

FCC Radio Test Report

FCC ID: 2A5CV-RH-5188

The repo	ort concerns: Original Grant
Report Reference No:	24EFSS11090 04401
Date Sample(s) Received:	2025-02-24
Date of Tested:	From 2025-02-25 to 2025-03-20
Date of issue:	2025-03-21
Testing Laboratory	DongGuanShuoXin Electronic Technology Co., Ltd. Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China
Applicant's name: Address for	Huizhou Ronghui Technology Co., Ltd Liboshui No.1 Industrial Zone, Shiwan Town, Boluo County, Huizhou City, Guangdong Province, China
Equipment: Trade Mark Model Ratings	/

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Authorized Signatory:

Responsible Engineer :



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1 TEST REPORT DECLARE

Applicant	Huizhou Ronghui Technology Co., Ltd
Address for	Liboshui No.1 Industrial Zone, Shiwan Town, Boluo County, Huizhou City, Guangdong Province, China
Manufacturer	Huizhou Ronghui Technology Co., Ltd
Address	Liboshui No.1 Industrial Zone, Shiwan Town, Boluo County, Huizhou City, Guangdong Province, China
Factory	Huizhou Ronghui Technology Co., Ltd
Address	Liboshui No.1 Industrial Zone, Shiwan Town, Boluo County, Huizhou City, Guangdong Province, China
Equipment	Wireless Controller for RH-5188
Model No.	RH-5188
Trade Mark	/
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.



2 SUMMARY OF TEST RESULTS

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

Standard(s) Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	PASS	
15.247(d) 15.205(a) 15.209(a)	Radiated Emission	PASS	
15.247(a)(1)(iii)	Number of Hopping Frequency	PASS	
15.247(a)(1)(iii)	Average Time Of Occupancy	PASS	
15.247(a)(1)	Hopping Channel Separation	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.247(a)(1)	Maximum Output Power	PASS	
15.247(d)	Conducted Spurious Emission	PASS	
15.203	Antenna Requirement	PASS	Note(2)

Note:

- (1) "N/A" denotes test is not applicable in this test report
- (2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.



2.1 MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Uncertainty for Conduction emission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Uncertainty for Rediction Emission test (20MHz 200MHz)	4.60 dB (Polarize: V)
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: H)
Linearteinty for Dediction Emission test (200N/Lin 40Lin)	6.10 dB (Polarize: V)
Uncertainty for Radiation Emission test (200MHz-1GHz)	5.08 dB (Polarize: H)
Uncertainty for Dediction Emission text (1015-0015)	5.01 dB (Polarize: V)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: H)
Lincontainty for Dadiation Engineering toot (COLIE 40011-)	5.26 dB (Polarize: V)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: H)
Uncertainty for Dediction Emission test (1901 - 1001 -)	5.06 dB (Polarize: V)
Uncertainty for Radiation Emission test (18GHz-40GHz)	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	2030-08-27
A2LA	4893.01	2026-06-30
Innovation, Science and Economic Development Canada (ISED)	11033A CAB identifer:CN0083	2026-06-30
Federal Communications Commission (FCC)	171688 Designation No.:CN1235	2026-06-30



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Controller for RH-5188	
Brand Name	/	
Test Model	RH-5188	
Series Model	N/A	
Model Difference(s)	N/A	
Hardware Version	1.0	
Software Version	1.0	
Power Source	USB	
Power Rating	DC 5V	
Operation Frequency	2402 MHz ~ 2480 MHz	
Modulation Technology	GFSK, π/4-DQPSK, 8-DPSK	
Bit Rate of Transmitter	1Mbps /2Mbps /3Mbps	
Antenna Information	Antenna Type: PCB	Maximum Peak Gain: 0dBi
Max. Output Power	1Mbps: 4.144 dBm (0.002597 W 2Mbps: 3.824 dBm (0.002412 W 3Mbps: 4.111 dBm (0.002577 W	ý)

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)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		



3.2 DESCRIPTION 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 01_3Mbps	

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

AC power line conducted emissions test		
Final Test Mode	Description	
Mode 2	TX Mode Channel 01_3Mbps	

Radiated emissions test - Below 1GHz					
Final Test Mode Description					
Mode 2 TX Mode Channel 01_3Mbps					

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

Conducted test					
Final Test Mode Description					
Mode 1	TX Mode NOTE (1)				

Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) The measurements for Hopping Channel Separation, Bandwidth and Maximum Output Power were tested during 1Mbps, 2Mbps and 3Mbps, the worst case are 1Mbps and 3Mbps, only worst case was documented.

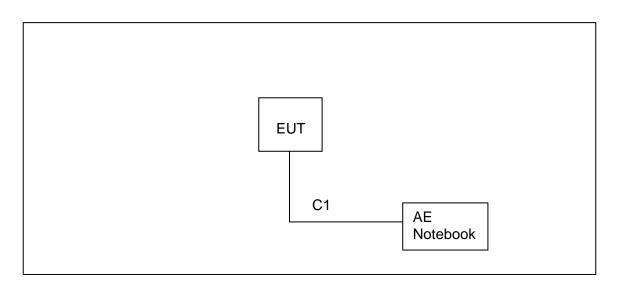


3.3 PARAMETERS OF TEST SOFTWARE

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 FHSS

Test Software	FCC.exe				
Frequency (MHz)	2402	2441	2480		
Parameters(1Mbps)	Default	Default	Default		
Parameters(3Mbps)	Default	Default	Default		

3.4 BLOCKDIAGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED



3.5 SUPPORT UNITS

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

Item	Cable Type	Shielded Type	Ferrite Core	Length
C1	DC Cable	NO	NO	0.8m



3.6 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage
AC Power Line Conducted Emissions	21.9°C	000/	DC 5V
AC Power Line Conducted Emissions	21.9 C	66%	(AC 120V/60Hz)
Radiated Emissions-9K-30MHz	25.0°C	60%	DC 5V
Radiated Emissions-30 MHz to 1GHz	21.8°C	47%	DC 5V
Radiated Emissions-Above 1000 MHz	21.8°C	47%	DC 5V
Number of Hopping Frequency	24.6°C	48%	DC 5V
Average Time Of Occupancy	24.6°C	48%	DC 5V
Hopping Channel Separation	24.6°C	48%	DC 5V
Bandwidth	24.6°C	48%	DC 5V
Maximum Output Power	24.6°C	48%	DC 5V
Conducted Spurious Emission	24.6°C	48%	DC 5V



4 AC POWER LINE CONDUCTED EMISSIONS TEST

4.1 LIMIT

Frequency of Emission (MHz)	Limit (dBµV)			
Frequency of Emission (MHz)	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

4.2 TEST PROCEDURE

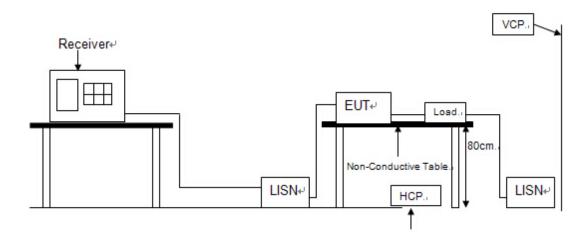
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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-systemtechn ik	MTS-IMP-136	261115-010-0024	11/17/2025
2	EMI Test Receiver	R&S	ESCI	101308	06/05/2025
3	LISN	AFJ	LS16	16011103219	06/05/2025
4	LISN	Schwarzbeck	NSLK 8127	8127-432	06/05/2025
5	MeasurementSoftwar e	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A



4.4 TESTSETUP

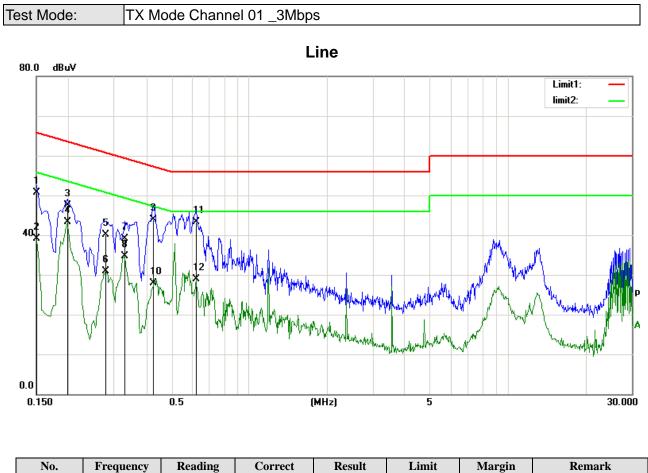


4.5 EUT OPERATING CONDITIONS

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.



4.6 TEST RESULTS

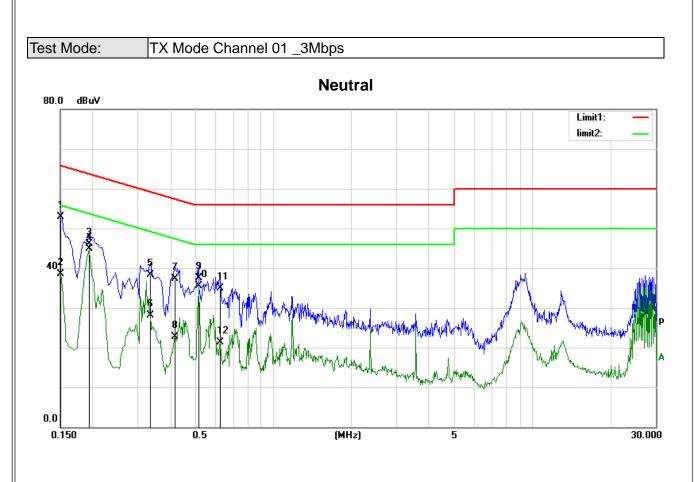


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1500	39.85	10.88	50.73	65.99	-15.26	QP
2	0.1500	28.22	10.88	39.10	55.99	-16.89	AVG
3	0.1980	36.66	10.89	47.55	63.69	-16.14	QP
4	0.1980	32.39	10.89	43.28	53.69	-10.41	AVG
5	0.2787	29.65	10.50	40.15	60.85	-20.70	QP
6	0.2787	20.47	10.50	30.97	50.85	-19.88	AVG
7	0.3301	28.49	10.59	39.08	59.45	-20.37	QP
8	0.3301	24.12	10.59	34.71	49.45	-14.74	AVG
9	0.4260	33.09	10.81	43.90	57.33	-13.43	QP
10	0.4260	17.19	10.81	28.00	47.33	-19.33	AVG
11	0.6260	32.60	10.67	43.27	56.00	-12.73	QP
12	0.6260	18.31	10.67	28.98	46.00	-17.02	AVG

Remarks:

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





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1500	42.03	10.88	52.91	65.99	-13.08	QP
2	0.1500	27.56	10.88	38.44	55.99	-17.55	AVG
3	0.1945	35.15	10.86	46.01	63.84	-17.83	QP
4	0.1945	33.97	10.86	44.83	53.84	-9.01	AVG
5	0.3339	27.66	10.60	38.26	59.35	-21.09	QP
6	0.3339	17.60	10.60	28.20	49.35	-21.15	AVG
7	0.4180	26.41	10.82	37.23	57.49	-20.26	QP
8	0.4180	11.83	10.82	22.65	47.49	-24.84	AVG
9	0.5140	26.83	10.74	37.57	56.00	-18.43	QP
10	0.5140	24.80	10.74	35.54	46.00	-10.46	AVG
11	0.6260	24.26	10.67	34.93	56.00	-21.07	QP
12	0.6260	10.72	10.67	21.39	46.00	-24.61	AVG

Remarks:

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



5 RADIATED EMISSION TEST

5.1 LIMIT

In case the emission fall within the restricted band specified on15.205(a) &RSS-Gen 8.10, then the 15.209(a) &RSS-Gen 8.9 limit in the table below has to be followed.

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

Frequency	Field Strength	Measurement Distance		
(MHz)	(microvolts/meter)	(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	Magnetic field strength (H-Field)	Measurement Distance			
(MHz)	(μA/m)	(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	Field Strength				
(MHz)	(µV/m at 3m)				
30-88	100				
88-216	150				
216-960	200				
Above 960	500				

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Note:

(1) The limit for radiated test was performed according to FCC PART 15C and RSS-247.

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

(3) Emission level (dBuV/m)=20log Emission level (uV/m).



5.2 TEST PROCEDURE AND SETTING

- 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 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	RBW 1MHz VBW 3MHz peak detector for Pk value				
(Emission in restricted band)	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				

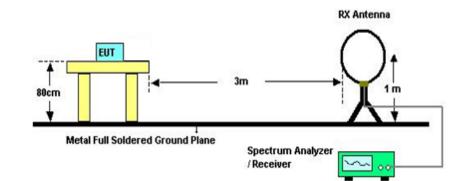


5.3 MEASUREMENT INSTRUMENTS LIST

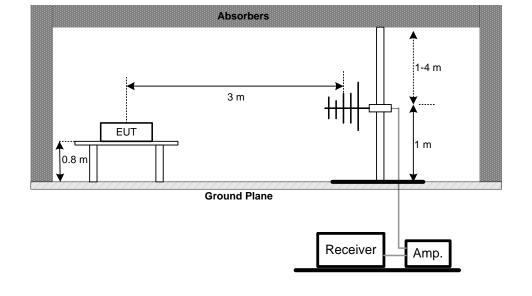
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101307	06/05/2025
2	Spectrum Analyzer	Agilent	E4407B	US40240708	11/17/2025
3	Loop antenna	SCHWARZBECK K	FMZB1519	1519-062	03/30/2025
4	Broadband antenna	SCHWARZBECK	VULB9168	VULB9168-192	03/29/2025
5	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D 1065	03/29/2025
6	Preamplifier Amplifier	HP	8447F	3113A05680	11/17/2025
7	PRE-AMPLIFIER	EMEC	EM01G26G	980136	03/29/2025
8	RF Cable	R&S	Test Cable 4	4	11/17/2025
9	RF Cable	R&S	Test Cable 5	5	11/17/2025
10	RF Cable	R&S	Test Cable 9	9	04/17/2025
11	RF Cable	R&S	Test Cable 10	10	04/17/2025
12	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

5.4 TESTSETUP

9 kHz-30 MHz

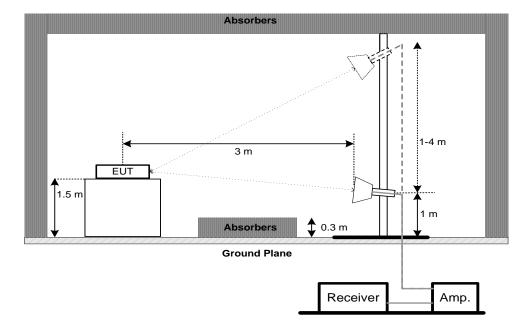


30 MHz to 1 GHz





Above 1 GHz



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.



5.6 TEST RESULTS - 9 kHz TO 30MHz

	Mode:
Toet	Mode:
1031	MOUE.

TX Mode Channel 01 _3Mbps

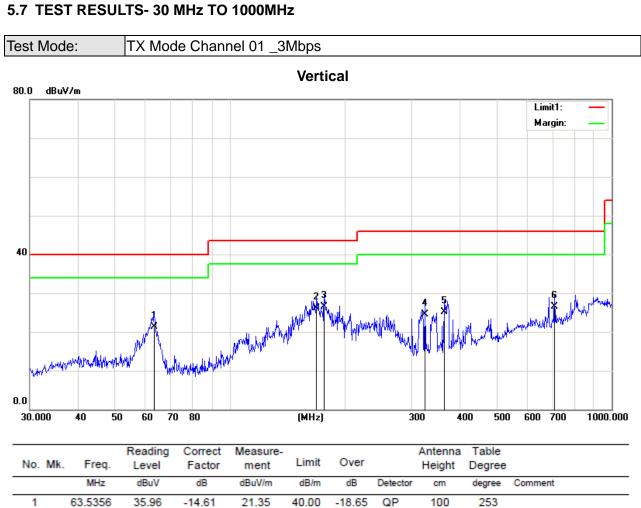
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				Р
				Р

Note:

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

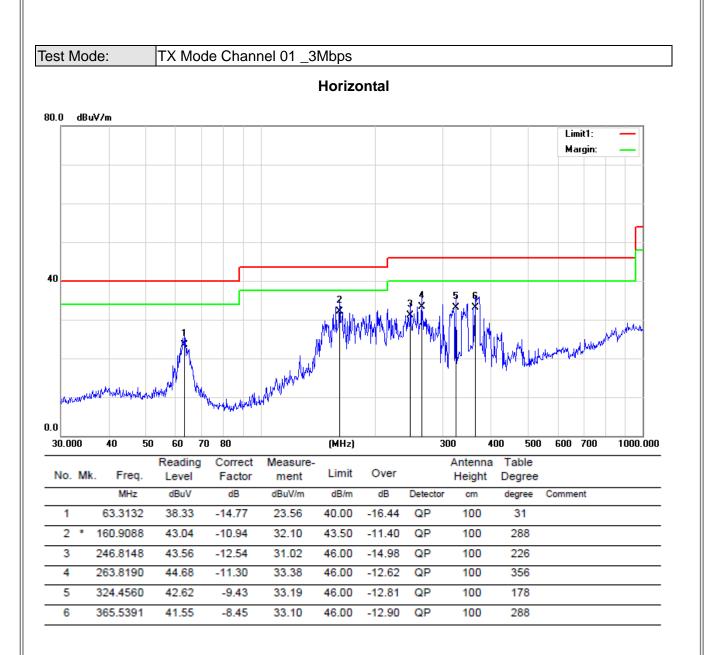
Distance extrapolation factor =20 log (specific distance/test distance)(dB); Limit line = specific limits(dBuv) + distance extrapolation factor





1	63.5356	35.96	-14.61	21.35	40.00	-18.65	QP	100	253	
2	169.0054	37.80	-11.62	26.18	43.50	-17.32	QP	100	243	
3 *	176.8877	38.65	-12.23	26.42	43.50	-17.08	QP	100	243	
4	324.4560	33.98	-9.43	24.55	46.00	-21.45	QP	100	68	
5	365.5391	33.48	-8.45	25.03	46.00	-20.97	QP	100	20	
6	709.1823	29.21	-2.69	26.52	46.00	-19.48	QP	100	198	





2390.000

2402.050

3 X 2401.900

2

4 *

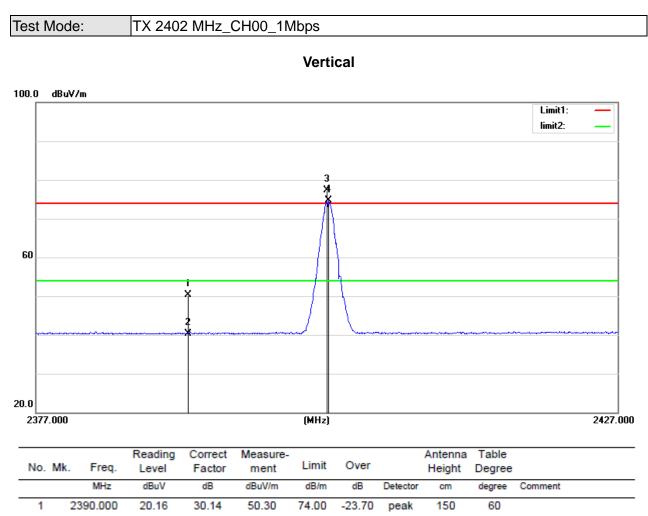
10.24

47.25

44.46



5.8 TEST RESULTS - ABOVE 1000MHz (BAND EDGE)



40.38

77.40

74.61

54.00

74.00

54.00

-13.62

3.40

20.61

AVG

peak

AVG

150

150

150

60

60

60

No Limit

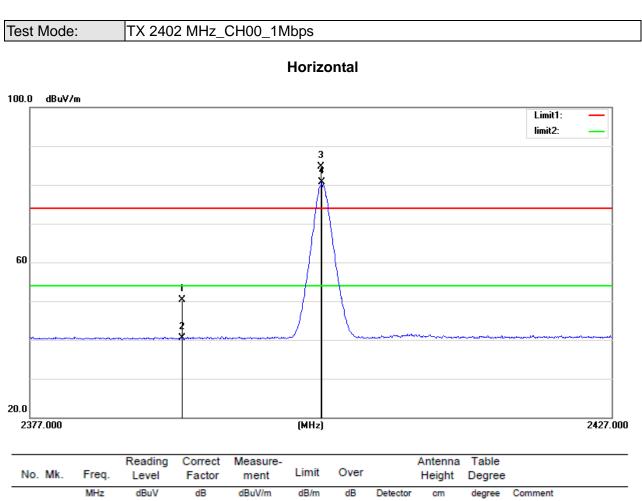
No Limit

30.14

30.15

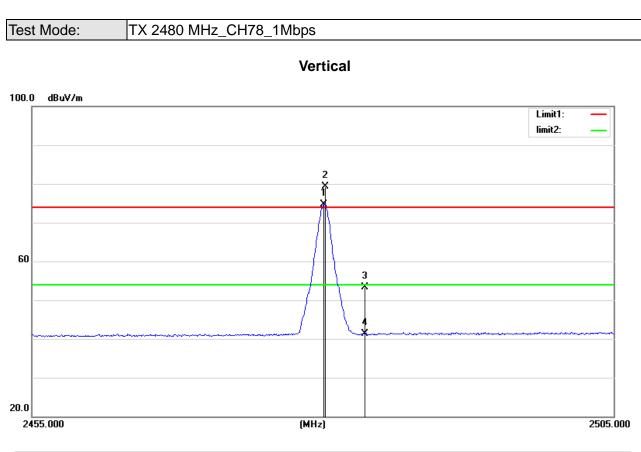
30.15





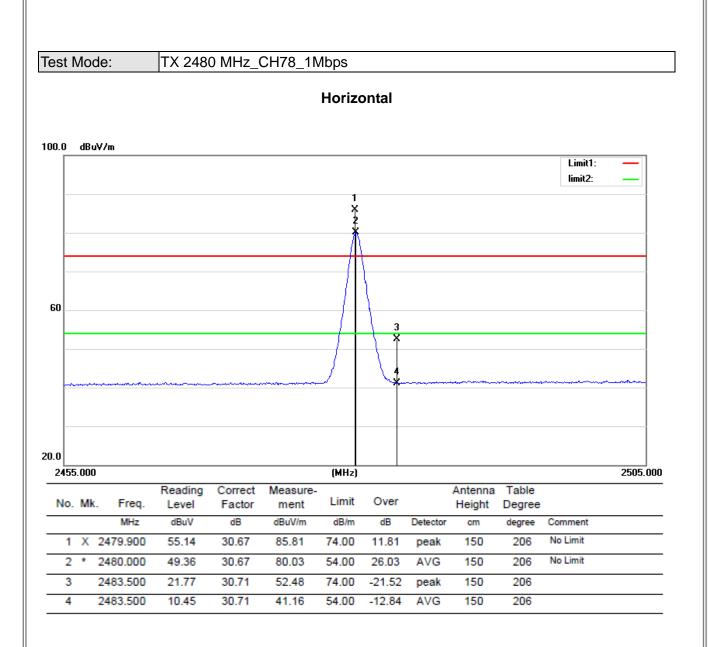
	MHZ	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	2390.000	20.23	30.14	50.37	74.00	-23.63	peak	150	29	
2	2390.000	10.32	30.14	40.46	54.00	-13.54	AVG	150	29	
3 X	2401.900	54.49	30.15	84.64	74.00	10.64	peak	150	29	No Limit
4 *	2402.000	50.47	30.15	80.62	54.00	26.62	AVG	150	29	No Limit



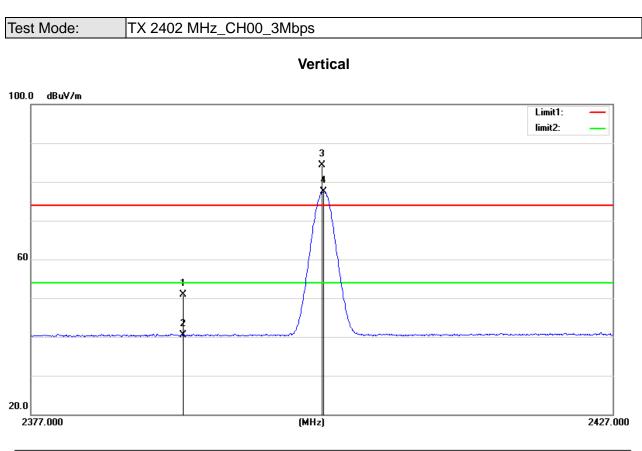


No.	M	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	*	2480.000	44.04	30.67	74.71	54.00	20.71	AVG	150	137	No Limit
2	Х	2480.150	48.61	30.67	79.28	74.00	5.28	peak	150	137	No Limit
3		2483.500	22.69	30.71	53.40	74.00	-20.60	peak	150	137	
4		2483.500	10.59	30.71	41.30	54.00	-12.70	AVG	150	137	



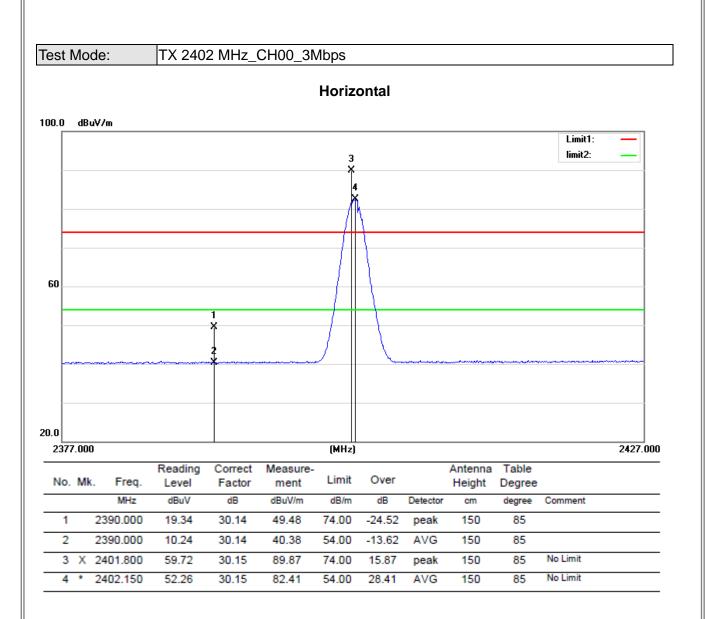




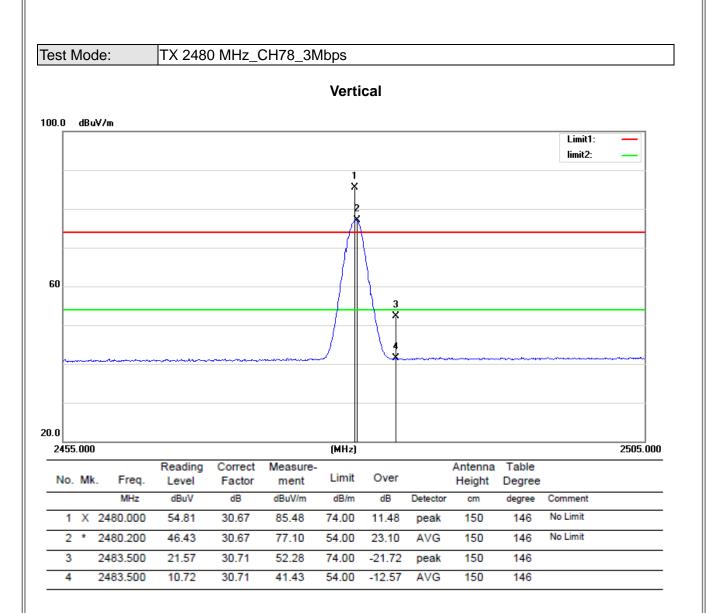


No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		2390.000	20.72	30.14	50.86	74.00	-23.14	peak	150	171	
2		2390.000	10.27	30.14	40.41	54.00	-13.59	AVG	150	171	
3	Х	2401.900	54.25	30.15	84.40	74.00	10.40	peak	150	171	No Limit
4	*	2402.050	47.39	30.15	77.54	54.00	23.54	AVG	150	171	No Limit

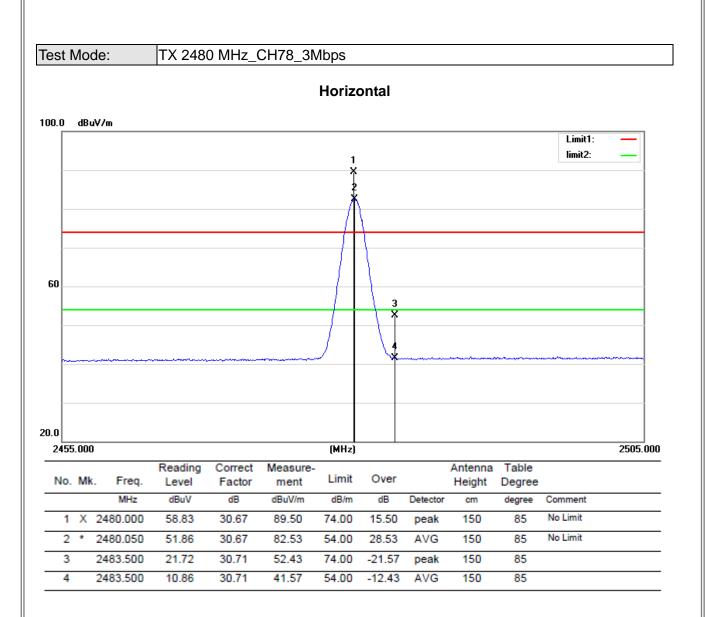






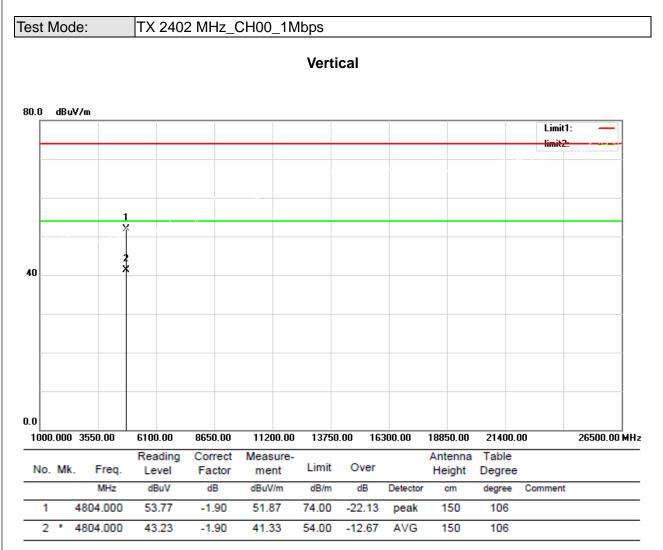




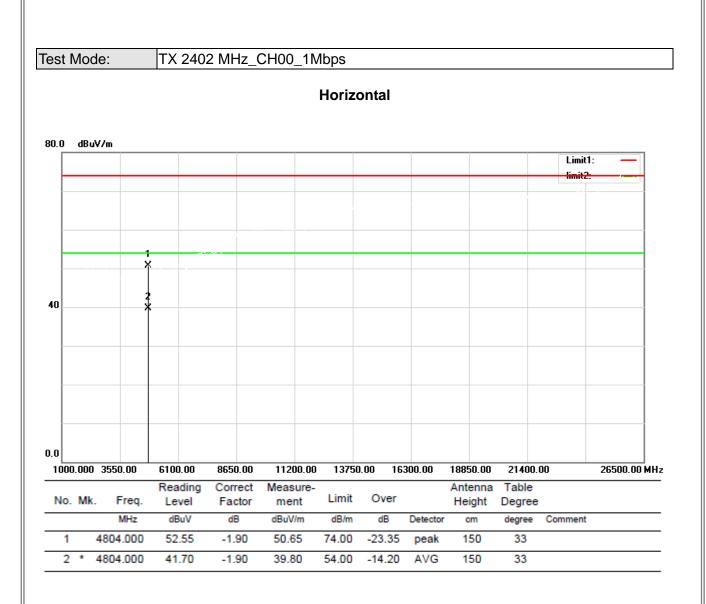




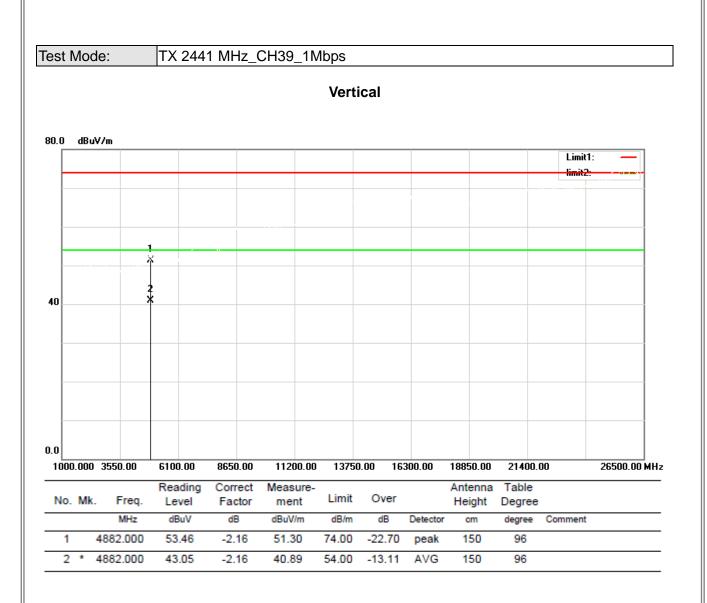
5.9 TEST RESULTS - ABOVE 1000MHz (HARMONIC)



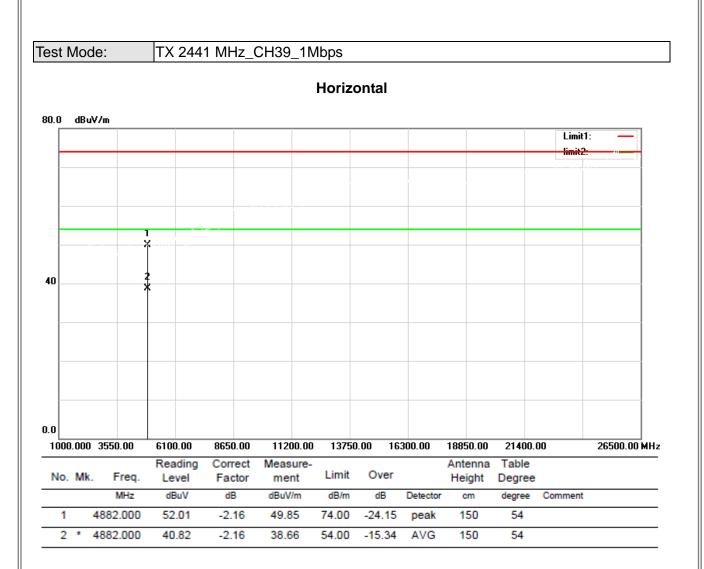




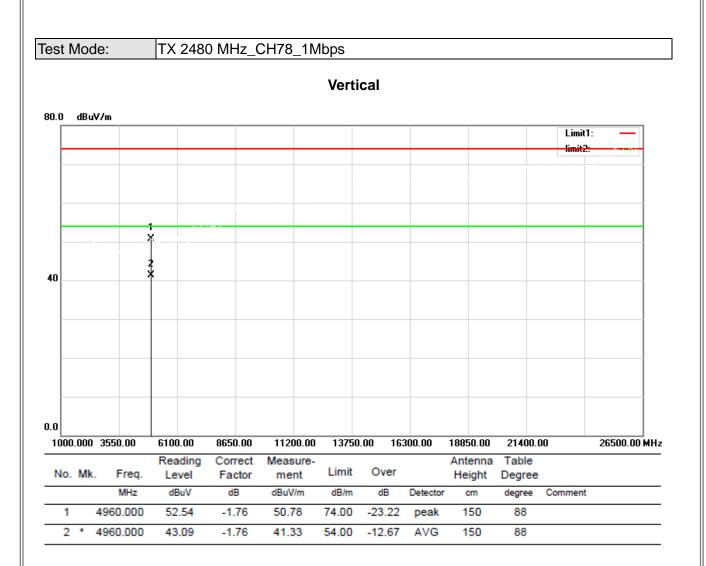




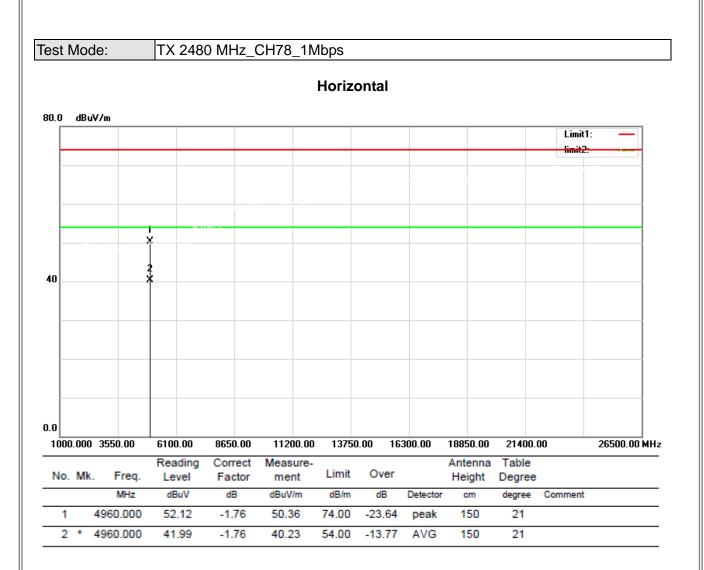




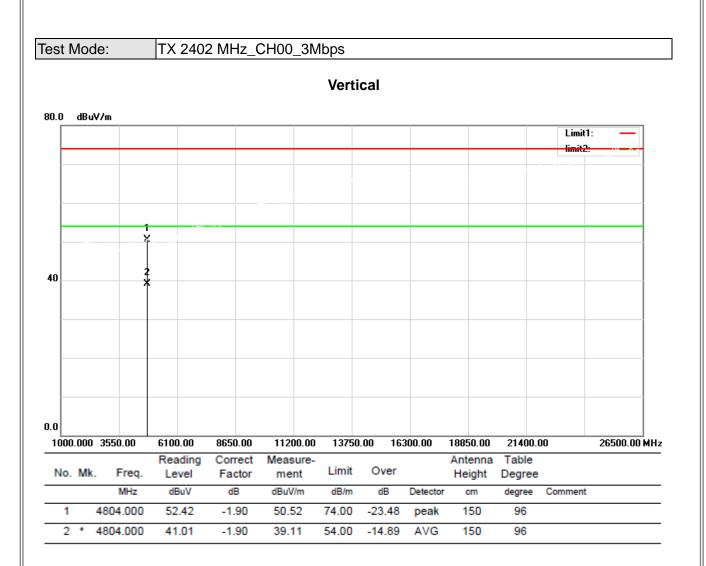




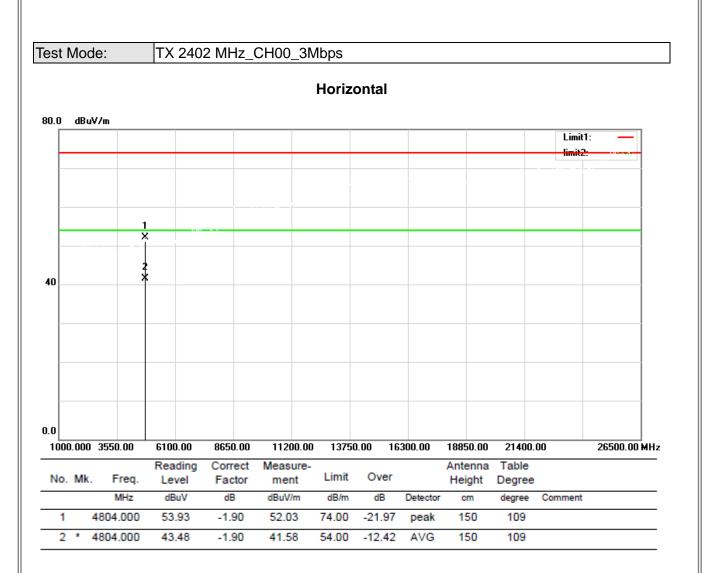








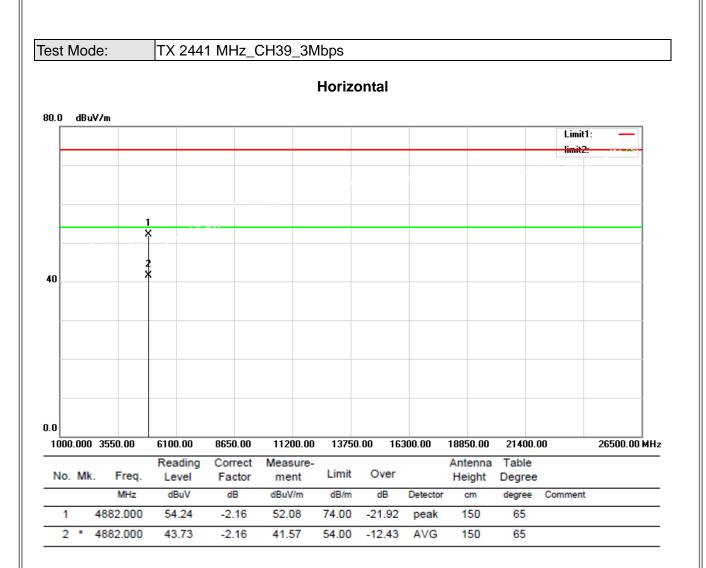




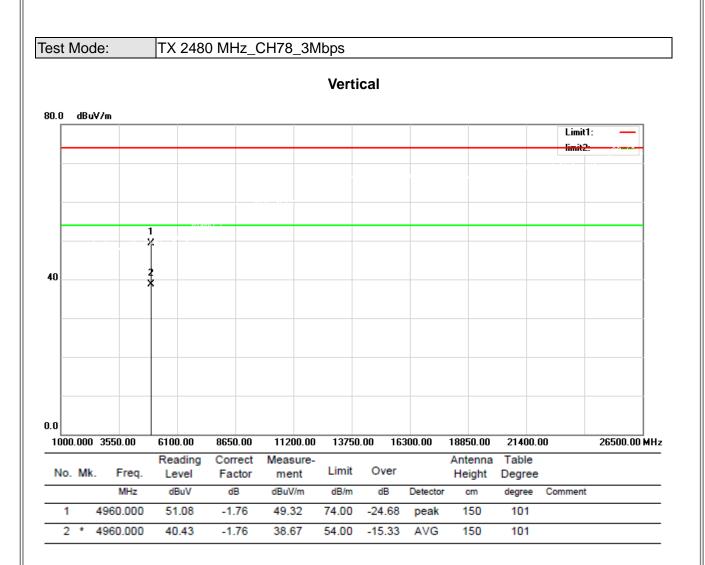




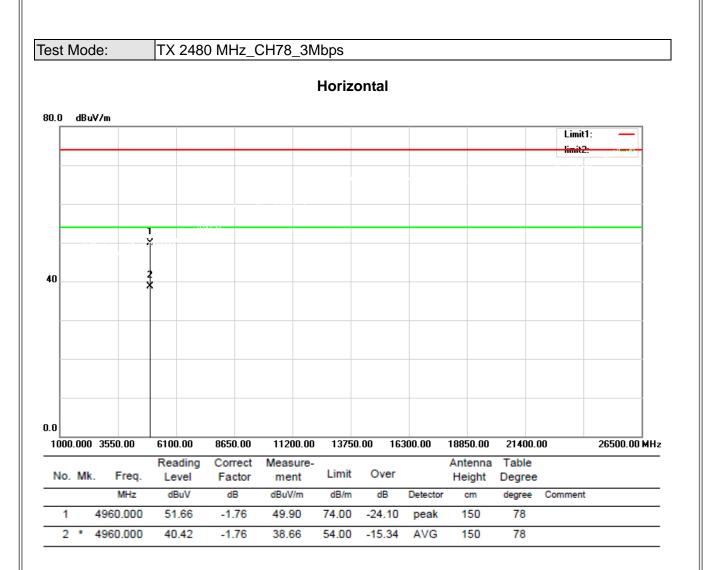














6 NUMBER OF HOPPING FREQUENCY

6.1 LIMIT

FCC Part15, Subpart C (15.247)				
Section Test Item				
15.247(a)(1)(iii) Number of Hopping Frequency				

6.2 TEST 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: RBW=100 kHz, VBW=300 kHz, Sweep time = Auto.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RBW	100kHz
VBW	300kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3 MEASUREMENT INSTRUMENTS LIST

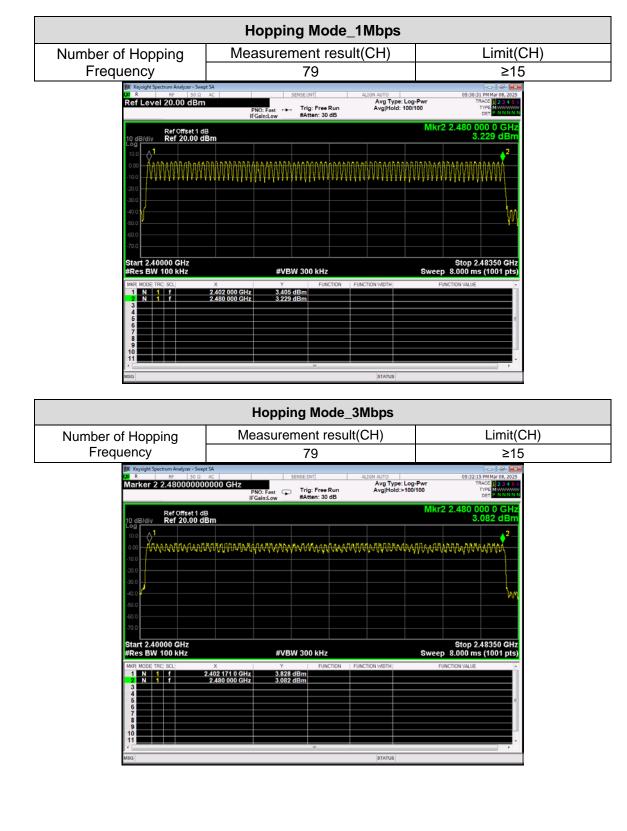
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

6.4 TEST SETUP

EUT	SPECTRUM	
	ANALYZER	

6.5 EUT OPERATION CONDITIONS







7 AVERAGE TIME OF OCCUPANCY

7.1 LIMIT

FCC Part15, Subpart C (15.247)					
Section Test Item Limit					
15.247(a)(1)(iii)	Average Time of Occupancy	0.4sec			

7.2 TEST PROCEDURE AND SETTING

a. The transmitter output (antenna port) was connected to the spectrum analyzer

- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses
- d. Sweep Time is more than once pulse time
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span
- f. Measure the maximum time duration of one single pulse
- g. Set the EUT for DH1, DH3 and DH5 packet transmitting
- h. Measure the maximum time duration of one single pulse
- i. DH1 Packet permit maximum 1600 / 79 / 2 = 10.12 hops per second in each channel (1 time slot TX, 1 time slot RX).So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots TX, 1 time slot RX).So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds
- k. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots TX, 1 time slot RX).So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds

7.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

7.4 TEST SETUP

EUT	SPECTRUM	
	ANALYZER	

7.5 EUT OPERATION CONDITIONS

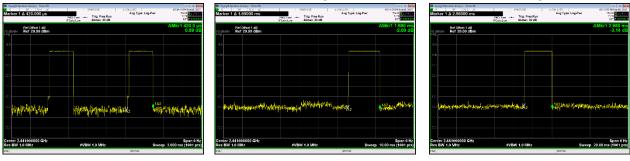


TX Mode_1Mbps							
Mode	Channel Frequency	Pulse Time	Dwell Time	Limit			
wode	(MHz)	(ms)	(ms)	(ms)			
DH1	2441	0.420	134.4	400			
DH3	2441	1.690	270.4	400			
DH5	2441	2.980	317.7	400			

DH1

DH3

DH5



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	TX Mode_3Mbps							
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)				
DH1	2441	0.420	134.4	400				
DH3	2441	1.700	272.0	400				
DH5	2441	3.020	321.9	400				

2441MHzDH1

2441MHzDH3

2441MHzDH5





Residuation Andream Secondaria	40	SENSE OVT	A 10H AURO Avg Typ	e: Log-Pwr	05-44:13 PA 427 (8, 202) 16.44:13 PA 427 (8, 202)
	PRC: Faxet	 Trig: Free Run #Atten: 30 dB 			DOT D MARK
Ref Offset 1 dE	ŧm				ΔMkr1 3.020 m 0.33 d
			-		
	B			162	
- Harrison - 1-	allefetter piper webspicel	with the with the state	×X2	A ALAN AND	eponter Algorian (A
enter 2.441000000 GH es BW 1.0 MHz	z	BW 1,0 MHz			Span 0 H 20.00 ms (1001 pt)



8 HOPPING CHANNEL SEPARATION MEASUREMENT

8.1 LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

8.2 TEST 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. Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW Sweep = Auto Detector function = Peak Trace = Max Hold

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RBW	10 kHz
VBW	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3 MEASUREMENT INSTRUMENTS LIST

lte	em Kin	d of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
	1 Spe	ectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22
	2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
	3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

8.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.5 EUT OPERATION CONDITIONS



	TX Mode_1Mbps					
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result		
CH00	2402	1.008	>(25KHz or 2/3*20dB Bandwidth)	PASS		
CH39	2441	1.140	>(25KHz or 2/3*20dB Bandwidth)	PASS		
CH78	2480	0.987	>(25KHz or 2/3*20dB Bandwidth)	PASS		















	TX Mode_3Mbps					
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result		
CH00	2402	0.831	>(25KHz or 2/3*20dB Bandwidth)	PASS		
CH39	2441	0.852	>(25KHz or 2/3*20dB Bandwidth)	PASS		
CH78	2480	0.984	>(25KHz or 2/3*20dB Bandwidth)	PASS		





9 BANDWIDTH TEST

9.1 LIMIT

FCC Part15, Subpart C (15.247)			
Section Test Item			
15.247(a)(1)	Bandwidth		

9.2 TEST 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: RBW= 30 kHz, VBW=100 kHz, Sweep Time = Auto.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth
RBW	30kHz
VBW	100kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

9.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

9.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

9.5 EUT OPERATION CONDITIONS



TX Mode_1Mbps				
Channel	Frequency	20dB Bandwidth	99 % Emission Bandwidth	Result
	(MHz)	(MHz)	(MHz)	
CH00	2402	0.882	0.8737	PASS
CH39	2441	0.881	0.8738	PASS
CH78	2480	0.880	0.8730	PASS





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TX Mode_3Mbps					
Channel	Frequency	20dB Bandwidth	99 % Emission Bandwidth	Result	
	(MHz)	(MHz)	(MHz)		
CH00	2402	1.227	1.1413	PASS	
CH39	2441	1.228	1.1408	PASS	
CH78	2480	1.228	1.1422	PASS	

2402MHz

2441MHz

2480MHz



Kopipi Spectrum Analyzer - Occupied 844 20 R 85 54 0 40		Center Freq: 2.441000000	N A/TO SHz AvgHold:>10/10	(4:>7:35 F# F2r18.30 Radio Std: None
	Al Cointure	#Atten: 30 dB	AvgHold:>1515	Radio Device: BTS
10 dB/dly Ref 20.00 dBm				
Log	·		1	
100				
000	~~~	$ \sim \sim$		
	1			
0.0				
a adad				×
and the second s				
Center 2/441 GHz				Span 3 Mil
ØRes BW 30 kHz		#VBW 100 kHz		Sweep 3.2 m
Occupied Bandwidt	h	Total Power	10.8 dBm	
1.:	1408 MHz			
Transmit Freq Error	-12.961 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	1.228 MHz	x dB	-20.00 dB	

Korjet Spedium Andyse - Occasica 84 R 84 St 0 42 Ref Value 20.00 dBm	al Coincion	Center Freq: 2.48000000	Sk AUTO GHz AvgHold:>19/10	Radio Device: BTS
10 dB/dle Ref 20.00 dBm				
100				
		AAA		
20	100	· · ·	~~~	
m				
				,
enter 2.48 GHz Res BW 30 kHz		#VBW 100 kHz		Span 3 M Sweep 3.2
Occupied Bandwidth		Total Power	10.7 dBm	
1.1	422 MHz			
Transmit Freq Error	-12.742 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	1.228 MHz	x dB	-20.00 dB	
26			STOTUS	



10 MAXIMUM OUTPUT POWER

10.1 LIMIT

FCC Part15 , Subpart C (15.247)				
Section Test Item Limit				
15.247(a)(1)Maximum Output Power0.125Watt or 21dBm				

Note:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB band width of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

10.2 TEST 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: RBW= 1MHz/3MHz, VBW= 1MHz/3MHz, Sweep time = Auto.

10.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

10.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

10.5 EUT OPERATION CONDITIONS



	TX Mode_1Mbps							
Channel	Frequency	Output Power	Output Power	Deeult				
	(MHz)	(dBm)	(W)	Result				
CH00	2402	4.144	0.002597	PASS				
CH39	2441	4.031	0.002530	PASS				
CH78	2480	3.929	0.002471	PASS				
Limit	21dBm /0.125W							

CH00

CH39

CH78

💷 Kapsight Spectrum Analysis - Swept SA		00	KopigHSpectrum Analyzer - SweptSA			(4.52 53 PH F2r18, 2005	🗰 Kapalgh Espectrum Amelyus - Swept SA			o 0 👪
Marker 1 2401820000000 GHz	PND: Fact Trig: Free Run If Gaintow AAmer: 20 dB	AUSH 200 Avg Type: Log-Par Track 2005 Avg Type: Log-Par Track 2005	Marker 1 2.440901000000 G	PRC: Level Trig: Pres Run If CalicLow #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 100/100	64 22 58 PH (2018, 2025 1940) 19 54 10 5 1940) 10 54 10 5 10 50 10 5 10 5 10 5 10 5 10 5 10	Marker 1 2,479916000000 GHz	ant Trig: Free Run	Aug Type: Log Pwr 194325 Res Avg Hold: 100/100 1770 bcr	1
Ref Offset 1 dB		Mkr1 2.401 820 GHz 4.144 dBm	10 dB/div Ref Offset 1 dB 10 dB/div Ref 20.00 dBm		м	kr1 2.440 901 GHz 4.031 dBm	10 dB/dtv Ref 20.00 dBm		Mkr1 2.479 91 3.92	16 GHz 9 dBm
16.0			160				100			
				*				• · · · ·		
-0.0			-000				-0.0			
23.0			23.0				21.0			
-111			-911				<0.1			
-43.5			-0.5				-43.5			
51.5			51.5				515			
.73.0			.73.0				72.0			
Center 2,402000 GHz		Span 3.000 MHz	Center 2.441000 GHz			Span 3.000 MHz	Center 2.480000 GHz		Span 3.0	NA DEL
aRes BW 3.0 MHz	#VBW 8.0 MHz	Sweep 1.000 ms (1001 pts)	aRes BW 3.0 MHz	#VBW 8.0 MHz		p 1.000 ms (1001 pts)	#Res BW 3.0 MHz	#VBW 8.0 MHz	Sweep 1.000 ms (1	001 pts)
156		50/05	156		STOTUS		V 56		STATUS	



TX Mode_2Mbps							
Channel	Frequency	Output Power	Output Power	Result			
	(MHz)	(dBm)	(W)	Result			
CH00	2402	3.824	0.002412	PASS			
CH39	2441	3.673	0.002330	PASS			
CH78	2480	3.581	0.002281	PASS			
Limit	21dBm /0.125W						

CH00

CH39

CH78

	Monitorian Second	A.594.5/10 11.9/13 Filter 11.20/3 Aug Type: Log-Pwr 94-2012 Aug Type:	Kopigit Spectrum Analyzer Swags 54 Kopigit Spectrum Analyzer Swags 54 Kopigit Spectrum Analyzer Spectrum Kopigit Spect	A_364 A_170 119532 FW for 11.303 Aug Type: Log-Puer 15532 FW for 11.303 Aug Type: Log-Puer 1552 FW for 11.303 Aug Type: Log-Puer 1552 FW for 11.303 B dd 0 dd
Ref Offset 1 dB Mkr1 2.402 051 G	Ref Offset 1 dB 10 gB/dtv Ref 20.00 dBm	Mkr1 2.441 036 GHz 3.673 dBm	Ref Ottset 1 dB	Mkr1 2.480 012 GHz 3.581 dBm
	160		100	¢'
	-00		-02	
22	20		n:	
402	0.5			
	200		200	
723	730		720	
Center 2.402000 GHz Span 3.000 M area BW 3.0 MHz Sweep 1.000 ms (1001 p [22]	z Center 2.441000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz	Span 3.000 MHz Sweep 1.000 ms (1001 pts)	Center 2,480000 GHz #Res BW 3.0 MHz #VBW 8.0 MH	Span 3.000 MHz z Sweep 1.000 ms (1001 pts)



TX Mode_3Mbps						
Channel	Frequency	Output Power	Output Power	Result		
	(MHz)	(dBm)	(W)	Result		
CH00	2402	4.111	0.002577	PASS		
CH39	2441	3.993	0.002508	PASS		
CH78	2480	3.908	0.002459	PASS		
Limit	21dBm /0.125W					

CH39

CH00 **CH78** Avg Type: Log-Pwr AvgHold:>100100 Avg Type: Log-Pwr Avg Hold:>100100 Avg Type: Log-Pwr Avg Hold:>100100 Trig: Free Run Trig: Free Run Trig Free Run 81 dB Span 3.000 5 1.000 ms (1001 Center 2.441000 GI #Res BW 3.0 MHz Span 3.000 MHz 5 1.000 ms (1001 pts) Span 3.000 1.000 ms (100 ter 2.402000 G s BW 3.0 MHz Center 2.480000 #Res BW 3.0 MH r 8.0 M



11 CONDUCTED SPURIOUS EMISSION

11.1 LIMIT

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.

11.2 TEST 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: RBW= 100 kHz, VBW=300 kHz, Sweep time = Auto.

11.3 MEASUREMENT INSTRUMENTS LIST

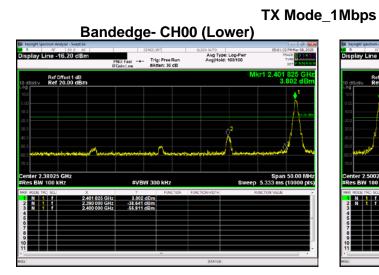
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2025/05/22
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

11.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

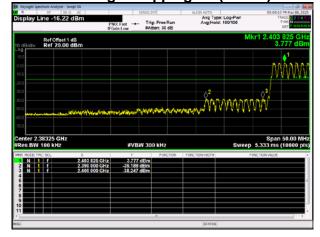
11.5 EUT OPERATION CONDITIONS



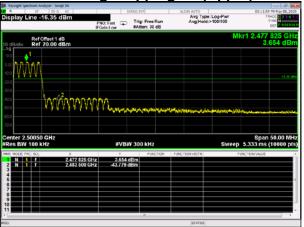


Banchedge CH78 (Upper)

Bandedge- Hopping on (Lower)



BandedgeHopping on (Upper)



10th Harmonic of the fundamental frequency





