FCC Part 15C Compliance Test Report
Bluetooth

Test Report no.:	EMC_BO_001737	**Date of Report:**	06-Aug-2012
Number of pages:	53	**Project support engineer:**	Robert Müller

Customer:	Novero GmbH, Meesmannstr. 103, 44807 Bochum, Germany		
Customers contact:	Jürgen Hindersmann		
Manufacturer	Novero GmbH		
EUT ident.:	**Hands-Free Unit with Bluetooth, WLAN and GSM/WCDMA, HT-5**		
FCC ID	WJLHT-5	**IC:**	7847A-HT5

Referred documents:	CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), Public Notice DA 00-705, IC standards RSS-GEN and RSS-210. Deviations or clarifications to these standards are noted in the related test result under “test method and limit”.

Testing Laboratory:	novero Test Center, Meesmannstr.103, 44807 Bochum, Germany			
	Tel.:	+49 234/51668-0	Fax.:	+49 234 51668 4880
	FCC listing no.:	881111	IC recognition no.:	7847A-1
	Laboratory manager:	Jürgen Mitterer		

Test result	The EUT complies with the requirements made in the referred test documents.

Date and signature:

Digitally signed by Juergen Mitterer
DN: cn=Juergen Mitterer, o=novero, ou=QVC, email=jurgen.mitterer@novero.com, c=DE
Date: 2012.08.22 09:44:48 +02'00'

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	16-April-2012
Testing completed	13-May-2012
The customer's contact person	Jürgen Hindersmann
Notes	None

1.1. EUT and Accessory Information

The EUT is a DC powered GSM850/900/1800/1900/FDDI/FDDV with WLAN and Bluetooth device for automotive applications. EUT is tested with maximum rated TX power. EUT has separate BT and WLAN antennas and fixed GSM/FDD antenna connector. No dedicated external antenna specified.

Product	Type	SN	HW	MV	SW	DUT
UHV premium	HT-5	A09737413	X21		X907	GEM010
UHV premium	HT-5	A09738048	X21		X907	GEM013

1.2. Summary of Test Results

Bluetooth:

Section in CFR 47	Section in *RSS-GEN* or RSS-210	Name of the test	Result
15.247(b)(1)	A8.4 (b)	Conducted peak output power	PASSED
15.247(d)	A8.5	Band edge compliance of RF emissions	PASSED
15.247(c)	A8.5	Spurious RF conducted emissions	PASSED
15.247(c), 15.209	A8.5	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	NA
15.247(a)(1)	A8.1 (a)	20 dB / 99% bandwidth	PASSED
15.247(a)(1)	A8.1 (b)	Carrier frequency separation	PASSED
15.247(a)(1)(iii)	A8.1 (d)	Number of hopping frequencies	PASSED
15.247(a)(1)(iii)	A8.1 (d)	Time of occupancy	PASSED

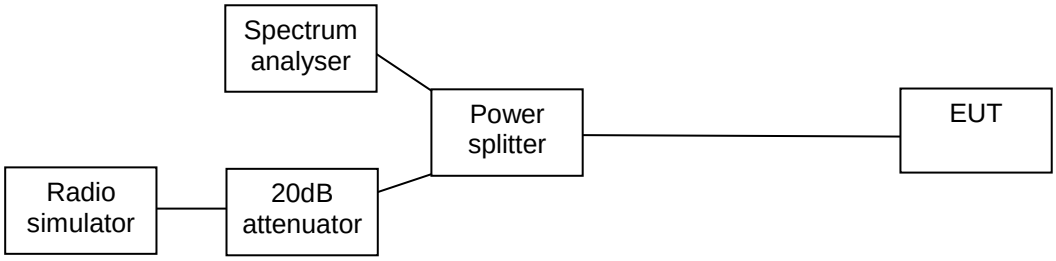
PASSED: The EUT complies with the essential requirements in the standard.
FAILED: The EUT does not comply with the essential requirements in the standard.
NP: The test was not performed.
NA: The test was not applicable

CONTENTS

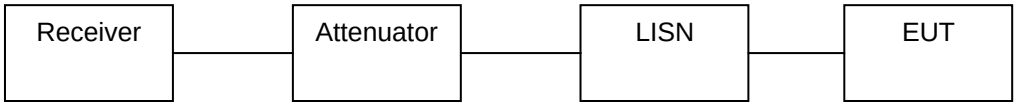
1. SUMMARY FOR FCC PART 15C COMPLIANCE TEST REPORT 2
   1.1. EUT AND ACCESSORY INFORMATION 2
   1.2. SUMMARY OF TEST RESULTS 2
2. TEST SETUPS 4
   2.1. CONDUCTED RF TEST SETUP 4
   2.2. AC POWER LINE CONDUCTED EMISSIONS TEST SETUP 4
   2.3. SPURIOUS RADIATED EMISSIONS TEST SETUP 4
3. CONDUCTED PEAK OUTPUT POWER (FCC §15.247(B)(1), RSS-210 A8.4 (2)) 5
   3.1. TEST METHOD AND LIMIT 5
   3.2. BLUETOOTH TEST RESULTS 6
4. BAND EDGE COMPLIANCE OF RF EMISSIONS (FCC §15.247(D), RSS-210 A8.5) 10
   4.1. TEST METHOD AND LIMIT 10
   4.2. BLUETOOTH TEST RESULTS 11
5. SPURIOUS RF CONDUCTED EMISSIONS (FCC §15.247(D), RSS-A8.5) 27
   5.1. TEST METHOD AND LIMIT 27
   5.2. BLUETOOTH TEST RESULTS 28
6. SPURIOUS RADIATED EMISSIONS (FCC §15.247(D), §15.209, RSS-210 A8.5) 34
   6.1. TEST METHOD AND LIMIT 34
   6.2. BLUETOOTH TEST RESULTS 35
7. 20 DB / 99% BANDWIDTH (FCC §15.247(A)(1), RSS-210 A8.1 (A)) 39
   7.1. TEST METHOD AND LIMIT 39
   7.2. BLUETOOTH TEST RESULTS 40
8. CARRIER FREQUENCY SEPARATION (FCC §15.247(A)(1), RSS-210 A8.1 (B)) 44
   8.1. TEST METHOD AND LIMIT 44
   8.2. BLUETOOTH TEST RESULTS 45
   8.3. TEST METHOD AND LIMIT 47
   8.4. BLUETOOTH TEST RESULTS 48
9. TIME OF OCCUPANCY (FCC §15.247(A)(1)(III), RSS-210 A8.1 (D)) 50
   9.1. TEST METHOD AND LIMIT 50
   9.2. BLUETOOTH TEST RESULTS 51
10. TEST EQUIPMENT 53
   10.1. CONDUCTED MEASUREMENTS 53
   10.2. RADIATED MEASUREMENTS 53

2. Test setups

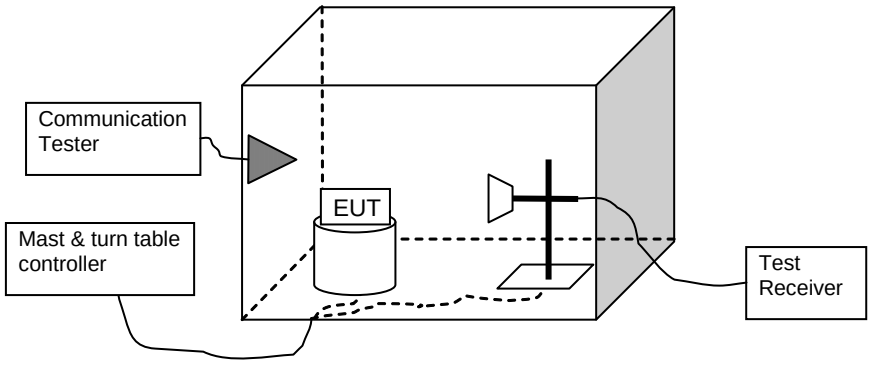
2.1. Conducted RF test setup



2.2. AC power line conducted emissions test setup



2.3. Spurious radiated emissions test setup



3. Conducted peak output power

(FCC §15.247(b)(1), RSS-210 A8.4 (2))

EUT with DUT number	GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	25 / 50
Date of measurements	07-May-2012
Measured by	Robert Müller

3.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for conducted peak output power measurements

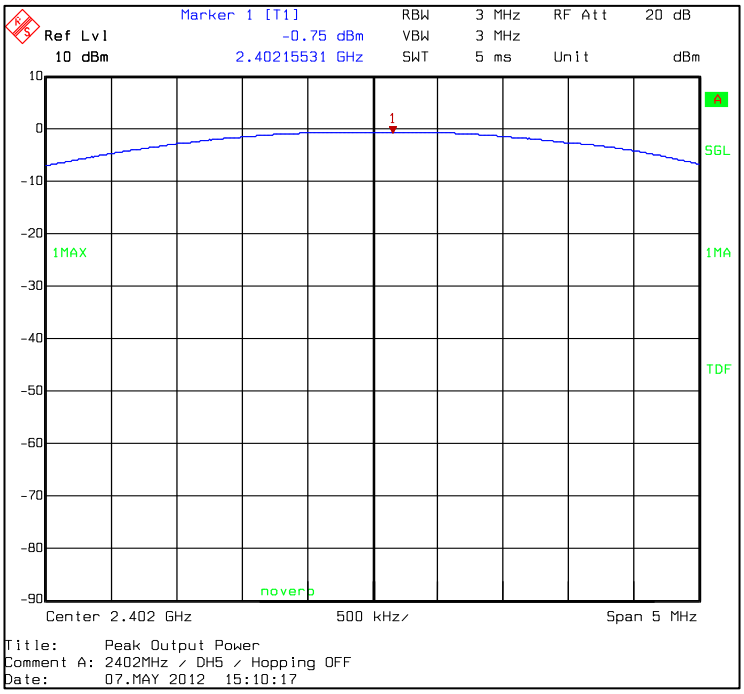
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. Bluetooth Test results

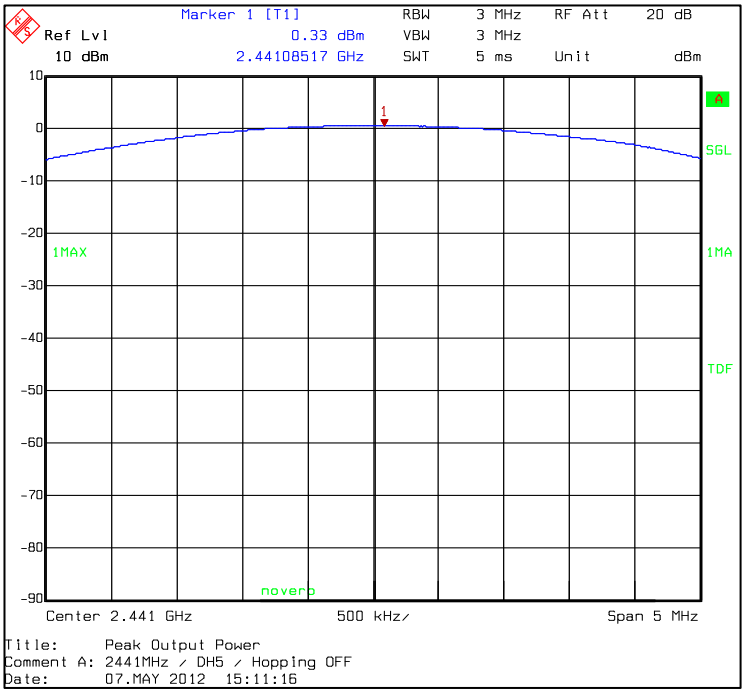
3.2.1 GFSK modulation, PRBS packet type

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-0.75	0.84	PASSED
39 / 2441	0.33	1.08	PASSED
78 / 2480	0.94	1.24	PASSED

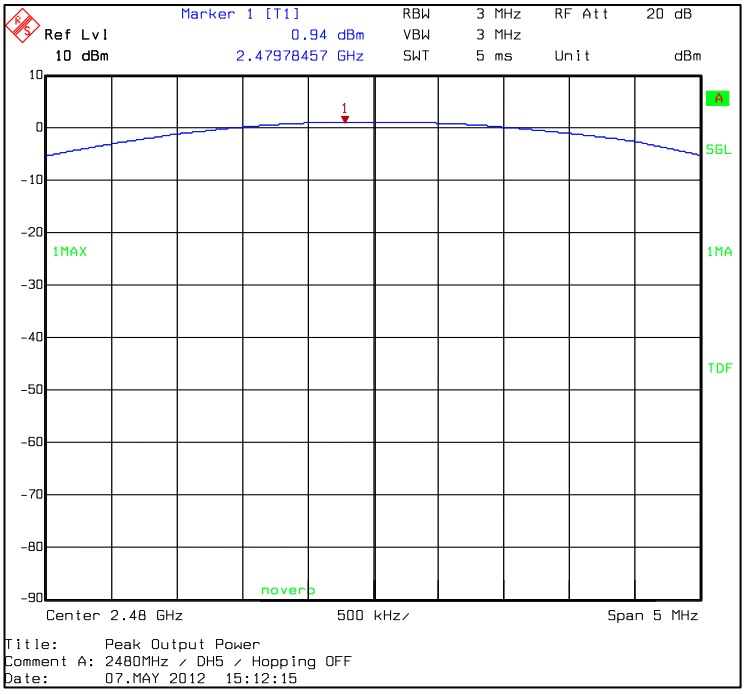
Channel 0 / 2402 MHz (Peak detector, RBW: 3 MHz)



Channel 39 / 2441 MHz (Peak detector, RBW: 3 MHz)



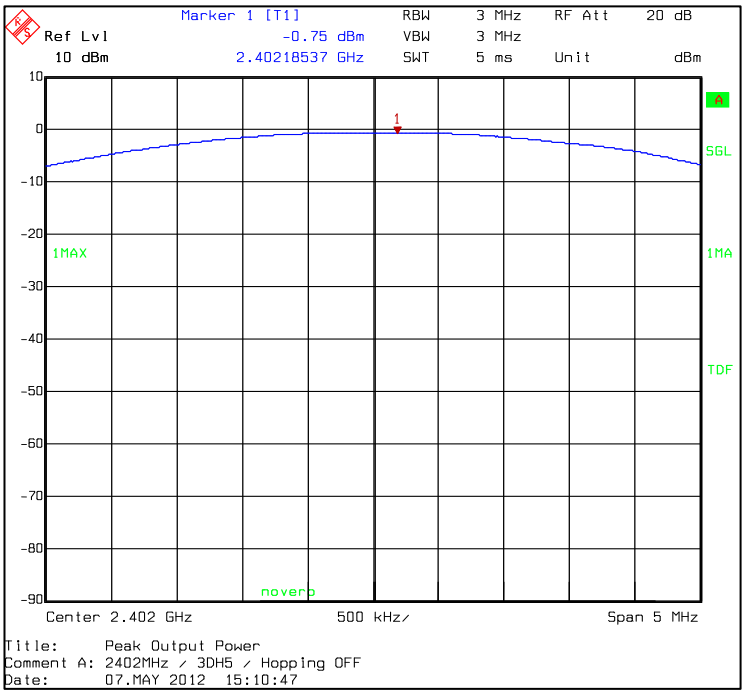
Channel 78 / 2480 MHz (Peak detector, RBW: 3 MHz)



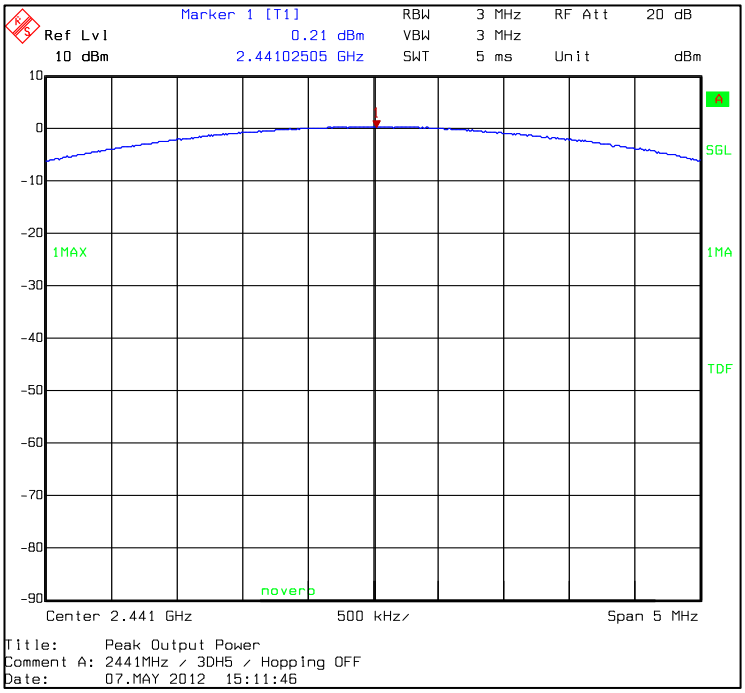
3.2.2 8DPSK modulation, PRBS packet type

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-0.75	0.84	PASSED
39 / 2441	0.21	1.05	PASSED
78 / 2480	0.81	1.21	PASSED

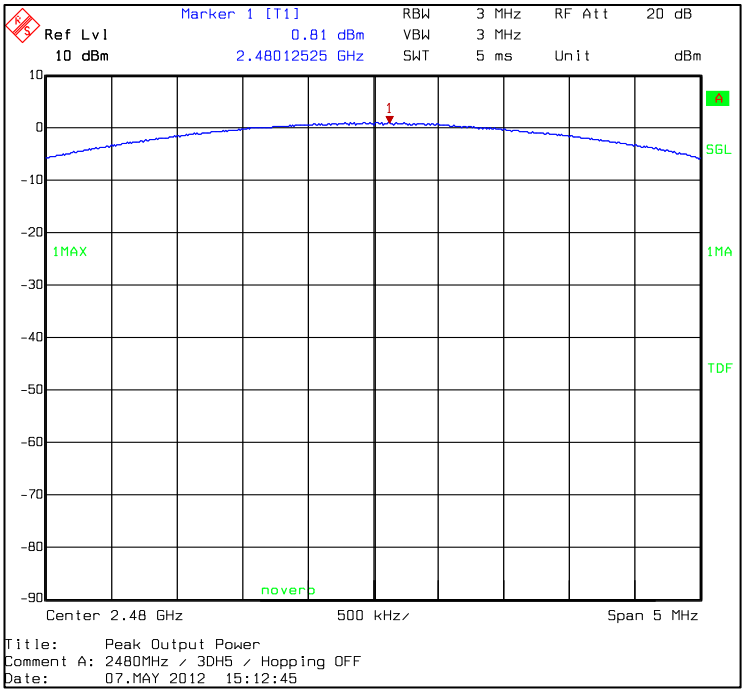
Channel 0 / 2402 MHz (Peak detector, RBW: 3 MHz)



Channel 39 / 2441 MHz (Peak detector, RBW: 3 MHz)



Channel 78 / 2480 MHz (Peak detector, RBW: 3 MHz)



4. Band edge compliance of RF emissions
(FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	GEM010 & GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	23.8 / 46
Date of measurements	07-May-2012
Measured by	Robert Müller

4.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit Average [dBµV/m]	Limit Peak [dBµV/m]
Below 2390 and above 2483.5	≤ 54	≤ 74

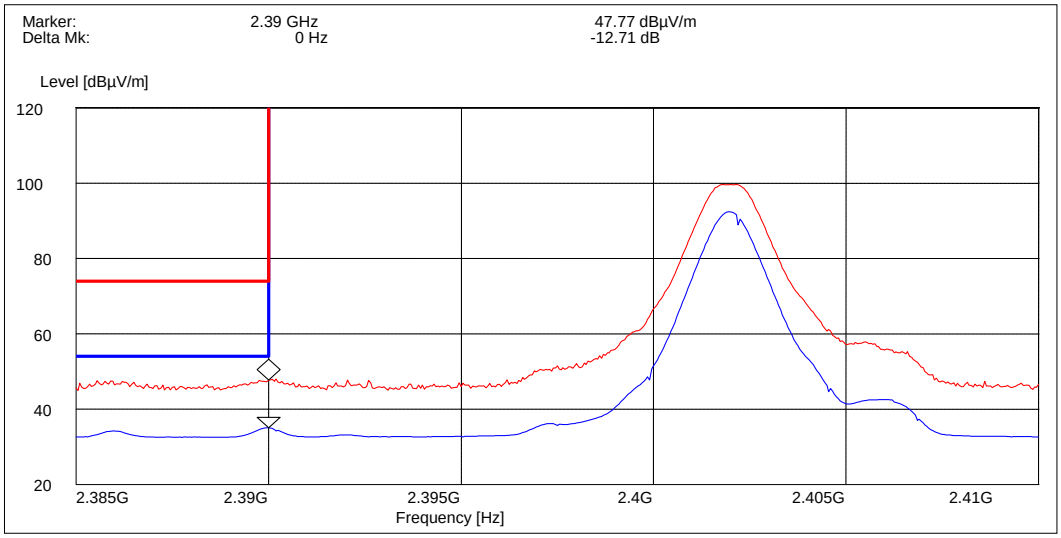
Limits for band edge compliance of RF conducted emissions measurements

Frequency range [MHz]	Limit [dBc]
Below 2400 and above 2483.5	-30

4.2. Bluetooth Test results

4.2.1 GFSK modulation, PRBS packet type

Radiated, channel 0 / 2402 MHz, hopping off



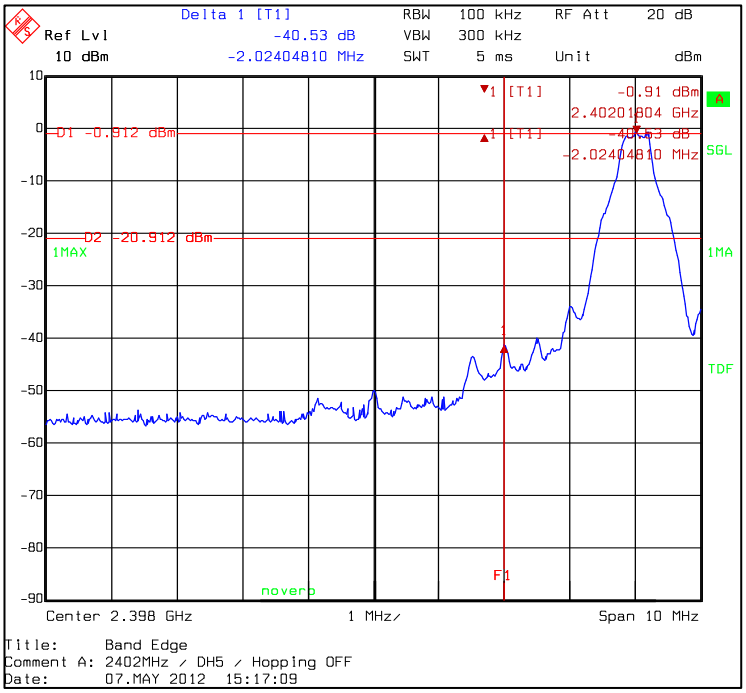
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	47.77	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	35.06	PASSED

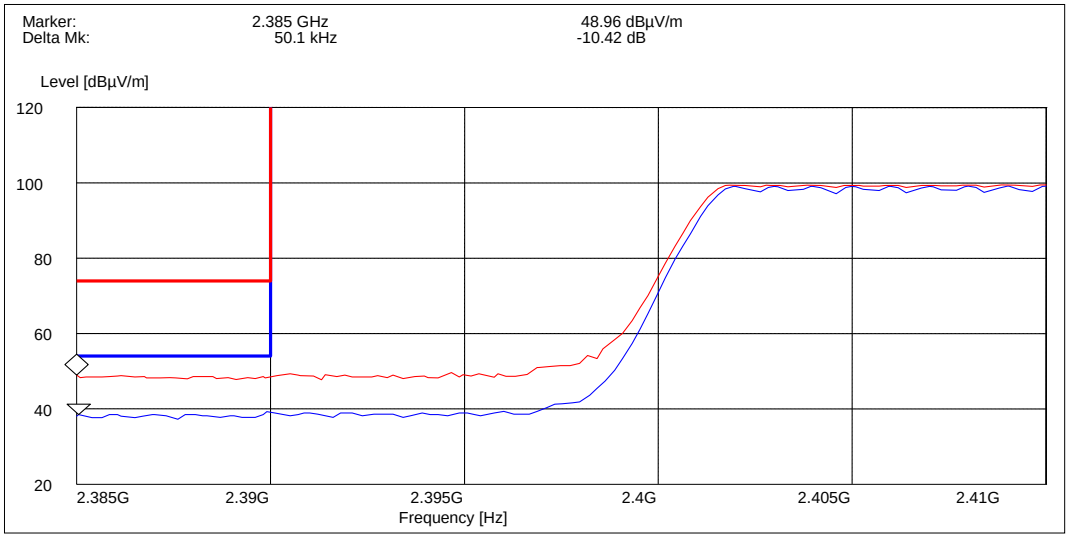
Conducted, channel 0 / 2402 MHz, hopping off



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
0 / 2402	-40.53	PASSED

Radiated, channel 0 / 2402 MHz, hopping on



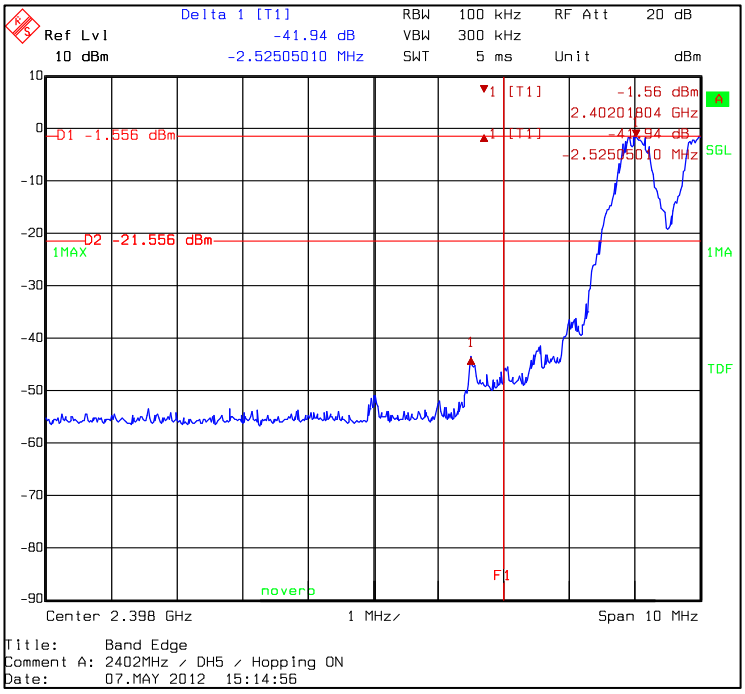
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	48.96	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	38.54	PASSED

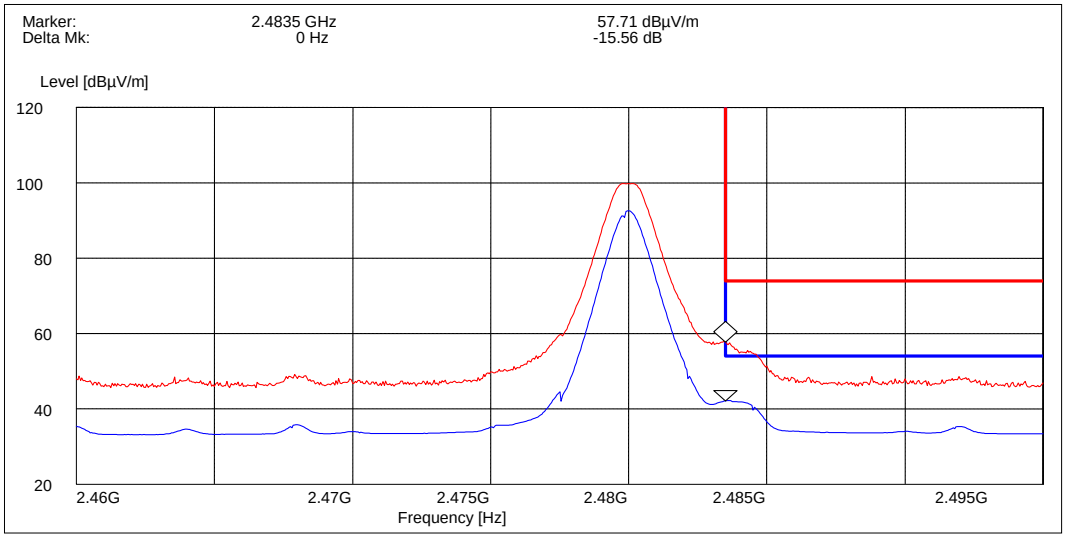
Conducted, channel 0 / 2402 MHz, hopping on



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
0 / 2402	-41.94	PASSED

Radiated, channel 78 / 2480 MHz, hopping off



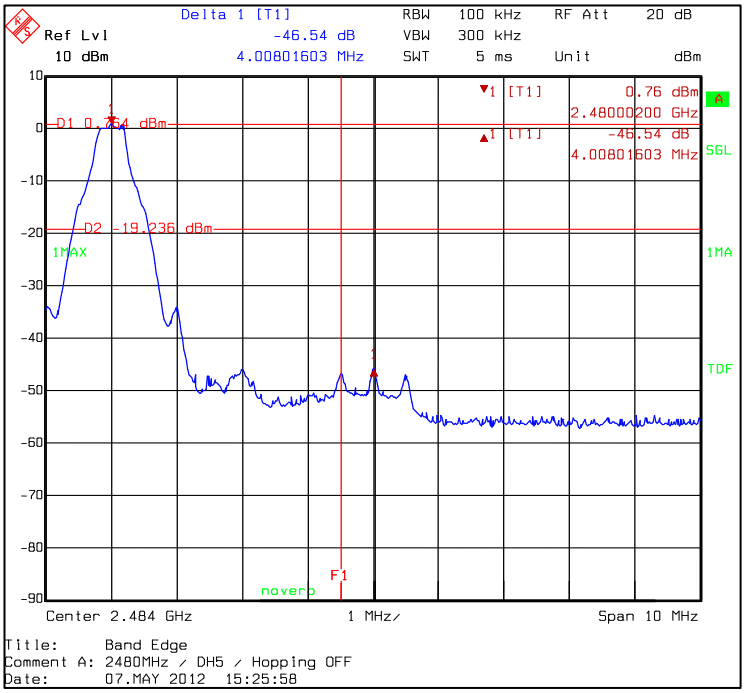
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	57.71	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	42.15	PASSED

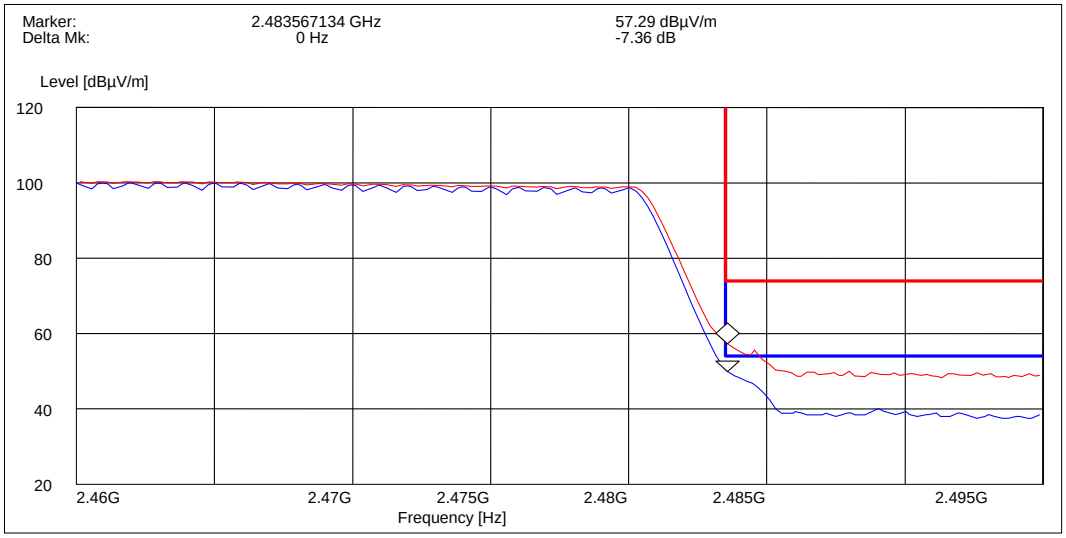
Conducted, channel 78 / 2480 MHz, hopping off



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
0 / 2402	-46.54	PASSED

Radiated, channel 78 / 2480 MHz, hopping on



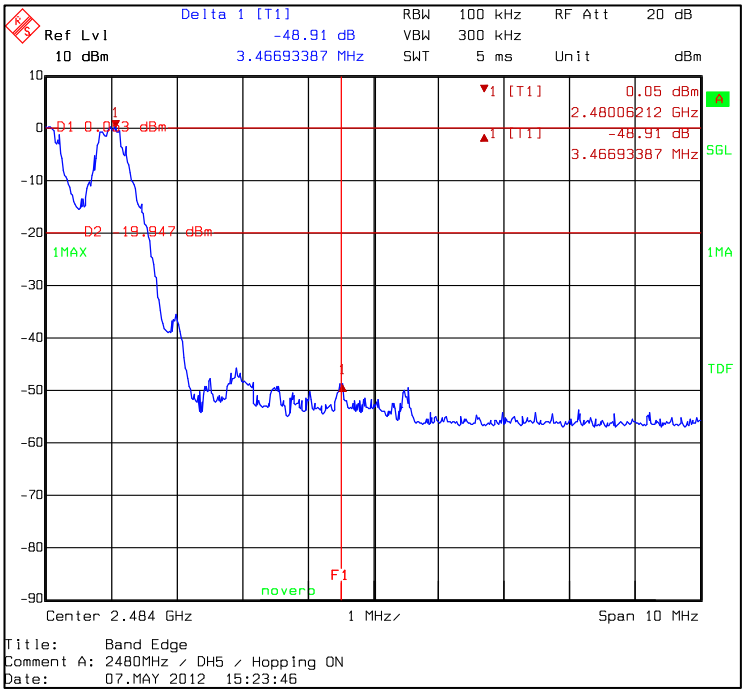
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	57.29	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	49.93	PASSED

Conducted, channel 78 / 2480 MHz, hopping on

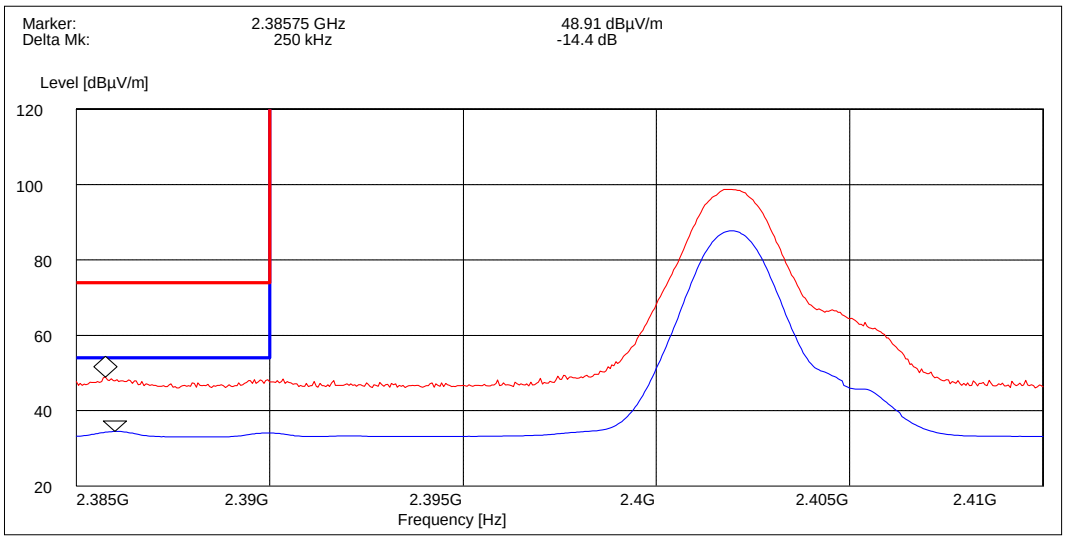


Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
78 / 2480	-48.91	PASSED

4.2.2 8DPSK modulation, PRBS packet type

Radiated, channel 0 / 2402 MHz, hopping off



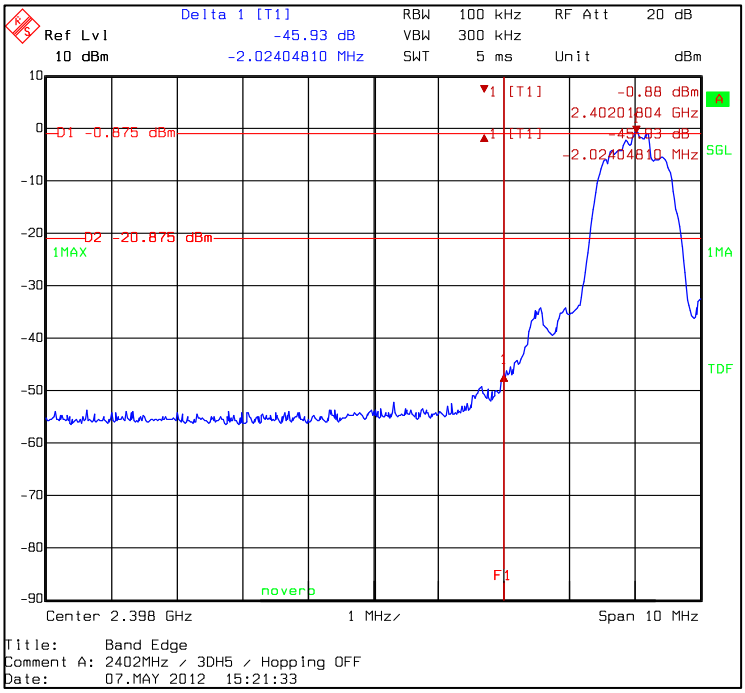
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	48.91	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	34.51	PASSED

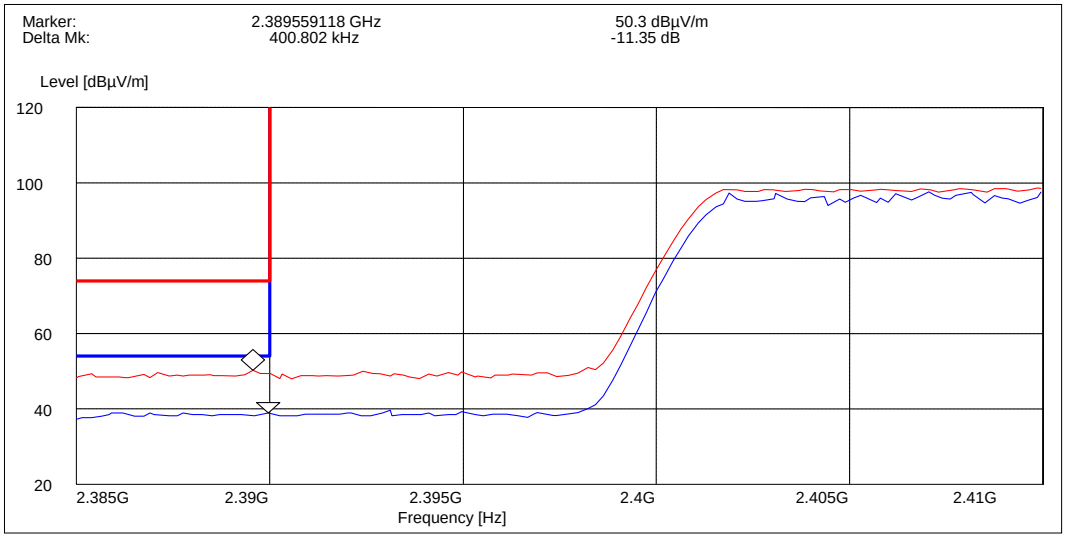
Conducted, channel 0 / 2402 MHz, hopping off



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
0 / 2402	-45.93	PASSED

Radiated, channel 0 / 2402 MHz, hopping on



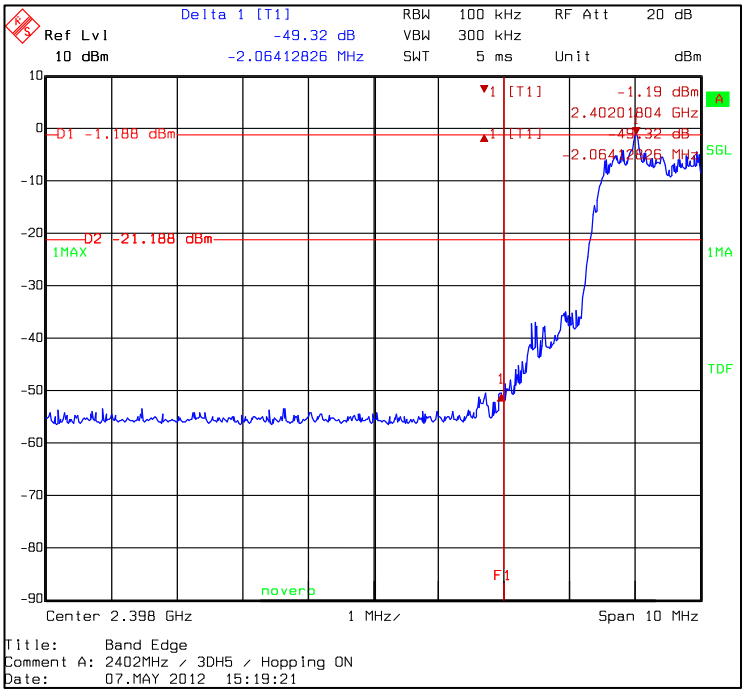
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	50.30	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
0 / 2402	38.95	PASSED

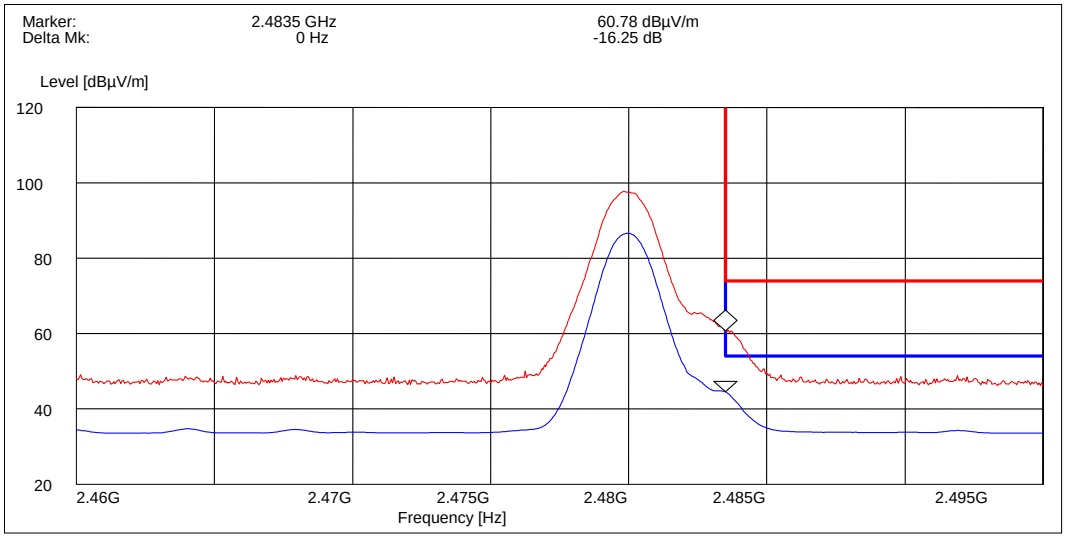
Conducted, channel 0 / 2402 MHz, hopping on



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
0 / 2402	-49.32	PASSED

Radiated, channel 78 / 2480 MHz, hopping off



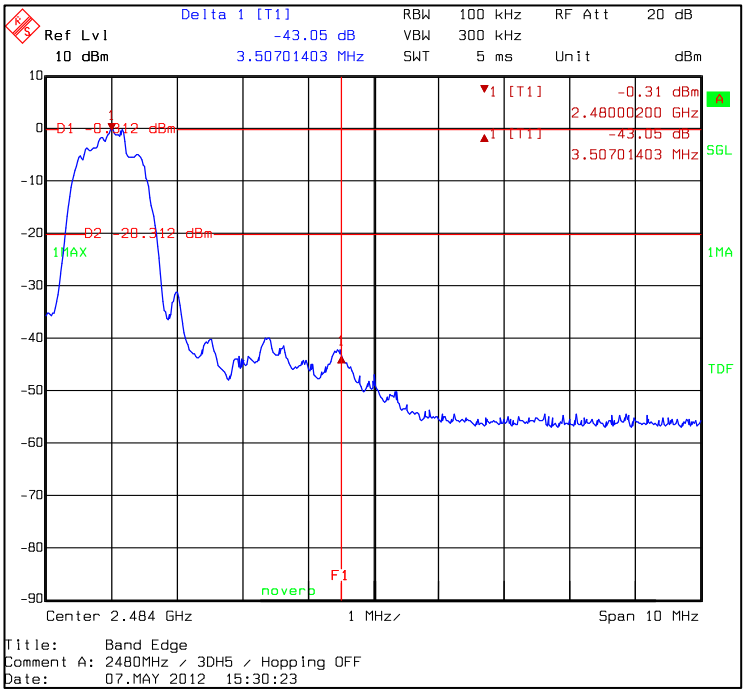
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	60.78	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	44.53	PASSED

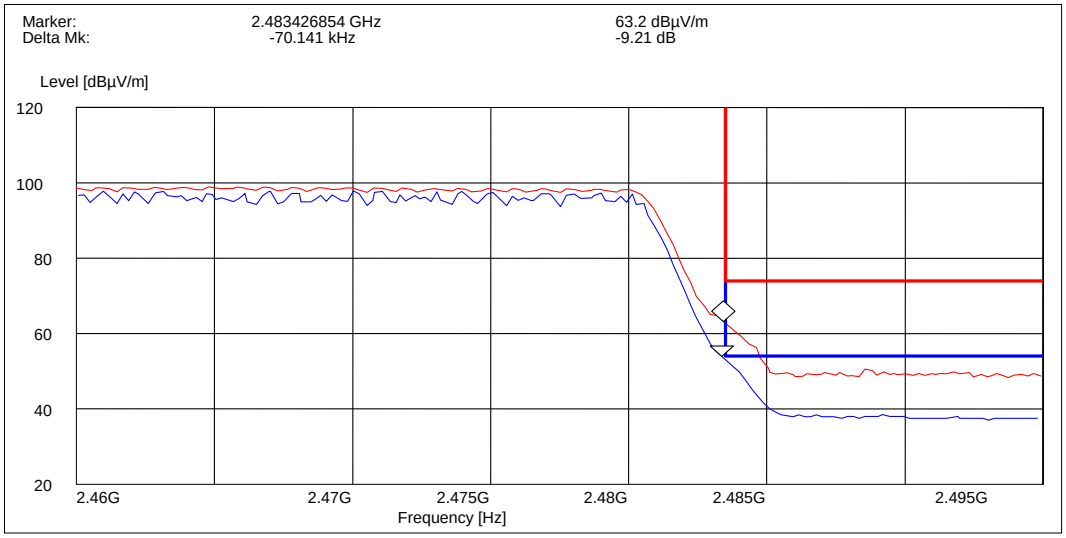
Conducted, channel 78 / 2480 MHz, hopping off



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
0 / 2402	-43.05	PASSED

Radiated, channel 78 / 2480 MHz, hopping on



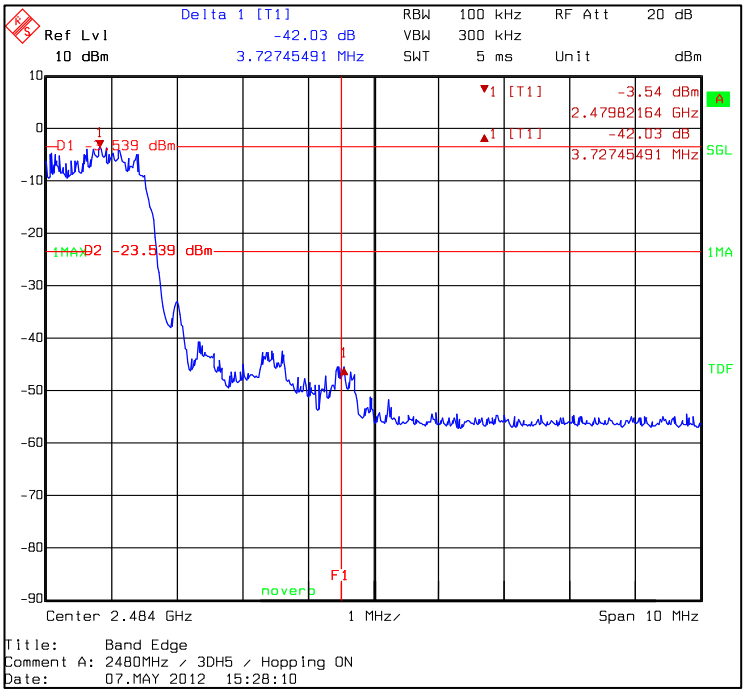
Peak (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	63.20	PASSED

Average (RBW: 1 MHz)

Channel / f_C [MHz]	E [dBµV/m]	Result
78 / 2480	53.99	PASSED

Conducted, channel 78 / 2480 MHz, hopping on



Peak (RBW: 100 KHz)

Channel / f_C [MHz]	P [dBc]	Result
78 / 2480	-42.03	PASSED

5. Spurious RF conducted emissions
(FCC §15.247(d), RSS-A8.5)

EUT with DUT number	GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	25 / 50
Date of measurements	07-May-2012
Measured by	Robert Müller

5.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

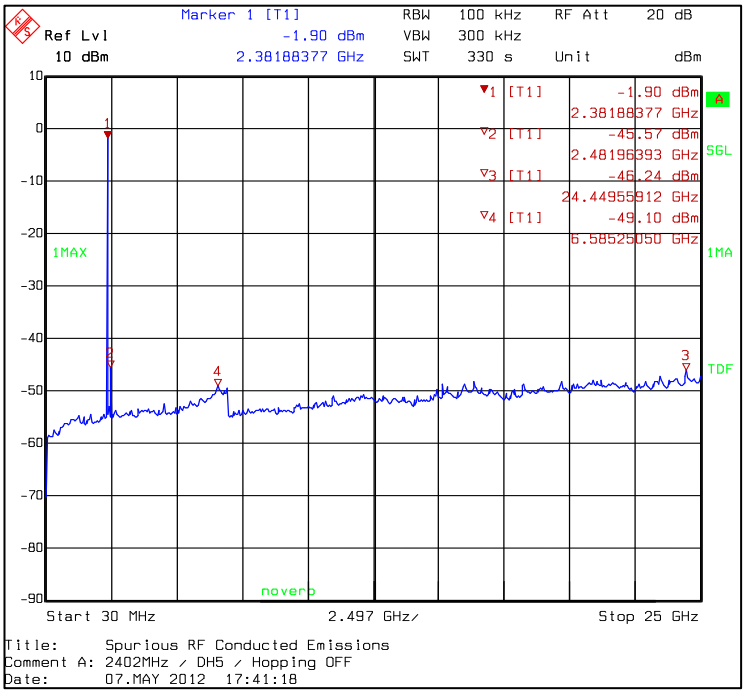
Limits for spurious RF conducted emissions measurements

Frequency range [MHz]	Limit [dBc]
1 – 25000	≤ -20

5.2. Bluetooth Test results

5.2.1 GFSK modulation, PRBS packet type

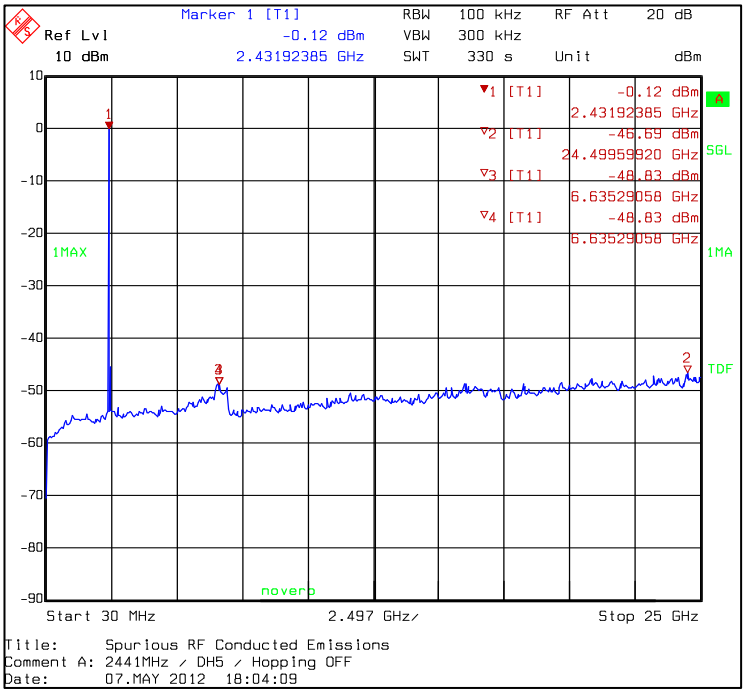
Channel 0 / 2402 MHz



Peak (RBW: 100 KHz)

Frequency [MHz]	P [dBc]	Result
2481.96	-45.57	PASSED
6585.25	-49.10	PASSED
24449.56	-46.24	PASSED

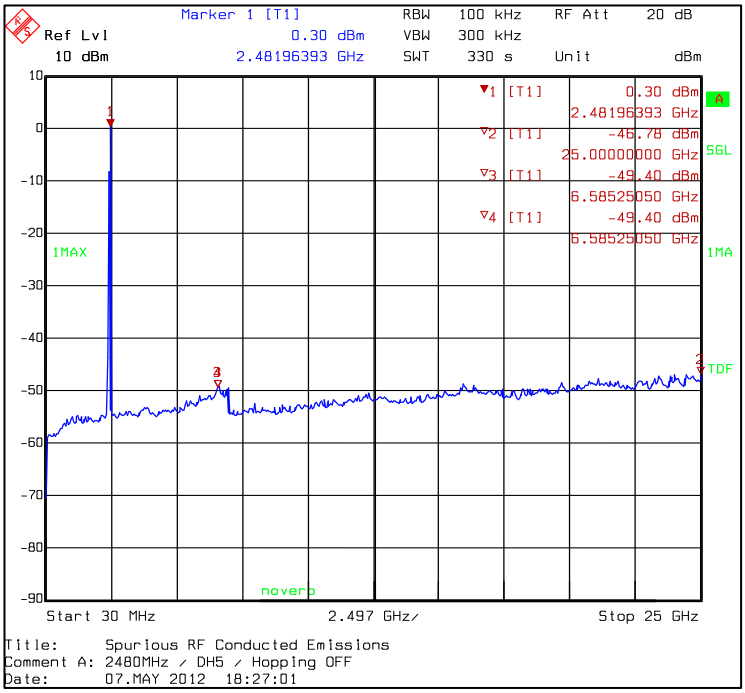
Channel 39 / 2441 MHz



Peak (RBW: 100 KHz)

Frequency [MHz]	P [dBc]	Result
6635.29	-48.83	PASSED
24499.60	-46.69	PASSED

Channel 78 / 2480 MHz

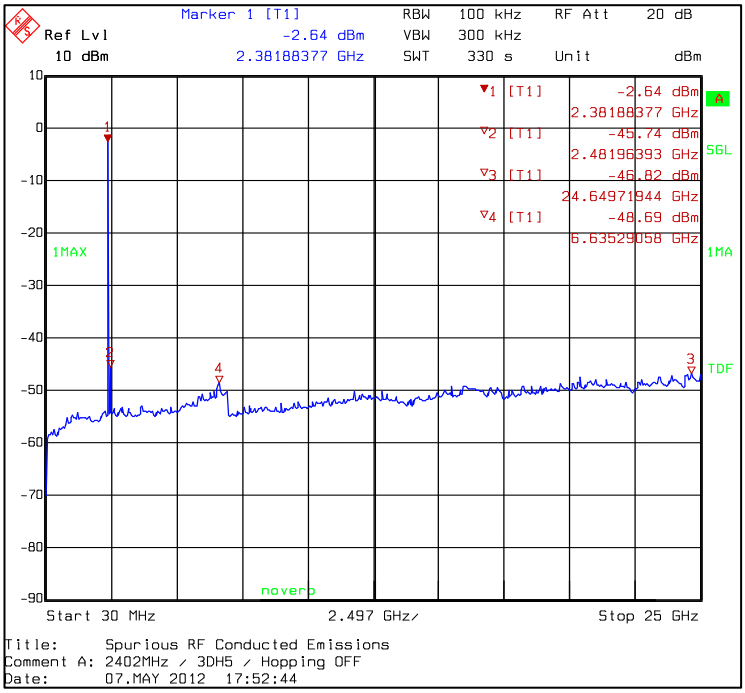


Peak (RBW: 100 KHz)

Frequency [MHz]	P [dBc]	Result
6585.25	-49.40	PASSED
25000	-46.78	PASSED

5.2.2 8DPSK modulation, PRBS packet type

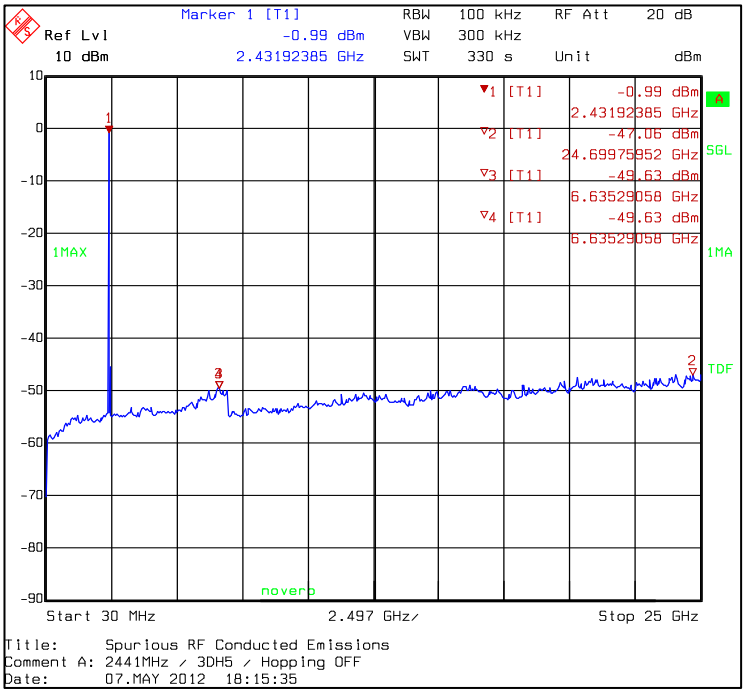
Channel 0 / 2402 MHz



Peak (RBW: 100 KHz)

Frequency [MHz]	P [dBc]	Result
2481.96	-45.74	PASSED
6635.29	-48.69	PASSED
24649.72	-46.82	PASSED

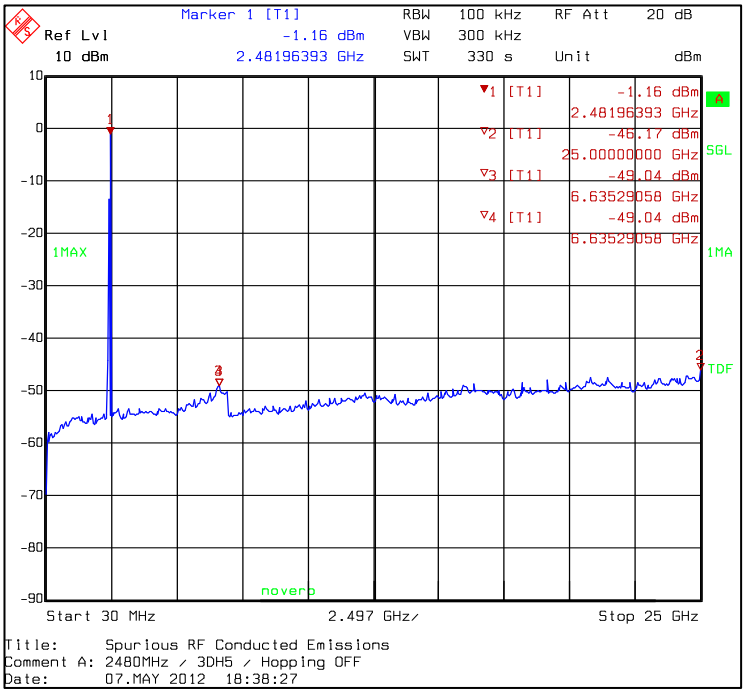
Channel 39 / 2441 MHz



Peak (RBW: 100 KHz)

Frequency [MHz]	P [dBc]	Result
6635.29	-49.63	PASSED
24699.76	-47.06	PASSED

Channel 78 / 2480 MHz



Peak (RBW: 100 KHz)

Frequency [MHz]	P [dBc]	Result
6635.29	-49.04	PASSED
25000	-46.17	PASSED

6. Spurious radiated emissions
(FCC §15.247(d), §15.209, RSS-210 A8.5)

EUT with DUT number	GEM010
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	23.8 / 46
Date of measurements	13-May-2012
Measured by	Robert Müller

6.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210 as follows:

Below 1GHz:

The Preliminary Measurement and the Final Measurement is performed in 3m distance by rotating the turntable of 360 degrees and moving the antenna height between 1-4m.

The Preliminary Measurement is performed with floor absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed without floor absorbers, if the Preliminary Measurement results are closer than 20 dB to the permissible limit.

Between 1-3GHz:

The Preliminary Measurement and the Final Measurement is performed in 3m distance by rotating the turntable of 360 degrees at fixed height.

The Preliminary Measurement and the Final Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed, if the Preliminary Measurement results are closer than 20 dB to the permissible limit.

Above 3GHz:

The Preliminary Measurement and the Final Measurement is performed in 1.5m distance by rotating the turntable of 360 degrees at fixed height.

The Preliminary Measurement and the Final Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed, if the Preliminary Measurement results are closer than 20 dB to the permissible limit.

General:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The EUT is placed at nonconductive plate at the turntable center.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$E\ [\mu V/m] = U_{RX} + A_{CF}$

Where U_{RX} is receiver reading and A_{CF} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{CF} = L_{CABLES} + AF - G_{PREAMP}$).

Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit [µV/m]	Limit [dBµV/m]	Detector
30 – 88	100	40	Quasi peak
88 – 216	150	43.5	Quasi peak
216 – 960	200	46	Quasi peak
960 – 1000	500	54	Quasi peak
Above 1000	500	54	Average
Above 1000	5000	74	Peak

6.2. Bluetooth Test results

6.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7330.16	41.40	117.49	50.90	-9.50	VERTICAL	PASSED
17777.55	53.30	462.38	47.40	5.90	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7329.16	28.40	26.30	37.80	-9.40	VERTICAL	PASSED
17775.06	40.50	105.93	34.60	5.90	VERTICAL	PASSED

No further emissions found less than 20dB to the regulatory limit

Channel 39 / 2441 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
30.00	22.50	13.34	29.00	-6.50	VERTICAL	PASSED
864.03	35.20	57.52	47.80	-12.60	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7324.15	40.90	110.92	50.40	-9.50	VERTICAL	PASSED
17790.08	53.80	489.78	47.80	6.00	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7324.65	28.50	26.61	37.90	-9.40	VERTICAL	PASSED
17792.08	41.30	116.14	35.20	6.10	VERTICAL	PASSED

No further emissions found less than 20dB to the regulatory limit

Channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
4947.39	36.40	66.07	53.20	-16.80	HORIZONTAL	PASSED
7372.25	42.00	125.89	50.90	-8.90	HORIZONTAL	PASSED
17613.23	54.20	512.86	48.40	5.80	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
4942.89	23.90	15.67	40.80	-16.90	HORIZONTAL	PASSED
7372.25	28.70	27.23	37.60	-8.90	HORIZONTAL	PASSED
17614.73	41.00	112.20	35.1	5.90	HORIZONTAL	PASSED

No further emissions found less than 20dB to the regulatory limit

6.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7329.16	41.80	123.03	51.30	-9.50	VERTICAL	PASSED
17797.09	55.00	562.34	48.90	6.10	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7324.66	28.50	26.61	37.90	-9.40	VERTICAL	PASSED
17793.09	41.90	124.45	35.80	6.10	VERTICAL	PASSED

No further emissions found less than 20dB to the regulatory limit

Channel 39 / 2441 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result

No emissions found less than 20dB to the regulatory limit

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
4920.34	37.20	72.44	54.40	-17.20	VERTICAL	PASSED
7324.66	41.40	117.49	50.80	-9.40	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
4919.34	24.80	17.38	42.00	-17.20	VERTICAL	PASSED
7331.16	28.60	26.92	38.10	-9.50	HORIZONTAL	PASSED

No further emissions found less than 20dB to the regulatory limit

Channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7412.32	42.00	125.89	50.60	-8.60	HORIZONTAL	PASSED
17786.57	55.00	562.34	49.00	6.00	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{CF} [dB]	Polarisation	Result
7409.32	28.50	26.61	37.20	-8.70	HORIZONTAL	PASSED
17785.57	41.70	121.62	35.70	6.00	VERTICAL	PASSED

No further emissions found less than 20dB to the regulatory limit

7. 20 dB / 99% bandwidth

(FCC §15.247(a)(1), RSS-210 A8.1 (a))

EUT with DUT number	GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	25 / 50
Date of measurements	07-May-2012
Measured by	Robert Müller

7.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for 20 dB bandwidth measurements

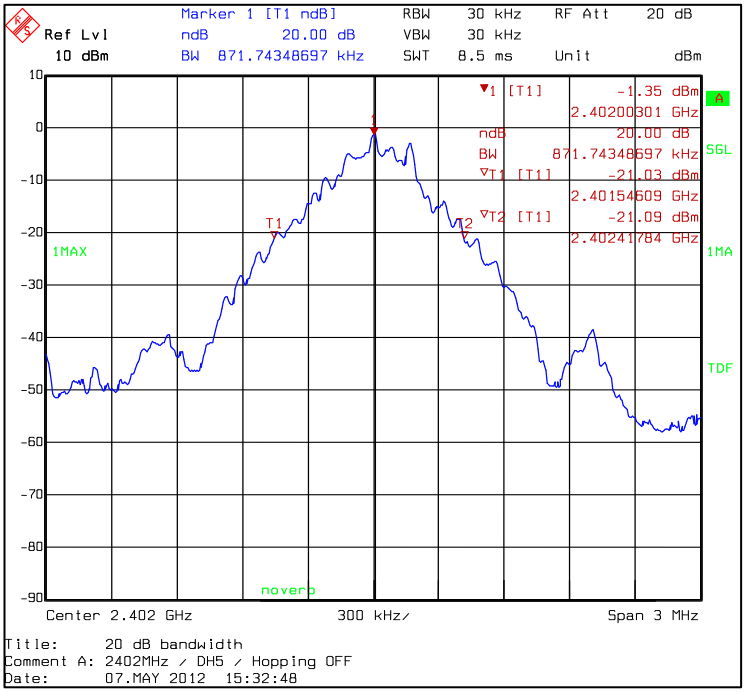
Limit [MHz]
N/A

7.2. Bluetooth Test results

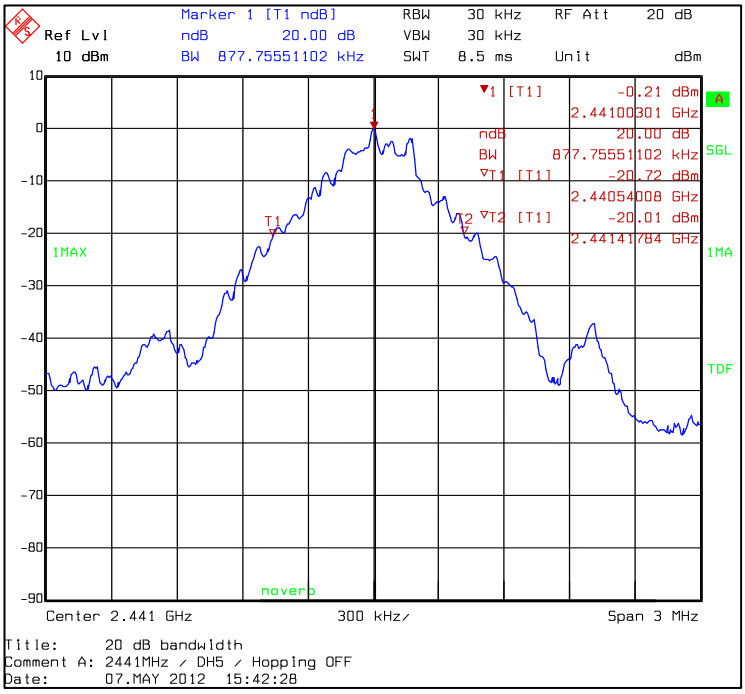
7.2.1 GFSK modulation, PRBS packet type

Channel / f_C [MHz]	20 dB bandwidth [kHz]	99% bandwidth [kHz]	Result
0 / 2402	871.74	871.74	PASSED
39 / 2442	877.76	871.74	PASSED
78 / 2480	877.76	871.74	PASSED

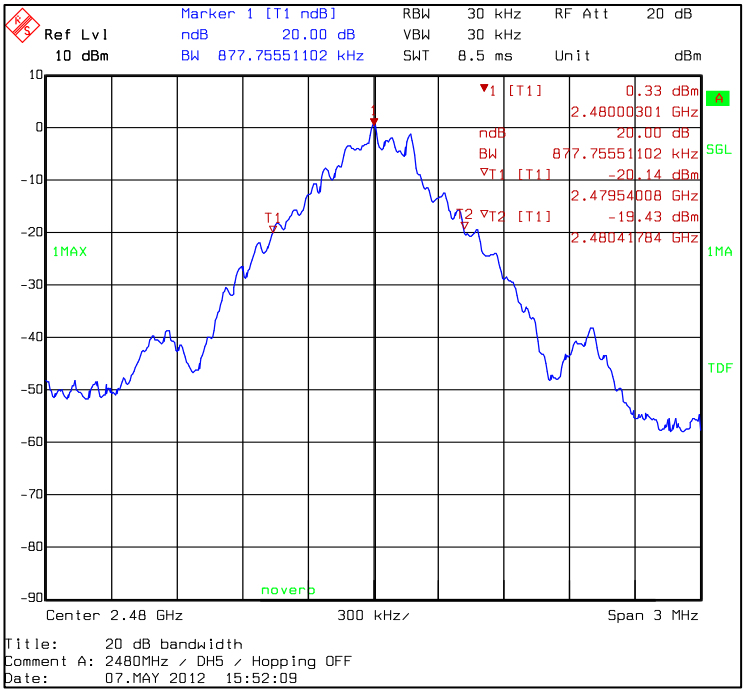
Channel 0 / 2402 MHz



Channel 39 / 2442 MHz



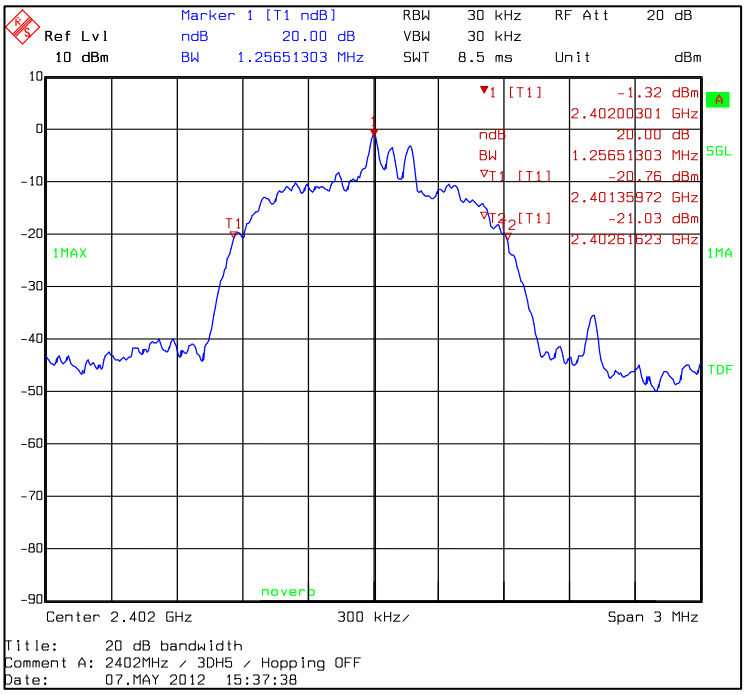
Channel 78 / 2480 MHz



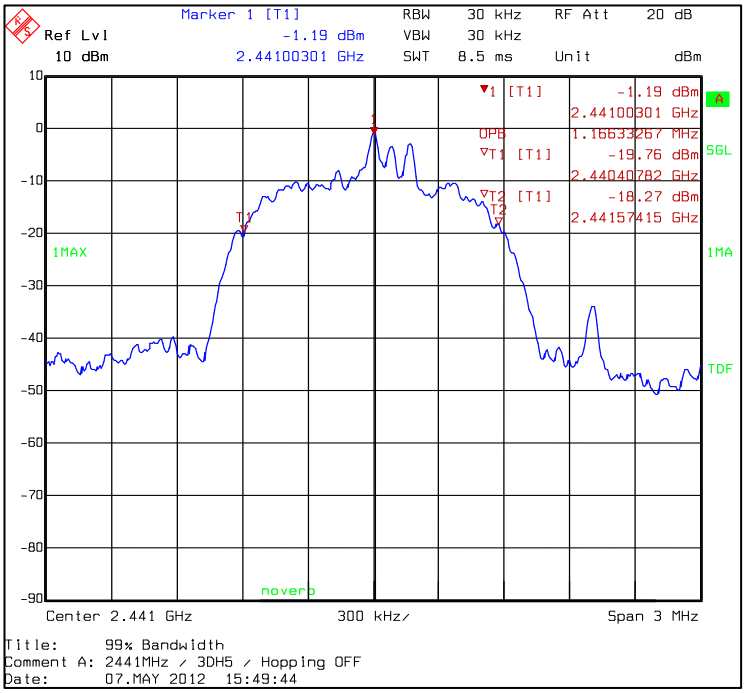
7.2.2 8DPSK modulation, PRBS packet type

Channel / f_C [MHz]	20 dB bandwidth [kHz]	99% bandwidth [kHz]	Result
0 / 2402	1256.51	1178.36	PASSED
39 / 2442	1256.51	1166.33	PASSED
78 / 2480	1256.51	1166.33	PASSED

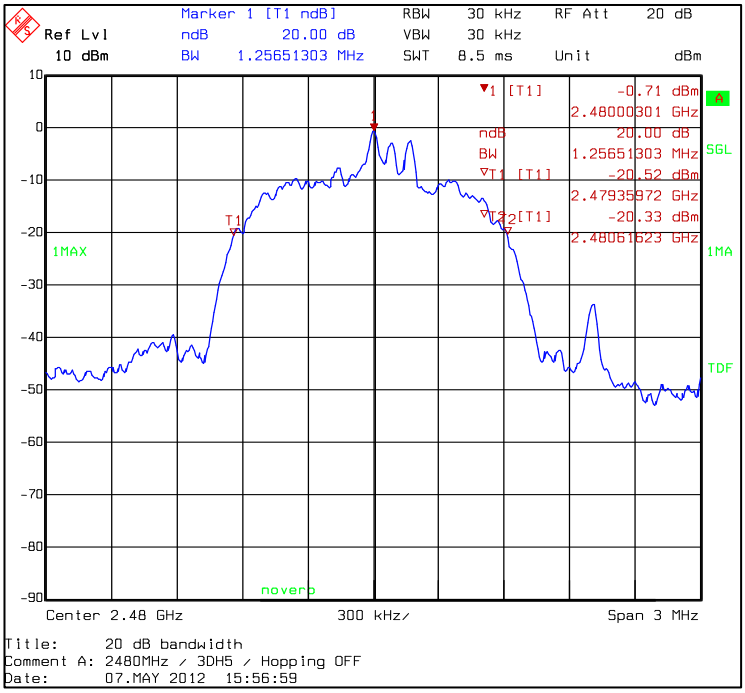
Channel 0 / 2402 MHz



Channel 39 / 2441 MHz



Channel 78 / 2480 MHz



8. Carrier frequency separation

(FCC §15.247(a)(1), RSS-210 A8.1 (b))

EUT with DUT number	GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	25 / 50
Date of measurements	07-May-2012
Measured by	Robert Müller

8.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for carrier frequency separation measurements

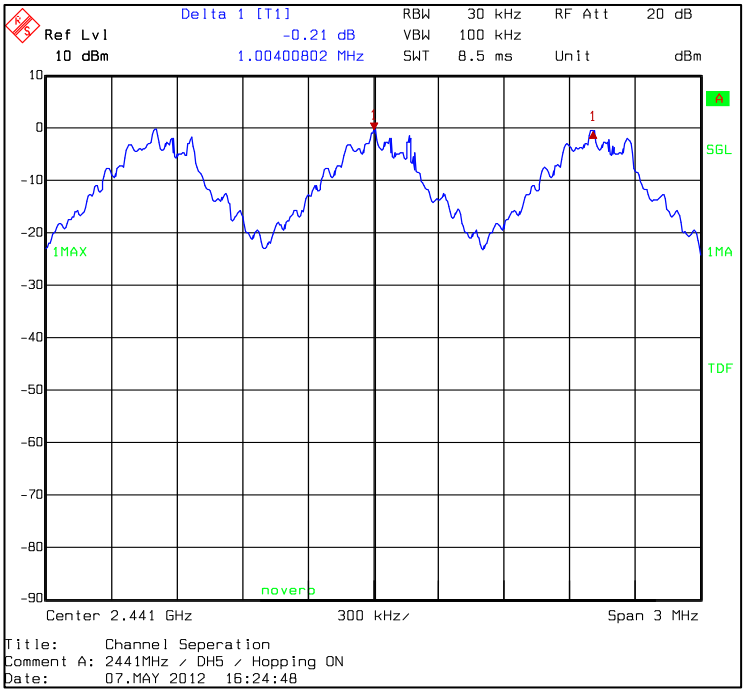
Limit [MHz]
≥ 0.025 or 2/3 of the 20 dB bandwidth

8.2. Bluetooth Test results

8.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1004	PASSED

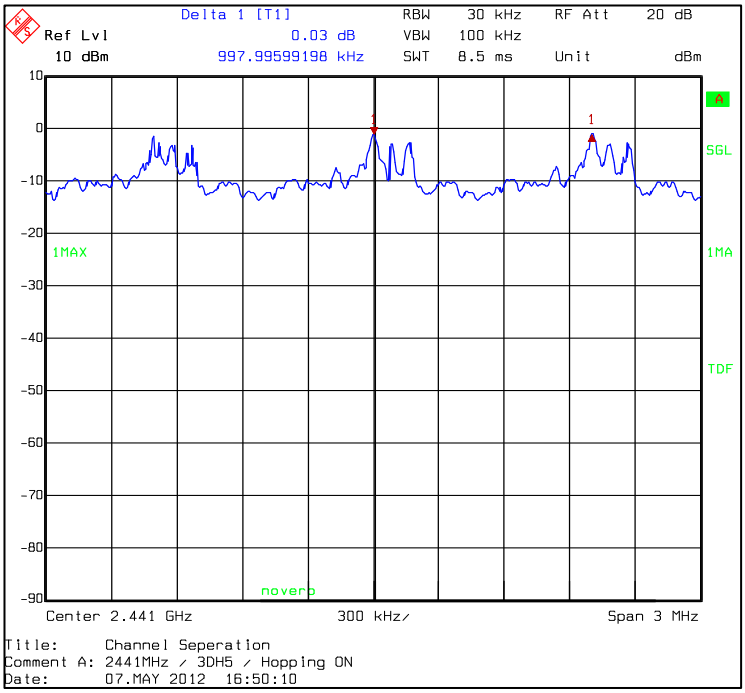
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



8.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
998.00	PASSED

Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



Number of hopping frequencies
(FCC §15.247(a)(1)(iii), RSS-210 A8.1 (d))

EUT with DUT number	GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	25 / 50
Date of measurements	07-May-2012
Measured by	Robert Müller

8.3. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for number of hopping frequencies measurements

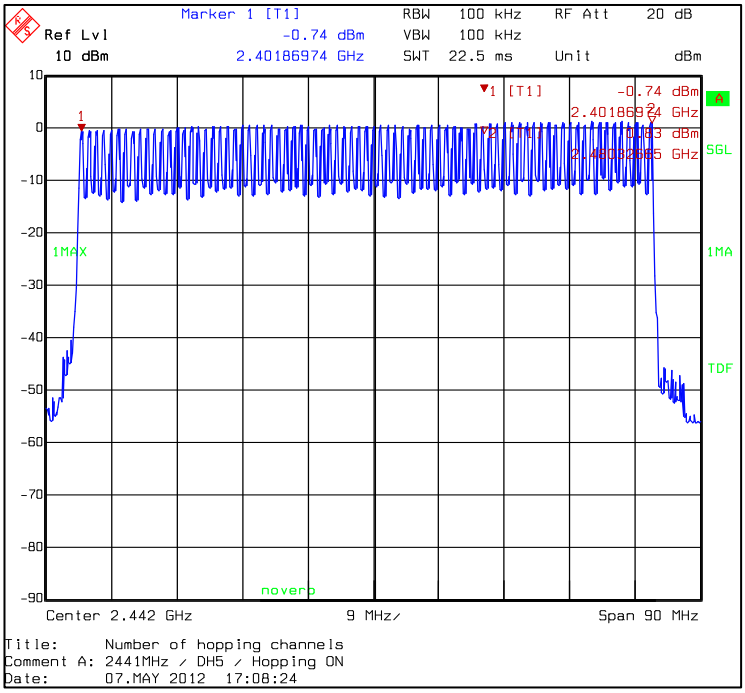
Limit [number]
≥ 15

8.4. Bluetooth Test results

8.4.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	PASSED

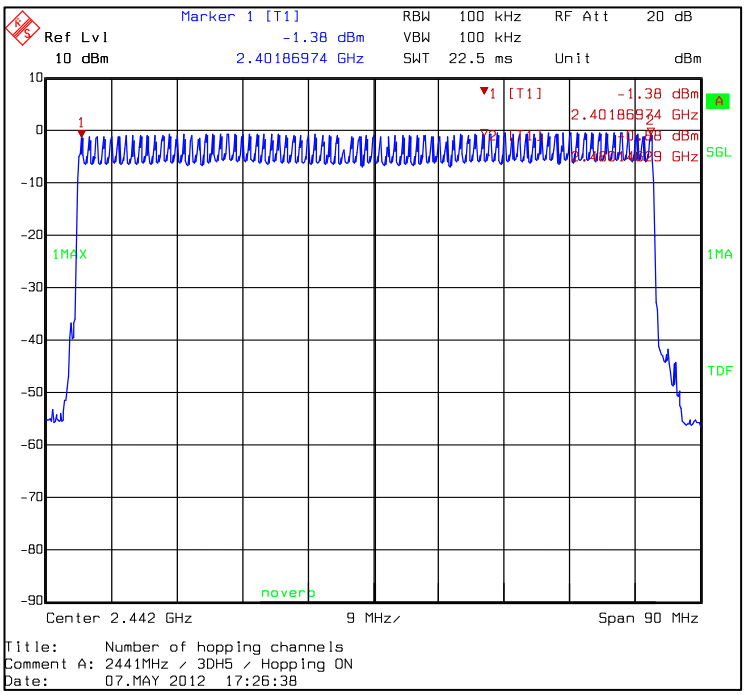
Hopping on, number of hopping frequencies



8.4.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	PASSED

Hopping on, number of hopping frequencies



9. Time of occupancy

(FCC §15.247(a)(1)(iii), RSS-210 A8.1 (d))

EUT with DUT number	GEM013
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	13.2 / DC
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH]	25 / 50
Date of measurements	07-May-2012
Measured by	Robert Müller

9.1. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210 as follows:

The total time of occupancy is get by multiplying the measured number of transmissions occurred during 31.6 second period with the duration of one transmission.

Limits for time of occupancy measurements

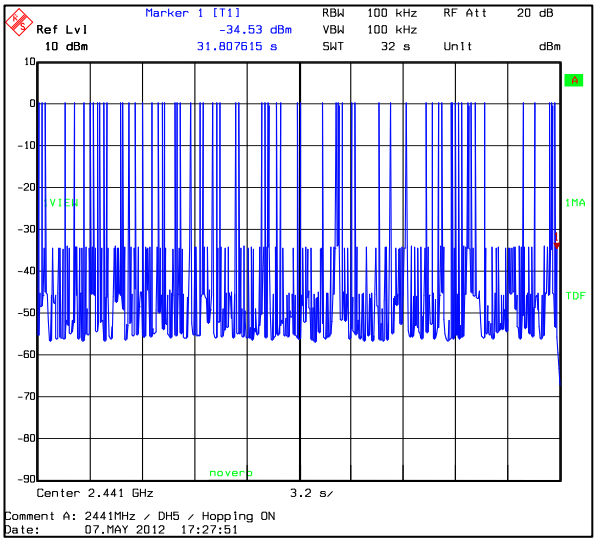
Limit [s]
≤ 0.4

9.2. Bluetooth test results

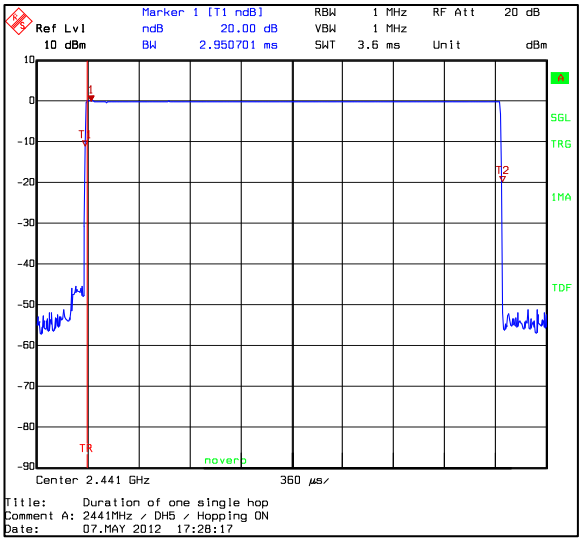
9.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
65	2950	0.19175	PASSED

Hopping on, number of transmissions, channel 39 / 2441 MHz, DH5



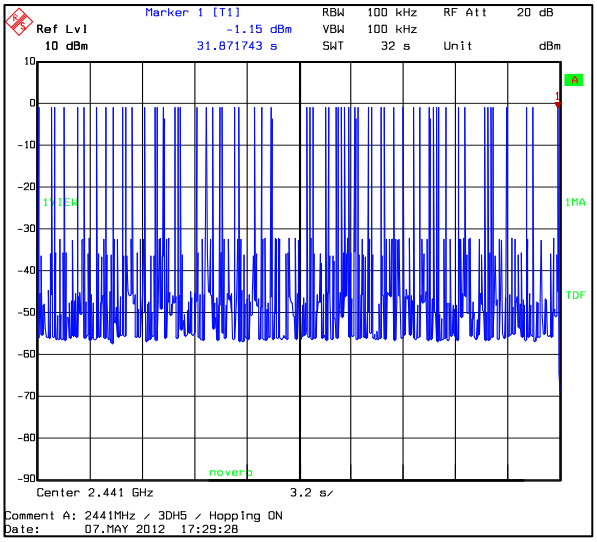
Hopping on, duration of one transmission, channel 39 / 2441 MHz, DH5



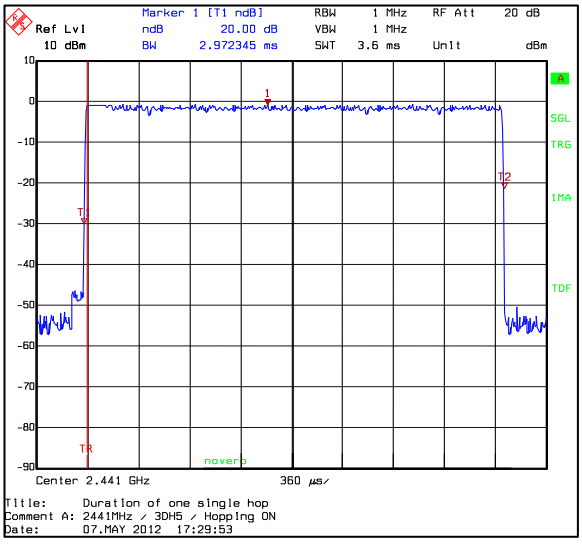
9.2.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
64	2972	0.190208	PASSED

Hopping on, number of transmissions, channel 39 / 2441 MHz



Hopping on, duration of one transmission, channel 39 / 2441 MHz



10. Test Equipment

10.1. Conducted measurements

Equipment	Type	Manufacturer	Calibrated	Cycle [Years]
EMI Test Receiver	ESCS 30	R&S	May 2011	1
LISN 50 µH	ESH3-Z5	R&S	Jul 2011	1
LISN 50 µH	ESH3-Z5	R&S	Jul 2011	1
V network	ESH3-Z6	R&S	May 2011	1
V network	ESH3-Z6	R&S	May 2011	1
T-ISN	ISN T800	Teseq	Jul 2010	2
Thermo- Hygrograph	OPUS 10	Lufft	Jun 2011	2
EM Injection clamp	F-33-1	Fischer	Apr 2012	2
Signal generator	SML01	R&S	Apr 2012	2
Digital Radio Communication Tester	CMU200	R&S	Jun 2012	2
RF Emission Software	ES-K1 v.1.71	R&S	n.a.	--
EMI Test Receiver	FSEM30	R&S	Jul 2011	1
Temperature Test system	VT4004	Vötsch	Jul 2012	2
Power Supply	E3632A	Agilent	Jul 2012	1
Signal generator	SMP02	R&S	Jun 2011	2
BT/WLAN Tester	N 4010 A	Agilent	May 2011	2
Digital Radio Communication Tester	CMU200	R&S	Jun 2012	1
RF Radio Software	RADIO	novero	n.a.	--

10.2. Radiated measurements

Equipment	Type	Manufacturer	Calibrated	Cycle [Years]
Controller	2090	ETS	n.a.	--
MAST	2075	ETS	n.a.	--
Ultra Broadband Antenna	HL562	R&S	Mar 2009	3
Digital Radio Communication Tester	CMU200	R&S	Jul 2011	2
EMI Test receiver	ESIB26	R&S	Jul 2012	1
Yaesu controller	G-1000DXC	YAESU	n.a.	--
Computer controller (Yaesu)	GS-232B	YAESU	n.a.	--
Anechoic chamber	3 meter semi/full anechoic chamber	ETS Euroshield	Mar 2012	3
Horn Antenna	3115	EMCO	Apr 2012	3
Horn Antenna	BBHA9120LF	Schwarzbeck	Aug 2011	3
Standard Horn Antenna	3160-09	EMCO	n.a.	--
Thermo- Hygrograph	OPUS 10	Lufft	Jun 2011	2
Band Reject Filter	WRCG 2400/2485 - 2375/2510 - 60/20EE	Wainwright	Mar 2012	1
Notch Filter GSM850	WRCD 800/880-0,2/40-5SSSD	Wainwright	Mar 2012	1
Band Reject Filter WCDMA850	WRCG 832/838-825/845-40/5SS	Wainwright	Mar 2012	1
Notch Filter GSM1900	WRCD 1700/2000-0,2/40-5SSSD	Wainwright	Mar 2012	1
Band Reject Filter AWS 1700	WRCGV1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	Mar 2012	1
RF Emission Software	ES-K1 v.1.71	R&S	n.a.	--