

Test Report

- **Report No.:** MTi211207007-05E1
- Date of issue: Apr. 29, 2022
- Applicant: Shenzhen Monster Creative Technology Co., Ltd.
- Product: Bluetooth Speaker
- Model(s): MS12109, M69F
- FCC ID: 2AVD2-MS12109

Shenzhen Microtest Co., Ltd. http://www.mtitest.com





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2. The test results in this test report are only responsible for the samples submitted

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Contents

1	General Description	5
	1.1 Description of the EUT	
	1.2 Description of test modes	
	1.3 Measurement uncertainty	
2	Summary of Test Result	7
3	Test Facilities and Accreditations	8
	3.1 Test laboratory	8
4	Equipment List	9
5	Test Result	10
	5.1 Antenna requirement	10
	5.2 AC power line conducted emissions	11
	5.3 20dB occupied bandwidth	
	5.4 Conducted peak output power	
	5.5 Carrier frequency separation	
	5.6 Average time of occupancy	
	5.7 Number of hopping channels	
	5.8 Conducted emissions at the band edge	
	5.9 Conducted spurious emissions	
	5.10 Radiated spurious emission	37
P	hotographs of the Test Setup	55
P	hotographs of the EUT	55



	Test Result Certification				
Applicant: Shenzhen Monster Creative Technology Co., Ltd.					
Address:	Flat G, 3/F, Building D, The Central Avenue, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China				
Manufacturer:	Shenzhen Jonter Digital Co., Ltd				
Address:	3/F, Building4, Jinfo Industrial Park, Hezhou Village, Hangcheng Town, Bao'an District, Shenzhen, China				
Factory:	Dongguan Jonter Digital Co., Ltd.				
Address:	Building 1, No. 5, Daguizi East Street, Tangjiao Village, Chashan Town, Dongguan, China				
Product description					
Product name:	Bluetooth Speaker				
Trademark:	MONSTER, JONTER				
Model name:	MS12109				
Serial Model:	M69F				
Standards:	FCC 47 CFR Part 15 Subpart C				
Test method:	ANSI C63.10-2013				
Date of Test					
Date of test:	2021-12-07 ~ 2022-04-29				
Test result: Pass					

Test Engineer :

y An

(Danny Xu)

Reviewed By: :

leor chen

(Leon Chen)

Approved By: :

Tom Kue

(Tom Xue)



1 General Description

1.1 Description of the EUT

Product name:	Bluetooth Speaker
Model name:	MS12109
Series Model:	M69F
Model difference:	All the models are the same circuit and module, except the model's name.
Electrical rating:	Input: DC 5V/2A Battery: DC 7.4V 2500mAh
Hardware version:	V1.0
Software version:	V5
Accessories:	N/A
EUT serial number:	MTi211207007-05-S0001
RF specification:	
Bluetooth version:	V5.0
Operation frequency:	2402 MHz ~ 2480 MHz
Modulation type:	GFSK, π/4-DQPSK,8DPSK
Antenna designation: PCB antenna, antenna Gain: -0.58 dBi	
Max. peak conducted output power:	5.78 dBm

1.2 Description of test modes

1.2.1 Operation channel list

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474



Page 6 of 55

Report No.: MTi211207007-05E1

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-

1.2.2 Test channels

Chanel	Frequency	
Lowest (CH0)	2402MHz	
Middle (CH39)	2441MHz	
Highest (CH78)	2480MHz	

Note: The test software has been used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

1.2.3 Description of support units

Support equipment list						
Description	Model	Serial No.	Manufacturer			
Adapter	HW-090200CH0	/	Huizhou BYD Electronics Co., Ltd.			

1.3 Measurement uncertainty

Parameter	Measurement uncertainty
AC power line conducted emission (9 kHz~30 MHz)	±2.5 dB
Occupied Bandwidth	±3 %
Conducted RF output power	±0.16 dB
Conducted spurious emissions	±0.21 dB
Radiated emission (9 kHz ~ 30 MHz)	±4.0 dB
Radiated emission (30 MHz~1 GHz)	±4.2 dB
Radiated emission (above 1 GHz)	±4.3 dB

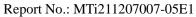
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



2 Summary of Test Result

No.	FCC reference	Description of test	Result
1	§ 15.203	Antenna requirement	Pass
2	§ 15.207	AC power line conducted emissions	Pass
3	15.247(a)(1)	20dB occupied bandwidth	Pass
4	15.247(b)(1)	Conducted peak output power	Pass
5	15.247(a)(1)	Carrier Frequencies Separation	Pass
6	15.247(a)(1)	Average time of occupancy (Dwell time)	Pass
7	15.247(a)(1)	Number of hopping channels	Pass
8	15.247(d)	Conducted emission at the band edge	Pass
9	15.247(d)	Conducted spurious emissions	Pass
10	15.247(d)	Radiated spurious emissions	Pass

Note: N/A means not applicable.





3 Test Facilities and Accreditations

3.1 Test laboratory

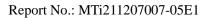
Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573

Page 8 of 55



4 Equipment List

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
MTi-E002	EMI Test Receiver	R&S	ESCI3	101368	2021/06/02	2022/06/01
MTi-E023	Artificial power network	Schwarzbeck	NSLK8127	NSLK8127# 841	2021/06/02	2022/06/01
MTi-E025	Artificial power network	Schwarzbeck	NSLK8127	8127183	2021/06/02	2022/06/01
MTI-E043	EMI test receiver	R&S	ESCI7	101166	2021/06/02	2022/06/01
MTI-E046	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00044	2021/05/30	2023/05/29
MTI-E044	Broadband antenna	Schwarzbeck	VULB9163	9163-1338	2021/05/30	2023/05/29
MTI-E045	Horn antenna	Schwarzbeck	BBHA9120D	9120D-2278	2021/05/30	2023/05/29
MTI-E047	Pre-amplifier	Hewlett-Packard	8447F	3113A06184	2021/06/02	2022/06/01
MTI-E048	Pre-amplifier	Agilent	8449B	3008A01120	2021/06/02	2022/06/01
MTi-E120	Broadband antenna	Schwarzbeck	VULB9163	9163-1419	2021/05/30	2023/05/29
MTi-E121	Pre-amplifier	Hewlett-Packard	8447D	2944A09365	2022/04/15	2023/04/14
MTi-E123	Pre-amplifier	Agilent	8449B	3008A04723	2021/05/06	2022/05/05
MTi-E135	Horn antenna	Schwarzbeck	BBHA 9170	00987	2021/05/30	2023/05/29
MTi-E136	Pre-amplifier	Space-Dtronics	EWLAN1840G -G45	210405001	2021/06/02	2022/06/01
MTi-E062	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2021/06/23	2022/06/22
MTi-E067	RF Control Unit	Tonscend	JS0806-1	19D8060152	2021/06/02	2022/06/01
MTi-E068	RF Control Unit	Tonscend	JS0806-2	19D8060153	2021/06/02	2022/06/01
MTi-E069	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2021/06/02	2022/06/01
MTI-E010S	EMI Measurement Software	Farad	EZ-EMC Ver. EMEC-3A1	/	/	/
MTI-E014S	RF Test System	Tonscend	TS®JS1120 V2.6.88.0330	/	/	/





5 Test Result

5.1 Antenna requirement

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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Description of the antenna of EUT

The antenna of EUT is PCB antenna (Antenna Gain: -0.58 dBi). which is no consideration of replacement.



5.2 AC power line conducted emissions

5.2.1 Limits

Frequency (MHz)	Detector type / Bandwidth	Limit-Quasi-peak dBµV	Limit-Average dBµV
0.15 -0.5		66 to 56	56 to 46
0.5 -5	Average / 9 kHz	56	46
5 -30		60	50

Note 1: the limit decreases with the logarithm of the frequency in the range of 0.15 MHz to 0.5 MHz.

5.2.2 Test Procedures

a) The test setup is refer to the standard ANSI C63.10-2013.

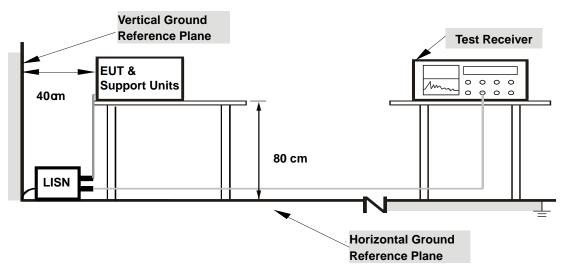
b) The EUT is connected to the main power through a line impedance stabilization network (LISN). All support equipment is powered from additional LISN(s).

c) Emissions were measured on each current carrying line of the EUT using an EMI test receiver connected to the LISN powering the EUT.

d) The test receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes described in Item 1.2.

e) The test data of the worst-case condition(s) was recorded.

5.2.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the test setup.

5.2.4 Test Result

Notes:

All modes of operation of the EUT were investigated, and only the worst-case results are reported.

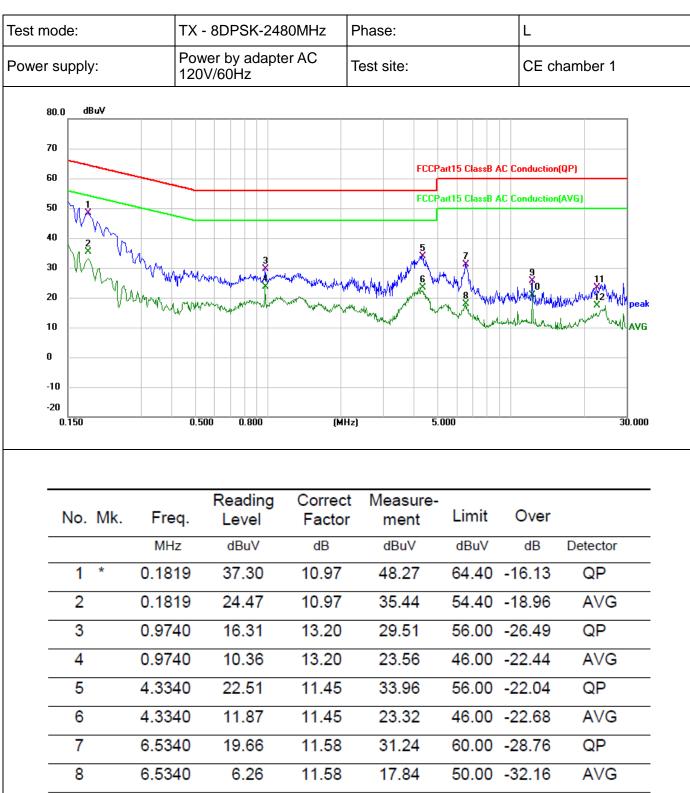
Calculation formula:

Measurement (dB μ V) = Reading Level (dB μ V) + Correct Factor (dB) Over (dB) = Measurement (dB μ V) – Limit (dB μ V)



Page 12 of 55

Report No.: MTi211207007-05E1



11.65

11.65

11.80

11.80

25.51

20.99

23.38

17.33

60.00 -34.49

50.00 -29.01

60.00 -36.62

50.00 -32.67

QP

AVG

QP

AVG

12.2900

12.2900

22.5580

22.5580

9

10

11

12

13.86

9.34

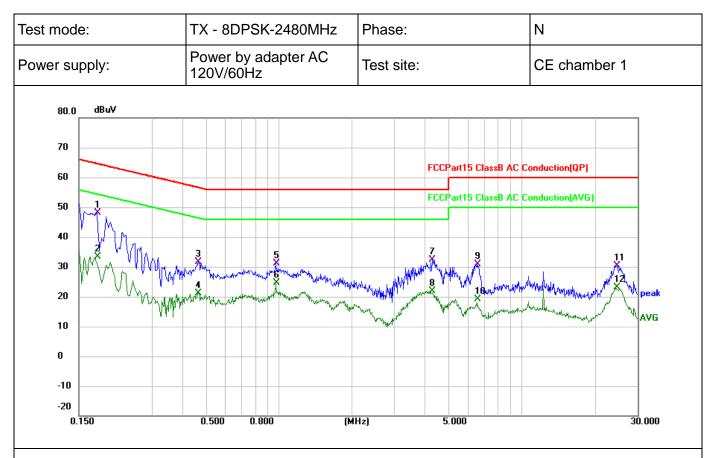
11.58

5.53



Page 13 of 55

Report No.: MTi211207007-05E1



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1780	37.09	10.94	48.03 64.58 -16.5		-16.55	QP
2		0.1780	22.39	10.94	33.33 54.58 -21.25		-21.25	AVG
3		0.4660	20.74	10.89	31.63	31.63 56.58 -24.95		QP
4		0.4660	10.28	10.89	21.17 46.58 -25.41		AVG	
5		0.9740	18.03	13.13	31.16	31.16 56.00 -24.84		QP
6		0.9740	11.51	13.13	24.64	4.64 46.00 -21.36		AVG
7		4.2780	20.96	11.38	32.34	56.00	-23.66	QP
8		4.2780	10.52	11.38	21.90	46.00	-24.10	AVG
9		6.5580	19.38	11.39	30.77	60.00	-29.23	QP
10		6.5580	7.68	11.39	19.07	50.00	-30.93	AVG
11		24.6700	18.54	11.78	30.32	60.00	-29.68	QP
12		24.6700	11.29	11.78	23.07	50.00	-26.93	AVG



5.3 20dB occupied bandwidth

5.3.1 Limits

None, for reporting purposes only.

5.3.2 Test setup



5.3.3 Test procedures

- a) Test method: ANSI C63.10-2013 Section 6.9.2.
- b) The transmitter output of EUT is connected to the spectrum analyzer.
- c) Spectrum analyzer setting: RBW=30 kHz, VBW=100 kHz, detector= Peak

5.3.4 Test results

Mode	Test channel	Frequency (MHz)	20dB Bandwidth (MHz)
	CH0	2402	0.931
GFSK	CH39	2441	0.9352
	CH78	2480	0.9358
	CH0	2402	1.282
π/4-DQPSK	CH39	2441	1.281
	CH78	2480	1.286
	CH0	2402	1.297
8DPSK	CH39	2441	1.296
	CH78	2480	1.295



GFSK mode - 20dB occupied bandwidth



CH39







π /4-DQPSK mode - 20dB occupied bandwidth



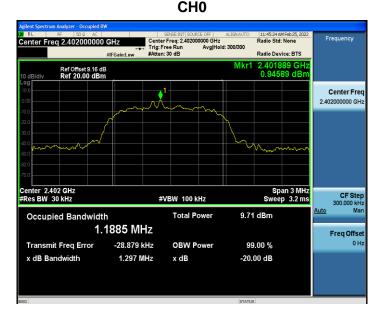
CH39





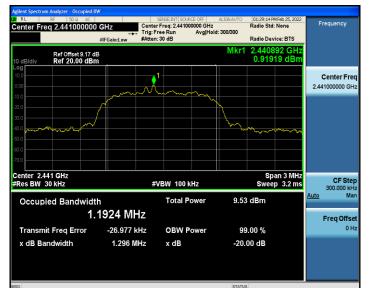


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Page 17 of 55

CH39







5.4 Conducted peak output power

5.4.1 Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.4.2 Test setup

сит	Spectrum	
EUT	Analyzer	

5.4.3 Test procedure

a) Test method: ANSI C63.10-2013 Section 7.8.5.

b) The EUT was set to continuously transmitting in the max power during the test.

c) The transmitter output of EUT is connected to the spectrum analyzer.

d) Spectrum analyzer setting: RBW > 20dB occupied bandwidth, VBW ≥ RBW, detector= Peak

5.4.4 Test results

Mode	Test channel	Test channel Frequency (MHz)		Limit (dBm)	
	CH0	2402	2.32	≤ 20.97	
GFSK	CH39	2441	2.04	≤ 20.97	
	CH78	2480	2.27	≤ 20.97	
	CH0	2402	5.05	≤ 20.97	
π/4-DQPSK	CH39	2441	5.05	≤ 20.97	
	CH78	2480	5.31	≤ 20.97	
	CH0	2402	5.36	≤ 20.97	
8DPSK	CH39	2441	5.41	≤ 20.97	
	CH78	2480	5.78	≤ 20.97	

GFSK mode - peak conducted output power



CH39







$\pi/4\text{-}DQPSK$ mode - peak conducted output power



CH39

Center F	RF 50 Q AC req 2.441000000	GHz PNO: Fast ↔		CE OFF #Avg Typ Avg Hold:		TRAC	1 Feb 25, 2022 E 2 3 4 5 6 E M + + + + + + + + + + + + + + + + + +	Frequer	ncy
0 dB/div	Ref Offset 9.17 dB Ref 30.00 dBm	IFGain:Low	anticent. 44		Mkr1	2.440 8	70 GHz 45 dBm	Auto	o Tuni
20.0								Cente 2.4410000	
0.00	and all the second second	مىلىقەر بىرىمى مەربىي	• • • ¹	 	·····		and the second	Sta i 2.4385000	rtFre 00 G⊦
20.0								Sto 2.4435000	pFre 00 G⊦
30.0									F Ste DOO ki Ma
40.0 50.0								Freq	Offs 0 H
60.0									
Center 2. Res BW	441000 GHz 3.0 MHz	#VBW	/ 8.0 MHz		Sweep 1	5 Span 000 ms (.000 MHz 1001 pts)		





8DPSK mode – peak conducted output power



CH39

Ref Offset 9.17 dB Ref 30.00 dBm	IFGain:Low	1		Mkr1		85 GHz 10 dBm	Auto T Center F 2.441000000
		1					
		· · · · · · · · · · · · · · · · · · ·					
							Start F 2.438500000
							Stop F 2.443500000
							CF S 500.000 <u>Auto</u>
							Freq Of
1000 GHz					Span 5	.000 MHz	
	1000 GHz 0 MHz				0 MHz #VBW 8.0 MHz Sweep 1		1000 GHz Span 5.000 MHz D MHz #VBW 8.0 MHz Sweep 1.000 ms (1001 pts)

CH78





5.5 Carrier frequency separation

5.5.1 Limits

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 bandwidth of the hopping channel, whichever is greater

5.5.2 Test setup

	Spectrum
EUT	Analyzer

5.5.3 Test procedure

- a) Test method: ANSI C63.10-2013 Section 7.8.2.
- b) The EUT was set to hopping mode during the test.
- c) The transmitter output of EUT is connected to the spectrum analyzer.
- d) Spectrum Setting: RBW = 30 kHz, VBW = 100 kHz, detector= Peak.

5.5.4 Test results

Mode	Test channel	Test Result (MHz)	Limit (MHz)	Result
GFSK	Hop-mode	1	>=0.624	Pass
π/4-DQPSK	Hop-mode	Hop-mode 1		Pass
8DPSK	Hop-mode	0.998	>=0.865	Pass



Carrier frequency separation



π/4-DQPSK



8DPSK





5.6 Average time of occupancy

5.6.1 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

5.6.2 Test setup



5.6.3 Test procedure

- a) Test method: ANSI C63.10-2013 Section 7.8.4
- b) The EUT was set to hopping mode during the test.
- c) The tranistter output of EUT is connneted to the specturm analyzer.

d) Spectrum analyzer setting: RBW = 1MHz, VBW = 3MHz, Span = 0Hz, Detector = Peak, weep time: As necessary to capture the entire dwell time per hopping channel.

e) Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

f) The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

Mode	Mode Data Fre Packet (Pulse width (ms)	Number of pulses in 3.16 s	Average time of occupancy (s)	Limit (s)	Result
	DH1	2441	0.37	32	0.0118	<=0.4	Pass
GFSK	DH3	2441	1.63	20	0.0326	<=0.4	Pass
	DH5	2441	2.88	12	0.0346	<=0.4	Pass
	2DH1	2441	0.38	33	0.0125	<=0.4	Pass
π/4-DQPS K	2DH3	2441	1.63	14	0.0228	<=0.4	Pass
	2DH5	2441	2.88	10	0.0288	<=0.4	Pass
	3DH1	2441	0.39	32	0.0125	<=0.4	Pass
8DPSK	3DH3	2441	1.66	16	0.0266	<=0.4	Pass
	3DH5	2441	2.92	11	0.0321	<=0.4	Pass

5.6.4 Test results

Notes:

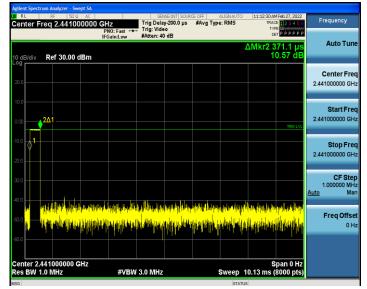
1. Period time = 0.4 (s) * 79 = 31.6(s)

2. Average time of occupancy = Pulse width * Number of pulses in 3.16s * 10

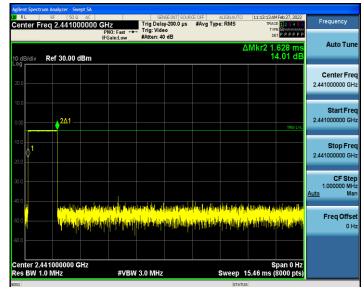


GFSK mode - Average time of occupancy

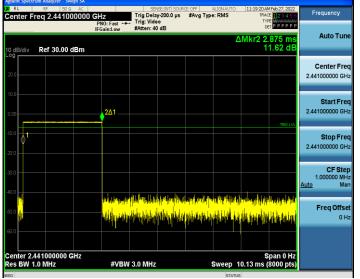
Pulse width – DH1



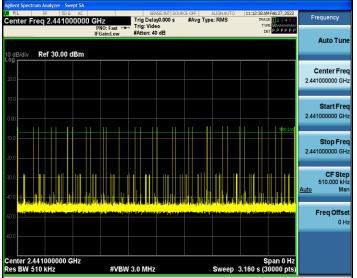
Pulse width – DH3



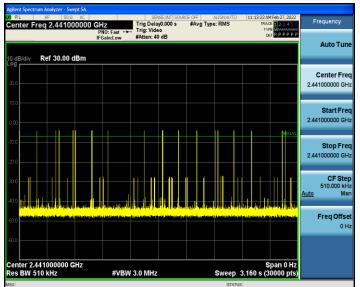
Pulse width – DH5



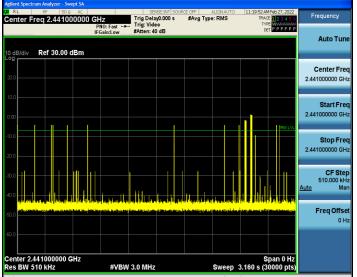
Number of pulses in 3.16 s - DH1



Number of pulses in 3.16 s – DH3



Number of pulses in 3.16 s – DH5

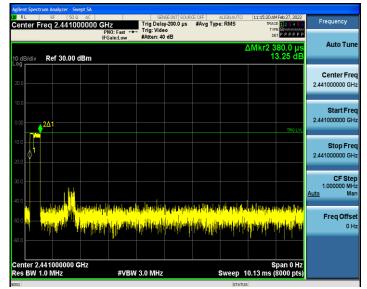


Address: 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, ChinaTel: (86-755)88850135Fax: (86-755) 88850136Web: www.mtitest.comE-mail: mti@51mti.com

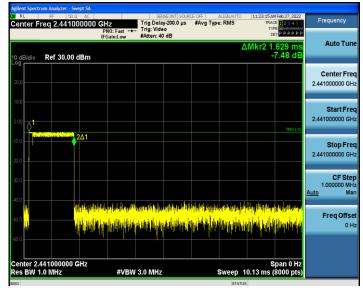


$\pi/4\text{-}D\text{QPSK}$ - Average time of occupancy

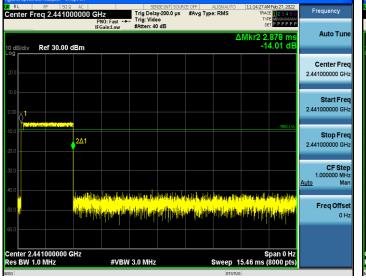
Pulse width – 2DH1



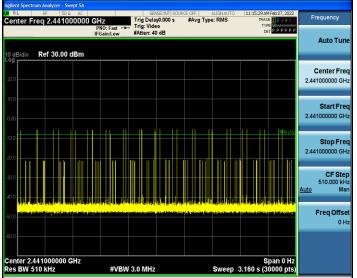
Pulse width – 2DH3



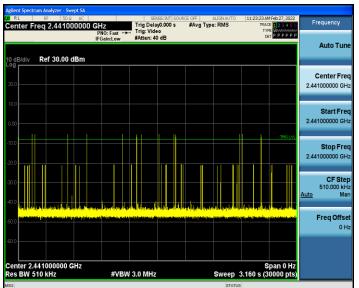
Pulse width - 2DH5



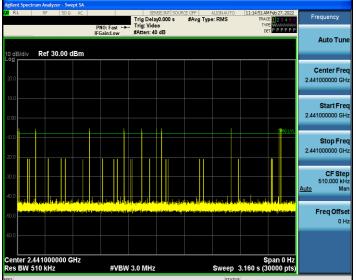
Number of pulses in 3.16 s – 2DH1



Number of pulses in 3.16 s – 2DH3



Number of pulses in 3.16 s – 2DH5

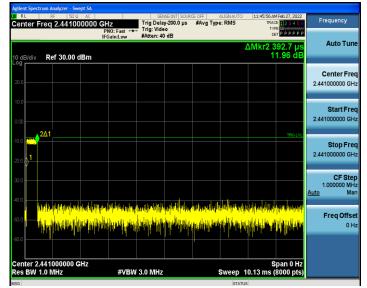


Address: 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, ChinaTel: (86-755)88850135Fax: (86-755) 88850136Web: www.mtitest.comE-mail: mti@51mti.com

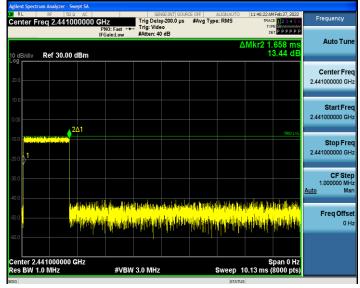


8DPSK - Average time of occupancy

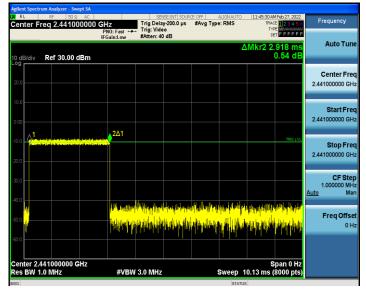
Pulse width – 3DH1



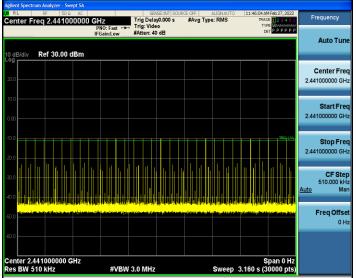
Pulse width – 3DH3



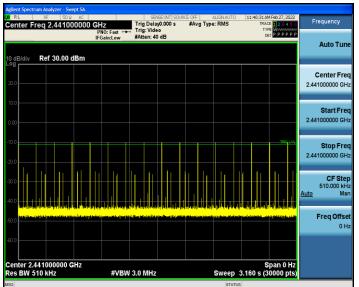
Pulse width - 3DH5



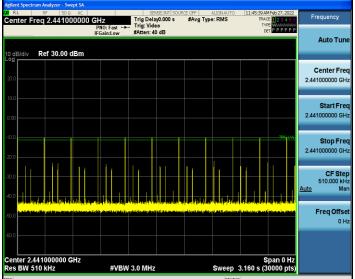
Number of pulses in 3.16 s – 3DH1



Number of pulses in 3.16 s – 3DH3



Number of pulses in 3.16 s – 3DH5



Address: 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, ChinaTel: (86-755)88850135Fax: (86-755) 88850136Web: www.mtitest.comE-mail: mti@51mti.com



5.7 Number of hopping channels

5.7.1 Limit

Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

5.7.2 Test setup

сит	Spectrum	
EUT	Analyzer	

5.7.3 Test procedure

- a) Test method: ANSI C63.10-2013 Section 7.8.3
- b) The EUT was set to hopping mode during the test.
- c) The tranistter output of EUT is connneted to the specturm analyzer.
- d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

5.7.4 Test results

Mode	Quantity of Hopping Channel	Limit	Results	
GFSK	79	≥15	Pass	
π/4-DQPSK	79	≥15	Pass	
8DPSK	79	≥15	Pass	



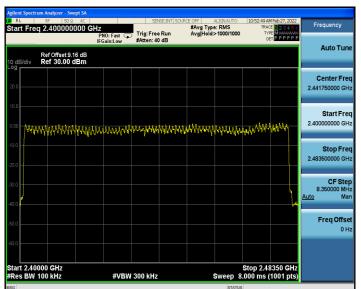
Number of hopping channels



π/4-DQPSK

RL	ctrum Analyzer - S RF 50 req 2.40000	9 AC 0000 GHz			ISE:INT SOUR	#Avg Type	ALIGNAUTO e: RMS >1000/1000	TRA	M Feb 27, 2022 CE 123456 PE MINIM	Frequency
10 dB/div	Ref Offset 9 Ref 30.00	IF 9.16 dB	PNO: Fast 😱 Gain:Low	#Atten: 40		Arginola.	- 1000/1000	D	TPPPPP	Auto Tun
20.0										Center Fre 2.441750000 GH
10.0 0.00 M	Mariana Mariana Mariana Mariana M	www.	wwww	www	WWW	www	WWWWW	MAN MA	www	Start Fre 2.400000000 GH
10.0										Stop Fre 2.483500000 G⊦
30.0 40.0										CF Ste 8.350000 MH Auto Ma
50.0										Freq Offse 0 H
-60.0										
	10000 GHz N 100 kHz		#VBW	300 kHz			Sweep {		8350 GHz (1001 pts)	

8DPSK







5.8 Conducted emissions at the band edge

5.8.1 Limits

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 conducted power limits. If the transmitter complies with the conducted 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.8.2 Test setup



5.8.3 Test procedure

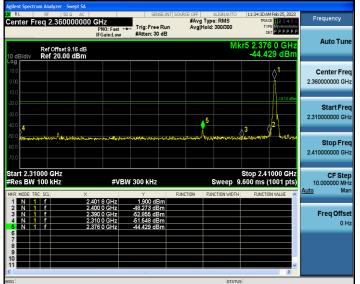
- a) Test method: ANSI C63.10-2013 Section 6.10.4
- b) The EUT was set to non-hopping mode & hopping mode during the test.
- c) The transmitter output of EUT is connected to the spectrum analyzer.
- d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

5.8.4 Test results



GFSK mode - conducted emissions at the band edge

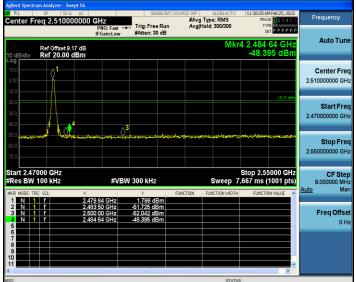
Low band-edge (no-hopping mode mode)



Low band-edge (hopping mode)

	RF 50 Ω	AC IO GHZ PNO; Fast			ALIGN AUTO ype: RMS Id:>300/300	09:39:20 AM Feb 2 TRACE	3 4 5 6 Freq	uency
dB/div	ef Offset 9.1 d tef 20.00 dB	IFGain:Low				2.350 925 -43.142 c	GHZ A	uto Tur
							2.35250	nter Fre
0.0 0.0 0.0	4 480.0.600.0.0.664	ին որոչուն որոշում		ስለብለስ ቤስ ፍልፋ ልላ እ.	005400404040	-10	s	tart Fr
	146046400420642	nhhidikaa hundaka	101100000000000000000000000000000000000	anna dunaanna	an fan this fils	UDIOUUTIKU KAKA AAVI		Stop Fr 20000 G
art 2.3000 Res BW 10	0 kHz		BW 300 kHz			Stop 2.40500 0.07 ms (1001	pts) 10.50	CF St 00000 M
KR MODE TRC S 1 N 1 1 1 2 N 1 1 1 3 N 1 1 1 4 N 1 1 1 5 N 1 1 1	f f f f	× 2.404 790 GHz 2.400 000 GHz 2.390 000 GHz 2.310 000 GHz 2.350 925 GHz	1.750 dBm 45.950 dBm 45.930 dBm 43.903 dBm 43.142 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALU		eq Offs 0
							>	

High band-edge (non-hopping mode)



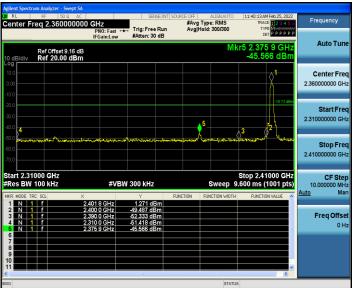
High band-edge (hopping mode)

Agilent Spectrum Analyzer - Swept SA					
x RL RF 50Ω AC Start Freq 2.470000000 GI		#Avg Type:	RMS TRAC	E MIALALIALAL	Frequency
Ref Offset 9.17 dB 10 dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30 d		Mkr4 2.550	00 GHz 24 dBm	Auto Tune
10.0 10.0 1 0.00 10.0 1 -10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0				-18 29 dBm	Center Free 510000000 GH:
-20.0	<u>3</u>		und a below him a bola de		Start Free 470000000 GH
-60.0					Stop Free
Start 2.47000 GHz #Res BW 100 kHz MKR MODE TBC SCL X 1 N 1 f 247	#VBW 300 kHz	FUNCTION FUNCT	Stop 2.55 weep 7.667 ms (rion width Function	1001 pts)	CF Stej 8.000000 MH Ma
2 N 1 f 2.48 3 N 1 f 2.50 4 N 1 f 2.55 5 6	33 50 GHz 50.500 dBm 30 00 GHz 49.542 dBm 30 00 GHz 46.724 dBm	1			Freq Offse 0 H
7 8 9 10 11				v	
KS	Ш		STATUS	>	

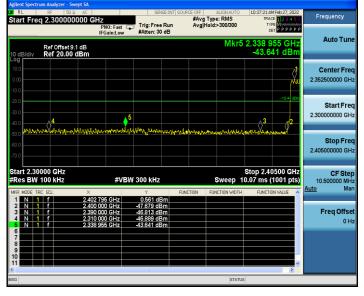


π /4-DQPSK mode - conducted emissions at the band edge

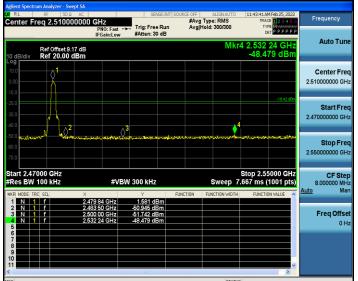
Low band-edge (non-hopping mode)



Low band-edge (hopping mode)



High band-edge (non-hopping mode)



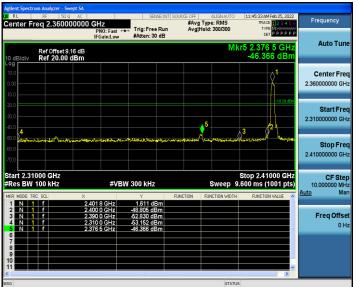
High band-edge (hopping mode)

Agilent Spectrum Analyzer - Swept SA				
Mart Freq 2.470000000 G		AT SOURCE OFF ALIGNAUTO #Avg Type: RMS n Avg Hold>300/300	10:17:05 AM Feb 27, 2022 TRACE 2 3 4 5 6 TYPE	Frequency
Ref Offset 9.17 dB 10 dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30 dB		сет <u>РРРРРР</u> 4 2.531 92 GHz -46.707 dBm	Auto Tune
10.0 0.00 MMMMM				Center Freq 2.510000000 GHz
-20.0		¢4	-18.28 dBm	Start Free 2.470000000 GHz
-50.0	<u></u>	ung programme and here and her	ىرىماتەلىدىرلىتىلەتلەرمىيە يەرىمىيەرلەر مەرىپىيەر بىرىكىيەر بىرىكىيەر بىرىكىيەر بىرىكىيەر بىرىكەر	Stop Fred 2.550000000 GH:
Start 2.47000 GHz #Res BW 100 kHz MKR MODE TRC SCL 1 1 1	#VBW 300 kHz		Stop 2.55000 GHz 667 ms (1001 pts) FUNCTION VALUE	CF Step 8.000000 MH: Auto Mar
2 N 1 f 2.48 3 N 1 f 2.50 4 N 1 f 2.53 5 6	33 50 GHz 51.246 dBm 30 00 GHz 50.129 dBm 31 92 GHz 46.707 dBm			Freq Offsel 0 Hz
7 8 9 10 11			~	
MSG	Ш	STATUS	>	

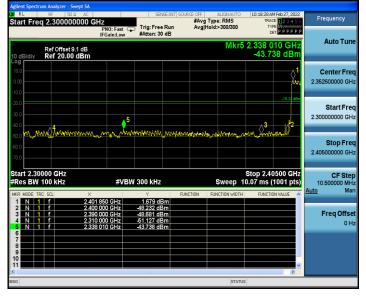


8DPSK mode - conducted emissions at the band edge

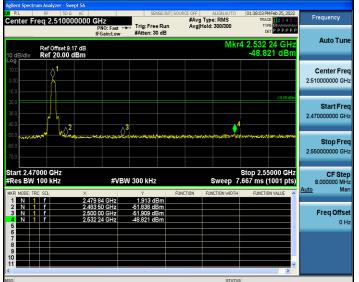
Low band-edge (non-hopping mode)



Low band-edge (hopping mode)



High band-edge (non-hopping mode)



High band-edge (hopping mode)

gilent Spectr	um Analyz RE	er - Swept SA							
		50 Q AC				dLIGNAUTO /g Type: RMS alHold>300/300	TRA	M Feb 27, 2022 CE 1 2 3 4 5 6 (PE M	Frequency
10 dB/div		fset 9.17 dB 0.00 dBm	PNO: Fast IFGain:Low	#Atten: 30 d			r4 2.533	92 GHz 66 dBm	Auto Tune
.og 10.0 0.00 ////// 10.0	, h								Center Fre 2.510000000 GH
20.0 30.0 40.0		10 ²		5 ³			4	-18.39 dBm	Start Fre 2.470000000 GH
50.0 60.0 70.0		<u> </u>	,	Laura 1997 - 1999 - 199	,	4-14			Stop Fre 2.550000000 GH
tart 2.47 Res BW	100 kH	z	#VE	300 kHz	CINICIPAL	· · ·	7.667 ms	5000 GHz (1001 pts)	CF Ste 8.000000 MH <u>Auto</u> Ma
KR MODE TR	it str f		177 84 GHz	Y 1.607 dBn		FUNCTION WIDTH	H FUNCT	UN VALUE	
2 N 3 N 4 N 5 6	f f f	2.5	483 50 GHz 500 00 GHz 533 92 GHz	-50.023 dBn -49.656 dBn -46.966 dBn	1				FreqOffse 0 ⊦
7 8 9 10									
1				Ш				~	
SG	_					STAT	JS		



5.9 Conducted spurious emissions

5.9.1 Limits

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 conducted power limits. If the transmitter complies with the conducted 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.9.2 Test setup



5.9.3 Test procedure

- a) Test method: ANSI C63.10-2013 Section 6.10.4
- b) The EUT was set to non-hopping mode & hopping mode during the test.
- c) The transmitter output of EUT is connected to the spectrum analyzer.
- d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

5.9.4 Test results

Notes:

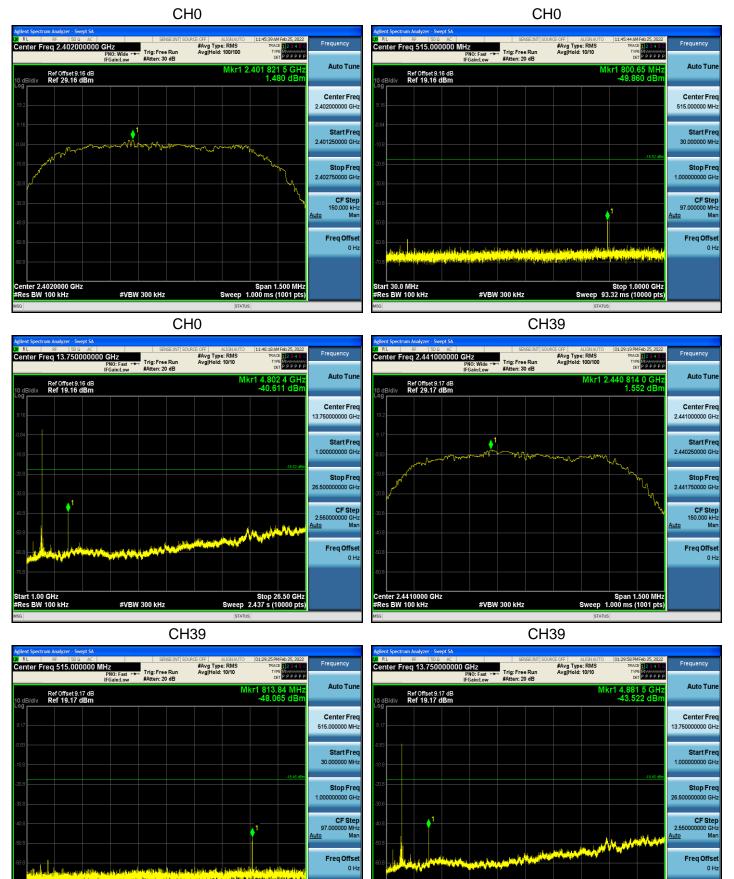
All modes of operation of the EUT were investigated, and only the worst-case results are reported. The worst-case mode: TX mode (8DPSK).



Stop 26.50 GHz 2.437 s (10000 ptc)

Sweep

Conducted spurious emissions -8DPSK mode



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1.00 GH;

#VBW 300 kHz

Stop 1.0000 GHz 93.32 ms (10000

Su

30.0 MHz BW 100 kHz

#VBW 300 kHz



Conducted spurious emissions -8DPSK mode



CH78



Frequency enter Freq 515.000000 MHz #Avg Type: RMS Avg|Hold: 10/10 Trig: Free Run #Atten: 20 dB Auto Tun Ref Offset 9.17 dB Ref 19.17 dBm 1 826.84 MF -49.051 dB Center Freq 515.000000 MH; Start Free 30.000000 MH Stop Freq 1.00000000 GH CF Step 97.000000 ML **↓**¹ Ma Freq Offse 0 H; Stop 1.0000 GHz Sweep 93.32 ms (10000 pts) start 30.0 MHz Res BW 100 kHz #VBW 300 kHz



5.10 Radiated spurious emission

5.10.1 Limits

§ 15.247 (d) 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 conducted power limits. If the transmitter complies with the conducted 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 § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.205(c)).

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

§ 15.209 Radiated emission limits; general requirements.

Note 1: the tighter limit applies at the band edges.

Note 2: the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

§ 15.35 (b) requirements:

When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§ 15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.



According to ANSI C63.10-2013, the tests shall be performed in the frequency range shown in the following table:

Frequency range of measurements for unlicensed wireless device

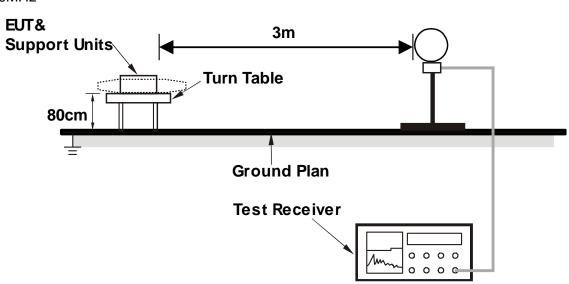
Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Frequency range of measurements for unlicensed wireless device with digital device

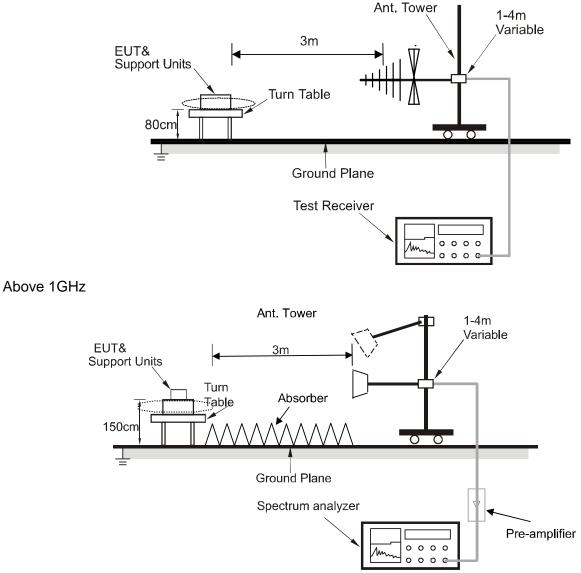
Highest frequency generated or used in the device or on which the device operates or tunes	Upper frequency range of measurement
Below 1.705 MHz	30 MHz
1.705 MHz to 108 MHz	1000 MHz
108 MHz to 500 MHz	2000 MHz
500 MHz to 1000 MHz	5000 MHz
	5th harmonic of the highest frequency or 40 GHz, whichever is lower



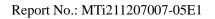
5.10.2 Test setup Below 30MHz



30MHz~1GHz



For the actual test configuration, please refer to the related item – Photographs of the test setup.





5.10.3 Test procedure

a) Test method: ANSI C63.10-2013 Section 6.3, 6.4, 6.5, 6.6, 6.10.

b) The EUT is placed on an on-conducting table 0.8 meters above the ground plane for measurement below 1GHz, 1.5 meters above the ground plane for measurement above 1GHz.

c) Emission blew 18 GHz were measured at a 3 meters test distance, above 18 GHz were measured at 1-meter test distance with the application of a distance correction factor

d) The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

KDB 558074 D01 15.247 Meas Guidance v05r02

The use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the unwanted emission limit is subject to an average field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period.

Test instrument setup

Frequency	Test receiver / Spectrum analyzer setting
9 kHz ~ 150 kHz	Quasi Peak / RBW: 200 Hz
150 kHz ~ 30 MHz	Quasi Peak / RBW: 9 kHz
30 MHz ~ 1 GHz	Quasi Peak / RBW: 120 kHz
Above 1 GHz	Peak / RBW: 1 MHz, VBW: 3MHz, Peak detector AVG / RBW: 1 MHz, VBW: 1/T, Peak detector

5.10.4 Test results

Notes:

The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported.

All modes of operation of the EUT were investigated, and only the worst-case results are reported.

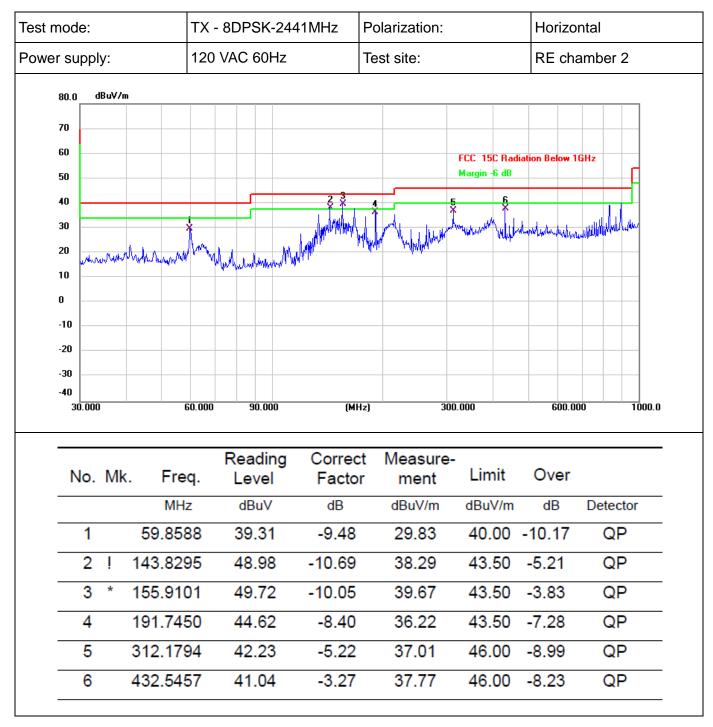
There were no emissions found below 30MHz within 20dB of the limit.

Calculation formula:

Measurement ($dB\mu V/m$) = Reading Level ($dB\mu V$) + Correct Factor (dB/m) Over (dB) = Measurement ($dB\mu V/m$) – Limit ($dB\mu V/m$)

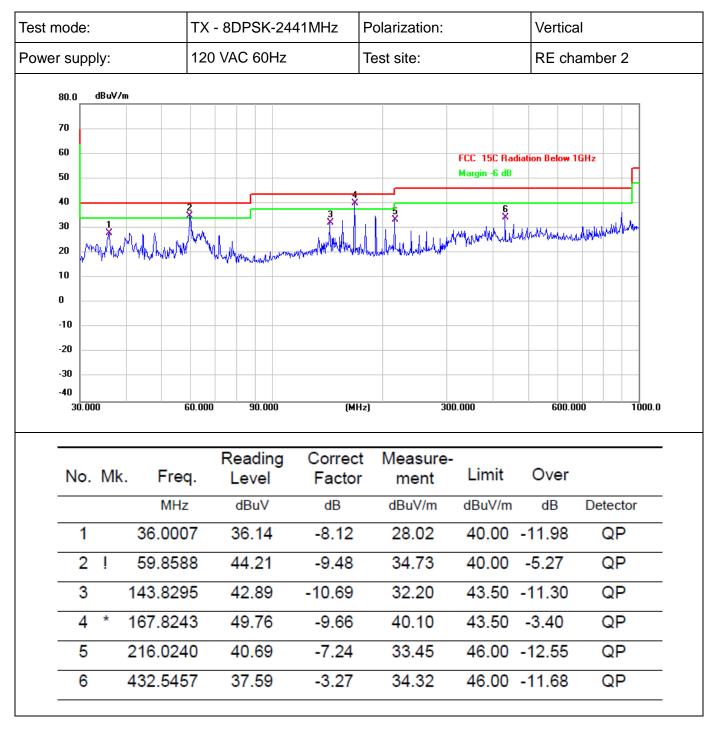


Radiated emissions between 30MHz – 1GHz





Radiated emissions between 30MHz – 1GHz





est mode:	TX 8DPSK – 2402	MHz Polaria	zation:	Horizor	ntal
ower supply:	DC 7.4V	Test s	ite:	RE cha	mber 2
86.9dBuV/m					
77				FCC ABOVE	_1G_PEAK
67	1 X				
57	2	5	Man have and an and a source of the	FCC ARQVE	J.G.AVG
47	Were down with the second standing	6 X			
37 huld month	*	×			
27					
17					
7					
-3					
-13					
-23 -33					
1000.000 2700.00	4400.00 6100.00 7800.	.00 (MHz) 1	1200.00 12900.00	14600.00 163	300.00 18000.0
1000.000 2700.00				14600.00 163	300.00 18000.0
		Correct Me	easure- nent Limit	14600.00 163 Over	300.00 18000.0
No. Mk. F	Reading	Correct Me Factor r	easure-	Over	300.00 18000.0
No. Mk. F	Reading Freq. Level MHz dBuV	Correct Me Factor r dB dE	easure- nent Limit 3uV/m dBuV/m	Over	
No. Mk. F	Reading Freq. Level MHz dBuV .000 57.92	Correct Me Factor r dB dE 1.52 5	easure- nent Limit ^{BuV/m} dBuV/m 9.44 74.00	Over dB	Detector
No. Mk. F 1 4804	Reading Freq. Level MHz dBuV .000 57.92 .000 48.13	Correct Me Factor r dB dE 1.52 5 1.52 4	easure- nent Limit ^{BuV/m} dBuV/m 9.44 74.00 9.65 54.00	Over dB -14.56	Detector pea k
No. Mk. F 1 4804 2 * 4804	Reading Freq. Level MHz dBuV .000 57.92 .000 48.13 .000 40.67	Correct Me Factor r dB dE 1.52 5 1.52 4 5.46 4	easure- nent Limit ^{BuV/m} dBuV/m 9.44 74.00 9.65 54.00 6.13 74.00	Over dB -14.56 -4.35	Detector peak AVG
No. Mk. F 1 4804 2 * 4804 3 7206	Reading Freq. Level MHz dBuV .000 57.92 .000 48.13 .000 40.67 .000 31.12	Correct Me Factor r dB dE 1.52 5 1.52 4 5.46 4 5.46 3	easure- nent Limit ^{BuV/m} dBuV/m 9.44 74.00 9.65 54.00 6.13 74.00 6.58 54.00	Over dB -14.56 -4.35 -27.87	Detector peak AVG peak



Test mode:	TX 8	3DPSK – 2402	2 MHz	Polarization:		Vertica	al
Power supply:	DC	7.4V		Test site:		RE cha	amber 2
86.9 dBuV/m	ŀ					·	
77						FCC ABOVE	E_1G_PEAK
67	1						
57	×				municipal	FCGABOXI	na Jan Allenn
47		yuma / mulaupon .	Wagewith and first in succession of	2			
37	1 water and a second	4 ×		ζ			
27 4							
17							
7							
-3							
-13							
-23							
-33							
	00.00 4400.00	Reading	о.оо (мн Correct	Measure-			300.00 18000.0(
	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
1000.000 27	. Freq. MHz	Reading Level dBuV	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over dB	300.00 18000.00 Detector
1000.000 27	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit dBuV/m	Over	
1000.000 27 No. Mk	. Freq. MHz	Reading Level dBuV	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over dB -15.53	Detector
1000.000 27 No. Mk	. Freq. MHz 4804.000	Reading Level dBuV 56.95	Correct Factor dB 1.52	Measure- ment dBuV/m 58.47	Limit dBuV/m 74.00 54.00	Over dB -15.53	Detector peak
1000.000 27 No. Mk	. Freq. MHz 4804.000 4804.000	Reading Level dBuV 56.95 48.65	Correct Factor dB 1.52 1.52	Measure- ment dBuV/m 58.47 50.17	Limit dBuV/m 74.00 54.00 74.00	Over dB -15.53 -3.83	Detector peak AVG
1000.000 27 No. Mk	. Freq. MHz 4804.000 4804.000 7206.000	Reading Level dBuV 56.95 48.65 40.18	Correct Factor dB 1.52 1.52 5.46	Measure- ment dBuV/m 58.47 50.17 45.64	Limit dBuV/m 74.00 54.00 74.00 54.00	Over dB -15.53 -3.83 -28.36	Detector peak AVG peak



est mode:		TX 8DF	PSK - 244	1 MHz	Polariza	ation:		Horizor	ntal
ower supply:		DC 7.4	V		Test site	e:		RE cha	amber 2
86.9 dBuV/	m								
77								FCC ABOVE	_1G_PEAK
67	1								
57		1 ¥			5		W. dr. d. m. Mr		- J.G. AMG-MM
47			when showing the start	and the second second second		A Martine Contraction	motorgentryster		
37	from	mun	4 ×		Š.				
27									
17									
7									
-3									
-13									
-23									
-33									
		R	eading	Correc	t Mea	sure-	Limit	14600.00 163 Over	300.00 18000
1000.000		Ri eq. [eading	Correc	t Mea	sure- ent		Over	300.00 18000 Detector
1000.000	k. Fr	Ri eq. L	eading _evel	Correc Facto	ct Mea or me dBu	sure- ent V/m	Limit dBuV/m	Over	
No. M	k. Fro	eq. L Hz	eading _evel dBuV	Correc Facto	ct Mea or me dBu 54.	sure- ent V/m 44	Limit dBuV/m	Over dB -19.56	Detector
No. M	k. Fro Mi 4882.0	Ri eq. L Hz 000 (eading _evel dBuV 52.76	Correc Facto dB 1.68	ct Mea or me dBu 54. 46.	sure- ent V/m 44 24	Limit dBuV/m 74.00 54.00	Over dB -19.56	Detector peak
No. M	k. Fro Mi 4882.0 4882.0	Ri eq. L Hz 000 4 000 4	eading _evel dBuV 52.76 14.56	Correc Facto dB 1.68 1.68	ct Mea or me dBu 54. 46.	sure- ent V/m 44 24	Limit dBuV/m 74.00 54.00 74.00	Over dB -19.56 -7.76	Detector peak AVG
1000.000 No. M 1 2 * 3	k. Fro MH 4882.0 4882.0 7323.0	Ri eq. L Hz 000 4 000 4 000 3	eading _evel dBuV 52.76 14.56 11.21	Correc Facto dB 1.68 1.68 5.45	ct Mea or me dBu 54. 46. 36.	sure- ent V/m .44 .24 .66	Limit dBuV/m 74.00 54.00 74.00 54.00	Over dB -19.56 -7.76 -27.34	Detector peak AVG peak



Test mode:	TX 8DF	PSK - 2441 MHz	Polarizatio	n:	Vertica	al
Power supply:	DC 7.4	V	Test site:		RE ch	amber 2
86.9 dBuV/m						
77					FCC ABOV	E_1G_PEAK
67						
57			5	Mary Mary Mary Mary Mary Mary Mary Mary	FCCABOX	Endland Million M
47	mustin	when when the second	6 X			
37	Jun marker -	*	^			
27						
17						
7						
-3						
-13						
-23						
-23 -33 1000.000 2700.	00 4400.00 6	100.00 7800.00	(MHz) 11200.0	00 12900.00	14600.00 11	6300.00 18000.0 (
-33	00 4400.00 6	100.00 7800.00	(MHz) 11200.0	00 12900.00	14600.00 10	6300.00 18000.0(
-33 1000.000 2700.		100.00 7800.00 eading Corre		·e-		6300.00 18000.0(
-33	Re		ect Measur		14600.00 10 Over	6300.00 18000.0(
-33 1000.000 2700.	Re Freq. L	eading Corre	ect Measur	re- Limit	Over	6300.00 18000.0(
-33 1000.000 2700. No. Mk.	Re Freq. L MHz o	eading Corre evel Fact	ect Measur or ment dBuV/m	re- Limit dBuV/m	Over	
-33 1000.000 2700. No. Mk. 1 48	Re Freq. L MHz 0 882.000 5	eading Corre evel Fact dBuV dB	ect Measur or ment dBuV/m 8 56.09	re- Limit dBuV/m	Over dB	Detector
-33 1000.000 2700. No. Mk. 1 48 2 * 48	Re Freq. L MHz 0 882.000 5 882.000 4	eading Corre evel Fact dBuV dB 64.41 1.66	ect Measur or ment dBuV/m 8 56.09 8 48.70	re- Limit dBuV/m 74.00 54.00	Over dB -17.91	Detector peak
-33 1000.000 2700. No. Mk. 1 48 2 * 48 3 73	Re Freq. L MHz 0 882.000 5 882.000 4 823.000 4	eading Corre evel Fact dBuV dB 64.41 1.66	ect Measur or ment dBuV/m 8 56.09 8 48.70 5 45.77	re- Limit dBuV/m 74.00 54.00 74.00	Over dB -17.91 -5.30	Detector peak AVG
-33 1000.000 2700. No. Mk. 1 48 2 * 48 3 73 4 73	Re Freq. L MHz 0 382.000 5 382.000 4 323.000 3	eading Corre evel Fact dBuV dB 54.41 1.65 7.02 1.65 0.32 5.45	ect Measur or ment dBuV/m 8 56.09 8 48.70 5 45.77 5 35.48	re- Limit dBuV/m 74.00 54.00 74.00 54.00	Over dB -17.91 -5.30 -28.23	Detector peak AVG peak



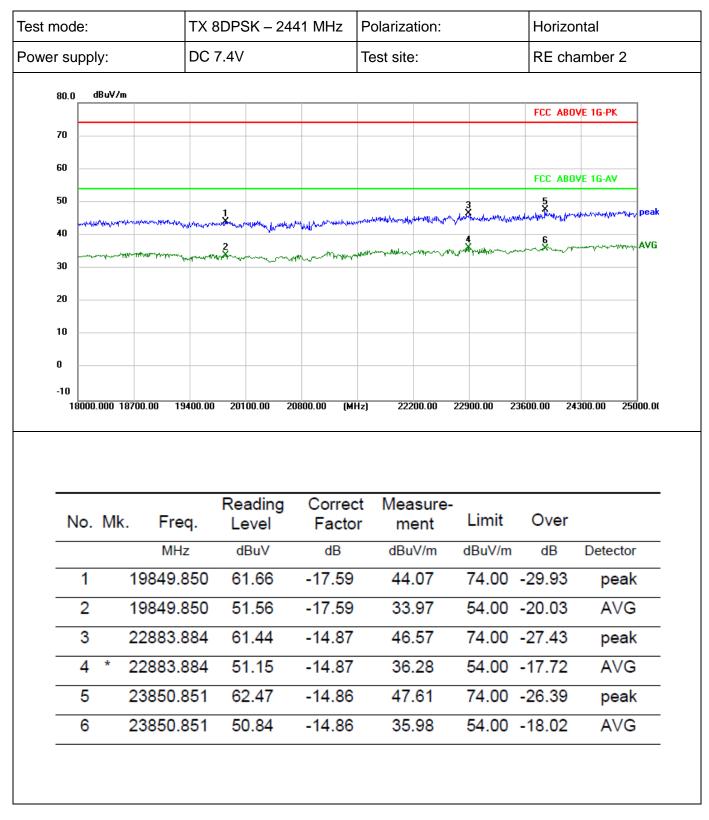
Fest mode:		TX 8D	PSK – 248	80 MHz	Polariza	ation:		Horizo	ntal
Power supply:		DC 7.4	١V		Test site	e:		RE cha	amber 2
86.9 dBuV/	m								
77								FCC ABOVE	_1G_PEAK
67									
57		1						FCCARQXE	int Guy Mann
47		2		- topological and the same	-1-15	and the second and the second	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·	
37	-	and and the second s	×		×				
27									
17									
7									
-3									
-13									
-23									
1000.000	2700.00 4	400.00	6100.00 78	00.00 (M	Hz) 11	200.00	12900.00 1	4600.00 16	300.00 18000.0
					-				500.00 10000.0
	. F w		Reading	Corre	ct Mea	asure-			
No. M		eq.	Level	Facto	ct Mea or m	ent	Limit	Over	
No. MI	MH	eq. Iz	Level dBuV	Facto dB	ct Mea or m dBu	ent JV/m	Limit dBuV/m	Over dB	Detector
1	м⊦ 4960.0	eq. Iz)00	Level dBuV 51.69	Facto dB 1.83	or m dBi 53	ent uV/m 5.52	Limit dBuV/m 74.00	Over dB -20.48	Detector peak
No. MI	MH	eq. Iz)00	Level dBuV	Facto dB	or m dBi 53	ent JV/m	Limit dBuV/m 74.00	Over dB	Detector
1	м⊦ 4960.0	eq. Iz 000 000	Level dBuV 51.69	Facto dB 1.83	or m dBu 53 46	ent uV/m 5.52	Limit dBuV/m 74.00 54.00	Over dB -20.48	Detector peak
1 2 *	M⊢ 4960.0 4960.0	eq. Hz 000 000	Level dBuV 51.69 44.49	Facto dB 1.83 1.83	or m dBi 53 46 45	ent uV/m 5.52 5.32	Limit dBuV/m 74.00 54.00 74.00	Over dB -20.48 -7.68	Detector peak AVG
1 2 * 3	M⊢ 4960.0 4960.0 7440.0	eq. Hz 000 000 000 000	Level dBuV 51.69 44.49 39.95	Facto dB 1.83 1.83 5.43	et Mea or m 53 46 45 39	ent JV/m 5.52 5.32 5.38	Limit dBuV/m 74.00 54.00 74.00 54.00	Over dB -20.48 -7.68 -28.62	Detector peak AVG peak



Test mode:	TX 8DPSK – 24	480 MHz	Polarization:		Vertic	cal
Power supply:	DC 7.4V	-	Test site:		RE c	hamber 2
86.9 dBuV/m	·	·			·	
77					FCC ABO	VE_16_PEAK
67						
57	1 ×				FCC ABO	Y.E. J. Grund Malander
47	3 Alexandres	3 manunda	- Sutrain manufacture	an a	····	
37	have a second	4	6 ×			
27						
17						
7						
-3						
-13						
-23						
25						
-33	4400.00 6100.00	7800.00 (MH;	z) 11200.00	12900.00	14600.00	16300.00 18000.00
-33	4400.00 6100.00	7800.00 (MHa	z) 11200.00	12900.00	14600.00	16300.00 18000.00
-33				12900.00	14600.00	16300.00 18000.00
-33 1000.000 2700.00	Reading	^{7800.00} (мн: Correct Factor	^{z)} 11200.00 Measure- ment	12900.00 Limit	14600.00 Over	16300.00 18000.00
-33 1000.000 2700.00 No. Mk. Fr	Reading	Correct	Measure-			16300.00 18000.00 Detector
-33 1000.000 2700.00 No. Mk. Fr	Reading eq. Level Hz dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
-33 1000.000 2700.00 No. Mk. Fr Mi 1 4960.0	Reading eq. Level Hz dBuV 000 54.12	Correct Factor dB 1.83	Measure- ment dBuV/m 55.95	Limit dBuV/m 74.00	Over dB -18.05	Detector peak
-33 1000.000 2700.00 No. Mk. Fr Mi 1 4960.0 2 * 4960.0	Reading eq. Level Hz dBuV 000 54.12 000 45.75	Correct Factor dB 1.83 1.83	Measure- ment dBuV/m 55.95 47.58	Limit dBuV/m 74.00 54.00	Over dB -18.05 -6.42	Detector peak AVG
-33 1000.000 2700.00 No. Mk. Fr Mk 1 4960.0 2 * 4960.0 3 7440.0	Reading Level Hz dBuV 000 54.12 000 45.75 000 40.49	Correct Factor dB 1.83 1.83 5.43	Measure- ment dBuV/m 55.95 47.58 45.92	Limit dBuV/m 74.00 54.00 74.00	Over dB -18.05 -6.42 -28.08	Detector peak AVG peak
-33 1000.000 2700.00 No. Mk. Fr Mi 1 4960.0 2 * 4960.0	Reading Level Hz dBuV 000 54.12 000 45.75 000 40.49	Correct Factor dB 1.83 1.83	Measure- ment dBuV/m 55.95 47.58	Limit dBuV/m 74.00 54.00 74.00	Over dB -18.05 -6.42	Detector peak AVG
-33 1000.000 2700.00 No. Mk. Fr Mk 1 4960.0 2 * 4960.0 3 7440.0	Reading Level Hz dBuV 000 54.12 000 45.75 000 40.49 000 32.53	Correct Factor dB 1.83 1.83 5.43	Measure- ment dBuV/m 55.95 47.58 45.92	Limit dBuV/m 74.00 54.00 74.00 54.00	Over dB -18.05 -6.42 -28.08	Detector peak AVG peak



Radiated emissions above 18 GHz

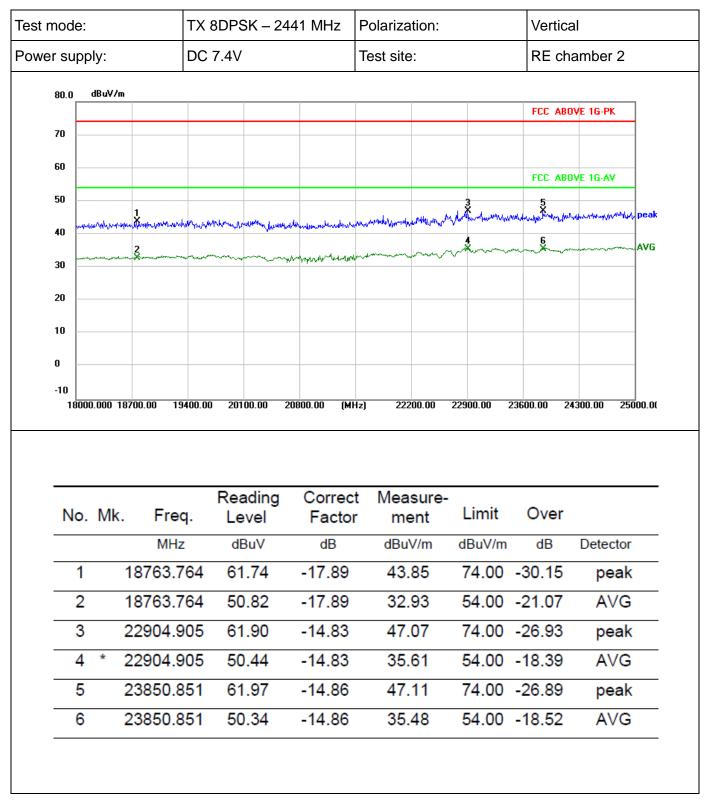


Notes:

The test distance is 1m.

The distance factor is -9.5dB, which has been in compensation during the testing.



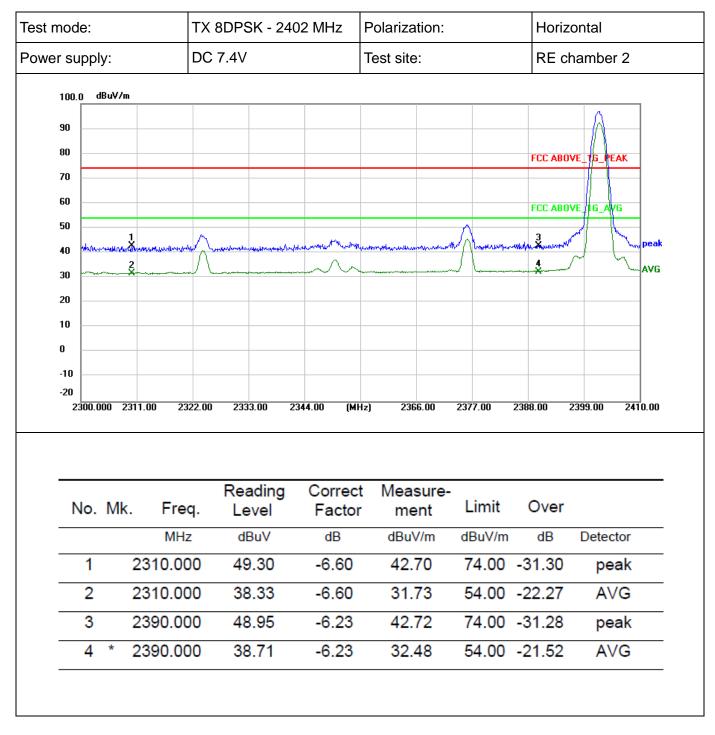


Notes:

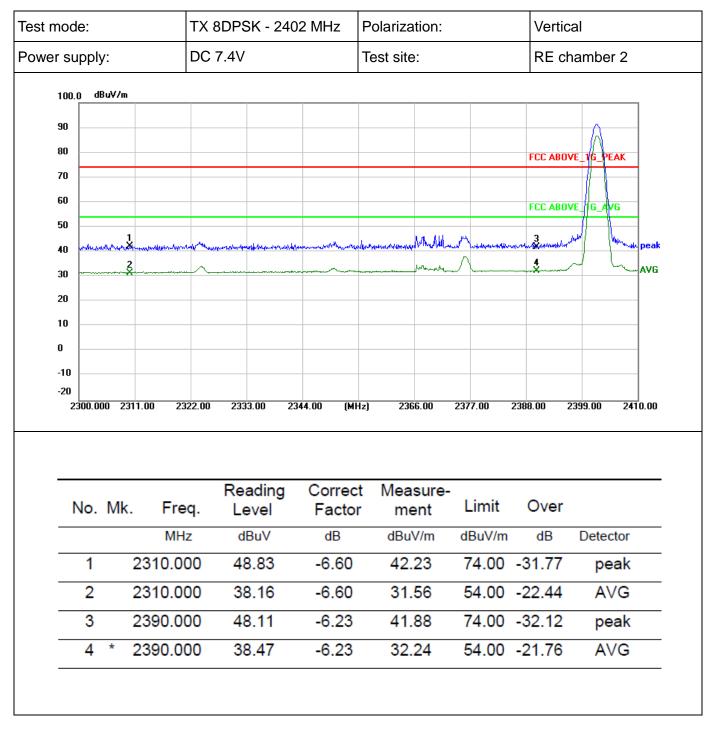
The test distance is 1m.

The distance factor is -9.5dB, which has been in compensation during the testing.

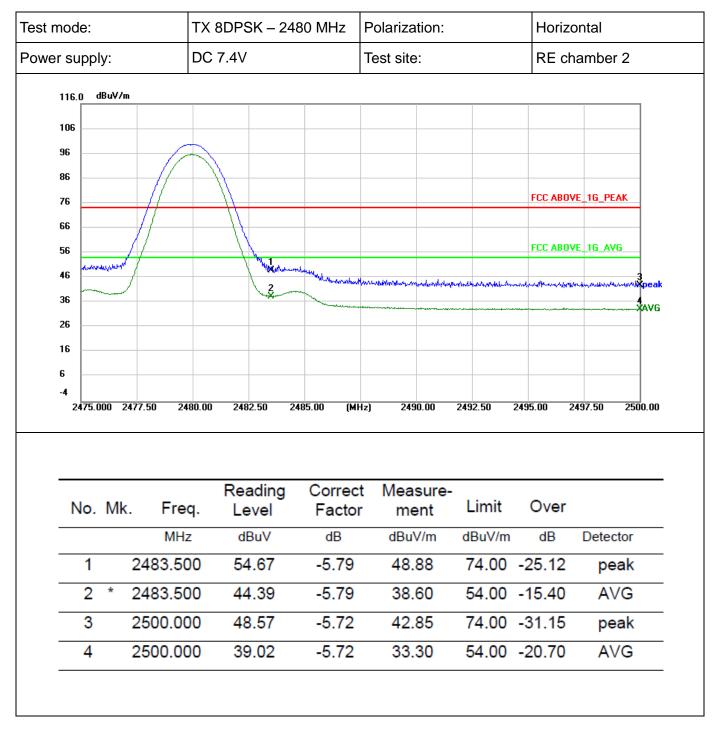




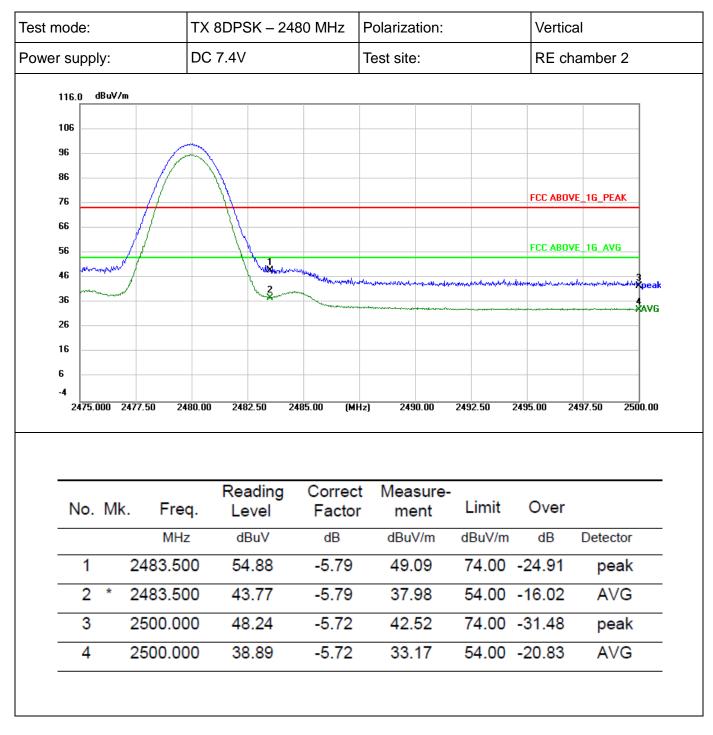














Photographs of the Test Setup

See the appendix – Test Setup Photos.

Photographs of the EUT

See the appendix - EUT Photos.

----End of Report----