

TEST REPORT

Report No.: BCTC2111644657E

Applicant: Shenzhen Yixin Sihai plastic products Co., Ltd

Product Name: 701 mouse

Model/Type 70 reference:

701 mouse

Tested Date: 2021-11-09 to 2021-11-11

Issued Date: 2021-11-23





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FCC ID:2A3TZ701MOUSE

Product Name: 701 mouse

Trademark: N/A

Model/Type Ref.: 701 mouse

Prepared For: Shenzhen Yixin Sihai plastic products Co., Ltd

Address: 101, building a, No. 12, Gushu Difu Road, Xixiang, Bao'an District, Shenzhen,

China

Manufacturer: Shenzhen Yixin Sihai plastic products Co., Ltd

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Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei,

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Sample Received Date: 2021-11-09

Sample tested Date: 2021-11-09 to 2021-11-11

Issue Date: 2021-11-23

Report No.: BCTC2111644657E

Test Standards FCC Part15.247 ANSI C63.10-2013

Test Results PASS

Tested by:

kelsey Ton

Kelsey Tan/ Project Handler

Approved by:

10

Zero Zhou/Reviewer

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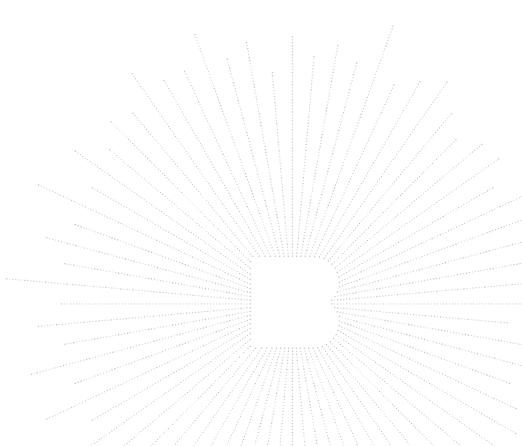
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(Note: N/A Means Not Applicable)



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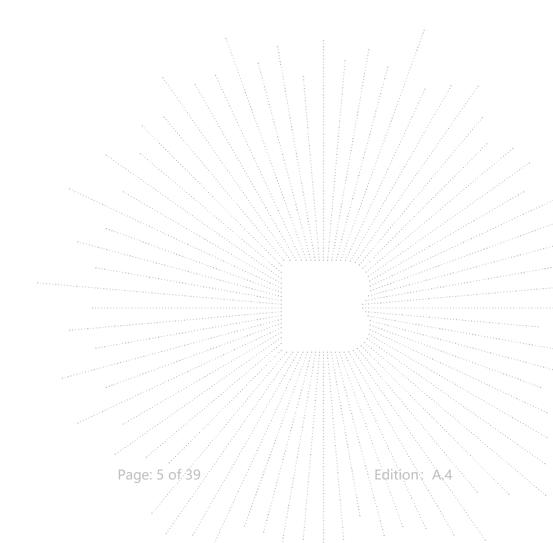
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1. Version

Report No.	Issue Date	Description	Approved
BCTC2111644657E	2021-11-23	Original	Valid



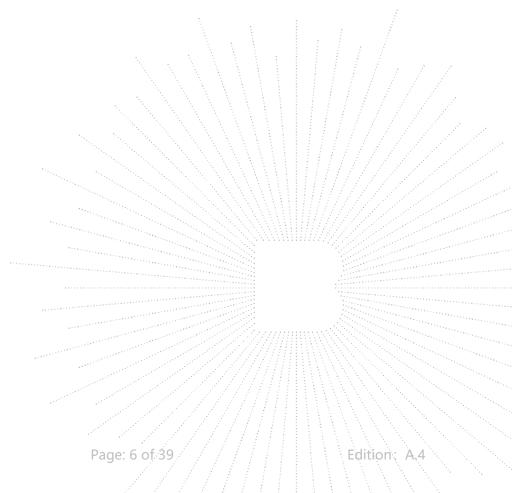
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2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Conducted Emission	15.207	N/A
2	6dB Bandwidth	15.247 (a)(2)	PASS
3	Peak Output Power	15.247 (b)	PASS
4	Radiated Spurious Emission	15.247 (d), 15.205	PASS
5	Power Spectral Density	15.247 (e)	PASS
6	Restricted Band of Operation	15.205	PASS
7	Band Edge (Out of Band Emissions)	15.247(d)	PASS
8	Antenna Requirement	15.203	PASS



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3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(9KHz-30MHz)	U=3.7dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission (150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59°C

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4. Product Information And Test Setup

4.1 Product Information

Model/Type reference: 701 mouse

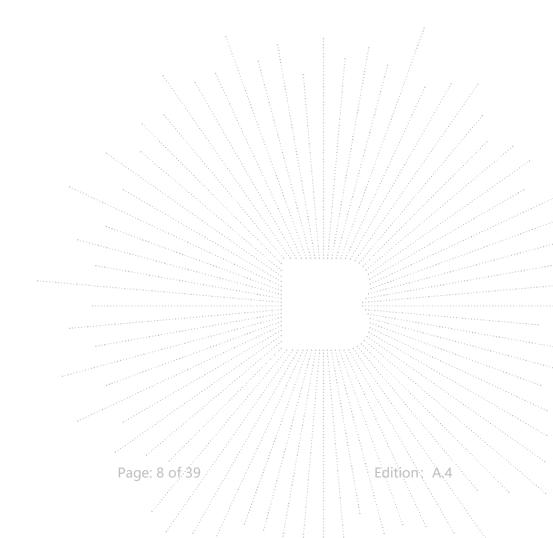
Model differences: N/A

Operation Frequency: 2404-2478MHz

Type of Modulation: GFSK Number Of Channel: 75CH

Antenna installation: PCB antenna

Antenna Gain: -0.5dBi Ratings: DC 3V



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4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Radiated Spurious Emission



4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	701 mouse	N/A	701 mouse	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.3M	USB cable unshielded

Notes:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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4.4 Channel List

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

4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

For All Mode	Description	Modulation Type
Mode 1	CH01	/
Mode 2	CH38	GFSK
Mode 3	CH75	
Mode 4	Link mode (Radiated emiss	ion)

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Fully-charged battery is used during the test

4.6 Table of parameters of text software setting

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

Test software Version	SecureCRT
Frequency	2404 MHz 2441 MHz 2478 MHz
Parameters	DEF DEF DEF

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5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

FCC Test Firm Registration Number: 712850

IC Registered No.: 23583

5.2 Test Instrument Used

	RF Conducted Test								
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.				
Power Metter	Keysight	E4419	1	May 28, 2021	May 27, 2022				
Power Sensor (AV)	Keysight	E9300A	1	May 28, 2021	May 27, 2022				
Signal Analyzer 20kHz-26.5G Hz	Keysight	N9020A	MY49100060	May 28, 2021	May 27, 2022				
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	1	May 28, 2021	May 27, 2022				

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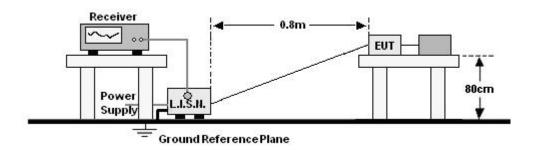
Radiated Emissions Test (966 Chamber)							
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.		
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023		
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022		
Receiver	R&S	ESRP	101154	May 28, 2021	May 27, 2022		
Amplifier	SKET	LAPA_01G18 G-45dB	\	May 28, 2021	May 27, 2022		
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 28, 2021	May 27, 2022		
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	Jun. 01, 2021	May 31, 2022		
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 02, 2021	Jun. 01, 2022		
Horn Antenn (18GHz-40GH z)	Schwarzbeck	BBHA9170	00822	Jun. 15, 2021	Jun. 14, 2022		
Amplifier (18GHz-40GH z)	MITEQ	TTA1840-35- HG	2034381	May 28, 2021	May 27, 2022		
Loop Antenna (9KHz-30MHz	Schwarzbeck	FMZB1519B	00014	Jun. 02, 2021	Jun. 01, 2022		
RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-000 8	May 28, 2021	May 27, 2022		
RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 28, 2021	May 27, 2022		
RF cables3 (1GHz-40GHz	Huber+Suhnar	1GHz-40GHz	1607106	May 28, 2021	May 27, 2022		
Power Metter	Keysight	E4419		May 28, 2021	May 27, 2022		
Power Sensor (AV)	Keysight	E9300A		May 28, 2021	May 27, 2022		
Signal Analyzer 20kHz-26.5G Hz	Keysight	N9020A	MY49100060	May 28, 2021	May 27, 2022		
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	1	May 28, 2021	May 27, 2022		
Software	Frad	EZ-EMC	FA-03A2 RE	\			

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6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

Frequency (MHz)	Limit (dBuV)		
Frequency (MHZ)	Quas-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	
0.50 -5.0	56.00	46.00	
5.0 -30.0	60.00	50.00	

Notes:

- 1. *Decreasing linearly with logarithm of frequency.
- 2. The lower limit shall apply at the transition frequencies.

6.3 Test procedure

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

- a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

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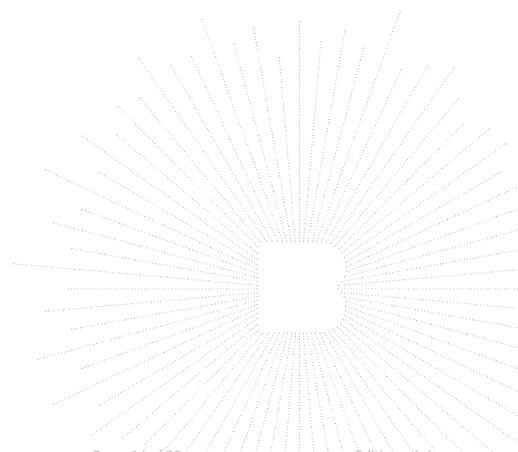


6.4 EUT Operating Conditions

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.

6.5 Test Result

The EUT is powered by the DC only, the test item is not applicable.



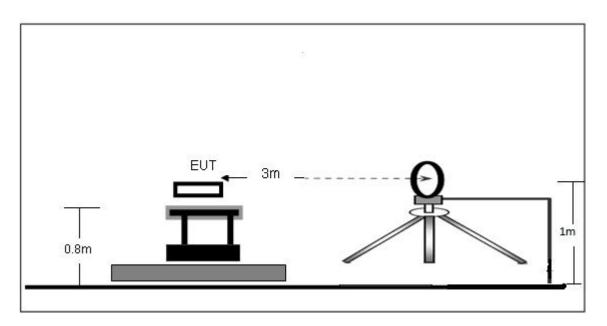
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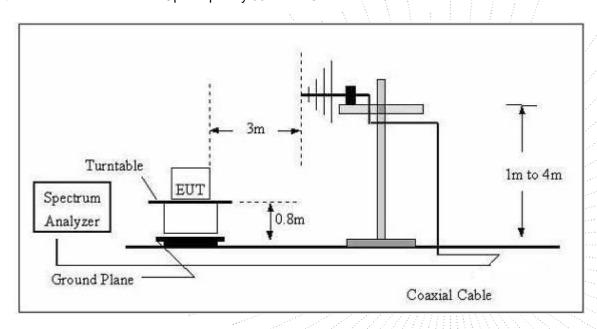
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

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



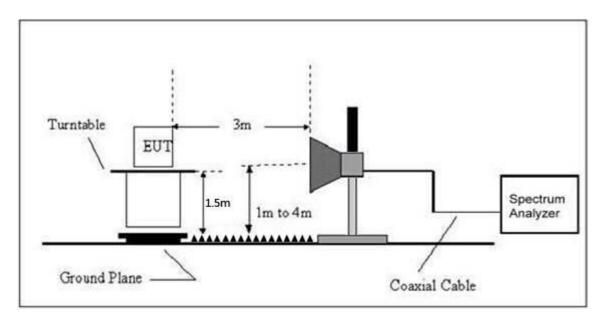
(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



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



7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance			
(MHz)	uV/m	(m)	ر uV/m	dBuV/m		
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80		
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40		
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40		
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾		
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾		
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾		
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾		

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).

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Frequency Range Of Radiated Measurement

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- (a) For an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:
- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator operates at or above 95 GHz: To the third harmonic of the highest fundamental frequency or to 750 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (5) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a) (1)through (4) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this section, whichever is the higher frequency range of investigation.

7.3 Test procedure

Receiver Parameter	Setting
Attenuation	Auto ;
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Spectrum Parameter	Setting //////
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic 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 (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.

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- 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.

Above 1GHz test procedure as below:

- a. 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.
- 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 middlest 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.

7.4 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.

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7.5 Test Result

Below 30MHz

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	DC 3V
Test Mode:	Mode 4	Test voltage .	DC 3V

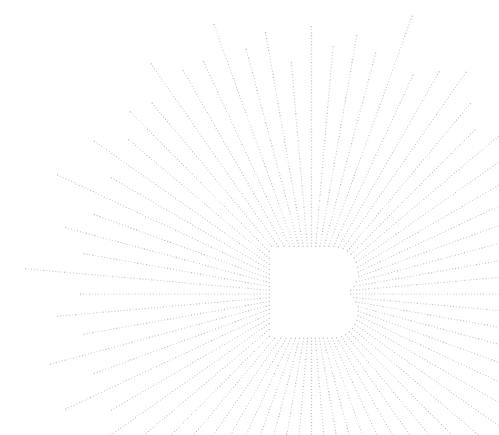
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

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 =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

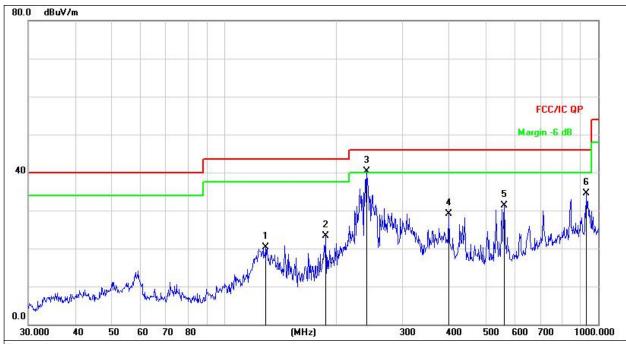


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Between 30MHz - 1GHz

<u>'</u>		Relative Humidity:	54%	
Pressure:	101KPa	Phase :	Horizontal	
Test Mode:	Mode 4	Test Voltage :	DC 3V	



Remark:

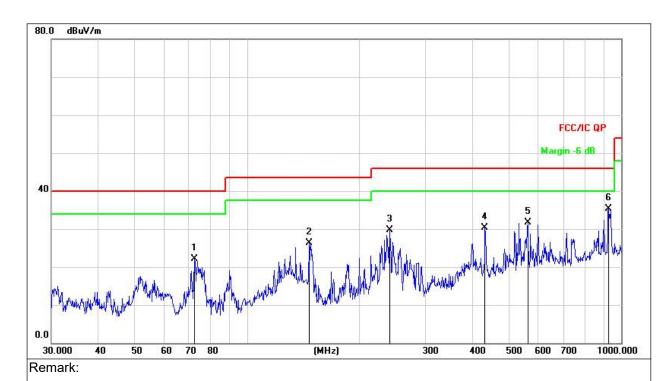
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detecto
1		129.0146	38.39	-18.08	20.31	43.50	-23.19	QP
2		187.0958	39.77	-16.49	23.28	43.50	-20.22	QP
3	*	240.8304	55.14	-14.80	40.34	46.00	-5.66	QP
4	ě	399.0302	39.90	-10.88	29.02	46.00	-16.98	QP
5	3	560.6928	38.18	-6.92	31.26	46.00	-14.74	QP
6		929.0082	34.05	0.44	34.49	46.00	-11.51	QP

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Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 4	Test Voltage :	DC 3V



Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		72.3376	41.21	-19.12	22.09	40.00	-17.91	QP
2		146.3735	45.59	-19.25	26.34	43.50	-17.16	QP
3		240.8304	44.42	-14.80	29.62	46.00	-16.38	QP
4		432.5457	40.34	-10.02	30.32	46.00	-15.68	QP
5		562.6624	38.57	-6.87	31.70	46.00	-14.30	QP
6	*	925.7563	34.90	0.44	35.34	46.00	-10.66	QP

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Between 1GHz - 25GHz

			GFSK				
Polar	Frequency	Reading Level	Correct Factor	Measure-m ent	Limits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	Туре
			Low chan	nel			
V	4808.00	53.35	-0.43	52.92	74.00	-21.08	PK
V	4808.00	42.44	-0.43	42.01	54.00	-11.99	AV
V	7212.00	44.92	8.31	53.23	74.00	-20.77	PK
V	7212.00	35.21	8.31	43.52	54.00	-10.48	AV
Н	4808.00	48.52	-0.43	48.09	74.00	-25.91	PK
Н	4808.00	38.66	-0.43	38.23	54.00	-15.77	AV
Н	7212.00	43.01	8.31	51.32	74.00	-22.68	PK
Н	7212.00	34.59	8.31	42.90	54.00	-11.10	AV
			Middle cha	nnel		•	
V	4882.00	51.99	-0.38	51.61	74.00	-22.39	PK
V	4882.00	45.52	-0.38	45.14	54.00	-8.86	AV
V	7323.00	41.06	8.83	49.89	74.00	-24.11	PK
V	7323.00	31.62	8.83	40.45	54.00	-13.55	AV
Н	4882.00	47.62	-0.38	47.24	74.00	-26.76	PK
Н	4882.00	38.21	-0.38	37.83	54.00	-16.17	AV
Н	7323.00	39.96	8.83	48.79	74.00	-25.21	PK
Н	7323.00	32.95	8.83	41.78	54.00	-12.22	AV
			High chan	nel			
V	4956.00	53.02	-0.32	52.70	74.00	-21.30	; PK
V	4956.00	44.63	-0.32	44.31	54.00	-9.69	AV
V	7434.00	45.75	9.35	55.10	74.00	-18.90	PK
V	7434.00	36.49	9.35	45.84	54.00	-8.16	AV
Н	4956.00	51.40	-0.32	51.08	74.00	-22.92	PK
Н	4956.00	41.00	-0.32	40.68	54.00	-13.32	AV
Н	7434.00	42.81	9.35	52.16	74.00	-21.84	PK
Н	7434.00	33.90	9.35	43.25	54.00	-10.75	AV

Remark:

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

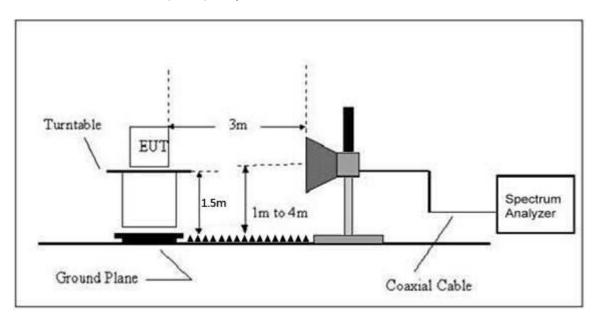
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8. Radiated Band Emission Measurement And Restricted Bands Of Operation

8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Above 1GHz



8.2 Limit

FCC Part15 C Section 15.209 and 15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41		4	,,,,

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Limits Of Radiated Emission Measurement (Above 1000MHz)

Frequency (MHz)	Limit (dBuV/m) (at 3M)		
Frequency (Wiriz)	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).

8.3 Test Procedure

Receiver Parameter	Setting		
Attenuation	Auto		
Start Frequency	2300MHz		
Stop Frequency	2520		
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average		

Above 1GHz test procedure as below:

- a. 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.
- 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 middlest 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.

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8.4 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.

8.5 Test Result

	Polar (H/V)		Level	Correct Factor (dB)	Measure- ment (dBuV/m)	Lim (dBu	nits V/m)	Result
			(dBuV/m)		PK	PK	AV	
			Lo	w Channel 2	404MHz			
	Н	2390.00	56.78	-6.70	50.08	74.00	54.00	PASS
GFSK	Н	2400.00	58.38	-6.71	51.67	74.00	54.00	PASS
	V	2390.00	55.97	-6.70	49.27	74.00	54.00	PASS
	V	2400.00	57.74	-6.71	51.03	74.00	54.00	PASS
	High Channel 2478MHz							
	Н	2483.50	57.12	-6.79	50.33	74.00	54.00	PASS
	Н	2485.00	48.70	-6.81	41.89	74.00	54.00	PASS
	V	2483.50	55.79	-6.79	49.00	74.00	54.00	PASS
	V	2485.00	48.48	-6.81	41.67	74.00	54.00	PASS

Remark:

1. Emission Level = Meter Reading + Factor,

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

Over= Emission Level - Limit

- 2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
- 3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB
- 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 5. This report only shows the worst case test data.

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9. Power Spectral Density Test

9.1 Block Diagram Of Test Setup



9.2 Limit

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

Limits Of Radiated Emission Measurement (Above 1000MHz)

9.3 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 kHz
- 4. Set the VBW ≥ 3 x 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.

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9.4 EUT Operating Conditions

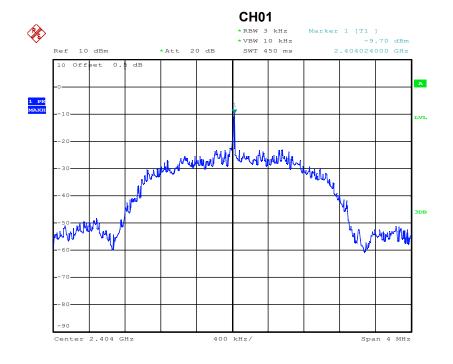
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

9.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	DC 3V

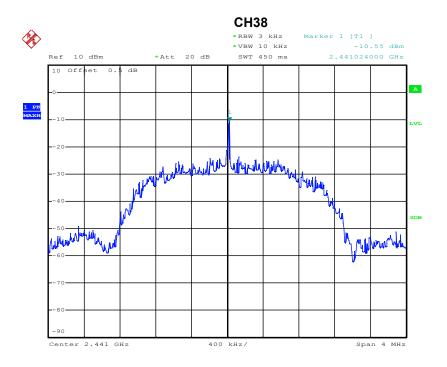
Frequency	Power Spectral Density(dBm/3kHz)	Limit (dBm/3kHz)	Result
2404 MHz	-9.70	8	PASS
2441 MHz	-10.55	8	PASS
2478 MHz	-11.95	8	PASS



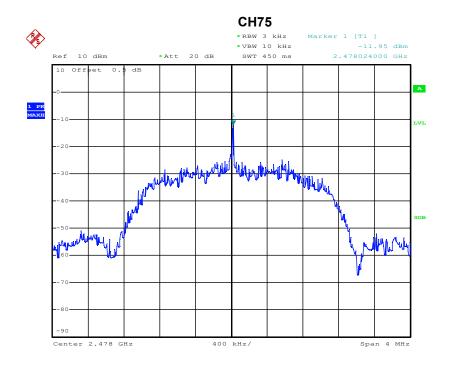
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Date: 22.NOV.2021 17:58:24



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10. Bandwidth Test

10.1 Block Diagram Of Test Setup

EUT	SPECTRUM
S 1887 C 1887	ANALYZER

10.2 Limit

FCC Part15 (15.247) , Subpart C						
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS		

10.3 Test procedure

- 1. Set RBW = 100 kHz.
- 2. Set the video bandwidth (VBW) \geq 3 x 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.

10.4 EUT operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

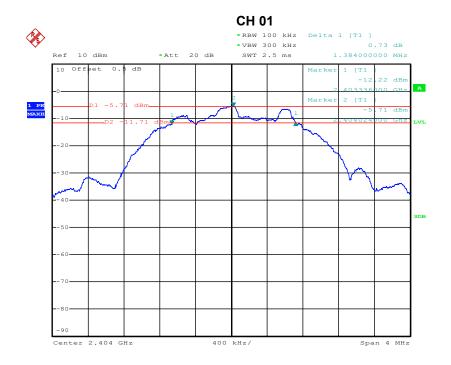
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10.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	DC 3V

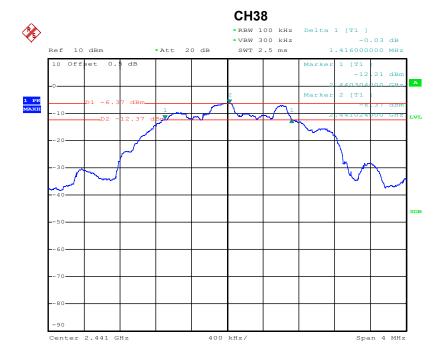
Frequency	6dB bandwidth (MHz)	Limit (kHz)	Result
2404 MHz	1.384	500	Pass
2441 MHz	1.416	500	Pass
2478 MHz	1.428	500	Pass



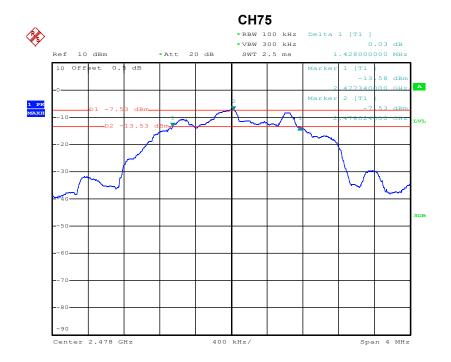
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Date: 22.NOV.2021 13:36:49



Date: 22.NOV.2021 11:56:45

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11. Peak Output Power Test

11.1 Block Diagram Of Test Setup

POWER METER

11.2 Limit

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

11.3 Test Procedure

a. The EUT was directly connected to the Power meter

11.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

11.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	DC 3V

	Frequency	Maximum Conducted Output Power(PK) (dBm)	Conducted Output Power Limit(dBm)
GFSK	2404 MHz	-4.94	30
	2441 MHz	-5.75	30
	2478 MHz	-6.97	30

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12. 100 kHz Bandwidth Of Frequency Band Edge

12.1 Block Diagram Of Test Setup



12.2 Limit

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.

12.3 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.

12.4 EUT operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

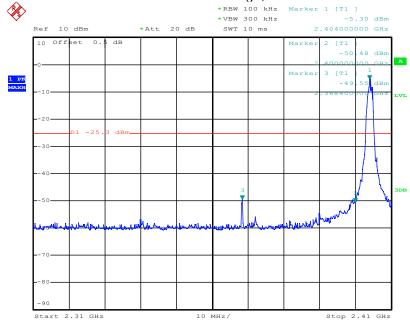
12.5 Test Result

Temperature:	26 ℃	Jacob (Control of Control of Cont	Relative Humidity:	54%
Pressure:	101KPa	Jan San San San San San San San San San S	Test Voltage :	DC 3V

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GFSK: Band Edge, Left Side



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GFSK: Band Edge, Right Side

Date: 22.NOV.2021 18:06:39

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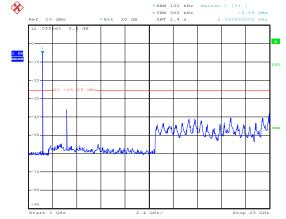


%

Conducted Emission Measurement GESK

Report No.: BCTC2111644657E

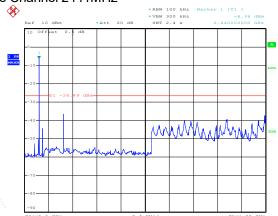




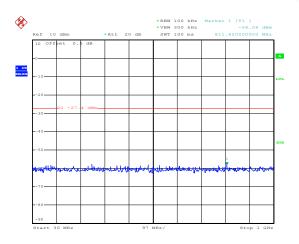
Date: 22.NOV.2021 17:50:22 Date: 22.NOV.2021 17:49:54

*RBW 100 kHz Marker 1 [T1] *VBW 300 kHz -28.54 dBm Ref 10 dBm *Att 20 dB SWT 100 ma 608.12000000 MHz 10 Offict 0.4 dB -0 -10 -20 -1-26.49 dBm -30 -30 -30 -30 -30 -30 dBm -30 -30 -30 -30 dBm -30 -30 -30 -30 dBm

Middle Channel 2441MHz

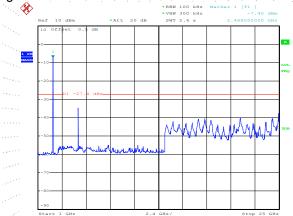


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High Channel 2478MHz

Date: 22.NOV.2021 13:46:12



Date: 22.NOV.2021 17:47:14 Date: 22.NOV.2021 17:46:27

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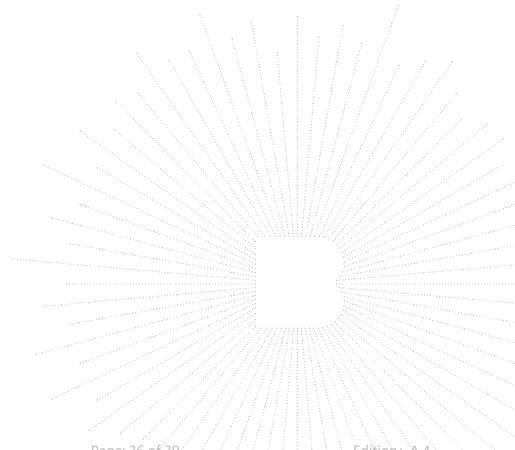
13. Antenna Requirement

13.1 Limit

15.203 requirement: For intentional device, according to 15.203: 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.

13.2 Test Result

The EUT antenna is PCB antenna, fulfill the requirement of this section.



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14. EUT Photographs

EUT Photo 1



EUT Photo 2



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15. EUT Test Setup Photographs

Radiated Measurement Photos





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STATEMENT

- 1. The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3. The test report is invalid without stamp of laboratory.
- 4. The test report is invalid without signature of person(s) testing and authorizing.
- 5. The test process and test result is only related to the Unit Under Test.
- 6. The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P. C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com.

E-Mail: bctc@bctc-lab.com.cn

**** END ****

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