

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Continental Automotive GmbH

CAR RADIO

Model Number: CRD4512UBA-OR

Additional Model: CR4512UBA-OR, TR4512UBA-OR, CRD4512UBA/AGC,

CR4512UBA/AGC, CR4511UA-OR, CRD4512UBA/KOM,

CRD4512UBA/CLA, CR4512UBA/CLA, CRD4512UBA/SDF,

CR4512UBA/SDF, CRD4612UBA, CR4612UBA, CRD4612UBA/KOM,

CRD4612UBA/PRI

FCC ID: Y7O-CRD4512UBA-OR

Prepared for:	Continental Automotive GmbH
	Philipsstrasse 1, Wetzlar, Germany 35576
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
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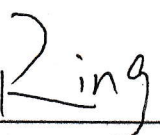
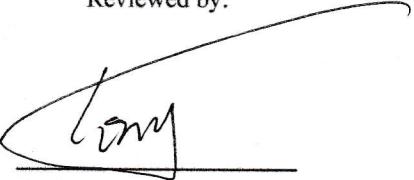
Report Number:	ESTE-R1904023
Date of Test:	Mar. 11~Apr. 08, 2019
Date of Report:	Apr. 10, 2019

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EST Technology Co., Ltd.

Applicant:	Continental Automotive GmbH		
Address:	Philipsstrasse 1, Wetzlar, Germany 35576		
Manufacturer:	Continental Automotive GmbH		
Address:	Philipsstrasse 1, Wetzlar, Germany 35576		
E.U.T:	CAR RADIO		
Model Number:	CRD4512UBA-OR		
Additional Model:	CR4512UBA-OR, TR4512UBA-OR, CRD4512UBA/AGC, CR4512UBA/AGC, CR4511UA-OR, CRD4512UBA/KOM, CRD4512UBA/CLA, CR4512UBA/CLA, CRD4512UBA/SDF, CR4512UBA/SDF, CRD4612UBA, CR4612UBA, CRD4612UBA/KOM, CRD4612UBA/PRI (Except for the trademark and model name, the rest is identical.)		
Power Supply:	DC 12V		
Test Voltage:	DC 12V		
Trade Name:	Continental, AGCO, KUBOTA, Komatsu Forest, Claas, SDF, PRINOTH		
Date of Receipt:	Mar. 11, 2019	Date of Test:	Mar. 11~Apr. 08, 2019
Test Specification:	FCC Rules and Regulations Part 15 Subpart C:2018 ANSI C63.10:2013		
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.		
Prepared by:	Reviewed by:	Date: Apr. 10, 2019	
 Ring / Assistant	 Tony / Engineer	 Approved by: _____ International Manager	
Other Aspects:	None.		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	CAR RADIO
FCC ID	:	Y7O-CRD4512UBA-OR
Model Number	:	CRD4512UBA-OR
Operation frequency	:	2402MHz~2480MHz
Number of channel	:	79
Antenna	:	Internal antenna (Antenna Gain: 0 dBi)
Modulation	:	BT BDR: GFSK BT EDR: $\pi/4$ -DQPSK BT EDR: 8-DPSK
Sample Type	:	Prototype production

2. SUMMARY OF TEST

2.1. Summary of test result

Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) KDB 558074	PASS
20dB Bandwidth	FCC Part 15: 15.247a1 KDB 558074	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) KDB 558074	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) KDB 558074	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) KDB 558074	PASS
Radiated Emissions	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10:2013 KDB 558074	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) KDB 558074	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10:2013 KDB 558074	N/A
Antenna requirement	FCC Part 15: 15.203	PASS
Note: KDB 558074 D01 15.247 Meas Guidance v05		

2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
Date of registration: November 13, 2017

Certificated by FCC, USA
Designation Number: CN1215
Test Firm Registration Number: 722932
Date of registration: November 21, 2017

Certificated by A2LA, USA
Registration No.: 4366.01
Date of registration: November 07, 2017

Certificated by Industry Canada
CAB identifier No.: CN0035
Date of registration: January 04, 2019

Certificated by VCCI, Japan
Registration No.: R-13663; C-14103
Date of registration: July 25, 2017
This Certificate is valid until: July 24, 2020

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L2-64
Date of registration: April 28, 2011

Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	$\pm 3.48\text{dB}$
Uncertainty for spurious emissions test (30MHz-1GHz)	$\pm 4.60\text{ dB(Polarize: H)}$
	$\pm 4.68\text{ dB(Polarize: V)}$
Uncertainty for spurious emissions test (1GHz to 18GHz)	$\pm 4.96\text{dB}$
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

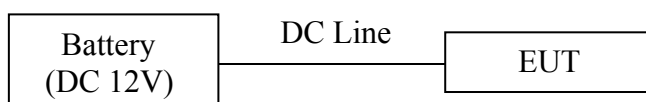
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

2.4. Assistant equipment used for test

2.4.1. N/A

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into Bluetooth test mode by software before test.



(EUT: CAR RADIO)

2.6. Test mode

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Mode	Channel	Frequency
GFSK	Low	2402MHz
	Middle	2441MHz
	High	2480MHz
8-DPSK	Low	2402MHz
	Middle	2441MHz
	High	2480MHz
Note:GFSK,8-DPSK, $\pi/4$ -DQPSK modes all have been tested , only worse case GFSK,8-DPSK is reported.		

2.7. Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2402	2	2403	3	2404	4	2405
5	2406	6	2407	7	2408	8	2409
9	2410	10	2411	11	2412	12	2413
13	2414	14	2415	15	2416	16	2417
17	2418	18	2419	19	2420	20	2421
21	2422	22	2423	23	2424	24	2425
25	2426	26	2427	27	2428	28	2429
29	2430	30	2431	31	2432	32	2433
33	2434	34	2435	35	2436	36	2437
37	2438	38	2439	39	2440	40	2441
41	2442	42	2443	43	2444	44	2445
45	2446	46	2447	47	2448	48	2449
49	2450	50	2451	51	2452	52	2453
53	2454	54	2455	55	2456	56	2457
57	2458	58	2459	59	2460	60	2461
61	2462	62	2463	63	2464	64	2465
65	2466	66	2467	67	2468	68	2469
69	2470	70	2471	71	2472	72	2473
73	2474	74	2475	75	2476	76	2477
77	2478	78	2479	79	2480	-	-

2.8. Test Equipment

2.8.1. For conducted emission test

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	CEPREI	June 15,18	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	101260	CEPREI	June 15,18	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101100	CEPREI	June 15,18	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.2. For radiated emission test(9 kHz-30MHz)

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	101780	CEPREI	June 15,18	1 Year
Active Loop Antenna	SCHWARZB ECK	FMZB 1519B	1519B-088	N/A	Aug. 01,18	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.3. For radiated emissions test (30-1000MHz)

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	101780	CEPREI	June 15,18	1 Year
Bilog Antenna	Teseq	CBL 6111D	27090	CEPREI	June 15,18	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.4. For radiated emission test(above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	BBHA9120D1002	CEPREI	June 18,18	1 Year
Horn Antenna	SCHWARZB ECK	BBHA9170	BBHA9170242	CEPREI	June 18,18	1 Year
Signal Amplifier	SCHWARZB ECK	BBV9718	9718-212	CEPREI	June 15,18	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV	103173	CEPREI	June 15,18	1 Year
PSA Series Spectrum Analyzer	Agilent	E4447A	MY50180031	CEPREI	June 15,18	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

2.8.5. For connect EUT antenna terminal test

Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSV	103173	CEPREI	June 15,18	1 Year
Spectrum Analyzer	Agilent	E4408B	MY44211139	CEPREI	June 15,18	1 Year

3. MAXIMUM PEAK OUTPUT POWER

3.1. Limit

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset employing at least 75 non-overlapping hopping channels; shall not exceed 0.125 W if the hopset employing at greater than or equal to 15 and less than 75 non-overlapping hopping channels.

3.2. Test Procedure

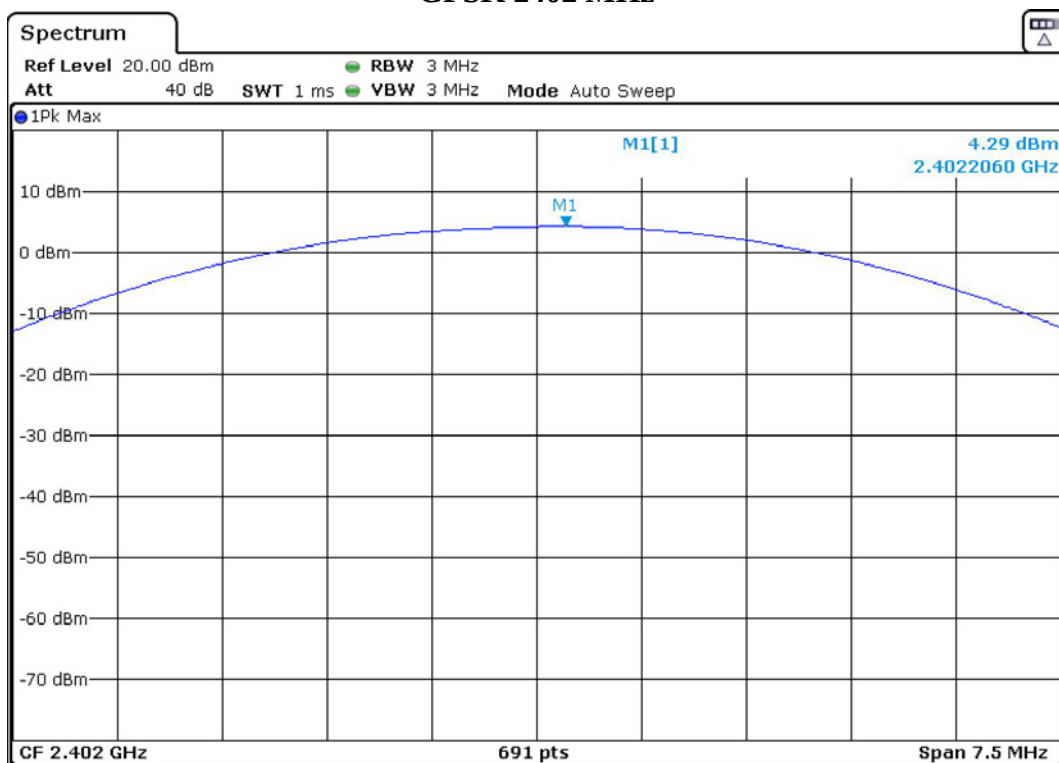
The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable.

3.3. Test Result

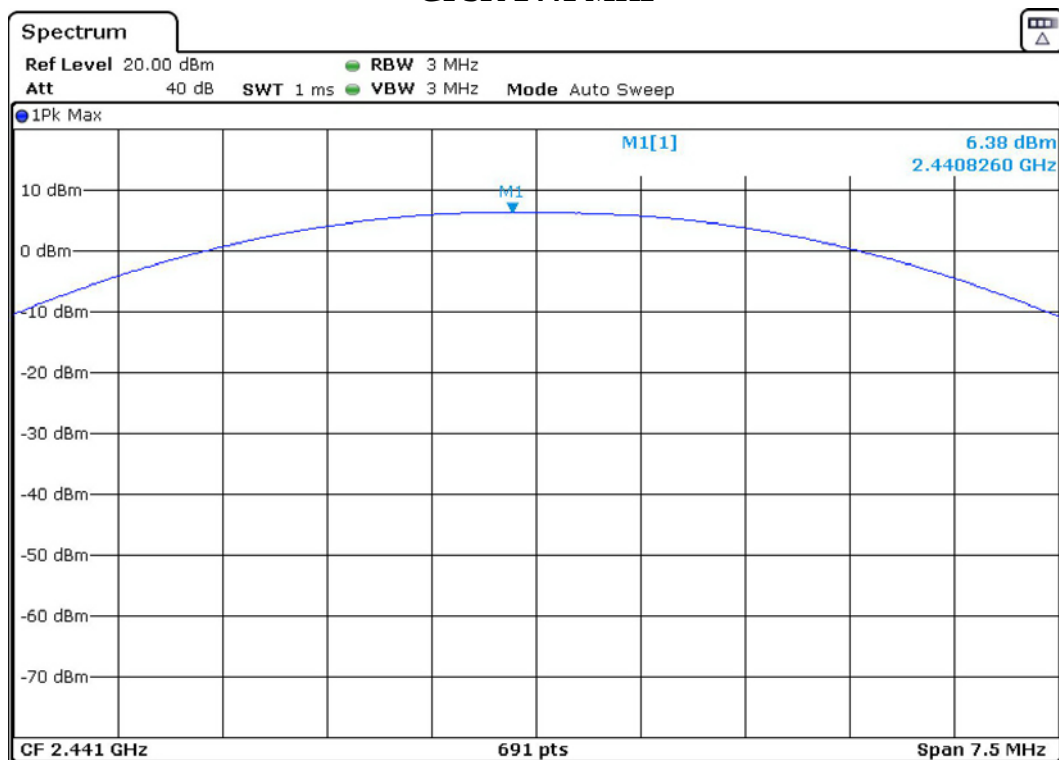
EUT: CAR RADIO					
M/N: CRD4512UBA-OR					
Test date: 2019-03-20		Test site: RF site		Tested by: Seven	
Mode	Freq (MHz)	Result (dBm)	Limit		Conclusion
			dBm	W	
GFSK	2402	4.29	30.00	1	Pass
	2441	6.38	30.00	1	Pass
	2480	6.69	30.00	1	Pass
8-DPSK	2402	2.24	30.00	1	Pass
	2441	4.83	30.00	1	Pass
	2480	5.21	30.00	1	Pass

3.4. Test Data

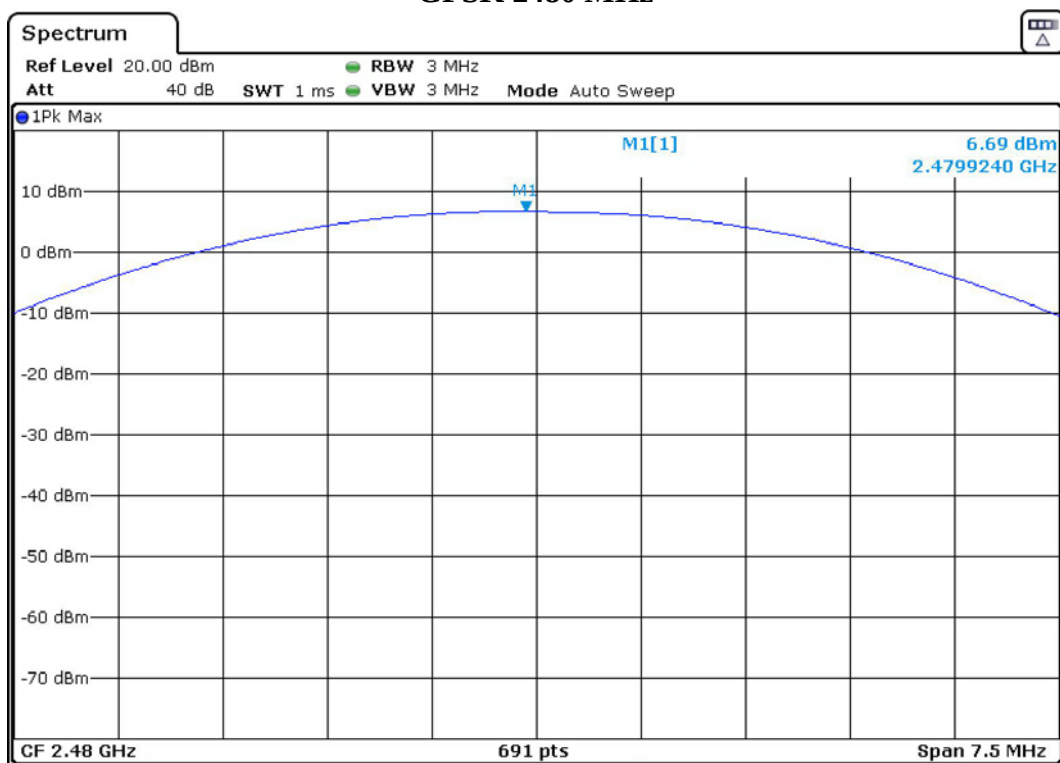
GFSK 2402 MHz



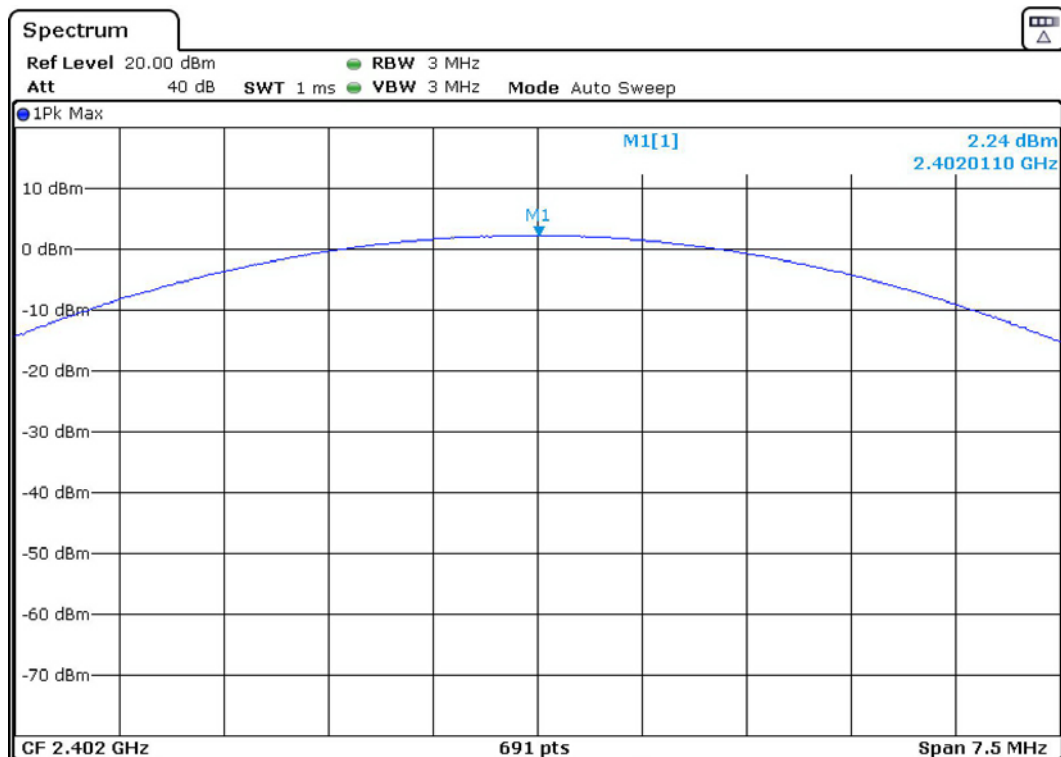
GFSK 2441 MHz



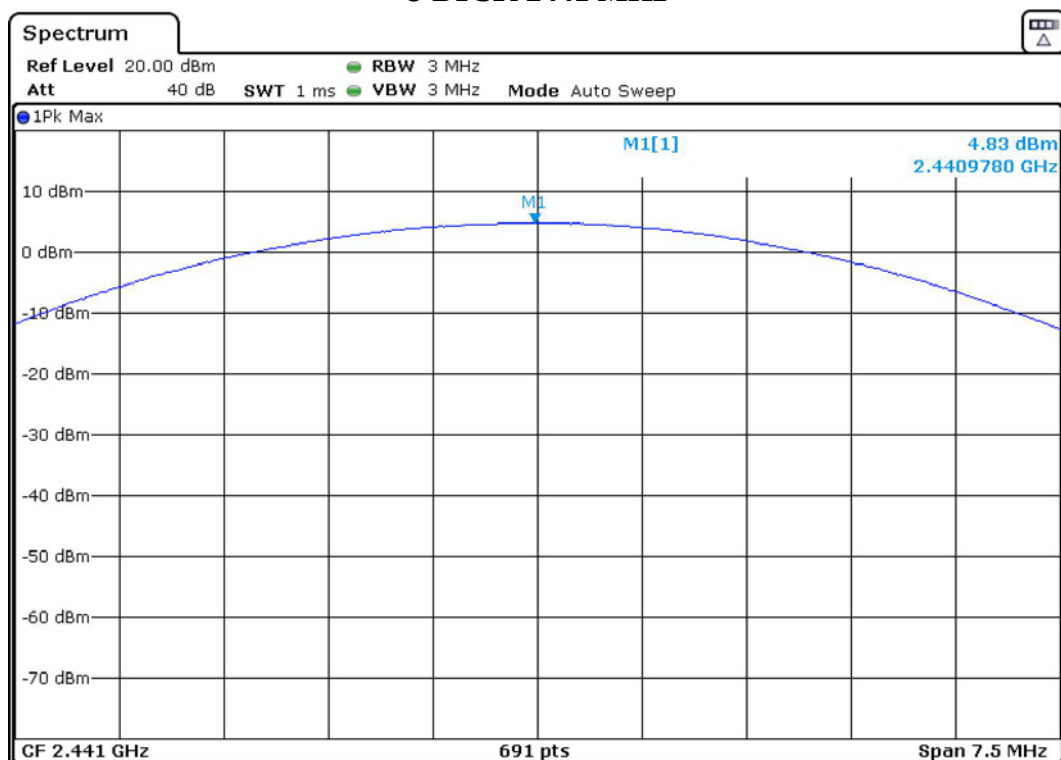
GFSK 2480 MHz



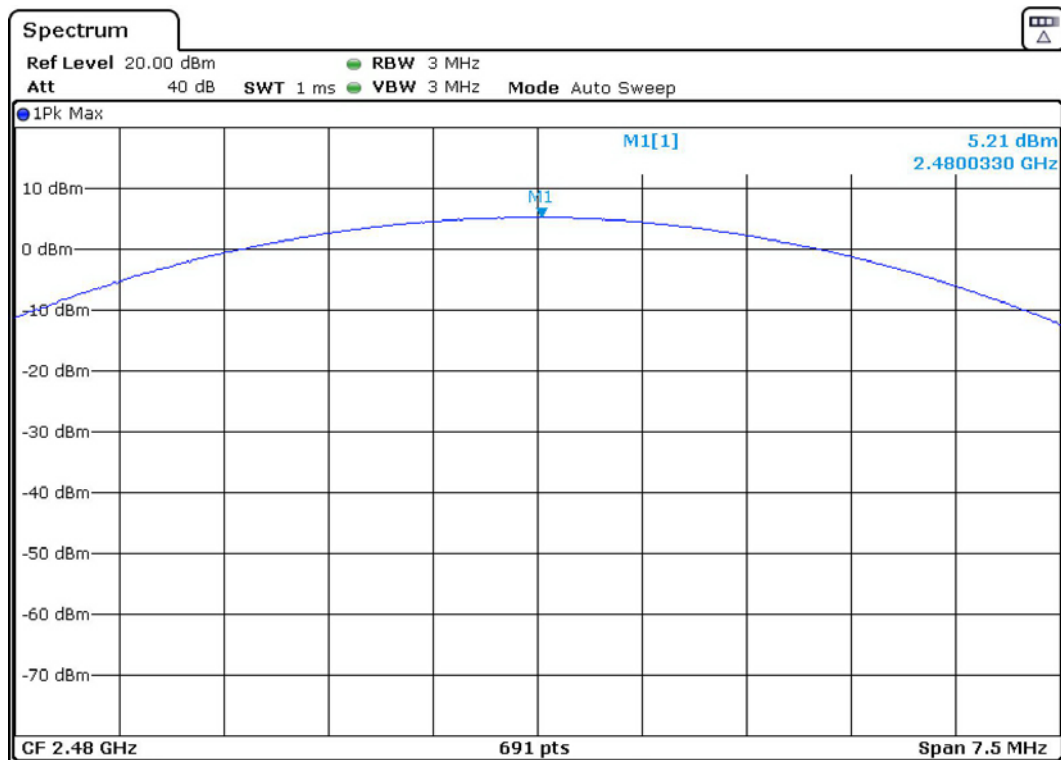
8-DPSK 2402 MHz



8-DPSK 2441 MHz



8-DPSK 2480 MHz



4. 20 DB BANDWIDTH

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2. Test Procedure

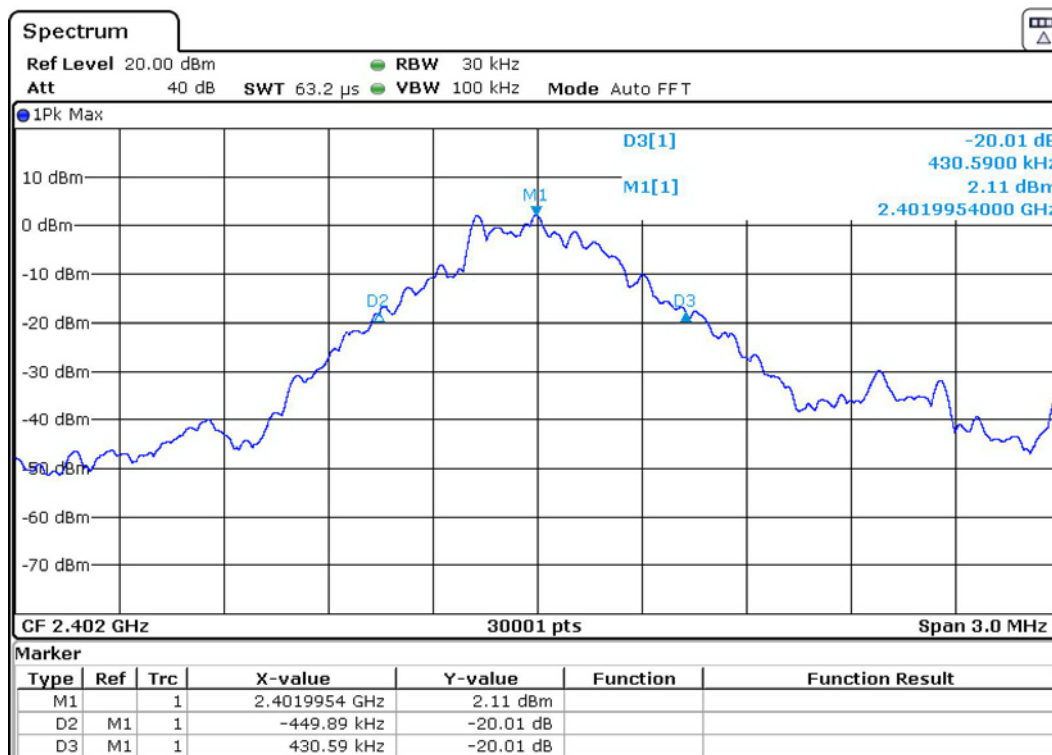
The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3. Test Result

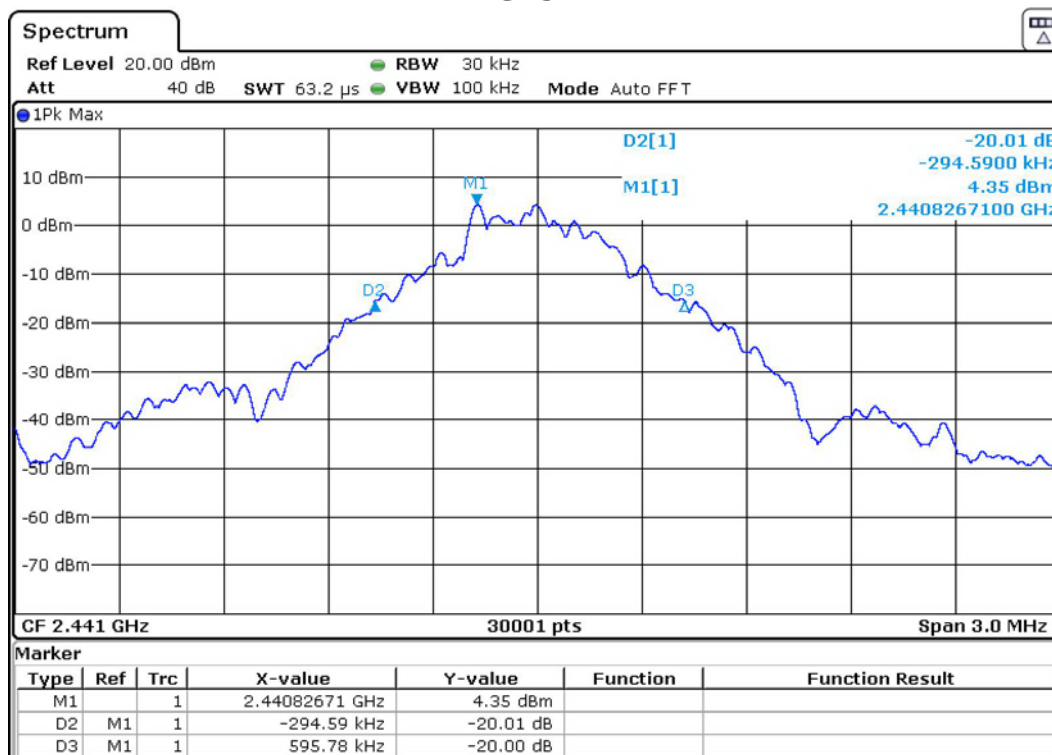
EUT: CAR RADIO				
M/N: CRD4512UBA-OR				
Test date: 2019-03-20		Test site: RF site		Tested by: Seven
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
GFSK	2402	0.88048	/	PASS
	2441	0.89037	/	PASS
	2480	0.89007	/	PASS
8-DPSK	2402	1.20666	/	PASS
	2441	1.20766	/	PASS
	2480	1.20736	/	PASS

4.4. Test Data

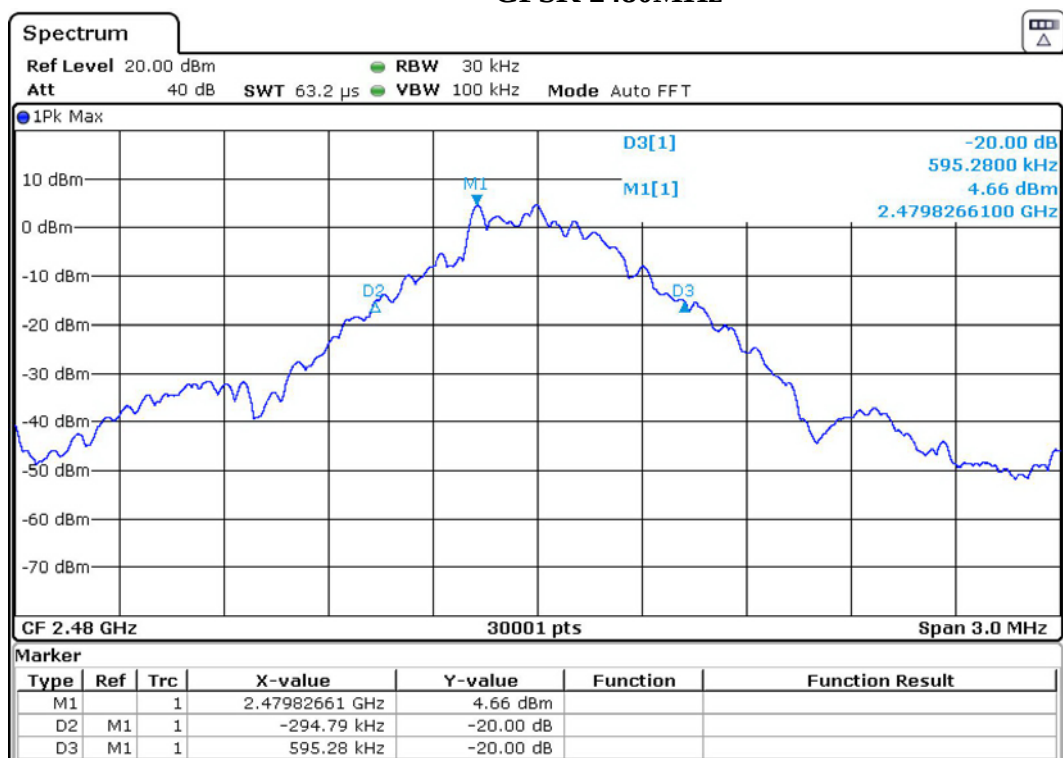
GFSK 2402MHz



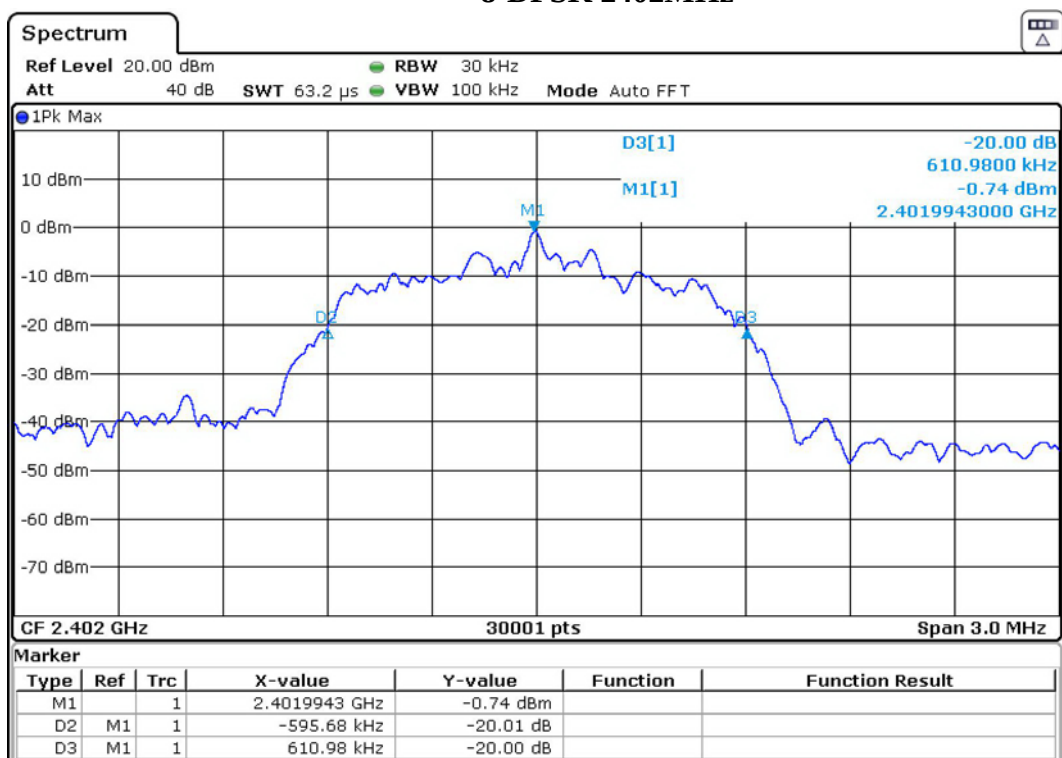
GFSK 2441MHz



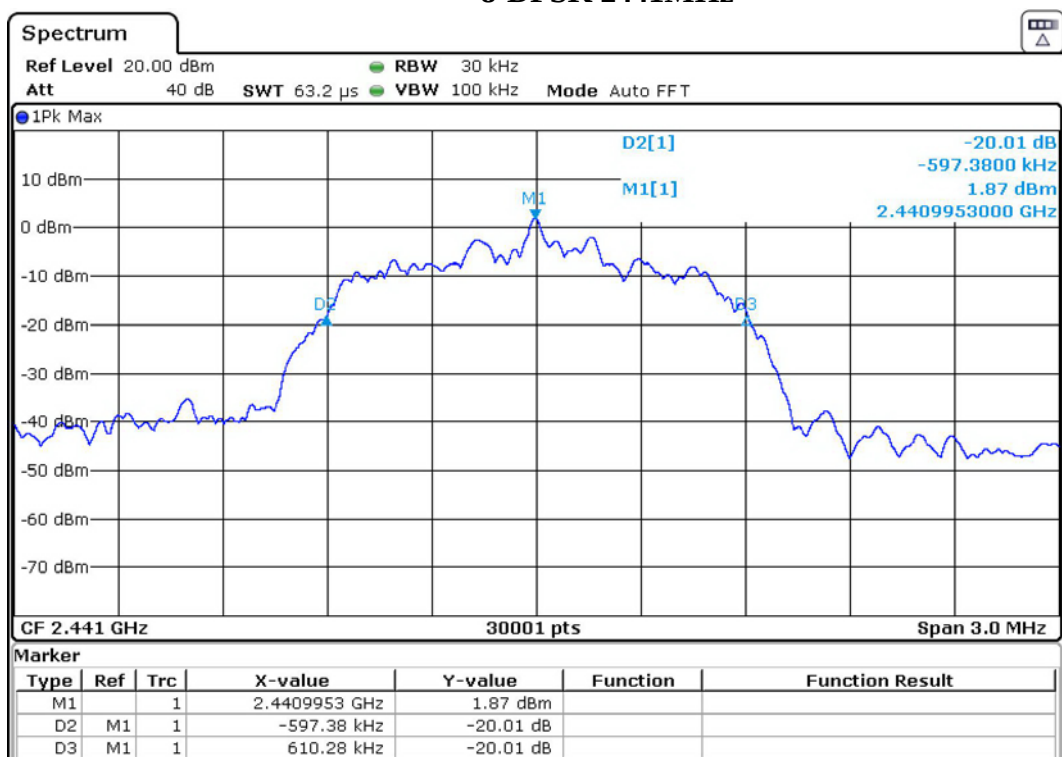
GFSK 2480MHz



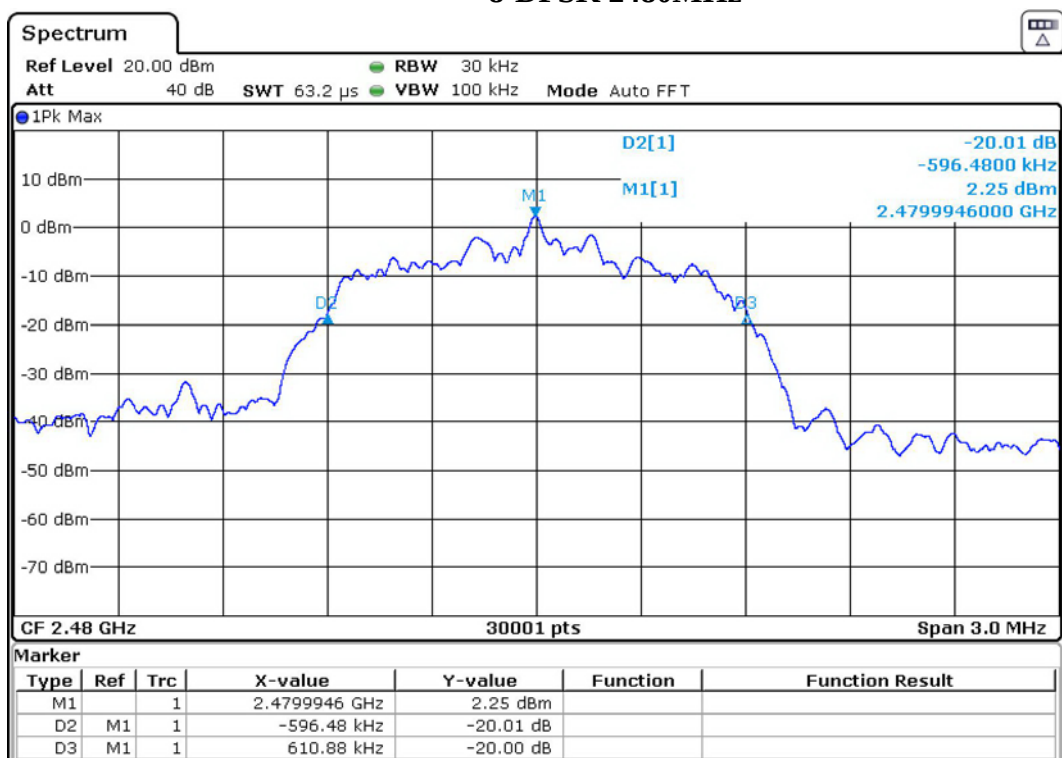
8-DPSK 2402MHz



8-DPSK 2441MHz



8-DPSK 2480MHz



5. CARRIER FREQUENCY SEPARATION

5.1. 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 125 mW.

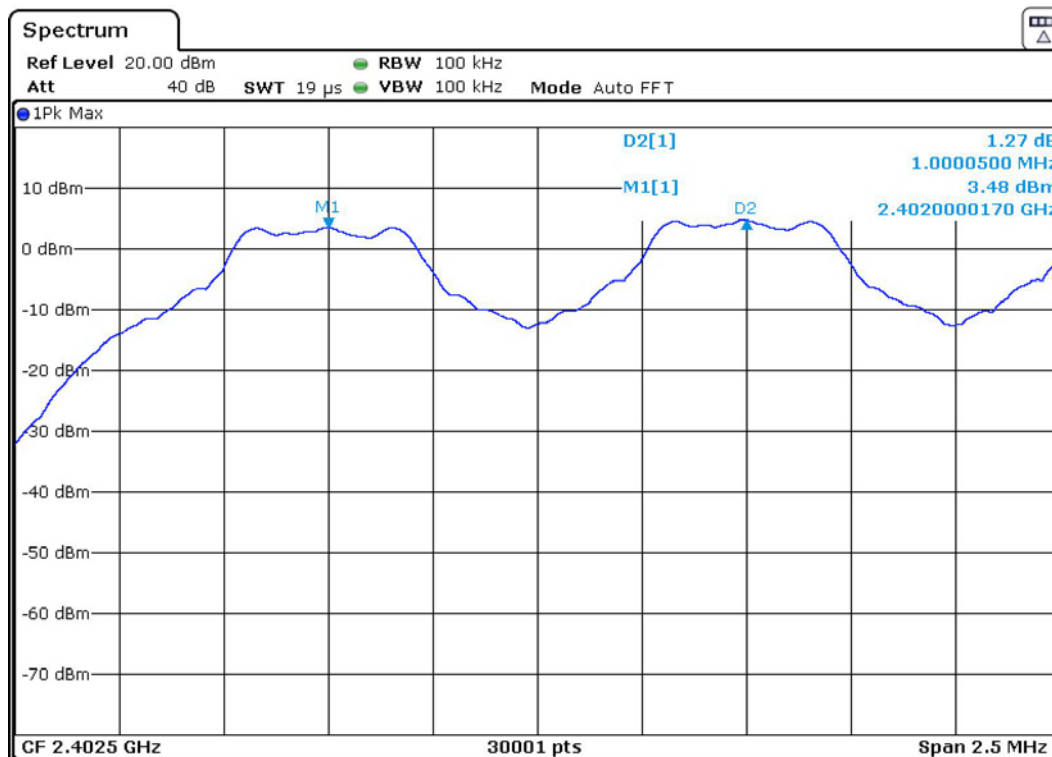
5.2. Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW.

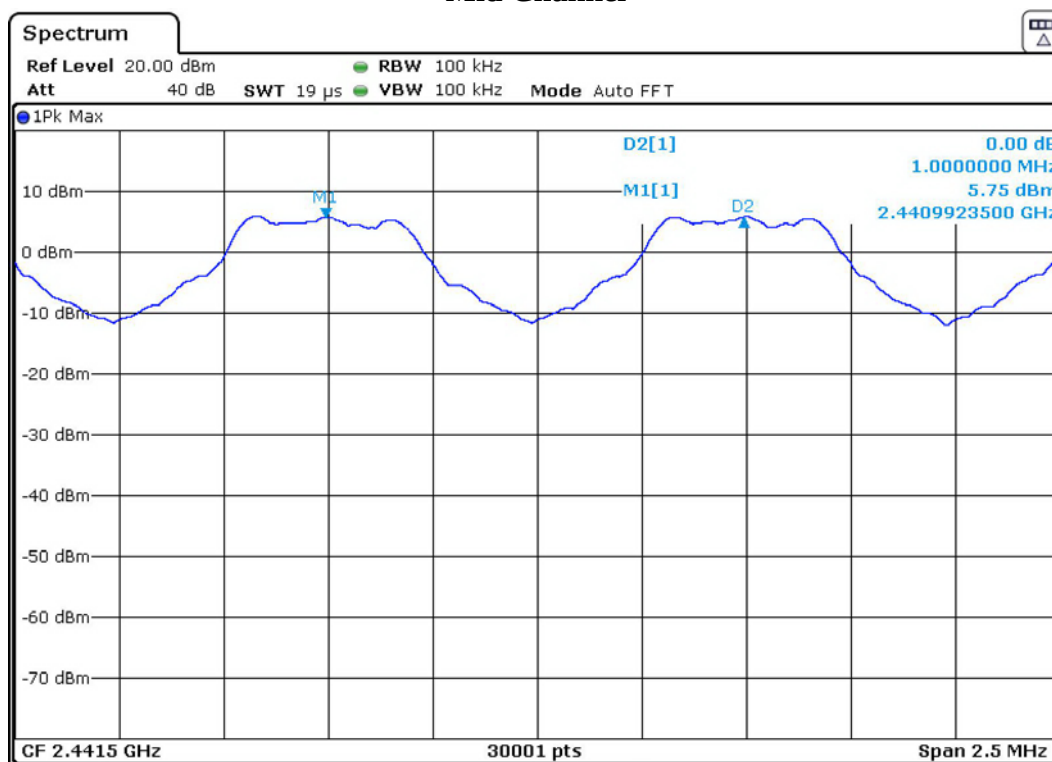
5.3. Test Result

EUT: CAR RADIO				
M/N: CRD4512UBA-OR				
Test date: 2019-03-20			Test site: RF site	Tested by: Seven
Mode	Channel	Channel separation (MHz)	Limit (MHz)	Conclusion
GFSK	Low CH	1.00005	0.88048	PASS
	Mid CH	1.00000	0.89037	PASS
	High CH	1.00000	0.89007	PASS
8-DPSK	Low CH	1.00000	> 2/3 of the 20dB Bandwidth or 25[kHz](whichever is greater)	PASS
	Mid CH	1.00000		PASS
	High CH	1.00000		PASS

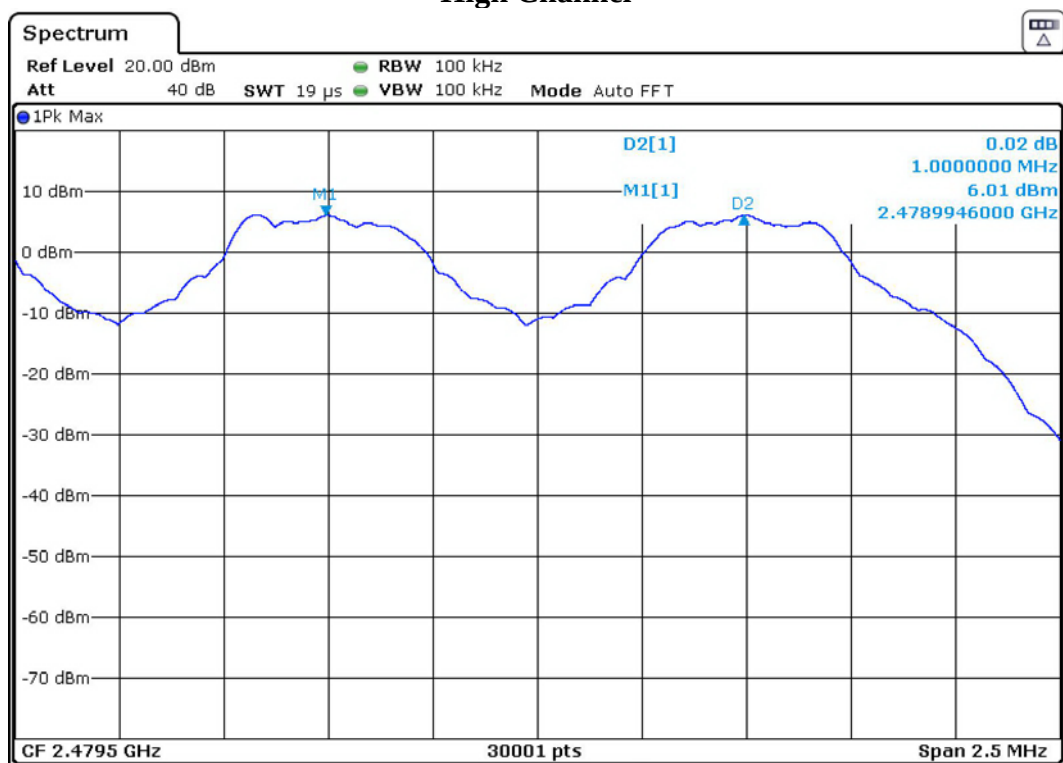
5.4. Test Data

GFSK
Low Channel

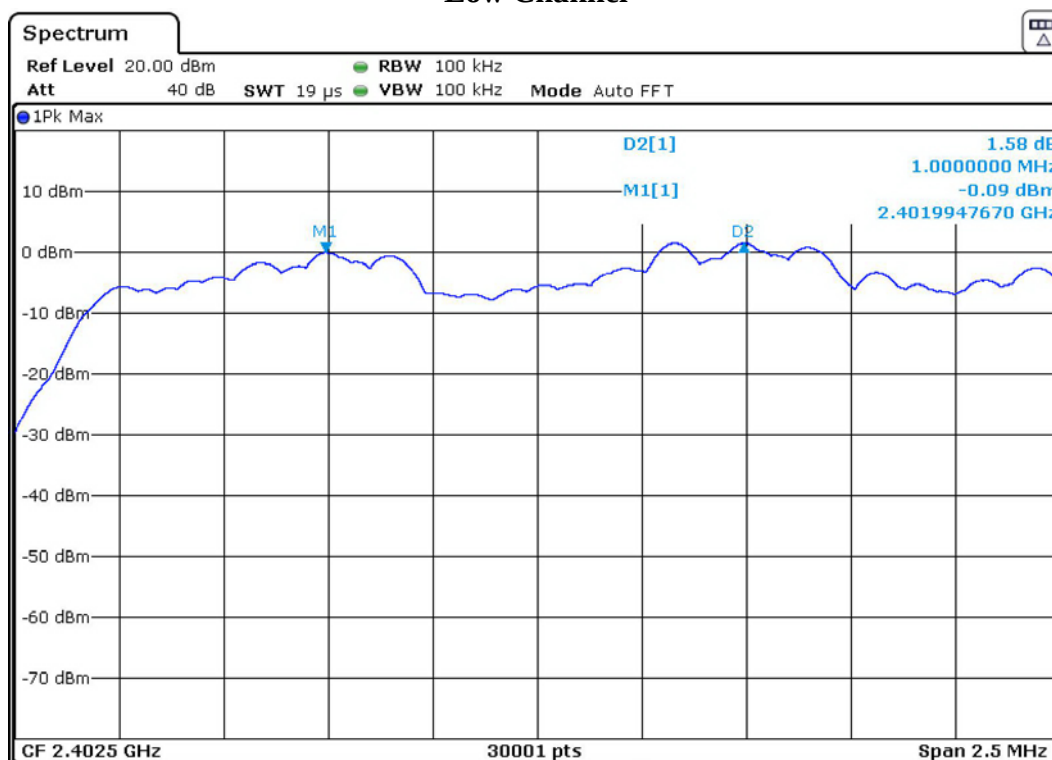
Mid Channel



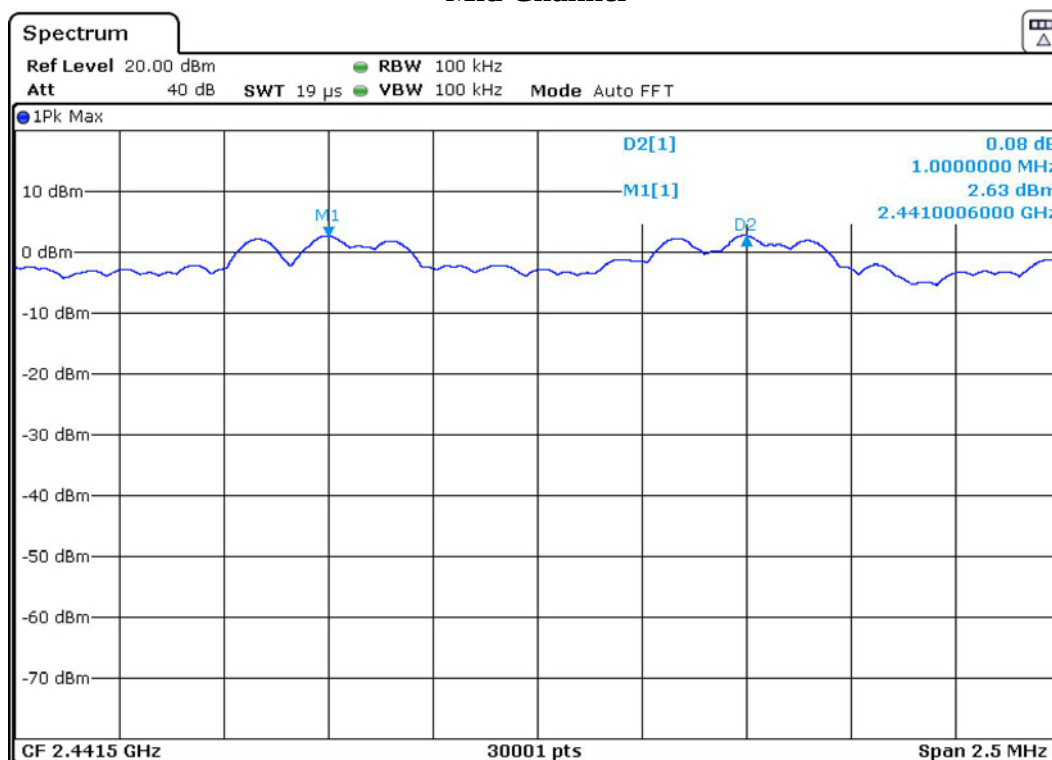
High Channel



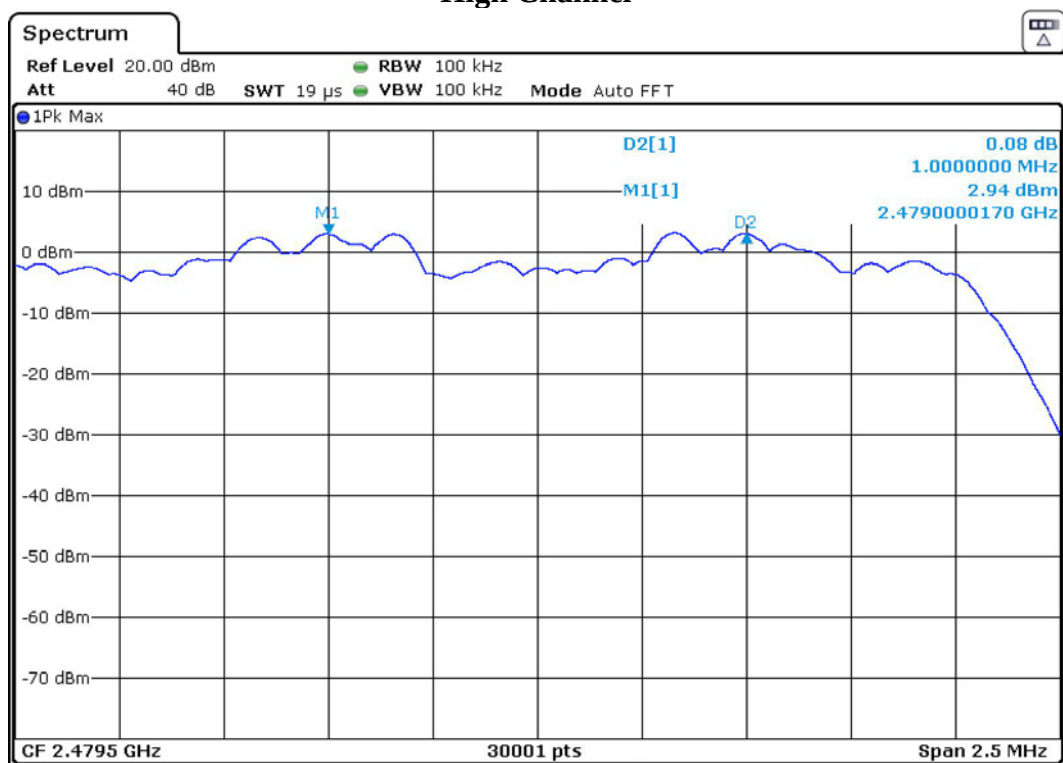
8-DPSK Low Channel



Mid Channel



High Channel



6. NUMBER OF HOPPING CHANNEL

6.1. Limit

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

6.2. Test Procedure

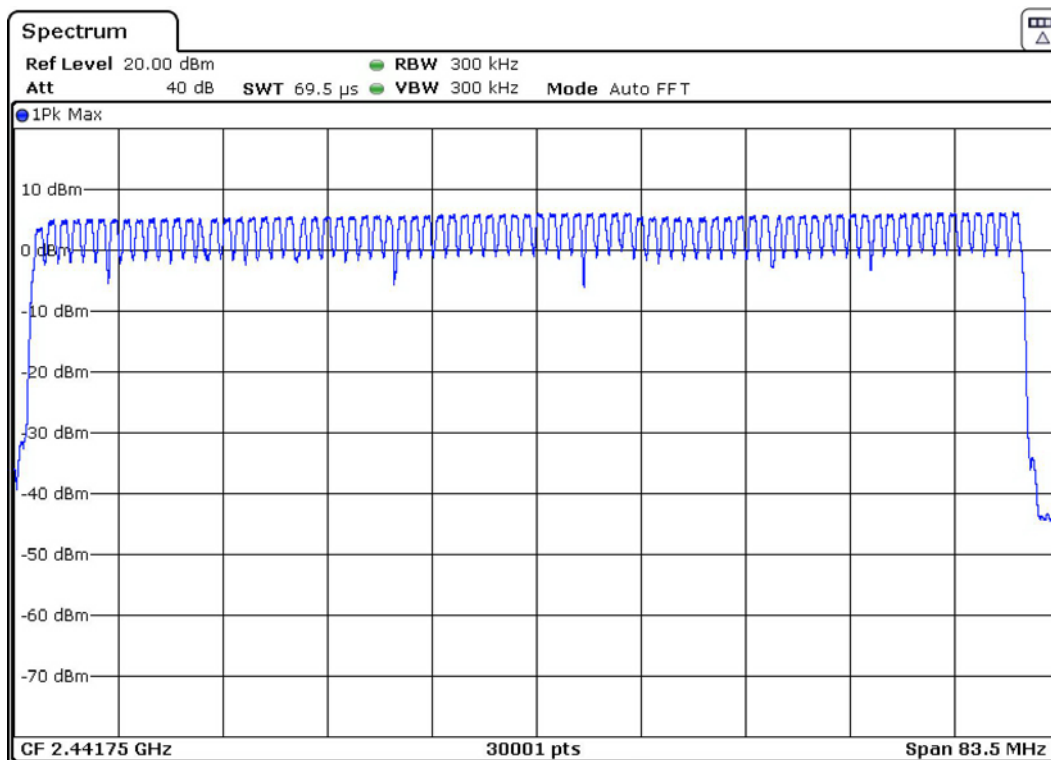
The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable. The number of hopping channel was measured by spectrum analyzer with 300kHz RBW and 300kHz VBW.

6.3. Test Result

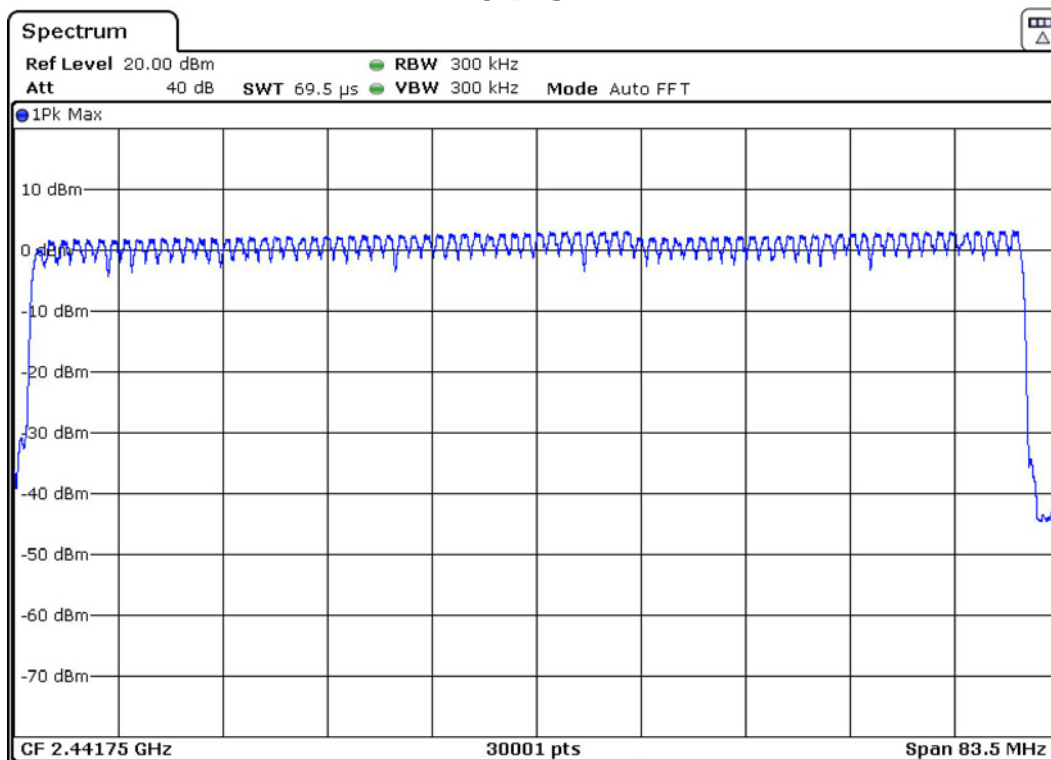
EUT: CAR RADIO			
M/N: CRD4512UBA-OR			
Test date: 2019-03-20		Test site: RF site	Tested by: Seven
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
8-DPSK	79	>15	PASS

6.4. Test Data

GFSK



8-DPSK



7. DWELL TIME

7.1. Limit

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.

7.2. Test Procedure

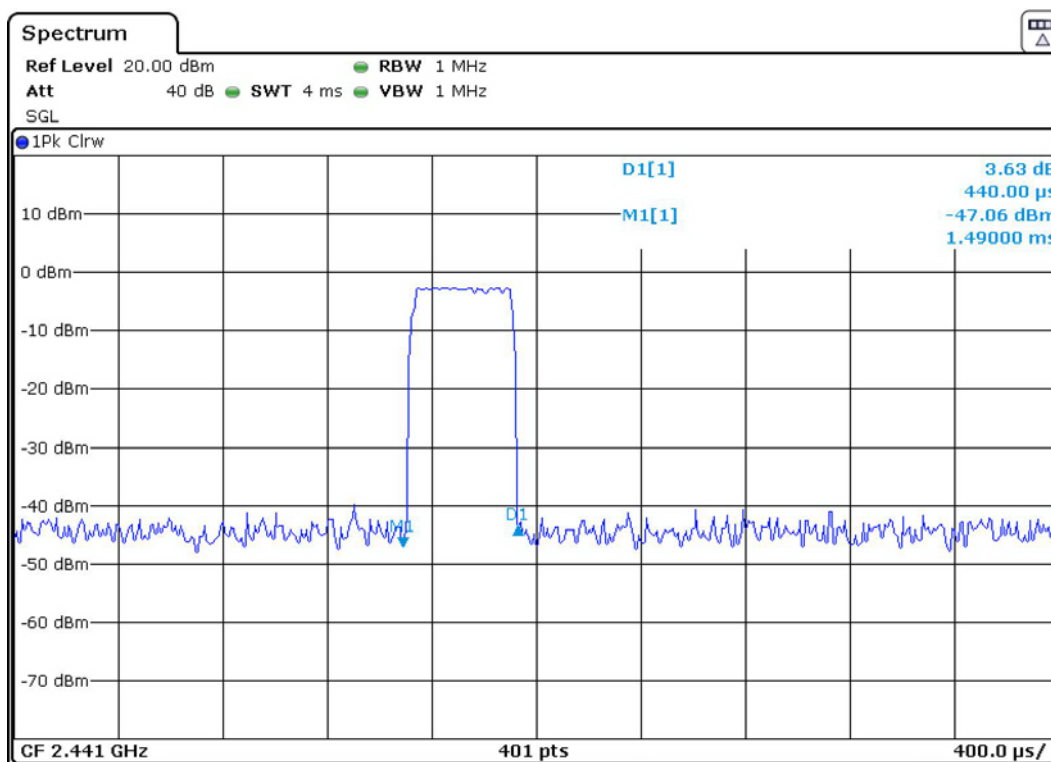
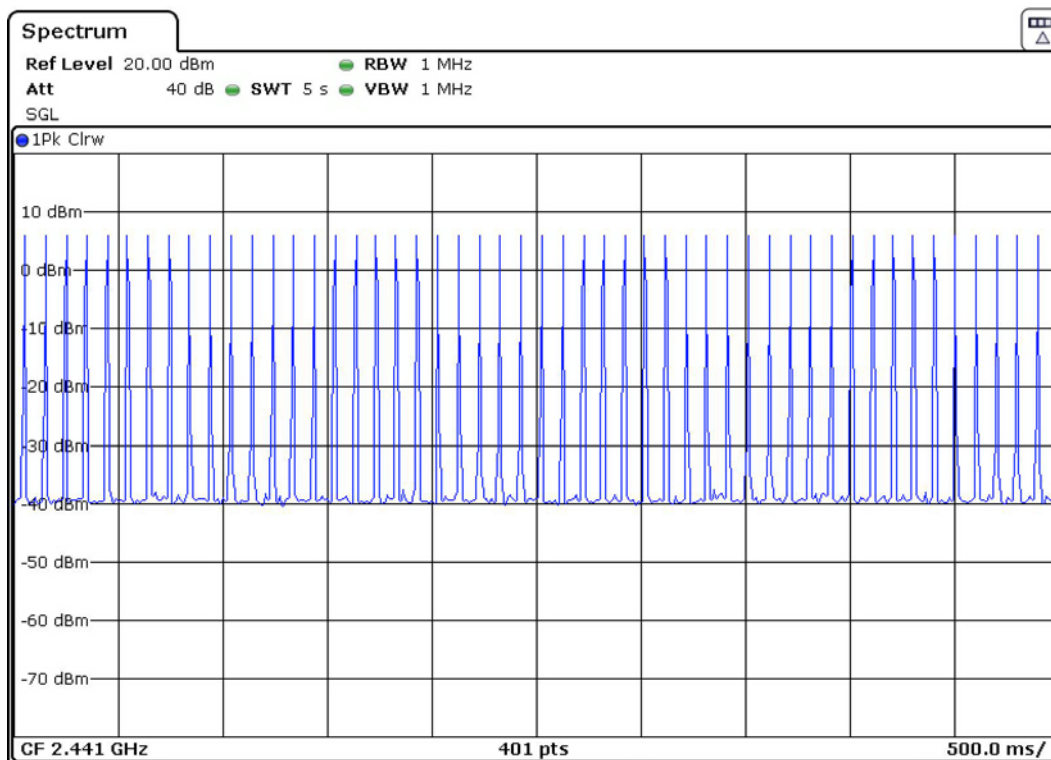
1. The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency = measured channel, RBW = 1MHz, VBW= 1MHz, Frequency Span = 0 Hz.
4. Set sweep time properly to capture the entire dwell time per hopping channel.
5. Set detector type to Peak and trace mode to Max Hold and make the measurement.
6. Repeat step 3-5 until all channels measured were complete.

7.3. Test Result

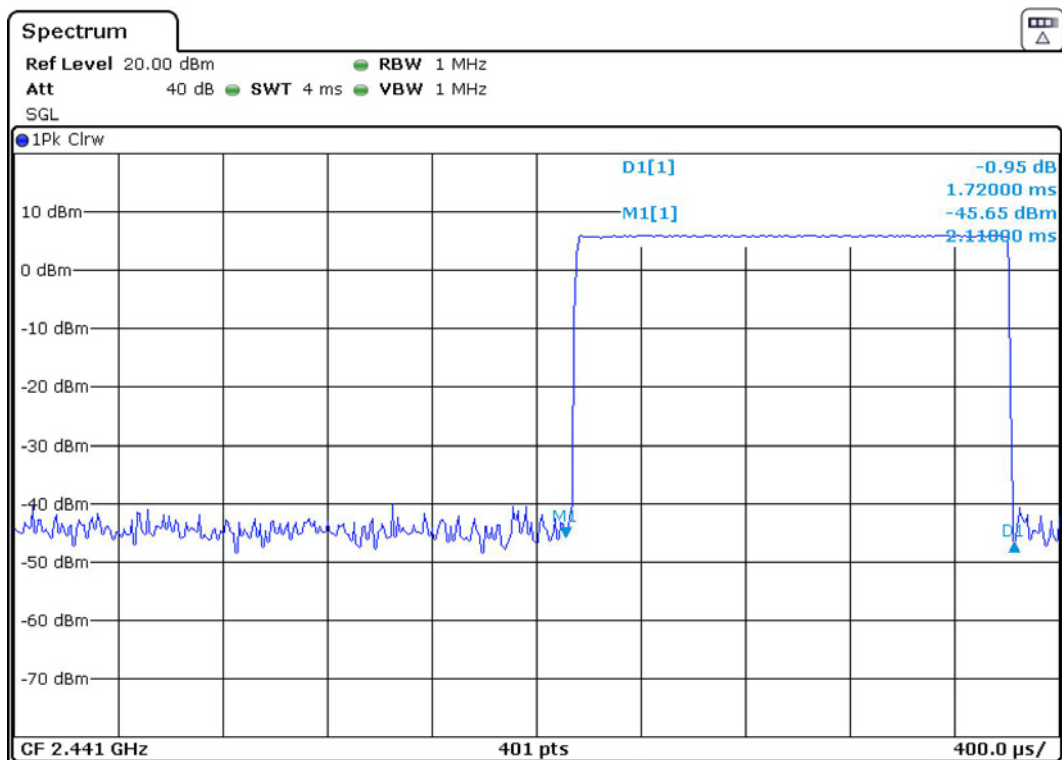
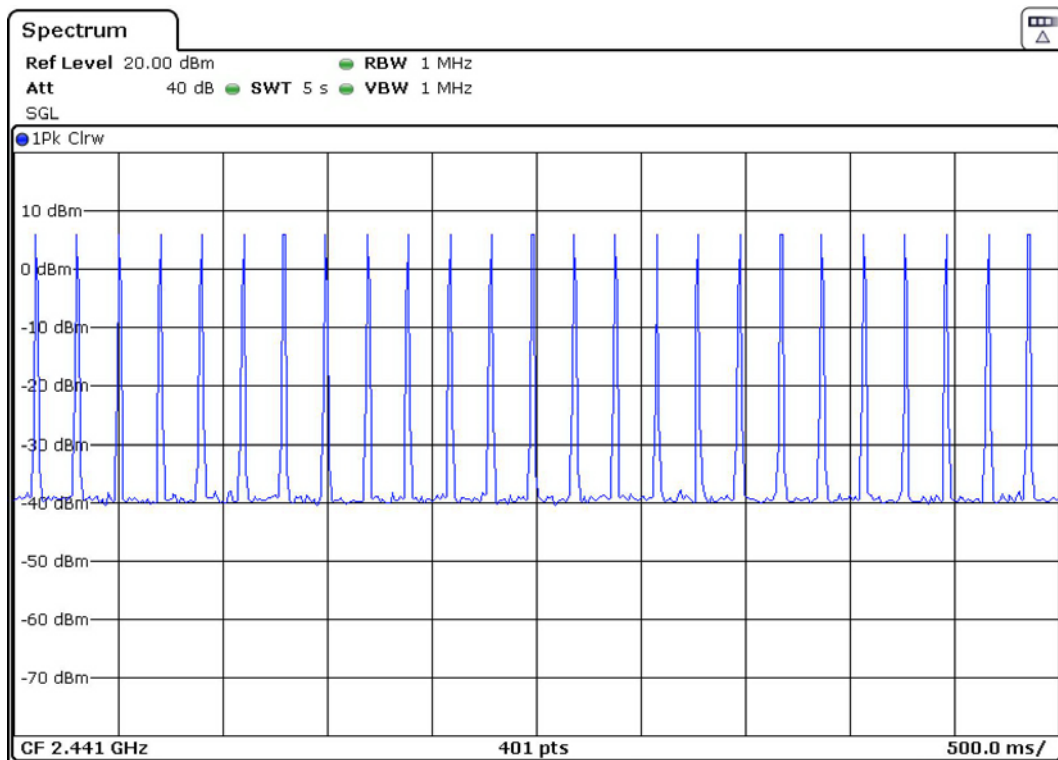
EUT: CAR RADIO						
M/N: CRD4512UBA-OR						
Test date: 2019-03-20		Test site: RF site		Tested by: Seven		
Mode	Hopping number	Measure time (s)	Burst on time (ms)	Dwell time (ms)	Limit	Conclusion
GFSK DH1	50	5	0.44	139.04	<400ms	PASS
GFSK DH3	25	5	1.72	271.76	<400ms	PASS
GFSK DH5	17	5	2.95	316.95	<400ms	PASS
8-DPSK 3DH1	50	5	0.46	145.36	<400ms	PASS
8-DPSK 3DH3	25	5	1.71	270.18	<400ms	PASS
8-DPSK 3DH5	17	5	2.97	319.10	<400ms	PASS
Dwell time = Hopping number/measure time *0.4*79*burst on time.						

7.4. Test Data

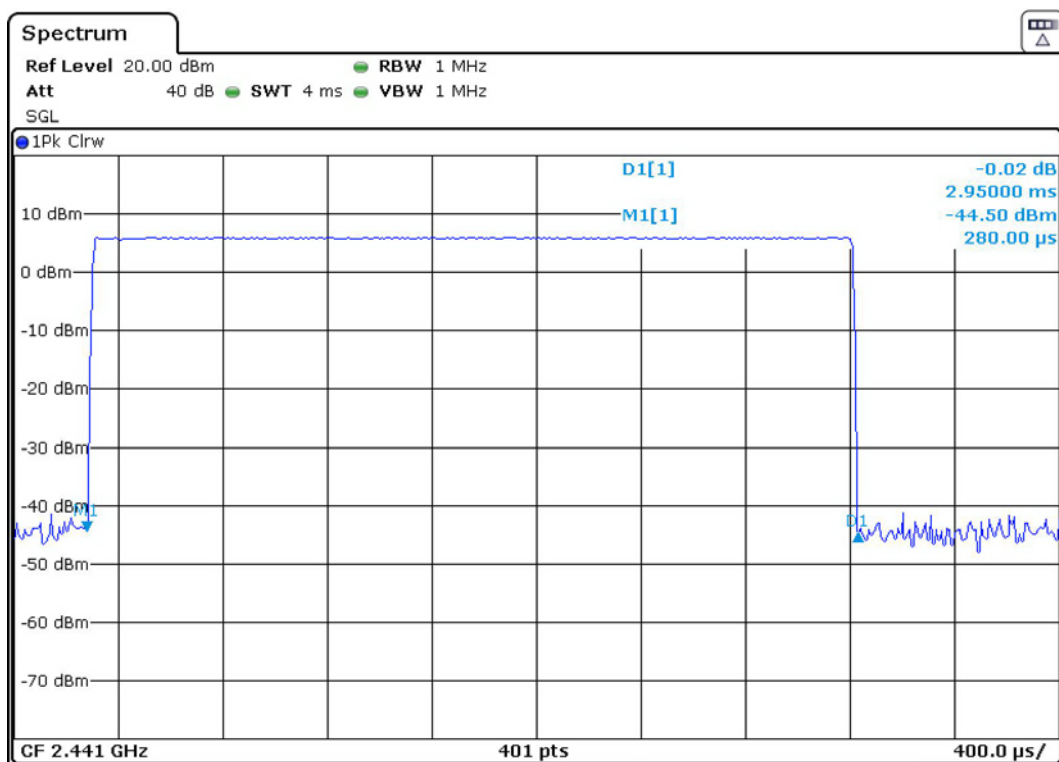
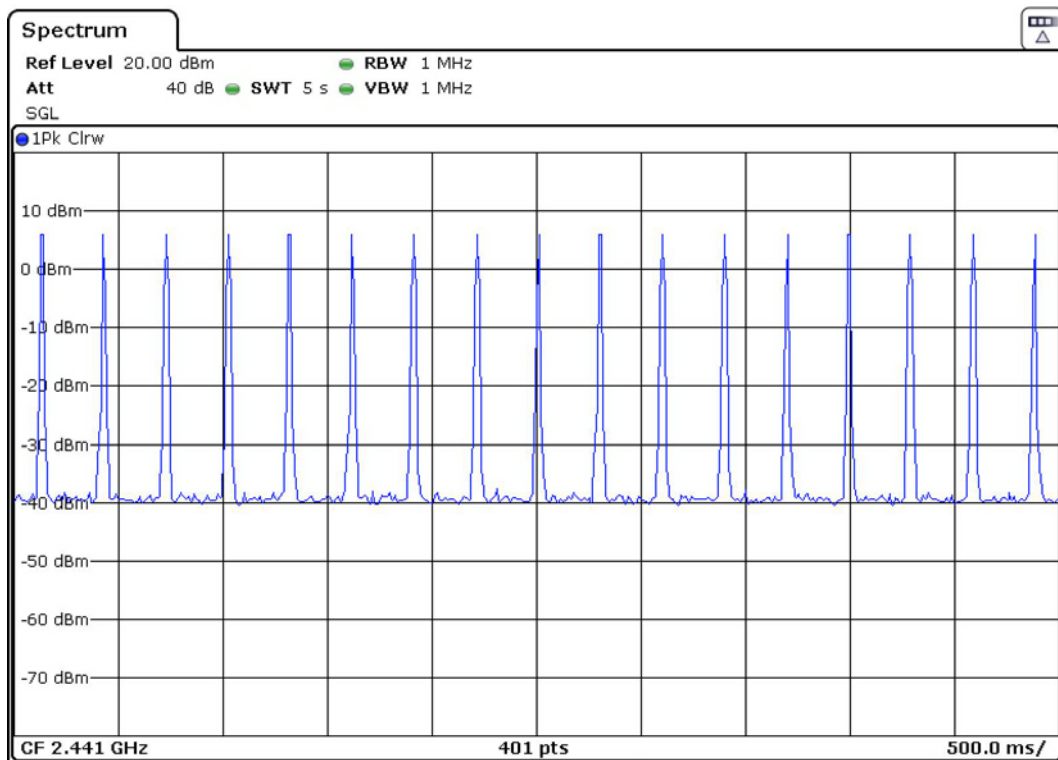
GFSK DH1



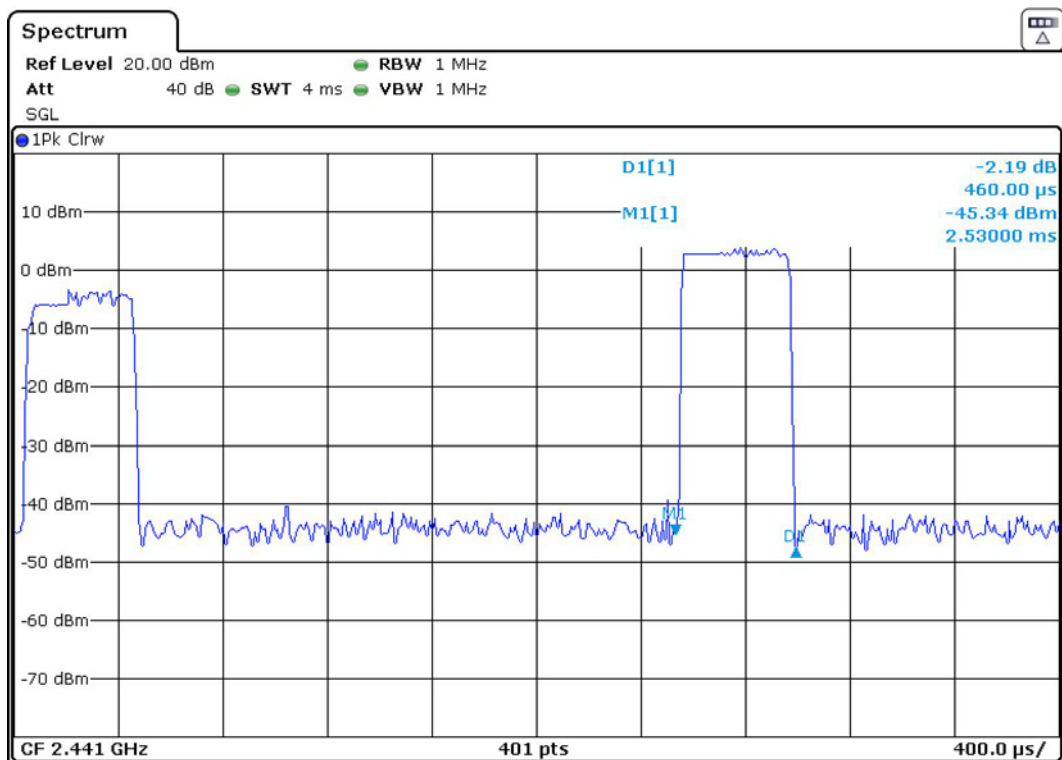
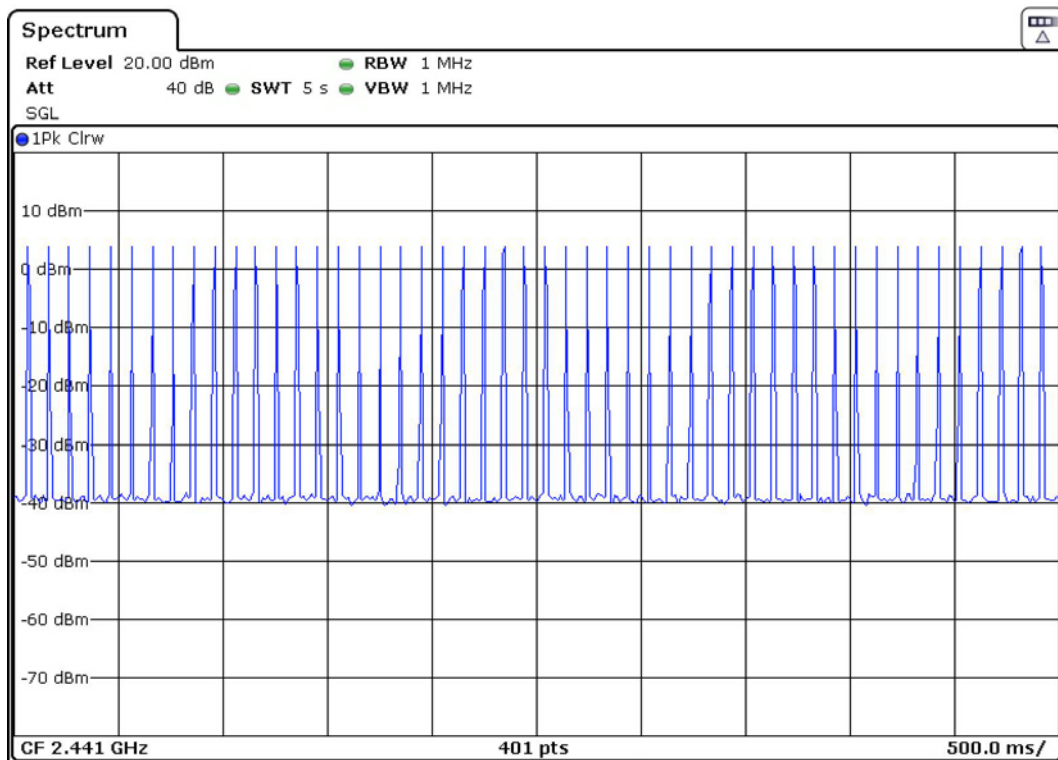
GFSK DH3



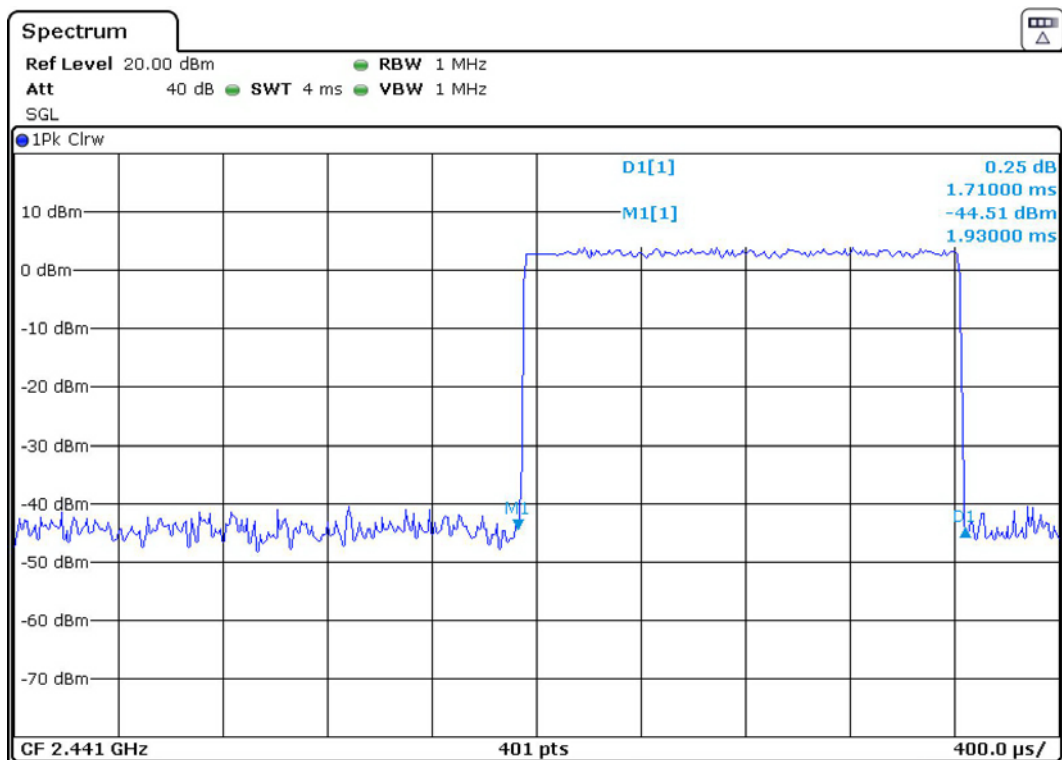
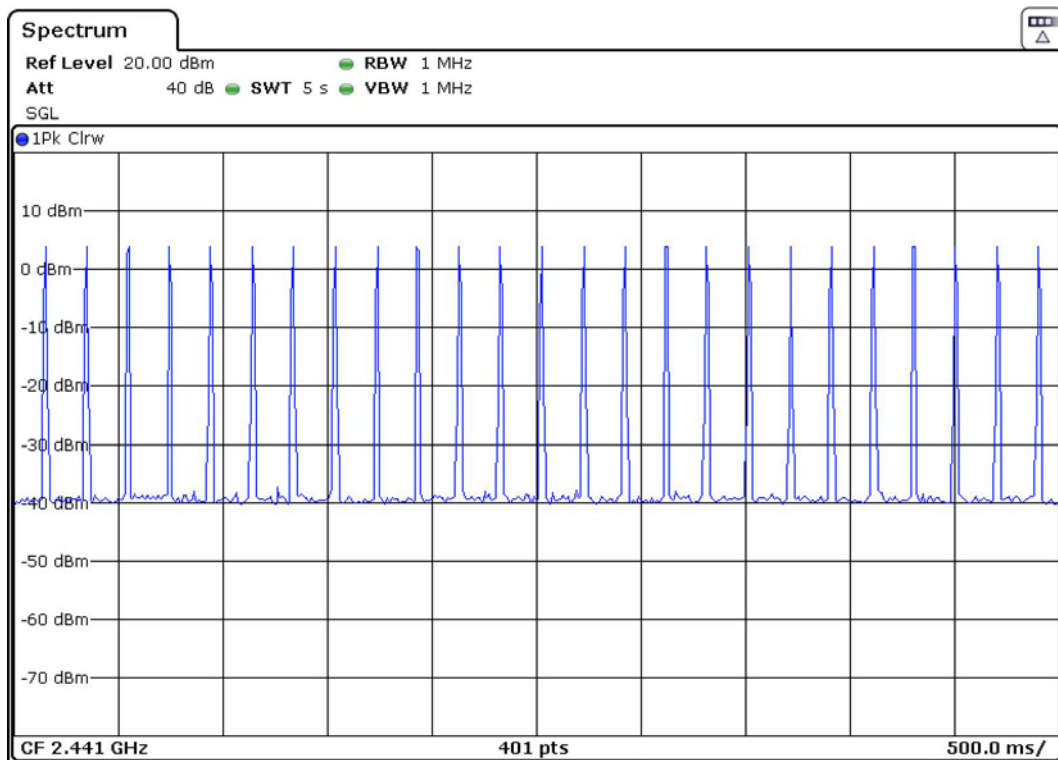
GSFK DH5



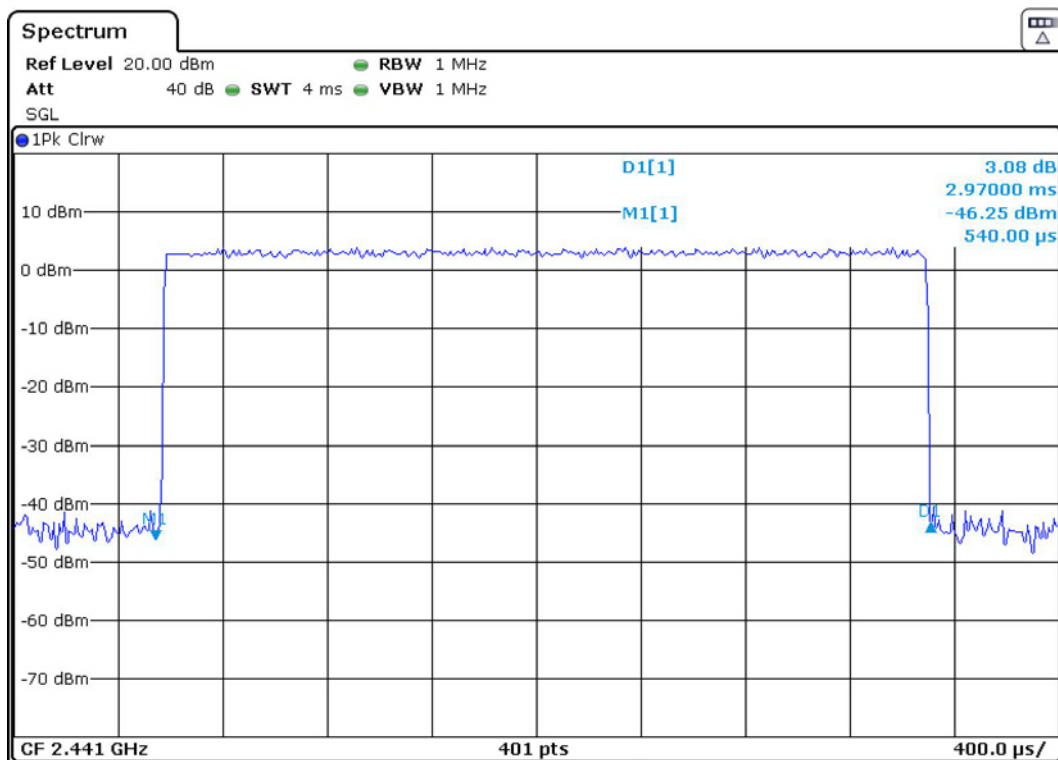
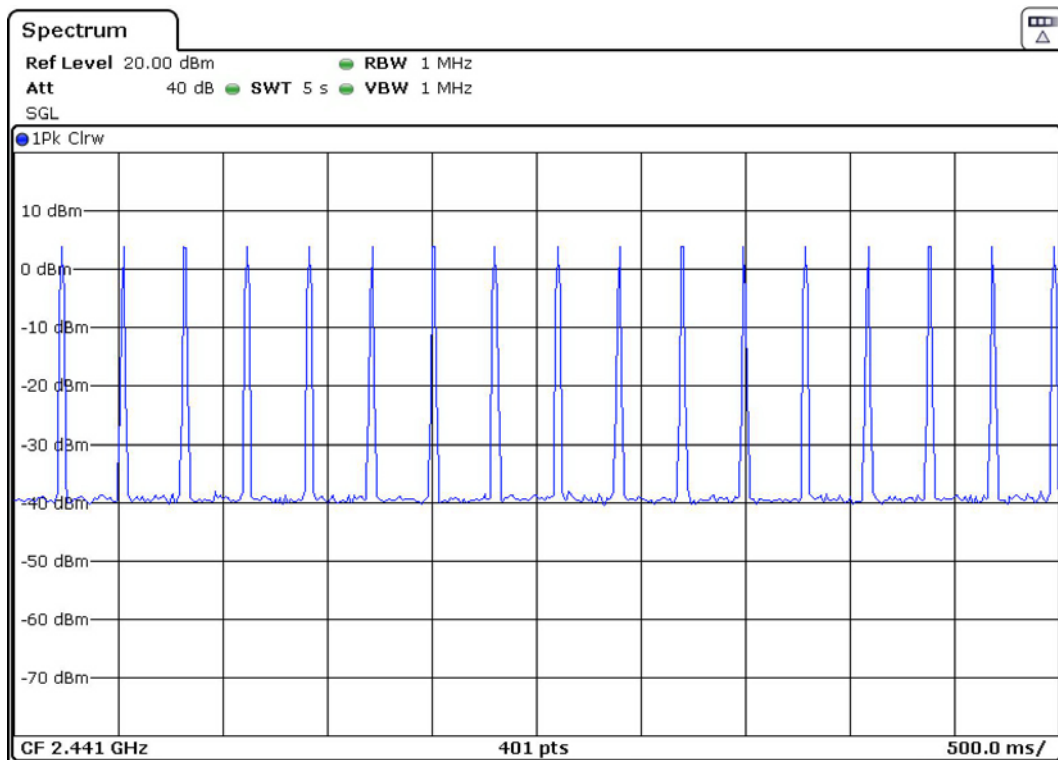
8-DPSK 3DH1



8-DPSK 3DH3



8-DPSK 3DH5



8. RADIATED EMISSIONS

8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

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)

15.209 Limit

Frequency (MHz)	Field Strength(μ V/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

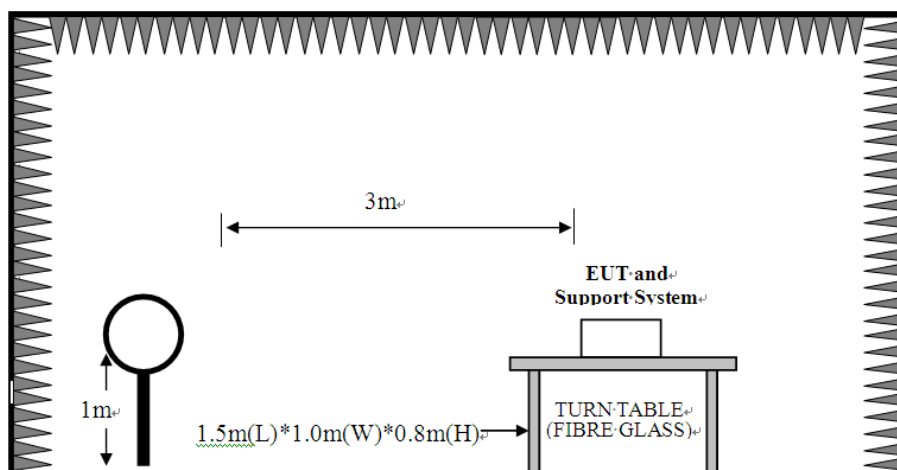
Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

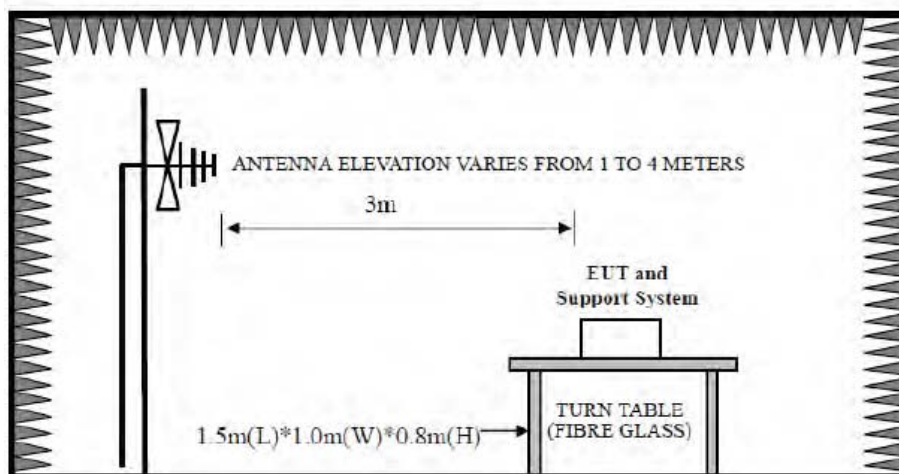
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

8.2. Block Diagram of Test setup

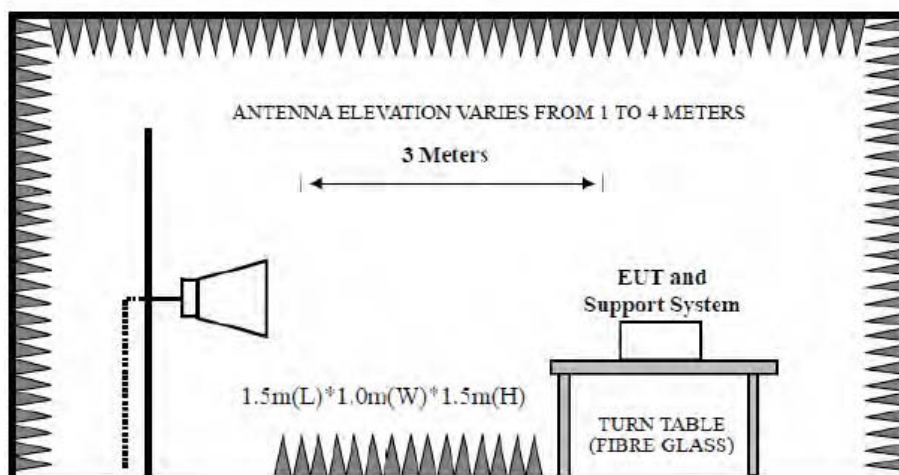
9kHz~30MHz



30~1000MHz



Above 1GHz



8.3. Test Procedure

EUT was placed on a turn table, which is 0.8 meter high above ground for 9kHz~1000MHz test, and which is 1.5 meter high above ground for above 1GHz test. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

The test frequency analyzer system was set to Peak Detect (300Hz RBW in 9kHz to 150kHz and 10kHz RBW in 150kHz to 30MHz) Function and Specified Bandwidth with Maximum Hold Mode.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

PEAK detector, 1MHz/1MHz for PAEK measurement,

PEAK detector, 1MHz/10Hz for Average measurement

The frequency range from 30MHz to 10th harmonic (25GHz) are checked.

8.4. Test Result

Pass

Note: 1、For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

2、The frequency 2402MHz、2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

3、GFSK is worst state

8.5. Test Data

9 kHz – 30 MHz

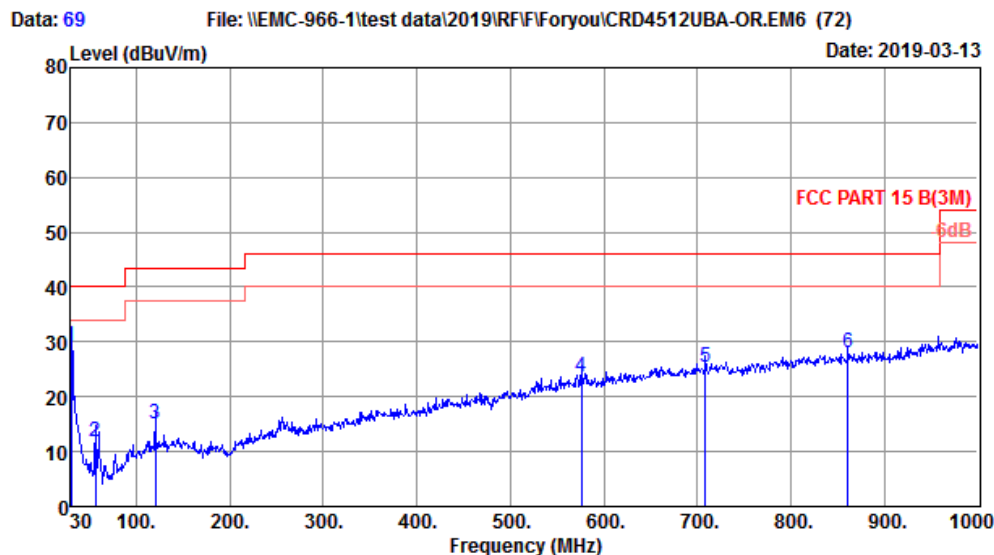
Pass

Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

30 MHz – 1000 MHz

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Site no. : 1# 966 Chamber Data no. : 69
Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:19.2';Humi:48.5%;Press:101.9kPa
Engineer : ZERO
EUT : CAR RADIO
Power : DC 12V
M/N : CRD4512UBA-OR
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	18.50	0.14	10.60	29.24	40.00	10.76	QP
2	56.19	5.70	0.36	5.61	11.67	40.00	28.33	QP
3	120.21	11.40	0.94	2.67	15.01	43.50	28.49	QP
4	576.11	19.76	2.91	1.06	23.73	46.00	22.27	QP
5	709.00	21.59	3.31	0.60	25.50	46.00	20.50	QP
6	861.29	23.41	3.77	0.94	28.12	46.00	17.88	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

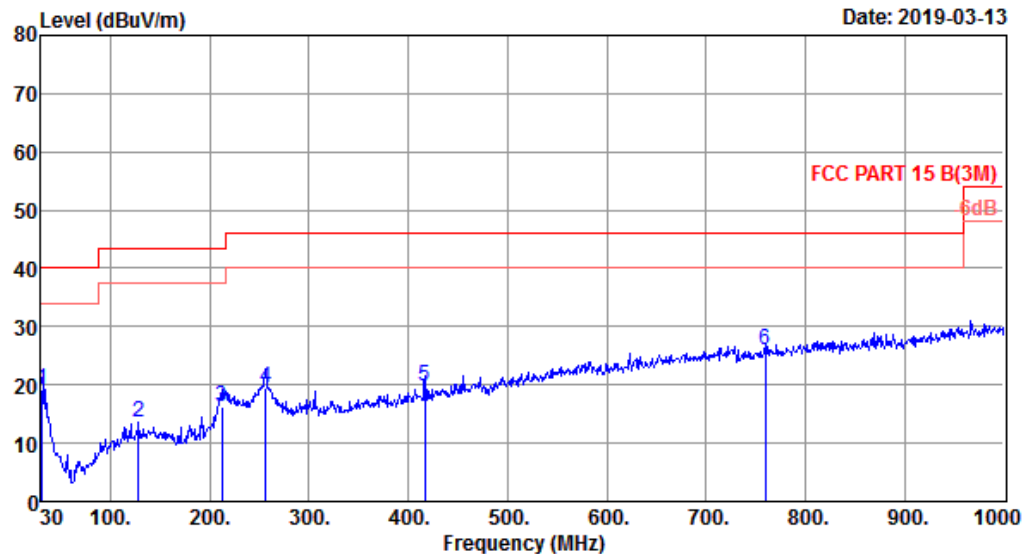
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Data: 70

File: \\EMC-966-1\\test data\\2019\\RF\\Foryou\\CRD4512UBA-OR.EM6 (72)

Date: 2019-03-13



Site no. : 1# 966 Chamber Data no. : 70
 Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:19.2'; Humi:48.5%; Press:101.9kPa
 Engineer : ZERO
 EUT : CAR RADIO
 Power : DC 12V
 M/N : CRD4512UBA-OR
 Test Mode : TX Mode

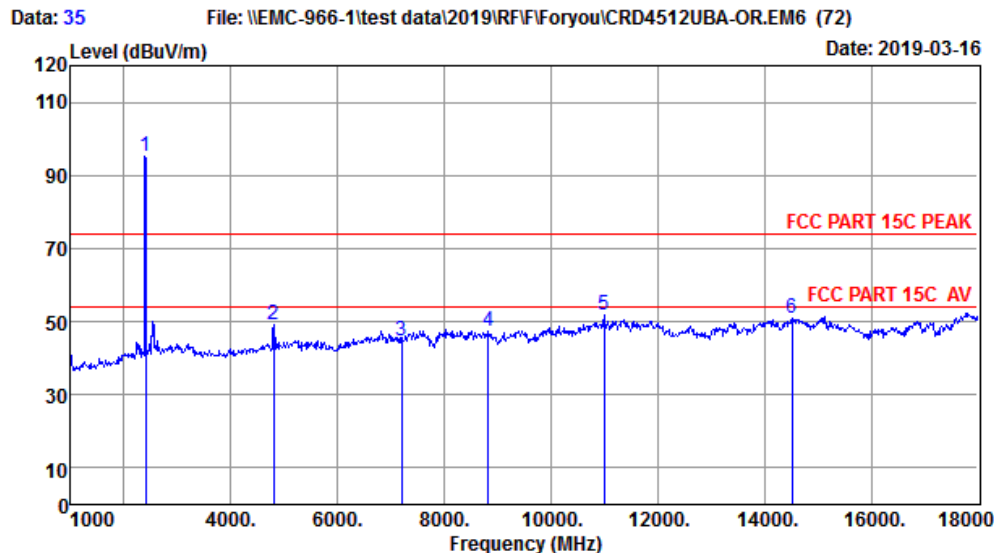
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.97	17.50	0.14	1.60	19.24	40.00	20.76	QP
2	127.97	11.72	0.96	0.90	13.58	43.50	29.92	QP
3	212.36	8.96	1.37	5.89	16.22	43.50	27.28	QP
4	256.01	13.30	1.67	4.64	19.61	46.00	26.39	QP
5	417.03	16.51	2.19	0.94	19.64	46.00	26.36	QP
6	759.44	22.26	3.64	0.16	26.06	46.00	19.94	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

1000-18000MHz

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Site no. : 1# 966 Chamber Data no. : 35
 Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:27.3';Humi:54%;Press:101.52kPa
 Engineer : Seven
 EUT : CAR RADIO
 Power : DC 12V
 M/N : CRD4512UBA-OR
 Test Mode : GFSK TX 2402Mhz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.26	4.03	33.23	97.02	95.08	74.00	-21.08	Peak
2	4804.00	31.16	6.02	33.38	45.27	49.07	74.00	24.93	Peak
3	7206.00	36.05	7.37	31.47	32.86	44.81	74.00	29.19	Peak
4	8820.00	36.50	8.71	30.75	32.98	47.44	74.00	26.56	Peak
5	10996.00	40.00	10.20	31.51	33.02	51.71	74.00	22.29	Peak
6	14515.00	41.05	11.94	31.24	29.18	50.93	74.00	23.07	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

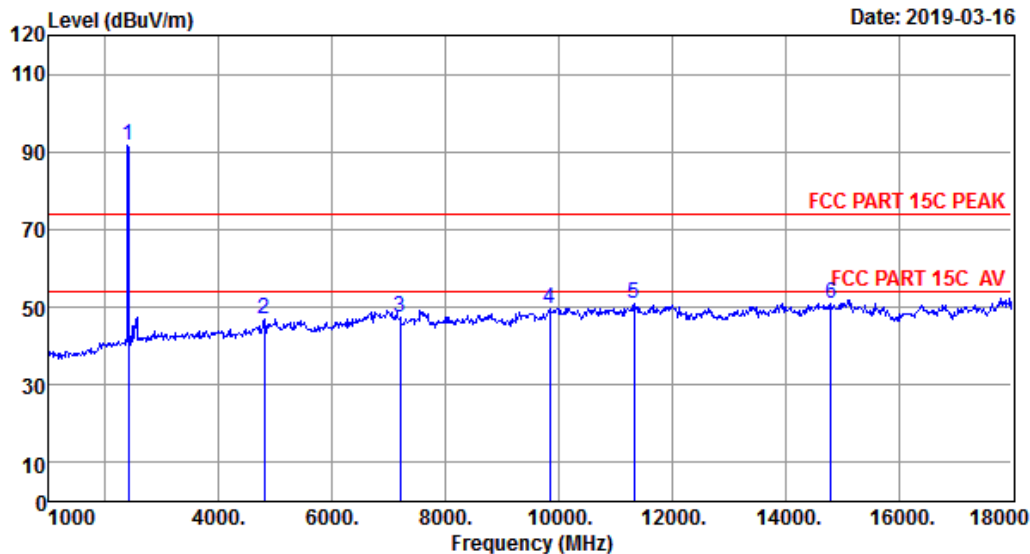
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Data: 36

File: \\EMC-966-1\test data\2019\RF\Foryou\CRD4512UBA-OR.EM6 (72)

Date: 2019-03-16



Site no. : 1# 966 Chamber Data no. : 36
 Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:27.3'; Humi:54%; Press:101.52kPa
 Engineer : Seven
 EUT : CAR RADIO
 Power : DC 12V
 M/N : CRD4512UBA-OR
 Test Mode : GFSK TX 2402Mhz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.26	4.03	33.23	93.50	91.56	74.00	-17.56	Peak
2	4804.00	31.16	6.02	33.38	43.13	46.93	74.00	27.07	Peak
3	7206.00	36.05	7.37	31.47	35.40	47.35	74.00	26.65	Peak
4	9840.00	38.19	9.35	33.18	35.36	49.72	74.00	24.28	Peak
5	11336.00	39.76	9.97	30.65	31.75	50.83	74.00	23.17	Peak
6	14804.00	41.02	12.23	30.33	28.05	50.97	74.00	23.03	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

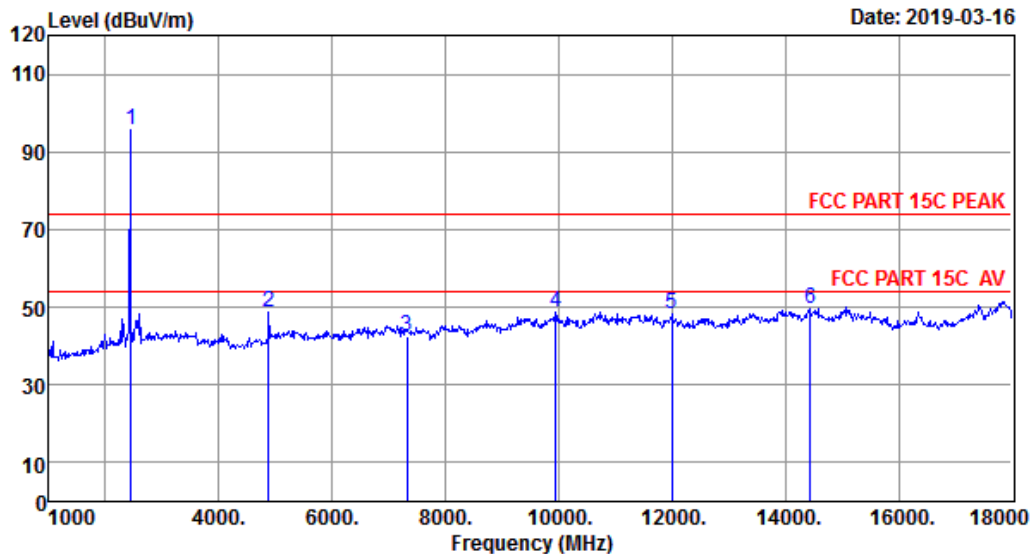
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Data: 37

File: \\EMC-966-1\test data\2019\RF\F\Foryou\CRD4512UBA-OR.EM6 (72)

Date: 2019-03-16



Site no. : 1# 966 Chamber Data no. : 37
 Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:27.3'; Humi:54%; Press:101.52kPa
 Engineer : Seven
 EUT : CAR RADIO
 Power : DC 12V
 M/N : CRD4512UBA-OR
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.33	4.03	33.39	97.62	95.59	74.00	-21.59	Peak
2	4882.00	31.39	6.10	33.02	44.30	48.77	74.00	25.23	Peak
3	7323.00	36.19	7.62	31.20	29.94	42.55	74.00	31.45	Peak
4	9942.00	38.40	9.35	32.92	34.07	48.90	74.00	25.10	Peak
5	11999.00	39.30	10.80	30.20	28.28	48.18	74.00	25.82	Peak
6	14447.00	41.06	12.05	30.92	27.59	49.78	74.00	24.22	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

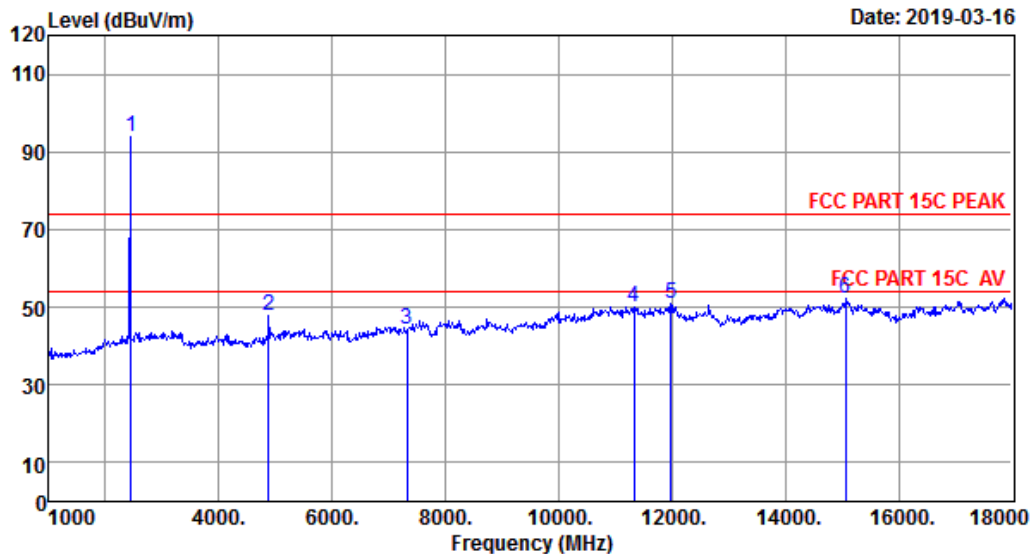
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Data: 38

File: \\EMC-966-1\test data\2019\RF\F\Foryou\CRD4512UBA-OR.EM6 (72)

Date: 2019-03-16



Site no. : 1# 966 Chamber Data no. : 38
 Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:27.3'; Humi:54%; Press:101.52kPa
 Engineer : Seven
 EUT : CAR RADIO
 Power : DC 12V
 M/N : CRD4512UBA-OR
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.33	4.03	33.39	95.83	93.80	74.00	-19.80	Peak
2	4882.00	31.39	6.10	33.02	43.14	47.61	74.00	26.39	Peak
3	7323.00	36.19	7.62	31.20	31.77	44.38	74.00	29.62	Peak
4	11336.00	39.76	9.97	30.65	30.99	50.07	74.00	23.93	Peak
5	11982.00	39.31	10.76	30.25	31.01	50.83	74.00	23.17	Peak
6	15059.00	40.82	12.15	31.09	30.41	52.29	74.00	21.71	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.