

# FCC LISTED, REGISTRATION NUMBER: 720267

# IC LISTED REGISTRATION NUMBER IC 4621A-1

AT4 wireless, S.A. Parque Tecnológico de Andalucía, c/ Severo Ochoa nº 2 29590 Campanillas/ Málaga/ España Tel. 952 61 91 00 - Fax 952 61 91 13 MÁLAGA, C.I.F. A29 507 456 Registro Mercantil de Málaga,Tomo 1169, Libro 82, Folio 133, Hoja MA3729

# TEST REPORT

# **REFERENCE STANDARD:**

# USA FCC Part 15.247, 15.209

# CANADA RSS-210, RSS-Gen

Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.

# Licence-Exempt Radio Apparatus (All Frequency Bands): Category I Equipment.

General Requirements and Information for the Certification of Radio Apparatus.

NIE:	41273RRF.001
Approved by (name / position & signature):	A. Llamas / RF Lab. Manager
Elaboration date:	2014-03-12
Identification of item tested:	7265NGW
Brand name:	INTEL
Model and/or type reference:	7265NGW ( includes family sub-models 7265NGW AN, 7265NGW NB and 7265NGW BN)
Serial number:	TA#: G97996-007
	WF MAC:001500E67260
	BD MAC: 001500E67264
Other identification of the product:	Commercial name: 7265NGW HW Version: QS SW Version: Test SW: DRTU_1_7_3_859
	Op SW: V17.0.0
	For OEM factory installation:
	FCC ID: PD97265NG
	IC: 1000M-7265NG
	For user installation:
	FCC ID: PD97265NGU
	IC: 1000M-7265NG
Features:	802.11 a/b/g/n/ac Wireless LAN+ BT 4.0
Description:	2x2 PCIe M.2 adapter card
Applicant:	INTEL MOBILE COMMUNICATIONS
Address:	100 Center Point Circle, Suite 200, Columbia, South Carolina 29210 USA
CIF/NIF/Passport:	No provided data
Contact person:	Steven Hackett
Telephone / Fax:	Tel: 803-216-2344/ FAX: 803-216-2176



e-mail:::	steven.c.hackett@intel.com
Test samples supplier:	Same as applicant
Manufacturer:	Same as applicant



Test method requested	See S	tandard		
Standard:		FCC Part 15.247 10-01-12 Edition: Op MHz, 2400 -2483.5 MHz, and 5725 - 58:		he bands 902 -
		FCC Part 15.209 10-01-12 Edition: Ra rements.	diated emission	limits; genera
	CAN	ADA RSS-210 Issue 8 (December 2010)	).	
	CAN	ADA RSS-Gen Issue 3 (December 2010	).	
	Hopp ANS	part 15.247 and Filing and Measurementing Spread Spectrum System DA 00-70 I C63.10-2009: American National Standless Devices.	5 Released Mar	ch 30, 2000.
Test procedure:	PERI	F010		
Non-standardized test method	N/A			
Used instrumentation:	Con	ducted Measurements		
			Last Cal. date	Cal. due date
	1.	Spectrum analyser Rohde & Schwarz FSW50	2013/10	2015/10
	Rad	ated Measurements		
			Last Cal. date	Cal. due date
	1.	Semianechoic Absorber Lined Chamber IR 11. BS	N.A.	N.A.
	2. 3.	Control Chamber IR 12.BC Hybrid Bilog antenna Sunol Sciences Corporation JB6	N.A. 2011/05	N.A. 2014/05
	4.	Antenna mast EM 1072 NMT	N.A.	N.A.
	5.	Rotating table EM 1084-4. ON Double-ridge Guide Horn antenna 1-18	N.A.	N.A.
	6.	GHz HP 11966E	2011/05	2014/05
	7.	Double-ridge Guide Horn antenna 18- 40 GHz Agilent 119665J	2011/09	2014/09
	8.	EMI Test Receiver R&S ESPI3	2013/12	2015/12
	9.	RF pre-amplifier Miteq JS4-12002600- 30-5A.	2012/07	2014/07
	10.	Multi Device Controller EMCO 2090	N.A.	N.A.
	11.	Spectrum analyser Rohde & Schwarz FSW50	2013/10	2015/10
	12.	RF pre-amplifier Schwarzbeck BBV 9718	2014/02	2015/02
	13.	RF pre-amplifier Schaffner CPA 9231A.	2013/06	2015/06

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# **Competences and guarantees**

AT4 wireless is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjuction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 720267.

AT4 wireless is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621A-1.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance programme for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

## **General conditions**

- 1. This report is only referred to the item that has undergone the test.
- 2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
- 3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
- 4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

## Uncertainty

Uncertainty (factor k=2) was calculated according to the AT4 wireless internal document:

PODT000: Procedimiento para el cálculo de incertidumbres de medida.



# Usage of samples

Samples undergoing test have been selected by: the client.

Sample S/01 is composed of the following elements:

<u>Control N°</u>	Description	Model	Serial N°	Date of reception
41273/001	2x2 PCIe M.2	7265NGW	TA#: G97996-007	16/01/2014
	adapter card		WF MAC:001500E67260	
			BD MAC: 001500E67264	

Auxiliary elements used with the sample S/01:

<u>Control Nº</u> 38067/28	Description Laptop PC	<u>Manufacture</u> DELL	<u>Model</u> Latitude E5420	<u>Serial №</u> CTFQQL1	Date of reception 08/01/2013
38067/29	Cable of the AC/DC Adapter	DELL			08/01/2013
38067/30	AC/DC Adapter	DELL	LA90PM111		08/01/2013
40104B/16	Reference Antenna	SkyCross	WIMAX/WLAN		26/09/2013
40104B/17	Reference Antenna	SkyCross	WIMAX/WLAN		26/09/2013
38067/36	M2/NGFF extender cable				08/01/2013
38067/37	HMC/NGFF Testing board	INTEL	PCB00390	3902412-252	11/01/2013
38067/38	Adapter of the AC/DC Board Testing	SINPRO	SPU60-102	07990464 1249	11/01/2013
1302	Board 35mmx35mm				
40079/09	USB cable				26/09/2013



# Usage of samples

Sample S/02 is composed of the following elements:

Control Nº 41273/001

**Description** 2x2 PCIe M.2 adapter card

7265NGW

Model

Serial Nº TA#: G97996-007 WF MAC:001500E67260 BD MAC: 001500E67264 **Date of reception** 16/01/2014

Auxiliary elements used with the sample S/01:

<u>Control Nº</u> 38067/28	<u>Description</u> Laptop PC	<u>Manufacture</u> DELL	<u>Model</u> Latitude E5420	<u>Serial Nº</u> CTFQQL1	Date of reception
38067/29	Cable of the AC/DC Adapter	DELL			08/01/2013 08/01/2013
38067/30	AC/DC Adapter	DELL	LA90PM111		08/01/2013
38067/36	M2/NGFF extender cable				08/01/2013
38067/37	HMC/NGFF Testing board	INTEL	PCB00390	3902412-252	11/01/2013
38067/38	Adapter of the AC/DC Board Testing	SINPRO	SPU60-102	07990464 1249	11/01/2013
1302	Board 35mmx35mm				
40079/09	USB cable				26/09/2013

- 1. Sample S/01 has undergone following test(s). All radiated tests indicated in appendix A.
- 2. Sample S/02 has undergone following test(s). All conducted tests indicated in appendix A.

# **Testing period**

The performed test started on 2014-01-28 and finished on 2014-02-05.

The tests have been performed at AT4 wireless.



# **Environmental conditions**

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 19.1°C
_	Max. = 22.1°C
Relative humidity	Min. = 49%
	Max. = 55.5%
Shielding effectiveness	> 100 dB
Electric insulation	$> 10 \text{ k}\Omega$
Reference resistance to earth	$< 0.5 \ \Omega$

In the semianechoic chamber (21 meters x 11 meters x 8 meters), the following limits were not exceeded during the test.

Temperature	$Min. = 17.4^{\circ}C$
	$Max. = 20.1^{\circ}C$
Relative humidity	Min. = 41.1%
	Max. = 44.5%
Air pressure	Min. = 1016mbar
	Max. $= 1019$ mbar
Shielding effectiveness	> 100 dB
Electric insulation	$> 10 \text{ k}\Omega$
Reference resistance to earth	$< 0.5 \ \Omega$
Normal site attenuation (NSA)	$< \pm 4$ dB at 10 m distance between item
	under test and receiver antenna, (30 MHz to
	1000 MHz)
Field homogeneity	More than 75% of illuminated surface is
	between 0 and 6 dB (26 MHz to 1000
	MHz).

In the chamber for conducted measurements the following limits were not exceeded during the test:

Temperature	$Min. = 19.1^{\circ}C$
_	$Max. = 24.7^{\circ}C$
Relative humidity	Min. = 43.1%
	Max. = 51.1%
Air pressure	Min. = 1018mbar
	Max. = $1019$ mbar
Shielding effectiveness	> 100 dB
Electric insulation	$> 10 \text{ k}\Omega$
Reference resistance to earth	$< 0,5 \Omega$



# Summary

Considering the results of the performed test according to standard USA FCC Parts 15.247 and 15.209 / Canada RSS-210, the item under test is **IN COMPLIANCE** with the requested specifications specified in the standard.

NOTE: The results presented in this Test Report apply only to the particular item under test established in page 1 of this document, as presented for test on the date(s) shown in section, "USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS".

# **Remarks and comments**

1.- No comments.

# **Testing verdicts**

Not applicable:	NA
Pass:	Р
Fail:	F
Not measured:	

FCC PART 15 / RSS-210 PARAGRAPH		VERDICT			
	NA	Р	F	NM	
FCC 15.247 Subclause (a) (1). 20 dB Bandwidth and Carrier frequency separation / RSS-210 Clause A8.1 (b)		Р			
FCC 15.247 Subclause (a) (1) (iii). Number of hopping channels / RSS-210 Clause A8.1 (d)		Р			
FCC 15.247 Subclause (a) (1) (iii). Time of occupancy (Dwell Time) / RSS-210 Clause A8.1 (d)		Р			
FCC 15.247 Subclause (b). Maximum peak output power and antenna gain / RSS-210, Clause A8.4 (2)		Р			
FCC 15.247 Subclause (d). Emission limitations conducted (Transmitter) / RSS-210 Clause A8.5		Р			
FCC 15.247 Subclause (d). Emission limitations radiated (Transmitter) / RSS-210 Clause A8.5		Р			



# **APPENDIX A: Test result**



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# **TEST CONDITIONS**

Power supply (V):

 $V_{nominal} = 3.3 Vdc$ 

Type of power supply = DC voltage from HMC/NGFF Testing board.

Type of antenna = External attachable PIFA antenna.

Declared Gain for antenna (maximum) = 3.24 dBi

TEST FREQUENCIES: Lowest channel: 2402 MHz Middle channel: 2441 MHz Highest channel: 2480 MHz

For Bluetooth Basic and EDR operational modes the transmission is at CHAIN B RF output.

For radio testing purposes the card was installed in a test fixture. The test fixture is connected to a laptop computer and dc power supplied. The laptop computer was used to configure the EUT to continuously transmit at a specified output power with different modes and modulation schemes.

# CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to the spectrum analyzer using a low loss RF cable. The reading in the spectrum analyser is corrected taking into account the cable loss.

# RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive (wooden) platform one meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.



# FCC Section 15.247 Subclause (a) (1) / RSS-210 Clause A8.1 (b). 20 dB Bandwidth and Carrier frequency separation

## **SPECIFICATION**

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.

#### <u>RESULTS</u>

(See next plots)

Modulation: GFSK

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2441 MHz	2480 MHz
20 dB Spectrum bandwidth (kHz)	971.00	971.00	973.00
Measurement uncertainty (kHz)		±7	

#### Modulation: Π/4-DQPSK (2Mbps)

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2441 MHz	2480 MHz
20 dB Spectrum bandwidth (kHz)	1424.60	1426.60	1432.60
Measurement uncertainty (kHz)		±7	

#### Modulation: 8-DPSK (3Mbps)

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2441 MHz	2480 MHz
20 dB Spectrum bandwidth (kHz)	1442.60	1444.60	1438.60
Measurement uncertainty (kHz)		±7	



# Modulation: GFSK

#### 20 dB BANDWIDTH.

Lowest Channel: 2402 MHz.



## 20 dB BANDWIDTH

Middle Channel: 2441 MHz.





#### 20 dB BANDWIDTH

Highest Channel: 2480 MHz.



#### Carrier frequency separation

MultiView	)								
RefLevel 10.0 Att	20 dB 🖷 SWT	t 1.28 dB ● RB 2 ms ● VB	W 30 kHz W 300 kHz M	ode Auto Sweep					
1 Frequency Sw		√		- Maril			and	D2[1]	<ul> <li>1Pk View</li> <li>-0.11 dB</li> <li>-1.00200 MHz</li> <li>3.57 dBm</li> <li>.44100150 GHz</li> </ul>
-10 dBm		- M	mm	· ۷۸		M	m		Mar Mary
-30 dBm									
-40 dBm									
-50 dBm									
-70 dBm									
-80 dBm									
2.4395 GHz			1000 pts	5	30	)0.0 kHz/			2.4425 GHz

The hopping channel carrier frequencies are separated by a minimum of the 20 dB bandwidth of the hopping channel.



# **Modulation:** Π/4-DQPSK

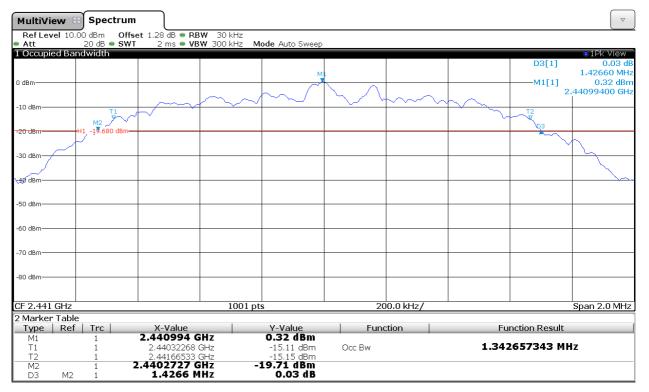
## 20 dB BANDWIDTH.

Lowest Channel: 2402 MHz.



## 20 dB BANDWIDTH

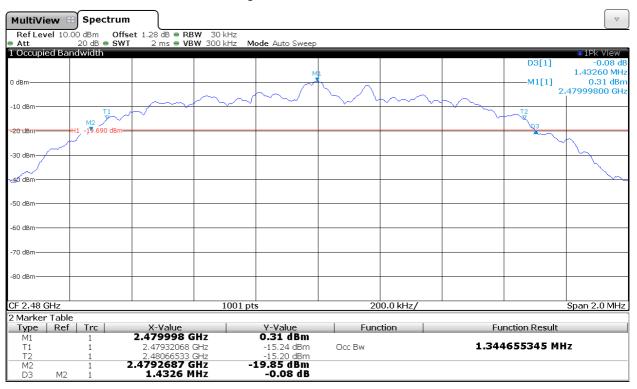
Middle Channel: 2441 MHz.



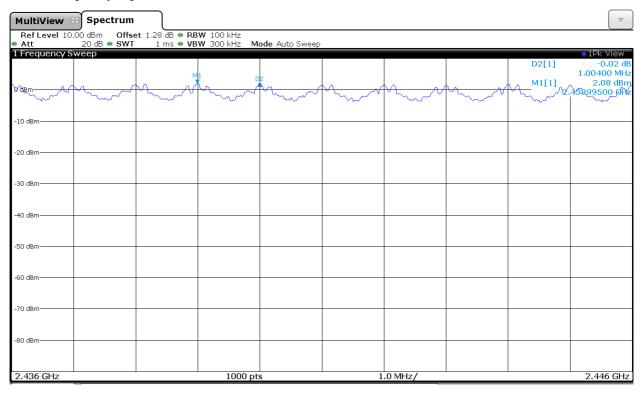


#### 20 dB BANDWIDTH

Highest Channel: 2480 MHz.



Carrier frequency separation



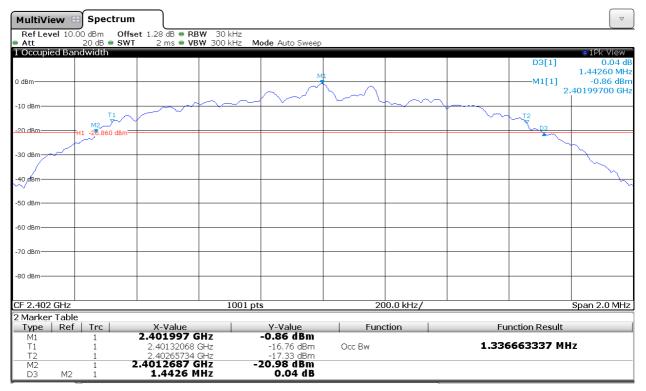
The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel



# Modulation: 8-DPSK

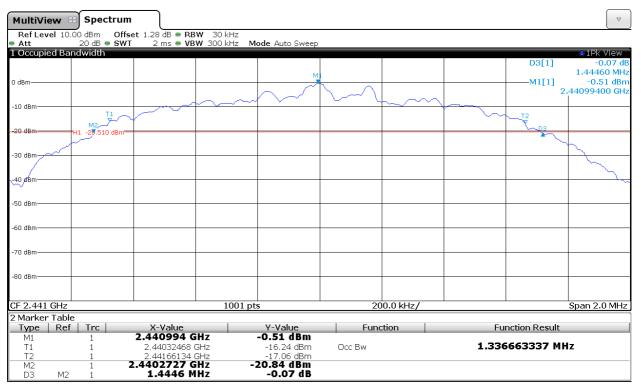
#### 20 dB BANDWIDTH

Lowest Channel: 2402 MHz.



# 20 dB BANDWIDTH

#### Middle Channel: 2441 MHz.





## 20 dB BANDWIDTH

Highest Channel: 2480 MHz.



#### Carrier frequency separation

MultiView									
Ref Level 10 Att	20 dB 🖷 SWT	et 1.28 dB • RB 1 ms • VB	W 100 kHz W 300 kHz M(	ode Auto Sweep					●1Pk View
1 Frequency S		Mar and	$\sim$	i Mar and	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	with the second se	Mar and	D2[1]	-0.13 dB 1.00400 MHz 1.00 dBm 43999500 GAZ
-10 dBm			×		~	~			~
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
2.436 GHz			1000 pts		1	.0 MHz/			2.446 GHz

The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel.



# FCC Section 15.247 Subclause (a) (1) (iii) / RSS-210 Clause A8.1 (d). Number of hopping channels

# **SPECIFICATION**

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

# **RESULTS**

The number of hopping channels is 79 for all three modes (see next plots).

MultiView									
RefLevel 10. Att	20 dB 🖷 SWT	et 1.28 dB = RB 1 ms VB		ode Auto Sweep					
1 Frequency S								M1[1]	● 1Pk View 5.02 MgBm 2.4020210 GHz 5.10 dBm
0 dBm									2.4399470 GHz
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBpt									
ل المسلم (الم) -60 dBm									
-70 dBm									
-80 dBm									
2.398 GHz				s	4	.3 MHz/			2.441 GHz
3 Marker Tabl Type   Ref M1 M2	Trc   1 2	X-Value 2.402021 GH 2.439947 GH	  Z	Y-Value 5.02 dBm 5.16 dBm	Fund	ction	Fu	nction Result	

# **Modulation: GFSK**

Number of hopping frequencies: 39



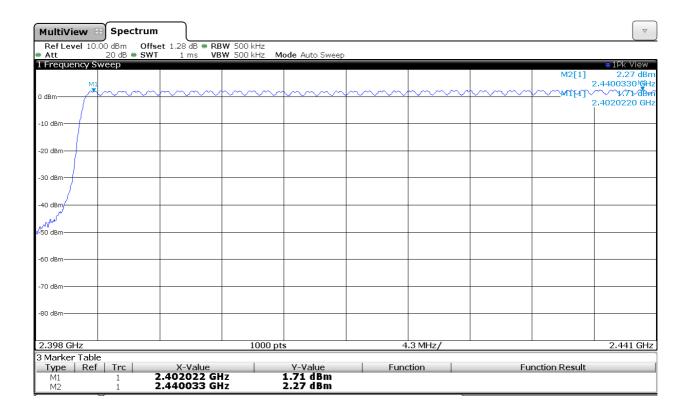
MultiView									
Ref Level 10. Att	.00 dBm Offse 20 dB = SWT	et 1.28 dB • RB 1 ms VB		ode Auto Sweep					
1 Frequency S		11110 10							●1Pk View
		$\gamma\gamma\gamma\gamma\gamma\gamma$	vvvv	~~~~~		$\sim$	~~~~		M5.02 dBm 2:4860310 GHz 5.17 dBm
-10 dBm									2.4400340 GHz
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
2.439 GHz			1000 pt	s	4	.4 MHz/			2,483 GHz
3 Marker Tabl Type Ref M1	Trc   1 2	X-Value 2.440034 GF	lz.	Y-Value 5.17 dBm	Func	ction	Fu	nction Result	
M2	1 2	.480031 GF	Iz	5.02 dBm					

Number of hopping frequencies: 40

Total number of hopping frequencies: 79



# **Modulation:** Π/4-DQPSK



Number of hopping frequencies: 39



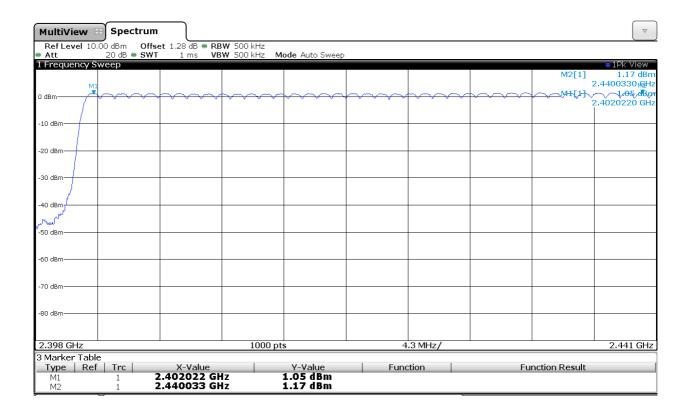
MultiView 🖯	🛛 Spectrum	l								$\bigtriangledown$
RefLevel 10. Att	00 dBm Offs 20 dB = SWT	et 1.28 dB = 1 1 ms 1		Mode Auto Swee						
1 Frequency S		11115	JON JOO KI IZ	Mode Auto Swee	, ,				● 1 Dk	View
I I requeriey o	теер							M2[1]		11 dBm
M1									2 49992	10 GHz
0 dBm	$\sim$	h	$\neg \cdots $	$\sim$	$\sim \sim $	-	h			12 dBm
o ubili									2.4400\$	40 GHz
-10 dBm										
										}
-20 dBm										
										1
-30 dBm										
										1
-40 dBm										-
										r
-50 dBm										l (M
-30 dbm										
-60 dBm										
-70 dBm										
-80 dBm										
2.439 GHz		1	100	0 pts		1.4 MHz/	1	1	2.49	33 GHz
3 Marker Table	2		100						2.10	
Type Ref		X-Value	1	Y-Value	Eup	ction	E	nction Result		
M1		2.440034 0	iHz	2.12 dBm	- Turi	cuon	10	incloir Acsult		
M2		2.480031		2.11 dBm						

Number of hopping frequencies: 40

Total number of hopping frequencies: 79



# Modulation: 8-DPSK



Number of hopping frequencies: 39



MultiView									
RefLevel 10. Att	00 dBm Offso. 20 dB • SWT	et 1.28 dB ● RB 1 ms VB		ode Auto Sweep					
1 Frequency S		11113 VB	10 300 KHZ 14	oue Auto oneep					●1Pk View
M1 Bab			~~~~						1.36 dBm 2.4800290 GHz ∽√ ₹1.30 dBm
Brabmer .		· · · ·			<u> </u>	, , <u>, , , ,</u>		2	2.4400840 GHz
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									had
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
2.439 GHz			1000 pt	s	4	.4 MHz/			2.483 GHz
3 Marker Table Type Ref M1	Trc	X-Value 2.440034 GH	lz	Y-Value 1.30 dBm	Fund	ction	Fu	nction Result	
M2	1 2	2.480029 GH	lz	1.36 dBm					

Number of hopping frequencies: 40

Total number of hopping frequencies: 79



# FCC Section 15.247 Subclause (a) (1) (iii) / RSS-210 Clause A8.1 (d). Time of occupancy (Dwell Time)

# **SPECIFICATION**

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed =  $0.4 \times 79 = 31.6$  seconds.

#### **RESULTS**

## **Modulation: GFSK**

## 1. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH1.

The system makes worst case 1600 hops per second or 1 time slot has a length of  $625\mu$ s with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/2 = 800 hops per second with 79 channels. So you have each channel 800/79 = 10.13 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $10.13 \times 31.6 = 320.11$  times of appearance.

Each Tx-time per appearance is  $376.38 \ \mu s$  (see next plot).

So we have  $320.11 \times 376.38 \ \mu s = 120.48 \ ms$  per 31.6 seconds.

MultiView	Spectrum									
Ref Level 10. Att TRG:VID	.00 dBm Offse 20 dB • SWT	et 1.28 dB ● RB 1 ms ● VB	W 1 MHz W 1 MHz							SGL
1 Zero Span		M1				D2			D2[1] M1[1]	●1Pk Clrw -0.33 dB 376.376 µs 4.94 dBm
0 dBm										251 ns
-10 dBm										
-20 dBm	-TRG -24.000 dBm									
-30 dBm										
-40 dBm	r m	m								
-50 dBm										
	MARY						ht way and	Alfallarman 1999	MALING AND	
-80 dBm				1000	) pts		·			100.0 µs/



# 2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

A DH3 Packet needs 3 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/4 = 400 hops per second with 79 channels. So you have each channel 400/79 = 5.1 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $5.1 \times 31.6 = 161.16$  times of appearance.

Each Tx-time per appearance is 1.633 ms (see next plot). So we have 161.16 x 1.633 ms = 263.17 ms per 31.6 seconds.

MultiView 8	Spectrum									$\bigtriangledown$
Ref Level 10. Att TRG:VID	00 dBm Offset 20 dB • SWT	: 1.28 dB • RB 3 ms • VB	W 1 MHz W 1 MHz						S	GL
Zero Span	M1					D2		D2[1]	●1Pk Clr -0.28 1.632633	d שיין
) dBm								M1[1]	4.91 d -750	
10 dBm										_
20 dBm	-TRG -24.000 dBm									
30 dBm										
40 dBm										
50 dBm										
50 dBm										
anethulle wheel								Hundardard		
30 dBm							· · · · · · · · · · · · · · · · · · ·		, h. n. l	
F 2.441 GHz				1000	) pts				300.0 µ	IS/



# 3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

A DH5 Packet needs 5 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/6 = 266.67 hops per second with 79 channels. So you have each channel 266.67/79 = 3.37 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $3.37 \times 31.6 = 106.49$  times of appearance.

Each Tx-time per appearance is 2.880 ms (see next plot). So we have 106.49 x 2.880 ms = 306.69 ms per 31.6 seconds.

MultiView 😁 S	Spectrum						
	dBm Offset 1.28 dB ● F ) dB ● SWT 4 ms ● V	BW 1 MHz BW 1 MHz					SGL
1 Zero Span							●1Pk Clrw
	M1					D2[1]	
	¥	· · · · · · · · · · · · · · · · · · ·		• • • • • • • • • • • • • • • • • • • •	 · · · · · · · · · · · · · · · · · · ·	D2[1] D2 M1[1]	2.879880 ms
0 dBm						M1[1]	4.90 dBm
o ubili							-4 <b>.7</b> 54 μ <del>s</del>
-10 dBm							
-20 dBm TRG	-20.000 dBm						
-30 dBm							
-40 dBm							
	ו או						
-50 dBm							
-60 dBm	u <u>.</u>						
utation of his li						Line	What what what what
Aster And And A	h					14 N	
-80 dBm							
-00 ubiii							
			1000				400.0
CF 2.441 GHz			1000	pts			400.0 µs/

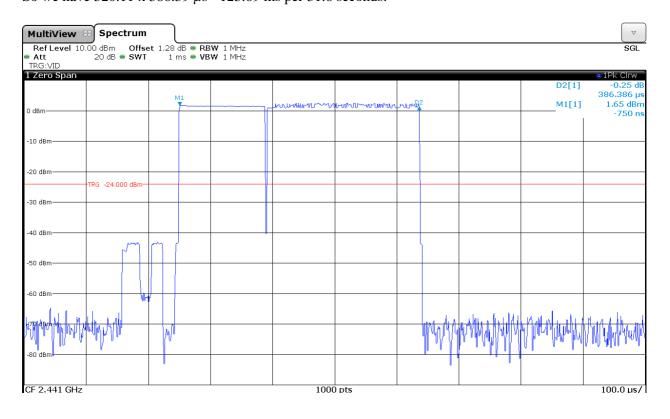


# **Modulation:** Π/4-DQPSK

## 1. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH1.

The system makes worst case 1600 hops per second or 1 time slot has a length of  $625\mu$ s with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/2 = 800 hops per second with 79 channels. So you have each channel 800/79 = 10.13 times per second and so for a period of 0.4 x 79 = 31.6 seconds you have  $10.13 \times 31.6 = 320.11$  times of appearance.

Each Tx-time per appearance is  $386.39 \ \mu s$  (see next plot). So we have  $320.11 \ x \ 386.39 \ \mu s = 123.69 \ ms \ per \ 31.6 \ seconds.$ 

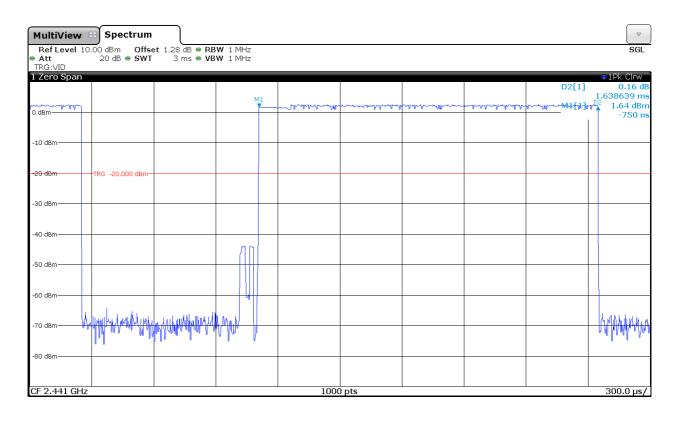




# 2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

A DH3 Packet needs 3 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/4 = 400 hops per second with 79 channels. So you have each channel 400/79 = 5.1 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $5.1 \times 31.6 = 161.16$  times of appearance.

Each Tx-time per appearance is 1.639 ms (see next plot). So we have 161.16 x 1.639 ms = 264.14 ms per 31.6 seconds.





# 3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

A DH5 Packet needs 5 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/6 = 266.67 hops per second with 79 channels. So you have each channel 266.67/79 = 3.37 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $3.37 \times 31.6 = 106.49$  times of appearance.

Each Tx-time per appearance is 2.888 ms (see next plot). So we have 106.49 x 2.888 ms = 307.54 ms per 31.6 seconds.

	B Spectrum	t 1.28 dB • RE	W 1 MHz			 		SGL
Att TRG:VID	20 dB 🖷 SWT	4 ms 🖷 VE						
Zero Span							D2[1]	<ul> <li>1Pk Clrw</li> <li>0.87 c</li> <li>2.887888 m</li> </ul>
dBm				harren afternen		 	M1[1]	
LO dBm	M1							
20 dBm	-TRG -20.000 dBm-							
80 dBm								
۰0 dBm	h							
50 dBm								
i0 dBm								
Hugh will a	,							addin and a fight
30 dBm								
F 2.441 GHz				100				400.0
F 2.441 GHz				100	0 pts			400.0 µs



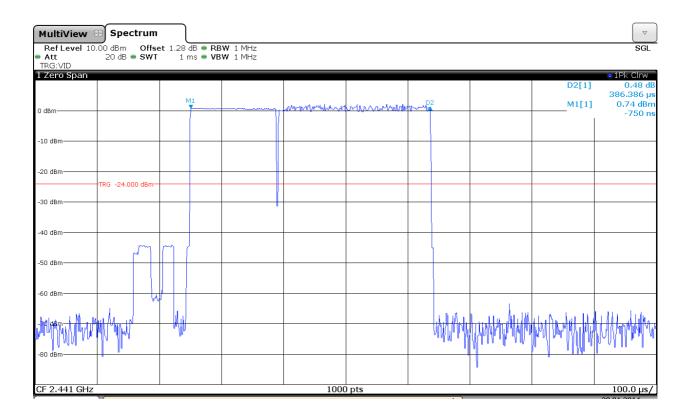
# Modulation: 8-DPSK

# 1. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH1.

The system makes worst case 1600 hops per second or 1 time slot has a length of  $625\mu$ s with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/2 = 800 hops per second with 79 channels. So you have each channel 800/79 = 10.13 times per second and so for a period of 0.4 x 79 = 31.6 seconds you have  $10.13 \times 31.6 = 320.11$  times of appearance.

Each Tx-time per appearance is 386.39 µs (see next plot).

So we have  $320.11 \times 386.39 \ \mu s = 123.69 \ ms \ per \ 31.6 \ seconds.$ 





# 2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

A DH3 Packet needs 3 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/4 = 400 hops per second with 79 channels. So you have each channel 400/79 = 5.1 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $5.1 \times 31.6 = 161.16$  times of appearance.

Each Tx-time per appearance is 1.639 ms (see next plot). So we have 161.16 x 1.639 ms = 264.14 ms per 31.6 seconds.

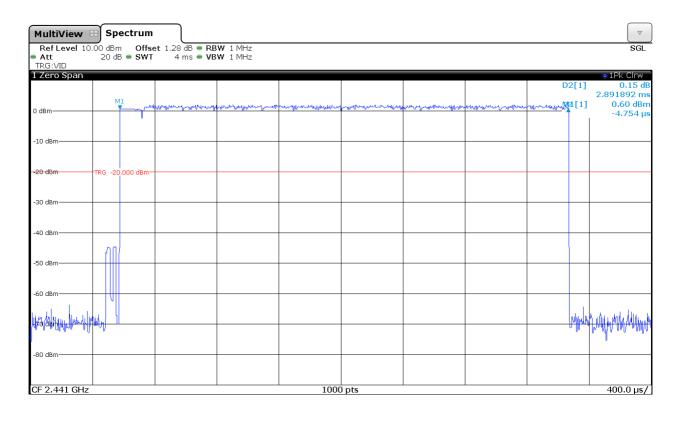
MultiView	B Spectrum									$\bigtriangledown$
Ref Level 10. Att TRG:VID	.00 dBm Offse 20 dB • SWT	et 1.28 dB ● RE 3 ms ● VB								SGL
1 Zero Span									D2[1]	●1Pk Clrw 0.55 dB 1.638639 ms
0 dBm		M	L	har and the second second	n wether the	magament	and the second	Maner and D2	м1[1]	
-10 dBm										
<del>20 dBm</del>	-TRG -20.000 dBm—									
-30 dBm										
-40 dBm		ภาม								
-50 dBm										
-60 dBm										
-zolgew <sup>144</sup> ,111,144	why why why									
-80 dBm										
05.0.441.011										200.0(
CF 2.441 GHz				100	u pus					300.0 μs/



# 3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

A DH5 Packet needs 5 time slots for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/6 = 266.67 hops per second with 79 channels. So you have each channel 266.67/79 = 3.37 times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $3.37 \times 31.6 = 106.49$  times of appearance.

Each Tx-time per appearance is 2.892 ms (see next plot). So we have 106.49 x 2.892 ms = 307.97 ms per 31.6 seconds.





# FCC Section 15.247 Subclause (b) / RSS-210 Clause A8.4 (2). Maximum peak output power and antenna gain

## **SPECIFICATION**

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm).

## **RESULTS**

MAXIMUM OUTPUT POWER. See next plots.

Declared maximum antenna gain: 3.24 dBi.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

#### Modulation: GFSK

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2441 MHz	2480 MHz
Maximum peak power (dBm)	5.11	5.34	5.37
Maximum EIRP power (dBm)	8.35	8.58	8.61
Measurement uncertainty (dB)		±1.2	

## Modulation: Π/4-DQPSK (2Mbps)

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2441 MHz	2480 MHz
Maximum peak power (dBm)	3.97	4.23	4.38
Maximum EIRP power (dBm)	7.21	7.47	7.62
Measurement uncertainty (dB)		$\pm 1.2$	

## Modulation: 8-DPSK (3Mbps)

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2441 MHz	2480 MHz
Maximum peak power (dBm)	3.35	3.61	3.55
Maximum EIRP power (dBm)	6.59	6.85	6.79
Measurement uncertainty (dB)		±1.2	

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.



# PEAK OUTPUT POWER (CONDUCTED).

## Modulation: GFSK

Lowest Channel: 2402 MHz.

MultiView 8									
Ref Level 10. Att	00 dBm Offs 20 dB • SWT	et 1.28 dB   RB  1 ms  VB	W 3 MHz W 10 MHz Mo	de Auto Sween					
1 Frequency Sy		1 1113 0 40		de Adto officep					●1Pk View
I Trequency o	нсер			M	1			M1[1]	5.11 dBm
					i				40201500 GHz
					_				10201000 0112
0 dBm									
	_								
10 10-	and the second sec								
-10 dBm									
	~~~								
-20 dBm									
-20 060									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
CF 2.402 GHz			1000 pt	S	1	.0 MHz/		S	pan 10.0 MHz
3 Marker Table	2								
Type Ref	Trc	X-Value		Y-Value	Fund	tion	Fu	nction Result	
M1	1	2.402015 GH	iz i	Y-Value 5.11 dBm					
				-					

Modulation: GFSK

## Middle Channel: 2441 MHz.

MultiView 8									
RefLevel 10. Att	00 dBm Offs 20 dB • SW	set 1.28 dB ● RB T 1 ms ● VB		de Auto Sweep					
1 Frequency Sy									●1Pk View
					M1			M1[1]	5.34 dBm 44117500 GHz.
0 dBm		_						2	
U UBIII									
		T							
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
oo abiii									
CF 2.441 GHz			1000 pt	s	1	.0 MHz/			Span 10.0 MHz
3 Marker Table Type   Ref		X-Value	1	V-Valua	Func	rtion	C.,	nction Result	
M1	1	2.441175 GH	łz	Y-Value 5.34 dBm	Func		Fu	incuon Result	



# PEAK OUTPUT POWER (CONDUCTED).

# Modulation: GFSK

Highest Channel: 2480 MHz.

MultiView	Spectrum								
RefLevel 10. Att	00 dBm Offs 20 dB • SWT	et 1.28 dB • RB	W 3 MHz W 10 MHz Mo	de Auto Swoon					
1 Frequency S		I IIIS 🛡 VB	W IOMHZ WO	de Auto Sweep					●1Pk View
i friequente, o	HOOP				M1			M1[1]	5.37 dBm
					×				48011500 GHz
0 dBm									
o ubiii									
								<u> </u>	
-10 dBm									
22 IZ									
-20 dBm									
d.u.									
-30 dBm									
-40 dBm									
-50 dBm									
oo abiii									
-60 dBm									
-70 dBm									
-70 ubiii									
-80 dBm									
CF 2.48 GHz			1000 pt:	s	1	.0 MHz/		S	pan 10.0 MHz
3 Marker Table	2								
Type Ref	Trc	X-Value		Y-Value 5.37 dBm	Fund	tion	Fu	nction Result	
M1	1	2.480115 GH	iz	5.37 dBm					

# Modulation: Π/4-DQPSK Lowest Channel: 2402 MHz

MultiView 8	Spectrum								
RefLevel 10. Att	00 dBm Offse 20 dB = SWT	et 1.28 dB • RB	W 3 MHz W 10 MHz Mo	de Auto Sweep					
1 Frequency Sy									●1Pk View
				м	1			M1[1]	3.97 dBm 40198500 GHz
0 dBm								-	
o ubin									
-10 dBm								$\sim$	
-10 UBIII									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
CF 2.402 GHz			1000 pts	\$	1	.0 MHz/			Span 10.0 MHz
3 Marker Table Type   Ref		X-Value		Y-Value	Euno	tion	Fu	unction Result	
M1	1 2	.401985 GF	lz s	3.97 dBm	. un				



# PEAK OUTPUT POWER (CONDUCTED)

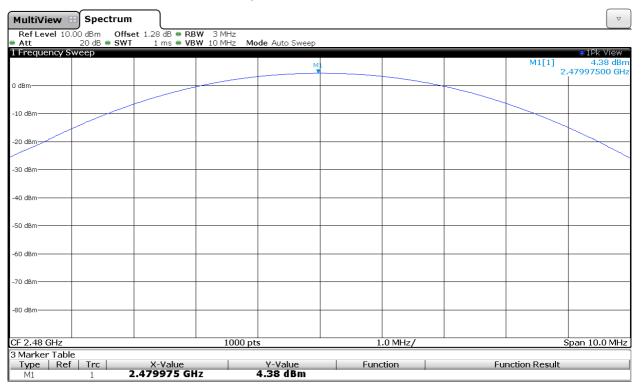
# Modulation: $\Pi/4$ -DQPSK

Middle Channel: 2441 MHz.

MultiView									
Ref Level 10. Att	20 dB 🖷 SWT	et 1.28 dB • RB 1 ms • VB	WF 3 MHz WF 10 MHz Mo	de Auto Sweep					
1 Frequency S	ween								●1Pk View
	n oop							M1[1]	4.23 dBm
				M	1			2	44099500 GHz
								2.	44033300 0112
0 dBm		-					/		
							/		
-10 dBm									
-20 dBm									
-20 dbiii									
-30 dBm									
-30 UBIII									
-40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
70 abiii									
-80 dBm									
-80 UBIII									
CF 2.441 GHz		1	1000 pts	s i	1	.0 MHz/		S	pan 10.0 MHz
			1000 pt		-				
3 Marker Table					-		-		
Type Ref		X-Value		Y-Value 4.23 dBm	Func	tion	Fu	nction Result	
M1	1 2	2.440995 GH	<u>IZ (</u>	4.23 aBm					

Modulation:  $\Pi/4$ -DQPSK

Highest Channel: 2480 MHz.





# PEAK OUTPUT POWER (CONDUCTED).

### Modulation: 8-DPSK

Lowest Channel: 2402 MHz

MultiView 8									
Ref Level 10. Att	00 dBm Offs 20 dB = SW1	et 1.28 dB • RB	WF 3 MHz WF 10 MHz Mo	de Auto Sween					
1 Frequency Sv			10 MIN 10 MIN	de Auto Sweep					●1Pk View
					1			M1[1]	3.35 dBm
					·			2.	40200500 GHz
0 dBm									
-10 dBm		<b>F</b>							
-20 dBm									$\sim$
-20 dbm									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm									
-60 UBIII									
-70 dBm									
-80 dBm									
25.0.100.011			1000						10.01.01
CF 2.402 GHz			1000 pts	S	1	.0 MHz/		S	pan 10.0 MHz
3 Marker Table Type   Ref		X-Value		V-Value	Fund	rtion	Eu	nction Result	
M1	1	2.402005 GH	Iz :	Y-Value 3.35 dBm			Tu	neuorneodit	

#### Modulation: 8-DPSK

#### Middle Channel: 2441 MHz.

MultiView	Spectru	ım							
Ref Level 10.		ffset 1.28 dB 🖷 RB							
Att 1 Frequency Sv	20 dB 🖷 SN	NT 1 ms 🔍 VB	W 10 MHz Mo	de Auto Sweep					●1Pk View
1 Frequency 5	weep							M1[1]	3.61 dBm
				1	11				.44104500 GHz
0 dBm									
U UBIII							/		
								L	
-10 dBm		4							
	_								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
00 00									
-60 dBm									
-70 dBm									
50 dbm									
-80 dBm									
CF 2.441 GHz			1000 pt	s	1	.0 MHz/			Span 10.0 MHz
3 Marker Table									
Type Ref		X-Value		Y-Value 3.61 dBm	Fund	ction	Fu	Inction Result	
M1	1	2.441045 GH	IZ	3.61 dBm					



# PEAK OUTPUT POWER (CONDUCTED).

Modulation: 8-DPSK Highest Channel: 2480 MHz.

MultiView	B) Spectrum	ı							$\bigtriangledown$
Ref Level 10.	.00 dBm Offs 20 dB • SW1	et 1.28 dB • RE	W 3 MHz W 10 MHz Mo	de Auto Swoon					
Att 1 Frequency S	20 db SWI		WIO MILZ WIO	de Auto Sweep					●1Pk View
I I requeriey o	l cep							M1[1]	3.55 dBm
				N	1				48002500 GHz
									10002000 0112
0 dBm		-							
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
co dou									
-60 dBm									
-70 dBm									
, o abiii									
-80 dBm									
CF 2.48 GHz			1000 pts		1	.0 MHz/	1	C	pan 10.0 MHz
			1000 pt:	3	1			3	
3 Marker Table			1				-		
Type Ref		X-Value	-	Y-Value 3.55 dBm	Func	ction	Fu	nction Result	
M1	1	2.480025 GH	12	5.55 abm					



# FCC Section 15.247 Subclause (d) / RSS-210 Clause A8.5. Band-edge compliance of conducted emissions (Transmitter)

#### **SPECIFICATION**

Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power.

#### **RESULTS:**

#### **Modulation: GFSK**

#### 1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). See next plot.

1 Frequency Swe 0 dBm	30 dB 🖷 SWT 🛛 1	3 dB = RBW 300 ms = VBW 1						M1 D2[1] M1[1]	● 1Pk View -44.46 dB -2.1450 MHz 5.00 dBm 2.4021430 GHz
1 Frequency Swe 0 dBm	eep							M1[1]	-44.46 dE -2.1450 MHz 5.00 dBm
-10 dBm	-15.000 dBm							M1[1]	-2.1450 MH: 5.00 dBm
-10 dBm	-15.000 dBm							M1[1]	5.00 dBn
-10 dBm	-15.000 dBm								
H1	-15.000 dBm								
H1	-15.000 dBm								
	-15.000 dBm								
-20 dBm									
							1 /		
-30 dBm									
-40 dBm						D2			
-40 0Bm						A.	1		www.
						Nº W	r		1 m
-50 dBm					munund	www			1 mile
	warmonalin	monentermon	moundmen	menun	while .				
-60 dBm									
-70 dBm									
-80 dBm									
						V1			
						Ť			
2.39 GHz			1000 pts		1.5	MHz/			2.405 GHz
3 Marker Table					-		_		
Type   Ref   M1		-Value 143 GHz			Functio	on	Fu	Inction Result	
MI D2 M1	1 -2.	145 MHz	-44.4						



# 2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). See next plot.

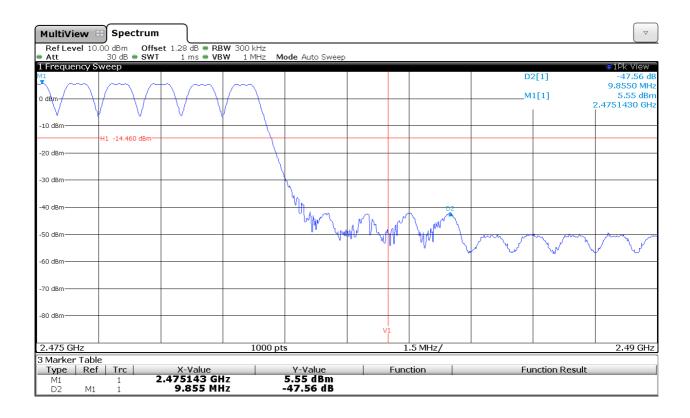


#### Verdict: PASS

#### 3. LOW FREQUENCY SECTION (HOPPING ON). See next plot.







# 4. HIGH FREQUENCY SECTION (HOPPING ON). See next plot.



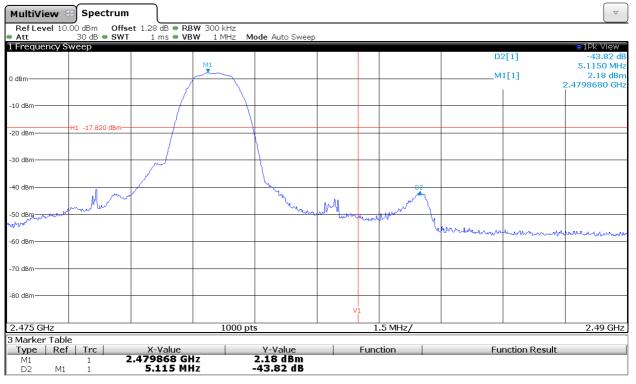
# **Modulation:** Π/4-DQPSK

1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). See next plot.

MultiView	Spectrum								
RefLevel 10. Att	00 dBm Offse 30 dB • SWT	et 1.28 dB • RB 1 ms • VB	W 300 kHz W 1 MHz M	ode Auto Sweep					
1 Frequency S							M	D2[1]	● 1Pk View -44.41 dB -2.2200 MHz
0 dBm								M1[1]	1,76 dBm 2,4018730 GHz
-10 dBm								+	
-20 dBm	H1 -18.240 dBm								
-30 dBm								+	
-40 dBm						D2 ,	<u> </u>	h.	h
-50 dBm						m			and many and
-50 dBm	murantura	uthnerwooder	mmunolout	well marshim the	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
-70 dBm									
-80 dBm									
						V1			
2.39 GHz			1000 pt	5	1	.5 MHz/			2.405 GHz
3 Marker Table Type Ref	Trc	X-Value 2.401873 GH -2.22 MH	lz	Y-Value 1.76 dBm	Func	tion	F	unction Result	
D2 M1	1	-2.22 MH	Iz ·	44.41 dB					

Verdict: PASS

# 2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). See next plot.



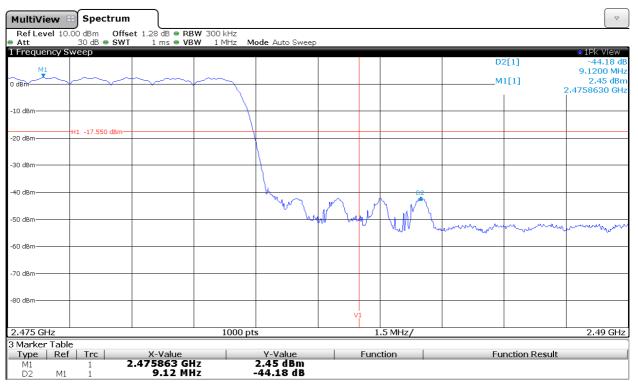


# 3. LOW FREQUENCY SECTION (HOPPING ON). See next plot.

D2[1] -4 M1 -2.10	View 5.26 dB 00 MHz 33 dBm
1 Frequency Sweep 01Pl D2[1] -4 M1 -2.10	5.26 dB 00 MHz 33 dBm
D2[1] -4 M1 -2.10	5.26 dB 00 MHz 33 dBm
M1 -2.10	00 MHz 33 dBrn
	33 dBm
0 dBm	SIL GHZ
	00 0112
-10 dBm	
H1 -18.170 dBm	
-20 dBm - 11 -2017 dom	
-30 dBm	
-40 dBm-	
-50 dBm	
-50 dBm	
-60 dBm	
-00 0.0011-	
-70 dBm	
-80 dBm	
vi vi	
2.39 GHz 1000 pts 1.5 MHz/ 2.4	05 GHz
Marker Table	<u> </u>
Type   Ref   Trc   X-Value   Y-Value   Function   Function Result	
M1 1 2.402098 GHz 1.83 dBm	
D2 M1 1 -2.1 MHz -45.26 dB	

#### Verdict: PASS

# 4. HIGH FREQUENCY SECTION (HOPPING ON). See next plot.





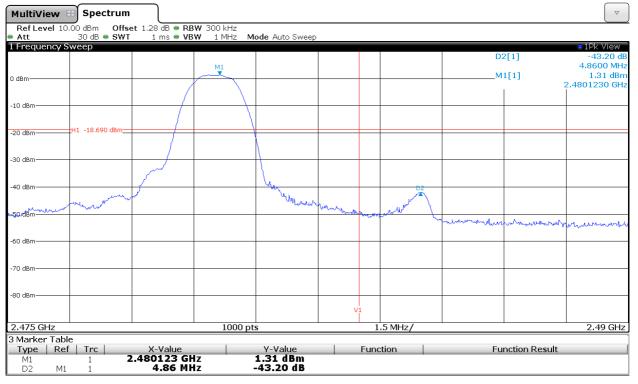
# Modulation: 8-DPSK

#### 1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). See next plot.

MultiView	) 🗄 Spectrum	·								
Ref Level		et 1.28 dB 🖷 RB								
Att 1 Frequency	30 dB • SWT	1 m s 🗢 VB	W 1MHZ M	ode Auto Sweep						●1Pk View
0 dBm	Зисср							~	D2[1]	-44.70 dE -2.3700 MHz 0,88 dBm
U UBIII										2,4021280 GHz 
-10 dBm									$ \rightarrow $	
-20 dBm	H1 -19.120 dBm									
-30 dBm								~		
-40 dBm						D2	A		han here	
-50 dBm	mun mange	when work when we we was	~ Mthomas and a marked	atur and the good	musum		~			mun
-60 dBm							_			
-70 dBm										
-80 dBm										
						V	1			
2.39 GHz			1000 pt	S	. 1	.5 MHz/				2.405 GHz
3 Marker Ta								_		
M1	Ref   Trc   1 2 M1 1	X-Value 2.402128 GH -2.37 MH	Z Z	Y-Value 0.88 dBm -44.70 dB	Euno Funo	ction		Fu	nction Result	

#### Verdict: PASS

# 2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). See next plot.



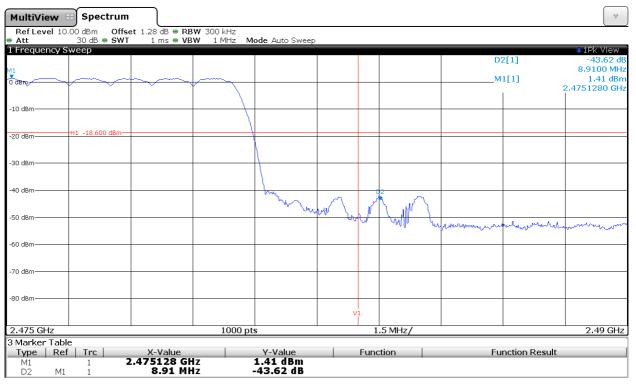


# 3. LOW FREQUENCY SECTION (HOPPING ON). See next plot.

MultiView 8	Spectrum									
Ref Level 10.		et 1.28 dB 🖷 RB								
Att 1 Frequency Sv	30 dB • SWT	1 ms 🖷 VB	W 1 MHz M	ode Auto Sweep						• 1Pk View
I Frequency S	weep								D2[1]	-45.16 dB
										-2.5200 MHz
0 dBm								~	M1 M1[1]	0.87 dBm
								1		2.4021280 GHz
-10 dBm										
-20 dBm	:H1 -19.130 dBm									
-30 dBm										
-30 ubili								1		
							1			
-40 dBm										
						D2	N″ –			
50 dBm					May proven	burn and				
-50 dBm-	mon an aller	mantententen	MMugunary	up of the way of the w	and the					
and the second	/									
-60 dBm										
-70 dBm										
y o dbiii										
-80 dBm										
						v	1			
2.39 GHz			1000 pt	6	1	.5 MHz/				2.405 GHz
3 Marker Table								_		
Type Ref	Trc	X-Value 2.402128 GH	17	Y-Value 0.87 dBm	Func	ction		Fu	inction Result	
M1 D2 M1	1	-2.52 Mł	7	45.16 dB						
	1	2102 111					-			20.01.2014

#### Verdict: PASS

# 4. HIGH FREQUENCY SECTION (HOPPING ON). See next plot.





# FCC Section 15.247 Subclause (d) / RSS-210 Clause A8.5. Emission limitations conducted (Transmitter)

#### **SPECIFICATION**

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

#### **RESULTS:**

#### **Modulation: GFSK**

MultiView	🕄 Spectrun	n							
RefLevel 10 Att		et 1.28 dB • RB 250 ms • VB		de Auto Sween					
1 Frequency S		200 m3 0 00							.●1Pk View
м								M2[1]	-57.53 dBi 4.803990 GH
0 dBm								M1[1]	4.32 dBi 2.401520 GF
-10 dBm									
20 dBm	H1 -15.680 dBm-								
-30 dBm									
-40 dBm									
50 dBm									
-6nidth	Market and Andrews	ſ		and the second secon	Manthe de Miller de Mande		and the state of the		
	and the second se								
-70 dBm									
-80 dBm									
300.0 kHz			30000 pt	:s	2	2.5 GHz/			25.0 GH
3 Marker Tabl Type   Ref		X-Value		Y-Value	Fund	rtion	Fu	nction Result	
M1 M2	1 1	2.40152 GH 4.80399 GH	z z -	4.32 dBm 57.53 dBm					

#### 1. LOWEST CHANNEL (2402 MHz): 300 kHz-25 GHz (see next plot).

Note: The peak above the limit is the carrier frequency.



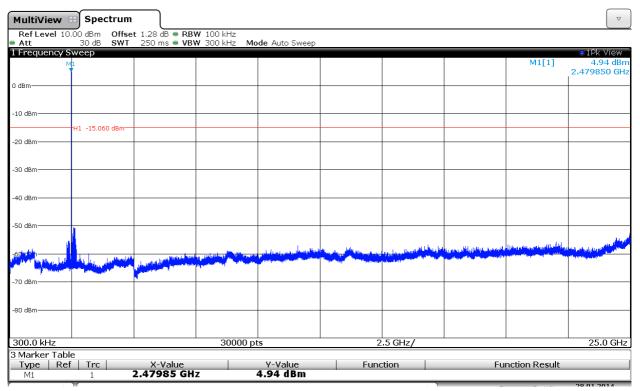
MultiView	B Spectru	m							
Ref Level 10. Att		set 1.28 dB • F T 250 ms • V	RBW 100 kHz VBW 300 kHz M	ode Auto Sweep					
1 Frequency S									●1Pk View
М	L							M1[1]	4.85 dBm
	1								2.440690 GHz
0 dBm									
10.10-									
-10 dBm									
	H1 -15.150 dBm								
-20 dBm									
-30 dBm									
-40 dBm									
-40 0011									
-50 dBm	h								
	1								II and
and the state			بر العام بر ا	deconstru	a cara Managarita	A STATE OF A	وكالمقمعان فكالر وخافقان حاقر وأع	المالطين بالالجاري أخلطا ويرا	and a local section of the
-60 P	den in and had	and the second s				And the second sec	and the second		Contraction of the second of t
	and the second second second	and a second							
-70 dBm		"							
-80 dBm									
300.0 kHz			30000 p	ots	2	.5 GHz/			25.0 GHz
3 Marker Tabl									
Type Ref		X-Value		Y-Value	Fund	ction	Fu	nction Result	
M1	1	2.44069 0	5HZ	4.85 dBm					

# 2. MIDDLE CHANNEL (2441 MHz): 300 kHz-25 GHz (see next plot).

Note: The peak above the limit is the carrier frequency.

Verdict: PASS

# 3. HIGH CHANNEL (2480 MHz): 300 kHz-25 GHz (see next plot).



Note: The peak above the limit is the carrier frequency.

Verdict: PASS

Report N°(NIE): 41273RRF.001



# **Modulation:** Π/4-DQPSK

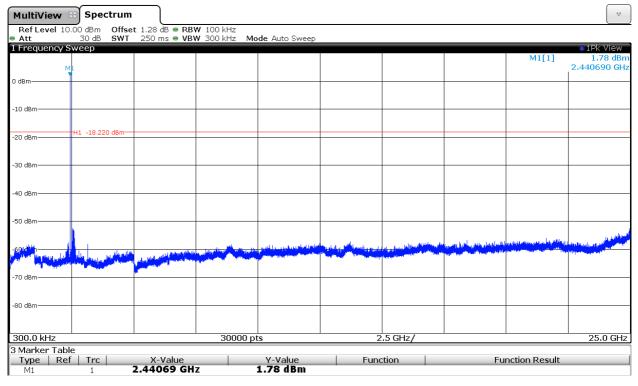
MultiView	Spectrum								
RefLevel 10. Att	.00 dBm Offse 30 dB SWT	t 1.28 dB • RBV 250 ms • VBV		de Auto Sweep					
1 Frequency S		250 ms 🔍 VBY	9 300 KHZ 100	de Auto Sweep					●1Pk View
								M2[1]	-59,10 dBm
0 dBm								M1[1]	4.803990 GHz 1.52 dBm
U dBm-									2.402350 GHz
-10 dBm									
	H1 -18.480 dBm								
-20 dBm	101100 0011								
-30 dBm									
-40 dBm									
-50 dBm	, мз								
	M2			. bu akaas	ta contra a		and a state of a survey of the state	ومطلبحهم ولعمرون يطاؤنك وروا	والمتلج والمتعالم والمتلج ومتعاجل والمراجل
-50 Charles	والمساللة والمسالية والله	A DESCRIPTION OF THE OWNER OF THE					And the set of the set		
			·						
-70 dBm									
-80 dBm									
300.0 kHz	1	1	30000 pt	s	2	2.5 GHz/	I	1	25.0 GHz
3 Marker Tabl									
Type Ref		X-Value 2.40235 GH:	-	Y-Value 1.52 dBm	Fund	ction	Fu	nction Result	
M1 M2		2.40235 GH	∠ z -!	1.52 abm 59.10 dBm					
M3		3.08901 GH	z -!	55.75 dBm					

1. LOWEST CHANNEL (2402 MHz): 300 kHz-25 GHz (see next plot).

Note: The peak above the limits is the carrier frequency.

# Verdict: PASS

# 2. MIDDLE CHANNEL (2441 MHz): 300 kHz-25 GHz (see next plot).



Note: The peak above the limits is the carrier frequency.



MultiView	Spectrum								
Ref Level 10. Att	30 dB SWT	t 1.28 dB • RBV 250 ms • VBV		<b>de</b> Auto Sweep					
1 Frequency S	weep							M1[1]	● 1Pk View 1.49 dBm 2.479850 GHz
0 dBm	, 								
-10 dBm									
-20 dBm	H1 -18.510 dBm								
-30 dBm									
-40 dBm									
-50 dBm									
-SELVER AND AND A							an a	dal, pisidi pitising padada padalah pitising pitising pada pada pada pada pada pada pada pad	
-70 dBm		<b>n</b>							
-80 dBm									
300.0 kHz			30000 pt	s	2	.5 GHz/			25.0 GHz
3 Marker Table Type   Ref M1	Trc	X-Value 2.47985 GH	z :	Y-Value L.49 dBm	Func	ction	Fu	nction Result	20.01.2014

# 3. HIGH CHANNEL (2480 MHz): 300 kHz-25 GHz (see next plot).

Note: The peak above the limit is the carrier frequency.



# Modulation: 8-DPSK

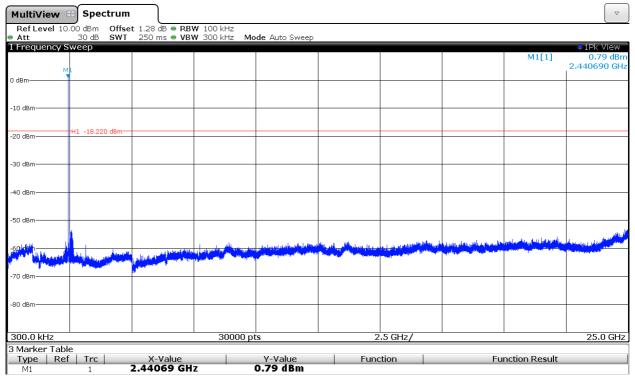
MultiView 🗄 Spectrum	$\bigtriangledown$
Ref Level         10.00 dBm         Offset         1.28 dB         RBW         100 kHz           ● Att         30 dB         SWT         250 ms         VBW         300 kHz         Mode         Auto Sweep	
1 Frequency Sweep	●1Pk View
M1[1	] 0.62 dBm 2.402350 GHz
M1 0 dBm M2[1	
	4.803990 GHz
-10 dBm	
-10 0801-	
-20 rd8m +11 -19 380 d8m	
-20 dBm +11 -19.380 dBm	
-30 dBm-	
-40 dBm-	
-50 dBm	
	Mala a sure of the second second second
-70 dBm	
-80 dBm	
300.0 kHz 30000 pts 2.5 GHz/	25.0 GHz
3 Marker Table	2010 0112
Type   Ref   Trc   X-Value   Y-Value   Function   Function Res	ult
M1 1 <b>2.40235 GHz 0.62 dBm</b> M2 1 <b>4.80399 GHz -59.65 dBm</b>	
M2 1 4.80399 GHz -59.65 dBm	

# 1. LOWEST CHANNEL (2402 MHz): 300 kHz-25 GHz (see next plot).

Note: The peak above the limits is the carrier frequency.

# Verdict: PASS

# 2. MIDDLE CHANNEL (2441 MHz): 300 kHz-25 GHz (see next plot).



Note: The peak above the limit is the carrier frequency.



MultiView 88	Spectrum	ı )								
Ref Level 10.0										
Att 1 Frequency Sw	30 dB SWT	250 ms	s 🗢 VBW	300 kHz	Mode Auto Sweep	0				●1Pk View
I Frequency Sw	eep								M1[1]	0.79 dBm
MI										2.479850 GHz
0 dBm										
10.10-										
-10 dBm										
-20 dBm	1 -19.210 dBm									
-30 dBm										
40 40-										
-40 dBm										
-50 dBm										
									ويطلطهم ومعرفاته والمعصورة والمكر	
-60	L		La Julio A		أقعر الأراد العراق والارجار والم	and the second states a	ويتعادر والمتعادية والمعادية والمعاد			And a little state
	A Contraction of the second	Jacob and a billion		A CONTRACT OF A CONTRACT						
-70 dBm										
-70 UBIII										
-80 dBm										
300.0 kHz				20000		,	2.5 GHz/			25.0 GHz
3 Marker Table				30000	pts					23.0 GHZ
Type Ref	Trc	X-V	alue		Y-Value	Eun	ction	Fu	nction Result	
M1		2.4798			0.79 dBm	- Turi	000/1	14		

# 3. HIGH CHANNEL (2480 MHz): 300 kHz-25 GHz (see next plot).

Note: The peak above the limit is the carrier frequency.



# FCC Section 15.247 Subclause (d) / RSS-210 Clause A8.5. Emission limitations radiated (Transmitter)

#### **SPECIFICATION**

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength ( $\mu V/m$ )	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

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

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

#### **RESULTS:**

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.



# Frequency range 30 MHz-1000 MHz.

Note: The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
32.91	V	Quasi-peak	30.33	±4.12
81.41	V	Quasi-peak	28.64	±4.12
143.49	V	Quasi-peak	36.52	±4.12
165.80	V	Quasi-peak	37.88	±4.12

#### Spurious levels operating (radiated) closest to limit.

#### Frequency range 1 GHz-25 GHz

Modulation: GFSK

### 1. CHANNEL: LOWEST (2402 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
2.3422	Н	Peak	46.06	± 4.0
2.3422	Н	Average	34.79	± 4.0
2.4943	Н	Peak	46.61	± 4.0
2.4943	Н	Average	35.05	± 4.0
2.5021	Н	Peak	47.93	± 4.0
2.3021	Н	Average	38.97	± 4.0
2.5218	Н	Peak	47.94	± 4.0
2.5216	Н	Average	39.09	± 4.0
4.8040	V	Peak	48.37	± 4.0
4.0040	V	Average	46.73	± 4.0



Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	47.76	± 4.0
2.3809	Н	Average	35.71	± 4.0
	Н	Peak	47.13	± 4.0
2.4934	Н	Average	35.05	± 4.0
	Н	Peak	48.07	± 4.0
2.5412	Н	Average	39.90	± 4.0
	Н	Peak	48.41	± 4.0
2.5611	Н	Average	39.11	± 4.0
	V	Peak	47.79	± 4.0
4.8819	V	Average	46.27	± 4.0

# 2. CHANNEL: MIDDLE (2441 MHz).

# 3. CHANNEL: HIGHEST (2480 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	46.31	± 4.0
2.3800	Н	Average	36.37	± 4.0
	Н	Peak	47.55	± 4.0
2.4835	Н	Average	35.50	± 4.0
	Н	Peak	48.03	± 4.0
2.5801	Н	Average	38.72	± 4.0
	Н	Peak	47.52	± 4.0
2.6401	Н	Average	39.13	± 4.0
	V	Peak	32.89	± 4.0
3.1885	V	Average	27.54	± 4.0
	V	Peak	45.90	± 4.0
4.9601	V	Average	44.23	± 4.0



# Modulation: Π/4-DQPSK

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
2.3420	Н	Peak	47.03	± 4.0
2.5+20	Н	Average	34.59	± 4.0
2.4953	Н	Peak	46.68	± 4.0
2.4955	Н	Average	35.04	± 4.0
2 2010	Н	Peak	47.60	± 4.0
2.5019	Н	Average	37.46	± 4.0
	Н	Peak	47.67	± 4.0
2.5206	Н	Average	37.65	± 4.0
	V	Peak	34.08	± 4.0
3.0885	V	Average	27.60	± 4.0
	V	Peak	45.34	± 4.0
4.8039	V	Average	41.95	± 4.0

# 1. CHANNEL: LOWEST (2402 MHz).

# 2. CHANNEL: MIDDLE (2441 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	46.10	± 4.0
2.3810	Н	Average	35.03	± 4.0
	Н	Peak	47.42	± 4.0
2.4943	Н	Average	35.02	± 4.0
	Н	Peak	49.24	± 4.0
2.5407	Н	Average	38.09	± 4.0
	Н	Peak	48.13	± 4.0
2.5609	Н	Average	37.44	± 4.0
	V	Peak	33.33	± 4.0
3.1384	V	Average	26.89	± 4.0
	V	Peak	44.13	± 4.0
4.8820	V	Average	40.59	± 4.0



Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	46.98	± 4.0
2.3801	Н	Average	35.54	± 4.0
	Н	Peak	48.21	± 4.0
2.4835	Н	Average	36.19	± 4.0
	Н	Peak	47.06	± 4.0
2.5399	Н	Average	37.25	± 4.0
	Н	Peak	47.58	± 4.0
2.6400	Н	Average	37.85	± 4.0
	V	Peak	35.77	± 4.0
3.1886	V	Average	30.04	± 4.0
	V	Peak	43.09	± 4.0
4.9600	V	Average	38.73	± 4.0

# 3. CHANNEL: HIGHEST (2480 MHz).

# Verdict: PASS

# Modulation: 8-DPSK

# 1. CHANNEL: LOWEST (2402 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	46.31	± 4.0
2.3220	Н	Average	34.47	± 4.0
	Н	Peak	47.51	± 4.0
2.4950	Н	Average	34.99	± 4.0
	Н	Peak	47.55	± 4.0
2.5021	Н	Average	37.26	± 4.0
	Н	Peak	48.47	± 4.0
2.5222	Н	Average	37.38	± 4.0
	V	Peak	33.75	± 4.0
3.0882	V	Average	26.88	± 4.0
	V	Peak	45.52	± 4.0
4.8040	V	Average	40.76	± 4.0



Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	46.80	± 4.0
2.3809	Н	Average	35.81	± 4.0
	Н	Peak	46.73	± 4.0
2.4953	Н	Average	35.05	± 4.0
	Н	Peak	47.94	± 4.0
2.5411	Н	Average	38.33	± 4.0
	Н	Peak	47.90	± 4.0
2.5610	Н	Average	38.08	± 4.0
	V	Peak	33.36	± 4.0
3.1385	V	Average	26.09	± 4.0
	V	Peak	43.66	± 4.0
4.8821	V	Average	38.92	± 4.0

# 2. CHANNEL: MIDDLE (2441 MHz).

# 3. CHANNEL: HIGHEST (2480 MHz).

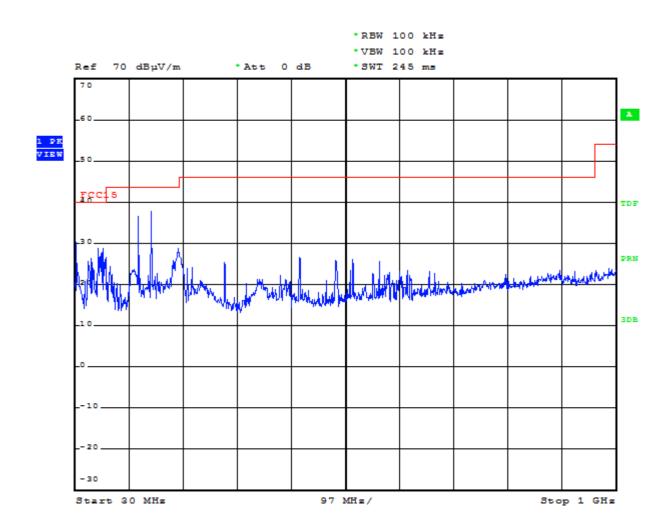
Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
	Н	Peak	46.64	± 4.0
2.3800	Н	Average	36.39	± 4.0
	Н	Peak	49.40	± 4.0
2.4835	Н	Average	36.59	± 4.0
	Н	Peak	47.51	± 4.0
2.5800	Н	Average	37.70	± 4.0
	Н	Peak	47.49	± 4.0
2.6201	Н	Average	37.76	± 4.0
	Н	Peak	48.05	± 4.0
2.6400	Н	Average	38.95	± 4.0
	V	Peak	35.69	± 4.0
3.1885	V	Average	29.24	± 4.0
	V	Peak	41.97	± 4.0
4.9601	V	Average	37.24	± 4.0

# Verdict: PASS

Report N°(NIE): 41273RRF.001



# FREQUENCY RANGE 30 MHz-1000 MHz.



(This plot is valid for all three channels and all modulation modes).



# FREQUENCY RANGE 1 GHz to 3 GHz.

#### **Modulation: GFSK**

# CHANNEL: Lowest (2402 MHz).

MultiView 🗄	Spectrum										
Ref Level 80.0 Att TDF	00 dBµV/m 0 dB • SV	WT 1s	<ul><li>RBW</li><li>VBW</li></ul>	1 MHz 1 MHz	Mode A	Auto Sweep					
3 Frequency Sw	veep									●1Pk View	∋2Av ViewLin
	H2 74.000	dBuV/m-									
70 dBµV/m											
60 dBµV/m											
	41 54.000 dBµV/m-										
50 dBµV/m 								1. 0	. washer month	LUNDIN AND MUMININ	white martined
		hamante	ambular	Antoniona	ا مالاد ، محد	. I render wer would	du ver who dong to	hun hun man			
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								mon	ليستعال السالية		
- <del>36 d8µ∨/m</del>			~								
20 dBµV/m											
10 dBµV/m											
Q dD V/m											
0 dBµV/m											
-10 dBµV/m											
1.0.0115				1	000 -= t						2.0.015
1.0 GHz				1	000 pt	5	20	0.0 MHz/			3.0 GHz

Note: The peak shown in the plot is the carrier frequency.

# CHANNEL: Middle (2441 MHz).

MultiView	B Spectrum									
Ref Level 8 Att DF	30.00 dBμV/m 0 dB = <b>S</b>	● RBV WT 1s ● VBV	VIMHz VIMHz Mo	de Auto Sweep						
Frequency	Sweep								●1Pk View	∋2Av ViewLir
	H2 74.000	dBµV/m								
0 dBµV/m										
0 dBµV/m										
,										
0 dBµV/m										
	numun	Mundulat annua	and at a print of a star	محاليم روير والمح والاح	and out the Matter	man war and	lunger	lynement the server	whenthe	-ulabar miller Mar
Julian Andrewski Andr D dBµV/m — — — — — — — — — — — — — — — — — — —										
									Lu.	
o do w/										
0-dBµ∀/m										
0 dBµV/m										
0 dBµV/m										
dBµV/m										
ι0 dBμV/m										
1.0 GHz			100	0 pts		200.0 MHz/				3.0 GH



# CHANNEL: Highest (2480 MHz).

Ref Level 80.00 dBµV/m          • REW 1 MHz         • Mode Auto Sweep         • 1Pk V/Ew • 2Av V         • 1Pk V/Ew • 1Pk V         • 1Pk V/Ew • 1Pk V         • 1Pk V/Ew • 1Pk V         • 1Pk V         • 1Pk V/Ew • 1Pk V         • 1Pk V/Ew • 1Pk	MultiView	B Spectrum									
Frequency Sweep         1Pk View © 2Av V           H2 74.000 dBµV/m         Image: Comparison of the second se	Att	0 dBµV/m 0 dB • S	● RBW WT 1 s ● VBW	1 MHz 1 MHz Mode	Auto Sweep						
H2 74.000       dBµV/m       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C       C		Sweep								●1Pk View	∋2Av ViewLir
0 dBµV/m			dBµV/m								
H1 54.000 dBµV/m       Image: second se	0 dBµV/m										
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		metericontration	where the ward ward ward ward ward ward ward ward	yman yn seulonony	mound have been and	uhumban	whiteman	uner-	hourset	ununumunu	d montemane and
0 dBμV/m <t< td=""><td>D dBµV/m</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	D dBµV/m										
D dBμV/m	9•d <del>Bµ∀/m</del>										
0 dBμV/m	0.dBu//m										
	o appoyni										
	0 dBµV/m───										
10 dBµv/m	dBµV/m										
	10 dBuV/m										
1.0 GHz 1000 pts 200.0 MHz/	1.0 GHz			1000 pt	s	20	0.0 MHz/	l			3.0 GF

Note: The peak shown in the plot is the carrier frequency.

# **Modulation:** Π/4-DQPSK

# CHANNEL: Lowest (2402 MHz).

MultiView	🖽 Spectrum							
Ref Level 8 Att TDF		RBW 1 MHz VBW 1 MHz Mode /	Auto Sweep					
3 Frequency	Sweep						●1Pk View (	∋2Av ViewLin
	H2 74.000 dBµV/m							
70 dBµV/m								
60 dBµV/m								
50 dBµV/m	H1 54.000 dBµV/m							
1 Maria Materia	man and a second and and	www.	with the with our	munhownow	withumment	henryphilipping	man when the work	mhallamhlarthte
40 dBµV/m								
-9 <del>0 dBµV/m</del>								
20 dBµV/m								
20 0000/11								
10 dBµV/m								
0 dBµV/m								
-10 dBµV/m								
1.0 GHz		1000 pt	s	20	0.0 MHz/			3.0 GHz
2 Marker Tab	ble							



# CHANNEL: Middle (2441 MHz).

MultiView	🕄 Spectrum									
Ref Level 80 Att TDF	0.00 dBµV/m 0 dB • SV	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode	Auto Sweep						
3 Frequency S	Sweep								●1Pk View	∋2Av ViewLin
	H2 74.000	dBµV/m								
70 dBµV/m										
60 dBµV/m										
50 dBµV/m	H1 54.000 dBµV/m-									
hermonicalithement	undertransporter	uni-abilitin abilities	handlohnumon	and an and the second second	reductions	with an town	me	Whannon Milita	hallowedge of the second of th	www.madeland
40 dBµV/m							L	Lulle		
- <del>30 dBµ∀/m</del>										
20 dBµV/m										
10 dBµV/m										
0 dBµV/m										
о соµv/m										
-10 dBµV/m										
1.0 GHz			1000 pt	is s	20	0.0 MHz/	I			3.0 GHz
2 Marker Tabl	le									

Note: The peak shown in the plot is the carrier frequency.

# CHANNEL: Highest (2480 MHz).

MultiView										
Ref Level 8 Att TDF	0.00 dBµV/m 0 dB ● <b>S'</b>		W 1 MHz W 1 MHz Mo	<b>de</b> Auto Sweep	1					
Frequency	Sweep								●1Pk View	⊜2Av ViewLin
	H2 74.000	dBµV/m								
70 dBµV/m										+
0 dBµV/m										
i0 dBµV/m	un have have									
		e construction of				white here the the	automan	and was been	seacher and the way	Mulladown
uluutuwwhite 10 dBuV/m	u www. What the ward	no concernance	Lunder all the start	alexia and a state of the second s	Julian con c					
10 GDD1)11										ļ
3 <del>0 dBµV/m====</del>							en e			
10°06977m										
20 dBµV/m										
LO dBµV/m										
) dBµV/m										+
10 dBµV/m										<b></b>
1.0 GHz			1000	) pts		200.0 MH	z/			3.0 G⊢



# **Modulation: 8-DPSK**

#### CHANNEL: Lowest (2402 MHz).

MultiView	Spectrum								
Ref Level 80.0 Att TDF	0 dBµV/m 0 dB • SV	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode /	Auto Sweep					
<b>3 Frequency Sw</b>	veep							●1Pk View	∋2Av ViewLin
	H2 74.000	dBµV/m							
70 dBµV/m									
60 dBµV/m									
	H1 54.000 dBµV/m-								
50 dBµV/m mhumhunhunhuhu 40 dBuV/m					المربع المربع	burlannaler under well	Semon months	www.holewaluk	whomenhallowed
mounder and when	mound have we	howwww.	and well when the	mount moundains	to Conduct Mandalan and and	w			
40 dBµV/m									
							Lunare		
- <del>30 dBµV/m</del>	·								
20 dBµV/m									
20 00000									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
-10 0000/11									
1.0 GHz		I	1000 pt	s	20	0.0 MHz/		I	3.0 GHz
2 Marker Table									

Note: The peak shown in the plot is the carrier frequency.

#### CHANNEL: Middle (2441 MHz).

MultiView 😁	Spectrum									
Ref Level 80.00 Att TDF	0 dB 🖷 SN	♥T 1s ● V	RBW 1 MH: VBW 1 MH:	z z Mode A	Auto Sweep					
3 Frequency Sw	еер								●1Pk View	∋2Av ViewLin
H1	1 74.000 dBµV/m+									
70 dBµV/m										
60 dBµV/m										
		dBµV/m								
50 dBµV/m							استقرفه سناد	 manufatra	annual materia	umhannenaliterne
40 dBµV/m	wheelpreaked-role-	mounderhour	ununun	lunnunduu	an moundarity	unnoununt	head and a second second second			
								Luulu	L.u.a	
- <del>38-dBµV/m</del>										
20 dBµV/m										
10 dBµV/m										
0 dBµV/m										
-10 dBµV/m										
1.0 GHz				1000 pt:	s	20	0.0 MHz/			3.0 GHz
2 Marker Table								 		05.02.2014



# CHANNEL: Highest (2480 MHz).

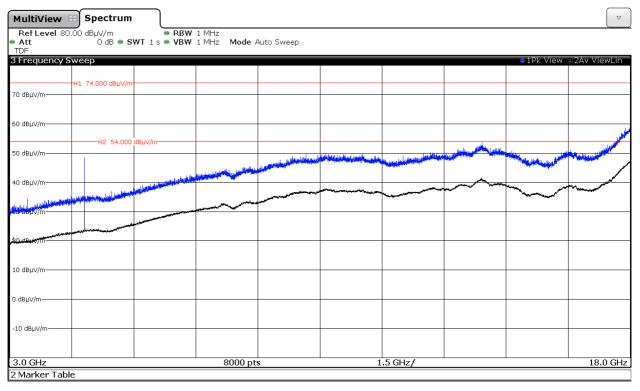
Ref Level 8 Att	30.00 dBµV/m	RB	WIMHz WIMHz Mod	- Auto Curren						
TDF	U db 🖷 5	WALTS - AR		e Auto Sweep						
Frequency	/ Sweep								●1Pk View	∋2Av ViewLir
	— H1 74.000 dBµV/m									
0 dBµV/m───										
0 dBµV/m										
0 dBµV/m	H2 54.000									
other work have	mulaupation	mummulterray	andertoon who when	and have demonstration	warmanahaund	whill and a statemental	wind	huburt	theilden	rinhaminana
0 dBµV/m								Lunera	ur.	
<del>0 dBµ∀/m</del>										
:0 dBµV/m										
0 dBµV/m										
dBµV/m										
LO dBµV/m										
.0 0000/11										
LO GHz		1	1000			0.0 MHz/	1			3.0 GH



#### FREQUENCY RANGE 3 GHz to 18 GHz.

#### **Modulation: GFSK**

#### CHANNEL: Lowest (2402 MHz).



# CHANNEL: Middle (2441 MHz).

MultiView	88 Spectrum								
Ref Level 80 Att TDF	0.00 dBµV/m 0 dB ● SWT :	• RBW 1 1 s • VBW 1		uto Sweep					
3 Frequency S	Sweep							●1Pk View	∋2Av ViewLin
70 dBµV/m	H1 74.000 dBµV/m								
60 dBµV/m									العمار
50 dBµV/m	H2 54.000 dBµV;	/m		السبب المقترين وروا			and the second		Marine Marine Marine
40 dBµV/m	atal, s., data	Contract of the second second	and the state of t				and the second sec		
Staby / m	en et de la faisse de la constituir de la c			الإسل والمسابعة المحامل والمحامة المواجع					Ny Color and Color
Jania.		and the second se							
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
3.0 GHz			8000 pts	;	1	.5 GHz/			18.0 GHz
2 Marker Tabl	le								1



# CHANNEL: Highest (2480 MHz).

MultiView	B) Spectrum								
Ref Level 80 Att TDF	0 dB 🖷 S	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode A	luto Sweep					
3 Frequency S	weep							●1Pk View (	∋2Av ViewLin
	-H1 74.000 dBµV/m-								
70 dBµV/m									
60 dBµV/m									
50 dBµV/m	H2 54.000	dBµV/m						alat al	
			المعادين التطالب والم	ميلايه أواللالدي ومادية والمواصل والمع		and an			No. of the second s
40 dBµV/m	المتلحق والمسادية المسلم والمدارة والمسلم			and the second			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Marca Marca
in the second synthesis in the second s			and the second s						
2 Lunger manual		and the second se							
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
3.0 GHz			8000 pts	s	1	5 GHz/			18.0 GHz
2 Marker Tabl	e								



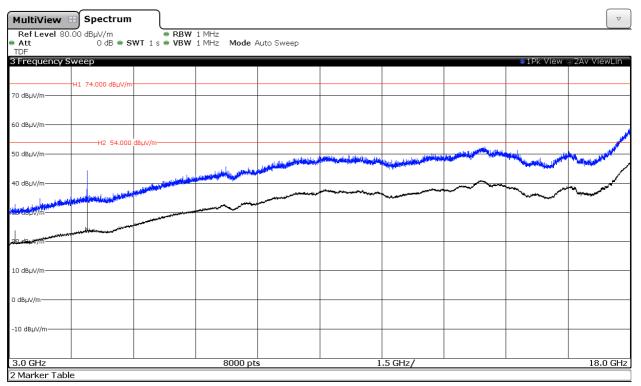
# **Modulation:** Π/4-DQPSK

# CHANNEL: Lowest (2402 MHz).

MultiView	B Spectrum	Ì							
Ref Level 80 Att TDF	0.00 dBµV/m 0 dB ● S	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode /	Auto Sweep					
Frequency S	Sweep							●1Pk View	∋2Av ViewLin
	H1 74.000 dBµV/m								
'0 dBµV/m									
0 dBµV/m									
									J
i0 dBµV/m	H2 54.000	ashr/w					and the second s		المحمليل
				and the strength of the second				and the second second second	a second and a second as a
		L. Salahana	ويجز المنافع المنافع المراجل المراجل المراجل المراجل						
Ю dBµV/m		and the second s		- Marine Contraction		and the second second second second		~	man and a second
A CONTRACTOR OF THE	and the states of the states					-		and the second s	
ie ueg/v/m									
	and the second s	- dem							
Quilippin .									
.0 dBµV/m									
) dBµV/m									
10 dBµV/m									
3.0 GHz			8000 pt		1			1	18.0 GH:

2 Marker Table

### CHANNEL: Middle (2441 MHz).





# CHANNEL: Highest (2480 MHz).

MultiView 88	Spectrum							▽ )
Ref Level 80.0 Att TDF	Ю dBµV/m 0 dB ● <b>SW</b>	● RBW T 1 s ● VBW	1 MHz 1 MHz Mode A	Auto Sweep				
<b>3 Frequency Sw</b>	veep						●1Pk View (	∋2Av ViewLin
70 dBµV/m	41 74.000 dBμV/m							
60 dBµV/m								
50 dBµV/m	H2 54.000 dB		Langer and the state of the sta	in the second		and the second secon	and a free of the second s	
40 dBµV/m	hand a second			and the second			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Manual Market
Elliale with	with man war and the second							
10 dBµV/m								
0 dBµV/m								
-10 dBµV/m								
3.0 GHz			8000 pts	5	1			18.0 GHz
2 Marker Table								

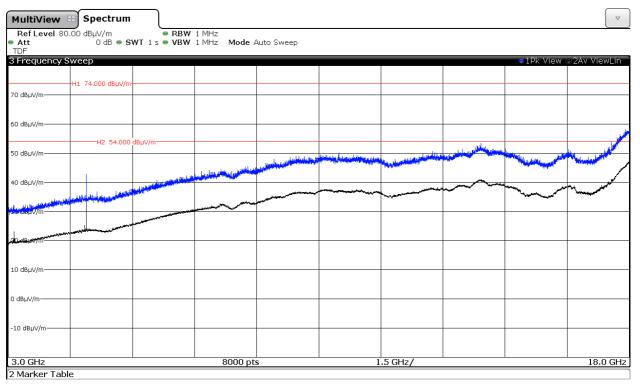


# **Modulation: 8-DPSK**

#### CHANNEL: Lowest (2402 MHz).

MultiView	B Spectrum								
Ref Level 80. Att TDF		● RBW WT 1s ● VBW	1 MHz 1 MHz Mode A	Auto Sweep					
3 Frequency S	weep						1	●1Pk View (	∋2Av ViewLin
70 dBµV/m	Η1 74.000 dBμV/m-								
60 dBµV/m									الل.
50 dBµV/m	H2 54.000 c	dBµV/m		ر بر معامله الم	distant darker mantility of con-	a and a state of the	a had the state of		Non and a state of the state of
40 dBµV/m			a the second of the second						
al and the state of the state o	and and the second states of the second s			And and the second second second	and a second				and the second s
se depV/m		and the second							
2QualByseym									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
3.0 GHz	· · · · ·		8000 pts	S	1	.5 GHz/			18.0 GHz
2 Marker Tabl	e								

#### CHANNEL: Middle (2441 MHz).





# CHANNEL: Highest (2480 MHz).

MultiView	Spectrum	7						▽ )
Ref Level 80. Att TDF	00 dBµV/m 0 dB ● <b>SWT</b> 1	• RBW 1 MHz Is • VBW 1 MHz Mode A	uto Sweep					
3 Frequency S	weep						●1Pk View (	∋2Av ViewLin
70 dBµV/m	H1 74.000 dBμV/m							
60 dBµV/m								/
50 dBµV/m	H2 54.000 dBµV/i		فيبأح فافتنا فيتقولوا والتقول		Managara and a fact of the state of the stat	and in the second s	and the second designed to the second designed and the	No. of Concession, State of Co
40 dBµV/m	and the state of the	Later building a second s	and the second	*******		anication and the second		No have a second of the second of the second
REABUSTIN	- and the second second second							
10 dBµV/m								
0 dBµV/m								
-10 dBµV/m								
3.0 GHz		8000 pts	;	1	5 GHz/	I I		18.0 GHz
2 Marker Table	e							



# FREQUENCY RANGE 18 GHz to 25 GHz.

MultiView	B) Spectrum								$\bigtriangledown$
Ref Level 80. Att TDF	.00 dBµV/m 0 dB ● S	• RBW WT 1s • VBW	1 MHz 1 MHz Mode A	Auto Sweep					
3 Frequency S	weep							●1Pk View	∋2Av ViewLin
	∙H1 74.000 dBµV/m·								
70 dBµV/m									
60 dBµV/m									
50 dBµV/m	H2 54.000								
Dia la des alla dalla dalla	والمعالية والمتعادية والمتعادية	ومتروية والمستنف المعتما التلوران أواجه	A STATE OF THE STA	and the state of the sector	In the second stands and second second	and the second second second second	alate and a state of the	Hannes and the bir want to	ومعناقا فيعطينا والمشاهد ومعاد
		a distant to be subt		been a contraction of the set			100-00		i i i managari i i i i i
40 dBµV/m						·	ale		
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
o abpvym									
-10 dBµV/m									
18.0 GHz			8000 pts	5	80	0.0 MHz/	l		26.0 GHz
2 Marker Tabl	e								

(This plot is valid for all three channels and all modulation modes).



# FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

### **CHANNEL:** Lowest

#### **Modulation: GFSK**

MultiView 8	B) Spectrum								
Ref Level 80. Att TDF	.00 dBµV/m 0 dB ● S	● RBW WT 1 s ● VBW	1 MHz 1 MHz Mode A	Auto Sweep					
3 Frequency S	weep							●1Pk View	∋2Av ViewLin
	H1 74.000 dBµV/m								
70 dBµV/m									
60 dBµV/m									
	H2 54.000	dBu\//m							
50 dBµV/m			an and which have the	morenderalitederalite	alton mound	workman	and	holedoormon holedoor	millionsherewhite
40 dBµV/m									
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
o dopayini									
-10 dBµV/m									
2.31 GHz			1000 pt:	<u> </u>	8	.0 MHz/			2.39 GHz
2 Marker Table	e		1000 pt	-	0				2102 0112

# **Modulation:** Π/4-DQPSK

Ref Level 80			W 1 MHz					7
Att	0 dB 🖷 S'	WT 1 s 🖷 VB	W 1 MHz Mode	Auto Sweep				
IDF Frequency S	Sweep						●1Pk View	⊜2Av ViewLii
	H2 74.000	dBµV/m						
) dBµV/m								
0 dBµV/m	-H1 54.000 dBµV/m-							
0 dBµV/m			Mayor han wood and	annound mon when it	habertunte	 moundation	-	the market
0 dBµV/m								
) dBµV/m								
) dBµV/m								
0 dBµV/m								
dBµV/m								
0 dBµV/m								
	1	1			1			



# **Modulation: 8-DPSK**

MultiView	Spectrum								$\bigtriangledown$
Ref Level 80 Att TDF	.00 dBµV/m 0 dB ● <b>S</b> '	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode A	Auto Sweep					
3 Frequency S	weep							●1Pk View	∋2Av ViewLin
	H2 74.000	dBµV/m							
70 dBμV/m									
60 dBµV/m									
50 dBµV/m	H1 54.000 dBµV/m								
	mathematic	water downers	and the states of the second	windy march to do not	and a second second starting	and the annual of the	and an observation water a plane of the	have bedre about	Laute draw Milled Morth
40 dBµV/m									
30 dBµV/m									
20 dBµV/m									
20 00000									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.31 GHz	1	1	1000 pt	S	8	.0 MHz/		1	2.39 GHz
2 Marker Tabl	e								

# **CHANNEL:** Middle

#### **Modulation: GFSK**

MultiView	88 Spectrum	l							$\bigtriangledown$
Ref Level 8 Att	30.00 dBµV/m 0 dB ● <b>S</b> '	● RBW WT 1 s ● VBW	1 MHz 1 MHz Mode	Auto Sweep					
IDF Frequency	Sween							a 1 Dk View	∋2Av ViewLin
requeries	энсер							STLK MGM	SZAV VICWEIII
	H2 74.000	dBµV/m							
0 dBµV/m——									
0 dBµV/m									
, app1, m									
0 dBµV/m									
www.	molectorementer	and an and the second	mundered water work	mulmour	mound	- normal production	ar musich the M	nouveround	Marillow Marina
0 dBµV/m───									
			^			+		<u>├</u>	
0 dBµV/m									
0 dBµV/m									
0 dBµV/m									
dBµV/m									
10 dBµV/m									
2.31 GHz			1000 pt	is	5	3.0 MHz/			2.39 GH



# Modulation: Π/4-DQPSK

MultiView 😁	Spectrum								
Ref Level 80.00 Att TDF	0 dBµV/m 0 dB ● <b>SW</b>	● RBW /T 1s ● VBW	1 MHz 1 MHz Mode /	Auto Sweep					
3 Frequency Swo	еер							●1Pk View	∋2Av ViewLin
	H2 74.000 di	BµV/m							
70 dBµV/m									
60 dBµV/m									
H1 50 dBµV/m	1 54.000 dBµV/m								
with munimities	Hullwellennen	whenthetthetware	hunderalanderich	mounduran	manuteranderson	electrolegitesterte	meneraltumetertunes	ond sector would	managentalise
40 dBµV/m									
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.31 GHz 2 Marker Table			1000 pt	s	8	.0 MHz/			2.39 GHz

# Modulation: 8-DPSK

MultiView	🙁 Spectrum								
Ref Level 8 Att TDF	30.00 dBμV/m 0 dB <b>● S</b>	● RB <sup>1</sup> WT 1 s ● VB1	₩ 1 MHz ₩ 1 MHz Mode	Auto Sweep					
3 Frequency	Sweep							●1Pk View	∋2Av ViewLin
70 dBµV/m	H1 74.000 dBµV/m								
60 dBµV/m									
	H2 54.000	dBµV/m							
50 dBµV/m	mound	upathouse	multimer	ausendertermetrown	unnunun	Montheman	termed and the second	munumunu	hudenan
40 dBµV/m									
								~	
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.31 GHz	1	1	1000 pt	S	8	.0 MHz/	1	1	2.39 GHz
2 Marker Tal	ble								



# **CHANNEL:** Highest

# Modulation: GFSK

MultiView 😁	Spectrum								
Ref Level 80.00 Att TDF	dBµV/m 0 dB <b>● SWT</b> 1 s	<ul> <li>RBW 1 MH</li> <li>VBW 1 MH</li> </ul>	z z <b>Mode</b> A	uto Sweep					
3 Frequency Swe	ер							●1Pk View (	∋2Av ViewLin
70 dBµV/m	— H2 74.000 dBµV/m-								
60 dBµV/m									
H1	54.000 dBµV/m								
50 dBµV/m	Munipoplanovalue	hendrementeende	lubhamen	Masselinardune	hourselowant	wanterman	und	derman ward ward	Manuali
40 dBµV/m									
30 dBµV/m	~~~~~								
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.31 GHz 2 Marker Table			1000 pts	;	8	.0 MHz/			2.39 GHz

# Modulation: Π/4-DQPSK

MultiView	B Spectrum	٦						$\bigtriangledown$
Ref Level 80 Att TDF	.00 dBµV/m 0 dB ● SWT 1	● RBW 1 MHz s ● VBW 1 MHz M	<b>1ode</b> Auto Sweep					
3 Frequency S	weep						●1Pk View	⊜2Av ViewLin
	H2 74.000 dBµV/r	m						
70 dBµV/m								
60 dBµV/m								
	H1 54.000 dBµV/m							
50 dBµV/m	manananananananana	which when when the	www.manualudor	ntomonorodithem	montherenant	and and the second s	www.automation	moundertend
40 dBµV/m								
30 dBµV/m								
20 dBµV/m								
10 dBµV/m								
0 dBµV/m								
-10 dBµV/m								
-10 0000/11								
2.31 GHz		10	00 pts	{	3.0 MHz/			2.39 GHz
2 Marker Tabl	e							



# Modulation: 8-DPSK

MultiView	Spectrum								
Ref Level 80.0 Att TDF	0 dBµV/m 0 dB • S	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode #	Auto Sweep					
3 Frequency Sv	weep							●1Pk View	∋2Av ViewLin
70 dBµV/m	H1 74.000 dBµV/m								
60 dBµV/m									
	H2 54.000	dBµV/m────							
50 dBµV/m	ilm.m.m.hilline.lit.	-thran-thrandorma	Hultowandhuman	water marine	hand and the second	phalenteritetriteritetrite	Manhananan	www.www.	ndahrwowenschalde
40 dBµV/m								~	
30 dBµV/m				·					
20 dBµV/m									
10 dBµV/m									
0 dBµV/m					<u></u>				
-10 dBµV/m									
2.31 GHz			1000 pt:	<u> </u>	8	.0 MHz/			2.39 GHz
2 Marker Table	•		1000 pt	5		10 1112/			2:07 012



# FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)

#### **CHANNEL:** Lowest

MultiView 🗄	Spectrum										
Ref Level 80.0 Att TDF	0 dB 🖷 SV	WT 1s	■ RBW ■ VBW	1 MHz 1 MHz Mo	<b>de</b> Auto Swe	еер					
3 Frequency Sv	veep				<u> </u>					●1Pk View	∋2Av ViewLin
	H2 74.000 (	dBµV/m──									
70 dBµV/m											
60 dBµV/m											
cc appr,m											
+	H1 54.000 dBµV/m−										
50 dBµV/m			line at				and the second second second	a the transformer of the			and a second
Manuman	Munhander	minublid	up Minunal 1	Monthearthan	windformented	para managera	well-well-	and a second and a second	Mar Mar Mar Mar Marker	an warren and a star	winnerwinner
40 dBµV/m											
·······											
30 dBµV/m											
20 dBµV/m											
10 dBµV/m											
0 dBµV/m											
-10 dBµV/m											
D 400E CU-				1000							
2.4835 GHz				1000	pts		1.	65 MHz/			2.5 GHz

2 Marker Table

(This plot is valid for all modulation modes).

# **CHANNEL:** Middle

MultiView	B Spectrum								
Ref Level 80 Att TDF	0 dBµV/m 0 dB ● SW	● RBW /T 1 s ● VBW	1 MHz 1 MHz Mode /	Auto Sweep					
B Frequency S	Sweep							●1Pk View	∋2Av ViewLin
	H2 74.000 d	BuV/m							
70 dBµV/m									
60 dBµV/m									
	H1 54.000 dBµV/m-								
50 dBµV/m	where dreamphilitered in	manuland	ununshrundershy	mentermontal	housemand	moundation	wound	-lulissenodeleven	ullantultranew
40 dBµV/m									
 30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
) dBµV/m									
-10 dBµV/m									
2.4835 GHz			1000 pt	s	1.	65 MHz/			2.5 GH
Marker Tabl	e								

(This plot is valid for all modulation modes).



# **CHANNEL:** Highest

#### Modulation: GFSK

MultiView 88	Spectrum	J							
Ref Level 80.0 Att TDF	00 dBµV/m 0 dB ● <b>SWT</b> 1	• RBW 1 s • VBW 1	. MHz . MHz <b>Mode</b> A	Auto Sweep					
3 Frequency Sw	veep							●1Pk View	∋2Av ViewLin
70 dBµV/m	H2 74.000 dBµV/m	1							
yo abpyin									
60 dBµV/m									
50 dBuV/mjuvalladen	H1 54.000 dBµV/m	an and the start of the start o	unt-monorent	an a	wanter	rennadrender	glunderware	onduunoum	monunderse
40 dBµV/m									
30 dBµV/m					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.4835 GHz			1000 pts	6	1.	.65 MHz/			2.5 GHz
2 Marker Table						· · · · ·			

# Modulation: Π/4-DQPSK

MultiView 8	Spectrum								$\bigtriangledown$
Ref Level 80.0 Att TDF		● RBW WT 1s ● VBW	1 MHz 1 MHz Mode	Auto Sweep					
3 Frequency Sv	weep							●1Pk View	⊜2Av ViewLin
	H2 74.000	dBuV/m							
70 dBµV/m									
60 dBµV/m									
	H1 54.000 dBµV/m−								
50 dBµV/m	and march of	mundund	an when the more than the	Annowwedthe	nomenonomeno	manger bound and some the	ourmante	Munanautura	pelanenel work out have not
40 dBµV/m									
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.4835 GHz			1000 pt	s	1.	.65 MHz/			2.5 GHz
Marker Table	•								



#### **Modulation: 8-DPSK**

MultiView	Spectrum								
Ref Level 80 Att TDF	.00 dBµV/m 0 dB ● S	● RBW WT 1s ● VBW	1 MHz 1 MHz Mode A	Auto Sweep					
3 Frequency S	weep							● 1Pk View	∋2Av ViewLin
	H1 74.000 dBµV/m								
70 dBµV/m									
60 dBµV/m									
	H2 54.000	dBµV/m							
50. daw/mmmh	and a construction of the second s								
	a all when the second	humanthatimeter	out hourself might	manufacture	whiteholarturner	montontortholistic	he was here was for the	muniter monthly when	interviewence
40 dBµV/m									
Mallo Martin Martine					~				
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
-10 dBµV/m									
2.4835 GHz	•	•	1000 pts	5	1.	65 MHz/		•	2.5 GHz
2 Marker Tabl	e								