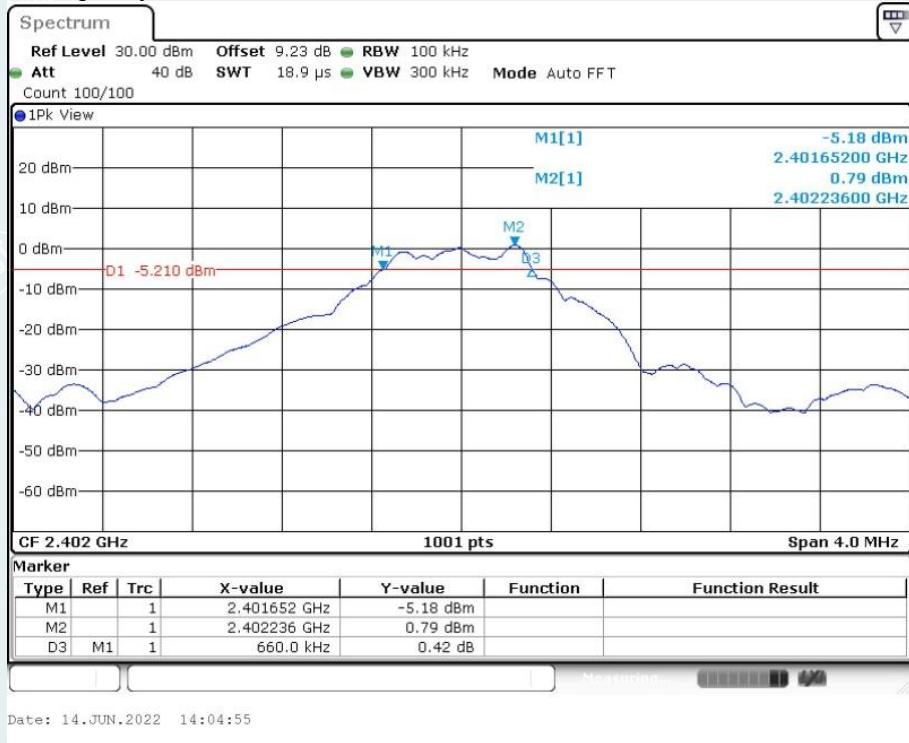
Date: 2022-06-14

BLE_1M

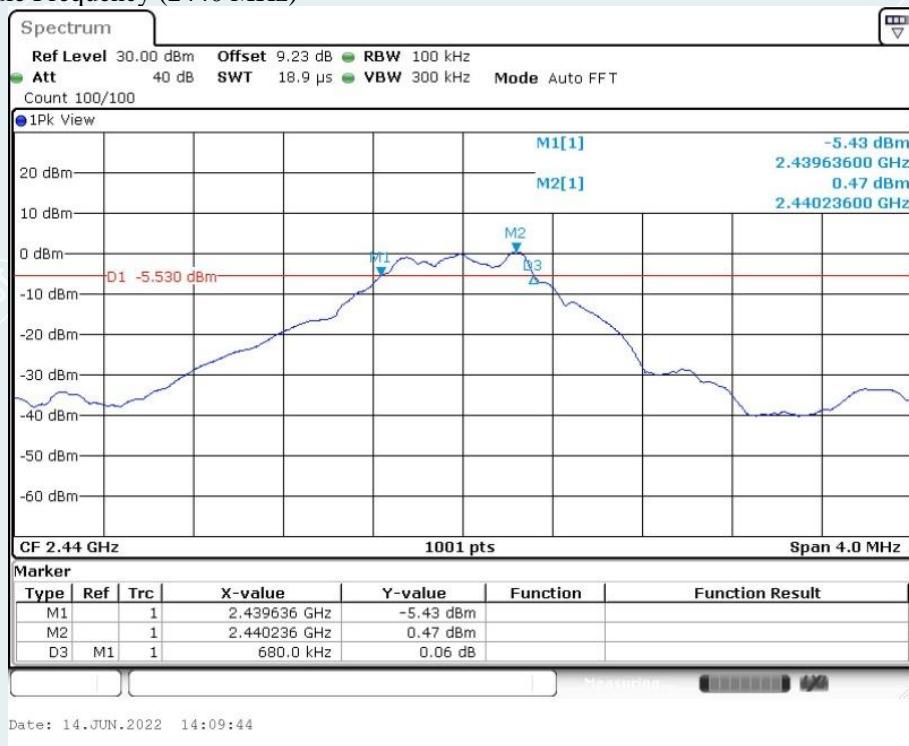
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	660	≥ 500	PASS
Middle	2440	680		PASS
Highest	2480	696		PASS

BLE_1M

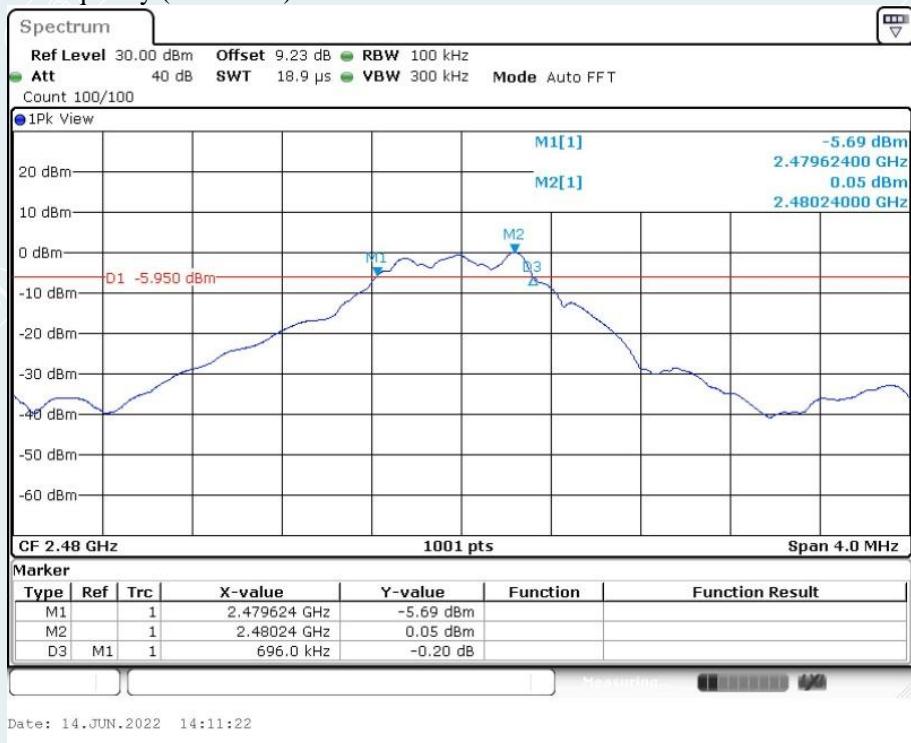
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)



Highest Frequency (2480MHz)



----- The following blanks -----

7. MAXIMUM PEAK OUTPUT POWER

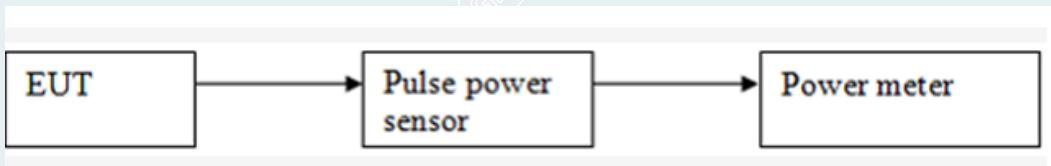
7.1 LIMITS

The maximum Peak output power measurement is 1W

7.2 TEST PROCEDURES

- 1) RF output of EUT was connected to the broadband peak RF power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 2) Set to the maximum power setting and enable the EUT transmit continuously.
- 3) Measure the conducted output power and record the results in the test report.

7.3 TEST SETUP



7.4 TEST RESULTS

Environment: 24.5 °C/52% RH/101.0kPa

Tested By:Huang Lifang

Voltage: DC 3.3V

Date: 2022-06-14

BLE_1M

Channel	Frequency (MHz)	Measured Channel Power (dBm)	Limit	Peak/Average	Result
Lowest	2402	1.28	1W (30dBm)	Peak	Pass
Middle	2440	1.18			Pass
Highest	2480	0.91			Pass

8. POWER SPECTRAL DENSITY

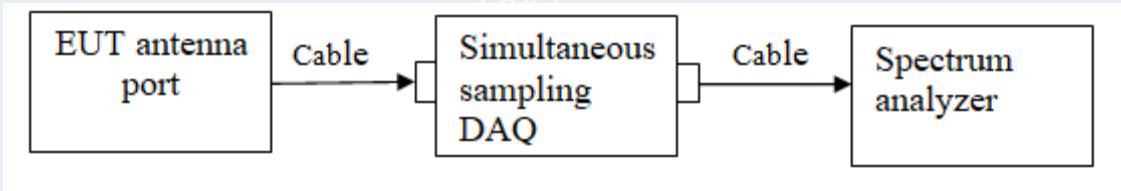
8.1 LIMITS

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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

8.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3) Set the analyzer span to 1.5 times the DTS bandwidth. Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$. Set the VBW $\geq [3 \times \text{RBW}]$. Detector = peak. Sweep time = auto couple. Trace mode = max hold. Allow trace to fully stabilize. Use the peak marker function to determine the maximum amplitude level within the RBW. If measured value exceeds requirement, then reduce RBW (but no less than 3kHz) and repeat.
- 4) Repeat above procedures until all frequencies measured were complete.

8.3 TEST SETUP



8.4 TEST RESULTS

Environment: 24.5°C/52%RH/101.0kPa

Voltage: DC 3.3V

Tested By: Huang Lifang

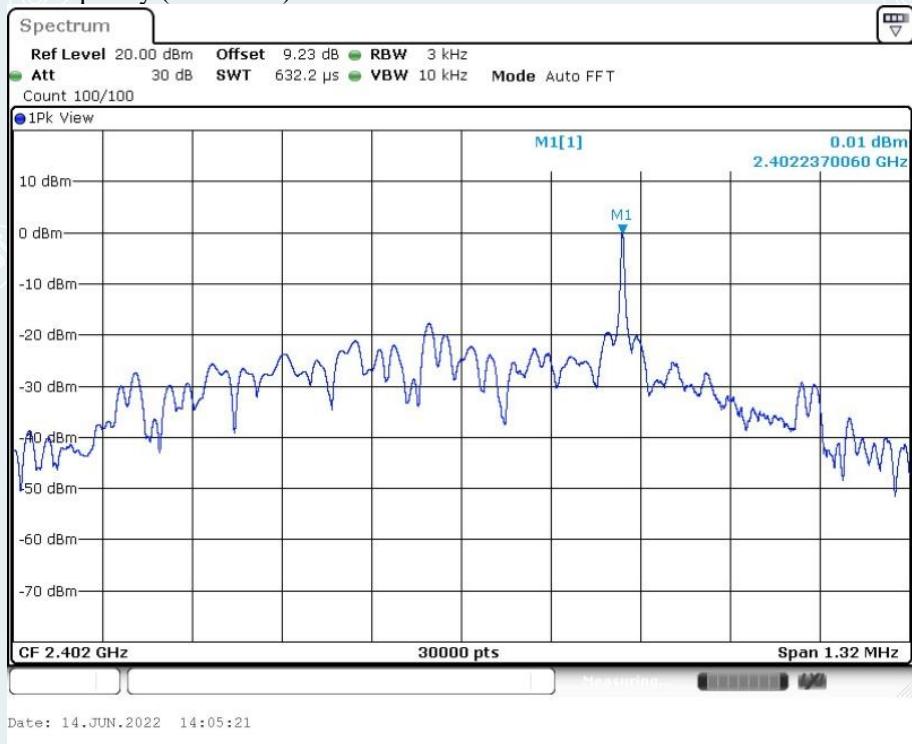
Date: 2022-06-14

BLE_1M

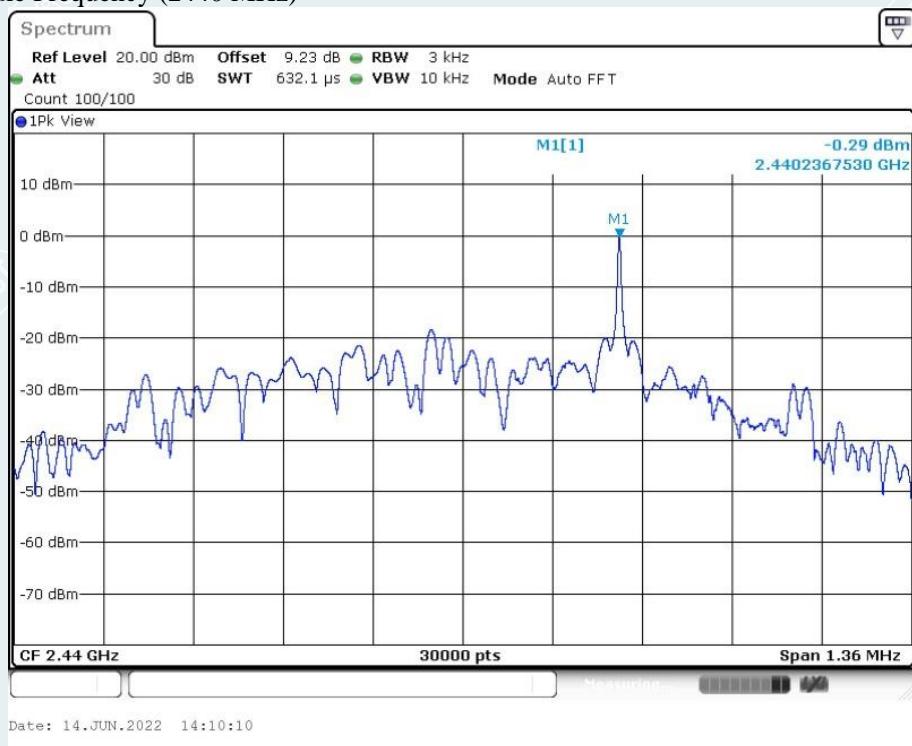
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
Lowest	2402	0.01	8.00	PASS
Middle	2440	-0.29		PASS
Highest	2480	-0.75		PASS

BLE_1M

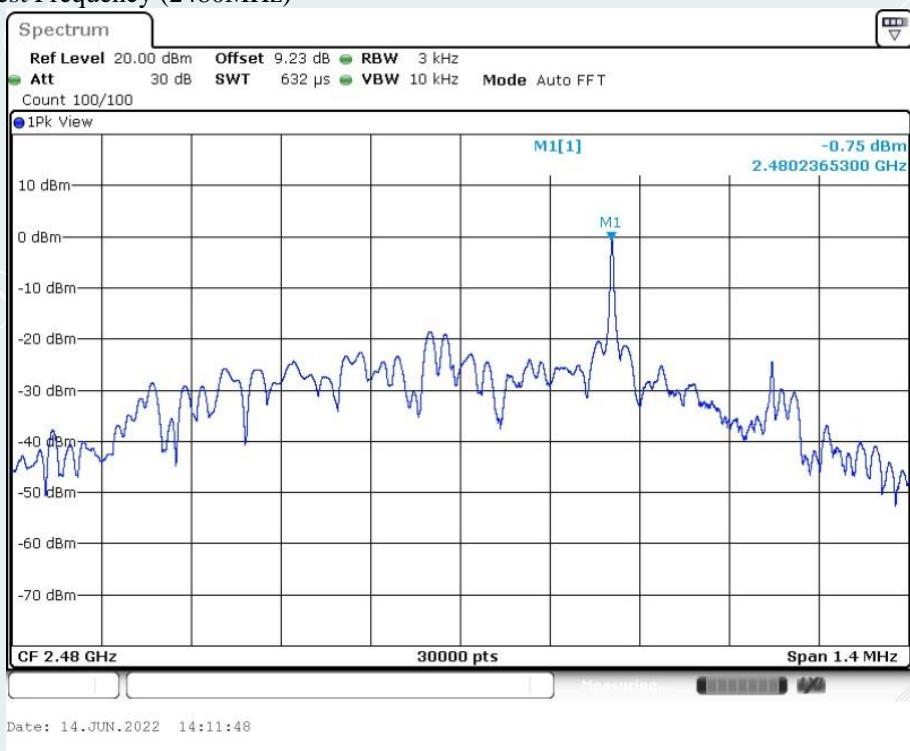
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)



Highest Frequency (2480MHz)



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9. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

9.1 LIMITS

In any 100kHz 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 20dB below that in the 100kHz 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 30dB instead of 20dB.

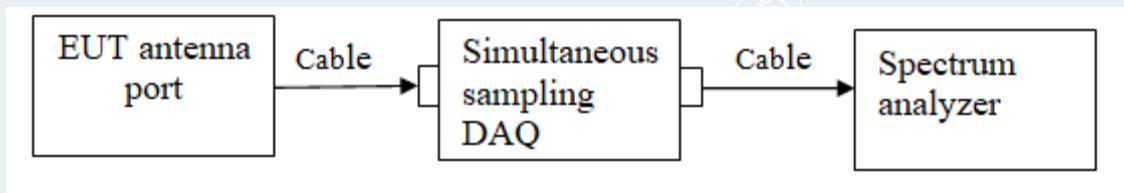
9.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 15.247 Measurement Guidance v05r02.

Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

- 1) Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: RBW =100kHz; VBW =300kHz, Frequency range = 30MHz to 26.5GHz; Sweep = auto; Detector Function = Peak. Trace = Max, hold.
- 3) Measure and record the results in the test report.
- 4) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

9.3 TEST SETUP



9.4 TEST RESULTS

Environment: 24.5°C/52%RH/101.0kPa

Tested By:Huang Lifang

Voltage: DC 3.3V

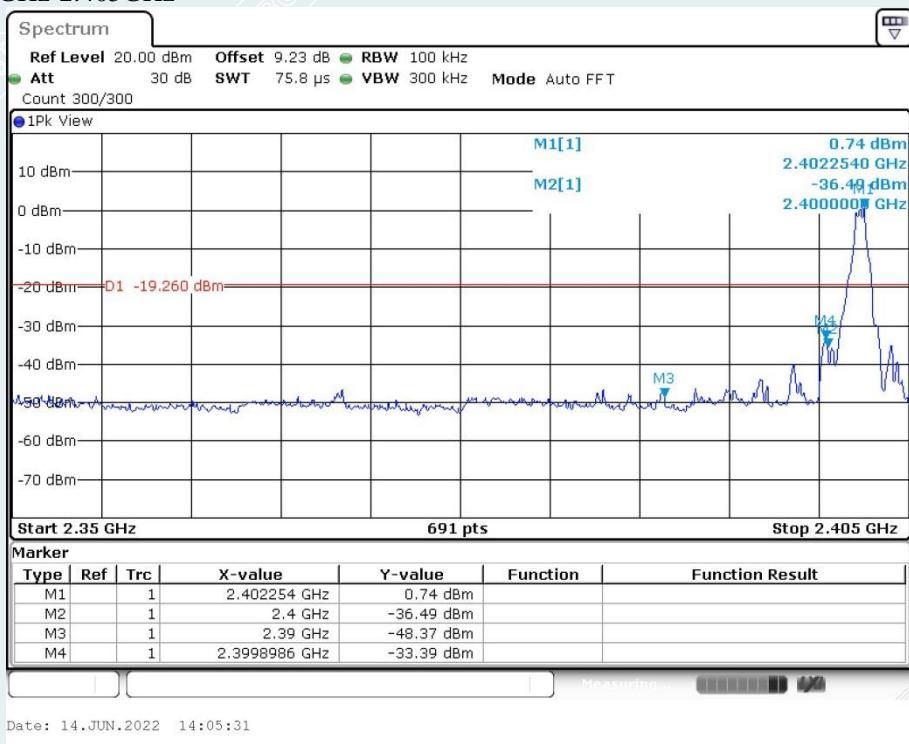
Date: 2022-06-14

Band edge measurements

BLE_1M

Lowest Frequency (2402MHz)

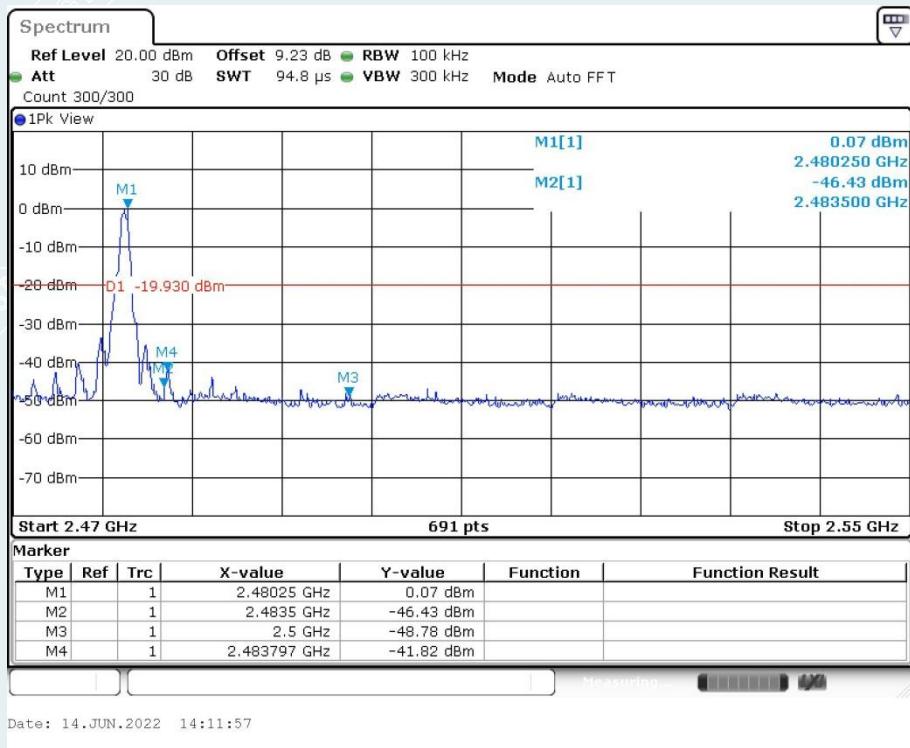
2.35GHz-2.405GHz



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Highest Frequency (2480MHz)

2.47GHz-2.55GHz

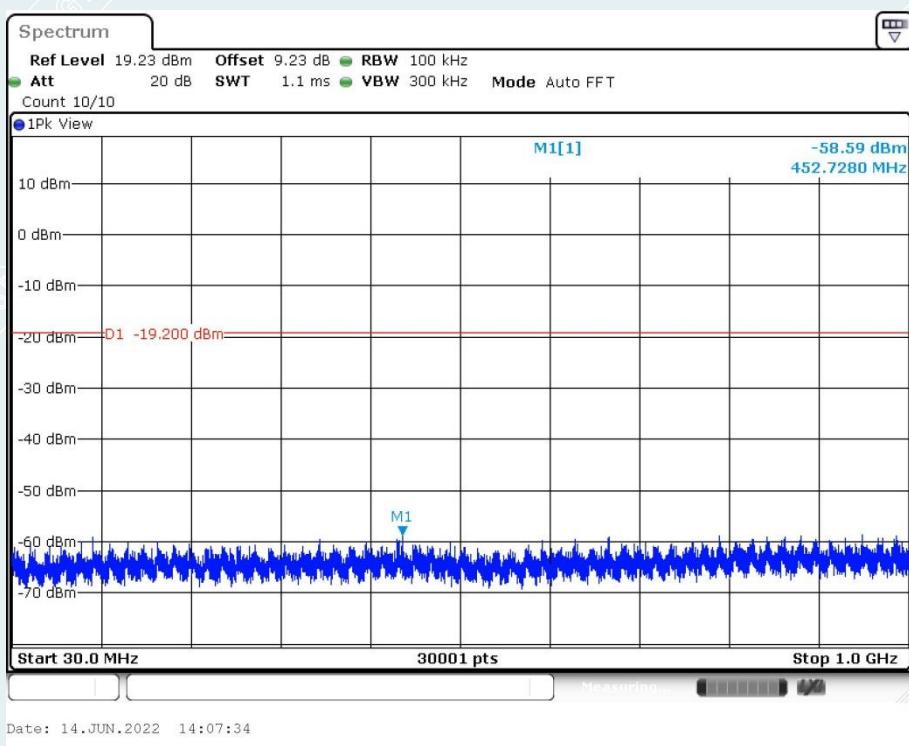
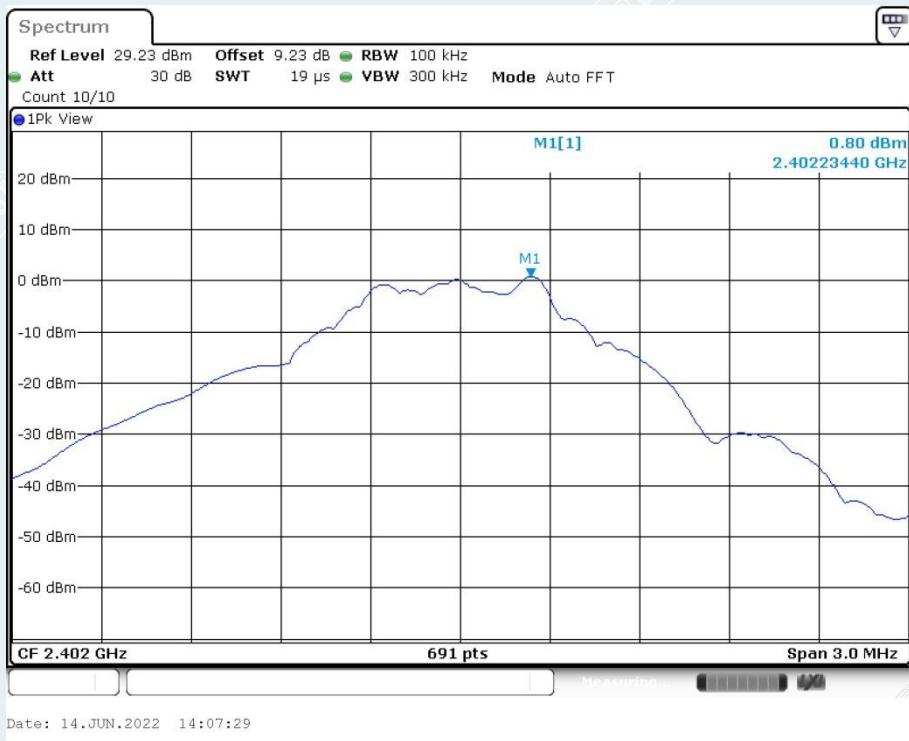


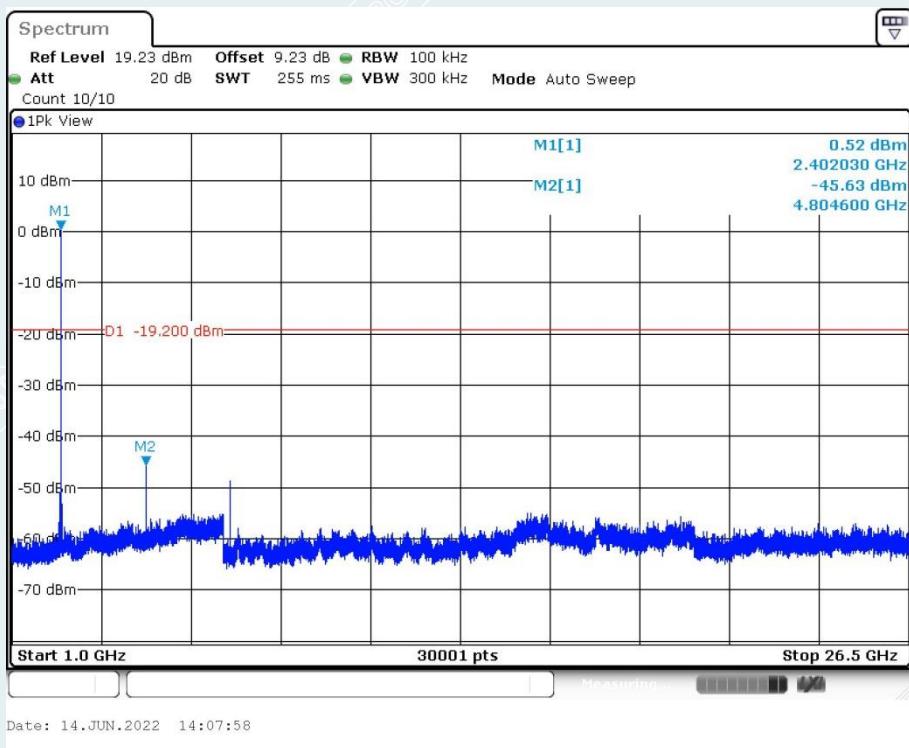
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Conducted Spurious Emission

BLE_1M

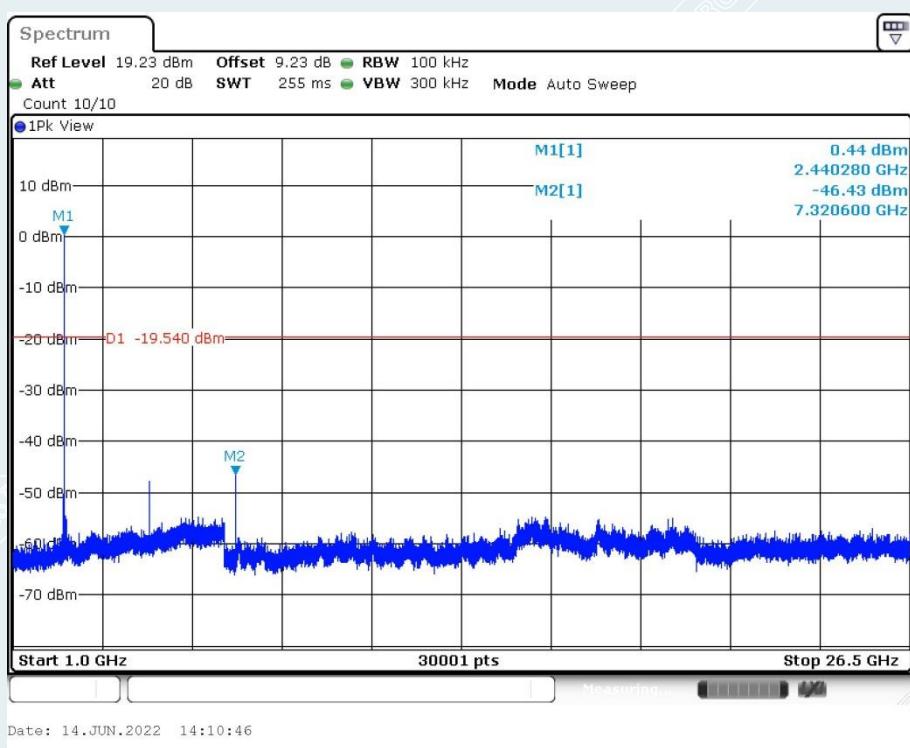
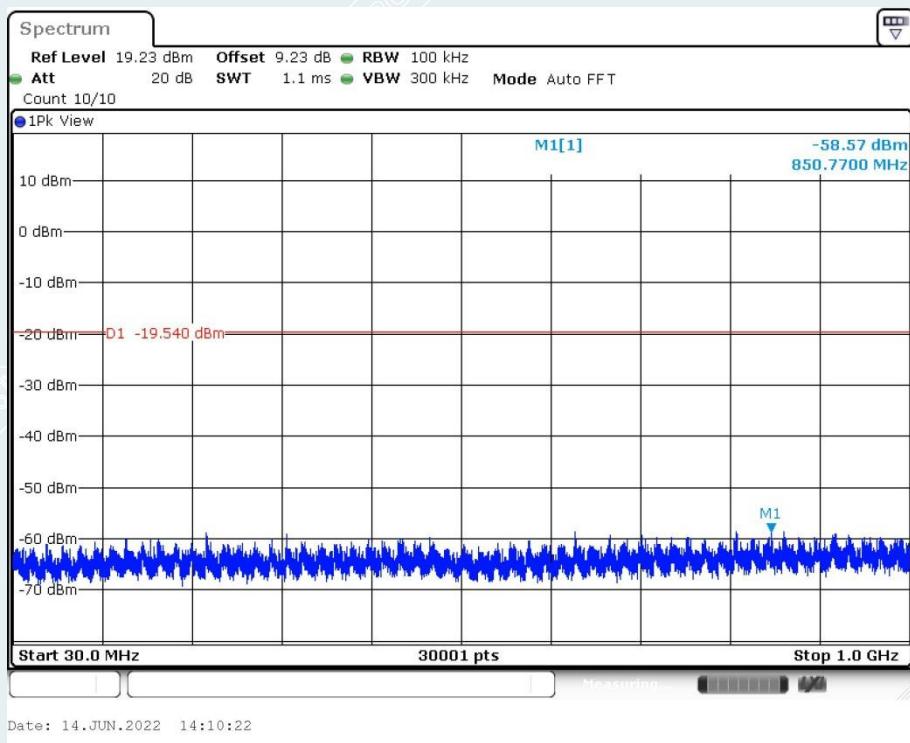
Lowest Frequency (2402MHz)





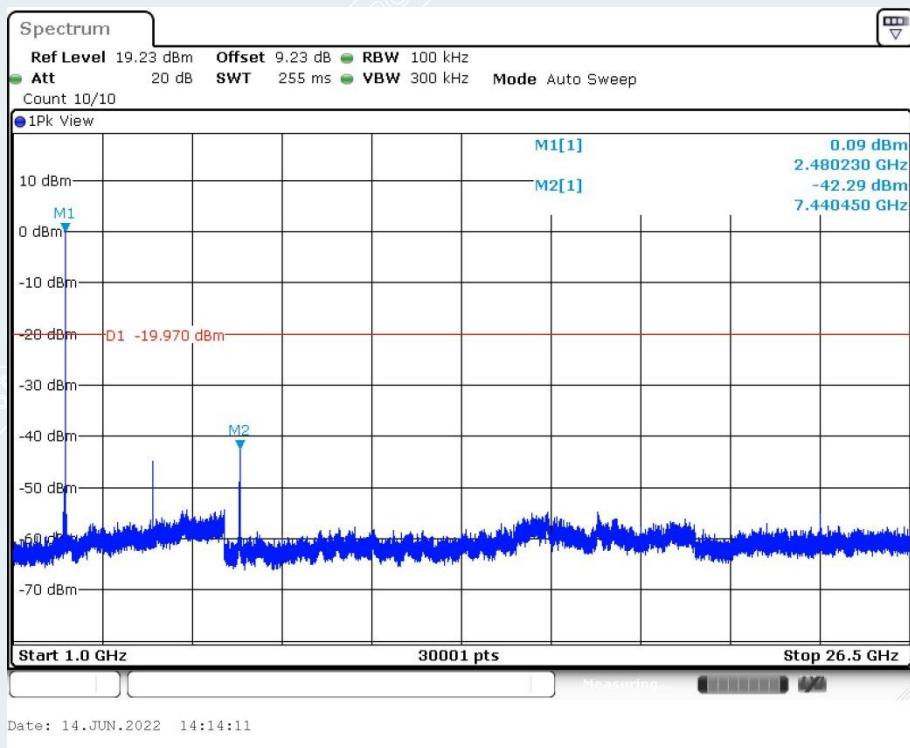
Middle Frequency (2440MHz)





Highest Frequency (2480MHz)





----- The following blanks -----

10. RESTRICTED BANDS OF OPERATION

10.1 LIMITS

Section 15.247(d) 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)).

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

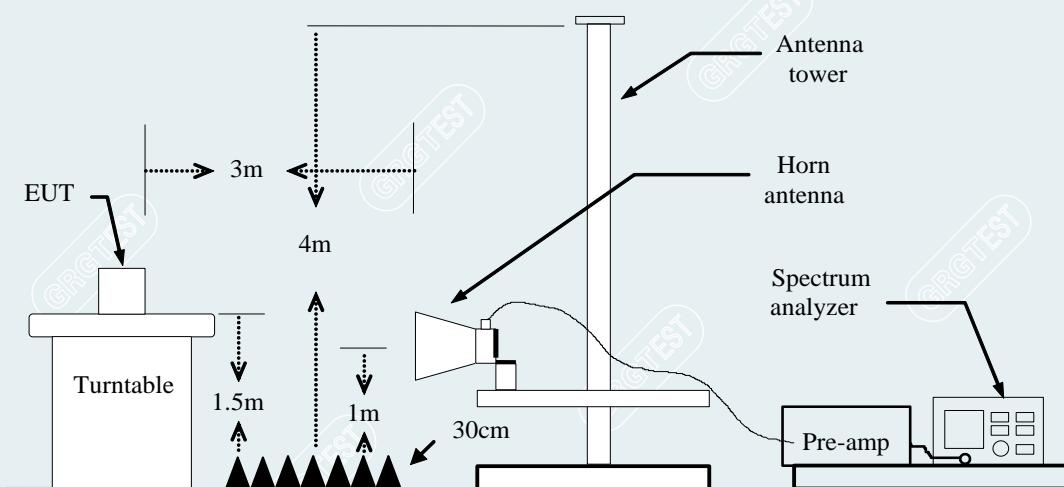
Frequency (MHz)	Quasi-peak(μ V/m)	Measurement distance(m)	Quasi-peak(dB μ V/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

10.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 15.247 Meas Guidance v05r02.

- 1) The EUT is placed on a turntable, which is 1.5m above the ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - a) PEAK: RBW=1MHz / VBW=1MHz / Sweep=AUTO.
 - b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO.
 If the EUT is configured to transmit with duty cycle $\geq 98\%$, set $VBW \leq RBW/100$ (i.e., 10kHz) but not less than 10 Hz. If the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$, Where T is defined in section 2.9.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus polarization are measured.

10.3 TEST SETUP



10.4 TEST RESULTS

Equipment:	Bluetooth module	Test Date	2022-06-13
Model No.:	BC213	Test Engineer:	Zhang Zishan
Test Voltage:	DC 3.3V	Environment:	24.8°C/49%RH/101.0kPa

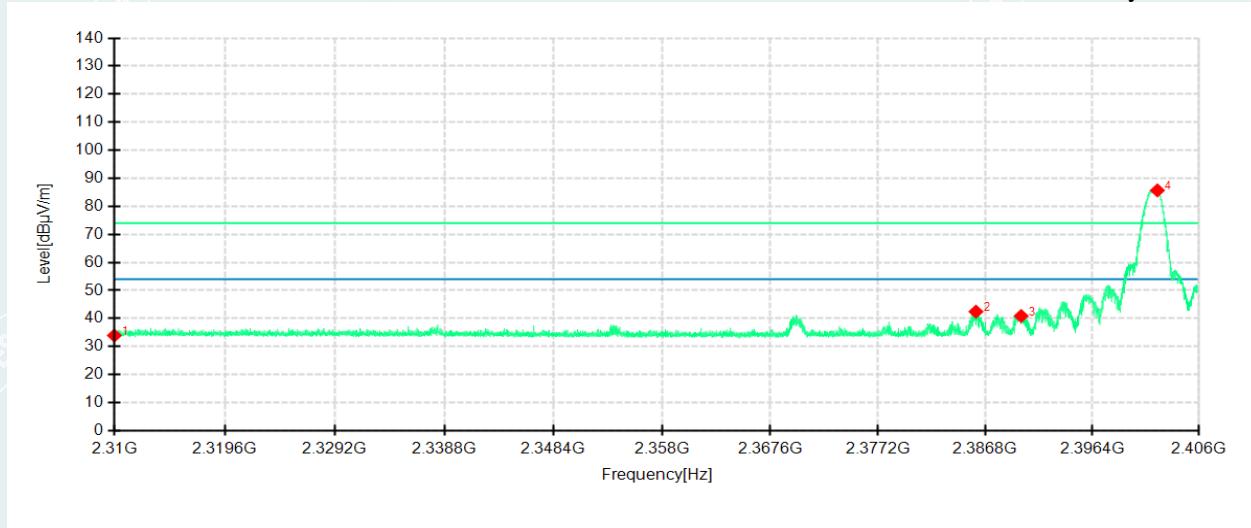
BLE 1M

Lowest Frequency

Frequency 2402MHz

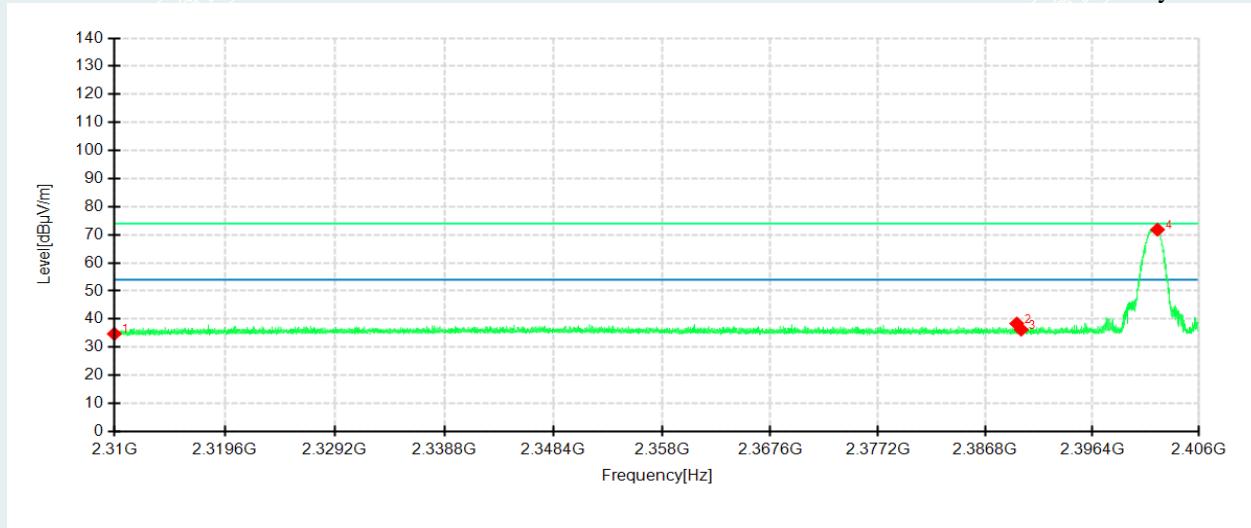
Detector mode: Peak

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical

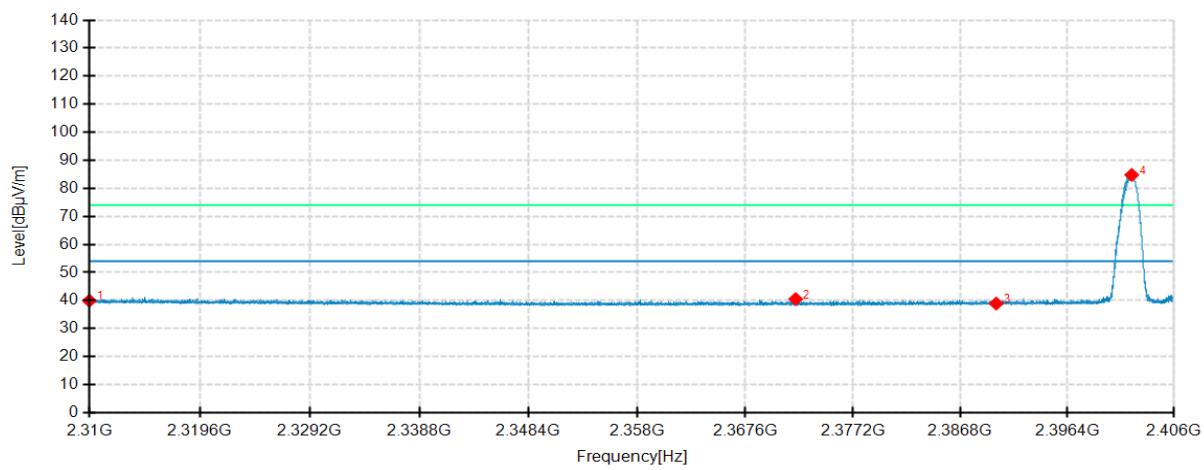


No.	Frequency MHz	Reading dB μ V/m	Level dB μ V/m	Factor dB	Limit dB μ V/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	53.24	33.93	-19.31	74.00	40.07	200	95	Horizontal	/
2	2385.9456	61.71	42.44	-19.27	74.00	31.56	100	96	Horizontal	/
3	2390.0000	60.12	40.88	-19.24	74.00	33.12	100	96	Horizontal	/
4	2402.2560	104.83	85.67	-19.16	74.00	-11.67	100	96	Horizontal	No limit
1	2310.0000	53.47	34.74	-18.73	74.00	39.26	200	296	Vertical	/
2	2389.6032	56.51	38.41	-18.10	74.00	35.59	100	196	Vertical	/
3	2390.0000	54.36	36.26	-18.10	74.00	37.74	100	14	Vertical	/
4	2402.2656	90.03	71.82	-18.21	74.00	2.18	200	94	Vertical	No limit

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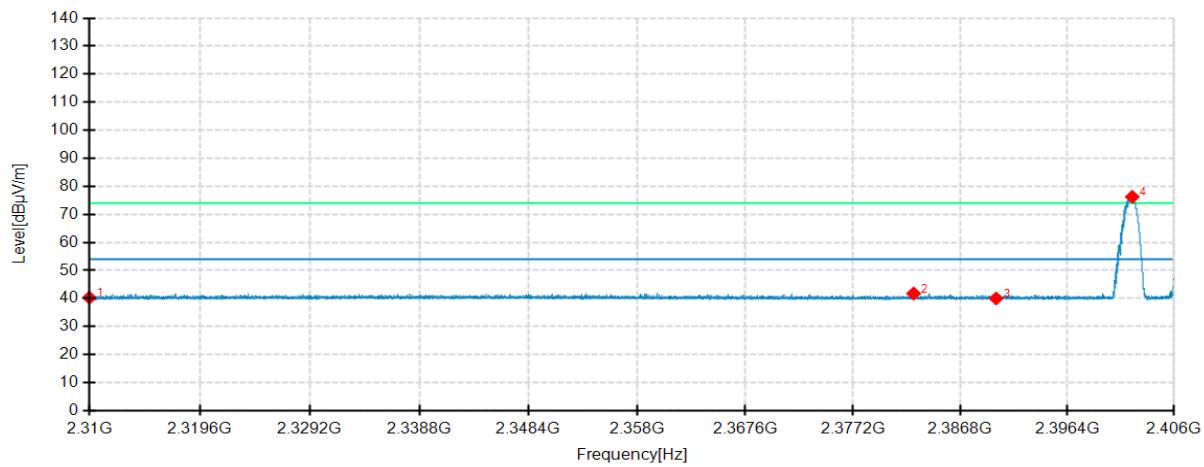
Lowest Frequency
Frequency 2402MHz
Detector mode: Average

Polarity: Horizontal



Detector mode: Average

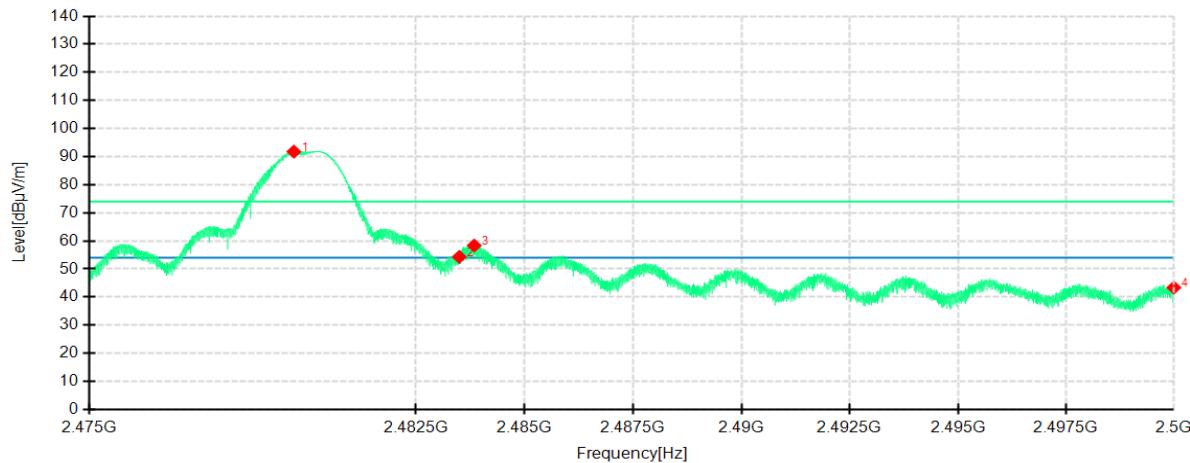
Polarity: Vertical



No.	Frequency MHz	Reading dB μ V/m	Level dB μ V/m	Factor dB	Limit dB μ V/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	35.99	39.92	3.93	54.00	14.08	100	265	Horizontal	/
2	2372.0736	37.46	40.51	3.05	54.00	13.49	100	114	Horizontal	/
3	2390.0000	35.76	38.89	3.13	54.00	15.11	200	137	Horizontal	/
4	2402.1984	81.57	84.77	3.20	54.00	-30.77	100	53	Horizontal	No limit
1	2310.0000	35.78	40.29	4.51	54.00	13.71	200	127	Vertical	/
2	2382.6048	37.43	41.77	4.34	54.00	12.23	200	202	Vertical	/
3	2390.0000	35.73	40.00	4.27	54.00	14.00	200	196	Vertical	/
4	2402.2464	72.11	76.26	4.15	54.00	-22.26	100	111	Vertical	No limit

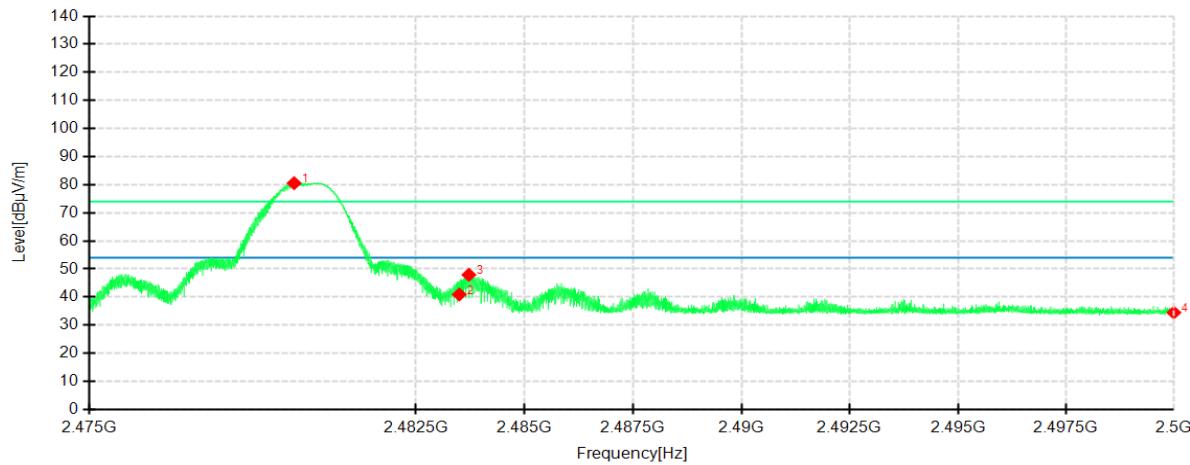
Highest Frequency
Frequency 2480MHz
Detector mode: Peak

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



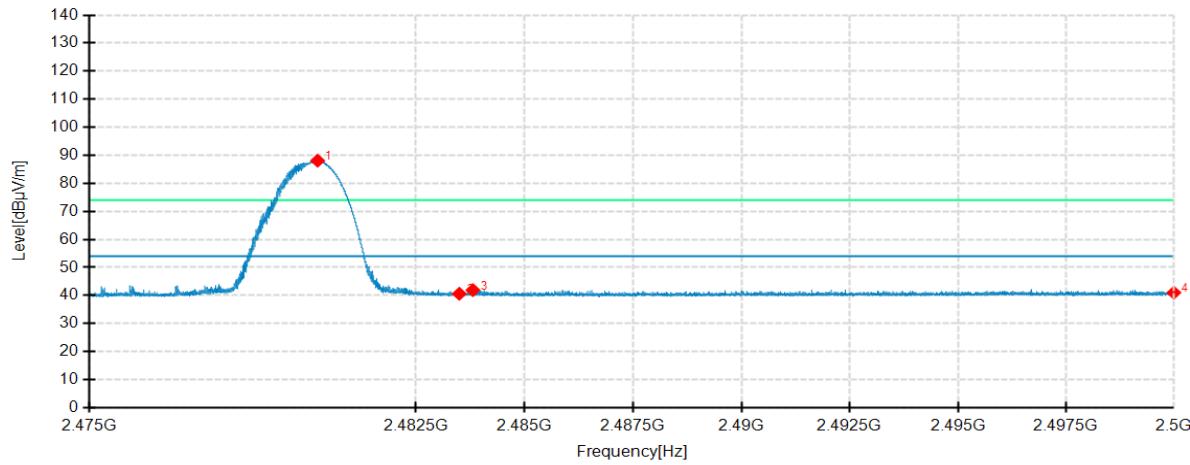
No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.6950	109.90	91.77	-18.13	74.00	-17.77	100	63	Horizontal	No limit
2	2483.5000	72.35	54.29	-18.06	74.00	19.71	100	86	Horizontal	/
3	2483.8425	76.39	58.34	-18.05	74.00	15.66	100	66	Horizontal	/
4	2500.0000	61.15	43.39	-17.76	74.00	30.61	100	60	Horizontal	/
1	2479.7000	99.25	80.55	-18.70	74.00	-6.55	100	112	Vertical	No limit
2	2483.5000	59.61	40.91	-18.70	74.00	33.09	100	96	Vertical	/
3	2483.7200	66.61	47.91	-18.70	74.00	26.09	100	96	Vertical	/
4	2500.0000	53.13	34.47	-18.66	74.00	39.53	200	251	Vertical	/

Highest Frequency

Frequency 2480MHz

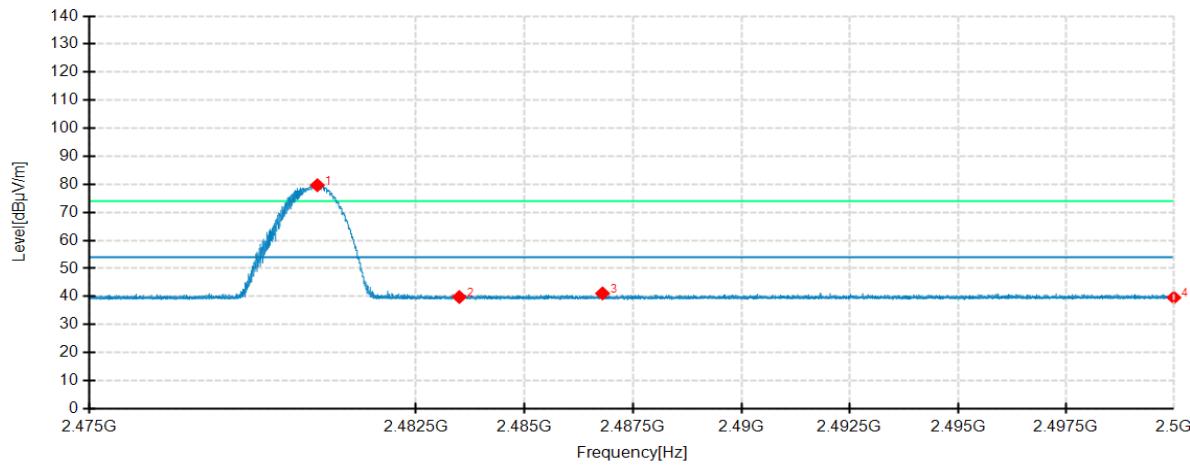
Detector mode: Average

Polarity: Horizontal



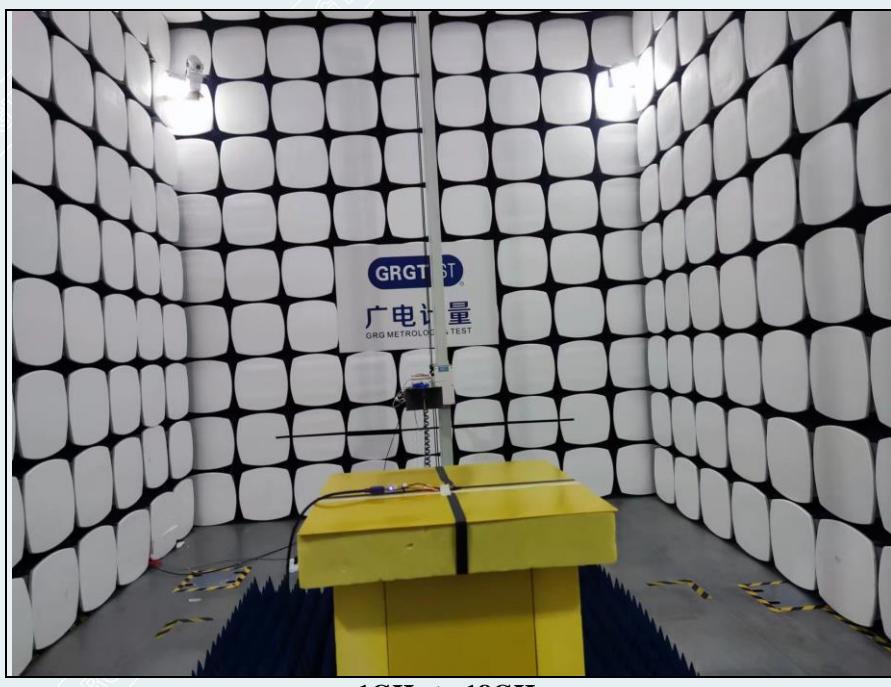
Detector mode: Average

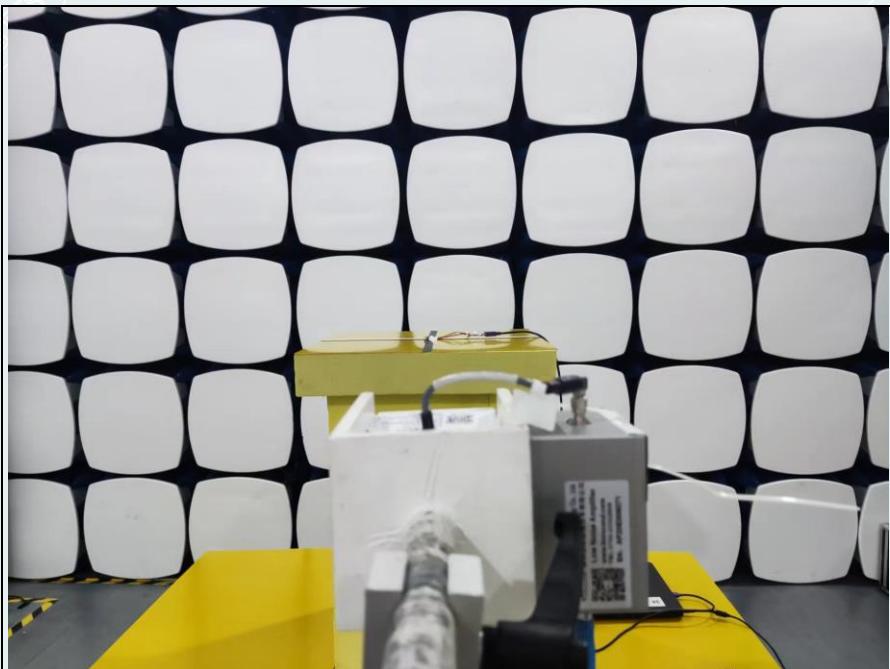
Polarity: Vertical



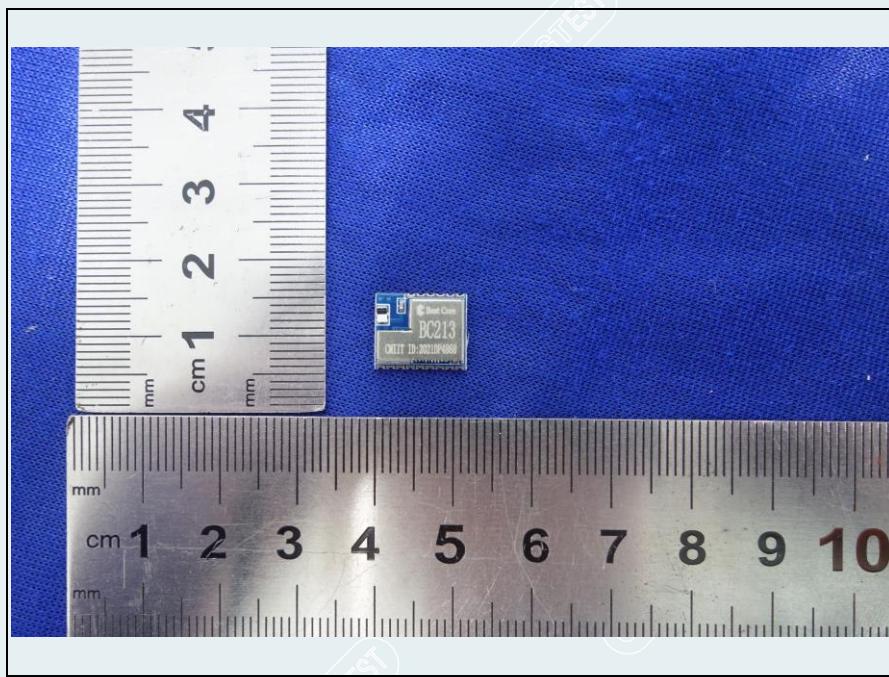
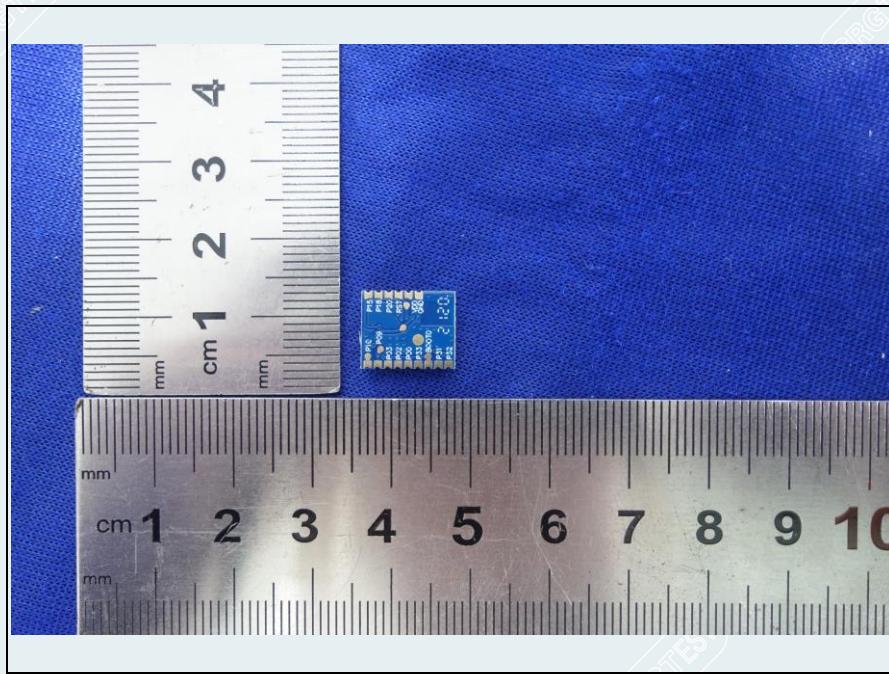
No.	Frequency MHz	Reading dB μ V/m	Level dB μ V/m	Factor dB	Limit dB μ V/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2480.2425	83.82	88.08	4.26	54.00	-34.08	100	55	Horizontal	No limit
2	2483.5000	36.28	40.61	4.33	54.00	13.39	100	9	Horizontal	/
3	2483.8125	37.58	41.91	4.33	54.00	12.09	200	147	Horizontal	/
4	2500.0000	36.36	41.01	4.65	54.00	12.99	100	266	Horizontal	/
1	2480.2350	76.01	79.69	3.68	54.00	-25.69	100	96	Vertical	No limit
2	2483.5000	36.13	39.82	3.69	54.00	14.18	100	96	Vertical	/
3	2486.8000	37.40	41.10	3.70	54.00	12.90	200	264	Vertical	/
4	2500.0000	35.85	39.60	3.75	54.00	14.40	200	109	Vertical	/

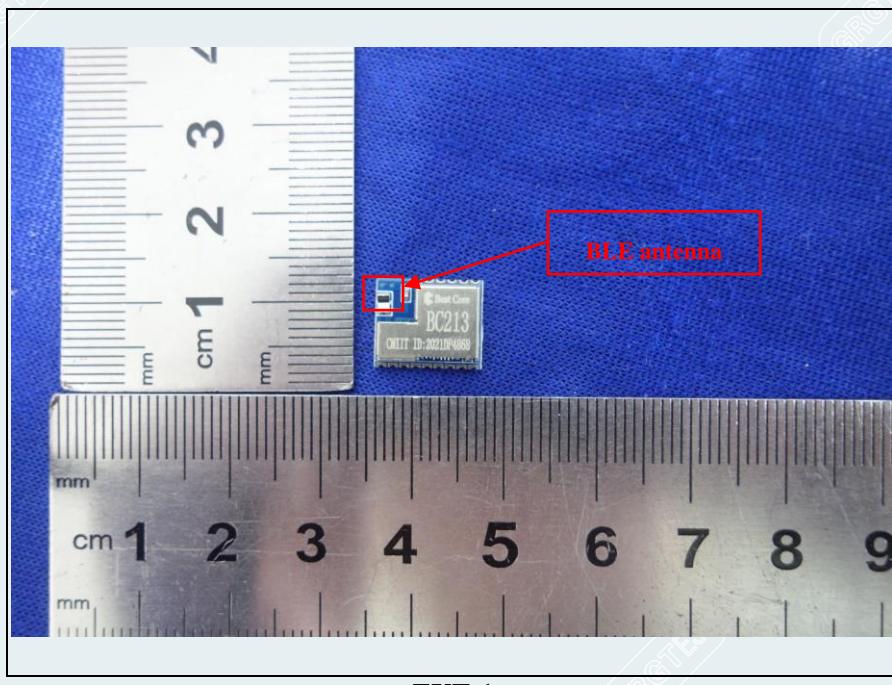
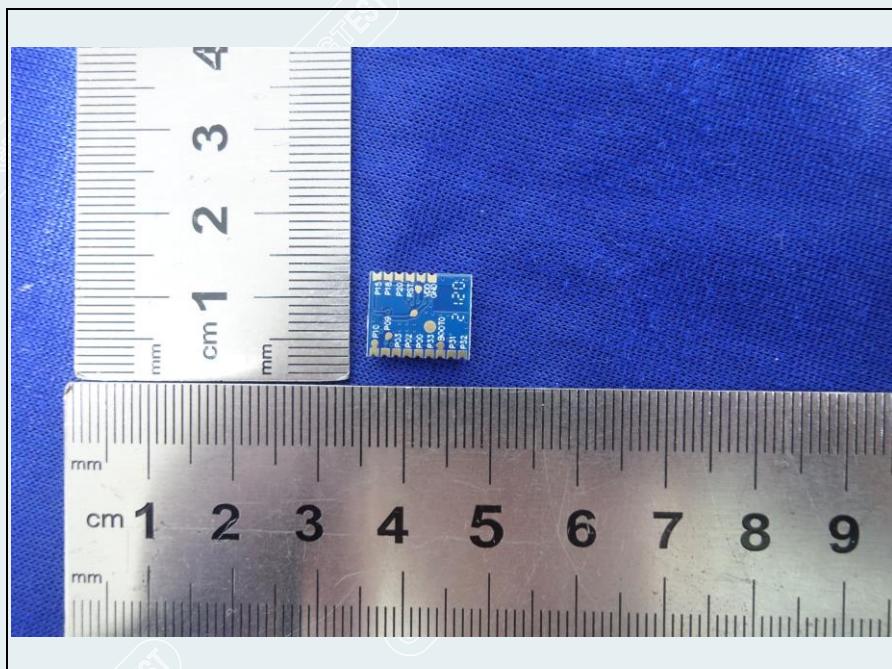
Remark: Max field strength in 3m distance. No any other emission which falls in restricted bands can be detected and be reported.

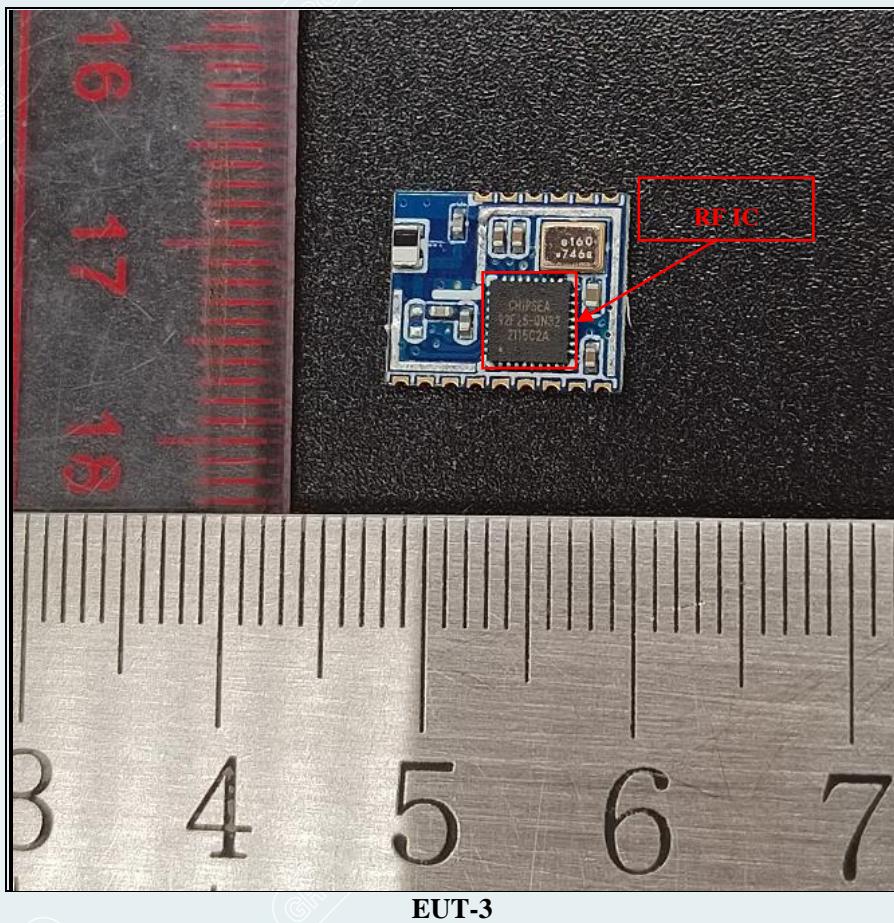
APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM**Below 1GHz****1GHz to 18GHz**



----- The following blanks -----

APPENDIX B. PHOTOGRAPH OF THE EUT**External Photos of EUT****EUT-1****EUT-2**

Internal Photos of EUT**EUT-1****EUT-2**



----- End of Report -----