



TEST REPORT

Application No.: GZCR2204000409AT
Applicant: HEXAERO PTE. LTD.
Address of Applicant: 160 ROBINSON ROAD #14-04 SPORE BUSINESS FEDERATION CTR
SINGAPORE (068914)
Manufacturer: HEXAERO PTE. LTD.
Address of Manufacturer: 160 ROBINSON ROAD #14-04 SPORE BUSINESS FEDERATION CTR
SINGAPORE (068914)
Factory: INVENTEC APPLIANCES(JIANGNING) CORPORATION
Address of Factory: 133, Jiang-Jun Road, Jiangning District, Nanjing, 211153, P.R. China
Equipment Under Test (EUT):
EUT Name: HERELINK Controller Unit
Model No.: HX4-06211
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2022-04-14
Date of Test: 2022-05-09 to 2022-06-23
Date of Issue: 2022-07-22

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

Kobe Jian
EMC Laboratory Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZCR220400040902	2022-07-22	Original

Authorized for issue by			
			
		Curry Wu/Project Engineer	
			
		Ricky Liu/Reviewer	

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 Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Note:

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

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



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.6V supply by rechargeable battery DC 5V charging by USB port
Cable(s):	about 1.5m USB cable
Operation Frequency:	2412MHz to 2462MHz for 20MHz 2409MHz to 2459MHz for 10MHz
Modulation Type:	QPSK
Bandwidth	10MHz & 20MHz
Antenna Type:	Dedicated antenna
Antenna Gain:	Ant 1:3dBi Ant 2:4dBi
Remark	Ant 1 is transmitting + receiving function Ant 2 is receiving function only

4.2 Channel List

10MHz:

1	2409.00	5	2429.00	9	2449.00
2	2414.00	6	2434.00	10	2454.00
3	2419.00	7	2439.00	11	2459.00
4	2424.00	8	2444.00		

20MHz:

1	2412.00	5	2432.00	9	2452.00
2	2417.00	6	2437.00	10	2457.00
3	2422.00	7	2442.00	11	2462.00
4	2427.00	8	2447.00		

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
--	--	--	--
The EUT has been tested as an independent unit.			

4.4 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Peak Output Power	$\pm 0.75\text{dB}$
Minimum 6dB Bandwidth	$\pm 3\%$
Power Spectrum Density	$\pm 2.84\text{dB}$
Conducted Band Edges Measurement	$\pm 0.75\text{dB}$
Conducted Spurious Emissions	$\pm 0.75\text{dB}$
Radiated Emissions which fall in the restricted bands	$\pm 5.00\text{dB}$ (30MHz-1GHz; 3m); $\pm 4.38\text{dB}$ (30MHz-1GHz; 10m); $\pm 5.12\text{dB}$ (1GHz-6GHz); $\pm 5.38\text{dB}$ (6GHz-18GHz); $\pm 5.61\text{dB}$ (18GHz-40GHz)
Radiated Spurious Emissions Below 1GHz	$\pm 5.00\text{dB}$ (3m); $\pm 4.38\text{dB}$ (10m)
Radiated Spurious Emissions Above 1GHz	$\pm 5.12\text{dB}$ (1GHz-6GHz); $\pm 5.38\text{dB}$ (6GHz-18GHz); $\pm 5.61\text{dB}$ (18GHz-40GHz)

4.5 Test Location

All tests were performed at:

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

Tel: +86 20 82155555

Fax: +86 20 82075059

No tests were sub-contracted.

4.6 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

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

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Peak Output Power

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2021-08-30	2022-08-29
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Minimum 6dB Bandwidth

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2021-08-30	2022-08-29
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Power Spectrum Density

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2021-08-30	2022-08-29
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Conducted Band Edges Measurement

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2021-08-30	2022-08-29
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Conducted Spurious Emissions

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MI CABLE	SGS-EMC	0.8M	EMC2137	2021-11-02	2023-11-01
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
4X4 Power sensor Unit	TST	TSPS2023R	EMC2226	2021-08-30	2022-08-29
Test Software	TST	V2.0	GZE100-78	N/A	N/A



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Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2021-11-01	2022-10-31
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2022-06-21	2023-06-20
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2022-05-20	2023-05-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-03-03	2025-03-02



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Radiated Spurious Emissions Above 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-12-17	2022-12-16
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2021-09-20	2022-09-19
MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2021-11-01	2022-10-31
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

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



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

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

EUT Antenna:

Both of two antenna are dedicated and no consideration of replacement. The best case gain of the antenna is 3 dBi for antenna 1 and 4 dBi for antenna 2 (Rx only).

Antenna location: Refer to internal photo.

7 Radio Spectrum Matter Test Results

7.1 Conducted Peak Output Power

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

Test Method: ANSI C63.10 (2013) Section 11.9.2

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

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.6 °C

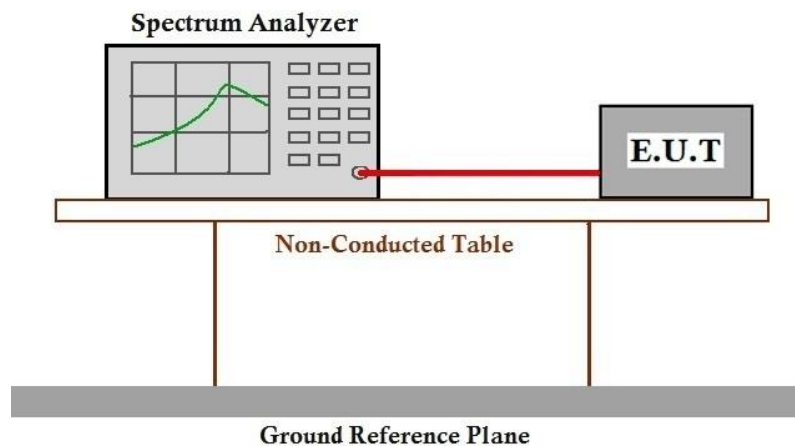
Humidity: 44.3 % RH

Atmospheric Pressure: 1005 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



7.1.4 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

7.2 Minimum 6dB Bandwidth

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

7.2.1 E.U.T. Operation

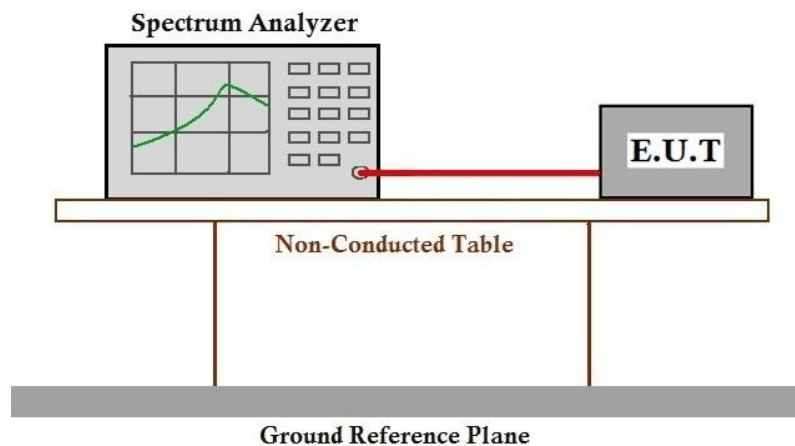
Operating Environment:

Temperature: 25.6 °C Humidity: 44.3 % RH Atmospheric Pressure: 1005 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.3 Power Spectrum Density

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

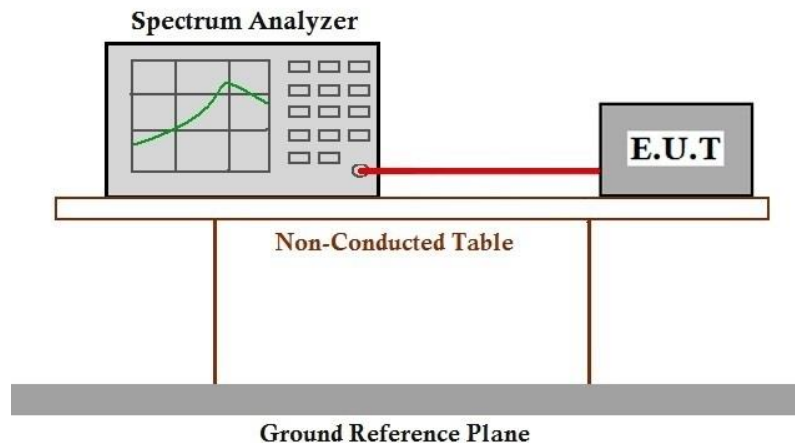
7.3.1 E.U.T. Operation

Operating Environment:					
Temperature:	25.6 °C	Humidity:	44.3 % RH	Atmospheric Pressure:	1005 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.4 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

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

7.4.1 E.U.T. Operation

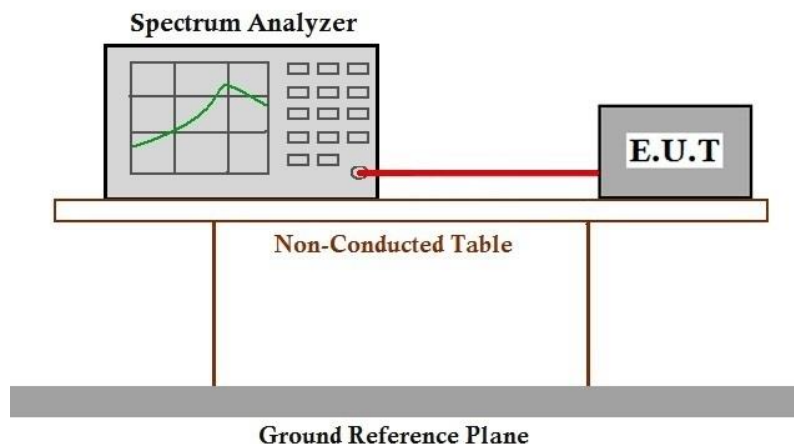
Operating Environment:

Temperature: 25.6 °C Humidity: 44.3 % RH Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.5 Conducted Spurious Emissions

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

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

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

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25.6 °C

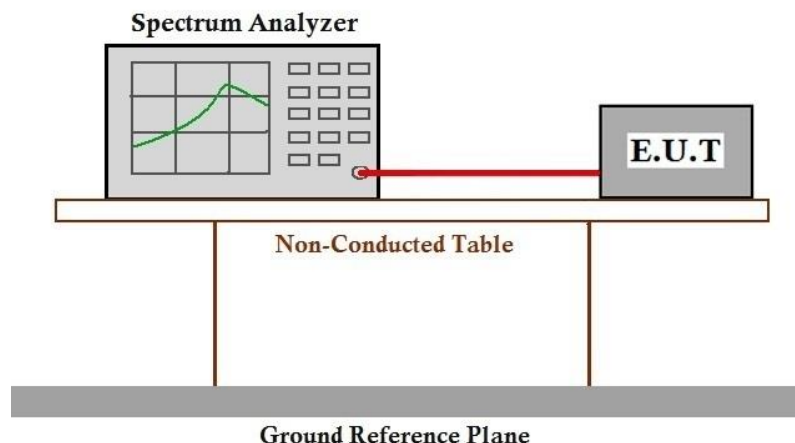
Humidity: 44.3 % RH

Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details



7.6 Radiated Emissions which fall in the restricted bands

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

Test Method: ANSI C63.10 (2013) Section 6.10.5

Test Distance: 3 m

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.

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22.7 °C

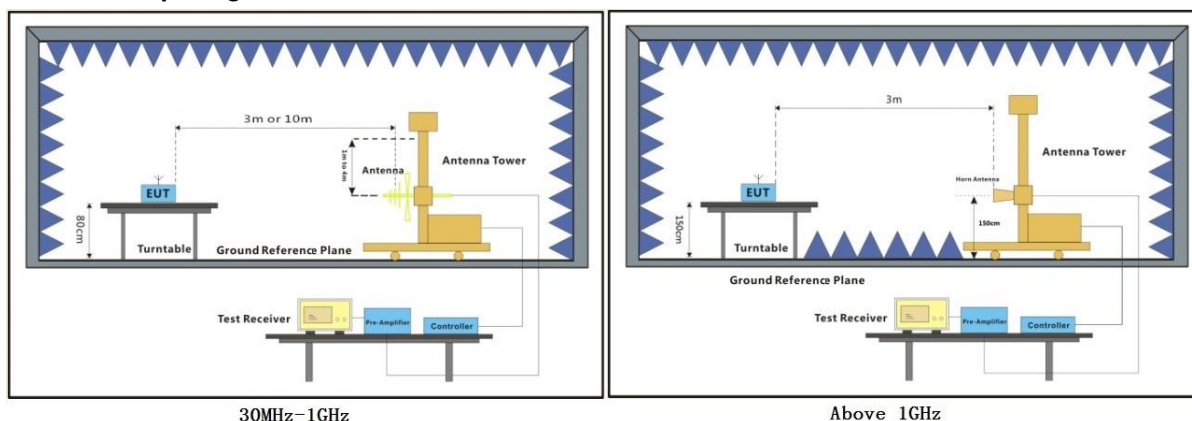
Humidity: 58.3 % RH

Atmospheric Pressure: 1005 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



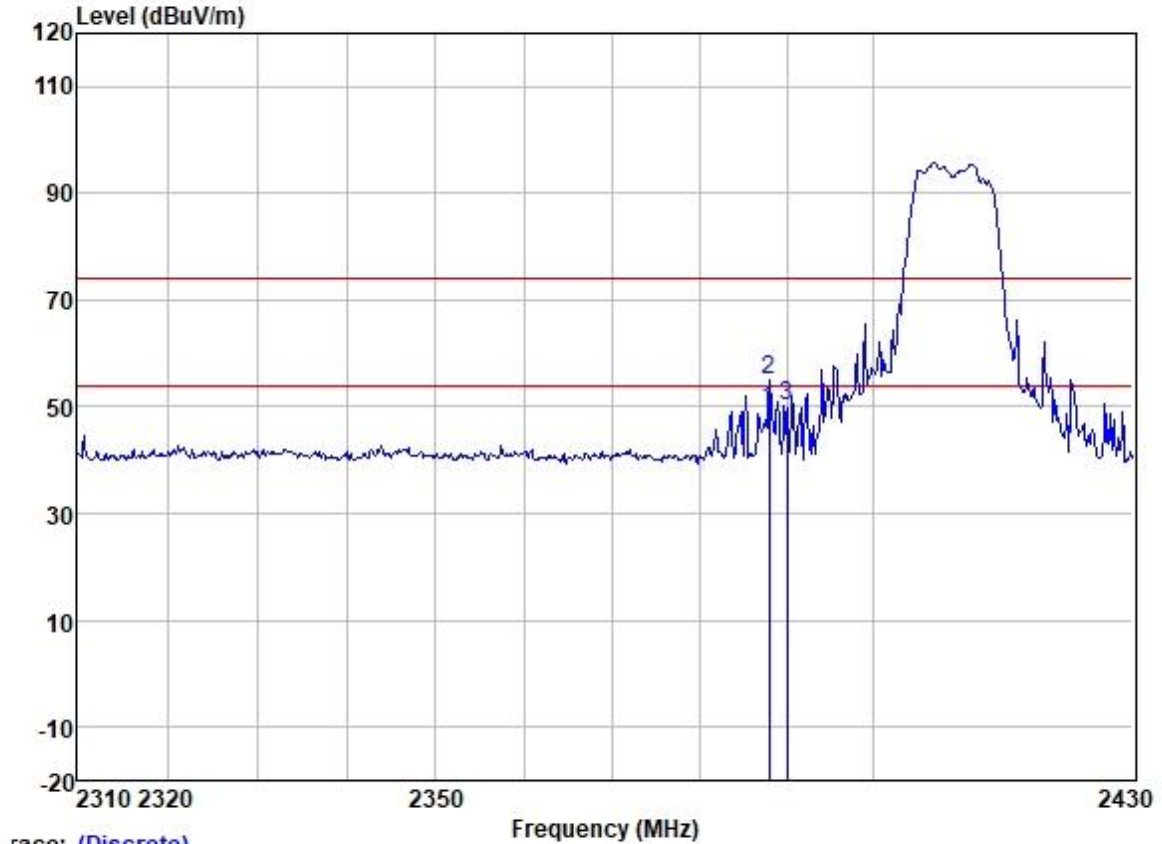
7.6.4 Measurement Procedure and Data

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

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

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

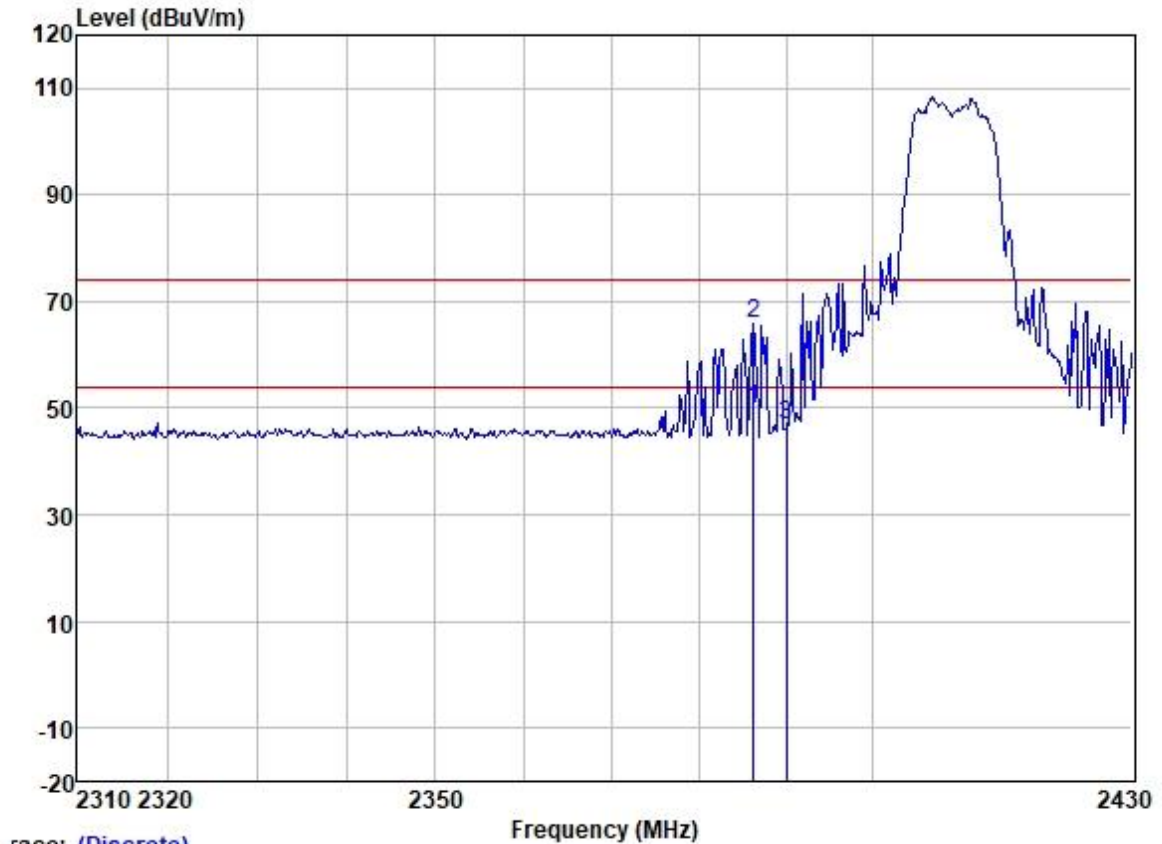
Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: Low; 10M



Trace: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2387.912	55.06	27.33	4.22	37.14	49.47	54.00	-4.53	VERTICAL	Average
2	2387.912	60.71	27.33	4.22	37.14	55.12	74.00	-18.88	VERTICAL	Peak
3	2390.000	55.71	27.33	4.22	37.14	50.12	74.00	-23.88	VERTICAL	Peak

Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: Low; 10M



Trace: (Discrete)

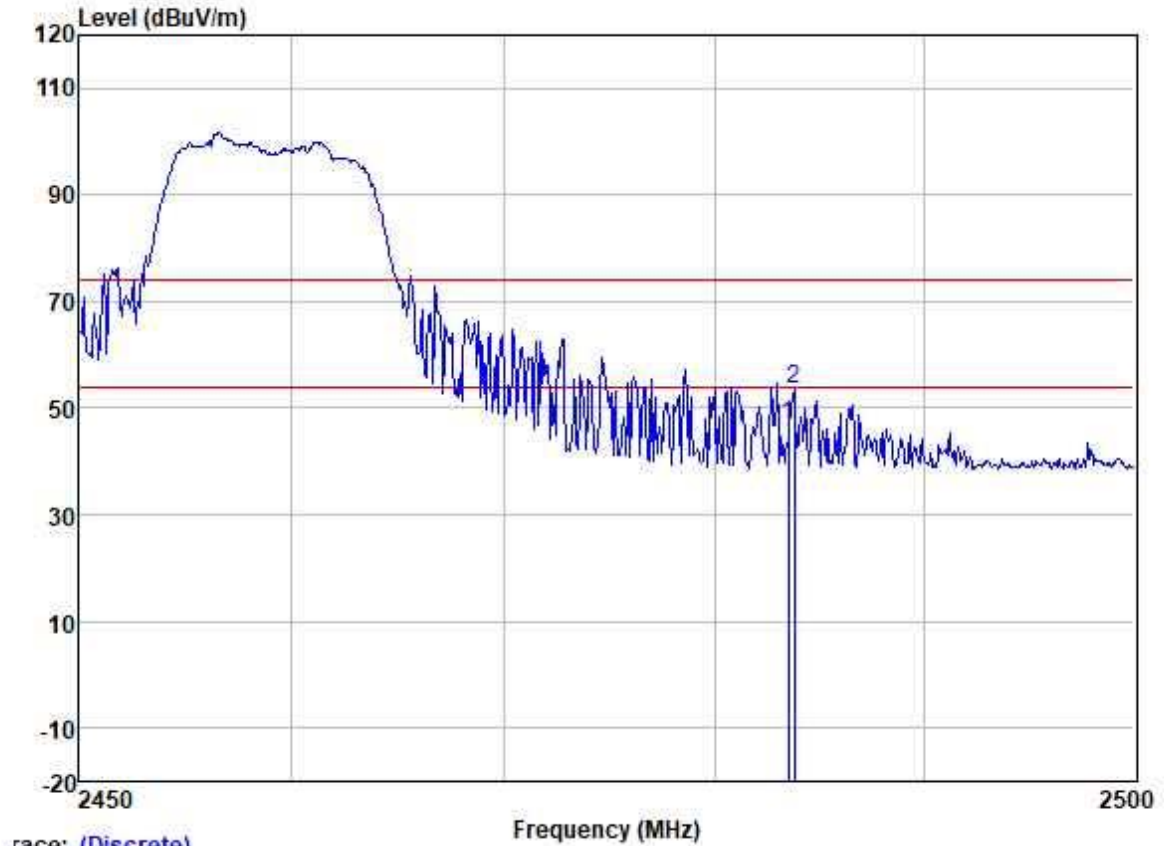
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2386.219	55.58	27.33	4.22	37.14	49.99	54.00	-4.01	HORIZONTAL	Average
2	2386.219	71.50	27.33	4.22	37.14	65.91	74.00	-8.09	HORIZONTAL	Peak
3	2390.000	52.50	27.33	4.22	37.14	46.91	74.00	-27.09	HORIZONTAL	Peak



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Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: High; 10M



Trace: (Discrete)

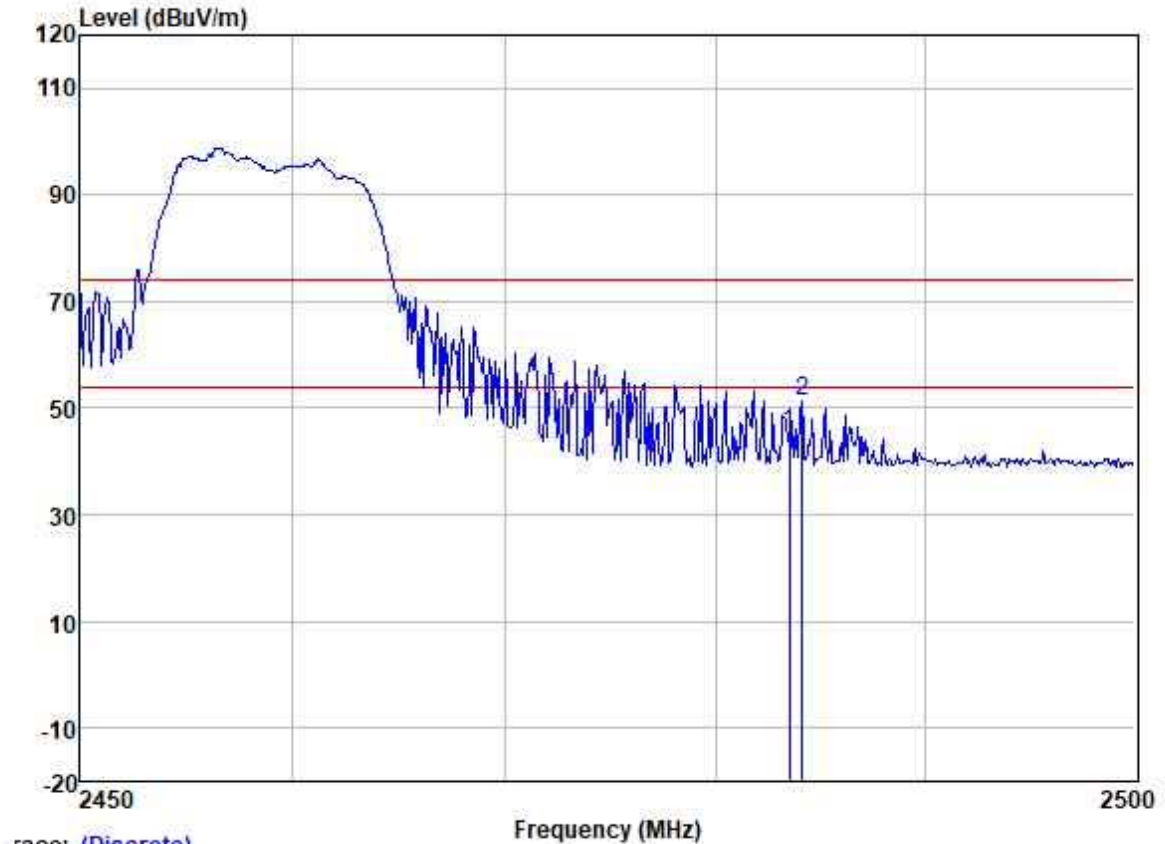
	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	53.04	27.48	3.42	37.13	46.81	74.00	-27.19	VERTICAL	Peak
2	2483.790	59.89	27.48	3.42	37.13	53.66	74.00	-20.34	VERTICAL	Peak



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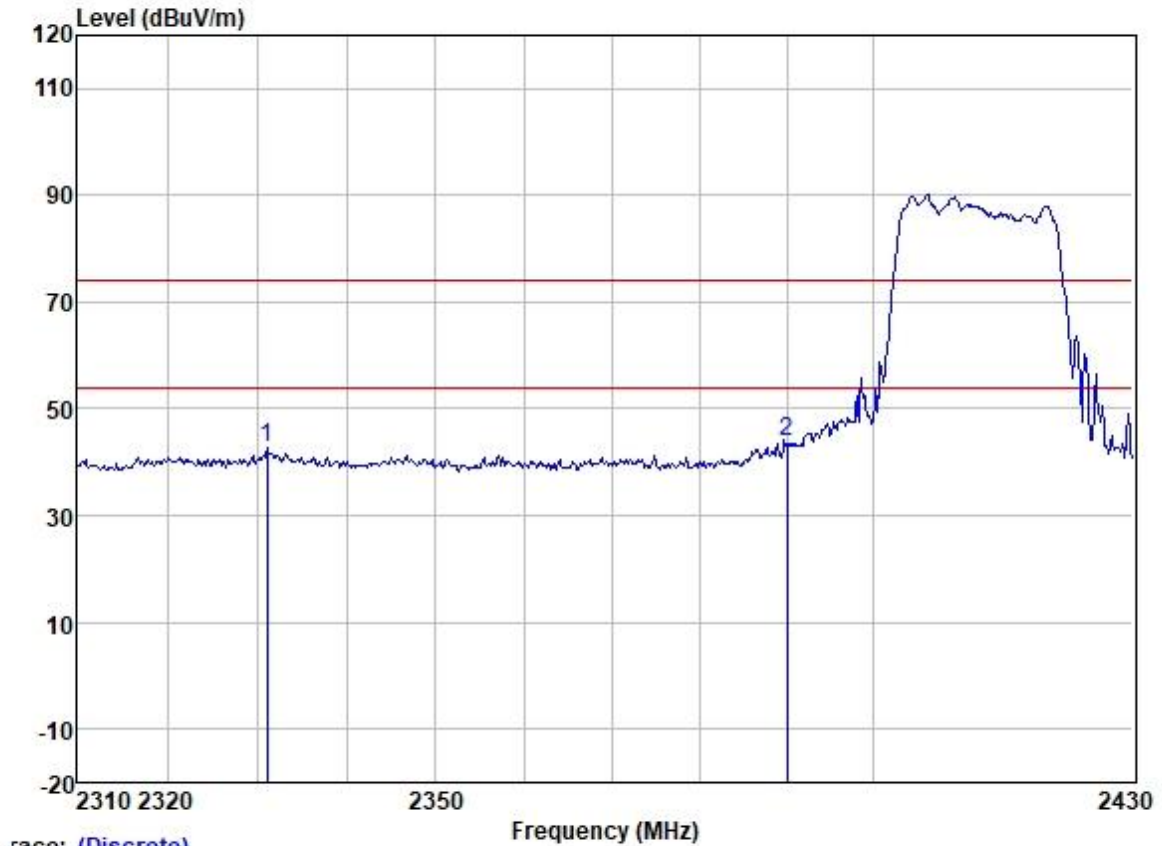
Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: High; 10M



Trace: (Discrete)

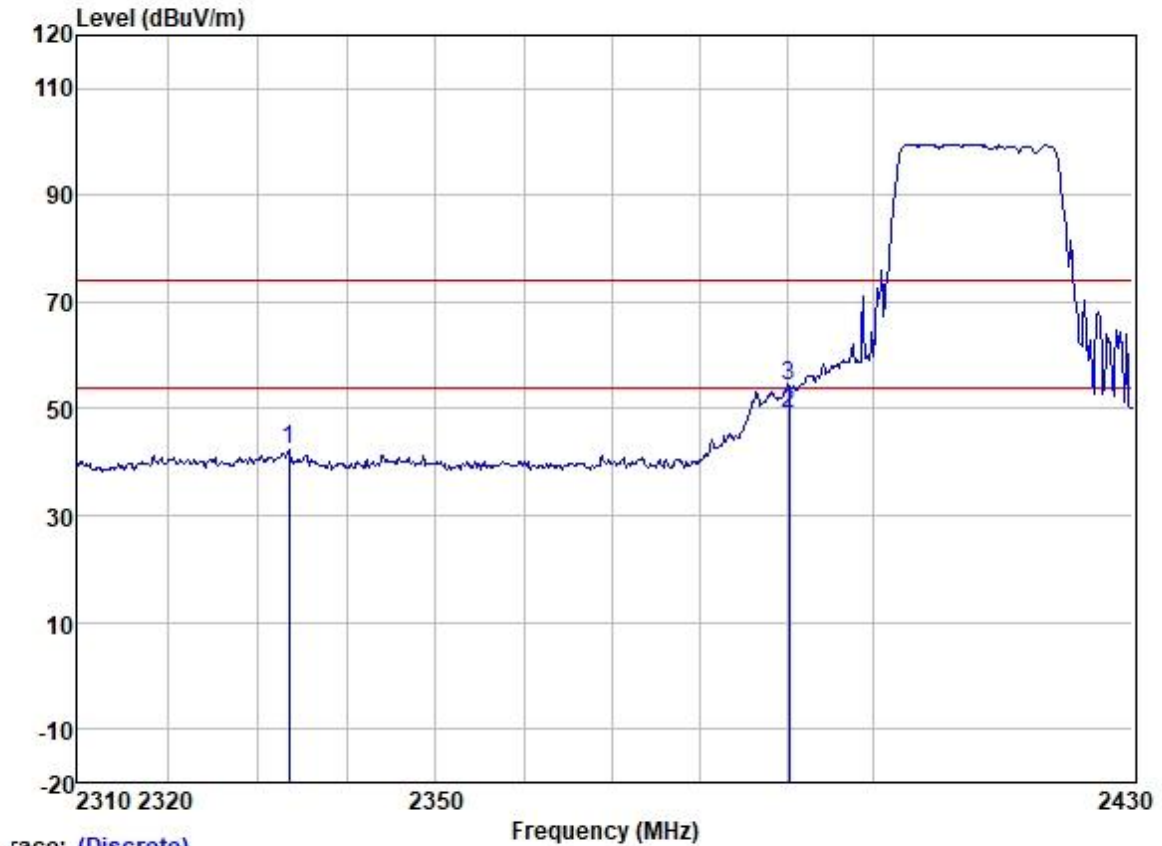
	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier	Level	Limit	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	51.69	27.48	3.42	37.13	45.46	74.00	-28.54	HORIZONTAL	Peak
2	2484.091	57.65	27.48	3.42	37.13	51.42	74.00	-22.58	HORIZONTAL	Peak

Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: Low; 20M



		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2331.154	47.78	27.20	4.76	37.15	42.59	74.00	-31.41	VERTICAL	Peak
2	2390.000	49.49	27.33	4.22	37.14	43.90	74.00	-30.10	VERTICAL	Peak

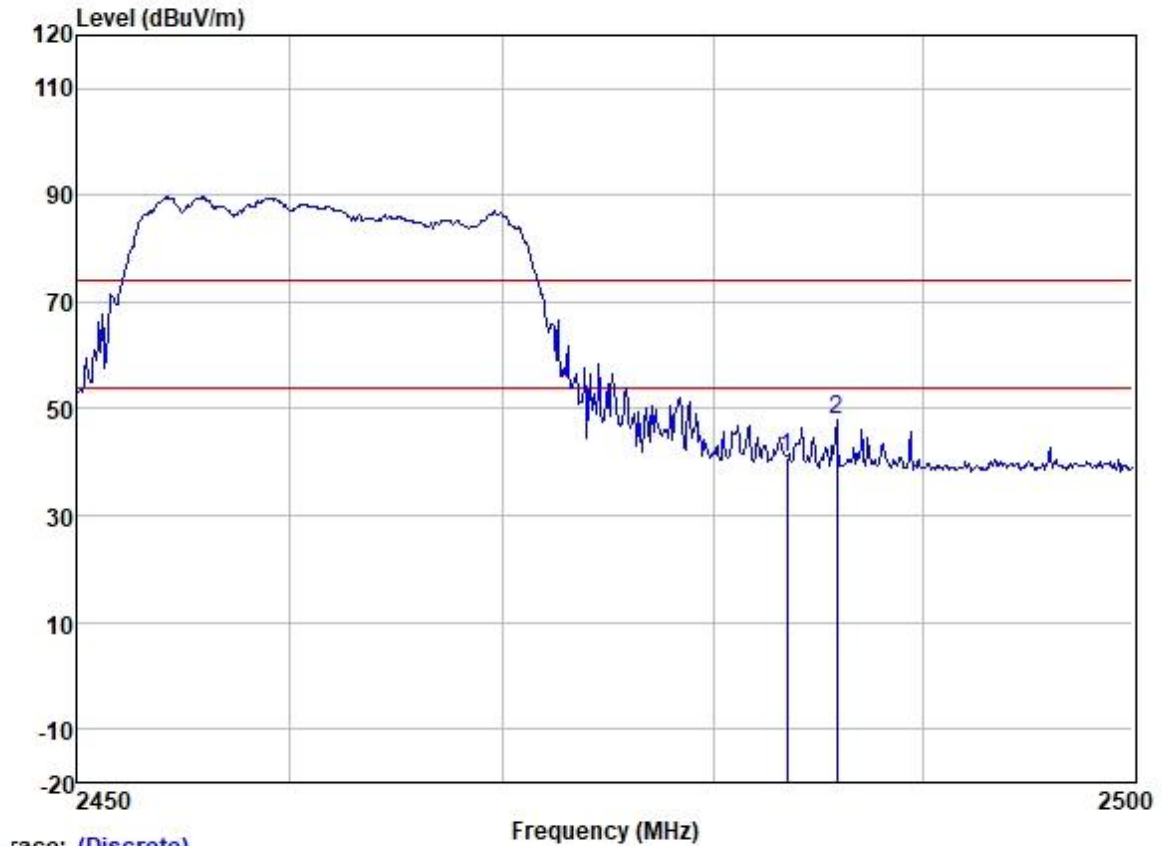
Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: Low; 20M



Trace: (Discrete)

	Read	Antenna	Cable	Preamp		Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2333.516	47.35	27.20	4.76	37.15	42.16	74.00	-31.84	HORIZONTAL Peak
2	2390.210	54.77	27.33	4.22	37.14	49.18	54.00	-4.82	HORIZONTAL Average
3	2390.210	59.94	27.33	4.22	37.14	54.35	74.00	-19.65	HORIZONTAL Peak

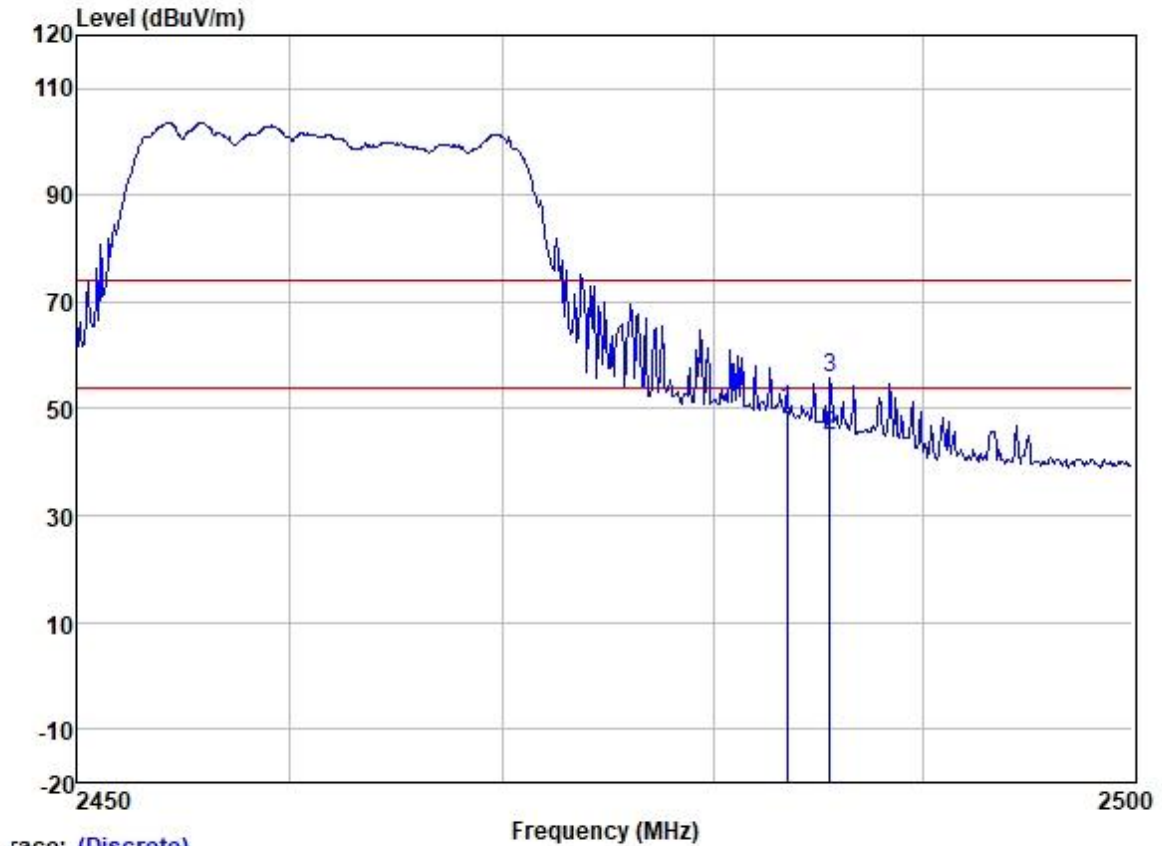
Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: High; 20M



Trace: (Discrete)

		ReadAntenna		Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2483.500	47.15	27.48	3.42	37.13	40.92	74.00	-33.08	VERTICAL	Peak
2	2485.848	54.30	27.48	3.42	37.13	48.07	74.00	-25.93	VERTICAL	Peak

Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: High; 20M



Trace: (Discrete)

	Freq	Read	Antenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	55.97	27.48	3.42	37.13	49.74	74.00	-24.26	HORIZONTAL Peak
2	2485.546	51.28	27.48	3.42	37.13	45.05	54.00	-8.95	HORIZONTAL Average
3	2485.546	61.97	27.48	3.42	37.13	55.74	74.00	-18.26	HORIZONTAL Peak



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7.7 Radiated Spurious Emissions Below 1GHz

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

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

Limit:

Test Distance:

3 m

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

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C

Humidity: 52 % RH

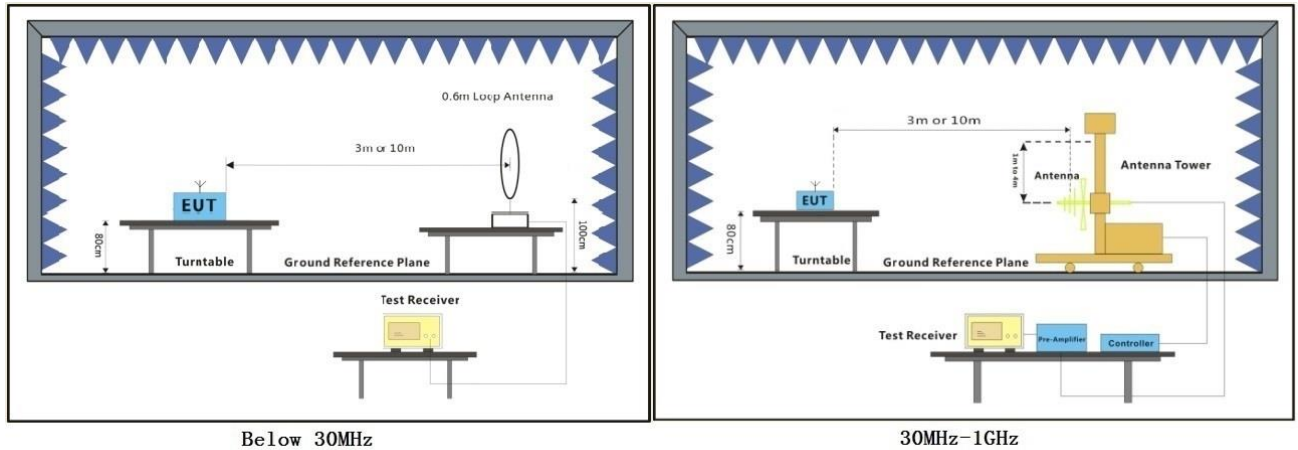
Atmospheric Pressure: 1005 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.



7.7.3 Test Setup Diagram



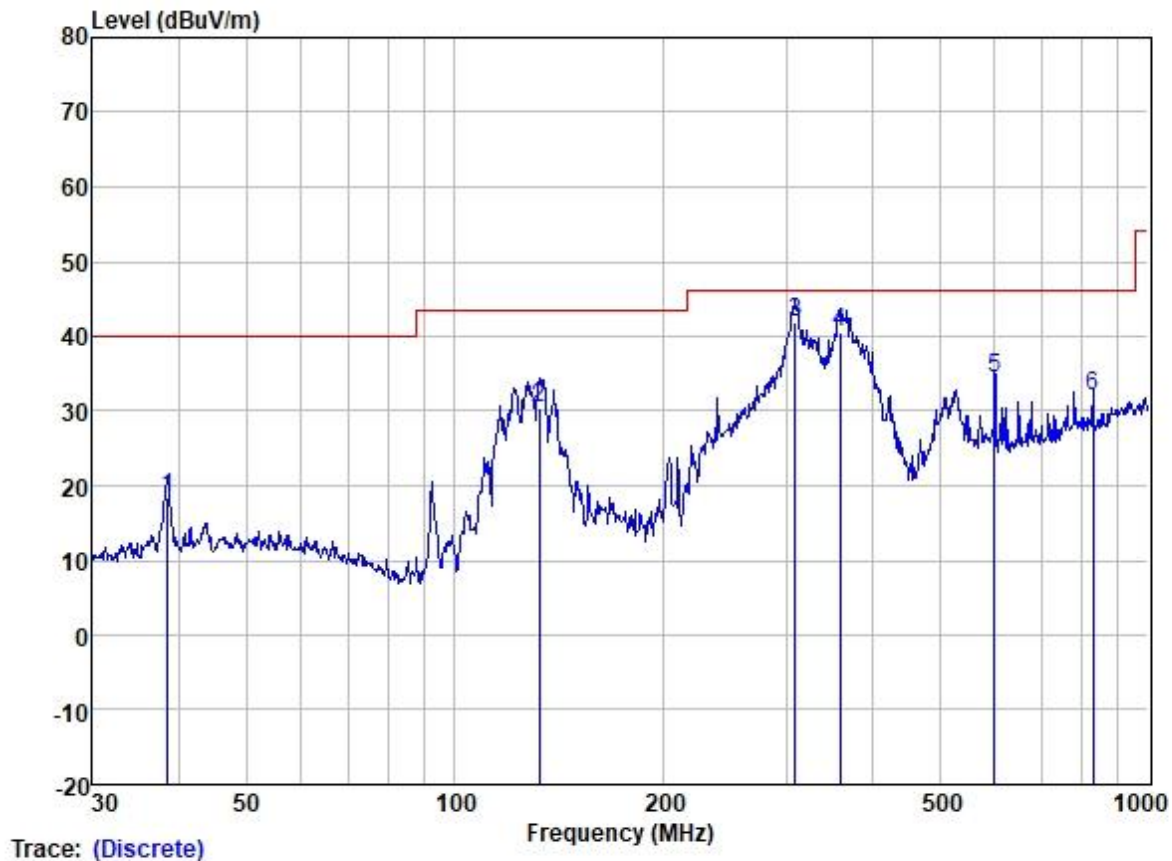
7.7.4 Measurement Procedure and Data

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

Remark:

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

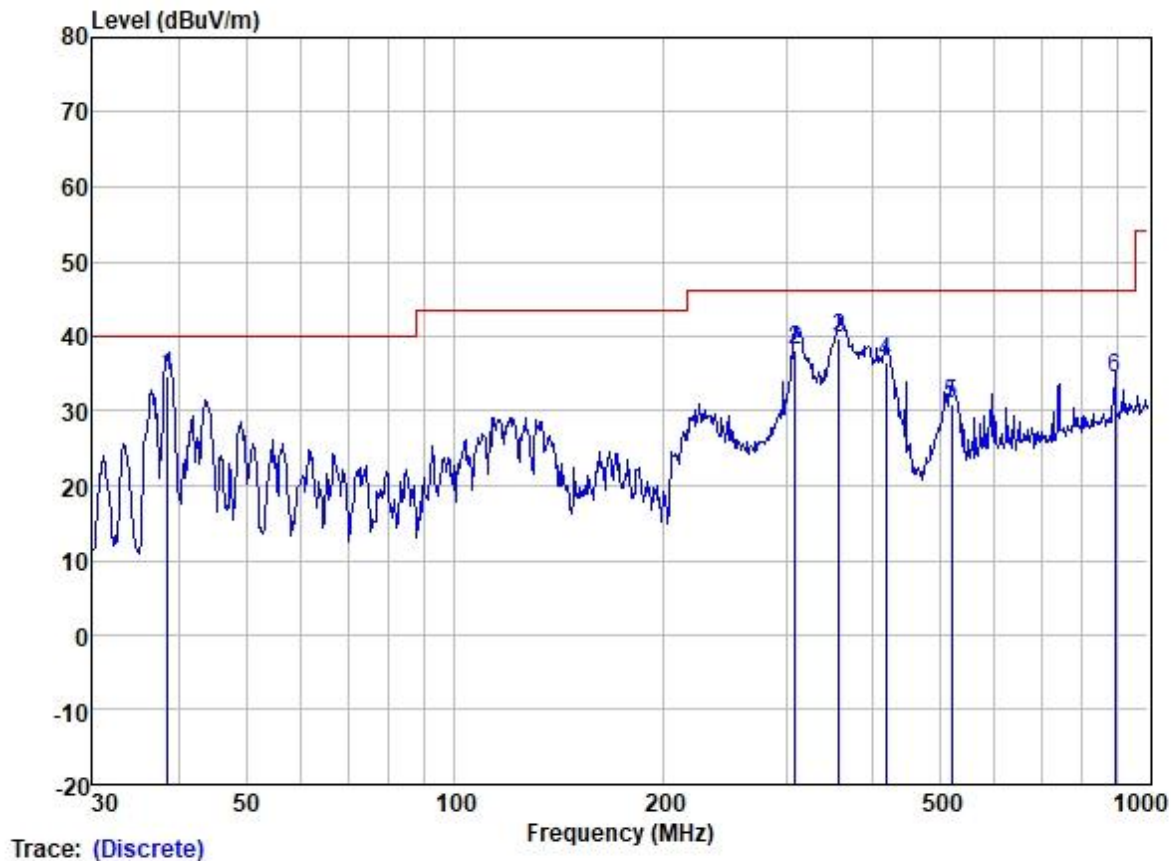
Test Mode: 02; Polarity: Horizontal



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

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	38.481	31.67	12.89	1.09	27.18	18.47	40.00	-21.53	HORIZONTAL	QP
2	132.221	43.29	12.08	1.99	26.98	30.38	43.50	-13.12	HORIZONTAL	QP
3	309.998	51.84	13.46	3.23	26.60	41.93	46.00	-4.07	HORIZONTAL	QP
4	359.186	49.63	14.38	3.70	27.10	40.61	46.00	-5.39	HORIZONTAL	QP
5	599.321	37.65	19.79	5.14	28.21	34.37	46.00	-11.63	HORIZONTAL	QP
6	833.317	30.84	22.63	6.38	27.98	31.87	46.00	-14.13	HORIZONTAL	QP

Test Mode: 02; Polarity: Vertical



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

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	38.481	47.83	12.89	1.09	27.18	34.63	40.00	-5.37	VERTICAL	QP
2	309.998	48.11	13.46	3.23	26.60	38.20	46.00	-7.80	VERTICAL	QP
3	357.929	48.85	14.35	3.70	27.09	39.81	46.00	-6.19	VERTICAL	QP
4	417.641	44.22	15.80	4.01	27.41	36.62	46.00	-9.38	VERTICAL	QP
5	520.888	36.25	18.11	4.55	28.01	30.90	46.00	-15.10	VERTICAL	QP
6	893.857	32.21	23.24	6.86	27.86	34.45	46.00	-11.55	VERTICAL	QP

7.8 Radiated Spurious Emissions Above 1GHz

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

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

Limit:

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

7.8.1 E.U.T. Operation

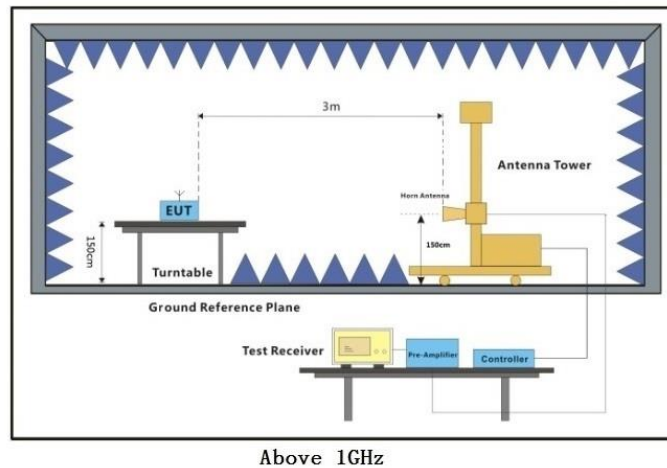
Operating Environment:

Temperature: 22.7 °C Humidity: 58.4 % RH Atmospheric Pressure: 1005 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in continuously transmitting mode(10MHz/20MHz) with all modulation types. Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

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

Remark:

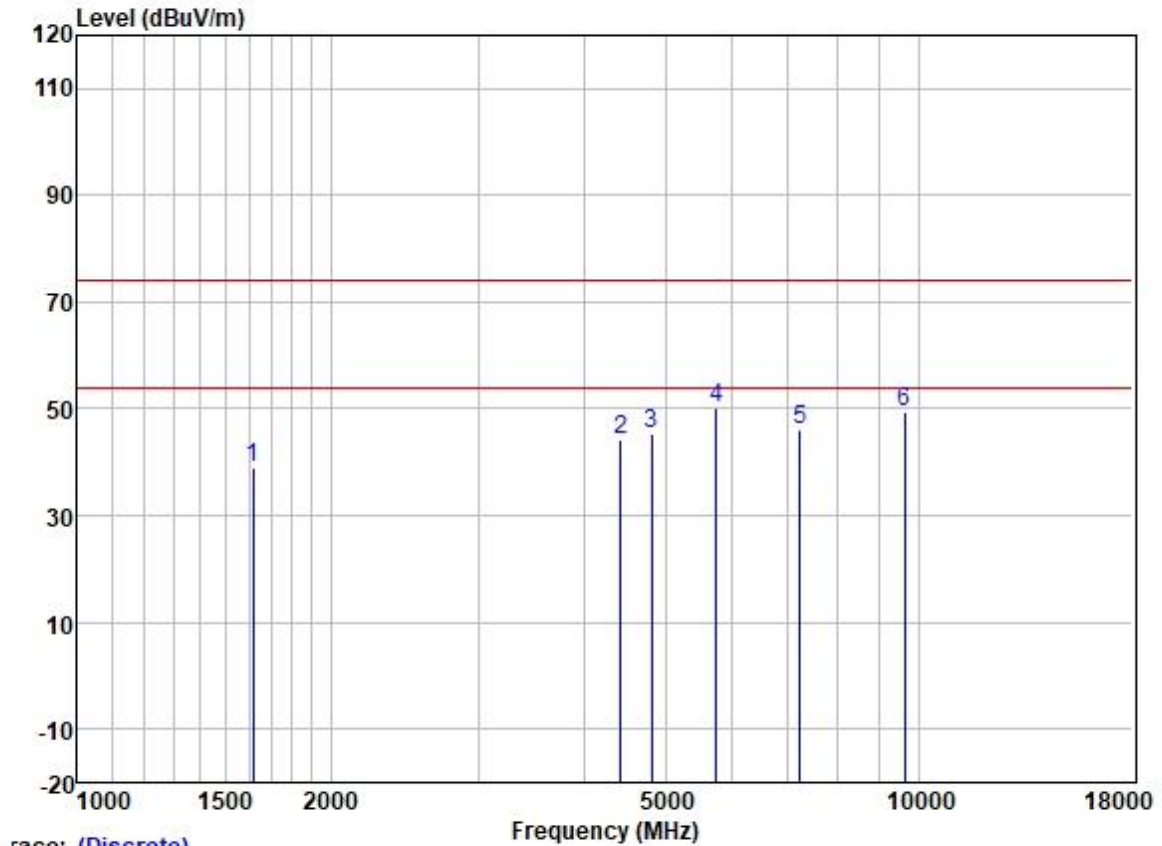
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from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



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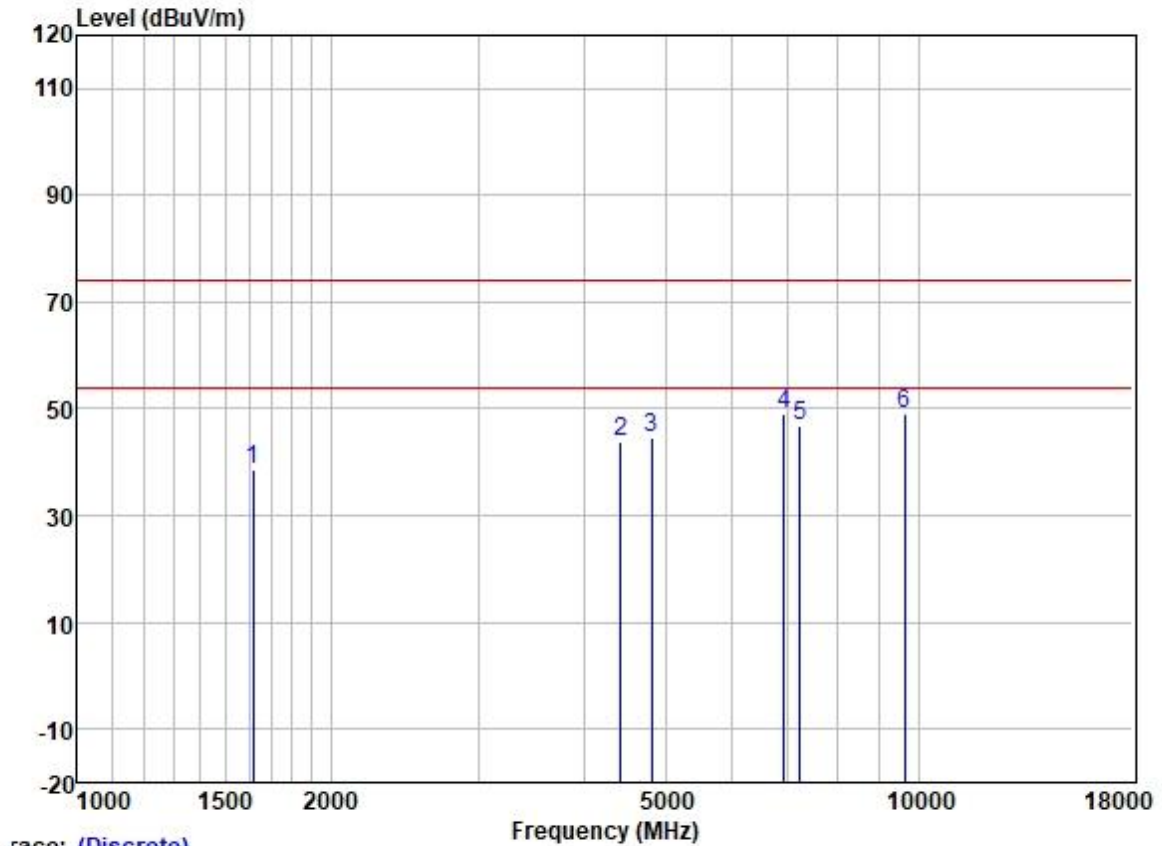
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Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: Low ; 10M



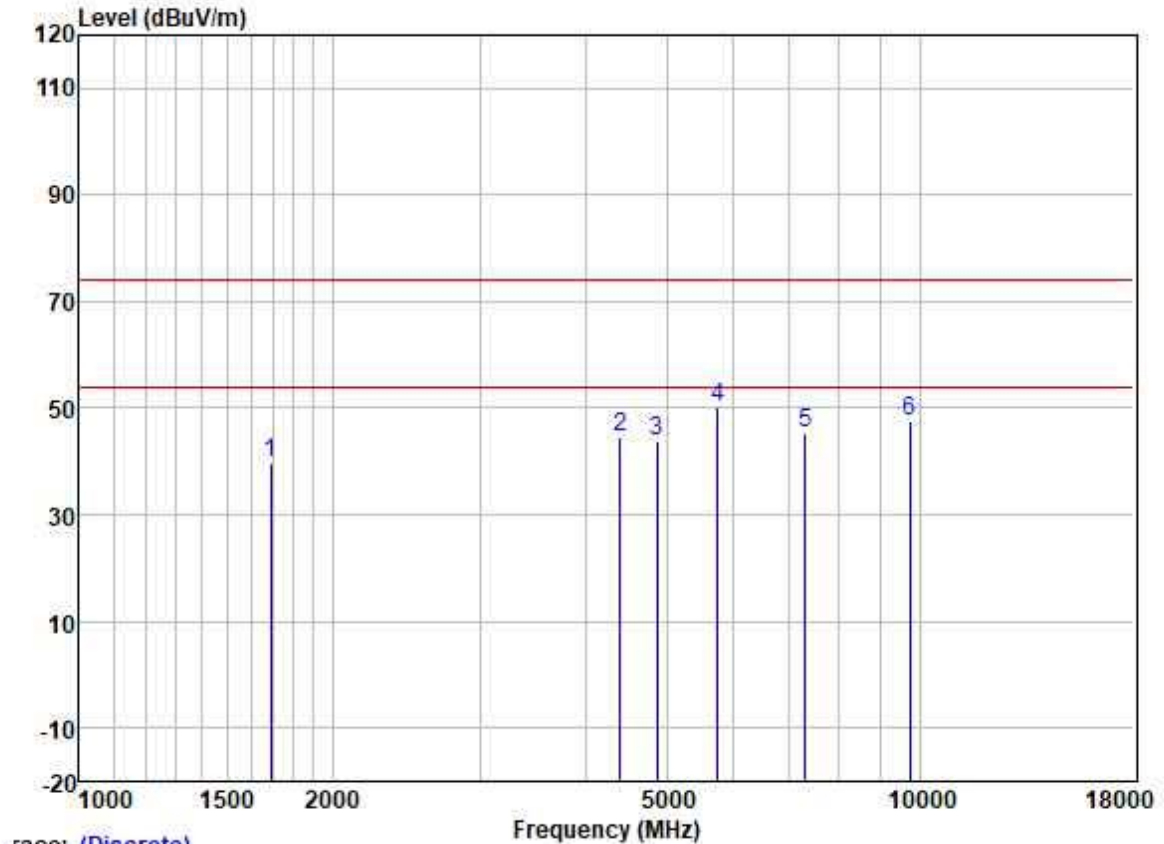
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1615.754	48.03	25.60	3.04	37.55	39.12	74.00	-34.88	VERTICAL	peak
2	4430.628	44.70	30.72	5.36	36.62	44.16	74.00	-29.84	VERTICAL	peak
3	4818.000	44.79	31.45	5.46	36.50	45.20	74.00	-28.80	VERTICAL	peak
4	5746.982	48.57	32.10	5.70	36.14	50.23	74.00	-23.77	VERTICAL	peak
5	7227.000	41.12	35.62	6.35	36.94	46.15	74.00	-27.85	VERTICAL	peak
6	9636.000	40.05	38.40	7.89	36.86	49.48	74.00	-24.52	VERTICAL	peak

Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: Low ; 10M



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1615.754	47.65	25.60	3.04	37.55	38.74	74.00	-35.26	HORIZONTAL	peak
2	4430.628	44.56	30.72	5.36	36.62	44.02	74.00	-29.98	HORIZONTAL	peak
3	4818.000	44.06	31.45	5.46	36.50	44.47	74.00	-29.53	HORIZONTAL	peak
4	6914.763	44.54	34.89	6.39	36.60	49.22	74.00	-24.78	HORIZONTAL	peak
5	7227.000	41.72	35.62	6.35	36.94	46.75	74.00	-27.25	HORIZONTAL	peak
6	9636.000	39.65	38.40	7.89	36.86	49.08	74.00	-24.92	HORIZONTAL	peak

Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: middle ; 10M



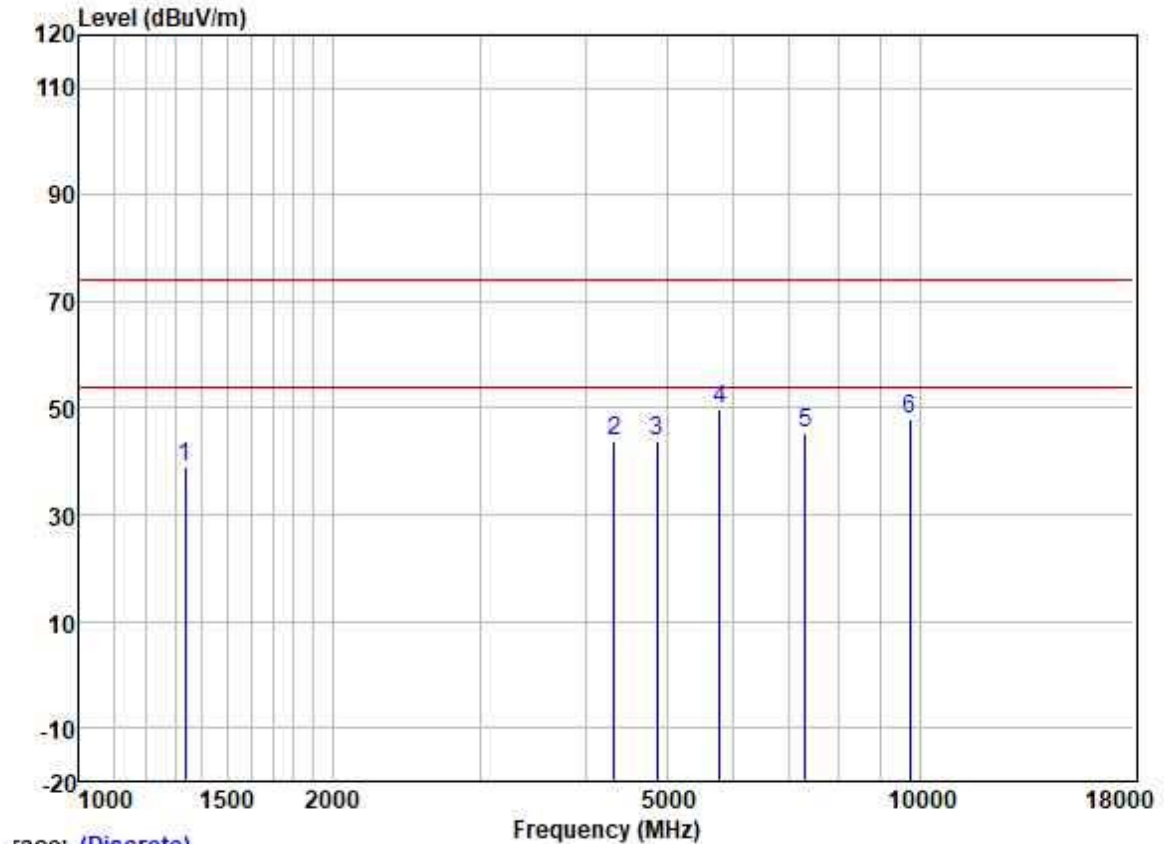
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	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1692.231	48.37	25.70	3.30	37.46	39.91	74.00	-34.09	VERTICAL	peak
2	4405.090	45.22	30.68	5.37	36.63	44.64	74.00	-29.36	VERTICAL	peak
3	4868.000	43.36	31.54	5.49	36.48	43.91	74.00	-30.09	VERTICAL	peak
4	5746.982	48.47	32.10	5.70	36.14	50.13	74.00	-23.87	VERTICAL	peak
5	7302.000	39.89	35.93	6.32	36.99	45.15	74.00	-28.85	VERTICAL	peak
6	9736.000	38.38	38.47	7.56	36.84	47.57	74.00	-26.43	VERTICAL	peak



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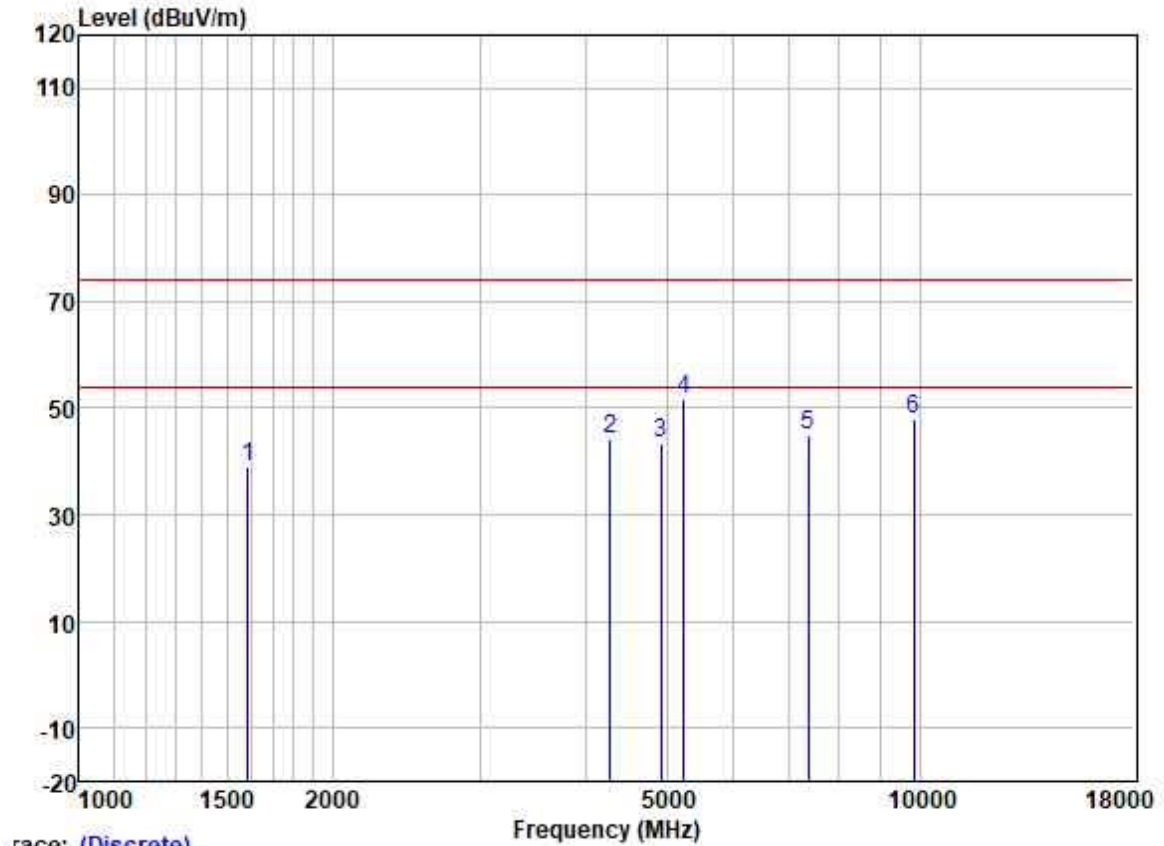
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Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: middle ; 10M



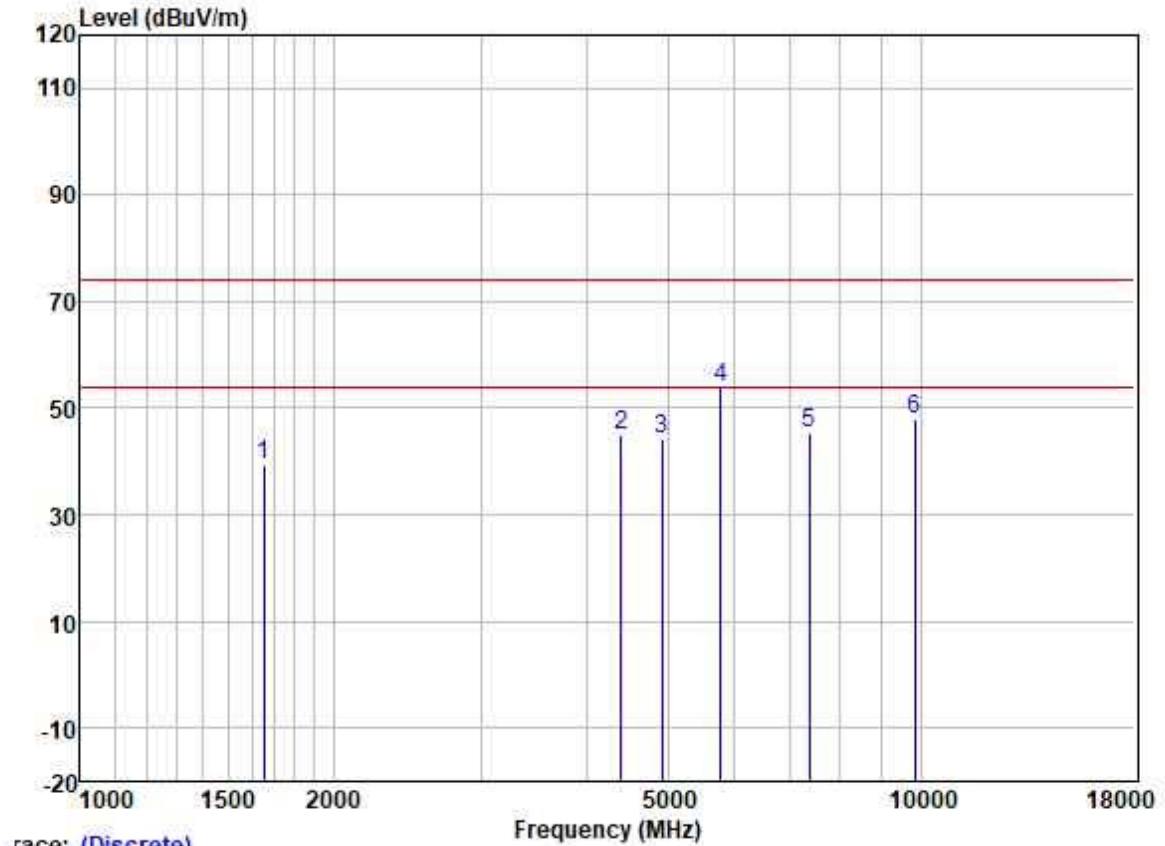
	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1335.141	49.17	25.28	2.73	38.02	39.16	74.00	-34.84	HORIZONTAL	peak
2	4329.354	44.81	30.54	5.31	36.64	44.02	74.00	-29.98	HORIZONTAL	peak
3	4868.000	43.26	31.54	5.49	36.48	43.81	74.00	-30.19	HORIZONTAL	peak
4	5780.300	48.06	32.16	5.68	36.14	49.76	74.00	-24.24	HORIZONTAL	peak
5	7302.000	39.91	35.93	6.32	36.99	45.17	74.00	-28.83	HORIZONTAL	peak
6	9736.000	38.91	38.47	7.56	36.84	48.10	74.00	-25.90	HORIZONTAL	peak

Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: High ; 10M



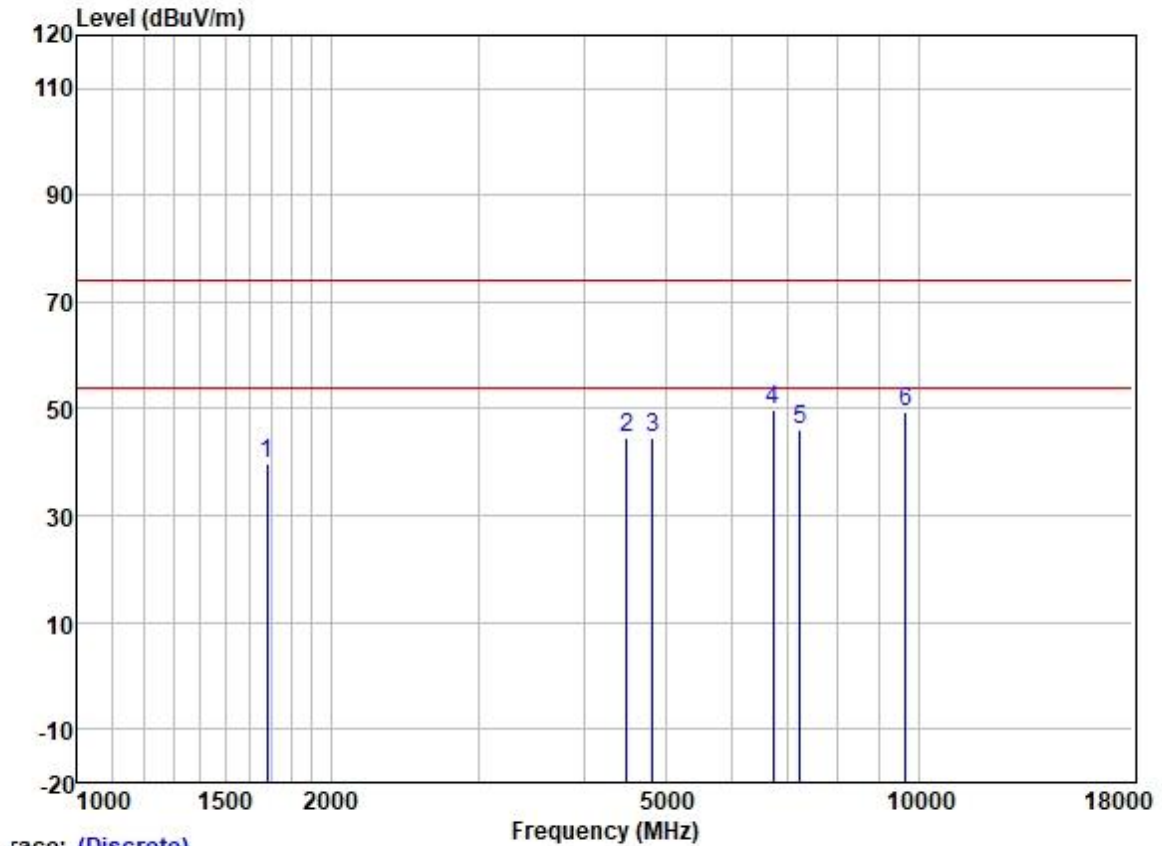
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	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1587.975	47.99	25.57	3.00	37.58	38.98	74.00	-35.02	VERTICAL	peak
2	4279.589	45.28	30.42	5.27	36.65	44.32	74.00	-29.68	VERTICAL	peak
3	4918.000	42.91	31.60	5.51	36.45	43.57	74.00	-30.43	VERTICAL	peak
4	5239.274	50.69	31.75	5.37	36.27	51.54	74.00	-22.46	VERTICAL	peak
5	7377.000	39.48	36.12	6.31	37.04	44.87	74.00	-29.13	VERTICAL	peak
6	9836.000	39.25	38.58	7.06	36.82	48.07	74.00	-25.93	VERTICAL	peak

Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: High ; 10M



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1653.550	48.15	25.64	3.14	37.51	39.42	74.00	-34.58	HORIZONTAL	peak
2	4405.090	45.63	30.68	5.37	36.63	45.05	74.00	-28.95	HORIZONTAL	peak
3	4918.000	43.40	31.60	5.51	36.45	44.06	74.00	-29.94	HORIZONTAL	peak
4	5780.300	52.27	32.16	5.68	36.14	53.97	74.00	-20.03	HORIZONTAL	peak
5	7377.000	39.81	36.12	6.31	37.04	45.20	74.00	-28.80	HORIZONTAL	peak
6	9836.000	39.11	38.58	7.06	36.82	47.93	74.00	-26.07	HORIZONTAL	peak

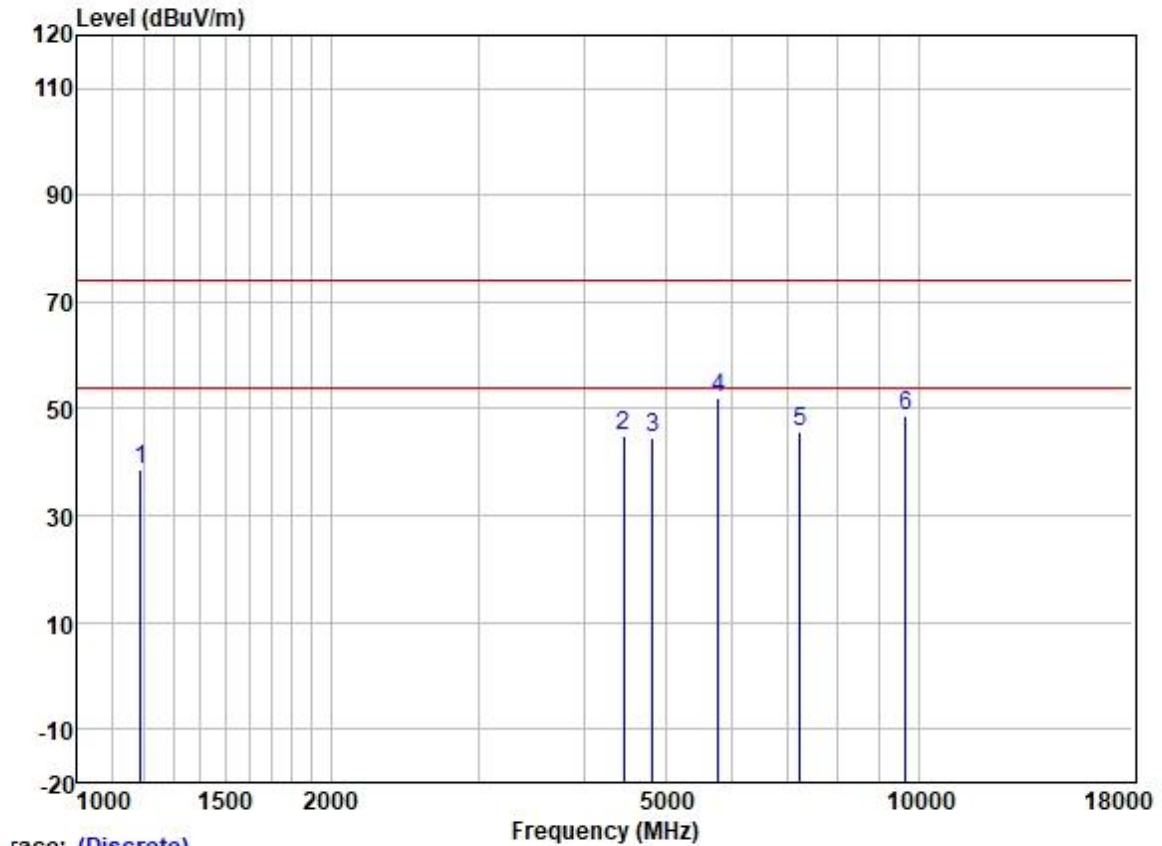
Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: Low ; 20M



Trace: (Discrete)

	Freq	Read	Antenna	Cable	Preamp	Limit	Over		
		Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1682.477	48.31	25.68	3.25	37.48	39.76	74.00	-34.24	VERTICAL peak
2	4495.125	45.01	30.80	5.33	36.60	44.54	74.00	-29.46	VERTICAL peak
3	4824.000	44.26	31.45	5.46	36.50	44.67	74.00	-29.33	VERTICAL peak
4	6717.762	45.62	34.44	6.29	36.42	49.93	74.00	-24.07	VERTICAL peak
5	7236.000	41.01	35.70	6.35	36.94	46.12	74.00	-27.88	VERTICAL peak
6	9648.000	39.81	38.40	7.89	36.85	49.25	74.00	-24.75	VERTICAL peak

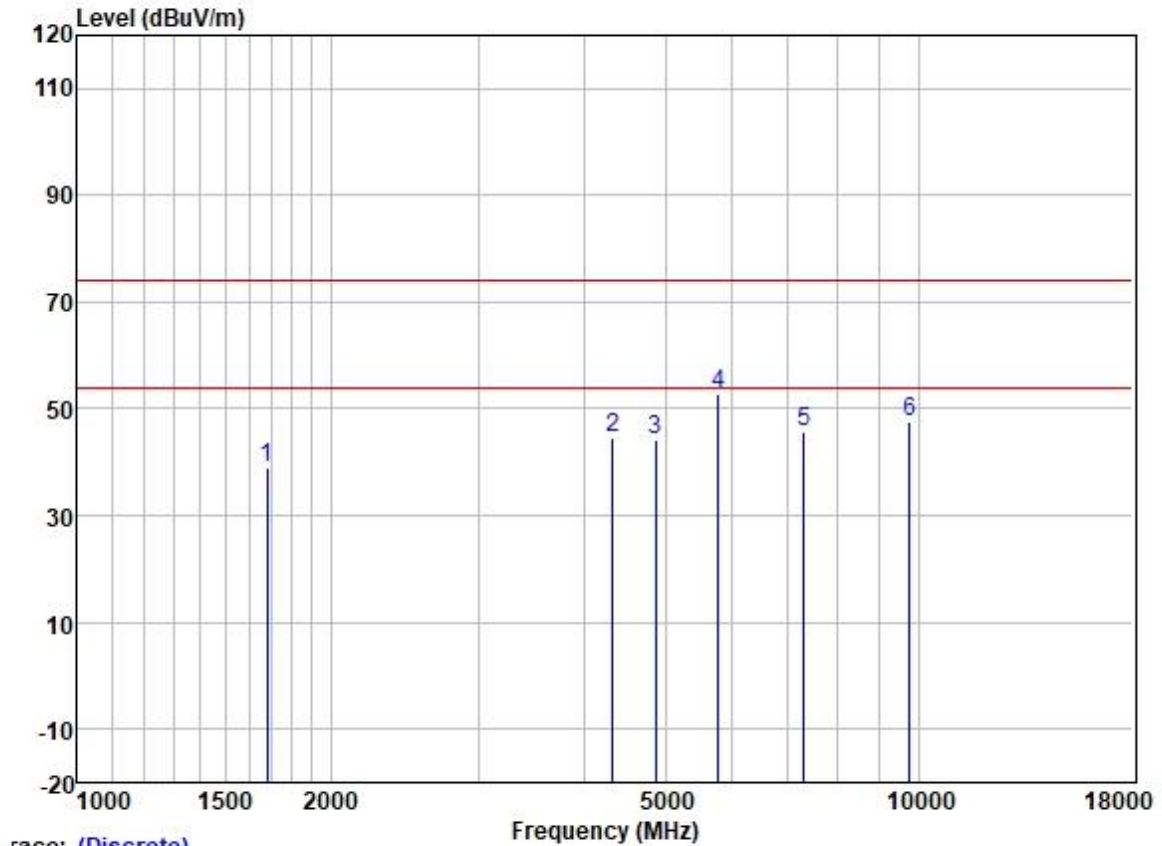
Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: Low ; 20M



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1189.368	49.55	24.63	2.57	38.14	38.61	74.00	-35.39	HORIZONTAL	peak
2	4456.315	45.42	30.75	5.35	36.62	44.90	74.00	-29.10	HORIZONTAL	peak
3	4824.000	44.33	31.45	5.46	36.50	44.74	74.00	-29.26	HORIZONTAL	peak
4	5780.300	50.54	32.16	5.68	36.14	52.24	74.00	-21.76	HORIZONTAL	peak
5	7236.000	40.48	35.70	6.35	36.94	45.59	74.00	-28.41	HORIZONTAL	peak
6	9648.000	39.41	38.40	7.89	36.85	48.85	74.00	-25.15	HORIZONTAL	peak

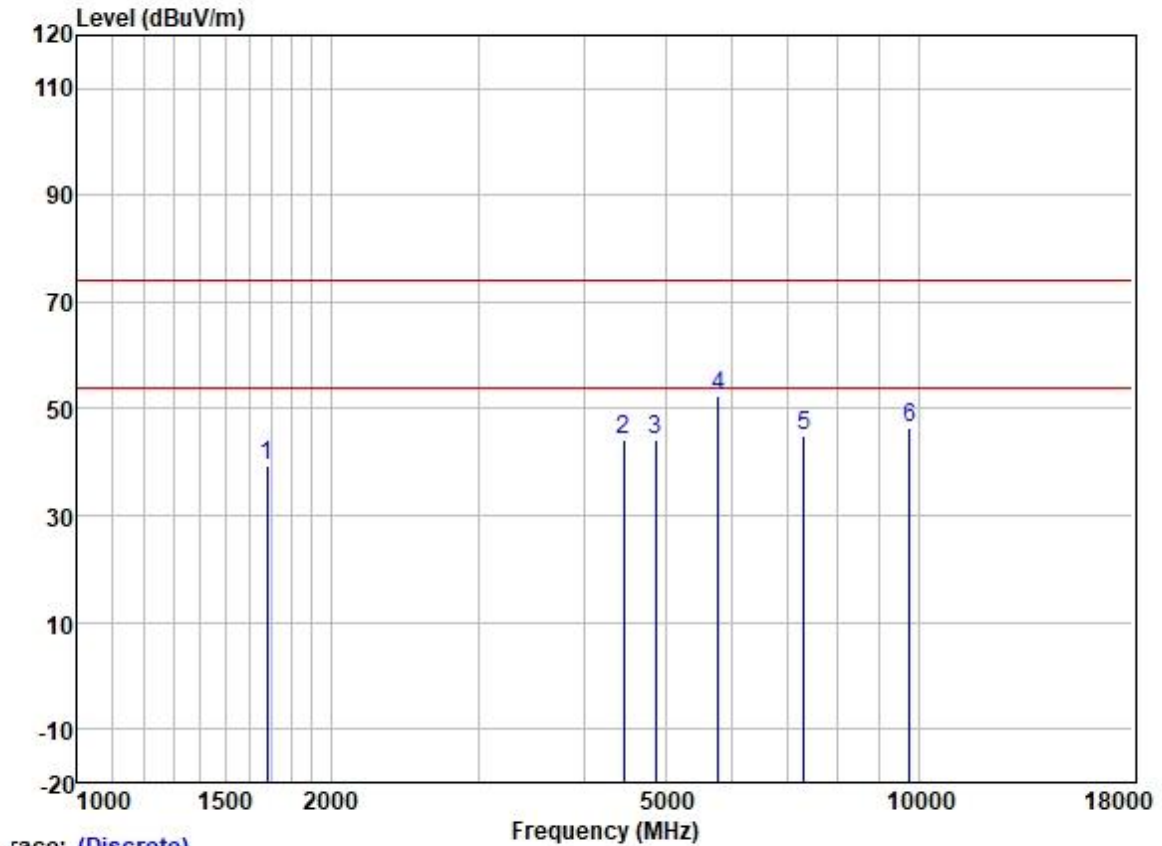
Test Mode: 01; Polarity: Vertical; Modulation: QPSK; Channel: middle ; 20M



Trace: (Discrete)

	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	47.55	25.68	3.25	37.48	39.00	74.00	-35.00	VERTICAL	peak
2	4329.354	45.39	30.54	5.31	36.64	44.60	74.00	-29.40	VERTICAL	peak
3	4874.000	43.81	31.54	5.49	36.48	44.36	74.00	-29.64	VERTICAL	peak
4	5780.300	50.97	32.16	5.68	36.14	52.67	74.00	-21.33	VERTICAL	peak
5	7311.000	40.52	35.93	6.32	36.99	45.78	74.00	-28.22	VERTICAL	peak
6	9748.000	38.66	38.50	7.43	36.83	47.76	74.00	-26.24	VERTICAL	peak

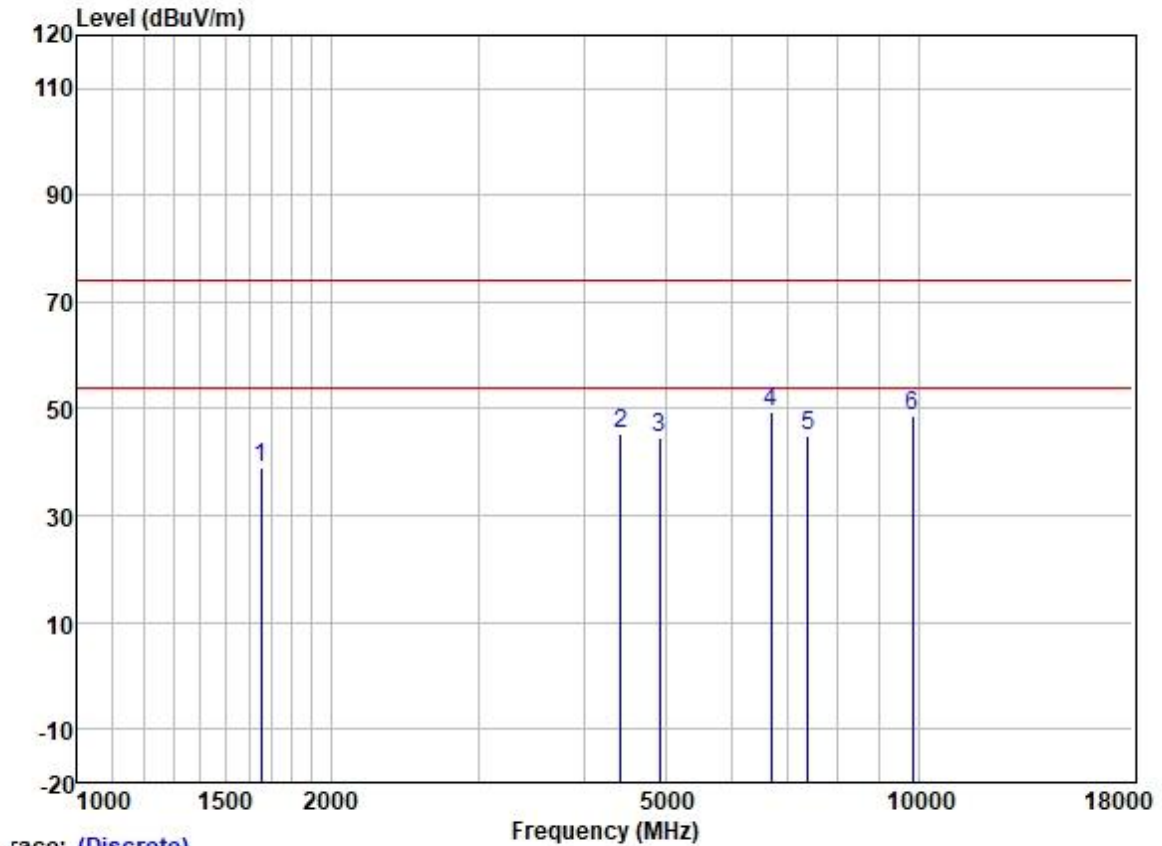
Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: middle ; 20M



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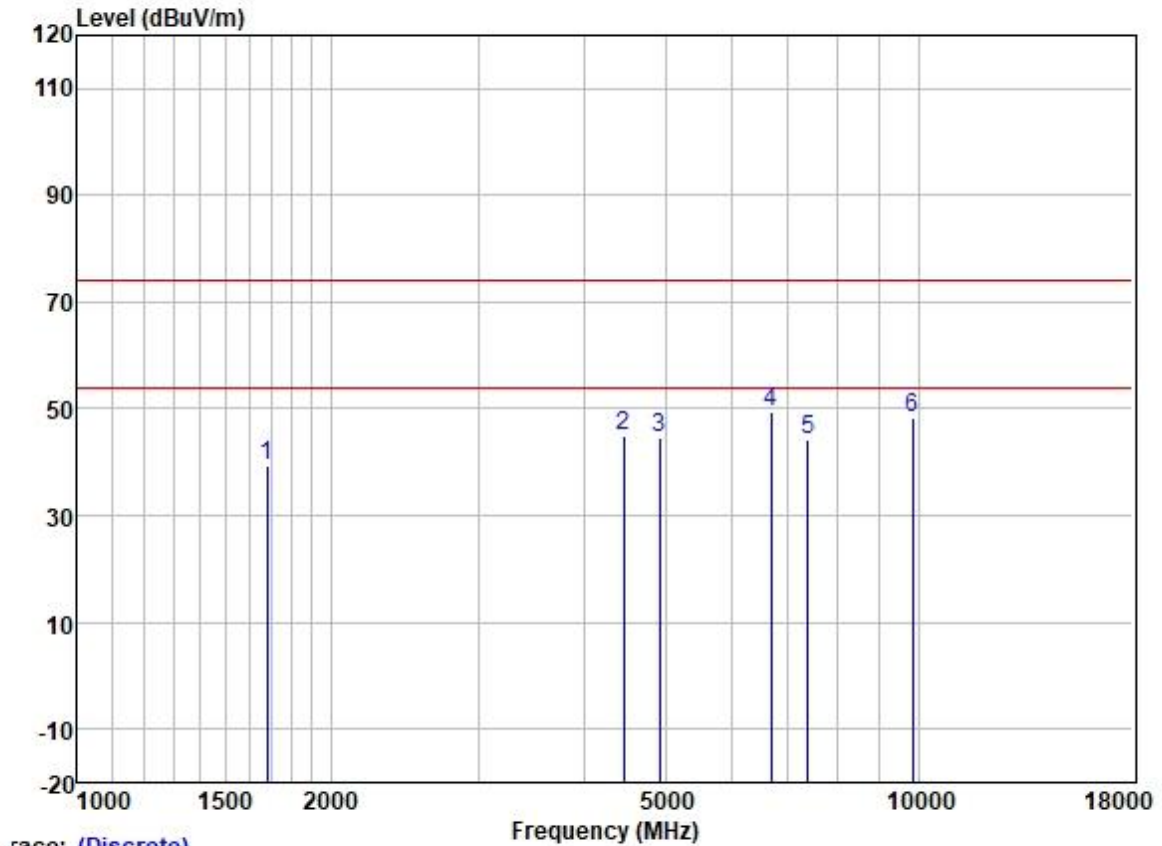
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		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1682.477	47.84	25.68	3.25	37.48	39.29	74.00	-34.71	HORIZONTAL	peak
2	4456.315	44.90	30.75	5.35	36.62	44.38	74.00	-29.62	HORIZONTAL	peak
3	4874.000	43.60	31.54	5.49	36.48	44.15	74.00	-29.85	HORIZONTAL	peak
4	5780.300	50.76	32.16	5.68	36.14	52.46	74.00	-21.54	HORIZONTAL	peak
5	7311.000	39.62	35.93	6.32	36.99	44.88	74.00	-29.12	HORIZONTAL	peak
6	9748.000	37.33	38.50	7.43	36.83	46.43	74.00	-27.57	HORIZONTAL	peak

Test Mode: 01; Polarity: Vertical; Modulation:QPSK; Channel:High ; 20M



	Freq	ReadAntenna	Cable	Preamp		Limit	Over			
		Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1653.550	47.59	25.64	3.14	37.51	38.86	74.00	-35.14	VERTICAL	peak
2	4430.628	45.73	30.72	5.36	36.62	45.19	74.00	-28.81	VERTICAL	peak
3	4924.000	43.87	31.62	5.51	36.45	44.55	74.00	-29.45	VERTICAL	peak
4	6679.040	45.27	34.33	6.27	36.39	49.48	74.00	-24.52	VERTICAL	peak
5	7386.000	39.62	36.17	6.30	37.04	45.05	74.00	-28.95	VERTICAL	peak
6	9848.000	39.81	38.58	7.06	36.82	48.63	74.00	-25.37	VERTICAL	peak

Test Mode: 01; Polarity: Horizontal; Modulation: QPSK; Channel: High ; 20M



Trace: (Discrete)

	Freq	Read	Antenna	Cable	Preamp	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1682.477	48.08	25.68	3.25	37.48	39.53	74.00	-34.47	HORIZONTAL peak
2	4456.315	45.36	30.75	5.35	36.62	44.84	74.00	-29.16	HORIZONTAL peak
3	4924.000	43.92	31.62	5.51	36.45	44.60	74.00	-29.40	HORIZONTAL peak
4	6679.040	45.33	34.33	6.27	36.39	49.54	74.00	-24.46	HORIZONTAL peak
5	7386.000	38.71	36.17	6.30	37.04	44.14	74.00	-29.86	HORIZONTAL peak
6	9848.000	39.64	38.58	7.06	36.82	48.46	74.00	-25.54	HORIZONTAL peak

8 Test Setup Photo

Refer to Appendix - Test Setup Photos for GZCR220400040902

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2204000409AT



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10 Appendix

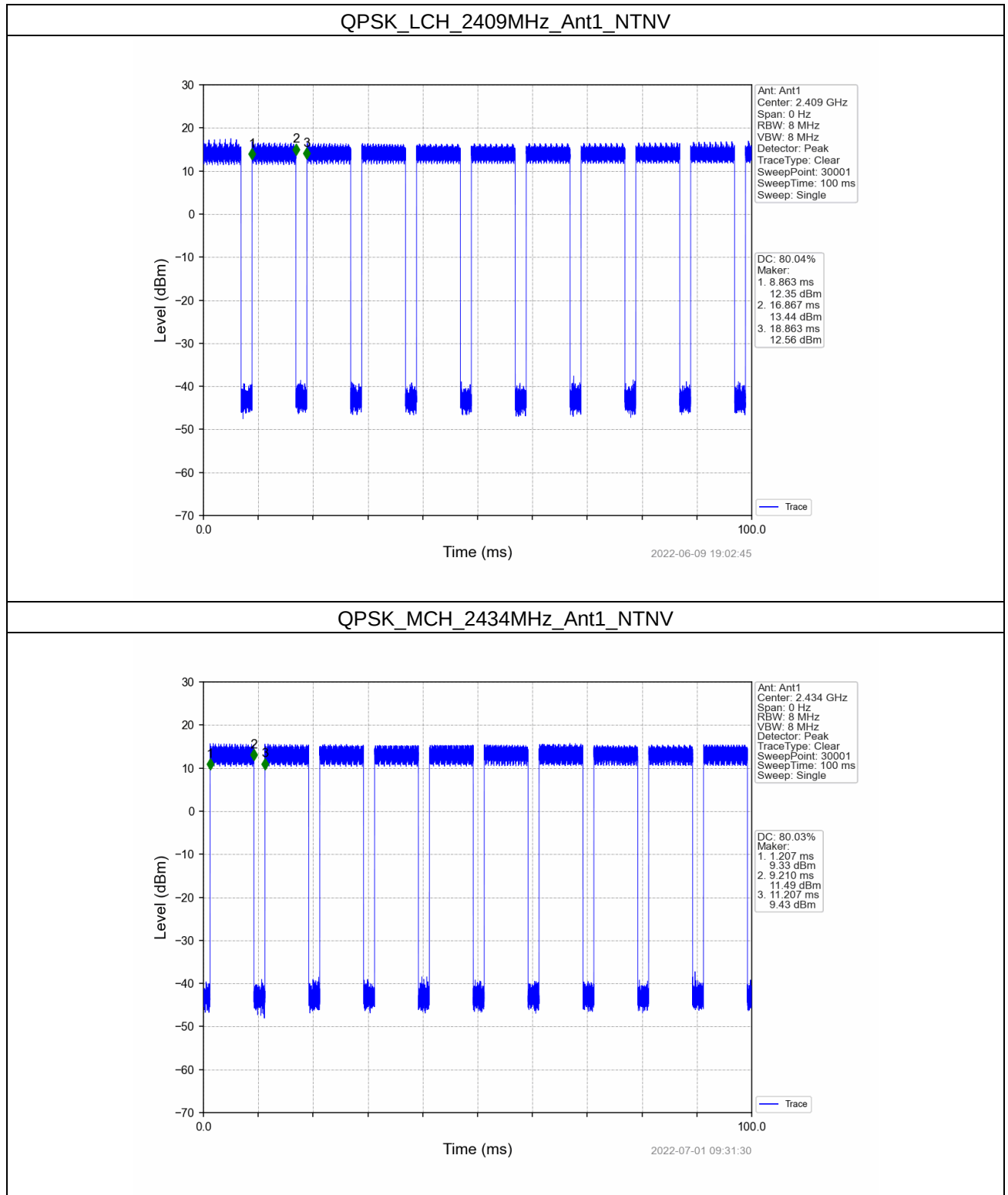
1. Duty Cycle

1.1 Ant1

1.1.1 Test Result

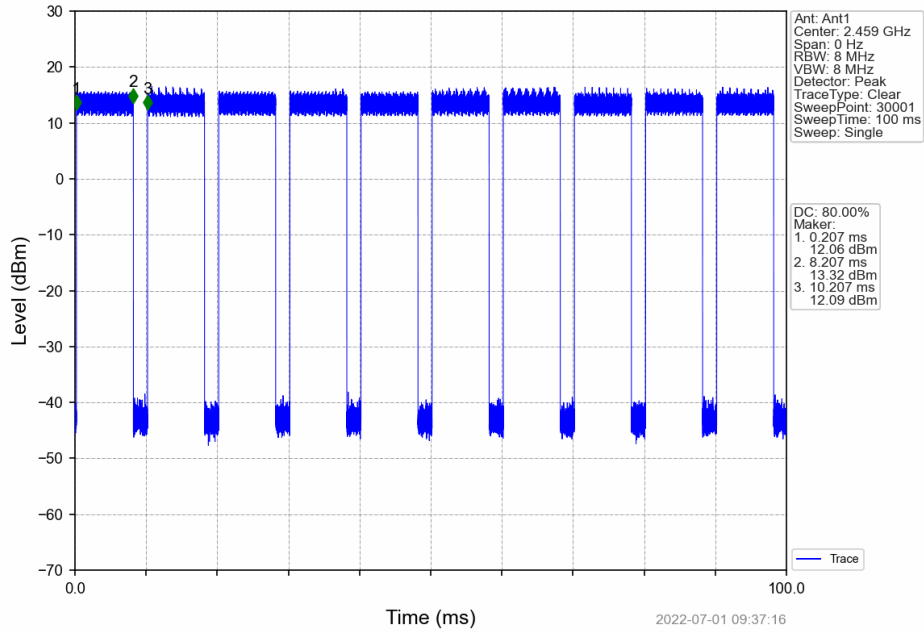
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
QPSK	SISO	2409	8.004	10.000	80.04	0.97	0.00
		2434	8.003	10.000	80.03	0.97	0.00
		2459	8.000	10.000	80.00	0.97	0.03
QPSK2	SISO	2412	8.003	10.000	80.03	0.97	0.00
		2437	8.003	10.000	80.03	0.97	0.00
		2462	8.003	10.000	80.03	0.97	0.00

1.1.2 Test Graph

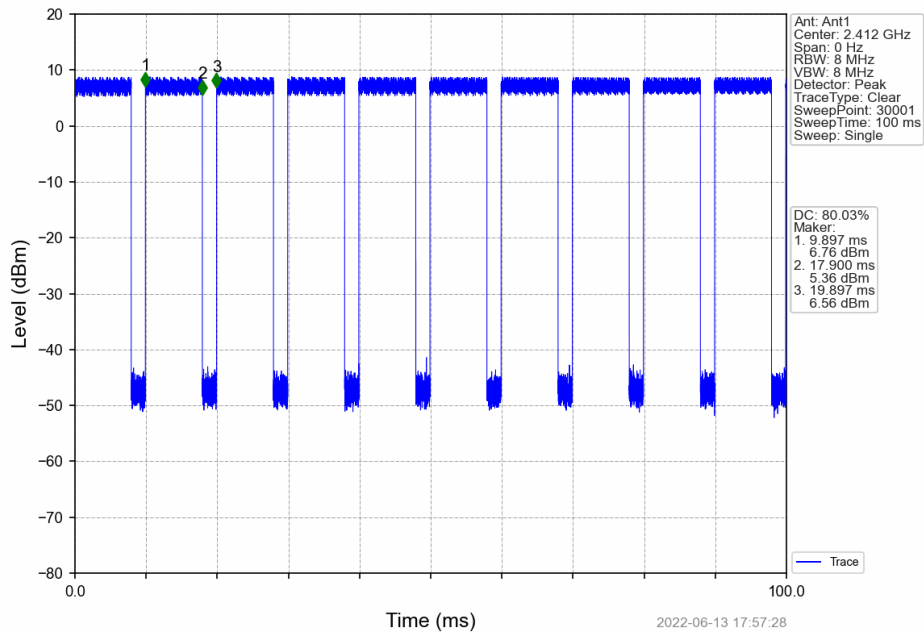


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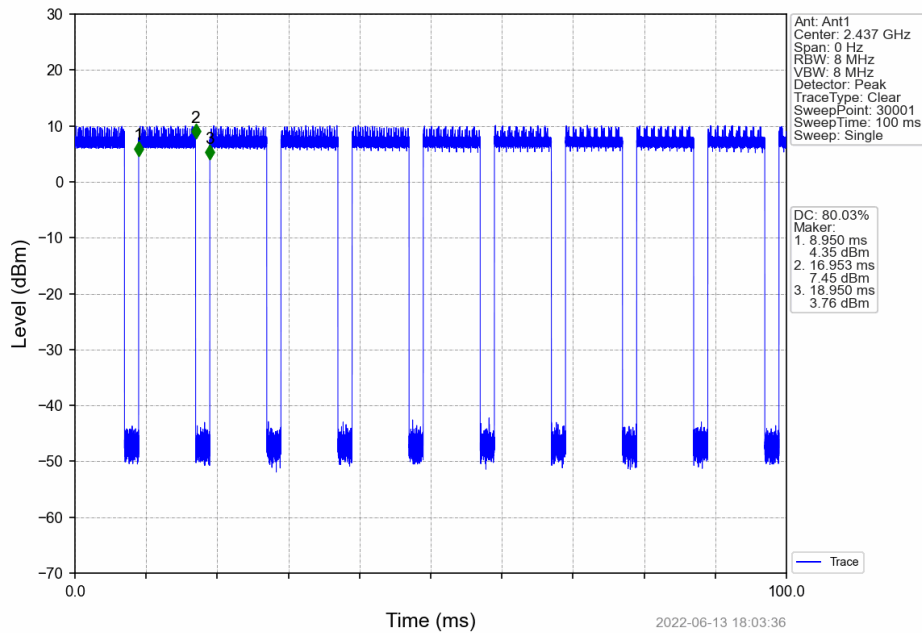
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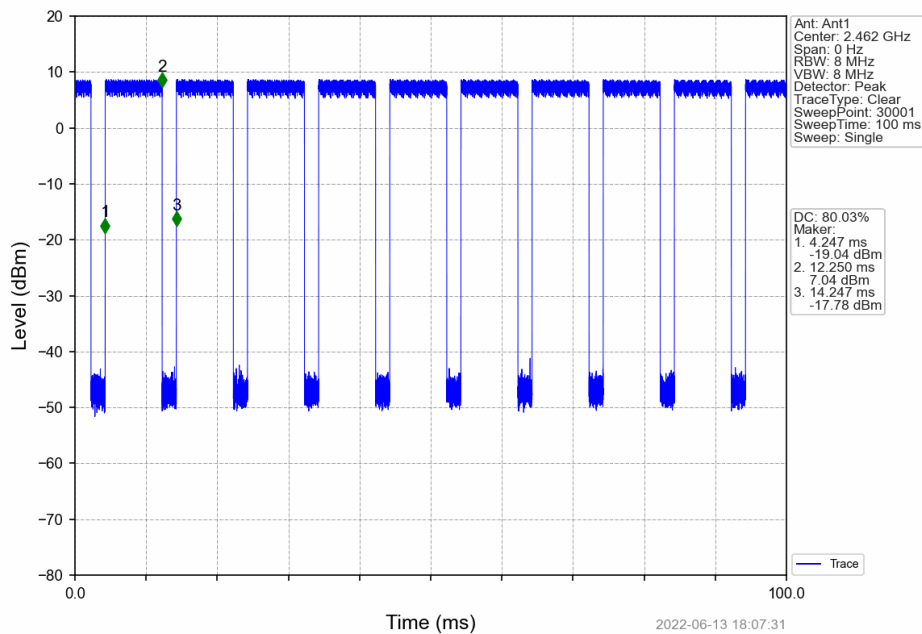
QPSK2_LCH_2412MHz_Ant1_NTNV



QPSK2_MCH_2437MHz_Ant1_NTNV



QPSK2_HCH_2462MHz_Ant1_NTNV



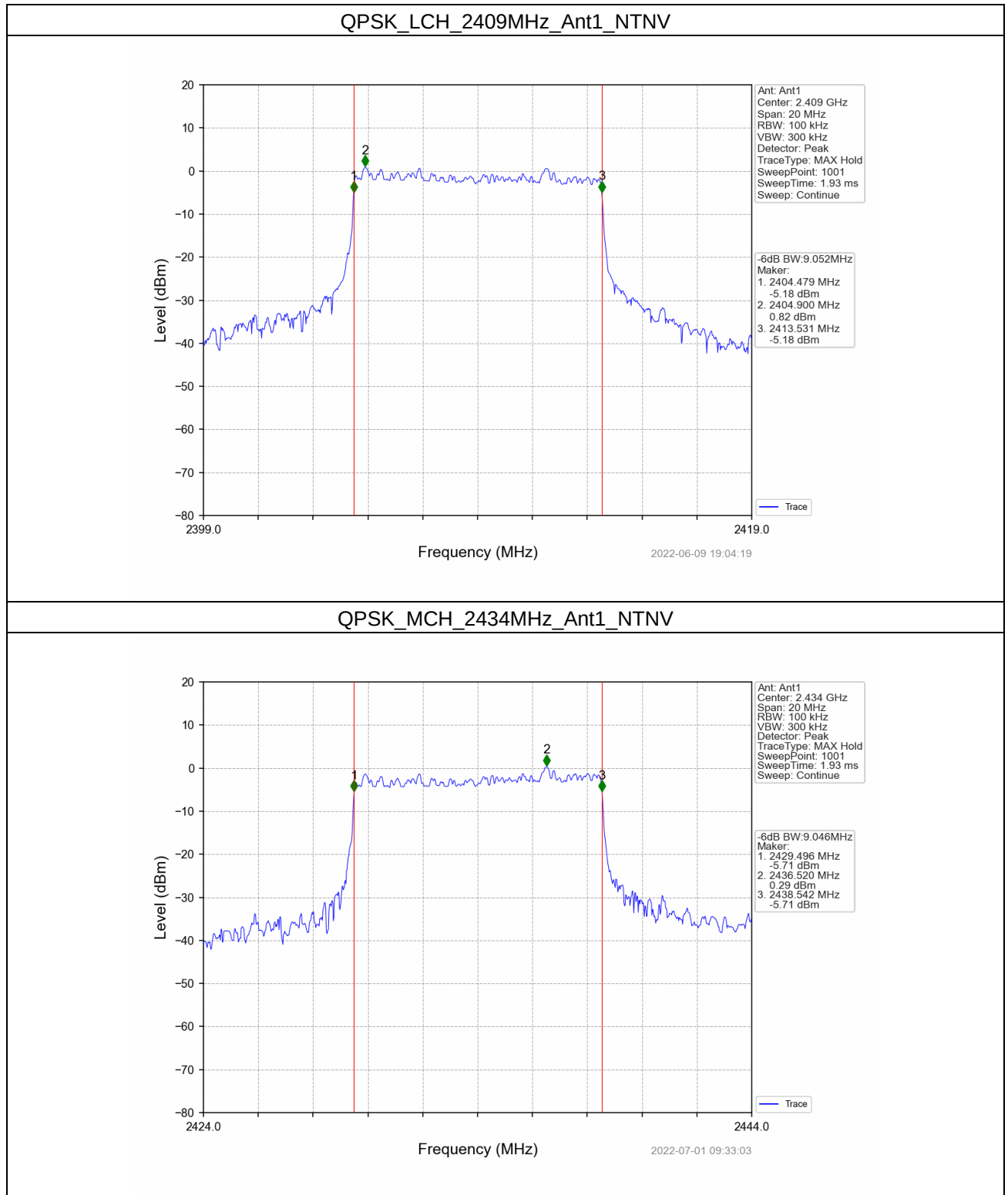
2. Bandwidth

2.1 6dB BW

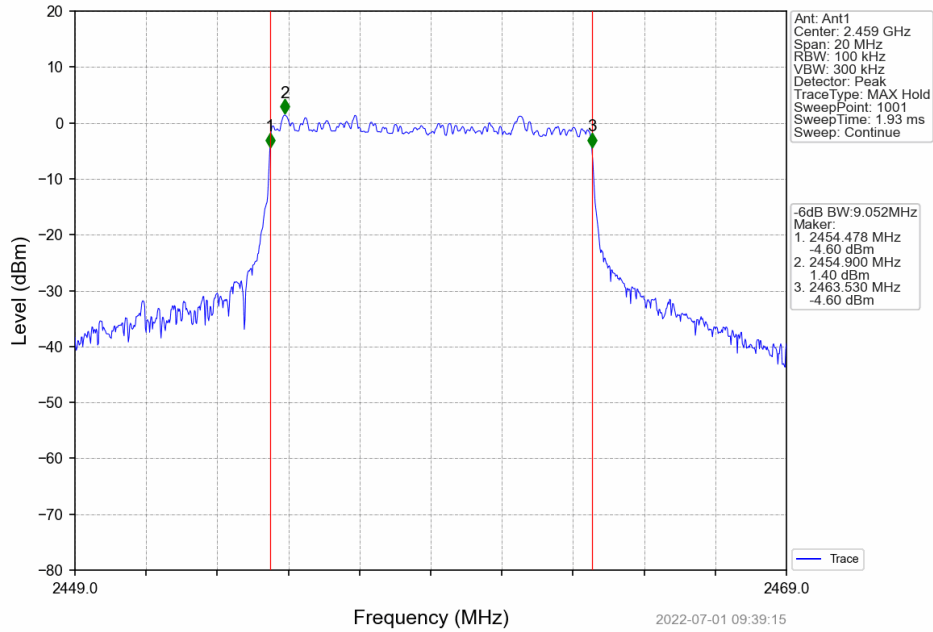
2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
QPSK	SISO	2409	1	9.052	≥ 0.5	Pass
		2434	1	9.046	≥ 0.5	Pass
		2459	1	9.052	≥ 0.5	Pass
QPSK2	SISO	2412	1	18.031	≥ 0.5	Pass
		2437	1	18.057	≥ 0.5	Pass
		2462	1	16.354	≥ 0.5	Pass

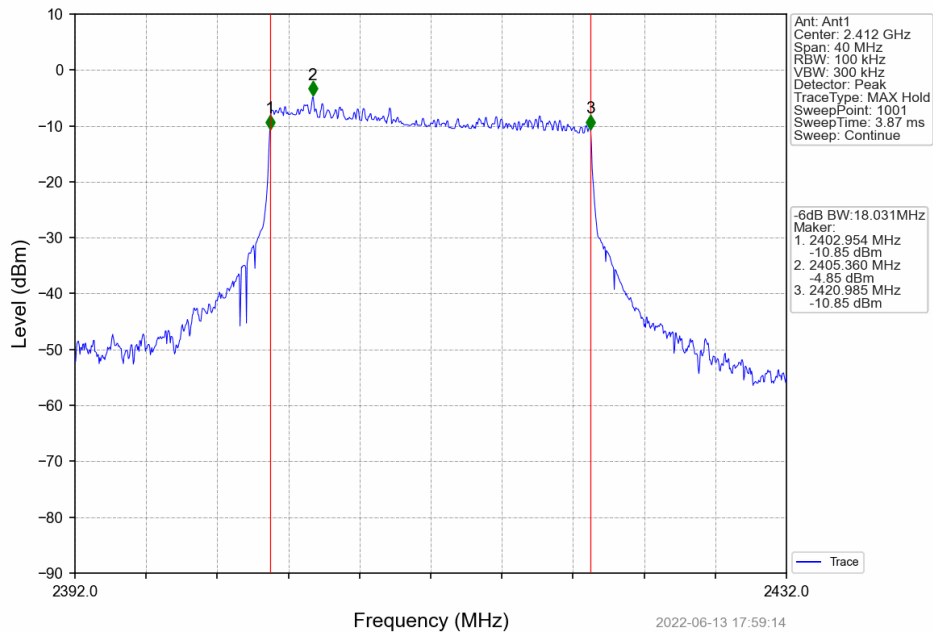
2.1.2 Test Graph



QPSK_HCH_2459MHz_Ant1_NTNV

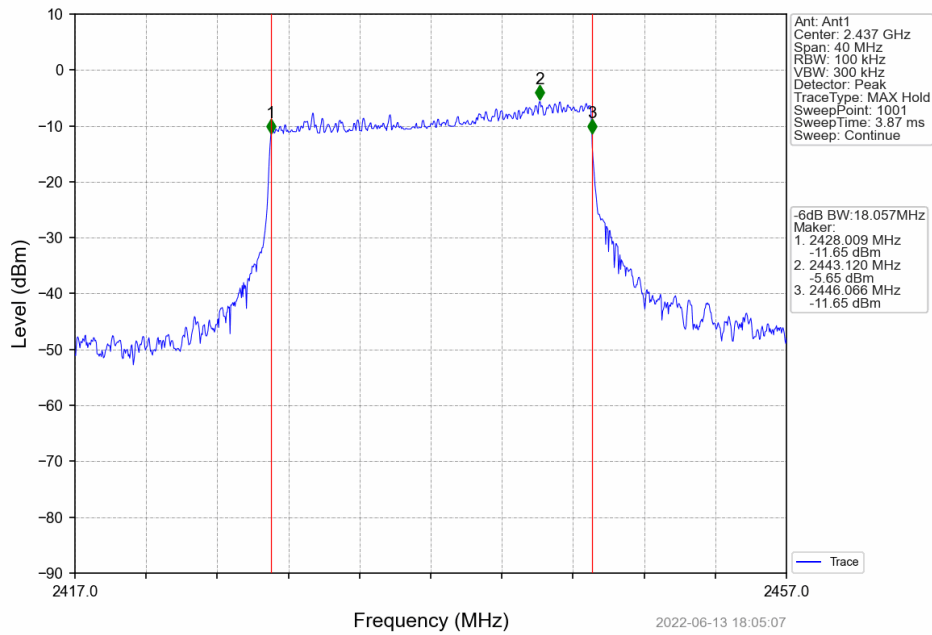


QPSK2_LCH_2412MHz_Ant1_NTNV

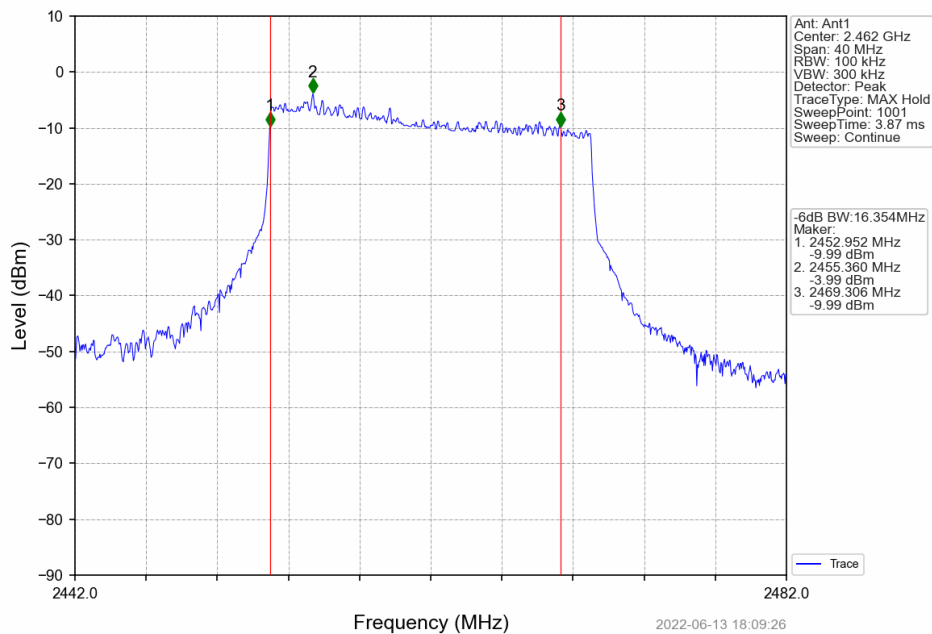


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QPSK2_MCH_2437MHz_Ant1_NTNV



QPSK2_HCH_2462MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Power

3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
QPSK	SISO	2409	1.22	<=30	Pass
		2434	1.39	<=30	Pass
		2459	1.17	<=30	Pass
QPSK2	SISO	2412	1.44	<=30	Pass
		2437	1.49	<=30	Pass
		2462	1.30	<=30	Pass

Note1: Antenna Gain: Ant1: 3dBi;

4. Maximum Power Spectral Density

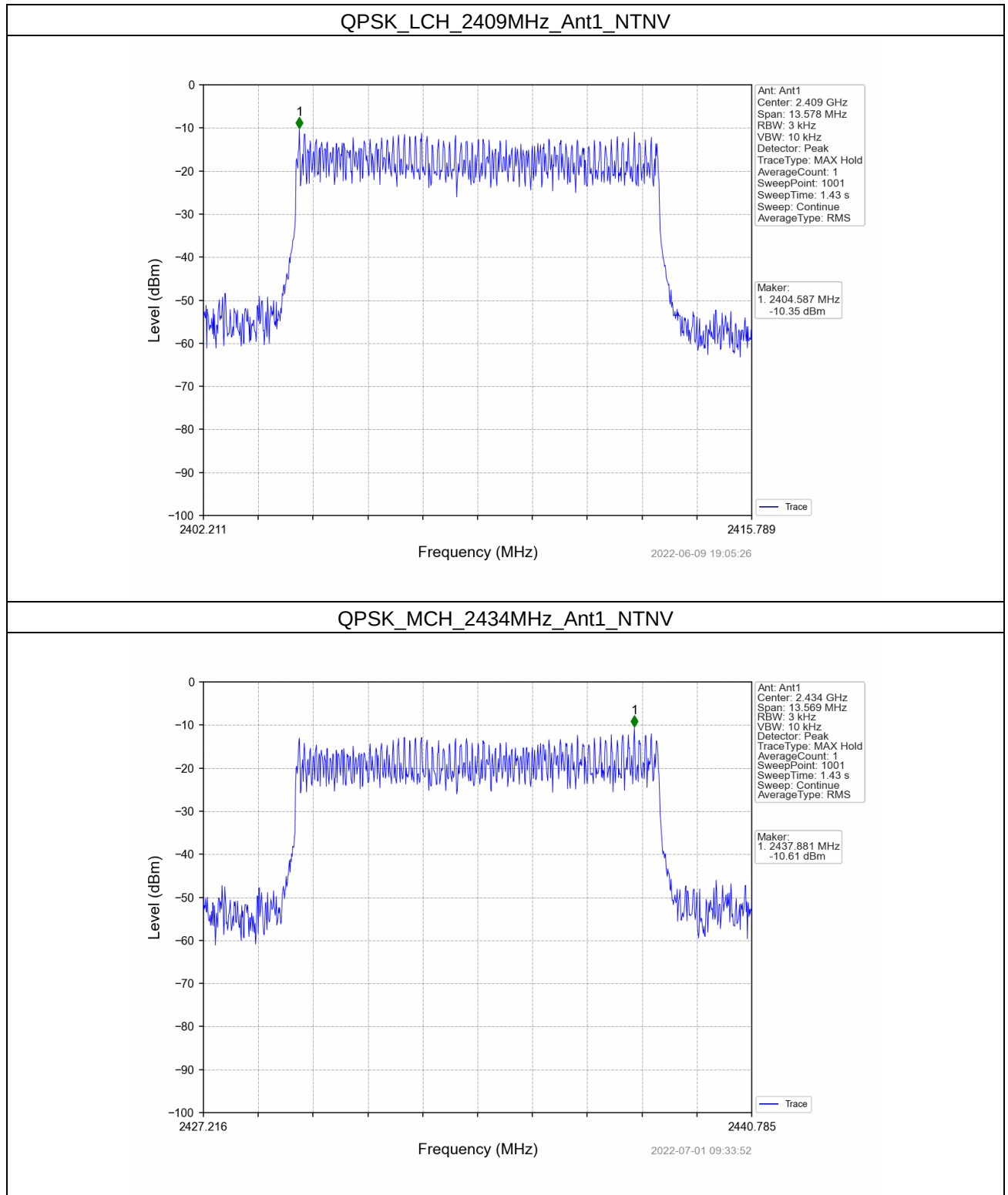
4.1 PSD

4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
QPSK	SISO	2409	-10.35	<=8	Pass
		2434	-10.61	<=8	Pass
		2459	-10.38	<=8	Pass
QPSK2	SISO	2412	-17.19	<=8	Pass
		2437	-16.75	<=8	Pass
		2462	-16.55	<=8	Pass

Note1: Antenna Gain: Ant: 3dBi;

4.1.2 Test Graph

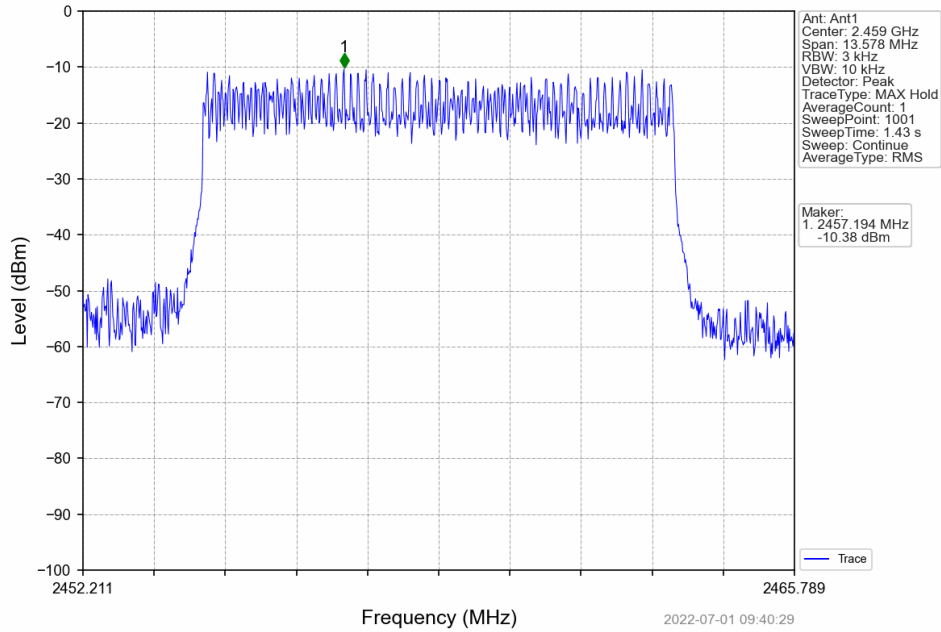


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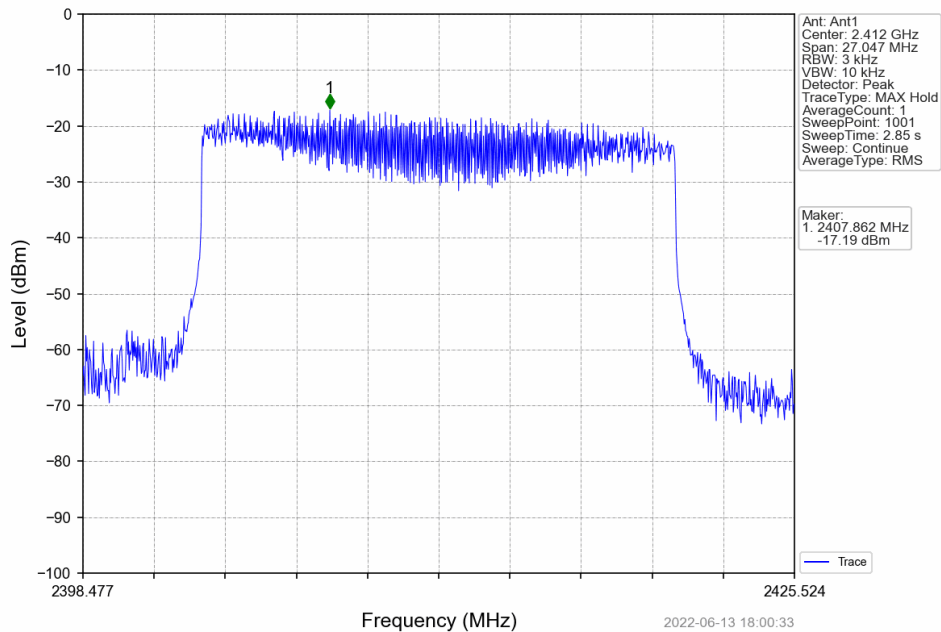
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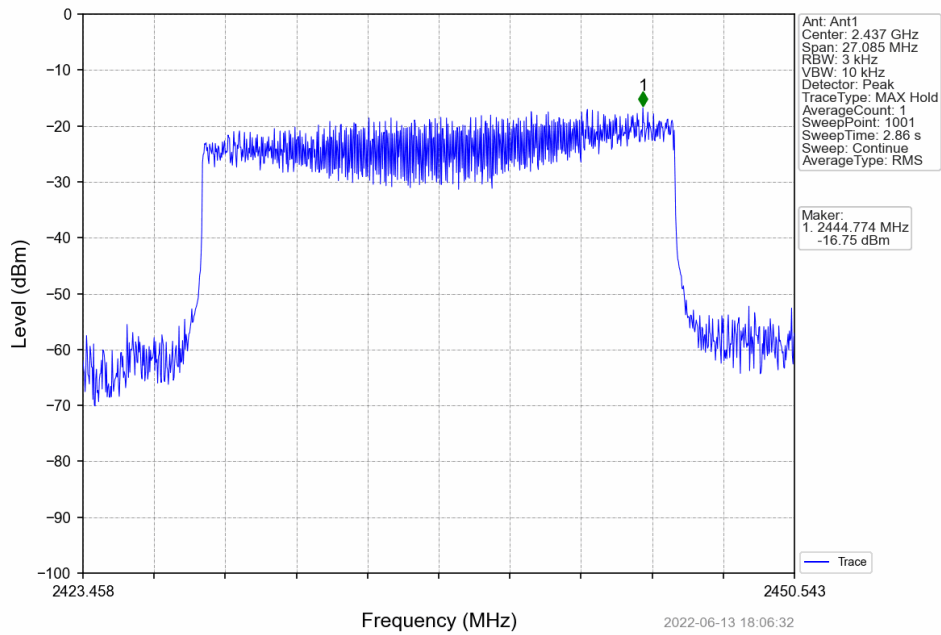
QPSK_HCH_2459MHz_Ant1_NTNV



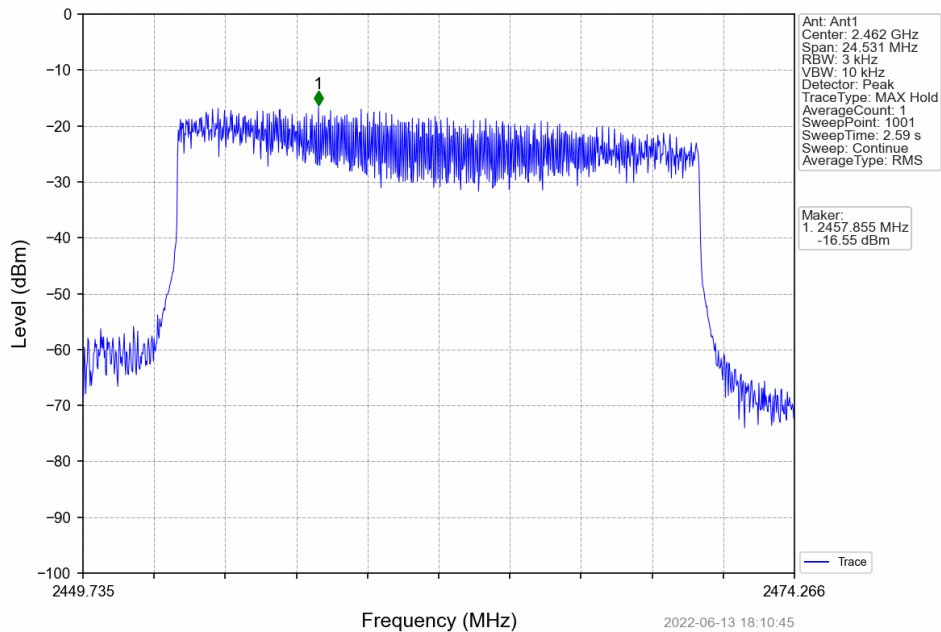
QPSK2_LCH_2412MHz_Ant1_NTNV



QPSK2_MCH_2437MHz_Ant1_NTNV



QPSK2_HCH_2462MHz_Ant1_NTNV



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5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Ref

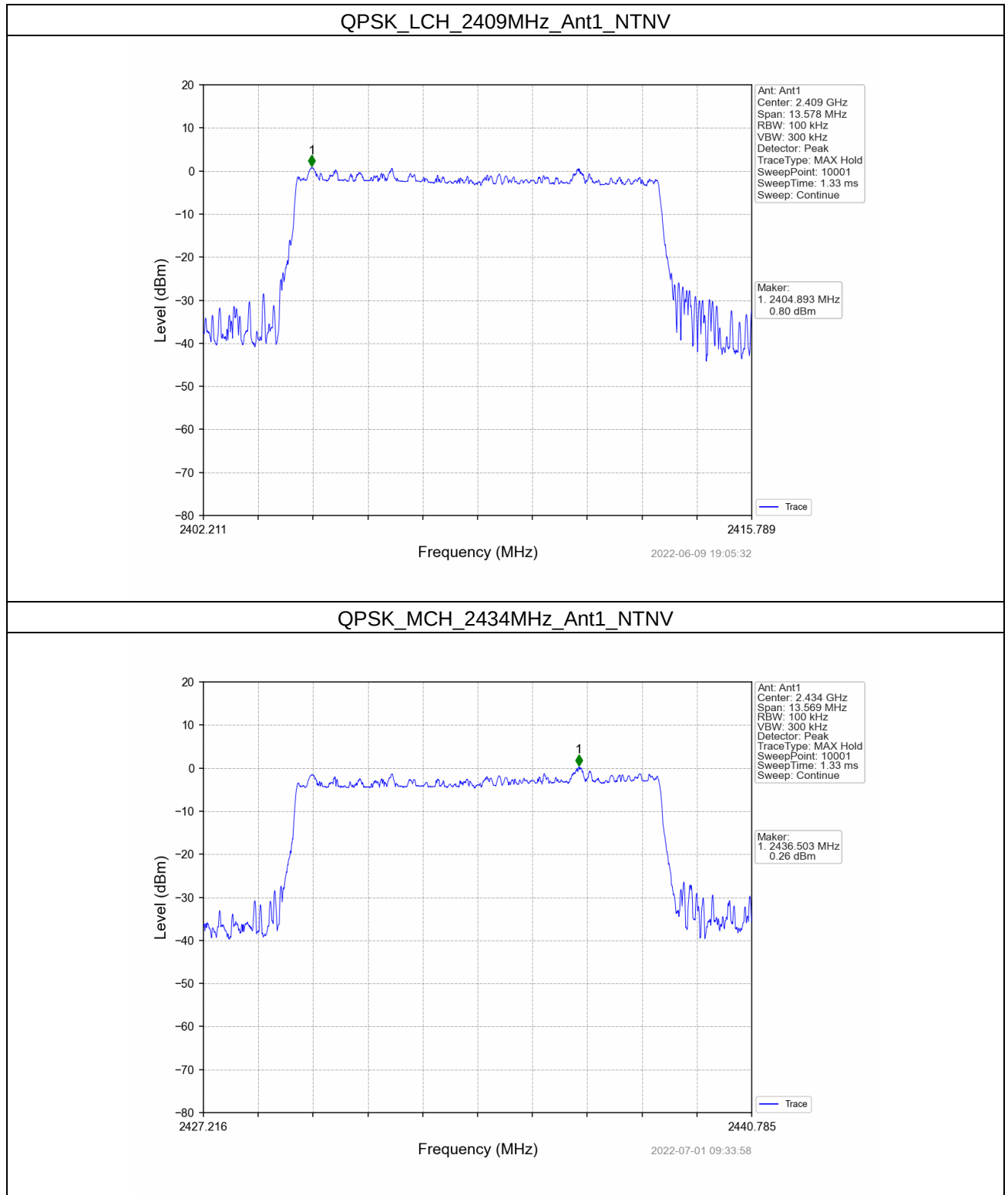
5.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
QPSK	SISO	2409	1	0.80
		2434	1	0.26
		2459	1	1.30
QPSK2	SISO	2412	1	-4.91
		2437	1	-5.83
		2462	1	-5.23

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

5.1.2 Test Graph

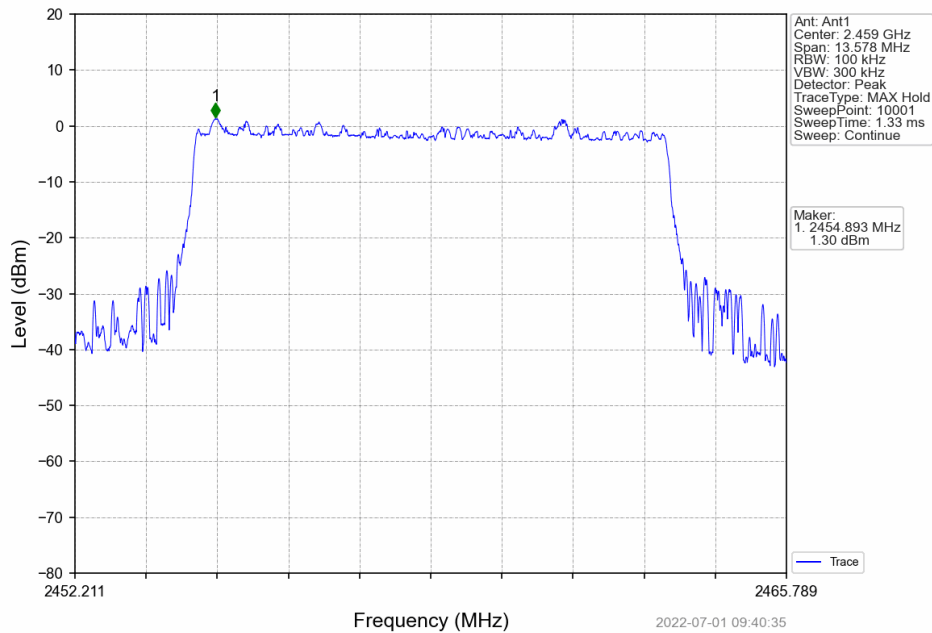


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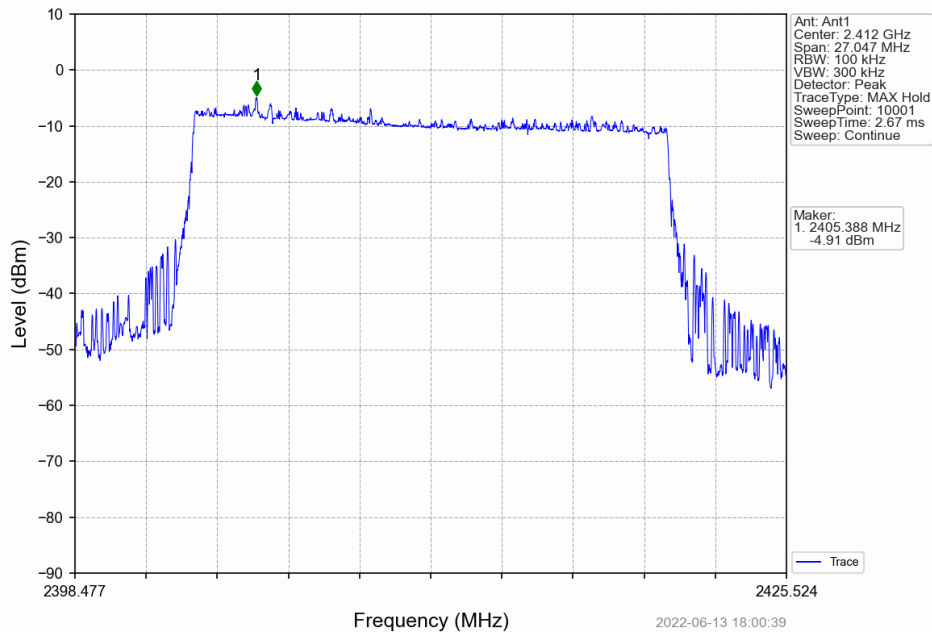
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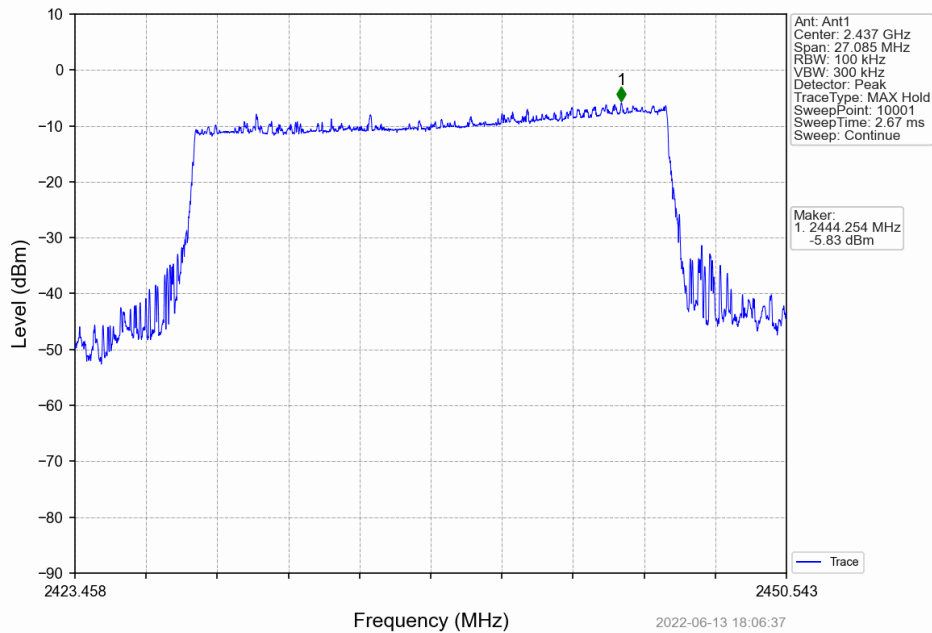
QPSK_HCH_2459MHz_Ant1_NTNV



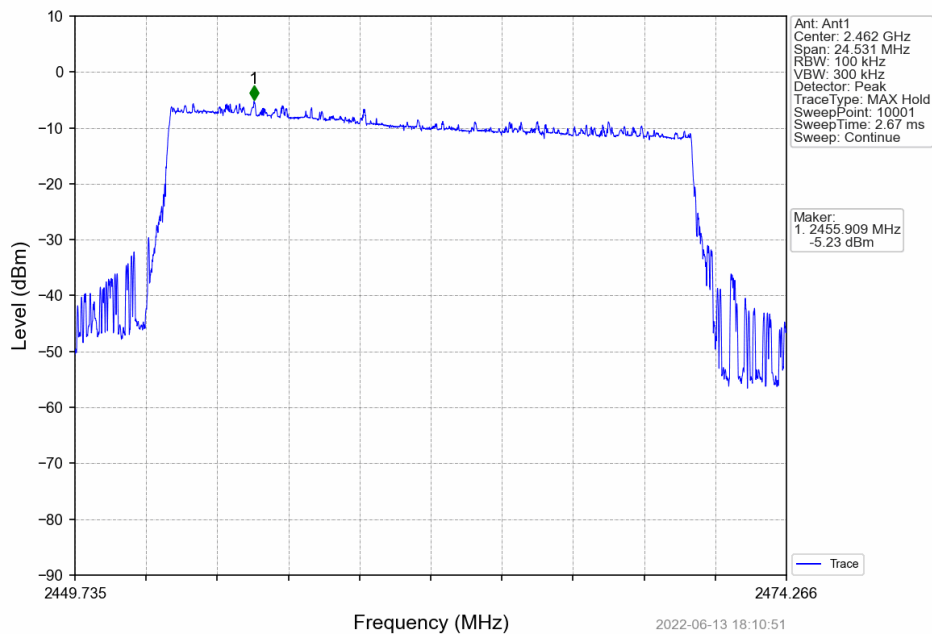
QPSK2_LCH_2412MHz_Ant1_NTNV



QPSK2_MCH_2437MHz_Ant1_NTNV



QPSK2_HCH_2462MHz_Ant1_NTNV



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5.2 CSE

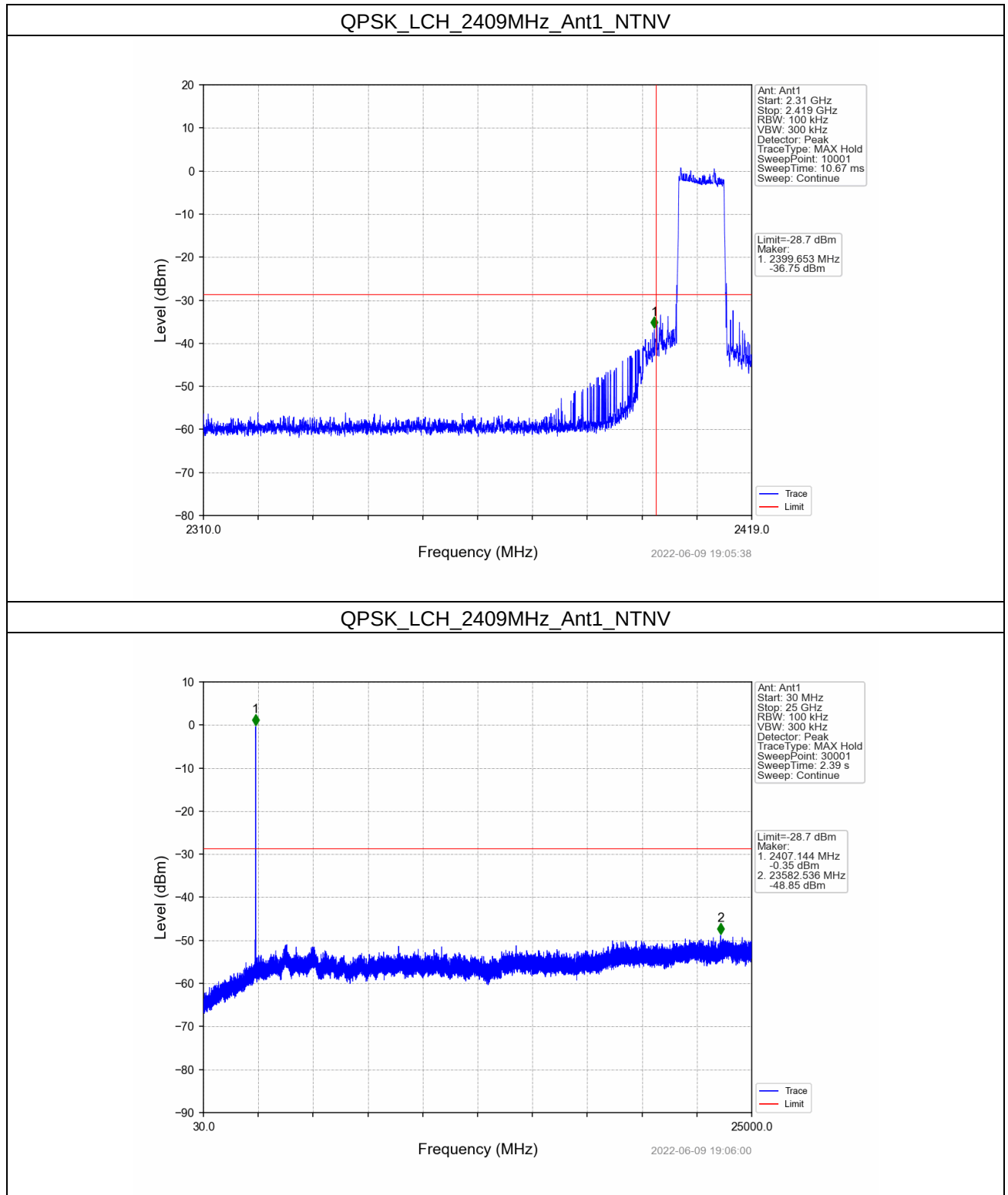
5.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
QPSK	SISO	2409	1	1.30	-28.70	Pass
		2434	1	1.30	-18.70	Pass
		2459	1	1.30	-18.70	Pass
QPSK2	SISO	2412	1	-4.91	-34.91	Pass
		2437	1	-4.91	-34.91	Pass
		2462	1	-4.91	-34.91	Pass

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

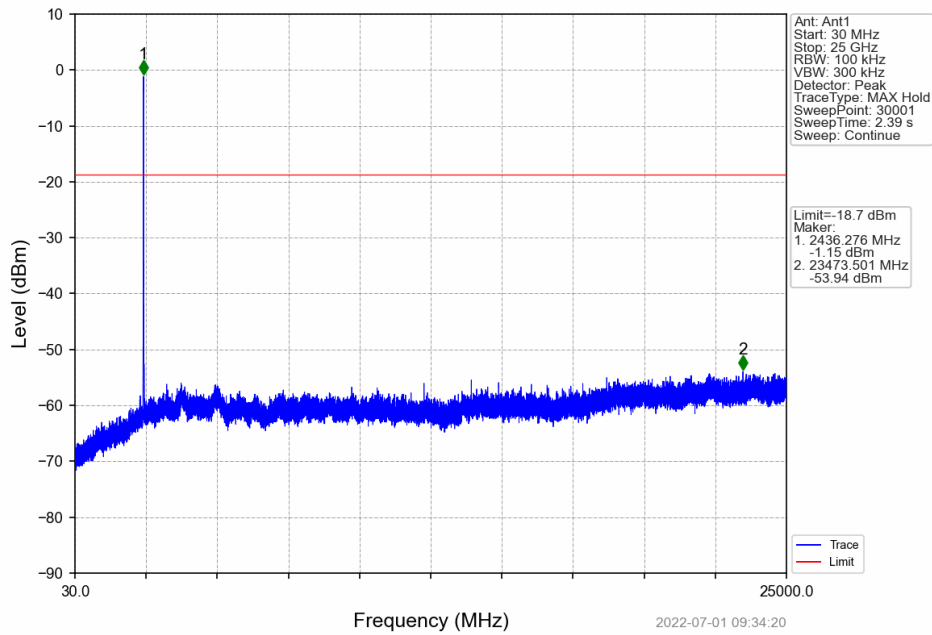
Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

5.2.2 Test Graph

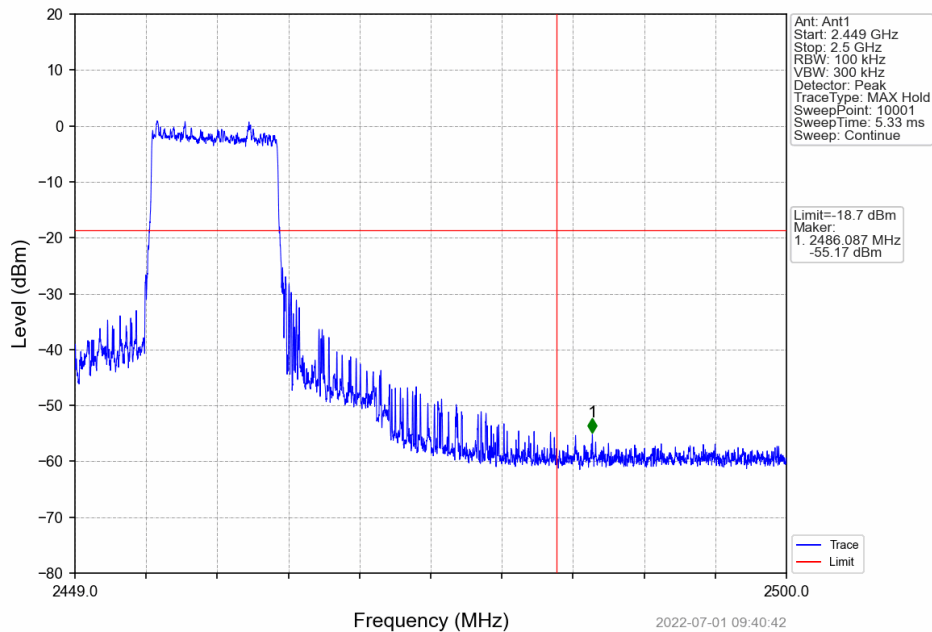


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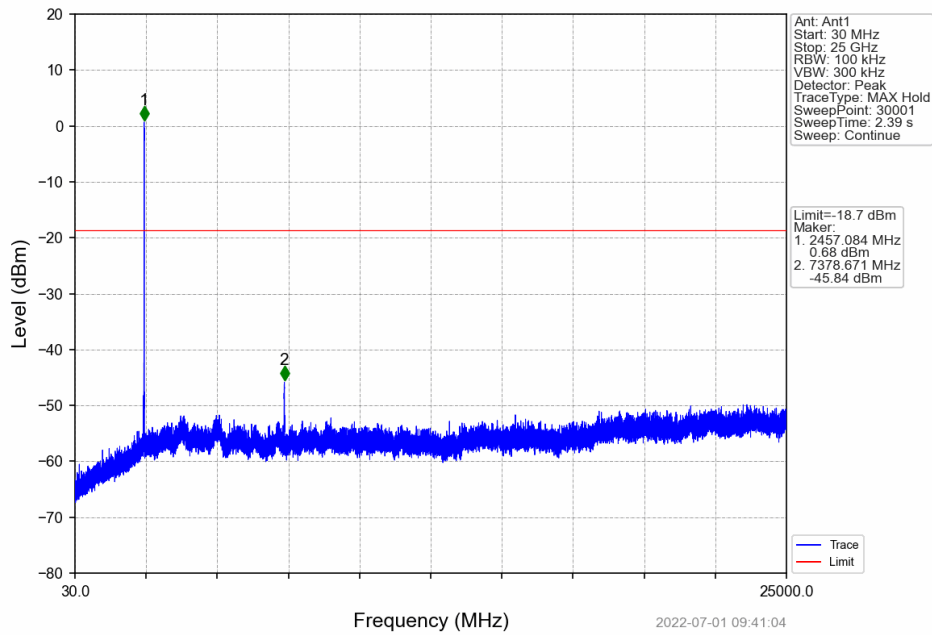
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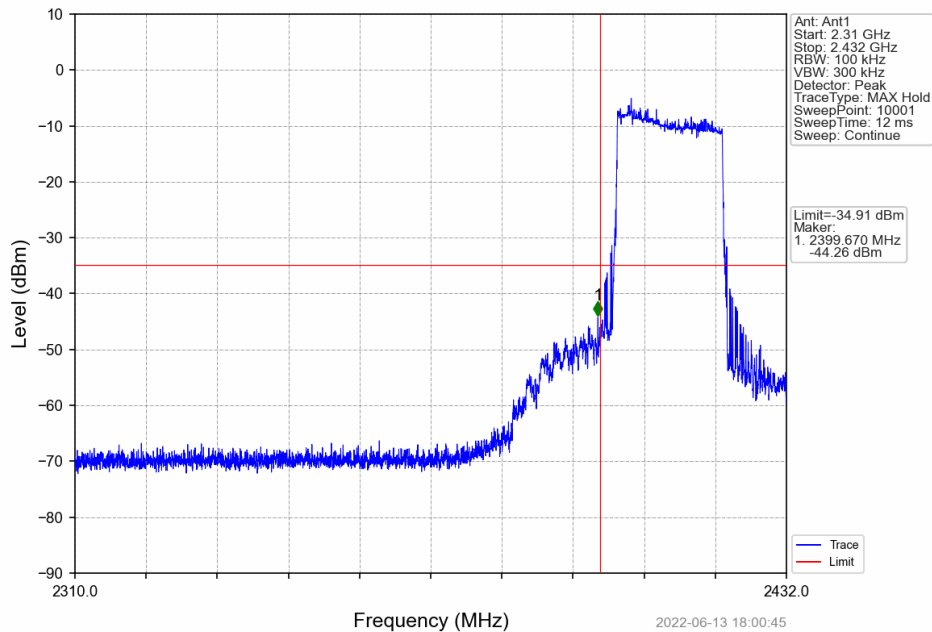
QPSK_HCH_2459MHz_Ant1_NTNV



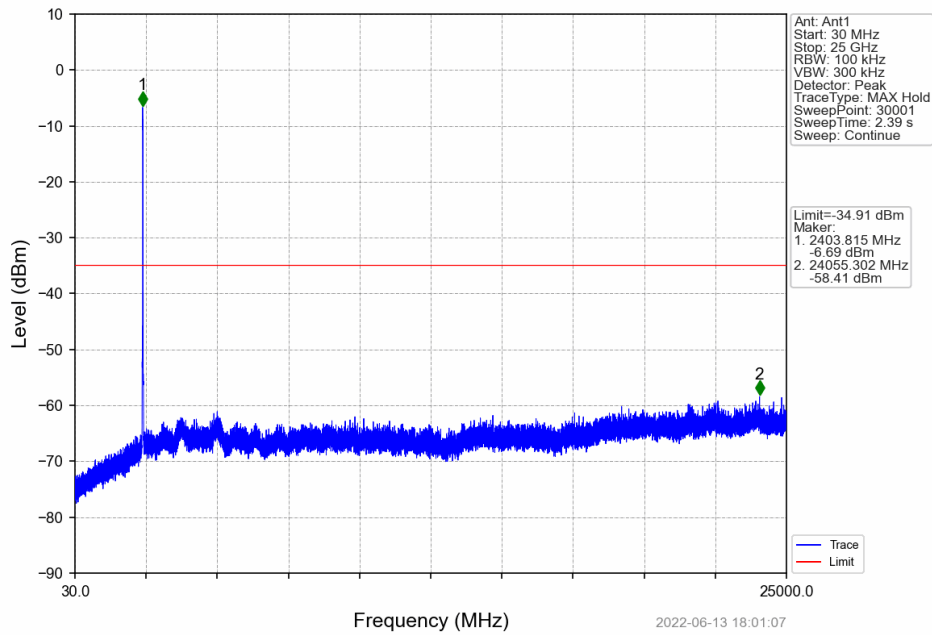
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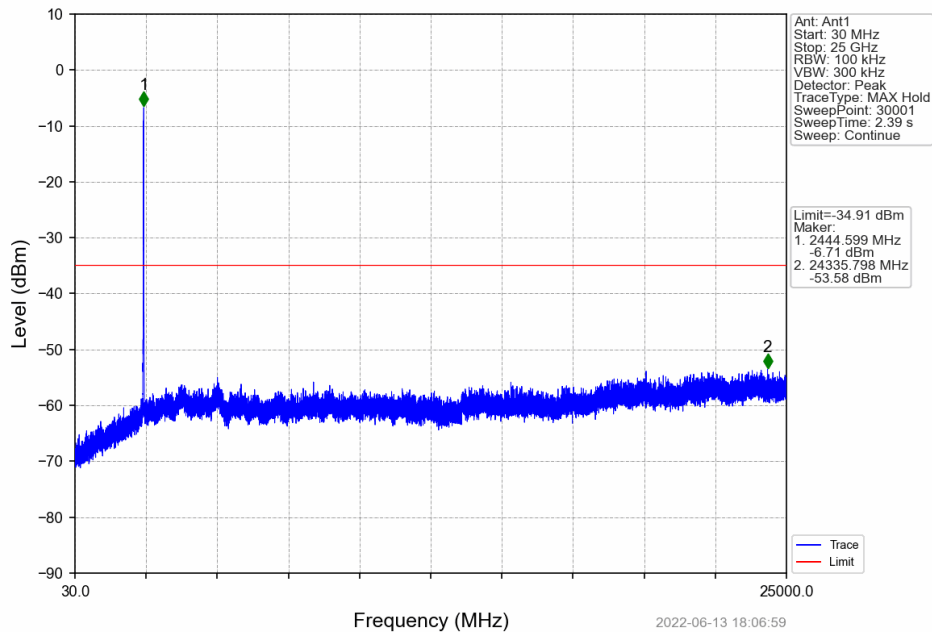
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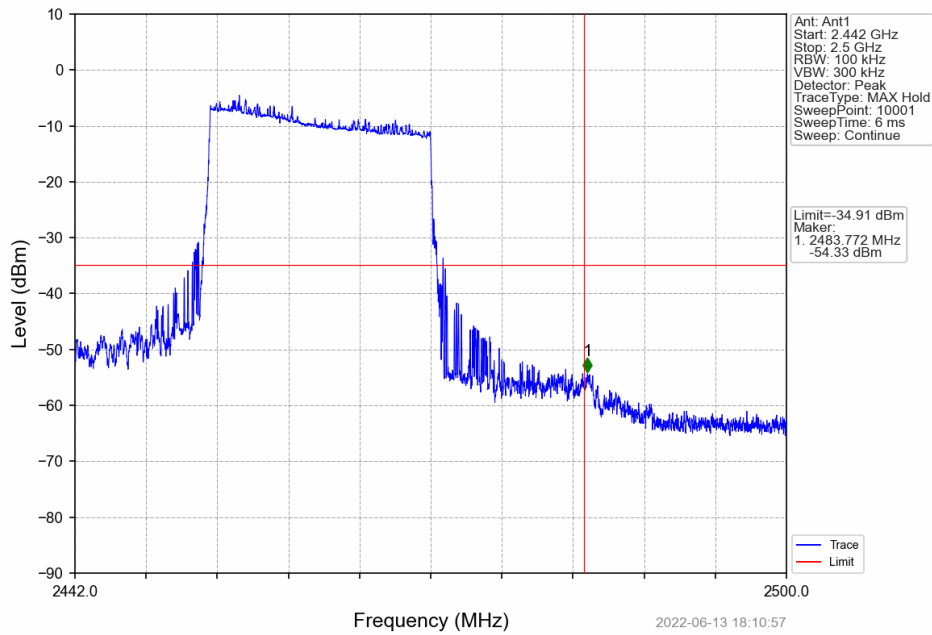
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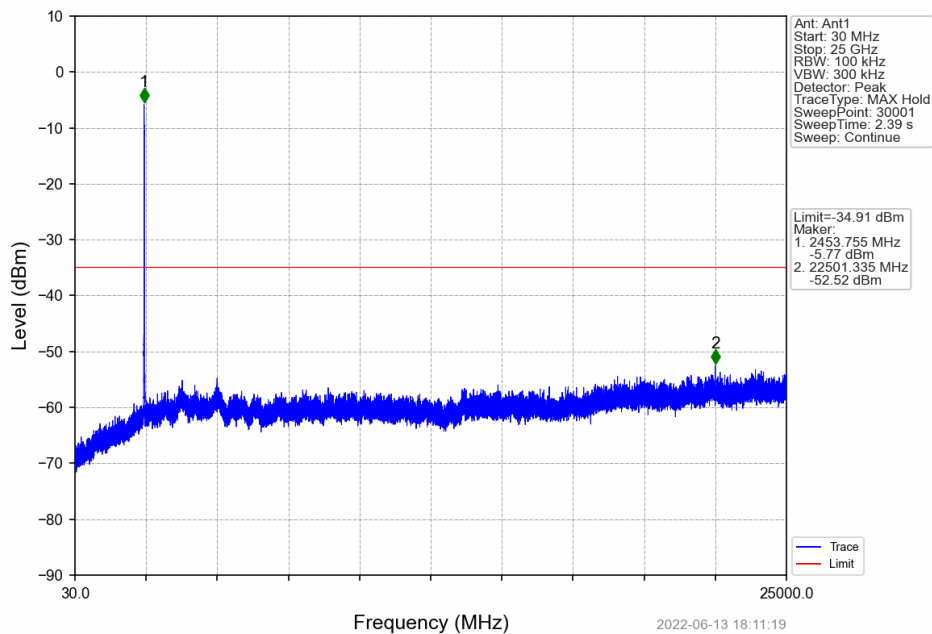
QPSK2_MCH_2437MHz_Ant1_NTNV



QPSK2_HCH_2462MHz_Ant1_NTNV



QPSK2_HCH_2462MHz_Ant1_NTNV



- End of the Report -