

**FCC LISTED, REGISTRATION
NUMBER: 905266**

**IC LISTED REGISTRATION NUMBER
IC 4621**

AT4 wireless, S.A.

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Registro Mercantil de Málaga, Tomo 1169,
Libro 82, Folio 133, Hoja MA3729

TEST REPORT

REFERENCE STANDARD:

USA FCC Part 15.247

NIE : 30479RET.001

Approved by
(name / position & signature) : A. Llamas / RF Lab. Manager

Elaboration date : 2009-11-23

Identification of item tested : Bluetooth module

Trademark : ---

Model and/or type reference : PBA31308

Serial number : ---

Other identification of the product : Commercial name: UNISTONE

FCC ID: Q2331308

HW version: V2.01

Features : Bluetooth BT2.1+EDR, integral antenna PIFA

Description : Bluetooth module on USB dongle with PIFA antenna

Applicant : INFINEON TECHNOLOGIES

Address : Am Campeon 1-12, 85579 Neubiberg Germany

CIF/NIF/Passport : DE 812655055

Contact person: Jean-Pierre Thimm

Telephone / Fax : +49 8923428706

e-mail: : Jean-pierre.thimm@infineon.com

Test samples supplier : Same as applicant

Manufacturer : Panasonic Electronic Devices Europe GmbH

Address : Zeppelinstrasse 19, 21337 Lüneburg, Germany

CIF/NIF/Passport : ---

Telephone / Fax : ---

Test method requested	See Standard		
Standard	USA FCC Part 15.247: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz: Section 15.247 Subclause (b). Maximum output power (radiated) and antenna gain. Section 15.247 Subclause (d). Band-edge emissions compliance (Transmitter). Section 15.247 Subclause (d). Emissions radiated (Transmitter).		
Test procedure	PEET034: Medidas radioeléctricas a equipos de radio de espectro ensanchado en la banda de 2,4 GHz.		
Non-standardized test method	N/A		
Used instrumentation		Last Cal. date	Cal. due date
	1. Semianechoic Absorber Lined Chamber IR 11. BS	N.A.	N.A.
	2. Control Chamber IR 12.BC	N.A.	N.A.
	3. Hybrid Bilog antenna Sunol Sciences Corporation JB6	2008-10	2011-10
	4. Antenna mast EM 1072 NMT	N.A.	N.A.
	5. Rotating table EM 1084-4. ON	N.A.	N.A.
	6. Double-ridge Guide Horn antenna 1-18 GHz HP 11966E	2008/03	2011/03
	7. Double-ridge Guide Horn antenna 18-40 GHz Agilent 119665J	2008/09	2011/09
	8. EMI Test Receiver R&S ESIB26	2009/09	2010/09
	9. RF pre-amplifier Miteq JS4-12002600-30-5A.	2008/07	2010/07
	10. Multi Device Controller EMCO 2090	N.A.	N.A.
	11. Spectrum Analyzer R&S ESU40	2007/11	2009/11
	12. RF pre-amplifier Miteq AFS5-04001300-15-10P-6.	2008/07	2010/07
	13. RF pre-amplifier Schaffner CPA 9231.	2009/03	2011/03
	14. Antenna tripod EMCO 11968C.	N.A.	N.A.
	15. Spectrum analyser Agilent PSA E4440A	2008/01	2010/01
Report template No.	FDT08_11		
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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 conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

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 4621.

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 M/01 is composed of the following elements:

<u>Control N°</u>	<u>Description</u>	<u>Model</u>	<u>Serial N°</u>	<u>Date of reception</u>
30479/01	Bluetooth USB Dongle with integral antenna	PBA31308	---	26/10/2009

Sample M/02 is composed of the following elements:

<u>Control N°</u>	<u>Description</u>	<u>Model</u>	<u>Serial N°</u>	<u>Date of reception</u>
30479/09	Bluetooth USB Dongle with antenna connector	PBA31308	---	19/11/2009

1. Sample M/01 has undergone following test(s).
Radiated tests indicated in appendix A.
2. Sample M/02 has undergone following test(s).
Conducted RF power for antenna gain calculation indicated in appendix A.

Testing period

The performed test started on 2009-10-30 and finished on 2009-11-23.

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. = 24.5 °C Max. = 25.2 °C
Relative humidity	Min. = 55.7 % Max. = 56.3 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

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

Temperature	Min. = 23.2 °C Max. = 24.1 °C
Relative humidity	Min. = 54.3 % Max. = 55.2 %
Air pressure	Min. = 1020 mbar Max. = 1020 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±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).

Summary

Considering the results of the performed test according to standard USA FCC Parts 15.247, 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: Test not requested.

Testing verdicts

Not applicable: NA
 Pass.....: P
 Fail: F
 Not measured.....: NM

FCC PART 15 PARAGRAPH	VERDICT			
	NA	P	F	NM
15.247 Subclause (a) (1). 20 dB Bandwidth and Carrier frequency separation				NM ¹
15.247 Subclause (a) (1) (iii). Number of hopping channels				NM ¹
15.247 Subclause (a) (1) (iii). Time of occupancy (Dwell Time)				NM ¹
15.247 Subclause (b). Maximum peak output power (radiated) and antenna gain		P		
15.247 Subclause (c). Band-edge of radiated emissions (Transmitter)		P		
15.247 Subclause (c). Emission limitations conducted (Transmitter)				NM ¹
15.247 Subclause (c). Emission limitations radiated (Transmitter)		P		

1: See point “Remarks and comments”.

APPENDIX A: Test result

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TEST CONDITIONS

Power supply (V):

$$V_{\text{nominal}} = 5.0 \text{ Vdc}$$

Type of power supply = DC voltage from USB port.

Type of antenna = Integral antenna.

TEST FREQUENCIES:

Lowest channel: 2402 MHz

Middle channel: 2441 MHz

Highest channel: 2480 MHz

The test set-up was made in accordance to the general provisions of ANSI C63.4: 2003.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyser.

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.

Section 15.247 Subclause (b). Maximum 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 PEAK OUTPUT POWER (CONDUCTED). See next plots.

Modulation: GFSK

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum peak power (dBm)	3.18	3.50	2.91
Measurement uncertainty (dB)	±1.5		

Modulation: $\Pi/4$ -DQPSK (2Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum peak power (dBm)	2.70	3.04	2.47
Measurement uncertainty (dB)	±1.5		

Modulation: 8-DPSK (3Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum peak power (dBm)	3.19	3.51	2.92
Measurement uncertainty (dB)	±1.5		

MAXIMUM PEAK OUTPUT POWER (RADIATED).

Modulation: GFSK

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Correction Factor (dB)	35.0	35.1	35.2
Maximum EIRP peak power (dBm)	0.26	0.40	-0.89
Measurement uncertainty (dB)	±4.0		

Modulation: $\Pi/4$ -DQPSK (2 Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Correction Factor (dB)	35.0	35.1	35.2
Maximum EIRP peak power (dBm)	-0.52	-0.28	-1.48
Measurement uncertainty (dB)	± 4.0		

Modulation: 8-DPSK (3Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Correction Factor (dB)	35.0	35.1	35.2
Maximum EIRP peak power (dBm)	-0.48	0.29	-1.08
Measurement uncertainty (dB)	± 4.0		

CALCULATED ANTENNA GAIN

Modulation: GFSK

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Radiated Power (dBm)	0.26	0.40	-0.89
Conducted Power (dBm)	3.18	3.50	2.91
Antenna gain (dBi)	-2.92	-3.10	-3.80

Modulation: $\Pi/4$ -DQPSK (2 Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Radiated Power (dBm)	-0.52	-0.28	-1.48
Conducted Power (dBm)	2.70	3.04	2.47
Antenna gain (dBi)	-3.22	-3.32	-3.95

Modulation: 8-DPSK (3Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Radiated Power (dBm)	-0.48	0.29	-1.08
Conducted Power (dBm)	3.19	3.51	2.92
Antenna gain (dBi)	-3.67	-3.22	-4.00

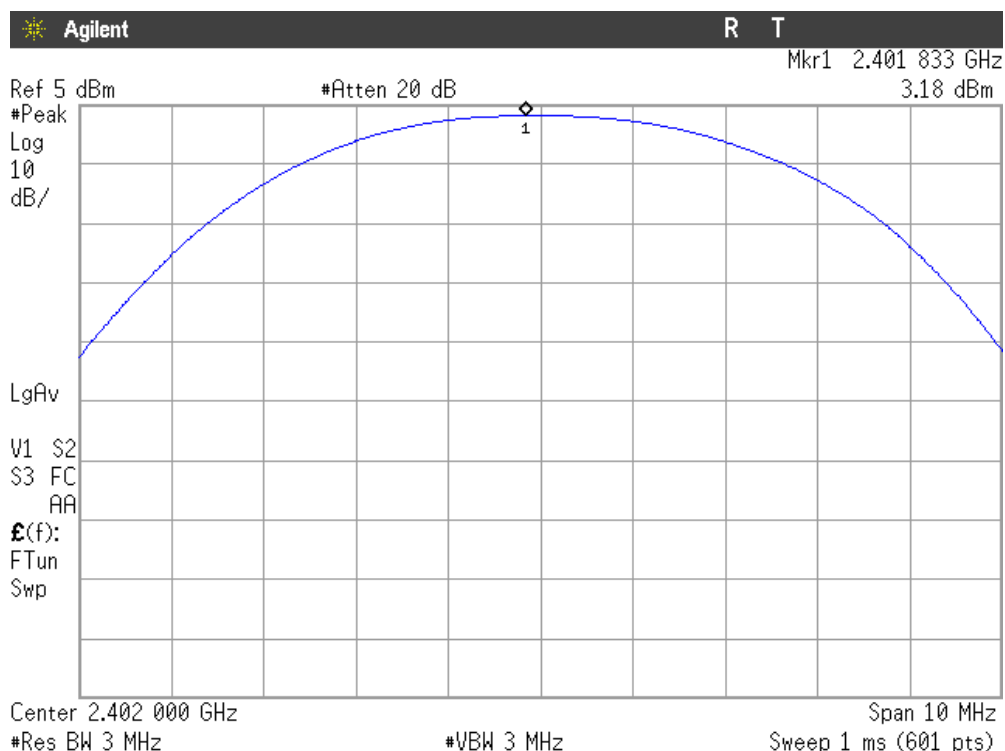
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Verdict: PASS

PEAK OUTPUT POWER (CONDUCTED).

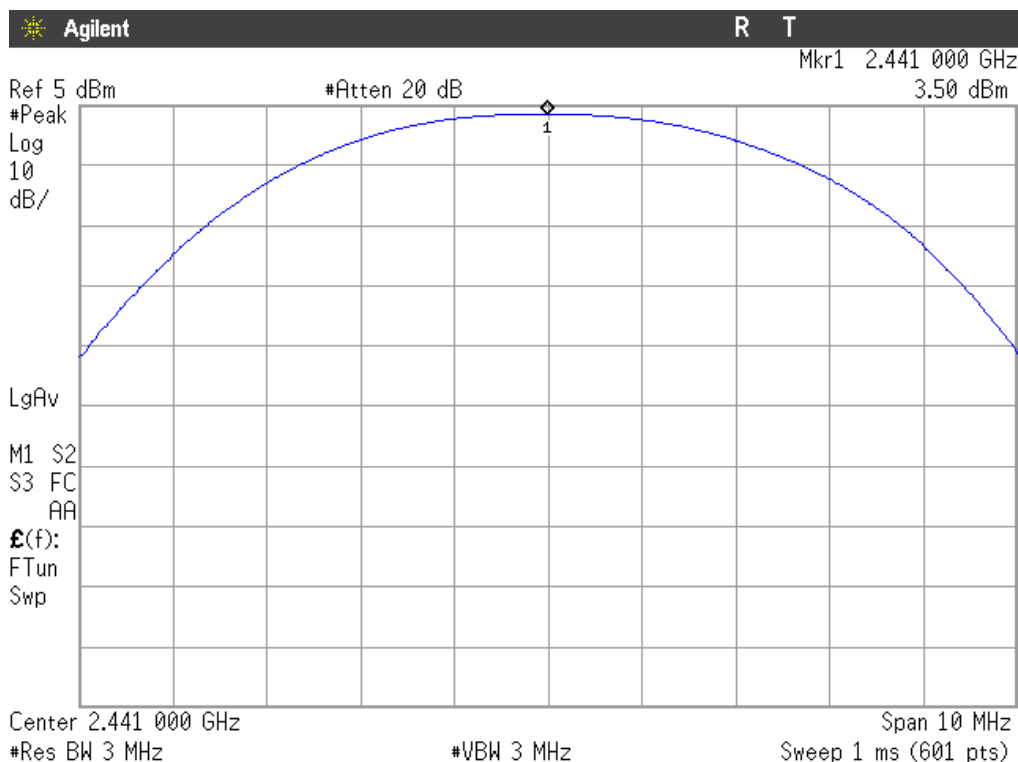
Modulation: GFSK

Lowest Channel: 2402 MHz.



Modulation: GFSK

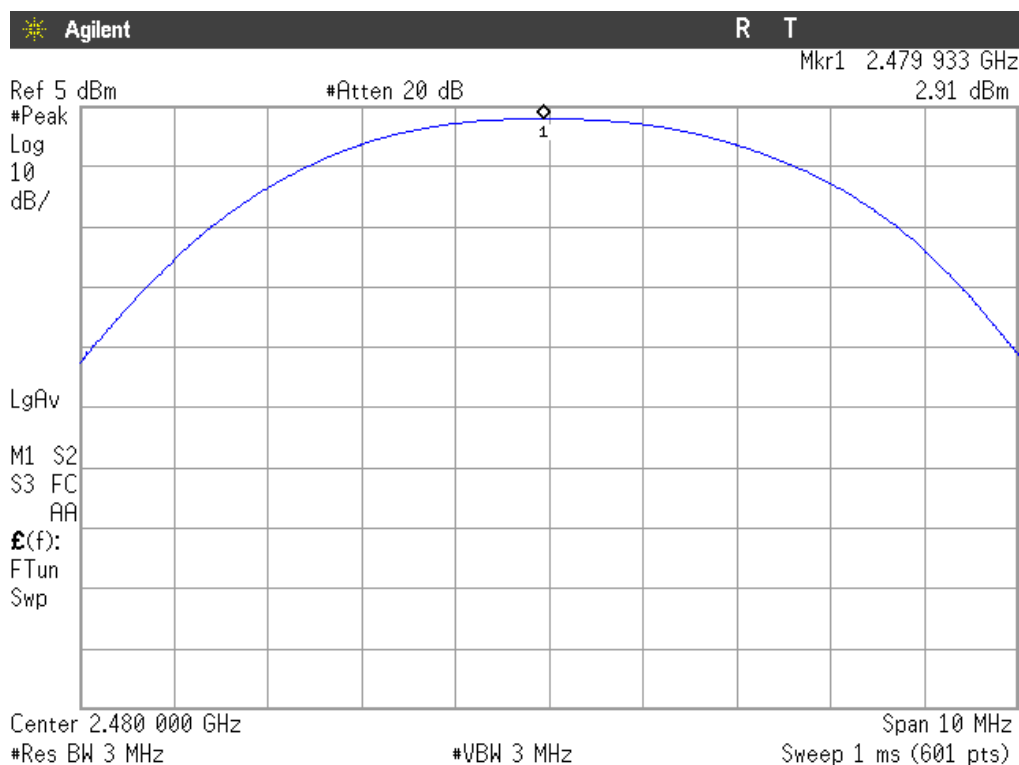
Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (CONDUCTED).

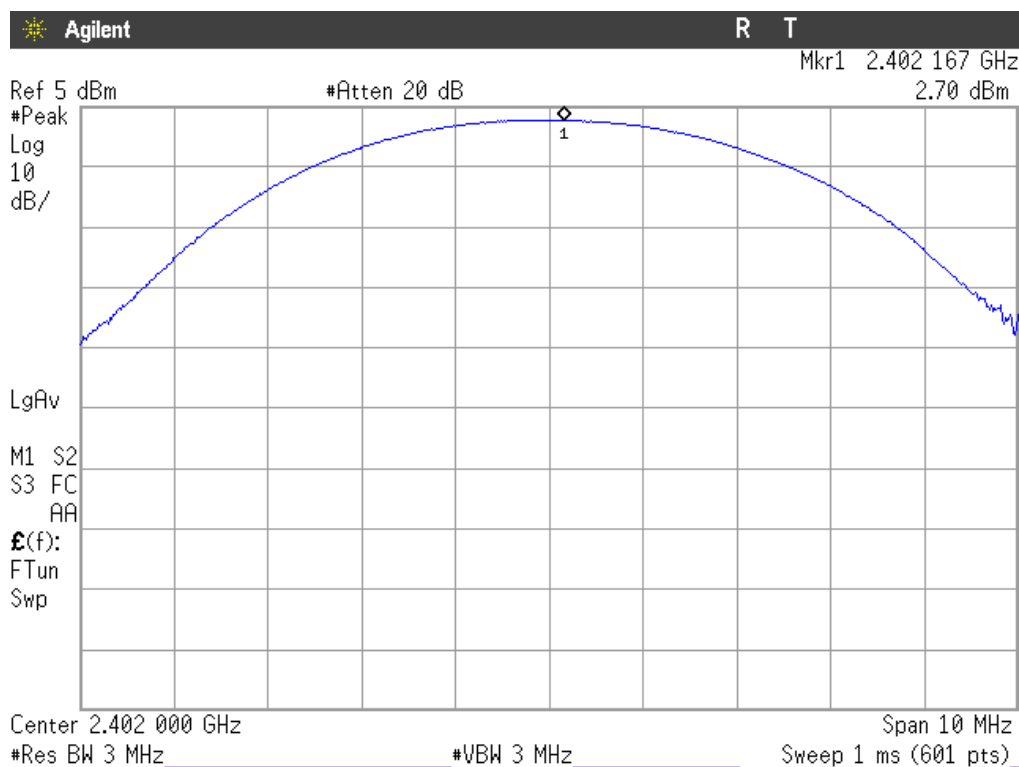
Modulation: GFSK

Highest Channel: 2480 MHz.



Modulation: $\Pi/4$ -DQPSK

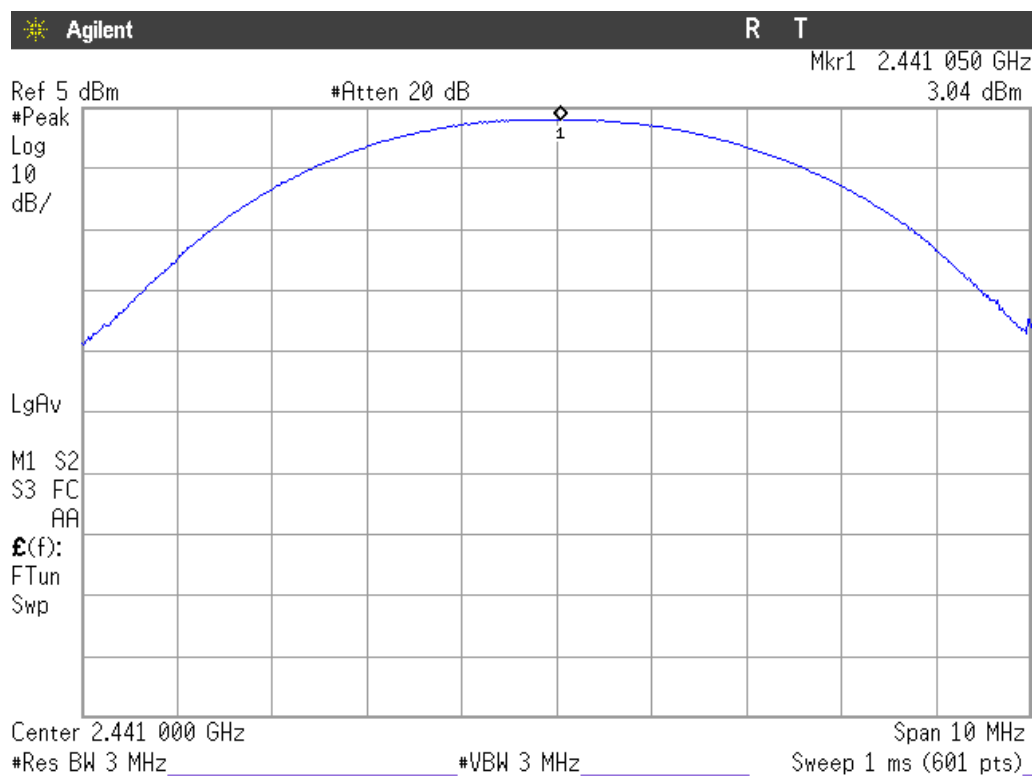
Lowest Channel: 2402 MHz



PEAK OUTPUT POWER (CONDUCTED)

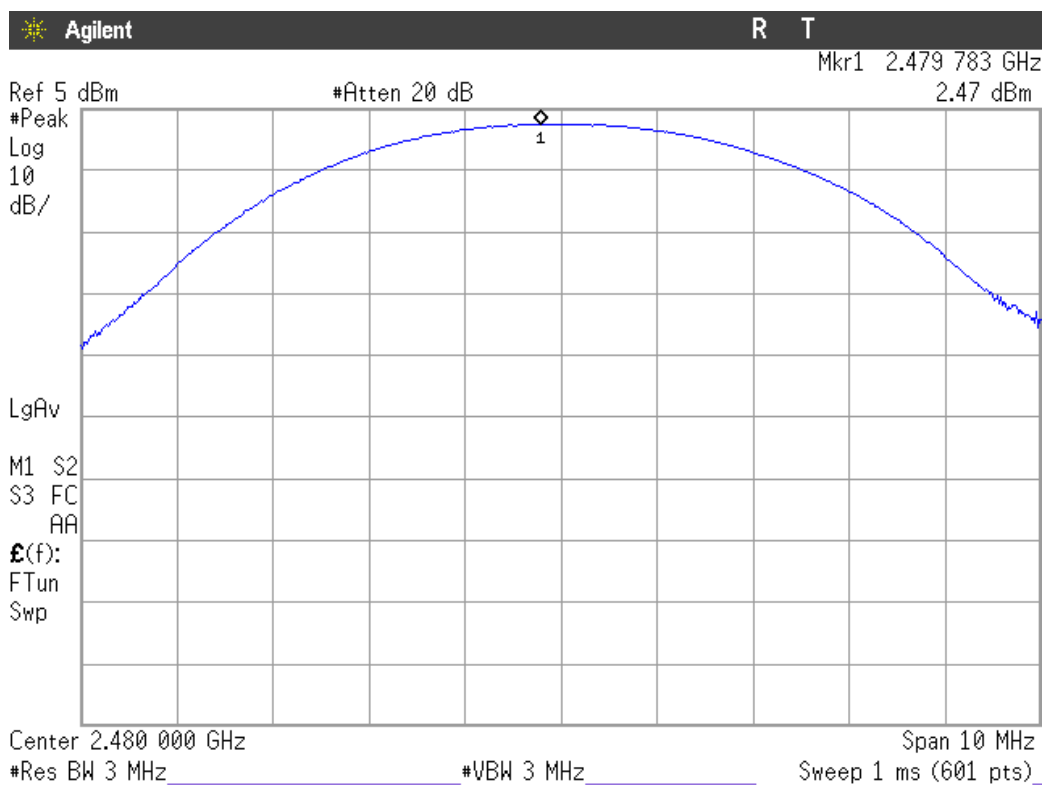
Modulation: $\Pi/4$ -DQPSK

Middle Channel: 2441 MHz.



Modulation: $\Pi/4$ -DQPSK

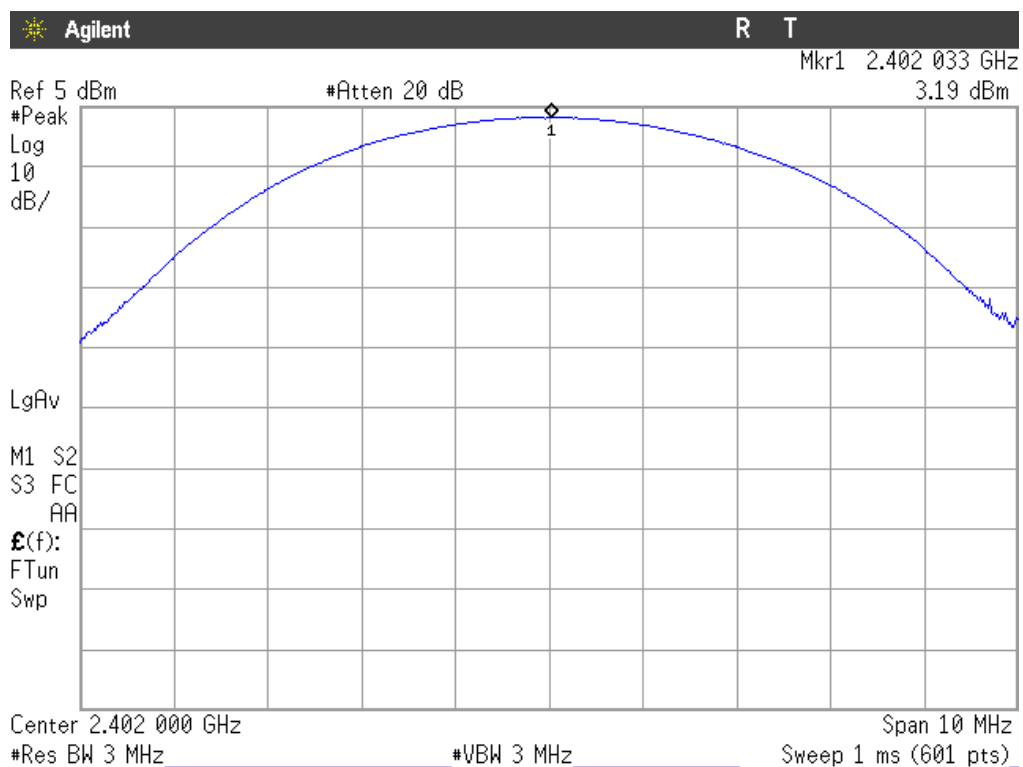
Highest Channel: 2480 MHz.



PEAK OUTPUT POWER (CONDUCTED).

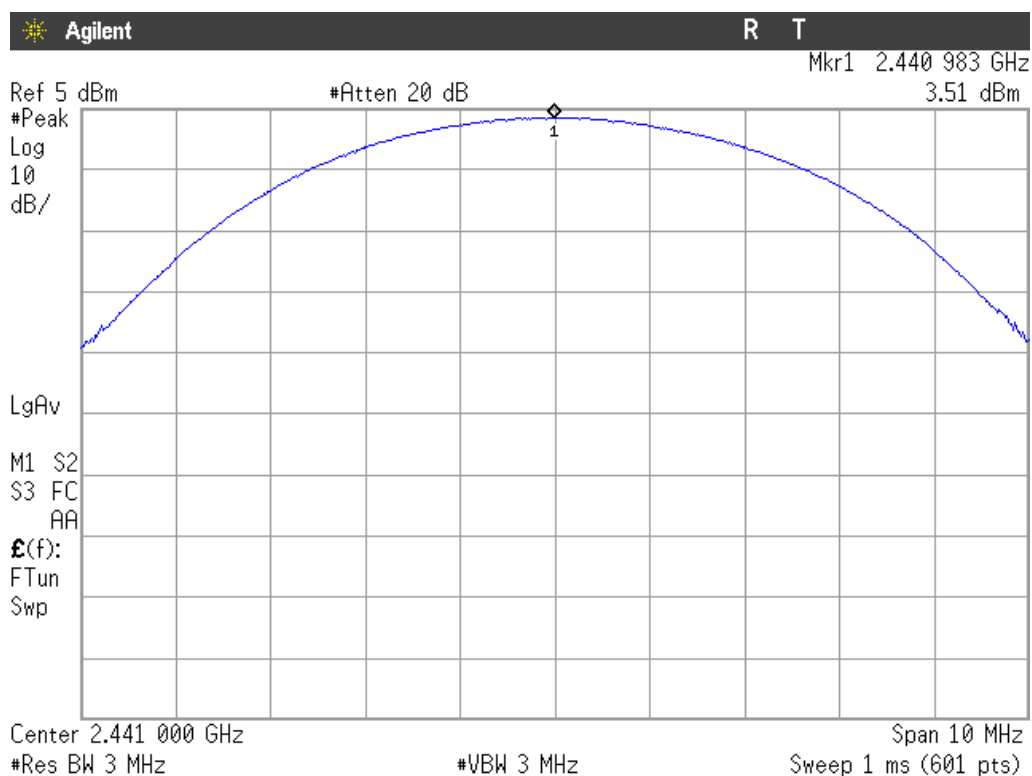
Modulation: 8-DPSK

Lowest Channel: 2402 MHz



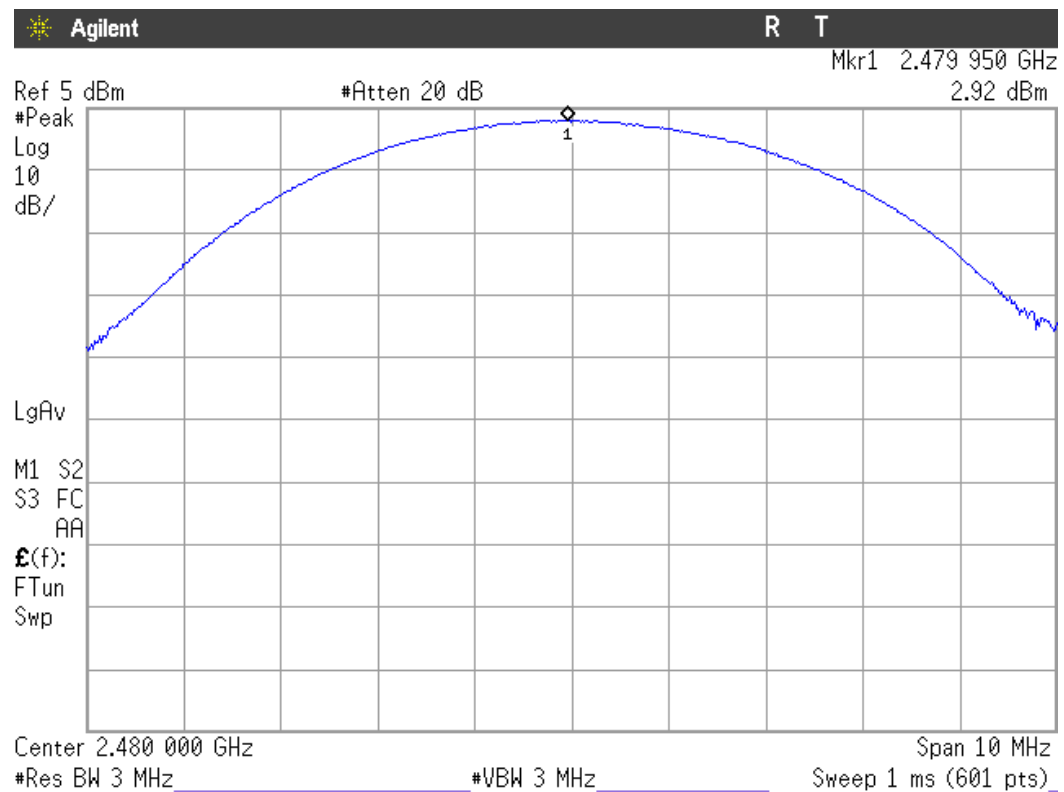
Modulation: 8-DPSK

Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (CONDUCTED).

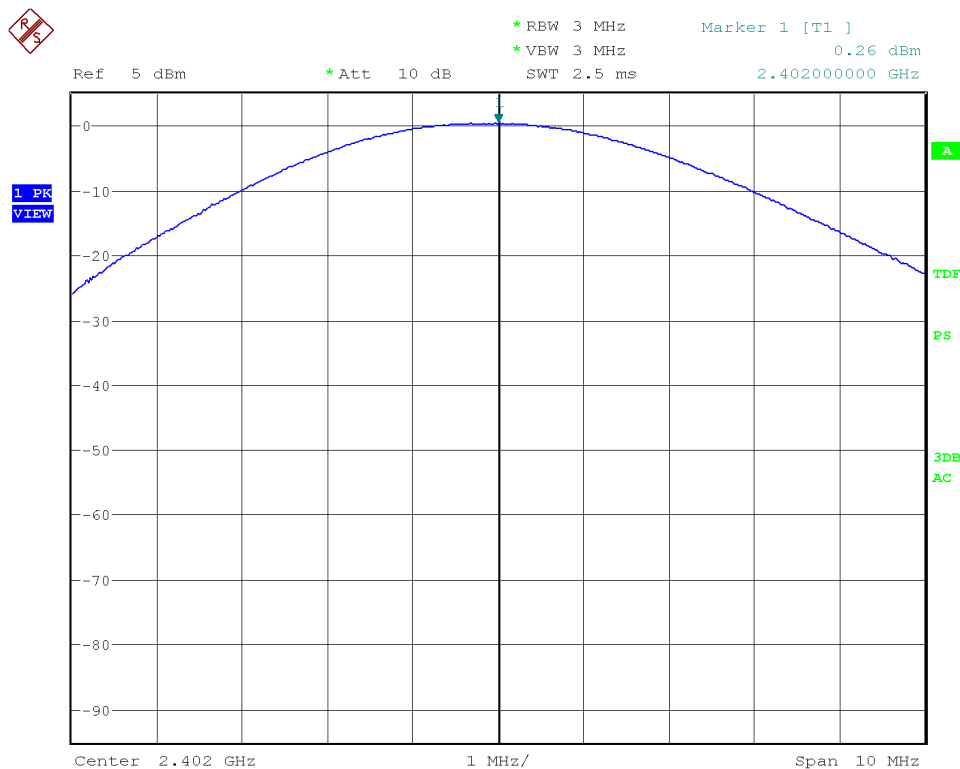
Modulation: 8-DPSK Highest Channel: 2480 MHz.



PEAK OUTPUT POWER (RADIATED).

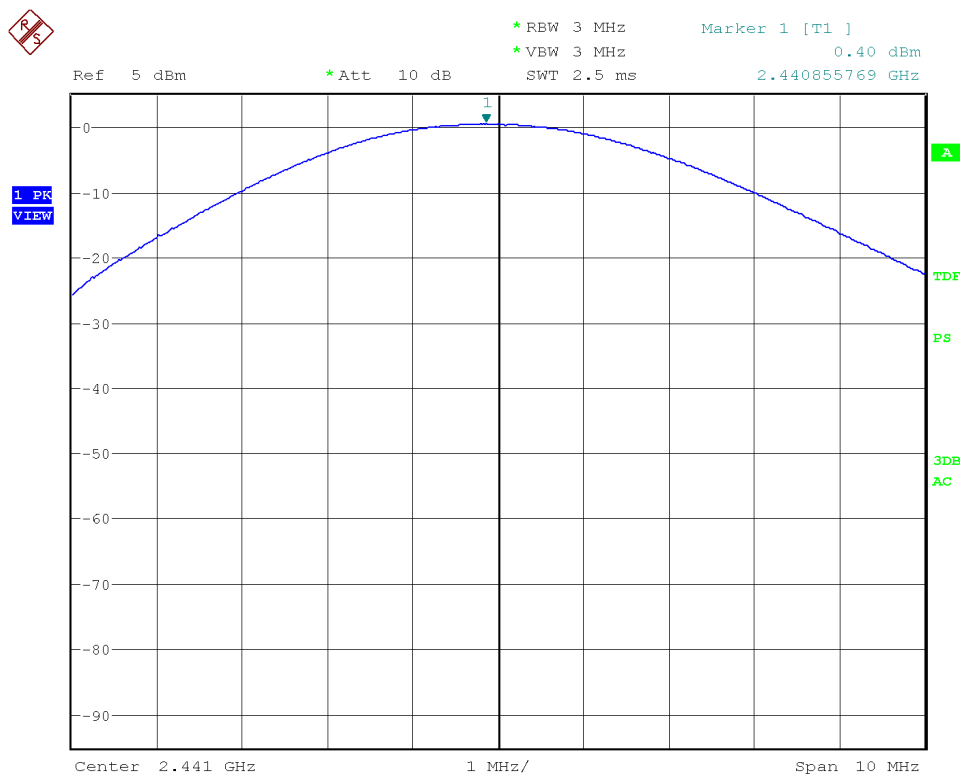
Modulation: GFSK

Lowest Channel: 2402 MHz.



Modulation: GFSK

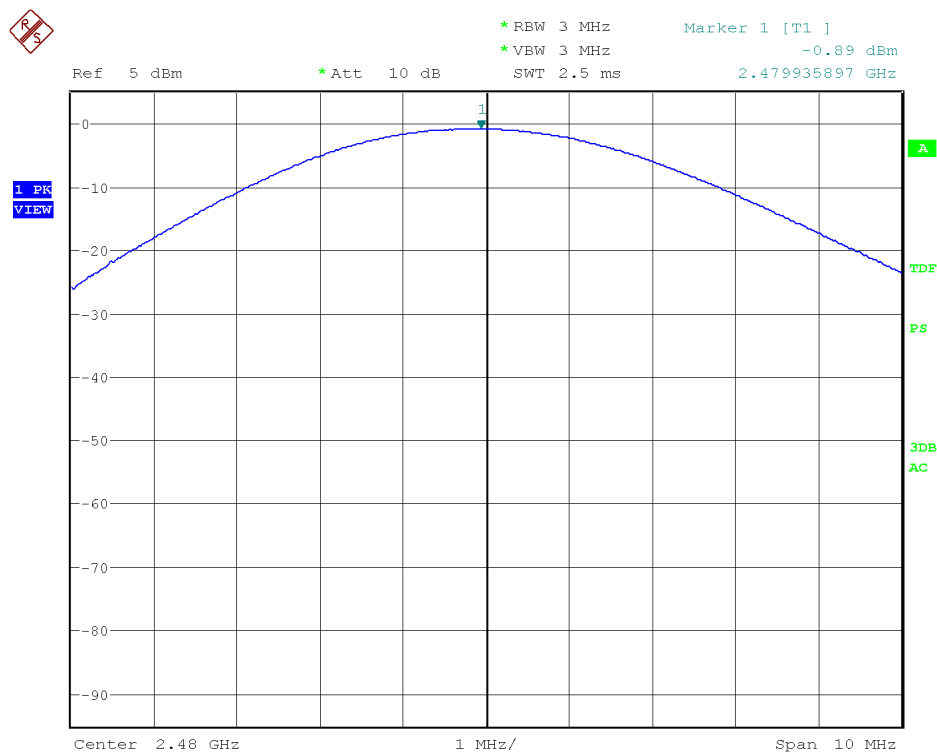
Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (RADIATED).

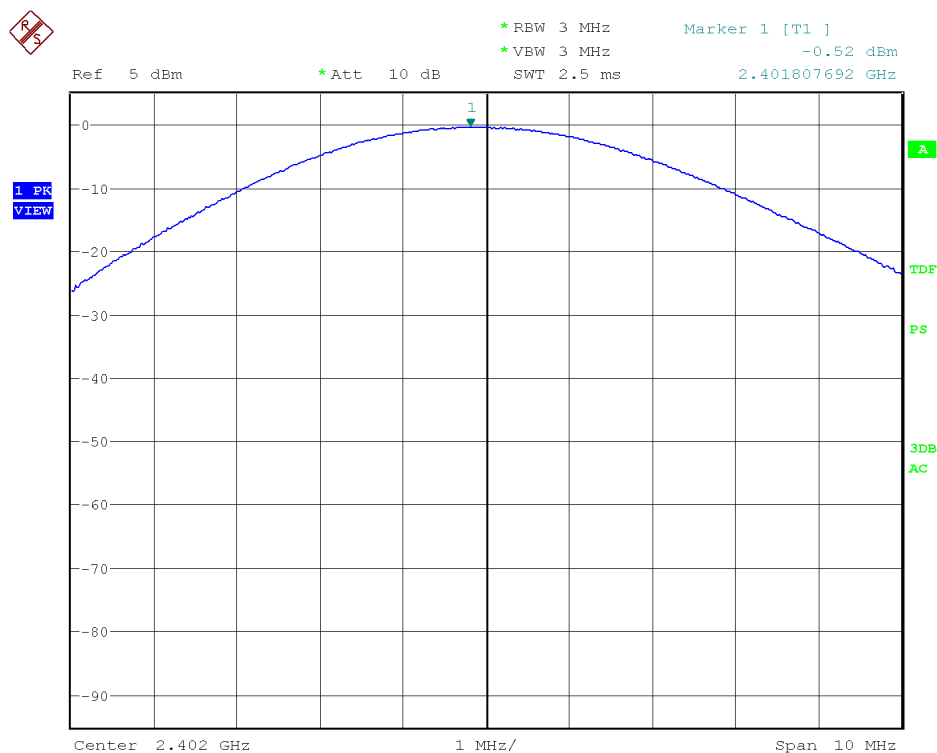
Modulation: GFSK

Highest Channel: 2480 MHz.



Modulation: $\Pi/4$ -DQPSK

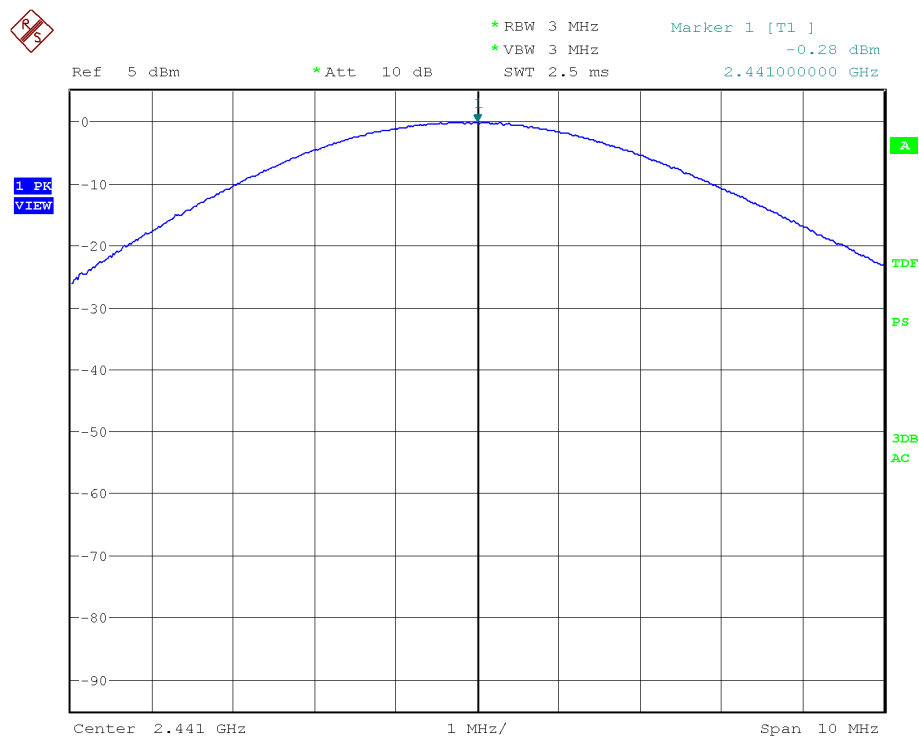
Lowest Channel: 2402 MHz.



PEAK OUTPUT POWER (RADIATED).

Modulation: $\Pi/4$ -DQPSK

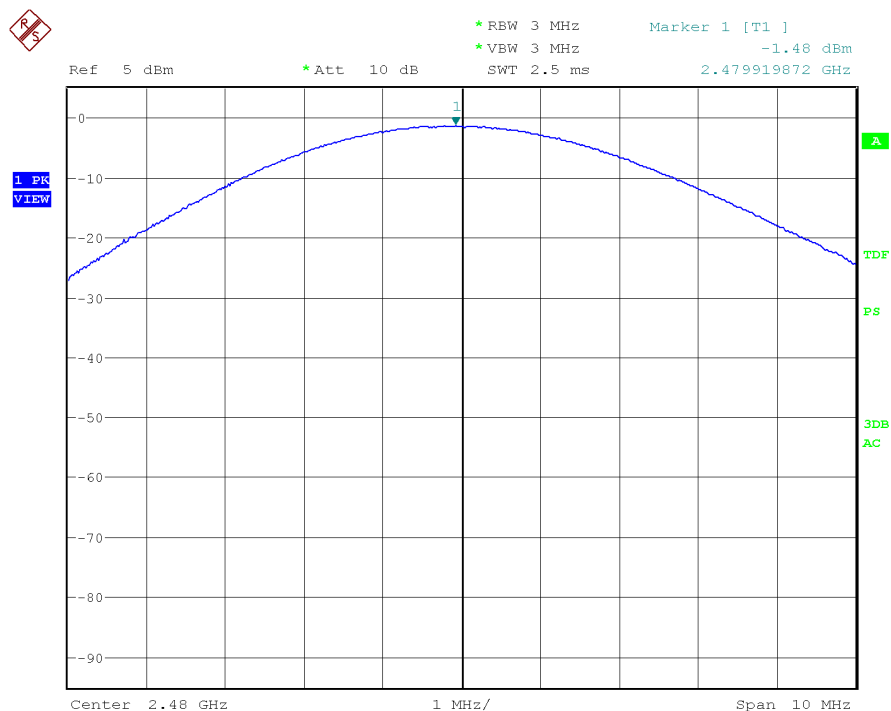
Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (RADIATED).

Modulation: $\Pi/4$ -DQPSK

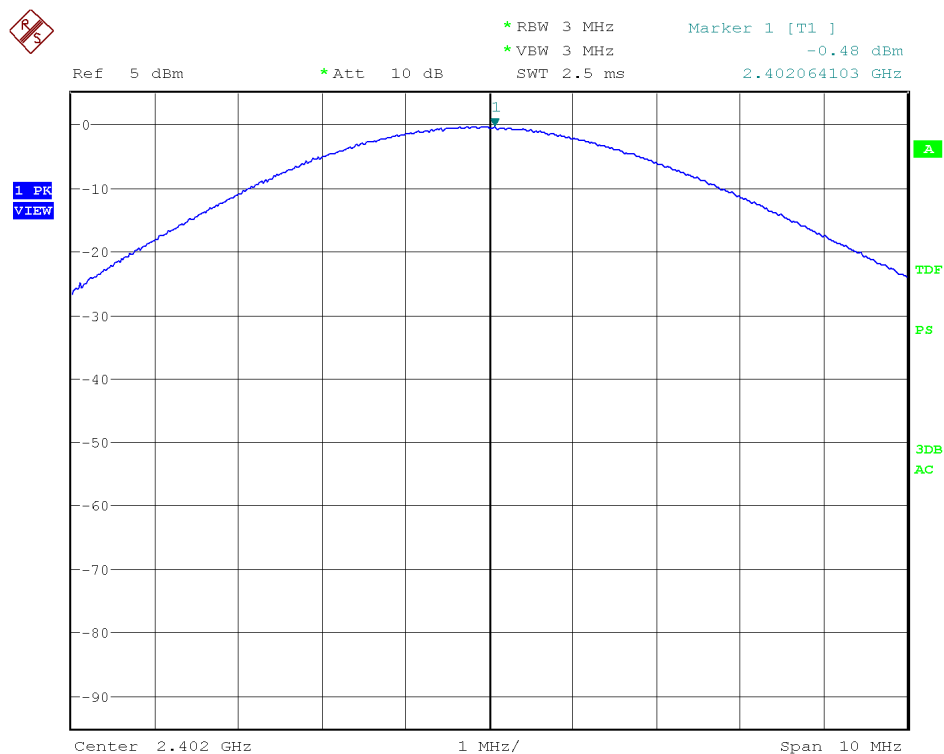
Highest Channel: 2480 MHz.



PEAK OUTPUT POWER (RADIATED).

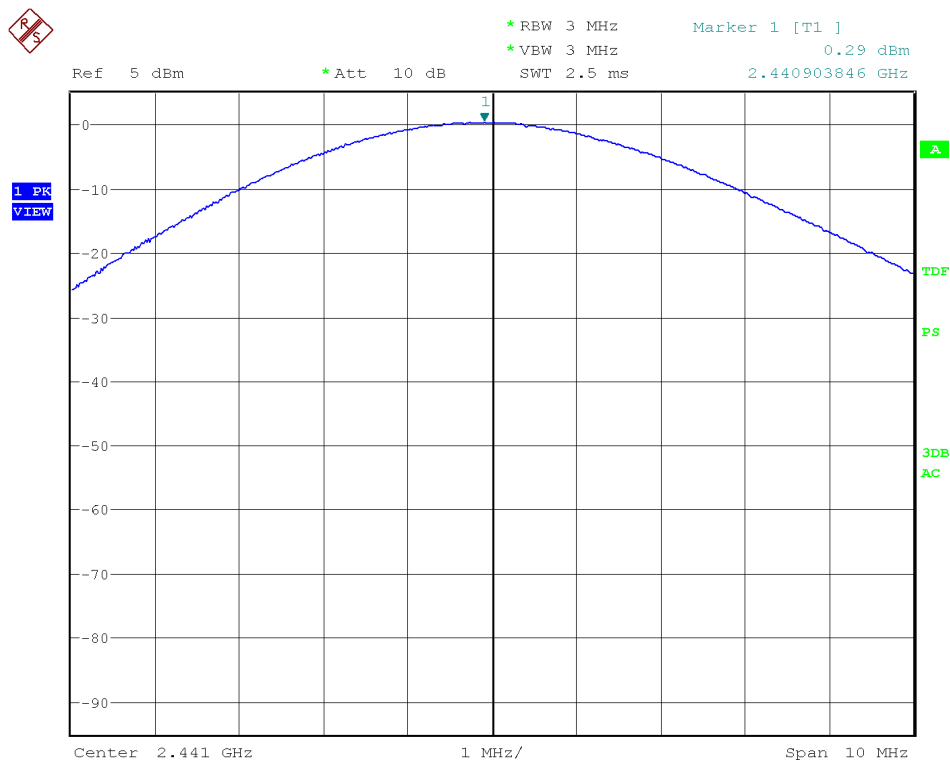
Modulation: 8-DPSK

Lowest Channel: 2402 MHz.



Modulation: 8-DPSK

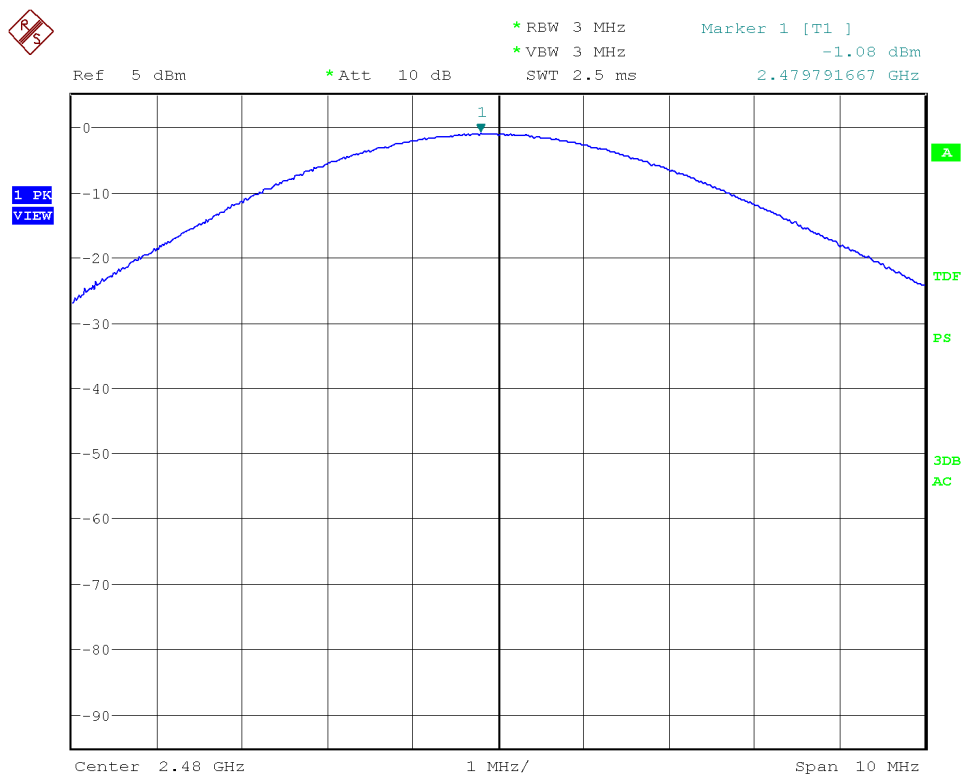
Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (RADIATED).

Modulation: 8-DPSK

Highest Channel: 2480 MHz.



Section 15.247 Subclause (d). Band-edge emissions compliance (Transmitter)

SPECIFICATION:

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

RESULTS:

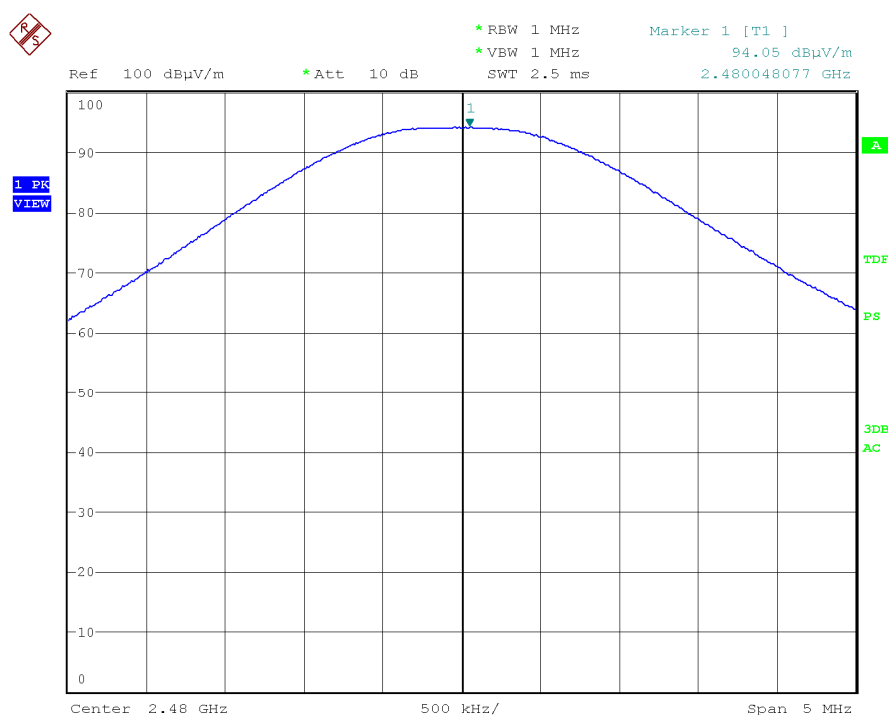
Band-edge compliance of radiated emissions

Maximum peak and average field strength of fundamental emission at 3 m distance

HIGHEST CHANNEL (2480 MHz):

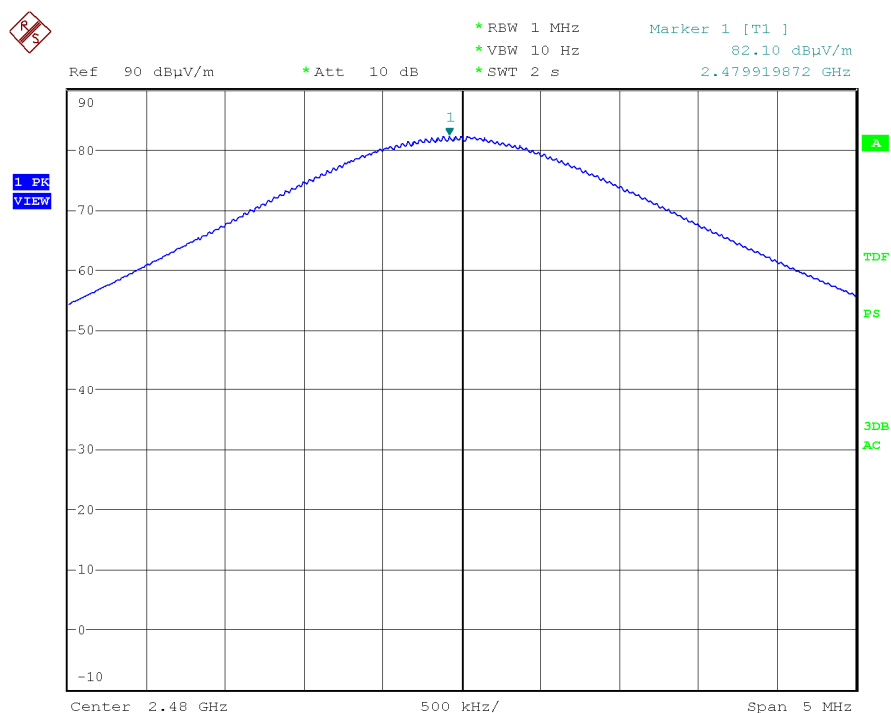
Modulation: GFSK

Maximum field strength at 3 m. Peak value.



Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

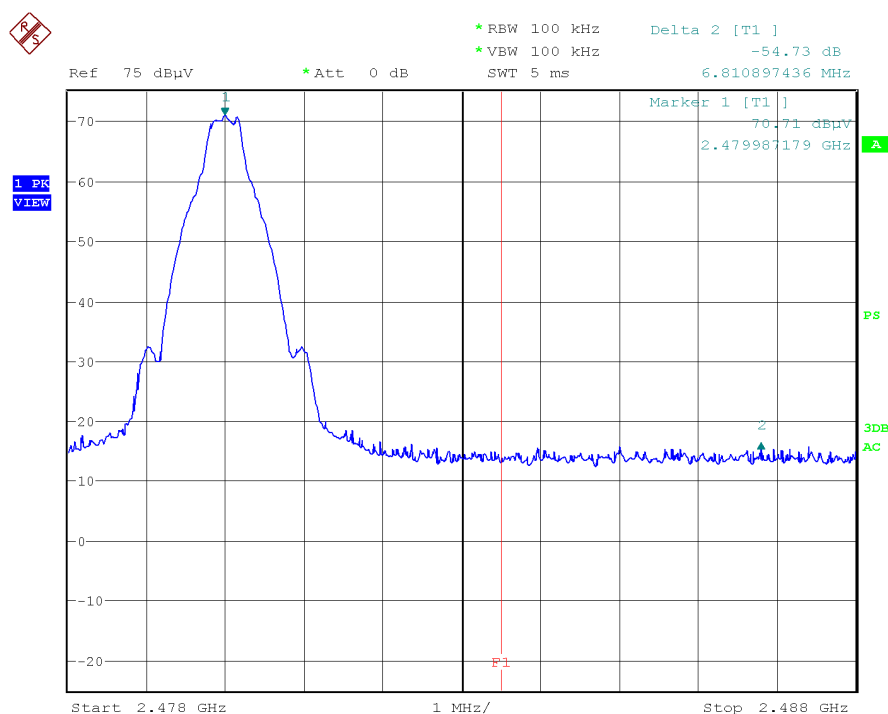
Maximum field strength at 3 m. Average value.



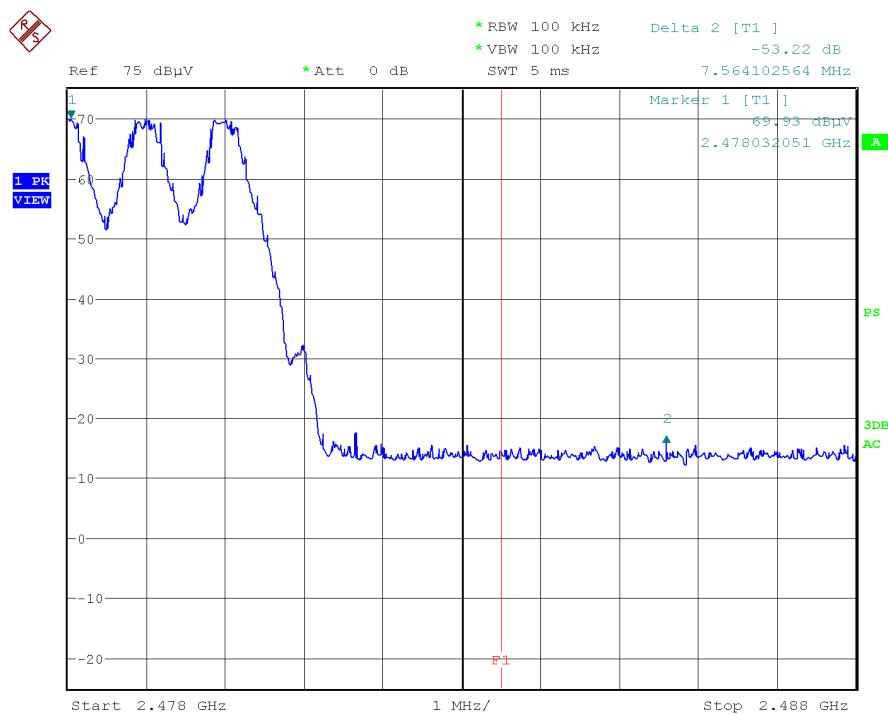
Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

BAND-EDGE COMPLIANCE. RADIATED. Marker-Delta Method.

Single carrier



Hopping mode



Note: No correction is applied for this relative measurement.

Band edge compliance of radiated emissions

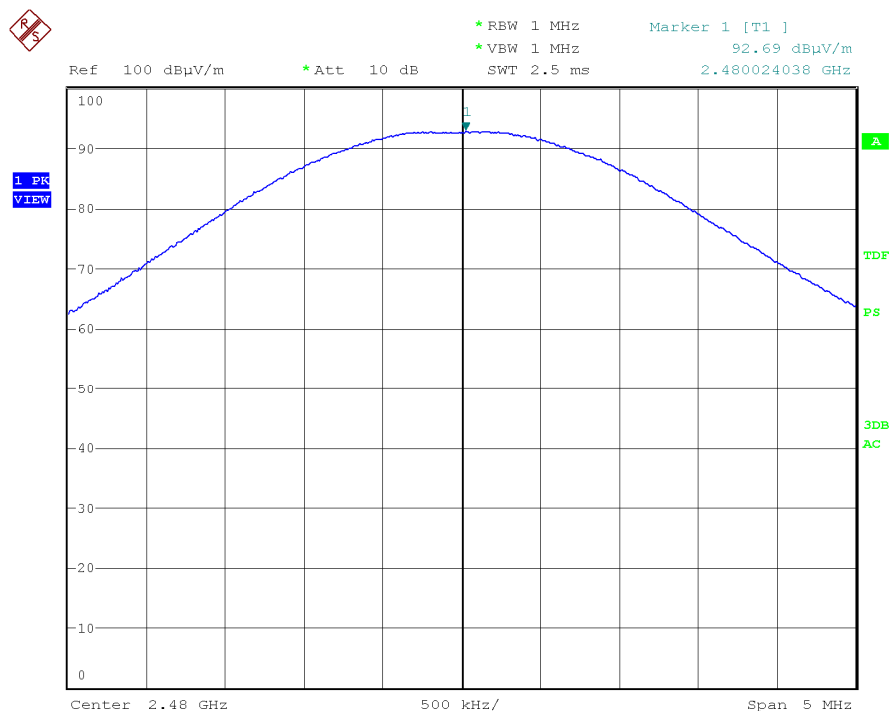
Fundamental max. average value 3 m	Delta value	Calculated value 3 m	Limit
82.10 dB μ V/m	54.73 dB (single carrier) 53.22 dB (hopping mode)	27.37 dB μ V/m (single carrier) 28.88 dB μ V/m (hopping mode)	54 dB μ V/m

Fundamental max. Peak value 3 m	Delta value	Calculated value 3 m	Limit
94.05 dB μ V/m	54.73 dB (single carrier) 53.22 dB (hopping mode)	39.32 dB μ V/m (single carrier) 40.83 dB μ V/m (hopping mode)	74 dB μ V/m

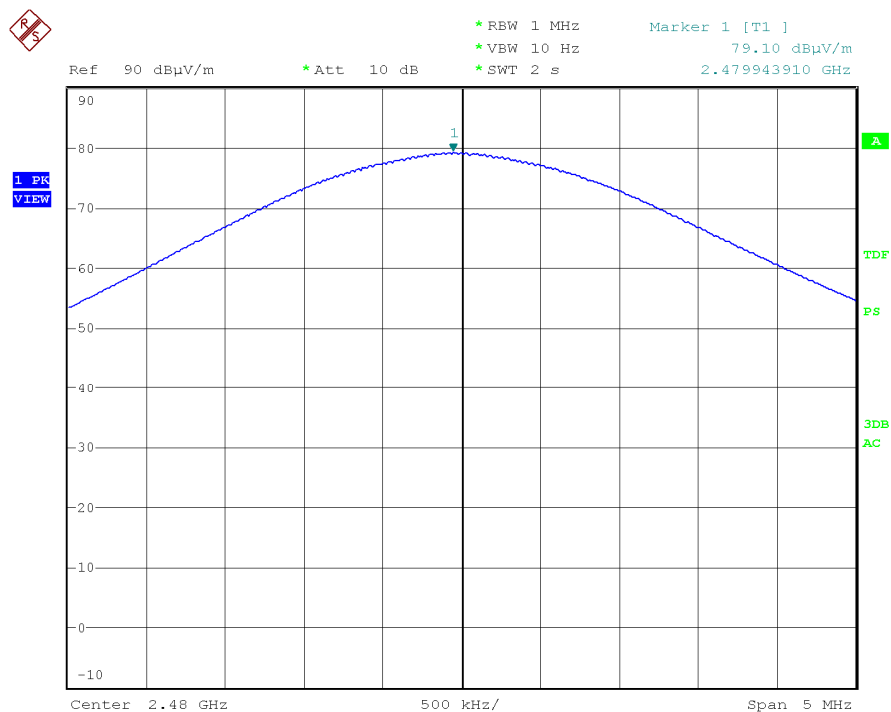
Verdict: PASS

Modulation: $\Pi/4$ -DQPSK

Maximum field strength at 3 m. Peak value.



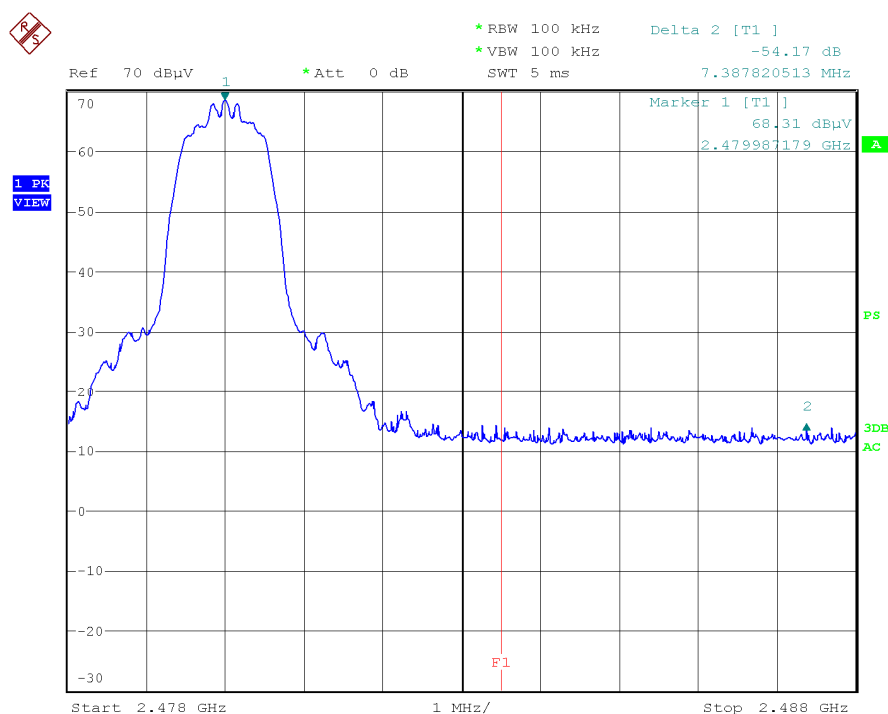
Maximum field strength at 3 m. Average value.



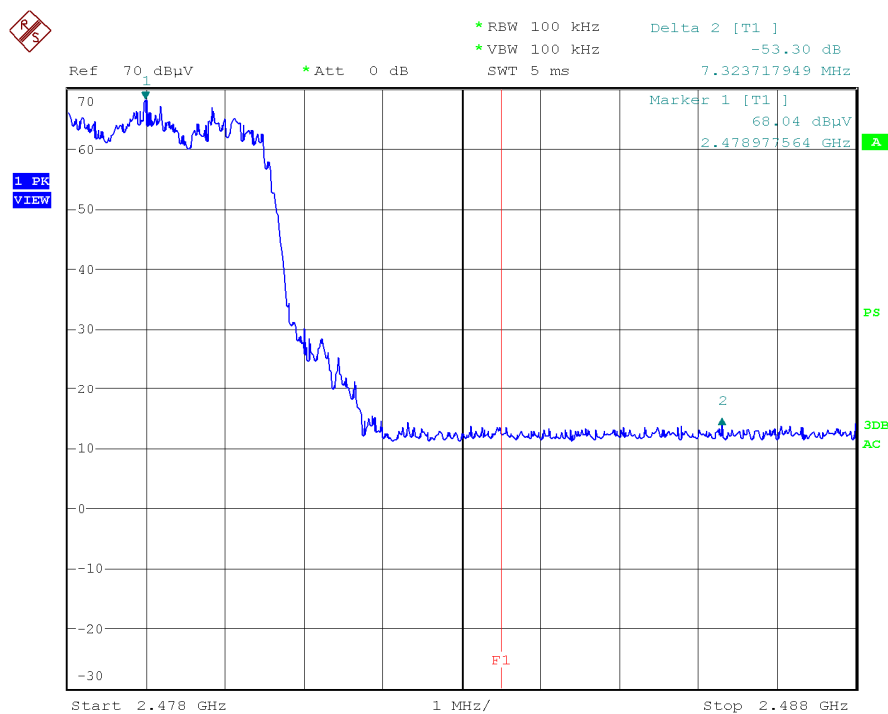
Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

BAND-EDGE COMPLIANCE. RADIATED. Marker-Delta Method.

Single carrier



Hopping mode



Note: No correction is applied for this relative measurement.

Band edge compliance of radiated emissions

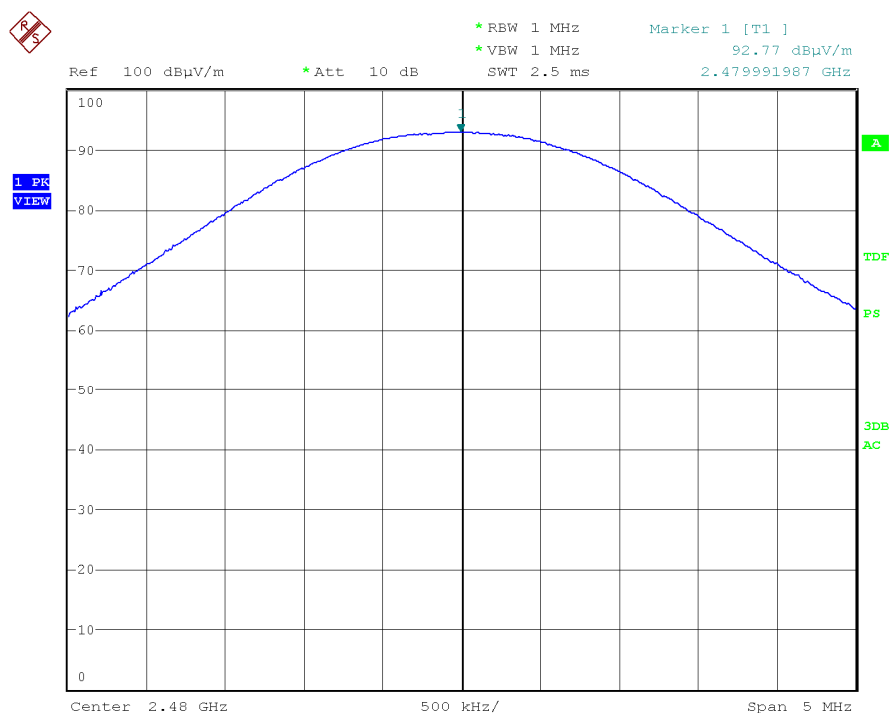
Fundamental max. average value 3 m	Delta value	Calculated value 3 m	Limit
79.10 dB μ V/m	54.17 dB (single carrier) 53.30 dB (hopping mode)	24.93 dB μ V/m (single carrier) 25.80 dB μ V/m (hopping mode)	54 dB μ V/m

Fundamental max. Peak value 3 m	Delta value	Calculated value 3 m	Limit
92.69 dB μ V/m	54.17 dB (single carrier) 53.30 dB (hopping mode)	38.52 dB μ V/m (single carrier) 39.39 dB μ V/m (hopping mode)	74 dB μ V/m

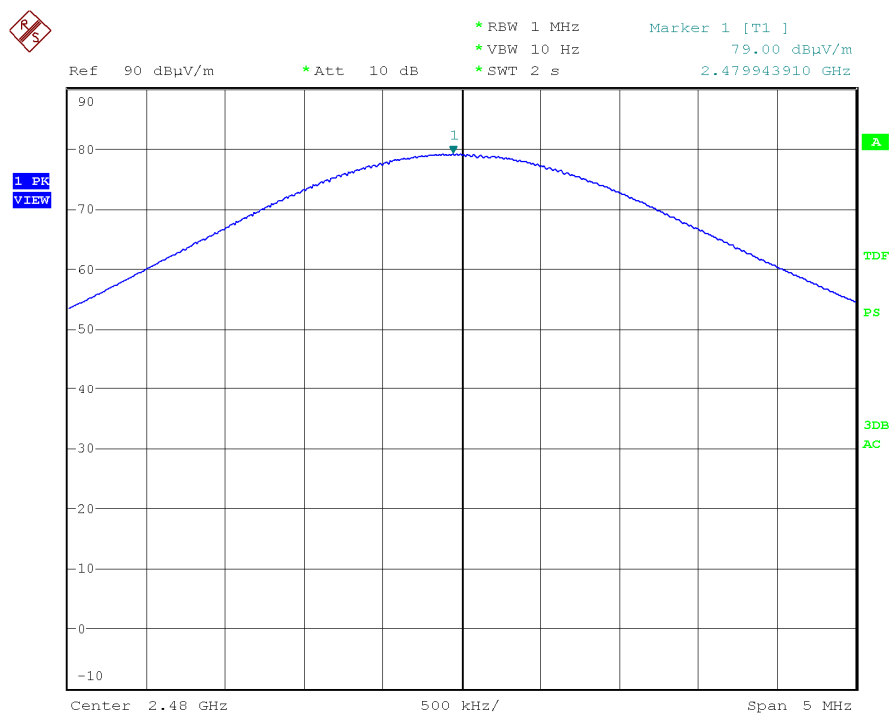
Verdict: PASS

Modulation: 8-DPSK

Maximum field strength at 3 m. Peak value.



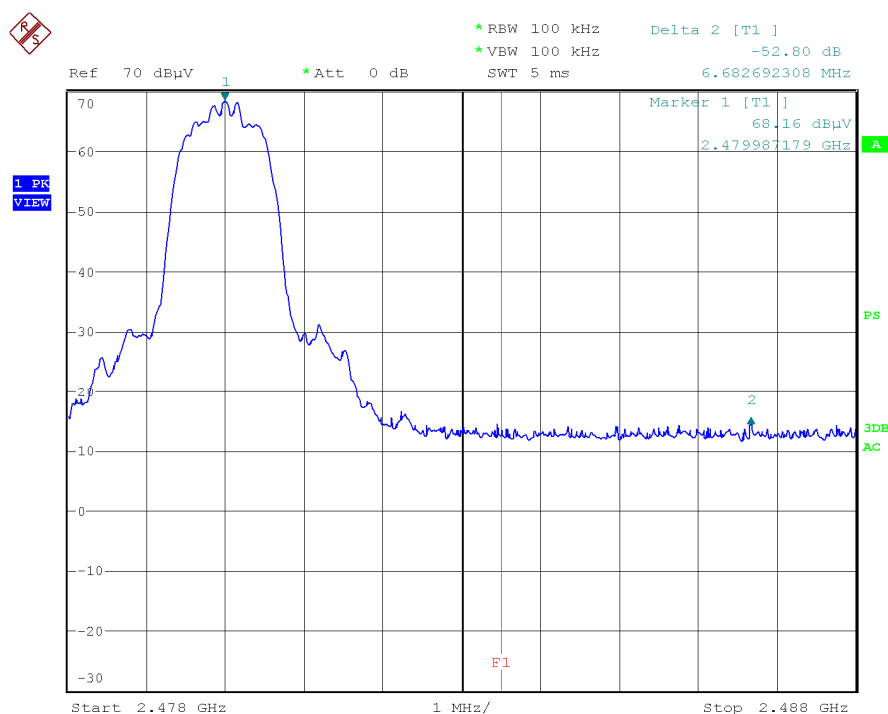
Maximum field strength at 3 m. Average value.



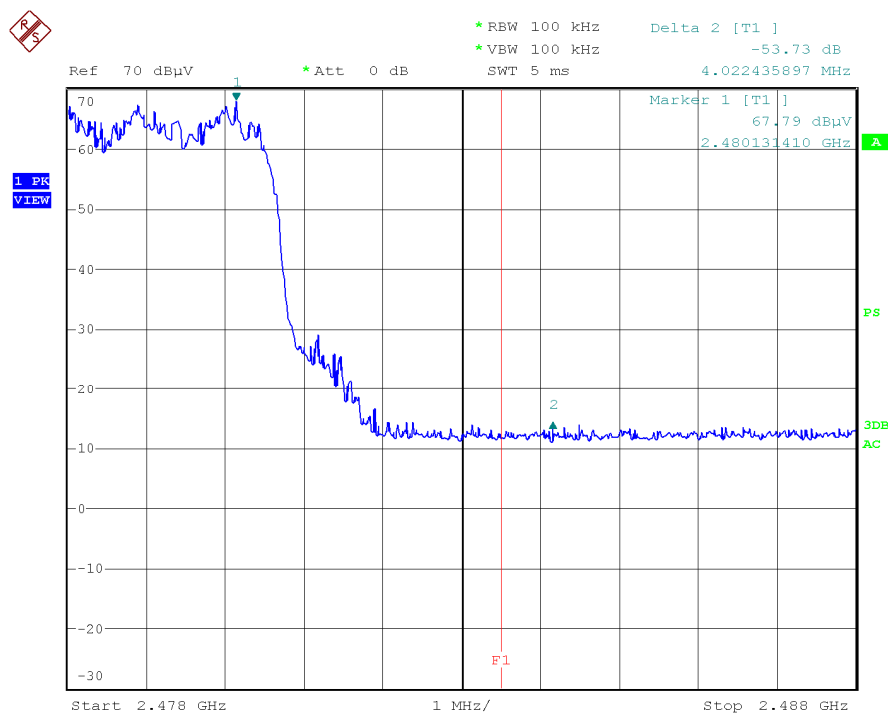
Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

BAND-EDGE COMPLIANCE. RADIATED. Marker-Delta Method.

Single carrier



Hopping mode



Note: No correction is applied for this relative measurement.

Band edge compliance of radiated emissions

Fundamental max. average value 3 m	Delta value	Calculated value 3 m	Limit
79.00 dB μ V/m	52.80 dB (single carrier) 53.73 dB (hopping mode)	26.20 dB μ V/m (single carrier) 25.27 dB μ V/m (hopping mode)	54 dB μ V/m

Fundamental max. Peak value 3 m	Delta value	Calculated value 3 m	Limit
92.77 dB μ V/m	52.80 dB (single carrier) 53.73 dB (hopping mode)	39.97 dB μ V/m (single carrier) 39.04 dB μ V/m (hopping mode)	74 dB μ V/m

Verdict: PASS

Section 15.247 Subclause (d). 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 ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	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.

The equipment transmits continuously in the selected channel so it is not necessary a duty cycle correction factor.

Frequency range 30 MHz-1000 MHz.

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

Spurious levels operating (radiated).

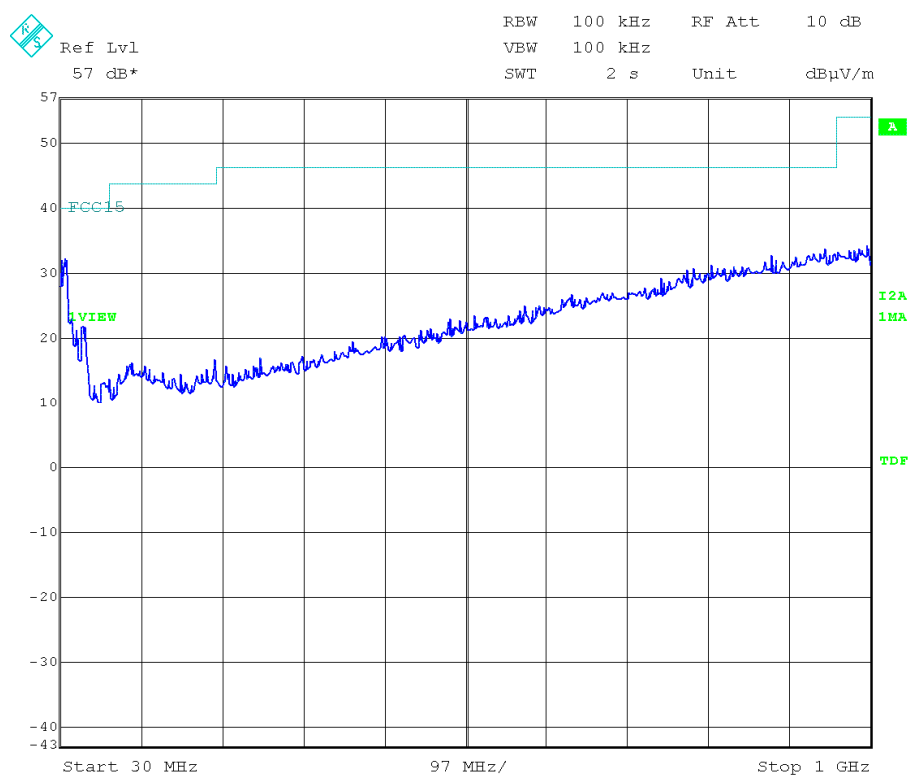
Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
35.8317	V	Quasi-peak	29.83	± 3.8
57.2144	V	Quasi-peak	20.57	± 3.8

Frequency range 1 GHz-25 GHz

No spurious signals found in all the range for all modulation modes.

Additionally, no spurious signals were found inside the restricted bands 2310-2390 MHz and 2483.5-2500 MHz and at the harmonic frequencies for the three operating channels and modulation modes.

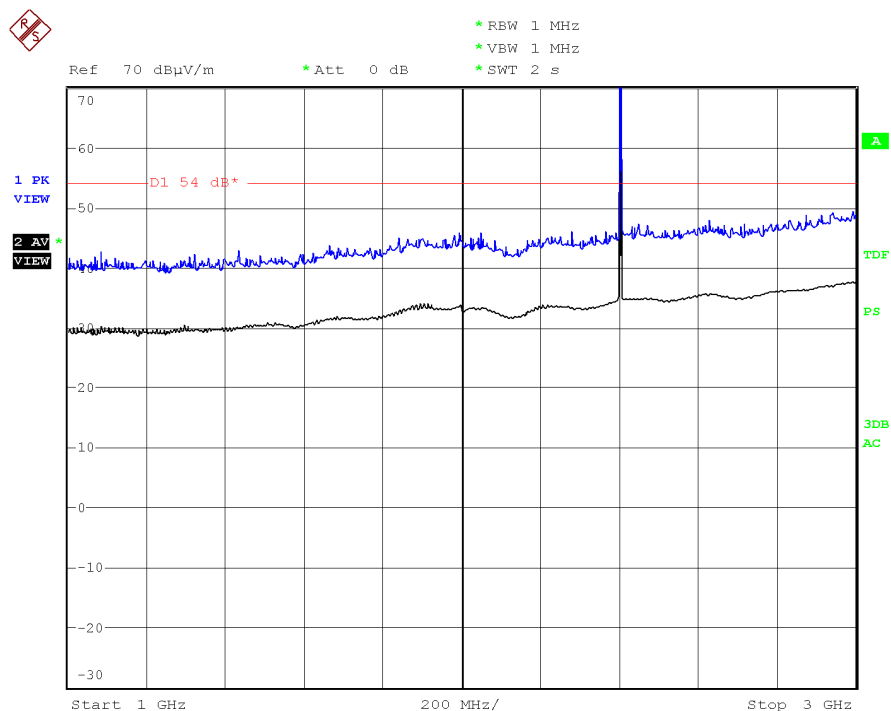
FREQUENCY RANGE 30 MHz-1000 MHz.



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

FREQUENCY RANGE 1 GHz to 3 GHz.

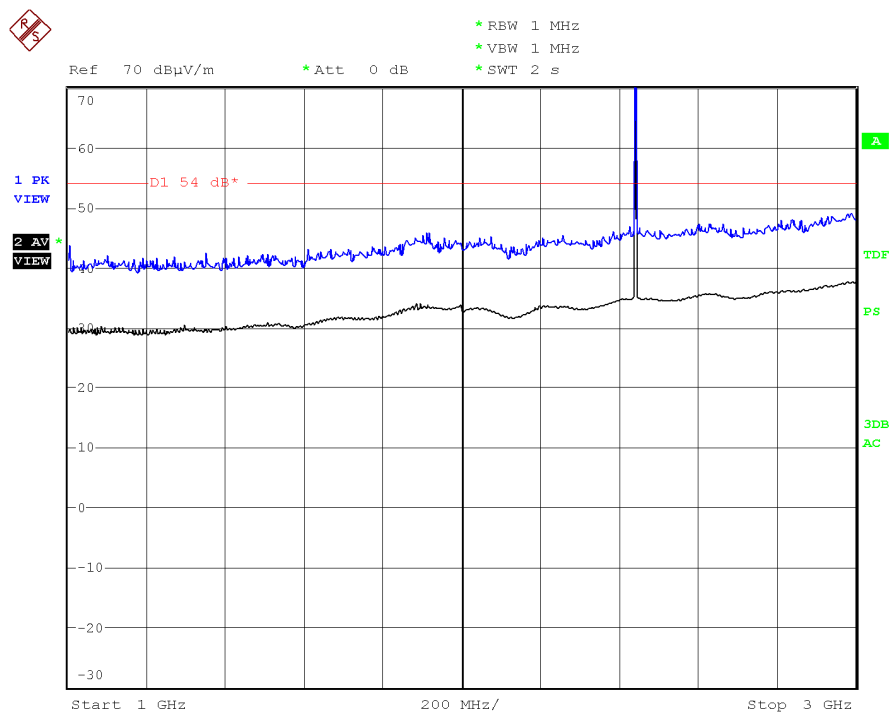
CHANNEL: Lowest (2402 MHz).



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

(This plot is valid for all modulation modes).

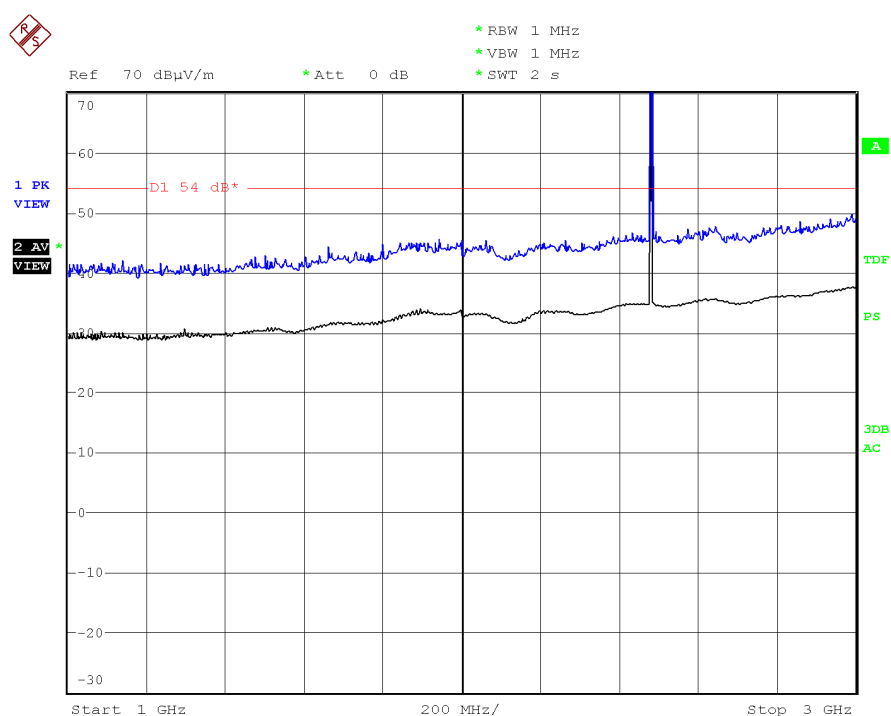
CHANNEL: Middle (2441 MHz).



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

(This plot is valid for all modulation modes).

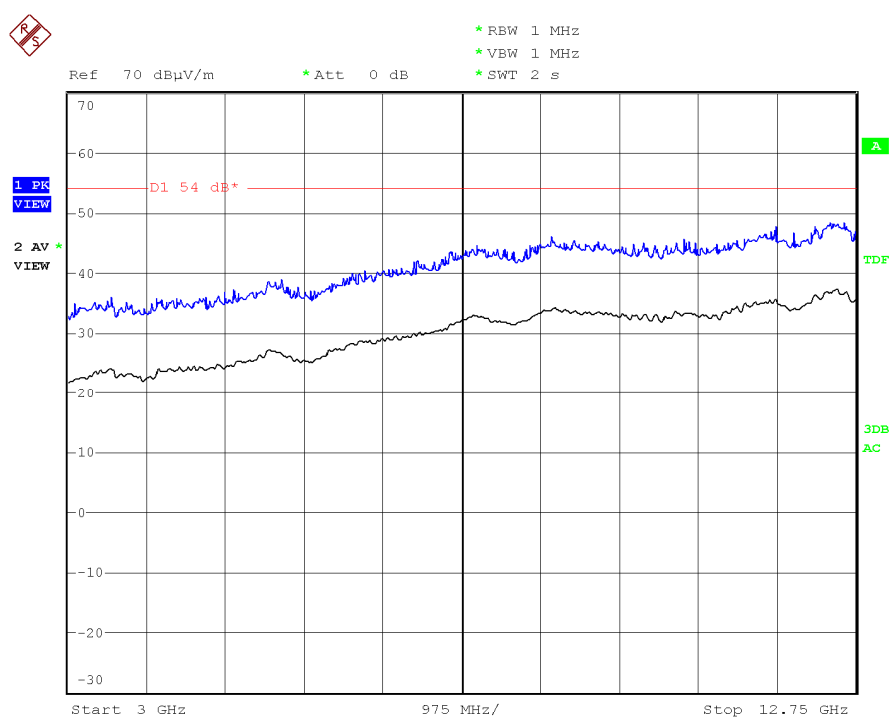
CHANNEL: Highest (2480 MHz).



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

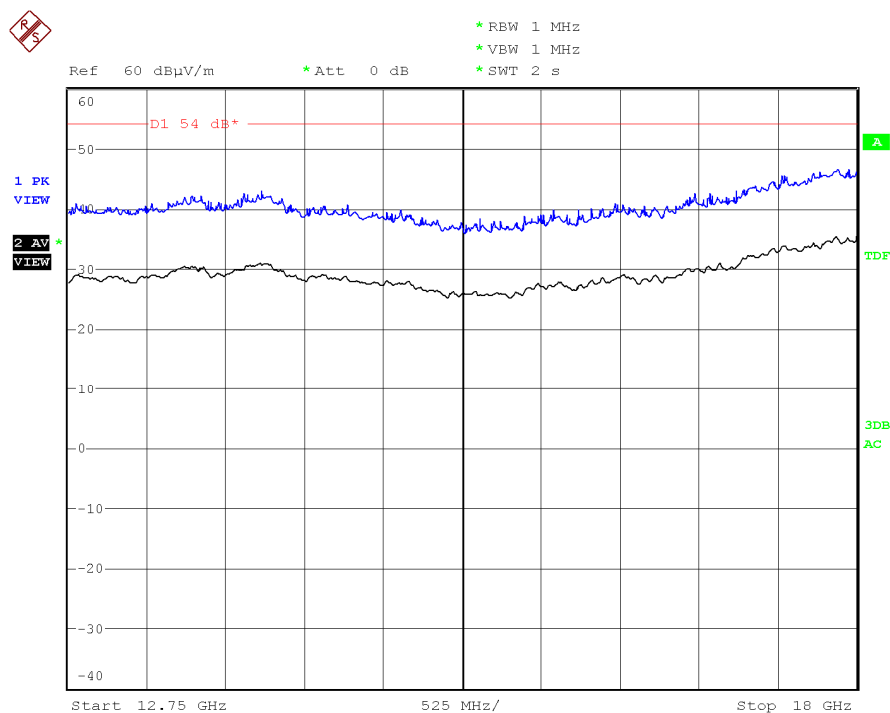
(This plot is valid for all modulation modes).

FREQUENCY RANGE 3 GHz to 12.75 GHz.



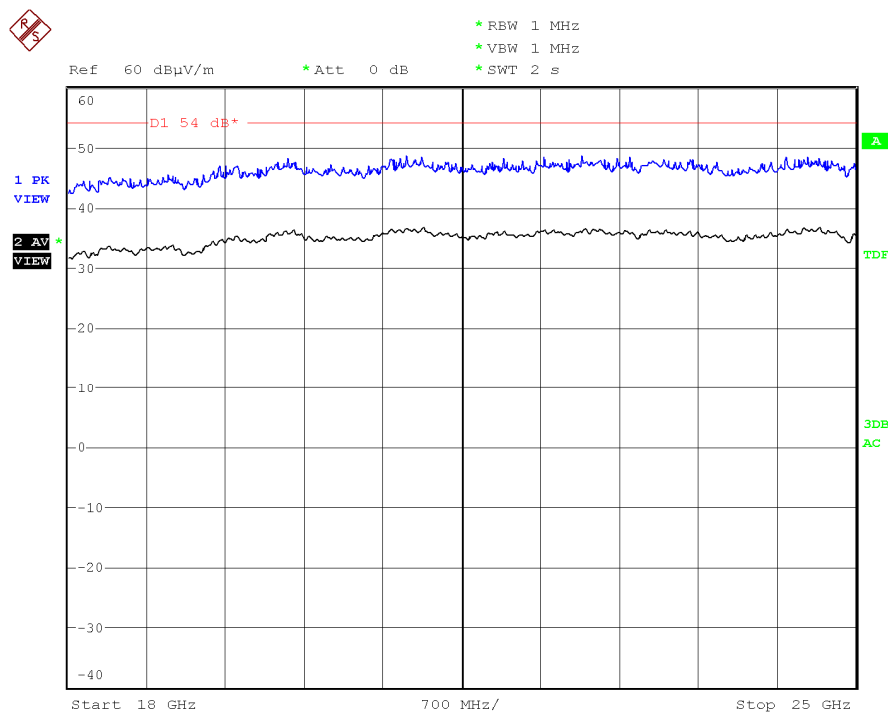
(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 12.75 GHz to 18 GHz.



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

FREQUENCY RANGE 18 GHz to 25 GHz.

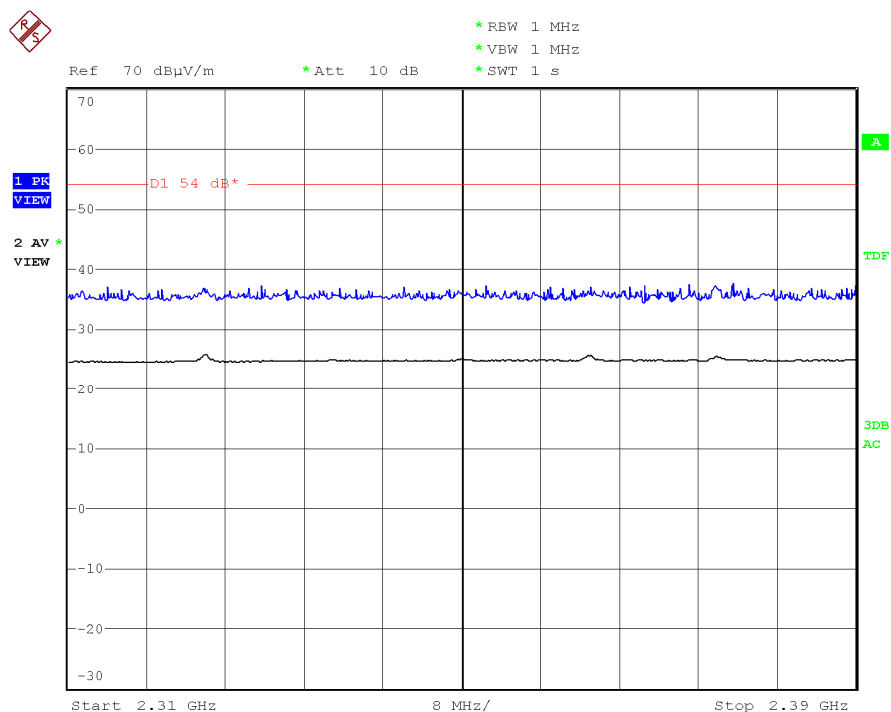


(This plot is valid for all three channels and all modulation modes).

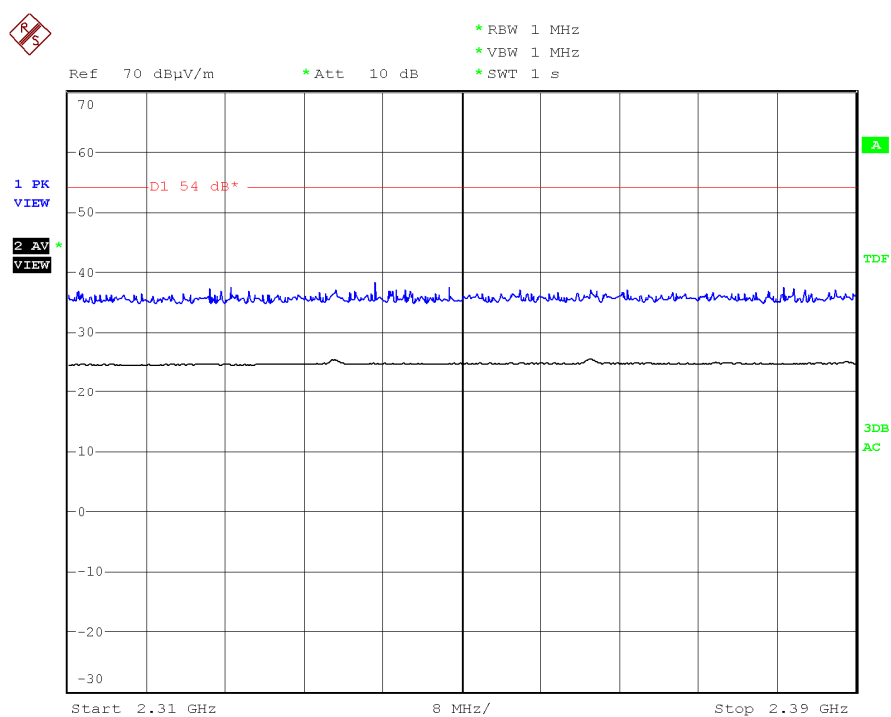
FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

Modulation: GFSK

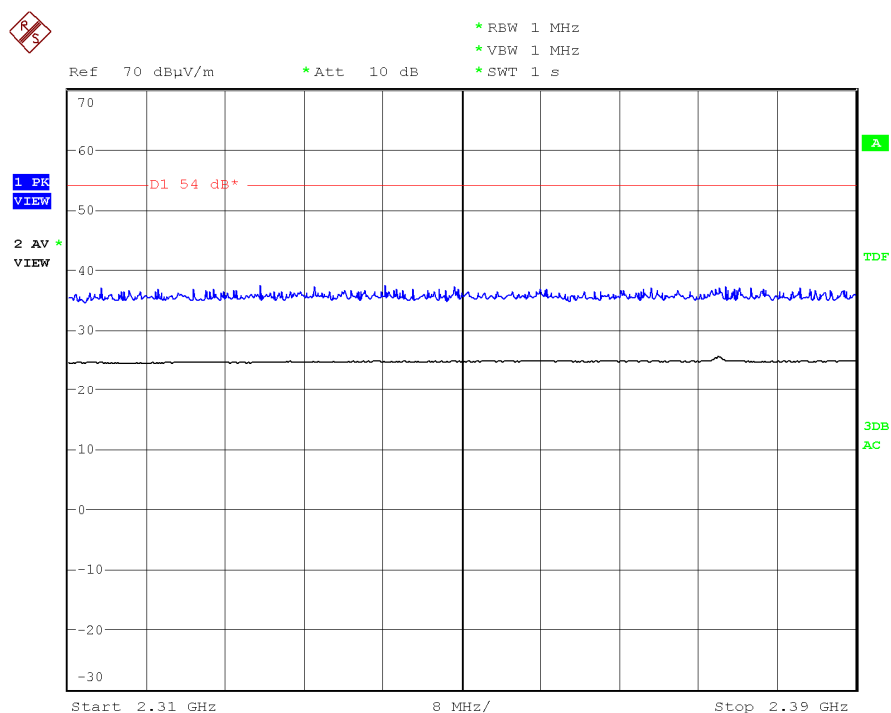
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).

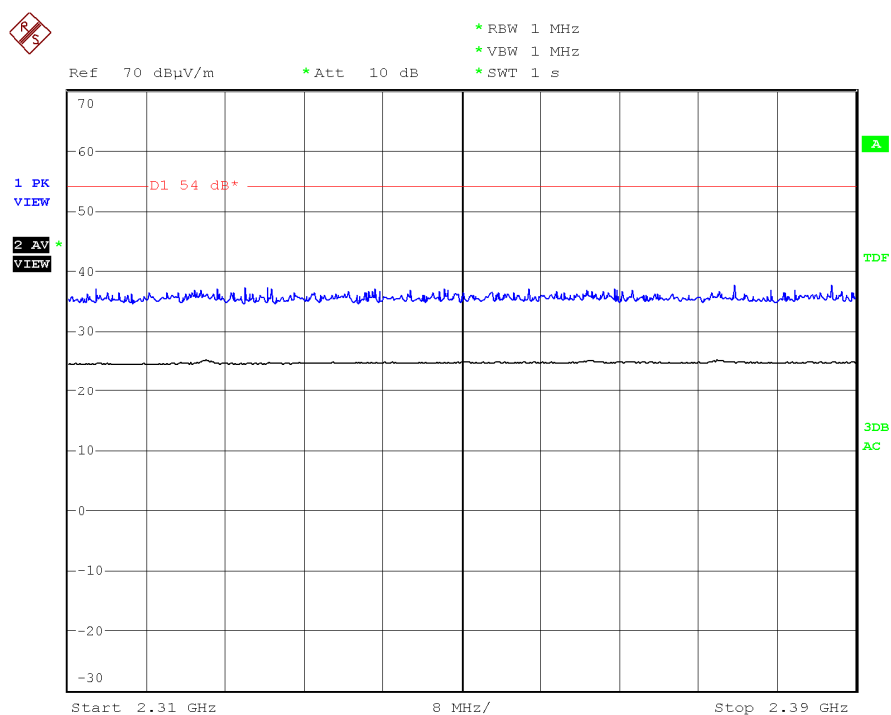


CHANNEL: Highest (2480 MHz).

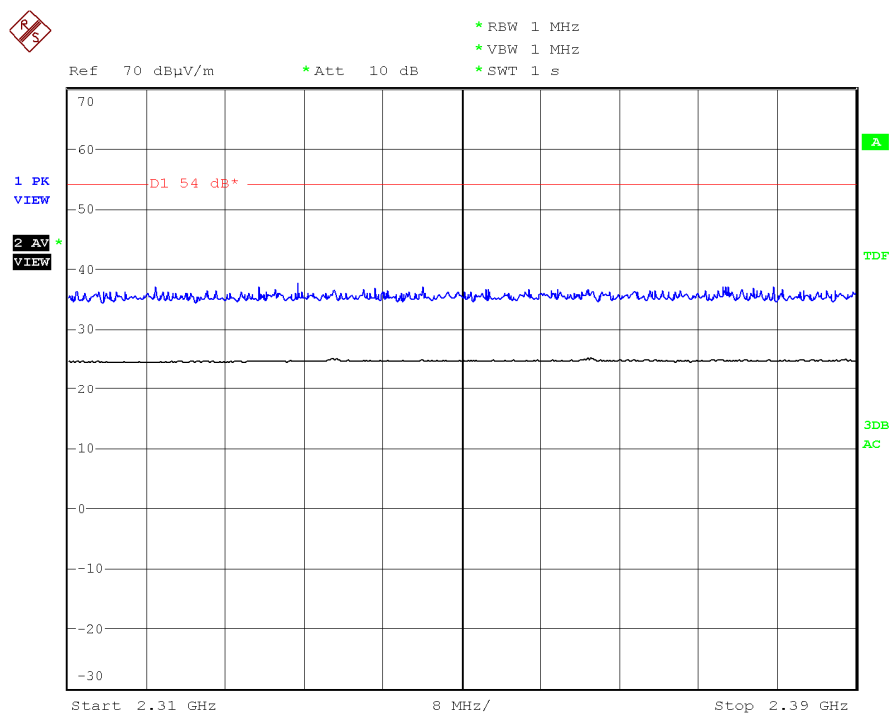


Modulation: $\pi/4$ -DQPSK

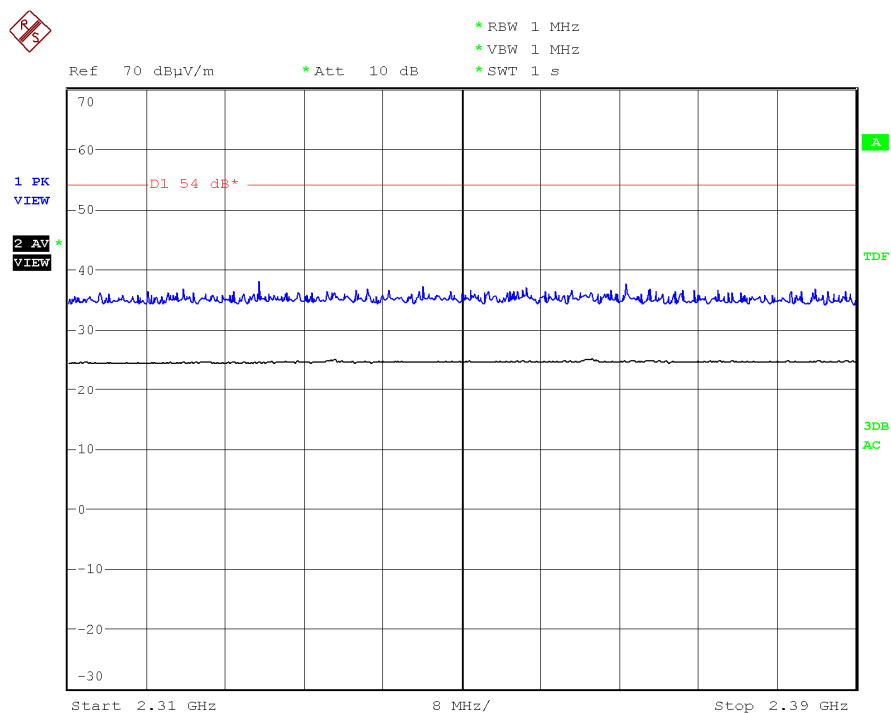
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).

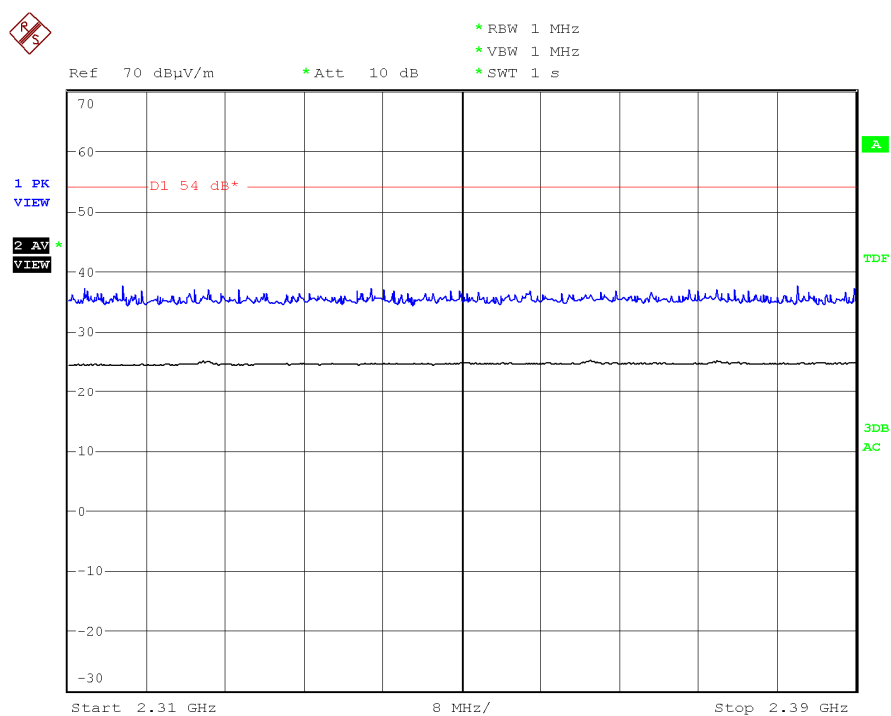


CHANNEL: Highest (2480 MHz).

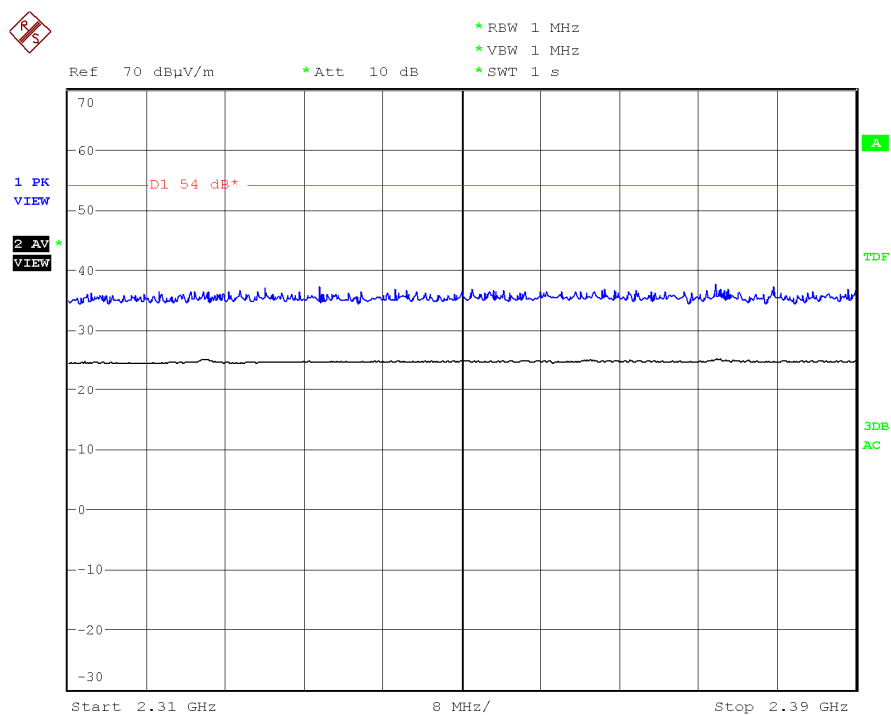


Modulation: 8-DPSK

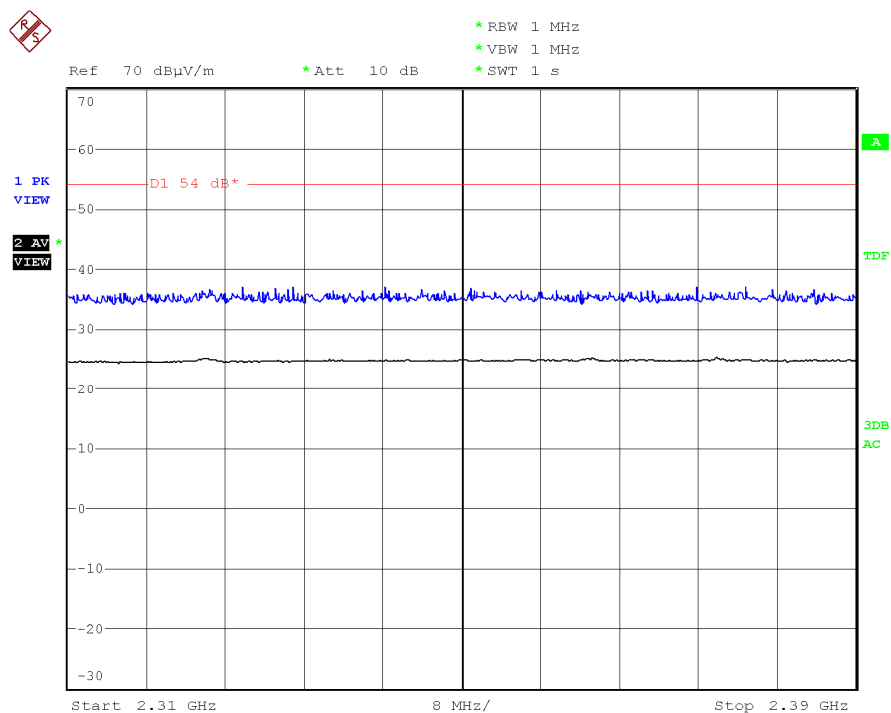
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).



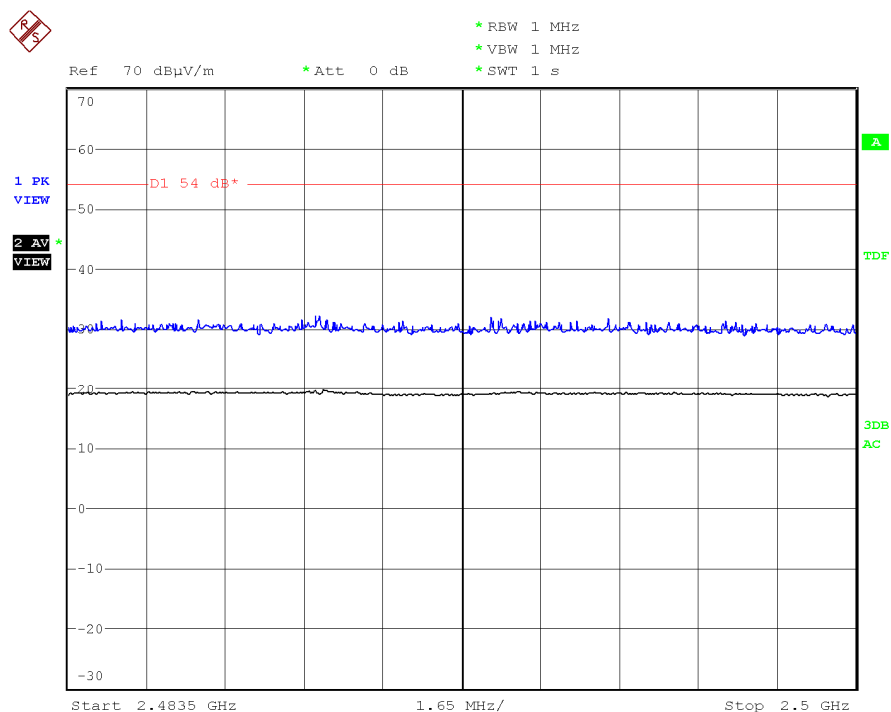
CHANNEL: Highest (2480 MHz).



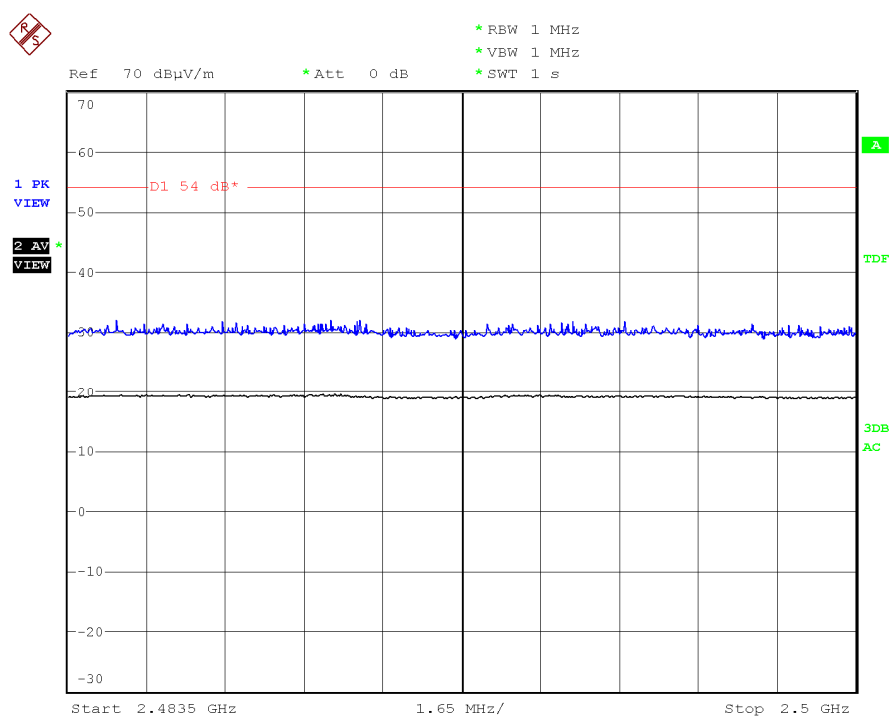
FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)

Modulation: GFSK

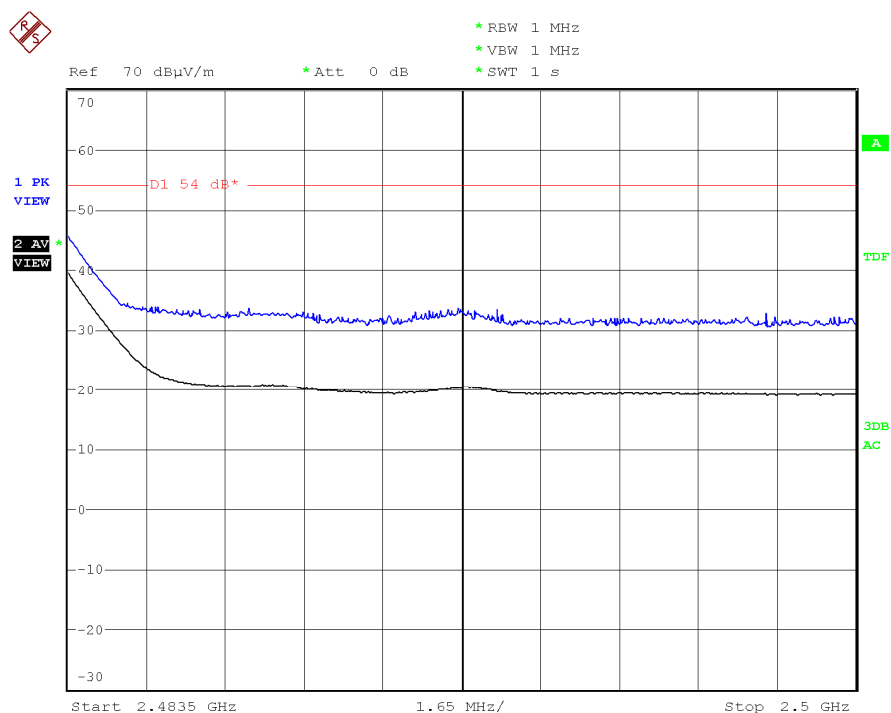
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).

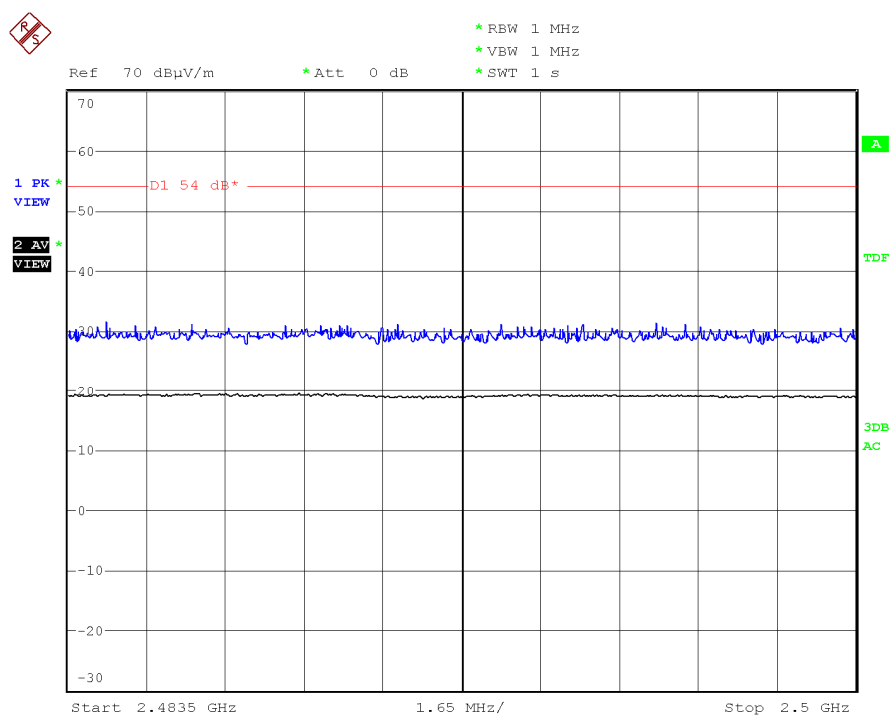


CHANNEL: Highest (2480 MHz).

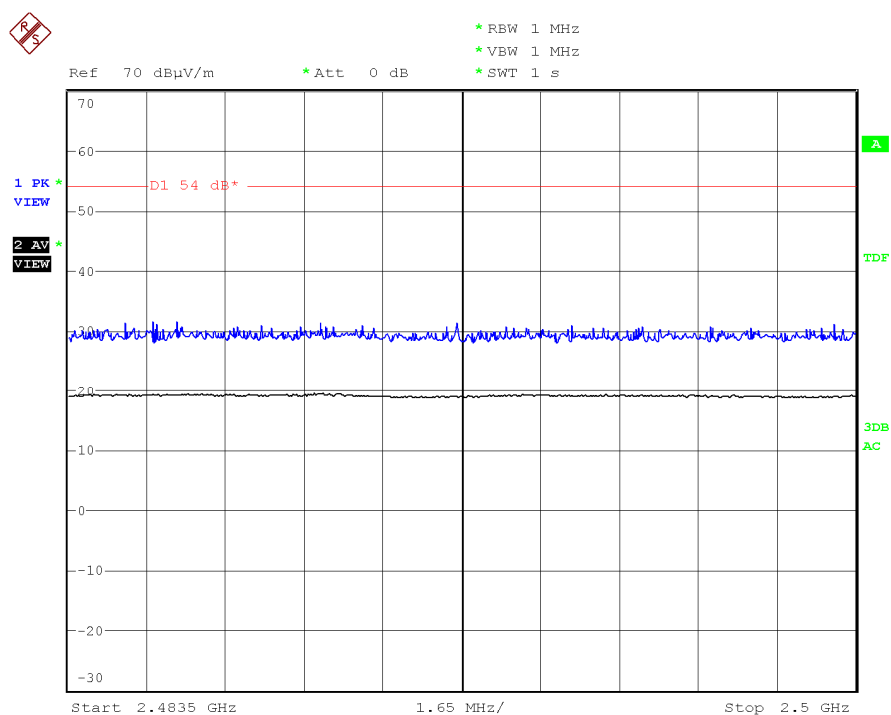


Modulation: $\Pi/4$ -DQPSK

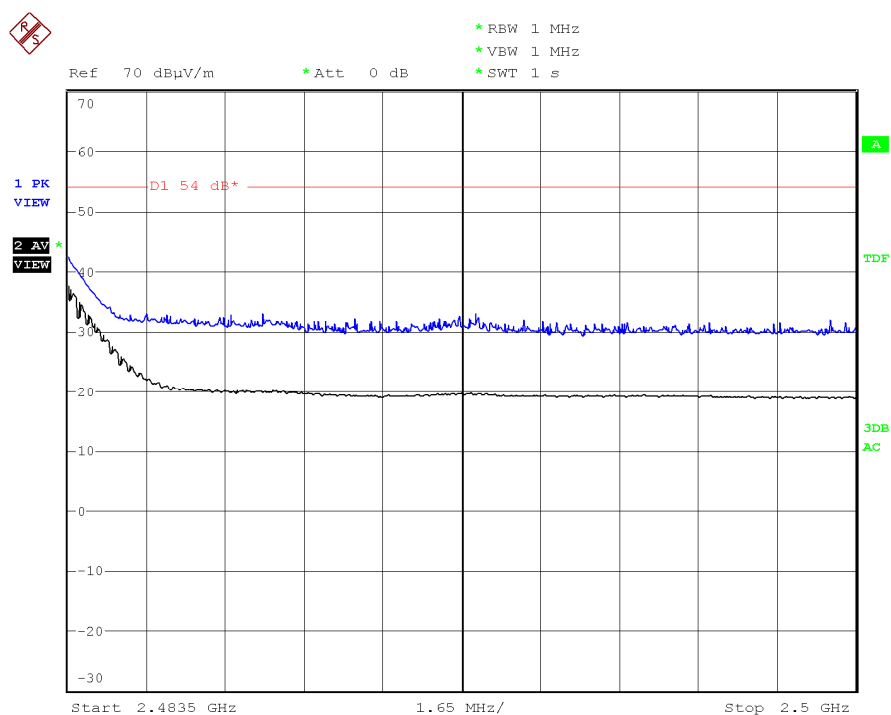
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).

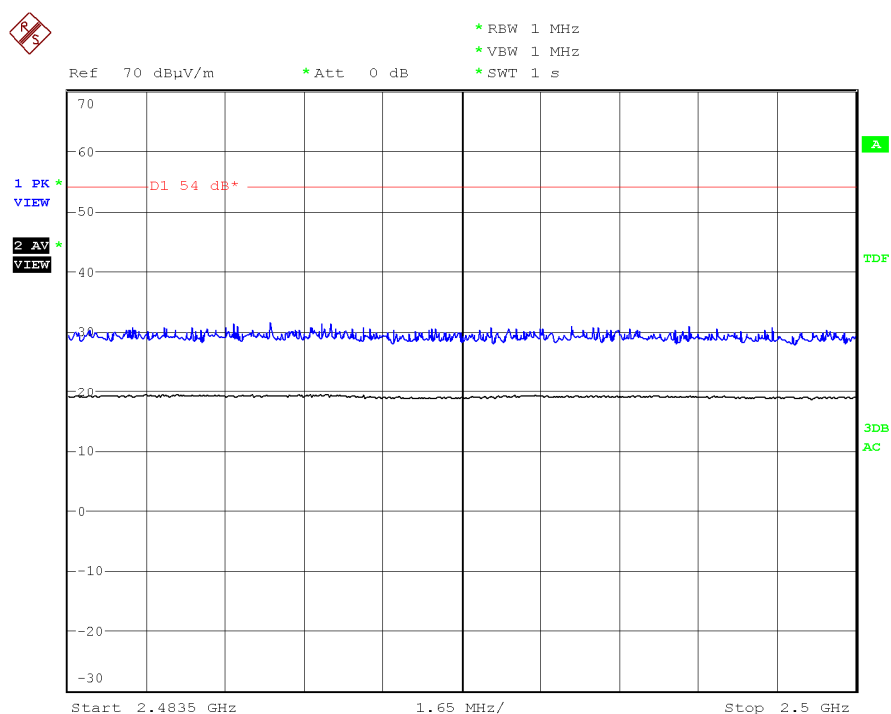


CHANNEL: Highest (2480 MHz).

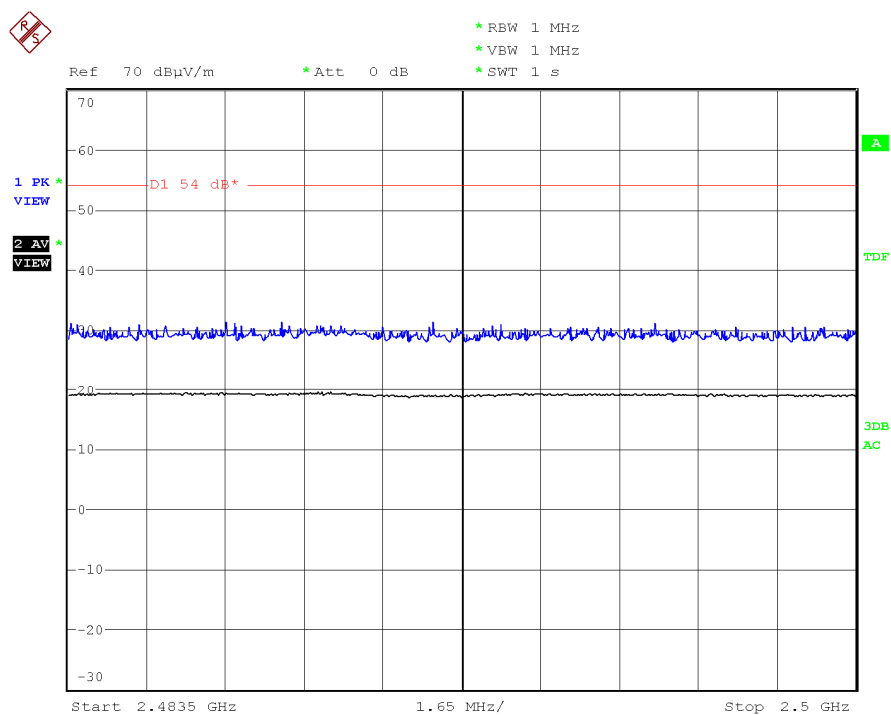


Modulation: 8-DPSK

CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).



CHANNEL: Highest (2480 MHz).

