



TEST REPORT

Report No.: SRTC2012-H024-E0028

Product Name: GSM/GPRS/EDGE/UMTS

Digital Mobile Phone with Bluetooth and WiFi

Product Model: ONE TOUCH 902A

Applicant: TCT Mobile Limited

Manufacturer: TCT Mobile Limited

Specification: FCC Part 15, Subpart C (July 10, 2008 edition)

IC RSS-210 (Issue 8, December 2010)

IC RSS-Gen (Issue 3 December 2010)

FCC ID: RAD243

IC: 9238A-0009

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

Tel: 86-10-68009202 Fax: 86-10-68009205

CONTENTS

| | |
|---|----|
| 1. General information | 3 |
| 1.1 Notes of the test report | 3 |
| 1.2 Information about the testing laboratory..... | 3 |
| 1.3 Applicant's details | 3 |
| 1.4 Manufacturer's details..... | 3 |
| 1.5 Application details | 4 |
| 1.6 Reference specification..... | 4 |
| 1.7 Information of EUT | 4 |
| 1.7.1 General information..... | 4 |
| 1.7.2 EUT details | 5 |
| 1.7.3 Auxiliary equipment details..... | 5 |
| 2. Test information | 7 |
| 2.1 Summary of the test results..... | 7 |
| 2.2 Test result..... | 8 |
| 2.2.1 Occupied Bandwidth | 8 |
| 2.2.2 Peak Power Output | 15 |
| 2.2.3 Spurious RF Conducted Emissions | 22 |
| 2.2.4 Spurious Radiated Emissions..... | 41 |
| 2.2.5 Band Edge Compliance | 49 |
| 2.2.6 Dwell time | 67 |
| 2.2.7 Channel separation | 74 |
| 2.2.8 Number of hopping frequencies | 76 |
| 2.2.9 AC Power line Conducted Emission | 78 |
| 2.3. Measurement Uncertainty | 80 |
| 2.4. List of test equipment..... | 81 |

1. General information

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC).

The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company: The State Radio_monitoring_center Testing Center (SRTC)
Address: No.80 Beilishi Road, Xicheng District, Beijing China
City: Beijing
Country or Region: China
Contacted person: Wang Junfeng
Tel: +86 10 68009181 +86 10 68009202
Fax: +86 10 68009195 +86 10 68009205
Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

1.3 Applicant's details

Company: TCT Mobile Limited
Address: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area
City: Shanghai
Country or Region: P.R.China
Grantee Code: RAD
Contacted person: Gong Zhizhou
Tel: +86-21-61460890
Fax: +86-21-61460602
Email: zhizhou.gong@jrdcom.com

1.4 Manufacturer's details

Company: TCT Mobile Limited
Address: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area
City: Shanghai
Country or Region: P.R.China
Contacted person: Gong Zhizhou
Tel: +86-21-61460890
Fax: +86-21-61460602
Email: zhizhou.gong@jrdcom.com

1.5 Application details

Date of reception of test sample: 12th March 2012

Date of test: 12th March 2012 to 15th March 2012

1.6 Reference specification

FCC Part 15, Subpart C (July 10, 2008 edition)

IC RSS-210 (Issue 8, December 2010)

IC RSS-Gen (Issue 3 December 2010)

1.7 Information of EUT

1.7.1 General information

| | |
|----------------------------|---|
| Name of EUT | GSM/GPRS/EDGE/UMTS Digital Mobile Phone with Bluetooth and WiFi |
| FCC ID | RAD243 |
| IC | 9238A-0009 |
| Frequency range | 2.4GHz~2.4835GHz |
| Number of channel | 79 |
| Modulation type | GFSK, $\pi/4$ DQPSK, 8DPSK |
| Duplex mode | TDD |
| Channel spacing | 1MHz |
| Data rate | 1Mbps, 2 Mbps, 3 Mbps |
| Antenna type | Fixed Internal |
| Power Supply | Battery or charger |
| Rated Power Supply Voltage | 3.7V |
| HW Version | PIO01 |
| SW Version | SW134 |

1.7.2 EUT details

| Product Name | Product Model | IMEI |
|---|----------------|-----------------|
| GSM/GPRS/EDGE/UMTS Digital Mobile Phone with Bluetooth and WiFi | ONE TOUCH 902A | 013022000001015 |

1.7.3 Auxiliary equipment details

| Equipment | Charger |
|----------------|----------------------------------|
| Manufacturer | HUIZHOU BYD ELECTRONIC CO., LTD. |
| Model Number | CBA3002AG0C1 |
| Input Voltage | 100V-240V a.c. |
| Output Voltage | 5.0V d.c. |
| Frequency | 50/60Hz |

| Equipment | Charger |
|----------------|----------------------------------|
| Manufacturer | HUIZHOU BYD ELECTRONIC CO., LTD. |
| Model Number | CBA3001AG0C1 |
| Input Voltage | 100V-240V a.c. |
| Output Voltage | 5.0V d.c. |
| Frequency | 50/60Hz |

| Equipment | Charger |
|----------------|----------------------------------|
| Manufacturer | HUIZHOU BYD ELECTRONIC CO., LTD. |
| Model Number | CBA3001AG0C2 |
| Input Voltage | 100V-240V a.c. |
| Output Voltage | 5.0V d.c. |
| Frequency | 50/60Hz |

| Equipment | Charger |
|----------------|----------------------------|
| Manufacturer | Ten Pao International Ltd. |
| Model Number | CBA3000AG0C1 |
| Input Voltage | 100V-240V a.c. |
| Output Voltage | 5.0V d.c. |
| Frequency | 50/60Hz |

| Equipment | Battery |
|---------------|-------------------------------|
| Manufacturer | SHENZHEN BAK BATTERY CO., LTD |
| Model Number | CAB31L0000C2 |
| Capacity | 1000mAh |
| Rated Voltage | 3.7V d.c. |

| Equipment | Data Cable |
|--------------|--------------------------------------|
| Manufacturer | Shen Zhen Ju Wei Electronic Co., LTD |
| Model Number | CDA3122002C1 |

| Equipment | Data Cable |
|--------------|------------------------------------|
| Manufacturer | Huizhou Shenghua Industry Co., Ltd |
| Model Number | CDA3122002C2 |

| Equipment | Data Cable |
|--------------|--------------------------------------|
| Manufacturer | Shen Zhen Ju Wei Electronic Co., LTD |
| Model Number | CDA3122005C1 |

| Equipment | Data Cable |
|--------------|------------------------------------|
| Manufacturer | Huizhou Shenghua Industry Co., Ltd |
| Model Number | CDA3122005C2 |

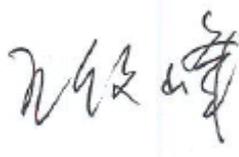
Note: As the information described above, there are four different models of charger manufactured by two different companies, and four different models of data cable manufactured by two different companies.

The relevant tests have been performed in order to verify in which combination case (EUT exercised by only one model of charger and one model of data cable) the EUT would have the worst features. So all the tests shown in this test report are performed when the EUT exercised by the charger CBA3000AG0C1 and the data cable CDA3122005C2.

2. Test information

2.1 Summary of the test results

| No. | Test case | FCC and IC reference | Verdict |
|-----|----------------------------------|--|---------|
| 1 | Occupied Bandwidth | FCC Part15.247(a)(1) IC RSS-210 § A8.1(a) | Pass |
| 2 | Peak Power Output | FCC Part15.247(a)(1) IC RSS-210 § A8.4(2) | Pass |
| 3 | Spurious RF Conducted Emissions | FCC Part15.247(d) IC RSS-210 § A8.5 | Pass |
| 4 | Spurious Radiated Emissions | FCC Part15.247(d)/15.35(b)/15.209 IC RSS-210 § A8.5 | Pass |
| 5 | Band Edge Compliance | FCC Part15.247(d) IC RSS-210 § A8.5 | Pass |
| 6 | Dwell time | FCC Part15.247(a)(1)(iii) IC RSS-210 § A8.1(d) | Pass |
| 7 | Channel separation | FCC Part15.247(a)(1) IC RSS-210 § A8.1(b) | Pass |
| 8 | Number of Hopping frequencies | FCC Part15.247(a)(1)(iii) IC RSS-210 § A8.1(d) | Pass |
| 9 | AC Power line Conducted Emission | FCC Part15.107/15.207 IC RSS-Gen § 7.2.2 | Pass |

| | |
|---|--|
| <p>This Test Report Is Issued by: Mr. Song Qizhu Director of the test lab</p>  | <p>Checked by: Mr. Wang Junfeng Deputy director of the test lab</p>  |
| <p>Tested by: Mr. Li Bin Test engineer</p>  | <p>Issued date:</p> <p style="text-align: center;">2012.05.30</p> |

2.2 Test result

2.2.1 Occupied Bandwidth

2.2.1.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.1.2 Test Description

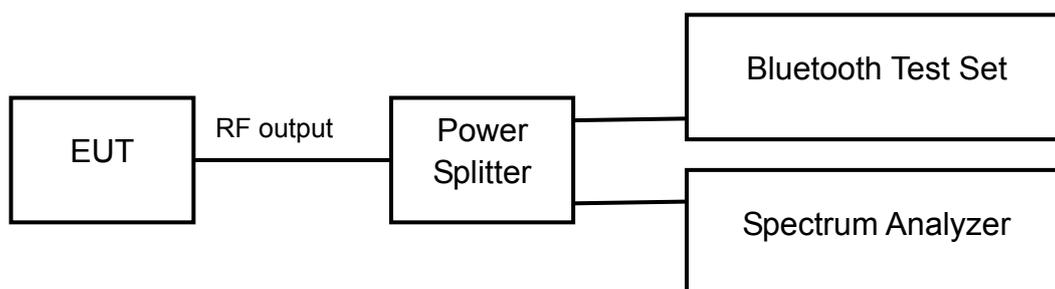
The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

The Equipment Under Test (EUT) was setup in a shielded room to perform the occupied bandwidth measurements.

The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The results recorded were measured with the modulation which produces the worst-case (widest) occupied bandwidth. The resolution bandwidth for measuring the reference level and the occupied bandwidth was 10 kHz.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.



2.2.1.3 Test limit

FCC Part15.247(a)(1):

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

IC RSS-210 § A8.1(a):

The bandwidth of a frequency hopping channel is the -20 dB emission bandwidth, measured with the hopping stopped. The system radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset, while the long-term distribution appears evenly distributed.

2.2.1.4 Test result

Modulation type: GFSK

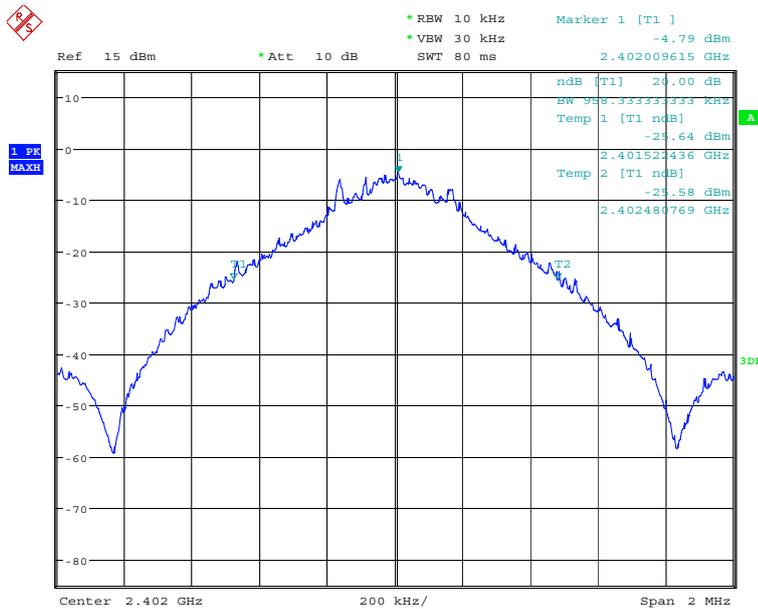
| Carrier frequency (MHz) | Channel No. | 20 dB bandwidth(kHz) |
|-------------------------|-------------|----------------------|
| 2402 | 0 | 958.33 |
| 2441 | 39 | 964.74 |
| 2480 | 79 | 923.08 |

Modulation type: $\pi/4$ DQPSK

| Carrier frequency (MHz) | Channel No. | 20 dB bandwidth(kHz) |
|-------------------------|-------------|----------------------|
| 2402 | 0 | 1298.08 |
| 2441 | 39 | 1298.08 |
| 2480 | 79 | 1288.46 |

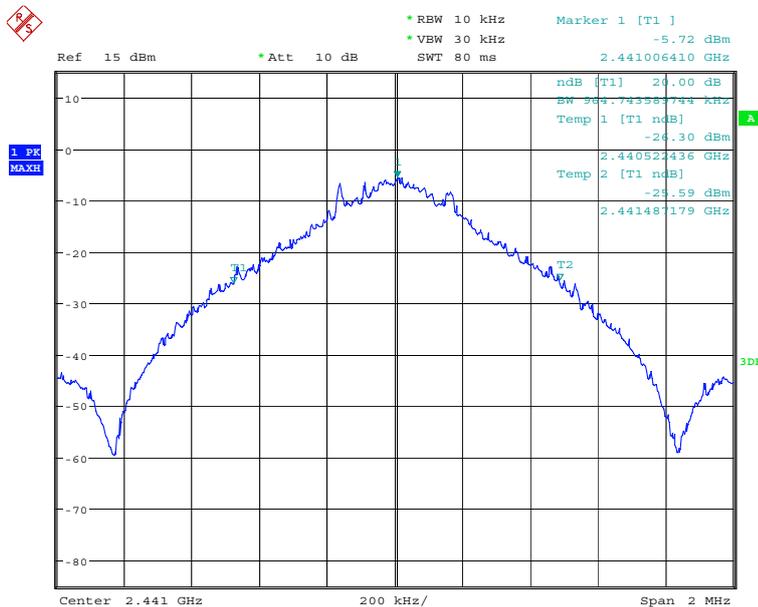
Modulation type: 8DPSK

| Carrier frequency (MHz) | Channel No. | 20 dB bandwidth(kHz) |
|-------------------------|-------------|----------------------|
| 2402 | 0 | 1294.87 |
| 2441 | 39 | 1304.49 |
| 2480 | 79 | 1304.49 |



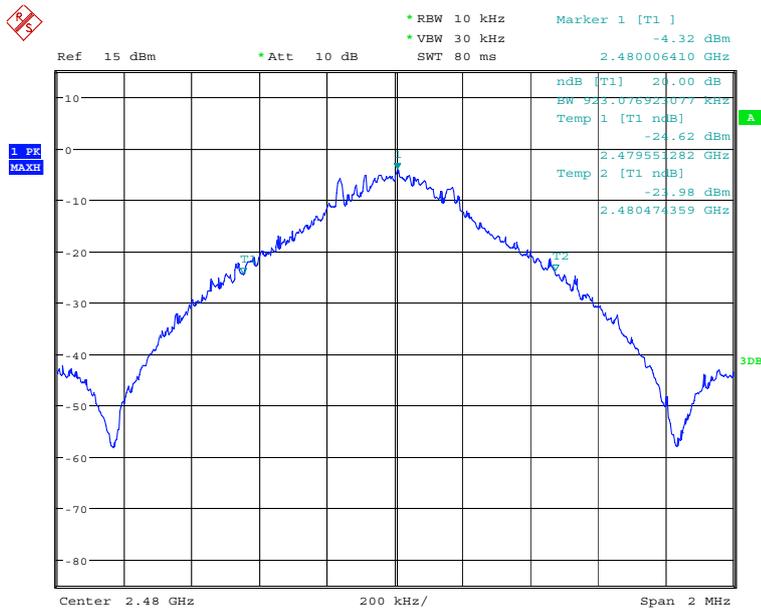
Date: 12.MAR.2012 14:17:22

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



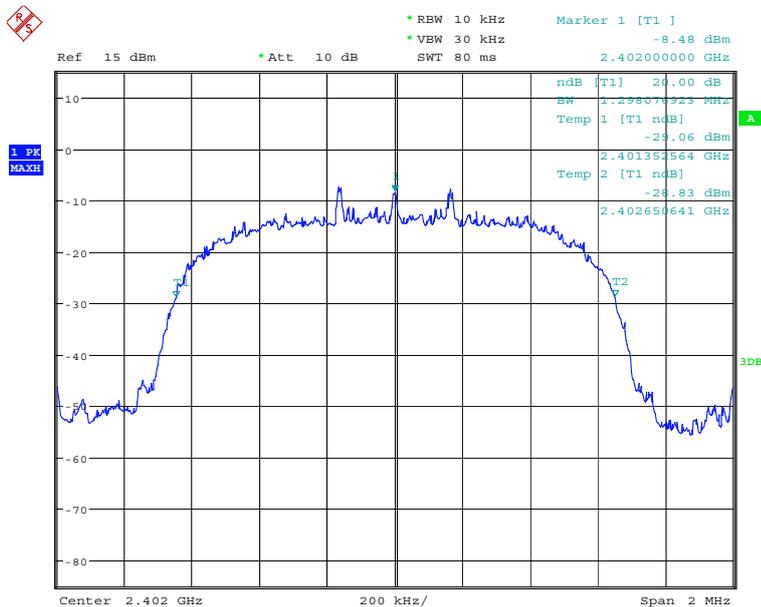
Date: 12.MAR.2012 14:19:22

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



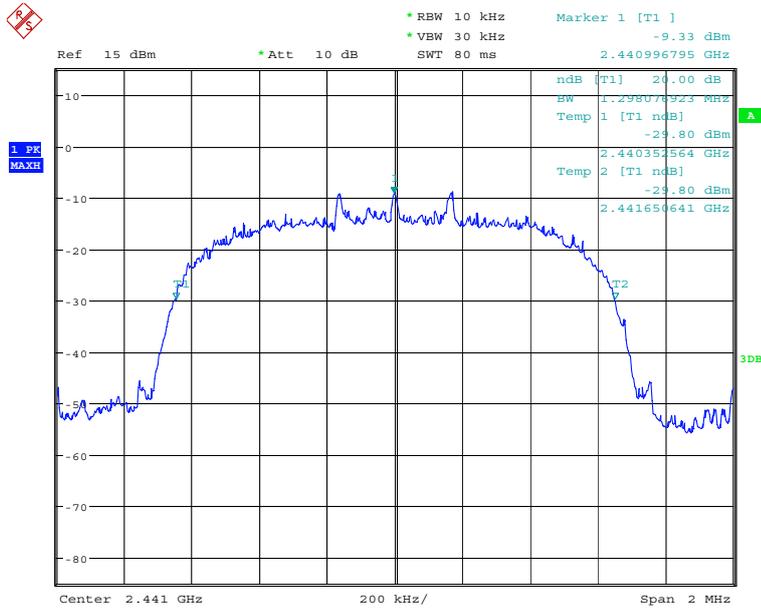
Date: 12.MAR.2012 14:21:12

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK



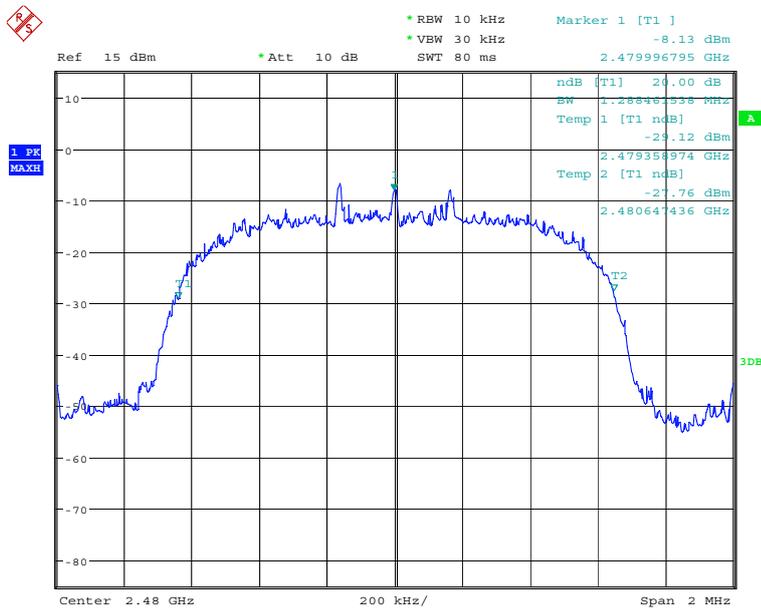
Date: 12.MAR.2012 14:22:57

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



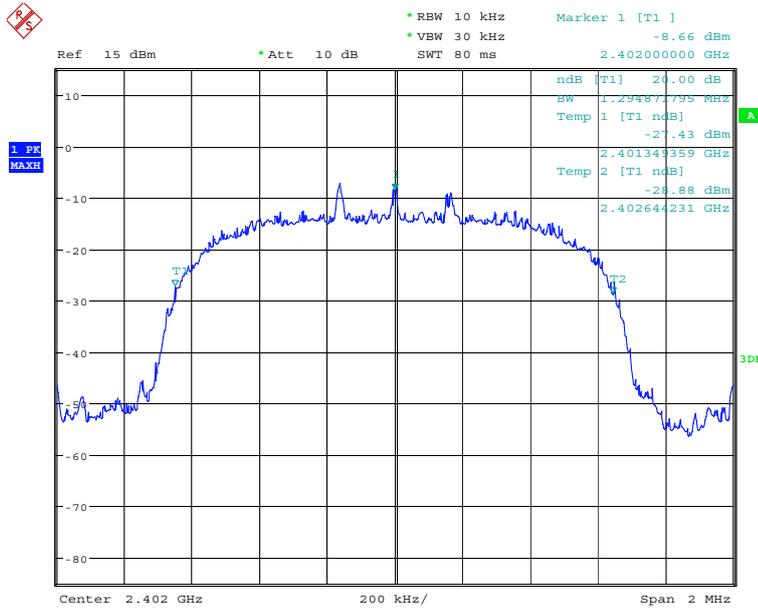
Date: 12.MAR.2012 14:24:41

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK



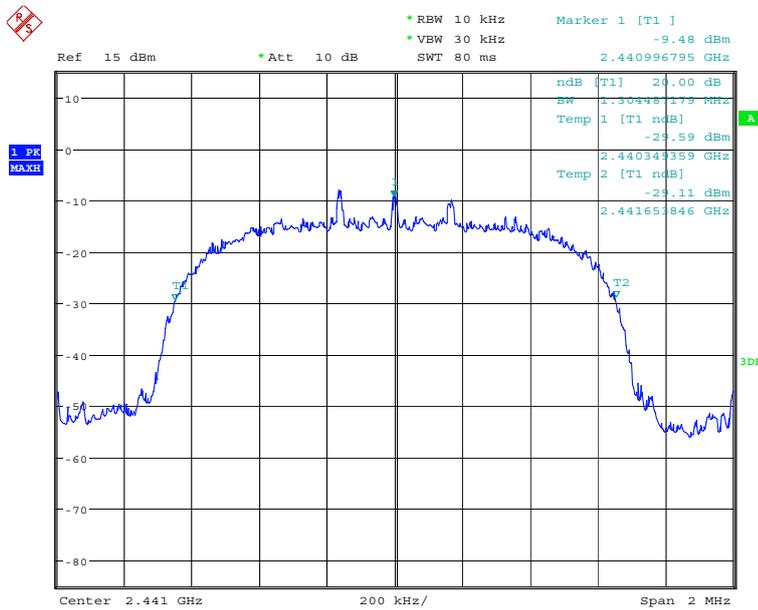
Date: 12.MAR.2012 14:25:45

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK



Date: 12.MAR.2012 14:27:05

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Date: 12.MAR.2012 14:29:18

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: 8DPSK

2.2.2 Peak Power Output

2.2.2.1 Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.2.2 Test Description

The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009

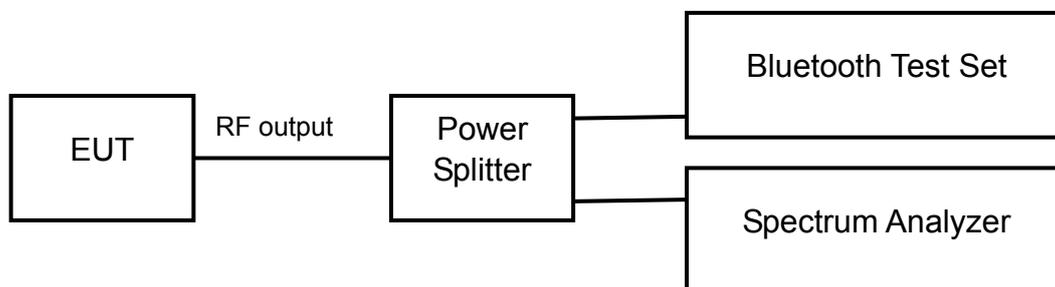
The Equipment Under Test (EUT) was set up in a shielded room to perform the output power measurements.

The results recorded were measured with the modulation which produces the worst-case (highest) output power.

The resolution bandwidth for measuring the output power was 2 MHz.

The reference level of the spectrum analyzer was set higher than the output power of the EUT.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.



2.2.2.3 Test limit

FCC Part15.247(a)(1):

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

IC RSS-210 § A8.4(2):

For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W

Used conversion factor: Limit (dBm) = 10 log (Limit (W)/1mW)

==> Maximum Output Power: 30 dBm

2.2.2.4 Test Condition

| Hopping Mode | Modulation type | RBW | VBW | Span | Sweep time |
|--------------|-----------------|------|------|------|------------|
| Hopping OFF | GFSK | 2MHz | 3MHz | 8MHz | 1ms |
| Hopping OFF | $\pi/4$ DQPSK | 2MHz | 3MHz | 8MHz | 1ms |
| Hopping OFF | 8DPSK | 2MHz | 3MHz | 8MHz | 1ms |

2.2.2.4 Test result:

Modulation type: GFSK

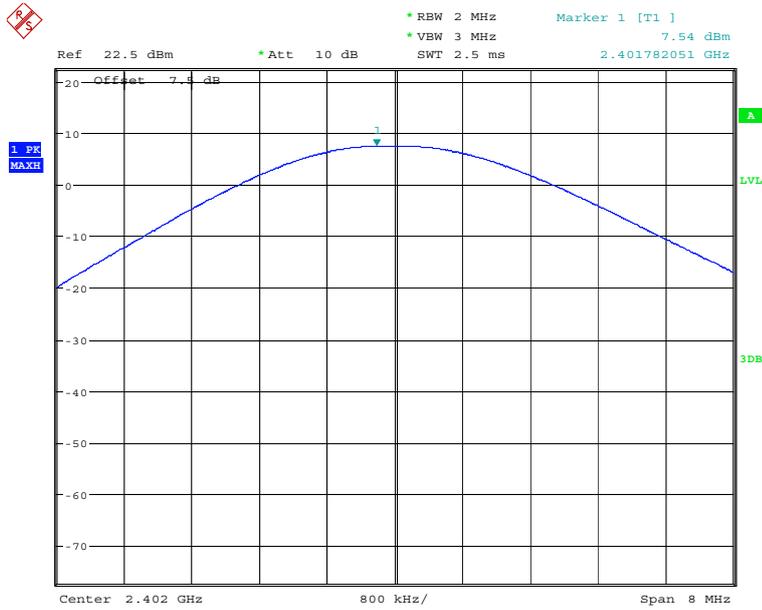
| Carrier frequency (MHz) | Channel No. | Peak Conducted Output Power (dBm) |
|-------------------------|-------------|-----------------------------------|
| 2402 | 0 | 7.54 |
| 2441 | 39 | 6.76 |
| 2480 | 78 | 8.13 |

Modulation type: $\pi/4$ DQPSK

| Carrier frequency (MHz) | Channel No. | Peak Conducted Output Power (dBm) |
|-------------------------|-------------|-----------------------------------|
| 2402 | 0 | 7.39 |
| 2441 | 39 | 6.69 |
| 2480 | 78 | 7.48 |

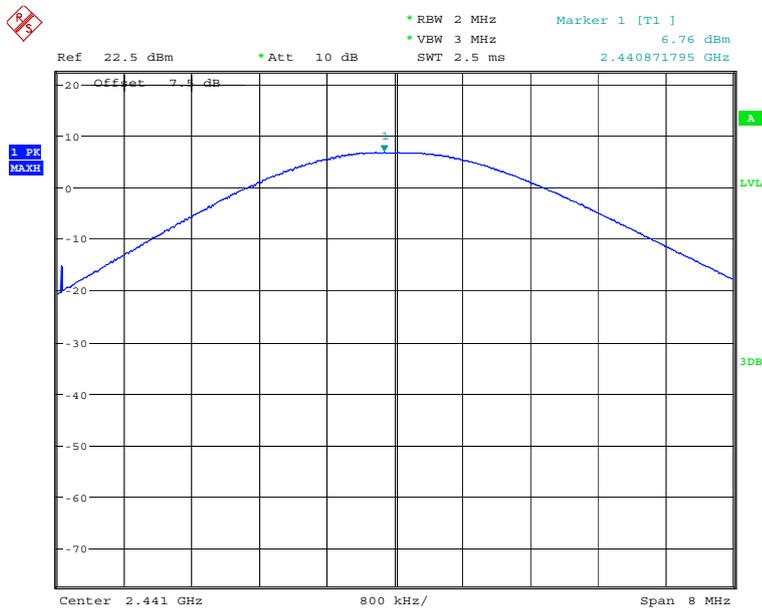
Modulation type: 8DPSK

| Carrier frequency (MHz) | Channel No. | Peak Conducted Output Power (dBm) |
|-------------------------|-------------|-----------------------------------|
| 2402 | 0 | 7.33 |
| 2441 | 39 | 6.66 |
| 2480 | 78 | 7.93 |



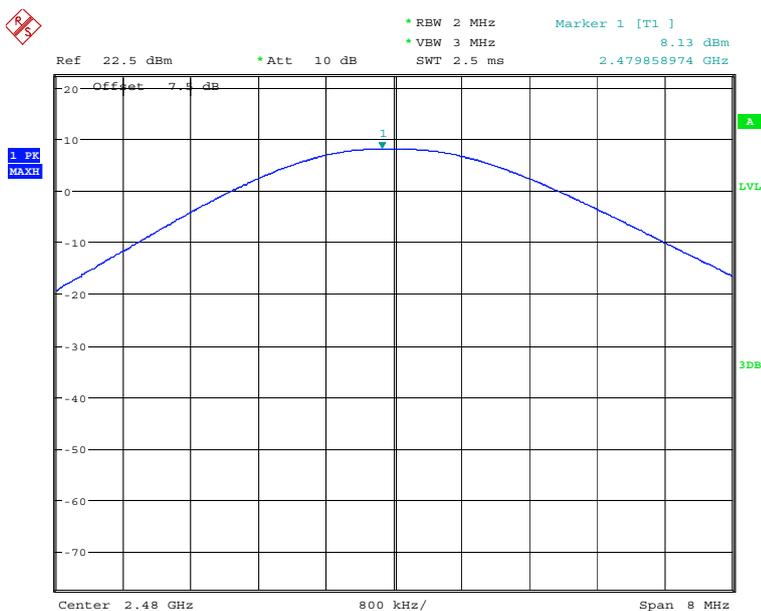
Date: 13.MAR.2012 08:44:21

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



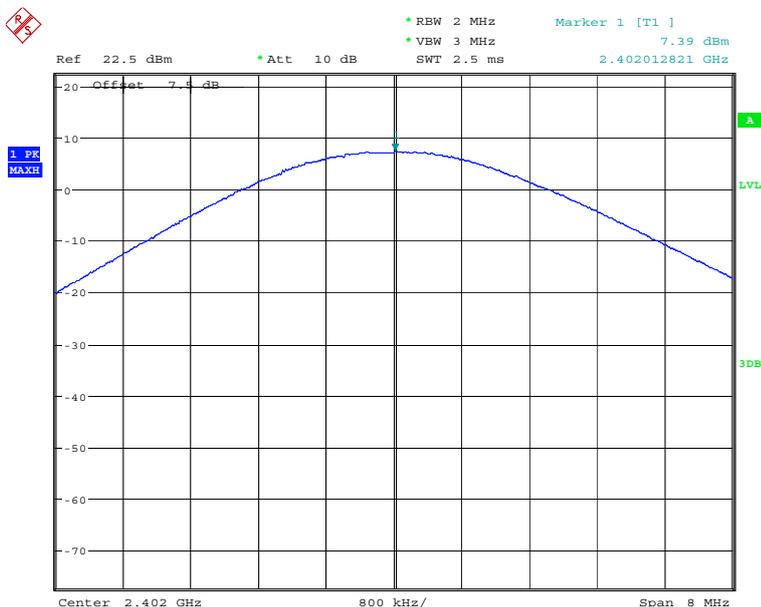
Date: 13.MAR.2012 08:46:40

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



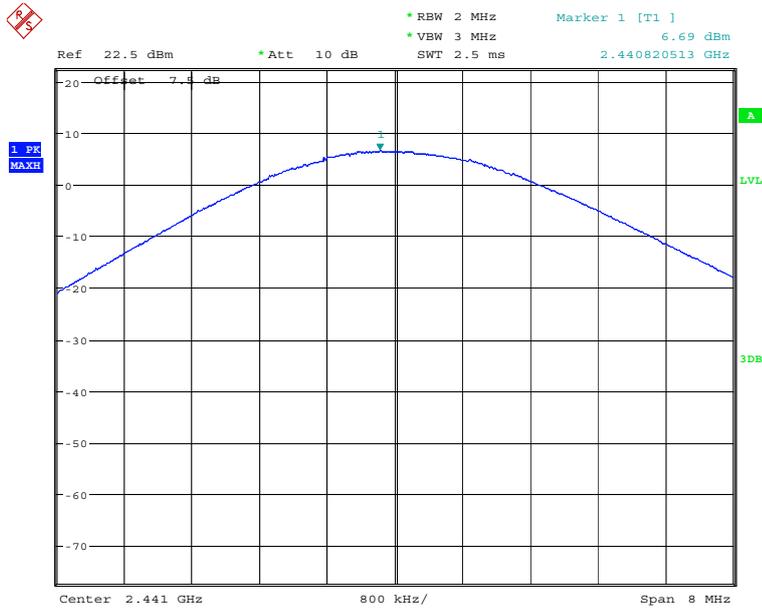
Date: 13.MAR.2012 08:48:34

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK



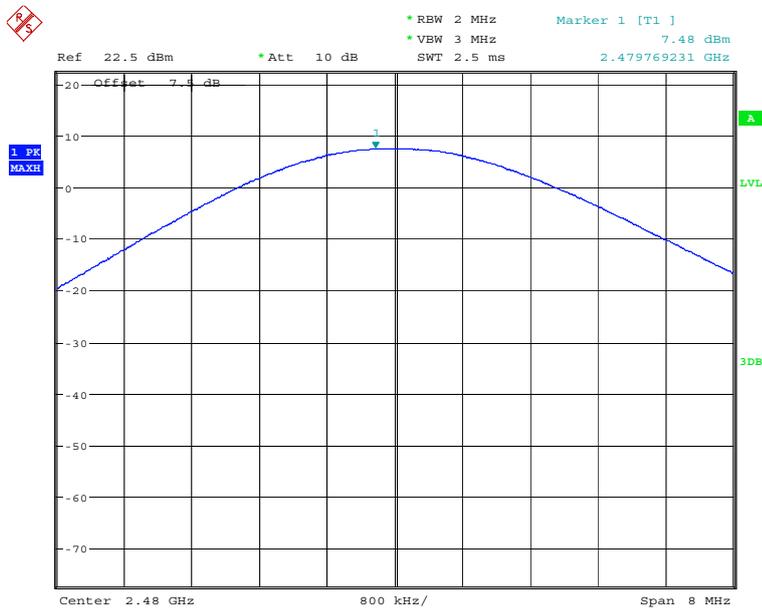
Date: 13.MAR.2012 08:56:12

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



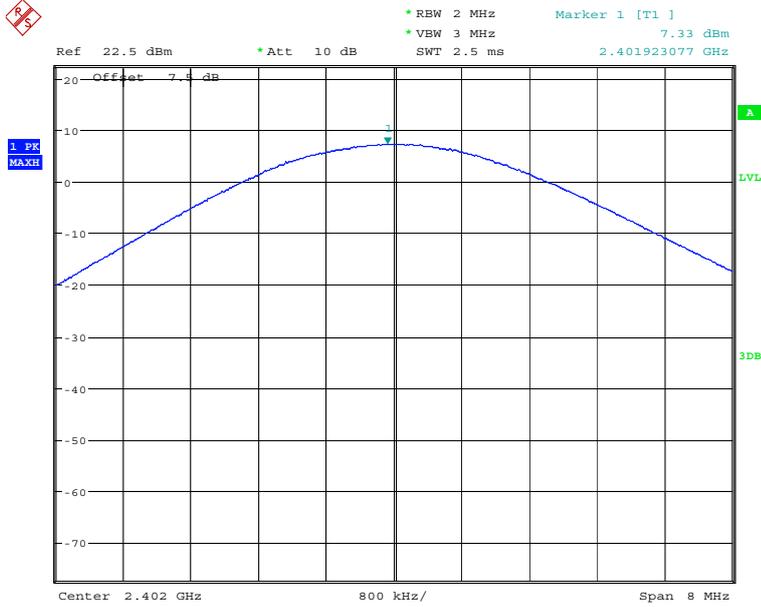
Date: 13.MAR.2012 08:58:49

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK



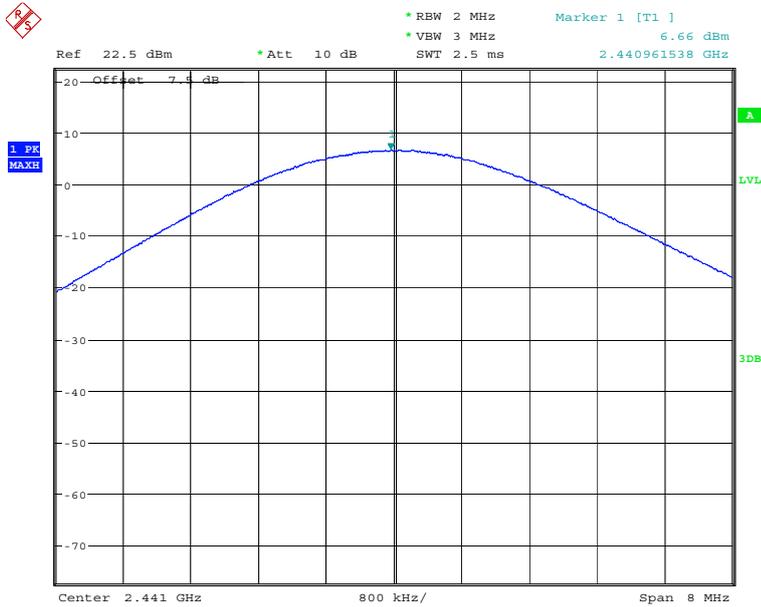
Date: 13.MAR.2012 09:00:48

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK



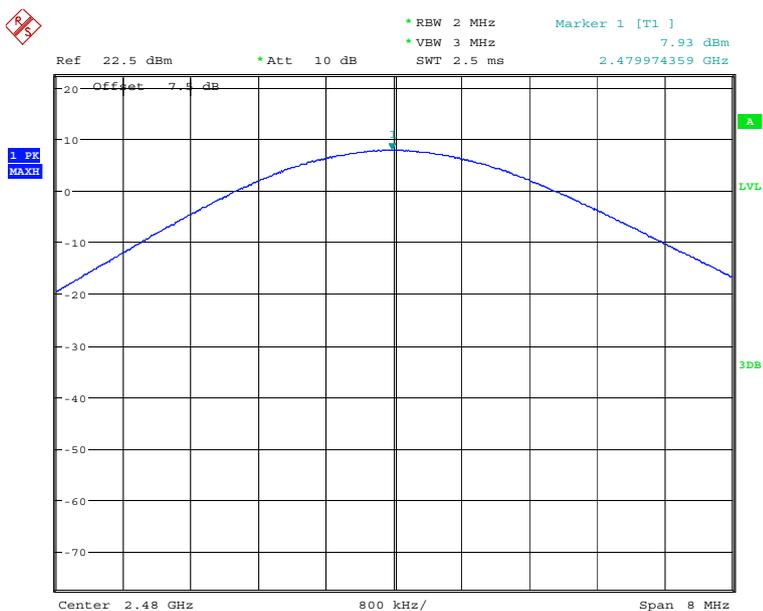
Date: 13.MAR.2012 09:03:49

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Date: 13.MAR.2012 09:05:27

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: 8DPSK



Date: 13.MAR.2012 09:06:36

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: 8DPSK

2.2.3 Spurious RF Conducted Emissions

2.2.3.1 Ambient condition:

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.3.2 Test Description

The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

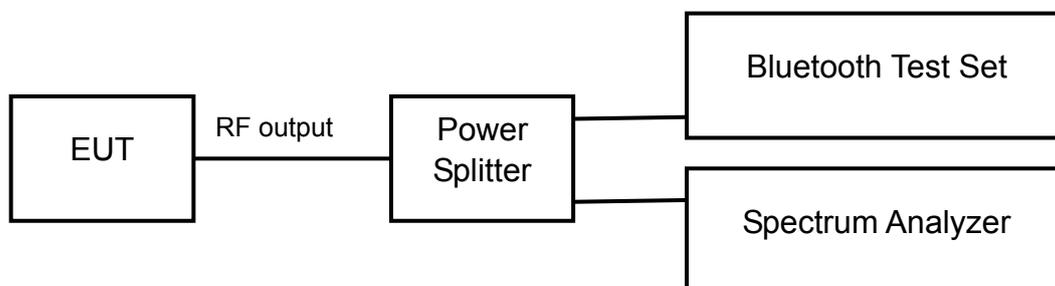
The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

Analyzer settings:

- Detector: Peak-Maxhold
- Frequency range: 30 ~25000 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz

The reference value for the measurement of the spurious RF conducted emissions is determined during the test “band edge compliance” (cf. chapter 4.5). This value is used to calculate the 20 dBc limit.



2.2.3.3 Test limit

FCC Part15.247(d):

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

IC RSS-210 § A8.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.2.3.4 Test result

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: GFSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

Carrier frequency (MHz): 2441

Channel No.:39

Modulation type: GFSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

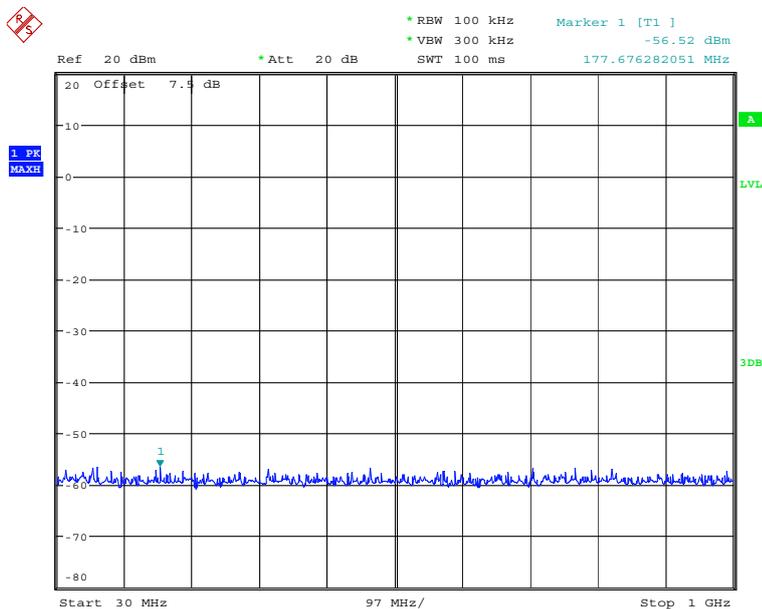
Carrier frequency (MHz): 2480

Channel No.:78

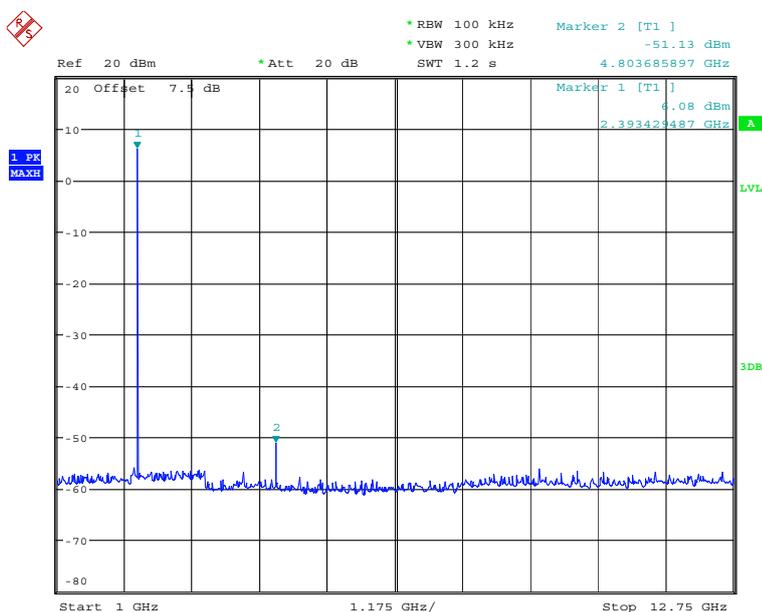
Modulation type: GFSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

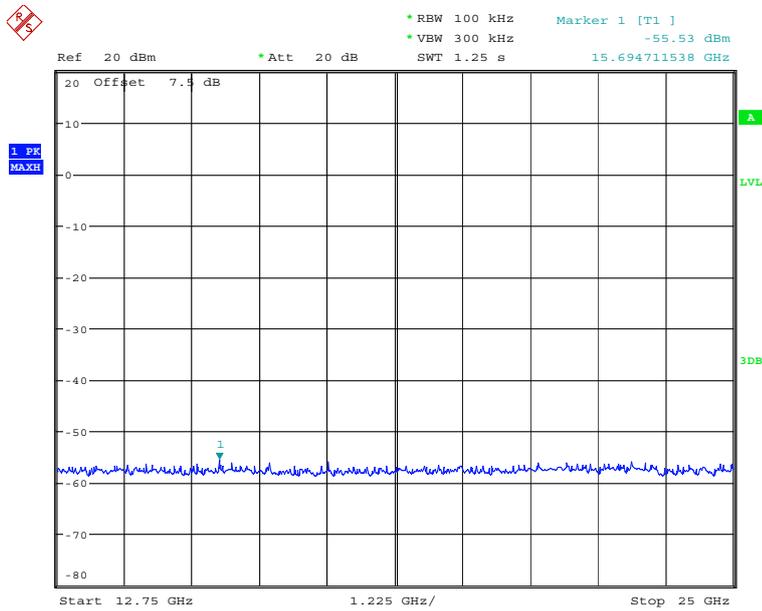
Note: The Reference value see 2.2.5 Band Edge Compliance



Date: 13.MAR.2012 09:10:30

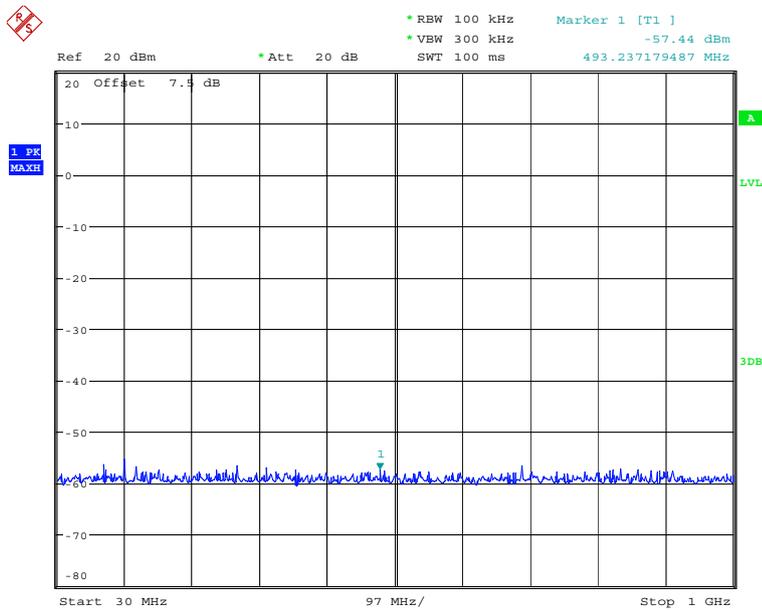


Date: 13.MAR.2012 09:11:06

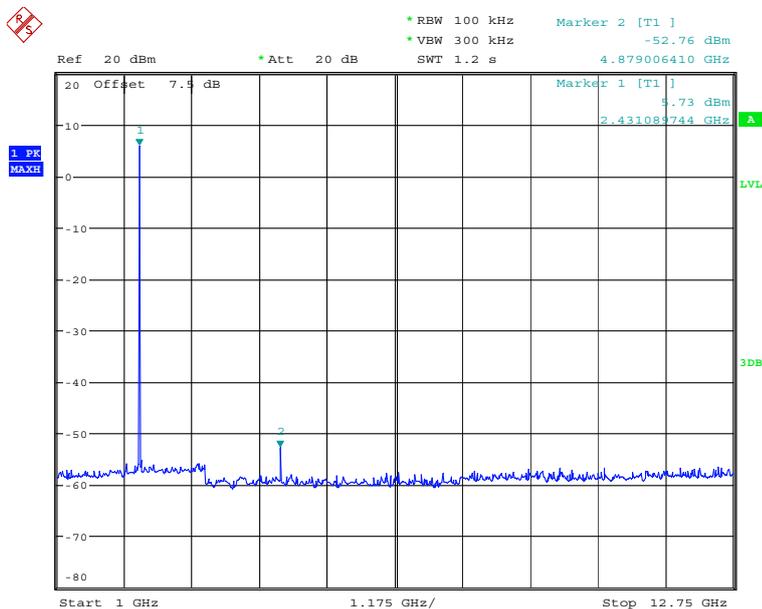


Date: 13.MAR.2012 09:13:34

Carrier frequency (MHz): 2402
 Channel No.:0
 Modulation type: GFSK



Date: 13.MAR.2012 09:34:30

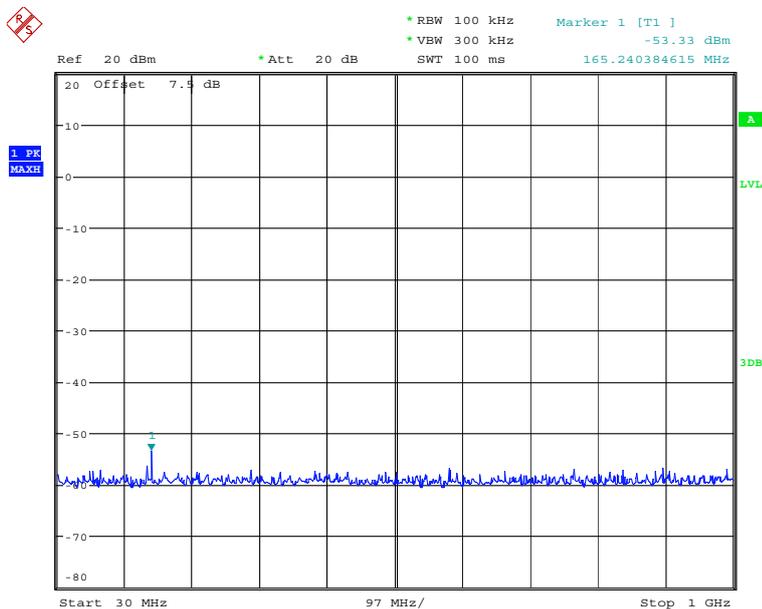


Date: 13.MAR.2012 09:35:24

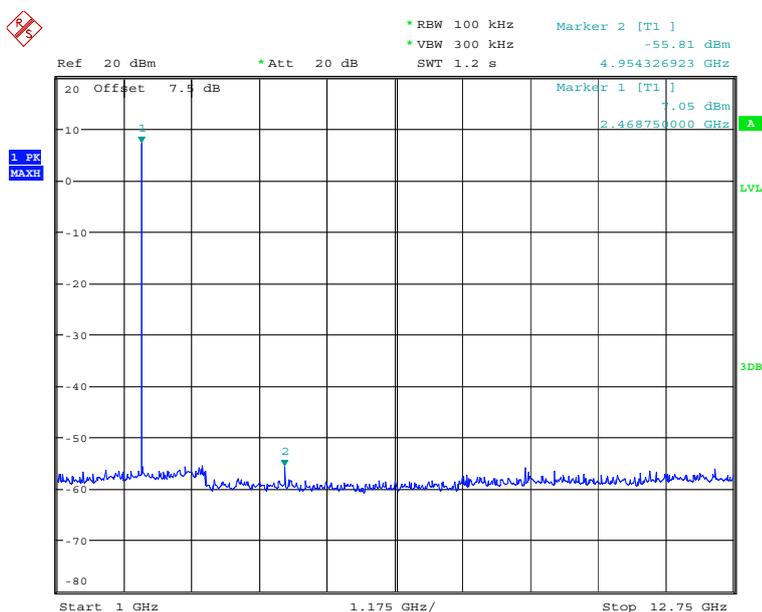


Date: 13.MAR.2012 09:36:15

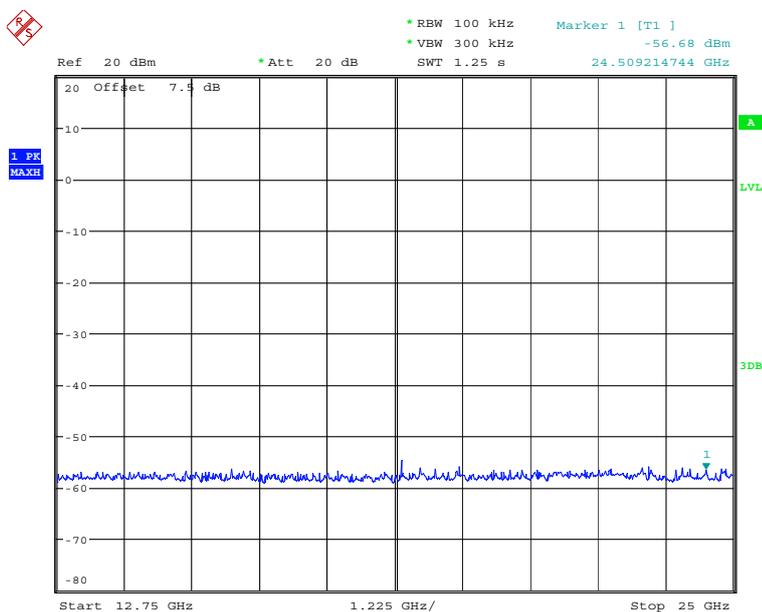
Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



Date: 13.MAR.2012 09:37:13



Date: 13.MAR.2012 09:38:00



Date: 13.MAR.2012 09:39:06

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

Carrier frequency (MHz): 2441

Channel No.:39

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

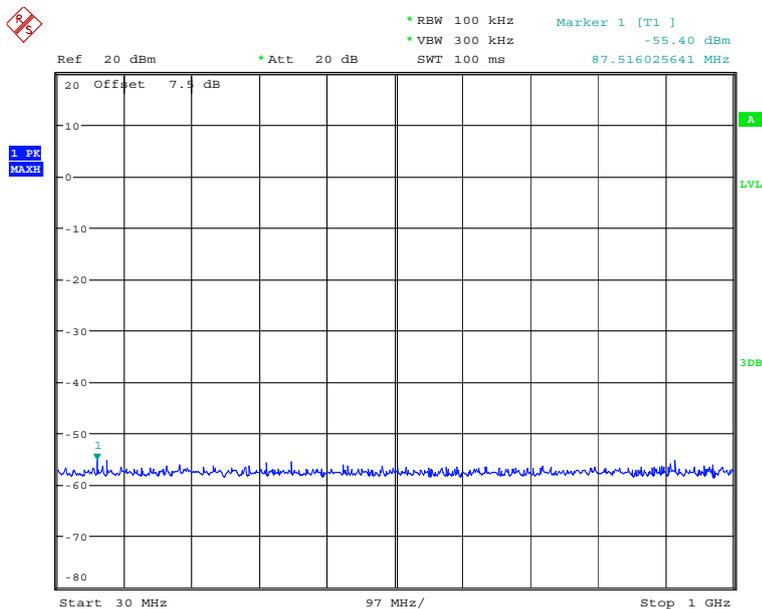
Carrier frequency (MHz): 2480

Channel No.:78

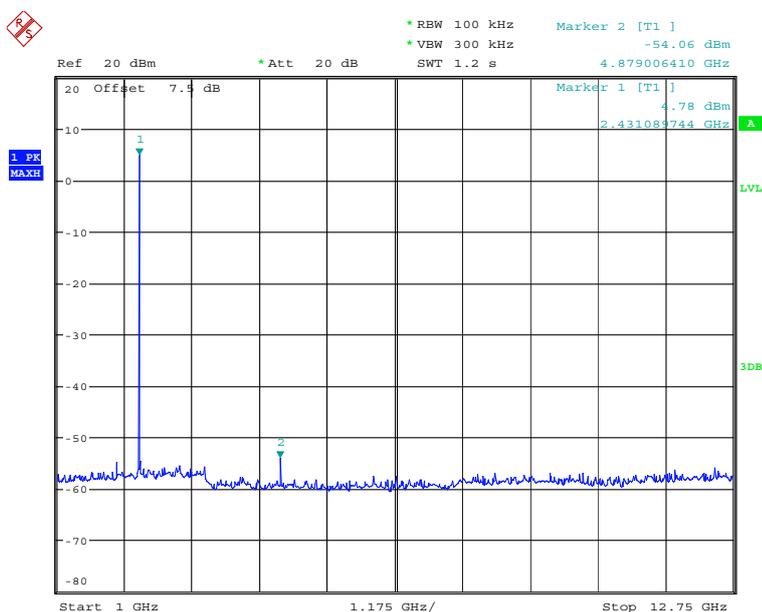
Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

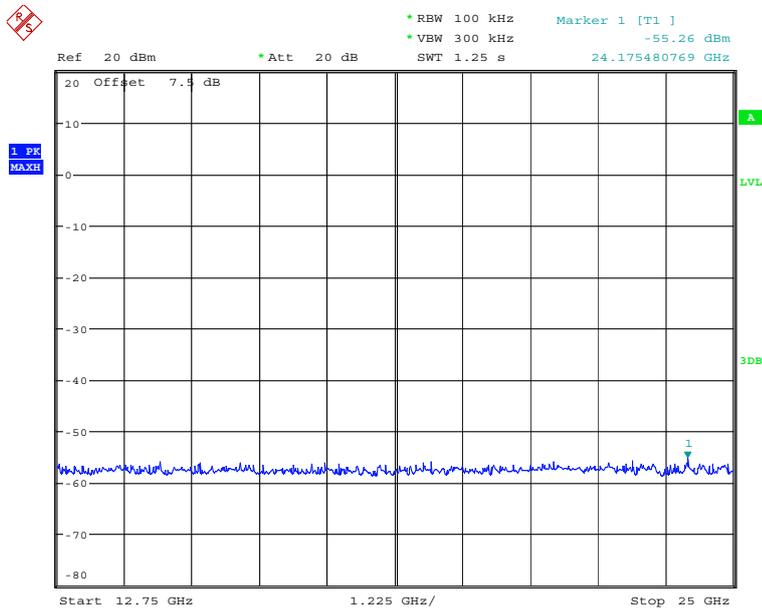
Note: The Reference value see 2.2.5 Band edge compliance



Date: 13.MAR.2012 09:42:53

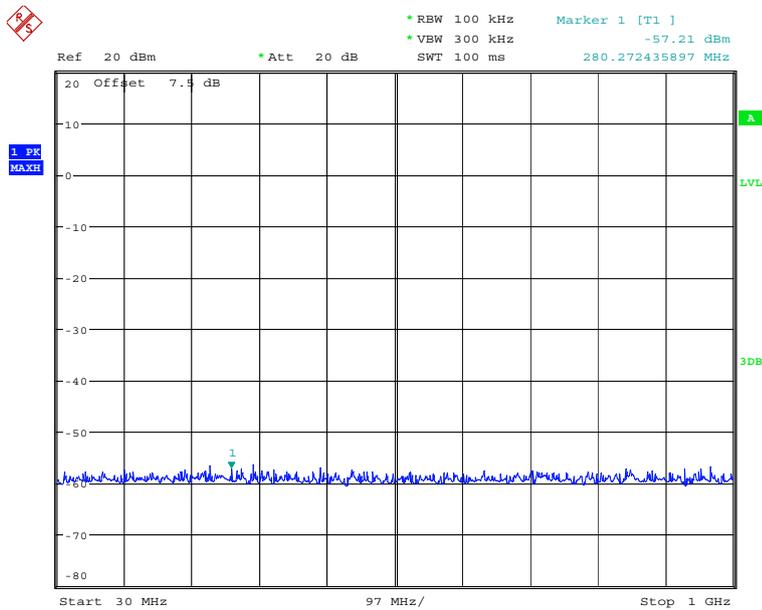


Date: 13.MAR.2012 09:44:05

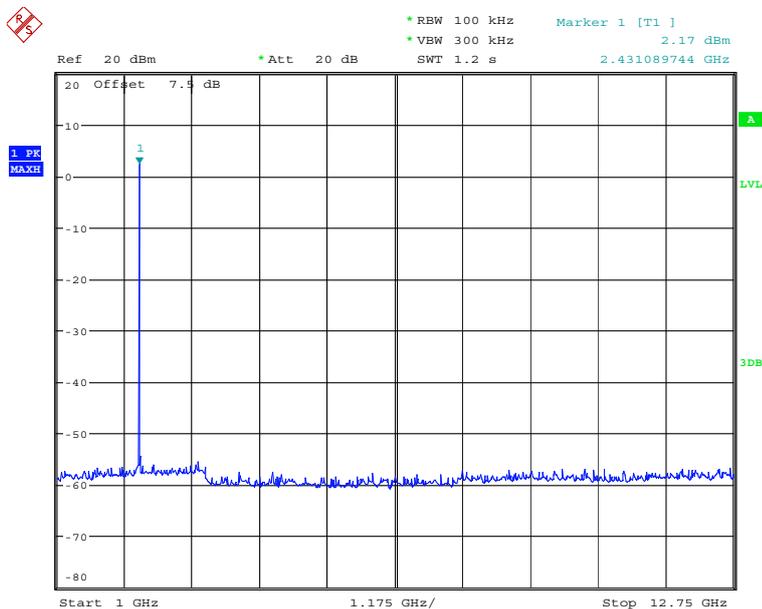


Date: 13.MAR.2012 09:46:35

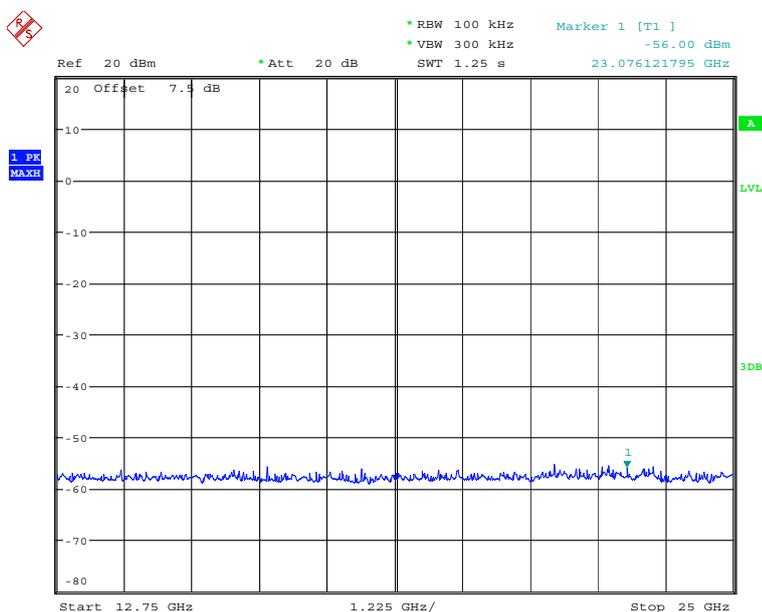
Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



Date: 13.MAR.2012 09:47:03

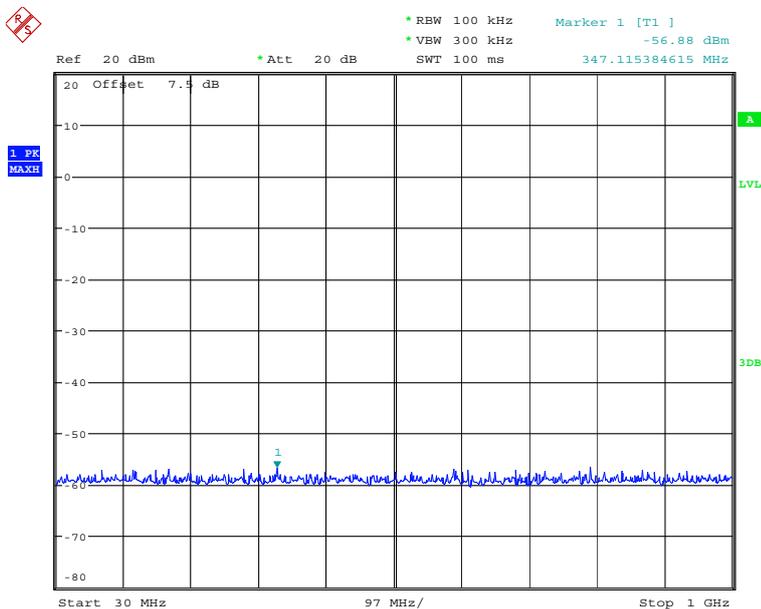


Date: 13.MAR.2012 09:47:42

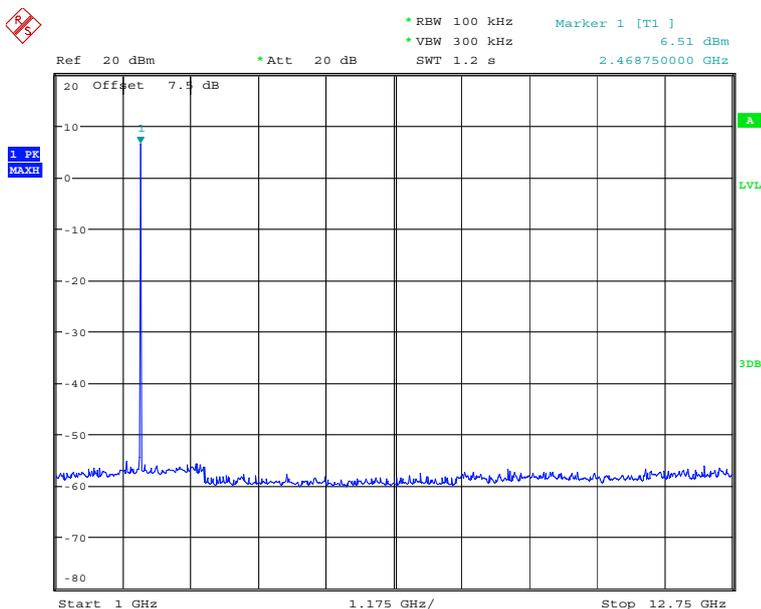


Date: 13.MAR.2012 09:49:02

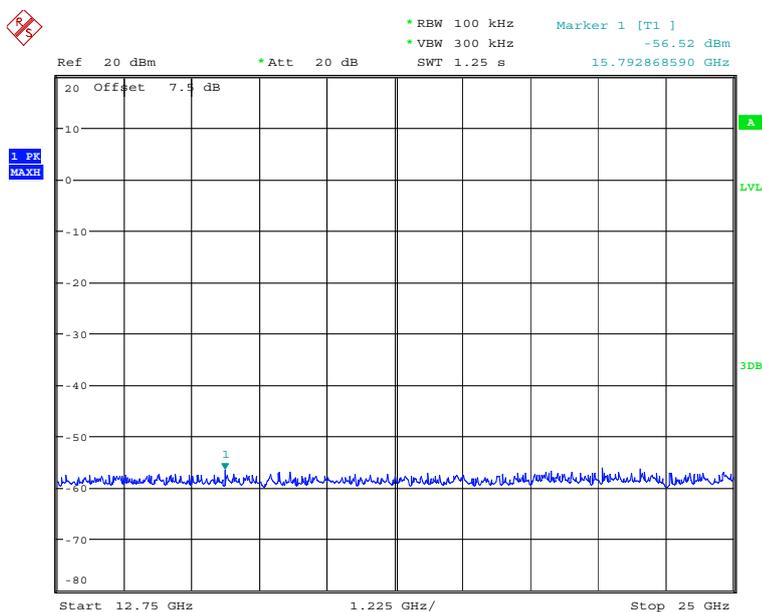
Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK



Date: 13.MAR.2012 09:49:27



Date: 13.MAR.2012 09:50:54



Date: 13.MAR.2012 09:51:15

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: 8DPSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

Carrier frequency (MHz): 2441

Channel No.:39

Modulation type: 8DPSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

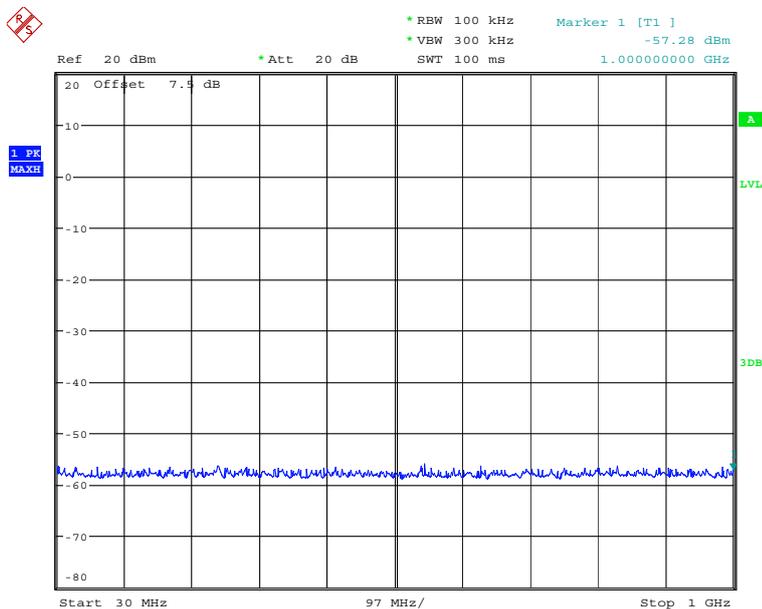
Carrier frequency (MHz): 2480

Channel No.:78

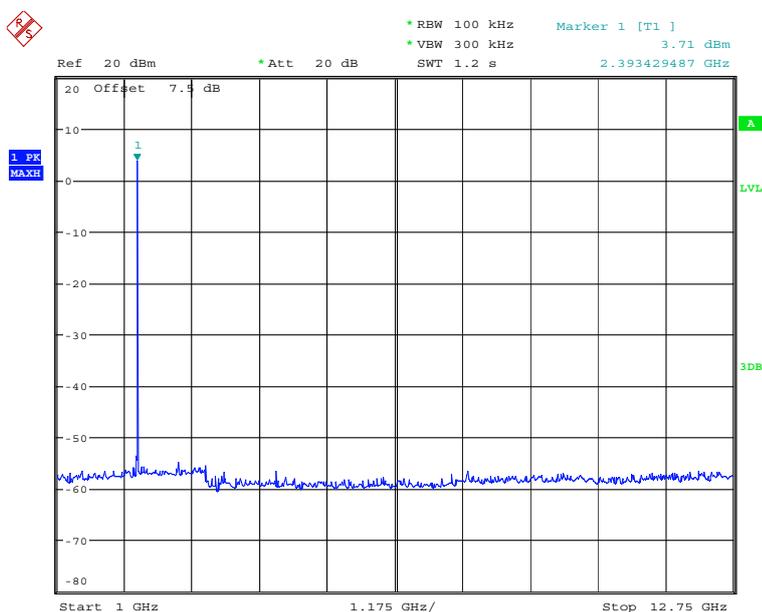
Modulation type: 8DPSK

| Frequency MHz | Corrected measurement value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|---------------------------------|---------------------|-----------|----------|
| --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- |

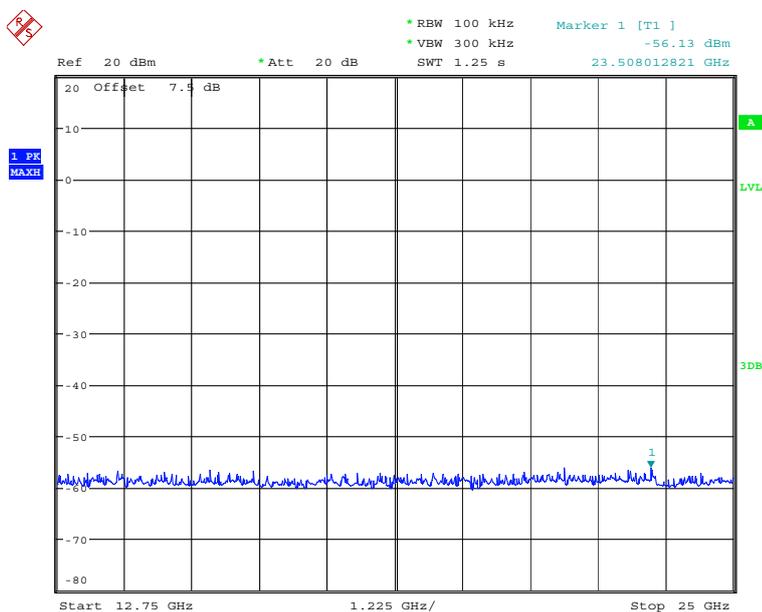
Note: The Reference value see 2.2.5 Band edge compliance



Date: 13.MAR.2012 09:53:05

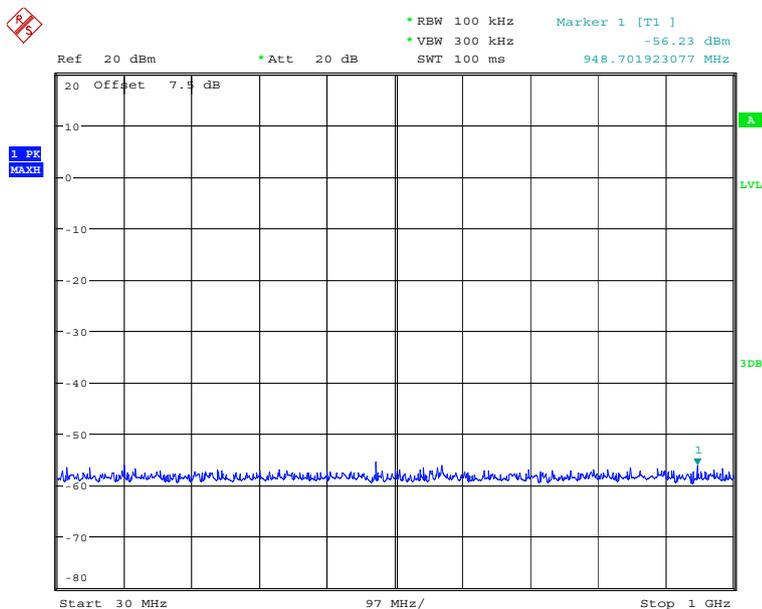


Date: 13.MAR.2012 09:54:47

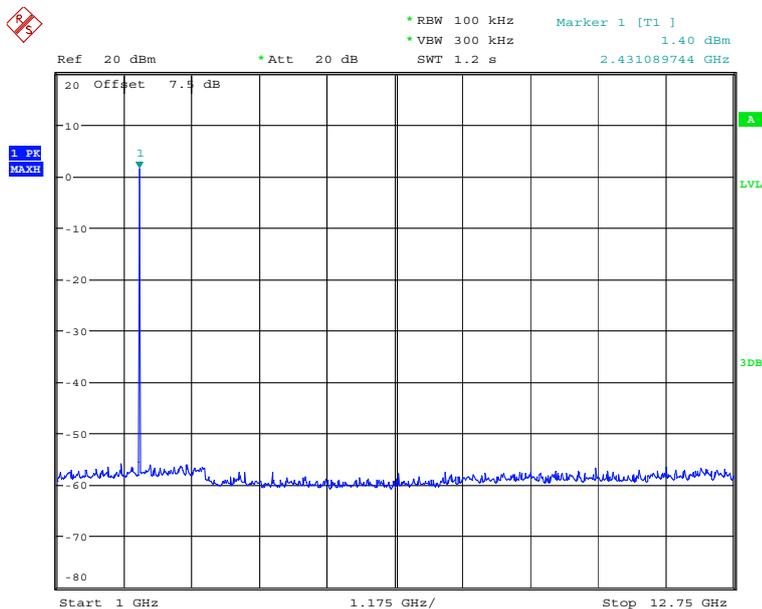


Date: 13.MAR.2012 09:55:05

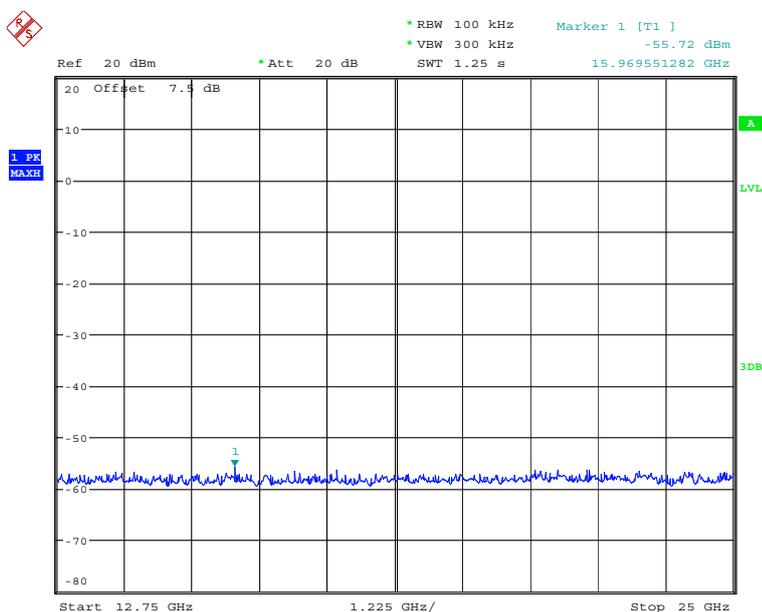
Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Date: 13.MAR.2012 09:55:53

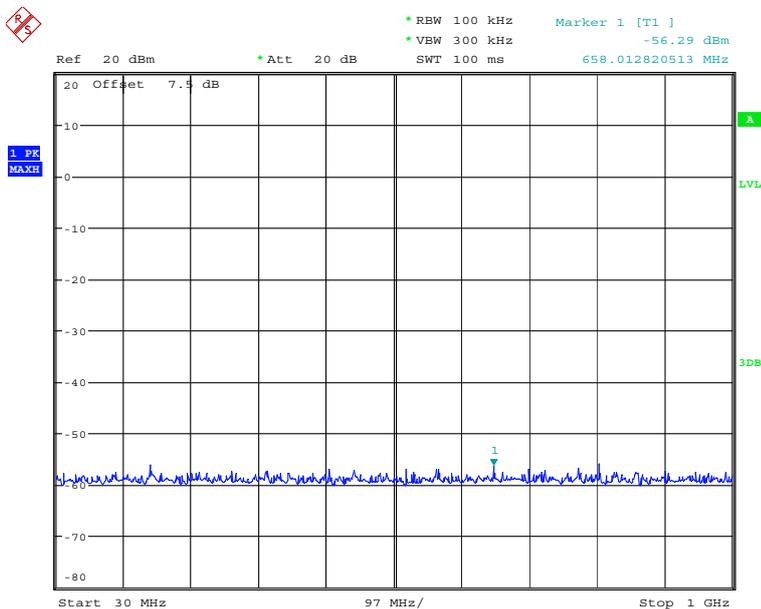


Date: 13.MAR.2012 09:56:36

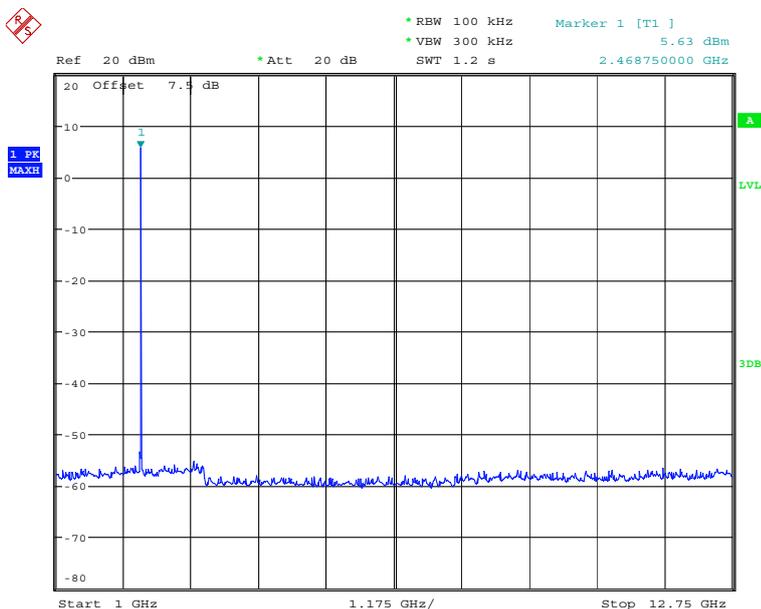


Date: 13.MAR.2012 09:58:50

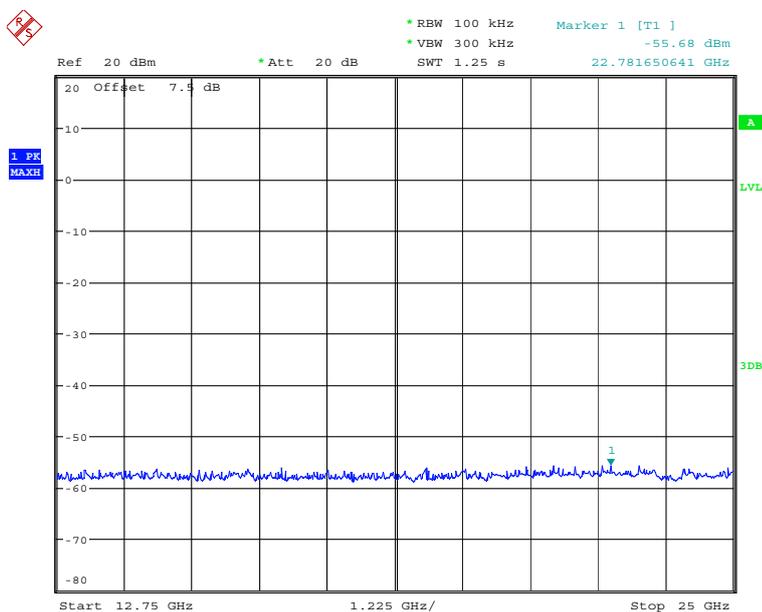
Carrier frequency (MHz): 2441
 Channel No.:39
 Modulation type: 8DPSK



Date: 13.MAR.2012 10:00:27



Date: 13.MAR.2012 10:02:01



Date: 13.MAR.2012 10:03:48

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: 8DPSK

2.2.4 Spurious Radiated Emissions

2.2.4.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 18.3°C | 36.2% | 100.2kPa |

2.2.4.2 Test Description

The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

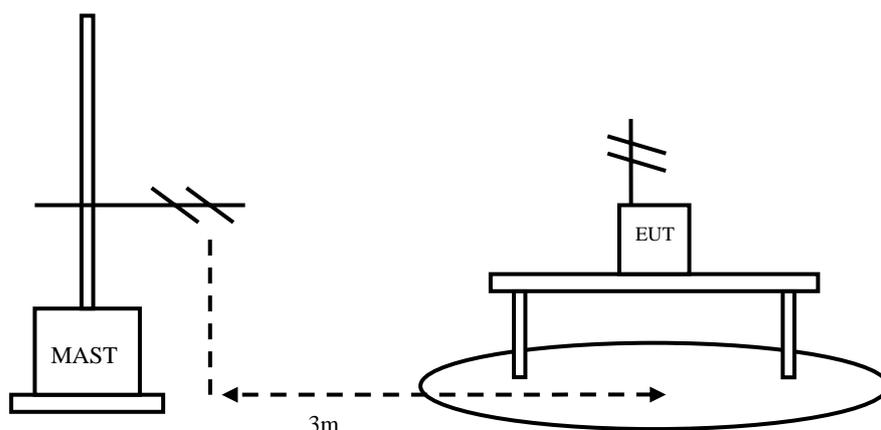
The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

The radiated emissions measurements were made in a typical installation configuration.

Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz or above, using receive log period antenna HL562 or Ridge horn antenna HF906.

During the test, the antenna height and EUT azimuth were varied in order to identify the maximum level of emission from the EUT. The height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees. The measurements shall be repeated with orthogonal polarization of the test antenna. The results (reference to 2.2.4.4) shall be showed the worst case of the three orthogonal axes.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.



2.2.4.3 Test limit

FCC Part15.247(d):

... In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

FCC Part15.209:

Radiated Emission Limits

| Frequency of Emission(MHz) | Limits | |
|---|------------|---------------|
| | Detector | Unit (dBμV/m) |
| 30~88 | Quasi-peak | 40.0 |
| 88~216 | Quasi-peak | 43.5 |
| 216~960 | Quasi-peak | 46.0 |
| 960~1000 | Quasi-peak | 54.0 |
| 1000~5th harmonic of the highest frequency or 40GHz, whichever is lower | Average | 54.0 |
| | Peak | 74.0 |

FCC Part15.35(b):

..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: Limit (dBμV/m) = 20 log (Limit (μV/m)/1μV/m)

IC RSS-210 § A8.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.2.4.4 Test result

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{Rpl}$$

The worst case attitude: The mobile lay down.

For GFSK

Channel No.:39

| Frequency(MHz) | Result(dBuV/m) | A_{Rpl} (dB) | P_{mea} (dBuV/m) | Polarity |
|----------------|----------------|----------------|---------------------------|------------|
| 46.27 | 22.83 | 9.8 | 13.03 | Vertical |
| 47.39 | 22.05 | 9.8 | 12.25 | Vertical |
| 49.50 | 22.09 | 9.8 | 12.09 | Vertical |
| 82.18 | 23.71 | 7.1 | 16.61 | Vertical |
| 6166.33 | 20.15 | 13.3 | 6.85 | Horizontal |
| 6983.97 | 23.17 | 16.6 | 6.57 | Horizontal |

For $\pi/4$ DQPSK

Channel No.:39

| Frequency(MHz) | Result(dBuV/m) | A_{Rpl} (dB) | P_{mea} (dBuV/m) | Polarity |
|----------------|----------------|----------------|---------------------------|------------|
| 48.94 | 32.09 | 9.8 | 22.29 | Vertical |
| 49.78 | 30.95 | 9.8 | 21.15 | Vertical |
| 81.90 | 31.87 | 7.2 | 24.67 | Vertical |
| 6158.32 | 20.16 | 13.4 | 6.76 | Horizontal |
| 6983.99 | 23.17 | 16.6 | 6.57 | Horizontal |
| 10011.02 | 28.40 | 9.2 | 19.2 | Horizontal |

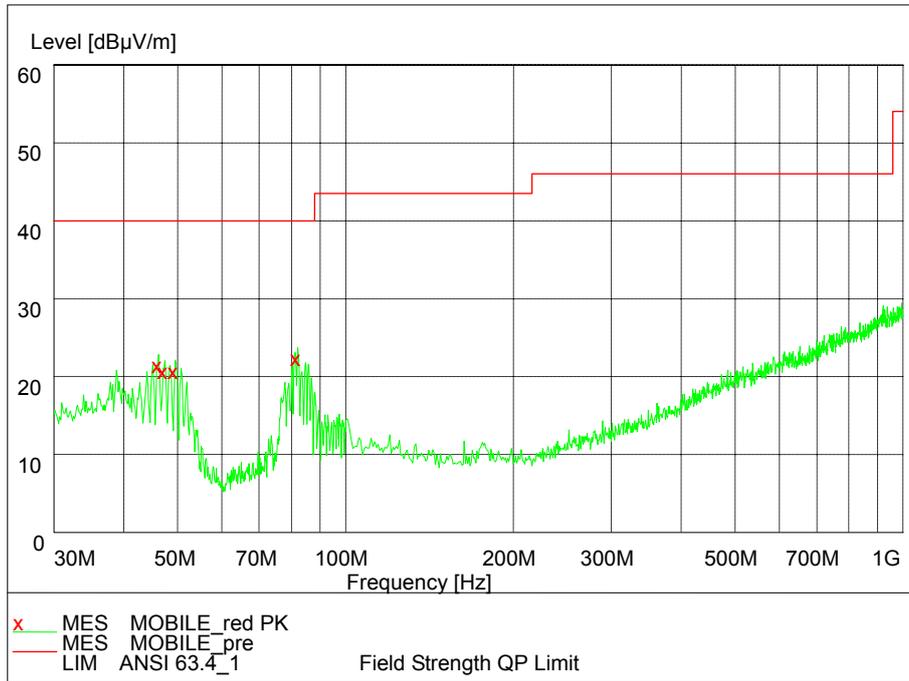
For 8DPSK

Channel No.:39

| Frequency(MHz) | Result(dBuV/m) | A_{Rpl} (dB) | P_{mea} (dBuV/m) | Polarity |
|----------------|----------------|----------------|---------------------------|------------|
| 46.83 | 22.72 | 9.8 | 12.92 | Vertical |
| 47.96 | 23.22 | 9.8 | 13.42 | Vertical |
| 84.70 | 23.75 | 8.4 | 15.35 | Vertical |
| 943.89 | 29.44 | 24.4 | 5.04 | Horizontal |
| 6991.98 | 23.42 | 16.6 | 6.82 | Horizontal |
| 9981.96 | 28.18 | 9.2 | 18.98 | Horizontal |

Carrier frequency (MHz): 2441

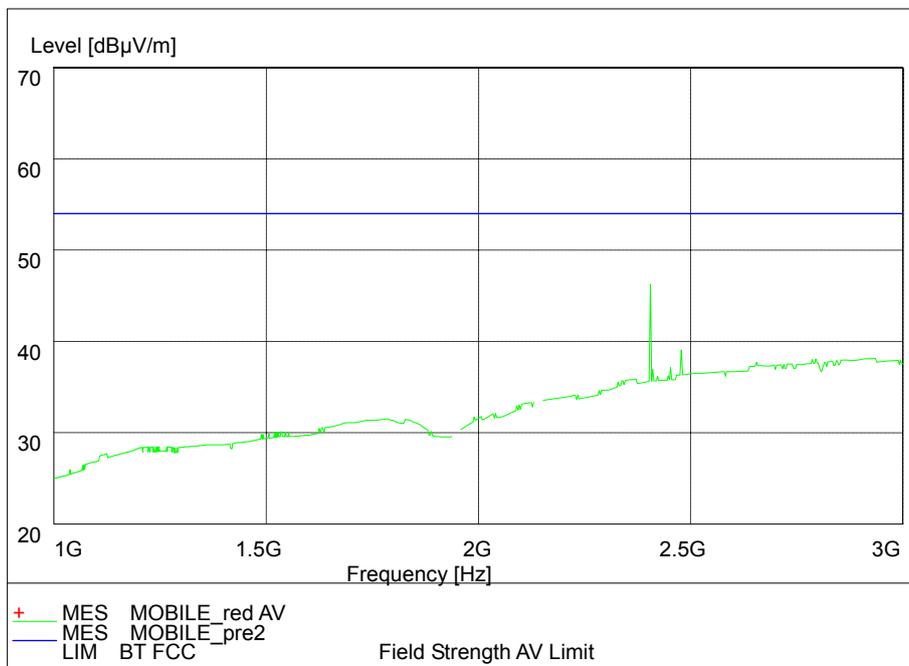
Channel No.: 39



Frequency Range: 30MHz-1000MHz

Detector: Av mode and PK mode

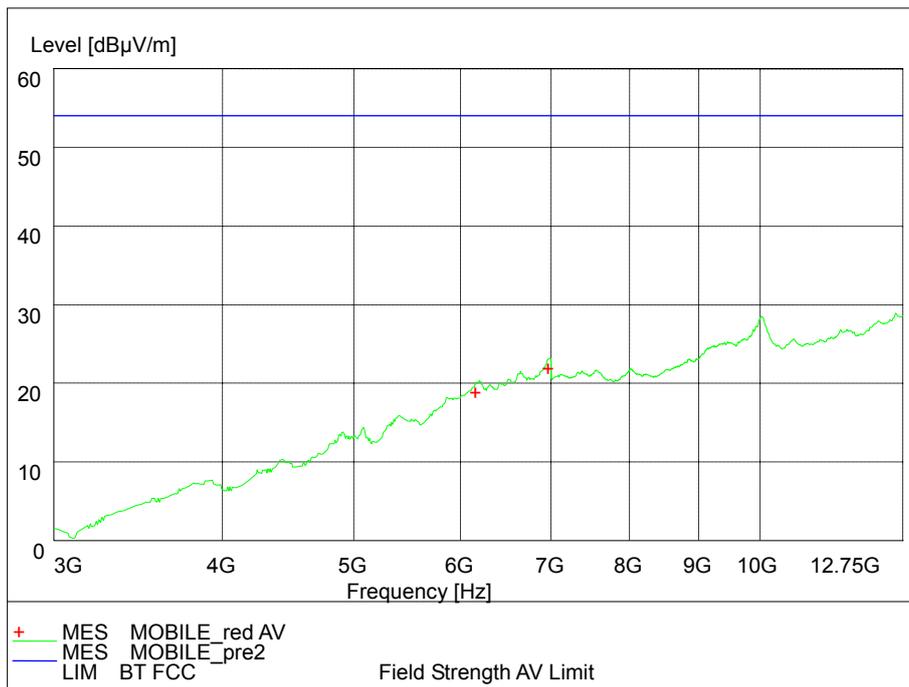
Modulation type: GFSK



Frequency Range: 1GHz-3GHz

Detector: Av mode and PK mode

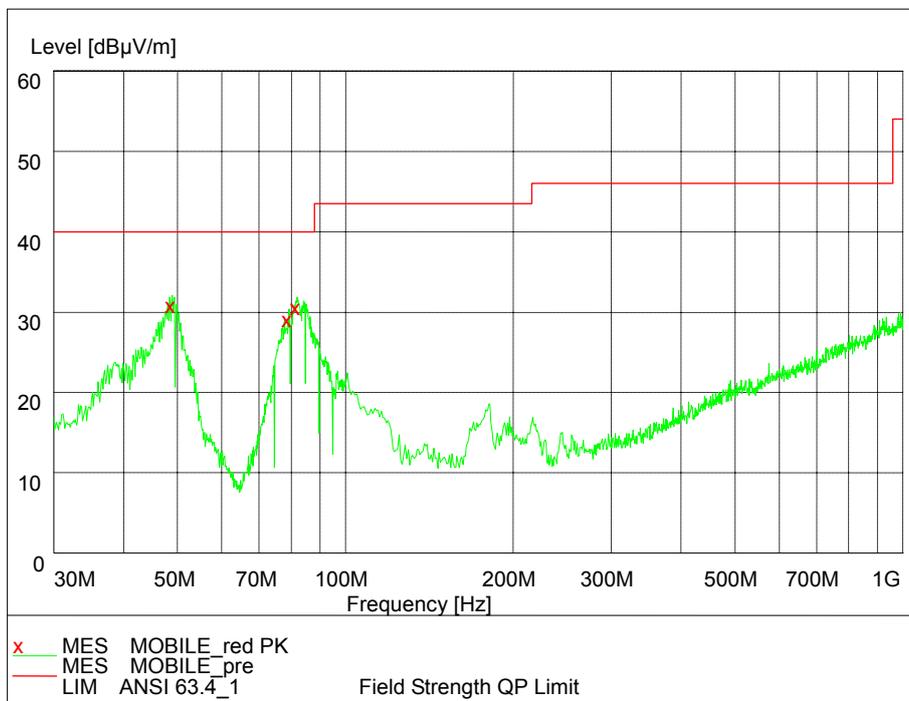
Modulation type: GFSK



Frequency Range: 3GHz-12.75GHz

Detector: Av mode and PK mode

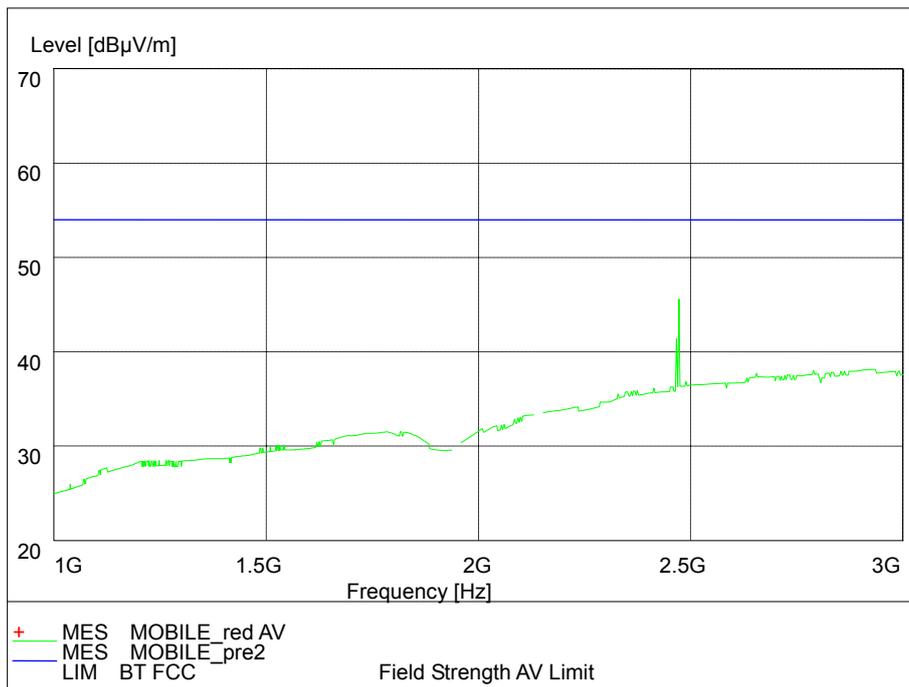
Modulation type: GFSK



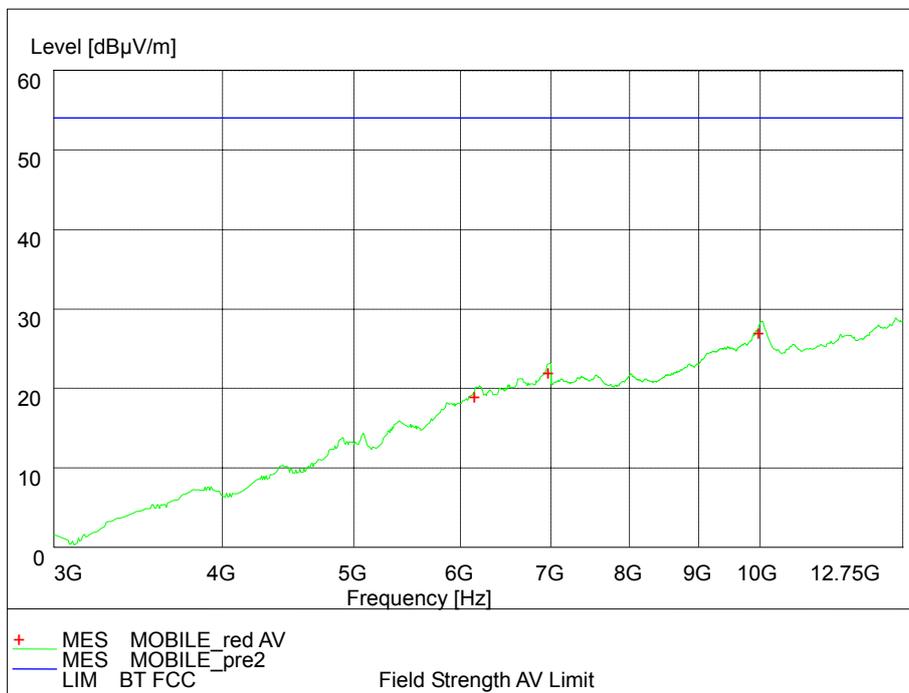
Frequency Range: 30MHz-1000MHz

Detector: Av mode and PK mode

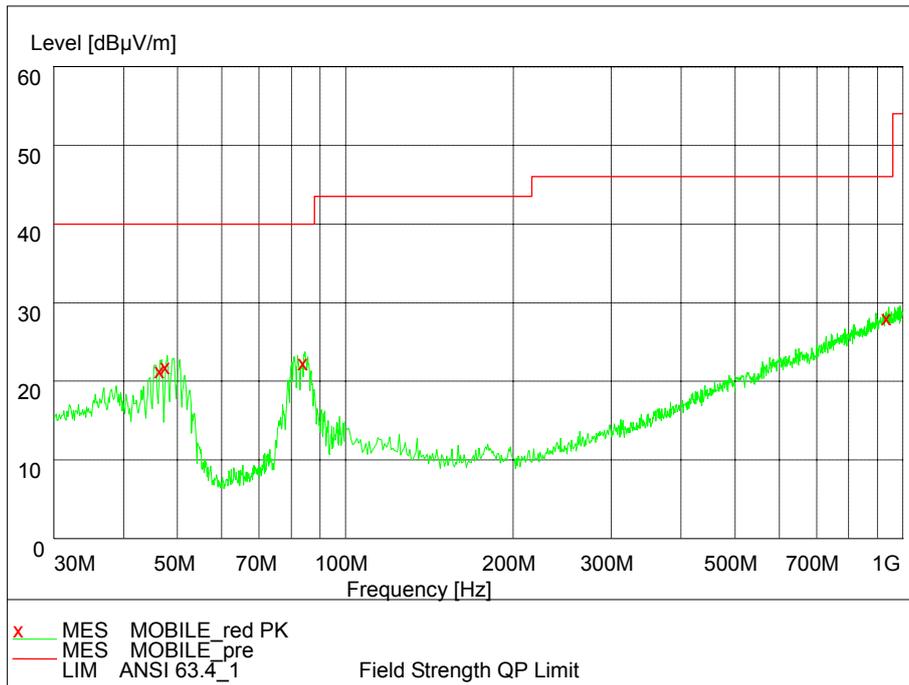
Modulation type: $\pi/4$ DQPSK



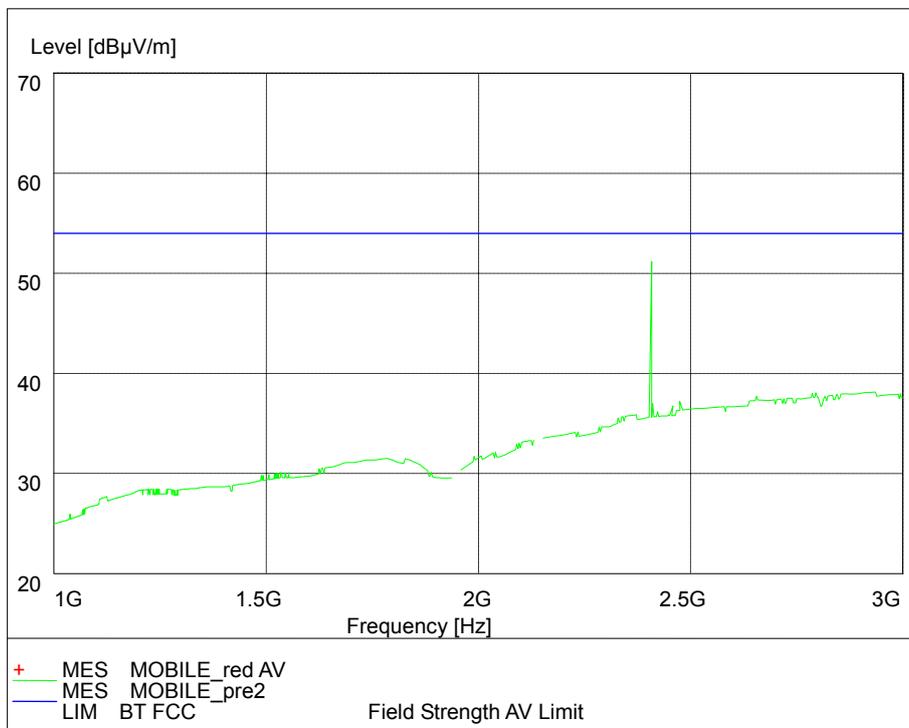
Frequency Range: 1GHz-3GHz
Detector: Av mode and PK mode
Modulation type: $\pi/4$ DQPSK



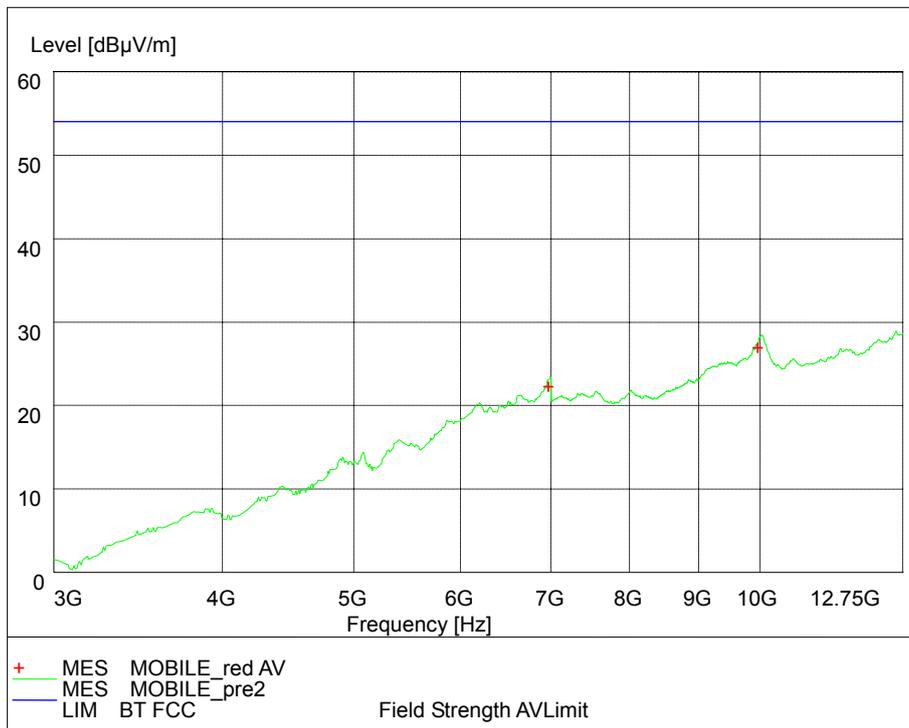
Frequency Range: 3GHz-25GHz
Detector: Av mode and PK mode
Modulation type: $\pi/4$ DQPSK



Frequency Range: 30MHz-1000 MHz
 Detector: Av mode and PK mode
 Modulation type: 8DPSK



Frequency Range: 1GHz-3GHz
 Detector: Av mode and PK mode
 Modulation type: 8DPSK



Frequency Range: 3GHz-25GHz
 Detector: Av mode and PK mode
 Modulation type: 8DPSK

2.2.5 Band Edge Compliance

2.2.5.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.5.2 Test Description

The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

2.2.5.2.1 RF Conducted Measurement:

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

For the first measurement the EUT is set to transmit on the lowest channel (2402 MHz). The lower band edge is 2390 MHz.

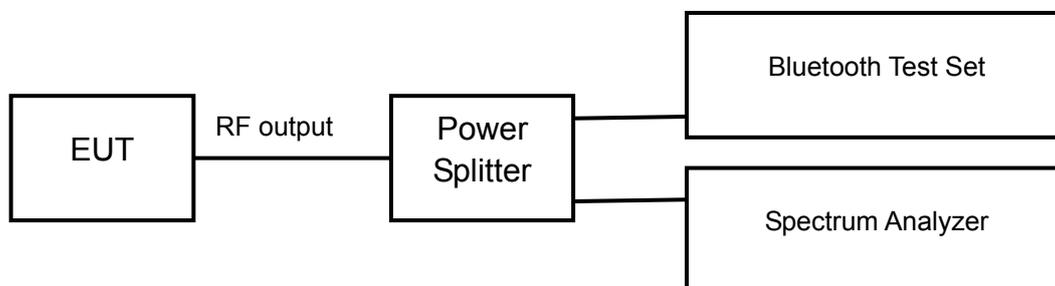
Analyzer settings:

- Detector: Peak
- RBW= 100 kHz
- VBW= 300 kHz

For the second measurement the EUT is set to transmit on the highest channel (2480MHz). The higher band edge is 2483.5 MHz.

Analyzer settings:

- Detector: Peak
- RBW= 100 kHz
- VBW= 300 kHz



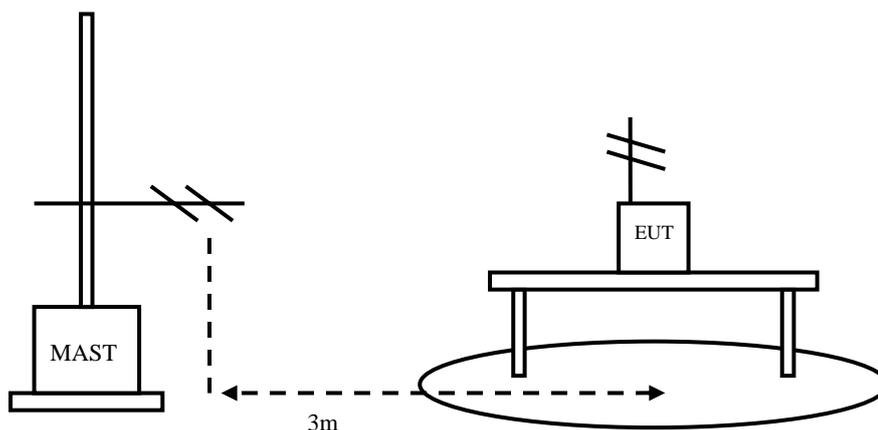
2.2.5.2.2 RF Radiated Measurement

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

The radiated emissions measurements were made in a typical installation configuration.

During the test, the antenna height and EUT azimuth were varied in order to identify the maximum level of emission from the EUT. The height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.



2.2.6.3 Test limit

2.2.6.3.1 RF Conducted Measurement:

FCC Part15.247(d):

“In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

2.2.6.3.2 RF Radiated Measurement

IC RSS-210 § A8.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.2.5.4 Test result

RF Conducted Measurement

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: GFSK

| Frequency MHz | Hopping Mode | Measured value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|--------------|--------------------|---------------------|-----------|----------|
| 2390 | Hopping OFF | -56.49 | 6.77 | -13.23 | 63.26 |
| 2390 | Hopping ON | -56.70 | 5.99 | -14.01 | 62.69 |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: GFSK

| Frequency MHz | Hopping Mode | Measured value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|--------------|--------------------|---------------------|-----------|----------|
| 2483.5 | Hopping OFF | -51.43 | 7.48 | -12.52 | 58.91 |
| 2483.5 | Hopping ON | -55.99 | 7.13 | -12.87 | 63.12 |

RF Radiated Measurement

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: GFSK

| Frequency MHz | Hopping Mode | Correction Factor dB/m | Reading Level dBuV | Emission Level dBuV/m | Detector |
|---------------|--------------|------------------------|--------------------|-----------------------|----------|
| 2402 | Hopping OFF | 2.7 | 72.93 | 75.63 | Peak |
| 2402 | Hopping ON | 2.7 | 72.47 | 75.17 | Peak |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: GFSK

| Frequency MHz | Hopping Mode | Correction Factor dB/m | Reading Level dBuV | Emission Level dBuV/m | Detector |
|---------------|--------------|------------------------|--------------------|-----------------------|----------|
| 2480 | Hopping OFF | 2.5 | 73.14 | 75.64 | Peak |
| 2480 | Hopping ON | 2.5 | 71.76 | 74.26 | Peak |

Band Edge Test Data

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: GFSK

| Frequency MHz | Hopping Mode | Fundamental (dBuV/m) | Delta dB | Band Edge Field Strength (dBuV/m) | Detector |
|---------------|--------------|----------------------|----------|-----------------------------------|----------|
| 2390 | Hopping OFF | 75.63 | 63.26 | 12.37 | Peak |
| 2390 | Hopping ON | 75.17 | 62.69 | 12.48 | Peak |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: GFSK

| Frequency MHz | Hopping Mode | Fundamental (dBuV/m) | Delta dB | Band Edge Field Strength (dBuV/m) | Detector |
|---------------|--------------|----------------------|----------|-----------------------------------|----------|
| 2483.5 | Hopping OFF | 75.64 | 58.91 | 16.73 | Peak |
| 2483.5 | Hopping ON | 74.26 | 63.12 | 11.14 | Peak |

Note:

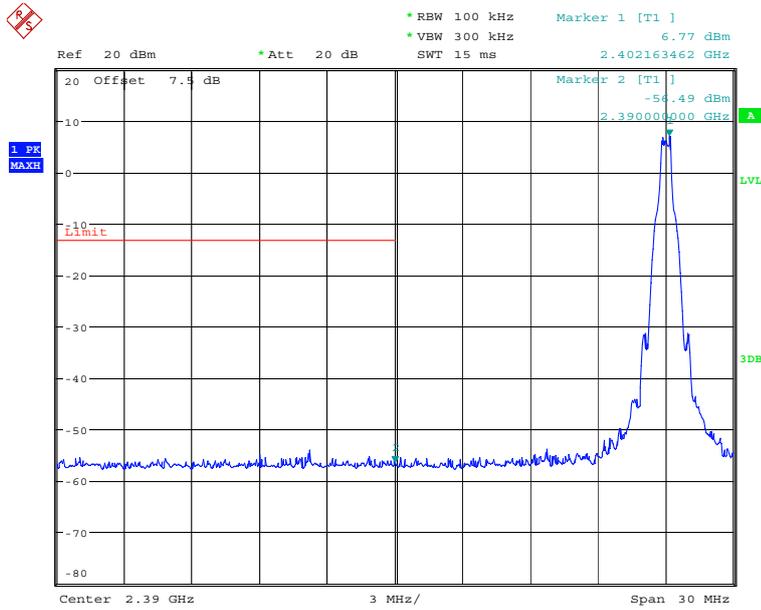
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Delta

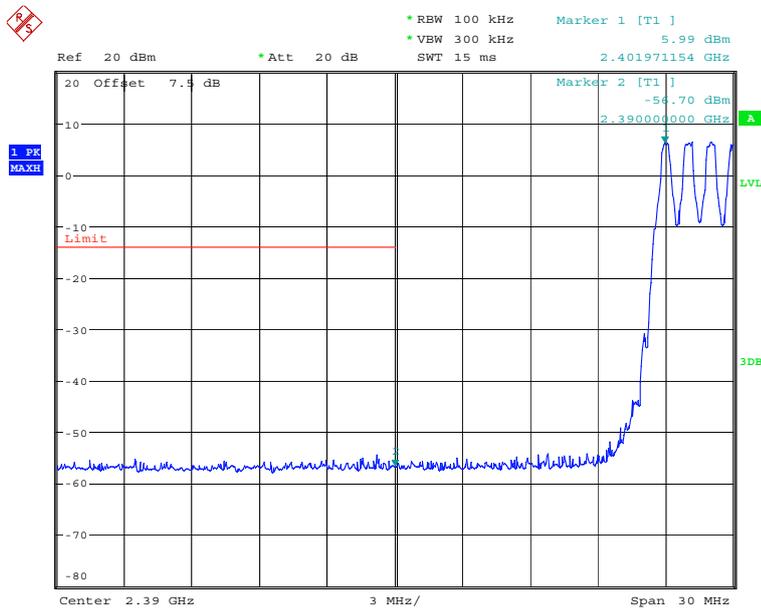
F = Fundamental field Strength (Peak or Average)

Delta= Conducted Band Edge Delta (Peak or Average)



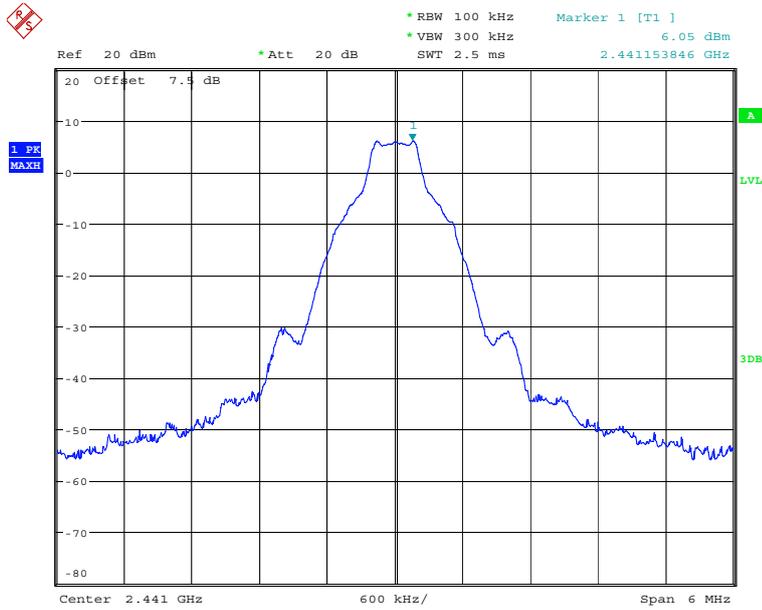
Date: 13.MAR.2012 10:44:37

Carrier frequency (MHz): 2402
Channel No.:0, Hopping OFF
Modulation type: GFSK



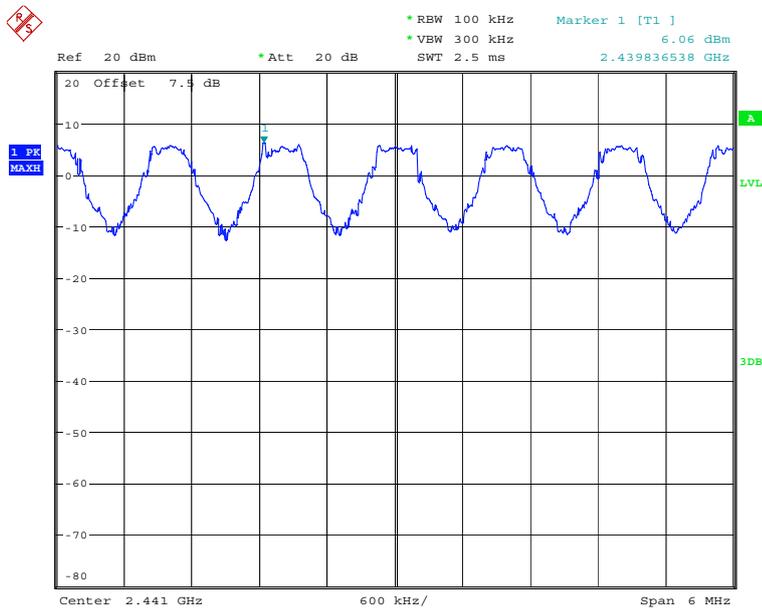
Date: 13.MAR.2012 11:23:04

Carrier frequency (MHz): 2402
Channel No.:0, Hopping ON
Modulation type: GFSK



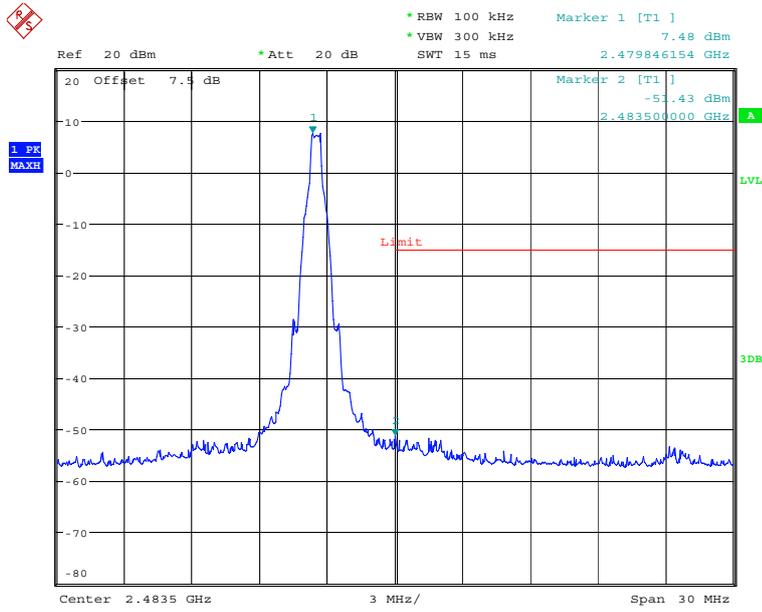
Date: 13.MAR.2012 13:43:27

Carrier frequency (MHz): 2441
 Channel No.:39, Hopping OFF
 Modulation type: GFSK



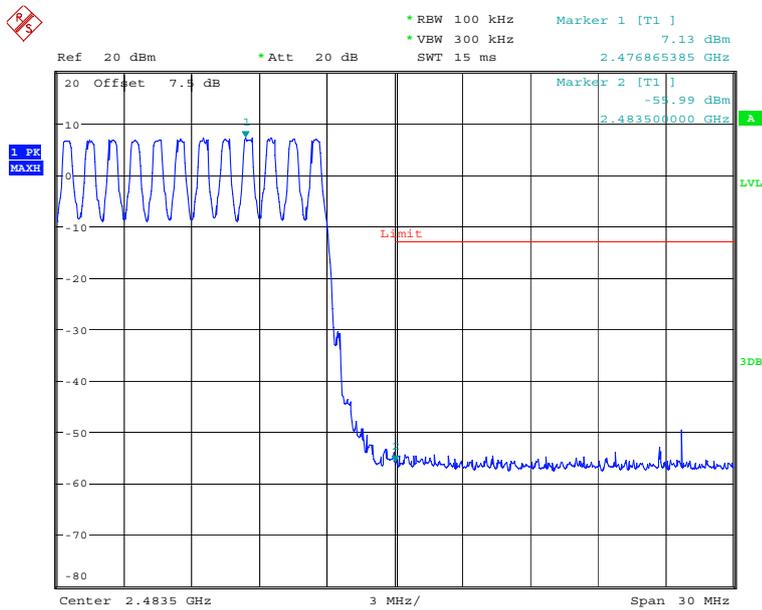
Date: 13.MAR.2012 13:47:14

Carrier frequency (MHz): 2441
 Channel No.:39, Hopping ON
 Modulation type: GFSK



Date: 13.MAR.2012 13:58:34

Carrier frequency (MHz): 2480
Channel No.:78, Hopping OFF
Modulation type: GFSK



Date: 13.MAR.2012 14:27:51

Carrier frequency (MHz): 2480
Channel No.:78, Hopping ON
Modulation type: GFSK

RF Conducted Measurement

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Hopping Mode | Measured value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|--------------|--------------------|---------------------|-----------|----------|
| 2390 | Hopping OFF | -56.54 | 5.65 | -14.35 | 62.19 |
| 2390 | Hopping ON | -56.77 | 4.98 | -15.02 | 61.75 |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Hopping Mode | Measured value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|--------------|--------------------|---------------------|-----------|----------|
| 2483.5 | Hopping OFF | -52.27 | 7.29 | -12.71 | 59.56 |
| 2483.5 | Hopping ON | -53.14 | 6.33 | -13.67 | 59.47 |

RF Radiated Measurement

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Hopping Mode | Correction Factor dB/m | Reading Level dBuV | Emission Level dBuV/m | Detector |
|---------------|--------------|------------------------|--------------------|-----------------------|----------|
| 2402 | Hopping OFF | 2.7 | 73.62 | 76.32 | Peak |
| 2402 | Hopping ON | 2.7 | 72.09 | 74.79 | Peak |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Hopping Mode | Correction Factor dB/m | Reading Level dBuV | Emission Level dBuV/m | Detector |
|---------------|--------------|------------------------|--------------------|-----------------------|----------|
| 2480 | Hopping OFF | 2.5 | 73.22 | 75.73 | Peak |
| 2480 | Hopping ON | 2.5 | 72.13 | 74.63 | Peak |

Band Edge Test Data

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Hopping Mode | Fundamental (dBuV/m) | Delta dB | Band Edge Field Strength (dBuV/m) | Detector |
|---------------|--------------|----------------------|----------|-----------------------------------|----------|
| 2390 | Hopping OFF | 76.32 | 62.19 | 14.13 | Peak |
| 2390 | Hopping ON | 74.79 | 61.75 | 13.04 | Peak |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: $\pi/4$ DQPSK

| Frequency MHz | Hopping Mode | Fundamental (dBuV/m) | Delta dB | Band Edge Field Strength (dBuV/m) | Detector |
|---------------|--------------|----------------------|----------|-----------------------------------|----------|
| 2483.5 | Hopping OFF | 75.73 | 59.56 | 16.17 | Peak |
| 2483.5 | Hopping ON | 74.63 | 59.47 | 15.16 | Peak |

Note:

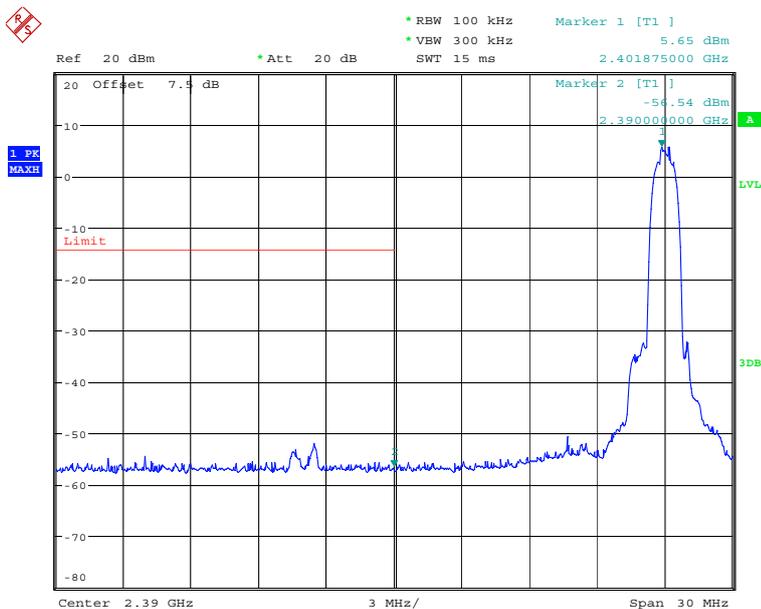
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Delta

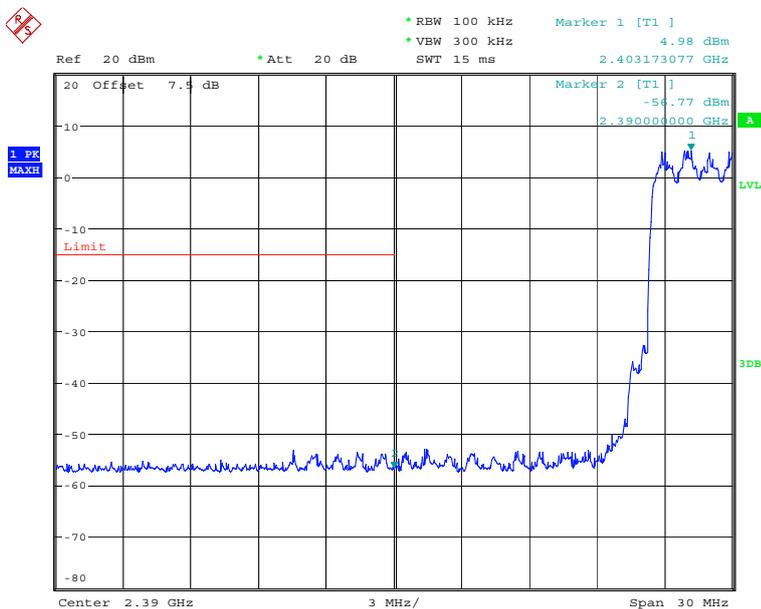
F = Fundamental field Strength (Peak or Average)

Delta= Conducted Band Edge Delta (Peak or Average)



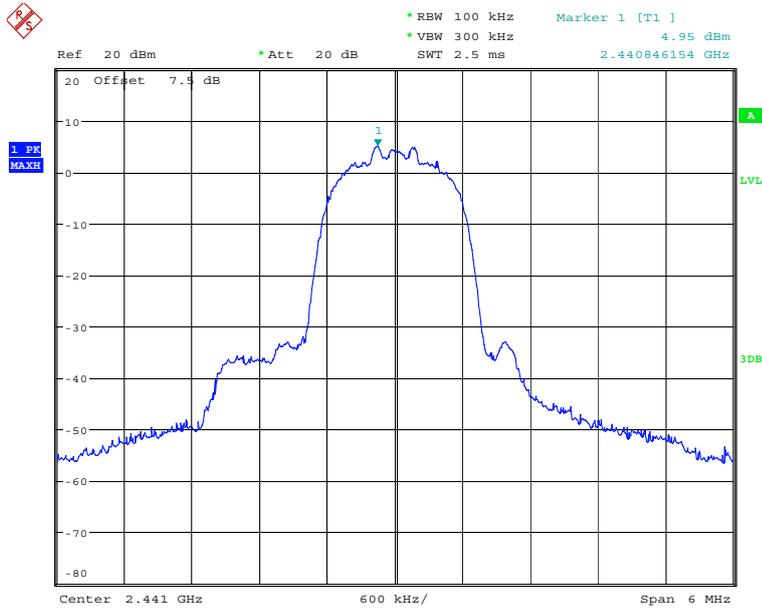
Date: 13.MAR.2012 10:59:03

Carrier frequency (MHz): 2402
Channel No.:0, Hopping OFF
Modulation type: $\pi/4$ DQPSK



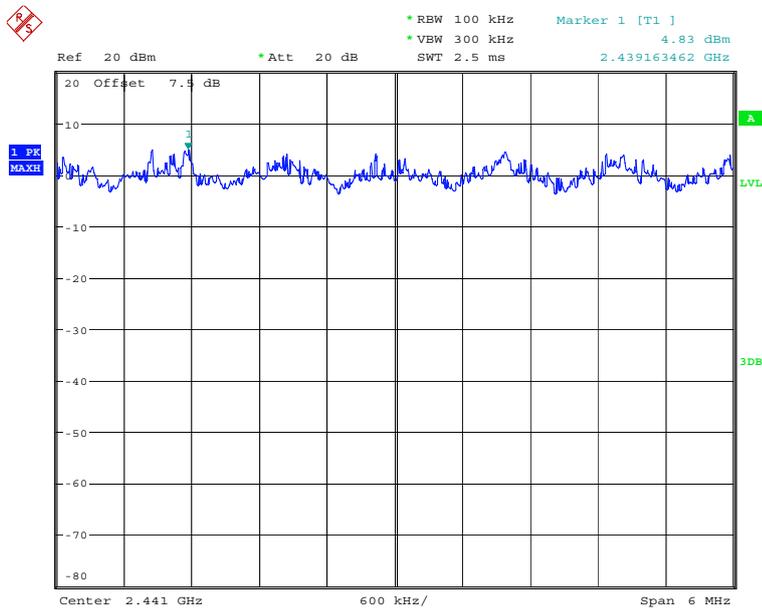
Date: 13.MAR.2012 11:37:02

Carrier frequency (MHz): 2402
Channel No.:0, Hopping ON
Modulation type: $\pi/4$ DQPSK



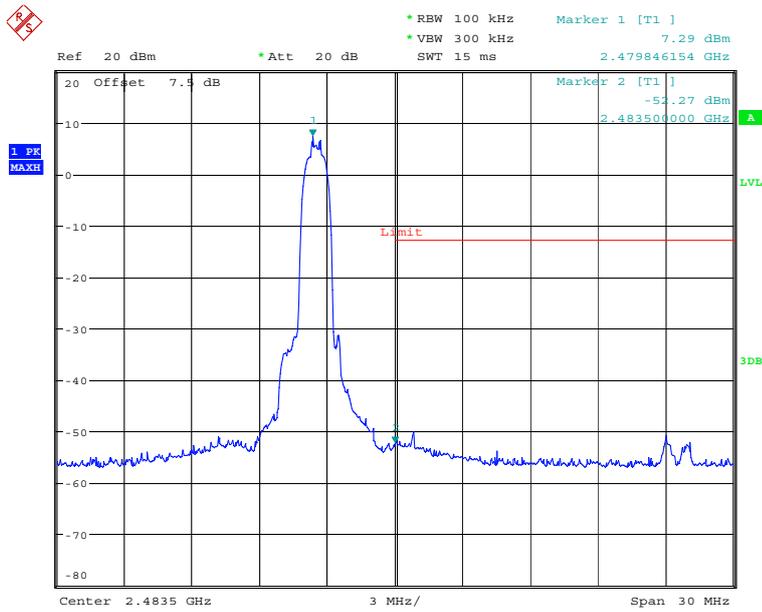
Date: 13.MAR.2012 13:44:50

Carrier frequency (MHz): 2441
Channel No.:39, Hopping OFF
Modulation type: $\pi/4$ DQPSK



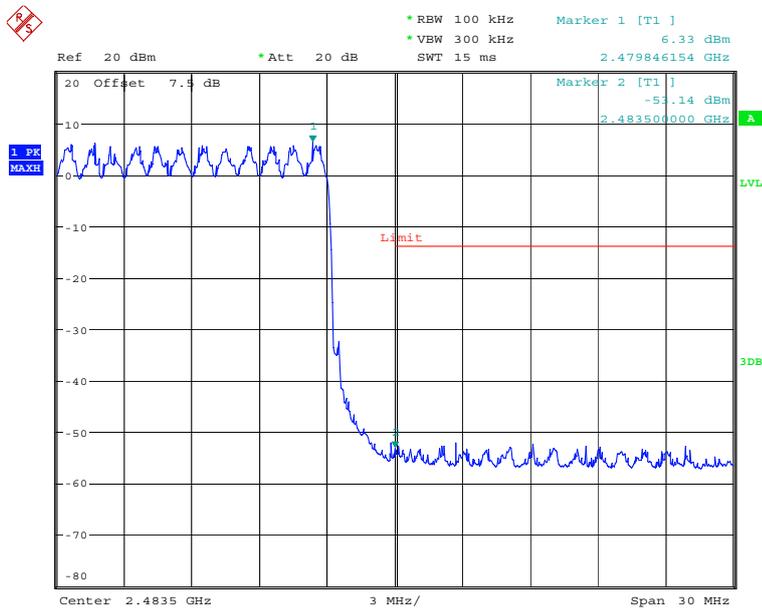
Date: 13.MAR.2012 13:49:26

Carrier frequency (MHz): 2441
Channel No.:39, Hopping ON
Modulation type: $\pi/4$ DQPSK



Date: 13.MAR.2012 14:11:58

Carrier frequency (MHz): 2480
Channel No.:78, Hopping OFF
Modulation type: $\pi/4$ DQPSK



Date: 13.MAR.2012 14:38:20

Carrier frequency (MHz): 2480
Channel No.:78, Hopping ON
Modulation type: $\pi/4$ DQPSK

RF Conducted Measurement

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: 8DPSK

| Frequency MHz | Hopping Mode | Measured value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|--------------|--------------------|---------------------|-----------|----------|
| 2390 | Hopping OFF | -56.37 | 6.50 | -13.50 | 62.87 |
| 2390 | Hopping ON | -56.92 | 5.04 | -14.96 | 61.96 |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: 8DPSK

| Frequency MHz | Hopping Mode | Measured value dBm | Reference value dBm | Limit dBm | Delta dB |
|---------------|--------------|--------------------|---------------------|-----------|----------|
| 2483.5 | Hopping OFF | -52.59 | 6.34 | -13.66 | 58.93 |
| 2483.5 | Hopping ON | -53.67 | 6.10 | -13.90 | 59.77 |

RF Radiated Measurement

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: 8DPSK

| Frequency MHz | Hopping Mode | Correction Factor dB/m | Reading Level dBuV | Emission Level dBuV/m | Detector |
|---------------|--------------|------------------------|--------------------|-----------------------|----------|
| 2402 | Hopping OFF | 2.7 | 73.14 | 75.84 | Peak |
| 2402 | Hopping ON | 2.7 | 71.58 | 74.28 | Peak |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: 8DPSK

| Frequency MHz | Hopping Mode | Correction Factor dB/m | Reading Level dBuV | Emission Level dBuV/m | Detector |
|---------------|--------------|------------------------|--------------------|-----------------------|----------|
| 2480 | Hopping OFF | 2.5 | 73.11 | 75.61 | Peak |
| 2480 | Hopping ON | 2.5 | 72.29 | 74.79 | Peak |

Band Edge Test Data

Carrier frequency (MHz): 2402

Channel No.:0

Modulation type: 8DPSK

| Frequency MHz | Hopping Mode | Fundamental (dBuV/m) | Delta dB | Band Edge Field Strength (dBuV/m) | Detector |
|---------------|--------------|----------------------|----------|-----------------------------------|----------|
| 2390 | Hopping OFF | 75.84 | 62.87 | 12.97 | Peak |
| 2390 | Hopping ON | 74.28 | 61.96 | 12.32 | Peak |

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: 8DPSK

| Frequency MHz | Hopping Mode | Fundamental (dBuV/m) | Delta dB | Band Edge Field Strength (dBuV/m) | Detector |
|---------------|--------------|----------------------|----------|-----------------------------------|----------|
| 2483.5 | Hopping OFF | 75.61 | 58.93 | 16.68 | Peak |
| 2483.5 | Hopping ON | 74.79 | 59.77 | 15.02 | Peak |

Note:

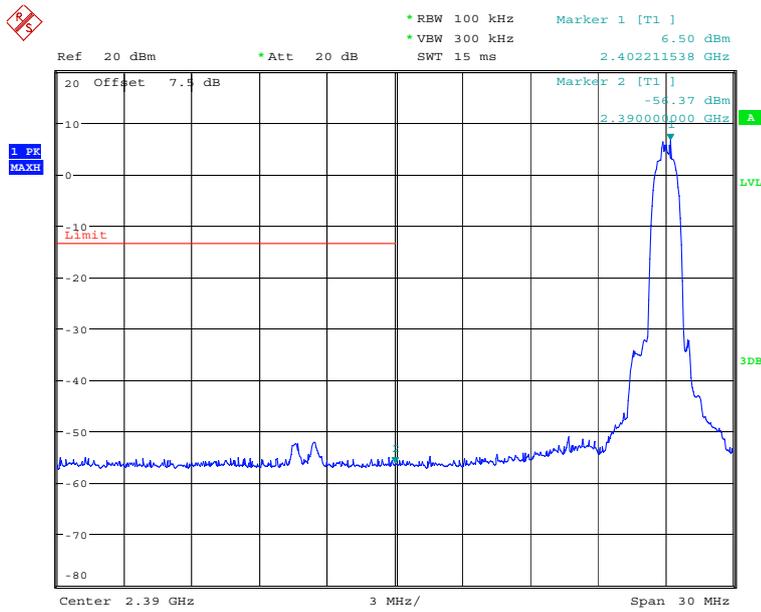
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F - Delta

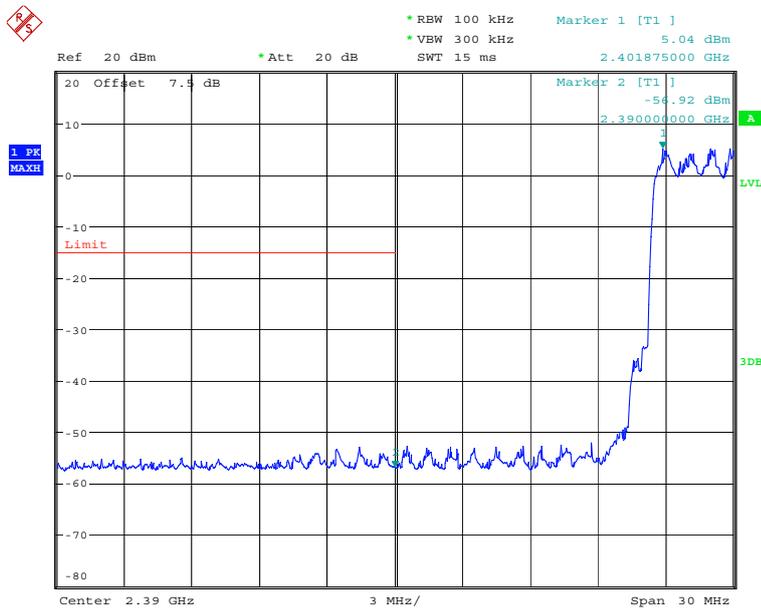
F = Fundamental field Strength (Peak or Average)

Delta= Conducted Band Edge Delta (Peak or Average)



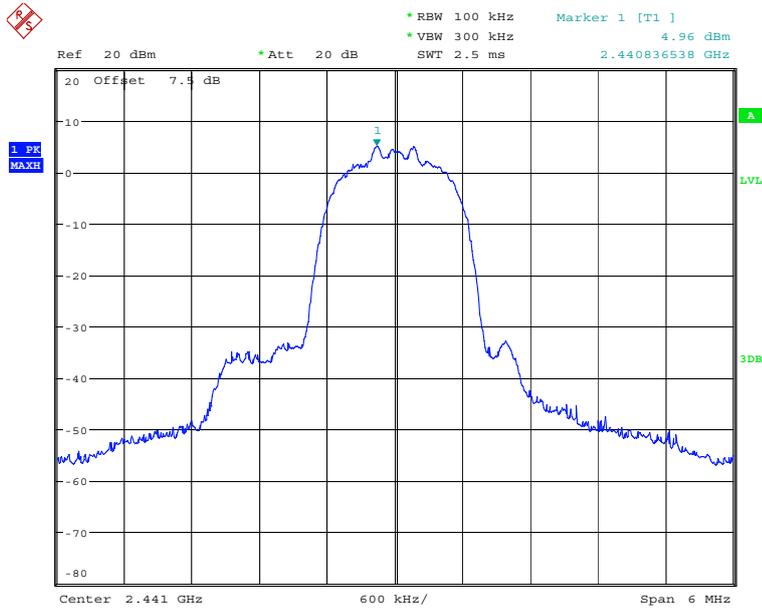
Date: 13.MAR.2012 11:16:59

Carrier frequency (MHz): 2402
Channel No.:0, Hopping OFF
Modulation type: 8DPSK



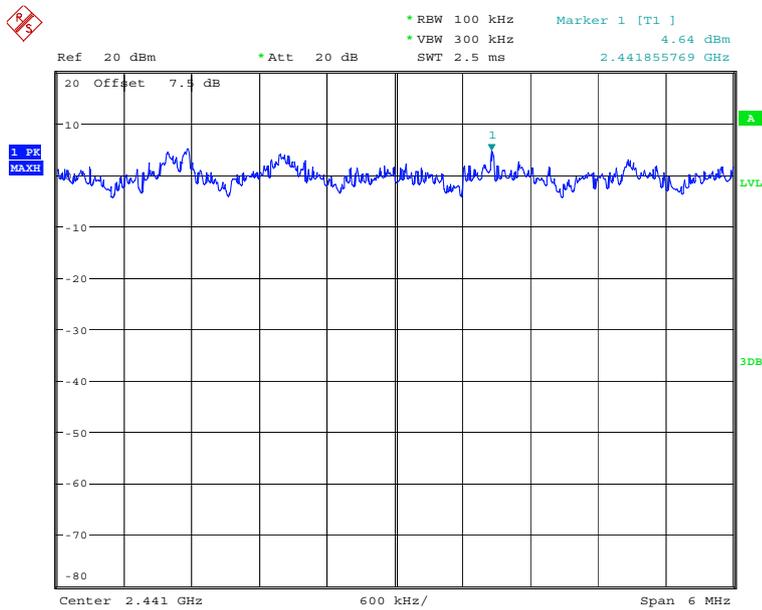
Date: 13.MAR.2012 11:49:36

Carrier frequency (MHz): 2402
Channel No.:0, Hopping ON
Modulation type: 8DPSK



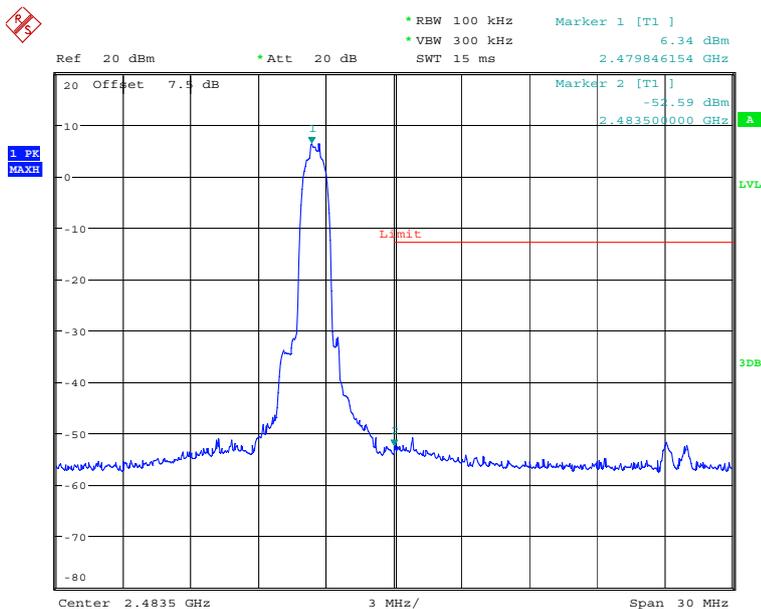
Date: 13.MAR.2012 13:45:39

Carrier frequency (MHz): 2441
Channel No.:39, Hopping OFF
Modulation type: 8DPSK



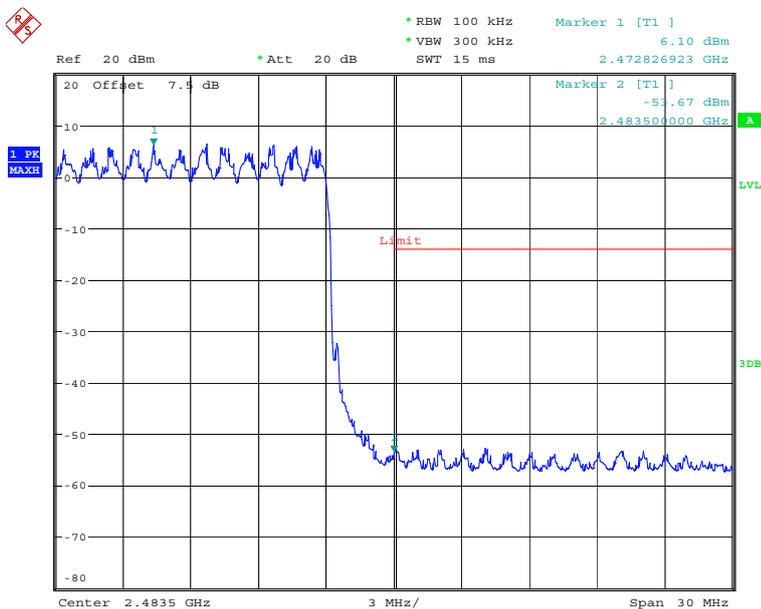
Date: 13.MAR.2012 13:51:13

Carrier frequency (MHz): 2441
Channel No.:39, Hopping ON
Modulation type: 8DPSK



Date: 13.MAR.2012 14:19:23

Carrier frequency (MHz): 2480
Channel No.:78, Hopping OFF
Modulation type: 8DPSK



Date: 13.MAR.2012 14:44:25

Carrier frequency (MHz): 2480
Channel No.:78, Hopping ON
Modulation type: 8DPSK

2.2.6 Dwell time

2.2.6.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.6.2 Test Description

The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

The Equipment Under Test (EUT) was set up in a shielded room to perform the dwell time measurements.

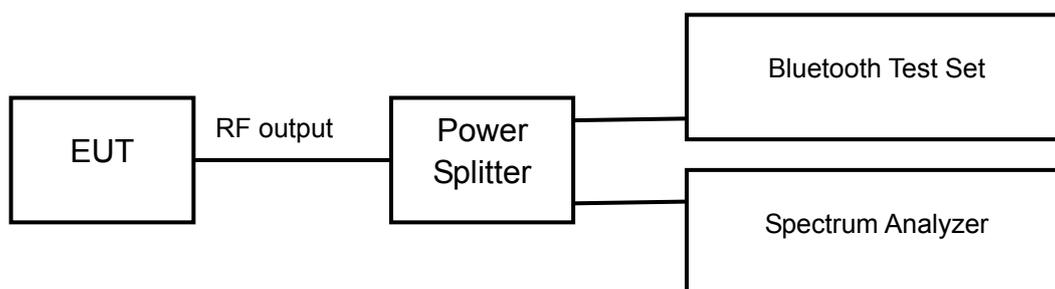
The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

The time slot length is measured of three different packet types which are available in the Bluetooth technology. Those are DH1, DH3 and DH5 packets. The dwell time is calculated by:

Dwell time = time slot length * hop rate * 31.6/ number of hopping channels

with:

- hop rate=1600/2 * 1/s for DH1 packets =800
- hop rate=1600/4 * 1/s for DH3 packets =400
- hop rate=1600/6 * 1/s for DH5 packets =266.67
- number of hopping channels=79
- 31.6 s=0.4 seconds multiplied by the number of hopping channels=0.4s * 79



2.2.6.3 Test limit

FCC Part15.247(a)(1)(iii)

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

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Since the Bluetooth technology uses 79 channels this period is calculated to be 31.6 seconds.

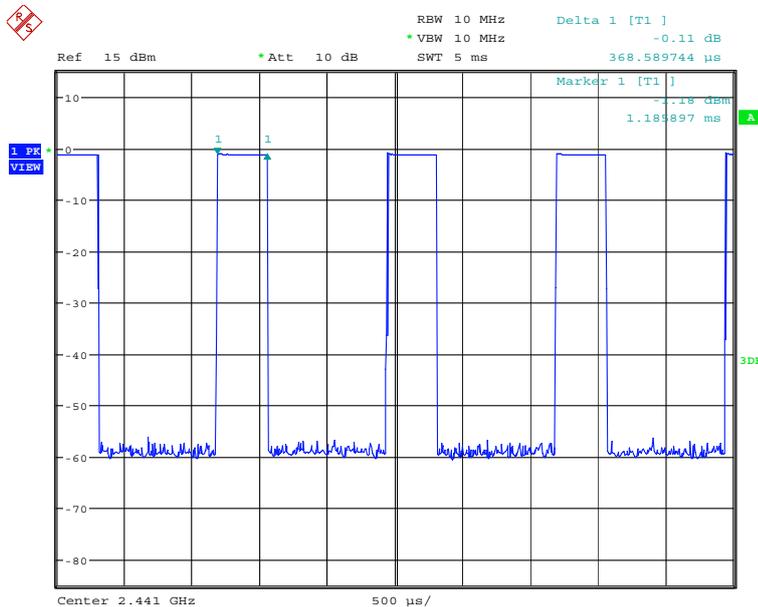
IC RSS-210 § A8.1(d)

Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

2.2.6.4 Test result

Modulation type: GFSK

| Packet type | Time slot length ms | Dwell time | Dwell time ms |
|-------------|---------------------|--|---------------|
| DH1 | 0.3686 | time slot length *31.6 *1600/2 /79 | 117.95 |
| DH3 | 1.6186 | time slot length * 31.6 *1600/4 /79 | 258.98 |
| DH5 | 2.8686 | time slot length * 31.6 *1600/6 /79 | 305.98 |

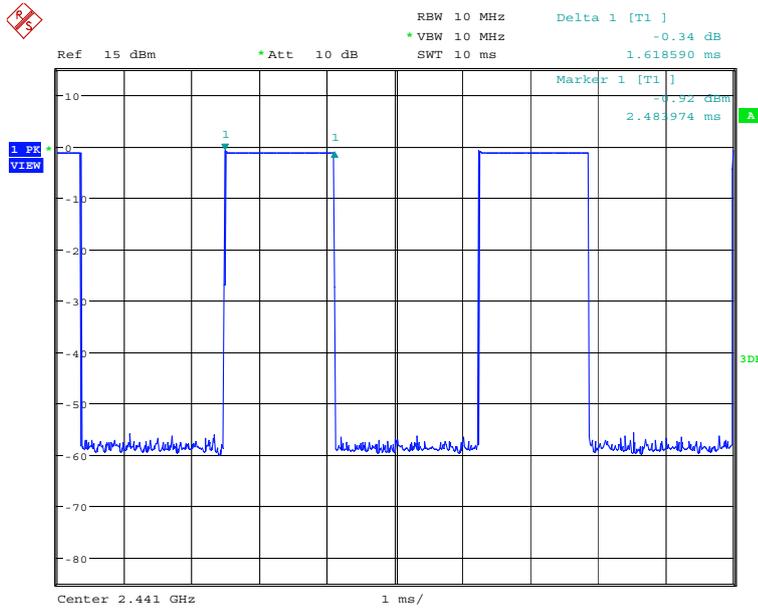


Date: 13.MAR.2012 14:53:33

Carrier frequency (MHz): 2441

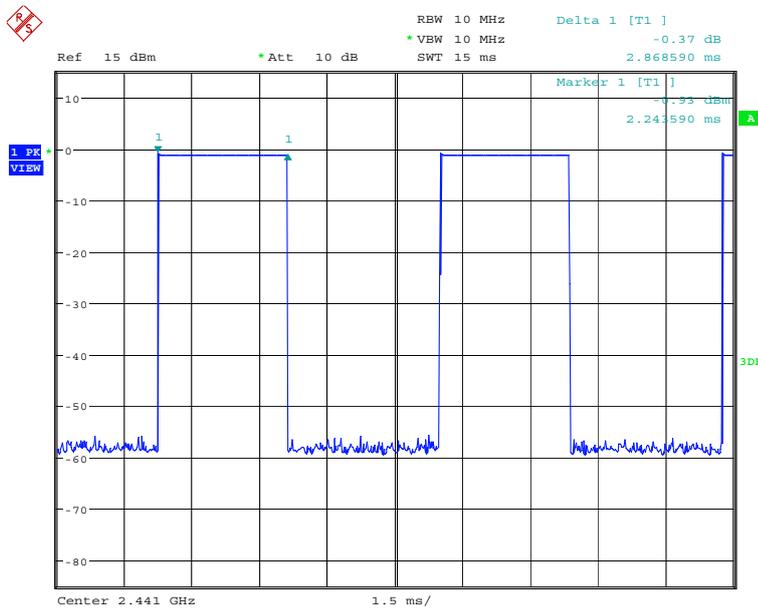
Packet type: DH1

Modulation type: GFSK



Date: 13.MAR.2012 14:54:21

Carrier frequency (MHz): 2441
Packet type: DH3
Modulation type: GFSK

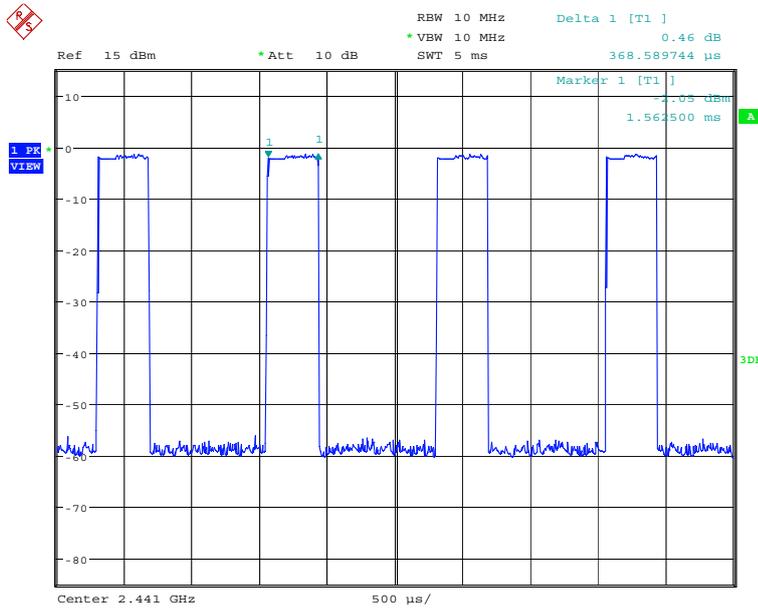


Date: 13.MAR.2012 14:55:10

Carrier frequency (MHz): 2441
Packet type: DH5
Modulation type: GFSK

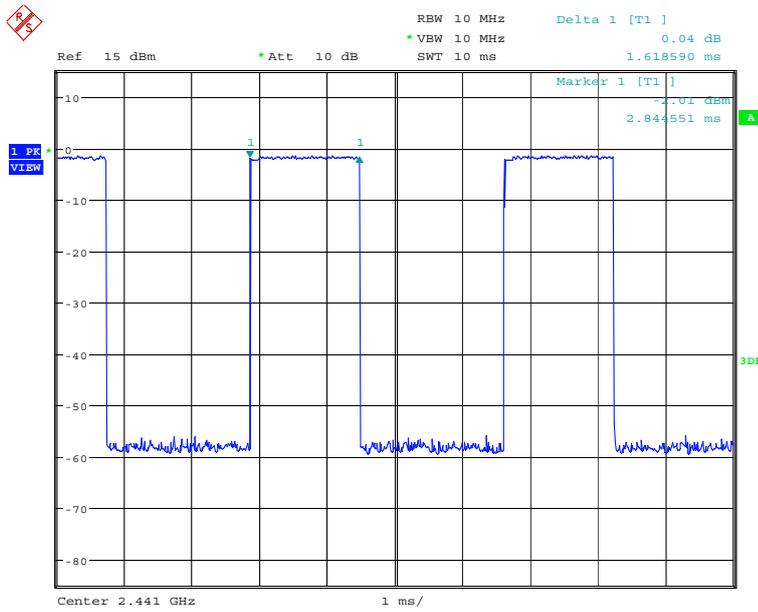
Modulation type: $\pi/4$ DQPSK

| Packet type | Time slot length ms | Dwell time | Dwell time ms |
|-------------|---------------------|--|---------------|
| DH1 | 0.3686 | time slot length *31.6 *1600/2 /79 | 117.95 |
| DH3 | 1.6186 | time slot length * 31.6 *1600/4 /79 | 258.98 |
| DH5 | 2.8686 | time slot length * 31.6 *1600/6 /79 | 305.98 |



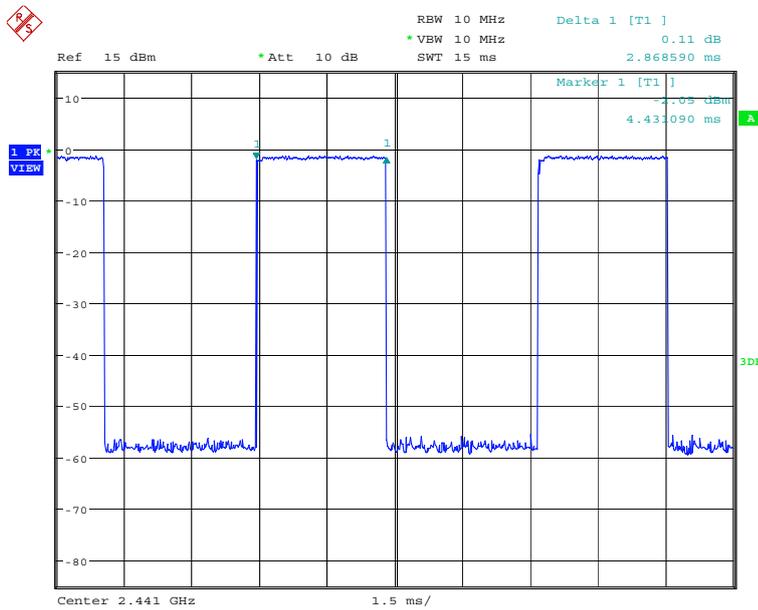
Date: 13.MAR.2012 14:56:06

Carrier frequency (MHz): 2441
Packet type: DH1
Modulation type: $\pi/4$ DQPSK



Date: 13.MAR.2012 14:56:54

Carrier frequency (MHz): 2441
Packet type: DH3
Modulation type: $\pi/4$ DQPSK

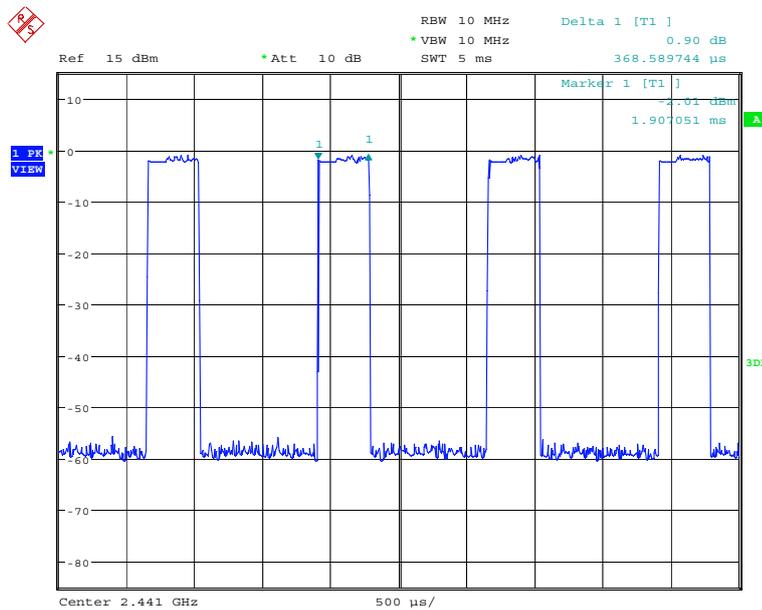


Date: 13.MAR.2012 14:57:29

Carrier frequency (MHz): 2441
Packet type: DH5
Modulation type: $\pi/4$ DQPSK

Modulation type: 8DPSK

| Packet type | Time slot length ms | Dwell time | Dwell time ms |
|-------------|---------------------|--|---------------|
| DH1 | 0.3686 | time slot length *31.6 *1600/2 /79 | 117.95 |
| DH3 | 1.6186 | time slot length * 31.6 *1600/4 /79 | 258.98 |
| DH5 | 2.8686 | time slot length * 31.6 *1600/6 /79 | 305.98 |

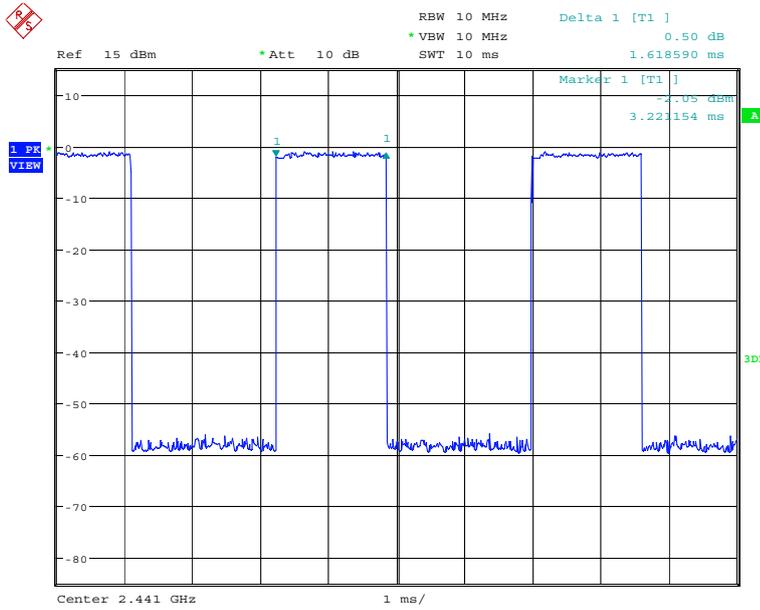


Date: 13.MAR.2012 14:59:48

Carrier frequency (MHz): 2441

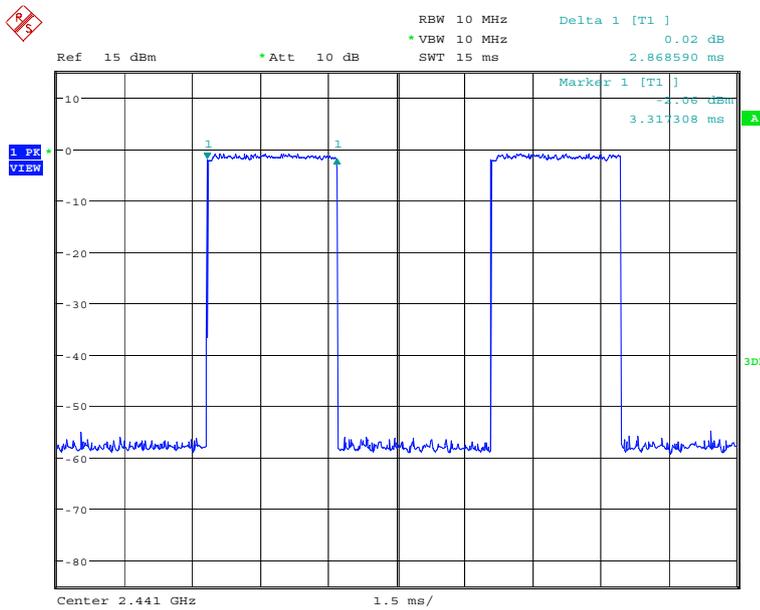
Packet type:DH1

Modulation type: 8DPSK



Date: 13.MAR.2012 15:00:31

Carrier frequency (MHz): 2441
Packet type:DH3
Modulation type: 8DPSK



Date: 13.MAR.2012 15:01:22

Carrier frequency (MHz): 2441
Packet type:DH5
Modulation type: 8DPSK

2.2.7 Channel separation

2.2.7.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.7.2 Test Description

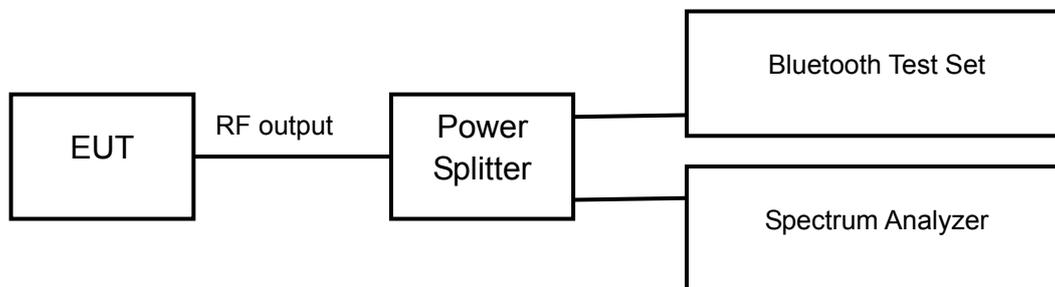
The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

The Equipment Under Test (EUT) was set up in a shielded room to perform the channel separation measurements.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

Analyzer settings:

- Detector: Peak-Maxhold
- Span: 3 MHz
- Centre Frequency: 2441 MHz
- Resolution Bandwidth (RBW): 30 kHz
- Video Bandwidth (VBW): 100 kHz
- Sweep Time: Coupled



2.2.7.3 Test limit

FCC Part15.247(a)(1)

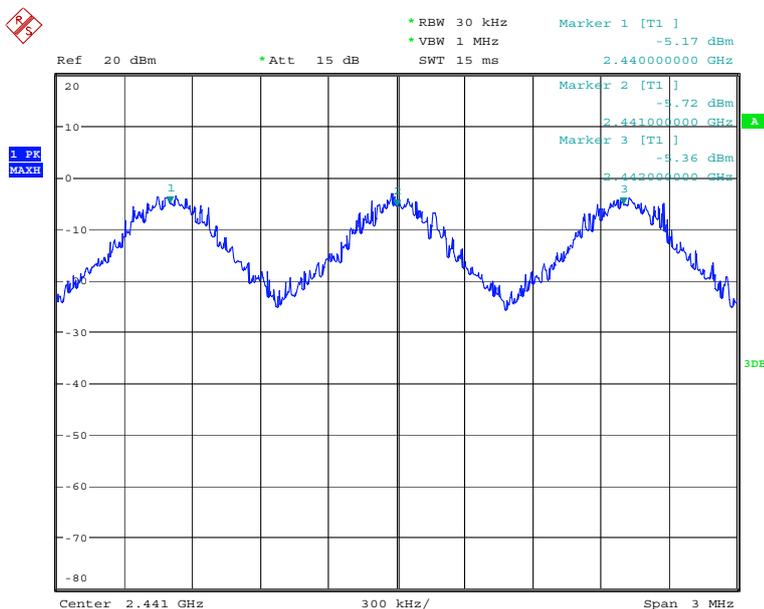
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

IC RSS-210 § A8.1(b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

2.2.7.4 Test result

| | |
|--------------|---------------------------|
| Op-mode | Channel separation MHz |
| Hopping mode | 1 |



Date: 13.MAR.2012 15:04:22

Op-mode: Hopping mode

2.2.8 Number of hopping frequencies

2.2.8.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 22°C | 40% | 101.1kPa |

2.2.8.2 Test Description

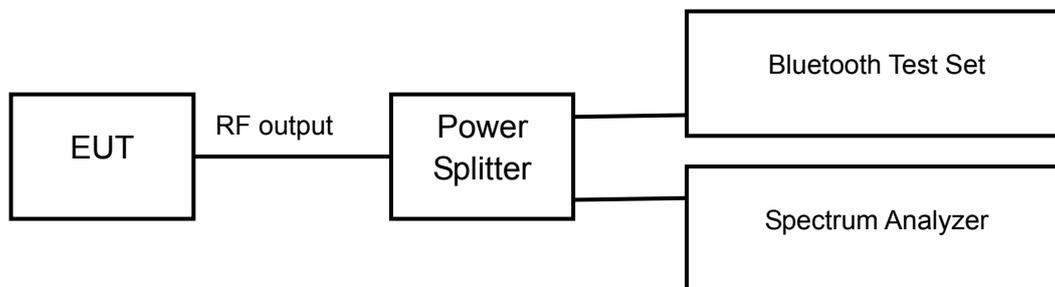
The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

The Equipment Under Test (EUT) was set up in a shielded room to perform the number of hopping frequencies measurement.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

Analyzer settings:

- Detector: Peak-Maxhold
- Start frequency: 2400 MHz
- Stop frequency: 2483.5 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Sweep Time: Coupled



2.2.8.3 Test limit

FCC Part15.247(a)(1)(iii)

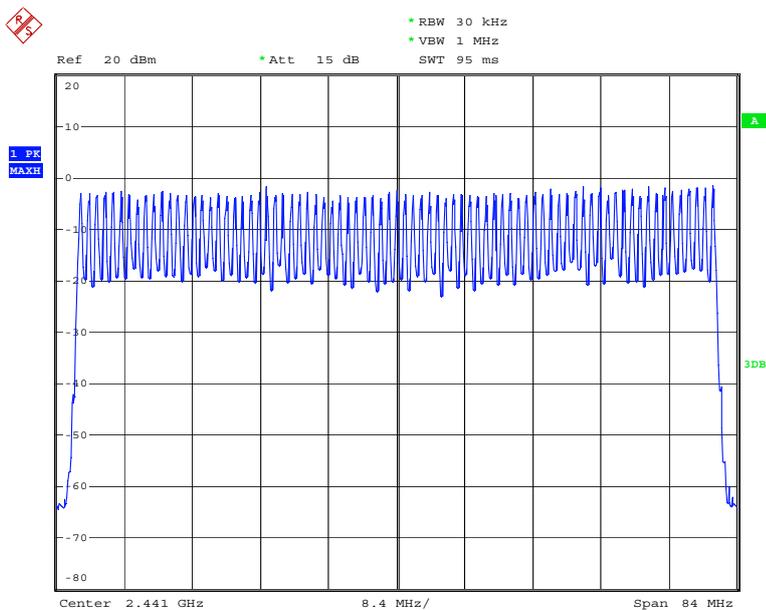
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

IC RSS-210 § A8.1(d)

Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

2.2.8.4 Test result

| Op-mode | Result |
|--------------|--------|
| Hopping mode | 79 |



Date: 13.MAR.2012 15:10:39

Op-mode: Hopping mode

2.2.9 AC Power line Conducted Emission

2.2.9.1 Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 18°C | 34% | 99.6kPa |

2.2.9.2 Test limit

FCC Part15.107 and Part15.207

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|-----------------------------|------------------------|------------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

IC RSS-Gen § 7.2.2

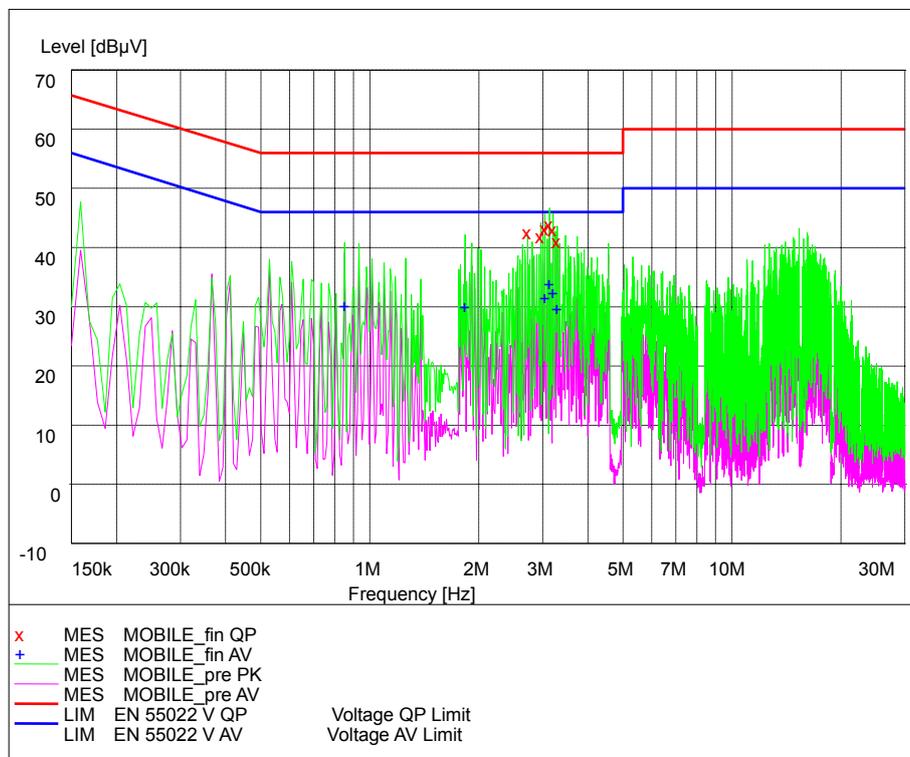
Restricted bands, identified in Table 3, are designated primarily for safety-of-life services (distress calling and certain aeronautical bands), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following restrictions apply:

- (a) fundamental components of modulation of licence-exempt radio apparatus shall not fall within the restricted bands of Table 3;
- (b) unwanted emissions falling into restricted bands of Table 3 shall comply with the limits specified in RSS-Gen;
- (c) unwanted emissions not falling within restricted frequency bands shall either comply with the limits specified in the applicable RSS, or with those specified in RSS-Gen.

The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009

2.2.9.3 Test result

Noise Level of the Measuring Instrument



L and N Line

MEASUREMENT RESULT: "MOBILE_fin AV"

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 2.724000 | 44.40 | 20.3 | 56 | 11.6 | L1 | GND |
| 2.967000 | 43.70 | 20.3 | 56 | 12.3 | L1 | GND |
| 3.048000 | 44.90 | 20.3 | 56 | 11.1 | L1 | GND |
| 3.129000 | 45.60 | 20.3 | 56 | 10.4 | N | GND |
| 3.210000 | 44.70 | 20.3 | 56 | 11.3 | L1 | GND |
| 3.291000 | 42.80 | 20.3 | 56 | 13.2 | L1 | GND |

MEASUREMENT RESULT: "MOBILE_fin QP"

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.852000 | 31.80 | 20.3 | 46 | 14.2 | L1 | GND |
| 1.833000 | 31.70 | 20.2 | 46 | 14.3 | L1 | GND |
| 3.048000 | 33.20 | 20.3 | 46 | 12.8 | L1 | GND |
| 3.129000 | 35.50 | 20.3 | 46 | 10.5 | N | GND |
| 3.210000 | 34.10 | 20.3 | 46 | 11.9 | L1 | GND |
| 3.291000 | 31.40 | 20.3 | 46 | 14.6 | L1 | GND |

2.3. Measurement Uncertainty

| Items | Uncertainty | |
|----------------------|----------------|--------|
| Occupied Bandwidth | 3kHz | |
| Peak power output | 0.67dB | |
| Band edge compliance | 1.20dB | |
| Spurious emissions | 30MHz~1GHz | 2.83dB |
| | 1GHz~12.75GHz | 2.50dB |
| | 12.75GHz~25GHz | 2.75dB |

2.4. List of test equipment

| No. | Name/ Model | Manufacturer | S/N | Cal Due date |
|-----|---|--------------|------------|--------------|
| 1. | Spectrum Analyzer FSQ 40 | R&S | 200065 | 2013.3 |
| 2. | Signal Generator E8257D | Agilent | MY46520645 | 2012.8 |
| 3. | Oscilloscope 54622A | Agilent | MY40010227 | 2012.8 |
| 4. | Bluetooth Test Set MT8852B | Auritsu | 001007002 | 2012.8 |
| 5. | Cable N-N | Spectrum | 6-046 | 2012.8 |
| 6. | Cable N-N | Spectrum | 6-050 | 2012.8 |
| 7. | Power Splitter 11850C | Agilent | 026057 | 2012.8 |
| 8. | 12.65m×8.03m×7.50m Fully-Anechoic Chamber | FRANKONIA | ----- | ----- |
| 9. | 23.18m×16.88m×9.60m Semi-Anechoic Chamber | FRANKONIA | --- | ----- |
| 10. | Turn table Diameter:1m | HD | ----- | ----- |
| 11. | Turn table Diameter:5m | HD | ----- | ----- |
| 12. | Antenna master FAC(MA4.0) | MATURO | ----- | ----- |
| 13. | Antenna master SAC(MA4.0) | MATURO | ----- | ----- |
| 14. | 9.080m×5.255m×3.525m Shielding room | FRANKONIA | ----- | ----- |
| 15. | HF 906 Double-Ridged Waveguide Horn Antenna | R&S | 100030 | 2012.8 |
| 16. | HF 906 Double-Ridged Waveguide Horn Antenna | R&S | 100029 | 2012.8 |
| 17. | HL562 Ultra log antenna | R&S | 100016 | 2012.8 |
| 18. | 3160-09 Receive antenna | SCHWARZ-BECK | 002058-002 | 2012.8 |
| 19. | ESI 40 EMI test receiver | R&S | 100015 | 2012.8 |
| 20. | Radio tester | CMU 200 | 114667 | 2012.8 |
| 21. | ESCS30 EMI test receiver | R&S | 100029 | 2012.8 |
| 22. | HL562 Receive antenna | R&S | 100167 | 2012.8 |
| 23. | ESH3-Z5 LISN | R&S | 100020 | 2012.8 |