

TEST REPORT

Application No.: SZCR2604001624AT

Applicant: Voyetra Turtle Beach, Inc.

Address of Applicant: 15822 BERNARDO CENTER DRIVE, SUITE 105, SAN DIEGO, California, 92127 United States

Manufacturer: Voyetra Turtle Beach, Inc.

Address of Manufacturer: 15822 BERNARDO CENTER DRIVE, SUITE 105, SAN DIEGO, California, United States

Factory: Voyetra Turtle Beach, Inc.

Address of Factory: 15822 BERNARDO CENTER DRIVE, SUITE 105, SAN DIEGO, California, United States

Equipment Under Test (EUT):

EUT Name: Wireless flight simulator

Model No.: SWAB0037, SAAB0038 ♣

♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Trade Mark: TURTLE BEACH

FCC ID: XGB-SWAB0037

Standard(s) : 47 CFR Part 15, Subpart C 15.247

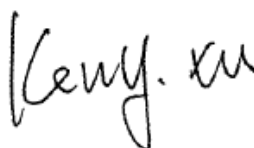
Date of Receipt: 2026-04-20

Date of Test: 2026-05-02 to 2026-05-07

Date of Issue: 2026-05-26

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


Keny Xu
EMC Laboratory Manager



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 2 of 49

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2026-05-26		Original

Authorized for issue by:				
		Byron Liang		
		Byron Liang/Project Engineer		
		Eric Fu		
		Eric Fu/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
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2020) Section 6.10.5 & 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2020) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2020) Section 6.6 & 11.12	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Maximum Conducted Output Power		ANSI C63.10 (2020) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2020) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectral Density		ANSI C63.10 (2020) Section 11.10.3	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2020) Section 6.10.4	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2020) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass

Declaration of EUT Family Grouping:

Model No.: SWAB0037, SAAB0038

Only the model SWAB0037 was tested. According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on packaging.



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3 Contents

	Page
1 Cover Page	1
2 Test Summary	3
3 Contents	4
4 General Information	6
4.1 Details of E.U.T.	6
4.2 Description of Support Units	6
4.3 Measurement Uncertainty	6
4.4 Test Location	7
4.5 Test Facility	7
4.6 Deviation from Standards	7
4.7 Abnormalities from Standard Conditions	7
5 Equipment List	8
6 Radio Spectrum Technical Requirement	10
6.1 Antenna Requirement	10
6.1.1 Test Requirement:	10
6.1.2 Conclusion	10
7 Radio Spectrum Matter Test Results	11
7.1 Radiated Emissions which fall in the restricted bands	11
7.1.1 E.U.T. Operation	11
7.1.2 Test Mode Description	11
7.1.3 Test Setup Diagram	12
7.1.4 Measurement Procedure and Data	12
7.2 Radiated Spurious Emissions Below 1GHz	15
7.2.1 E.U.T. Operation	15
7.2.2 Test Mode Description	15
7.2.3 Test Setup Diagram	16
7.2.4 Measurement Procedure and Data	17
7.3 Radiated Spurious Emissions Above 1GHz	20
7.3.1 E.U.T. Operation	20
7.3.2 Test Mode Description	20
7.3.3 Test Setup Diagram	20
7.3.4 Measurement Procedure and Data	21
7.4 Maximum Conducted Output Power	26
7.4.1 E.U.T. Operation	26
7.4.2 Test Mode Description	26
7.4.3 Test Setup Diagram	27
7.4.4 Measurement Procedure and Data	27
7.5 Minimum 6dB Bandwidth	28
7.5.1 E.U.T. Operation	28



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 5 of 49

7.5.2	Test Mode Description	28
7.5.3	Test Setup Diagram	28
7.5.4	Measurement Procedure and Data.....	28
7.6	Power Spectral Density	29
7.6.1	E.U.T. Operation	29
7.6.2	Test Mode Description	29
7.6.3	Test Setup Diagram	29
7.6.4	Measurement Procedure and Data.....	29
7.7	Conducted Band Edges Measurement	30
7.7.1	E.U.T. Operation	30
7.7.2	Test Mode Description	30
7.7.3	Test Setup Diagram	30
7.7.4	Measurement Procedure and Data.....	30
7.8	Conducted Spurious Emissions	31
7.8.1	E.U.T. Operation	31
7.8.2	Test Mode Description	31
7.8.3	Test Setup Diagram	31
7.8.4	Measurement Procedure and Data.....	31
8	Test Setup Photo	32
9	EUT Constructional Details (EUT Photos)	32
10	Appendix.....	33



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V(USB powered)
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.3 LE
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	3.17dBi
Antenna Number:	1

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Radiated Emissions which fall in the restricted bands	$\pm 6.0\text{dB}$ (Below 1GHz); $\pm 4.6\text{dB}$ (Above 1GHz)
Radiated Spurious Emissions Below 1GHz	$\pm 6.0\text{dB}$ for 3m; $\pm 5.0\text{dB}$ for 10m
Radiated Spurious Emissions Above 1GHz	$\pm 4.6\text{dB}$ (1-18GHz); $\pm 4.8\text{dB}$ (18-40GHz)
Maximum Conducted Output Power	$\pm 0.4\text{dB}$
Minimum 6dB Bandwidth	$\pm 0.3\%$
Power Spectral Density	$\pm 0.4\text{dB}$
Conducted Band Edges Measurement	$\pm 2.7\text{dB}$
Conducted Spurious Emissions	$\pm 2.7\text{dB}$

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/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.
- the measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



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Report No.: SZCR260400162402

Page: 7 of 49

4.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

4.5 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2025-05-07	2028-05-06
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2026-02-02	2027-02-01
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2025-07-22	2026-07-21
Microwave system amplifier	Agilent	83017A	SEM005-25	2025-09-10	2026-09-09
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2025-07-05	2026-07-04

Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2025-11-17	2027-11-16
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2025-07-25	2026-07-24
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2025-08-29	2027-08-28
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2026-02-02	2027-02-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2025-07-05	2026-07-04

Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2025-05-07	2028-05-06
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2026-02-02	2027-02-01
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2025-07-22	2026-07-21
Microwave system amplifier	Agilent	83017A	SEM005-25	2025-09-10	2026-09-09
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2025-07-05	2026-07-04
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2025-07-22	2027-07-21
Pre-Amplifier	TST PASS	LNA180400G40	SEM005-39	2025-05-22	2026-05-21



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Report No.: SZCR260400162402

Page: 9 of 49

RF Conducted Test					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Power Sensor	TST PASS	TSPS2023R	SEM009-26	2026-02-04	2027-02-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-16	2026-02-04	2027-02-03
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2025-07-24	2026-07-23
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2026-02-03	2027-02-02
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2025-07-05	2026-07-04
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2026-02-02	2027-02-01

General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2025-07-23	2026-07-22
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2025-07-23	2026-07-22
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2026-02-14	2027-02-13



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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 a PCB antenna integrated on the mainboard and is not replaceable, the best case gain of the antenna1 is 3.17dBi.

Antenna location: Refer to internal photo.

7 Radio Spectrum Matter Test Results

7.1 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 (2020) Section 6.10.5 & 11.12
 Measurement Distance: 3m
 Test Engineer: Logic Wang

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.

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



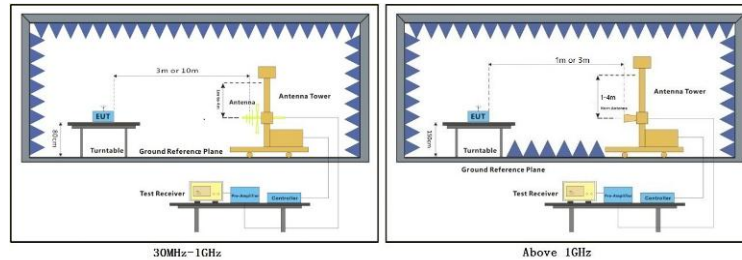
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7.1.3 Test Setup Diagram



7.1.4 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.
- 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.
- 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 peak, quasi-peak or average 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 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.

Remark 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

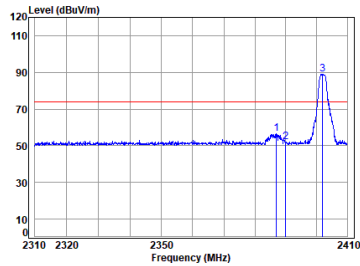
Remark 4: For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.



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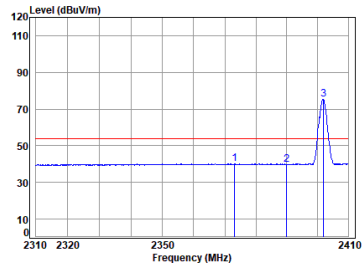
BLE_2M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1	2386.927	16.13	28.57	32.78	44.71	56.63	74.00	-17.37	Peak	0.00
2	2390.000	16.13	28.58	32.78	39.69	51.86	74.00	-22.14	Peak	0.00
3 p	2402.000	16.15	28.61	32.77	77.05	89.04	74.00	15.04	Peak	0.00

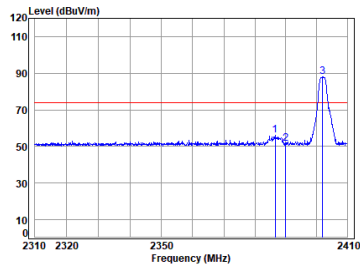
BLE_2M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1	2373.209	16.11	28.55	32.79	28.39	40.26	54.00	-13.74	Average	0.00
2	2390.000	16.13	28.58	32.78	27.82	39.75	54.00	-14.25	Average	0.00
3 q	2402.000	16.15	28.61	32.77	63.33	75.32	54.00	21.32	Average	0.00

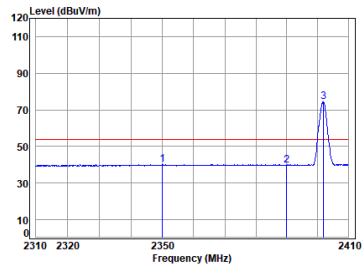
BLE_2M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1	2386.522	16.13	28.57	32.78	44.06	55.98	74.00	-18.02	Peak	0.00
2	2390.000	16.13	28.58	32.78	39.69	51.62	74.00	-22.38	Peak	0.00
3 p	2402.000	16.15	28.61	32.77	75.95	87.94	74.00	13.94	Peak	0.00

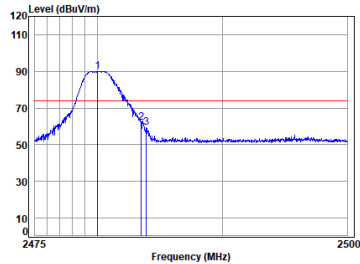
BLE_2M_TX_CH_00_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1	2349.990	16.07	28.50	32.80	28.46	40.23	54.00	-13.77	Average	0.00
2	2390.000	16.13	28.58	32.78	27.83	39.76	54.00	-14.24	Average	0.00
3 q	2402.000	16.15	28.61	32.77	62.49	74.48	54.00	20.48	Average	0.00

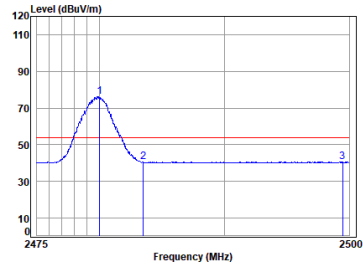
BLE_2M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2480 Band edge
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 p 2480.000	16.27	28.96	32.73	77.51	90.01	74.00	16.01	Peak	0.00
2 2483.500	16.28	28.97	32.73	49.52	62.04	74.00	-11.96	Peak	0.00
3 2483.896	16.28	28.97	32.73	46.58	59.10	74.00	-14.90	Peak	0.00

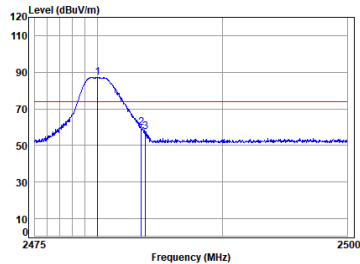
BLE_2M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2480 Band edge
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 q 2480.000	16.27	28.96	32.73	63.77	76.27	54.00	22.27	Average	0.00
2 2483.500	16.28	28.97	32.73	27.90	40.42	54.00	-13.58	Average	0.00
3 2499.472	16.30	29.00	32.73	28.13	40.70	54.00	-13.30	Average	0.00

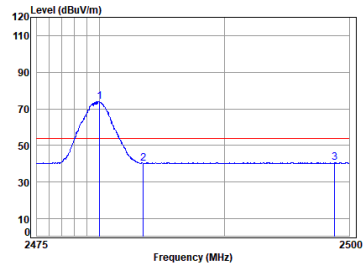
BLE_2M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2480 Band edge
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 p 2480.000	16.27	28.96	32.73	74.62	87.12	74.00	13.12	Peak	0.00
2 2483.500	16.28	28.97	32.73	47.06	59.58	74.00	-14.42	Peak	0.00
3 2483.821	16.28	28.97	32.73	44.76	57.28	74.00	-16.72	Peak	0.00

BLE_2M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2480 Band edge
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 q 2480.000	16.27	28.96	32.73	61.53	74.03	54.00	20.03	Average	0.00
2 2483.500	16.28	28.97	32.73	27.81	40.33	54.00	-13.67	Average	0.00
3 2498.844	16.30	29.00	32.73	28.08	40.65	54.00	-13.35	Average	0.00

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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 15 of 49

7.2 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2020) Section 6.4,6.5
 Measurement Distance: 3m
 Test Engineer: Mason Wu

Limit:

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

Note

1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

2. At frequencies below 1GHz, measurements may be performed at a distance different to specified in the regulations.

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Below 30MHz, Aux Factor = 40 dB/decade of distance, the aux factor is $40\log(3/300) = -80\text{dB}$ (for 3m test distance).

EX. Above 30MHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(10/3) = 10.46\text{dB}$ (for 10m test distance).

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 45.6 % RH Atmospheric Pressure: 1015 mbar

7.2.2 Test Mode Description

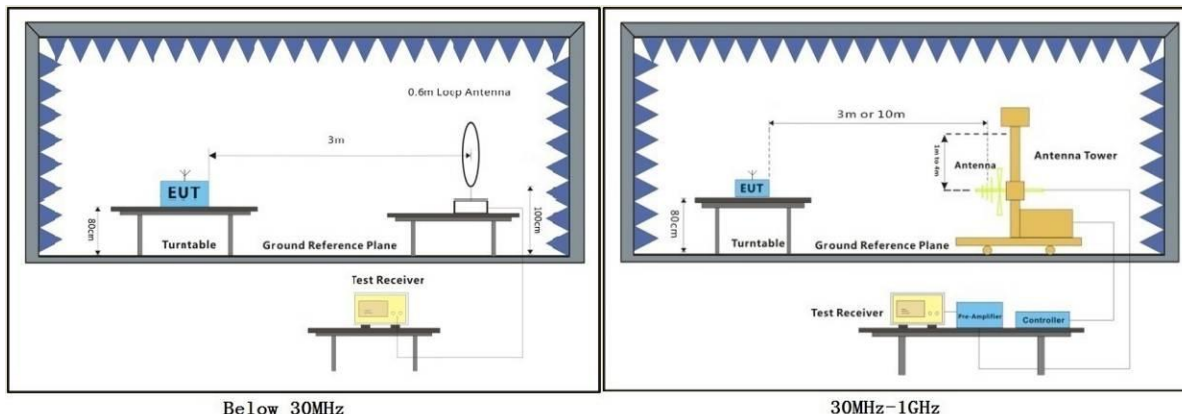
Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



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7.2.3 Test Setup Diagram



Below 30MHz

30MHz-1GHz

7.2.4 Measurement Procedure and Data

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

Remark:

1. At frequencies below 1GHz, measurements may be performed at a distance different to specified in the regulations.

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Below 30MHz, Aux Factor = 40 dB/decade of distance, the aux factor is $40\log(3/300) = -80\text{dB}$ (for 3m test distance).

EX. Above 30MHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(10/3) = 10.46\text{dB}$ (for 10m test distance).

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the worst-case test curve is displayed.



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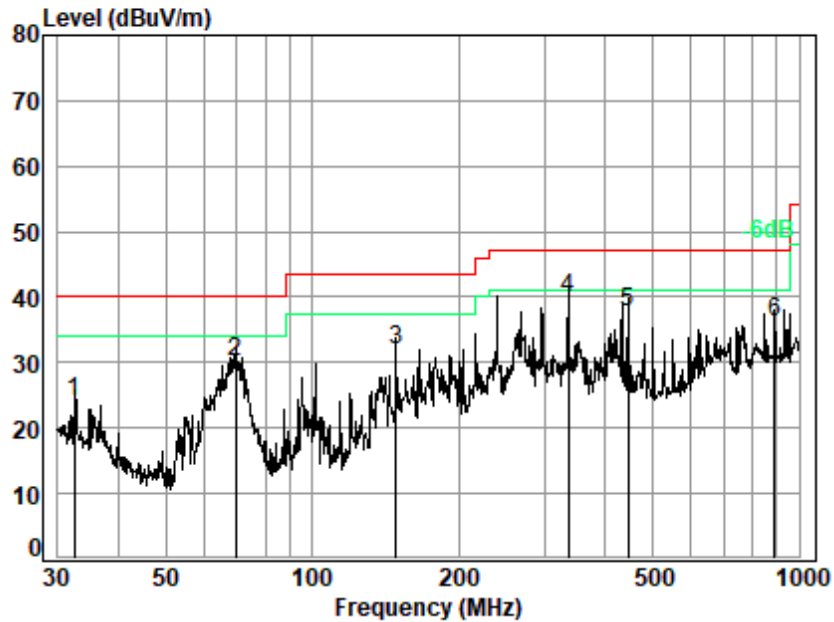
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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 18 of 49

Test Mode: 01; Polarity: Horizontal



Condition: 3m HORIZONTAL

Job No. : 01624AT/01625AT

Test Mode: 00

		Ant	Cable	Preamp	Read	Limit	Over	
	Freq	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dB	
1	32.406	20.13	0.76	27.65	30.76	24.00	40.00	QP
2	69.600	10.55	0.98	27.62	46.35	30.26	40.00	QP
3	148.441	12.76	1.49	27.71	45.32	31.86	43.50	QP
4 q	336.035	18.64	2.26	27.60	46.50	39.80	47.00	QP
5	444.851	20.85	2.64	27.84	42.17	37.82	47.00	QP
6	890.728	27.78	3.95	27.02	31.37	36.08	47.00	QP



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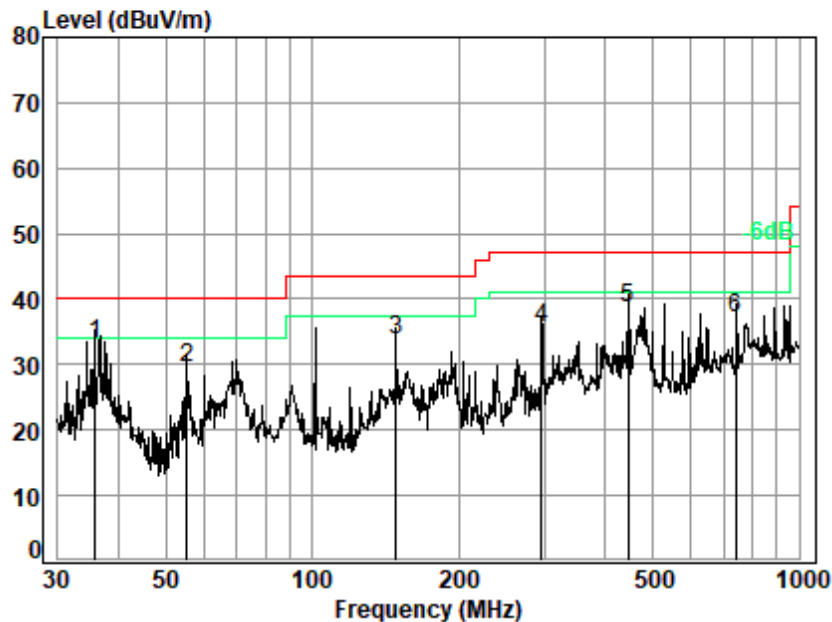
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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 19 of 49

Test Mode: 01; Polarity: Vertical



Condition: 3m VERTICAL

Job No. : 01624AT/01625AT

Test Mode: 00

		Ant	Cable	Preamp	Read	Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1	q	35.749	18.22	0.79	27.64	41.92	33.29	40.00 -6.71 QP
2		55.221	12.01	0.91	27.63	44.15	29.44	40.00 -10.56 QP
3		148.441	12.76	1.49	27.71	47.14	33.68	43.50 -9.82 QP
4		296.184	17.18	2.10	27.51	43.74	35.51	47.00 -11.49 QP
5		444.851	20.85	2.64	27.84	43.05	38.70	47.00 -8.30 QP
6		742.259	25.92	3.53	27.73	35.43	37.15	47.00 -9.85 QP



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No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

7.3 Radiated Spurious Emissions Above 1GHz

Test Requirement: 47 CFR Part 15, Subpart C 15.205 & 15.209
 Test Method: ANSI C63.10 (2020) Section 6.6 & 11.12
 Measurement Distance: 3m
 Test Engineer: Logic Wang

Limit:

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

Note:

At Above 18GHz, measurements may be performed at a distance shorter than that specified in the regulations

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Above 18GHz, Aux Factor = 20 dB/decade of distance, the aux factor is $20\log(1/3) = -9.54\text{dB}$ (for 1m test distance).

7.3.1 E.U.T. Operation

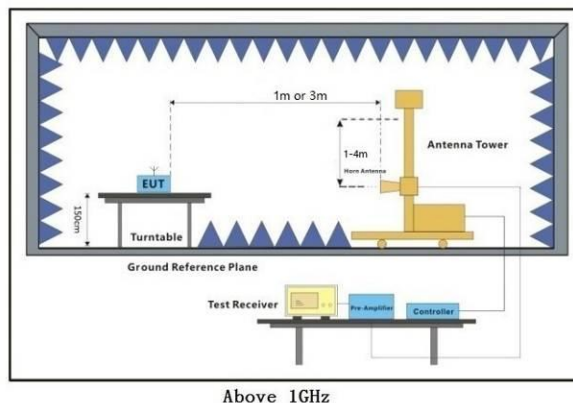
Operating Environment:

Temperature: 23.5 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5m above the ground at a 3m fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3m away from the interference-receiving antenna from 1GHz to 18GHz, and 1m away from the interference-receiving antenna above 18GHz.
- b. The interference-receiving antenna was mounted on the variable-height antenna tower, with its boresight facing the EUT throughout the test.
- c. The antenna height is varied from 1m to 4m 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 1m to 4m 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. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- g. 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.
- h. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Scan from 1GHz to 10th harmonic of the highest frequency or 40 GHz, whichever is lower.
2. 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.
3. For the frequency above 18GHz, testing had been executed under all test modes, only the worst-case test curve is displayed in the report.
4. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s).



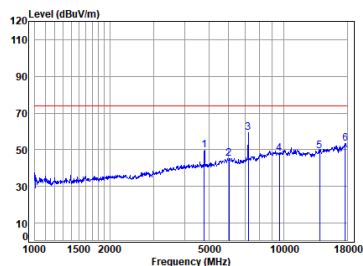
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Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

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Shenzhen Branch Calibration Laboratory

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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

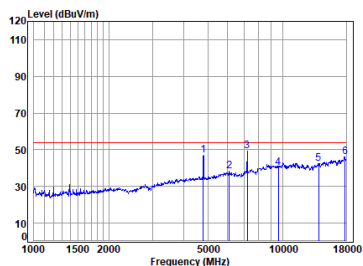
BLE_2M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1 4804.000	7.41	33.82	54.22	62.89	49.90	74.00	-24.10	Peak		0.00
2 6036.421	8.93	35.23	53.10	54.30	45.36	74.00	-28.64	Peak		0.00
3 p 7206.000	8.50	36.33	53.18	67.62	59.27	74.00	-14.73	Peak		0.00
4 9608.000	10.74	37.80	53.35	52.92	48.11	74.00	-25.89	Peak		0.00
5 13957.530	10.97	39.42	52.91	51.85	49.33	74.00	-24.67	Peak		0.00
6 17690.530	11.32	44.01	52.55	50.55	53.33	74.00	-20.67	Peak		0.00

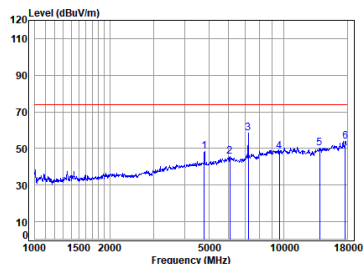
BLE_2M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1 4804.000	7.41	33.82	54.22	60.11	47.12	54.00	-6.88	Average		0.00
2 6106.616	8.92	35.79	53.11	46.62	38.22	54.00	-15.78	Average		0.00
3 q 7206.000	8.50	36.33	53.18	57.64	49.29	54.00	-4.71	Average		0.00
4 9608.000	10.74	37.80	53.35	45.11	40.38	54.00	-13.70	Average		0.00
5 13957.530	10.97	39.42	52.91	45.16	42.64	54.00	-11.36	Average		0.00
6 17793.090	11.38	43.45	52.58	43.68	46.01	54.00	-7.99	Average		0.00

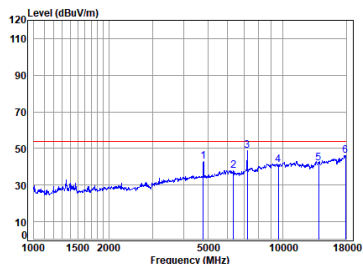
BLE_2M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1 4804.000	7.41	33.82	54.22	61.17	48.18	74.00	-25.82	Peak		0.00
2 6071.417	8.92	35.46	53.11	54.13	45.40	74.00	-28.60	Peak		0.00
3 p 7206.000	8.50	36.33	53.18	66.66	58.21	74.00	-15.69	Peak		0.00
4 9608.000	10.74	37.80	53.35	53.17	48.36	74.00	-25.64	Peak		0.00
5 13957.530	10.97	39.42	52.91	52.50	49.98	74.00	-24.02	Peak		0.00
6 17690.530	11.32	44.01	52.55	50.95	53.73	74.00	-20.27	Peak		0.00

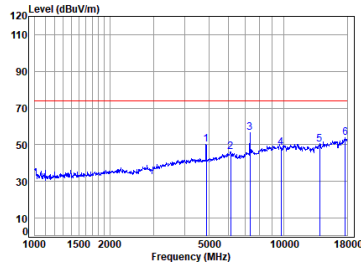
BLE_2M_TX_CH_00_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1 4804.000	7.41	33.82	54.22	55.71	42.72	54.00	-11.28	Average		0.00
2 6340.436	8.90	35.38	53.14	46.83	37.97	54.00	-16.03	Average		0.00
3 q 7206.000	8.50	36.33	53.18	57.12	48.77	54.00	-5.23	Average		0.00
4 9608.000	10.74	37.80	53.35	46.03	41.22	54.00	-12.78	Average		0.00
5 13957.530	10.97	39.42	52.91	44.71	42.19	54.00	-11.81	Average		0.00
6 17896.250	11.44	43.59	52.45	43.55	46.13	54.00	-7.87	Average		0.00

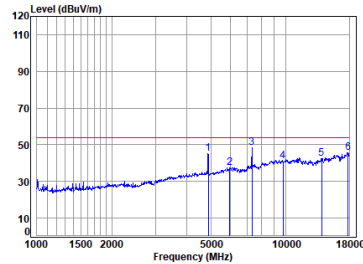
BLE_2M_TX_CH_19_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT01625AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	Line	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4880.000	7.47	34.12	54.21	62.76	50.14	74.00	-23.86 Peak	0.00
2 5949.811	8.92	35.75	53.11	54.60	46.16	74.00	-27.84 Peak	0.00
3 p 7320.000	8.46	36.10	53.17	65.04	56.43	74.00	-17.57 Peak	0.00
4 9760.000	10.69	37.56	53.29	53.45	48.41	74.00	-25.59 Peak	0.00
5 13957.530	10.97	39.42	52.91	52.63	50.11	74.00	-23.89 Peak	0.00
6 17690.530	11.32	44.01	52.55	50.84	53.62	74.00	-20.38 Peak	0.00

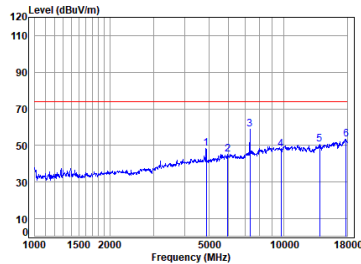
BLE_2M_TX_CH_19_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT01625AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	Line	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4880.000	7.47	34.12	54.21	57.67	45.05	54.00	-8.95 Average	0.00
2 5949.811	8.86	35.20	53.15	46.69	37.60	54.00	-16.40 Average	0.00
3 q 7320.000	8.46	36.10	53.17	57.12	48.51	54.00	-5.49 Average	0.00
4 9760.000	10.69	37.56	53.29	46.14	41.10	54.00	-12.90 Average	0.00
5 13957.530	10.97	39.42	52.91	45.15	42.63	54.00	-11.37 Average	0.00
6 17644.590	11.41	43.49	52.48	43.09	45.51	54.00	-8.49 Average	0.00

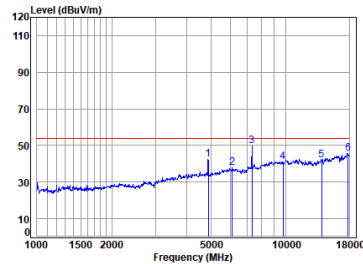
BLE_2M_TX_CH_19_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT01625AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	Line	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4880.000	7.47	34.12	54.21	60.93	48.31	74.00	-25.69 Peak	0.00
2 5949.811	8.86	35.20	53.15	54.40	45.31	74.00	-28.69 Peak	0.00
3 p 7320.000	8.46	36.10	53.17	67.50	58.89	74.00	-15.11 Peak	0.00
4 9760.000	10.69	37.56	53.29	53.16	48.12	74.00	-25.88 Peak	0.00
5 13957.530	10.97	39.42	52.91	53.11	50.59	74.00	-23.41 Peak	0.00
6 17644.590	11.41	43.49	52.48	51.13	53.55	74.00	-20.45 Peak	0.00

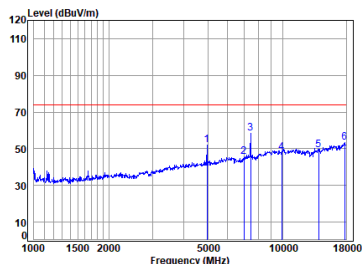
BLE_2M_TX_CH_19_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT01625AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	Line	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4880.000	7.47	34.12	54.21	55.07	42.45	54.00	-11.55 Average	0.00
2 6088.991	8.92	35.67	53.11	46.47	37.95	54.00	-16.05 Average	0.00
3 q 7320.000	8.46	36.10	53.17	58.53	49.92	54.00	-4.08 Average	0.00
4 9760.000	10.69	37.56	53.29	46.31	41.27	54.00	-12.73 Average	0.00
5 13957.530	10.97	39.42	52.91	44.66	42.14	54.00	-11.86 Average	0.00
6 17644.590	11.41	43.49	52.48	43.05	45.47	54.00	-8.53 Average	0.00

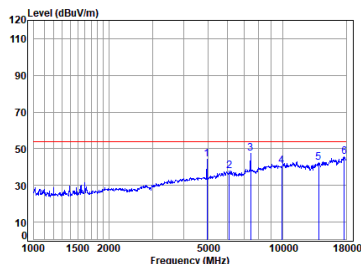
BLE_2M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	dBuV/m	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4960.000	7.53	33.94	54.20	64.57	51.04	74.00	-22.16 Peak	0.00
2 6995.172	8.56	35.52	53.20	54.68	45.56	74.00	-28.44 Peak	0.00
3 p 7440.000	8.43	36.22	53.15	67.05	58.55	74.00	-15.45 Peak	0.00
4 9920.000	10.64	37.70	53.23	52.70	47.81	74.00	-26.19 Peak	0.00
5 13957.530	10.97	39.42	52.91	51.91	49.39	74.00	-24.61 Peak	0.00
6 17741.740	11.35	43.81	52.53	50.67	53.30	74.00	-20.70 Peak	0.00

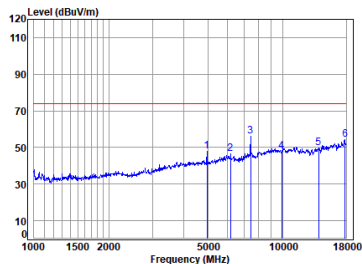
BLE_2M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	dBuV/m	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4960.000	7.53	33.94	54.20	57.13	44.40	54.00	-9.60 Average	0.00
2 6995.172	8.92	35.79	53.11	46.20	37.80	54.00	-16.20 Average	0.00
3 q 7440.000	8.43	36.22	53.15	55.89	47.39	54.00	-6.61 Average	0.00
4 9920.000	10.64	37.70	53.23	45.51	40.62	54.00	-13.38 Average	0.00
5 13957.530	10.97	39.42	52.91	44.97	42.45	54.00	-11.55 Average	0.00
6 17690.530	11.32	44.01	52.55	42.71	45.49	54.00	-8.51 Average	0.00

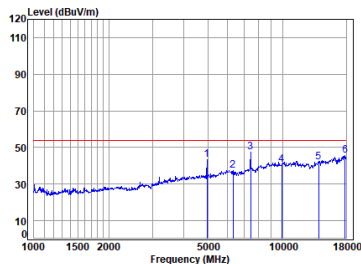
BLE_2M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	dBuV/m	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4960.000	7.53	33.94	54.20	60.50	47.77	74.00	-26.23 Peak	0.00
2 6177.627	8.91	35.48	53.12	55.17	46.44	74.00	-27.56 Peak	0.00
3 p 7440.000	8.43	36.22	53.15	64.79	56.29	74.00	-17.71 Peak	0.00
4 9920.000	10.64	37.70	53.23	52.70	47.81	74.00	-26.19 Peak	0.00
5 13957.530	10.97	39.42	52.91	52.21	49.69	74.00	-24.31 Peak	0.00
6 17793.000	11.30	43.45	52.50	51.75	54.00	74.00	-19.92 Peak	0.00

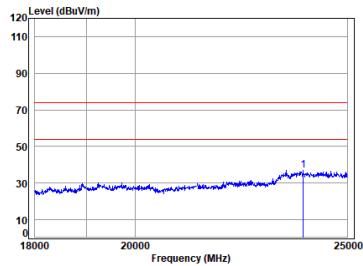
BLE_2M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Aux
MHz	Loss	Factor	Factor	Level	dBuV/m	dBuV/m	Limit	Factor
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB
1 4960.000	7.53	33.94	54.20	56.03	43.30	54.00	-10.70 Average	0.00
2 6322.136	8.90	35.34	53.13	46.44	37.55	54.00	-16.45 Average	0.00
3 q 7440.000	8.43	36.22	53.15	55.77	47.27	54.00	-6.73 Average	0.00
4 9920.000	10.64	37.70	53.23	45.54	40.65	54.00	-13.35 Average	0.00
5 13957.530	10.97	39.42	52.91	44.62	42.10	54.00	-11.90 Average	0.00
6 17844.590	11.41	43.49	52.40	43.30	45.72	54.00	-8.28 Average	0.00

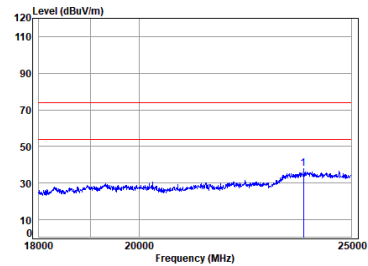
BLE_TX_CH_M_Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01624AT\01625AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 p23868.430	6.77	38.95	50.37	51.18	36.99	74.00	-37.01	Peak	-9.54

BLE_TX_CH_M_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 01624AT\01625AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 p23782.340	6.77	38.91	50.36	52.16	37.94	74.00	-36.06	Peak	-9.54



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 26 of 49

7.4 Maximum Conducted Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
 Test Method: ANSI C63.10 (2020) Section 11.9.1
 Test Engineer: Mingli Hu

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

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 26.0 °C Humidity: 71.6 % RH Atmospheric Pressure: 1015 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



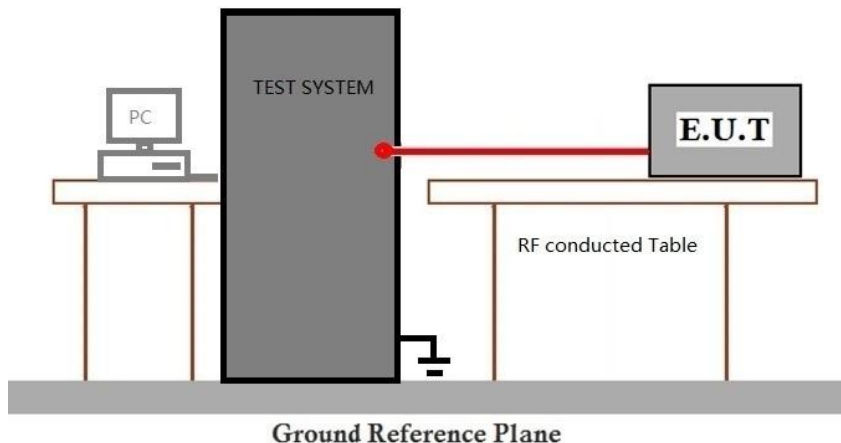
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7.4.3 Test Setup Diagram



7.4.4 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

7.5 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
 Test Method: ANSI C63.10 (2020) Section 11.8.1
 Test Engineer: Mingli Hu

Limit:
 ≥500 kHz

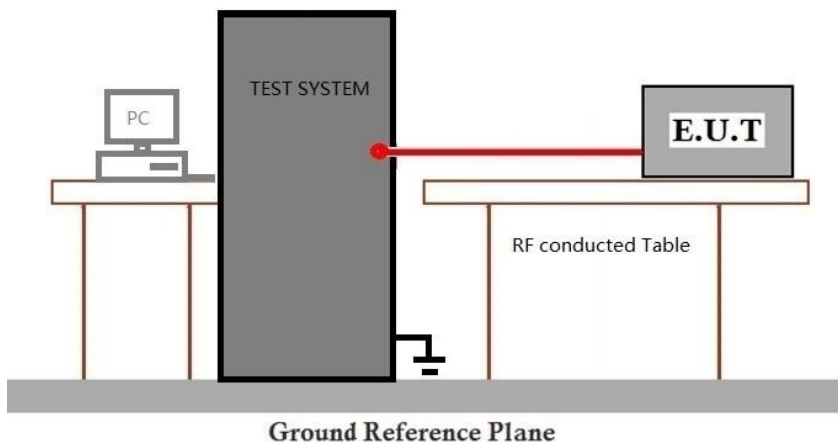
7.5.1 E.U.T. Operation

Operating Environment:
 Temperature: 26.0 °C Humidity: 71.6 % RH Atmospheric Pressure: 1015 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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7.6 Power Spectral Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
 Test Method: ANSI C63.10 (2020) Section 11.10.3
 Test Engineer: Mingli Hu

Limit:

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

7.6.1 E.U.T. Operation

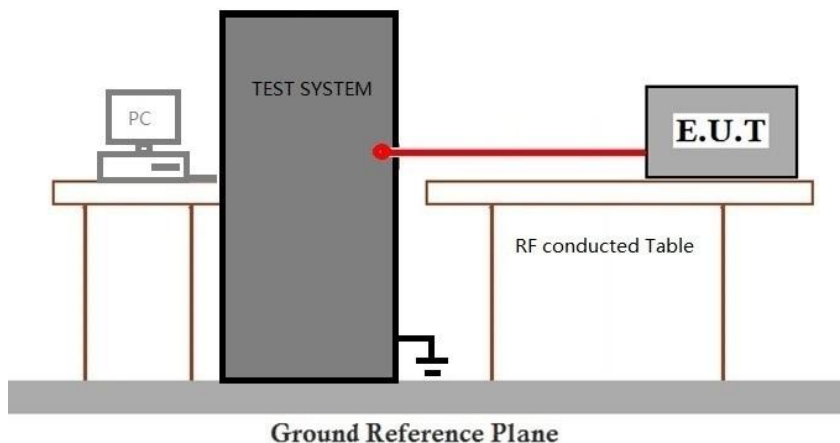
Operating Environment:

Temperature: 26.0 °C Humidity: 71.6 % RH Atmospheric Pressure: 1015 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

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7.7 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2020) Section 6.10.4
 Test Engineer: Mingli Hu

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)).

7.7.1 E.U.T. Operation

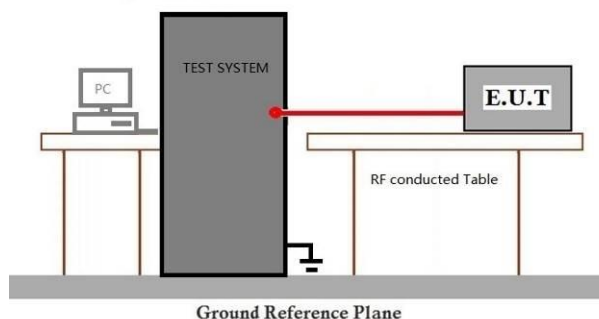
Operating Environment:

Temperature: 26.0 °C Humidity: 71.6 % RH Atmospheric Pressure: 1015 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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7.8 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2020) Section 11.11
 Test Engineer: Mingli Hu

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)).

7.8.1 E.U.T. Operation

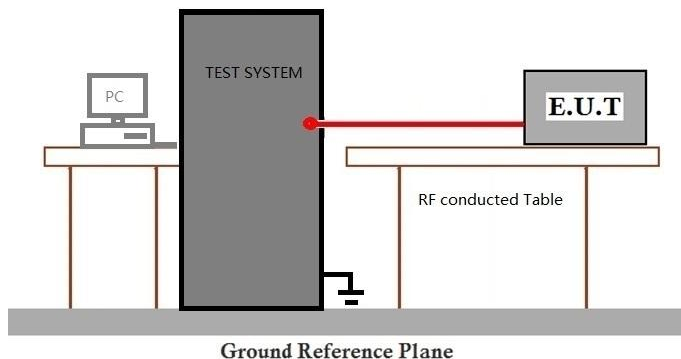
Operating Environment:

Temperature: 26.0 °C Humidity: 71.6 % RH Atmospheric Pressure: 1015 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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8 Test Setup Photo

Refer to Appendix – Test Setup Photos for SZCR2604001624AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2604001624AT



10 Appendix

1. Duty Cycle

1.1 Test Result

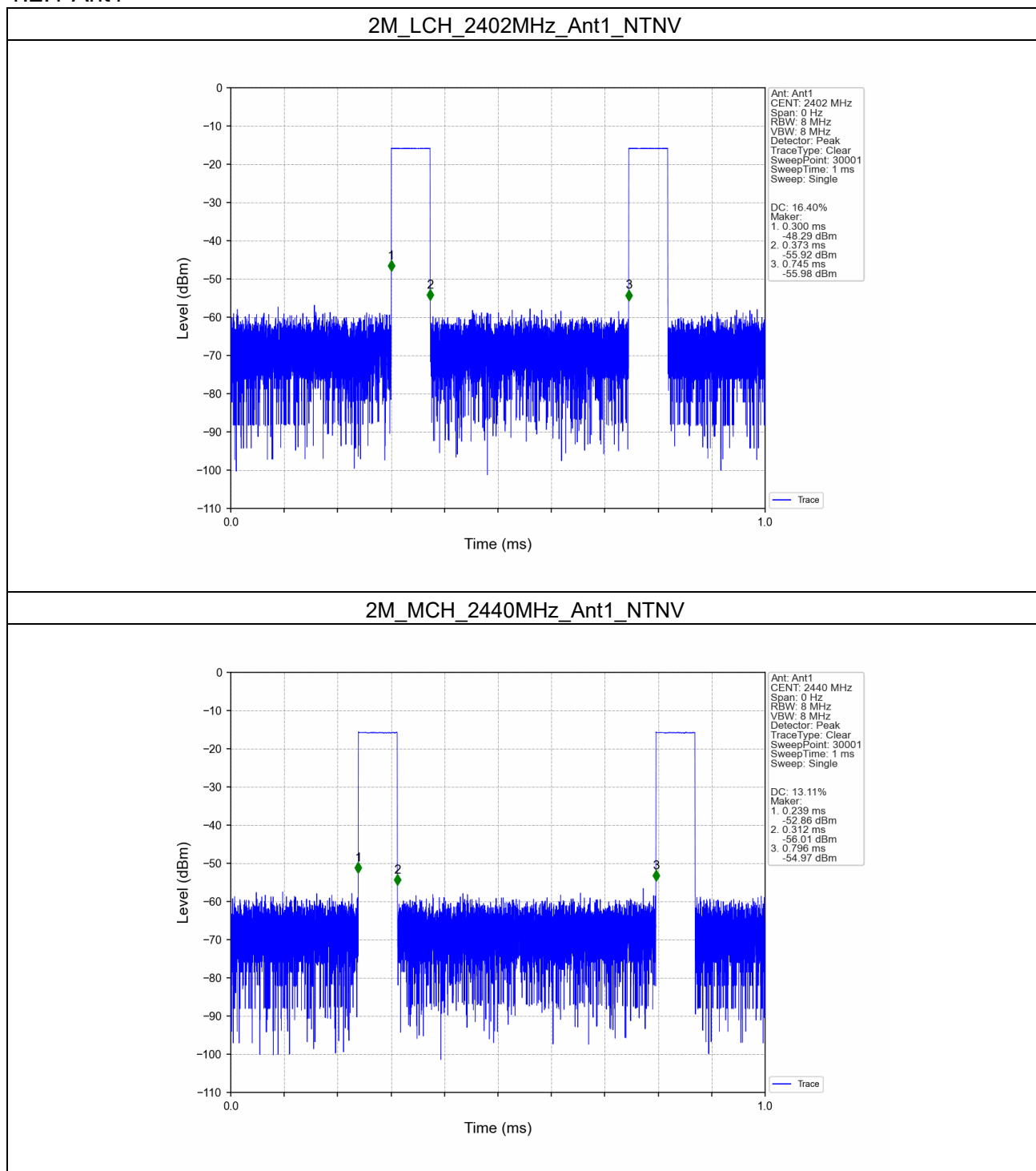
1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
2M	SISO	2402	0.073	0.445	16.40	7.85	0.00
		2440	0.073	0.557	13.11	8.83	0.00
		2480	0.074	0.518	14.29	8.45	0.00



1.2 Test Graph

1.2.1 Ant1



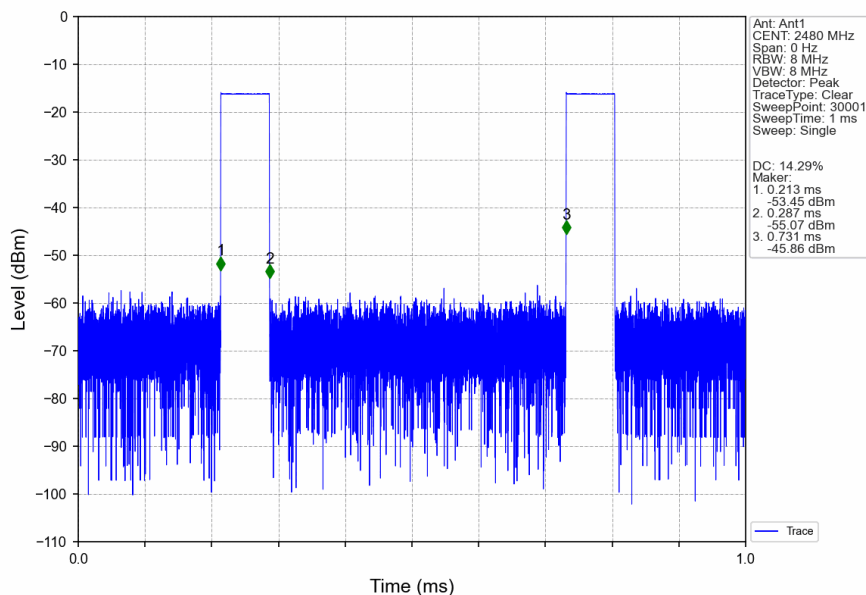
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2M_HCH_2480MHz_Ant1_NTNV



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260400162402

Page: 36 of 49

2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
2M	SISO	2402	1	2.011	/	Pass
		2440	1	2.014	/	Pass
		2480	1	2.030	/	Pass

2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
2M	SISO	2402	1	1.066	≥ 0.5	Pass
		2440	1	0.902	≥ 0.5	Pass
		2480	1	1.200	≥ 0.5	Pass



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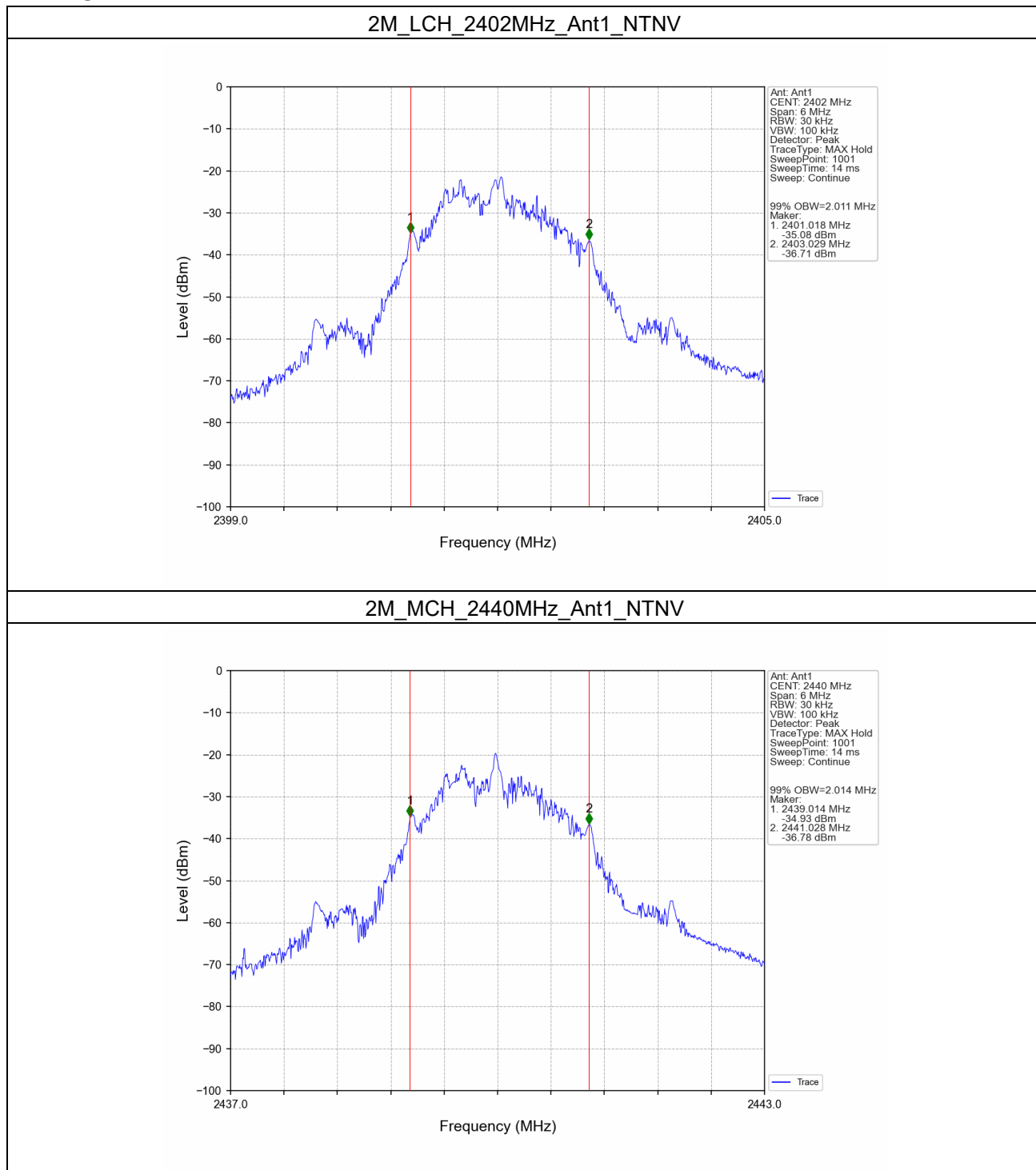
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2.2 Test Graph

2.2.1 OBW



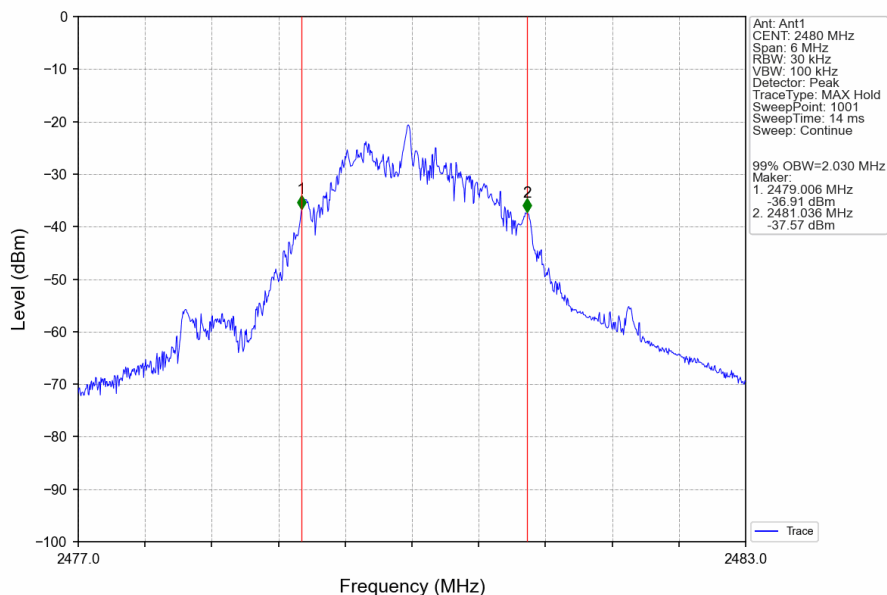
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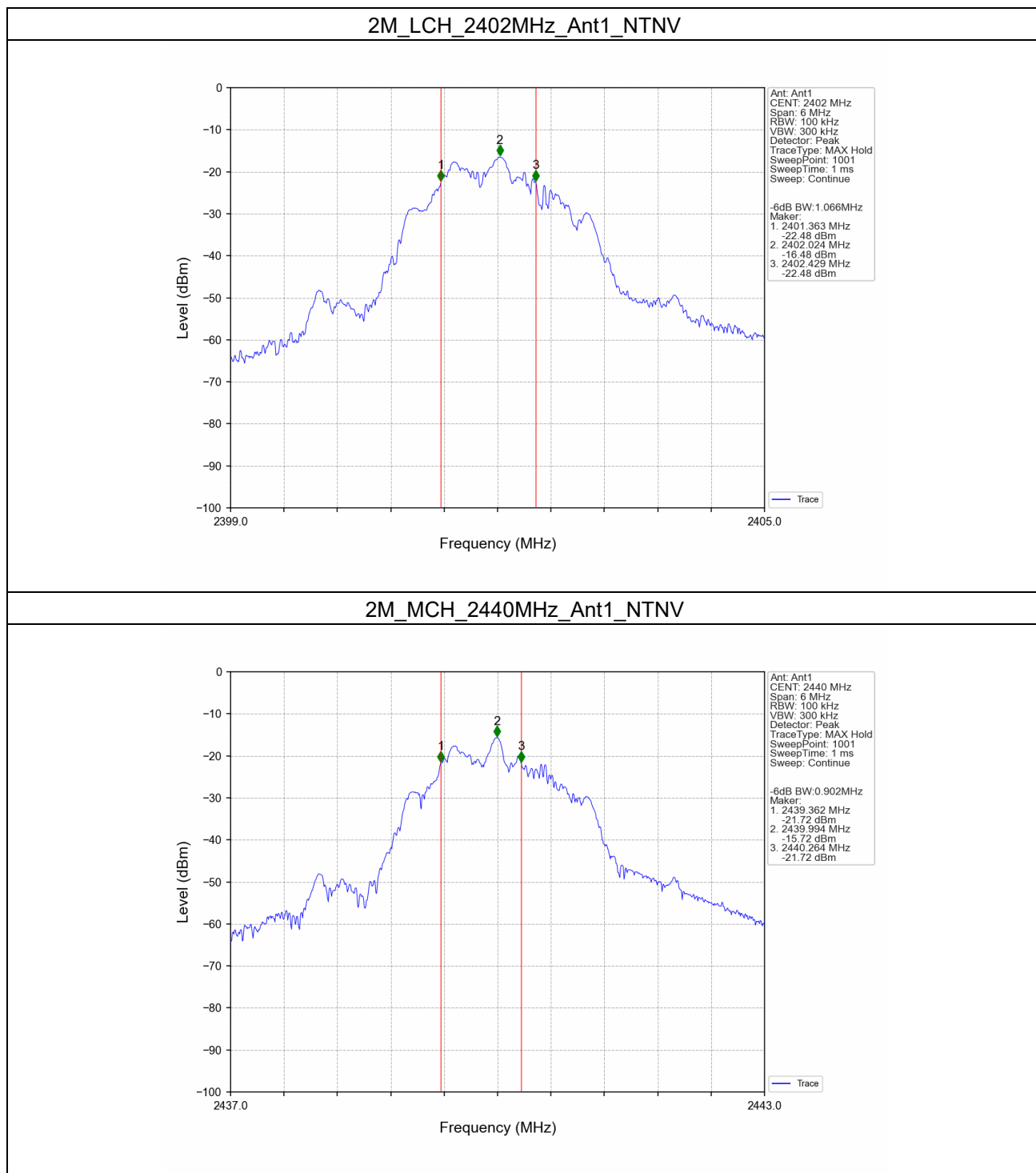
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2.2.2 6dB BW

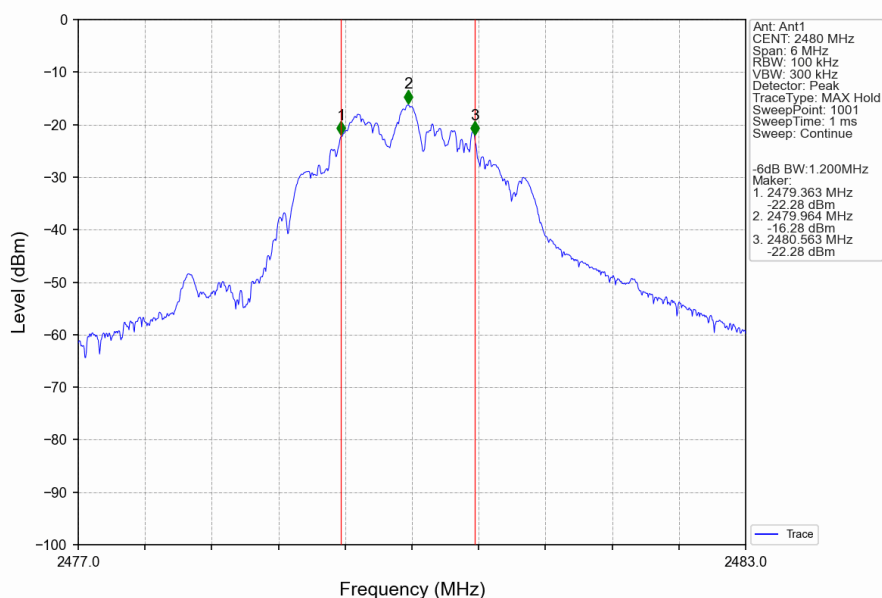


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3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
2M	SISO	2402	-15.67	<=30	Pass
		2440	-15.67	<=30	Pass
		2480	-16.05	<=30	Pass

Note1: Antenna Gain: Ant1: 3.17dBi;

4. Maximum Power Spectral Density

4.1 Test Result

4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit	
2M	SISO	2402	-35.31	<=8	Pass
		2440	-33.42	<=8	Pass
		2480	-34.08	<=8	Pass

Note1: Antenna Gain: Ant1: 3.17dBi;



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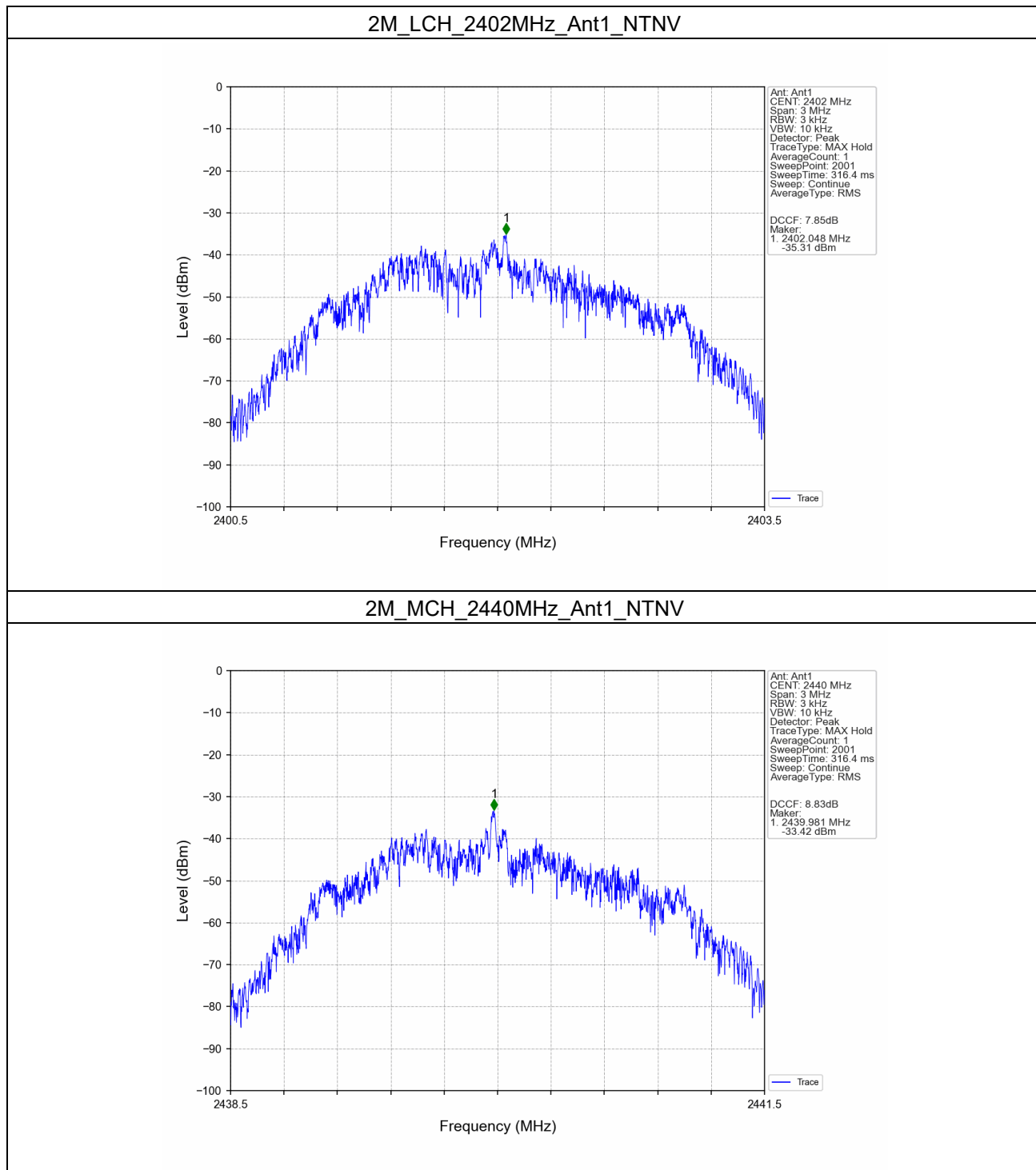
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4.2 Test Graph

4.2.1 PSD



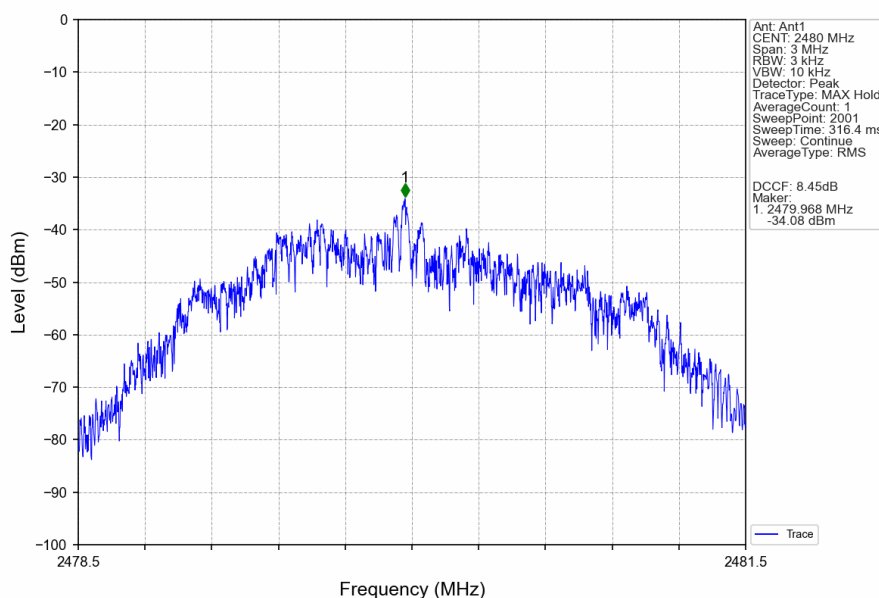
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2M_HCH_2480MHz_Ant1_NTNV



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5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
2M	SISO	2402	1	-16.35
		2440	1	-15.86
		2480	1	-16.50

5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
2M	SISO	2402	1	-15.86	-35.86	Pass
		2440	1	-15.86	-35.86	Pass
		2480	1	-15.86	-35.86	Pass



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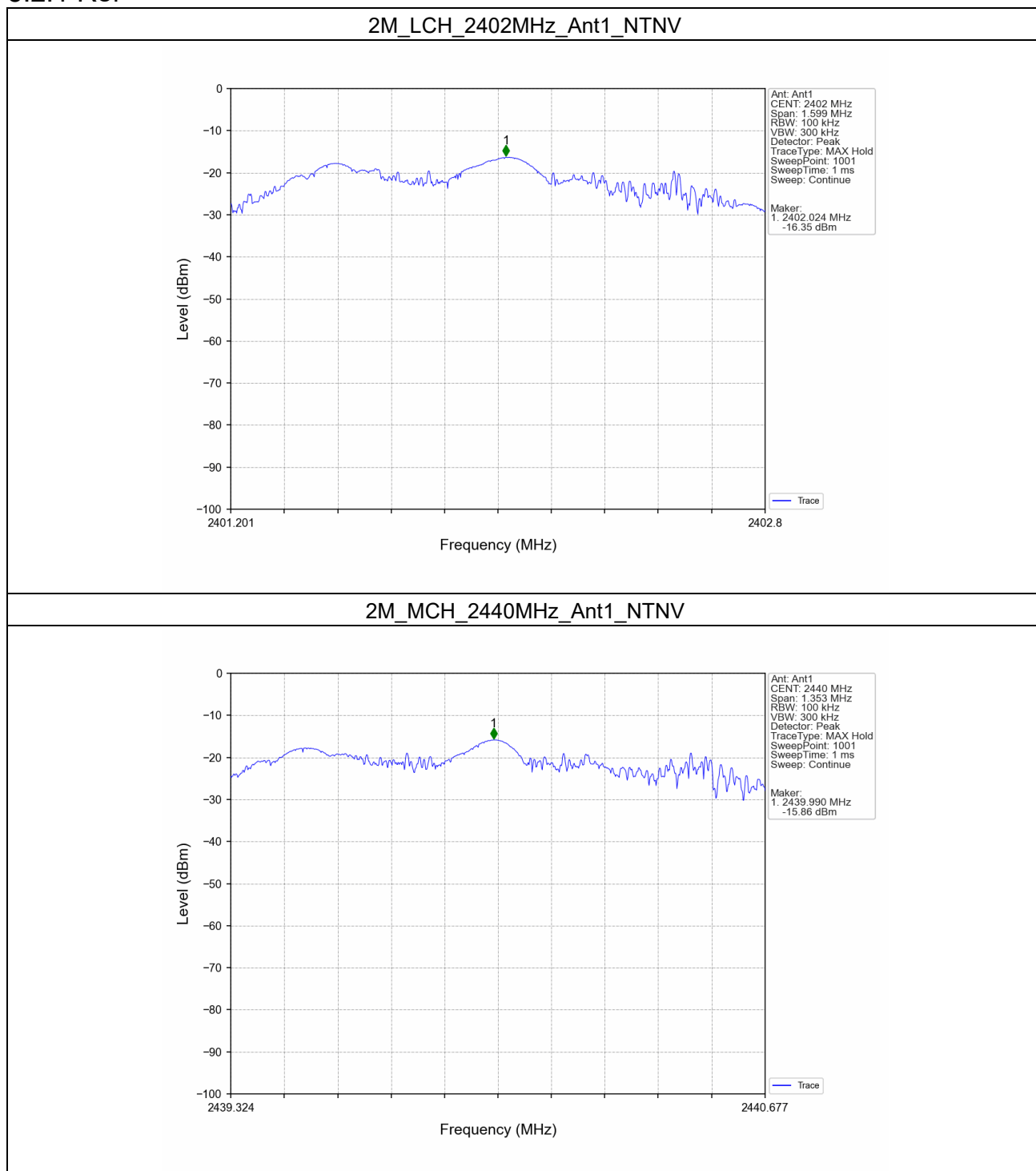
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5.2 Test Graph

5.2.1 Ref



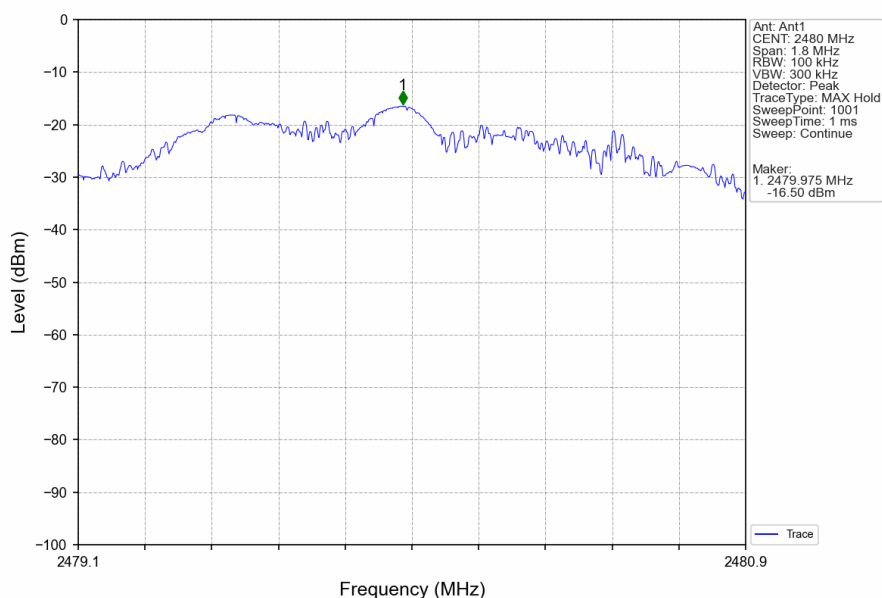
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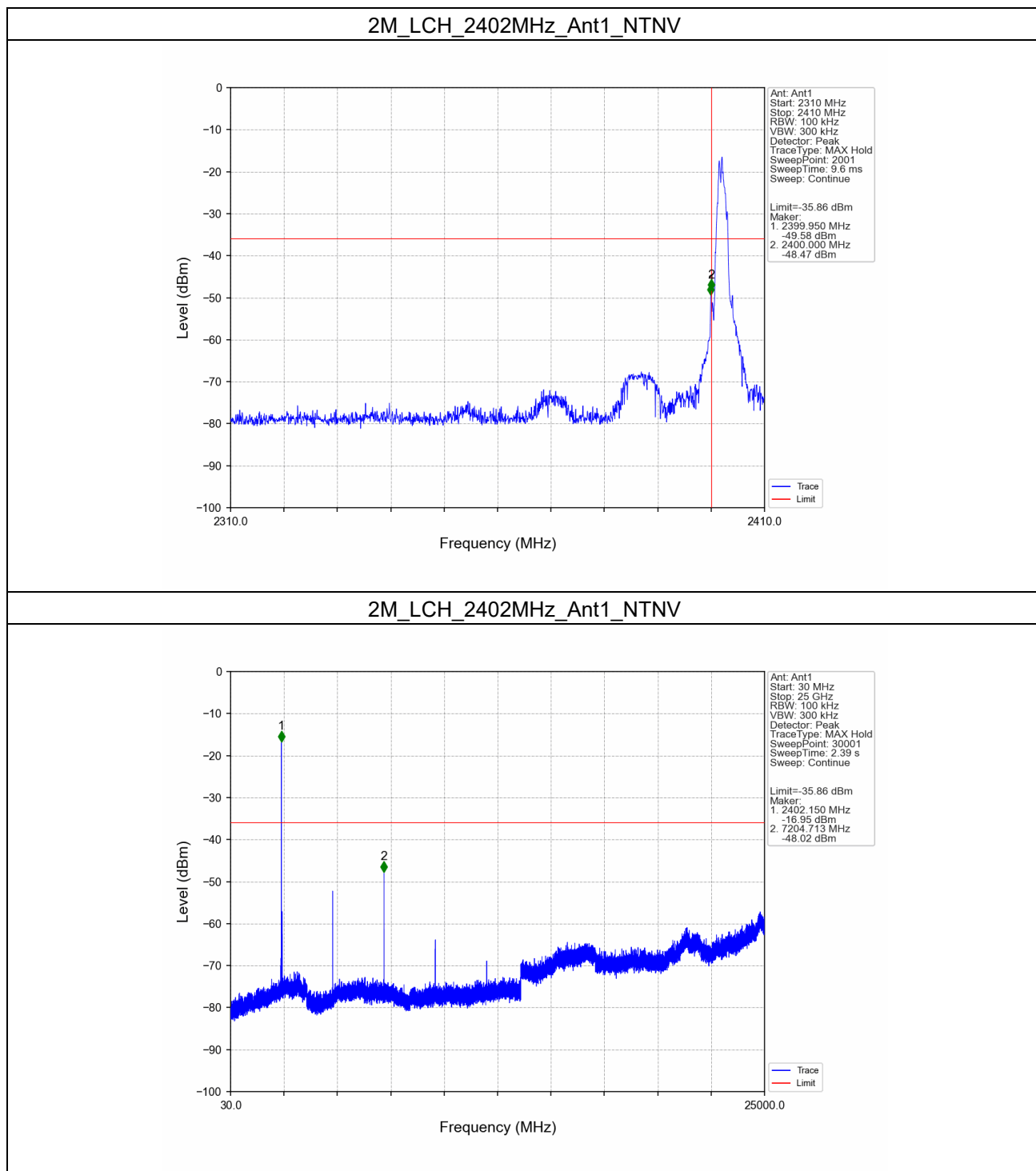
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5.2.2 CSE

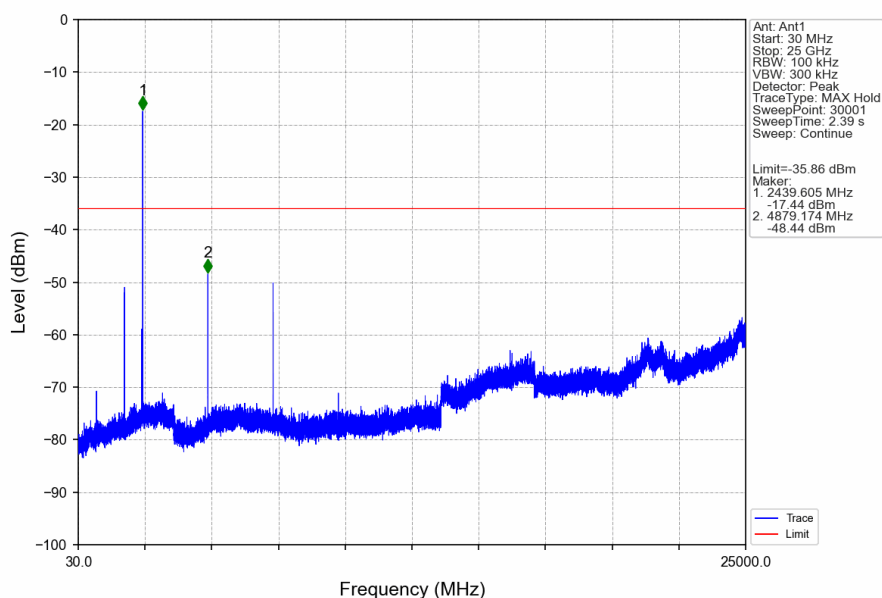


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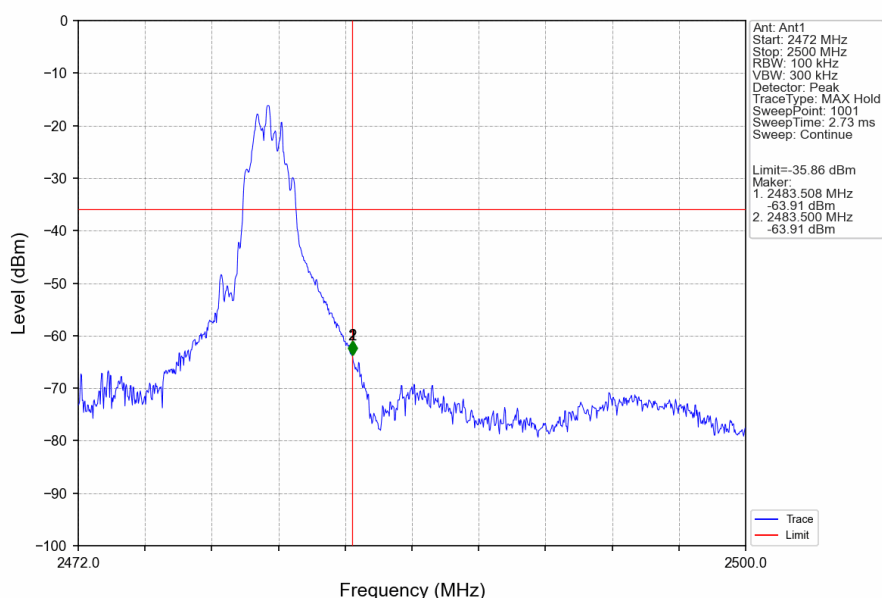
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2M_HCH_2480MHz_Ant1_NTNV

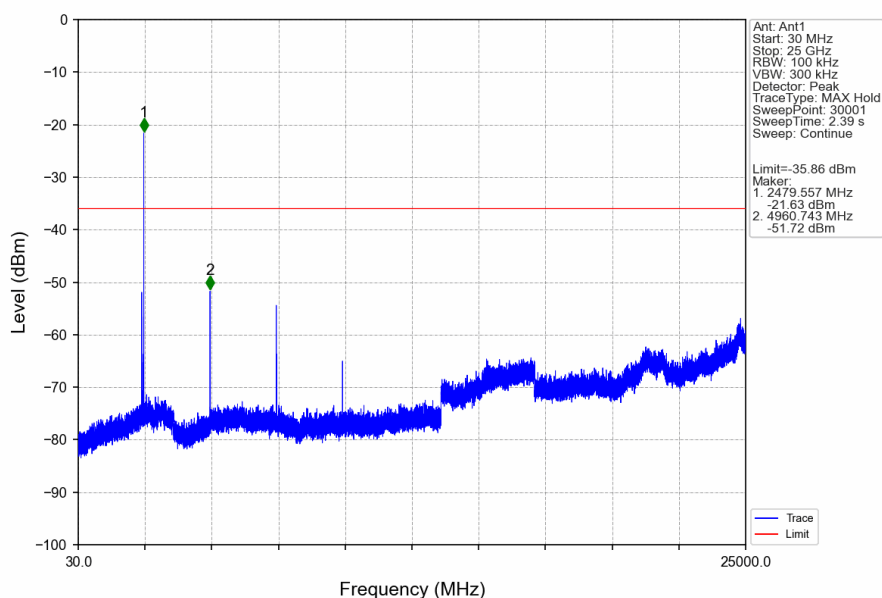


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- End of the Report -



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