CMA Testing and Certification Laboratories
廠商會檢定中心

TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Application No. : LV003658(0)

Applicant : CLEMENTONI SPA
ZONA INDUSTRIALE FONTENOCE
RECANATI MC, ITALY

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

Description	Model
Cyber Robot	95779
Cyber Robot	AD12946

Sample registration No. : RU040580-001
Radio Frequency : 2402MHz – 2480MHz Transceiver
Rating : 4 x 1.5V AA size batteries
No. of submitted sample : Two (2) set (s)

Reference No. : ICQHK No. 17-565

Date Received : 16 Dec 2016.

Test Period : 16 Dec 2016 to 03 Jan 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 63.

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

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

FCC ID: 2AK7GAD12946

CMA Industrial Development Foundation Limited
Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.
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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Remark : All two models are the same in circuitry and components; and therefore model 95779 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.

For and on behalf of
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Authorized Signature : _____

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Table of Contents

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

1 General Information

1.1 General Description

The equipment under test (EUT) is an bluetooth control robot. The EUT is power by 4 x 1.5V AA size batteries. It operates at 2402 – 2480MHz. The EUT is connected with Apple devices via BLE. When the user using the app to control the EUT, the EUT will take the corresponding action such as play music, dacnce and walk etc.

The brief circuit description is listed as follows:

- U6, SP	and its associated circuit act as voice module
- U2	and its associated circuit act as voltage regulator
- U4, U5, Q1-Q4	and its associated circuit act as motor drive circuit
- U3, Y2, Y1	and its associated circuit act as RF module and crystal

The brief circuit description is saved with filename: 2AK7GAD12946_OpDesc.pdf

The antenna is permanently attached in EUT and the radio output power is unable to adjust.

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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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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	17 May 2018	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	17 May 2018	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
OSP	Rohde & Schwarz	OSP	OSP120 V02	06 Jun 2017	1Year

Support equipment

Supplied by Client:

- Apple iPad Mini (Model: A1550)

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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 axes 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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

2.2 Conducted Emission Measurement Data

Environmental conditions:

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

Summary

Test	Frequency (MHz)	Result
RF output power	2402.000	PASS
Power Spectral Density	2402.000	PASS
Minimum Emission Bandwidth 6 dB	2402.000	PASS
Band Edge low	2402.000	PASS
Tx Spurious Emission	2402.000	PASS
Rx Spurious Emission	2402.000	PASS
RF output power	2440.000	PASS
Power Spectral Density	2440.000	PASS
Minimum Emission Bandwidth 6 dB	2440.000	PASS
Tx Spurious Emission	2440.000	PASS
Rx Spurious Emission	2440.000	PASS
RF output power	2480.000	PASS
Power Spectral Density	2480.000	PASS
Minimum Emission Bandwidth 6 dB	2480.000	PASS
Band Edge high	2480.000	PASS
Tx Spurious Emission	2480.000	PASS
Rx Spurious Emission	2480.000	PASS

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TEST REPORT

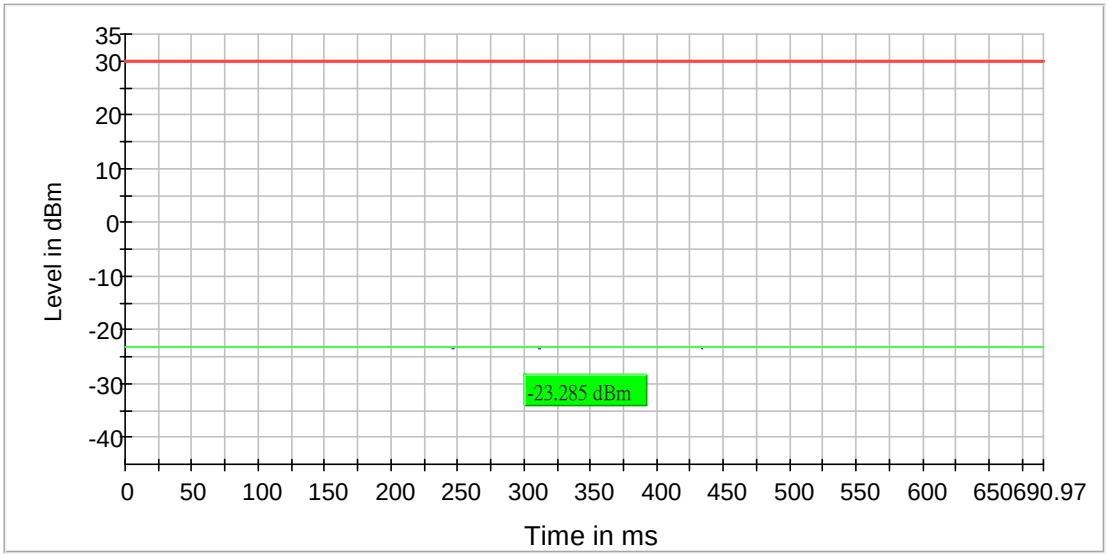
Report No. : AV0008484(2) Date : 24 May 2017

RF output power (2402 MHz)

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

Result

DUT Frequency (MHz)	Gated EIRP (dBm)	Limit Max (dBm)	DutyCycle (%)	Result
2402.000000	-23.3	30.0	69.162	PASS



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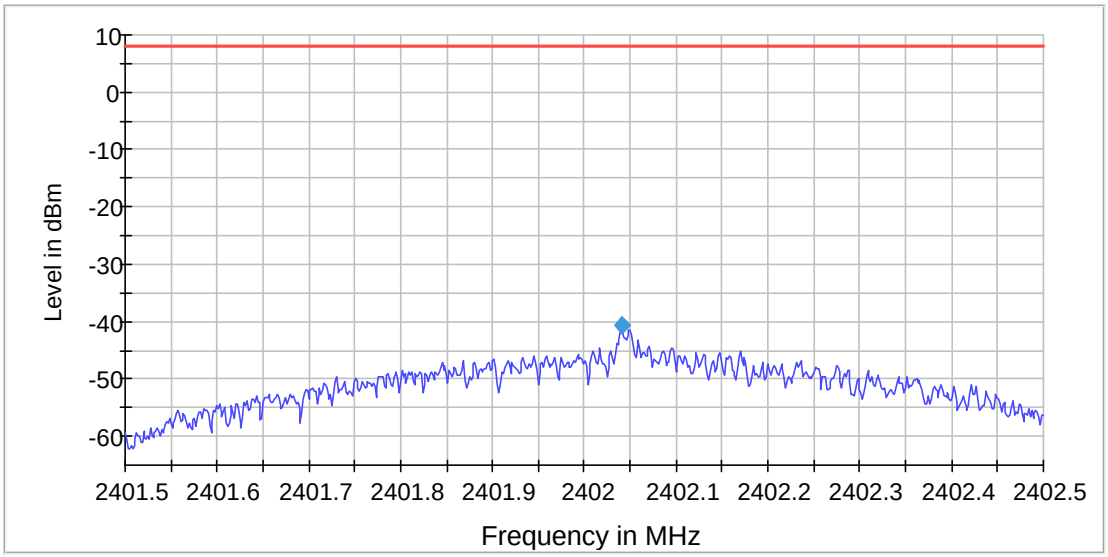
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Power Spectral Density (2402 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2402.041168	-40.591	8.0	PASS



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40150 GHz	2.40150 GHz
Stop Frequency	2.40250 GHz	2.40250 GHz
Span	1.000 MHz	1.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	667	~ 667
Sweeptime	667.000 ms	667.000 ms
Reference Level	-30.000 dBm	-30.000 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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TEST REPORT

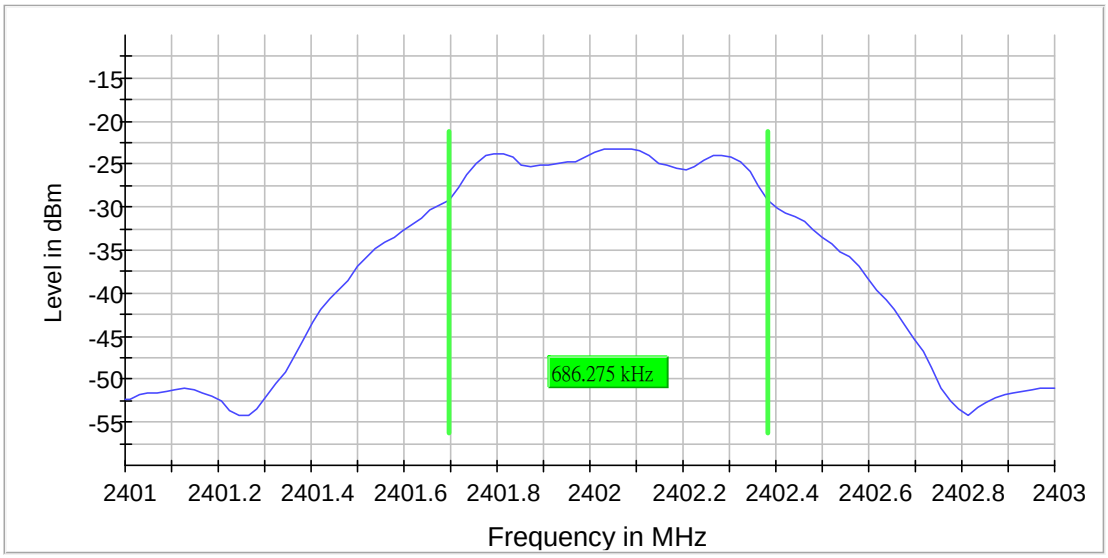
Report No. : AV0008484(2) Date : 24 May 2017

Minimum Emission Bandwidth 6 dB (2402 MHz)

Test according to FCC title 47 part 15 §15.247(a) and 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
2402.000000	0.686275	0.500000	---	2401.696078	2402.382353	-23.2	PASS



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 µs	AUTO
Reference Level	-30.000 dBm	-30.000 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
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	36 / max. 150	max. 150
Stable	15 / 15	15

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Band Edge low (2402 MHz)

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

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2402.073758	-30.2

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.925042	-78.1	28.0	-50.2	PASS
2399.875069	-79.3	29.2	-50.2	PASS
2399.825097	-80.5	30.3	-50.2	PASS
2399.775125	-80.9	30.8	-50.2	PASS
2399.575236	-81.0	30.9	-50.2	PASS
2399.625208	-81.1	30.9	-50.2	PASS
2399.725153	-81.2	31.1	-50.2	PASS
2399.475292	-81.2	31.1	-50.2	PASS
2398.825652	-81.3	31.1	-50.2	PASS
2399.525264	-81.3	31.2	-50.2	PASS
2399.125486	-81.5	31.3	-50.2	PASS
2399.325375	-81.5	31.3	-50.2	PASS
2399.675180	-81.6	31.4	-50.2	PASS
2398.775680	-81.6	31.5	-50.2	PASS
2398.975569	-81.6	31.5	-50.2	PASS

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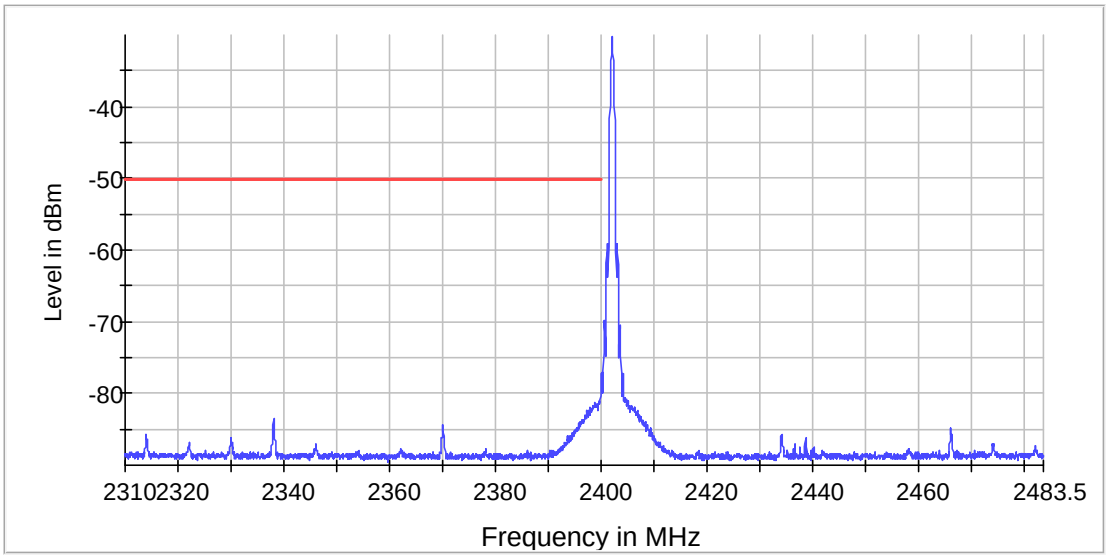
Report No. : AV0008484(2) Date : 24 May 2017



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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	-30.000 dBm	-30.000 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	1800	~ 1800
Sweeptime	1.800 s	1.800 s
Reference Level	-30.000 dBm	-30.000 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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Tx Spurious Emission (2402 MHz)

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2399.250268	-57.3	15.0	-42.3
4803.993109	-58.7	17.5	-41.2
4804.493054	-59.0	17.8	-41.2
4803.493165	-59.1	17.8	-41.2
4804.992999	-59.3	18.1	-41.2
4802.993220	-60.4	19.1	-41.2
19734.250984	-60.7	19.4	-41.2
16385.116555	-62.1	19.8	-42.3
19749.687520	-61.1	19.9	-41.2
19719.408162	-61.3	20.1	-41.2
19717.627023	-61.4	20.2	-41.2
20137.382039	-61.5	20.2	-41.2
19743.750391	-61.5	20.2	-41.2
19734.844697	-61.6	20.3	-41.2
16259.249422	-62.6	20.4	-42.3

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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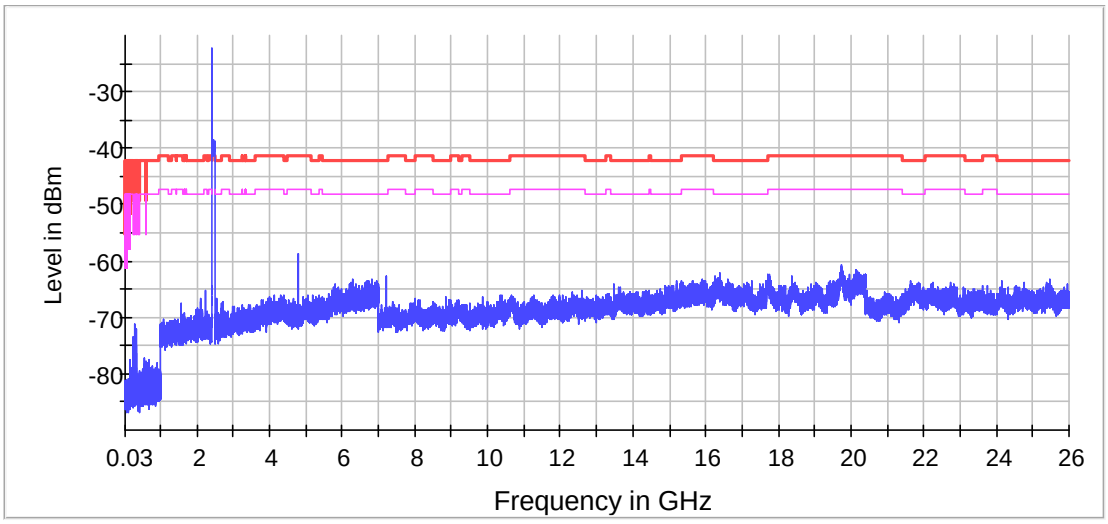

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Rx Spurious Emission (2402 MHz)

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19708.831114	-60.3	19.1	-41.2
19771.827799	-60.4	19.1	-41.2
19770.827851	-60.5	19.2	-41.2
19746.829114	-60.7	19.5	-41.2
20390.795221	-60.7	19.5	-41.2
19767.828009	-60.7	19.5	-41.2
19689.832114	-60.8	19.6	-41.2
19744.829220	-60.8	19.6	-41.2
19715.830746	-60.9	19.7	-41.2
19791.826746	-61.0	19.7	-41.2
19764.828167	-61.0	19.8	-41.2
19693.831904	-61.0	19.8	-41.2
19714.830798	-61.0	19.8	-41.2
20139.808431	-61.0	19.8	-41.2
19752.828798	-61.1	19.9	-41.2

Measurement Settings

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

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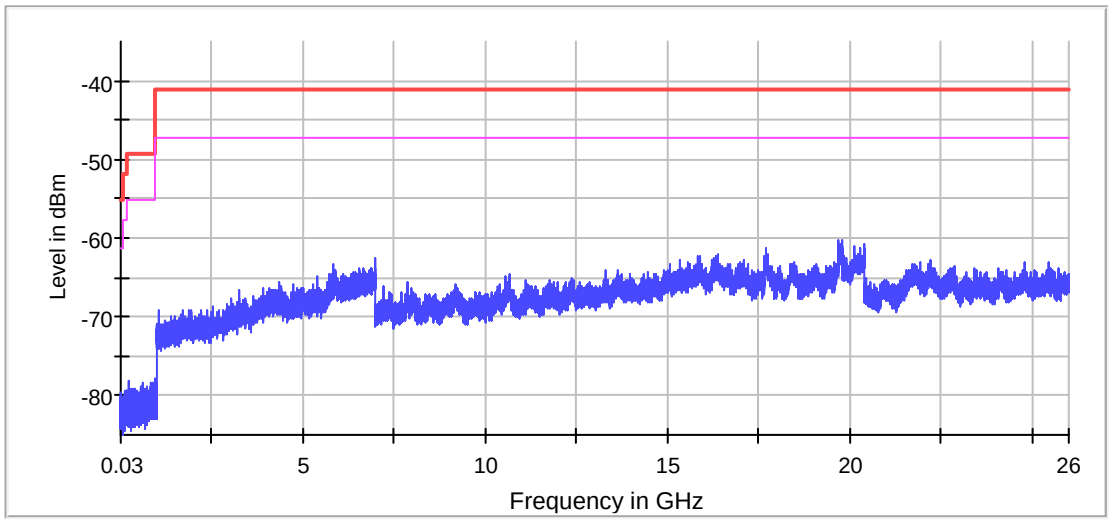
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017



Limit [limit.Result:1] Threshold [limit 2.Result:1]

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	9700	~ 9700
Sweeptime	9.700 ms	AUTO
Reference Level	-67.000 dBm	-67.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	6000	~ 6000
Sweeptime	6.000 ms	AUTO
Reference Level	-67.000 dBm	-67.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	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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TEST REPORT

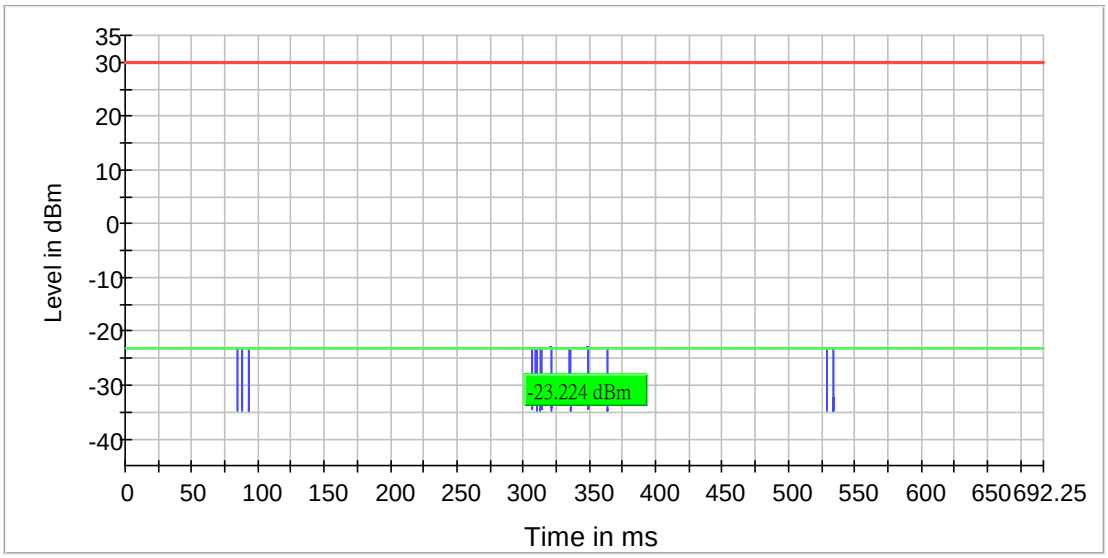
Report No. : AV0008484(2) Date : 24 May 2017

RF output power (2440 MHz)

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

Result

DUT Frequency (MHz)	Gated EIRP (dBm)	Limit Max (dBm)	DutyCycle (%)	Result
2440.000000	-23.2	30.0	69.290	PASS



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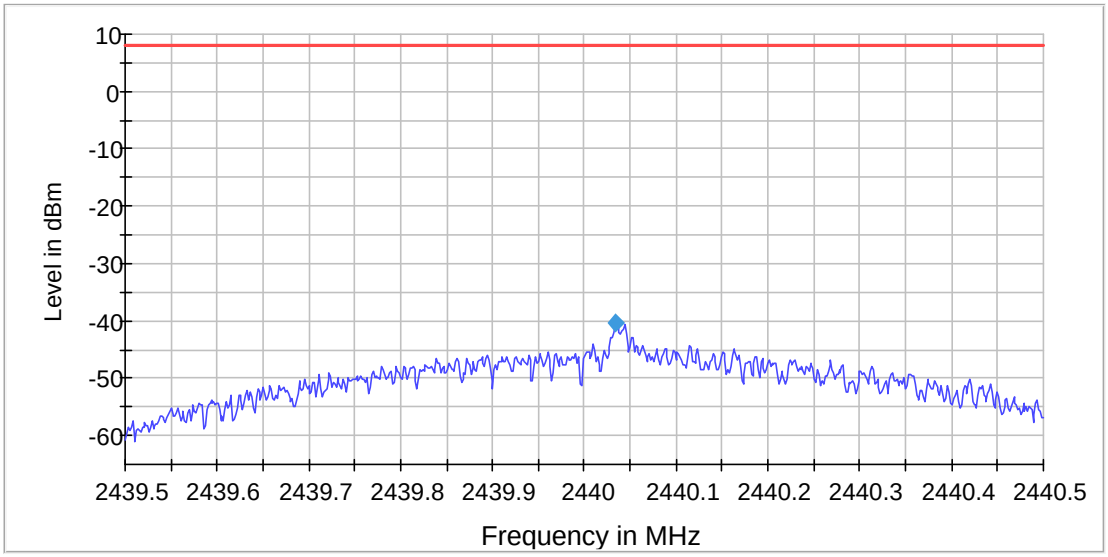
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Power Spectral Density (2440 MHz; 0.000 dBm; 1 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2440.033683	-40.384	8.0	PASS



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43950 GHz	2.43950 GHz
Stop Frequency	2.44050 GHz	2.44050 GHz
Span	1.000 MHz	1.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	667	~ 667
Sweeptime	667.000 ms	667.000 ms
Reference Level	-30.000 dBm	-30.000 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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TEST REPORT

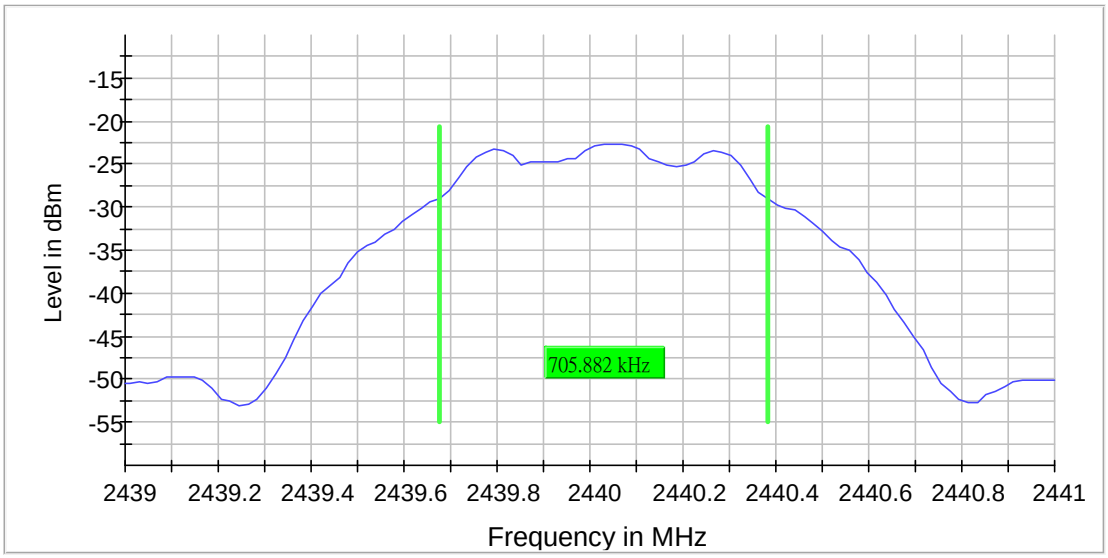
Report No. : AV0008484(2) Date : 24 May 2017

Minimum Emission Bandwidth 6 dB (2440 MHz)

Test according to FCC title 47 part 15 §15.247(a) and 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
2440.000000	0.705882	0.500000	---	2439.676471	2440.382353	-22.7	PASS



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 µs	AUTO
Reference Level	-30.000 dBm	-30.000 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
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	40 / max. 150	max. 150
Stable	15 / 15	15

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Tx Spurious Emission (2440 MHz)

Result

DUT Frequency (MHz)	Result
2440.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
835.233493	-60.2	17.9	-42.2
835.183496	-60.3	18.1	-42.2
19724.157865	-60.2	18.9	-41.2
19723.564152	-60.2	19.0	-41.2
835.383485	-61.3	19.1	-42.2
835.333488	-61.4	19.2	-42.2
19743.750391	-60.5	19.3	-41.2
19728.907568	-60.6	19.4	-41.2
835.283491	-61.7	19.4	-42.2
19709.908756	-60.9	19.7	-41.2
835.133498	-62.1	19.8	-42.2
19720.001875	-61.1	19.9	-41.2
835.433483	-62.1	19.9	-42.2
17719.189426	-61.1	19.9	-41.2
19745.531529	-61.2	20.0	-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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TEST REPORT

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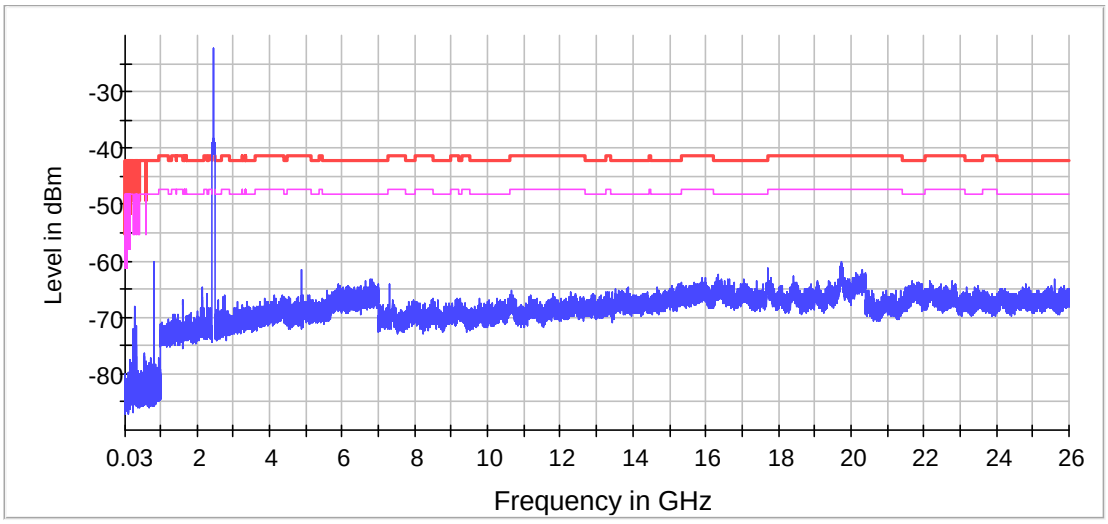

× Limit [limit.Result:1] × Sum Level [trace.Result:1]

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Rx Spurious Emission (2440 MHz)

Result

DUT Frequency (MHz)	Result
2440.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19703.831377	-60.4	19.1	-41.2
19744.829220	-60.5	19.3	-41.2
19781.827272	-60.6	19.3	-41.2
19735.829693	-60.7	19.5	-41.2
19727.830114	-60.7	19.5	-41.2
19732.829851	-60.7	19.5	-41.2
19765.828114	-60.8	19.5	-41.2
19731.829904	-60.8	19.6	-41.2
19773.827693	-60.9	19.6	-41.2
19766.828062	-61.1	19.8	-41.2
19716.830693	-61.1	19.9	-41.2
19743.829272	-61.1	19.9	-41.2
20238.803221	-61.2	20.0	-41.2
19737.829588	-61.2	20.0	-41.2
19729.830009	-61.2	20.0	-41.2

Measurement Settings

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

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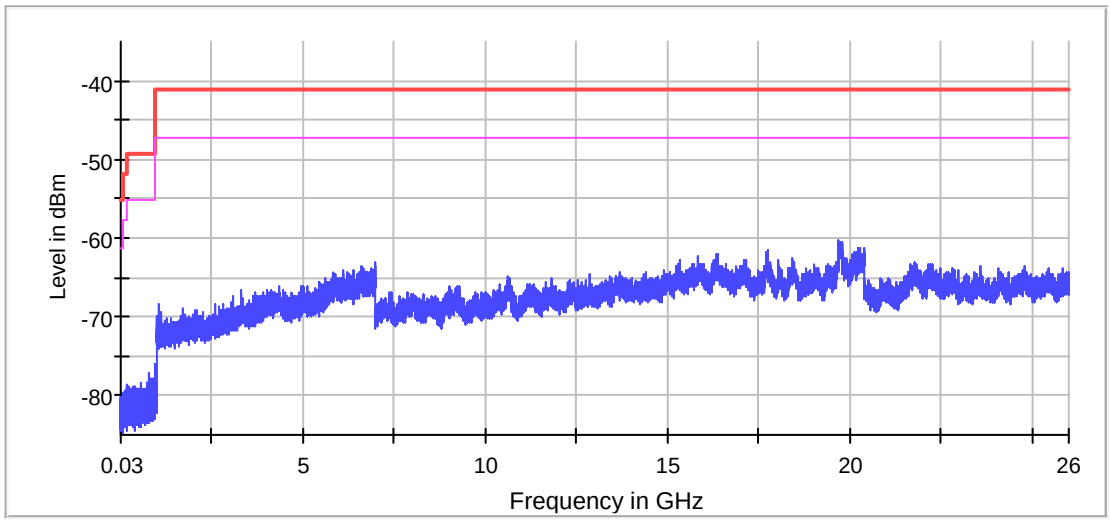

Limit [limit.Result:1] Threshold [limit 2.Result:1]

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	9700	~ 9700
Sweeptime	9.700 ms	AUTO
Reference Level	-67.000 dBm	-67.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	6000	~ 6000
Sweeptime	6.000 ms	AUTO
Reference Level	-67.000 dBm	-67.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	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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TEST REPORT

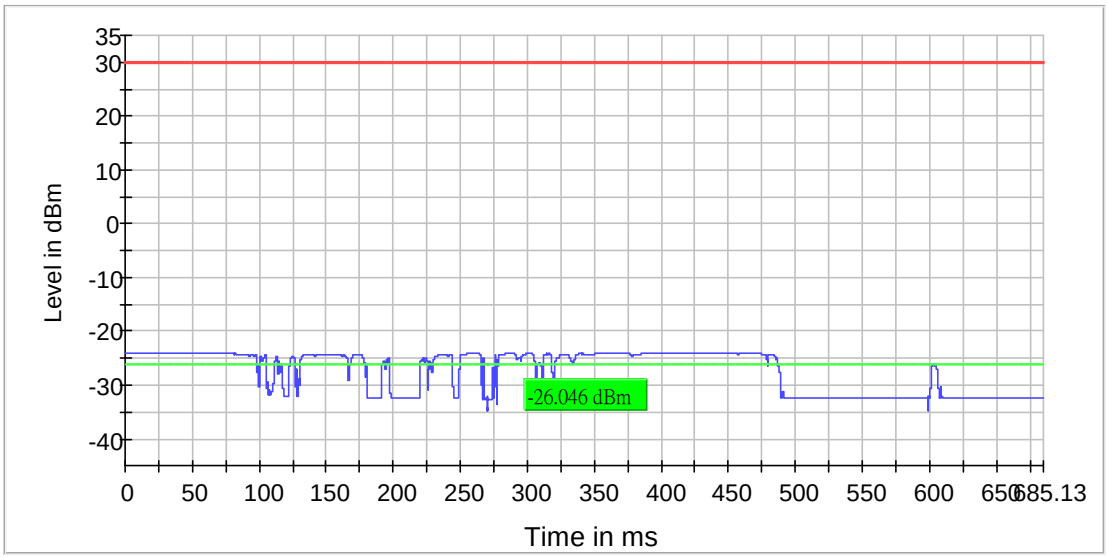
Report No. : AV0008484(2) Date : 24 May 2017

RF output power (2480 MHz; 0.000 dBm; 1 MHz)

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

Result

DUT Frequency (MHz)	Gated EIRP (dBm)	Limit Max (dBm)	DutyCycle (%)	Result
2480.000000	-26.0	30.0	68.577	PASS



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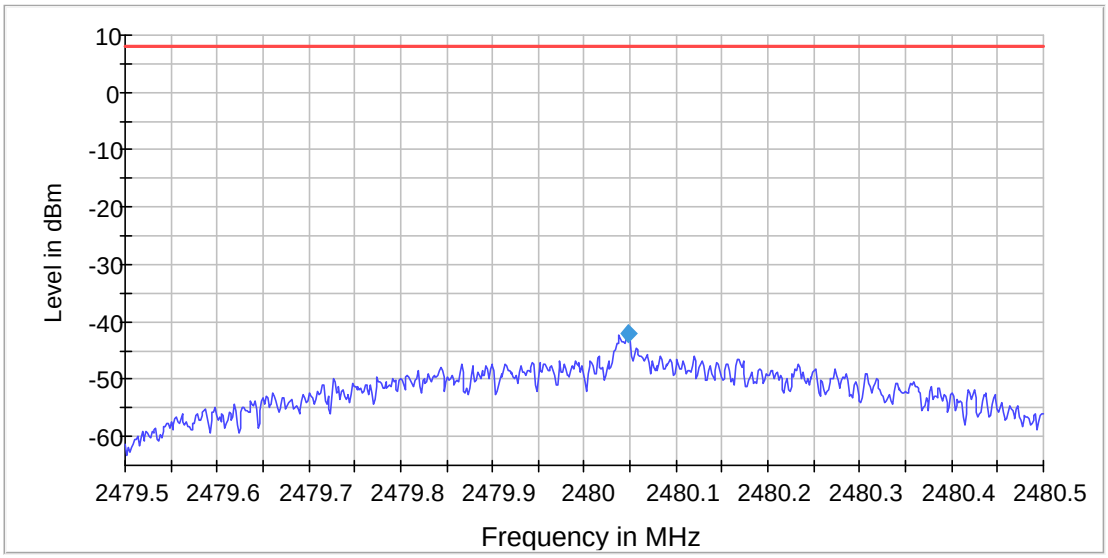
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Power Spectral Density (2480 MHz; 0.000 dBm; 1 MHz)

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2480.048653	-41.991	8.0	PASS



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47950 GHz	2.47950 GHz
Stop Frequency	2.48050 GHz	2.48050 GHz
Span	1.000 MHz	1.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	667	~ 667
Sweeptime	667.000 ms	667.000 ms
Reference Level	-30.000 dBm	-30.000 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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TEST REPORT

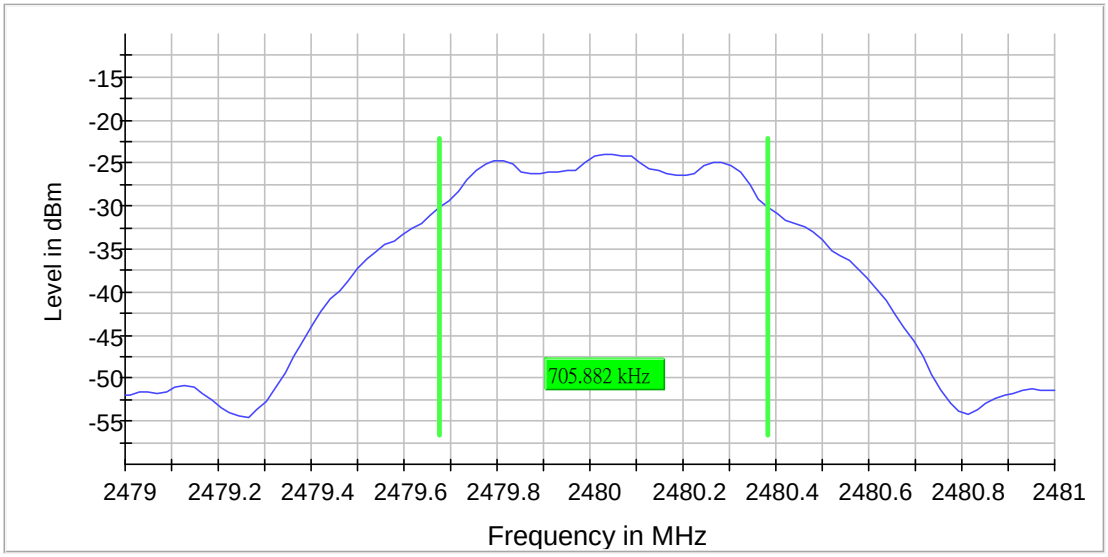
Report No. : AV0008484(2) Date : 24 May 2017

Minimum Emission Bandwidth 6 dB (2480 MHz)

Test according to FCC title 47 part 15 §15.247(a) and 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
2480.000000	0.705882	0.500000	---	2479.676471	2480.382353	-24.0	PASS



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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 µs	AUTO
Reference Level	-30.000 dBm	-30.000 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
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30	0.30
Run	30 / max. 150	max. 150
Stable	15 / 15	15

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Band Edge high (2480 MHz)

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

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2479.977110	-31.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.824018	-82.1	31.1	-51.0	PASS
2483.774169	-82.3	31.3	-51.0	PASS
2483.724320	-82.3	31.3	-51.0	PASS
2483.923716	-82.3	31.3	-51.0	PASS
2483.624622	-82.4	31.4	-51.0	PASS
2484.372356	-82.5	31.5	-51.0	PASS
2483.524924	-82.5	31.5	-51.0	PASS
2483.674471	-82.5	31.5	-51.0	PASS
2484.023414	-82.6	31.6	-51.0	PASS
2483.574773	-82.6	31.6	-51.0	PASS
2483.973565	-82.6	31.6	-51.0	PASS
2484.322508	-82.7	31.7	-51.0	PASS
2483.873867	-82.8	31.8	-51.0	PASS
2484.123112	-82.9	31.9	-51.0	PASS
2484.422205	-83.1	32.1	-51.0	PASS

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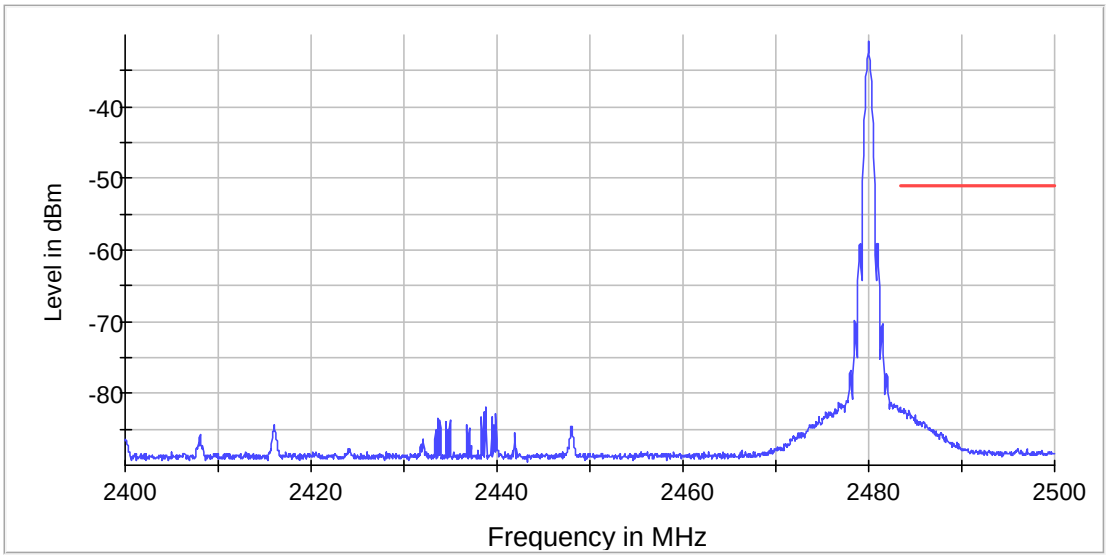

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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	-30.000 dBm	-30.000 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	-30.000 dBm	-30.000 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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Tx Spurious Emission (2480 MHz)

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
17698.409474	-62.9	10.5	-52.4
16397.584526	-62.9	10.6	-52.4
6954.255064	-63.0	10.6	-52.4
16420.145616	-63.1	10.7	-52.4
6905.260488	-63.1	10.7	-52.4
17669.911256	-63.1	10.7	-52.4
6905.760433	-63.1	10.8	-52.4
5933.368082	-63.1	10.8	-52.4
16331.088682	-63.2	10.9	-52.4
17697.222049	-63.2	10.9	-52.4
17682.972939	-63.2	10.9	-52.4
5932.868137	-63.3	10.9	-52.4
17677.629523	-63.3	11.0	-52.4
16315.652147	-63.3	11.0	-52.4
16263.405412	-63.4	11.0	-52.4

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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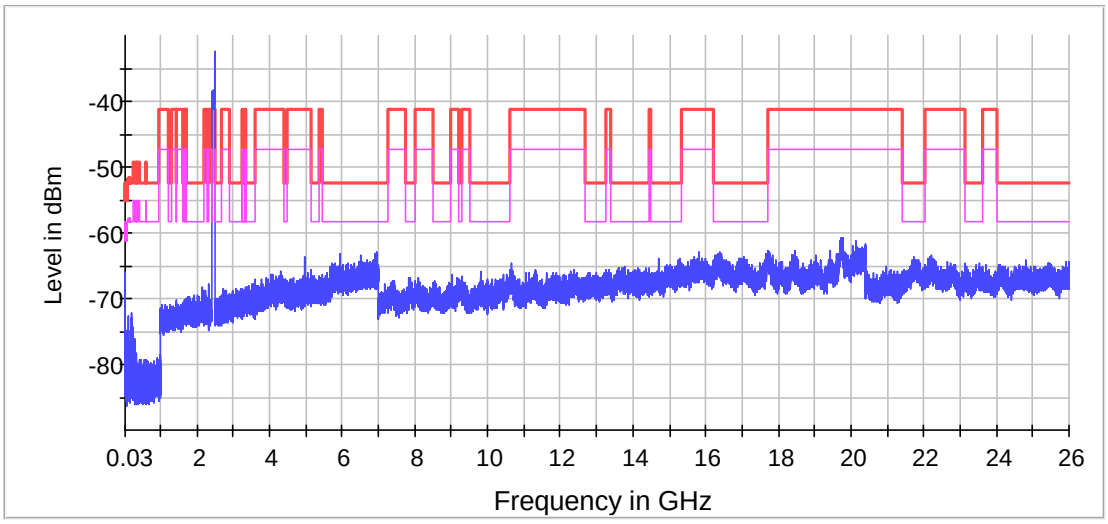
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017



× Limit [limit.Result:1] × Sum Level [trace.Result:1]

FCC ID: 2AK7GAD12946

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Rx Spurious Emission (2480 MHz)

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Final measurements

Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19701.831483	-59.8	18.6	-41.2
19740.829430	-60.2	19.0	-41.2
19744.829220	-60.6	19.3	-41.2
19710.831009	-60.7	19.5	-41.2
19729.830009	-60.8	19.6	-41.2
19747.829062	-60.9	19.7	-41.2
19759.828430	-61.0	19.8	-41.2
19745.829167	-61.1	19.9	-41.2
19709.831062	-61.1	19.9	-41.2
20278.801116	-61.1	19.9	-41.2
19713.830851	-61.2	19.9	-41.2
19738.829535	-61.2	20.0	-41.2
19717.830640	-61.2	20.0	-41.2
19762.828272	-61.2	20.0	-41.2
19694.831851	-61.2	20.0	-41.2

Measurement Settings

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

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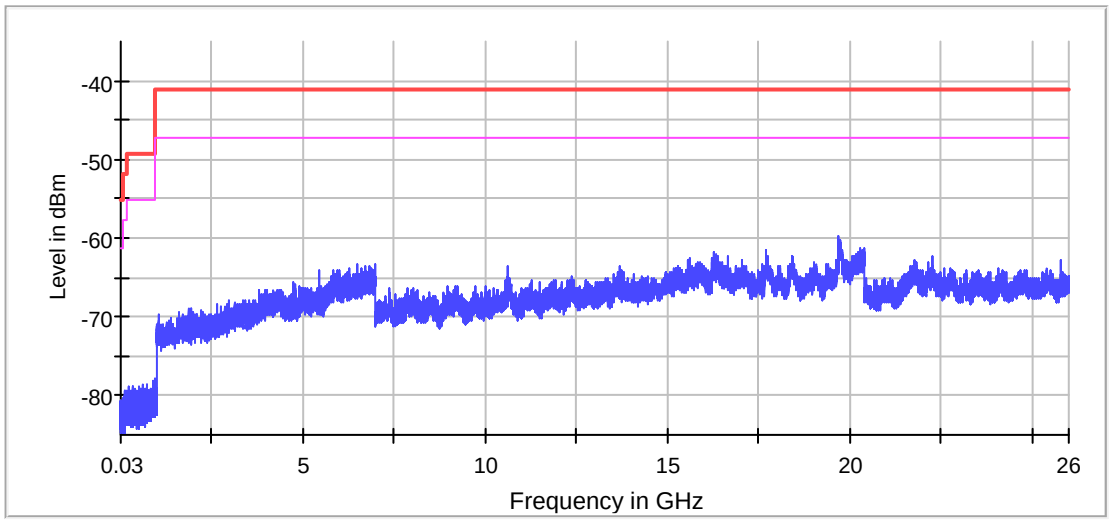
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017



Limit [limit.Result:1] Threshold [limit 2.Result:1]

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	9700	~ 9700
Sweeptime	9.700 ms	AUTO
Reference Level	-67.000 dBm	-67.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

Pre Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	6000	~ 6000
Sweeptime	6.000 ms	AUTO
Reference Level	-67.000 dBm	-67.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

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
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)

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)
-	-	-	-	-	-	-	-

Remark:
No specified superious emissions were found.
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.

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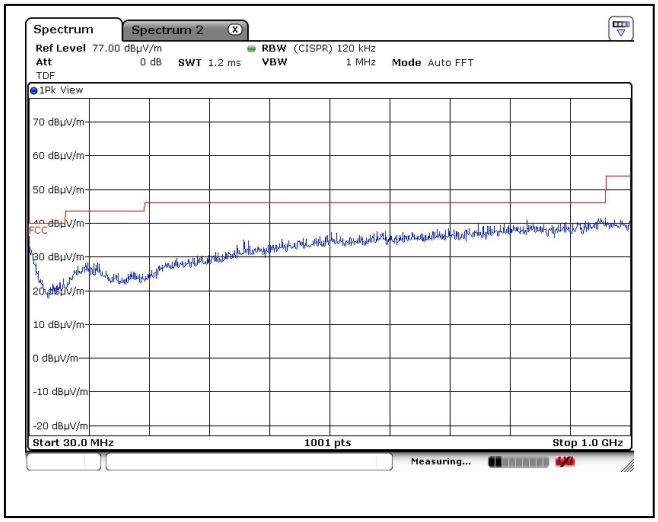
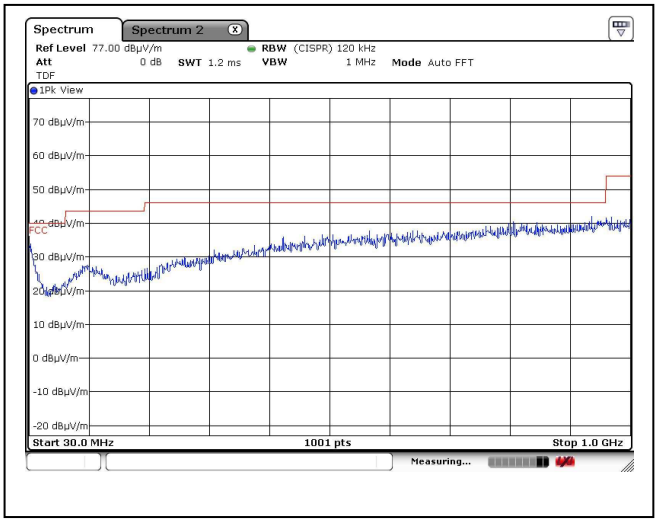
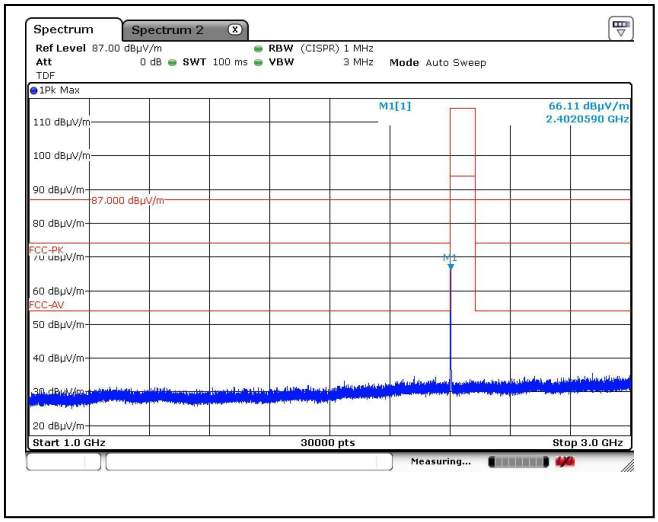
2.3 Radiated Emission Measurement Data (cont'd)



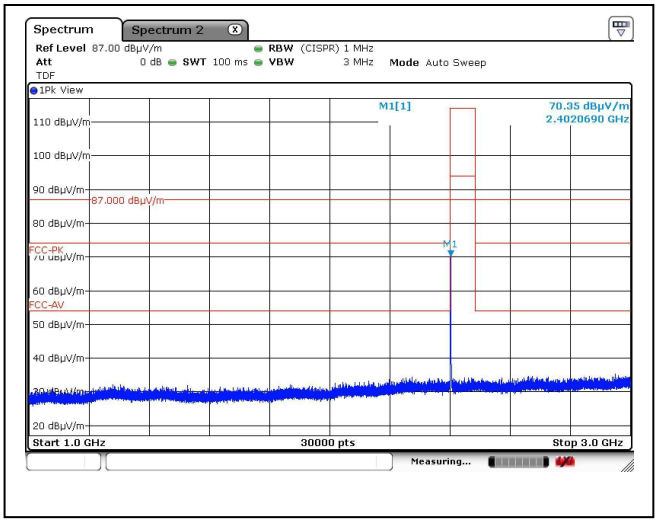
Lower channel, 30MHz – 1GHz, Horizontal



Lower channel, 30MHz – 1GHz, Vertical



Lower channel, 1GHz – 3GHz, Horizontal



Lower channel, 1GHz – 3GHz, Vertical

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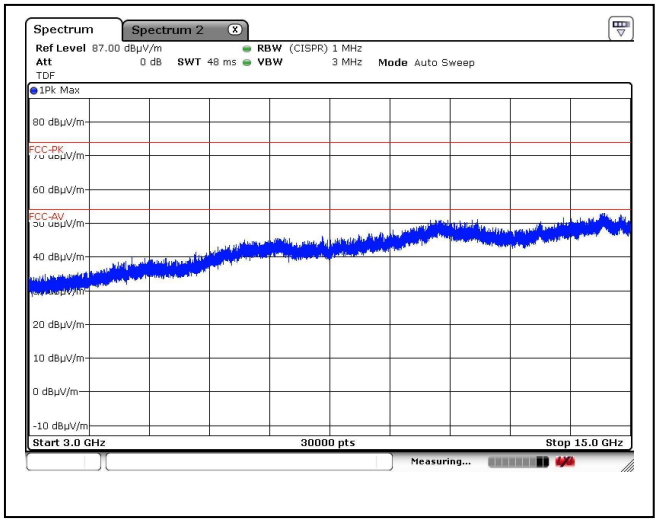
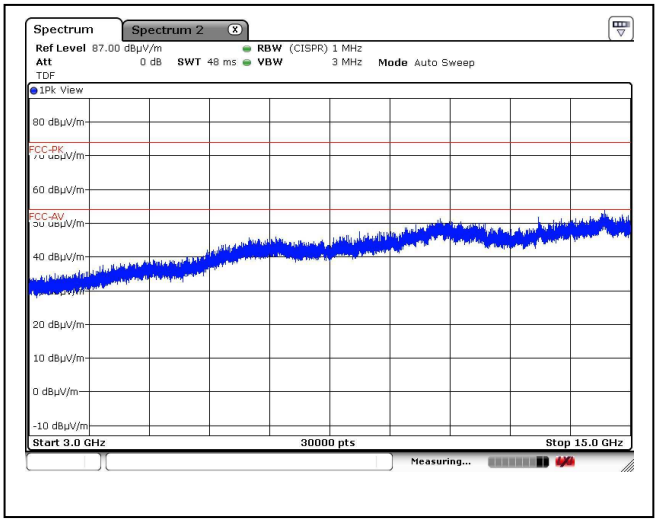
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

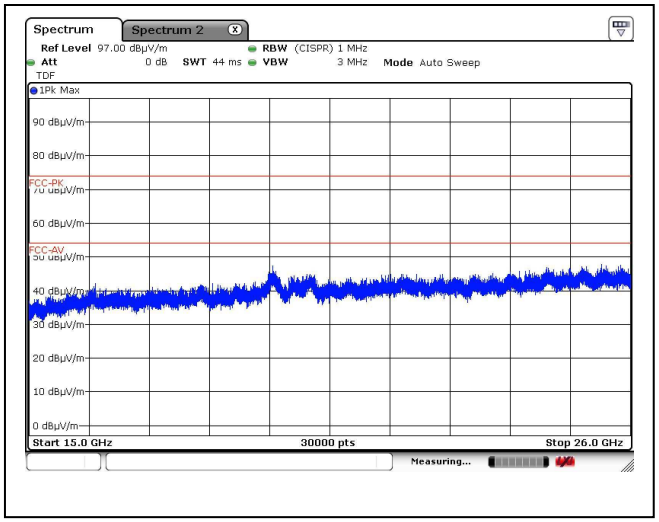
2.3 Radiated Emission Measurement Data (cont'd)



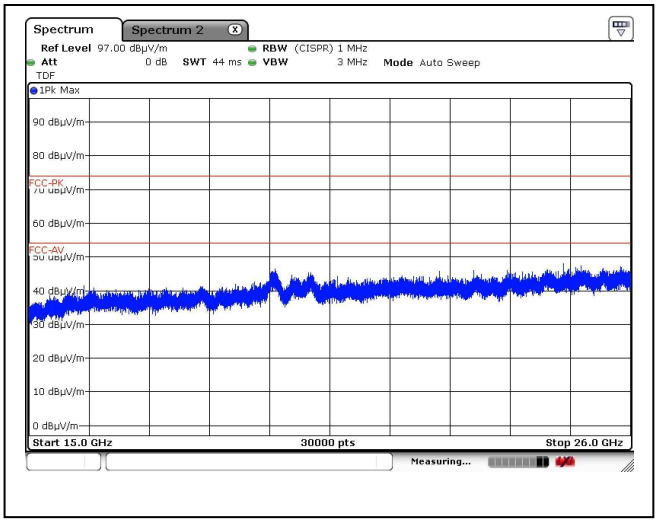
Lower channel, 3GHz – 15GHz, Horizontal



Lower channel, 3GHz – 15GHz, Vertical



Lower channel, 15GHz – 26GHz, Horizontal



Lower channel, 15GHz – 26GHz, Vertical

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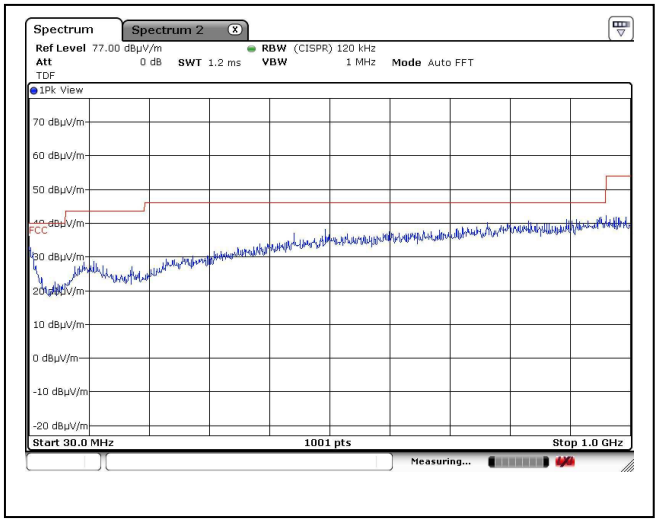
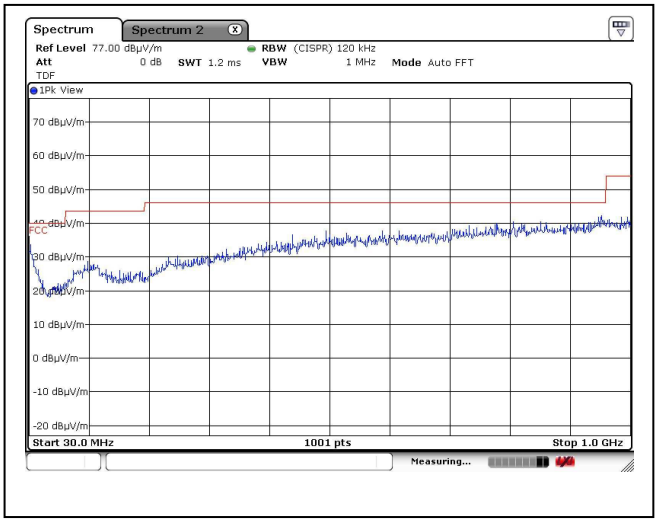
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

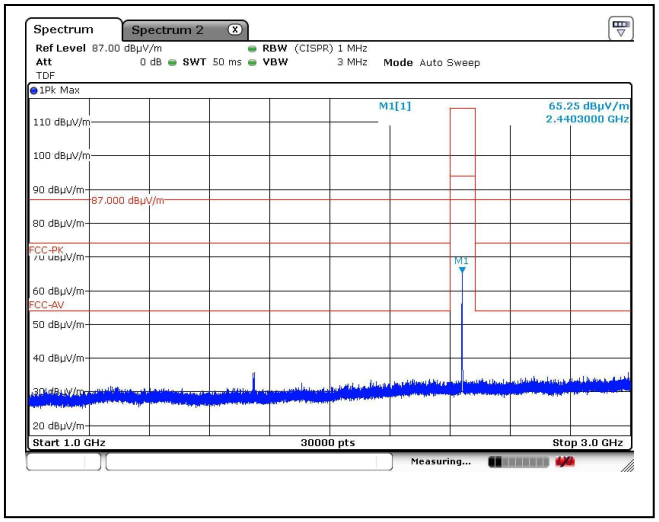
2.3 Radiated Emission Measurement Data (cont'd)



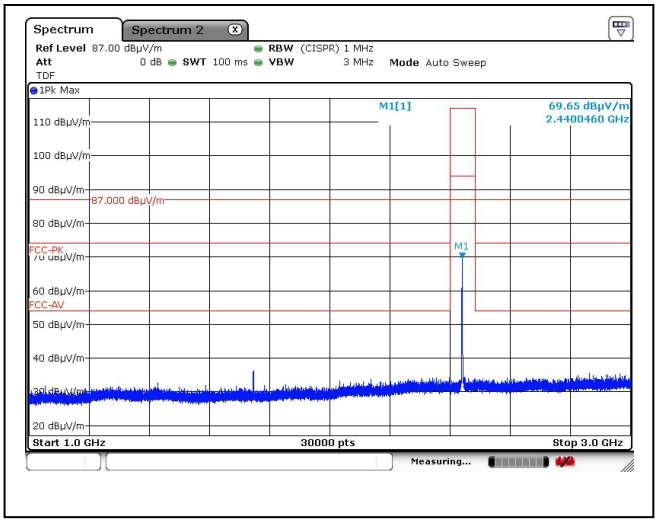
Middle channel, 30MHz – 1GHz, Horizontal



Middle channel, 30MHz – 1GHz, Vertical



Middle channel, 1GHz – 3GHz, Horizontal



Middle channel, 1GHz – 3GHz, Vertical

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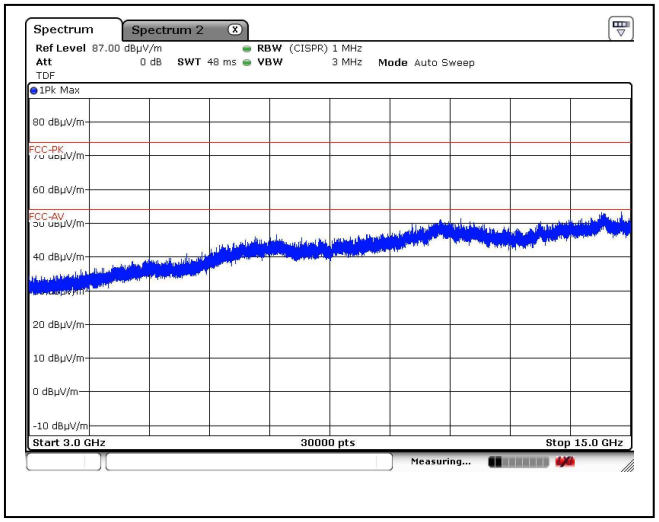
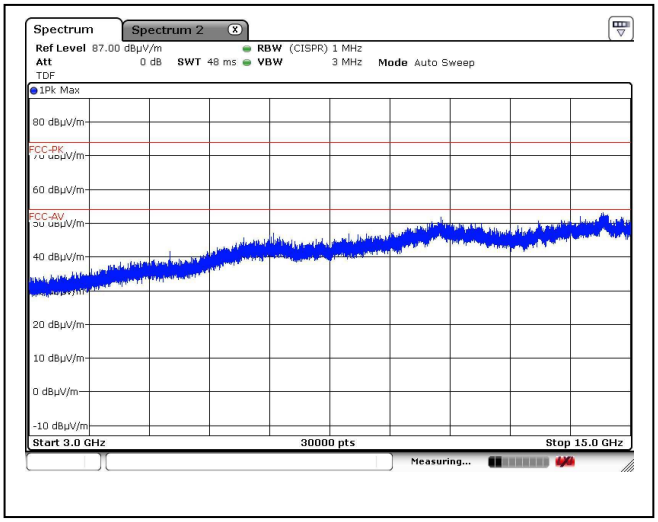
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

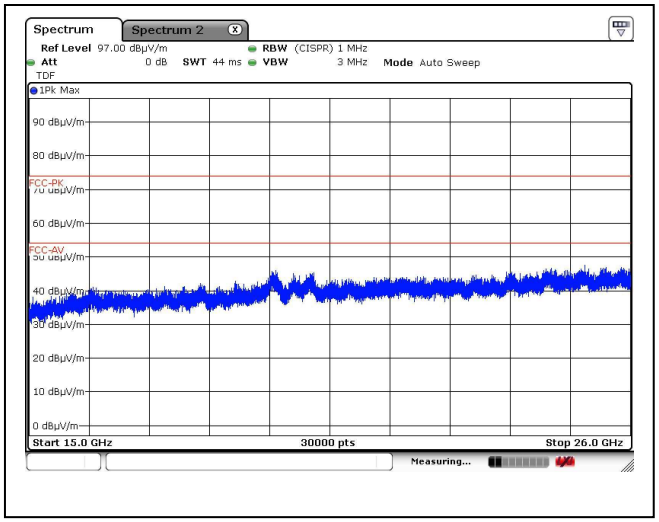
2.3 Radiated Emission Measurement Data (cont'd)



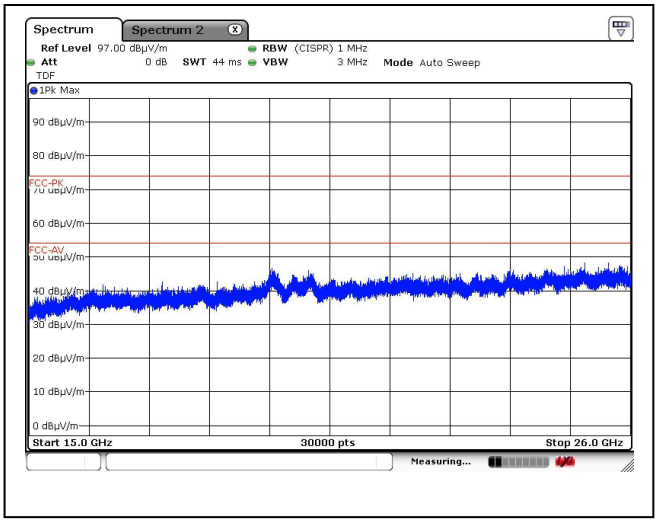
Middle channel, 3GHz – 15GHz, Horizontal



Middle channel, 3GHz – 15GHz, Vertical



Middle channel, 15GHz – 26GHz, Horizontal



Middle channel, 15GHz – 26GHz, Vertical

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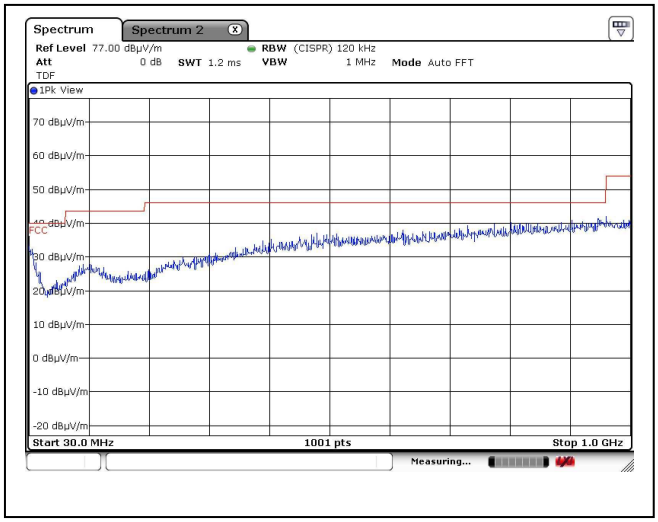
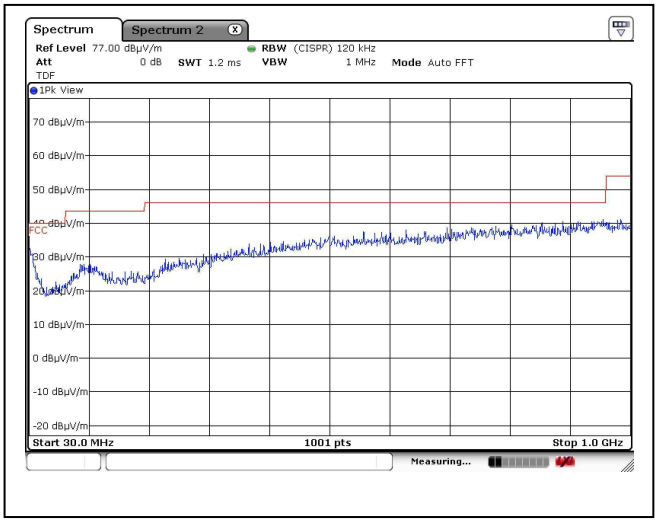
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

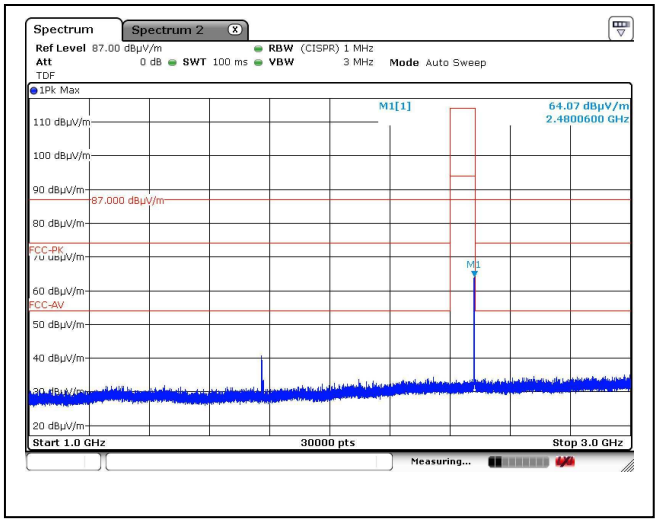
2.3 Radiated Emission Measurement Data (cont'd)



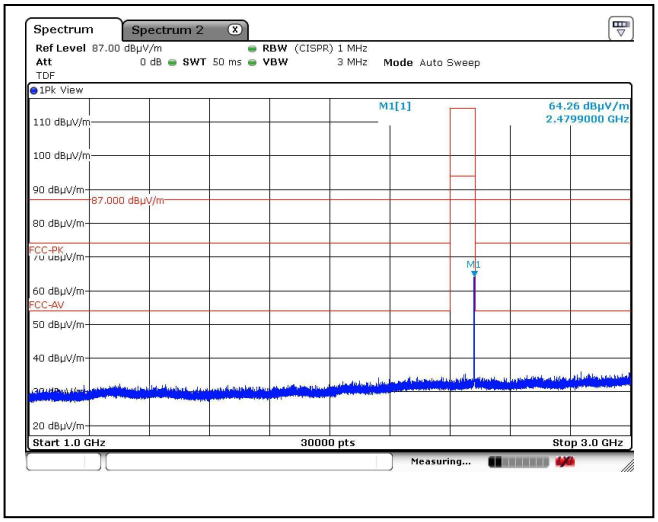
Higher channel, 30MHz – 1GHz, Horizontal



Higher channel, 30MHz – 1GHz, Vertical



Higher channel, 1GHz – 3GHz, Horizontal



Higher channel, 1GHz – 3GHz, Vertical

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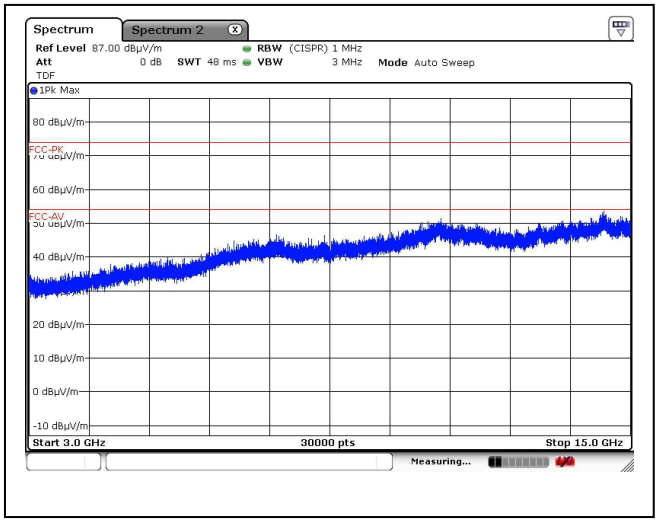
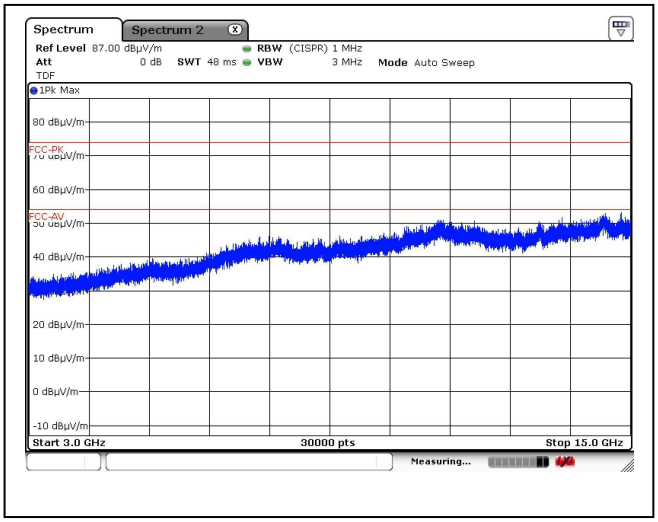
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

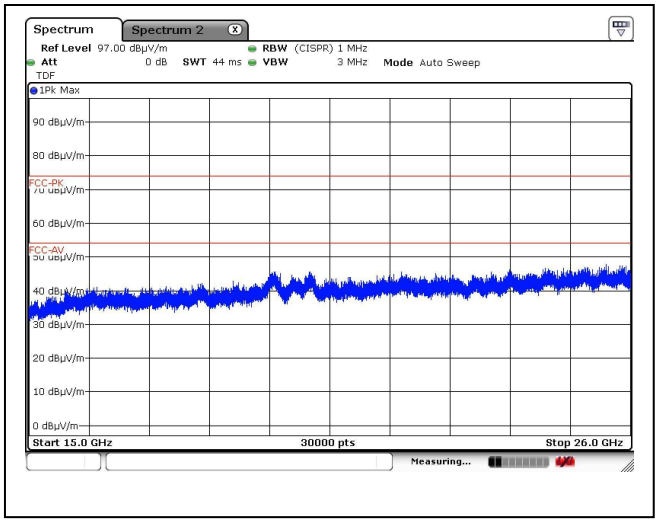
2.3 Radiated Emission Measurement Data (cont'd)



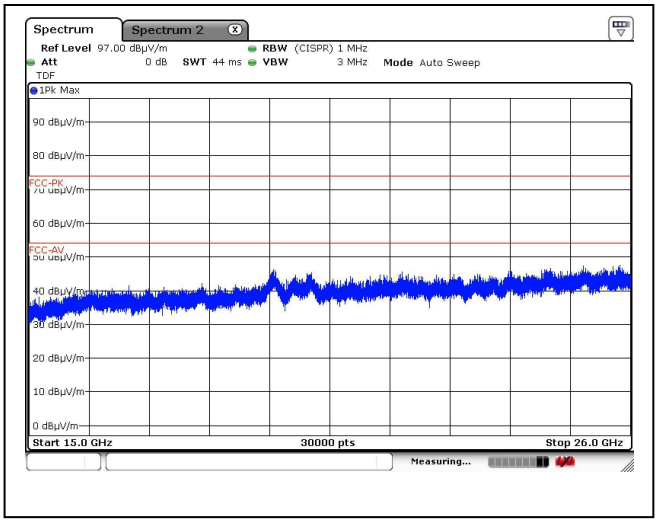
Higher channel, 3GHz – 15GHz, Horizontal



Higher channel, 3GHz – 15GHz, Vertical



Higher channel, 15GHz – 26GHz, Horizontal



Higher channel, 15GHz – 26GHz, Vertical

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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

2.3 Radiated Emission Measurement Data (cont'd)

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	22	° 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 emissions were found.

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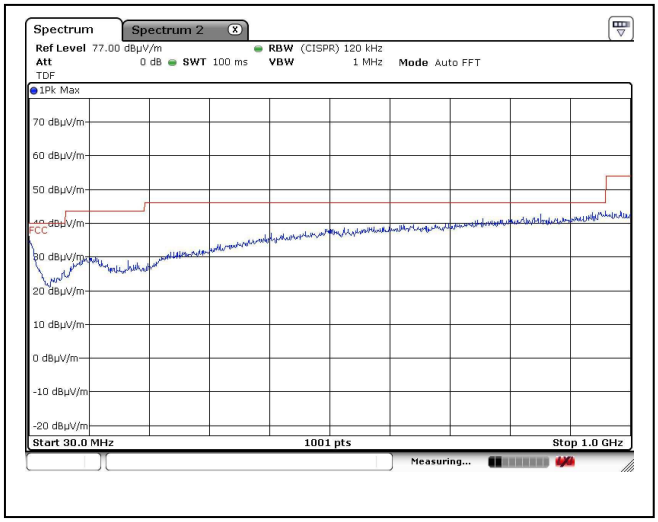
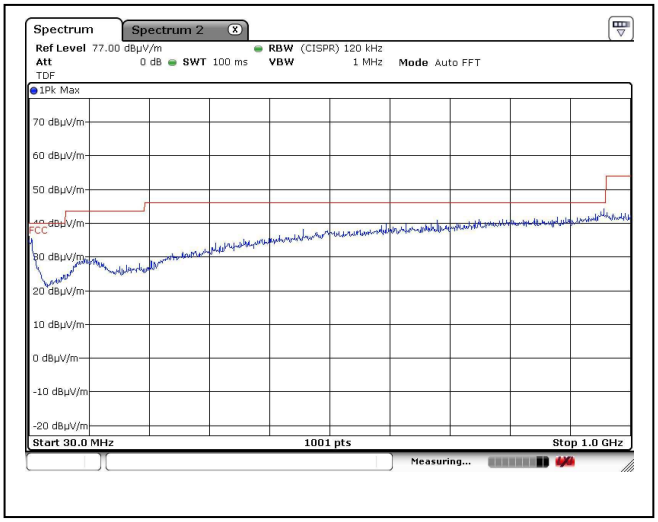
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

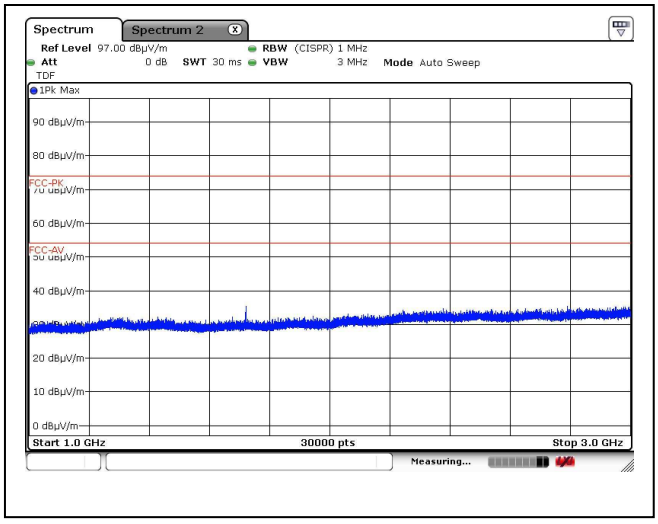
2.3 Radiated Emission Measurement Data (cont'd)



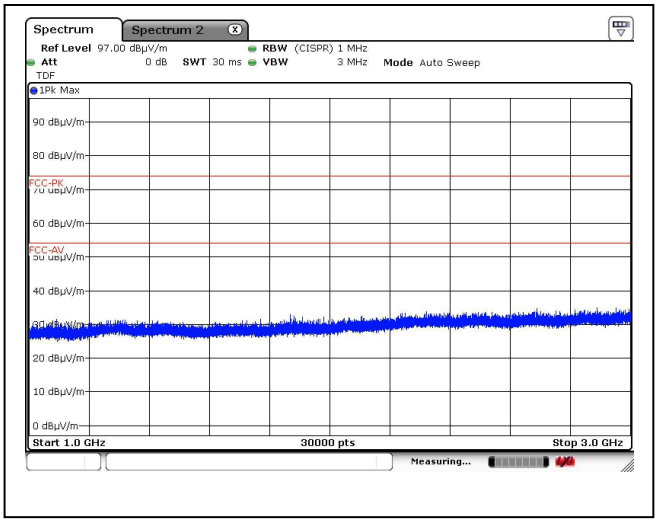
Receiving mode, 30MHz – 1GHz, Horizontal



Receiving mode, 30MHz – 1GHz, Vertical



Receiving mode, 1GHz – 3GHz, Horizontal



Receiving mode, 1GHz – 3GHz, Vertical

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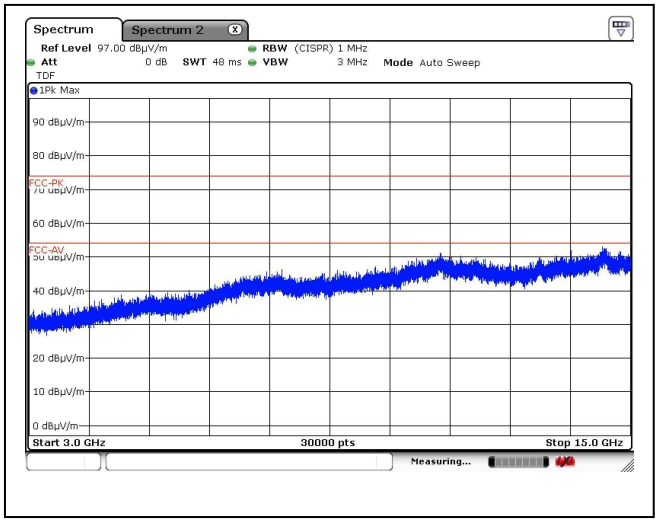
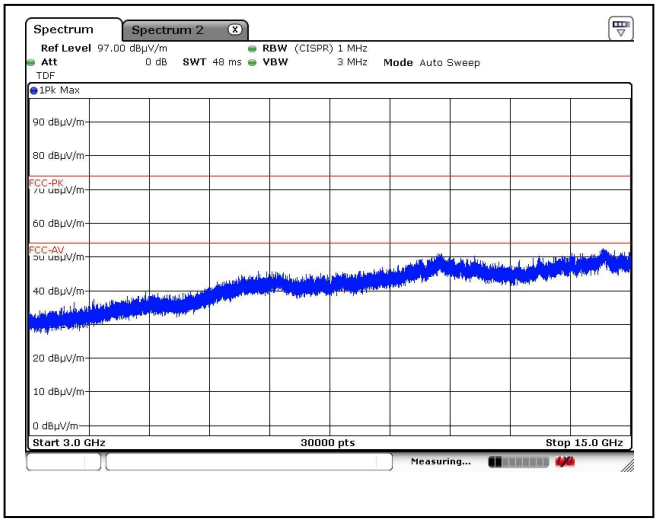
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

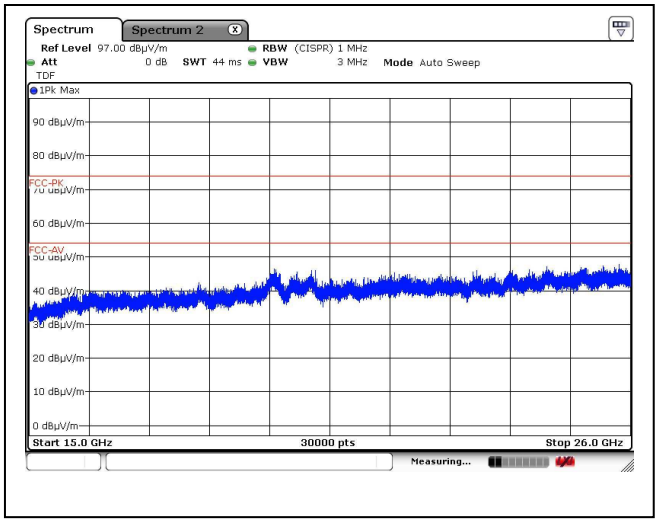
2.3 Radiated Emission Measurement Data (cont'd)



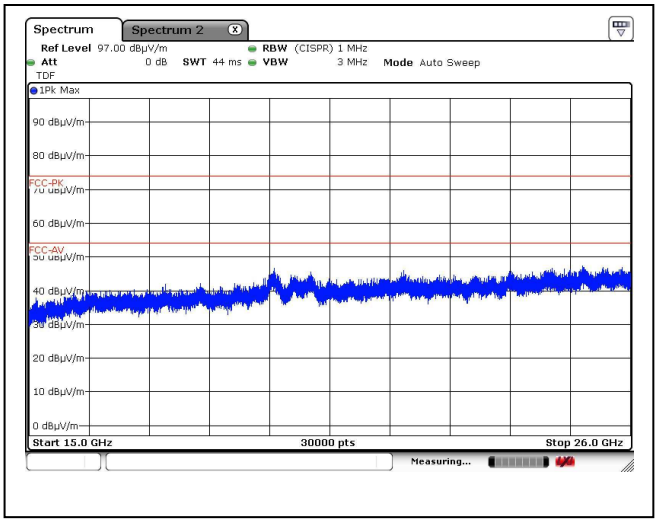
Receiving mode, 3GHz – 15GHz, Horizontal



Receiving mode, 3GHz – 15GHz, Vertical



Receiving mode, 15GHz – 26GHz, Horizontal



Receiving mode, 15GHz – 26GHz, Vertical

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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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

4 Photograph

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

For electronic filing, the photos are saved with filename 2AK7GAD12946_TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename 2AK7GAD12946_ExtPho.pdf and 2AK7GAD12946_IntPho.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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TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

5 Appendices

A1 Photos of External Configurations

A2 Antenna Requirement

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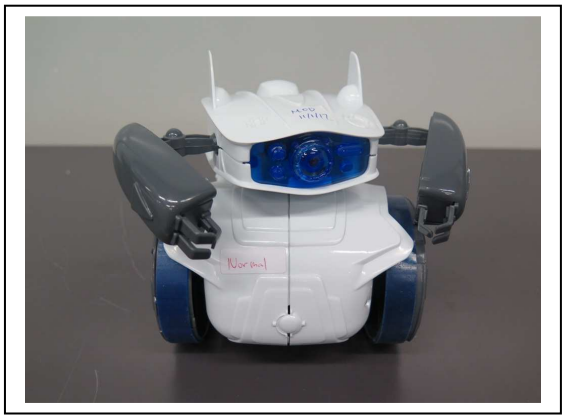
TEST REPORT

Report No. : AV0008484(2) Date : 24 May 2017

A1 Photos of External Configurations



Tested by: Stanley
Mr. Yau Kwok Pun, Stanley

Reviewed by:
Mr. WONG Lap-pong, Andrew

FCC ID: 2AK7GAD12946

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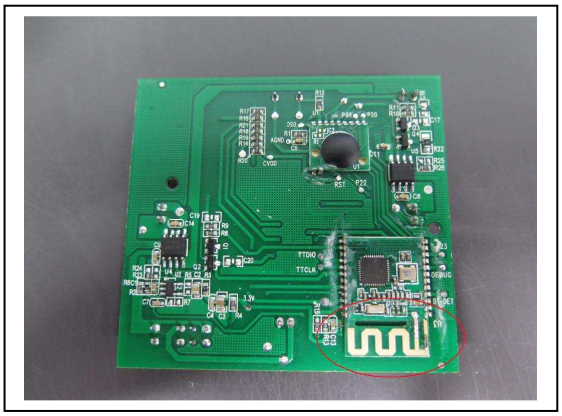
A2 Anteanna Requirement



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

Tested by: Mr. Yau Kwok Pun, Stanley

Reviewed by: Mr. WONG Lap-pong, Andrew

FCC ID: 2AK7GAD12946

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