TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.247

TEST REPORT

For

DGL Group LTD.

195 Raritan Center Parkway Edison, NJ 08837

FCC ID:2AANZ17KR

Report Type:	**Product Type:**
Original Report	Travel Bass wireless LED Speaker

Report Number:	RSZ200708002-00C
Report Date:	2020-07-30
Reviewed By:	Ivan Cao Assistant Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, 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:	Travel Bass wireless LED Speaker
EUT Model:	DG-17KR-BLK
Operation Frequency:	2402-2480 MHz
Maximum Peak Output Power (Conducted):	-1.76 dBm
Modulation Type:	GFSK
Rated Input Voltage:	DC 3.7V from Battery or DC 5V from USB port
Serial Number:	RSZ200708002-RF -S1
EUT Received Date:	2020.07.14
EUT Received Status:	Good

Objective

This report is prepared on behalf of ***DGL Group LTD.*** 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 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: 2AANZ17KR
FCC Part 15B JAB submissions with FCC ID: 2AANZ17KR

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 558074 D01 15.247 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.69 Pulongcun, Puxinhu Industry Area, Tangxia, 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 must not be used by the customer to claim product certification, approval, or endorsement by A2LA, or any agency of the U.S. Government.

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 Engineering Mode, which was provided by the manufacturer.

For Bluetooth LE mode, 40 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	…	…
…	…	…	…
…	…	…	…
..	…	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

Equipment Modifications

No modification was made to the EUT.

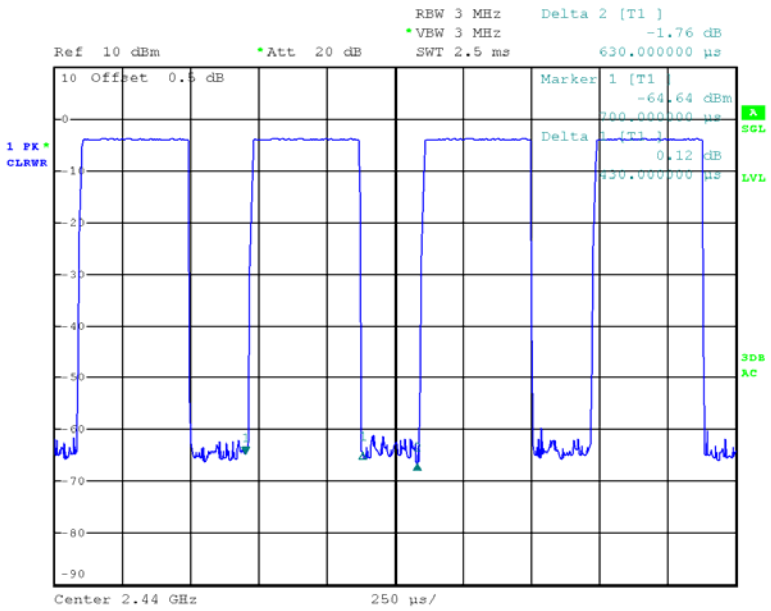
EUT Exercise Software

The ' BT_Tool V1.0.9 ' was used during test, which was provided by manufacturer. The maximum power level was configured by the software as below table:

Channel	Frequency (MHz)	Power level setting
Low	2402	7
Middle	2440	7
High	2480	7

The maximum duty cycle as following table:

T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
0.43	0.63	68.25



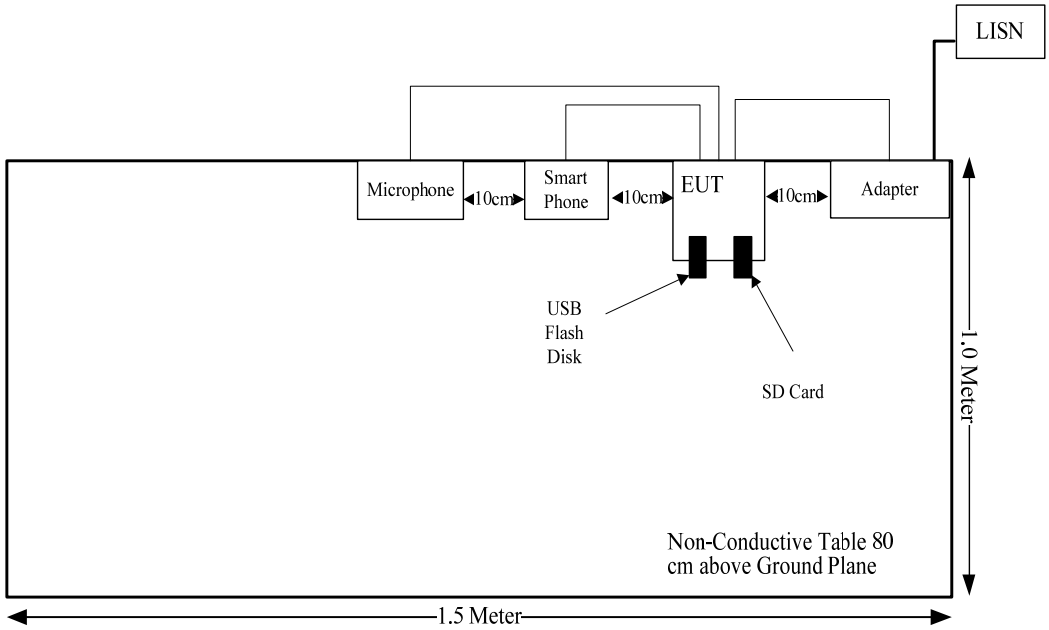
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IPRO	Adapter	NTR-S01	190725003
USB Flash Disk	Kingston	32G	249633
GlocalMe	Smartphone	P3S18	3089d47dfb40
Keenion	Microphone	Un-known	MIC-001
SanDisk	TF card	4G	249520

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Audio Cable	No	No	1	EUT	Smartphone
USB Cable	No	No	1	Adapter	EUT
Audio Cable	No	No	1	EUT	Microphone

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	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 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Conducted output power including Tune-up Tolerance**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
2402-2480	-0.68	0.86	-1	0.79	20.00	0.0001	1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has one internal PCB antenna arrangement for BT/BLE, fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
BLE	50	-0.68 dBi/2.4~2.5GHz

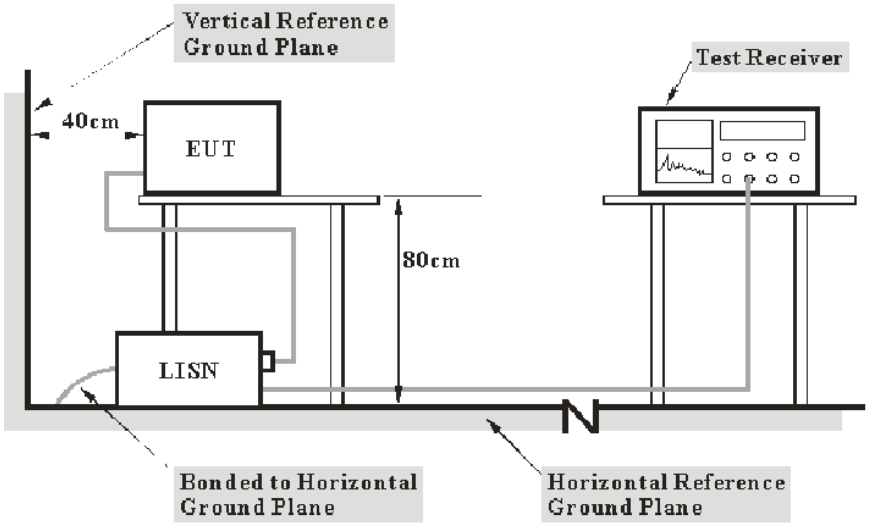
Result: Compliance.

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.

The spacing between the peripherals was 10 cm.

The EUT 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 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
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2019-09-05	2020-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	LISN	ENV 216	101614	2019-09-12	2020-09-12
R&S	EMI Test Receiver	ESCI	101121	2020-05-09	2021-05-09

*** 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

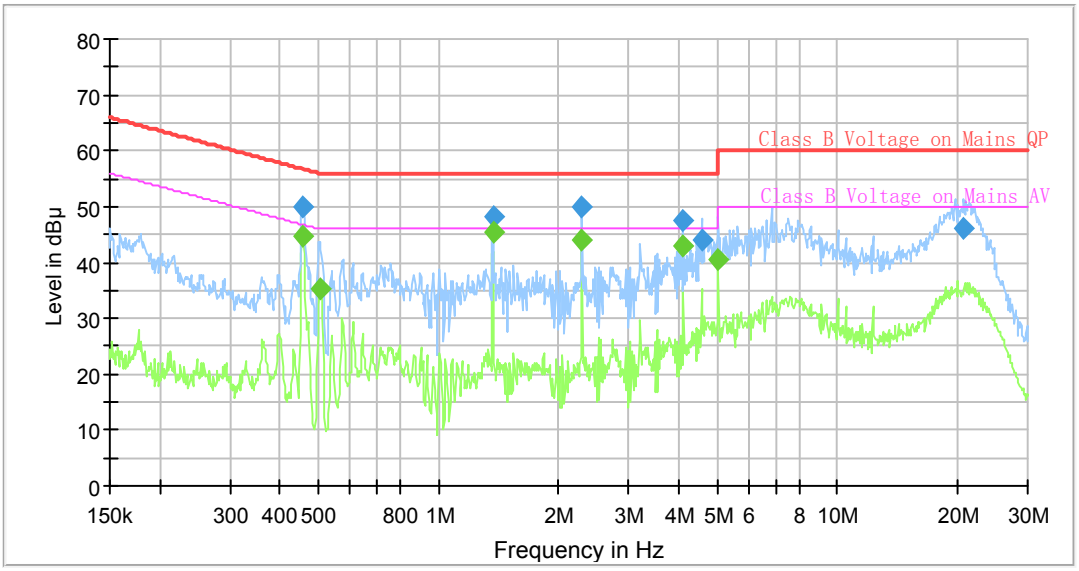
Environmental Conditions

Temperature:	28.9°C
Relative Humidity:	65%
ATM Pressure:	100.8kPa
Tester:	Barry Yang
Test Date:	2020-07-29

Test Result: Compliance

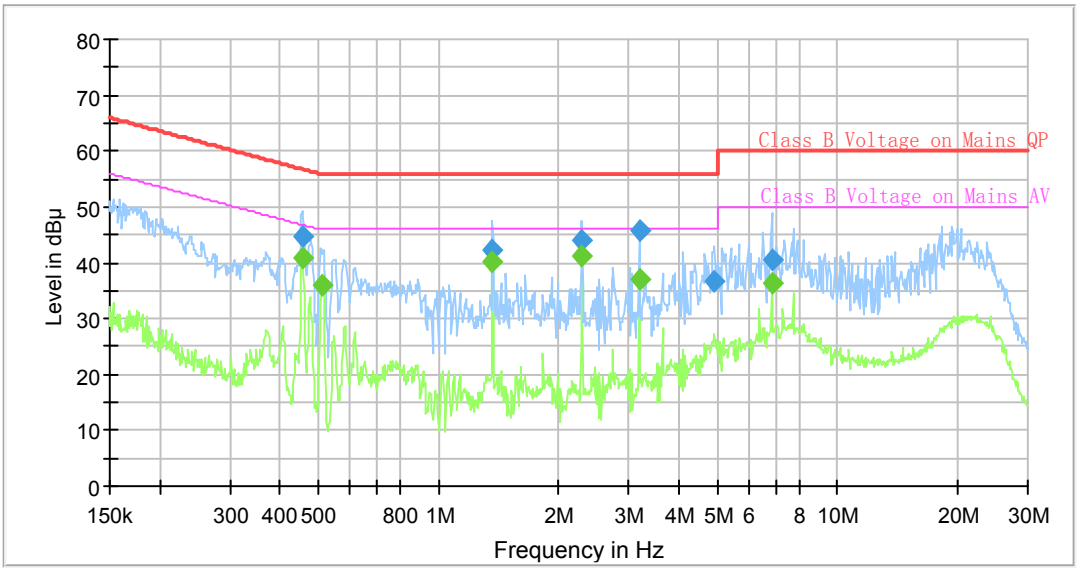
Test Mode: Transmitting

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.456166	---	44.63	46.76	2.13	9.000	L1	9.7
0.456166	49.98	---	56.76	6.78	9.000	L1	9.7
0.504016	---	35.45	46.00	10.55	9.000	L1	9.7
1.373481	48.19	---	56.00	7.81	9.000	L1	9.7
1.373481	---	45.27	46.00	0.73	9.000	L1	9.7
2.284341	49.89	---	56.00	6.11	9.000	L1	9.8
2.284341	---	43.85	46.00	2.15	9.000	L1	9.8
4.114871	---	42.81	46.00	3.19	9.000	L1	9.8
4.114871	47.59	---	56.00	8.41	9.000	L1	9.8
4.569236	43.88	---	56.00	12.12	9.000	L1	9.8
5.023411	---	40.67	50.00	9.33	9.000	L1	9.8
20.709055	46.03	---	60.00	13.97	9.000	L1	10.1

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.456166	---	40.77	46.76	5.99	9.000	N	9.6
0.456166	44.88	---	56.76	11.88	9.000	N	9.6
0.511614	---	36.07	46.00	9.93	9.000	N	9.6
1.366648	42.32	---	56.00	13.68	9.000	N	9.6
1.366648	---	40.02	46.00	5.98	9.000	N	9.6
2.284341	44.15	---	56.00	11.85	9.000	N	9.6
2.284341	---	41.15	46.00	4.85	9.000	N	9.6
3.190708	---	36.88	46.00	9.12	9.000	N	9.6
3.190708	45.69	---	56.00	10.31	9.000	N	9.6
4.924186	36.57	---	56.00	19.43	9.000	N	9.7
6.843757	---	36.26	50.00	13.74	9.000	N	9.7
6.843757	40.61	---	60.00	19.39	9.000	N	9.7

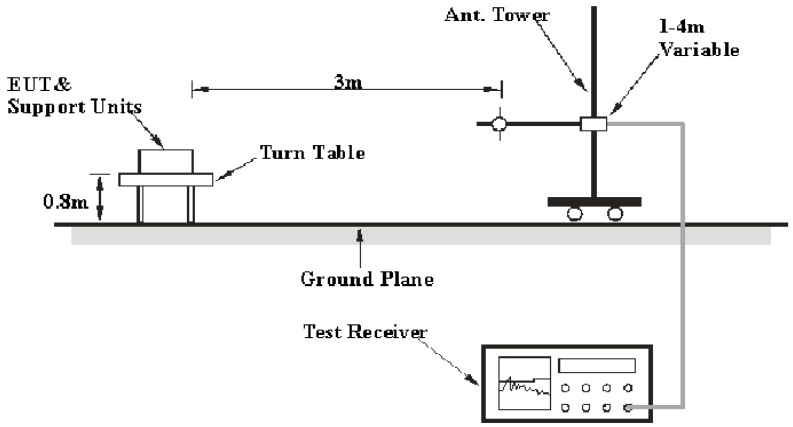
FCC §15.209, §15.205 & §15.247(d) - Spurious Emissions

Applicable Standard

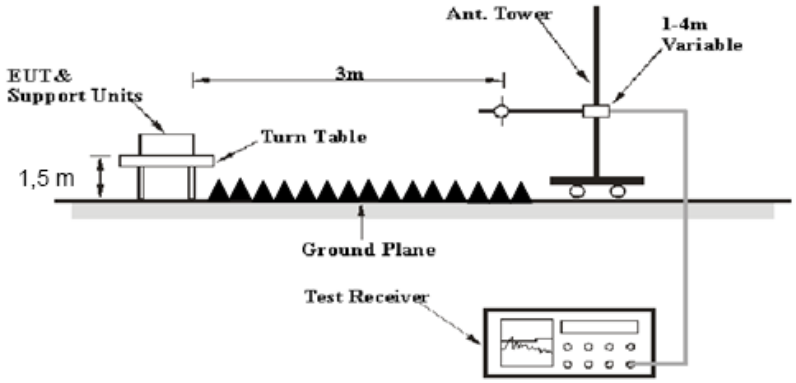
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission Below 1GHz tests were performed in the 3 meters chamber A, 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 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	A060611-1	2017-11-10	2020-11-10
R&S	EMI Test Receiver	ESR3	102453	2019-09-12	2020-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2020-05-06	2021-05-06
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiation Above 1GHz					
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-05-09	2021-05-09
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2017-12-06	2020-12-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2020-06-27	2021-06-27
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2019-09-05	2020-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2020-06-27	2021-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2020-06-16	2021-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2020-06-16	2021-06-16

**** 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

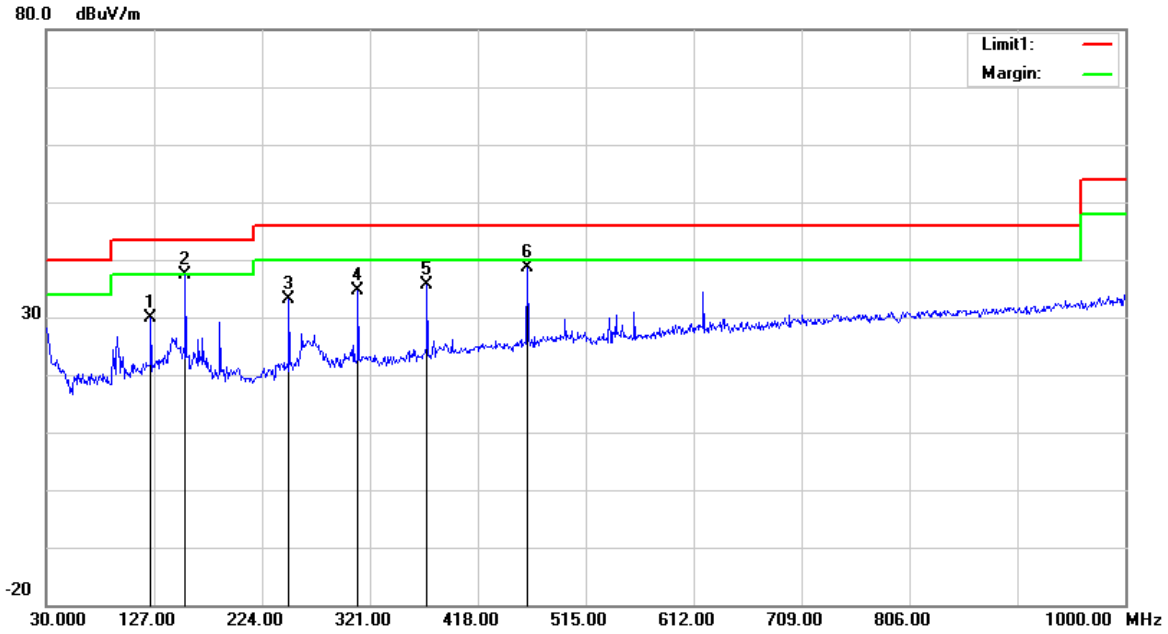
Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	27.8 °C	29°C
Relative Humidity:	43 %	60%
ATM Pressure:	100.2kPa	100.1kPa
Tester:	Joker Chen	Joker Chen
Test Date:	2020-07-15	2020-07-17

Test Result: Compliance, please Refer to the following data

Test Mode: Transmitting

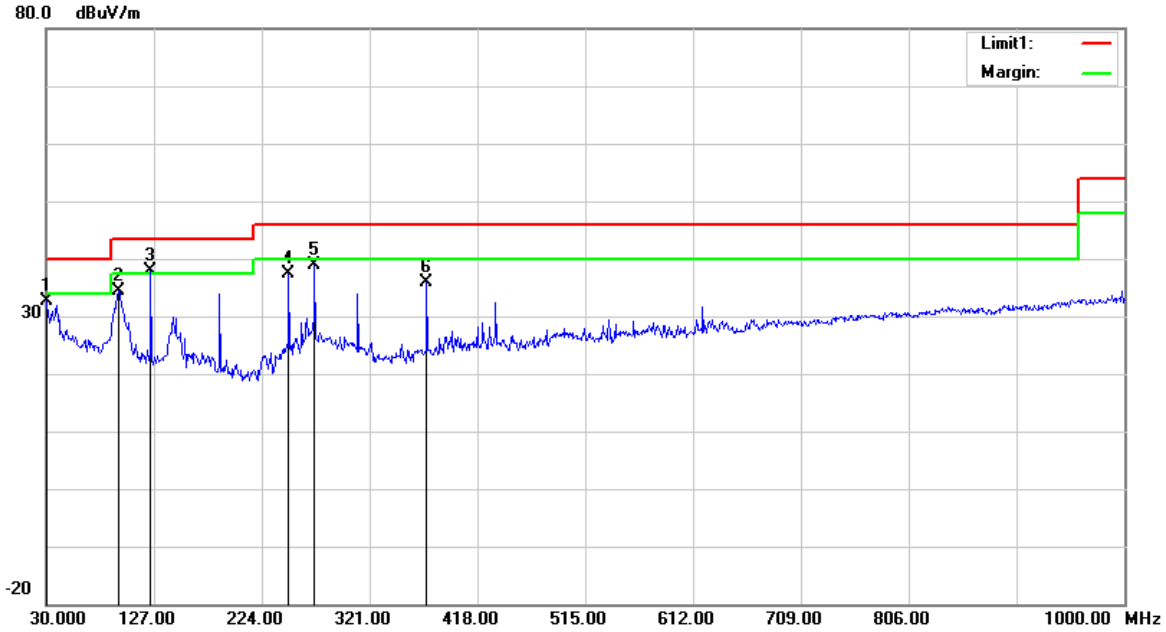
1) 30MHz-1GHz(Middle channel was the worst)

Horizontal:



Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
124.0900	34.58	peak	-4.75	29.83	43.50	13.67
155.1300	43.44	peak	-6.05	37.39	43.50	6.11
248.2500	39.05	peak	-5.87	33.18	46.00	12.82
310.3300	38.18	peak	-3.49	34.69	46.00	11.31
372.4100	38.26	peak	-2.68	35.58	46.00	10.42
462.6200	39.35	peak	-0.77	38.58	46.00	7.42

Vertical:



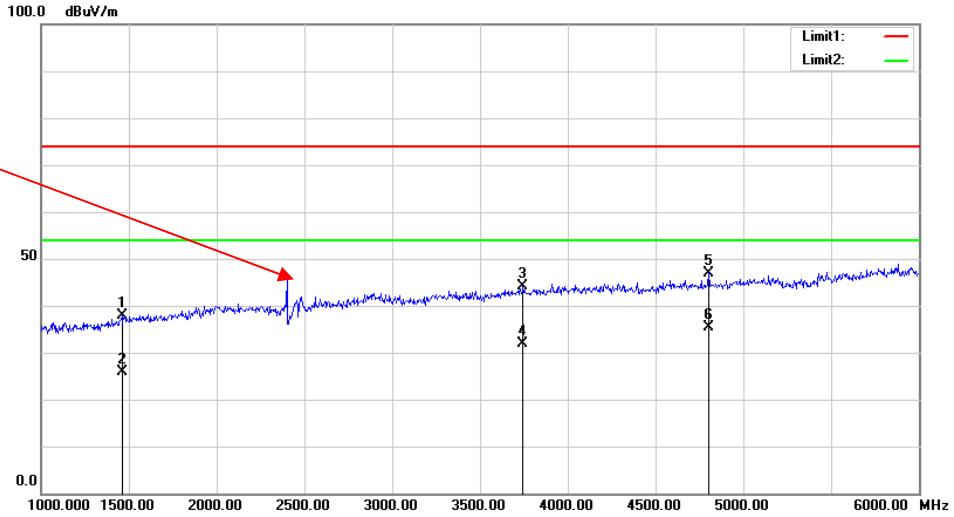
Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	31.10	peak	1.46	32.56	40.00	7.44
94.9900	44.88	peak	-10.44	34.44	43.50	9.06
124.0900	42.55	peak	-4.75	37.80	43.50	5.70
248.2500	43.26	peak	-5.87	37.39	46.00	8.61
271.5300	42.98	peak	-4.12	38.86	46.00	7.14
372.4100	38.54	peak	-2.68	35.86	46.00	10.14

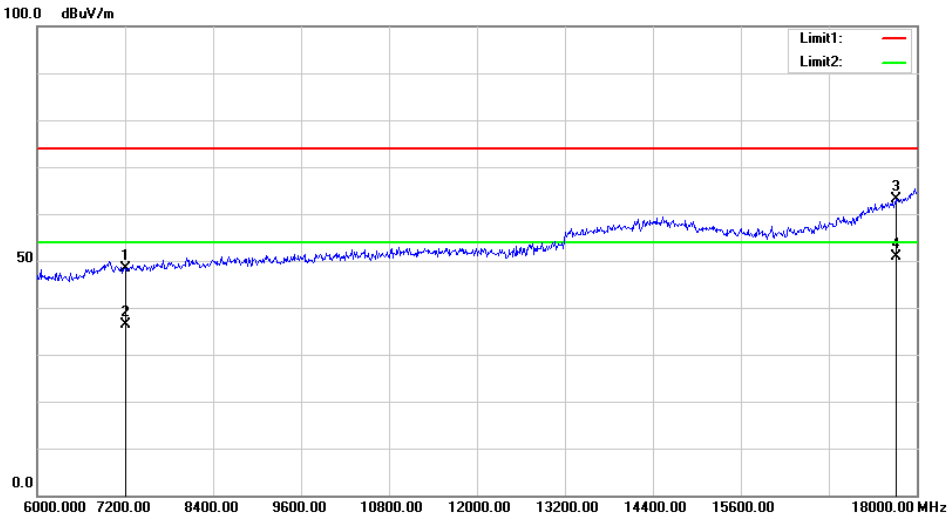
2)1GHz-25GHz:

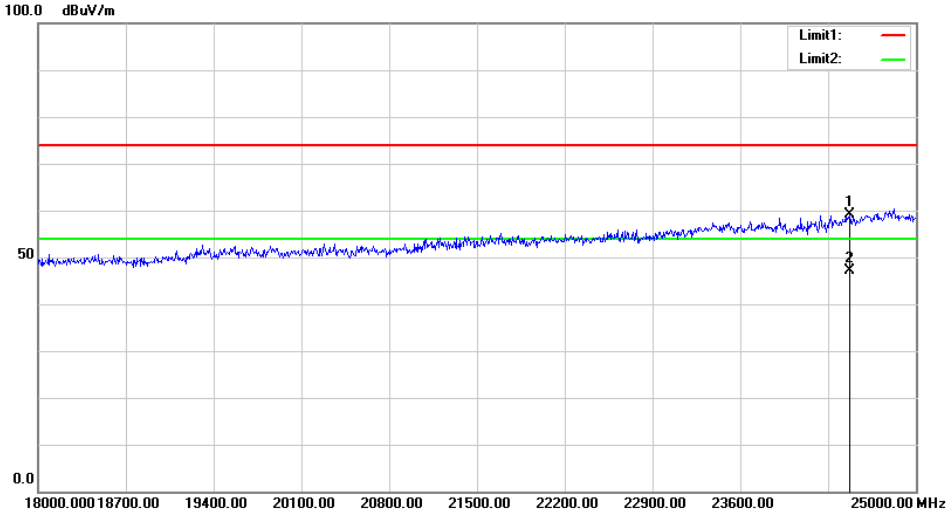
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	60.34	PK	H	28.10	1.80	0.00	90.24	N/A	N/A
2402.00	59.68	AV	H	28.10	1.80	0.00	89.58	N/A	N/A
2402.00	60.99	PK	V	28.10	1.80	0.00	90.89	N/A	N/A
2402.00	60.48	AV	V	28.10	1.80	0.00	90.38	N/A	N/A
2390.00	25.72	PK	V	28.08	1.80	0.00	55.60	74.00	18.40
2390.00	14.88	AV	V	28.08	1.80	0.00	44.76	54.00	9.24
4804.00	37.69	PK	V	32.91	3.17	25.60	48.17	74.00	25.83
4804.00	28.80	AV	V	32.91	3.17	25.60	39.28	54.00	14.72
7206.00	37.21	PK	V	35.74	4.82	25.60	52.17	74.00	21.83
7206.00	26.76	AV	V	35.74	4.82	25.60	41.72	54.00	12.28
Middle Channel: 2440 MHz									
2440.00	60.16	PK	H	28.18	1.82	0.00	90.16	N/A	N/A
2440.00	59.31	AV	H	28.18	1.82	0.00	89.31	N/A	N/A
2440.00	61.18	PK	V	28.18	1.82	0.00	91.18	N/A	N/A
2440.00	60.34	AV	V	28.18	1.82	0.00	90.34	N/A	N/A
4880.00	37.26	PK	V	33.06	3.27	25.66	47.93	74.00	26.07
4880.00	27.42	AV	V	33.06	3.27	25.66	38.09	54.00	15.91
7320.00	36.49	PK	V	36.03	4.62	25.72	51.42	74.00	22.58
7320.00	25.66	AV	V	36.03	4.62	25.72	40.59	54.00	13.41
High Channel: 2480 MHz									
2480.00	60.58	PK	H	28.26	1.84	0.00	90.68	N/A	N/A
2480.00	59.87	AV	H	28.26	1.84	0.00	89.97	N/A	N/A
2480.00	61.11	PK	V	28.26	1.84	0.00	91.21	N/A	N/A
2480.00	60.51	AV	V	28.26	1.84	0.00	90.61	N/A	N/A
2483.50	25.99	PK	V	28.27	1.84	0.00	56.10	74.00	17.90
2483.50	15.45	AV	V	28.27	1.84	0.00	45.56	54.00	8.44
4960.00	37.05	PK	V	33.22	3.23	25.63	47.87	74.00	26.13
4960.00	27.18	AV	V	33.22	3.23	25.63	38.00	54.00	16.00
7440.00	36.43	PK	V	36.34	4.41	25.85	51.33	74.00	22.67
7440.00	25.27	AV	V	36.34	4.41	25.85	40.17	54.00	13.83

Test plots(Worst Low channel)
Horizontal:

Fundamental Test with Band Rejection Filter

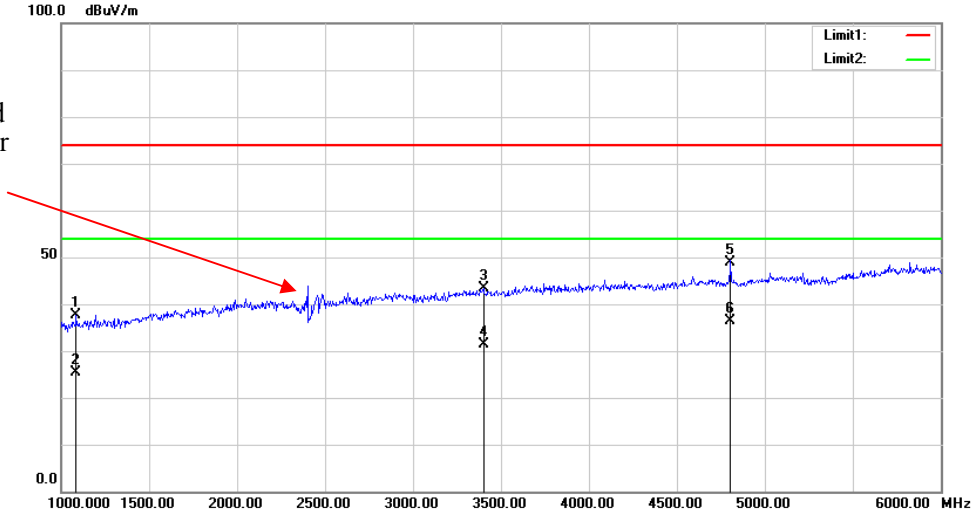


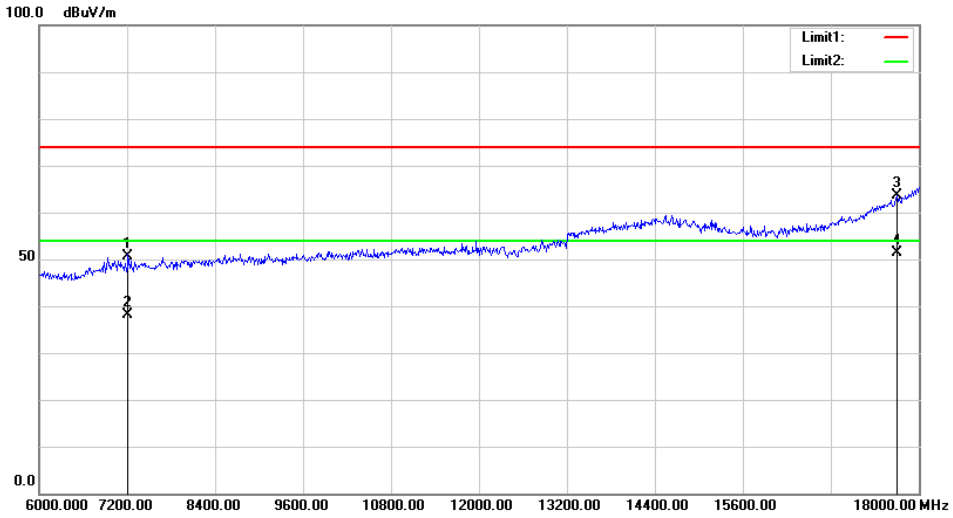


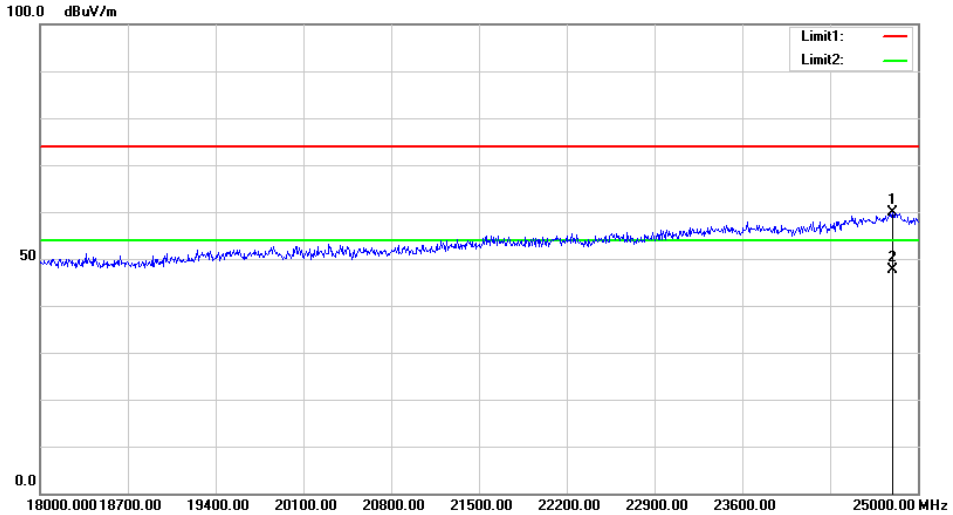


Vertical:

Fundamental Test with Band Rejection Filter







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

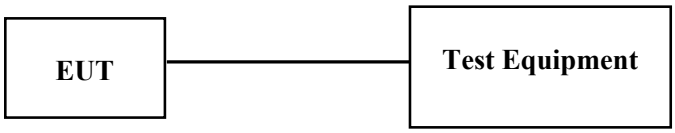
Applicable Standard

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	FSP 38	100478	2020-05-09	2021-05-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	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

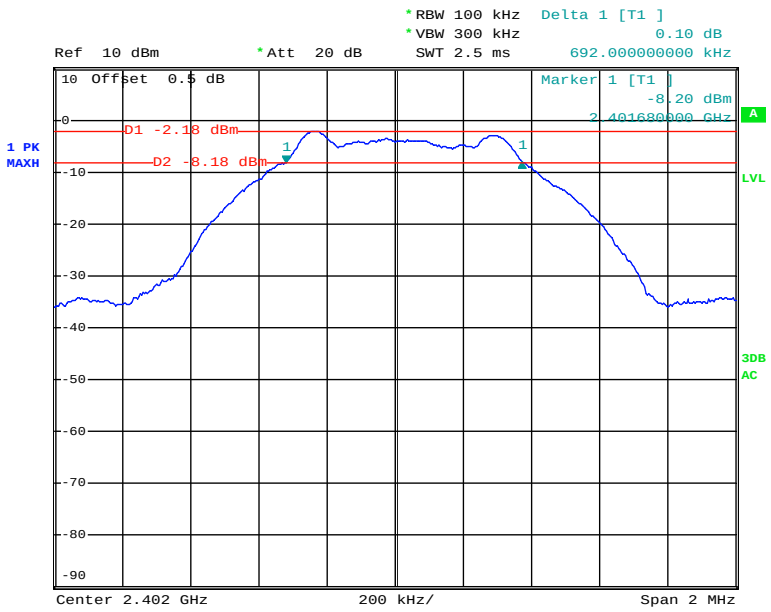
Temperature:	28.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.1 kPa
Tester:	Vern Shen
Test Date:	2020-07-17

Test Mode: Transmitting

Frequency (MHz)	6dB Emission Bandwidth (MHz)	Limit (MHz)
2402	0.692	0.5
2440	0.696	0.5
2480	0.696	0.5

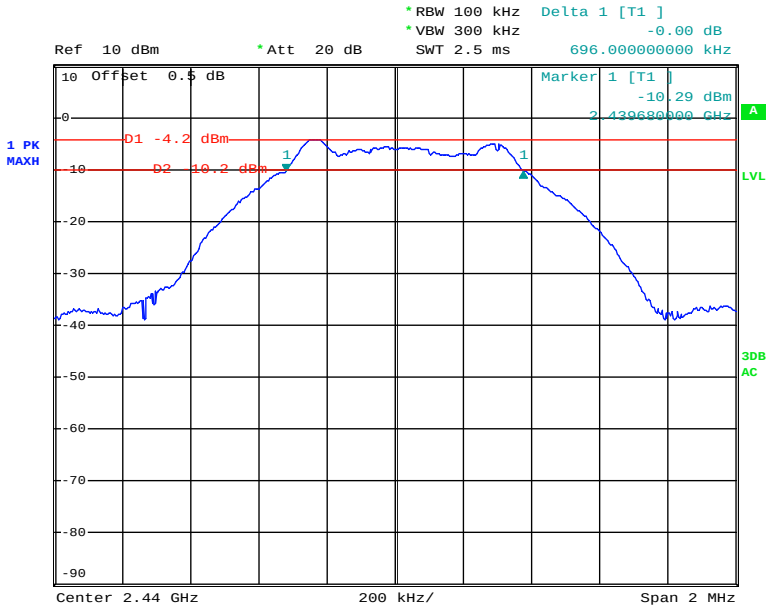
Please refer to following plots:

Low Channel



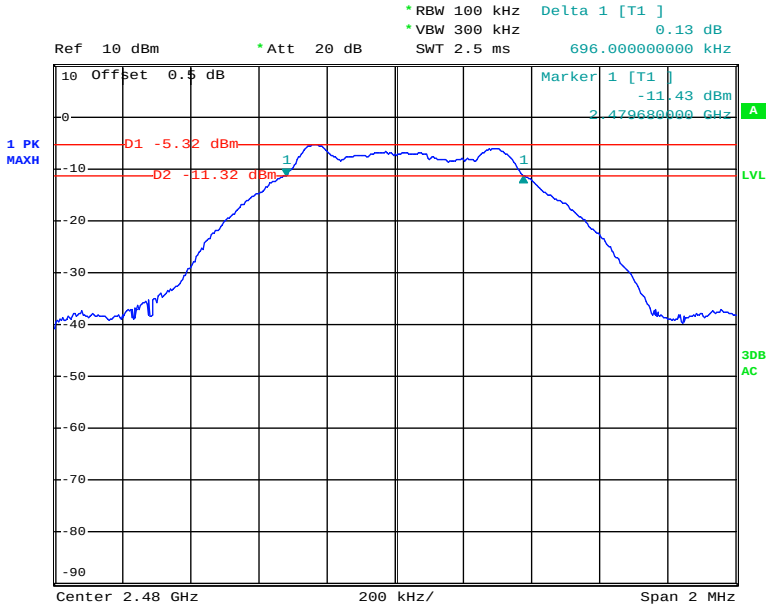
Date: 17.JUL.2020 18:59:44

Middle Channel



Date: 17.JUL.2020 19:00:47

High Channel



Date: 17.JUL.2020 19:02:16

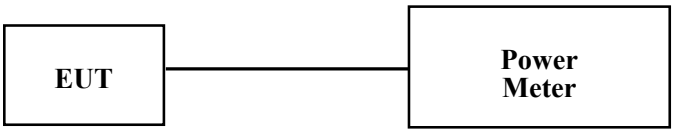
FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER

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.
4. Set the power Meter to test Peak output power, record the result as peak power.
5. Set the power meter to test average output power, record the result as average power.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	N/A
Agilent	USB Wideband Power Sensor	U2021XA	MY5425009	2020-05-09	2021-05-09

*** 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:	28.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.1 kPa
Tester:	Vern Shen
Test Date:	2020-07-17

Test Mode: Transmitting

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

Frequency (MHz)	Maximum Peak Conducted Output power (dBm)	Limit (dBm)
2402	-1.87	30
2440	-1.97	30
2480	-1.76	30

Note: The data above was tested in conducted mode.

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	FSP 38	100478	2020-05-09	2021-05-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	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).

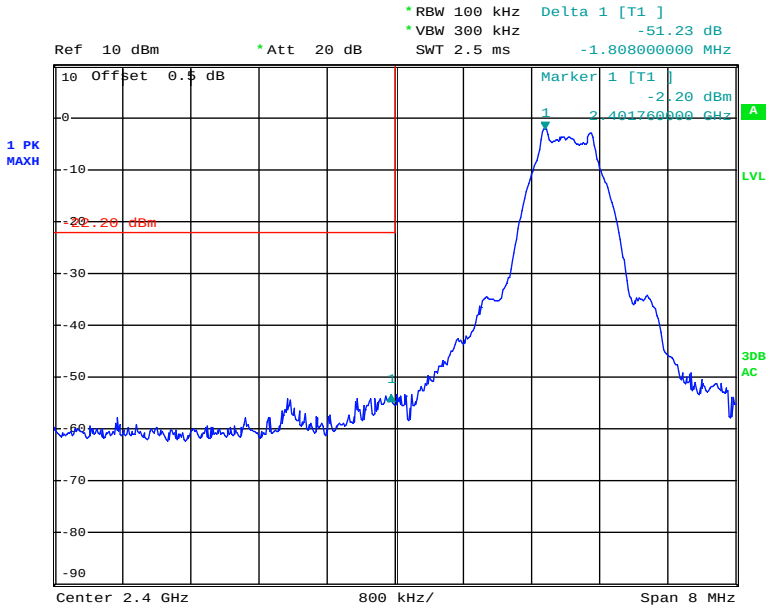
Test Data

Environmental Conditions

Temperature:	28.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.1 kPa
Tester:	Vern Shen
Test Date:	2020-07-13

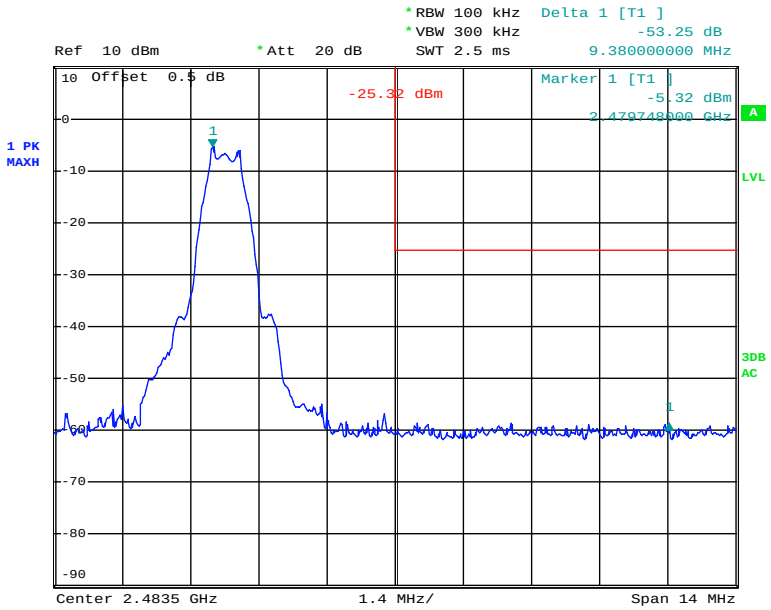
Test mode: Transmitting
Test Result: Compliant. Please refer to following plots.

Band Edge, Left Side



Date: 17.JUL.2020 19:00:20

Band Edge, Right Side



Date: 17.JUL.2020 19:02:53

FCC §15.247(e) - Power Spectral Density

Applicable Standard

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	FSP 38	100478	2020-05-09	2021-05-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	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

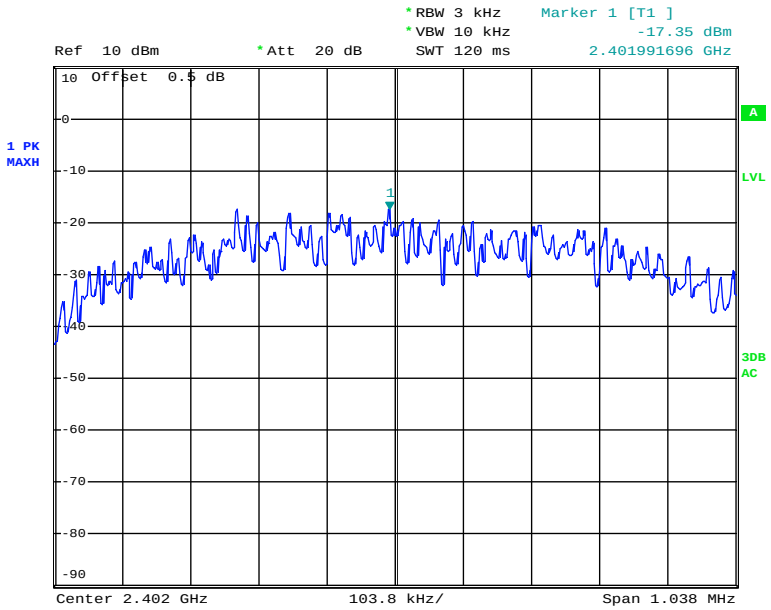
Temperature:	28.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.1 kPa
Tester:	Vern Shen
Test Date:	2020-07-13

Test Result: Compliance, *please refer to the following table and plots*

Test Mode: Transmitting

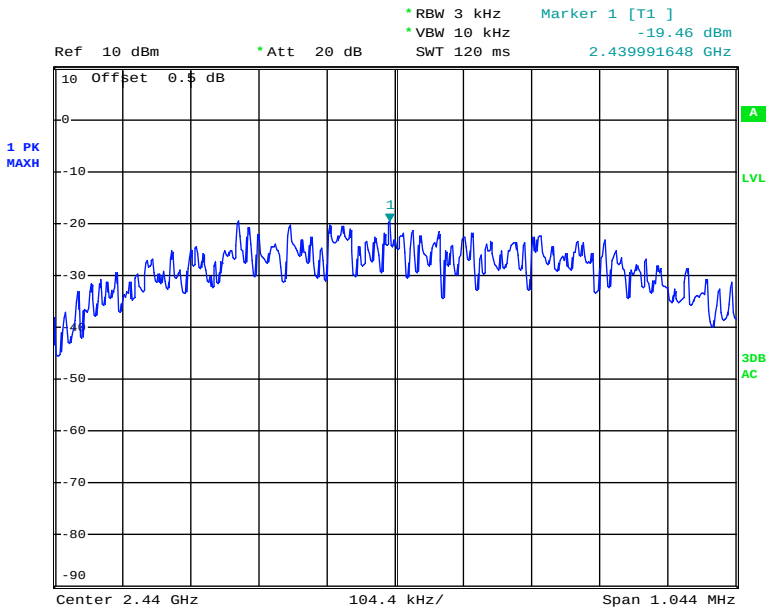
Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
2402	-17.35	8
2440	-19.46	8
2480	-20.46	8

Low



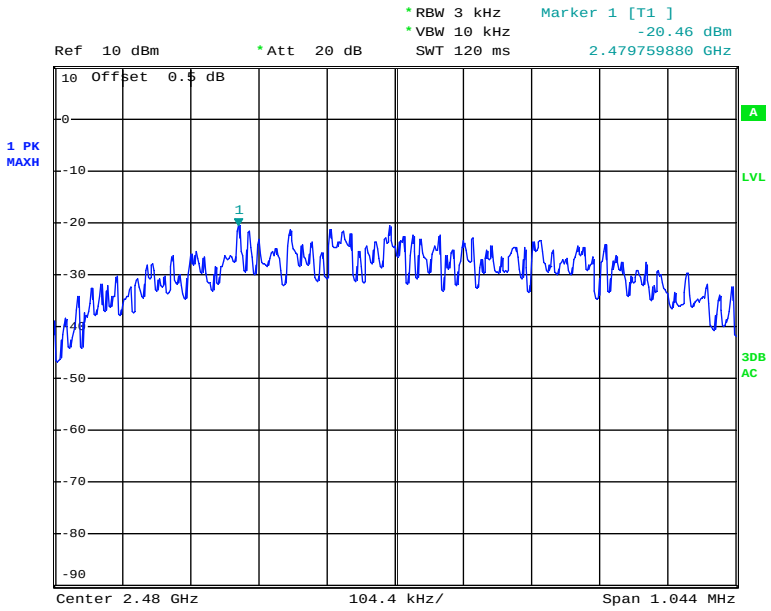
Date: 17.JUL.2020 19:00:08

Middle



Date: 17.JUL.2020 19:01:05

High



Date: 17.JUL.2020 19:02:37

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