RF TEST REPORT

Report No.:	SET2014-01529
Product Name:	DJI LIGHTBRIDGE
FCC ID:	SS3-201402241
Model No. :	DJI Lightbridge (ground)
Applicant:	SZ DJI TECHNOLOGY CO.,LTD.
Address:	Room 613、614, 6/F, HKUST SZ IER Bldg, No.9 Yuexing 1st Rd Hi-Tech Park(South), Nanshan District, Shenzhen, Guangdong, China
Issued by:	CCIC-SET
Lab Location:	Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055, P. R. China
	Tel: 86 755 26627338 **Fax:** 86 755 26627238

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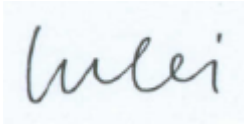
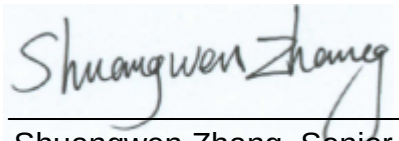
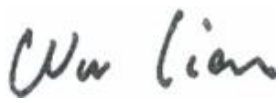
Test Report

Product Name.....:	DJI LIGHTBRIDGE
Brand Name.....:	DJI
Trade Name.....:	DJI
Applicant.....:	SZ DJI TECHNOLOGY CO.,LTD.
Applicant Address.....:	Room 613、614, 6/F, HKUST SZ IER Bldg, No.9 Yuexing 1st Rd Hi-Tech Park(South), Nanshan District, Shenzhen, Guangdong, China
Manufacturer.....:	SZ DJI TECHNOLOGY CO.,LTD.
Manufacturer Address .....:	Room 613、614, 6/F, HKUST SZ IER Bldg, No.9 Yuexing 1st Rd Hi-Tech Park(South), Nanshan District, Shenzhen, Guangdong, China
Test Standards.....:	47 CFR Part 15 Subpart C：Radio Frequency Devices ANSI C63.10:2009：American National Standard for Testing Unlicensed Wireless Devices DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
Test Result.....:	PASS
Tested by .....:	 2014.03.01 Lu Lei，Test Engineer
Reviewed by .....:	 2014.03.01 Shuangwen Zhang, Senior Egineer
Approved by .....:	 2014.03.01 Wu Li'an，Manager

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Change History		
Issue	Date	Reason for change
1.0	Mar 01, 2014	First edition

1. General Information

1.1. EUT Description

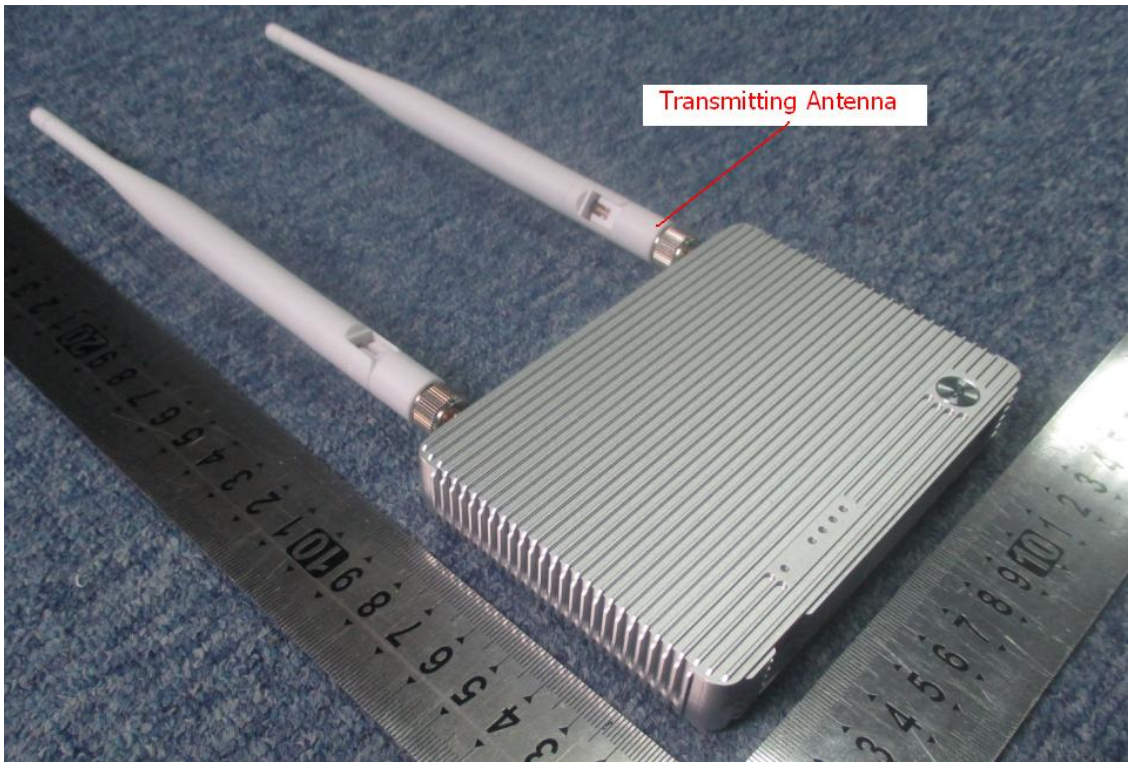
EUT Type ..... :	DJI LIGHTBRIDGE
Serial No. ..... :	(n.a, marked #1 by test site)
Hardware Version ..... :	IG800 GSP V1
Software Version ..... :	IG800_GS_LPC1765_V01.00.01.41_U27_20140211
Modulation Type ..... :	GFSK
Frequency Range ..... :	The frequency range used is 2405.376MHz – 2477.056MHz (36 channel,at interval of 2.048MHz) The frequency block is 2400MHz to 2483.5MHz
Antenna Type ..... :	SMA Antenna
Antenna Gain ..... :	4.68 dBi

Note 1: The EUT is a LIGHTBRIDGE, it contains operating at 2.4GHz ISM band; the frequencies allocated is F(MHz)=2405.376+2.048*(n-1) (1<=n<=36). The lowest, middle, highest channel numbers of the DJI LIGHTBRIDGE used and tested in this report are separately 1 (2405.376MHz), 19 (2442.240MHz) and 36(2477.056MHz).

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 3: The EUT had two different adapter, both of them had been test in this report

Note 4: When the ground unit is receiving signals, both the antennas stop transmitting signals and start receiving signals. When the ground unit is transmitting signals, the antennas stop receiving signals and one of the antennas starts transmitting signals.



1.2. Support Equipment

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.
1	Mobile Phone	SAMSUNG	SM-N900	SAMSUNG	H5914A03
2	Digital camera	SONY	NEX-5N	SONY	H3949C55

1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2012	Radio Frequency Devices
2	ANSI C63.10 2009	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.203	Antenna Requirement	PASS
2	15.247(a)	Number of Hopping Frequency	PASS
3	15.247(b)	Peak Output Power	PASS
4	15.247(a)	20dB Bandwidth	PASS
5	15.247(a)	Carrier Frequency Separation	PASS
6	15.247(a)	Time of Occupancy (Dwell time)	PASS
7	15.247(d)	Conducted Spurious Emission	PASS
8	15.247(d)	Band Edge	PASS
9	15.207	Conducted Emission	PASS
10	15.209 15.247(c)	Radiated Emission	PASS

Note 1: The tests were performed according to the method of measurements prescribed in DA-00-705.

Note 2: The test of Radiated Emission was performed according to the method of measurements prescribed in ANSI C63.10 2009.

1.4. Facilities and Accreditations

1.4.1. Facilities

CNAS-Lab Code: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 406086, Renewal date Nov. 19, 2011, valid time is until Nov. 18, 2014.

IC-Registration No.: 11185A

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on July. 15, 2013, valid time is until July. 15, 2016.

1.4.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (℃):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2.1.2. Antenna Information

Antenna Category: External antenna
EUT has two external antennas via standard connector, which can be removed.
Antenna General Information:

No.	EUT Model	Ant. Cat.	Ant. Type	Gain(dBi)
1	DJI LIGHTBRIDGE	External	SMA	4.68

2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

Note：Ensure to use the special antennas and install them by a professional trained. Any other types of antennas are forbidden.

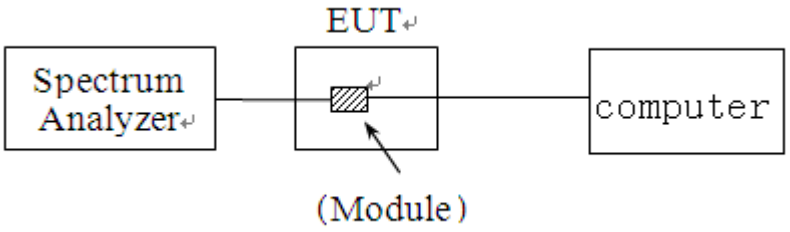
2.2. Number of Hopping Frequency

2.2.1. Requirement

According to FCC §15.247(a)(1)(iii), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

2.2.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT, which is powered by the Battery, is connected to the Spectrum Analyzer (SA), the path loss as the factor is calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE of the EUT is activated.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.06.10

2.2.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

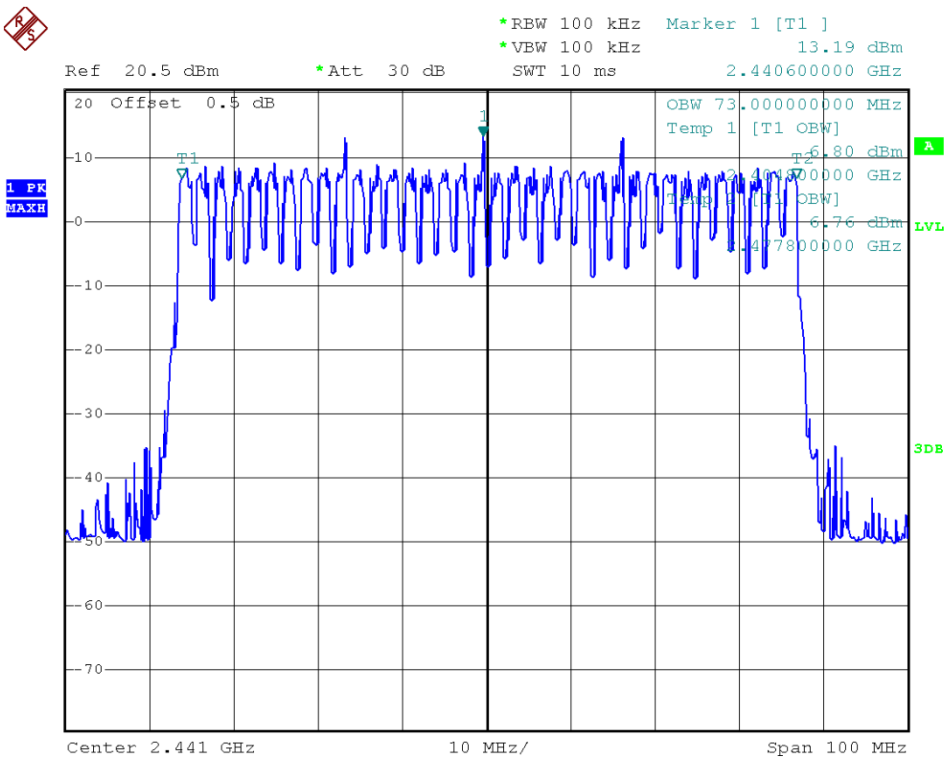
2.2.4. Test Result

The DJI LIGHTBRIDGE operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

A. Test Verdict:

Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
2400 - 2483.5	36	15	Plot A	PASS

B. Test Plots:



Plot A

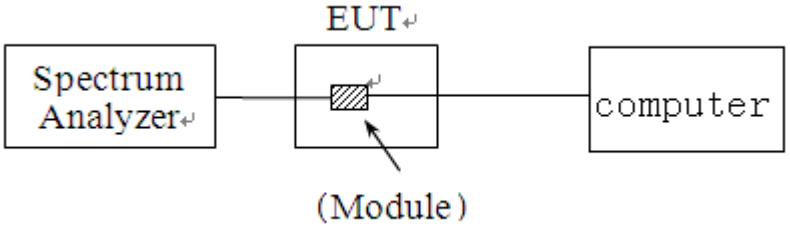
2.3. Peak Output Power

2.3.1. Requirement

According to FCC §15.247(b)(1), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

2.3.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT, which is powered by the Battery, is connected to the Spectrum Analyzer (SA), the path loss as the factor is calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE of the EUT is activated and controlled .

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.06.10

2.3.3. Test Result

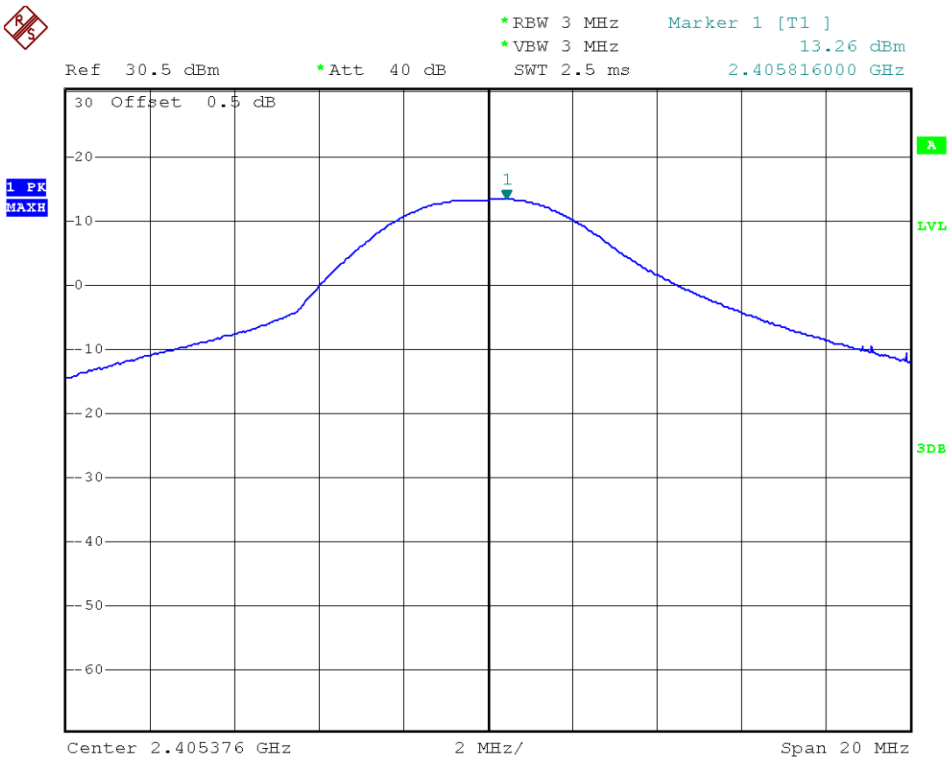
The DJI LIGHTBRIDGE operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module. The lowest, middle and highest channel were tested by Spectrum Analyzer.

2.3.3.1. GFSK Mode

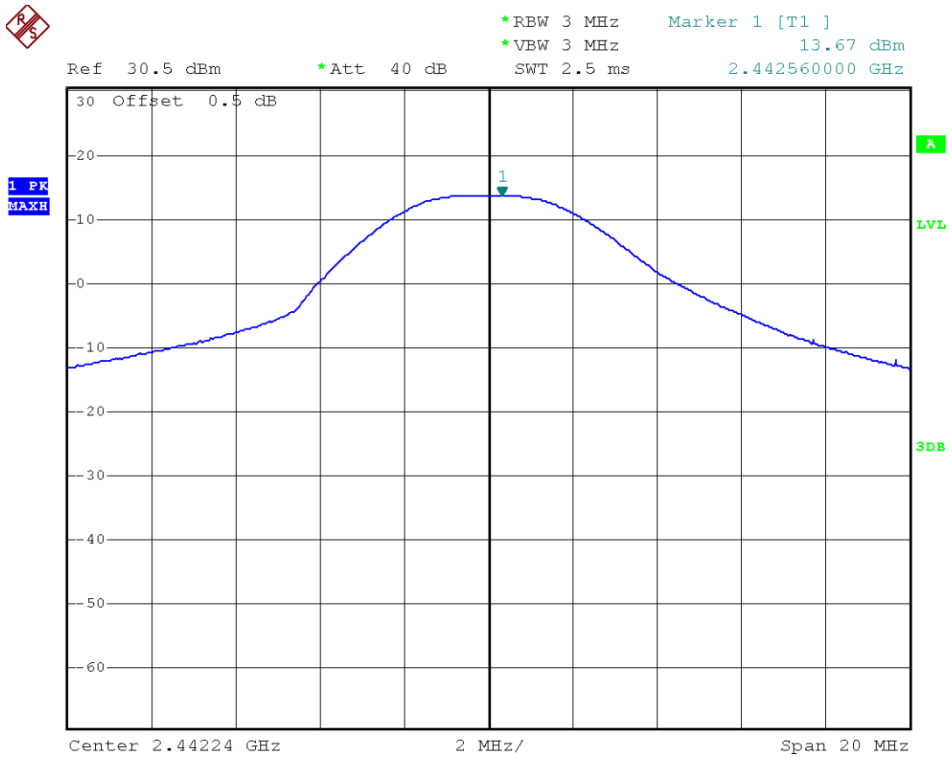
A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Refer to Plot	Verdict
		dBm	W	dBm	W		
1	2405.376	13.26	0.02118	30	1	Plot A1	PASS
19	2442.240	13.67	0.02328			Plot A2	PASS
36	2477.056	13.88	0.02443			Plot A3	PASS

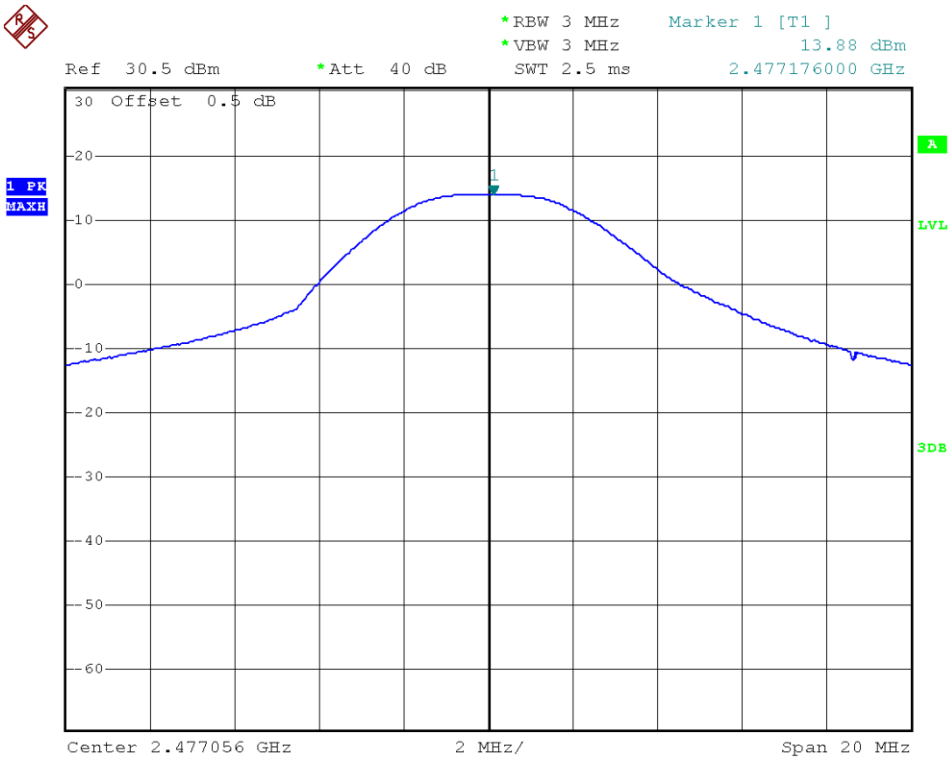
B. Test Plots:



Plot A1



Plot A2


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
13.88 dBm
2.477176000 GHz
Ref 30.5 dBm
*Att 40 dB
SWT 2.5 ms
30 Offset 0.5 dB
1 PK
MAXH
A
LVL
3DB
Center 2.477056 GHz
2 MHz/
Span 20 MHz

Plot A3

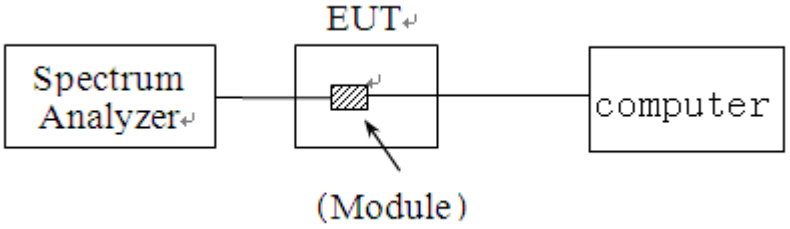
2.4. 20dB Bandwidth

2.4.1. Definition

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth (10*log1% = 20dB) taking the total RF output power.

2.4.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT, which is powered by the Battery, is connected to the Spectrum Analyzer (SA), the path loss as the factor is calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE of the EUT is activated .

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.06.10

2.4.1. Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW ≥ 1% of the 20 dB bandwidth

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

2.4.2. Test Result

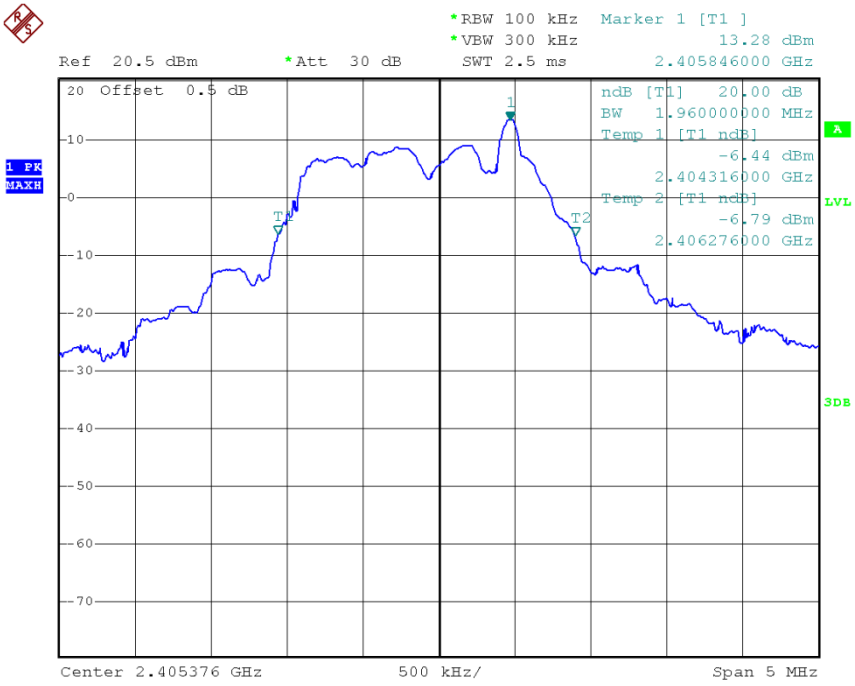
The DJI LIGHTBRIDGE operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.

A. Test Verdict:

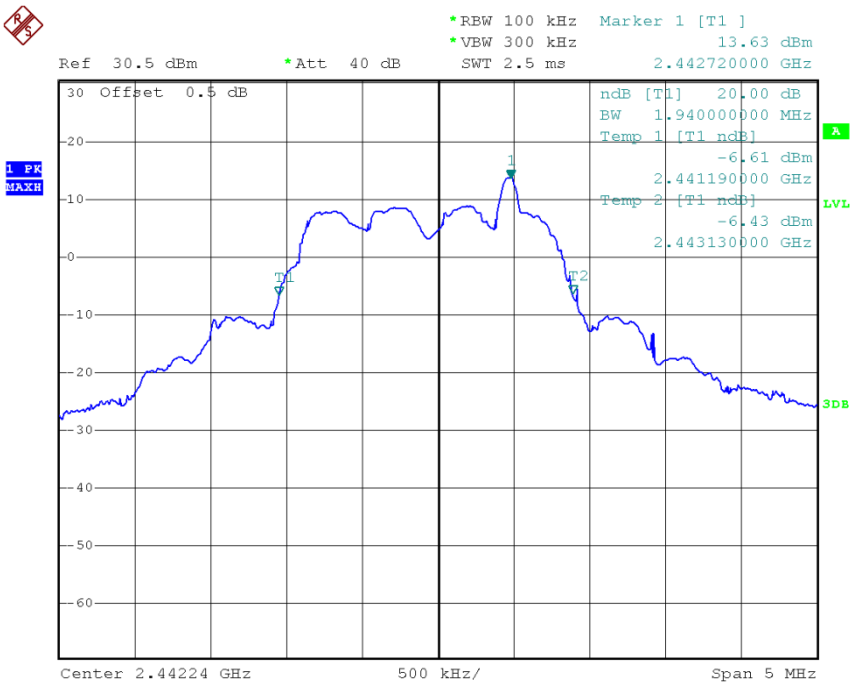
The maximum 20dB bandwidth measured is 2.050MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
1	2405.376	1.960	Plot A
19	2442.240	1.940	Plot B
36	2477.056	2.050	Plot C

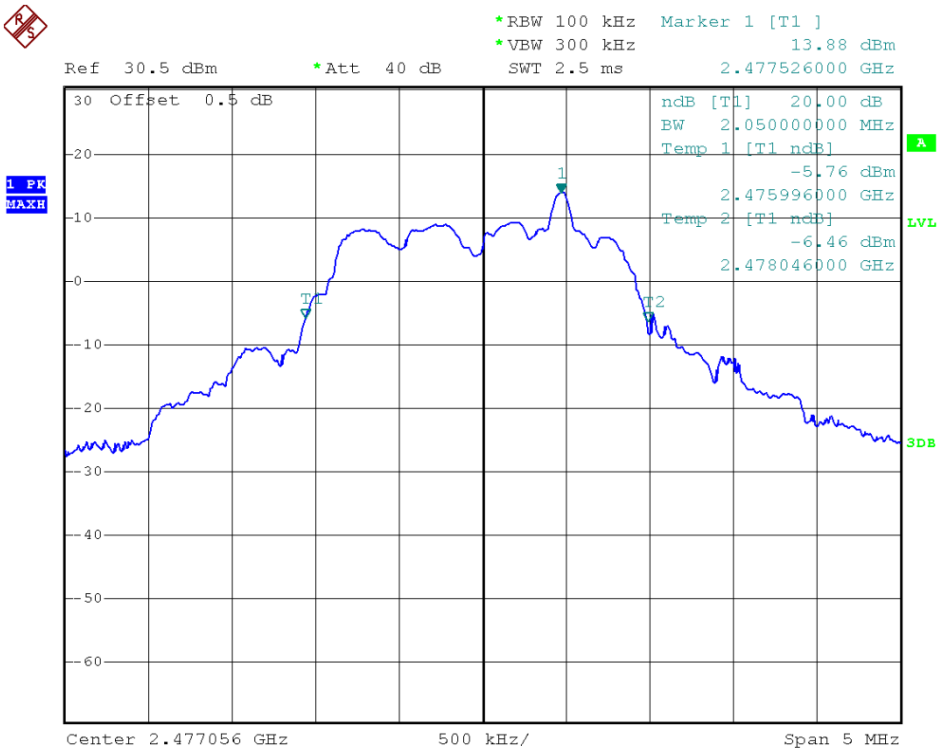
B. Test Plots:



(Plot A: Channel 1 = 2405.376)



(Plot B: Channel 19= 2442.240)



(Plot C: Channel 36= 2477.056)

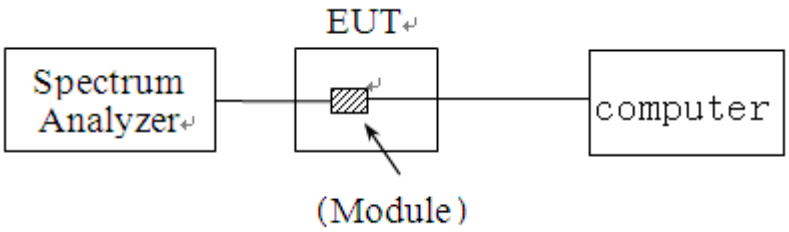
2.5. Carried Frequency Separation

2.5.1. Definition

According to FCC §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

2.5.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT, which is powered by the Battery, is connected to the Spectrum Analyzer (SA), the path loss as the factor is calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE of the EUT is activated .

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.06.10

2.5.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span

Video (or Average) Bandwidth (VBW) ≥ RBW

Sweep = auto

Detector function = peak

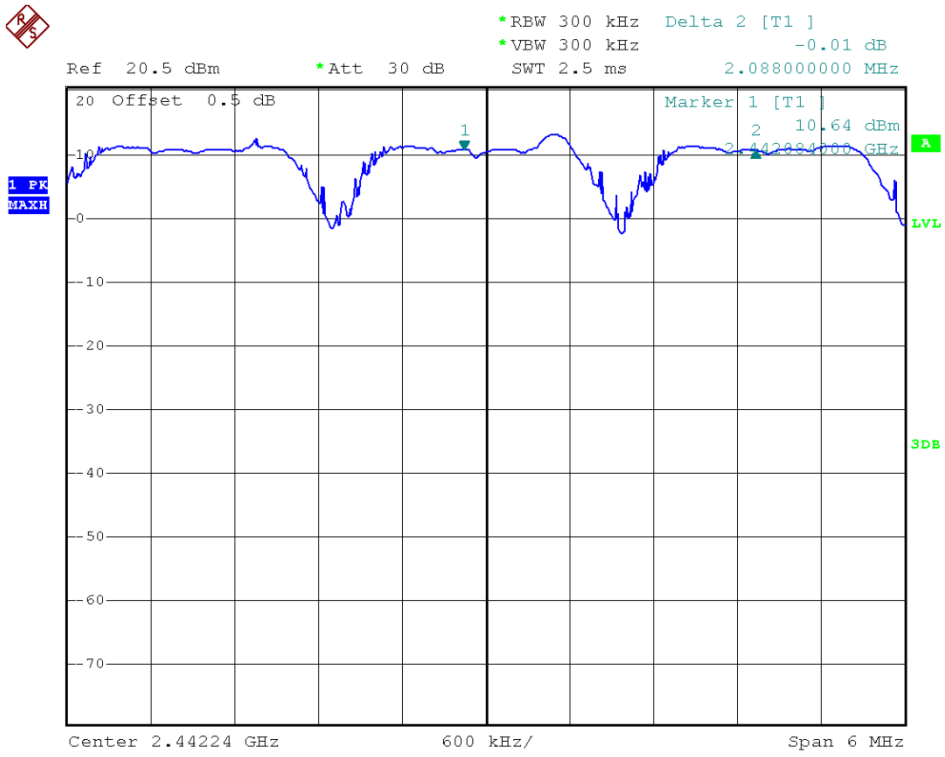
Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

2.5.4. Test Result

The DJI LIGHTBRIDGE operates at hopping-on test mode.

For any adjacent channels (e.g. the channel 19 and 20 as showed in the Plot A), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (2.050MHz, refer to section 2.4.1), whichever is greater. So, the verdict is PASSING



Plot A

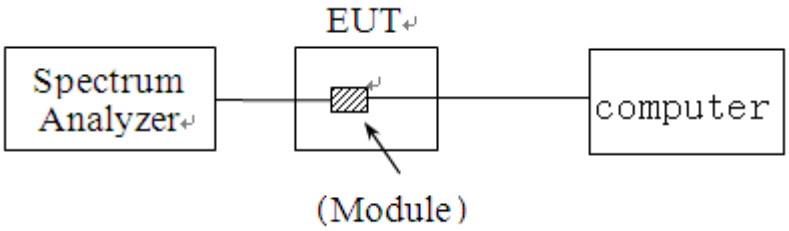
2.6. Time of Occupancy (Dwell time)

2.6.1. Requirement

According to FCC §15.247(a) (1) (iii), frequency hopping systems in the 2400 - 2483.5MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

2.6.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT, which is powered by the Battery, is connected to the Spectrum Analyzer (SA), the path loss as the factor is calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE of the EUT is activated .

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.06.10

2.6.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1 MHz

VBW ≥ RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

2.6.4. Test Result

The average time of occupancy on any channel within the Period can be calculated with formulas :

{Total of Dwell} = {Pulse Time} * (1000 / 12) / {Number of Hopping Frequency} * {Period}

{Period} = 0.4s * {Number of Hopping Frequency}

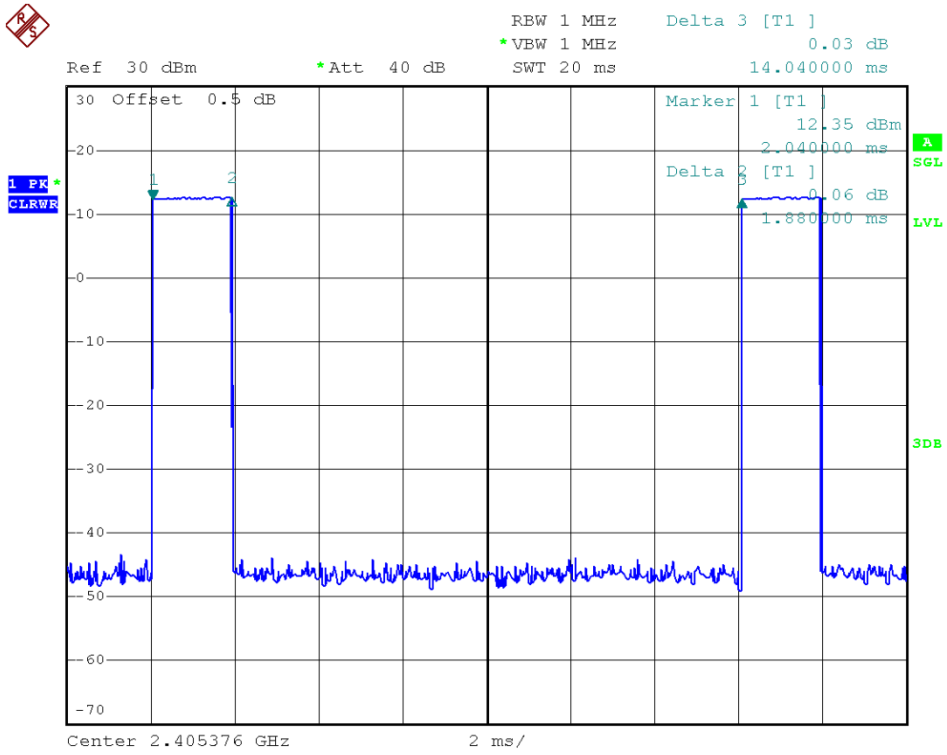
The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

A. Test Verdict:

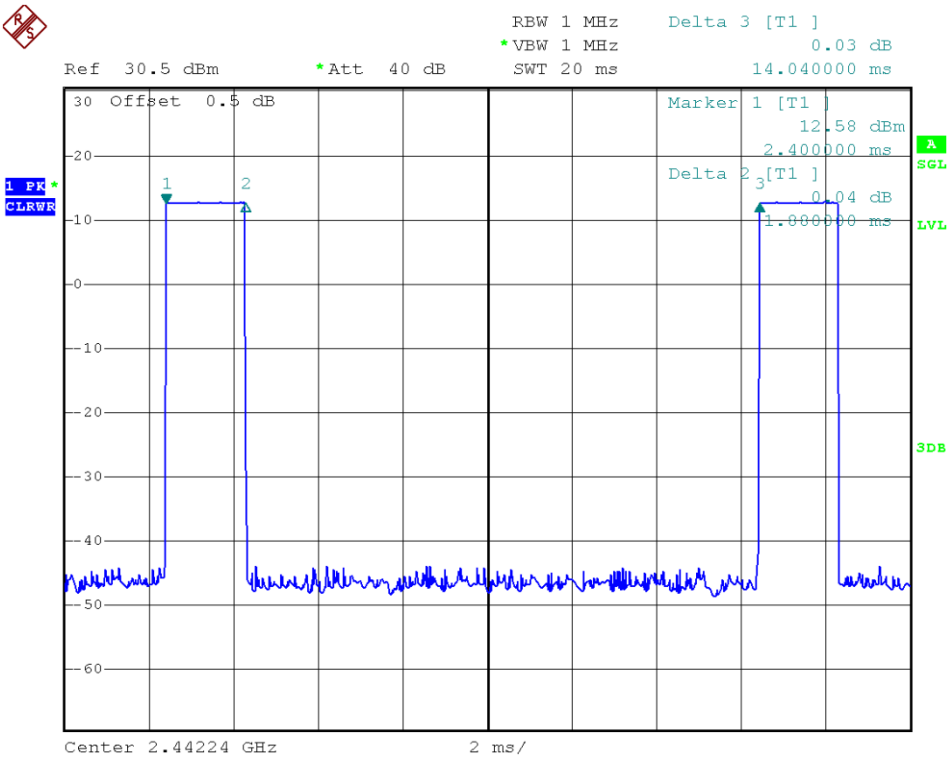
Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
1	2405.376	1.88	Plot A	62.6667	400	PASS
19	2442.240	1.88	Plot B	62.6667		PASS
36	2477.056	1.92	Plot C	64.0000		PASS

B. Test Plots:

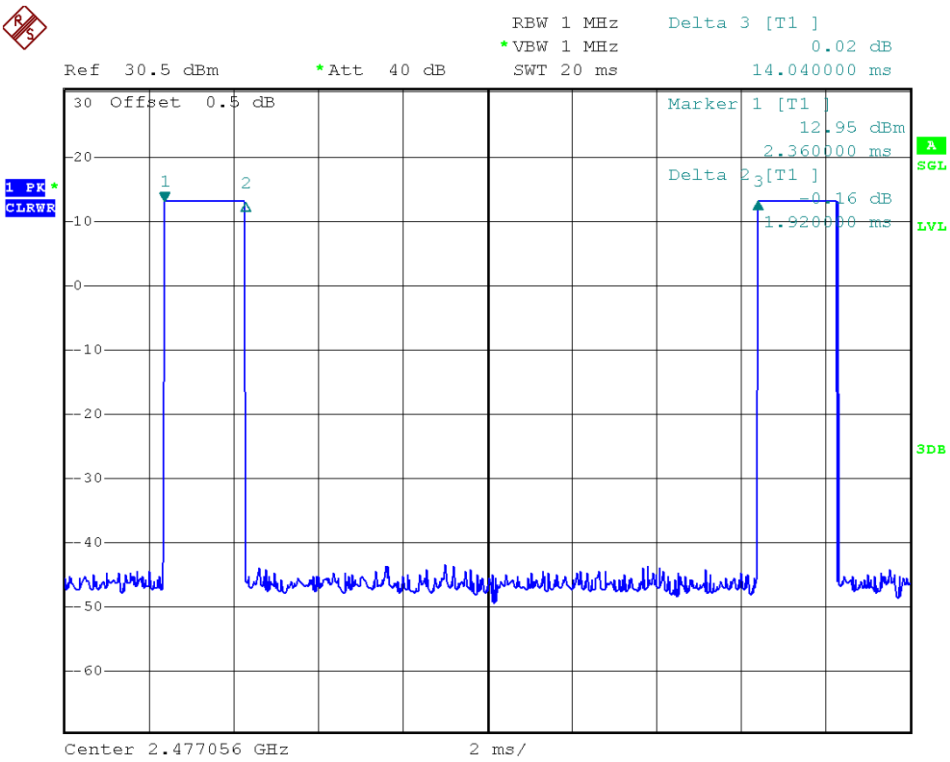
Note: the following plots record the Pulse Time of the Module carrier.



(Plot A: Channel 1= 2405.376)



(Plot B: Channel 19= 2442.240)



(Plot C: Channel 36= 2477.056)

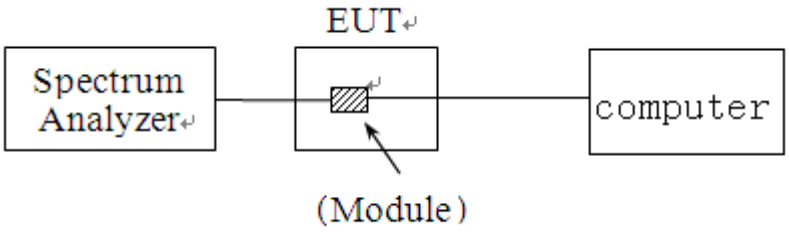
2.7. Conducted Spurious Emissions

2.7.1. Requirement

According to FCC §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.7.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT, which is powered by the Battery, is connected to the Spectrum Analyzer (SA), the path loss as the factor is calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE of the EUT is activated.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2014.06.10

2.7.3. Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

2.7.4. Test Result

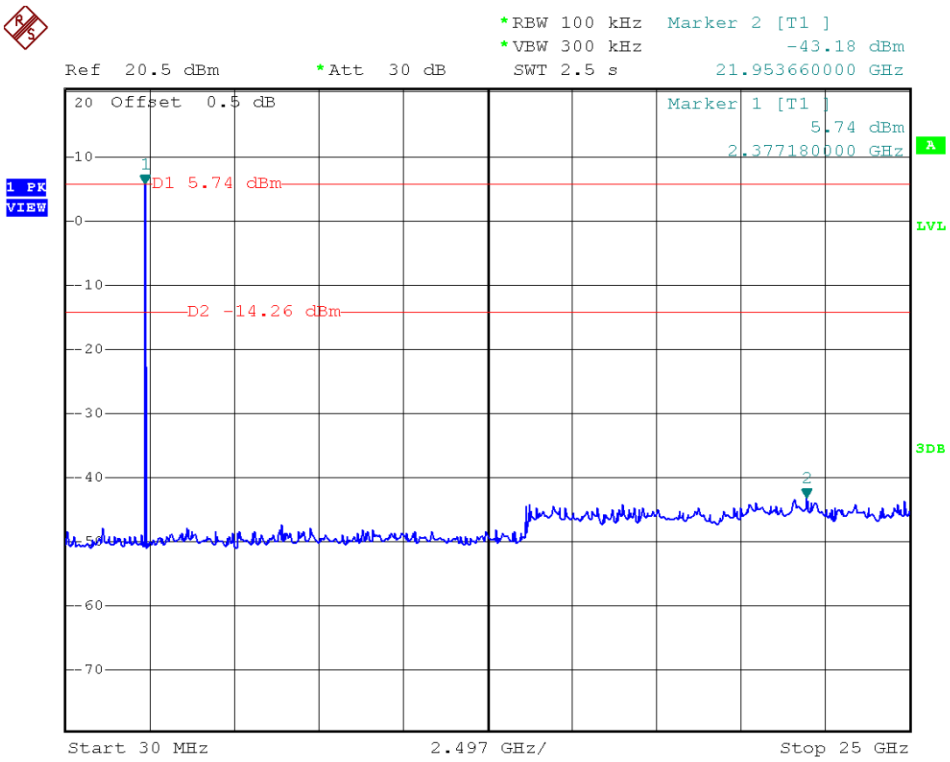
The DJI LIGHTBRIDGE operates at hopping-off test mode. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

A. Test Verdict:

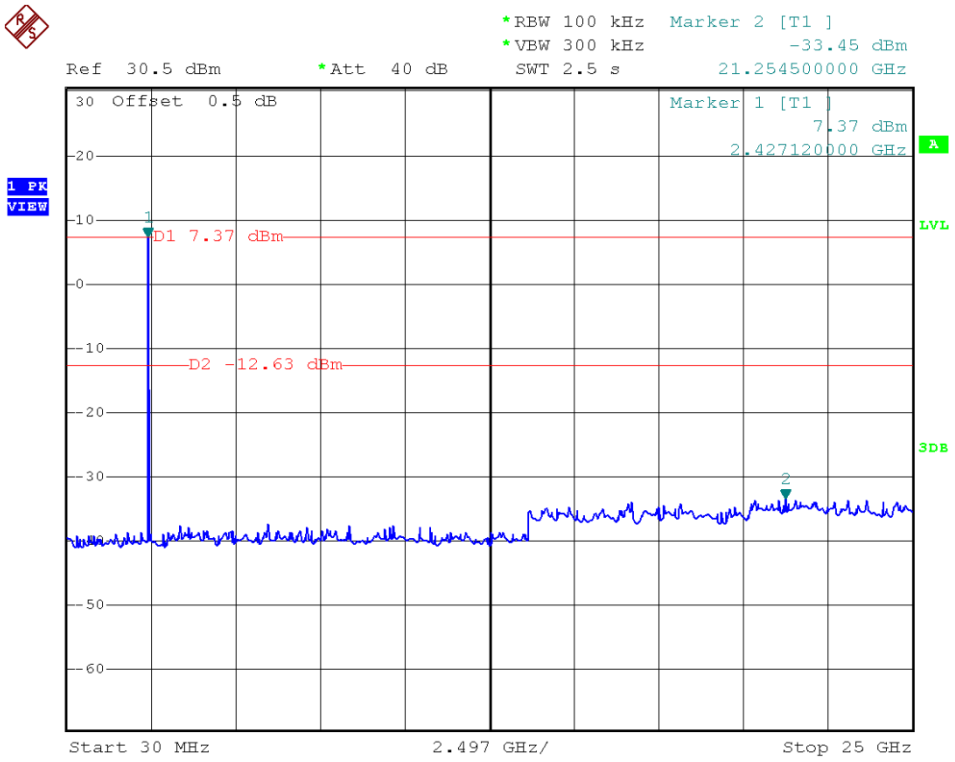
Channel	Frequency (MHz)	Measured Max. Out of Band EmissiondBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
1	2405.376	-43.18	Plot A.1	5.74	-14.26	PASS
19	2442.240	-33.45	Plot B.1	7.37	-12.63	PASS
36	2477.056	-33.16	Plot C.1	8.64	-11.36	PASS

B. Test Plots:

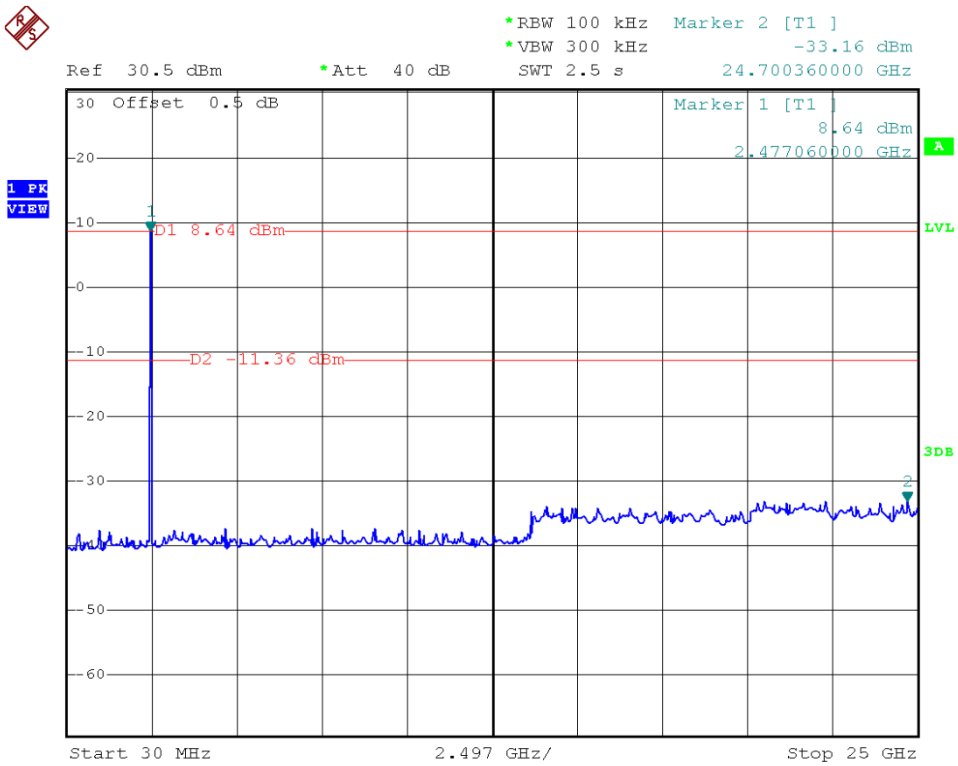
Note: the power of the Module transmitting frequency should be ignored.



(Plot A.1: Channel 1= 2405.376, 30MHz to 25GHz)



(Plot B.1: Channel 19= 2442.240, 30MHz to 25GHz)



(Plot C.1: Channel 36= 2477.056, 30MHz to 25GHz)

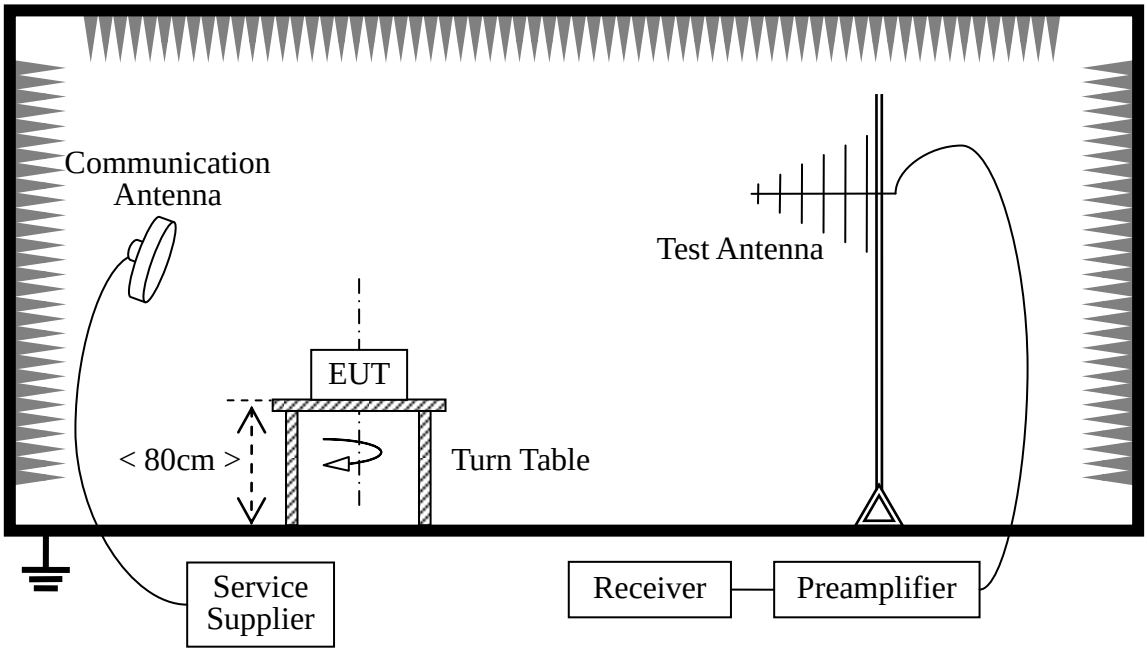
2.8. Band Edge

2.8.1. Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.8.2. Test Description

A. Test Setup:



The DJI LIGHTBRIDGE of the EUT is powered by the Battery. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the DJI LIGHTBRIDGE is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna.For the Test Antenna:

Horn Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Receiver	R&S	FSP40	1164.4391.40	2014.06.10
Full-Anechoic Chamber	Albatross	12.8m*6.8m*6.4m	A0412372	2014.06.10
Double ridge horn antenna	R&S	HF906	100150	2014.06.10
Ultra-wideband antenna	R&S	HL562	A0304224	2014.06.10
Ampilier 1G~18GHz	R&S	MITEQ AFS42-00101800	25-S-42	2014.06.10

2.8.3. Test Procedure

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak /AV

Trace = max hold

Allow the trace to stabilize.

2.8.4. Test Result

The DJI LIGHTBRIDGE operates at hopping-off test mode. The lowest and highest channels are tested to verify the band edge emissions.

The measurement results are obtained as below:
$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$
A_T: Total correction Factor except Antenna
U_R: Receiver Reading
G_{preamp}: Preamplifier Gain
A_{Factor}: Antenna Factor at 3m

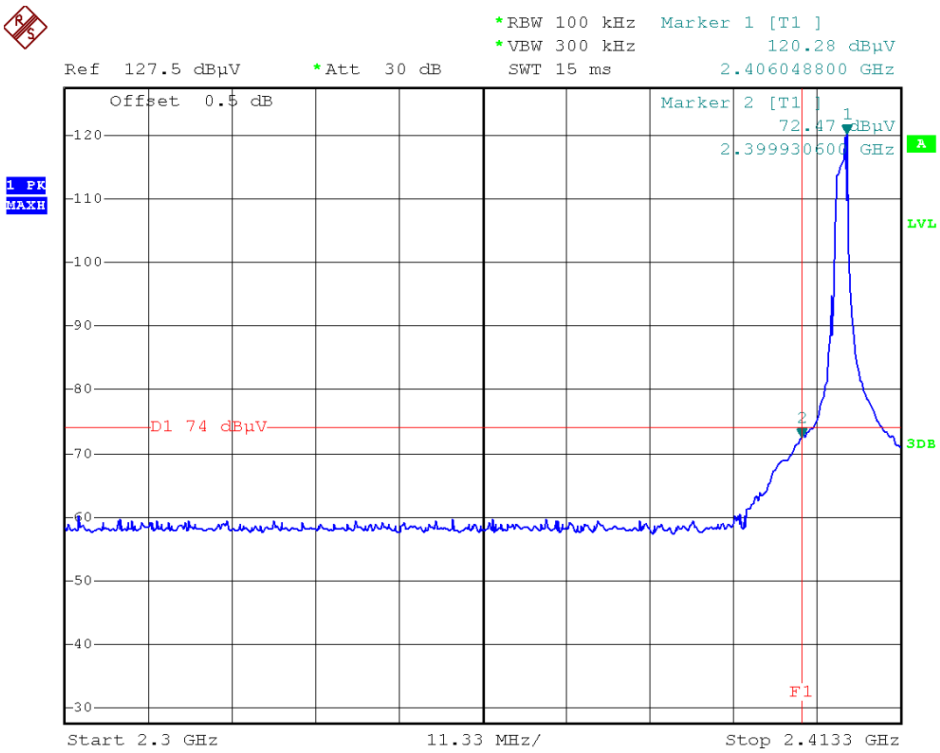
Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

Test Verdict:

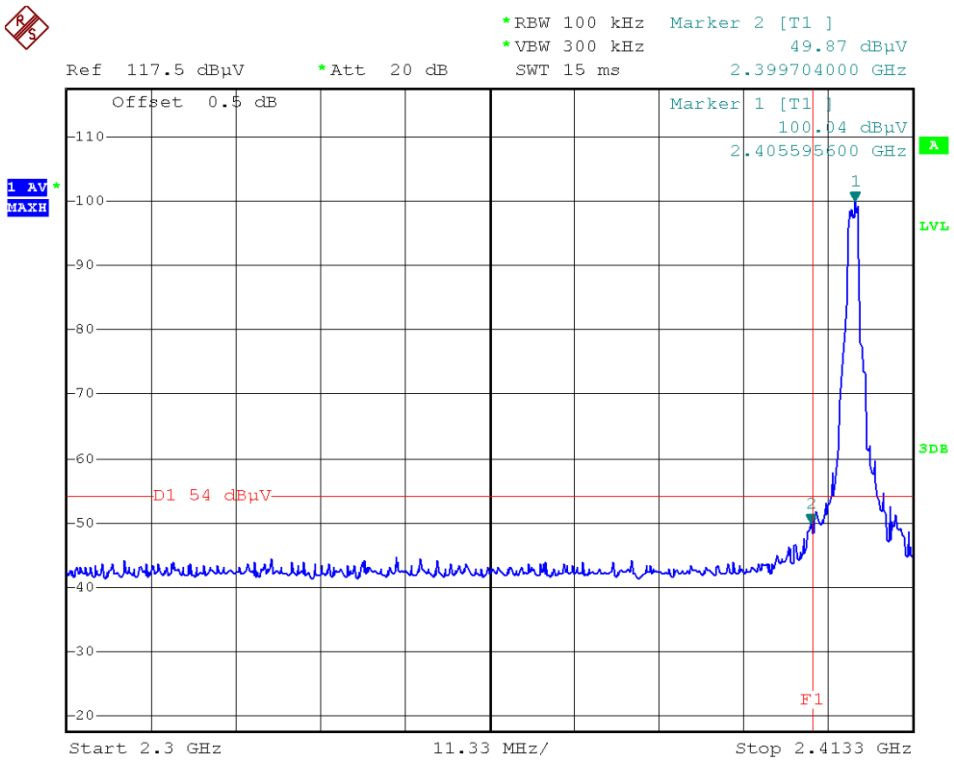
(Un-hopping)

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
1	2399.931	PK	72.47	-31.7	28.3	69.07	74	Pass
1	2399.704	AV	49.87	-31.7	28.3	46.47	54	Pass
36	2483.740	PK	71.77	-29.45	29.2	71.52	74	Pass
36	2483.860	AV	52.05	-29.45	29.2	51.80	54	Pass

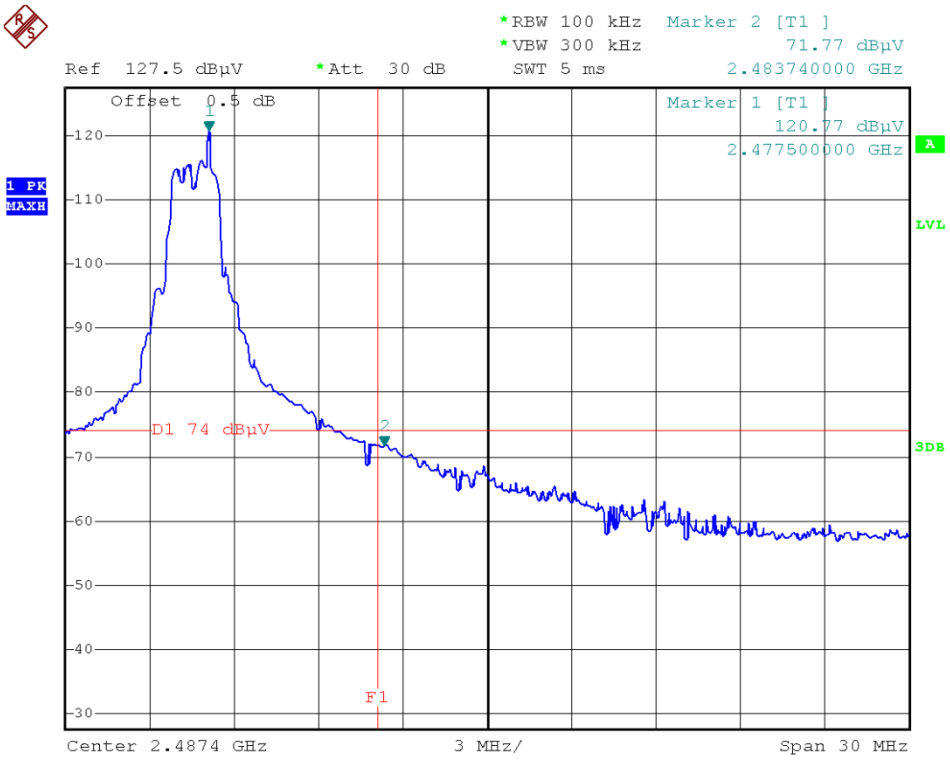
Test Plots:



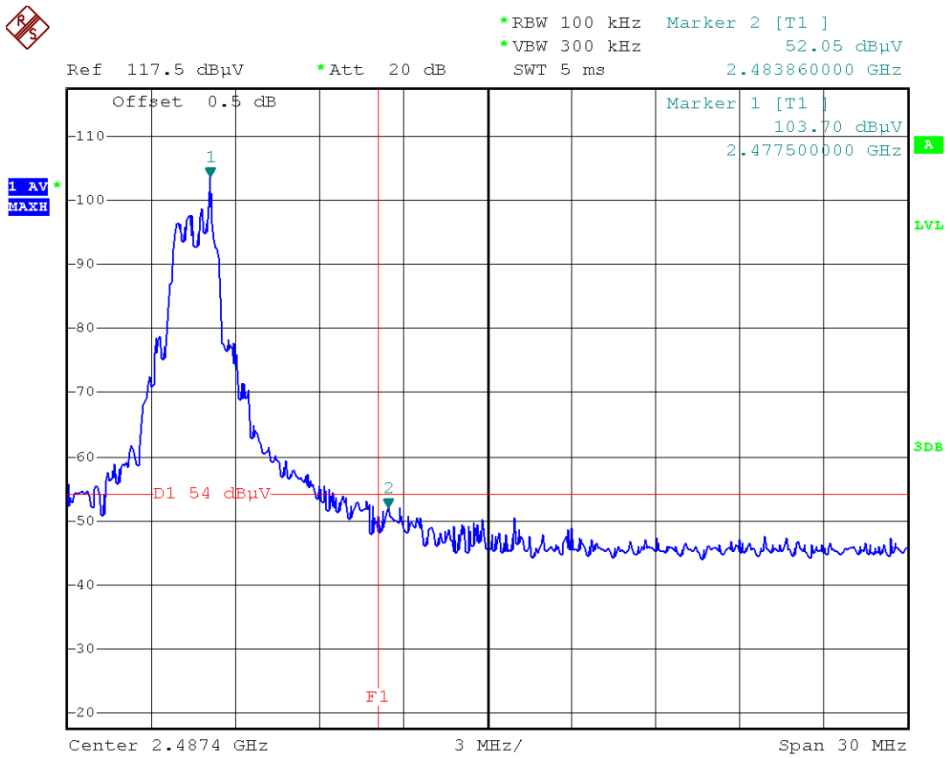
(Plot A1: Channel = 1 PEAK)



(Plot A2: Channel = 1 AVERAGE)



(Plot B1: Channel = 36 PEAK)



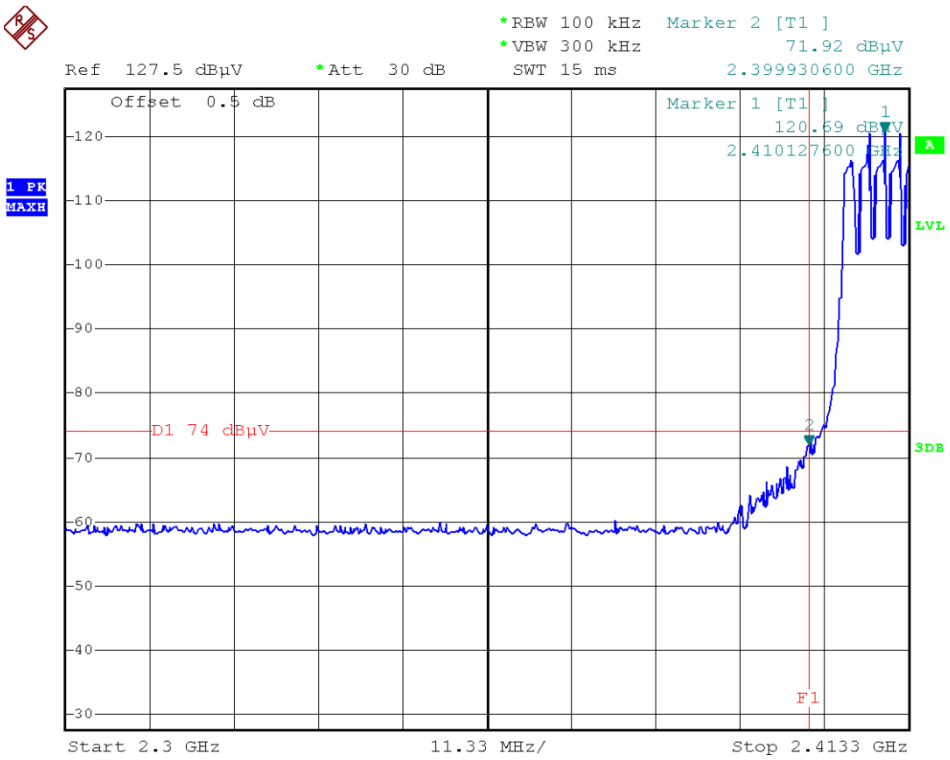
(Plot B2: Channel = 36 AVERAGE)

Test Verdict:

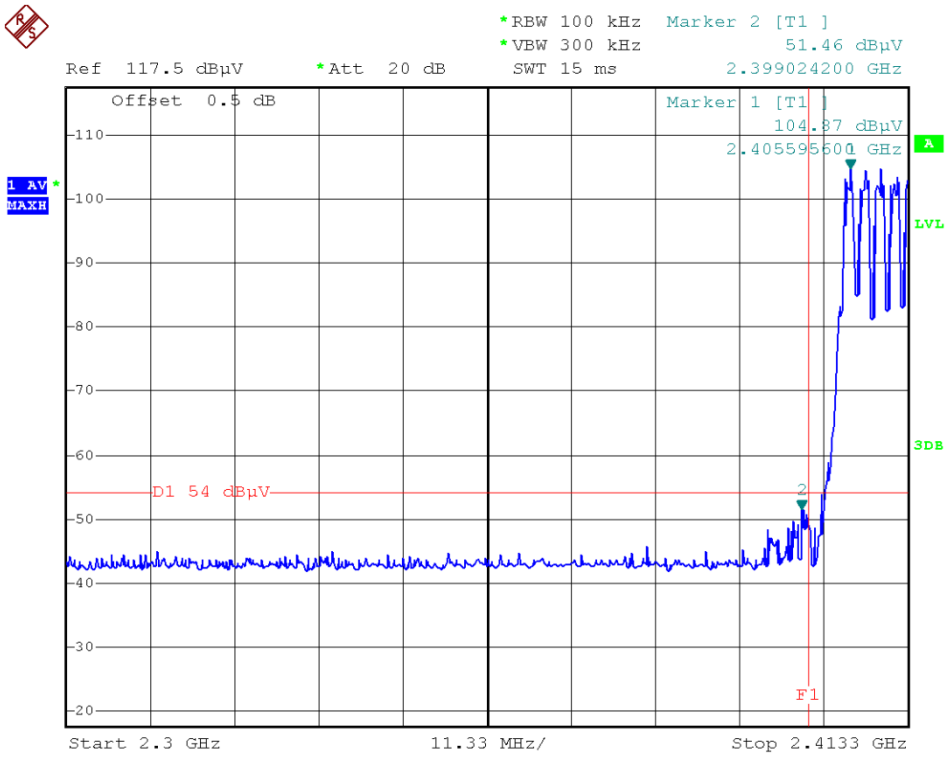
(hopping)

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
1	2399.931	PK	71.92	-31.7	28.3	68.52	74	Pass
1	2399.024	AV	51.46	-31.7	28.3	48.06	54	Pass
36	2483.920	PK	70.58	-29.45	29.2	70.33	74	Pass
36	2484.880	AV	48.54	-29.45	29.2	48.29	54	Pass

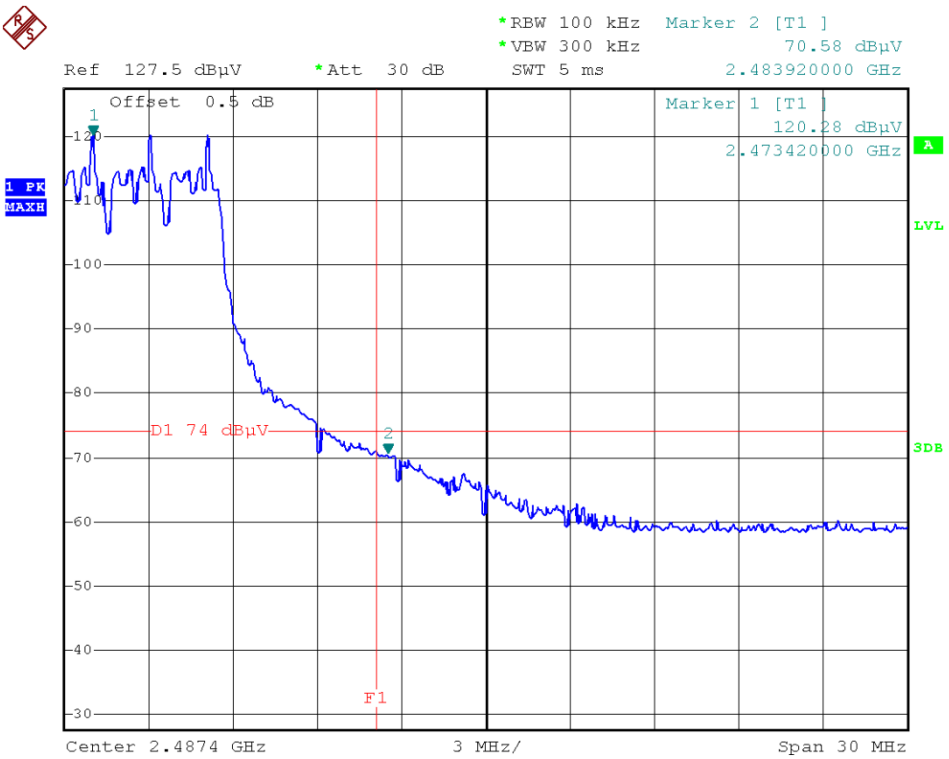
Test Plots:



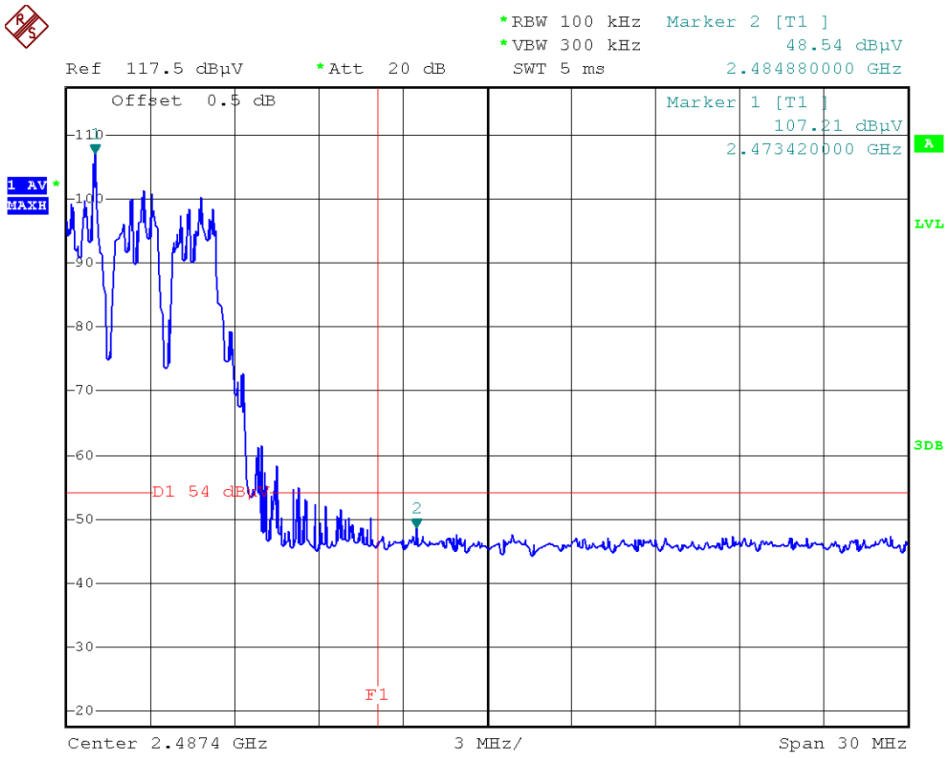
(Plot A1-1: Channel = 1 PEAK)



(Plot A2-1: Channel = 1 AVERAGE)



(Plot B1-1: Channel = 36 PEAK)



(Plot B2-1: Channel = 36 AVERAGE)

2.9. Conducted Emission

2.9.1. Requirement

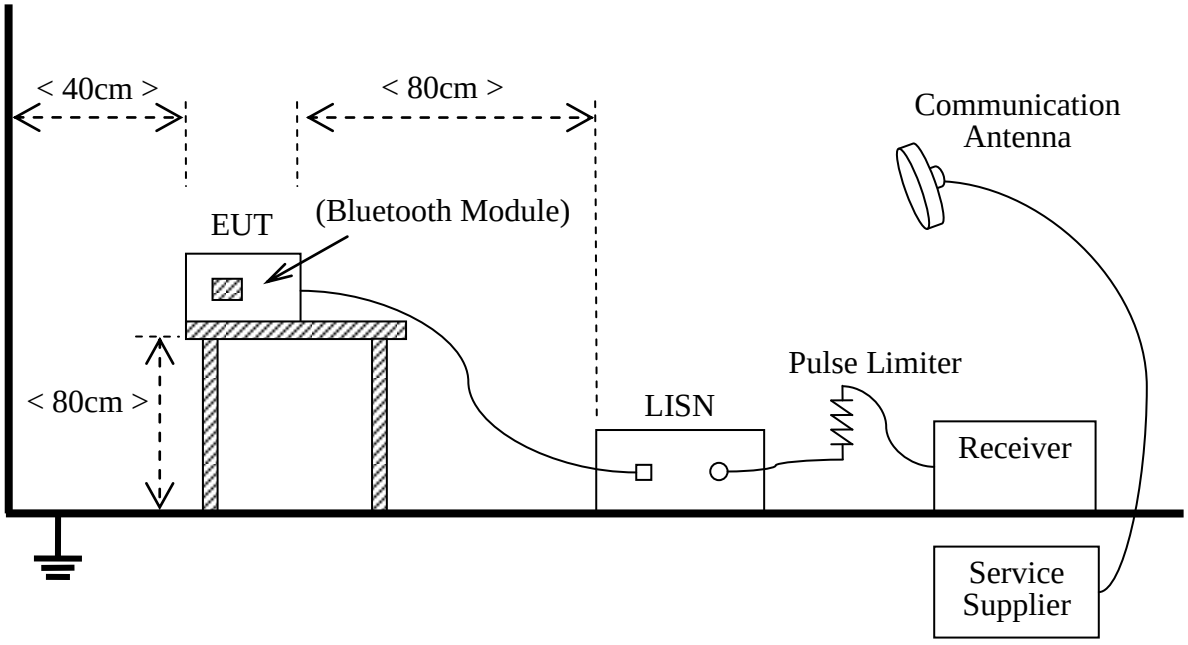
According to FCC section 15.207 and RSS- Gen section 7.2.4, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

NOTE:
(a) The lower limit shall apply at the band edges.
(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.9.2. Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4:2009

The DJI LIGHTBRIDGE of the EUT is powered by the Battery charged with USB port of PC, PC is powered by 120V, 60Hz AC mains supply. The factors of the site are calibrated to correct the reading. During the measurement, the DJI LIGHTBRIDGE is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Test Receiver	ROHDE&SCHWARZ	ESCS30	A0304260	2014.06.10
LISN	ROHDE&SCHWARZ	ESH2-Z5	A0304221	2014.06.10
Service Supplier	ROHDE&SCHWARZ	CMU200	A0304252	2014.06.10
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	A0304291	(n.a.)

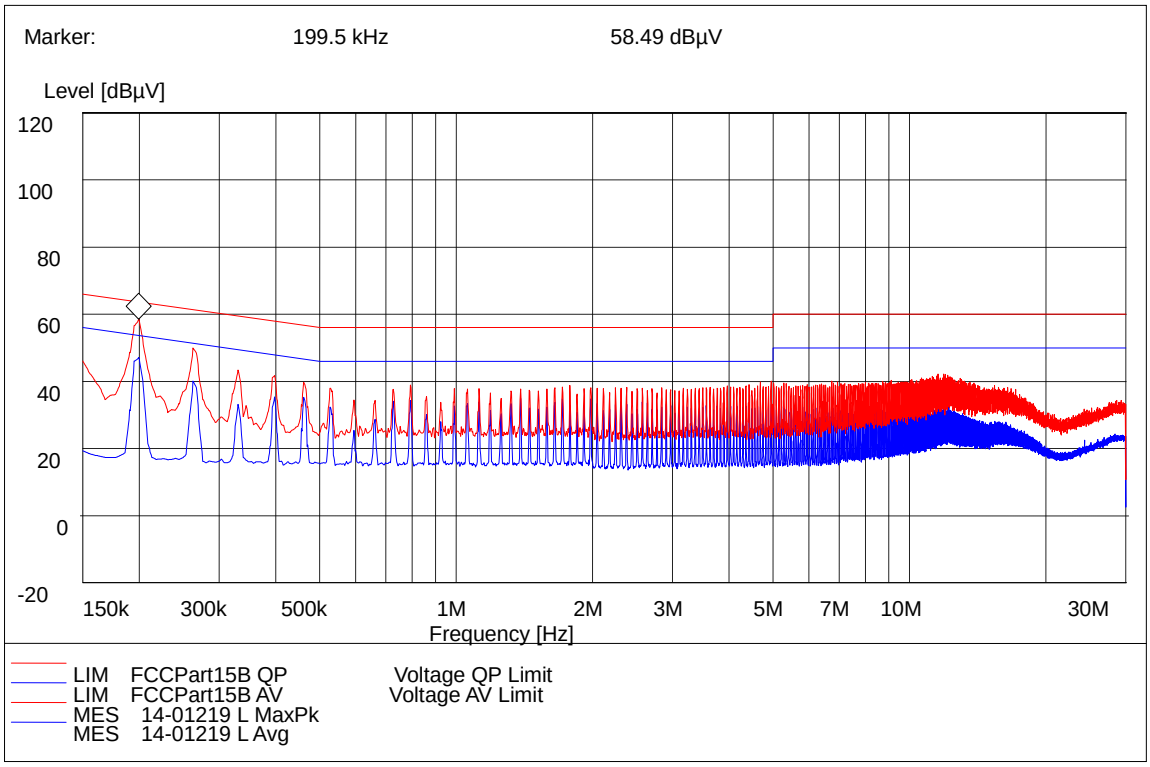
2.9.3. Test Result

A. Test setup:

The EUT configuration of the emission tests is EUT .

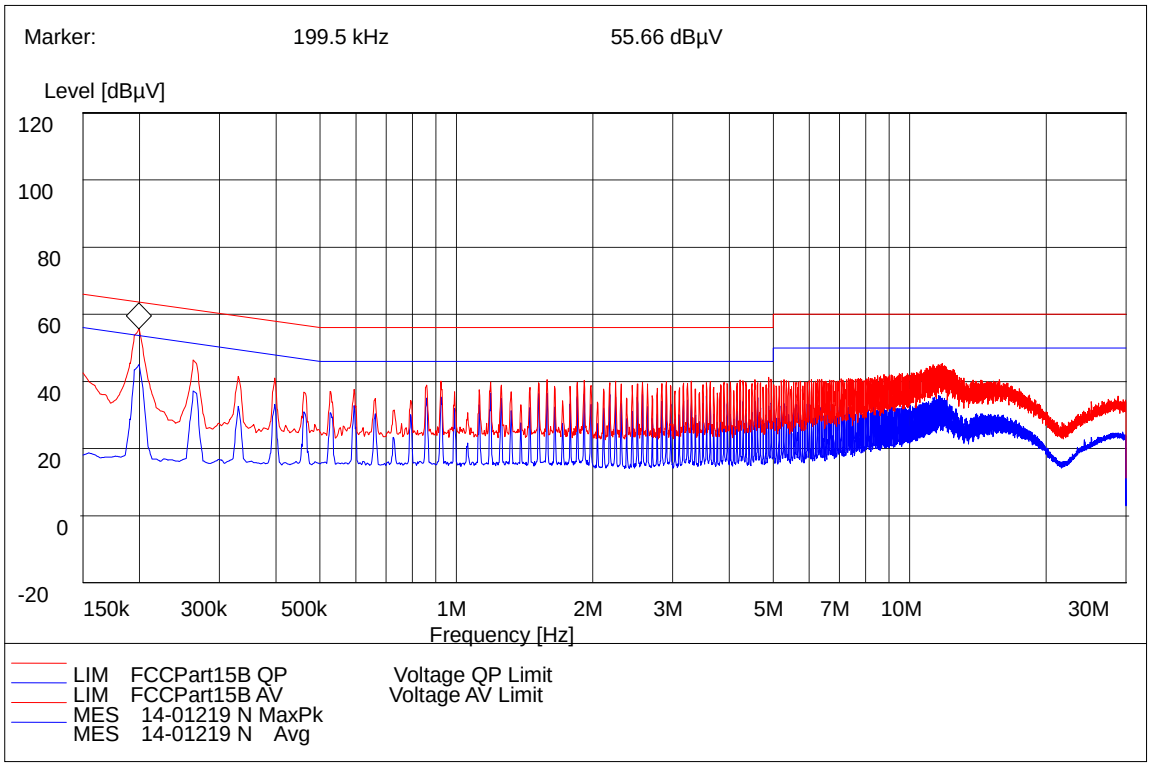
B. Test Plots:

Adapter 1:A13-040N3A



Conducted Disturbance at Mains Terminals					
L Test Data					
QP			AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.9950	63.7	54.54	0.995	53.7	41.51
0.2615	61.4	44.16	0.2615	51.4	34.87
6.7370	60.0	37.21	6.737	50.0	26.54
L Test Curve					

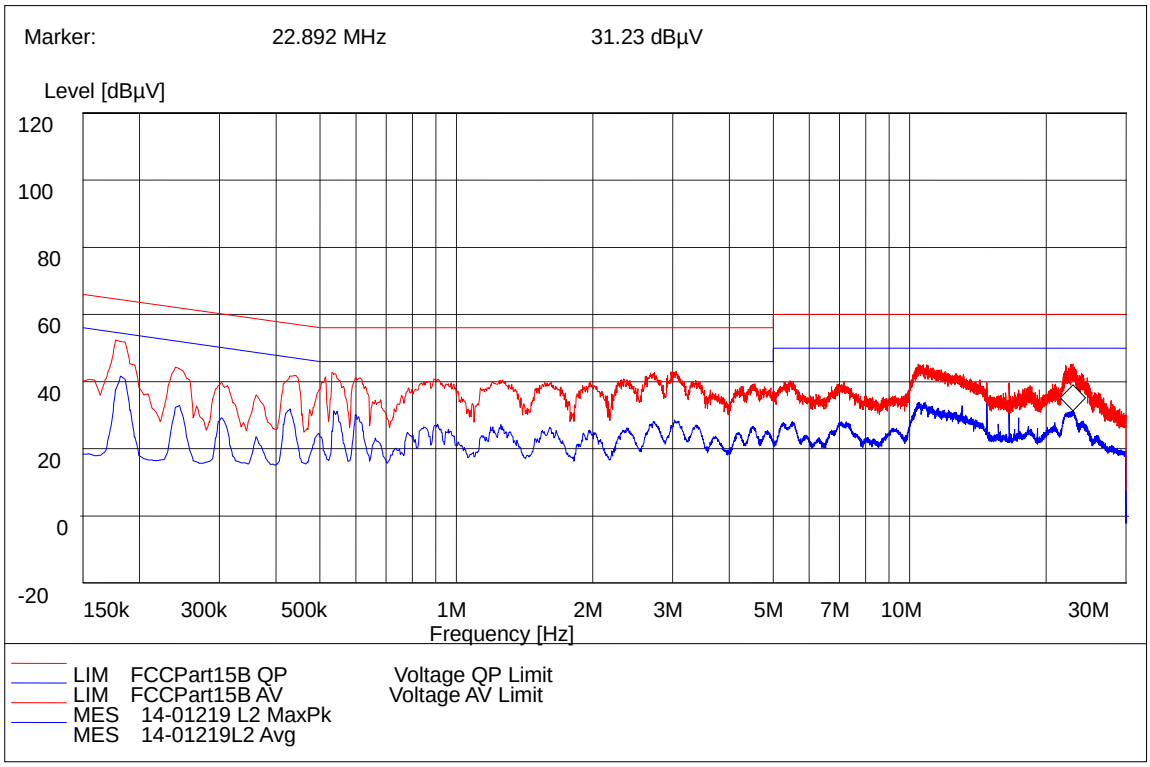
(Plot A: L Phase)



(Plot B: N Phase)

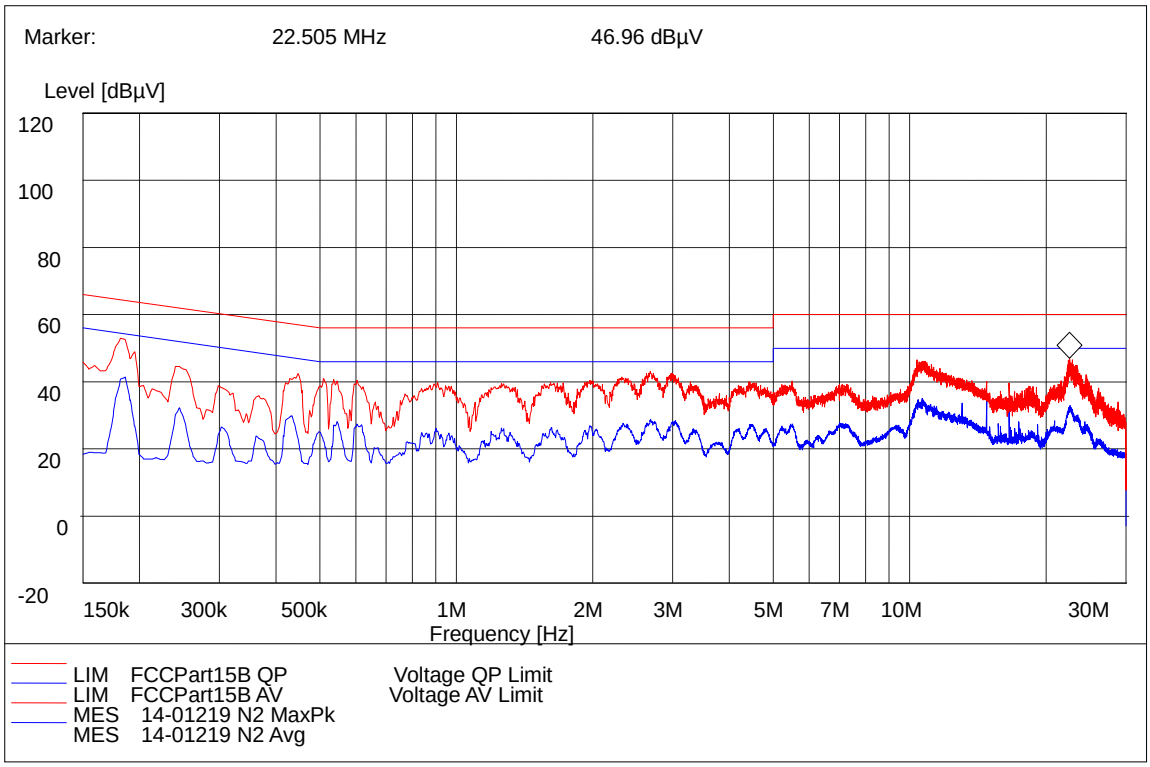
Conducted Disturbance at Mains Terminals					
N Test Data					
QP			AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.1989	63.70	51.98	0.1989	53.70	41.25
0.2612	61.40	42.26	0.2612	51.40	33.15
4.8832	56.00	37.30	4.8832	46.00	28.65
N Test Curve					

Adapter 2:GTM91120-3014.5-2.5-T2



Conducted Disturbance at Mains Terminals					
L Test Data					
QP			**AV**		
Frequency (MHz)	**Limits (dBµV)**	**Measurement Value (dBµV)**	**Frequency (MHz)**	**Limits (dBµV)**	**Measurement Value (dBµV)**
0.177	64.60	52.37	0.177	54.60	37.59
3.056	56.00	43.12	3.056	46.00	27.16
22.892	60.00	45.26	22.892	50.00	31.23
L Test Curve					

(Plot C: L Phase)



Conducted Disturbance at Mains Terminals					
N Test Data					
QP			AV		
Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)	Frequency (MHz)	Limits (dBµV)	Measurement Value (dBµV)
0.1815	64.40	52.99	0.1815	54.40	40.82
2.678	56.00	43.11	2.678	46.00	28.15
22.505	60.00	46.96	22.505	50.00	32.30
N Test Curve					

(Plot D: N Phase)

2.10. Radiated Emission

2.10.1. Requirement

According to FCC section 15.247(c) and RSS-A8.5, radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

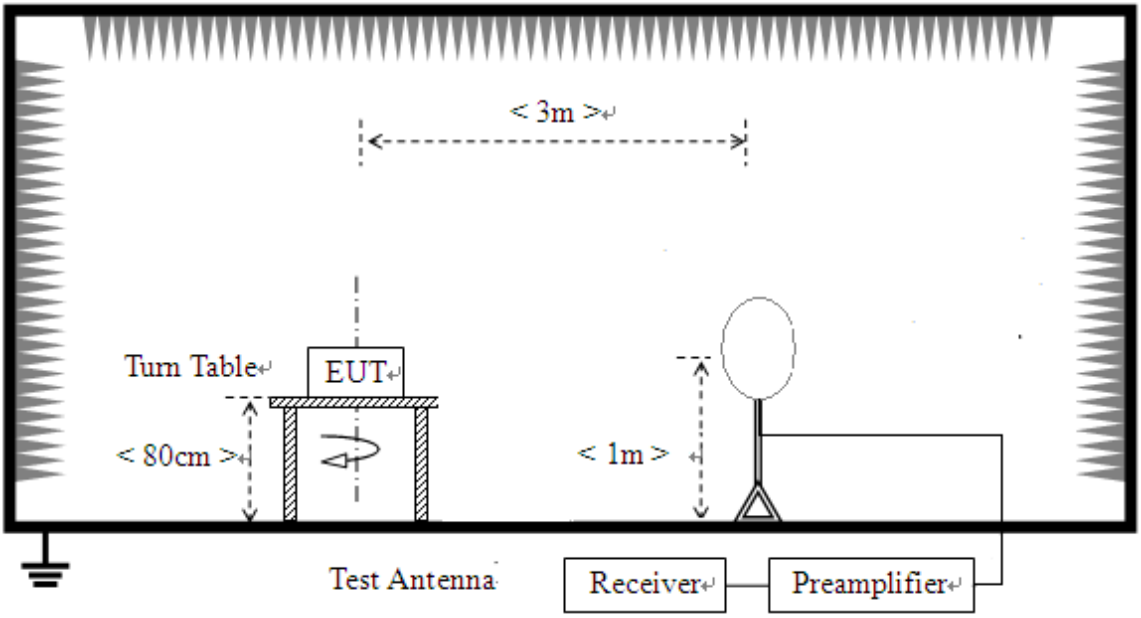
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

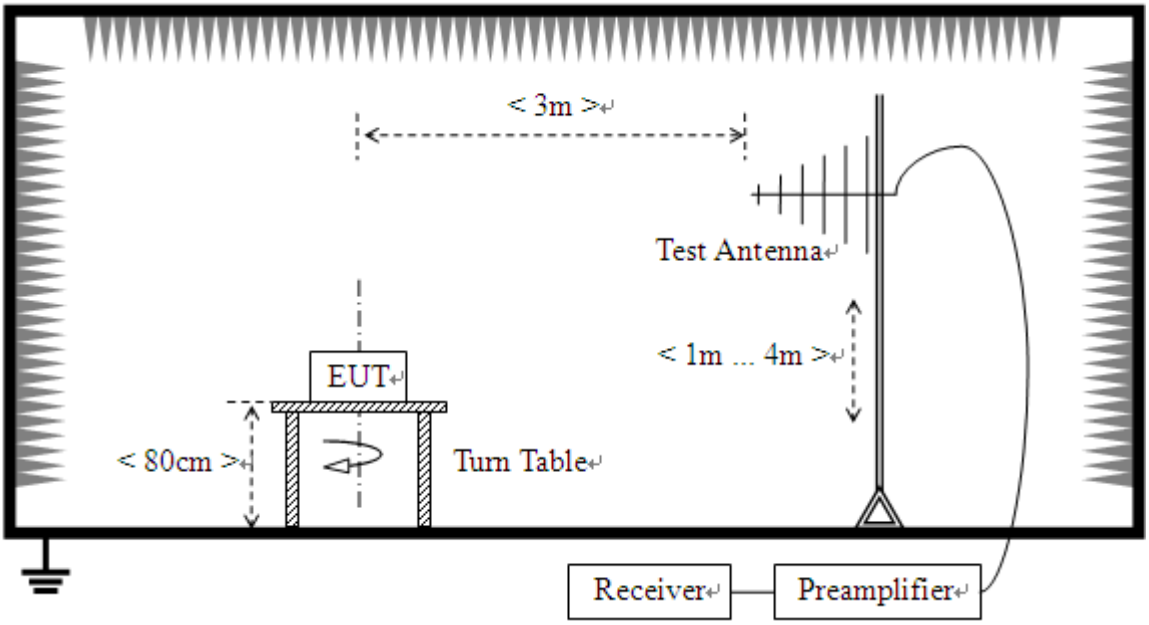
2.10.2. Test Description

A. Test Setup:

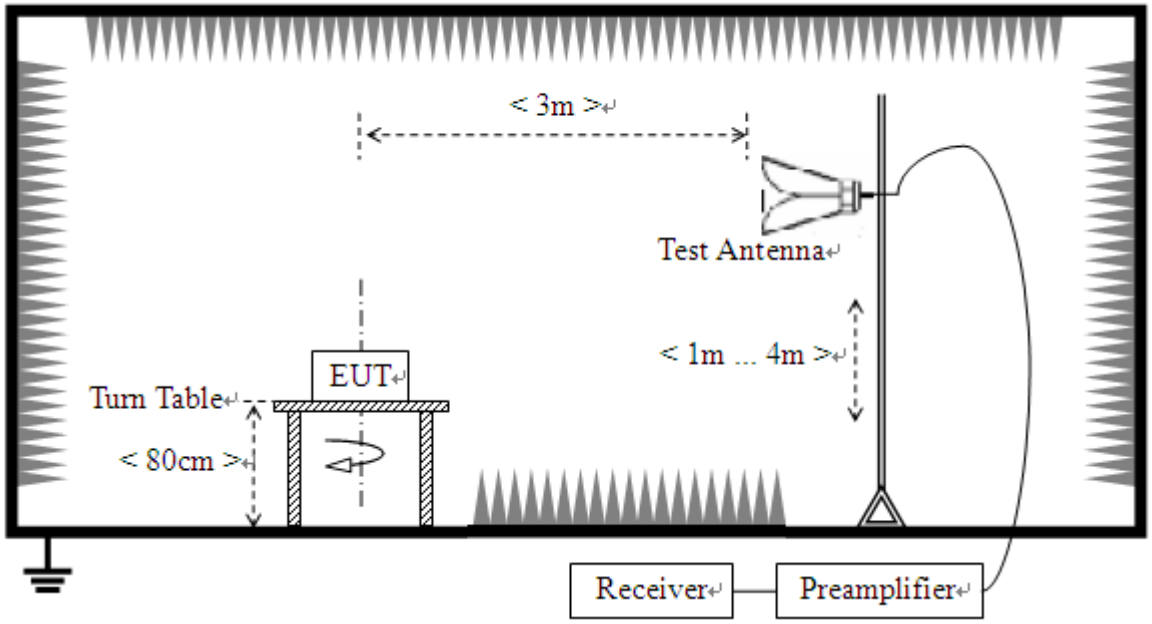
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

The DJI LIGHTBRIDGE of the EUT is powered by the Battery. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the DJI LIGHTBRIDGE is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 2GHz) and Horn Test Antenna (above 2GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal.Due Date
System Simulator	R&S	CMU200	100448	2014.06.10
Receiver	R&S	E7405A	US44210471	2014.06.10
Full-Anechoic Chamber	Albatross	12.8m*6.8m*6.4m	A0412372	2014.01.04
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2014.06.10
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120C-963	2014.06.10

Description	Manufacturer	Model	Serial No.	Cal.Due Date
Test Antenna - Horn	R&S	HL050S7	71688	2014.06.10
Test Antenna -Loop	Schwarzbeck	HFH2-Z2	100047	2014.06.10
Ampilier 1G~18GHz	R&S	MITEQ AFS42-00101800	25-S-42	2014.06.10
amplifier 20M~3GHz	R&S	PAP-0203H	22018	2014.06.10

2.10.3. Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

2.10.4. Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

During the test, the total correction Factor AT and A_{Factor} were built in test software.

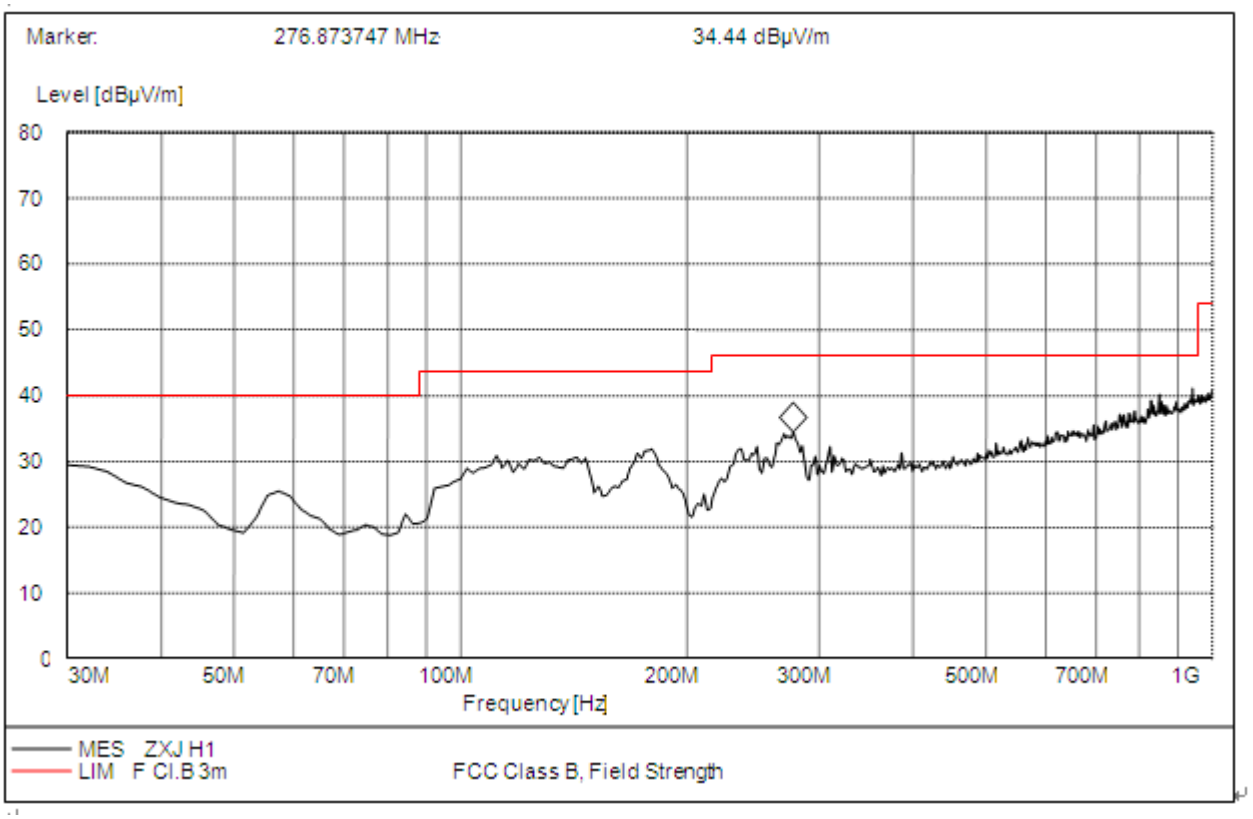
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

For 9KHz to 30MHz

The test has been performed, and the Radiated Emission level is too low to the limit.

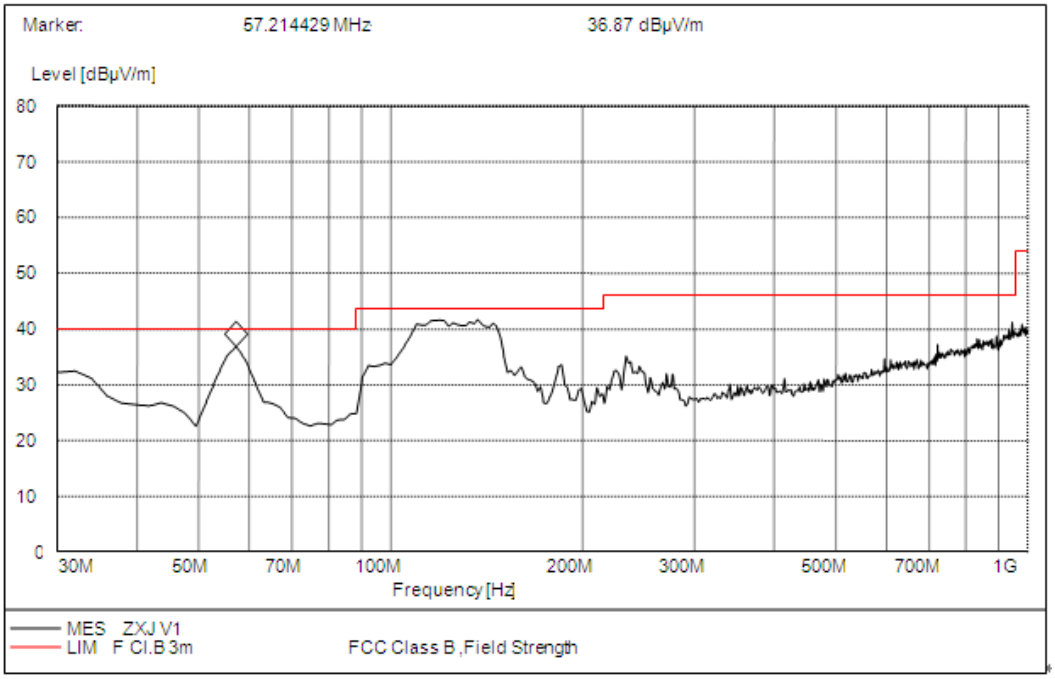
For 30MHz to 1000 MHz

Adapter 1:A13-040N3A



(Plot A: 30MHz to 1GHz, Antenna Horizontal)

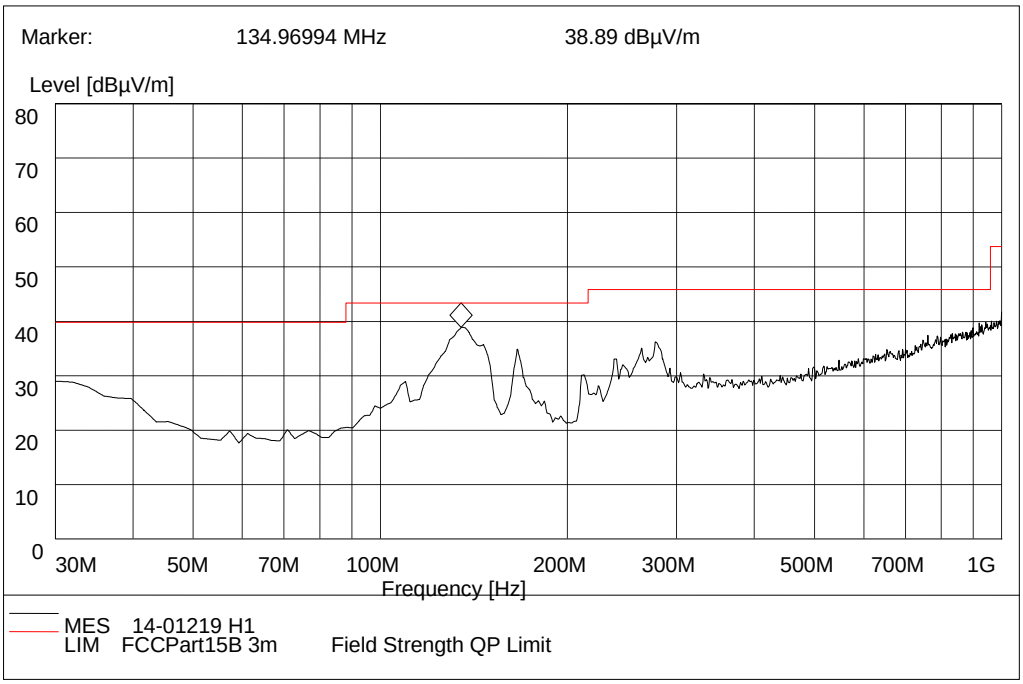
Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
179.67	31.89	120	100	43.5	11.61	Horizontal	Pass
236.05	31.92	120	100	46.0	14.08	Horizontal	Pass
276.87	34.44	120	100	46.0	11.56	Horizontal	Pass



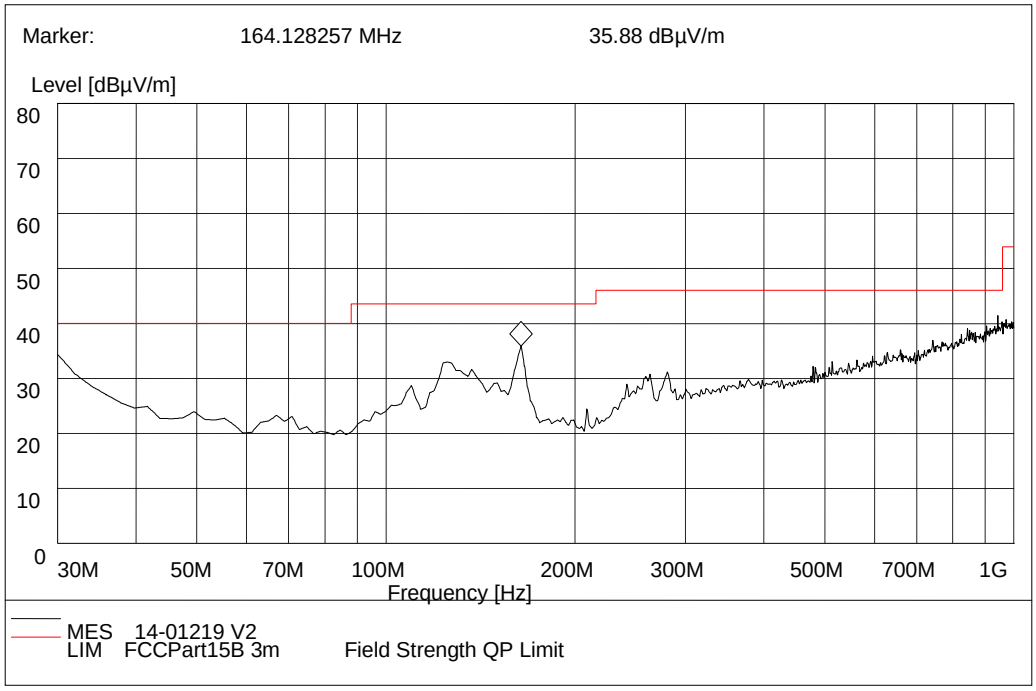
(Plot B: 30MHz to 1GHz, Antenna Vertical)

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBµV/m)	Margin (dB)	Antenna	Verdict
57.214	36.87	120	100	40.0	3.13	Vertical	Pass
136.630	38.90	120	100	43.5	4.60	Vertical	Pass

Adapter 2:GTM91120-3014.5-2.5-T2



Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBμV/m)	Margin (dB)	Antenna	Verdict
134.96994	38.89	120	100	43.5	4.61	Horizontal	Pass
289.4598	35.92	120	100	46.0	10.08	Horizontal	Pass



Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dBμV/m)	Margin (dB)	Antenna	Verdict
30.0000	34.89	120	100	43.5	8.61	Vertical	Pass
164.1283	35.88	120	100	43.5	7.62	Vertical	Pass

For 1GHz to 25GHz(worst case)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（1CH_2405.376MHz）											
No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	*2405.376	103.35	PK	/	/	1.00 H	360	106.75	28.3	4.90	-36.6
1	*2405.376	92.83	AV	/	/	1.00 H	360	96.23	28.3	4.90	-36.6
2	4810.752	49.17	PK	74	24.83	1.00 H	359	45.97	32.7	7.00	-36.5
2	4810.752	40.59	AV	54	13.41	1.00 H	359	37.39	32.7	7.00	-36.5
3	7216.128	51.88	PK	74	22.12	1.00 H	152	42.48	35.8	8.90	-35.3
3	7216.128	44.16	AV	54	9.84	1.00 H	152	34.76	35.8	8.90	-35.3

4	9612.504	49.99	PK	74	24.01	1.00 H	140	37.39	37.2	10.20	-34.8
4	9612.504	45.45	AV	54	8.55	1.00 H	140	32.85	37.2	10.20	-34.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（1CH_2405.376MHz）

No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	*2405.376	101.78	PK	/	/	1.00 V	124	105.18	28.3	4.90	-36.6
1	*2405.376	90.47	AV	/	/	1.00 V	124	93.87	28.3	4.90	-36.6
2	4810.752	49.87	PK	74	24.13	1.00 V	339	46.67	32.7	7.00	-36.5
2	4810.752	44.35	AV	54	9.65	1.00 V	339	41.15	32.7	7.00	-36.5
3	7216.128	49.99	PK	74	24.01	1.00 V	340	40.59	35.8	8.90	-35.3
3	7216.128	42.08	AV	54	11.92	1.00 V	340	32.68	35.8	8.90	-35.3
4	9612.504	52.21	PK	74	21.79	1.00 V	20	39.61	37.2	10.20	-34.8
4	9612.504	44.88	AV	54	9.12	1.00 V	20	32.28	37.2	10.20	-34.8

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（19CH_2442.240MHz）

No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	*2442.240	104.53	PK	/	/	1.00 H	153	107.73	28.3	5.10	-36.6
1	*2442.240	92.10	AV	/	/	1.00 H	153	95.3	28.3	5.10	-36.6
2	4884.480	46.26	PK	74	27.74	1.00 H	202	42.86	32.3	7.60	-36.5
2	4884.480	35.21	AV	54	18.79	1.00 H	202	31.81	32.3	7.60	-36.5
3	7326.720	50.31	PK	74	23.69	1.00 H	355	40.91	36.1	8.60	-35.3
3	7326.720	42.71	AV	54	11.29	1.00 H	355	33.31	36.1	8.60	-35.3
4	9768.960	50.17	PK	74	23.83	1.00 H	28	37.57	37.2	10.20	-34.8
4	9768.960	42.14	AV	54	11.86	1.00 H	28	29.54	37.2	10.20	-34.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（19CH_2442.240MHz）

No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	*2442.240	103.37	PK	/	/	1.00 V	121	106.57	28.3	5.1	-36.6
1	*2442.240	92.12	AV	/	/	1.00 V	121	95.32	28.3	5.1	-36.6
2	4884.480	47.92	PK	74	26.08	1.00 V	97	44.52	32.3	7.6	-36.5
2	4884.480	37.39	AV	54	16.61	1.00 V	97	33.99	32.3	7.6	-36.5
3	7326.720	56.80	PK	74	17.2	1.00 V	288	47.4	36.1	8.6	-35.3
3	7326.720	43.00	AV	54	11	1.00 V	288	33.6	36.1	8.6	-35.3
4	9768.960	50.05	PK	74	23.95	1.00 V	89	37.45	37.2	10.2	-34.8
4	9768.960	35.04	AV	54	18.96	1.00 V	89	22.44	37.2	10.2	-34.8

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（36CH_2477.056MHz）

No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	*2477.056	103.87	PK	/	/	1.00 H	154	107.17	28.6	4.70	-36.6
1	*2477.056	89.87	AV	/	/	1.00 H	154	93.17	28.6	4.70	-36.6
2	4954.112	49.81	PK	74	24.19	1.00 H	100	46.01	33	7.00	-36.2
2	4954.112	35.04	AV	54	18.96	1.00 H	100	31.24	33	7.00	-36.2
3	7431.168	51.08	PK	74	22.92	1.00 H	190	41.68	36.2	8.50	-35.3

3	7431.168	41.94	AV	54	12.06	1.00 H	190	32.54	36.2	8.50	-35.3
4	9908.224	49.91	PK	74	24.09	1.00 H	113	37.31	37.2	10.20	-34.8
4	9908.224	36.92	AV	54	17.08	1.00 H	113	24.32	37.2	10.20	-34.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（36CH_2477.056MHz）

No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	*2477.056	98.89	PK	/	/	1.00 V	247	102.19	28.6	4.70	-36.6
1	*2477.056	87.14	AV	/	/	1.00 V	247	90.44	28.6	4.70	-36.6
2	4954.112	51.96	PK	74	22.04	1.00 V	90	48.16	33	7.00	-36.2
2	4954.112	46.78	AV	54	7.22	1.00 V	90	42.98	33	7.00	-36.2
3	7431.168	53.07	PK	74	20.93	1.00 V	29	43.67	36.2	8.50	-35.3
3	7431.168	41.91	AV	54	12.09	1.00 V	29	32.51	36.2	8.50	-35.3
4	9908.224	50.8	PK	74	23.2	1.00 V	222	38.2	37.2	10.20	-34.8
4	9908.224	40.34	AV	54	13.66	1.00 V	222	27.74	37.2	10.20	-34.8

REMARKS: 1. Emission level (dBuV/m) =Raw Value (dBuV) +Antenna Factor (dB/m) + Cable Factor (dB) +Pre-amplifier Factor

2. The other emission levels were very low against the limit.

3. The other emission levels were very low against the limit.

4. Margin value = Limit value- Emission level.

2.11. RF exposure evaluation

Equation from page 8 of OET Bulletin 65,Edition 97-01.

$$S = \frac{PG}{4\pi R^2}$$

Where：

S=power density

P=power input to the antenna

G=numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the centre of radiation of the antenna

2.11.1 . Limits For Maximum Permissible Exposure

According to FCC Part 1.1307,system operation under the provisions of this section shall be operated in a Manner the ensures that the pulic is not exposed to radio frequency energy level in excess of the commission's guidelines.

According to FCC Part 1.1310 RF exposure is calculated.

Limits for Occupational/controlled Exposure			
Frequency Range(MHz)	Electric Field Strength（E）（V/m）	Magnetic Field Strength （H）（A/m）	Power Density(S) （mW/cm2）
0.3-1.34	614	1.63	(100)*
1.34-30	1842/f	2.19/f	(180/f2)*
30-300	27.5	0.073	0.2
300-1500	--	--	f/1500
1500-100,000	--	--	1.0

2.11.2 . Test Result

Maximum peak output power at antenna input terminal(dBm):	13.88
Maximum peak output power at antenna input terminal(mW):	24.434
Source-based time-averaged output power:	--
Prediction distance(cm):	20
Predication frequency(MHz):	2477.056
Antenna Gain (typical) (dBi):	4.68
Power density at predication frequency at 20 cm(mW/cm^2):	0.01430
MPE limit for RF exposure at prediction frequency(mW/cm^2):	1.0

2.11.3. Conclusion

Since the test result is passed.

** END OF REPORT **