



FCC TEST REPORT

FCC ID:2BDD3BST-701SHW

Report Number.....: **ZKT-2310268236E**

Date of Test..... Oct. 18, 2023 to Oct. 26, 2023

Date of issue.....: Oct. 26, 2023

Total number of pages..... 32

Test Result: PASS

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

Address: 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name: Huizhou Best Vehicle Electronics Co., Ltd

Address: Country Garden Meilong Lake Intelligent Manufacturing Industry New City,Xinxu Town, Huiyang, Huizhou City

Manufacturer's name: Huizhou Best Vehicle Electronics Co., Ltd

Address: Country Garden Meilong Lake Intelligent Manufacturing Industry New City,Xinxu Town, Huiyang, Huizhou City

Test specification:

Standard.....: FCC CFR Title 47 Part 15 Subpart C Section 15.249
ANSI C63.10:2013

Test procedure.....: /

Non-standard test method: N/A

Test Report Form No.....: /**Test Report Form(s) Originator.....: ZKT Testing****Master TRF: Dated: 2020-01-06**

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name.....: Digital wireless reversing system

Trademark: Serbetter

Model/Type reference.....: BST-701SHW
BST-702SHW, BST-704SHW, BST-701CSW, BST-702CSW,
BST-704CSW

Ratings.....: Input: DC 12-30V



Testing procedure and testing location:

Testing Laboratory.....: **Shenzhen ZKT Technology Co., Ltd.**

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Jim Liu

Reviewer (name + signature).....: Jackson Fang

Approved (name + signature).....: Lake Xie





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1. VERSION

Report No.	Version	Description	Approved
ZKT-2310268236E	Rev.01	Initial issue of report	Oct. 26, 2023



2. TEST SUMMARY

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Result	Remark
15.203	Antenna Requirement	PASS	
15.207	AC Power Line Conducted Emission	N/A	
15.215 (c)	20dB Occupied Bandwidth	PASS	
15.209/15.249	Radiated Emission and Fundamental	PASS	
15.205/15.209	Restricted Band	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF Occupied Bandwidth	U=1.8MHz
8	humidity uncertainty	U=5.3%
9	Temperature uncertainty	U=0.59℃



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Digital wireless reversing system
Model No.:	BST-701SHW
Model Different.:	Only the model name is different.
Serial No.:	BST-702SHW, BST-704SHW, BST-701CSW, BST-702CSW, BST-704CSW
Sample(s) Status:	Engineer sample
Channel numbers:	79
Operation Frequency:	2406MHz~2478MHz
Modulation technology:	FHSS
Antenna Type:	External Antenna
Antenna gain:	5.11dBi
Power supply:	Input: DC 12-30V
AC/DC Adapter:	N/A
AC/DC Adapter Mode:	N/A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2406MHz	6	2425MHz	11	2448MHz	16	2468MHz
2	2409MHz	7	2428MHz	12	2452MHz	17	2472MHz
3	2415MHz	8	2432MHz	13	2455MHz	18	2475MHz
4	2418MHz	9	2442MHz	14	2458MHz	19	2478MHz
5	2422MHz	10	2445MHz	15	2465MHz		

Note:

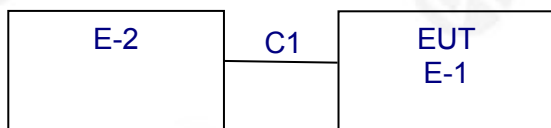
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency
The lowest channel	2406MHz
The middle channel	2445MHz
The Highest channel	2478MHz

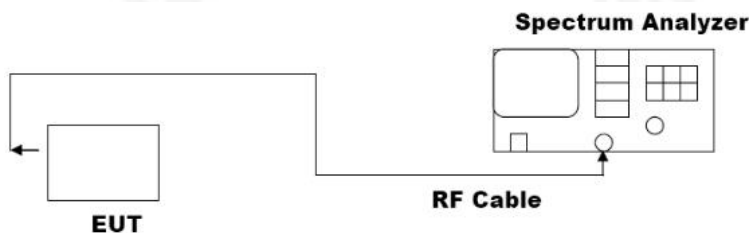


3.2 Test Setup Configuration

Operation of EUT during Conducted and Radiation testing:



Operation of EUT during RF Conducted testing:



3.3 Support Equipment

The EUT has been tested as an independent 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Digital wireless reversing system	Serbetter	BST-701SHW	See page 8	EUT
E-2	Storage Battery	Narada	ZKT-00	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	1.0M	Car Charger

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



3.4 Test Mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	
Test Software	Secure CRT Portable
Power level setup	<0dBm



3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Oct. 21, 2023	Oct. 20, 2024
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Oct. 21, 2023	Oct. 20, 2024
3	Test Cable	N/A	C-01	N/A	N/A	Oct. 21, 2023	Oct. 20, 2024
4	Test Cable	N/A	C-02	N/A	N/A	Oct. 21, 2023	Oct. 20, 2024
5	Test Cable	N/A	C-03	N/A	N/A	Oct. 21, 2023	Oct. 20, 2024
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Oct. 28, 2022	Oct. 27, 2023
7	Triple-Loop Antenna	N/A	RF300	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Oct. 31, 2022	Oct. 30, 2023
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Oct. 28, 2022	Oct. 27, 2023
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Oct. 28, 2022	Oct. 27, 2023
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	4.32	Oct. 28, 2022	Oct. 27, 2023
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	N/A	Nov. 02, 2022	Nov. 01, 2023
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Nov. 01, 2022	Oct. 31, 2023
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Oct. 28, 2022	Oct. 27, 2023
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Nov. 01, 2022	Oct. 31, 2023
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	060747	N/A	Nov. 15, 2022	Nov. 14, 2023
9	Amplifier (1GHz-26.5GHz)	Agilent	8449B	3008A00315	N/A	Oct. 28, 2022	Oct. 27, 2023
10	Amplifier (500MHz-40GHz)	QUANJUDA	DLE-161	097	N/A	Oct. 28, 2022	Oct. 27, 2023
11	Test Cable	N/A	R-01	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
12	Test Cable	N/A	R-02	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
13	Test Cable	N/A	R-03	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
14	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
15	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
16	Turntable	MF	MF-7802B S	N/A	N/A	\	\
17	Antenna tower	MF	MF-7802B S	N/A	N/A	\	\



RF Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Oct. 28, 2022	Oct. 27, 2023
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Oct. 28, 2022	Oct. 27, 2023
3	Test Cable	N/A	RF-01	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
4	Test Cable	N/A	RF-02	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
5	Test Cable	N/A	RF-03	N/A	N/A	Oct. 28, 2022	Oct. 27, 2023
6	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Oct. 21, 2023	Oct. 20, 2024
7	Signal Generator	Agilent	N5182A	N/A	A.01.87	Oct. 21, 2023	Oct. 20, 2024
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Nov. 15, 2022	Nov. 14, 2023
9	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Oct. 28, 2022	Oct. 27, 2023
10	MWRF Power Meter Test system	MW	MW100-RF CB	N/A	N/A	Oct. 21, 2023	Oct. 20, 2024
11	Power Meter	KEYSIGHT	N1912A P	N/A	A.05.00	Oct. 21, 2023	Oct. 20, 2024
12	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
13	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



4. EMC EMISSION TEST

4.1 Conducted emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

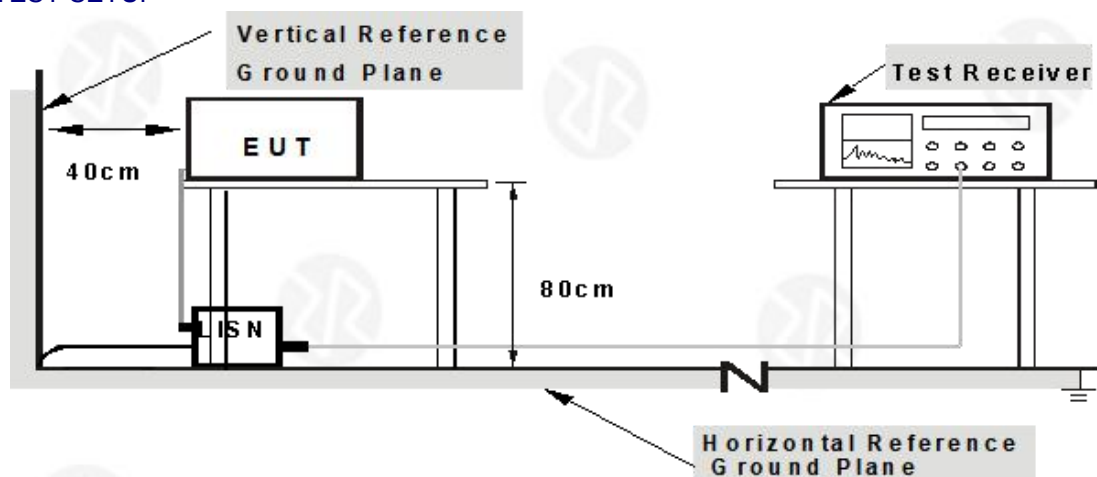
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation



4.1.4 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

4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.6 Test Result

N/A

Only AC products need to test this item, DC products are not applicable.



4.2 Radiated emissions

Test Requirement:	FCC Part15 C Section 15.209/15.249				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	MX5Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average

4.2.1 Radiated Emission Limits

Frequencies (MHz)	Field Strength (micorvolts/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

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT

Fundamental Frequency	Field Strength of Fundamental @3m (millivolts/meter)	Average Limit @3m (dBuV/m)	Peak Limit @3m (dBuV/m)
900-928MHz	50	94	114
2400-2483.5MHz	50	94	114
5725-5875MHz	50	94	114
24.0-24.25GHz	250	108	128

Note:

1. Average Limit (dBuV/m)=20×log[1000×Field Strength (mV/m)].
2. Peak Limit (dBuV/m)= Average Limit (dBuV/m)+20dB



4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

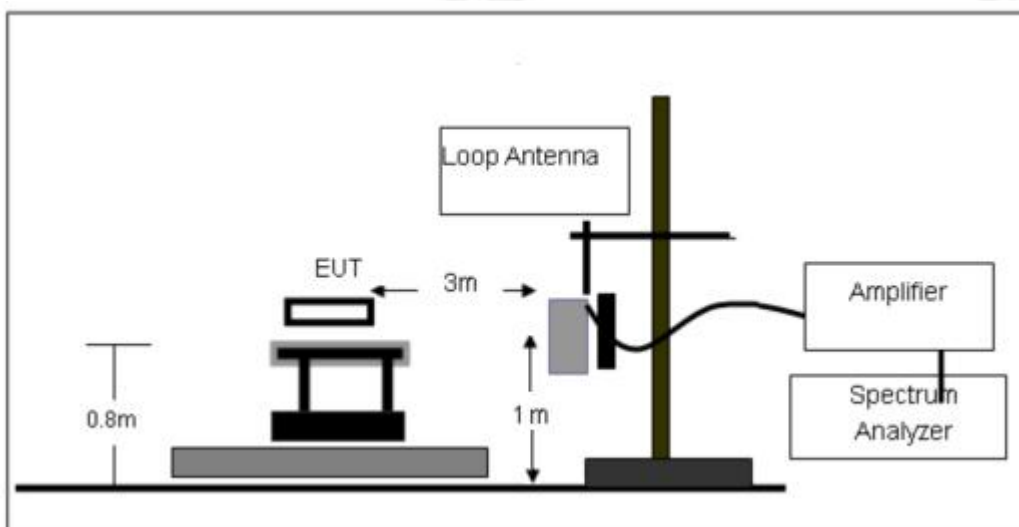
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

No deviation

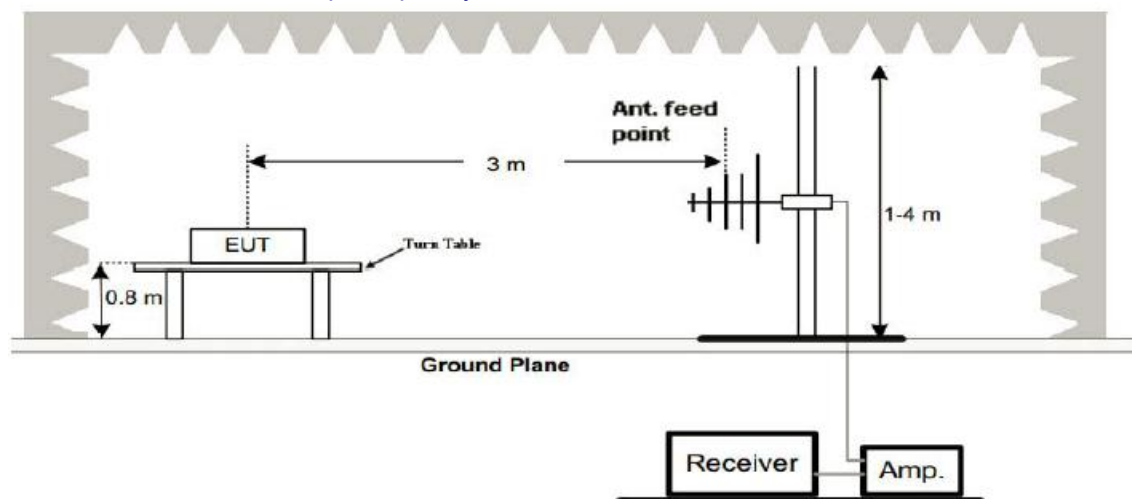
4.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz

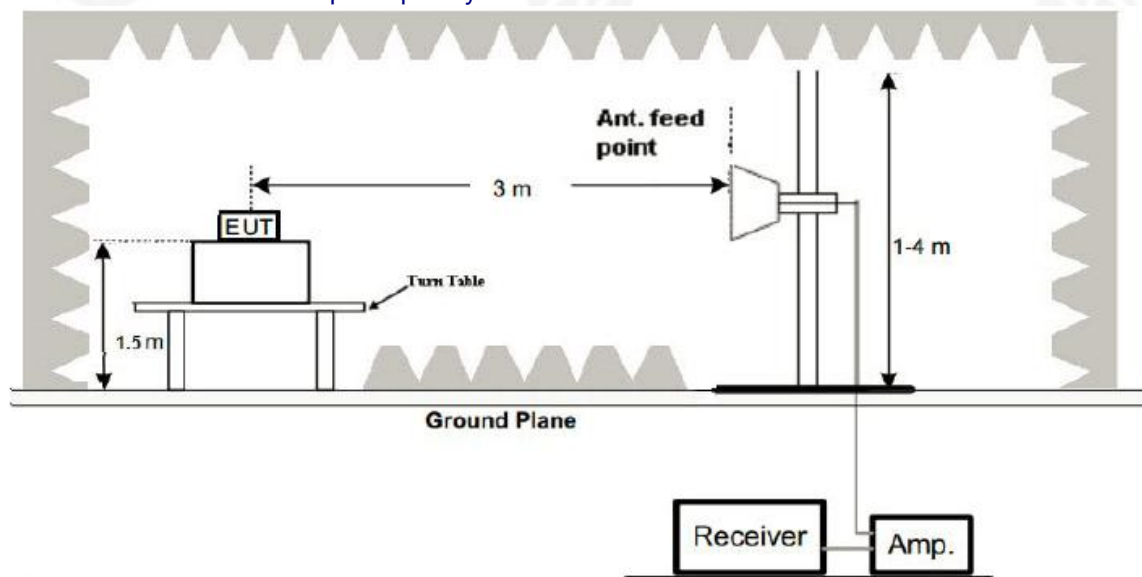




(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 TEST RESULTS

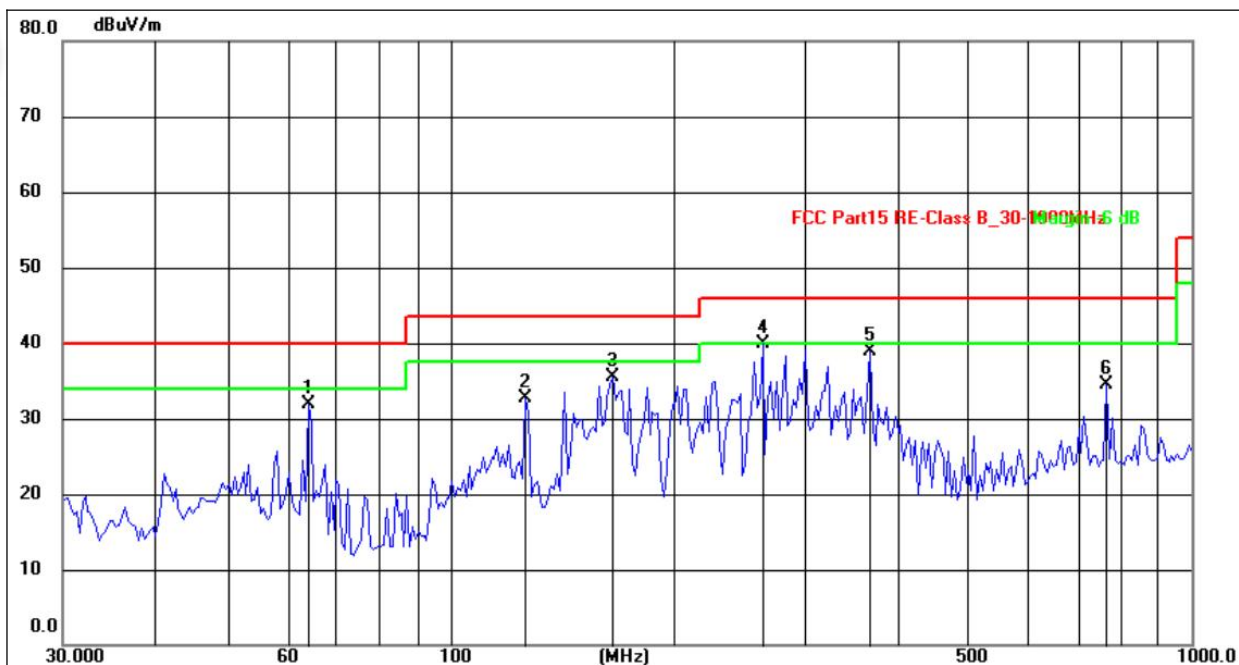
Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



Between 30MHz – 1GHz

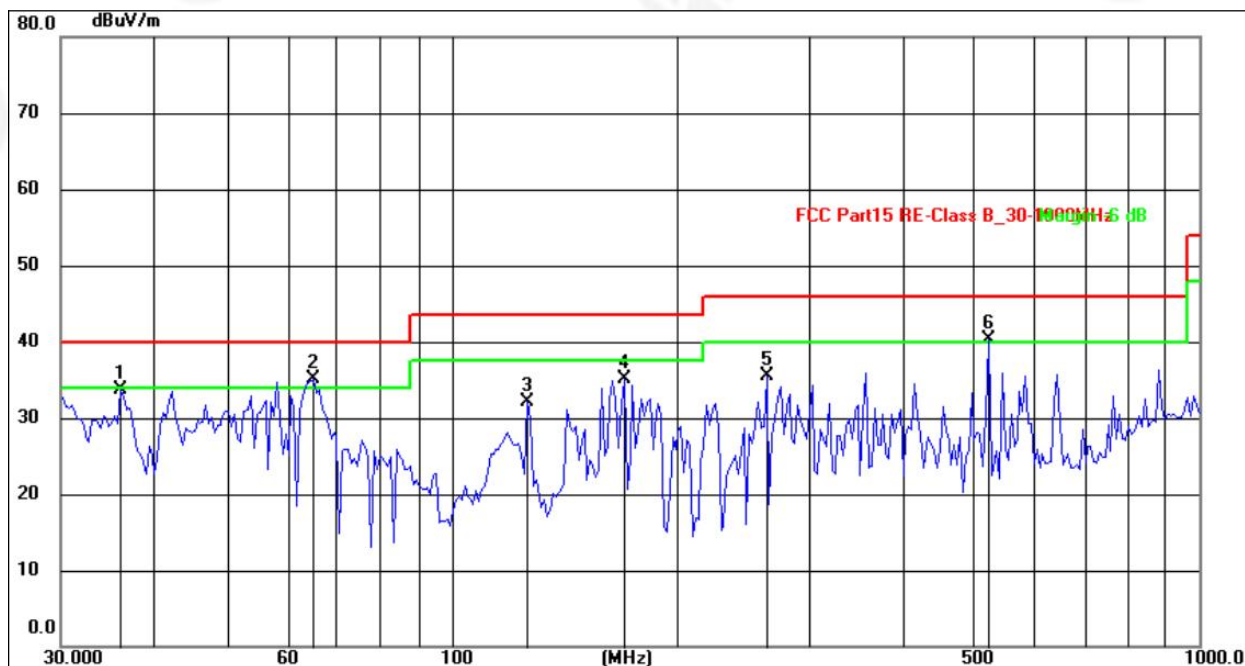
Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 12V	Test Channel :	2406MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	64.3200	47.35	-15.39	31.96	40.00	-8.04	QP
2	126.3285	50.76	-18.06	32.70	43.50	-10.80	QP
3	165.7768	52.23	-16.67	35.56	43.50	-7.94	QP
4	263.8190	55.20	-15.33	39.87	46.00	-6.13	QP
5	368.1116	55.69	-16.70	38.99	46.00	-7.01	QP
6	768.7481	41.40	-6.87	34.53	46.00	-11.47	QP



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 12V	Test Channel :	2406MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.0638	51.19	-17.44	33.75	40.00	-6.25	QP
2	65.4578	53.91	-18.87	35.04	40.00	-4.96	QP
3	126.3285	53.32	-21.24	32.08	43.50	-11.42	QP
4	170.1947	55.21	-20.02	35.19	43.50	-8.31	QP
5	263.8190	54.98	-19.52	35.46	46.00	-10.54	QP
6	522.7178	51.06	-10.70	40.36	46.00	-5.64	QP

Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3.The test data shows only the worst case 2406MHz.



1GHz~25GHz

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2406MHz									
V	2406.00	82.64	30.64	5.26	24.22	81.48	114.00	-32.52	PK
V	2406.00	82.11	30.64	5.26	24.22	80.95	94.00	-13.05	AV
V	4812.00	53.56	30.55	5.77	24.66	53.44	74.00	-20.56	PK
V	4812.00	43.13	30.55	5.77	24.66	43.01	54.00	-10.99	AV
V	7218.00	54.84	30.33	6.32	24.55	55.38	74.00	-18.62	PK
V	7218.00	43.62	30.33	6.32	24.55	44.16	54.00	-9.84	AV
V	9624.00	51.54	30.85	7.45	24.69	52.83	74.00	-21.17	PK
V	9624.00	43.06	30.85	7.45	24.69	44.35	54.00	-9.65	AV
V	12030.00	53.56	31.02	8.99	25.57	57.10	74.00	-16.90	PK
V	12030.00	43.00	31.02	8.99	25.57	46.54	54.00	-7.46	AV
H	2406.00	82.32	30.64	5.26	24.22	81.16	114.00	-32.84	PK
H	2406.00	81.94	30.64	5.26	24.22	80.78	94.00	-13.22	AV
H	4812.00	50.58	30.55	5.77	24.66	50.46	74.00	-23.54	PK
H	4812.00	43.19	30.55	5.77	24.66	43.07	54.00	-10.93	AV
H	7218.00	51.24	30.33	6.32	24.55	51.78	74.00	-22.22	PK
H	7218.00	43.63	30.33	6.32	24.55	44.17	54.00	-9.83	AV
H	9624.00	50.73	30.85	7.45	24.69	52.02	74.00	-21.98	PK
H	9624.00	43.32	30.85	7.45	24.69	44.61	54.00	-9.39	AV
H	12030.00	52.58	31.02	8.99	25.57	56.12	74.00	-17.88	PK
H	12030.00	43.50	31.02	8.99	25.57	47.04	54.00	-6.96	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2445MHz									
V	2445.00	82.57	30.64	5.26	24.22	81.41	114.00	-32.59	PK
V	2445.00	82.13	30.64	5.26	24.22	80.97	94.00	-13.03	AV
V	4890.00	50.99	30.55	5.77	24.66	50.87	74.00	-23.13	PK
V	4890.00	43.45	30.55	5.77	24.66	43.33	54.00	-10.67	AV
V	7335.00	52.03	30.33	6.32	24.55	52.57	74.00	-21.43	PK
V	7335.00	43.02	30.33	6.32	24.55	43.56	54.00	-10.44	AV
V	9780.00	53.73	30.85	7.45	24.69	55.02	74.00	-18.98	PK
V	9780.00	43.24	30.85	7.45	24.69	44.53	54.00	-9.47	AV
V	12225.00	54.77	31.02	8.99	25.57	58.31	74.00	-15.69	PK
V	12225.00	43.71	31.02	8.99	25.57	47.25	54.00	-6.75	AV
H	2445.00	82.44	30.64	5.26	24.22	81.28	114.00	-32.72	PK
H	2445.00	81.96	30.64	5.26	24.22	80.80	94.00	-13.20	AV
H	4890.00	54.60	30.55	5.77	24.66	54.48	74.00	-19.52	PK
H	4890.00	43.06	30.55	5.77	24.66	42.94	54.00	-11.06	AV
H	7335.00	53.39	30.33	6.32	24.55	53.93	74.00	-20.07	PK
H	7335.00	43.37	30.33	6.32	24.55	43.91	54.00	-10.09	AV
H	9780.00	54.64	30.85	7.45	24.69	55.93	74.00	-18.07	PK
H	9780.00	43.79	30.85	7.45	24.69	45.08	54.00	-8.92	AV
H	12225.00	54.03	31.02	8.99	25.57	57.57	74.00	-16.43	PK
H	12225.00	43.29	31.02	8.99	25.57	46.83	54.00	-7.17	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2478MHz									
V	2478.00	82.49	30.64	5.26	24.22	81.33	114.00	-32.67	PK
V	2478.00	82.21	30.64	5.26	24.22	81.05	94.00	-12.95	AV
V	4956.00	52.20	30.55	5.77	24.66	52.08	74.00	-21.92	PK
V	4956.00	43.57	30.55	5.77	24.66	43.45	54.00	-10.55	AV
V	7434.00	52.30	30.33	6.32	24.55	52.84	74.00	-21.16	PK
V	7434.00	43.80	30.33	6.32	24.55	44.34	54.00	-9.66	AV
V	9912.00	54.19	30.85	7.45	24.69	55.48	74.00	-18.52	PK
V	9912.00	43.01	30.85	7.45	24.69	44.30	54.00	-9.70	AV
V	12390.00	51.90	31.02	8.99	25.57	55.44	74.00	-18.56	PK
V	12390.00	43.07	31.02	8.99	25.57	46.61	54.00	-7.39	AV
H	2478.00	82.37	30.64	5.26	24.22	81.21	114.00	-32.79	PK
H	2478.00	81.92	30.64	5.26	24.22	80.76	94.00	-13.24	AV
H	4956.00	50.55	30.55	5.77	24.66	50.43	74.00	-23.57	PK
H	4956.00	43.15	30.55	5.77	24.66	43.03	54.00	-10.97	AV
H	7434.00	53.28	30.33	6.32	24.55	53.82	74.00	-20.18	PK
H	7434.00	43.55	30.33	6.32	24.55	44.09	54.00	-9.91	AV
H	9912.00	52.03	30.85	7.45	24.69	53.32	74.00	-20.68	PK
H	9912.00	43.15	30.85	7.45	24.69	44.44	54.00	-9.56	AV
H	12390.00	51.90	31.02	8.99	25.57	55.44	74.00	-18.56	PK
H	12390.00	43.05	31.02	8.99	25.57	46.59	54.00	-7.41	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



5. RADIATED BAND EMISSION MEASUREMENT

5.1 Test Requirement:

Test Requirement:	FCC Part15 C Section 15.205 and 15.209				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2390MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Average	1MHz	3MHz	Average

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2390MHz
Stop Frequency	2500MHz
RB / VB (emission in restricted band)	1 MHz / 3 MHz for Peak, 1 MHz / 3MHz for Average

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 0.8meters above the ground at a 3 meter camber. 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 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 rota 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. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel,the Highest channel

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

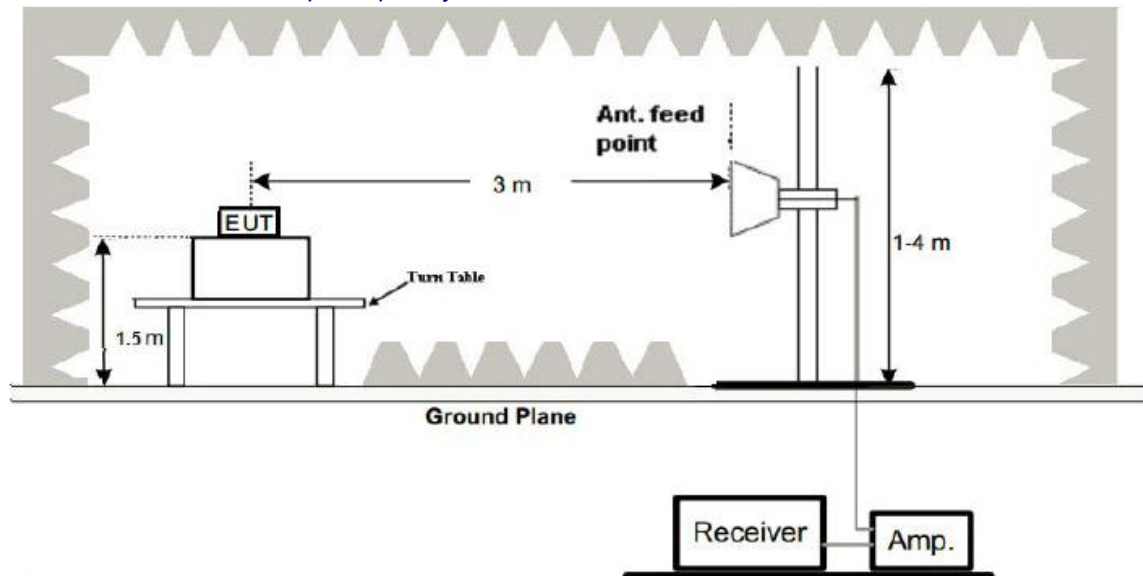


5.3 DEVIATION FROM TEST STANDARD

No deviation

5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



5.5 EUT OPERATING CONDITIONS

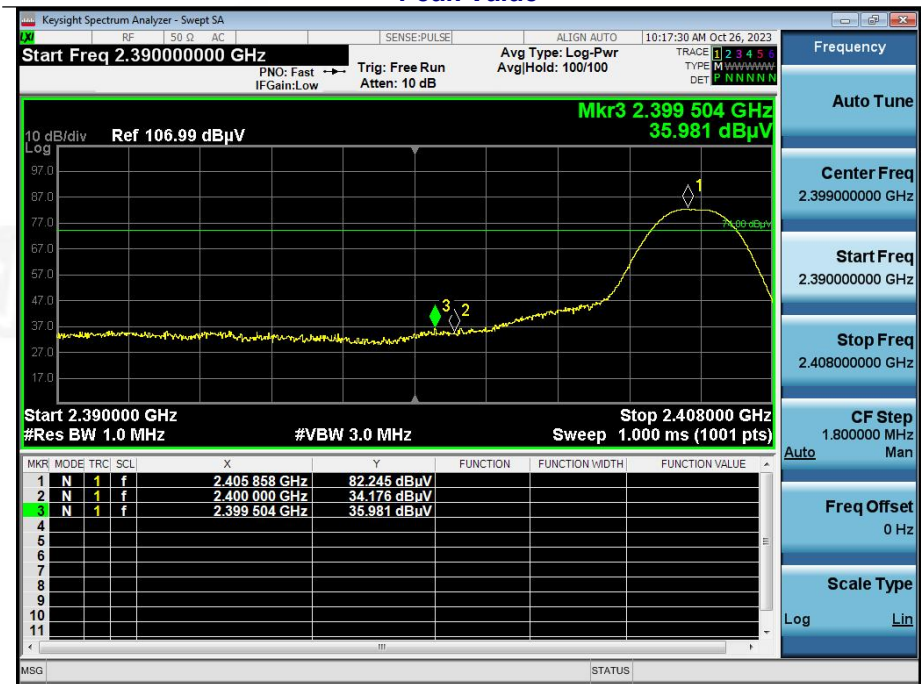
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



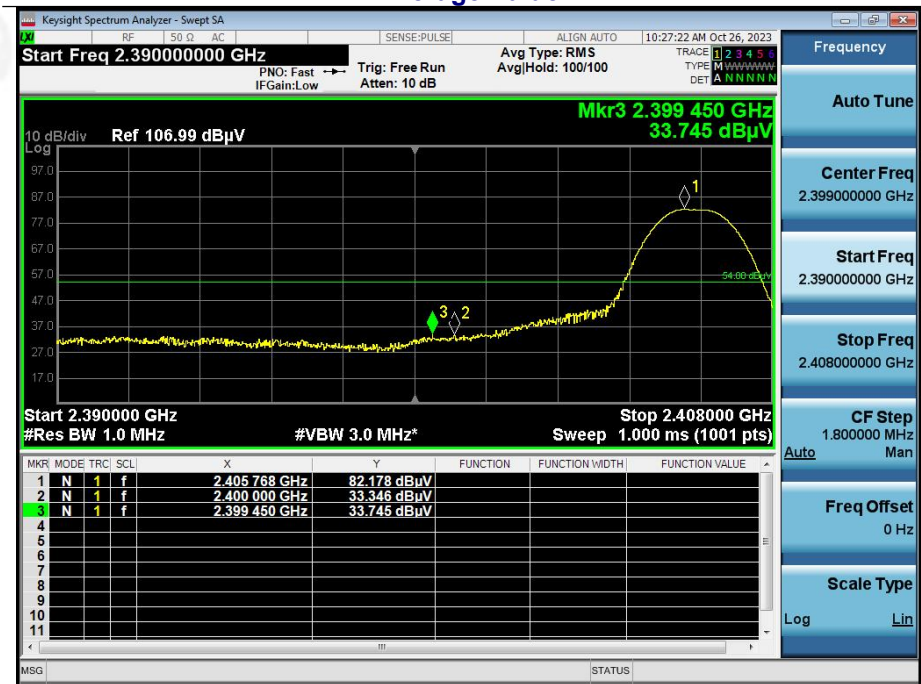
5.6 TEST RESULT

Temperature	26℃	Relative Humidity:	54%
Pressure	101kPa	Test Voltage	DC 12V
Test Mode	2406MHz	Polarization	Horizontal

Peak Value



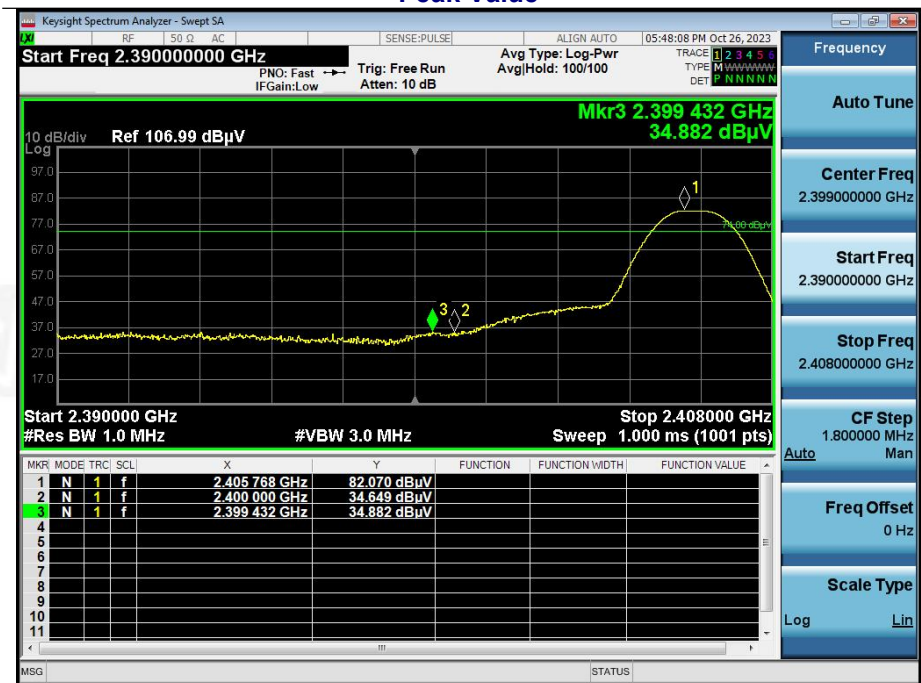
Average Value



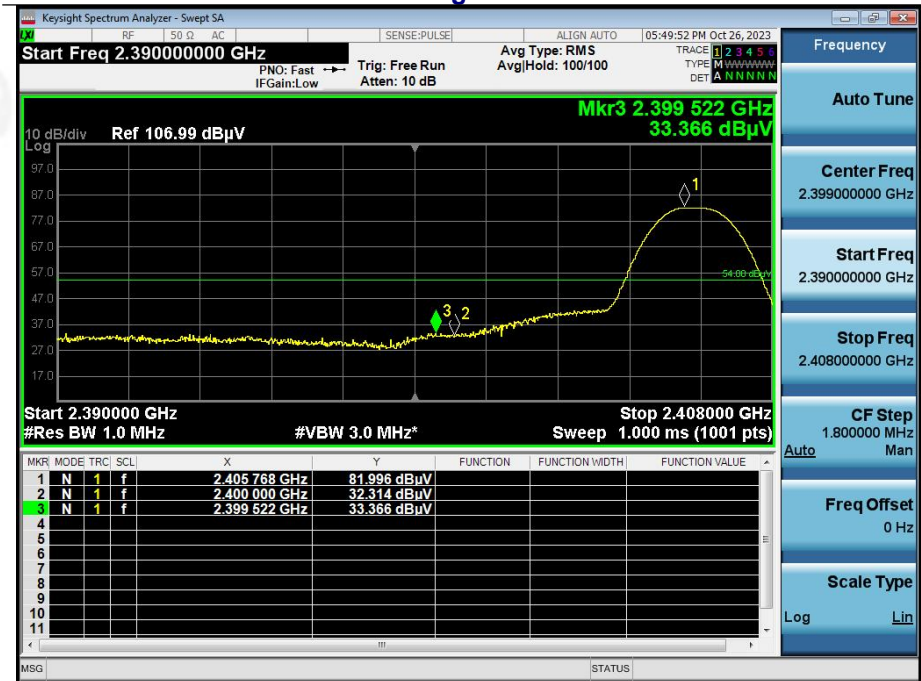


Temperature	26°C	Relative Humidity:	54%
Pressure	101kPa	Test Voltage	DC 12V
Test Mode	2406MHz	Polarization	Vertical

Peak Value



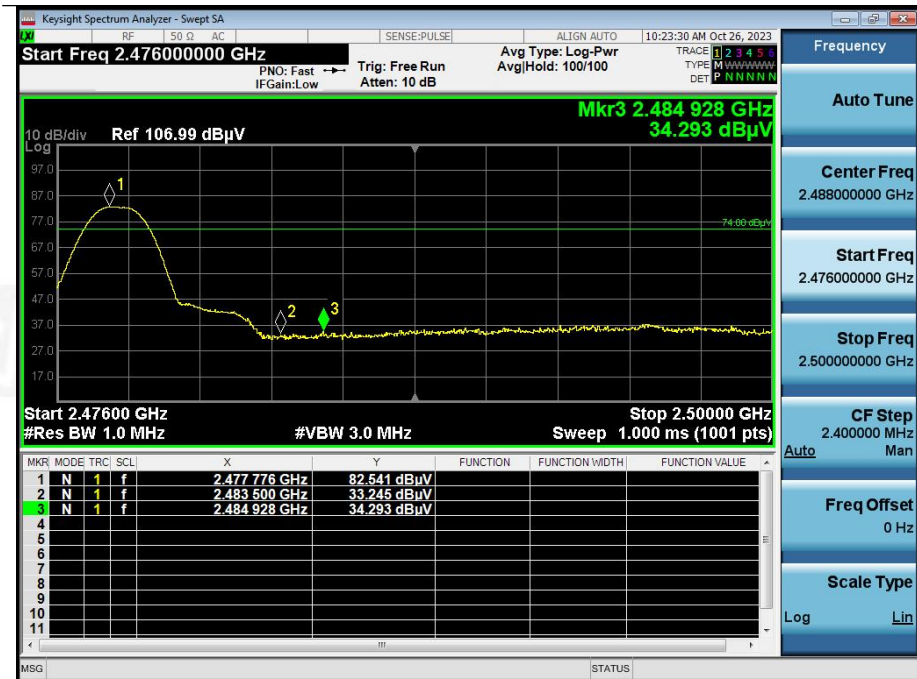
Average Value



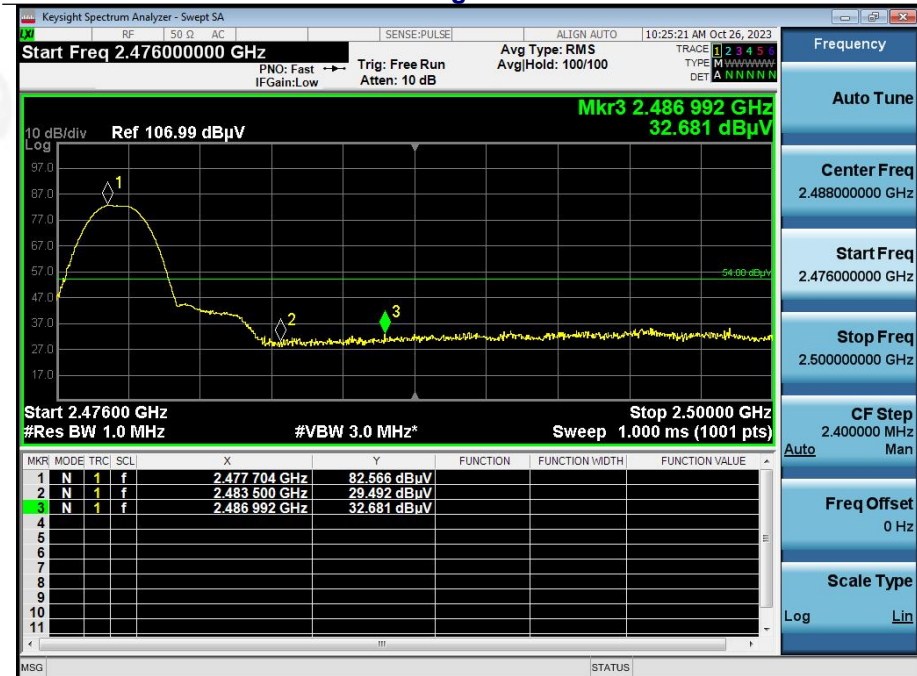


Temperature	26°C	Relative Humidity:	54%
Pressure	101kPa	Test Voltage	DC 12V
Test Mode	2478MHz	Polarization	Horizontal

Peak Value



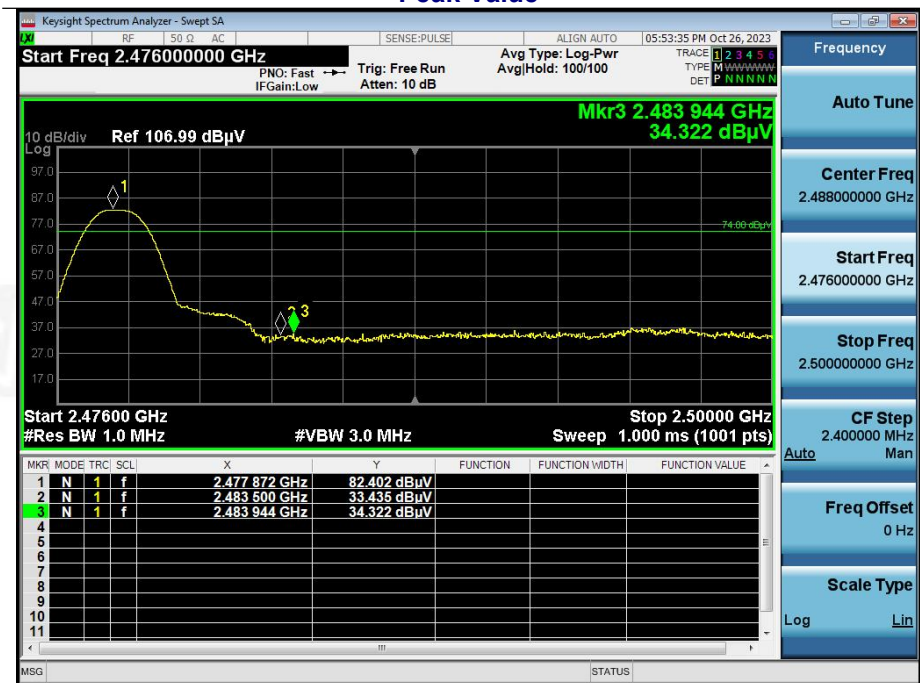
Average Value





Temperature	21.8°C	Relative Humidity	58%
Pressure	101kPa	Test Voltage	DC 12V
Test Mode	2478MHz	Polarization	Vertical

Peak Value



Average Value





6. 20DB BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10:2013

6.1 Test Setup



6.2 Limit

FCC Part15 (15.249) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.249(c)	Bandwidth	2400-2483.5	PASS

6.3 Test procedure

1. Set resolution bandwidth (RBW) = 1 ~ 5% or DTS BW, not to exceed 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.4 DEVIATION FROM STANDARD

No deviation.

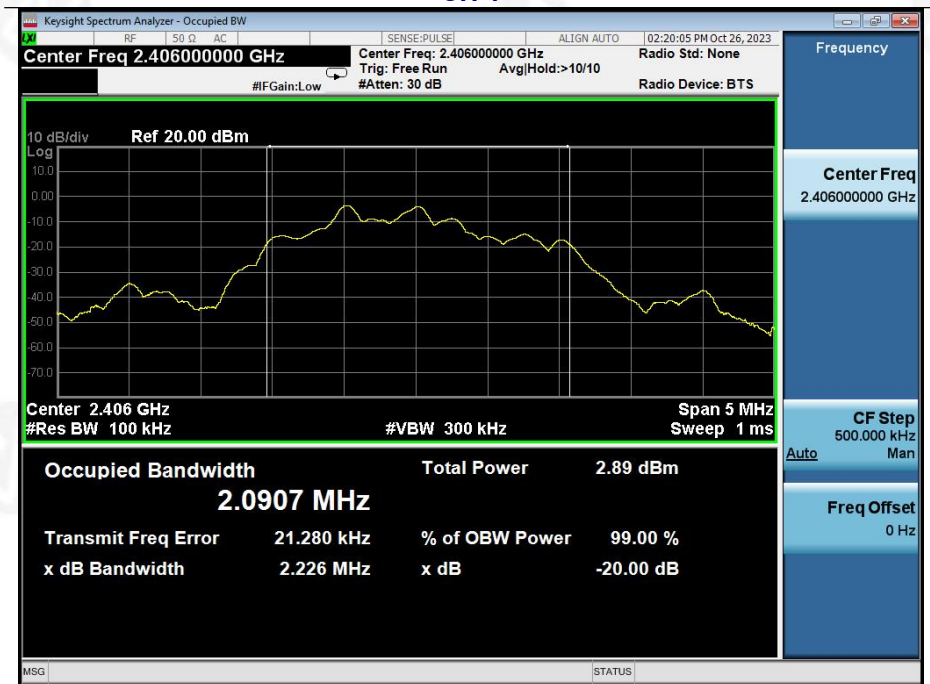
6.5 Test Result

Mode	Test channel	20dB Emission Bandwidth (MHz)	Result
FHSS	Lowest	2.226	Pass
	Middle	2.224	
	Highest	2.222	

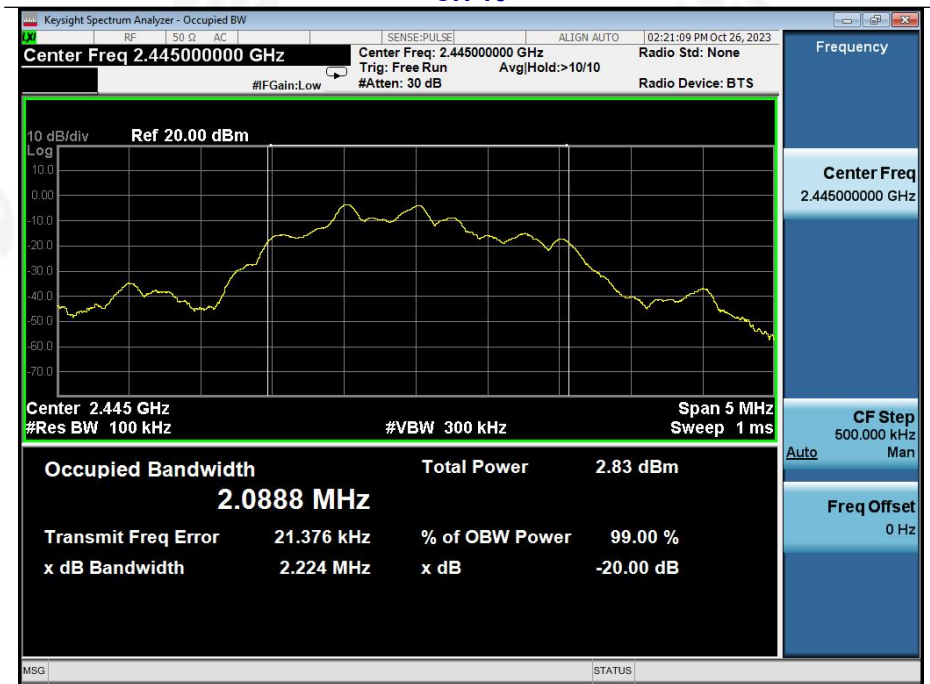


Test plots

CH 1



CH 10





CH 19





7. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: 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, 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.	
EUT Antenna:	
The antenna is External Antenna, the best case gain of the antennas is 5.11dBi, reference to the appendix II for details	



8. Test Setup Photo

Reference to the appendix I for details.

9. EUT Constructional Details

Reference to the appendix II for details.

***** END OF REPORT *****