

TEST REPORT

Application No.: SZCR2603001139AT
Applicant: Minut, Inc.
Address of Applicant: 440 N Barranca Ave #8080, Covina, California 91723 United States
Manufacturer: Minut AB
Address of Manufacturer: Baltzarsgatan 23, 211 36 Malmö, Sweden
Factory: Scanfil Malmö AB
Address of Factory: Bronsyxegatan 6B, 213 75 Malmö, Sweden
Equipment Under Test (EUT):
EUT Name: Minut Home Sensor
Model No.: E1-N, MT-ID01
Trade Mark: Minut
FCC ID: 2AFXO-ID01
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2026-03-25
Date of Test: 2026-05-09 to 2026-06-02
Date of Issue: 2026-06-29

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 2 of 73

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2026-06-29		Original

Authorized for issue by:				
		Gebin Sun		
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		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 & 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



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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	11
6.1 Antenna Requirement	11
6.1.1 Test Requirement:	11
6.1.2 Conclusion	11
7 Radio Spectrum Matter Test Results	12
7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)	12
7.1.1 E.U.T. Operation	12
7.1.2 Test Mode Description	12
7.1.3 Test Setup Diagram	13
7.1.4 Measurement Procedure and Data	13
7.2 Radiated Emissions which fall in the restricted bands	16
7.2.1 E.U.T. Operation	16
7.2.2 Test Mode Description	16
7.2.3 Test Setup Diagram	17
7.2.4 Measurement Procedure and Data	18
7.3 Radiated Spurious Emissions Below 1GHz	23
7.3.1 E.U.T. Operation	23
7.3.2 Test Mode Description	24
7.3.3 Test Setup Diagram	24
7.3.4 Measurement Procedure and Data	25
7.4 Radiated Spurious Emissions Above 1GHz	32
7.4.1 E.U.T. Operation	32
7.4.2 Test Mode Description	32
7.4.3 Test Setup Diagram	33
7.4.4 Measurement Procedure and Data	33
7.5 Maximum Conducted Output Power	41
7.5.1 E.U.T. Operation	41



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 5 of 73

7.5.2	Test Mode Description	41
7.5.3	Test Setup Diagram	42
7.5.4	Measurement Procedure and Data.....	42
7.6	Minimum 6dB Bandwidth	43
7.6.1	E.U.T. Operation	43
7.6.2	Test Mode Description	43
7.6.3	Test Setup Diagram	43
7.6.4	Measurement Procedure and Data.....	43
7.7	Power Spectral Density	44
7.7.1	E.U.T. Operation	44
7.7.2	Test Mode Description	44
7.7.3	Test Setup Diagram	44
7.7.4	Measurement Procedure and Data.....	44
7.8	Conducted Band Edges Measurement	45
7.8.1	E.U.T. Operation	45
7.8.2	Test Mode Description	45
7.8.3	Test Setup Diagram	46
7.8.4	Measurement Procedure and Data.....	46
7.9	Conducted Spurious Emissions	47
7.9.1	E.U.T. Operation	47
7.9.2	Test Mode Description	47
7.9.3	Test Setup Diagram	48
7.9.4	Measurement Procedure and Data.....	48
8	Test Setup Photo	49
9	EUT Constructional Details (EUT Photos)	49
10	Appendix.....	50



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4 General Information

4.1 Details of E.U.T.

Power supply:	Input: AC85-240V, 50/60Hz or PoE or DC5V 500mA Max
Cable Loss (for RF conducted test):	0.7dB
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	4.31dBi

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	A1357	REF. No.SEA05A03C

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	$\pm 3.2\text{dB}$
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.: SZCR260300113902

Page: 7 of 73

4.4 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

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 Power Line (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	2025-12-15	2026-12-14
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	2026-02-24	2027-02-23

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
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2026-03-29	2029-03-28
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
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2026-03-21	2027-03-20
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	310N	SEM005-04	2026-02-02	2027-02-01



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 9 of 73

	Co				
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2026-11-19
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	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	2026-04-28	2027-04-27

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



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 10 of 73

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

15.203 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.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 4.31dBi.

Antenna location: Refer to internal photos



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7 Radio Spectrum Matter Test Results

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

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2020) Section 6.2

Test Engineer: Mason Wu

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: 23.4 °C

Humidity: 42.3 % RH

Atmospheric Pressure: 1015 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Pre-scan	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

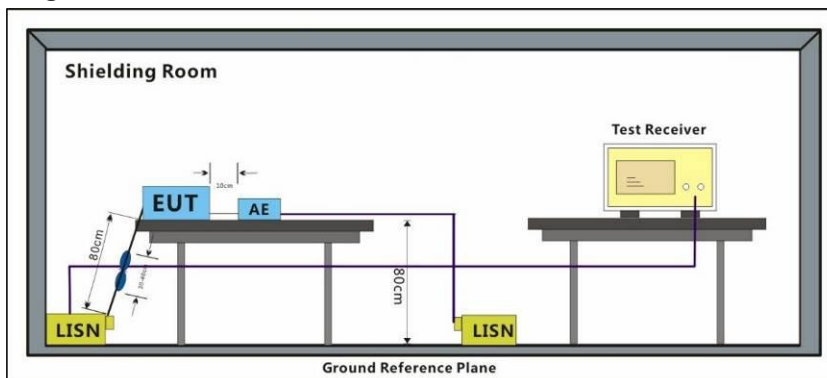

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7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

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

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

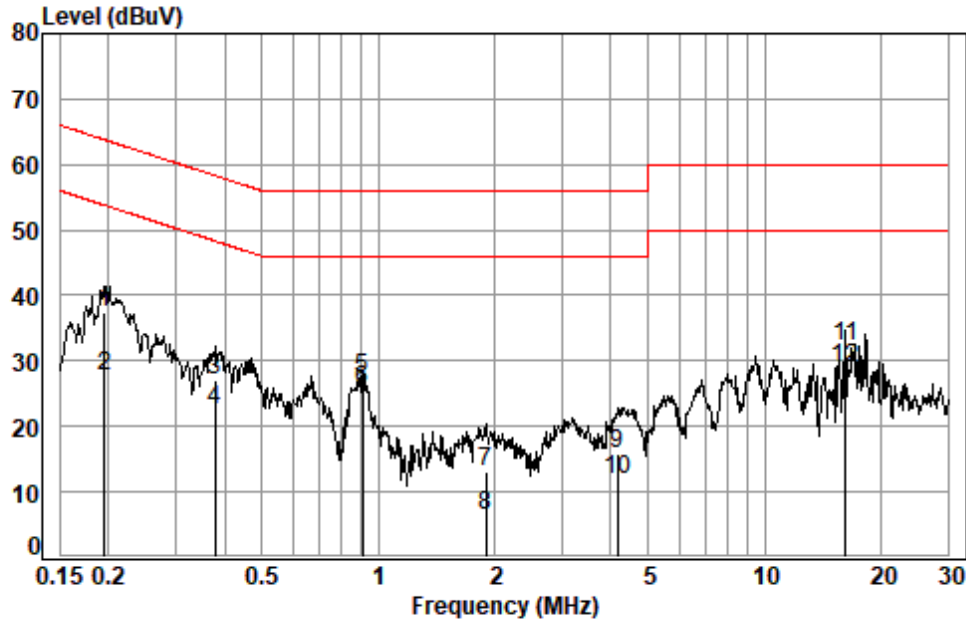
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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 14 of 73

Test Mode: 00; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 01439AT
Test mode: 00

		Cable	LISN	Read	Limit	Over	
	Freq	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB
1 *	0.1955	0.06	9.83	27.67	37.56	63.80	-26.24 QP
2	0.1955	0.06	9.83	17.70	27.59	53.80	-26.21 Average
3	0.3771	0.07	9.77	17.28	27.12	58.34	-31.22 QP
4	0.3771	0.07	9.77	12.68	22.52	48.34	-25.82 Average
5	0.9087	0.10	9.64	17.54	27.28	56.00	-28.72 QP
6 *	0.9087	0.10	9.64	15.89	25.63	46.00	-20.37 Average
7	1.8979	0.11	9.65	3.34	13.10	56.00	-42.90 QP
8	1.8979	0.11	9.65	-3.37	6.39	46.00	-39.61 Average
9	4.1575	0.13	9.66	6.13	15.92	56.00	-40.08 QP
10	4.1575	0.13	9.66	2.10	11.89	46.00	-34.11 Average
11	16.2256	0.29	9.63	22.23	32.15	60.00	-27.85 QP
12	16.2256	0.29	9.63	18.94	28.86	50.00	-21.14 Average



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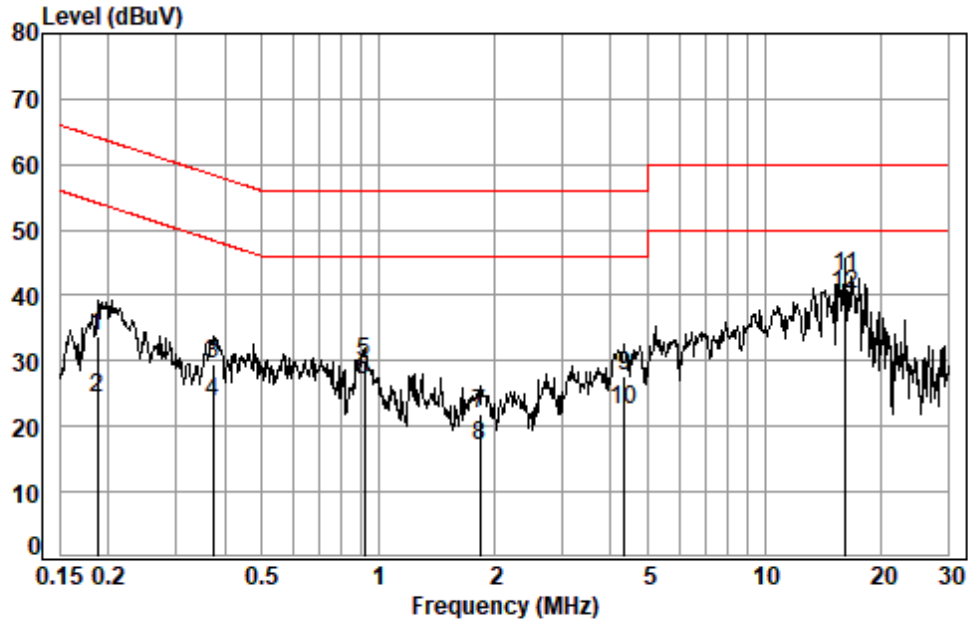
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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 15 of 73

Test Mode: 00; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 01439AT
Test mode: 00

	Freq	Cable Loss	LISN Factor	Read Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dB	
1	0.1874	0.06	9.85	23.98	33.89	64.15	QP
2	0.1874	0.06	9.85	14.31	24.22	54.15	Average
3	0.3731	0.07	9.74	19.74	29.55	58.43	QP
4	0.3731	0.07	9.74	13.92	23.73	48.43	Average
5	0.9233	0.10	9.61	20.01	29.72	56.00	QP
6	0.9233	0.10	9.61	17.39	27.10	46.00	Average
7	1.8288	0.11	9.63	12.22	21.96	56.00	QP
8	1.8288	0.11	9.63	7.30	17.04	46.00	Average
9	4.3376	0.13	9.65	17.75	27.53	56.00	QP
10	4.3376	0.13	9.65	12.74	22.52	46.00	Average
11 *	16.2256	0.29	9.62	32.96	42.87	60.00	QP
12 *	16.2256	0.29	9.62	30.14	40.05	50.00	Average



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 16 of 73

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 & 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.

7.2.1 E.U.T. Operation

Operating Environment:

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

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

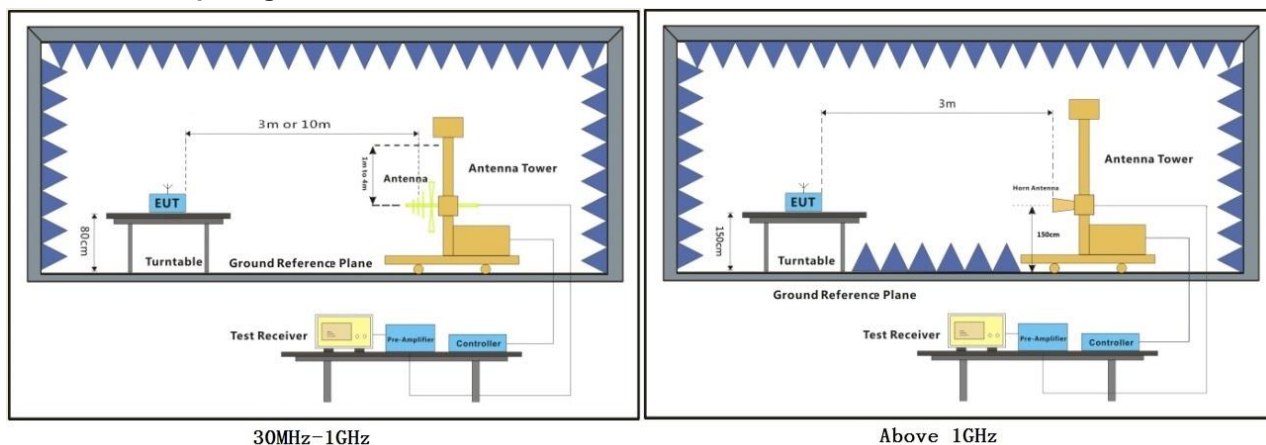


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7.2.3 Test Setup Diagram



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.



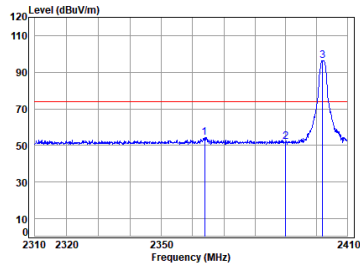
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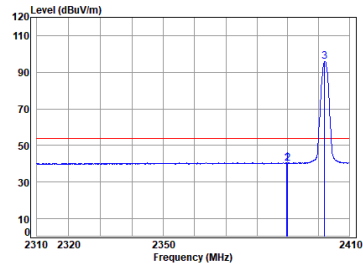
BLE_1M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT01140AT
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	2363.874	16.09	28.63	32.83	42.63	54.52	74.00	-19.48	Peak	0.00
2	2390.000	16.13	28.68	32.80	41.11	52.12	74.00	-21.88	Peak	0.00
3 p	2402.000	16.15	28.72	32.79	84.23	96.31	74.00	22.31	Peak	0.00

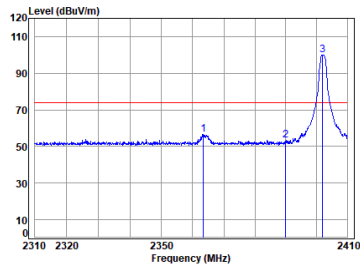
BLE_1M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT01140AT
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	2389.659	16.13	28.68	32.80	28.51	40.52	54.00	-13.48	Average	0.00
2	2390.000	16.13	28.68	32.80	28.89	40.10	54.00	-13.90	Average	0.00
3 q	2402.000	16.15	28.72	32.79	83.92	96.00	54.00	42.00	Average	0.00

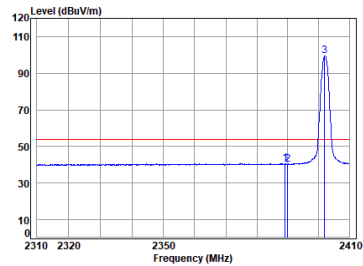
BLE_1M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT01140AT
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	2363.373	16.09	28.63	32.83	44.86	56.75	74.00	-17.25	Peak	0.00
2	2390.000	16.13	28.68	32.80	41.49	53.59	74.00	-20.50	Peak	0.00
3 p	2402.000	16.15	28.72	32.79	87.98	100.06	74.00	26.06	Peak	0.00

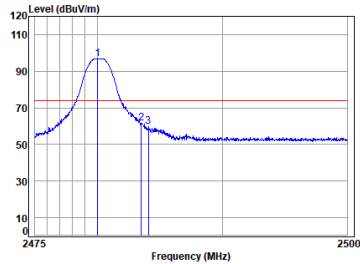
BLE_1M_TX_CH_00_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT01140AT
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	2389.153	16.13	28.68	32.81	28.67	40.67	54.00	-13.33	Average	0.00
2	2390.000	16.13	28.68	32.80	28.29	40.30	54.00	-13.70	Average	0.00
3 q	2402.000	16.15	28.72	32.79	87.60	99.68	54.00	45.68	Average	0.00

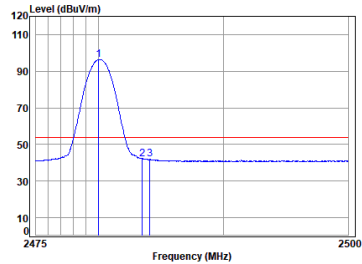
BLE_1M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
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	29.16	32.72	84.21	96.92	74.00	22.92	Peak	0.00
2 2483.500	16.28	29.17	32.72	48.87	61.60	74.00	-12.40	Peak	0.00
3 2484.071	16.28	29.17	32.72	47.01	59.74	74.00	-14.26	Peak	0.00

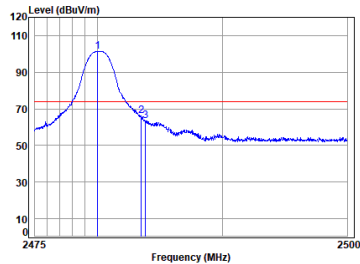
BLE_1M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
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	29.16	32.72	83.75	96.46	54.00	42.46	Average	0.00
2 2483.500	16.28	29.17	32.72	29.46	42.19	54.00	-11.81	Average	0.00
3 2484.096	16.28	29.17	32.72	29.39	42.12	54.00	-11.88	Average	0.00

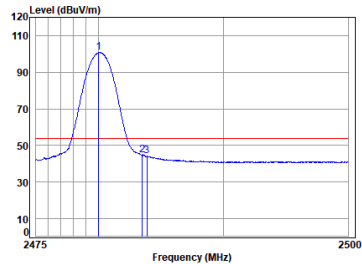
BLE_1M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
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	29.16	32.72	88.46	101.17	74.00	27.17	Peak	0.00
2 2483.500	16.28	29.17	32.72	53.58	66.31	74.00	-7.69	Peak	0.00
3 2483.821	16.28	29.17	32.72	50.90	63.63	74.00	-10.37	Peak	0.00

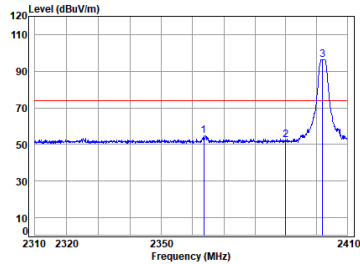
BLE_1M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
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	29.16	32.72	88.05	100.76	54.00	46.76	Average	0.00
2 2483.500	16.28	29.17	32.72	32.13	44.86	54.00	-9.14	Average	0.00
3 2483.871	16.28	29.17	32.72	31.39	44.12	54.00	-9.88	Average	0.00

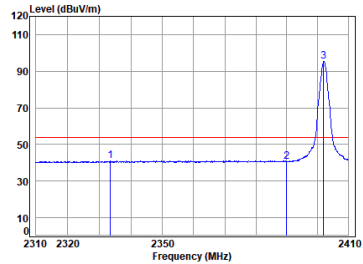
BLE_2M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1	2363.573	16.09	28.63	32.83	43.00	54.89	74.00	-19.11	Peak		0.00
2	2390.000	16.13	28.68	32.80	40.45	52.46	74.00	-21.54	Peak		0.00
3 p	2402.000	16.15	28.72	32.79	84.38	96.46	74.00	22.46	Peak		0.00

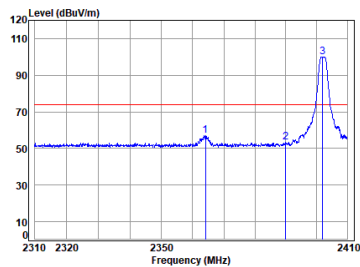
BLE_2M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1	2333.516	16.05	28.53	32.86	29.42	41.14	54.00	-12.86	Average		0.00
2	2390.000	16.13	28.68	32.80	28.57	40.58	54.00	-13.42	Average		0.00
3 q	2402.000	16.15	28.72	32.79	83.12	95.20	54.00	41.20	Average		0.00

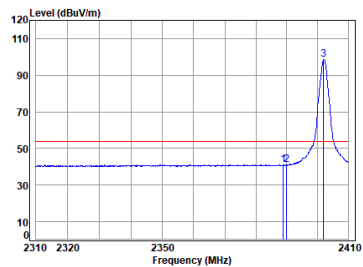
BLE_2M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1	2364.175	16.09	28.63	32.83	45.29	57.18	74.00	-16.82	Peak		0.00
2	2390.000	16.13	28.68	32.80	41.30	53.31	74.00	-20.69	Peak		0.00
3 p	2402.000	16.15	28.72	32.79	87.94	100.02	74.00	26.02	Peak		0.00

BLE_2M_TX_CH_00_Vertical-Avg

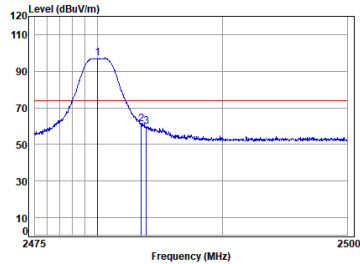


Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2402 Band edge
BLE

	Freq	Cable Loss	Factor	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	dB		dB
1	2388.850	16.13	28.68	32.81	29.19	41.19	54.00	-12.81	Average		0.00
2	2390.000	16.13	28.68	32.80	29.10	41.11	54.00	-12.89	Average		0.00
3 q	2402.000	16.15	28.72	32.79	86.61	98.69	54.00	44.69	Average		0.00



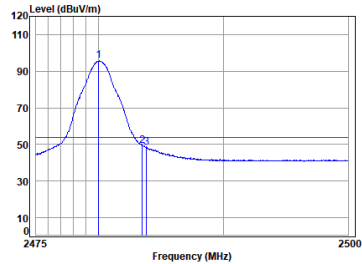
BLE_2M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
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	29.16	32.72	84.28	96.99	74.00	22.99	Peak	0.00
2 2483.500	16.28	29.17	32.72	48.27	61.00	74.00	-13.00	Peak	0.00
3 2483.896	16.28	29.17	32.72	47.12	59.85	74.00	-14.15	Peak	0.00

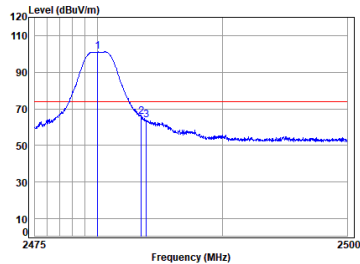
BLE_2M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
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	29.16	32.72	82.89	95.60	74.00	21.60	Average	0.00
2 2483.500	16.28	29.17	32.72	36.71	49.44	74.00	-24.56	Average	0.00
3 2483.821	16.28	29.17	32.72	35.82	48.55	74.00	-25.45	Average	0.00

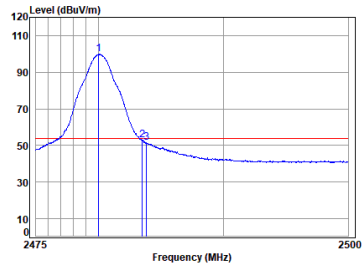
BLE_2M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
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	29.16	32.72	88.42	101.13	74.00	27.13	Peak	0.00
2 2483.500	16.28	29.17	32.72	52.85	65.58	74.00	-8.42	Peak	0.00
3 2483.896	16.28	29.17	32.72	51.19	63.92	74.00	-10.08	Peak	0.00

BLE_2M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
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	29.16	32.72	87.02	99.73	74.00	25.73	Average	0.00
2 2483.500	16.28	29.17	32.72	40.18	52.91	74.00	-21.09	Average	0.00
3 2483.821	16.28	29.17	32.72	38.72	51.45	74.00	-22.55	Average	0.00

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: 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).

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 42.5 % RH Atmospheric Pressure: 1015 mbar



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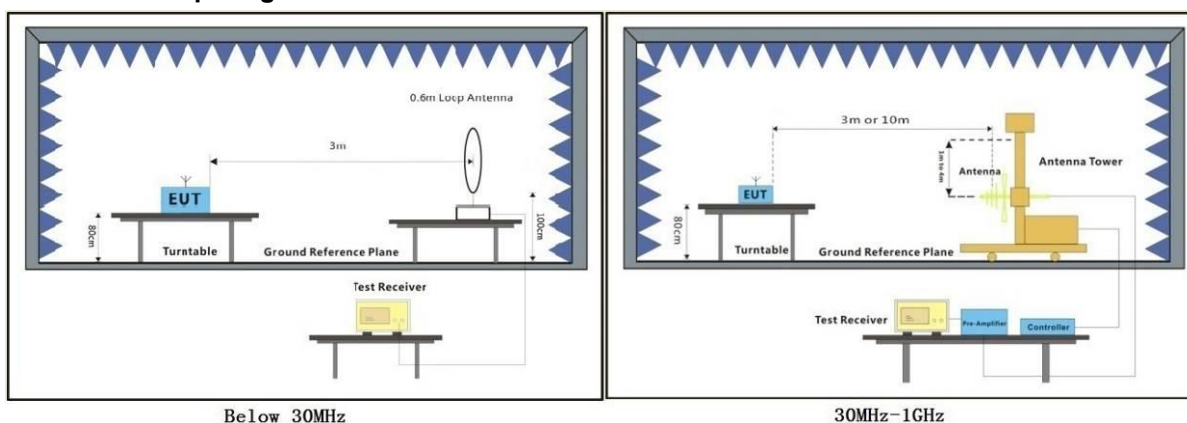
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7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
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 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. 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.
2. 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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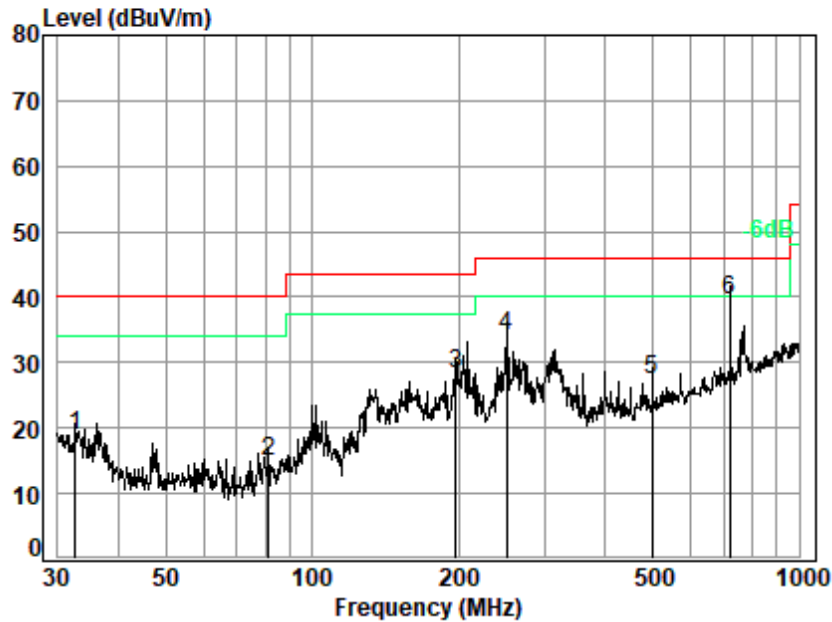
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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 26 of 73

Test Mode: 00; Polarity: Horizontal



Condition: 3m HORIZONTAL

Job No. : 01139AT

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	32.634	20.04	0.76	27.65	25.60	18.75	40.00	-21.25 QP
2	81.212	10.77	1.11	27.61	30.73	15.00	40.00	-25.00 QP
3	197.200	14.14	1.69	27.80	40.26	28.29	43.50	-15.21 QP
4	250.301	17.25	1.93	27.63	42.60	34.15	46.00	-11.85 QP
5	499.425	22.48	2.81	27.94	29.94	27.29	46.00	-18.71 QP
6 q	721.726	26.09	3.47	27.78	37.78	39.56	46.00	-6.44 QP



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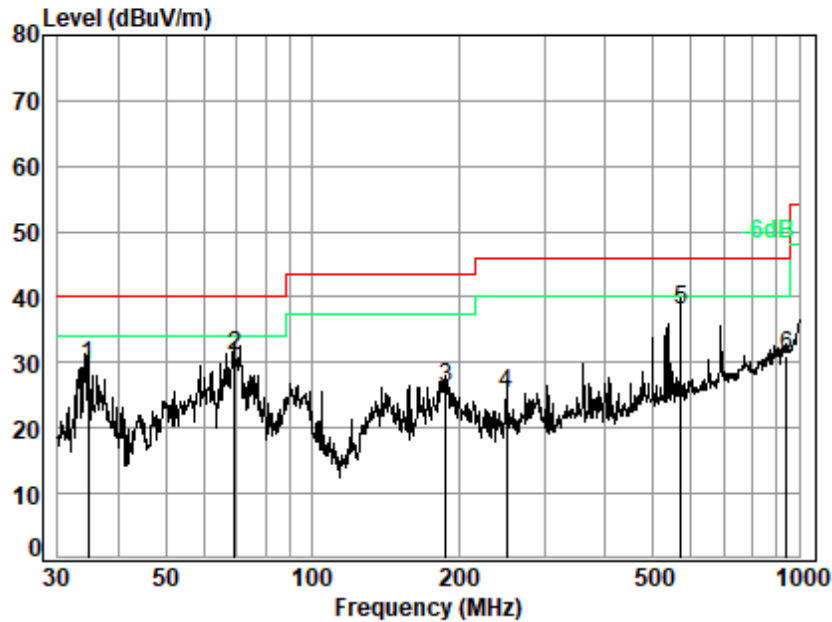
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Test Mode: 00; Polarity: Vertical



Condition: 3m VERTICAL

Job No. : 01139AT

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	34.639	18.87	0.78	27.65	37.50	29.50	40.00	-10.50 QP
2	69.114	10.58	0.98	27.62	47.14	31.08	40.00	-8.92 QP
3	188.413	14.38	1.66	27.78	37.84	26.10	43.50	-17.40 QP
4	250.301	17.25	1.93	27.63	33.70	25.25	46.00	-20.75 QP
5 q	570.610	23.35	3.02	28.06	39.67	37.98	46.00	-8.02 QP
6	942.131	29.01	4.06	26.72	24.63	30.98	46.00	-15.02 QP

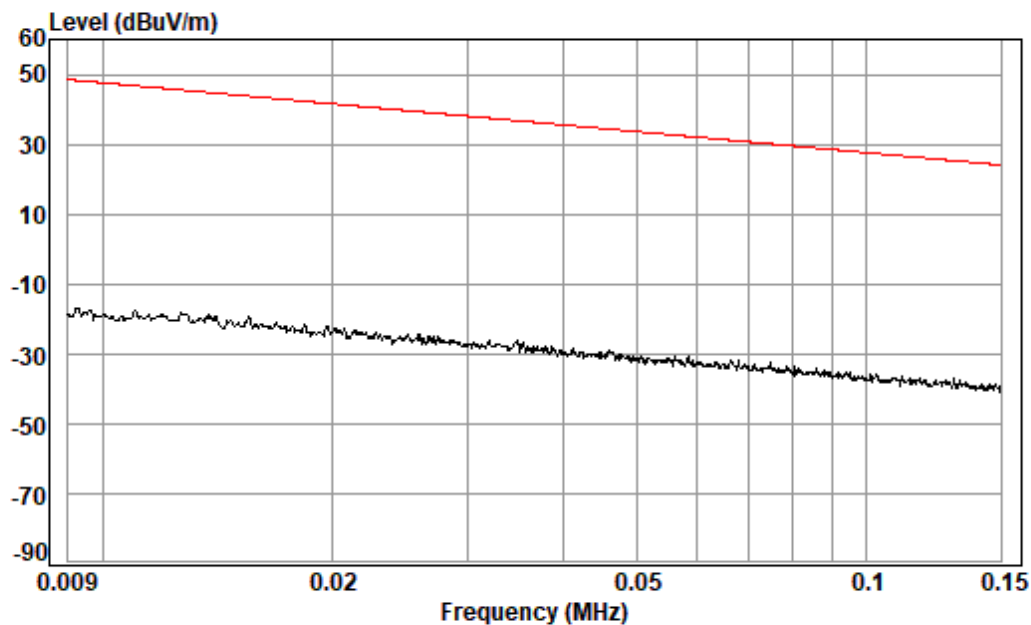


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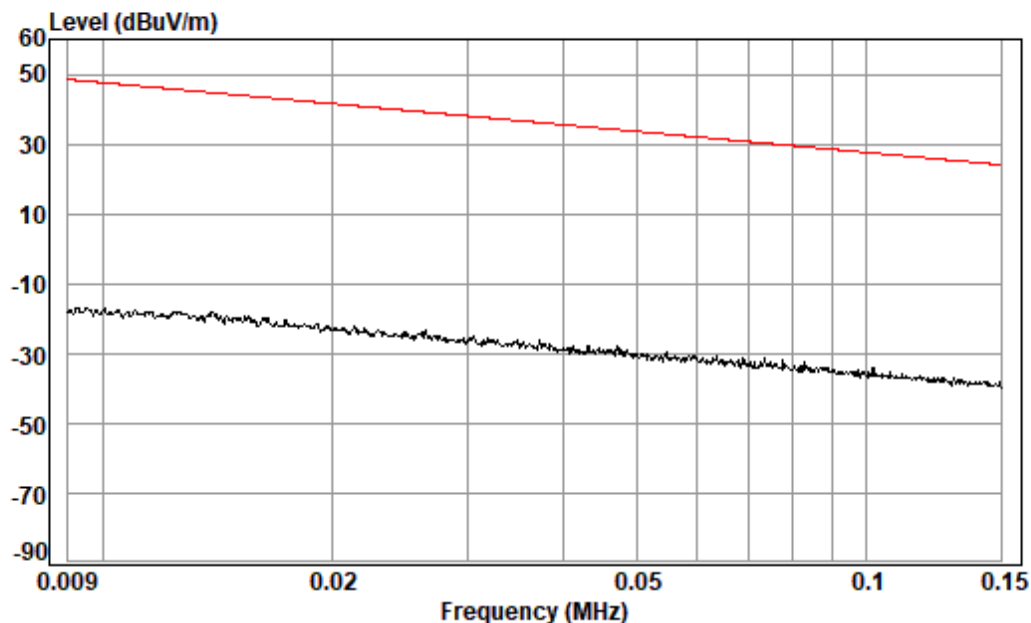


Condition: 3m
 Job No. : 01139AT
 Test Mode: 00
 : coaxial



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Condition: 3m
 Job No. : 01139AT
 Test Mode: 00
 : coplanar

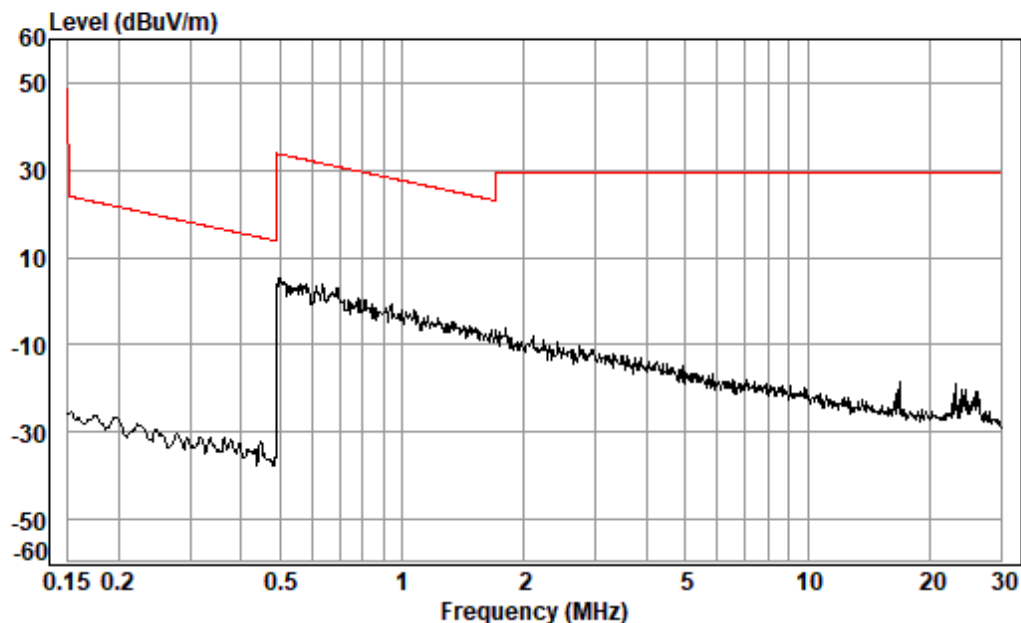


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Condition: 3m
 Job No. : 01139AT
 Test Mode: 00
 : coaxial

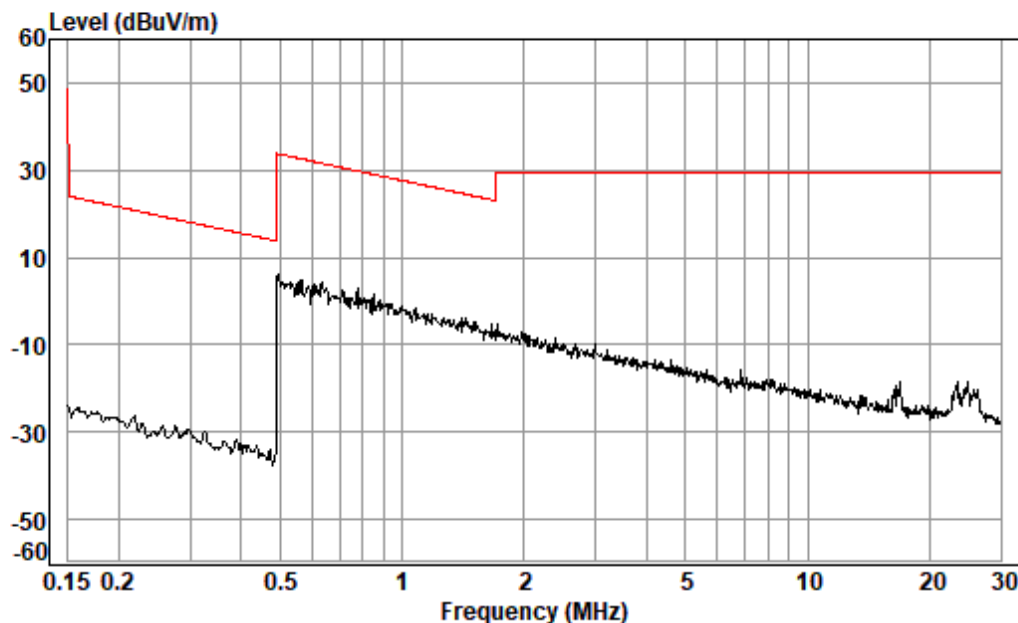


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Condition: 3m
 Job No. : 01139AT
 Test Mode: 00
 : coplanar



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 32 of 73

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 & 11.12
 Measurement Distance: 1m & 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).

7.4.1 E.U.T. Operation

Operating Environment:

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

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

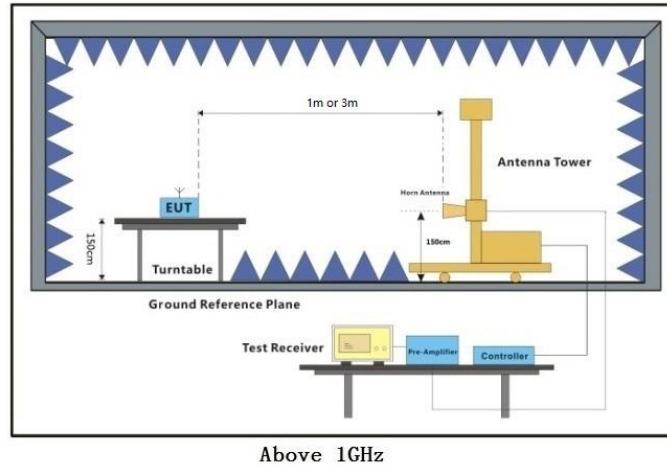


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7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

- 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.
- The interference-receiving antenna was mounted on the variable-height antenna tower, with its boresight facing the EUT throughout the test.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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:

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

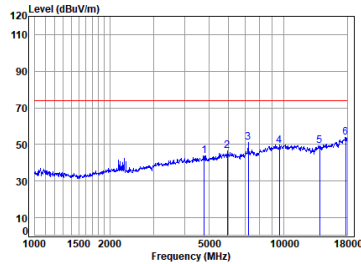


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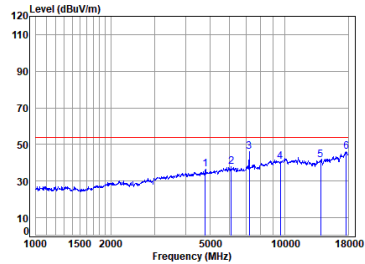
BLE_1M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2402 TX RSE
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 4804.000	7.41	33.75	54.19	56.83	43.88	74.00	-30.20	Peak	0.00
2 5932.638	8.83	34.90	53.35	56.23	46.61	74.00	-27.39	Peak	0.00
3 7206.000	8.50	36.25	53.33	59.69	51.11	74.00	-22.89	Peak	0.00
4 9608.000	10.74	37.90	53.20	53.93	49.37	74.00	-24.63	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.88	49.48	74.00	-24.52	Peak	0.00
6 p17741.740	11.35	43.97	52.58	51.16	53.90	74.00	-20.10	Peak	0.00

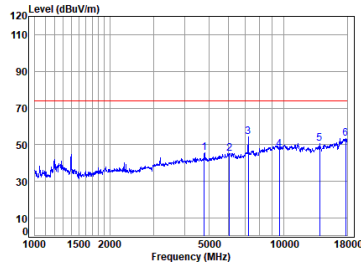
BLE_1M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2402 TX RSE
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 4804.000	7.41	33.75	54.19	49.61	36.58	54.00	-17.42	Average	0.00
2 6088.991	8.92	35.71	53.29	46.54	37.88	54.00	-16.12	Average	0.00
3 7206.000	8.50	36.25	53.33	54.51	45.93	54.00	-8.07	Average	0.00
4 9608.000	10.74	37.90	53.20	45.15	40.59	54.00	-13.41	Average	0.00
5 13957.530	10.97	39.53	53.90	41.60	41.60	54.00	-12.40	Average	0.00
6 q17690.530	11.32	44.21	52.59	43.35	46.29	54.00	-7.71	Average	0.00

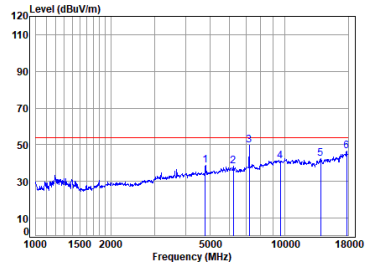
BLE_1M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2402 TX RSE
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 4804.000	7.41	33.75	54.19	58.77	45.74	74.00	-28.26	Peak	0.00
2 6053.004	8.92	35.43	53.29	54.30	45.36	74.00	-28.64	Peak	0.00
3 p 7206.000	8.50	36.25	53.33	62.67	54.09	74.00	-19.91	Peak	0.00
4 9608.000	10.74	37.90	53.20	51.94	47.38	74.00	-26.62	Peak	0.00
5 13957.530	10.97	39.53	53.90	50.59	50.59	74.00	-23.41	Peak	0.00
6 17741.740	11.35	43.97	52.58	50.73	53.47	74.00	-20.53	Peak	0.00

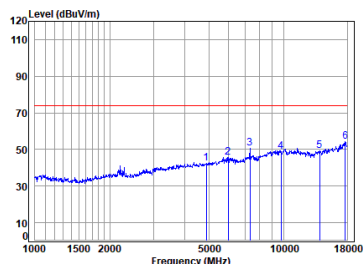
BLE_1M_TX_CH_00_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2402 TX RSE
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 4804.000	7.41	33.75	54.19	51.82	38.79	54.00	-15.21	Average	0.00
2 6213.441	8.91	35.57	53.28	47.30	38.50	54.00	-15.50	Average	0.00
3 q 7206.000	8.50	36.25	53.33	58.47	49.89	54.00	-4.11	Average	0.00
4 9608.000	10.74	37.90	53.20	45.60	41.04	54.00	-12.96	Average	0.00
5 13957.530	10.97	39.53	53.90	45.06	42.46	54.00	-11.54	Average	0.00
6 17741.740	11.35	43.97	52.58	43.58	46.32	54.00	-7.68	Average	0.00

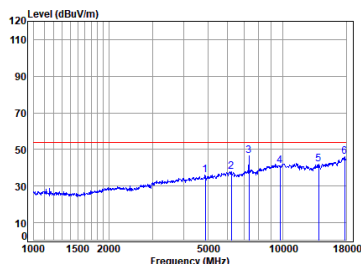
BLE_1M_TX_CH_19_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	54.75	42.31	74.00	-31.69	Peak	0.00
2 5984.305	8.91	35.11	53.31	54.81	45.52	74.00	-28.48	Peak	0.00
3 7320.000	8.46	36.00	53.40	59.39	50.45	74.00	-23.55	Peak	0.00
4 9760.000	10.69	37.74	53.00	53.46	48.81	74.00	-25.19	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.66	49.26	74.00	-24.74	Peak	0.00
6 p17690.530	11.32	44.21	52.59	51.34	54.28	74.00	-19.72	Peak	0.00

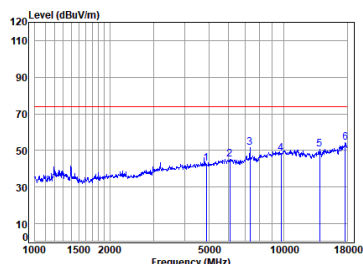
BLE_1M_TX_CH_19_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	48.45	36.01	54.00	-17.99	Average	0.00
2 6213.441	8.91	35.57	53.28	46.75	37.95	54.00	-16.05	Average	0.00
3 q 7320.000	8.46	36.00	53.40	55.47	46.53	54.00	-7.47	Average	0.00
4 9760.000	10.69	37.74	53.00	45.85	41.20	54.00	-12.80	Average	0.00
5 13957.530	10.97	39.53	53.90	45.23	41.83	54.00	-12.17	Average	0.00
6 17741.740	11.35	43.97	52.58	43.49	46.23	54.00	-7.77	Average	0.00

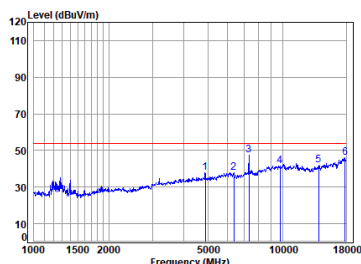
BLE_1M_TX_CH_19_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	55.52	43.08	74.00	-30.92	Peak	0.00
2 6071.417	8.92	35.57	53.29	54.01	45.21	74.00	-28.79	Peak	0.00
3 7320.000	8.46	36.00	53.40	60.62	51.68	74.00	-22.32	Peak	0.00
4 9760.000	10.69	37.74	53.00	53.06	48.41	74.00	-25.59	Peak	0.00
5 13957.530	10.97	39.53	53.90	54.08	50.68	74.00	-23.32	Peak	0.00
6 p17690.530	11.32	44.21	52.59	51.22	54.16	74.00	-19.84	Peak	0.00

BLE_1M_TX_CH_19_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	50.27	37.83	54.00	-16.17	Average	0.00
2 6358.789	8.89	35.39	53.26	46.87	37.89	54.00	-16.11	Average	0.00
3 q 7320.000	8.46	36.00	53.40	56.37	47.43	54.00	-6.57	Average	0.00
4 9760.000	10.69	37.74	53.00	45.95	41.30	54.00	-12.70	Average	0.00
5 13957.530	10.97	39.53	53.90	45.31	41.01	54.00	-12.09	Average	0.00
6 17844.590	11.41	43.54	52.55	43.76	46.16	54.00	-7.84	Average	0.00



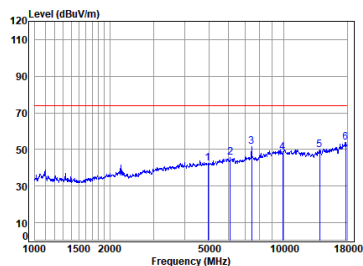
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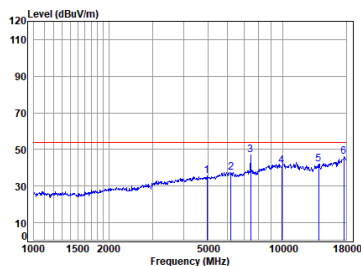
BLE_1M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	54.99	42.46	74.00	-31.54	Peak	0.00
2 6088.991	8.92	35.71	53.29	54.15	45.49	74.00	-28.51	Peak	0.00
3 7440.000	8.43	36.30	53.47	60.34	51.60	74.00	-22.40	Peak	0.00
4 9920.000	10.64	37.68	52.96	53.06	48.42	74.00	-25.58	Peak	0.00
5 13957.530	10.97	39.53	53.90	53.14	49.74	74.00	-24.26	Peak	0.00
6 p17741.740	11.35	43.97	52.58	51.18	53.92	74.00	-20.08	Peak	0.00

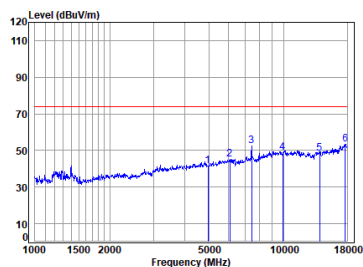
BLE_1M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	47.90	35.37	54.00	-18.63	Average	0.00
2 6195.508	8.91	35.62	53.28	46.29	37.54	54.00	-16.46	Average	0.00
3 q 7440.000	8.43	36.30	53.47	55.68	46.94	54.00	-7.06	Average	0.00
4 9920.000	10.64	37.68	52.96	45.51	48.87	54.00	-13.13	Average	0.00
5 13957.530	10.97	39.53	53.90	45.22	41.82	54.00	-12.18	Average	0.00
6 17639.470	11.28	43.70	52.61	43.55	45.92	54.00	-8.08	Average	0.00

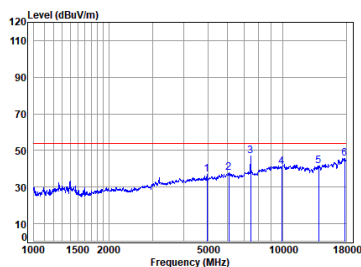
BLE_1M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	54.23	41.70	74.00	-32.30	Peak	0.00
2 6071.417	8.92	35.57	53.29	54.01	45.21	74.00	-28.79	Peak	0.00
3 7440.000	8.43	36.30	53.47	61.41	52.67	74.00	-21.33	Peak	0.00
4 9920.000	10.64	37.68	52.96	53.44	48.80	74.00	-25.20	Peak	0.00
5 13957.530	10.97	39.53	53.90	51.86	48.46	74.00	-25.54	Peak	0.00
6 p17690.530	11.32	44.21	52.59	50.59	53.53	74.00	-20.47	Peak	0.00

BLE_1M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	49.29	36.76	54.00	-17.24	Average	0.00
2 6071.417	8.92	35.57	53.29	46.69	37.89	54.00	-16.11	Average	0.00
3 q 7440.000	8.43	36.30	53.47	55.73	46.99	54.00	-7.01	Average	0.00
4 9920.000	10.64	37.68	52.96	45.81	41.17	54.00	-12.83	Average	0.00
5 13957.530	10.97	39.53	53.90	44.93	41.53	54.00	-12.47	Average	0.00
6 17741.740	11.35	43.97	52.58	43.09	45.83	54.00	-8.17	Average	0.00



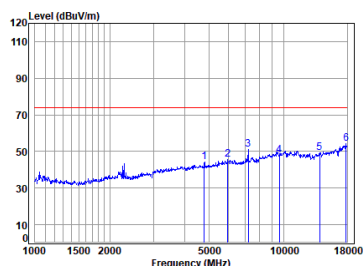
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Shenzhen Branch

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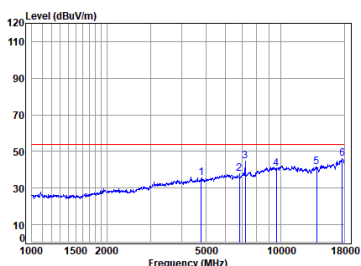
BLE_2M_TX_CH_00_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT/01140AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4804.000	7.41	33.75	54.19	57.06	44.03	74.00	-29.97	Peak	0.00
2 5949.811	8.86	34.90	53.34	54.98	45.40	74.00	-28.60	Peak	0.00
3 7206.000	8.50	36.25	53.33	59.49	50.91	74.00	-23.09	Peak	0.00
4 9600.000	10.74	37.90	53.20	52.36	47.80	74.00	-26.20	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.51	49.11	74.00	-24.89	Peak	0.00
6 p17793.090	11.38	43.56	52.56	51.91	54.29	74.00	-19.71	Peak	0.00

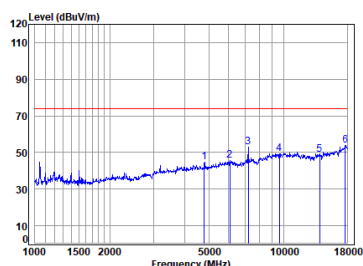
BLE_2M_TX_CH_00_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT/01140AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4804.000	7.41	33.75	54.19	48.43	35.40	54.00	-18.60	Average	0.00
2 5949.811	8.86	35.60	53.22	46.69	37.73	54.00	-16.27	Average	0.00
3 7206.000	8.50	36.25	53.33	53.39	44.81	54.00	-9.19	Average	0.00
4 9600.000	10.74	37.90	53.20	45.08	48.52	54.00	-13.48	Average	0.00
5 13957.530	10.97	39.53	53.90	45.13	41.75	54.00	-12.27	Average	0.00
6 q17690.530	11.32	44.21	52.59	43.11	46.05	54.00	-7.95	Average	0.00

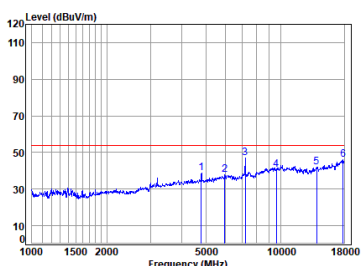
BLE_2M_TX_CH_00_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT/01140AT
Mode : 2402 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4804.000	7.41	33.75	54.19	57.86	44.83	74.00	-29.17	Peak	0.00
2 5949.811	8.92	35.57	53.29	54.35	45.55	74.00	-28.45	Peak	0.00
3 7206.000	8.50	36.25	53.33	61.48	52.90	74.00	-21.10	Peak	0.00
4 9600.000	10.74	37.90	53.20	53.75	49.19	74.00	-24.61	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.31	48.91	74.00	-25.09	Peak	0.00
6 p17690.530	11.32	44.21	52.59	50.90	53.84	74.00	-20.16	Peak	0.00

BLE_2M_TX_CH_00_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT/01140AT
Mode : 2402 TX RSE
BLE

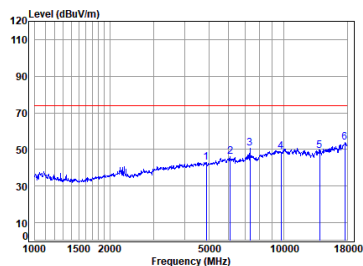
Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4804.000	7.41	33.75	54.19	51.85	38.82	54.00	-15.18	Average	0.00
2 5949.811	8.86	34.90	53.34	47.27	37.69	54.00	-16.31	Average	0.00
3 q 7206.000	8.50	36.25	53.33	55.63	47.05	54.00	-6.95	Average	0.00
4 9600.000	10.74	37.90	53.20	45.02	40.46	54.00	-13.54	Average	0.00
5 13957.530	10.97	39.53	53.90	45.30	41.90	54.00	-12.10	Average	0.00
6 17844.590	11.41	43.54	52.55	43.64	46.04	54.00	-7.96	Average	0.00



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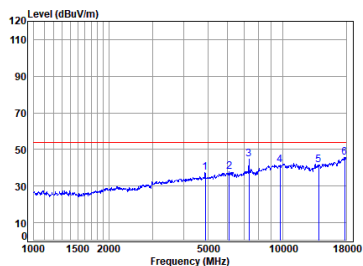
BLE_2M_TX_CH_19_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamplifier	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	55.53	43.09	74.00	-30.91	Peak	0.00
2 6088.991	8.92	35.71	53.29	54.83	46.17	74.00	-27.83	Peak	0.00
3 7320.000	8.46	36.00	53.40	59.73	50.79	74.00	-23.21	Peak	0.00
4 9760.000	10.69	37.74	53.00	53.35	48.70	74.00	-25.30	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.66	49.26	74.00	-24.74	Peak	0.00
6 p17639.470	11.28	43.70	52.61	51.37	53.74	74.00	-20.26	Peak	0.00

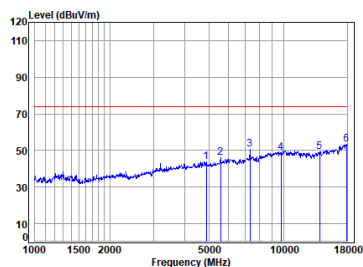
BLE_2M_TX_CH_19_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamplifier	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	49.68	37.24	54.00	-16.76	Average	0.00
2 6088.991	8.92	35.71	53.29	46.38	37.72	54.00	-16.28	Average	0.00
3 7320.000	8.46	36.00	53.40	53.82	44.88	54.00	-9.12	Average	0.00
4 9760.000	10.69	37.74	53.00	45.98	41.33	54.00	-12.67	Average	0.00
5 13957.530	10.97	39.53	53.90	45.84	41.64	54.00	-12.36	Average	0.00
6 q17741.740	11.35	43.97	52.58	43.04	45.78	54.00	-8.22	Average	0.00

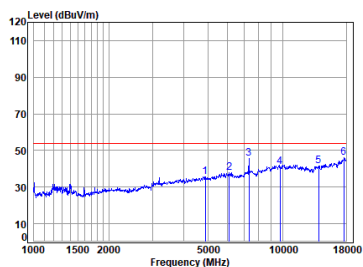
BLE_2M_TX_CH_19_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamplifier	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	56.37	43.93	74.00	-30.07	Peak	0.00
2 5583.251	8.29	35.00	53.62	56.39	46.06	74.00	-27.94	Peak	0.00
3 7320.000	8.46	36.00	53.40	59.36	50.42	74.00	-23.58	Peak	0.00
4 9760.000	10.69	37.74	53.00	53.54	48.89	74.00	-25.11	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.63	49.23	74.00	-24.77	Peak	0.00
6 p17896.250	11.44	43.60	52.53	50.77	53.28	74.00	-20.72	Peak	0.00

BLE_2M_TX_CH_19_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT\01140AT
Mode : 2440 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamplifier	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4880.000	7.47	34.24	54.15	47.84	35.40	54.00	-18.60	Average	0.00
2 6088.991	8.92	35.71	53.29	46.43	37.77	54.00	-16.23	Average	0.00
3 7320.000	8.46	36.00	53.40	54.61	45.67	54.00	-8.33	Average	0.00
4 9760.000	10.69	37.74	53.00	45.75	41.10	54.00	-12.90	Average	0.00
5 13957.530	10.97	39.53	53.90	44.83	41.43	54.00	-12.57	Average	0.00
6 q17639.470	11.28	43.70	52.61	43.56	45.93	54.00	-8.07	Average	0.00



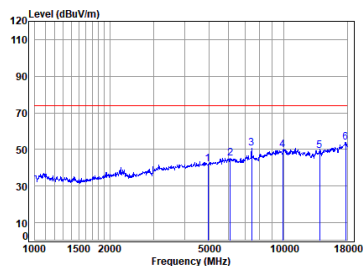
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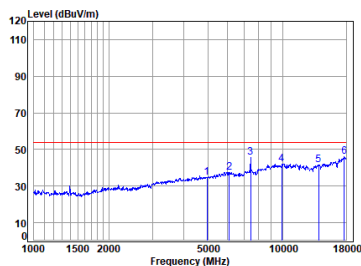
BLE_2M_TX_CH_39_Horizontal-Peak



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	54.56	42.03	74.00	-31.97	Peak	0.00
2 6088.991	8.92	35.71	53.29	53.86	45.20	74.00	-28.80	Peak	0.00
3 7440.000	8.43	36.30	53.47	59.28	50.54	74.00	-23.46	Peak	0.00
4 9920.000	10.64	37.68	52.96	54.26	49.62	74.00	-24.38	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.90	49.59	74.00	-24.50	Peak	0.00
6 p17741.740	11.35	43.97	52.58	51.32	54.06	74.00	-19.94	Peak	0.00

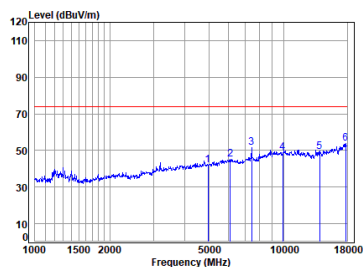
BLE_2M_TX_CH_39_Horizontal-Avg



Site : chamber
Condition: 3m HORIZONTAL
Job No : 01139AT01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	47.21	34.68	54.00	-19.32	Average	0.00
2 6106.616	8.92	35.80	53.29	46.08	37.51	54.00	-16.49	Average	0.00
3 7440.000	8.43	36.30	53.47	54.24	45.50	54.00	-8.50	Average	0.00
4 9920.000	10.64	37.68	52.96	46.53	41.89	54.00	-12.11	Average	0.00
5 13957.530	10.97	39.53	53.90	44.75	41.35	54.00	-12.65	Average	0.00
6 q17690.530	11.32	44.21	52.59	42.95	45.89	54.00	-8.11	Average	0.00

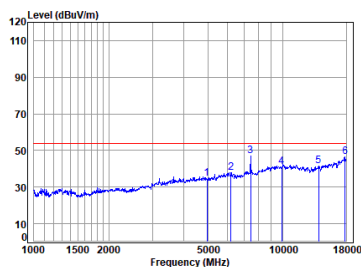
BLE_2M_TX_CH_39_Vertical-Peak



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	54.71	42.18	74.00	-31.82	Peak	0.00
2 6106.616	8.92	35.80	53.29	53.83	45.26	74.00	-28.74	Peak	0.00
3 7440.000	8.43	36.30	53.47	60.42	51.68	74.00	-22.32	Peak	0.00
4 9920.000	10.64	37.68	52.96	53.34	48.70	74.00	-25.30	Peak	0.00
5 13957.530	10.97	39.53	53.90	52.88	49.48	74.00	-24.52	Peak	0.00
6 p17741.740	11.35	43.97	52.58	51.01	53.75	74.00	-20.25	Peak	0.00

BLE_2M_TX_CH_39_Vertical-Avg



Site : chamber
Condition: 3m VERTICAL
Job No : 01139AT01140AT
Mode : 2480 TX RSE
BLE

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over	Remark	Aux Factor
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		dB
1 4960.000	7.53	34.06	54.12	47.20	34.67	54.00	-19.33	Average	0.00
2 6195.508	8.91	35.62	53.28	46.63	37.88	54.00	-16.12	Average	0.00
3 q 7440.000	8.43	36.30	53.47	55.55	46.81	54.00	-7.19	Average	0.00
4 9920.000	10.64	37.68	52.96	45.48	40.84	54.00	-13.16	Average	0.00
5 13957.530	10.97	39.53	53.90	45.13	41.73	54.00	-12.27	Average	0.00
6 17844.590	11.41	43.54	52.55	44.06	46.46	54.00	-7.54	Average	0.00



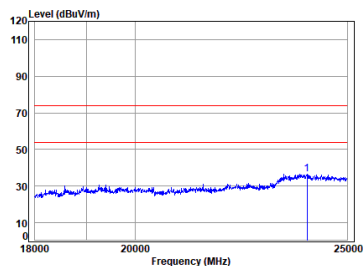
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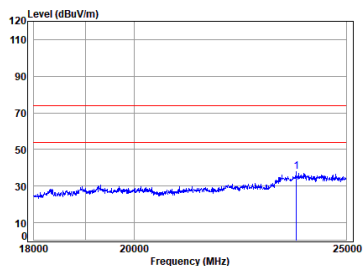
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BLE_1M_TX_CH_19_Horizontal-Peak



BLE_1M_TX_CH_19_Vertical-Peak



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 41 of 73

7.5 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

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 1015 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.



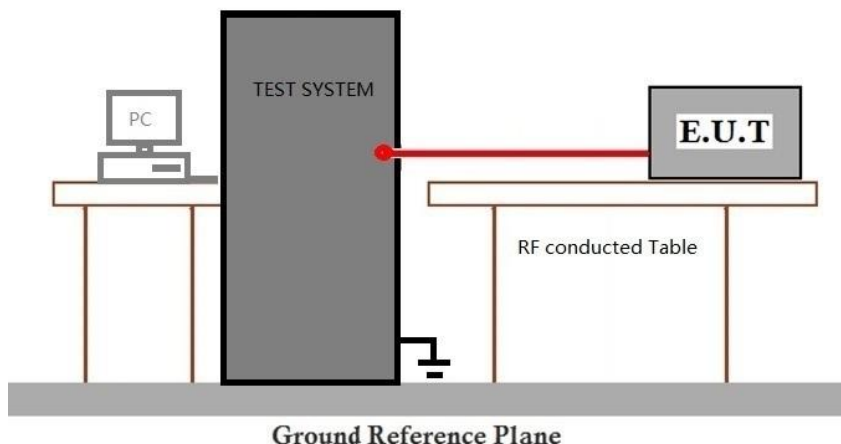
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7.5.3 Test Setup Diagram



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

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: Mingli Hu

Limit:
 ≥500 kHz

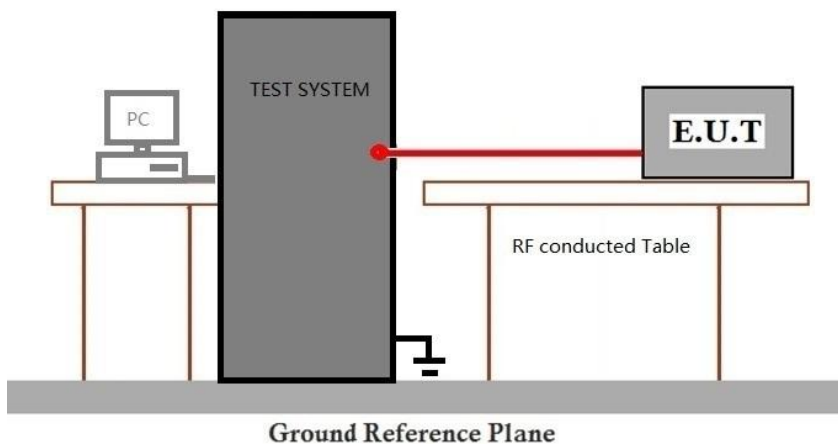
7.6.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.3 °C Humidity: 51.1 % RH Atmospheric Pressure: 1015 mbar

7.6.2 Test Mode Description

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

Please Refer to Appendix for Details



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7.7 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

7.7.1 E.U.T. Operation

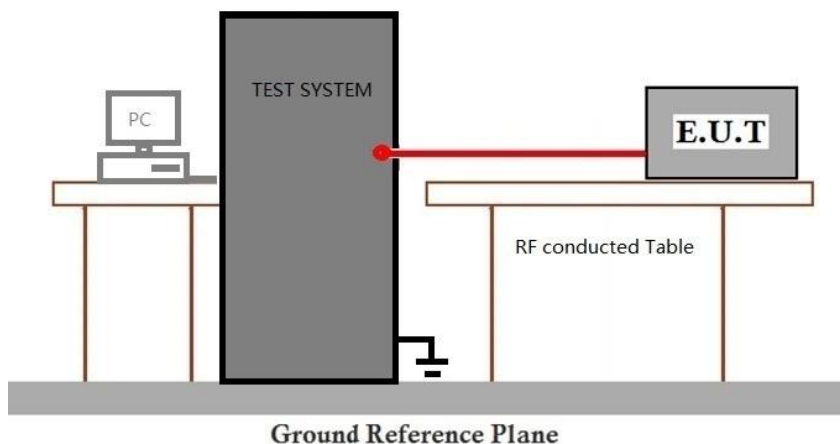
Operating Environment:

Temperature: 23.3 °C Humidity: 51.1 % RH Atmospheric Pressure: 1015 mbar

7.7.2 Test Mode Description

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

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 51.1 % RH Atmospheric Pressure: 1015 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

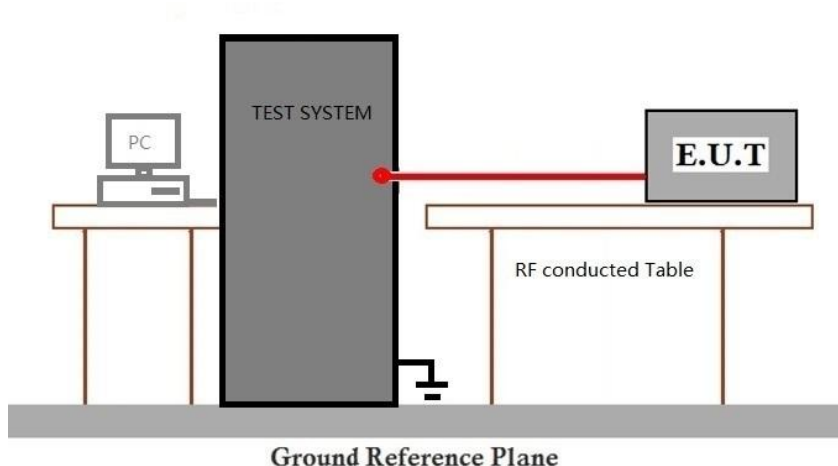


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7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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SZEMC-TRF-01 Rev. A/2

Report No.: SZCR260300113902

Page: 47 of 73

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: 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).

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 51.1 % RH Atmospheric Pressure: 1015 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	01	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

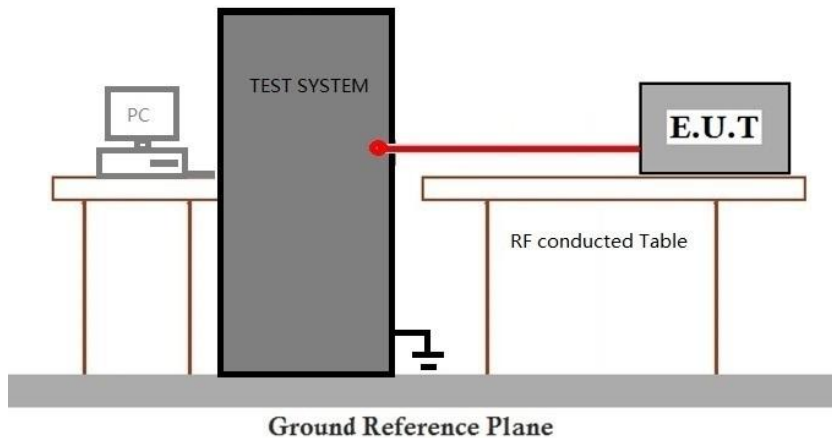


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7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2603001139AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2603001139AT



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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 (%)
1M	SISO	2402	0.394	0.625	63.04	2.00	0.31
		2440	0.394	0.625	63.04	2.00	0.27
		2480	0.394	0.625	63.04	2.00	0.33
2M	SISO	2402	0.209	0.625	33.44	4.76	0.38
		2440	0.209	0.625	33.44	4.76	0.35
		2480	0.209	0.625	33.44	4.76	0.35



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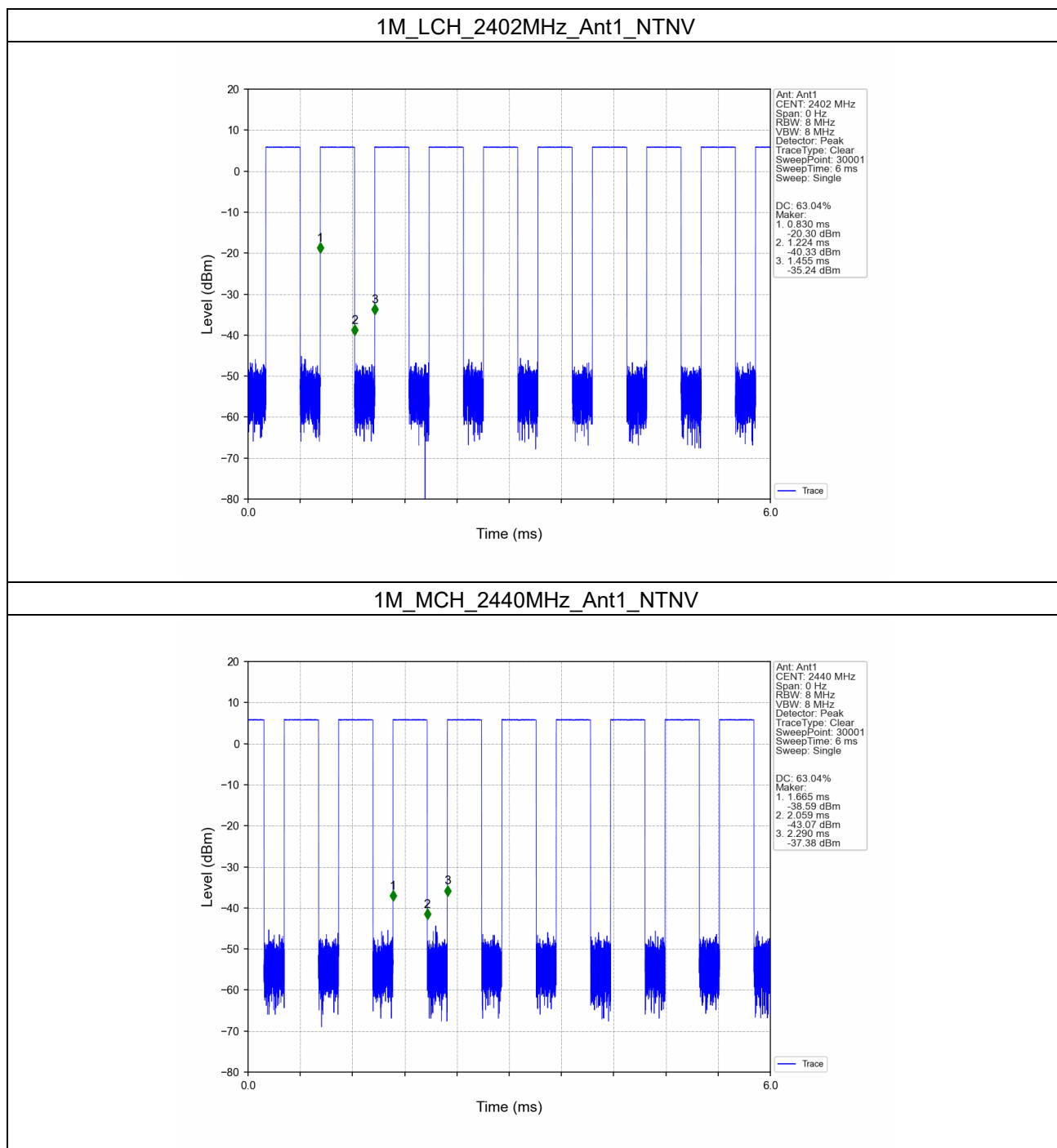
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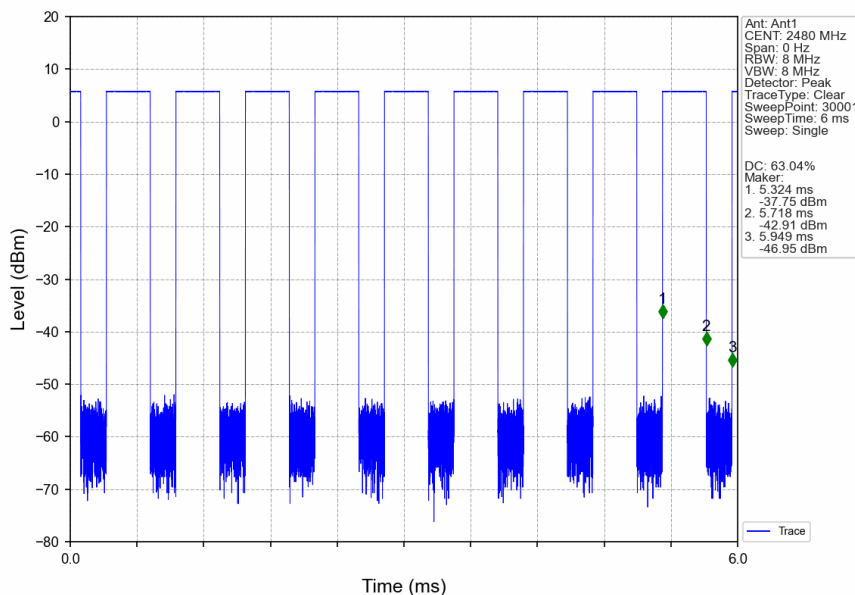
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1.2 Test Graph

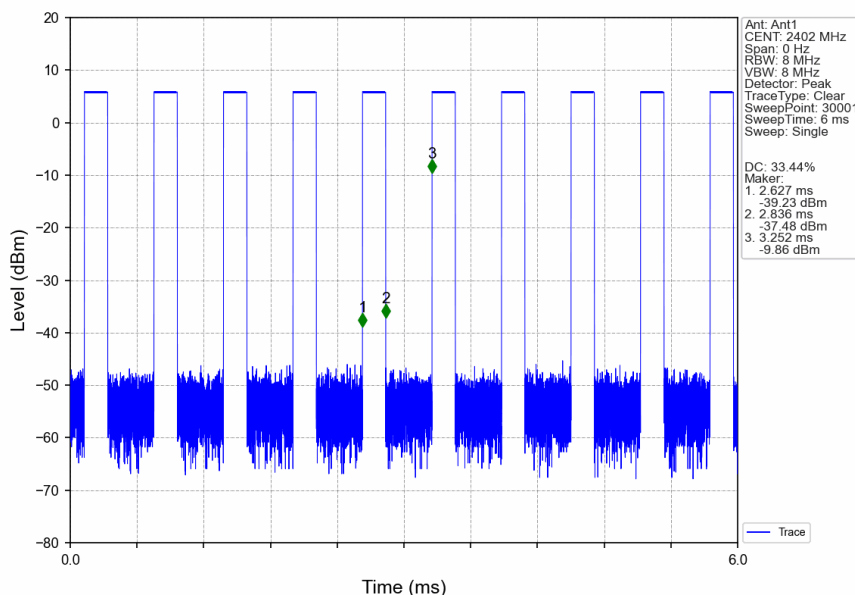
1.2.1 Ant1



1M_HCH_2480MHz_Ant1_NTNV



2M_LCH_2402MHz_Ant1_NTNV

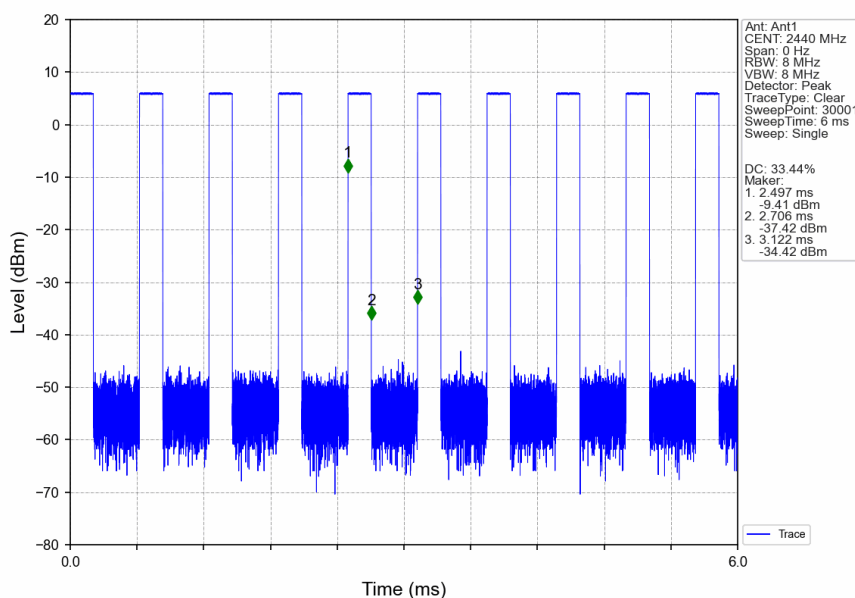


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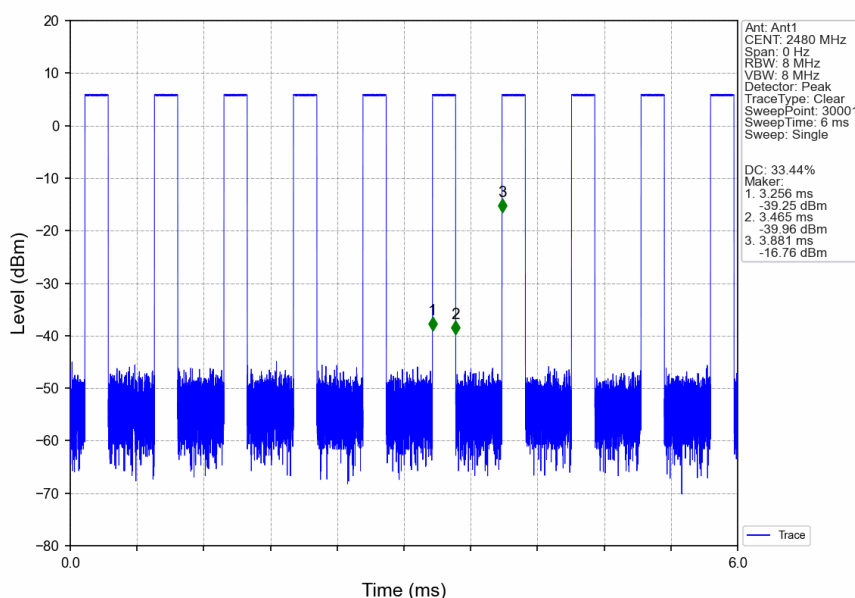
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2M_MCH_2440MHz_Ant1_NTNV



2M_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	1.015	/	Pass
		2440	1	1.015	/	Pass
		2480	1	1.016	/	Pass
2M	SISO	2402	1	2.025	/	Pass
		2440	1	2.025	/	Pass
		2480	1	2.024	/	Pass

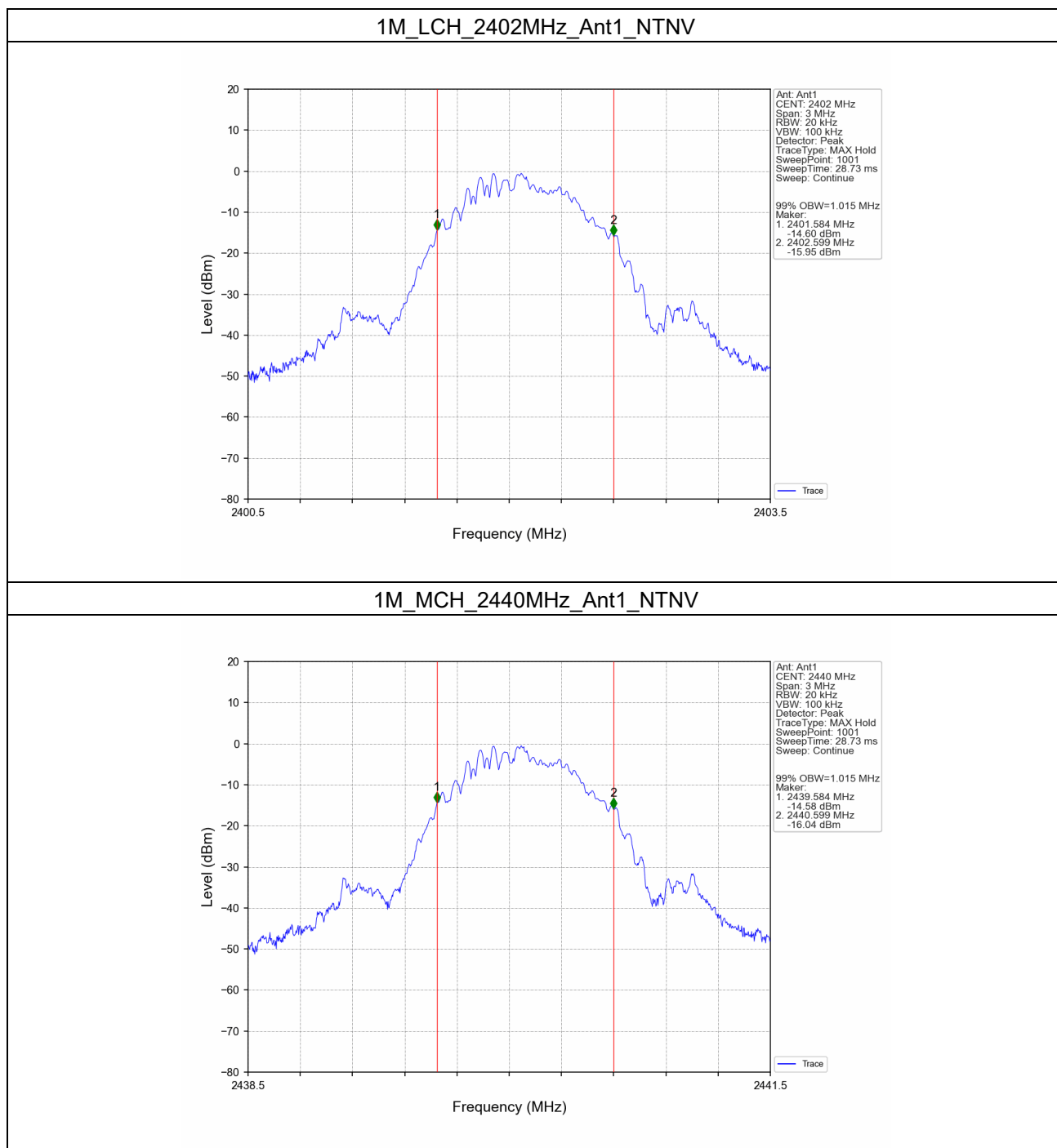
2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.656	≥ 0.5	Pass
		2440	1	0.655	≥ 0.5	Pass
		2480	1	0.651	≥ 0.5	Pass
2M	SISO	2402	1	1.165	≥ 0.5	Pass
		2440	1	1.190	≥ 0.5	Pass
		2480	1	1.175	≥ 0.5	Pass



2.2 Test Graph

2.2.1 OBW



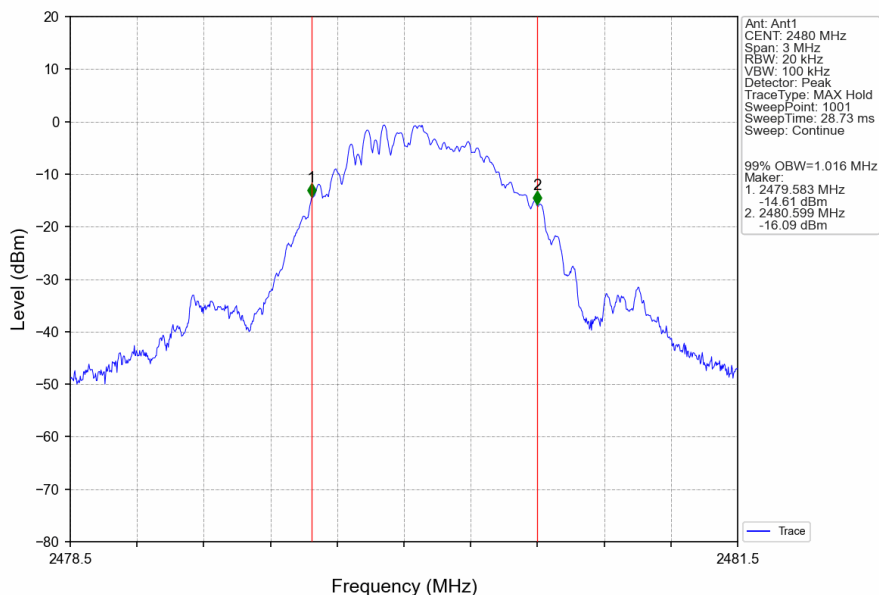
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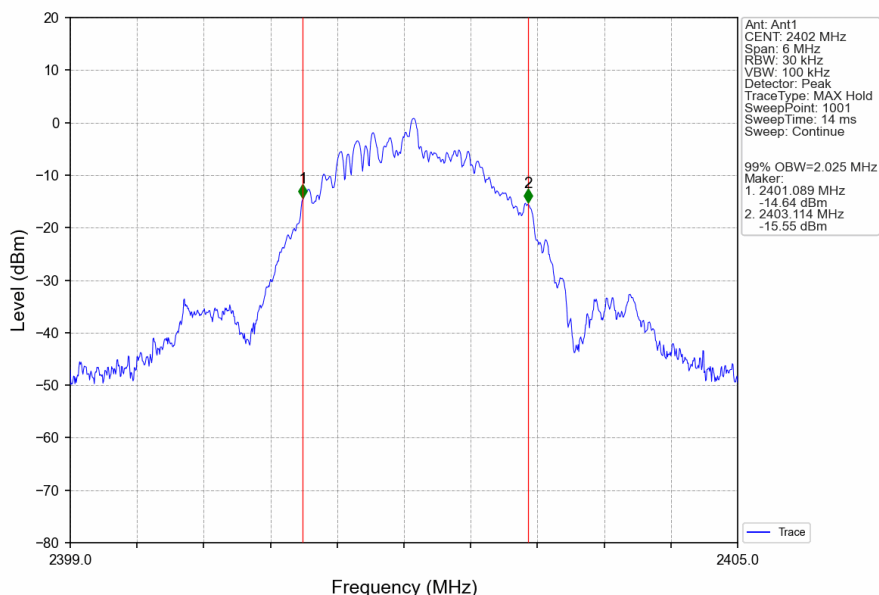
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1M_HCH_2480MHz_Ant1_NTNV



2M_LCH_2402MHz_Ant1_NTNV



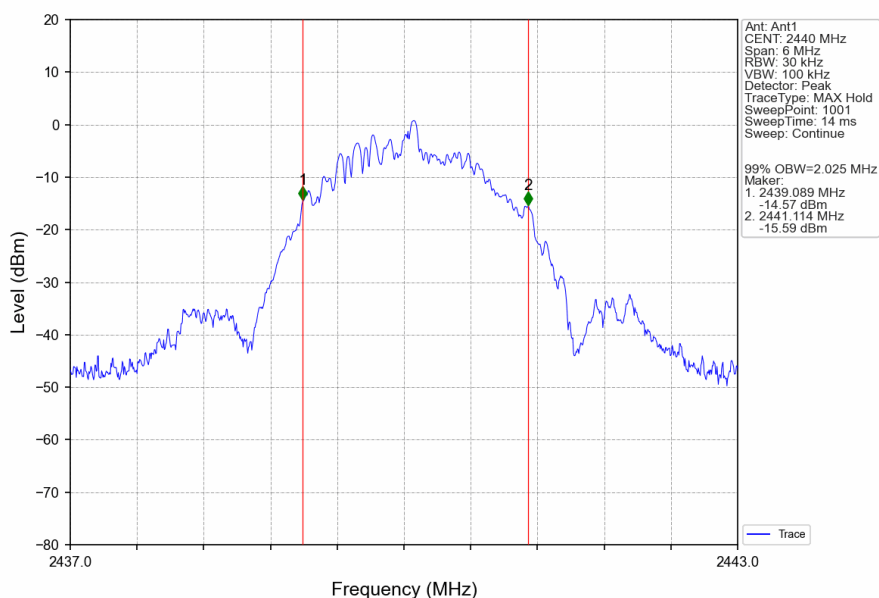
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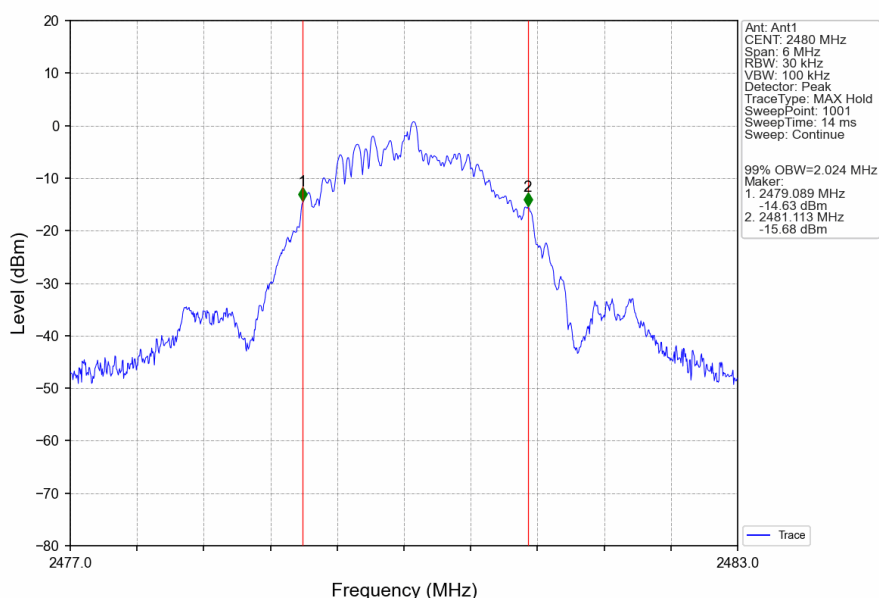
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2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



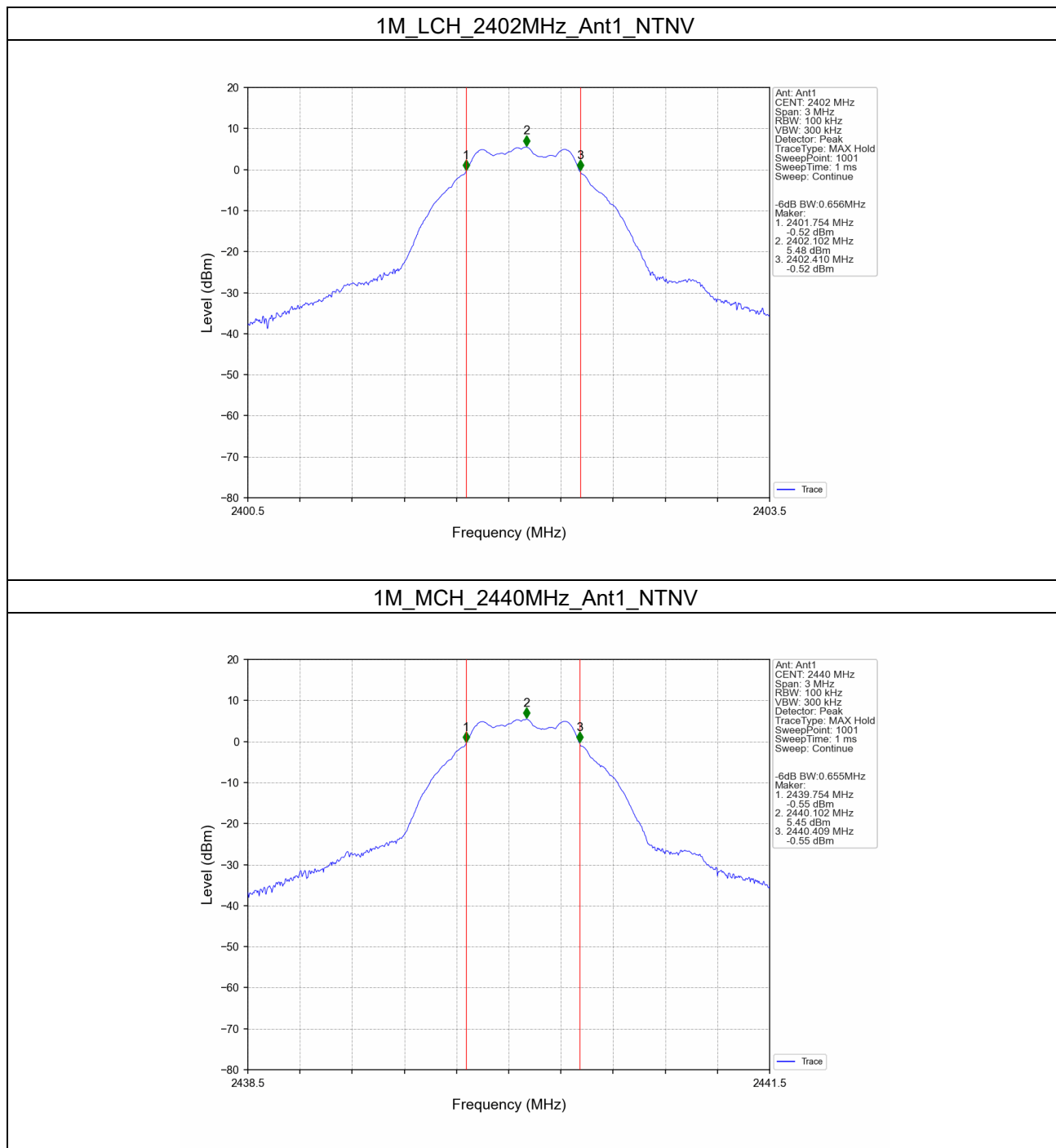
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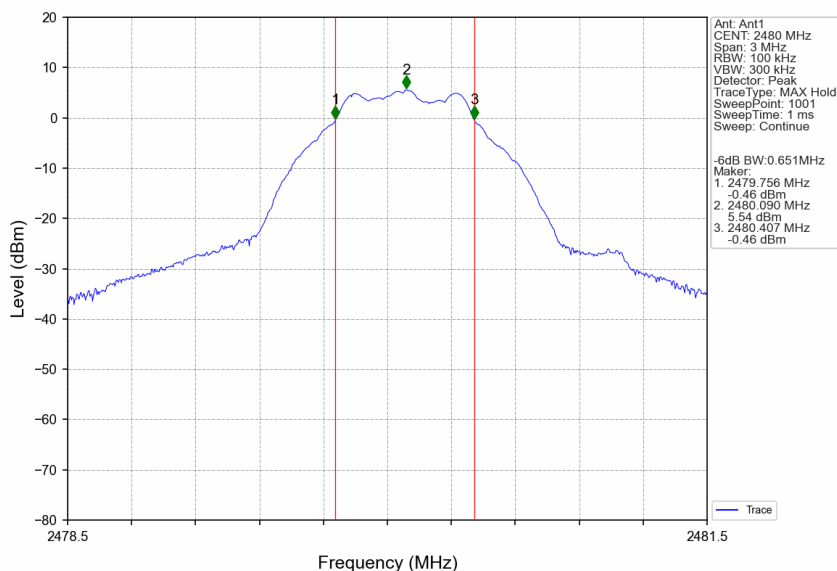
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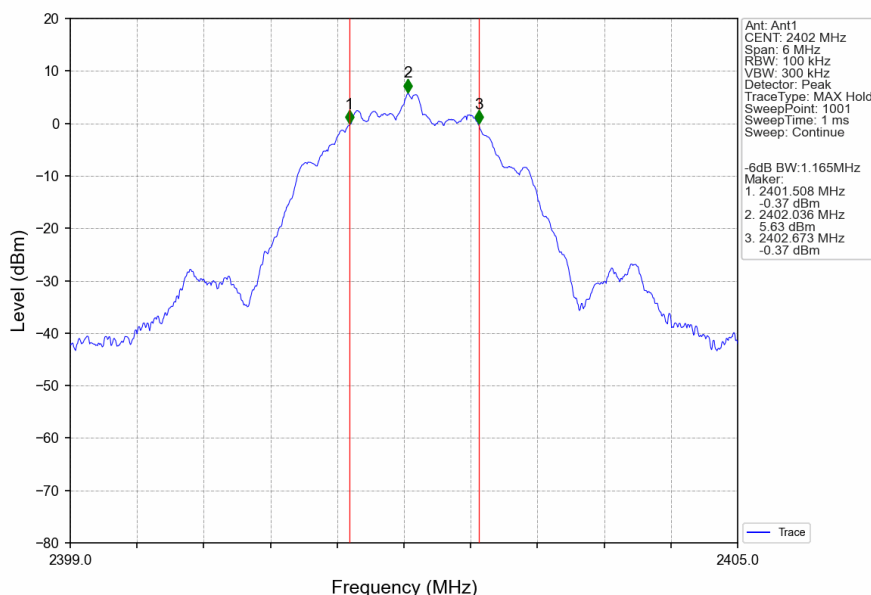
2.2.2 6dB BW



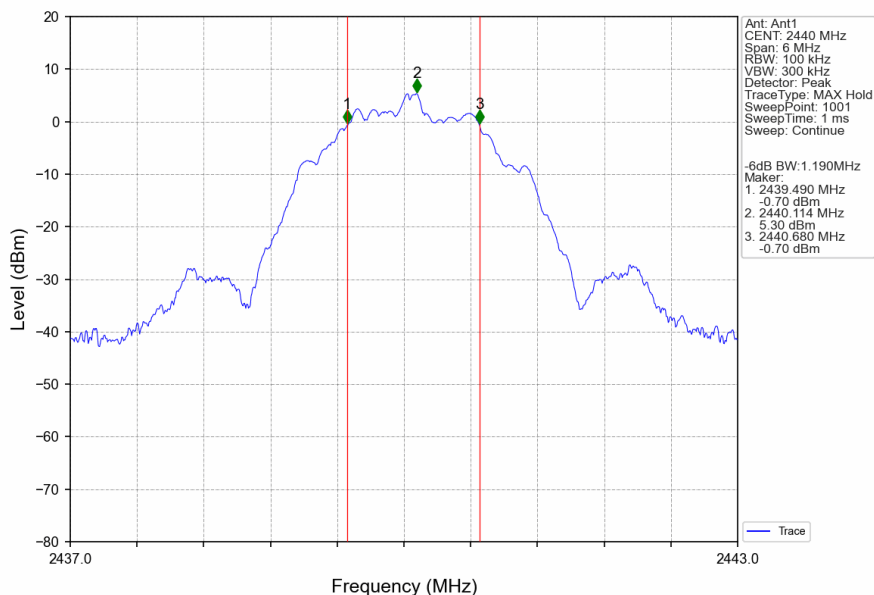
1M_HCH_2480MHz_Ant1_NTNV



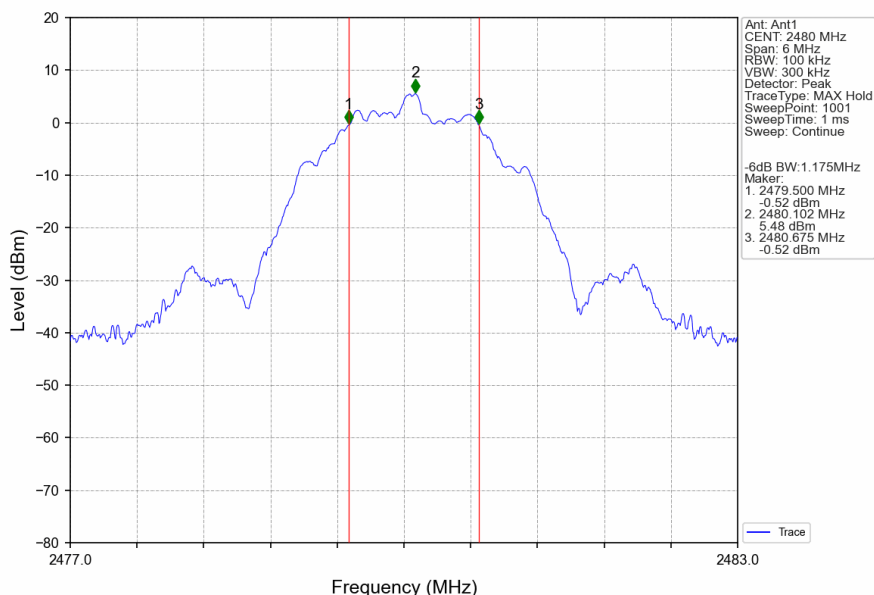
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_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	5.83	<=30	Pass
		2440	5.81	<=30	Pass
		2480	5.77	<=30	Pass
2M	SISO	2402	5.93	<=30	Pass
		2440	5.89	<=30	Pass
		2480	5.86	<=30	Pass

Note1: Antenna Gain: Ant1: 4.31dBi;

4. Maximum Power Spectral Density

4.1 Test Result

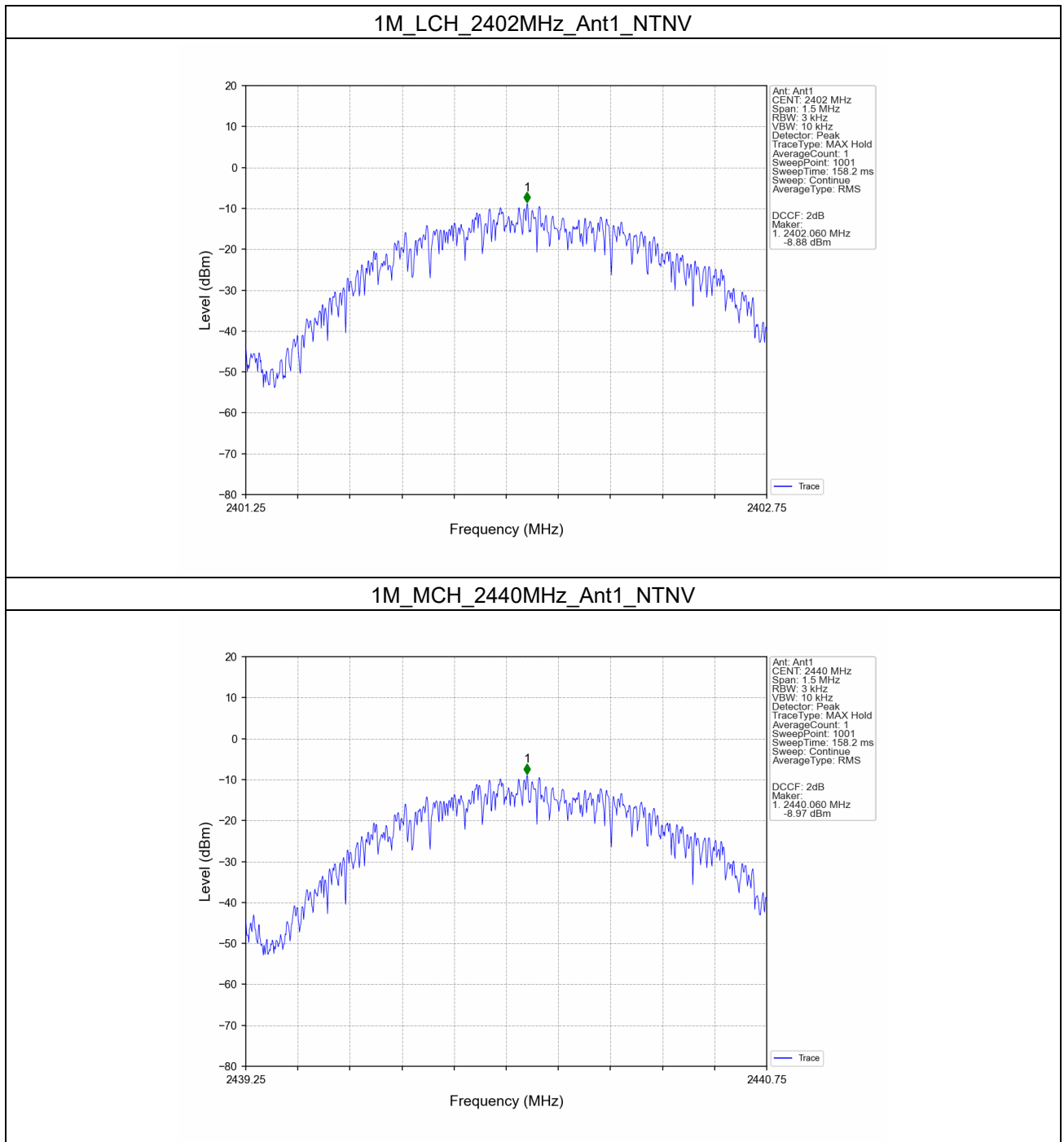
4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm)		Verdict
			ANT1	Limit(dBm/3kHz)	
1M	SISO	2402	-8.88	<=8	Pass
		2440	-8.97	<=8	Pass
		2480	-8.94	<=8	Pass
2M	SISO	2402	-12.06	<=8	Pass
		2440	-11.88	<=8	Pass
		2480	-12.01	<=8	Pass

Note1: Antenna Gain: Ant1: 4.31dBi;

4.2 Test Graph

4.2.1 PSD



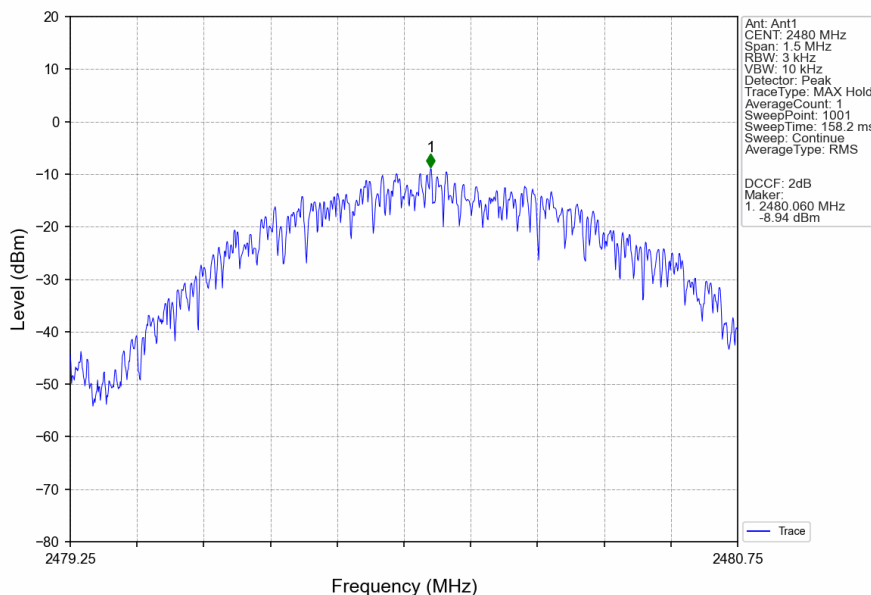
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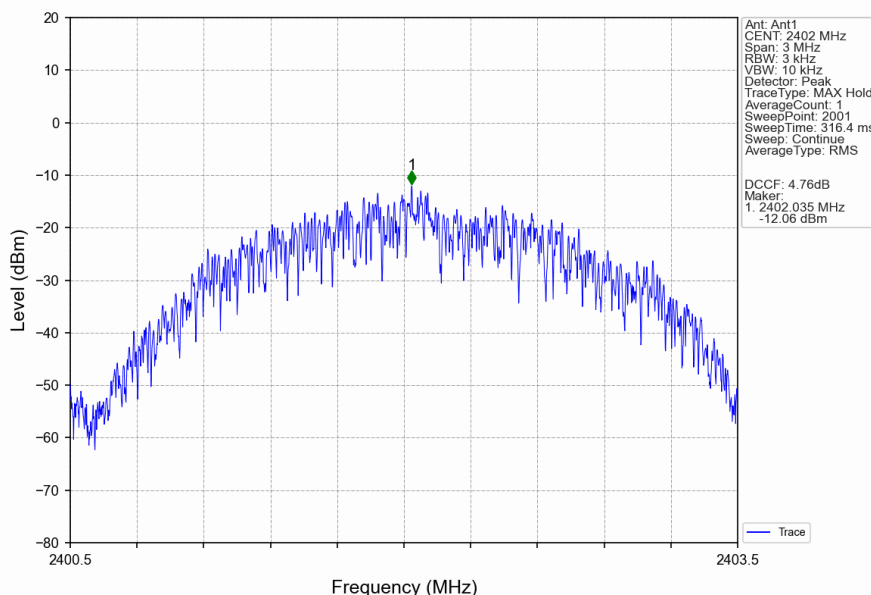
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1M_HCH_2480MHz_Ant1_NTNV



2M_LCH_2402MHz_Ant1_NTNV



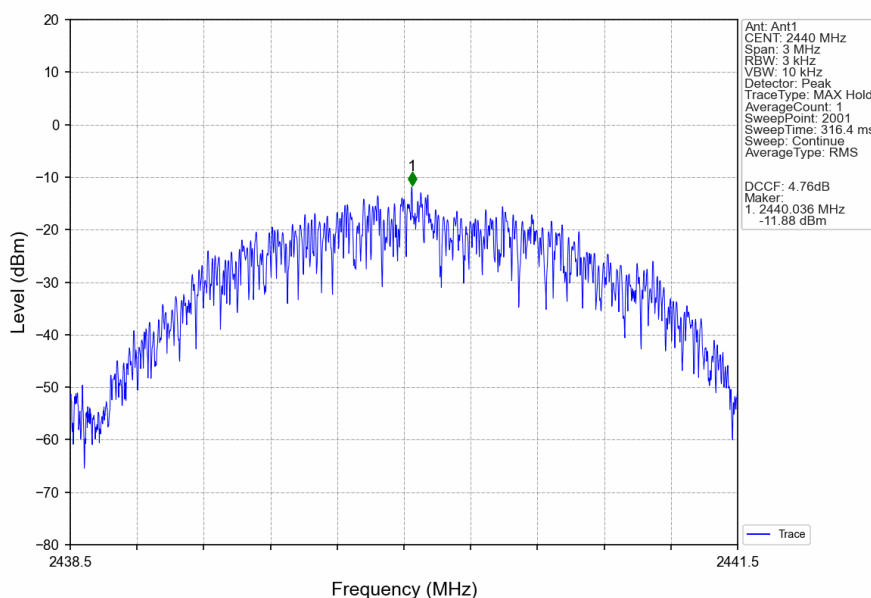
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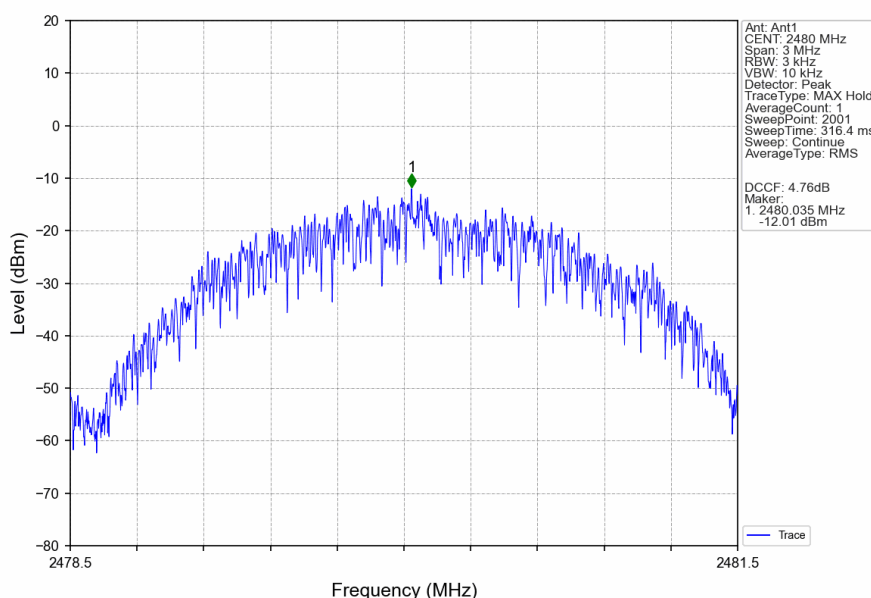
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2M_MCH_2440MHz_Ant1_NTNV



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)
1M	SISO	2402	1	5.53
		2440	1	5.40
		2480	1	5.50
2M	SISO	2402	1	5.42
		2440	1	5.40
		2480	1	5.42

5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	5.53	-14.47	Pass
		2440	1	5.53	-14.47	Pass
		2480	1	5.53	-14.47	Pass
2M	SISO	2402	1	5.42	-14.58	Pass
		2440	1	5.42	-14.58	Pass
		2480	1	5.42	-14.58	Pass



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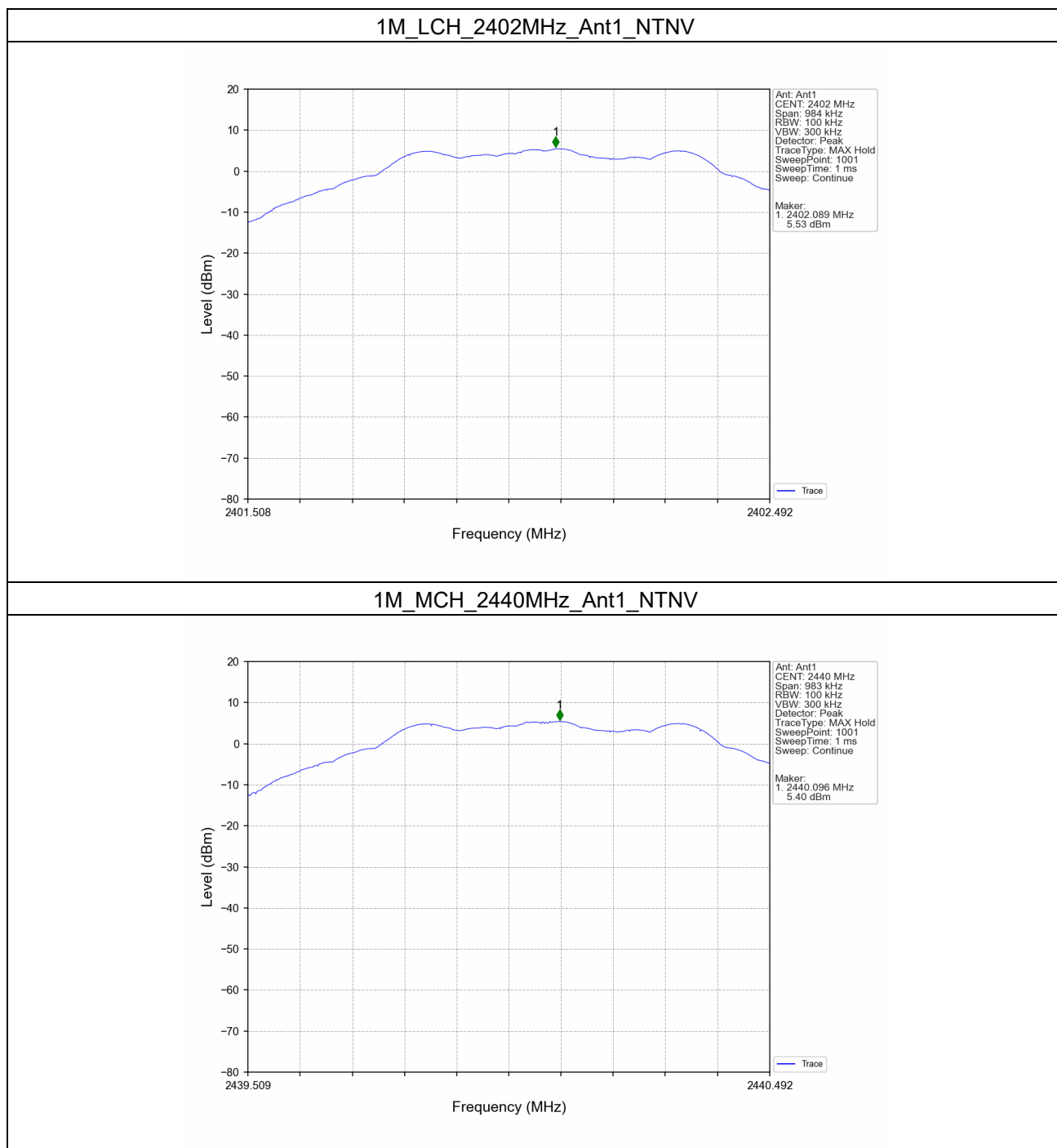
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5.2 Test Graph

5.2.1 Ref



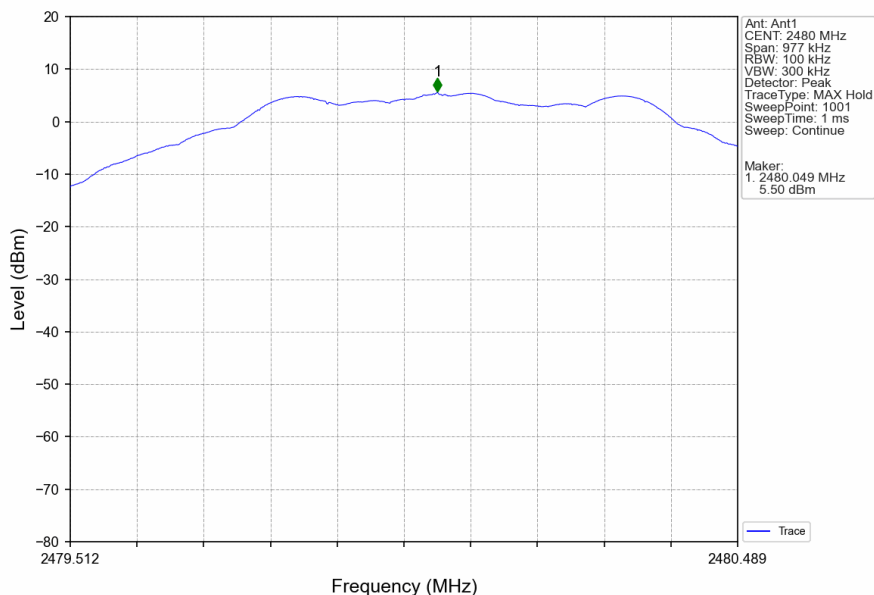
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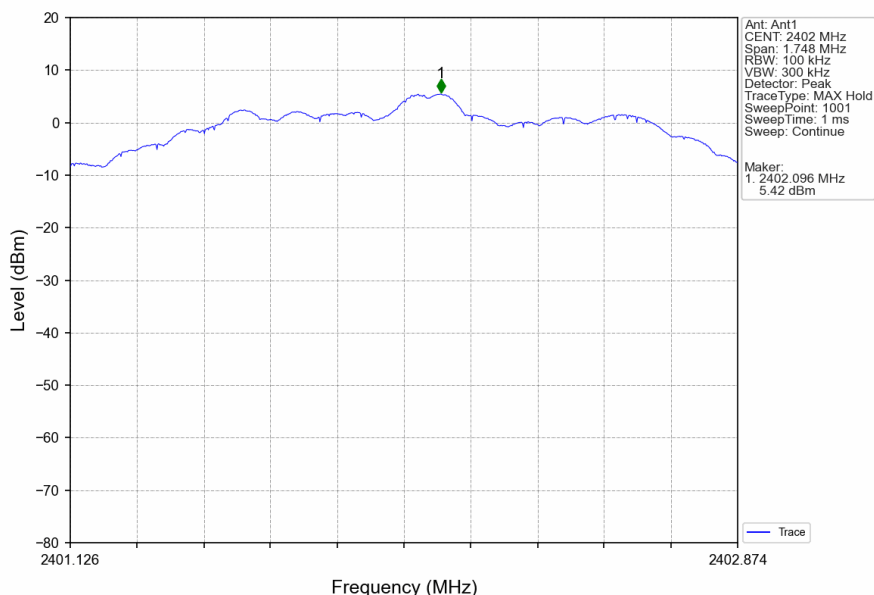
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2M_LCH_2402MHz_Ant1_NTNV



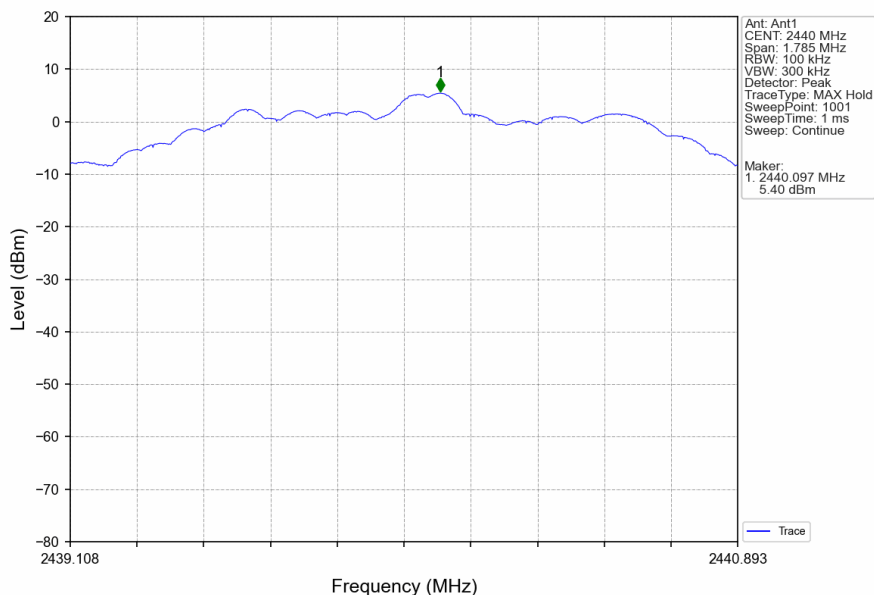
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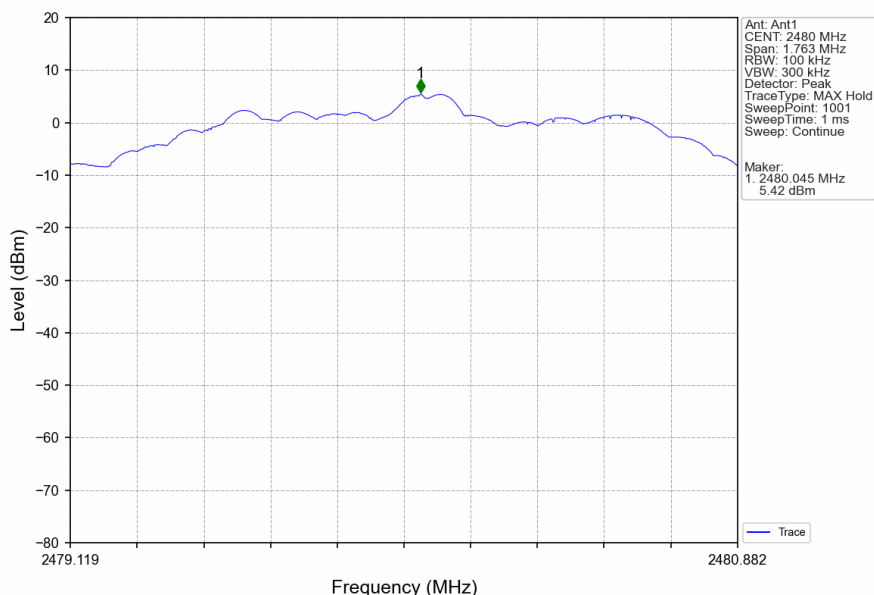
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2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



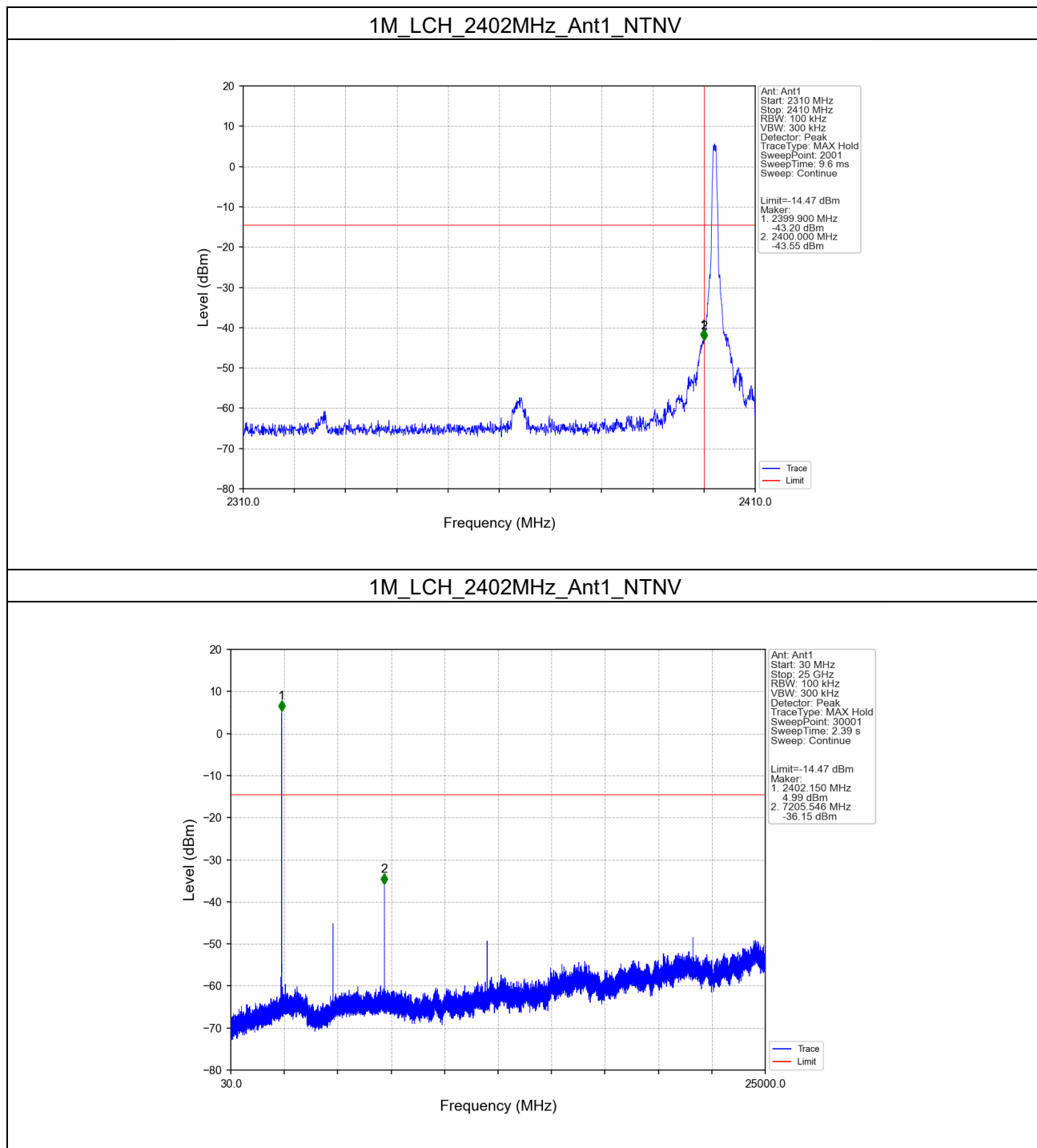
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5.2.2 CSE

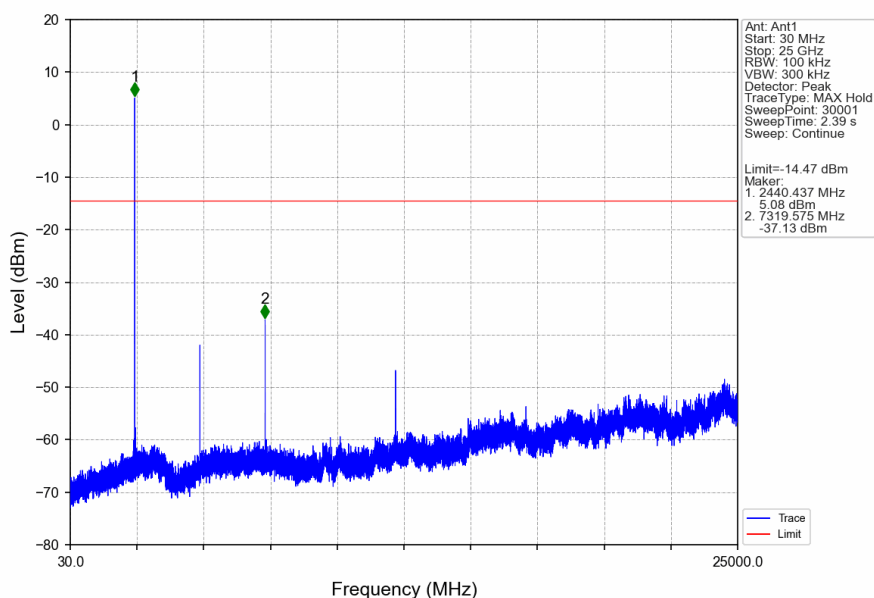


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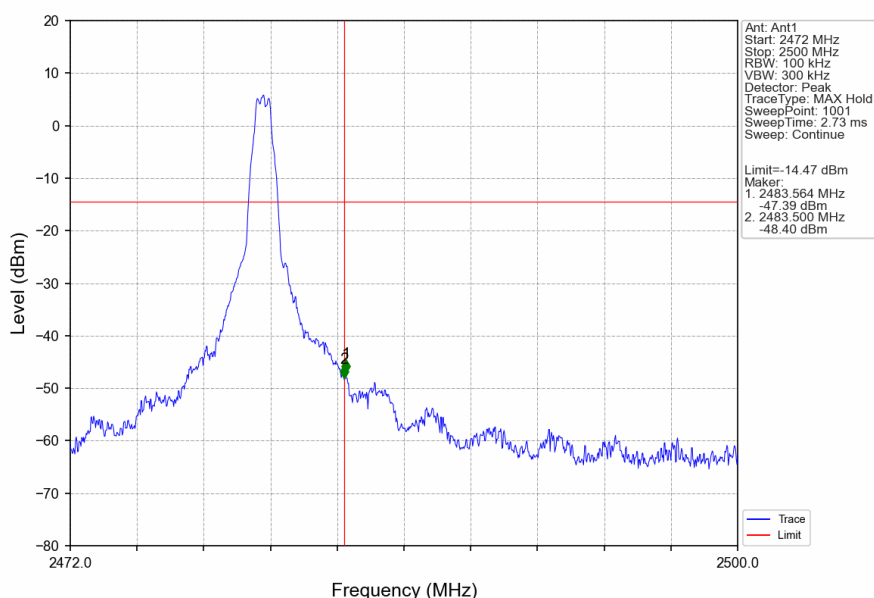
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1M_MCH_2440MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV

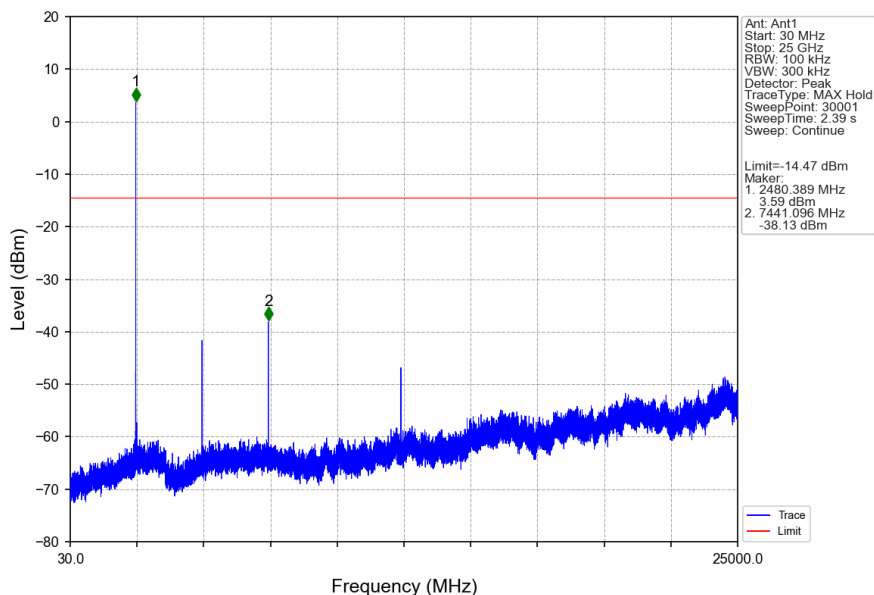


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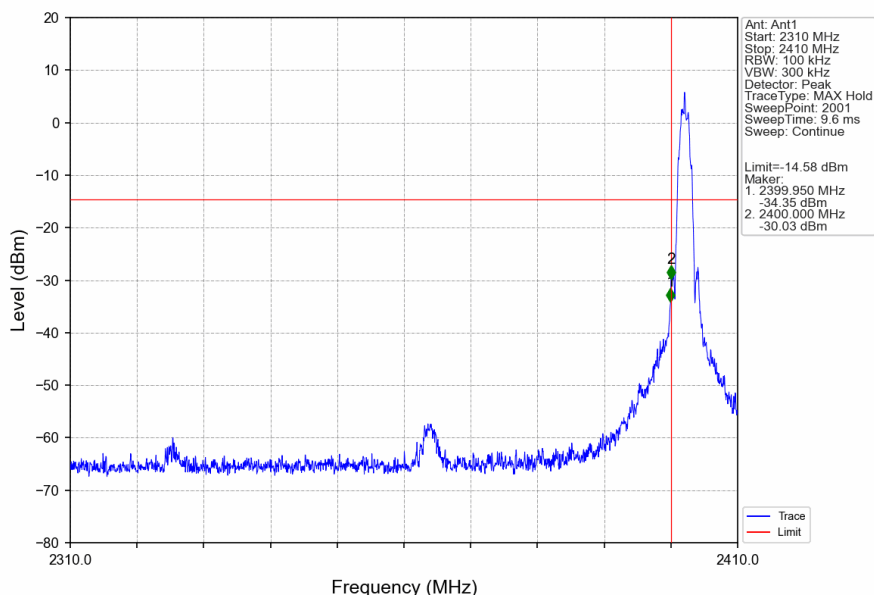
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1M_HCH_2480MHz_Ant1_NTNV



2M_LCH_2402MHz_Ant1_NTNV



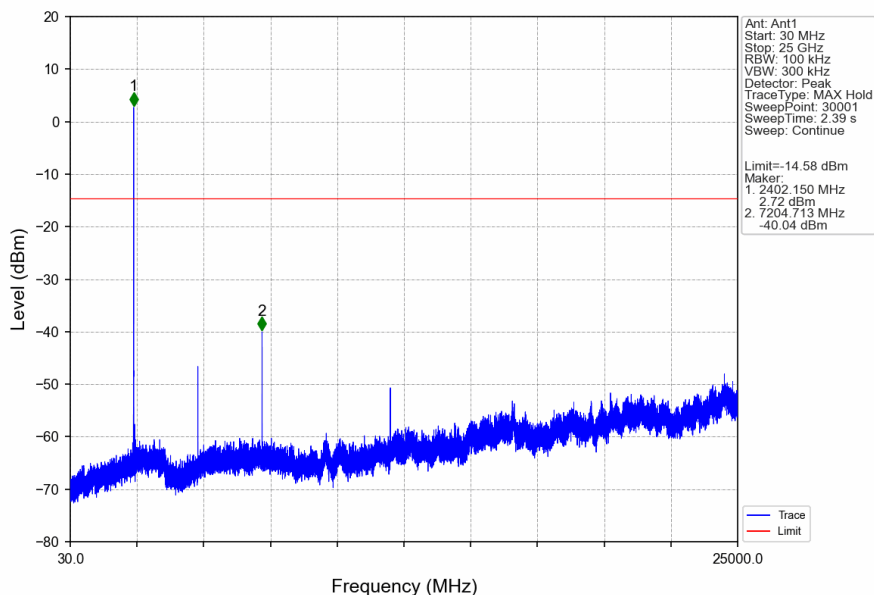
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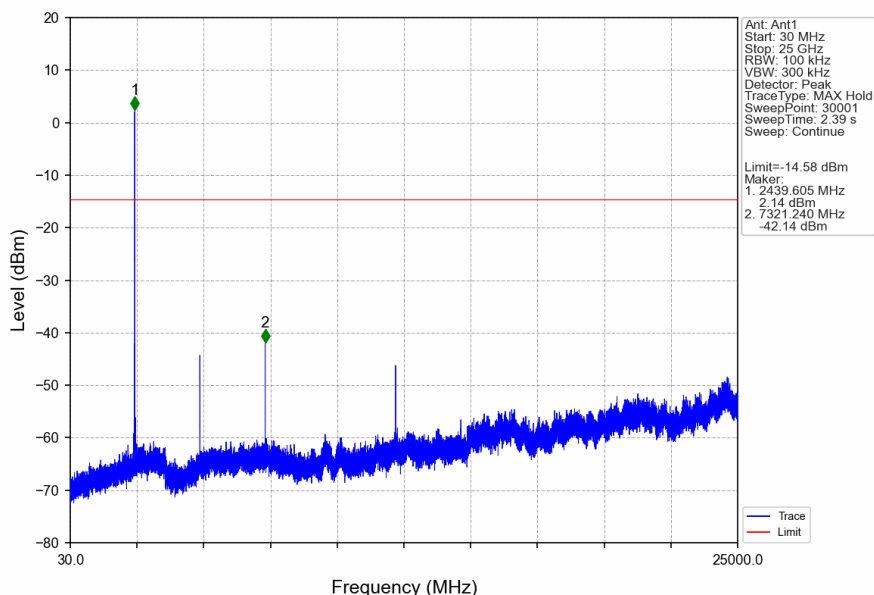
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2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



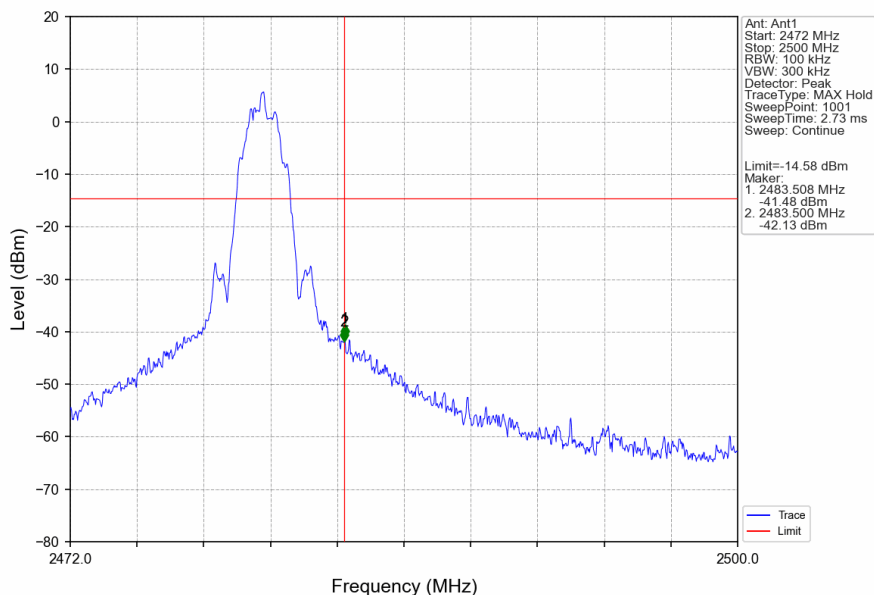
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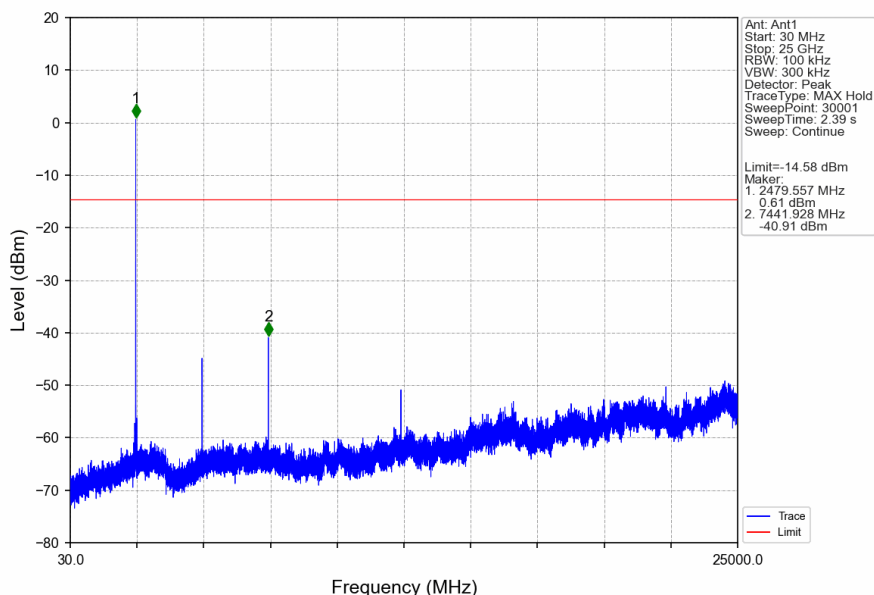
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2M_HCH_2480MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



- End of the Report -



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