TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.247

TEST REPORT

For

Flyability SA

EPFL INNOVATION PARK BLDG C, Lausanne Switzerland

FCC ID: 2AL7M-MAGICKAYAKRC

Report Type:	Product Name:
Original Report	GCS GOV

Report Number:	DG1210701-26647E-00A
Report Date:	2021-07-29
Reviewed By:	Allen Qiao RF Supervisor
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		GCS GOV
EUT Model:		108060
Operation Frequency:		SDR 4M: 2405-2479MHz SDR 8M: 2407-2477MHz
Maximum Peak Output Power (Conducted):		28.96dBm
Modulation Type:		OFDM
Rated Input Voltage:		DC 12.0V from adapter or DC 7.2V from battery
Antenna Gain▲:		3.2 dBi
Adapter Information	**Model:**	SYS1541-2412
	Input:	100-240V~, 1.0A MAX, 50/60Hz
	Output:	12V 2A
Serial Number:		DG1210701-26647E-RF-S1
EUT Received Date:		2021.07.05
EUT Received Status:		Good

Objective

This report is prepared on behalf of ***Flyability SA*** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules

The tests were performed in order to determine the compliance of the EUT with FCC Rules Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209, 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and KDB 558074 D01 DTS Meas Guidance v05r02.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB,200M~1GHz: 5.92 dB,1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

This report cannot be reproduced except in full, without prior written approval of the Company.

This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in RF Transmiitting mode.

The EUT has 2 antennas for SDR, and supports 2T2R mode.
SDR 4M mode : 75 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	39	2443
2	2406	…	…
…	…	…	…
…	…	74	2478
37	2441	75	2479
38	2442	/	/

EUT was tested with 2405MHz, 2442MHz and 2479MHz.

SDR 8M mode : 71 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2407	37	2443
2	2408	…	…
…	…	…	…
…	…	70	2476
35	2441	71	2477
36	2442	/	/

EUT was tested with 2407MHz, 2442MHz and 2477MHz.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

The software:' IP Control ' was used during test, which was provided by manufacturer. The maximum power level was configured by the software as below table▲:

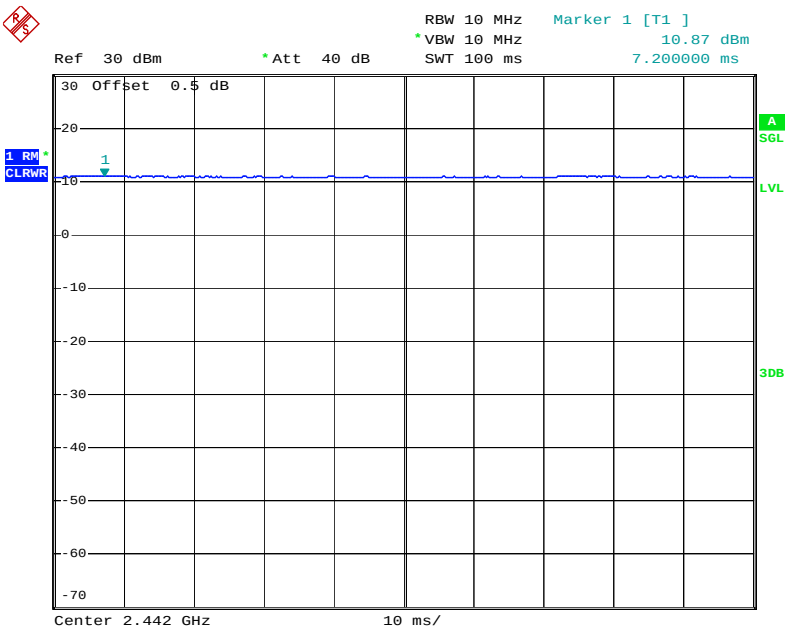
Test Modes	Channel	Frequency (MHz)	Power level	
			Chain 0	Chain 1
SDR 4M	Low	2405	20	20
	Middle	2442	20	20
	High	2475	20	20
		2476	19	19
		2477	15	15
		2478	9	9
		2479	7	7
SDR 8M	Low	2407	20	20
	Middle	2442	20	20
	High	2471	20	20
		2472	18	18
		2473	17	17
		2474	15	15
		2475	9	9
		2476	8	8
		2477	7	7

For SDR modes, the power was configured as default setting. Per pretest the conducted output power, the power in difference power level, all test items performed at Low, Middle and High Channel, except Conducted Output Power and Spurious Emissions pretest all channel and reported the channels power, radiation bandedge test with all channels have difference power level with maximum power.

The duty cycle as below:

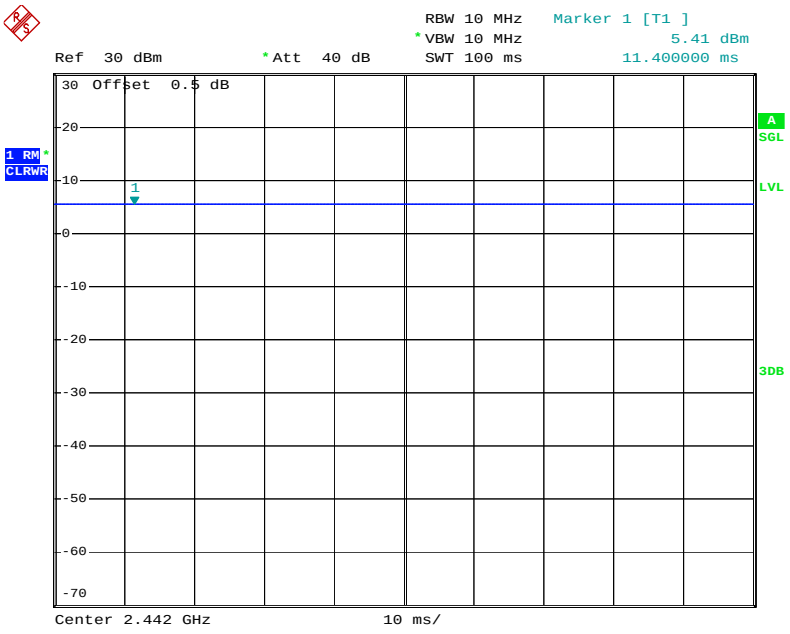
Mode	**T_{on} (ms)**	**T_{on+off} (ms)**	**Duty Cycle (%)**
SDR 4M	100	100	100
SDR 8M	100	100	100

SDR 4M



Date: 23.JUL.2021 14:59:05

SDR *8M*



Date: 23.JUL.2021 14:56:53

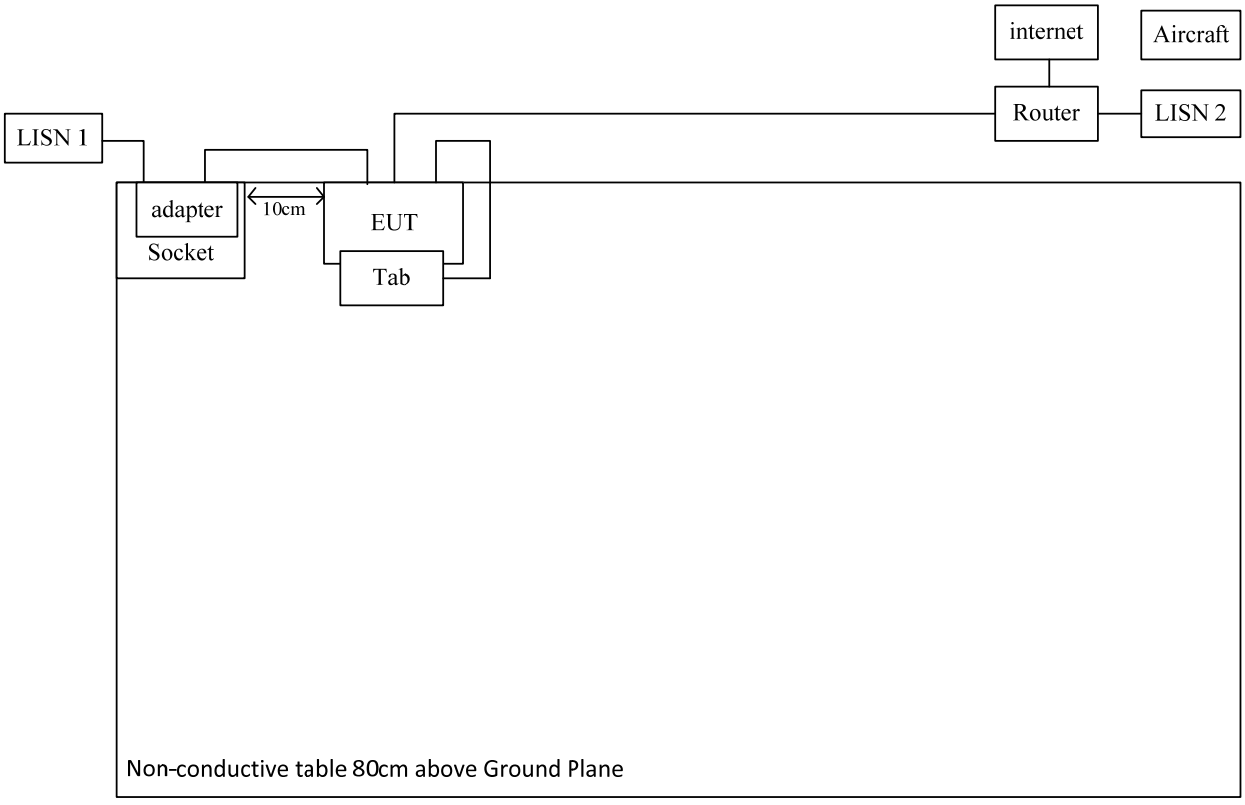
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SAMSUNG	Galaxy Tab Active2	SM-T390	R52K8040QTJ
FlyAbility	Aircraft	ELIOS 2	107324
ZIONCOM	Router	MB-R210-00	NA

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From	To
RJ45 Cable	Yes	No	10	Router	EUT
USB Cable	Yes	No	0.5	EUT	Tab

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§15.247 (i) & §1.1310 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Conducted Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

§15.247(i) and §1.1310

Test Result

Compliance, please refer to the SAR report: DG1210701-26647E-20.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, 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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Information And Connector Construction

The EUT has two antennas with a unique type of connector to attach to the EUT, fulfill the requirement of this section. Please refer to below information and the EUT photos:

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
Dipole	50	3.2 dBi/2.4~2.5GHz

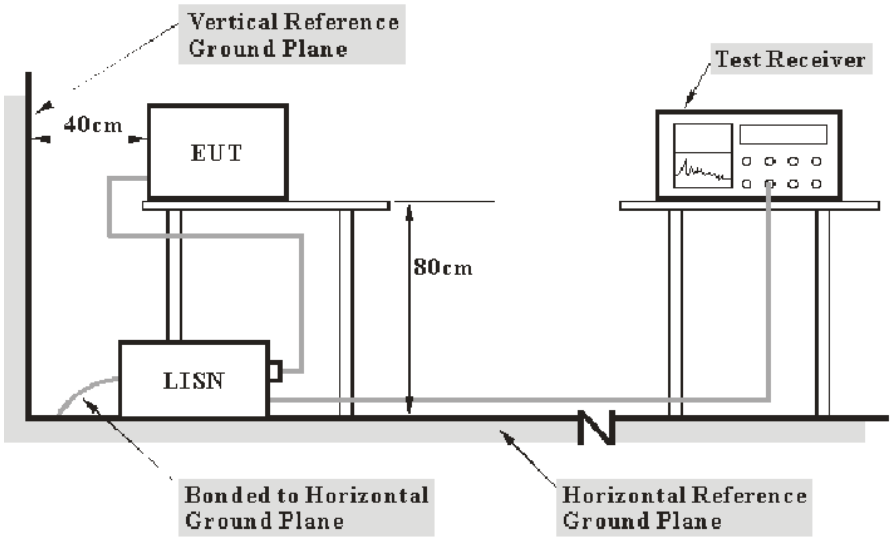
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a).

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main LISN with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV 216	101614	2020-09-12	2021-09-12
R&S	EMI Test Receiver	ESCI	101121	2021-07-06	2022-07-05
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2020-09-05	2021-09-05
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

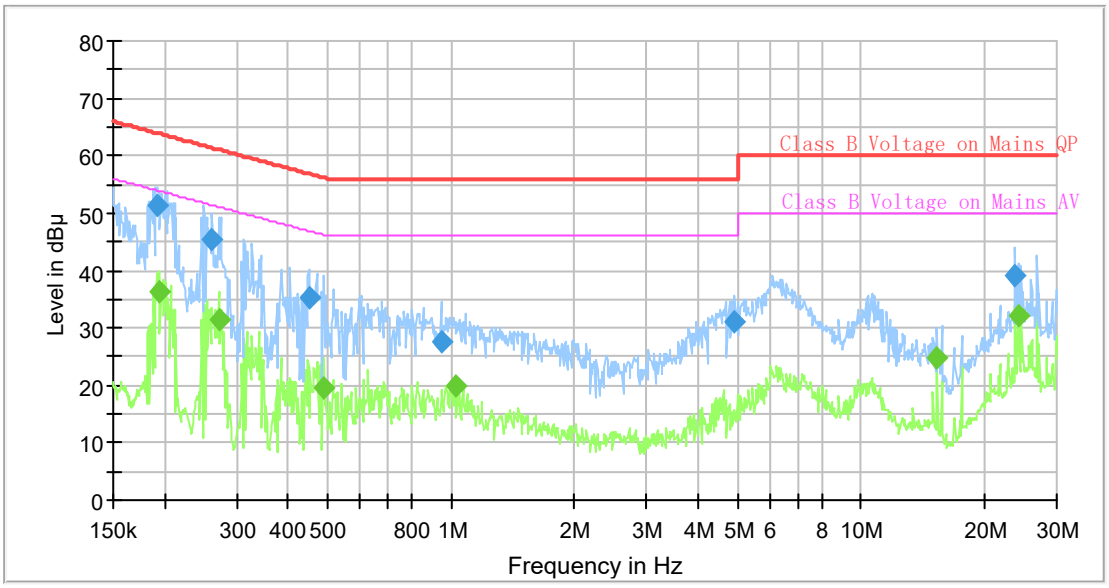
Environmental Conditions

Temperature:	26.0℃
Relative Humidity:	52%
ATM Pressure:	100.3kPa
Tester:	Walker Chen
Test Date:	2021-07-19

Test Result: Compliance

Test Mode: Charging

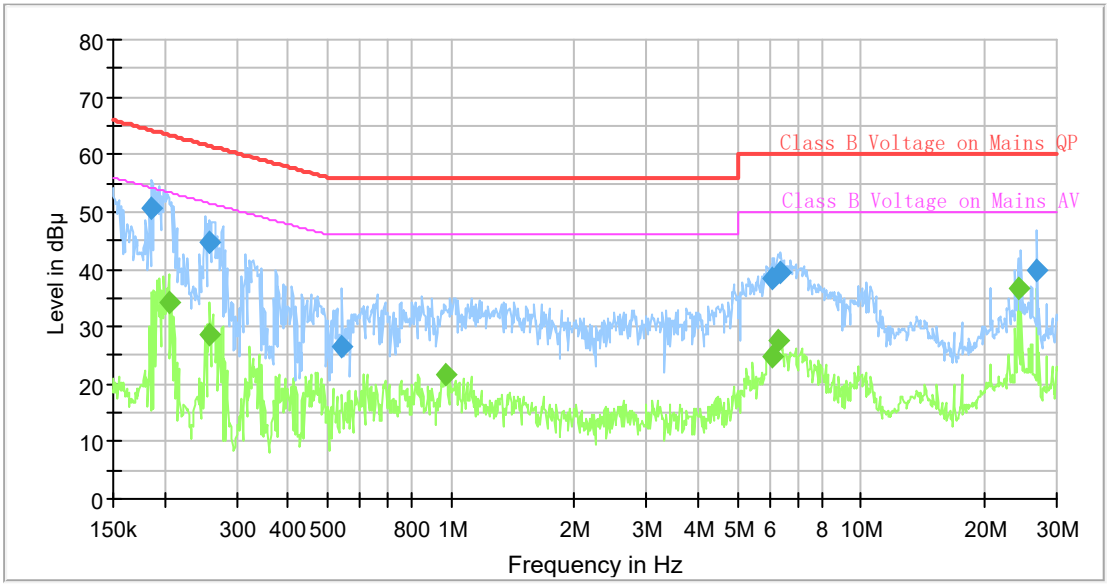
AC120 V, 60 Hz, Line:



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.192484	51.41	---	63.93	12.52	9.000	L1	9.6
0.194414	---	36.24	53.85	17.61	9.000	L1	9.6
0.260930	45.53	---	61.40	15.87	9.000	L1	9.6
0.271552	---	31.48	51.07	19.59	9.000	L1	9.6
0.449391	35.28	---	56.89	21.61	9.000	L1	9.6
0.489157	---	19.64	46.18	26.54	9.000	L1	9.6
0.944861	27.52	---	56.00	28.48	9.000	L1	9.7
1.023352	---	19.96	46.00	26.04	9.000	L1	9.7
4.924186	31.08	---	56.00	24.92	9.000	L1	9.7
15.353117	---	24.70	50.00	25.30	9.000	L1	10.2
23.812775	39.22	---	60.00	20.78	9.000	L1	10.0
24.171755	---	32.25	50.00	17.75	9.000	L1	10.0

AC120 V, 60 Hz, Neutral:



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.185880	50.74	---	64.22	13.48	9.000	N	9.6
0.205378	---	34.13	53.39	19.26	9.000	N	9.6
0.258340	---	28.74	51.48	22.74	9.000	N	9.6
0.258340	44.61	---	61.48	16.87	9.000	N	9.6
0.543169	26.39	---	56.00	29.61	9.000	N	9.6
0.973564	---	21.77	46.00	24.23	9.000	N	9.6
6.041476	---	24.71	50.00	25.29	9.000	N	9.6
6.102041	38.39	---	60.00	21.61	9.000	N	9.6
6.287406	---	27.66	50.00	22.34	9.000	N	9.6
6.382190	39.60	---	60.00	20.40	9.000	N	9.6
24.171755	---	36.66	50.00	13.34	9.000	N	9.9
26.840802	39.96	---	60.00	20.04	9.000	N	9.9

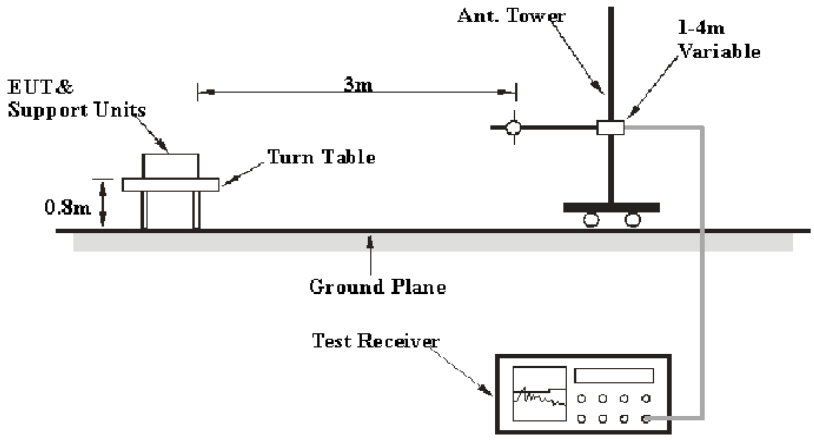
FCC §15.209, §15.205, §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

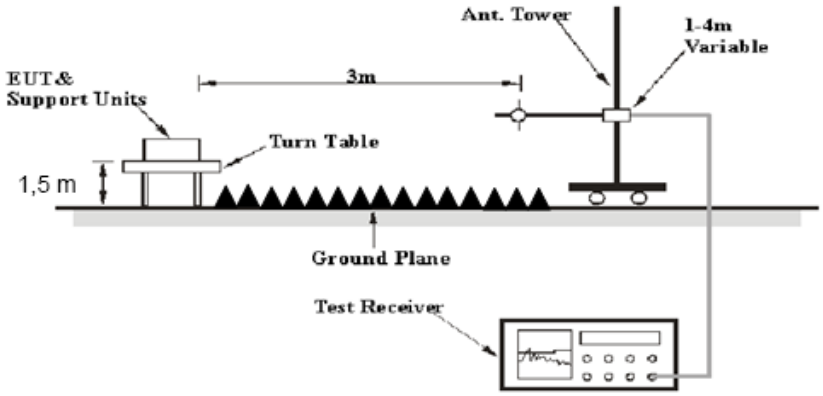
FCC §15.247 (d); §15.209; §15.205

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission below 1GHz tests were performed in the 10 meters chamber test site, above 1GHz tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

30MHz-1000MHz:

Measurement	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 25GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit –Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiation Below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESCI	100224	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2020-09-24	2021-09-24
Sonoma	Amplifier	310N	185914	2020-10-13	2021-10-13
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiation Above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2020-12-05	2023-12-04
Agilent	Spectrum Analyzer	E4440A	SG43360054	2021-07-06	2022-07-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2021-06-27	2022-06-26
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2020-09-05	2021-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2021-06-27	2022-06-26
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2021-06-16	2022-06-15
Mini Circuits	High Pass Filter	VHF-6010+	31118	2021-06-16	2022-06-15

**** Statement of Traceability:*** *Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data

Environmental Conditions

Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	26.2 °C	28.7~29.1°C
Relative Humidity:	52 %	25~32%
ATM Pressure:	100.3 kPa	100.3kPa
Tester:	Burt Hu	Jeremy Liang Lee Li
Test Date:	2021-07-21	2021-07-16~2021-07-19

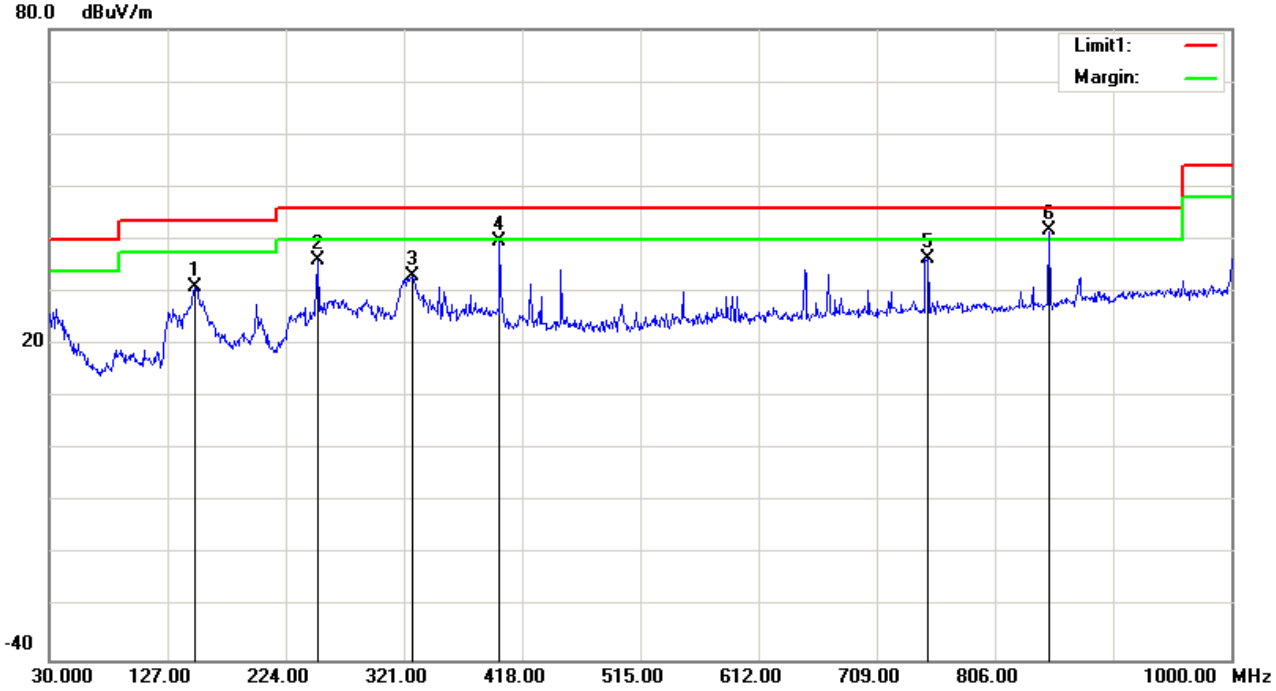
Test Mode: Transmitting
Note: the SDR_4M and SDR_8M can transmitting simultenuously.

Test Result: Compliance. Please refer to the following table and plots.

Note: for high channel, the worst bandedge test channel in conducted bandedge test item was verified in radiation test.

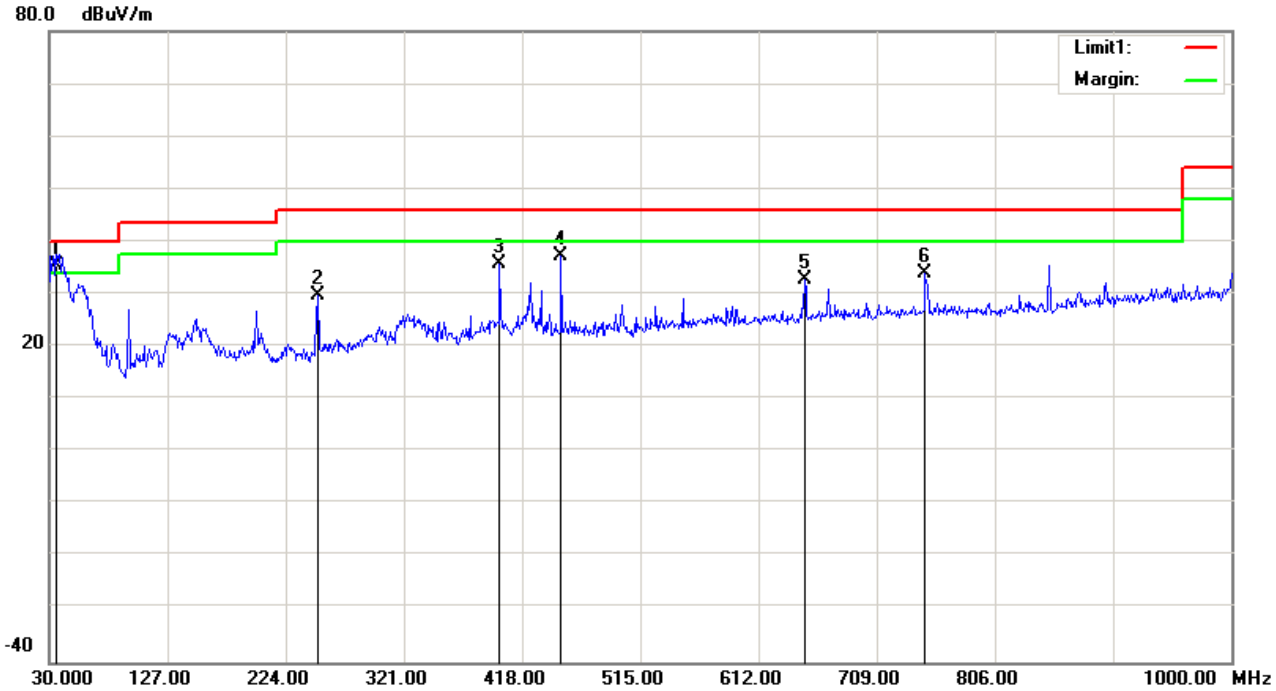
1) 30MHz-1GHz (SDR 8Mbps High Channel was the worst):

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
149.3100	40.34	peak	-9.29	31.05	43.50	12.45
250.1900	45.71	peak	-9.73	35.98	46.00	10.02
327.7900	39.98	peak	-7.06	32.92	46.00	13.08
399.5700	44.81	peak	-5.27	39.54	46.00	6.46
750.7100	35.81	peak	0.56	36.37	46.00	9.63
850.6200	39.96	QP	1.84	41.80	46.00	4.20

Vertical:



Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.8200	42.55	QP	-7.15	35.40	40.00	4.60
250.1900	39.34	peak	-9.73	29.61	46.00	16.39
399.5700	40.89	peak	-5.27	35.62	46.00	10.38
450.0100	41.62	peak	-4.32	37.30	46.00	8.70
649.8300	33.23	peak	-0.45	32.78	46.00	13.22
748.7700	33.30	peak	0.55	33.85	46.00	12.15

2)1GHz-25GHz:

SDR 4M:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
Channel: 2405 MHz									
2405.00	77.60	PK	H	28.11	1.80	0.00	107.51	N/A	N/A
2405.00	66.54	AV	H	28.11	1.80	0.00	96.45	N/A	N/A
2405.00	87.39	PK	V	28.11	1.80	0.00	117.30	N/A	N/A
2405.00	77.12	AV	V	28.11	1.80	0.00	107.03	N/A	N/A
2390.00	27.63	PK	V	28.08	1.80	0.00	57.51	74.00	16.49
2390.00	17.56	AV	V	28.08	1.80	0.00	47.44	54.00	6.56
4810.00	34.35	PK	V	32.92	3.17	25.61	44.83	74.00	29.17
4810.00	22.43	AV	V	32.92	3.17	25.61	32.91	54.00	21.09
7215.00	35.05	PK	V	35.76	4.81	25.61	50.01	74.00	23.99
7215.00	22.84	AV	V	35.76	4.81	25.61	37.80	54.00	16.20
Channel: 2442 MHz									
2442.00	78.03	PK	H	28.18	1.82	0.00	108.03	N/A	N/A
2442.00	67.79	AV	H	28.18	1.82	0.00	97.79	N/A	N/A
2442.00	87.48	PK	V	28.18	1.82	0.00	117.48	N/A	N/A
2442.00	77.63	AV	V	28.18	1.82	0.00	107.63	N/A	N/A
4884.00	35.47	PK	V	33.07	3.28	25.66	46.16	74.00	27.84
4884.00	23.07	AV	V	33.07	3.28	25.66	33.76	54.00	20.24
7326.00	35.45	PK	V	36.05	4.61	25.73	50.38	74.00	23.62
7326.00	23.24	AV	V	36.05	4.61	25.73	38.17	54.00	15.83
Channel: 2475 MHz									
2475.00	77.10	PK	H	28.25	1.84	0.00	107.19	N/A	N/A
2475.00	67.36	AV	H	28.25	1.84	0.00	97.45	N/A	N/A
2475.00	87.92	PK	V	28.25	1.84	0.00	118.01	N/A	N/A
2475.00	77.19	AV	V	28.25	1.84	0.00	107.28	N/A	N/A
2483.50	33.67	PK	V	28.27	1.84	0.00	63.78	74.00	10.22
2483.50	21.74	AV	V	28.27	1.84	0.00	51.85	54.00	2.15
Channel: 2476 MHz									
2476.00	75.25	PK	H	28.25	1.84	0.00	105.34	N/A	N/A
2476.00	65.98	AV	H	28.25	1.84	0.00	96.07	N/A	N/A
2476.00	86.21	PK	V	28.25	1.84	0.00	116.30	N/A	N/A
2476.00	76.23	AV	V	28.25	1.84	0.00	106.32	N/A	N/A
2483.50	37.36	PK	V	28.27	1.84	0.00	67.47	74.00	6.53
2483.50	23.11	AV	V	28.27	1.84	0.00	53.22	54.00	0.78
Channel: 2477 MHz									
2477.00	74.31	PK	H	28.25	1.84	0.00	104.40	N/A	N/A
2477.00	64.19	AV	H	28.25	1.84	0.00	94.28	N/A	N/A
2477.00	81.80	PK	V	28.25	1.84	0.00	111.89	N/A	N/A
2477.00	71.90	AV	V	28.25	1.84	0.00	101.99	N/A	N/A
2483.50	37.12	PK	V	28.27	1.84	0.00	67.23	74.00	6.77
2483.50	22.96	AV	V	28.27	1.84	0.00	53.07	54.00	0.93
Channel: 2478 MHz									
2478.00	68.14	PK	H	28.26	1.84	0.00	98.24	N/A	N/A
2478.00	59.74	AV	H	28.26	1.84	0.00	89.84	N/A	N/A
2478.00	75.41	PK	V	28.26	1.84	0.00	105.51	N/A	N/A
2478.00	66.14	AV	V	28.26	1.84	0.00	96.24	N/A	N/A
2483.50	40.14	PK	V	28.27	1.84	0.00	70.25	74.00	3.75
2483.50	23.04	AV	V	28.27	1.84	0.00	53.15	54.00	0.85

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Remark	Polar (H/V)	Factor (dB/m)					
Channel: 2479 MHz									
2479.00	65.26	PK	H	28.26	1.84	0.00	95.36	N/A	N/A
2479.00	55.89	AV	H	28.26	1.84	0.00	85.99	N/A	N/A
2479.00	73.66	PK	V	28.26	1.84	0.00	103.76	N/A	N/A
2479.00	63.58	AV	V	28.26	1.84	0.00	93.68	N/A	N/A
2483.50	41.03	PK	V	28.27	1.84	0.00	71.14	74.00	2.86
2483.50	23.41	AV	V	28.27	1.84	0.00	53.52	54.00	0.48
4958.00	35.86	PK	V	33.22	3.23	25.63	46.68	74.00	27.32
4958.00	23.74	AV	V	33.22	3.23	25.63	34.56	54.00	19.44
7437.00	35.63	PK	V	36.34	4.42	25.84	50.55	74.00	23.45
7437.00	23.29	AV	V	36.34	4.42	25.84	38.21	54.00	15.79

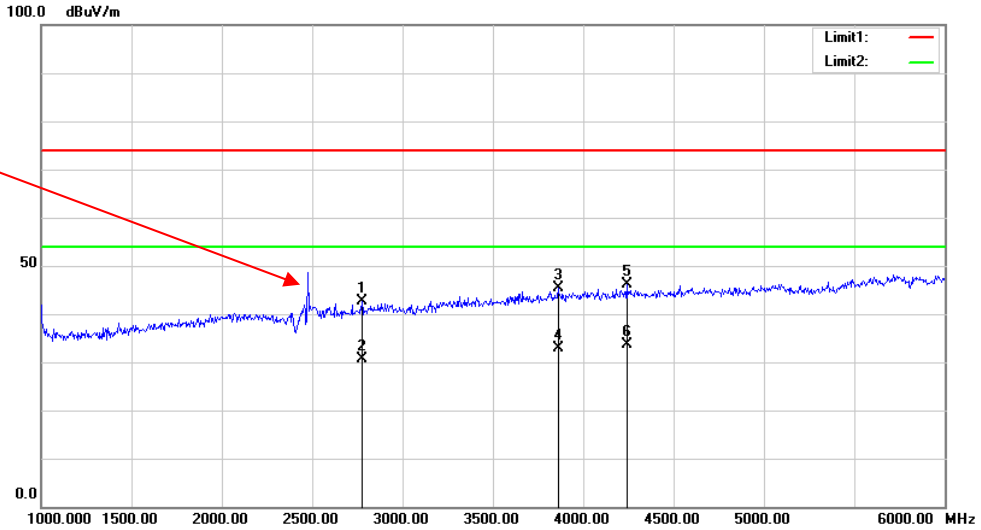
SDR 8M:

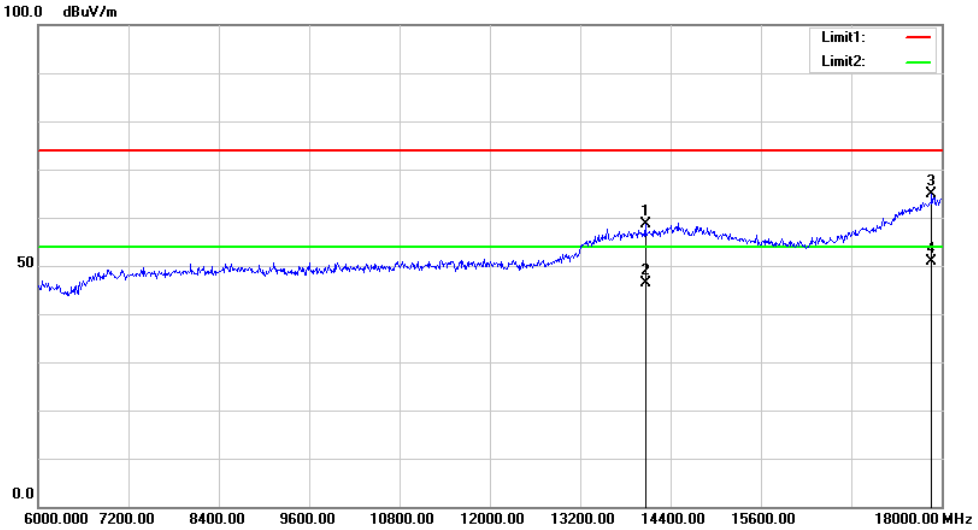
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
Channel: 2407 MHz									
2407.00	78.35	PK	H	28.11	1.80	0.00	108.26	N/A	N/A
2407.00	66.54	AV	H	28.11	1.80	0.00	96.45	N/A	N/A
2407.00	83.42	PK	V	28.11	1.80	0.00	113.33	N/A	N/A
2407.00	71.69	AV	V	28.11	1.80	0.00	101.60	N/A	N/A
2390.00	29.08	PK	V	28.08	1.80	0.00	58.96	74.00	15.04
2390.00	17.03	AV	V	28.08	1.80	0.00	46.91	54.00	7.09
4814.00	34.09	PK	V	32.93	3.18	25.61	44.59	74.00	29.41
4814.00	22.14	AV	V	32.93	3.18	25.61	32.64	54.00	21.36
7221.00	34.79	PK	V	35.77	4.80	25.62	49.74	74.00	24.26
7221.00	22.58	AV	V	35.77	4.80	25.62	37.53	54.00	16.47
Channel: 2442 MHz									
2442.00	78.03	PK	H	28.18	1.82	0.00	108.03	N/A	N/A
2442.00	66.79	AV	H	28.18	1.82	0.00	96.79	N/A	N/A
2442.00	83.12	PK	V	28.18	1.82	0.00	113.12	N/A	N/A
2442.00	70.88	AV	V	28.18	1.82	0.00	100.88	N/A	N/A
4884.00	34.91	PK	V	33.07	3.28	25.66	45.60	74.00	28.40
4884.00	22.46	AV	V	33.07	3.28	25.66	33.15	54.00	20.85
7326.00	34.89	PK	V	36.05	4.61	25.73	49.82	74.00	24.18
7326.00	22.68	AV	V	36.05	4.61	25.73	37.61	54.00	16.39
Channel: 2471 MHz									
2471.00	78.24	PK	H	28.24	1.84	0.00	108.32	N/A	N/A
2471.00	68.44	AV	H	28.24	1.84	0.00	98.52	N/A	N/A
2471.00	84.55	PK	V	28.24	1.84	0.00	114.63	N/A	N/A
2471.00	74.03	AV	V	28.24	1.84	0.00	104.11	N/A	N/A
2483.50	32.01	PK	V	28.27	1.84	0.00	62.12	74.00	11.88
2483.50	22.56	AV	V	28.27	1.84	0.00	52.67	54.00	1.33
Channel: 2472 MHz									
2472.00	74.98	PK	H	28.24	1.84	0.00	105.06	N/A	N/A
2472.00	65.14	AV	H	28.24	1.84	0.00	95.22	N/A	N/A
2472.00	84.18	PK	V	28.24	1.84	0.00	114.26	N/A	N/A
2472.00	73.16	AV	V	28.24	1.84	0.00	103.24	N/A	N/A
2483.50	34.26	PK	V	28.27	1.84	0.00	64.37	74.00	9.63
2483.50	22.20	AV	V	28.27	1.84	0.00	52.31	54.00	1.69
Channel: 2473 MHz									
2473.00	75.44	PK	H	28.25	1.84	0.00	105.53	N/A	N/A
2473.00	64.86	AV	H	28.25	1.84	0.00	94.95	N/A	N/A
2473.00	82.17	PK	V	28.25	1.84	0.00	112.26	N/A	N/A
2473.00	71.82	AV	V	28.25	1.84	0.00	101.91	N/A	N/A
2483.50	42.74	PK	V	28.27	1.84	0.00	72.85	74.00	1.15
2483.50	23.14	AV	V	28.27	1.84	0.00	53.25	54.00	0.75
Channel: 2474 MHz									
2474.00	73.23	PK	H	28.25	1.84	0.00	103.32	N/A	N/A
2474.00	63.15	AV	H	28.25	1.84	0.00	93.24	N/A	N/A
2474.00	80.05	PK	V	28.25	1.84	0.00	110.14	N/A	N/A
2474.00	70.08	AV	V	28.25	1.84	0.00	100.17	N/A	N/A
2483.50	41.25	PK	V	28.27	1.84	0.00	71.36	74.00	2.64
2483.50	22.15	AV	V	28.27	1.84	0.00	52.26	54.00	1.74

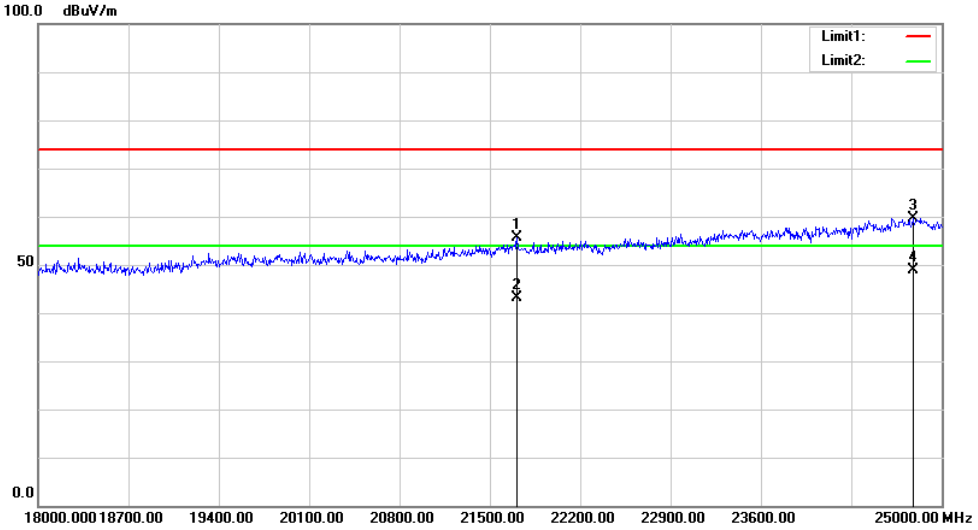
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Remark	Polar (H/V)	Factor (dB/m)					
Channel: 2475 MHz									
2475.00	64.41	PK	H	28.25	1.84	0.00	94.50	N/A	N/A
2475.00	56.93	AV	H	28.25	1.84	0.00	87.02	N/A	N/A
2475.00	73.14	PK	V	28.25	1.84	0.00	103.23	N/A	N/A
2475.00	62.73	AV	V	28.25	1.84	0.00	92.82	N/A	N/A
2483.50	41.25	PK	V	28.27	1.84	0.00	71.36	74.00	2.64
2483.50	22.15	AV	V	28.27	1.84	0.00	52.26	54.00	1.74
Channel: 2476 MHz									
2476.00	61.03	PK	H	28.25	1.84	0.00	91.12	N/A	N/A
2476.00	51.79	AV	H	28.25	1.84	0.00	81.88	N/A	N/A
2476.00	71.09	PK	V	28.25	1.84	0.00	101.18	N/A	N/A
2476.00	60.07	AV	V	28.25	1.84	0.00	90.16	N/A	N/A
2483.50	41.23	PK	V	28.27	1.84	0.00	71.34	74.00	2.66
2483.50	23.48	AV	V	28.27	1.84	0.00	53.59	54.00	0.41
Channel: 2477 MHz									
2477.00	61.25	PK	H	28.25	1.84	0.00	91.34	N/A	N/A
2477.00	51.14	AV	H	28.25	1.84	0.00	81.23	N/A	N/A
2477.00	70.45	PK	V	28.25	1.84	0.00	100.54	N/A	N/A
2477.00	60.55	AV	V	28.25	1.84	0.00	90.64	N/A	N/A
2483.50	41.23	PK	V	28.27	1.84	0.00	71.34	74.00	2.66
2483.50	23.49	AV	V	28.27	1.84	0.00	53.60	54.00	0.40
4954.00	34.99	PK	V	33.21	3.24	25.63	45.81	74.00	28.19
4954.00	22.87	AV	V	33.21	3.24	25.63	33.69	54.00	20.31
7431.00	35.23	PK	V	36.32	4.43	25.84	50.14	74.00	23.86
7431.00	23.99	AV	V	36.32	4.43	25.84	38.90	54.00	**15.10**

Worst plots (SDR 8M High channel was the worst)
Horizontal

Fundamental
Test with Band
Rejection Filter

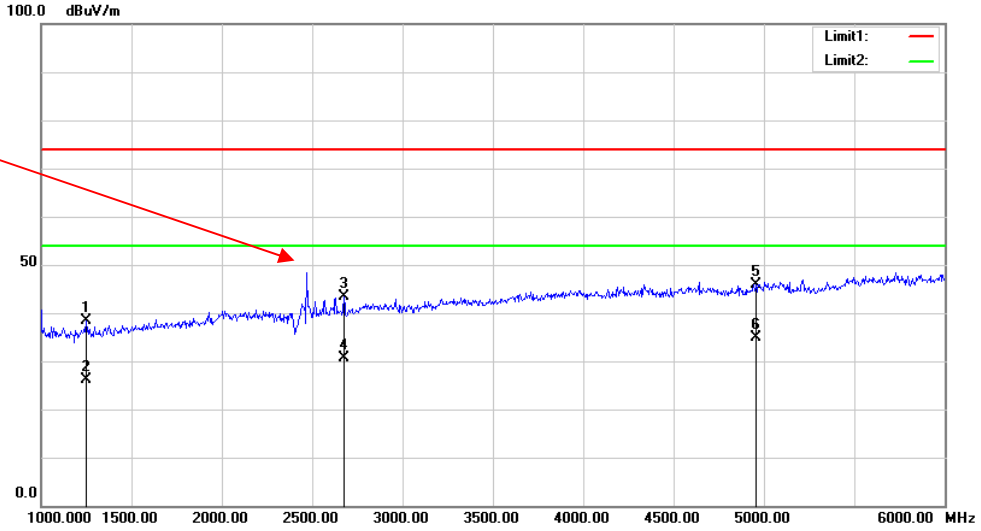


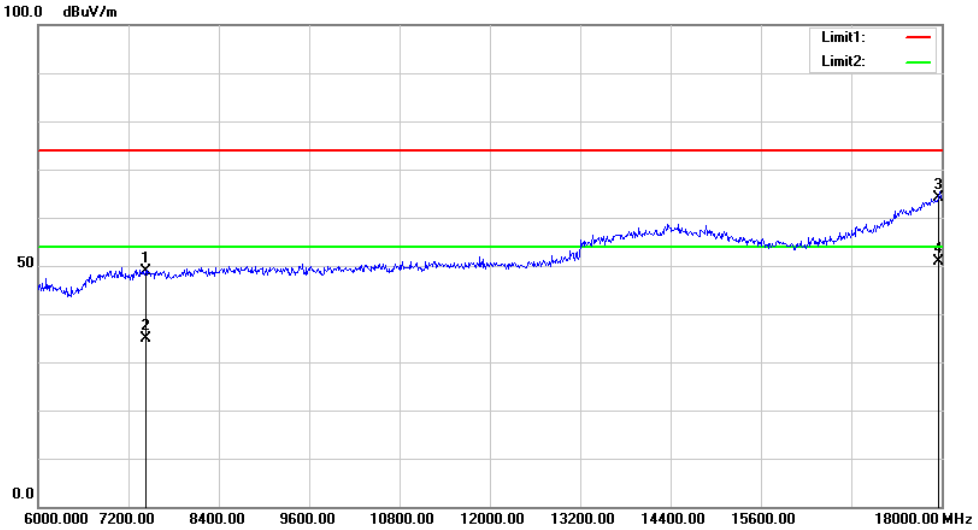


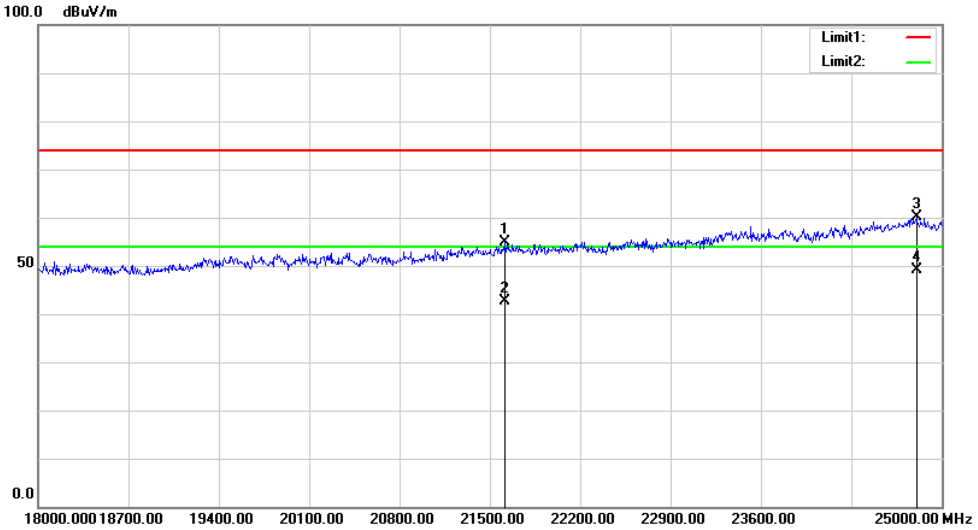


Vertical

Fundamental Test with Band Rejection Filter







FCC §15.247(a) (2) –6 dB EMISSION BANDWIDTH

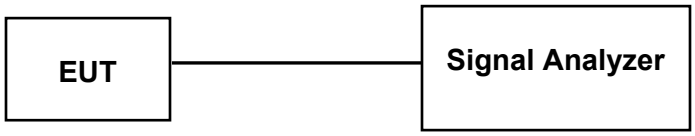
Applicable Standard

According to FCC §15.247(a) (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3×RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2021-07-07	2022-07-07
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.4~28.7°C
Relative Humidity:	43~49%
ATM Pressure:	100~100.5kPa
Tester:	Rennes Guo
Test Date:	2021-07-13~2021-07-19

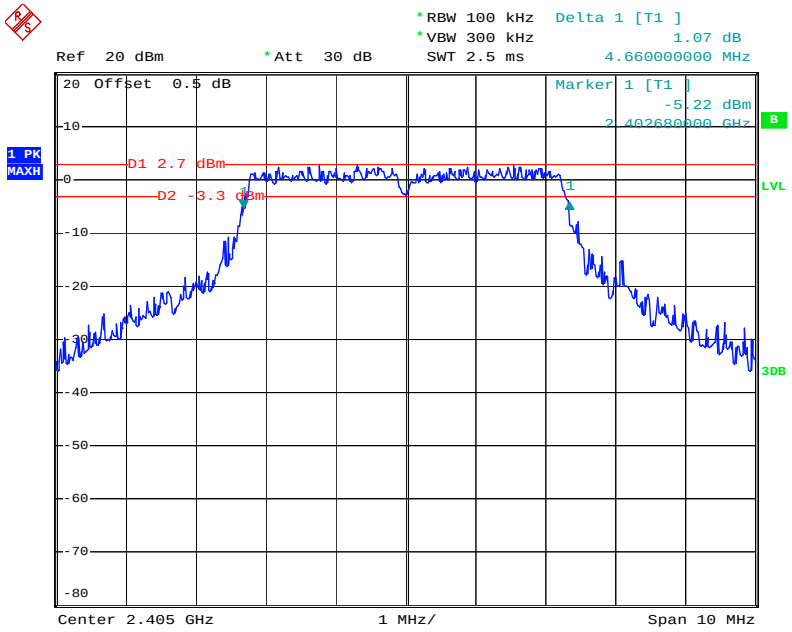
Test Mode: Transmitting

Test Result: Compliance. Test only was performed at chain 0, please refer to the following table and plots.

Mode	Channel	Frequency (MHz)	Result (MHz)	Limit (MHz)
SDR 4M	Low	2405	4.660	0.5
	Middle	2442	4.580	
	High	2479	4.600	
SDR 8M	Low	2407	9.780	
	Middle	2442	9.855	
	High	2477	9.720	

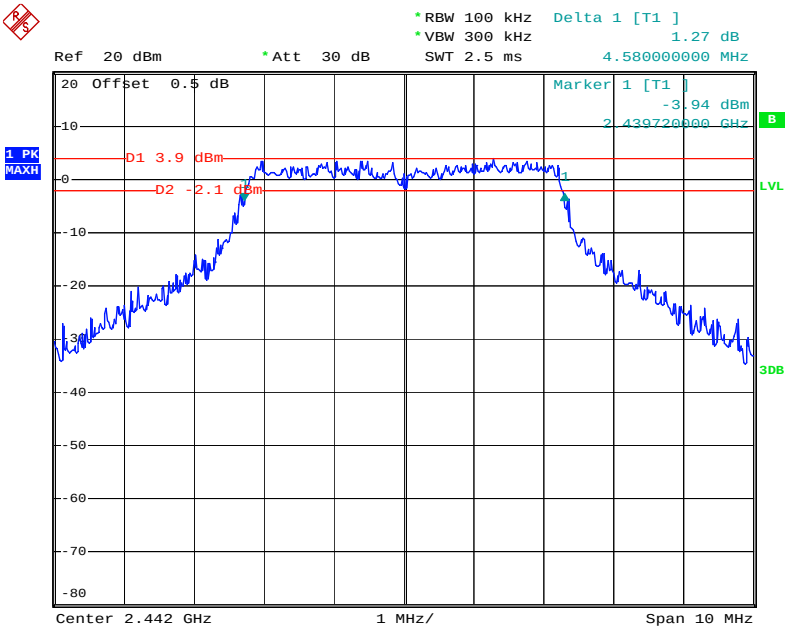
SDR 4M

Low Channel



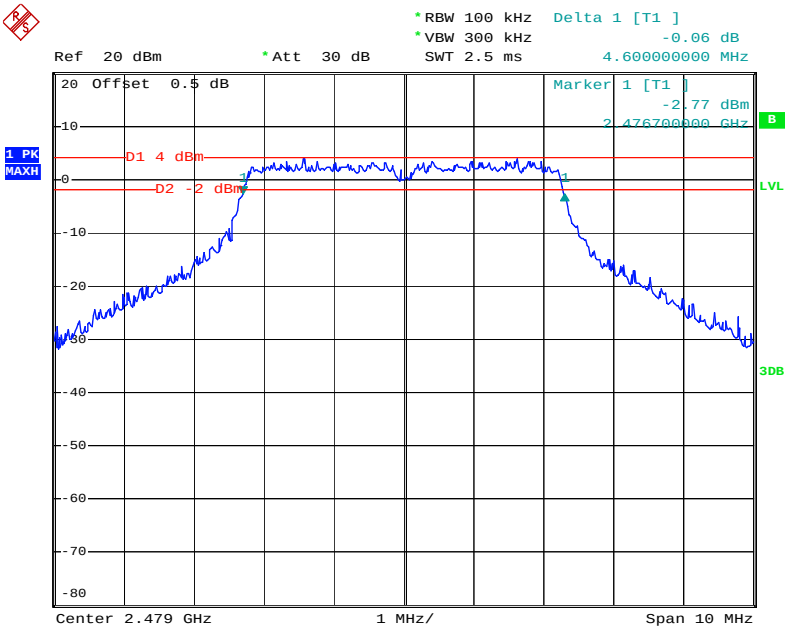
Date: 19.JUL.2021 11:42:45

Middle Channel



Date: 19.JUL.2021 11:40:19

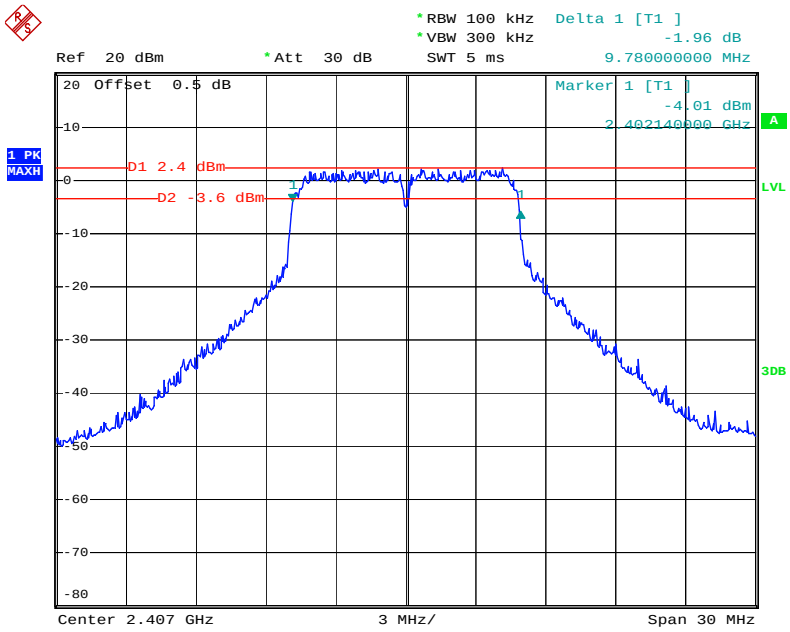
High Channel



Date: 19.JUL.2021 11:35:58

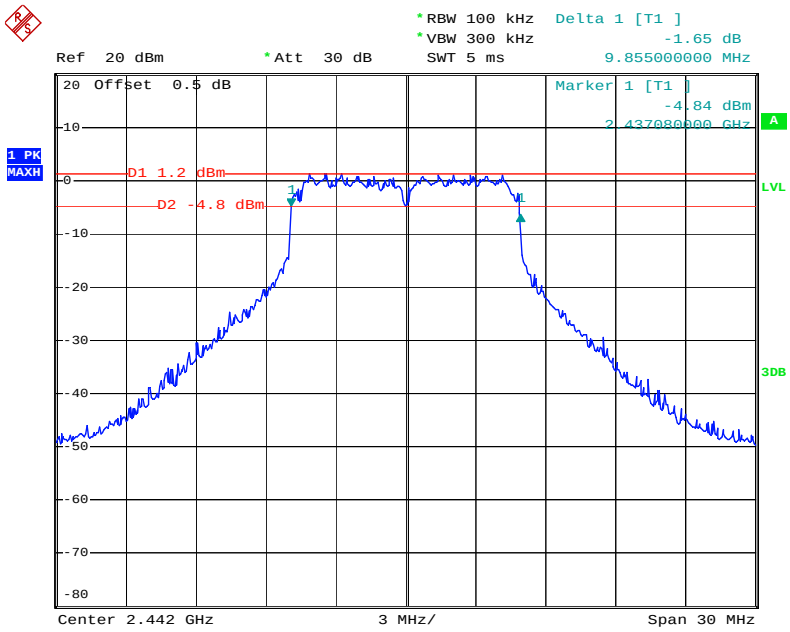
SDR 8M

Low Channel



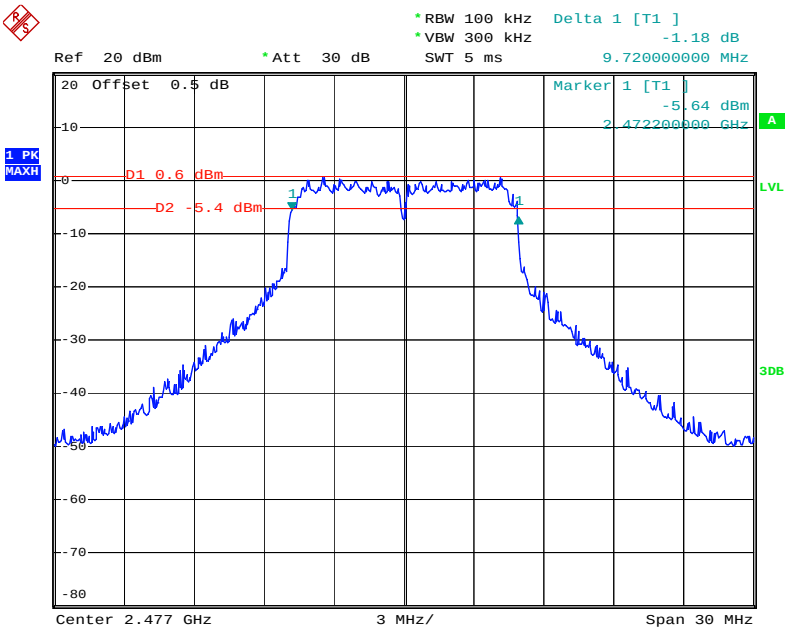
Date: 13.JUL.2021 15:16:38

Middle Channel



Date: 13.JUL.2021 15:14:35

High Channel



Date: 13.JUL.2021 15:18:06

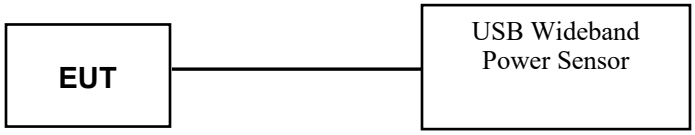
FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to test equipment.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.4~28.7°C
Relative Humidity:	43~49%
ATM Pressure:	100~100.5kPa
Tester:	Rennes Guo
Test Date:	2021-07-13~2021-07-19

Test Result: Compliance. Please refer to the following table.

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power (dBm)		Total (dBm)	Limit (dBm)
			Chain 0	Chain 1		
SDR 4M	Low	2405	21.62	21.83	24.74	30
	Middle	2442	21.83	22.01	24.93	
	High	2475	21.43	21.97	24.72	
		2476	19.52	19.65	22.6	
		2477	15.92	15.84	18.89	
		2478	10.03	9.87	12.96	
		2479	8.01	7.85	10.94	
SDR 8M	Low	2407	25.97	25.92	28.96	
	Middle	2442	25.64	25.58	28.62	
	High	2471	25.32	25.64	28.49	
		2472	21.97	22.03	25.01	
		2473	19.85	19.74	22.81	
		2474	17.38	17.41	20.41	
		2475	13.87	13.67	16.78	
		2476	10.24	10.39	13.33	
		2477	8.25	8.46	11.37	

Note:
The maximum antenna gain is 3.2 dBi in 2.4GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Directional gain = 3.2 dBi

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

According to FCC§15.247(d):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)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2021-07-07	2022-07-07
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

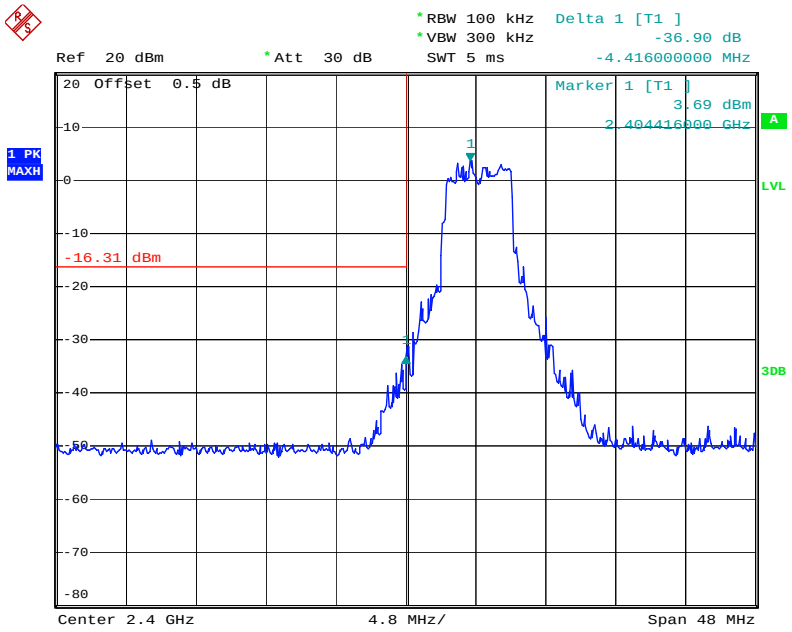
Temperature:	25.4~28.7°C
Relative Humidity:	43~49%
ATM Pressure:	100~100.5kPa
Tester:	Rennes Guo
Test Date:	2021-07-13~2021-07-19

Test mode: Transmitting

Test Result: Compliance. Please refer to following plots.

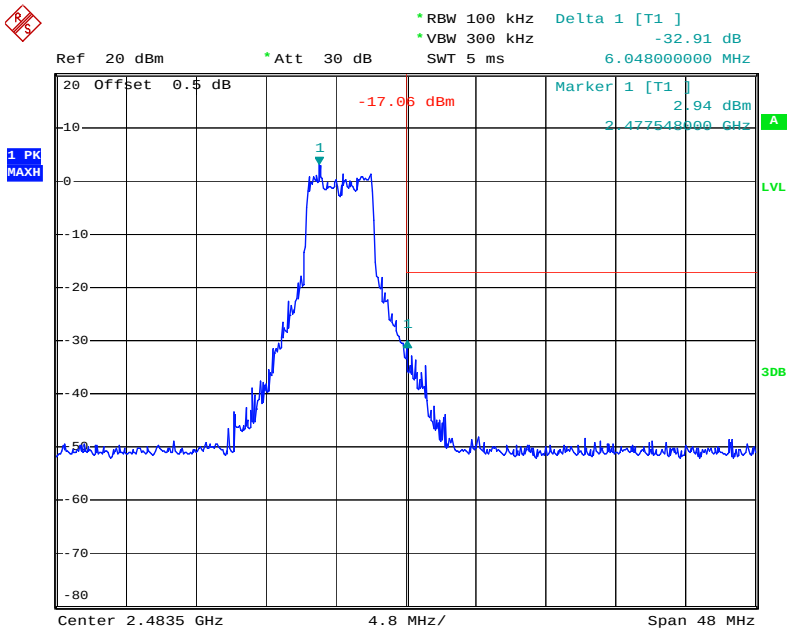
SDR 4M Chain 0

Band Edge, Left Side



Date: 19.JUL.2021 16:53:40

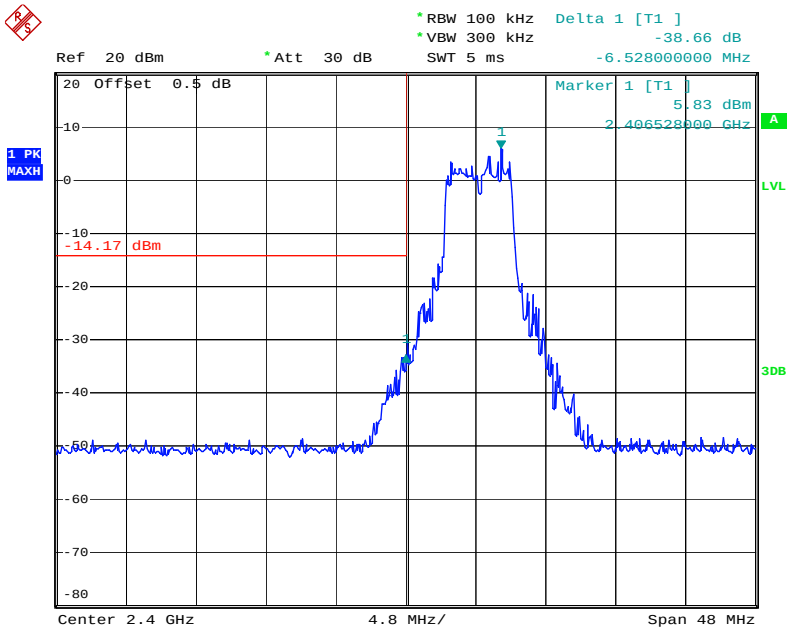
Band Edge, Right Side



Date: 19.JUL.2021 16:57:04

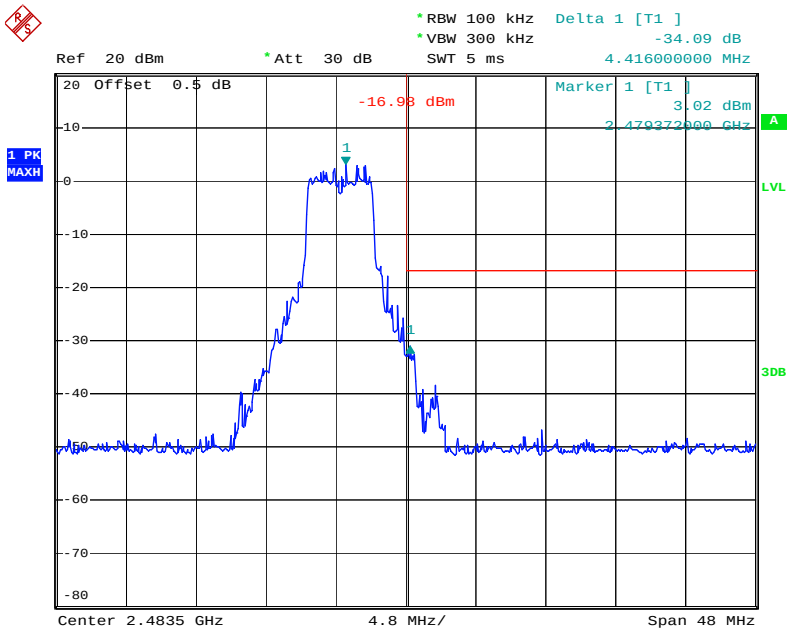
SDR 4M Chain 1

Band Edge, Left Side



Date: 19.JUL.2021 17:13:21

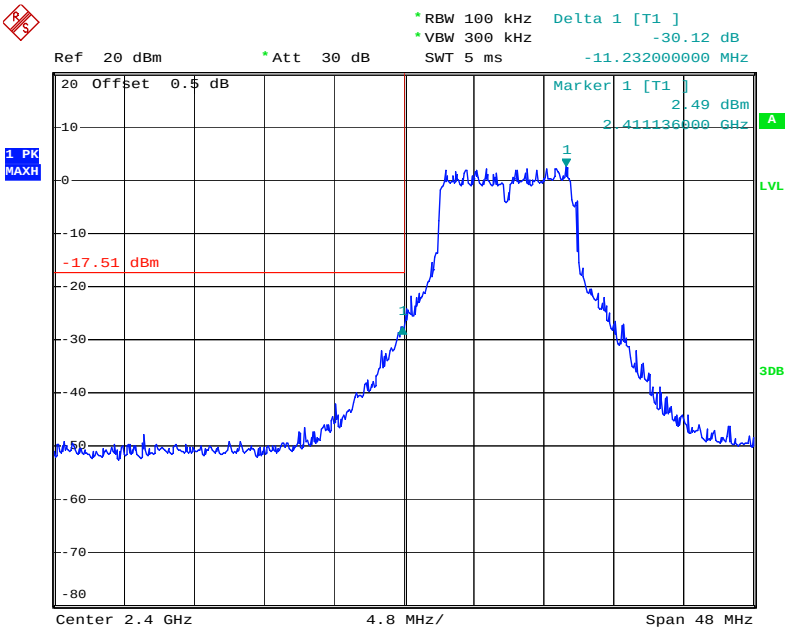
Band Edge, Right Side



Date: 19.JUL.2021 17:04:56

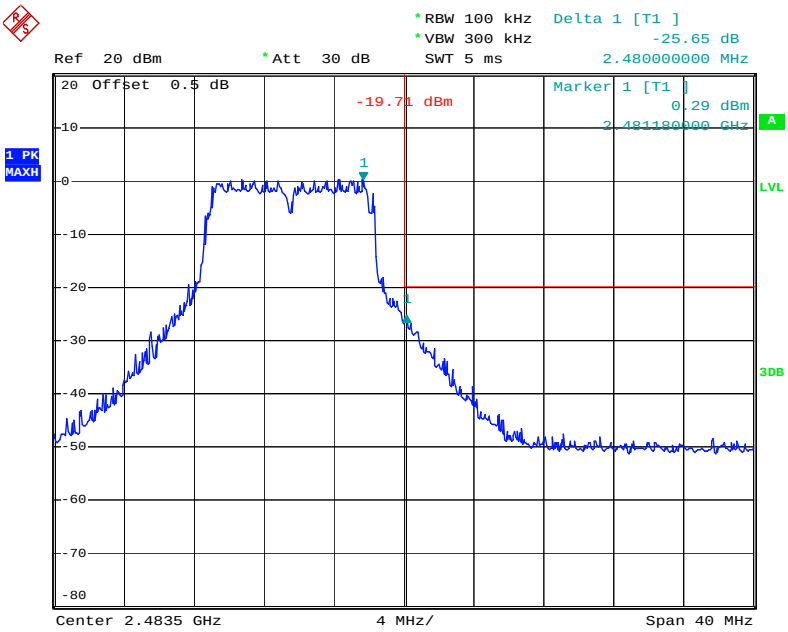
SDR 8M Chain 0

Band Edge, Left Side



Date: 13.JUL.2021 15:40:45

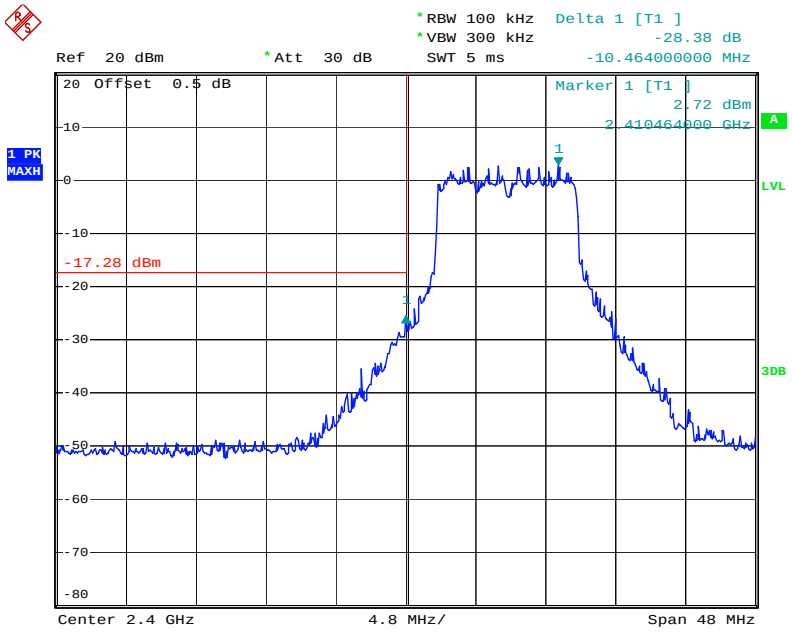
Band Edge, Right Side



Date: 13.JUL.2021 15:29:27

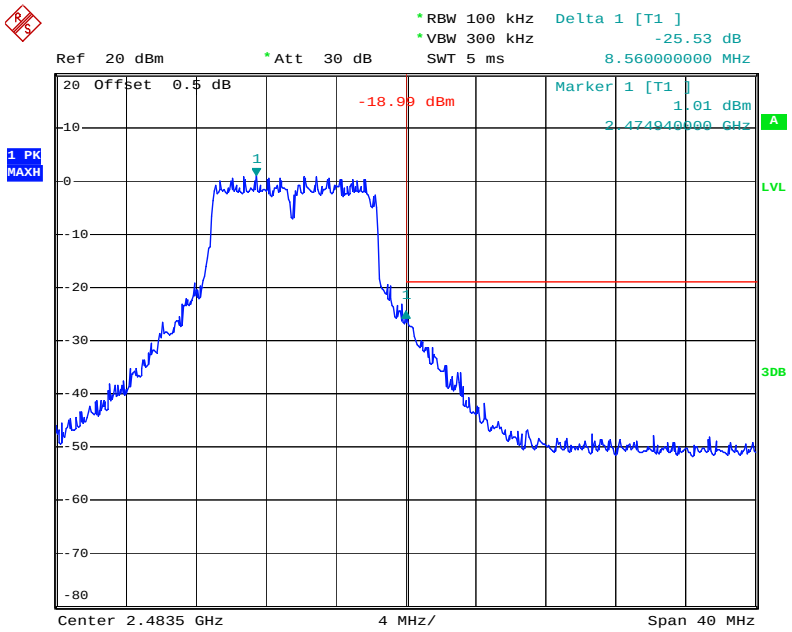
8M Chain 1

Band Edge, Left Side



Date: 13.JUL.2021 15:44:18

Band Edge, Right Side



Date: 13.JUL.2021 15:32:25

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

According to FCC§15.247(e):For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS bandwidth.
4. Use the peak marker function to determine the maximum amplitude level.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2021-07-07	2022-07-07
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.4~28.7°C
Relative Humidity:	43~49%
ATM Pressure:	100~100.5kPa
Tester:	Rennes Guo
Test Date:	2021-07-13~2021-07-19

Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table and plots

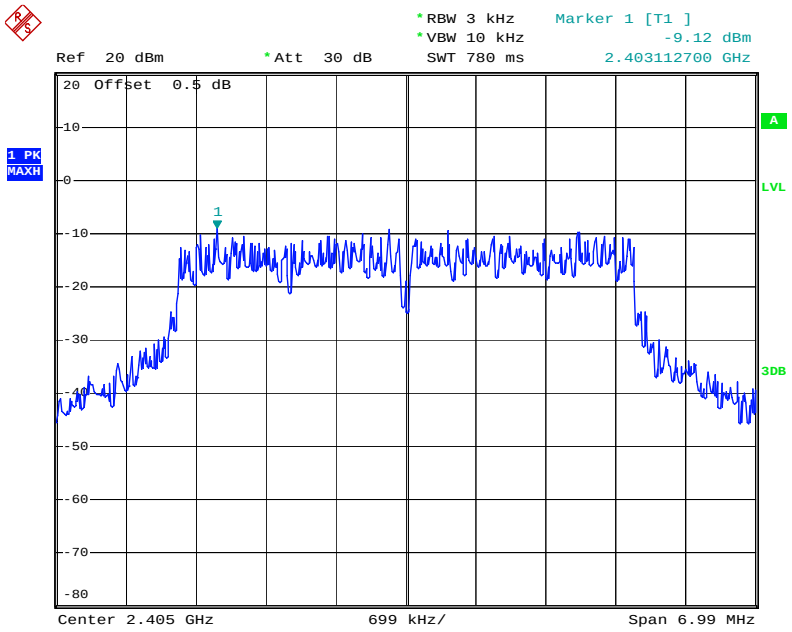
Mode	Channel	Frequency (MHz)	Result (dBm/3kHz)			Limit (dBm/3kHz)
			Chain 0	Chain 1	Total	
SDR 4M	Low	2405	-9.12	-8.40	-5.73	7.8
	Middle	2442	-8.84	-7.07	-4.86	
	High	2479	-8.85	-8.73	-5.78	
SDR 8M	Low	2407	-10.59	-9.93	-7.24	
	Middle	2442	-11.05	-10.95	-7.99	
	High	2477	-11.51	-11.54	-8.51	

Note 1:The maximum antenna gain is 3.2 dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

Array Gain = 10 log(NANT/NSS) dB.
So:
Directional gain = GANT + Array Gain = 3.2+10*log(2/1)=6.2 dBi

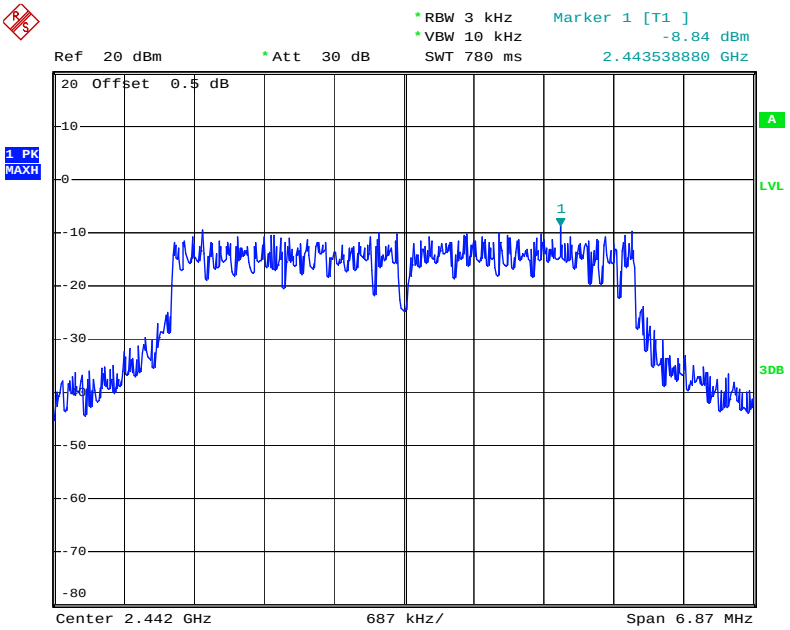
SDR 4M Chain 0

Power Spectral Density, Low Channel



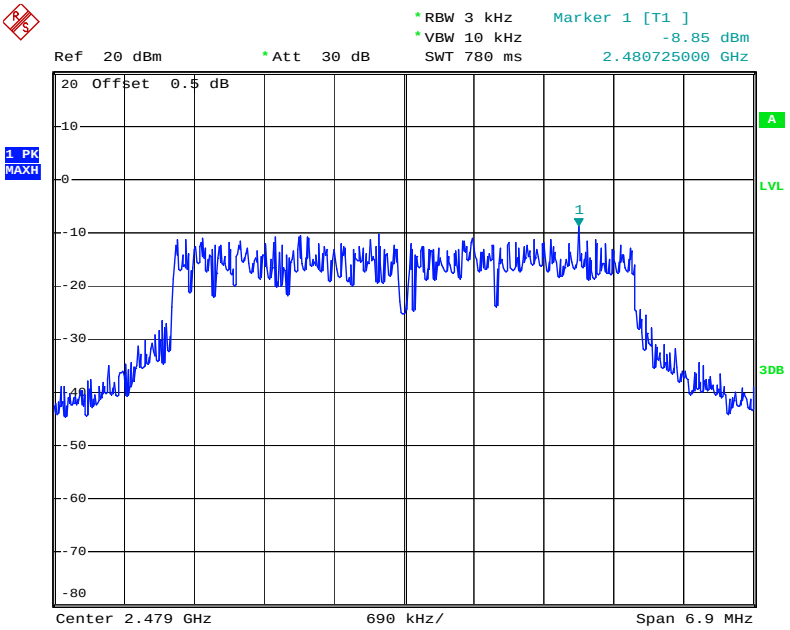
Date: 19.JUL.2021 16:52:57

Power Spectral Density, Middle Channel



Date: 19.JUL.2021 16:50:11

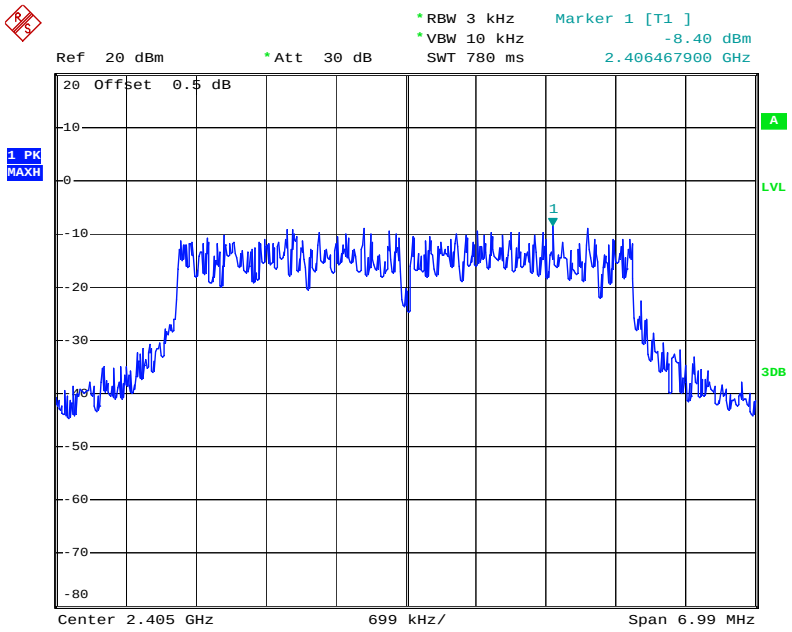
Power Spectral Density, High Channel



Date: 19.JUL.2021 16:56:19

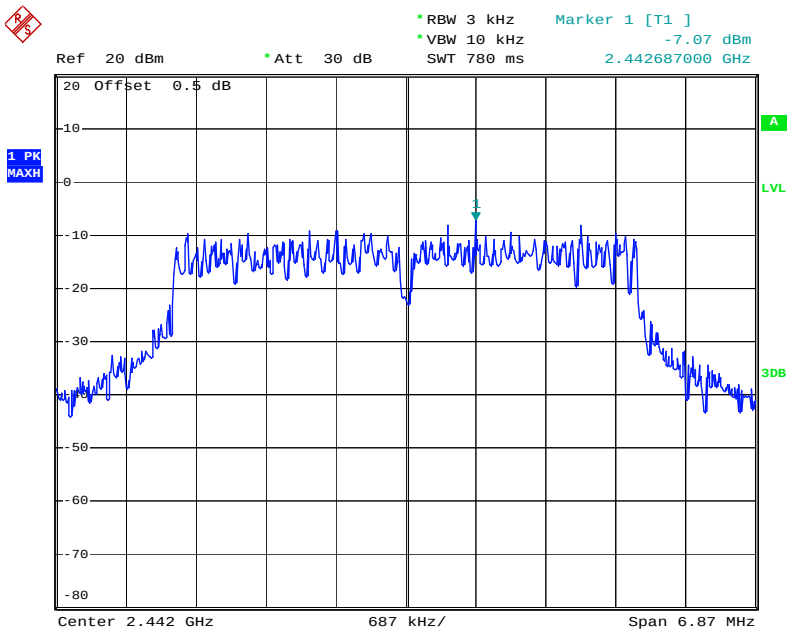
SDR 4M Chain 1

Power Spectral Density, Low Channel



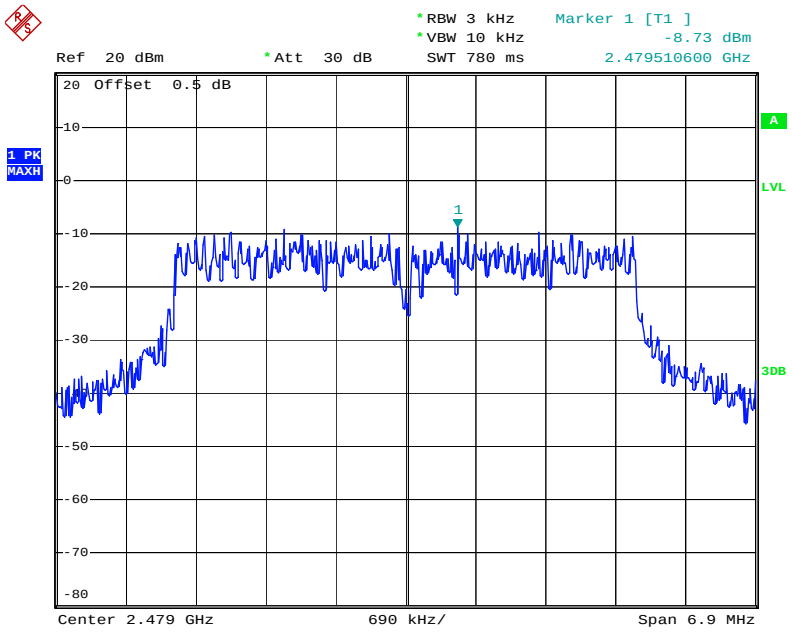
Date: 19.JUL.2021 17:12:53

Power Spectral Density, Middle Channel



Date: 19.JUL.2021 17:10:50

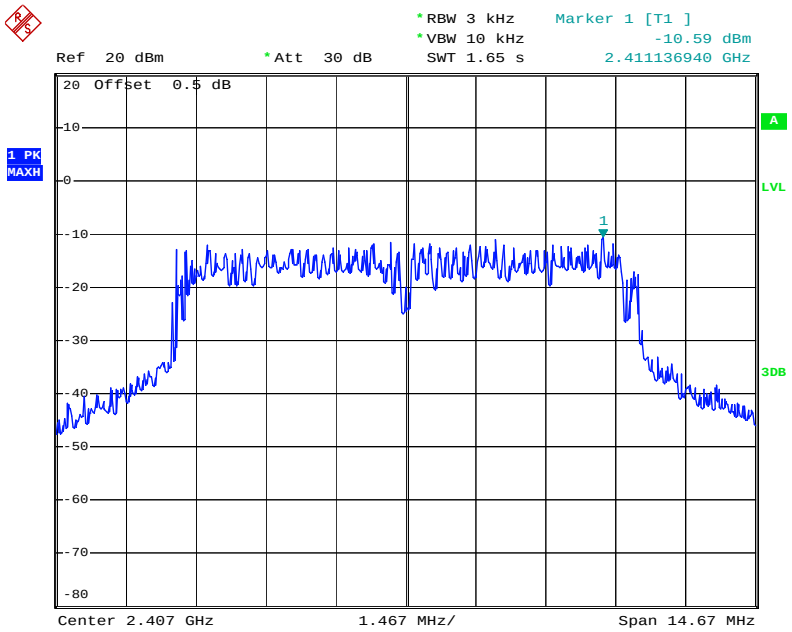
Power Spectral Density, High Channel



Date: 19.JUL.2021 17:04:16

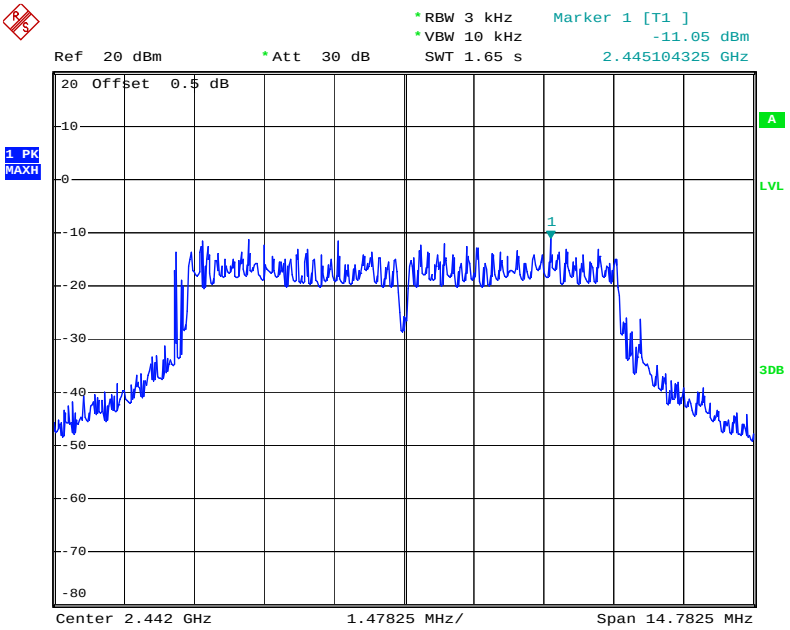
SDR 8M Chain 0

Power Spectral Density, Low Channel



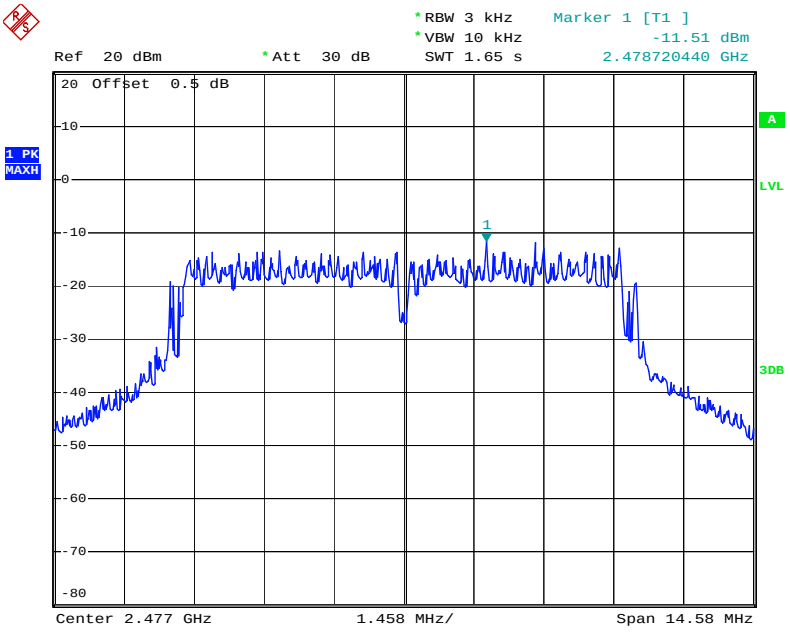
Date: 13.JUL.2021 15:41:59

Power Spectral Density, Middle Channel



Date: 13.JUL.2021 15:37:23

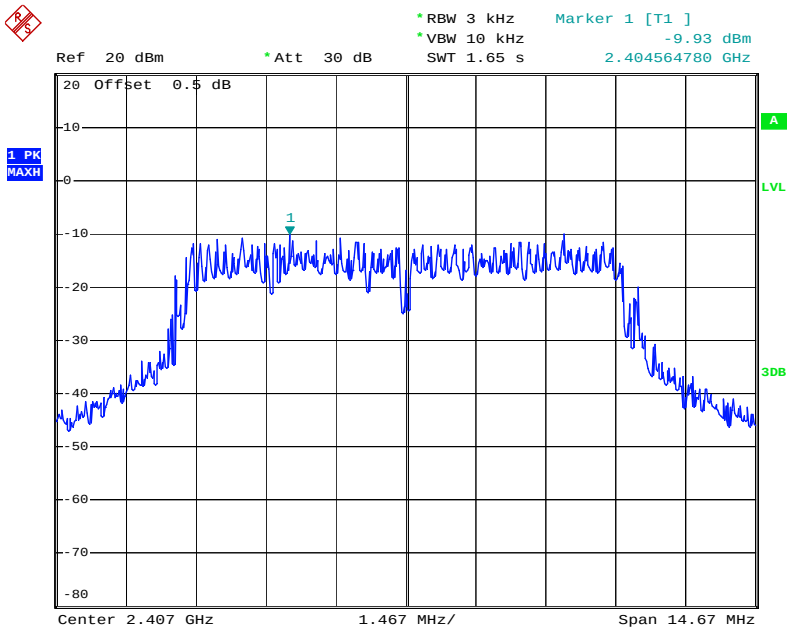
Power Spectral Density, High Channel



Date: 13.JUL.2021 15:28:40

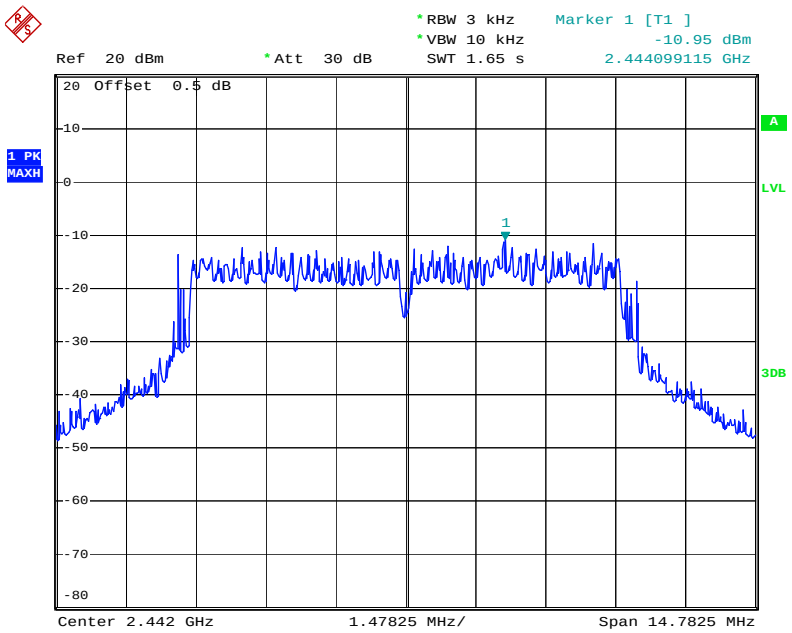
SDR 8M Chain 1

Power Spectral Density, Low Channel



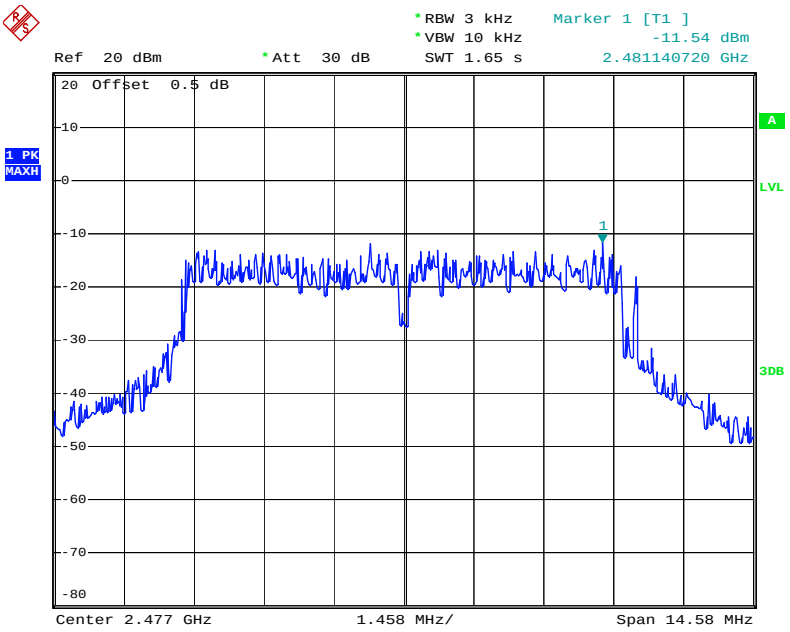
Date: 13.JUL.2021 15:44:02

Power Spectral Density, Middle Channel



Date: 13.JUL.2021 15:35:38

Power Spectral Density, High Channel



Date: 13.JUL.2021 15:31:59

******* END OF REPORT ******