

# TEST REPORT

**Application No.:** GZCR2311001226HS  
**Applicant:** R. J. Reynolds Vapor Company  
**Address of Applicant:** P.O Box 906 401 N. Main St Winston-Salem, NC 27102, USA  
**Manufacturer:** R. J. Reynolds Vapor Company  
**Address of Manufacturer:** P.O Box 906 401 N. Main St Winston-Salem, NC 27102, USA  
**Factory:**  
 1. Shenzhen Smoore Technology Limited Zixing Branch  
 2. Shenzhen Smoore Technology Limited Songgang Branch  
**Address of Factory:**  
 1. No.6 songgang Avenue, Tantou Community, Songgang Street, Bao'an District, Shenzhen, Guangdong Province, China  
 2. No.2 South Second Road of Datianyang, Dongfang Community, Songgang Street, Bao'an District, Shenzhen City, Guangdong Province, China  
**Equipment Under Test (EUT):**  
**EUT Name:** e-Cigarette  
**Model No.:** TF16-UAP1  
**Trade Mark:** Vuse  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.247  
**Date of Receipt:** 2021-07-13  
**Date of Test:** 2021-08-02 to 2021-08-11 for RE above 1G and RF conducted test  
 2022-04-15 to 2022-06-13 for CE and RE below 1G  
**Date of Issue:** 2023-11-29

<b>Test Result:</b>	<b>Pass*</b>
---------------------	--------------

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

*Ricky Liu*

Ricky Liu  
Manager



Revision Record			
Version	Report No.	Date	Remark
01	GZCR231100122602	2023-11-29	Original

Authorized for issue by			
		Kevin Zhang	
		Kevin Zhang/Project Engineer	
		Vico Cui	
		Vico Cui/Reviewer	



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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(b)(4)	Pass

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

**Note:**

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply: Powered by built-in battery:  
Option 1:  
Model: EE8014376X  
Rated: DC 3.85V 400mAh 1.54Wh  
Option 2:  
Model: BAT01C  
Rated: DC 3.85V 400mAh 1.54Wh  
DC 5 V for charging

Cable(s): DC input ports

Test Voltage: AC 120 V, 60 Hz

Operation Frequency: 2402MHz to 2480MHz

Modulation Type: GFSK

Number of Channels: 40

Channel Spacing: 2MHz

Antenna Type: Integral Antenna

Antenna Gain: 3.36 dBi

### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC Power Adapter	XINYING	XY-800K (Input: AC 180-230V, 50Hz; Output: DC5V, Max, 1200mA)	RE01
USB Cable (0.7 m length)	/	/	/
MacBook Air	APPLE	Apple A1370	C02GR7BPDJYD



### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	±2.76dB
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Radiated Emissions which fall in the restricted bands	±5.00dB (30MHz-1GHz; 3m);±4.38dB (30MHz-1GHz; 10m);± 5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	±5.00dB (3m); ±4.38dB (10m)
Radiated Spurious Emissions Above 1GHz	±5.12dB (1GHz-6GHz); ±5.38dB (6GHz-18GHz); ±5.61dB(18GHz-40GHz)
<b>Remark:</b> The $U_{lab}$ (lab Uncertainty) is less than $U_{ETSI}$ (ETSI Uncertainty), so the test results – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.	

### 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.

## 4.5 Test Facility

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

### ● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

### ● 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.

### ● 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.

### ● ISED (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-20107 and T-11179)

The 10m Semi-anechoic chamber, 966 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-20107 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 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

## 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
Coaxial Cable	HangTianXing	2m	EMC0107	2020-09-09	2022-09-08
Two-Line V-Network	Rohde & Schwarz	ENV216	EMC0118	2021-12-23	2022-12-22
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	2019-10-20	2022-10-19
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2021-09-24	2022-09-23
EMI Test Receiver (9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2022-05-20	2023-05-19
Test Software E3r	Audix	Ver.6.11812	GZE100-77	N/A	N/A

Conducted Peak Output Power					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2021-05-19	2022-05-18
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

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	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(10Hz-44GHz)	Agilent Technologies	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(10Hz-44GHz)	Agilent Technologies	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(10Hz-44GHz)	Agilent Technologies	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 (20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-01-08	2022-01-07
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna(1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Signal Analyzer (20Hz-26.5GHz)	Rohde & Schwarz	FISQ 26	EMC0069	2020-11-13	2021-11-12



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Radiated Emissions below 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2022-05-16	2023-05-15
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2022-05-20	2023-05-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-03-03	2025-03-02

Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
EMI Test Receiver (20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-01-08	2022-01-07
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2020-09-09	2021-09-08

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05



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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(b)(4)

#### 6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna: The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3.36 dBi.

Antenna location: Refer to internal photo.



## 7 Radio Spectrum Matter Test Results

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

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 21.3 °C

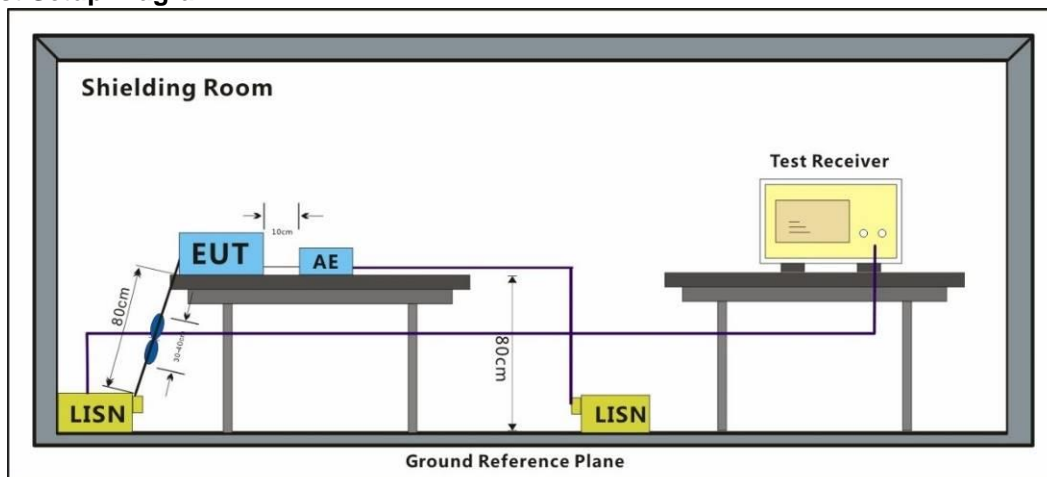
Humidity: 60.4 % RH

Atmospheric Pressure: 1016 mbar

#### 7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	Charging mode with battery option 1
Final test	03	Charging mode with battery option 2

#### 7.1.3 Test Setup Diagram



## 7.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

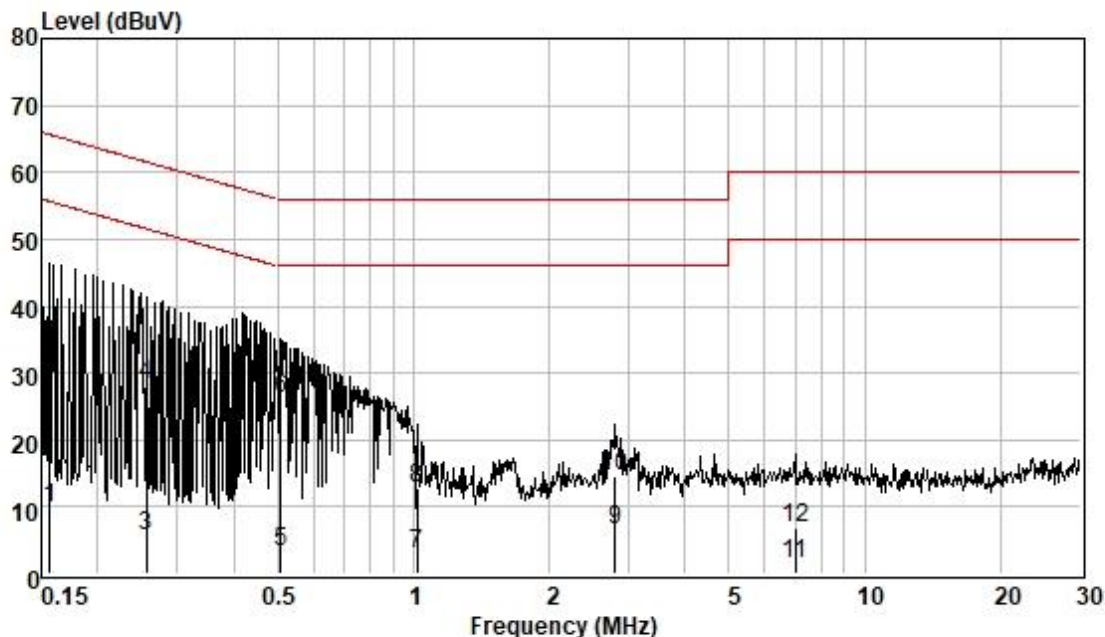
Remark: Level=Read Level+ Cable Loss+ LISN Factor



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Test Mode: 01; Line: Live line



Pol : LINE

Mode :

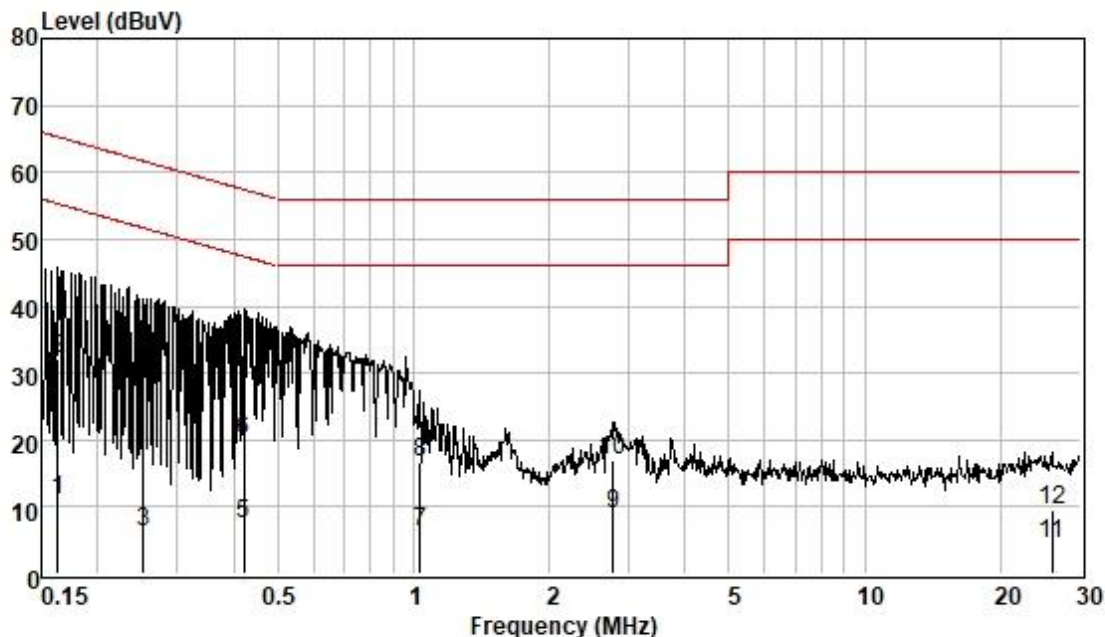
Model :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.156	0.12	0.06	9.54	9.72	55.65	-45.93	Average
2	0.156	24.33	0.06	9.54	33.93	65.65	-31.72	QP
3	0.256	-3.89	0.06	9.57	5.74	51.56	-45.82	Average
4	0.256	18.59	0.06	9.57	28.22	61.56	-33.34	QP
5	0.507	-6.43	0.07	9.59	3.23	46.00	-42.77	Average
6	0.507	16.58	0.07	9.59	26.24	56.00	-29.76	QP
7	1.021	-6.67	0.07	9.60	3.00	46.00	-43.00	Average
8	1.021	3.24	0.07	9.60	12.91	56.00	-43.09	QP
9	2.794	-3.32	0.14	9.61	6.43	46.00	-39.57	Average
10	2.794	4.81	0.14	9.61	14.56	56.00	-41.44	QP
11	7.025	-8.49	0.21	9.75	1.47	50.00	-48.53	Average
12	7.025	-3.23	0.21	9.75	6.73	60.00	-53.27	QP





Test Mode: 01; Line: Neutral Line



Pol : NEUTRAL

Mode :

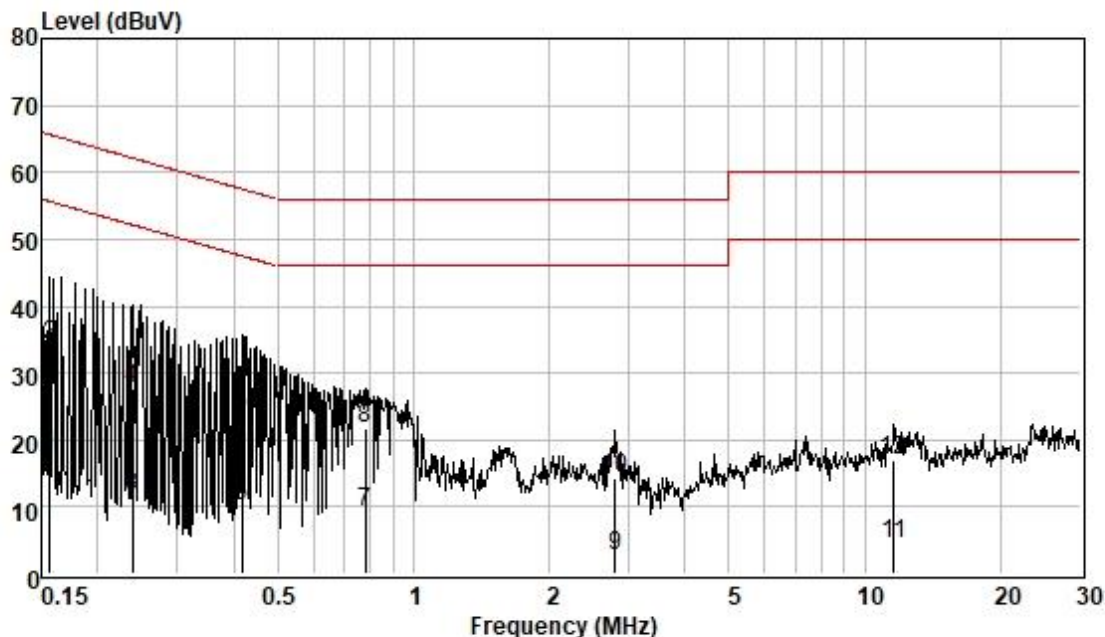
Model :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.163	1.55	0.06	9.54	11.15	55.30	-44.15	Average
2	0.163	22.59	0.06	9.54	32.19	65.30	-33.11	QP
3	0.252	-3.28	0.06	9.56	6.34	51.69	-45.35	Average
4	0.252	21.96	0.06	9.56	31.58	61.69	-30.11	QP
5	0.421	-2.09	0.06	9.58	7.55	47.42	-39.87	Average
6	0.421	10.29	0.06	9.58	19.93	57.42	-37.49	QP
7	1.032	-3.31	0.07	9.59	6.35	46.00	-39.65	Average
8	1.032	7.09	0.07	9.59	16.75	56.00	-39.25	QP
9	2.765	-0.87	0.14	9.61	8.88	46.00	-37.12	Average
10	2.765	7.19	0.14	9.61	16.94	56.00	-39.06	QP
11	26.001	-5.81	0.41	9.91	4.51	50.00	-45.49	Average
12	26.001	-0.71	0.41	9.91	9.61	60.00	-50.39	QP





Test Mode: 03; Line: Live line

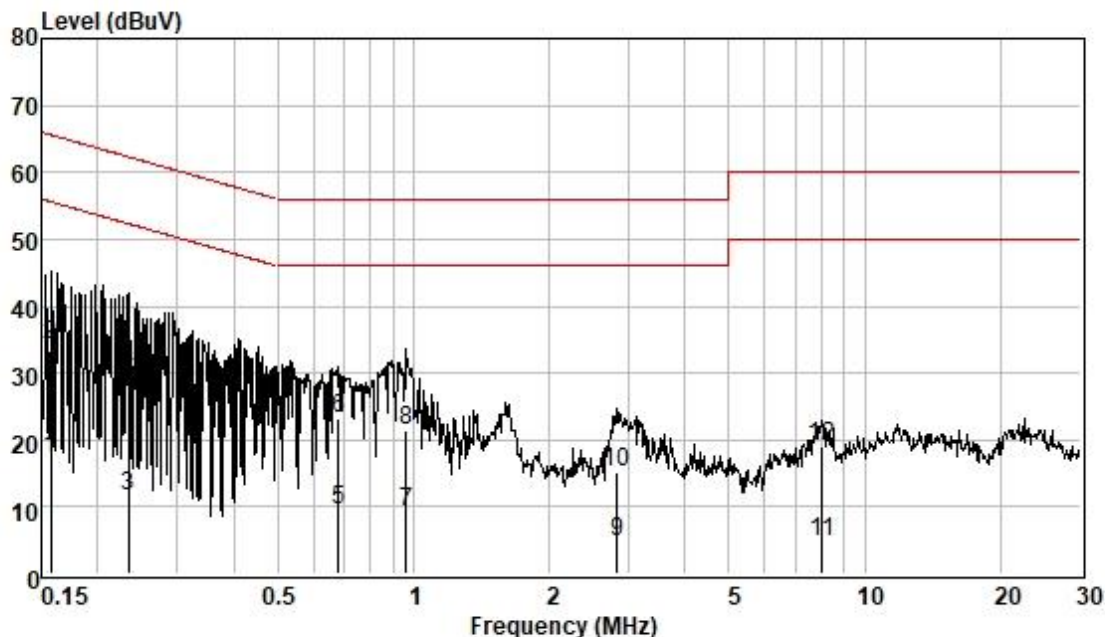


Pol : LINE  
Mode :  
Model :

	Freque	Read	Cable	LISN	Measured	Limit	Over	
	nc	Level	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.156	8.18	0.06	9.54	17.78	55.65	-37.87	Average
2	0.156	24.64	0.06	9.54	34.24	65.65	-31.41	QP
3	0.239	2.06	0.06	9.57	11.69	52.13	-40.44	Average
4	0.239	18.17	0.06	9.57	27.80	62.13	-34.33	QP
5	0.417	0.42	0.06	9.58	10.06	47.51	-37.45	Average
6	0.417	14.04	0.06	9.58	23.68	57.51	-33.83	QP
7	0.783	-0.53	0.07	9.60	9.14	46.00	-36.86	Average
8	0.783	11.90	0.07	9.60	21.57	56.00	-34.43	QP
9	2.794	-6.97	0.14	9.61	2.78	46.00	-43.22	Average
10	2.794	4.62	0.14	9.61	14.37	56.00	-41.63	QP
11	11.559	-5.57	0.26	9.79	4.48	50.00	-45.52	Average
12	11.559	6.89	0.26	9.79	16.94	60.00	-43.06	QP



Test Mode: 03; 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
1	0.157	7.53	0.06	9.53	17.12	55.60	-38.48	Average
2	0.157	24.48	0.06	9.53	34.07	65.60	-31.53	QP
3	0.234	1.84	0.06	9.56	11.46	52.30	-40.84	Average
4	0.234	20.68	0.06	9.56	30.30	62.30	-32.00	QP
5	0.683	-0.29	0.07	9.59	9.37	46.00	-36.63	Average
6	0.683	13.40	0.07	9.59	23.06	56.00	-32.94	QP
7	0.963	-0.43	0.07	9.59	9.23	46.00	-36.77	Average
8	0.963	11.65	0.07	9.59	21.31	56.00	-34.69	QP
9	2.824	-4.91	0.14	9.61	4.84	46.00	-41.16	Average
10	2.824	5.38	0.14	9.61	15.13	56.00	-40.87	QP
11	8.020	-5.27	0.21	9.76	4.70	50.00	-45.30	Average
12	8.020	9.00	0.21	9.76	18.97	60.00	-41.03	QP



### 7.2 Conducted Peak Output Power

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

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

Limit:

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

#### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

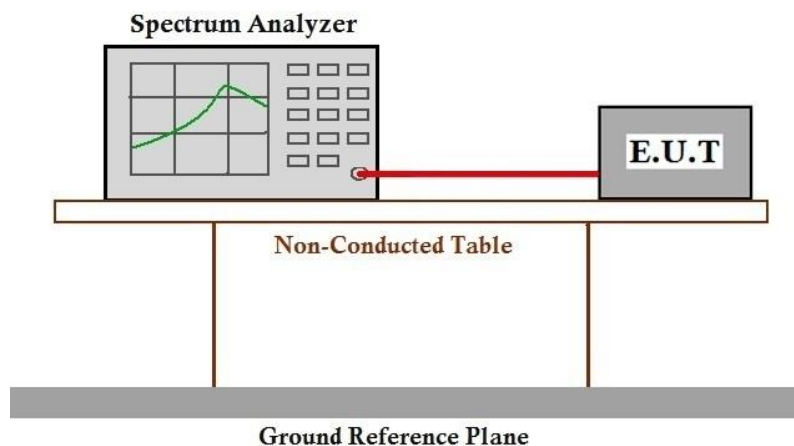
Humidity: 60.1 % RH

Atmospheric Pressure: 1016 mbar

#### 7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.

#### 7.2.3 Test Setup Diagram



#### 7.2.4 Measurement Procedure and Data

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

Please Refer to Appendix for Details



### 7.3 Minimum 6dB Bandwidth

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

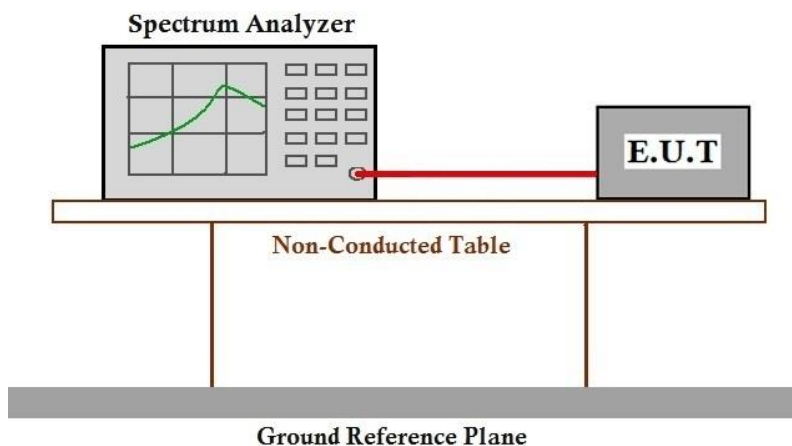
#### 7.3.1 E.U.T. Operation

Operating Environment:  
 Temperature: 22.4 °C Humidity: 60.1 % RH Atmospheric Pressure: 1016 mbar

#### 7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.

#### 7.3.3 Test Setup Diagram



#### 7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details



### 7.4 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

#### 7.4.1 E.U.T. Operation

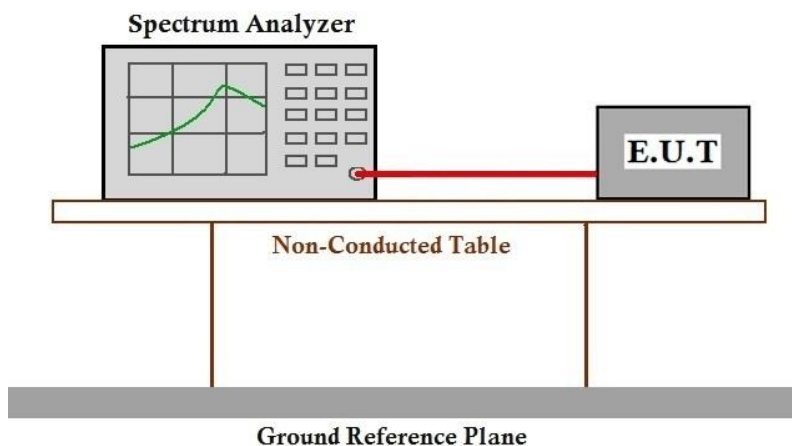
Operating Environment:

Temperature: 22.4 °C Humidity: 60.1 % RH Atmospheric Pressure: 1016 mbar

#### 7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.

#### 7.4.3 Test Setup Diagram



#### 7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

### 7.5 Conducted Band Edges Measurement

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

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

Limit:

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

#### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

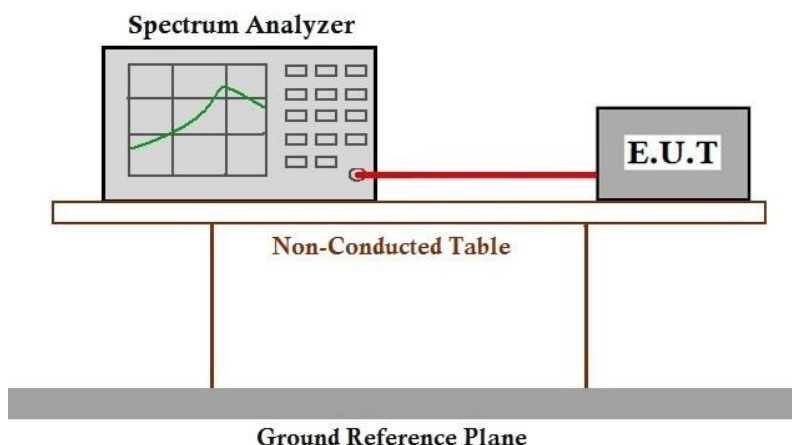
Humidity: 60.1 % RH

Atmospheric Pressure: 1016 mbar

#### 7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.

#### 7.5.3 Test Setup Diagram



#### 7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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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: 22.4 °C

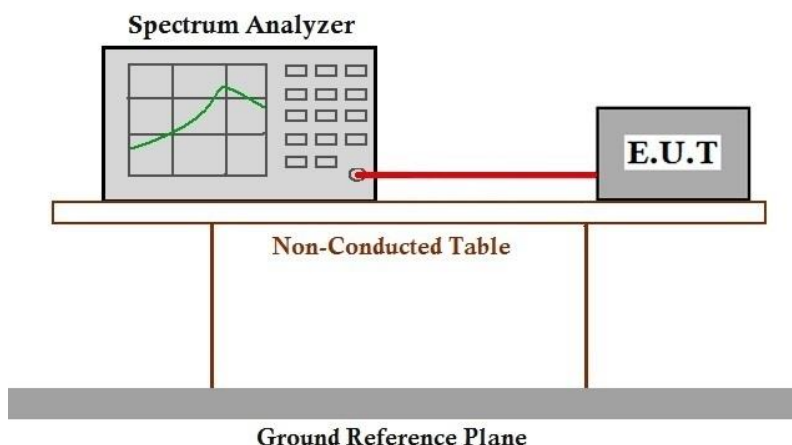
Humidity: 60.1 % RH

Atmospheric Pressure: 1016 mbar

#### 7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.

#### 7.6.3 Test Setup Diagram



#### 7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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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 11.12

Limit:

Test Distance: 3 m

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: 23.2 °C

Humidity: 59.6 % RH

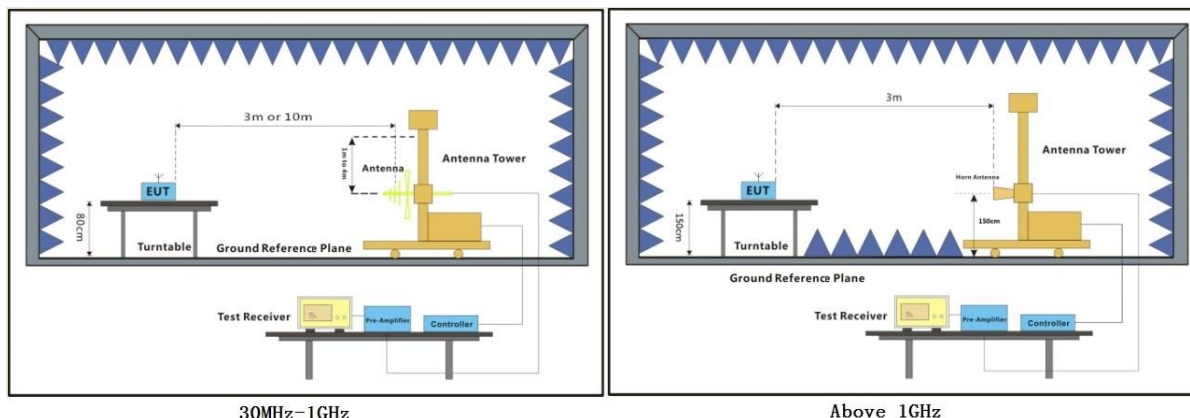
Atmospheric Pressure: 1016 mbar

#### 7.7.2 Test Mode Description

Pre-scan / Mode  
Final test Code Description

Final test 04 TX mode\_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.

#### 7.7.3 Test Setup Diagram





## 7.7.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

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

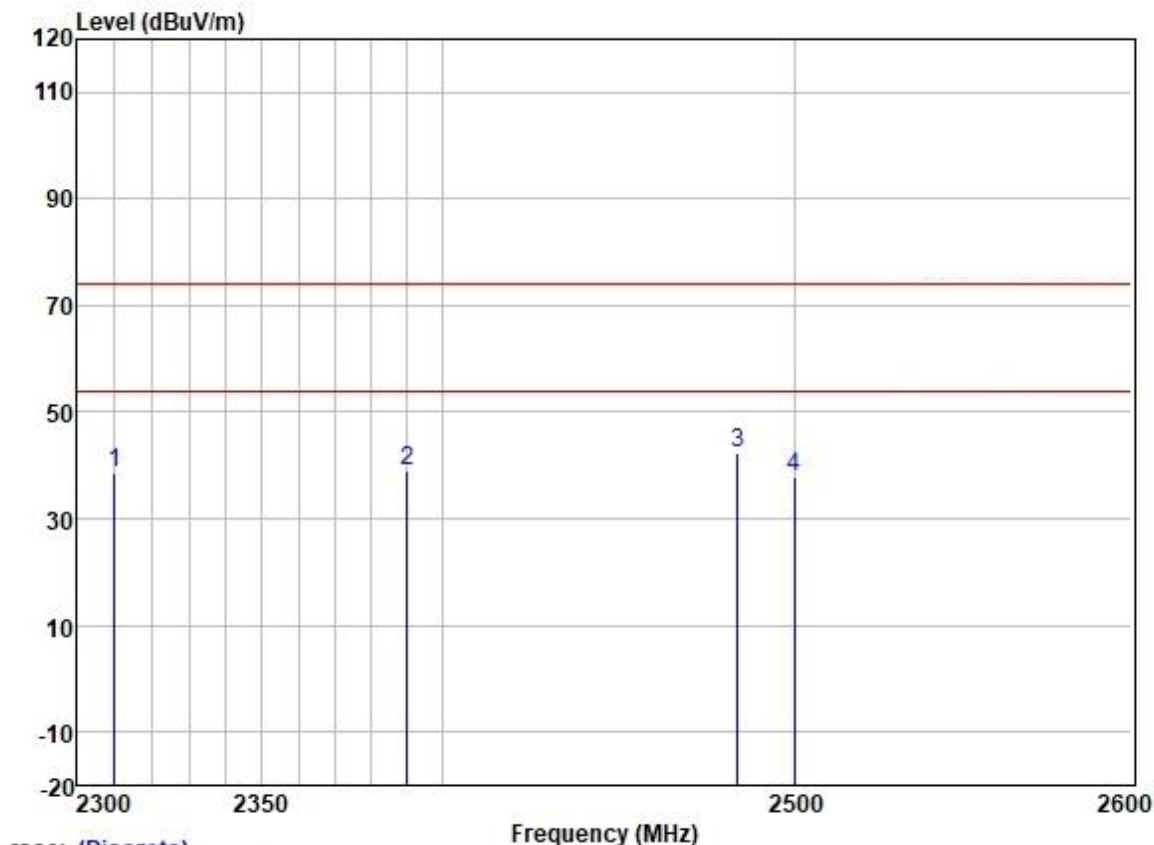
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:High



Trace: (Discrete)

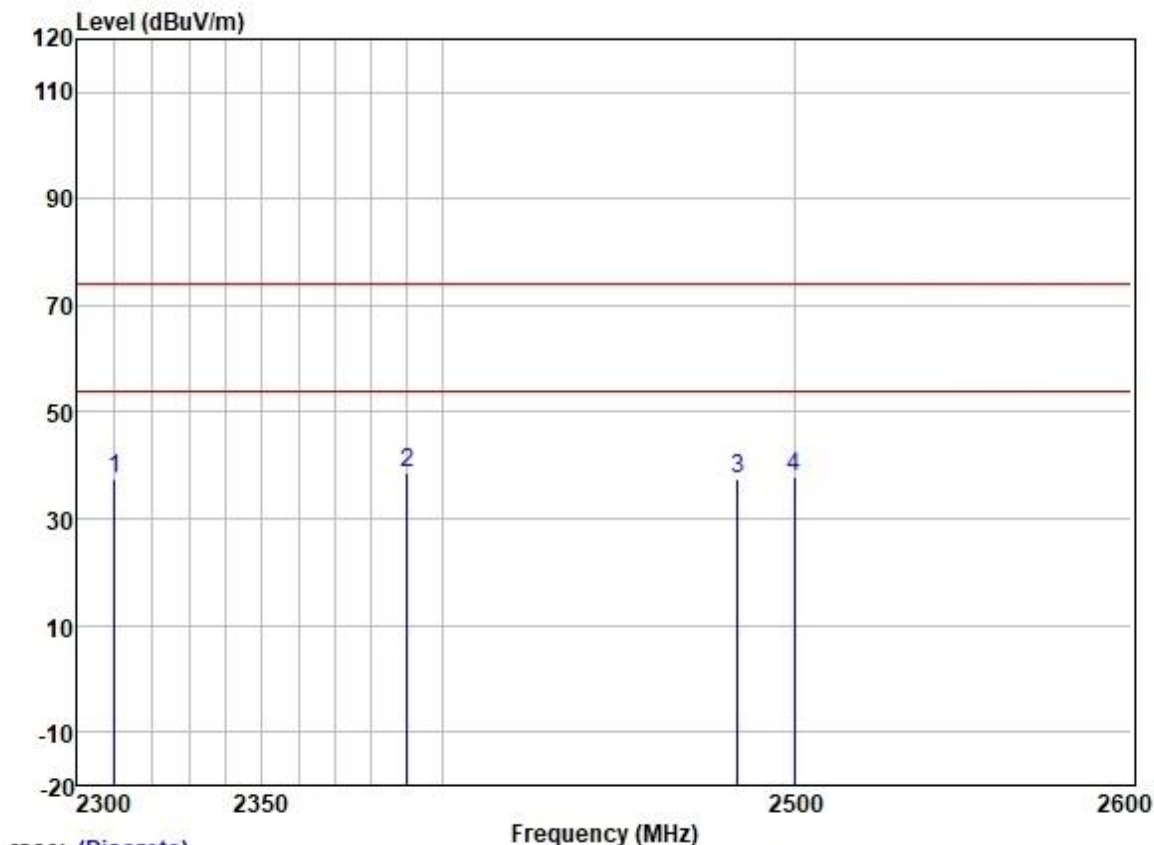
	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	45.61	27.15	3.32	37.62	38.46	74.00	-35.54	HORIZONTAL Peak
2	2390.000	45.62	27.33	3.48	37.59	38.84	74.00	-35.16	HORIZONTAL Peak
3	2483.500	48.97	27.48	3.53	37.57	42.41	74.00	-31.59	HORIZONTAL Peak
4	2500.000	44.62	27.50	3.40	37.56	37.96	74.00	-36.04	HORIZONTAL Peak



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Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:Low

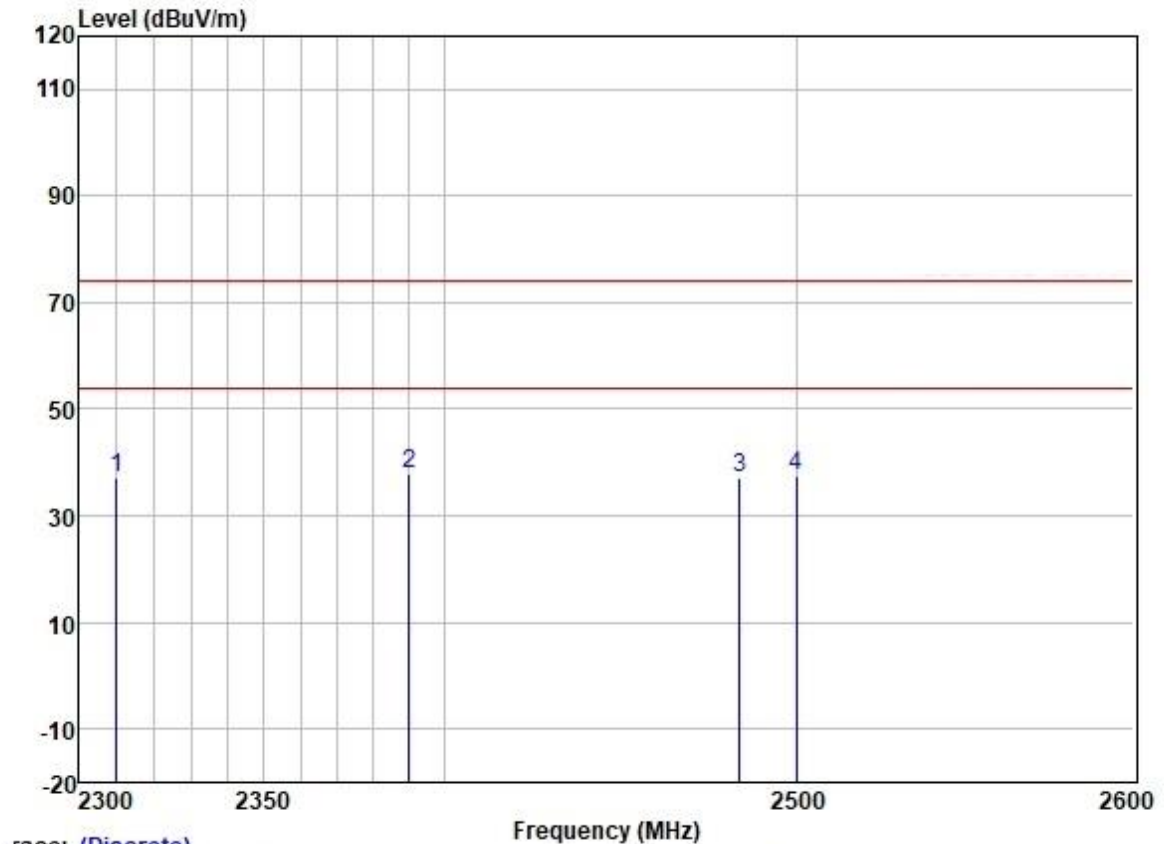


Trace: (Discrete)

	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	44.51	27.15	3.32	37.62	37.36	74.00	-36.64	HORIZONTAL Peak
2	2390.000	45.29	27.33	3.48	37.59	38.51	74.00	-35.49	HORIZONTAL Peak
3	2483.500	44.02	27.48	3.53	37.57	37.46	74.00	-36.54	HORIZONTAL Peak
4	2500.000	44.37	27.50	3.40	37.56	37.71	74.00	-36.29	HORIZONTAL Peak



Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:High



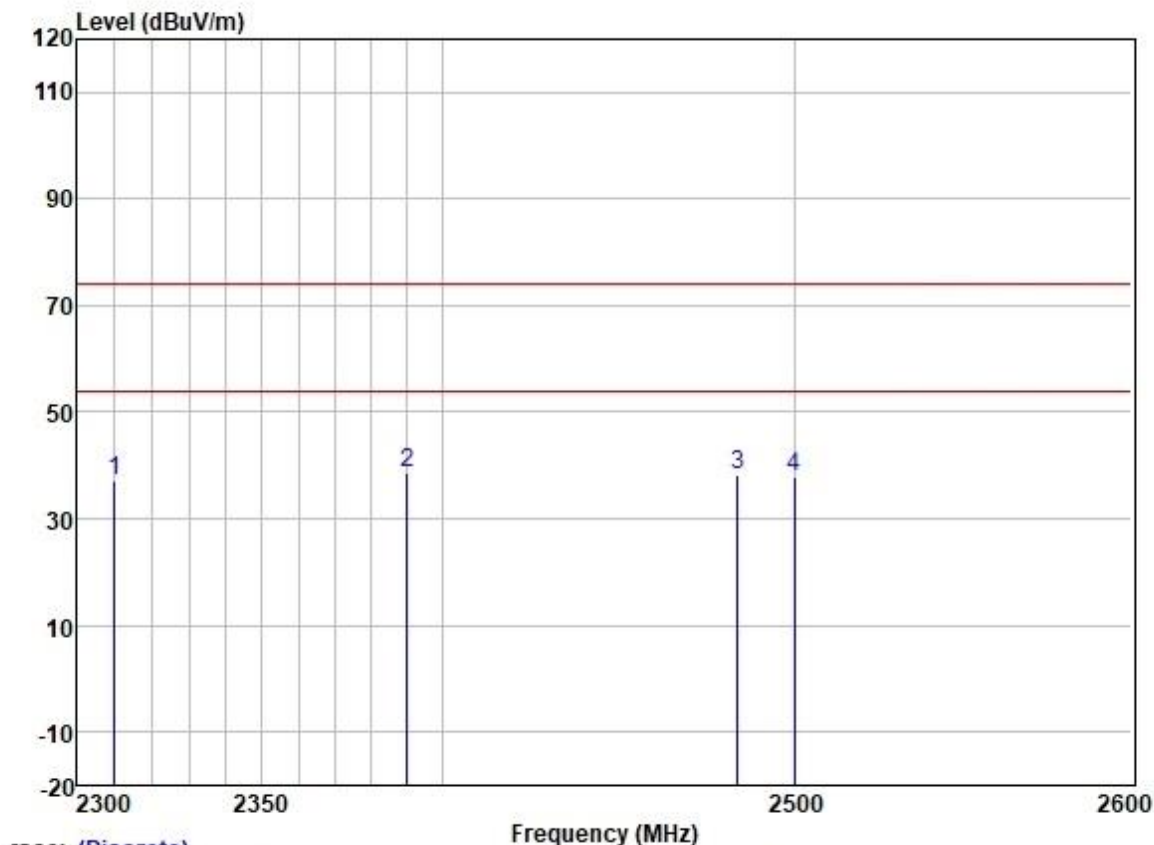
Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	44.30	27.15	3.32	37.62	37.15	74.00	-36.85	VERTICAL	Peak
2	2390.000	44.78	27.33	3.48	37.59	38.00	74.00	-36.00	VERTICAL	Peak
3	2483.500	43.56	27.48	3.53	37.57	37.00	74.00	-37.00	VERTICAL	Peak
4	2500.000	44.33	27.50	3.40	37.56	37.67	74.00	-36.33	VERTICAL	Peak





Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:Low



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	44.19	27.15	3.32	37.62	37.04	74.00	-36.96	VERTICAL Peak
2	2390.000	45.49	27.33	3.48	37.59	38.71	74.00	-35.29	VERTICAL Peak
3	2483.500	44.81	27.48	3.53	37.57	38.25	74.00	-35.75	VERTICAL Peak
4	2500.000	44.50	27.50	3.40	37.56	37.84	74.00	-36.16	VERTICAL Peak



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## 7.8 Radiated Spurious Emissions Below 1GHz

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

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

Limit:

Test Distance: 10 m

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

### 7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

Humidity: 56.3 % RH

Atmospheric Pressure: 1016 mbar

### 7.8.2 Test Mode Description

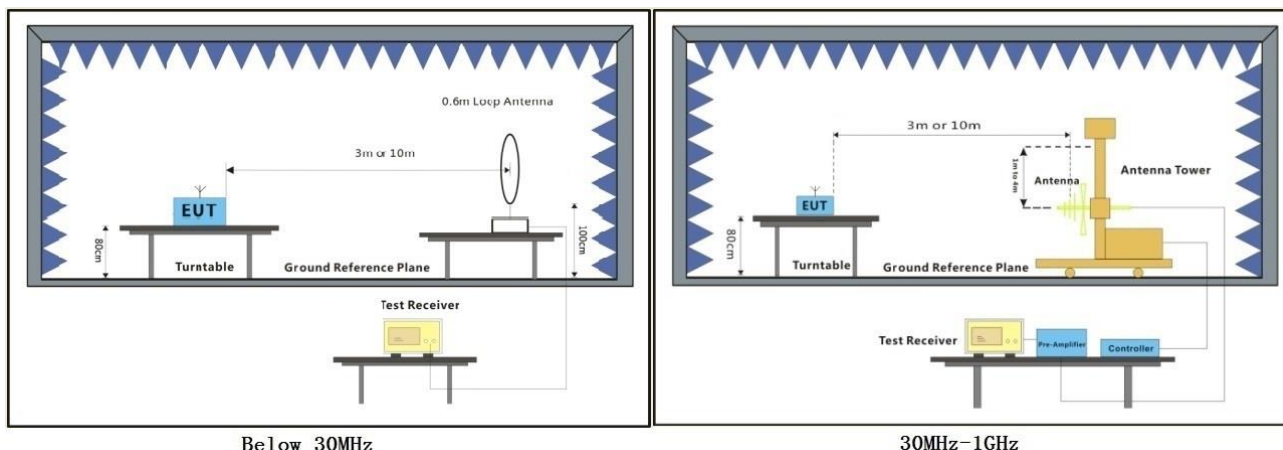
Pre-scan / Final test	Mode Code	Description
Final test	01	Charging mode with battery option 1
Final test	03	Charging mode with battery option 2
Pre-scan	04	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 1.
Pre-scan	05	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation for battery 2.



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### 7.8.3 Test Setup Diagram



### 7.8.4 Measurement Procedure and Data

- 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.
- 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.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- Repeat above procedures until all frequencies measured was complete.

Remark:

- Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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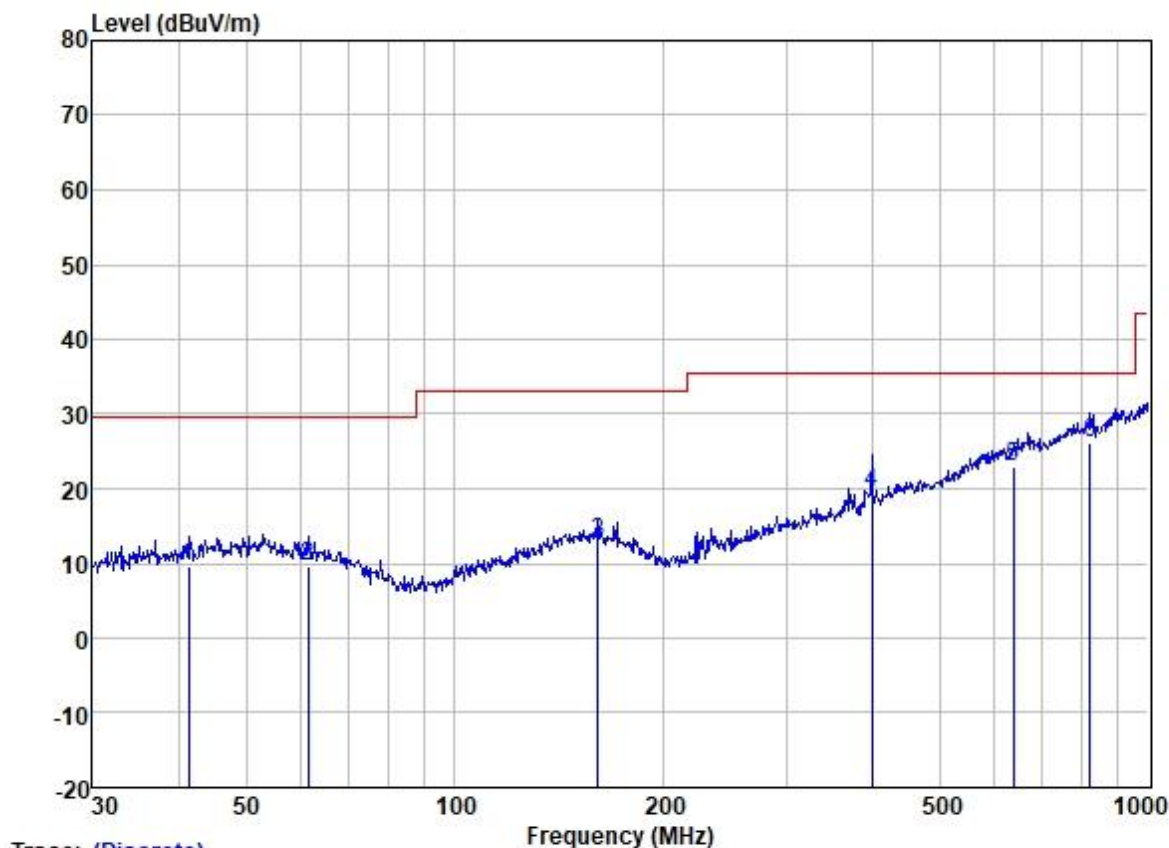
SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch, EMC Laboratory

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663  
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编: 510663

t (86-20) 82155555 www.sgs.com.cn  
t (86-20) 82155555 sgs.china@sgs.com



Test Mode: 01; Polarity: Horizontal



Trace: (Discrete)

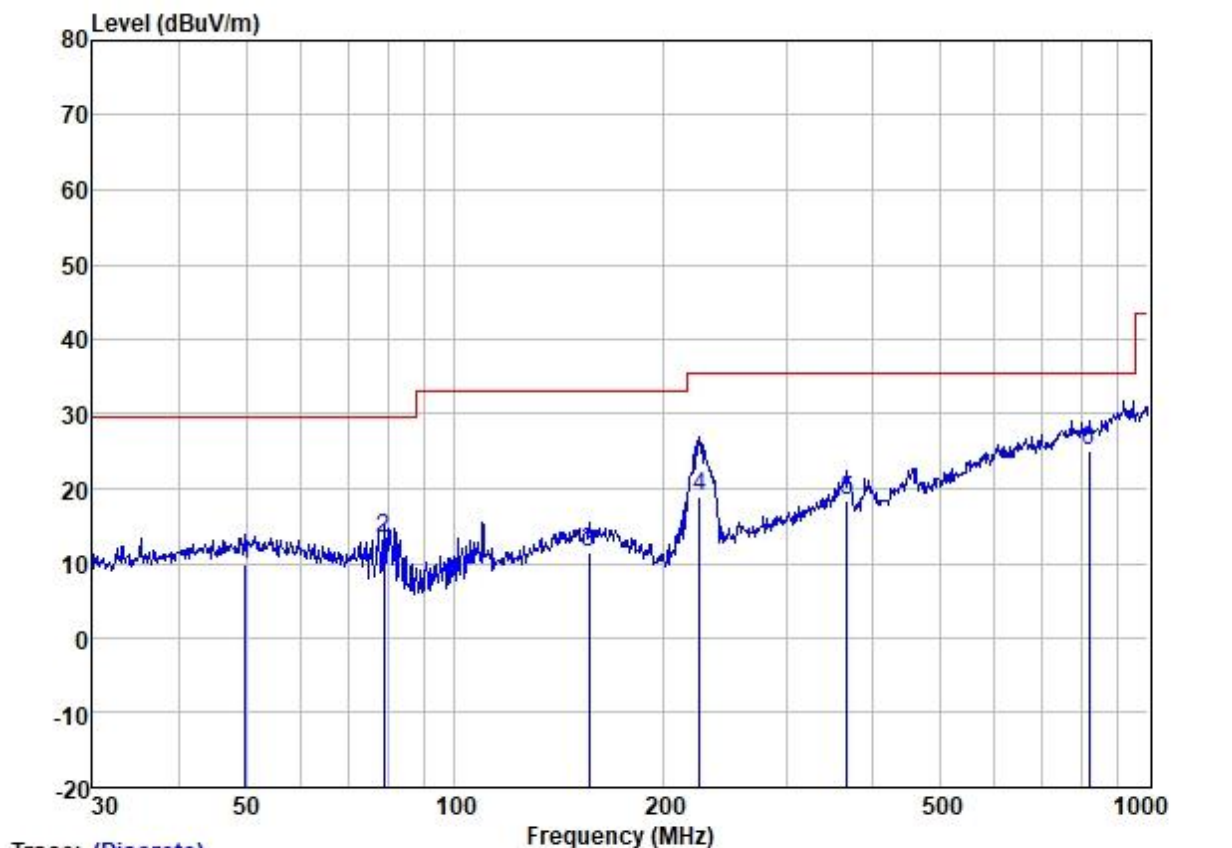
Site : SGS  
Job :  
Model :  
Power :  
Test Mode : CHARGING

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	41.277	22.45	13.16	1.11	27.17	9.55	29.50	-19.95	HORIZONTAL	QP
2	61.346	22.74	12.70	1.28	27.15	9.57	29.50	-19.93	HORIZONTAL	QP
3	160.909	23.83	13.29	2.34	26.79	12.67	33.10	-20.43	HORIZONTAL	QP
4	399.030	27.41	15.38	3.93	27.32	19.40	35.60	-16.20	HORIZONTAL	QP
5	638.369	25.55	20.13	5.39	28.19	22.88	35.60	-12.72	HORIZONTAL	QP
6	824.597	25.14	22.66	6.30	27.99	26.11	35.60	-9.49	HORIZONTAL	QP





Test Mode: 01; Polarity: Vertical



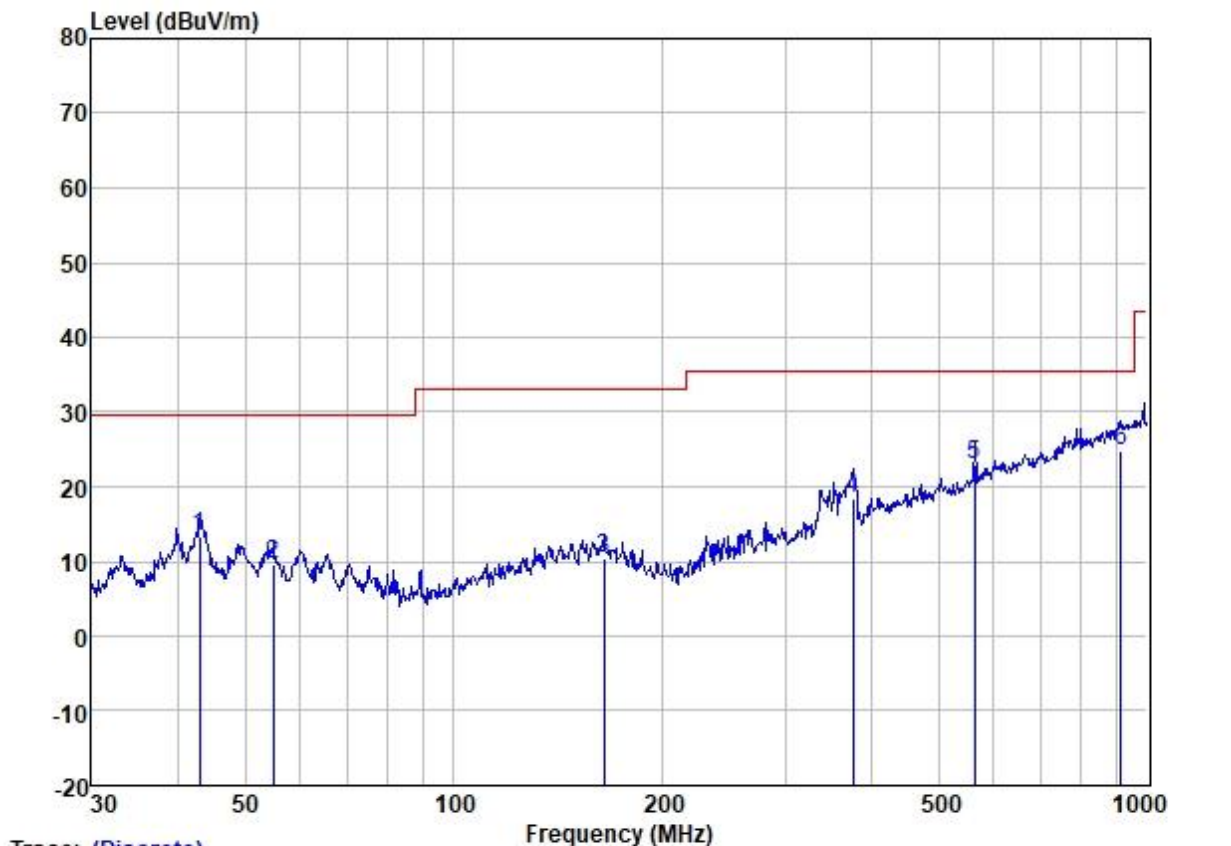
Trace: (Discrete)

Site : SGS  
Job :  
Model :  
Power :  
Test Mode : CHARGING

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	49.881	22.30	13.63	1.14	27.17	9.90	29.50	-19.60	VERTICAL	QP
2	78.965	29.75	9.09	1.47	27.10	13.21	29.50	-16.29	VERTICAL	QP
3	155.910	22.76	13.34	2.30	26.81	11.59	33.10	-21.51	VERTICAL	QP
4	225.308	33.01	9.89	2.69	26.70	18.89	35.60	-16.71	VERTICAL	QP
5	368.112	27.17	14.69	3.76	27.18	18.44	35.60	-17.16	VERTICAL	QP
6	821.710	24.05	22.70	6.30	28.00	25.05	35.60	-10.55	VERTICAL	QP



Test Mode: 03; Polarity: Horizontal

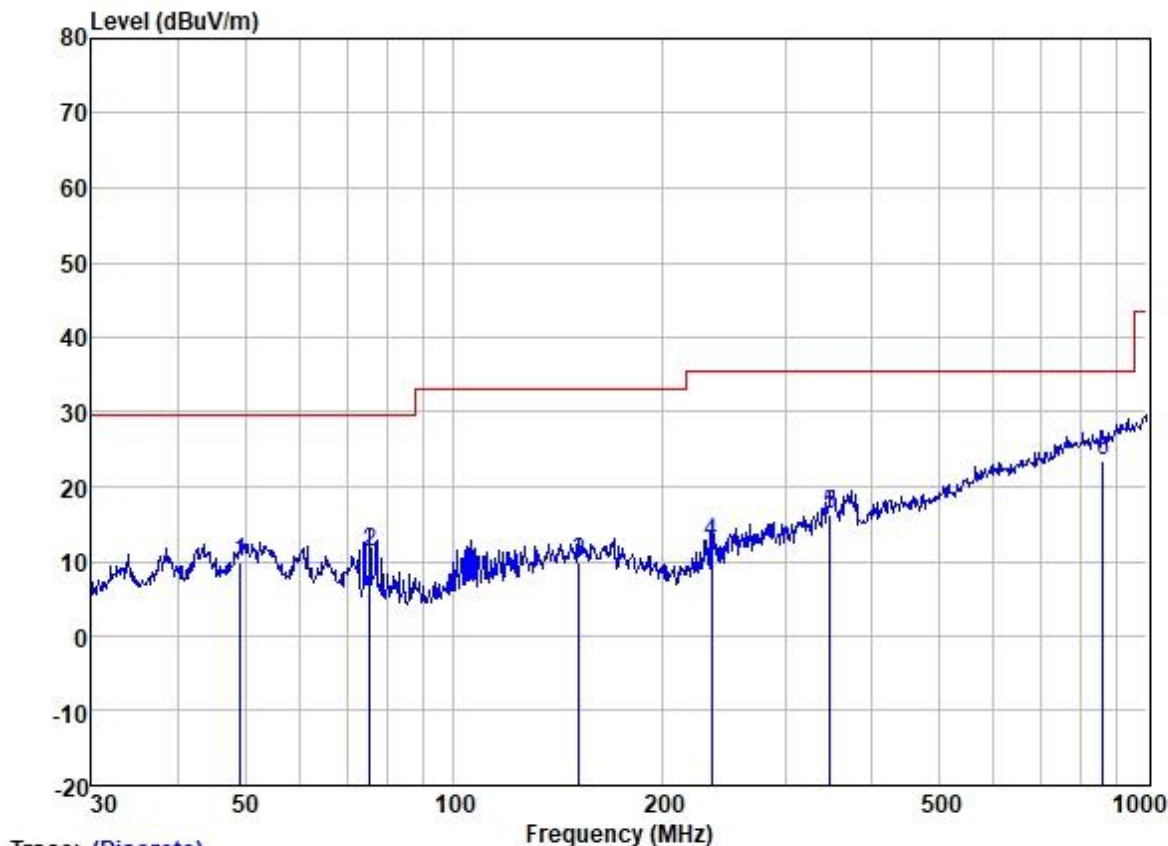


Site : SGS  
Job :  
Model :  
Power :  
Test Mode : CHARGING

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	42.900	31.89	13.32	1.11	32.98	13.34	29.50	-16.16	HORIZONTAL	QP
2	54.835	27.92	13.37	1.19	33.00	9.48	29.50	-20.02	HORIZONTAL	QP
3	164.330	27.81	13.09	2.37	33.00	10.27	33.10	-22.83	HORIZONTAL	QP
4	375.939	32.89	14.93	3.82	33.18	18.46	35.60	-17.14	HORIZONTAL	QP
5	562.662	32.81	18.53	4.93	33.36	22.91	35.60	-12.69	HORIZONTAL	QP
6	916.069	26.23	23.73	6.96	32.12	24.80	35.60	-10.80	HORIZONTAL	QP



Test Mode: 03; Polarity: Vertical



Trace: (Discrete)

Site : SGS  
Job :  
Model :  
Power :  
Test Mode : CHARGING

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	49.187	28.01	13.60	1.14	33.00	9.75	29.50	-19.75	VERTICAL	QP
2	75.711	32.86	9.95	1.45	33.00	11.26	29.50	-18.24	VERTICAL	QP
3	151.597	27.29	13.36	2.26	33.00	9.91	33.10	-23.19	VERTICAL	QP
4	234.991	31.78	10.94	2.76	33.03	12.45	35.60	-23.15	VERTICAL	QP
5	349.250	31.74	14.18	3.59	33.15	16.36	35.60	-19.24	VERTICAL	QP
6	863.056	26.76	22.53	6.63	32.52	23.40	35.60	-12.20	VERTICAL	QP





### 7.9 Radiated Spurious Emissions Above 1GHz

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

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

Limit:

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

#### 7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 23.2 °C

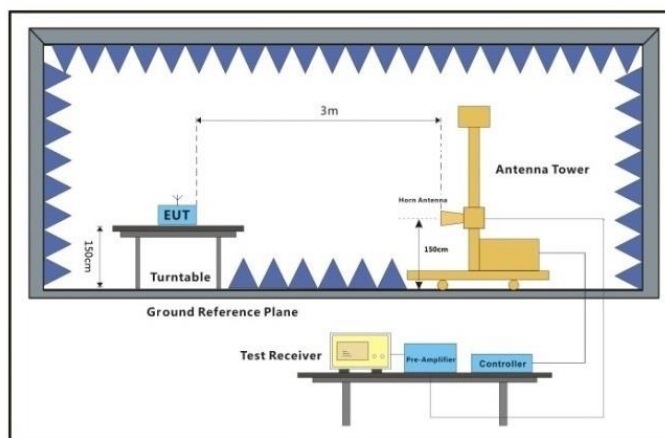
Humidity: 59.6 % RH

Atmospheric Pressure: 1016 mbar

#### 7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

#### 7.9.3 Test Setup Diagram



Above 1GHz





## 7.9.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

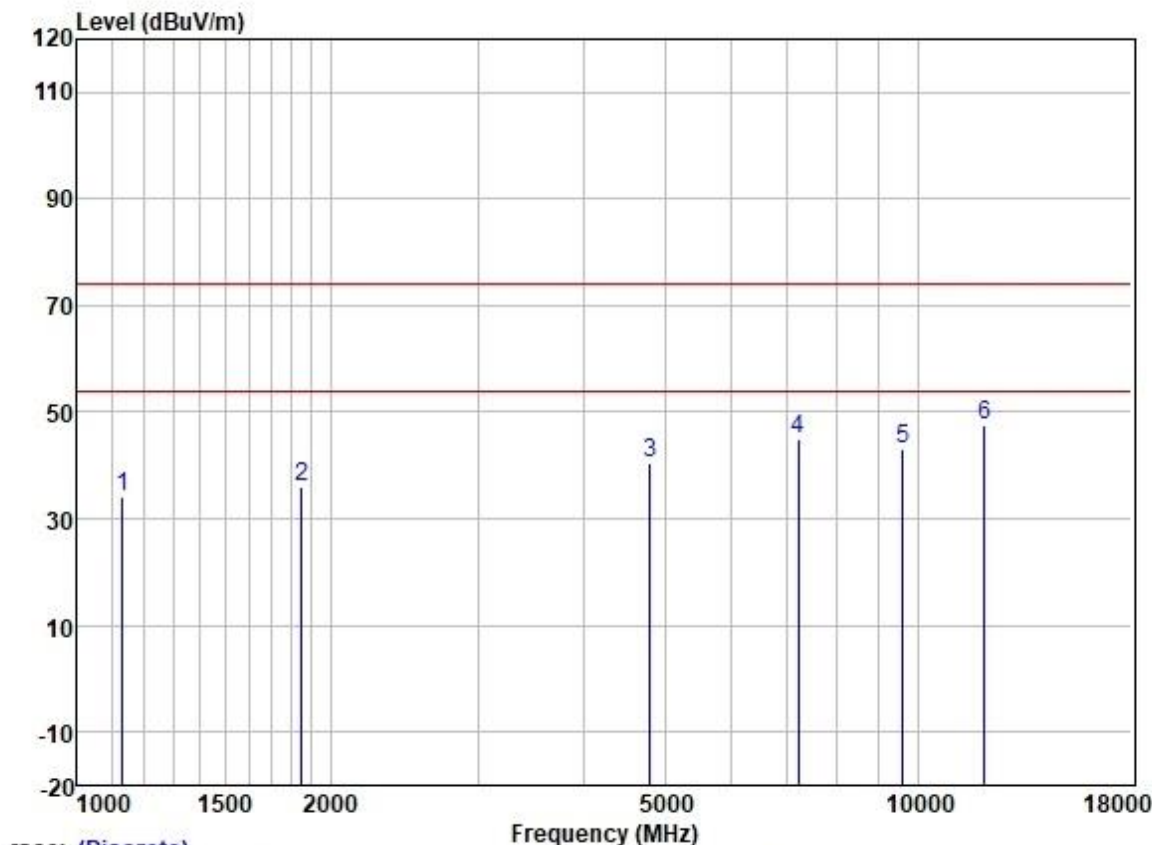
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low

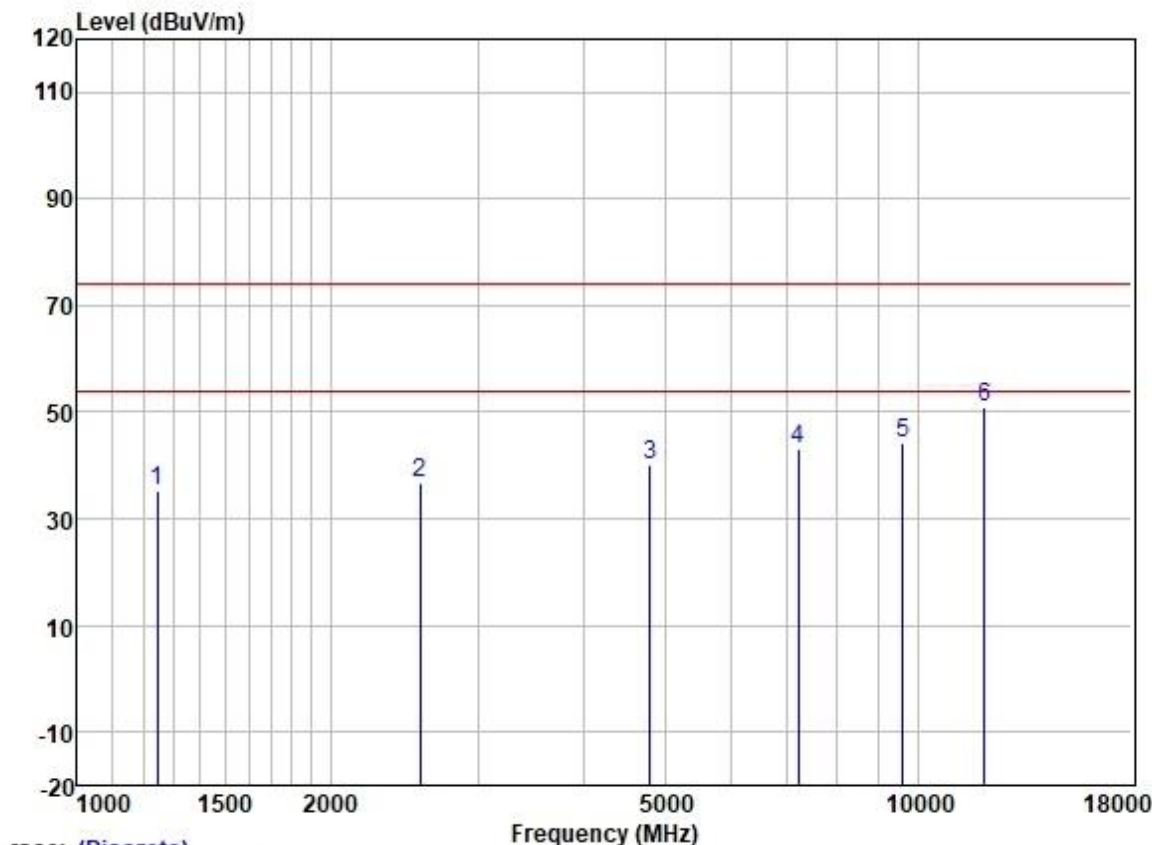


Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1132.340	45.80	24.44	2.22	38.43	34.03	74.00	-39.97	HORIZONTAL	Peak
2	1850.858	44.87	26.00	2.94	37.78	36.03	74.00	-37.97	HORIZONTAL	Peak
3	4804.297	40.44	31.42	5.40	36.83	40.43	74.00	-33.57	HORIZONTAL	Peak
4	7206.516	40.71	35.54	5.98	37.38	44.85	74.00	-29.15	HORIZONTAL	Peak
5	9608.518	35.04	38.37	7.07	37.42	43.06	74.00	-30.94	HORIZONTAL	Peak
6	12010.610	37.68	38.90	8.19	37.10	47.67	74.00	-26.33	HORIZONTAL	Peak



Test Mode: 00; Polarity: Vertical; Modulation: GFSK; Channel: Low



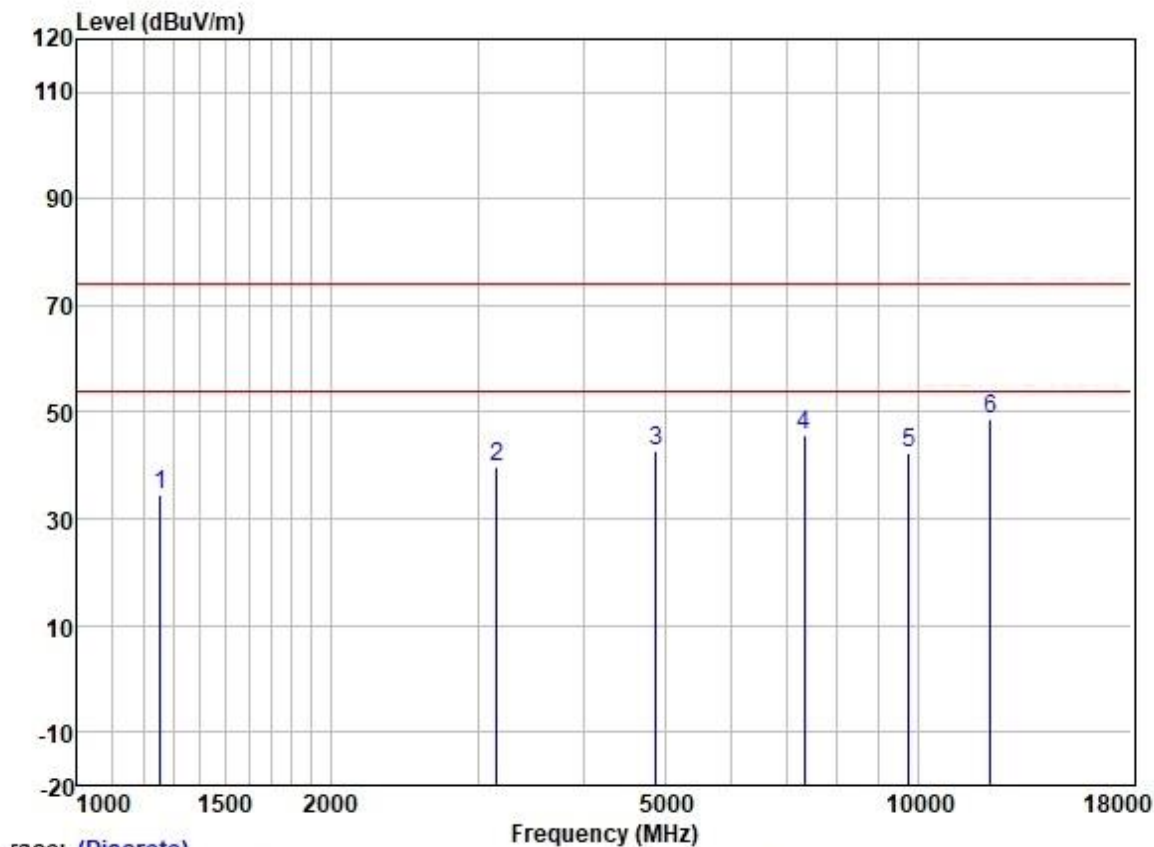
Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB		
1	1245.663	46.24	25.00	2.33	38.35	35.22	74.00	-38.78 VERTICAL	Peak
2	2558.371	43.13	27.57	3.46	37.54	36.62	74.00	-37.38 VERTICAL	Peak
3	4804.535	40.01	31.42	5.40	36.83	40.00	74.00	-34.00 VERTICAL	Peak
4	7206.419	38.87	35.54	5.98	37.38	43.01	74.00	-30.99 VERTICAL	Peak
5	9608.349	36.27	38.37	7.07	37.42	44.29	74.00	-29.71 VERTICAL	Peak
6	12010.010	41.07	38.90	8.19	37.10	51.06	74.00	-22.94 VERTICAL	Peak





Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:middle



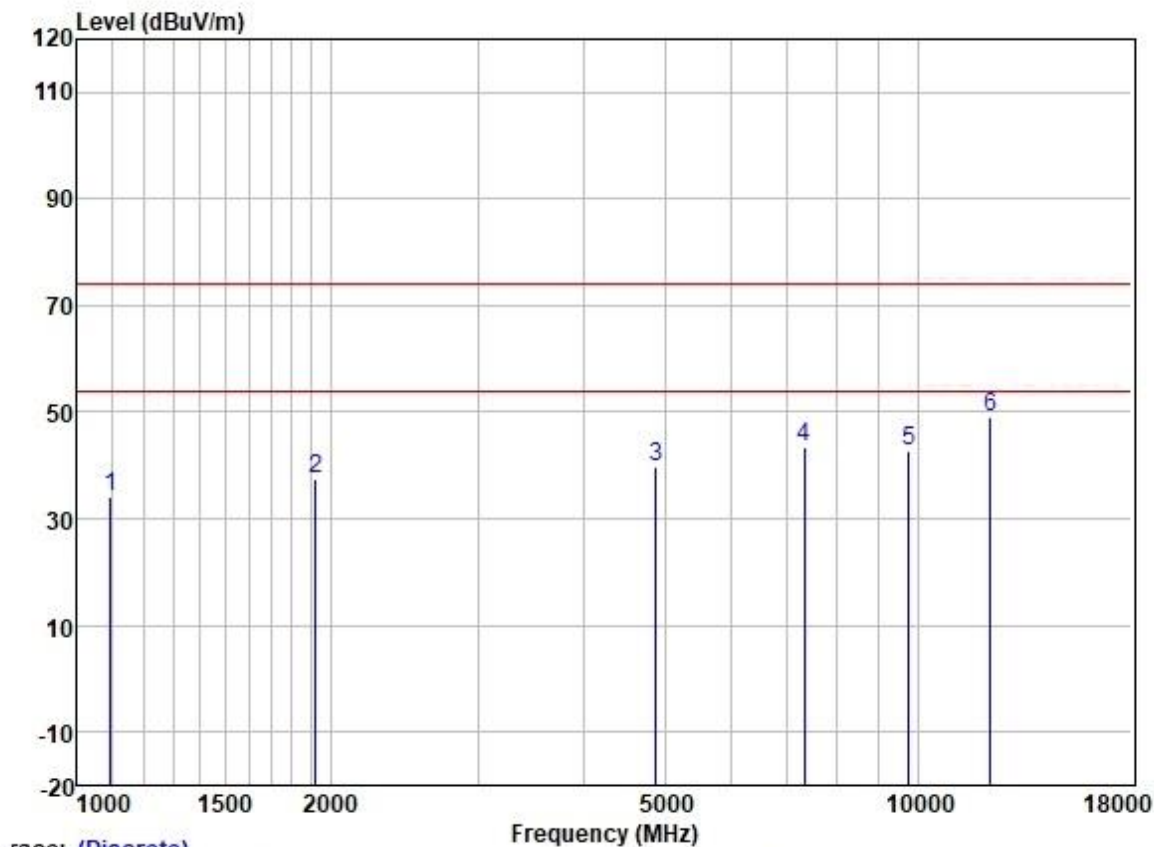
Trace: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1256.512	45.60	25.05	2.38	38.35	34.68	74.00	-39.32	HORIZONTAL	Peak
2	3159.355	44.43	28.54	3.97	37.12	39.82	74.00	-34.18	HORIZONTAL	Peak
3	4882.150	42.36	31.56	5.52	36.84	42.60	74.00	-31.40	HORIZONTAL	Peak
4	7323.195	41.13	36.00	6.13	37.43	45.83	74.00	-28.17	HORIZONTAL	Peak
5	9764.588	34.37	38.50	7.02	37.41	42.48	74.00	-31.52	HORIZONTAL	Peak
6	12205.310	38.90	38.74	8.08	37.00	48.72	74.00	-25.28	HORIZONTAL	Peak





Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle

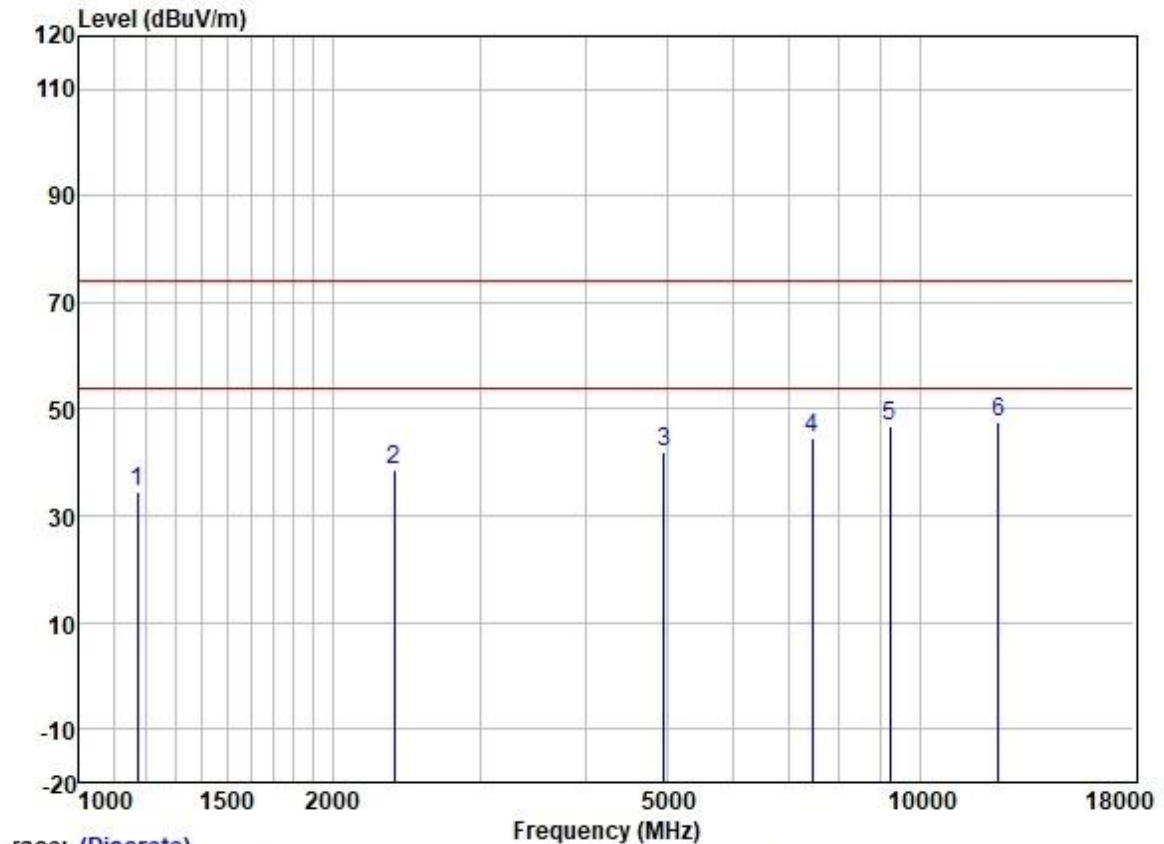


Trace: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1096.904	46.04	24.36	2.30	38.45	34.25	74.00	-39.75	VERTICAL	Peak
2	1921.727	46.25	26.06	2.94	37.74	37.51	74.00	-36.49	VERTICAL	Peak
3	4882.237	39.40	31.56	5.52	36.84	39.64	74.00	-34.36	VERTICAL	Peak
4	7323.721	38.67	36.00	6.13	37.43	43.37	74.00	-30.63	VERTICAL	Peak
5	9764.262	34.67	38.50	7.02	37.41	42.78	74.00	-31.22	VERTICAL	Peak
6	12205.510	39.14	38.74	8.08	37.00	48.96	74.00	-25.04	VERTICAL	Peak



Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High

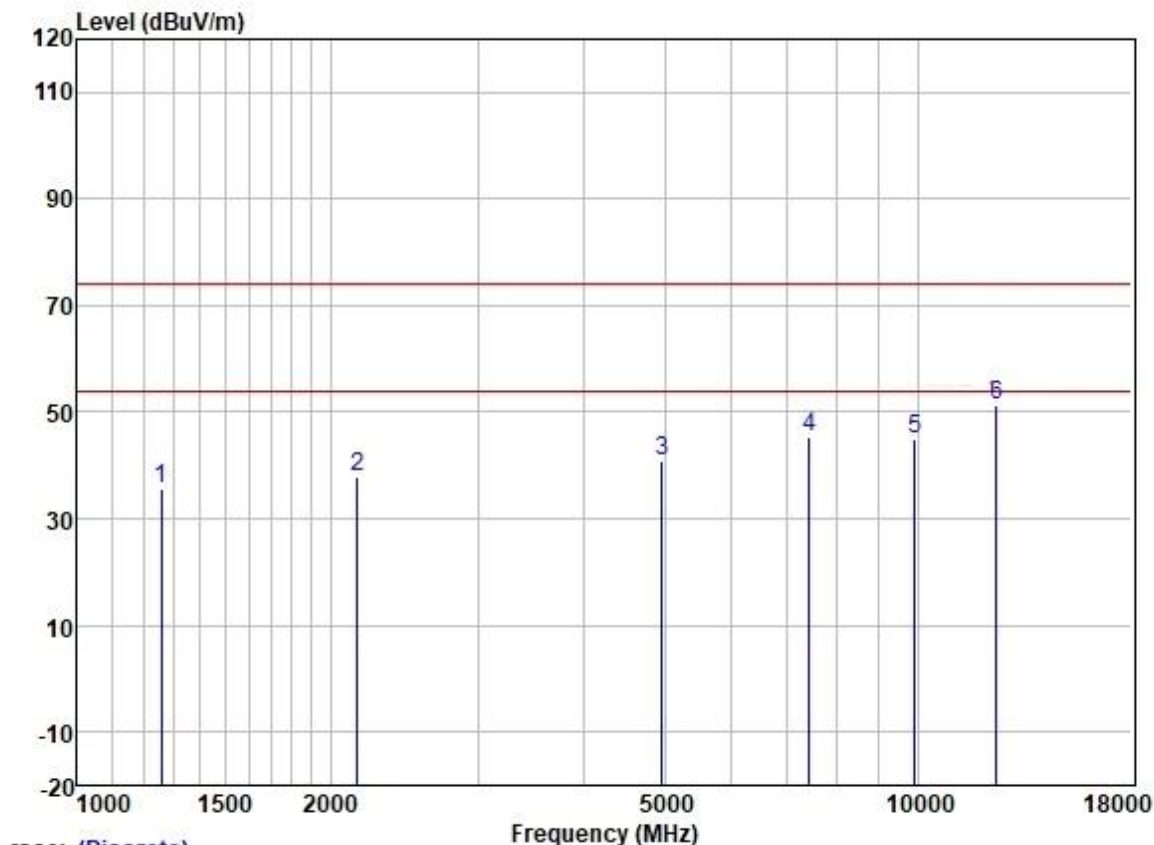


Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1172.303	45.77	24.56	2.39	38.40	34.32	74.00	-39.68	HORIZONTAL Peak
2	2373.157	45.59	27.30	3.45	37.60	38.74	74.00	-35.26	HORIZONTAL Peak
3	4968.641	41.31	31.67	5.66	36.85	41.79	74.00	-32.21	HORIZONTAL Peak
4	7440.921	39.47	36.27	6.22	37.47	44.49	74.00	-29.51	HORIZONTAL Peak
5	9220.778	39.14	37.79	7.36	37.46	46.83	74.00	-27.17	HORIZONTAL Peak
6	12400.390	38.02	38.57	7.97	36.88	47.68	74.00	-26.32	HORIZONTAL Peak



Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Trace: (Discrete)

	ReadAntenna	Cable	Preamp		Limit	Over			
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1260.149	46.49	25.07	2.40	38.35	35.61	74.00	-38.39	VERTICAL Peak
2	2157.260	45.72	26.45	3.18	37.66	37.69	74.00	-36.31	VERTICAL Peak
3	4960.516	40.44	31.65	5.65	36.84	40.90	74.00	-33.10	VERTICAL Peak
4	7440.442	40.14	36.27	6.22	37.47	45.16	74.00	-28.84	VERTICAL Peak
5	9920.063	36.71	38.65	6.96	37.40	44.92	74.00	-29.08	VERTICAL Peak
6	12400.080	41.77	38.57	7.97	36.88	51.43	74.00	-22.57	VERTICAL Peak



## 8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR231100122602



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## 9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2311001226HS



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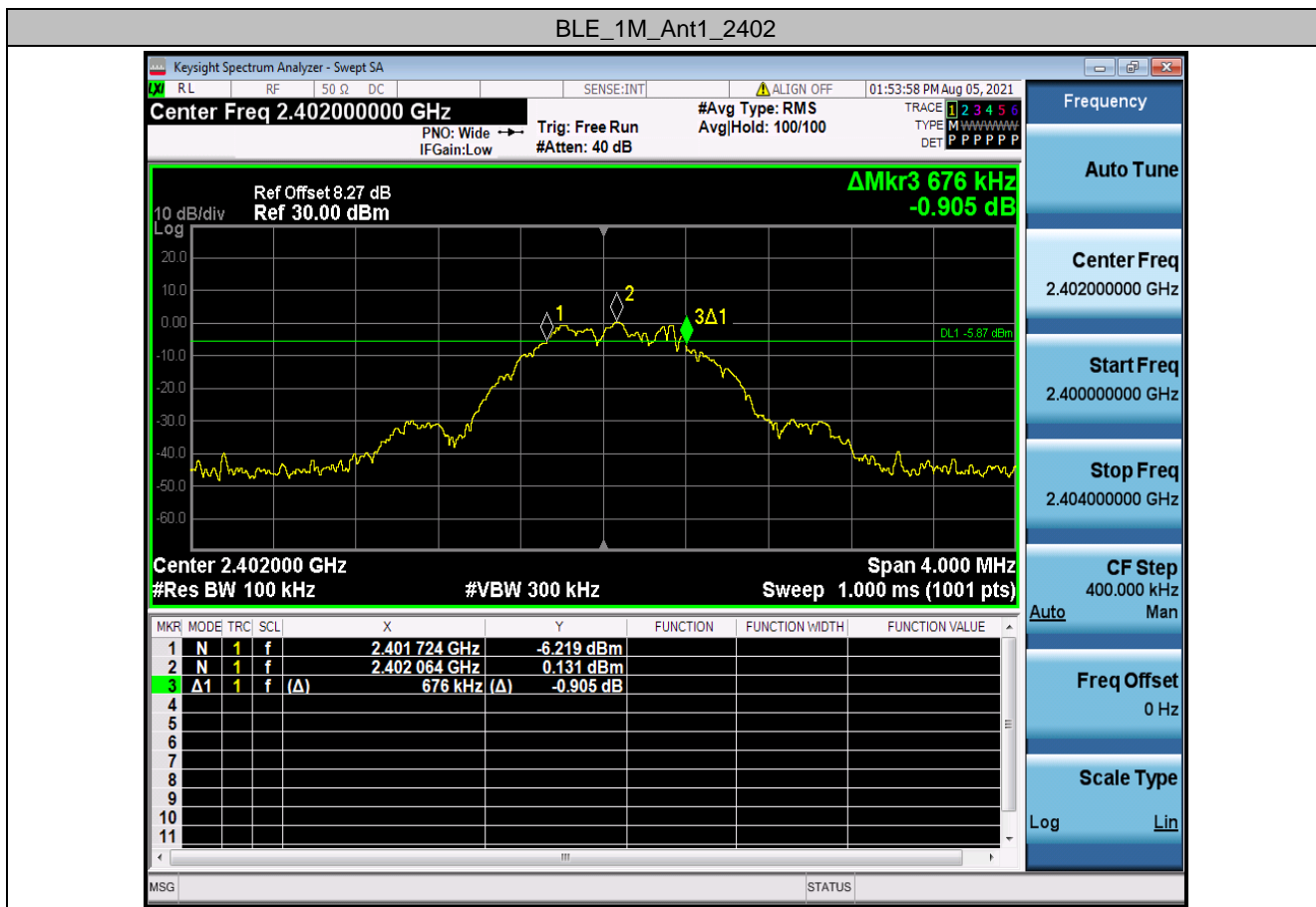
## 10 Appendix

### 10.1 Appendix A: DTS Bandwidth

#### 10.1.1 Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.676	2401.724	2402.400	$\geq 0.5$	PASS
		2442	0.676	2441.716	2442.392	$\geq 0.5$	PASS
		2480	0.628	2479.724	2480.352	$\geq 0.5$	PASS

#### 10.1.2 Test Graphs



### BLE\_1M\_Ant1\_2442



### BLE\_1M\_Ant1\_2480

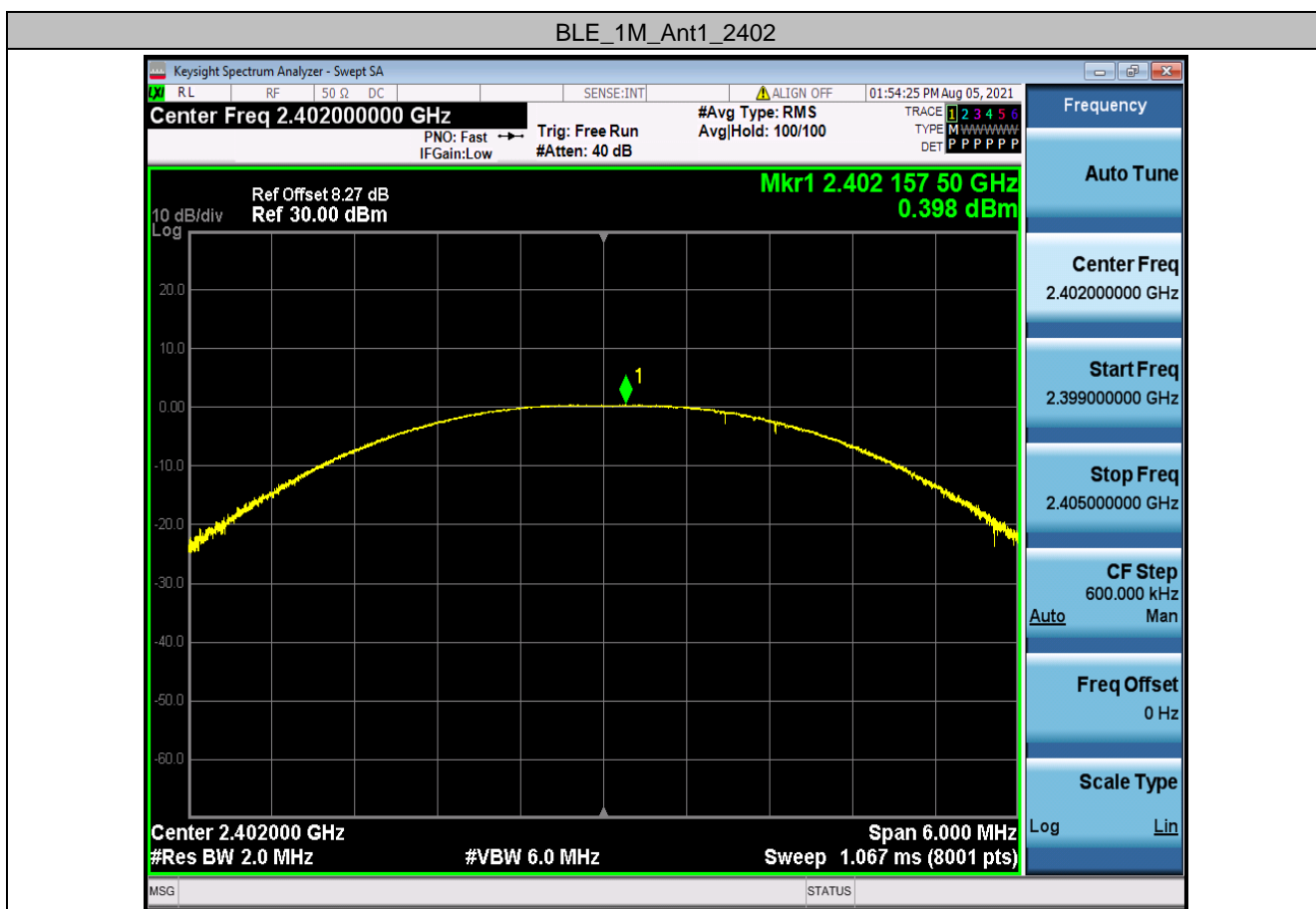


### 10.2 Appendix C: Maximum conducted output power

#### 10.2.1 Test Result

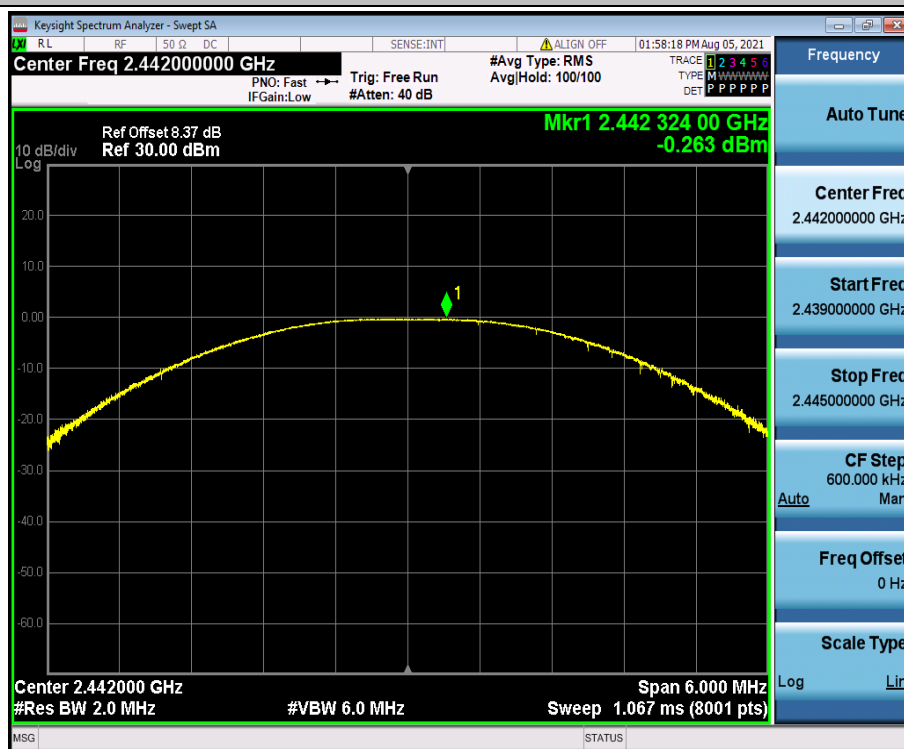
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.4	<=30	PASS
		2442	-0.26	<=30	PASS
		2480	-0.91	<=30	PASS

#### 10.2.2 Test Graphs





BLE\_1M\_Ant1\_2442



BLE\_1M\_Ant1\_2480



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### 10.3 Appendix D: Maximum power spectral density

#### 10.3.1 Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.45	<=8	PASS
		2442	-10.22	<=8	PASS
		2480	-10.81	<=8	PASS

#### 10.3.2 Test Graphs



BLE\_1M\_Ant1\_2442



BLE\_1M\_Ant1\_2480



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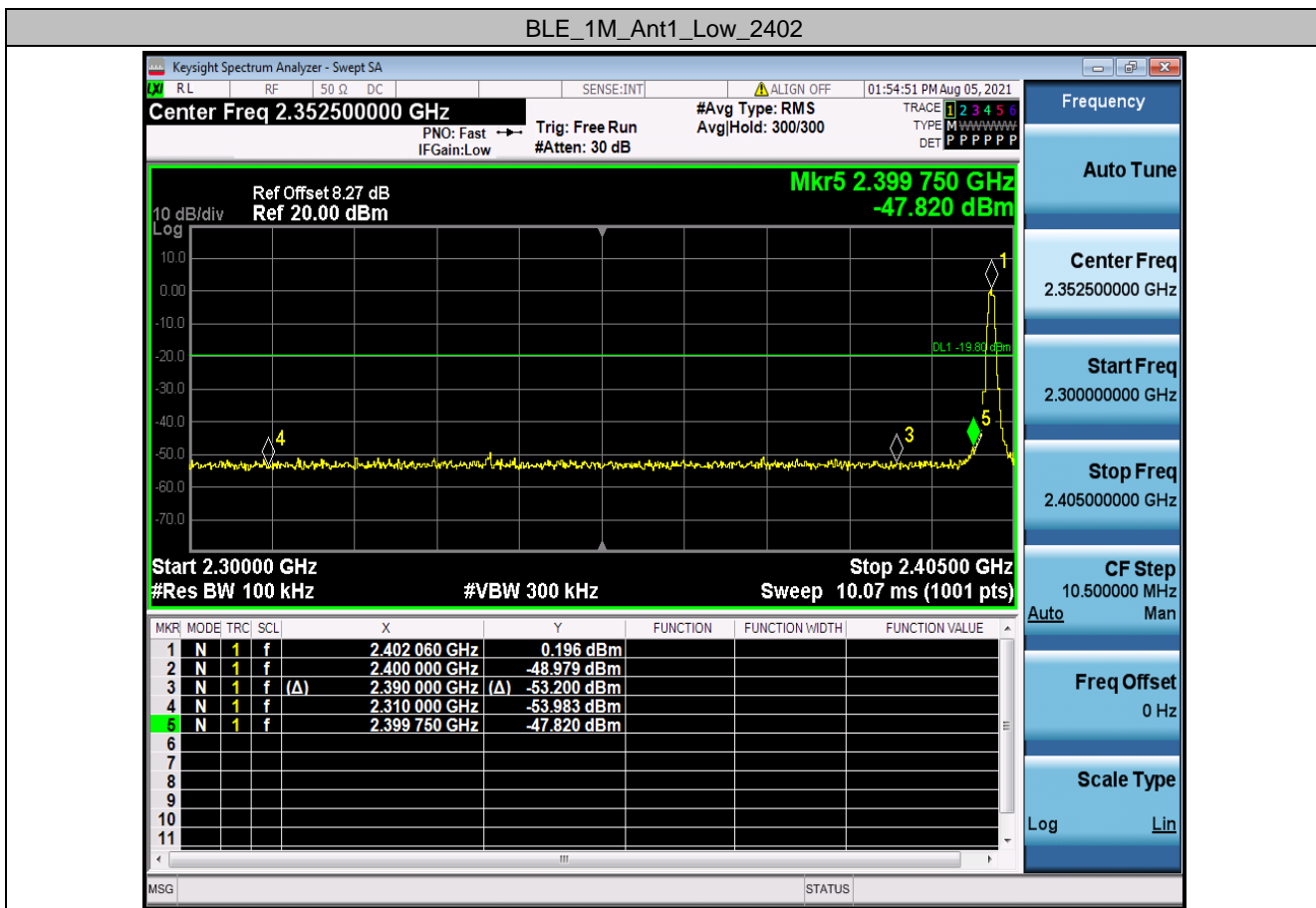


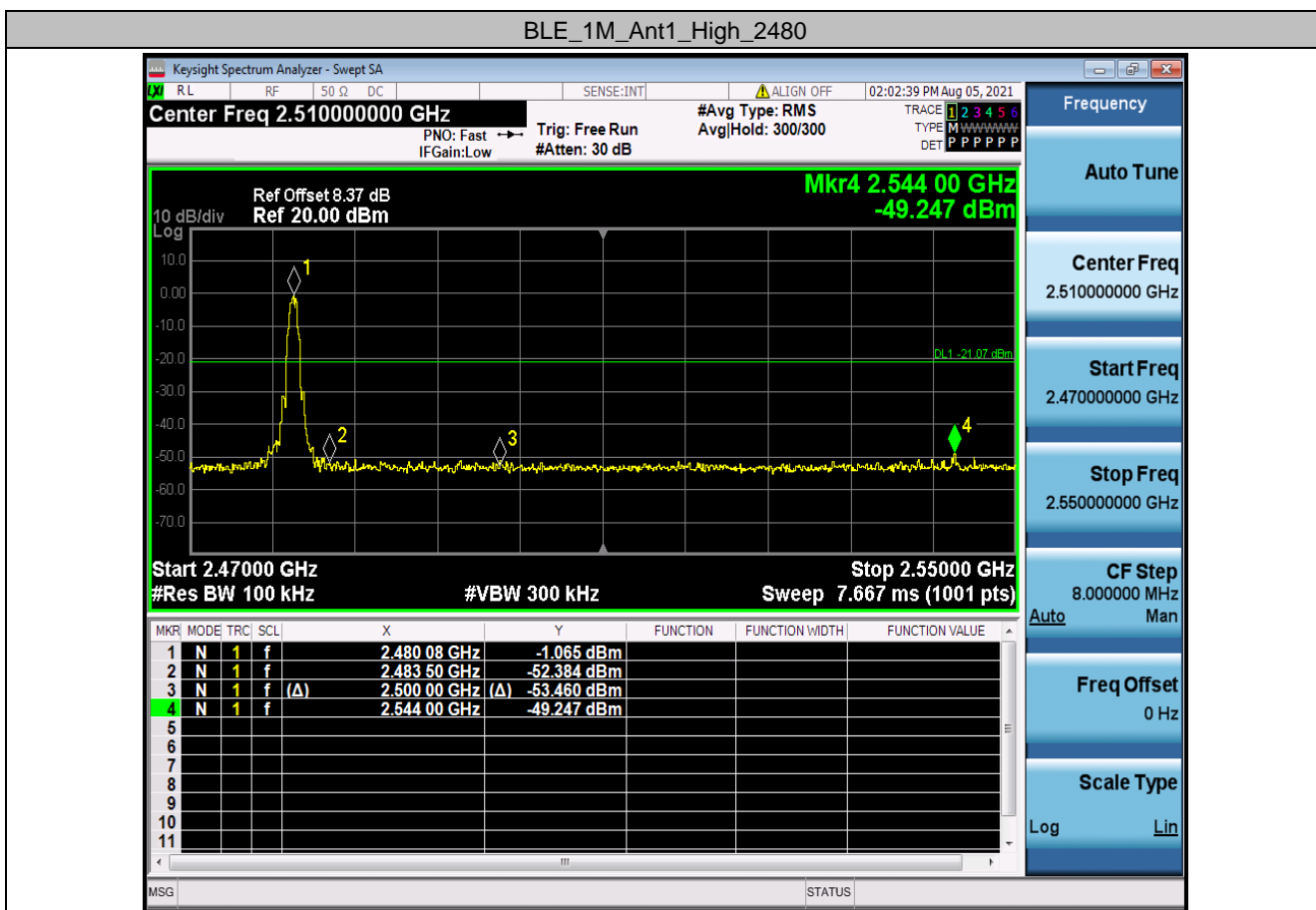
### 10.4 Appendix E: Band edge measurements

#### 10.4.1 Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.20	-47.82	<=-19.8	PASS
		High	2480	-1.07	-49.25	<=-21.07	PASS

#### 10.4.2 Test Graphs





### 10.5 Appendix F: Conducted Spurious Emission

#### 10.5.1 Test Result

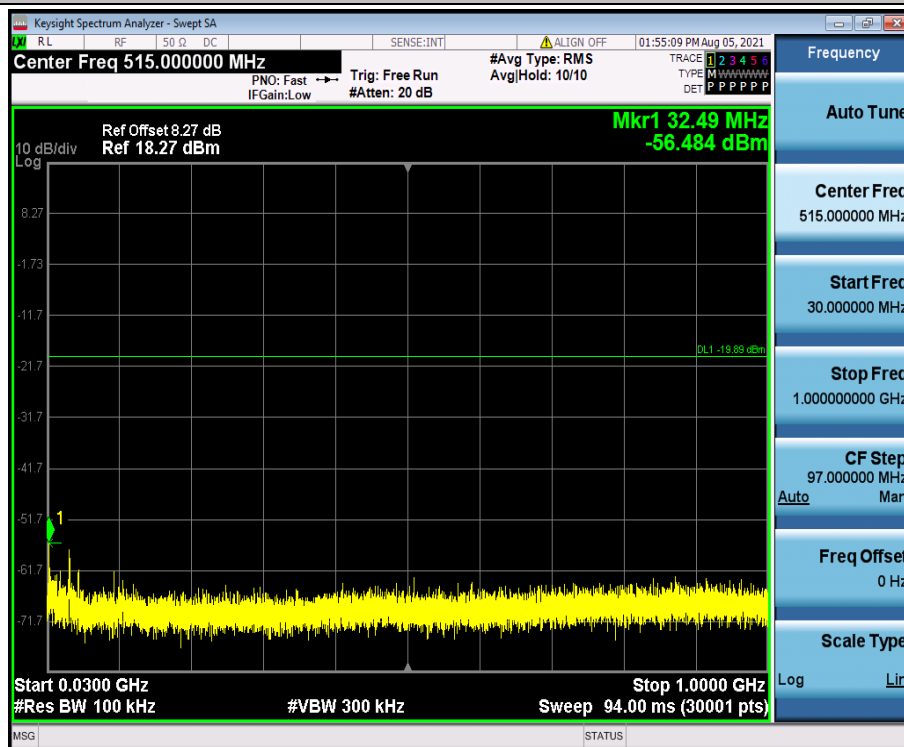
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	0.11	0.11	---	PASS
			30~1000	---	-56.484	<=-19.89	PASS
			1000~26500	---	-53.408	<=-19.89	PASS
		2442	Reference	-0.52	-0.52	---	PASS
			30~1000	---	-58.053	<=-20.518	PASS
			1000~26500	---	-53.073	<=-20.518	PASS
		2480	Reference	-1.52	-1.52	---	PASS
			30~1000	---	-56.867	<=-21.516	PASS
			1000~26500	---	-52.658	<=-21.516	PASS

#### 10.5.2 Test Graphs

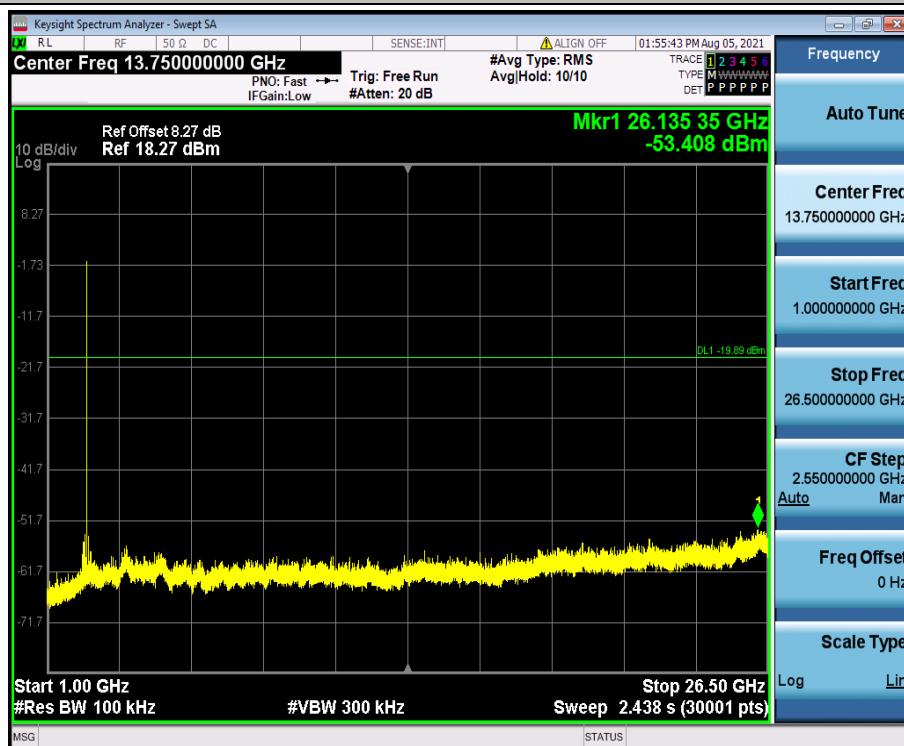


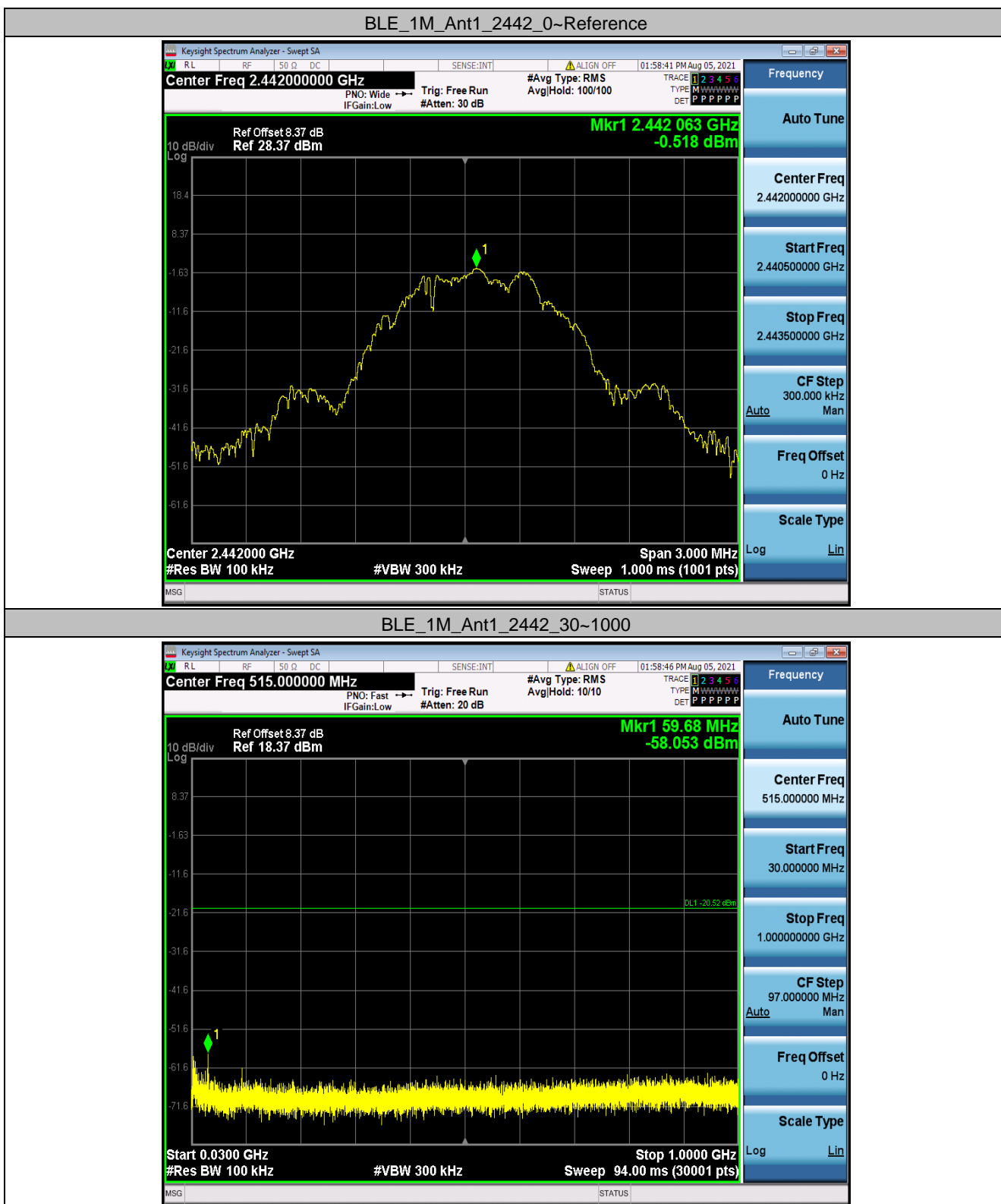


### BLE\_1M\_Ant1\_2402\_30~1000



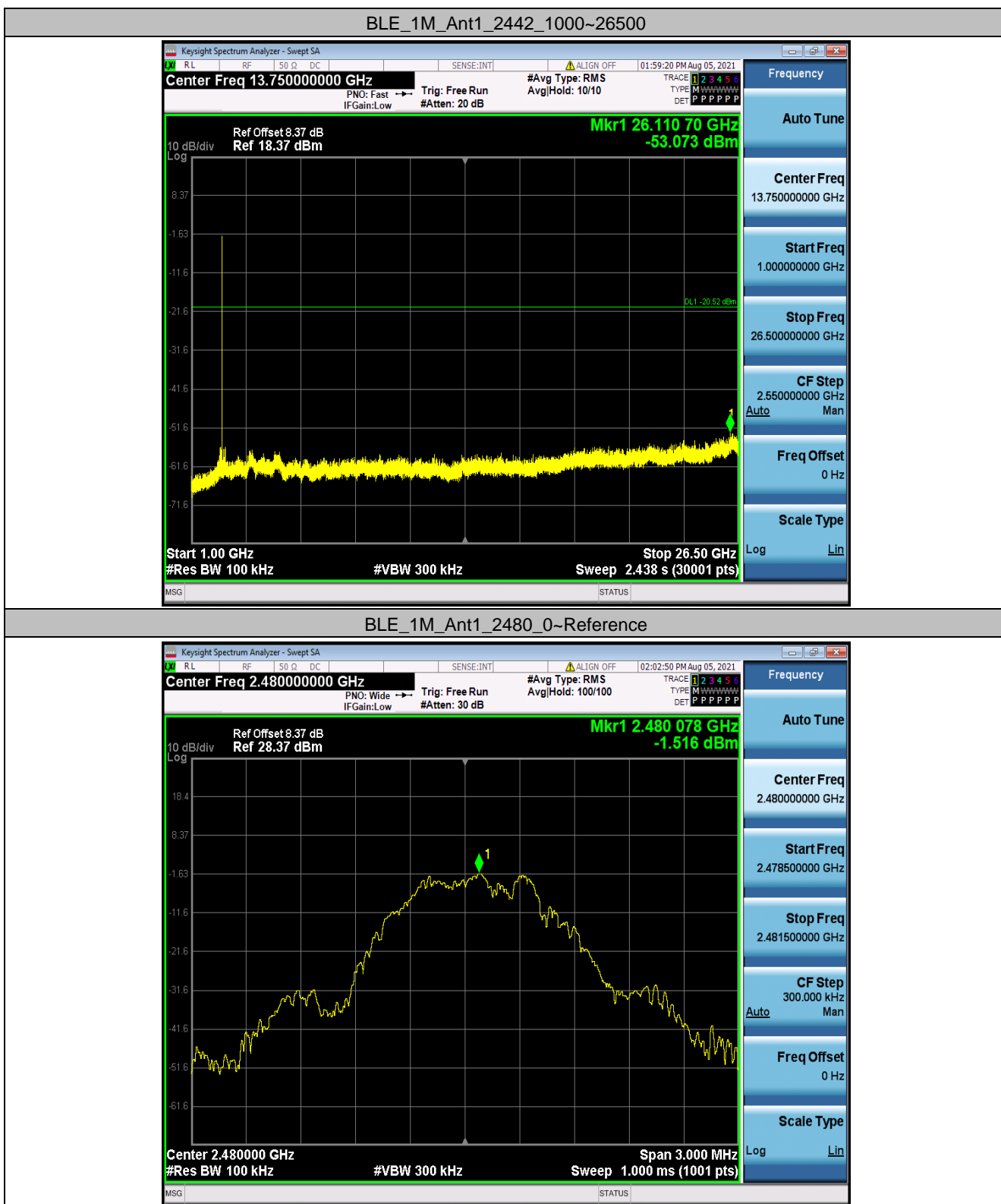
### BLE\_1M\_Ant1\_2402\_1000~26500





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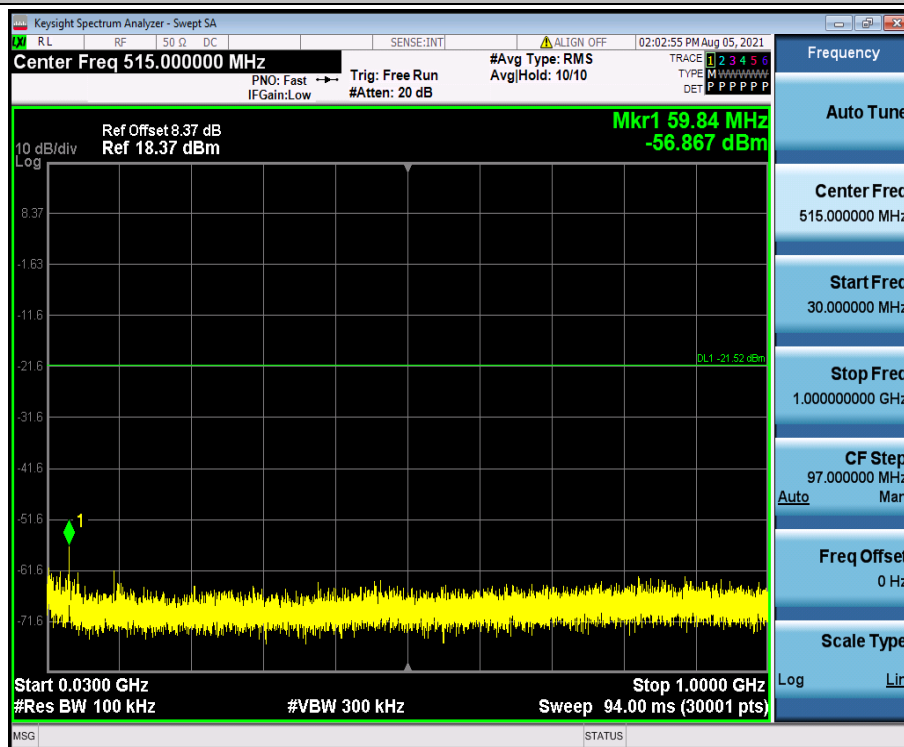
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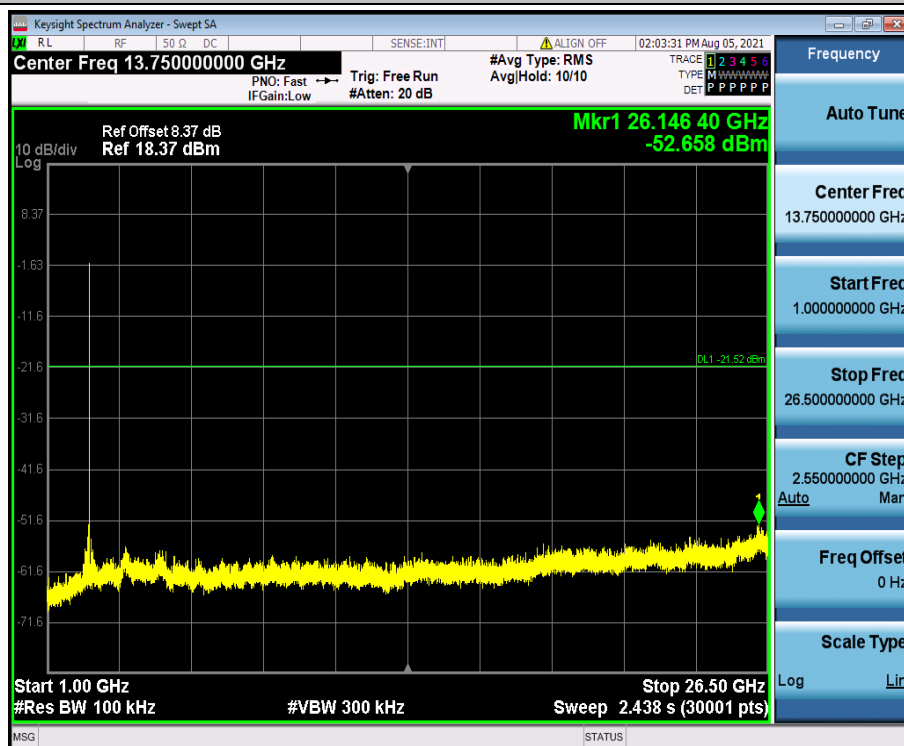
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### BLE\_1M\_Ant1\_2480\_30~1000

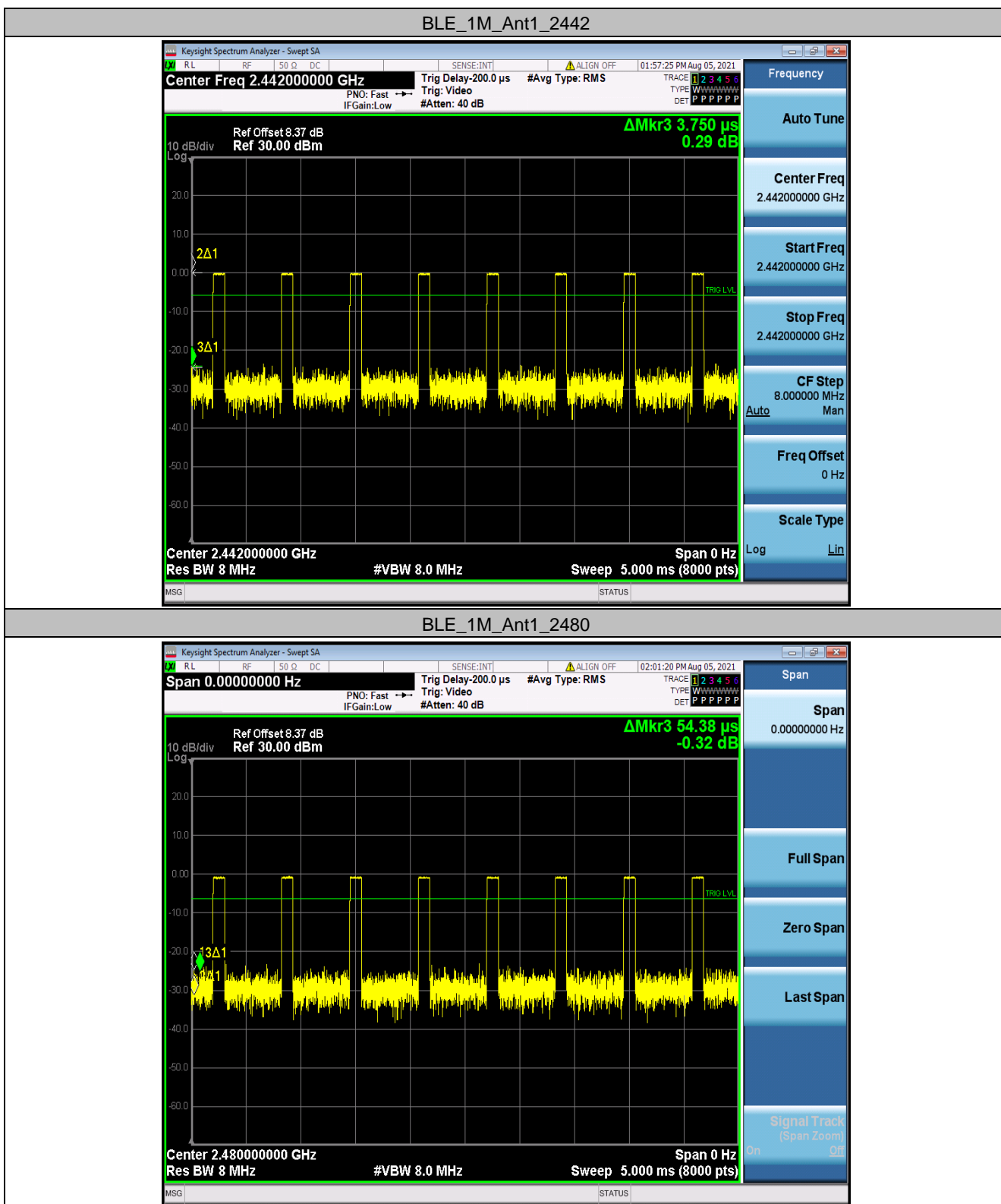


### BLE\_1M\_Ant1\_2480\_1000~26500









- End of the Report -



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