

FCC PART 15.247 TEST REPORT

For

Shenzhen Xinguodu Technology Co., Ltd.

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FCC ID:XDQ-NDCK-00

Report Type: Original Report	Product Name: Smart Switch Box
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Xinguodu Technology Co., Ltd.* 's product, model number: **NDCK-00** (**FCC ID:XDQ-NDCK-00**) (the "EUT") in this report was a **Smart Switch Box**, which was measured approximately: 5.0 cm (L) x 4.8 cm (W) x 2.2 cm (H), the rated input voltage: AC 120V/60Hz.

**All measurement and test data in this report was gathered from production sample serial number: 170818002 (Assigned by BACL, Dongguan). The EUT was received on 2017-08-21.*

Objective

This report is prepared on behalf of *Shenzhen Xinguodu Technology Co., 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)

No related submittal(s)/Grant(s).

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.

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: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
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)

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

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO 17025 by CNAS(Lab code: L5662). And accredited to ISO 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in Engineering Mode, which was provided by the manufacturer.

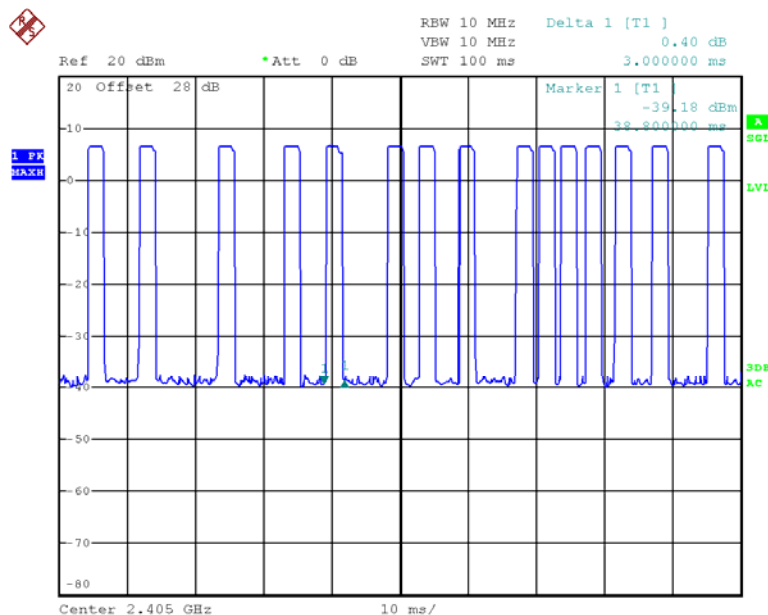
The system employ 16 channels as following table, that provided by the manufacturer, and CH11, CH18, CH26 were selected to test.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

EUT Exercise Software

The maximum power was configured by system default setting, the test software: ' Smart RF Studio' was used for select the test channels, that provided by the manufacturer:

T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)
3*15	100	45



Date: 10.OCT.2017 17:29:16

Equipment Modifications

No modification was made to the EUT.

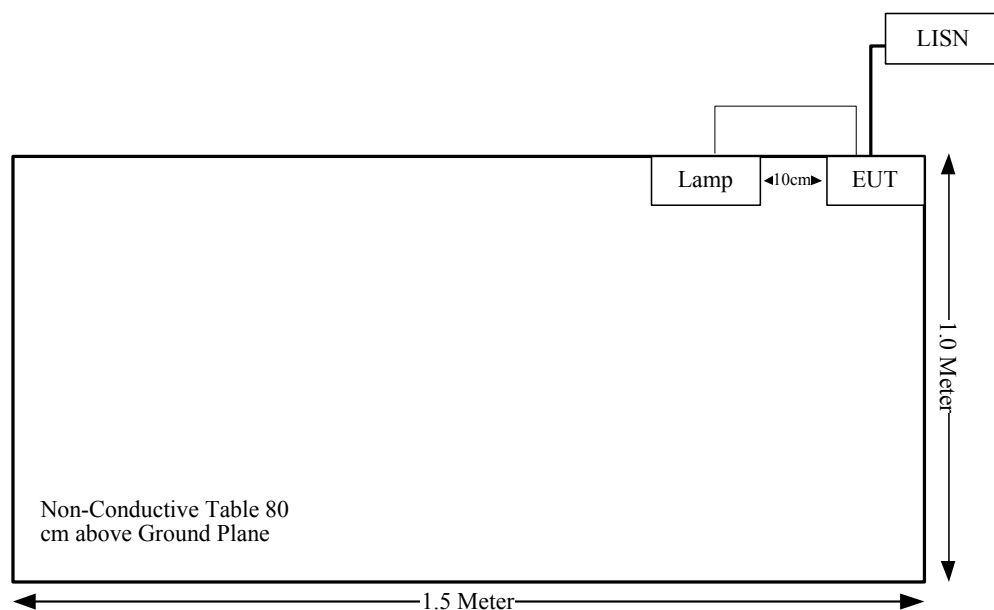
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	lamp	100W	/

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (cm)	From Port	To
AC Cable	No	No	100	EUT	Lamp

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 §15.247(i) and §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/f ²)	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.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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		Max. Target Power including Tolerance		Evaluation Distance (cm)	Power Density (W/m ²)	MPE Limit (W/m ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2405-2480	1.2	1.32	14	25.12	20.00	0.0066	1.0

Note: the Max. Target Power including Tolerance was declared by manufacturer.

Result: Compliance, The device meets MPE requirement for Devices Used by the General Public (Uncontrolled Environment) at distance ≥ 20 cm.

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 Connector Construction

The EUT has one internal antenna arrangement, and the antenna gain is 1.2 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

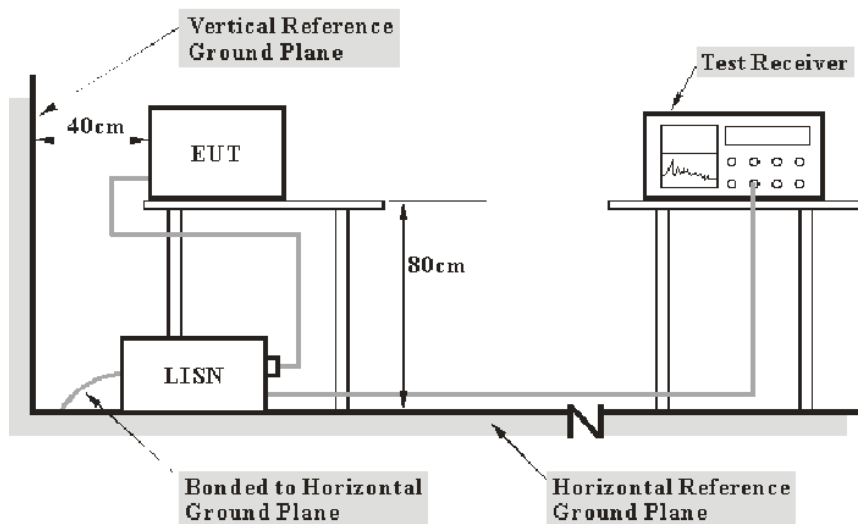
Result: Compliance.

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.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2016-12-08	2017-12-08
R&S	Two-line V-network	ENV 216	3560.6550.12	2016-12-08	2017-12-08
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
Unknown	Coaxial Cable	2m	Con-1	2017-09-05	2018-09-05

* **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).

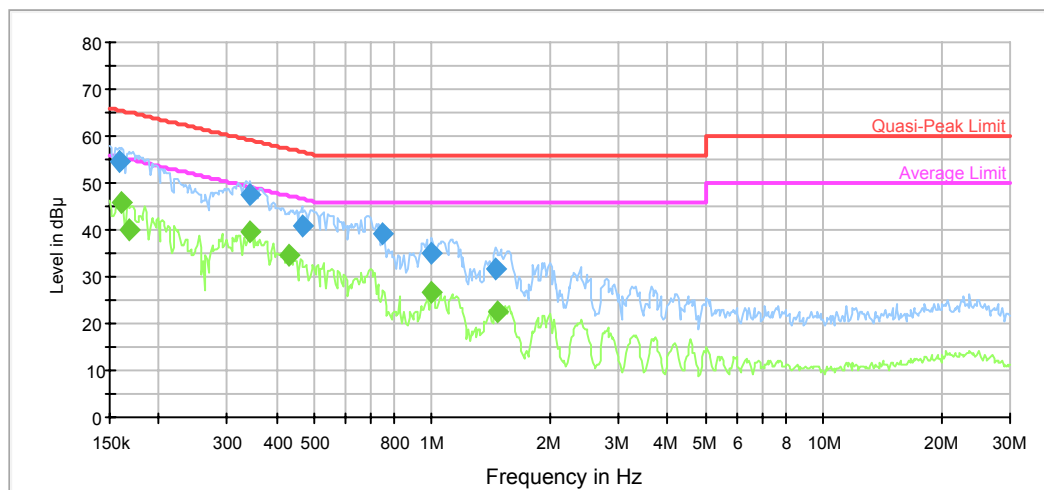
Test Data**Environmental Conditions**

Temperature:	27.5 °C
Relative Humidity:	42 %
ATM Pressure:	100.4 kPa

The testing was performed by Gaochao Gong on 2017-09-27.

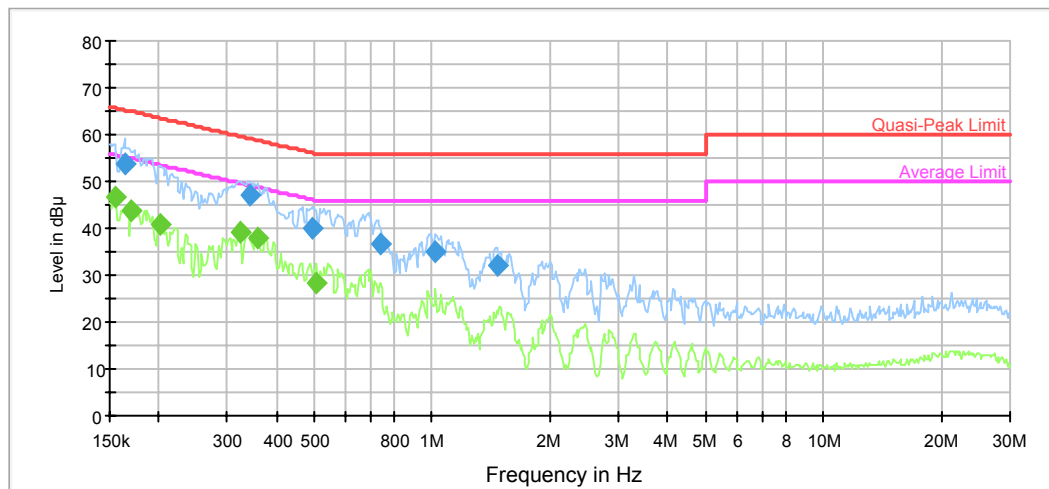
Test Mode: Transmitting

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.158604	54.4	9.000	L1	11.1	11.1	65.5	Compliance
0.343548	47.3	9.000	L1	10.1	11.8	59.1	Compliance
0.465037	41.0	9.000	L1	9.9	15.6	56.6	Compliance
0.744147	39.1	9.000	L1	9.8	16.9	56.0	Compliance
0.999305	34.8	9.000	L1	9.8	21.2	56.0	Compliance
1.453260	31.8	9.000	L1	9.7	24.2	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.161152	45.8	9.000	L1	11.0	9.6	55.4	Compliance
0.167702	40.2	9.000	L1	10.9	14.9	55.1	Compliance
0.343548	39.6	9.000	L1	10.1	9.5	49.1	Compliance
0.432855	34.7	9.000	L1	9.9	12.5	47.2	Compliance
0.999305	26.6	9.000	L1	9.8	19.4	46.0	Compliance
1.464886	22.3	9.000	L1	9.7	23.7	46.0	Compliance

AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.163741	53.6	9.000	N	11.0	11.7	65.3	Compliance
0.343548	47.0	9.000	N	10.1	12.1	59.1	Compliance
0.495646	40.2	9.000	N	9.9	15.9	56.1	Compliance
0.738241	36.5	9.000	N	9.8	19.5	56.0	Compliance
1.023481	35.0	9.000	N	9.8	21.0	56.0	Compliance
1.464886	31.9	9.000	N	9.7	24.1	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.156097	46.7	9.000	N	11.1	9.0	55.7	Compliance
0.170396	43.9	9.000	N	10.9	11.0	54.9	Compliance
0.201433	40.7	9.000	N	10.6	12.9	53.6	Compliance
0.324910	39.0	9.000	N	10.1	10.6	49.6	Compliance
0.357511	38.1	9.000	N	10.0	10.7	48.8	Compliance
0.507637	28.1	9.000	N	9.9	17.9	46.0	Compliance

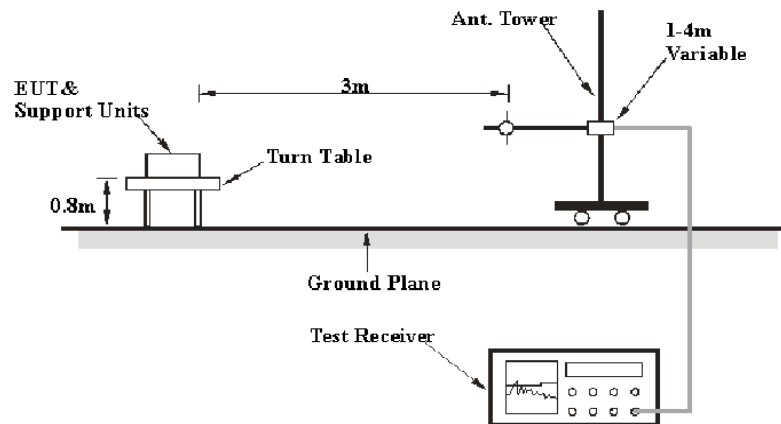
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

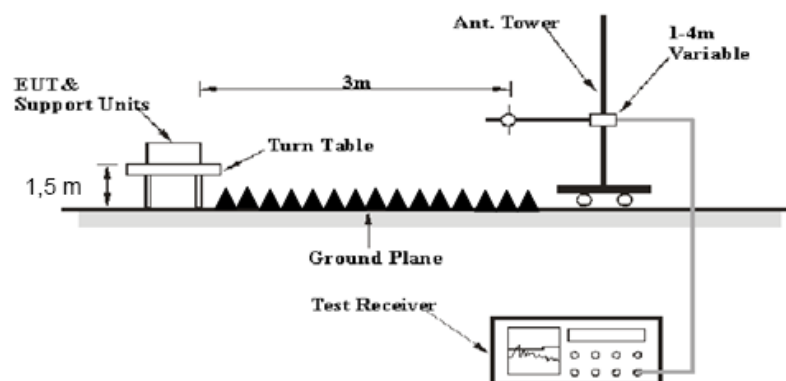
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, 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:

Detector	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
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100035	2016-07-28	2018-07-28
Sunol Sciences	Antenna	JB3	A060611-3	2017-07-21	2019-07-21
HP	Amplifier	8447F	2443A01912	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
unknown	Coaxial Cable	Chamber A-1	4m	2017-09-05	2018-09-05
unknown	Coaxial Cable	Chamber B-1	0.75m	2017-09-05	2018-09-05
unknown	Coaxial Cable	Chamber A-2	10m	2017-09-05	2018-09-05
unknown	Coaxial Cable	Chamber B-2	8m	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.42	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).

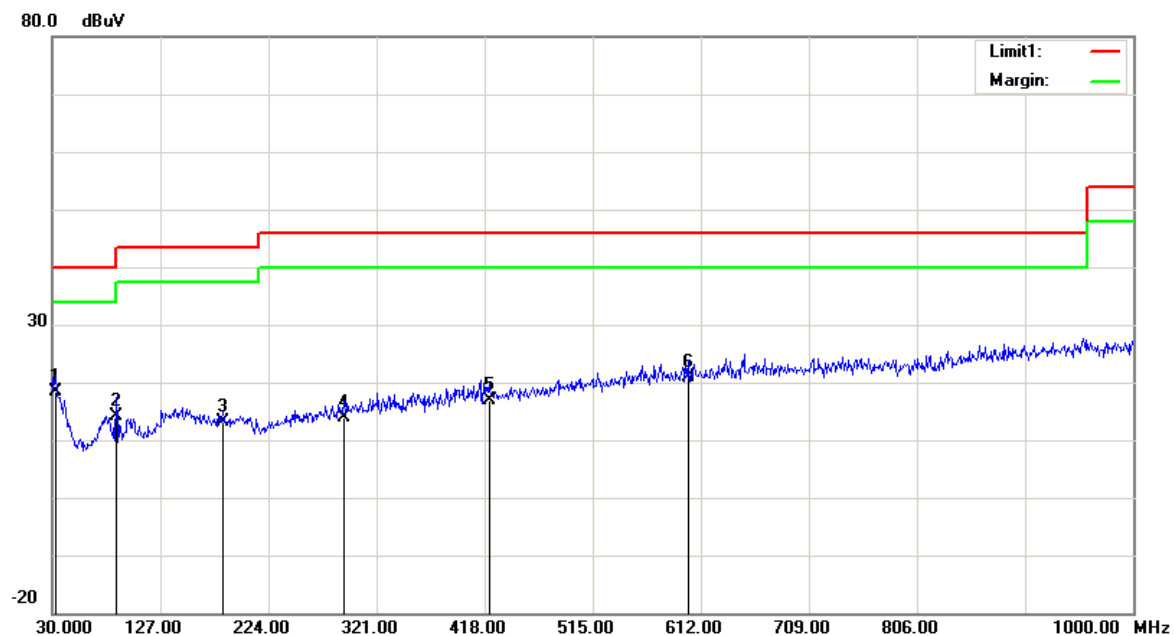
Test Data**Environmental Conditions**

Temperature:	25.5 °C
Relative Humidity:	56 %
ATM Pressure:	100.4 kPa

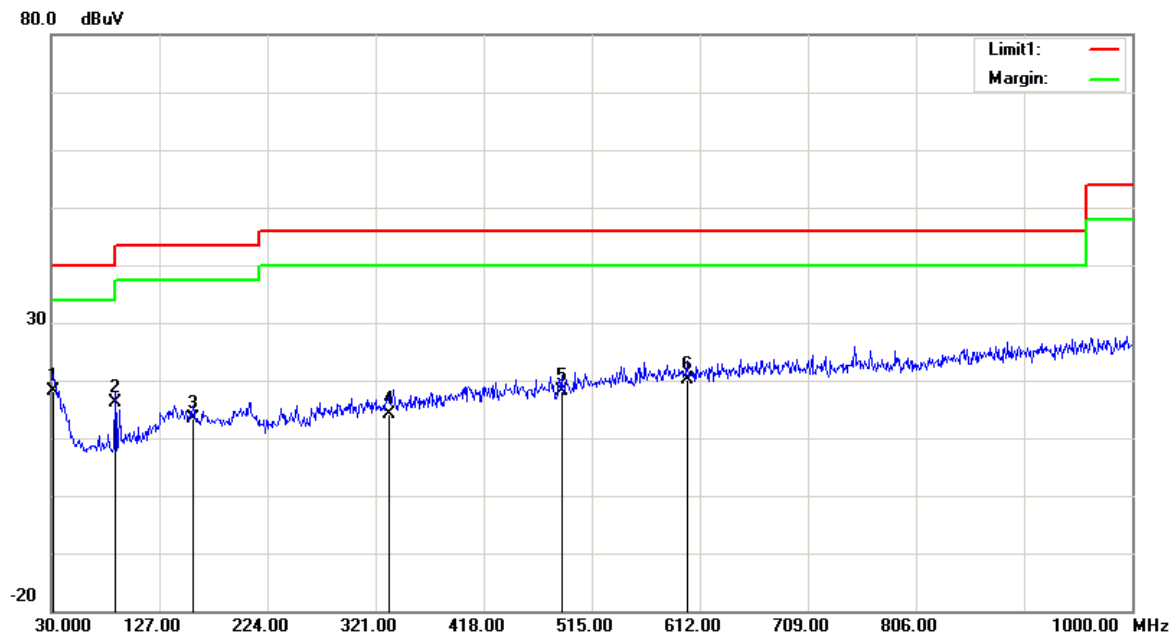
The testing was performed by Eric Xiao on 2017-09-28.

Test Result: Compliance, please Refer to the following data

Test Mode: Transmitting

1) 30MHz-1GHz**Horizontal:**

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
32.9100	27.67	QP	-9.17	18.50	40.00	21.50
87.2300	32.79	QP	-18.59	14.20	40.00	25.80
183.2600	26.57	QP	-13.47	13.10	43.50	30.40
291.9000	24.96	QP	-11.06	13.90	46.00	32.10
421.8800	24.36	QP	-7.56	16.80	46.00	29.20
600.3600	23.90	QP	-3.00	20.90	46.00	25.10

Vertical:

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
31.9400	26.80	QP	-8.70	18.10	40.00	21.90
87.2300	34.79	QP	-18.59	16.20	40.00	23.80
157.0700	26.14	QP	-12.64	13.50	43.50	30.00
332.6400	23.88	QP	-9.78	14.10	46.00	31.90
487.8400	24.26	QP	-6.06	18.20	46.00	27.80
600.3600	23.10	QP	-3.00	20.10	46.00	25.90

2) 1-25GHz:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2405 MHz									
2405	72.88	PK	H	28.11	3.11	0.00	104.10	N/A	N/A
2405	64.45	AV	H	28.11	3.11	0.00	95.67	N/A	N/A
2405	61.17	PK	V	28.11	3.11	0.00	92.39	N/A	N/A
2405	53.62	AV	V	28.11	3.11	0.00	84.84	N/A	N/A
2390	29.46	PK	H	28.08	3.10	0.00	60.64	74.00	13.36
2390	13.43	AV	H	28.08	3.10	0.00	44.61	54.00	9.39
4810	48.42	PK	H	32.92	4.31	35.48	50.17	74.00	23.83
4810	32.85	AV	H	32.92	4.31	35.48	34.60	54.00	19.40
7215	31.81	PK	H	35.76	5.46	35.97	37.06	74.00	36.94
7215	31.34	AV	H	35.76	5.46	35.97	36.59	54.00	17.41
5895	45.37	PK	H	34.26	4.62	35.85	48.40	74.00	25.60
5895	31.28	AV	H	34.26	4.62	35.85	34.31	54.00	19.69
Middle Channel: 2440 MHz									
2440	72.23	PK	H	28.18	3.11	0.00	103.52	N/A	N/A
2440	64.31	AV	H	28.18	3.11	0.00	95.60	N/A	N/A
2440	60.49	PK	V	28.18	3.11	0.00	91.78	N/A	N/A
2440	52.63	AV	V	28.18	3.11	0.00	83.92	N/A	N/A
4880	51.26	PK	H	33.06	4.40	35.54	53.18	74.00	20.82
4880	41.84	AV	H	33.06	4.40	35.54	43.76	54.00	10.24
7320	47.53	PK	H	36.03	5.52	35.98	53.10	74.00	20.90
7320	32.64	AV	H	36.03	5.52	35.98	38.21	54.00	15.79
5966	46.72	PK	H	34.29	4.65	35.85	49.81	74.00	24.19
5966	32.45	AV	H	34.29	4.65	35.85	35.54	54.00	18.46
6135	45.87	PK	H	34.27	4.83	35.82	49.15	74.00	24.85
6135	31.62	AV	H	34.27	4.83	35.82	34.90	54.00	19.10
High Channel: 2480 MHz									
2480	72.53	PK	H	28.26	3.10	0.00	103.89	N/A	N/A
2480	67.24	AV	H	28.26	3.10	0.00	98.60	N/A	N/A
2480	65.17	PK	V	28.26	3.10	0.00	96.53	N/A	N/A
2480	58.73	AV	V	28.26	3.10	0.00	90.09	N/A	N/A
2483.5	36.45	PK	H	28.27	3.10	0.00	67.82	74.00	6.18
2483.5	18.14	AV	H	28.27	3.10	0.00	49.51	54.00	4.49
4960	53.84	PK	H	33.22	4.42	35.60	55.88	74.00	18.12
4960	43.65	AV	H	33.22	4.42	35.60	45.69	54.00	8.31
7440	46.69	PK	H	36.34	5.60	35.99	52.64	74.00	21.36
7440	33.28	AV	H	36.34	5.60	35.99	39.23	54.00	14.77
6225	45.21	PK	H	34.26	4.94	35.80	48.61	74.00	25.39
6225	32.22	AV	H	34.26	4.94	35.80	35.62	54.00	18.38

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

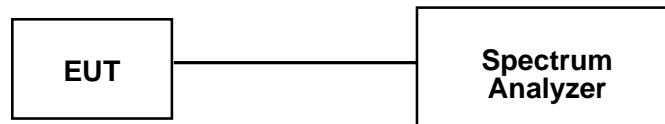
Applicable Standard

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

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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	2016-12-08	2017-12-08
Unknown	RF Cable	Unknown	C-4	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
Unknown	RF Attenuator	20dB	20dB-1	Each Time	/

* **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:	29.6 °C
Relative Humidity:	47 %
ATM Pressure:	100.4 kPa

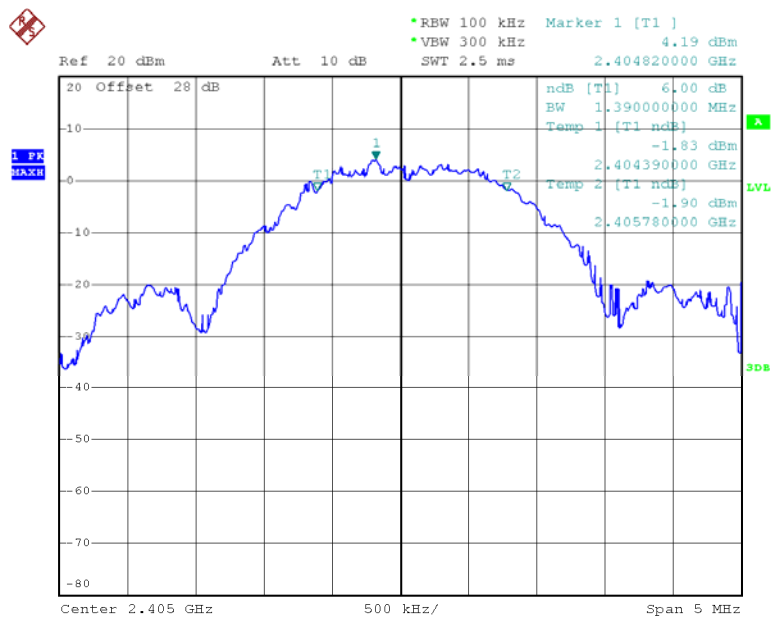
The testing was performed by David Huang on 2017-09-13.

Test Mode: Transmitting

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

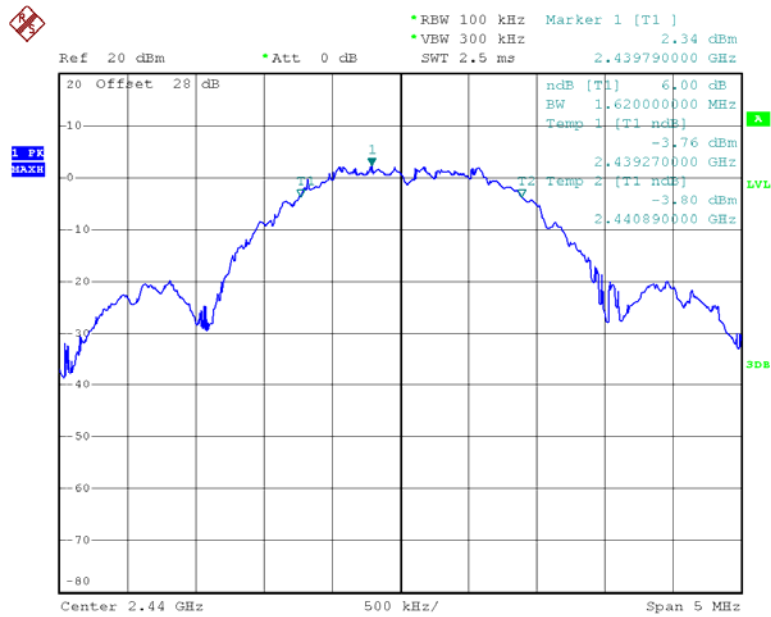
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
Low	2405	1.39	≥ 0.5
Middle	2440	1.62	≥ 0.5
High	2480	1.60	≥ 0.5

Low Channel



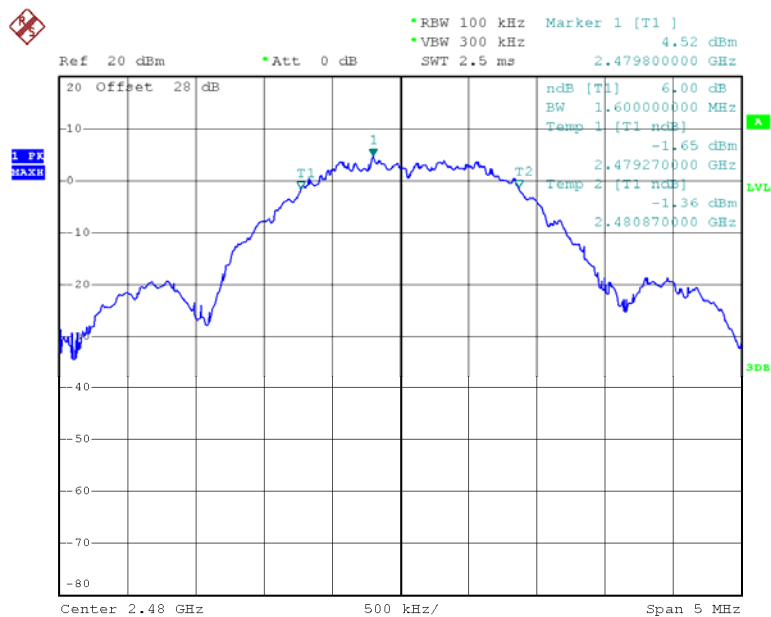
Date: 13.SEP.2017 19:45:01

Middle Channel



Date: 13.SEP.2017 18:30:50

High Channel



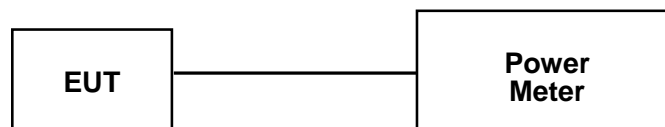
Date: 13.SEP.2017 15:49:47

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
Agilent	Wideband Power Sensor	N1921A	MY54210016	2016-11-03	2017-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2016-11-03	2017-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2016-11-03	2017-11-03
Unknown	RF Cable	Unknown	C-4	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
Unknown	RF Attenuator	20dB	20dB-1	Each Time	/

* **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:	29.6 °C
Relative Humidity:	47 %
ATM Pressure:	100.4 kPa

The testing was performed by David Huang on 2017-09-13.

Test Mode: Transmitting

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

Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Limit (dBm)
Low	2405	13.5	30
Middle	2440	12.33	30
High	2480	13.86	30

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	2016-12-08	2017-12-08
Unknown	RF Cable	Unknown	C-4	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
Unknown	RF Attenuator	20dB	20dB-1	Each Time	/

* **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

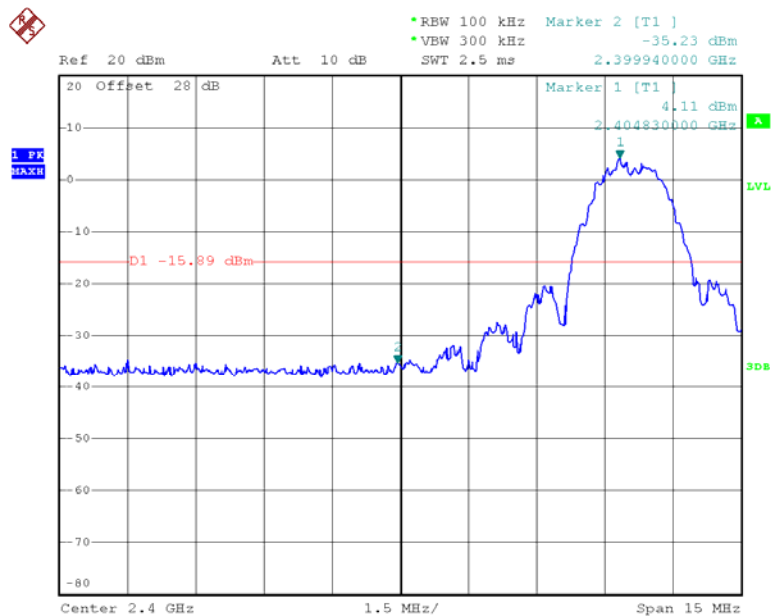
Temperature:	29.6 °C
Relative Humidity:	47 %
ATM Pressure:	100.4 kPa

The testing was performed by David Huang on 2017-09-13.

Test mode: Transmitting

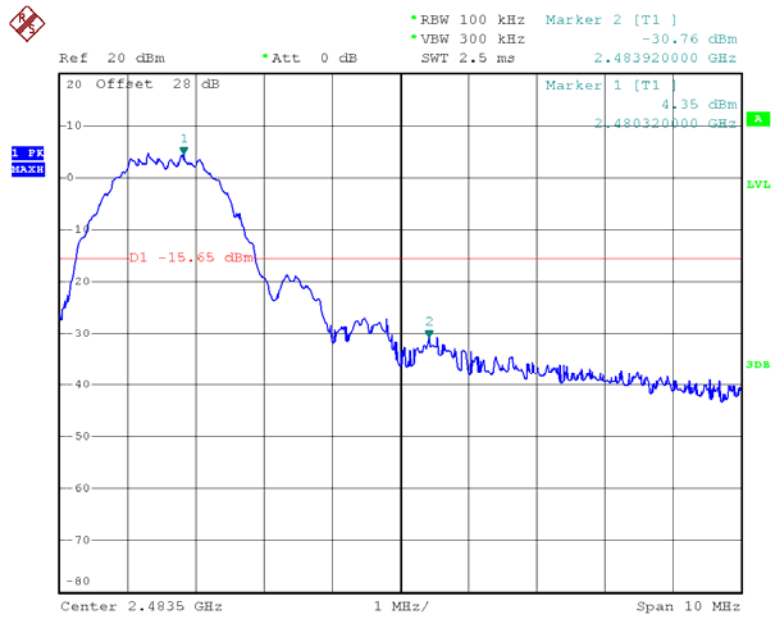
Test Result: Compliant. Please refer to following plots.

Band Edge, Left Side



Date: 13.SEP.2017 19:55:07

Band Edge, Right Side



Date: 13.SEP.2017 15:59:42

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	2016/12/08	2017/12/08
Unknown	RF Cable	Unknown	C-4	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
Unknown	RF Attenuator	20dB	20dB-1	Each Time	/

* **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:	29.6 °C
Relative Humidity:	47 %
ATM Pressure:	100.4 kPa

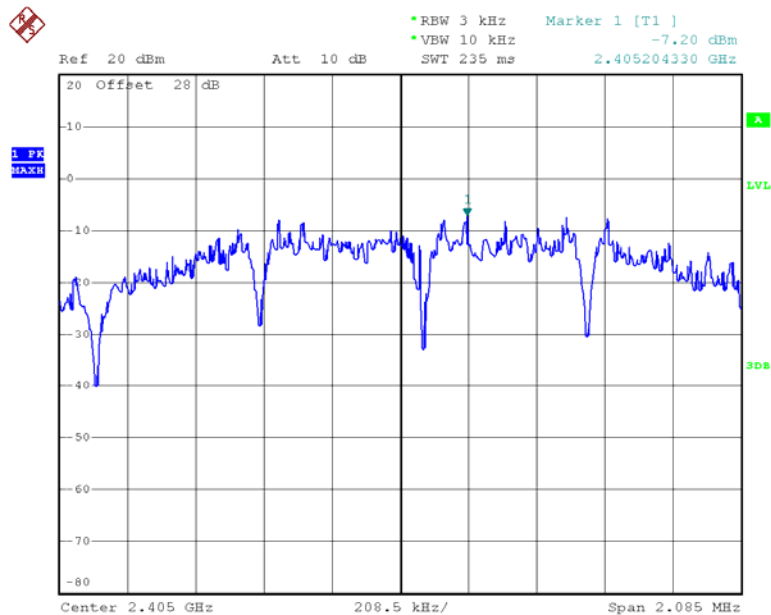
The testing was performed by David Huang on 2017-09-13.

Test Mode: Transmitting

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

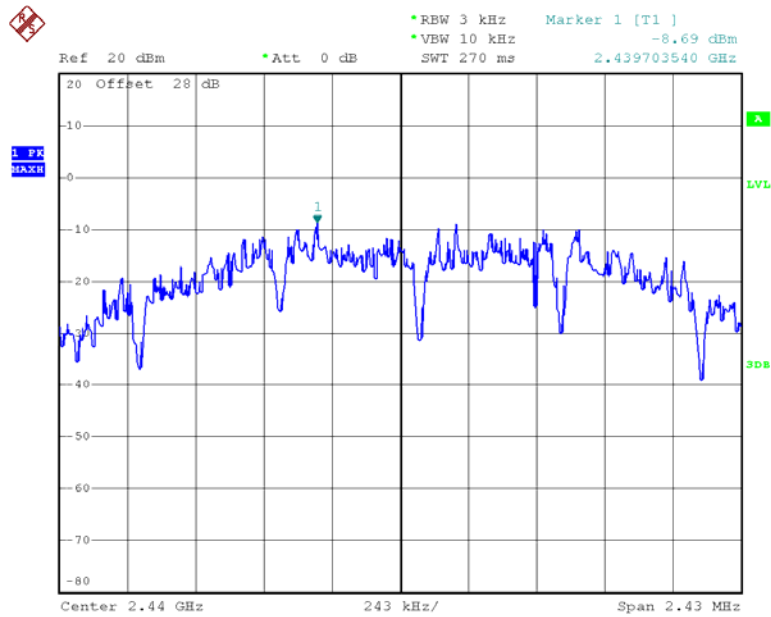
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
Low	2405	-7.20	≤8
Middle	2440	-8.69	≤8
High	2480	-6.70	≤8

Power Spectral Density, Low Channel



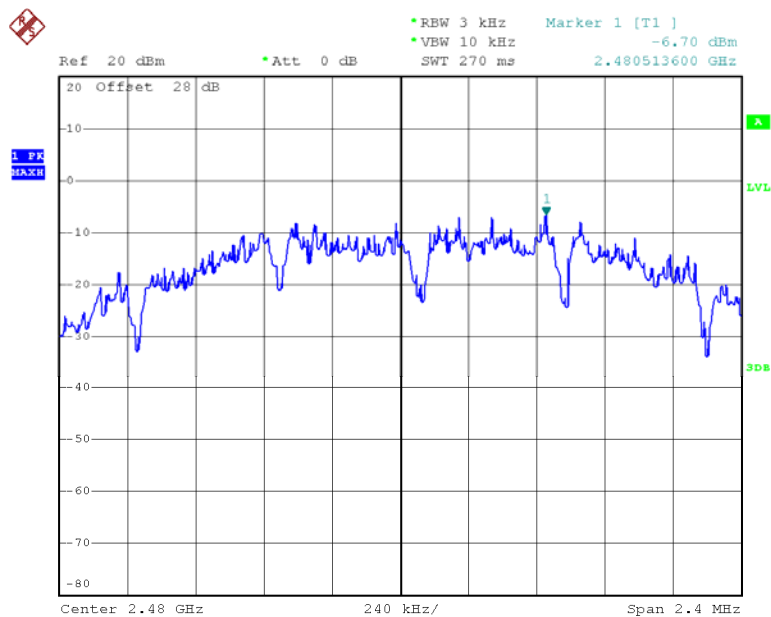
Date: 13.SEP.2017 19:50:30

Power Spectral Density, Middle Channel



Date: 13.SEP.2017 18:34:43

Power Spectral Density, High Channel



Date: 13.SEP.2017 15:56:20

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