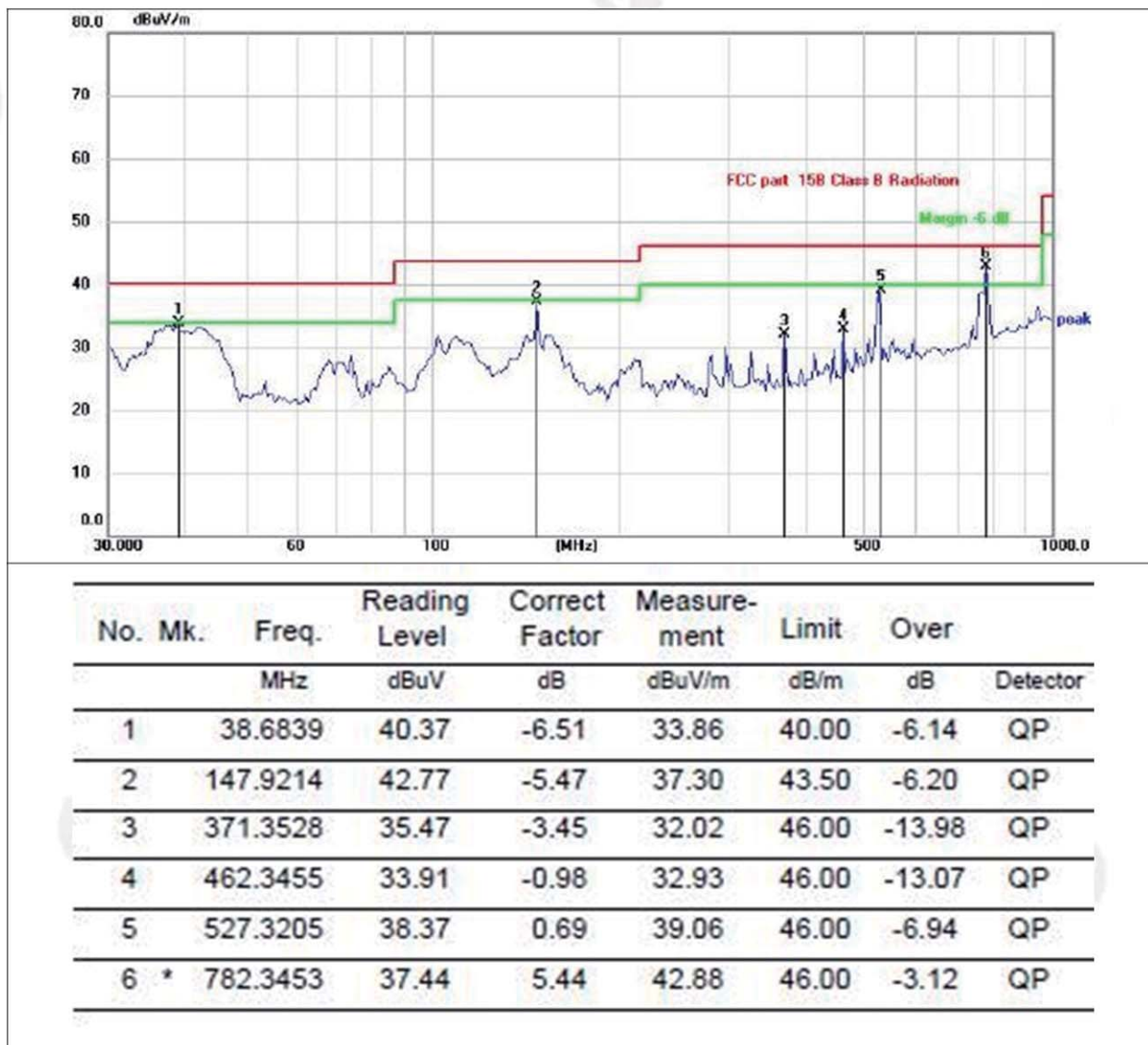




Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
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 GFSK mode



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:2402MHz									
V	4804.00	52.82	30.55	5.77	24.66	52.53	74.00	-21.47	Pk
V	4804.00	44.31	30.55	5.77	24.66	43.55	54.00	-10.45	AV
V	7206.00	54.23	30.33	6.32	24.55	54.68	74.00	-19.32	Pk
V	7206.00	43.17	30.33	6.32	24.55	44.00	54.00	-10.00	AV
V	9608.00	52.57	30.85	7.45	24.69	54.08	74.00	-19.92	Pk
V	9608.00	43.93	30.85	7.45	24.69	44.83	54.00	-9.17	AV
V	12010.00	53.88	31.02	8.99	25.57	57.32	74.00	-16.68	Pk
V	12010.00	44.59	31.02	8.99	25.57	48.60	54.00	-5.40	AV
H	4804.00	53.48	30.55	5.77	24.66	53.57	74.00	-20.43	Pk
H	4804.00	43.47	30.55	5.77	24.66	43.67	54.00	-10.33	AV
H	7206.00	52.77	30.33	6.32	24.55	53.72	74.00	-20.28	Pk
H	7206.00	43.18	30.33	6.32	24.55	43.78	54.00	-10.22	AV
H	9608.00	53.43	30.85	7.45	24.69	55.27	74.00	-18.73	Pk
H	9608.00	44.02	30.85	7.45	24.69	45.21	54.00	-8.79	AV
H	12010.00	52.13	31.02	8.99	25.57	54.98	74.00	-19.02	Pk
H	12010.00	42.44	31.02	8.99	25.57	45.80	54.00	-8.20	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:2440MHz									
V	4880.00	54.12	30.55	5.77	24.66	54.17	74.00	-19.83	Pk
V	4880.00	44.12	30.55	5.77	24.66	44.26	54.00	-9.74	AV
V	7320.00	52.16	30.33	6.32	24.55	51.87	74.00	-22.13	Pk
V	7320.00	43.30	30.33	6.32	24.55	43.53	54.00	-10.47	AV
V	9760.00	53.21	30.85	7.45	24.69	54.95	74.00	-19.05	Pk
V	9760.00	45.07	30.85	7.45	24.69	46.40	54.00	-7.60	AV
V	12200.00	52.26	31.02	8.99	25.57	56.10	74.00	-17.90	Pk
V	12200.00	42.80	31.02	8.99	25.57	45.73	54.00	-8.27	AV
H	4880.00	53.82	30.55	5.77	24.66	54.08	74.00	-19.92	Pk
H	4880.00	44.14	30.55	5.77	24.66	43.70	54.00	-10.30	AV
H	7320.00	52.16	30.33	6.32	24.55	52.55	74.00	-21.45	Pk
H	7320.00	44.32	30.33	6.32	24.55	44.62	54.00	-9.38	AV
H	9760.00	53.18	30.85	7.45	24.69	55.33	74.00	-18.67	Pk
H	9760.00	42.44	30.85	7.45	24.69	43.83	54.00	-10.17	AV
H	12200.00	51.70	31.02	8.99	25.57	55.30	74.00	-18.70	Pk
H	12200.00	43.39	31.02	8.99	25.57	46.32	54.00	-7.68	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:2480MHz									
V	4960.00	54.01	30.55	5.77	24.66	53.89	74.00	-20.11	Pk
V	4960.00	44.26	30.55	5.77	24.66	44.14	54.00	-9.86	AV
V	7440.00	53.14	30.33	6.32	24.55	53.68	74.00	-20.32	Pk
V	7440.00	42.79	30.33	6.32	24.55	43.33	54.00	-10.67	AV
V	9920.00	53.14	30.85	7.45	24.69	54.43	74.00	-19.57	Pk
V	9920.00	42.86	30.85	7.45	24.69	44.15	54.00	-9.85	AV
V	12400.00	51.30	31.02	8.99	25.57	54.84	74.00	-19.16	Pk
V	12400.00	42.87	31.02	8.99	25.57	46.41	54.00	-7.59	AV
H	4960.00	52.24	30.55	5.77	24.66	52.12	74.00	-21.88	Pk
H	4960.00	42.18	30.55	5.77	24.66	42.06	54.00	-11.94	AV
H	7440.00	53.12	30.33	6.32	24.55	53.66	74.00	-20.34	Pk
H	7440.00	44.10	30.33	6.32	24.55	44.64	54.00	-9.36	AV
H	9920.00	52.33	30.85	7.45	24.69	53.62	74.00	-20.38	Pk
H	9920.00	42.76	30.85	7.45	24.69	44.05	54.00	-9.95	AV
H	12400.00	52.58	31.02	8.99	25.57	56.12	74.00	-17.88	Pk
H	12400.00	43.92	31.02	8.99	25.57	47.46	54.00	-6.54	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 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above	Peak	1MHz	3MHz	Peak
	1GHz	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).

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 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.
7. 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

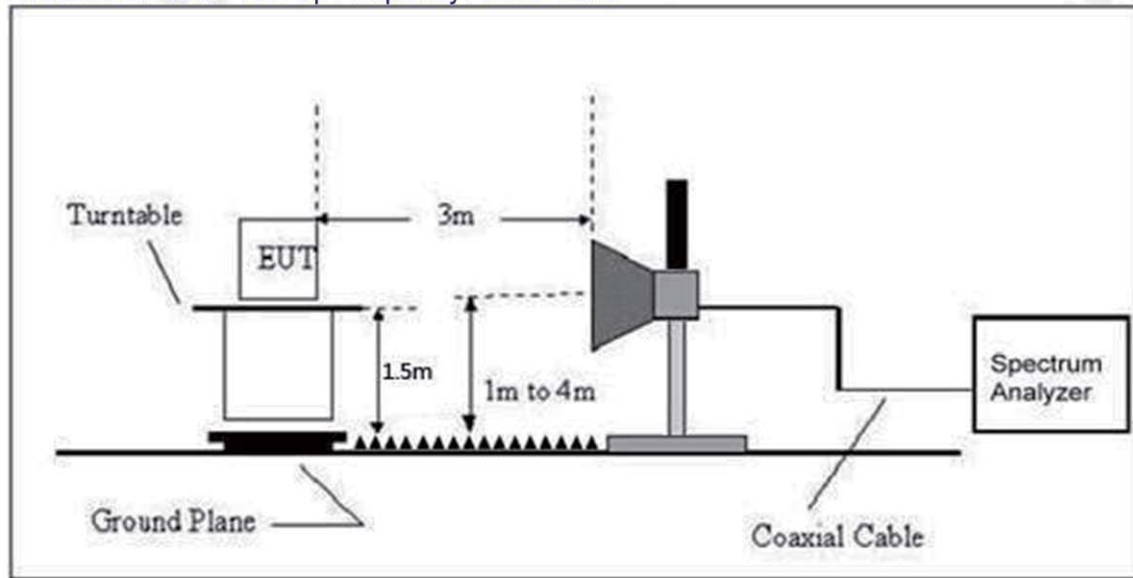
5.3 DEVIATION FROM TEST STANDARD

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

	Polar (H/V)	Frequenc y (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Detec tor Type	Result
GFSK	Low Channel: 2402MHz									
	H	2390.00	58.47	30.22	4.85	23.98	57.08	74.00	PK	PASS
	H	2390.00	50.05	30.22	4.85	23.98	48.66	54.00	AV	PASS
	H	2400.00	59.54	30.22	4.85	23.98	58.15	74.00	PK	PASS
	H	2400.00	50.42	30.22	4.85	23.98	49.03	54.00	AV	PASS
	V	2390.00	58.96	30.22	4.85	23.98	57.57	74.00	PK	PASS
	V	2390.00	51.21	30.22	4.85	23.98	49.82	54.00	AV	PASS
	V	2400.00	59.50	30.22	4.85	23.98	58.11	74.00	PK	PASS
	V	2400.00	50.88	30.22	4.85	23.98	49.49	54.00	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	59.01	30.22	4.85	23.98	57.62	74.00	PK	PASS
	H	2483.50	50.97	30.22	4.85	23.98	49.58	54.00	AV	PASS
	H	2500.00	58.79	30.22	4.85	23.98	57.40	74.00	PK	PASS
	H	2500.00	50.96	30.22	4.85	23.98	49.57	54.00	AV	PASS
	V	2483.50	59.84	30.22	4.85	23.98	58.45	74.00	PK	PASS
	V	2483.50	50.96	30.22	4.85	23.98	49.57	54.00	AV	PASS
	V	2500.00	60.35	30.22	4.85	23.98	58.96	74.00	PK	PASS
	V	2500.00	49.40	30.22	4.85	23.98	48.01	54.00	AV	PASS
Remark:										
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit										



6. POWER SPECTRAL DENSITY TEST

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8dBm/3kHz	2400-2483.5	PASS

6.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



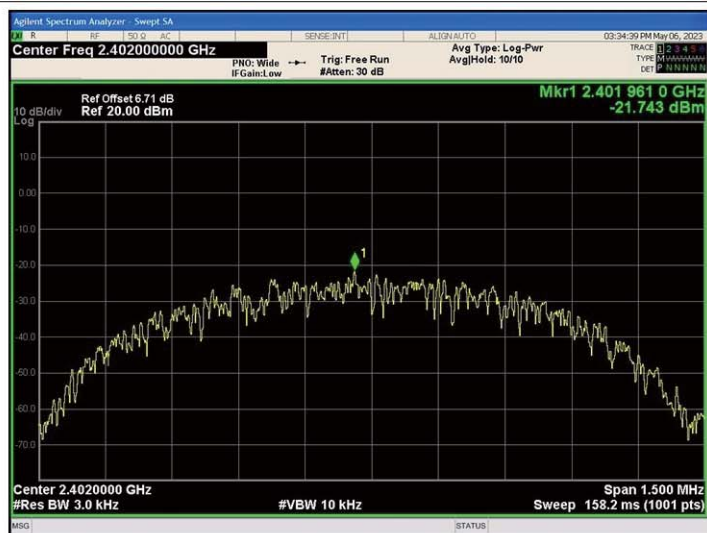
6.6 TEST RESULT

Temperature :	26°C	Relative Humidity :	54%
Test Mode :	GFSK	Test Voltage :	AC120V/60Hz

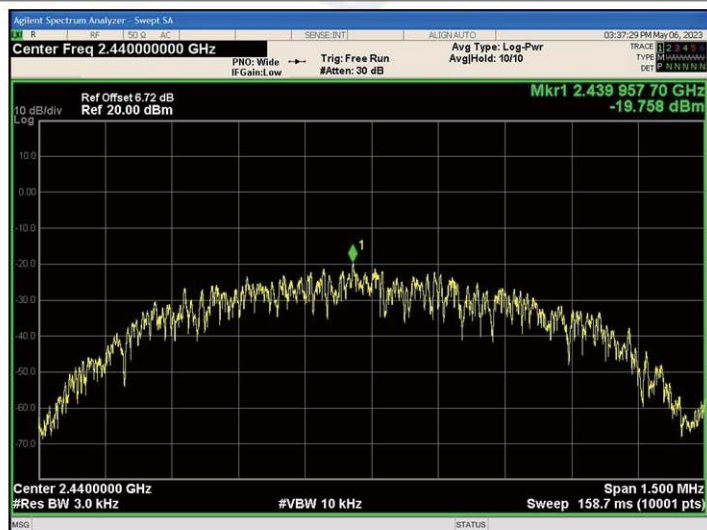
Frequency	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2402 MHz	-21.743	8	PASS
2440 MHz	-19.758	8	PASS
2480 MHz	-20.616	8	PASS



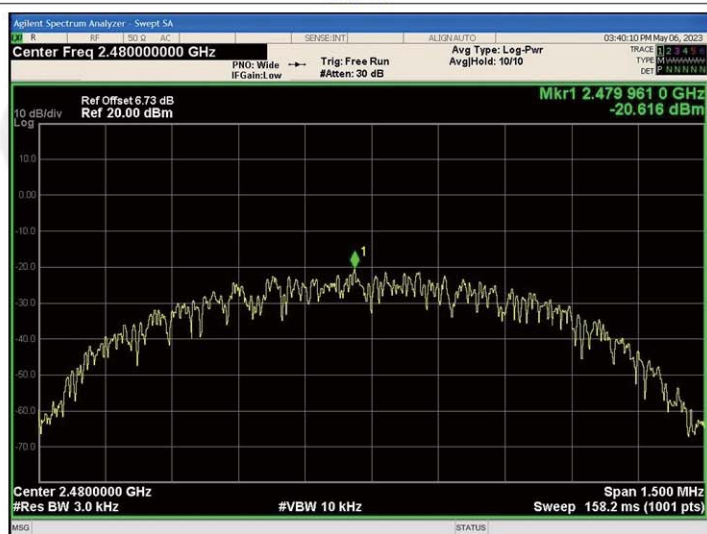
CH01



CH20



CH40





7. CHANNEL BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

7.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

7.2 TEST PROCEDURE

1. Set RBW = 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.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION 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.



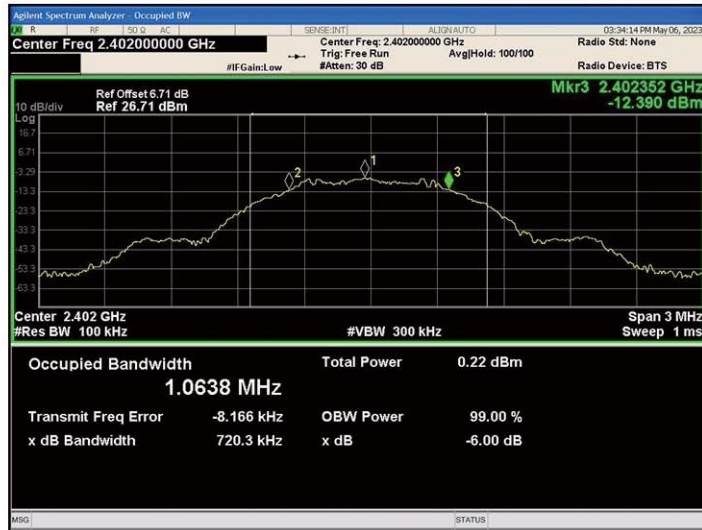
7.6 TEST RESULT

Temperature :	26℃	Relative Humidity :	54%
Test Mode :	GFSK	Test Voltage :	AC 120V/60Hz

Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
Lowest	0.720	>500	Pass
Middle	0.730		
Highest	0.703		



CH 01



CH20



CH40





8. PEAK OUTPUT POWER TEST

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION 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.



8.6 TEST RESULT

Temperature :	26℃	Relative Humidity :	54%
Test Mode :	GFSK	Test Voltage :	AC 120V/60Hz

Test channel	Peak Output Power (dBm)	Limit(dBm)	Result
Lowest	-6.335	30.00	Pass
Middle	-4.987		
Highest	-4.874		



9. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

9.1 APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

9.2 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



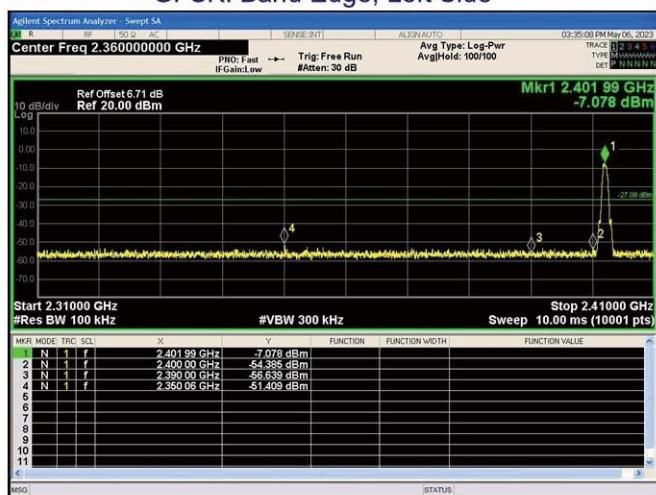
9.5 EUT OPERATION CONDITIONS

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.

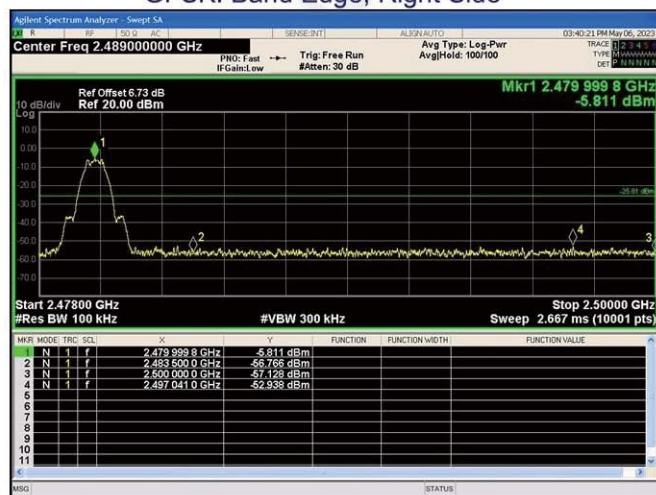
9.6 TEST RESULTS



GFSK: Band Edge, Left Side

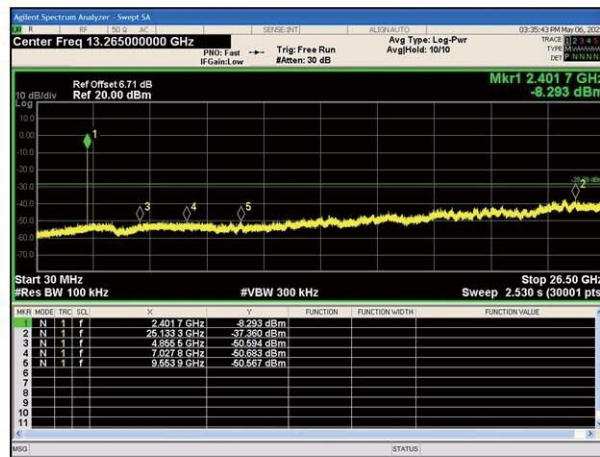


GFSK: Band Edge, Right Side

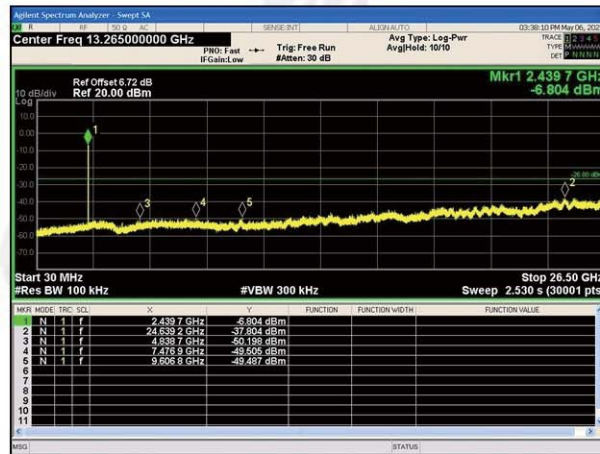




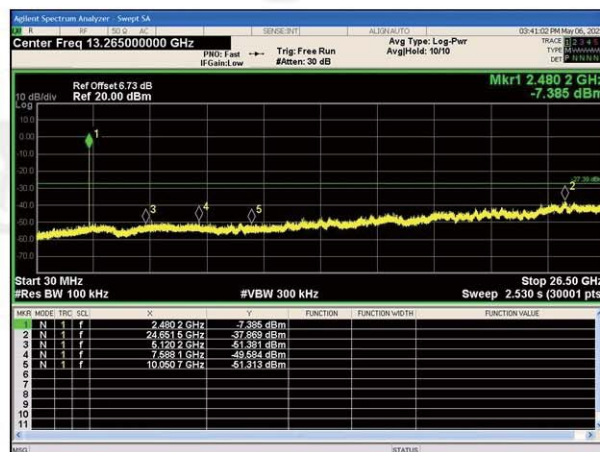
Lowest channel



Middle channel



Highest channel





10.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is internal antenna, the best case gain of the antennas is 3.0dBi, reference to the appendix II for details	



11. TEST SETUP PHOTO

Reference to the appendix I for details.

12. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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