

TEST REPORT

Report No.:	BCTC2208002179E	
Applicant:	Ningbo Suge Hemu Trade Co.,Ltd.	
Product Name:	TRANSISTOR MEGAPHONE	
Model/Type reference:	66SUR	/
Tested Date:	2022-08-11 to 2022-08-17	
Issued Date:	2022-08-17	
She	nzhen BCTC Testing Co., Ltd.	
No.: BCTC/RF-EMC-007	Page: 1 of 65	dition: A.5



FCC ID: 2A8BP-66SUR

Product Name:	TRANSISTOR MEGAPHONE
Trademark:	MyMealivos
Model/Type reference:	66SUR 55SUR
Prepared For:	Ningbo Suge Hemu Trade Co.,Ltd.
Address:	Room 106, 1st Floor, Building 2, 58 Dagang Middle Road, Xinqi Sub-district, Beilun District, Ningbo,Zhejiang, China
Manufacturer:	Ningbo Suge Hemu Trade Co.,Ltd.
Address:	Room 106, 1st Floor, Building 2, 58 Dagang Middle Road, Xinqi Sub-district, Beilun District, Ningbo,Zhejiang, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2022-08-11
Sample tested Date:	2022-08-11 to 2022-08-17
Issue Date:	2022-08-17
Report No.:	BCTC2208002179E
Test Standards:	FCC Part15.247 ANSI C63.10-2013
Test Results:	PASS
Remark:	This is Bluetooth Classic radio test report.

Tested by:

Vave

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

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(Note: N/A means not applicable)

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1. Version

Report No.	Issue Date	Description	Approved
BCTC2208002179E	2022-08-17	Original	Valid





2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Conducted emission AC power port	§15.207	N/A ¹
2	Conducted peak output power for FHSS	§15.247(b)(1)	PASS
3	20dB Occupied bandwidth	§1 5.247(a)(1)	PASS
4	Number of hoppingfrequencies	§15.247(a)(1)(iii)	PASS
5	Dwell Time	§15.247(a)(1)(iii)	PASS
6	Spurious RF conducted emissions	§15.247(d)	PASS
7	Band edge	§15.247(d)	PASS
8	Spurious radiated emissions for transmitter	§15.247(d) & §15.209 & §15.205	PASS
9	Antenna Requirement	15.203	PASS

Note1: The EUT is powered by the DC only, the test item is not applicable.

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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



4. Product Information And Test Setup

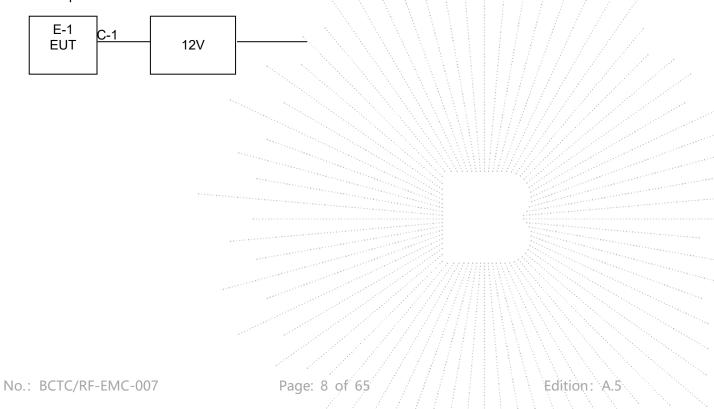
4.1 Product Information

66SUR 55SUR
All the model are the same circuit and RF module, except model names.
N/A
N/A
Bluetooth: 2402-2480MHz
Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK
79CH
PCB antenna
-0.58dBi
DC 12V

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	TRANSISTOR MEGAPHONE	MyMealivos	66SUR	55SUR	EUT

ltem	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	N/A	DC 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.

4.4 Channel List

СН	Frequency (MHz)	СН	Frequency (MHz)	СН	Frequency (MHz)	СН	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	79	1



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.

Test Mode	Test mode	Low channel	Middle channel	High channel		
1	Transmitting(GFSK)	2402MHz	2441MHz	2480MHz		
2	Transmitting(Pi/4DQPSK)	2402MHz	2441MHz	2480MHz		
3	Transmitting(8DPSK)	2402MHz	2441MHz	2480MHz		
4	Transmitting (Radiated emission)					

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		CMD	
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters	DEF	DEF	DEF



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, Zhancheng, 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 24, 2022	May 23, 2023
Power Sensor (AV)	Keysight	E9300A	/	May 24, 2022	May 23, 2023
Signal Analyzer 20kHz-26.5G Hz	Keysight	N9020A	MY49100060	May 24, 2022	May 23, 2023
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40		May 24, 2022	May 23, 2023

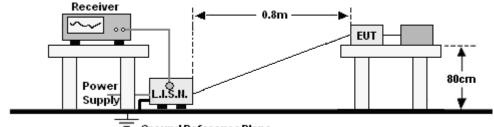


Radiated Emissions Test (966 Chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
Receiver	R&S	ESRP	101154	May 24, 2022	May 23, 2023
Amplifier	SKET	LAPA_01G18 G-45dB	١	May 24, 2022	May 23, 2023
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 24, 2022	May 23, 2023
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 26, 2022	May 25, 2023
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 06, 2022	Jun. 05, 2023
Horn Antenn (18GHz-40GHz)	Schwarzbeck	BBHA9170	00822	Jun. 06, 2022	Jun. 05, 2023
Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 26, 2022	May 25, 2023
Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	May 26, 2022	May 25, 2023
RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-000 8	May 26, 2022	May 25, 2023
RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 26, 2022	May 25, 2023
RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	May 26, 2022	May 25, 2023
Power Metter	Keysight	E4419	V N	May 26, 2022	May 25, 2023
Power Sensor (AV)	Keysight	E9300A		May 26, 2022	May 25, 2023
Signal Analyzer 20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 26, 2022	May 25, 2023
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40		May 26, 2022	May 25, 2023
Software	Frad	EZ-EMC	FA-03A2 RE		$\langle / / \Lambda / \rangle$



6. Conducted Emissions

6.1 Block Diagram Of Test Setup



Ground Reference Plane

6.2 Limit

	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.

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

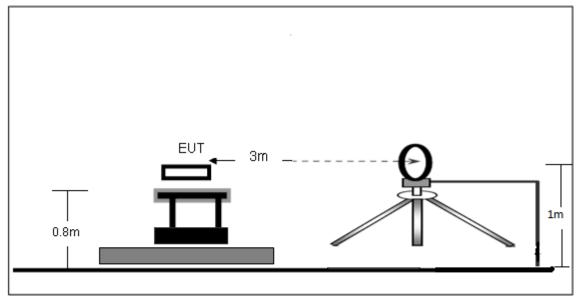
The EUT is powered by the DC only, the test item is not applicable.



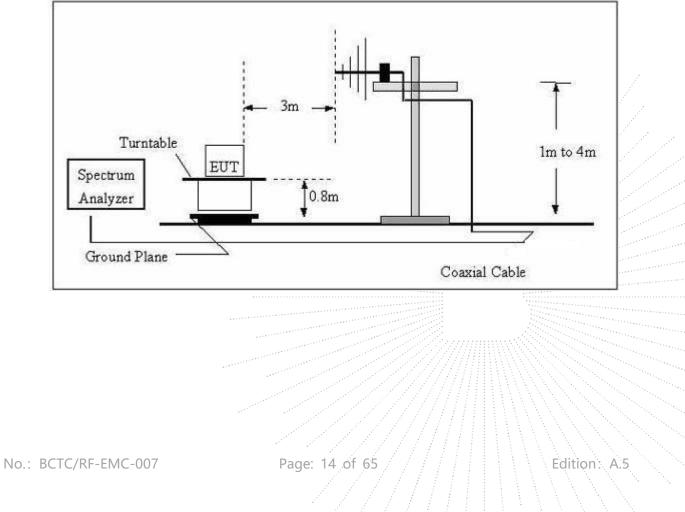
7. Radiated emissions

7.1 Block Diagram Of Test Setup

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

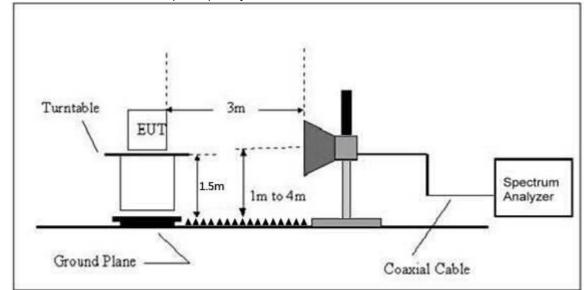


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





(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)	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).



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.

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.

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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 middle 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 °CRelative Humidity:54%				
Pressure:	101KPa	Teet Voltage :	DC 12V	
Test Mode:	Mode 4	Test Voltage :		

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.

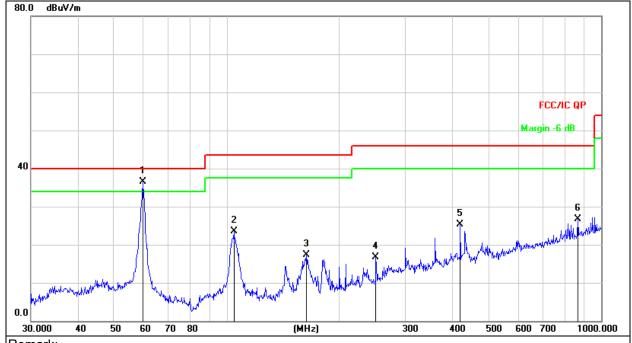
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Between 30MHZ – 1GHZ				
Temperature:	26 ℃	Relative Humidity:	54%	
Pressure:	101KPa	Phase :	Horizontal	
Test Mode:	Mode 4	Test Voltage:	DC 12V	





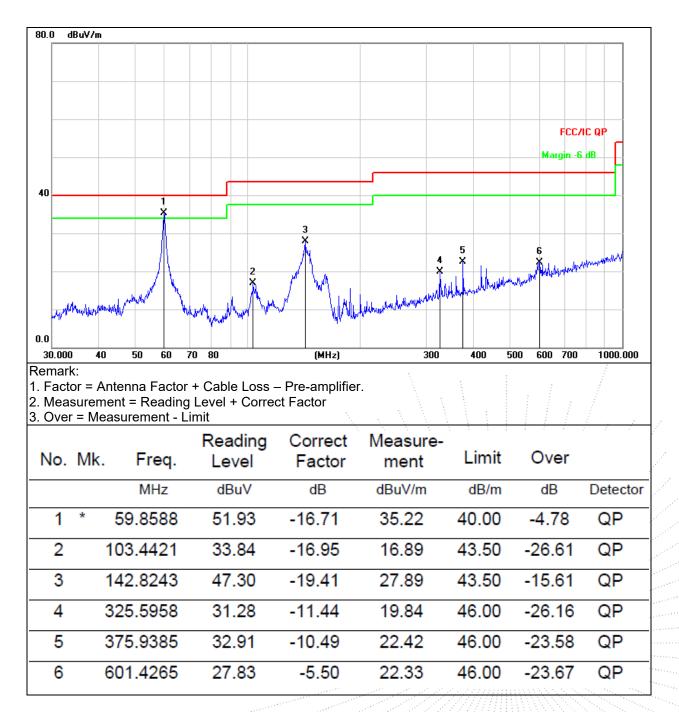
Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
 Measurement = Reading Level + Correct Factor
 Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	59.6493	53.10	-16.67	36.43	40.00	-3.57	QP
2		104.5361	40.49	-17.01	23.48	43.50	-20.02	QP
3		163.1818	36.18	-18.83	17.35	43.50	-26.15	QP
4		250.3012	30.94	-14.18	16.76	46.00	-29.24	QP
5		420.5803	35.00	-9.73	25.27	46.00	-20.73	QP
6	1	866.0879	28.18	-1.45	26.73	46.00	-19.27	QP



Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 4	Test Voltage:	DC 12V





	Frequency	Reading	Correct	Measure-m	Limits	Over	
Polar	riequency	Level	Factor	ent	Liiiits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	Туре
			GFSK Low ch	annel			
V	4804.00	52.80	-0.43	52.37	74.00	-21.63	PK
V	4804.00	41.89	-0.43	41.46	54.00	-12.54	AV
V	7206.00	43.73	8.31	52.04	74.00	-21.96	PK
V	7206.00	32.90	8.31	41.21	54.00	-12.79	AV
Н	4804.00	49.07	-0.43	48.64	74.00	-25.36	PK
Н	4804.00	39.76	-0.43	39.33	54.00	-14.67	AV
Н	7206.00	41.78	8.31	50.09	74.00	-23.91	PK
Н	7206.00	34.10	8.31	42.41	54.00	-11.59	AV
		G	FSK Middle c	hannel			
V	4882.00	51.16	-0.38	50.78	74.00	-23.22	PK
V	4882.00	43.33	-0.38	42.95	54.00	-11.05	AV
V	7323.00	44.01	8.83	52.84	74.00	-21.16	PK
V	7323.00	34.58	8.83	43.41	54.00	-10.59	AV
Н	4882.00	48.62	-0.38	48.24	74.00	-25.76	PK
Н	4882.00	39.21	-0.38	38.83	54.00	-15.17	AV
Н	7323.00	41.44	8.83	50.27	74.00	-23.73	PK
Н	7323.00	33.51	8.83	42.34	54.00	-11.66	AV
			GFSK High ch	annel			
V	4960.00	53.14	-0.32	52.82	74.00	-21.18	PK
V	4960.00	45.04	-0.32	44.72	54.00	-9.28	AV
V	7440.00	44.98	9.35	54.33	74.00	-19.67	PK
V	7440.00	34.64	9.35	43.99	54.00	-10.01	AV
Н	4960.00	51.97	-0.32	51.65	74.00	-22.35	PK
Н	4960.00	42.50	-0.32	42.18	54.00	-11.82	AV
Н	7440.00	42.74	9.35	52.09	74.00	-21.91	PK
Н	7440.00	35.68	9.35	45.03	54.00	-8.97	AV

Between 1GHz – 25GHz

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.

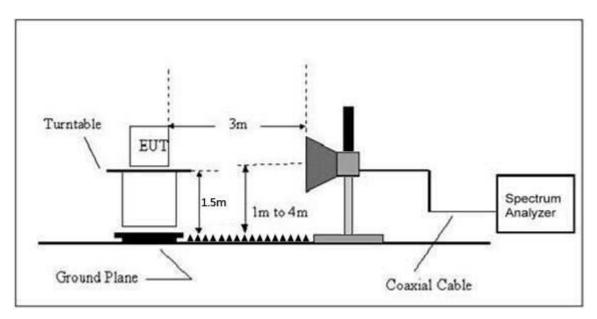
5.All the Modulation are test, the worst mode is GFSK, the data recording in the report.



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
¹ 0.495-0.505	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			



Limits Of Radiated Emission Measurement (Above 1000MHz)

	Limit (dBuV/m) (at 3M)				
Frequency (MHz)	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 Highest channel. Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

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.

No.: BCTC/RF-EMC-007



8.5 Test Result

Test mode	Polar (H/V)	Frequency (MHz)	Reading Level	Level Factor		Limits (dBuV/m)		Result					
	(11/1)	(11112)	(dBuV/m)	(dB)	РК	РК	AV						
		I	Low	Channel 2	402MHz								
	Н	2390.00	52.08	-6.70	45.38	74.00	54.00	PASS					
	Н	2400.00	56.27	-6.71	49.56	74.00	54.00	PASS					
	V	2390.00	51.80	-6.70	45.10	74.00	54.00	PASS					
GFSK	V	2400.00	52.48	-6.71	45.77	74.00	54.00	PASS					
Gran		High Channel 2480MHz											
	Н	2483.50	51.19	-6.79	44.40	74.00	54.00	PASS					
	Н	2500.00	47.25	-6.81	40.44	74.00	54.00	PASS					
	V	2483.50	50.23	-6.79	43.44	74.00	54.00	PASS					
	V	2500.00	45.44	-6.81	38.63	74.00	54.00	PASS					
	Low Channel 2402MHz												
	Н	2390.00	52.89	-6.70	46.19	74.00	54.00	PASS					
	Н	2400.00	56.73	-6.71	50.02	74.00	54.00	PASS					
	V	2390.00	53.11	-6.70	46.41	74.00	54.00	PASS					
	V	2400.00	53.11	-6.71	46.40	74.00	54.00	PASS					
π/4DQPSK	High Channel 2480MHz												
	Н	2483.50	52.51	-6.79	45.72	74.00	54.00	PASS					
	Н	2500.00	49.49	-6.81	42.68	74.00	54.00	PASS					
	V	2483.50	53.56	-6.79	46.77	74.00	54.00	PASS					
	V	2500.00	48.77	-6.81	41.96	74.00	54.00	PASS					
		L	Low	Channel 2	402MHz	:	/						
	Н	2390.00	53.64	-6.70	46.94	74.00	54.00	PASS					
	Н	2400.00	57.62	· -6.71 ·	50.91	74.00	54.00	PASS					
	V	2390.00	53.66	-6.70	46.96	74.00	54.00	PASS					
	V	2400.00	55.11	-6.71	48.40	74.00	54.00	PASS					
8DPSK		•	High	n Channel 2	480MHz								
	Н	2483.50	53.34	-6.79	46.55	74.00	54.00	PASS					
	Н	2500.00	49.09	-6.81	42.28	74.00	54.00	PASS					
	V	2483.50	52.09	-6.79	45.30	74.00	54.00	PASS					
	V	2500.00	48.89	-6.81	42.08	74.00	54.00	PASS					
Remark:	•												

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.



9. Conducted Emission

9.1 Block Diagram Of Test Setup

EUT	SPECTRUM
	ANALYZER

9.2 Limit

Regulation 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))

9.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

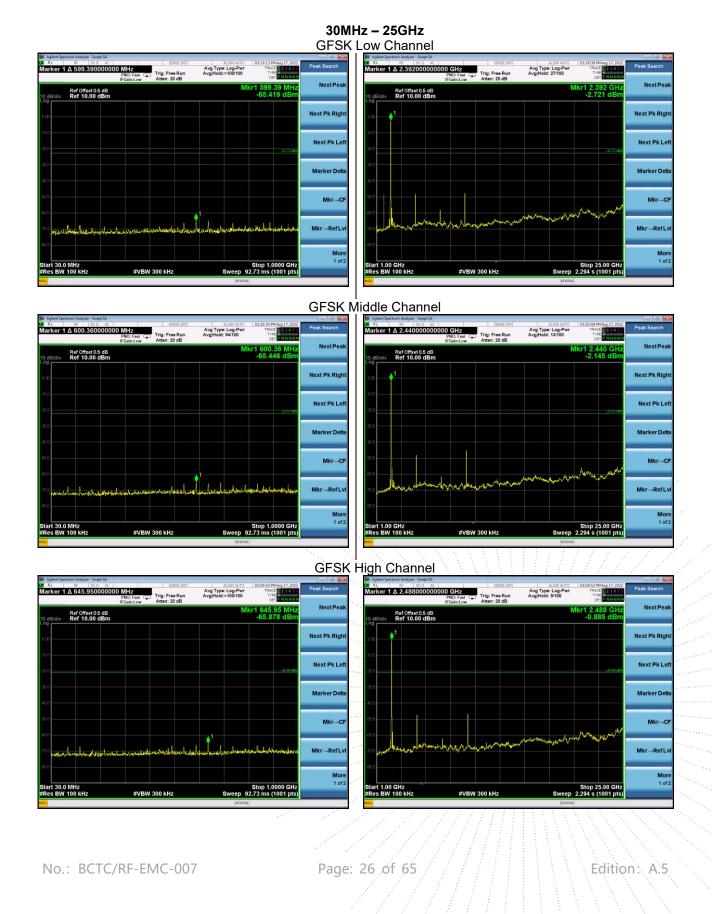
2. Set the spectrum analyzer:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

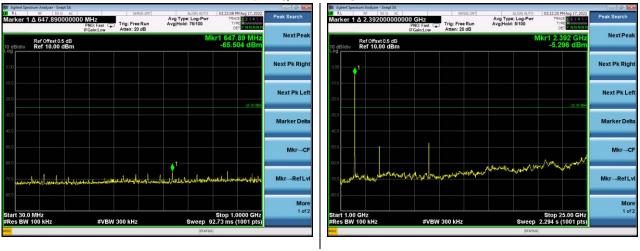


9.4 Test Result

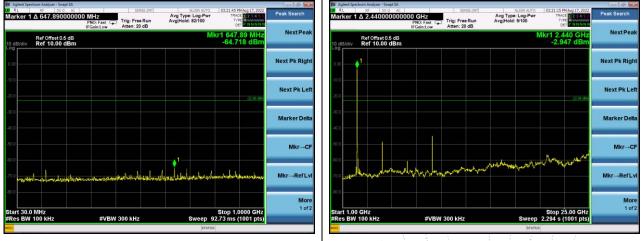


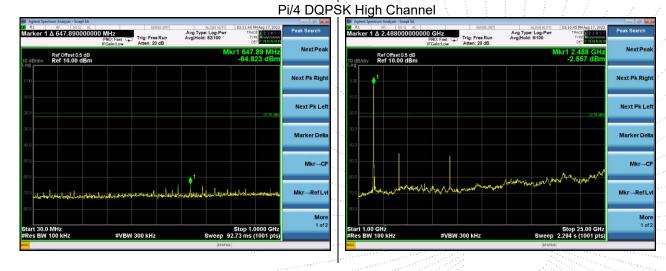


Pi/4 DQPSK Low Channel



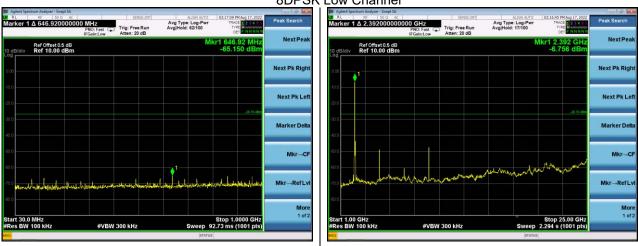




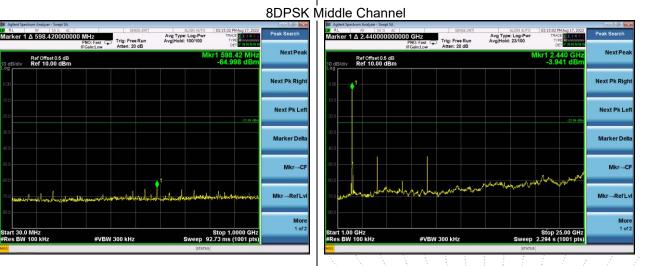


No.: BCTC/RF-EMC-007

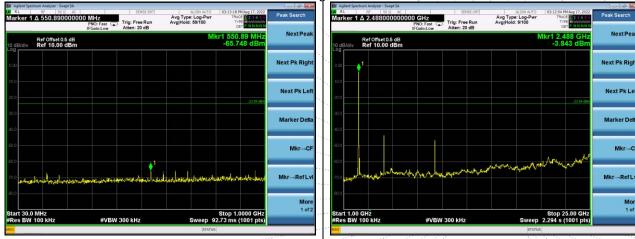




8DPSK Low Channel



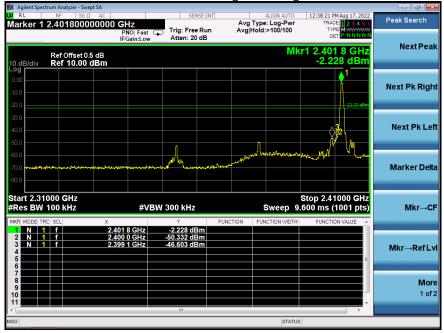
8DPSK High Channel



Edition: A.5

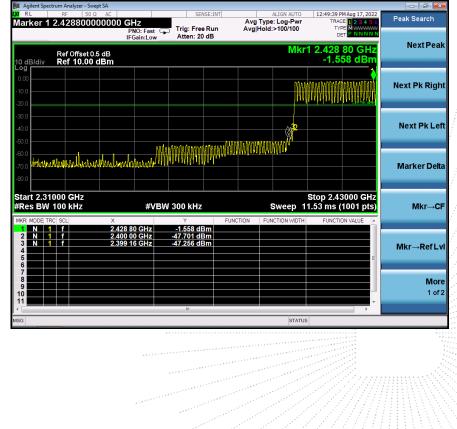
Mor 1 of





GFSK Transmitting Band edge-left side

GFSK Hopping Band edge-left side

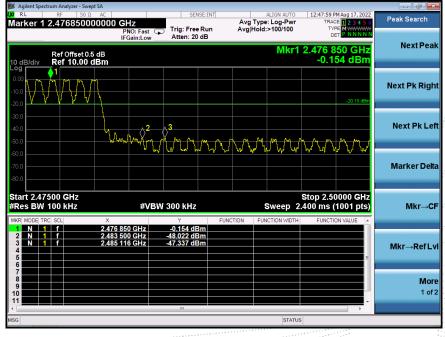




📕 Agilent Spec											- C ×
Marker 1	^{RF} 2.480	50 Ω 15600	AC	PNO: Fast				ALIGN AUTO Type: Log-Pwr Hold:>100/100	TRA T)	PM Aug 17, 2022 CE 1 2 3 4 5 6 PE M WWWWWW FT P N N N N N	Peak Search
10 dB/div		ffset 0.5 I 0.00 d		IFGain:Low	Atten:	20 dB		Mkr	1 2.480		NextPeak
-10.0										-20.08 dBm	Next Pk Right
-30.0 -40.0 -50.0		<i>ر</i>	M^2	3							Next Pk Left
60.0 -70.0 -80.0					and and a second se	~~~~~~	~~~^~^~	~mm,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hour front of the	Marker Delta
Start 2.47 FRes BW	100 kl		X		300 kH Y	F	JNCTION	Sweep	2.133 ms	0000 GHz (1001 pts)	Mkr→CF
1 N 1 2 N 1 3 N 1 4 5	f		2.483	156 GHz 500 GHz 996 GHz	-0.078 -43.663 -57.732	dBm				======================================	Mkr→RefLv
7 8 9 10 11											More 1 of 2
4 ISG								STAT	s	F	

GFSK Transmitting Band edge-right side

GFSK Hopping Band edge-right side



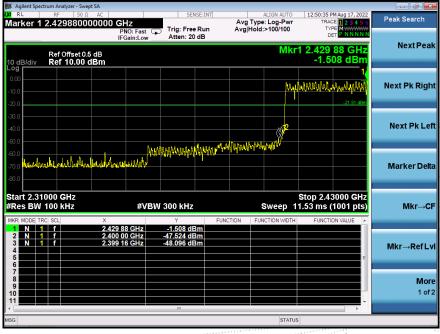






Pi/4 DQPSK Transmitting Band edge-left side

Pi/4 DQPSK Hopping Band edge-left side



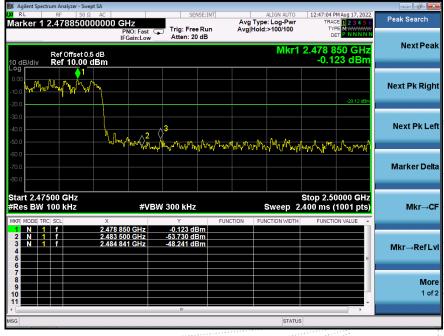
No.: BCTC/RF-EMC-007



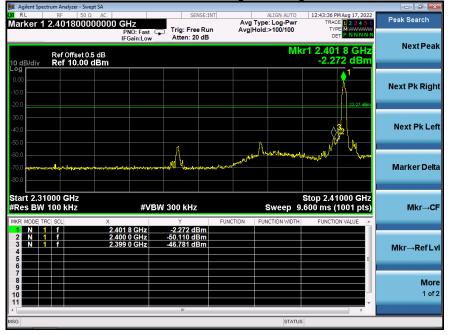
	trum Analyzer - Si							
Marker 1	RF 50 2.479848	000000 G		SENSE	Avg	ALIGN AUTO Type: Log-Pwr Hold:>100/100	12:41:02 PM Aug 17, 20 TRACE 1 2 3 4 TYPE M	5 6 Peak Search
10 dB/div	Ref Offset	IF 0.5 dB	NO: Fast Gain:Low	Atten: 20 dE		-	2.479 848 GH -0.062 dB	NN NextPeak
Log 0.00 -10.0 -20.0							-20.06 d	Next Pk Right
-30.0 -40.0 -50.0		and 2	3					Next Pk Left
-60.0 -70.0 -80.0		<u> </u>	hand and an and a second	a manana a a a a a a a a a a a a a a a a		non and	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Marker Delta
Start 2.47 #Res BW	100 kHz	X	#VBV	V 300 kHz Y	FUNCTION		Stop 2.50000 GF .133 ms (1001 pt FUNCTION VALUE	
1 N 1 2 N 1 3 N 1 4 5 6	f f f	2.479 84 2.483 50 2.485 56	0 GHz	-0.062 dBm -43.663 dBm -56.939 dBm				Mkr→RefLvl
7 8 9 10 11								More 1 of 2
MSG				m		STATUS	•	

Pi/4 DQPSK Transmitting Band edge-right side

Pi/4 DQPSK Hopping Band edge-right side

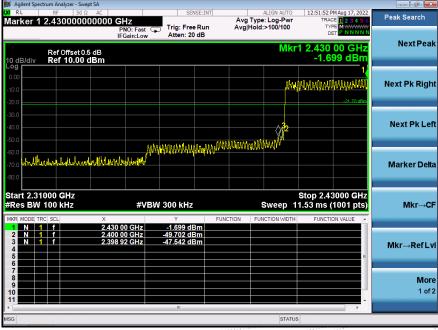






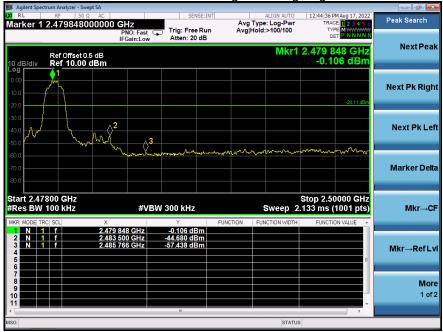
8DPSK Transmitting Band edge-left side

8DPSK Hopping Band edge-left side



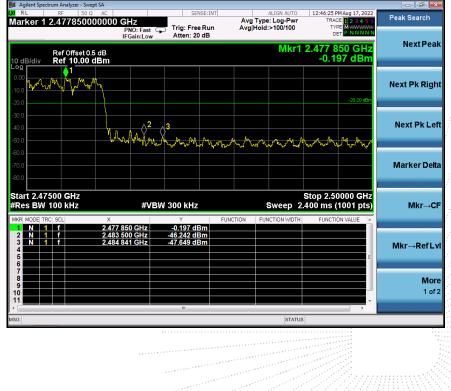
No.: BCTC/RF-EMC-007





8DPSK Transmitting Band edge-right side

8DPSK Hopping Band edge-right side





10. 20 dB Bandwidth

10.1 Block Diagram Of Test Setup



10.2 Limit

N/A

10.3 Test procedure

- 1. Set RBW = 30kHz.
- 2. Set the video bandwidth (VBW) \ge 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 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	AC120V/60Hz

Modulation	Test Channel	Bandwidth(MHz)
GFSK	Low	0.874
GFSK	Middle	0.877
GFSK	High	0.873
Pi/4 DQPSK	Low	1.250
Pi/4 DQPSK	Middle	1.252
Pi/4 DQPSK	High	1.253
8DPSK	Low	1.216
8DPSK	Middle	1.218
8DPSK	High	1.219

Test plots GFSK Low Channel







GFSK Middle Channel

GFSK High Channel







Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel







Pi/4 DQPSK High Channel

8DPSK Low Channel

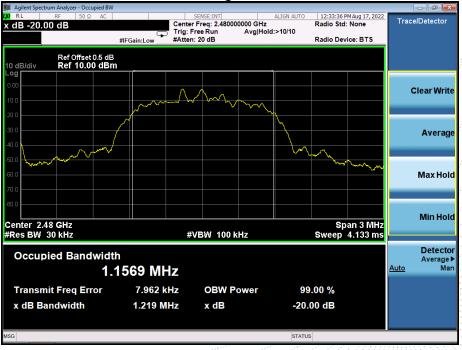




Image: Second State Image: Second State<			8043	n ivilaal	e Channe		
enter Freq 2.441000000 GHz FigsinLow Genter Freq: 2.44000000 GHz Trig: Free Run Avg Hold:>10/10 Radio Device: BTS Radio Device: BTS Radio Device: BTS Clear Write Average Max Hold Min Hold Average Max Hold Min Hold Average Max Hold Clear Write Detector Min Hold Average Max Hold Min Hold Average Max Hold Max Hold Max Hold Max Hold Max Hold Min Hold Average Max Hold Max Hold Min Hold Average Max Hold Max Hold Min Hold Max Hold Min Hold Average Max Hold Min Hold Max Hold Min Hold Max Hold Min Hold Max Hold Max Hold Min Hold Max Hold Max Hold Max Hold Min Hold Max Hol		er - Occupied BW					
Add Std: Note Ref Offset 0.5 dB dB/div Ref 0ffset 0.5 dB dB/div Ref 0ffset 0.5 dB dB/div Ref 0ffset 0.5 dB dB/div Ref 0ffset 0.5 dB Clear Write Average Max Hole Max Hole Ma							,2022 Trace/Detector
#FGain:Low #Atten: 20 dB Radio Device: BTS dB/div Ref 00fiset 0.5 dB Image: Clear Write in the cl	Center Freq 2.4	41000000 GF	Tuinu			Radio Std: None	The off betoetor
dB/div Ref 10.00 dBm Clear Write Clear Write Clear Write Average Average Max Hole Min Hole See BW 30 kHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB		#IF			/reginera	Radio Device: BT	s
dB/div Ref 10.00 dBm Clear Write Clear Write Clear Write Average Average Max Hole Min Hole See BW 30 kHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB							
Clear Write Clear Write Clear Write Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Average Max Hold Min Hold Min Hold Average Max Hold Min Hold Average Max Hold Min Hold Average Max Hold Min Hold Average Max Hold Max Hold Max Hold Min Hold Max	Ref C 10 dB/div Ref Log	offset 0.5 dB 10.00 dBm					
Clear Write Clear Write Clear Write Clear Write Clear Write Average Max Hole Min Hole Min Hole Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB							
Average Average Max Hold Max Hold	0.00		Δ	^			Clear Write
Average Average Max Hold Max Hold	10.0		Anner	~ mh			
Average Average Max Hold Max Hold	20.0			\checkmark	~~~~~		
Image: Constraint of the second se	20.0	<u>~</u>	/				
Image: Constraint of the second se	-30.0				h		Average
Image: Span 3 MHz Max Hold Min Hold Min Hold Span 3 MHz Span 3 MHz Cocupied Bandwidth #VBW 100 kHz Span 3 MHz Sweep 4.133 ms Occupied Bandwidth Auto 1.1543 MHz OBW Power Span 3 MHz Max Hold Min Hold Auto	-40.0	· /					
Image: Constraint of the second se		month				M n	
Image: Second state of the second s	-50.0						
Image: Second state of the second s	60.0 WWW					Mary Mary	Max Hold
Image: Second							Maxmora
enter 2.441 GHz tes BW 30 kHz Coccupied Bandwidth 1.1543 MHz Transmit Freq Error x dB Bandwidth 1.218 MHz x dB Auto Min Hold Sweep 4.133 ms Detecto Average I Man Min Hold Sweep 4.133 ms Detecto Average I Man Min Hold Sweep 4.133 ms Detecto Average I Man	70.0						
enter 2.441 GHz Span 3 MHz tes BW 30 kHz #VBW 100 kHz Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB	80.0						
enter 2.441 GHz Span 3 MHz tes BW 30 kHz #VBW 100 kHz Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB							Min Hold
Res BW 30 kHz #VBW 100 kHz Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Detecto Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB	Center 2 441 GH	7				Snan 3 I	MHz
Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB	#Res BW 30 kHz			#VBW 100 ki	lz		
Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB							
1.1543 MHz Auto Mar Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB	Occupied B	andwidth					
Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB			40 MIL-				
x dB Bandwidth 1.218 MHz x dB -20.00 dB		1.15	43 MHZ				Man Wan
	Transmit Free	q Error	8.347 kHz	OBW Po	wer	99.00 %	
	x dB Bandwid	ith	1.218 MHz	x dB	_	20.00 dB	
status							
STATUS							
	ISG				ST	ATUS	

8DPSK Middle Channel

8DPSK High Channel





11. Maximum Peak Output Power

11.1 Block Diagram Of Test Setup



11.2 Limit

			FCC Part15 (15.247),	Subpart C	
Section	Т	est Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1) Pe	ak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

11.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

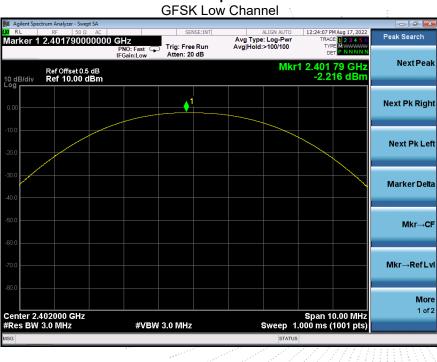
Page: 41 of 65



11.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	AC120V/60Hz

Modulation	Test Channel	Output Power (dBm)	Limit (dBm)
GFSK	Low	-2.216	21
GFSK	Middle	-1.026	21
GFSK	High	-0.075	21
Pi/4 DQPSK	Low	-1.313	21
Pi/4 DQPSK	Middle	-0.116	21
Pi/4 DQPSK	High	0.810	21
8DPSK	Low	-0.705	21
8DPSK	Middle	0.453	21
8DPSK	High	1.352	21



Test plots SESK Low Channe

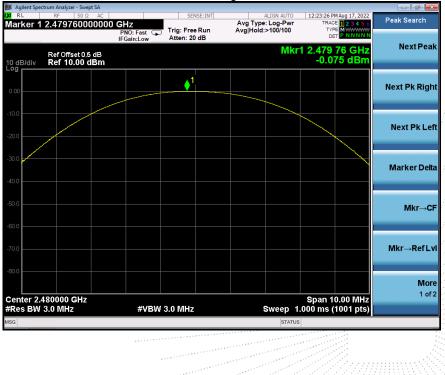




		hanne	adle C	FSK M	GF			
							um Analyzer - Swept S	
Peak Search	12:23:45 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	ALIGN AUTO :: Log-Pwr >100/100		SENSE:INT Free Run n: 20 dB	st 😱 Trig: Fr	00000 GHz	RF 50 Ω 2.440740000	RL Iarker 1
NextPeak	2.440 74 GHz -1.026 dBm	Mkr1				i dB J B m	Ref Offset 0.5 c Ref 10.00 dE	0 dB/div
Next Pk Righ				↓ ¹	•			0.00
								10.0
Next Pk Lef								20.0
								30.0
Marker Delta								40.0
Mkr→CF								50.0
Mkr→RefLv								70.0
								30.0
More 1 of 2	Span 10.00 MHz						1000 GHz	enter 2
	000 ms (1001 pts)	Sweep 1.		IHz	VBW 3.0 MH			Res BW
		STATUS						SG

GFSK Middle Channel

GFSK High Channel



No.: BCTC/RF-EMC-007



📕 Agilent Spectrum Analyzer - Swept S				
XI RL RF 50 Ω				Peak Search
Marker 1 2.40200000	D000 GHz PNO: Fast IFGain:Low Atten: 20 dE		TRACE 123456 TYPE MWWWW DET PNNNNN	
Ref Offset 0.5 c 0 dB/div Ref 10.00 dE	dB βm	Mł	r1 2.402 00 GHz -1.313 dBm	NextPeal
0.00	1			Next Pk Righ
10.0				
20.0				Next Pk Lef
10.0				Marker Delt
0.0				Mkr→C
0.0				
0.0				Mkr→RefLv
60.0				Mor 1 of
Center 2.402000 GHz Res BW 3.0 MHz	#VBW 3.0 MHz	Sweep	Span 10.00 MHz 1.000 ms (1001 pts)	
ISG		STAT	110	

Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel

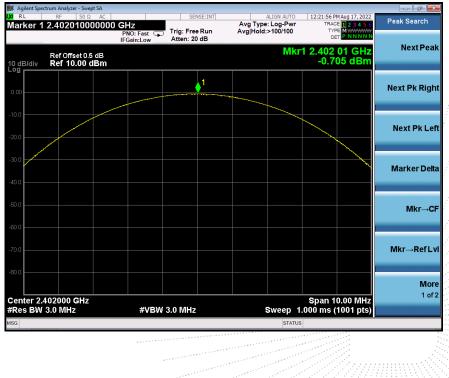




🚺 Agilent Spec	trum Analyzer - Swept SA	-	.,	It flight chan		
X/RL	RF 50 Ω AC		SENSE:INT	ALIGN AUTO	12:25:25 PM Aug 17, 2022	Peak Search
Marker 1	2.4800300000	DO GHZ PNO: Fast IFGain:Low	Trig: Free Run Atten: 20 dB	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET PNNNNN	
10 dB/div Log	Ref Offset 0.5 dB Ref 10.00 dBm			Mkr	1 2.480 03 GHz 0.810 dBm	NextPeak
0.00			1			Next Pk Right
-10.0						
-20.0						Next Pk Left
30.0						Marker Delta
40.0						Warker Dela
50.0						Mkr→CF
50.0						
30.0						Mkr→RefLv
						More 1 of 2
Center 2.4 #Res BW	180000 GHz 3.0 MHz	#VBW	3.0 MHz	Sweep 1	Span 10.00 MHz .000 ms (1001 pts)	
1SG				STATUS		

Pi/4 DQPSK High Channel

8DPSK Low Channel



No.: BCTC/RF-EMC-007



Og Image: Constraint of the second secon			liddle Channel		
Pro: Fast Pro: F					
Ref Offset 05 dB Mkr1 2.440 87 GHz 0.453 dBm Next Peak 000 000 0 <th></th> <th></th> <th></th> <th></th> <th>Peak Search</th>					Peak Search
Ref Offset 0.5 dB MKr 1 2.440 87 GHz 00 0.453 dBm 00 0.454 dBm 00	Marker 1 2.44087000000	PNO: Fast 🕞 Trig: Free Run	Avg Hold:>100/100	TYPE MWWWW DET P NNNNN	
Next Pk Right Next Pk Ri	IO dB/div Ref 10.00 dBm		Mkr1 2.4	40 87 GHz 0.453 dBm	NextPeak
Next Pk Left Nover Pk Left<	0.00	1			Next Pk Right
300 Marker Delta 300 Marker Delta <t< td=""><td></td><td></td><td></td><td></td><td>Next Pk Lef</td></t<>					Next Pk Lef
500	30.0				Marker Delta
300	40.0 50.0				Mkr_C
Res BW 3.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)	50.0				
enter 2.441000 GHz Span 10.00 MHz 1 of Res BW 3.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)	30.0				Mkr→RefLv
	Center 2.441000 GHz Res BW 3.0 MHz	#VBW 3.0 MHz	Spanner	an 10.00 MHz ns (1001 pts)	
	SG		STATUS		

8DPSK Middle Channel

8DPSK High Channel





12. Hopping Channel Separation

12.1 Block Diagram Of Test Setup



12.2 Limit

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, provided the systems operate with an output power no greater than 0.125W.

12.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.



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12.4 Test Result

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.004	0.874	PASS
GFSK	Middle	1.002	0.877	PASS
GFSK	High	1.002	0.873	PASS
Pi/4 DQPSK	Low	1.004	0.833	PASS
Pi/4 DQPSK	Middle	1.002	0.835	PASS
Pi/4 DQPSK	High	1.000	0.835	PASS
8DPSK	Low	1.000	0.811	PASS
8DPSK	Middle	1.002	0.812	PASS
8DPSK	High	1.002	0.813	PASS

Test plots GFSK Low Channel



Edition: A.5





	GFSK N	liddle Channel		
🎉 Agilent Spectrum Analyzer - Swept SA				
X RL RF 50 Ω AC Marker 1 Δ 1.002000000 Ν	Alten: 20 dB	ALIGN AUTO (Avg Type: Log-Pwr Avg Hold:>100/100	D1:08:10 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Peak Search
Ref Offset 0.5 dB 10 dB/div Ref 10.00 dBm	IFGain:Low Atten: 20 dB	ΔΜκ	r1 1.002 MHz 0.054 dB	Next Peak
0.00 X2				Next Pk Right
20.0				Next Pk Left
40.0				Marker Delta
60.0				Mkr→CF
70.0				Mkr→RefLvl
80 0 Center 2.441500 GHz			Span 2.000 MHz	More 1 of 2
¢Res BW 30 kHz Iss	#VBW 100 kHz	Sweep 2.13	3 ms (1001 pts)	

~ - - -

GFSK High Channel





						DR LOW	Chai		
	trum Analyzer - Swep	t SA							
RL	RF 50 Ω	AC		SEN	ISE:INT		ALIGN AUTO	01:03:19 PM Aug 17, 2022 TRACE 1 2 3 4 5 6	Peak Search
larker 1	1.00400000	PN	IO: Wide 🖵 Gain:Low	Trig: Free Atten: 20		Avg Hold	:>100/100	TYPE MWWWWW DET P NNNNN	
0 dB/div	Ref Offset 0.5 Ref 10.00 d	dB Bm					ΔΝ	/kr1 1.004 MHz 0.078 dB	Next Pea
						1	Δ2		Next Pk Righ
10.0	X2	$ \land $	\sim	~					
20.0		V V.	500	~~~	~~~	~~		m	Next Pk Lei
0.0									
0.0									Marker Delt
0.0									Mkr→C
0.0									
0.0									Mkr→RefL
30.0									Mon
enter 2.4 Res BW	02500 GHz		#\/B\M	100 kHz			Swaan 2	Span 2.000 MHz .133 ms (1001 pts)	1 of
G SG	JU KHZ		#VDVV	100 KHZ					
3							STATUS		

Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel







Pi/4 DQPSK High Channel

8DPSK Low Channel







8DPSK Middle Channel

8DPSK High Channel





13. Number Of Hopping Frequency

13.1 Block Diagram Of Test Setup



13.2 Limit

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

13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;



13.4 Test Result

Test Plots:

79 Channels in total GFSK



			Κ	DQPS	PI/4 L						
									Analyzer - Swep		
Marker Select Marker	MAug 17, 2022 E 1 2 3 4 5 6 PE M P N N N N N	TRAC	LIGN AUTO Log-Pwr 100/100	Avg Type Avg Hold:			Z NO:Fast ⊂ Gain:Low	PI	^{ξε} 50 Ω 78.07250		RI ar
Select Marker 1	2 5 MHz .780 dB	1 78.07: 0	ΔMkr					dB	ef Offset 0.5 ef 10.00 d	R 3/div R	dE
Norm	102 MM	UMMA	WWW	ah an An An	MMM	NUMM	IN MARIAN	LUVUUU	ስለለስስሲኒል	XANN	0
Delt				A MILLAN				al Ardacak	4979v144.)
Fixed)
o	<u> </u>									ļ	2
Properties]
Moi 1 of	3350 GHz 1001 pts)	Stop 2.43	weep 8			300 kHz	#VBW			t 2.4000 s BW 10	
			STATU								-



	80	DPSK		
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC arker 1 Δ 78.156000000	0 MHz PNO: Fast C	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	12:54:46 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Marker
Ref Offset 0.5 dB) dB/div Ref 10.00 dBm	IFGain:Low Atten: 20 dB		78.156 0 MHz 2.465 dB	Select Marker 1
a XPANAWWWWWWWW	INALAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	MANAMANAN		Norm
				Del
0.0				Fixed
0.0			¥	c
0.0				Properties
tart 2.40000 GHz Res BW 100 kHz	#VBW 300 kHz	Sweep 8.0	top 2.48350 GHz 00 ms (1001 pts)	Mo 1 of
G		STATUS		

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14. Dwell Time

14.1 Block Diagram Of Test Setup



14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

14.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. Centred on a hopping channel;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

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Edition:



14.4 Test Result

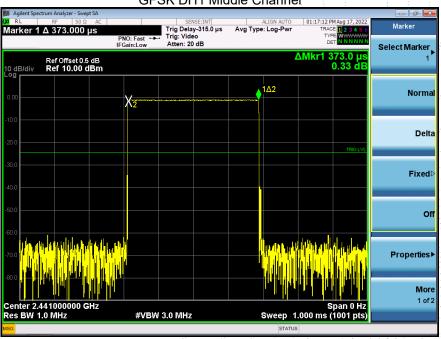
DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

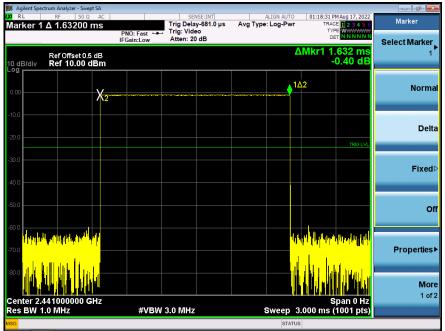
DH5:1600/79/6*0.4*79*(MkrDelta)/1000 DH3:1600/79/4*0.4*79*(MkrDelta)/1000 DH1:1600/79/2*0.4*79*(MkrDelta)/1000 Remark: Mkr Delta is once pulse time.

Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
GFSK	Middle	1DH1	0.373	0.119	0.4
		1DH3	1.632	0.261	0.4
		1DH5	2.868	0.306	0.4
Pi/4DQPSK	Middle	2DH1	0.383	0.123	0.4
		2DH3	1.632	0.261	0.4
		2DH5	2.872	0.306	0.4
8DPSK	Middle	3DH1	0.385	0.123	0.4
		3DH3	1.629	0.261	0.4
		3DH5	2.860	0.305	0.4



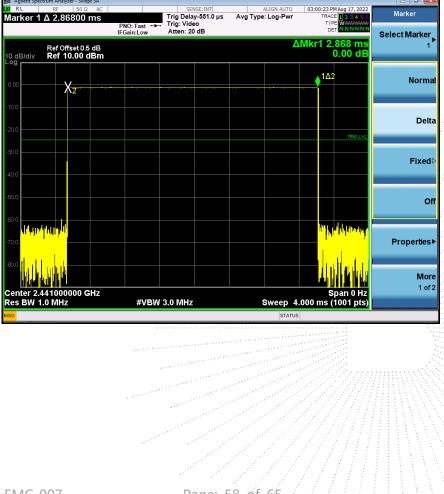
Test Plots GFSK DH1 Middle Channel



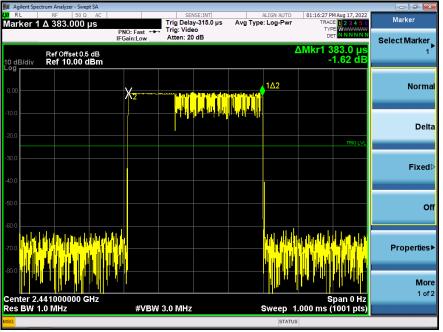


GFSK DH3 Middle Channel

GFSK DH5 High Middle Channel

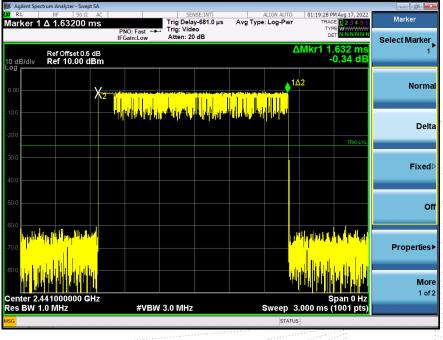




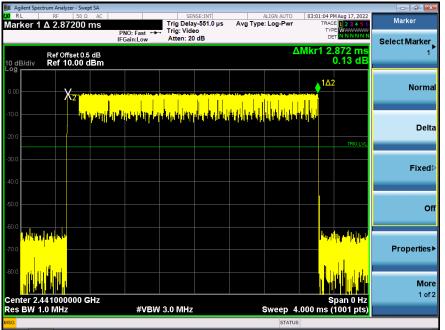


Pi/4DQPSK DH1 Middle Channel

Pi/4DQPSK DH3 Middle Channel

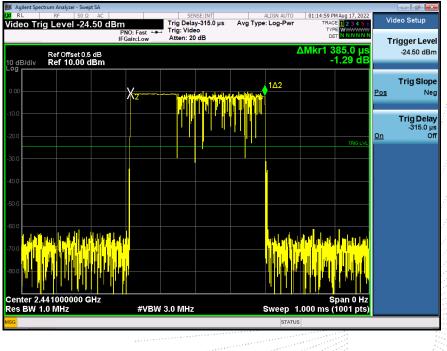




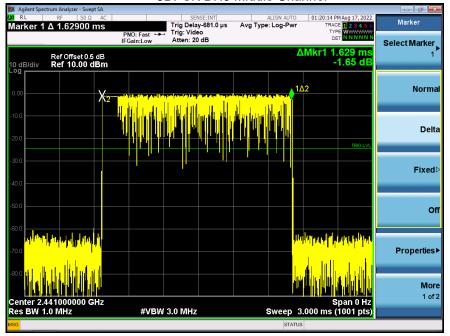


Pi/4DQPSK DH5 Middle Channel

8DPSK DH1 Middle Channel

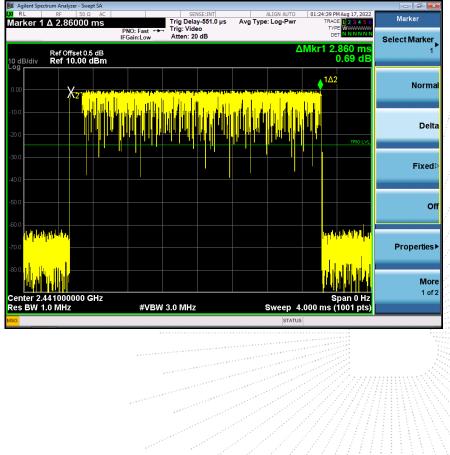






8DPSK DH3 Middle Channel

8DPSK DH5 Middle Channel



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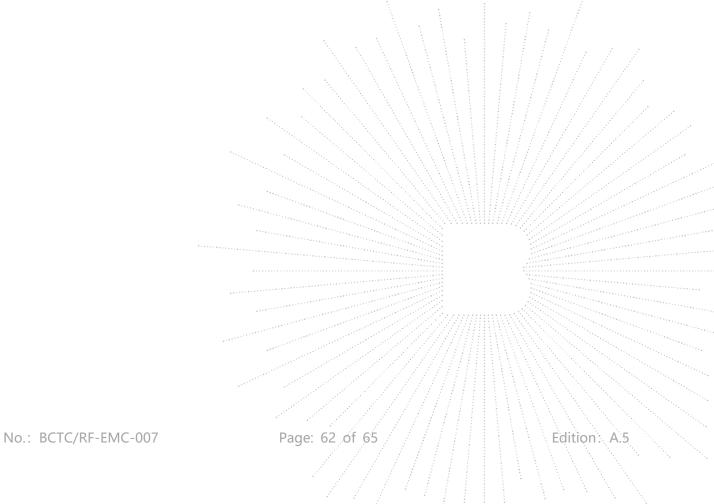
15. Antenna Requirement

15.1 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.

15.2 Test Result

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





16. EUT Photographs

EUT Photo



NOTE: Appendix-Photographs Of EUT Constructional Details

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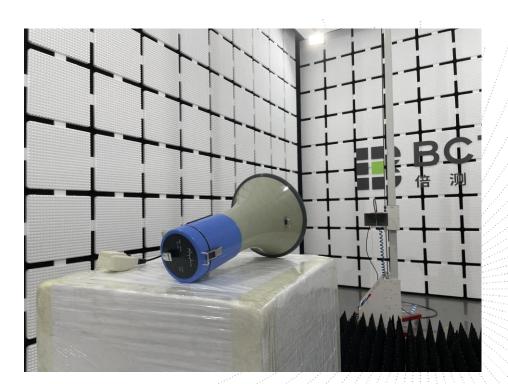
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17. EUT Test Setup Photographs

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 the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

8. The quality system of our laboratory is in accordance with ISO/IEC17025.

9. If there is any objection to this test 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, Zhancheng, 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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