TEST REPORT

Application No.:	SHCR2401000070HS
FCC ID:	2BESUJYC08A-01
Applicant:	Xianglu Robotics(Jiangsu) Co., Ltd.
Address of Applicant:	Room 1701, No.5(South), Zhihui Road, Huishan economic development District, Wuxi City, Jiangsu Province.
Manufacturer:	Xianglu Robotics(Jiangsu) Co., Ltd.
Address of Manufacturer:	Room 1701, No.5(South), Zhihui Road, Huishan economic development District, Wuxi City, Jiangsu Province.
Factory:	Xianglu Robotics(Dongguan) Co., Ltd.
Address of Factory:	No.11, Songbailangxinyuan No.2 Road, Dalang Town, Dongguan City, Guangdong Province.
Equipment Under Test (EUT):	
EUT Name:	Intelligent Cooking Machine
Model No.:	JYC08A-01
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2024-01-10
Date of Test:	2024-03-19 to 2024-03-26
Date of Issue:	2024-05-07
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.
Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Member of the SGS Group (SGS SA)

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2024-05-07	/

Authorized for issue by:				
Tested By		Wade Zhang **Wade Zhang/Project Engineer**		
Approved By		Parlam Zhan **Parlam Zhan / Reviewer**		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

3 Contents

Page

1 COVER PAGE 1

2 TEST SUMMARY 3

3 CONTENTS 4

4 GENERAL INFORMATION 6

4.1 DETAILS OF E.U.T. 6
4.2 DESCRIPTION OF SUPPORT UNITS 6
4.3 POWER LEVEL SETTING USING IN TEST 6
4.4 MEASUREMENT UNCERTAINTY 7
4.5 TEST LOCATION 8
4.6 TEST FACILITY 8
4.7 DEVIATION FROM STANDARDS 8
4.8 ABNORMALITIES FROM STANDARD CONDITIONS 8

5 EQUIPMENT LIST 9

6 RADIO SPECTRUM TECHNICAL REQUIREMENT 11

6.1 ANTENNA REQUIREMENT 11
6.1.1 Test Requirement: 11
6.1.2 Conclusion 11

7 RADIO SPECTRUM MATTER TEST RESULTS 12

7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 12
7.1.1 E.U.T. Operation 12
7.1.2 Test Mode Description 12
7.1.3 Test Setup Diagram 12
7.1.4 Measurement Procedure and Data 13
7.2 CONDUCTED PEAK OUTPUT POWER 18
7.2.1 E.U.T. Operation 18
7.2.2 Test Mode Description 18
7.2.3 Test Setup Diagram 18
7.2.4 Measurement Procedure and Data 18
7.3 MINIMUM 6DB BANDWIDTH 19
7.3.1 E.U.T. Operation 19
7.3.2 Test Mode Description 19
7.3.3 Test Setup Diagram 19
7.3.4 Measurement Procedure and Data 19
7.4 POWER SPECTRUM DENSITY 20
7.4.1 E.U.T. Operation 20
7.4.2 Test Mode Description 20
7.4.3 Test Setup Diagram 20
7.4.4 Measurement Procedure and Data 20
7.5 CONDUCTED BAND EDGES MEASUREMENT 21
7.5.1 E.U.T. Operation 21
7.5.2 Test Mode Description 21
7.5.3 Test Setup Diagram 21
7.5.4 Measurement Procedure and Data 21
7.6 CONDUCTED SPURIOUS EMISSIONS 22
7.6.1 E.U.T. Operation 22
7.6.2 Test Mode Description 22

7.6.3 Test Setup Diagram 22
7.6.4 Measurement Procedure and Data 22
7.7 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS 23
7.7.1 E.U.T. Operation 23
7.7.2 Test Mode Description 23
7.7.3 Test Setup Diagram 24
7.7.4 Measurement Procedure and Data 24
7.8 RADIATED SPURIOUS EMISSIONS BELOW 1GHZ 37
7.8.1 E.U.T. Operation 37
7.8.2 Test Mode Description 37
7.8.3 Test Setup Diagram 37
7.8.4 Measurement Procedure and Data 38
7.9 RADIATED SPURIOUS EMISSIONS ABOVE 1GHZ 41
7.9.1 E.U.T. Operation 41
7.9.2 Test Mode Description 41
7.9.3 Test Setup Diagram 41
7.9.4 Measurement Procedure and Data 42

8 TEST SETUP PHOTO 55

9 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS) 55

10 APPENDIX 55

10.1 APPENDIX A: DTS BANDWIDTH 55
10.1.1 Test Result 55
10.1.2 Test Graphs 56
10.2 APPENDIX B: OCCUPIED CHANNEL BANDWIDTH 58
10.2.1 Test Result 58
10.2.2 Test Graphs 59
10.3 APPENDIX C: MAXIMUM CONDUCTED OUTPUT POWER 61
10.3.1 Test Result 61
10.3.2 Test Graphs 62
10.4 APPENDIX D: MAXIMUM POWER SPECTRAL DENSITY 64
10.4.1 Test Result 64
10.4.2 Test Graphs 65
10.5 APPENDIX E: BAND EDGE MEASUREMENTS 67
10.5.1 Test Result 67
10.5.2 Test Graphs 68
10.6 APPENDIX F: CONDUCTED SPURIOUS EMISSION 70
10.6.1 Test Result 70
10.6.2 Test Graphs 71

4 General Information

4.1 Details of E.U.T.

Power Supply:	AC 380V 50Hz
Test Voltage:	AC 380V 50Hz&DC12V
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Mushroom antenna
Antenna Gain:	4.63 dBi (Provided by manufacturer)
Antenna Number:	1

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	LENOVO	L460	-
SecureCRT	VanDyke	V 6.2.0	-
Serial port adapter plate	-	Test Plate 3	-

4.3 Power level setting using in test

Channel	Power setting
0	Default
19	Default
39	Default

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty cycle	0.4%
4	Occupied Bandwidth	3%
5	RF conducted power	0.6dB
6	RF power density	2.9dB
7	Conducted Spurious emissions	0.75dB
8	RF Radiated power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious emission test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-6GHz)
		5.4dB (6GHz-18GHz)
10	Temperature test	1℃
11	Humidity test	3%
12	Supply voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.5 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Tel: +86 21 6191 5666 Fax: +86 21 6191 5678
No tests were sub-contracted.
Note:
1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).
3. Sample source: sent by customer.

4.6 Test Facility

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

• A2LA (Certificate No. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2023-12-19	2024-12-18
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2023-12-19	2024-12-18
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2023-08-01	2024-07-31
Signal Generator	R&S	SMR20	SHEM006-1	2023-08-01	2024-07-31
Signal Generator	Agilent	N5182A	SHEM182-1	2023-08-01	2024-07-31
Communication Tester	R&S	CMW270	SHEM183-1	2023-06-01	2024-05-31
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2023-08-01	2024-07-31
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2022-11-08	2024-11-07
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2023-12-19	2024-12-18
DC Power Supply	HP	6010A	SHEM222-1	2023-12-19	2024-12-18
Conducted test Cable	/	RF01~RF04	/	2023-12-19	2024-12-18
Switcher	Tonscend	JS0806	SHEM184-1	2023-08-01	2024-07-31
Test software	Tonscend	JS Tonscend BT/WIFI System	Version: 2.6	/	/
Switcher+Power Sensor	TST	TSPS2023R	SHEM263-1	2023-08-01	2024-07-31
Test software	TST	TST PASS	Version: 2.0	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2023-12-19	2024-12-18
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2023-12-19	2024-12-18
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2023-12-19	2024-12-18
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2023-09-03	2025-09-02
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2023-04-17	2025-04-16
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2023-09-03	2025-09-02
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2023-09-03	2025-09-02
Pre-Amplifier	HP	8447D	SHEM236-1	2023-12-19	2024-12-18
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2023-12-19	2024-12-18
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023-05-06	2026-05-05
RE test Cable	/	PT18-NMNM-10M	SHEM217-2	2023-12-19	2024-12-18
Test software	ESE	E3	Version: 6.111221a	/	/

Conducted Emissions at AC Mains Power Port (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2023/12/19	2024/12/18
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2023/12/19	2024/12/18
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2023/12/19	2024/12/18
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2023/12/19	2024/12/18
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2023/12/19	2024/12/18
CE test Cable	/	/	SHEM172-1	2023/12/19	2024/12/18
Test Software	ESE	e3	Version: 6.191211	N/A	N/A

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard 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:

The antenna is mushroom antenna and no consideration of replacement. The best case gain of the antenna is 4.63 dBi.

Antenna location: Refer to internal photo.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

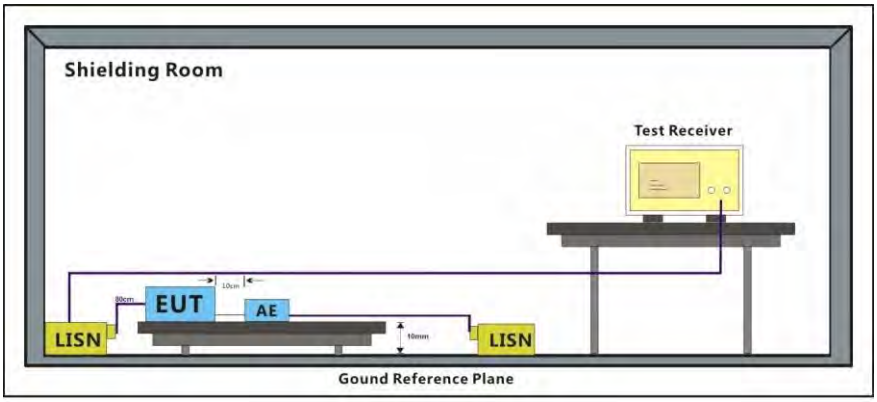
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

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 50ohm/50μH + 5ohm 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.

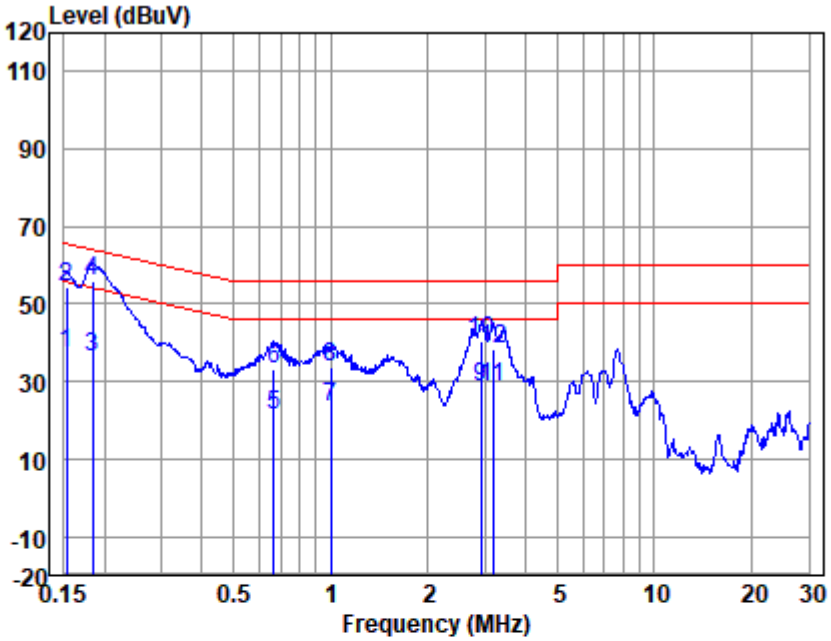
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

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.

Remark: Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 02; Line: Live line L1

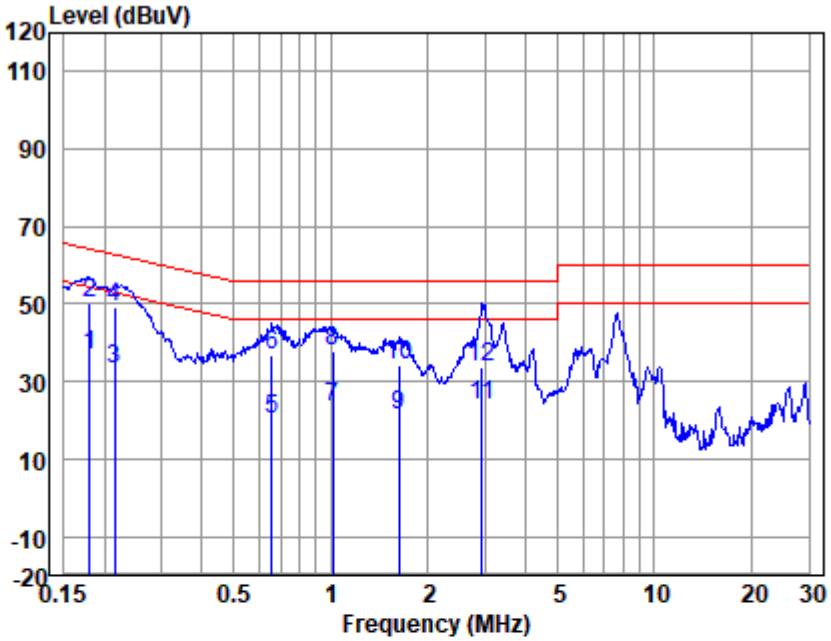


LISN : LINE
EUT/Project No : 0070HS
Test Mode : 02

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	26.98	0.37	9.90	37.25	55.87	-18.62	Average
2	0.15	44.04	0.37	9.90	54.31	65.87	-11.56	QP
3	0.18	26.28	0.27	9.90	36.45	54.33	-17.88	Average
4	0.18	45.63	0.27	9.90	55.80	64.33	-8.53	QP
5	0.67	11.20	0.05	9.90	21.15	46.00	-24.85	Average
6	0.67	23.46	0.05	9.90	33.41	56.00	-22.59	QP
7	1.00	13.36	0.06	10.00	23.42	46.00	-22.58	Average
8	1.00	23.57	0.06	10.00	33.63	56.00	-22.37	QP
9	2.92	18.12	0.12	10.14	28.38	46.00	-17.62	Average
10	2.92	30.21	0.12	10.14	40.47	56.00	-15.53	QP
11	3.17	18.13	0.13	10.15	28.41	46.00	-17.59	Average
12	3.17	28.27	0.13	10.15	38.55	56.00	-17.45	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 02; Line: Live line L2

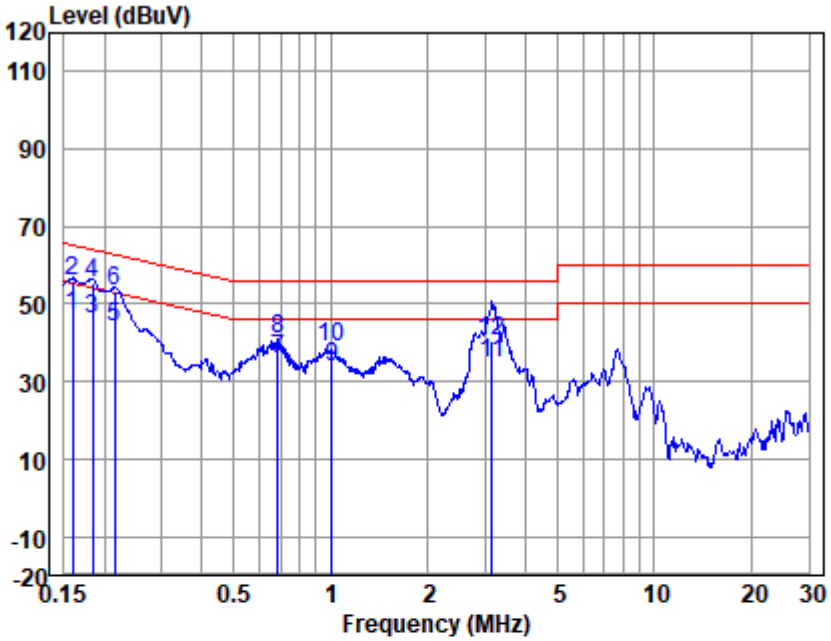


LISN : LINE
EUT/Project No : 0070HS
Test Mode : 02

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.18	26.54	0.28	9.90	36.72	54.50	-17.78	Average
2	0.18	40.00	0.28	9.90	50.18	64.50	-14.32	QP
3	0.22	23.12	0.21	9.90	33.23	53.01	-19.78	Average
4	0.22	39.12	0.21	9.90	49.23	63.01	-13.78	QP
5	0.66	10.56	0.06	9.90	20.52	46.00	-25.48	Average
6	0.66	26.99	0.06	9.90	36.95	56.00	-19.05	QP
7	1.02	13.45	0.05	10.00	23.50	46.00	-22.50	Average
8	1.02	27.58	0.05	10.00	37.63	56.00	-18.37	QP
9	1.63	10.99	0.07	10.07	21.13	46.00	-24.87	Average
10	1.63	23.94	0.07	10.07	34.08	56.00	-21.92	QP
11	2.93	13.80	0.12	10.14	24.06	46.00	-21.94	Average
12	2.93	23.53	0.12	10.14	33.79	56.00	-22.21	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 02; Line: Live line L3

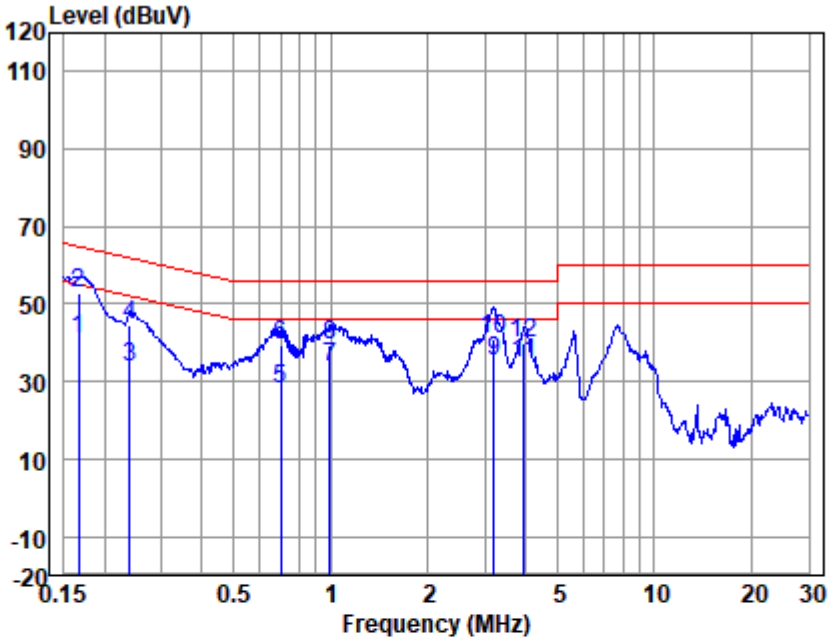


LISN : LINE
EUT/Project No : 0070HS
Test Mode : 02

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	37.10	0.36	9.90	47.36	55.52	-8.16	Average
2	0.16	45.78	0.36	9.90	56.04	65.52	-9.48	QP
3	0.18	35.93	0.28	9.90	46.11	54.33	-8.22	Average
4	0.18	45.50	0.28	9.90	55.68	64.33	-8.65	QP
5	0.22	34.01	0.22	9.90	44.13	53.01	-8.88	Average
6	0.22	43.07	0.22	9.90	53.19	63.01	-9.82	QP
7	0.69	25.68	0.07	9.90	35.65	46.00	-10.35	Average
8	0.69	30.92	0.07	9.90	40.89	56.00	-15.11	QP
9	1.00	23.71	0.06	10.00	33.77	46.00	-12.23	Average
10	1.00	29.06	0.06	10.00	39.12	56.00	-16.88	QP
11	3.16	24.37	0.12	10.15	34.64	46.00	-11.36	Average
12	3.16	30.40	0.12	10.15	40.67	56.00	-15.33	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Test Mode: 02; Line: Neutral Line



LISN : NEUTRAL
EUT/Project No : 0070HS
Test Mode : 02

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	30.76	0.34	9.90	41.00	55.16	-14.16	Average
2	0.17	42.76	0.34	9.90	53.00	65.16	-12.16	QP
3	0.24	23.70	0.21	9.90	33.81	52.13	-18.32	Average
4	0.24	34.46	0.21	9.90	44.57	62.13	-17.56	QP
5	0.70	17.96	0.06	9.90	27.92	46.00	-18.08	Average
6	0.70	29.50	0.06	9.90	39.46	56.00	-16.54	QP
7	0.99	23.46	0.06	10.00	33.52	46.00	-12.48	Average
8	0.99	29.18	0.06	10.00	39.24	56.00	-16.76	QP
9	3.19	25.10	0.12	10.15	35.37	46.00	-10.63	Average
10	3.19	30.61	0.12	10.15	40.88	56.00	-15.12	QP
11	3.96	24.26	0.14	10.17	34.57	46.00	-11.43	Average
12	3.96	29.70	0.14	10.17	40.01	56.00	-15.99	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.2.1 E.U.T. Operation

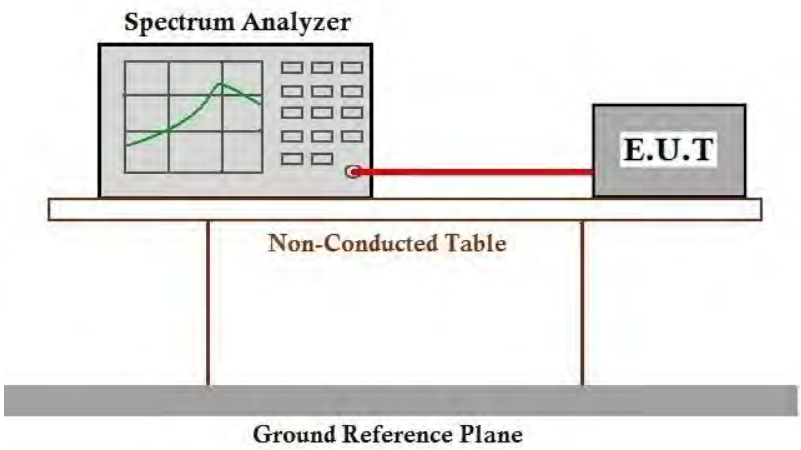
Operating Environment:

Temperature: 19.6 °C Humidity: 43.0 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

7.3 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥500 kHz

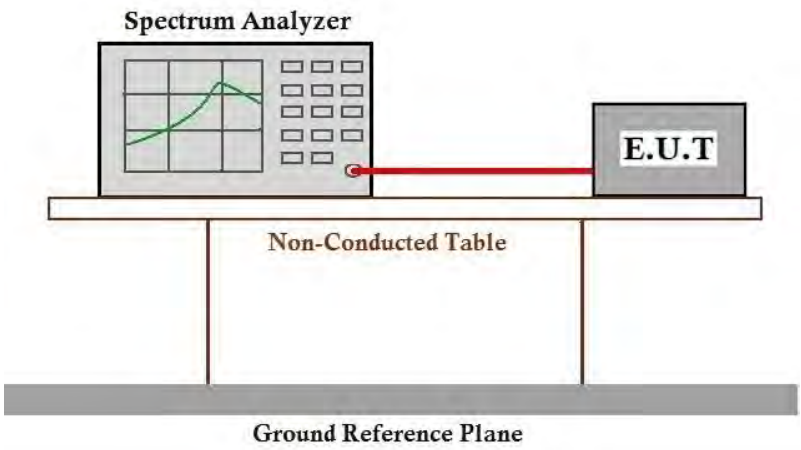
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 19.6 °C Humidity: 43.0 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.4 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit:
≤8dBm in any 3 kHz band during any time interval of continuous transmission

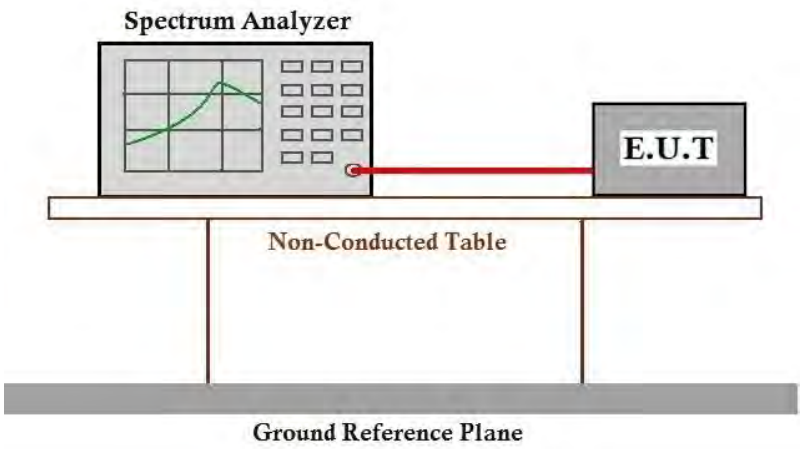
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 19.6 °C Humidity: 43.0 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.5 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.5.1 E.U.T. Operation

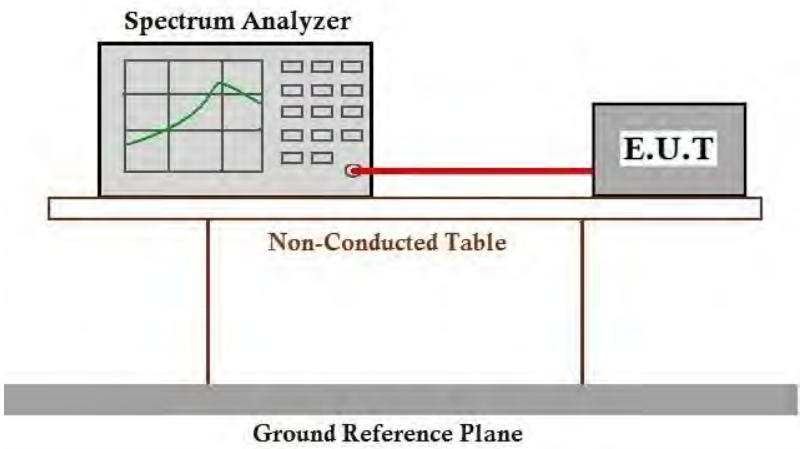
Operating Environment:

Temperature: 19.6 °C Humidity: 42.8 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.6.1 E.U.T. Operation

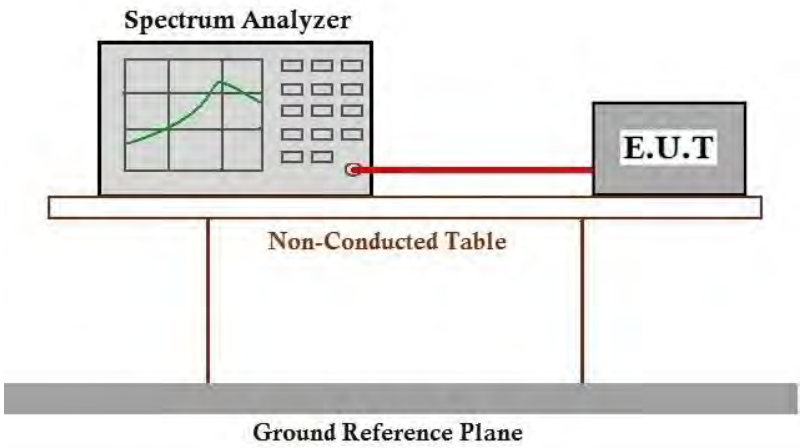
Operating Environment:

Temperature: 19.7 °C Humidity: 42.8 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.		

7.7.1 E.U.T. Operation

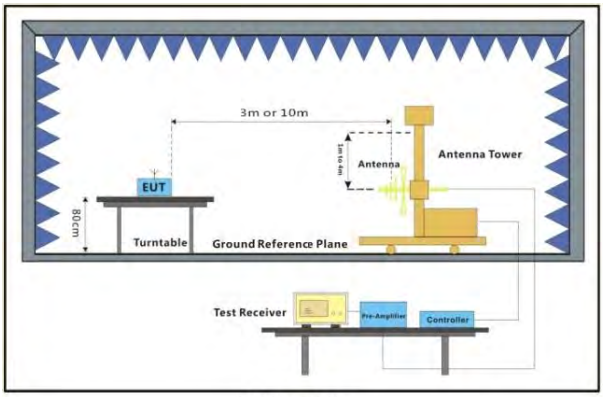
Operating Environment:

Temperature: 19.6 °C Humidity: 42.7 % RH Atmospheric Pressure: 1010 mbar

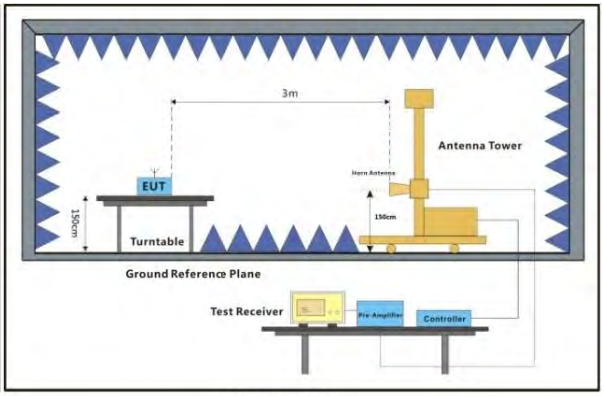
7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.7.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.7.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. 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.

e. 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 table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. 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.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

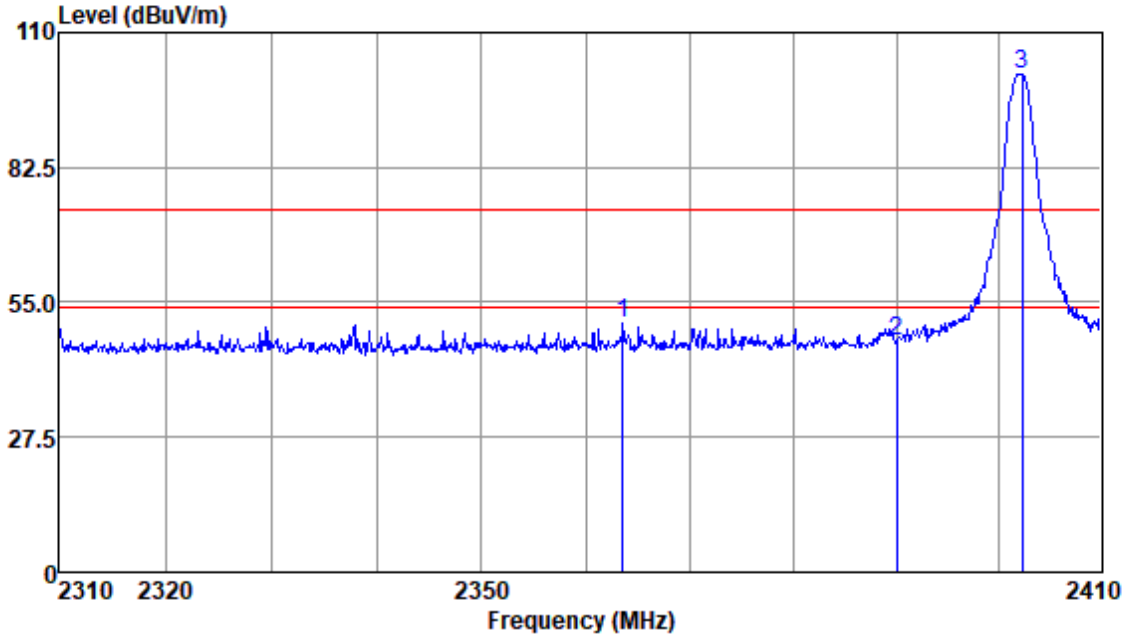
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:Low

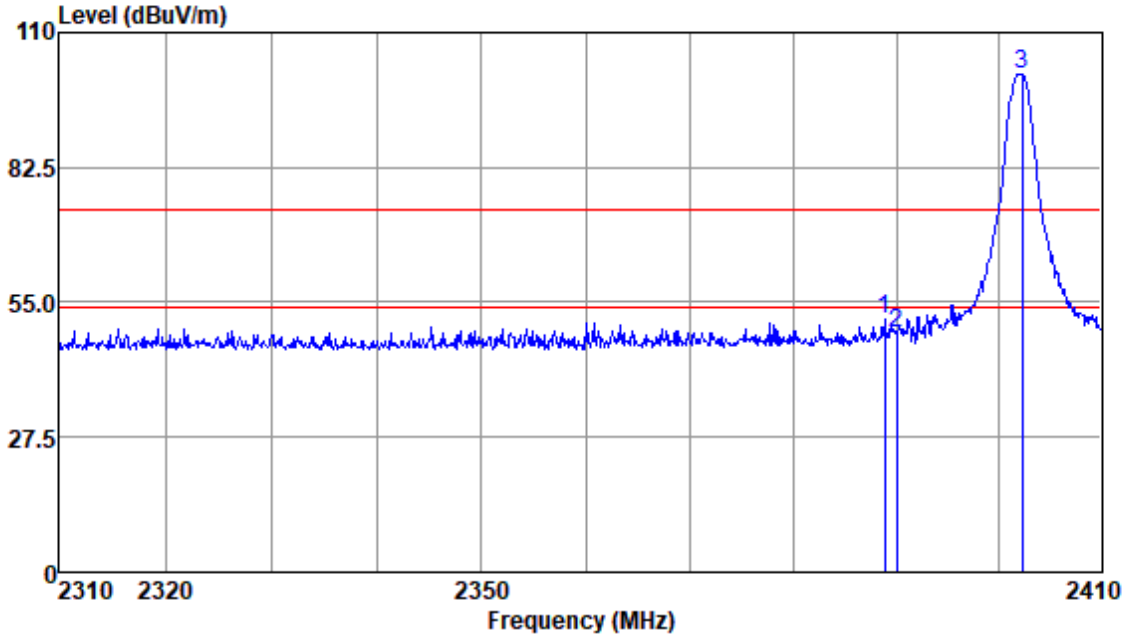


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2363.57	54.06	28.68	3.31	35.16	50.89	74.00	-23.11	Peak
2390.00	50.24	28.80	3.34	35.18	47.20	74.00	-26.80	Peak
2402.25	104.56	28.85	3.34	35.19	101.56	74.00	27.56	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:Low

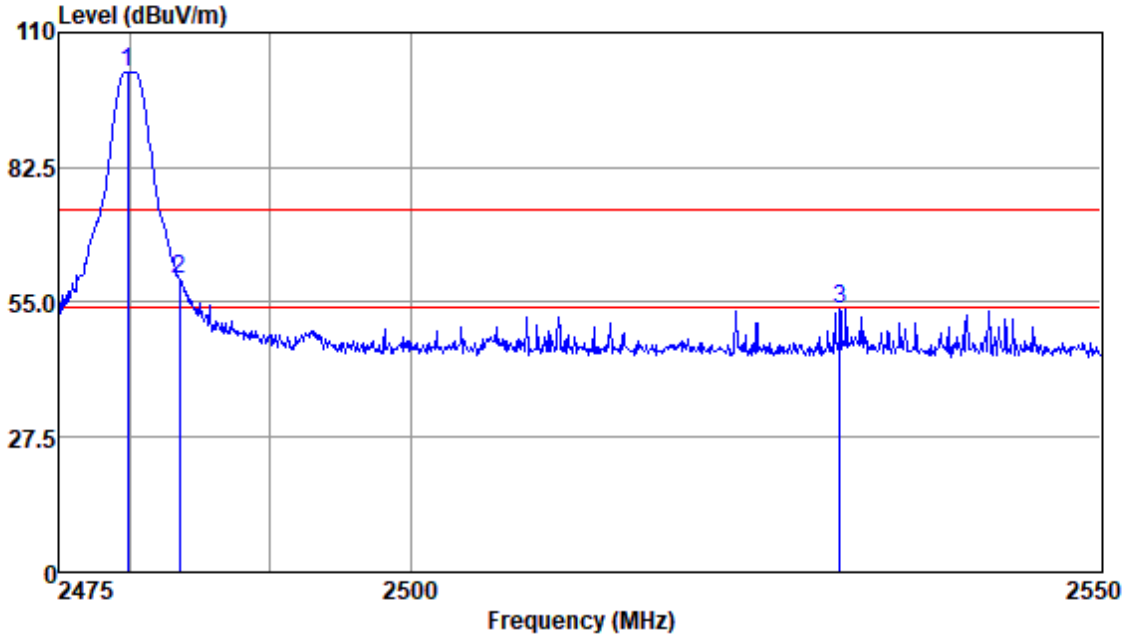


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2388.85	54.68	28.80	3.34	35.18	51.64	74.00	-22.36	Peak
2390.00	51.87	28.80	3.34	35.18	48.83	74.00	-25.17	Peak
2402.25	104.49	28.85	3.34	35.19	101.49	74.00	27.49	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:High

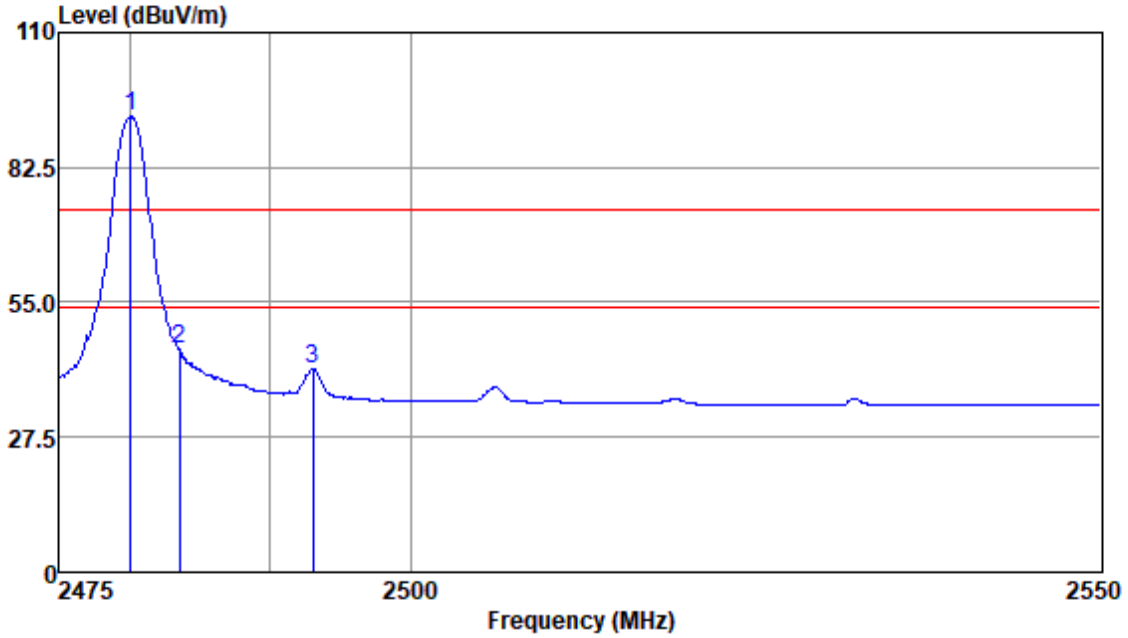


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2479.81	104.84	29.08	3.40	35.25	102.07	74.00	28.07	Peak
2483.50	62.62	29.09	3.36	35.26	59.81	74.00	-14.19	Peak
2530.96	56.39	29.13	3.43	35.31	53.64	74.00	-20.36	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:High

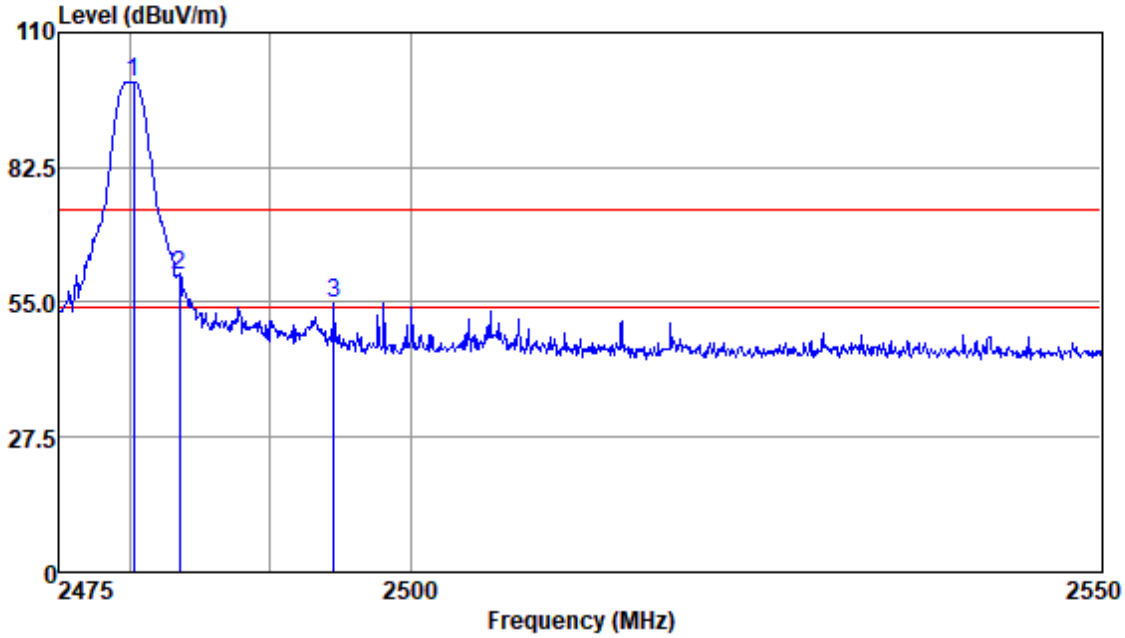


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.03	95.63	29.08	3.40	35.25	92.86	54.00	38.86	Average
2483.50	48.27	29.09	3.36	35.26	45.46	54.00	-8.54	Average
2493.02	44.15	29.10	3.33	35.26	41.32	54.00	-12.68	Average

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:High

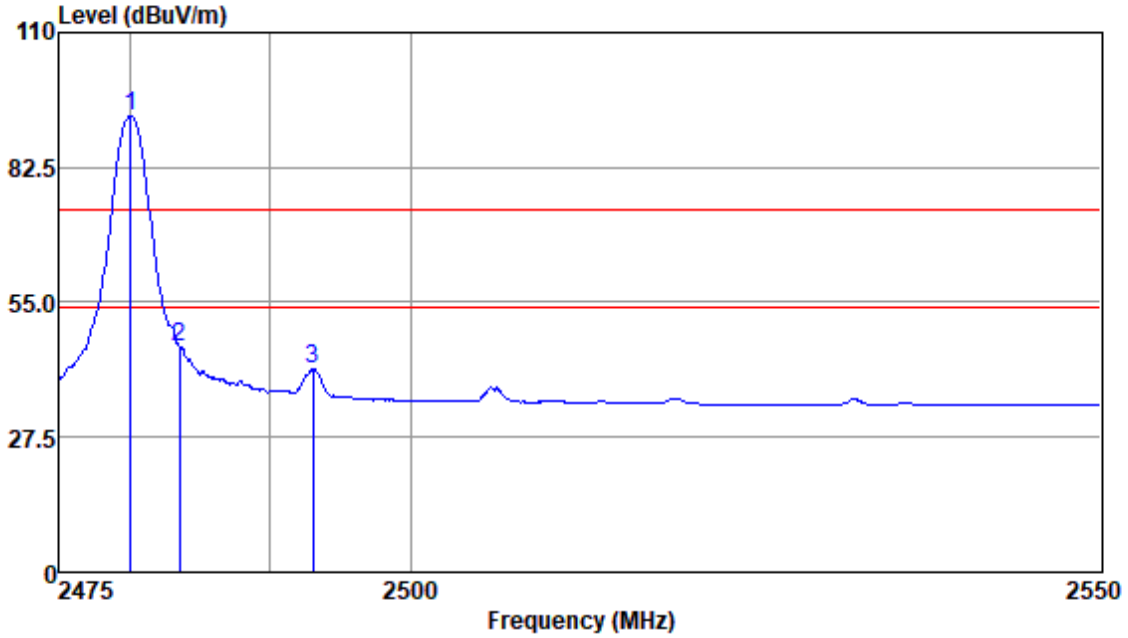


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.25	102.79	29.08	3.40	35.25	100.02	74.00	26.02	Peak
2483.50	63.10	29.09	3.36	35.26	60.29	74.00	-13.71	Peak
2494.51	57.49	29.10	3.33	35.26	54.66	74.00	-19.34	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:High

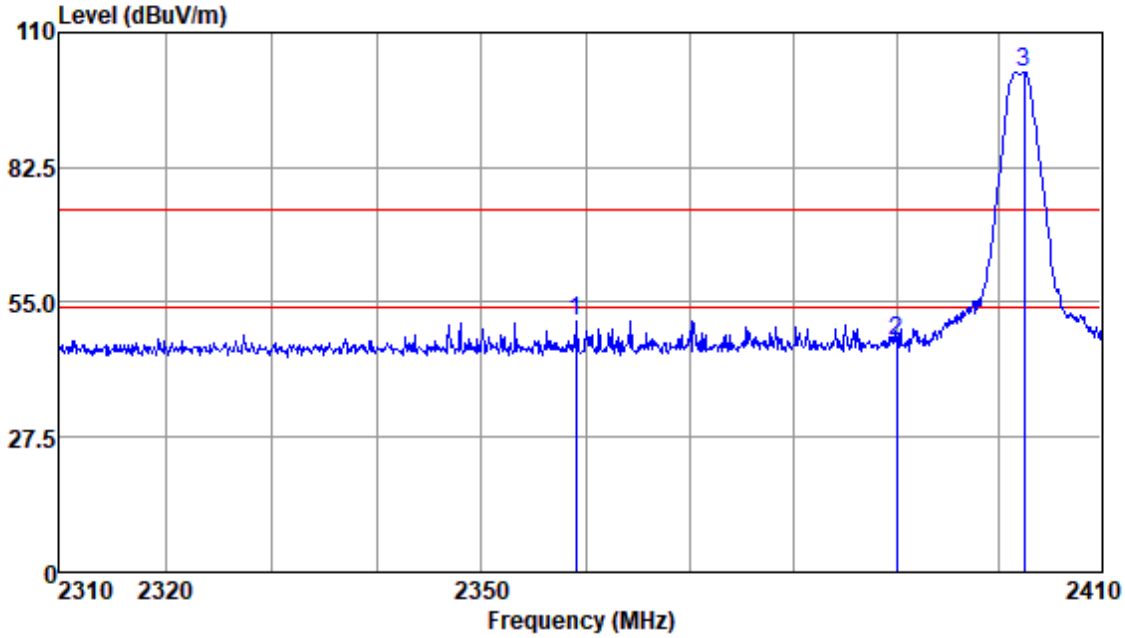


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.03	95.73	29.08	3.40	35.25	92.96	54.00	38.96	Average
2483.50	48.82	29.09	3.36	35.26	46.01	54.00	-7.99	Average
2493.02	44.20	29.10	3.33	35.26	41.37	54.00	-12.63	Average

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Horizontal; Modulation:GFSK; Channel:Low

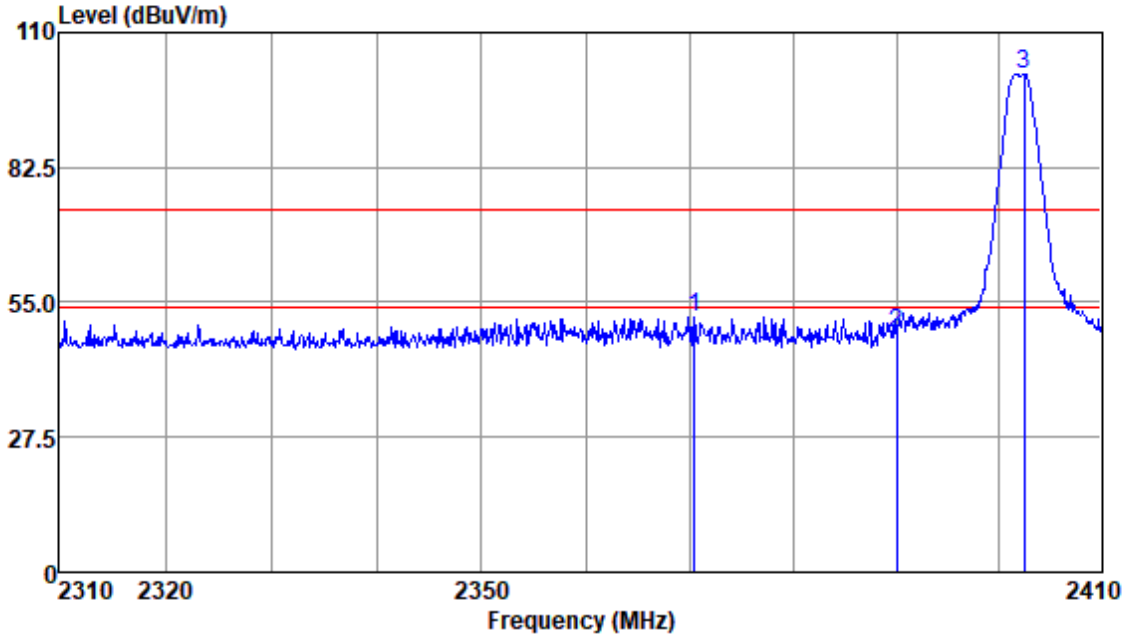


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2359.07	54.34	28.66	3.30	35.16	51.14	74.00	-22.86	Peak
2390.00	50.21	28.80	3.34	35.18	47.17	74.00	-26.83	Peak
2402.45	105.08	28.85	3.34	35.19	102.08	74.00	28.08	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Vertical; Modulation:GFSK; Channel:Low

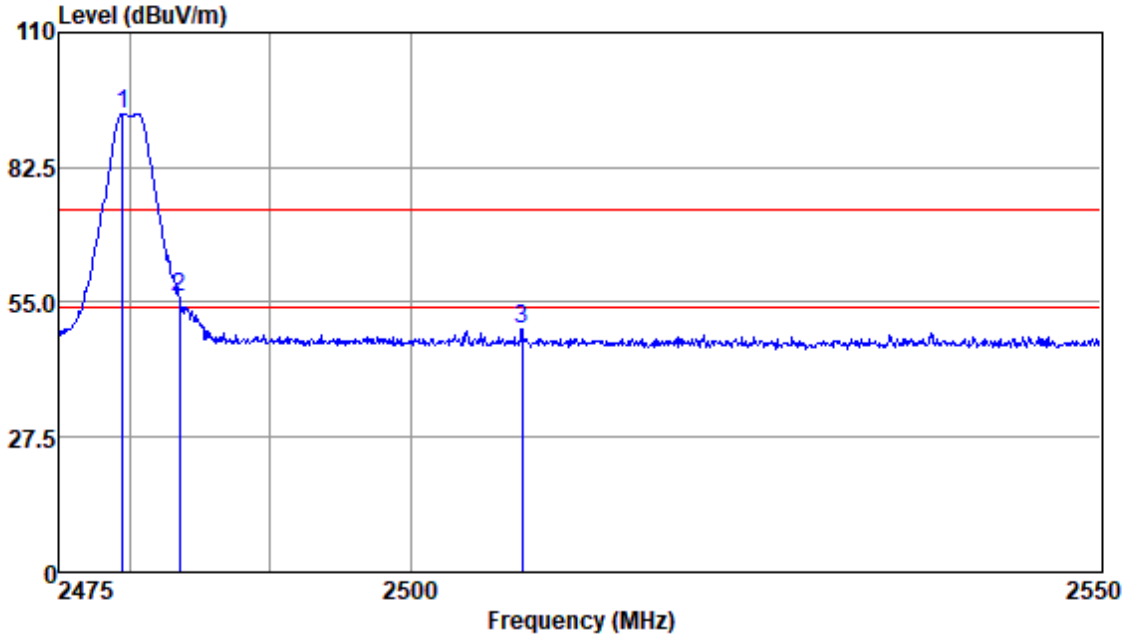


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2370.40	55.14	28.71	3.32	35.17	52.00	74.00	-22.00	Peak
2390.00	51.59	28.80	3.34	35.18	48.55	74.00	-25.45	Peak
2402.45	104.61	28.85	3.34	35.19	101.61	74.00	27.61	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Horizontal; Modulation:GFSK; Channel:High

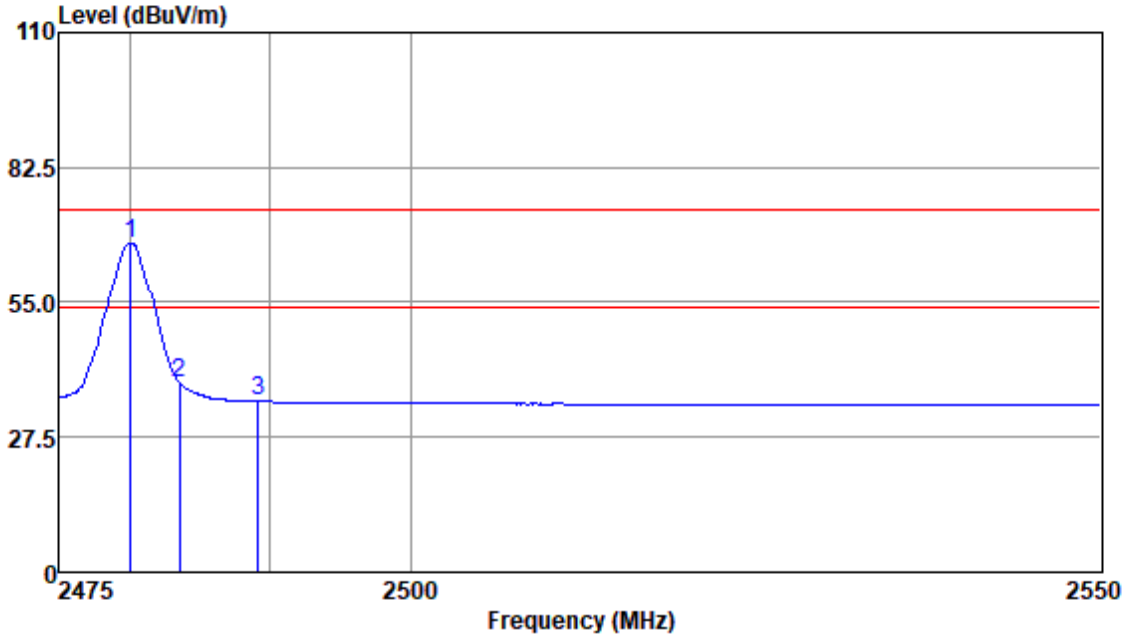


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2479.51	96.21	29.08	3.40	35.25	93.44	74.00	19.44	Peak
2483.50	58.80	29.09	3.36	35.26	55.99	74.00	-18.01	Peak
2508.02	52.31	29.13	3.39	35.28	49.55	74.00	-24.45	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Horizontal; Modulation:GFSK; Channel:High

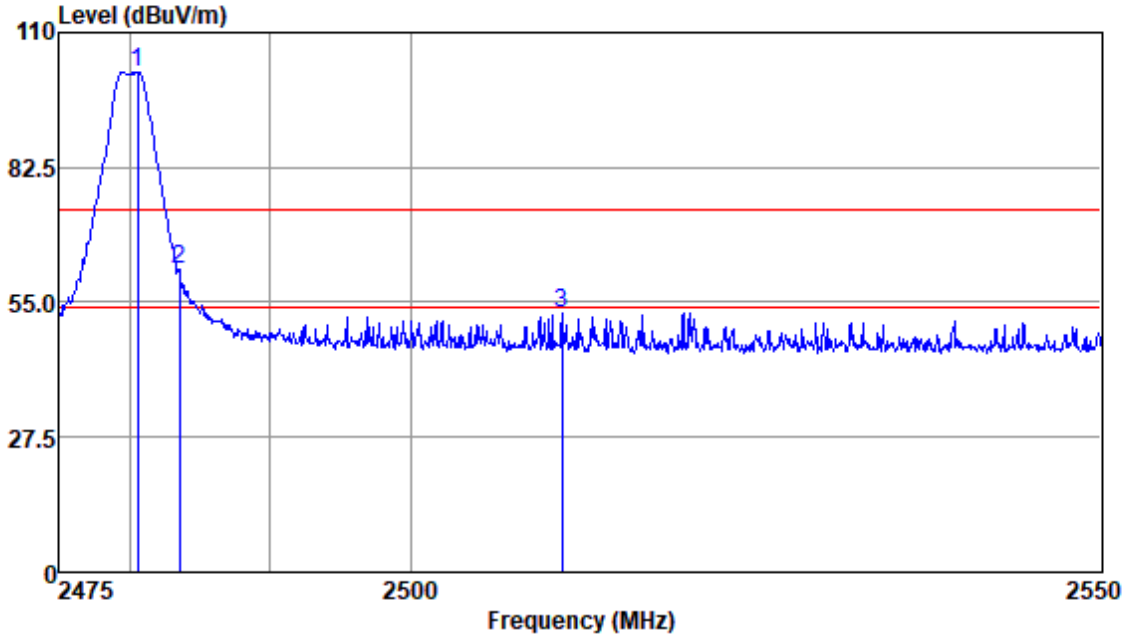


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.03	69.90	29.08	3.40	35.25	67.13	54.00	13.13	Average
2483.50	41.49	29.09	3.36	35.26	38.68	54.00	-15.32	Average
2489.15	37.63	29.10	3.33	35.26	34.80	54.00	-19.20	Average

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Vertical; Modulation:GFSK; Channel:High

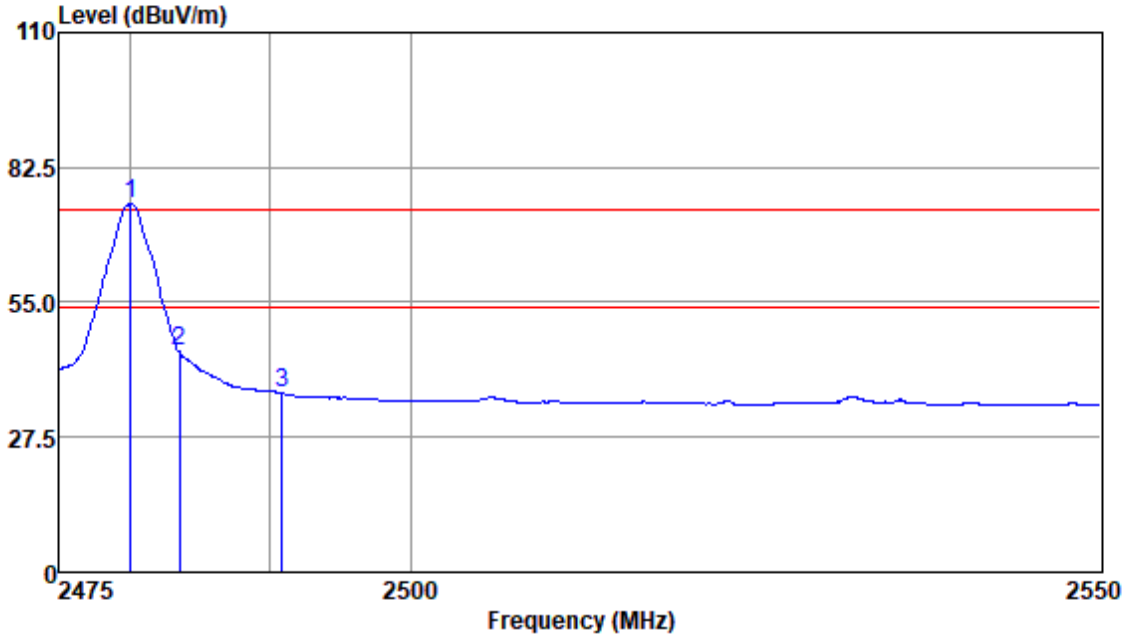


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.55	104.78	29.08	3.40	35.25	102.01	74.00	28.01	Peak
2483.50	64.67	29.09	3.36	35.26	61.86	74.00	-12.14	Peak
2510.87	55.54	29.13	3.42	35.29	52.80	74.00	-21.20	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Vertical; Modulation:GFSK; Channel:High



Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2480.03	77.90	29.08	3.40	35.25	75.13	54.00	21.13	Average
2483.50	47.80	29.09	3.36	35.26	44.99	54.00	-9.01	Average
2490.86	39.28	29.10	3.33	35.26	36.45	54.00	-17.55	Average

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

7.8 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

7.8.1 E.U.T. Operation

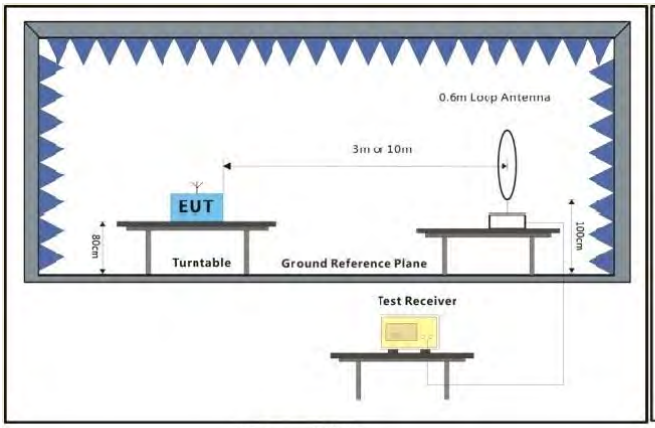
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

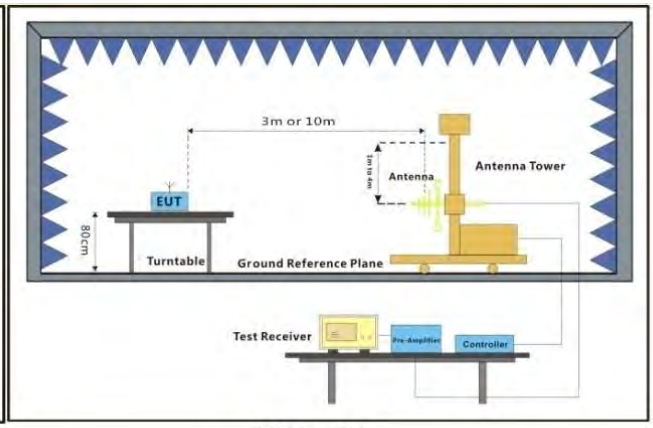
7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.8.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

7.8.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table 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. 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 quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

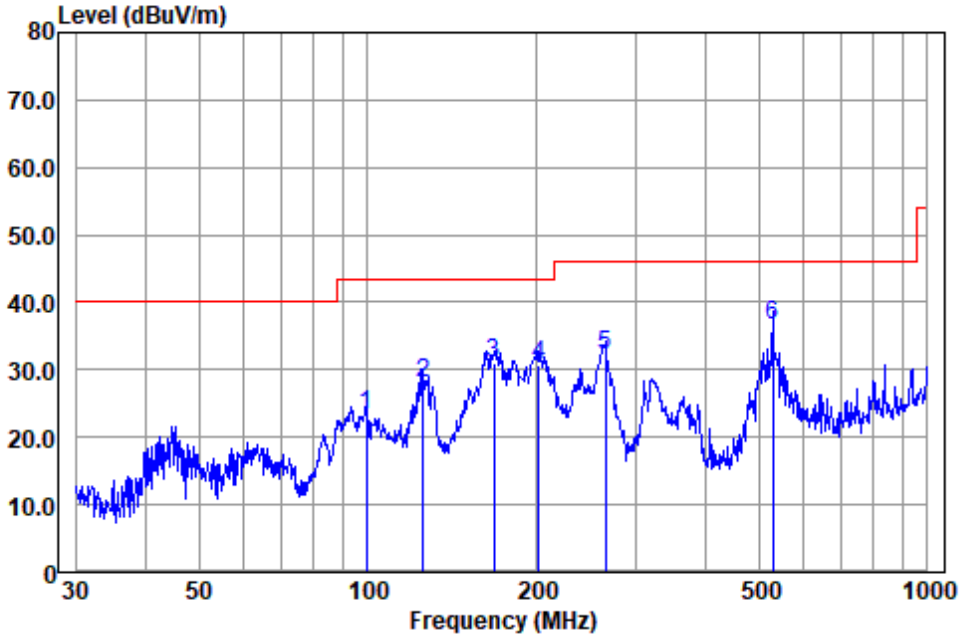
i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test Mode: 02; Polarity: Horizontal

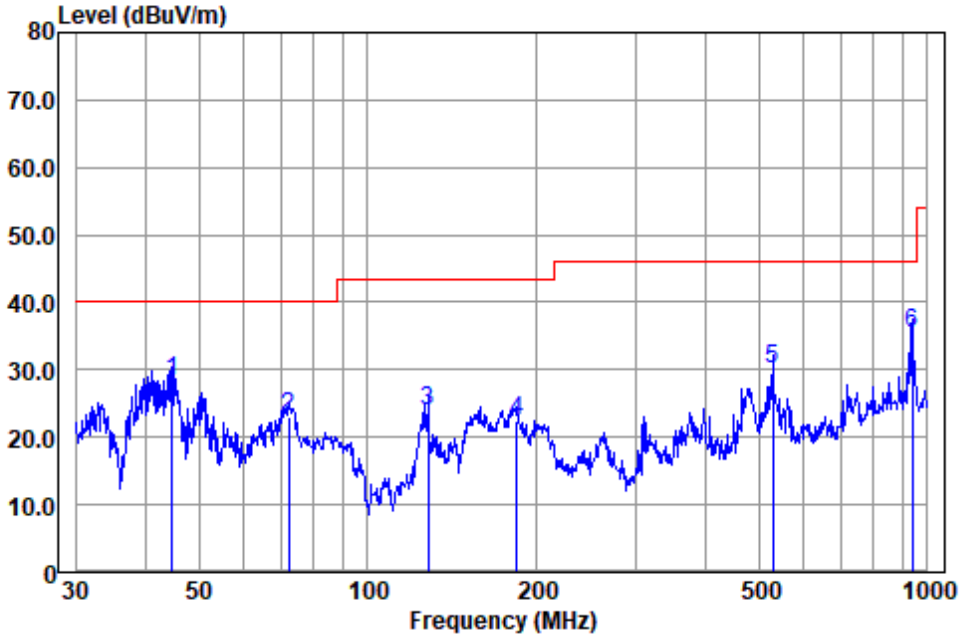


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS
Test mode :02

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	99.528	45.30	9.07	2.02	33.20	23.19	43.50	-20.31	QP
2	125.446	47.25	11.60	2.38	33.09	28.14	43.50	-15.36	QP
3	167.824	48.20	12.90	2.80	33.00	30.90	43.50	-12.60	QP
4	202.100	50.67	9.96	3.15	32.99	30.79	43.50	-12.71	QP
5	265.676	49.35	12.16	3.53	32.80	32.24	46.00	-13.76	QP
6	528.246	45.90	18.46	5.04	32.70	36.70	46.00	-9.30	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical



Antenna Polarity :VERTICAL
EUT/Project :0070HS
Test mode :02

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	44.743	46.50	13.76	1.31	33.20	28.37	40.00	-11.63	QP
2	72.338	43.51	11.08	1.76	33.20	23.15	40.00	-16.85	QP
3	128.113	42.62	11.90	2.56	33.08	24.00	43.50	-19.50	QP
4	184.490	41.64	11.07	2.77	33.00	22.48	43.50	-21.02	QP
5	528.246	39.31	18.46	5.04	32.70	30.11	46.00	-15.89	QP
6	938.833	36.25	23.70	7.09	31.55	35.49	46.00	-10.51	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

7.9 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.9.1 E.U.T. Operation

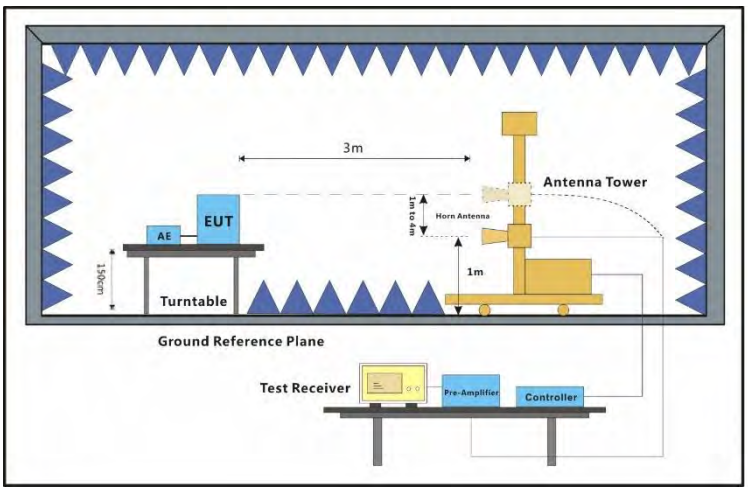
Operating Environment:

Temperature: 19.7 °C Humidity: 42.7 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	03	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table 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. 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 or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

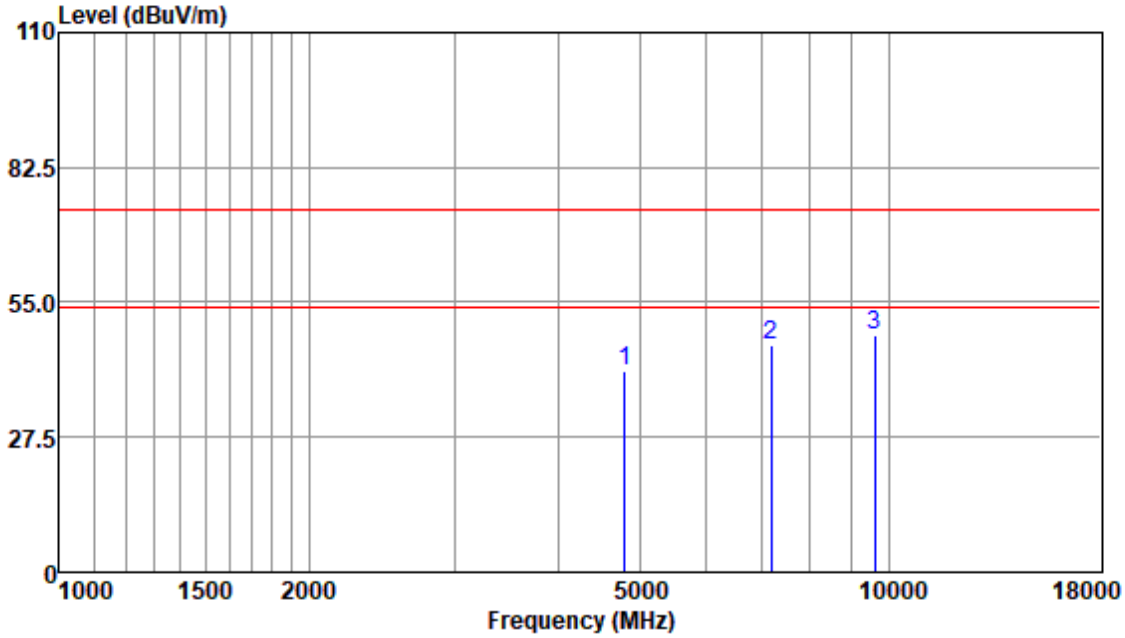
Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:Low

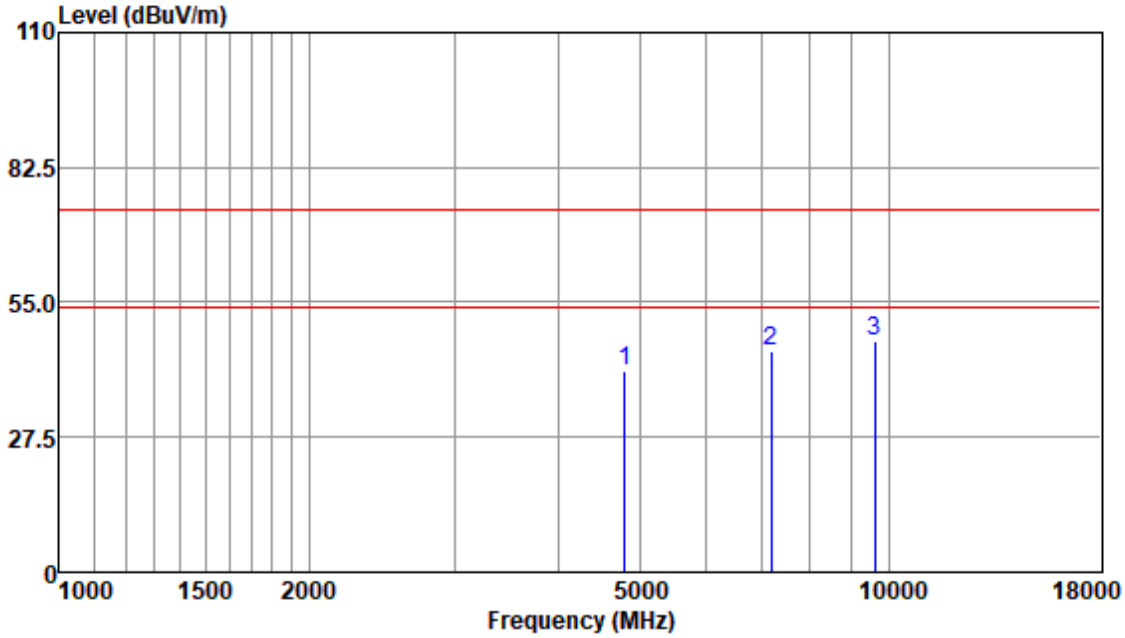


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4804.11	38.81	33.57	5.22	36.79	40.81	74.00	-33.19	Peak
7206.31	38.29	36.24	7.13	35.53	46.13	74.00	-27.87	Peak
9608.43	35.32	37.75	8.66	33.58	48.15	74.00	-25.85	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:Low

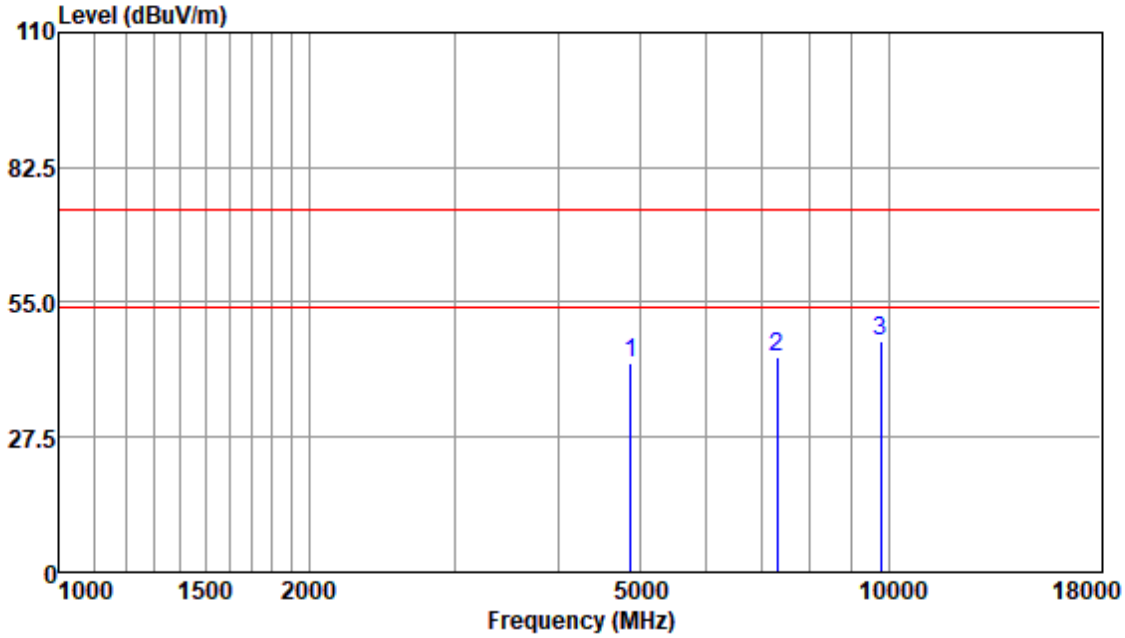


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4804.11	38.90	33.57	5.22	36.79	40.90	74.00	-33.10	Peak
7206.31	37.10	36.24	7.13	35.53	44.94	74.00	-29.06	Peak
9608.43	34.44	37.75	8.66	33.58	47.27	74.00	-26.73	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:middle

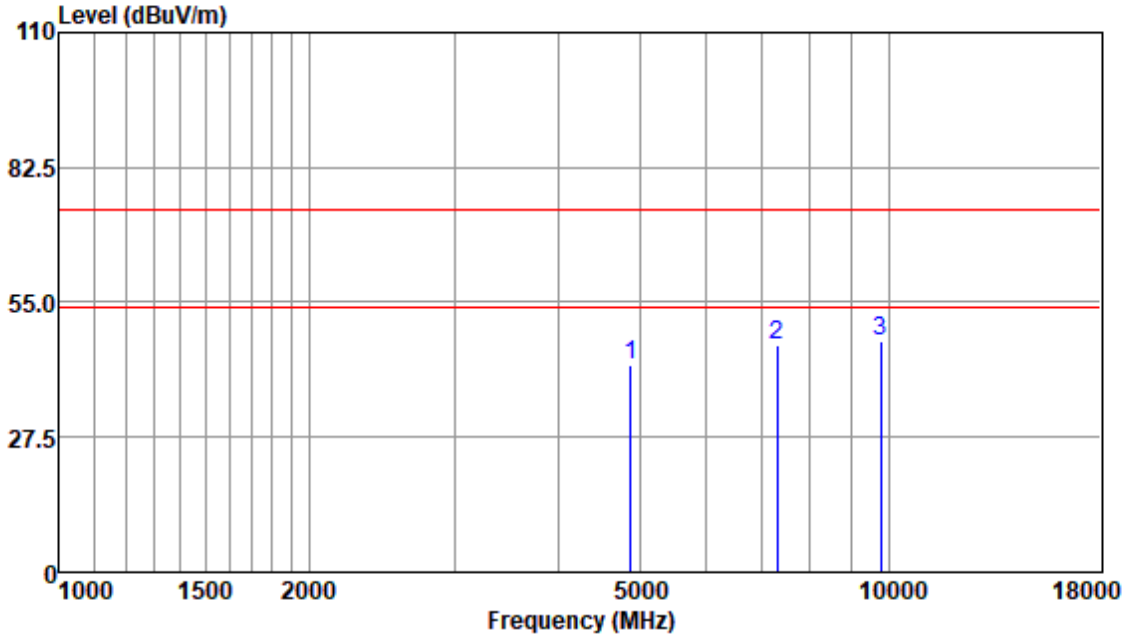


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4880.04	40.39	33.66	5.28	36.81	42.52	74.00	-31.48	Peak
7320.27	35.71	36.33	7.33	35.42	43.95	74.00	-30.05	Peak
9760.37	34.21	37.54	8.84	33.50	47.09	74.00	-26.91	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:middle

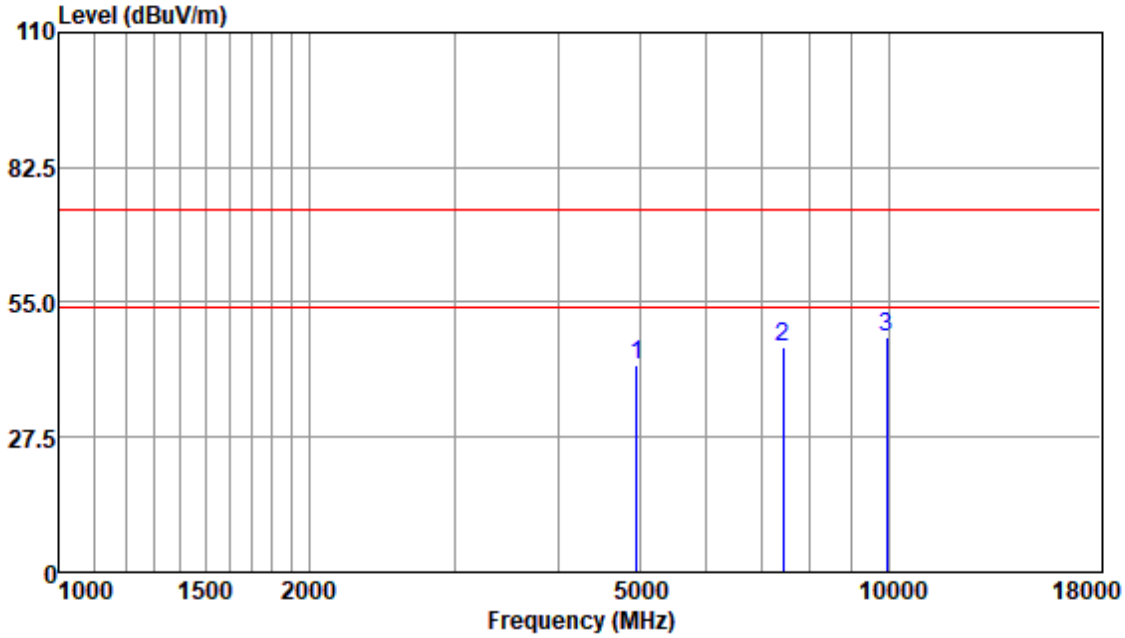


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4880.04	40.11	33.66	5.28	36.81	42.24	74.00	-31.76	Peak
7320.27	37.97	36.33	7.33	35.42	46.21	74.00	-27.79	Peak
9760.37	34.27	37.54	8.84	33.50	47.15	74.00	-26.85	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:High

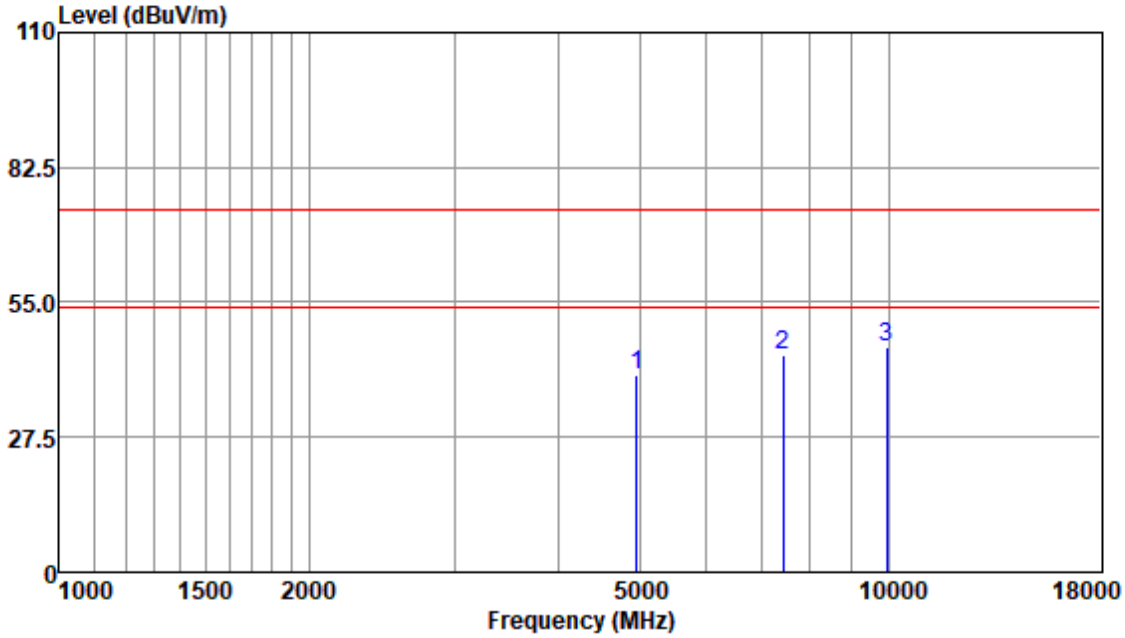


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4960.31	40.02	33.65	5.46	36.83	42.30	74.00	-31.70	Peak
7440.91	37.67	36.31	7.43	35.34	46.07	74.00	-27.93	Peak
9920.99	35.07	37.62	8.69	33.41	47.97	74.00	-26.03	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:High

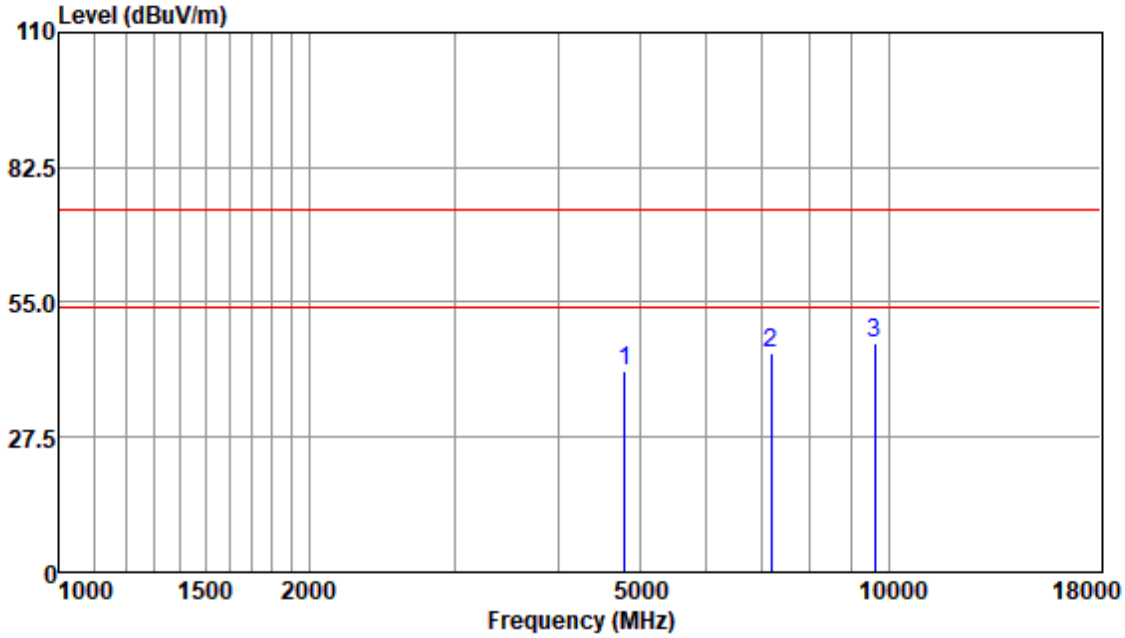


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4960.31	37.88	33.65	5.46	36.83	40.16	74.00	-33.84	Peak
7440.91	35.91	36.31	7.43	35.34	44.31	74.00	-29.69	Peak
9920.99	32.79	37.62	8.69	33.41	45.69	74.00	-28.31	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Horizontal; Modulation:GFSK; Channel:Low

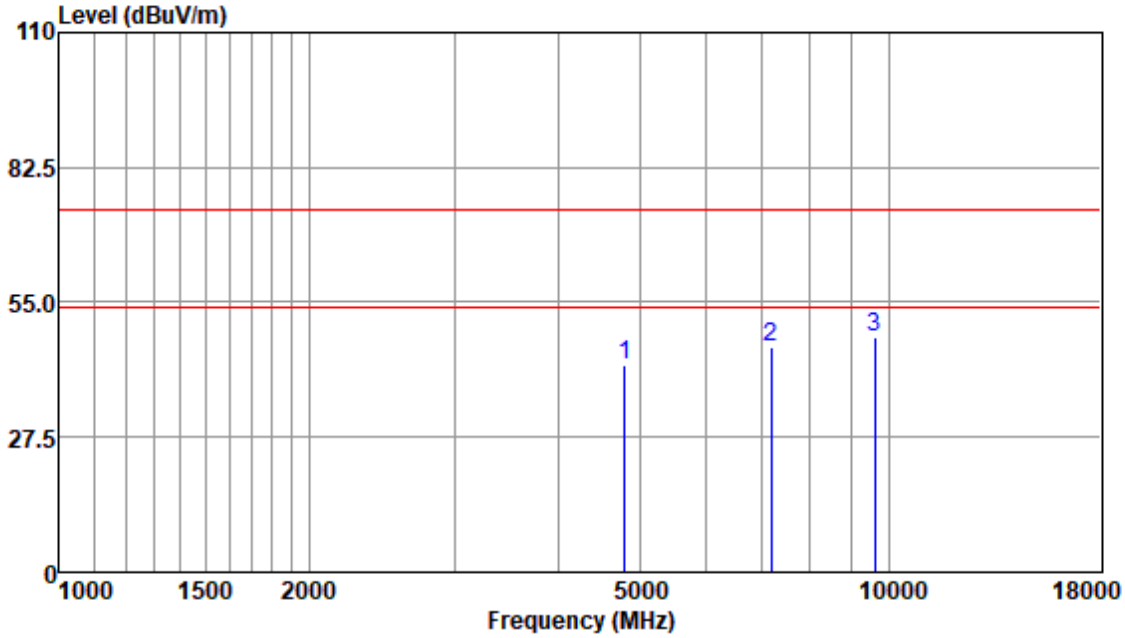


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4804.11	39.03	33.57	5.22	36.79	41.03	74.00	-32.97	Peak
7206.31	36.97	36.24	7.13	35.53	44.81	74.00	-29.19	Peak
9608.43	33.74	37.75	8.66	33.58	46.57	74.00	-27.43	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Vertical; Modulation:GFSK; Channel:Low

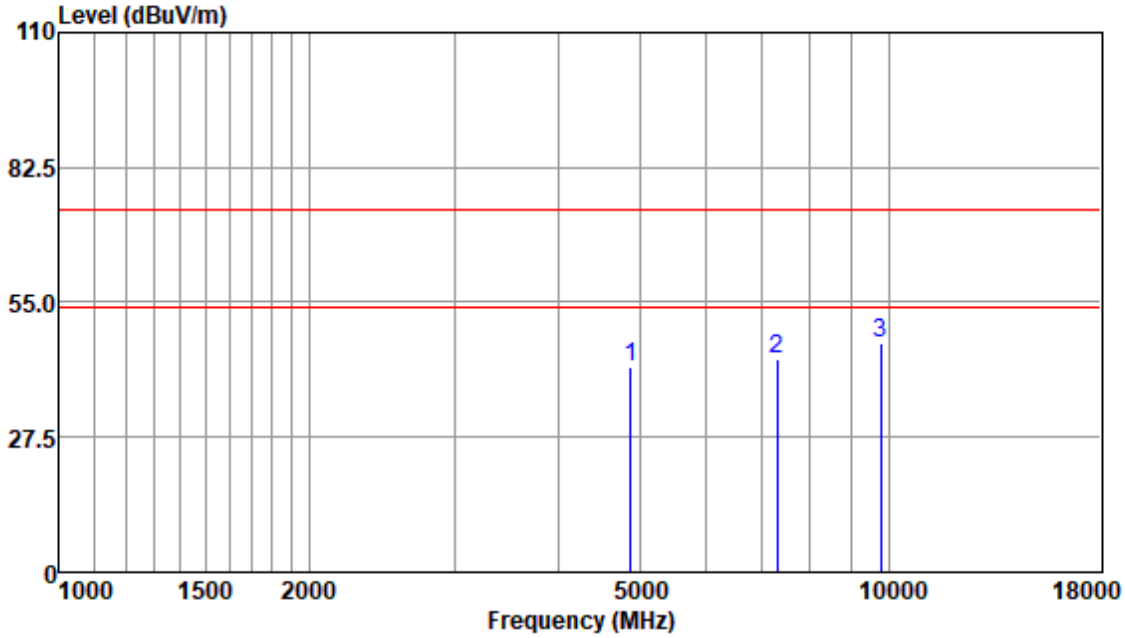


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4804.11	40.04	33.57	5.22	36.79	42.04	74.00	-31.96	Peak
7206.31	37.84	36.24	7.13	35.53	45.68	74.00	-28.32	Peak
9608.43	35.14	37.75	8.66	33.58	47.97	74.00	-26.03	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Horizontal; Modulation:GFSK; Channel:middle

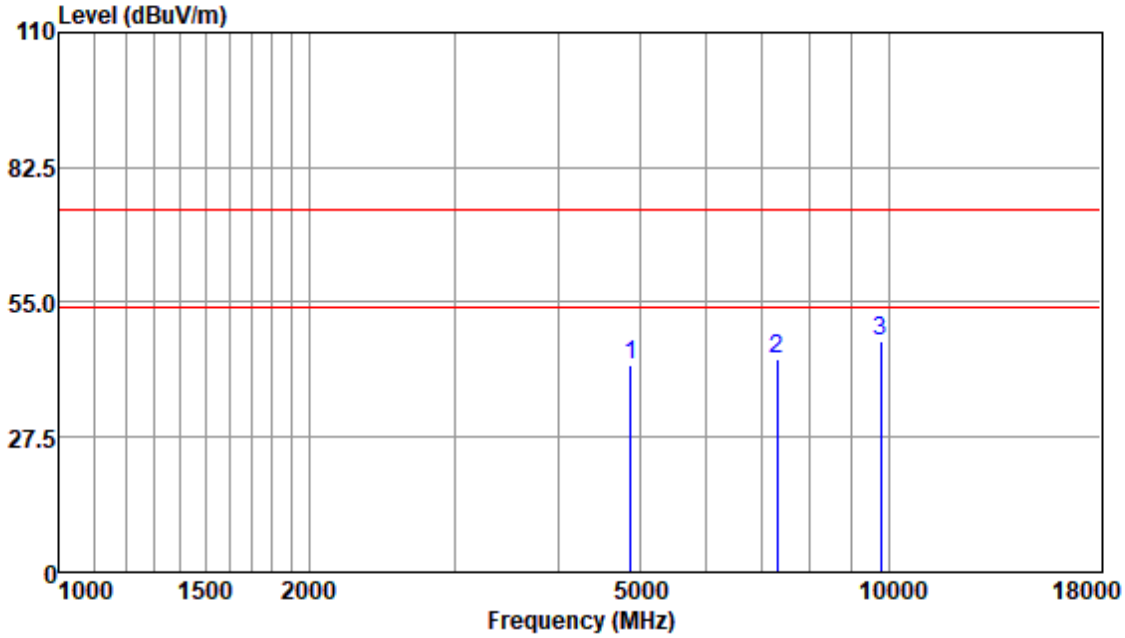


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4880.04	39.61	33.66	5.28	36.81	41.74	74.00	-32.26	Peak
7320.27	35.10	36.33	7.33	35.42	43.34	74.00	-30.66	Peak
9760.37	33.60	37.54	8.84	33.50	46.48	74.00	-27.52	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Vertical; Modulation:GFSK; Channel:middle

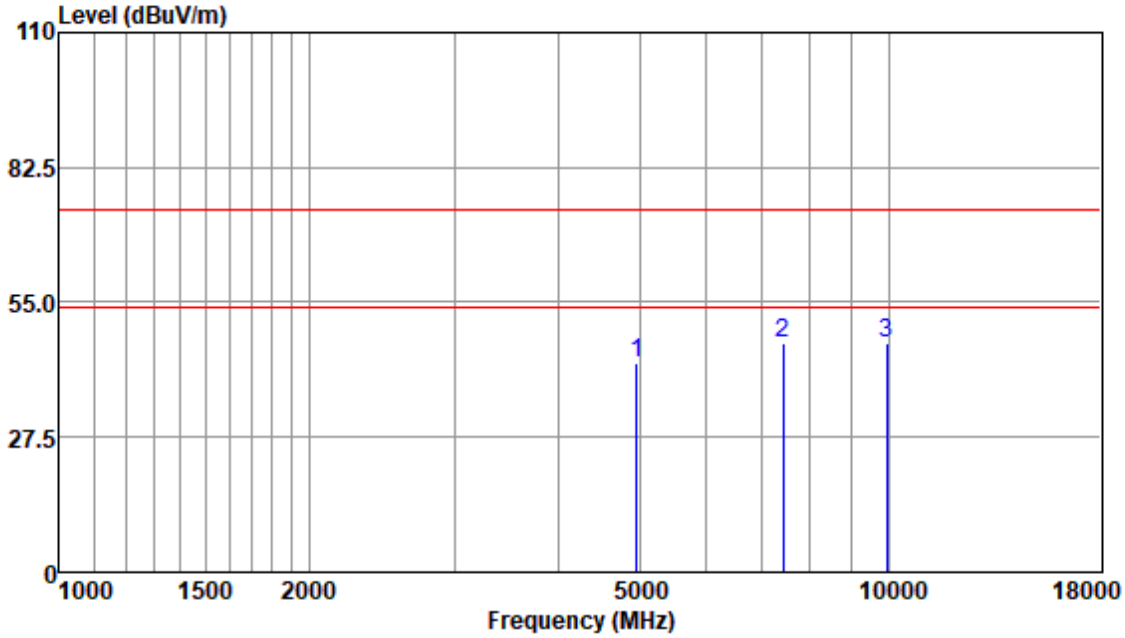


Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4880.04	40.06	33.66	5.28	36.81	42.19	74.00	-31.81	Peak
7320.27	35.11	36.33	7.33	35.42	43.35	74.00	-30.65	Peak
9760.37	34.40	37.54	8.84	33.50	47.28	74.00	-26.72	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Horizontal; Modulation:GFSK; Channel:High

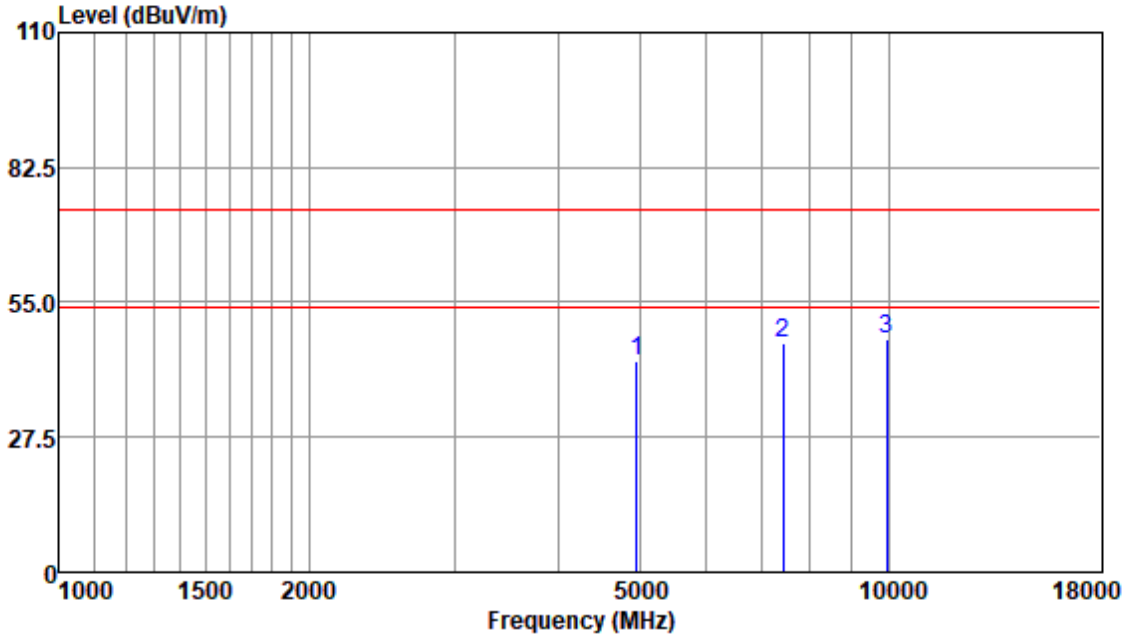


Antenna Polarity :HORIZONTAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4960.31	40.50	33.65	5.46	36.83	42.78	74.00	-31.22	Peak
7440.91	38.10	36.31	7.43	35.34	46.50	74.00	-27.50	Peak
9920.99	33.78	37.62	8.69	33.41	46.68	74.00	-27.32	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Test Mode: 03; Polarity: Vertical; Modulation:GFSK; Channel:High



Antenna Polarity :VERTICAL
EUT/Project :0070HS

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4960.31	40.95	33.65	5.46	36.83	43.23	74.00	-30.77	Peak
7440.91	38.10	36.31	7.43	35.34	46.50	74.00	-27.50	Peak
9920.99	34.55	37.62	8.69	33.41	47.45	74.00	-26.55	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SHCR2401000070HS

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2401000070HS

10 Appendix

10.1 Appendix A: DTS Bandwidth

10.1.1 Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.692	2401.652	2402.344	0.5	PASS
		2440	0.652	2439.676	2440.328	0.5	PASS
		2480	0.704	2479.640	2480.344	0.5	PASS
BLE_2M	Ant1	2402	1.220	2401.364	2402.584	0.5	PASS
		2440	1.164	2439.432	2440.596	0.5	PASS
		2480	1.328	2479.308	2480.636	0.5	PASS

10.1.2 Test Graphs

BLE_1M_Ant1_2402

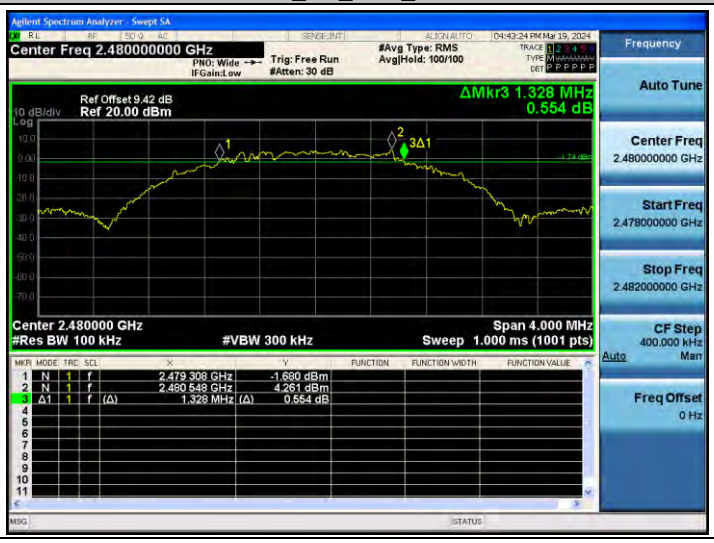
BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

BLE_2M_Ant1_2480



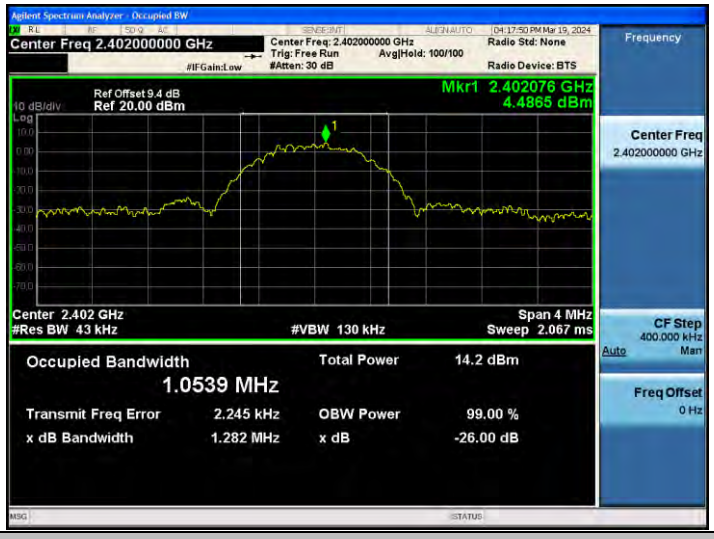
10.2 Appendix B: Occupied Channel Bandwidth

10.2.1 Test Result

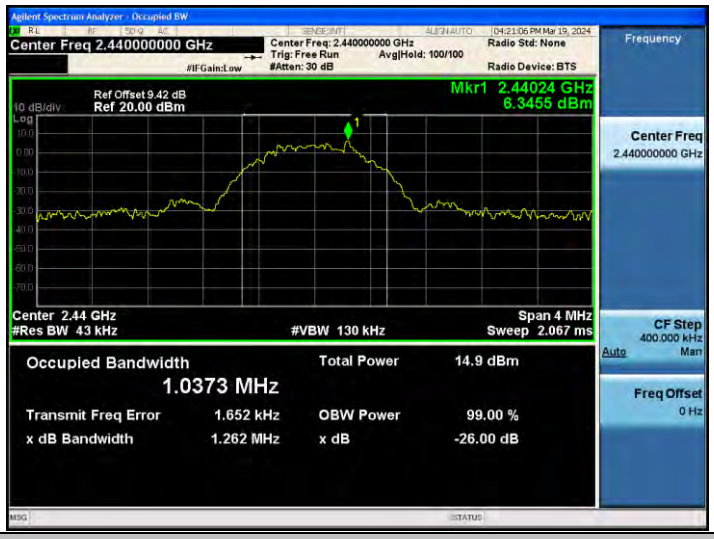
Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0539	2401.4753	2402.5292	---	---
		2440	1.0373	2439.4830	2440.5203	---	---
		2480	1.0449	2479.4767	2480.5216	---	---
BLE_2M	Ant1	2402	2.1029	2400.9688	2403.0717	---	---
		2440	2.0959	2438.9602	2441.0561	---	---
		2480	2.1080	2478.9565	2481.0645	---	---

10.2.2 Test Graphs

BLE_1M_Ant1_2402

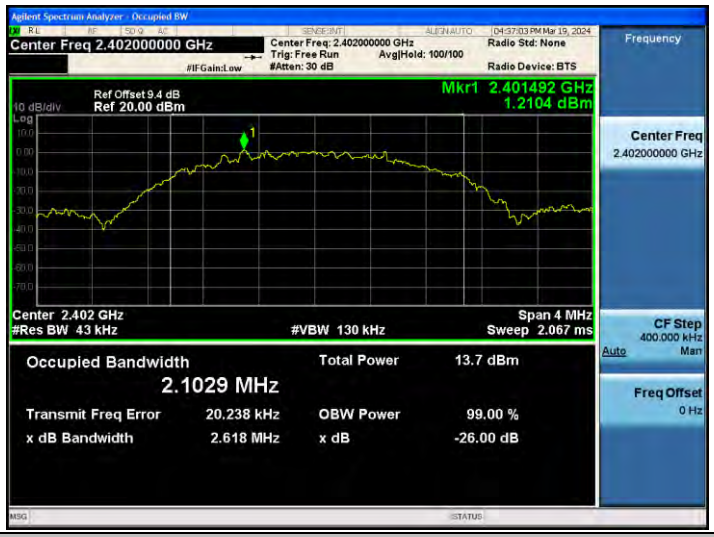


BLE_1M_Ant1_2440



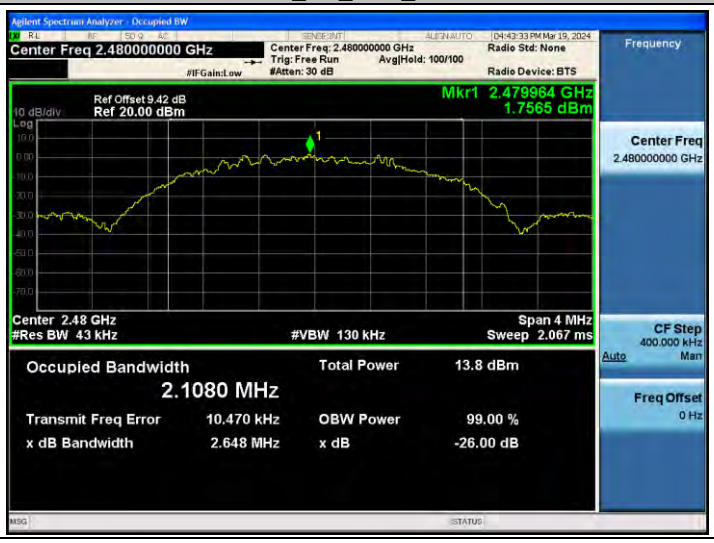
BLE_1M_Ant1_2480

BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

BLE_2M_Ant1_2480



10.3 Appendix C: Maximum conducted output power

10.3.1 Test Result

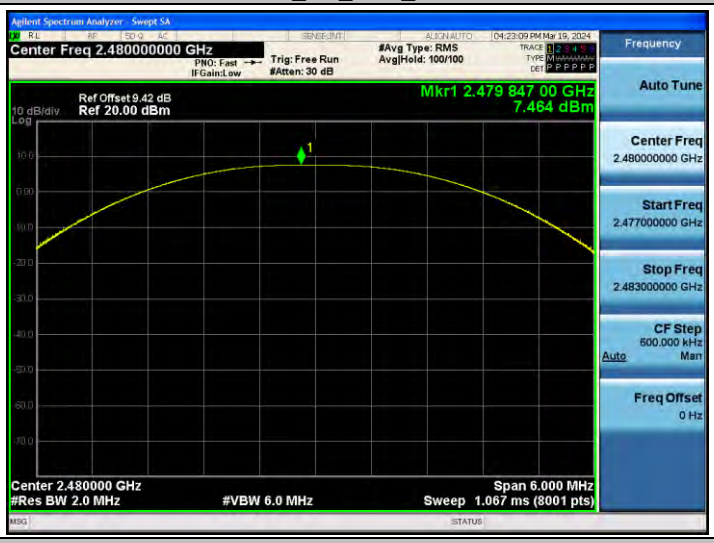
Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	7.6	≤30	PASS
		2440	7.9	≤30	PASS
		2480	7.46	≤30	PASS
BLE_2M	Ant1	2402	7.6	≤30	PASS
		2440	7.92	≤30	PASS
		2480	7.48	≤30	PASS

10.3.2 Test Graphs

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

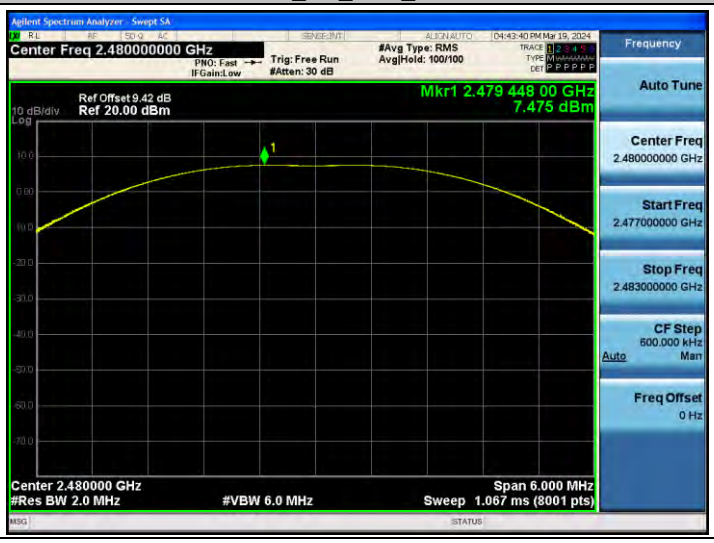
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

BLE_2M_Ant1_2480



10.4 Appendix D: Maximum power spectral density

10.4.1 Test Result

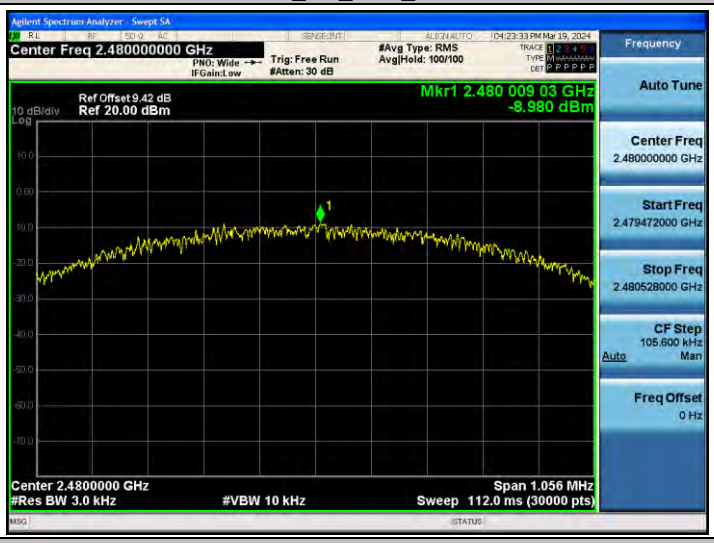
Test Mode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-8.39	≤8.00	PASS
		2440	-8.1	≤8.00	PASS
		2480	-8.98	≤8.00	PASS
BLE_2M	Ant1	2402	-11.72	≤8.00	PASS
		2440	-11.51	≤8.00	PASS
		2480	-11.89	≤8.00	PASS

10.4.2 Test Graphs

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

BLE_2M_Ant1_2480

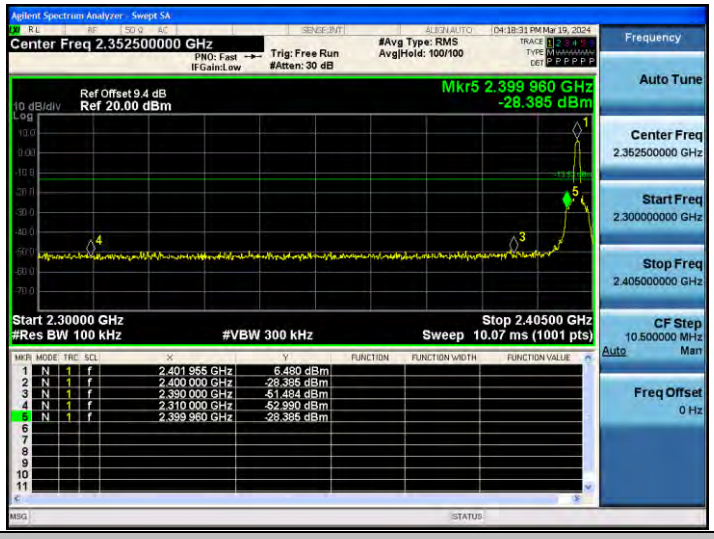
10.5 Appendix E: Band edge measurements

10.5.1 Test Result

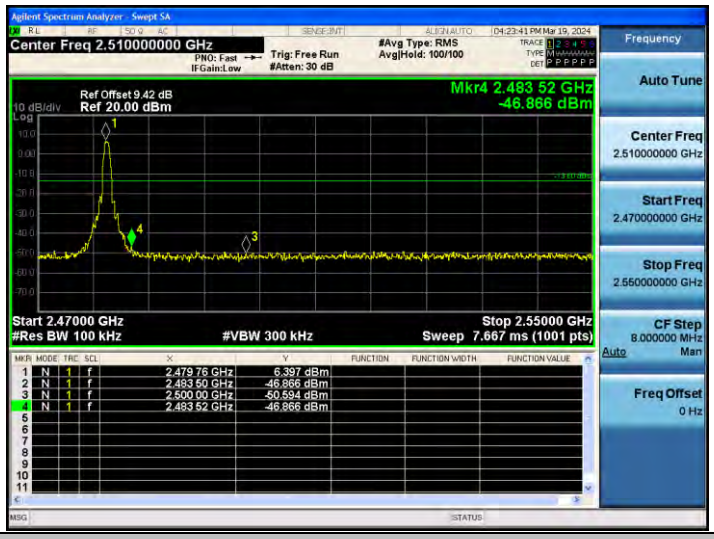
Test Mode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	6.48	-28.39	≤-13.52	PASS
		High	2480	6.40	-46.87	≤-13.6	PASS
BLE_2M	Ant1	Low	2402	5.99	-28.02	≤-14.02	PASS
		High	2480	5.06	-44.39	≤-14.94	PASS

10.5.2 Test Graphs

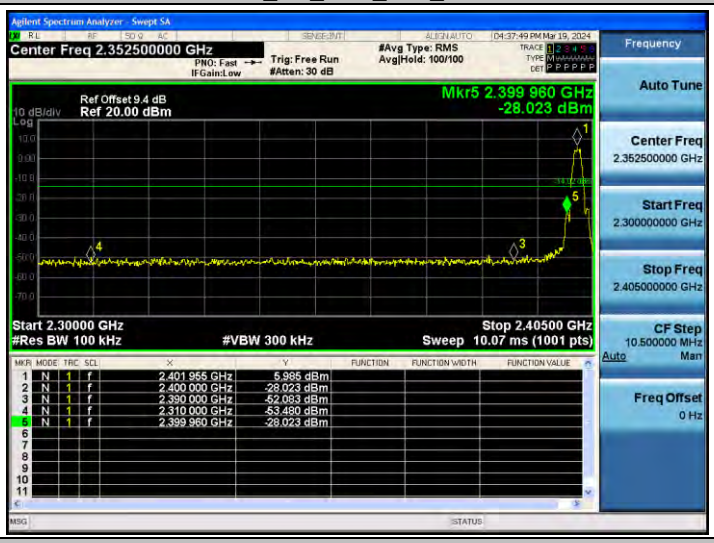
BLE_1M_Ant1_Low_2402



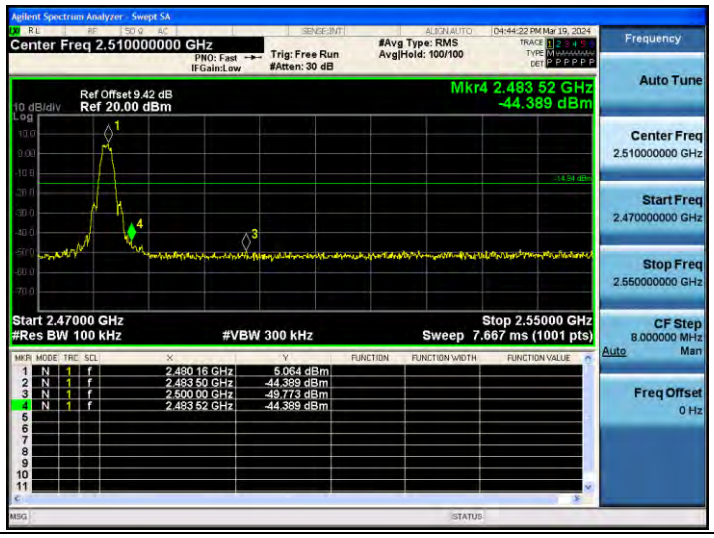
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.510000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
04:44:22 PM Mar 19, 2024
Frequency
Auto Tune
Center Freq
2.510000000 GHz
Start Freq
2.470000000 GHz
Stop Freq
2.550000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz
Ref Offset 9.42 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr4 2.483 52 GHz
-44.389 dBm
Start 2.47000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.55000 GHz
Sweep 7.667 ms (1001 pts)
1 N 1 f 2.480 16 GHz 5.064 dBm
2 N 1 f 2.483 50 GHz -44.389 dBm
3 N 1 f 2.500 00 GHz -49.773 dBm
4 N 1 f 2.483 52 GHz -44.389 dBm
MSG
STATUS

10.6 Appendix F: Conducted Spurious Emission

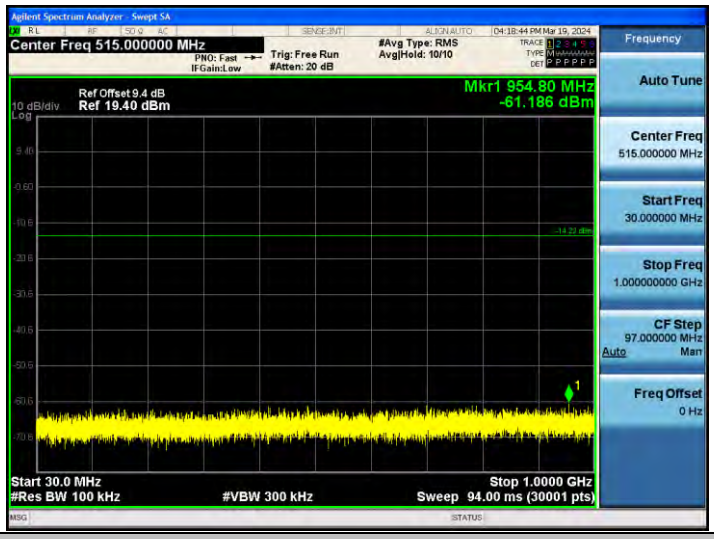
10.6.1 Test Result

Test Mode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.78	5.78	---	PASS
			30~1000	5.78	-61.19	≤-14.22	PASS
			1000~26500	5.78	-42.49	≤-14.22	PASS
		2440	Reference	6.27	6.27	---	PASS
			30~1000	6.27	-60.88	≤-13.73	PASS
			1000~26500	6.27	-42.23	≤-13.73	PASS
		2480	Reference	6.58	6.58	---	PASS
			30~1000	6.58	-61.17	≤-13.42	PASS
			1000~26500	6.58	-42.43	≤-13.42	PASS
BLE_2M	Ant1	2402	Reference	3.91	3.91	---	PASS
			30~1000	3.91	-60.97	≤-16.09	PASS
			1000~26500	3.91	-41.74	≤-16.09	PASS
		2440	Reference	6.75	6.75	---	PASS
			30~1000	6.75	-60.78	≤-13.25	PASS
			1000~26500	6.75	-42.09	≤-13.25	PASS
		2480	Reference	4.05	4.05	---	PASS
			30~1000	4.05	-61.15	≤-15.95	PASS
			1000~26500	4.05	-42.42	≤-15.95	PASS

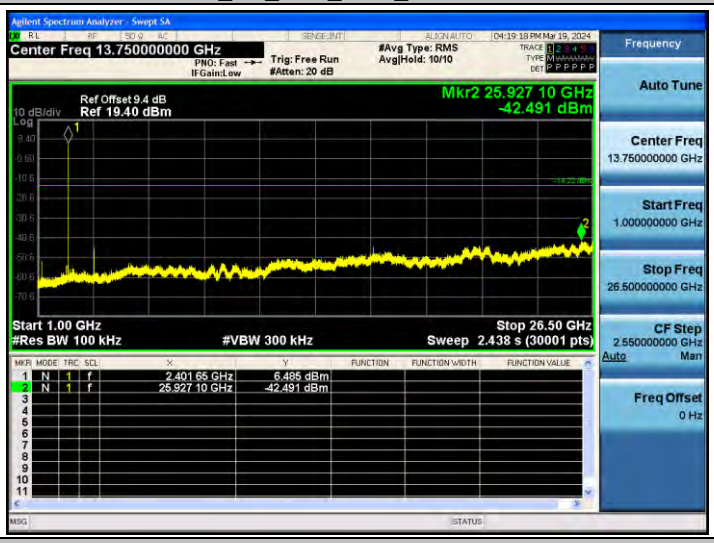
10.6.2 Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

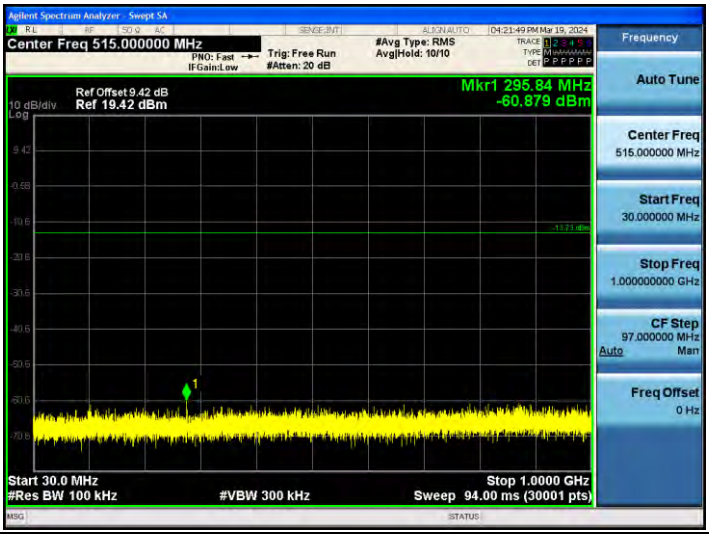


BLE_1M_Ant1_2402_1000~26500

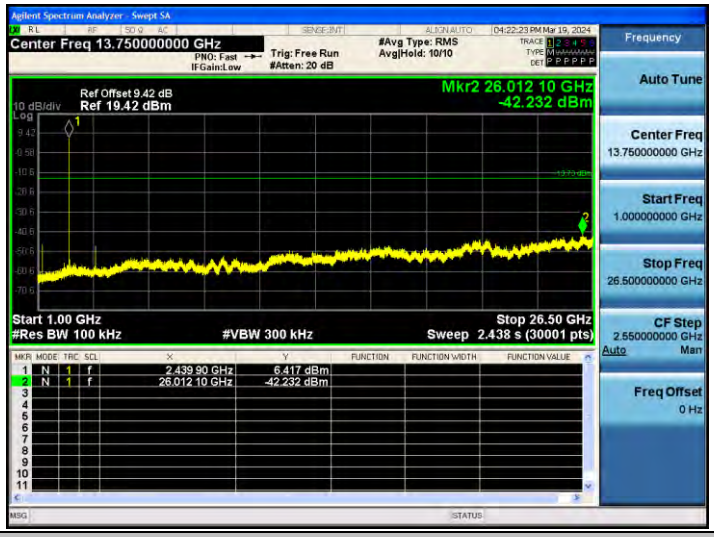


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

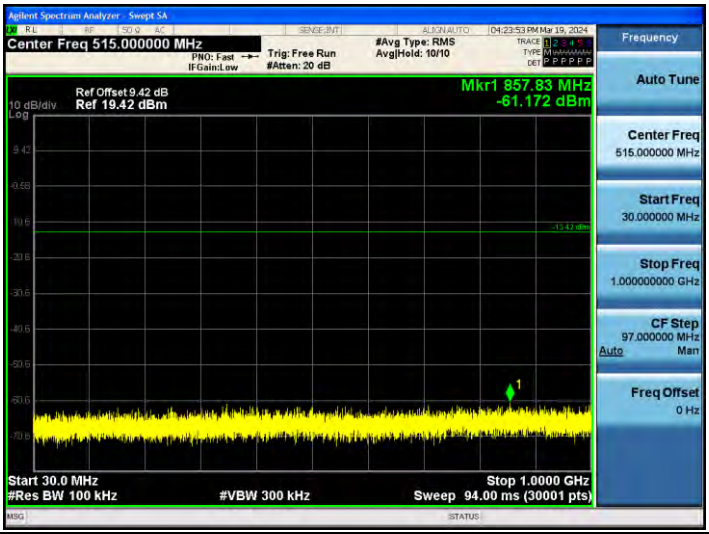


BLE_1M_Ant1_2440_1000~26500

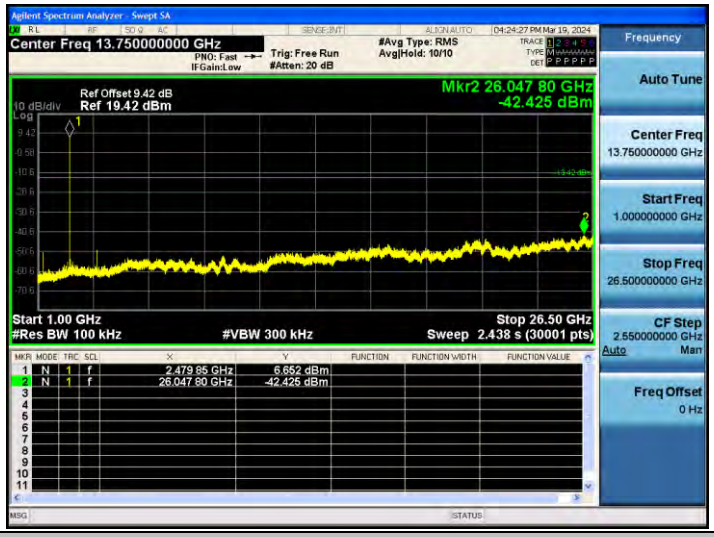


BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000

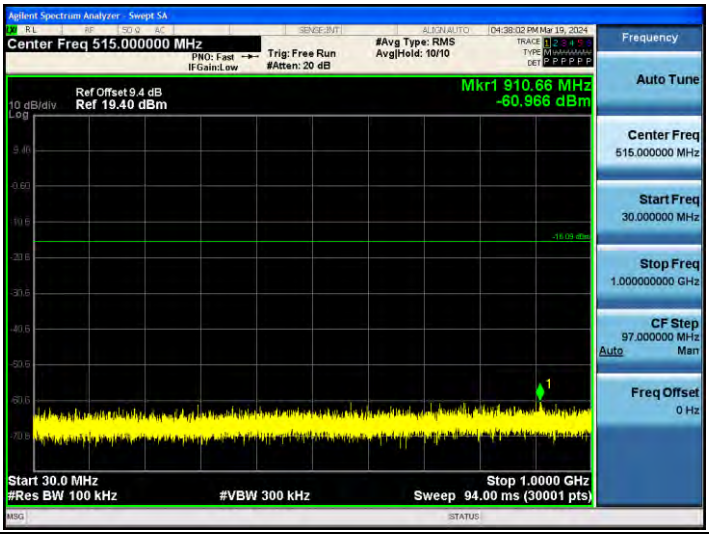


BLE_1M_Ant1_2480_1000~26500

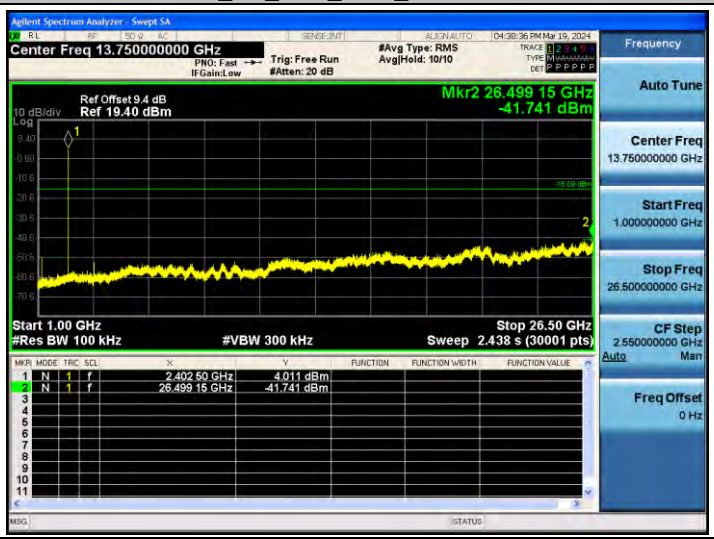


BLE_2M_Ant1_2402_0~Reference

BLE_2M_Ant1_2402_30~1000

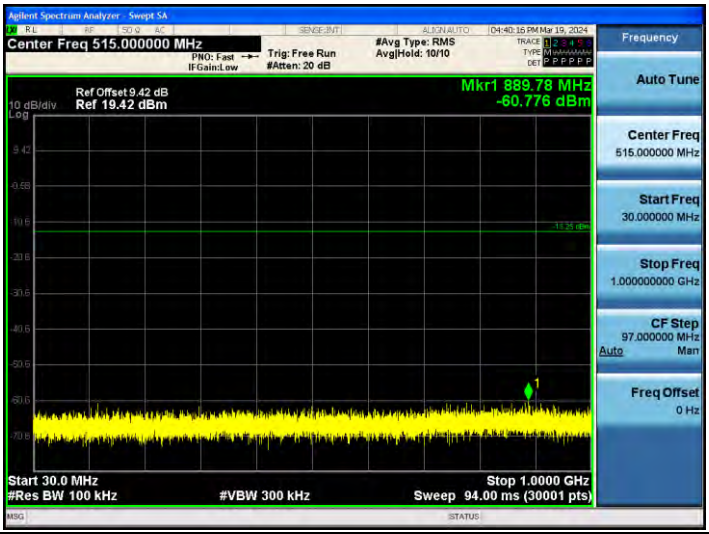


BLE_2M_Ant1_2402_1000~26500

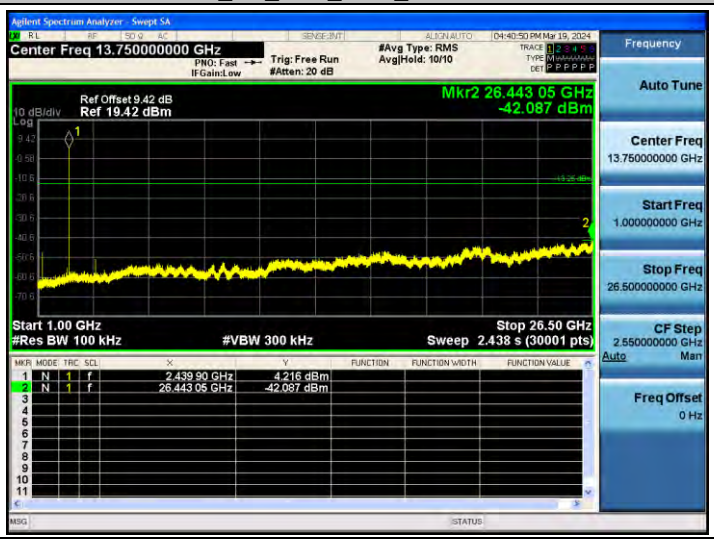


BLE_2M_Ant1_2440_0~Reference

BLE_2M_Ant1_2440_30~1000

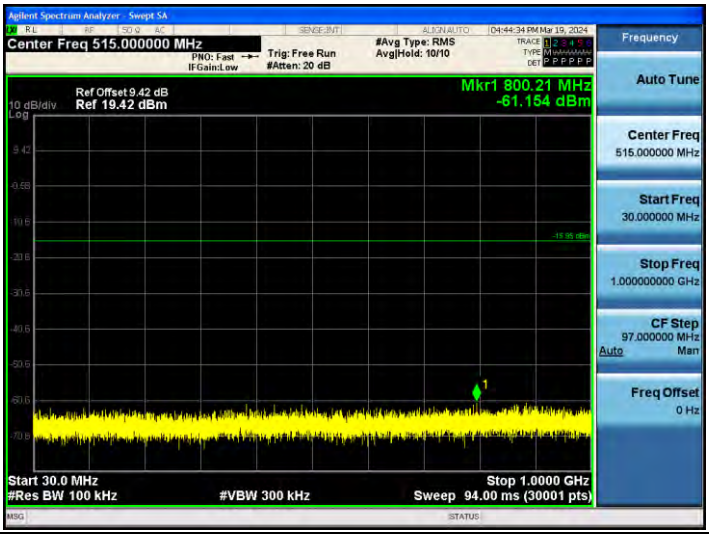


BLE_2M_Ant1_2440_1000~26500

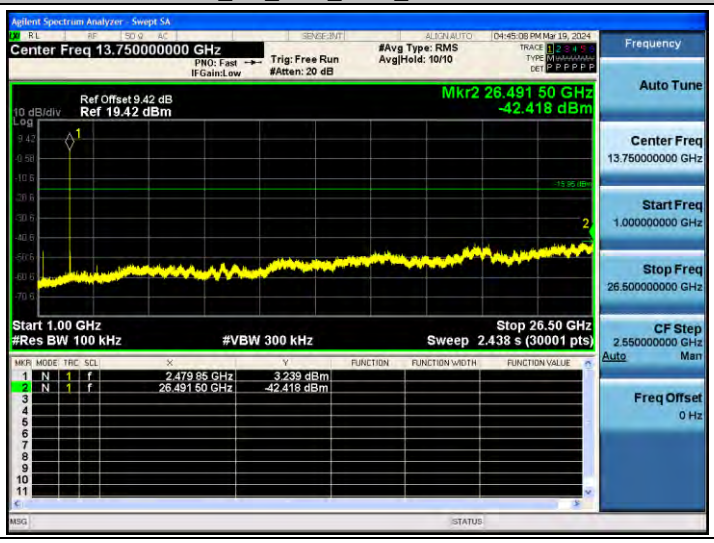


BLE_2M_Ant1_2480_0~Reference

BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



- End of the Report -