

Test Report				
1. Client				
Name :Address :	SENA TECHNOLOGIES.Inc 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea			
2. Use of Report	t: FCC Approval			
3. Sample Descr	ription			
 Product Nam Model Name 				
4. Date of Recei	pt: 2022-06-21			
5. Date of Test :	2022-08-16 ~ 2022-09-01			
6. Test Method : FCC Part 15 Subpart C 15.247 RSS-247 Issue 2(2017-02), RSS-GEN Issue 5(2019-03)				
7. Test Results :	Refer to the test results			
This test report must not be reproduced or reproduced in any way. The results shown in this test report are the results of testing the samples provided. This test report is prepared according to the requirements of ISO / IEC 17025.				
Affirmation	Tested by Technical Manager			
Affirmation	Dae-Seong, Choi Yong-Min, Won			
	Sep 19, 2022			

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EMC Labs Co., Ltd.



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<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
KR0140-RF2209-006	Sep 19, 2022	Initial Issue

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1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant Information

Applicant SENA TECHNOLOGIES.Inc	
Applicant Address 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea	
Contact Person Seunghyun Kim	
Telephone No.	+82-2-573-7772
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E-mail shkim@sena.com	

1.2. Manufacturer Information

Manufacturer	SENA TECHNOLOGIES.Inc
Manufacturer Address	19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea

1.3 Test Laboratory Information

Laboratory	EMC Labs Co., Ltd.		
Applicant Address	100, Jangjateo-ro, Hobeop-myeon, Icheon-si, Gyeonggi-do, Republic of		
	Korea		
Contact Person	Yongmin Won		
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Fax No.	+82-2-538-3668		
FCC Designation No.	KR0140		
FCC Registration No.	58000		
IC Site Registration No.	28751		



2. Equipment under Test(EUT) Information

2.1 General Information

Product Name OUTLANDER M			
Model Name	SP133		
FCC ID S7A-SP133			
IC	8154A-SP133		
Power Supply	DC 3.7 V		

2.2 Additional Information

Operating Frequency	2 402 MHz ~ 2 480 MHz		
Number of channel 79			
Modulation Type BDR Mode(GFSK), EDR Mode(Pi/4 DQPSK, 8DPSK)			
Antenna Type Chip Antenna			
Antenna Gain 0.3 dBi			
Firmware Version 1.0			
Hardware Version 1.0			
Test software	BlueTest3 V3.3.5		

2.3 Test Frequency

Test mode	Test Frequency (MHz)		
	Low Frequency	Middle Frequency	High Frequency
GFSK	2 402	2 441	2 480
Pi/4 DQPSK	Pi/4 DQPSK 2 402		2 480
8DPSK 2 402		2 441	2 480

2.4 Used Test Software Setting Value

Test Mode	Setting Item	
Test Mode	Power	
GFSK	8	
Pi/4 DQPSK	8	
8DPSK	8	

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2.5 Worst-Case

BDR	GFSK (DH5)			
EDR	8DPSK (3-DH5)			

Note: The power measurement has been conducted to determine the worst-case mode from all possible Combinations between available modelations, data rates.

2.6 Mode of operation during the test

- The EUT continuous transmission mode during the test with set at Low Channel, Middle Channel, and High Channel. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

2.7 Modifications of EUT

- None



3. Test Summary

Applied	FCC Rule	IC Rule	Test Items	Test Condition	Result
\square	15.203	_	Antenna Requirement		С
\square	15.247(a)	-	20 dB Bandwidth		С
\square	_	RSS GEN (6.7)	Occupied Bandwidth (99%)		С
	15.247(a)	RSS-247 (5.1)	Number of Hopping Frequencies	Conducted	С
	15.247(a)	RSS-247 (5.1)	Time of Occupancy (Dwell Time)	Conducted	С
\square	15.247(a)	RSS-247 (5.1)	Carrier Frequencies Separation		С
\square	15.247(b)	RSS-247 (5.4)	Peak Output Power		С
	15.247(d)	RSS-247 (5.5)	Conducted Spurious Emission		С
\square	15.247(d) 15.205 & 15.209	RSS-247 (5.5) RSS-GEN (8.9 & 8.10)	Radiated Spurious Emission	Radiated	С
	15.207	RSS-GEN (8.8)	Conducted Emissions	AC Line Conducted	С

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

The sample was tested according to the following specification: ANSI C63.10:2013.

Compliance was determined by specification limits of the applicable standard according to customer requirements.



4. Used equipment on test

Description	Manufacturer	Model Name	Serial Name	Next Cal.
TEMP & HUMID CHAMBER	JFM	JFMA-001	20200929-01	2022.12.17
CONTROLLER	AMWON TECHNOLOGY	TEMI2500	S7800VK191 0707	2022.12.17
PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	MY45304057	2022.12.15
MXG ANALOG SIGNAL GENERATOR	AGILENT	N5183A	MY50141890	2022.12.15
SYSTEM DC POWER SUPPLY	AGILENT	6674A	MY53000118	2022.12.15
VECTOR SIGNAL GENERATOR	ROHDE & SCHWARZ	SMBV100A	257524	2022.12.15
BLUETOOTH TESTER	TESCOM	TC-3000A	3000A480088	2022.12.15
DIRECTIONAL COUPLER	AGILENT	773D	2839A01855	2022.12.15
ATTENUATOR	AGILENT	8493C	73193	2022.12.15
ATTENUATOR	ACE RF COMM	ATT SMA 20W 20dB 8GHz	A-0820.SM20.2	2023.04.11
TERMINATIOM	HEWLETT PACKARD	909D	07492	2022.12.15
POWER DIVIDER	HEWLETT PACKARD	11636A	06916	2022.12.15
SLIDE-AC	DAEKWANG TECH	SV-1023	_	_
DIGITAL MULTIMETER	HUMANTECHSTORE	15B+	50561541WS	2022.12.15
ACTIVE LOOP ANTENNA	TESEQ	HLA 6121	55685	2022.12.30
Biconilog ANT	Schwarzbeck	VULB 9160	3260	2023.02.03
Biconilog ANT	Schwarzbeck	VULB9168	902	2023.01.14
Horn Ant.	Schwarzbeck	BBHA9120D	974	2023.01.08
Horn Ant.	S/B	BBHA9120D	1497	2023.01.25
Amplifier	TESTEK	TK-PA18H	200104-L	2023.03.17
EMI TEST RECEIVER	ROHDE& SCHWARZ	ESW44	101952	2023.04.07
PROGRAMMABLE DC POWER SUPPLY	ODA	OPE-305Q	oda-01-09-23-1831	2023.01.10
DC POWER SUPPLY	AGILENT	E3634A	MY40012120	2023.02.03
POWER SENSOR	AGILENT	U2001H	MY51140028	2023.02.19
Test Receiver	ROHDE & SCHWARZ	ESR7	101616	2023.06.28
LISN	ROHDE & SCHWARZ	ENV216	100409	2023.01.10
PULSE LIMITER	lignex1	EPL-30	NONE	2023.01.24

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5. Antenna Requirement

According to §15.203 An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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.

According to §15.247(b)(4) e conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1 Result

Complies

(The transmitter has a Chip Antenna. The directional peak gain of the antenna is 0.3 dBi.)



6. 20 dB Bandwidth & Occupied Bandwidth (99%)

6.1 Test Setup

Refer to the APPENDIX I.

6.2 Limit

Limit : Not Applicable

6.3 Test Procedure

- 1. The 20 dB bandwidth & Occupied bandwidth were measured with a spectrum analyzer connected to RF antenna Connector (conducted measurement) while EUT was operating in transmit mode. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer.
- 2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using below setting:

RBW = 1% to 5% of the 20 dB Bandwidth & Occupied Bandwidth VBW $\geq 3 \times RBW$ Span = between two times and five times the 20 dB Bandwidth & Occupied Bandwidth Sweep = Auto Detector function = Peak Trace = Max Hold

6.4 Test Result

Test Mode	Test Frequency	20 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
	Low	0.961	0.859
GFSK	Middle	0.962	0.859
	High	0.961	0.856
	Low	1.310	1.182
8DPSK	Middle	1.310	1.182
	High	1.312	1.184

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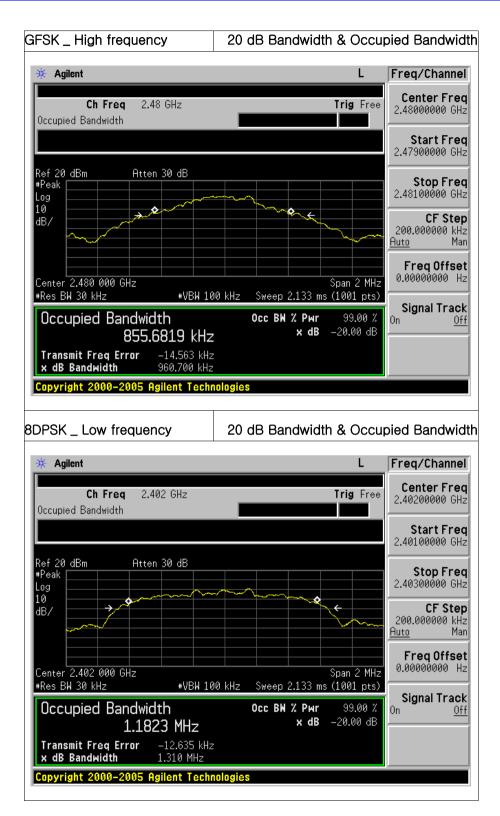


6.5 Test Plot



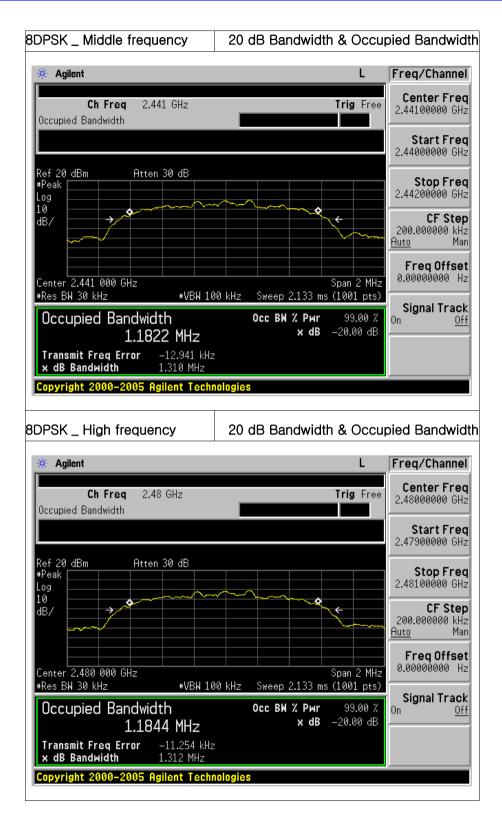
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7. Number of Hopping Frequencies

7.1 Test Setup

Refer to the APPENDIX I.

7.2 Limit

Limit : >= 15 hops

7.3 Test Procedure

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

To get higher resolution, two frequency ranges for FH mode within the 2400 \sim 2483.5 MHz were examined.

The spectrum analyzer is set to:

 Span = 50 MHz

 RBW = To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

 VBW ≥ RBW
 Sweep = Auto

 Detector = Peak
 Trace = Max hold

7.4 Test Result

Test Mode	Number of Hopping Channels
GFSK	79
8DPSK	79

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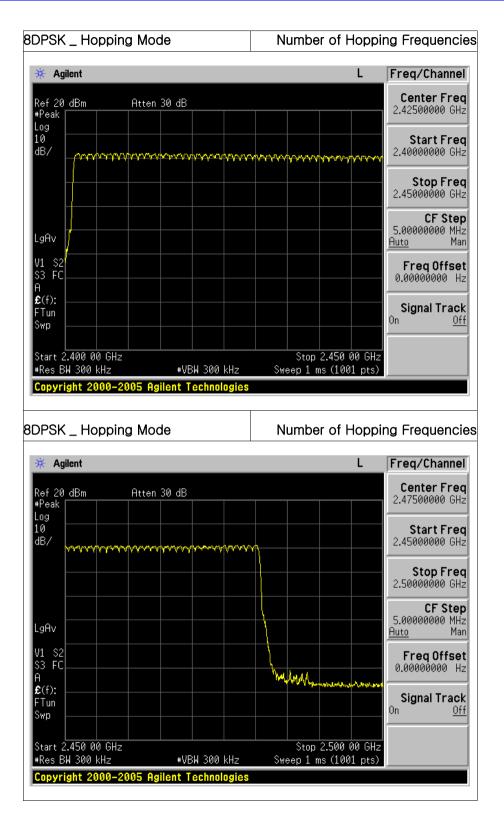


7.5 Test Plot

FSK _ Hopping Mode	Number of Hopping Frequenc
* Agilent	L Freq/Channe
Ref 20 dBm Atten 30 dB #Peak	2.42500000 GH
	Start Fre 2.4000000 GH
	Stop Fre 2.4500000 GH
LgAv	CF Ste 5.0000000 MH <u>Auto</u> Ma
V1 S2 S3 FC A	Freq Offse 0.00000000 H
£(f): FTun Swp	Signal Trac On <u>Ot</u>
Start 2.400 00 GHz #Res BW 300 kHz #VBW 300 kHz	Stop 2.450 00 GHz Sweep 1 ms (1001 pts)
Copyright 2000–2005 Agilent Technologies	
FSK _ Hopping Mode	Number of Hopping Frequenc
	Center Fre
Ref 20 dBm Atten 30 dB #Peak Log	2.47500000 GH
	MStart Fre 2.45000000 GH
	Stop Fre 2.5000000 GH
LgAv	CF Ste 5.00000000 MH <u>Auto</u> Ma
V1 S2 S3 FC	Freq Offse
A	a water and a start of the star
H £(f): FTun Swp	Signal Trac
£ (f):	Signal Trac

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8. Time of Occupancy (Dwell Time)

8.1 Test Setup

Refer to the APPENDIX I.

8.2 Limit

The maximum permissible time of occupancy is 400 ms within a period of 400 ms multiplied by the number of hopping channels employed.

8.3 Test Procedure

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

```
Center frequency = 2441 MHz Span = Zero

RBW = 1 MHz (RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T,

where T is the expected dwell time per channel)

VBW ≥ RBW Detector = Peak

Trace = Max hold
```

8.4 Test Result

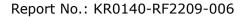
Test Mode	Number of Hopping Channels	Burst On Time (ms)	Result (sec)	Limit (sec)
GFSK (non-AFH)	79	2.884	0.31	0.40
GFSK (AFH)	20	2.884	0.15	0.40
8DPSK (non-AFH)	79	2.885	0.31	0.40
8DPSK (AFH)	20	2.885	0.15	0.40

Note: Dwell Time = 0.4 x Hopping channel x Burst On Time x ((Hopping rate / Time slots) / Hopping channel)

- Time slots for DH5 = 6 slots (TX = 5 slot / RX = 1 slot)

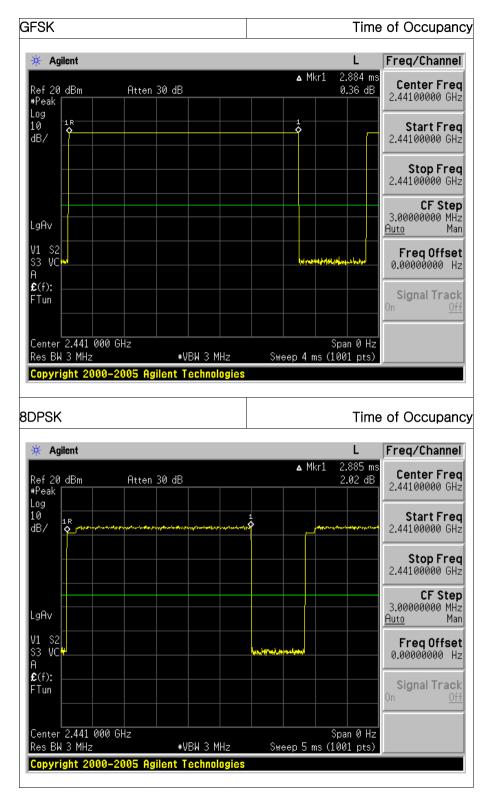
- Hopping Rate = 1600 for FH mode & 800 for AFH mode

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8.5 Test Plot



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9. Carrier Frequencies Separation

9.1 Test Setup

Refer to the APPENDIX I.

9.2 Limit

Limit : \geq 25 kHz or \geq Two-Thirds of the 20 dB Bandwidth whichever is greater.

9.3 Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = wide enough to capture the peaks of two adjacent channelsRBW = Start with the RBW set to approximately 30% of the channel spacing; adjust asnecessary to best identify the center of each individual channel.VBW \geq RBWDetector = PeakSweep = AutoTrace = Max hold

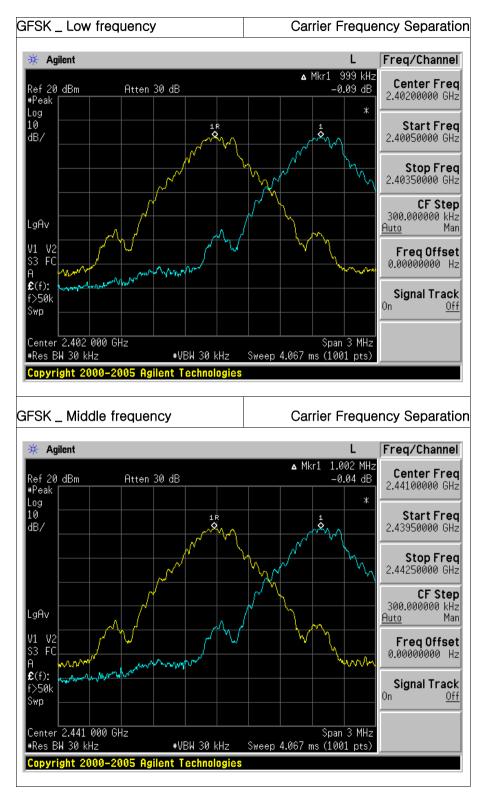
Test Mode	Test Frequency	Carrier Frequencies Separation (MHz)	Min. Limit (MHz)
	Low	0.999	0.641
GFSK	Middle	1.002	0.641
	High	0.999	0.641
	Low	1.002	0.873
8DPSK	Middle	0.999	0.873
	High	1.002	0.875

9.4 Test Result

Note: Limit(kHz) = Test Result of 20 dB BW * 2/3

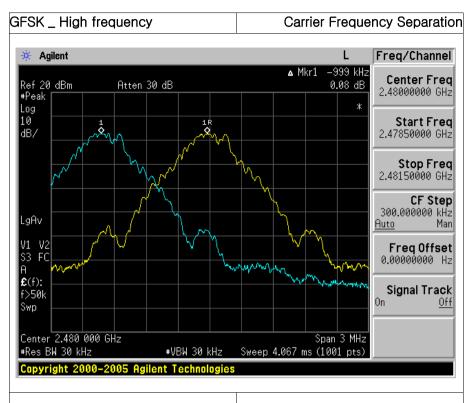


9.5 Test Plot



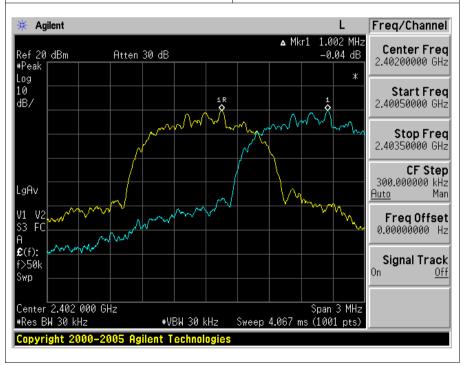
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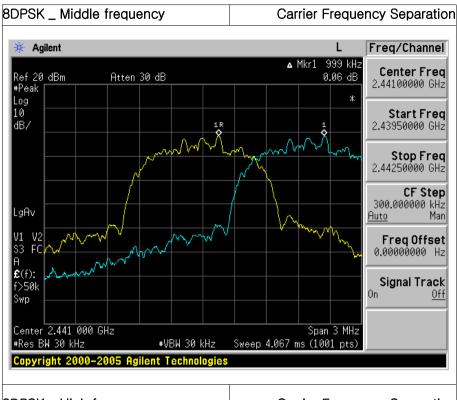
8DPSK _ Low frequency

Carrier Frequency Separation



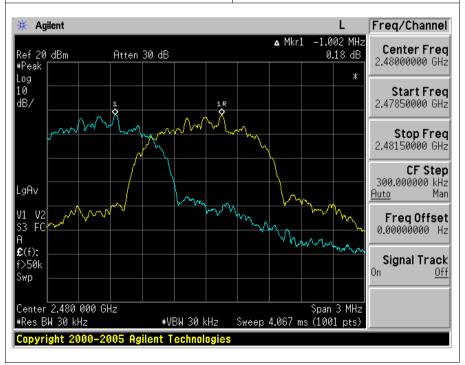
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8DPSK _ High frequency

Carrier Frequency Separation



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10. Peak Output Power

10.1 Test Setup

Refer to the APPENDIX I.

10.2 Limit

■ FCC Requirements

The maximum peak output power of the intentional radiator shall not exceed the following:

- §15.247(a)(1), 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.
- §15.247(b)(1), For frequency hopping systems operating in the 2400 2483.5 MHz employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725 5805 MHz band: 1 Watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
- IC Requirements
- RSS-247(5.4) (b), 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 uses 75 or more hopping channels, the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p shall not exceed 4 W, except as provided in section 5.4(e)

10.3 Test Procedure

- 1. The RF output power was measured with a spectrum analyzer connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, a spectrum analyzer was used to record the shape of the transmit signal.
- 2. The peak output power of the fundamental frequency was measured with the spectrum analyzer using;

Span = approximately 5 times of the 20 dB bandwidth, centered on a hopping channel

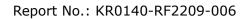
RBW ≥ 20 dB Bandwidth VBW ≥ RBW Sweep = Auto Detector function = Peak Trace = Max Hold

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10.4 Test Result

Test Mode	Test Frequency	Peak Out	put Power
Test Mode	Test Frequency	dBm	mW
	Low	5.82	3.82
GFSK	Middle	5.17	3.29
	High	5.67	3.69
	Low	4.38	2.74
Pi/4 DQPSK	Middle	3.28	2.13
	High	2.61	1.82
	Low	5.09	3.23
8DPSK	Middle	3.80	2.40
	High	3.00	2.00





10.5 Test Plot

SK _ Low fr					
Agilent				L	Freq/Channe
ef 20 dBm 'eak	Atten	30 dB	Mkr1	2.401 925 GH: 5.82 dBm	Center Fre 2.40200000 GH
g) 3/		\$			Start Fre 2.39950000 GH
					Stop Fre 2.40450000 GH
ıAv					CF Ste 500.000000 kH Auto Ma
. \$2 3 FC					Freq Offse 0.00000000
(f):					Signal Trac On <u>O</u>
enter 2.402 000	0 GHz			Span 5 MHz	
'ae K⊫ ≾ Mu≂		#URU 3 MU-	Swaan 1	ms (1001 nto)	
les BW 3 MHz Invright 2000	-2005 <u>Adi</u>		Sweep 1	ms (1001 pts)	
	-2005 Agi	#VBW 3 MHz lent Technologies	Sweep 1	ms (1001 pts)	
<mark>pyright 2000</mark> SK _ Middle		lent Technologies	Sweep 1		k Output Pov
opyright 2000 SK _ Middle Agilent	e frequer	lent Technologies ICY		Pea L 2.440 980 GH:	k Output Pov
ppyright 2000 SK _ Middle Agilent eak		lent Technologies ICY		Pea	k Output Pov Freq/Channe Center Fre
ppyright 2000 SK _ Middle Agilent	e frequer	lent Technologies ICY		Pea L 2.440 980 GH:	k Output Pov Freq/Channe Center Fre 2.44100000 GH Start Fre
SK _ Middle SK _ Middle Agilent	e frequer	lent Technologies ncy 30 dB		Pea L 2.440 980 GH:	k Output Pov Freq/Channe 2.44100000 GF Start Fre 2.43850000 GF
SK _ Middle SK _ Middle Agilent	e frequer	lent Technologies ncy 30 dB		Pea L 2.440 980 GH:	k Output Pov Freq/Channe Center Fre 2.44100000 GF Start Fre 2.43850000 GF 2.44350000 GF 2.44350000 GF CF Ste 500.000000 kF
SK _ Middle SK _ Middle Agilent eak	e frequer	lent Technologies ncy 30 dB		Pea L 2.440 980 GH:	k Output Pov Freq/Channe Center Fre 2.44100000 GF Start Fre 2.43850000 GF Stop Fre 2.44350000 GF CF Ste 500.000000 kF <u>Auto</u> Freq Offse
Agilent Agi	e frequer	lent Technologies ncy 30 dB		Pea L 2.440 980 GH:	k Output Pov Freq/Channe Center Fre 2.44100000 GF Start Fre 2.43850000 GF Stop Fre 2.44350000 GF CF Ste 500.0000000 GF Freq Offse 0.00000000 F Signal Trac
SK _ Middle Agilent Agilent Park Image: Second sec	Atten :	lent Technologies ncy 30 dB		Pea L 2.440 980 GH: 5.17 dBm	k Output Pov Freq/Channe Center Fre 2.44100000 GF 2.43850000 GF 2.43850000 GF 2.44350000 GF 2.44350000 GF CF Ste 500.0000000 FF 6.00000000 FF 0.00000000 FF 0.0000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.0000000 FF 0.000000 FF 0.00000 FF 0.000000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.00000 FF 0.0000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.00000000 FF 0.000000000 FF 0.0000000000
Agilent Agi	Atten :	lent Technologies ncy 30 dB	Mkr1	Pea L 2.440 980 GH:	k Output Pov Freq/Channe Center Fre 2.44100000 GF 2.443850000 GF 2.43850000 GF 2.44350000 GF 2.44350000 GF CF Ste 500.0000000 kF <u>Auto</u> Ma Freq Offse 0.00000000 F Signal Trac On <u>0</u>

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							E /Al
Agilent				ML-4	0 470-0	L CE CU-	Freq/Channe
ef 20 dBm	Atten	30 dB		Mkr1	2.479 9 5.6	65 GHZ 7 dBm	Center Fre 2.48000000 GI
'eak g							2.40000000 01
)				 			Start Fre
3/							2.47750000 GI
							Stop Fre 2.48250000 G
							CF Ste 500.000000 kl
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	2112						
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p <mark>pyright 2000-</mark> 4 DQPSK _ L	2005 Ag	ilent To	echnolog	weep 1 i		1 pts) Pea	
pyright 2000-	2005 Ag	ilent To	echnolog			1 pts) Pea L	Freq/Chann
4 DQPSK _ L Agilent	2005 Ag	ilent To quenc	echnolog		ms (100 2.401 9	1 pts) Pea L	Freq/Chann Center Fre
apyright 2000- 4 DQPSK _ L Agilent	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Chann Center Fre 2.40200000 G
4 DQPSK _ L Agilent	2005 Ag .ow fre	ilent To quenc	echnolog		ms (100 2.401 9	1 pts) Pea L 15 GHz	k Output Pov Freq/Channe Center Fre 2.40200000 GI Start Fre 2.39950000 GI
apyright 2000- 4 DQPSK _ L Agilent ef 20 dBm eak	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Chann Center Fre 2.40200000 G Start Fre 2.39950000 G
apyright 2000- 4 DQPSK _ L Agilent ef 20 dBm eak	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Chann Center Fre 2.40200000 G Start Fre 2.39950000 G Stop Fre
apyright 2000- 4 DQPSK _ L Agilent ef 20 dBm eak	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Channe Center Fre 2.40200000 G Start Fre 2.39950000 G Stop Fre 2.40450000 G
apyright 2000- 4 DQPSK _ L Agilent ef 20 dBm eak	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Chann Center Fre 2.40200000 G Start Fre 2.39950000 G Stop Fre 2.40450000 G CF Ste 500.000000 k
Agilent	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Chann Center Fre 2.40200000 Gi Start Fre 2.39950000 Gi Stop Fre 2.40450000 Gi CF Ste 500.000000 k <u>Auto</u> M
Agilent	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Channe Center Fre 2.40200000 GI Start Fre 2.39950000 GI Stop Fre 2.40450000 GI CF Ste 500.000000 kl <u>Auto</u> M
A DQPSK _ L Agilent Ag	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Chann Center Fre 2.40200000 Gi Start Fre 2.39950000 Gi Stop Fre 2.40450000 Gi CF Ste 500.000000 k Auto M Freq Offse 0.00000000
Agilent 4 DQPSK _ L 4 DQPSK _ L 4 DQPSK _ L 6 Agilent 9 </td <td>2005 Ag .ow fre</td> <td>ilent To quenc</td> <td>echnolog X</td> <td></td> <td>ms (100 2.401 9</td> <td>1 pts) Pea L 15 GHz</td> <td>Freq/Channe Center Fre 2.40200000 GI Start Fre 2.39950000 GI Stop Fre 2.40450000 GI CF Ste 500.0000000 ki <u>Auto</u> M Freq Offse 0.00000000 l</td>	2005 Ag .ow fre	ilent To quenc	echnolog X		ms (100 2.401 9	1 pts) Pea L 15 GHz	Freq/Channe Center Fre 2.40200000 GI Start Fre 2.39950000 GI Stop Fre 2.40450000 GI CF Ste 500.0000000 ki <u>Auto</u> M Freq Offse 0.00000000 l
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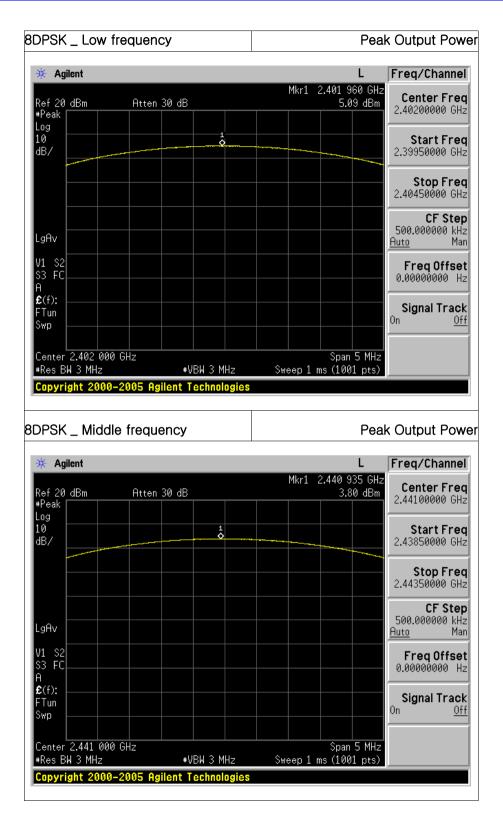


					-
Agilent				L	Freq/Channe
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eak				<u>3.20 dbiii</u>	2.44100000 GH
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3/					Start Fre 2.43850000 GH
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S2					Freq Offse
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:f):					
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enter 2.441 000 G es BW 3 MHz		/BW 3 MHz	Sweep 1	Span 5 MHz ms (1001 pts)	
OS DA STILZ					
ipyright 2000-2					
1 DQPSK _ Hi				Pea	
				Pea	Freq/Channe
1 DQPSK _ Hi	igh frequen			Pea L 2.479 860 GHz	Freq/Channe Center Fre
DQPSK_Hi Agilent f 20 dBm eak				Pea	Freq/Channe Center Fre
L DQPSK _ Hi Agilent of 20 dBm eak	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH
Agilent	igh frequen			Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre
L DQPSK _ Hi Agilent of 20 dBm eak	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre
Agilent	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre 2.47750000 GH Stop Fre
Agilent	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre 2.47750000 GH Stop Fre
Agilent	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre 2.47750000 GH Stop Fre 2.48250000 GH
Agilent f 20 dBm eak g	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GF Start Fre 2.47750000 GF Stop Fre 2.48250000 GF CF Ste 500.000000 kF
Agilent Agilent f 20 dBm eak g Av	igh frequen	cy		Pea L 2.479 860 GHz	k Output Pov Freq/Channe 2.4800000 GF Start Fre 2.47750000 GF 2.48250000 GF 2.48250000 GF CF Ste 500.000000 kF <u>Auto</u> Ma
4 DQPSK _ Hi Agilent f 20 dBm eak g a Agilent	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channel Center Fre 2.48000000 GH Start Fre 2.47750000 GH 2.48250000 GH 2.48250000 GH CF Ste 500.000000 kH Auto Ma
Agilent Agilent f 20 dBm eak g Av	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channel Center Fre 2.48000000 GH Start Fre 2.47750000 GH 2.48250000 GH 2.48250000 GH CF Ste 500.0000000 kH <u>Auto</u> Ma
4 DQPSK _ Hi Agilent f 20 dBm eak g g g g g g g g g g g g g g g g g g g	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channel Center Fre 2.48000000 GH Start Fre 2.47750000 GH 2.48250000 GH 2.48250000 GH CF Ste 500.0000000 KH Auto Ma
4 DQPSK _ Hi Agilent of 20 dBm eak g 3/ g a g a g	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre 2.47750000 GH 2.48250000 GH 2.48250000 GH CF Ste 500.0000000 KH Auto Ma Freq Offse 0.00000000 H
4 DQPSK _ Hi Agilent of 20 dBm eak 9 3/ 9 3/ 9 3/ 9 3/ 9	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre 2.47750000 GH 2.48250000 GH 2.48250000 GH CF Ste 500.0000000 KH Auto Ma Freq Offse 0.00000000 H
4 DQPSK _ Hi Agilent of 20 dBm eak g 3/ g a g a g	igh frequen	cy		Pea L 2.479 860 GHz	Freq/Channe Center Fre 2.48000000 GH Start Fre 2.47750000 GH 2.48250000 GH 2.48250000 GH CF Ste 500.0000000 KH Auto Ma Freq Offse 0.00000000 H

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Agilent				L	Freq/Channe
f 20 dBm	Atten 30 d	В	Mkr1 2.	479 905 GHz 3.00 dBm	Center Fre 2.48000000 G
Peak					2.10000000 01
) 3/					Start Fre 2.47750000 GH
					Stop Fre 2.48250000 GF
ıAv					CF Ste 500.000000 kH <u>Auto</u> M
. \$2 3 FC					Freq Offse 0.00000000 +
(f):					Signal Trac On <u>O</u>
enter 2.480 00 Res BW 3 MHz		∗VBW 3 MHz		Span 5 MHz s (1001 pts)	



11. TX Radiated Spurious Emission and Conducted Spurious Emission

11.1 Test Setup

Refer to the APPENDIX I.

11.2 Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)					
0.009 ~ 0.490	2400/F (kHz)	300					
0.490 ~ 1705	24000/F (kHz)	30					
1705 ~ 30.0	30	30					
30 ~ 88	100 **	3					
88 ~ 216	150 **	3					
216 ~ 960	200 **	3					
Above 960	500	3					

radiator shall not exceed the field strength levels specified in the following table

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 - 72 MHz, 76 - 88 MHz, 174 - 216 MHz or 470 - 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.



MHz	MHz	MHz	GHz
0.009 ~ 0.110	16.42 ~ 16.423	399.90 ~ 410	4.5 ~ 5.15
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.	1435 ~ 1626.5	9.0 ~ 9.2
4.20725 ~ 4.20775	25 73 ~ 74.6	1645.5 ~ 1646.5	9.3 ~ 9.5
4.17725 ~ 4.17775	74.8 ~ 75.2	1660 ~ 1710	10.6 ~ 12.7
6.215 ~ 6.218	108 ~ 121.94	1718.8 ~ 1722.2	13.25 ~ 13.4
6.26775 ~ 6.26825	149.9 ~ 150.05	2200 ~ 2300	14.47 ~ 14.5
6.31175 ~ 6.31225	156.52475 ~ 156.52525	2310 ~ 2390	15.35 ~ 16.2
8.291 ~ 8.294	156.7 ~ 156.9	2483.5 ~ 2500	17.7 ~ 21.4
8.362 ~ 8.366	162.0125 ~ 167.17	2690 ~ 2900	22.01 ~ 23.12
8.37625 ~ 8.38675	3345.8 ~ 3358	3260 ~ 3267	23.6 ~ 24.0
8.41425 ~ 8.41475	3600 ~ 4400	3332 ~ 3339	31.2 ~ 31.8
12.51975 ~ 12.52025	3345.8 ~ 3358	240 ~ 285	36.43 ~ 36.5
12.57675 ~ 12.57725	3600 ~ 4400	322 ~ 335.4	Above 38.6
13.36 ~ 13.41			

According to § 15.205(a) and (b), only spurious emissions are permitted in any of The frequency bands listed below:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.



11.3 Test Procedure for Radiated Spurious Emission

- 1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The table was rotated 360 degrees to determine the position of the highest radiation.
- During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 or 3 meter away from the interference-receiving antenna.
- 3. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.
- 4. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 5. For each suspected emission, the EUT was arranged to its worst case and then The antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading. (The EUT was pre-tested with three axes (X, Y, Z) and the final test was performed at the worst case.)
- 6. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 7. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.





Measurement Instrument Setting

- Frequency Range: Below 1 GHz RBW = 100 or 120 kHz, VBW = 3 x RBW, Detector = Peak or Quasi Peak
- Frequency Range: Above 1 GHz
 Peak Measurement
 RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Sweep time = Auto, Trace mode = Max Hold until the trace stabilizes

Average Measurement RBW = 1MHz, VBW ≥ 1/T, Detector = Peak, Sweep Time = Auto, Trace Mode = Max Hold until the trace stabilizes

11.4 Test Procedure for Conducted Spurious Emission

- 1. The transmitter output was connected to the spectrum analyzer.
- The reference level of the fundamental frequency was measured with the spectrumanalyzer using RBW = 100 kHz, VBW = 300 kHz.
- The conducted spurious emission was tested each ranges were set as below. Frequency range: 30 MHz ~ 26.5 GHz RBW = 100 kHz, VBW = 300 kHz, Sweep Time = Auto, Detector = Peak, Trace = Max Hold

LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)



11.5 Test Result

9 kHz ~ 25 GHz Data (Modulation: GFSK)

• Low frequency

Fraguanay	Rea	ding				Lin	nits	Re	sult	Margin	
Frequency	(dBu	IV/m)	Pol.	Factor (dB)	DCCF (dB)	(dBu	ıV/m)	(dBuV/m) AV / Peak		(dB)	
(MHz)	AV ,	/ Peak				AV /	Peak			AV / Peak	
2 389.40	N/A	32.83	V	11.84	-24.78	54.0	74.0	19.9	44.7	34.1	29.3
4 803.50	N/A	39.03	Н	4.30	-24.78	54.0	74.0	18.6	43.3	35.4	30.7

Middle frequency

Fraguanay	Rea	ding		- ·	0.005	Lin	nits	Re	sult	Margin	
Frequency	(dBu	V/m)	Pol.	Factor (dB)	DCCF (dB)	(dBu	V/m)	(dBuV/m) AV / Peak		(dB)	
(MHz)	AV /	/ Peak		(42)	(42)	AV /	Peak			AV / Peak	
4 882.16	N/A	38.08	Н	4.04	-24.78	54.0	74.0	17.3	42.1	36.7	31.9

High frequency

Fraguanay	Rea	ding				Lin	nits	Re	sult	Margin	
Frequency	(dBu	IV/m)	Pol.	Factor (dB)	DCCF (dB)	(dBu	IV/m)	(dBuV/m) AV / Peak		(dB)	
(MHz)	AV ,	/ Peak		(02)	(00)	AV /	Peak			AV / Peak	
2 488.16	N/A	34.71	V	12.21	-24.78	54.0	74.0	22.1	46.9	31.9	27.1
4 960.45	N/A	37.93	Н	4.21	-24.78	54.0	74.0	17.4	42.1	36.6	31.9

Note 1: The radiated emissions were inverstigated 9 kHz to 25 GHz. And no other spurious and harmonic emissions were found above listed frequencies.

Note 2: DCCF(Duty Cycle Correction Factor)

- Time to cycle through all channels = $\Delta t = T \text{ [ms] X 20}$ minimum hopping channels, where T = pulse width = 2.884 ms - 100 ms / $\Delta t \text{ [ms]} = H \rightarrow$ Round up to next highest integer, to account for worst case, H' = 100 / (2.884 X 20) = 1.73 ≈ 2

- The Worst Case Dwell Time = T [ms] x H' = 2.884 ms X 2 = 5.77 ms

- DCCF = $20 \times \log(\text{The Worst Case Dwell Time / 100 ms}) dB = <math>20 \times \log(5.77 / 100) = -24.78 dB$ Note 3: Sample Calculation.

Margin = Limit - Result / Peak Result = Peak Reading + TF / Average Result = Peak Reading + TF + DCCF TF = Ant factor + Cable Loss + Filter Loss - Amp Gain



9 kHz ~ 25 GHz Data (Modulation: 8DPSK)

• Low frequency

Fraguanay	Rea	ding						Ма	Margin		
Frequency	(dBu	ıV/m)	Pol.	Factor (dB)	DCCF (dB)	(dBu	IV/m)	(dBuV/m) AV / Peak		(dB)	
(MHz)	AV .	/ Peak			(00)	AV /	Peak			AV / Peak	
2 389.64	N/A	29.40	V	11.84	-24.78	54.0	74.0	16.5	41.2	37.5	32.8
4 803.75	N/A	35.95	Н	4.30	-24.78	54.0	74.0	15.5	40.3	38.5	33.8

• Middle frequency

Frequency	Rea	ding				Lin	nits	Re	sult	Ma	Margin	
Frequency	(dBu	V/m)	Pol.	Factor (dB)	DCCF (dB)	(dBu	IV/m)	(dBuV/m) AV / Peak		(dB)		
(MHz)	AV ,	/ Peak		(48)		AV /	Peak			AV / Peak		
4 882.02	N/A	36.06	Н	4.04	-24.78	54.0	74.0	15.3	40.1	38.7	33.9	

• High frequency

Fraguanay	Rea	ding				Lin	nits	Re	sult	Margin	
Frequency	(dBu	IV/m)	Pol.	Factor (dB)	DCCF (dB)	(dBu	V/m)	(dBuV/m) AV / Peak		(dB)	
(MHz)	AV ,	/ Peak		(42)	(00)	AV /	Peak			AV / Peak	
2 483.51	N/A	31.42	V	12.21	-24.78	54.0	74.0	18.9	43.6	35.1	30.4
4 959.73	N/A	35.57	Н	4.21	-24.78	54.0	74.0	15.0	39.8	39.0	34.2

Note 1: The radiated emissions were inverstigated 9 kHz to 25 GHz.

Note 2: DCCF(Duty Cycle Correction Factor)

- Time to cycle through all channels = Δt = T [ms] X 20 minimum hopping channels, where T = pulse width = 2.885 ms

- 100 ms / Δt [ms] = H -> Round up to next highest integer, to account for worst case, H' = 100 / (2.885 X 20) = 1.73 ≈ 2

- The Worst Case Dwell Time = T [ms] x H' = 2.885 ms X 2 = 5.77 ms

- DCCF = $20 \times \log(\text{The Worst Case Dwell Time / 100 ms}) dB = <math>20 \times \log(5.77 / 100) = -24.78 dB$ Note 3: Sample Calculation.

Margin = Limit - Result / Peak Result = Peak Reading + TF / Average Result = Peak Reading + TF + DCCF TF = Ant factor + Cable Loss + Filter Loss - Amp Gain



11.6 Test Plot for Radiated Spurious Emission

• GFSK _ Low frequency

									estricted Band - Pea			
AultiView 🔠	Spectrum	Spe	ectrum 2	x s	Spectrum 3	Spectru	um 4 🕱			⊽		
Ref Level 87 Att	7.00 dBµV		RBW 1 MHz VBW 3 MHz					L Fr	requency 2.3	3500000 GH		
Input Frequency S	1 AC PS	On	Notch Of	ť						●1Pk Max		
									M1[1]	32.83 dBµ 2.3894006 GH		
0 dBµV												
0 dBµV		_							-			
о dвµV									1			
) dBµV												
0 dBµV												
										where we		
Ю dBµV		1.1.1	10.0			and a second and a second as	In an All Andrew	aluba May	man and the second	A Statistics		
о dвµV	en why national	hinsperter	and states and	- Andrew State	and the second secon	Stat Barrad as south a		<i><i>w</i></i>				
0 dBµV	-	-							-			
dBµV												
10 dBµV												
			-									
2.31 GHz				.001 pts		8	.0 MHz/		Spurio	2.39 GHz		
	Spectru	n x							Spurio			
MultiView Ref Level 80	.00 dBµV		Spectrum	12	I Spect					us – Pea		
MultiView Ref Level 80 Att Input	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum	1 2 Mode						us – Pea ⊽ 3040000 GH • 1Pk Max		
MultiView Ref Level 80 Att Input	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	I Spect				requency 4.8	us – Pea ⊽ 3040000 GH		
fultiView Ref Level 80 Att Input Frequency S	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	I Spect				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView Ref Level 80 Att Input Frequency 1 0 d8µV	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	I Spect				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView Ref Level 80 Att Input Frequency 1 0 d8µV	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	I Spect				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView Ref Level 80 Att Input Frequency 9 0 d8µV	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	I Spect				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView Ref Level 80 Att Input Frequency S 0 d8µV 0 d8µV 0 d8µV	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
JultiView RefLevel 80 Att Input Frequencys 0 dsµv 0 dsµv	.00 dBµV 0 dB SW1 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	I Spect				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView Ref Level 80 Att Input Frequency S 0 d8µV 0 d8µV 0 d8µV 0 d8µV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
JultiView Ref Level 80 Att Input Frequency S 0 dsµV 0 dsµV 0 dsµV 0 dsµV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView Ref Level 80 Att Input Frequency S 0 d8µV 0 d8µV 0 d8µV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
JultiView Ref Level 80 Att Input Frequencys 0 dsµV 0 dsµV 0 dsµV 0 dsµV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
MultiView Ref Level 80 Att Input Trequency: 0 dbµV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
MultiView Ref Level 80 Att Input Import 0 dBµV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
MultiView Ref Level 80 Att Input Trequency: 0 dbµV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
AultiView RefLevel 80 Att input Frequency: 0 d8µV 0 d8µV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		
JultiView Ref Level 80 Att Input Frequency: 0 dBµV	00 dBµV 0 dB SWI 1 AC PS	1.01 ms •	Spectrum RBW 1 MHz VBW 3 MHz	1 2 Mode	X Spectr				requency 4.8	JS – Pea ⊽ 3040000 GH • 1Pk Max 39.03 dBµ'		

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• GFSK _ Middle frequency

MultiView	Spectrum	x Spe	ctrum 2	I Spectr	um 3 🛛 🛛	Z)			⊽
	0 dB SWT 1.0 1 AC PS	● RBW 01 ms ● VBW Off Notch		Auto Sweep		2	Fre	equency 4.88	
Frequency Sw	veep							M1[1] 4.	 1Pk Max 38.08 dBµ¹ 88215984 GH
'0 dBµV									
0 dBµV									
0 dBµV									
0 dBµV					M1				~
о dвµv-	and a second and a second second	hamilderawn	downwedgest	Januar		menallen verigi	indown works	Minaturetosrahaut	sambran har
0 dBµV									

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• GFSK _ High frequency

NultiView 8	Spectrum	Spectru	m 2 🕱	Spectrum 3	Spectru	um 4 🕅			▽
Ref Level 8 Att Input	7.00 dBµV 0 dB SV 1 AC PS	VT 1.01 ms 🖷 VBV		le Auto Sweep			Fr	equency 2.4	917500 GH
Frequency								1[1]	 1Pk Max 34.71 dBµ
0 dBµV	-			-					2.4881566 GH
0 dBµV									
) dBµV	-								
I dBµV									
I dBµV ————	-	MI							
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I dBµV									
dBµV	~								
dBµV	-			1					
			1001 -						25.04
			1001 p	ts	1.	65 MHz/		Spuriou	2.5 GH
.4835 GHz		m 🖾 Sp	1001 p	ts Spectr		2		Spuriou	
.4835 GHz IultiView Ref Level 80 Att	C Spectru 0.00 dBμV 0 dB SW	• RBV T 1.01 ms • VBW	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr		2		Spuriou	s – Pea
.4835 GHz IultiView Ref Level 80 Att Input	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBV	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr		2		equency 4.9	s − Pea ⊽ 500000 GH
4835 GHz IultiView Ref Level 80 Att Input Frequency	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr		2		equency 4.9	s – Pea ⊽
4835 GHz IultiView Ref Level 80 Att Input Frequency	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr		2		equency 4.9	s – Pea ⊽ 500000 GH • 1Pk Max 37.93 dBµ
LULTIVIEW All LULTIVIEW Ref Level 80 Att Frequency dBµV	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr		2		equency 4.9	s – Pea ⊽ 500000 GH • 1Pk Max 37.93 dBµ
LULTIVIEW Ref Level 80 Rtt nput Frequency I dBµV	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr		2		equency 4.9	s – Pea ⊽ 500000 GH • 1Pk Max 37.93 dBµ
LULTIVIEW Ref Level 80 Att Input Frequency 0 dBµV	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	ectrum 2 / 1 MHz / 3 MHz Mod	X Spectr	rum 3 🛛 🕅	2		equency 4.9	s – Pea ⊽ 500000 GH • 1Pk Max 37.93 dBµ
.4835 GHz fultiView Ref Level 80 Att input Frequency) dвµV	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	Pectrum 2 / 1 MHz Mod	X Spectr			Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz IultiView Xef Level 80 ktt приt Frequency d8µv	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	• RBV T 1.01 ms • VBW	Pectrum 2 / 1 MHz / 3 MHz Mod h Off	X Spectr	rum 3 🛛 🕅		Fr	equency 4.9	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz fultiView Ref Level 80 Att input Frequency) dвµv	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	X Spectr	rum 3 🛛 🕅		Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz fultiView Ref Level 80 Att input Frequency) dвµv	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	X Spectr	rum 3 🛛 🕅		Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz fultiView Ref Level 80 Att input Frequency) dвµv	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	X Spectr	rum 3 🛛 🕅		Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz fultiView Ref Level 80 Att Input Frequency 0 d8µV	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	X Spectr	rum 3 🛛 🕅		Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz fultiView Xef Level 80 Att input Frequency) dвµv) dвµv] dвµv] dвµv] dвµv] dвµv] dвµv]	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	X Spectr	rum 3 🛛 🕅		Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
.4835 GHz tultiView Xef Level 80 tit frequency d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv d8µv	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	X Spectr	rum 3 🛛 🕅		Fr	MI[1] 4.90	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH
10 d8µV 2.4835 GHz AultiView Ref Level SC Att Input Frequency 0 d8µV	 Spectru 0.00 dBµV 0 dB SW 1 AC PS 	Off Note	Pectrum 2 / 1 MHz Mod	Spectr e Auto Sweep	rum 3 🛛 🕅		Fr	equency 4.94	s - Per 500000 GH ●1Pk Max 37.93 dBµ 96044955 GH

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• 8DPSK _ Low frequency

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MultiView 8	Spectrum	Spectrum	12 🕱	Spectrum 3	Spectru	um 4 🕅			
Ref Level 8 Att	7.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW On Notd	1 MHz 3 MHz Mo	de Auto Sweep			Fre	equency 2.3	500000 GH
Input Frequency			n on						💶 1Pk Max
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10 dBµV									
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2.31 GHz			1001 p	ts	8	.0 MHz/	Ś	Spuriou	
	Υ			2		2		Spuriou	is – Pea
2.31 GHz MultiView Ref Level 80	0.00 dBµV	• RBW	ectrum 2	X Spect		2			is – Pea
MultiView Ref Level 80 Att Input	0.00 dBµV 0 dB SWT 1 AC PS		ectrum 2 1 MHz 3 MHz Mod	X Spect		2		Spuriou	IS — Pea ⊽ 040000 GH
MultiView Ref Level 80 Att Input	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS - Pea ⊽ 040000 GH
MultiView Ref Level 80 Att Input	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level 80 Att Input Frequency	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level 80 Att Input Frequency	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level SC Att Input Frequency 0 d8µV	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level SC Att Input Frequency 0 d8µV	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level 80 Att Input Frequency 0 d8µV	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level 80 Att Input Frequency 10 d8µV	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect		2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level 80 Att Input Frequency 0 dbµ/ 0 dbµ/	0.00 dBµV 0 dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ectrum 2 1 MHz 3 MHz Mod	X Spect	rum 3 🛛 🖾	2		equency 4.80	IS – Pea ⊽ 040000 GH • 1Pk Max 35.95 dBµ
MultiView Ref Level 80 Att Input Frequency 0 dbµ/ 0 dbµ/ 0 dbµ/	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod	Spectr Sveep				Mi[1] 4	IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH
MultiView Ref Level 80 Att Input Frequency 0 dbµ/ 0 dbµ/ 0 dbµ/	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	(⊽ 040000 GH •1Pk Max 35.95 dBµ 80075025 GH
MultiView Ref Level 80 Att Input Frequency i0 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	▼ ● 11% M5x 35.95 dBµ 30375025 GH
MultiView Ref Level 80 Att Input Frequency i0 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	(⊽ 040000 GH •1Pk Max 35.95 dBµ 80075025 GH
MultiView Ref Level 80 Att Input Frequency i0 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	(⊽ 040000 GH •1Pk Max 35.95 dBµ 80075025 GH
MultiView Ref Level 80 Att Input Frequency i0 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH
MultiView Ref Level 80 Att Input Frequency 10 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH
MultiView Ref Level 80 Att Input Input <t< td=""><td>0.00 dBµV 0 dB SWT 1 AC PS Sweep</td><td>e RBW 1.01 ms = VBW Off Notch</td><td>ectrum 2 1 MHz 3 MHz Mod Off</td><td>Spectr Sveep</td><td>rum 3 🛛 🖾</td><td></td><td>Fre</td><td>Mi[1] 4</td><td>IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH</td></t<>	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH
MultiView Ref Level 80 Att Input Frequency 0 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH
MultiView Ref Level 80 Att Input Frequency 0 dbµV	0.00 dBµV 0 dB SWT 1 AC PS Sweep	e RBW 1.01 ms = VBW Off Notch	ectrum 2 1 MHz 3 MHz Mod Off	Spectr Sveep	rum 3 🛛 🖾		Fre	Mi[1] 4	IS - Peł 040000 GH ●1Pk Max 35.95 dBµ a0375025 GH
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• 8DPSK _ Middle frequency

						Č	Spurio	us – Pea
		pectrum 2	X Spectr	um 3 🛛 🕱				
Ref Level 80.00 dBμλ Att 0 dE Input 1 AC	SWT 1.01 ms . VB	W 1 MHz W 3 MHz Mode tch Off	Auto Sweep			Fre	equency 4.8	820000 GH
Frequency Sweep							M1[1]	 1Pk Max 36.06 dBµV 4.88201998 GHz
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F 4,882 GHz		1001 pts		1	.0 MHz/			Span 10.0 MHz

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• 8DPSK _ High frequency

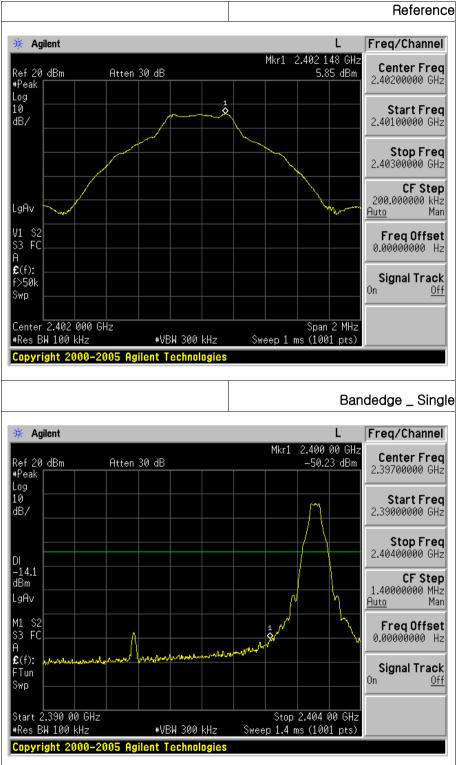
							Restrict	ed Ban	d – Pea
MultiView 8	Spectrum	Spectrum	2 🕅 St	ectrum 3	Spectru	um 4 🛛 🕅)		
Ref Level 8 Att	0 dB SW1	● RBW 1.01 ms ● VBW	3 MHz Mode	Auto Sweep			Fr	equency 2.4	917500 GH
Input Frequency	1 AC PS Sweep	On Notch	0#						• 1Pk Max
							2	1[1]	31.42 dBµ\ 2.4835082 GH
30 dBµV									LI ICCOUL OIL
™ dBµV									
i0 d8µV									
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MultiView Ref Level 80	€€ Spectrum	• RBW	ctrum 2	X Spectr					nd – Pea
MultiView Ref Level 80 Att Input	Spectrum O.00 dBμV O dB SWT 1 AC PS		ctrum 2 1 MHz 3 MHz Mode 4						nd – Pea veooooo GH
MultiView Ref Level 80 Att Input	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4						nd – Pea • • • • • • • • • • • •
MultiView Ref Level 80 Att Input Frequency	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4					equency 4.9	nd – Pea ⊽ 0600000 GH: 1Pk Max 35.57 dBµA
MultiView Ref Level 80 Att Input Frequency	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4					equency 4.9	nd – Pea ⊽ 0600000 GH: 1Pk Max 35.57 dBµA
MultiView Ref Level 80 Att Input Frequency 10 d8µV	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4					equency 4.9	nd – Pea ⊽ 0600000 GH: 1Pk Max 35.57 dBµA
MultiView Ref Level 80 Att Input Frequency 10 d8µV	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4					equency 4.9	600000 GH
MultiView Ref Level 8(Att Input Frequency 10 d8µV	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4					equency 4.9	nd – Pea ⊽ 0600000 GH: ■1Pk Max 35.57 dBµA
MultiView Ref Level 8(Att Input Frequency 70 d8µV	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4					equency 4.9	nd – Pea ⊽ 0600000 GH: ■1Pk Max 35.57 dBµA
MultiView Ref Level 80 Att Input Frequency 10 dbµV 10 dbµV 10 dbµV	Spectrum O.00 dBμV O dB SWT 1 AC PS	• RBW 1.01 ms • VBW	ctrum 2 1 MHz 3 MHz Mode 4	Auto Sweep				equency 4.9	nd – Pea ⊽ 0600000 GH: ■1Pk Max 35.57 dBµA
MultiView Ref Level 80 Att Input Frequency 10 10 48µV 10	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 80 Att Input Input <t< td=""><td>Spectrum O.00 dBμV O dB SWT 1 AC PS</td><td>RBW 1.01 ms VBW Off Notch</td><td>ctrum 2 1 MHz 3 MHz Mode A Off</td><td>NL:</td><td></td><td></td><td>Fr</td><td>MI[1]</td><td>nd – Pea ⊽ 0600000 GH: ■1Pk Max 35.57 dBµA</td></t<>	Spectrum O.00 dBμV O dB SWT 1 AC PS	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:			Fr	MI[1]	nd – Pea ⊽ 0600000 GH: ■1Pk Max 35.57 dBµA
MultiView Ref Level 80 Att Input Input <t< td=""><td>Spectrum 0.00 dB SWT 1 AC PS Sweep</td><td>RBW 1.01 ms VBW Off Notch</td><td>ctrum 2 1 MHz 3 MHz Mode A Off</td><td>NL:</td><td>rum 3 🛛 🛛</td><td></td><td>Fr</td><td>MI[1]</td><td>nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:</td></t<>	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 80 Att Input Frequency 10 dBµV	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 80 Att Input so dayv 50 dayv 50 dayv 40 dayv 40 dayv 40 dayv 40 dayv 40 dayv	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 80 Att Input so dayv 50 dayv 50 dayv 40 dayv 40 dayv 40 dayv 40 dayv 40 dayv	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 8(Att Input Input Frequency 10 dbµV	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 8(Att Input Input Frequency 10 dbµV	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
MultiView Ref Level 8(Att Input Input IPrequency 10 dbµV	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:
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MultiView Ref Level 80 Att Input Input 50 d8µV 50 d8µV 50 d8µV 40 d8µV	Spectrum 0.00 dB SWT 1 AC PS Sweep	RBW 1.01 ms VBW Off Notch	ctrum 2 1 MHz 3 MHz Mode A Off	NL:	rum 3 🛛 🛛		Fr	MI[1]	nd – Pea ▼ 0600000 GH: 11/k Max 35.57 dBµ 4.95973027 GH:

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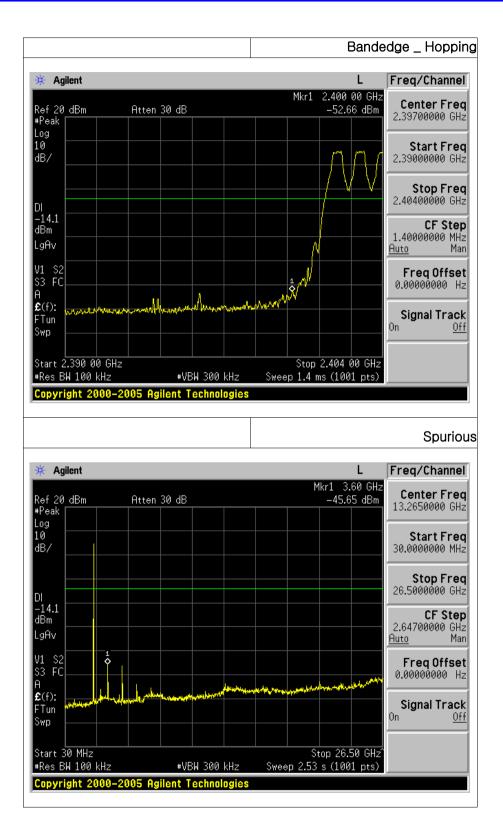
11.7 Test Plot for Conducted Spurious Emission

• GFSK _ Low frequency



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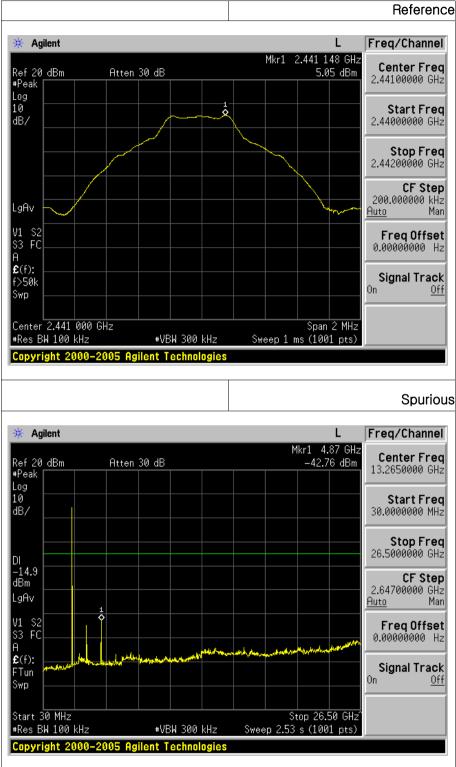




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• GFSK _ Middle frequency



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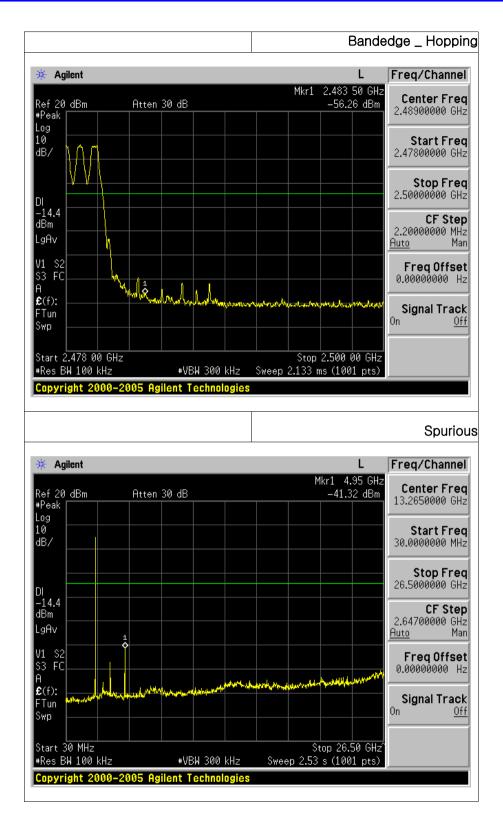


• GFSK _ High frequency



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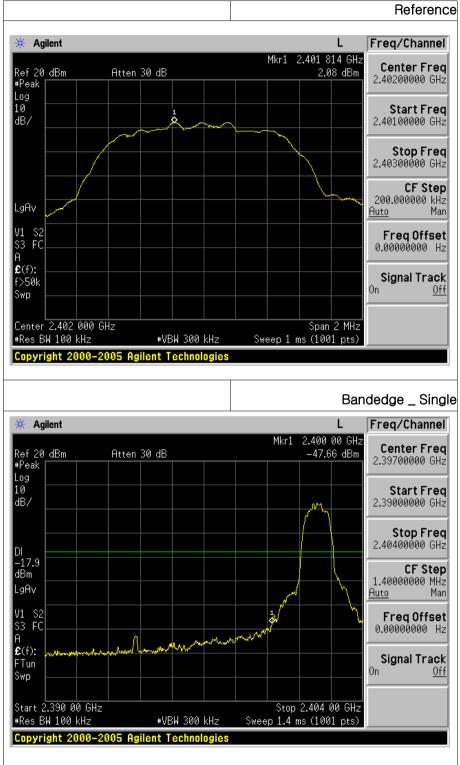




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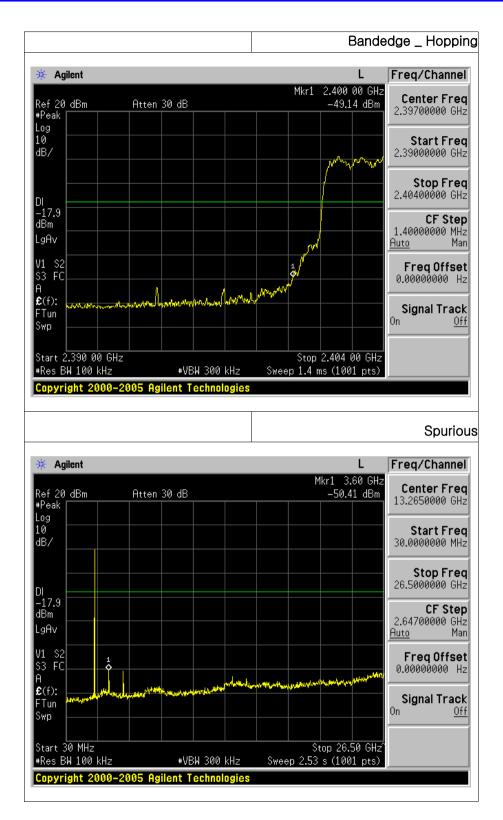


• 8DPSK _ Low frequency



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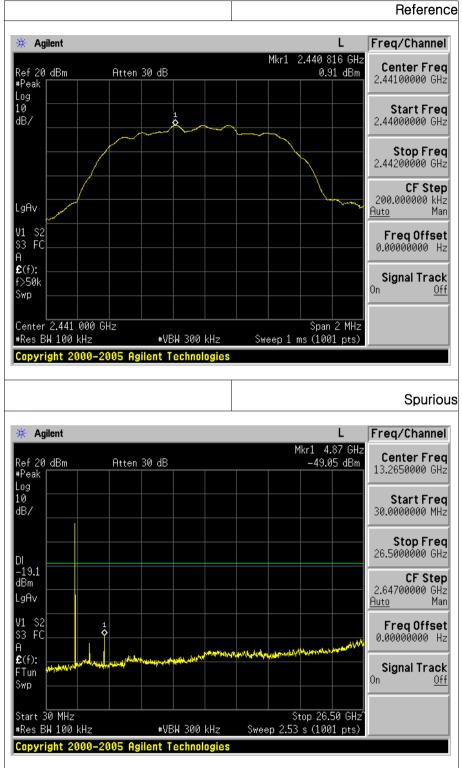




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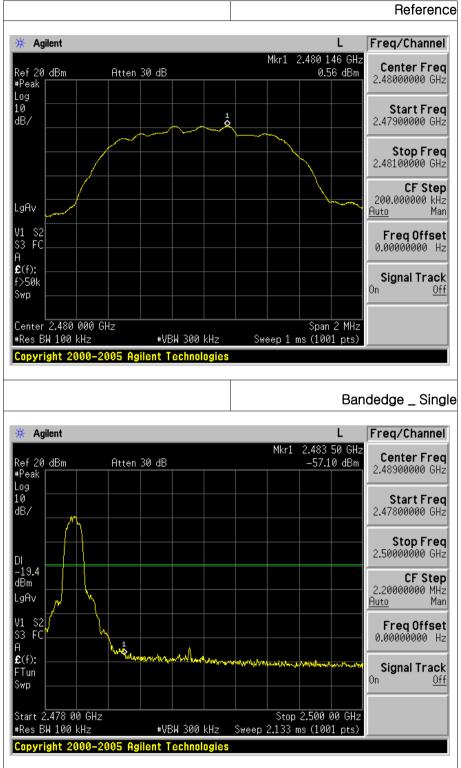
• 8DPSK _ Middle frequency



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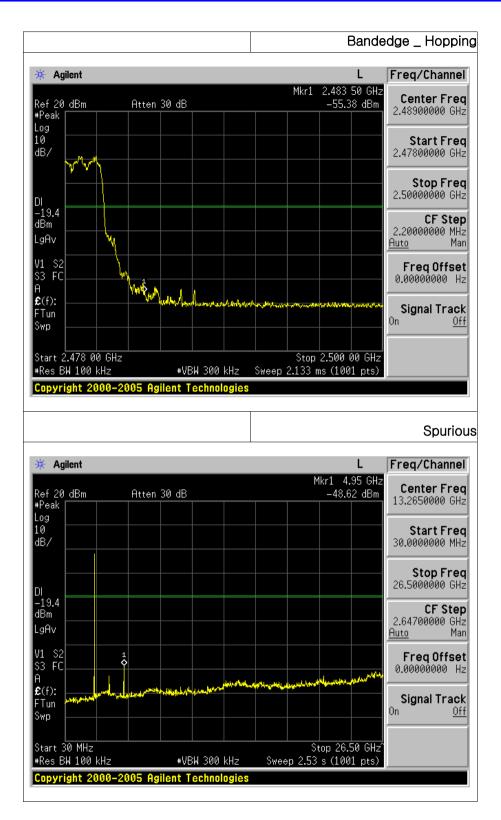


• 8DPSK _ High frequency



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12. Conducted Emission

12.1 Test Setup

See test photographs for the actual connections between EUT and support equipment.

12.2 Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Fraguaday Panga (MHz)	Conducted	Limit (dBuV)
Frequency Range (MHz)	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

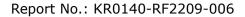
* Decreases with the logarithm of the frequency

12.3 Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10.

- The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
- The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
- 3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
- 4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

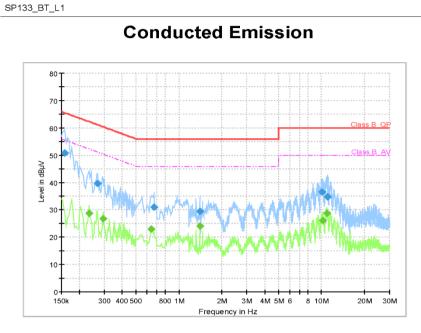
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12.4 Test Result

• AC Line Conducted Emission (Graph)

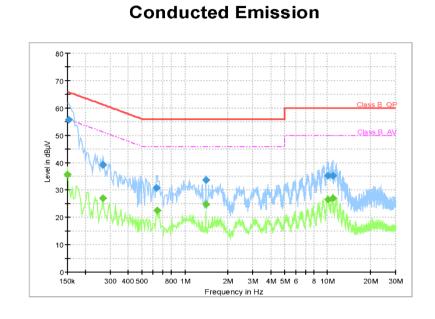


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.158	50.87	(ubµv) 	65.57	14.69	9	L1	19.4
0.234		28.76	52.31	23.55	9	L1	19.3
0.270	39.59		61.12	21.53	9	L1	19.4
0.294		26.71	50.41	23.70	9	L1	19.4
0.640		22.97	46.00	23.03	9	L1	19.8
0.670	30.95		56.00	25.05	9	L1	19.8
1.400	29.34		56.00	26.66	9	L1	19.7
1.400		24.04	46.00	21.96	9	L1	19.7
10.130	36.52		60.00	23.48	9	L1	20.0
10.220		26.17	50.00	23.83	9	L1	20.0
10.860		28.68	50.00	21.32	9	L1	20.0
10.990	34.84		60.00	25.16	9	L1	20.0

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SP133_BT_N

Final_Result

	Frequency	QuasiPeak	CAverage	Limit	Margin	Bandwidth	Line	Corr.
1	(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)	(kHz)		(dB)
[0.150		35.67	56.00	20.33	9	N	19.2
[0.154	55.71		65.78	10.07	9	N	19.3
[0.266		26.99	51.24	24.25	9	N	19.3
[0.266	39.18		61.24	22.07	9	N	19.3
[0.630	30.81		56.00	25.19	9	N	19.8
	0.640		22.45	46.00	23.55	9	N	19.8
[1.400	33.74		56.00	22.26	9	N	19.7
[1.400		24.75	46.00	21.25	9	N	19.7
ſ	10.100		26.58	50.00	23.42	9	N	20.0
[10.120	35.14		60.00	24.86	9	N	20.0
[10.860		27.01	50.00	22.99	9	N	20.0
[10.920	35.15		60.00	24.85	9	N	20.0

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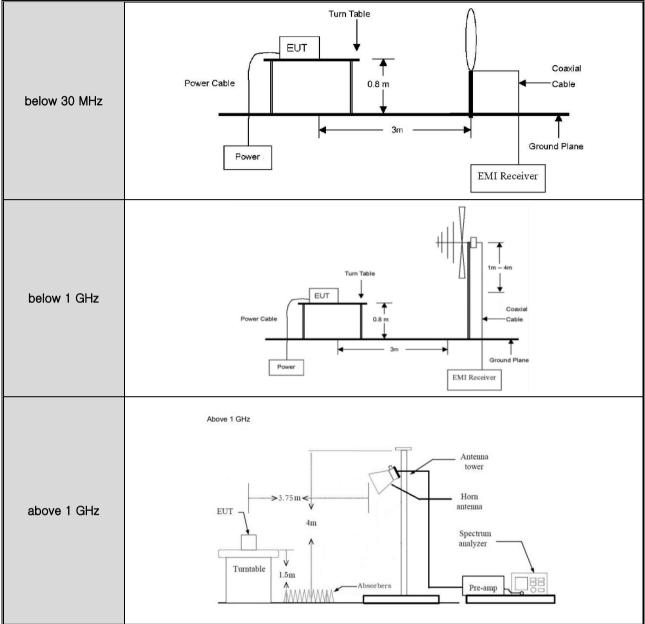
APPENDIX I

TEST SETUP

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Radiated Measurement



• Conducted Measurement

Conducted	EUT	Attenuator	Spectrum Analyzer

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APPENDIX II

UNCERTAINTY

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Measurement Item	Expanded Uncertainty U = <i>k</i> Uc (<i>k</i> =2)
Conducted RF power	0.32 dB
Conducted Spurious Emissions	0.32 dB
Radiated Spurious Emissions	6.34 dB
Conducted Emissions	1.74 dB