

JAPAN MIC

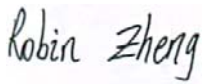
TEST REPORT

For

Godox Photo Equipment Co.,Ltd

1st to 4th Floor,Building 2/1st to 4th Floor,Yaochuan Industrial Zone,Tangwei Community,Fuhai Street,Bao' an District,Shenzhen 518103,China

Tested Model: TT600
Multiple Models: TT600S

Report Type: Original Report	Product Type: Thinklite Camera Flash
Report Number: RDG190327005-07	
Report Date: 2019-04-03	
Reviewed By:	Robin Zheng RF Engineer 
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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)

Equipment Name		Thinklite Camera Flash
Model Number		TT600
Multiple Models		TT600S
Normal 2.4G Technical Parameters	Modulation Type	MSK
	Emission Designator	F1D
	Frequency Range	2413-2464.5MHz
	Output Power	1mW
	Antenna Gain	-0.696dBi
Nominal Power Supply:		DC 6V
Battery Voltage Range		DC 4.8-6.4V
External Dimension		64mm(L)*76 mm(W)* 190mm(H)
serial number		190327005
Received Date		2019/3/28

Note: The series product, models TT600, TT600S are electrically identical, the difference details between them please refer to the declaration of similarity letter, we selected TT600 for testing.

Objective

The objective of the manufacturer is to demonstrate compliance with Radio Law of Japan item 19 of Article 2 Paragraph 1.

Test Methodology

All measurements contained in this report were conducted with technical regulations of the Radio Law of Japan.

EUT TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a engineering mode which was selected by manufacturer.

The extreme voltage test conditions which were declared by the manufacturer and the normal conditions are as below:

NV: Normal Voltage $6V_{DC}$

LV: Low Voltage $4.8V_{DC}$

HV: High Voltage $6.4V_{DC}$

EUT Exercise Software

The system was configured for testing in a engineering mode, the maximum power level was configured as default setting.

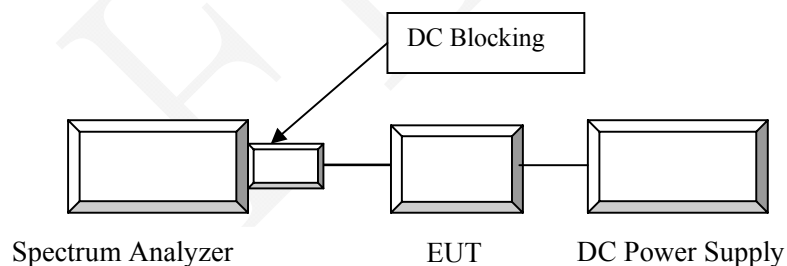
Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Pro instrument	DC Power Supply	pps3300	3300012

Configuration of Test Setup



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	2018-09-06	2019-09-06
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2018-12-10	2019-12-10
UNI-T	Multimeter	UT39A	M130199938	2018-07-24	2019-07-24
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

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

SUMMARY OF TEST RESULTS

MIC Notice No.88 Appendix No.43 Article 2, Paragraph 1, Item 19 Rules Section	Description of Test	Result
3	Frequency Error	Compliance
4	Occupied Bandwidth	Compliance
5	Transmitter Spurious Emission and Unwanted Emission Intensity	Compliance
6	Antenna Output Power and Output Power Tolerance	Compliance
7	Receiver Spurious Emission and Unwanted Emission Intensity	Compliance
8	Transmission Antenna Gain	Not Applicable
9	Transmission Radiation Angle Width	Not Applicable
10	Carrier sense capability	Not Applicable**
11	Frequency Hopping Dwell Time	Not Applicable*
12	Interference Prevention Function	Compliance
Note 1	Construction Protection Confirmation	Compliance

Note:

Not Applicable: Please refer to 'Note 3' of Antenna Output Power and Output Power Tolerance section.

Not Applicable*: Testing is only required for FHSS system devices.

Not Applicable**: The test only required for bandwidth more than 26MHz and less than 38MHz.

FREQUENCY ERROR

Limit

50 ppm or below

Test Procedure

Set the EUT to the measurement frequency without modulation.

Setting of SA is following as: RB: 30 kHz / VB: 100 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: MAX Hold.

Record the peak spot frequency.

If the EUT can't set at un-modulation mode, measure the 10dBc center frequency.

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	64 %
ATM Pressure:	102 kPa

The testing was performed by Carrie He on 2019-04-01.

Test Result: Compliance

Test Mode: Transmitting

Test Frequency MHz	Voltage	Measure Frequency (MHz)		Result MHz	Tolerance ppm	Limit
		F1	F2			
2413	LV	2412.788	2413.133	2412.961	-16.16	<50ppm
	NV	2412.804	2413.148	2412.976	-9.95	
	HV	2412.795	2413.167	2412.981	-7.87	
2438	LV	2437.800	2438.164	2437.982	-7.38	
	NV	2437.804	2438.148	2437.976	-9.84	
	HV	2437.796	2438.152	2437.974	-10.66	
2464.5	LV	2464.326	2464.657	2464.492	-3.25	
	NV	2464.304	2464.644	2464.474	-10.55	
	HV	2464.284	2464.654	2464.469	-12.58	

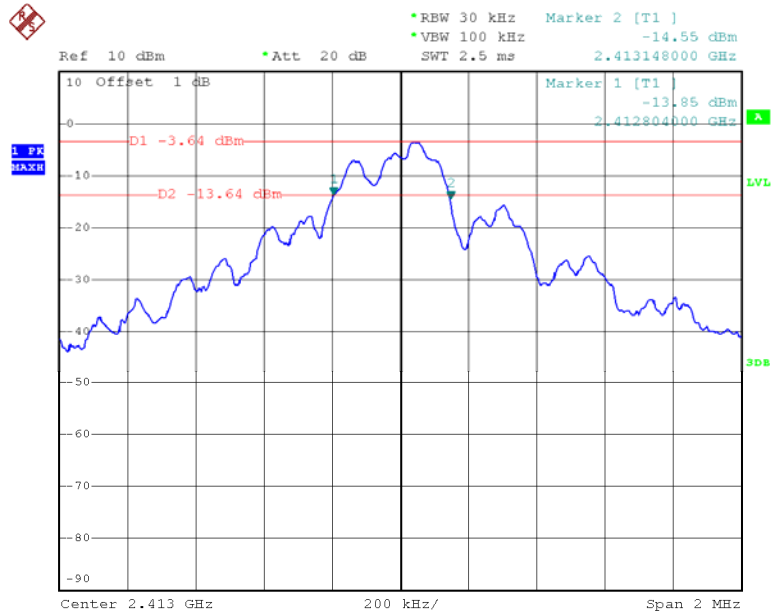
Note:

$$\text{Result} = (F1+F2)/2$$

$$\text{Tolerance} = (\text{Result}-\text{Test Frequency})/\text{Test Frequency} \times 10^6$$

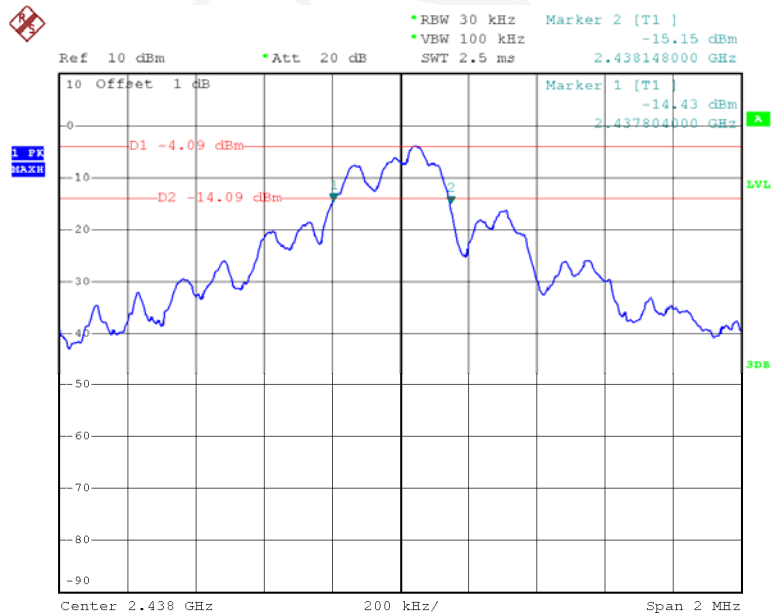
Please refer to the plots for normal voltage test.

Low Channel



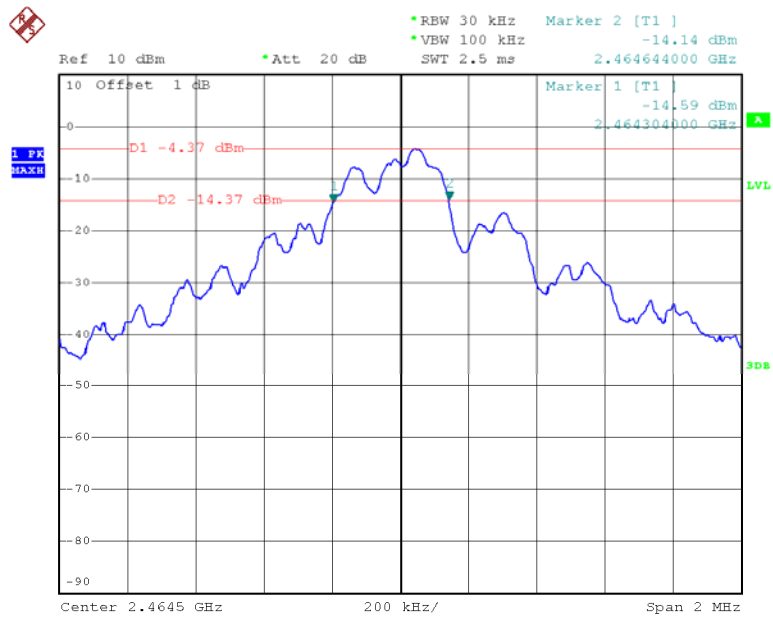
Date: 1.APR.2019 10:27:51

Middle Channel



Date: 1.APR.2019 10:13:11

High Channel



Date: 1.APR.2019 10:21:20

OCCUPIED BANDWIDTH

Limit

- Occupied bandwidth: FH \leq 83.5 MHz; OFDM, DS \leq 26 MHz; Others \leq 26 MHz

Test Procedure

- Setting of SA is following as: RB: 30 kHz/VB: 30 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	64 %
ATM Pressure:	102 kPa

The testing was performed by Carrie He on 2019-04-01.

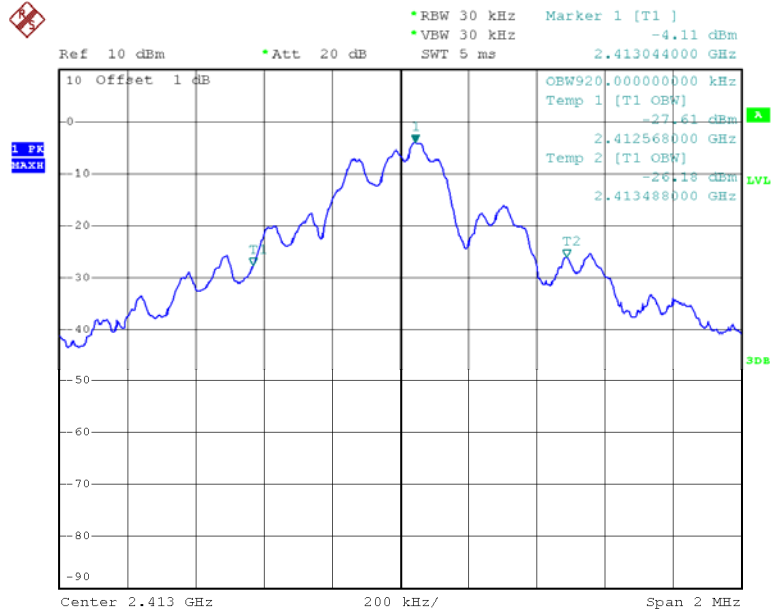
Test Result: Compliance

Test Mode: Transmitting

Test Channel	Low Channel			Middle Channel			High Channel			Limit
	LV	NV	HV	LV	NV	HV	LV	NV	HV	
Occupied Bandwidth (MHz)	0.918	0.920	0.918	0.911	0.912	0.922	0.912	0.908	0.908	<26MHz

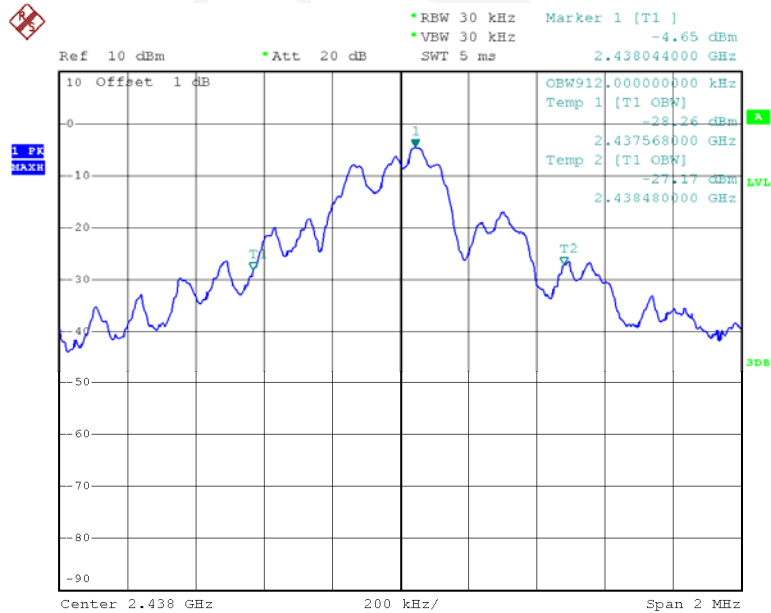
Please refer to the plots for normal voltage test.

Low Channel



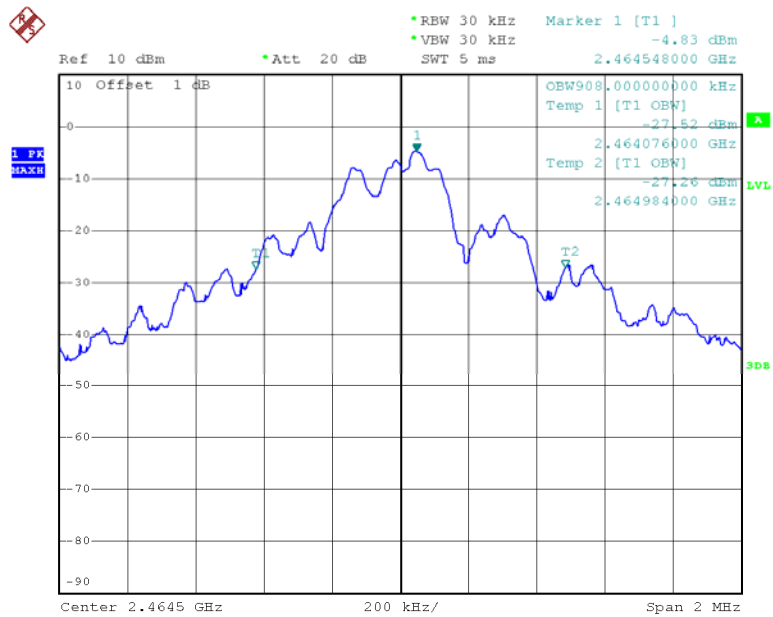
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Middle Channel



Date: 1.APR.2019 10:11:29

High Channel



Date: 1.APR.2019 10:20:07

TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY

Limit

- $f < 1000 \text{ MHz}$: $\leq 0.25 \mu\text{W}/100\text{kHz}$
- $1000\text{MHz} \leq f < 2387 \text{ MHz}$, $f > 2496.5 \text{ MHz}$: $\leq 2.5 \mu\text{W}/\text{MHz}$
- $2387 \text{ MHz} \leq f \leq 2400 \text{ MHz}$; $2483.5 \text{ MHz} < f \leq 2496.5 \text{ MHz}$: $\leq 25 \mu\text{W}/\text{MHz}$

Test Procedure

❖ Conditions of Application Equipment (EUT)

- The modulation state shall be in continuously transmitting mode.

❖ Spectrum Analyzer Conditions

- Setting of SA start 30MHz and stop frequency 1000MHz, RB:100kHz/VB:100kHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than $0.25 \mu\text{W}/100\text{kHz}$.
- Setting of SA start 1000MHz and stop frequency 2387MHz, RB:1MHz/VB:1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value +cable loss shall be less than $2.5 \mu\text{W}/\text{MHz}$.
- Setting of SA start 2387MHz and stop frequency 2400MHz, RB:1MHz/VB:1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value +cable loss shall be less than $25 \mu\text{W}/\text{MHz}$.
- Setting of SA start 2483.5MHz and stop frequency 2496.5MHz, RB:1MHz/VB:1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value +cable loss shall be less than $25 \mu\text{W}/\text{MHz}$.
- Setting of SA start 2496.5MHz and stop frequency 12500MHz, RB:1MHz/VB:1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value +cable loss shall be less than $2.5 \mu\text{W}/\text{MHz}$.

Test Data**Environmental Conditions**

Temperature:	25.2 °C
Relative Humidity:	64 %
ATM Pressure:	102kPa

The testing was performed by Carrie He on 2019-04-01.

Test Result: Compliance

Test Mode: Transmitting

Please refer to the below plots

Frequency Band		Low Channel			Middle Channel			High Channel			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band I (dBm/100kHz)	-58.73	-58.37	-58.20	-57.52	-57.66	-57.29	-58.21	-58.42	-58.57	-36dBm/100kHz (0.25 μ W/100kHz)
	Band II (dBm/MHz)	-32.58	-32.76	-32.39	-44.28	-44.11	-44.66	-43.07	-43.66	-43.31	-26dBm/MHz (2.5 μ W/MHz)
	Band III (dBm/MHz)	-38.75	-38.54	-38.05	-46.76	-46.54	-46.99	-49.84	-49.77	-49.24	-16dBm/MHz (25 μ W/MHz)
	Band IV (dBm/MHz)	-48.22	-47.92	-47.82	-48.57	-48.14	-48.29	-42.49	-42.21	-42.78	-16dBm/MHz (25 μ W/MHz)
	Band V (dBm/MHz)	-45.22	-45.09	-45.67	-46.75	-47.18	-46.94	-47.06	-47.28	-47.73	-26dBm/MHz (2.5 μ W/MHz)

Note:

Band I: 30MHz~1000MHz

Band II: 1000MHz~2387MHz

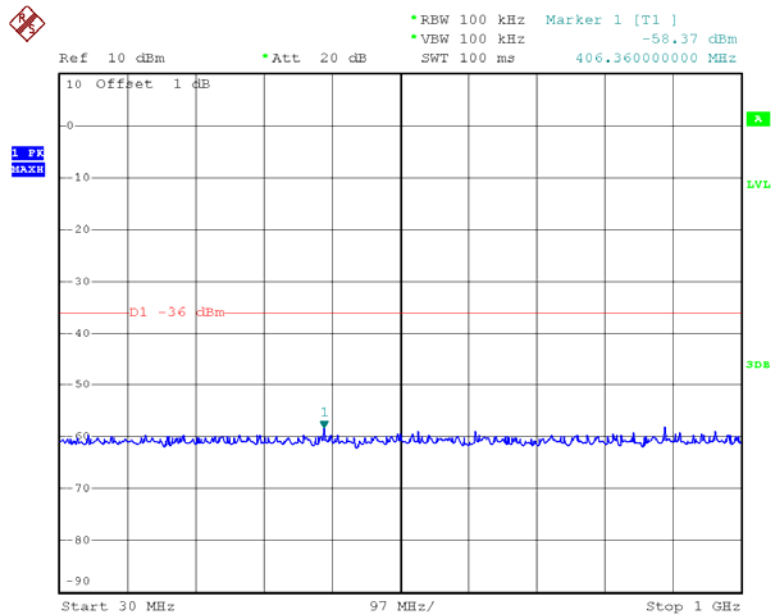
Band III: 2387MHz~2400MHz

Band IV: 2483.5MHz~2496.5MHz

Band V: 2496.5MHz~12500MHz

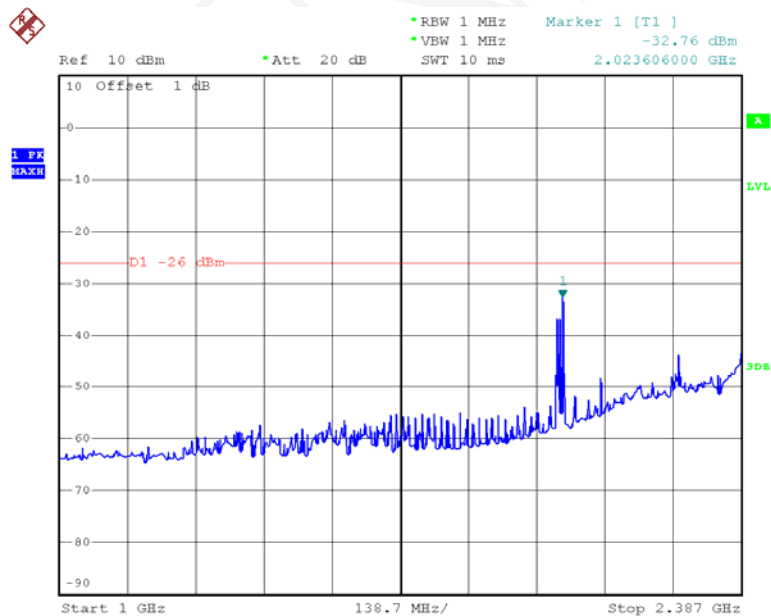
Please refer to the plots for normal voltage test.
Low Channel

30MHz~1000MHz



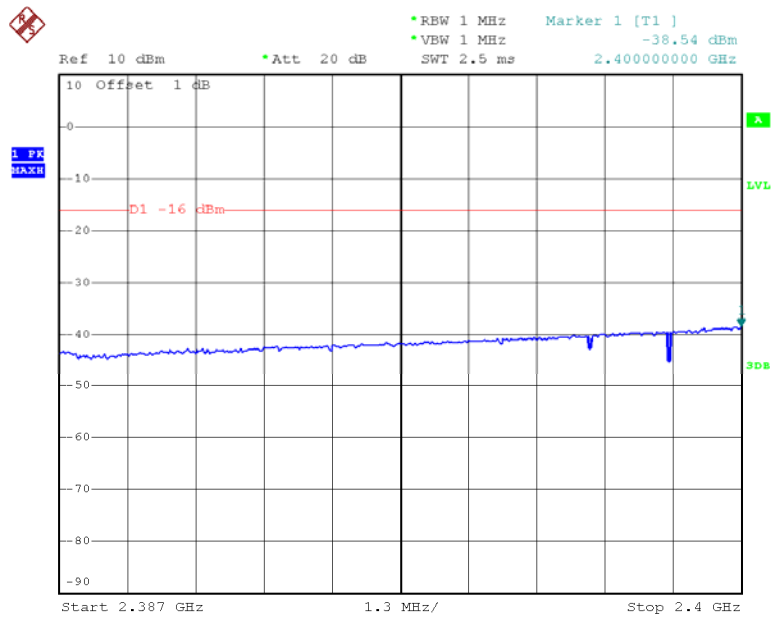
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1000MHz~2387MHz



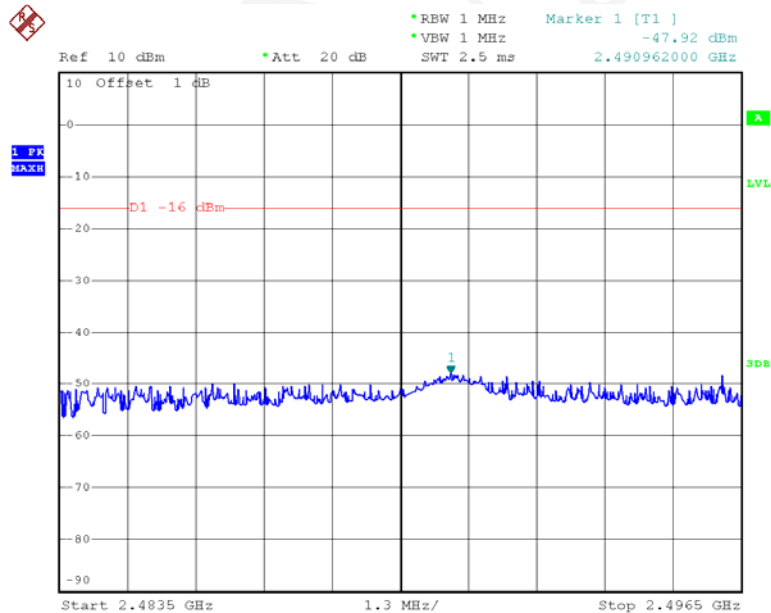
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2387MHz~2400MHz



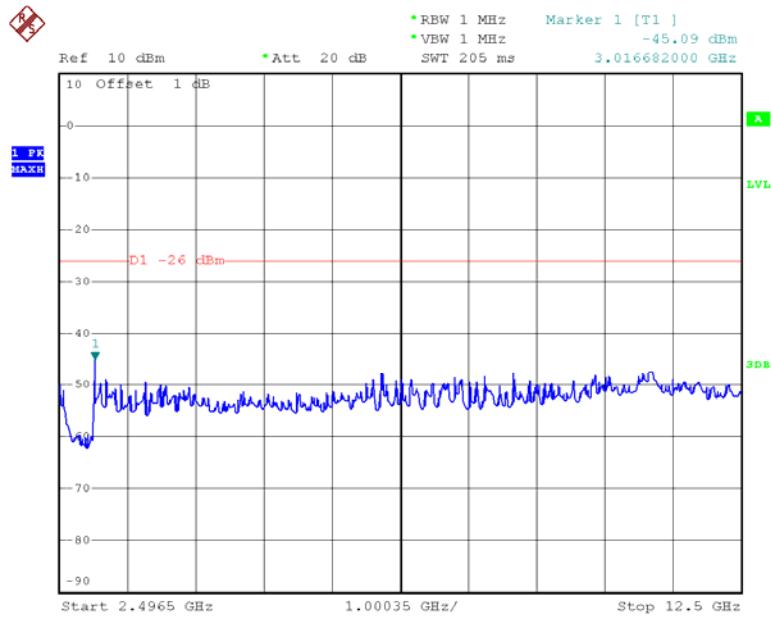
Date: 1.APR.2019 10:04:08

2483.5MHz~2496.5MHz



Date: 1.APR.2019 10:04:29

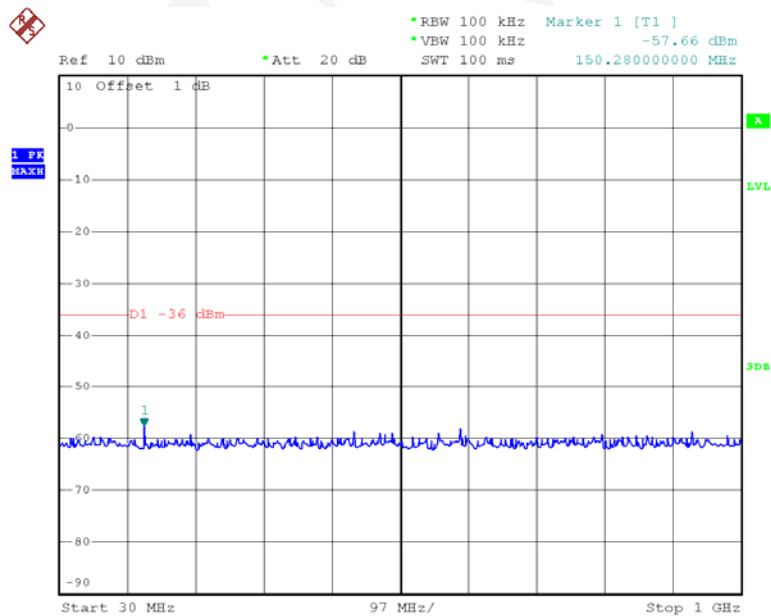
2496.5MHz~12500MHz



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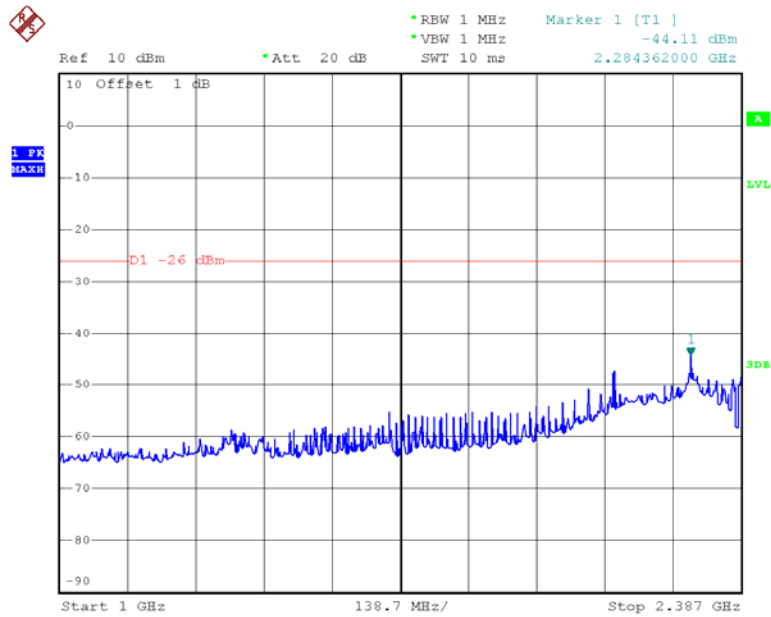
Middle Channel:

30MHz~1000MHz



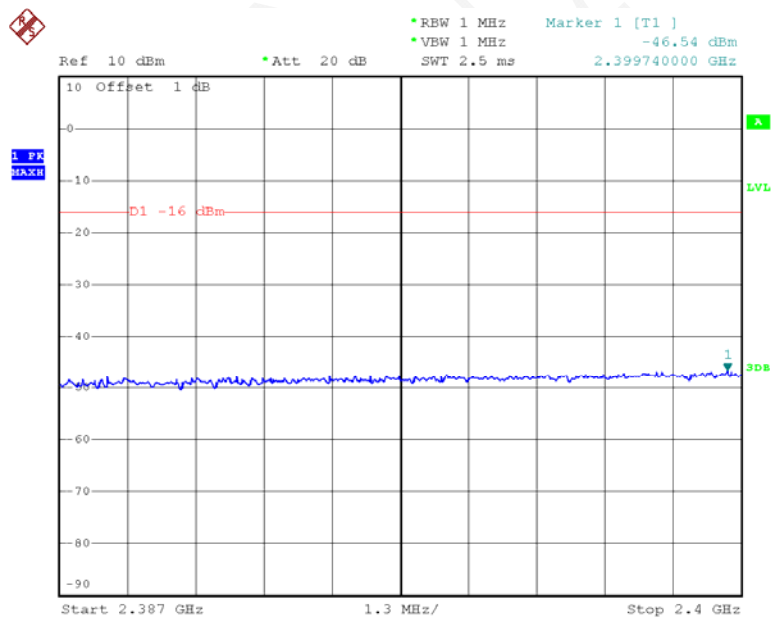
Date: 1.APR.2019 10:10:17

1000MHz~2387MHz



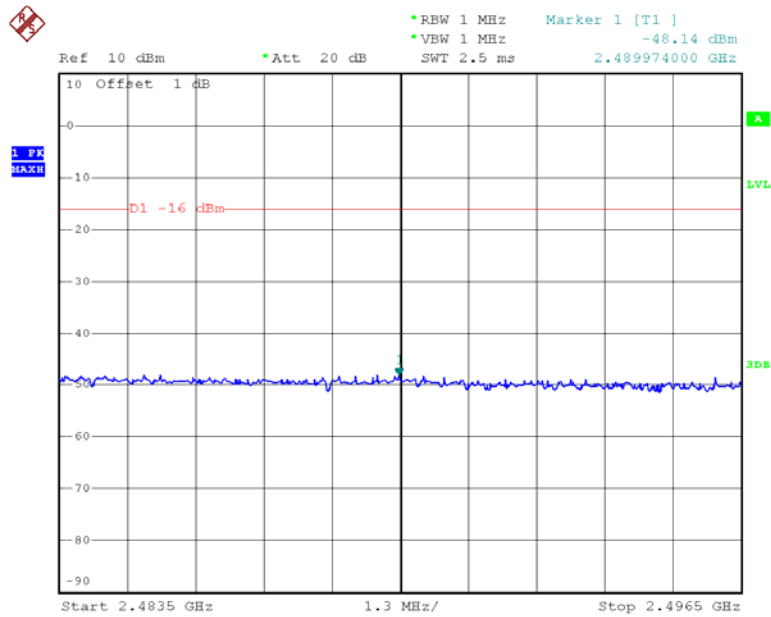
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2387MHz~2400MHz



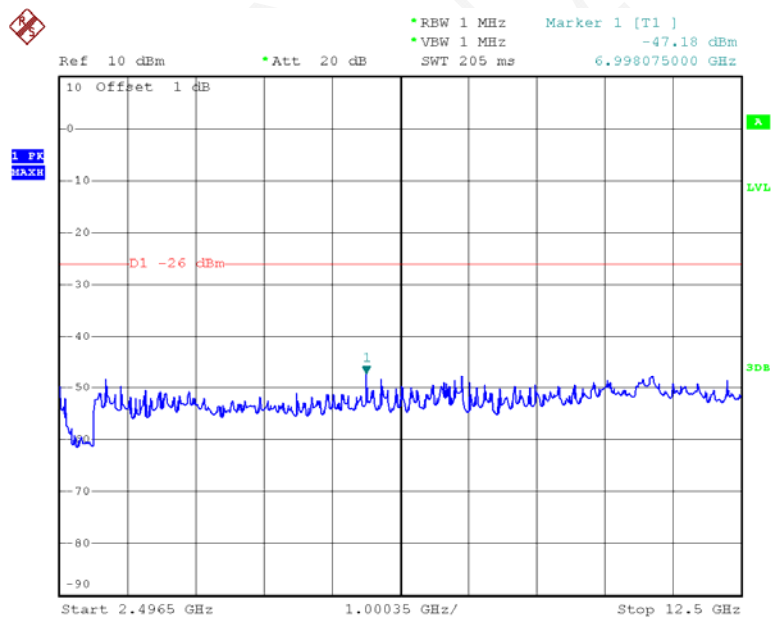
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2483.5MHz~2496.5MHz



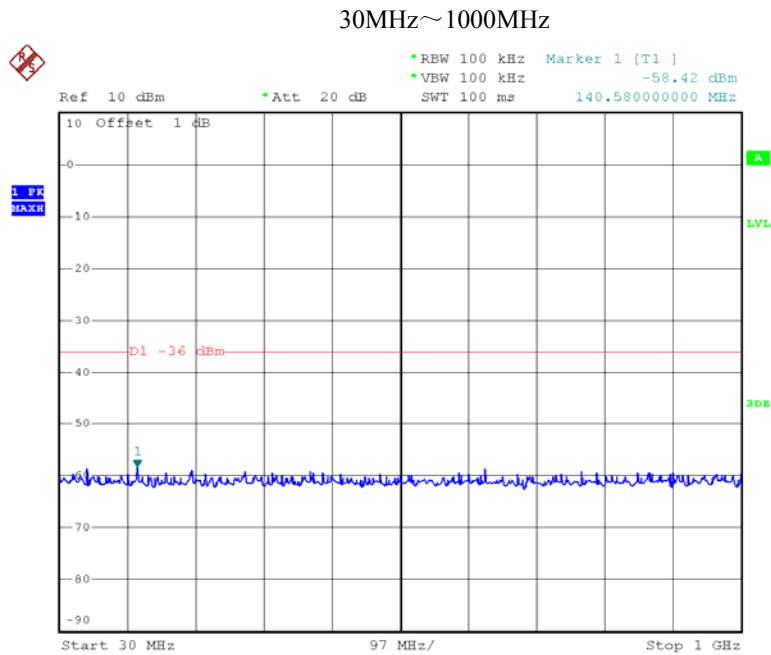
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2496.5MHz~12500MHz

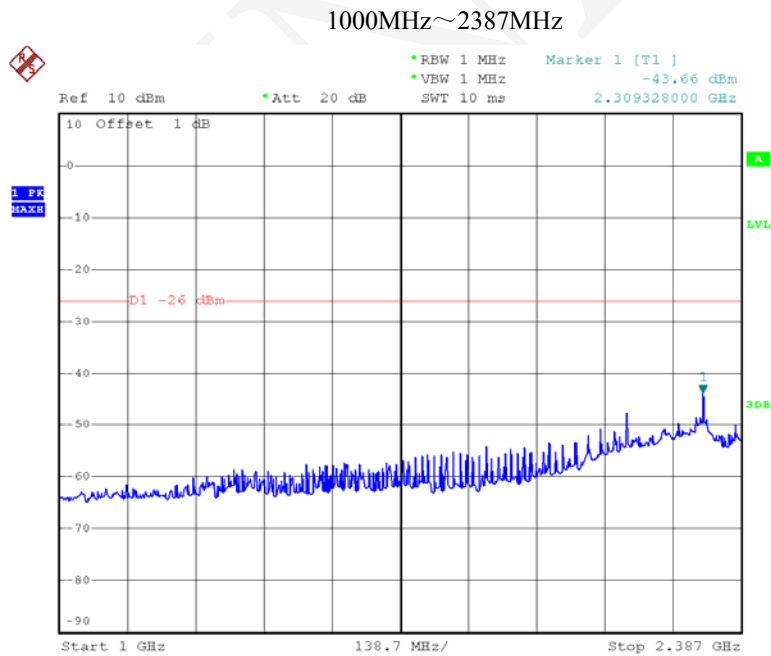


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High Channel:

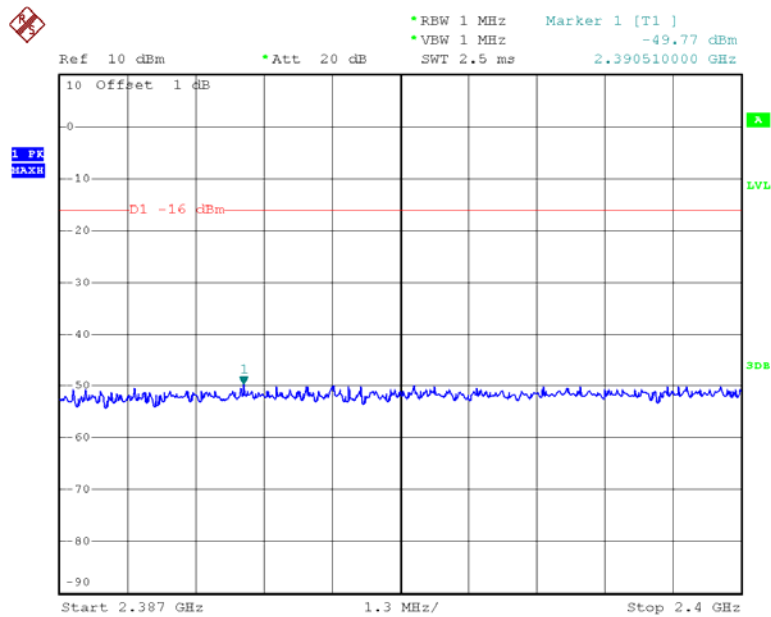


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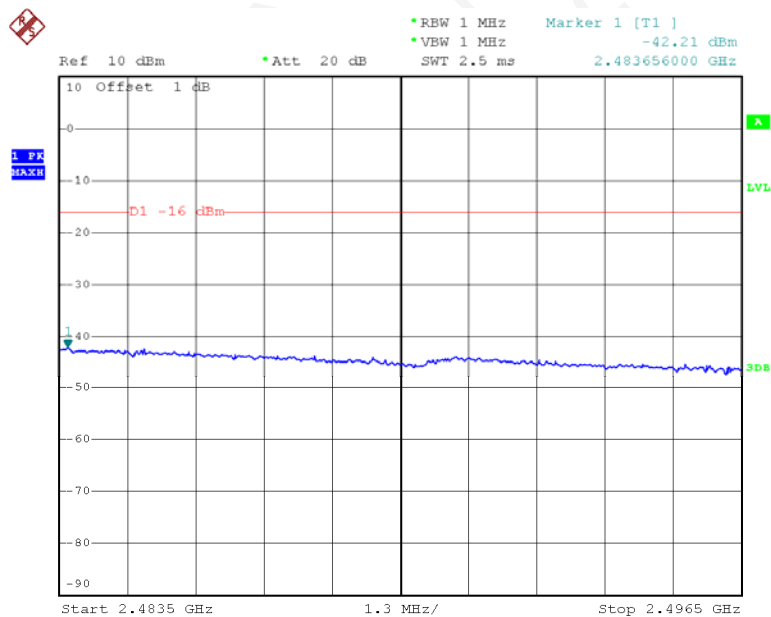
Date: 1.APR.2019 10:22:53

2387MHz~2400MHz



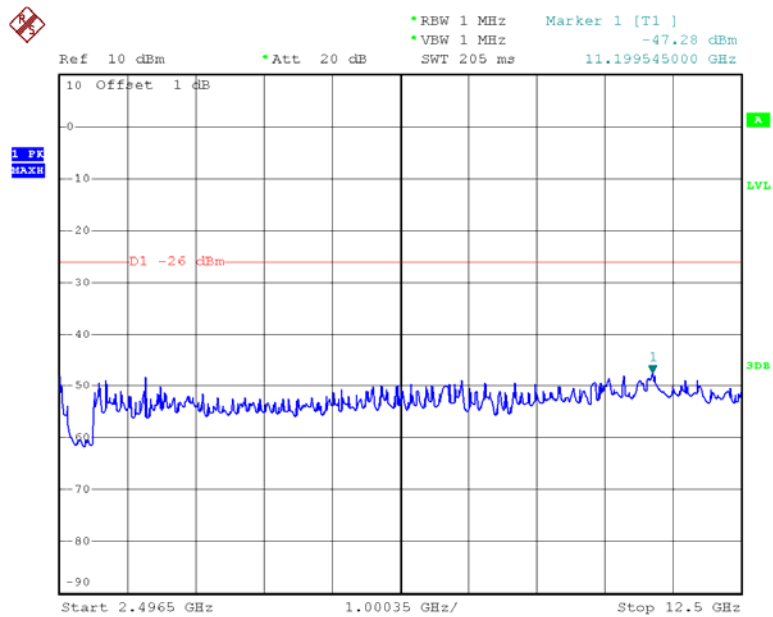
Date: 1.APR.2019 10:23:30

2483.5MHz~2496.5MHz



Date: 1.APR.2019 10:24:03

2496.5MHz~12500MHz



Date: 1.APR.2019 10:24:24

ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE

Limit

Antenna output power:

- $\leq 3 \text{ mW /MHz}$ (FHSS from 2402-2480 MHz)
- $\leq 10 \text{ mW/MHz}$ (OFDM, DSSS from 2400-2483.5 MHz)
- $\leq 10 \text{ mW}$ (other from 2400-2483.5 MHz)

The Output Power Tolerance must be within +20%, -80%.

- $\text{EIRP} \leq 12.14\text{dBm}$ (other from 2400-2483.5 MHz)

Test Procedure

Set the EUT Frequency to measure

Detector: Average

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	64 %
ATM Pressure:	102 kPa

The testing was performed by Carrie He on 2019-04-01.

Test Result: Compliance

Test Mode: Transmitting

Frequency	2413 MHz			2438 MHz			2464.5 MHz			Limit
Voltage	LV	NV	HV	LV	NV	HV	LV	NV	HV	
Reading (dBm)	-3.08	-3.18	-3.27	-4.13	-4.07	-4.37	-4.61	-4.88	-4.76	10dBm
Reading (mW)	0.49	0.48	0.47	0.39	0.39	0.37	0.35	0.33	0.33	10mW
Duty Cycle (%)	53.28	53.28	53.28	53.28	53.28	53.28	53.28	53.28	53.28	/
Antenna Power (mW)	0.92	0.90	0.88	0.73	0.73	0.69	0.66	0.62	0.63	10mW
Antenna power Error (%)	-8.00	-10.00	-12.00	-27.00	-27.00	-31.00	-34.00	-38.00	-37.00	+20% ~ -80%
EIRP (dBm)	-1.06	-1.15	-1.25	-2.06	-2.06	-2.31	-2.50	-2.77	-2.70	12.14dBm

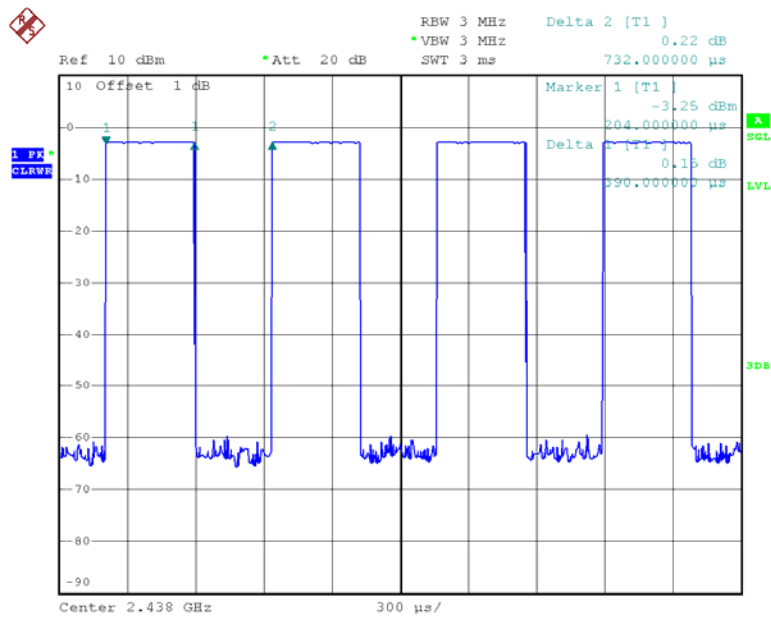
Note 1: the nominal output power is 1mW, and the antenna gain is -0.696dBi, which was declared by manufacturer.

Note 2: Antenna power = Reading / Duty Cycle.

Note 3: Transmission Antenna Gain and Transmission Radiation Angle Width are not required since EIRP less than 12.14dBm.

Note 4: Duty Cycle = $390/732 = 53.28\%$

Duty Cycle



Date: 1.APR.2019 10:18:18

RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY

Limit

- $\leq 4 \text{ nW}$ ($30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$)
- $\leq 20 \text{ nW}$ ($1 \text{ GHz} \leq f \leq 12.5 \text{ GHz}$)

Test Procedure

❖ Conditions of Application Equipment (EUT)

- The modulation state shall be “continuous receiving mode”.

❖ Spectrum Analyzer Conditions

- Start Frequency: Start Frequency of frequency range to measure (30MHz or 1GHz)
- Stop Frequency: Stop Frequency of frequency range to measure (1GHz or 12.5GHz)
- Span: AUTO (Measurement Range)
- RBW: 100 kHz, VBW: 100 kHz for Frequency < 1 GHz
- RBW: 1MHz, VBW: 1MHz for Frequency > 1 GHz
- Sweep time: AUTO or more
- Sweep mode: Auto Sweep
- Detection: Positive Peak
- Reference Level: Enough level for maximum dynamic range

Measurement Result

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	64 %
ATM Pressure:	102kPa

The testing was performed by Carrie He on 2019-04-01.

Test Result: Compliance, please see the below tables and plots

Test Mode: Receiving

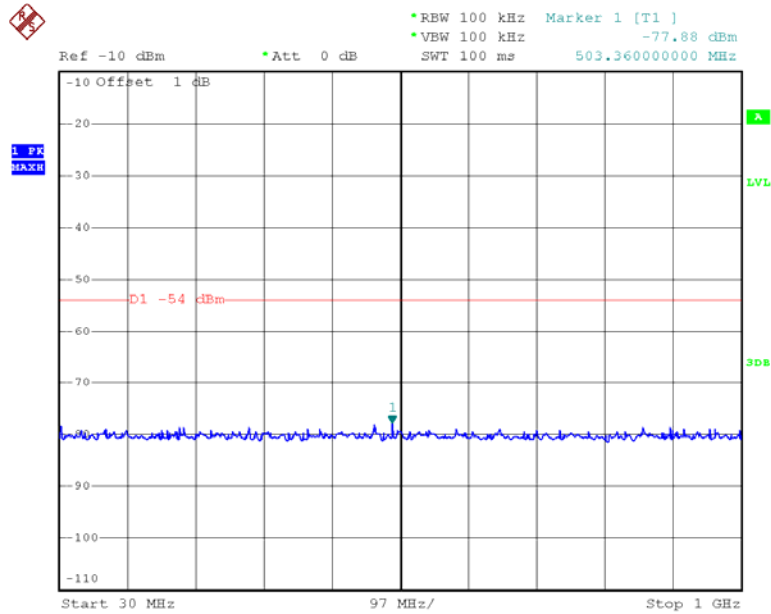
	Frequency band	Low Channel			Middle Channel			High Channel			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data (dBm)	Band VI	-78.05	-77.88	-77.67	-76.06	-76.27	-76.75	-76.59	-76.92	-77.46	-54dBm (4nW)
	Band VII	-67.21	-67.09	-67.56	-66.25	-66.44	-66.91	-67.89	-67.30	-67.16	-47dBm (20nW)

Note: Band VI: 30MHz~1000MHz Band VII: 1000MHz~12500MHz

Please refer to the plots for normal voltage test.

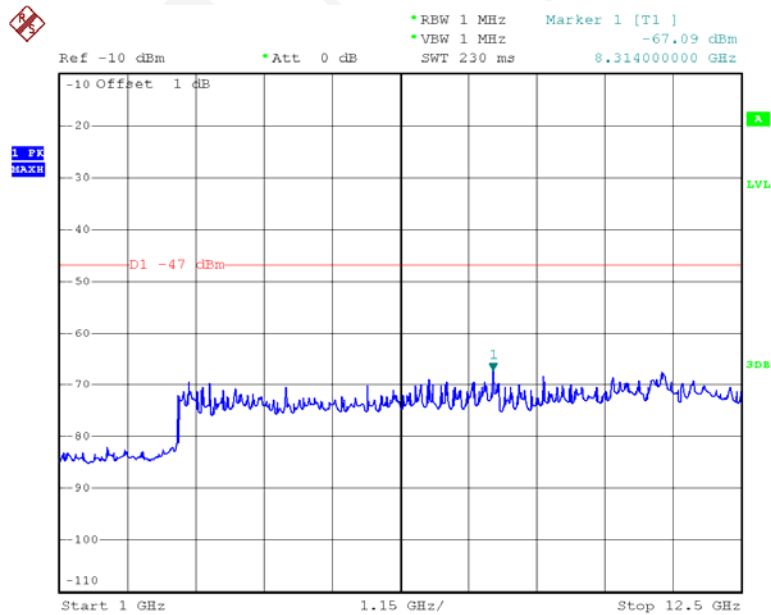
Low Channel

30MHz~1000MHz



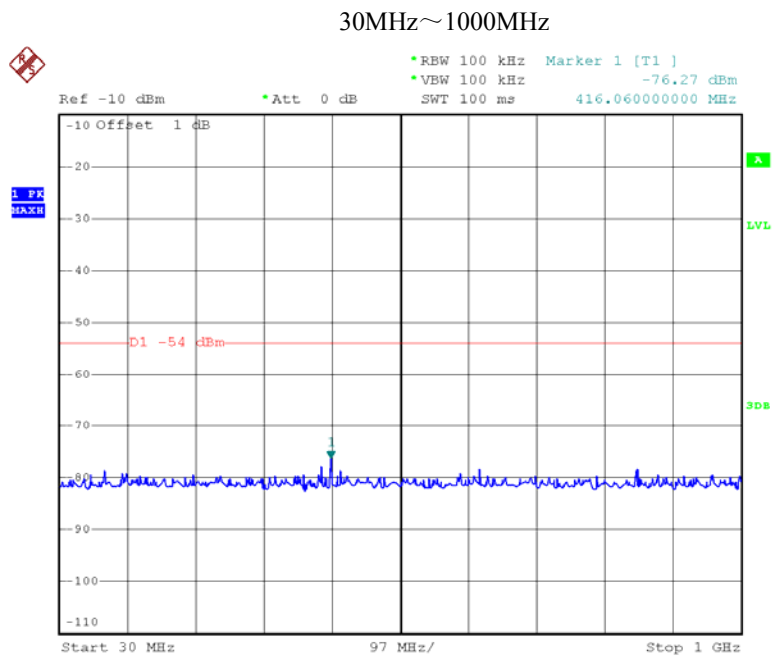
Date: 1.APR.2019 10:30:12

1000MHz~12500MHz

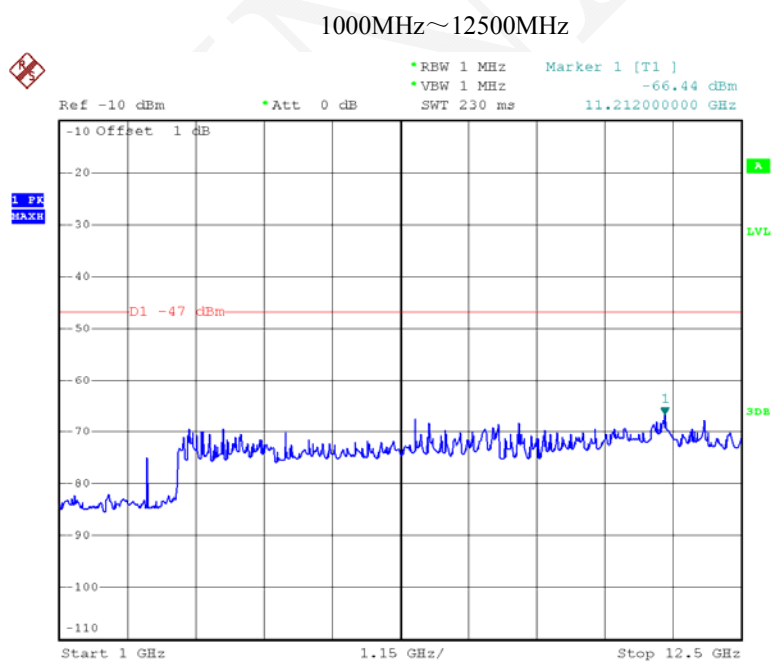


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Middle Channel:

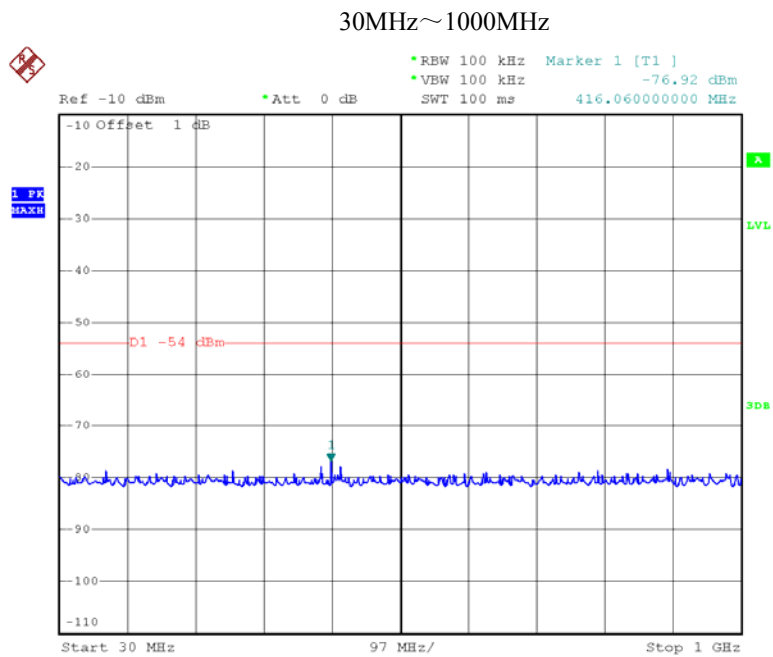


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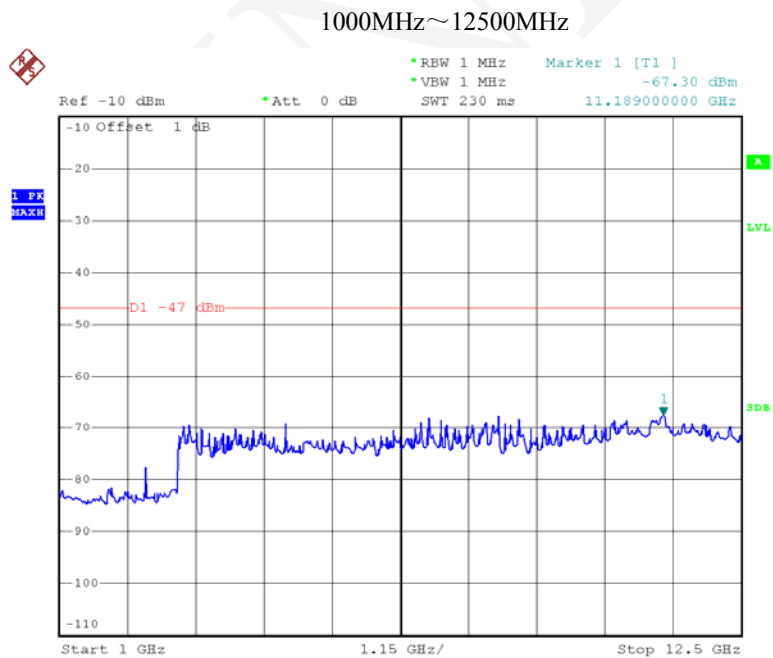


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High Channel:



Date: 1.APR.2019 10:30:55



Date: 1.APR.2019 10:32:04

INTERFERENCE PREVENTION FUNCTION

Requirement

The EUT shall have the interference prevention capability to transmit or to receive the identification automatically, so that sender and receiver shall exclude other equipment.

Test Procedure

In the case that the EUT has the function of automatically transmitting the identification code:

1. Transmit the predetermined identification codes from EUT
2. Check the transmitted identification codes with the demodulator.

In the case of receiving the identification codes:

1. Transmit the predetermined identification codes from the counterpart.
2. Check if communication is normal
3. Transmit the signal other than predetermined ID codes from the counterpart.
4. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

Measurement Result

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	64 %
ATM Pressure:	102 kPa

The testing was performed by Carrie He on 2019-04-01.

Test Result: Good

CONSTRUCTION PROTECTION CONFIRMATION

Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

Confirmation Method

The EUT was locked by special screw, so the EUT cannot be opened easily. Please refer the photos below.

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