

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

SZEMC-TRF-01 Rev. A/2

Report No.: SZCR251100478003

Page: 1 of 77

TEST REPORT

Application No.: SZCR2511004780AT
Applicant: SKULLCANDY, INC.
Address of Applicant: 1640 Redstone Center Drive, Suite 115A Park City, UT 84098, United States of America
Manufacturer: SKULLCANDY, INC.
Address of Manufacturer: 1640 Redstone Center Drive, Suite 115A Park City, UT 84098, United States of America
Equipment Under Test (EUT):
EUT Name: SMOKIN' BUDS 360
Model No.: S2SPW
Trade Mark:  Skullcandy
FCC ID: Y22-S2SPW
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2025-11-04
Date of Test: 2025-11-18 to 2025-11-25
Date of Issue: 2026-01-21

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



Keny Xu
EMC Laboratory Manager



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

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2026-01-21		Original

Authorized for issue by:				
		Tree Zhan		
		Tree Zhan/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
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2020) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2020) Section 6.10.5	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	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Conducted Peak 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 Spectrum Density		ANSI C63.10 (2020) Section 11.10.2	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



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4 General Information

4.1 Details of E.U.T.

Power supply:	Left earbuds: Lithium-ion Polymer rechargeable battery 3.7V 40mAh (Charge by travel case) Right earbuds: Lithium-ion Polymer rechargeable battery 3.7V 40mAh (Charge by travel case) travel case with backup battery: Lithium-ion Polymer rechargeable battery 3.7V 250mAh (Charged by Type-C port)
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	FPC Antenna
Antenna Gain:	Left earbud: 3.95dBi; Right earbud: 3.10dBi

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.
Adapter	Apple	A2244	REF. No.SEA05D14G

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)
Conducted Peak Output Power	$\pm 0.4\text{dB}$
20dB Bandwidth	$\pm 0.3\%$
Minimum 6dB Bandwidth	$\pm 0.3\%$
Power Spectrum 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.



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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

Conducted Emissions at AC Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2025-05-07	2028-05-06
EMI Test Receiver	Rohde&Schwarz	ESR	SZ-WRG-M-047	2025-01-08	2026-01-07
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2025-07-05	2026-07-04
LISN	Rohde&Schwarz	ENV216	SEM007-01	2025-07-25	2026-07-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2025-03-03	2026-03-02

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	2025-03-04	2026-03-03
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	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2025-03-21	2026-03-20

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Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2025-03-21	2026-03-20
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-16	2025-07-25	2026-07-24
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-18	2025-08-29	2027-08-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2025-03-04	2026-03-03
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2025-11-17	2027-11-16
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	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	2025-03-04	2026-03-03
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	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2025-03-21	2026-03-20

RF Conducted Test					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Power Sensor	TST PASS	TSPS2023R	SEM009-26	2025-03-04	2026-03-03
Power Sensor	KEYSIGHT	U2021XA	SEM009-16	2025-03-04	2026-03-03
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2025-07-24	2026-07-23
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2025-03-04	2026-03-03
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	2025-03-03	2026-03-02



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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	2025-03-03	2026-03-02



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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 are: Left earbud: 3.95dBi; Right earbud: 3.10dBi

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 (2020) Section 6.2
 Test Engineer: Wade Li

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: 23.3 °C Humidity: 48.6 % RH Atmospheric Pressure: 1020 mbar

7.1.2 Test Mode Description

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



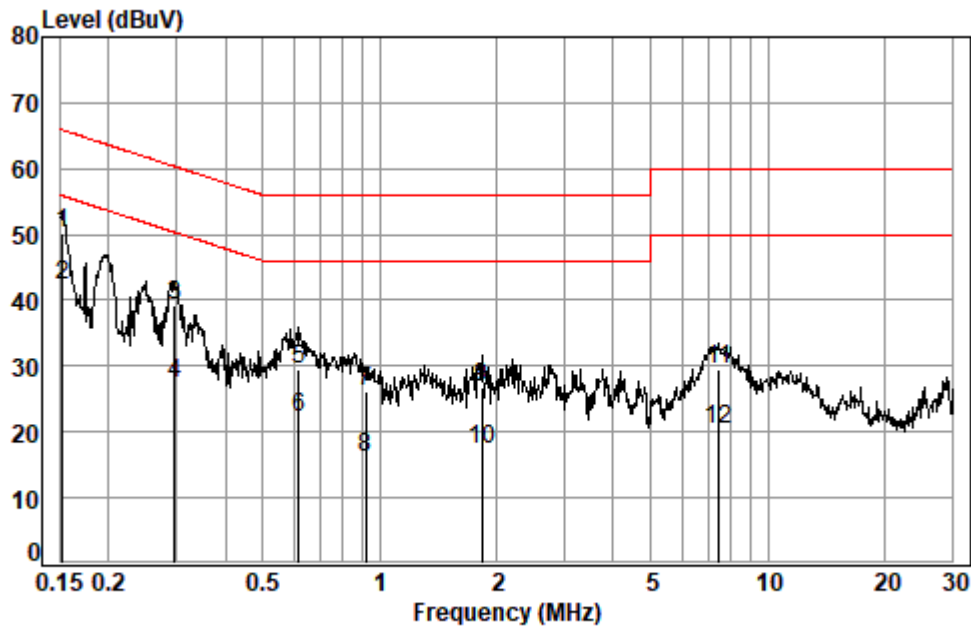
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Test Mode: 02; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 04780AT/04781AT
Test mode: 02

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 *	0.1524	0.06	10.19	39.83	50.08	65.87	-15.79	QP
2 *	0.1524	0.06	10.19	32.07	42.32	55.87	-13.55	Average
3	0.2955	0.08	9.86	29.33	39.27	60.37	-21.10	QP
4	0.2955	0.08	9.86	17.40	27.34	50.37	-23.03	Average
5	0.6173	0.10	9.61	19.72	29.43	56.00	-26.57	QP
6	0.6173	0.10	9.61	12.40	22.11	46.00	-23.89	Average
7	0.9184	0.11	9.60	16.34	26.05	56.00	-29.95	QP
8	0.9184	0.11	9.60	6.39	16.10	46.00	-29.90	Average
9	1.8288	0.12	9.58	16.94	26.64	56.00	-29.36	QP
10	1.8288	0.12	9.58	7.75	17.45	46.00	-28.55	Average
11	7.4860	0.15	9.68	19.80	29.63	60.00	-30.37	QP
12	7.4860	0.15	9.68	10.57	20.40	50.00	-29.60	Average



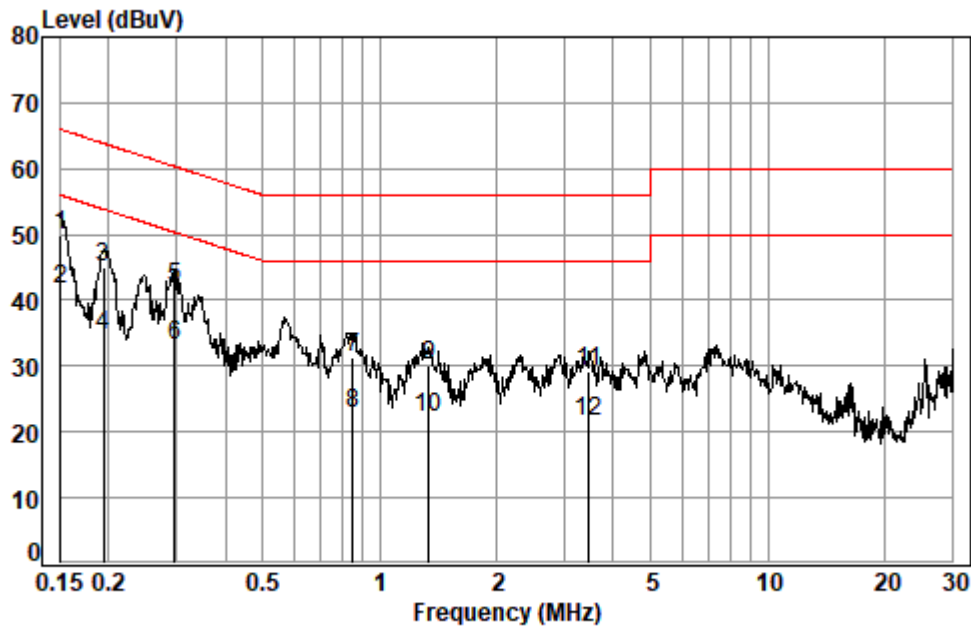
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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

Test Mode: 02; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 04780AT/04781AT
Test mode: 02

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 *	0.1508	0.06	10.15	39.54	49.75	65.96	-16.21	QP
2 *	0.1508	0.06	10.15	31.58	41.79	55.96	-14.17	Average
3	0.1945	0.07	10.09	34.95	45.11	63.84	-18.73	QP
4	0.1945	0.07	10.09	24.46	34.62	53.84	-19.22	Average
5	0.2971	0.08	9.78	32.19	42.05	60.32	-18.27	QP
6	0.2971	0.08	9.78	23.32	33.18	50.32	-17.14	Average
7	0.8528	0.11	9.59	21.66	31.36	56.00	-24.64	QP
8	0.8528	0.11	9.59	13.20	22.90	46.00	-23.10	Average
9	1.3379	0.12	9.54	20.41	30.07	56.00	-25.93	QP
10	1.3379	0.12	9.54	12.44	22.10	46.00	-23.90	Average
11	3.4722	0.13	9.55	19.57	29.25	56.00	-26.75	QP
12	3.4722	0.13	9.55	12.00	21.68	46.00	-24.32	Average



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7.2 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
 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.

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C Humidity: 56.3 % RH Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

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

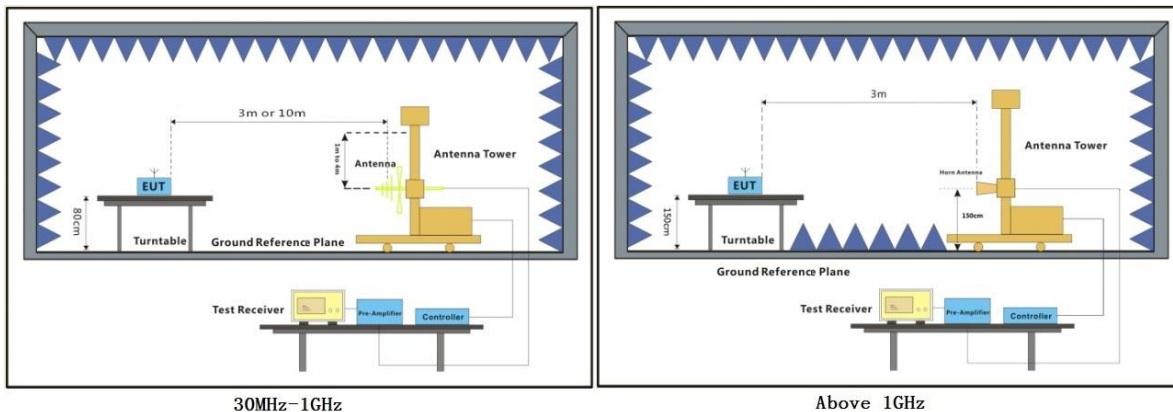


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7.2.3 Test Setup Diagram



7.2.4 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

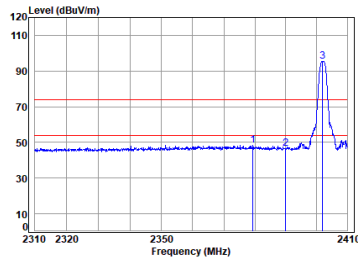
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level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

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.



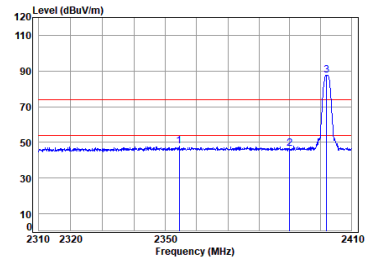
Left BLE_1M_TX_CH_00_Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2402 Band edge
: BLE

	Freq	Cable	Loss	Factor	Ant	Preamp	Read	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB	dB	
1	2379.352	16.12	29.10	32.79	36.06	48.49	74.00	-25.51	peak		
2	2390.000	16.13	29.10	32.78	34.03	46.48	74.00	-27.52	peak		
3 p	2402.000	16.15	29.09	32.77	83.08	95.55	74.00	21.55	peak		

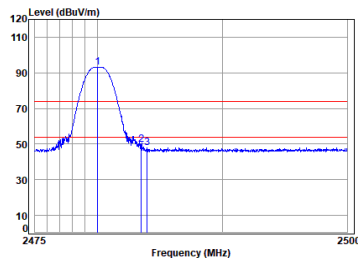
Left BLE_1M_TX_CH_00_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2402 Band edge
: BLE

	Freq	Cable	Loss	Factor	Ant	Preamp	Read	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB	dB	
1	2354.376	16.08	29.10	32.80	35.35	47.73	74.00	-26.27	peak		
2	2390.000	16.13	29.10	32.78	34.01	46.46	74.00	-27.54	peak		
3 p	2402.000	16.15	29.09	32.77	75.26	87.73	74.00	13.73	peak		

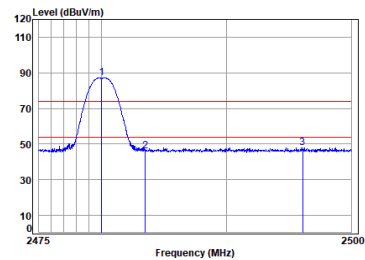
Left BLE_1M_TX_CH_39_Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2480 Band edge
: BLE

	Freq	Cable	Loss	Factor	Ant	Preamp	Read	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB	dB	
1 p	2480.000	16.27	28.90	32.73	80.69	93.13	74.00	19.13	peak		
2	2483.500	16.28	28.90	32.73	37.11	49.56	74.00	-24.44	peak		
3	2483.971	16.28	28.90	32.73	35.56	48.01	74.00	-25.99	peak		

Left BLE_1M_TX_CH_39_Vertical

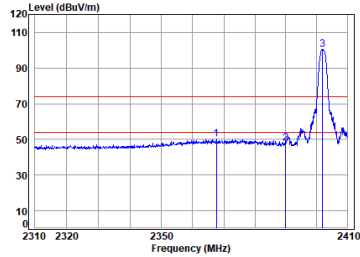


Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2480 Band edge
: BLE

	Freq	Cable	Loss	Factor	Ant	Preamp	Read	Level	Limit	Over	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB	dB	
1 p	2480.000	16.27	28.90	32.73	74.61	87.05	74.00	13.05	peak		
2	2483.500	16.28	28.90	32.73	33.70	46.15	74.00	-27.85	peak		
3	2496.083	16.29	28.90	32.73	35.67	48.13	74.00	-25.87	peak		



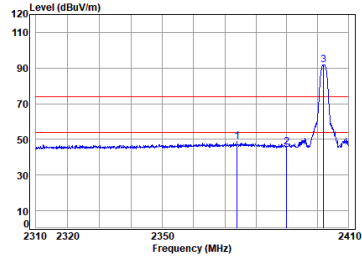
Right BLE_1M_TX_CH_00_Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2367.583	16.10	29.10	32.79	37.79	50.20	74.00	-23.80	peak	
2	2390.000	16.13	29.10	32.78	35.57	48.02	74.00	-25.98	peak	
3 p	2402.000	16.15	29.09	32.77	67.74	100.21	74.00	26.21	peak	

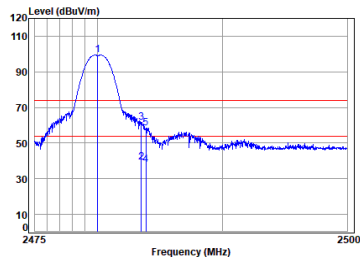
Right BLE_1M_TX_CH_00_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2373.913	16.11	29.10	32.79	36.37	48.79	74.00	-25.21	peak	
2	2390.000	16.13	29.10	32.78	33.51	45.76	74.00	-28.24	peak	
3 p	2402.000	16.15	29.09	32.77	79.28	91.75	74.00	17.75	peak	

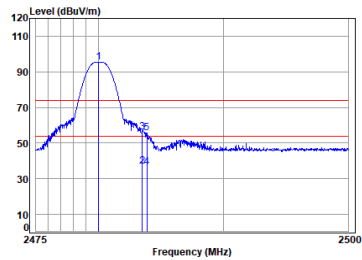
Right BLE_1M_TX_CH_39_Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2480 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 p	2480.000	16.27	28.90	32.73	86.89	99.33	74.00	25.33	peak	
2 q	2483.500	16.28	28.90	32.73	26.81	39.26	54.00	-14.74	Average	
3	2483.500	16.28	28.90	32.73	48.97	61.42	74.00	-12.58	peak	
4	2483.846	16.28	28.90	32.73	25.35	37.80	54.00	-16.20	Average	
5	2483.846	16.28	28.90	32.73	46.08	58.53	74.00	-15.47	peak	

Right BLE_1M_TX_CH_39_Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2480 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 p	2480.000	16.27	28.90	32.73	82.90	95.34	74.00	21.34	peak	
2 q	2483.500	16.28	28.90	32.73	24.54	36.99	54.00	-17.01	Average	
3	2483.500	16.28	28.90	32.73	43.59	56.04	74.00	-17.96	peak	
4	2483.846	16.28	28.90	32.73	24.03	36.48	54.00	-17.52	Average	
5	2483.846	16.28	28.90	32.73	43.10	55.55	74.00	-18.45	peak	



7.3 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: 3 or 10m
 Test Engineer: Ted 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

7.3.1 E.U.T. Operation

Operating Environment:

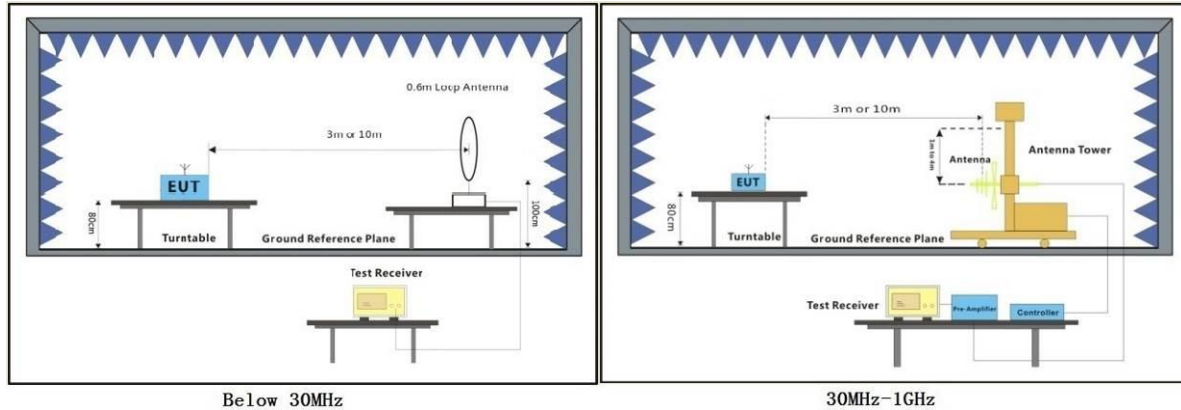
Temperature: 23.6 °C Humidity: 46.5 % RH Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

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



7.3.3 Test Setup Diagram



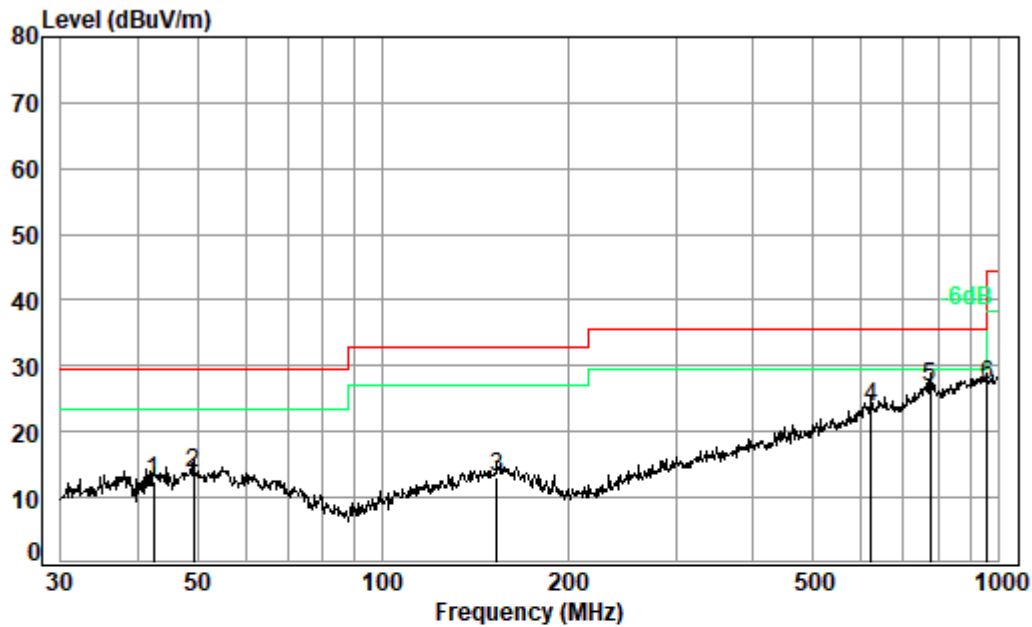
7.3.4 Measurement Procedure and Data

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 10 meters for frequency above 30MHz, and 3 meter for frequency below 30MHz 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.

Test Mode: 02; Polarity: Horizontal

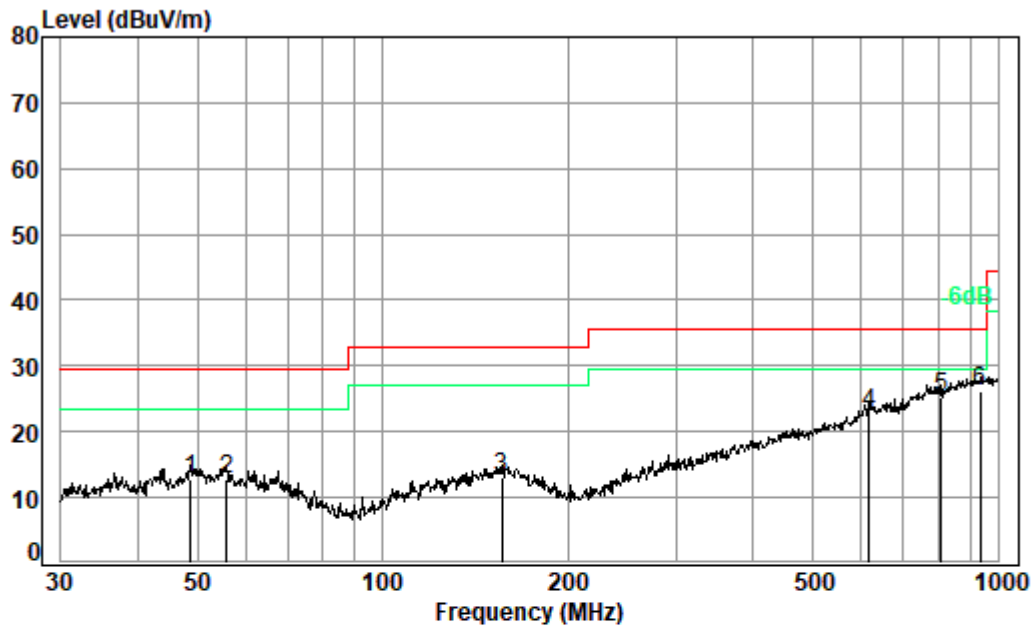


Condition: 10m HORIZONTAL
Job No. : 04780AT/04781AT
Test Mode: 02

	Read Freq	Ant Level	Ant Factor	Cable Loss	Preamp Factor	Limit Level	Over Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	42.451	27.62	17.14	0.16	32.40	12.52	29.50	-16.98	QP
2	49.359	27.76	18.13	0.25	32.40	13.74	29.50	-15.76	QP
3	153.200	27.05	17.90	0.63	32.50	13.08	33.00	-19.92	QP
4	622.890	29.65	24.57	2.11	32.70	23.63	35.60	-11.97	QP
5	776.878	30.40	26.46	2.50	32.47	26.89	35.60	-8.71	QP
6 pp	958.794	27.96	27.96	2.78	31.70	27.00	35.60	-8.60	QP



Test Mode: 02; Polarity: Vertical



Condition: 10m VERTICAL
Job No. : 04780AT/04781AT
Test Mode: 02

	Read Freq	Ant Level	Ant Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	48.843	26.97	18.06	0.25	32.40	12.88	29.50	-16.62	QP
2	55.805	27.06	17.82	0.21	32.42	12.67	29.50	-16.83	QP
3	156.458	26.91	17.89	0.63	32.50	12.93	33.00	-20.07	QP
4	616.372	28.89	24.43	2.09	32.70	22.71	35.60	-12.89	QP
5	807.429	28.35	26.56	2.58	32.37	25.12	35.60	-10.48	QP
6 pp	935.546	27.36	27.97	2.73	31.82	26.24	35.60	-9.36	QP



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The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$$L_3 / L_{10} = D_{10} / D_3$$

Note:

L₃: Level @ 3m distance. Unit: uV/m;

L₁₀: Level @ 10m distance. Unit: uV/m;

D₃: 3m distance. Unit: m

D₁₀: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
42.451	12.52	4.23	14.09	22.98	40	-17.02	H
49.359	13.74	4.86	16.21	24.20	40	-15.80	H
153.200	13.08	4.51	15.03	23.54	43.5	-19.96	H
622.890	23.63	15.19	50.63	34.09	46	-11.91	H
776.878	26.89	22.11	73.68	37.35	46	-8.65	H
958.794	27.00	22.39	74.62	37.46	46	-8.54	H
48.843	12.88	4.41	14.69	23.34	40	-16.66	V
55.805	12.67	4.30	14.33	23.13	40	-16.87	V
156.458	12.93	4.43	14.77	23.39	43.5	-20.11	V
616.372	22.71	13.66	45.54	33.17	46	-12.83	V
807.429	25.12	18.03	60.10	35.58	46	-10.42	V
935.546	26.24	20.51	68.37	36.70	46	-9.30	V



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch (SZEMC) Laboratory

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7.4 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
 Measurement Distance: 1m or 3m
 Test Engineer: Logic Wang

Limit:

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

7.4.1 E.U.T. Operation

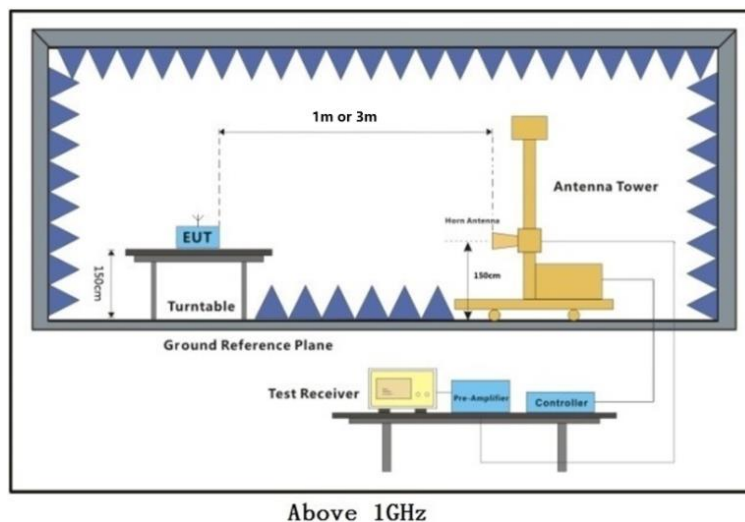
Operating Environment:

Temperature: 23.5 °C Humidity: 56.3 % RH Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

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

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

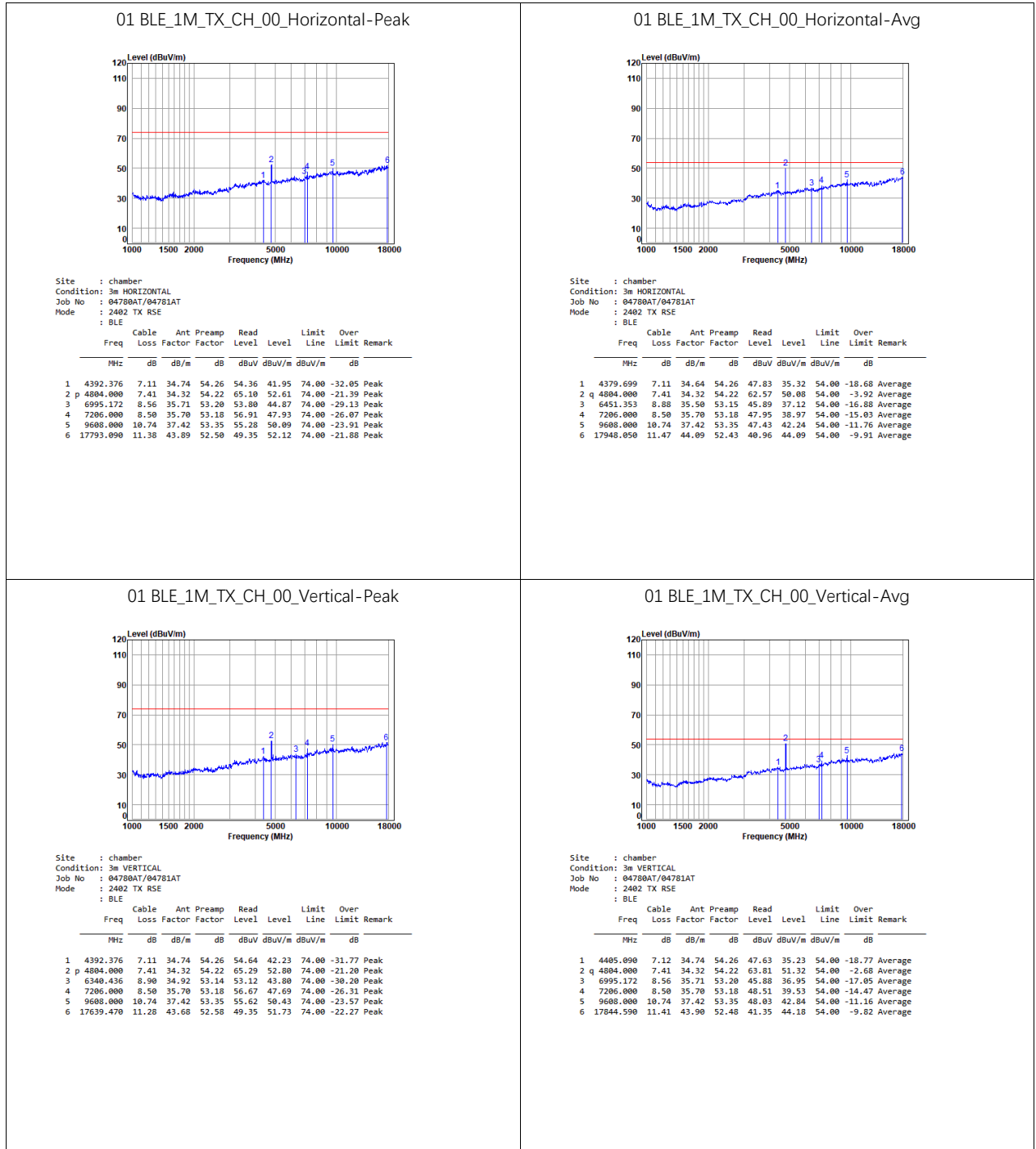
- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters for frequency above 1GHz, and 1 meter for frequency above 18GHz 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:

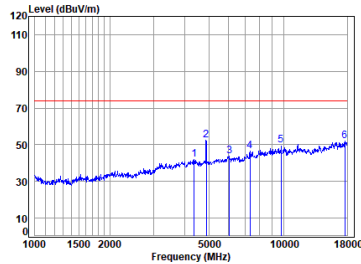
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 18GHz to 10th harmonic of the fundamental frequency or 40 GHz, whichever is lower, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above 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.
4. 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.
- 5: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 $\leq 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.



Left earbud:



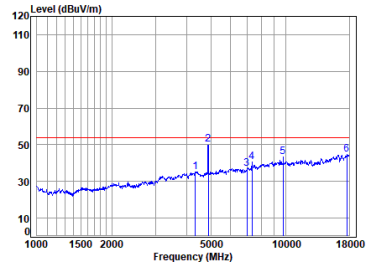
01 BLE_1M_TX_CH_19_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT/04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dBuV/m	
	dB	dB/m	dB	dB				
1 4367.058	7.10	34.54	54.26	54.66	42.04	74.00	-31.96	Peak
2 p 4880.000	7.47	34.62	54.21	64.67	52.55	74.00	-21.45	Peak
3 6053.894	8.92	35.01	53.11	53.10	43.92	74.00	-30.08	Peak
4 7320.000	8.46	35.70	53.17	55.48	46.47	74.00	-27.53	Peak
5 9760.000	10.69	37.38	53.29	55.09	49.87	74.00	-24.13	Peak
6 17639.470	11.28	43.68	52.58	49.68	51.98	74.00	-22.02	Peak

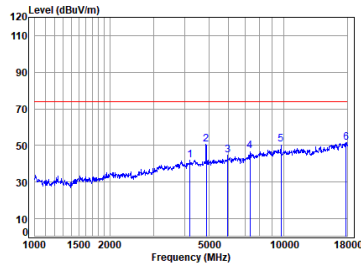
01 BLE_1M_TX_CH_19_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT/04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dBuV/m	
	dB	dB/m	dB	dB				
1 4329.354	7.00	34.23	54.26	48.25	35.30	54.00	-18.70	Average
2 q 4880.000	7.47	34.62	54.21	62.26	50.14	54.00	-3.86	Average
3 6995.172	8.56	35.71	53.20	45.94	37.01	54.00	-16.99	Average
4 7320.000	8.46	35.70	53.17	49.83	40.82	54.00	-13.18	Average
5 9760.000	10.69	37.38	53.29	48.76	43.54	54.00	-10.46	Average
6 17639.470	11.28	43.68	52.58	42.28	44.66	54.00	-9.34	Average

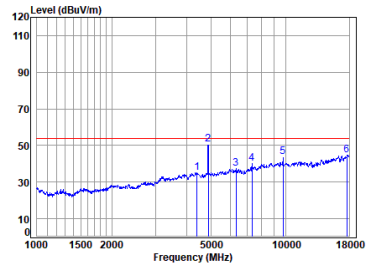
01 BLE_1M_TX_CH_19_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT/04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dBuV/m	
	dB	dB/m	dB	dB				
1 4206.011	7.02	33.80	54.28	55.62	42.16	74.00	-31.84	Peak
2 4880.000	7.47	34.62	54.21	62.88	50.76	74.00	-23.24	Peak
3 5949.811	8.86	34.70	53.15	54.21	44.62	74.00	-29.38	Peak
4 7320.000	8.46	35.70	53.17	56.00	46.99	74.00	-27.01	Peak
5 9760.000	10.69	37.38	53.29	55.67	50.45	74.00	-23.55	Peak
6 p17844.500	11.41	43.90	52.48	48.65	51.40	74.00	-22.52	Peak

01 BLE_1M_TX_CH_19_Vertical-Avg

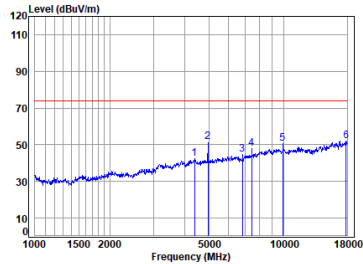


Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT/04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dBuV/m	
	dB	dB/m	dB	dB				
1 4405.090	7.12	34.74	54.26	47.73	35.33	54.00	-18.67	Average
2 q 4880.000	7.47	34.62	54.21	62.95	50.83	54.00	-3.17	Average
3 6322.136	8.90	34.96	53.13	46.48	37.21	54.00	-16.79	Average
4 7320.000	8.46	35.70	53.17	48.96	39.95	54.00	-14.05	Average
5 9760.000	10.69	37.38	53.29	48.82	43.60	54.00	-10.40	Average
6 17639.470	11.28	43.68	52.58	42.55	44.93	54.00	-9.07	Average



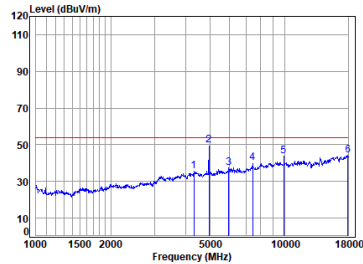
01 BLE_1M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT/04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4392.376	7.11	34.74	54.26	54.90	42.49	74.00	-31.51	Peak
2 4960.000	7.53	34.56	54.20	63.49	51.38	74.00	-22.62	Peak
3 6835.278	8.66	35.44	53.18	53.85	44.77	74.00	-29.23	Peak
4 7440.000	8.43	35.96	53.15	56.79	48.03	74.00	-25.97	Peak
5 9920.000	10.64	37.30	53.23	55.00	50.51	74.00	-23.49	Peak
6 17793.090	11.30	43.89	52.50	49.41	52.18	74.00	-21.82	Peak

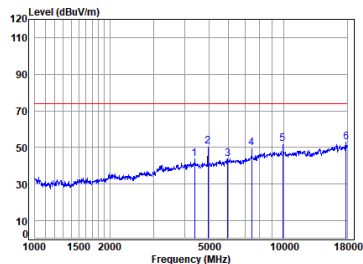
01 BLE_1M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT/04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4316.859	7.07	34.13	54.27	48.66	35.59	54.00	-18.41	Average
2 4960.000	7.53	34.56	54.20	61.87	49.76	54.00	-4.24	Average
3 5949.811	8.86	34.70	53.15	47.22	37.63	54.00	-16.37	Average
4 7440.000	8.43	35.96	53.15	49.06	40.30	54.00	-13.70	Average
5 9920.000	10.64	37.30	53.23	48.88	43.59	54.00	-10.41	Average
6 17948.050	11.47	44.09	52.43	40.97	44.10	54.00	-9.90	Average

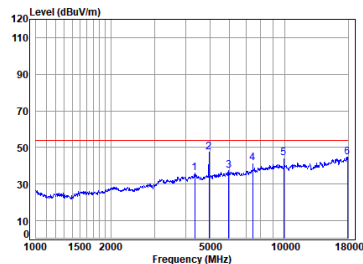
01 BLE_1M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT/04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4392.376	7.11	34.74	54.26	55.99	43.58	74.00	-30.42	Peak
2 4960.000	7.53	34.56	54.20	62.94	50.83	74.00	-23.17	Peak
3 5967.033	8.88	34.77	53.13	53.47	43.99	74.00	-30.01	Peak
4 7440.000	8.43	35.96	53.15	58.29	49.53	74.00	-24.47	Peak
5 9920.000	10.64	37.30	53.23	57.47	52.18	74.00	-21.82	Peak
6 17793.090	11.30	43.89	52.50	50.21	52.90	74.00	-21.02	Peak

01 BLE_1M_TX_CH_39_Vertical-Avg



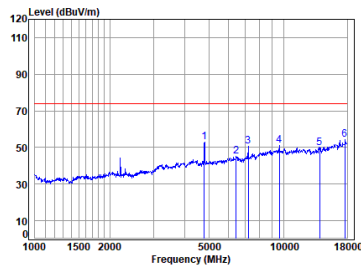
Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT/04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4354.454	7.09	34.44	54.26	48.63	35.90	54.00	-18.10	Average
2 4960.000	7.53	34.56	54.20	59.77	47.66	54.00	-6.34	Average
3 5949.811	8.86	34.70	53.15	47.02	37.43	54.00	-16.57	Average
4 7440.000	8.43	35.96	53.15	50.32	41.56	54.00	-12.44	Average
5 9920.000	10.64	37.30	53.23	49.40	44.11	54.00	-9.89	Average
6 17896.250	11.44	43.90	52.45	42.83	44.92	54.00	-9.08	Average



Right earbud:

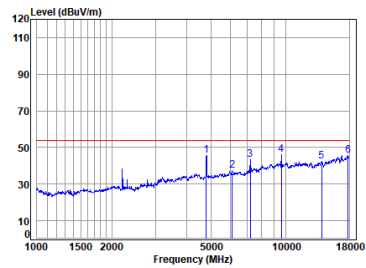
01 BLE_1M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 4804.000	7.41	34.32	54.22	65.34	52.85	74.00	-21.15	peak	
2 6451.353	8.88	35.50	53.15	53.97	45.20	74.00	-28.80	peak	
3 7206.000	8.50	35.70	53.18	59.44	50.46	74.00	-23.54	peak	
4 9680.000	10.74	37.42	53.35	56.40	51.21	74.00	-22.79	peak	
5 13957.530	10.97	39.62	52.91	52.04	49.72	74.00	-24.28	peak	
6 p17639.470	11.28	43.68	52.58	51.69	54.07	74.00	-19.93	peak	

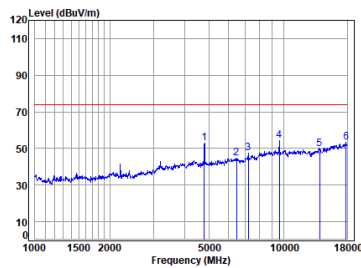
01 BLE_1M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 4804.000	7.41	34.32	54.22	58.32	45.83	54.00	-8.17	Average	
2 6088.991	8.92	35.08	53.11	46.34	37.23	54.00	-16.77	Average	
3 7206.000	8.50	35.70	53.18	52.52	43.54	54.00	-10.46	Average	
4 q 9680.000	10.74	37.42	53.35	51.00	45.89	54.00	-8.11	Average	
5 13957.530	10.97	39.62	52.91	44.89	42.57	54.00	-11.43	Average	
6 17793.090	11.38	43.89	52.58	42.82	45.59	54.00	-8.41	Average	

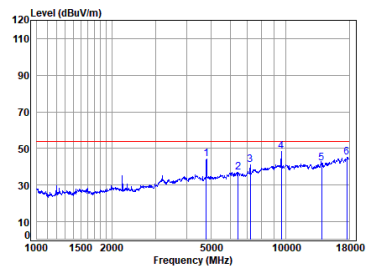
01 BLE_1M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 4804.000	7.41	34.32	54.22	65.60	53.11	74.00	-20.89	peak	
2 6470.026	8.88	35.54	53.15	53.63	44.90	74.00	-29.10	peak	
3 7206.000	8.50	35.70	53.18	56.35	47.37	74.00	-26.63	peak	
4 p 9680.000	10.74	37.42	53.35	59.48	54.29	74.00	-19.71	peak	
5 13957.530	10.97	39.62	52.91	52.02	49.70	74.00	-24.30	peak	
6 17844.590	11.41	43.90	52.48	50.58	53.41	74.00	-20.59	peak	

01 BLE_1M_TX_CH_00_Vertical-Avg

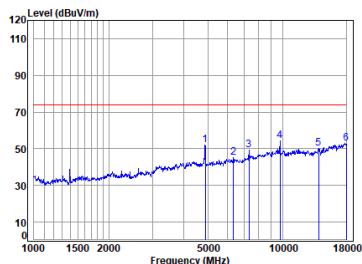


Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 4804.000	7.41	34.32	54.22	56.89	44.40	54.00	-9.60	Average	
2 6451.353	8.88	35.50	53.15	45.87	37.10	54.00	-16.90	Average	
3 7206.000	8.50	35.70	53.18	50.83	41.05	54.00	-12.95	Average	
4 q 9680.000	10.74	37.42	53.35	53.36	48.17	54.00	-5.83	Average	
5 13957.530	10.97	39.62	52.91	44.44	42.12	54.00	-11.88	Average	
6 17639.470	11.28	43.68	52.58	43.01	45.39	54.00	-8.61	Average	



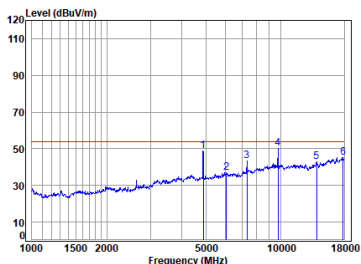
01 BLE_1M_TX_CH_19_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4880.000	7.47	34.62	54.21	64.28	52.16	74.00	-21.84	peak
2 6340.436	8.90	34.92	53.14	54.56	45.24	74.00	-28.76	peak
3 7320.000	8.46	35.70	53.17	58.50	49.49	74.00	-24.51	peak
4 p 9760.000	10.69	37.38	53.29	59.61	54.39	74.00	-19.61	peak
5 13957.530	10.97	39.62	52.91	52.49	50.17	74.00	-23.83	peak
6 18000.000	11.50	44.30	52.40	49.61	53.01	74.00	-20.99	peak

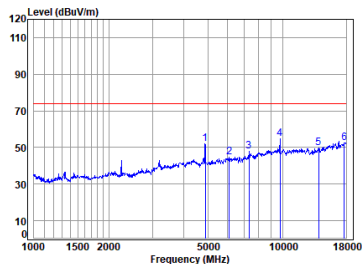
01 BLE_1M_TX_CH_19_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4880.000	7.47	34.62	54.21	60.96	48.84	54.00	-5.16	Average
2 6053.894	8.92	35.01	53.11	45.99	36.81	54.00	-17.19	Average
3 7320.000	8.46	35.70	53.17	52.55	43.54	54.00	-10.46	Average
4 q 9760.000	10.69	37.38	53.29	55.56	50.34	54.00	-3.66	Average
5 13957.530	10.97	39.62	52.91	45.23	42.91	54.00	-11.09	Average
6 17844.590	11.41	43.90	52.48	42.48	45.31	54.00	-8.69	Average

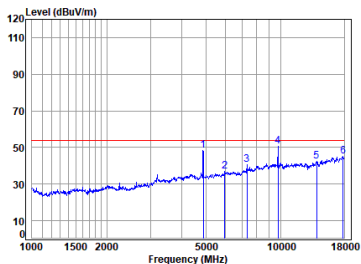
01 BLE_1M_TX_CH_19_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4880.000	7.47	34.62	54.21	64.09	51.97	74.00	-22.03	peak
2 6106.616	8.92	35.07	53.11	54.01	44.89	74.00	-29.11	peak
3 7320.000	8.46	35.70	53.17	56.88	47.87	74.00	-26.13	peak
4 p 9760.000	10.69	37.38	53.29	59.93	54.71	74.00	-19.29	peak
5 13957.530	10.97	39.62	52.91	52.20	49.88	74.00	-24.12	peak
6 17690.530	11.32	43.78	52.55	50.14	52.69	74.00	-21.31	peak

01 BLE_1M_TX_CH_19_Vertical-Avg

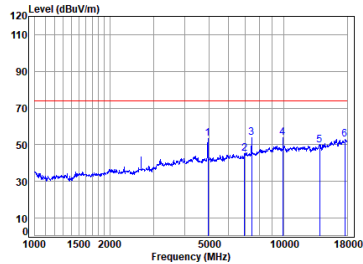


Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2440 TX RSE
BLE

Freq	Cable	Ant	Preamp	Read	Level	Limit	Over	Remark
MHz	Loss	Factor	Factor	Level	dBuV	dBuV/m	dB	
1 4880.000	7.47	34.62	54.21	60.43	48.31	54.00	-5.69	Average
2 5949.811	8.86	34.70	53.15	46.32	36.73	54.00	-17.27	Average
3 7320.000	8.46	35.70	53.17	49.69	40.68	54.00	-13.32	Average
4 q 9760.000	10.69	37.38	53.29	56.01	50.79	54.00	-3.21	Average
5 13957.530	10.97	39.62	52.91	44.71	42.39	54.00	-11.61	Average
6 17793.090	11.30	43.09	52.50	42.25	45.02	54.00	-8.98	Average



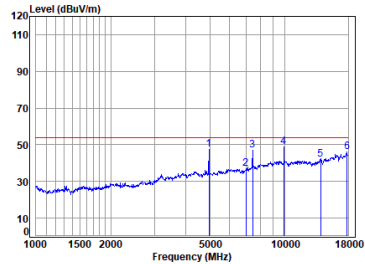
01 BLE_1M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 4960.000	7.53	34.56	54.20	65.51	53.40	74.00	-20.60	peak
2 6954.852	8.59	35.79	53.20	53.93	45.11	74.00	-28.89	peak
3 7440.000	8.43	35.96	53.15	62.44	53.68	74.00	-20.32	peak
4 p 9920.000	10.64	37.30	53.23	58.99	53.70	74.00	-20.30	peak
5 13957.530	10.97	39.62	52.91	51.92	49.60	74.00	-24.40	peak
6 17639.470	11.28	43.68	52.58	50.68	53.06	74.00	-20.94	peak

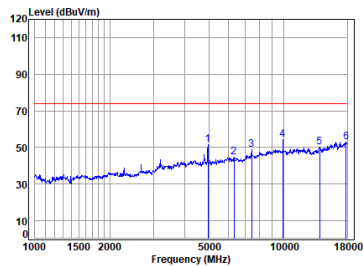
01 BLE_1M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 04780AT\04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 4960.000	7.53	34.56	54.20	59.59	47.48	54.00	-6.52	Average
2 6995.172	8.56	35.71	53.20	45.66	36.73	54.00	-17.27	Average
3 7440.000	8.43	35.96	53.15	55.91	47.15	54.00	-6.85	Average
4 q 9920.000	10.64	37.30	53.23	54.31	49.02	54.00	-4.98	Average
5 13957.530	10.97	39.62	52.91	44.39	42.07	54.00	-11.93	Average
6 17793.890	11.38	43.89	52.58	43.22	45.99	54.00	-8.01	Average

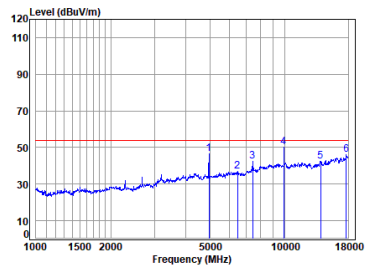
01 BLE_1M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 4960.000	7.53	34.56	54.20	63.67	51.56	74.00	-22.44	peak
2 6322.136	8.90	34.96	53.13	53.99	44.72	74.00	-29.28	peak
3 7440.000	8.43	35.96	53.15	57.57	48.81	74.00	-25.19	peak
4 p 9920.000	10.64	37.30	53.23	59.00	54.51	74.00	-19.49	peak
5 13957.530	10.97	39.62	52.91	52.29	49.97	74.00	-24.03	peak
6 17793.000	11.38	43.89	52.58	50.20	52.97	74.00	-21.03	peak

01 BLE_1M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 04780AT\04781AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 4960.000	7.53	34.56	54.20	58.61	46.50	54.00	-7.50	Average
2 6470.026	8.88	35.54	53.15	45.53	36.80	54.00	-17.20	Average
3 7440.000	8.43	35.96	53.15	51.01	42.25	54.00	-11.75	Average
4 q 9920.000	10.64	37.30	53.23	55.61	50.32	54.00	-3.68	Average
5 13957.530	10.97	39.62	52.91	44.86	42.54	54.00	-11.46	Average
6 17690.530	11.32	43.78	52.55	43.53	46.00	54.00	-7.92	Average



7.5 Conducted Peak 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: Byron Liang

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

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C

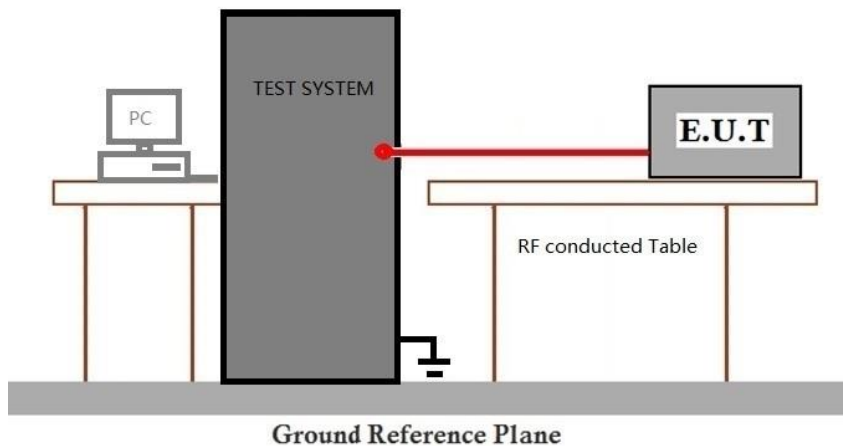
Humidity: 30.3 % RH

Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

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

7.5.3 Test Setup Diagram



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7.5.4 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



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7.6 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: Byron Liang

Limit:
 ≥500 kHz

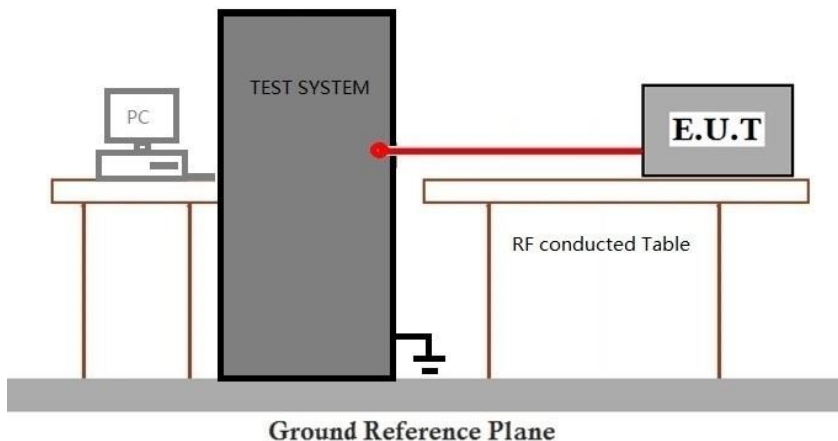
7.6.1 E.U.T. Operation

Operating Environment:
 Temperature: 24.6 °C Humidity: 30.3 % RH Atmospheric Pressure: 1020 mbar

7.6.2 Test Mode Description

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

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details



7.7 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
 Test Method: ANSI C63.10 (2020) Section 11.10.2
 Test Engineer: Byron Liang

Limit:

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

7.7.1 E.U.T. Operation

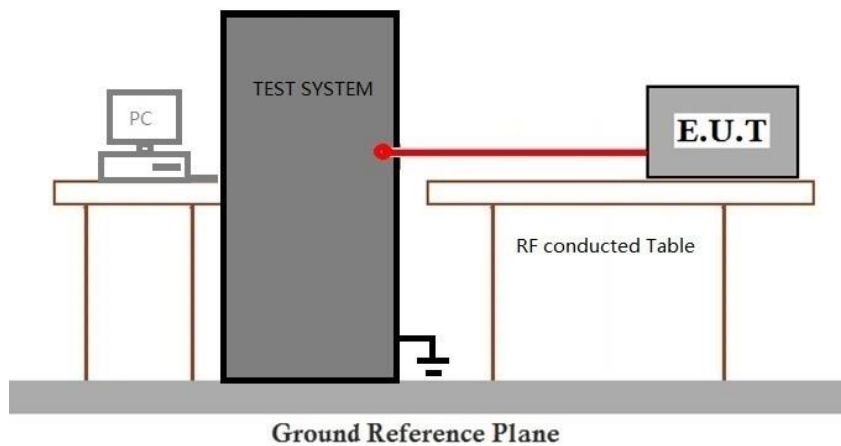
Operating Environment:

Temperature: 24.6 °C Humidity: 30.3 % RH Atmospheric Pressure: 1020 mbar

7.7.2 Test Mode Description

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

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 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: Byron Liang

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

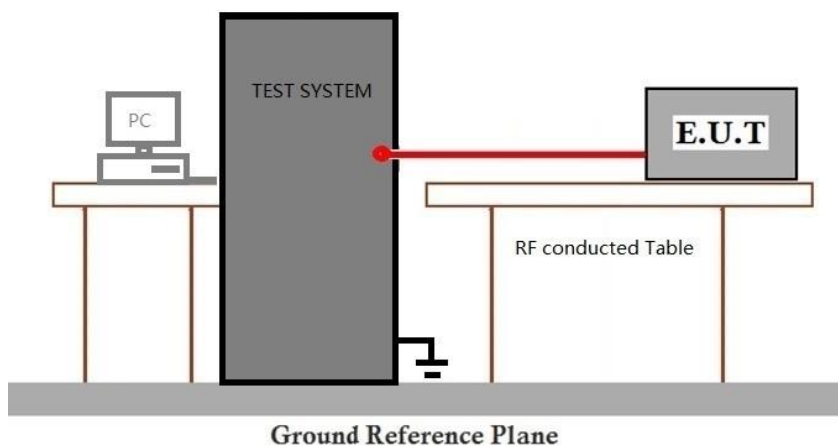
Operating Environment:

Temperature: 24.6 °C Humidity: 30.3 % RH Atmospheric Pressure: 1020 mbar

7.8.2 Test Mode Description

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

7.8.3 Test Setup Diagram





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7.8.4 Measurement Procedure and Data

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7.9 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: Byron Liang

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)).

7.9.1 E.U.T. Operation

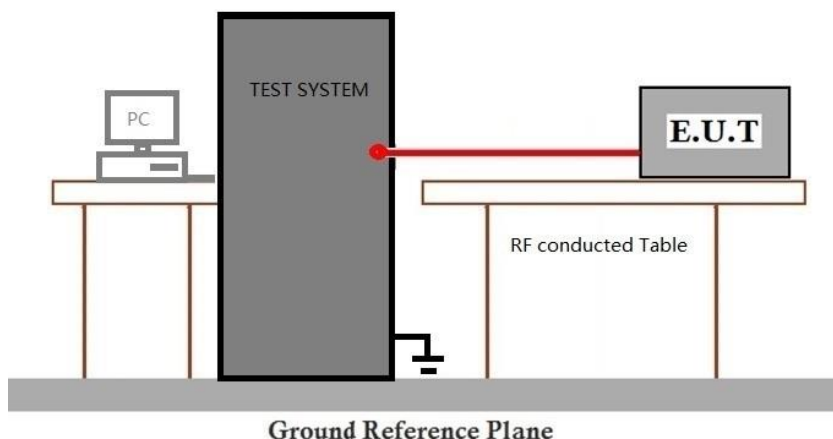
Operating Environment:

Temperature: 24.6 °C Humidity: 30.3 % RH Atmospheric Pressure: 1020 mbar

7.9.2 Test Mode Description

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

7.9.3 Test Setup Diagram





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7.9.4 Measurement Procedure and Data

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8 Test Setup Photo

Refer to Appendix – Test Setup Photos for SZCR2511004780AT



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9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2511004780AT



10 Appendix

For Right earbud:

1. Duty Cycle

1.1 Test Result

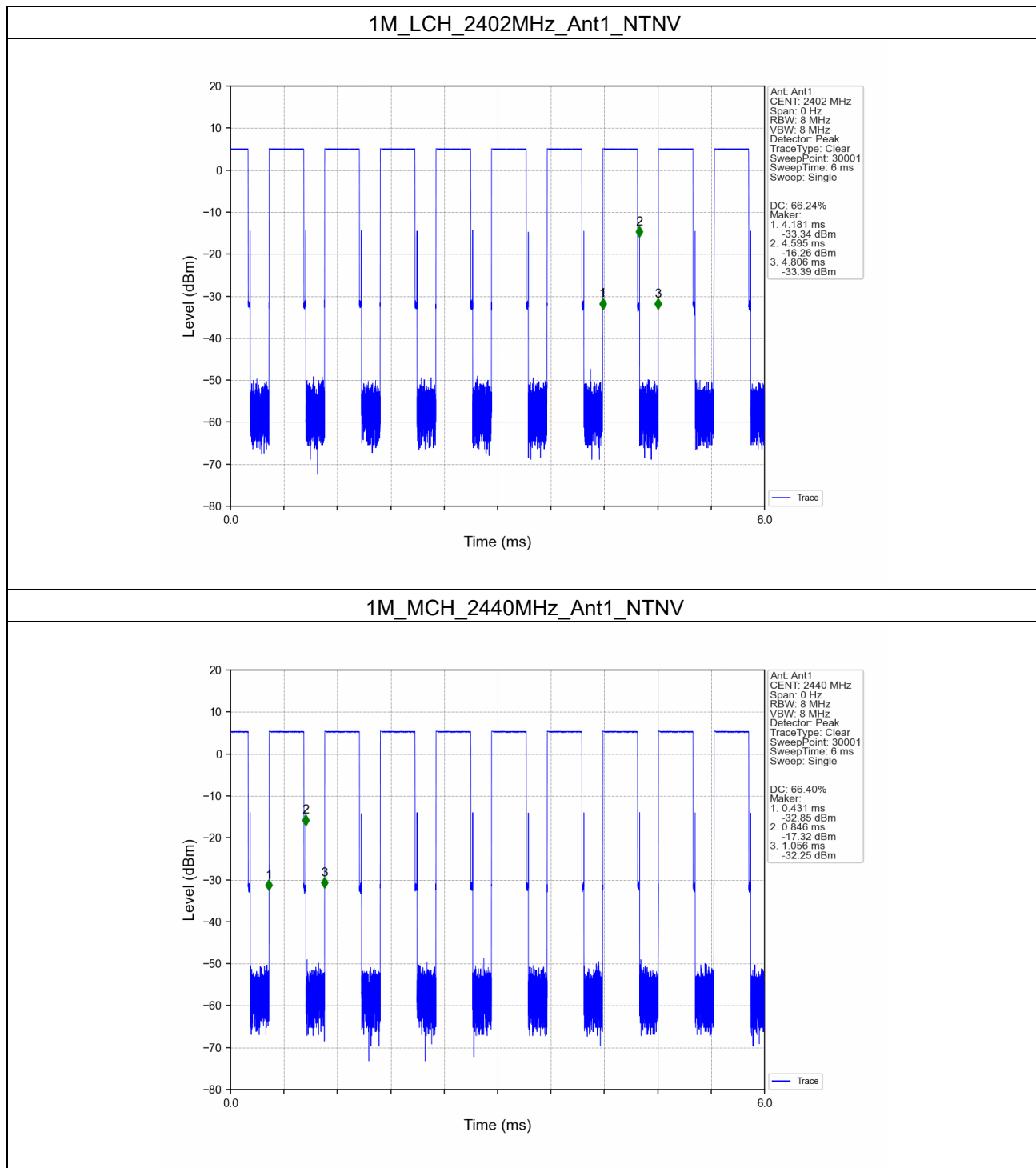
1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T _{on} (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	0.414	0.625	66.24	1.79	0.03
		2440	0.415	0.625	66.40	1.78	0.03
		2480	0.414	0.625	66.24	1.79	0.00

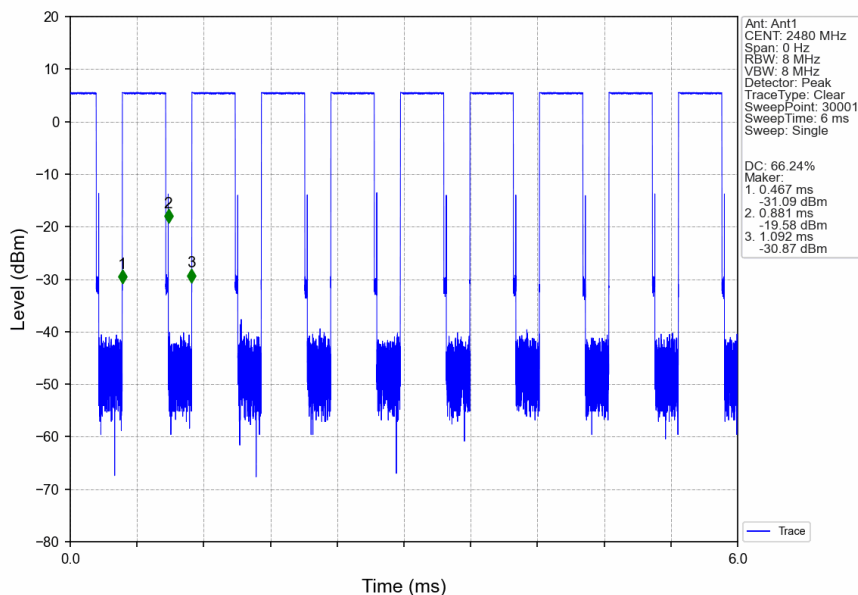


1.2 Test Graph

1.2.1 Ant1



1M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.034	/	Pass
		2440	1	1.037	/	Pass
		2480	1	1.039	/	Pass

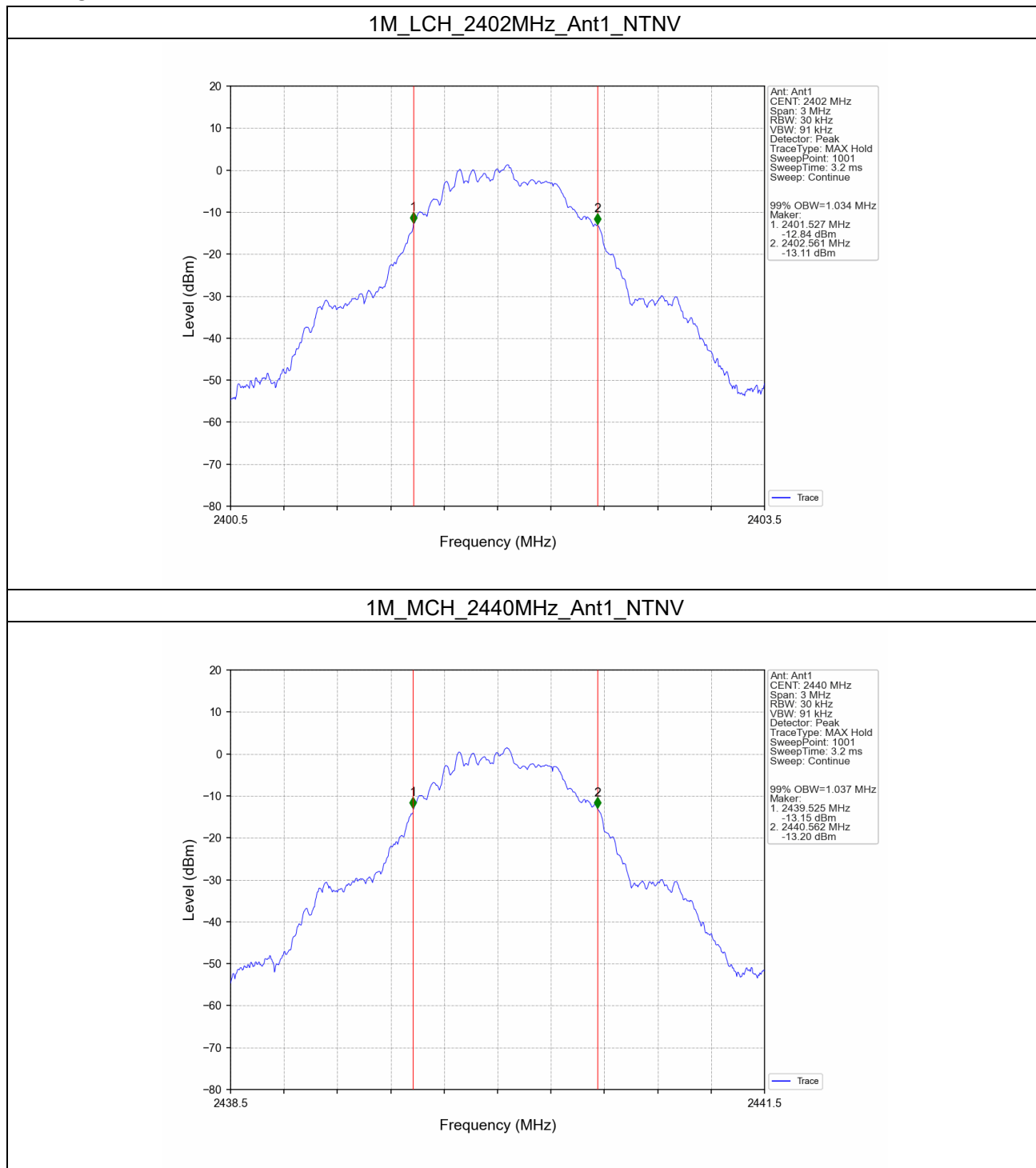
2.1.2 6dB BW

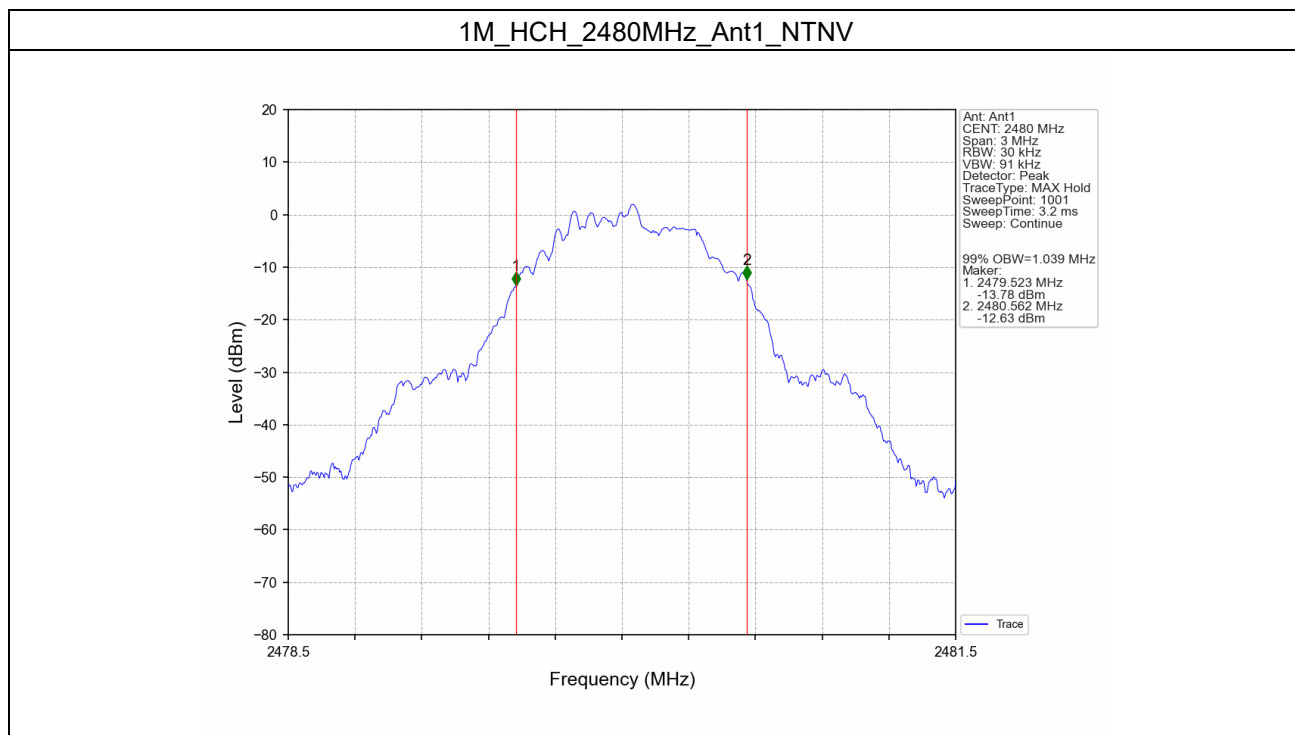
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.669	≥ 0.5	Pass
		2440	1	0.661	≥ 0.5	Pass
		2480	1	0.660	≥ 0.5	Pass



2.2 Test Graph

2.2.1 OBW

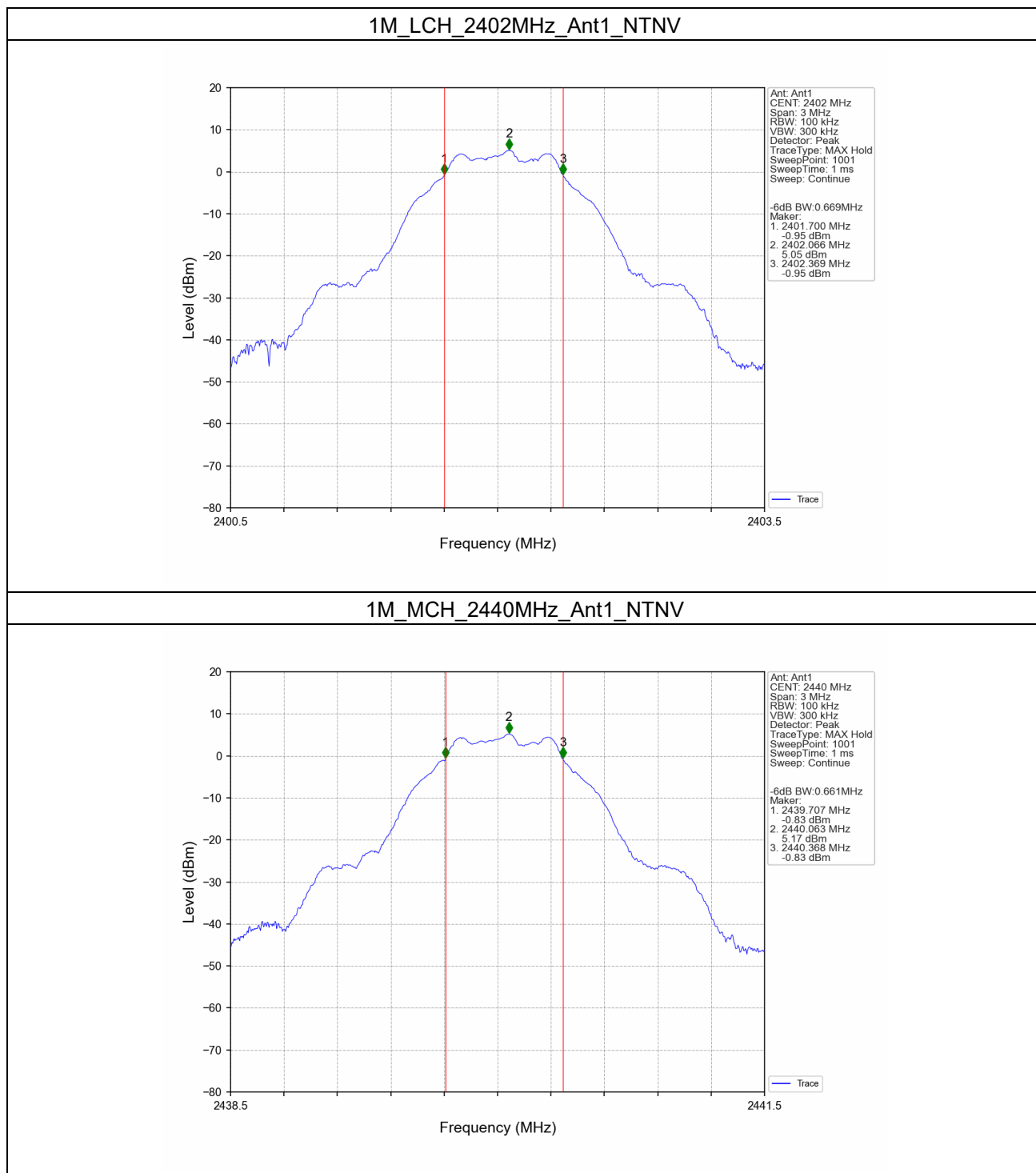




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2.2.2 6dB BW



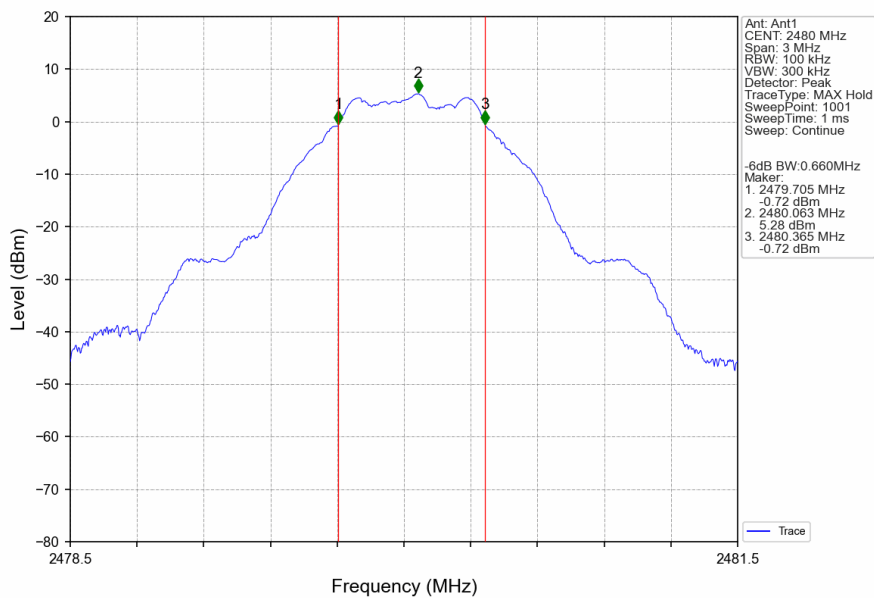
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1M_HCH_2480MHz_Ant1_NTNV



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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	
1M	SISO	2402	1.19	<=30	Pass
		2440	1.48	<=30	Pass
		2480	1.45	<=30	Pass
Note1: Antenna Gain: Ant1: 3.10dBi;					

4. Maximum Power Spectral Density

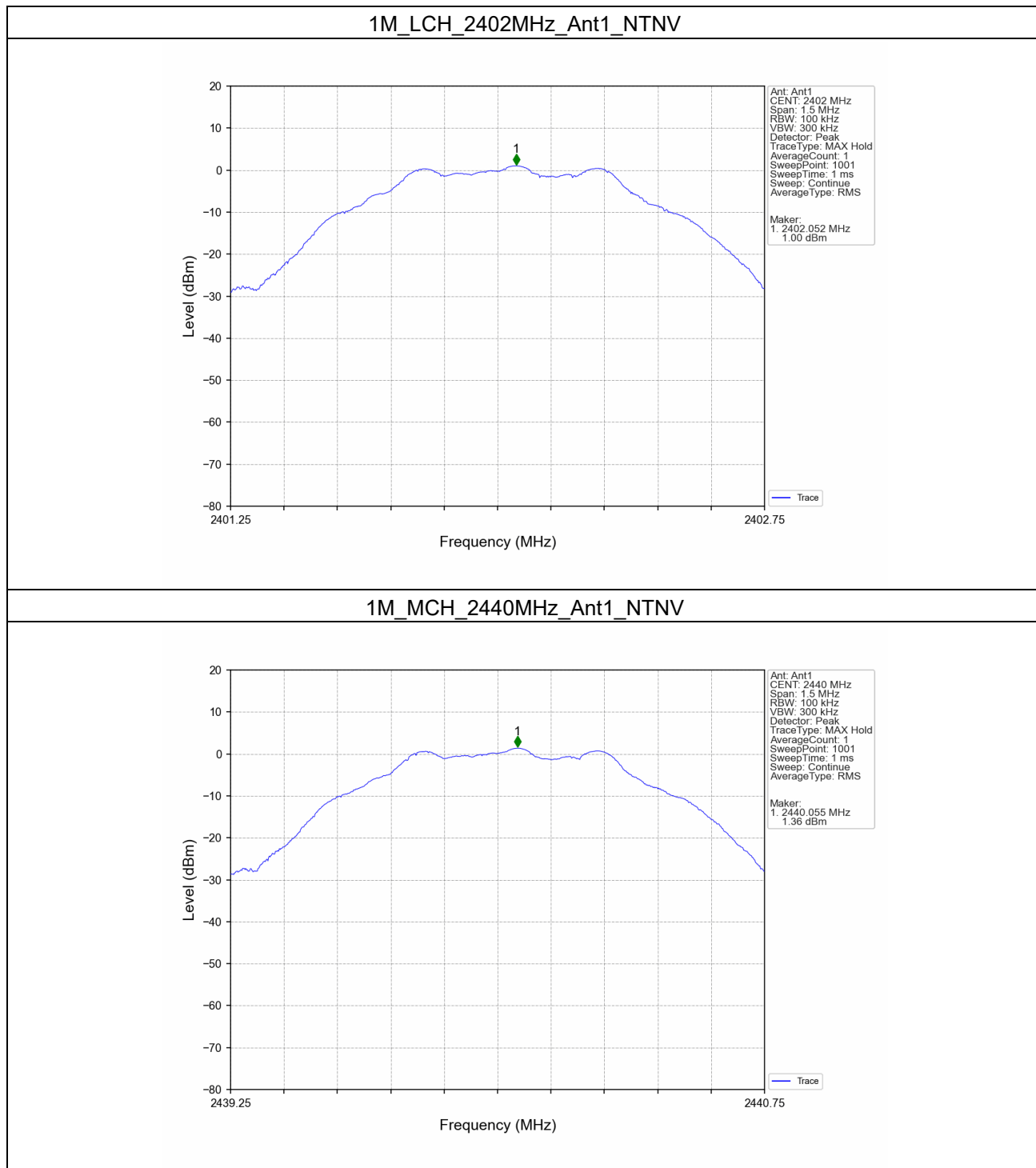
4.1 Test Result

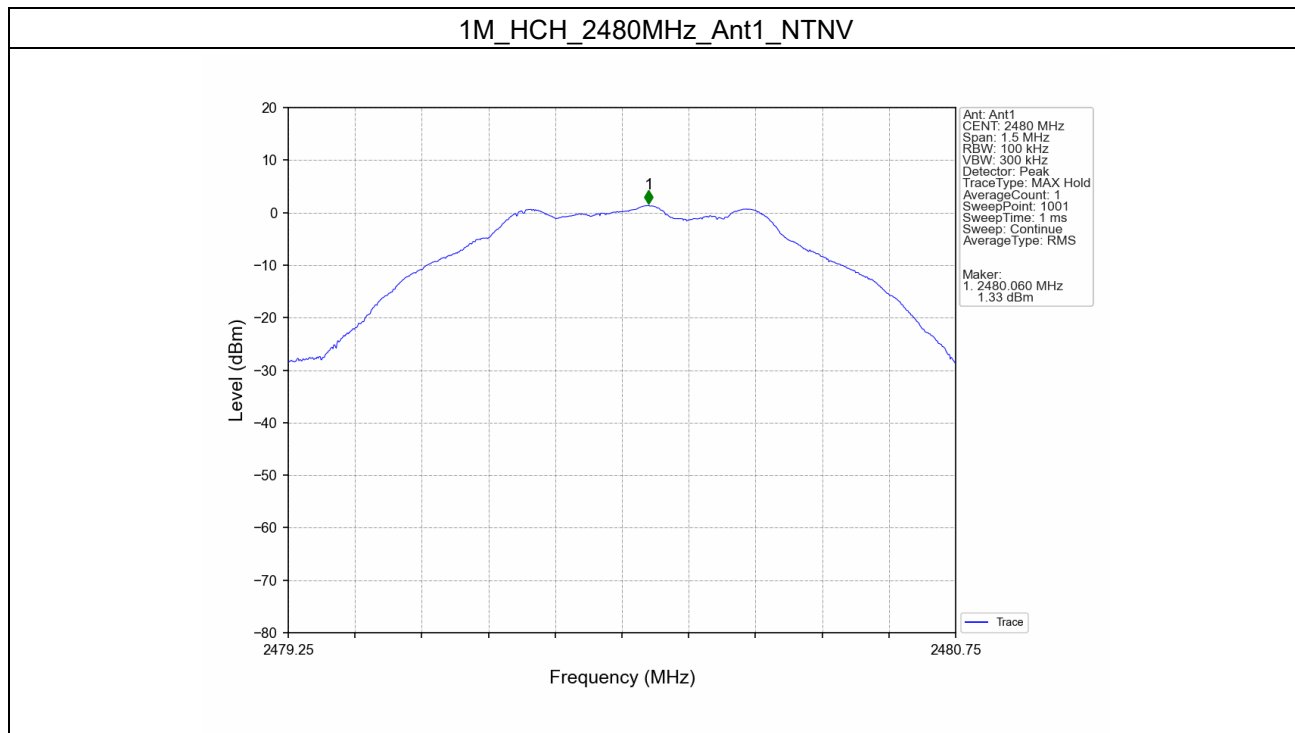
4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	1.00	<=8	Pass
		2440	1.36	<=8	Pass
		2480	1.33	<=8	Pass
Note1: Antenna Gain: Ant1: 3.10dBi;					

4.2 Test Graph

4.2.1 PSD





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)
1M	SISO	2402	1	1.00
		2440	1	1.33
		2480	1	1.32

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

5.1.2 CSE

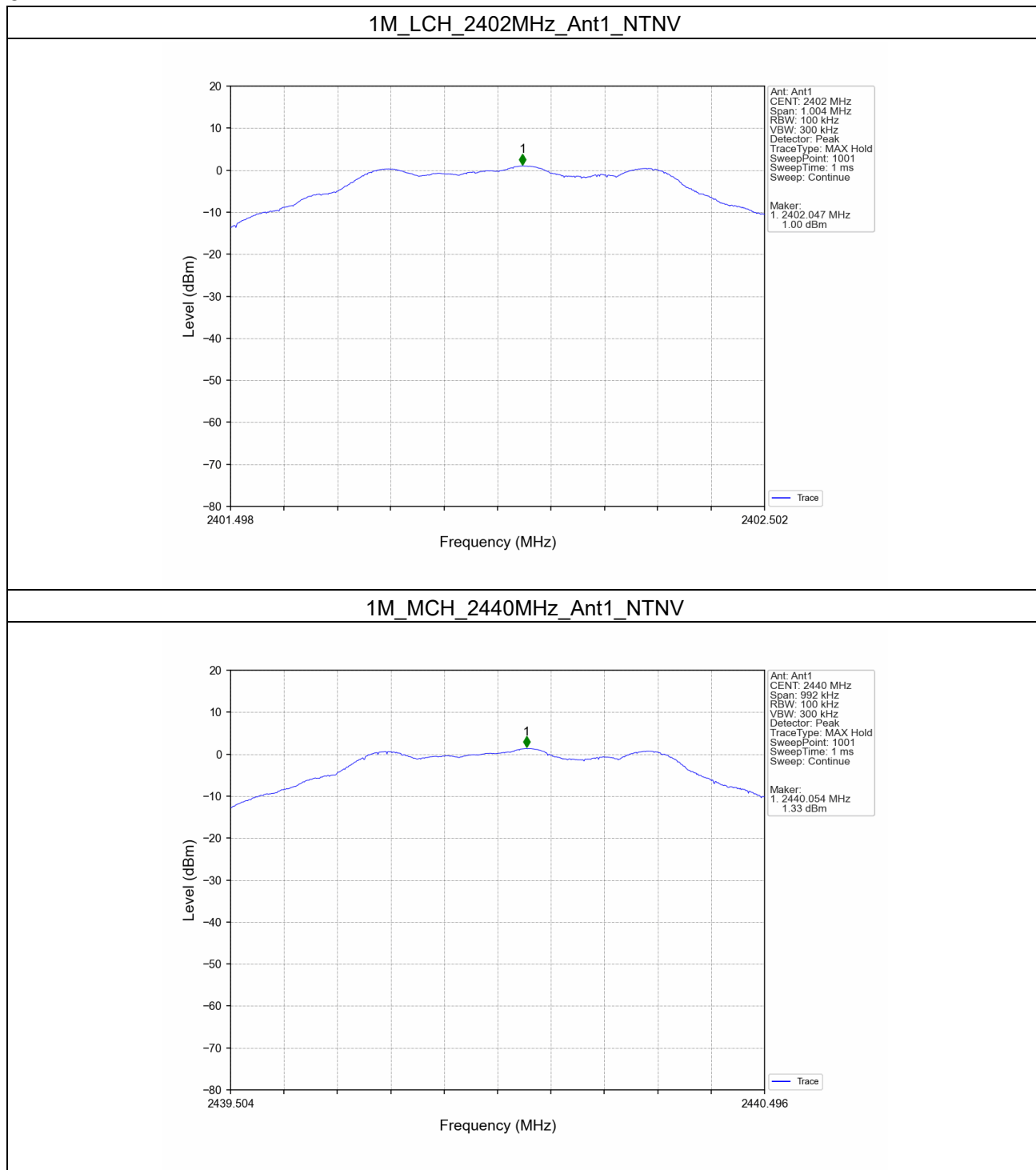
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	1.33	-18.67	Pass
		2440	1	1.33	-18.67	Pass
		2480	1	1.33	-18.67	Pass

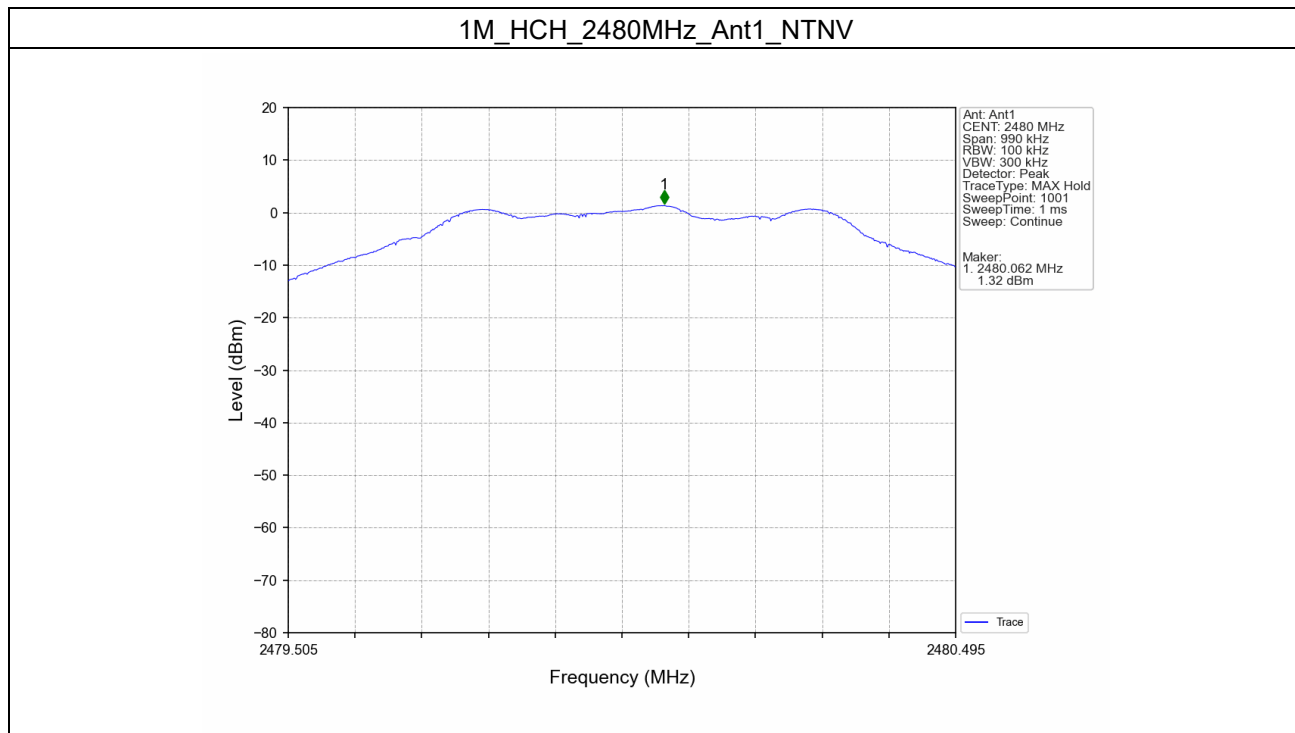
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.



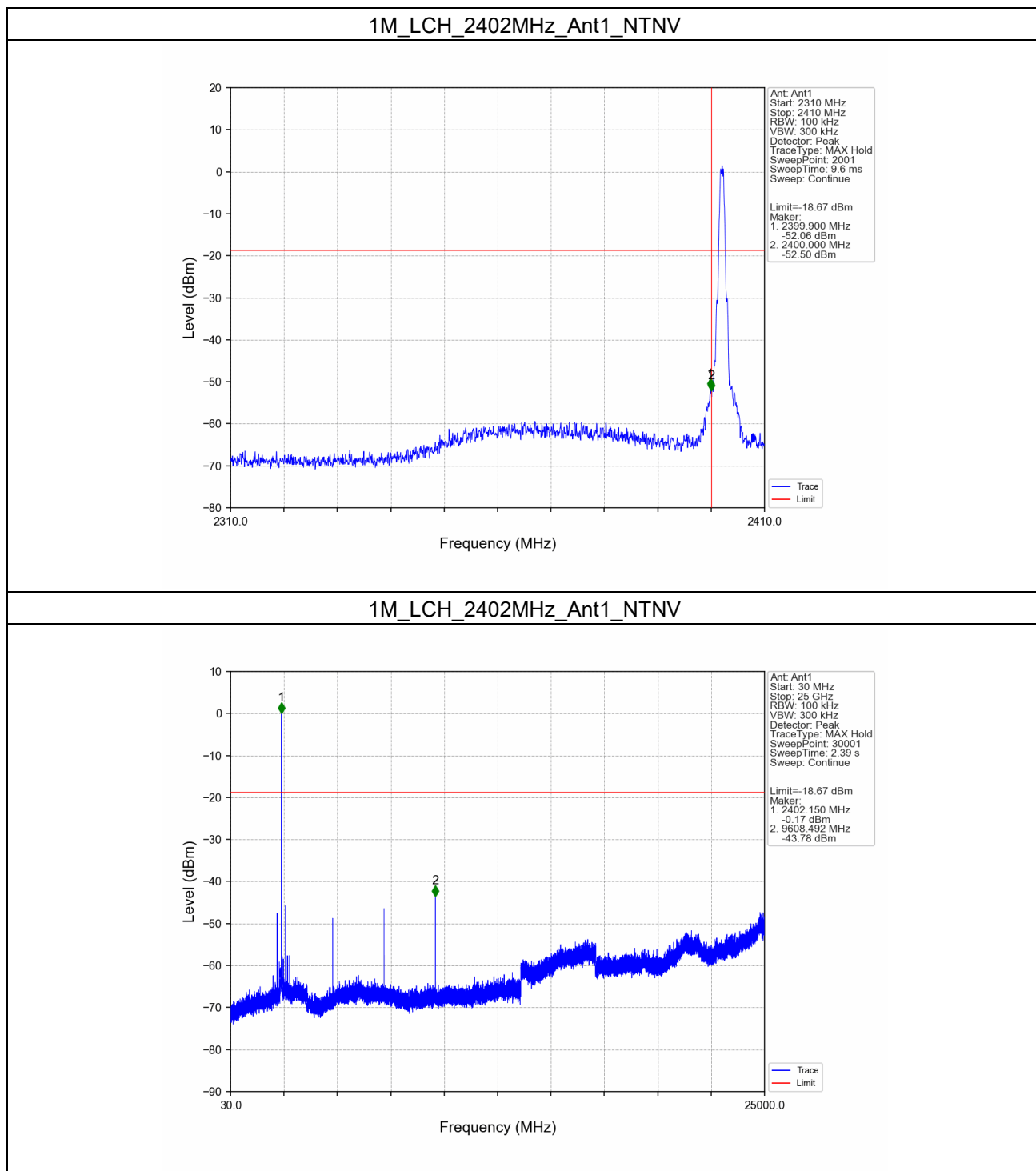
5.2 Test Graph

5.2.1 Ref





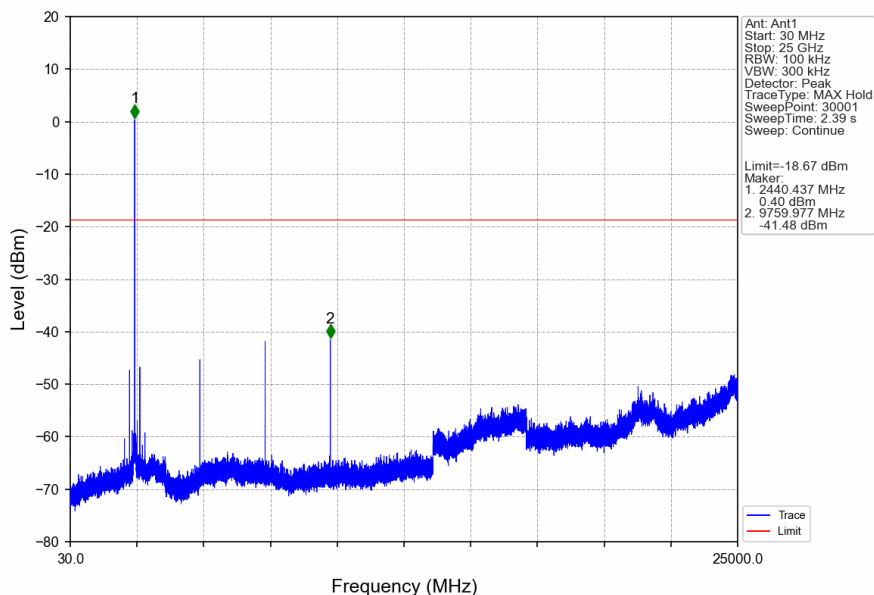
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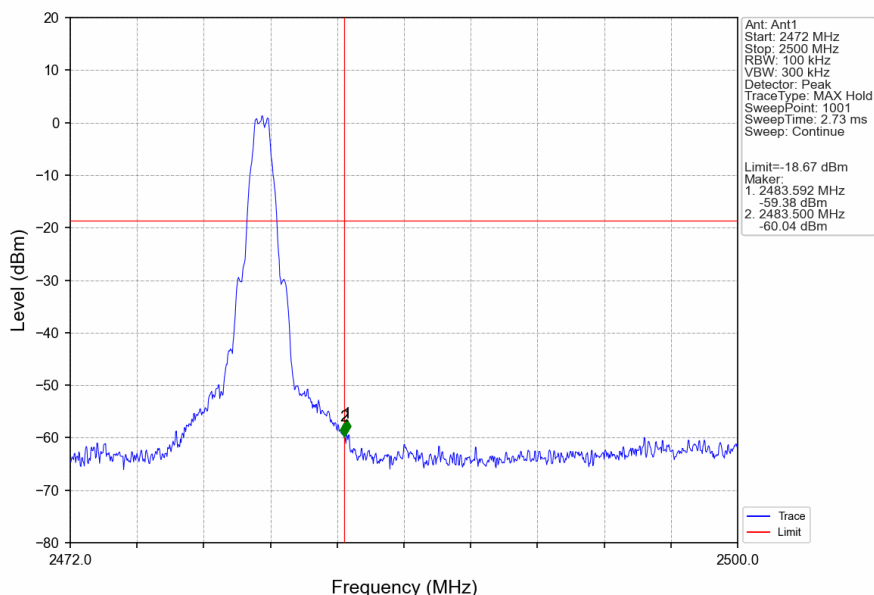
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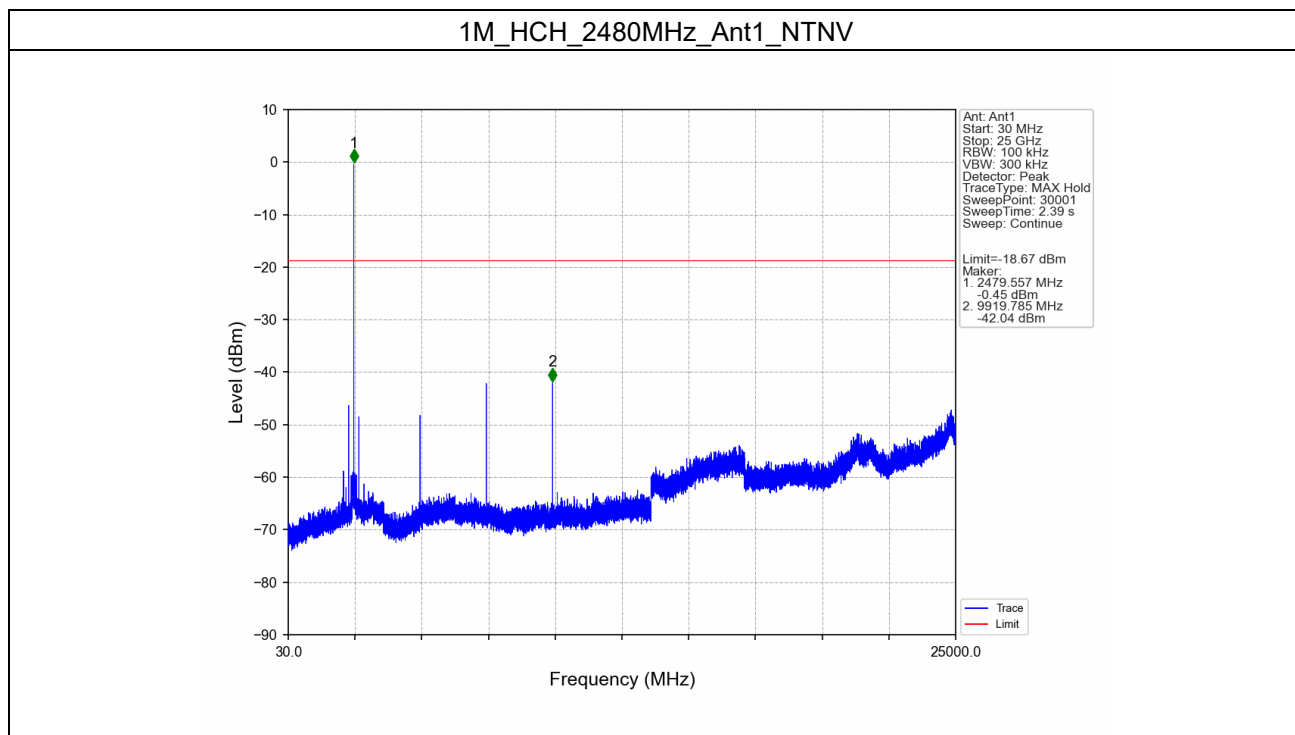
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1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV





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SZEMC-TRF-01 Rev. A/2

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For Left earbud:

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 (%)
1M	SISO	2402	0.414	0.625	66.24	1.79	0.00
		2440	0.414	0.625	66.24	1.79	0.00
		2480	0.414	0.625	66.24	1.79	0.00



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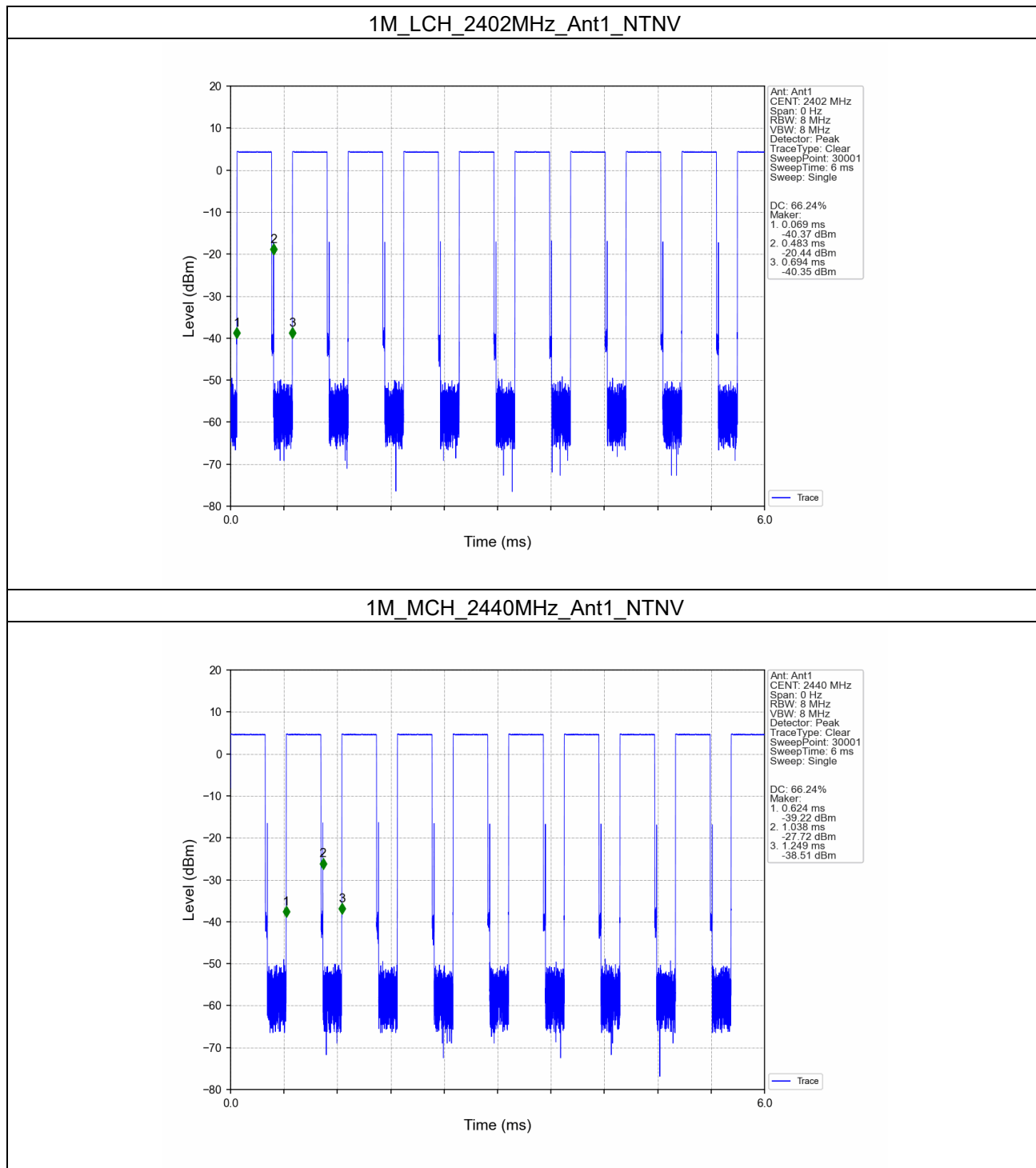
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1.2 Test Graph

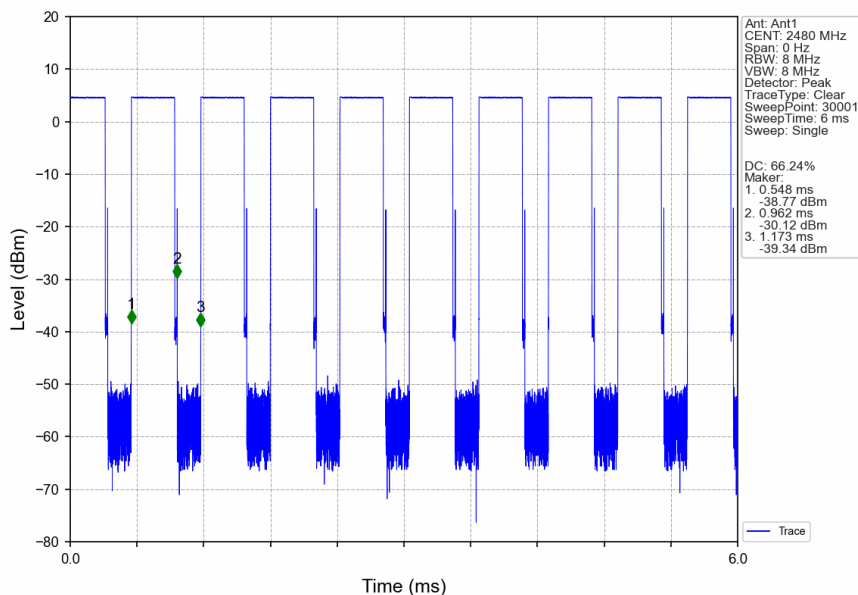
1.2.1 Ant1



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1M_HCH_2480MHz_Ant1_NTNV



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

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2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.033	/	Pass
		2440	1	1.036	/	Pass
		2480	1	1.038	/	Pass

2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.668	≥ 0.5	Pass
		2440	1	0.665	≥ 0.5	Pass
		2480	1	0.662	≥ 0.5	Pass



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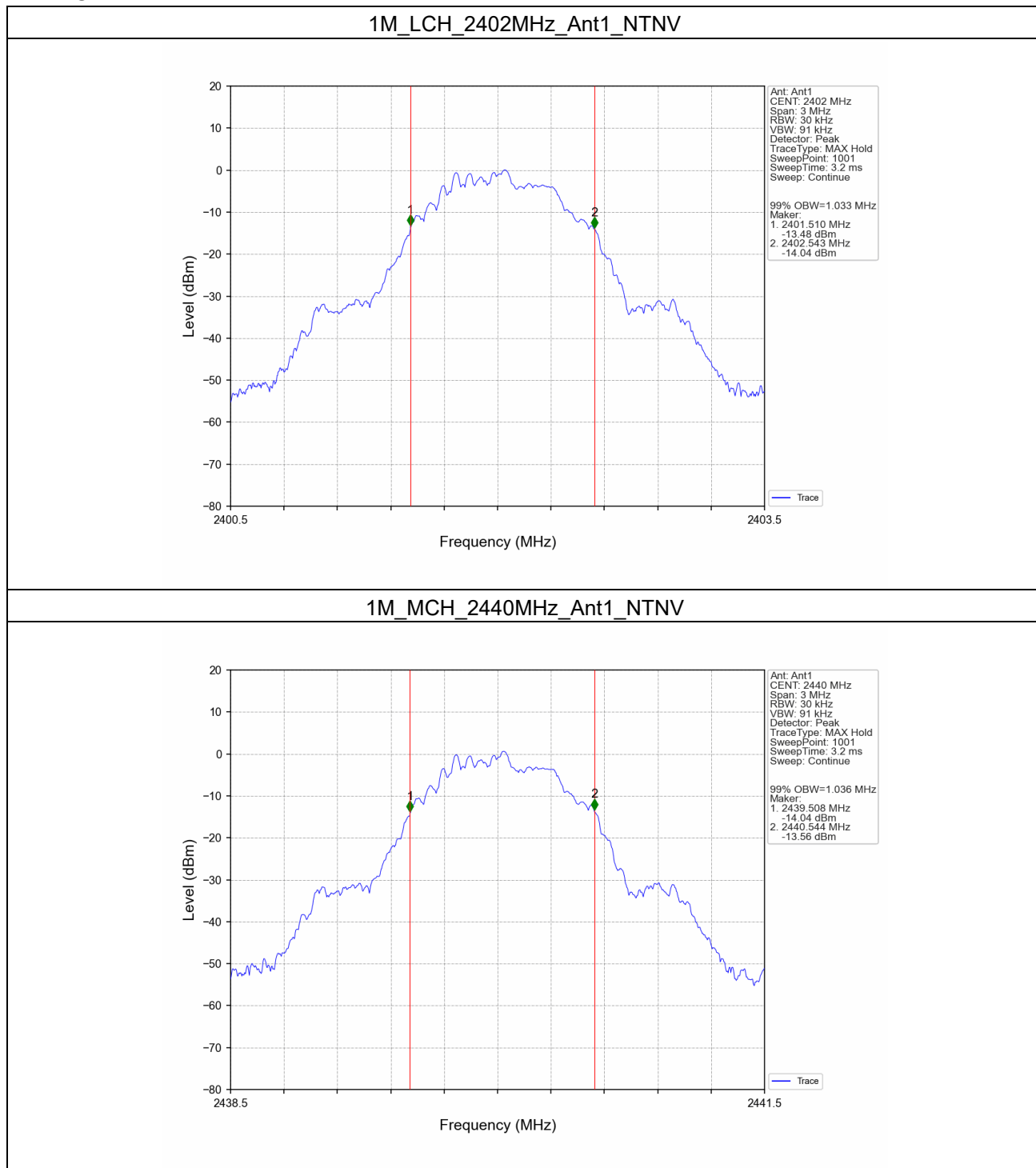
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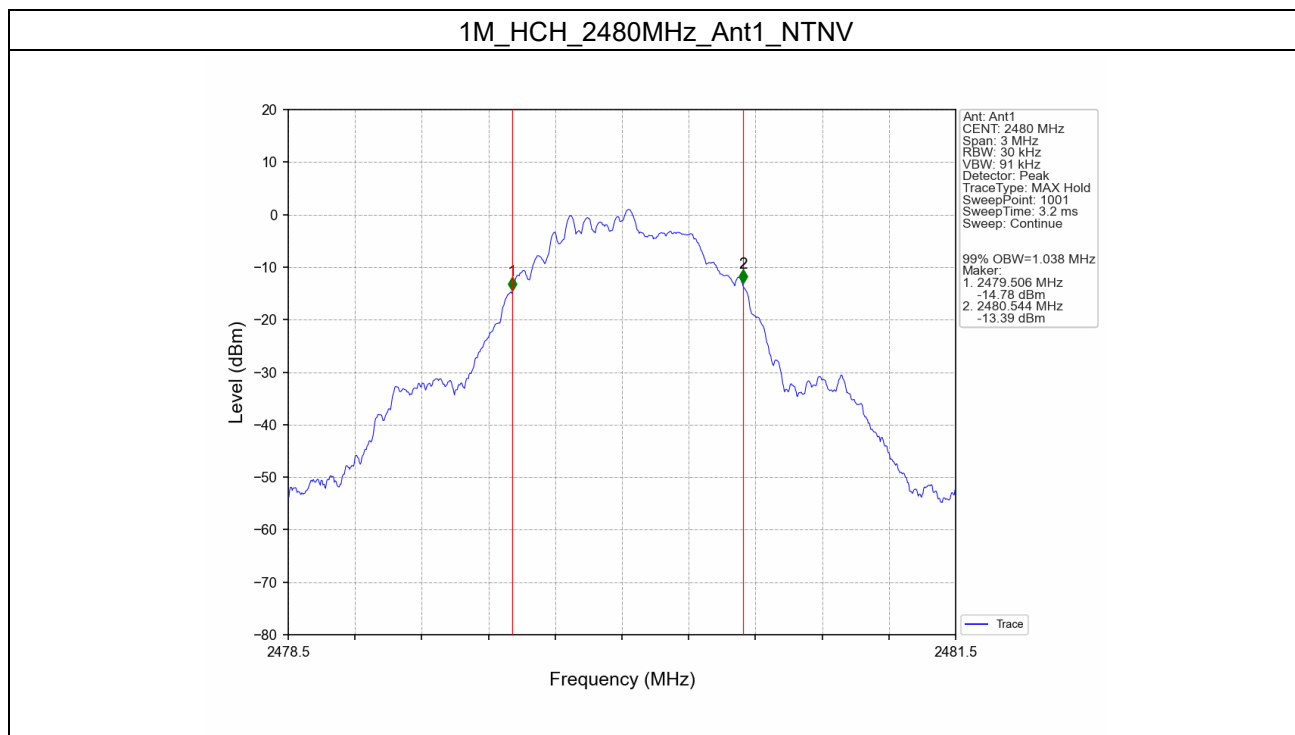
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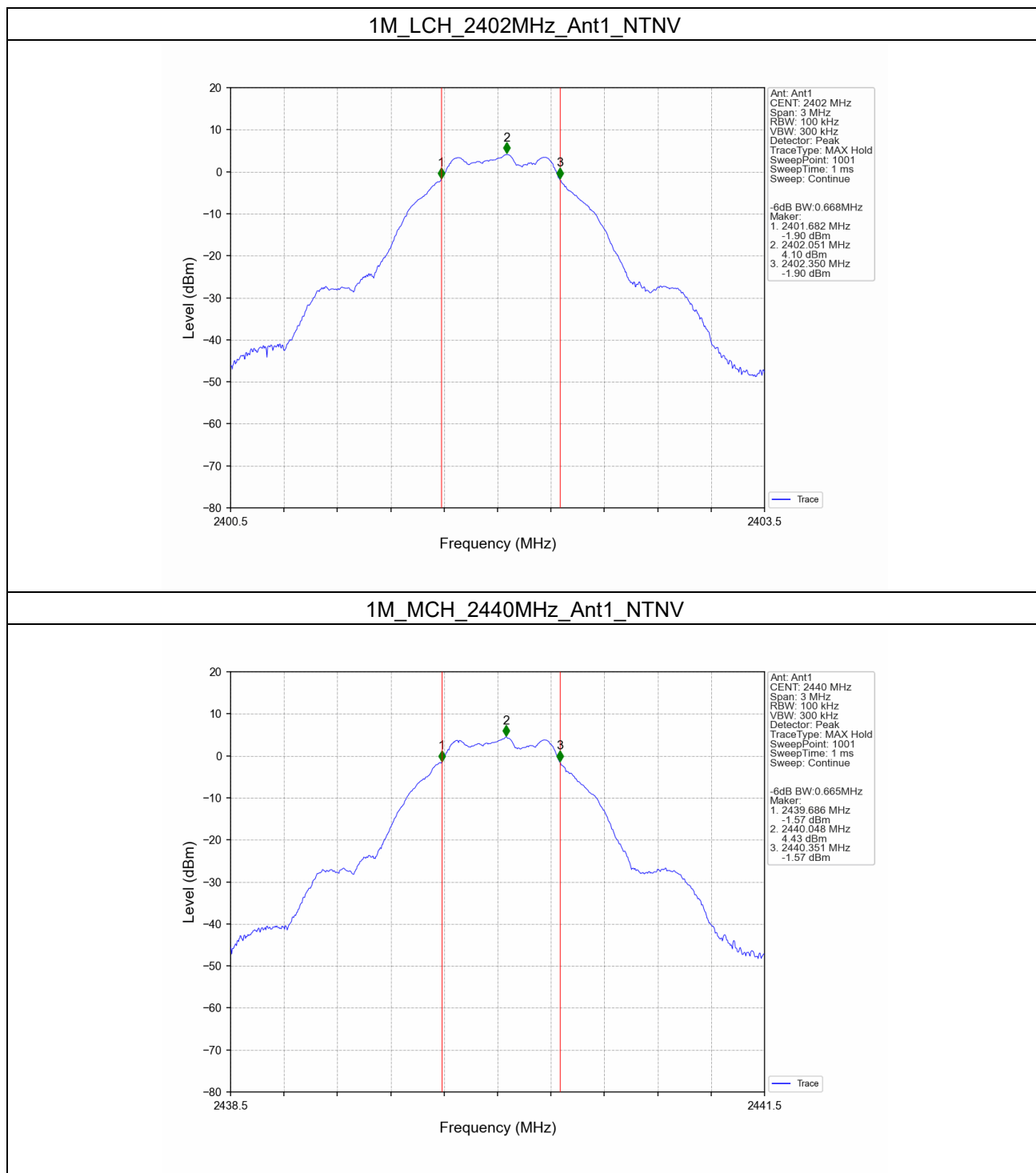
2.2 Test Graph

2.2.1 OBW

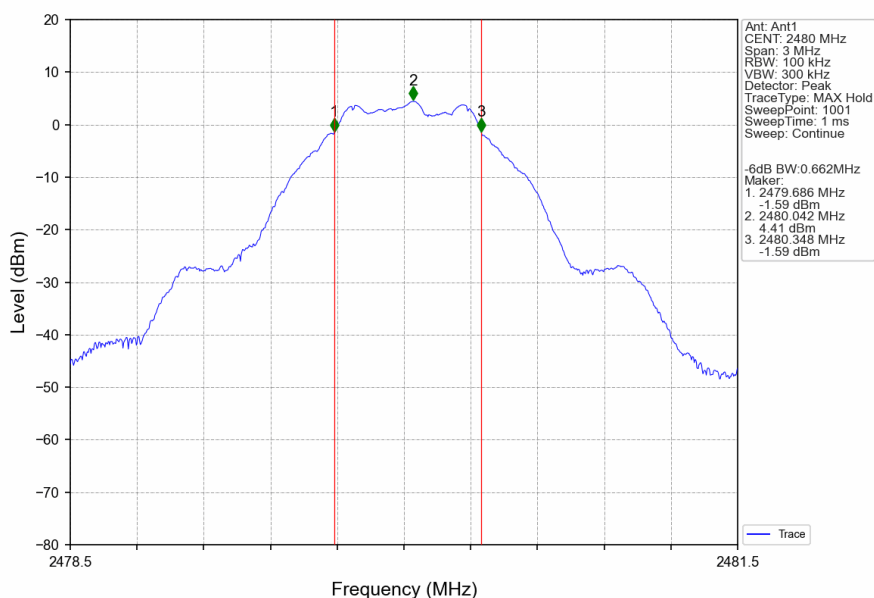




2.2.2 6dB BW



1M_HCH_2480MHz_Ant1_NTNV



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	
1M	SISO	2402	0.95	<=30	Pass
		2440	1.16	<=30	Pass
		2480	1.11	<=30	Pass
Note1: Antenna Gain: Ant1: 3.95dBi;					

4. Maximum Power Spectral Density

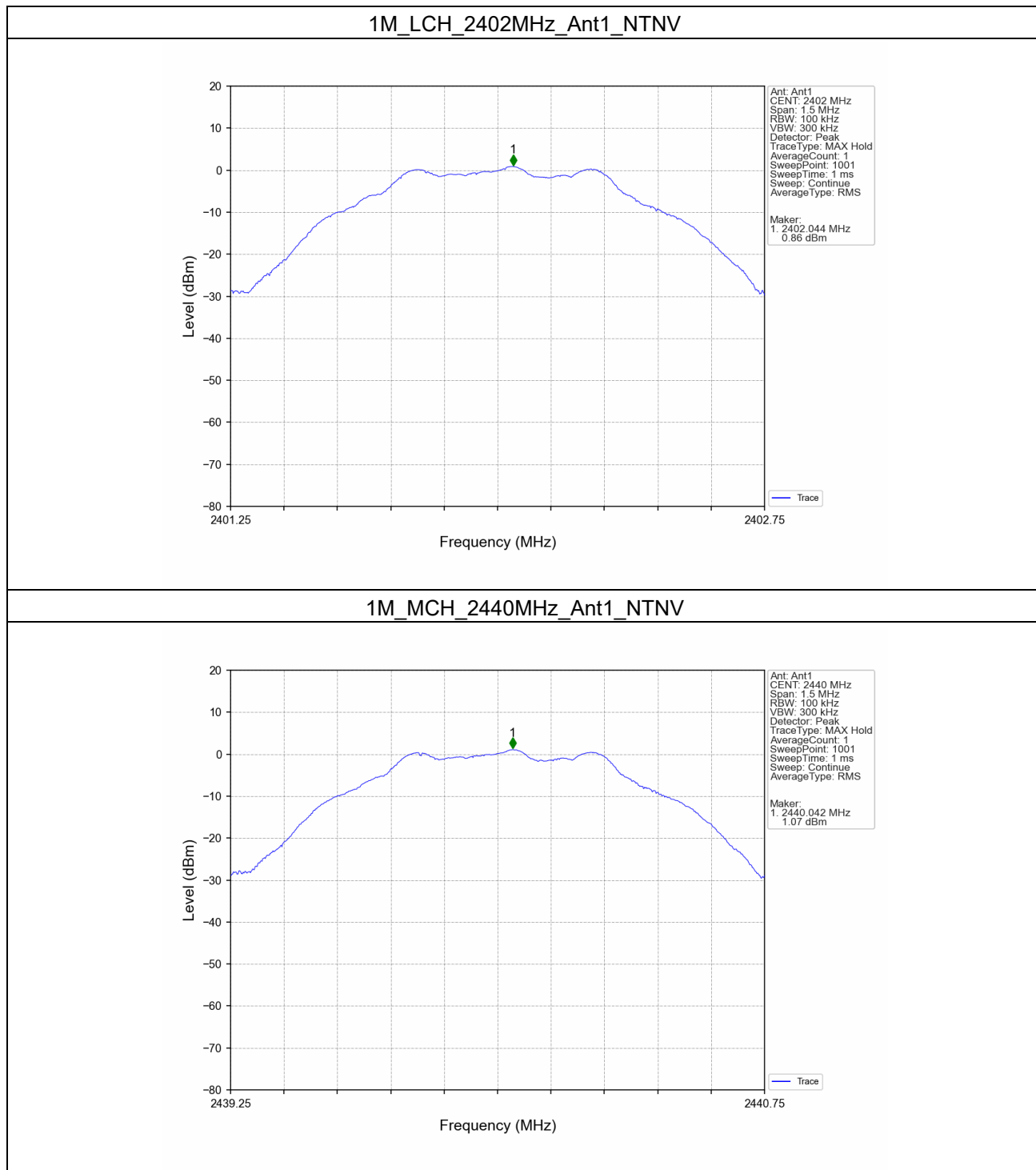
4.1 Test Result

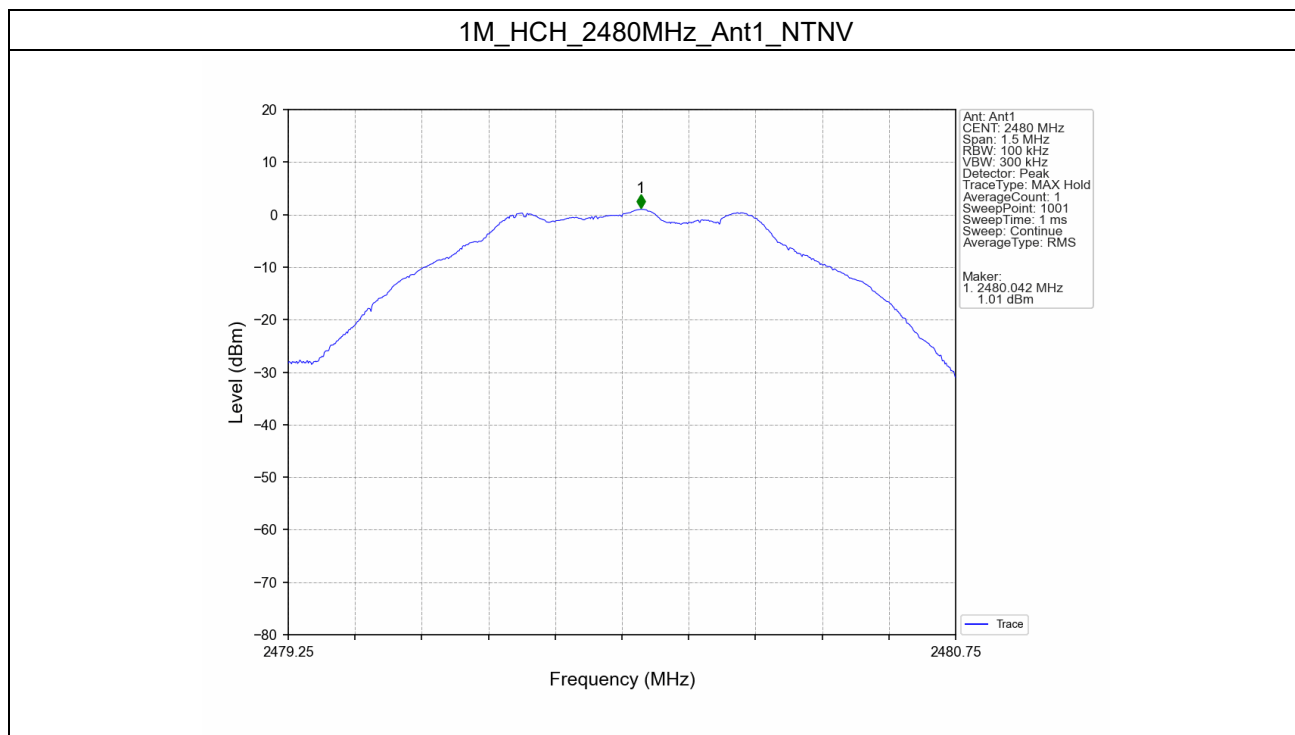
4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	0.86	<=8	Pass
		2440	1.07	<=8	Pass
		2480	1.01	<=8	Pass
Note1: Antenna Gain: Ant1: 3.95dBi;					

4.2 Test Graph

4.2.1 PSD





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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)
1M	SISO	2402	1	0.85
		2440	1	1.16
		2480	1	1.10

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

5.1.2 CSE

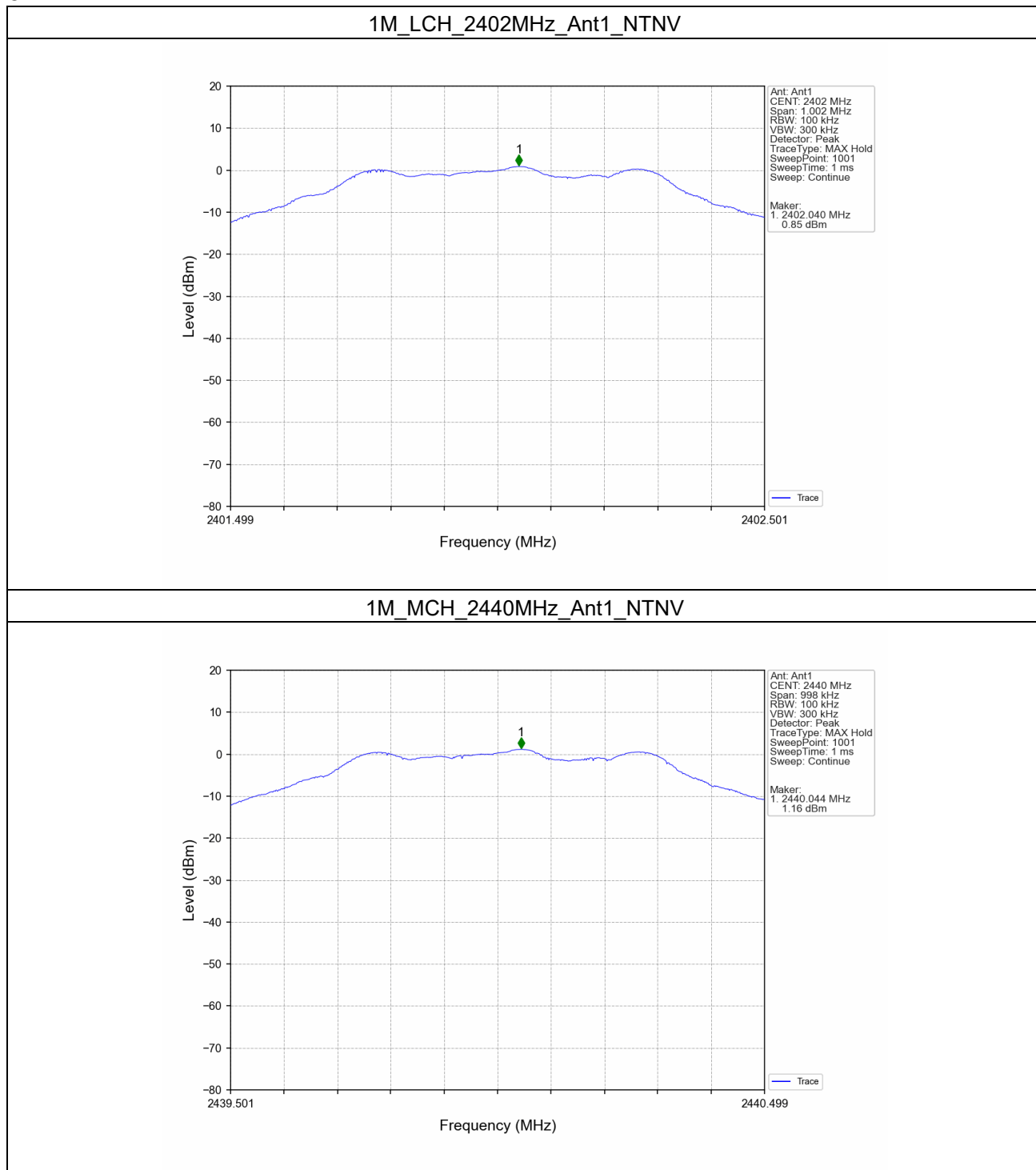
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	1.06	-18.94	Pass
		2440	1	1.06	-18.94	Pass
		2480	1	1.06	-18.94	Pass

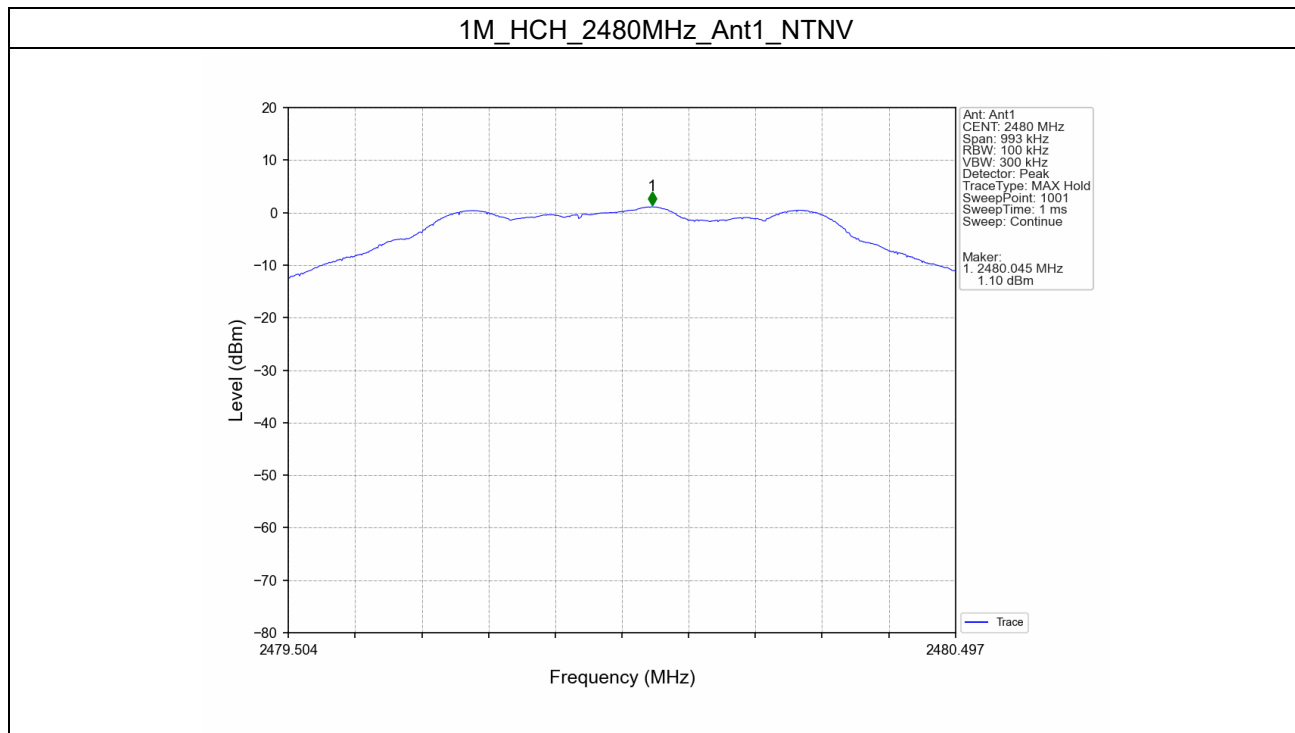
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.



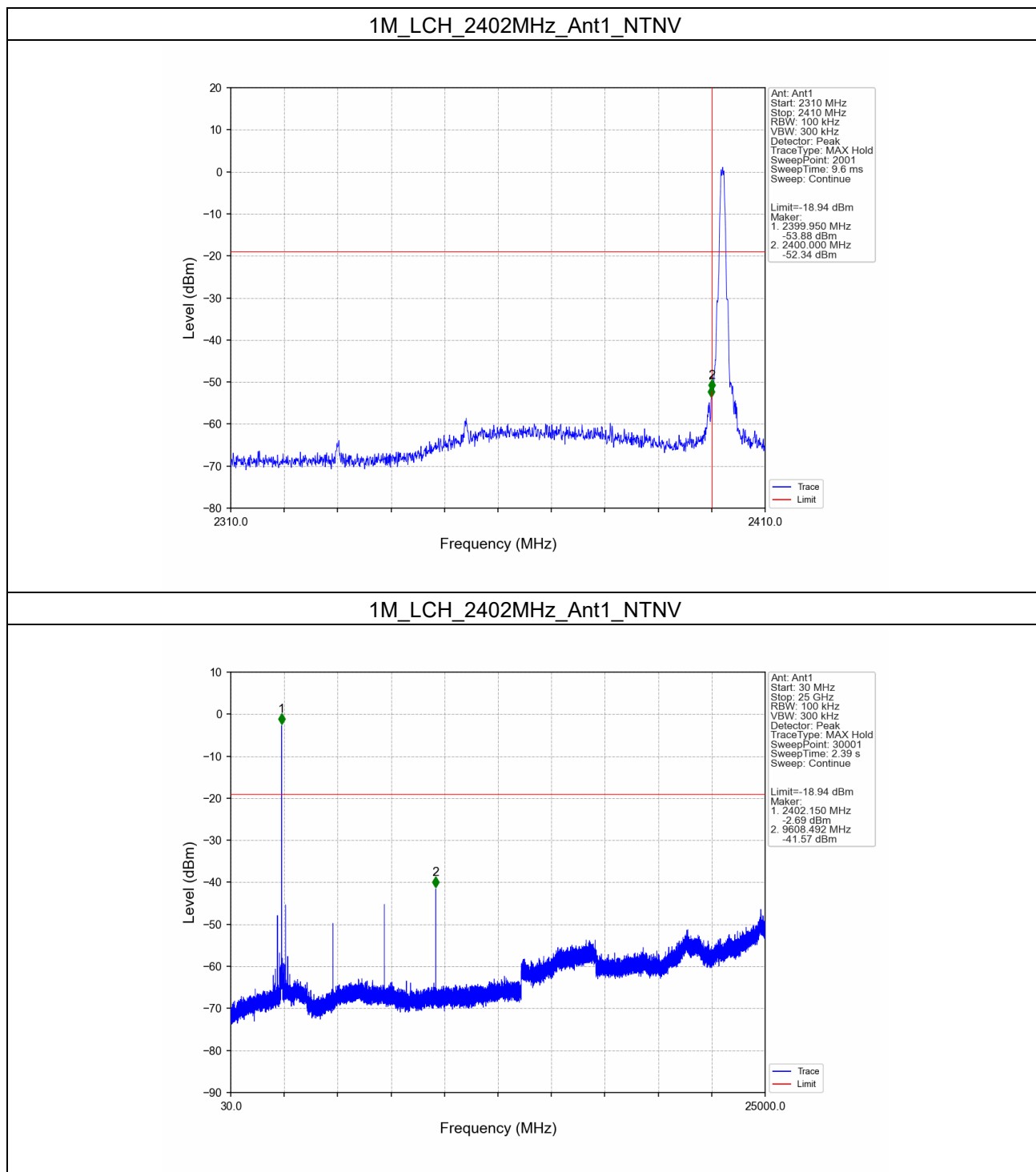
5.2 Test Graph

5.2.1 Ref





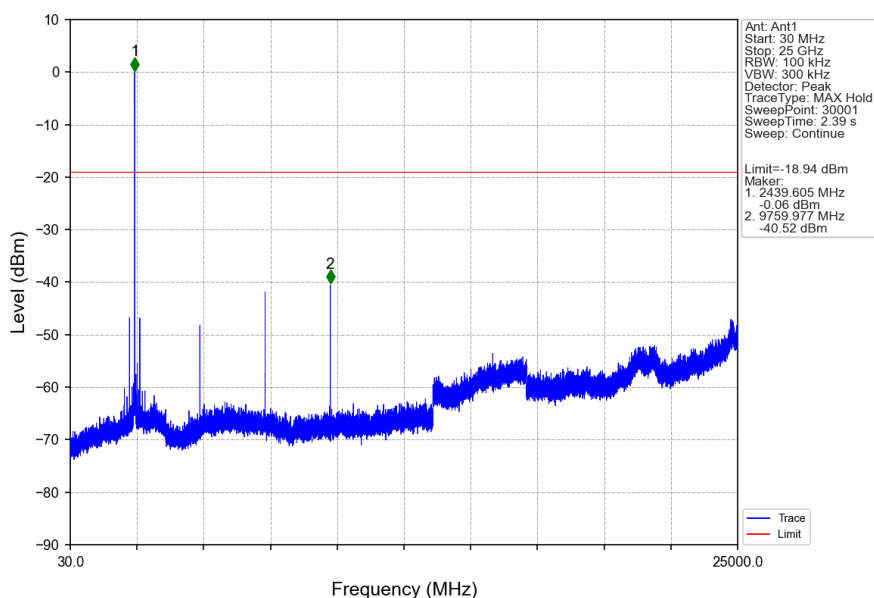
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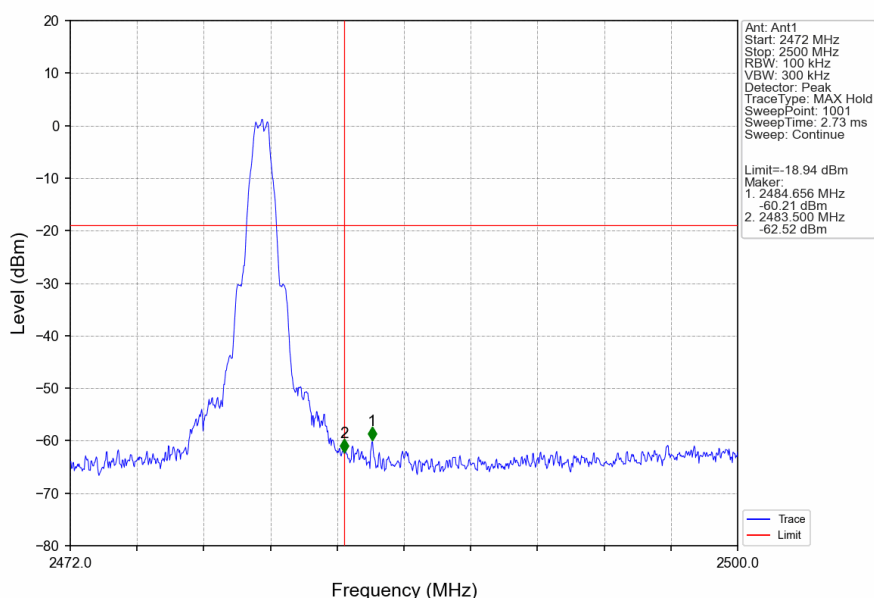
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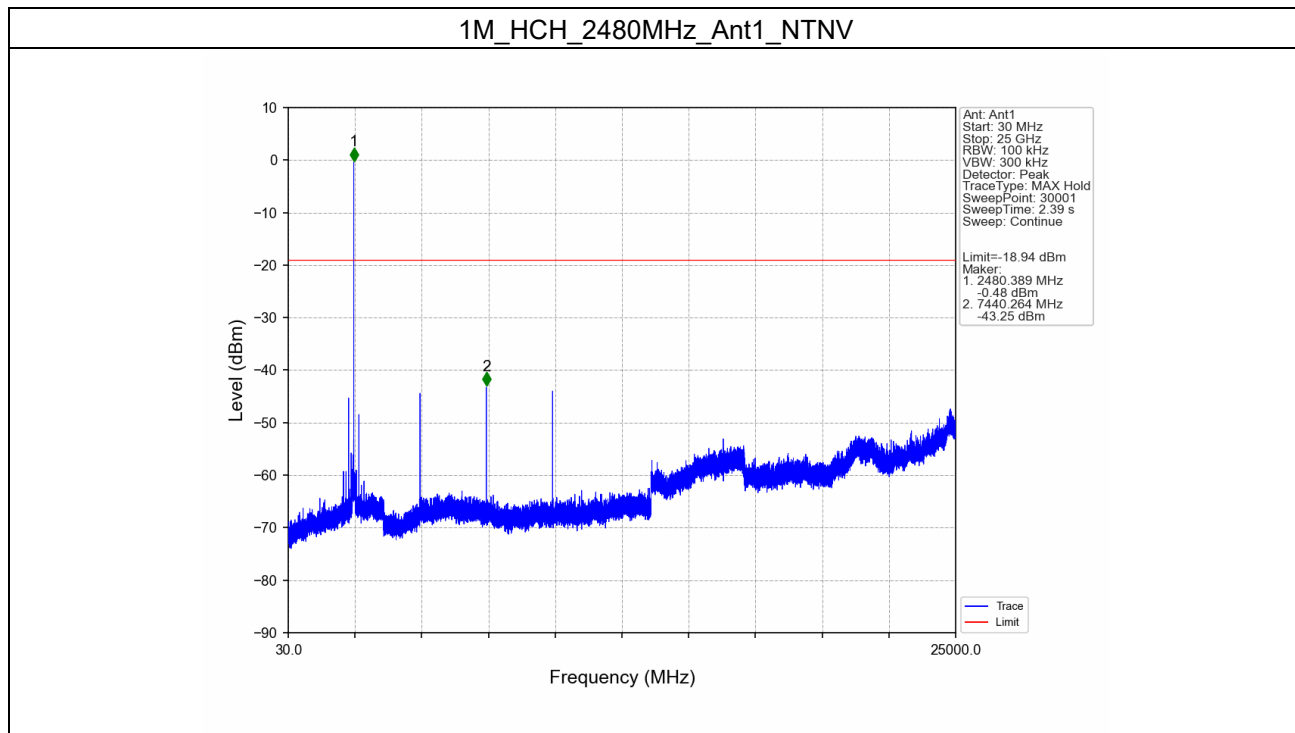
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1M_HCH_2480MHz_Ant1_NTNV





- End of the Report -