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Report No.: GZEM190901605902
Page: 1 of 59
FCC ID: 2AVEEGHA01

TEST REPORT

Application No.: GZEM1909016059CR
Applicant: Gardyn, Inc.
Address of Applicant: 6701 Pemberton Street, Bethesda MD 20817, USA
Manufacturer: Gardyn, Inc.
Address of Manufacturer: 6701 Pemberton Street, Bethesda MD 20817, USA
Factory: ON Limited
Address of Factory: Suite 1203, 12/F., Car Po Commercial Building 18 - 20 Lyndhurst Terrace, Central District, Hong Kong

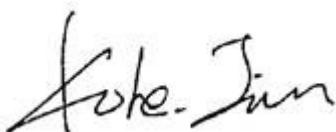
Equipment Under Test (EUT):

FCC ID: 2AVEEGHA01

EUT Name: Gardyn Home
Model No.: GH-A01
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2019-09-26
Date of Test: 2019-10-22 to 2019-12-10
Date of Issue: 2019-12-13

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Kobe Jian

EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

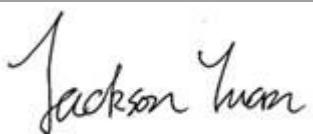


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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-12-13		Original

Authorized for issue by:			
Tested By	 Jackson Yuan		2019-10-22 to 2019-12-10
	Jackson_Yuan /Project Engineer	Date	
Checked By	 Ricky Liu		2019-12-13
	Ricky_Liu /Reviewer	Date	

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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(c)	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
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	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	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 24 V powered by AC/DC adapter as below:
	Model: FY1802407500
	Input: AC 100-240 V, 50/60 Hz, 2.6 A Max
	Output: DC 24 V, 7500 mA
Rated Power:	180W
Test Voltage:	AC 120 V, 60 Hz
Cable:	DC input ports for main unit
	For AC/DC adapter:
	AC mains (unshielded, 0.8 m)
	DC output cables (unshielded, 1.5m)
Antenna Gain	0 dBi
Antenna Type	PCB Antenna
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Monitor	SAMSUNG	225MS	CR22HVMP900646W
Mouse	DELL	MOC5UO	G1B02ZP5
Keyboard	DELL	SK-8115	CN-ODJ331-71616-7B1-109J

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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	$\pm 0.57\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF Conducted power	$\pm 0.68\text{dB}$
5	RF Power Density	$\pm 1.50\text{dB}$
6	Conducted Spurious Emissions	$\pm 1.04\text{dB}$
7	RF Radiated Power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious Emission Test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-18GHz)
9	Temperature	$\pm 0.4^\circ\text{C}$
10	Humidity	$\pm 1.3\%$
11	Supply Voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

4.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

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4.5 Test Facility

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

● NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● CNAS (Lab Code: L0167)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

● FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

● FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

● Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-10449 and T-11179 respectively.

● CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	Zhong Yu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Network	R&S	ENV216	EMC0118	2019-01-11	2020-01-10
LISN	R&S	ENV216	EMC2135	2019-09-16	2020-09-15
EMI Test Receiver	Rohde & Schwarz	ESCS30	EMC0506	2019-11-18	2020-11-17
Coaxial Cable	HangTianXing	2m	EMC0107	2018-09-20	2020-09-19
Voltage Probe	SGS	N/A	EMC0106	2018-04-04	2020-04-03
Conical Metal Housing	SGS-EMC	N/A	EMC0167	2018-04-19	2020-04-18
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

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Conducted Band Edges Measurement

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	2019-02-24	2020-02-23
ESG Vector Signal Generator	Keysight	E4438C	SEM006-03	2019-04-05	2020-04-04
EXG Analog Signal Generator	AgilentTechnologies	N5171B	SEM006-04	2017-07-26	2020-07-25
Power Meter	AgilentTechnologies	U2021XA_Ch2	SEM009-02	2019-05-29	2020-05-28
Power Meter	AgilentTechnologies	U2021XA_Ch3	SEM009-03	2019-05-29	2020-05-28
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Conducted Spurious Emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

Radiated Emissions which fall in the restricted bands

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMESS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	R & S	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2019-11-18	2020-11-17
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10

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10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2019-11-18	2020-11-17
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMEE SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Spurious Emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKMEE SS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	R & S	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2019-11-18	2020-11-17
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2019-11-18	2020-11-17
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2019-11-18	2020-11-17
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKMEE SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2019-07-16	2020-07-15
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

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

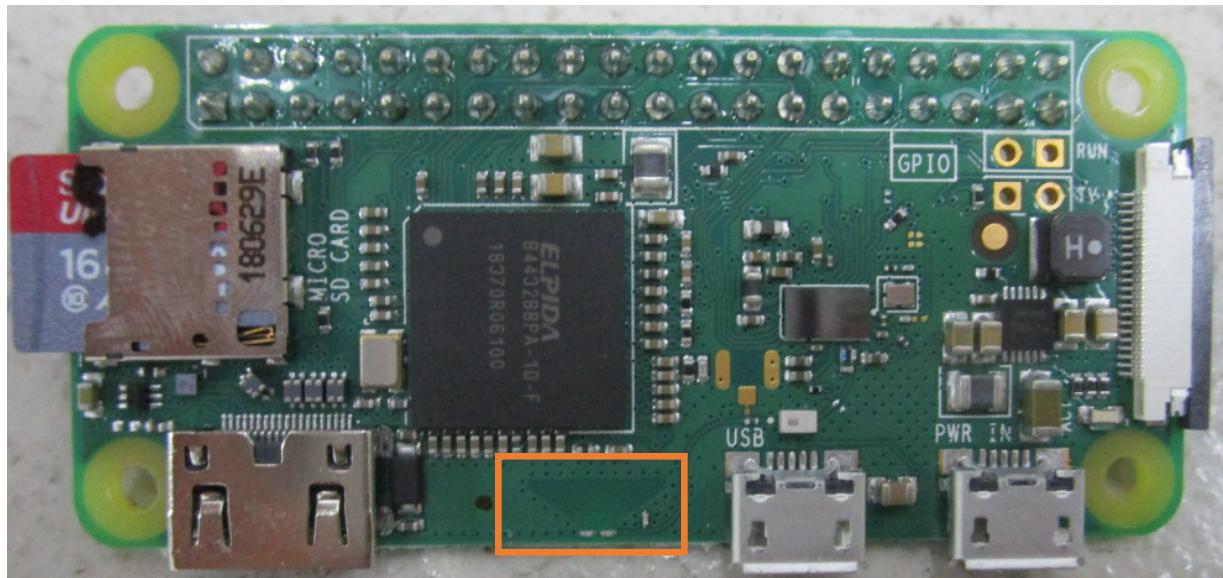
6.1.2 Conclusion

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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

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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(dB μ V)	
	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.

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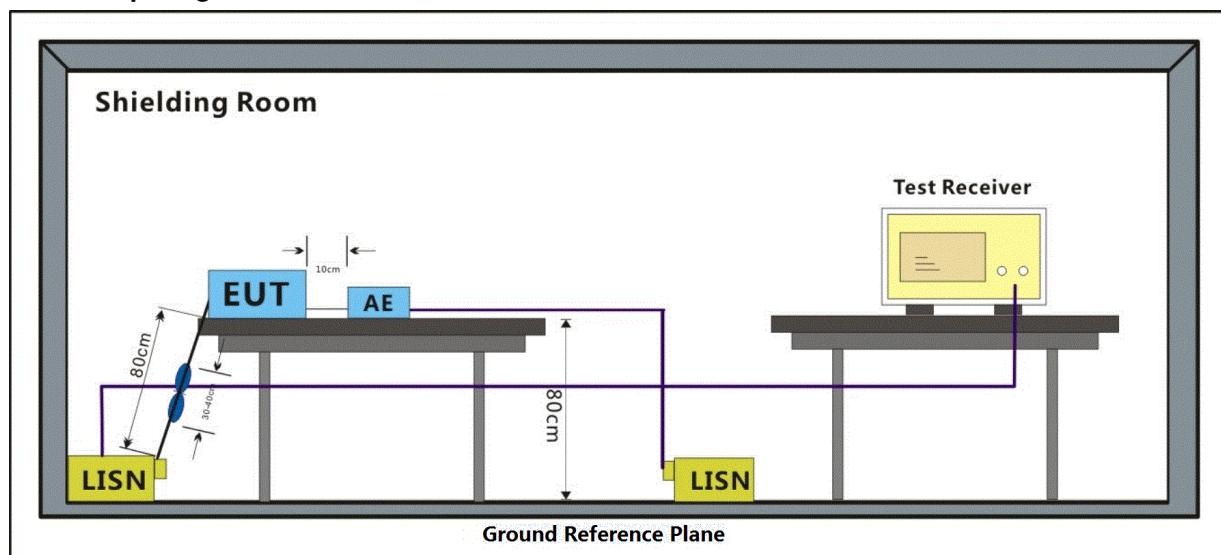
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7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
Test mode b:TX mode Keep the EUT in continuously transmitting mode with GFSK modulation

7.1.2 Test Setup Diagram



7.1.3 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/50 μ H + 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: LISN=Read Level+ Cable Loss+ LISN Factor



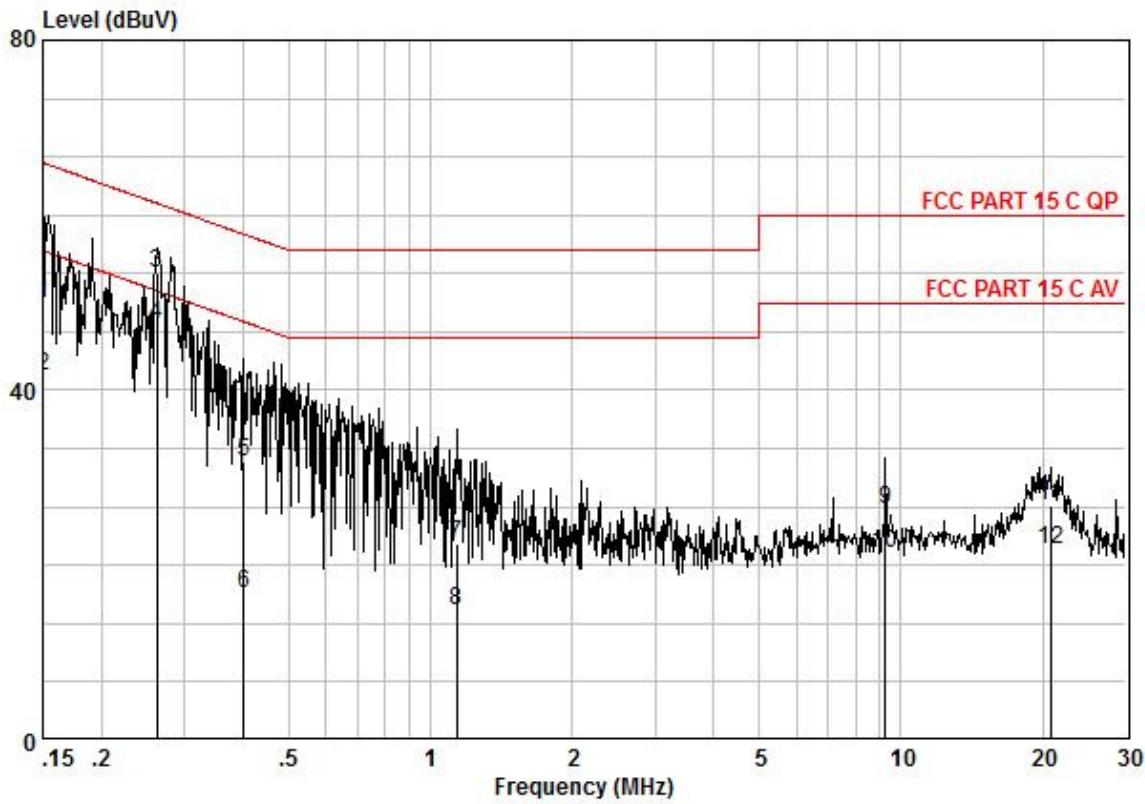
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Mode:b; Line:Live Line



Pol :LIVE
No :
Model :

Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0.15	40.24	0.10	9.67	50.01	66.00	-15.99	QP
0.15	31.90	0.10	9.67	41.67	56.00	-14.33	AVERAGE
0.26	43.69	0.10	9.67	53.46	61.38	-7.92	QP
0.26	37.65	0.10	9.67	47.42	51.38	-3.96	AVERAGE
0.40	22.10	0.10	9.66	31.86	57.81	-25.95	QP
0.40	7.00	0.10	9.66	16.76	47.81	-31.05	AVERAGE
1.14	12.57	0.10	9.68	22.35	56.00	-33.65	QP
1.14	4.95	0.10	9.68	14.73	46.00	-31.27	AVERAGE
9.25	16.29	0.30	9.75	26.34	60.00	-33.66	QP
9.25	11.23	0.30	9.75	21.28	50.00	-28.72	AVERAGE
20.81	16.64	0.40	9.83	26.87	60.00	-33.13	QP
20.81	11.56	0.40	9.83	21.79	50.00	-28.21	AVERAGE

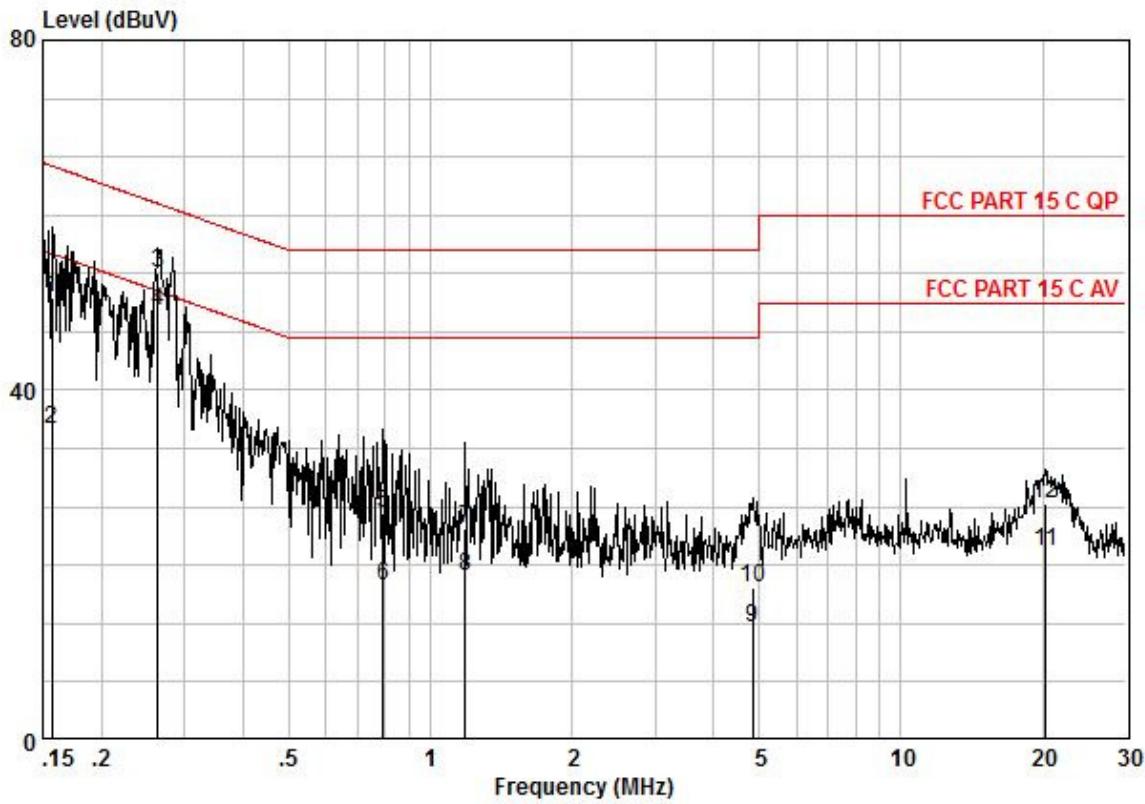
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Mode:b; Line:Neutral Line



Pol : NEUTRAL
No :
Model :

Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0.16	40.79	0.10	9.59	50.48	65.65	-15.17	QP
0.16	25.78	0.10	9.59	35.47	55.65	-20.18	AVERAGE
0.26	43.77	0.10	9.59	53.46	61.34	-7.88	QP
0.26	39.33	0.10	9.59	49.02	51.34	-2.32	AVERAGE
0.79	16.19	0.10	9.61	25.90	56.00	-30.10	QP
0.79	7.84	0.10	9.61	17.55	46.00	-28.45	AVERAGE
1.18	14.46	0.10	9.61	24.17	56.00	-31.83	QP
1.18	9.09	0.10	9.61	18.80	46.00	-27.20	AVERAGE
4.85	3.03	0.20	9.65	12.88	46.00	-33.12	AVERAGE
4.85	7.63	0.20	9.65	17.48	56.00	-38.52	QP
20.27	11.31	0.40	9.97	21.68	50.00	-28.32	AVERAGE
20.27	16.69	0.40	9.97	27.06	60.00	-32.94	QP

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7.2 Minimum 6dB Bandwidth

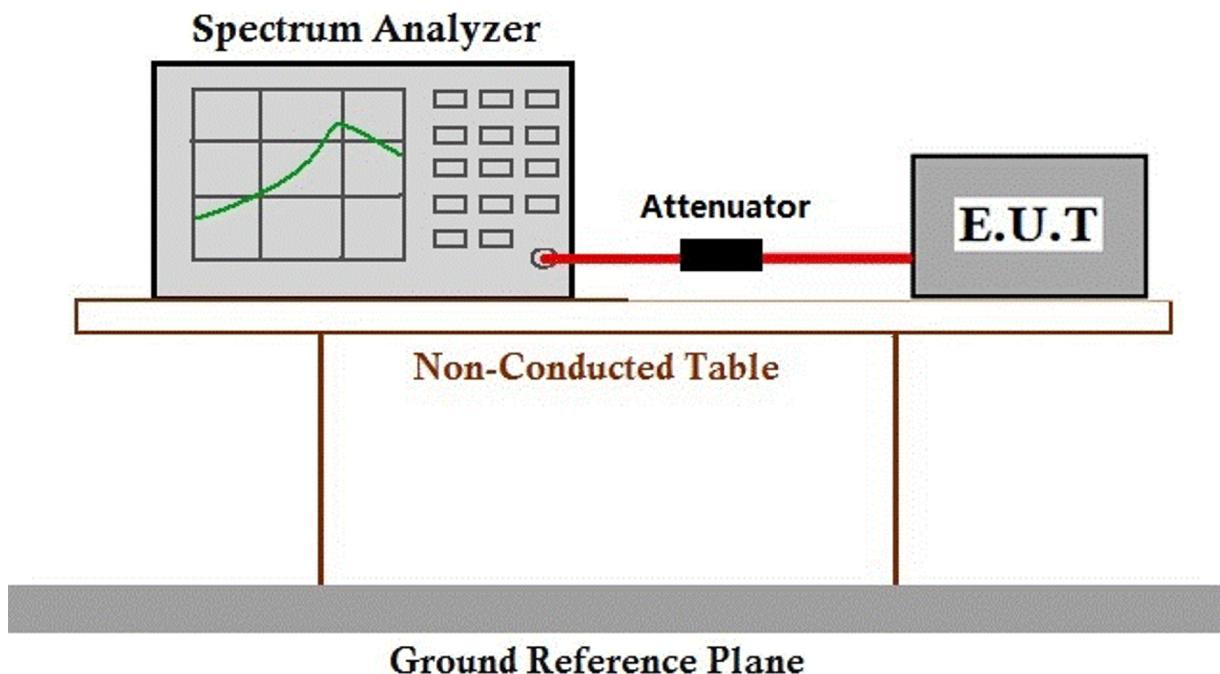
Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥ 500 kHz

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 47.3 % RH Atmospheric Pressure: 1020 mbar
Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.3 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 $25 \leq$ 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

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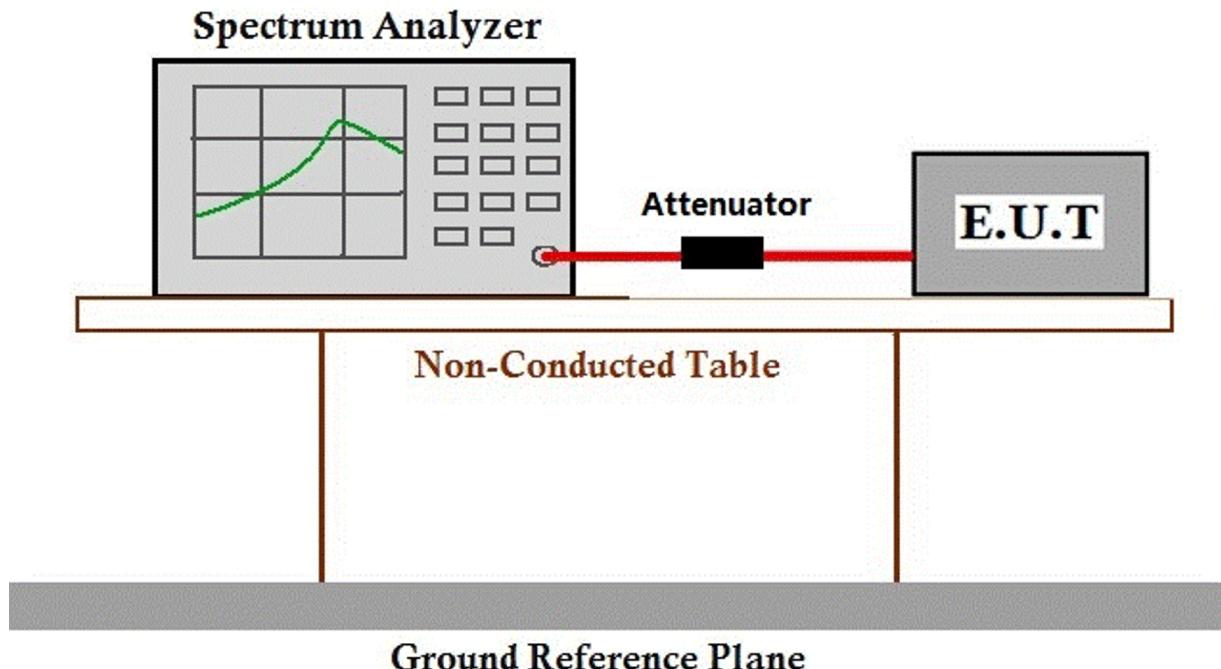
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7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 47.3 % RH Atmospheric Pressure: 1020 mbar

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.3.2 Test Setup Diagram**7.3.3 Measurement Procedure and Data**

The detailed test data see: Appendix 15.247



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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: $\leq 8\text{dBm}$ in any 3 kHz band during any time interval of continuous transmission

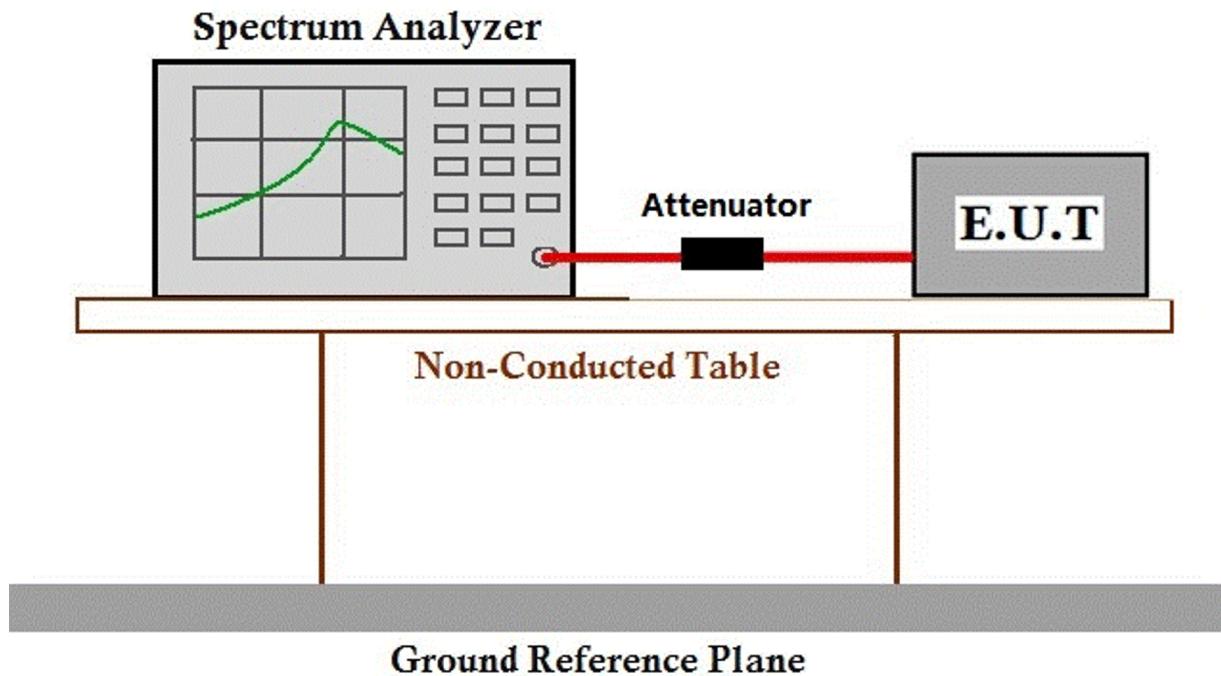
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 47.2 % RH Atmospheric Pressure: 1020 mbar

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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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)



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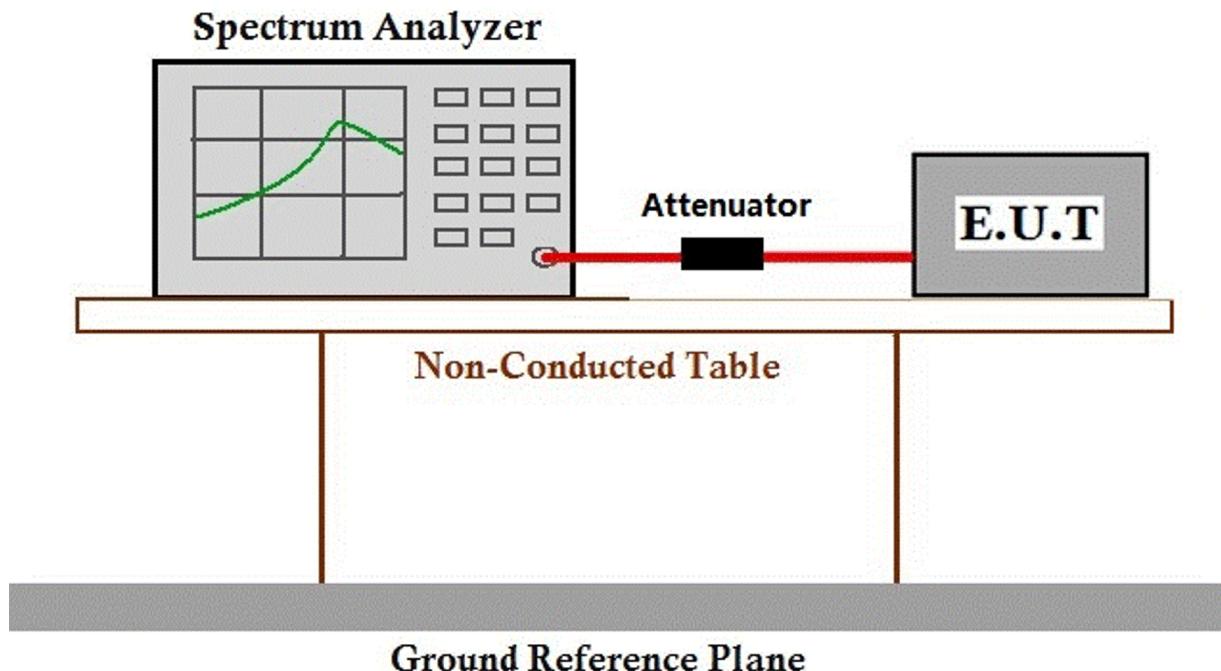
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7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 47.2 % RH Atmospheric Pressure: 1020 mbar
Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation**7.5.2 Test Setup Diagram****7.5.3 Measurement Procedure and Data**

The detailed test data see: Appendix 15.247

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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)



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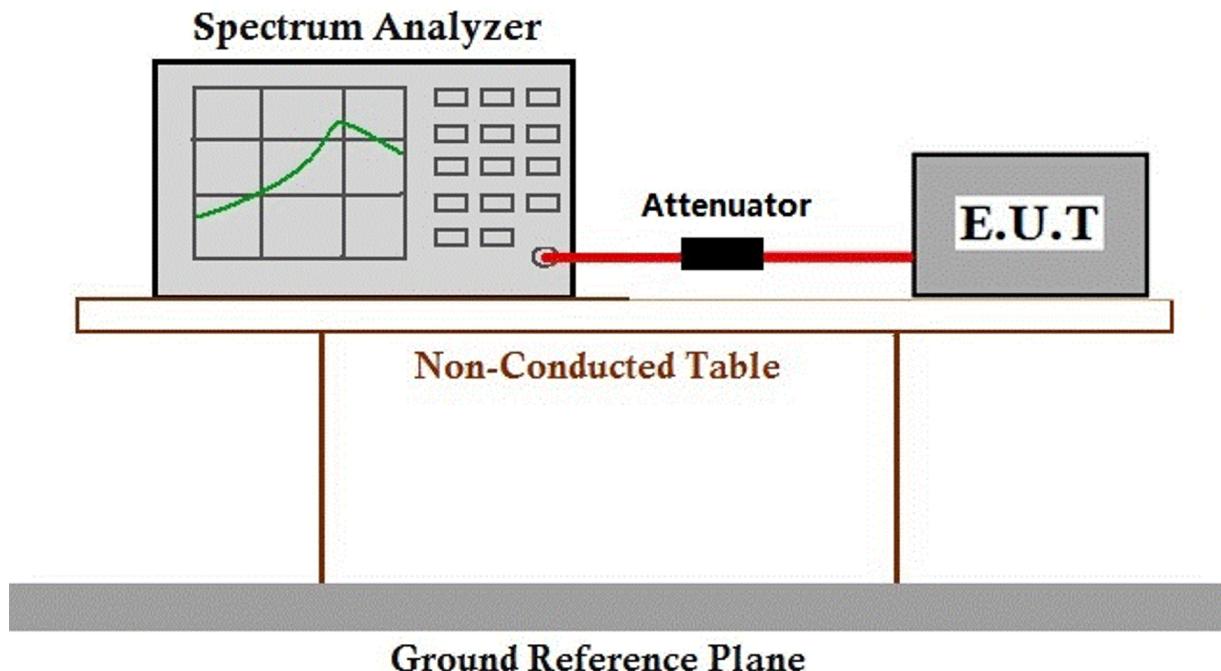
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7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 47.2 % RH Atmospheric Pressure: 1020 mbar
Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation**7.6.2 Test Setup Diagram****7.6.3 Measurement Procedure and Data**

The detailed test data see: Appendix 15.247

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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

Measurement Distance: 3m

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.



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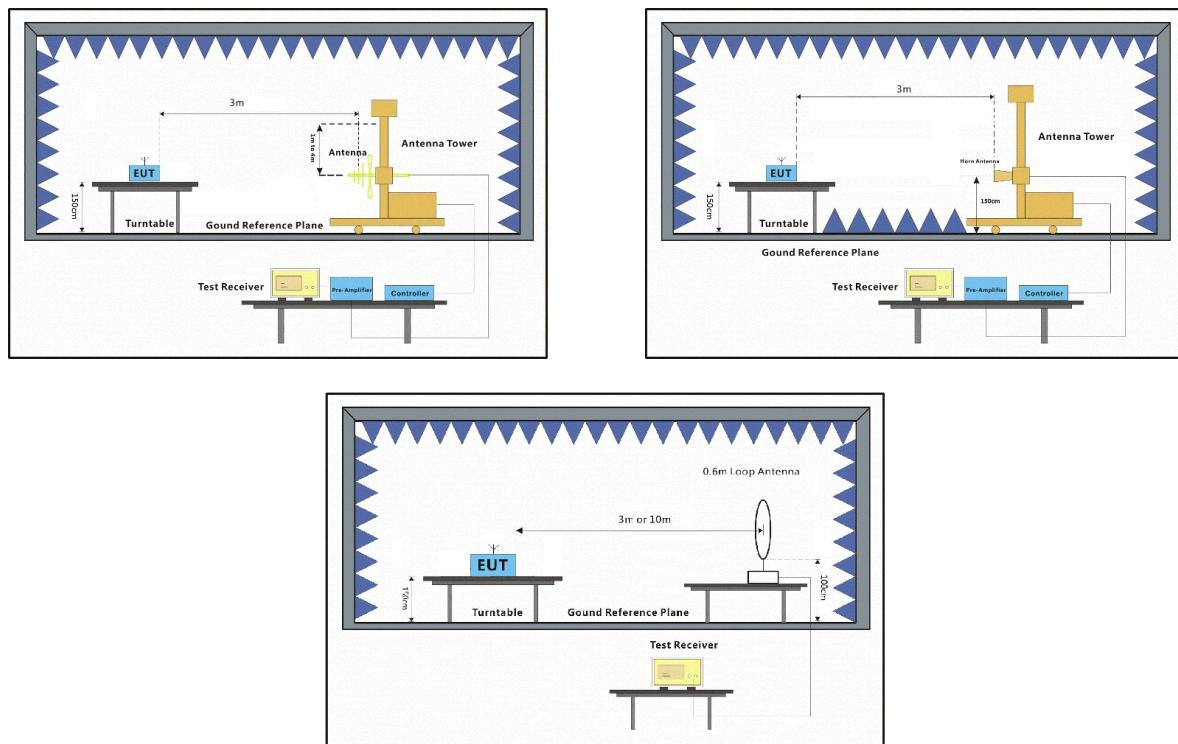
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.7.2 Test Setup Diagram



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7.7.3 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.

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



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	32.27	26.25	3.32	37.44	24.40	54.00	-29.60	HORIZONTAL	Average
2	2310.000	43.34	26.25	3.32	37.44	35.47	74.00	-38.53	HORIZONTAL	Peak
3	2390.000	32.86	26.43	3.48	37.42	25.35	54.00	-28.65	HORIZONTAL	Average
4	2390.000	44.26	26.43	3.48	37.42	36.75	74.00	-37.25	HORIZONTAL	Peak
5	2483.500	34.55	26.58	3.53	37.40	27.26	54.00	-26.74	HORIZONTAL	Average
6	2483.500	45.69	26.58	3.53	37.40	38.40	74.00	-35.60	HORIZONTAL	Peak
7	2500.000	31.17	26.60	3.40	37.39	23.78	54.00	-30.22	HORIZONTAL	Average
8	2500.000	45.30	26.60	3.40	37.39	37.91	74.00	-36.09	HORIZONTAL	Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

Freq	ReadAntenna		Cable		Preamp	Limit	Over	Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor	Level					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	33.81	26.25	3.32	37.44	25.94	54.00	-28.06	VERTICAL	Average
2	2310.000	44.43	26.25	3.32	37.44	36.56	74.00	-37.44	VERTICAL	Peak
3	2390.000	34.84	26.43	3.48	37.42	27.33	54.00	-26.67	VERTICAL	Average
4	2390.000	44.77	26.43	3.48	37.42	37.26	74.00	-36.74	VERTICAL	Peak
5	2483.500	32.52	26.58	3.53	37.40	25.23	54.00	-28.77	VERTICAL	Average
6	2483.500	45.92	26.58	3.53	37.40	38.63	74.00	-35.37	VERTICAL	Peak
7	2500.000	32.31	26.60	3.40	37.39	24.92	54.00	-29.08	VERTICAL	Average
8	2500.000	45.42	26.60	3.40	37.39	38.03	74.00	-35.97	VERTICAL	Peak

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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

Freq	ReadAntenna		Cable		Preamp Level	Line	Limit Over Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	30.96	26.25	3.32	37.44	23.09	54.00	-30.91	HORIZONTAL Average
2	2310.000	44.04	26.25	3.32	37.44	36.17	74.00	-37.83	HORIZONTAL Peak
3	2390.000	31.61	26.43	3.48	37.42	24.10	54.00	-29.90	HORIZONTAL Average
4	2390.000	44.66	26.43	3.48	37.42	37.15	74.00	-36.85	HORIZONTAL Peak
5	2483.500	41.40	26.58	3.53	37.40	34.11	54.00	-19.89	HORIZONTAL Average
6	2483.500	57.97	26.58	3.53	37.40	50.68	74.00	-23.32	HORIZONTAL Peak
7	2500.000	31.33	26.60	3.40	37.39	23.94	54.00	-30.06	HORIZONTAL Average
8	2500.000	44.08	26.60	3.40	37.39	36.69	74.00	-37.31	HORIZONTAL Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High

Freq	ReadAntenna		Cable		Preamp Level	Line	Limit Over Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	32.62	26.25	3.32	37.44	24.75	54.00	-29.25	VERTICAL Average
2	2310.000	43.82	26.25	3.32	37.44	35.95	74.00	-38.05	VERTICAL Peak
3	2390.000	33.47	26.43	3.48	37.42	25.96	54.00	-28.04	VERTICAL Average
4	2390.000	43.56	26.43	3.48	37.42	36.05	74.00	-37.95	VERTICAL Peak
5	2483.500	44.91	26.58	3.53	37.40	37.62	54.00	-16.38	VERTICAL Average
6	2483.500	57.87	26.58	3.53	37.40	50.58	74.00	-23.42	VERTICAL Peak
7	2500.000	32.72	26.60	3.40	37.39	25.33	54.00	-28.67	VERTICAL Average
8	2500.000	44.63	26.60	3.40	37.39	37.24	74.00	-36.76	VERTICAL Peak

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7.8 Radiated Spurious Emissions

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

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 3m

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.

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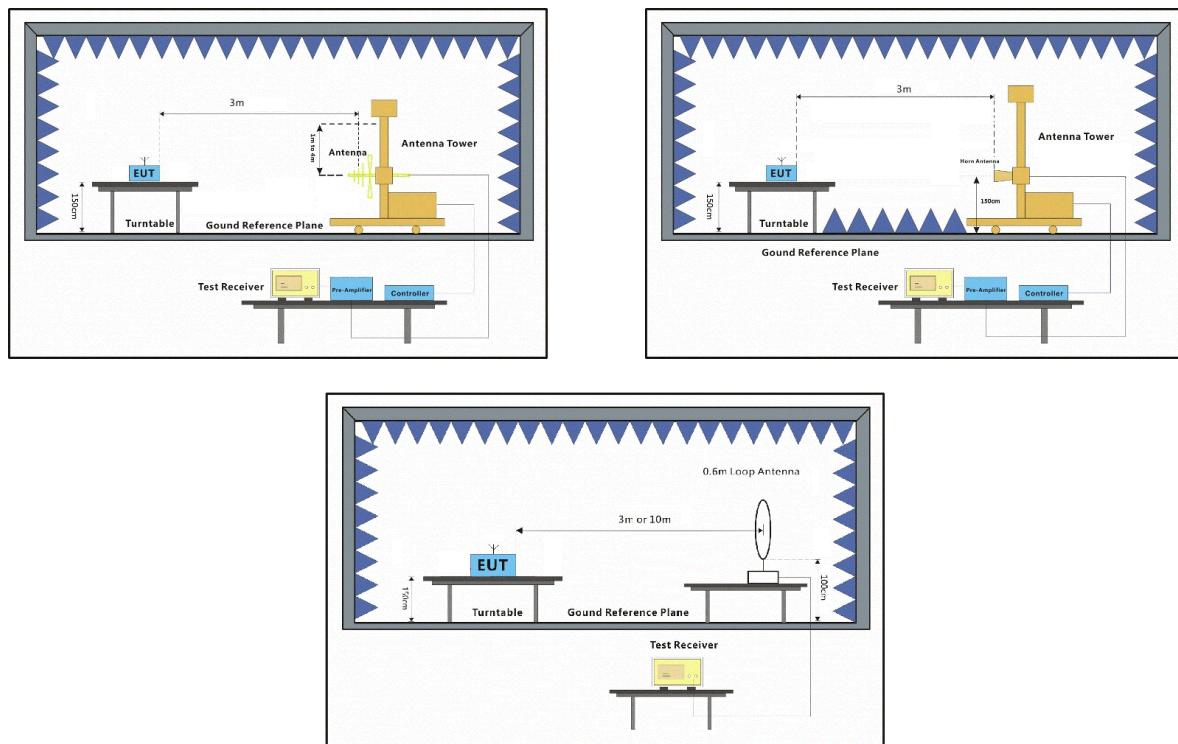
7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test mode b:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.8.2 Test Setup Diagram



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7.8.3 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) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and 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.

4) 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

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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark	
								MHz	dB
								dB/m	dB
1	204.238	2.00	16.00	25.34	35.73	28.39	43.50	-15.11	QP
2	250.301	2.16	17.91	25.22	37.25	32.10	46.00	-13.90	QP
3	297.224	2.28	19.45	25.11	39.36	35.98	46.00	-10.02	QP
4 pp	449.556	2.73	23.09	26.09	37.91	37.64	46.00	-8.36	QP
5	539.478	3.02	24.39	26.54	34.61	35.48	46.00	-10.52	QP
6	599.321	3.17	25.88	26.80	33.61	35.86	46.00	-10.14	QP

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Limit Line	Over Limit	Pol/Phase		Remark
								MHz	dBuV	
								dB/m	dB	
1	2973.293	34.51	27.87	3.78	37.09	29.07	54.00	-24.93	HORIZONTAL	Average
2	2973.293	45.56	27.87	3.78	37.09	40.12	74.00	-33.88	HORIZONTAL	Peak
3	3526.134	34.02	27.96	4.38	36.95	29.41	54.00	-24.59	HORIZONTAL	Average
4	3526.134	44.72	27.96	4.38	36.95	40.11	74.00	-33.89	HORIZONTAL	Peak
5	4804.760	35.28	30.79	5.40	36.94	34.53	54.00	-19.47	HORIZONTAL	Average
6	4804.760	44.67	30.79	5.40	36.94	43.92	74.00	-30.08	HORIZONTAL	Peak
7	7206.122	39.18	35.45	5.98	36.93	43.68	54.00	-10.32	HORIZONTAL	Average
8	7206.122	45.05	35.45	5.98	36.93	49.55	74.00	-24.45	HORIZONTAL	Peak
9	9608.916	35.04	37.51	7.07	37.08	42.54	54.00	-11.46	HORIZONTAL	Average
10	9608.916	45.64	37.51	7.07	37.08	53.14	74.00	-20.86	HORIZONTAL	Peak
11	12010.250	32.18	39.50	8.19	37.20	42.67	54.00	-11.33	HORIZONTAL	Average
12	12010.250	44.50	39.50	8.19	37.20	54.99	74.00	-19.01	HORIZONTAL	Peak

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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level		Limit Line		Over Limit	Remark
				MHz	dB	dB/m	dB	dBuV	dBuV/m
1	99.878	1.48	14.88	25.80	41.54	32.10	43.50	-11.40	QP
2	202.100	1.97	16.00	25.35	39.60	32.22	43.50	-11.28	QP
3	220.617	2.07	16.12	25.30	40.83	33.72	46.00	-12.28	QP
4 pp	243.377	2.10	17.64	25.23	43.45	37.96	46.00	-8.04	QP
5	302.481	2.28	19.58	25.12	40.77	37.51	46.00	-8.49	QP
6	451.135	2.72	23.12	26.10	33.06	32.80	46.00	-13.20	QP

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

Freq	ReadAntenna		Cable Loss	Preamp Factor	Limit		Over Limit	Pol/Phase	Remark
	Level	Factor			Line	Line			
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2905.331	36.28	27.76	3.71	37.13	30.62	54.00	-23.38	VERTICAL Average
2	2905.331	46.07	27.76	3.71	37.13	40.41	74.00	-33.59	VERTICAL Peak
3	3661.149	38.74	28.34	4.53	36.93	34.68	54.00	-19.32	VERTICAL Average
4	3661.149	45.06	28.34	4.53	36.93	41.00	74.00	-33.00	VERTICAL Peak
5	4804.668	38.94	30.79	5.40	36.94	38.19	54.00	-15.81	VERTICAL Average
6	4804.668	46.66	30.79	5.40	36.94	45.91	74.00	-28.09	VERTICAL Peak
7	7206.092	37.18	35.45	5.98	36.93	41.68	54.00	-12.32	VERTICAL Average
8	7206.092	45.38	35.45	5.98	36.93	49.88	74.00	-24.12	VERTICAL Peak
9	9608.062	33.62	37.51	7.07	37.08	41.12	54.00	-12.88	VERTICAL Average
10	9608.062	44.22	37.51	7.07	37.08	51.72	74.00	-22.28	VERTICAL Peak
11	12010.070	32.10	39.50	8.19	37.20	42.59	54.00	-11.41	VERTICAL Average
12	12010.070	44.46	39.50	8.19	37.20	54.95	74.00	-19.05	VERTICAL Peak

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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

Freq	ReadAntenna		Cable Preamp		Limit Level	Line Limit	Over Pol/Phase	Remark
	Level	Factor	Loss	Factor				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2871.934	37.14	27.70	3.70	37.15	31.39	54.00	-22.61 HORIZONTAL Average
2	2871.934	46.21	27.70	3.70	37.15	40.46	74.00	-33.54 HORIZONTAL Peak
3	3901.516	33.28	29.30	4.60	36.91	30.27	54.00	-23.73 HORIZONTAL Average
4	3901.516	43.90	29.30	4.60	36.91	40.89	74.00	-33.11 HORIZONTAL Peak
5	4880.977	34.17	30.93	5.50	36.95	33.65	54.00	-20.35 HORIZONTAL Average
6	4880.977	44.84	30.93	5.50	36.95	44.32	74.00	-29.68 HORIZONTAL Peak
7	7320.267	33.98	35.74	6.13	36.92	38.93	54.00	-15.07 HORIZONTAL Average
8	7320.267	43.33	35.74	6.13	36.92	48.28	74.00	-25.72 HORIZONTAL Peak
9	9760.497	34.02	37.70	7.02	37.09	41.65	54.00	-12.35 HORIZONTAL Average
10	9760.497	44.67	37.70	7.02	37.09	52.30	74.00	-21.70 HORIZONTAL Peak
11	12200.250	33.26	39.27	8.10	37.06	43.57	54.00	-10.43 HORIZONTAL Average
12	12200.250	43.64	39.27	8.10	37.06	53.95	74.00	-20.05 HORIZONTAL Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle

Freq	ReadAntenna		Cable Preamp		Limit Level	Line Limit	Over Pol/Phase	Remark
	Level	Factor	Loss	Factor				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	2871.934	37.84	27.70	3.70	37.15	32.09	54.00	-21.91 VERTICAL Average
2	2871.934	46.32	27.70	3.70	37.15	40.57	74.00	-33.43 VERTICAL Peak
3	3725.195	36.27	28.64	4.57	36.92	32.56	54.00	-21.44 VERTICAL Average
4	3725.195	45.25	28.64	4.57	36.92	41.54	74.00	-32.46 VERTICAL Peak
5	4880.977	35.79	30.93	5.50	36.95	35.27	54.00	-18.73 VERTICAL Average
6	4880.977	45.44	30.93	5.50	36.95	44.92	74.00	-29.08 VERTICAL Peak
7	7320.150	34.71	35.74	6.13	36.92	39.66	54.00	-14.34 VERTICAL Average
8	7320.150	44.03	35.74	6.13	36.92	48.98	74.00	-25.02 VERTICAL Peak
9	9760.018	36.29	37.70	7.02	37.09	43.92	54.00	-10.08 VERTICAL Average
10	9760.018	45.50	37.70	7.02	37.09	53.13	74.00	-20.87 VERTICAL Peak
11	12200.520	32.17	39.27	8.10	37.06	42.48	54.00	-11.52 VERTICAL Average
12	12200.520	43.03	39.27	8.10	37.06	53.34	74.00	-20.66 VERTICAL Peak

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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

Freq	ReadAntenna		Cable Preamp		Limit Level	Line	Over Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2774.030	40.37	27.43	3.68	37.26	34.22	54.00	-19.78	HORIZONTAL Average
2	2774.030	47.10	27.43	3.68	37.26	40.95	74.00	-33.05	HORIZONTAL Peak
3	3556.843	36.27	28.03	4.44	36.95	31.79	54.00	-22.21	HORIZONTAL Average
4	3556.843	45.68	28.03	4.44	36.95	41.20	74.00	-32.80	HORIZONTAL Peak
5	4960.151	34.91	31.05	5.65	36.96	34.65	54.00	-19.35	HORIZONTAL Average
6	4960.151	44.55	31.05	5.65	36.96	44.29	74.00	-29.71	HORIZONTAL Peak
7	7440.015	35.22	35.92	6.22	36.92	40.44	54.00	-13.56	HORIZONTAL Average
8	7440.015	45.18	35.92	6.22	36.92	50.40	74.00	-23.60	HORIZONTAL Peak
9	9920.018	34.18	37.92	6.96	37.10	41.96	54.00	-12.04	HORIZONTAL Average
10	9920.018	45.14	37.92	6.96	37.10	52.92	74.00	-21.08	HORIZONTAL Peak
11	12400.350	32.22	38.93	7.97	36.90	42.22	54.00	-11.78	HORIZONTAL Average
12	12400.350	44.06	38.93	7.97	36.90	54.06	74.00	-19.94	HORIZONTAL Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High

Freq	ReadAntenna		Cable Preamp		Limit Level	Line	Over Limit	Pol/Phase	Remark
	Level	Factor	Loss	Factor					
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2956.155	35.28	27.84	3.76	37.09	29.79	54.00	-24.21	VERTICAL Average
2	2956.155	46.19	27.84	3.76	37.09	40.70	74.00	-33.30	VERTICAL Peak
3	3801.333	34.71	29.01	4.60	36.92	31.40	54.00	-22.60	VERTICAL Average
4	3801.333	44.25	29.01	4.60	36.92	40.94	74.00	-33.06	VERTICAL Peak
5	4960.419	34.20	31.05	5.65	36.96	33.94	54.00	-20.06	VERTICAL Average
6	4960.419	44.07	31.05	5.65	36.96	43.81	74.00	-30.19	VERTICAL Peak
7	7440.309	33.62	35.92	6.22	36.92	38.84	54.00	-15.16	VERTICAL Average
8	7440.309	43.62	35.92	6.22	36.92	48.84	74.00	-25.16	VERTICAL Peak
9	9920.972	34.88	37.92	6.96	37.10	42.66	54.00	-11.34	VERTICAL Average
10	9920.972	43.23	37.92	6.96	37.10	51.01	74.00	-22.99	VERTICAL Peak
11	12400.350	31.49	38.93	7.97	36.90	41.49	54.00	-12.51	VERTICAL Average
12	12400.350	43.44	38.93	7.97	36.90	53.44	74.00	-20.56	VERTICAL Peak

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8 Appendix

8.1 Appendix 15.247

1.6dB Bandwidth

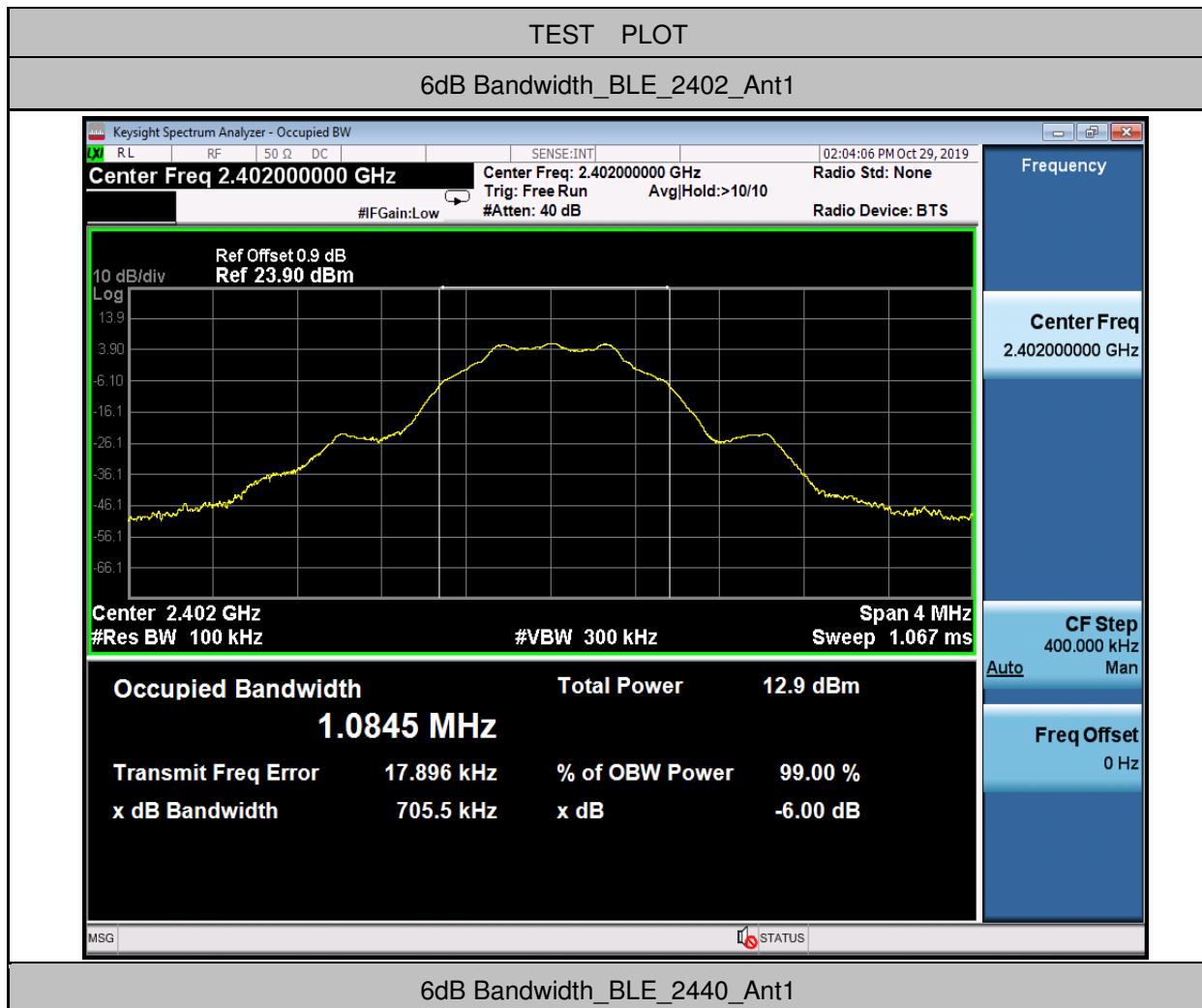
Test Mode	Test Channel	Ant	6dB Bandwidth [MHz]	Limit	Verdict
BLE	2402	Ant1	0.7055	0.5	PASS
BLE	2440	Ant1	0.6965	0.5	PASS
BLE	2480	Ant1	0.6895	0.5	PASS

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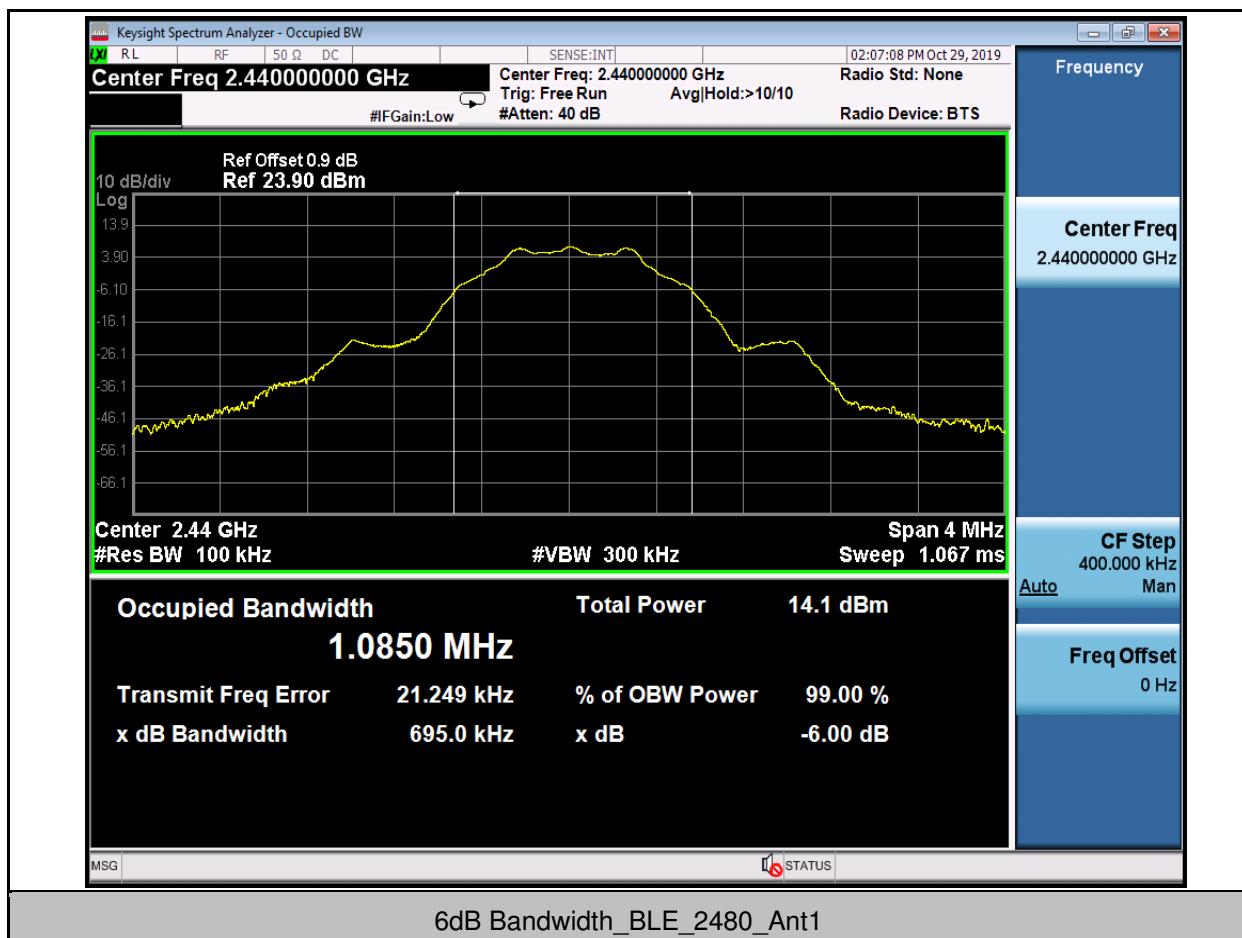


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2. Maximum peak conducted output power

Test Mode	Test Channel	Ant	Power[dBm]	Limit[dBm]	Verdict
BLE	2402	Ant1	6.518	30	PASS
BLE	2440	Ant1	7.783	30	PASS
BLE	2480	Ant1	7.77	30	PASS

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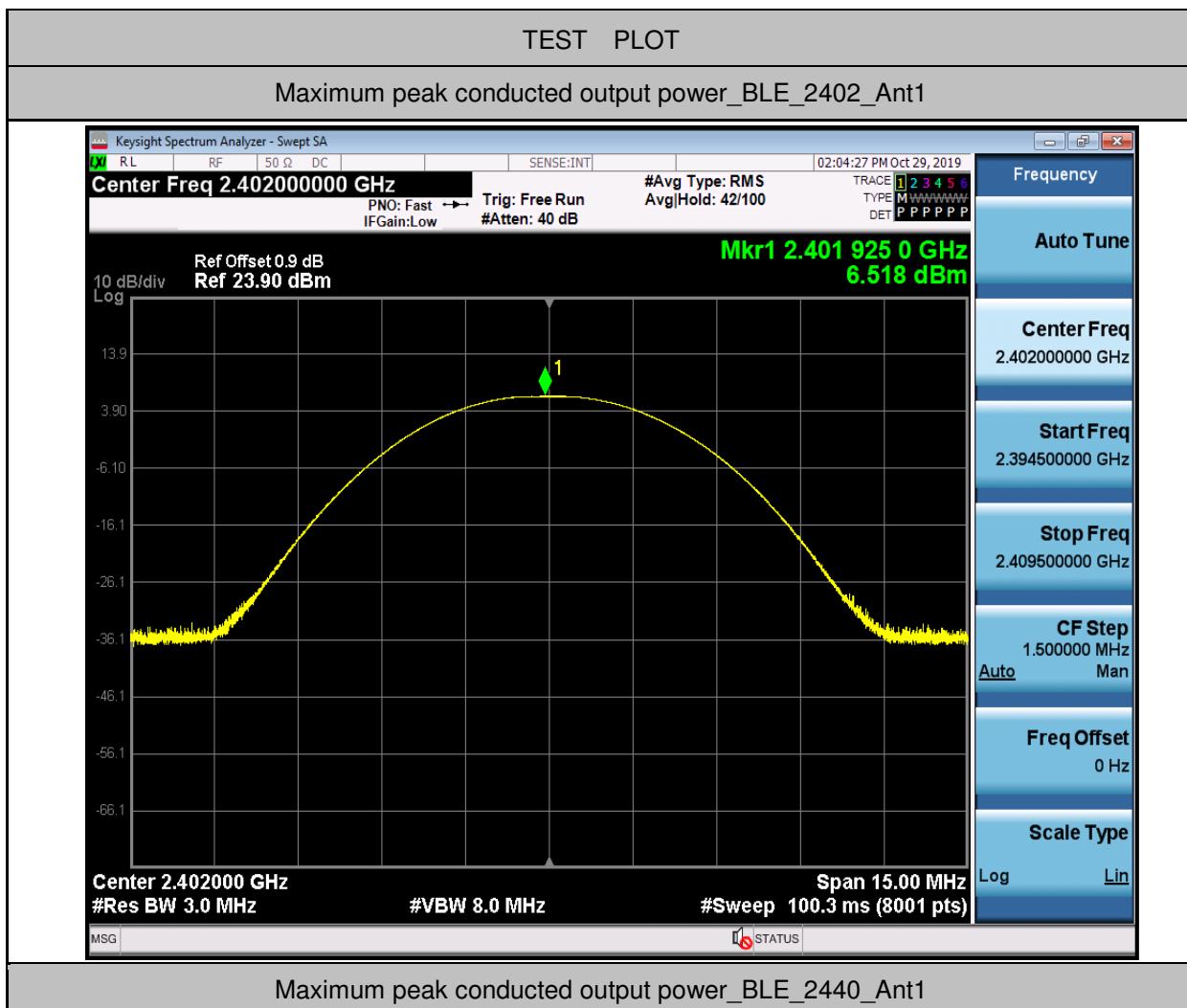


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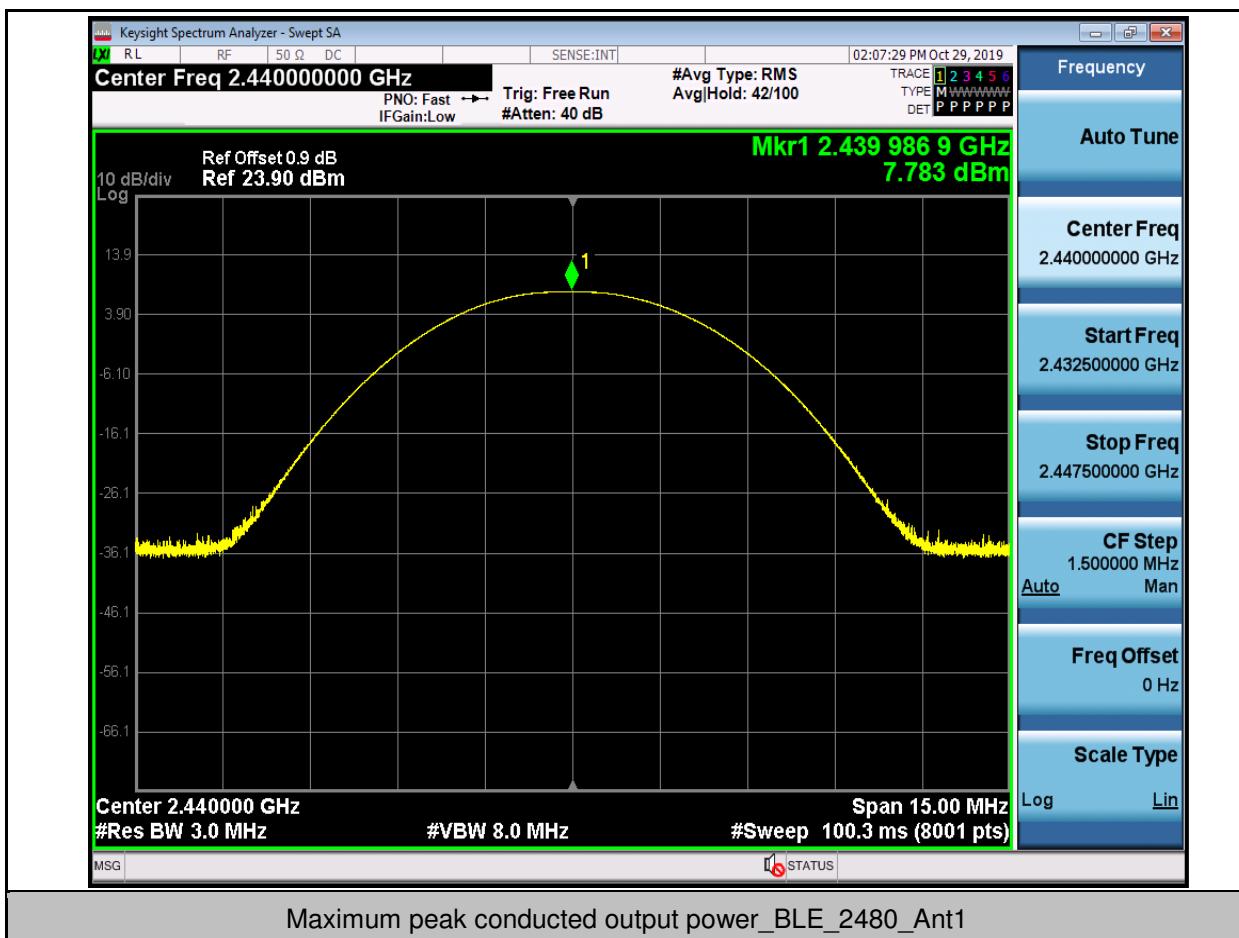


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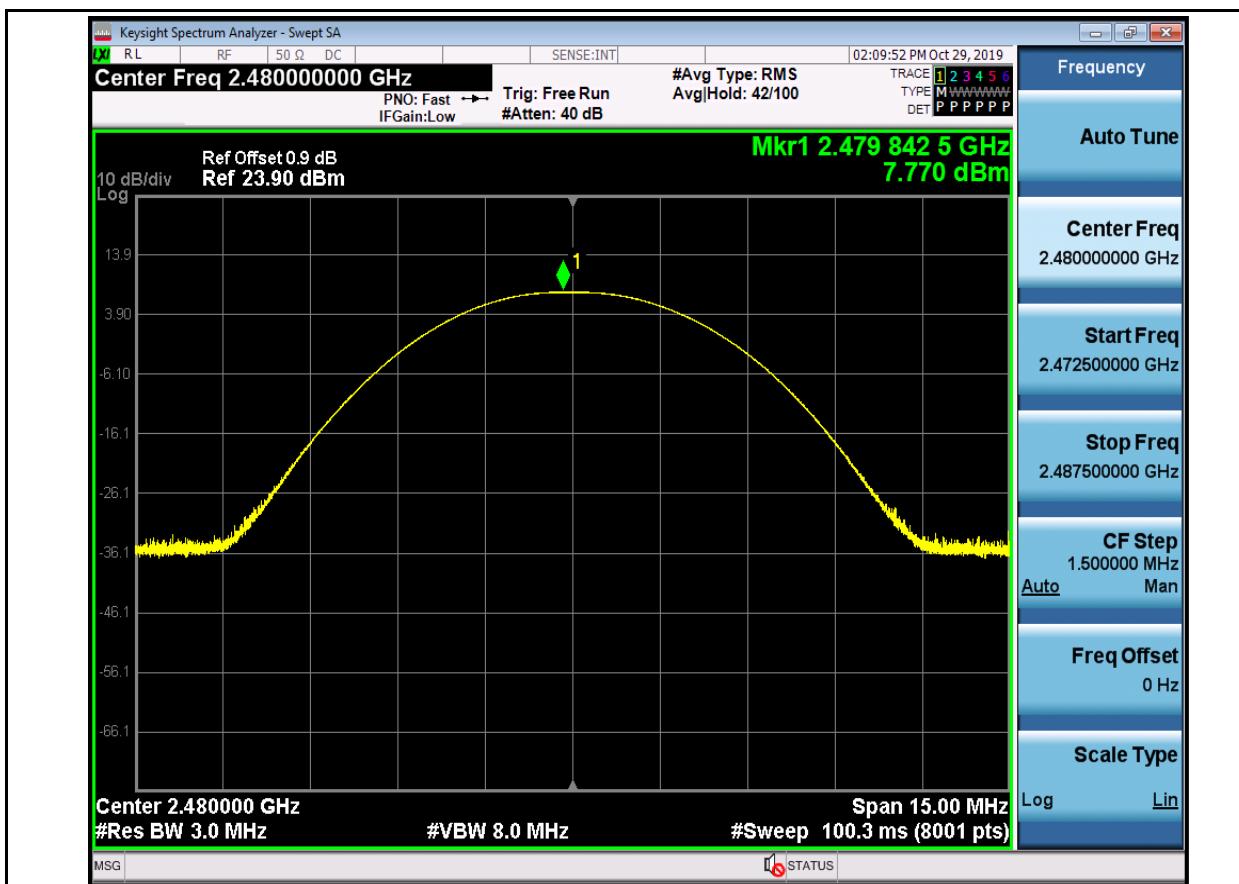
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3. Maximum Peak power spectral density

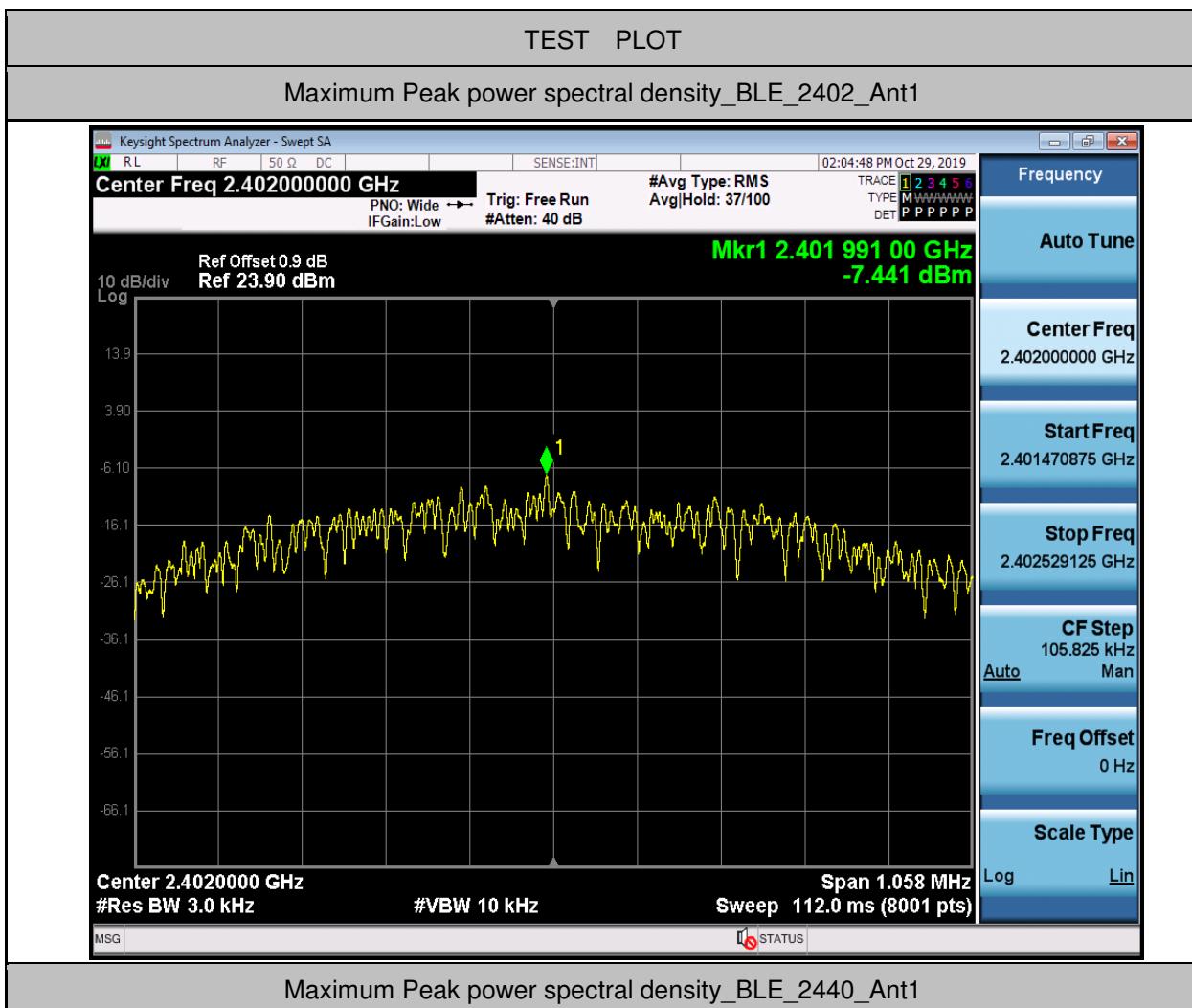
Test Mode	Test Channel	Ant	Result	Limit[dBm/3kHz]	Verdict
BLE	2402	Ant1	-7.441	8.00	PASS
BLE	2440	Ant1	-6.203	8.00	PASS
BLE	2480	Ant1	-6.32	8.00	PASS

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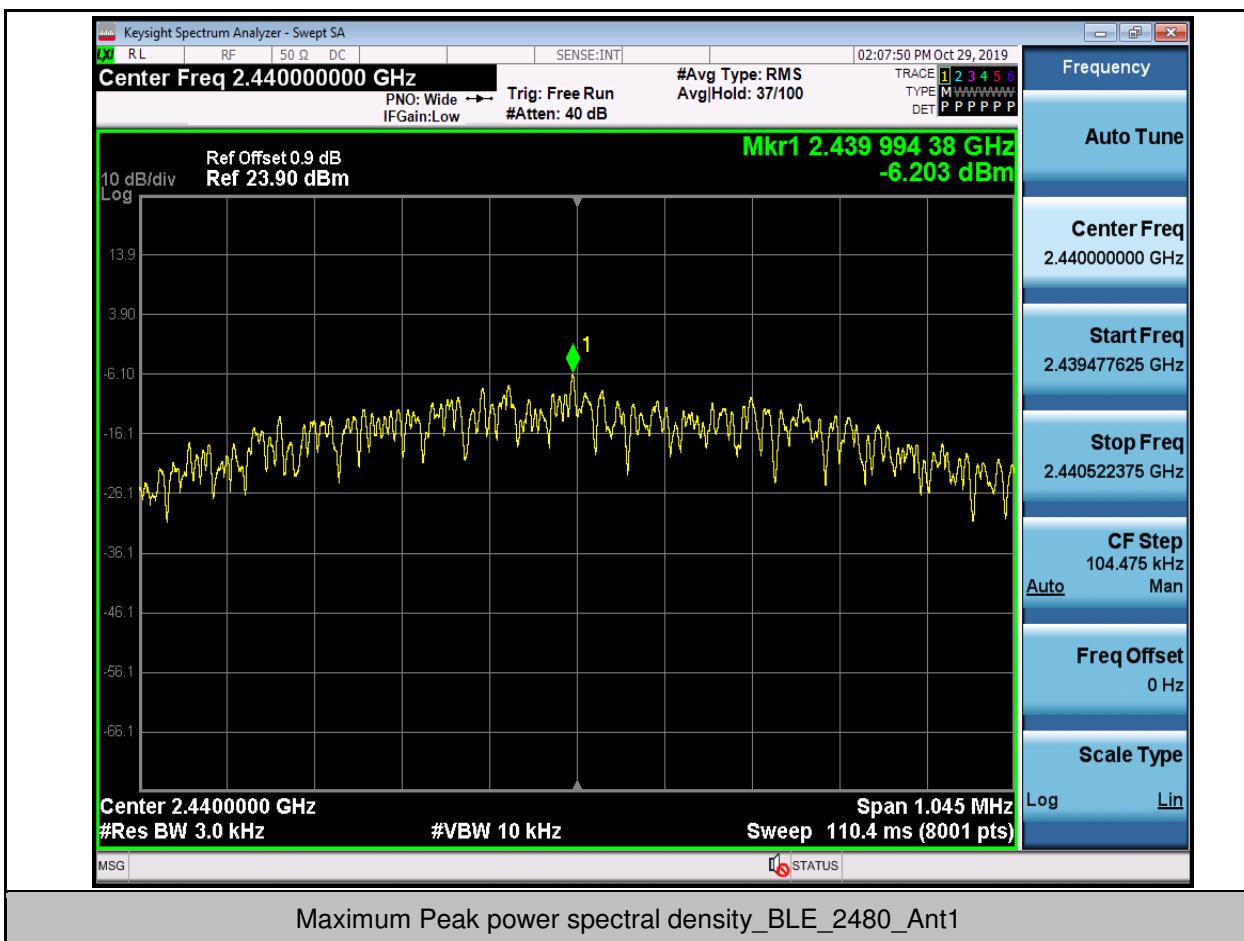


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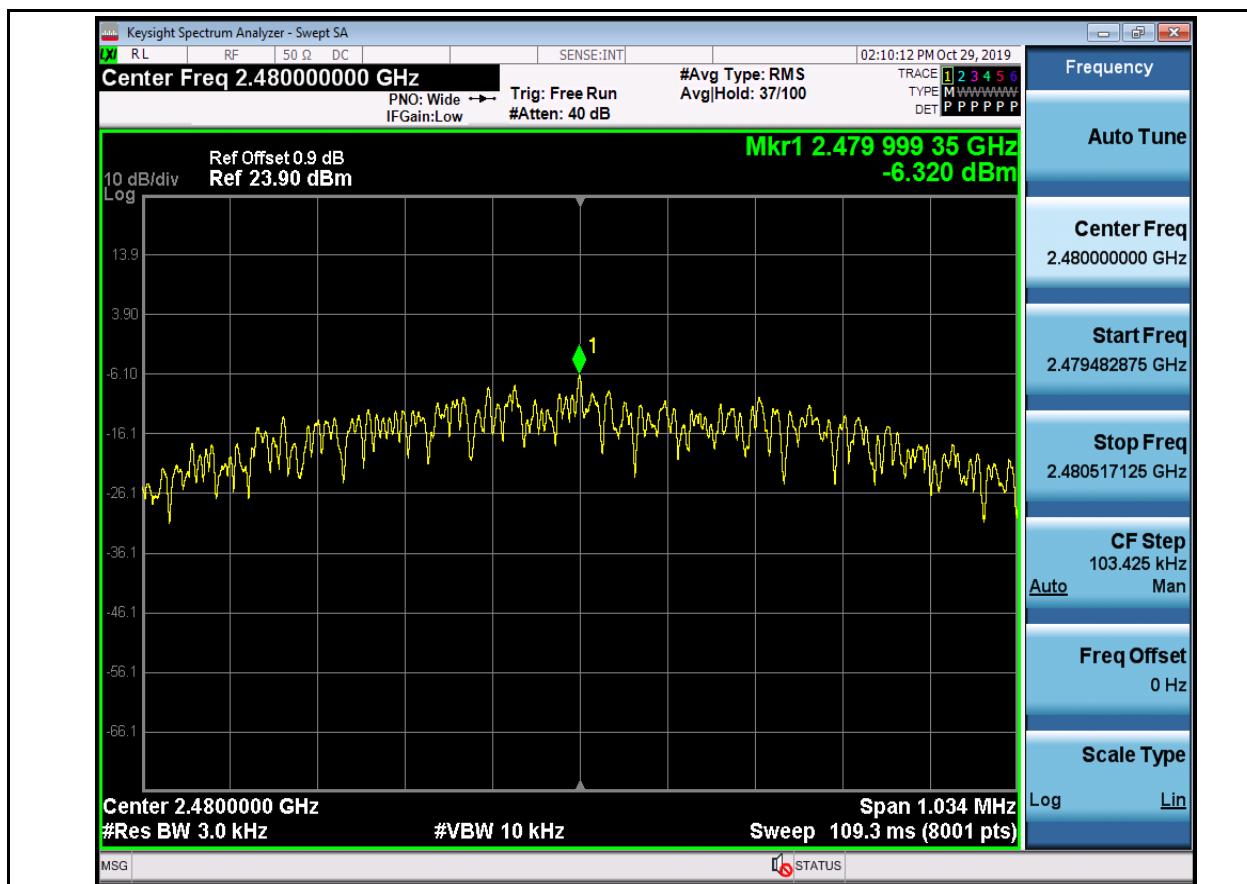


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4. Band-edge for RF Conducted Emissions

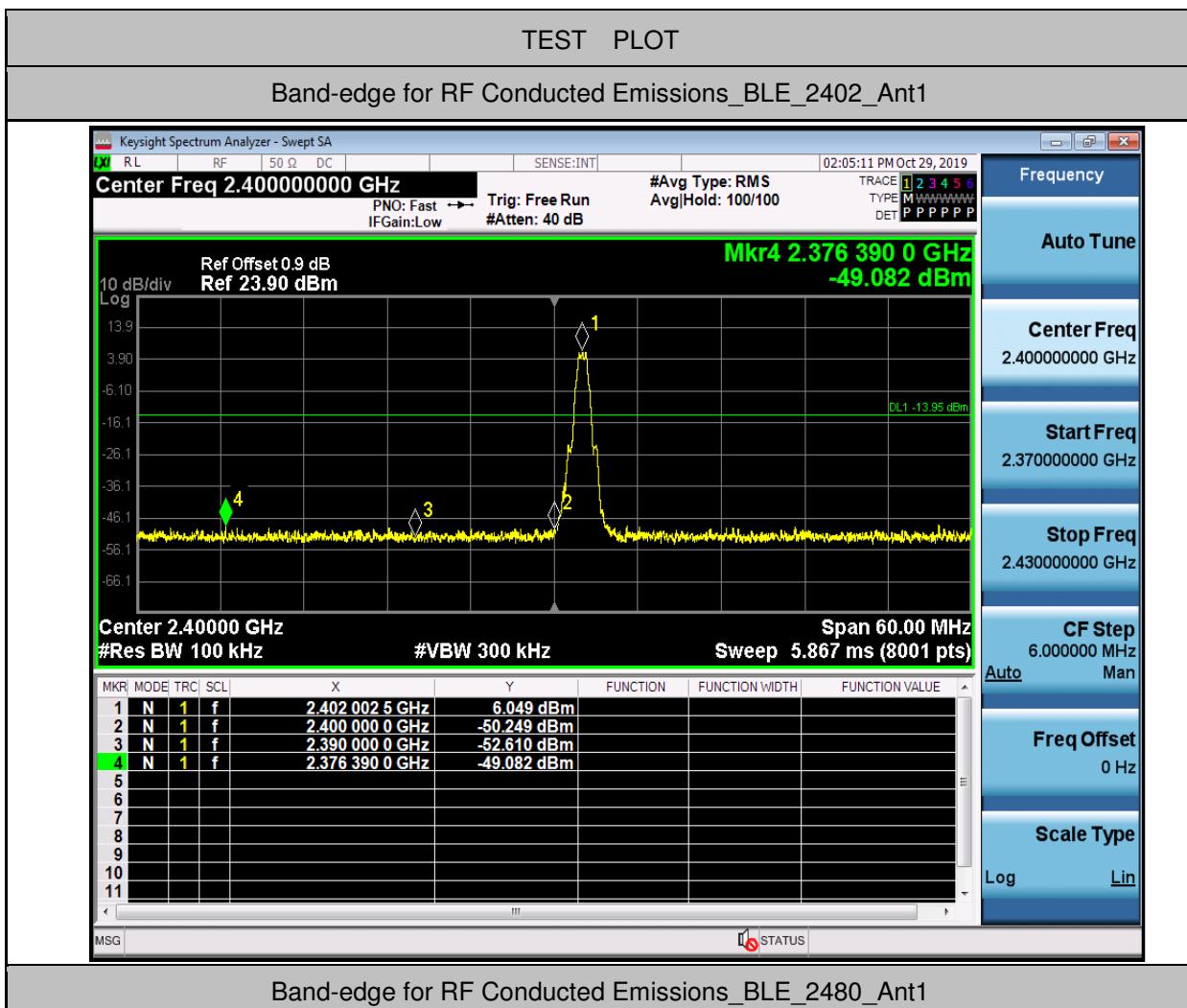
Test Mode	Test Channel	Ant	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
BLE	2402	Ant1	6.049	-49.082	-13.95	PASS
BLE	2480	Ant1	7.173	-48.511	-12.83	PASS

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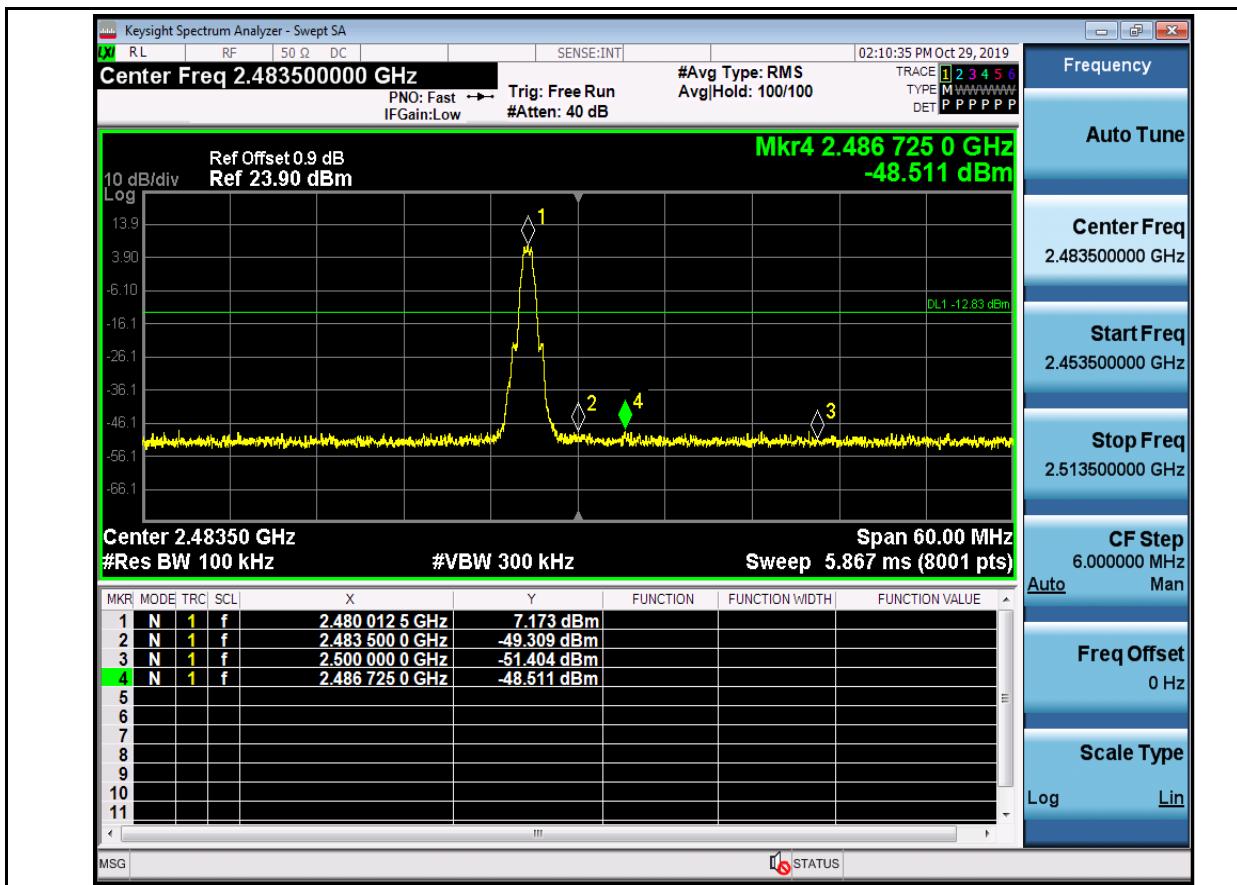


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5. RF Conducted Spurious Emissions

Test Mode	Test Channel	Ant	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BLE	2402	Ant1	30	10000	100	300	5.824	-23.673	<-14.176	PASS
BLE	2402	Ant1	10000	26000	100	300	5.824	-52.333	<-14.176	PASS
BLE	2440	Ant1	30	10000	100	300	7.082	-22.334	<-12.918	PASS
BLE	2440	Ant1	10000	26000	100	300	7.082	-51.699	<-12.918	PASS
BLE	2480	Ant1	30	10000	100	300	7.006	-24.283	<-12.994	PASS
BLE	2480	Ant1	10000	26000	100	300	7.006	-51.787	<-12.994	PASS

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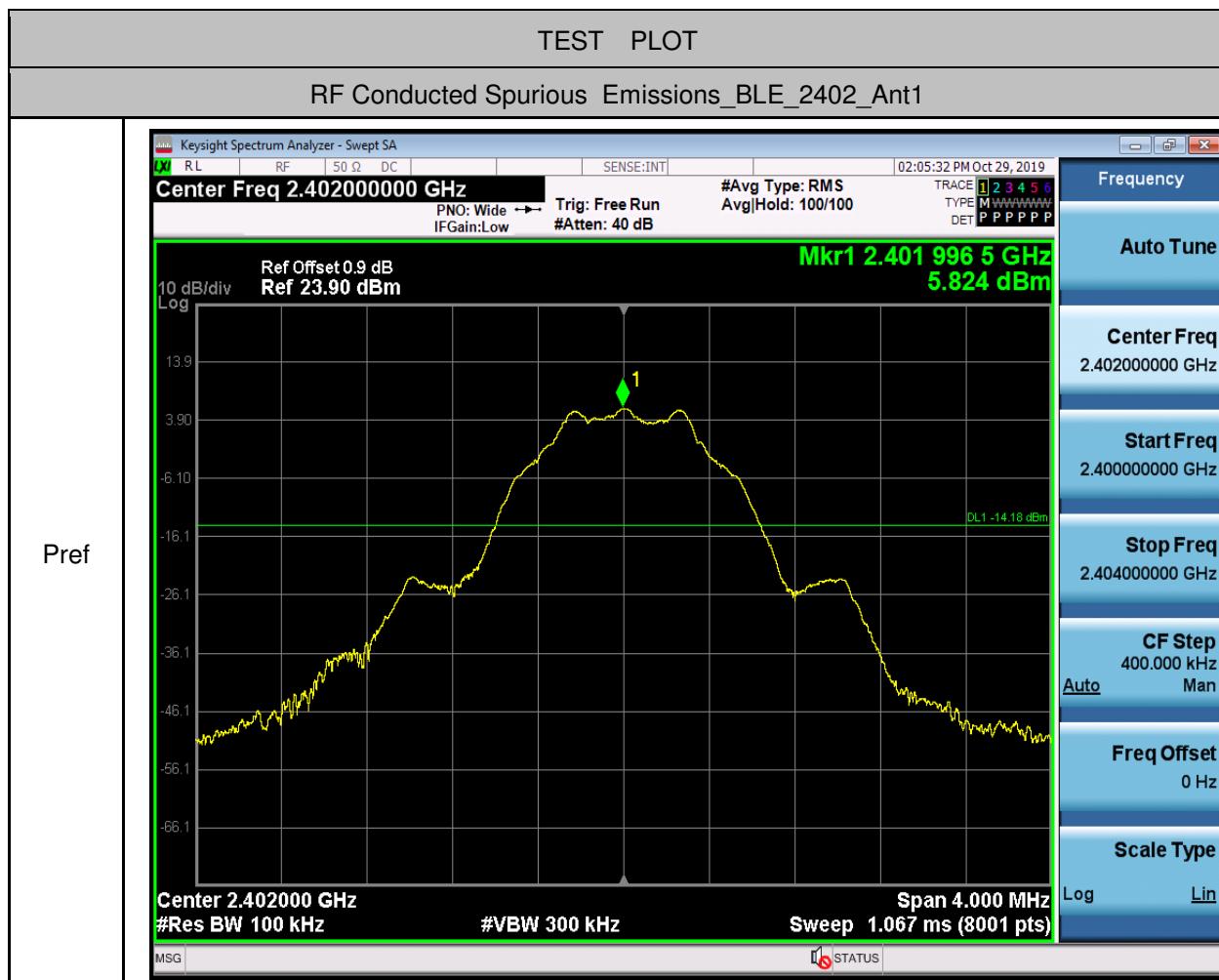
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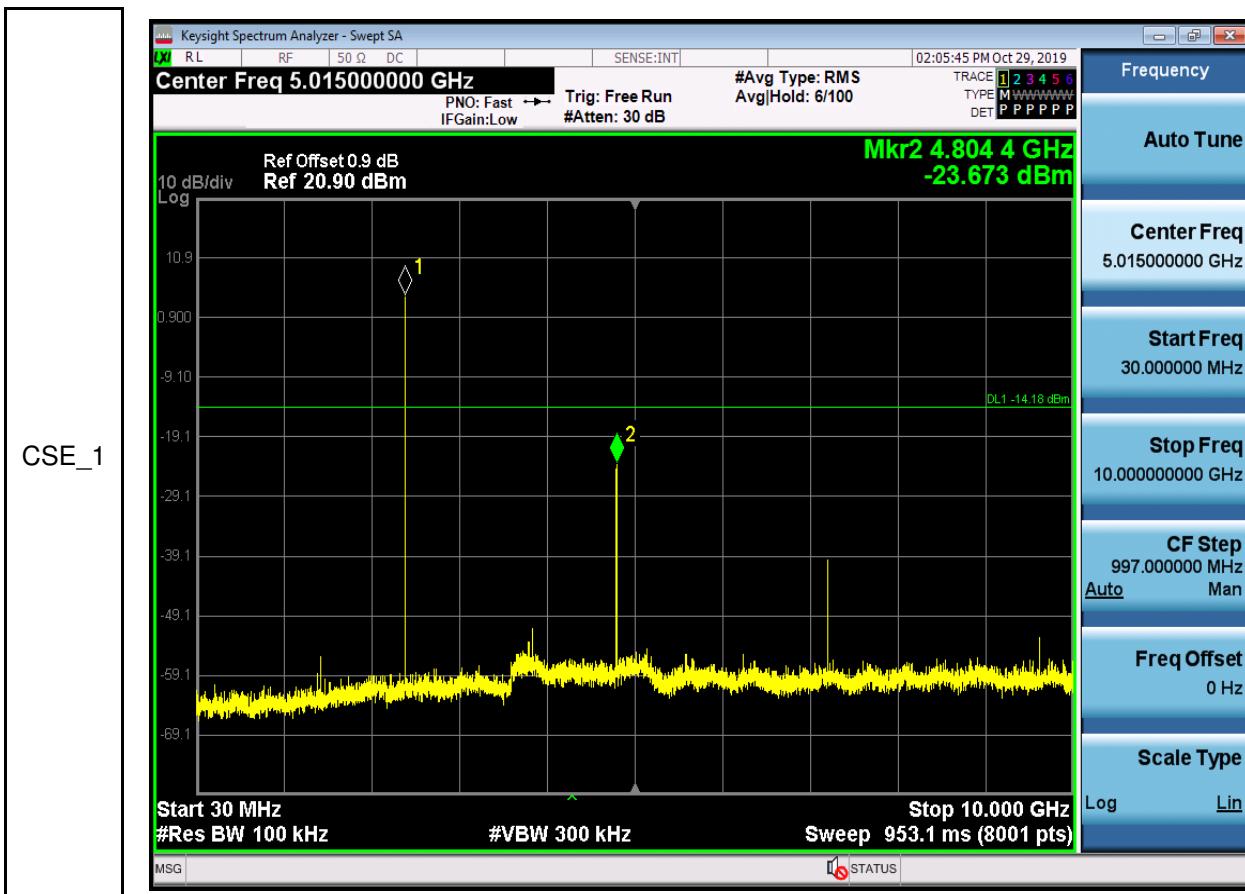
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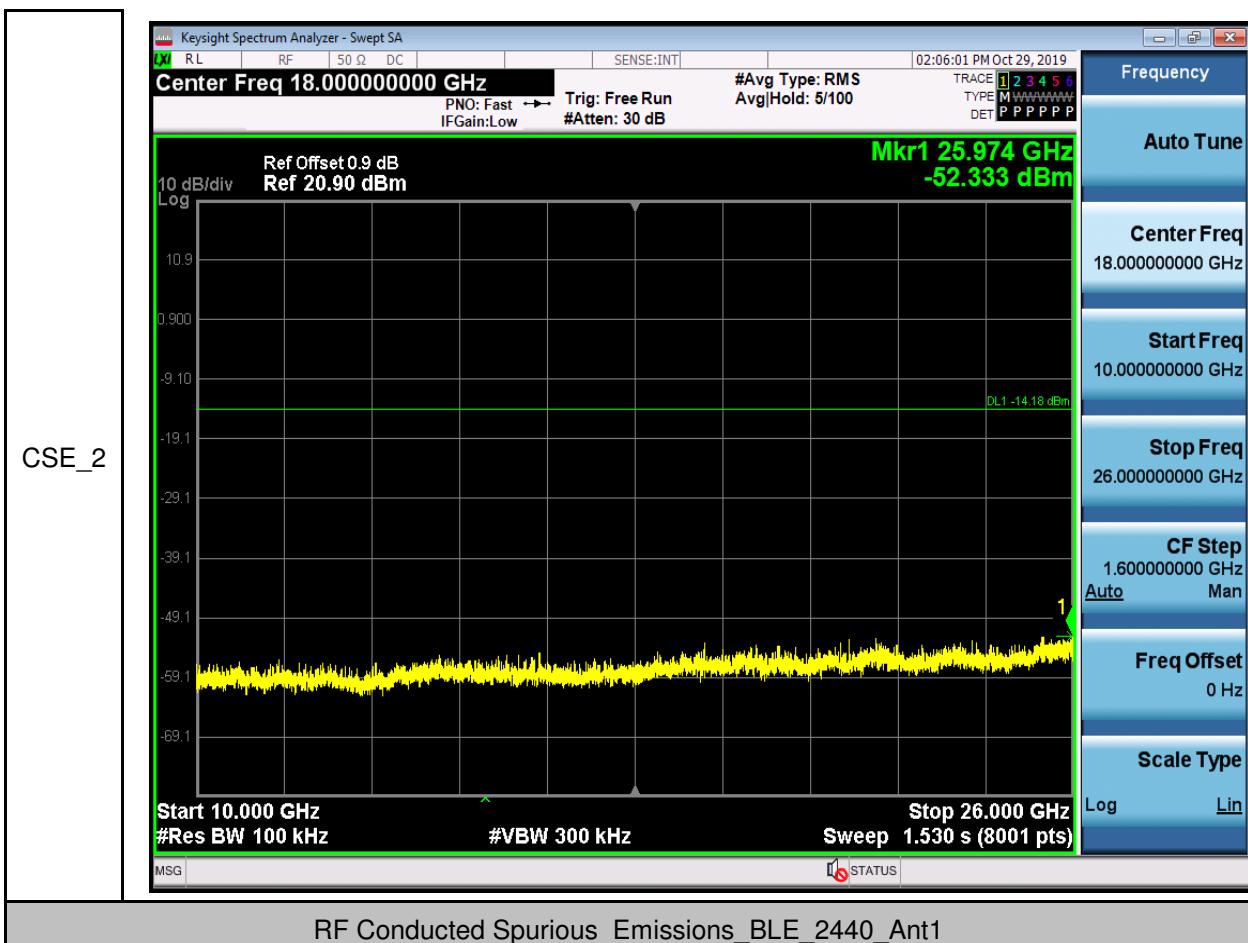
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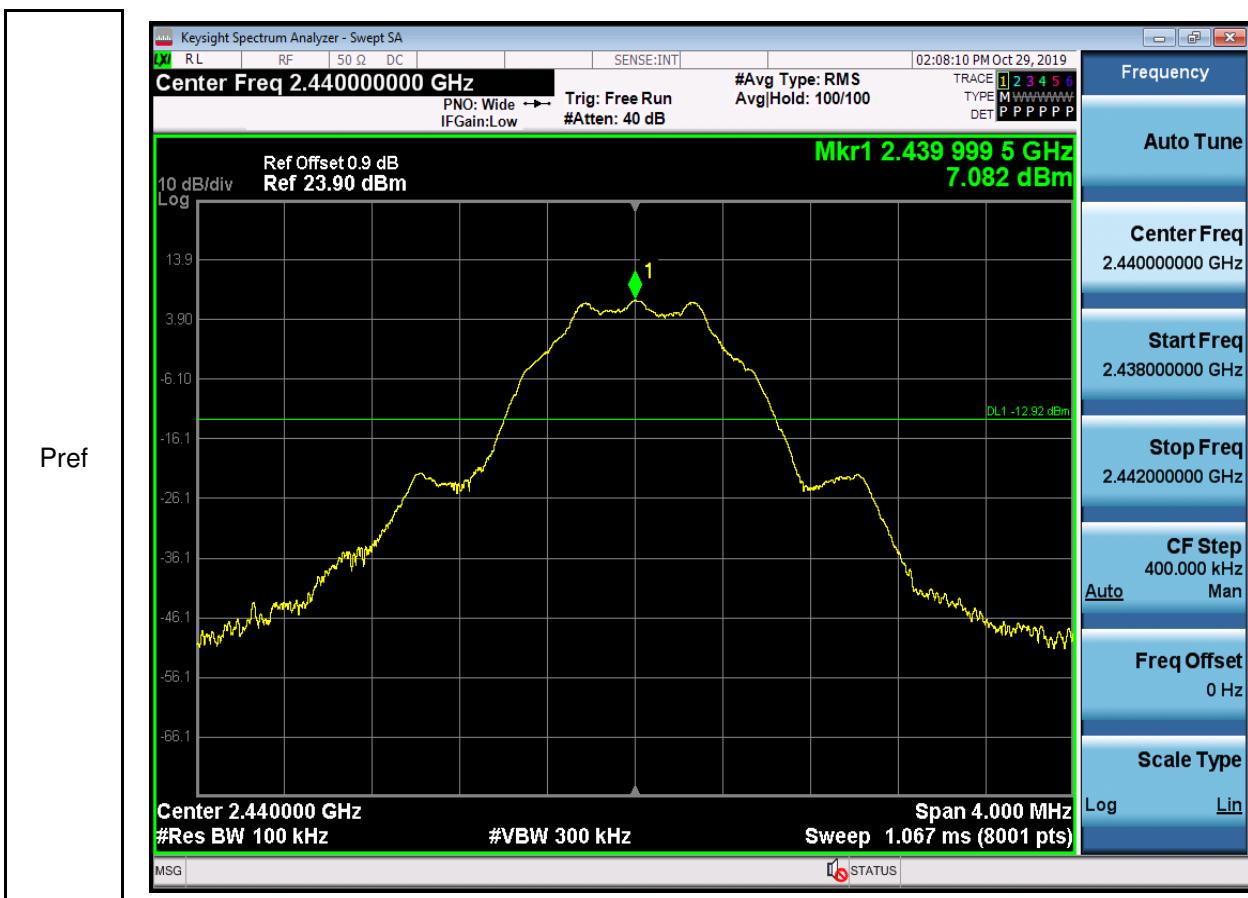


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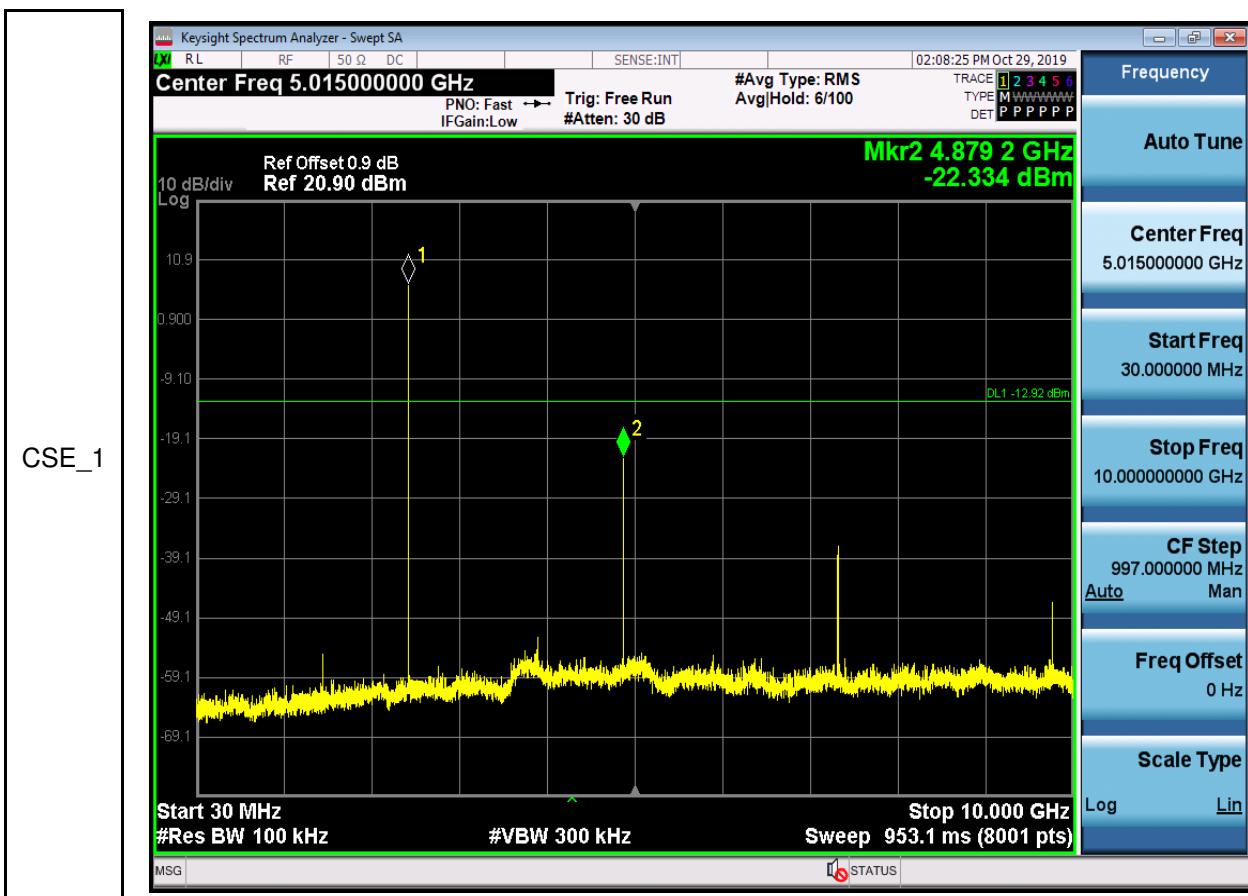


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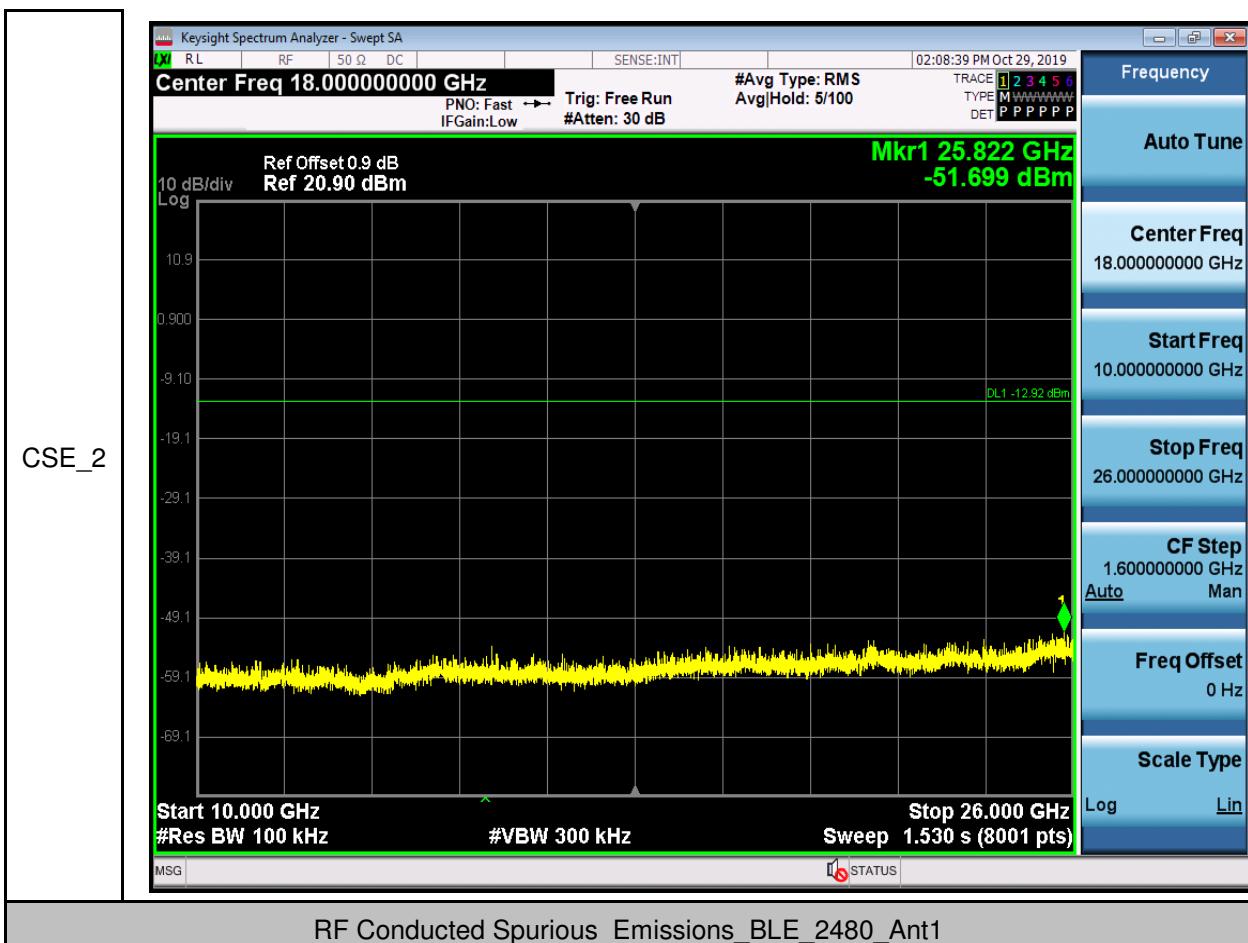
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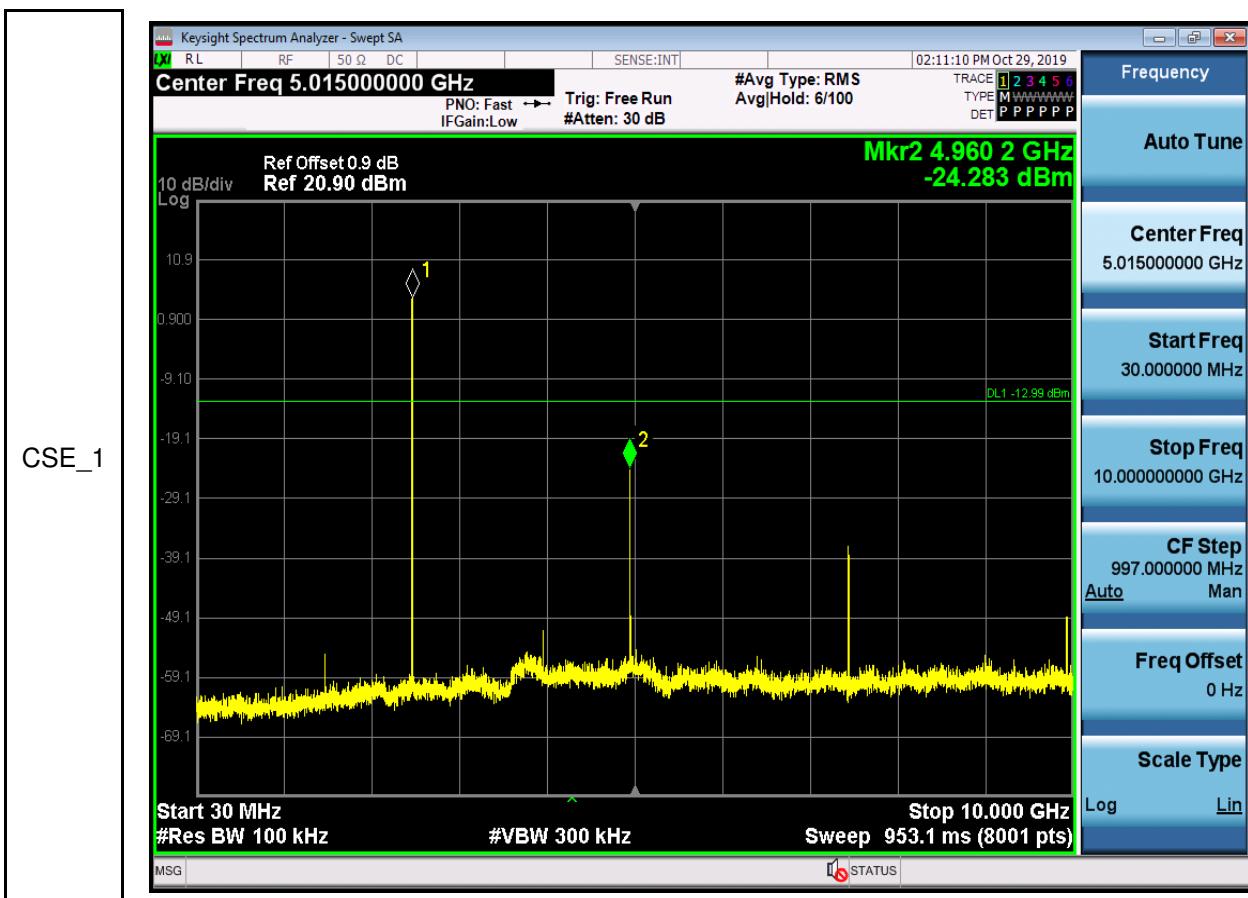


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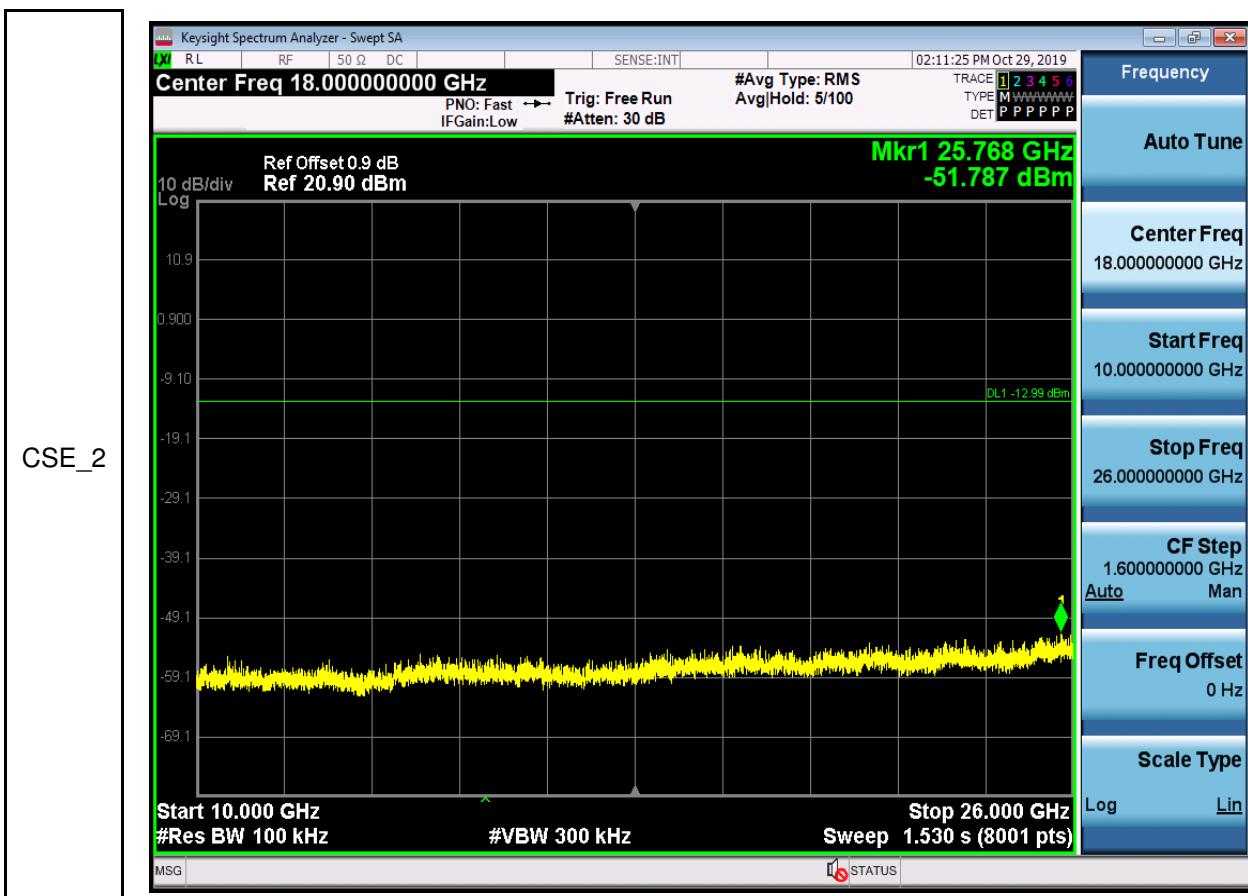
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