
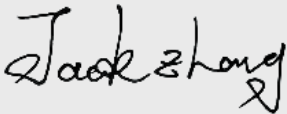




Test report No:
2360669R-RF-US-P06V01

FCC & ISED TEST REPORT

Product Name	LocoTag
Trademark	LocoTrack Primary
Model and /or type reference	T1B
FCC ID	2AYMO-LT-T1B
IC	27269-LTT1B
Applicant's name / address	System Loco Ltd Parkfield, Greaves Park, Lancaster
Test method requested, standard	47 CFR FCC Part 15 (Section 15.247) ANSI C63.10: 2013 RSS-Gen Issue 5 RSS-247 Issue 2
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Feng Jiao/ Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2023-08-17
Report Version	V1.0
Report template No	Template_FCC Part 15C-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Jun. 29, 2023
Date (start test)	Jul. 02, 2023
Date (finish test)	Aug. 01, 2023

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2360669R-RF-US-P06V01	V1.0	Initial issue of report.	2023-08-17

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with 47 CFR FCC Part 15 (Section 15.247), RSS-247 Issue 2, RSS-Gen Issue 5.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
 - Chapter 1.1 General Description of the Item(s);
 - Chapter 1.2 Antenna Informaion;
 - Chapter 1.3 Channel List.

USED EQUIPMENT

Conducted Test/ TR8

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date	Firmware Versiom	Software version
Wireless Connectivity Tester	R&S	CMW 270	102593	2024.05.19	V 4.0.60	N/A
Coaxial Cable	N/A	N/A	2477	2024.06.07	N/A	N/A
Coaxial Cable	N/A	N/A	2478	2024.06.07	N/A	N/A
High and low temperature and fast temperature change test box	ASTUOD	ASTD-FBT-225K	N/A	2024.05.19	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2023.08.22	N/A	N/A
Test system						
Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date	Firmware Versiom	Software version
MAX Signal Analyzer	Keysight	N9010A	MY48030494	2023.12.07	A.14.03	N/A
RF Control Unit	Tonscend	JS0806-2	22G8060594	2024.02.03	N/A	N/A
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY61252529	2024.05.19	B.01.96	N/A
Frequency extender for EXG or MXG	Keysight	N5182BX07	MY59362500	2024.05.19	N/A	N/A
EXG-B MW Analog Signal Generator	Keysight	N5173B	MY61252566	2023.09.27	B.01.95	N/A
Test Software	Tonscend	TS1120	JS1120-3	N/A	N/A	V3.0.22

Radiated Emission(9KHz-1GHz) / AC2

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date	Firmware Version	Software version
EMI Test Receiver	R&S	ESCI	100573	2023.09.16	4.42 SP3	N/A
Loop Antenna	R&S	HFH2-Z2E	101149	2024.04.24	N/A	N/A
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2024.02.09	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2024.05.18	N/A	N/A
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2024.05.20	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	3

Radiated Emission (1GHz-40GHz) / AC5

Instrument	Manufacturer	Model No.	Serial No.	Next Cal. Date	Firmware Version	Software version
EXA Spectrum Analyzer	Keysight	N9020B	MY60112218	2023.12.07	A.31.05	N/A
Pre-Amplifier	SKET	LNPA_0118G-45	SK2021090101	2024.05.13	N/A	N/A
Preamplifier	CHENGYI	EMC184045SE	980263	2024.07.08	N/A	N/A
DRG Horn	ETS-Lindgren	3117	00123988	2023.10.31	N/A	N/A
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2024.05.30	N/A	N/A
Filter Switch Box	MVE	MSW-F196	C070001S	2024.05.20	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2024.05.18	N/A	N/A
Coaxial Cable	TIMES	HF290A-NMNM-5.00M	651945-0001	2023.11.18	N/A	N/A
Coaxial Cable	TIMES	HF290A-NMNM-6.00M	651946-0001	2023.11.18	N/A	N/A
Coaxial Cable	TIMES	HF290A-NMNM-0.50M	651944-0001	2023.11.18	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	3

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95% .

Test item	Uncertainty
AC Power Line Conducted Emission	9kHz~150kHz: 2.80dB 150kHz~30MHz: 2.40dB
Peak Power Output	± 1.27 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 3.50 dB 300MHz~1GHz: 3.60 dB Vertical: 30MHz~200MHz: 3.60 dB 300MHz~1GHz: 3.50 dB
Radiated Emission(1GHz~26.5GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB Horizontal: 18GHz~26.5GHz: 5.30 dB Vertical: 18GHz~26.5GHz: 4.90 dB
RF antenna conducted test	± 1.27 dB
Radiated Emission Band Edge	± 3.9 dB
DTS Bandwidth	± 150 Hz
Occupied Bandwidth	± 1 kHz
Power Density	± 1.27 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name..... :	LocoTag
Model No. :	T1B
Trademark. :	LocoTrack Primary
FCC ID :	2AYMO-LT-T1B
IC..... :	27269-LTT1B
Hardware Version :	T1B-1-0
Software Version..... :	2.38.0
Manufacturer..... :	System Loco Ltd
Manufacturer Address..... :	Parkfield, Greaves Park, Lancaster

Wireless specification..... :	Bluetooth (LE)				
Operating frequency range(s)	2402~2480MHz				
Type of Modulation..... :	GFSK				
PHYs	<input checked="" type="checkbox"/> LE 1M	<input checked="" type="checkbox"/> LE 2M	<input type="checkbox"/> LE Coded S=2/8		
Data Rate	<input checked="" type="checkbox"/> 1Mbit/s	<input checked="" type="checkbox"/> 2Mbit/s	<input type="checkbox"/> 500/125 Kbit/s		
Number of channel..... :	40				

Rated power supply	Voltage and Frequency				
	<input type="checkbox"/>	AC: 220 - 240 V, 50/60 Hz			
	<input type="checkbox"/>	AC: 100 - 240 V, 50/60 Hz			
	<input type="checkbox"/>	DC: 1.7~3.3V			
	<input checked="" type="checkbox"/>	Battery:3.3V			
	<input type="checkbox"/>	Adapter:			
Mounting position	<input checked="" type="checkbox"/>	Tabletop equipment			
	<input type="checkbox"/>	Wall/Ceiling mounted equipment			
	<input type="checkbox"/>	Floor standing equipment			
	<input type="checkbox"/>	Hand-held/Portable equipment			
	<input type="checkbox"/>	Other: RF module			

1.2 Antenna Information

Antenna model / type number.....:	N/A		
Antenna serial number	N/A		
Antenna Delivery	<input checked="" type="checkbox"/>	1TX + 1RX	
	<input type="checkbox"/>	2TX + 2RX	
	<input type="checkbox"/>	Others:	
Antenna technology.....:	<input checked="" type="checkbox"/>	SISO	
	<input type="checkbox"/>	MIMO	<input type="checkbox"/> CDD
			<input type="checkbox"/> Beam-forming
Antenna Type.....:	<input type="checkbox"/>	External	<input type="checkbox"/> Dipole
			<input type="checkbox"/> Sectorized
			<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/> PIFA	
	<input type="checkbox"/>	<input type="checkbox"/> PCB	
	<input type="checkbox"/>	Others.....	
Antenna Gain	2.13dBi		

1.3 Channel List

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

Note: The General Description of the Item , antenna information and Channel List for the EUT in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode	Mode 1: Transmit by LE_1Mbps
	Mode 2: Transmit by LE_2Mbps

Note 1: Regards to the frequency band operation: the lowest, middle and highest frequency channel were selected to perform the test, then shown on this report.

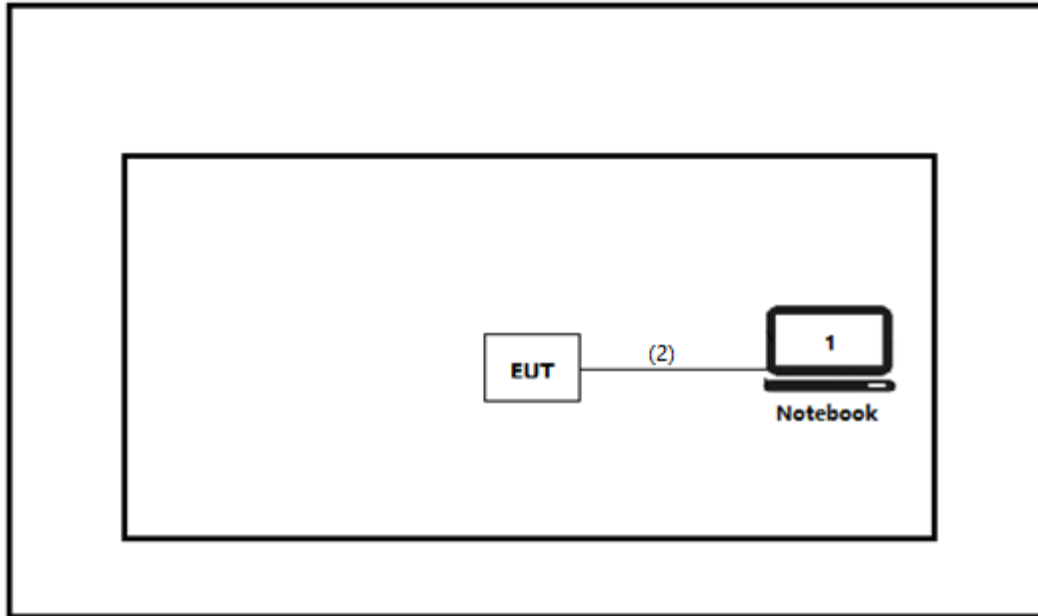
2.2 Auxiliary equipment / Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
(1) Notebook	Think pad x220	Lenovo	Adapter
(2) USB Control Cable	N/A	N/A	N/A
(3) USB Control Cable	N/A	N/A	N/A
software	Type / Version	Manufacturer	Supplied by
Putty	N/A	N/A	N/A

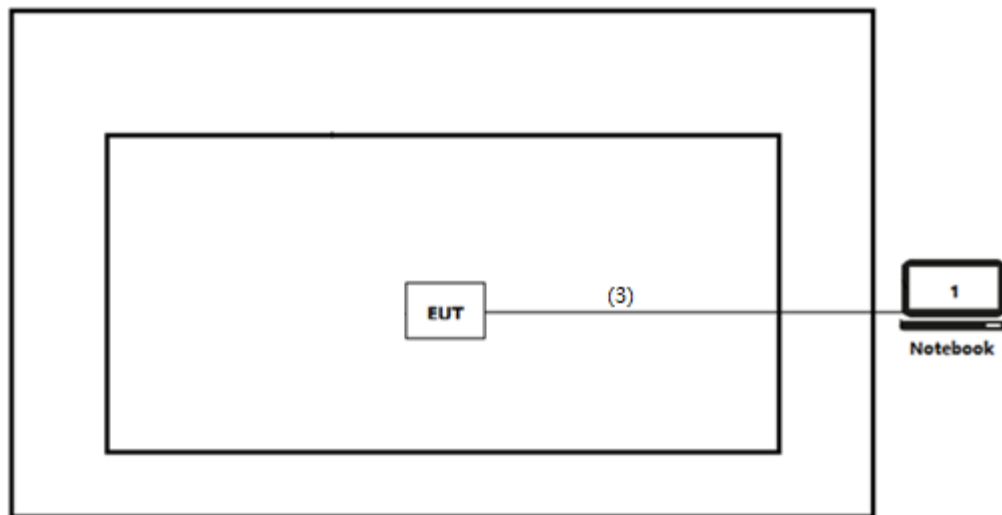
Accessories Information	Cable		
	Length used during test [m]	Attached during test	Shielded
(2)USB Control Cable	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(3)USB Control Cable	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- Conducted test



Test setup Diagram- Radiated test



2.4 Testing process

1	Setup the EUT shown in Section 2.3.
2	Execute the [Putty] on the notebook.
3	Configure the test mode, the test channel, and the data rate.
4	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
47 CFR FCC Part 15 (Section 15.247)	2023	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-Gen Issue 5 Amendment 1	2019	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2	2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

Requirement – Test Item of FCC	Standard(s)	Verdict	Remark
20dB Emission Bandwidth	FCC 15.247(a)(2)	PASS	Test data please refer to Appendix A
Maximum conducted output power	15.247 (b)(3)	PASS	Test data please refer to Appendix C
Maximum power spectral density	FCC 15.247(e)	PASS	Test data please refer to Appendix D
Band edge measurements	FCC 15.247(d) FCC 15.205 FCC 15.209	PASS	Test data please refer to Appendix E
Conducted Spurious Emission	FCC 15.247(d), FCC 15.209	PASS	Test data please refer to Appendix F
Duty cycle	ANSI C63.10:2013	PASS	Test data please refer to Appendix G
Emissions in Restricted Bands	FCC 15.205 FCC 15.209	PASS	Test data please refer to Appendix H
AC Power Line Conducted Emission	FCC 15.207	N/A	Not applicable, EUT is Battery operated.
Antenna Requirement	FCC 15.203	PASS	---

Requirement – Test case of ISED	Standard(s)	Verdict	Remark
DTS Bandwidth	RSS-Gen Issue 5 Paragraph 6.7 RSS-247 Issue 2 Paragraph 5.2	PASS	Test data please refer to Appendix A
Occupied Channel Bandwidth	RSS-Gen Issue 5 Paragraph 6.7 RSS-247 Issue 2 Paragraph 5.2	PASS	Test data please refer to Appendix B
Maximum conducted output power	RSS-247 Issue 2 Paragraph 5.4(d)	PASS	Test data please refer to Appendix C
Maximum power spectral density	RSS-247 Issue 2 Paragraph 5.2(b)	PASS	Test data please refer to Appendix D
Band edge measurements	RSS-Gen Issue 5 Paragraph 8.10	PASS	Test data please refer to Appendix E
Conducted Spurious Emission	RSS-247 Issue 2 Paragraph 5.5	PASS	Test data please refer to Appendix F
Duty cycle	ANSI C63.10:2013	PASS	Test data please refer to Appendix G
Emissions in Restricted Bands	RSS-Gen Issue 5 Paragraph 8.9	PASS	Test data please refer to Appendix H
AC Power Line Conducted Emission	RSS-Gen Issue 5 Paragraph 8.8	N/A	Not applicable, EUT is Battery operated.
Antenna Requirement	RSS-Gen Issue 5 Paragraph 6.8	PASS	---

3.4 Power setting in test

Mode	Channel	Frequency (MHz)	Power setting
Mode1	00	2402	3
	19	2440	3
	39	2480	3
Mode2	00	2402	3
	19	2440	3
	39	2480	3

3.5 Test Matrix

Test item	Mode: CYW20822-P4TAI040	
	1(#1)	2(#2)
DTS Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occupied Channel Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maximum conducted output power	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maximum power spectral density	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Band edge measurements	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Conducted Spurious Emission	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Duty cycle	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Emissions in Restricted Bands	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Note1: The only difference between sample #1 and sample #2 is whether to keep the original antenna, sample #1 is a conduction test product that removes the original antenna and is equipped with SMA wires, and sample #2 is a complete product that retains the original antenna.

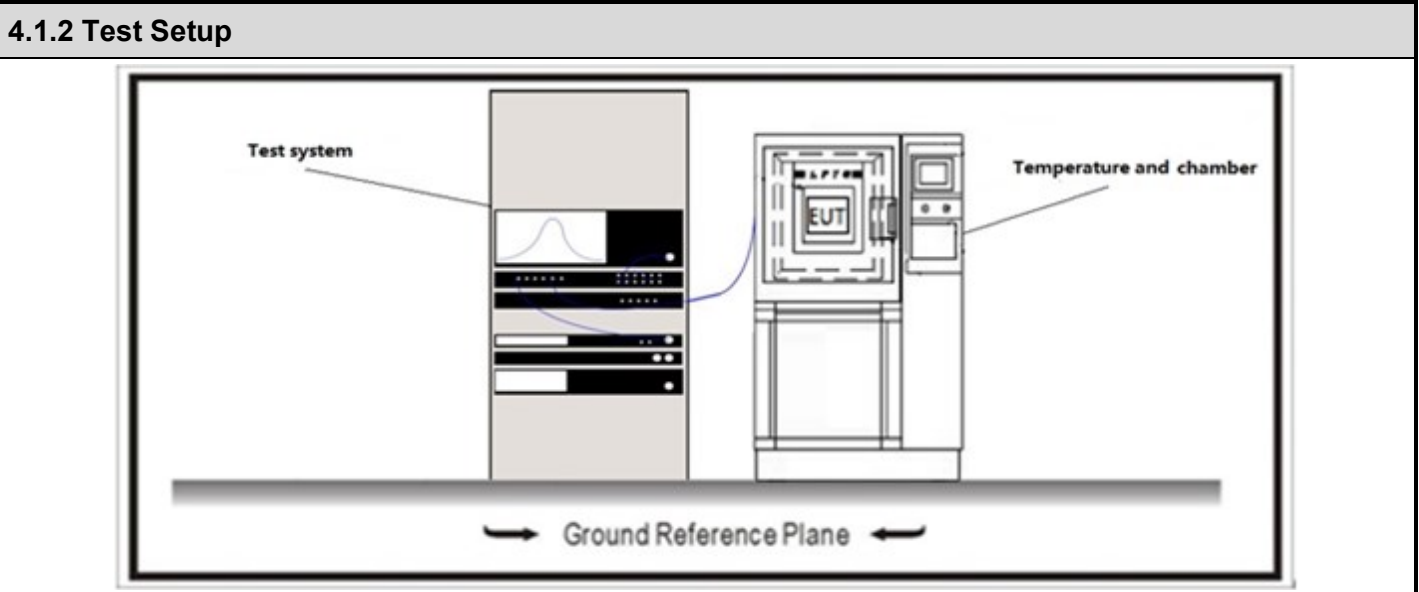
3.6 Test Facility

USA	:	FCC Designation Number: CN1199
CA	:	ISED CAB identifier: CN0040

4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE

4.1 DTS Bandwidth	VERDICT: PASS
--------------------------	----------------------

4.1.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(2); RSS-247 Issue 2 Paragraph 5.2.
Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz	



4.1.3 Test Procedure			
	Reference Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.8	DTS bandwidth
<input type="checkbox"/>	ANSI C63.10	11.8.1	Option 1
<input checked="" type="checkbox"/>	ANSI C63.10	11.8.2	Option 2

4.2 Occupied Channel Bandwidth

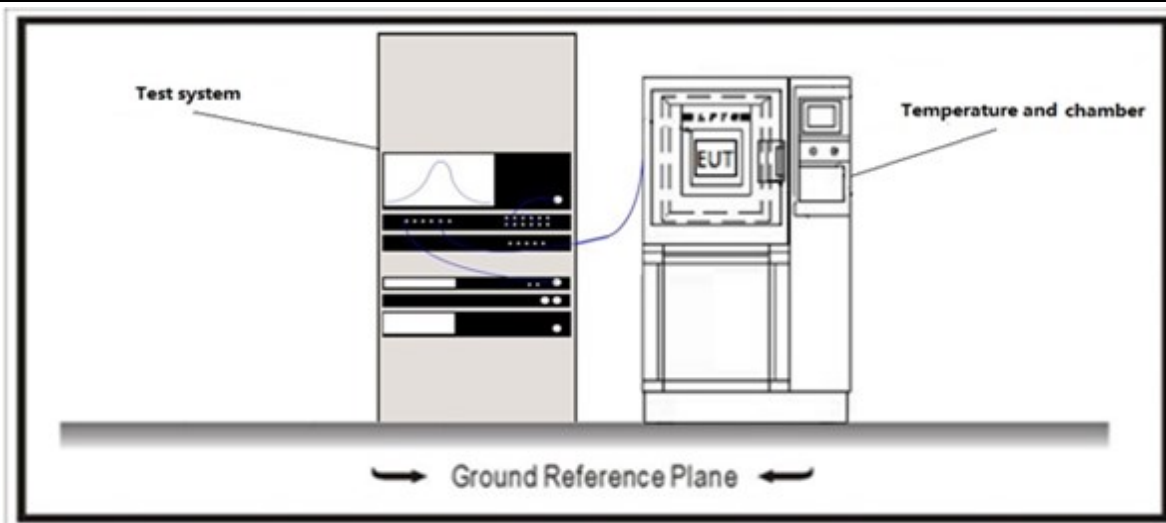
VERDICT: PASS

4.2.1 Limit

Standard RSS-Gen Issue 5 Paragraph 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs

4.2.2 Test Setup



4.2.3 Test Procedure

	Reference Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.8	DTS bandwidth
<input type="checkbox"/>	ANSI C63.10	11.8.1	Option 1
<input checked="" type="checkbox"/>	ANSI C63.10	11.8.2	Option 2

4.3 Maximum Conducted Output Power

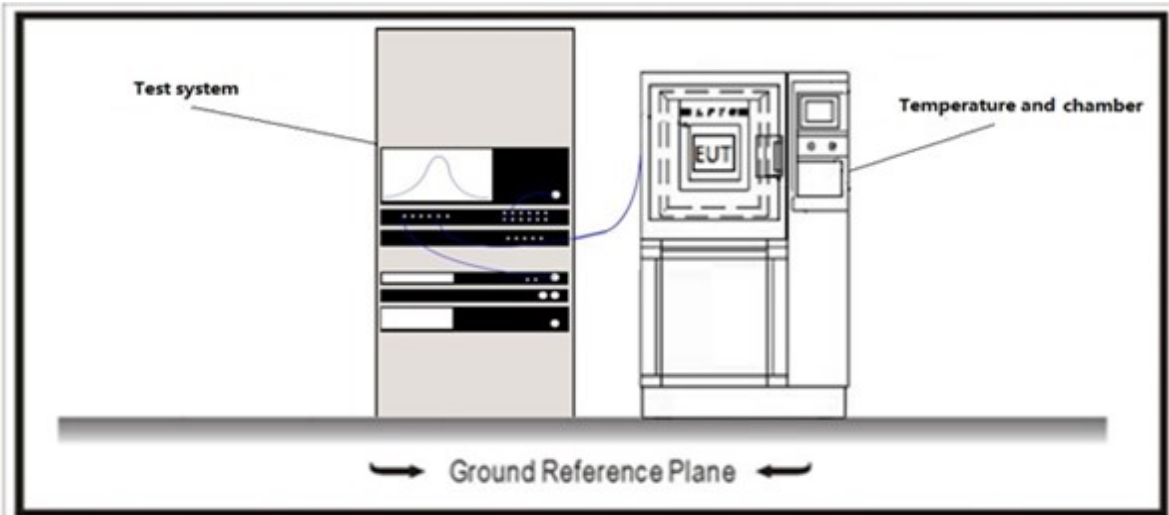
VERDICT: PASS

4.3.1 Limit

Standard		FCC Part 15 Subpart C Paragraph 15.247 (b)(3); RSS-247 Issue 2 Paragraph 5.4(d).
<input checked="" type="checkbox"/>	GTX < 6dBi	Pout≤30dBm
<input type="checkbox"/>	GTX > 6dBi	
<input type="checkbox"/>	Non-Fix point-point	Pout≤30-(GTX -6)
<input type="checkbox"/>	Fix point-point	Pout≤30-[(GTX-6)]/3
<input type="checkbox"/>	Point-to-multipoint	Pout≤30-(GTX-6)
<input type="checkbox"/>	Overlap Beams	Pout≤30-[(GTX-6)]/3
<input type="checkbox"/>	Aggregate power transmitted simultaneously on all beams	Pout≤30-[(GTX-6)]/3
<input type="checkbox"/>	single directional beam	Pout≤30-[(GTX-6)]/3+8dB

Note 1 : GTX directional gain of transmitting antennas.
Note 2 : Pout is maximum peak conducted output power .

4.3.2 Test Setup



4.3.3 Test Procedure

	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.9	Fundamental emission output power
<input checked="" type="checkbox"/>	ANSI C63.10	11.9.1	Maximum peak conducted output power
	<input type="checkbox"/> ANSI C63.10	11.9.1.1	RBW \geq DTS bandwidth
	<input type="checkbox"/> ANSI C63.10	11.9.1.2	Integrated band power method
	<input type="checkbox"/> ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method
<input type="checkbox"/>	ANSI C63.10	11.9.2	Maximum conducted (average) output power
	<input type="checkbox"/> ANSI C63.10	11.9.2.2	Measurement using a spectrum analyzer (SA)
	<input type="checkbox"/> ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle \geq 98%)
	<input type="checkbox"/> ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle \geq 98%)
	<input type="checkbox"/> ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle \leq 98%)
	<input type="checkbox"/> ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle \leq 98%)
	<input type="checkbox"/> ANSI C63.10	11.9.2.2.4	Method AVGSA-3
	<input type="checkbox"/> ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
	<input checked="" type="checkbox"/> ANSI C63.10	11.9.2.3	Measurement using a power meter (PM)
	<input checked="" type="checkbox"/> ANSI C63.10	11.9.2.3.1	Method AVGPM
	<input type="checkbox"/> ANSI C63.10	11.9.2.3.2	Method AVGPM-G

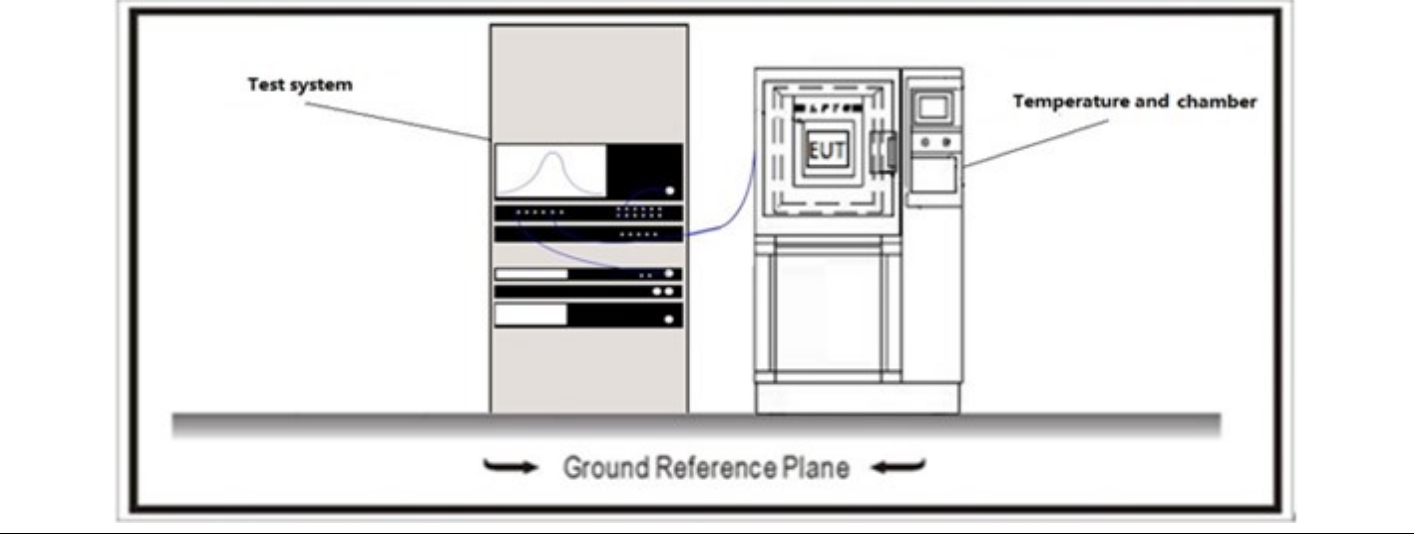
4.4 Maximum Power Spectral Density	VERDICT: PASS
---	----------------------

4.4.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247 (b)(3); RSS-247 Issue 2 Paragraph 5.2(b).
-----------------	---

Power Spectral Density ≤ 8dBm/3kHz

4.4.2 Test Setup



4.4.3 Test Procedure

	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.10	Maximum power spectral density level in the fundamental emission
<input checked="" type="checkbox"/>	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
<input type="checkbox"/>	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle ≥ 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle ≥ 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle < 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle < 98%)
<input type="checkbox"/>	ANSI C63.10	11.10.7	Method AVGPSD-3
<input type="checkbox"/>	ANSI C63.10	11.10.8	Method AVGPSD-3A

4.5 Band Edge Measurements	VERDICT: PASS
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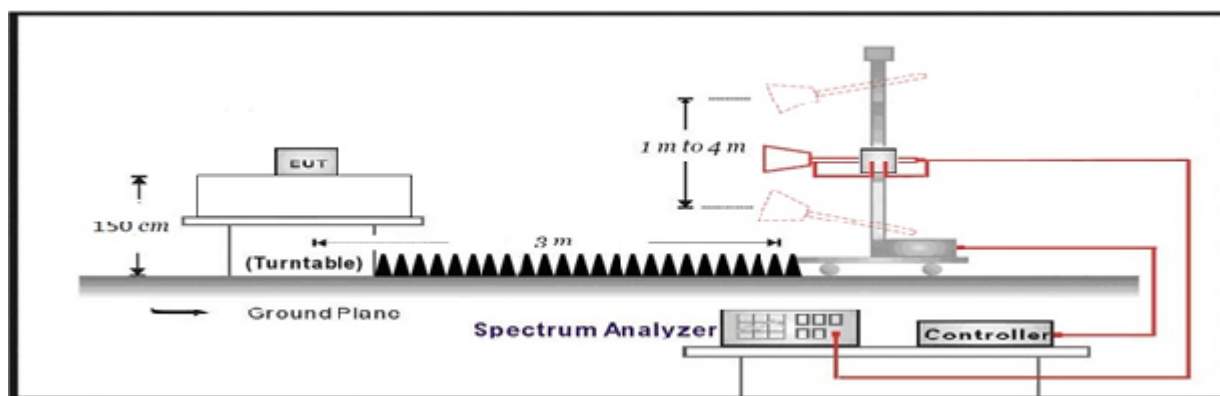
4.5.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d) , 15.209; RSS-Gen Issue 5 Paragraph 8.10.			
Frequency bands (MHz)	Detector	Limit (dBµV/m)	RBW (MHz)	Distance (m)
2310-2390	PK	74	1	3
2483.5-2500	AV	54	1	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

4.5.2 Test Setup

Above 1GHz Test Setup:



4.5.3 Test Procedure

	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	6.10	Band-edge testing
	<input checked="" type="checkbox"/> ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	<input type="checkbox"/> ANSI C63.10	6.10.6	Marker-delta method
<input checked="" type="checkbox"/>	ANSI C63.10	11.12	Emissions in restricted frequency bands
	<input checked="" type="checkbox"/> ANSI C63.10	11.12.1	Radiated emission measurements
	<input checked="" type="checkbox"/> ANSI C63.10	11.12.2.7	Radiated spurious emission test
<input type="checkbox"/>	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
<input type="checkbox"/>	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
<input checked="" type="checkbox"/>	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.6 Conducted Spurious Emission	VERDICT: PASS
--	----------------------

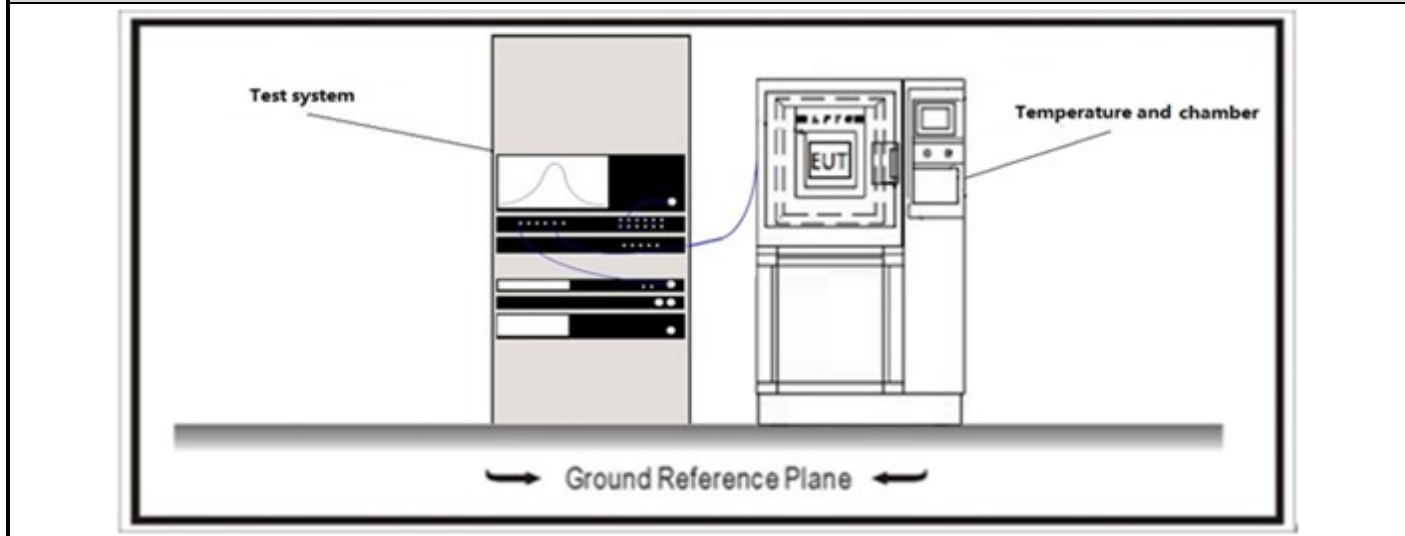
4.6.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d); RSS-247 Issue 2 Paragraph 5.5.
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

4.6.2 Test Setup



4.6.3 Test Procedure

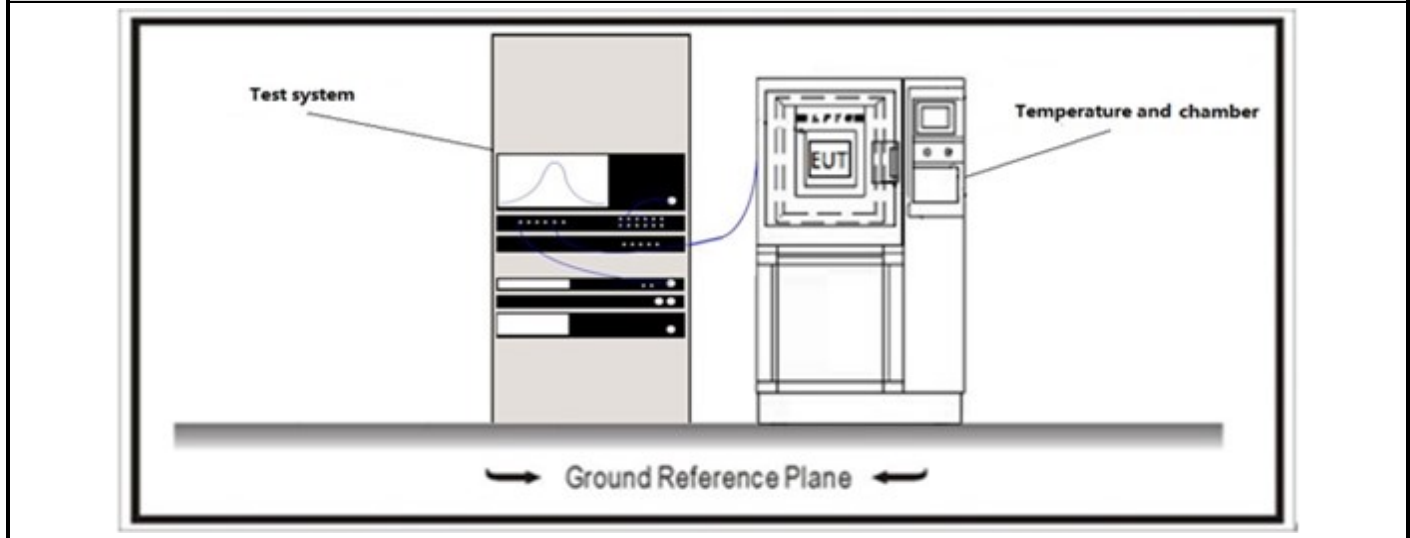
References	Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.11	Emissions in non-restricted frequency bands
	<input checked="" type="checkbox"/> ANSI C63.10	11.11.1	General
	<input checked="" type="checkbox"/> ANSI C63.10	11.11.2	Reference level measurement
	<input checked="" type="checkbox"/> ANSI C63.10	11.11.3	Emission level measurement

4.7 Duty cycle	VERDICT: PASS
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4.7.1 Limit

N/A

4.7.2 Test Setup



4.7.3 Test Procedure

References Rule	Chapter	Description
<input checked="" type="checkbox"/> ANSI C63.10	11.6	Duty cycle (D), transmission duration (T), and maximum power control level

4.8 Emissions in Restricted Bands	VERDICT: PASS
--	----------------------

4.8.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.205
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Restricted Bands of operation

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
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	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	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			

Standard	RSS-Gen Issue 5 Paragraph 8.10
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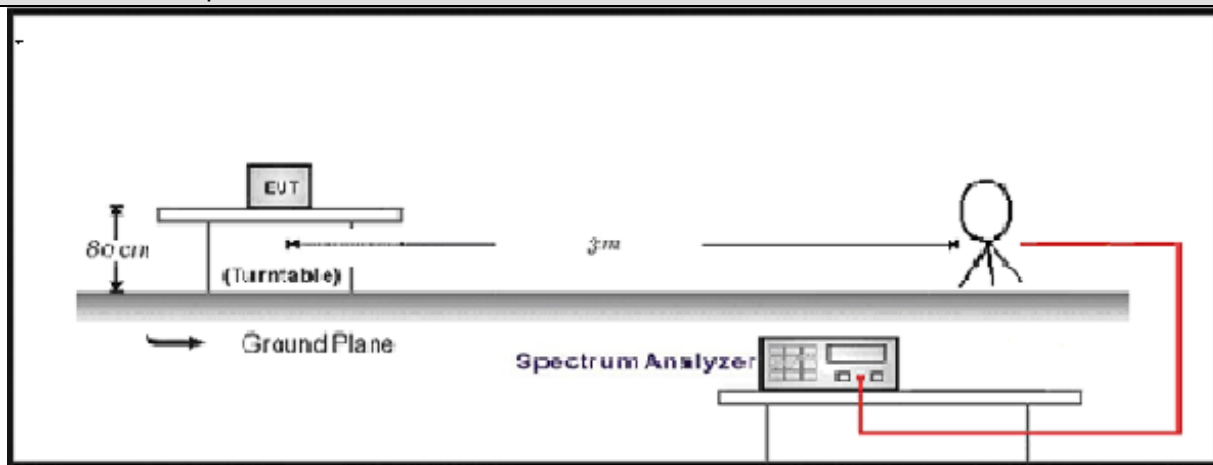
Restricted Bands of operation for IC

0.090 - 0.110	13.36 - 13.41	960 - 1427	9.0 - 9.2
0.495 - 0.505	16.42 - 16.423	1435 - 1626.5	9.3 - 9.5
2.1735 - 2.1905	16.69475 - 16.69525	1645.5 - 1646.5	10.6 - 12.7
3.020 - 3.026	16.80425 - 16.80475	1660 - 1710	13.25 - 13.4
4.125 - 4.128	25.5 - 25.67	1718.8 - 1722.2	14.47 - 14.5
4.17725 - 4.17775	37.5 - 38.25	2200 - 2300	15.35 - 16.2
4.20725 - 4.20775	73 - 74.6	2310 - 2390	17.7 - 21.4
5.677 - 5.683	74.8 - 75.2	2483.5 - 2500	22.01 - 23.12
6.215 - 6.218	108 - 138	2655 - 2900	23.6 - 24.0
6.26775 - 6.26825	149.9 - 150.05	3260 - 3267	31.2 - 31.8
6.31175 - 6.31225	156.52475 - 156.52525	3332 - 3339	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3345.8 - 3358	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3500 - 4400	
8.37625 - 8.38675	167.72 - 173.2	4500 - 5150	
8.41425 - 8.41475	240 - 285	5350 - 5460	
12.29 - 12.293	322 - 335.4	7250 - 7750	
12.51975 - 12.52025	399.9 - 410	8025 - 8500	
12.57675 - 12.57725	608 - 614	--	

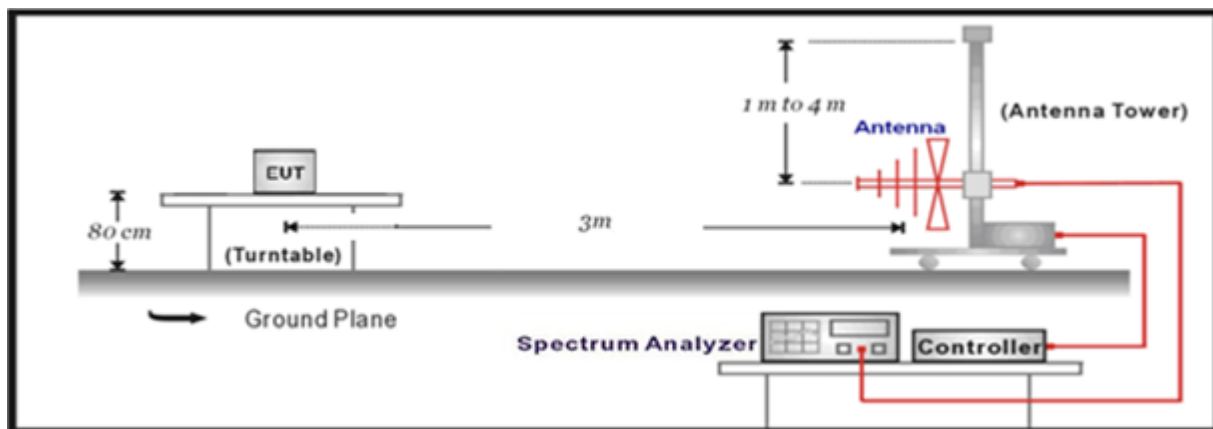
Restricted Band Emissions Limit			
FCC Part 15 Subpart C Paragraph 15.209			
Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)
RSS-Gen Issue 5 Paragraph 8.9.			
Frequency (MHz)	Field strength	Field strength (dBµV/m)	Measurement distance (m)
0.009 - 0.49	6.37/F(kHz) µA/m	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	63.7/F(kHz) µA/m	33.8 - 23	30 _(Note 1)
1.705 - 30	30 µV/m	29.5	30 _(Note 1)
30 - 88	100 µV/m	40	3 _(Note 2)
88 - 216	150 µV/m	43.5	3 _(Note 2)
216 - 960	200 µV/m	46	3 _(Note 2)
Above 960	500 µV/m	54	3 _(Note 2)
<p>Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).</p> <p>Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).</p>			

4.8.2 Test Setup

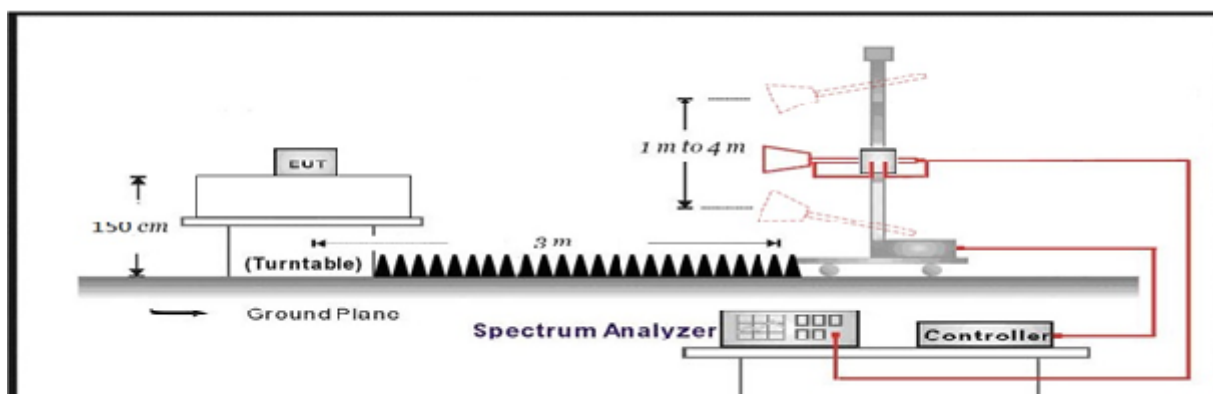
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.8.3 Test Procedure			
	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.12	Emissions in restricted frequency bands
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ANSI C63.10	11.12.1	Radiated emission measurements
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ANSI C63.10	11.12.2.7	Radiated spurious emission test
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.9 AC Power Line Conducted Emission	VERDICT: N/A
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4.9.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.207; RSS-Gen Issue 5 Paragraph 8.8.	
Frequency range [MHz]	Limit: QP [dB(μV) ¹⁾	Limit: AV [dB(μV) ¹⁾
0,15 - 0,50	66 - 56 ²⁾	56 - 46 ²⁾
0,50 - 5,0	56	46
5,0 - 30	60	50

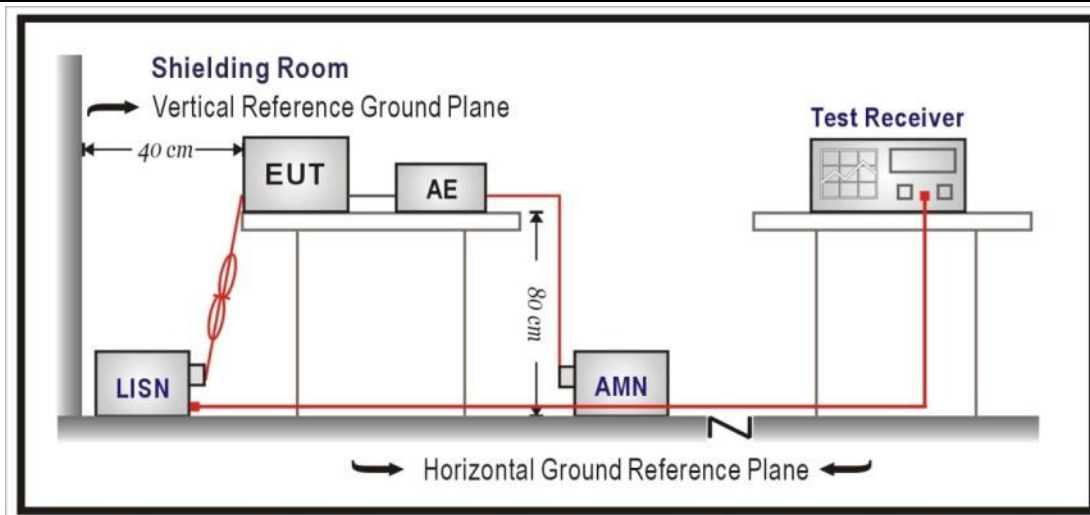
¹⁾ At the transition frequency, the lower limit applies.

²⁾ The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.9.2 Test Setup



4.9.3 Test Procedure

	References Rule	Chapter	Item
<input checked="" type="checkbox"/>	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.10 Antenna Requirement	VERDICT: PASS
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4.10.1 Limit:

Standard	FCC Part 15 Subpart C Paragraph 15.203; RSS-Gen Issue 5 Paragraph 6.8.
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An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

4.10.2 Antenna Connector Construction:

<input checked="" type="checkbox"/>	The use of a permanently attached antenna
<input checked="" type="checkbox"/>	The antenna use of a unique coupling to the intentional radiator
<input type="checkbox"/>	The use of a nonstandard antenna jack or electrical connector

Please refer to the attached document "Internal Photograph" to show the antenna connector.

5 TEST SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

6 TEST RESULT

Appendix A: DTS Bandwidth

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.720	2401.632	2402.352	0.5	PASS
BLE_1M	Ant1	2440	0.724	2439.624	2440.348	0.5	PASS
BLE_1M	Ant1	2480	0.684	2479.648	2480.332	0.5	PASS
BLE_2M	Ant1	2402	1.344	2401.344	2402.688	0.5	PASS
BLE_2M	Ant1	2440	1.436	2439.268	2440.704	0.5	PASS
BLE_2M	Ant1	2480	1.352	2479.292	2480.644	0.5	PASS

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



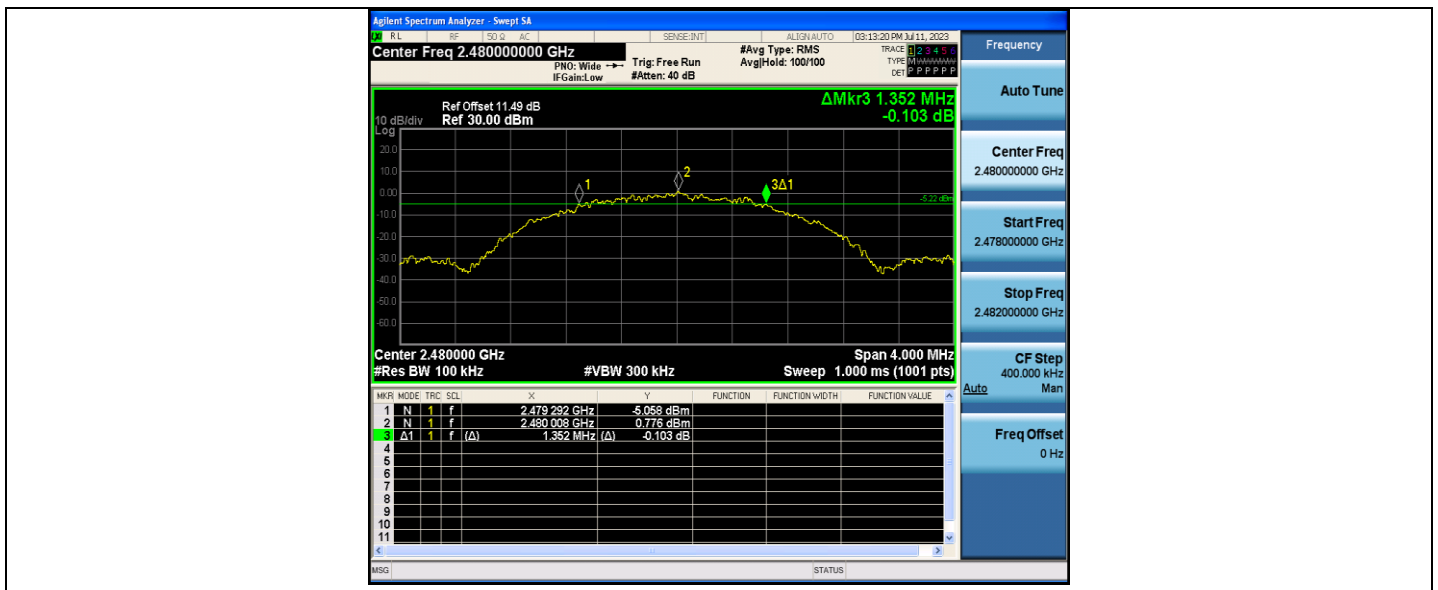
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



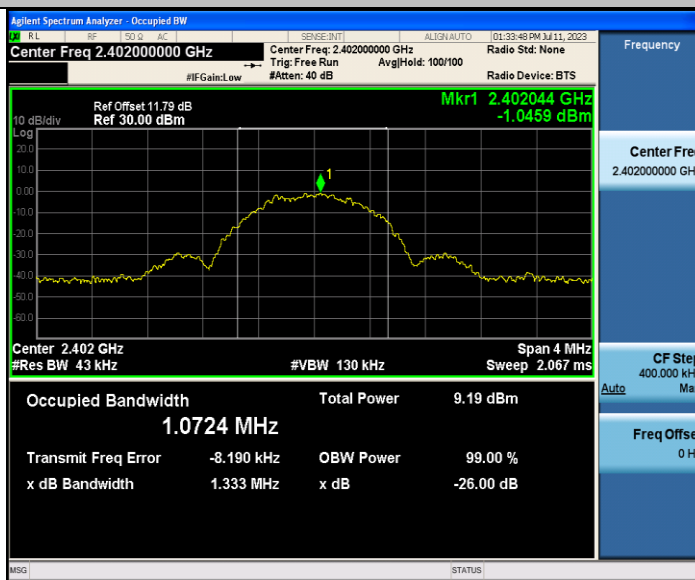
BLE_2M_Ant1_2480



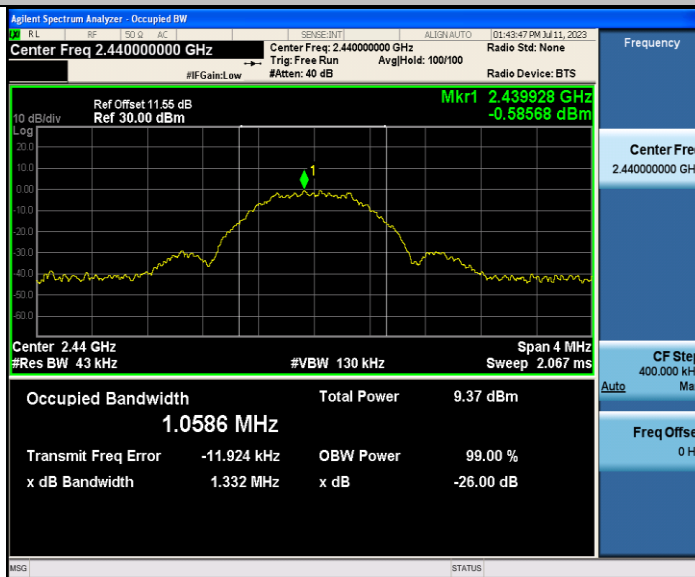
Appendix B: Occupied Channel Bandwidth

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
BLE_1M	Ant1	2402	1.0724	2401.4556	2402.5280
BLE_1M	Ant1	2440	1.0586	2439.4588	2440.5174
BLE_1M	Ant1	2480	1.0626	2479.4629	2480.5255
BLE_2M	Ant1	2402	2.0698	2400.9476	2403.0174
BLE_2M	Ant1	2440	2.0946	2438.9417	2441.0363
BLE_2M	Ant1	2480	2.1059	2478.9298	2481.0357

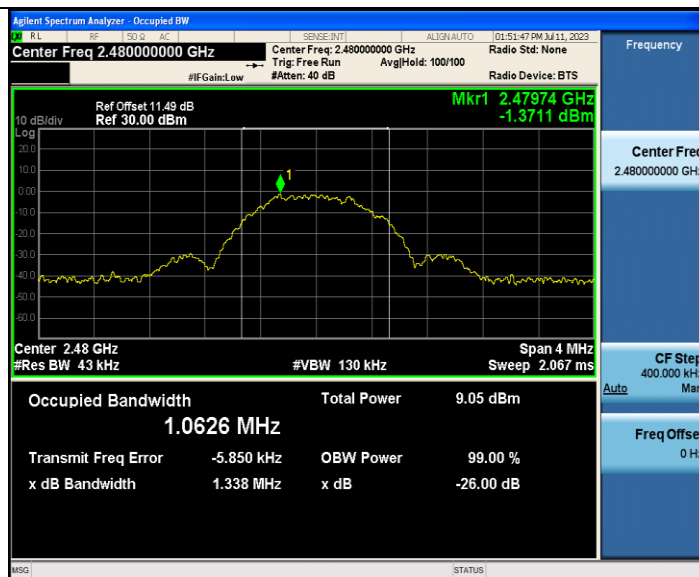
BLE_1M_Ant1_2402



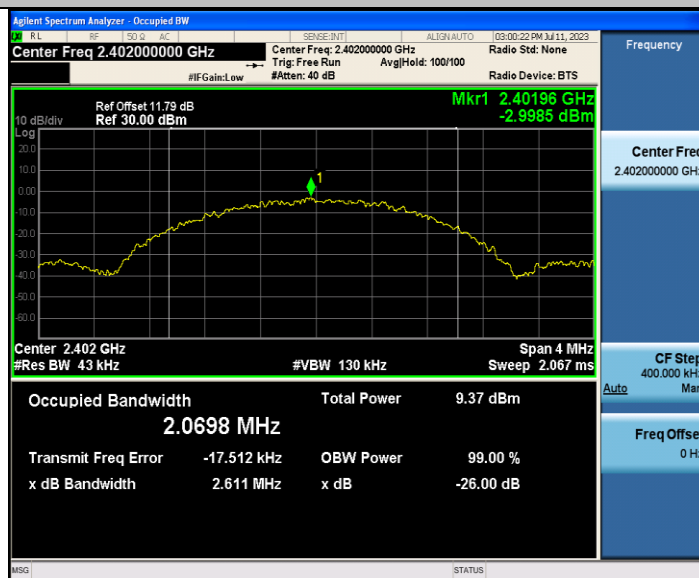
BLE_1M_Ant1_2440



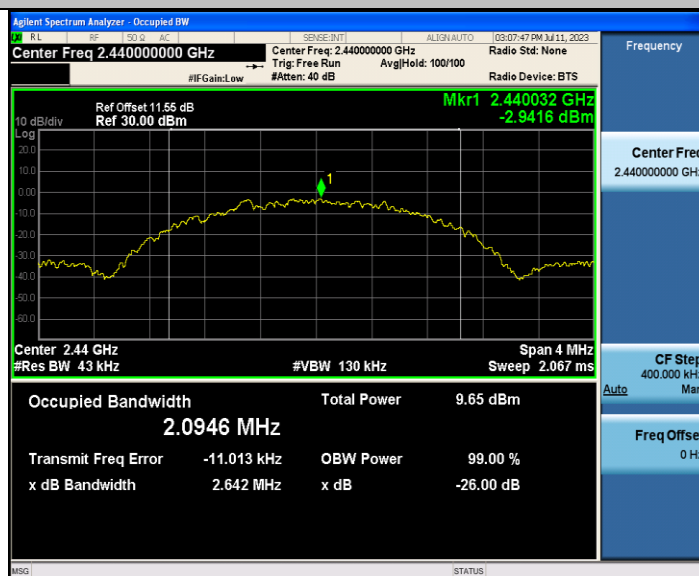
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



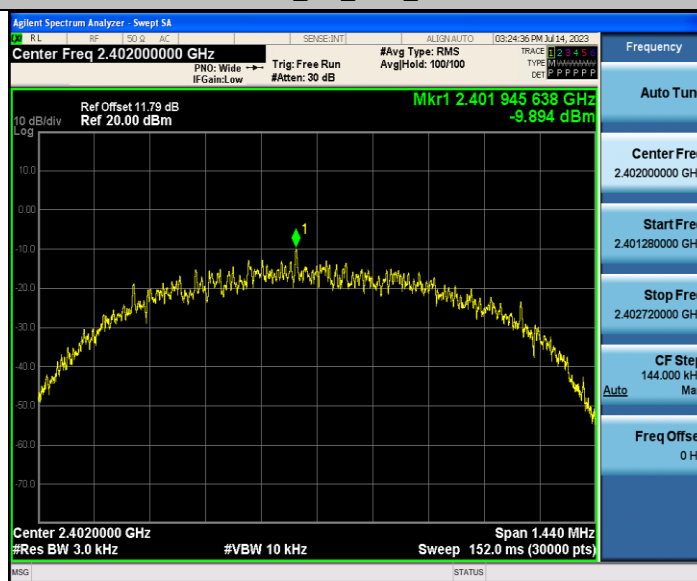
Appendix C: Maximum conducted output power

TestMode	Antenna	Frequency[MHz]	Conducted Average Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	1.18	≤30	3.31	≤36	PASS
BLE_1M	Ant1	2440	1.62	≤30	3.75	≤36	PASS
BLE_1M	Ant1	2480	1.54	≤30	3.67	≤36	PASS
BLE_2M	Ant1	2402	1.2	≤30	3.33	≤36	PASS
BLE_2M	Ant1	2440	1.56	≤30	3.69	≤36	PASS
BLE_2M	Ant1	2480	1.5	≤30	3.63	≤36	PASS

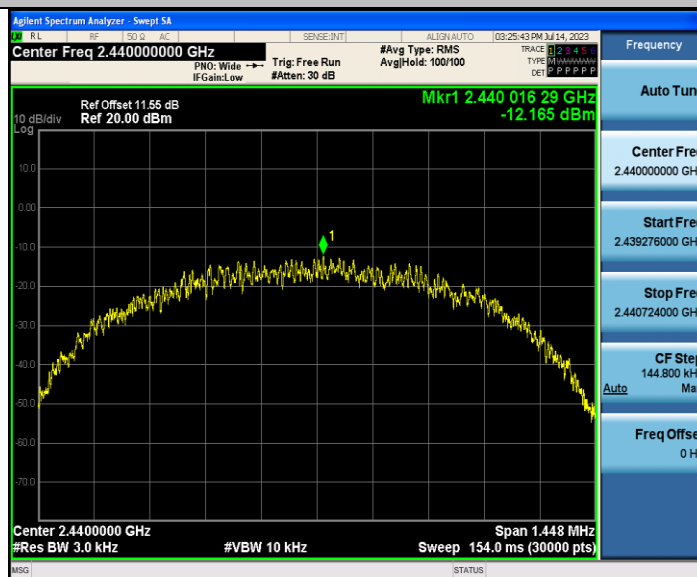
Appendix D: Maximum power spectral density

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.89	≤8.00	PASS
BLE_1M	Ant1	2440	-12.17	≤8.00	PASS
BLE_1M	Ant1	2480	-12.01	≤8.00	PASS
BLE_2M	Ant1	2402	-15.74	≤8.00	PASS
BLE_2M	Ant1	2440	-14.68	≤8.00	PASS
BLE_2M	Ant1	2480	-14.71	≤8.00	PASS

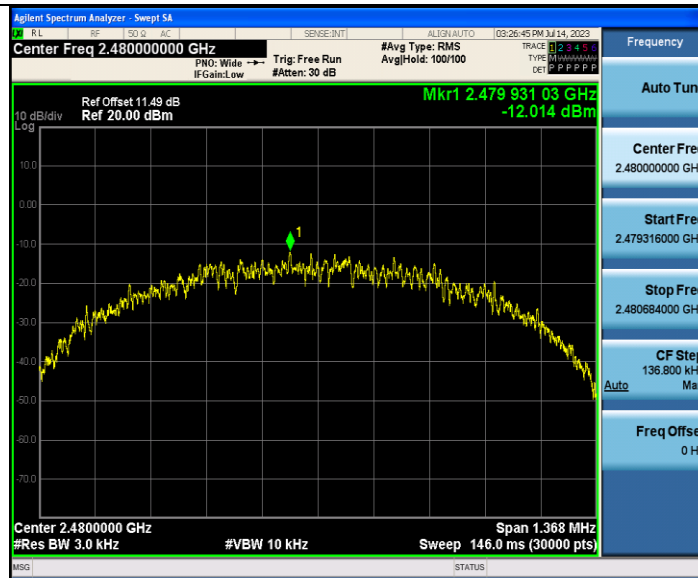
BLE_1M_Ant1_2402



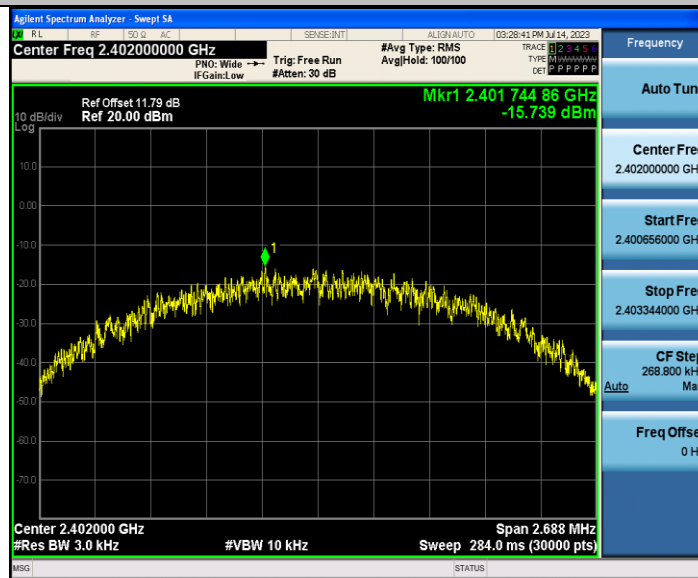
BLE_1M_Ant1_2440



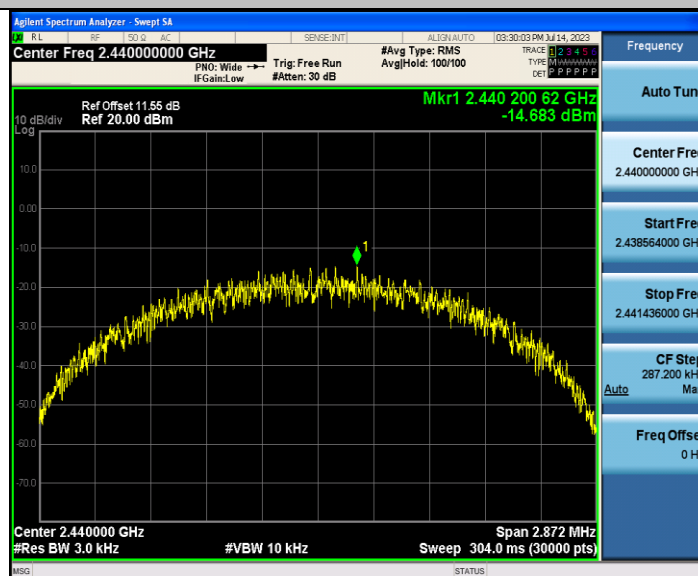
BLE_1M_Ant1_2480



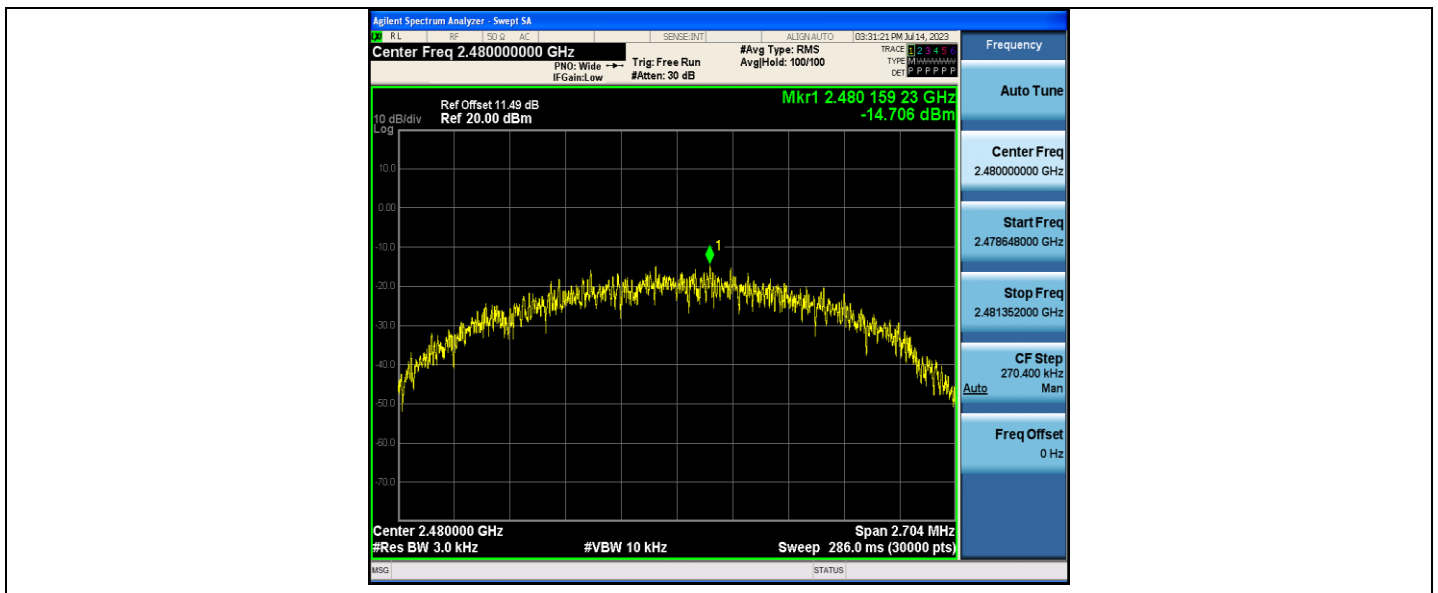
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

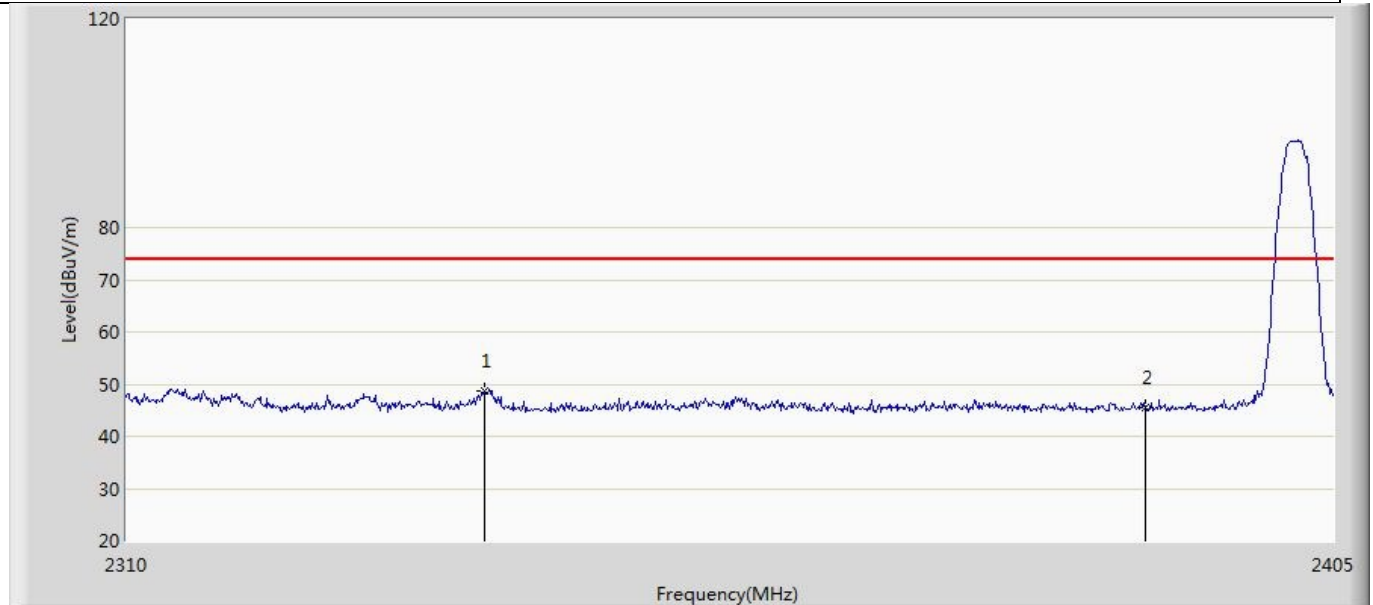


BLE_2M_Ant1_2480



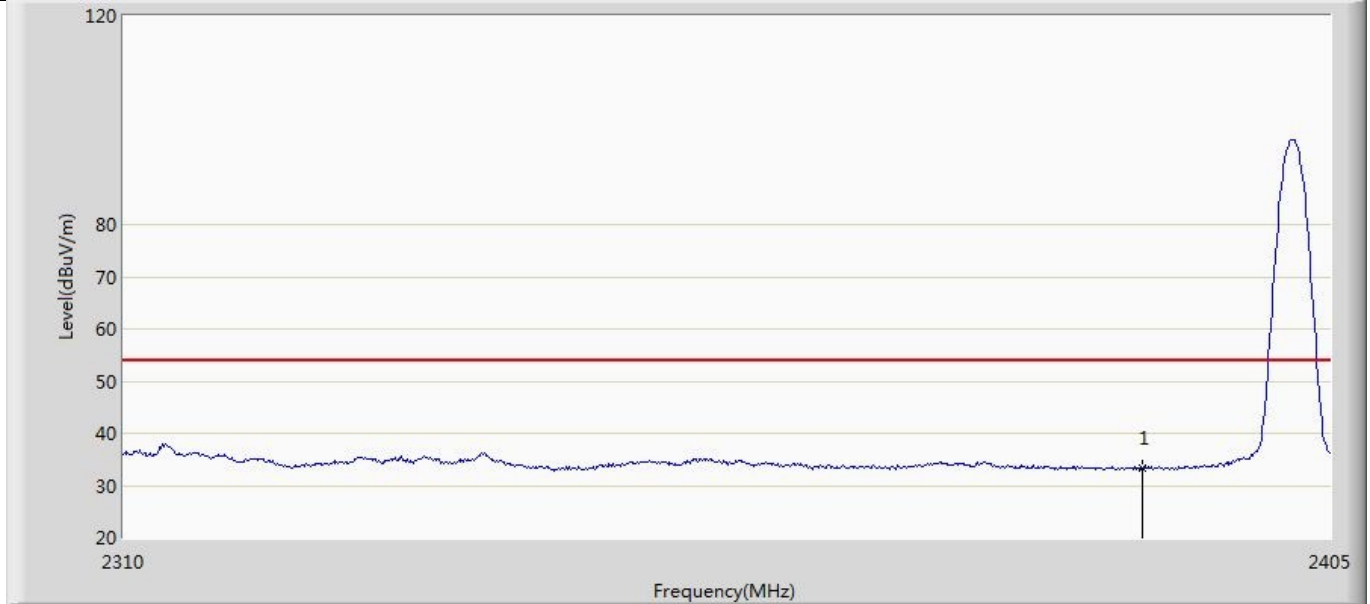
Appendix E: Band edge measurements

Profile: 2360669R	Page No.: 1
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps	



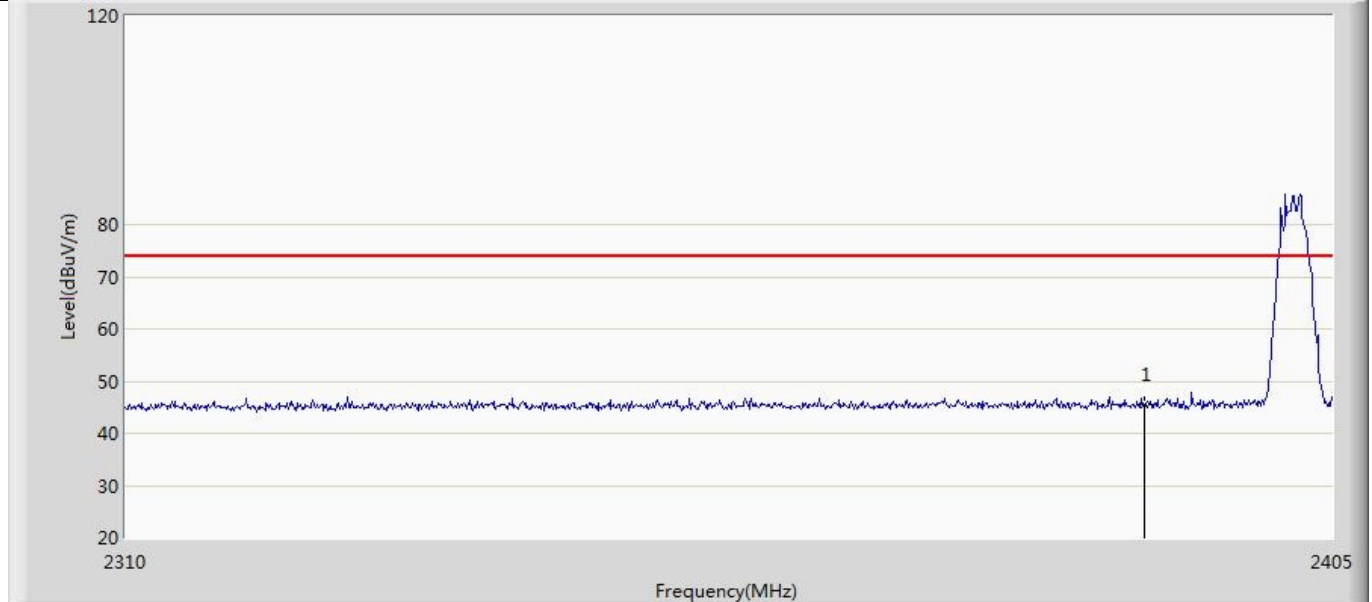
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2337.835	48.801	14.856	-25.199	74.000	33.946	PK
2		2390.000	45.412	11.299	-28.588	74.000	34.113	PK

Profile: 2360669R	Page No.: 2
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps	



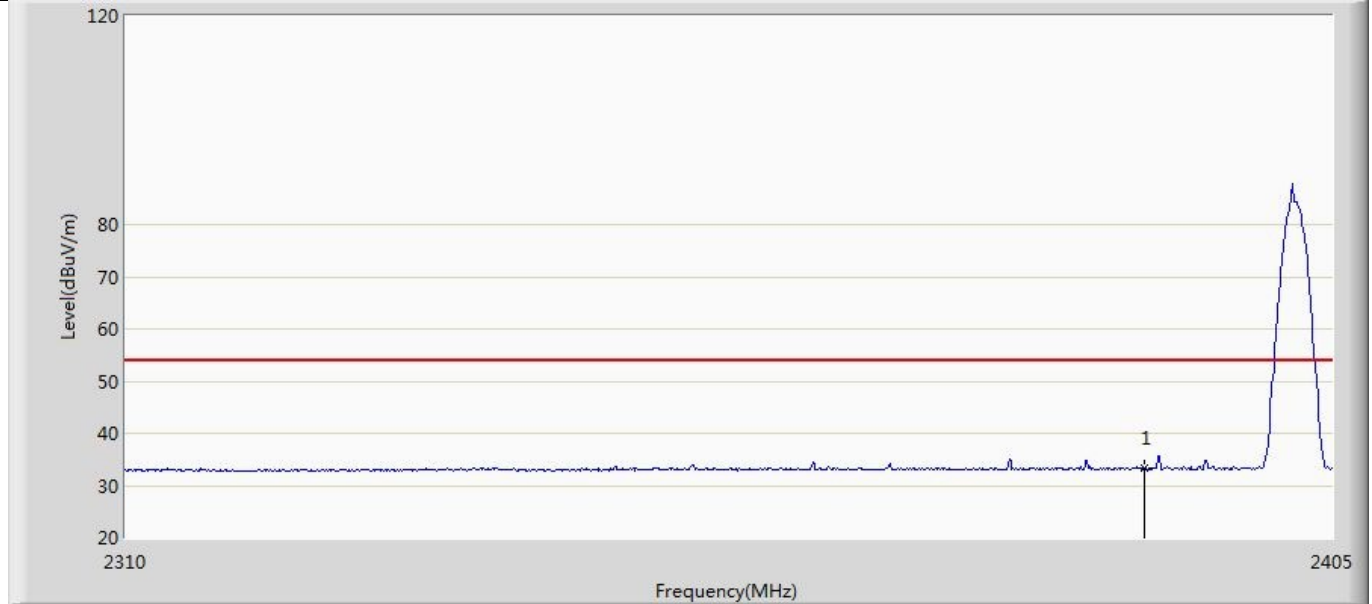
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	33.200	-0.913	-20.800	54.000	34.113	AV

Profile: 2360669R	Page No.: 3
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps	



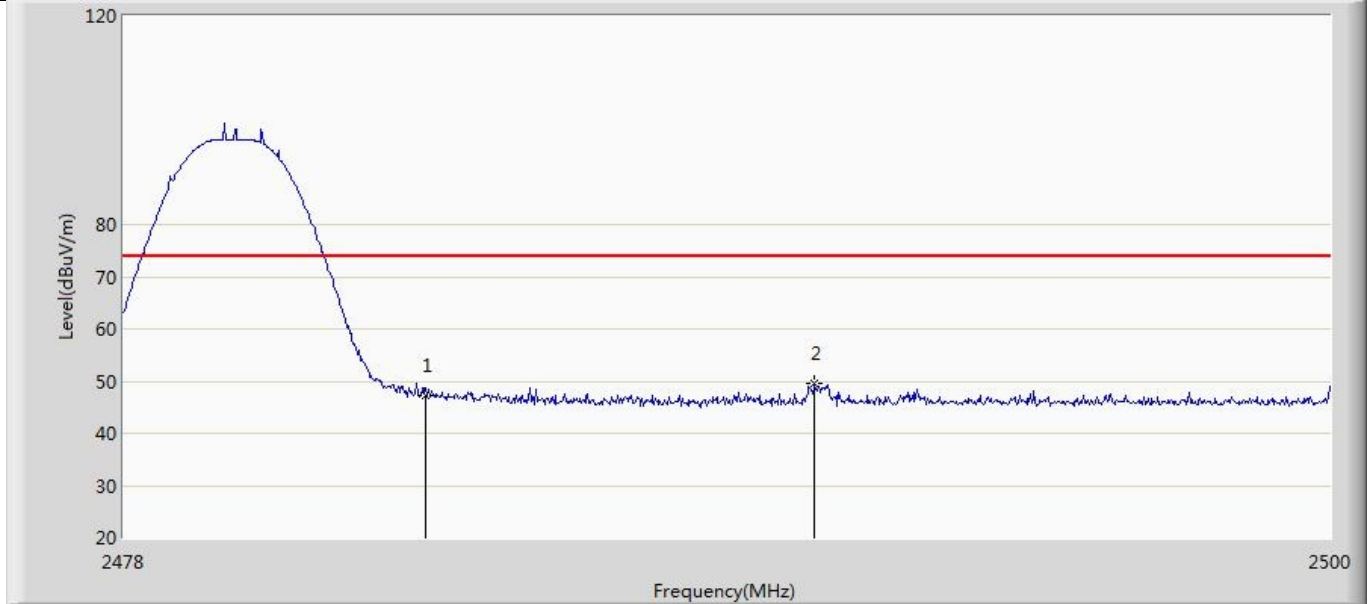
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	45.576	11.463	-28.424	74.000	34.113	PK

Profile: 2360669R	Page No.: 4
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps	



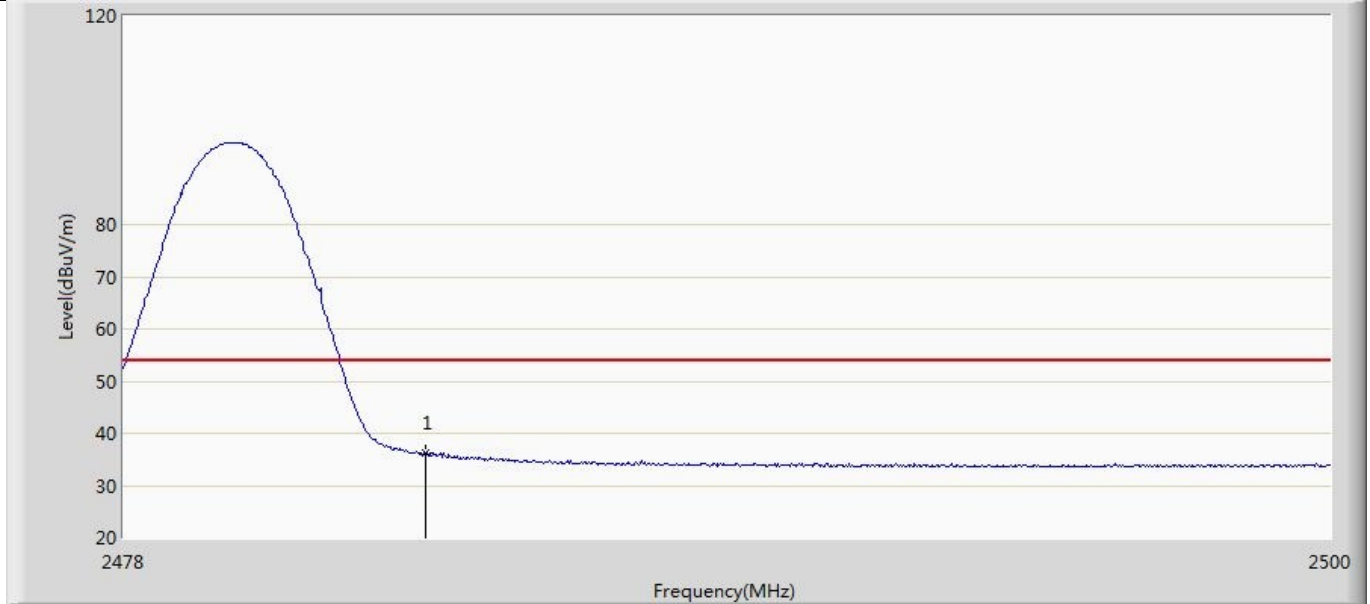
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	33.336	-0.777	-20.664	54.000	34.113	AV

Profile: 2360669R	Page No.: 5
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps	



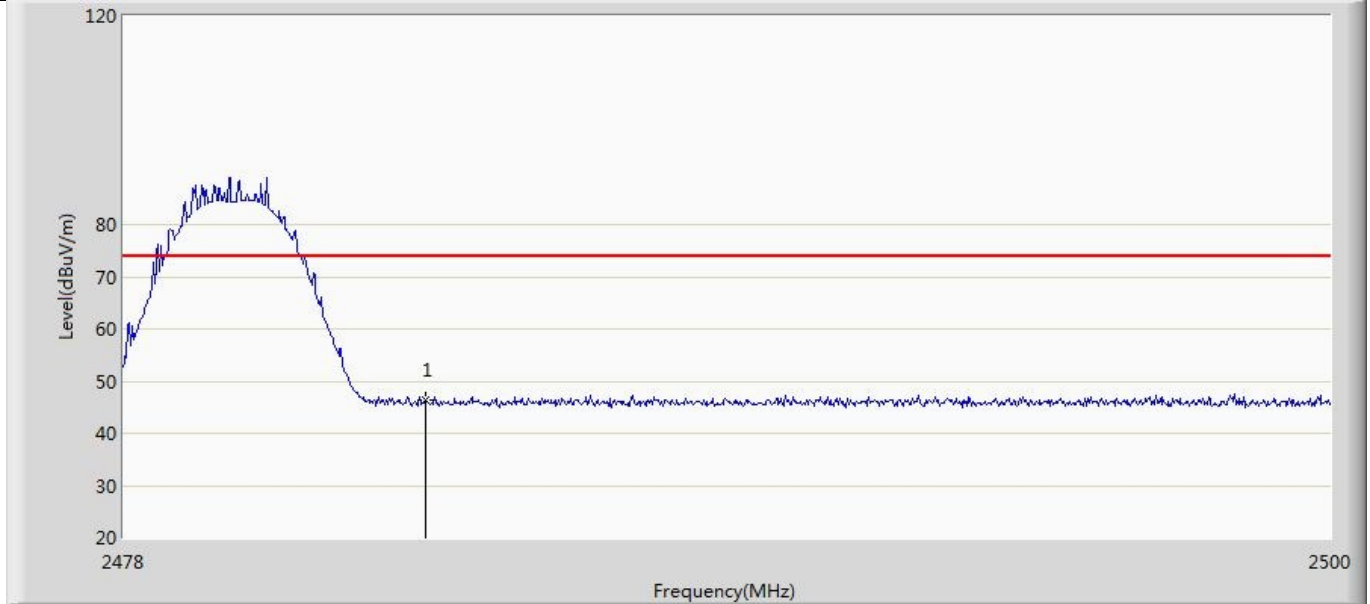
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2483.500	47.109	12.593	-26.891	74.000	34.516	PK
2	*	2490.584	49.548	15.021	-24.452	74.000	34.528	PK

Profile: 2360669R	Page No.: 6
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps	



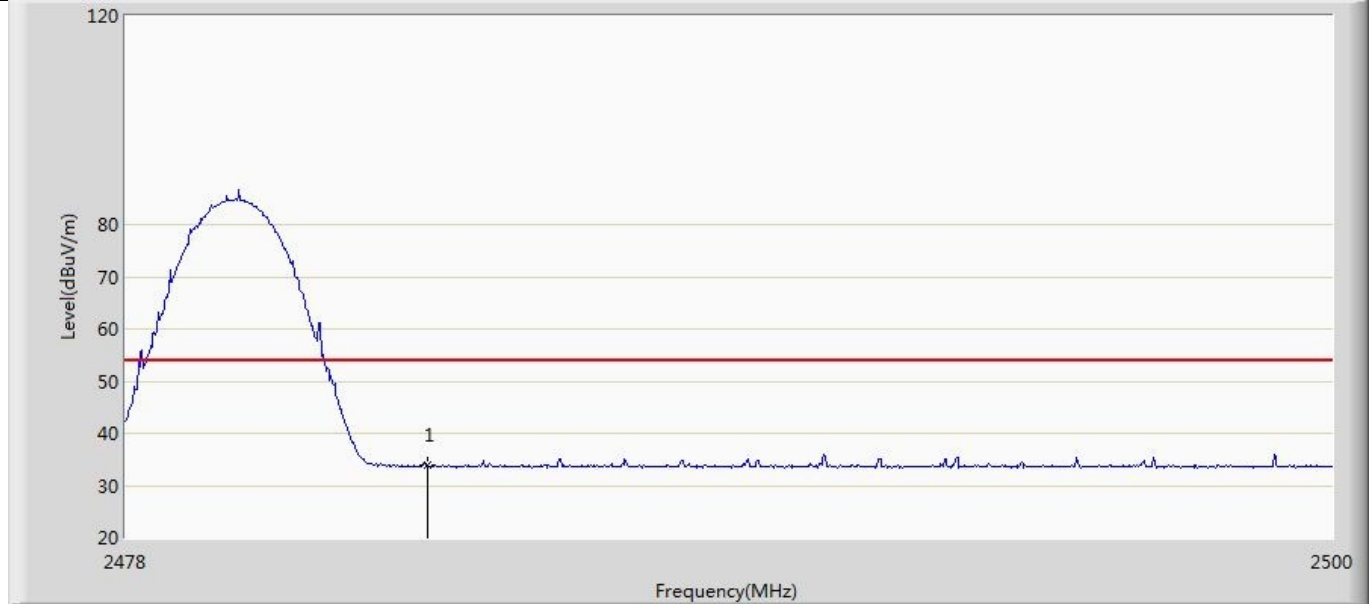
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	36.262	1.746	-17.738	54.000	34.516	AV

Profile: 2360669R	Page No.: 7
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps	



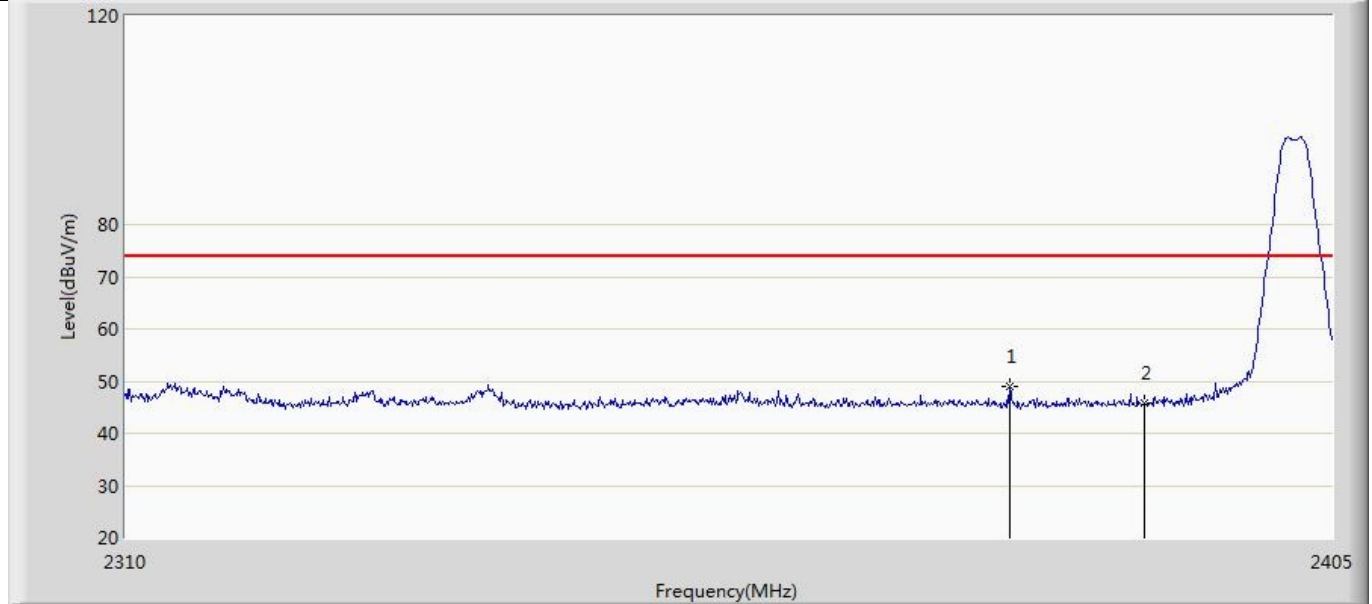
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	46.410	11.894	-27.590	74.000	34.516	PK

Profile: 2360669R	Page No.: 8
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps	



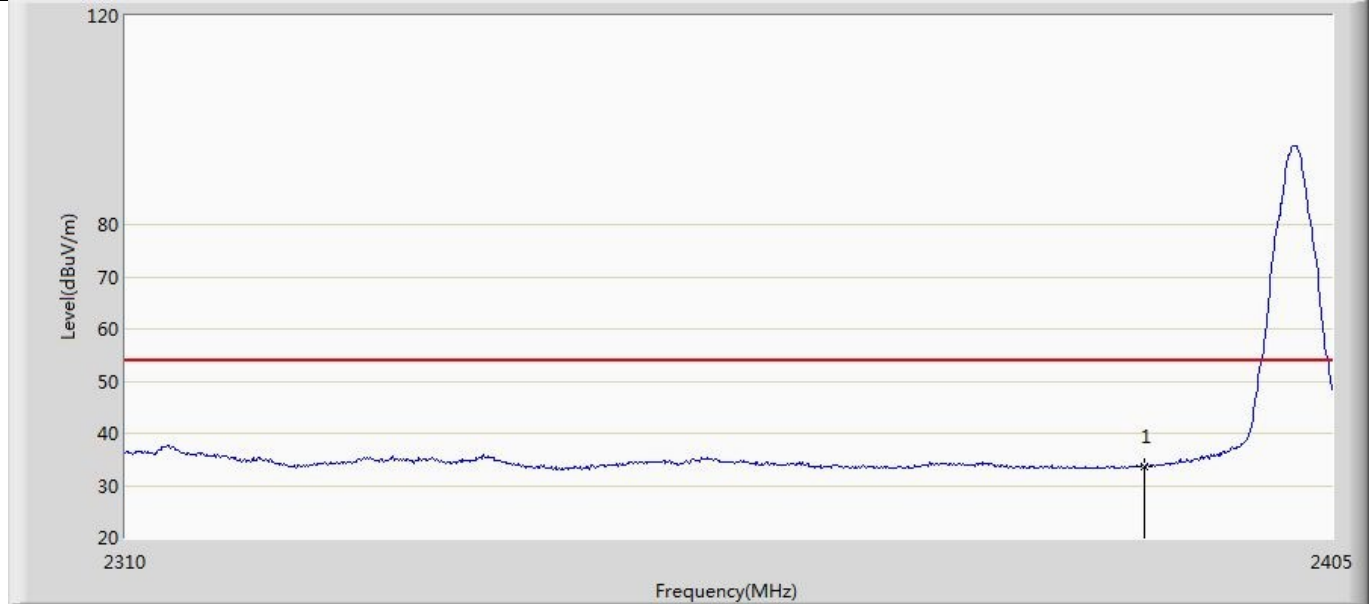
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	33.836	-0.680	-20.164	54.000	34.516	AV

Profile: 2360669R	Page No.: 9
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2402MHz by LE_2Mbps	



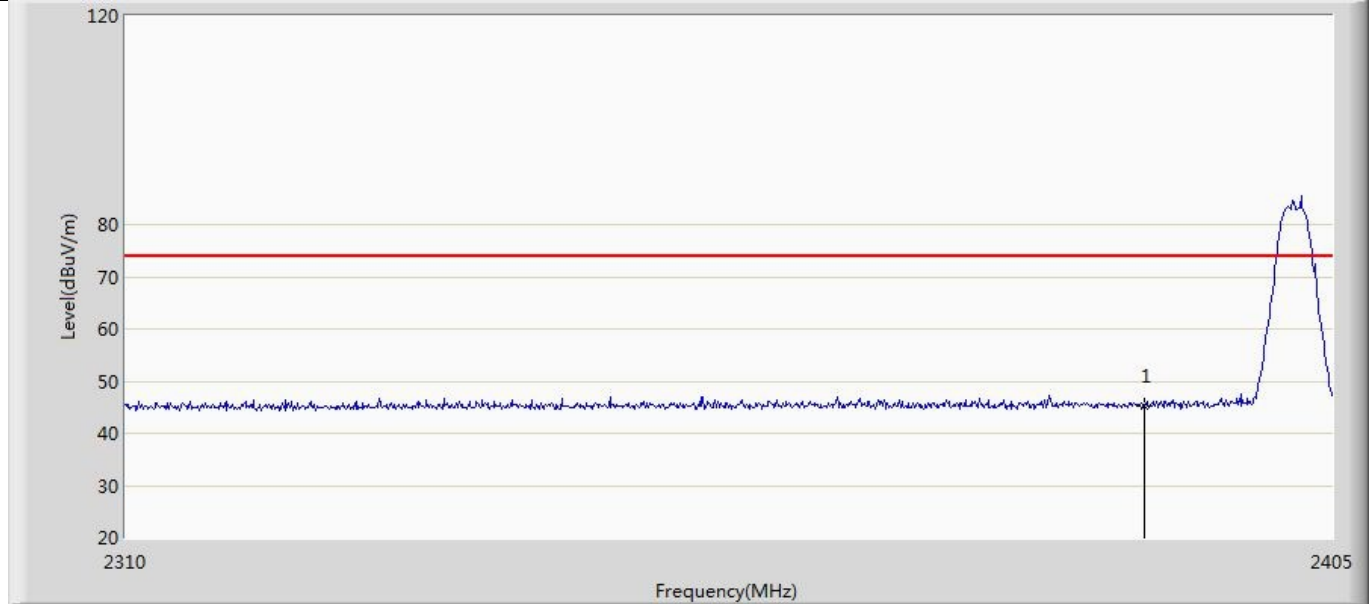
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2379.255	49.038	14.976	-24.962	74.000	34.062	PK
2		2390.000	45.819	11.706	-28.181	74.000	34.113	PK

Profile: 2360669R	Page No.: 10
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:20
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2402MHz by LE_2Mbps	



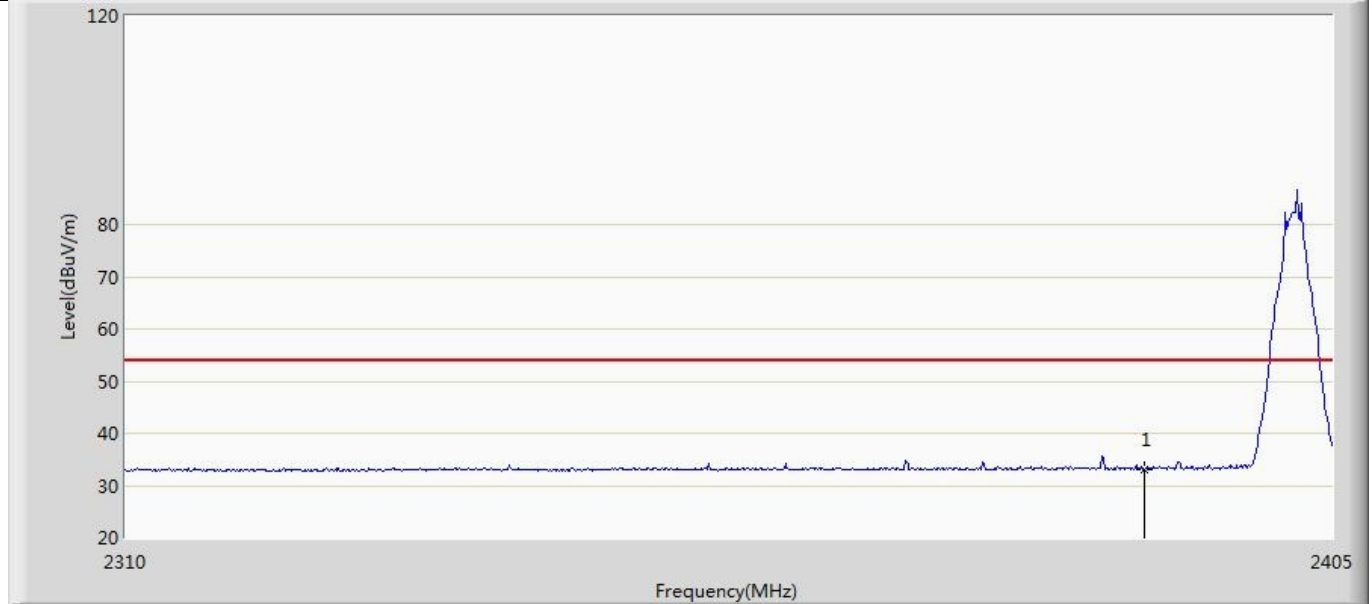
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	33.663	-0.450	-20.337	54.000	34.113	AV

Profile: 2360669R	Page No.: 11
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:21
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2402MHz by LE_2Mbps	



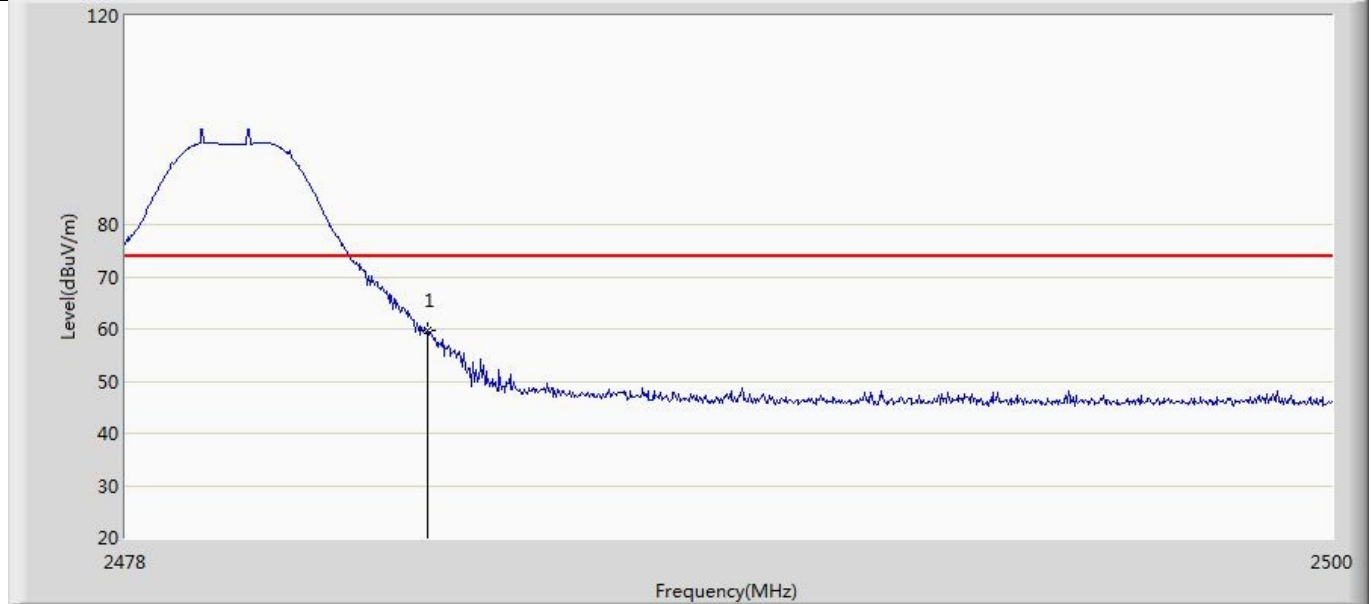
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	45.304	11.191	-28.696	74.000	34.113	PK

Profile: 2360669R	Page No.: 12
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:23
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2402MHz by LE_2Mbps	



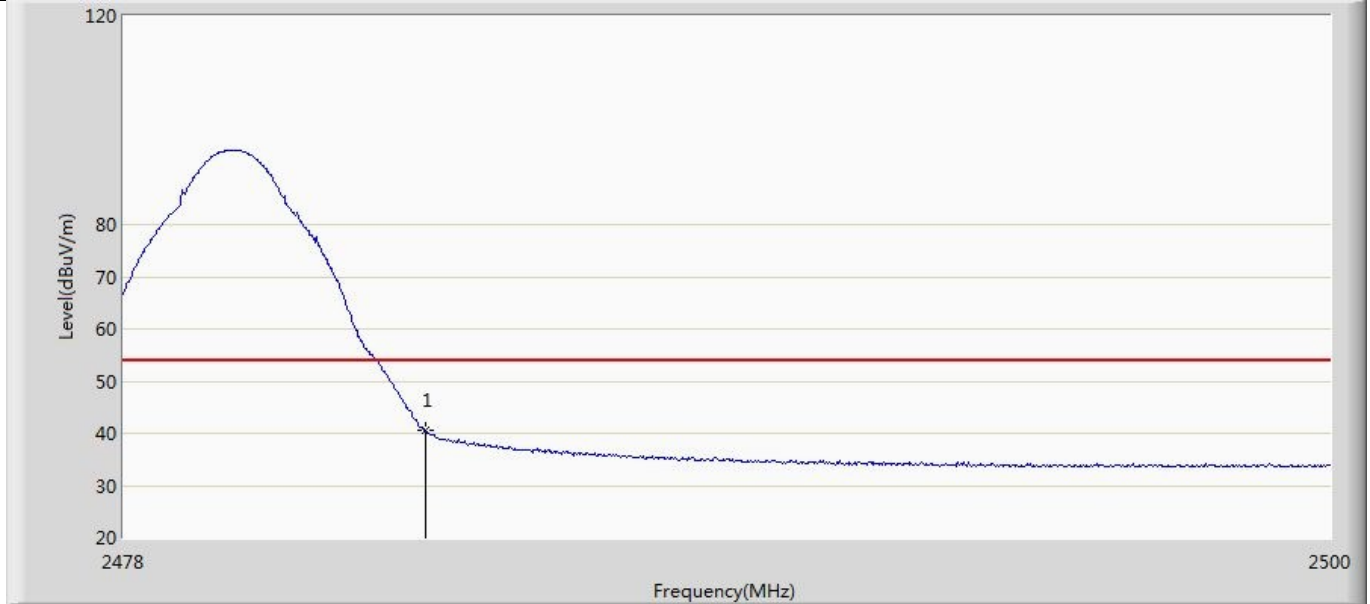
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	33.167	-0.946	-20.833	54.000	34.113	AV

Profile: 2360669R	Page No.: 13
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2480MHz by LE_2Mbps	



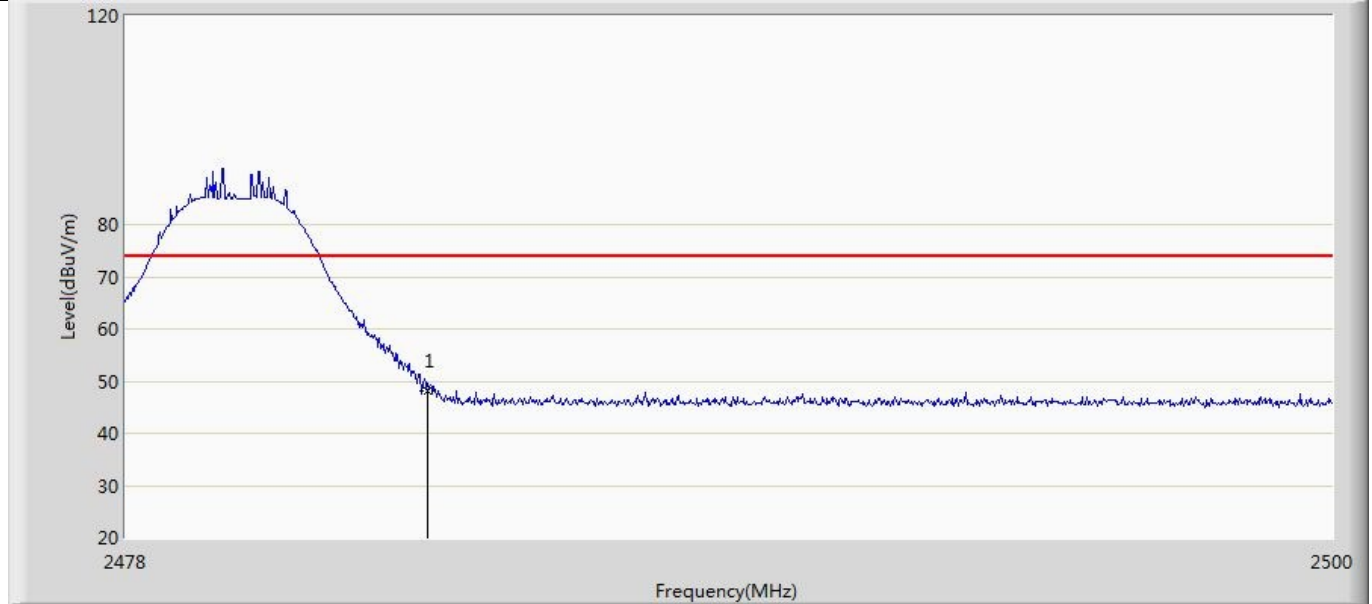
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	59.783	25.267	-14.217	74.000	34.516	PK

Profile: 2360669R	Page No.: 14
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:25
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2480MHz by LE_2Mbps	



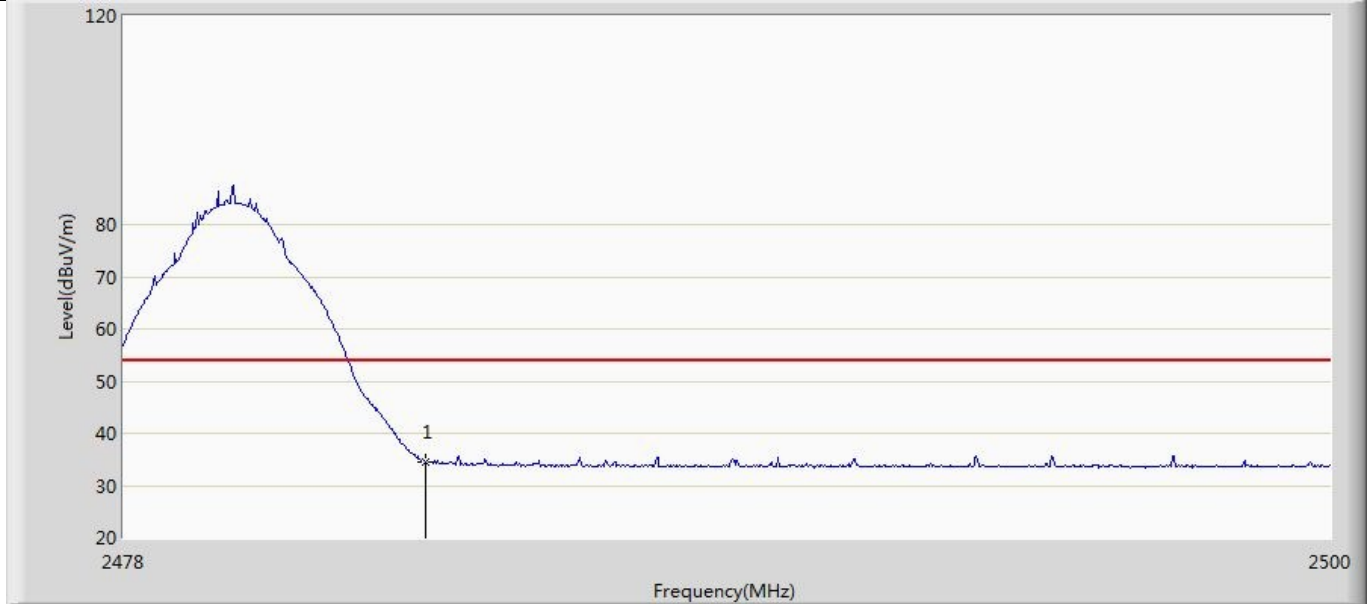
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	40.591	6.075	-13.409	54.000	34.516	AV

Profile: 2360669R	Page No.: 15
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:26
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2480MHz by LE_2Mbps	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	48.254	13.738	-25.746	74.000	34.516	PK

Profile: 2360669R	Page No.: 16
Engineer: Pengchengyang	
Site: AC5	Time: 2023/07/13 - 20:27
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LocoTag	Power: Battery
Note: Mode 2 : Transmit at 2480MHz by LE_2Mbps	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	34.600	0.084	-19.400	54.000	34.516	AV

Appendix F: Conducted Spurious Emission

Reference level measurement:

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2402.25	1.08
BLE_1M	Ant1	2440	2440.24	1.44
BLE_1M	Ant1	2480	2480.26	1.42
BLE_2M	Ant1	2402	2402.01	-0.19
BLE_2M	Ant1	2440	2440.02	0.57
BLE_2M	Ant1	2480	2480.49	1.16

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



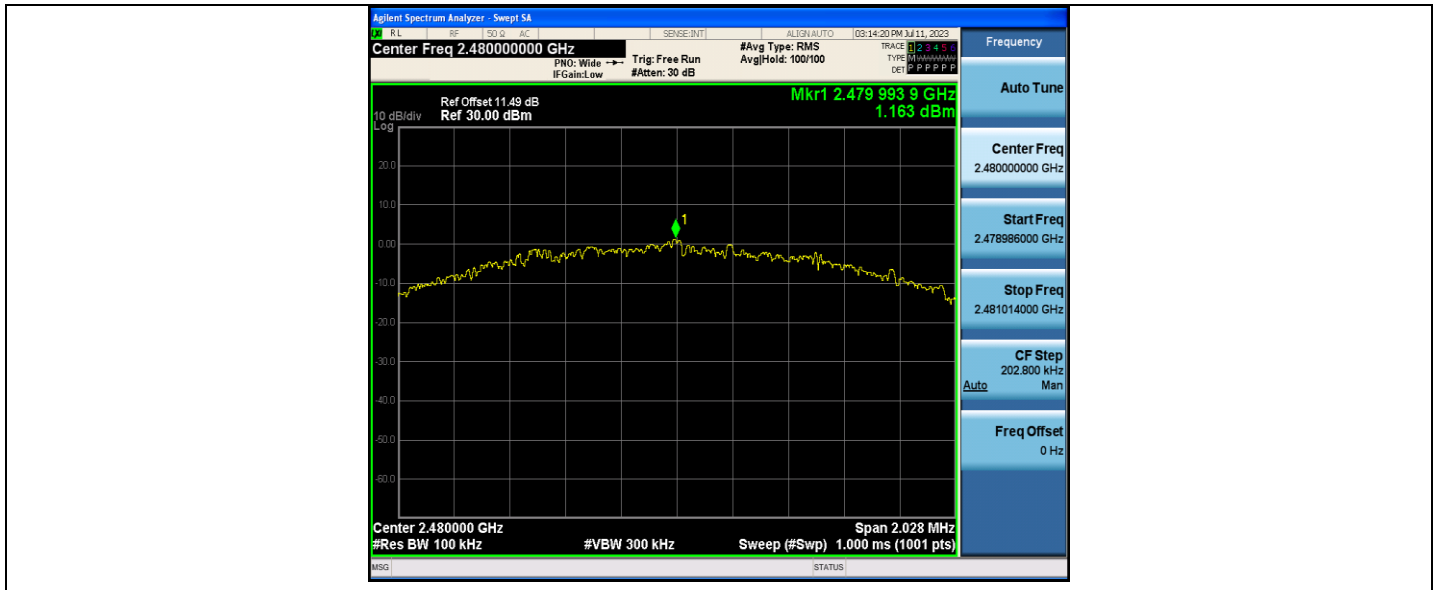
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



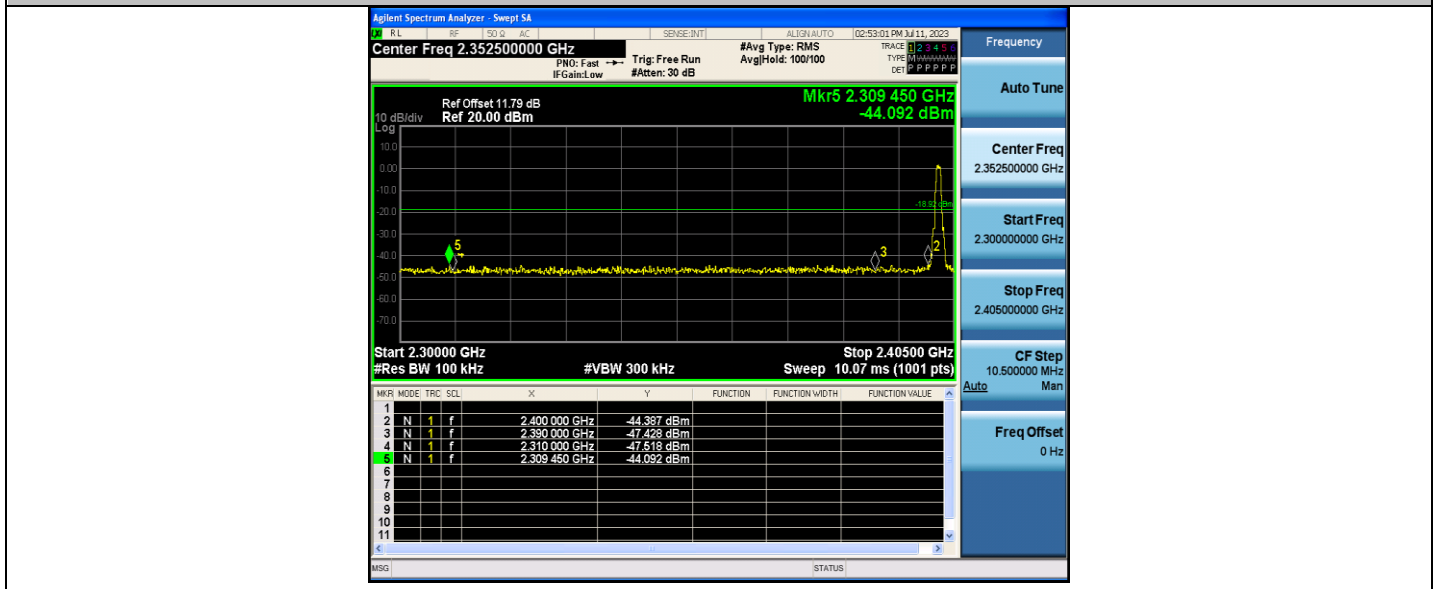
BLE_2M_Ant1_2480



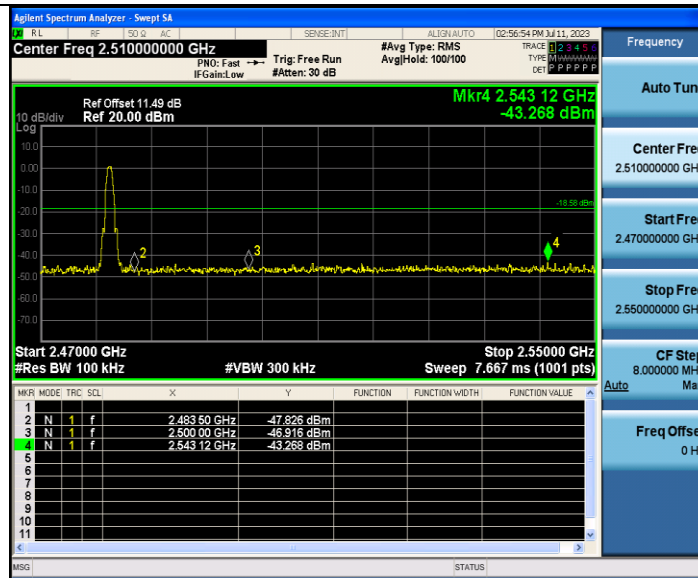
Band edge measurements :

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	1.08	-44.09	≤-18.92	PASS
BLE_1M	Ant1	High	2480	1.42	-43.27	≤-18.58	PASS
BLE_2M	Ant1	Low	2402	-0.19	-30.89	≤-20.19	PASS
BLE_2M	Ant1	High	2480	1.16	-43.82	≤-18.84	PASS

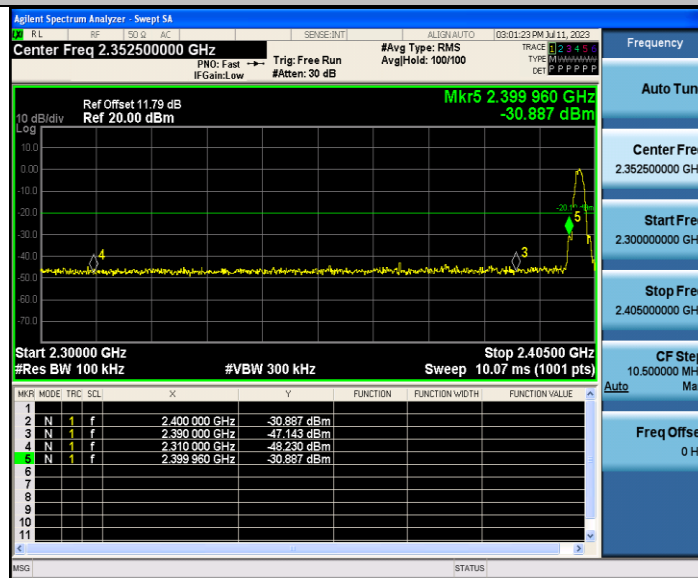
BLE_1M_Ant1_Low_2402



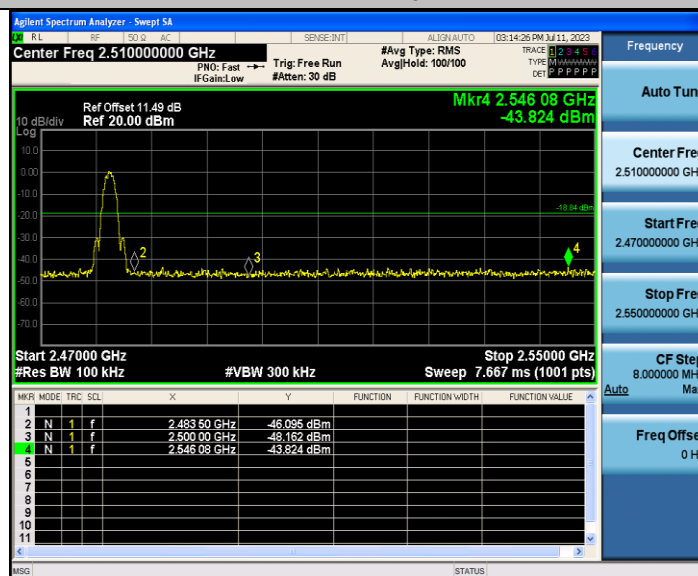
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480



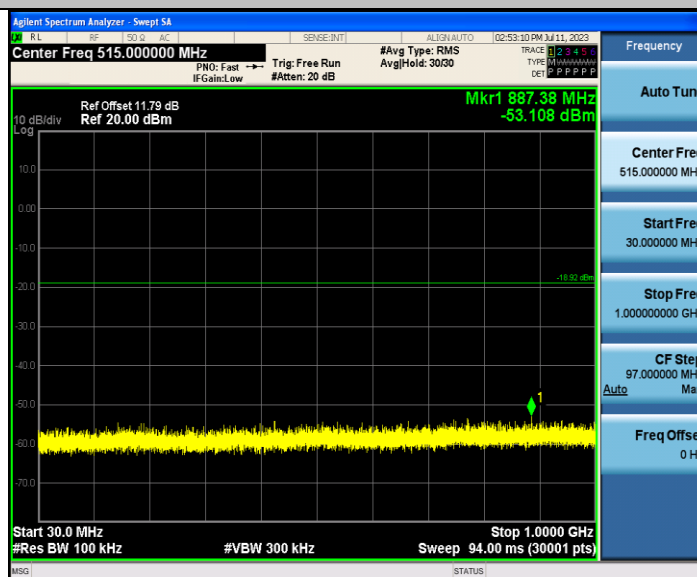
Conducted Spurious Emission :

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	1.08	-53.11	≤-18.92	PASS
			1000~3000	1.08	-50.93	≤-18.92	PASS
			3000~5000	1.08	-41.05	≤-18.92	PASS
			5000~7000	1.08	-50.7	≤-18.92	PASS
			7000~9000	1.08	-43.07	≤-18.92	PASS
			9000~11000	1.08	-51.18	≤-18.92	PASS
			11000~13000	1.08	-50.13	≤-18.92	PASS
			13000~15000	1.08	-46.26	≤-18.92	PASS
			15000~17000	1.08	-45.22	≤-18.92	PASS
			17000~19000	1.08	-45.08	≤-18.92	PASS
			19000~21000	1.08	-43.58	≤-18.92	PASS
		21000~23000	1.08	-43.24	≤-18.92	PASS	
		23000~25000	1.08	-41.49	≤-18.92	PASS	
		2440	30~1000	1.44	-53.19	≤-18.56	PASS
			1000~3000	1.44	-51.63	≤-18.56	PASS
			3000~5000	1.44	-44.24	≤-18.56	PASS
			5000~7000	1.44	-50.72	≤-18.56	PASS
			7000~9000	1.44	-43.04	≤-18.56	PASS
			9000~11000	1.44	-51.48	≤-18.56	PASS
			11000~13000	1.44	-50.27	≤-18.56	PASS
			13000~15000	1.44	-47.47	≤-18.56	PASS
			15000~17000	1.44	-44.56	≤-18.56	PASS
			17000~19000	1.44	-44.09	≤-18.56	PASS
			19000~21000	1.44	-43.58	≤-18.56	PASS
		21000~23000	1.44	-43.05	≤-18.56	PASS	
		23000~25000	1.44	-41.46	≤-18.56	PASS	
		2480	30~1000	1.42	-52.99	≤-18.58	PASS
			1000~3000	1.42	-51.33	≤-18.58	PASS
			3000~5000	1.42	-44.17	≤-18.58	PASS
			5000~7000	1.42	-51.35	≤-18.58	PASS
			7000~9000	1.42	-45.73	≤-18.58	PASS
			9000~11000	1.42	-51.88	≤-18.58	PASS
			11000~13000	1.42	-50.83	≤-18.58	PASS
13000~15000	1.42		-47.7	≤-18.58	PASS		
15000~17000	1.42		-44.55	≤-18.58	PASS		
17000~19000	1.42		-45.55	≤-18.58	PASS		
19000~21000	1.42		-42.73	≤-18.58	PASS		
21000~23000	1.42	-43.19	≤-18.58	PASS			
23000~25000	1.42	-42.04	≤-18.58	PASS			
BLE_2M	Ant1	2402	30~1000	-0.19	-52.73	≤-20.19	PASS
			1000~3000	-0.19	-50.13	≤-20.19	PASS
			3000~5000	-0.19	-42.48	≤-20.19	PASS
			5000~7000	-0.19	-50.84	≤-20.19	PASS
			7000~9000	-0.19	-44.4	≤-20.19	PASS
			9000~11000	-0.19	-51.81	≤-20.19	PASS
			11000~13000	-0.19	-51.59	≤-20.19	PASS
			13000~15000	-0.19	-47.13	≤-20.19	PASS

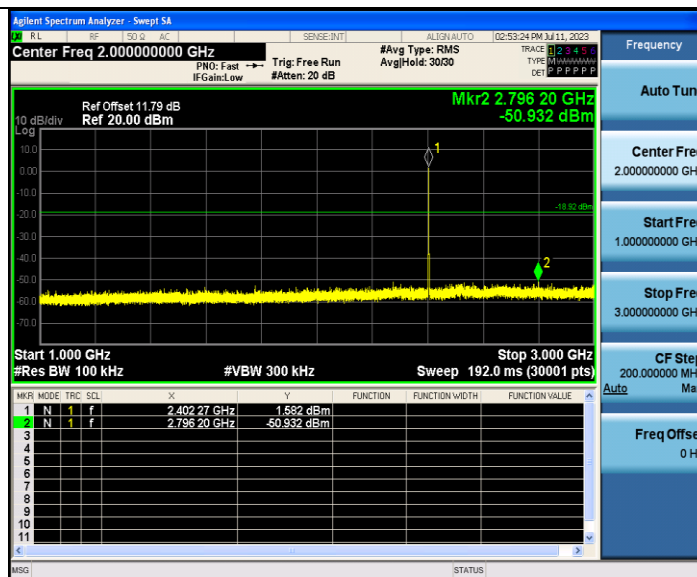


	2440	15000~17000	-0.19	-45.58	≤-20.19	PASS
		17000~19000	-0.19	-44.37	≤-20.19	PASS
		19000~21000	-0.19	-43.5	≤-20.19	PASS
		21000~23000	-0.19	-42.47	≤-20.19	PASS
		23000~25000	-0.19	-41.35	≤-20.19	PASS
		30~1000	0.57	-52.92	≤-19.43	PASS
		1000~3000	0.57	-51.13	≤-19.43	PASS
		3000~5000	0.57	-44.04	≤-19.43	PASS
		5000~7000	0.57	-51.06	≤-19.43	PASS
		7000~9000	0.57	-45.36	≤-19.43	PASS
		9000~11000	0.57	-51.63	≤-19.43	PASS
		11000~13000	0.57	-50.75	≤-19.43	PASS
		13000~15000	0.57	-46.64	≤-19.43	PASS
		15000~17000	0.57	-45.06	≤-19.43	PASS
		17000~19000	0.57	-44.98	≤-19.43	PASS
	19000~21000	0.57	-43.17	≤-19.43	PASS	
	21000~23000	0.57	-43.17	≤-19.43	PASS	
	23000~25000	0.57	-41.21	≤-19.43	PASS	
	2480	30~1000	1.16	-53.38	≤-18.84	PASS
		1000~3000	1.16	-51.63	≤-18.84	PASS
		3000~5000	1.16	-45.56	≤-18.84	PASS
		5000~7000	1.16	-51.43	≤-18.84	PASS
		7000~9000	1.16	-47.5	≤-18.84	PASS
		9000~11000	1.16	-51.07	≤-18.84	PASS
		11000~13000	1.16	-52.32	≤-18.84	PASS
		13000~15000	1.16	-46.98	≤-18.84	PASS
		15000~17000	1.16	-45.51	≤-18.84	PASS
		17000~19000	1.16	-45.22	≤-18.84	PASS
		19000~21000	1.16	-43.04	≤-18.84	PASS
		21000~23000	1.16	-43.13	≤-18.84	PASS
	23000~25000	1.16	-41.16	≤-18.84	PASS	

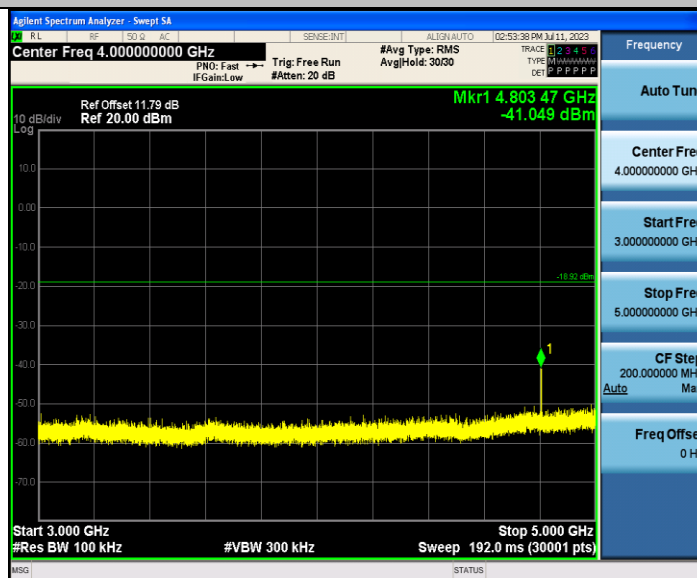
BLE_1M_Ant1_2402_30~1000



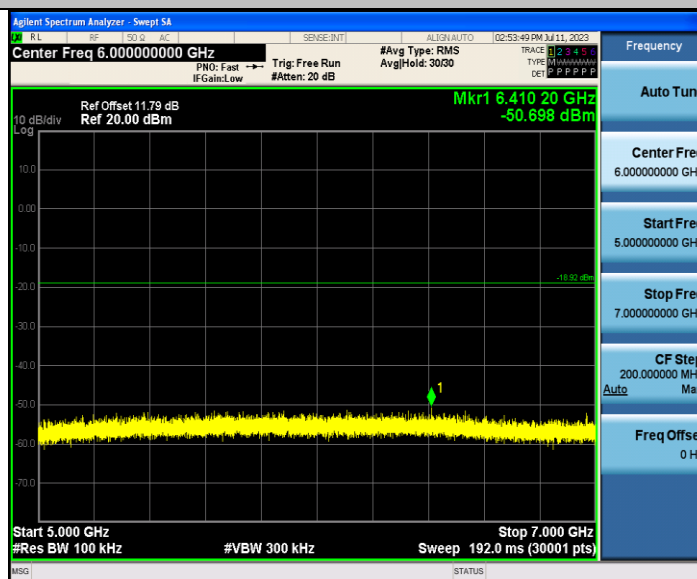
BLE_1M_Ant1_2402_1000~3000



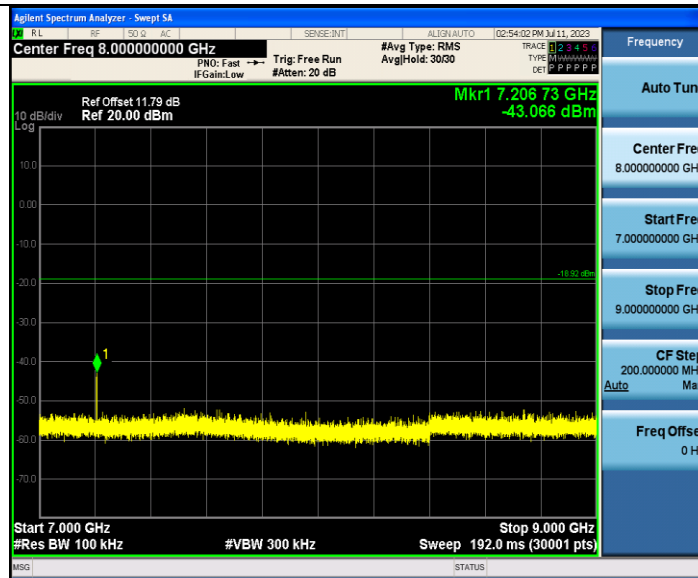
BLE_1M_Ant1_2402_3000~5000



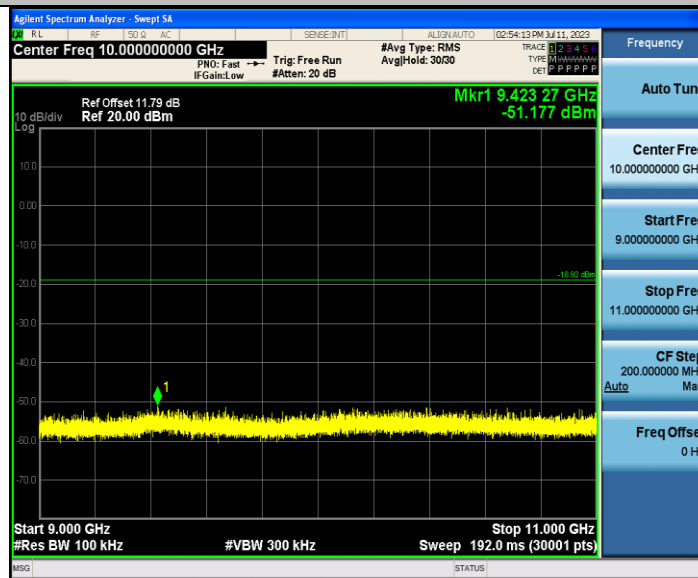
BLE_1M_Ant1_2402_5000~7000



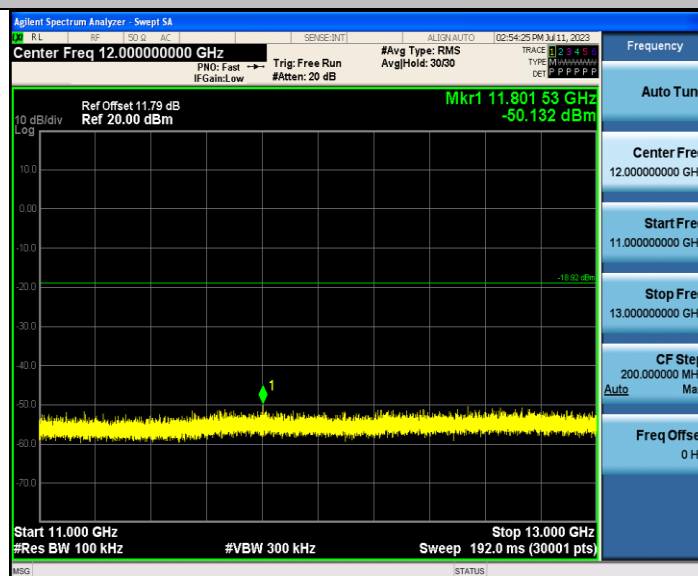
BLE_1M_Ant1_2402_7000~9000



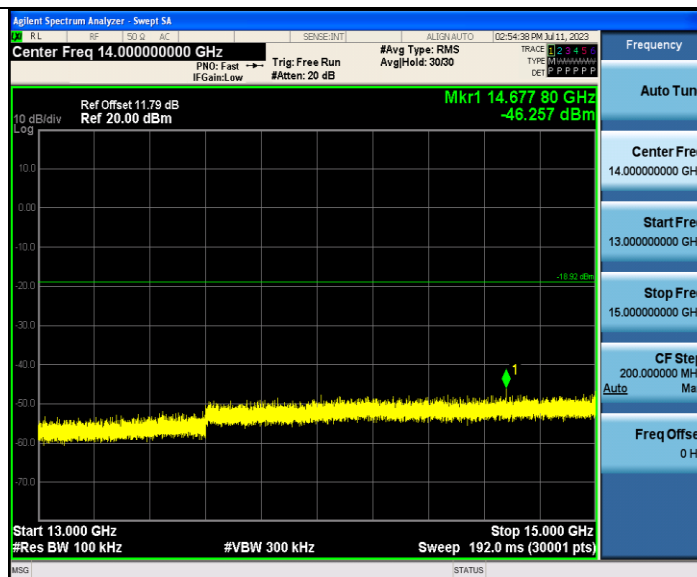
BLE_1M_Ant1_2402_9000~11000



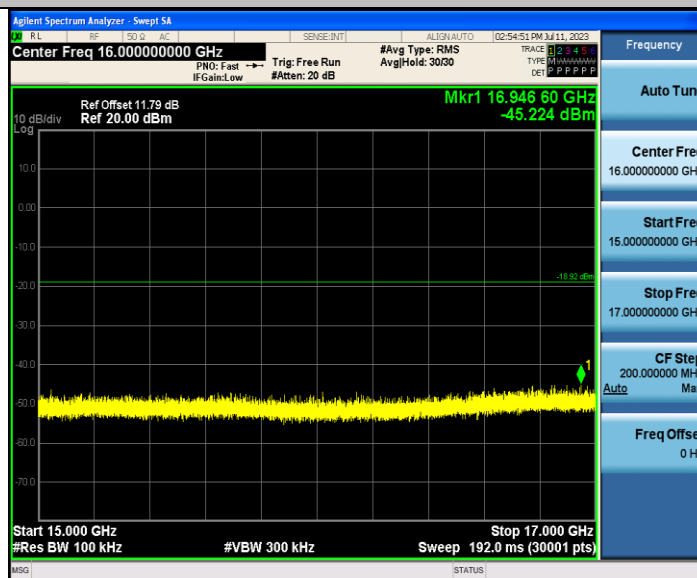
BLE_1M_Ant1_2402_11000~13000



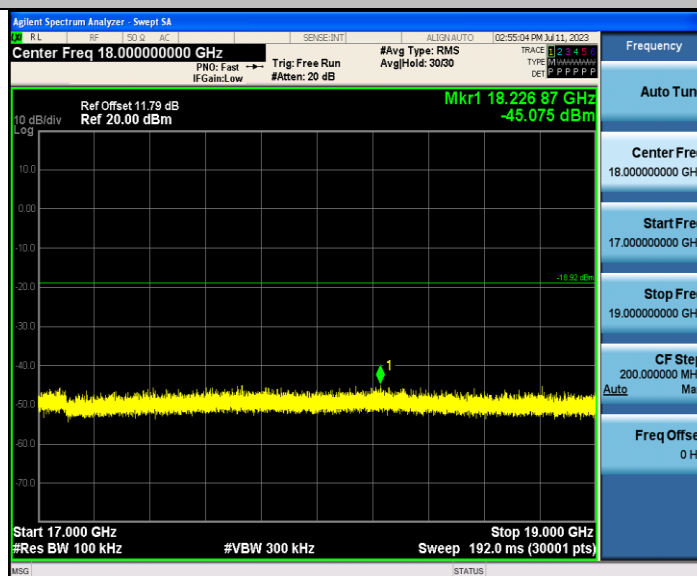
BLE_1M_Ant1_2402_13000~15000



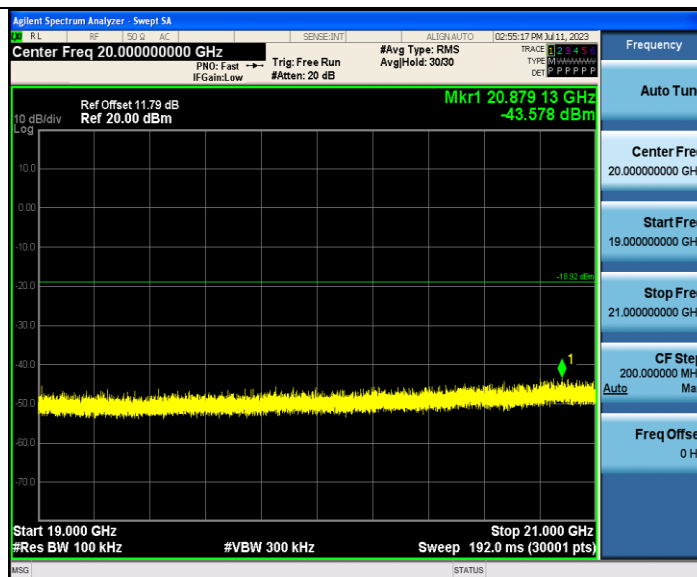
BLE_1M_Ant1_2402_15000~17000



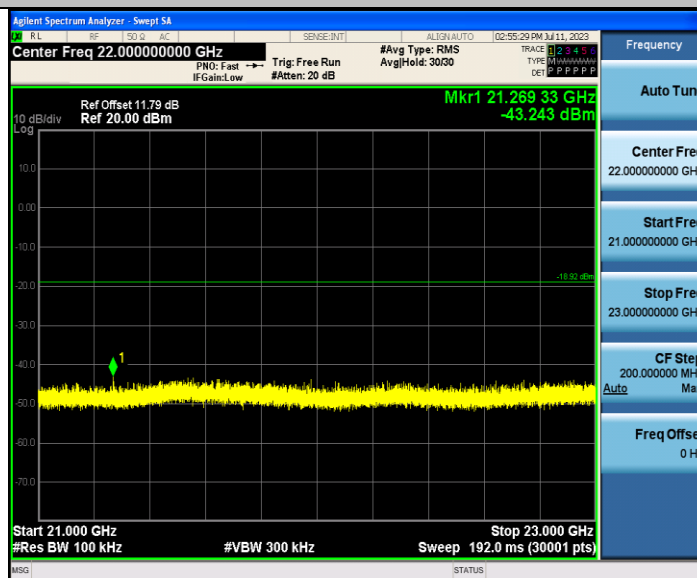
BLE_1M_Ant1_2402_17000~19000



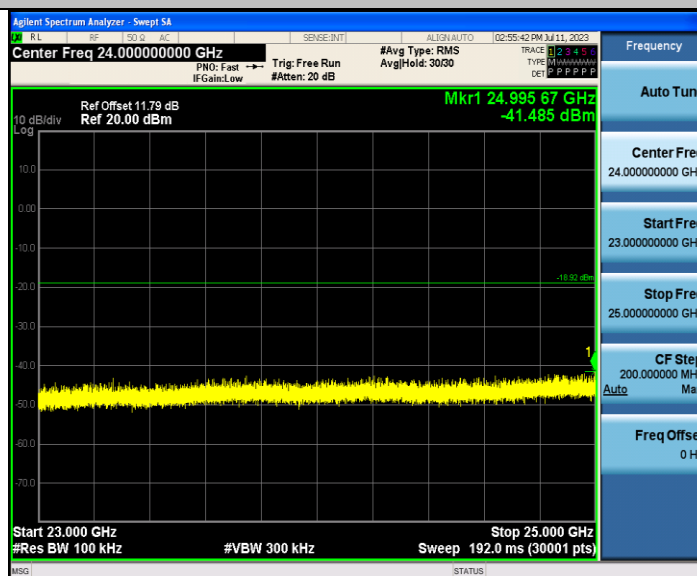
BLE_1M_Ant1_2402_19000~21000



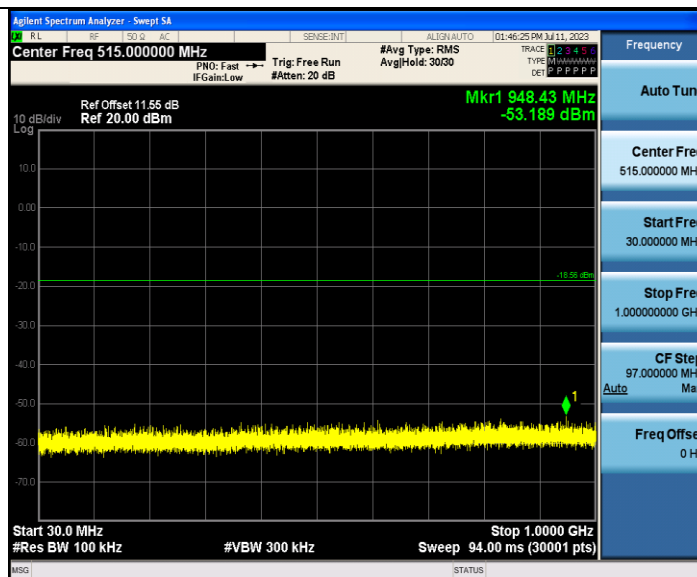
BLE_1M_Ant1_2402_21000~23000



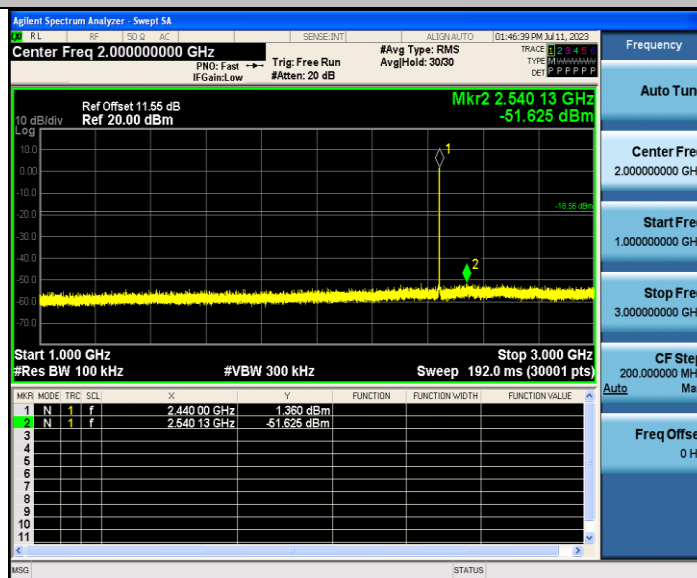
BLE_1M_Ant1_2402_23000~25000



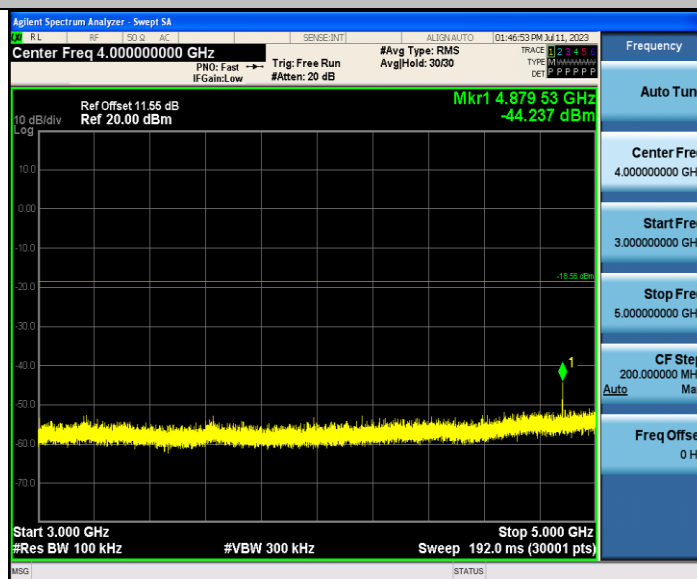
BLE_1M_Ant1_2440_30~1000



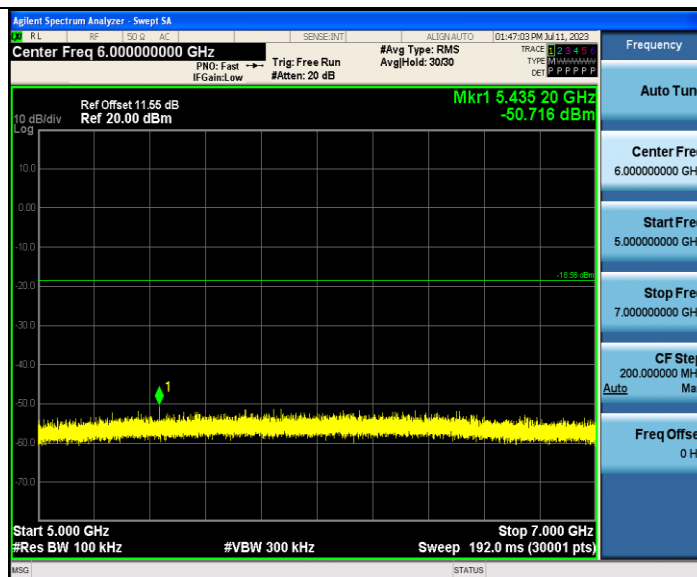
BLE_1M_Ant1_2440_1000~3000



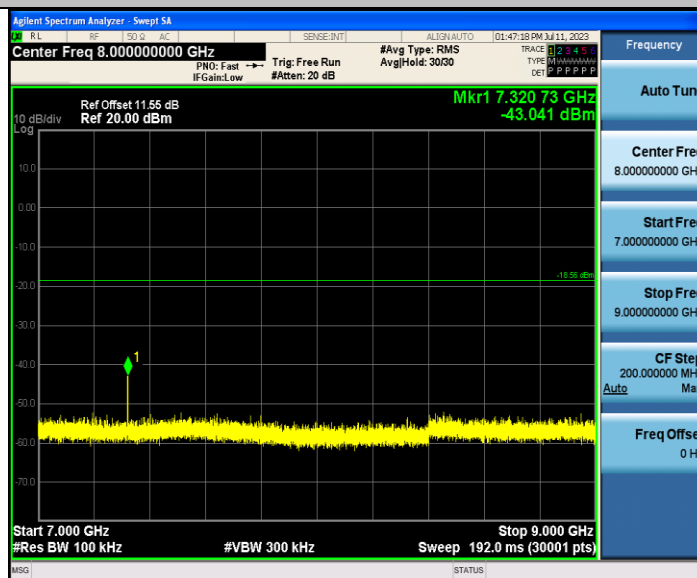
BLE_1M_Ant1_2440_3000~5000



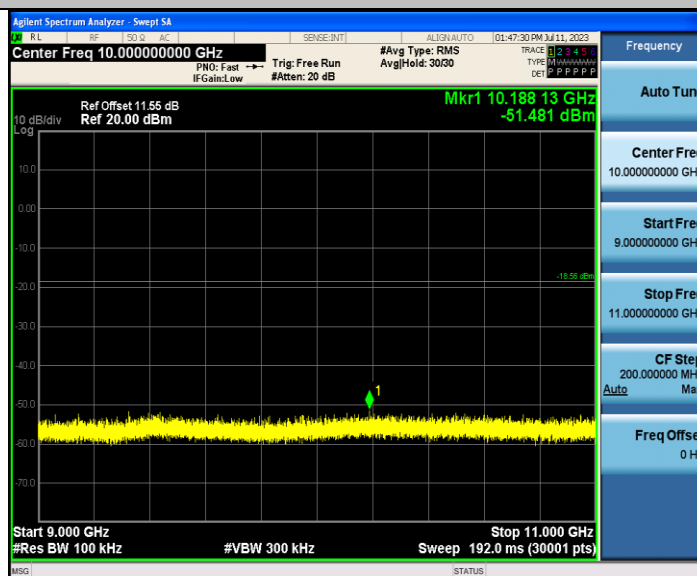
BLE_1M_Ant1_2440_5000~7000



BLE_1M_Ant1_2440_7000~9000



BLE_1M_Ant1_2440_9000~11000



BLE_1M_Ant1_2440_11000~13000