



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AV0020398(0) Date : 17 May 2017

Application No. : LV010810(0)

Applicant : LICC Manufacturing Co (Far East) Limited
B7, 18F Kong Nam Ind Bldg 603 Castle Peak Road
Tsuen Wan NT
Hong Kong

Sample Description : One(1) item of submitted sample stated to be

Description	Model
i-Lasso Presenter	G202, R201

Sample registration No. : RV019180-001
Radio Frequency : 2409.65MHz – 2465.68MHz Transceiver
Rating : 2 x 1.5V AAA size batteries
No. of submitted sample : Four (4) set (s)

Date Received : 13 Apr 2017.

Test Period : 18 Apr 2017 to 24 Apr 2017.

Test Requested : FCC Part 15 Certification, FCC Part 15 Verification Procedure

Test Method : 47 CFR Part 15 (10-1-15 Edition)
ANSI C63.4 – 2014, ANSI C63.10 – 2013

Test Engineer : Mr. Yau Kwok Pun, Stanley

Test Result : See attached sheet(s) from page 2 to 46.

Conclusion : The submitted sample was found to comply with requirement of FCC Part 15
Subpart B and C.

Remark : All two models are the same in circuitry and components; and therefore model
R201 was chosen to be the representative of the test sample. The difference(s)
between the tested model and the declared model(s) is/are model no., color and
sample description.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

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FCC ID: CWHPTT200M



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1 General Information

1.1 General Description

The equipment under test (EUT) is a laser presenter. The EUT is power by 2 x 1.5V AAA size batteries. It operates at 2409.65 – 2465.68MHz with GFSK modulation and oscillated by a 12MHz crystal. When pressed the buttons, it will take the corresponding action such as slide forward, backward, laser pointer and vibration.

The brief circuit description is listed as follows:

- | | |
|-------------------|---|
| - U4, Y1, ANTENNA | and its associated circuit act as RF module. |
| - U2 | and its associated circuit act as MCU. |
| - U1 | and its associated circuit act as step up regulator. |
| - S1, S2, S3, SW1 | and its associated circuit act as buttons and switch. |
| - JP1 | and its associated circuit act as laser diode. |
| - JP2 | and its associated circuit act as motor. |



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1.2 Location of the test site

FCC Registered Test Site Number: 416666

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	Rohde & Schwarz	ESCS30	100001	01 Feb 2018	1Year
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	16 Nov 2017	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	101190	12 May 2017	1Year
Spectrum Analyzer	Rohde & Schwarz	FSP30	100628	28 Mar 2018	1Year
Broadband Antenna	Schaffner	CBL6112B	2692	29 Mar 2018	2Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	21 Dec 2017	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2017	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2017	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2017	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2017	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2017	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	21 Dec 2017	1Year
LISN	Rohde & Schwarz	ENV216	101323	10 Nov 2017	1Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	29 Oct 2017	1Year
Rohde & Schwarz TS8997 Testing System					
Spectrum Analyzer	Rohde & Schwarz	FSV 40	101190	12 May 2017	1Year
Vector Generator	Rohde & Schwarz	SMBV100A	262024	04 May 2017	1Year
Generator	Rohde & Schwarz	SMB100A	103230	24 May 2017	1Year
OSP	Rohde & Schwarz	OSP	OSP120 V02	06 Jun 2017	1Year



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1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.83dB
30MHz ~ 200MHz (Vertical)	4.84dB
200MHz ~ 1000MHz (Horizontal)	4.87dB
200MHz ~ 1000MHz (Vertical)	5.94dB
1GHz ~ 6GHz	4.41dB
6GHz ~ 18GHz	4.64dB

Line-conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz~30MHz	2.64dB



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2 Description of the emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 0.4m and 0.8m high above the ground for below 1GHz measurement and 1.5m high above the ground for above 1GHz measurement. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

For 30MHz to 1GHz, broadband antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. And the reference point of antenna shall be 1 m above the ground.

For above 1GHz, horn antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. Preamplifier and High Pass filter was used for measurements. The reference point of antenna shall be 1 m above the ground.

The device was rotated through three orthogonal to determine which attitude and configuration produce the highest emission during measurement for Radiated Emission measurement.

The EUT will connect to TS 8997 testing system for direct conducted measurement.



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2.2 Conducted Emission Measurement Data

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	24	° C
Relative humidity:	62	%

Summary

Test	Frequency (MHz)	Result
RF output power	2409.65	PASS
Power Spectral Density	2409.65	PASS
Minimum Emission Bandwidth 6 dB	2409.65	PASS
Band Edge low	2409.65	PASS
Tx Spurious Emission	2409.65	PASS
Rx Spurious Emission	2409.65	PASS
RF output power	2436.69	PASS
Power Spectral Density	2436.69	PASS
Minimum Emission Bandwidth 6 dB	2436.69	PASS
Tx Spurious Emission	2436.69	PASS
Rx Spurious Emission	2436.69	PASS
RF output power	2465.68	PASS
Power Spectral Density	2465.68	PASS
Minimum Emission Bandwidth 6 dB	2465.68	PASS
Band Edge high	2465.68	PASS
Tx Spurious Emission	2465.68	PASS
Rx Spurious Emission	2465.68	PASS



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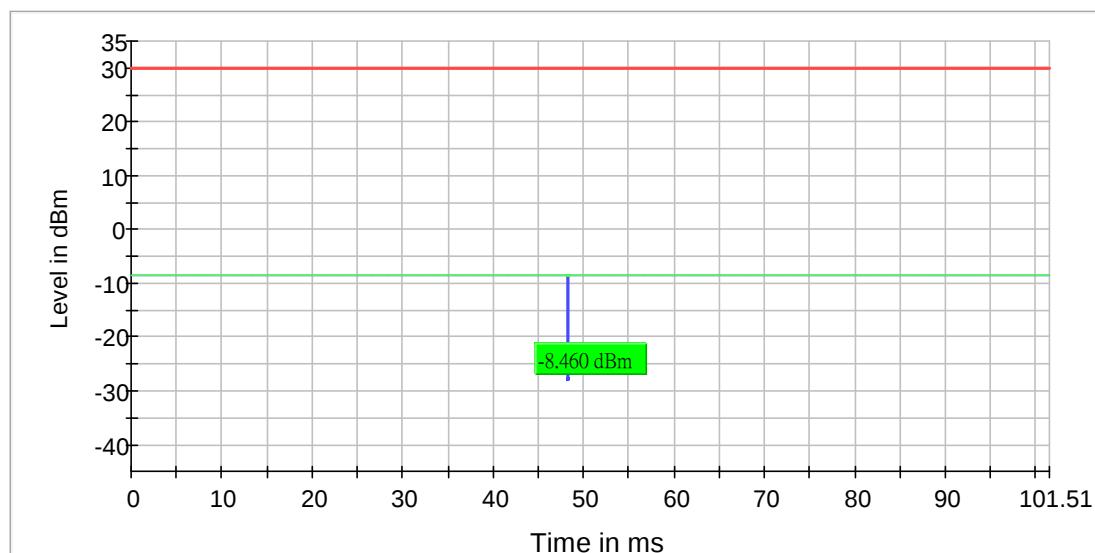
Date : 17 May 2017

RF output power (2409.65 MHz)

Test according to FCC title 47 part 15 §15.247(b), ANSI C63.10. The test produces based on ANSI C63.10 clauses 11.9.2.3 method AVGPM-G.

Result

DUT Frequency (MHz)	Gated EIRP (dBm)	Limit Max (dBm)	Duty Cycle (%)	Result
2409.650000	-8.5	30.0	10.393	PASS





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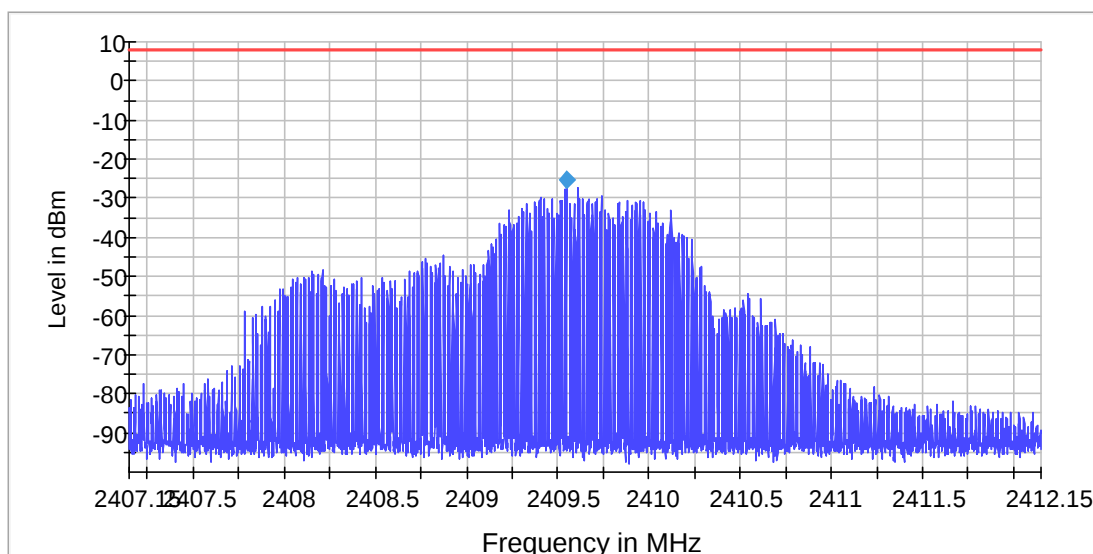
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Power Spectral Density (2409.65 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2409.650000	2409.547271	-25.109	8.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40715 GHz	2.40715 GHz
Stop Frequency	2.41215 GHz	2.41215 GHz
Span	5.000 MHz	5.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	3333	~ 3333
SweepTime	3.340 s	3.333 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3



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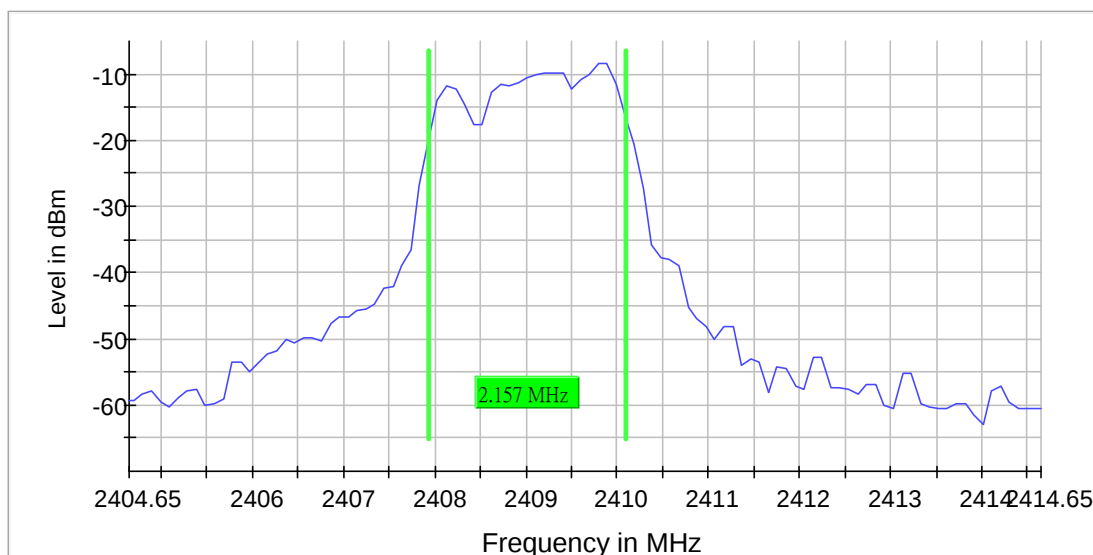
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Minimum Emission Bandwidth 6 dB (2409.65 MHz)

Test according to FCC title 47 part 15 §15.247(a), ANSI C63.10.

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2409.650000	2.156862	0.500000	---	2407.934314	2410.091176	-8.4	PASS





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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40465 GHz	2.40465 GHz
Stop Frequency	2.41465 GHz	2.41465 GHz
Span	10.000 MHz	10.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 100
SweepTime	37.924 μ s	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	136 / max. 150	max. 150
Stable	15 / 15	15



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Band Edge low (2409.65 MHz)

Test according to FCC title 47 part 15 §15.247(d), ANSI C63.10.

Result

DUT Frequency (MHz)	Result
2409.650000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2409.369390	-17.6

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2397.476402	-65.5	28.0	-37.6	PASS
2397.526374	-65.8	28.2	-37.6	PASS
2397.426430	-66.2	28.6	-37.6	PASS
2397.676291	-66.6	29.0	-37.6	PASS
2397.576346	-66.8	29.2	-37.6	PASS
2397.626319	-67.4	29.8	-37.6	PASS
2397.376458	-69.4	31.8	-37.6	PASS
2361.596335	-71.1	33.5	-37.6	PASS
2361.696280	-71.3	33.7	-37.6	PASS
2361.646308	-71.3	33.7	-37.6	PASS
2385.533037	-71.6	34.0	-37.6	PASS
2385.383120	-71.8	34.2	-37.6	PASS
2349.503054	-72.0	34.4	-37.6	PASS
2385.433093	-72.0	34.4	-37.6	PASS
2361.796224	-72.1	34.5	-37.6	PASS



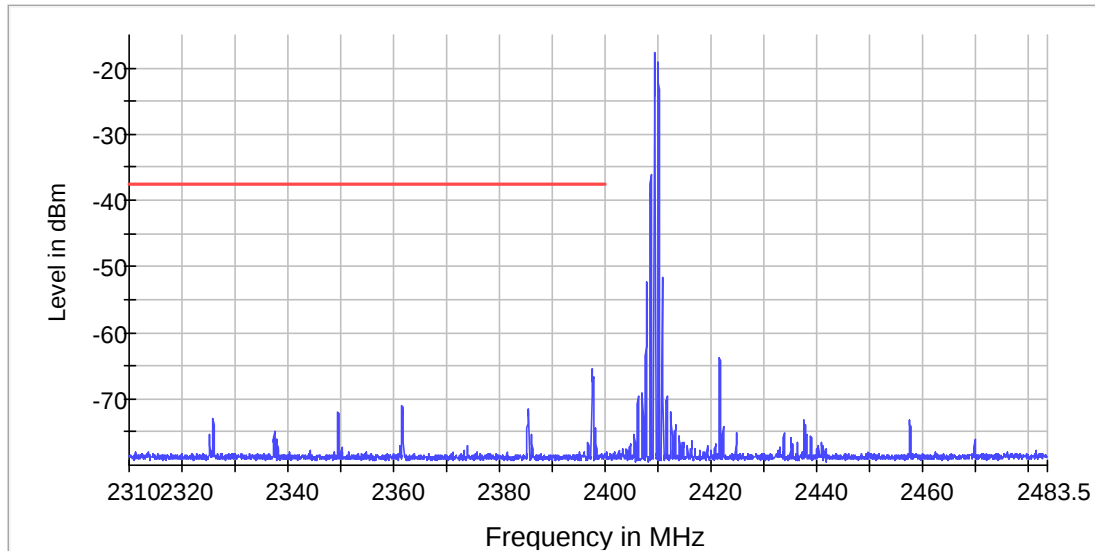
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Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
SweepTime	1.670 s	1.670 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 15	max. 15
Stable	3 / 3	3

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
SweepTime	1.800 s	1.800 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 15	max. 15
Stable	3 / 3	3



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Tx Spurious Emission (2409.65 MHz)

Test according to FCC title 47 part 15 §15.247(d), ANSI C63.10.

Result

DUT Frequency (MHz)	Result
2409.650000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
4818.491504	-39.7	-50.6	-41.2	9.4	PASS

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4818.491504	-39.7	-1.5	-41.2
4818.991449	-39.7	-1.5	-41.2
4819.991338	-39.7	-1.5	-41.2
4819.491394	-39.7	-1.5	-41.2
4820.491283	-40.4	-0.9	-41.2
4817.991560	-43.2	2.0	-41.2
4820.991228	-48.6	7.4	-41.2
7230.063746	-41.4	8.4	-33.0
7228.282607	-41.4	8.5	-33.0
7228.876320	-41.9	9.0	-33.0
7227.688894	-42.0	9.1	-33.0
7230.657459	-42.1	9.1	-33.0
7229.470033	-42.5	9.5	-33.0
7227.095182	-43.2	10.3	-33.0
4817.491615	-53.3	12.1	-41.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	1000.000000	1	1
1000.000000	2400.000000	2	2
2400.000000	2483.500000	2	2
2483.500000	7000.000000	2	2
7000.000000	26000.000000	2	2



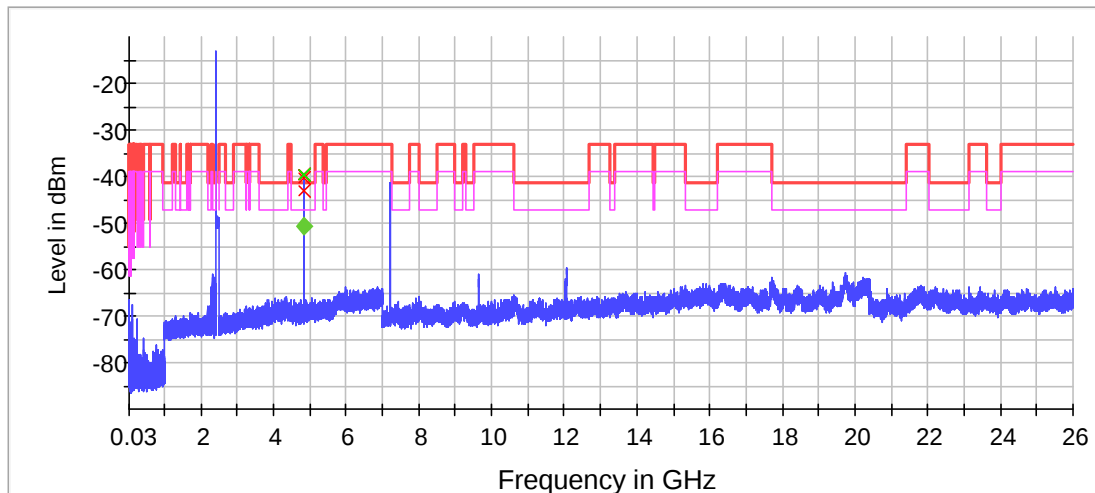
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× Limit [limit.Result:1] × Sum Level [trace.Result:1]
◆ Threshold [limit 2.Result:1] ◆ Critical [Over Limit.Result:1]



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Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	19400	~ 19400
SweepTime	19.400 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	2800	~ 2800
SweepTime	2.800 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3



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Final Measurement 2

Setting	Instrument Value	Target Value
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	10001	~ 10001
SweepTime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off



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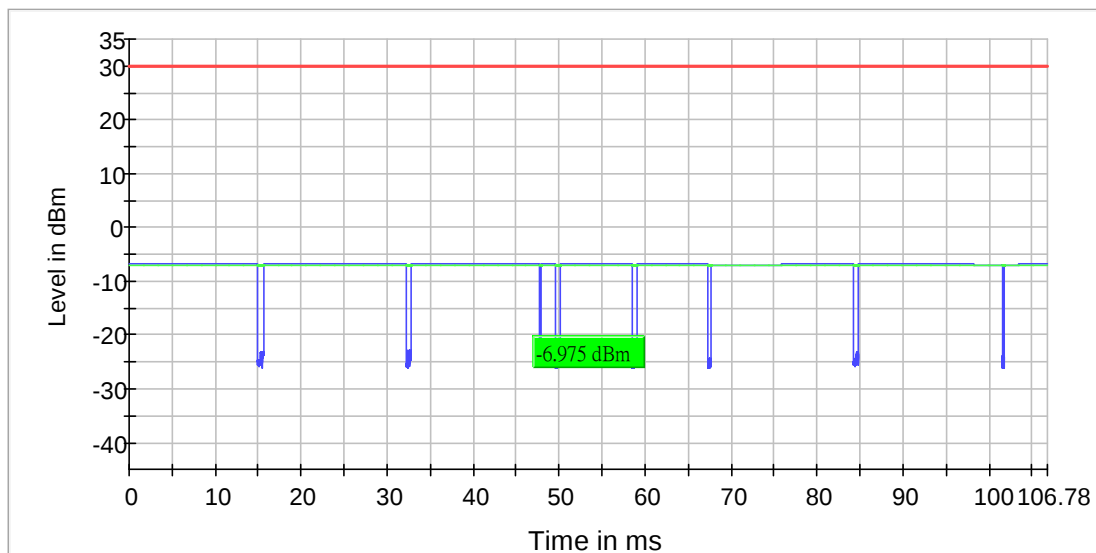
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RF output power (2435.69 MHz)

Test according to FCC title 47 part 15 §15.247(b), ANSI C63.10. The test produces based on ANSI C63.10 clauses 11.9.2.3 method AVGPM-G.

Result

DUT Frequency (MHz)	Gated EIRP (dBm)	Limit Max (dBm)	Duty Cycle (%)	Result
2435.690000	-7.0	30.0	10.761	PASS





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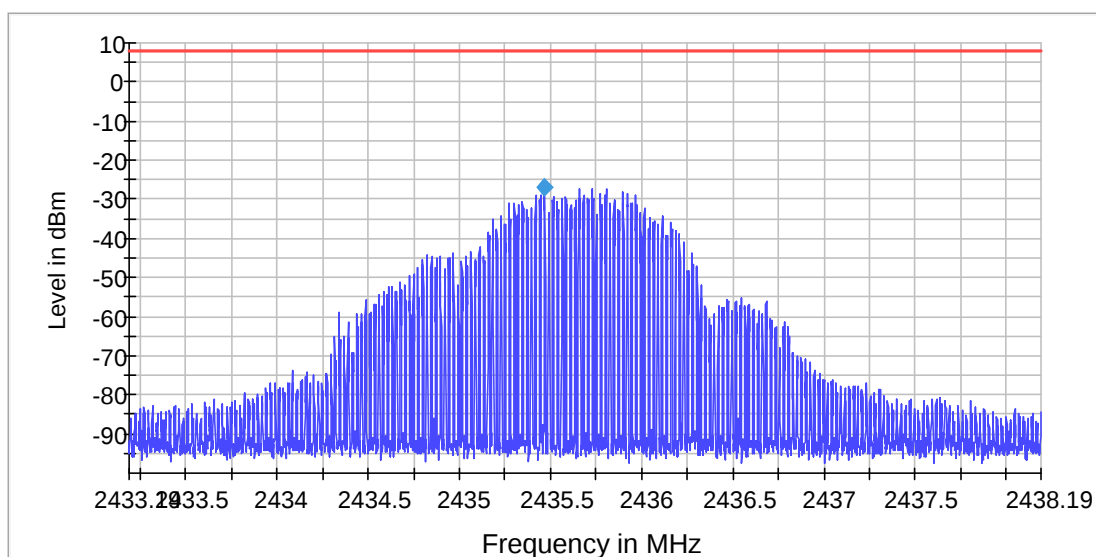
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Power Spectral Density (2435.69 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2435.690000	2435.468794	-27.081	8.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43319 GHz	2.43319 GHz
Stop Frequency	2.43819 GHz	2.43819 GHz
Span	5.000 MHz	5.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	3333	~ 3333
SweepTime	3.340 s	3.333 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3



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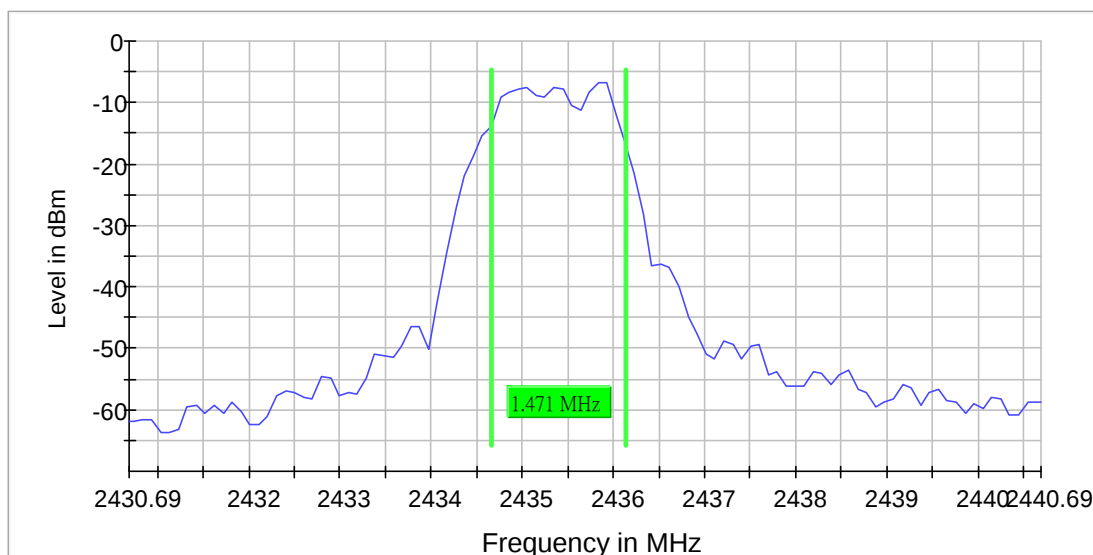
Date : 17 May 2017

Minimum Emission Bandwidth 6 dB (2435.69 MHz)

Test according to FCC title 47 part 15 §15.247(a), ANSI C63.10.

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2435.690000	1.470588	0.500000	---	2434.660588	2436.131176	-6.7	PASS





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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43069 GHz	2.43069 GHz
Stop Frequency	2.44069 GHz	2.44069 GHz
Span	10.000 MHz	10.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 100
SweepTime	37.924 μ s	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamplifier	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	61 / max. 150	max. 150
Stable	15 / 15	15



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Tx Spurious Emission (2435.69 MHz)

Test according to FCC title 47 part 15 §15.247(d), ANSI C63.10.

Result

DUT Frequency (MHz)	Result
2435.690000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
4870.985693	-43.3	-55.7	-41.2	14.5	PASS
7306.058996	-41.7	-55.6	-41.2	14.4	PASS

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
7306.058996	-41.7	0.5	-41.2
7306.652709	-41.7	0.5	-41.2
7307.840135	-41.8	0.5	-41.2
7308.433848	-41.9	0.6	-41.2
7307.246422	-42.5	1.3	-41.2
4870.985693	-43.3	2.0	-41.2
4870.485748	-43.3	2.1	-41.2
4871.985582	-43.5	2.3	-41.2
7305.465283	-43.6	2.4	-41.2
4871.485638	-43.9	2.6	-41.2
4872.485527	-44.8	3.6	-41.2
4869.985804	-46.9	5.7	-41.2
7309.027561	-49.0	7.7	-41.2
4872.985472	-50.2	9.0	-41.2
4869.485859	-55.7	14.5	-41.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	1000.000000	1	1
1000.000000	2400.000000	2	2
2400.000000	2483.500000	2	2
2483.500000	7000.000000	2	2
7000.000000	26000.000000	2	2



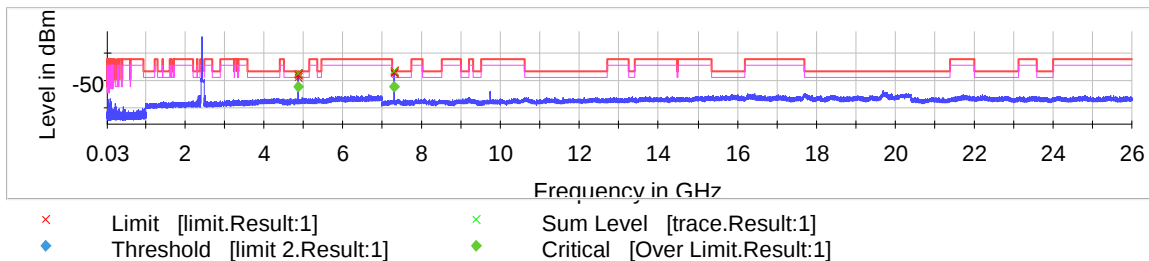
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Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	19400	~ 19400
SweepTime	19.400 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	2800	~ 2800
SweepTime	2.800 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3



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Final Measurement 2

Setting	Instrument Value	Target Value
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	10001	~ 10001
SweepTime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off



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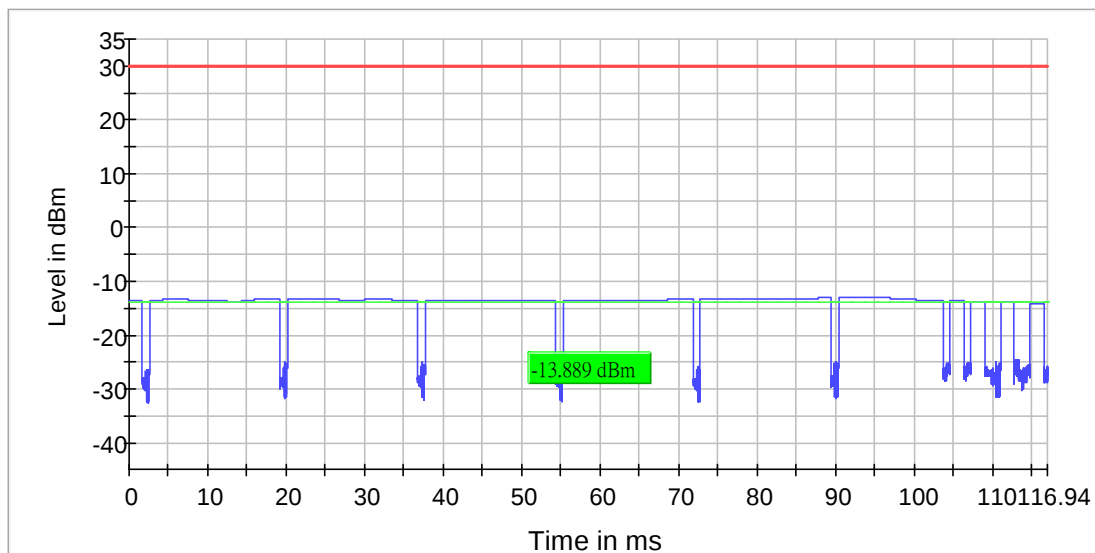
Date : 17 May 2017

RF output power (2465.68 MHz)

Test according to FCC title 47 part 15 §15.247(b), ANSI C63.10. The test produces based on ANSI C63.10 clauses 11.9.2.3 method AVGPM-G.

Result

DUT Frequency (MHz)	Gated EIRP (dBm)	Limit Max (dBm)	Duty Cycle (%)	Result
2465.680000	-13.9	30.0	11.709	PASS





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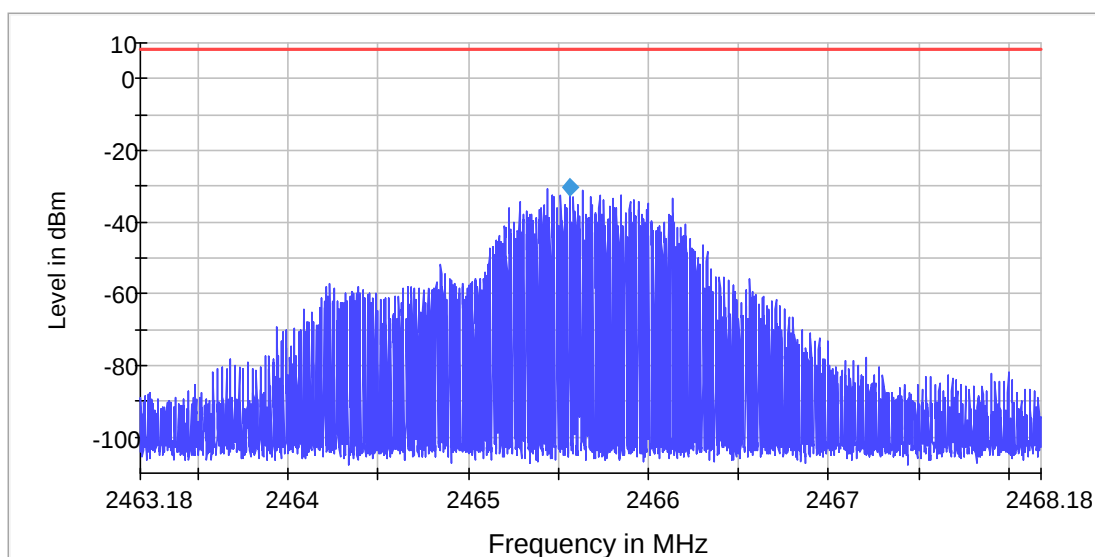
Report No. : AV0020398(0)

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Power Spectral Density (2465.68 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2465.680000	2465.562274	-30.081	8.0	PASS



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.46318 GHz	2.46318 GHz
Stop Frequency	2.46818 GHz	2.46818 GHz
Span	5.000 MHz	5.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	3333	~ 3333
SweepTime	3.340 s	3.333 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3



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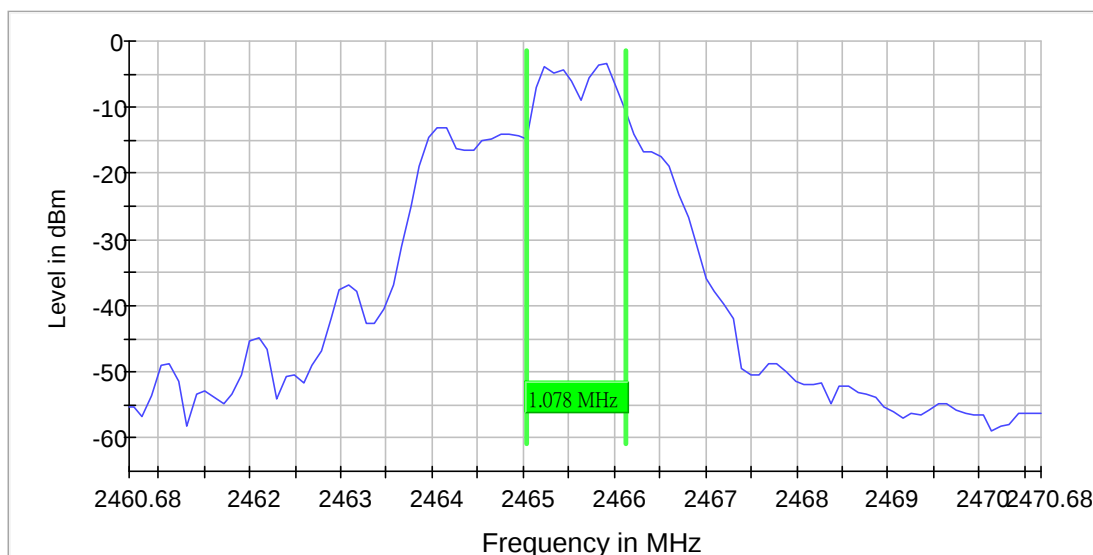
Date : 17 May 2017

Minimum Emission Bandwidth 6 dB (2465.68 MHz)

Test according to FCC title 47 part 15 §15.247(a), ANSI C63.10.

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2465.680000	1.078431	0.500000	---	2465.042745	2466.121176	-3.5	PASS





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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.46068 GHz	2.46068 GHz
Stop Frequency	2.47068 GHz	2.47068 GHz
Span	10.000 MHz	10.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 100
SweepTime	37.924 μ s	AUTO
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamplifier	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	86 / max. 150	max. 150
Stable	15 / 15	15



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Band Edge high (2465.68 MHz)

Test according to FCC title 47 part 15 §15.247(d), ANSI C63.10.

Result

DUT Frequency (MHz)	Result
2465.680000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2465.385847	-12.4

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2489.407100	-70.6	38.2	-32.4	PASS
2489.506798	-70.8	38.4	-32.4	PASS
2489.307402	-71.0	38.6	-32.4	PASS
2489.855740	-71.0	38.6	-32.4	PASS
2489.606495	-71.0	38.6	-32.4	PASS
2489.805891	-71.1	38.8	-32.4	PASS
2489.656344	-71.5	39.1	-32.4	PASS
2489.257553	-73.7	41.3	-32.4	PASS
2490.055136	-73.9	41.5	-32.4	PASS
2489.456949	-74.0	41.7	-32.4	PASS
2489.905589	-74.6	42.2	-32.4	PASS
2489.706193	-75.6	43.2	-32.4	PASS
2490.154834	-75.6	43.2	-32.4	PASS
2484.721299	-76.0	43.6	-32.4	PASS
2490.104985	-76.3	44.0	-32.4	PASS



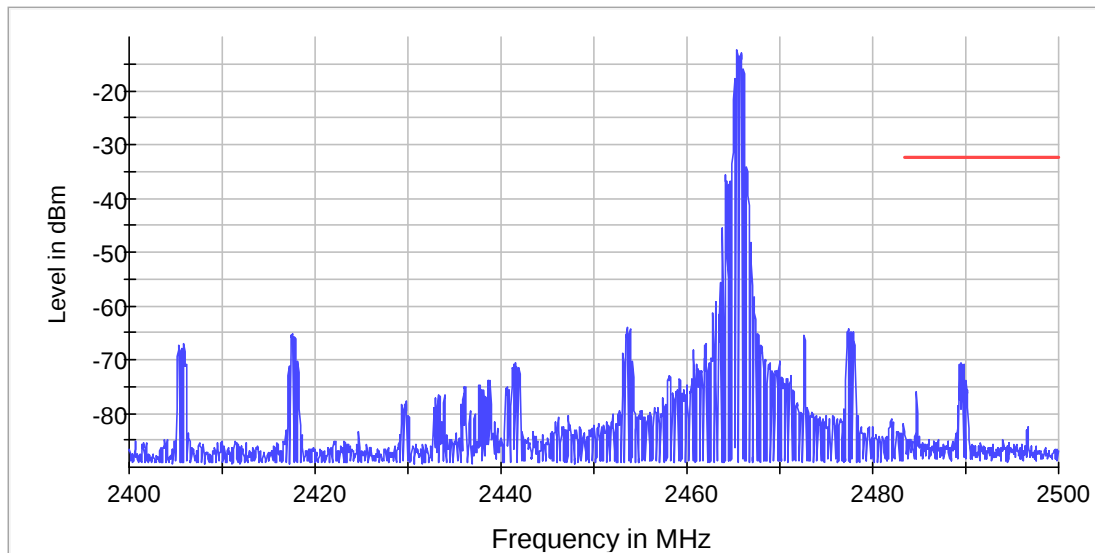
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Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
SweepTime	1.670 s	1.670 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 15	max. 15
Stable	3 / 3	3

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	330	~ 330
SweepTime	330.000 ms	330.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 15	max. 15
Stable	3 / 3	3



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Tx Spurious Emission (2465.68 MHz)

Test according to FCC title 47 part 15 §15.247(d), ANSI C63.10.

Result

DUT Frequency (MHz)	Result
2465.680000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
4930.979051	-33.9	-46.8	-41.2	5.5	PASS
7398.084495	-45.6	-60.3	-41.2	19.0	PASS

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4930.979051	-33.9	-7.3	-41.2
4930.479107	-33.9	-7.3	-41.2
4931.978941	-34.1	-7.1	-41.2
4932.478885	-34.2	-7.0	-41.2
4931.478996	-34.4	-6.9	-41.2
4929.979162	-36.3	-5.0	-41.2
4932.978830	-36.9	-4.3	-41.2
4929.479217	-45.2	4.0	-41.2
7398.084495	-45.6	4.4	-41.2
7398.678208	-45.6	4.4	-41.2
7395.709643	-45.7	4.4	-41.2
7396.303356	-45.7	4.5	-41.2
7397.490782	-45.9	4.7	-41.2
7396.897069	-46.7	5.4	-41.2
4933.478775	-48.3	7.1	-41.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	1000.000000	1	1
1000.000000	2400.000000	2	2
2400.000000	2483.500000	2	2
2483.500000	7000.000000	2	2
7000.000000	26000.000000	2	2



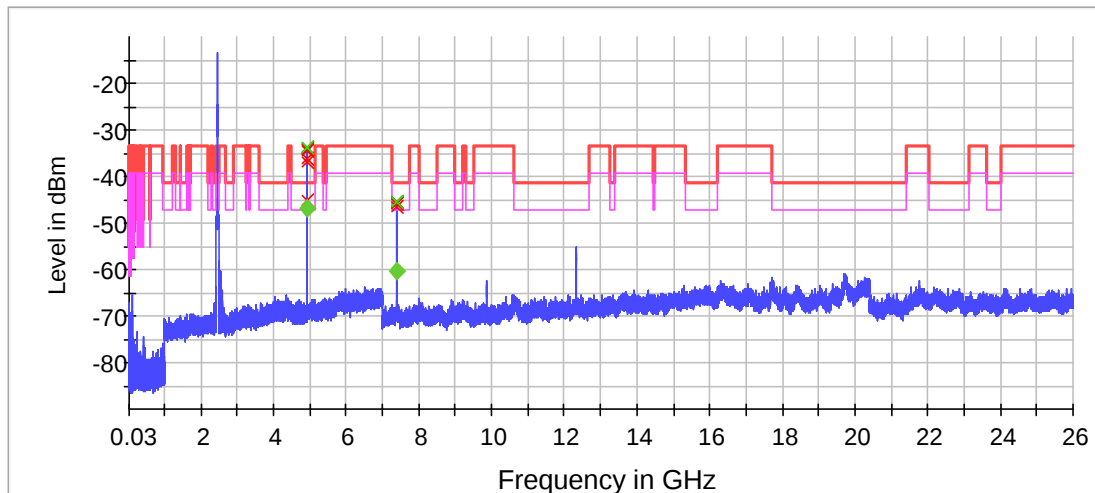
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× Limit [limit.Result:1] × Sum Level [trace.Result:1]
◆ Threshold [limit 2.Result:1] ◆ Critical [Over Limit.Result:1]



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Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	19400	~ 19400
SweepTime	19.400 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	2800	~ 2800
SweepTime	2.800 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	3 / max. 150	max. 150
Stable	3 / 3	3



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Final Measurement 2

Setting	Instrument Value	Target Value
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	10001	~ 10001
SweepTime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off



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2.3 Radiated Emission Measurement Data

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	23	°C
Relative humidity:	60	%

Testing frequency range: 9kHz to 26GHz Mode: Transmission (i-Lasso Presenter)

Measurement: Quasi-peak (9kHz – 1GHz), Peak and Average (above 1GHz)

RBW: 9kHz (below 30MHz), 120KHz (30MHz – 1GHz), 1MHz (above 1GHz)

VBW: 30kHz (below 30MHz), 300kHz (30MHz – 1GHz), 3MHz (above 1GHz, Peak measurement), 10Hz (above 1GHz, Average measurement)

Channel	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Measurement (Peak/Average)
Lower	2408.968	V	95.5	-4.2	91.3	-	-	Peak
Lower	2408.968	V	34.3	-4.2	30.1	-	-	Average
Lower	2409.783	H	92.5	-4.2	88.3	-	-	Peak
Lower	2409.783	H	33.8	-4.2	29.6	-	-	Average
Lower	4818.735	H	62.7	3.1	65.8	74.0	-8.2	Peak
Lower	4818.735	H	26.7	3.1	29.8	54.0	-24.2	Average
Lower	4818.962	V	58.5	3.1	61.6	74.0	-12.4	Peak
Lower	4818.962	V	26.0	3.1	29.1	54.0	-24.9	Average
Lower	7227.716	H	58.1	10.8	68.9	74.0	-5.1	Peak
Lower	7227.716	H	24.0	10.8	34.8	54.0	-19.2	Average
Lower	7228.073	V	57.8	10.8	68.6	74.0	-5.4	Peak
Lower	7228.073	V	24.4	10.8	35.2	54.0	-18.8	Average

Remark:

Other emissions more than 20dB below the limit are not reported.

If Peak measurement values are lower than average limit, average measurement is not necessary.

For electronic filing, the RE spectrum graphs are saved with filename CWHPTT200M_REGraph.pdf.



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Channel	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Measurement (Peak/Average)
Middle	2435.201	H	95.9	-4.2	91.7	-	-	Peak
Middle	2435.201	H	34.3	-4.2	30.1	-	-	Average
Middle	2435.211	V	94.7	-4.2	90.5	-	-	Peak
Middle	2435.211	V	34.2	-4.2	30.0	-	-	Average
Middle	4870.683	H	63.5	3.1	66.6	74.0	-7.4	Peak
Middle	4870.683	H	27.2	3.1	30.3	54.0	-23.7	Average
Middle	4870.769	V	60.6	3.1	63.7	74.0	-10.3	Peak
Middle	4870.769	V	26.4	3.1	29.5	54.0	-24.5	Average
Middle	7306.050	V	57.6	10.8	68.4	74.0	-5.6	Peak
Middle	7306.050	V	24.8	10.8	35.6	54.0	-18.4	Average
Middle	7307.681	H	59.9	10.8	70.7	74.0	-3.3	Peak
Middle	7307.681	H	25.2	10.8	36.0	54.0	-18.0	Average

Remark:

Other emissions more than 20dB below the limit are not reported.

If Peak measurement values are lower than average limit, average measurement is not necessary.

For electronic filing, the RE spectrum graphs are saved with filename CWHPTT200M_REGraph.pdf.



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Channel	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Measurement (Peak/Average)
Higher	2465.107	H	94.0	-4.3	89.7	-	-	Peak
Higher	2465.107	H	34.4	-4.3	30.1	-	-	Average
Higher	2465.257	V	96.1	-4.3	91.8	-	-	Peak
Higher	2465.257	V	34.7	-4.3	30.4	-	-	Average
Higher	4930.679	H	60.9	3.2	64.1	74.0	-9.9	Peak
Higher	4930.679	H	26.0	3.2	29.2	54.0	-24.8	Average
Higher	4930.947	V	58.7	3.2	61.9	74.0	-12.1	Peak
Higher	4930.947	V	25.7	3.2	28.9	54.0	-25.1	Average
Higher	7396.116	V	52.8	12.8	65.6	74.0	-8.4	Peak
Higher	7396.116	V	22.6	12.8	35.4	54.0	-18.6	Average
Higher	7396.374	H	56.6	12.8	69.4	74.0	-4.6	Peak
Higher	7396.374	H	23.1	12.8	35.9	54.0	-18.1	Average

Remark:

Other emissions more than 20dB below the limit are not reported.

If Peak measurement values are lower than average limit, average measurement is not necessary.

For electronic filing, the RE spectrum graphs are saved with filename CWHPTT200M_REGraph.pdf.



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2.3 Radiated Emission Measurement Data (cont'd)

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	23	° C
Relative humidity:	60	%

Testing frequency range: 9kHz to 26GHz Mode: Receiving

Measurement: Quasi-peak (9kHz – 1GHz), Peak (above 1GHz)

RBW: 9kHz (below 30MHz), 120KHz (30MHz – 1GHz), 1MHz (above 1GHz)

VBW: 30kHz (below 30MHz), 300kHz (30MHz – 1GHz), 3MHz (above 1GHz)

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
-	-	-	-	-	-	-

Remark:

No specified emission found.

For electronic filing, the RE spectrum graphs are saved with filename CWHPTT200M_REGraph.pdf.



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3 Description of the Line-conducted Test

3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

No measurement is required as the EUT is a battery-operated product.



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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conducted Emission

For electronic filing, the photos are saved with filename CWHPTT200M_TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename CWHPTT200M_ExPho.pdf and CWHPTT200M_InPho.pdf.

4.3 Antenna requirement

Appendices A2 shows the antenna is permanently attached and cannot be changed. Therefore it fulfils the section 15.203 requirement.



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5 Appendices

- A1 Photos of External Configurations
- A2 Antenna Requirement

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FCC ID: CWHPTT200M

Tested by:

Stanley

Mr. Yau Kwok Pun, Stanley

Reviewed by:

P. J.

Mr. WONG Lap-pong, Andrew



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A1 Photos of External Configurations



Tested by:

Stanley

Mr. Yau Kwok Pun, Stanley

Reviewed by:

PR.

Mr. WONG Lap-pong, Andrew

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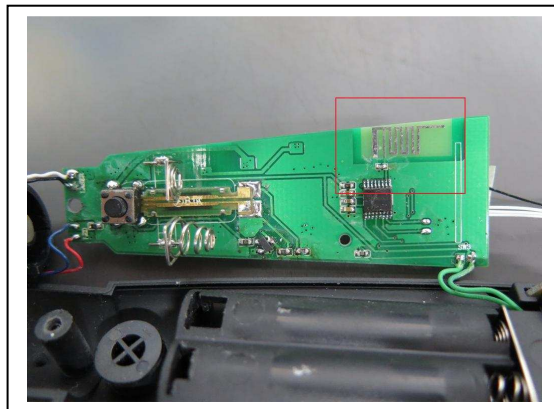
廠商會檢定中心

TEST REPORT

Report No. : AV0020398(0)

Date : 17 May 2017

A2 Antenna Requirement



***** End of Report *****

Tested by:

Stanley

Mr. Yau Kwok Pun, Stanley

Reviewed by:

PR.

Mr. WONG Lap-pong, Andrew

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