REPORT

issued by an Accredited Testing Laboratory

Contact person
Kennet Palm
Electronics
+45 26 14 75 43
Kennet.palm@sp.se

Date 2012-10-29 | Reference PX27177 | Page 1 (41)

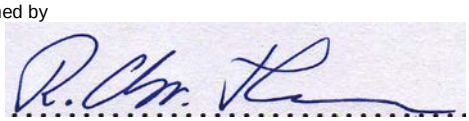
1002
ISO/IEC 17025

Hippih ApS
Diplomvej 372
2800 Kgs. Lyngby
Denmark

FCC Part 15C Compliance testing of Bluetooth LE hipKey

SP Technical Research Institute of Sweden
Electronics

Performed by



Ruben Hansen

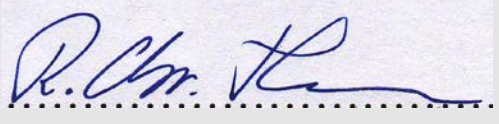
Examined by

Kennet Palm

FCC Part 15C Compliance Test Report

Test Report no.:	PX27177 FCC Part 15C	**Date of Report:**	30 Oct 2012
Number of pages:	41	**Customer's Contact person:**	Danny van der Poel
Testing laboratory:	SP Technical Research Institute of Sweden Electronics A.C. Meyersvaenge 15 2450 COPENHAGEN SV DENMARK Tel. +45 80 250 955	**Customer:**	Hippih ApS Diplomvej 372 2800 Kgs. Lyngby Denmark Tlf.: +45 29279020
FCC listing no.: **IC recognition no.:**	589866 10247A		
Tested devices/ accessories:	**Bluetooth Low Energy device hipKey, Type H120101, Sn: V1.0, SW: V049, HW: B1.1**		
FCC ID:	**PYO-H120101**	**IC:**	
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), DTS procedures KDB 558074 v02, IC standards, RSS-210 (Issue 8, December 2010). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".**		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory.		
Test Results:	**The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document		

Date and signature for the contents:



Kennet Palm **Ruben Hansen**

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	Aug 2012
Testing completed	10 Oct 2012
The customer's contact person	Danny van der Poel
Test Plan referred to	ELd-12-010
Notes	None
Document name	PX27177 FCC Part 15C

1.1. EUT and Accessory Information

Devices under tests

Product	Type	SN	HW	SW	EUT
hipKey	H120101	V1.0	B1.1 (=A02)	V049	ELd-12-010

The EUT is a **Bluetooth Low Energy** device, operating as a Digital Transmission System (DTS) with the following test relevant specification:

Max transmit power: **8 dBm**, which was used during all conducted tests.
Integral antenna with antenna gain: **-2dB**.
Internal LiOn battery, **3.7 Volt DC**. The battery can be charged by any standard Micro USB 5 Volt charger.
Transmission is using **GFSK** modulation.
The used frequency range is **2400 to 2483.5 MHz**
The number of channels for a BTLE device is **40** (0 to 39).
Measurements were made on single channels, 100% Duty Cycle, with Frequency Hopping turned off.

1.2. Test setups

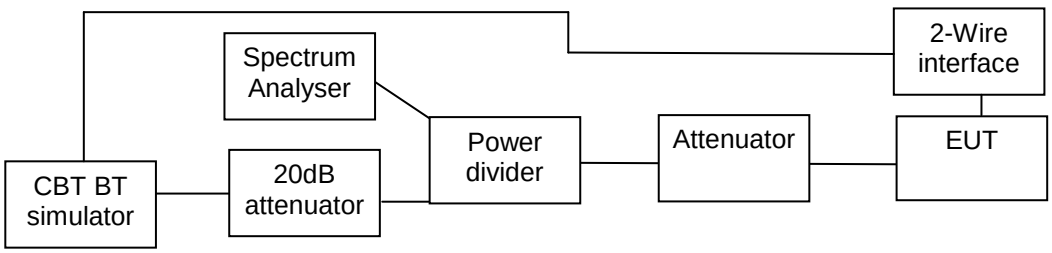


Fig. 1 Setup for RF Conducted test cases

The EUT was setup in test mode by the use of a serial 2-Wire interface between the BT CBT

simulator and the EUT. The EUT had an antenna connector for the conducted RF test cases.

The EUT was tested with maximum rated TX power.

Fig. 1b RF Conducted Test Setup

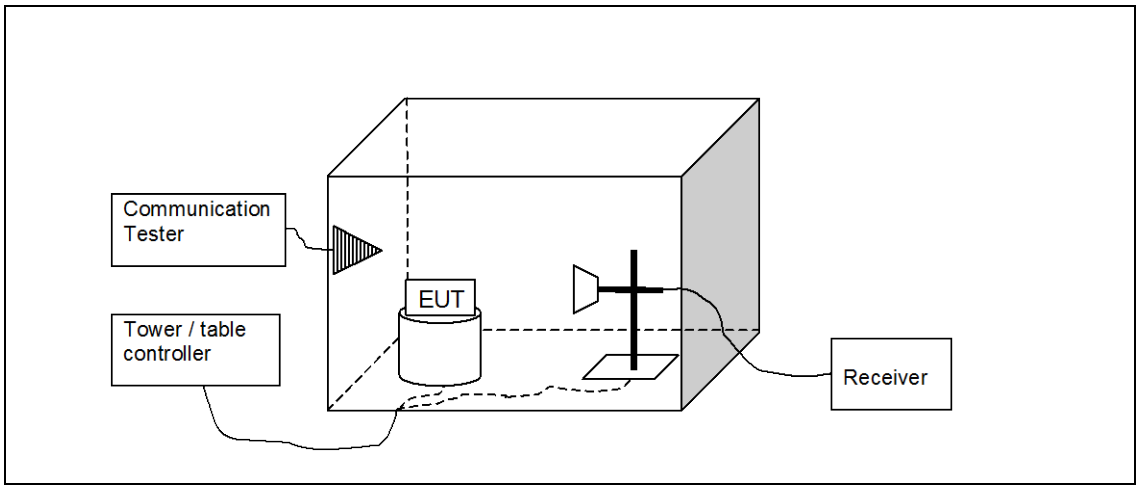


Fig 2. Radiated Emission

The EUT was setup in test mode by the use of a serial 2-Wire interface between the BT CBT simulator and the EUT. The EUT had an integral antenna and was disconnected from the 2-Wire and the CBT tester during the Radiated Emission test cases.

The EUT was tested with maximum rated TX power.

Fig. 2b Radiated Emision Setup

1.3. Summary of Test Results

Bluetooth Low Energy:

Section in CFR 47		Section in RSS-GEN	Name of the test	Result
KBD 558074 §8	15.247 (b)(3)	A8(0.4(2))	Conducted peak output power	PASSED
KBD 558074 §10.2.5	15.247 (d)	A8(0.5)	Band edge compliance of RF	PASSED
KBD 558074 §10.2.2	15.247 (d)	A8(0.5)	Spurious RF conducted emissions	PASSED
KBD 558074 §10.2.1	15.247 (d)	A8(0.5)	Spurious radiated emissions	PASSED
KBD 558074 §7	15.247 (a)(2)		6 dB Emission Bandwidth	PASSED
KBD 558074 §9	15.247 (e)		Maximum Power Spectral Density	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 by the SP A/S Laboratory.

CONTENTS

2. Spurious radiated emission

(FCC §15.247(d), §15.209)

EUT with EUT number	hipKey ELd-12-010
Accessories with DUT numbers	None
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 /101.9
Date of measurements	10-Oct-2012
Measured by	Søren Søltoft

2.1. Test method and limit

The measurement is made according to KBD 558074 and IC standard RSS-210 as follows:

The frequency range 30 MHz to 26.5 GHz was measured.

The measurement is divided into the Preliminary Measurement and the Final Measurement. The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center and measured in 3 orthogonal axes. The Integral antenna in EUT was used during the Radiated Emission tests. The 10cm long cable for 2-Wire setup was bundled during test. (Cable is not removeable):

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

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

The measurement results are obtained as follows:
$E\ [dB\mu V/m] = U_{RX}\ [dB\mu V] + A_{TOT}\ [dB]$

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

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

2.2. Bluetooth Test results

Channel 0 / 2402 MHz

Peak (RBW: 1 MHz, VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
4804.5	49.643	303.49	47.31	2.34	Vertical	1.7	123.0	Passed
7207.7	50.439	332.62	37.85	12.59	Horizontal	1.7	67.0	Passed
9607.5	52.13	404.11	37.19	14.94	Vertical	1.7	203.0	Passed

Average (RBW: 1 MHz. VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	URX [dBµV]	ATOT [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
4804.5	37.803	77.65	35.47	2.34	Vertical	1.7	123.0	Passed
7207.7	36.965	70.51	24.38	12.59	Horizontal	1.7	67.0	Passed
9607.5	39.433	93.68	24.49	14.94	Vertical	1.7	203.0	Passed

Channel 19 / 2440 MHz

Quasi peak (RBW: 120kHz, VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	URX [dBµV]	ATOT [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
30.210	20.38	10.45	31.32	-10.94	Horizontal	4.01	39.0	Passed
33.717	20.51	10.60	33.95	-13.44	Horizontal	3.00	126.0	Passed
39.446	14.20	5.13	31.56	-17.36	Horizontal	1.00	269.0	Passed
41.176	10.57	3.38	29.09	-18.52	Horizontal	1.20	141.0	Passed
597.969	18.32	8.24	32.87	-14.55	Horizontal	1.50	10.0	Passed

Peak (RBW: 1 MHz, VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
2987.780	50.759	345.10	41.93	8.83	Horizontal	1.7	114.0	Passed
4880.260	48.186	256.63	46.01	2.18	Horizontal	1.7	298.0	Passed
6929.356	58.306	822.81	47.62	10.68	Horizontal	1.7	142.0	Passed
10514.230	56.753	688.10	37.75	19.00	Horizontal	1.7	258.0	Passed
11500.703	55.827	618.51	36.69	19.13	Vertical	1.7	102.0	Passed
12061.925	55.174	573.72	37.48	17.69	Horizontal	1.7	1.0	Passed
13431.362	56.919	701.37	36.95	19.97	Vertical	1.7	182.0	Passed
14640.379	60.613	1073.12	38.28	22.33	Vertical	1.7	246.0	Passed
16010.620	60.657	1078.57	41.43	19.23	Vertical	1.7	282.0	Passed

Average (RBW: 1MHz. VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
2987.780	37.357	73.76	28.52	8.83	Horizontal	1.7	114.0	Passed
4880.260	38.022	79.63	35.84	2.18	Horizontal	1.7	298.0	Passed
6929.356	45.637	191.36	34.95	10.68	Horizontal	1.7	142.0	Passed
10514.230	43.945	157.49	24.94	19.00	Horizontal	1.7	258.0	Passed
11500.703	43.14	143.55	24.01	19.13	Vertical	1.7	102.0	Passed
12061.925	41.95	125.17	24.26	17.69	Horizontal	1.7	1.0	Passed
13431.362	44.234	162.82	24.27	19.97	Vertical	1.7	182.0	Passed
14640.379	47.12	226.99	24.79	22.33	Vertical	1.7	246.0	Passed
16010.620	47.59	239.61	28.36	19.23	Vertical	1.7	282.0	Passed

Channel 39 / 2480 MHz

Peak (RBW: 1 MHz. VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
4959.5	50.761	345.18	47.58	3.18	Vertical	1.7	159.0	Passed
7438.8	49.696	305.35	37.32	12.38	Vertical	1.7	15.0	Passed
9918.5	53.308	462.81	37.32	15.99	Horizontal	1.7	329.0	Passed

Average (RBW: 1 MHz. VBW: 1MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Antenna height [m]	Turn table [deg]	Result
4959.5	39.05	89.64	35.87	3.18	Vertical	1.7	159.0	Passed
7438.8	36.488	66.74	24.11	12.38	Vertical	1.7	15.0	Passed
9918.5	40.456	105.39	24.47	15.99	Horizontal	1.7	329.0	Passed

3. Conducted peak output power

EUT with DUT number	hipKey ELd-12-010
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	Internal battery
Results	PASSED
EUT Antenna Gain	-2 dB
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 /101.9
Date of measurements	24-Sep/10-Oct-2012
Measured by	Ruben Hansen

3.1. Test method and limit

The measurement is made according to KBD 558074 and IC standard RSS-210.

Attenuation EUT to Spectrum Analyzer = 19 dB

Limits for conducted peak output power measurements

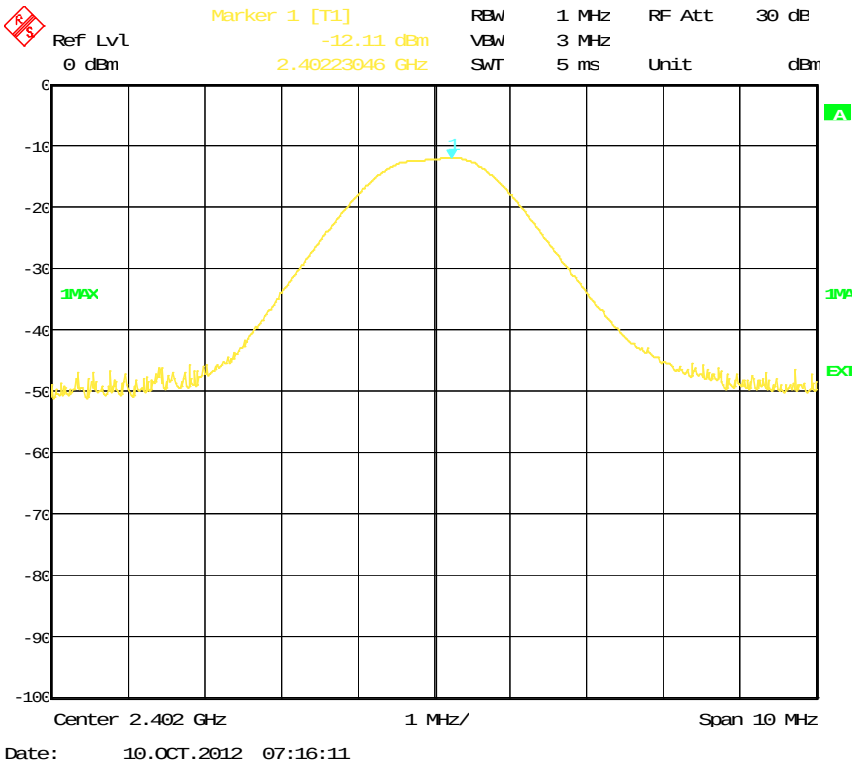
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	<= 1	<= 30

3.2. Bluetooth Test results

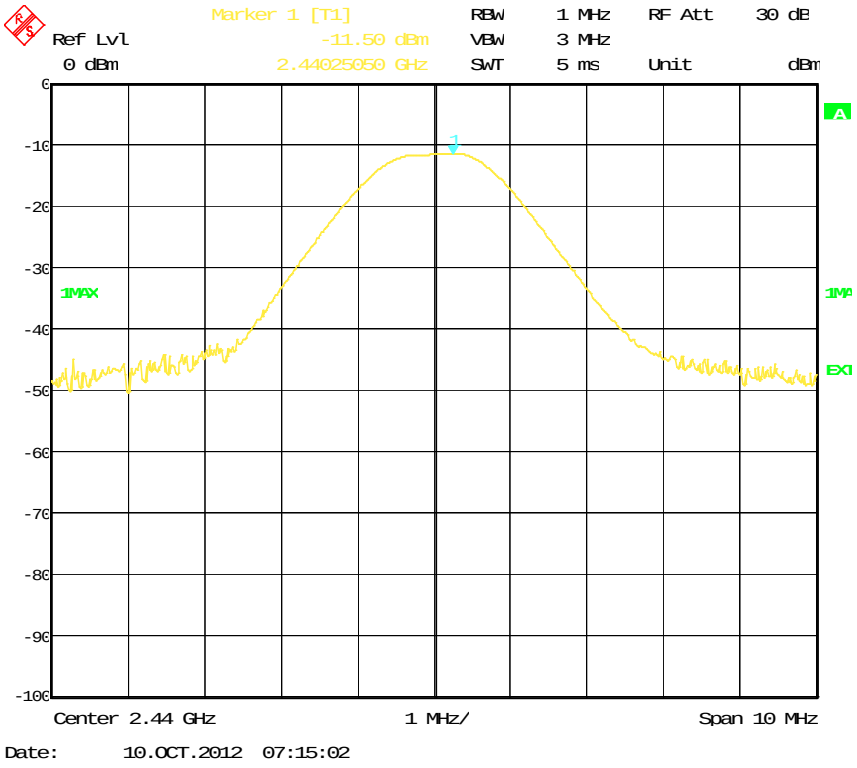
Attenuation EUT to Spectrum Analyzer = 19 dB

Channel / f_C [MHz]	Correction [dB]	P [dBm]	Result
0 / 2402	19	6.89	PASSED
19 / 2441	19	7.50	PASSED
39 / 2480	19	7.63	PASSED

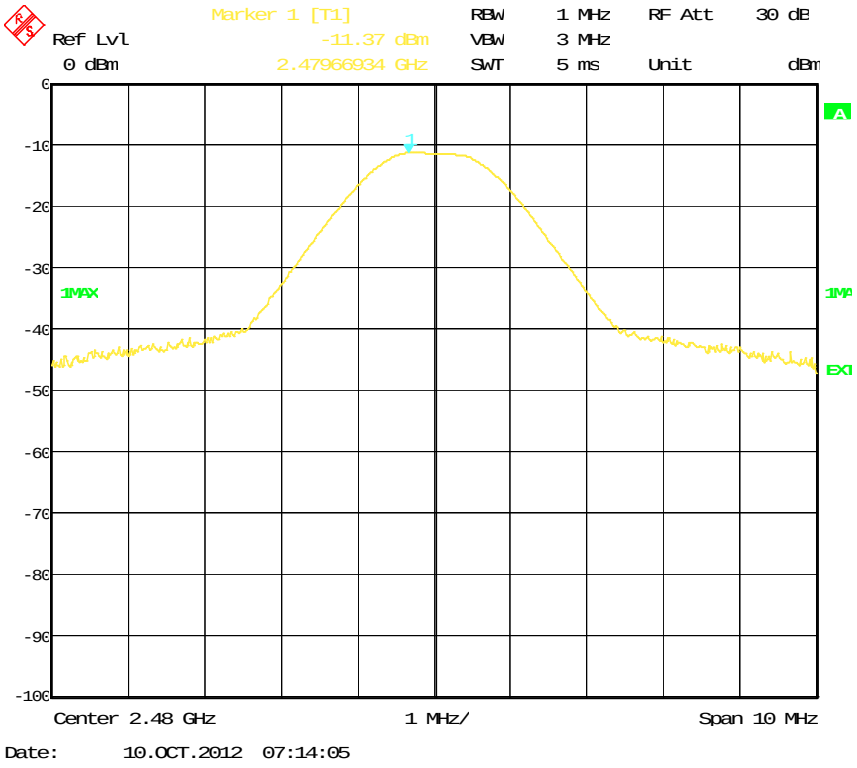
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz VBW: 3 MHz)



Channel 19 / 2441 MHz (Peak detector, RBW: 1 MHz VBW: 3 MHz)



Channel 39 / 2480 MHz (Peak detector, RBW: 1 MHz VBW: 3 MHz)



4. 6 dB Emission Bandwidth

EUT with DUT number	hipKey ELd-12-010
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	Internal battery 3.7 Volt
Results	PASSED
EUT Antenna Gain	-2 dB
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 /101.9
Date of measurements	24-Sep/10-Oct-2012
Measured by	Ruben Hansen

4.1. Test method and limit

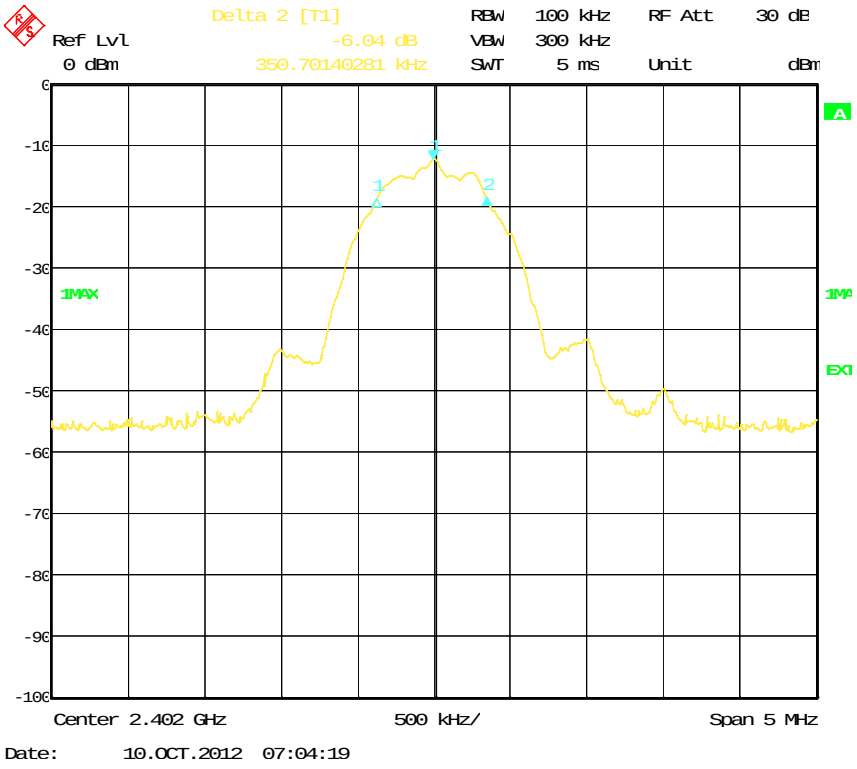
The measurement is made according to KBD 558074 and IC standard RSS-210.

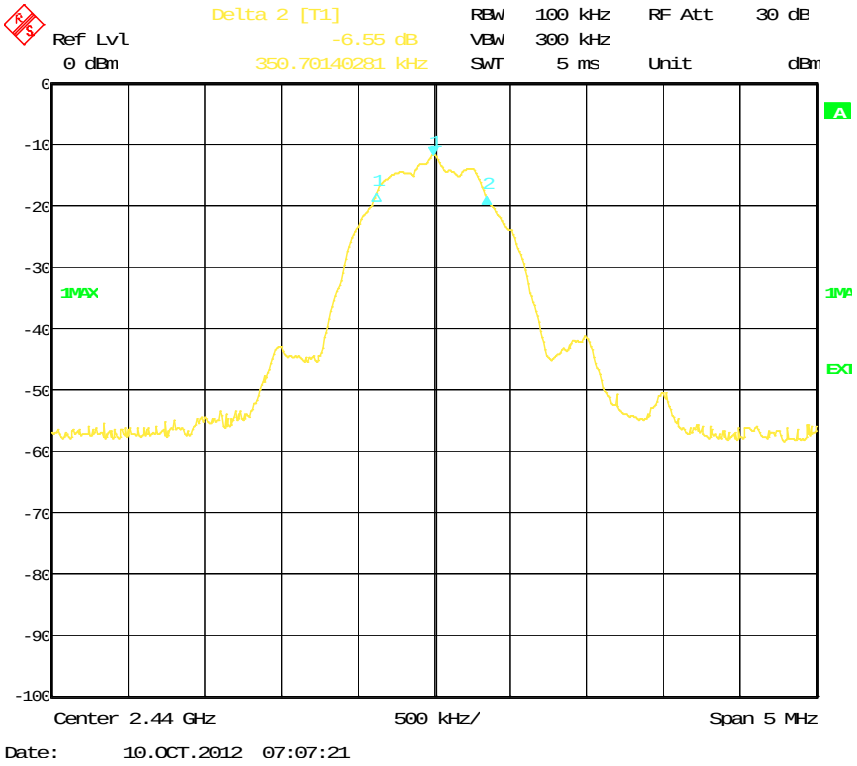
Limits for conducted peak output power measurements

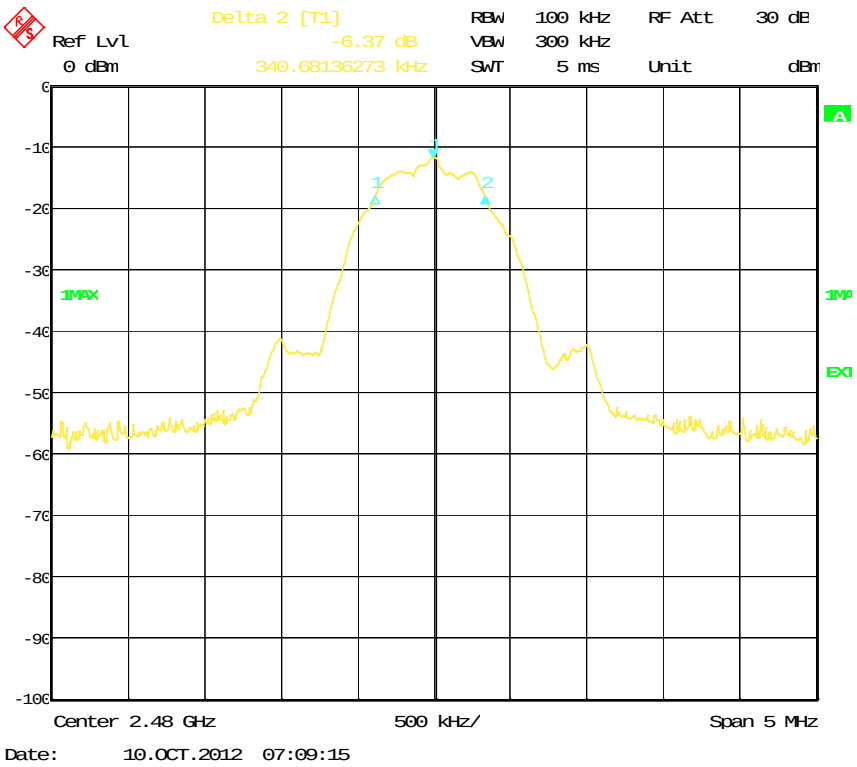
Frequency range [MHz]	Limit [6dB, kHz]
2400 – 2483.5	>= 500

4.1.1 Bandwidth

Channel / f_C [MHz]	BW [kHz]	Result
0 / 2402	710	PASSED
19 / 2441	710	PASSED
39 / 2480	701	PASSED




Delta 2 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-6.55 dB
VBW 300 kHz
0 dBm
350.70140281 kHz
SWT 5 ms
Unit dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1MAX
A
1MA
EXT
1
2
Center 2.44 GHz
500 kHz/
Span 5 MHz
Date: 10.OCT.2012 07:07:21


Delta 2 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-6.37 dB
VBW 300 kHz
0 dBm
340.68136273 kHz
SWT 5 ms
Unit dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1MAX
A
1MA
EXT
1
2
Center 2.48 GHz
500 kHz/
Span 5 MHz
Date: 10.OCT.2012 07:09:15

5. Spurious RF conducted emissions

EUT with DUT number	hipKey ELd-12-010
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	Internal battery
Results	PASSED
EUT Antenna Gain	-2 dB
Ground Reflection Factor	6 dB <= 30 MHz <= 4.7 dB. <= 1 GHz <= 0 dB
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 /101.9
Date of measurements	24-Sep/10-Oct-2012
Measured by	Ruben Hansen

5.1. Test method and limit

The measurement is made according to KBD DA 558074 and IC standard RSS-210.

Attenuation EUT to Spectrum Analyzer = 19 dB

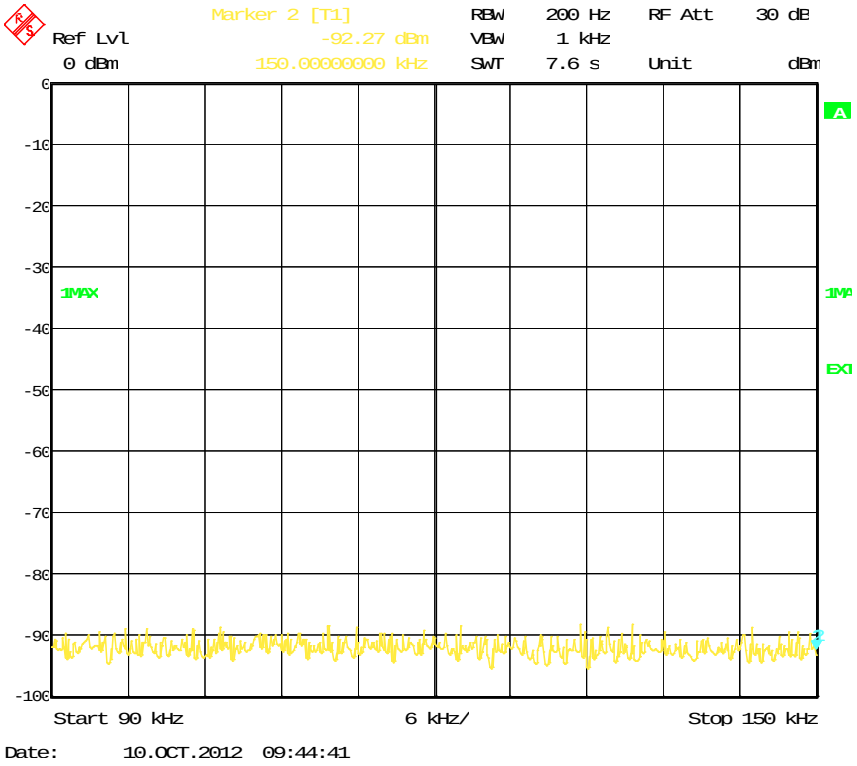
Limits for spurious RF conducted emissions measurements

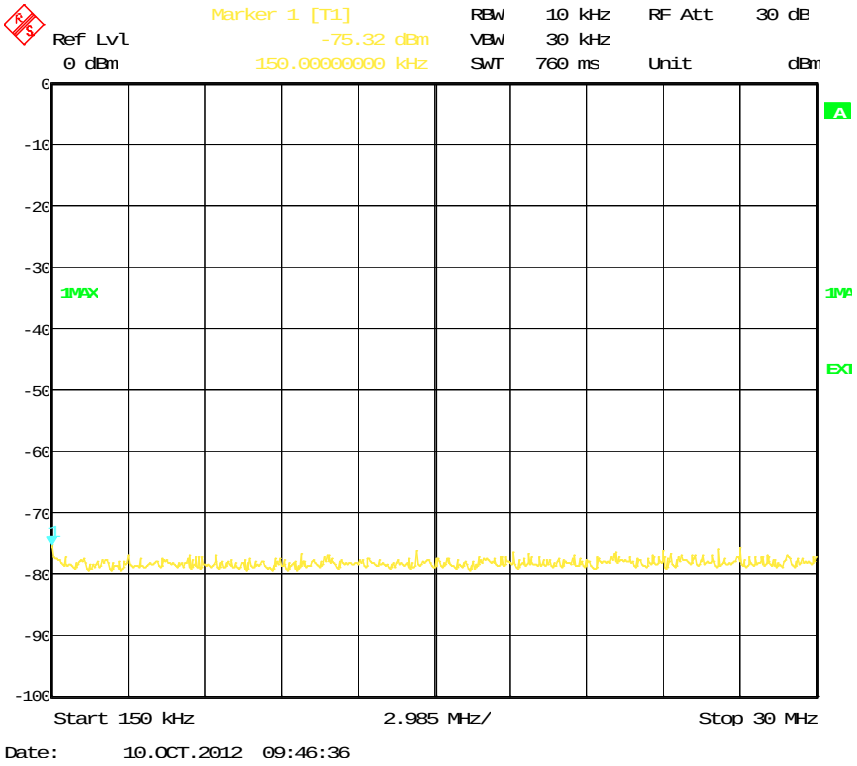
Frequency range [MHz]	Limit [dBc]
1 – 25000	<= -20

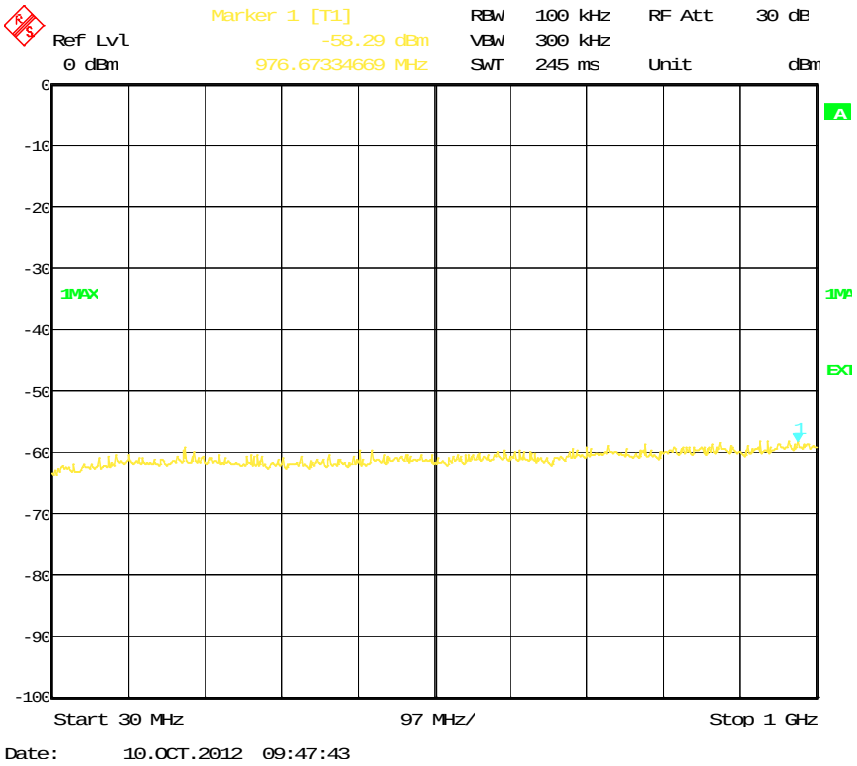
Compliance with restricted band requirements of §15.205 is shown in Section 2 Spurious Radiated Emission.

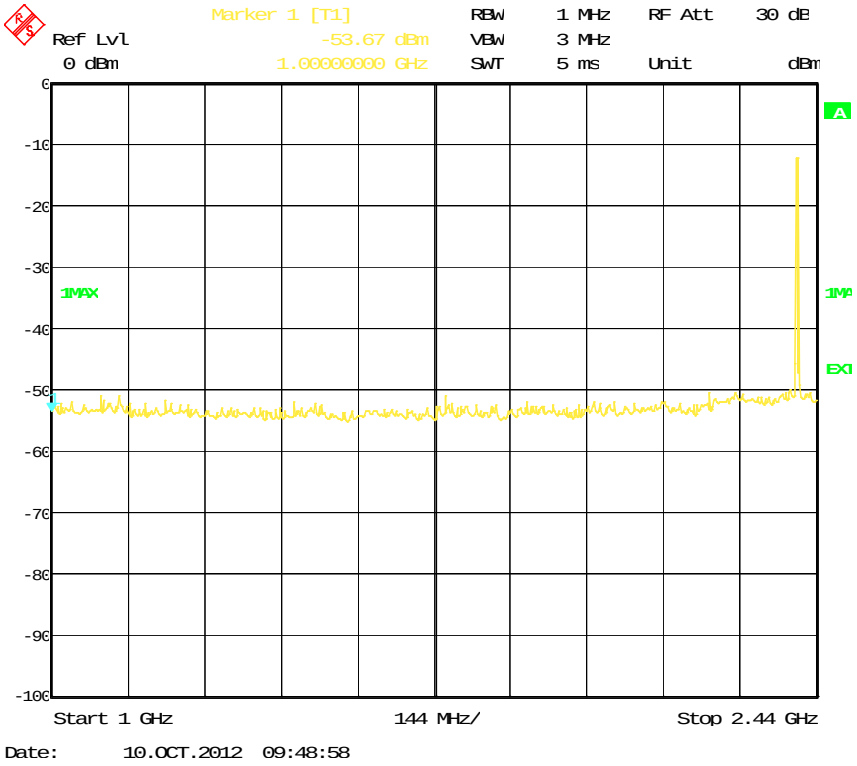
5.2. Bluetooth Test results

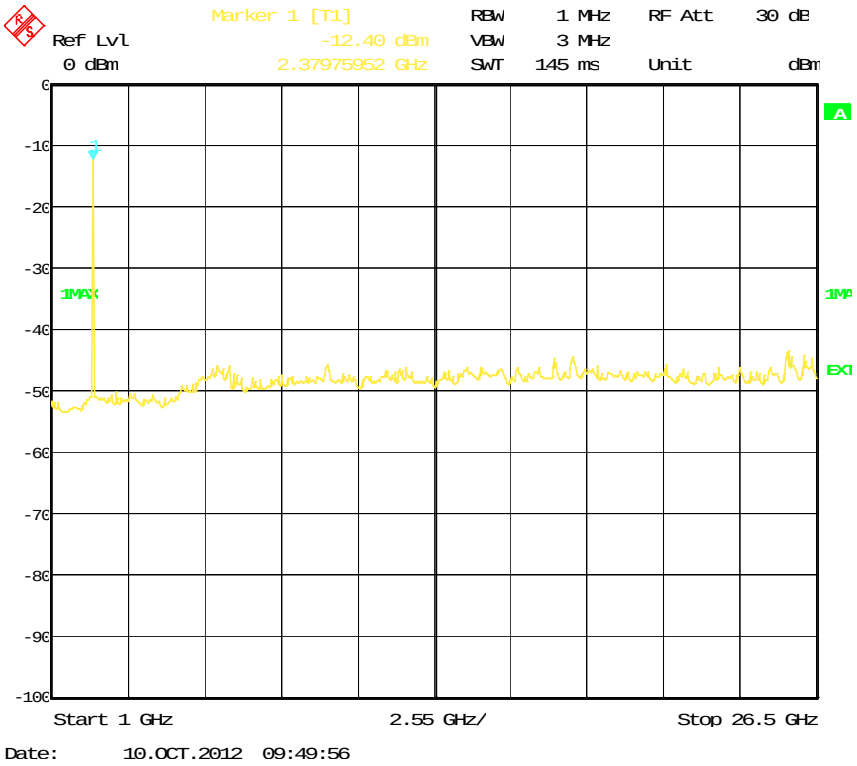
Channel 0 / 2402 MHz

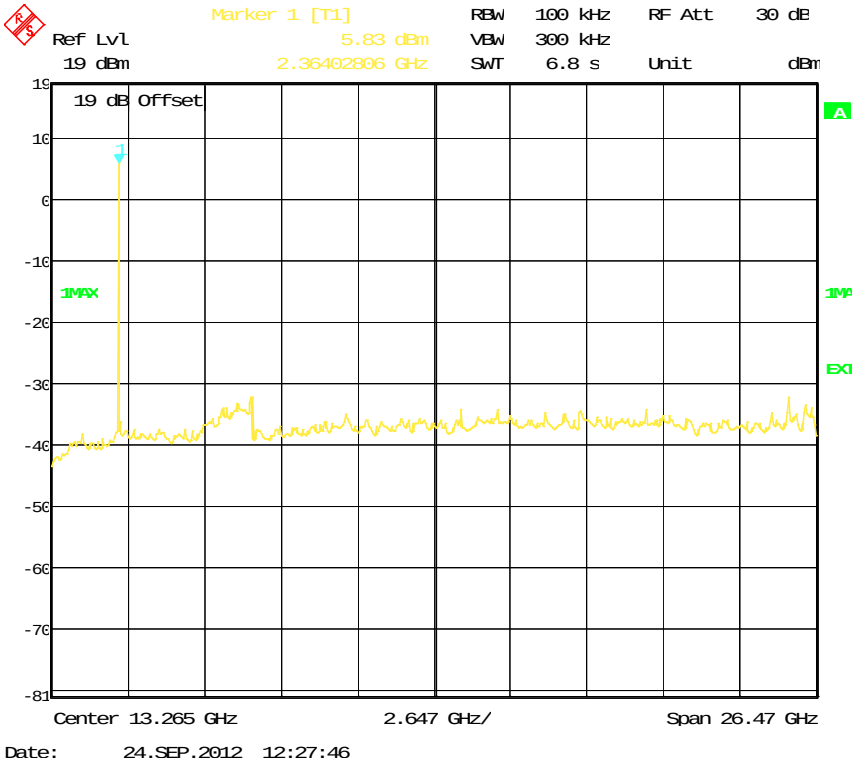


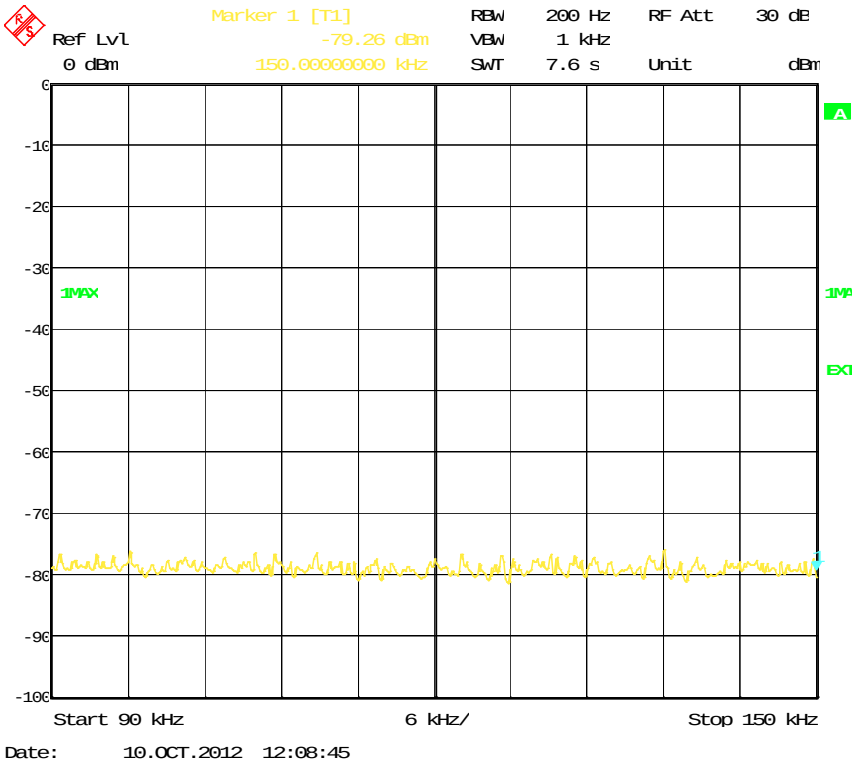

Marker 1 [T1]
-75.32 dBm
150.00000000 kHz
RBW 10 kHz
VBW 30 kHz
SWT 760 ms
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
1MAX
A
Start 150 kHz
2.985 MHz/
Stop 30 MHz
Date: 10.OCT.2012 09:46:36

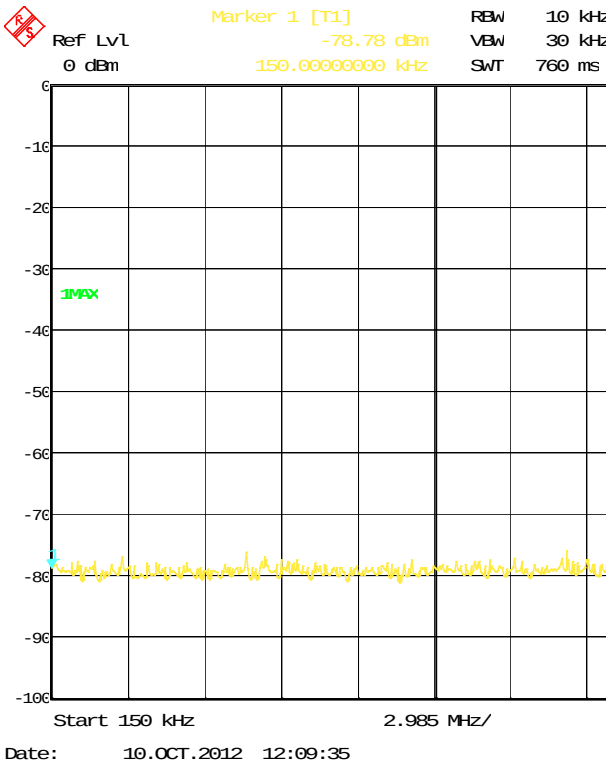

Marker 1 [T1]
-58.29 dBm
976.67334669 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
1MAX
A
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 10.OCT.2012 09:47:43

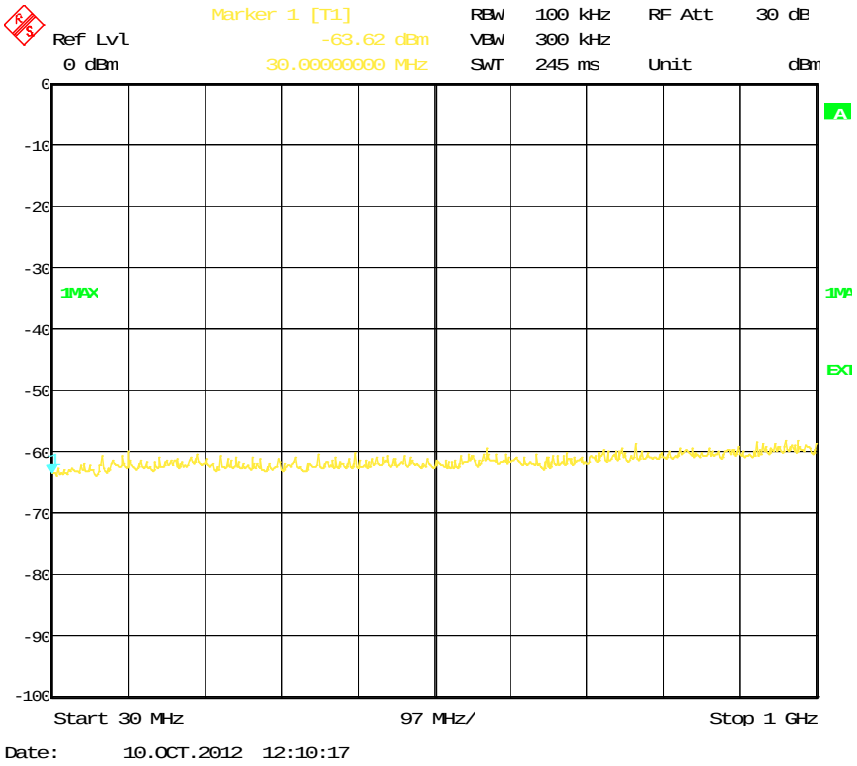

Marker 1 [T1]
-53.67 dBm
1.00000000 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1MAX
A
1MA
EXT
Start 1 GHz
144 MHz/
Stop 2.44 GHz
Date: 10.OCT.2012 09:48:58

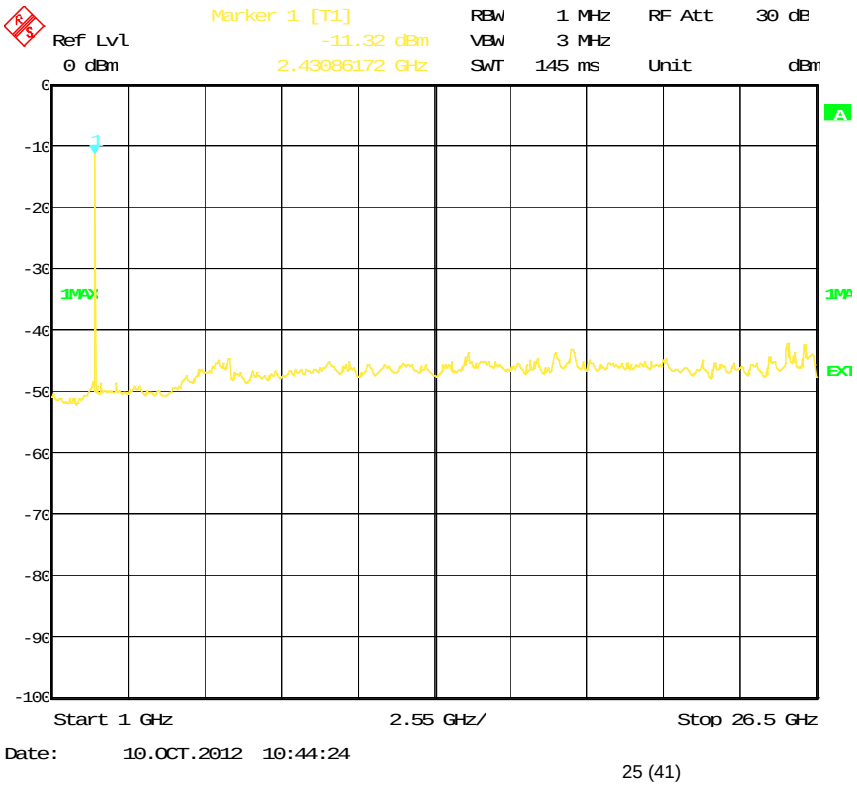

Marker 1 [T1]
-12.40 dBm
2.37975952 GHz
RBW 1 MHz
VBW 3 MHz
SWT 145 ms
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1MAX
A
1MA
EXT
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz
Date: 10.OCT.2012 09:49:56

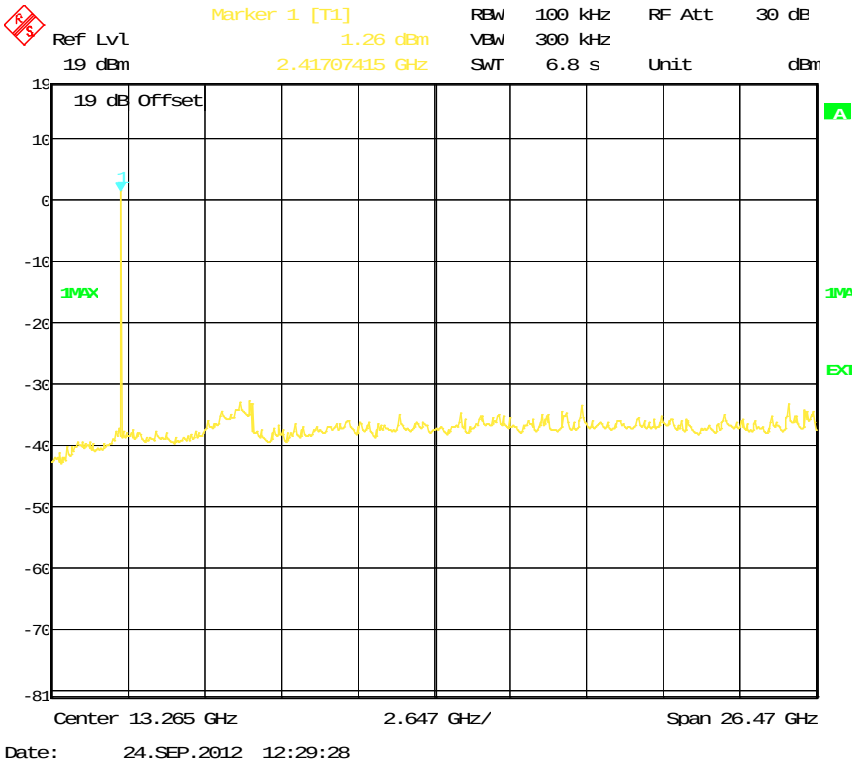

Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
5.83 dBm
VBW 300 kHz
19 dBm
2.36402806 GHz
SWT 6.8 s
Unit dBm
19 dB Offset
1MAX
A
Center 13.265 GHz
2.647 GHz/
Span 26.47 GHz
Date: 24.SEP.2012 12:27:46

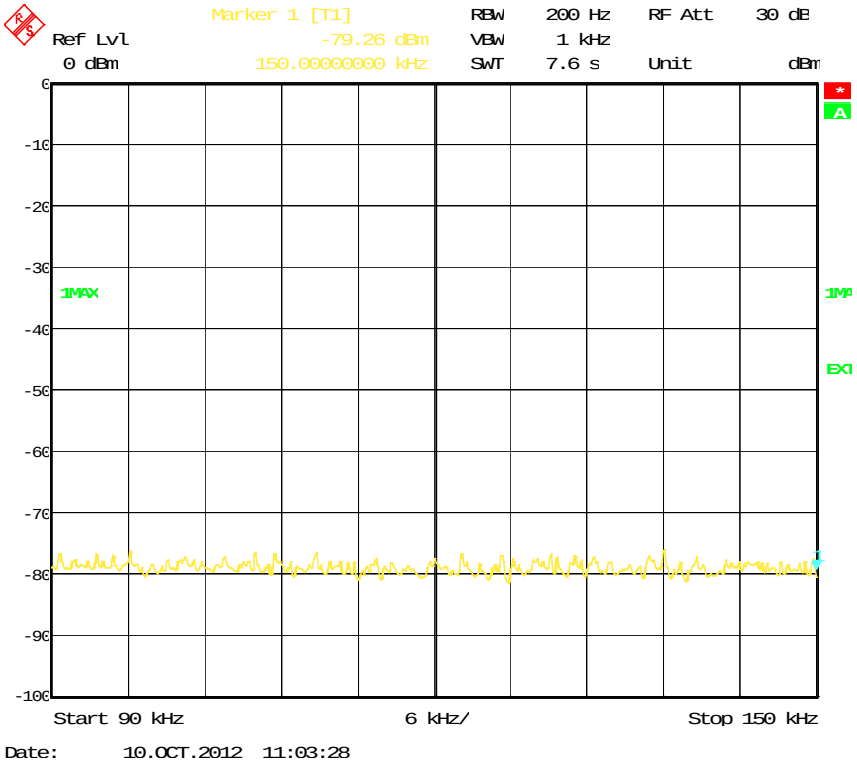

Marker 1 [T1]
RBW 200 Hz
RF Att 30 dB
Ref Lvl
-79.26 dBm
VBW 1 kHz
0 dBm
150.00000000 kHz
SWT 7.6 s
Unit dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1MAX
A
Start 90 kHz
6 kHz/
Stop 150 kHz
Date: 10.OCT.2012 12:08:45

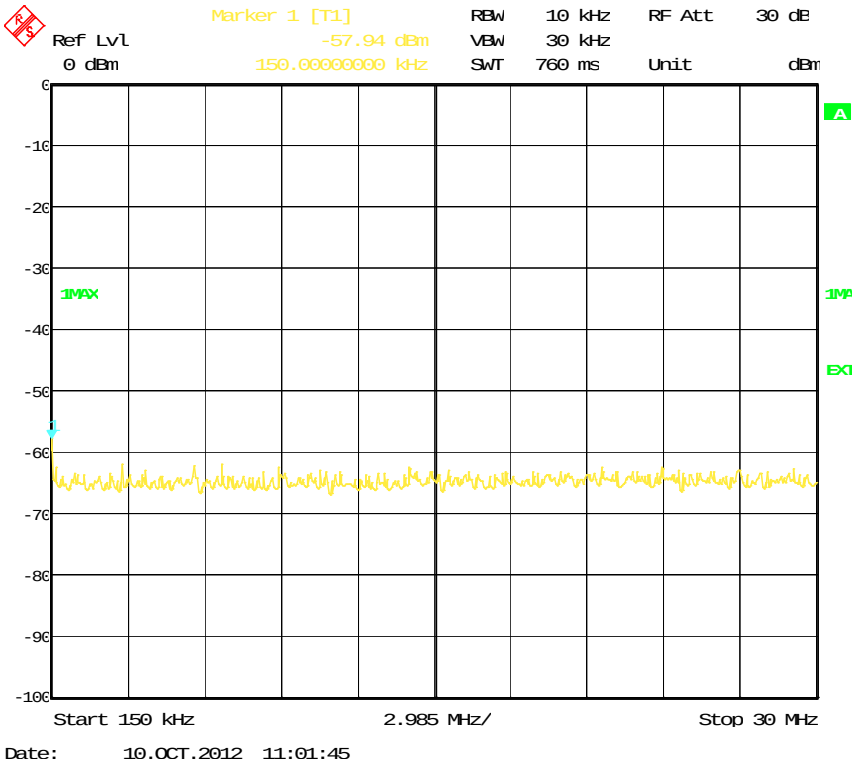

Marker 1 [T1]
RBW 10 kHz
Ref Lvl
-78.78 dBm
VBW 30 kHz
0 dBm
150.00000000 kHz
SWT 760 ms
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1MAX
Start 150 kHz
2.985 MHz/
Date: 10.OCT.2012 12:09:35

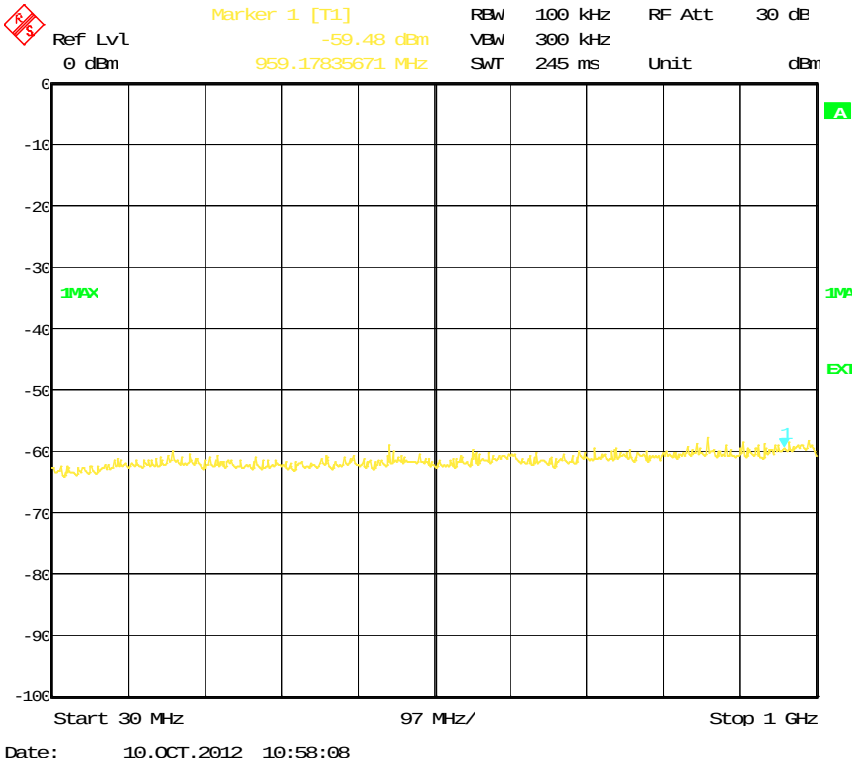

Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-63.62 dBm
VBW 300 kHz
0 dBm
30.00000000 MHz
SWT 245 ms
Unit dBm
0
-10
-20
-30
1MAX
-40
-50
-60
-70
-80
-90
-100
A
1MA
EXT
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 10.OCT.2012 12:10:17

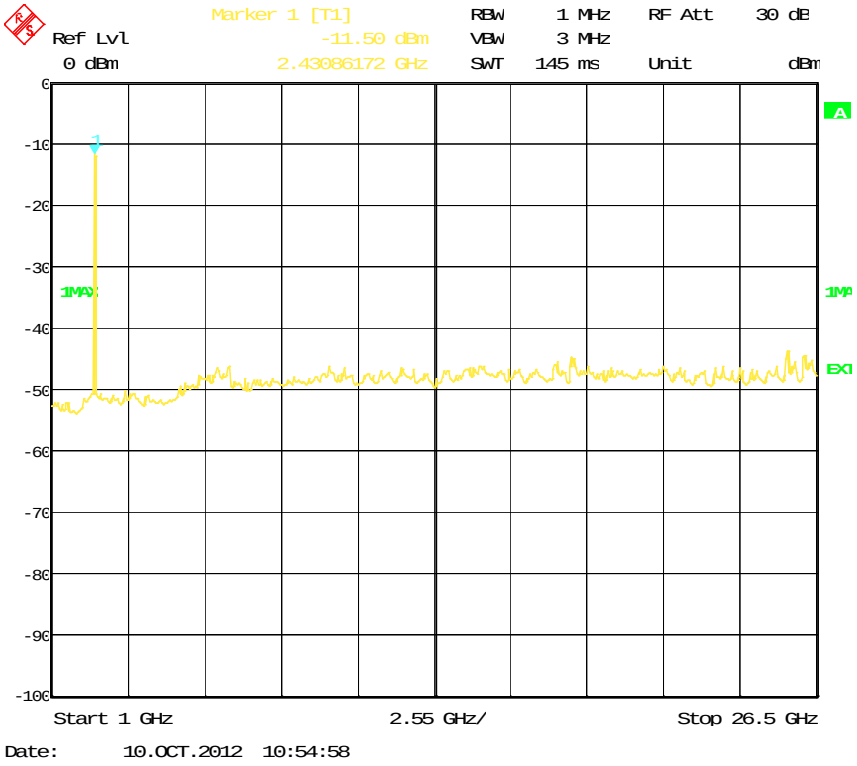

Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-11.32 dBm
VBW 3 MHz
0 dBm
2.43086172 GHz
SWT 145 ms
Unit dBm
0
-10
-20
-30
1MAX
-40
-50
-60
-70
-80
-90
-100
A
1MA
EXT
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz
Date: 10.OCT.2012 10:44:24

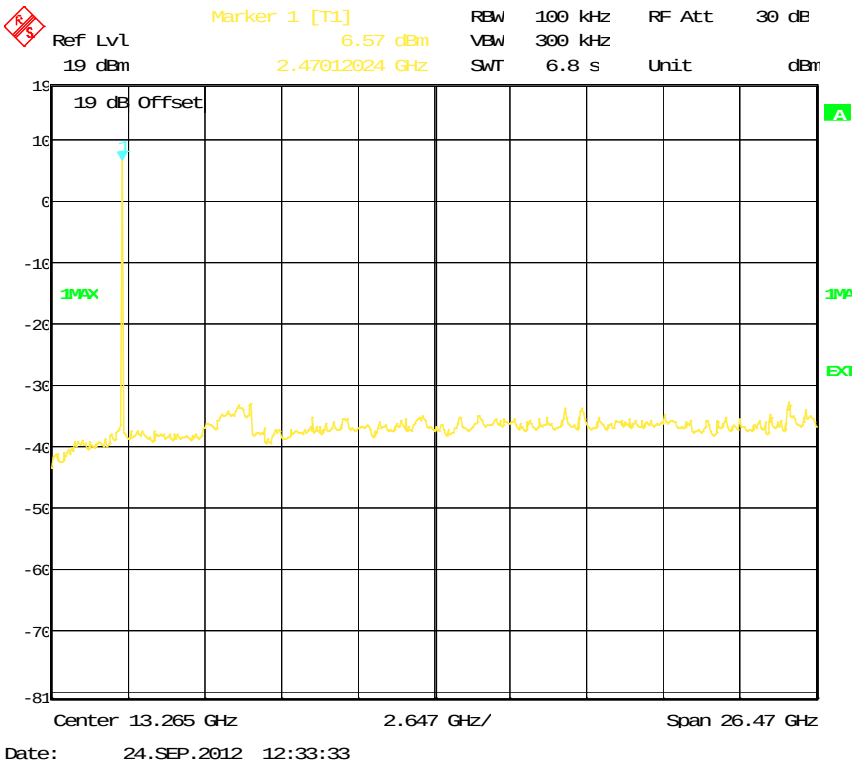

Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
1.26 dBm
VBW 300 kHz
19 dBm
2.41707415 GHz
SWT 6.8 s
Unit dBm
19 dB Offset
1MAX
Center 13.265 GHz
2.647 GHz/
Span 26.47 GHz
Date: 24.SEP.2012 12:29:28


Marker 1 [T1]
-79.26 dBm
150.00000000 kHz
RBW 200 Hz
VBW 1 kHz
SWT 7.6 s
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
1MAX
Start 90 kHz
6 kHz/
Stop 150 kHz
Date: 10.OCT.2012 11:03:28


Marker 1 [T1]
-57.94 dBm
150.00000000 kHz
RBW 10 kHz
VBW 30 kHz
SWT 760 ms
RF Att 30 dB
Unit dBm
Ref Lvl
0 dBm
1MAX
Start 150 kHz
2.985 MHz/
Stop 30 MHz
Date: 10.OCT.2012 11:01:45


Marker 1 [T1]
Ref Lvl
0 dBm
-59.48 dBm
959.17835671 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
1MAX
A
1MA
EXT
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 10.OCT.2012 10:58:08


Marker 1 [T1]
Ref Lvl
0 dBm
-11.50 dBm
2.43086172 GHz
RBW 1 MHz
VBW 3 MHz
SWT 145 ms
RF Att 30 dB
Unit dBm
1MAX
A
1MA
EXT
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz
Date: 10.OCT.2012 10:54:58


Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
6.57 dBm
VBW 300 kHz
19 dBm
2.47012024 GHz
SWT 6.8 s
Unit dBm
19 dB Offset
1MAX
A
Center 13.265 GHz
2.647 GHz/
Span 26.47 GHz
Date: 24.SEP.2012 12:33:33

6. Power Spectral Density

EUT with DUT number	hipKey ELd-12-010
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	Internal battery 3.7 Volt
Results	PASSED
EUT Antenna Gain	-2 dB
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 /101.9
Date of measurements	24-Sep/10-Oct-2012
Measured by	Ruben Hansen

6.1. Test method and limit

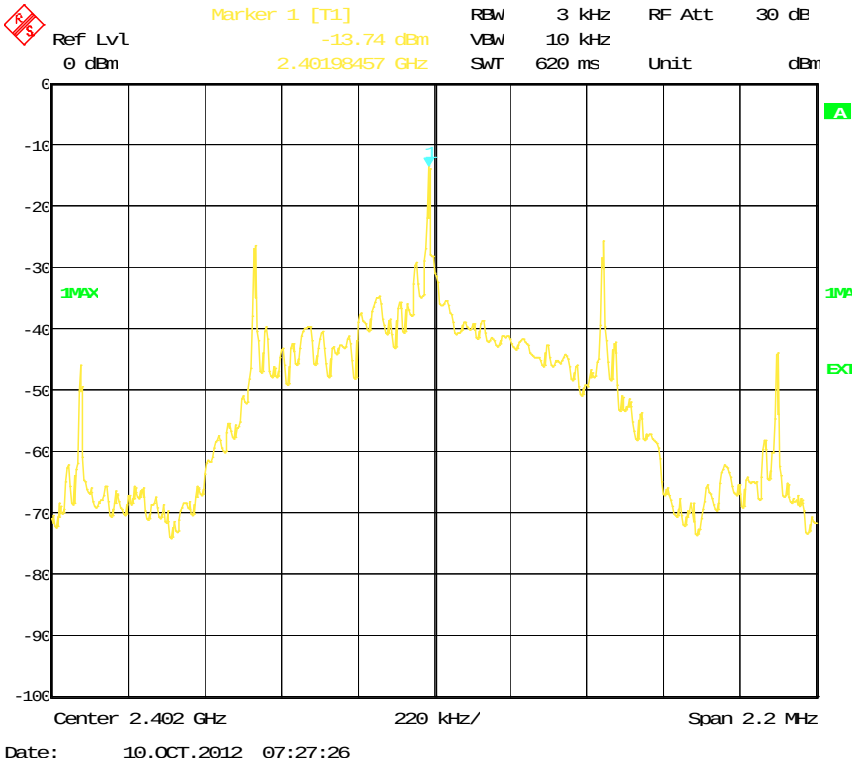
The measurement is made according to KBD 558074

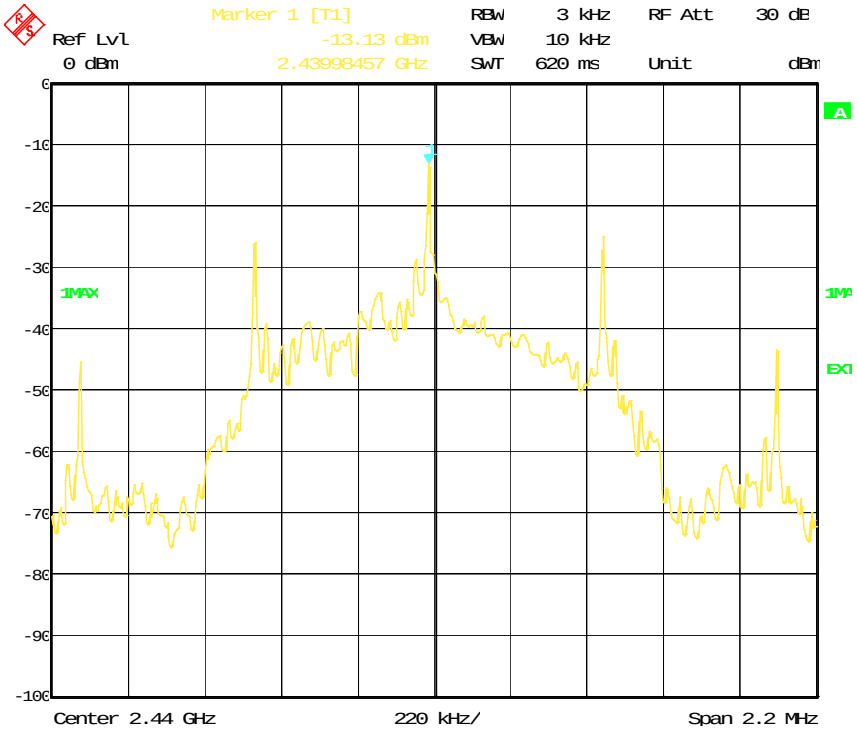
Attenuation EUT to Spectrum Analyzer = 19 dB

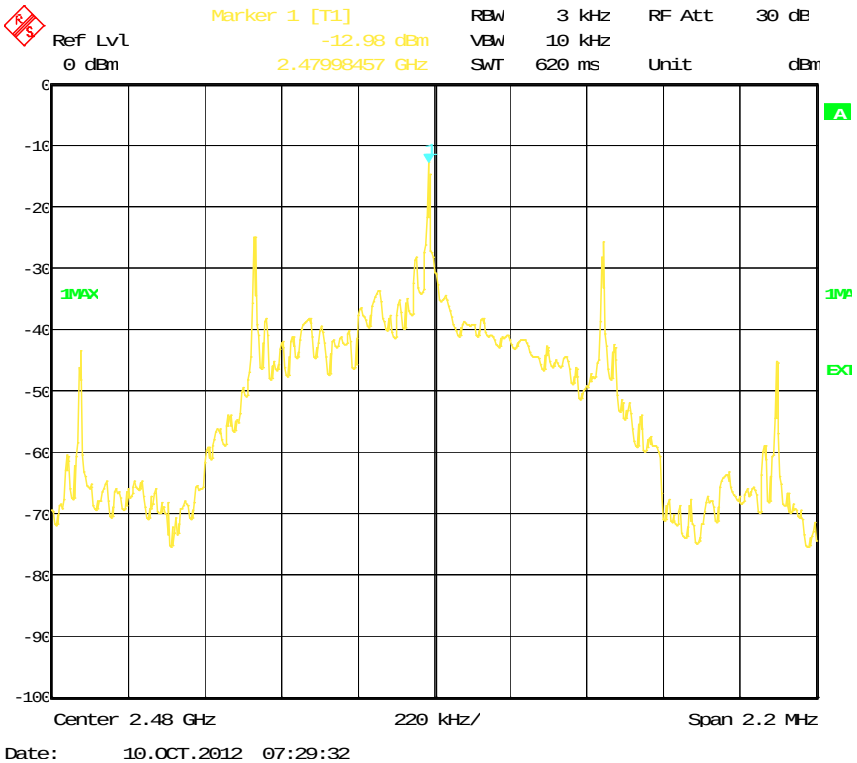
Limits for DTS Power Spectral Density measurements

Limit [dBm]
8

6.1.1 PSD


Marker 1 [T1]
RBW 3 kHz
RF Att 30 dB
Ref Lvl
-13.74 dBm
VBW 10 kHz
0 dBm
2.40198457 GHz
SWT 620 ms
Unit dBm
1MAX
A
Center 2.402 GHz
220 kHz/
Span 2.2 MHz
Date: 10.OCT.2012 07:27:26





Attenuation EUT to Spectrum Analyzer = 19 dB

Peak (RBW: 3 kHz, VBW: 10 kHz)

Frequency [MHz]	Corr. [dB]	Peak	Result
0 / 2402	19	5.76	PASSED
19 / 2441	19	5.87	PASSED
39 / 2480	19	6.02	PASSED

7. Band Edge Compliance

EUT with DUT number	hipKey ELd-12-010
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	Internal battery 3.7 Volt Nom.
Results	PASSED
EUT Antenna Gain	-2 dB
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 /101.9
Date of measurements	10-Oct-2012
Measured by	Ruben Hansen

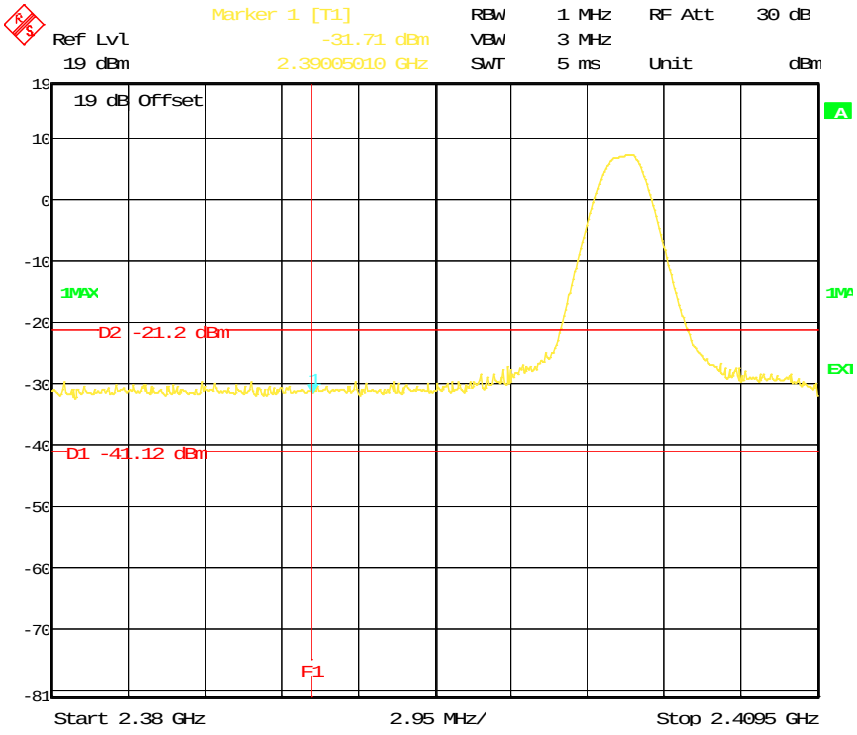
7.1. Test method and limit

The measurement is made according to FCC §15.247 (d)

Limit(s)

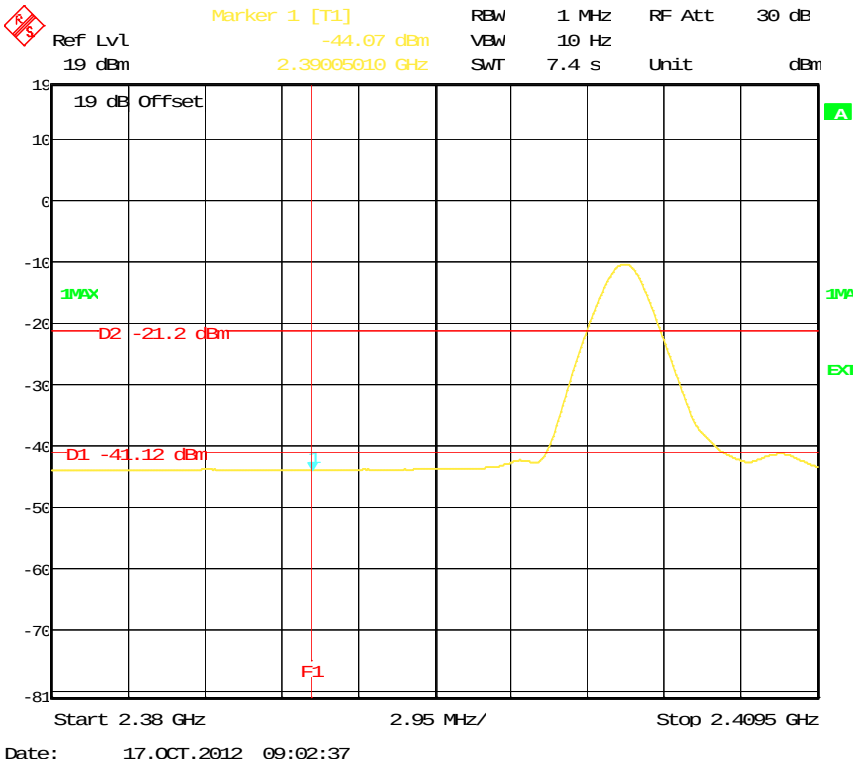
Frequency range of Harmonics or Spurious Emission	Average Limit Converted from Field Strength to dBm measured at RF port	Average Field strength Limit of Fundamental [dBuV/m] @ 3 meters	Peak Field Strength Limit of Fundamental [dBuV/m] @ 3 meters	Peak Limit Converted from Field Strength to dBm measured at RF port
Above 960 MHz	-41.12	54	74	-21.2

Measurements were made conducted, and the antenna gain (-2 dB) has not been taken into account.

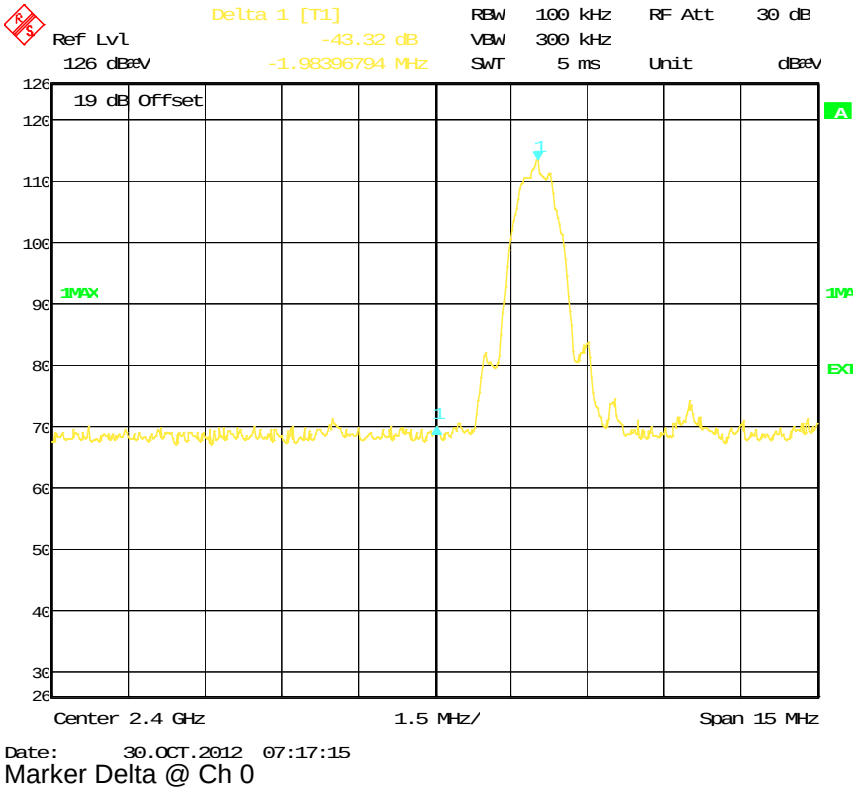


Date: 17.OCT.2012 09:03:53

Peak Ch 0

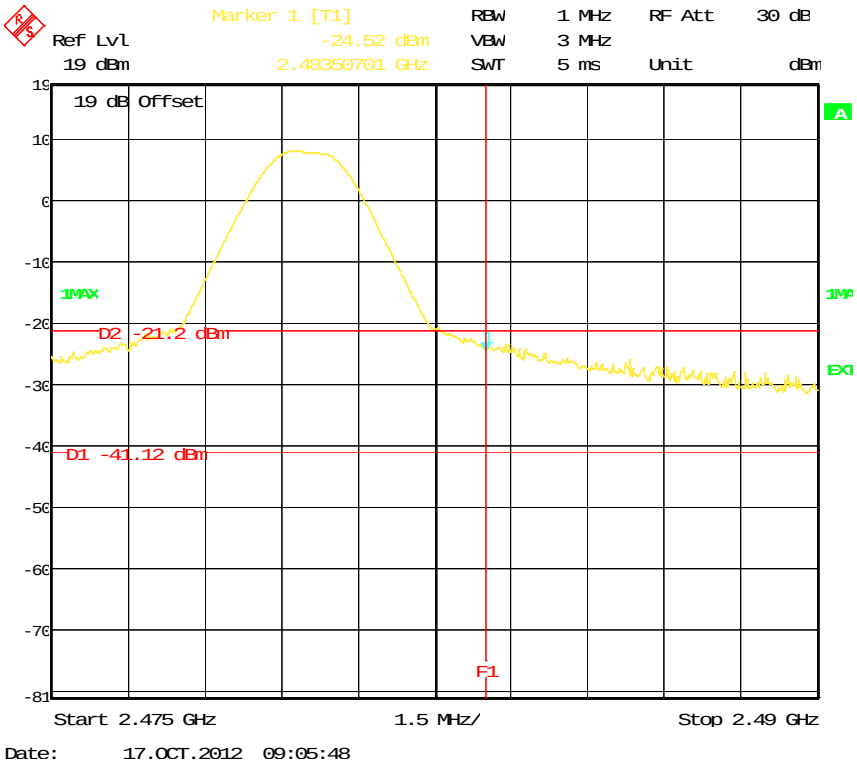

Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-44.07 dBm
VBW 10 Hz
19 dBm
2.39005010 GHz
SWT 7.4 s
Unit dBm
19 dB Offset
1MAX
D2 -21.2 dBm
D1 -41.12 dBm
F1
Start 2.38 GHz
2.95 MHz/
Stop 2.4095 GHz
Date: 17.OCT.2012 09:02:37

Avg. Ch 0

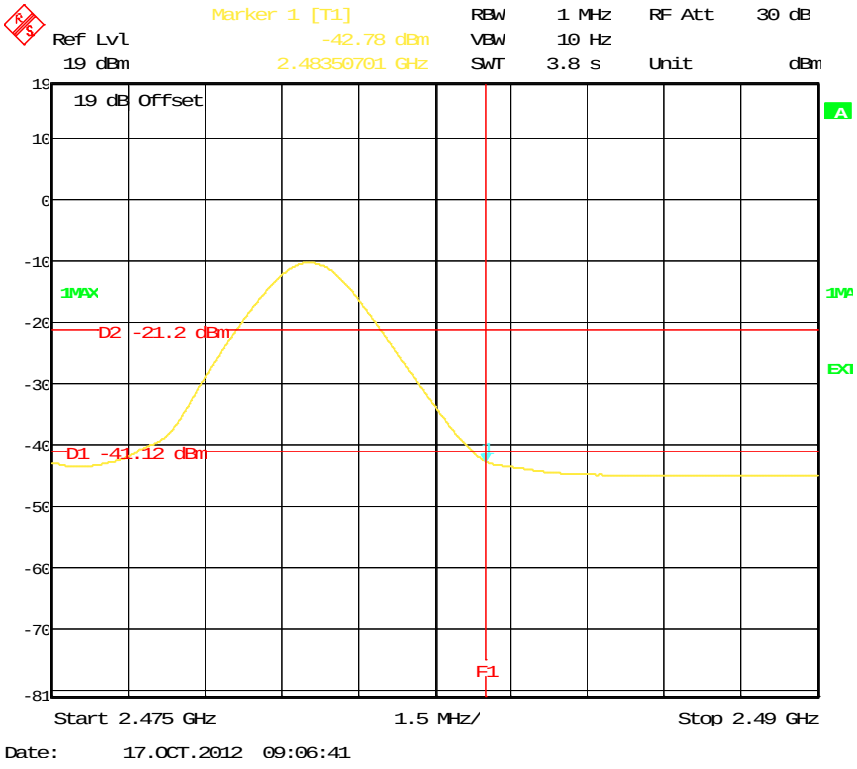


Marker Delta @ Ch 0

The Delta measurement was made with RBW = 100 kHz, VBW = 300 kHz and yielded 43.32 dB


Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-24.52 dBm
VBW 3 MHz
19 dBm
2.48350701 GHz
SWT 5 ms
Unit dBm
19 dB Offset
1MAX
D2 -21.2 dBm
D1 -41.12 dBm
F1
Start 2.475 GHz
1.5 MHz/
Stop 2.49 GHz
Date: 17.OCT.2012 09:05:48

Peak Ch 39


Marker 1 [T1]
-42.78 dBm
2.48350701 GHz
RBW 1 MHz
VBW 10 Hz
SWT 3.8 s
RF Att 30 dB
Unit dBm
Ref Lvl
19 dBm
19 dB Offset
1MAX
D2 -21.2 dBm
D1 -41.12 dBm
F1
Start 2.475 GHz
1.5 MHz/
Stop 2.49 GHz
Date: 17.OCT.2012 09:06:41

Avg. CH 39

8. Test Equipment

8.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Next Cal. date
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	-
13513	Pulse Limiter	ESH3Z2	Rohde&Schwarz	-
14993	Receiver	ESCS30	Rohde&Schwarz	30 oct 2012
13935	LISN	ESH3-Z5	Rohde&Schwarz	24 aug 2013
20682	LISN	ESH3-Z5	Rohde&Schwarz	24 aug 2013
18772	Shielded Chamber	RFD-100	ETS-Lindgren	-
19116	Power splitter	-	various	-
19625	Climatic Chamber	VT4002EMC	Vötsch	19 sep 2013
15945	Spectrum Analyzer	FSIQ	Rohde&Schwarz	10 aug 2013
20168	Bluetooth Tester	CBT	Rohde&Schwarz	-
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	-
20544	Transformer. 230/115V	-	Nokia	-

8.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Next Cal. date
13077	Power Supply	EA-3016	-	-
20763	Analyzer 20Hz-26.5GHz	ESI	Rohde&Schwarz	7 aug 2013
18773	Anechoic chamber	RFD-100	ETS-Lindgren	31 jan 2015
18774	Anechoic chamber	RFSD-F/A-100	ETS-Lindgren	31 jan 2015
18792	Mast/turntable controller	2090	ETS-EMCO	-
18860	Antenna	HL562	Rohde&Schwarz	1 feb 2013
20117	RF Preamplifier 100MHz-3GHz	AFS4-00100300	Miteq	7 aug 2013
20120	RF Preamplifier 200MHz-18GHz	AMF60-020180-29-20P	Miteq	7 aug 2013
18805	RF Preamplifier 1-26.5GHz (In metal box)	JS4-01002600-36-5P	Miteq	7 aug 2013
20168	Bluetooth Tester	CBT	Rohde&Schwarz	-
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	-
20544	Transformer. 230/115V	-	Nokia	-
20698	Antenna	BBHA 9120 D	SCHWARZBECK	1 mar 2013
17524	Horn Antenna 18 - 26.5 GHz	638	Narda	-

9. Uncertainty Budget

	Frequency [MHz]	Polarization	Expanded Uncertainty [dB] (k=2)
Radiated Emission AEC 30 - 3000 MHz (CISPR 16-4)	30 - 200	Vertical	**4.73**
	200 - 3000	Vertical	**4.97**
	30 - 200	Horizontal	**4.72**
	200 - 3000	Horizontal	**5.08**
Radiated Emission AEC 3 - 6 GHz (CISPR 16-4)	3000 - 6000	Vertical	**3.76**
	3000 - 6000	Horizontal	**3.77**
Uncertainty for Spurious emission (ETSI TR 100 028)	30 - 1000		**5.34**
	1000 - 3000		**5.47**
	over 3000		**5.53**
Conducted RF			**3.45**
Time measurement using Spectrum Analyser		%	**8.42**
Conducted disturbances AC using a 50 W/50 mH AMN (CISPR 16-4)	0.01 - 0.15		**3.44**
Conducted disturbances DC using a 50 W/50 mH AMN (CISPR 16-4)	0.01 - 0.15		**3.44**
Conducted disturbances AC using a 50 W/50 mH AMN (CISPR 16-4)	0.15 - 30		**3.44**
Conducted disturbances DC using a 50 W/50 mH AMN (CISPR 16-4)	0.15 -30		**3.44**
Radiated Emission Mag. Loop Antenna	0.15 - 30		**3.60**