



Test Report

Date : 2017-09-12

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No. : HM170752

Applicant:

Skyrocket H.K. Limited
Room 1205, 12/F, Harbour Crystal Centre, 100 Granville Road,
Tsimshatsui East, Kowloon, Hong Kong

Manufacturer:

Skyrocket H.K. Limited
Room 1205, 12/F, Harbour Crystal Centre, 100 Granville Road,
Tsimshatsui East, Kowloon, Hong Kong

Description of Sample(s):

Product: Recoil WiFi Hub
Brand Name: Skyrocket
Model Number: 01759
FCC ID: O5301759TX24G

Date Sample(s) Received:

2017-05-12

Date Tested:

2017-05-17 to 2017-09-01

Investigation Requested:


Perform ElectroMagnetic Interference measurement in accordance with FCC 47 CFR [Codes of Federal Regulations] Part 15: 2015 and ANSI C63.10: 2013 for FCC Certification.

Conclusion(s):

The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark(s):

The tested model supports 802.11b only
This Laboratory Report supersedes our previous Test Report No. HM170752 issued on 2017-09-01 which is hereby deemed null and void.


CHEUNG Chi, Kenneth
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.



The Hong Kong Standards and Testing Centre Limited

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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate

Telephone: (852) 26661888

Fax: (852) 26644353

1.2 Equipment Under Test [EUT]

Description of Sample(s)

Product: Recoil WiFi Hub
Manufacturer: Skyrocket H.K. Limited
Room 1205, 12/F, Harbour Crystal Centre, 100 Granville Road, Tsimshatsui East, Kowloon, Hong Kong
Brand Name: Skyrocket
Model Number: 01759
Rating: Input: 4.5Vd.c, "AA" x 3 /
Powered by external USB Power Bank: 5.0Vd.c/
110Va.c, 5Vd.c (Adaptor was not provided by manufacturer,
universal adaptor was used for tests.)

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is Recoil WiFi Hub, which is a gaming device operated at 802.11b mode only. The R.F. signal was modulated by IC; the type of modulation used was DSSS. EUT could only be powered by internal batteries or external USB power bank.

1.3 Date of Order

2017-05-12

1.4 Submitted Sample(s):

4 Samples

1.5 Test Duration

2017-05-17 to 2017-09-01

1.6 Country of Origin

China

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1.7 Antenna Details

Antenna Type:	Dipole antenna
Antenna Gain:	2dBi

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 Regulations. ANSI C63.10:2013 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION						
Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Maximum Peak Conducted Output Power	FCC 47CFR 15.247(b)(1)	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC power-line conducted emissions	FCC 47CFR 15.207	ANSI C63.10:2013	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Radiated Spurious Emissions	FCC 47CFR 15.209	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Spectral Density	FCC 47CFR 15.247(a)(1)	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6dB Bandwidth	FCC 47CFR 15.247(a)(1)	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Band-edge measurement (Radiated)	FCC 47CFR 15.247(d)	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RF Exposure	FCC 47CFR 15.247(i)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A – Not Applicable

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2.3 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate in the table below is the worst case rate with respect to the specific test item.

Investigation has been done on all the possible configurations for searching the worst cases.

The following table is a list of the test modes shown in this test report.

Test Items	Mode
Maximum Peak Conducted Output Power	DSSS
6dB Bandwidth	DSSS
Power Spectral Density	DSSS
Radiated Spurious Emissions	DSSS
Band-edge compliance Measurement	DSSS

2.4 Table for Frequency Channel Supported

Channel Numbers	Channel Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

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3.0 Test Results

3.1 Emission

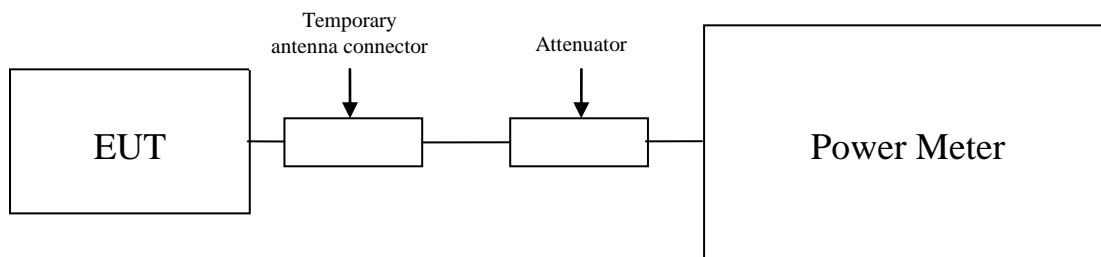
3.1.1 Maximum Peak Conducted Output Power

Test Requirement: FCC 47CFR 15.247(b)(2)
Test Method: ANSI C63.10:2013
Test Date: 2017-05-17
Mode of Operation: Tx mode

Test Method:

The RF output of the EUT was connected to the Power Meter. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in dBm.

Test Setup:



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Limits for Maximum Peak Conducted Output Power [FCC 47CFR 15.247]:

2400–2483.5 MHz band:

The maximum peak output power shall not exceeded the following limits:

For frequency hopping systems employing at least 75 hopping channels: 1 Watt

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt

Results of mode (Fundamental Power): Pass

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2412	0.00102

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2437	0.00131

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2462	0.00122

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB
1GHz to 18GHz 1.7dB

Remark:

1. All test data for each data rate were verified, but only the worst case was reported.
2. The EUT is programmed to transmit signals continuously for all testing.

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3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207

Test Method: ANSI C63.10:2013

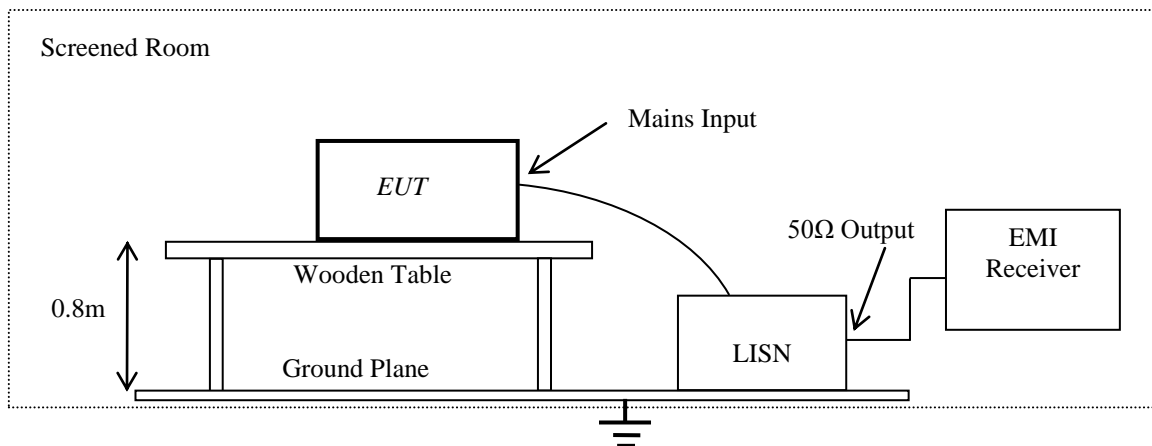
Test Date: 2017-09-01

Mode of Operation: 802.11b Tx mode

Test Method:

The test was performed in accordance with ANSI C63.10:2013, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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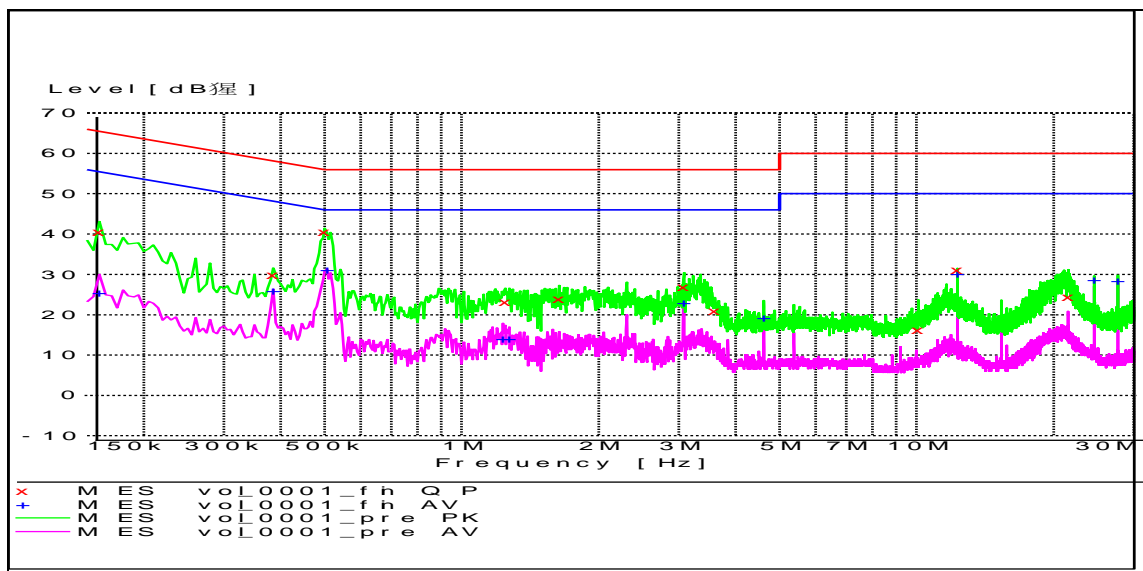
Limit for Conducted Emissions (FCC 47CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of 802.11b Tx mode – Live and Neutral: PASS



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MEASUREMENT RESULT: "vol_0001_fin QP"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.225000	44.60	9.9	63	18.1	L1	GND
0.275000	42.30	9.9	61	18.7	L1	GND
0.585000	45.90	9.9	56	10.1	L1	GND
0.950000	32.70	9.8	56	23.3	L1	GND
1.660000	30.10	10.0	56	25.9	L1	GND
3.590000	42.10	10.4	56	13.9	N	GND
3.975000	39.20	10.5	56	16.8	L1	GND
6.775000	30.40	10.6	60	29.6	N	GND
13.255000	26.30	10.7	60	33.7	L1	GND
27.445000	33.30	10.7	60	26.7	L1	GND

MEASUREMENT RESULT: "vol_0001_fin AV"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.170000	33.90	9.9	55	21.1	L1	GND
0.275000	27.80	9.9	51	23.2	L1	GND
0.580000	30.60	9.9	46	15.4	L1	GND
0.945000	20.20	9.8	46	25.8	L1	GND
2.115000	20.60	10.1	46	25.4	N	GND
3.590000	30.50	10.4	46	15.5	L1	GND
3.620000	30.40	10.4	46	15.6	N	GND
10.225000	20.80	10.3	50	29.2	L1	GND
13.255000	22.40	10.7	50	27.6	L1	GND
28.330000	19.90	10.8	50	30.1	L1	GND

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3.1.2 Radiated Spurious Emissions

Test Requirement:	FCC 47CFR 15.209
Test Method:	ANSI C63.10: 2013
Test Date:	2017-05-17, 2017-09-01
Mode of Operation:	802.11b, Tx mode / Tx mode (battery operated)/ Tx mode (powered by power bank), Tx mode (powered by AC/DC adaptor)

Test Method:

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-anechoic chamber located on the G/F of "The Hong Kong Standards and Testing Centre Ltd." with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

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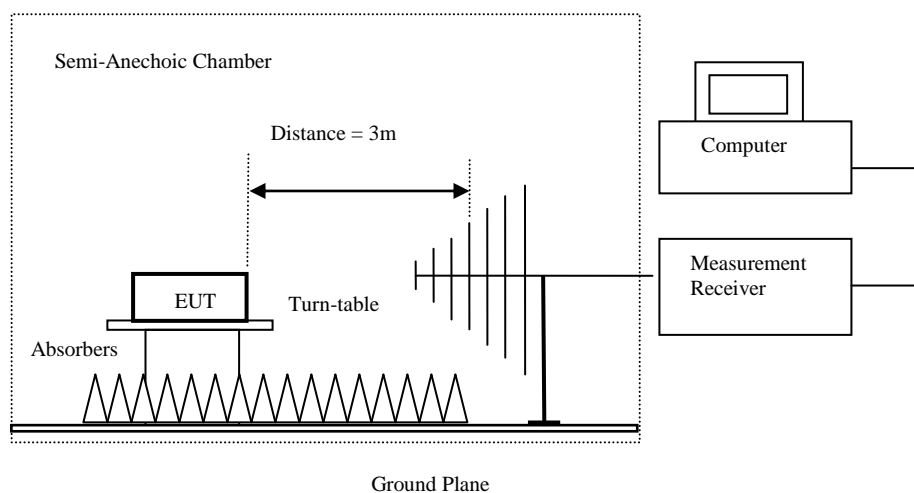
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Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW: 10kHz
	VBW: 30kHz
	Sweep: Auto
	Span: Fully capture the emissions being measured
	Trace: Max. hold
30MHz – 1GHz (QP)	RBW: 120kHz
	VBW: 120kHz
	Sweep: Auto
	Span: Fully capture the emissions being measured
	Trace: Max. hold
Above 1GHz (Pk & Av)	RBW: 1MHz
	VBW: 3MHz
	Sweep: Auto
	Span: Fully capture the emissions being measured
	Trace: Max. hold

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.

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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

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Result of Tx mode (802.11b: 2412.0 MHz) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (802.11b: 2412.0 MHz) (30MHz – 1GHz): Pass

Field Strength of Spurious Emissions Quasi-Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (802.11b: 2412.0 MHz) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dB	E-Field Polarity
4824.0	12.3	42.4	54.7	74.0	19.3	Vertical
7236.0	3.1	46.7	49.8	74.0	24.2	Vertical
9648.0	2.7	48.4	51.1	74.0	22.9	Vertical
12060.0	1.9	53.1	55.0	74.0	19.0	Vertical

Result of Tx mode (802.11b: 2412.0 MHz) (Above 1GHz): Pass

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dB	E-Field Polarity
4824.0	-6.1	42.4	36.3	54.0	17.7	Vertical
7236.0	-10.3	46.7	36.4	54.0	17.6	Vertical
9648.0	-11.1	48.4	37.3	54.0	16.7	Vertical
12060.0	-12.1	53.1	41.0	54.0	13.0	Vertical

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Result of Tx mode (802.11b: 2437.0 MHz) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (802.11b: 2437.0 MHz) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions Quasi-Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (802.11b: 2437.0 MHz) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dB	E-Field Polarity
4874.0	10.3	42.5	52.8	74.0	21.2	Vertical
7311.0	6.7	47.1	53.8	74.0	20.2	Vertical
9748.0	2.9	49.3	52.2	74.0	21.8	Vertical
12185.0	1.7	53.1	54.8	74.0	19.2	Vertical

Result of Tx mode (802.11b: 2437.0 MHz) (Above 1GHz): Pass

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dB	E-Field Polarity
4874.0	-3.4	42.5	39.1	54.0	14.9	Vertical
7311.0	-7.9	47.1	39.2	54.0	14.8	Vertical
9748.0	-10.1	49.3	39.2	54.0	14.8	Vertical
12185.0	-11.1	53.1	42.0	54.0	12.0	Vertical

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Result of Tx mode (802.11b: 2462.0 MHz) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (802.11b: 2462.0 MHz) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions Quasi-Peak Value						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (802.11b: 2462.0 MHz) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dB	E-Field Polarity
4924.0	11.4	43.2	54.6	74.0	19.4	Vertical
7386.0	5.5	46.2	51.7	74.0	22.3	Vertical
9848.0	2.0	50.9	52.9	74.0	21.1	Vertical
12310.0	1.1	54.3	55.4	74.0	18.6	Vertical

Result of Tx mode (802.11b: 2462.0 MHz) (Above 1GHz): Pass

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dB	E-Field Polarity
4924.0	-5.7	43.2	37.5	54.0	16.5	Vertical
7386.0	-10.9	46.2	35.3	54.0	18.7	Vertical
9848.0	-11.0	50.9	39.9	54.0	14.1	Vertical
12310.0	-11.7	54.3	42.6	54.0	11.4	Vertical

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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx mode (battery operated), (9kHz – 30MHz): PASS

Emissions detected are more than 20 dB below the FCC Limits

Result of Tx mode (battery operated), (30MHz – 1GHz): PASS

Field Strength of Fundamental and Harmonics Emissions Quasi-Peak Value						
Frequency MHz	Measured Level @3m dB $\mu\text{V/m}$	Correction Factor dB $\mu\text{V/m}$	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
121.6	15.3	11.3	26.6	21.4	100	Horizontal
232.1	20.3	15.7	36.0	63.1	150	Horizontal
278.0	11.2	16.1	27.3	23.2	150	Vertical
328.0	12.3	17.7	30.0	31.6	200	Horizontal
336.1	10.3	17.9	28.2	25.7	200	Horizontal
400.0	22.7	21.3	44.0	158.5	200	Vertical

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Result of Tx mode (powered by power bank), (9kHz – 30MHz): PASS

Emissions detected are more than 20 dB below the FCC Limits

Result of Tx mode (powered by power bank), (30MHz – 1GHz): PASS

Field Strength of Fundamental and Harmonics Emissions						
Quasi-Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
127.3	30.7	11.3	42.0	125.9	100	Horizontal
180.0	6.9	13.8	20.7	10.8	150	Vertical
290.1	4.3	16.2	20.5	10.6	150	Horizontal
333.3	25.6	17.9	43.5	149.6	200	Vertical
400.0	23.5	21.3	44.8	173.8	200	Vertical
508.2	3.3	22.7	26.0	20.0	200	Horizontal

Result of Tx mode (powered by AC/DC adaptor), (9kHz – 30MHz): PASS

Emissions detected are more than 20 dB below the FCC Limits

Result of Tx mode (powered by AC/DC adaptor), (30MHz – 1GHz): PASS

Field Strength of Fundamental and Harmonics Emissions						
Quasi-Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
124.6	27.3	11.3	38.6	85.1	100	Horizontal
180.0	5.8	13.8	19.6	9.5	150	Vertical
288.7	5.1	16.2	21.3	11.6	150	Horizontal
329.1	22.8	17.9	40.7	108.4	200	Vertical
400.0	21.3	21.3	42.6	134.9	200	Vertical
498.3	4.1	22.6	26.7	21.6	200	Horizontal

Remarks:

- * Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty: (9kHz - 30MHz): 3.3dB

(30MHz - 1GHz): 4.6dB

(1GHz - 26GHz): 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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3.1.3 Power Spectral Density

Test Requirement: FCC 47CFR 15.247(e)
Test Method: ANSI C63.10:2013
Test Date: 2017-05-18
Mode of Operation: Tx mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=3kHz , VBW= 10KHz , Set the span to 1.5 times the DTS channel bandwidth. Detector = peak, Sweep time = auto couple , Trace mode = max hold. Measure the Power Spectral Density (PSD) and record the results in dBm.

Test Setup:

As Test Setup of clause 3.1.3 in this test report.

Test Limit:

The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF=10\log(3\text{ kHz}/100\text{ kHz}=-15.2\text{dB})$

Result of on mode: Pass

Maximum power spectral density

Transmitter Frequency (MHz)	Maximum Power spectral density level / 100kHz band (dBm)	Bandwidth correction factor (100kHz to 3kHz) (dB)	Maximum Power spectral density level / 3kHz band (dBm)	Maximum Power spectral density / 3kHz band limit
2412.0	-10.8	-15.2	-26.0	8dBm
2437.0	-13.7	-15.2	-28.9	8dBm
2462.0	-12.6	-15.2	-27.8	8dBm

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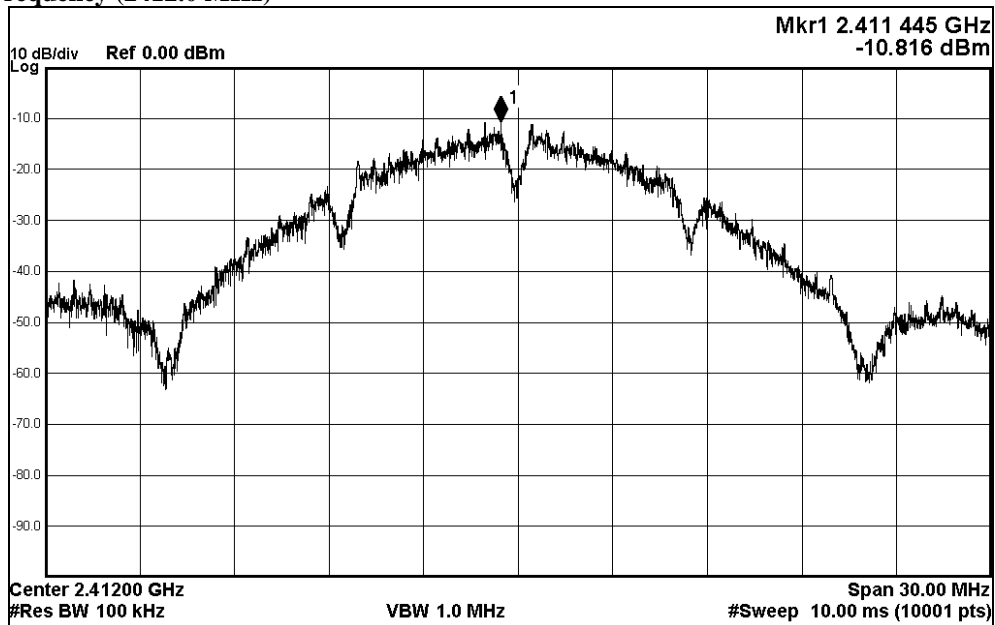
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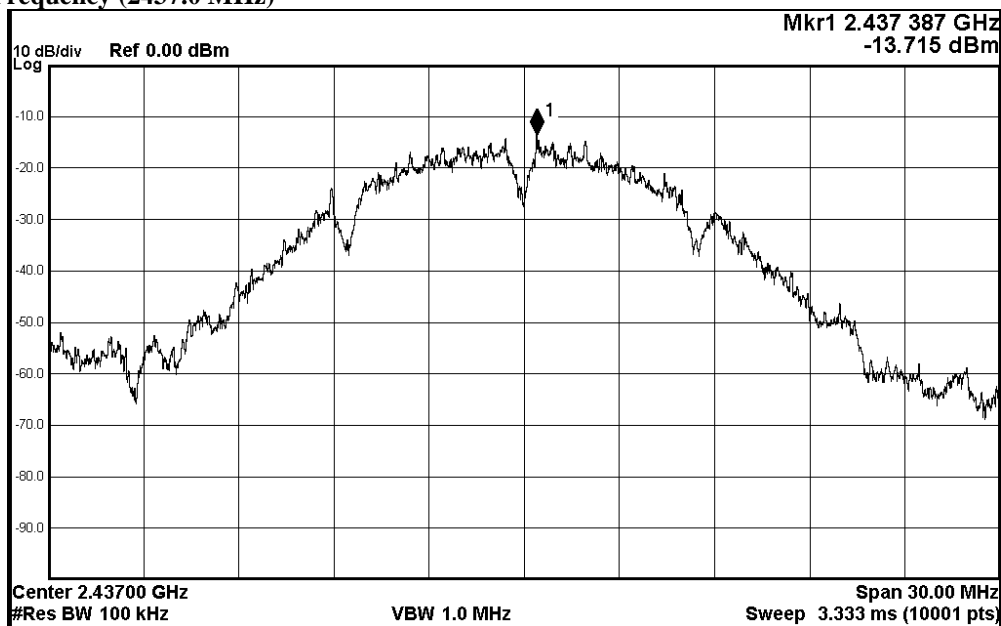
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Lowest Frequency (2412.0 MHz)



Middle Frequency (2437.0 MHz)



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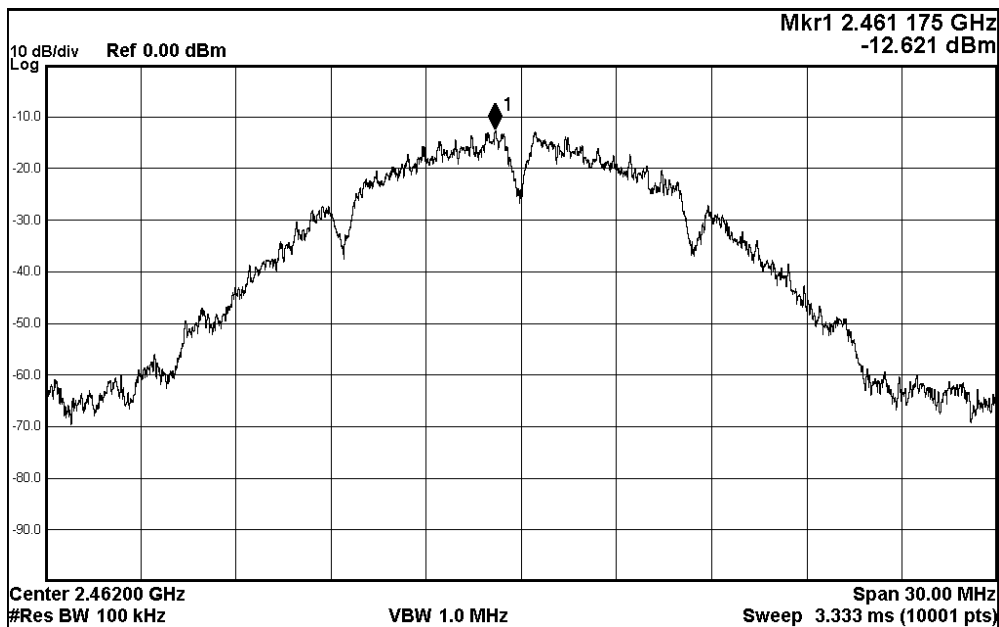
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Highest Frequency (2462.0 MHz)



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3.1.5 6dB Bandwidth Measurement

Test Requirement: FCC 47CFR 15.247(a)(2)

Test Method: ANSI C63.10-2013

Test Date: 2017-05-19

Mode of Operation: Tx mode

Remark:

The result has been done on all the possible configurations for searching the worst cases.

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.3 in this test report.

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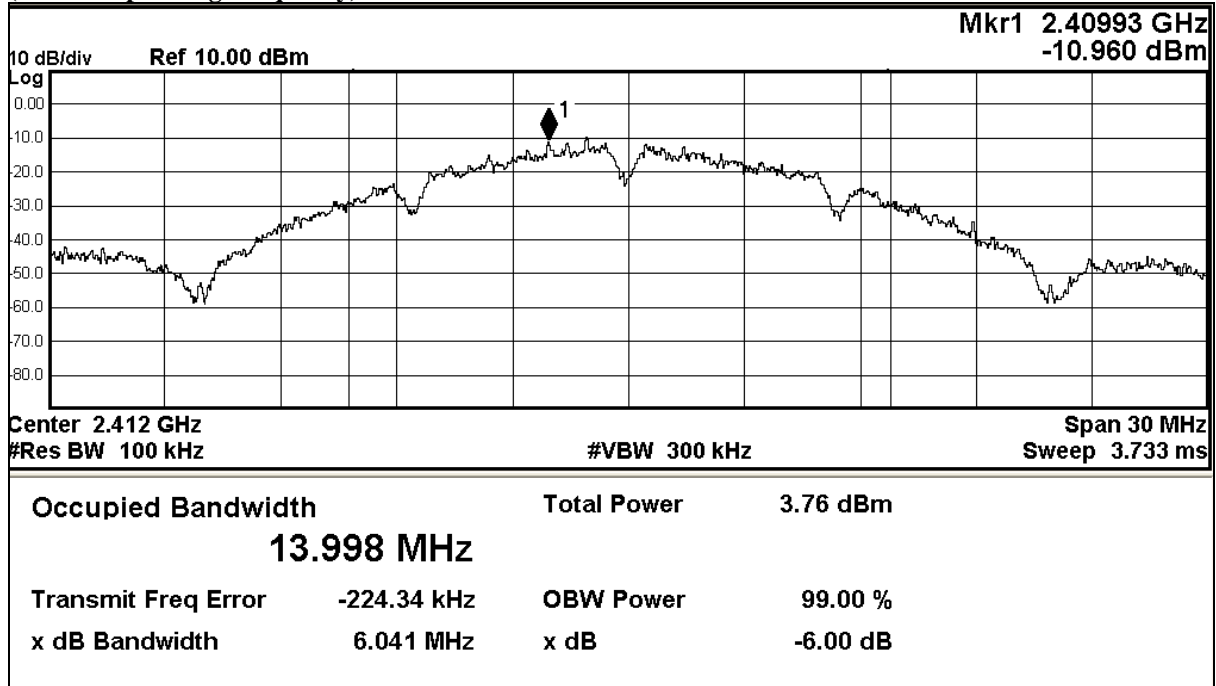
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Fundamental Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412	6.04	>500kHz

(Lowest Operating Frequency)





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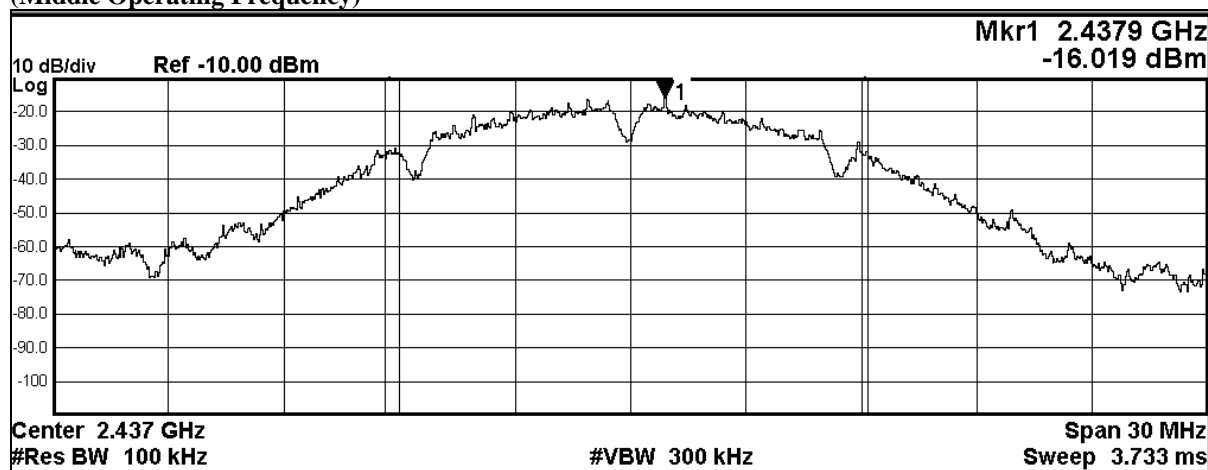
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Fundamental Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437	7.53	>500kHz

(Middle Operating Frequency)



Occupied Bandwidth	Total Power	-1.94 dBm
12.530 MHz		
Transmit Freq Error	-107.03 kHz	OBW Power
x dB Bandwidth	7.528 MHz	99.00 %
	x dB	-6.00 dB

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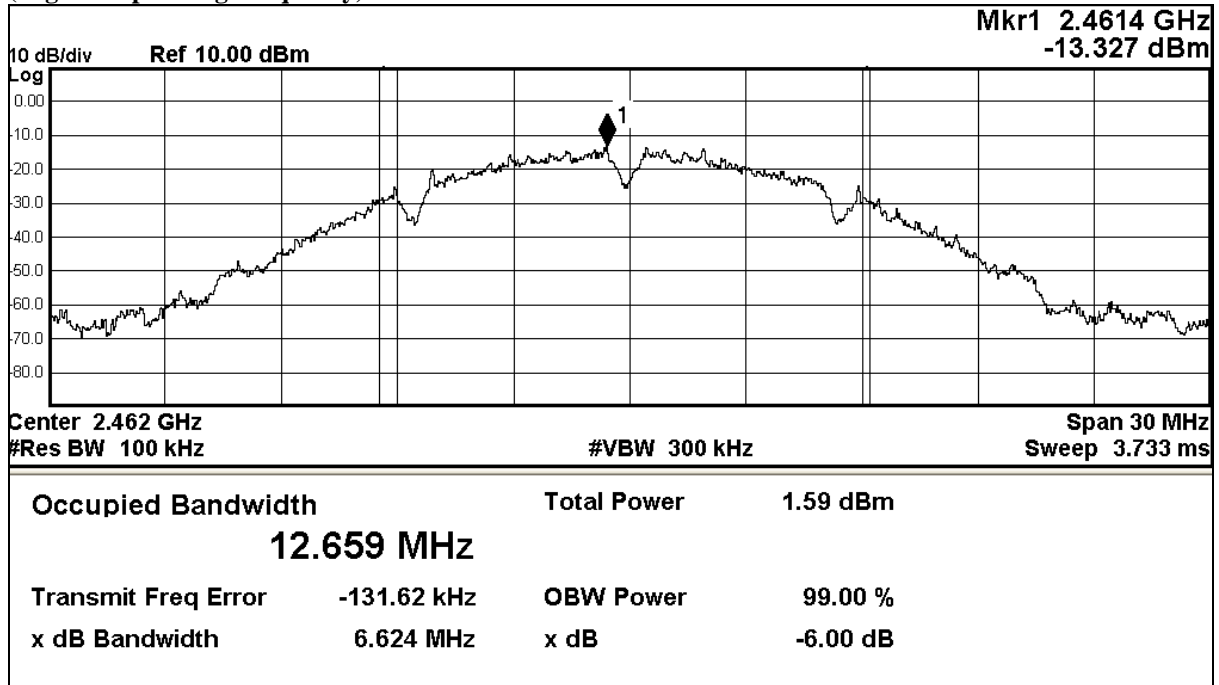
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Fundamental Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462	6.62	>500kHz

(Highest Operating Frequency)



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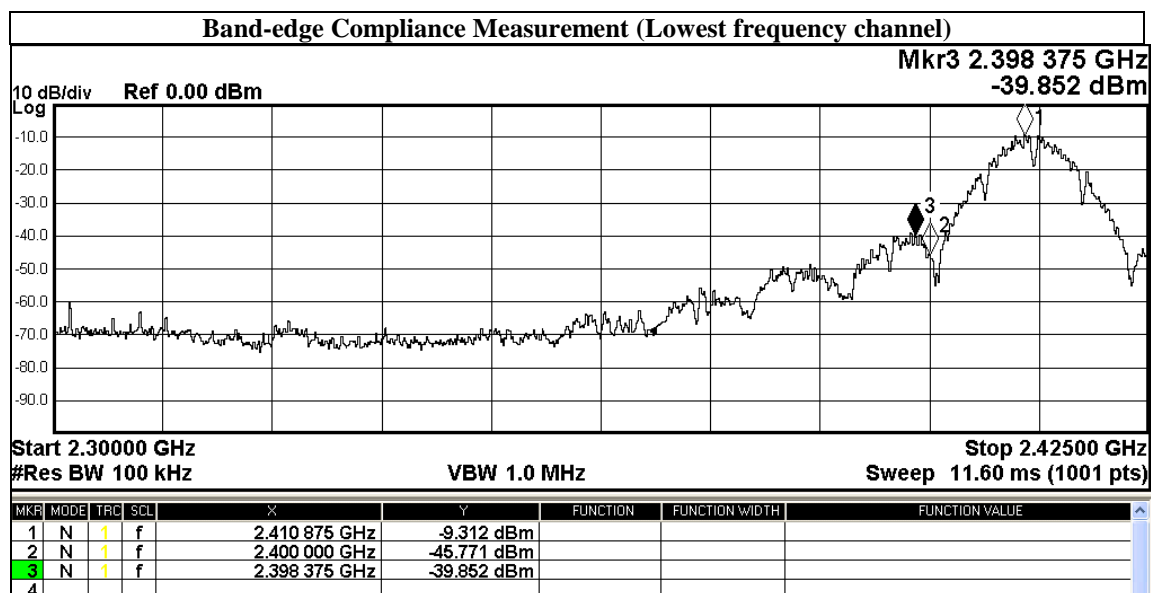
3.1.6 Band-edge Compliance Measurement:

Limit :

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

Band-edge Compliance Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2400 - Lowest Fundamental (2412)	30.5



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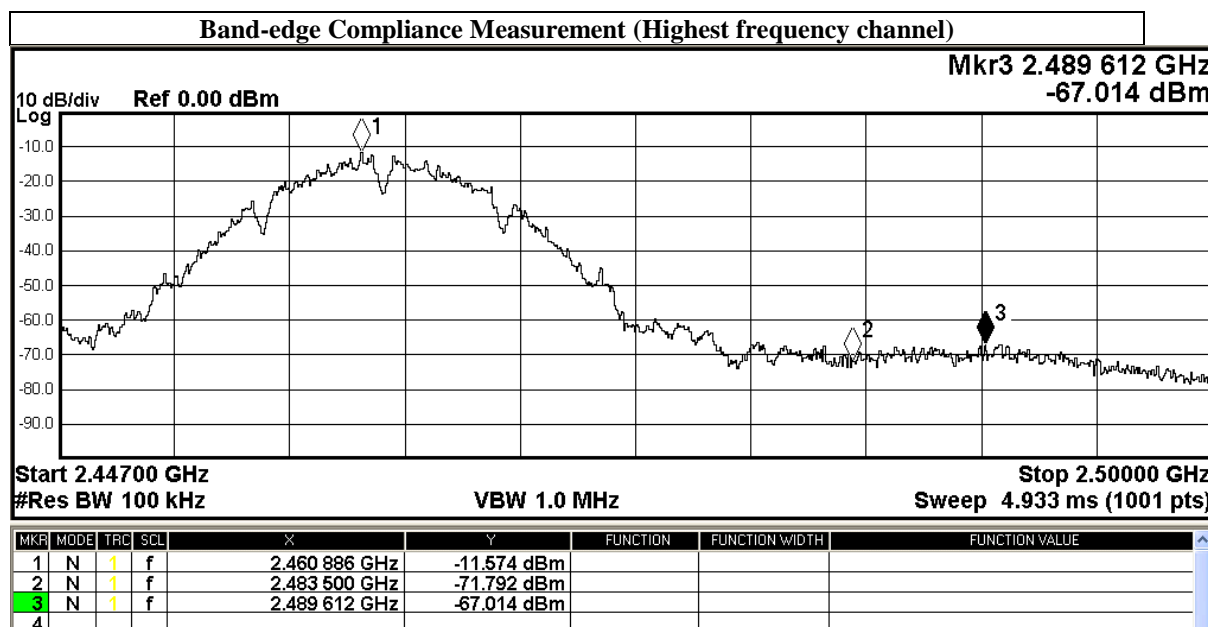
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Band-edge Compliance Measurement:

Frequency Range	Radiated Emission Attenuated below the
[MHz]	Fundamental
Highest Fundamental (2462) - 2483.5	[dB]
	55.5



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Band-edge Compliance Measurement:

Limit :

Radiated emissions which fall in the restricted bands, as defined in RSS-Gen Issue 4(see § 8.10 Restricted Frequency Bands) , must also comply with the radiated emission limits specified in RSS-Gen Table 4

Result: 802.11b (Lowest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2398.4	16.4	36.8	53.2	74.0	20.8	Vertical

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2398.4	8.4	36.8	45.2	74.0	28.8	Vertical

Result: 802.11b (Highest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2489.6	8.9	37.2	46.1	74.0	27.9	Vertical

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2489.6	-1.2	37.2	36.0	74.0	38.0	Vertical

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3.1.11 Antenna Requirement

Test Requirements: § 15.203

Test Specification:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Results:

802.11b

This is dipole antenna. There is no external antenna, the antenna gain = 2dBi. User is unable to remove or changed the Antenna.

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3.1.12 RF Exposure

Test Requirement: FCC 47CFR 15.247(i)
Test Date: 2017-05-18
Mode of Operation: Tx mode

Test Method:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

Test Results:

Test Results:

The EUT complied with the requirement(s) of this section.
EUT meets the requirements of these sections as proven through MPE calculation
The MPE calculation for EUT @ 20cm

Based on the highest P = 1.31mW (2412MHz)

$$\begin{aligned} P_d &= PG / 4\pi R^2 = (1.31 \times 1) / 12.566 \times (20)^2 \\ &= (1.31) / 12.566 \times 400 = 1.31 / 5026.4 \\ &= 0.00061212 \text{ mW/cm}^2 \end{aligned}$$

where:

- * Pd = power density in mW/cm²
- * G = Antenna numeric gain (1); Log G = g/10 (g = 0dBi).
- * P = Conducted RF power to antenna (1.31mW).
- * R = Minimum allowable distance.(20 cm)

**The SAR evaluation is not needed (this is a desk top device, R> 20 cm)

**The EUT (antenna) must be 0.2 meters away from the General Population.

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Appendix A

List of Measurement Equipment

LIST OF MEASUREMENT EQUIPMENT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDevice CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2017/04/24	2018/04/24
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2016/06/01	2017/06/01
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2016/04/27	2018/04/27
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2016/05/13	2018/05/13
EM301	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-10	00130988	2016/05/13	2018/05/13
EM302	PRECISION OMNIDIRECTIONAL DIPOLE (1 – 6GHZ)	SEIBERSDORF LABORATORIES	POD 16	161806/L	2016/05/11	2018/05/11
EM303	PRECISION OMNIDIRECTIONAL DIPOLE (6 – 18GHZ)	SEIBERSDORF LABORATORIES	POD 618	6181908/L	2016/05/11	2018/05/11
EM318	USB WIDEBAND POWER SENSOR	AGILENT	U2022XA	MY53470001	2017/03/23	2019/03/23
EM353	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2016/03/16	2018/03/16
EM354	BICONILOG ANTENNA	ETS-LINDGREN	3143B	00142073	2016/02/29	2018/02/29
EM356	ANTENNA POSITIONING TOWER	ETS-LINDGREN	2171B	00150346	N/A	N/A

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM119	LISN	R & S	ESH3-Z5	0831.5518.52	2016/11/29	2017/11/29
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2017/06/01	2018/06/01
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357-8810.52/54	2017/01/11	2018/01/11
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2017/02/02	2022/02/02
N/A	MEASUREMENT AND EVALUATION SOFTWARE	ROHDE & SCHWARZ	ESIB-K1	V1.20	N/A	N/A

Remarks:-

CM Corrective Maintenance
 N/A Not Applicable or Not Available
 TBD To Be Determined

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Appendix B

Photographs of EUT

Front View of the product



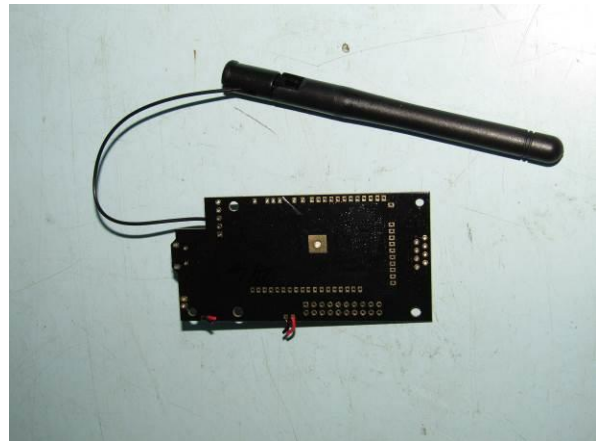
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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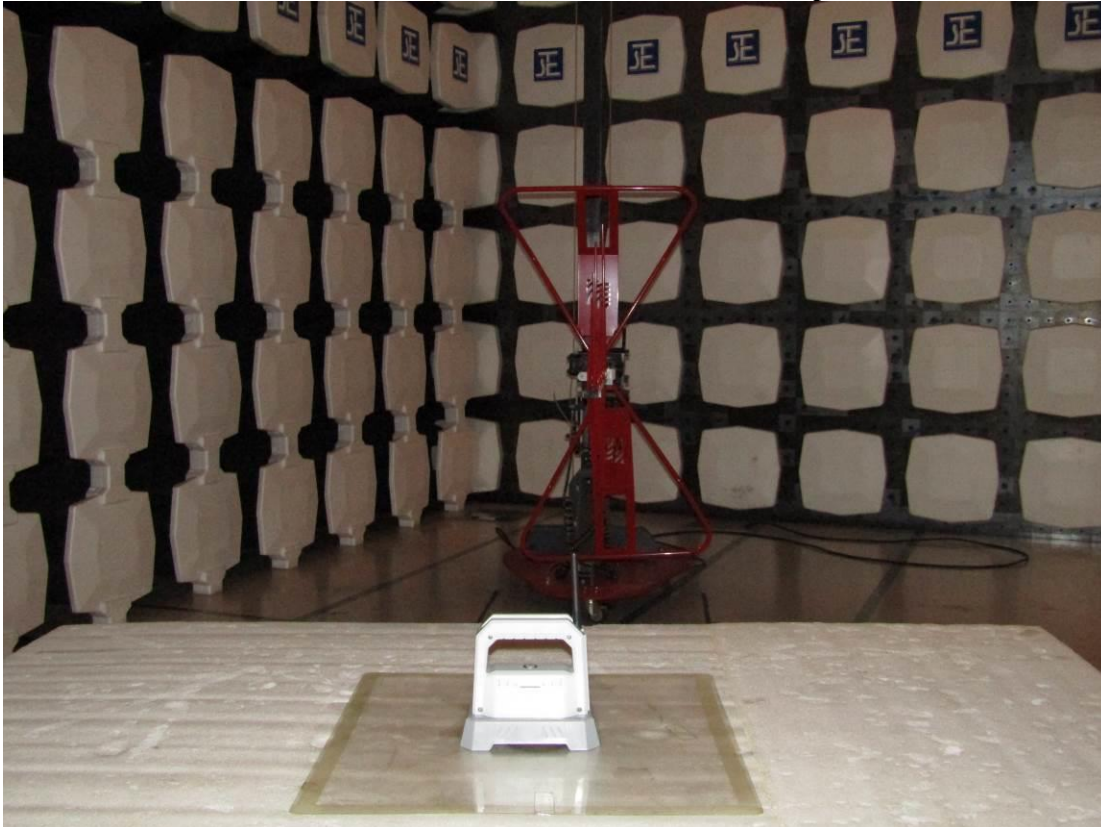
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Measurement of Radiated Emission Test Set Up



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Measurement of Radiated Emission Test Set Up



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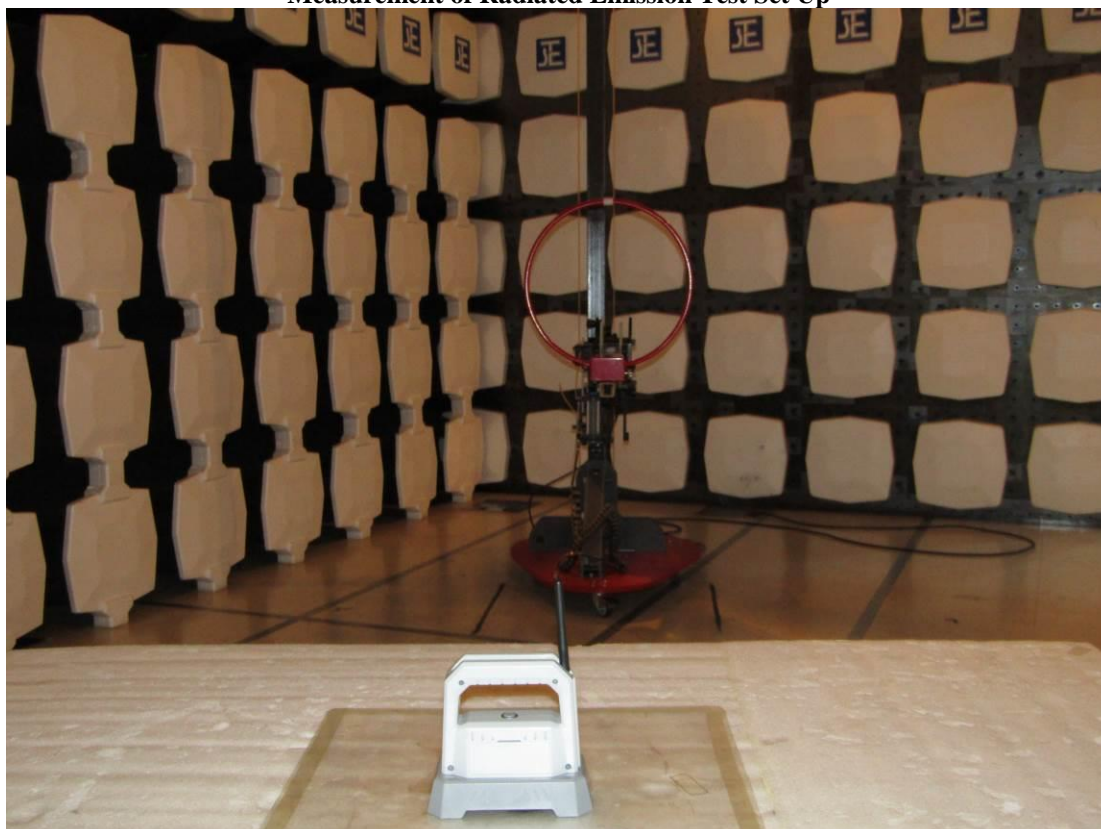
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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Measurement of Conducted Emission Test Set Up



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

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