

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC145282

1 of 91 Page:

FCC Radio Test Report FCC ID: 2AE5PSW-620

Original Grant

Report No. TB-FCC145282

Applicant SW Technology Limited

Equipment Under Test (EUT)

EUT Name Car Radio

SW-620 Model No.

Series Model No. N/A

Brand Name SW

Receipt Date 2015-09-01

Test Date 2015-09-01 to 2015-09-15

Issue Date 2015-09-16

Standards FCC Part 15: 2014, Subpart C(15.247)

Test Method ANSI C63.10:2013

Conclusions PASS

In the configuration tested, the EUT complied with the standards specified above,

The EUT technically complies with the FCC requirements

Test/Witness Engineer

Approved& Authorized

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0

Tel: +86 75526509301

Fax: +86 75526509195



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1. General Information about EUT

1.1 Client Information

Applicant: SW Technology Limited

Address : Unit 1202, 12/F Mirror Tower 61 Mody RD TST East KL, Hong Kong

Manufacturer : Shenzhen Hengbao Ying Photoelectricity Co.,Ltd.

Address : Floor 3rd, Floor 4rd, Factory Dongyuan, No.28 of West, Bei huan

Road, Longteng Community, ShiYan Sub District, Baoan District,

Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Car Radio				
Models No.	٠,	SW-620				
Model Difference		N/A				
a mar		Operation Frequency: Bluetooth:2402~2480MHz				
		Number of Channel:	Bluetooth:79 Channels see note (2)			
Product Description		Max Peak Output Power: 8-DPSK:5.644dBm (Conducted P				
Description		Antenna Gain:	0 dBi PCB Antenna			
		Modulation Type:	GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps) 8-DPSK(3 Mbps)			
Power Supply	1:	DC power by Battery.	De la Company			
Power Rating	1.1	DC 12V Battery.				
Connecting I/O Port(S)	:	Please refer to the User's Manual				

Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.

(3) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459



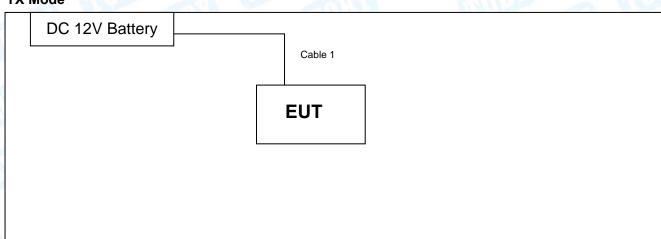
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	AND T	CILITY I	7 _ NE		
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454	U	
26	2428	53	2455		

(4) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode





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1.4 Description of Support Units

Equipment Information								
Name Model FCC ID/DOC Manufacturer Used "√"								
12V DC Battery	V DC Battery FM1212		V					
	Cable Information							
Number Shielded Type Ferrite Core Length Note								
Cable 1	NO	NO	0.2m	120				

1.5 Description of 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 follow was evaluated respectively.

For Conducted Test						
Final Test Mode	Description					
Mode 1	DC Charging with TX GFSK Mode					

For Radiated Test				
Final Test Mode	Description			
Mode 1	DC Charging with TX GFSK Mode			
Mode 2	TX Mode(GFSK) Channel 00/39/78			
Mode 3	TX Mode(π /4-DQPSK) Channel 00/39/78			
Mode 4	TX Mode(8-DPSK) Channel 00/39/78			
Mode 5	Hopping Mode(GFSK)			
Mode 6	Hopping Mode(π /4-DQPSK)			
Mode 7	Hopping Mode(8-DPSK)			

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate. We have pretested all the test mode above.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: GFSK (1 Mbps)



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TX Mode: π /4-DQPSK (2 Mbps)
TX Mode: 8-DPSK (3 Mbps)

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test 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 of Bluetooth mode.

Test Software Version	1	BlueTest	COLUMN TO SERVICE OF THE PARTY
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
π /4-DQPSK	DEF	DEF	DEF
8-DPSK	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
	Level Accuracy:	
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Padiated Emission	Level Accuracy:	. 4 60 dB
Radiated Emission	9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy:	±4.40 dB
Radiated Effilssion	30MHz to 1000 MHz	±4.40 dB
Dadiated Emission	Level Accuracy:	. 4 20 dB
Radiated Emission	Above 1000MHz	±4.20 dB



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1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

May 22, 2014 certificated by TUV Rheinland(China) Co., Ltd. with TUV certificate No.: UA 50282953 0001 and report No.: 17026822 002. The certificate is valid until the next scheduled audit or up to 18 months, at the discretion of TUV Rhineland.



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2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1						
Standard Section		T	1 1			
FCC	IC	Test Item	Judgment	Remark		
15.203	<u> </u>	Antenna Requirement	PASS	N/A		
15.207	RSS-GEN 7.2.2	Conducted Emission	PASS	N/A		
15.205	RSS-Gen 7.2.3	Restricted Bands	PASS	N/A		
15.247(a)(1)	RSS 247 5.1 (2)	Hopping Channel Separation	PASS	N/A		
15.247(a)(1)	RSS 247 5.1 (4)	Dwell Time	PASS	N/A		
15.247(b)(1)	RSS 247 5.4 (2)	Peak Output Power	PASS	N/A		
15.247(b)(1)	RSS 247 5.1 (4)	Number of Hopping Frequency	PASS	N/A		
15.247(c)	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A		
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW GFSK:838.7603kHz π/4-DQPSK: 1180.10kHz 8-DPSK: 1162.70kHz		

Note: N/A is an abbreviation for Not Applicable.



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3. Test Equipment

Conducted Emission Test						
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date	
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Aug. 07, 2015	Aug. 06, 2016	
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Aug. 07, 2015	Aug. 06, 2016	
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 07, 2015	Aug. 06, 2016	
LISN	Rohde & Schwarz	ENV216	101131	Aug. 07, 2015	Aug. 06, 2016	
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Date	
Radiation	Emission Tes	τ		T	Cal. Due	
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 29, 2015	Aug. 28, 2016	
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016	
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 28, 2015	Mar. 27, 2016	
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 28, 2015	Mar. 27, 2016	
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 28, 2015	Mar. 27, 2016	
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 28, 2015	Mar. 27, 2016	
Pre-amplifier	Sonoma	310N	185903	Mar. 28, 2015	Mar. 27, 2016	
Pre-amplifier	HP	8447B	3008A00849	Mar. 28, 2015	Mar. 27, 2016	
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 28, 2015	Mar. 27, 2016	
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A	



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4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

4.1.2 Test Limit

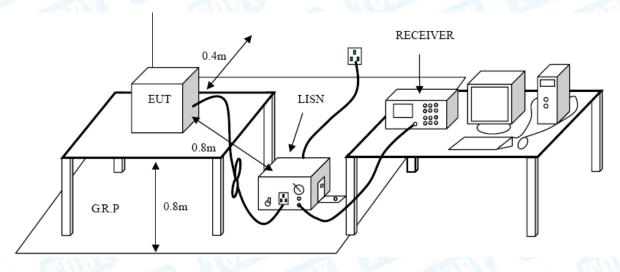
Conducted Emission Test Limit

Eroguanov	Maximum RF Line Voltage (dBμV)					
Frequency	Quasi-peak Level	Average Level				
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *				
500kHz~5MHz	56	46				
5MHz~30MHz	60	50				

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2 Test Setup



4.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.



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I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4 EUT Operating Mode

Please refer to the description of test mode.

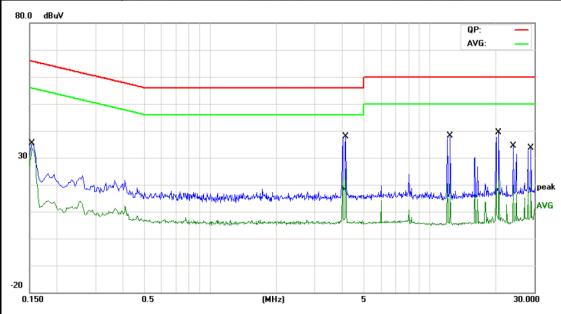
4.5 Test Data

Please see the next page.



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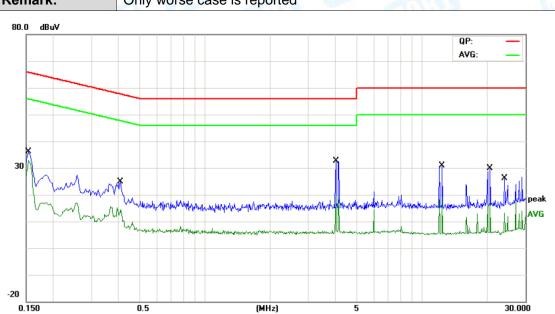
EUT:	Car Radio	Model Name :	SW-620							
Temperature:	25 ℃	Relative Humidity:	55%							
Test Voltage:	DC 12V	DC 12V								
Terminal:	Line									
Test Mode:	USB Charging with TX GFS	SK Mode 2402 MHz	AMILE.							
Remark:	mark: Only worse case is reported									
			N. C.							



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBu∀	dBu∨	dB	Detector
1		0.1539	22.63	11.22	33.85	65.78	-31.93	QP
2		0.1539	22.12	11.22	33.34	55.78	-22.44	AVG
3	*	4.1380	24.00	9.97	33.97	56.00	-22.03	QP
4		4.1380	9.75	9.97	19.72	46.00	-26.28	AVG
5		12.4100	22.91	10.57	33.48	60.00	-26.52	QP
6		12.4100	8.13	10.57	18.70	50.00	-31.30	AVG
7		20.6740	23.50	10.81	34.31	60.00	-25.69	QP
8		20.6740	8.14	10.81	18.95	50.00	-31.05	AVG
9		24.0740	17.66	10.84	28.50	60.00	-31.50	QP
10		24.0740	3.16	10.84	14.00	50.00	-36.00	AVG
11		28.9500	15.54	11.50	27.04	60.00	-32.96	QP
12		28.9500	2.71	11.50	14.21	50.00	-35.79	AVG



EUT: Car Radio **Model Name:** SW-620 **Relative Humidity:** Temperature: 25 ℃ 55% Test Voltage: **DC 12V** Terminal: Neutral **Test Mode:** USB Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBu∀	dBu∨	dB	Detector
1		0.1539	22.91	11.22	34.13	65.78	-31.65	QP
2	*	0.1539	22.14	11.22	33.36	55.78	-22.42	AVG
3		0.4100	8.71	10.12	18.83	57.65	-38.82	QP
4		0.4100	2.58	10.12	12.70	47.65	-34.95	AVG
5		4.0140	18.60	9.97	28.57	56.00	-27.43	QP
6		4.0140	5.08	9.97	15.05	46.00	-30.95	AVG
7		12.4060	15.60	10.57	26.17	60.00	-33.83	QP
8		12.4060	2.50	10.57	13.07	50.00	-36.93	AVG
9		20.6820	12.83	10.81	23.64	60.00	-36.36	QP
10		20.6820	0.98	10.81	11.79	50.00	-38.21	AVG
11		24.0900	8.96	10.84	19.80	60.00	-40.20	QP
12		24.0900	-1.22	10.84	9.62	50.00	-40.38	AVG



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5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.209

5.1.2 Test Limit

Radiated Emission Limit (9 kHz~1000MHz)

Frequency (MHz	Field Strength (microvolt/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

Radiated Emission Limit (Above 1000MHz)

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

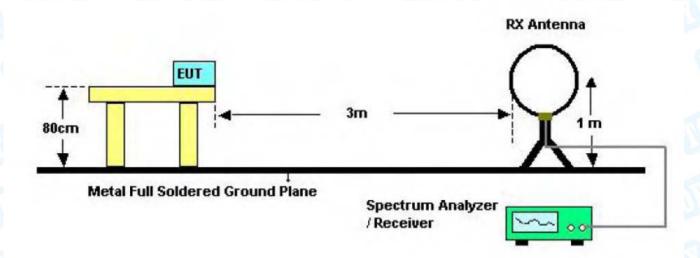
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

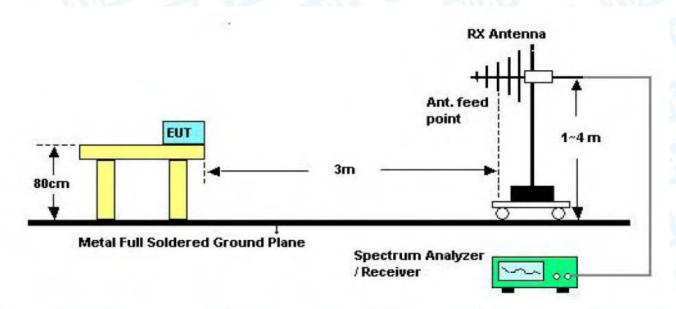


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5.2 Test Setup

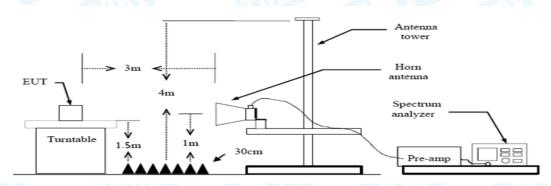


Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup





Above 1GHz Test Setup

5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.

5.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 Kz with Peak Detector for Average Values.

Test data please refer the following pages.



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emperature: est Voltage:		lio	- AND	Model Na	ame :	SW-62	20			
est Voltage:	25 ℃		13	Relative	Relative Humidity:					
	DC 12\	/		1 Com		N. B.				
nt. Pol.	Horizoi	ntal	CHARLE		I HAVE		667			
est Mode:	TX GF	SK Mode 2	2402MHz	COLUMN TO THE PARTY OF THE PART	9	- GI	Mr.			
emark:	Only w	orse case	is reported	Tree of						
30 dBuV/m	60 70	80	2 3 X X X X X X X X X X X X X X X X X X X	300	(RF)FCC 15C	3M Radiation Margin -6 X				
			Correct N	A						
No. Mk. Fr	eq.	Reading Level	Factor	Measure- ment	Limit	Over				
		_			Limit dBuV/m	Over	Detecto			
М	eq.	Level	Factor	ment			Detecto peak			
1 ! 76.2	r eq. Hz	Level dBuV	Factor dB/m	ment dBuV/m	dBuV/m	dB				
1 ! 76.2 2 135.	req. Hz 2442	Level dBu√ 58.45	Factor dB/m -23.41	ment dBuV/m 35.04	dBuV/m 40.00	dB -4.96	peak			
1 ! 76.2 2 135.4 3 ! 180.4	req. Hz 2442 0319	dBuV 58.45 58.87	dB/m -23.41 -22.08	ment dBuV/m 35.04 36.79	dBuV/m 40.00 43.50	dB -4.96 -6.71	peak peak			
1 ! 76.2 2 135.4 3 ! 180.4 4 ! 360.4	req. Hz 2442 0319 0165	Devel dBuV 58.45 58.87 59.27	dB/m -23.41 -22.08 -20.57	ment dBuV/m 35.04 36.79 38.70	dBuV/m 40.00 43.50 43.50	dB -4.96 -6.71 -4.80	peak peak peak			



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The second second			
EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V	01	
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MH	z	- Chillian
Remark:	Only worse case is report	ted	3
80.0 dBuV/m			

									(RF)FCC	15C 3M	Margir	6	F
30					J	12 3 XX		المسلمال					ıl.
	Assertance of the market	Mary Mary Arth	rupar	411	A (M) A MIL.		in an analysis	Jan.					

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		128.5629	56.97	-22.22	34.75	43.50	-8.75	peak
2		135.0319	56.71	-22.08	34.63	43.50	-8.87	peak
3	*	165.4866	58.49	-20.88	37.61	43.50	-5.89	peak
4		541.3724	47.33	-10.13	37.20	46.00	-8.80	peak
5		721.7259	47.06	-7.10	39.96	46.00	-6.04	peak
6		900.1473	44.61	-5.06	39.55	46.00	-6.45	peak

^{*:}Maximum data x:Over limit !:over margin



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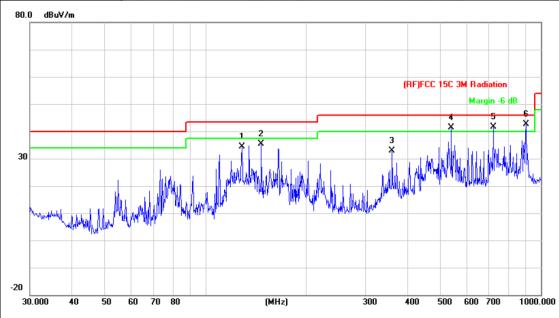
EUT:			Car	Ra	dio			Oll	Mo	del I	Nam	ie :			SV	N-62	20	
Tempe	eratur	e:	25	$^{\circ}$ C	9	1			Rel	ativ	е Ни	ımi	dity	:	55	5%		
Test V	oltage	e:	DC	; 12	·V		Jane Brand		MI .				A		N			
Ant. P	ol.		Но	rizo	ntal		_ N				<u>a</u>					1	1	
Test M	lode:		TX	GF	SK	Mode	e 2441N	ЛHz	6	M				À	. 1			
Remar	k:		On	ly v	vors	e cas	se is rep	orted	J.	340		A						
80.0 di	BuV/m																	_
30 ·	Barre Contract of the Contract	Makenter	WALL A		**************************************	2 X X				hy/hy/s		(R	F)FCC	5 X	3M Ra	diation		F
-20 30.000	40	50	60	70	80		(I	MHz)		3	300	40	00	500	600	700	10	00.00
No.	Mk.	Fre	eq.			ading evel	•	rect ctor	Mea me	sure ent	-	Lin	nit		Ove	er		
		MH	Ηz		₫E	Bu V	dB	/m	dBu	ıV/m		dΒ	uV/n	า	d⊟	}	Det	ecto
1	ļ	78.4	133		57	7.77	-23	.34	34	.43		40	0.00)	-5.	57	pe	eak
2		110.1	816	3	57	7.00	-21	.88	35	5.12		43	3.50)	-8.3	38	р	eak
3	ļ	128.5	629	•	61	1.13	-22	.22	38	3.91		43	3.50)	-4.	59	pe	eak
4	ļ	360.4	476	3	56	3.47	-14	.55	41	.92		46	3.00)	-4.0	80	pe	eak
5	*	541.3	3724	1	52	2.71	-10	.13	42	2.58		46	3.00)	-3.4	42	р	eak

Emission Level= Read Level+ Correct Factor



Page: 21 of 91

EUT:	Car Radio	Model Name :	SW-620						
Temperature:	25 °C	Relative Humidity:	55%						
Test Voltage:	DC 12V		13.9						
Ant. Pol.	Vertical								
Test Mode:	TX GFSK Mode 2441MHz	CU1372	LITTLE TO						
Remark:	Only worse case is reported								



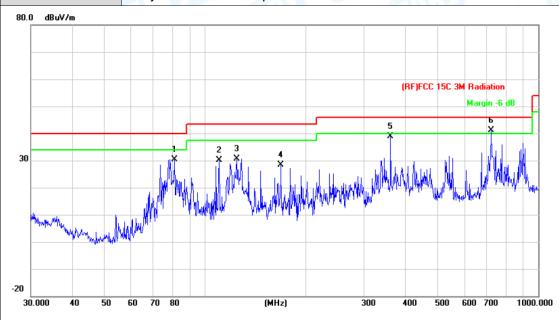
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		128.5630	56.67	-22.22	34.45	43.50	-9.05	peak
2		146.8877	56.70	-21.42	35.28	43.50	-8.22	peak
3		360.4476	47.38	-14.55	32.83	46.00	-13.17	peak
4	ļ	541.3725	51.49	-10.13	41.36	46.00	-4.64	peak
5	İ	721.7259	48.81	-7.10	41.71	46.00	-4.29	peak
6	*	903.3094	47.57	-5.02	42.55	46.00	-3.45	peak

^{*:}Maximum data x:Over limit !:over margin



Page: 22 of 91

EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V		13
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		OM.
Remark:	Only worse case is reported		



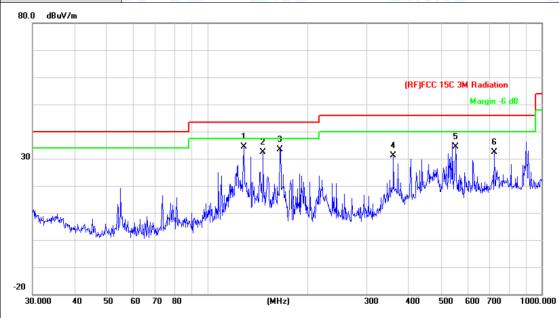
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		80.9275	53.65	-23.22	30.43	40.00	-9.57	peak
2		110.1816	52.13	-21.88	30.25	43.50	-13.25	peak
3		124.5690	53.03	-22.35	30.68	43.50	-12.82	peak
4		169.0054	49.59	-21.11	28.48	43.50	-15.02	peak
5		360.4476	53.34	-14.55	38.79	46.00	-7.21	peak
6	*	721.7259	48.32	-7.10	41.22	46.00	-4.78	peak

^{*:}Maximum data x:Over limit !:over margin



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EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V		13
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz		C. C. C.
Remark:	Only worse case is reported		



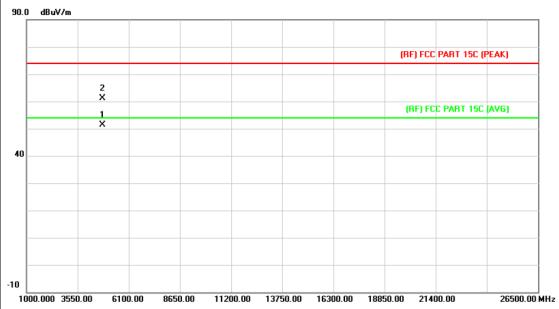
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	128.5630	56.72	-22.22	34.50	43.50	-9.00	peak
2		146.8877	53.73	-21.42	32.31	43.50	-11.19	peak
3		164.9075	54.25	-20.84	33.41	43.50	-10.09	peak
4		360.4476	45.80	-14.55	31.25	46.00	-14.75	peak
5		552.8832	44.47	-10.13	34.34	46.00	-11.66	peak
6		721.7259	39.37	-7.10	32.27	46.00	-13.73	peak

^{*:}Maximum data x:Over limit !:over margin



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EUT:	Car Radio	Model Name :	SW-620					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 12V	DC 12V						
Ant. Pol.	Horizontal	Horizontal						
Test Mode:	TX GFSK Mode 2402MHz		THE PERSON NAMED IN					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.							
00.0 10.41		·	·					

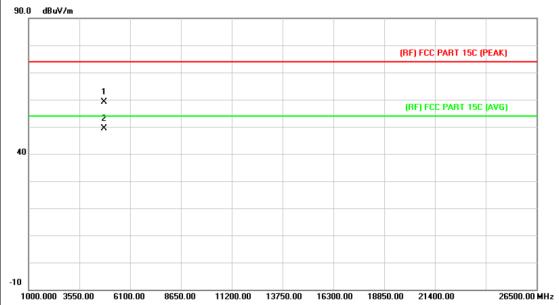


N	o. MI	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.024	37.93	13.44	51.37	54.00	-2.63	AVG
2		4804.147	47.64	13.44	61.08	74.00	-12.92	peak



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EUT:	Car Radio	Model Name :	SW-620						
Temperature:	25 ℃	Relative Humidity:							
Test Voltage:	DC 12V	DC 12V							
Ant. Pol.	Vertical	Vertical							
Test Mode:	TX GFSK Mode 2402MHz		CATA STATE						
Remark: No report for the emission which more than 10 dB below the									
	prescribed limit.								

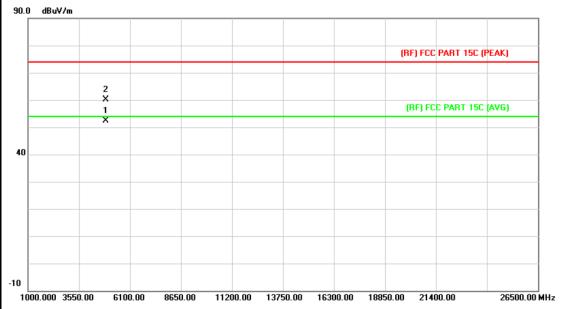


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.015	45.66	13.44	59.10	74.00	-14.90	peak
2	*	4804.018	35.97	13.44	49.41	54.00	-4.59	AVG



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EUT:	Car Radio	Model Name :	SW-620					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 12V	DC 12V						
Ant. Pol.	Horizontal	Horizontal						
Test Mode:	TX GFSK Mode 2441MHz	CU1372	LITTLE OF					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.							

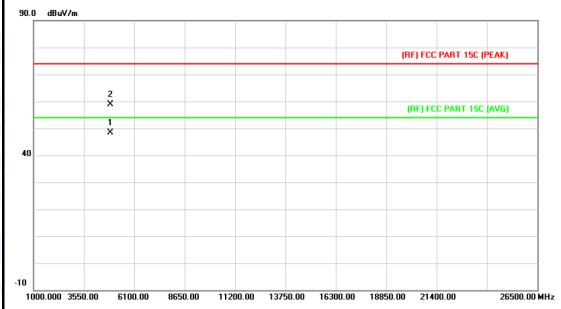


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.057	38.44	13.90	52.34	54.00	-1.66	AVG
2		4882.330	46.19	13.90	60.09	74.00	-13.91	peak



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 12V						
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2441MHz		LITTLE TO				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

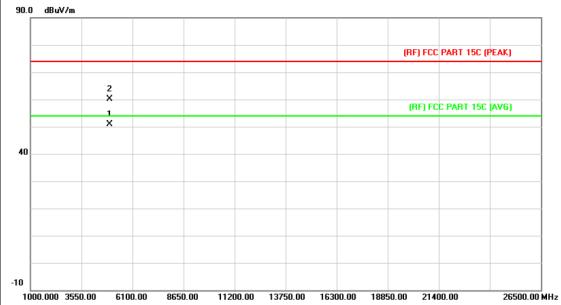


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.084	34.54	13.90	48.44	54.00	-5.56	AVG
2		4882.198	44.86	13.90	58.76	74.00	-15.24	peak



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity: 55%					
Test Voltage:	DC 12V						
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480MHz	(U) 32	DITT.				
Remark:	No report for the emission which more than 10 dB below the						
prescribed limit.							

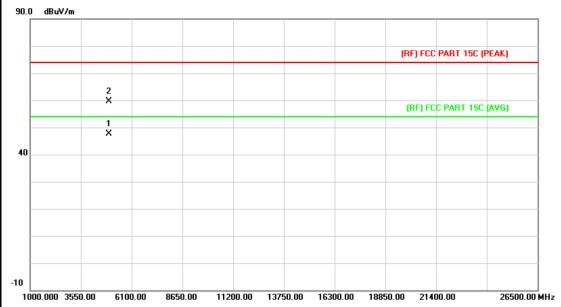


N	o. Mi	د. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.003	36.54	14.36	50.90	54.00	-3.10	AVG
2		4960.093	45.78	14.36	60.14	74.00	-13.86	peak



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 12V						
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2480MHz		DIO.				
Remark:	mark: No report for the emission which more than 10 dB below the prescribed limit.						

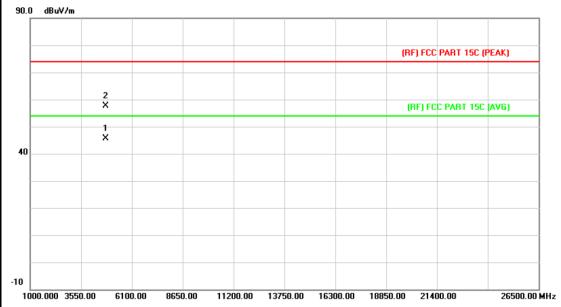


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.087	33.39	14.36	47.75	54.00	-6.25	AVG
2		4960.648	45.39	14.36	59.75	74.00	-14.25	peak



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EUT:	Car Radio	Model Name :	SW-620			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage: DC 12V						
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2402MHz		OM.			
Remark: No report for the emission which more than 10 dB below the prescribed limit.						

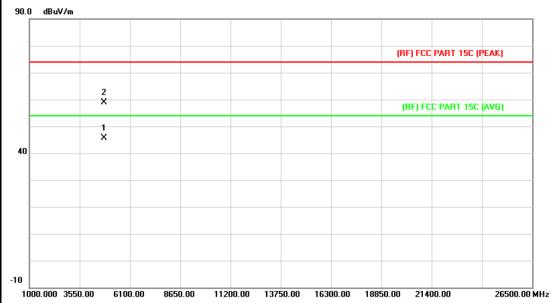


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.201	32.19	13.44	45.63	54.00	-8.37	AVG
2		4804.471	44.28	13.44	57.72	74.00	-16.28	peak



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	25 °C Relative Humidity: 55%					
Test Voltage:	DC 12V						
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2402MHz	TX 8-DPSK Mode 2402MHz					
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						

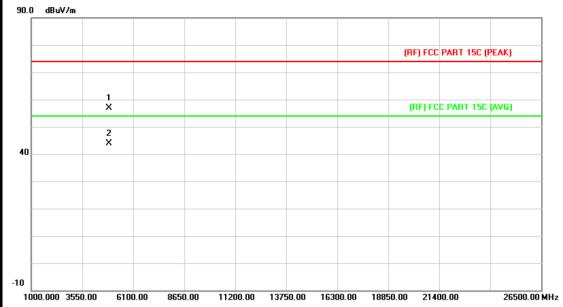


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.183	32.10	13.44	45.54	54.00	-8.46	AVG
2		4804.318	45.45	13.44	58.89	74.00	-15.11	peak



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EUT:	Car Radio	Model Name :	SW-620					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	DC 12V	DC 12V						
Ant. Pol.	Horizontal							
Test Mode:	TX 8-DPSK Mode 2441MHz		LINE .					
Remark: No report for the emission which more than 10 dB below the prescribed limit.								

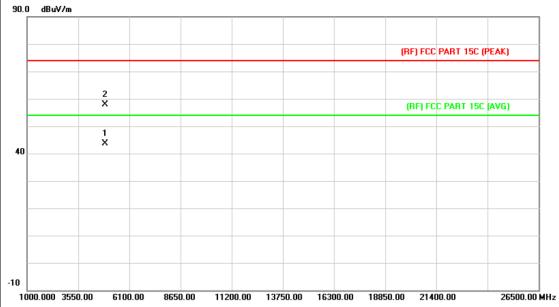


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.925	42.98	13.90	56.88	74.00	-17.12	peak
2	*	4882.198	29.95	13.90	43.85	54.00	-10.15	AVG



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Car Radio	Model Name :	SW-620					
25 ℃	Relative Humidity:	55%					
DC 12V	DC 12V						
Vertical							
TX 8-DPSK Mode 2441MHz		- FILLER					
Remark: No report for the emission which more than 10 dB below the prescribed limit.							
	25 °C DC 12V Vertical TX 8-DPSK Mode 2441MHz	25 °C Relative Humidity: DC 12V Vertical TX 8-DPSK Mode 2441MHz No report for the emission which more than 10 dB be					

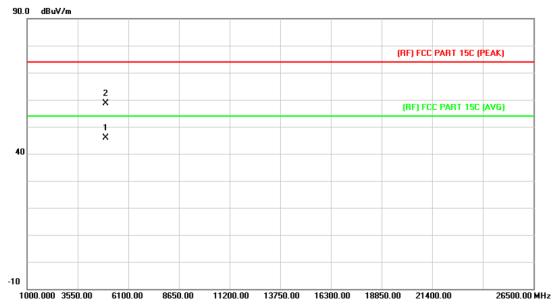


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.528	29.79	13.90	43.69	54.00	-10.31	AVG
2		4882.164	44.00	13.90	57.90	74.00	-16.10	peak



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EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V	V CO	(3/3)
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		LINE TO
Remark:	No report for the emission w prescribed limit.	hich more than 10 dB b	elow the

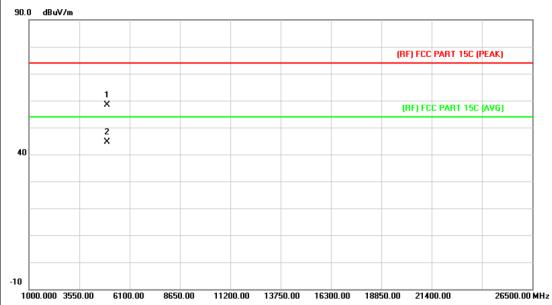


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.072	31.52	14.36	45.88	54.00	-8.12	AVG
2		4960.288	44.34	14.36	58.70	74.00	-15.30	peak



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EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V	1	
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2480MHz		- FILL
Remark:	No report for the emission w	hich more than 10 dB	below the
	prescribed limit.	The same	



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.361	44.05	14.36	58.41	74.00	-15.59	peak
2	*	4959.997	30.17	14.36	44.53	54.00	-9.47	AVG



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6. Restricted Bands Requirement

6.1 Test Standard and Limit

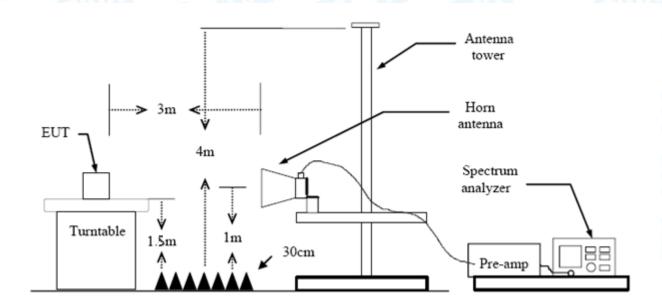
6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency	Class B (dBuV/m)(at 3m)				
Band (MHz)	Peak	Average			
2310 ~2390	74	54			
2483.5 ~2500	74	54			

Note: All restriction bands have been tested, only the worst case is reported.

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.



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(3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.4 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 KHz with Peak Detector for Average Values.

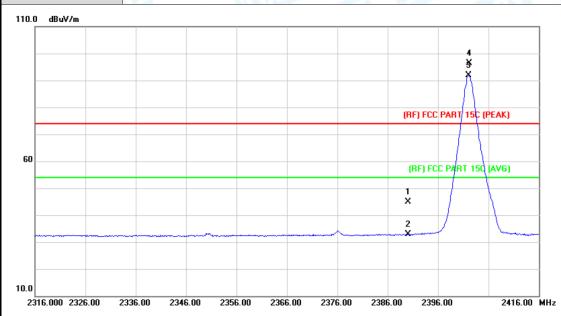
All restriction bands have been tested, only the worst case is reported.



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(1) Radiation Test

EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 12V	DC 12V					
Ant. Pol.	Horizontal		THE STATE OF THE PARTY OF THE P				
Test Mode:	TX GFSK Mode 2402MHz						
Remark:	N/A						

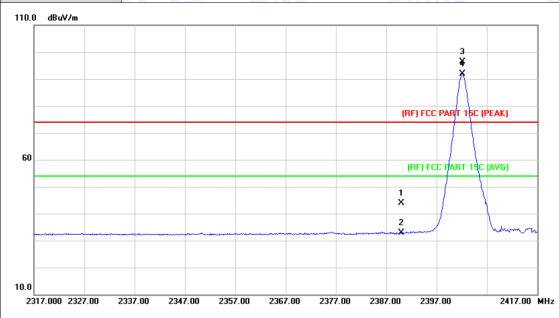


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	44.17	0.77	44.94	74.00	-29.06	peak
2		2390.000	32.02	0.77	32.79	54.00	-21.21	AVG
3	*	2402.100	91.09	0.82	91.91	Fundamental	Frequency	AVG
4	Χ	2402.200	95.55	0.82	96.37	Fundamental	Frequency	peak



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Į.	EUT:	Car Radio	Model Name :	SW-620				
	Temperature:	25 ℃	Relative Humidity:	55%				
	Test Voltage:	DC 12V						
	Ant. Pol.	Vertical	Vertical					
	Test Mode:	TX GFSK Mode 2402MHz						
	Remark:	N/A						

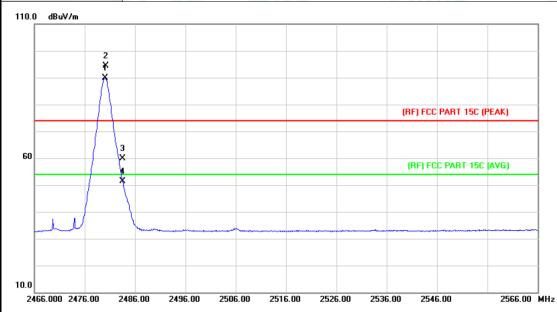


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.21	0.77	43.98	74.00	-30.02	peak
2		2390.000	32.00	0.77	32.77	54.00	-21.23	AVG
3	Х	2402.100	95.57	0.82	96.39	Fundamenta	Frequency	peak
4	*	2402.100	91.07	0.82	91.89	Fundamenta	l Frequency	AVG



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 12V	DC 12V					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480 MHz						
Remark:	N/A	The same					

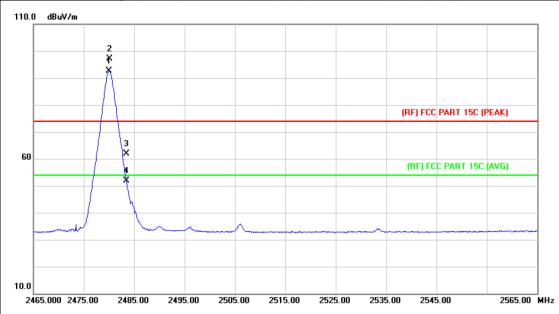


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	88.80	1.15	89.95	Fundamental	Frequency	AVG
2	Χ	2480.200	93.21	1.15	94.36	Fundamental	Frequency	peak
3		2483.500	58.76	1.17	59.93	74.00	-14.07	peak
4		2483.500	50.11	1.17	51.28	54.00	-2.72	AVG



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 12V	DC 12V					
Ant. Pol.	Vertical	W Co					
Test Mode:	TX GFSK Mode 2480 MHz	TX GFSK Mode 2480 MHz					
Remark:	N/A						

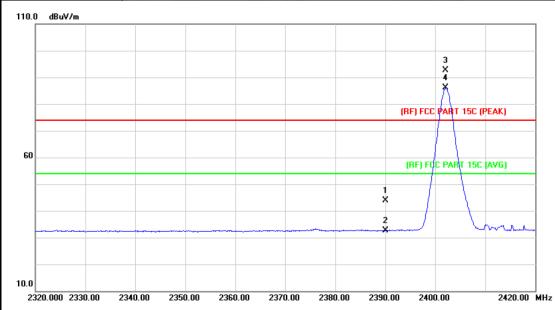


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	91.47	1.15	92.62	Fundamental	Frequency	AVG
2	Х	2480.200	95.93	1.15	97.08	Fundamental	Frequency	peak
3		2483.500	60.69	1.17	61.86	74.00	-12.14	peak
4		2483.500	50.63	1.17	51.80	54.00	-2.20	AVG



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EUT:	Car Radio	Model Name :	SW-620				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 12V	DC 12V					
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2402MHz	TX 8-DPSK Mode 2402MHz					
Remark:	N/A						

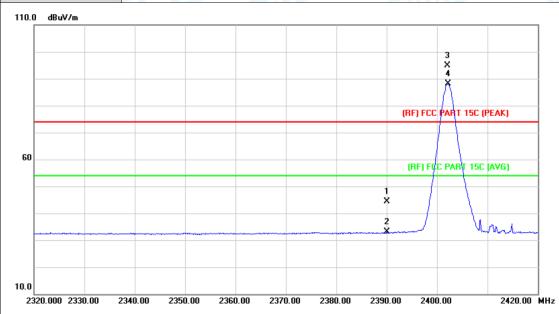


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.23	0.77	44.00	74.00	-30.00	peak
2		2390.000	31.97	0.77	32.74	54.00	-21.26	AVG
3	Х	2402.100	91.77	0.82	92.59	Fundamenta	I Frequency	peak
4	*	2402.100	85.24	0.82	86.06	Fundamenta	l Frequency	AVG



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EUT:	Car Radio	Model Name :	SW-620			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 12V					
Ant. Pol.	Vertical					
Test Mode:	TX 8-DPSK Mode 2402MHz					
Remark:	N/A					

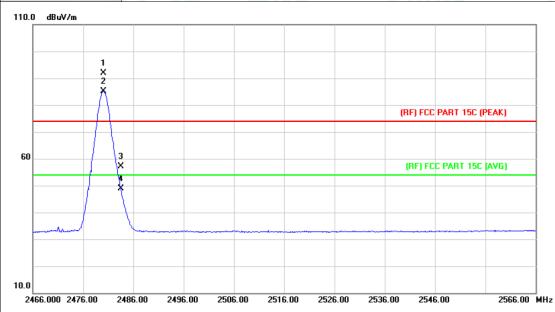


No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.50	0.77	44.27	74.00	-29.73	peak
2		2390.000	32.24	0.77	33.01	54.00	-20.99	AVG
3	Х	2402.100	94.00	0.82	94.82	Fundamental	l Frequency	peak
4	*	2402.200	87.24	0.82	88.06	Fundamental	l Frequency	AVG



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EUT:	Car Radio	Model Name :	SW-620		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 12V	DC 12V			
Ant. Pol.	Horizontal				
Test Mode:	TX 8-DPSK Mode 2480MH	TX 8-DPSK Mode 2480MHz			
Remark:	N/A				

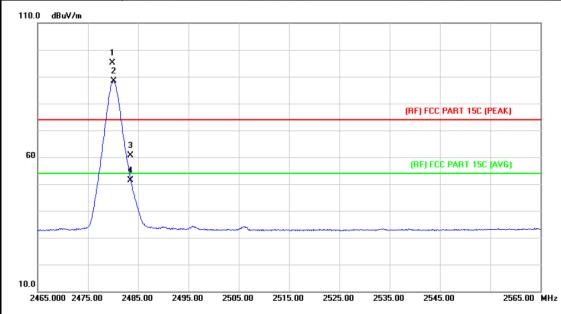


N	lo. Mł	κ. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2480.000	90.64	1.15	91.79	Fundamental	Frequency	peak
2	*	2480.100	84.10	1.15	85.25	Fundamental	Frequency	AVG
3		2483.500	56.04	1.17	57.21	74.00	-16.79	peak
4		2483.500	47.61	1.17	48.78	54.00	-5.22	AVG



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EUT:	Car Radio	Model Name :	SW-620	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	DC 12V			
Ant. Pol.	Vertical			
Test Mode:	TX 8-DPSK Mode 2480MH	TX 8-DPSK Mode 2480MHz		
Remark:	N/A	The same of the sa		



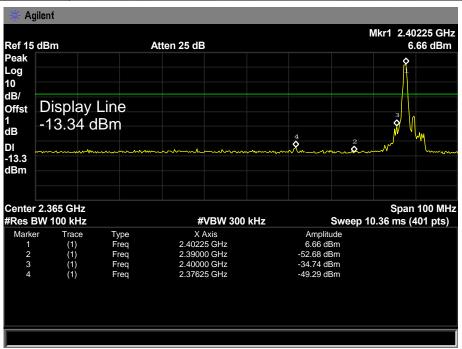
No. Mk. Fre		. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2479.900	94.00	1.15	95.15	Fundamental	Frequency	peak
2	*	2480.100	87.18	1.15	88.33	Fundamental	Frequency	AVG
3		2483.500	59.48	1.17	60.65	74.00	-13.35	peak
4		2483.500	50.09	1.17	51.26	54.00	-2.74	AVG

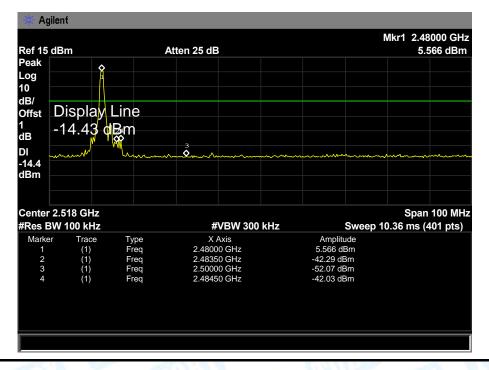




(2) Conducted Test

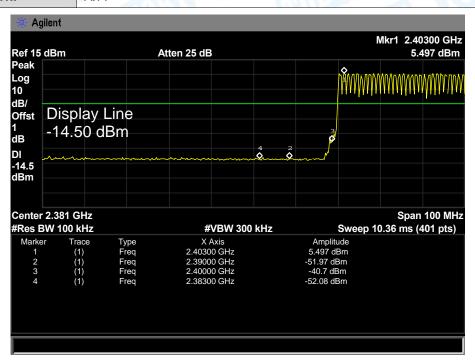
EUT:	Car Radio	Model Name :	SW-620	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	DC 12V	DC 12V		
Test Mode:	TX GFSK Mode 2402MHz / 24	TX GFSK Mode 2402MHz / 2480 MHz		
Remark:	N/A	The same of the sa		

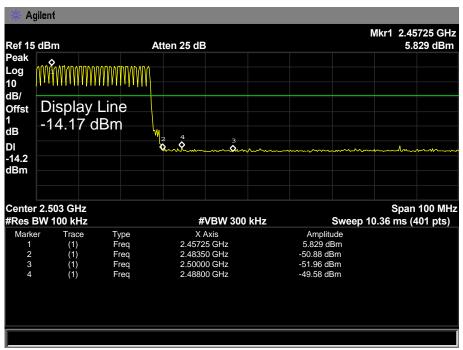






EUT:Car RadioModel Name :SW-620Temperature:25 °CRelative Humidity:55%Test Voltage:DC 12VTest Mode:GFSK Hopping ModeRemark:N/A







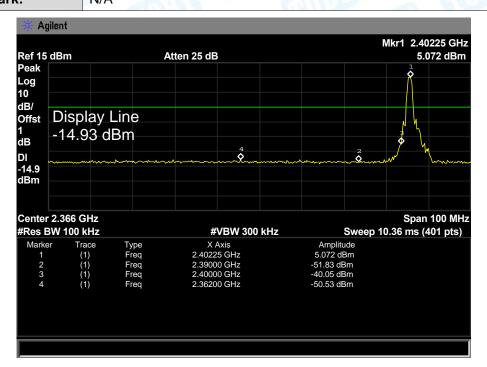
EUT: Car Radio Model Name : SW-620

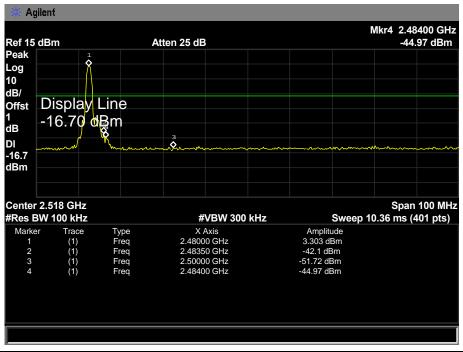
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: DC 12V

Test Mode: TX 8-DPSK Mode 2402MHz / 2480 MHz

Remark: N/A







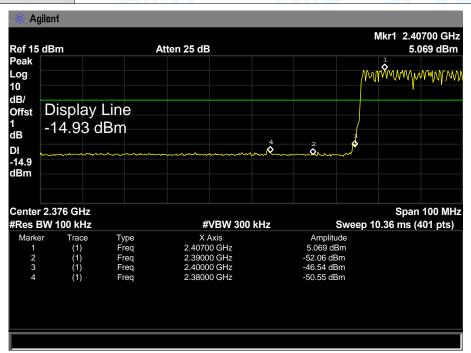
EUT: Car Radio Model Name : SW-620

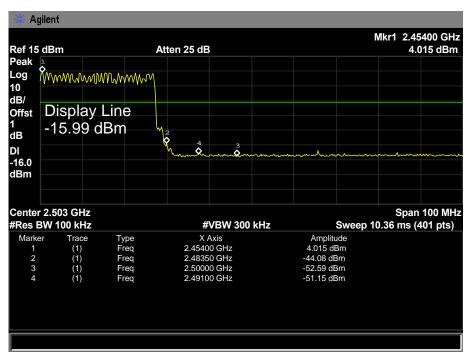
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: DC 12V

Test Mode: 8-DPSK Hopping Mode

Remark: N/A







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7. Number of Hopping Channel

7.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

7.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

7.5 Test Data

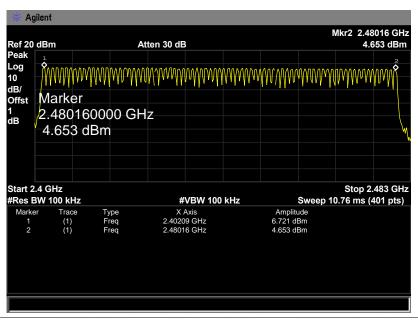


EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V		1.0

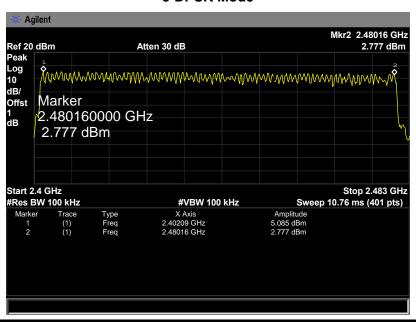
Test Mode: Hopping Mode (GFSK/ 8-DPSK)

Frequency Range	Quantity of Hopping Channel	Limit
2402MU- 2400MU-	79	>15
2402MHz~2480MHz	79	~15

GFSK Mode



8-DPSK Mode





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8. Average Time of Occupancy

8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247 (a)(1)

8.1.2 Test Limit

Section	Test Item	Limit	
15.247(a)(1)/ RSS-210	Average Time of	0.4.000	
Annex 8(A8.1d)	Occupancy	0.4 sec	

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

8.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

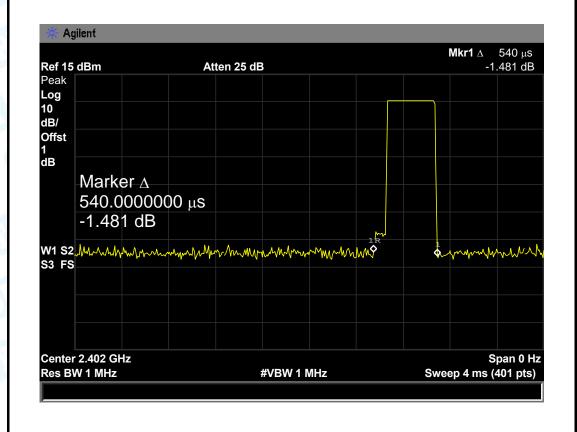


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8.5 Test Data

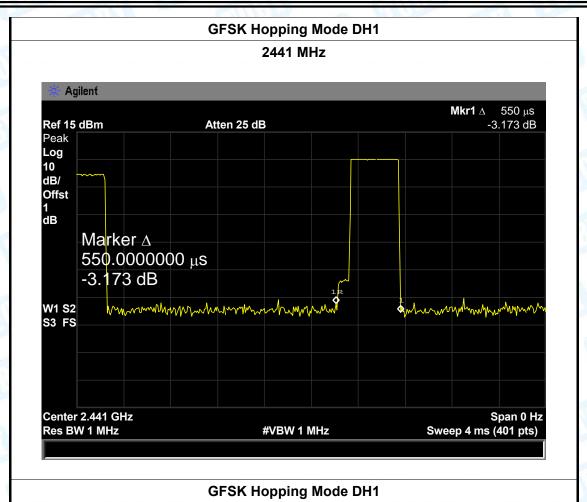
ì	EUT:		Car Radio		Model Name :		SW-620
	Temperature:		25 ℃		Relative Humidity:		55%
۱	Test Voltage:		DC 12V			1000	
	Test Mode:		Hopping N	Mode (GFSK DH1)	CHILD SE		A MILLS
	Channel Pu		lse Time	Total of Dwell	Period Time	Limit	Result
	(MHz)		(ms)	(ms)	(s)	(ms)	Nesuit
ľ	2402		0.540	172.80			
			0.550	176.00	31.60 400		PASS
			0.540	172.80			
	GESK Hopping Mode DH1						

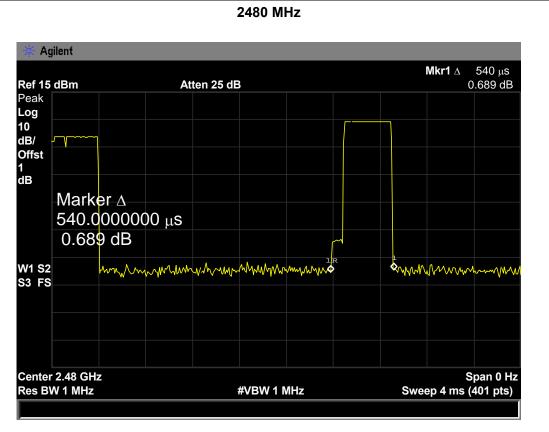
GFSK Hopping Mode DH1





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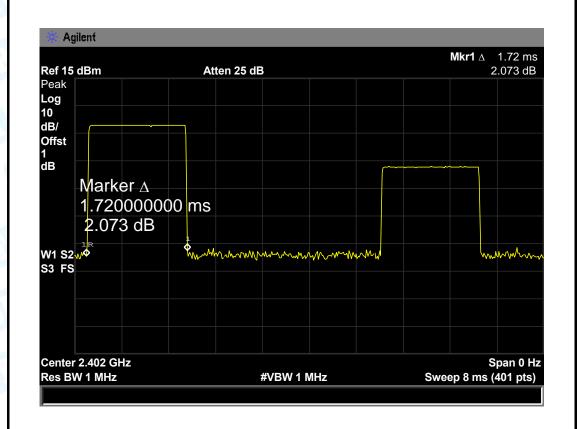




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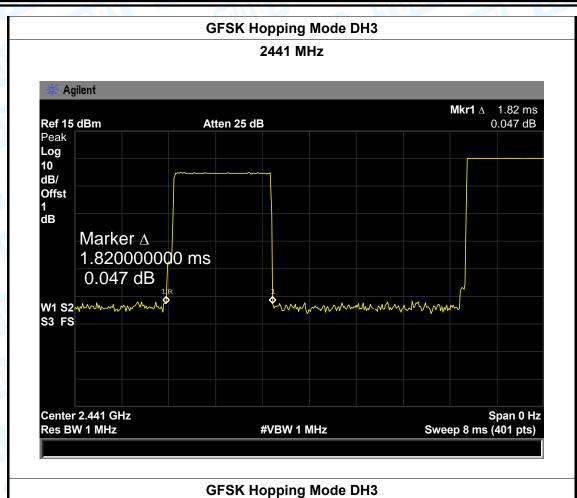
EUT:		Car Radio		Model Name :		SW-620
Temperature:	Temperature:			Relative	Humidity:	55%
Test Voltage:		DC 12V		630		
Test Mode:		Hopping I	Mode (GFSK DH3)		Alle	
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		1.720	275.20			
2441		1.820	291.20	31.60	400	PASS
2480		1.820	291.20			

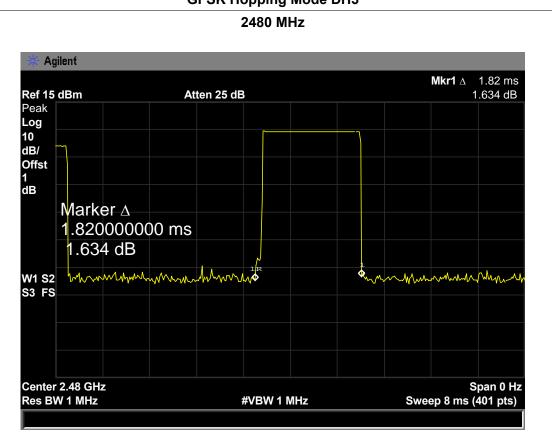
GFSK Hopping Mode DH3





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2480

3.060

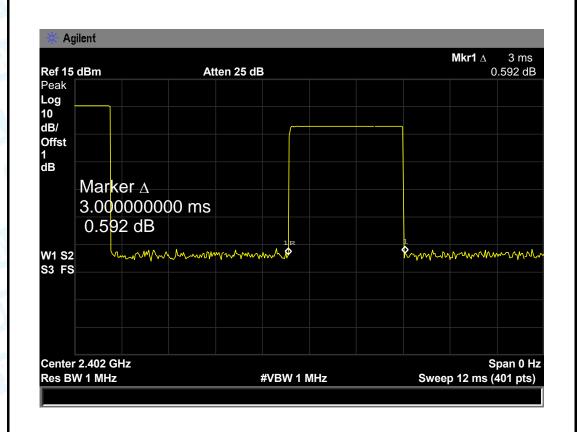
Report No.: TB-FCC145282

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EUT:	UT: Car Radio Model Name :		ame :	SW-620		
Temperature	:	25 ℃		Relative Humidity:		55%
Test Voltage: DC 12V						
Test Mode: Hopping		Hopping I	Mode (GFSK DH5)		Alle	
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		3.000	320.00			
2441		3.090	329.60	31.60	400	PASS

GFSK Hopping Mode DH5

326.40





GFSK Hopping Mode DH5 2441 MHz Agilent **Mkr1** Δ 3.09 ms Ref 15 dBm -1.418 dB Atten 25 dB Peak Log 10 dB/ Offst 1 dB Marker ∆ 3.090000000 ms -1.418 dB mm, marken was a surface with the surface was a surface with the surface w W1 S2 S3 FS Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 12 ms (401 pts) **GFSK Hopping Mode DH5** 2480 MHz Agilent **Mkr1** Δ 3.06 ms Ref 15 dBm Atten 25 dB -0.279 dB Peak Log 10 dB/ Offst 1 dB Marker A 3.060000000 ms -0.279 dB

&munhammon-much

#VBW 1 MHz

W1 S2 MM Mymphod

Center 2.48 GHz

Res BW 1 MHz

S3 FS

Span 0 Hz

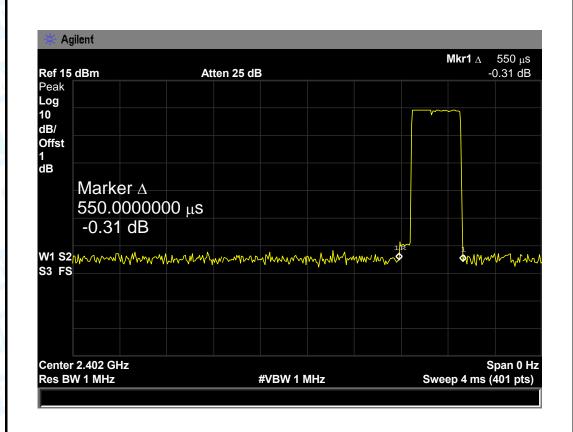
Sweep 12 ms (401 pts)



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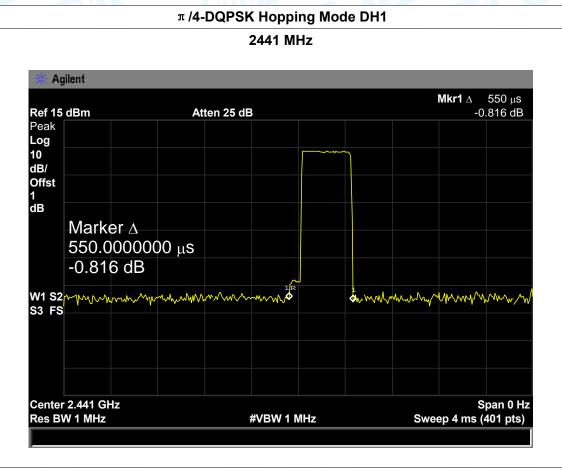
				25. 10.		
EUT:	: Car Radio		Model Name :		SW-620	
Temperature		25 ℃		Relative Hum	55%	
Test Voltage:		DC 12V		1		
Test Mode:		Hopping N	Mode (π/4-DQPSK D	DH1)	100	
Channel	Pu	lse Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		0.550	176.00			
2441		0.550	176.00	31.60	400	PASS
2480		0.550	176.00			
				·		

π /4-DQPSK Hopping Mode DH1

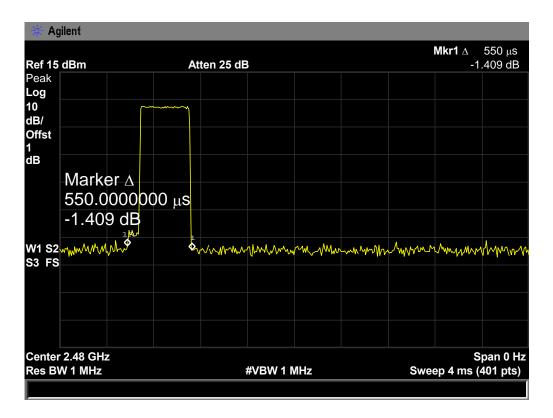




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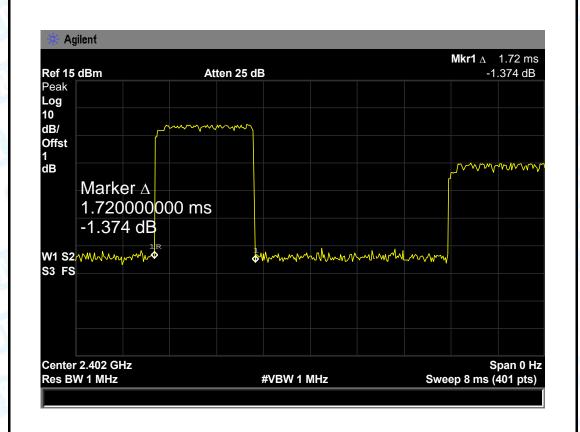




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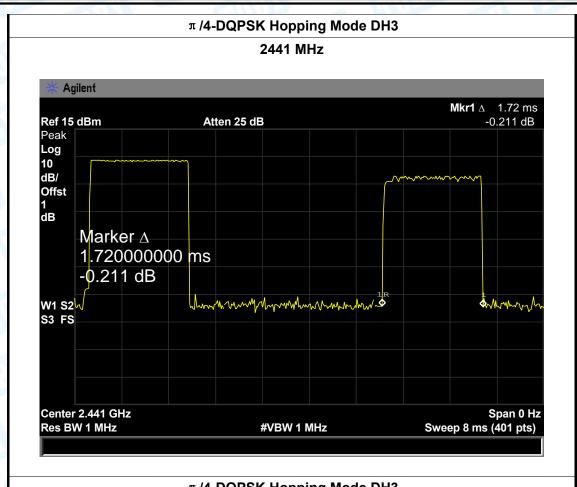
EUT:		Car Radio	LINI.	Model Name	:	SW-620
Temperature	:	25 ℃		Relative Hum	idity:	55%
Test Voltage:		DC 12V	W. Comment			
Test Mode:		Hopping N	Mode (π/4-DQPSK	DH3)	Rillian	
Channel	Pu	lse Time	Total of Dwell	Period Time	Limit	Result
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		1.720	275.2			
2441		1.720	275.2	31.60	400	PASS
2480		1.800	288.00			
		_	// DODOK Harris	. Marila Dillo		•

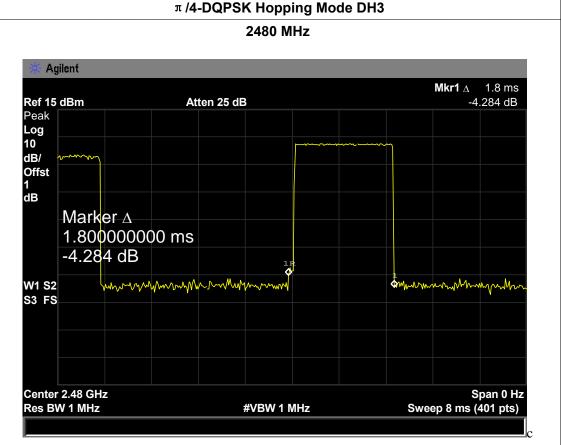
π /4-DQPSK Hopping Mode DH3





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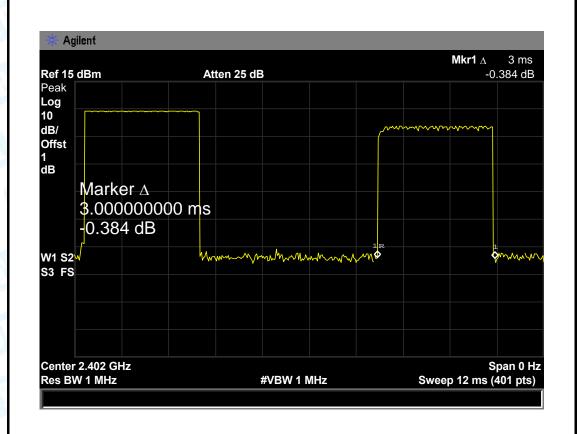




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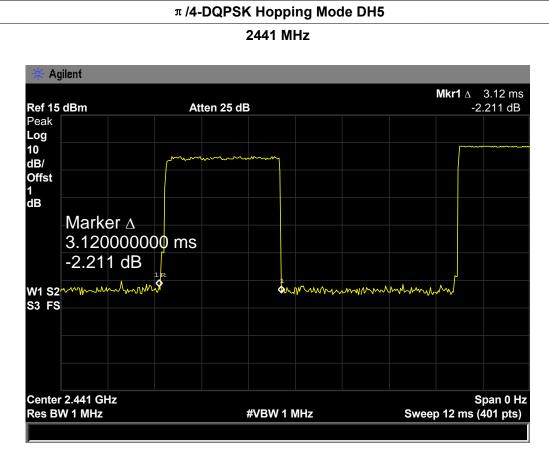
EUT:		Car Radio		Model Name	:	SW-620
Temperature		25 ℃		Relative Humidity: 5		55%
Test Voltage:		DC 12V				
Test Mode:		Hopping N	Mode (π/4-DQPSK D	DH5)	S. Comment	
Channel	Pu	Ise Time	Total of Dwell	Period Time	Limit	Decult
(MHz)		(ms)	(ms)	(s)	(ms)	Result
2402		3.000	320.00			
2441		3.120	332.80	31.60	400	PASS
2480		3.090	329.60			
	ı	π	//_DODSK Honning	Mode DH5		1

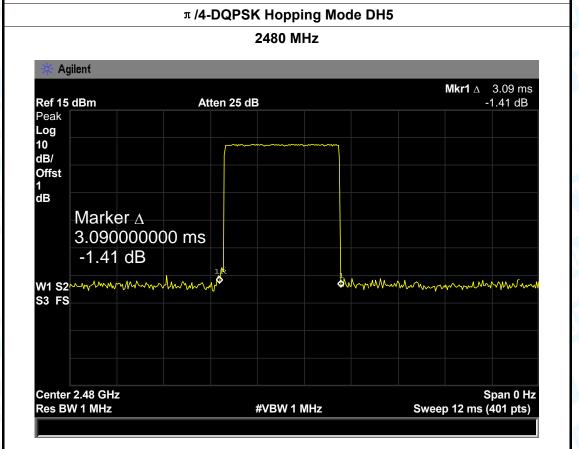
π /4-DQPSK Hopping Mode DH5





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π /4-DQPSK Hopping Mode DH5







2480

0.550

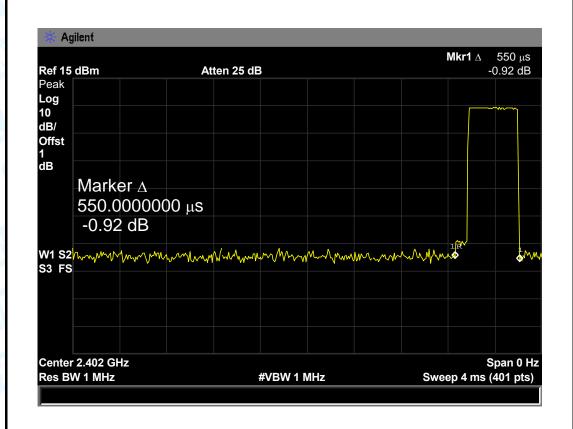
Report No.: TB-FCC145282

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EUT:	T: Car Radio			Model Na	ame :	SW-620	
Temperature:		25 °C Relative Humidity:			Humidity:	55%	
Test Voltage:		DC 12V	TV TV				
Test Mode:		Hopping I	Mode (8-DPSK DH1)		Alle		
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result	
2402		0.550	176.00				
2441		0.550	176.00	31.60	400	PASS	

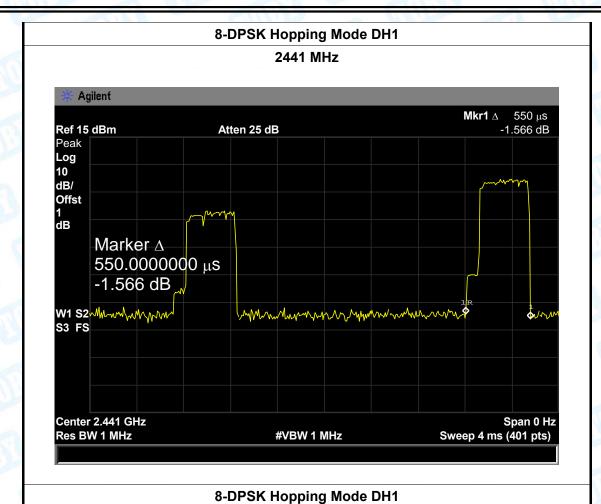
8-DPSK Hopping Mode DH1

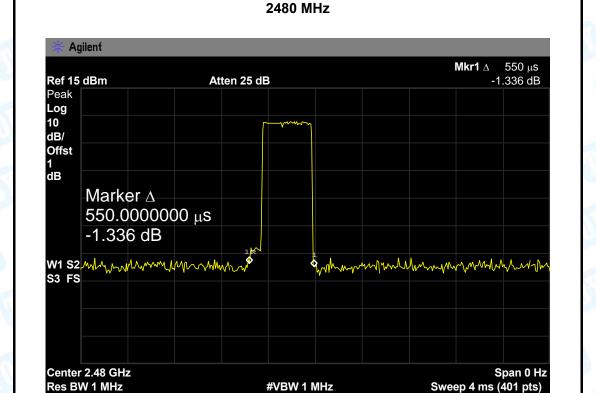
176.00





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2441

2480

1.820

1.820

Report No.: TB-FCC145282

PASS

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EUT:		Car Radio		Model Na	ame :	SW-620
Temperature		25 ℃		Relative	Humidity:	55%
Test Voltage:		DC 12V	TO THE			
Test Mode:		Hopping I	Mode (8-DPSK DH3)		Alle	
Channel (MHz)	Pu	lse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402		1.820	291.20			

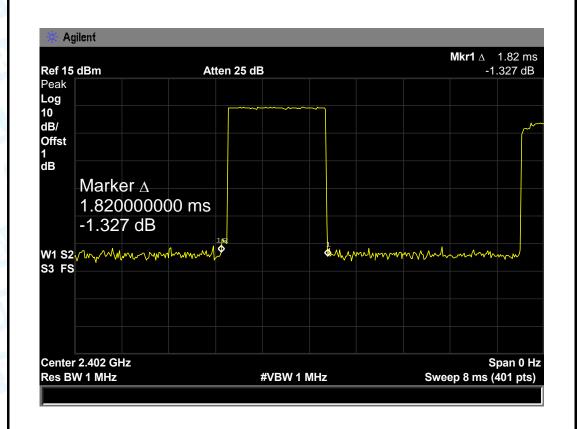
8-DPSK Hopping Mode DH3

31.60

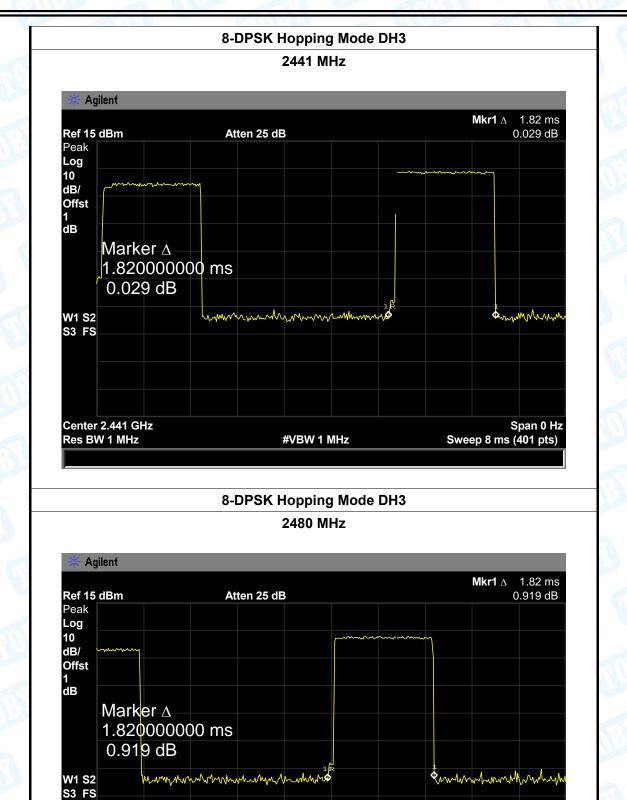
400

291.20

291.20







#VBW 1 MHz

Center 2.48 GHz

Res BW 1 MHz

Span 0 Hz

Sweep 8 ms (401 pts)



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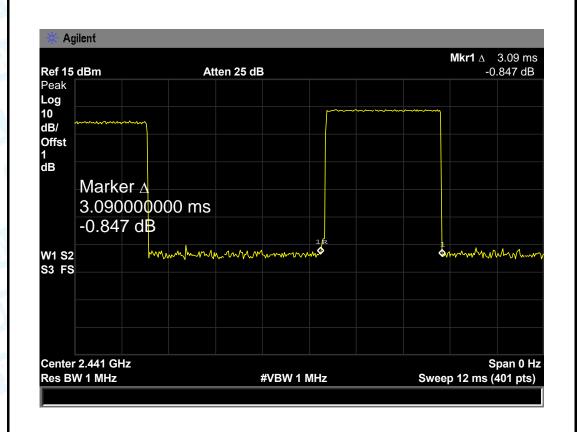
Channel (MHz)	Pulse Time	Total of Dwell (ms)	Period Time	Limit	Result	
Test Mode:	Hopping	Mode (8-DPSK DH5)		Alle		
Test Voltage:	DC 12V	The same of the sa	6		3	
Temperature:	25 ℃		Relative H	lumidity:	55%	
EUT:	Car Radio		Model Nar	ne :	SW-620	

 Channel (MHz)
 Pulse Time (ms)
 Total of Dwell (ms)
 Period Time (s)
 Limit (ms)
 Result

 2402
 3.090
 329.60
 31.60
 400
 PASS

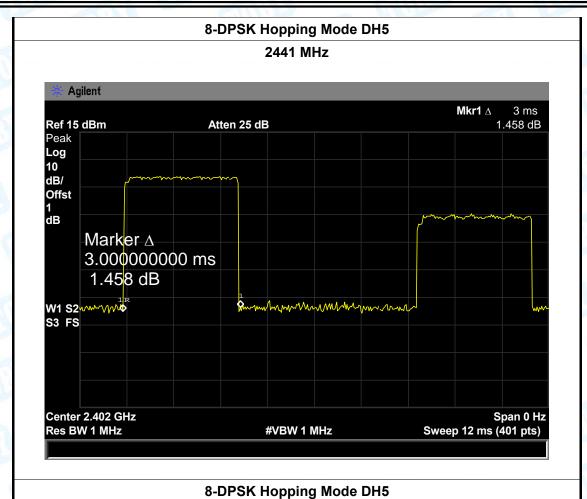
 2480
 3.090
 329.60
 329.60
 400
 PASS

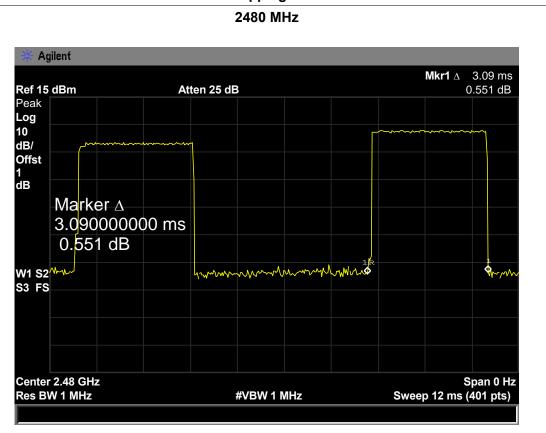
8-DPSK Hopping Mode DH5





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9. Channel Separation and Bandwidth Test

9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	<=1 MHz (20dB bandwidth)	2400~2483.5
Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

9.2 Test Setup



9.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Channel Separation: RBW=30 kHz, VBW=100 kHz.

Bandwidth: RBW=30 kHz, VBW=100 kHz.

- (3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
 - (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

9.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

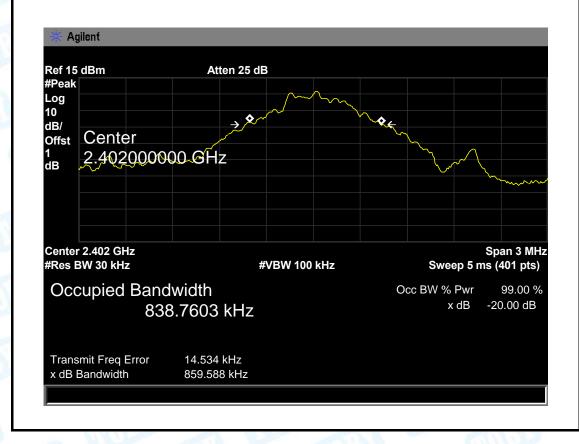


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9.5 Test Data

EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V		
Test Mode:	TX Mode (GFSK)	CHILD ST	2 110
Channel frequence		20dB Bandwidth (kHz)	20dB Bandwidth *2/3
(MHz)	(kHz)	(KIIZ)	(kHz)
(MHZ) 2402	838.7603	859.588	(kHz)
,		. ,	(kHz)
2402	838.7603	859.588	(kHz)

GFSK TX Mode

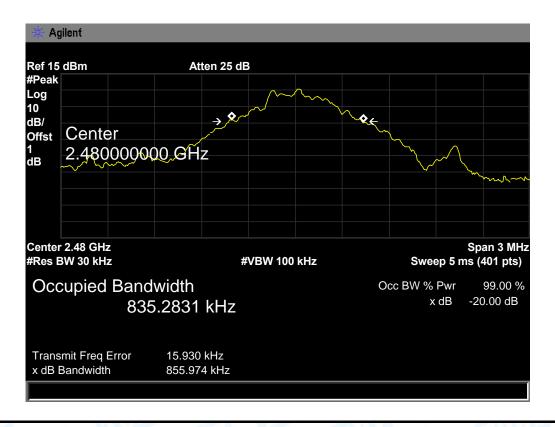






GFSK TX Mode 2441 MHz Agilent Ref 15 dBm Atten 25 dB #Peak Log 10 **⇒ &** dB/ Center Offst 2.441000000 GHz 1 dB Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth 99.00 % Occ BW % Pwr x dB -20.00 dB 832.2516 kHz Transmit Freq Error 14.476 kHz x dB Bandwidth 857.241 kHz

GFSK TX Mode



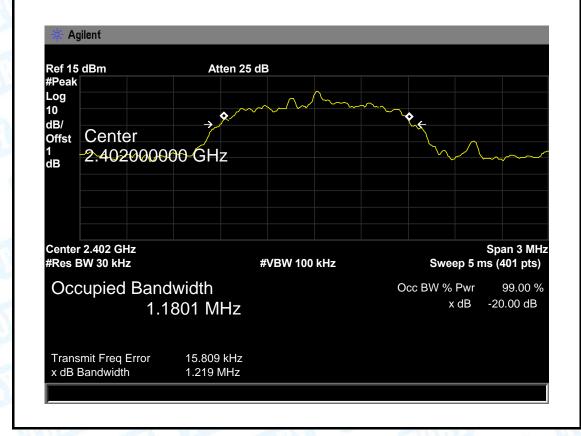


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Channel frequence	99% OBW	20dB Bandwidth	20dB
Test Mode:	TX Mode (π /4-DQPSK)		
Test Voltage:	DC 12V		03
Temperature:	25 ℃	Relative Humidity:	55%
EUT:	Car Radio	Model Name :	SW-620

Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1180.10	1219.00	812.67
2441	1170.20	1218.00	812.00
2480	1161.10	1208.00	805.33

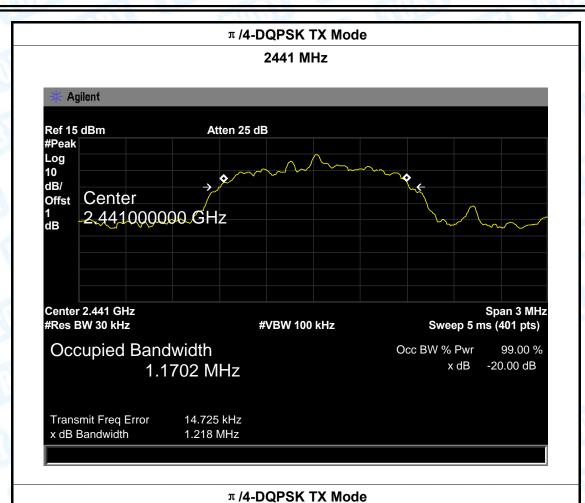
π/4-DQPSK TX Mode

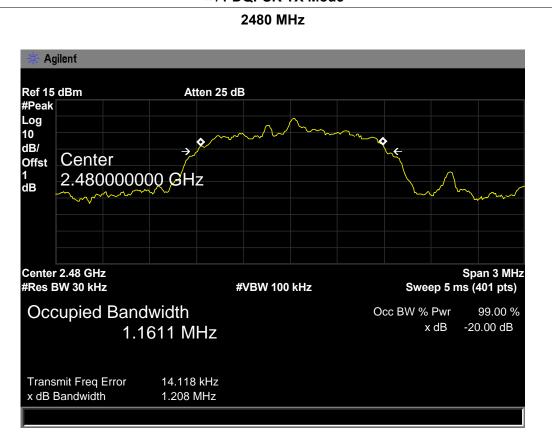




TOBY

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2480

Report No.: TB-FCC145282

808.67

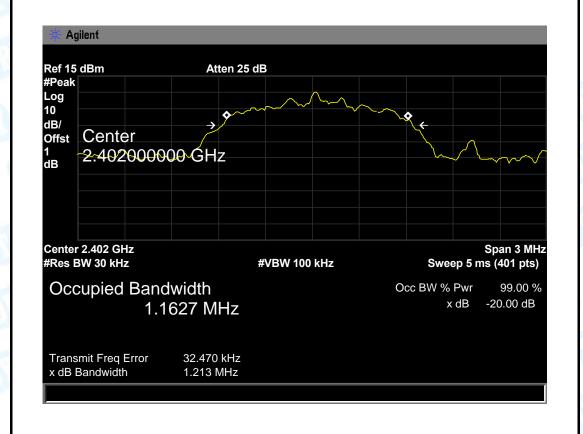
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EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V	TO THE REAL PROPERTY.	133
Test Mode:	TX Mode (8-DPSK)		
Channel frequen	cy 99% OBW	20dB Bandwidth	20dB
(MHz)	(kHz)	(kHz)	Bandwidth *2/3
			(kHz)
2402	1162.70	1213.00	808.67
2441	1153.20	1212.00	808.00

8-DPSK TX Mode 2402 MHz

1213.00

1147.60







8-DPSK TX Mode 2441 MHz Agilent Ref 15 dBm Atten 25 dB #Peak Log 10 dB/ Center Offst 2.441000000 GHz 1 dB Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth 99.00 % Occ BW % Pwr x dB -20.00 dB 1.1532 MHz Transmit Freq Error 33.258 kHz x dB Bandwidth 1.212 MHz 8-DPSK TX Mode

2480 MHz Agilent Ref 15 dBm Atten 25 dB #Peak Log 10 dB/ Center Offst 2.480000000 GHz 1 dB Center 2.48 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB 1.1476 MHz

Transmit Freq Error

x dB Bandwidth

31.889 kHz

1.213 MHz



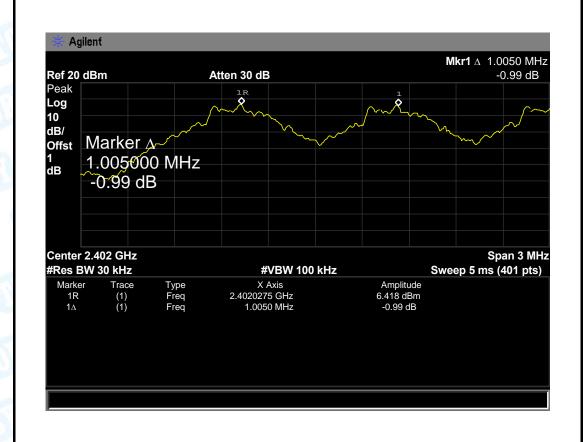
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EUT:	Car Radio	Model Name :	SW-620
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 12V		TIMIT TO

Test Mode: Hopping Mode (GFSK)

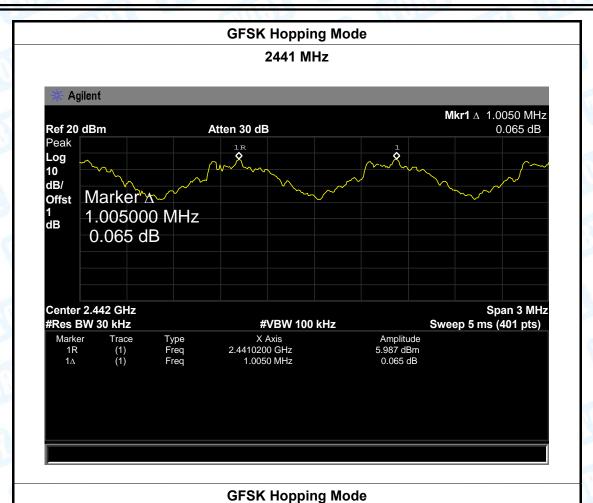
Channel frequency (MHz)	Separation Read Value	Separation Limit (kHz)
	(kHz)	
2402	1005.00	859.588
2441	1005.00	857.241
2480	1005.00	855.974

GFSK Hopping Mode







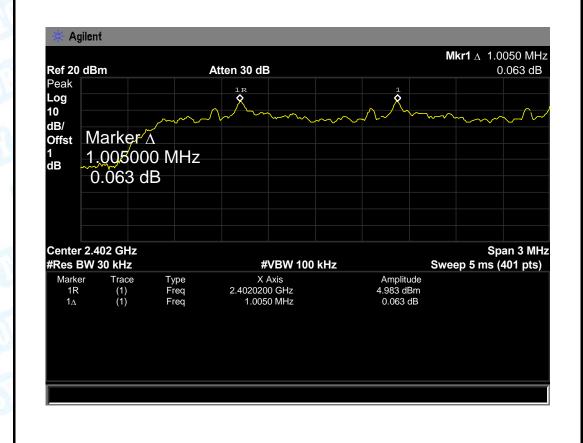


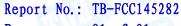




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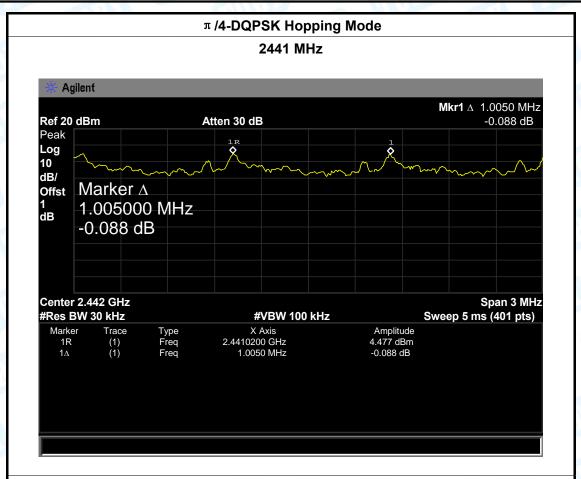
EUT:	Car Radio	The same	Model	Name :	SW-620
Temperature:	25 ℃		Relativ	e Humidity:	55%
Test Voltage:	DC 12V				3
Test Mode:	Hopping N	Mode (π/4-DQPSK)		A WILL	
Channel frequen	cy (MHz)	Separation Read V	alue	Separation	Limit (kHz)
		(kHz)			
2402		1005.00		812	2.67
2441		1005.00		812	2.00
2480		1005.00		805	5.33
		π /4-DQPSK Hopping	Mode		



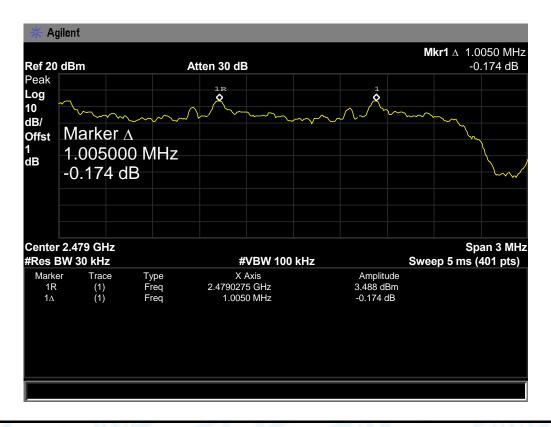




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$\pi\,\text{/4-DQPSK}$ Hopping Mode



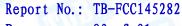


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EUT:	Car Radio		Model	Name :	SW-620
Temperature:	25 ℃		Relativ	e Humidity:	55%
Test Voltage:	DC 12V	No.			
Test Mode:	Hopping N	Mode (8-DPSK)		A Million	
Channel frequen	cy (MHz)	Separation Read V	alue	Separation	Limit (kHz)
		(kHz)			
2402		1005.00		808	3.67
2441		1005.00		808	3.00
2480		1005.00		808	3.67
		8-DPSK Hopping N	lode		

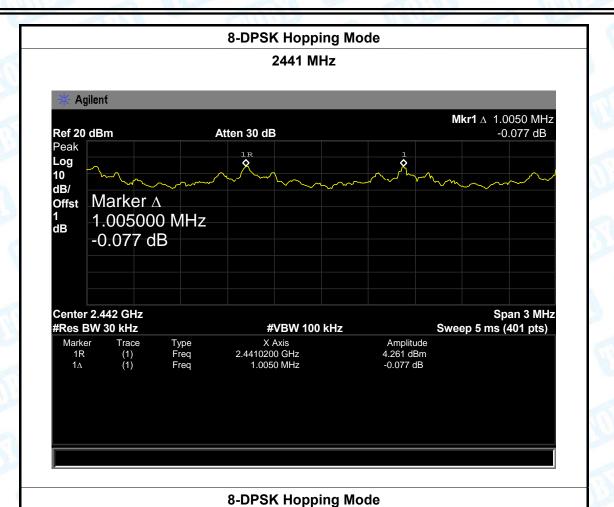


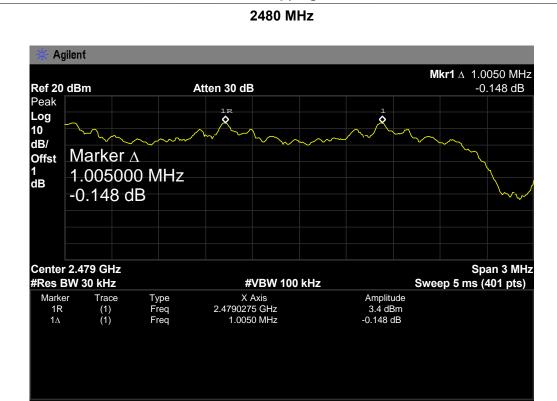






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10. Peak Output Power Test

10.1 Test Standard and Limit

10.1.1 Test Standard FCC Part 15.247 (b) (1)

10.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm)	2400~2483.5
0.000	Other <125 mW(21dBm)	

10.2 Test Setup



10.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz. RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

10.4 EUT Operating Condition

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



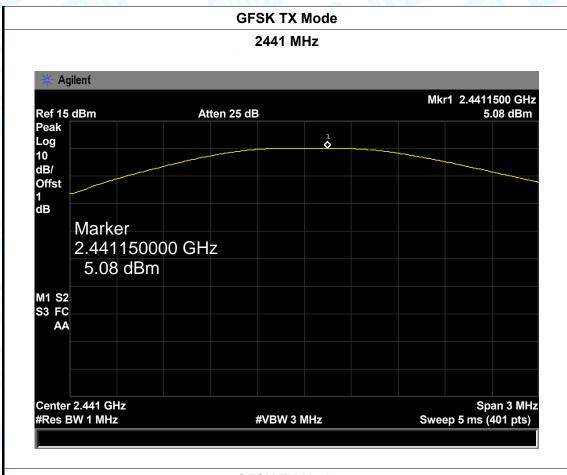
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10.5 Test Data

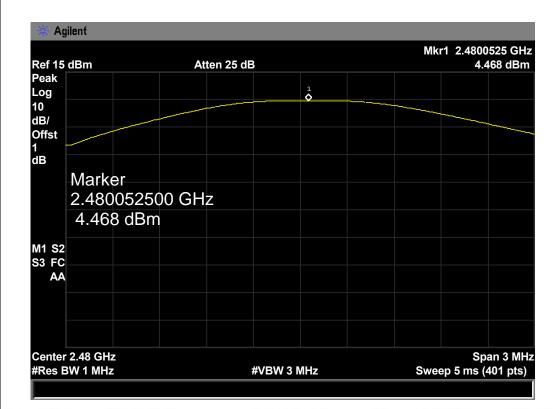
Temperature: 25 °C Relative Humidity: 55% Test Voltage: DC 12V Test Mode: TX Mode (GFSK) Channel frequency (MHz) Test Result (dBm) Limit (dBm) 2402 5.451 2441 5.080 21 2480 4.468 4.468 4.468 GFSK TX Mode 2402 MHz	EUT:	Car Radio		Model Name :	SW-620
Test Mode: TX Mode (GFSK) Channel frequency (MHz) Test Result (dBm) Limit (dBm) 2402 5.451 2441 5.080 21 2480 4.468 GFSK TX Mode	Temperature:	25 ℃	- EUL	Relative Humidity	: 55%
Channel frequency (MHz) Test Result (dBm) Limit (dBm) 2402 5.451 2441 5.080 21 2480 4.468 GFSK TX Mode GFSK TX Mode	Гest Voltage:	DC 12V		WILL STATE	MAGE
2402 5.451 2441 5.080 21 2480 4.468 GFSK TX Mode	Test Mode:	TX Mode (0	GFSK)		
2441 5.080 21 2480 4.468 GFSK TX Mode	Channel freque	ncy (MHz)	Test Result (dB	m) Lim	it (dBm)
2480 4.468 GFSK TX Mode	2402		5.451		
GFSK TX Mode	2441		5.080		21
	2480		4.468		
2402 MHz		<u>'</u>	GFSK TX Mod	е	
			2402 MHz		
* Agilent	* Agilent		2402 MHz		
Mkr1 2.4021875 GH			_	Mkr1	
-	Ref 15 dBm		Atten 25 dB		



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GFSK TX Mode

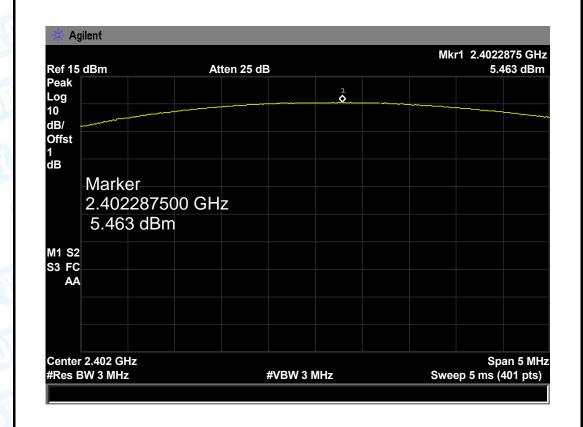




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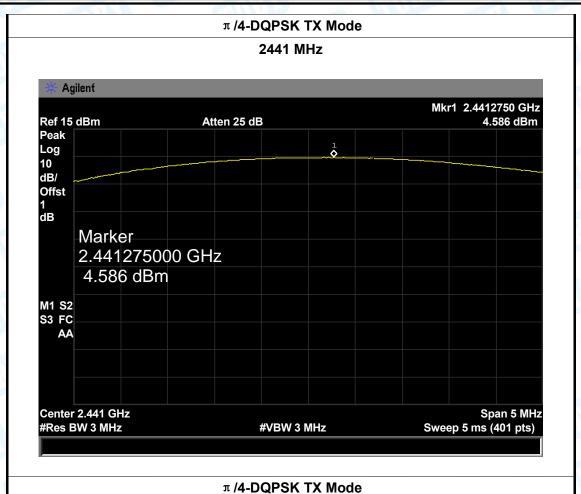
EUT:	Car Radio	Model Name :		SW-620
Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage:	DC 12V			
Test Mode:	TX Mode	(π/4-DQPSK)		
Channel frequen	Channel frequency (MHz) Test Result (dBm)		dBm) Lin	nit (dBm)
2402		5.463		
2441		4.586	4.586 21 3.645	
2480		3.645		
		π /4-DOPSK TX	Mode	

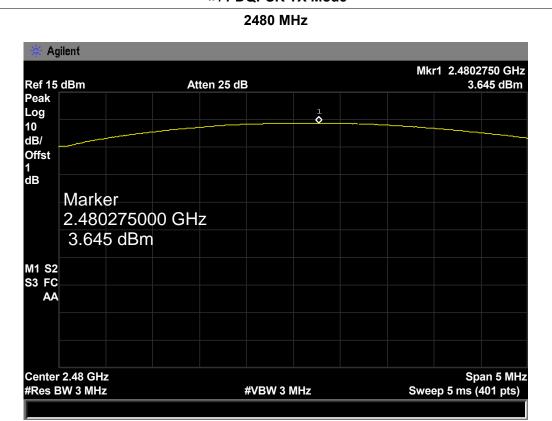
π/4-DQPSK TX Mode





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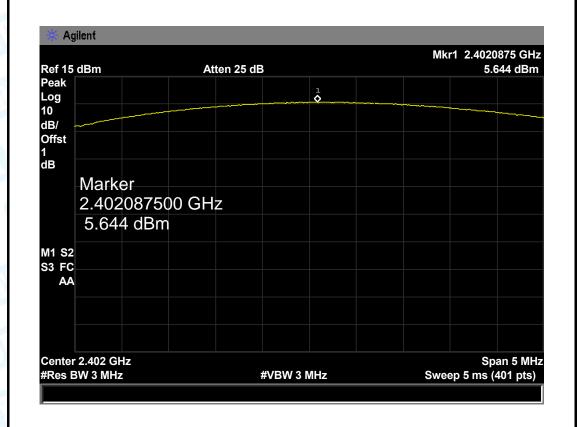




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EUT:	Car Radio M		Model Name :	SW-620
Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage:	DC 12V	W. Comment		33
Test Mode:	TX Mode	(8-DPSK)		
Channel frequen	cy (MHz)	Test Result (d	dBm) Lir	nit (dBm)
2402		5.644		
2441		4.909	4.909 21 4.132	
2480		4.132		
		8-DDSK TY M	lode	

8-DPSK TX Mode





8-DPSK TX Mode 2441 MHz Agilent Mkr1 2.4412250 GHz 4.909 dBm Ref 15 dBm Atten 25 dB Peak Log 1 **Q** 10 dB/ Offst 1 dB Marker 2.441225000 GHz 4.909 dBm

M1 S2 S3 FC AA

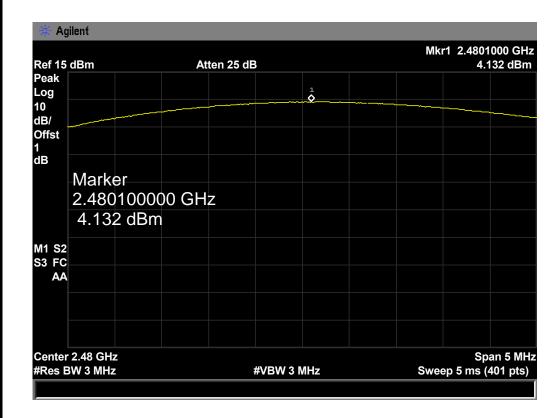
Center 2.441 GHz

#Res BW 3 MHz

8-DPSK TX Mode

#VBW 3 MHz

2480 MHz



Span 5 MHz

Sweep 5 ms (401 pts)



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11. Antenna Requirement

11.1 Standard Requirement

11.1.1 Standard FCC Part 15.203

11.1.2 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.

11.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

The EUT antenna is a PCB antenna. It complies with the standard requirement.

	Antenna Type
en en	▼ Permanent attached antenna
	□ Unique connector antenna
1	☐ Professional installation antenna