

TEST REPORT

Product : Smart Analyzer
Trade mark : Schwarzkopf Professional
Model/Type reference : v1.1
Serial Model : /
Report Number : EED39O82078701R3
FCC ID : 2AV4ZA161902
Date of Issue : December 11, 2024

Test Standards	Result
☒ 47 CFR Part 15 Subpart C	PASS

Prepared for:

Henkel AG & Co. KGaA
40191 Düsseldorf, Germany

Prepared by:

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检验检测专用章
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December 11, 2024

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Authorized Signatory



EED39O820787

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Report No. : EED39O82078701R3

Modification Record

No.	Last Report No.	Modification Description
1	EED39O82078701	First report
2	EED39O82078701R1	Remove the antenna photo from the P35
3	EED39O82078701R2	Change Sample Type
4	EED39O82078701R3	Change FCC-Designation No. and add the cable to the equipment List

Note: This testing report displaces the original report of EED39O82078701R2, and the original one EED39O8207870R2 was invalid since the date of this testing report released.

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1. Test Summary

Test item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2020	PASS
AC Power Line Conducted Emission	47 CFR Part 15Subpart C Section 15.207	ANSI C63.10-2020	PASS
Maximum conducted output power	47 CFR Part 15Subpart C Section 15.247 (b)(3)	ANSI C63.10-2020	PASS
DTS Bandwidth	47 CFR Part 15Subpart C Section 15.247 (a)(2)	ANSI C63.10-2020	PASS
Maximum Power Spectral Density	47 CFR Part 15Subpart C Section 15.247 (e)	ANSI C63.10-2020	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2020	PASS
RF Conducted Spurious Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2020	PASS
Radiated Spurious Emissions	47 CFR Part 15Subpart C Section 15.205/15.209	ANSI C63.10-2020	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15Subpart C Section 15.205/15.209	ANSI C63.10-2020	PASS

Remark:

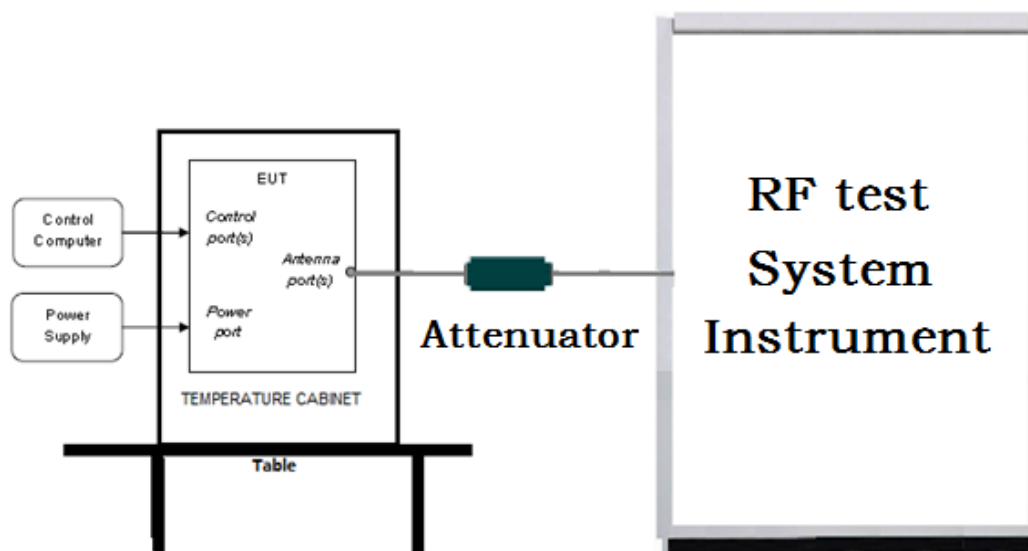
Test according to ANSI C63.4-2014 & ANSI C63.10-2020.

The tested samples and the sample information are provided by the client.

2. Test Requirement

2.1. Test Setup

For Conducted Test Setup



For Radiated Emissions Test Setup

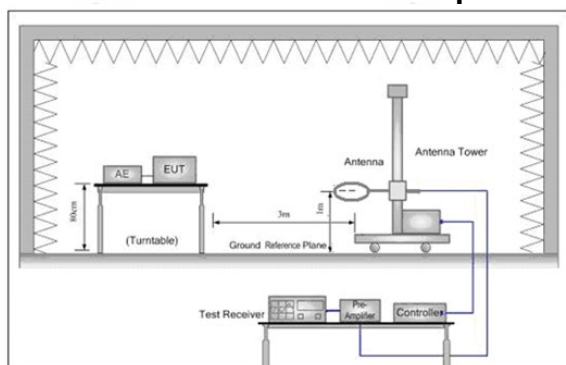


Figure 1. Below 30MHz

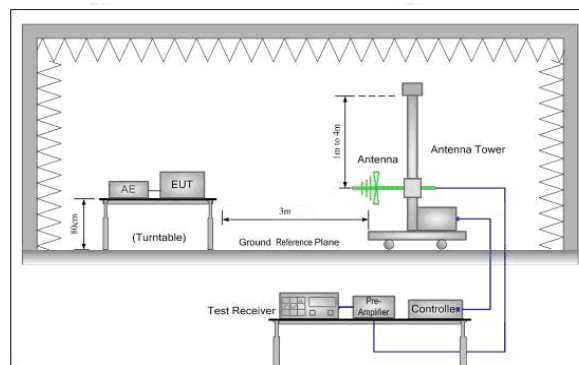


Figure 2. 30MHz to 1GHz

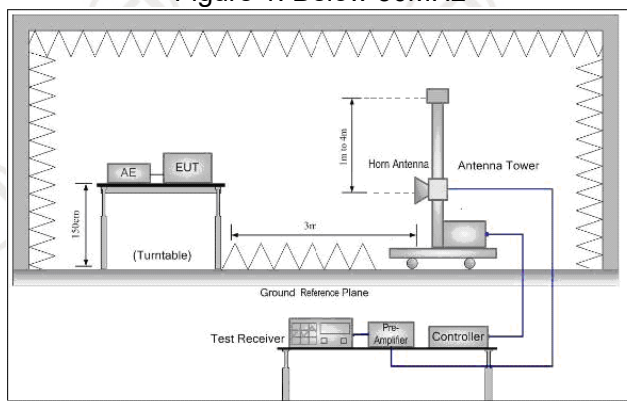
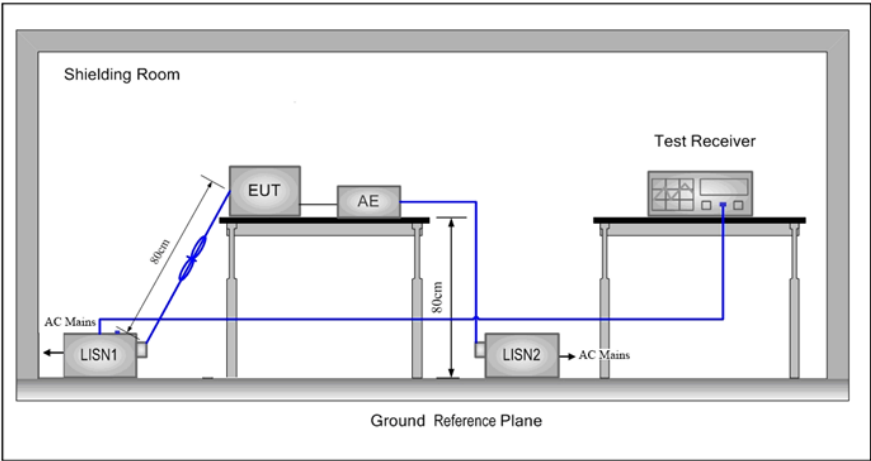


Figure 3. Above 1GHz

For Conducted Emissions Test Setup



2.2. Test Environment

Operating Environment:	
Temperature:	20.8 °C
Humidity:	46.5 % RH
Atmospheric Pressure:	1008mbar

2.3. Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK	2402MHz ~2480 MHz	Channel 1	Channel 20	Channel 40
		2402MHz	2440MHz	2480MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

3. General Information

3.1. Client Information

Applicant:	Henkel AG & Co. KGaA
Address of Applicant:	40191 Düsseldorf, Germany
Manufacturer:	Henkel AG & Co. KGaA
Address of Manufacturer:	40191 Düsseldorf, Germany
Factory:	Henkel AG & Co. KGaA
Address of Factory:	40191 Düsseldorf, Germanyd

3.2. General Description of EUT

Product Name:	Smart Analyzer
Model No.(EUT):	v1.1
Trade Mark:	Schwarzkopf Professional
EUT Supports Radios application:	Bluetooth V4.2 BLE
Power Supply:	Model No: SYS1561-1105 Input: AC100-240V 1.0A, 50/60Hz Output: DC 5.0V 2.1A
Sample Received Date:	2023.02.10
Sample tested Date:	2023.02.22~2023.03.21

3.3. Product Specification subjective to this standard

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	Bluetooth LE4.2
Modulation Technique:	DSSS
Modulation Type:	GFSK
Number of Channel:	40
Sample Type:	portable device
Test Software of EUT:	Direct test mode (manufacturer declare)
Antenna Type:	Chip antenna
Antenna Gain ^① :	2.0 dBi
Test Voltage:	DC 3.7V

Note: 1 The antenna gain is provided by the client and we Centre Testing International (Suzhou) CO., LTD. test lab is not responsible for the accuracy of the antenna gain information.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
3	2406MHz	13	2426MHz	23	2446MHz	33	2466MHz
4	2408MHz	14	2428MHz	24	2448MHz	34	2468MHz
5	2410MHz	15	2430MHz	25	2450MHz	35	2470MHz
6	2412MHz	16	2432MHz	26	2452MHz	36	2472MHz
7	2414MHz	17	2434MHz	27	2454MHz	37	2474MHz
8	2416MHz	18	2436MHz	28	2456MHz	38	2476MHz
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

3.4. Description of Support Units

The EUT has been tested with associated equipment below.

1) support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
NB	ThinkPad	E490	FCC ID and DOC	CTI

3.5. Test Location

All test facilities used to collect the test data are located at Building 18, Zhihui New Town Ecological Industrial Park, No. 1206, Jinyang East Road, Lujia Town, Kunshan, Jiangsu, China.

3.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No. 5734.01

Centre Testing International (Suzhou) CO., LTD. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration. Laboratories and any additional program requirements in the identified field of testing.

FCC-Designation No.:CN1371

Centre Testing International Group Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The American association for Centre Testing International Group Co., Ltd. EMC laboratory accreditation Designation No.:CN1371

3.7. Deviation from Standards

None.

3.8. Abnormalities from Standard Conditions

None.

3.9. Other Information Requested by the Customer

None.

3.10. Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Occupied Bandwidth	0.56%
2	RF Power conducted	0.59 dB
3	Power Spectral Density, conducted	2.37 dB
4	Unwanted Emission, conducted	2.68 dB
5	All Emission, radiated	4.41 dB(30MHz-1GHz)
		4.99 dB(1GHz-18GHz)
		5.307 dB(18GHz-40GHz)
6	Temperature test	0.54°C
7	Humidity test	1.62%
8	DC and low frequency voltages test	1.14%

4. Equipment List

RF test system					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Signal Generator	R&S	SMB100A	182002	2022-10-14	2023-10-13
Spectrum Analyzer	R&S	FSV40	101588	2022-10-14	2023-10-13
Vector signal generator	R&S	SMBV100B	101985	2022-10-14	2023-10-13
Temperature/ Humidity Indicator	testo	608-H1	1945222628	2021-12-28	2022-12-27
Switch Automatic control	R&S	OSP-B157W8	101111	2022-10-14	2023-10-13
High-low temperature chamber	GIANT FORCE	GTH-800-40-CP	MAA1908-003	2022-12-03	2023-12-02
Automatic test software	Shenzhen JS TONSCEND	/	V2.6.77.0518	/	/

966 Semi-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Receiver	R&S	ESU8	100537	2022-12-05	2023-12-04
Spectrum analyzer	R&S	FSV40	101185	2022-12-05	2023-12-04
Preamplifier (30MHz~1GHz)	R&S	SCU-08	100748	2022-05-24	2023-05-23
Preamplifier (1GHz~18GHz)	R&S	SCU-18D	1987397	2022-12-08	2023-12-07
Preamplifier (18GHz~40GHz)	/	MTLNA1804003 0235	12009007	2022-10-14	2023-10-13
Loop Antenna (9kHz~30MHz)	TESEQ	HLA6121	54575	2022-02-26	2023-02-25
Antenna (30MHz~1GHz)	SCHWARZBEC K	VULB9163	9163-965	2022-10-22	2023-10-21
Antenna (1GHz~18GHz)	R&S	HF907	102524	2022-12-13	2023-12-12
Antenna (18GHz~40GHz)	R&S	BBHA9170	1032	2022-10-16	2023-10-15
Band rejection filter	Xi'an xingbo	XBLBQ-DZA81	200827-1-02	/	/
HF 907cable	/	W1503	X3	2022-10-14	2023-10-13
9163 cable	/	W13.02	X2	2022-10-14	2023-10-13
RF cable 1	Junyou	PT40-KMKM-2M	W2029760002	2022-10-14	2023-10-13
RF cable 1	Junyou	PT40-KMKM-1M	W2029770001	2022-10-14	2023-10-13

5. Radio Technical Requirements Specification

5.1. Reference Documents for Testing

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

5.2. Test Results List

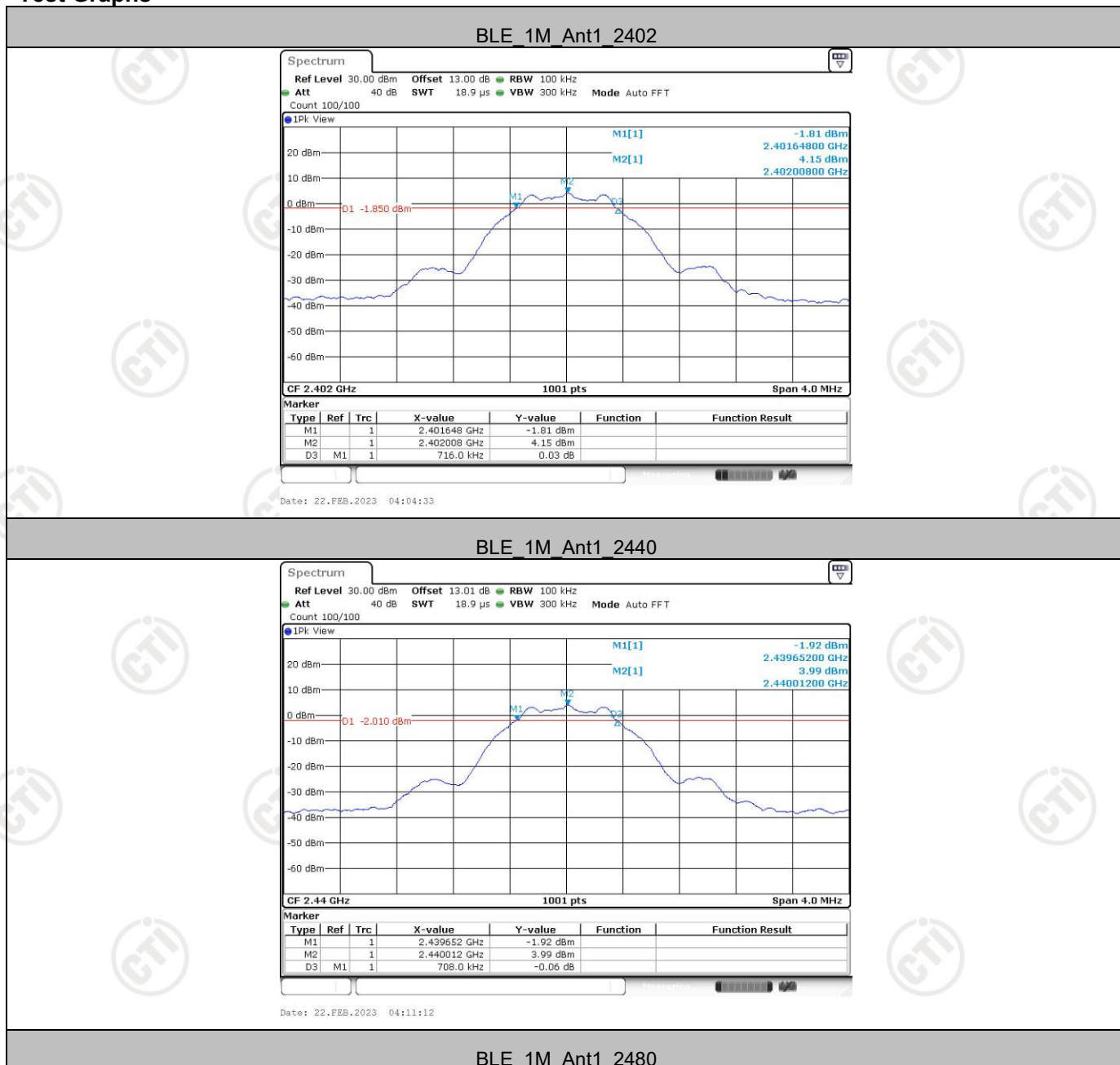
Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(2)	ANSI C63.10 Section 11.8.1	DTS Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (b)(3)	ANSI C63.10 Section 11.9.1	Maximum conducted output power	PASS	Appendix B)
Part15C Section 15.247 (e)	ANSI C63.10 Section 11.10.2	Maximum power spectral density	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI C63.10 Section 11.13.3.2	Band-edge for RF Conducted Emissions	PASS	Appendix D)
Part15C Section 15.247(d)	ANSI C63.10 Section 11.11	Conducted Spurious Emissions	PASS	Appendix E)
Part15C Section 15.203/15.247 (c)	ANSI C63.10	Antenna Requirement	PASS	Appendix F)
Part15C Section 15.207	ANSI C63.10 Section 6.2	AC Power Line Conducted Emission	PASS	Appendix G)
Part15C Section 15.205/15.209	ANSI C63.10 Section 6.10.5	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI C63.10 Section 6.4,6.5,6.6	Radiated Spurious Emissions	PASS	Appendix I)

Appendix A): DTS Bandwidth

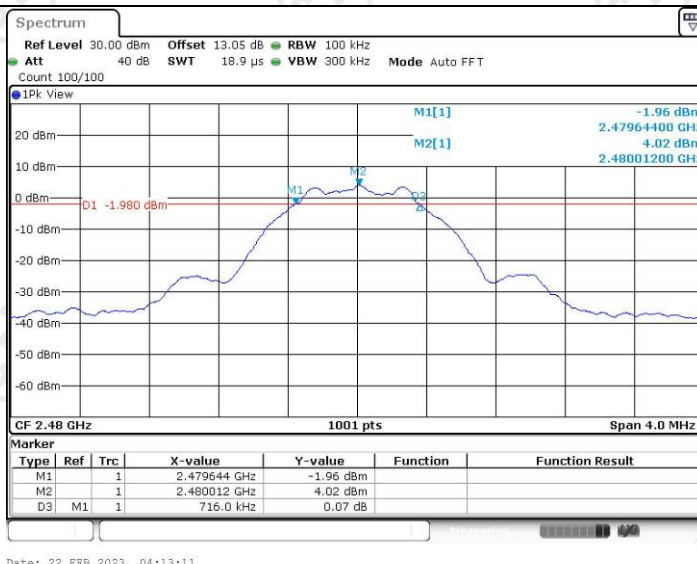
Test Result

Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.72	2401.65	2402.36	0.5	PASS
		2440	0.71	2439.65	2440.36	0.5	PASS
		2480	0.72	2479.64	2480.36	0.5	PASS
BLE_2M	Ant1	2402	0.71	2401.65	2402.36	0.5	PASS
		2440	0.71	2439.64	2440.36	0.5	PASS
		2480	0.71	2479.64	2480.36	0.5	PASS

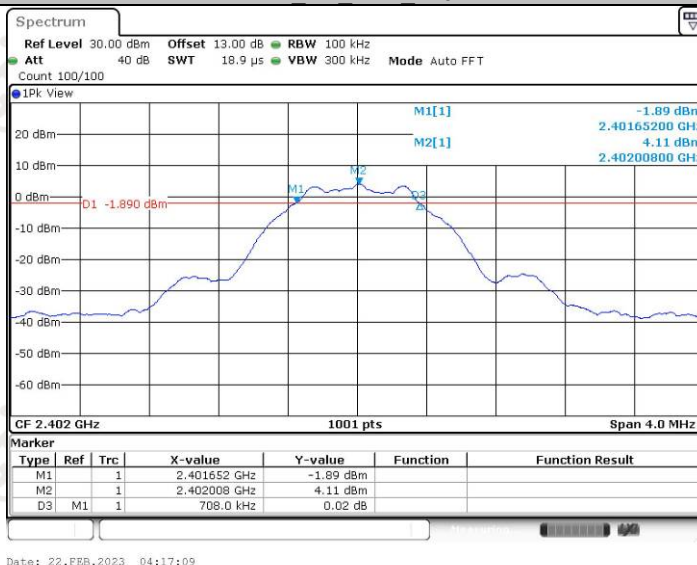
Test Graphs



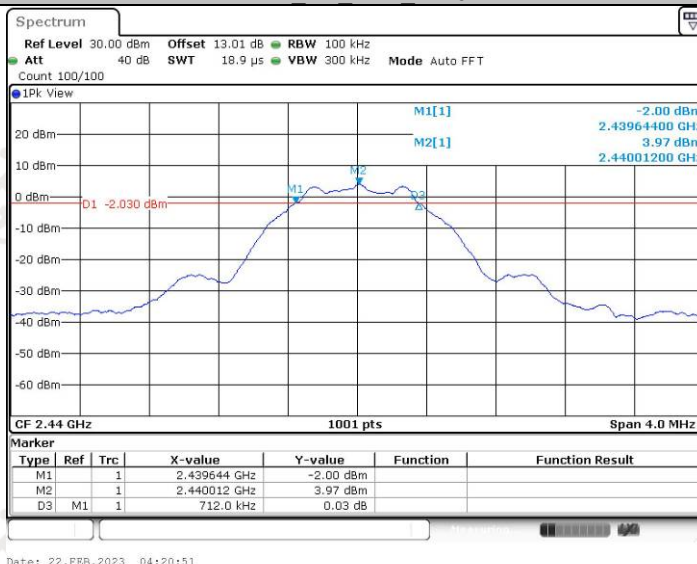
Report No. : EED39082078701R3



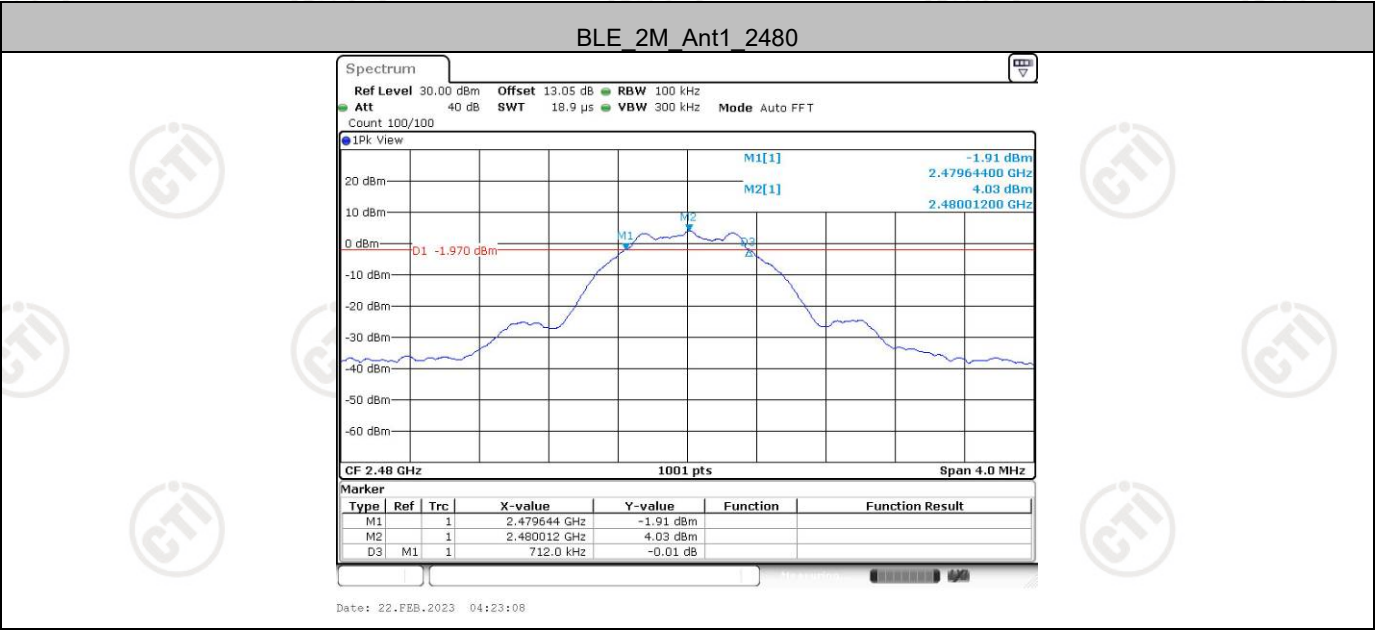
BLE 2M Ant1 2402



BLE 2M Ant1 2440



Report No. : EED39O82078701R3



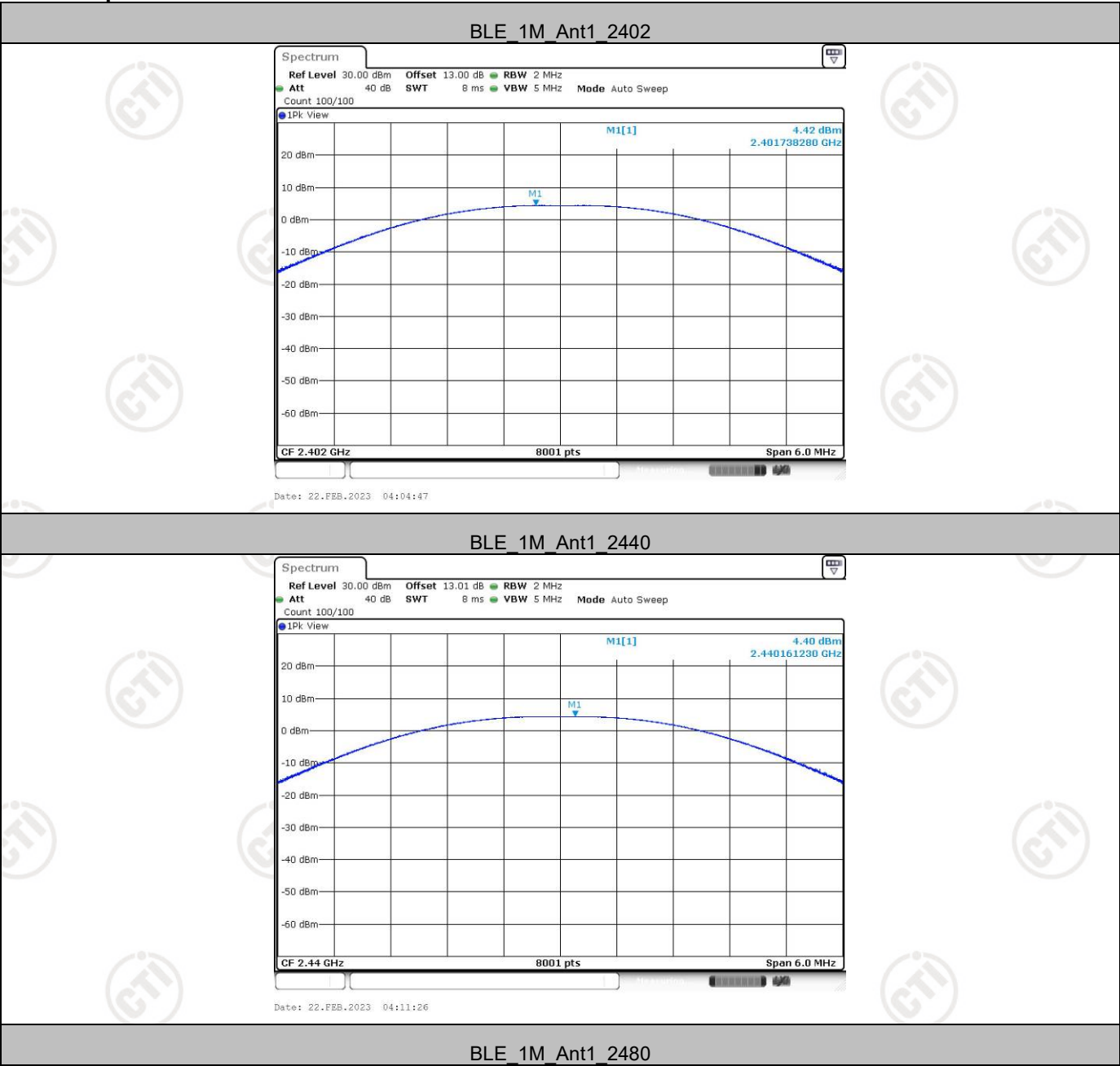
Appendix B): Maximum conducted output power

Test Result

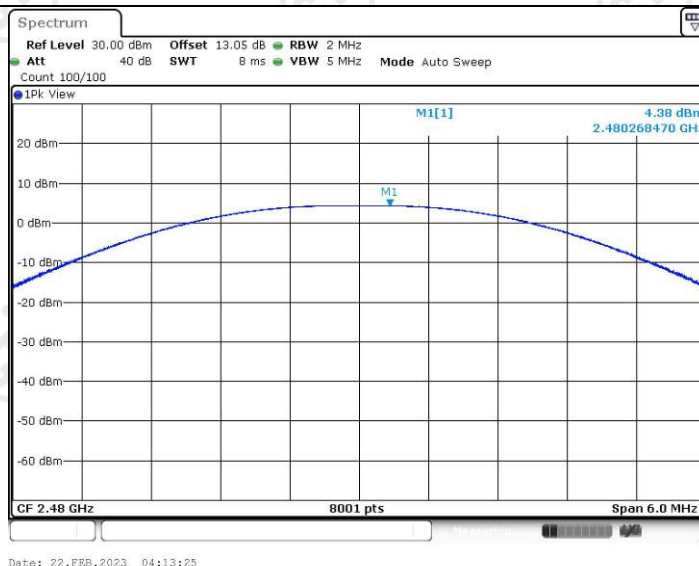
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	4.42	≤30	6.42	≤36	PASS
		2440	4.4	≤30	6.4	≤36	PASS
		2480	4.38	≤30	6.38	≤36	PASS
BLE_2M	Ant1	2402	4.4	≤30	6.4	≤36	PASS
		2440	4.37	≤30	6.37	≤36	PASS
		2480	4.33	≤30	6.33	≤36	PASS

Report No. : EED39082078701R3

Test Graphs



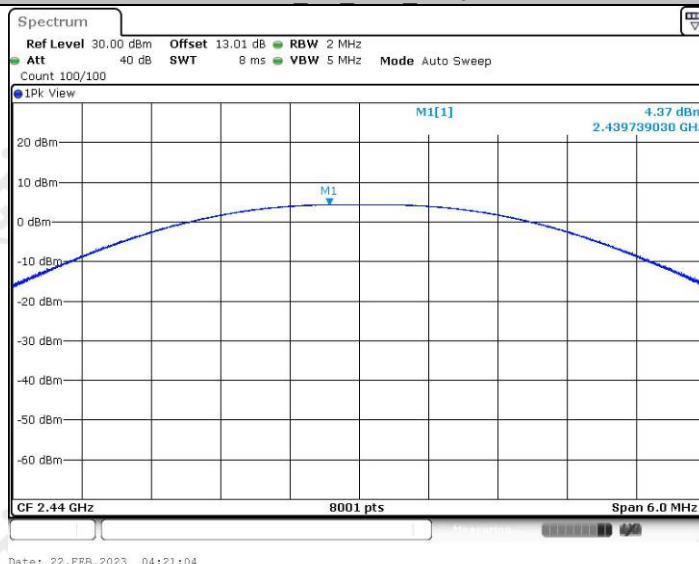
Report No. : EED39082078701R3



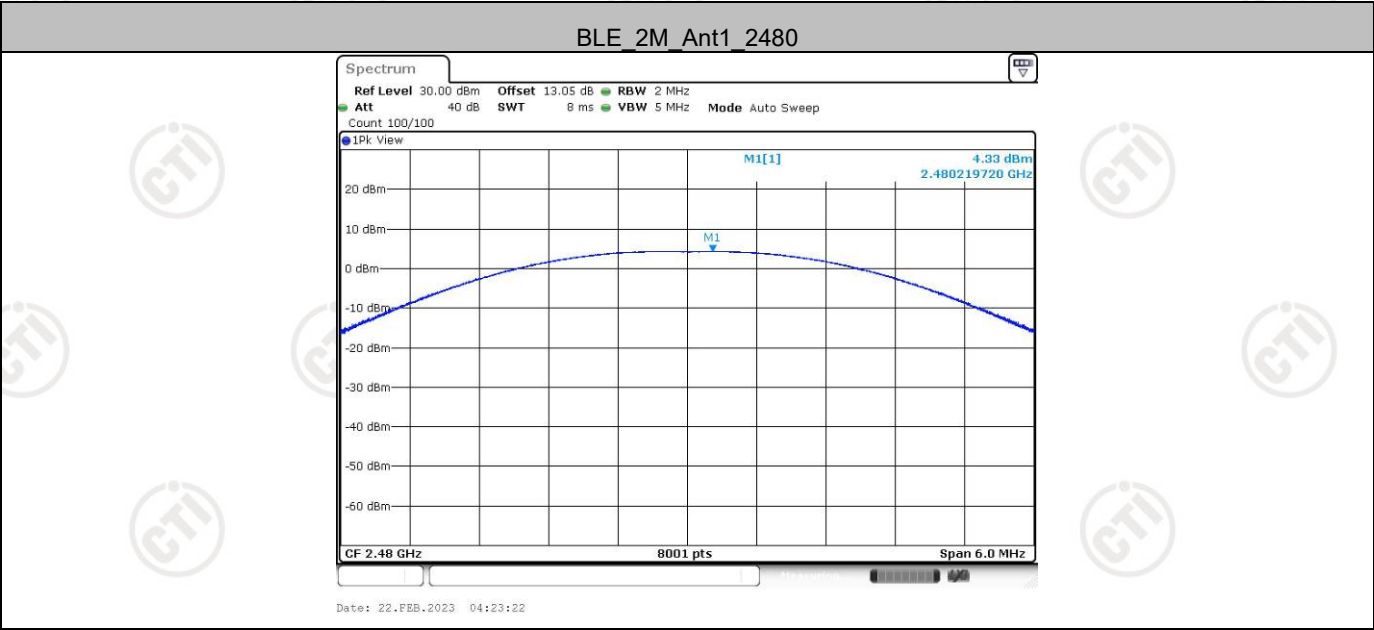
BLE 2M Ant1 2402



BLE 2M Ant1 2440



Report No. : EED39082078701R3



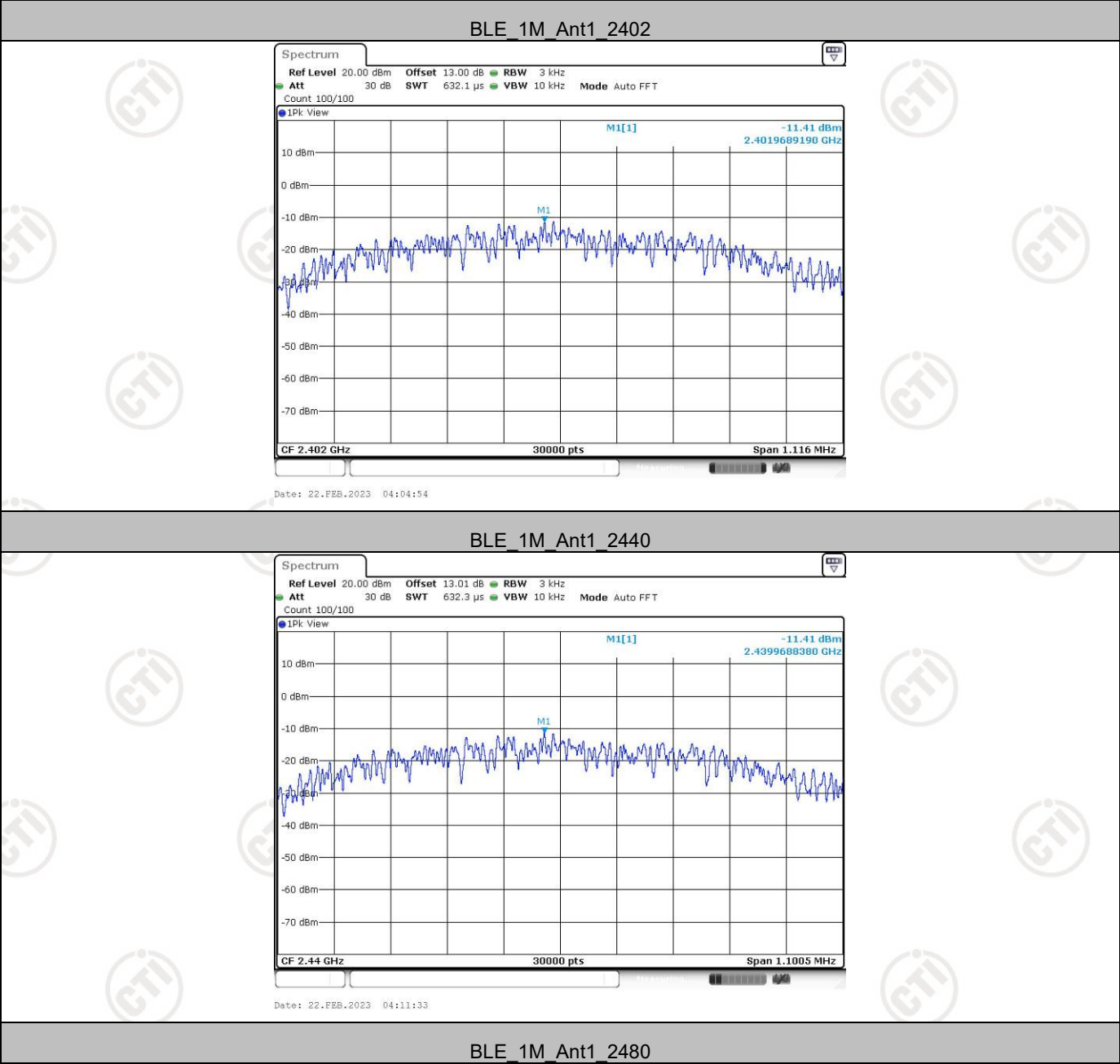
Appendix C): Maximum power spectral density

Test Result

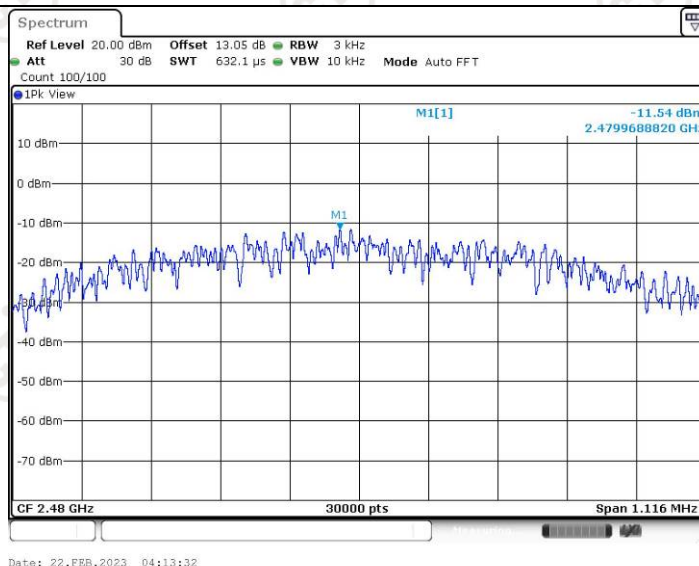
Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-11.41	≤8.00	PASS
		2440	-11.41	≤8.00	PASS
		2480	-11.54	≤8.00	PASS
BLE_2M	Ant1	2402	-11.46	≤8.00	PASS
		2440	-11.42	≤8.00	PASS
		2480	-11.51	≤8.00	PASS

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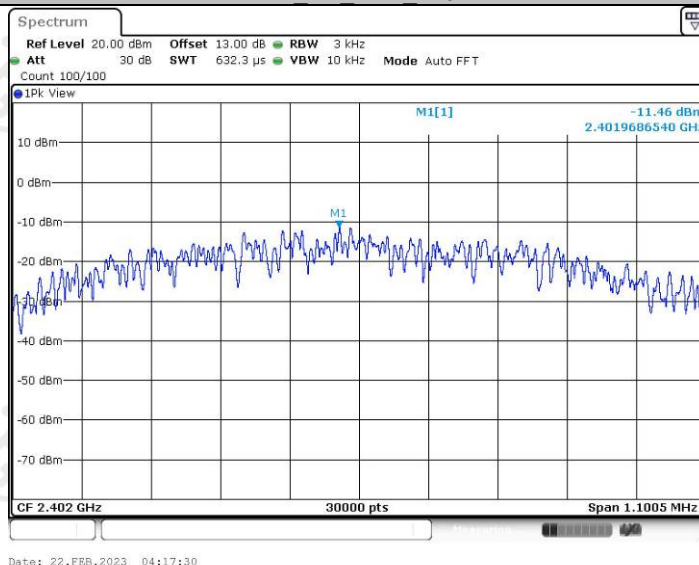
Test Graphs



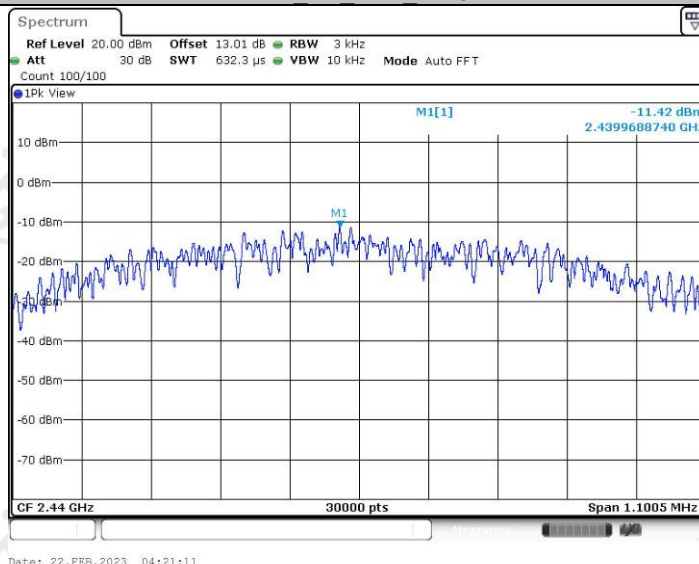
Report No. : EED39082078701R3



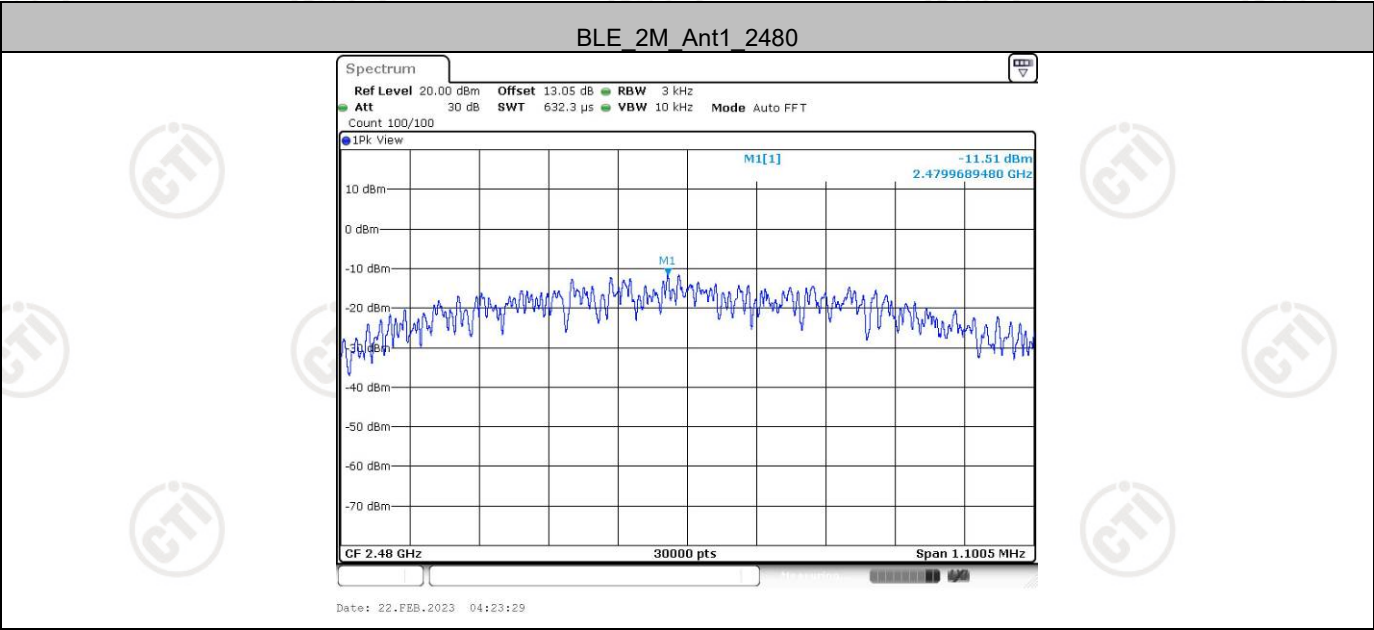
BLE 2M Ant1 2402



BLE 2M Ant1 2440



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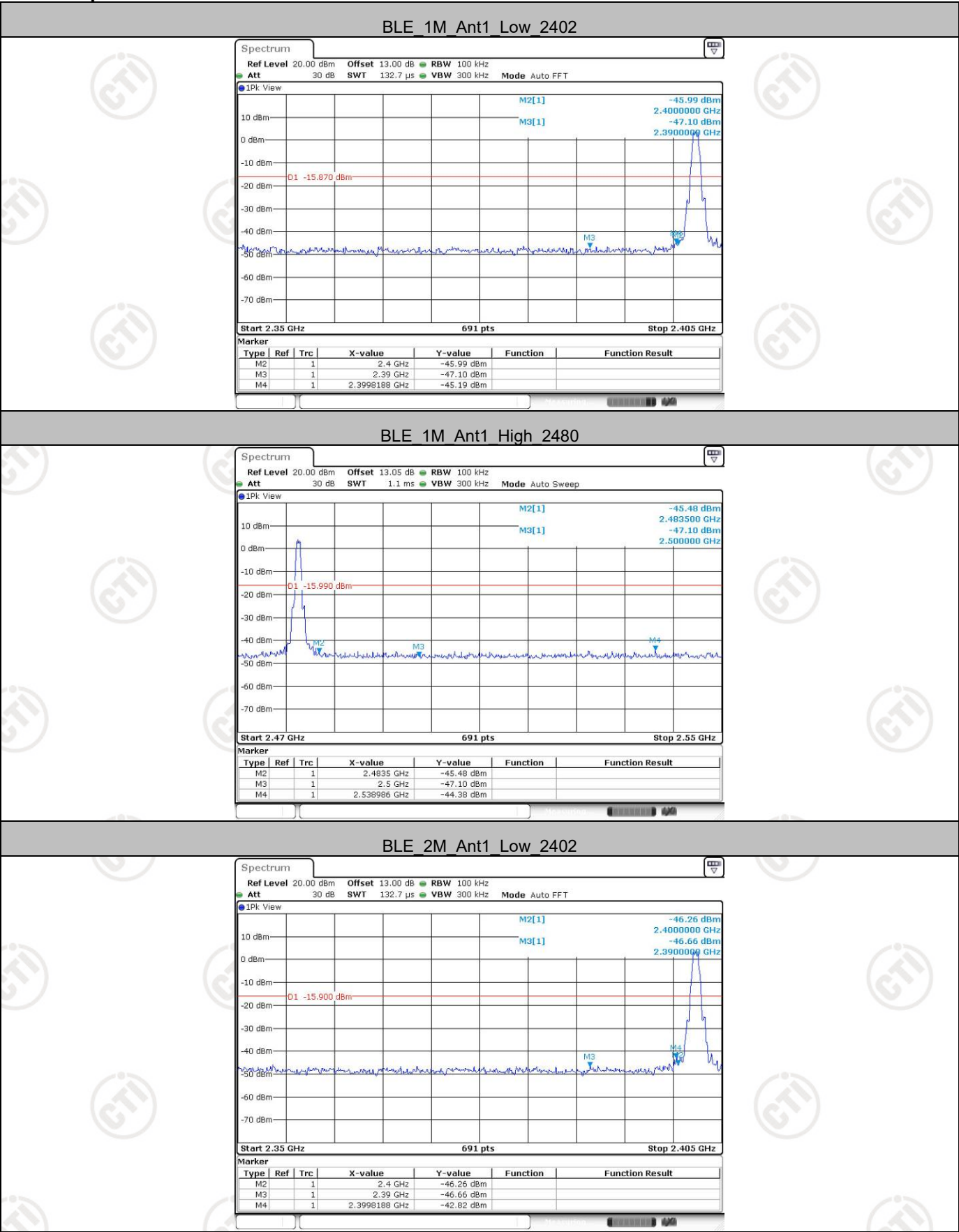
Appendix D): Band-edge for RF Conducted Emissions

Test Result

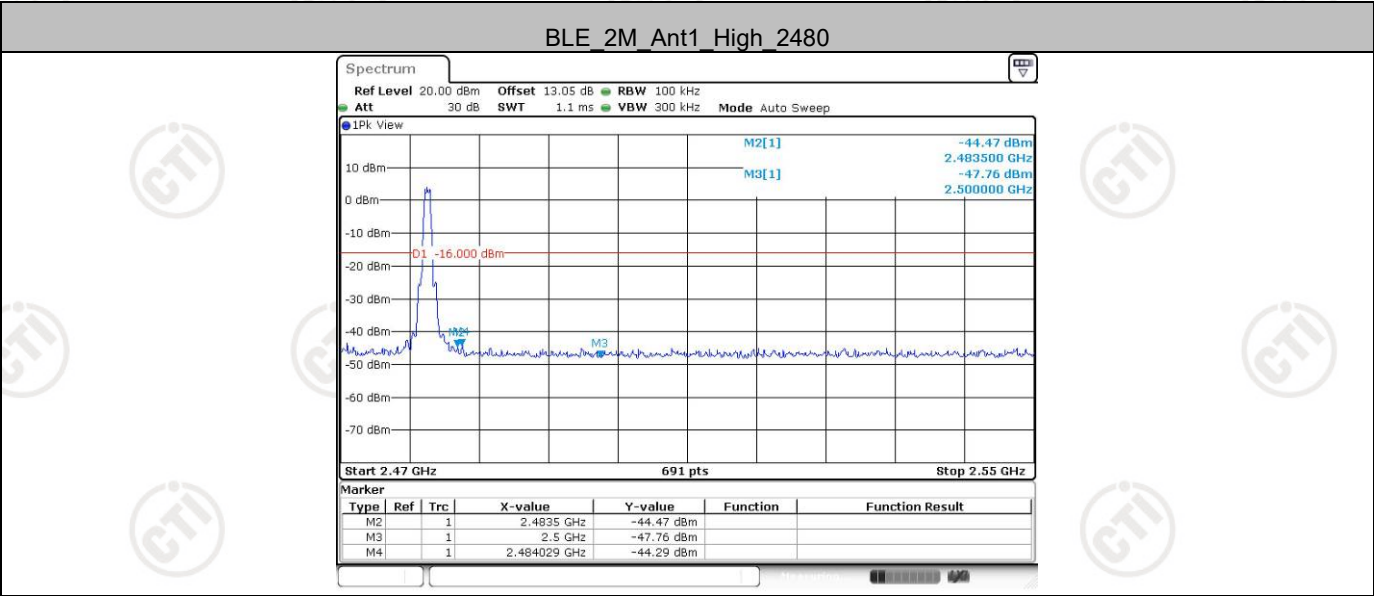
Test Mode	Antenna	Ch Name	Frequency[MHz]	Ref Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	4.13	-45.19	≤-15.87	PASS
		High	2480	4.01	-44.38	≤-15.99	PASS
BLE_2M	Ant1	Low	2402	4.10	-42.82	≤-15.9	PASS
		High	2480	4.00	-44.29	≤-16	PASS

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Test Graphs



Report No. : EED39082078701R3



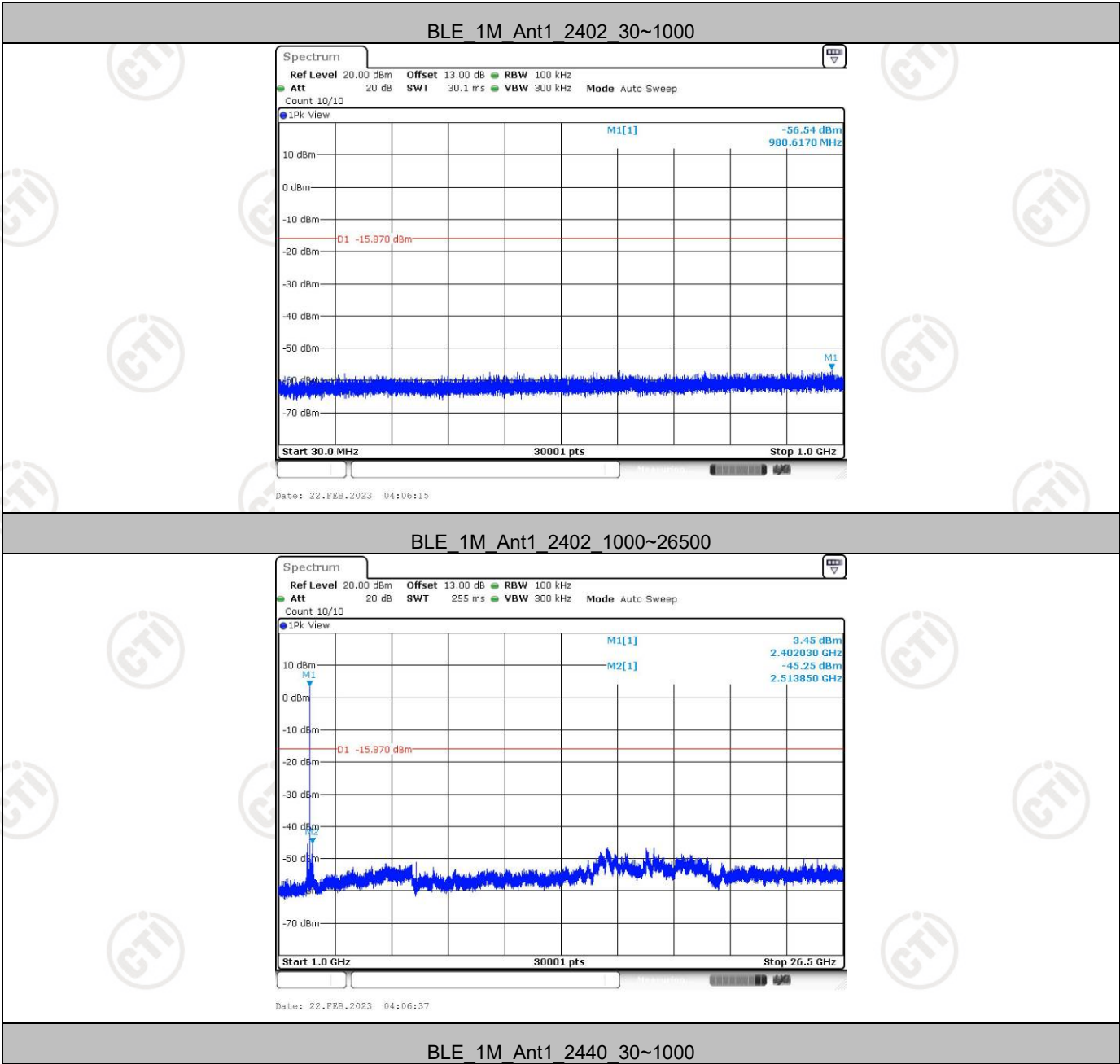
Appendix E): Conducted Spurious Emissions

Test Result

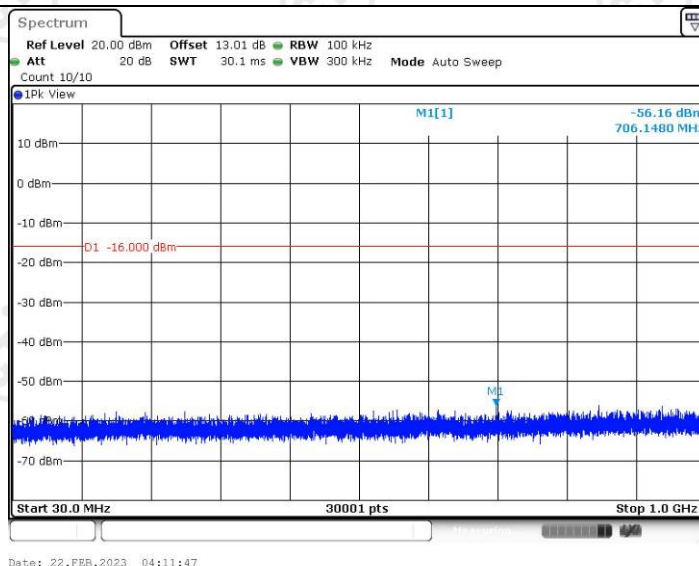
Test Mode	Antenna	Frequency[MHz]	Freq Range [MHz]	Ref Level [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	4.13	-56.54	≤-15.87	PASS
			1000~26500	4.13	-45.25	≤-15.87	PASS
		2440	30~1000	4.00	-56.16	≤-16	PASS
			1000~26500	4.00	-45.36	≤-16	PASS
		2480	30~1000	4.01	-56.34	≤-15.99	PASS
			1000~26500	4.01	-46.37	≤-15.99	PASS
BLE_2M	Ant1	2402	30~1000	4.10	-49.84	≤-15.9	PASS
			1000~26500	4.10	-44.78	≤-15.9	PASS
		2440	30~1000	3.97	-55.37	≤-16.03	PASS
			1000~26500	3.97	-45.04	≤-16.03	PASS
		2480	30~1000	4.00	-56.4	≤-16	PASS
			1000~26500	4.00	-45.62	≤-16	PASS

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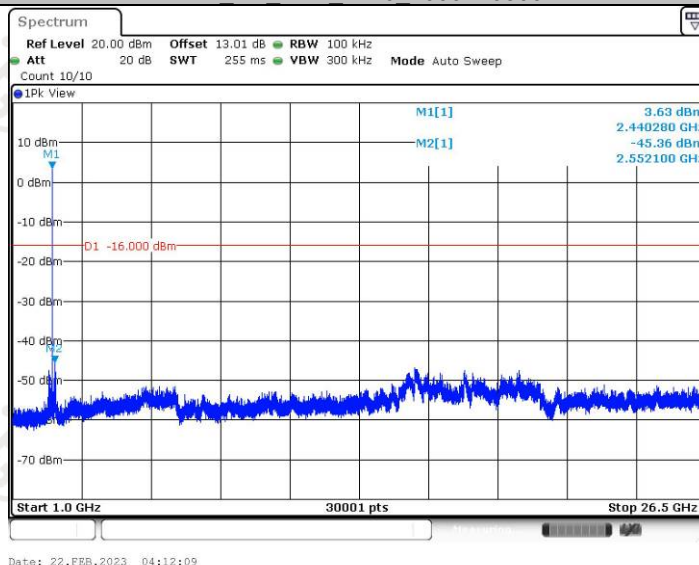
Test Graphs



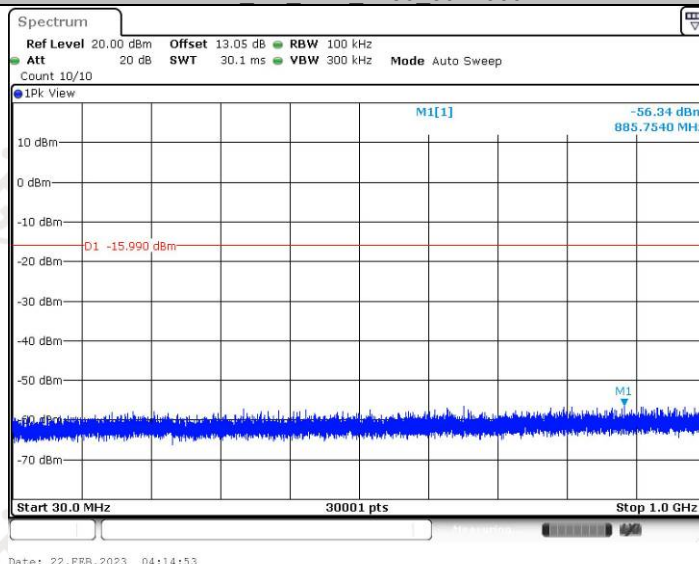
Report No. : EED39082078701R3



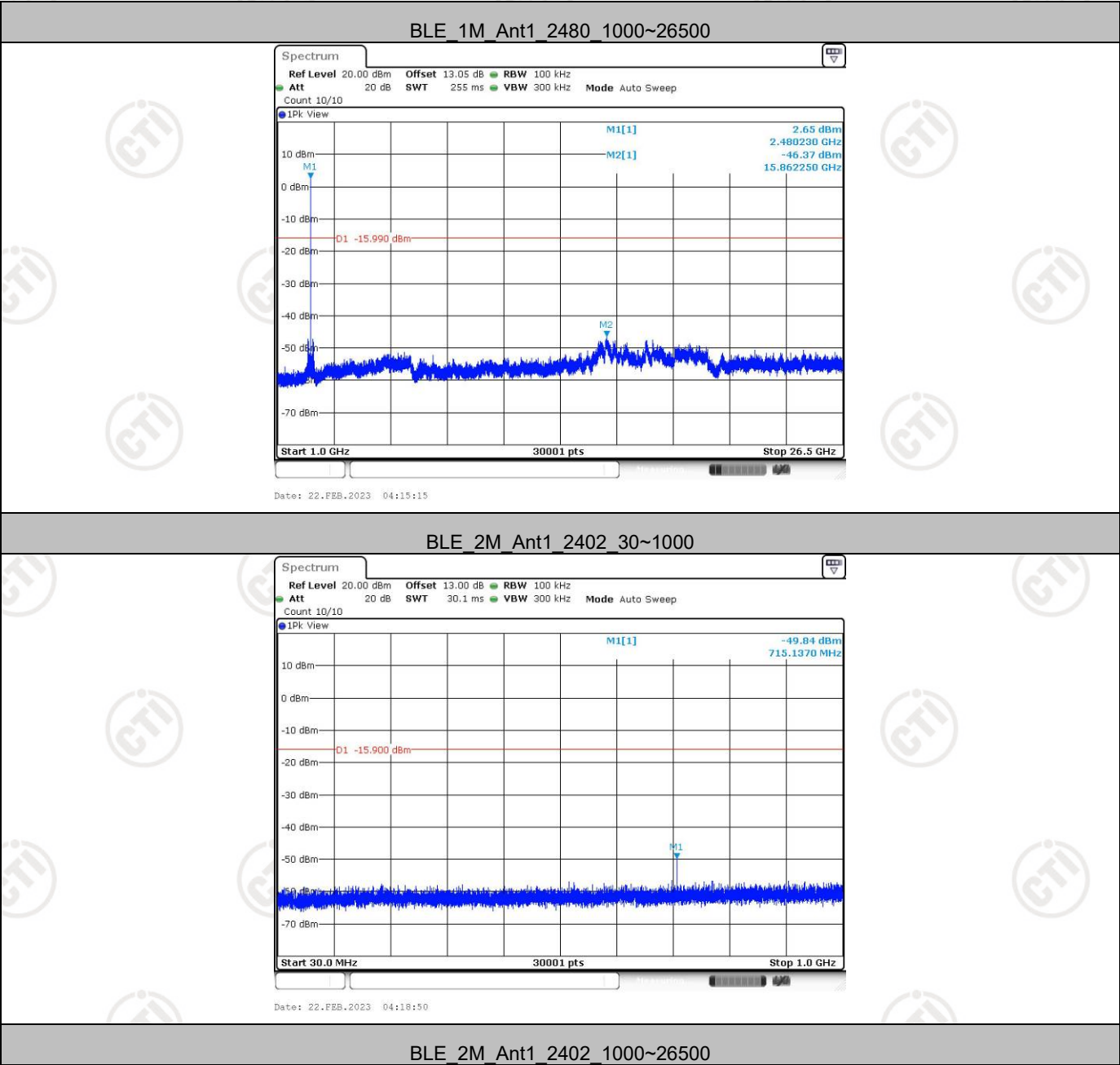
BLE 1M Ant1 2440 1000~26500



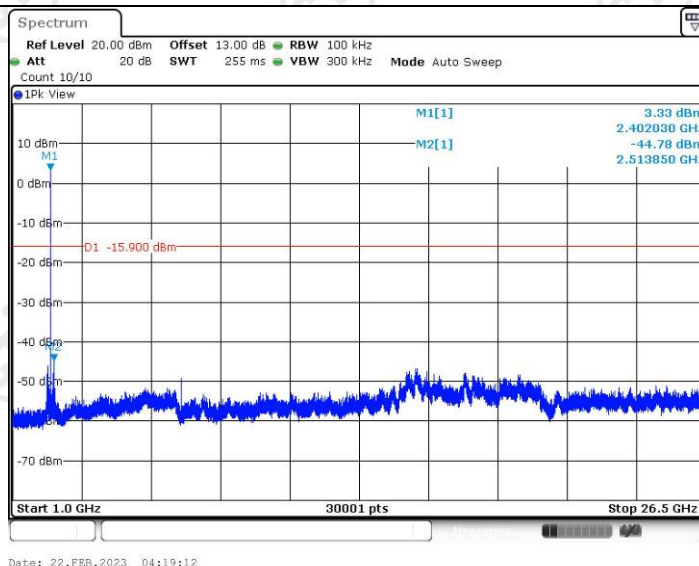
BLE 1M Ant1 2480 30~1000



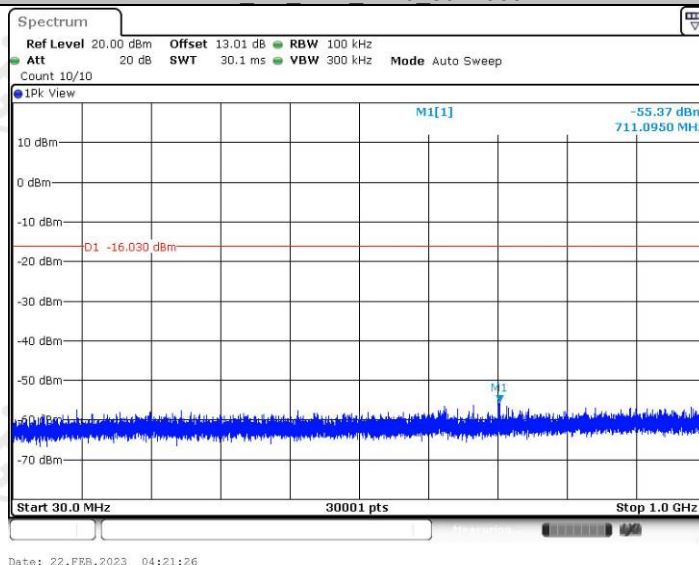
Report No. : EED39O82078701R3



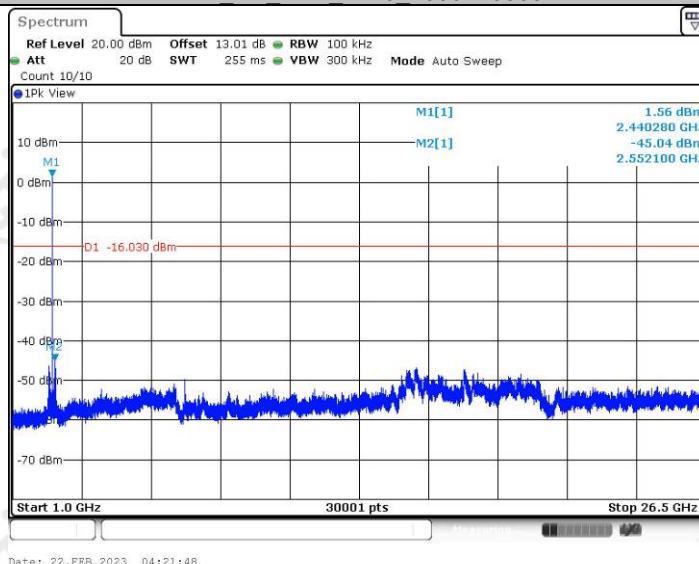
Report No. : EED39082078701R3



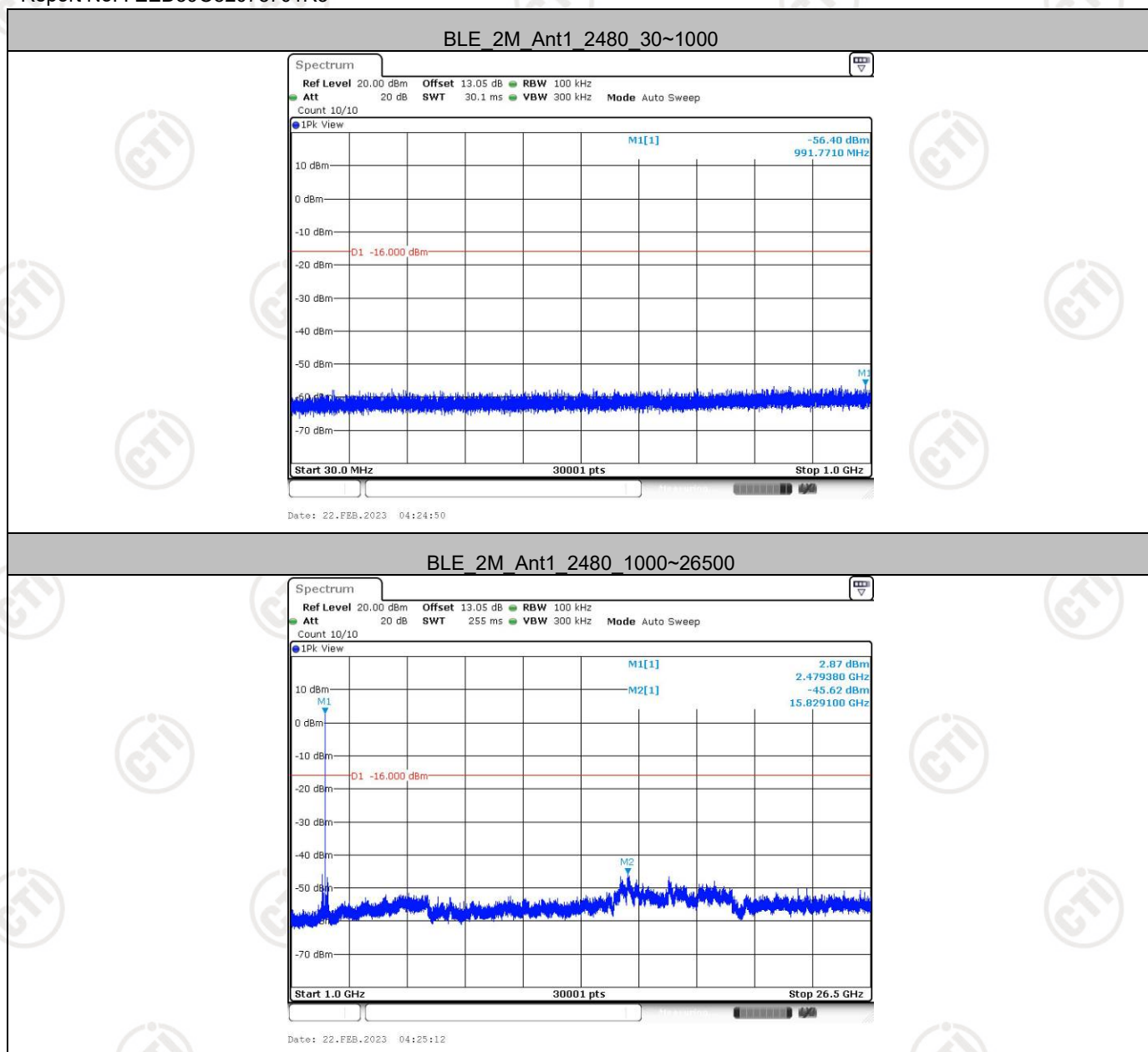
BLE 2M Ant1 2440 30~1000



BLE 2M Ant1 2440 1000~26500



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Appendix F): Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:	Antenna photos can be found in the EED39O82078904 report
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The antenna is integrated on the main PCB and no consideration of replacement.
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Appendix G): AC Power Line Conducted Emission

Test Procedure:	Test frequency range :150KHz-30MHz 1)The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.														
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBμV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> * The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. NOTE: The lower limit is applicable at the transition frequency	Frequency range (MHz)	Limit (dBμV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBμV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													

Measurement Data

The product is supplied by DC power.

Appendix H): Restricted bands around fundamental frequency (Radiated)

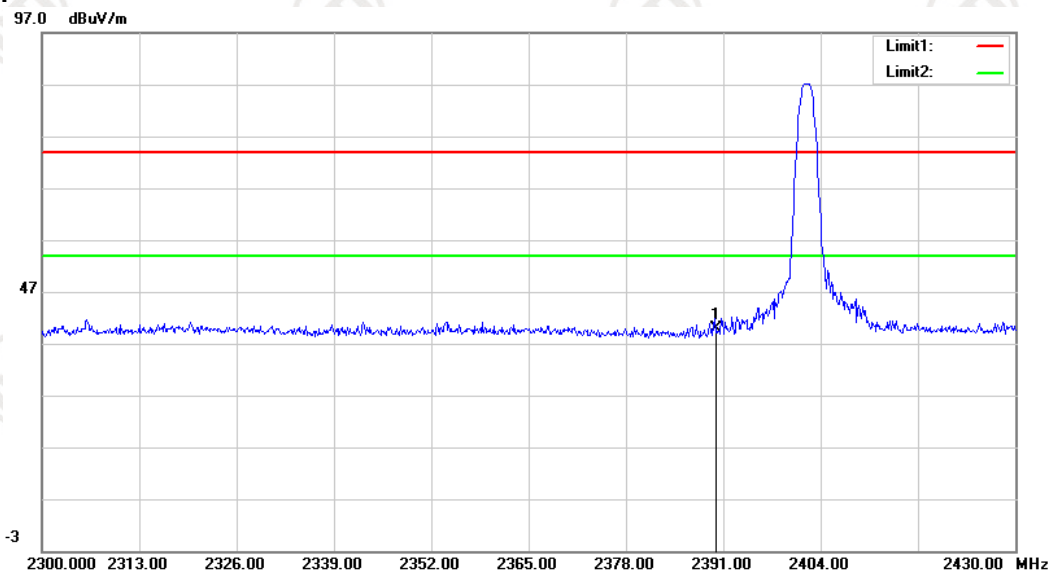
Receiver Setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr><tr><td>Peak</td><td>1MHz</td><td>1/T</td><td>Average</td></tr></table>	Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	Peak	1MHz	1/T	Average	
Frequency	Detector	RBW	VBW	Remark																	
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak																	
Above 1GHz	Peak	1MHz	3MHz	Peak																	
	Peak	1MHz	1/T	Average																	
Test Procedure:	Below 1GHz test procedure as below: a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel Above 1GHz test procedure as below: a. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter). b. Test the EUT in the lowest channel , the Highest channel c. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case. d. Repeat above procedures until all frequencies measured was complete.																				
Limit:	<table><tr><td>Frequency</td><td>Limit (dBμV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>74.0</td><td>Peak Value</td></tr></table>	Frequency	Limit (dBμV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value	74.0	Peak Value
Frequency	Limit (dBμV/m @3m)	Remark																			
30MHz-88MHz	40.0	Quasi-peak Value																			
88MHz-216MHz	43.5	Quasi-peak Value																			
216MHz-960MHz	46.0	Quasi-peak Value																			
960MHz-1GHz	54.0	Quasi-peak Value																			
Above 1GHz	54.0	Average Value																			
	74.0	Peak Value																			

Report No. : EED39082078701R3

Test plot as follows:

Mode:	BLE_1M	Channel:	2402
Remark:	Horizontal		

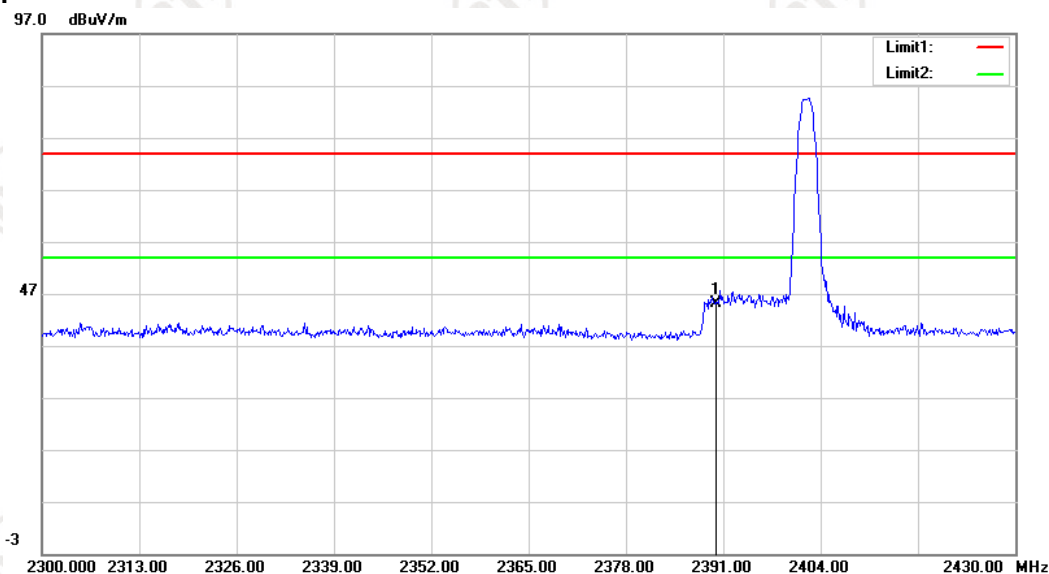
Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	37.13	2.71	39.84	74.00	-34.16	200	268	peak

Mode:	BLE_1M	Channel:	2402
Remark:	Vertical		

Test Graph

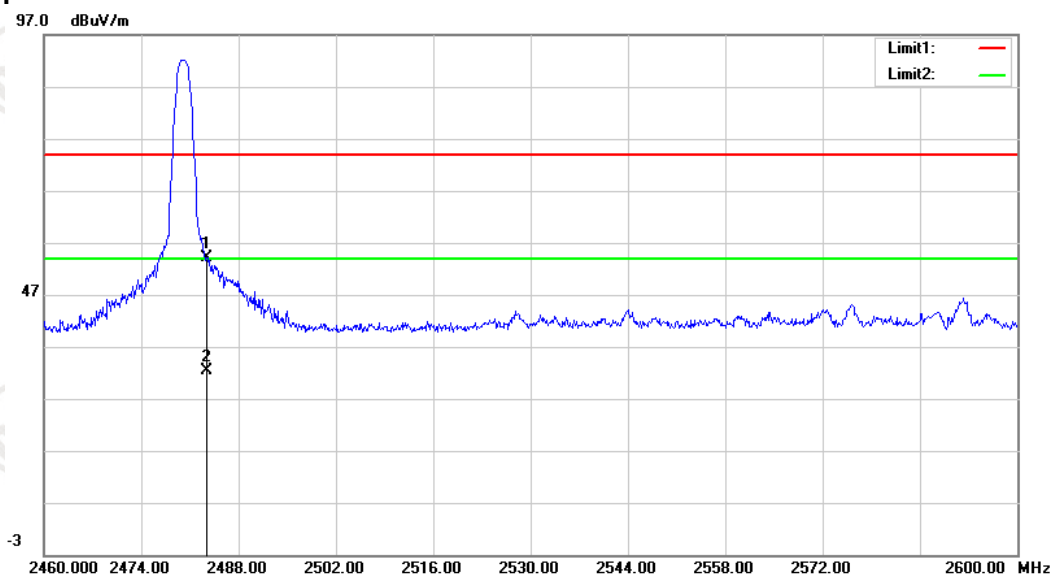


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	42.43	2.71	45.14	74.00	-28.86	145	0	peak

Report No. : EED39082078701R3

Mode:	BLE_1M	Channel:	2480
Remark:	Horizontal		

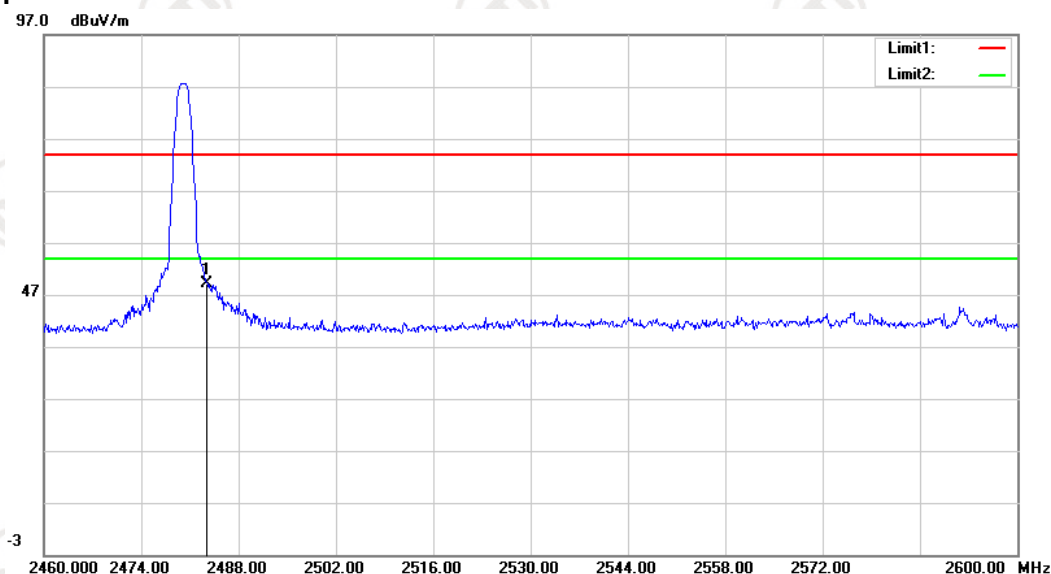
Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	51.17	2.92	54.09	74.00	-19.91	100	222	peak
2	2483.500	29.58	2.92	32.50	54.00	-21.50	100	222	AVG

Mode:	BLE_1M	Channel:	2480
Remark:	Vertical		

Test Graph

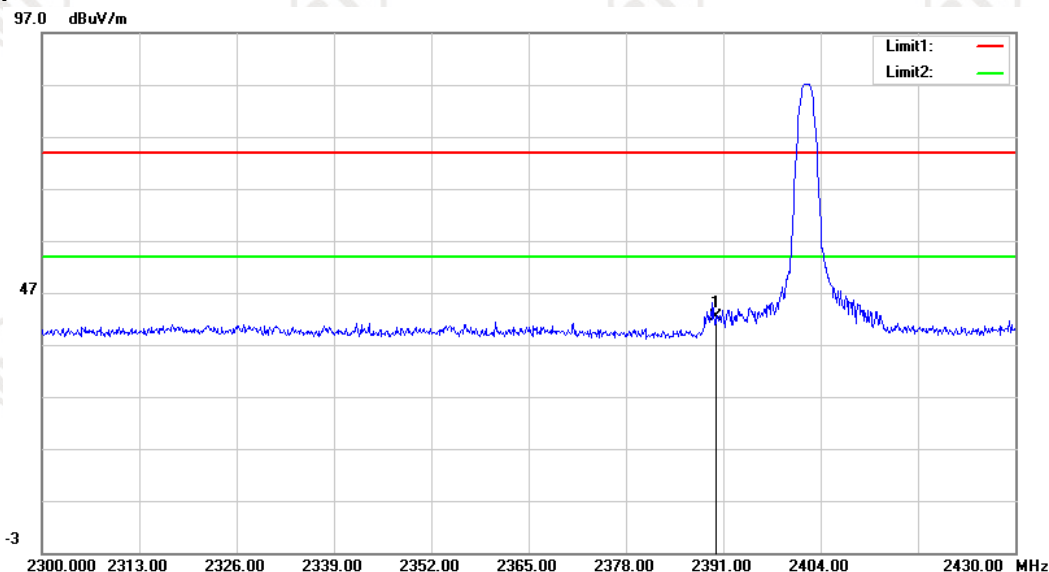


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	46.31	2.92	49.23	74.00	-24.77	100	61	peak

Report No. : EED39082078701R3

Mode:	BLE_2M	Channel:	2402
Remark:	Horizontal		

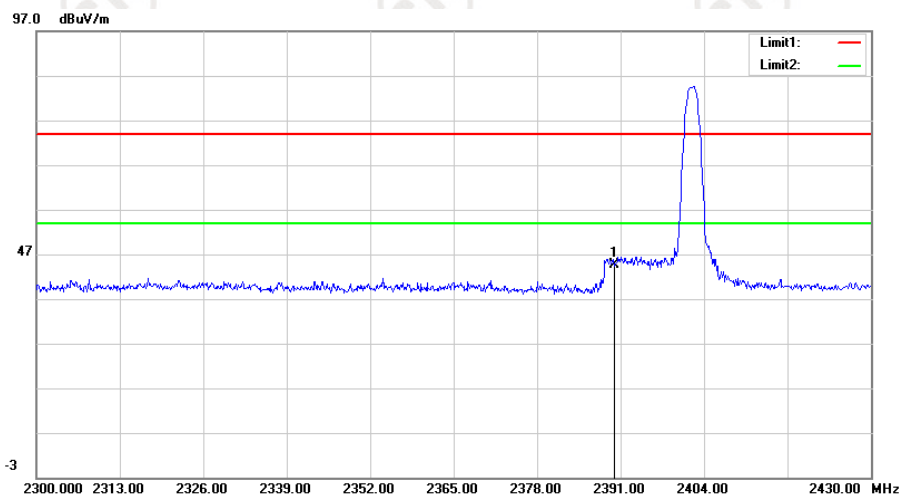
Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	39.76	2.71	42.47	74.00	-31.53	100	300	peak

Mode:	BLE_2M	Channel:	2402
Remark:	Vertical		

Test Graph

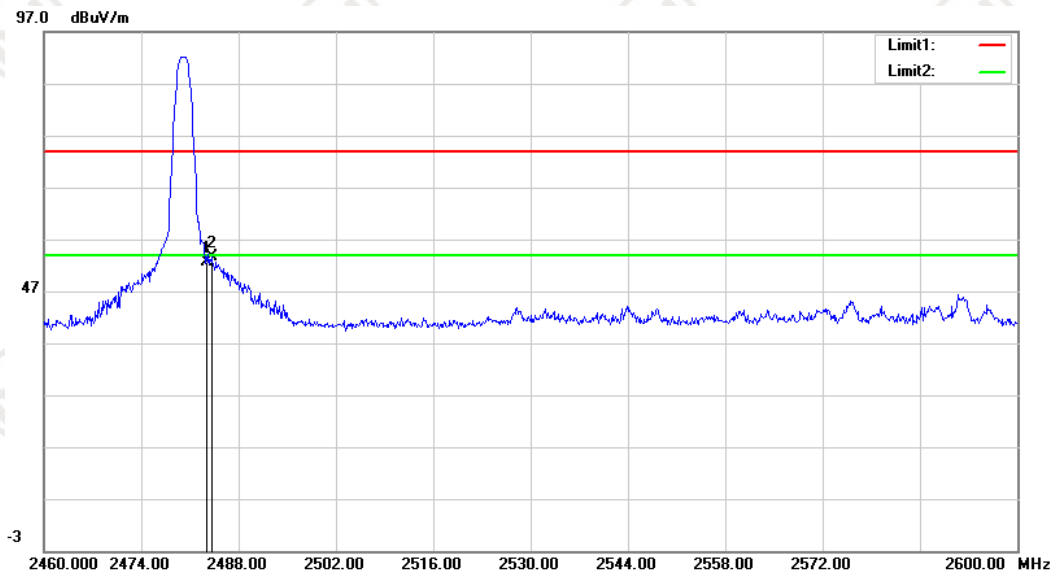


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	42.00	2.71	44.71	74.00	-29.29	146	0	peak

Report No. : EED39082078701R3

Mode:	BLE_2M	Channel:	2480
Remark:	Horizontal		

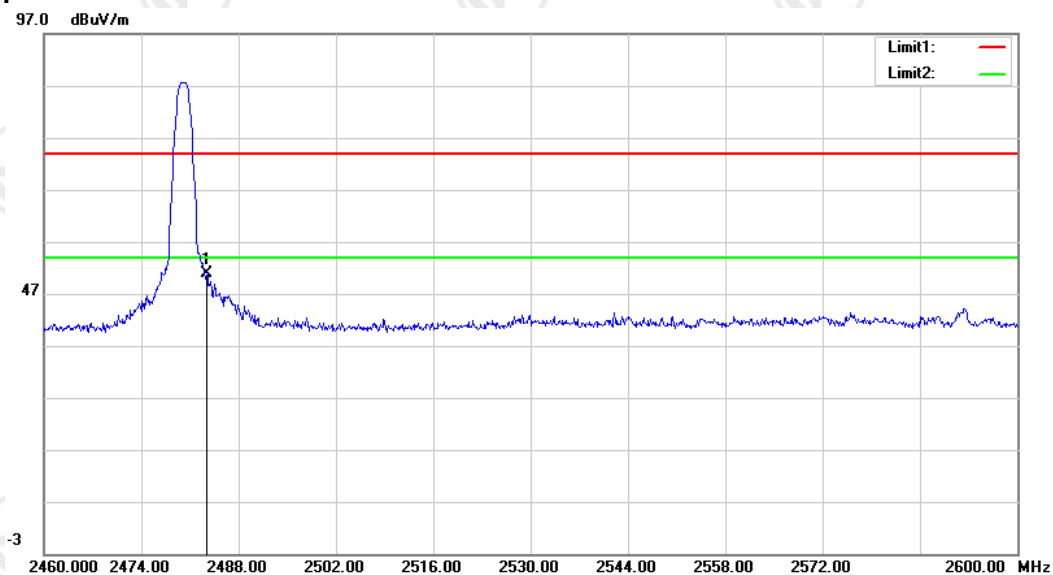
Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	49.73	2.92	52.65	74.00	-21.35	100	202	peak
2	2484.080	50.61	2.92	53.53	74.00	-20.47	100	225	peak

Mode:	BLE_2M	Channel:	2480
Remark:	Vertical		

Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	47.88	2.92	50.80	74.00	-23.20	100	67	peak

Report No. : EED39082078701R3

Note:

1)As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation. So, only the peak values are measured:

2) The field strength is calculated by adding the correct Factor. The basic equation with a sample calculation is as follows:

Final Test Level = Reading +Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix I): Radiated Spurious Emissions

Receiver Setup:	<table><tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr><tr><td>0.009MHz-0.090MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr><tr><td>0.009MHz-0.090MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr><tr><td>0.090MHz-0.110MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr><tr><td>0.110MHz-0.490MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr><tr><td>0.110MHz-0.490MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr><tr><td>0.490MHz -30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr><tr><td>Peak</td><td>1MHz</td><td>1/T</td><td>Average</td></tr></table>	Frequency	Detector	RBW	VBW	Remark	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	Peak	1MHz	1/T	Average
Frequency	Detector	RBW	VBW	Remark																																														
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak																																														
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average																																														
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak																																														
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak																																														
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average																																														
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak																																														
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak																																														
Above 1GHz	Peak	1MHz	3MHz	Peak																																														
	Peak	1MHz	1/T	Average																																														
Test Procedure:	Below 1GHz test procedure as below: - The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. - The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower. - The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. - For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading. - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. - If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Above 1GHz test procedure as below: - Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter (Above 18GHz the distance is 1 meter and table is 1.5 meter). - Test the EUT in the lowest channel, the middle channel, the Highest channel - The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case. - Repeat above procedures until all frequencies measured was complete.																																																	
Limit:	<table><tr><th>Frequency</th><th>Field strength microvolt/meter)</th><th>Limit (dBμV/m)</th><th>Remark</th><th>Measurement distance (m)</th></tr><tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz)</td><td>-</td><td>-</td><td>300</td></tr><tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz)</td><td>-</td><td>-</td><td>30</td></tr><tr><td>1.705MHz-30MHz</td><td>30</td><td>-</td><td>-</td><td>30</td></tr><tr><td>30MHz-88MHz</td><td>100</td><td>40.0</td><td>Quasi-peak</td><td>3</td></tr><tr><td>88MHz-216MHz</td><td>150</td><td>43.5</td><td>Quasi-peak</td><td>3</td></tr><tr><td>216MHz-960MHz</td><td>200</td><td>46.0</td><td>Quasi-peak</td><td>3</td></tr><tr><td>960MHz-1GHz</td><td>500</td><td>54.0</td><td>Quasi-peak</td><td>3</td></tr><tr><td>Above 1GHz</td><td>500</td><td>54.0</td><td>Average</td><td>3</td></tr></table> Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.	Frequency	Field strength microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30	1.705MHz-30MHz	30	-	-	30	30MHz-88MHz	100	40.0	Quasi-peak	3	88MHz-216MHz	150	43.5	Quasi-peak	3	216MHz-960MHz	200	46.0	Quasi-peak	3	960MHz-1GHz	500	54.0	Quasi-peak	3	Above 1GHz	500	54.0	Average	3				
Frequency	Field strength microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)																																														
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300																																														
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30																																														
1.705MHz-30MHz	30	-	-	30																																														
30MHz-88MHz	100	40.0	Quasi-peak	3																																														
88MHz-216MHz	150	43.5	Quasi-peak	3																																														
216MHz-960MHz	200	46.0	Quasi-peak	3																																														
960MHz-1GHz	500	54.0	Quasi-peak	3																																														
Above 1GHz	500	54.0	Average	3																																														

Report No. : EED39082078701R3

Radiated Spurious Emissions test Data:

Radiated Emission below 1GHz:

Mode:	GFSK Transmitting	Channel:	2480
Remark:			

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
31.9400	V	52.48	-17.17	35.31	40.00	-4.69	QP
59.1000	V	46.16	-16.04	30.12	40.00	-9.88	QP
138.6400	V	46.21	-16.20	30.01	43.50	-13.49	QP
170.6500	V	49.90	-16.25	33.65	43.50	-9.85	QP
385.9900	V	51.15	-11.94	39.21	46.00	-6.79	QP
543.1300	V	37.22	-8.00	29.22	46.00	-16.78	QP
60.0700	H	37.56	-16.24	21.32	40.00	-18.68	QP
182.2900	H	45.92	-16.27	29.65	43.50	-13.85	QP
284.1400	H	37.13	-14.48	22.65	46.00	-23.35	QP
327.7900	H	37.44	-13.43	24.01	46.00	-21.99	QP
383.0800	H	44.53	-12.01	32.52	46.00	-13.48	QP
742.9500	H	30.74	-5.39	25.35	46.00	-20.65	QP

Notes:

- 1) Through Pre-scan then find the GFSK-CH39 is the worst case mode and only the worst data was recorded.

Report No. : EED39082078701R3

Transmitter Emission above 1GHz:

Mode:	BLE_1M	Channel:	2402
Remark:			

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4804.000	34.58	9.15	43.73	74.00	-30.27	200	316	peak
2	7206.000	30.95	12.01	42.96	74.00	-31.04	100	308	peak
3	9606.000	27.76	14.87	42.63	74.00	-31.37	100	62	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4804.000	35.46	9.15	44.61	74.00	-29.39	200	291	peak
2	7206.000	30.95	12.01	42.96	74.00	-31.04	200	6	peak
3	9608.000	26.51	14.86	41.37	74.00	-32.63	197	360	peak

Mode:	BLE_1M	Channel:	2440
Remark:			

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4880.000	33.00	9.32	42.32	74.00	-31.68	100	270	peak
2	7320.000	31.35	12.19	43.54	74.00	-30.46	100	226	peak
3	9760.000	28.54	14.74	43.28	74.00	-30.72	200	340	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4880.000	32.24	9.32	41.56	74.00	-32.44	100	148	peak
2	7320.000	30.63	12.19	42.82	74.00	-31.18	200	354	peak
3	9760.000	27.59	14.74	42.33	74.00	-31.67	100	31	peak

Report No. : EED39O82078701R3

Mode:	BLE_1M	Channel:	2480
Remark:			

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4960.000	37.04	9.51	46.55	74.00	-27.45	200	101	peak
2	7205.000	32.54	12.01	44.55	74.00	-29.45	200	143	peak
3	9920.000	28.79	14.61	43.40	74.00	-30.60	149	360	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4960.000	33.71	9.51	43.22	74.00	-30.78	100	337	peak
2	7409.000	31.56	12.33	43.89	74.00	-30.11	200	213	peak
3	9920.000	28.74	14.61	43.35	74.00	-30.65	200	239	peak

Mode:	BLE_2M	Channel:	2402
Remark:			

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4804.000	33.31	9.15	42.46	74.00	-31.54	200	315	peak
2	7205.000	32.20	12.01	44.21	74.00	-29.79	100	204	peak
3	9602.000	28.07	14.87	42.94	74.00	-31.06	100	298	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4791.000	35.83	9.12	44.95	74.00	-29.05	100	80	peak
2	7205.000	32.68	12.01	44.69	74.00	-29.31	200	93	peak
3	9585.000	27.94	14.85	42.79	74.00	-31.21	100	182	peak

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Mode:	BLE_2M	Channel:	2440
Remark:			

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4880.000	31.95	9.32	41.27	74.00	-32.73	200	1	peak
2	7307.000	31.34	12.17	43.51	74.00	-30.49	200	1	peak
3	9760.000	28.76	14.74	43.50	74.00	-30.50	100	211	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4880.000	32.16	9.32	41.48	74.00	-32.52	100	95	peak
2	7307.000	32.17	12.17	44.34	74.00	-29.66	200	33	peak
3	9760.000	28.28	14.74	43.02	74.00	-30.98	182	360	peak

Mode:	BLE_2M	Channel:	2480
Remark:			

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4960.000	36.72	9.51	46.23	74.00	-27.77	200	121	peak
2	7392.000	31.01	12.31	43.32	74.00	-30.68	126	360	peak
3	9920.000	28.51	14.61	43.12	74.00	-30.88	141	360	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4960.000	35.17	9.51	44.68	74.00	-29.32	100	335	peak
2	7409.000	30.98	12.33	43.31	74.00	-30.69	100	115	peak
3	9920.000	28.28	14.61	42.89	74.00	-31.11	100	162	peak

Note:

1) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak values are measured:

2) The field strength is calculated by adding the correct Factor. The basic equation with a sample calculation is as follows:

Final Test Level = Reading +Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

*** End of Report ***

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