

Test Report

Verified code: 453649

Report No.: E20220906368001-2

Customer: Carbon HealthTechnologies, Inc.

Address: 2100 Franklin Street Suite 355, Oakland, 94612, California, USA

Sample Name: LogBand

Sample Model: CH-M1-11

Receive Sample Date: Sep.07,2022

Test Date: Sep.08,2022 ~ Sep.21,2022

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

Test Result: Pass

Prepared by: Chen XiaoGang

Reviewed by:

Jiang Tao

Approved by:

Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2022-12-02

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

Address: No.163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, China
Tel: (+86) 400-602-0999 FAX: (+86) 020-38698685 Web: <http://www.grgtest.com>



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5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20220906368001-2	Original Issue	2022-09-23

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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	Pass
§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: The antenna is internal antenna. The max gain of antenna is -10.35dBi, 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: Carbon HealthTechnologies, Inc.
Address: 2100 Franklin Street Suite 355, Oakland, 94612, California, USA

2.2 MANUFACTURER

Name: Carbon HealthTechnologies, Inc.
Address: 2100 Franklin Street Suite 355, Oakland, 94612, California, USA

2.3 FACTORY

Name: Guangdong Transtek Medical Electronics Co., Ltd.
Address: Zone A, No 105, Dongli Road, Torch Development District, 528437 Zhongshan, Guangdong, China

2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: LogBand
Model No.: CH-M1-11
Adding Model: /
Trade Name: /
FCC ID: 2A7WWCH-M1-11
Power supply: 3.8Vdc supplied by an internal rechargeable Li-ion battery.
DC 5V supplied by USB type A port
Model: 311013
Battery Specification: Nominal Voltage: 3.8Vdc
Rated Capacity: 23mAh, 0.09Wh
Frequency Band: 2402MHz-2480MHz
Transmit Power: GFSK for 1Mbps: -0.06dBm
Modulation type: GFSK for 1Mbps
Channel space: 2MHz
Antenna Specification: Internal antenna with -10.35dBi gain (Max.)
Temperature Range: 0°C ~ +40°C
Hardware Version: TMP-2281-V2
Software Version: T011
Sample No: E20220906368001-0001, E20220906368001-0003
Note: /

2.5 CHANNELIST

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

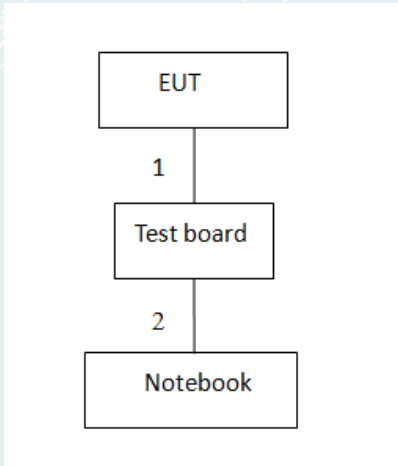
2.7 LOCAL SUPPORTIVE

Name of equipment	Manufacturer	Model	Serial number	Note
Notebook	DELL	Latitude3490	5GSXKP2	/
Test board	/	/	/	/
Adapter	Huawei	HW-090200CH0	/	/

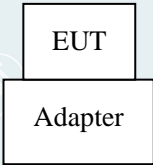
No.	Cable Type	Qty.	Shielded Type	Ferrite Core(Qty.)	Length
1	DC cable	1	No	0	Unshielded 0.15m
2	USBextension cable	1	No	0	Unshielded 1m

2.8 CONFIGURATION OF SYSTEM UNDER TEST

For Radiated Spurious Emission, Restricted bands of operation ,6dB bandwidth, Maximum Peak Output Power, Power Spectral Density, Conducted band edges and Spurious Emission



For Conducted Emission



Test software:

Software version	Test level
nRFgoStudio	Default

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2.9 DUTY CYCLE

Environment: 23.6℃/51%RH/101.0kPa
Tested By: Qin Tingting

Voltage: DC 5V from test board
Date: 2022-09-20

Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	DC [%]	T [s]
BLE_1M	Ant1	2440	0.43	0.63	68.25	0.00043

BLE_1M_2440MHz



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3. LABORATORY AND ACCREDITATIONS

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 Guangang 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,
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4. 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	5.1dB ¹⁾
		30MHz~200MHz	4.5dB ¹⁾
		200MHz~1000MHz	4.4dB ¹⁾
		1GHz~18GHz	5.6dB ¹⁾
		18GHz~26.5GHz	3.7dB ¹⁾
	Vertical	9kHz~30MHz	5.1dB ¹⁾
		30MHz~200MHz	4.4dB ¹⁾
		200MHz~1000MHz	4.5dB ¹⁾
		1GHz~18GHz	5.6dB ¹⁾
		18GHz~26.5GHz	3.7dB ¹⁾
Conduction Emission		150kHz~30MHz	3.4dB ¹⁾

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

Note:

¹⁾ This uncertainty represents an expanded uncertainty expressed at approximately the 95%.
This uncertainty represents an expanded uncertainty factor of $k=2$.

5. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Conducted Emissions				
EMI TEST RECEIVER	R&S	ESCI	100783	2023-08-28
LISN(EUT)	R&S	ENV216	101543	2023-09-13
Test S/W	EZ	CCS-3A1-CE		
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
LoopAntenna	TESEQ	HLA6121	52599	2023-04-02
Spectrum Analyzer	KEYSIGHT	N9010A	MY52221469	2023-06-29
Horn Antenna	Schwarzbeck	BBHA9120D	02143	2022-10-22
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170-497	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	FSW43	102072	2023-09-02
BT/WIFI System	Tonscend	JS0806		
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.

6. CONDUCTED EMISSION MEASUREMENT

6.1 LIMITS

Frequency range	Limits (dBμV)	
	Quasi-peak	Average
150kHz~0.5MHz	66~56	56~46
0.5MHz~5MHz	56	46
5MHz~30MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150kHz to 0.5MHz.

6.2 TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.10:2013.

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

– Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

– All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

– The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

– Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

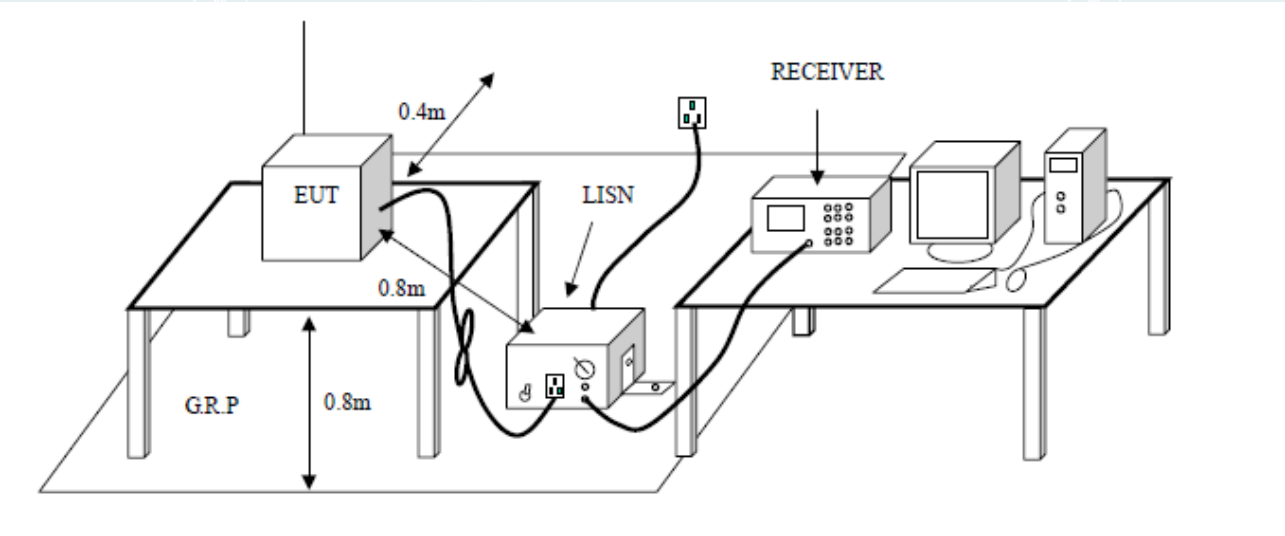
– I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.6 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.6 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

6.3 TEST SETUP



6.4 DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

- Factor
- = Insertion loss of LISN + Cable Loss
- Result
- = Quasi-peak Reading/ Average Reading + Factor
- Limit
- =Limit stated in standard
- Margin
- = Result (dBuV) – Limit (dBuV)

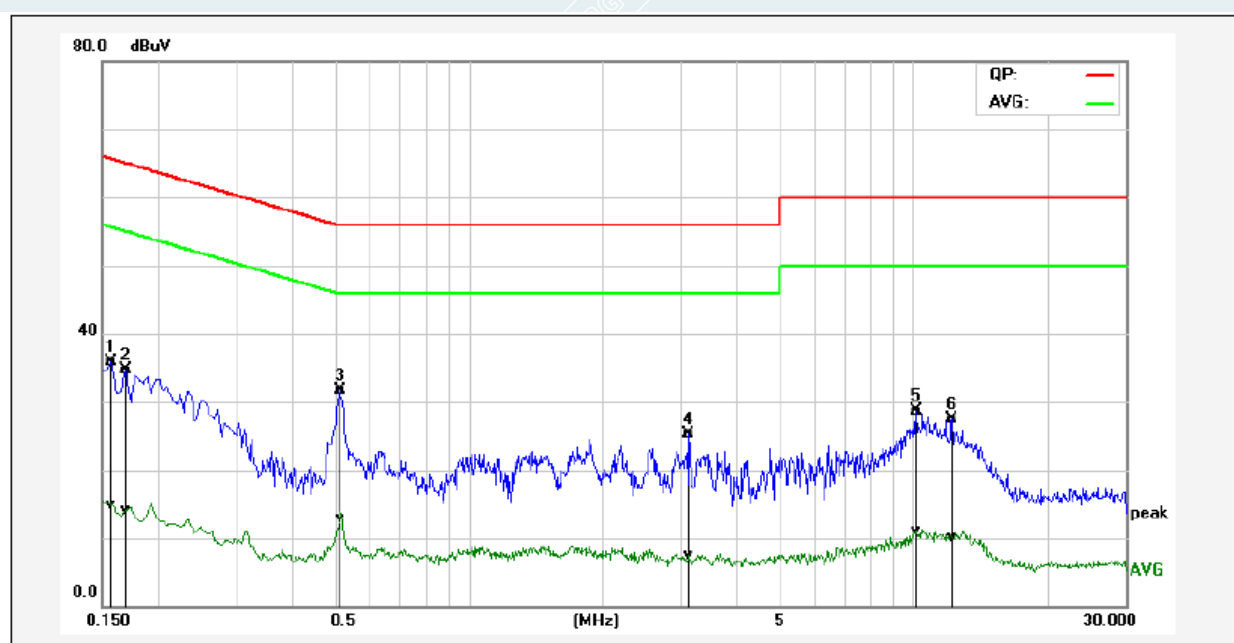
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6.5 TEST RESULTS

For adapter power supply:

EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	23.6°C/51%RH/101.0kPa	Test Mode	BLE 1M 2402MHz
Tested By	Tang Shenghui	Line	L
Tested Date	2022-09-21	Test Voltage	AC 120V/ 60Hz

(The chart below shows the highest readings taken from the final data with Adapter supply.)



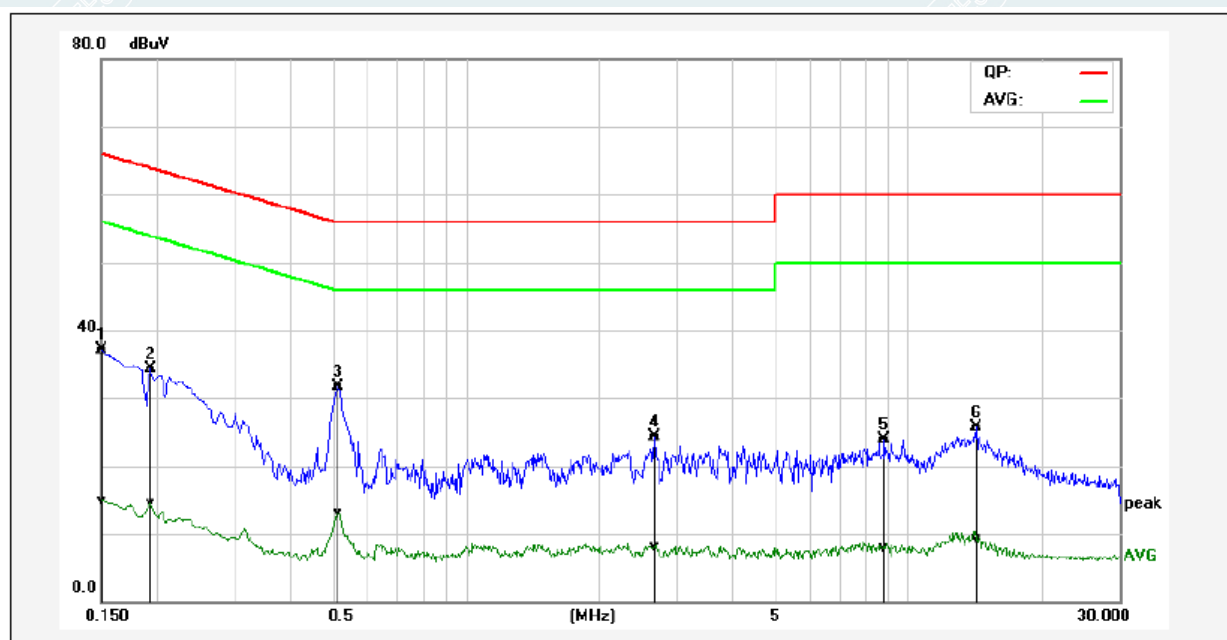
No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1580	26.23	5.36	9.61	35.84	14.97	65.56	55.57	-29.72	-40.60	Pass
2	0.1700	25.08	4.50	9.61	34.69	14.11	64.96	54.96	-30.27	-40.85	Pass
3*	0.5140	22.05	3.28	9.60	31.65	12.88	56.00	46.00	-24.35	-33.12	Pass
4	3.1260	15.62	-2.15	9.64	25.26	7.49	56.00	46.00	-30.74	-38.51	Pass
5	10.1580	18.92	1.42	9.71	28.63	11.13	60.00	50.00	-31.37	-38.87	Pass
6	12.2060	17.79	0.46	9.72	27.51	10.18	60.00	50.00	-32.49	-39.82	Pass

REMARKS: L = Live Line

Pre-scan all mode and recorded the worst case results in this report (TX-Low Channel(1Mbps))

EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	23.6°C/51%RH/101.0kPa	Test Mode	BLE 1M 2402MHz
Tested By	Tang Shenghui	Line	N
Tested Date	2022-09-21	Test Voltage	AC 120V/ 60Hz

(The chart below shows the highest readings taken from the final data with Adaptor supply.)



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	27.60	5.33	9.60	37.20	14.93	65.99	56.00	-28.79	-41.07	Pass
2	0.1940	24.65	4.98	9.59	34.24	14.57	63.86	53.86	-29.62	-39.29	Pass
3*	0.5140	22.12	3.54	9.59	31.71	13.13	56.00	46.00	-24.29	-32.87	Pass
4	2.6660	14.76	-1.49	9.63	24.39	8.14	56.00	46.00	-31.61	-37.86	Pass
5	8.8300	14.14	-1.78	9.72	23.86	7.94	60.00	50.00	-36.14	-42.06	Pass
6	14.2540	15.98	-0.55	9.80	25.78	9.25	60.00	50.00	-34.22	-40.75	Pass

REMARKS: N = Neutral Line.

Pre-scan all mode and recorded the worst case results in this report (TX-Low Channel(1Mbps))

7. RADIATED SPURIOUS EMISSIONS

7.1 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($\mu\text{V/m}$)	Measurement distance(m)	Quasi-peak(dB $\mu\text{V/m}$)@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 $\mu\text{V/m}$).
The Avg Limit=54+20*log(3/1)=63.54 (dB $\mu\text{V/m}$).

7.2 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 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 premeasurement 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 premeasurement 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 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 premeasurement 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 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 premeasurements 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 premeasurement 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.

7.3 TEST SETUP

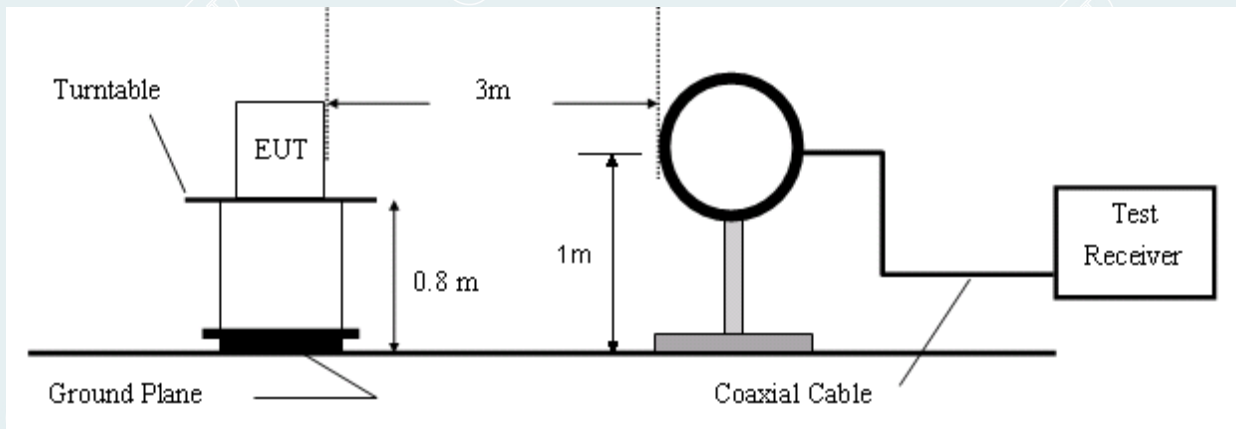


Figure 1. 9kHz to 30MHz radiated emissions test configuration

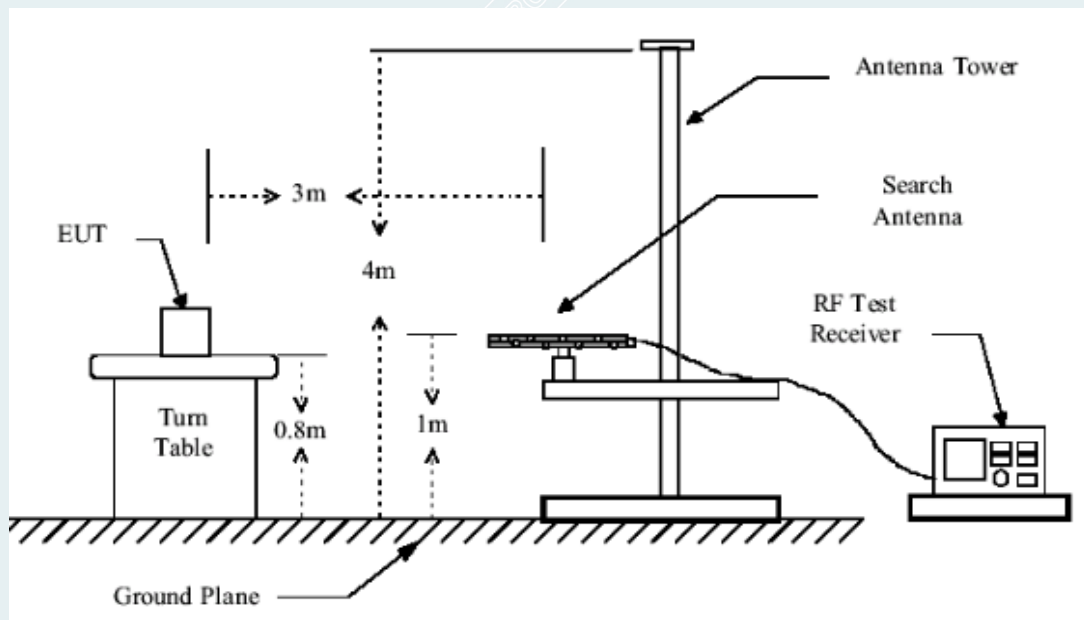


Figure 2. 30MHz to 1GHz radiated emissions test configuration

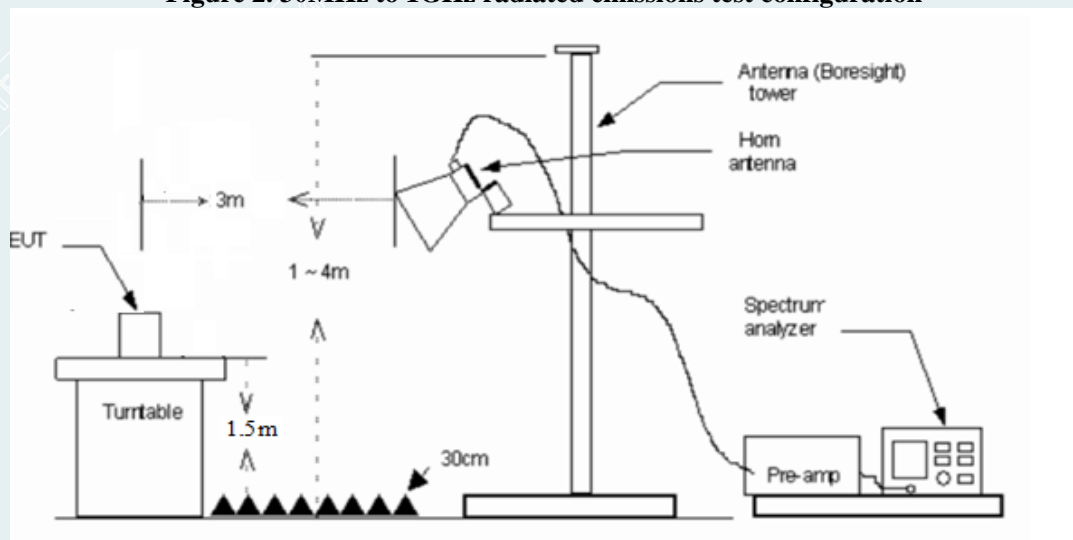


Figure 3. 1GHz to 18GHz radiated emissions test configuration

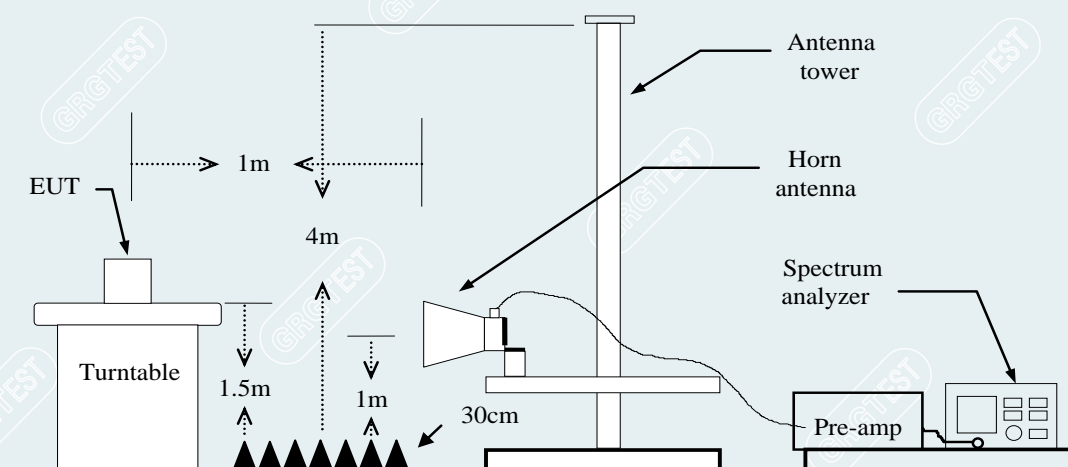


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

7.4 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

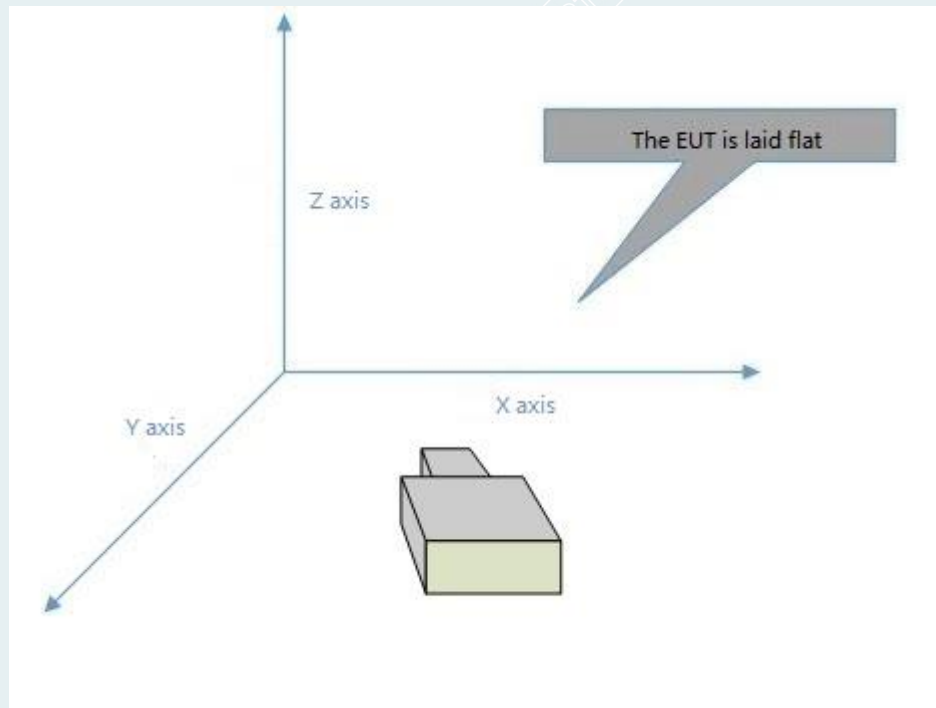
= Quasi-peak Reading

AVG

= Average Reading

7.5 TEST RESULTS

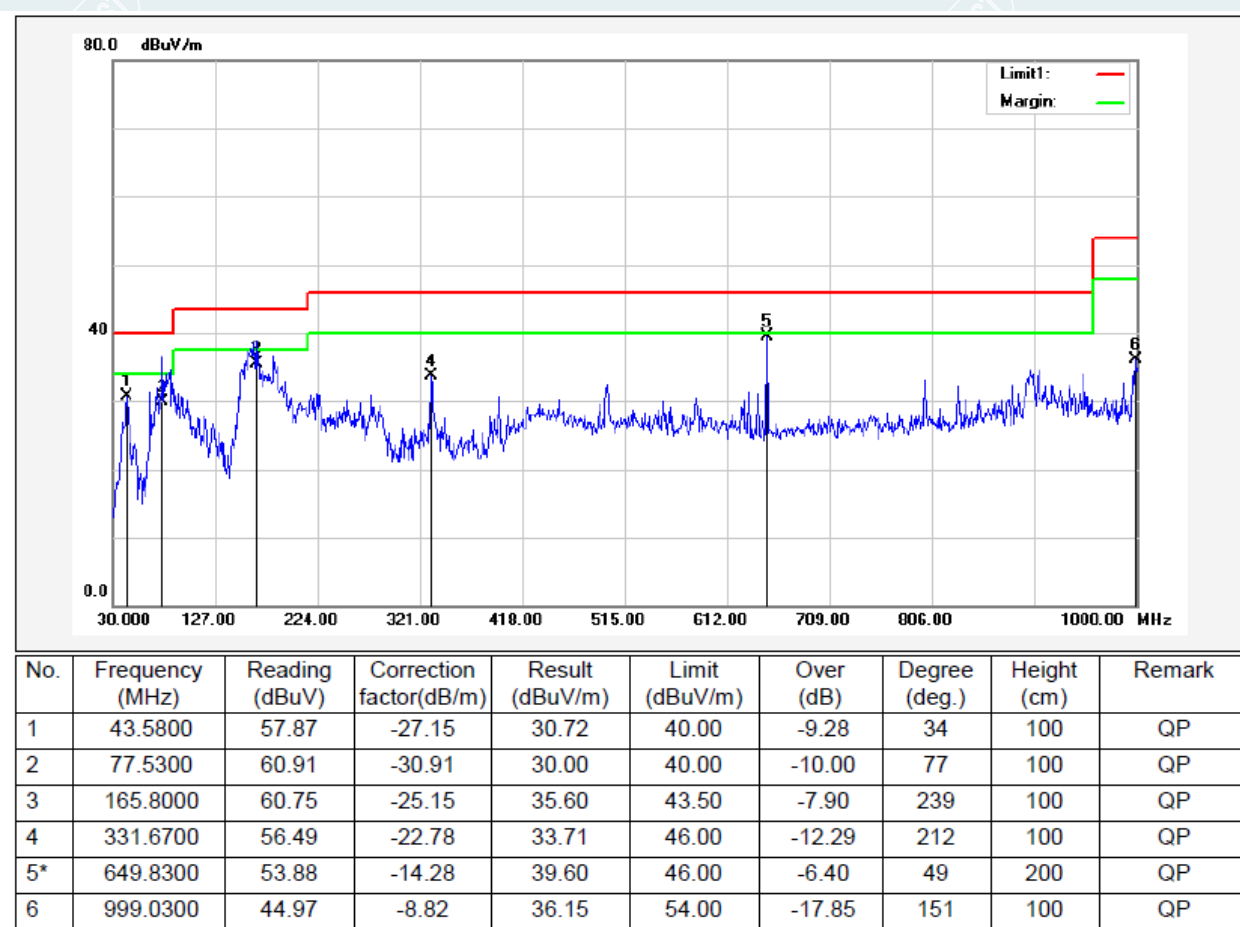
The test are under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X axis. So the data shown the X axis only.



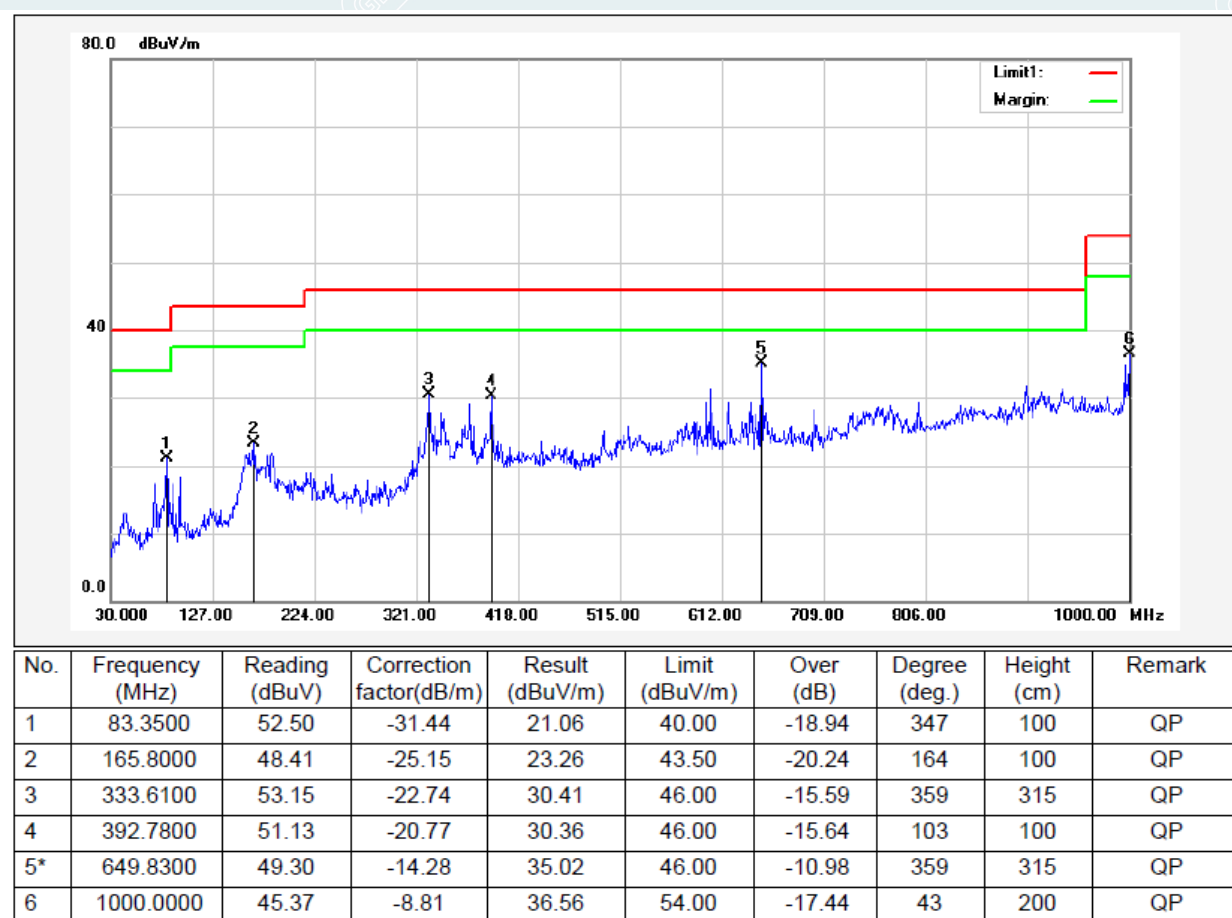
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Below 1GHz

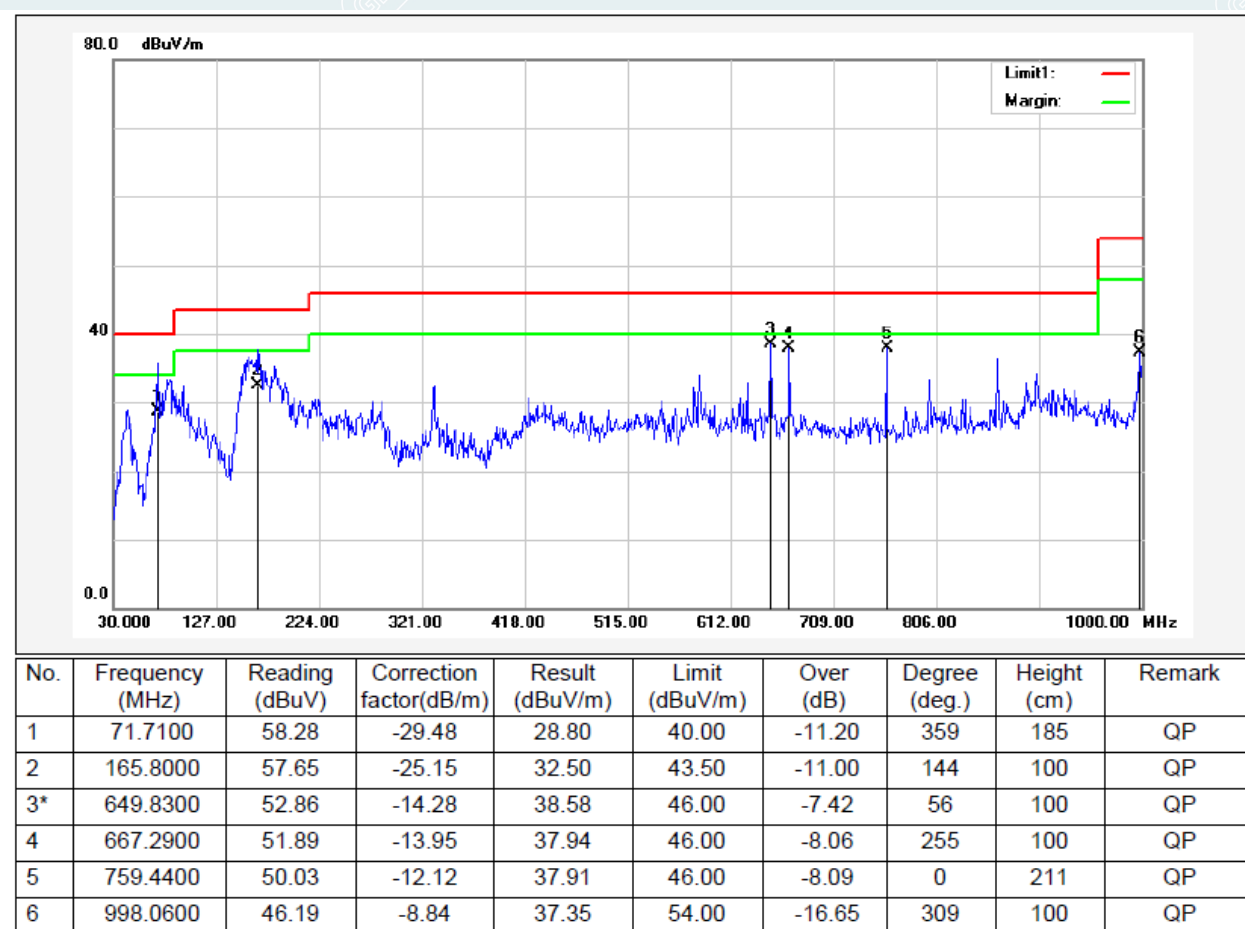
EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	21.2°C/33%RH/101.0kPa	Test Voltage	DC 5V from test board
Test Mode	TX/ BLE_1M (2402MHz)	Polarity	Vertical
Tested By	Zhang Zishan	Tested Date	2022-09-16



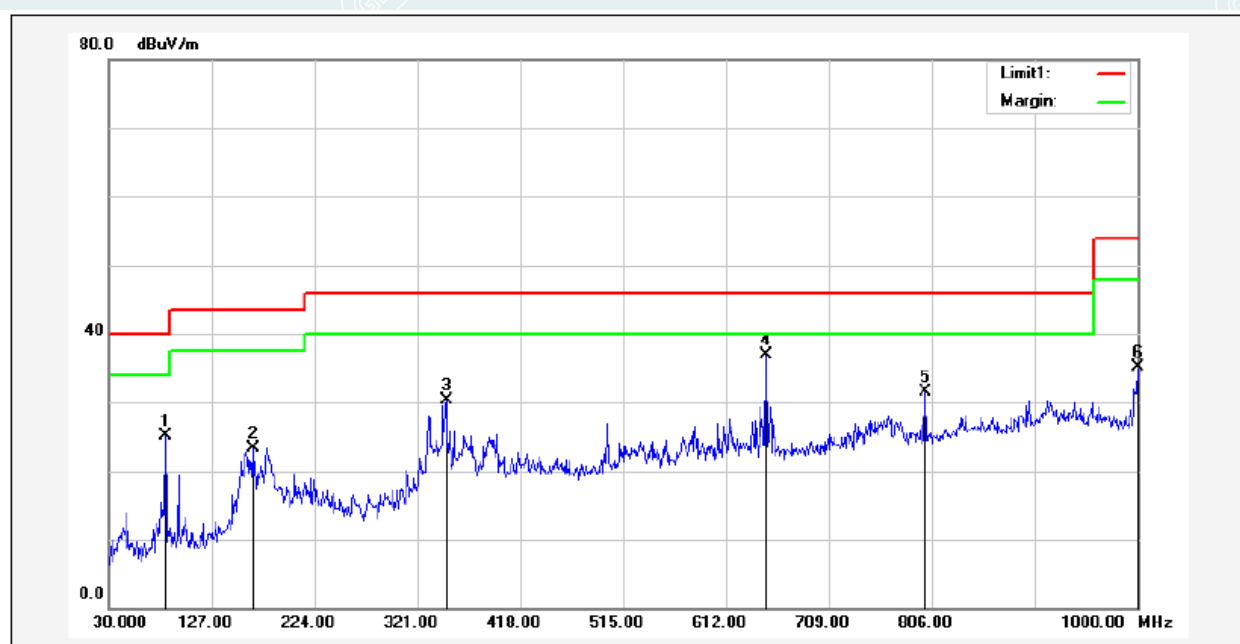
EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	21.2°C/33%RH/101.0kPa	Test Voltage	DC 5V from test board
Test Mode	TX/ BLE_1M (2402MHz)	Polarity	Horizontal
Tested By	Zhang Zishan	Tested Date	2022-09-16



EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	21.2°C/33%RH/101.0kPa	Test Voltage	DC 5V from test board
Test Mode	TX/ BLE_1M (2440MHz)	Polarity	Vertical
Tested By	Zhang Zishan	Tested Date	2022-09-16

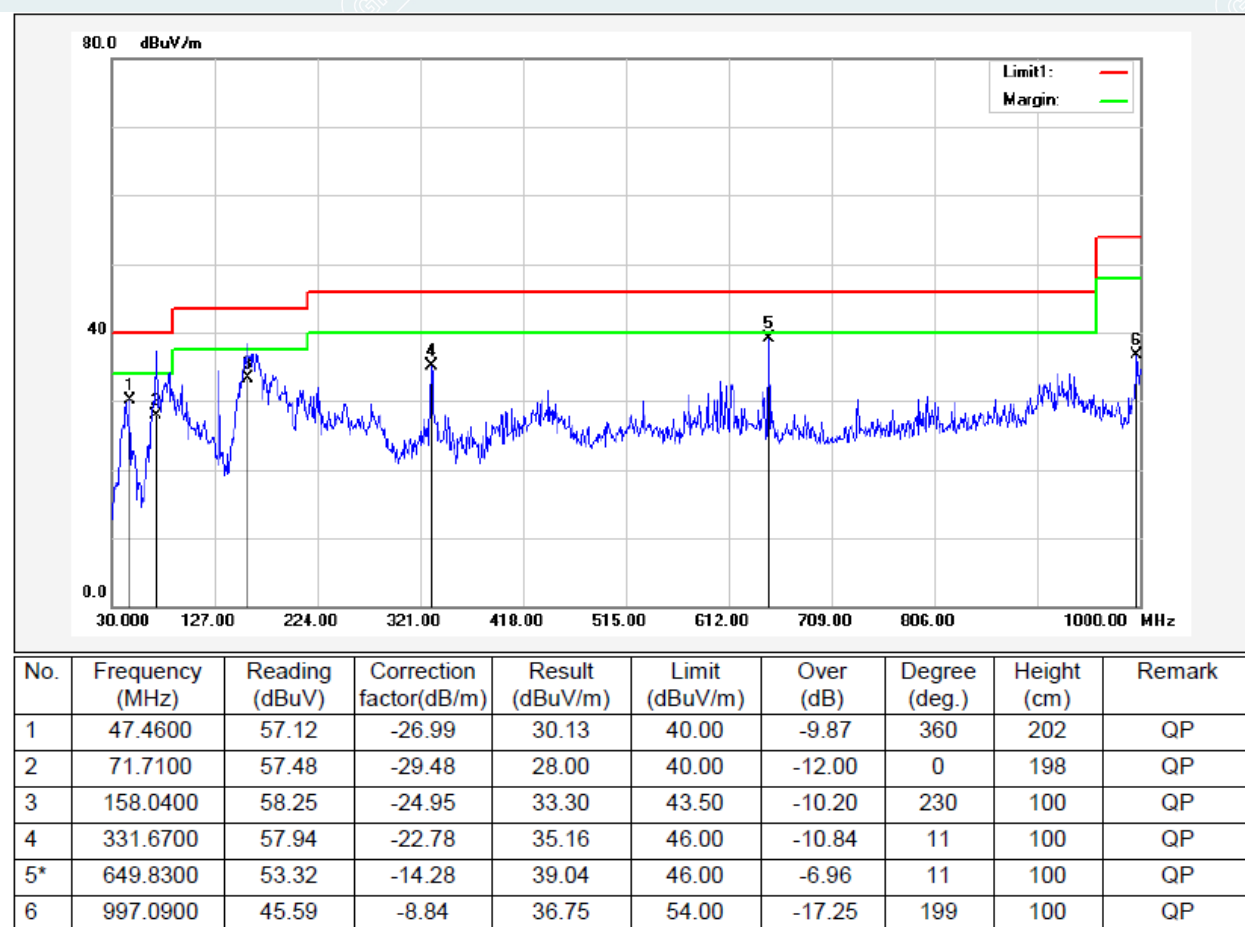


EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	21.2°C/33%RH/101.0kPa	Test Voltage	DC 5V from test board
Test Mode	TX/ BLE_1M (2440MHz)	Polarity	Horizontal
Tested By	Zhang Zishan	Tested Date	2022-09-16

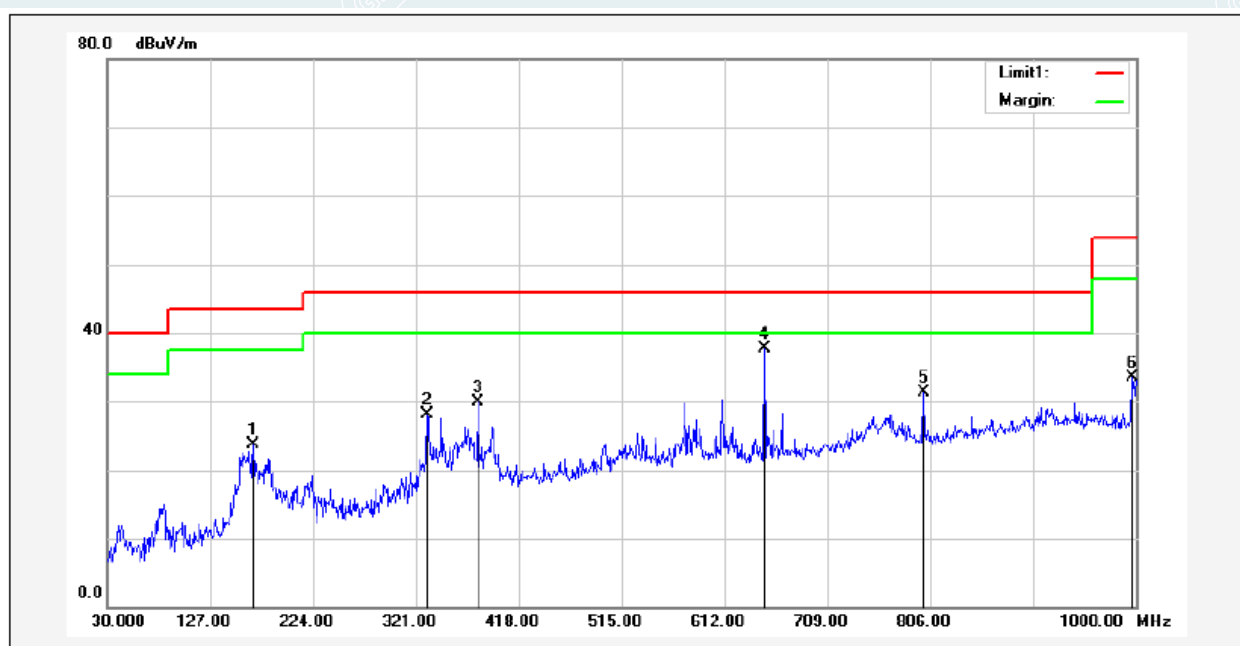


No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	83.3500	56.55	-31.44	25.11	40.00	-14.89	133	100	QP
2	165.8000	48.48	-25.15	23.33	43.50	-20.17	176	100	QP
3	348.1600	52.74	-22.39	30.35	46.00	-15.65	321	299	QP
4*	649.8300	51.22	-14.28	36.94	46.00	-9.06	61	400	QP
5	800.1800	43.05	-11.52	31.53	46.00	-14.47	342	100	QP
6	1000.0000	43.87	-8.81	35.06	54.00	-18.94	316	100	QP

EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	21.2°C/33%RH/101.0kPa	Test Voltage	DC 5V from test board
Test Mode	TX/ BLE_1M (2480MHz)	Polarity	Vertical
Tested By	Zhang Zishan	Tested Date	2022-09-16



EUT Name	LogBand	Model	CH-M1-11
Environmental Conditions	21.2°C/33%RH/101.0kPa	Test Voltage	DC 5V from test board
Test Mode	TX/ BLE_1M (2480MHz)	Polarity	Horizontal
Tested By	Zhang Zishan	Tested Date	2022-09-16



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	167.7400	48.92	-25.20	23.72	43.50	-19.78	301	199	QP
2	331.6700	50.80	-22.78	28.02	46.00	-17.98	354	199	QP
3	379.2000	51.17	-21.26	29.91	46.00	-16.09	77	299	QP
4*	649.8300	51.89	-14.28	37.61	46.00	-8.39	6	199	QP
5	800.1800	42.87	-11.52	31.35	46.00	-14.65	51	299	QP
6	996.1200	42.43	-8.86	33.57	54.00	-20.43	220	400	QP

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-18GHz:

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: 23.6°C/51%RH/101.0kPa

Tested By:Zhang Zishan

Voltage: DC 5V from test board

Date: 2022-09-16

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1488.311	67.45	44.68	-22.77	74.00	29.32	200	152	Horizontal
2	1997.8747	65.89	44.72	-21.17	74.00	29.28	100	94	Horizontal
3	2664.4581	63.49	45.06	-18.43	74.00	28.94	100	114	Horizontal
4	3996.0996	59.75	43.53	-16.22	74.00	30.47	100	121	Horizontal
5	4803.1803	59.47	47.43	-12.04	74.00	26.57	100	318	Horizontal
6	7206.4206	54.95	51.02	-3.93	74.00	22.98	200	224	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7206.2044	-3.93	50.74	46.81	54.00	7.19	193	225.6	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1661.5827	68.85	46.35	-22.50	74.00	27.65	100	173	Vertical
2	2159.1449	66.34	45.87	-20.47	74.00	28.13	100	183	Vertical
3	2846.2308	65.37	47.93	-17.44	74.00	26.07	100	164	Vertical
4	2998.4998	63.77	47.41	-16.36	74.00	26.59	100	133	Vertical
5	3990.099	59.31	43.43	-15.88	74.00	30.57	200	308	Vertical
6	4804.6805	58.59	46.24	-12.35	74.00	27.76	100	235	Vertical

Mode: TX/ BLE_1M

Middle Frequency (2440MHz)

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 5V from test board

Date: 2022-09-16

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1381.2977	68.38	45.02	-23.36	74.00	28.98	200	142	Horizontal
2	1993.6242	66.06	44.88	-21.18	74.00	29.12	100	245	Horizontal
3	2832.4791	61.60	44.90	-16.70	74.00	29.10	100	93	Horizontal
4	3990.099	57.87	41.69	-16.18	74.00	32.31	100	357	Horizontal
5	4879.688	61.32	48.20	-13.12	74.00	25.80	100	225	Horizontal
6	6660.366	54.42	47.35	-7.07	74.00	26.65	100	48	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1164.5206	67.27	43.02	-24.25	74.00	30.98	100	123	Vertical
2	1665.0831	70.56	48.16	-22.40	74.00	25.84	100	182	Vertical
3	2662.7078	67.84	50.14	-17.70	74.00	23.86	100	203	Vertical
4	3994.5995	60.55	44.65	-15.90	74.00	29.35	100	257	Vertical
5	4879.688	61.50	48.42	-13.08	74.00	25.58	100	246	Vertical
6	6609.3609	53.75	47.37	-6.38	74.00	26.63	200	290	Vertical

Mode: TX/ BLE_1M

Highest Frequency (2480MHz)

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 5V from test board

Date: 2022-09-16

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1376.7971	68.71	45.35	-23.36	74.00	28.65	100	52	Horizontal
2	1991.3739	66.07	44.90	-21.17	74.00	29.10	100	293	Horizontal
3	2659.4574	63.93	45.49	-18.44	74.00	28.51	100	261	Horizontal
4	3990.099	61.99	45.81	-16.18	74.00	28.19	100	140	Horizontal
5	4959.1959	60.59	48.78	-11.81	74.00	25.22	100	296	Horizontal
6	6709.871	52.98	46.89	-6.09	74.00	27.11	100	214	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.1381	-11.81	60.99	49.18	54.00	4.82	141	249.7	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1661.8327	69.21	46.71	-22.50	74.00	27.29	100	175	Vertical
2	2666.2083	66.68	49.02	-17.66	74.00	24.98	100	205	Vertical
3	3984.0984	59.21	43.37	-15.84	74.00	30.63	100	268	Vertical
4	4960.6961	60.85	49.33	-11.52	74.00	24.67	100	238	Vertical
5	5977.7978	54.57	45.54	-9.03	74.00	28.46	100	225	Vertical
6	6634.8635	53.54	46.74	-6.80	74.00	27.26	100	123	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.1504	-11.52	60.20	48.68	54.00	5.32	127	237.4	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

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: 23.6°C/51%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 5V from test board

Date: 2022-09-16

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18385.475	53.17	40.87	-12.30	83.54	42.67	150	345	Horizontal
2	19575.475	53.04	41.70	-11.34	83.54	41.84	150	261	Horizontal
3	21206.625	51.59	41.54	-10.05	83.54	42.00	150	144	Horizontal
4	22859.45	50.81	42.10	-8.71	83.54	41.44	150	158	Horizontal
5	25026.525	48.17	40.90	-7.27	83.54	42.64	150	294	Horizontal
6	25873.55	48.98	41.05	-7.93	83.54	42.49	150	10	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18899.725	52.91	41.05	-11.86	83.54	42.49	150	218	Vertical
2	20260.15	52.00	41.29	-10.71	83.54	42.25	150	250	Vertical
3	22659.7	50.32	41.40	-8.92	83.54	42.14	150	99	Vertical
4	22872.625	49.72	41.03	-8.69	83.54	42.51	150	336	Vertical
5	24945.35	48.10	40.85	-7.25	83.54	42.69	150	319	Vertical
6	26451.125	47.93	40.92	-7.01	83.54	42.62	150	65	Vertical

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

Mode: TX/ BLE_1M

Middle Frequency (2440MHz)

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 5V from test board

Date: 2022-09-16

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18621.35	53.28	41.20	-12.08	83.54	42.34	150	212	Horizontal
2	19611.175	53.10	41.80	-11.30	83.54	41.74	150	102	Horizontal
3	20499.85	51.29	40.80	-10.49	83.54	42.74	150	198	Horizontal
4	22752.775	50.28	41.51	-8.77	83.54	42.03	150	166	Horizontal
5	24930.9	48.87	41.50	-7.37	83.54	42.04	150	280	Horizontal
6	25634.275	46.62	39.05	-7.57	83.54	44.49	150	295	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18468.35	53.28	41.12	-12.16	83.54	42.42	150	195	Vertical
2	19615.85	52.69	41.44	-11.25	83.54	42.10	150	243	Vertical
3	21198.125	51.83	41.87	-9.96	83.54	41.67	150	306	Vertical
4	22927.025	49.70	41.03	-8.67	83.54	42.51	150	306	Vertical
5	24930.475	47.67	40.40	-7.27	83.54	43.14	150	129	Vertical
6	25658.075	46.89	39.33	-7.56	83.54	44.21	150	258	Vertical

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

Mode: TX/ BLE_1M

Highest Frequency (2480MHz)

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: DC 5V from test board

Date: 2022-09-16

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18875.925	53.48	41.60	-11.88	83.54	41.94	150	52	Horizontal
2	19651.55	53.12	41.84	-11.28	83.54	41.70	150	346	Horizontal
3	21927.425	50.56	40.79	-9.77	83.54	42.75	150	185	Horizontal
4	23559.425	48.19	39.48	-8.71	83.54	44.06	150	151	Horizontal
5	24933.025	45.46	38.10	-7.36	83.54	45.44	150	232	Horizontal
6	25684	44.68	37.01	-7.67	83.54	46.53	150	68	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18627.3	52.95	40.92	-12.03	83.54	42.62	150	178	Vertical
2	19542.325	52.98	41.63	-11.35	83.54	41.91	150	327	Vertical
3	20160.7	52.21	41.41	-10.80	83.54	42.13	150	196	Vertical
4	21131.4	51.17	41.19	-9.98	83.54	42.35	150	116	Vertical
5	22872.2	48.75	40.06	-8.69	83.54	43.48	150	82	Vertical
6	25720.975	43.91	36.26	-7.65	83.54	47.28	150	163	Vertical

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8. 6dB BANDWIDTH

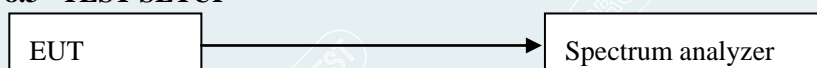
8.1 LIMITS

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.

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) 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.

8.3 TEST SETUP



8.4 TEST RESULTS

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Qin Tingting

Voltage: DC 5V from test board

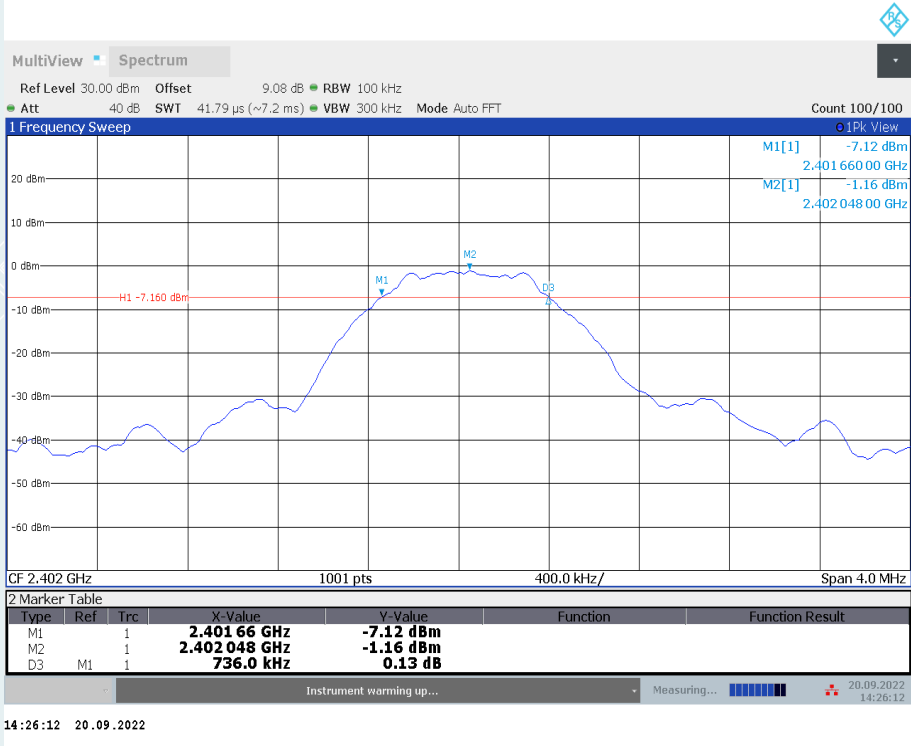
Date: 2022-09-20

BLE_1M

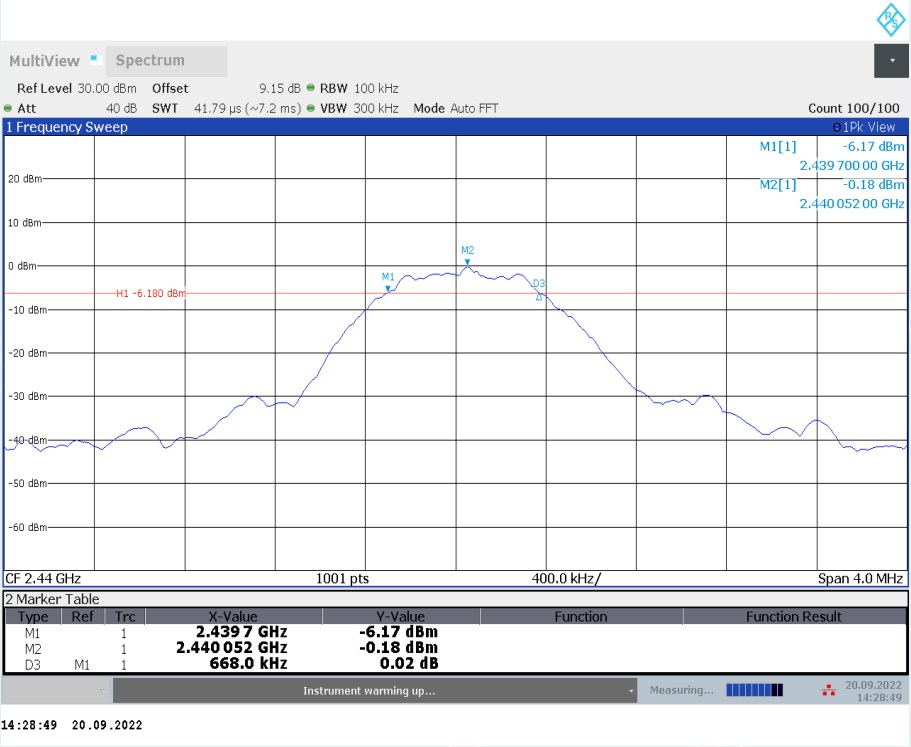
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	736	≥ 500	PASS
Middle	2440	668		PASS
Highest	2480	744		PASS

BLE_1M

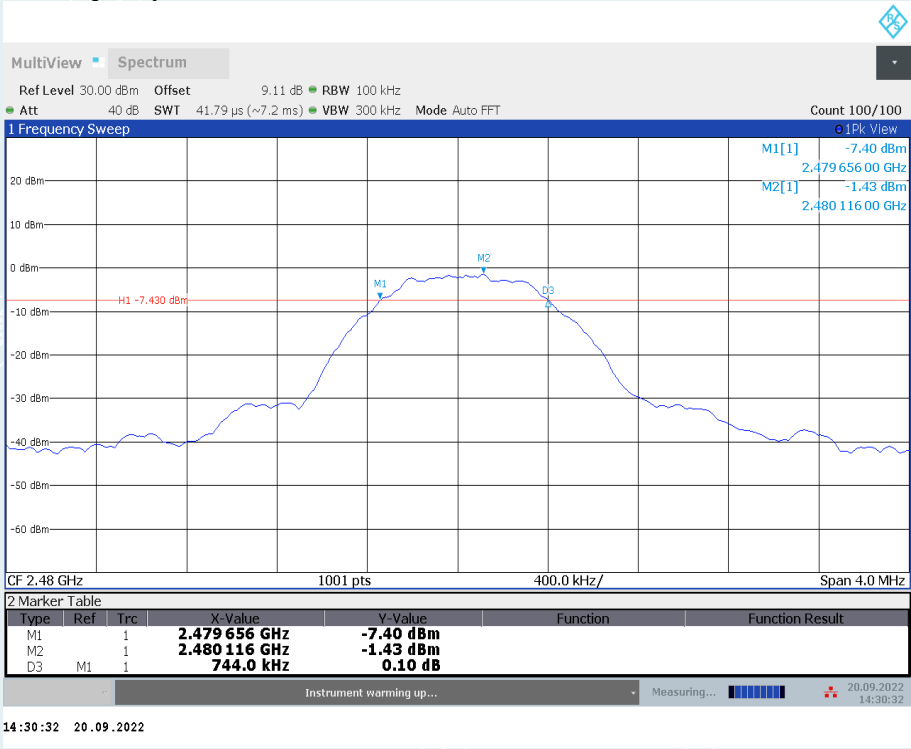
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)



Highest Frequency (2480MHz)



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9. MAXIMUM PEAK OUTPUT POWER

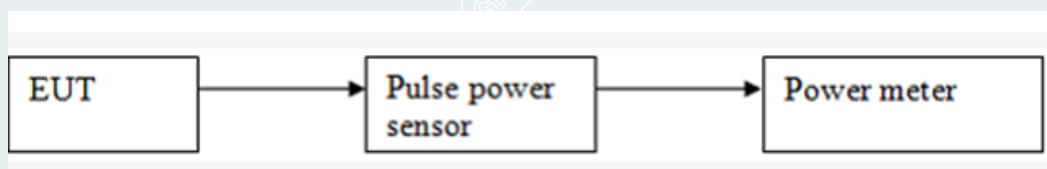
9.1 LIMITS

The maximum Peak output power measurement is 1W

9.2 TEST PROCEDURES

- 1) RF output of EUT was connected to the broadband peak RF power meter by RF cable. 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.

9.3 TEST SETUP



9.4 TEST RESULTS

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Qin Tingting

Voltage: DC 5V from test board

Date: 2022-09-20

BLE_1M

Channel	Frequency (MHz)	Measured Channel Power (dBm)	Limit	Peak/Average	Result
Lowest	2402	-0.67	1W (30dBm)	Peak	Pass
Middle	2440	-0.23			Pass
Highest	2480	-0.06			Pass

10. POWER SPECTRAL DENSITY

10.1 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.

10.2 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.

10.3 TEST SETUP



10.4 TEST RESULTS

Environment: 23.6°C/51%RH/101.0kPa

Tested By: Qin Tingting

Voltage: DC 5V from test board

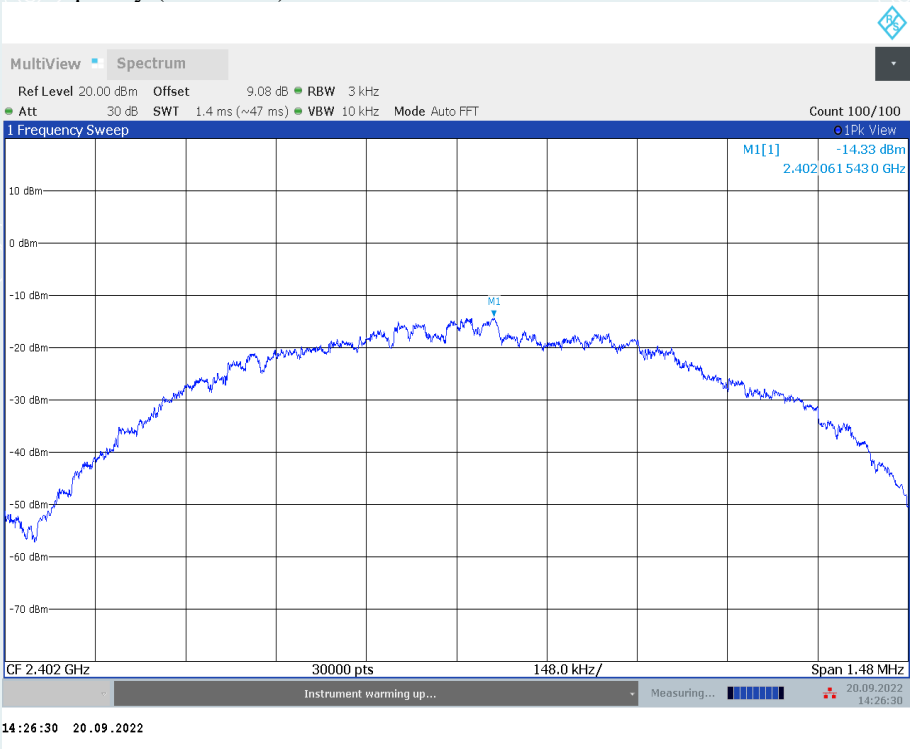
Date: 2022-09-20

BLE_1M

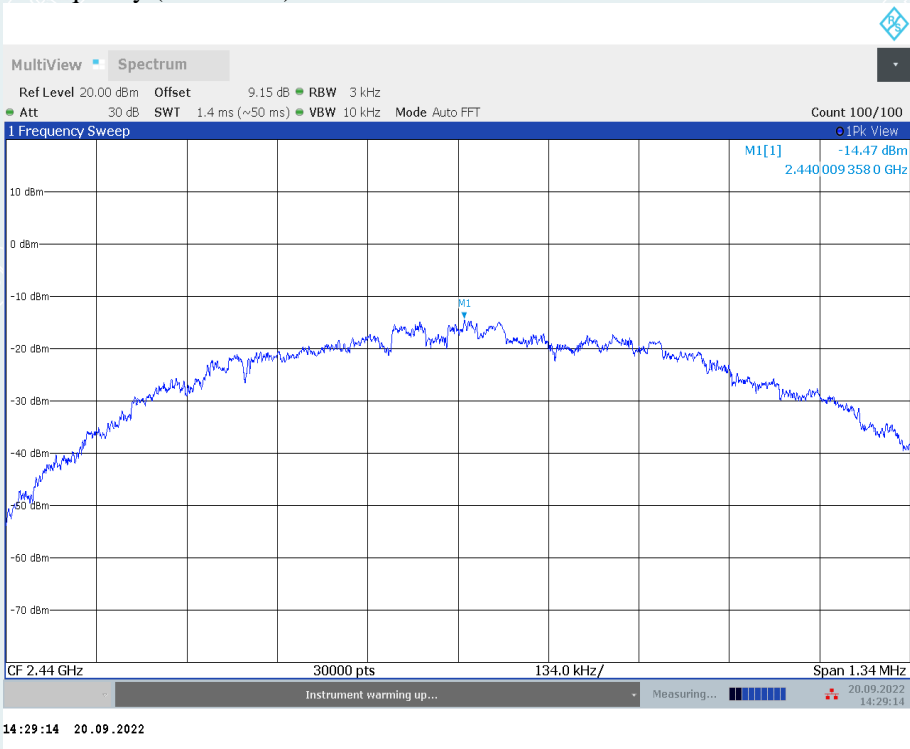
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
Lowest	2402	-14.33	8.00	PASS
Middle	2440	-14.47		PASS
Highest	2480	-14.49		PASS

BLE_1M

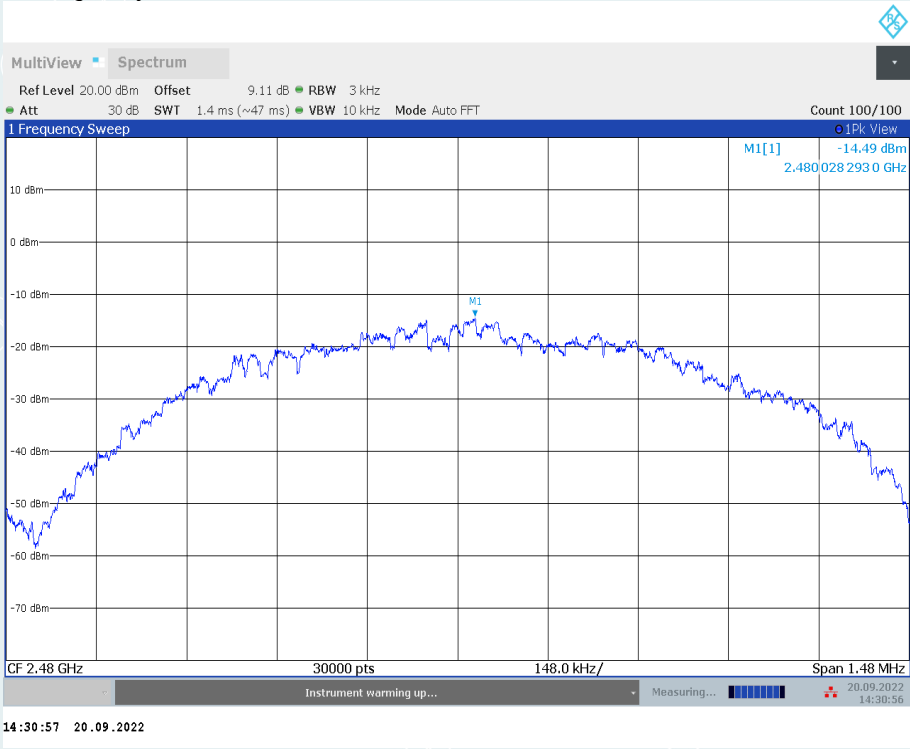
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)



Highest Frequency (2480MHz)



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11. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

11.1 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.

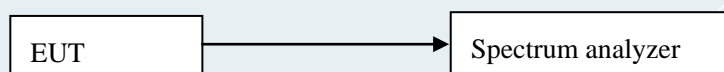
11.2 TEST PROCEDURES

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.

11.3 TEST SETUP



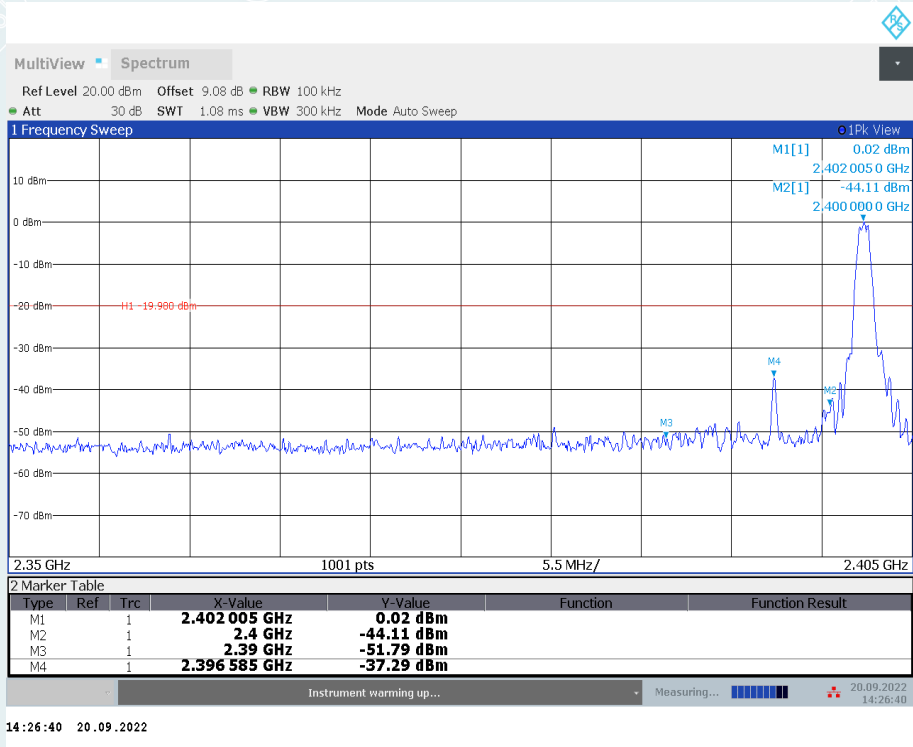
11.4 TEST RESULTS

Environment: 23.6°C/51%RH/101.0kPa
Tested By: Qin Tingting

Voltage: DC 5V from test board
Date: 2022-09-20

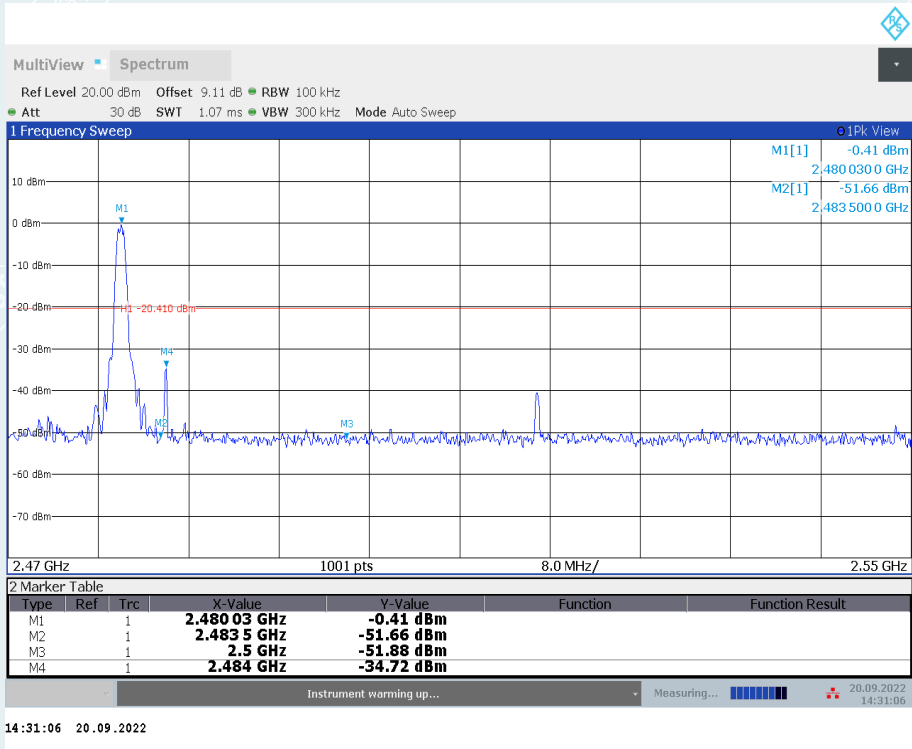
Band edge measurements
BLE_1M

Lowest Frequency (2402MHz)
2.35GHz-2.405GHz



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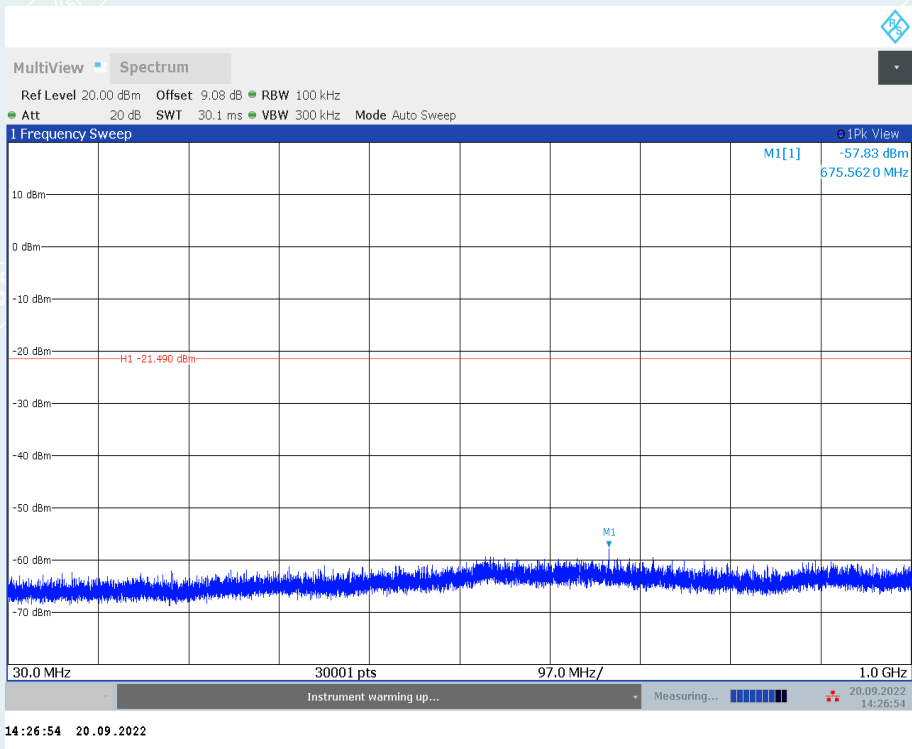
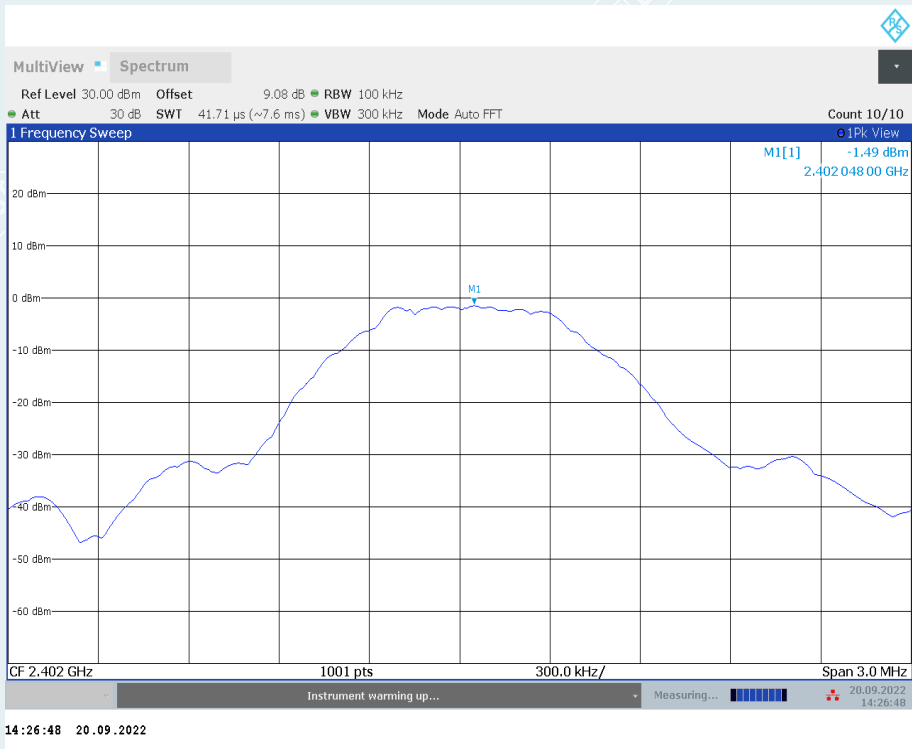
Highest Frequency (2480MHz)
2.47GHz-2.55GHz

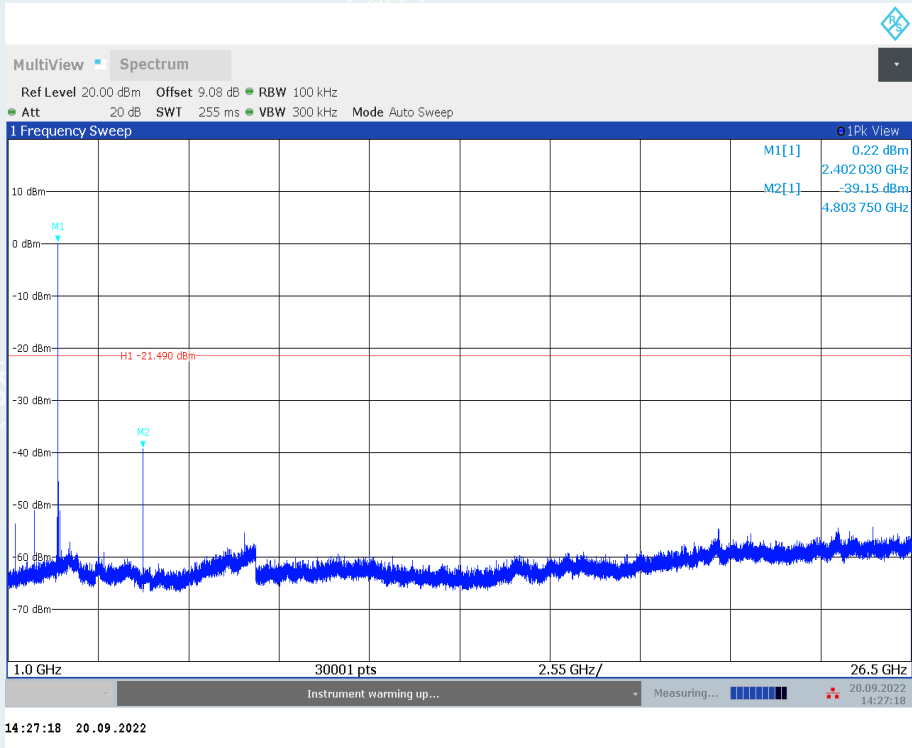


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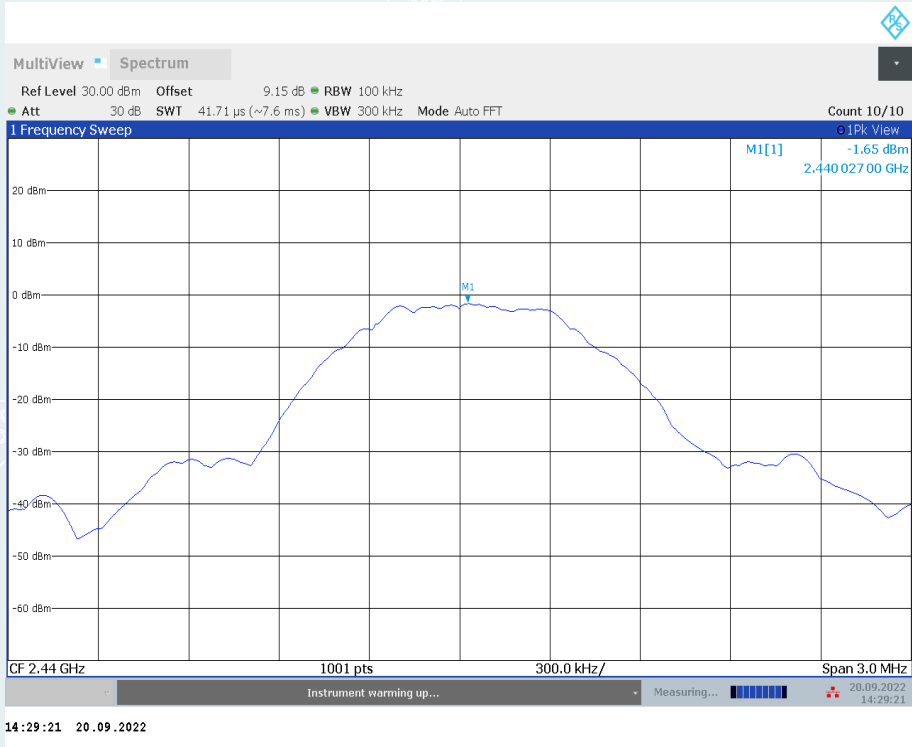
Conducted Spurious Emission
BLE_1M

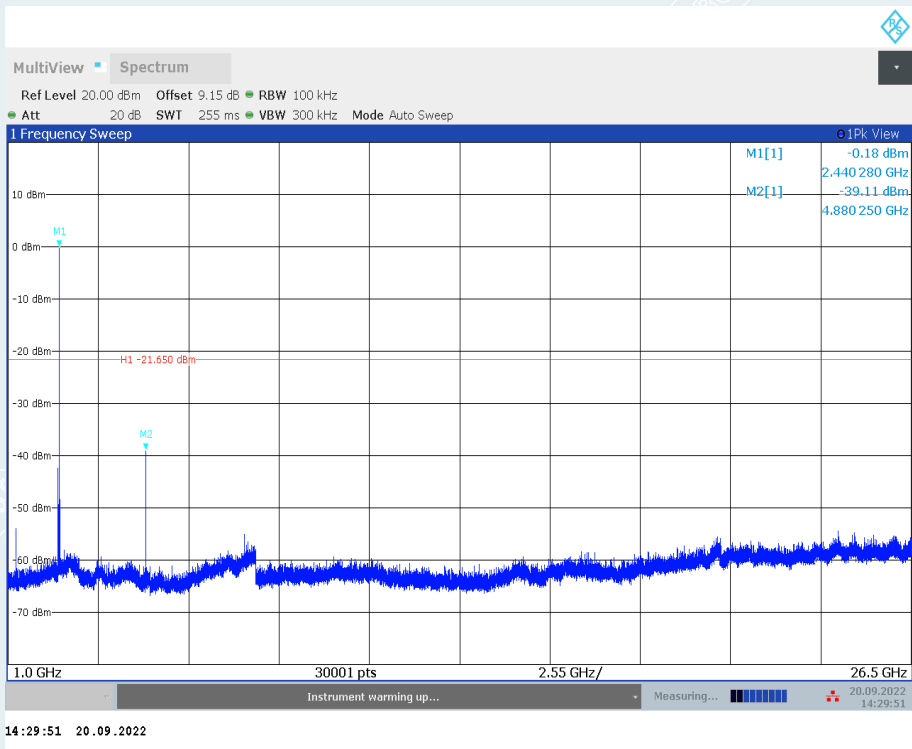
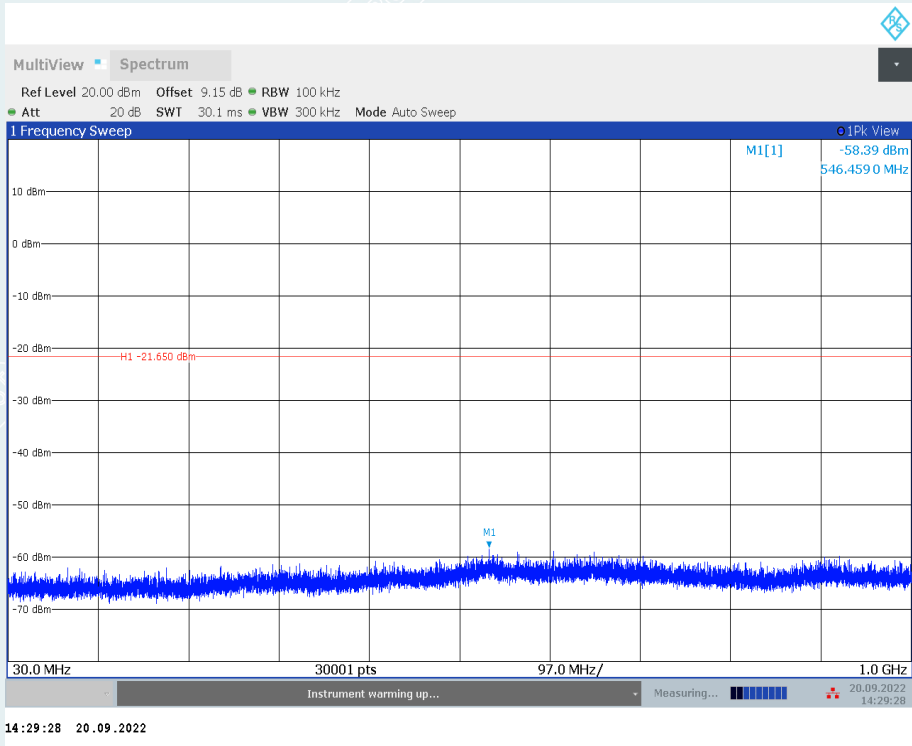
Lowest Frequency (2402MHz)



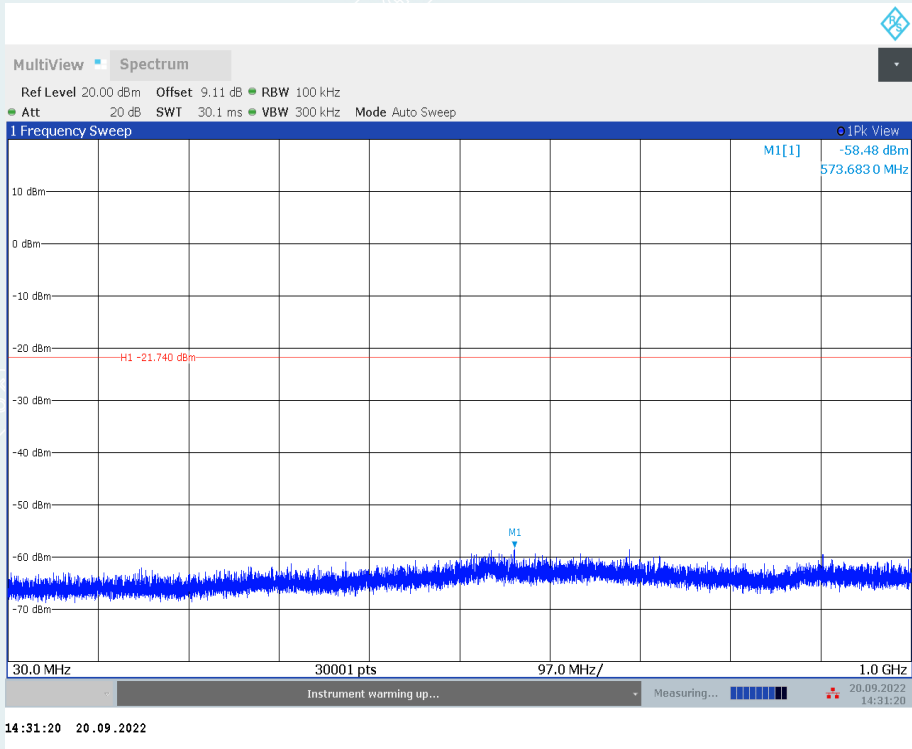
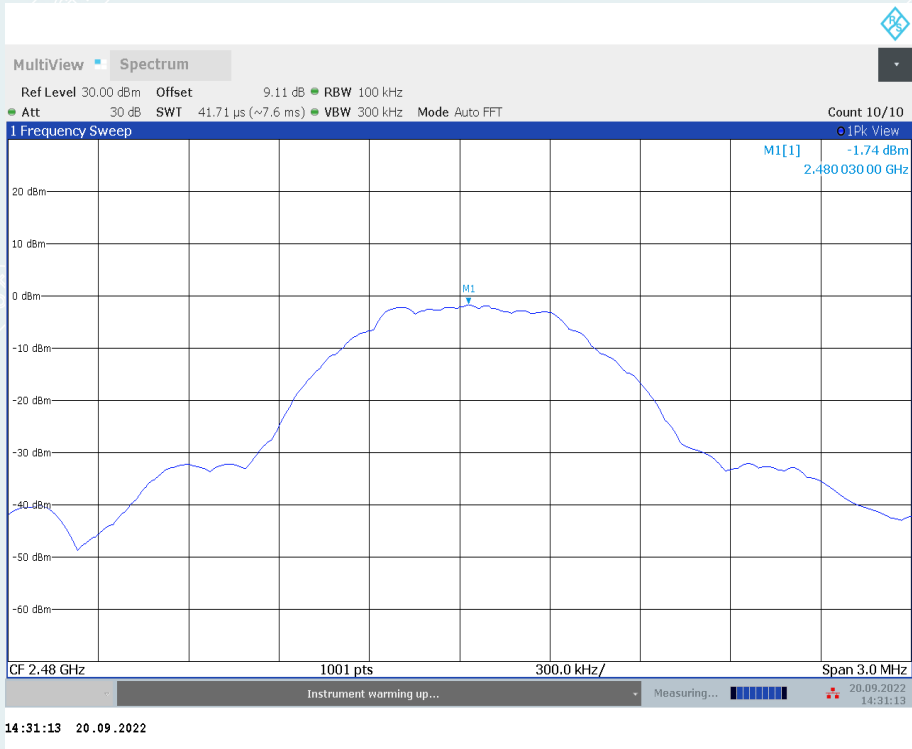


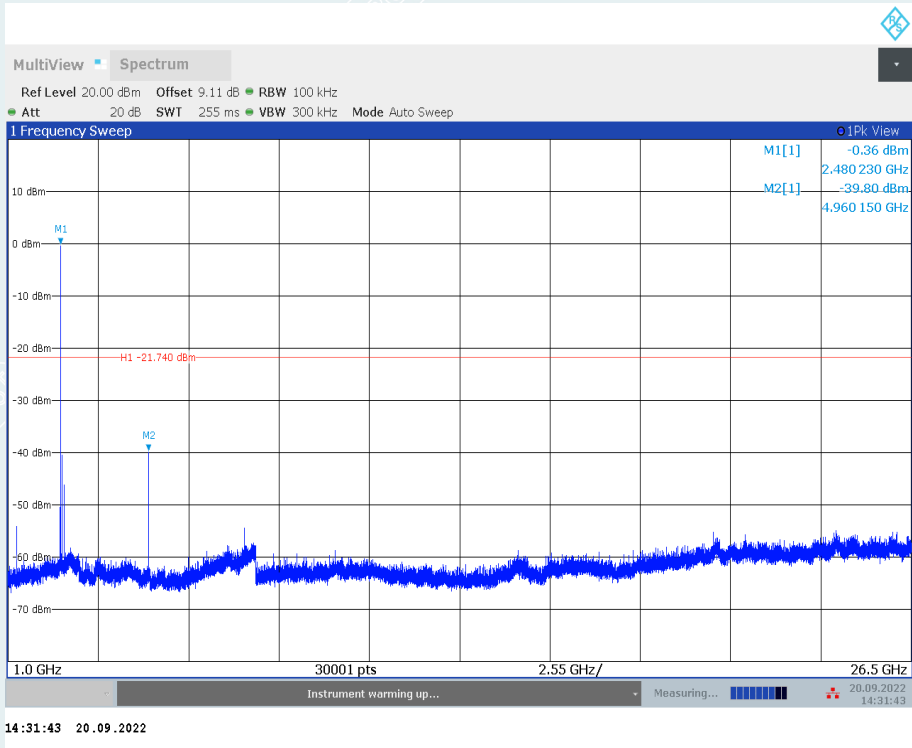
Middle Frequency (2440MHz)





Highest Frequency (2480MHz)





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12. RESTRICTED BANDS OF OPERATION

12.1 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

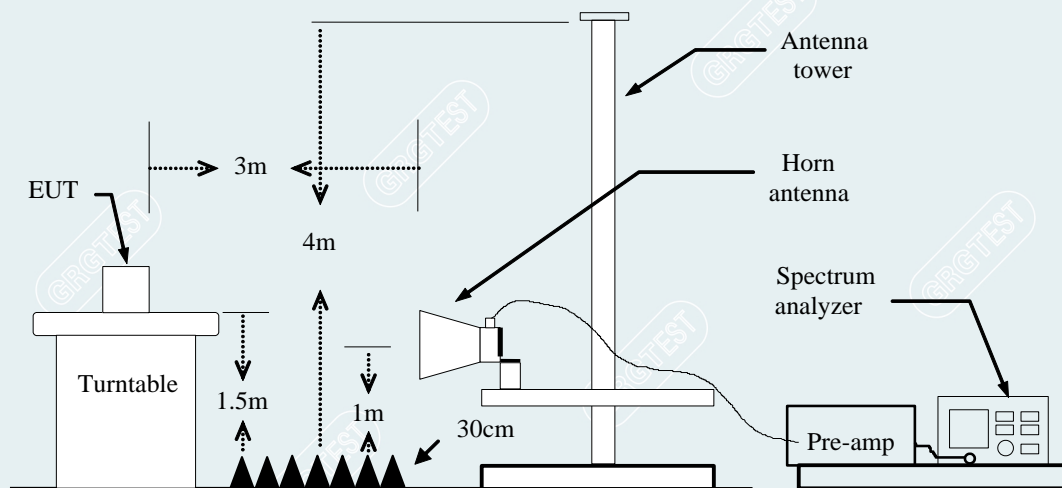
12.2 TEST PROCEDURES

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.

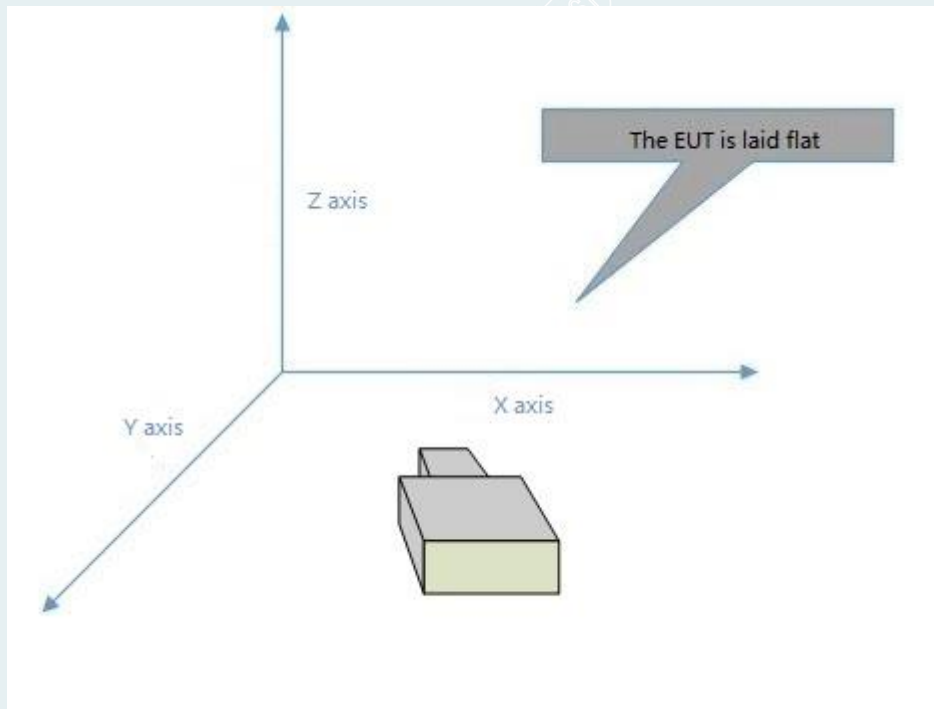
If the EUT is configured to transmit with duty cycle $\geq 98\%$, set $VBW \leq RBW/100$ (i.e., 10kHz) but not less than 10 Hz. If the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$, Where T is defined in section 2.9.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus polarization are measured.

12.3 TEST SETUP



12.4 TEST RESULTS

The test are under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X axis. So the data shown the X axis only.

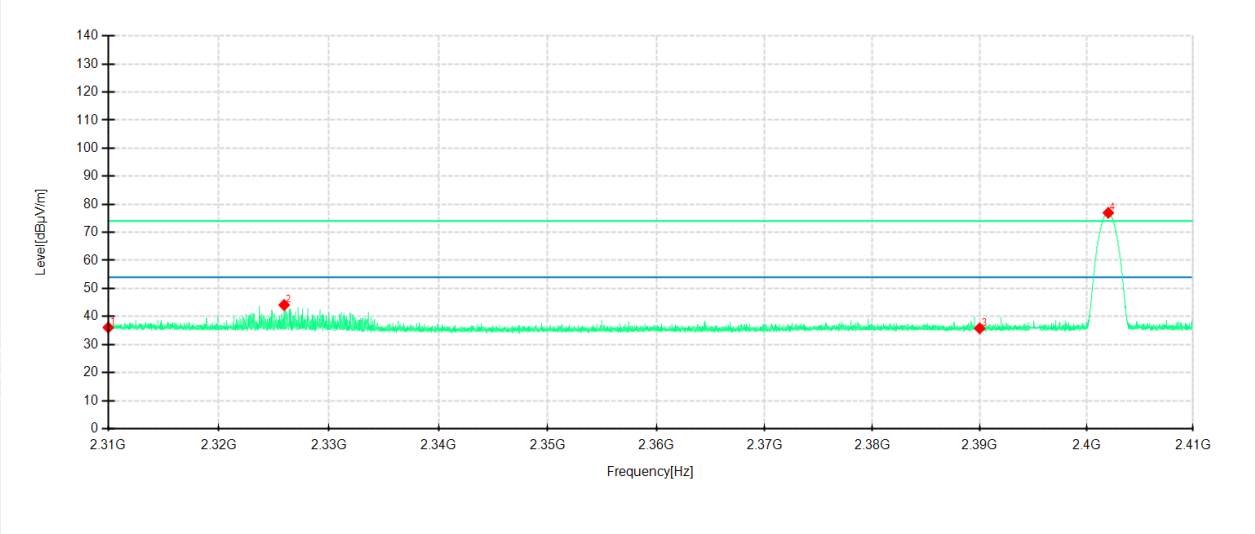


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Equipment:	LogBand	Test Date	2022-09-16
Model No.:	CH-M1-11	Test Engineer:	Zhang Zishan
Test Voltage:	DC 5V from test board	Environmental Conditions	24.8℃/51%RH/101.0kPa

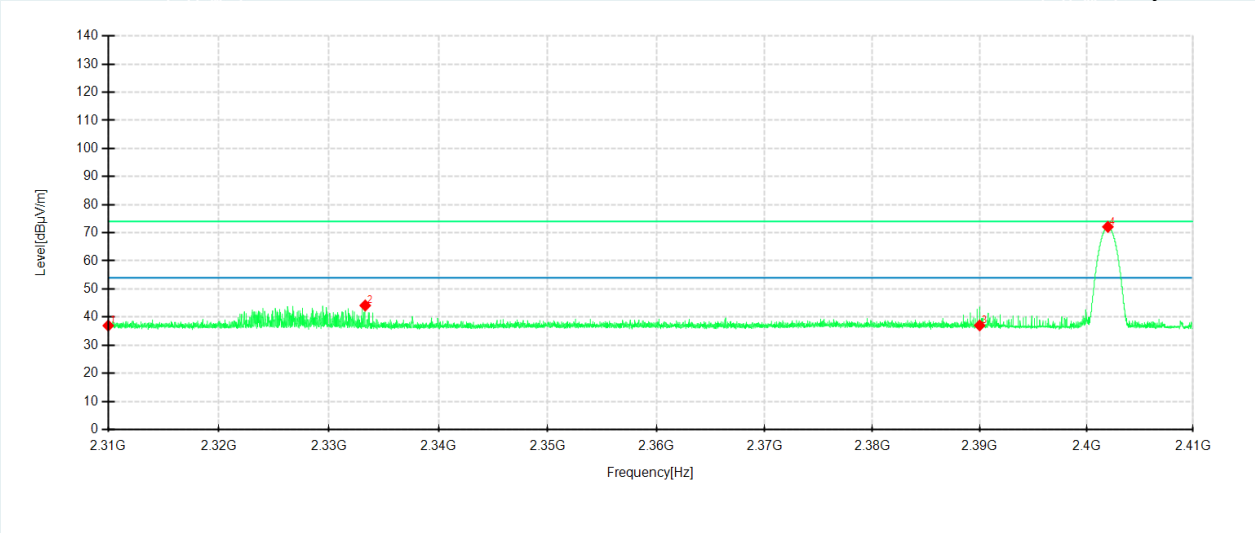
BLE 1M
Lowest Frequency
Frequency 2402MHz
Detector mode: Peak

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	56.79	36.08	-20.71	74.00	37.92	100	187	Horizontal	/
2	2325.93	65.24	44.08	-21.16	74.00	29.92	100	187	Horizontal	/
3	2390	57.05	35.75	-21.30	74.00	38.25	200	360	Horizontal	/
4	2402.04	98.07	76.95	-21.12	74.00	-2.95	100	187	Horizontal	No limit
1	2310	57.09	36.96	-20.13	74.00	37.04	100	352	Vertical	/
2	2333.31	64.27	44.13	-20.14	74.00	29.87	200	188	Vertical	/
3	2390	57.19	37.03	-20.16	74.00	36.97	100	172	Vertical	/
4	2402	92.28	72.11	-20.17	74.00	1.89	200	54	Vertical	No limit

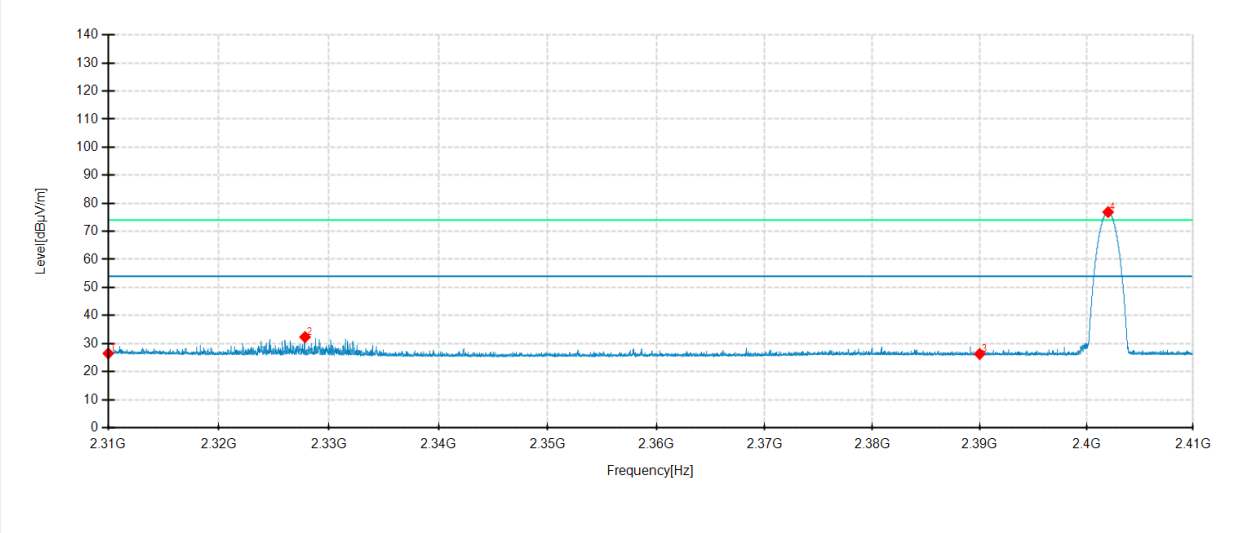
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Lowest Frequency

Frequency 2402MHz

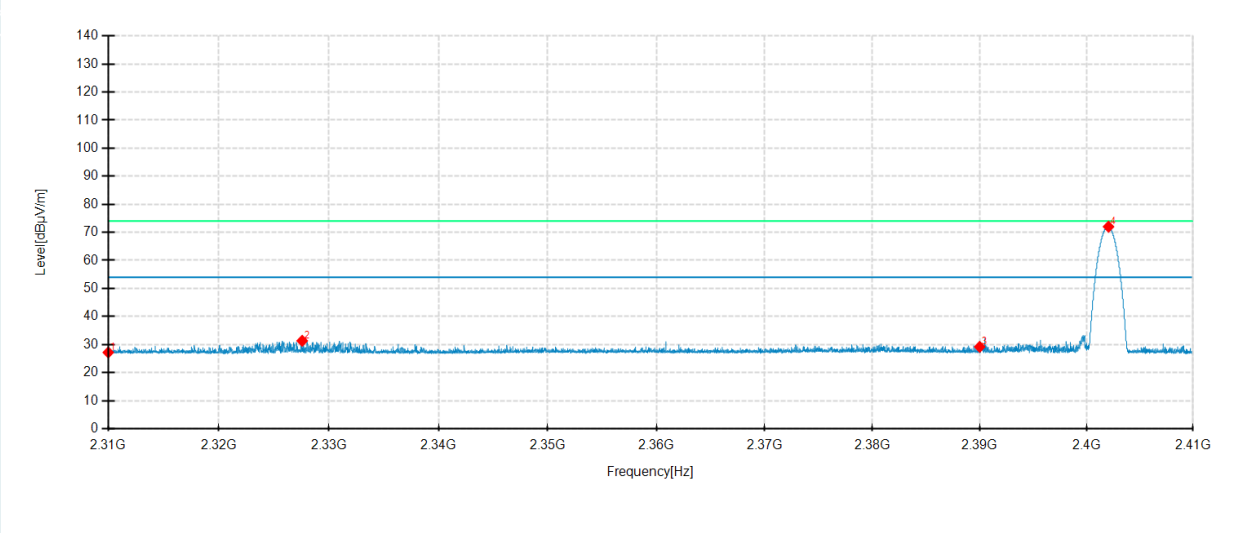
Detector mode: Average

Polarity: Horizontal



Detector mode: Average

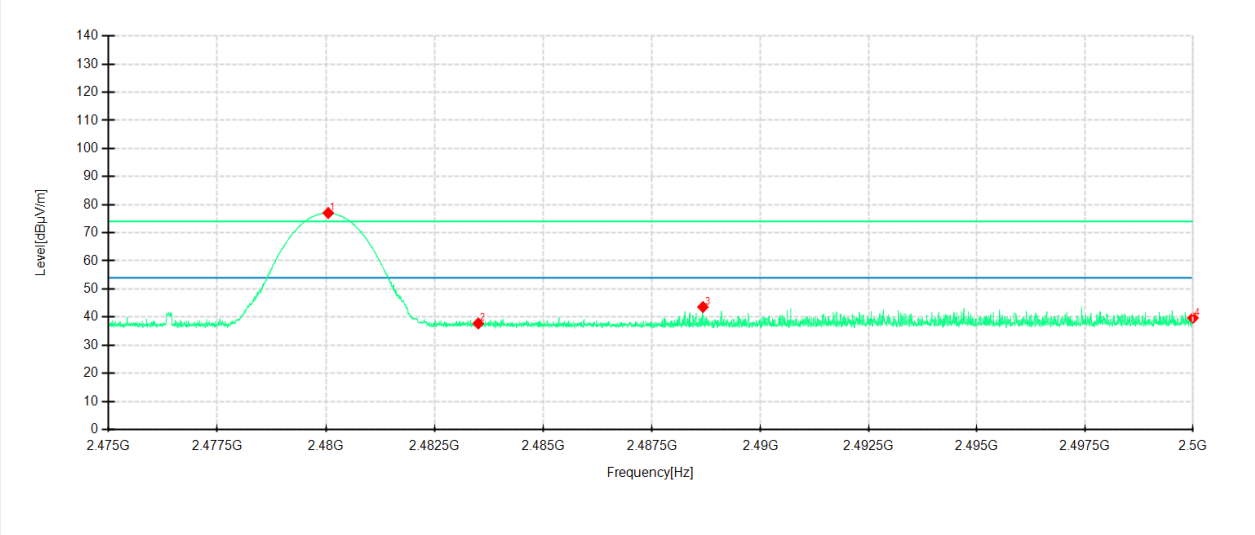
Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310	47.17	26.46	-20.71	54.00	27.54	100	189	Horizontal	/
2	2327.83	53.50	32.29	-21.21	54.00	21.71	100	189	Horizontal	/
3	2390	47.58	26.28	-21.30	54.00	27.72	100	189	Horizontal	/
4	2402.02	97.98	76.86	-21.12	54.00	-22.86	100	189	Horizontal	No limit
1	2310	47.31	27.18	-20.13	54.00	26.82	200	188	Vertical	/
2	2327.57	51.46	31.33	-20.13	54.00	22.67	100	234	Vertical	/
3	2390	49.33	29.17	-20.16	54.00	24.83	100	234	Vertical	/
4	2402.06	92.17	72.00	-20.17	54.00	-18.00	200	52	Vertical	No limit

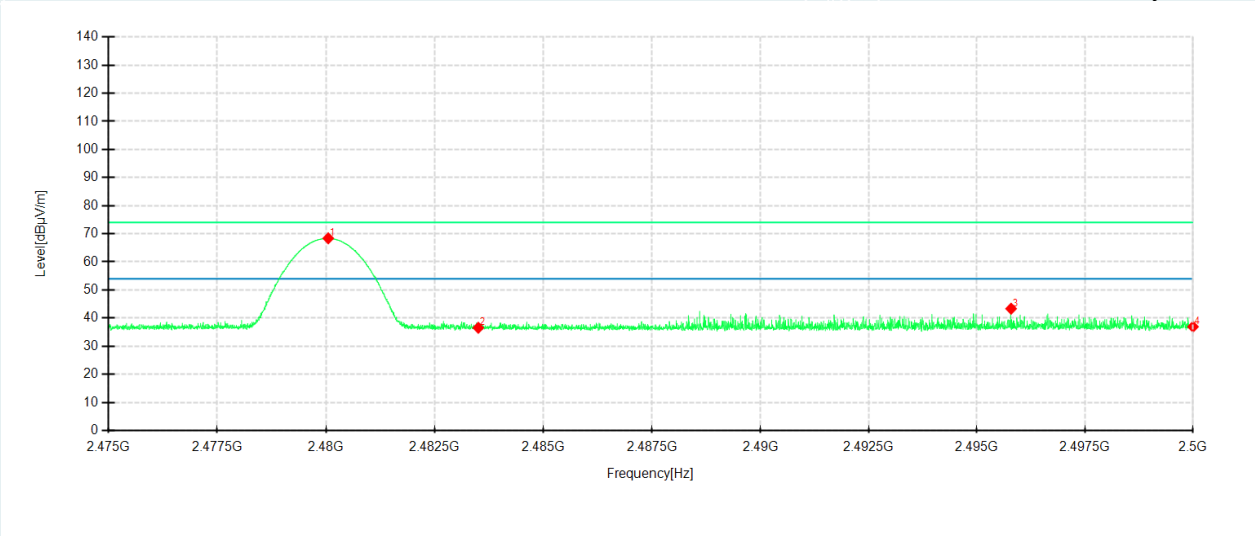
Highest Frequency
Frequency 2480MHz
Detector mode: Peak

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



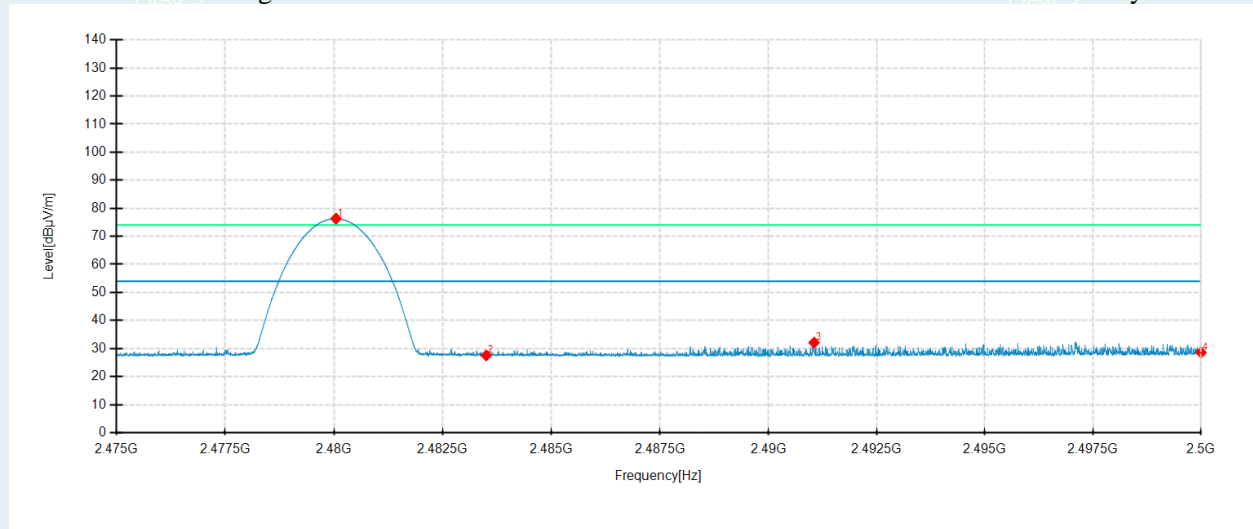
No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2480.05	96.96	77.03	-19.93	74.00	-3.03	200	173	Horizontal	No limit
2	2483.5	57.60	37.73	-19.87	74.00	36.27	100	2	Horizontal	/
3	2488.675	63.38	43.57	-19.81	74.00	30.43	200	246	Horizontal	/
4	2500	59.33	39.68	-19.65	74.00	34.32	200	246	Horizontal	/
1	2480.05	88.90	68.39	-20.51	74.00	5.61	200	64	Vertical	No limit
2	2483.5	57.06	36.55	-20.51	74.00	37.45	100	173	Vertical	/
3	2495.79	63.87	43.33	-20.54	74.00	30.67	100	316	Vertical	/
4	2500	57.46	36.91	-20.55	74.00	37.09	100	173	Vertical	/

Highest Frequency

Frequency 2480MHz

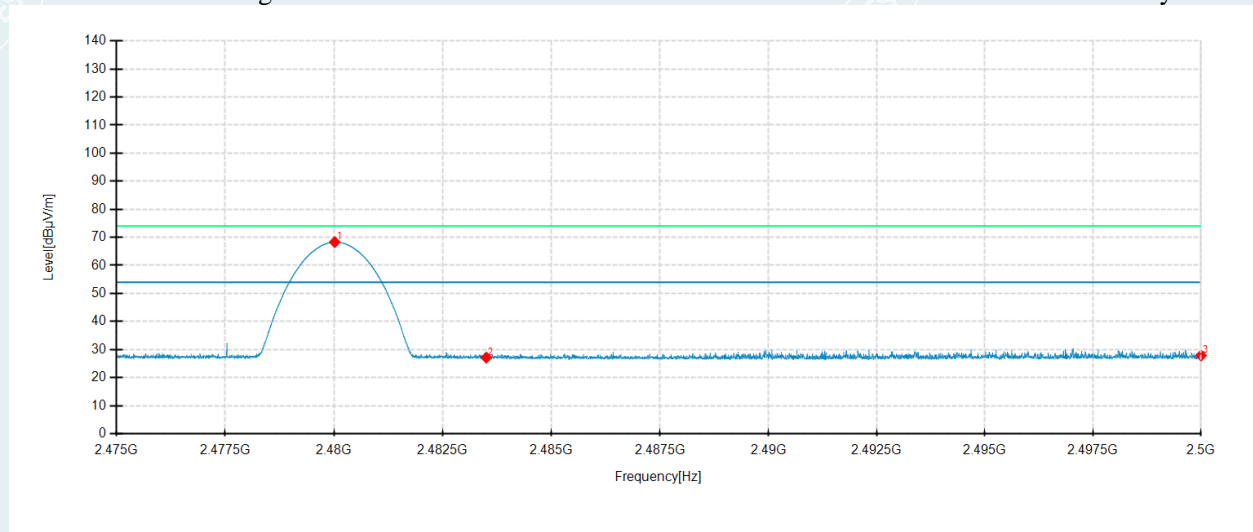
Detector mode: Average

Polarity: Horizontal



Detector mode: Average

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2480.045	96.25	76.32	-19.93	54.00	-22.32	200	285	Horizontal	No limit
2	2483.5	47.41	27.54	-19.87	54.00	26.46	200	285	Horizontal	/
3	2491.055	51.85	32.08	-19.77	54.00	21.92	100	187	Horizontal	/
4	2500	48.23	28.58	-19.65	54.00	25.42	100	0	Horizontal	/
1	2480.015	88.81	68.30	-20.51	54.00	-14.30	200	66	Vertical	No limit
2	2483.5	47.64	27.13	-20.51	54.00	26.87	200	188	Vertical	/
3	2500	48.42	27.87	-20.55	54.00	26.13	200	178	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

Please refer to the attached document E20220906368001-4-Test Photo.

APPENDIX B. PHOTOGRAPH OF THE EUT

Please refer to the attached document E20220906368001-5-EUT Photo.

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