



RF TEST REPORT

Report No.: SET2019-09844

Product Name: USB Dongle

FCC ID: UTWBTSG

IC: 6914A-BTSG

Model No. : BTSG

Applicant: Janam Technologies LLC

Address: 100 Crossways Park West Suite 105 Woodbury, NY 11797

Dates of Testing: 08/01/2019 — 08/27/2019

Issued by: CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

Lab Location: Building 28/29, East of Shigu Xili Industrial Zone, Nanshan District
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Test Report

Product Name.....: USB Dongle

Brand Name: Janam

Trade Name.....: Janam

Applicant.....: Janam Technologies LLC

Applicant Address.....: 100 Crossways Park West Suite 105 Woodbury, NY 11797

Manufacturer: Janam Technologies LLC.

Manufacturer Address: 100 Crossways Park West Suite 105 Woodbury, NY 11797

Test Standards.....: 47 CFR Part 15 .249
IC RSS-Gen(Issue 5, April 2018)
IC RSS-210(Issue 9, Aug. 2016)

Test Result: PASS

Tested by: Robin Luo 2019.08.27
Shallwe Yang, Test Engineer

Reviewed by: Chris You 2019.08.27
Chris You, Senior Engineer

Approved by: Shuangwen Zhang 2019.08.27
Shuangwen Zhang, Manager

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Change History		
Issue	Date	Reason for change
1.0	2019.08.27	First edition

1. General Information

1.1. EUT Description

EUT Type	USB Dongle
Hardware Version	103c8-r71-v2
Software Version	SCANNER_V3.9
Frequency Range	2407~2480MHz
Channel Number	74
Bit Rate of Transmitter	2Mbps
Modulation Type	GFSK
Antenna Type	PCB Antenna
Antenna Gain	1.8dBi

Note 1: The EUT is a Barcode Scanner, it operating at 2.4GHz ISM band;

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 was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C, Section 15.249:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2017	Radio Frequency Devices
2	ANSI C63.10 2013	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	15.215(c)	20dB Bandwidth	PASS
3	15.207(a)	Conducted Emission	PASS
4	15.205 15.209 15.249(a)	Radiated Emission	PASS

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10-2013.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	2407	37	2444
1	2408	38	2445
2	2409	39	2446
3	2410	40	2447
4	2411	41	2448
5	2412	42	2449
6	2413	43	2450
7	2414	44	2451
8	2415	45	2452
9	2416	46	2453
10	2417	47	2454
11	2418	48	2455
12	2419	49	2456
13	2420	50	2457
14	2421	51	2458
15	2422	52	2459
16	2423	53	2460
17	2424	54	2461
18	2425	55	2462
19	2426	56	2463
20	2427	57	2464

21	2428	58	2465
22	2429	59	2466
23	2430	60	2467
24	2431	61	2468
25	2432	62	2469
26	2433	63	2470
27	2434	64	2471
28	2435	65	2472
29	2436	66	2473
30	2437	67	2474
31	2438	68	2475
32	2439	69	2476
33	2440	70	2477
34	2441	71	2478
35	2442	72	2479
36	2443	73	2480

Test Items	Modulation Type	Channel
20dB Bandwidth Conducted and Spurious Emission Radiated and Spurious Emission	GFSK	0/33/73
Band Edge(Restricted Band)	GFSK	0/73

1.3. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Notebook	DELL	PP11L	DELL	H5914A03	FCC DOC

1.4. Facilities and Accreditations

1.4.1. Facilities

FCC-Registration No.: CN5031

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. Designation Number: CN5031, valid time is until December 31, 2019.

CAB identifier: CN0064

ISED Registration: 11185A-1

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-1 on Aug. 04, 2016, valid time is until Dec. 31, 2019.

NVLAP Lab Code: 201008-0

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

1.4.2. Test Environment Conditions

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

Temperature (°C):	15°C - 35°C
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: Internal Antenna

A internal Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Antenna General Information:

No.	EUT	Ant. Type	Gain(dBi)
1	Barcode Scanner(Dongle)	PCB	2.5

2.1.3. Result: comply

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

2.2. 20dB and 99% Occupied Bandwidth

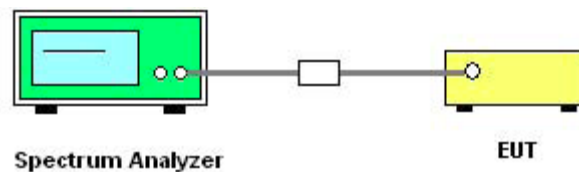
2.2.1. Limit of 20dB Bandwidth

Intentional radiators must be designed to ensure that 20dB bandwidth of the emission in the specific band.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

1. 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 30 kHz.

Set the Video bandwidth (VBW) = 100 kHz.

5. For 99% OBW, set the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz.

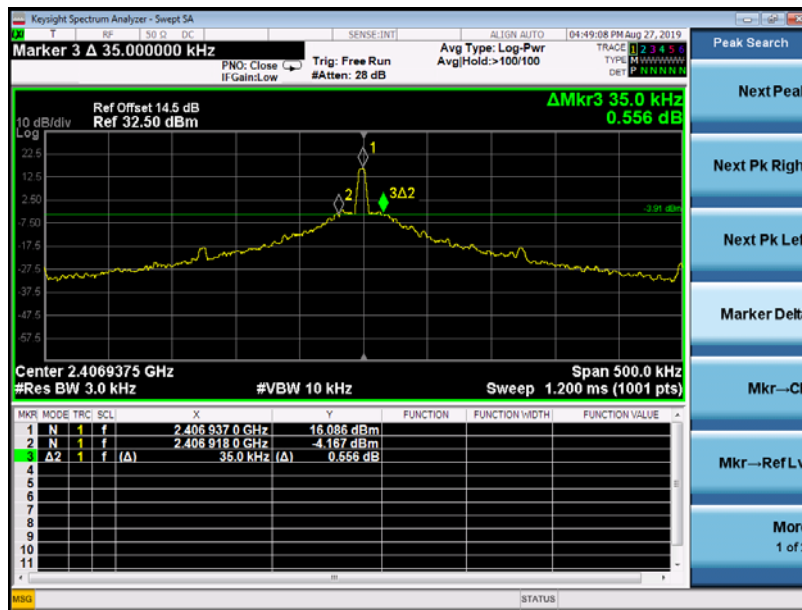
Set the Video bandwidth (VBW) = 10 kHz.

6. Measure and record the results in the test report.

2.2.5. Test Results of 20dB and 99% Occupied Bandwidth

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
0	2407	0.035	0.125
33	2440	0.029	0.119
73	2480	0.029	0.114

2.2.6. Test Results (plots) of 20dB and 99% Occupied Bandwidth



2407MHz



2440MHz



2480MHz

99% OBW



2407MHz



2440MHz



2480MHz

2.3. Radiated Emission

2.3.1. Limit of Radiated Emission

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	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

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

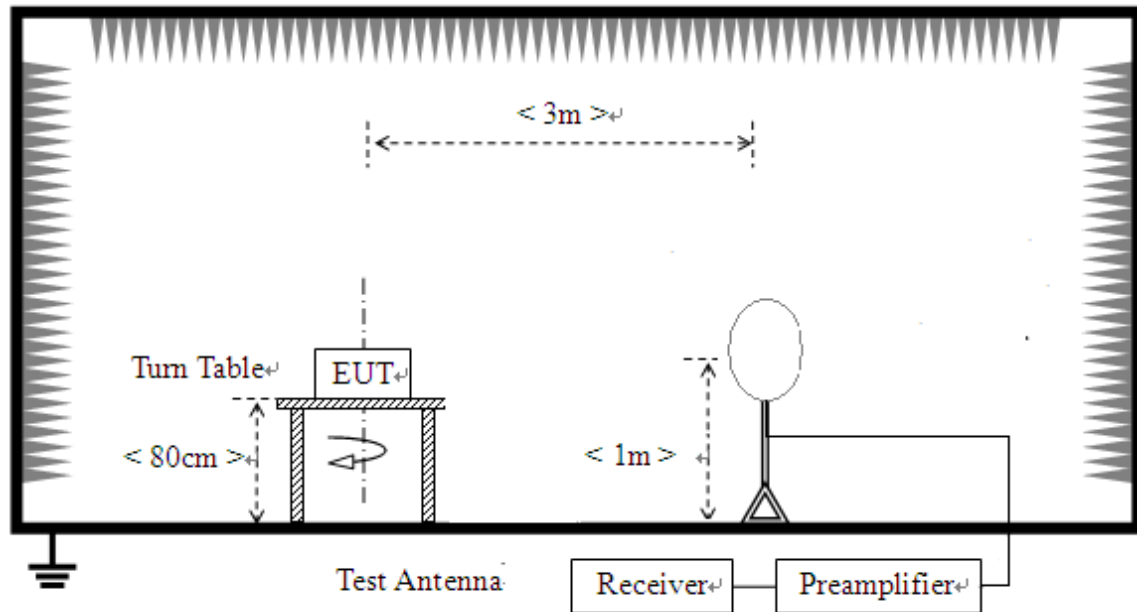
Note: Emission level(dBuV/m)=20log Emission level(uV/m)

2.3.2. Measuring Instruments

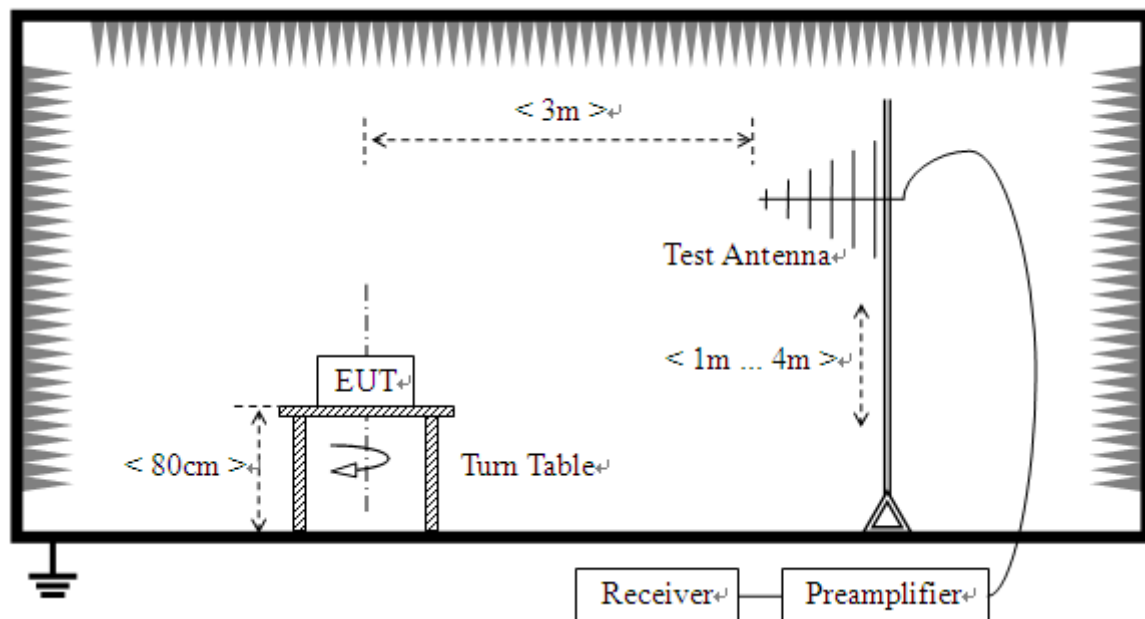
The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup

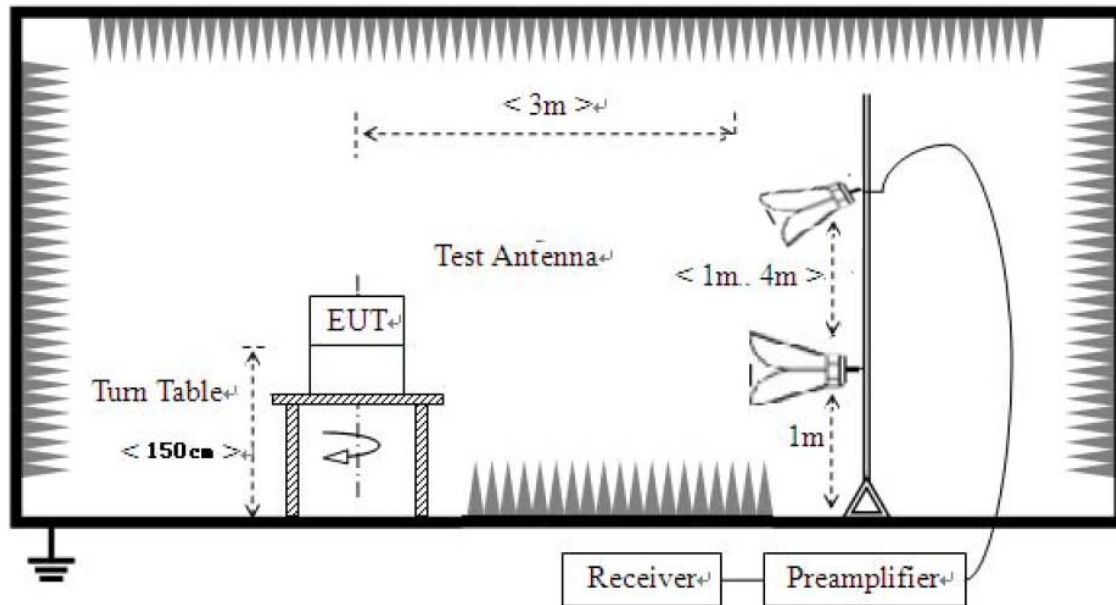
For radiated emissions from 9 KHz to 30 MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.3.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.

Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

7. For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

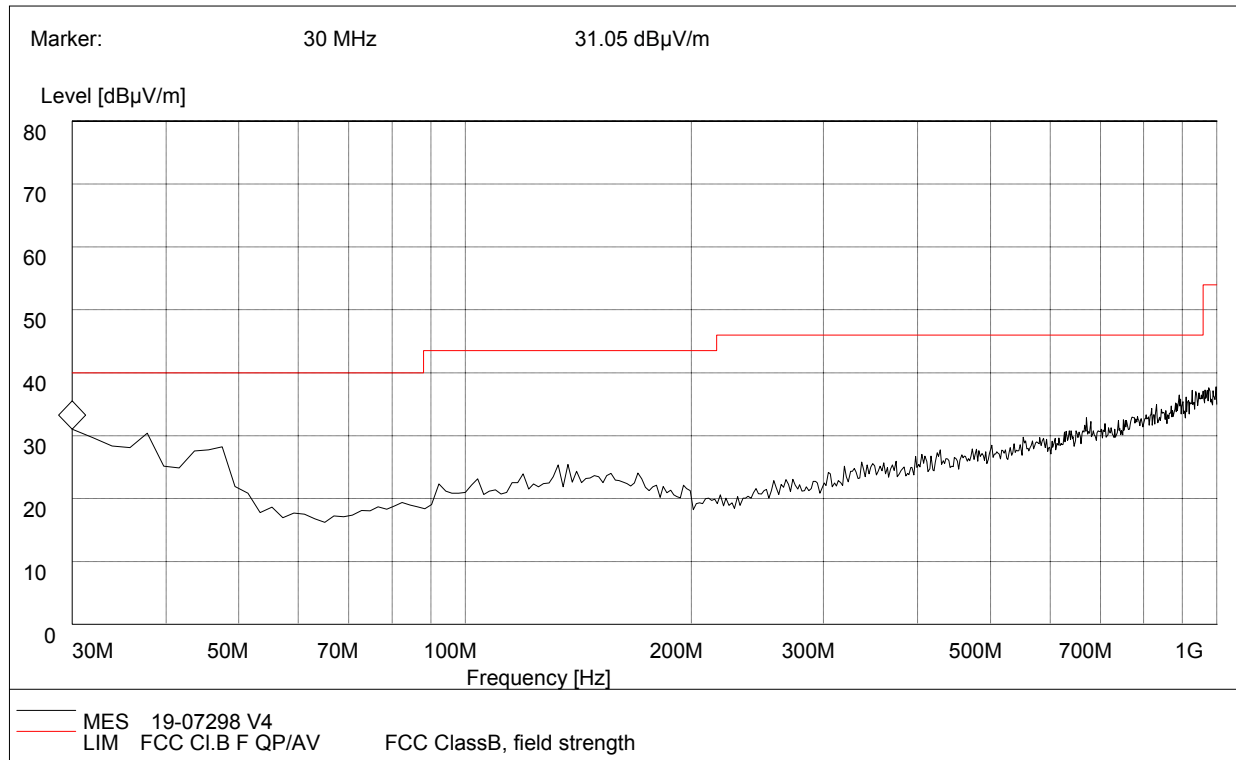
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. 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.

2.3.5. Test Results of Radiated Band Edge and Spurious Emission

For 9 kHz to 30MHz

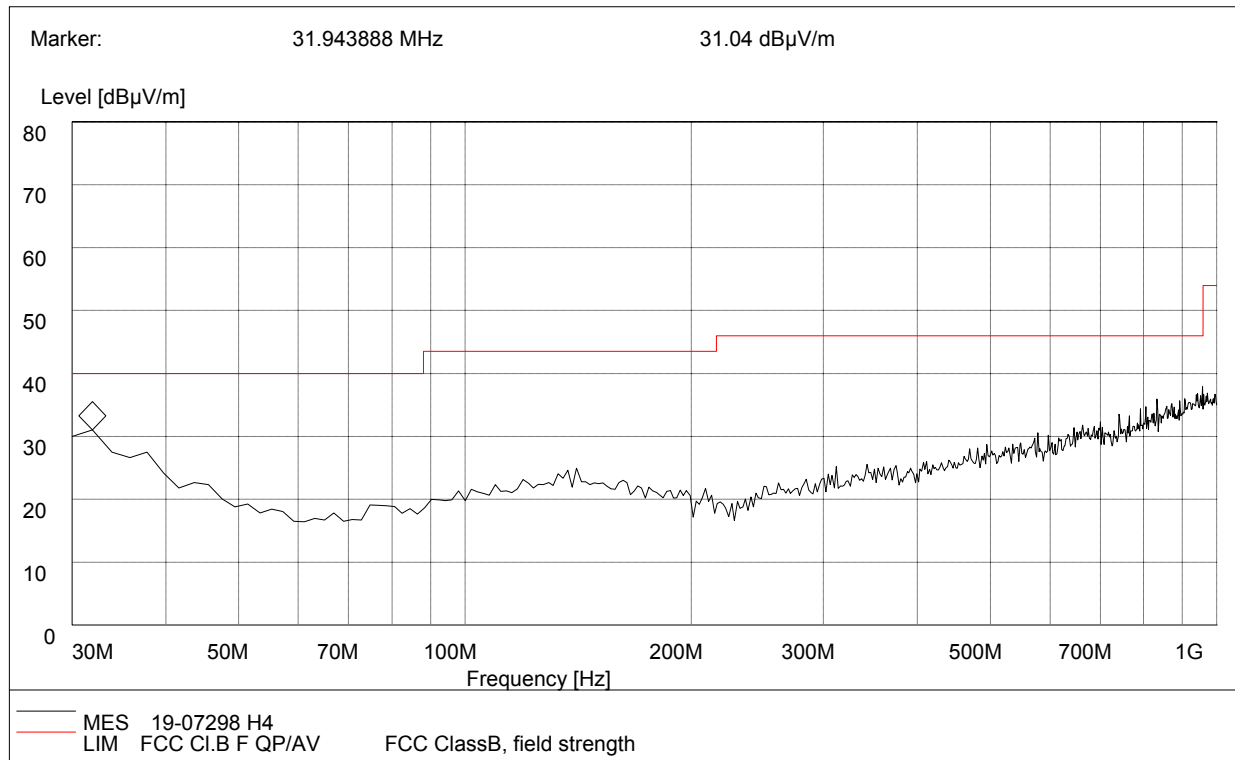
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1000 MHz



30MHz to 1GHz, Antenna Vertical

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
30	31.05	120.000	150.0	40.0	Vertical	Pass



30MHz to 1GHz, Antenna Horizontal

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Antenna	Verdict
31.94	31.04	120.000	150.0	40.0	Horizontal	Pass

For 1GHz to 25 GHz
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (0CH_2407MHz)

No.	Fre. (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390	53.21	PK	74.00	-20.79	1.6	300	51.91	5.2	28.60	32.5	1.3
2	2390	45.03	AV	54.00	-8.97	1.6	300	43.73	5.2	28.60	32.5	1.3
3	2407*	96.62	PK	114.00	-17.38	1.6	300	95.02	5.3	28.70	32.4	1.6
4	2407*	91.22	AV	94.00	-2.78	1.6	300	89.62	5.3	28.70	32.4	1.6
5	4814	50.32	PK	74.00	-23.68	1.6	300	43.92	7.4	30.40	31.4	6.4
6	4814	41.82	AV	54.00	-12.18	1.6	300	35.42	7.4	30.40	31.4	6.4
7	7221	51.62	PK	74.00	-22.38	1.6	300	42.32	9.9	31.50	32.1	9.3
8	7221	43.36	AV	54.00	-10.64	1.6	300	34.06	9.9	31.50	32.1	9.3

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (0CH 2407MHz)

No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2390	52.69	PK	74.00	-21.31	1.5	70	51.39	5.2	28.60	32.5	1.3
2	2390	43.04	AV	54.00	-10.96	1.5	70	41.74	5.2	28.60	32.5	1.3
3	2407*	95.36	PK	114.00	-18.64	1.5	70	93.76	5.3	28.70	32.4	1.6
4	2407*	89.65	AV	94.00	-4.35	1.5	70	88.05	5.3	28.70	32.4	1.6
5	4814	52.13	PK	74.00	-21.87	1.5	70	45.73	7.4	30.40	31.4	6.4
6	4814	43.76	AV	54.00	-10.24	1.5	70	37.36	7.4	30.40	31.4	6.4
7	7221	53.33	PK	74.00	-20.67	1.5	70	44.03	9.9	31.50	32.1	9.3
8	7221	45.07	AV	54.00	-8.93	1.5	70	35.77	9.9	31.50	32.1	9.3

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (33CH_2440MHz)

No.	Fre. (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2440*	93.65	PK	114.00	-20.35	1.7	240	91.55	5.4	28.7	32	2.1
2	2440*	89.36	AV	94.00	-4.64	1.7	240	87.26	5.4	28.7	32	2.1
3	4880	51.63	PK	74.00	-22.37	1.7	240	45.23	6.7	31.20	31.5	6.4
4	4880	43.43	AV	54.00	-10.57	1.7	240	37.03	6.7	31.20	31.5	6.4
5	7320	52.64	PK	74.00	-21.36	1.7	240	46.24	6.7	31.20	31.5	6.4
6	7320	43.06	AV	54.00	-10.94	1.7	240	36.66	6.7	31.20	31.5	6.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (33CH_2440MHz)

No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2440*	94.56	PK	114.00	-19.44	1.5	80	92.46	5.4	28.7	32	2.1
2	2440*	90.33	AV	94.00	-3.67	1.5	80	88.23	5.4	28.7	32	2.1
3	4880	52.61	PK	74.00	-21.39	1.5	80	46.21	6.7	31.20	31.5	6.4
4	4880	42.63	AV	54.00	-11.37	1.5	80	36.23	6.7	31.20	31.5	6.4
5	7320	52.68	PK	74.00	-21.32	1.5	80	46.28	6.7	31.20	31.5	6.4
6	7320	45.12	AV	54.00	-8.88	1.5	80	38.72	6.7	31.20	31.5	6.4

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (73CH_2480MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2480*	95.33	PK	114.00	-18.67	1.6	280	91.53	6.1	29.2	31.5	3.8
2	2480*	92.14	AV	94.00	-1.86	1.6	280	88.34	6.1	29.2	31.5	3.8
3	2483.5	51.18	PK	74.00	-22.82	1.6	280	47.78	5.7	29.50	31.8	3.4
4	2483.5	43.69	AV	54.00	-10.31	1.6	280	40.29	5.7	29.50	31.8	3.4
5	4960	52.63	PK	74.00	-21.37	1.6	280	47.08	7	30.05	31.5	5.55
6	4960	44.38	AV	54.00	-9.62	1.6	280	38.83	7	30.05	31.5	5.55
7	7440	53.33	PK	74.00	-20.67	1.6	280	38.13	16	31.20	32	15.2
8	7440	45.75	AV	54.00	-8.25	1.6	280	30.55	16	31.20	32	15.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (73CH_2480MHz)

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Cab. Loss (dB)	Ant. Factor (dB)	Pre. Amp. (dB)	Cor. Factor (dB/m)
1	2480*	96.32	PK	114.00	-17.68	1.5	280	92.52	6.1	29.2	31.5	3.8
2	2480*	92.65	AV	94.00	-1.35	1.5	280	88.85	6.1	29.2	31.5	3.8
3	2483.5	52.63	PK	74.00	-21.37	1.5	280	49.23	5.7	29.50	31.8	3.4
4	2483.5	44.38	AV	54.00	-9.62	1.5	280	40.98	5.7	29.50	31.8	3.4
5	4960	53.32	PK	74.00	-20.68	1.5	280	47.77	7	30.05	31.5	5.55
6	4960	45.84	AV	54.00	-8.16	1.5	280	40.29	7	30.05	31.5	5.55
7	7440	53.98	PK	74.00	-20.02	1.5	280	38.78	16	31.20	32	15.2
8	7440	45.80	AV	54.00	-8.2	1.5	280	30.6	16	31.20	32	15.2

REMARKS:

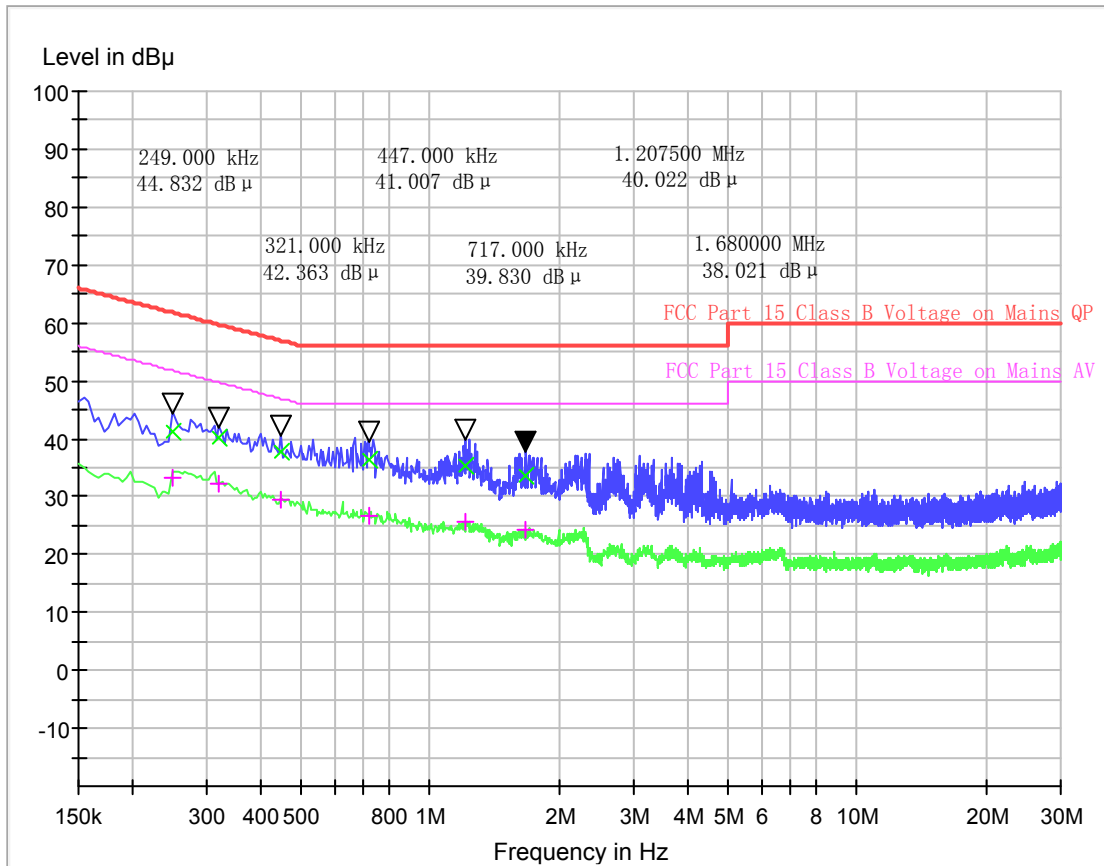
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
- Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level - Limit value
5. " * ": Fundamental frequency.

2.4.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.4.5. Test Results of Conducted Emission

1. The EUT configuration of the emission tests is Tx Mode + USB (Charging)

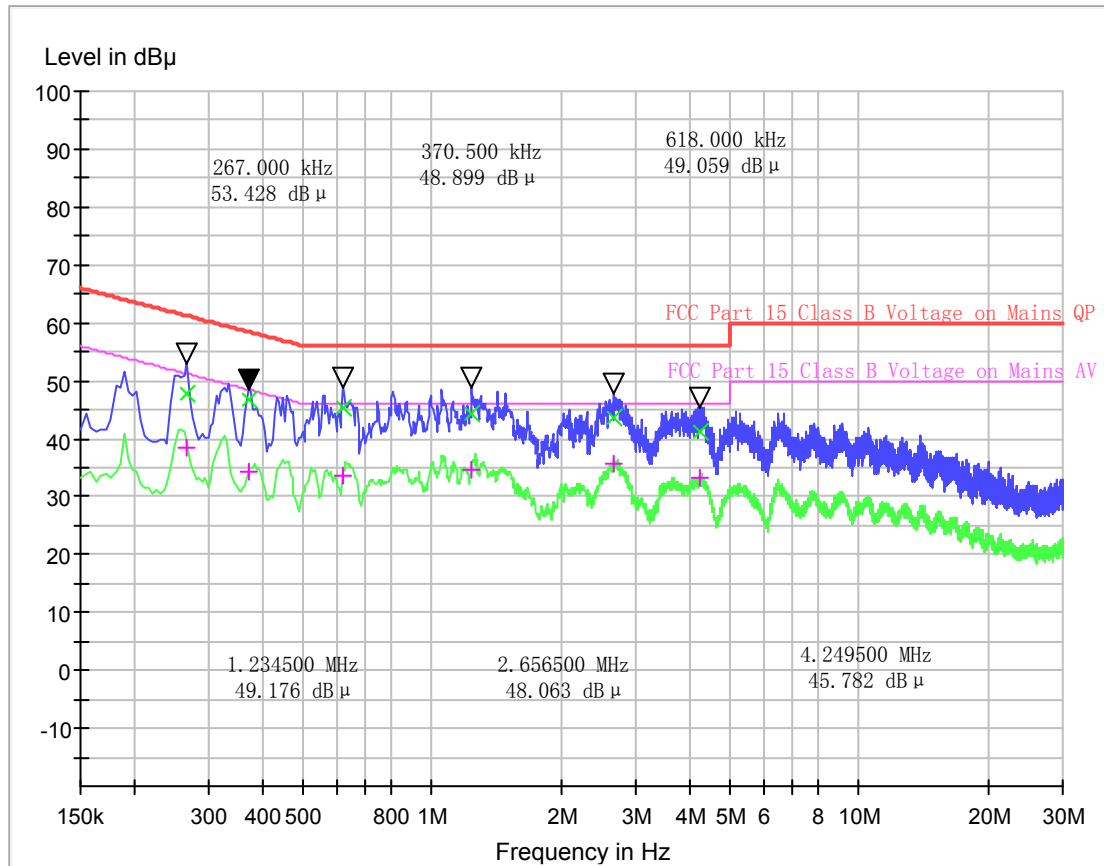


(Plot A: L Phase)

Conducted Disturbance at Mains Terminals

L Test Data

QP			AV		
Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)	Frequency (MHz)	Limits (dBμV)	Measurement Value (dBμV)
0.249000	61.8	41.37	0.249000	61.8	33.28
0.321000	59.7	40.22	0.321000	59.7	32.27
0.447000	56.9	37.79	0.447000	56.9	29.43
0.717000	56.0	36.41	0.717000	56.0	26.77
1.207500	56.0	35.46	1.207500	56.0	25.68
1.680000	56.0	33.46	1.680000	56.0	24.10



(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)
0.267000	61.2	47.82	0.267000	51.2	38.47
0.370500	58.5	46.90	0.370500	48.5	34.39
0.618000	56.0	45.35	0.618000	46.0	33.60
1.234500	56.0	44.43	1.234500	46.0	34.55
2.656500	56.0	43.57	2.656500	46.0	35.55
4.249500	56.0	41.22	4.249500	46.0	33.13

Test Result: PASS

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI TEST RECEIVER	R&S	ESW26	A180502935	2018.11.01	2019.10.31
2	Power Meter	R&S	NRP-Z31	102872	2019.05.05	2020.05.04
3	TURNTABLE	ETS	2088	2149	N/A	N/A
4	ANTENNA MAST	ETS	2075	2346	N/A	N/A
5	EMI TEST Software	R&S	ESK1	N/A	N/A	N/A
6	Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.11.10	2020.11.09
7	Amplifier	MILMEGA	80RF1000-250	A140901925	2017.10.09	2020.10.08
8	JS amplifier	AR	25S1G4AM1	A0304248	2017.10.09	2020.10.08
9	High pass filter	Compliance Direction systems	BSU-6	34202	2018.11.11	2019.11.10
13	Horn Antenna	ShwarzBeck	9120D	1012	2018.11.11	2019.11.10
14	Horn Antenna	ShwarzBeck	BBHA9170	25841	2018.11.11	2019.11.10
15	ULTRA-BROADBAND ANTENNA	R&S	HL562	A0304224	2017.07.14	2020.07.13
16	Passive Loop Antenna	R&S	HFH2-Z2	100047	2019.04.26	2022.04.25
17	Temperature chamber	Dongguan gaoda instrument CO.LTD	GD-7005-100	130130101	2019.04.22	2020.04.21
18	Spectrum Analyzer	Keysight	N9030A	A160702554	2018.11.15	2019.11.14
19	Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02

** END OF REPORT **