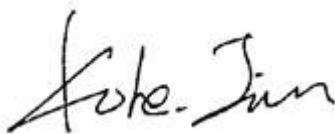


TEST REPORT

Application No.: GZEM2012017393CR
Applicant: Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address of Applicant: No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China.
Equipment Under Test (EUT):
FCC ID: 2AUYFRMA2006
EUT Name: realme Watch 2 Pro
Model No.: RMA2006
Trade Mark: realme
Standard(s): 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2020-12-18
Date of Test: 2020-12-19 to 2020-12-23
Date of Issue: 2020-12-30

Test Result:	Pass*
---------------------	--------------

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



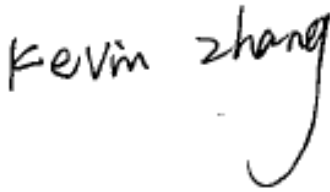
Kobe Jian
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-12-30		Original

Authorized for issue by:			
Tested By	 Kevin_Zhang /Project Engineer	2020-12-19 to 2020-12-23	Date
Checked By	 Ricky_Liu /Reviewer	2020-12-30	Date



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Guangzhou Branch Testing Center EEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

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

N/A: Not applicable

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 5V for charging DC 3.85 V for normal working powered by built-in battery as below: Model: XE205 Rated: DC 3.85 V, 390 mAh, 1.502 Wh
Test Voltage:	DC 3.85 V
Cable:	For main unit: DC charging ports For charger: USB input cables DC output ports
Function:	Watch with BLE function
Antenna Gain:	0 dBi declared by applicant
Antenna Type:	Integral Antenna
Channel Spacing:	2MHz
Modulation Type:	GFSK
Number of Channels:	40
Operation Frequency:	2402MHz to 2480MHz
Hardware:	LS450-R-V3
Software:	SV01
S/N:	GZ_SP_20210102327
Test Software	sscom32.exe
Power Setting	-0.81 dBm can not be changed by user

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No. SEA1800
BT test board	SGS EMC	RF 07	RF 07



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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	0.68dB
5	RF Power Density	1.50dB
6	Conducted Spurious Emissions	1.04dB
7	RF Radiated Power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious Emission Test	4.5dB (30MHz-1GHz)
		4.8dB (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:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



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Guangzhou Branch EMC Laboratory

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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

4.8 Duty cycle of the EUT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percent.

Formula:

Duty Cycle = Ton/(Ton+Toff)

Measurement Procedure:

1. Set span = Zero
2. RBW=8MHz
3. VBW=8MHz
4. Detector=Peak

Mode	Channel(MHz)	Duty Cycle(%)	Correction Factor(dB)*
BLE	2402	100.00	0
	2440	100.00	0
	2480	100.00	0

*Correction Factor(dB) = 10log(1/Duty Cycle)

Please refer to appendix 15.247 for details.



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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	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Network	Rohde & Schwarz	ENV216	EMC0118	2020-01-10	2021-01-09
LISN	Rohde & Schwarz	ENV216	EMC2135	2020-09-25	2021-09-24
EMI Test Receiver	Rohde & Schwarz	ESCS30	EMC0506	2020-11-13	2021-11-12
Coaxial Cable	HangTianXing	2m	EMC0107	2020-09-09	2022-09-08
Voltage Probe	SGS-EMC	N/A	EMC0106	2019-05-10	2021-05-09
Conical Metal Housing	SGS-EMC	N/A	EMC0167	2020-04-19	2022-04-18
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	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	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
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	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	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	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	2020-01-10	2021-01-09
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2020-06-08	2023-06-07
Horn Antenna	SCHWARZBECKME SS-ELEKTRONIK	BBHA 9120D	EMC2016	2019-09-25	2022-09-24
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2020-05-26	2021-05-25
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2020-11-13	2021-11-12
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2021-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
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	2020-12-19	2023-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME 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



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Radiated Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2020-01-10	2021-01-09
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2020-01-10	2021-01-09
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 25MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	EMC2174	2018-09-06	2021-09-05
Bi-log Type Antenna	Schaffner Chase	CBL6143	EMC0519	2020-06-08	2023-06-07
Horn Antenna	SCHWARZBECKME SS-ELEKTRONIK	BBHA 9120D	EMC2016	2019-09-25	2022-09-24
Horn Antenna 1GHz-18GHz	Rohde & Schwarz	HF906	EMC0518	2018-09-02	2021-09-01
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2020-01-10	2021-01-09
Amplifier	HP	8447F	EMC2065	2020-05-26	2021-05-25
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2020-11-13	2021-11-12
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2021-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2020-01-10	2021-01-09
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2020-01-10	2021-01-09
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	2020-12-19	2023-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME 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	2020-07-09	2021-07-08



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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. Please refer to internal photos for details.



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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(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.

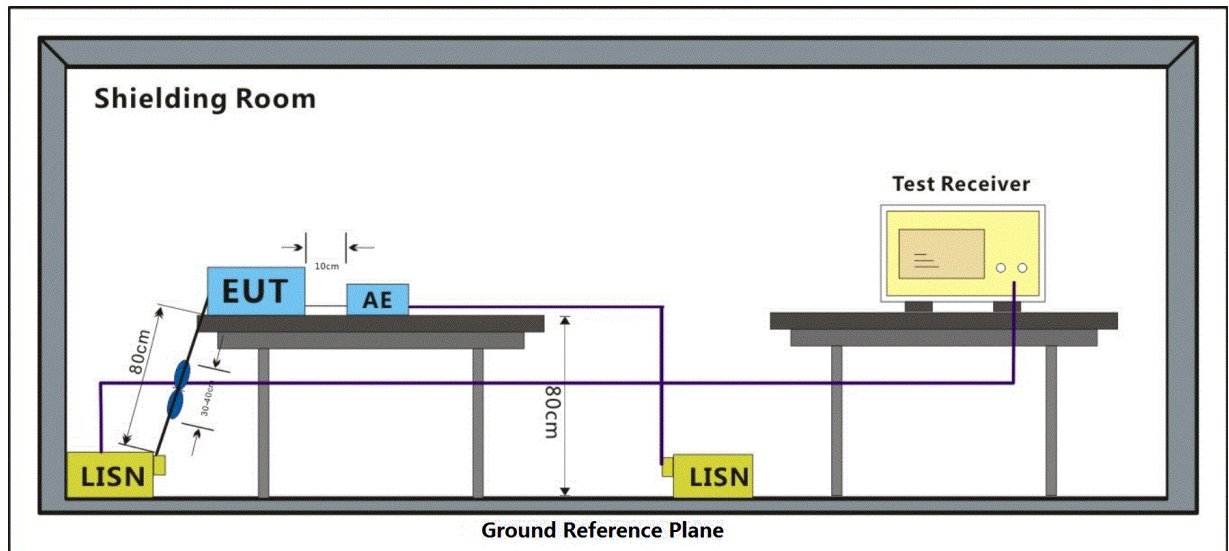
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 21.2 °C Humidity: 48.3 % 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/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.

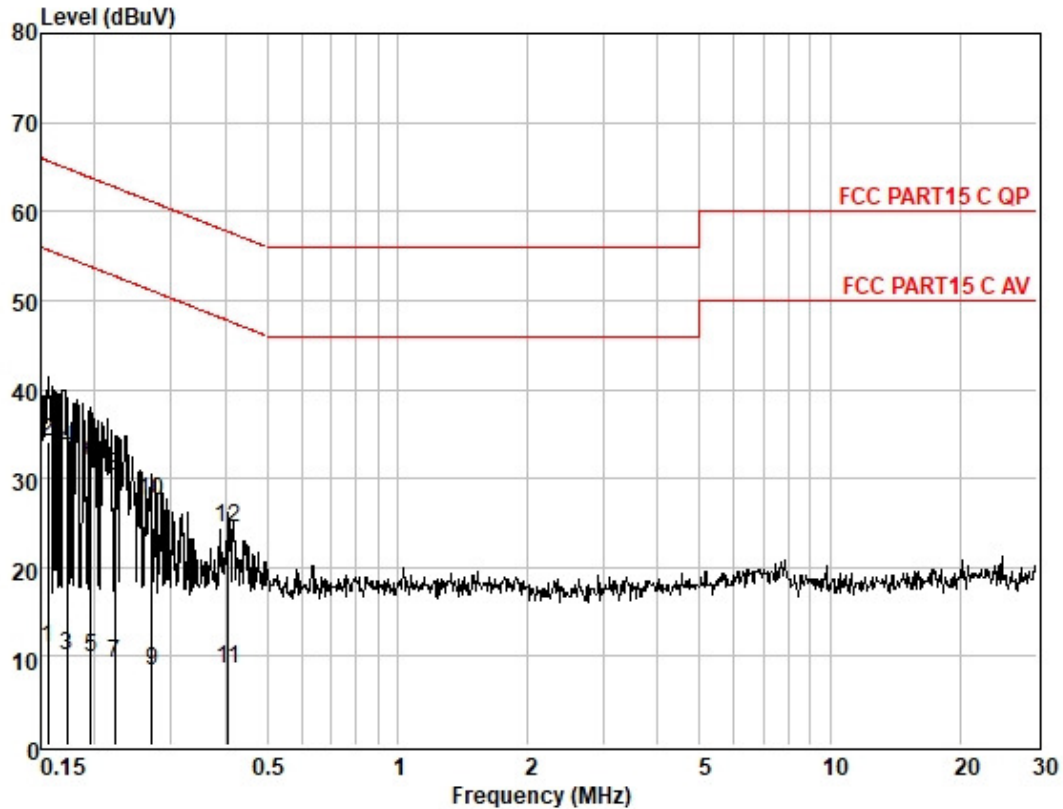
Remark: LISN=Read Level+ Cable Loss+ LISN Factor



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Mode:b; Line:Live Line

Pol :LINE
Mode :
Model :

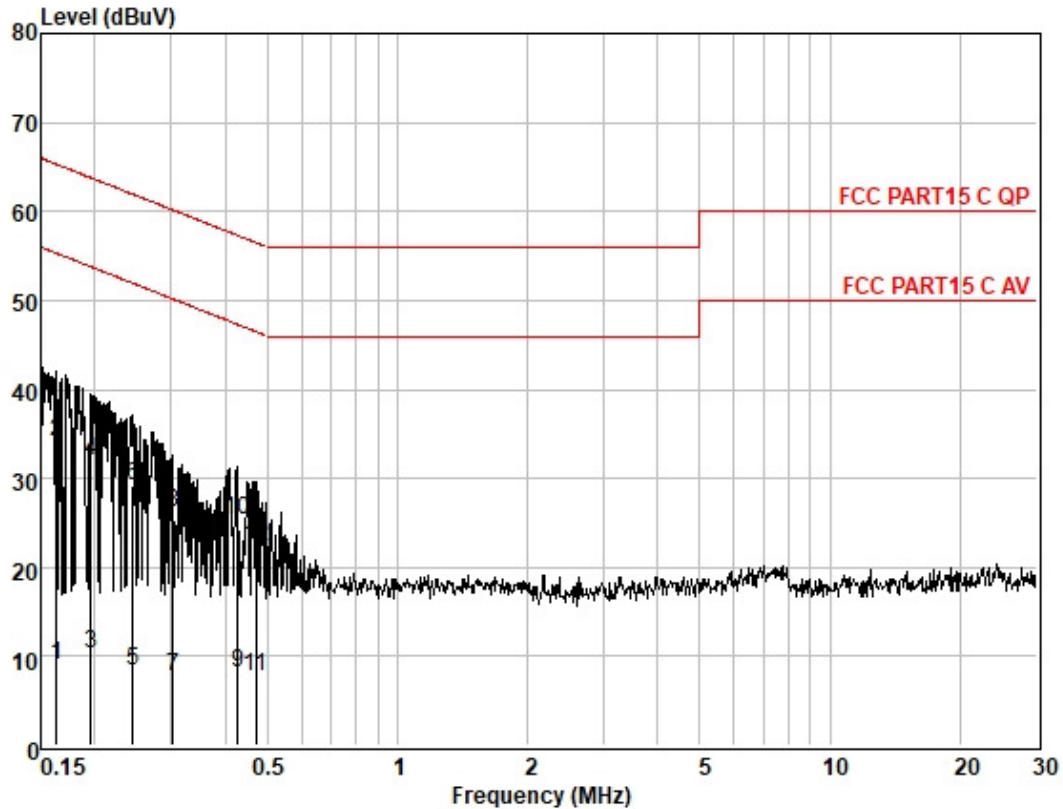
Frequeunc MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
0.16	1.30	0.06	9.62	10.98	55.69	-44.71	Average
0.16	24.51	0.06	9.62	34.19	65.69	-31.50	QP
0.17	0.34	0.06	9.62	10.02	54.86	-44.84	Average
0.17	23.57	0.06	9.62	33.25	64.86	-31.61	QP
0.20	0.17	0.06	9.63	9.86	53.80	-43.94	Average
0.20	22.02	0.06	9.63	31.71	63.80	-32.09	QP
0.22	-0.41	0.06	9.63	9.28	52.74	-43.46	Average
0.22	20.51	0.06	9.63	30.20	62.74	-32.54	QP
0.27	-1.25	0.06	9.62	8.43	51.07	-42.64	Average
0.27	17.74	0.06	9.62	27.42	61.07	-33.65	QP
0.41	-0.99	0.06	9.62	8.69	47.73	-39.04	Average
0.41	14.73	0.06	9.62	24.41	57.73	-33.32	QP



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Mode:b; Line:Neutral Line



Pol : NEUTRAL
Mode :
Model :

Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
0.16	-0.50	0.06	9.55	9.11	55.30	-46.19	Average
0.16	24.46	0.06	9.55	34.07	65.30	-31.23	QP
0.20	0.75	0.06	9.54	10.35	53.80	-43.45	Average
0.20	22.45	0.06	9.54	32.05	63.80	-31.75	QP
0.24	-1.28	0.06	9.55	8.33	51.95	-43.62	Average
0.24	19.57	0.06	9.55	29.18	61.95	-32.77	QP
0.30	-1.84	0.06	9.54	7.76	50.15	-42.39	Average
0.30	16.55	0.06	9.54	26.15	60.15	-34.00	QP
0.43	-1.42	0.06	9.56	8.20	47.29	-39.09	Average
0.43	15.78	0.06	9.56	25.40	57.29	-31.89	QP
0.47	-1.95	0.07	9.55	7.67	46.49	-38.82	Average
0.47	12.79	0.07	9.55	22.41	56.49	-34.08	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

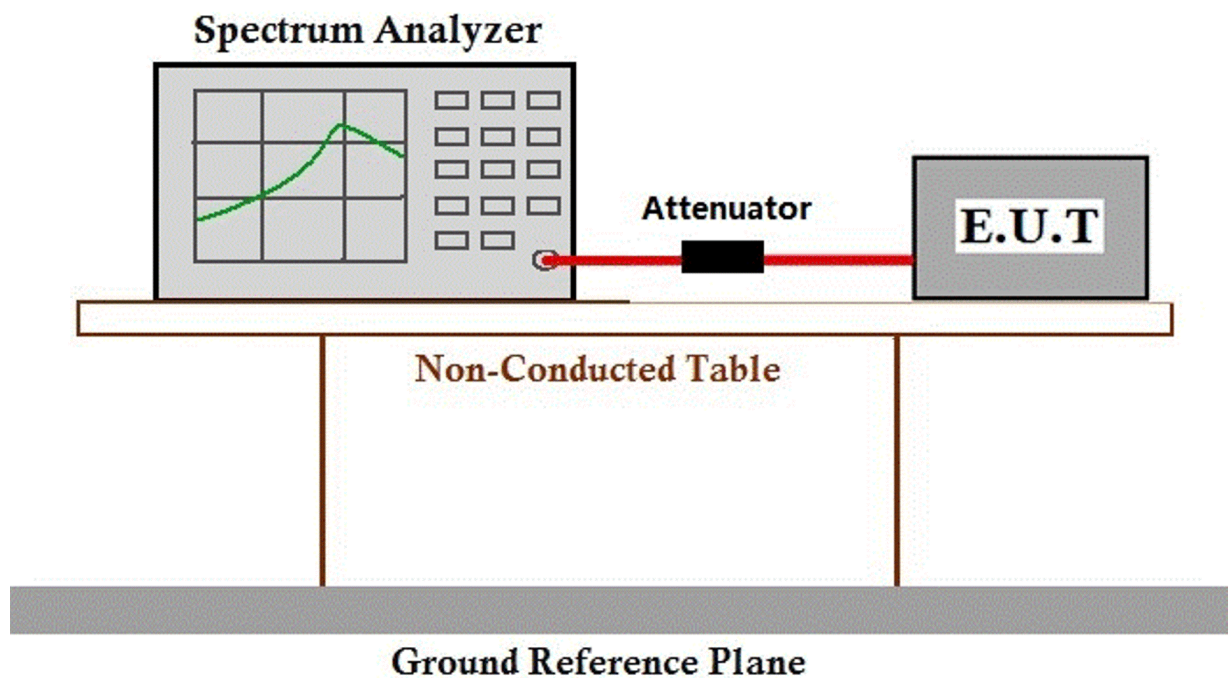
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 53.8 % 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

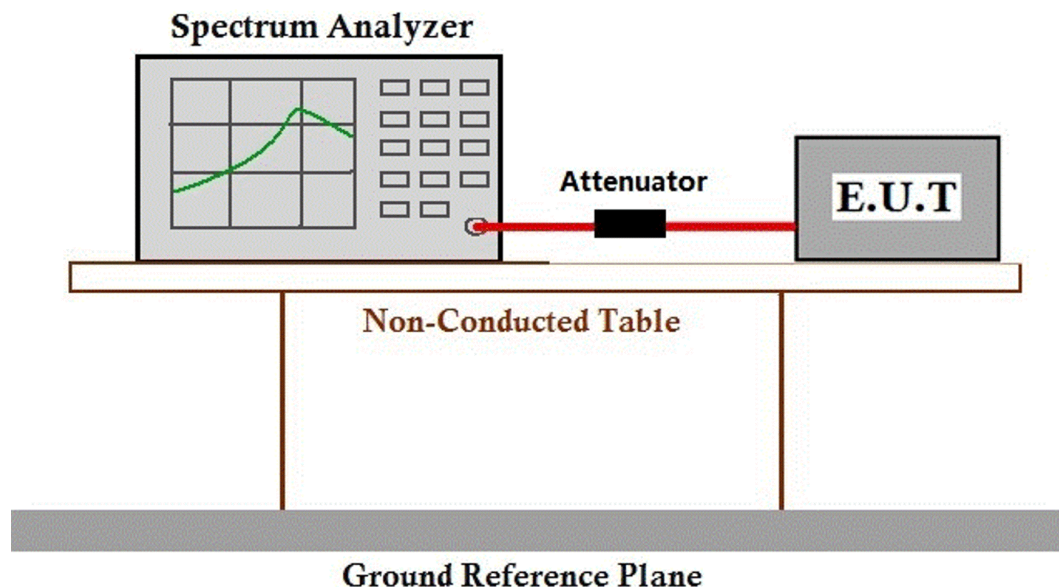
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 53.8 % 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



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

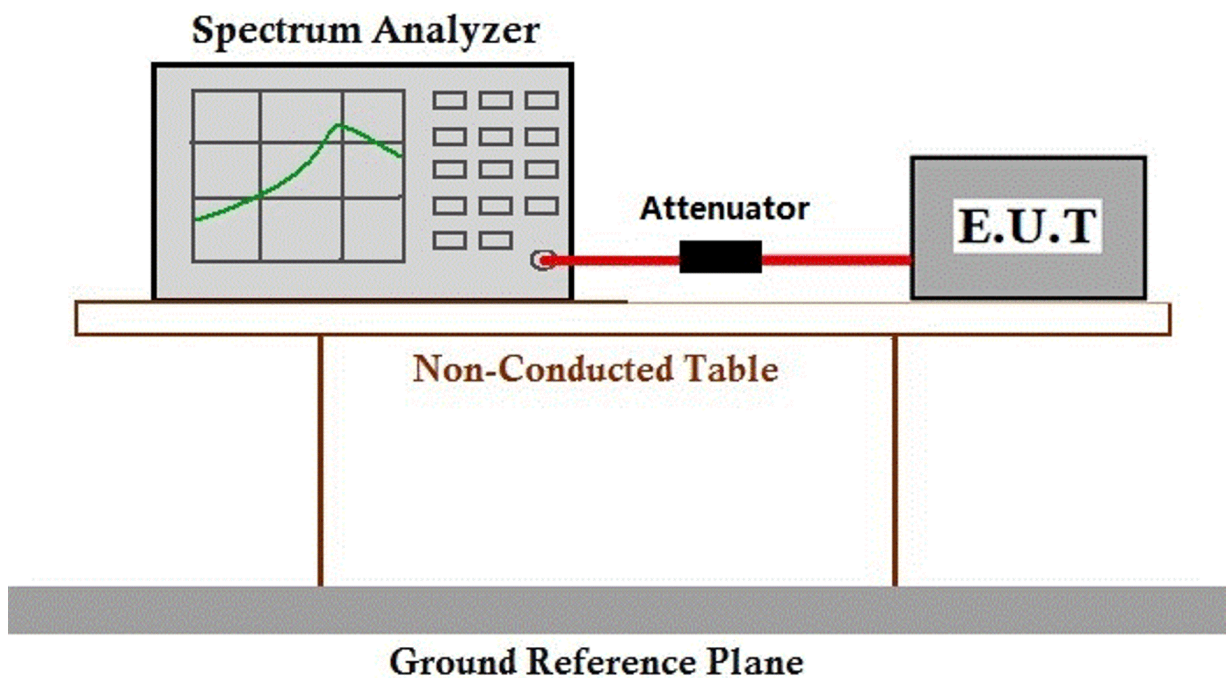
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 53.8 % 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))

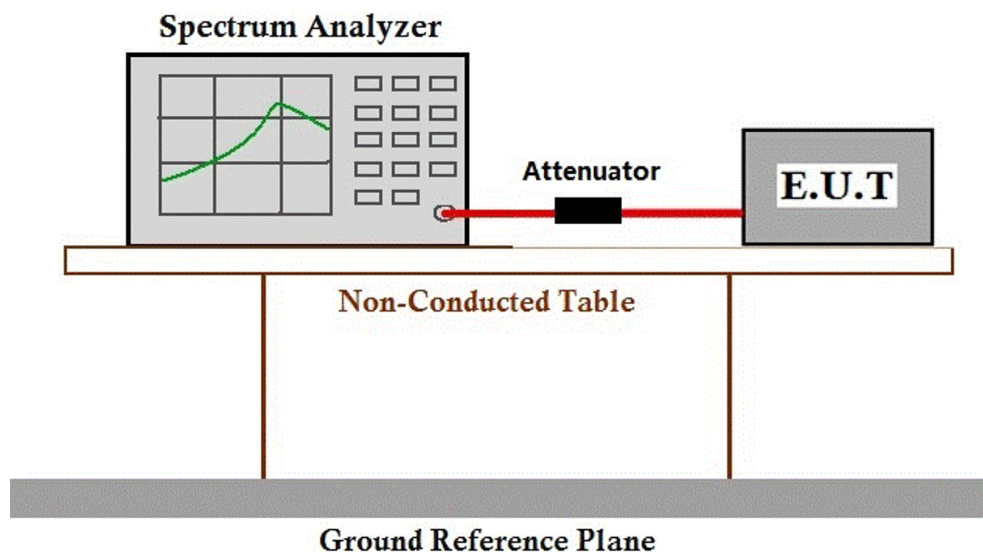
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 53.8 % 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))

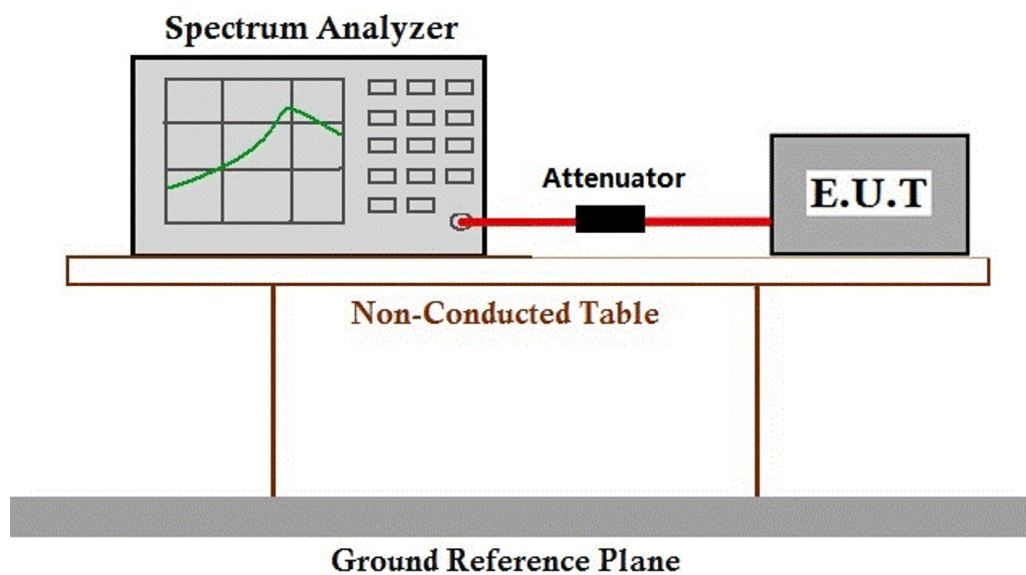
7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 53.8 % 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



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.

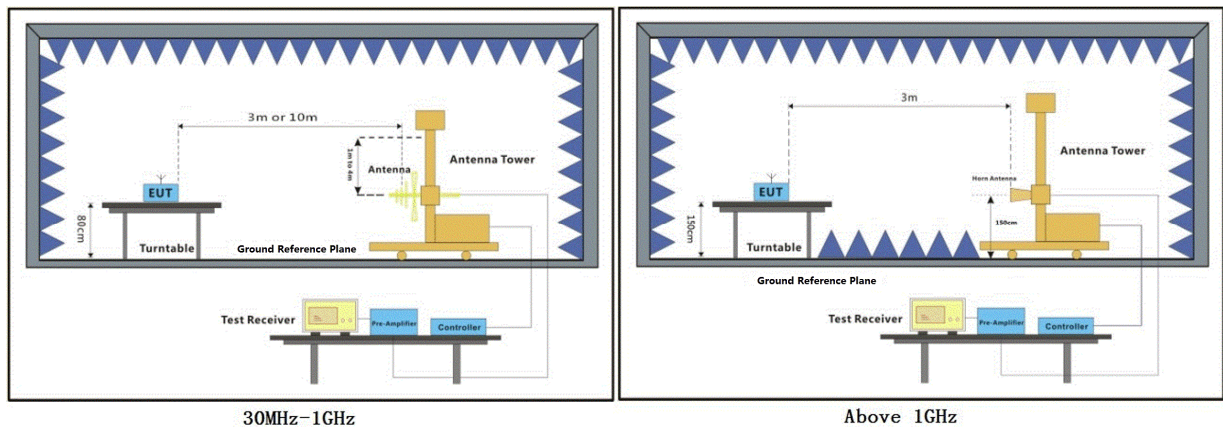
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 19.1 °C Humidity: 52.2 % 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.

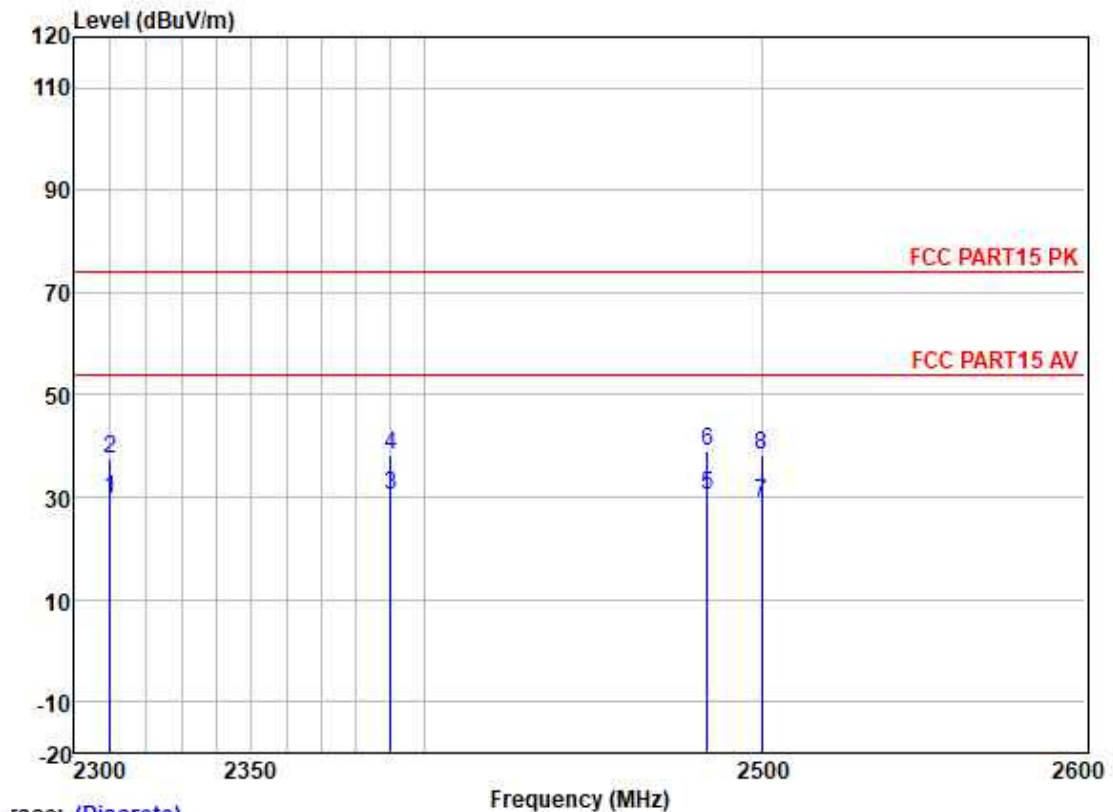
Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor



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



Trace: (Discrete)

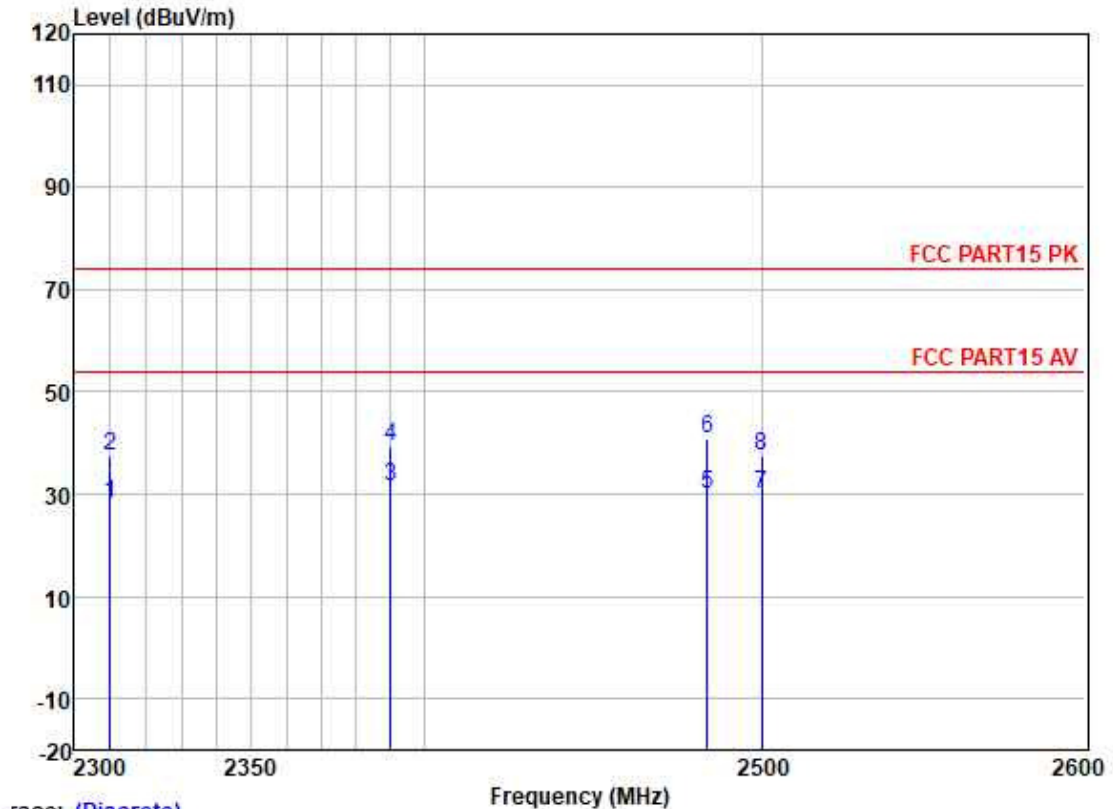
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	36.68	27.15	3.32	37.62	29.53	54.00	-24.47	HORIZONTAL	Average
2	2310.000	44.48	27.15	3.32	37.62	37.33	74.00	-36.67	HORIZONTAL	Peak
3	2390.000	37.04	27.33	3.48	37.59	30.26	54.00	-23.74	HORIZONTAL	Average
4	2390.000	45.06	27.33	3.48	37.59	38.28	74.00	-35.72	HORIZONTAL	Peak
5	2483.500	36.87	27.48	3.53	37.57	30.31	54.00	-23.69	HORIZONTAL	Average
6	2483.500	45.46	27.48	3.53	37.57	38.90	74.00	-35.10	HORIZONTAL	Peak
7	2500.000	35.65	27.50	3.40	37.56	28.99	54.00	-25.01	HORIZONTAL	Average
8	2500.000	45.08	27.50	3.40	37.56	38.42	74.00	-35.58	HORIZONTAL	Peak



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



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	35.16	27.15	3.32	37.62	28.01	54.00	-25.99	VERTICAL	Average
2	2310.000	44.53	27.15	3.32	37.62	37.38	74.00	-36.62	VERTICAL	Peak
3	2390.000	38.34	27.33	3.48	37.59	31.56	54.00	-22.44	VERTICAL	Average
4	2390.000	46.10	27.33	3.48	37.59	39.32	74.00	-34.68	VERTICAL	Peak
5	2483.500	36.60	27.48	3.53	37.57	30.04	54.00	-23.96	VERTICAL	Average
6	2483.500	47.56	27.48	3.53	37.57	41.00	74.00	-33.00	VERTICAL	Peak
7	2500.000	36.81	27.50	3.40	37.56	30.15	54.00	-23.85	VERTICAL	Average
8	2500.000	44.22	27.50	3.40	37.56	37.56	74.00	-36.44	VERTICAL	Peak



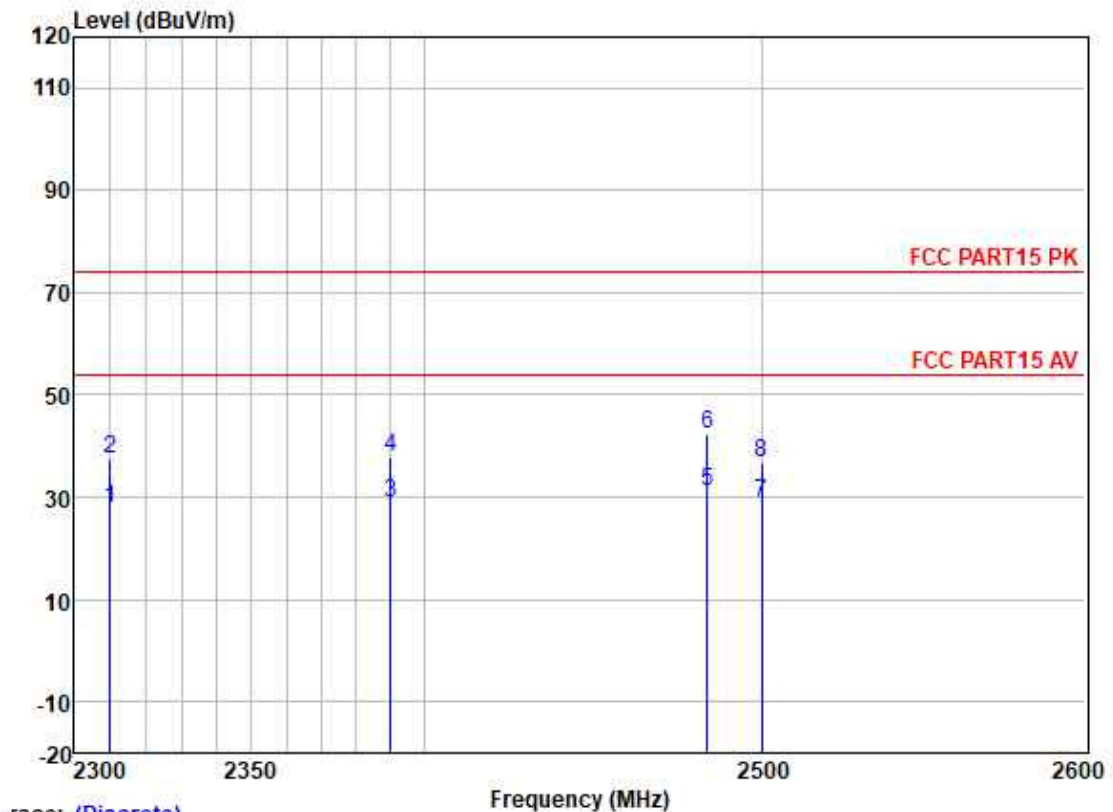
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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



Trace: (Discrete)

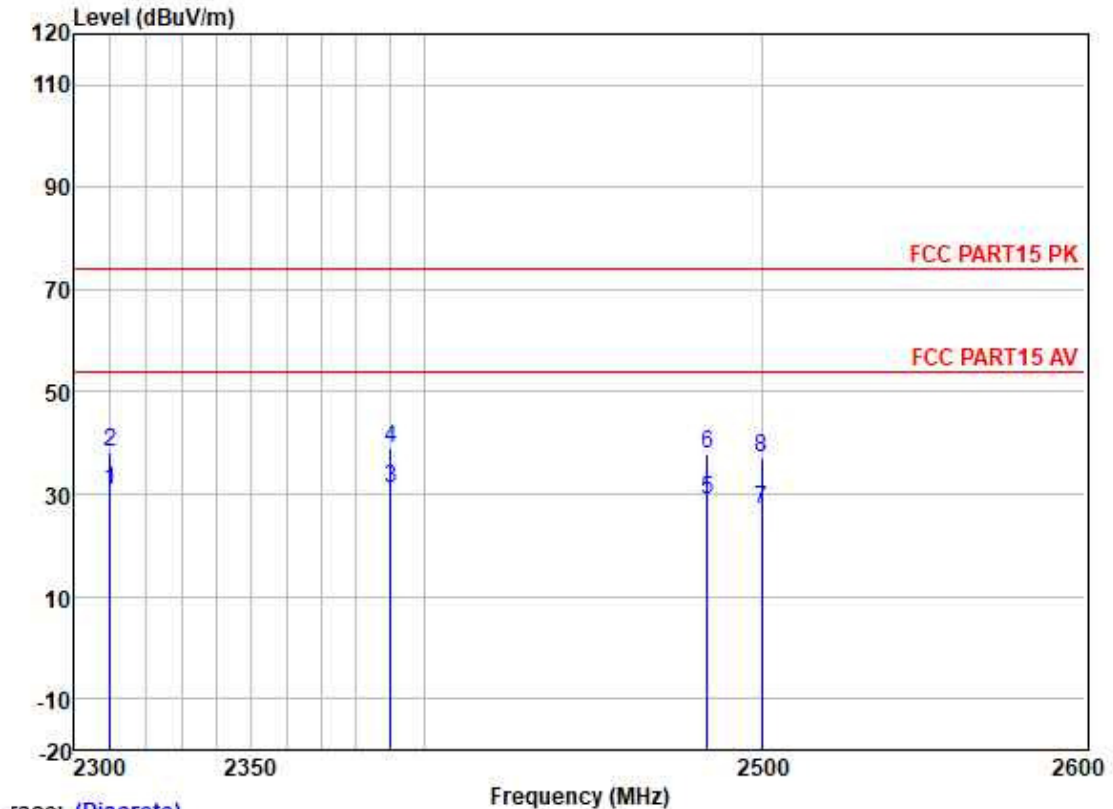
	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	34.82	27.15	3.32	37.62	27.67	54.00	-26.33	HORIZONTAL Average
2	2310.000	44.53	27.15	3.32	37.62	37.38	74.00	-36.62	HORIZONTAL Peak
3	2390.000	35.57	27.33	3.48	37.59	28.79	54.00	-25.21	HORIZONTAL Average
4	2390.000	44.53	27.33	3.48	37.59	37.75	74.00	-36.25	HORIZONTAL Peak
5	2483.500	37.67	27.48	3.53	37.57	31.11	54.00	-22.89	HORIZONTAL Average
6	2483.500	48.85	27.48	3.53	37.57	42.29	74.00	-31.71	HORIZONTAL Peak
7	2500.000	35.70	27.50	3.40	37.56	29.04	54.00	-24.96	HORIZONTAL Average
8	2500.000	43.55	27.50	3.40	37.56	36.89	74.00	-37.11	HORIZONTAL Peak



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



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	37.76	27.15	3.32	37.62	30.61	54.00	-23.39	VERTICAL	Average
2	2310.000	45.44	27.15	3.32	37.62	38.29	74.00	-35.71	VERTICAL	Peak
3	2390.000	37.90	27.33	3.48	37.59	31.12	54.00	-22.88	VERTICAL	Average
4	2390.000	45.74	27.33	3.48	37.59	38.96	74.00	-35.04	VERTICAL	Peak
5	2483.500	35.39	27.48	3.53	37.57	28.83	54.00	-25.17	VERTICAL	Average
6	2483.500	44.59	27.48	3.53	37.57	38.03	74.00	-35.97	VERTICAL	Peak
7	2500.000	33.86	27.50	3.40	37.56	27.20	54.00	-26.80	VERTICAL	Average
8	2500.000	43.93	27.50	3.40	37.56	37.27	74.00	-36.73	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.

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 19.1 °C Humidity: 52.2 % RH Atmospheric Pressure: 1020 mbar

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



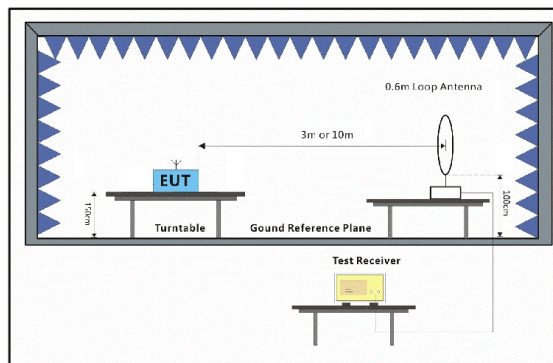
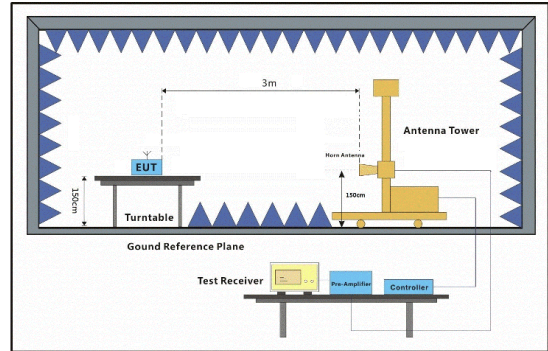
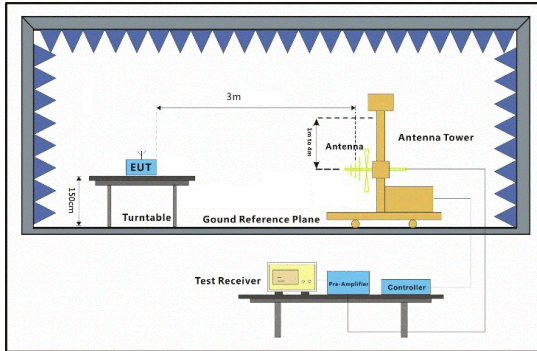
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7.8.2 Test Setup Diagram



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:

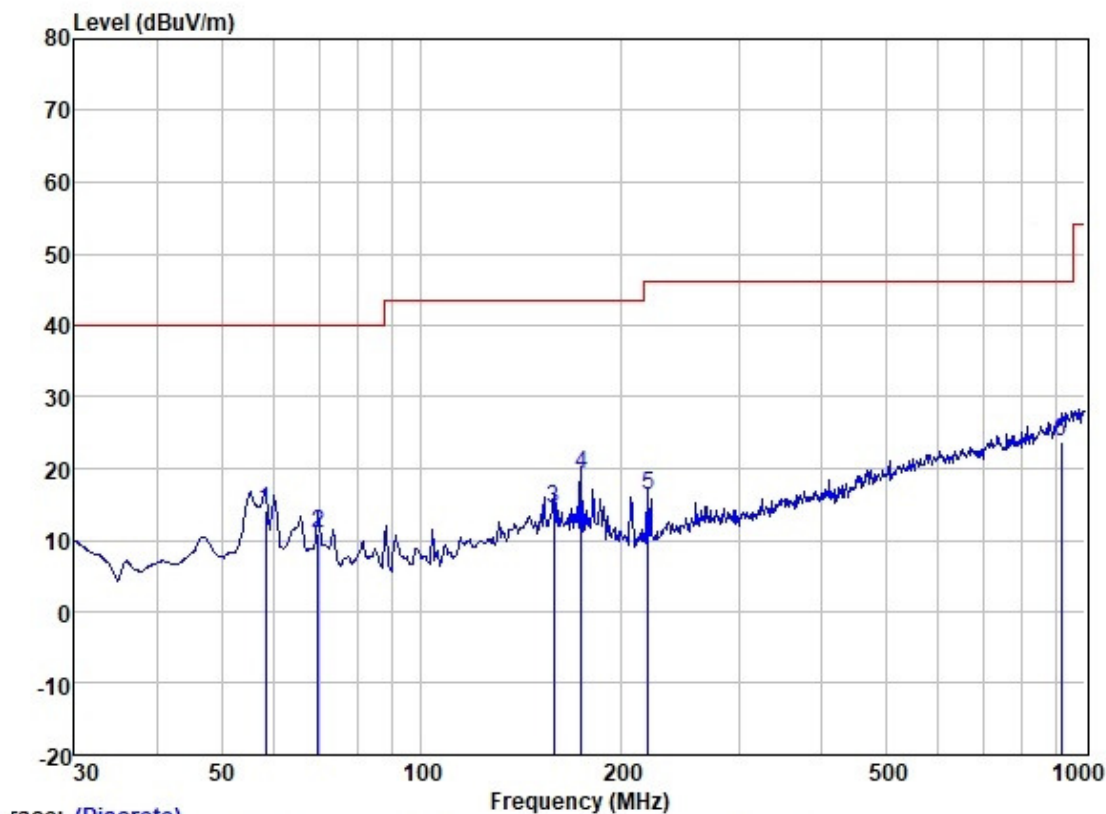
- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final 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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Guangzhou Branch Testing Center EEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

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



Trace: (Discrete)

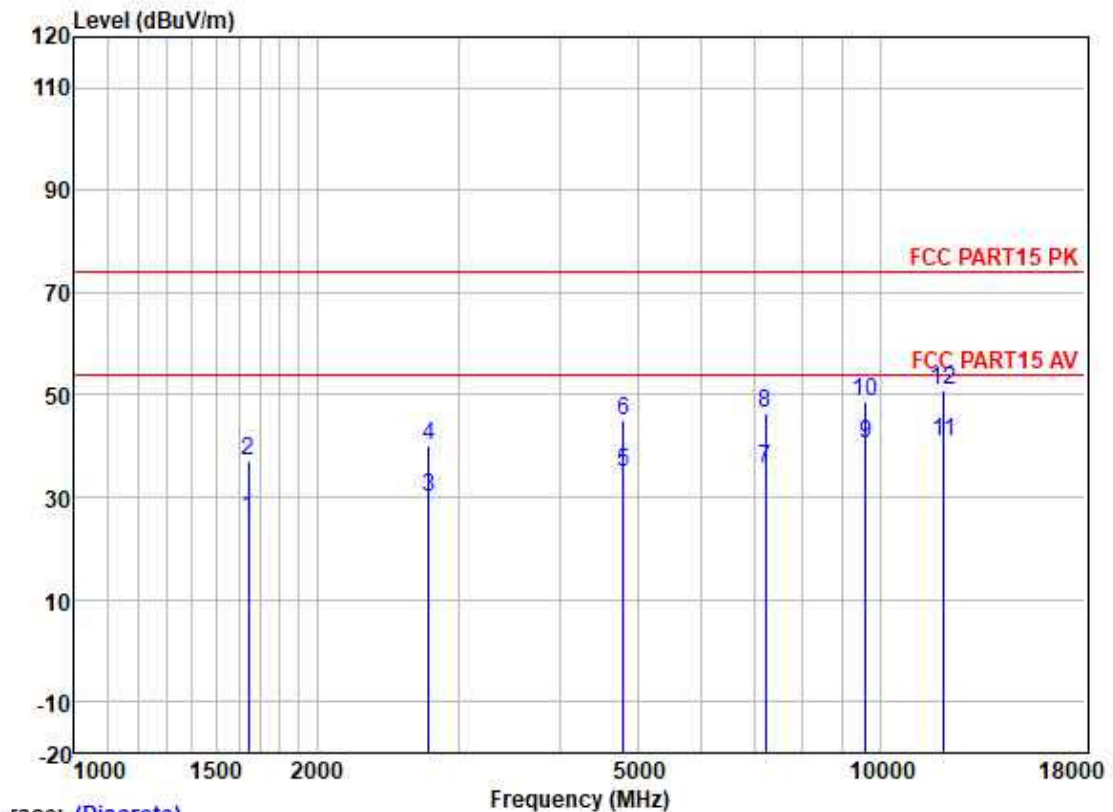
	Freq	ReadAntenna	Cable	Preamp		Limit	Over		
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	58.203	28.94	14.14	0.58	29.48	14.18	40.00	-25.82	HORIZONTAL QP
2	69.845	26.94	12.72	0.72	29.42	10.96	40.00	-29.04	HORIZONTAL QP
3	158.112	28.94	13.66	1.25	29.40	14.45	43.50	-29.05	HORIZONTAL QP
4	173.814	34.37	12.93	1.32	29.40	19.22	43.50	-24.28	HORIZONTAL QP
5	219.075	33.55	11.20	1.01	29.43	16.33	46.00	-29.67	HORIZONTAL QP
6	919.287	24.72	23.58	3.74	28.43	23.61	46.00	-22.39	HORIZONTAL QP



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



Trace: (Discrete)

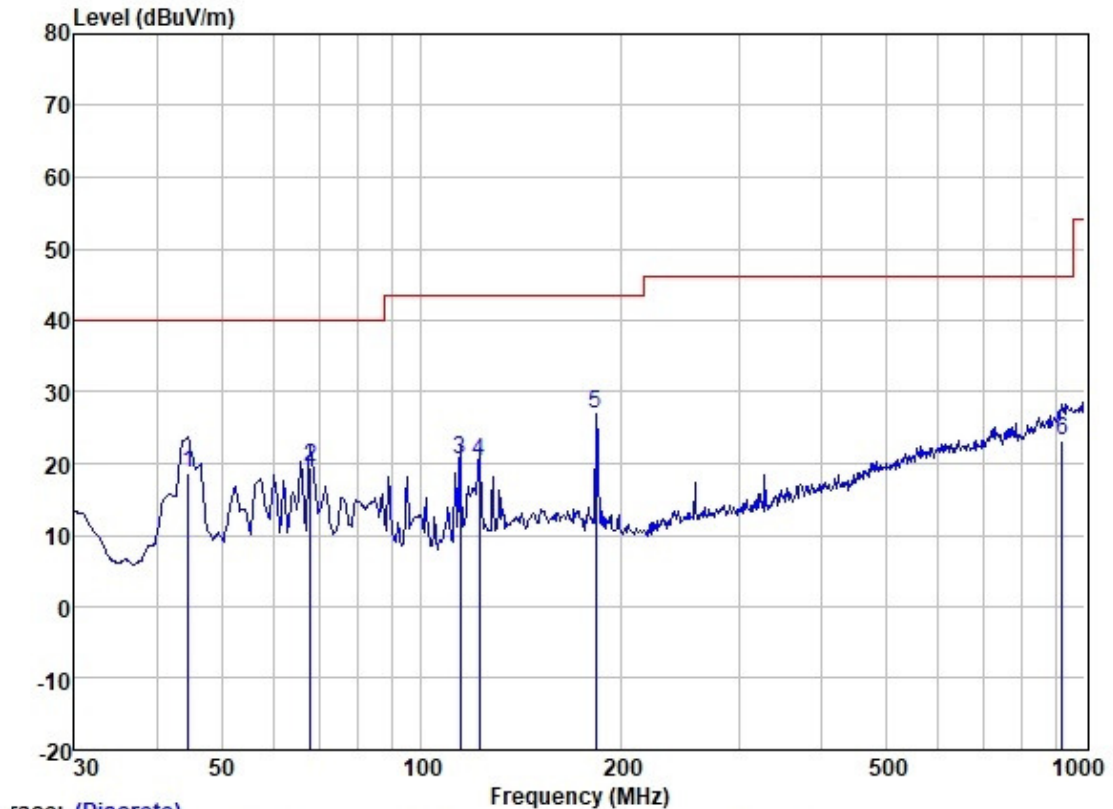
	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1644.019	35.29	25.63	2.80	37.93	25.79	54.00	-28.21	HORIZONTAL Average
2	1644.019	46.49	25.63	2.80	37.93	36.99	74.00	-37.01	HORIZONTAL Peak
3	2750.080	35.71	28.01	3.65	37.44	29.93	54.00	-24.07	HORIZONTAL Average
4	2750.080	45.75	28.01	3.65	37.44	39.97	74.00	-34.03	HORIZONTAL Peak
5	4804.245	35.04	31.42	5.40	36.83	35.03	54.00	-18.97	HORIZONTAL Average
6	4804.245	45.11	31.42	5.40	36.83	45.10	74.00	-28.90	HORIZONTAL Peak
7	7206.890	31.53	35.54	5.98	37.38	35.67	54.00	-18.33	HORIZONTAL Average
8	7206.890	42.30	35.54	5.98	37.38	46.44	74.00	-27.56	HORIZONTAL Peak
9	9608.860	32.37	38.37	7.07	37.42	40.39	54.00	-13.61	HORIZONTAL Average
10	9608.860	40.70	38.37	7.07	37.42	48.72	74.00	-25.28	HORIZONTAL Peak
11	12010.850	30.80	38.90	8.19	37.10	40.79	54.00	-13.21	HORIZONTAL Average
12	12010.850	40.81	38.90	8.19	37.10	50.80	74.00	-23.20	HORIZONTAL Peak



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



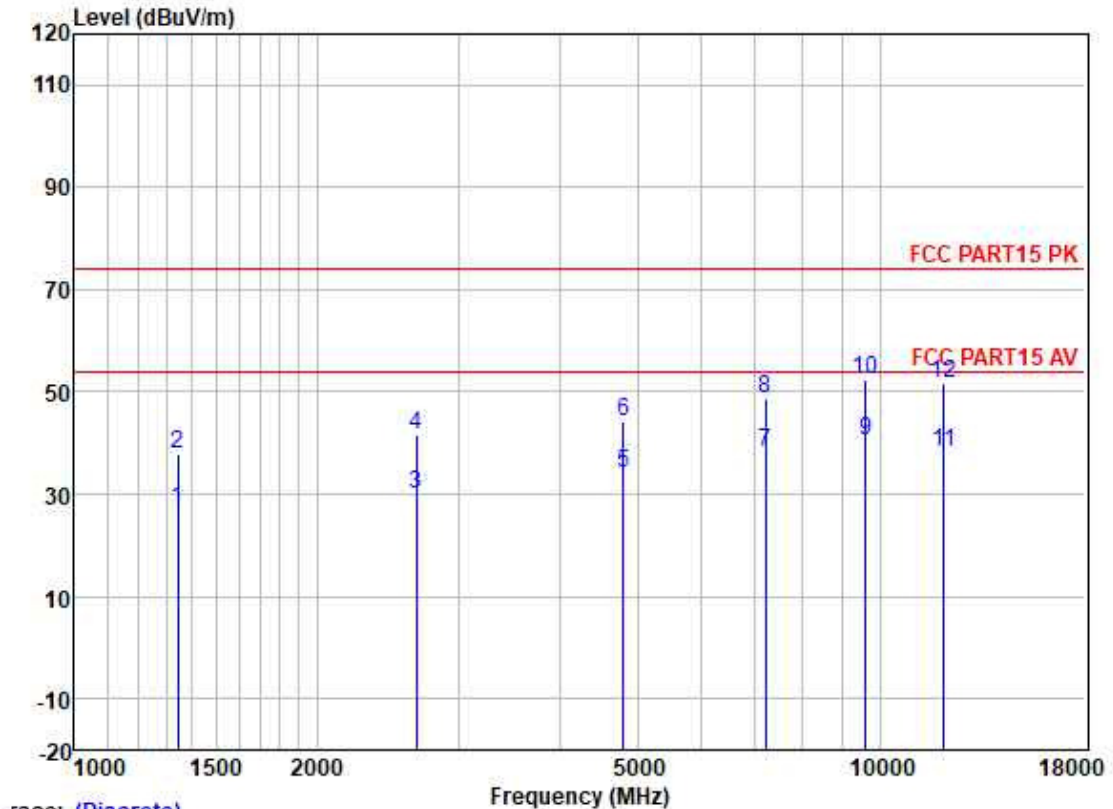
	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	dBuV/m	dBuV/m	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	44.587	33.46	14.07	0.70	29.53	18.70	40.00	-21.30	VERTICAL	QP
2	67.913	35.22	12.90	0.70	29.42	19.40	40.00	-20.60	VERTICAL	QP
3	114.515	38.35	10.69	0.91	29.40	20.55	43.50	-22.95	VERTICAL	QP
4	121.976	37.50	11.15	0.93	29.40	20.18	43.50	-23.32	VERTICAL	QP
5	183.201	42.58	12.52	1.32	29.40	27.02	43.50	-16.48	VERTICAL	QP
6	922.516	24.31	23.62	3.72	28.40	23.25	46.00	-22.75	VERTICAL	QP



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



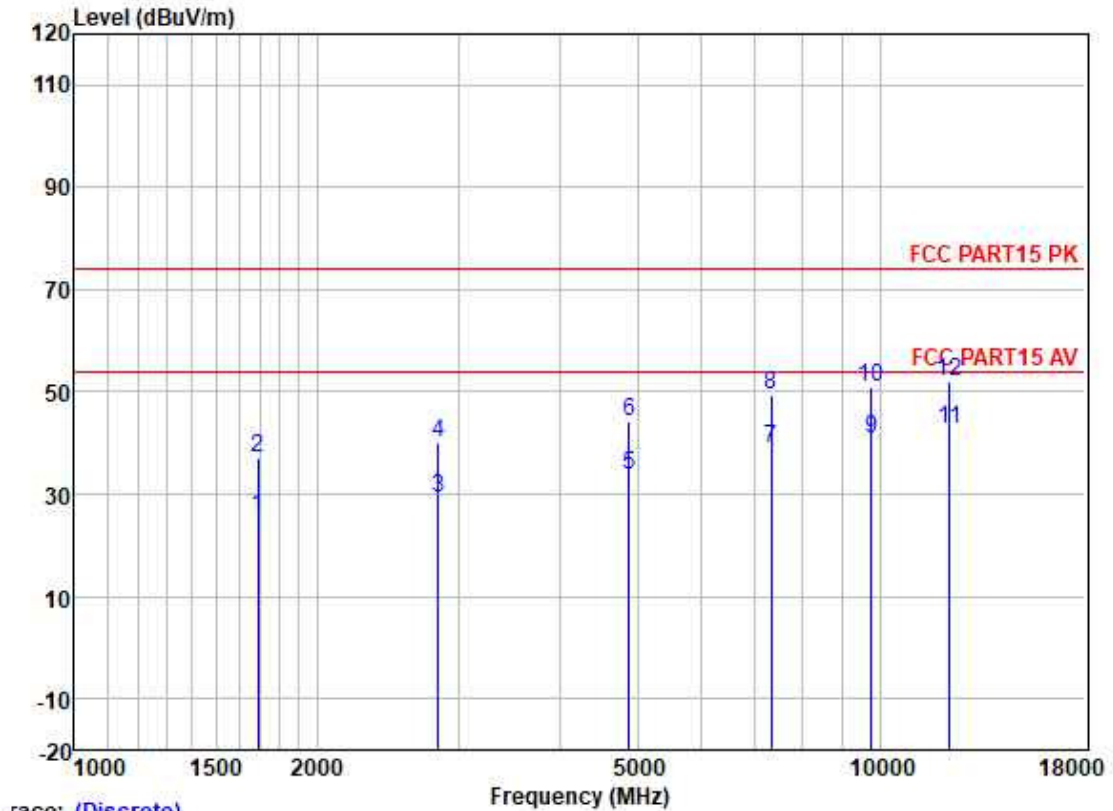
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1342.882	37.53	25.30	2.60	38.27	27.16	54.00	-26.84	VERTICAL	Average
2	1342.882	48.37	25.30	2.60	38.27	38.00	74.00	-36.00	VERTICAL	Peak
3	2656.331	36.18	27.73	3.55	37.49	29.97	54.00	-24.03	VERTICAL	Average
4	2656.331	47.73	27.73	3.55	37.49	41.52	74.00	-32.48	VERTICAL	Peak
5	4804.888	34.32	31.42	5.40	36.83	34.31	54.00	-19.69	VERTICAL	Average
6	4804.888	44.38	31.42	5.40	36.83	44.37	74.00	-29.63	VERTICAL	Peak
7	7206.461	34.15	35.54	5.98	37.38	38.29	54.00	-15.71	VERTICAL	Average
8	7206.461	44.43	35.54	5.98	37.38	48.57	74.00	-25.43	VERTICAL	Peak
9	9608.717	32.37	38.37	7.07	37.42	40.39	54.00	-13.61	VERTICAL	Average
10	9608.717	44.48	38.37	7.07	37.42	52.50	74.00	-21.50	VERTICAL	Peak
11	12010.100	28.12	38.90	8.19	37.10	38.11	54.00	-15.89	VERTICAL	Average
12	12010.100	41.66	38.90	8.19	37.10	51.65	74.00	-22.35	VERTICAL	Peak



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



Trace: (Discrete)

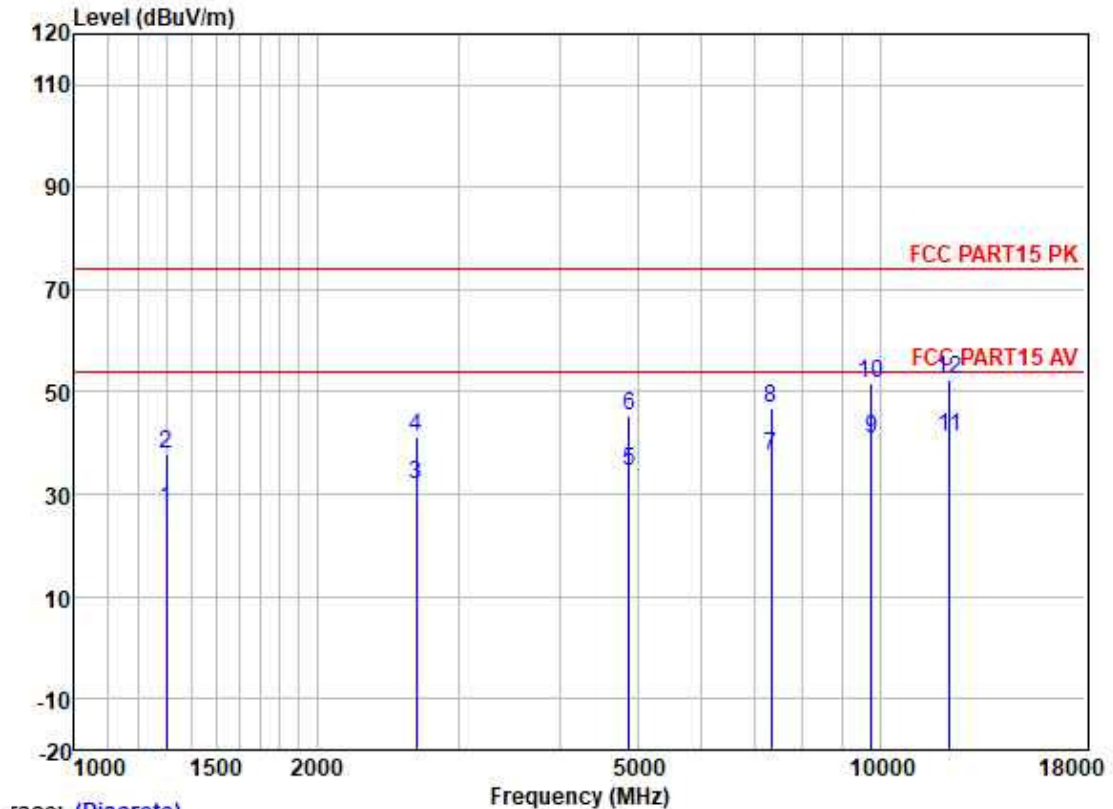
	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	Pol/Phase	Remark
	MHz	Level	Factor	Loss	Factor	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1692.231	35.09	25.70	2.80	37.89	25.70	54.00	-28.30	HORIZONTAL Average
2	1692.231	46.37	25.70	2.80	37.89	36.98	74.00	-37.02	HORIZONTAL Peak
3	2830.728	34.64	28.20	3.70	37.40	29.14	54.00	-24.86	HORIZONTAL Average
4	2830.728	45.56	28.20	3.70	37.40	40.06	74.00	-33.94	HORIZONTAL Peak
5	4884.181	33.48	31.56	5.52	36.84	33.72	54.00	-20.28	HORIZONTAL Average
6	4884.181	43.85	31.56	5.52	36.84	44.09	74.00	-29.91	HORIZONTAL Peak
7	7326.038	34.24	36.00	6.13	37.43	38.94	54.00	-15.06	HORIZONTAL Average
8	7326.038	44.68	36.00	6.13	37.43	49.38	74.00	-24.62	HORIZONTAL Peak
9	9768.603	32.73	38.53	7.01	37.41	40.86	54.00	-13.14	HORIZONTAL Average
10	9768.603	42.96	38.53	7.01	37.41	51.09	74.00	-22.91	HORIZONTAL Peak
11	12210.310	32.94	38.74	8.08	37.00	42.76	54.00	-11.24	HORIZONTAL Average
12	12210.310	42.41	38.74	8.08	37.00	52.23	74.00	-21.77	HORIZONTAL Peak



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



Trace: (Discrete)

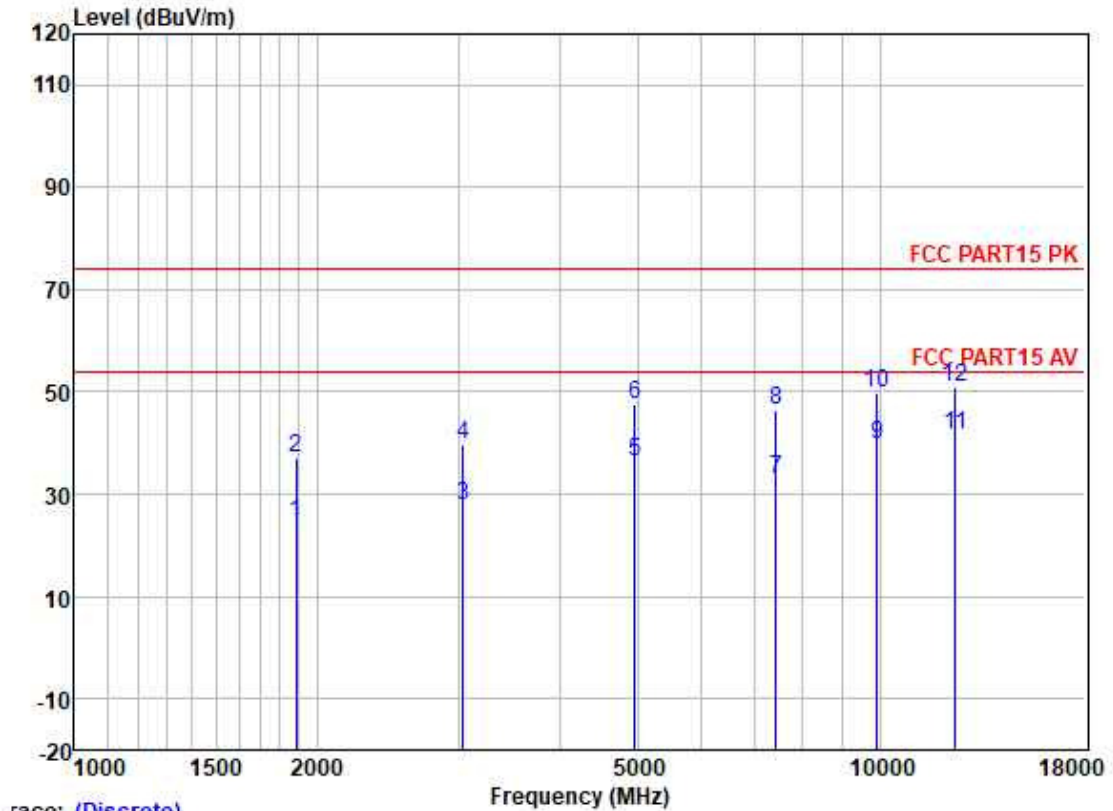
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1300.858	37.56	25.20	2.60	38.31	27.05	54.00	-26.95	VERTICAL	Average
2	1300.858	48.34	25.20	2.60	38.31	37.83	74.00	-36.17	VERTICAL	Peak
3	2656.331	37.95	27.73	3.55	37.49	31.74	54.00	-22.26	VERTICAL	Average
4	2656.331	47.32	27.73	3.55	37.49	41.11	74.00	-32.89	VERTICAL	Peak
5	4884.993	34.42	31.56	5.52	36.84	34.66	54.00	-19.34	VERTICAL	Average
6	4884.993	45.27	31.56	5.52	36.84	45.51	74.00	-28.49	VERTICAL	Peak
7	7326.999	32.75	36.00	6.13	37.43	37.45	54.00	-16.55	VERTICAL	Average
8	7326.999	42.03	36.00	6.13	37.43	46.73	74.00	-27.27	VERTICAL	Peak
9	9768.230	32.81	38.53	7.01	37.41	40.94	54.00	-13.06	VERTICAL	Average
10	9768.230	43.42	38.53	7.01	37.41	51.55	74.00	-22.45	VERTICAL	Peak
11	12210.700	31.58	38.74	8.08	37.00	41.40	54.00	-12.60	VERTICAL	Average
12	12210.700	42.48	38.74	8.08	37.00	52.30	74.00	-21.70	VERTICAL	Peak



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



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp	Limit	Over			
	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1883.236	33.08	26.03	2.91	37.77	24.25	54.00	-29.75	HORIZONTAL Average
2	1883.236	46.03	26.03	2.91	37.77	37.20	74.00	-36.80	HORIZONTAL Peak
3	3034.063	32.83	28.42	3.83	37.22	27.86	54.00	-26.14	HORIZONTAL Average
4	3034.063	44.81	28.42	3.83	37.22	39.84	74.00	-34.16	HORIZONTAL Peak
5	4960.993	35.83	31.65	5.65	36.84	36.29	54.00	-17.71	HORIZONTAL Average
6	4960.993	47.05	31.65	5.65	36.84	47.51	74.00	-26.49	HORIZONTAL Peak
7	7440.375	28.12	36.27	6.22	37.47	33.14	54.00	-20.86	HORIZONTAL Average
8	7440.375	41.59	36.27	6.22	37.47	46.61	74.00	-27.39	HORIZONTAL Peak
9	9920.214	31.39	38.65	6.96	37.40	39.60	54.00	-14.40	HORIZONTAL Average
10	9920.214	41.70	38.65	6.96	37.40	49.91	74.00	-24.09	HORIZONTAL Peak
11	12400.510	32.09	38.57	7.97	36.88	41.75	54.00	-12.25	HORIZONTAL Average
12	12400.510	41.42	38.57	7.97	36.88	51.08	74.00	-22.92	HORIZONTAL Peak



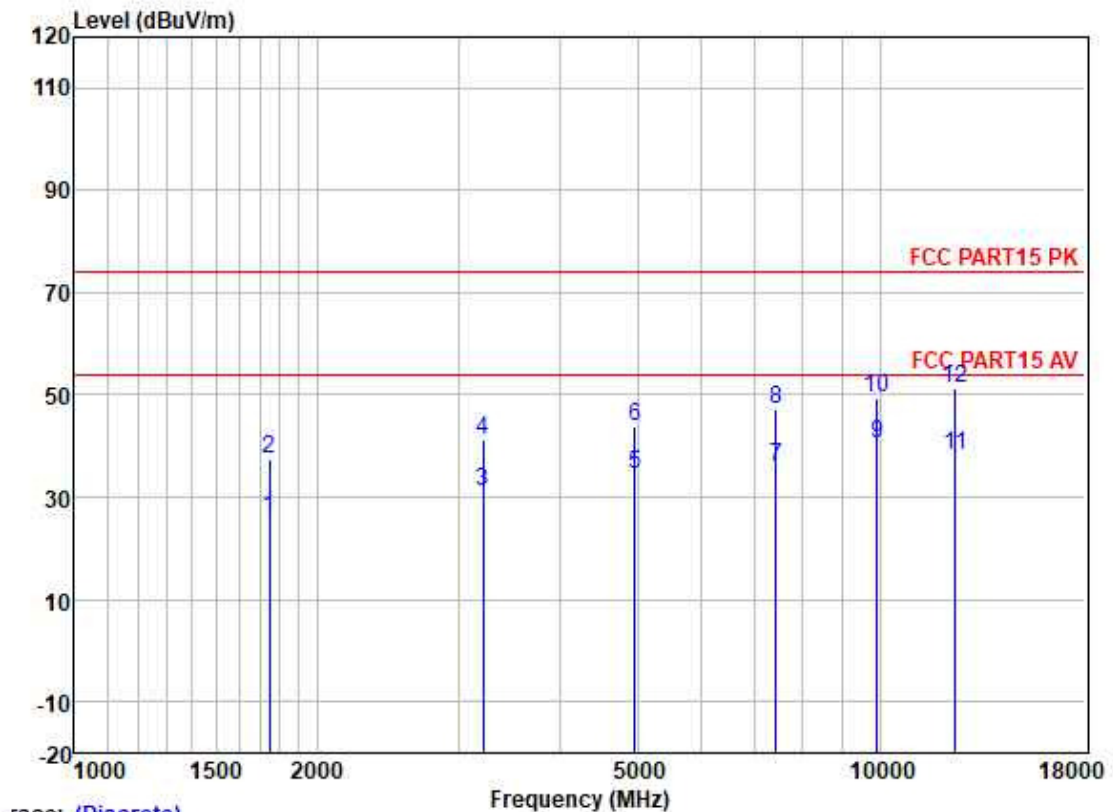
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Guangzhou Branch
Inspection & Testing Services

No.198 Kezhu Road, Science Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663 t (86-20) 82155555 f (86-20) 82075058 www.sgs.com.cn
中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

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



Trace: (Discrete)

	Freq	ReadAntenna Level Factor	Cable Preamp Loss Factor	Limit Line	Over Limit	Pol/Phase	Remark			
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1746.898	34.89	25.84	2.89	37.85	25.77	54.00	-28.23	VERTICAL	Average
2	1746.898	46.45	25.84	2.89	37.85	37.33	74.00	-36.67	VERTICAL	Peak
3	3214.623	35.74	28.61	4.01	37.07	31.29	54.00	-22.71	VERTICAL	Average
4	3214.623	45.62	28.61	4.01	37.07	41.17	74.00	-32.83	VERTICAL	Peak
5	4960.058	34.17	31.65	5.65	36.84	34.63	54.00	-19.37	VERTICAL	Average
6	4960.058	43.57	31.65	5.65	36.84	44.03	74.00	-29.97	VERTICAL	Peak
7	7440.542	30.83	36.27	6.22	37.47	35.85	54.00	-18.15	VERTICAL	Average
8	7440.542	42.05	36.27	6.22	37.47	47.07	74.00	-26.93	VERTICAL	Peak
9	9920.456	32.22	38.65	6.96	37.40	40.43	54.00	-13.57	VERTICAL	Average
10	9920.456	41.19	38.65	6.96	37.40	49.40	74.00	-24.60	VERTICAL	Peak
11	12400.820	28.46	38.57	7.97	36.88	38.12	54.00	-15.88	VERTICAL	Average
12	12400.820	41.79	38.57	7.97	36.88	51.45	74.00	-22.55	VERTICAL	Peak



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8 Appendix

8.1 Appendix 15.247

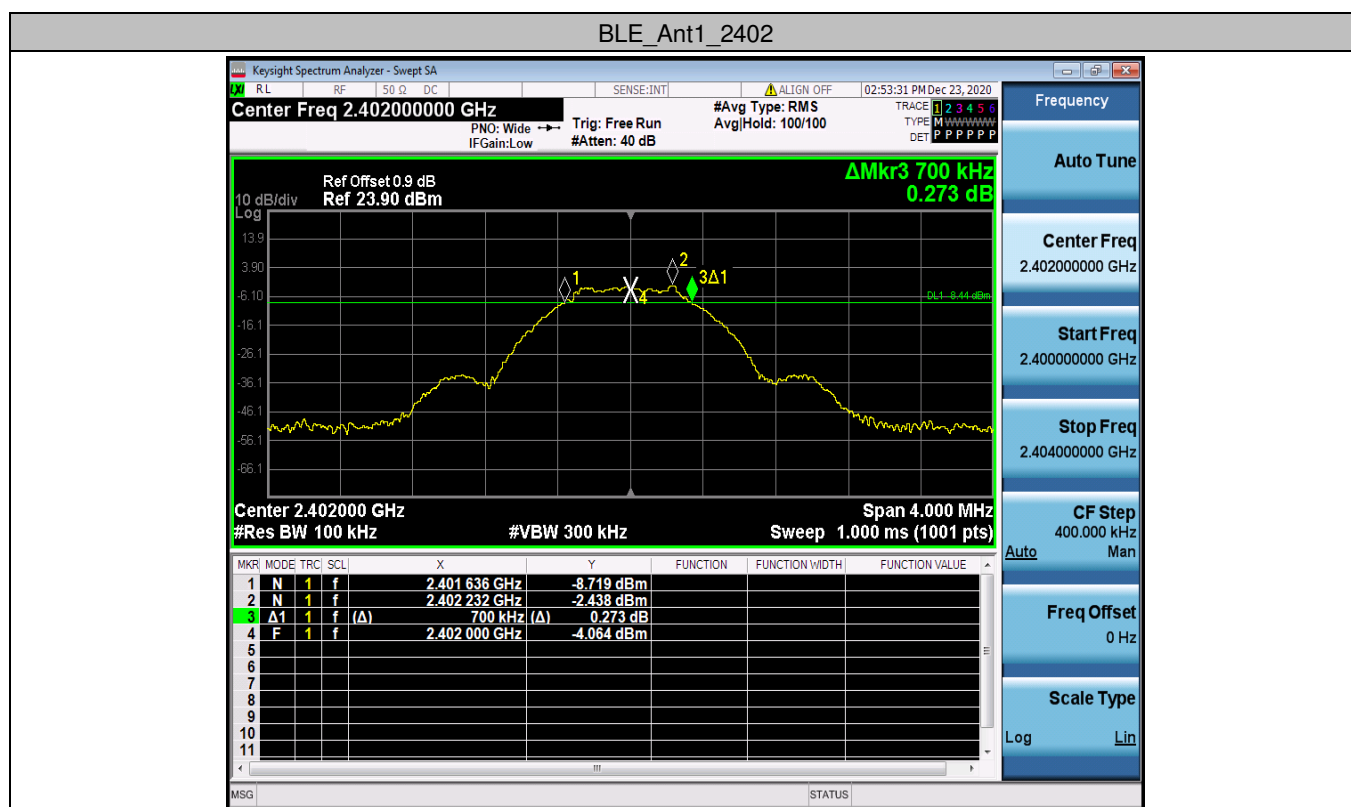
Cable Loss=0.9 dB

8.2 Appendix A: DTS Bandwidth

8.2.1 Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	0.700	2401.636	2402.336	0.5	PASS
		2442	0.736	2441.612	2442.348	0.5	PASS
		2480	0.736	2479.608	2480.344	0.5	PASS

8.2.2 Test Graphs



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BLE_Ant1_2442



BLE_Ant1_2480



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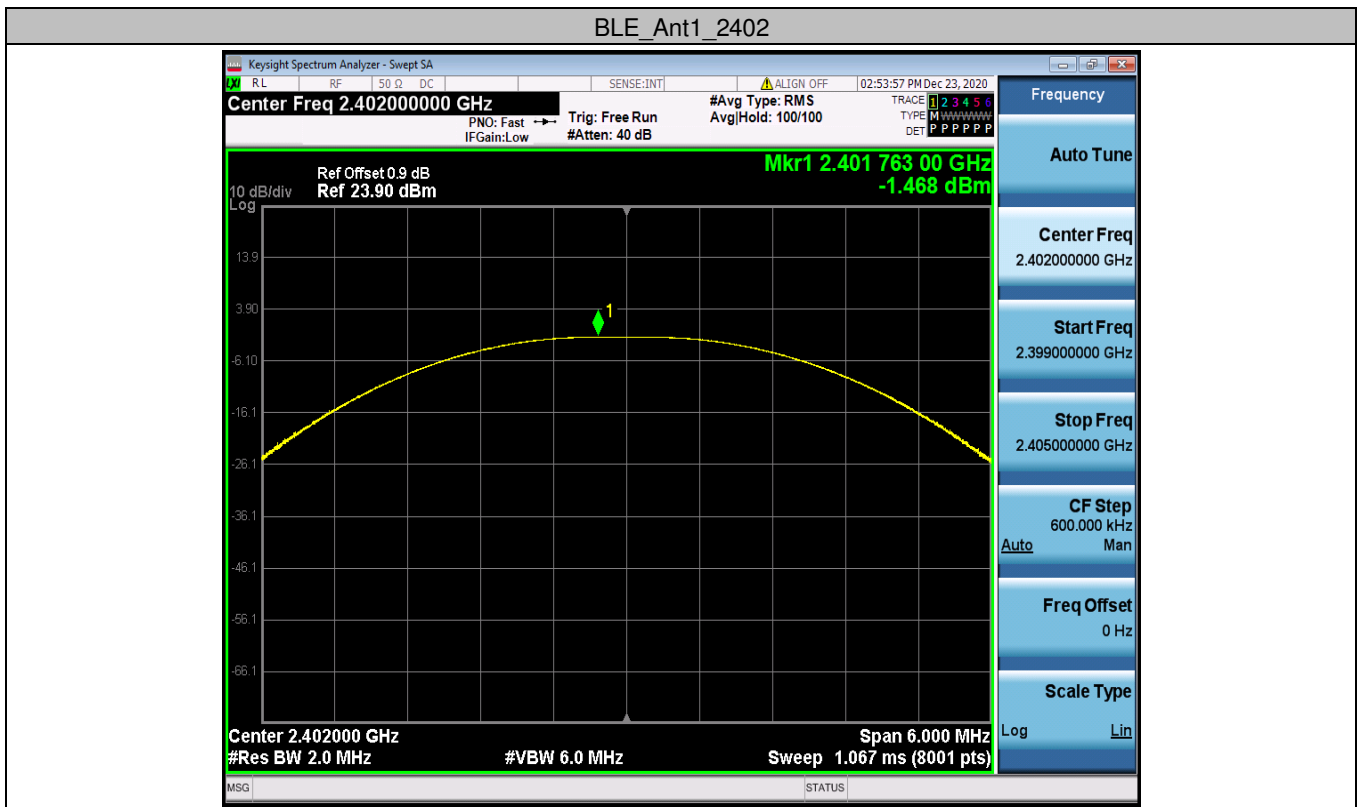
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8.3 Appendix B: Maximum conducted output power

8.3.1 Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	-1.47	<=30	PASS
		2442	-1.96	<=30	PASS
		2480	-2.12	<=30	PASS

8.3.2 Test Graphs



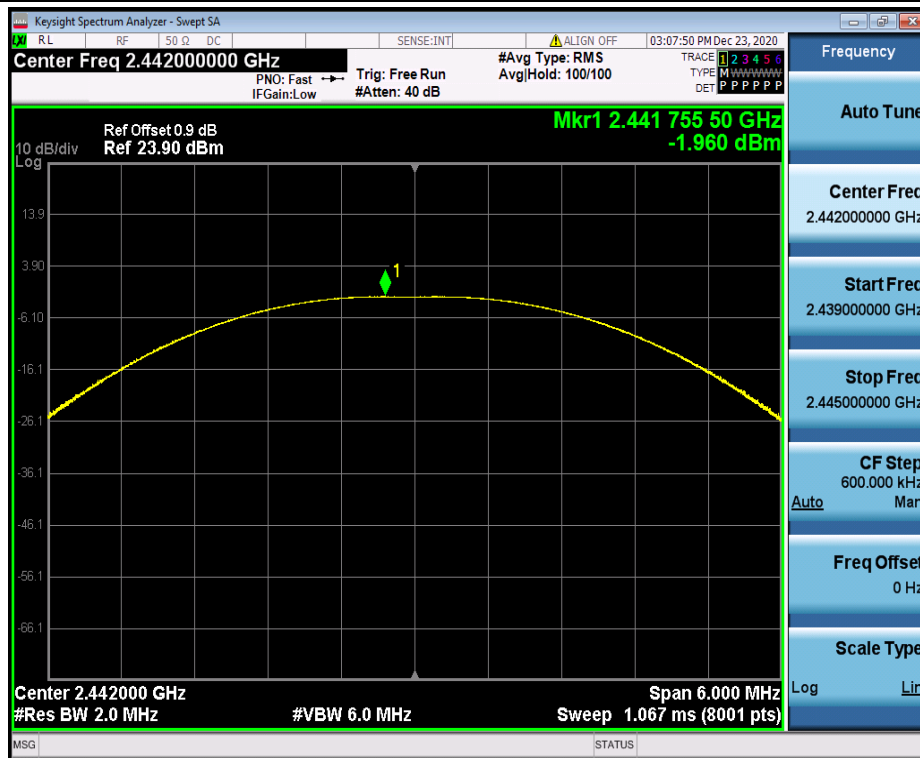
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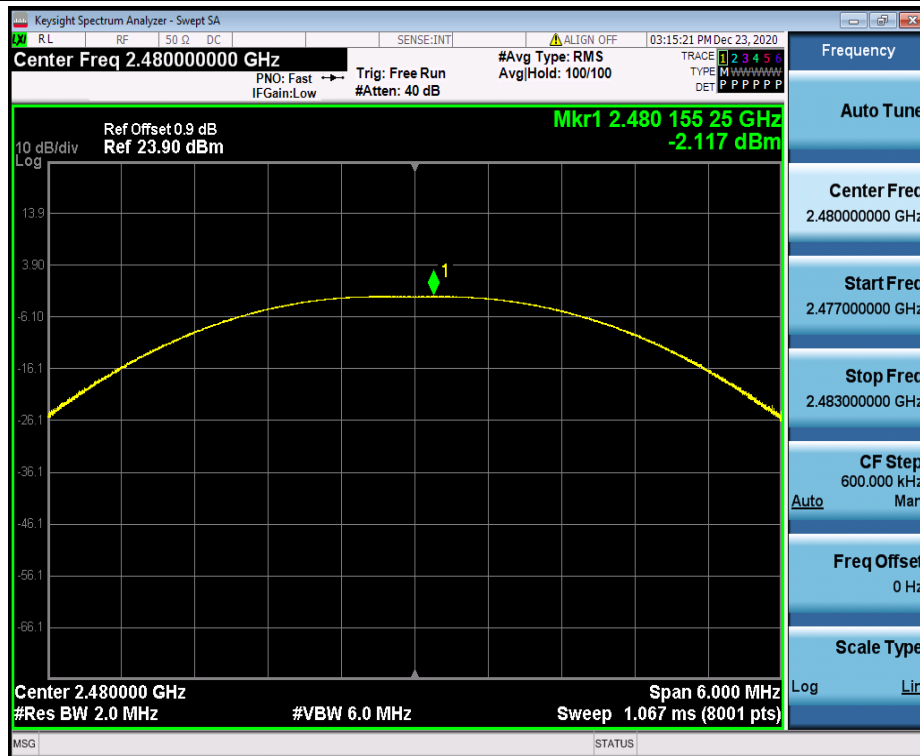
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BLE_Ant1_2442



BLE_Ant1_2480



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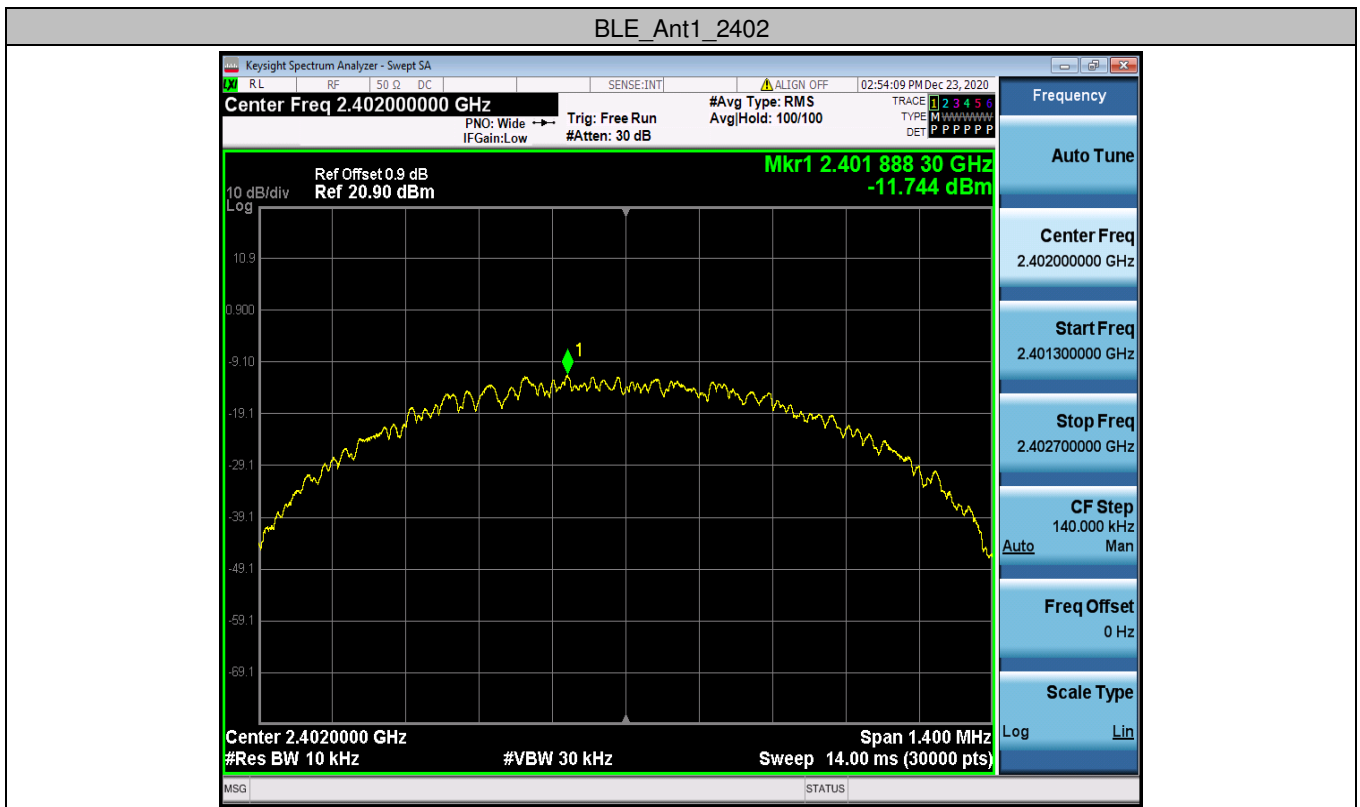
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8.4 Appendix C: Maximum power spectral density

8.4.1 Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE	Ant1	2402	-11.74	<=8	PASS
		2442	-12.53	<=8	PASS
		2480	-12.81	<=8	PASS

8.4.2 Test Graphs



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BLE_Ant1_2442



BLE_Ant1_2480



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8.5 Appendix D: Band edge measurements

8.5.1 Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	Low	2402	-2.18	-55.88	<=-22.18	PASS
		High	2480	-2.92	-57.37	<=-22.92	PASS

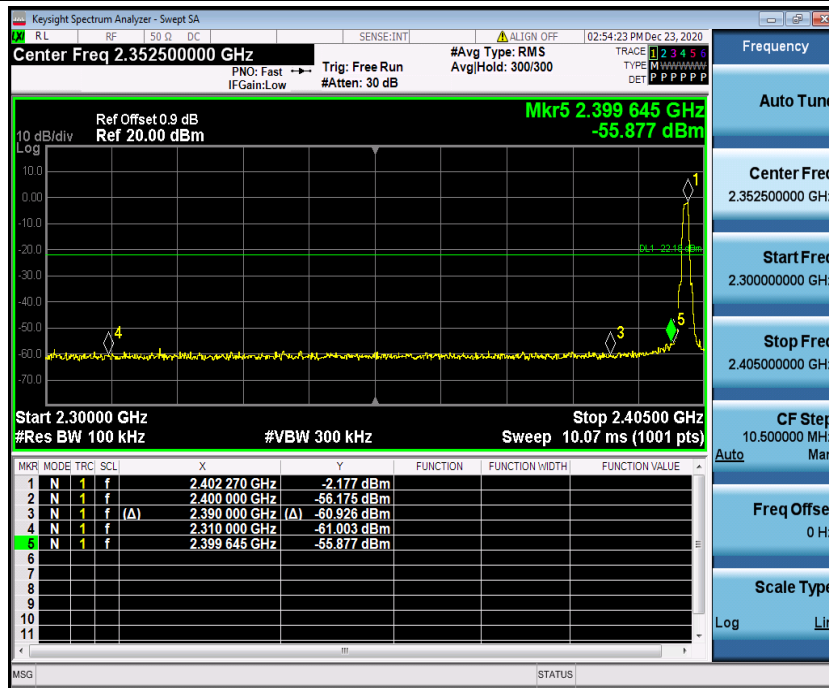


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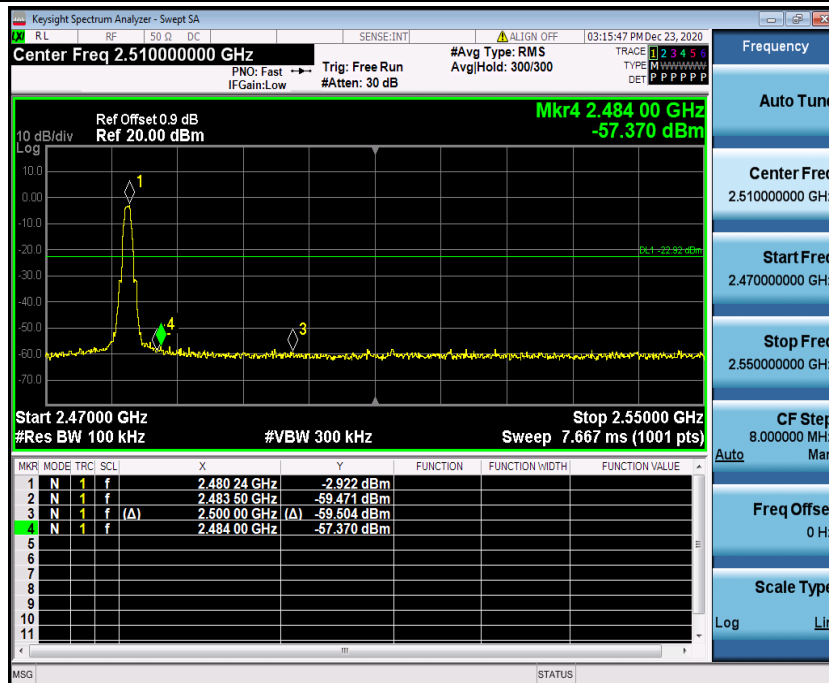
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8.5.2 Test Graphs

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BLE_Ant1_High_2480



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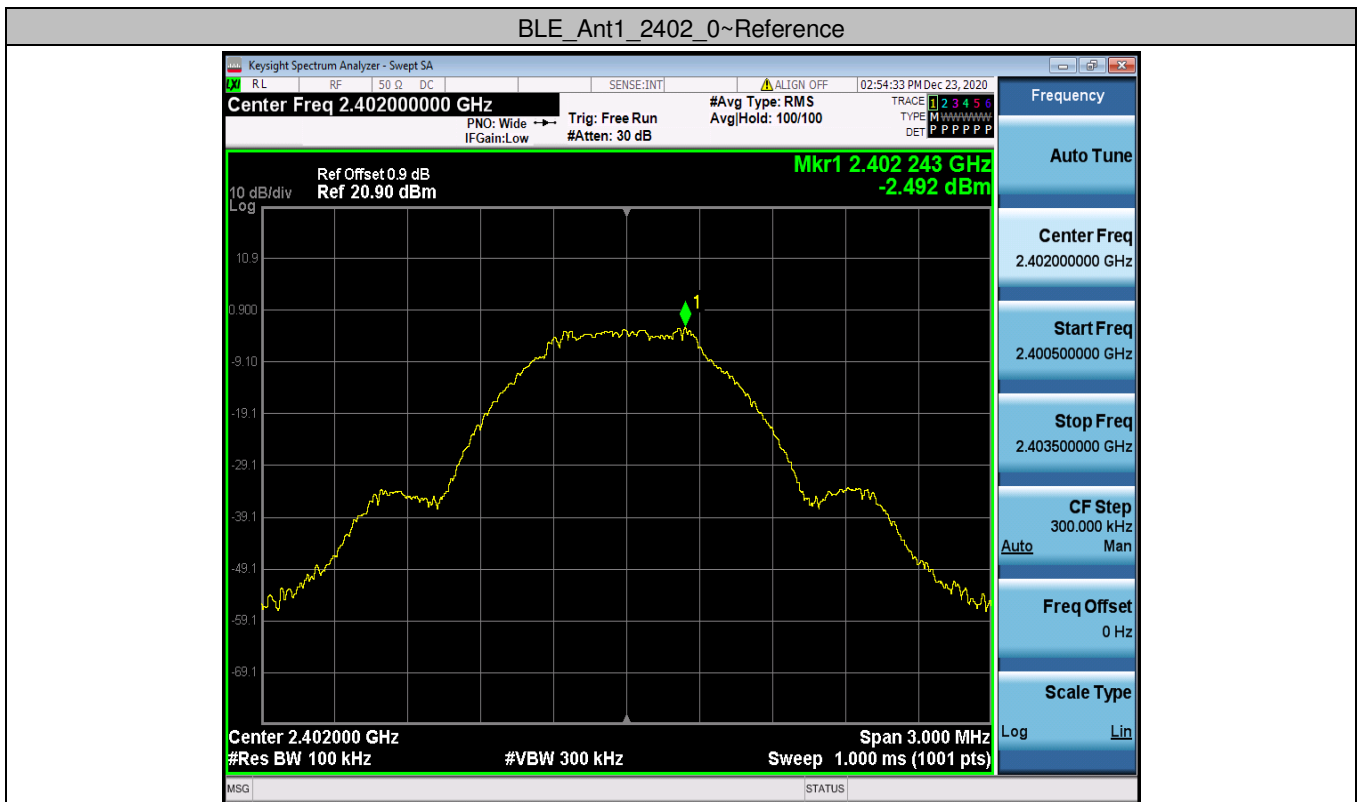
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8.6 Appendix E: Conducted Spurious Emission

8.6.1 Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	Reference	-2.49	-2.49	---	PASS
			30~1000	30~1000	-70.333	<=-22.492	PASS
			1000~26500	1000~26500	-52.194	<=-22.492	PASS
		2442	Reference	-3.07	-3.07	---	PASS
			30~1000	30~1000	-70.716	<=-23.069	PASS
			1000~26500	1000~26500	-54.032	<=-23.069	PASS
		2480	Reference	-3.16	-3.16	---	PASS
			30~1000	30~1000	-70.66	<=-23.162	PASS
			1000~26500	1000~26500	-54.216	<=-23.162	PASS

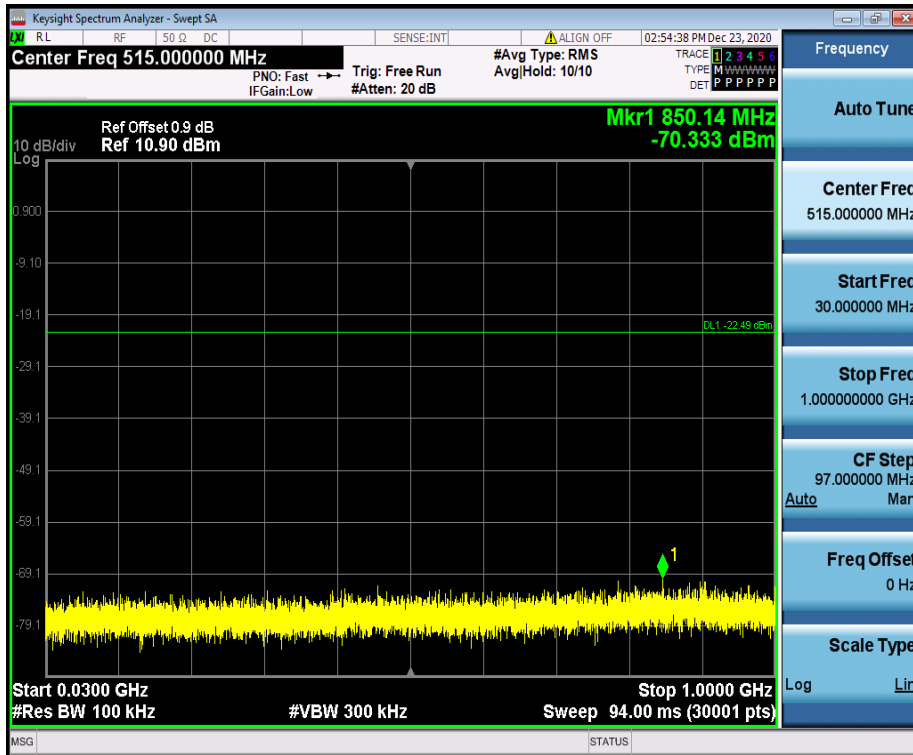
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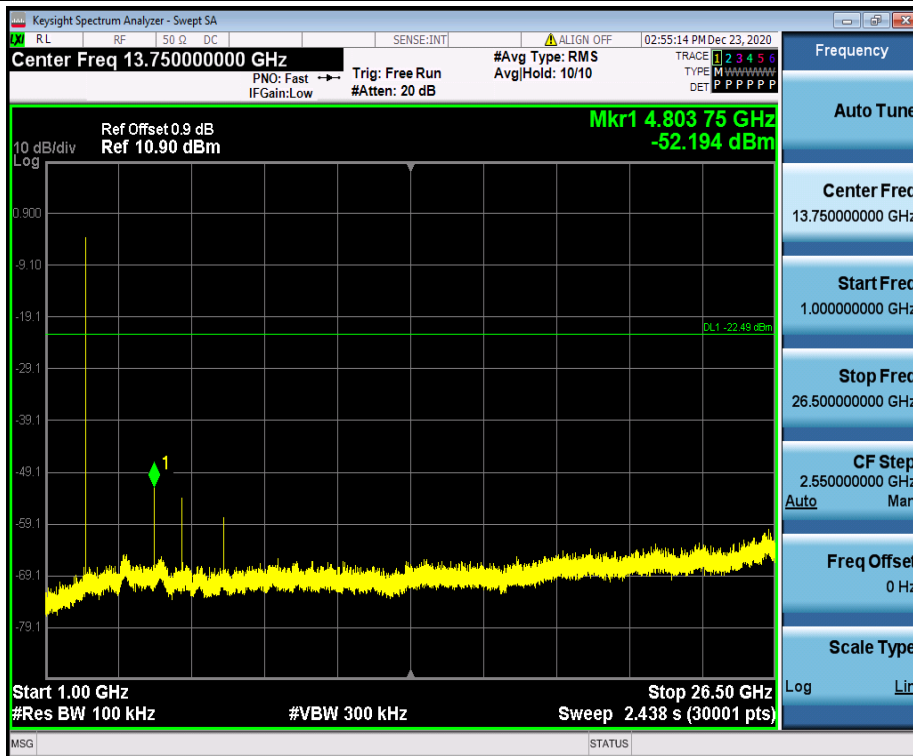
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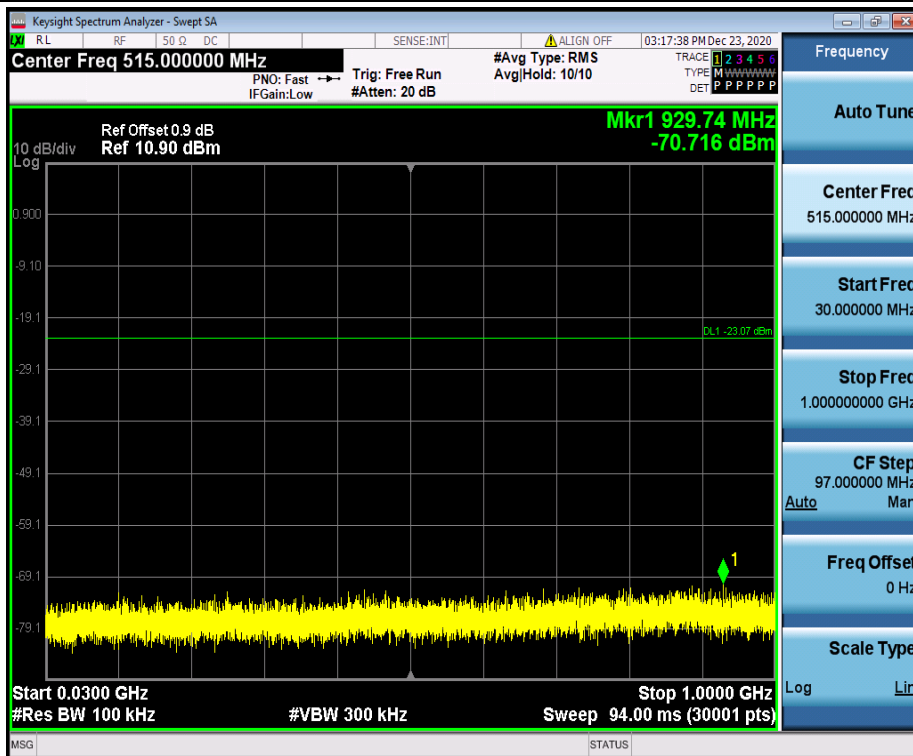
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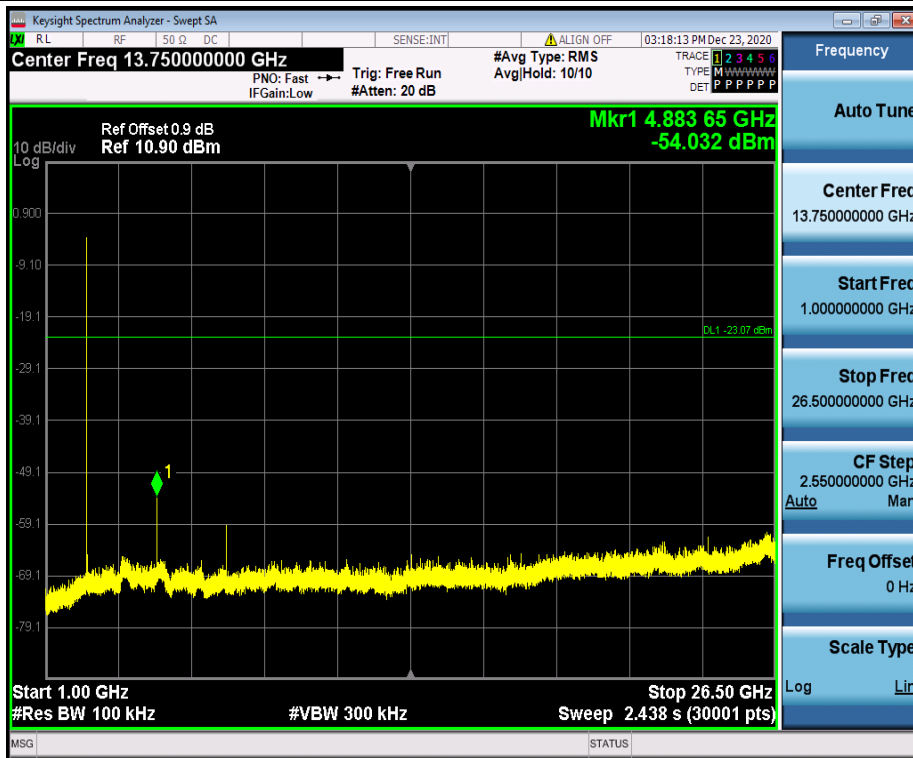
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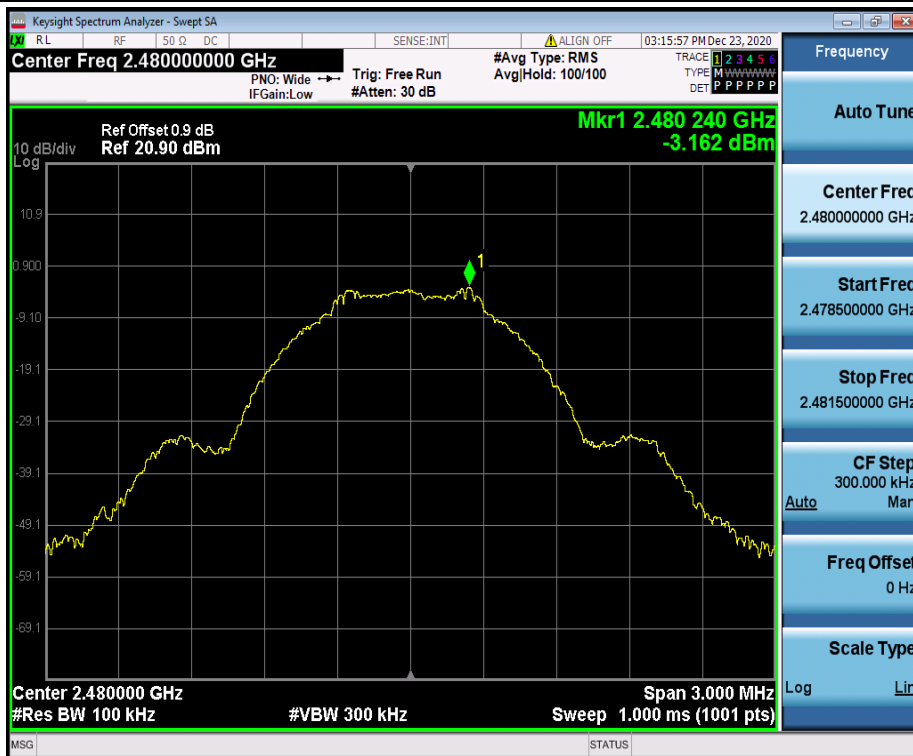
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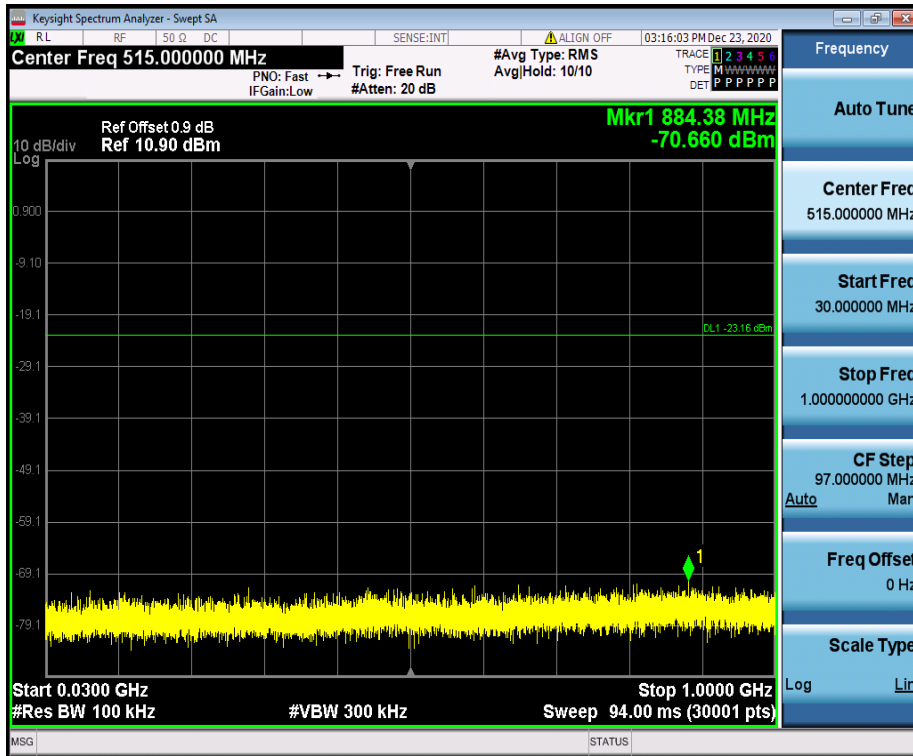
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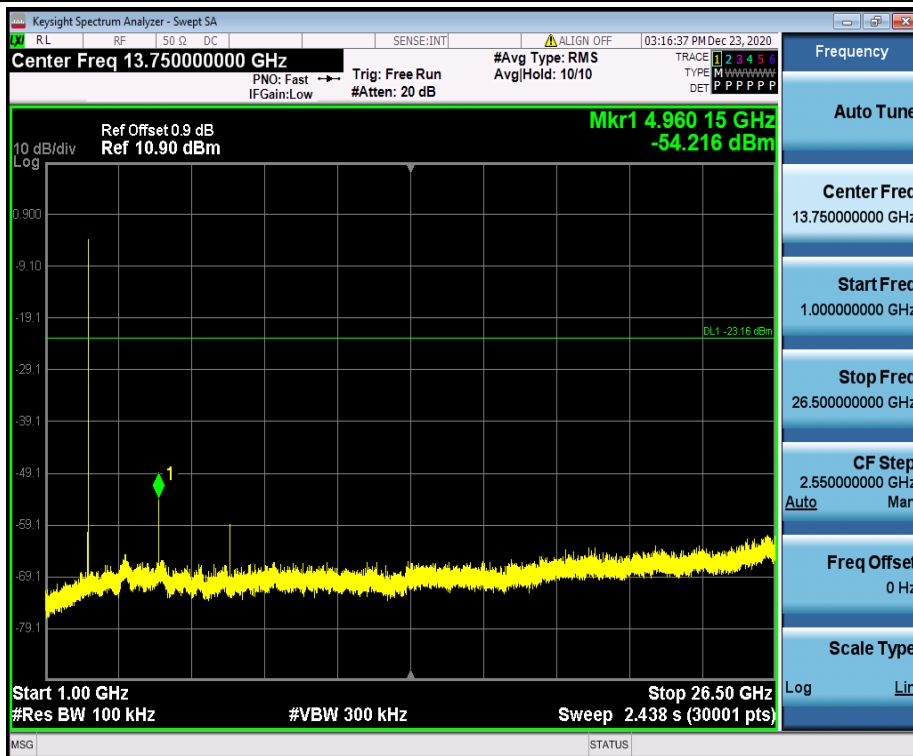
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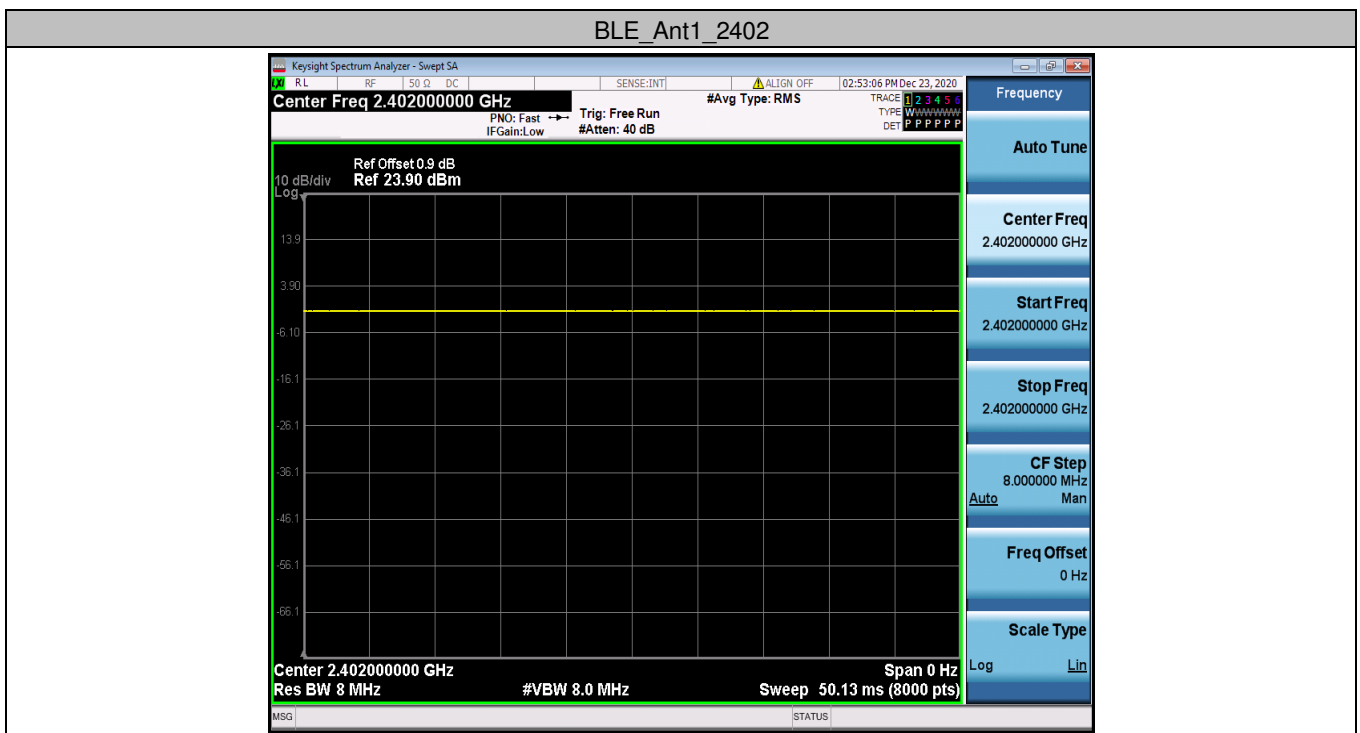
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8.7 Appendix F: Duty Cycle

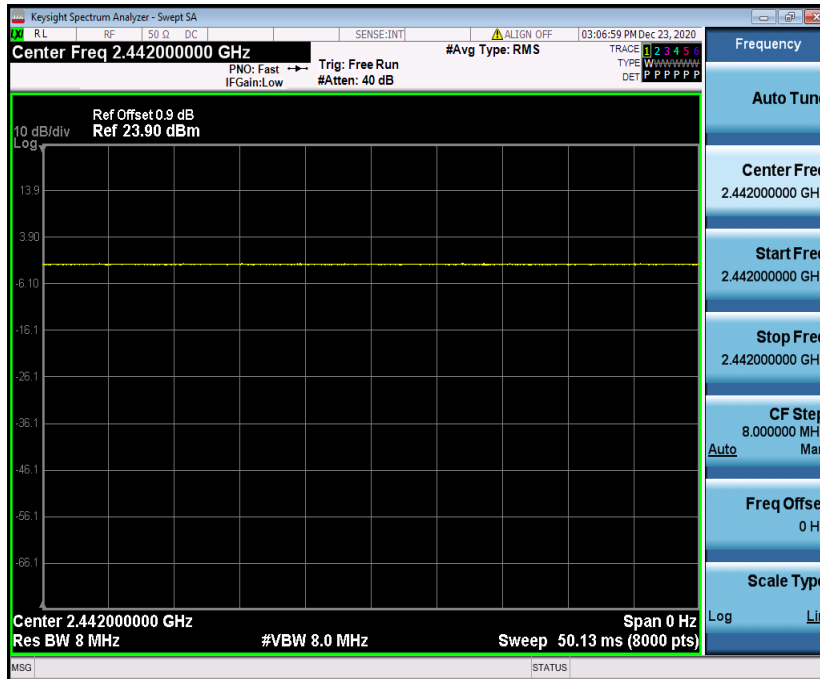
8.7.1 Test Result

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
BLE	Ant1	2402	50.00	50.00	100.00
		2442	50.00	50.00	100.00
		2480	50.00	50.00	100.00

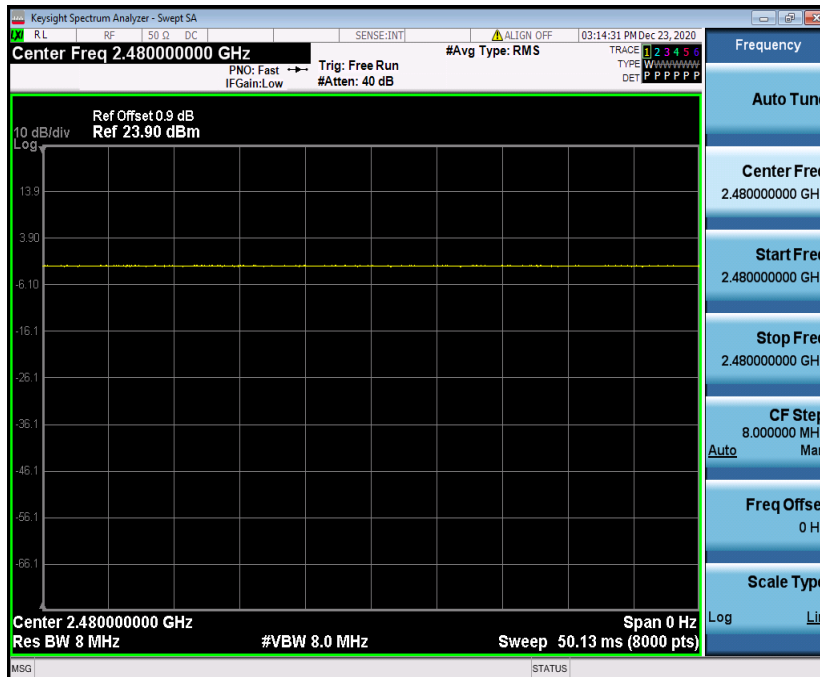
8.7.2 Test Graphs



BLE_Ant1_2442



BLE_Ant1_2480



--End of Report--



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