

TEST REPORT

Applicant:	Shenzhen Loyal Electronics Co.,Ltd
Address:	No.5 The First Industrial Area of Shanmen, Songgang, Baoan, 518000 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Manufacturer or Supplier	Shenzhen Loyal Electronics Co.,Ltd
Address	No.5 The First Industrial Area of Shanmen, Songgang, Baoan, 518000 Shenzhen, PEOPLE'S REPUBLIC OF CHINA
Product:	Wireless Receiver
Brand Name:	Loshine
Model:	R3616
Additional Model & Model Difference	N/A
Date of tests:	Jun. 11 to Jul. 27, 2020

the tests have been carried out according to the requirements of the following standard:

FCC Part 15, Subpart C, Section 15.249

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Evans He Project Engineer / EMC Department	Approved by David Huang Assistant Manager / EMC Department
<i>Evans He</i>	<i>David Huang</i>
Date: Feb. 03, 2021	

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Test Report No.: RF2102WSZ0009

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2102WSZ0009	Original release	Feb. 03, 2021

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.249)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	No antenna connector is used
§15.207 (a)	Conducted Emission	PASS	Powered from host unit
§15.205	Restricted Band of Operation	PASS	Compliant
§15.209 §15.249(a)	Radiated Emission	PASS	Compliant
§15.215(c)	20dB Bandwidth Test	PASS	Compliant

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	9KHz ~ 30MHz	±2.16dB
	30MHz ~ 1GMHz	±3.74dB
	1GHz ~ 18GHz	±4.66dB
	18GHz ~ 40GHz	±4.67dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Receiver
MODEL NO.	R3616
ADDITIONAL MODEL	N/A
FCC ID	2AAVD-R3616
NOMINAL VOLTAGE	DC 5V From Host unit
MODULATION TYPE	GFSK
OPERATING FREQUENCY	2404-2479MHz
ANTENNA TYPE	wire Antenna, with 0dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTES:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2102WSZ0009) for detailed product photo.



3.2 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and packet type. The worst case was found when the EUT was positioned on Y axis for radiated emission. The EUT was tested under the following mode.

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE≥1G	PLC	BW	
A	√	√	√	√	DC 5V From Host unit

Where **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz
BW: 20db bandwidth

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

Following channel(s) was (were) selected for the test as listed below.

TESTED CHANNEL	TESTED FREQUENCY
Low	2404 MHz
Middle	2440 MHz
High	2479 MHz



Channel List

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
1	2404	17	2423	33	2442	49	2461
2	2405	18	2424	34	2443	50	2462
3	2406	19	2425	35	2444	51	2466
4	2407	20	2426	36	2445	52	2467
5	2408	21	2427	37	2446	53	2468
6	2409	22	2428	38	2450	54	2469
7	2410	23	2429	39	2451	55	2470
8	2411	24	2430	40	2452	56	2471
9	2412	25	2434	41	2453	57	2472
10	2413	26	2435	42	2454	58	2473
11	2414	27	2436	43	2455	59	2474
12	2418	28	2437	44	2456	60	2475
13	2419	29	2438	45	2457	61	2476
14	2420	30	2439	46	2458	62	2477
15	2421	31	2440	47	2459	63	2478
16	2422	32	2441	48	2460	64	2479

Note: The more detailed channel, please refer to the product specifications

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	25deg. C, 55%RH	DC 5V From Host unit	Aaron Liang
BW	25deg. C, 56%RH	DC 5V From Host unit	Aaron Liang
PLC	25deg. C, 56%RH	DC 5V From Host unit	Aaron Liang

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, Section 15.249

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an dependent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Computer	Lenovo	E40-30	MP05R4Z1	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB extension cord 1m,Unshielded

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCS30	8471241027	Mar. 24, 20	Mar. 24, 21
Artificial Mains Network	SCHWARZBECK	8127	8127713	Mar. 24, 20	Mar. 24, 21
ISN	Com-Power	ISN T800	34373	Mar. 24, 20	Mar. 24, 21
Test software	EZ-EMC	ICP-03A1	N/A	N/A	N/A

- NOTE:**
1. The test was performed in shielded room 843.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.1.3 TEST PROCEDURES

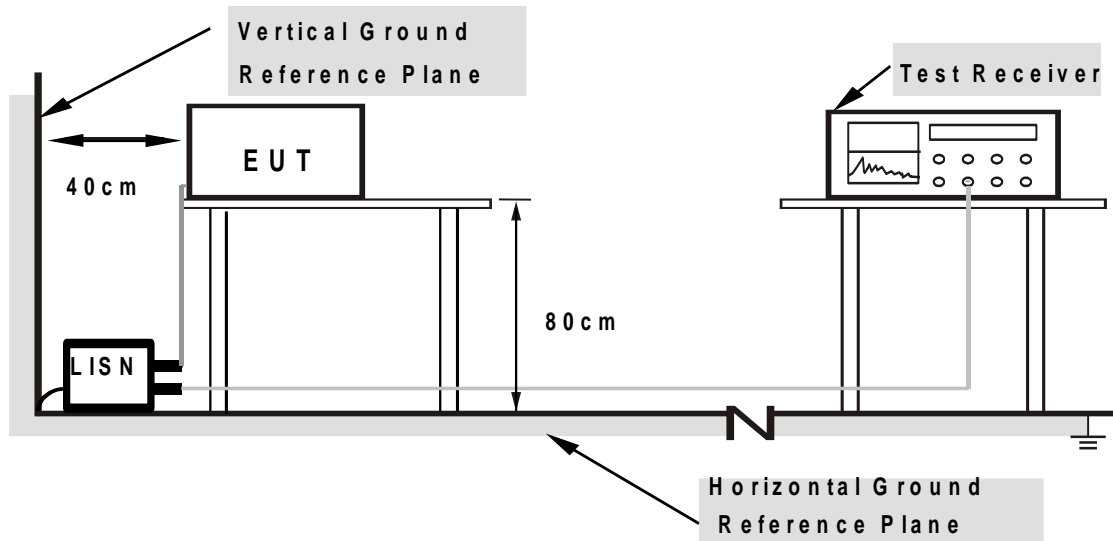
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.



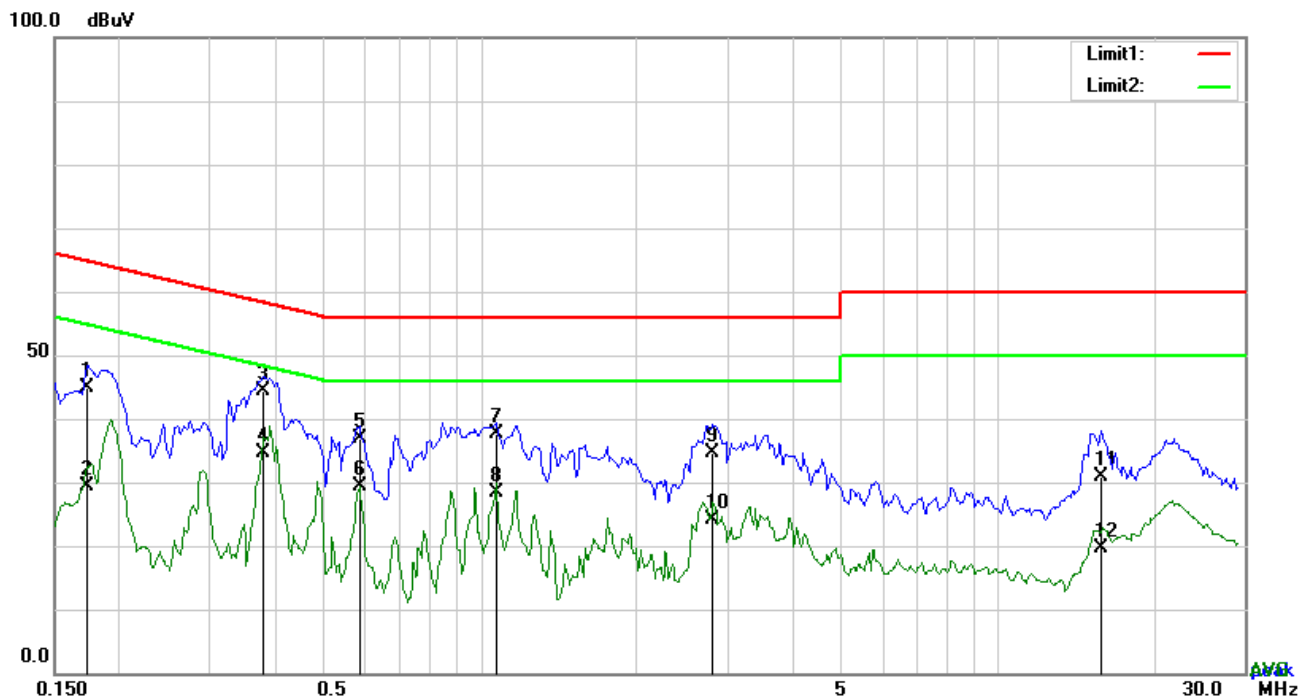
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA:

PHASE	Line	6dB BANDWIDTH	9kHz
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NO.	P/L	FREQUENCY (MHZ)	READING (DBUV)	DETECTOR	CORRECTED (DB)	RESULT (DBUV)	LIMIT (DBUV)	MARGIN (DB)
1	L1	0.1734	34.79	QP	10.12	44.91	64.80	-19.89
2	L1	0.1734	19.34	AVG	10.12	29.46	54.80	-25.34
3	L1	0.3801	34.26	QP	10.11	44.37	58.28	-13.91
4	L1	0.3801	24.51	AVG	10.11	34.62	48.28	-13.66
5	L1	0.5829	26.85	QP	10.10	36.95	56.00	-19.05
6	L1	0.5829	19.20	AVG	10.10	29.30	46.00	-16.70
7	L1	1.0743	27.43	QP	10.13	37.56	56.00	-18.44
8	L1	1.0743	18.33	AVG	10.13	28.46	46.00	-17.54
9	L1	2.8176	24.39	QP	10.16	34.55	56.00	-21.45
10	L1	2.8176	13.99	AVG	10.16	24.15	46.00	-21.85
11	L1	15.8154	20.42	QP	10.34	30.76	60.00	-29.24
12	L1	15.8154	9.36	AVG	10.34	19.70	50.00	-30.30

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

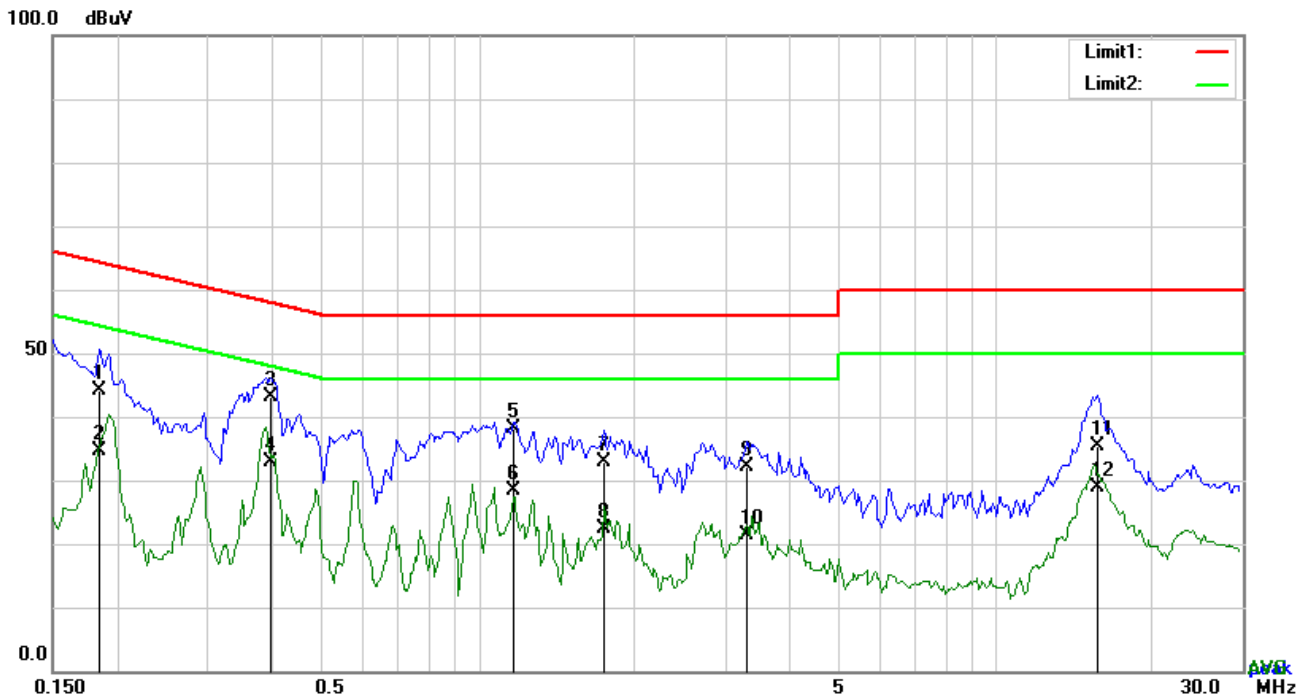




PHASE	Neutral	6dB BANDWIDTH	9kHz
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NO.	P/L	FREQUENCY (MHZ)	READING (DBUV)	DETECTOR	CORRECTED (DB)	RESULT (DBUV)	LIMIT (DBUV)	MARGIN (DB)
1	N	0.1851	33.93	QP	10.14	44.07	64.25	-20.18
2	N	0.1851	24.57	AVG	10.14	34.71	54.25	-19.54
3	N	0.3957	32.92	QP	10.13	43.05	57.94	-14.89
4	N	0.3957	22.78	AVG	10.13	32.91	47.94	-15.03
5	N	1.1718	28.10	QP	10.15	38.25	56.00	-17.75
6	N	1.1718	18.19	AVG	10.15	28.34	46.00	-17.66
7	N	1.7451	22.74	QP	10.16	32.90	56.00	-23.10
8	N	1.7451	12.14	AVG	10.16	22.30	46.00	-23.70
9	N	3.3042	21.92	QP	10.18	32.10	56.00	-23.90
10	N	3.3042	11.22	AVG	10.18	21.40	46.00	-24.60
11	N	15.7374	25.16	QP	10.32	35.48	60.00	-24.52
12	N	15.7374	18.54	AVG	10.32	28.86	50.00	-21.14

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
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	Field strength of fundamental (milli-volts/meter)	Field strength of harmonics (micro-volts/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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESL6	1300.5001K06 -100262-eQ	Mar. 24, 20	Mar. 24, 21
Bilog Antenna	Sunol Sciences	JB6	A110712	Apr. 08, 20	Apr. 07, 21
Active Antenna	CMO-POWER	AL-130	121031	Mar. 27, 20	Mar. 26, 21
Signal Amplifier	HP	8447E	443008	Mar. 24, 20	Mar. 24, 21
3m Semi-anechoic Chamber	SAEMC	9m*6m*6m	N/A	Oct. 18, 18	Oct. 17, 21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A
Spectrum	Agilent	E4446A	MY46180622	May 08, 20	May 07, 21
MXA signal analyzer	Agilent	N9020A	MY49100060	Mar. 24, 20	Mar. 24, 21
Horn Antenna	COM-POWER	HAH-118	71259	Apr. 17, 20	Apr. 17, 21
Horn Antenna	COM-POWER	HAH-118	71283	Mar. 20, 20	Mar. 19, 21
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170147	Jun. 30, 20	Jun. 29, 21
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170242	Jun. 30, 20	Jun. 29, 21
AMPLIFIER	EM Electornic Corporation	EM01G26G	60613	Mar. 24, 20	Mar. 24, 21
AMPLIFIER	Emc Instruments Corporation	Emc012645	980077	Jan. 04, 20	Jan. 03, 21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A

NOTE:

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments are 12 months (except 3mSemi-anechoic Chamber) and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above1GHz if tested.
4. The FCC Site Registration No. is 535293.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. 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.

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 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

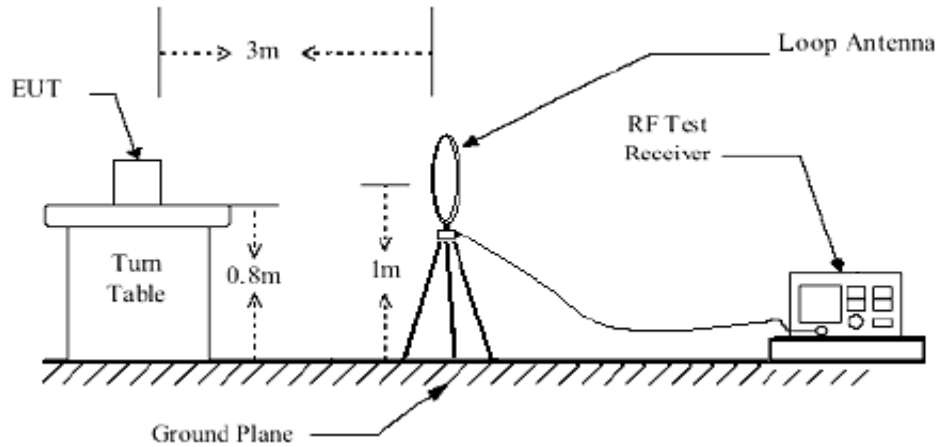
4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

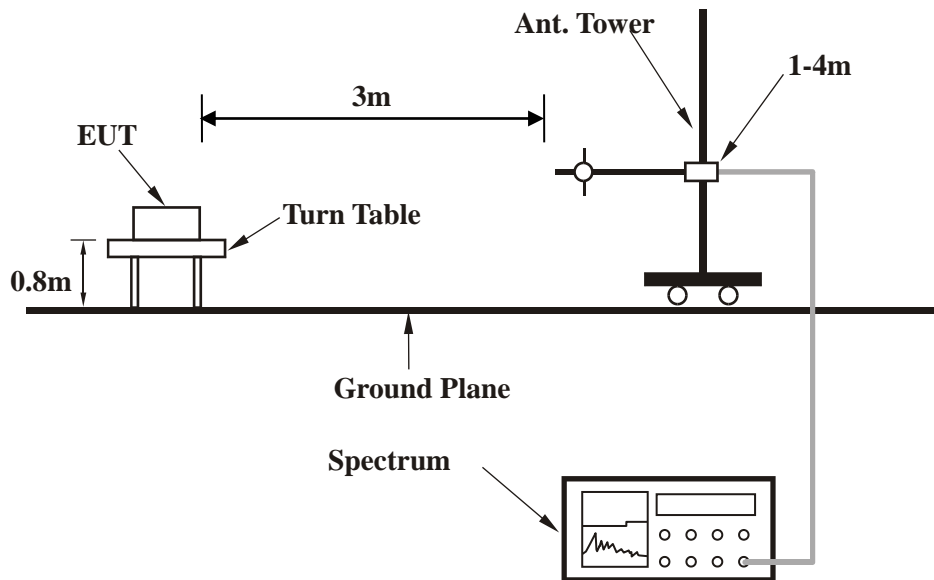


4.1.5 TEST SETUP

Below 30MHz test setup

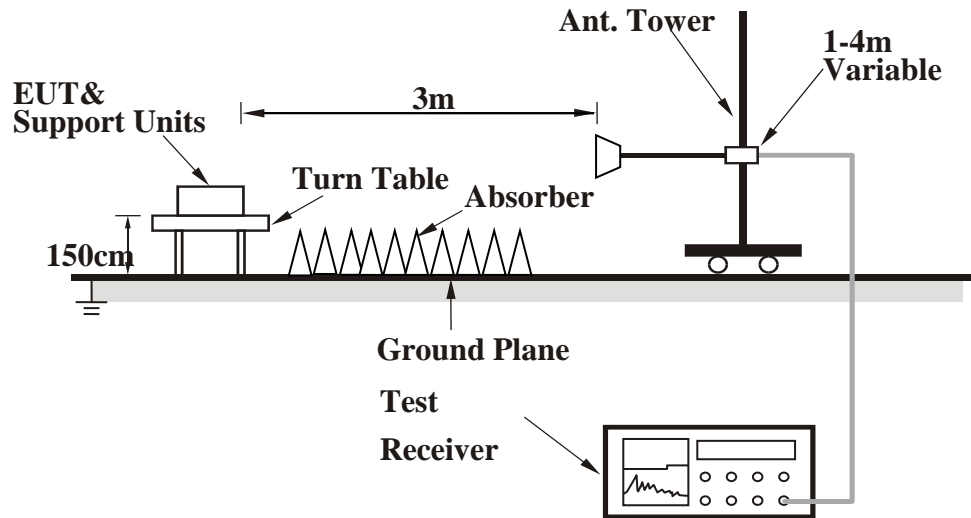


Below 1GHz test setup





Above 1GHz test setup



Note: For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

- c) Turned on the power of all equipment.
- d) EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.



4.1.7 TEST RESULTS

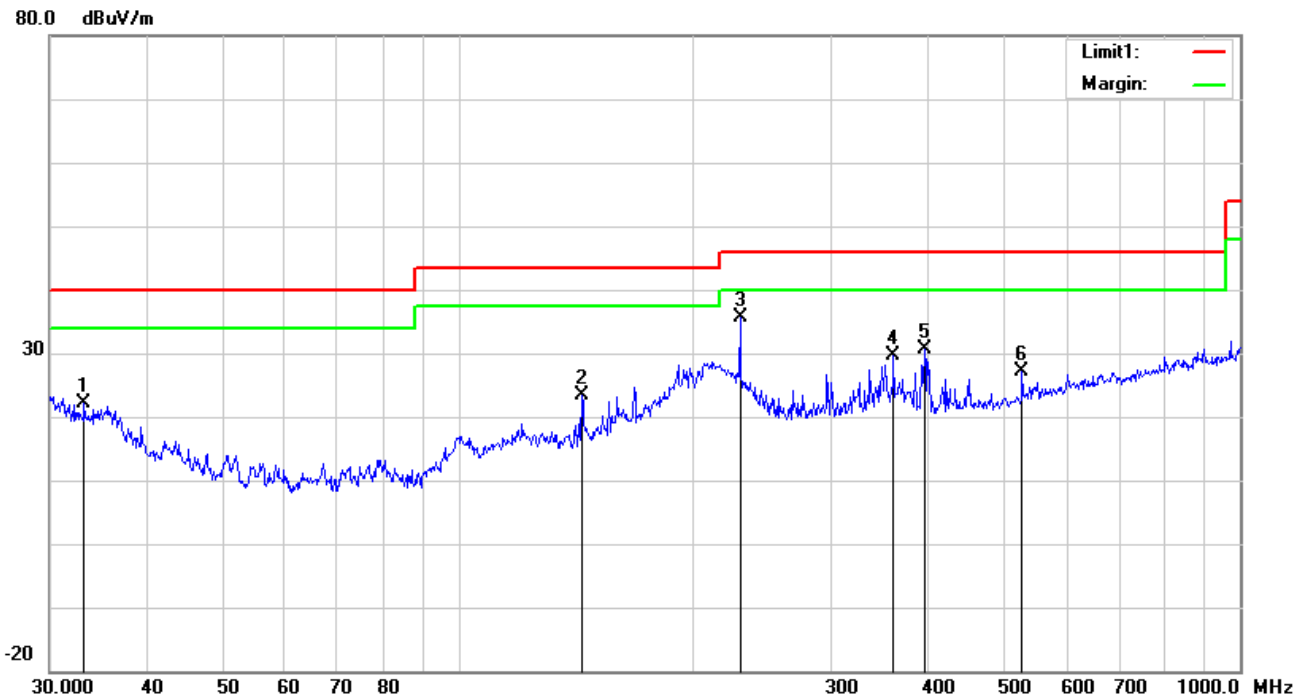
BELOW 1GHz WORST-CASE DATA

CHANNEL	TX Middle Channel	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
NO.	Freq. (MHz)	Reading (dBuV/m)	Ant-F (dB/m)	PA-G (dB)	Cab-L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	33.2112	25.34	18.93	22.26	0.15	22.16	40.00	-17.84	100	90
2	143.8295	31.82	12.60	22.38	1.23	23.27	43.50	-20.23	100	294
3	229.2931	44.73	11.69	22.33	1.59	35.68	46.00	-10.32	100	32
4	360.4477	34.98	14.87	22.12	1.87	29.60	46.00	-16.40	200	50
5	394.8545	35.15	15.59	22.02	1.92	30.64	46.00	-15.36	100	60
6	526.3967	28.65	18.07	21.75	2.20	27.17	46.00	-18.83	100	301

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.



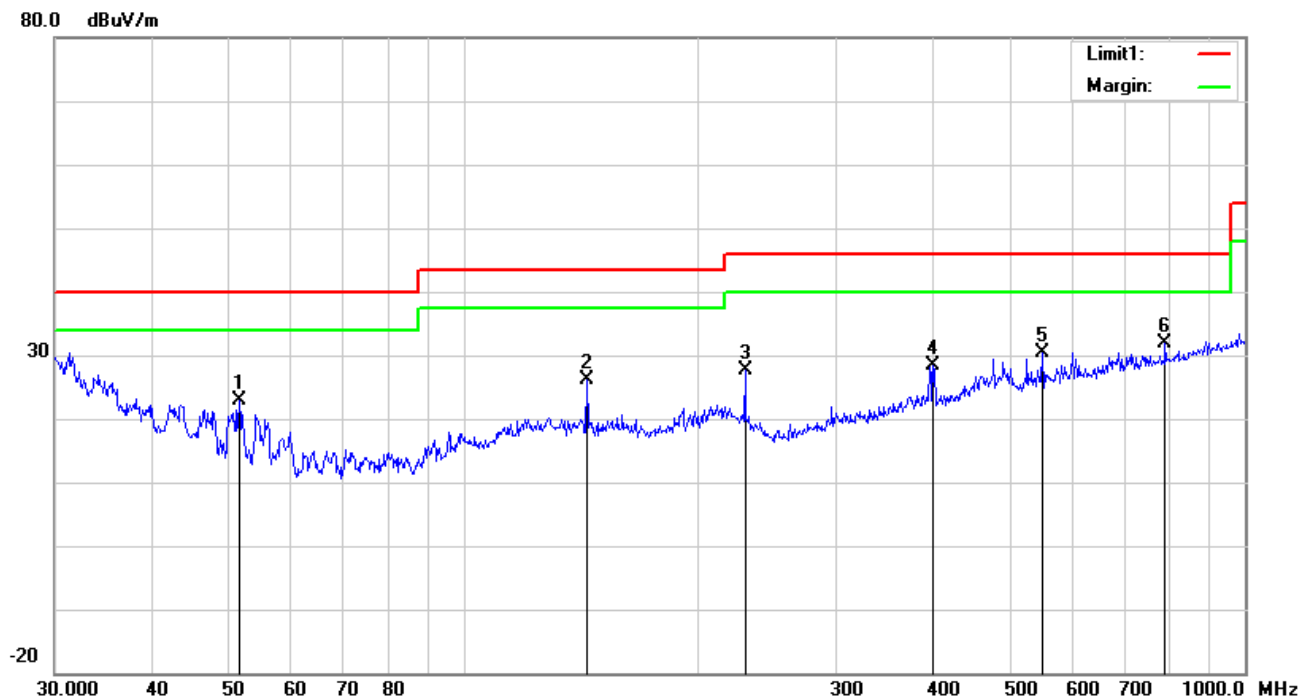


CHANNEL	TX Middle Channel	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
NO.	Freq. (MHz)	Reading (dBuV/m)	Ant-F (dB/m)	PA-G (dB)	Cab-L (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	51.6616	36.68	8.22	22.38	0.24	22.76	40.00	-17.24	100	102
2	143.8295	34.66	12.60	22.38	1.23	26.11	43.50	-17.39	100	347
3	229.2931	36.76	11.69	22.33	1.59	27.71	46.00	-18.29	100	255
4	399.0302	32.83	15.68	22.01	1.93	28.43	46.00	-17.57	200	87
5	550.9480	31.49	18.41	21.69	2.27	30.48	46.00	-15.52	100	243
6	790.6188	29.23	21.29	21.17	2.54	31.89	46.00	-14.11	100	321

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.





ABOVE 1GHZ WORST-CASE DATA:

CHANNEL	TX Low Channel	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400	49.56 PK	74	-24.44	200	237	63.21	-13.65
2	2400	16.69 AV	54	-37.31	200	237	30.34	-13.65
3	*2404	78.76 PK	114	-35.24	100	152	92.73	-13.97
4	*2404	45.89 AV	94	-48.11	100	152	59.86	-13.97
5	4808	57.58 PK	74	-16.42	200	72	61.33	-3.75
6	4808	24.71 AV	54	-29.29	200	72	28.46	-3.75
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400	52.84 PK	74	-21.16	200	211	66.49	-13.65
2	2400	19.97 AV	54	-34.03	200	211	33.62	-13.65
3	*2404	80.59 PK	114	-33.41	200	167	94.56	-13.97
4	*2404	47.72 AV	94	-46.28	200	167	61.69	-13.97
5	4808	56.64 PK	74	-17.36	200	291	60.39	-3.75
6	4808	23.77 AV	54	-30.23	200	291	27.52	-3.75

REMARK:

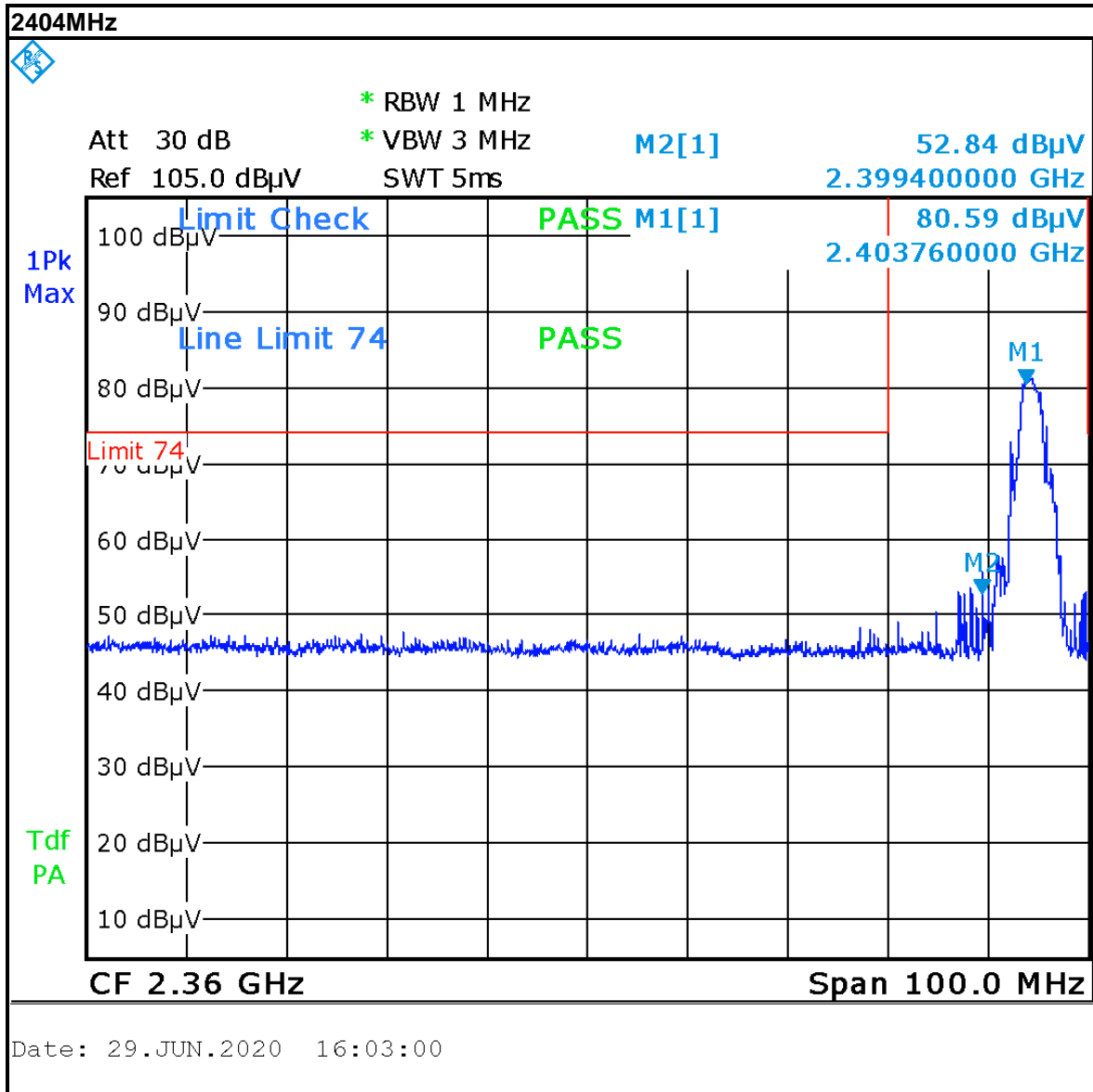
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



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Band edge Plot





CHANNEL	TX Middle Channel	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440	77.33 PK	114	-36.67	200	284	90.35	-13.02
2	*2440	44.46 AV	94	-49.54	200	284	57.48	-13.02
3	4808	56.46 PK	74	-17.54	200	112	60.42	-3.96
4	4808	23.59 AV	54	-30.41	200	112	27.55	-3.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440	79.77 PK	114	-34.23	100	205	92.79	-13.02
2	*2440	46.9 AV	94	-47.1	100	205	59.92	-13.02
3	4808	57.11 PK	74	-16.89	200	36	61.07	-3.96
4	4808	24.24 AV	54	-29.76	200	36	28.2	-3.96

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



CHANNEL	TX High Channel	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

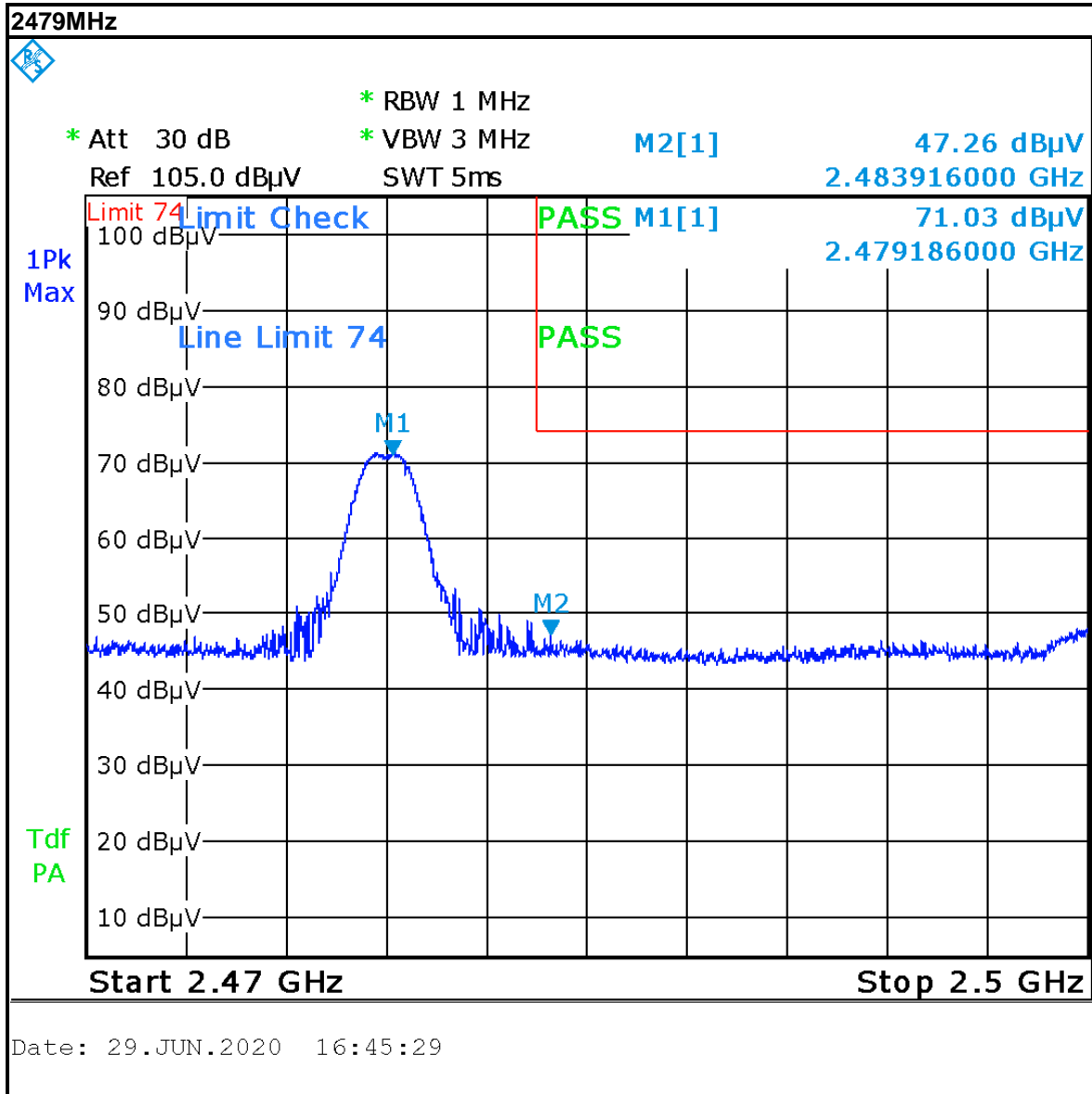
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2484	47.26 PK	74	-26.74	100	217	60.91	-13.65
2	2484	14.39 AV	54	-39.61	100	217	28.04	-13.65
3	*2479	71.03 PK	114	-42.97	100	130	85	-13.97
4	*2479	38.16	94	-55.84	100	130	52.13	-13.97
5	4958	56.06 PK	74	-17.94	200	14	59.81	-3.75
6	4958	23.19 AV	54	-30.81	200	14	26.94	-3.75
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2484	49.32 PK	74	-24.68	100	312	62.97	-13.65
2	2484	16.45 AV	54	-37.55	100	312	30.1	-13.65
3	*2479	75.34 PK	114	-38.66	200	239	89.31	-13.97
4	*2479	42.47 AV	94	-51.53	200	239	56.44	-13.97
5	4958	56.71 PK	74	-17.29	100	166	60.46	-3.75
6	4958	23.84 AV	54	-30.16	100	166	27.59	-3.75

REMARK:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



Band edge Plot





4.3 20dB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless Connectivity Tester	R&S	CMW270	1201.0002K75	Dec. 18, 19	Dec. 17, 20
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 24, 20	Mar. 24, 21
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 24, 20	Mar. 24, 21
RF Control Unit	Tonscend	JS0806-2	188060112	Mar. 24, 20	Mar. 24, 21
Signal Generation	Agilent	E4421B	US40051152	Dec. 18, 19	Dec. 17, 20
DC Power Supply	Agilent	E3640A	MY40004013	Mar. 28, 20	Mar. 27, 21
Programmable Temperature & Humidity Chamber	Hongjin	HYC-TH-225 DH	DG-180746	Mar. 24, 20	Mar. 24, 21
Test System	Tonscend	JS 1120-3	N/A	N/A	N/A
Power Splitter	Weinschel	1580-1	TL177	Mar. 20, 20	Mar. 19, 21

NOTE:

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

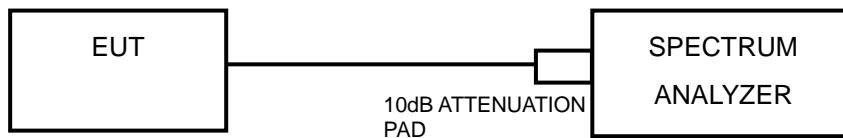
4.2.3 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



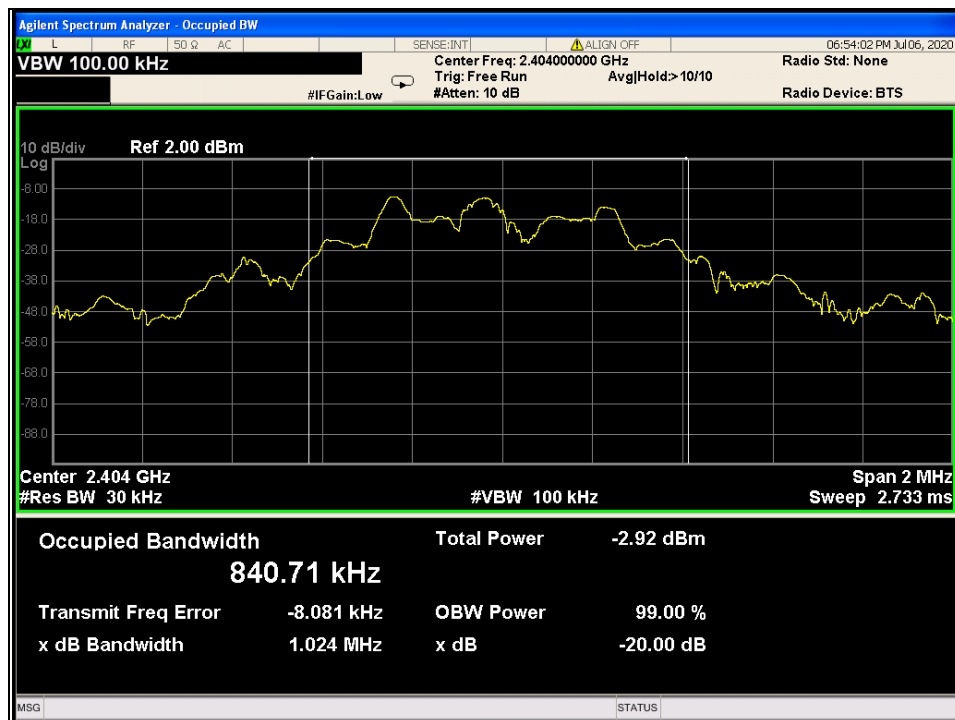
4.2.6 EUT OPERATING CONDITIONS

- a) Turned on the power of all equipment.
- b) EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

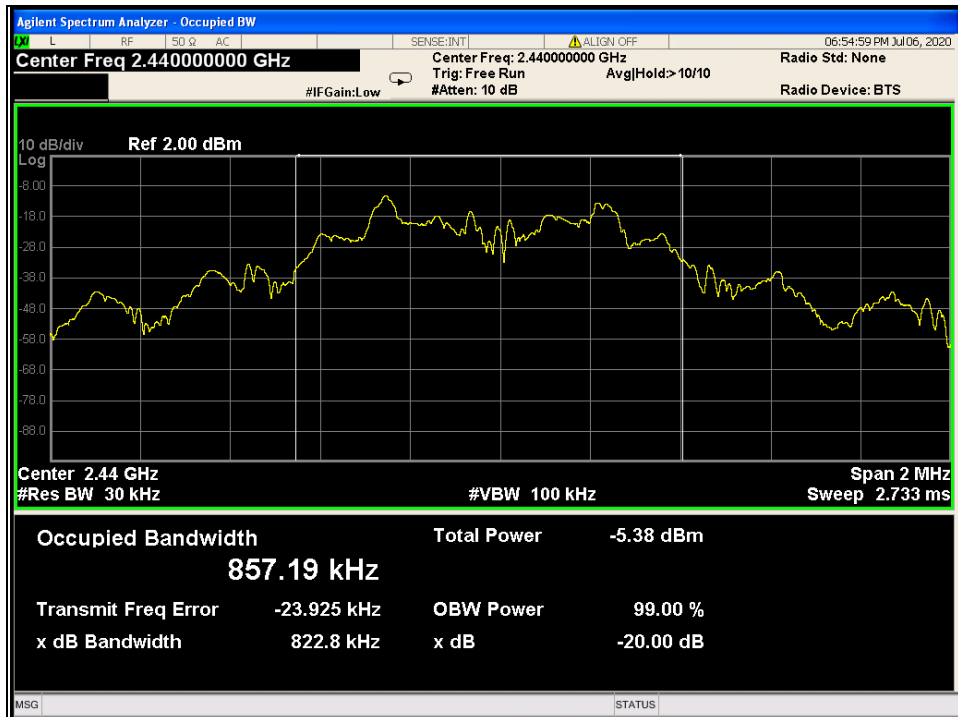
4.2.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
Low	2404	1.024
Middle	2440	0.8228
High	2479	0.8303

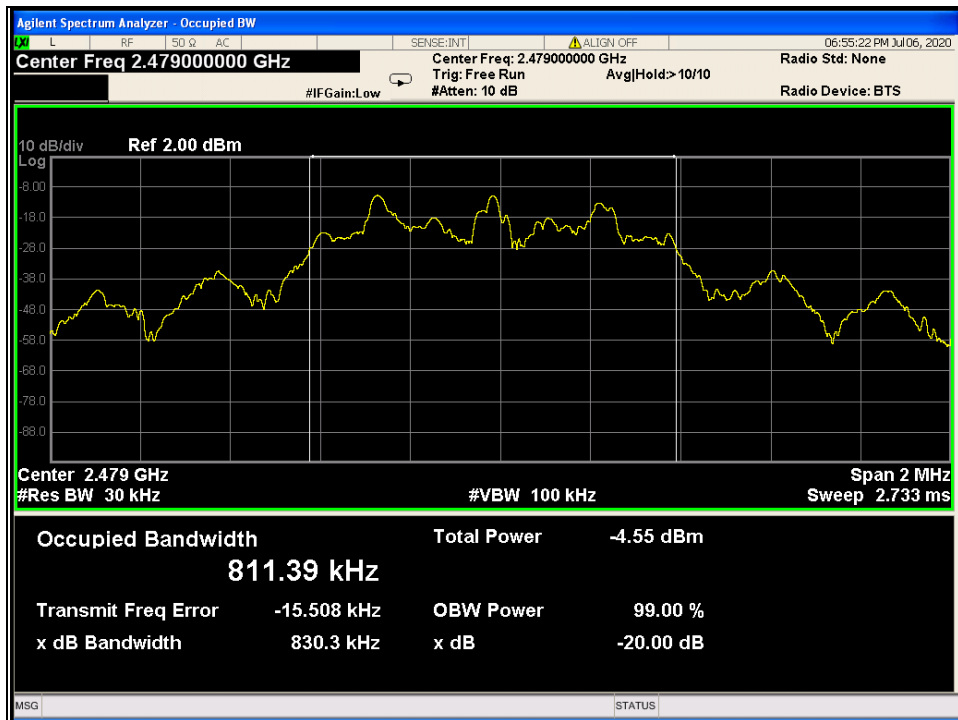
Test Data: Low channel



Test Data: Middle channel



Test Data: High channel





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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6. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---