FCC Radio Test Report

FCC ID: 2BBUS-ES3000-PLUS

The report concerns: Original Grant

Report Reference No.....:	24EFSS12035 01871
Date Sample(s) Received.....:	2024-03-12
Date of Tested.....:	2024-03-12 to 2024-03-25
Date of issue.....:	2024-03-25
Testing Laboratory .....:	DongGuanShuoXin Electronic Technology Co., Ltd.
Address .....:	Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China
Applicant's name .....:	Green Energy Scandinavia A/S
Address .....:	Dronningens Gate 22, 0154 Oslo, Norway
Manufacturer.....:	AJ POWER Co.Ltd.
Equipment.....:	BLACKBOX PORTABLE POWER STATION
Trade Mark .....:	N/A
Model .....:	ES3000-PLUS
Ratings .....:	DC Input: 58.4V/20A AC Input: 120V/60Hz Solar Input: 60~145V DC Output: 51.2V/40A AC Output: 3000W / 5000W (peak)

Test Engineer: Blue Qiu

Responsible Engineer : Smile Wang

Authorized Signatory: King Wang

Table of Contents Page

1 TEST REPORT DECLARE 4

2 SUMMARY OF TEST RESULTS 5

2.1 MEASUREMENT UNCERTAINTY 6

3 GENERAL INFORMATION 7

3.1 GENERAL DESCRIPTION OF EUT 7

3.2 DESCRIPTION OF TEST MODES 9

3.3 PARAMETERS OF TEST SOFTWARE 9

3.4 BLOCKDIAGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED 10

3.5 SUPPORT UNITS 10

3.6 TEST ENVIRONMENT CONDITIONS 10

4 AC POWER LINE CONDUCTED EMISSIONS TEST 11

4.1 LIMIT 11

4.2 TEST PROCEDURE 11

4.3 MEASUREMENT INSTRUMENTS LIST 11

4.4 TESTSETUP 12

4.5 EUT OPERATING CONDITIONS 12

4.6 TEST RESULTS 13

5 RADIATED EMISSION TEST 15

5.1 LIMIT 15

5.2 TEST PROCEDURE 16

5.3 MEASUREMENT INSTRUMENTS LIST 17

5.4 TESTSETUP 17

5.5 EUT OPERATING CONDITIONS 18

5.6 TEST RESULT- 9KHZ TO 30MHZ 19

5.7 TEST RESULT- 30MHZ TO 1000MHZ 20

5.8 TEST RESULT- ABOVE 1000MHZ(BAND EDGE) 22

5.9 TEST RESULTS - ABOVE 1000MHZ(HARMONIC) 26

6 BANDWIDTH TEST 32

6.1 LIMIT 32

6.2 TEST PROCEDURE AND SETTING 32

6.3 MEASUREMENT INSTRUMENTS LIST 32

6.4 TEST SETUP 32

6.5 EUT OPERATION CONDITIONS 32

6.6 TESTRESULTS 33

Table of Contents | Page

7 MAXIMUM OUTPUT POWER 34
7.1 LIMIT 34
7.2 TEST PROCEDURE 34
7.3 MEASUREMENT INSTRUMENTS LIST 34
7.4 TEST SETUP 34
7.5 EUT OPERATION CONDITIONS 34
7.6 TESTRESULTS 35
8 CONDUCTED SPURIOUS EMISSION 36
8.1 LIMIT 36
8.2 TEST PROCEDURE 36
8.3 MEASUREMENT INSTRUMENTS LIST 36
8.4 TEST SETUP 36
8.5 EUT OPERATION CONDITIONS 36
8.6 TEST RESULTS 37
9 POWER SPECTRAL DENSITY TEST 39
9.1 LIMIT 39
9.2 TEST PROCEDURE 39
9.3 MEASUREMENT INSTRUMENTS LIST 39
9.4 TEST SETUP 39
9.5 EUT OPERATION CONDITIONS 39
9.6 TEST RESULTS 40

1TEST REPORT DECLARE

Applicant	Green Energy Scandinavia A/S
Address	Dronningens Gate 22, 0154 Oslo, Norway
Manufacturer	AJ POWER Co.Ltd.
Address	Rm.406, Block 1, NO.114-5 Shengli Road, Jiangmen, Guangdong, China.
Factory	Dongguan Funpack Elec Co., LTD.
Address	Room 401, Building 4, No.45 Kuiqing Road, Qingxi Town, Dongguan City, Guangdong Province, China.
Equipment	BLACKBOX PORTABLE POWER STATION
Model No.	ES3000-PLUS
Trade Mark	N/A
Standard	FCC Part15, Subpart C (15.247) ANSI C63.10-2013

We Declare:

The equipment described above is tested by DongGuanShuoXin Electronic Technology Co., Ltd(ATT). and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuanShuoXin Electronic Technology Co., Ltd.(ATT) is assumed of full responsibility for the accuracy and completeness of these tests.

ATT is not responsible for the sampling stage, so the results only apply to the sample as received.

ATT's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. ATT shall have no liability for any declarations, inferences or generalizations drawn by the client or others from ATT issued reports.

2SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below:

Standard(s) Section		Test Item	Judgment	Remark
FCC	ISED			
15.207	-	AC Power Line Conducted Emissions	PASS	------
15.247(d) 15.205(a) 15.209(a)	-	Radiated Emissions	PASS	------
15.247(a)(2)	-	Bandwidth	PASS	------
15.247(b)(3)	-	Maximum Output Power	PASS	------
15.247(d)	-	ConductedSpurious Emission	PASS	------
15.247(e)	-	Power Spectral Density	PASS	------
-	-	Frequency Stability	N/A	Note(1)
15.203	-	Antenna Requirement	PASS	Note(2)

Note:

(1) “N/A” denotes test is not applicable to this device.

(2) The device what use a permanently attached antenna were considered sufficient tocomply with the provisions of 15.203.

2.1MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Uncertainty for Conductionemission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: V)
	4.60 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	6.10 dB (Polarize: V)
	5.08 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: V)
	5.01 dB (Polarize: H)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: V)
	5.26 dB (Polarize: H)
Uncertainty for Radiation Emission test (18GHz-40GHz)	5.06 dB (Polarize: V)
	5.06 dB (Polarize: H)
Uncertainty for radio frequency	±0.048kHz
Uncertainty for conducted RF Power	±0.32dB

Note:

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

Test Facility:

The Test site used by DongGuanShuoXin Electronic Technology Co., Ltd. to collect test data is located on the Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China

The test facility is recognized, certified, or accredited by the following organizations:

Item	Registration No.	Expiration Date
CNAS	L3098	2024-08-27
A2LA	4893.01	2024-06-30
Innovation, Science and Economic Development Canada (ISED)	11033A CAB identifer:CN0083	2024-06-30
Federal Communications Commission (FCC)	171688 Designation No.:CN1235	2024-06-30

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	BLACKBOX PORTABLE POWER STATION	
Brand Name	N/A	
Test Model	ES3000-PLUS	
Series Model	N/A	
Model Difference(s)	N/A	
Hardware Version	V1.0	
Software Version	V1.9	
Power Source	AC 120V/60Hz	
Power Rating	DC 5V	
Operation Frequency	2402 MHz ~ 2480 MHz	
Modulation Technology	GFSK	
Bit Rate of Transmitter	1Mbps	
Antenna Information	Antenna Type: PCB	Maximum Peak Gain: 3.29 dBi
Max. Output Power	1Mbps: 0.589dBm (0.001145 W)	

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the user's manual.

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

3.2DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode**NOTE (1)**
Mode 2	TX Mode Channel 19_1Mbps

Following mode(s) as (were) found to be the worst case(s) and selected for the final test.

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 2	TX Mode Channel 19_1Mbps

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode**NOTE (1)**

Conducted test	
Final Test Mode	Description
Mode 2	TX Mode Channel 19_1Mbps

Note:

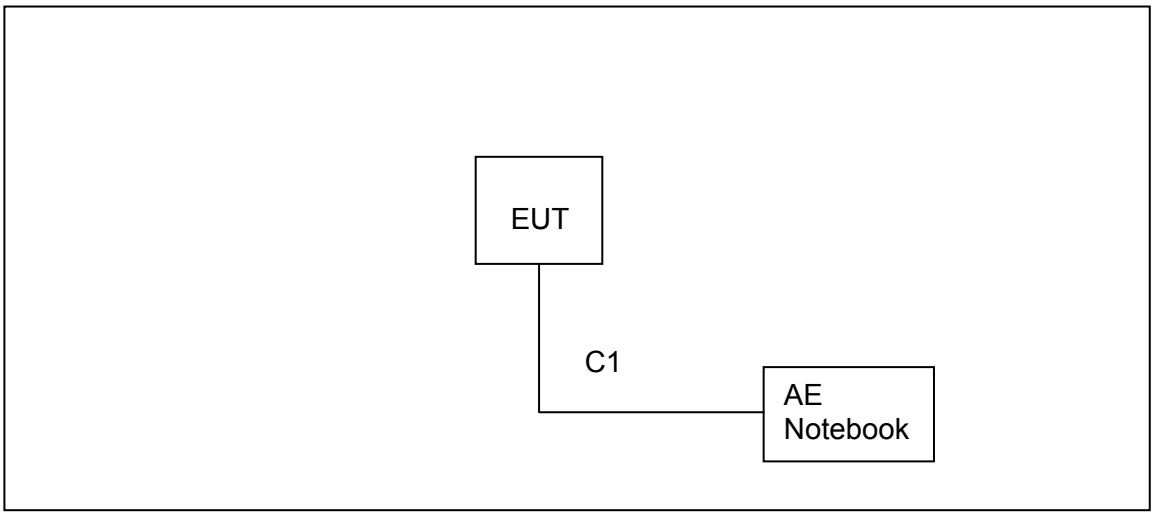
(1) The measurements are performed at the high, middle, low available channels.

3.3PARAMETERS OF TEST SOFTWARE

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of BT LE

Test Software	BK32xx RF Test_V1.8.2		
Frequency (MHz)	2402	2440	2480
Parameters-1Mbps	Default	Default	Default

3.4BLOCKDIAGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED



3.5SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
AE	Notebook	Lenovo	/	/

Item	Cable Type	Shielded Type	Ferrite Core	Length
C1	DC Cable	/	/	0.8m

3.6TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage
AC Power Line Conducted Emissions	23.5°C	53%	AC 120V/60Hz
Radiated Emissions-9K-30MHz	24°C	54%	AC 120V/60Hz
Radiated Emissions-30 MHz to 1GHz	24°C	54%	AC 120V/60Hz
Radiated Emissions-Above 1000 MHz	24°C	54%	AC 120V/60Hz
Bandwidth	24.1°C	55%	AC 120V/60Hz
Maximum Output Power	24.1°C	55%	AC 120V/60Hz
ConductedSpurious Emission	24.1°C	55%	AC 120V/60Hz
Power Spectral Density	24.1°C	55%	AC 120V/60Hz

4 AC POWER LINE CONDUCTED EMISSIONS TEST

4.1LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56*	56 to 46*
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.2TEST PROCEDURE

a. 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 equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. 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.

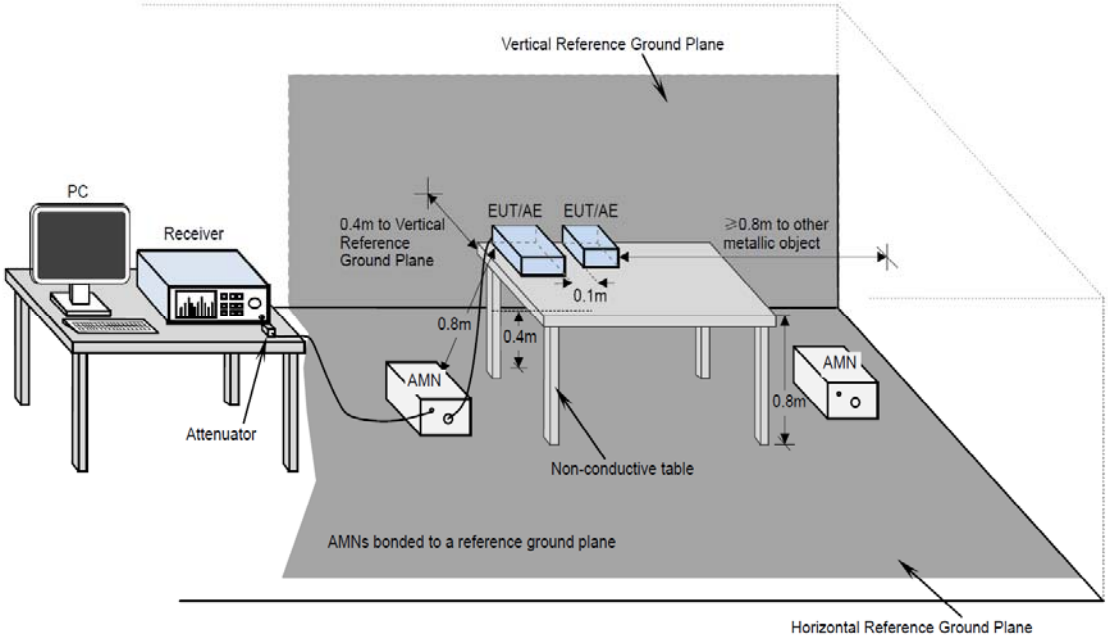
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

d. LISN at least 80 cm from nearest part of EUT chassis.

4.3MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	12/04/2024
2	EMI Test Receiver	R&S	ESCI	101308	11/29/2024
3	LISN	AFJ	LS16	16011103219	08/11/2024
4	LISN	Schwarzbeck	NSLK 8127	8127-432	08/11/2024
5	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

4.4TESTSETUP



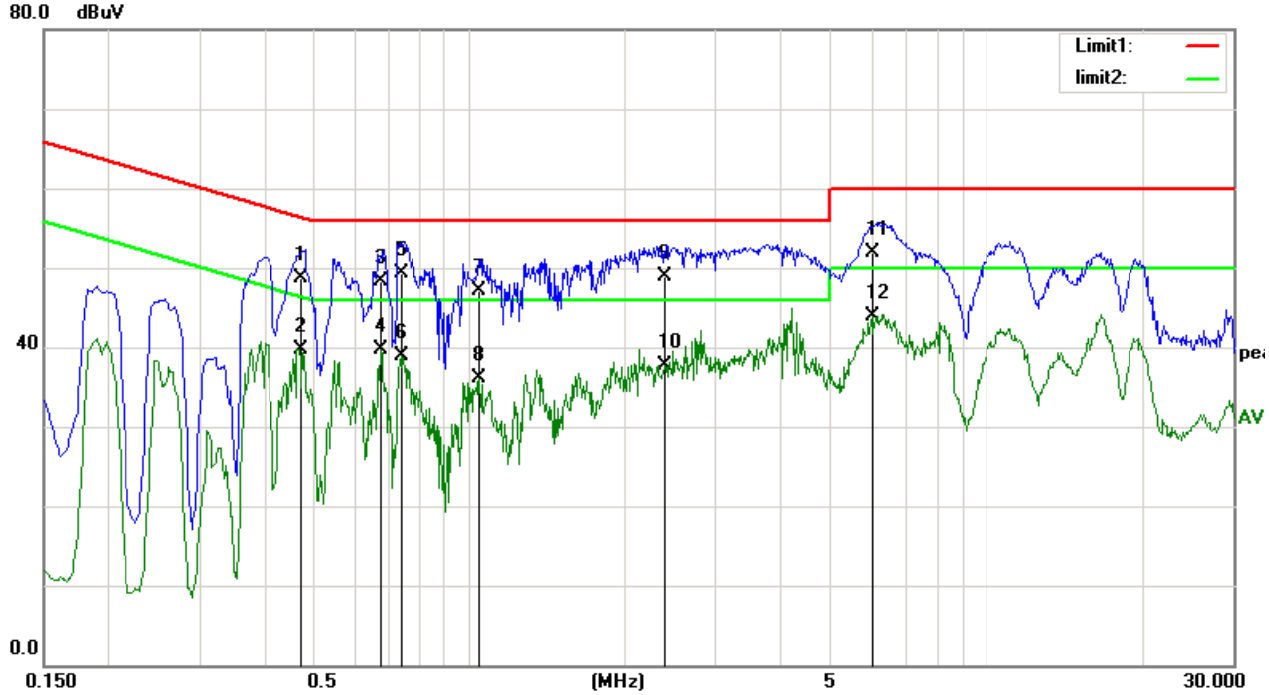
4.5EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting data or hopping on mode.

4.6TEST RESULTS

Test Mode:	TX Mode Channel 19_1Mbps

Line

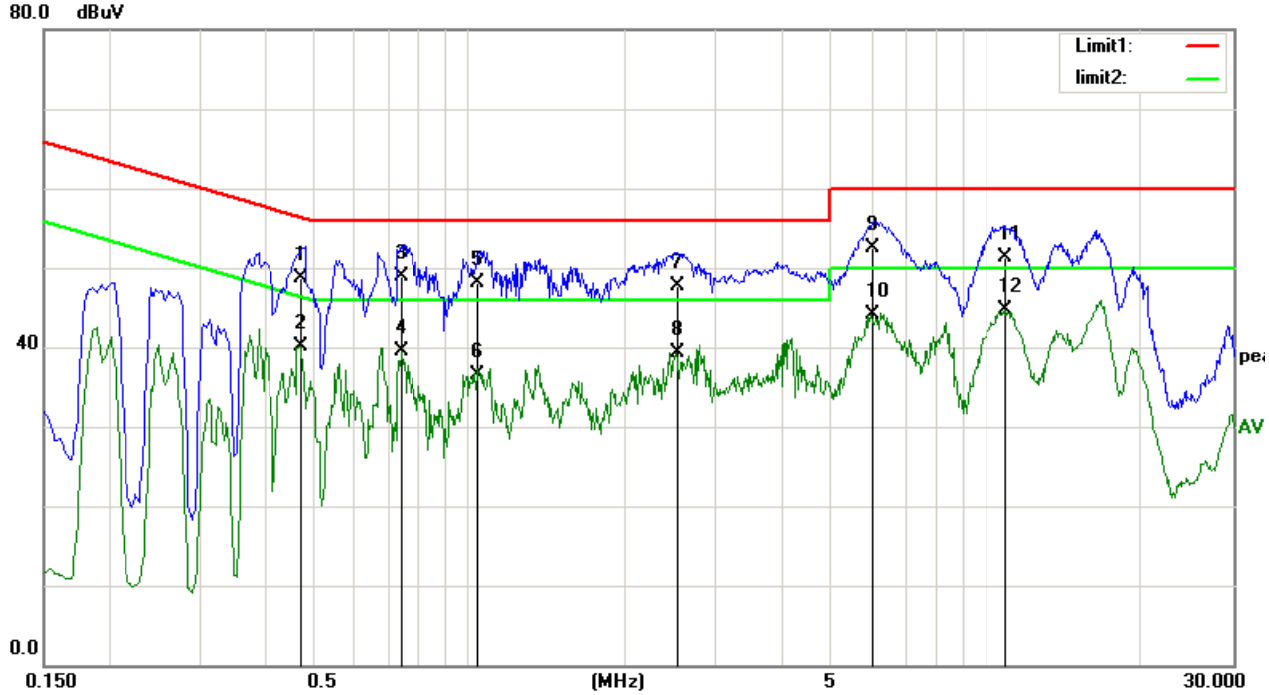


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4699	38.44	10.31	48.75	56.52	-7.77	QP
2	0.4699	29.45	10.31	39.76	46.52	-6.76	AVG
3	0.6740	38.07	10.22	48.29	56.00	-7.71	QP
4	0.6740	29.47	10.22	39.69	46.00	-6.31	AVG
5	0.7419	39.15	10.20	49.35	56.00	-6.65	QP
6	0.7419	28.66	10.20	38.86	46.00	-7.14	AVG
7	1.0460	37.03	10.16	47.19	56.00	-8.81	QP
8	1.0460	26.03	10.16	36.19	46.00	-9.81	AVG
9	2.3860	38.61	10.20	48.81	56.00	-7.19	QP
10	2.3860	27.57	10.20	37.77	46.00	-8.23	AVG
11	6.0499	41.65	10.21	51.86	60.00	-8.14	QP
12	6.0499	33.71	10.21	43.92	50.00	-6.08	AVG

Remarks:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode:	TX Mode Channel 19_1Mbps

Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4700	38.34	10.31	48.65	56.51	-7.86	QP
2	0.4700	29.80	10.31	40.11	46.51	-6.40	AVG
3	0.7420	38.69	10.20	48.89	56.00	-7.11	QP
4	0.7420	29.40	10.20	39.60	46.00	-6.40	AVG
5	1.0380	37.99	10.16	48.15	56.00	-7.85	QP
6	1.0380	26.41	10.16	36.57	46.00	-9.43	AVG
7	2.5020	37.43	10.20	47.63	56.00	-8.37	QP
8	2.5020	29.18	10.20	39.38	46.00	-6.62	AVG
9	5.9859	42.22	10.21	52.43	60.00	-7.57	QP
10	5.9859	33.88	10.21	44.09	50.00	-5.91	AVG
11	10.9139	41.10	10.25	51.35	60.00	-8.65	QP
12	10.9139	34.46	10.25	44.71	50.00	-5.29	AVG

Remarks:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

5 RADIATED EMISSION TEST

5.1LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000MHz)

Frequency (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

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-30 MHz)

Frequency (MHz)	Magnetic field strength (H-Field) (μA/m)	Measurement Distance (meters)
0.009-0.490	6.37/F(kHz)	300
0.490-1.705	6.37/F(kHz)	30
1.705-30.0	0.08	30

LIMITS OF RADIATED EMISSION MEASUREMENT (30 MHz-1000MHz)

Frequency (MHz)	Field Strength (μV/m at 3m)
30-88	100
88-216	150
216-960	200
Above 960	500

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

Note:

(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).

5.2TEST PROCEDURE

a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. 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 find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1GHz)
i. The test result is calculated as the following:
(1) Result = Reading + Correct Factor
(2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
(3) Margin = Result - Limit

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	RBW 1MHz VBW 3MHz peak detector for Pk value RMS detector for AV value

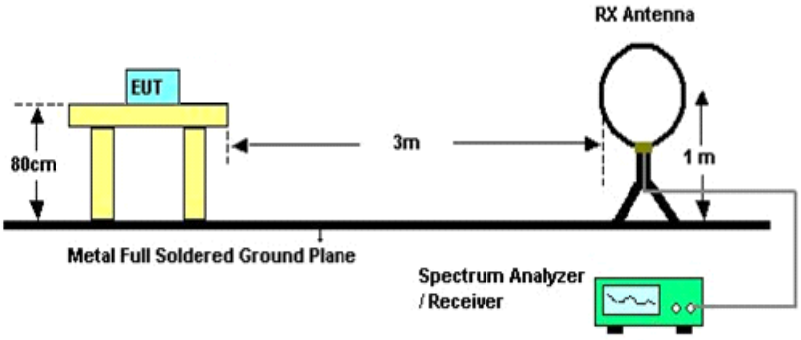
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

5.3MEASUREMENT INSTRUMENTS LIST

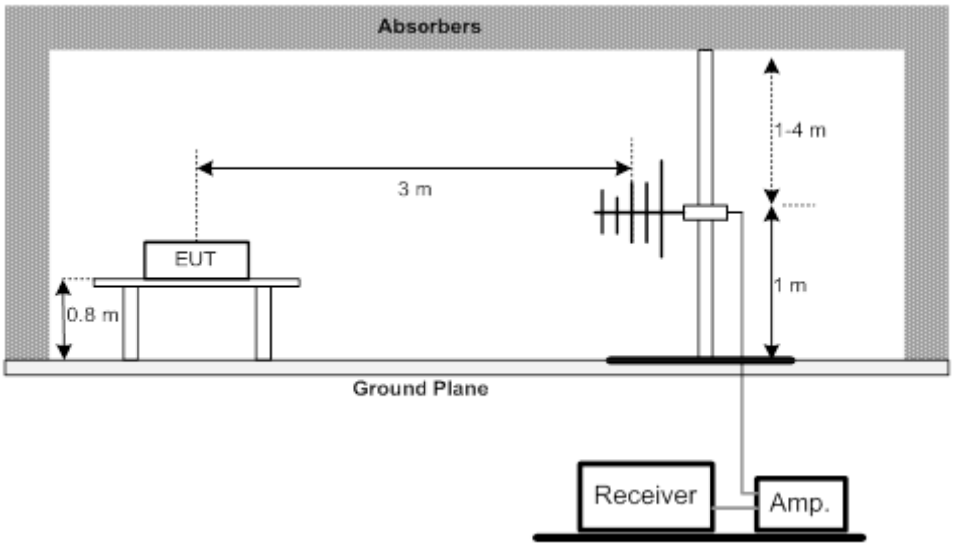
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101307	12/04/2024
2	Spectrum Analyzer	Agilent	E4407B	US40240708	11/06/2024
3	Loop antenna	SCHWARZBECK K	FMZB1519	1519-062	01/14/2025
4	Broadband antenna	SCHWARZBECK	VULB9168	VULB9168-192	07/02/2024
5	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D 1065	04/09/2024
6	Preamplifier Amplifier	HP	8447F	3113A05680	12/04/2024
7	PRE-AMPLIFIER	EMEC	EM01G26G	980136	04/05/2024
8	RF Cable	R&S	Test Cable 4	4	12/04/2024
9	RF Cable	R&S	Test Cable 5	5	12/04/2024
10	RF Cable	R&S	Test Cable 9	8	04/18/2024
11	RF Cable	R&S	Test Cable 10	9	04/18/2024
12	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

5.4TESTSETUP

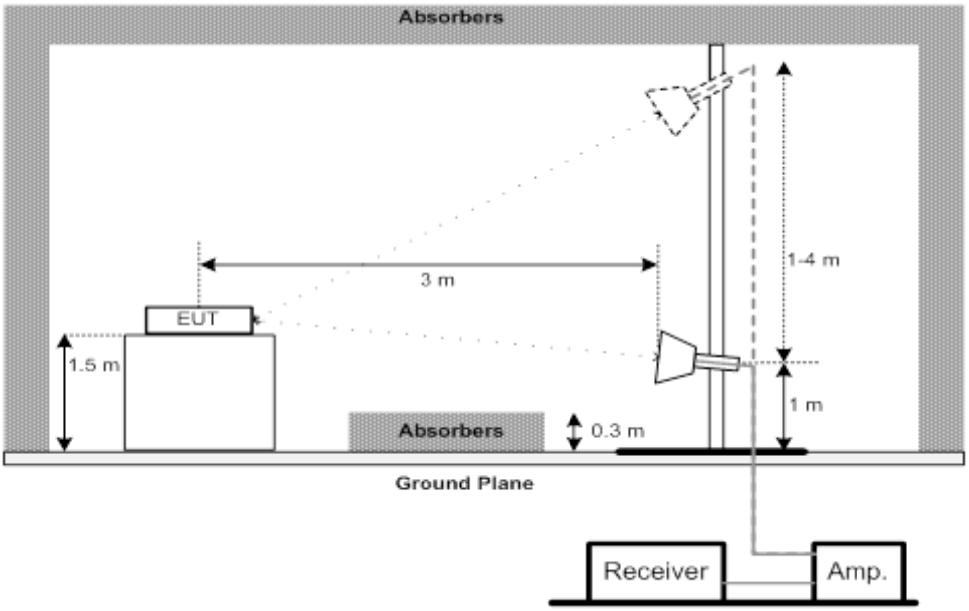
9 kHz-30 MHz



30 MHz to 1 GHz



Above 1 GHz



5.5EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT- 9kHz TO 30MHz

Test Mode:	TX Mode Channel 39_1Mbps

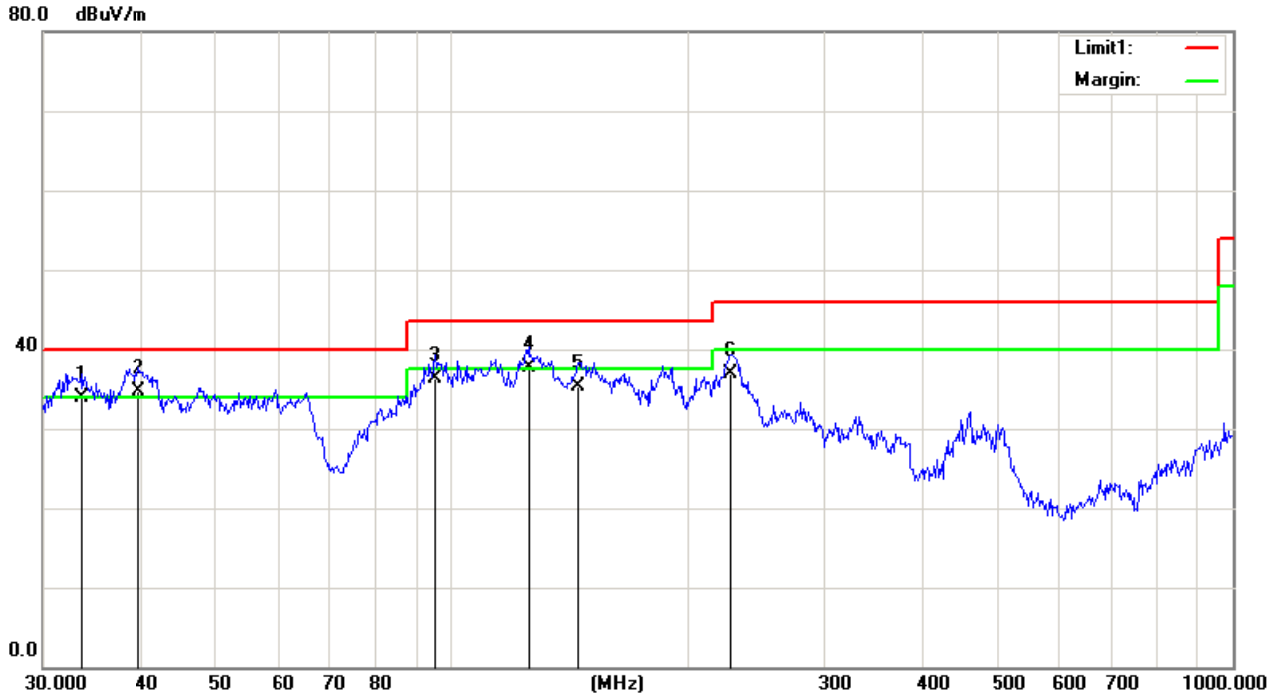
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =20 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor

5.7 TEST RESULT- 30MHz TO 1000MHz

Test Mode :	TX Mode Channel 19_1Mbps

Vertical

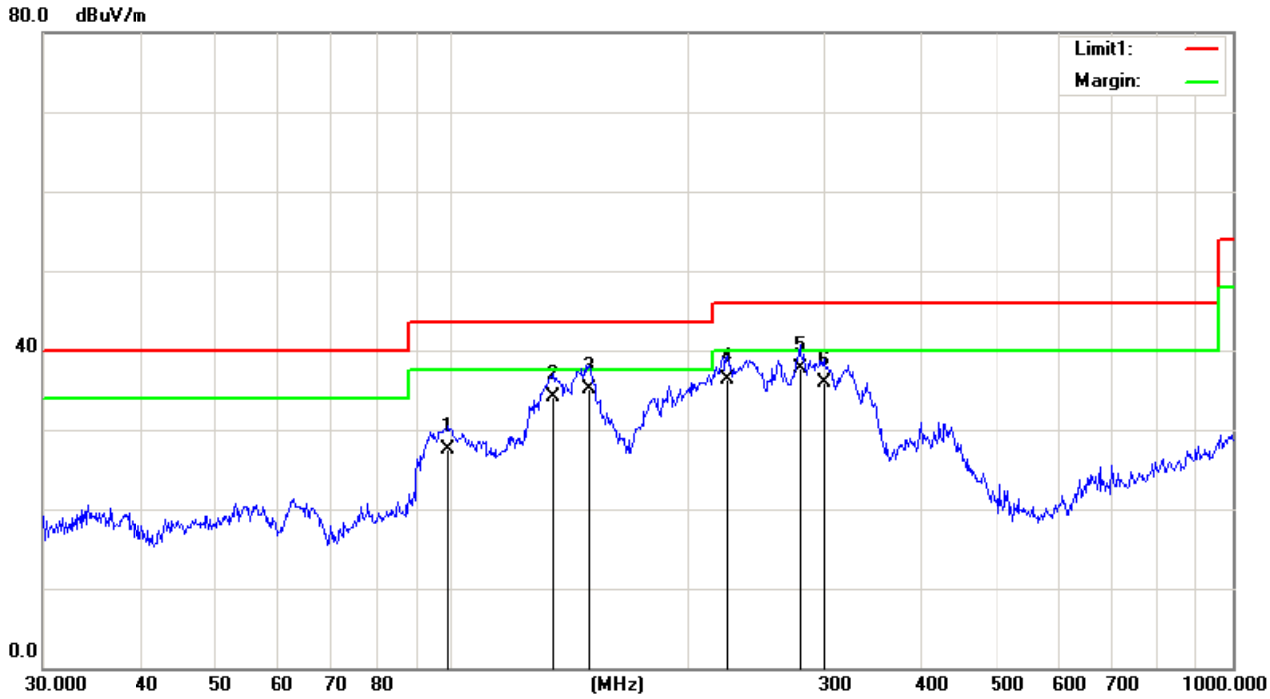


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		33.5623	47.68	-13.79	33.89	40.00	-6.11	QP	200	312	
2	*	39.8541	47.25	-12.48	34.77	40.00	-5.23	QP	100	245	
3		95.4270	52.21	-16.00	36.21	43.50	-7.29	QP	100	156	
4	!	125.4457	50.96	-13.33	37.63	43.50	-5.87	QP	100	165	
5		145.3505	48.84	-13.48	35.36	43.50	-8.14	QP	100	98	
6		227.6904	46.69	-9.74	36.95	46.00	-9.05	QP	200	119	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode :	TX Mode Channel 19_1Mbps

Horizontal



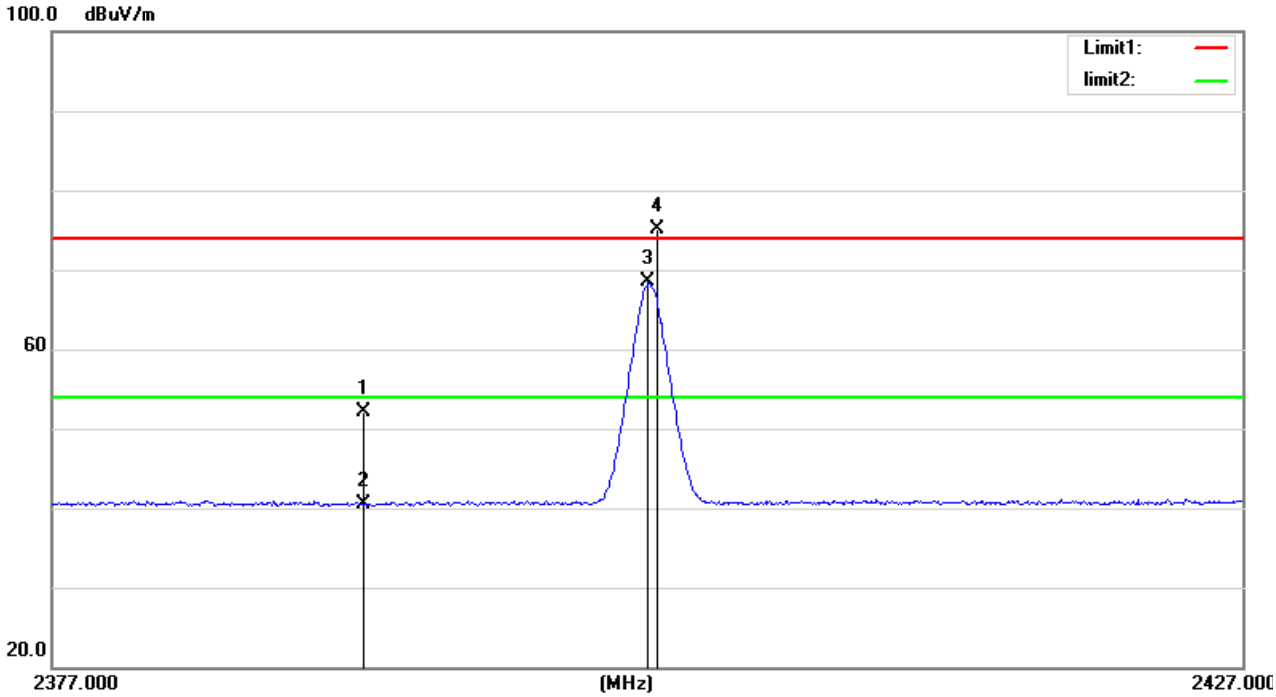
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		99.1795	45.14	-17.60	27.54	43.50	-15.96	QP	100	165	
2		135.0319	48.61	-14.59	34.02	43.50	-9.48	QP	100	144	
3		150.0107	49.14	-14.08	35.06	43.50	-8.44	QP	100	89	
4		225.3077	45.72	-9.45	36.27	46.00	-9.73	QP	200	45	
5	*	279.0436	44.05	-6.39	37.66	46.00	-8.34	QP	300	211	
6		299.3158	43.45	-7.62	35.83	46.00	-10.17	QP	100	269	

*:Maximum data x:Over limit !:over margin (Reference Only

5.8 TEST RESULT- ABOVE 1000MHz(BAND EDGE)

Test Mode:	TX 2402 MHz_CH00_1Mbps

Vertical

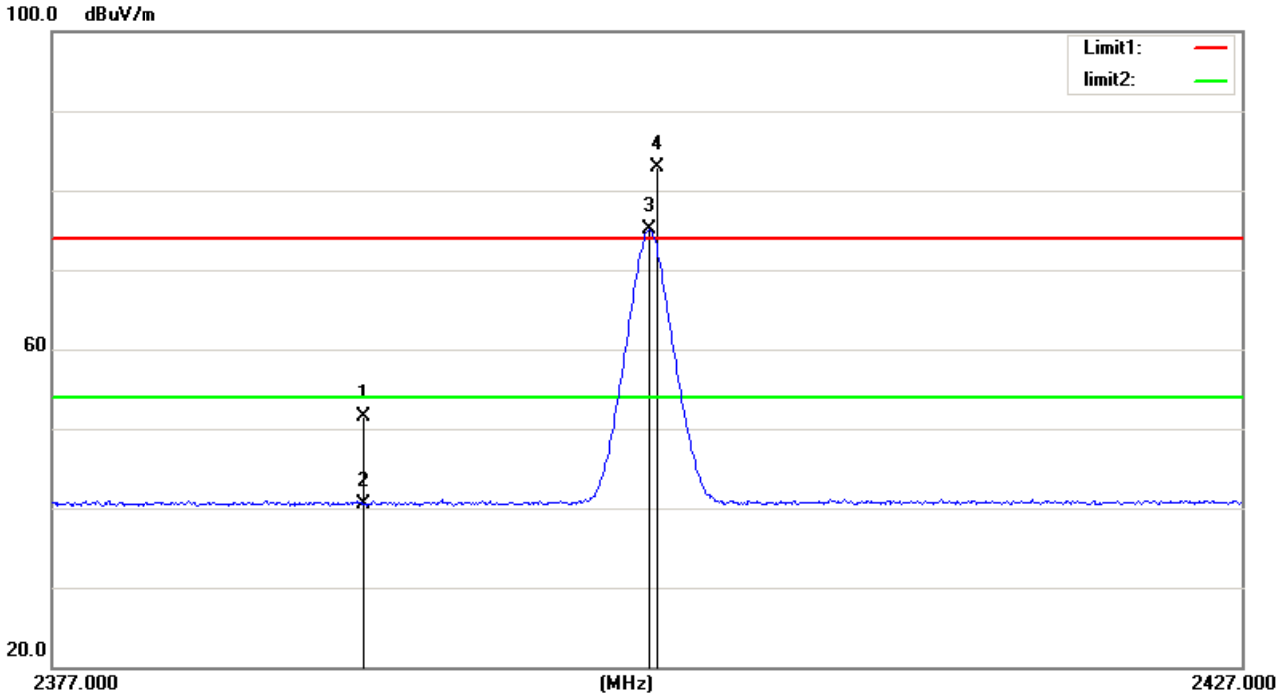


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		2390.000	21.94	30.14	52.08	74.00	-21.92	peak	150	116	
2		2390.000	10.34	30.14	40.48	54.00	-13.52	AVG	150	116	
3	*	2401.950	38.25	30.16	68.41	54.00	14.41	AVG	150	116	NO LIMIT
4	X	2402.300	44.94	30.17	75.11	74.00	1.11	peak	150	116	NO LIMIT

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode:	TX 2402 MHz_CH00_1Mbps

Horizontal

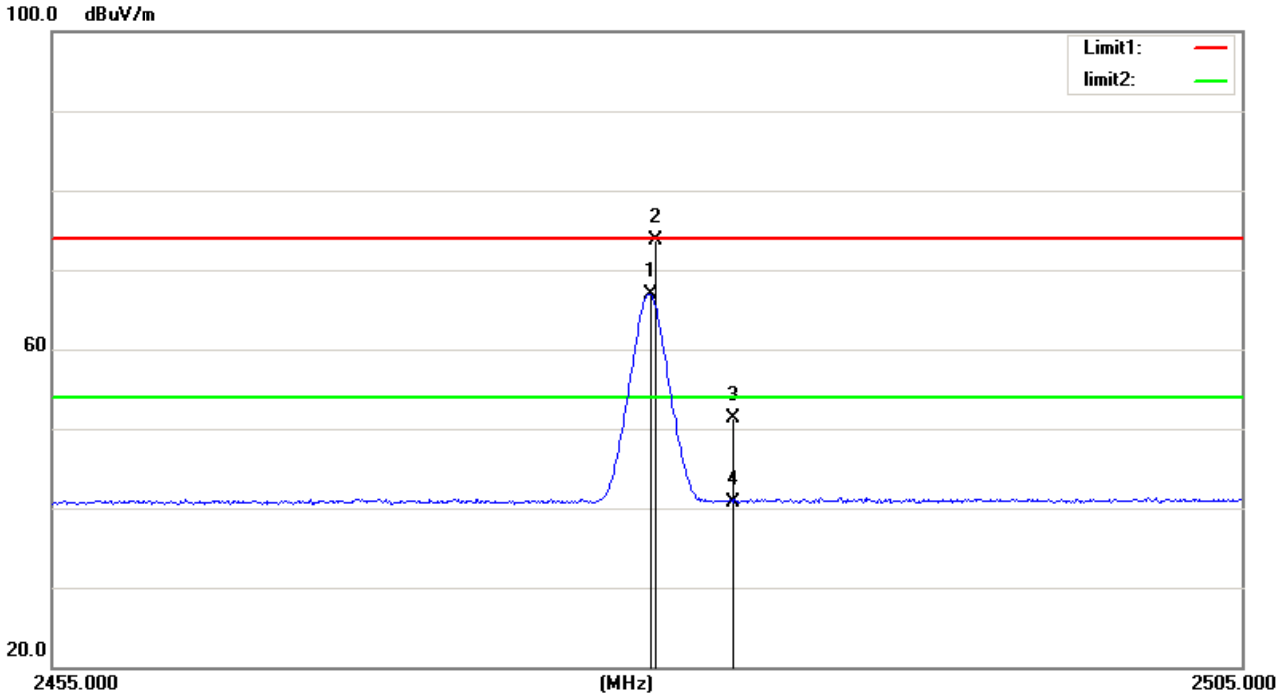


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		2390.000	21.29	30.14	51.43	74.00	-22.57	peak	150	192	
2		2390.000	10.41	30.14	40.55	54.00	-13.45	AVG	150	192	
3	*	2402.000	44.86	30.16	75.02	54.00	21.02	AVG	150	192	NO LIMIT
4	X	2402.300	52.64	30.17	82.81	74.00	8.81	peak	150	192	NO LIMIT

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode:	TX 2480 MHz_CH39_1Mbps

Vertical

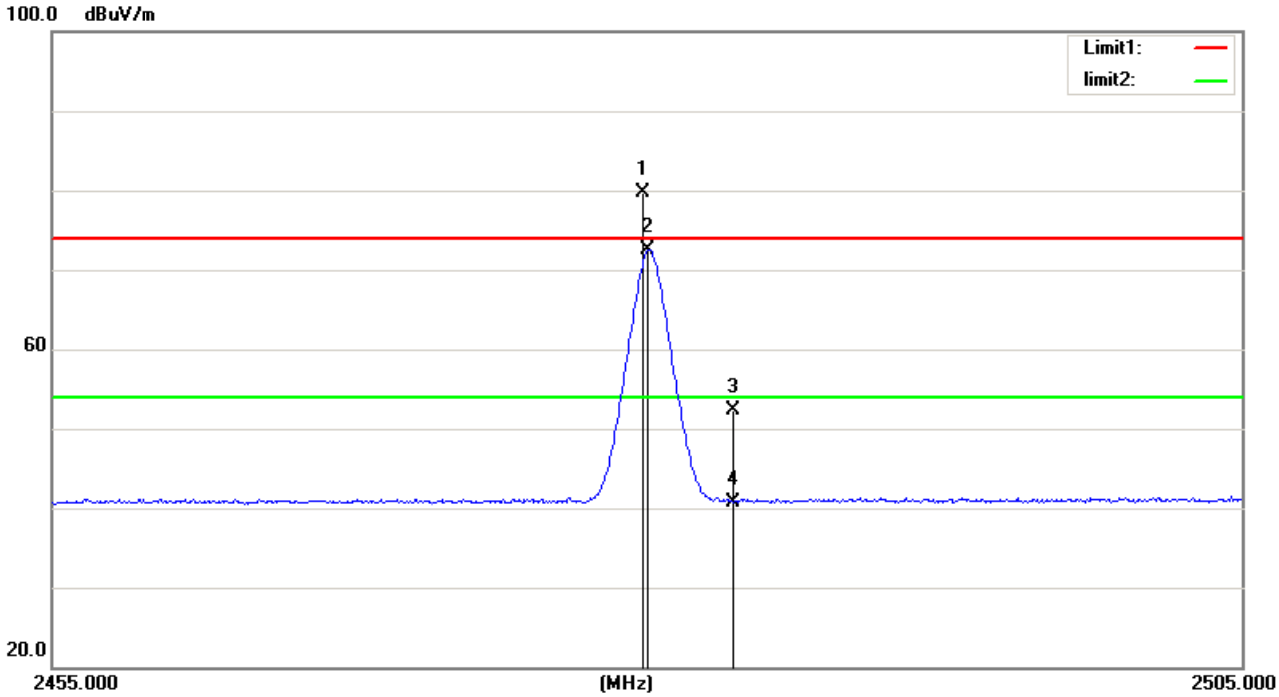


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	*	2480.050	36.65	30.34	66.99	54.00	12.99	AVG	150	117	NO LIMIT
2		2480.250	43.43	30.34	73.77	74.00	-0.23	peak	150	117	NO LIMIT
3		2483.500	20.90	30.34	51.24	74.00	-22.76	peak	150	117	
4		2483.500	10.41	30.34	40.75	54.00	-13.25	AVG	150	117	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode:	TX 2480 MHz_CH39_1Mbps

Horizontal



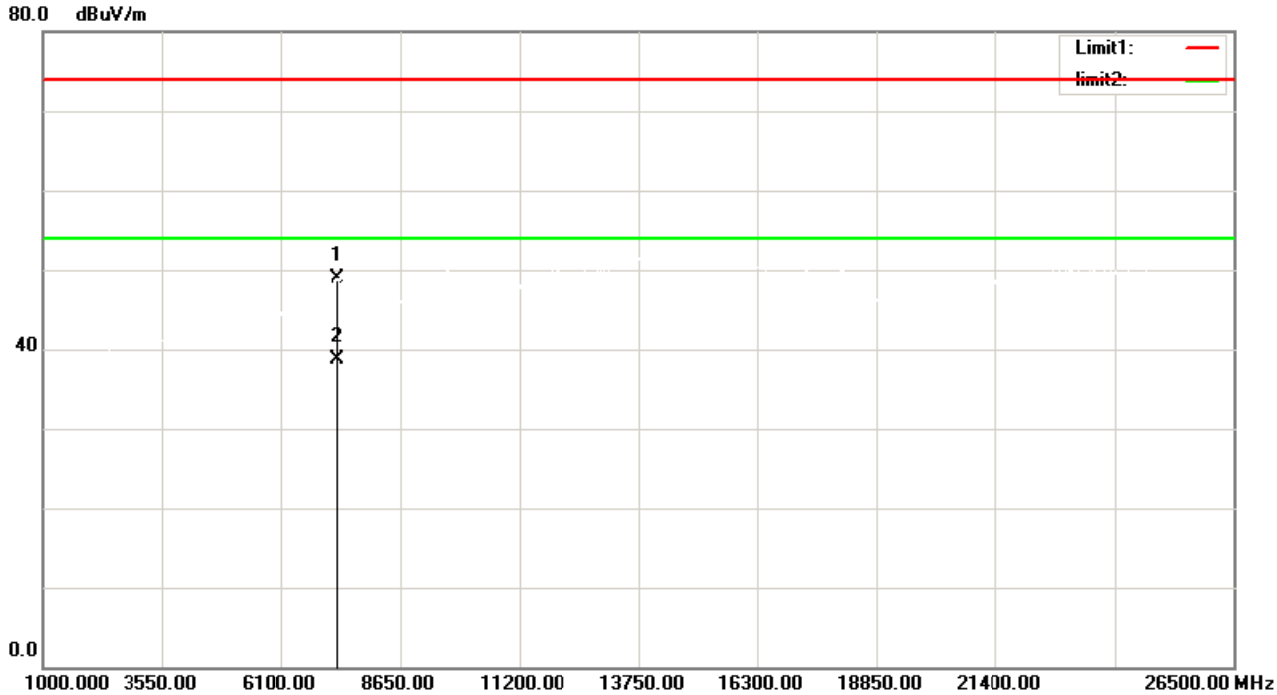
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	X	2479.750	49.43	30.34	79.77	74.00	5.77	peak	150	322	NO LIMIT
2	*	2479.950	42.15	30.34	72.49	54.00	18.49	AVG	150	322	NO LIMIT
3		2483.500	21.95	30.34	52.29	74.00	-21.71	peak	150	322	
4		2483.500	10.33	30.34	40.67	54.00	-13.33	AVG	150	322	

*:Maximum data x:Over limit !:over margin (Reference Only

5.9TEST RESULTS - ABOVE 1000MHz(HARMONIC)

Test Mode:	TX 2402 MHz_CH00_1Mbps

Vertical

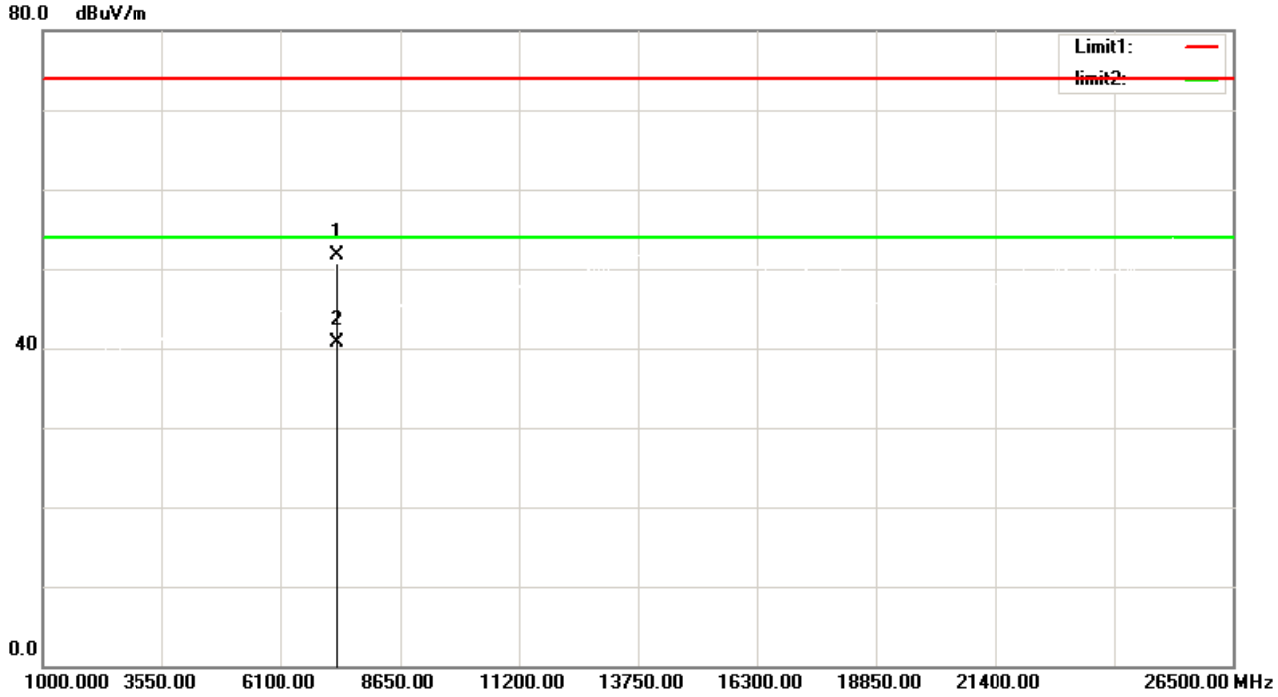


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		7311.250	51.05	-2.19	48.86	74.00	-25.14	peak	150	211	
2	*	7311.250	40.86	-2.19	38.67	54.00	-15.33	AVG	150	211	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode:	TX 2402 MHz_CH00_1Mbps

Horizontal

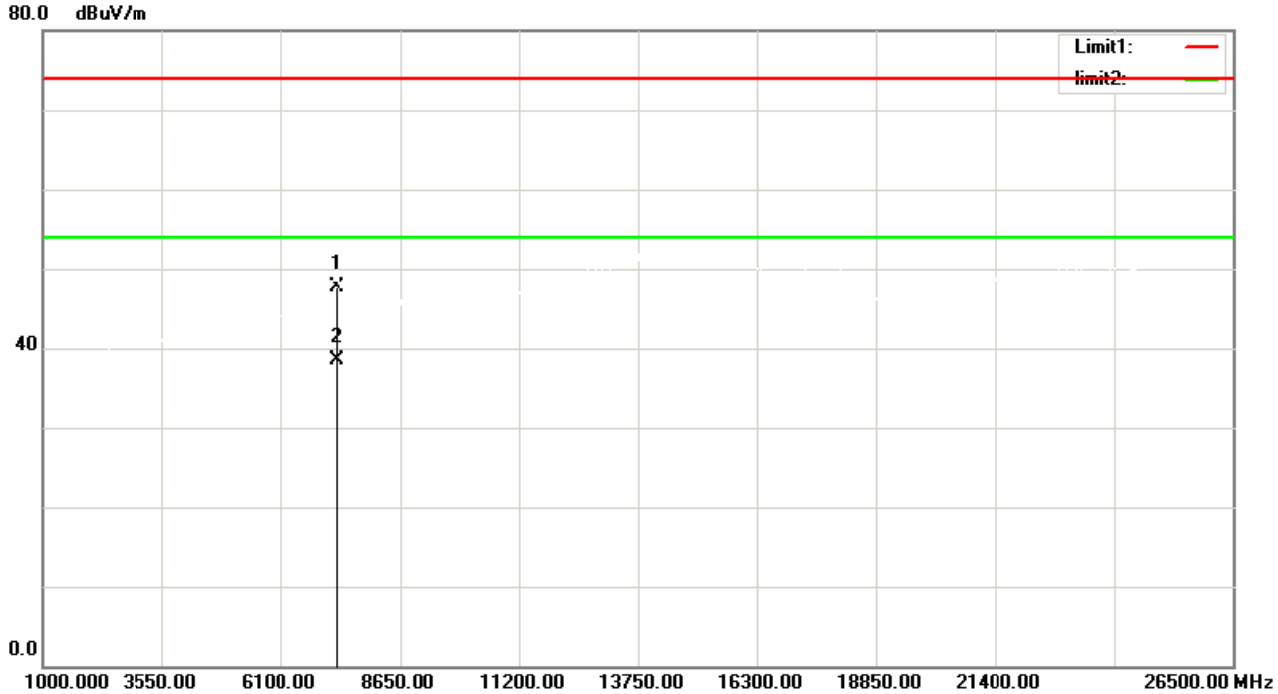


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		7311.250	53.95	-2.19	51.76	74.00	-22.24	peak	150	81	
2	*	7311.250	42.87	-2.19	40.68	54.00	-13.32	AVG	150	81	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Mode:	TX 2440 MHz_CH19_1Mbps

Vertical

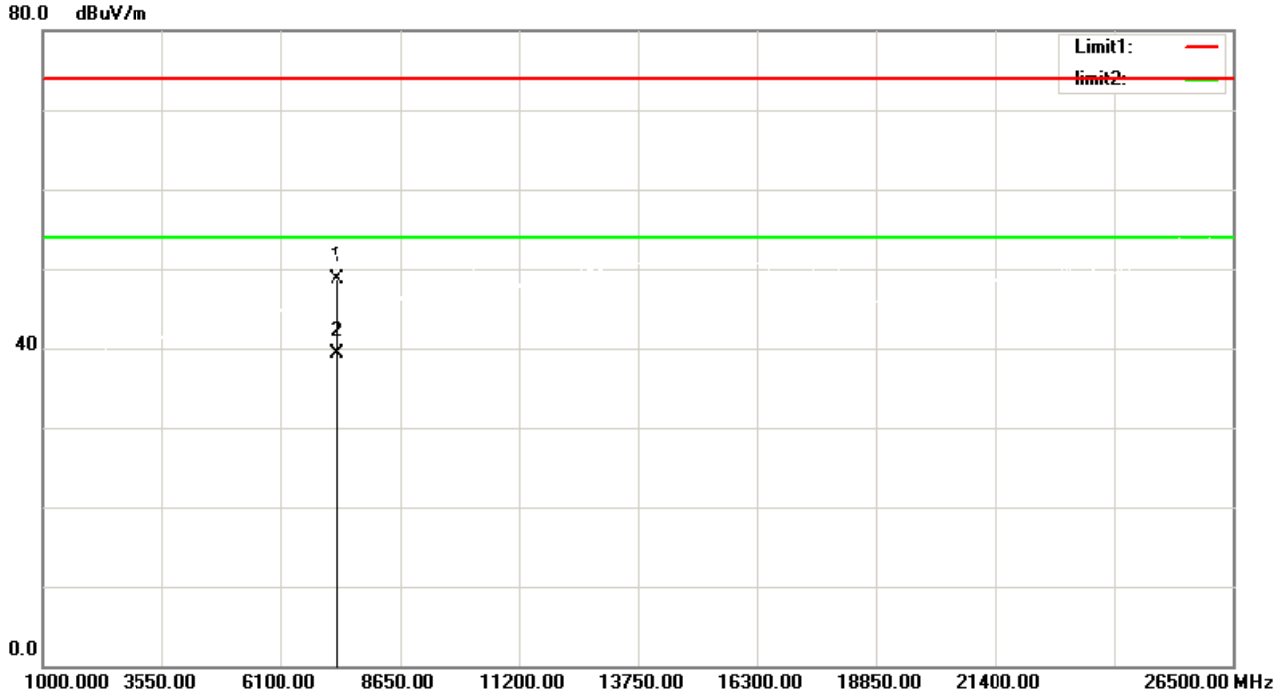


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		7320.000	49.96	-2.18	47.78	74.00	-26.22	peak	150	274	
2	*	7320.000	40.67	-2.18	38.49	54.00	-15.51	AVG	150	274	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Mode:	TX 2440 MHz_CH19_1Mbps

Horizontal

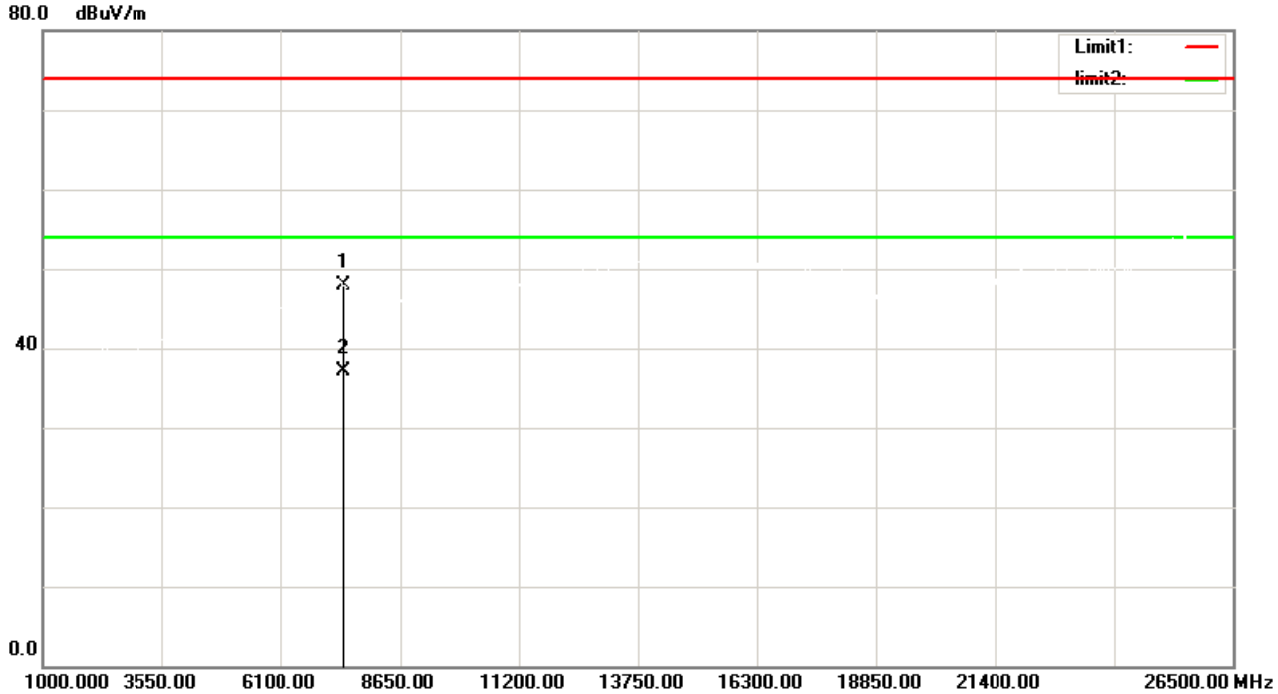


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		7320.000	50.81	-2.18	48.63	74.00	-25.37	peak	150	76	
2	*	7320.000	41.39	-2.18	39.21	54.00	-14.79	AVG	150	76	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode:	TX 2480 MHz_CH39_1Mbps

Vertical

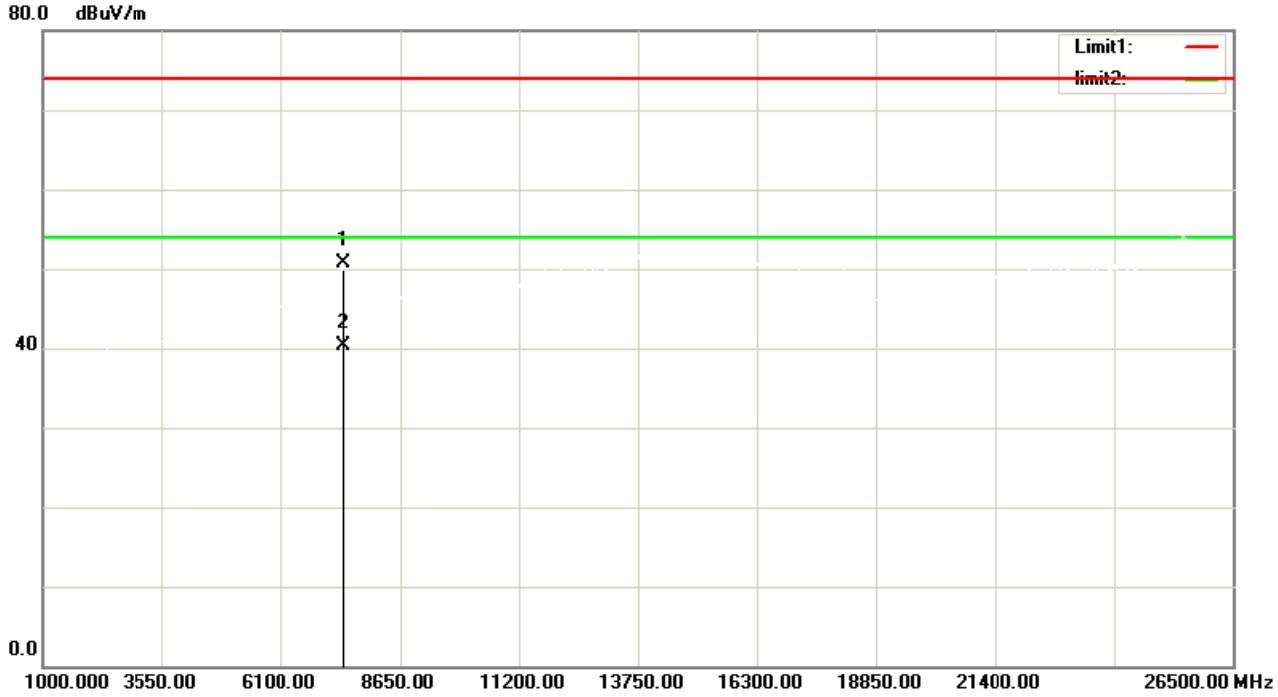


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		7438.500	49.93	-2.11	47.82	74.00	-26.18	peak	150	226	
2	*	7438.500	39.30	-2.11	37.19	54.00	-16.81	AVG	150	226	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Mode:	TX 2480 MHz_CH39_1Mbps

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		7438.750	52.86	-2.11	50.75	74.00	-23.25	peak	150	84	
2	*	7438.750	42.43	-2.11	40.32	54.00	-13.68	AVG	150	84	

*:Maximum data x:Over limit !:over margin (Reference Only

6BANDWIDTH TEST

6.1LIMIT

FCC Part15, Subpart C (15.247)		
Section	Test Item	Limit
15.247(a)(2)	Bandwidth	>= 500 kHz (6dB bandwidth)

6.2TEST PROCEDURE AND SETTING

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Spectrum Setting:
For 6dB Bandwidth RBW= 100 kHz, VBW=300 kHz, Sweep time =Auto.
For 99% Bandwidth RBW=30kHz, VBW=100kHz, Sweep time =Auto for 1Mbps.
RBW=100kHz, VBW=300kHz, Sweep time =Auto for 2Mbps.

6.3MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2024/05/23
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

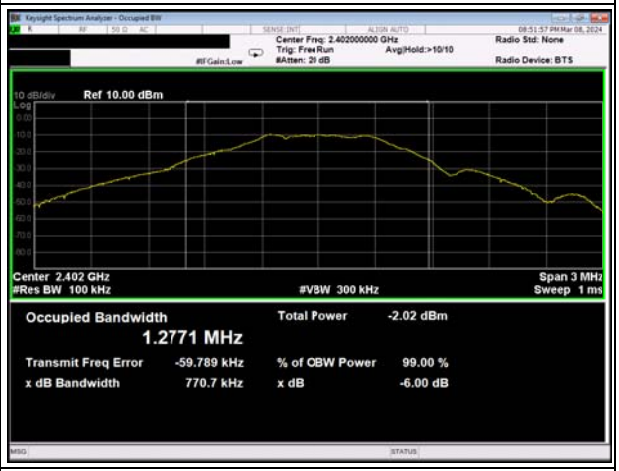
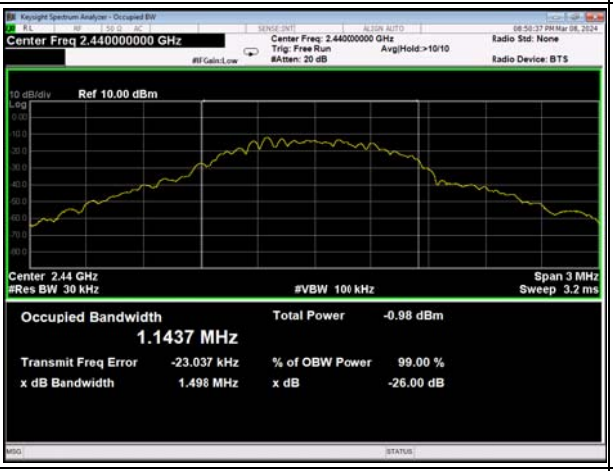
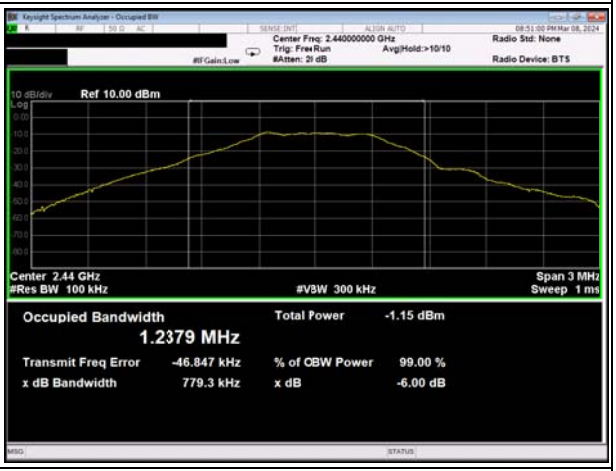
6.4TEST SETUP

6.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6TESTRESULTS

TX Mode_1Mbps				
Channel	Frequency (MHz)	6 dB bandwidth (MHz)	99%OBW (MHz)	Result
CH00	2402	0.7707	1.1533	PASS
CH19	2440	0.7793	1.1437	PASS
CH39	2480	0.7908	1.1226	PASS

	99%	6dB
2402 MHz		
2440 MHz		
2480 MHz		

7MAXIMUM OUTPUT POWER

7.1LIMIT

FCC Part15, Subpart C (15.247)		
Section	Test Item	Limit
15.247(b)(3)	Maximum Output Power	1 watt or 30dBm

7.2TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Spectrum Setting : RBW= 3MHz, VBW=8MHz, Sweep time = Auto.

7.3MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2024/05/23
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

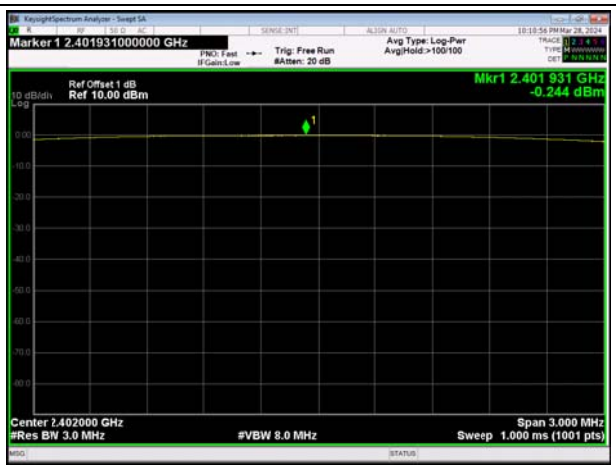
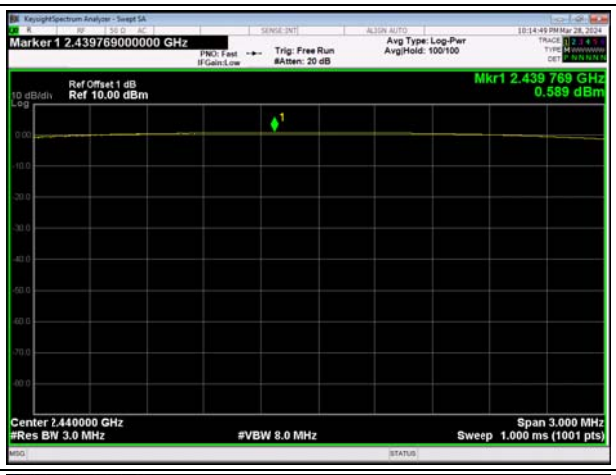
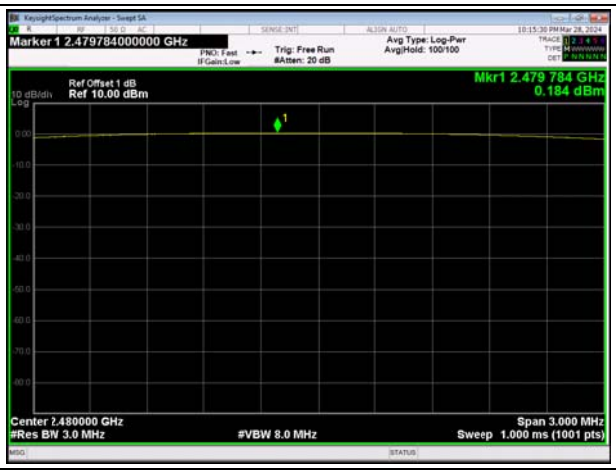
7.4TEST SETUP

7.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6TESTRESULTS

TX Mode_1Mbps				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
CH00	2402	-0.244	0.000945	PASS
CH19	2440	0.589	0.001145	PASS
CH39	2480	0.184	0.001043	PASS
Limit	30dBm / 1W			

2402MHz	
2440MHz	
2480MHz	

8CONDUCTED SPURIOUS EMISSION

8.1LIMIT

For FCC

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, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

8.2TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting : RBW= 100 kHz, VBW=300 kHz, Sweep time = Auto.

8.3MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2024/05/23
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

8.4TEST SETUP

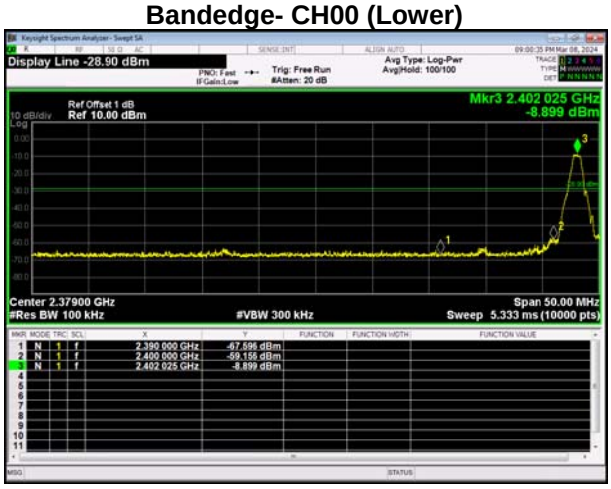
8.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

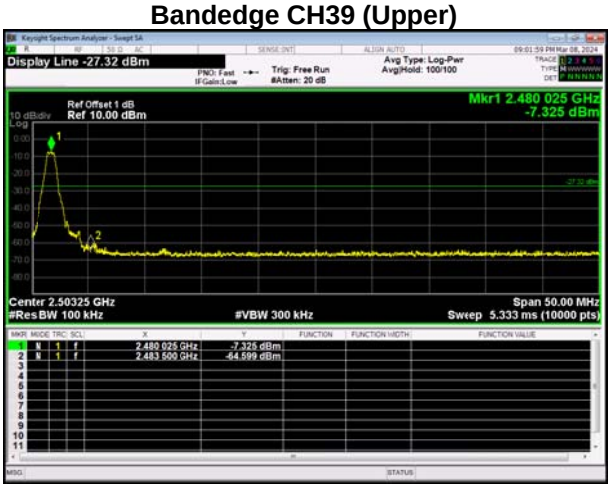
8.6 TEST RESULTS

TX Mode_1Mbps

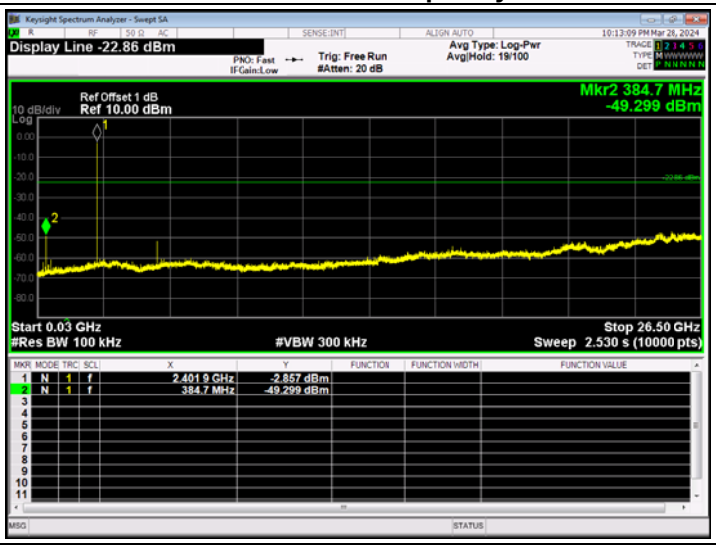
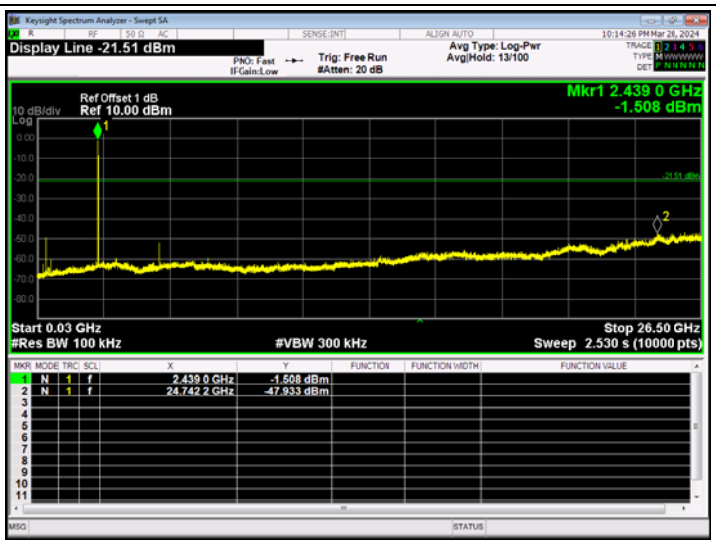
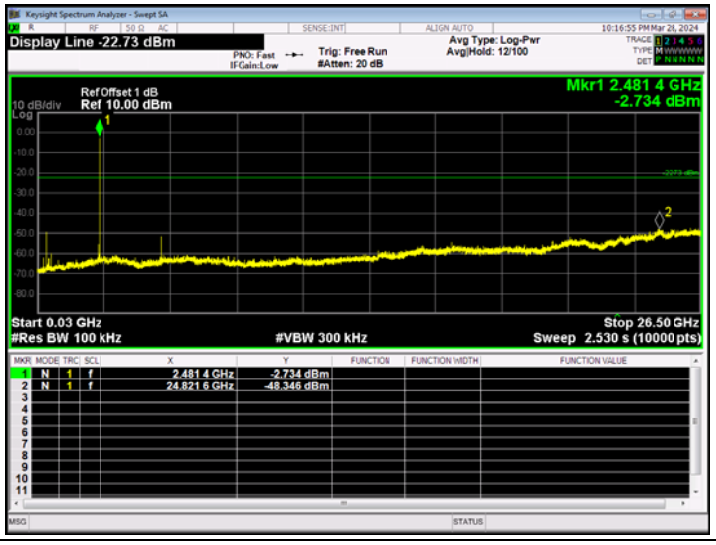
Bandedge- CH00 (Lower)



Bandedge CH39 (Upper)



CH00 – 10th Harmonic of the fundamental frequency

2402MHz	
2440MHz	
2480MHz	

9POWER SPECTRAL DENSITY TEST

9.1LIMIT

FCC Part15, Subpart C (15.247)		
Section	Test Item	Limit
15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

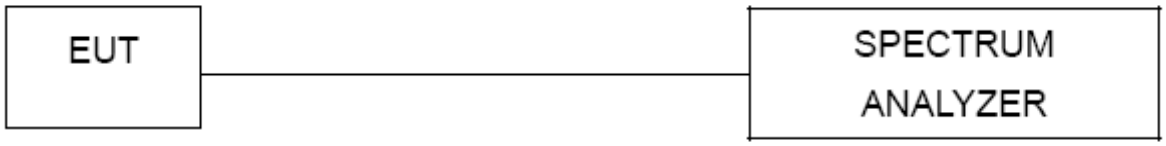
9.2TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW=3 kHz, VBW=10kHz, Sweep time = auto.

9.3MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2024/05/23
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

9.4TEST SETUP

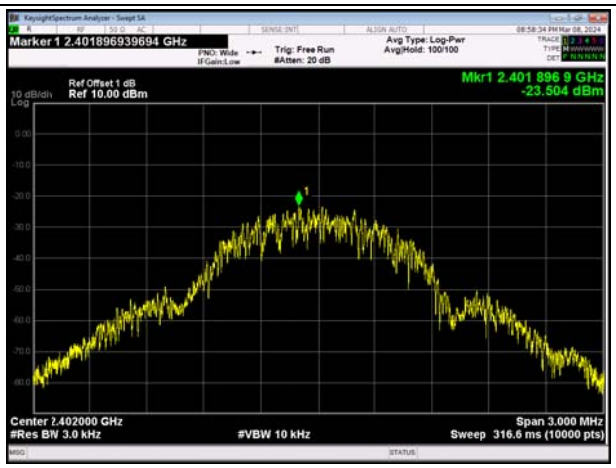
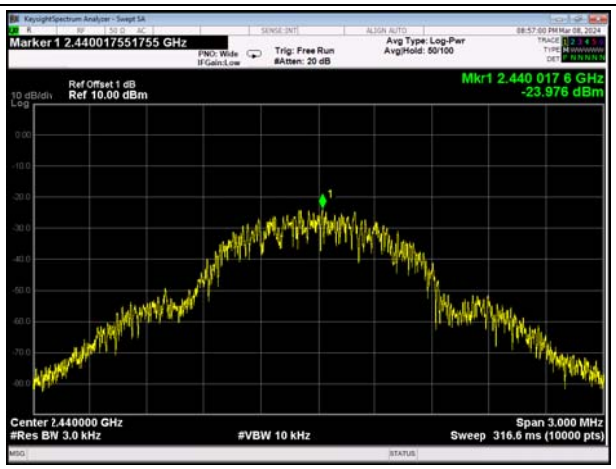
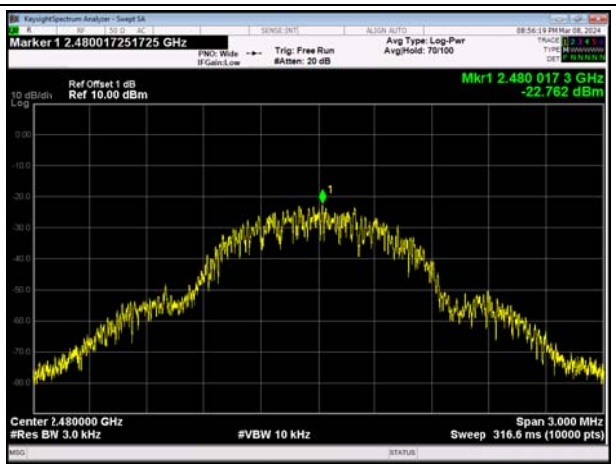


9.5EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

9.6 TEST RESULTS

TX Mode_1Mbps				
Channel	Frequency (MHz)	Power SpectralDensity (dBm/3 kHz)	Limit: <dBm/3KHz	Result
CH00	2402	-23.504	8	PASS
CH19	2440	-23.976	8	PASS
CH39	2480	-22.762	8	PASS

CH00	
CH19	
CH39	

END OF TEST REPORT