



TEST REPORT

Report No.: SRTC2011-H024-E0055

Product Name: GSM/GPRS/EDGE/WCDMA Digital
Mobile Phone with Bluetooth

Marketing Name: one touch 905M

Product Model: MINI3G M

Applicant: TCT Mobile Limited

Manufacture: TCT Mobile Limited

Specification: 47CFR Part 15 July 10, 2008, Subpart C

FCC ID: RAD204

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

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

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1. General information

1.1 Notes of the test report

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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
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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, E 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, E 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: 9th Jun 2011

Date of test: 10th Jun 2011 to 23rd Jun 2011

1.6 Reference specification

47CFR Part 15, July 10, 2008, Subpart C

1.7 Information of EUT

1.7.1 General information

Name of EUT	GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth
FCC ID	RAD204
Frequency range	2.4000~2.4835GHz
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	Integral
Power Supply	Battery or charger
Rated Power Supply Voltage	3.8V
HW Version	PIO3
SW Version	sw160

1.7.2 EUT details

Product Name	Marketing Name	Product Model	IMEI
GSM/GPRS/EDGE/WCDMA Digital Mobile Phone with Bluetooth	one touch 905M	MINI3G M	012835000000070

1.7.3 Auxiliary equipment details

Equipment	Charger
Manufacturer	Ten Pao International Ltd.
Model Number	CBA3120AA0C2
Input Voltage	100V-240V a.c.
Output Voltage	5.0V d.c.
Frequency	50/60Hz

Equipment	Battery
Manufacturer	BYD LITHIUM BATTERY CO., LTD
Model Number	CAB3120000C1
Capacity	850mAh
Rated Voltage	3.7V d.c.


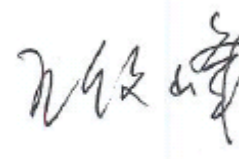

Equipment	Data Cable
Manufacturer	Shen Zhen Ju Wei Electronic Co.,LTD
Model Number	CDA3122001C1

Equipment	Data Cable
Manufacturer	Huizhou Shenghua Industry Co.,Ltd
Model Number	CDA3122001C2

2. Test information

2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	Occupied Bandwidth	15.247(a) (1)	Pass
2	Peak Power Output	15.247(a) (1)	Pass
3	Spurious RF Conducted Emissions	15.247(d)	Pass
4	Spurious Radiated Emissions	15.247(d), 15.35(b), 15.209	Pass
5	Band Edge Compliance	15.247(d)	Pass
6	Dwell time	15.247(a) (1)(iii)	Pass
7	Channel separation	15.247(a) (1)	Pass
8	Number of Hopping frequencies	15.247(a) (iii)	Pass
9	AC Powerline Conducted Emission	15.107, 15.207	Pass

This Test Report Is Issued by: Mr. Song Qizhu Director of the test lab 	Checked by: Mr. Wang Junfeng Deputy director of the test lab 
Tested by: Mr. Li Bin Test engineer 	Issued date: 2011.06.23

2.2 Test result

2.2.1 Occupied Bandwidth-§15.247(a) (1)

2.2.1.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.1kPa

2.2.1.2 Test Description

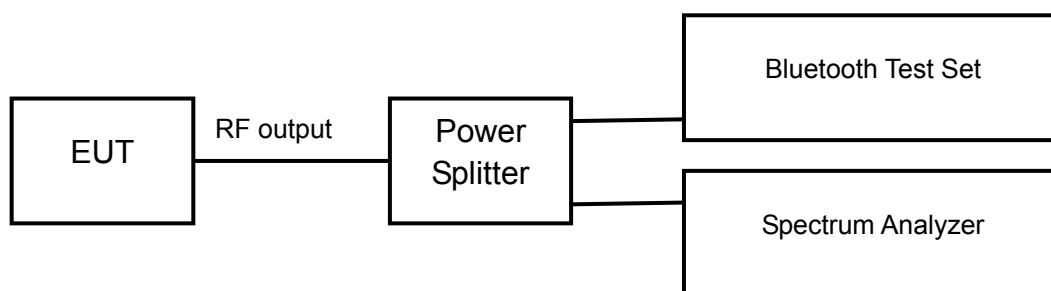
The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

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 Part 15, Subpart C, §15.247 (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.

2.2.1.4 Test result

Modulation type: GFSK

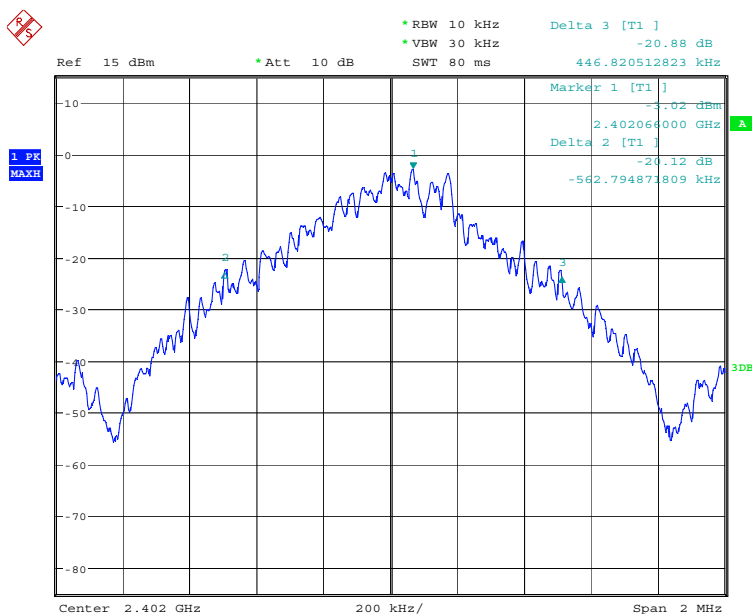
Carrier frequency (MHz)	Channel No.	20 dB bandwidth(KHz)
2402	0	1009.616
2441	39	1009.616
2480	79	1009.616

Modulation type: $\pi/4$ DQPSK

Carrier frequency (MHz)	Channel No.	20 dB bandwidth(KHz)
2402	0	1176.282
2441	39	1179.487
2480	79	1179.487

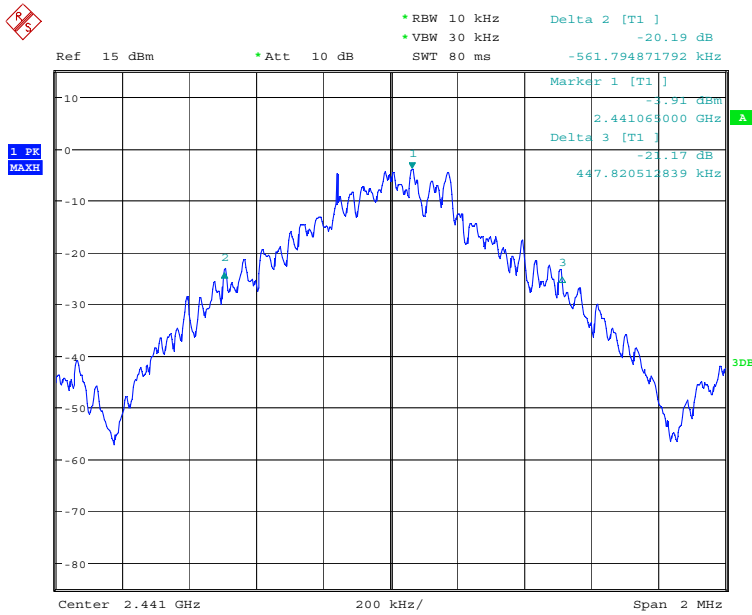
Modulation type: 8DPSK

Carrier frequency (MHz)	Channel No.	20 dB bandwidth(KHz)
2402	0	1198.718
2441	39	1195.513
2480	79	1198.718



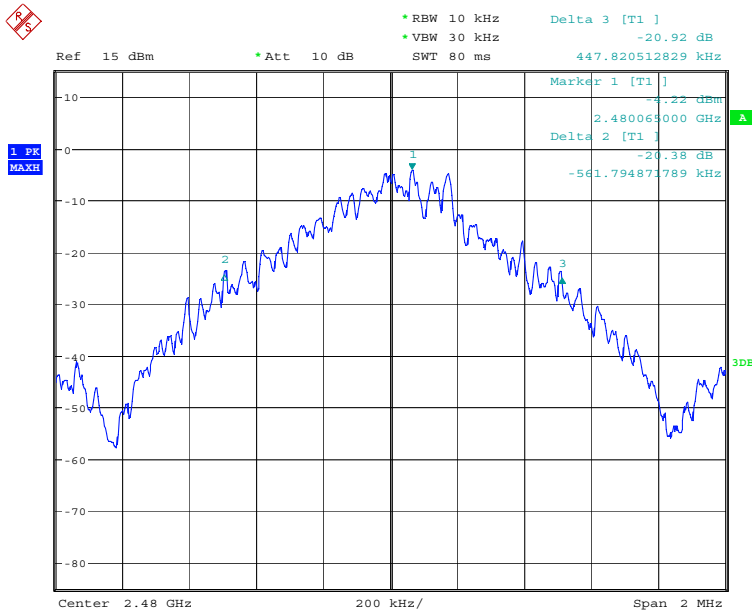
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Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



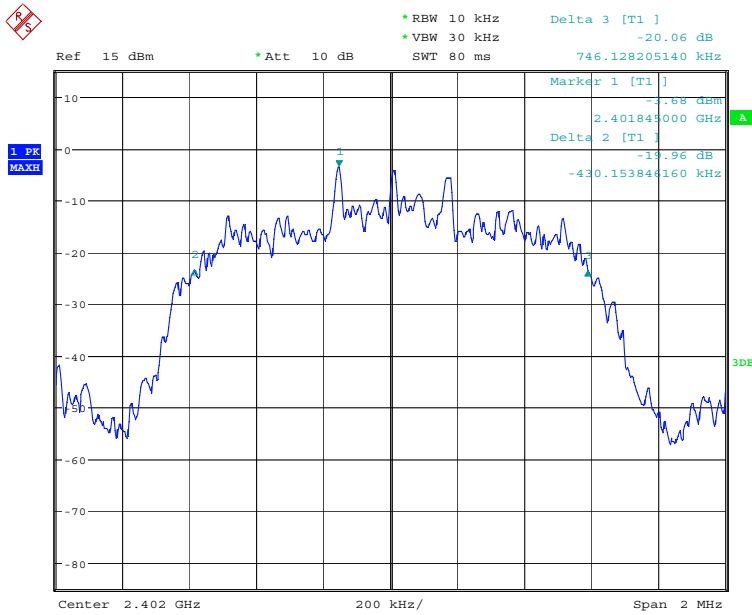
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Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



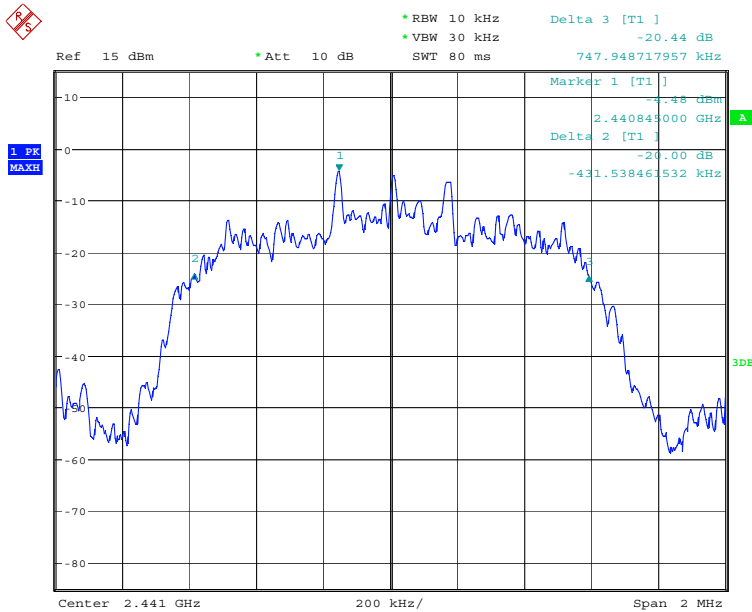
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Carrier frequency (MHz): 2480
Channel No.:78
Modulation type:GFSK



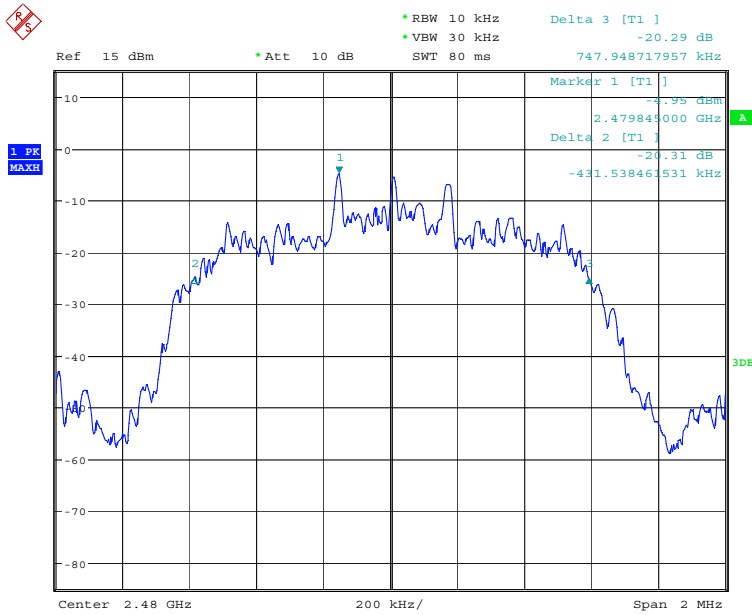
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Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



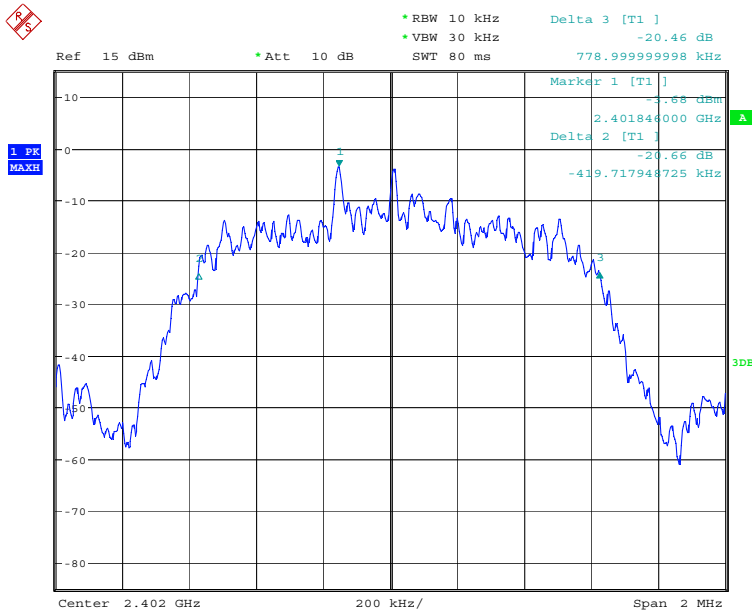
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Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK



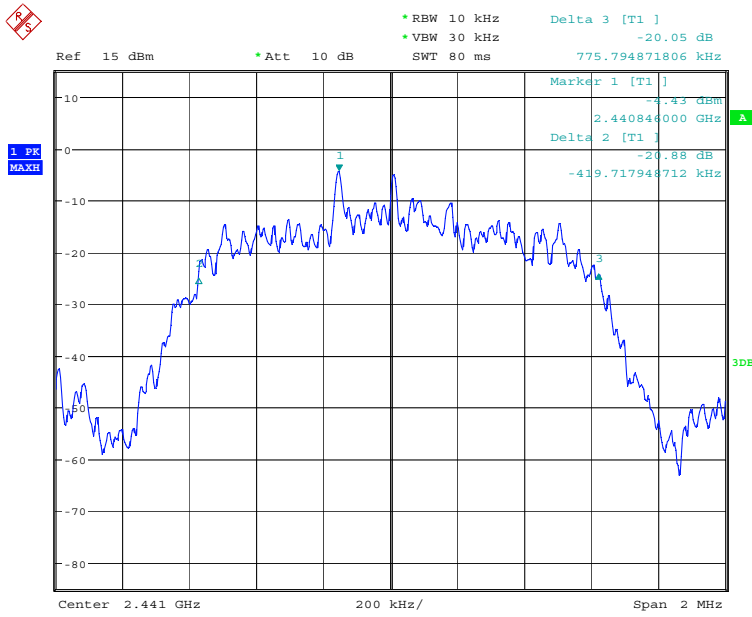
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Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK



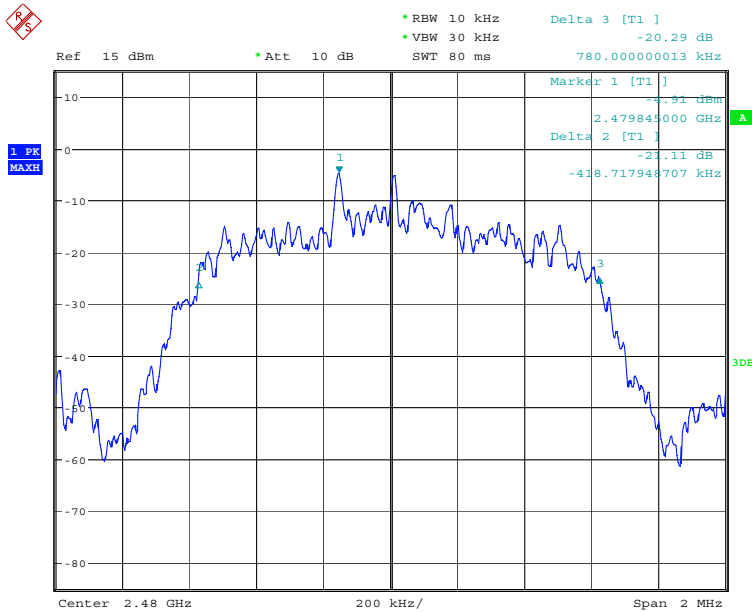
Date: 10.JUN.2011 18:03:55

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



Date: 10.JUN.2011 18:05:27

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



Date: 10.JUN.2011 18:10:42

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

2.2.2 Peak power output-§15.247(a) (1)

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

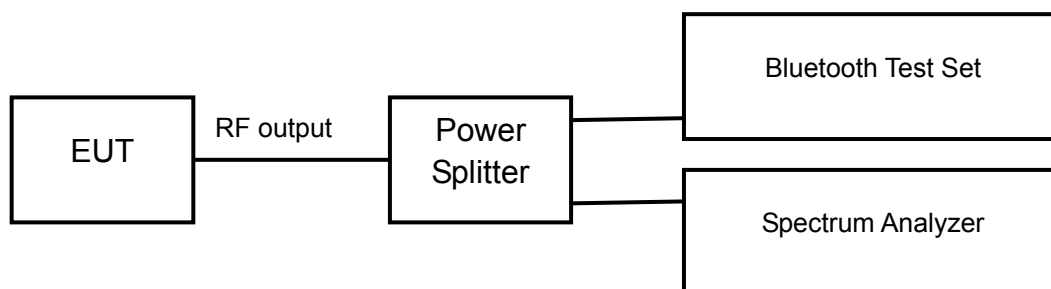
The Equipment Under Test (EUT) was set up in a shielded room to perform the output power measurements.

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 Part 15, Subpart C, §15.247 (b) (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.

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	Sweeptime
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:

Offset= the insertion loss of the power splitter+ cable loss
=7.00+0.50=7.50dB

Modulation type: GFSK

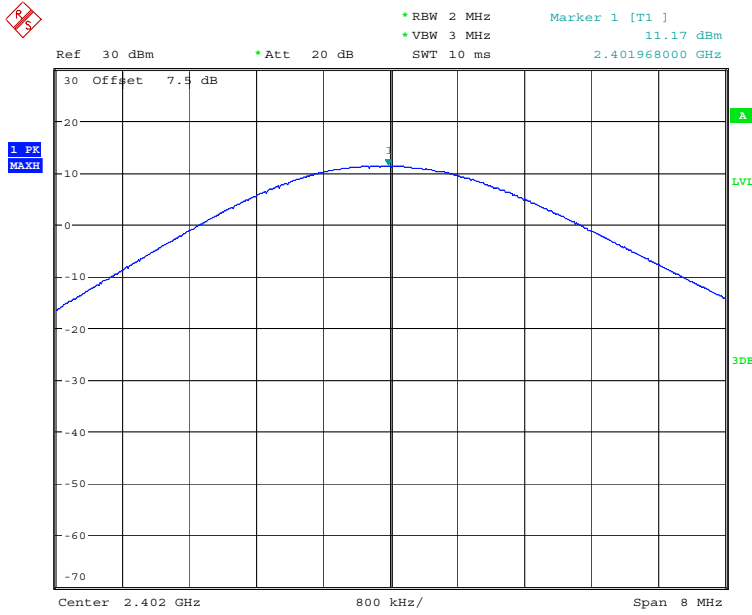
Carrier frequency (MHz)	Channel No.	Peak Conducted Output Power (dBm)
2402	0	11.17
2441	39	10.36
2480	78	9.89

Modulation type: $\pi/4$ DQPSK

Carrier frequency (MHz)	Channel No.	Peak Conducted Output Power (dBm)
2402	0	10.45
2441	39	9.65
2480	78	9.18

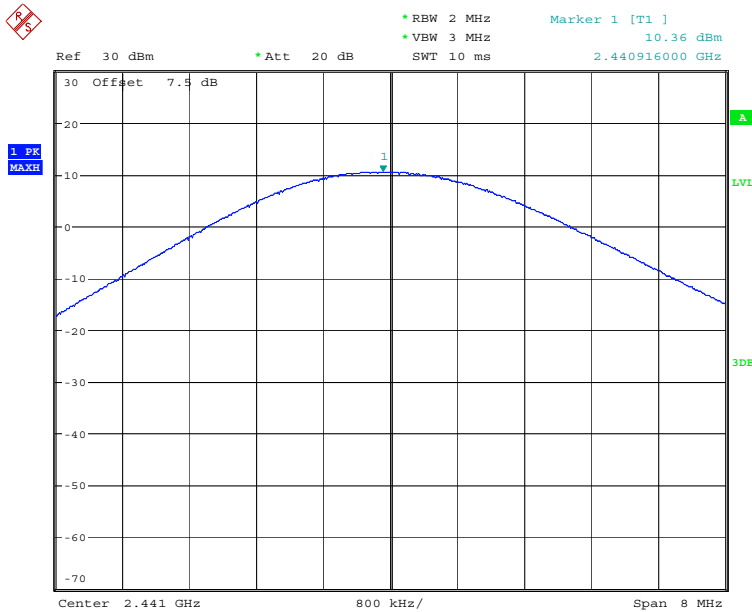
Modulation type: 8DPSK

Carrier frequency (MHz)	Channel No.	Peak Conducted Output Power (dBm)
2402	0	10.74
2441	39	9.93
2480	78	9.46



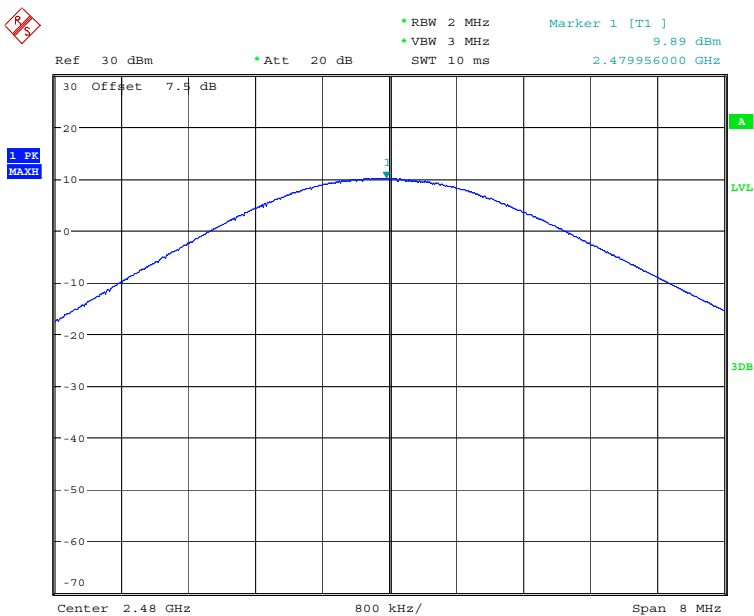
Date: 10.JUN.2011 18:23:00

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



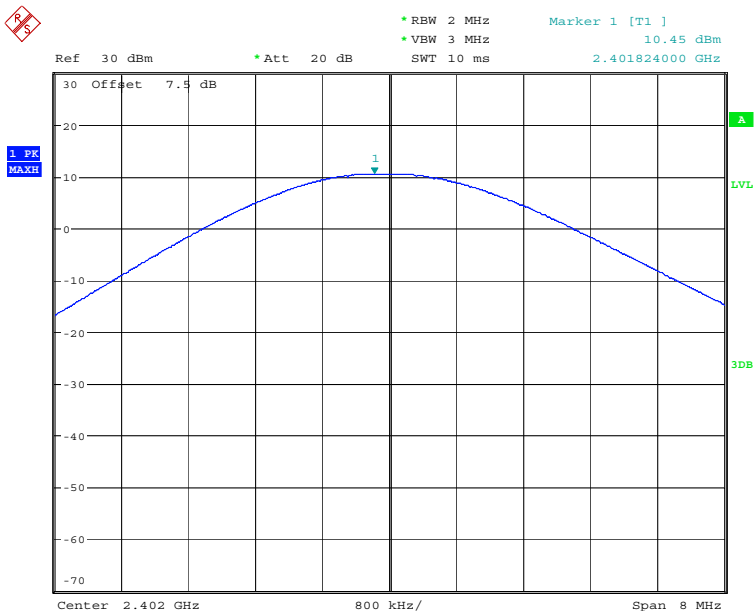
Date: 10.JUN.2011 18:23:36

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



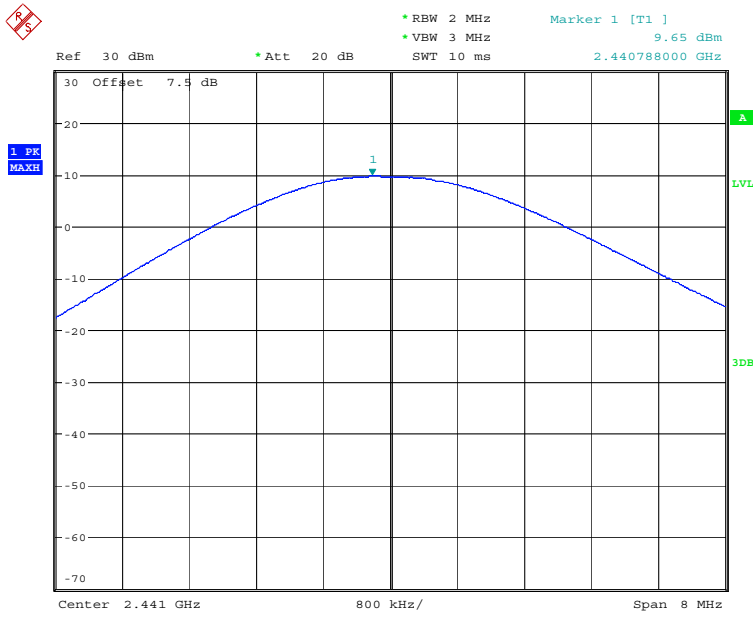
Date: 10.JUN.2011 18:24:15

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



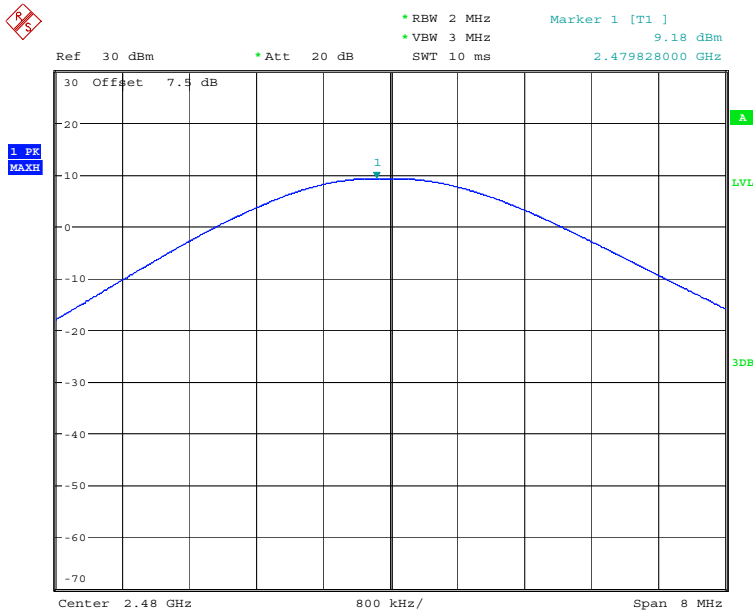
Date: 10.JUN.2011 18:25:39

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



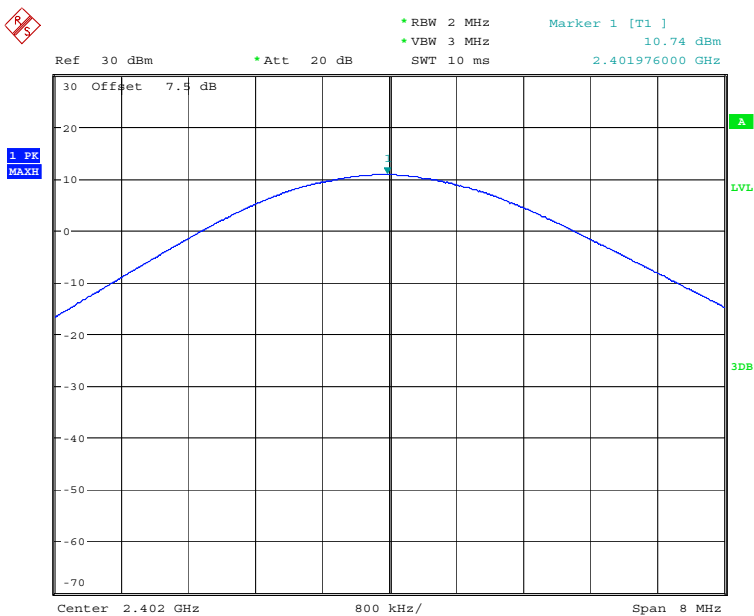
Date: 10.JUN.2011 18:26:05

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



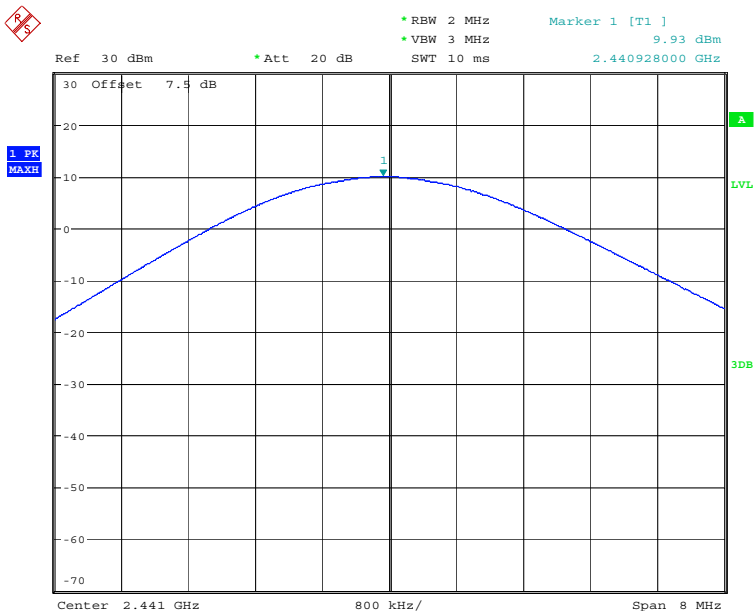
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Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK



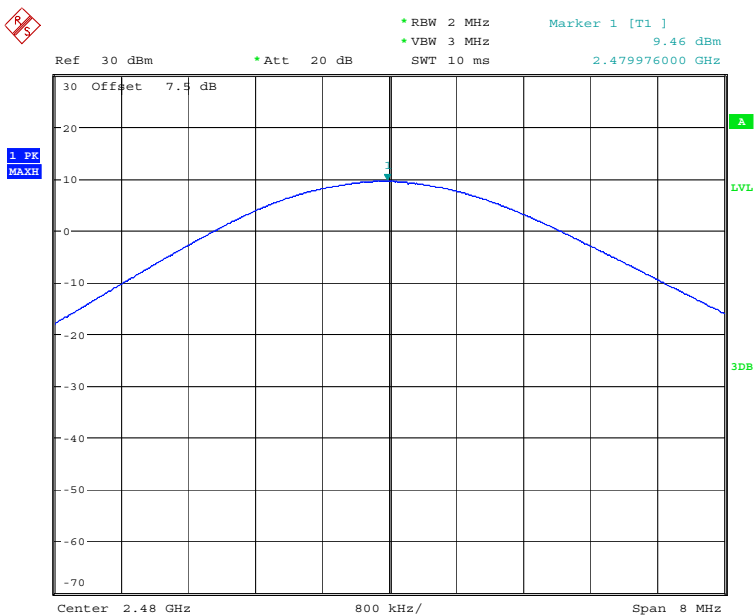
Date: 10.JUN.2011 18:28:33

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



Date: 10.JUN.2011 18:29:19

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



Date: 10.JUN.2011 18:30:14

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

2.2.3 Spurious RF conducted emissions-§15.247(d)

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.

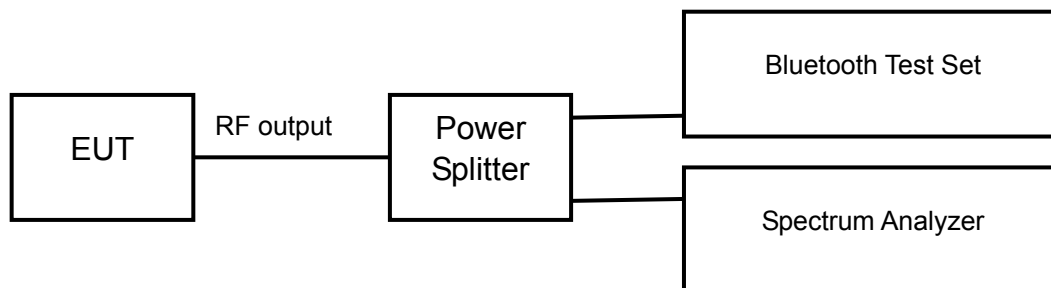
The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements.

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 Part 15, Subpart C, §15.247 (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.

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 to limit dB
---	---	---	---	---
---	---	---	---	---

Carrier frequency (MHz): 2441

Channel No.:39

Modulation type: GFSK

Frequency MHz	Corrected measurement value dBm	Reference value dBm	Limit dBm	Delta to limit dB
---	---	---	---	---
---	---	---	---	---

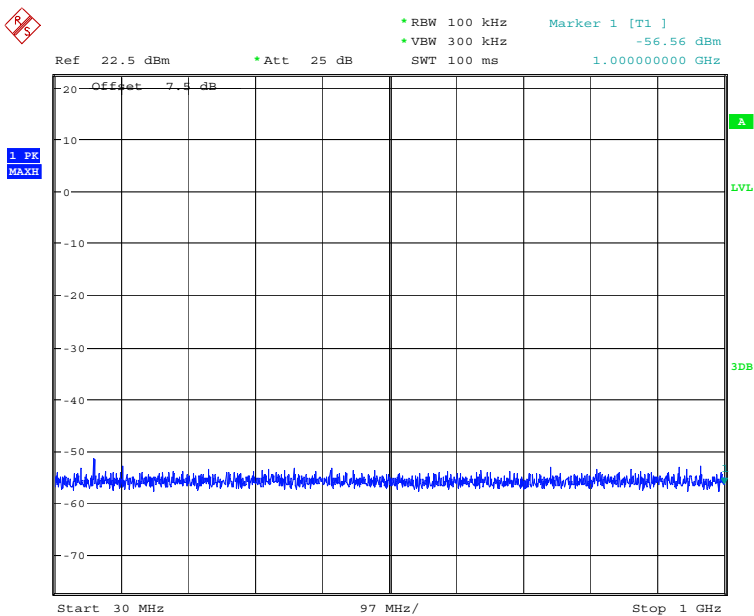
Carrier frequency (MHz): 2480

Channel No.:78

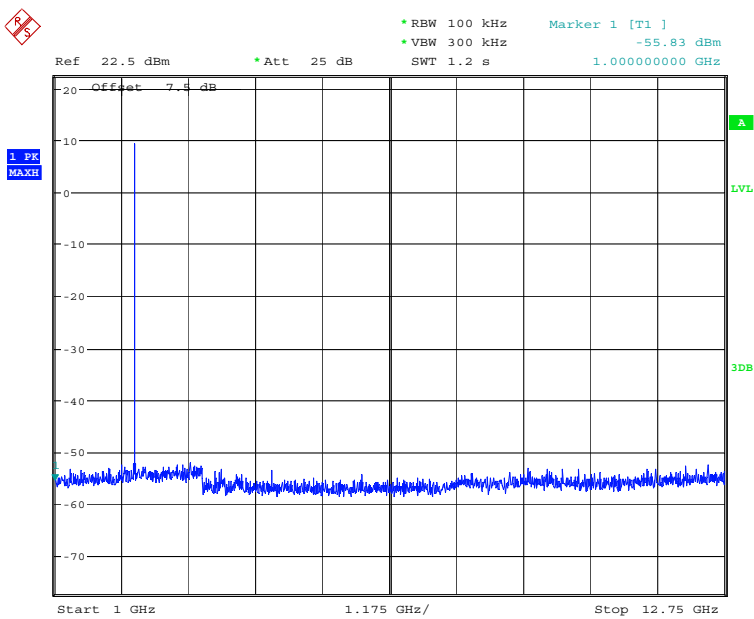
Modulation type: GFSK

Frequency MHz	Corrected measurement value dBm	Reference value dBm	Limit dBm	Delta to limit dB
---	---	---	---	---
---	---	---	---	---

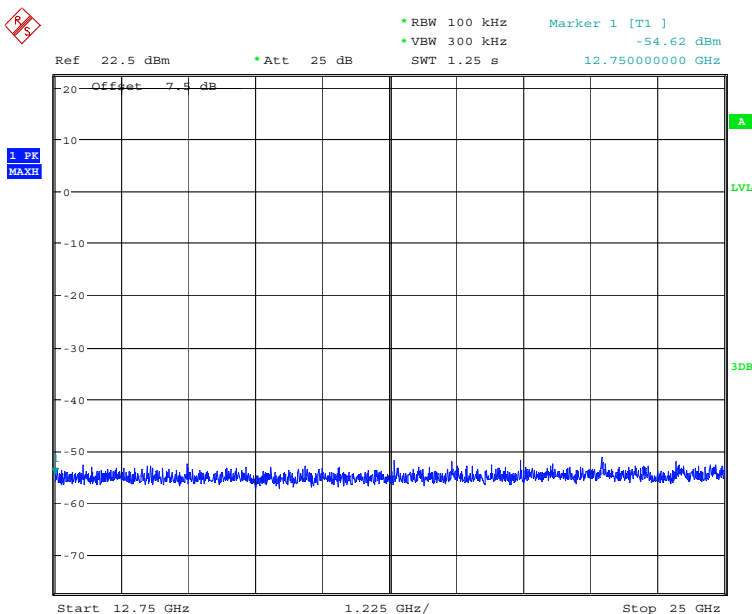
Note: The Reference value see 2.2.5 Band edge compliance



Date: 10.JUN.2011 18:32:11

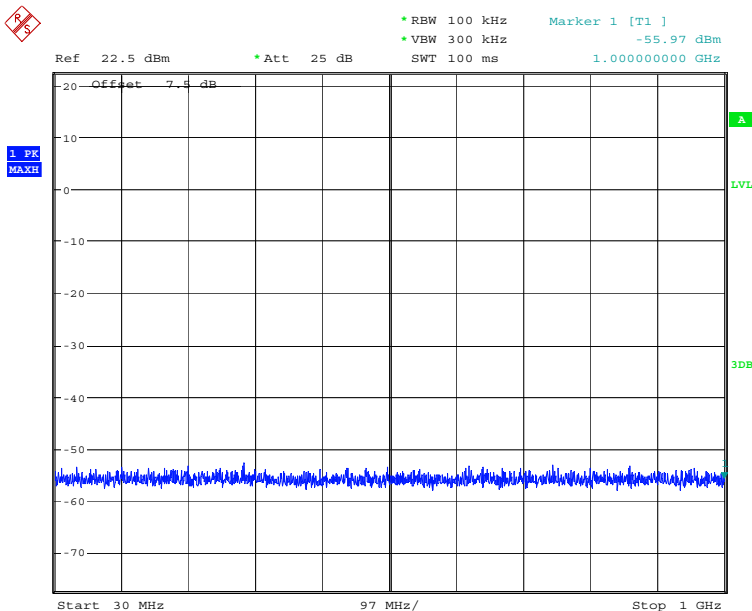


Date: 10.JUN.2011 18:32:28

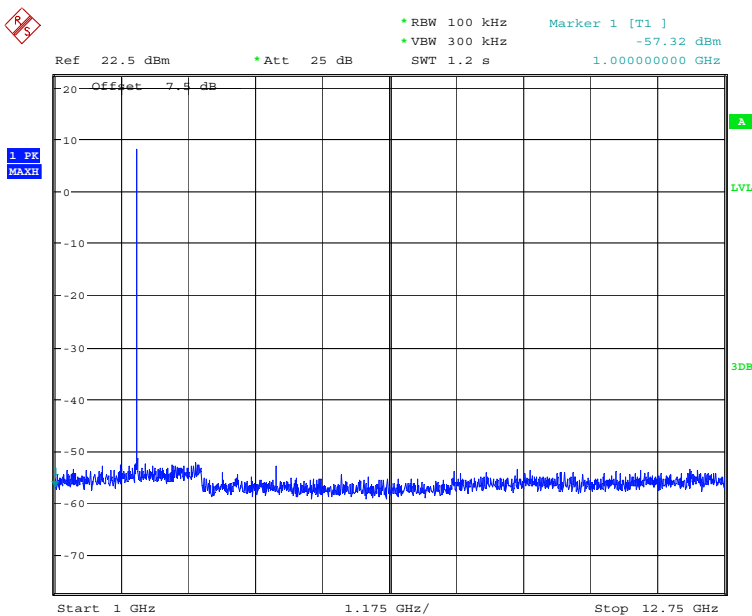


Date: 10.JUN.2011 18:32:47

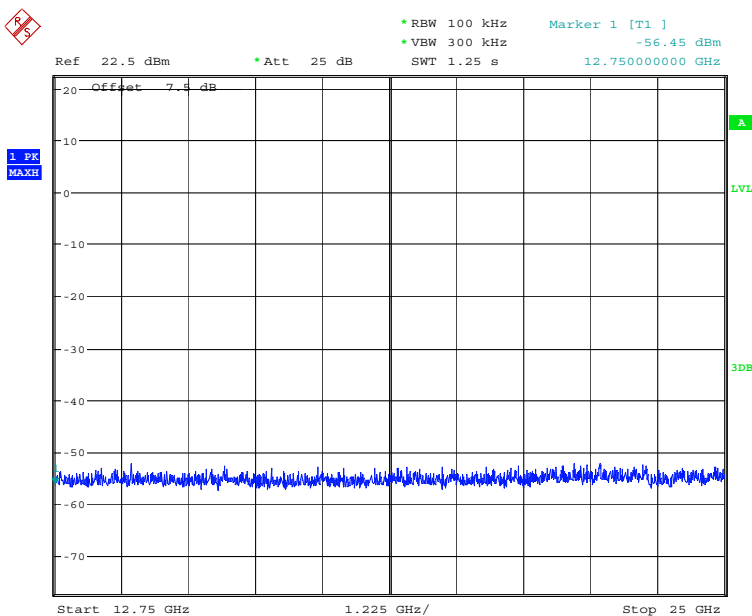
Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



Date: 10.JUN.2011 18:33:09

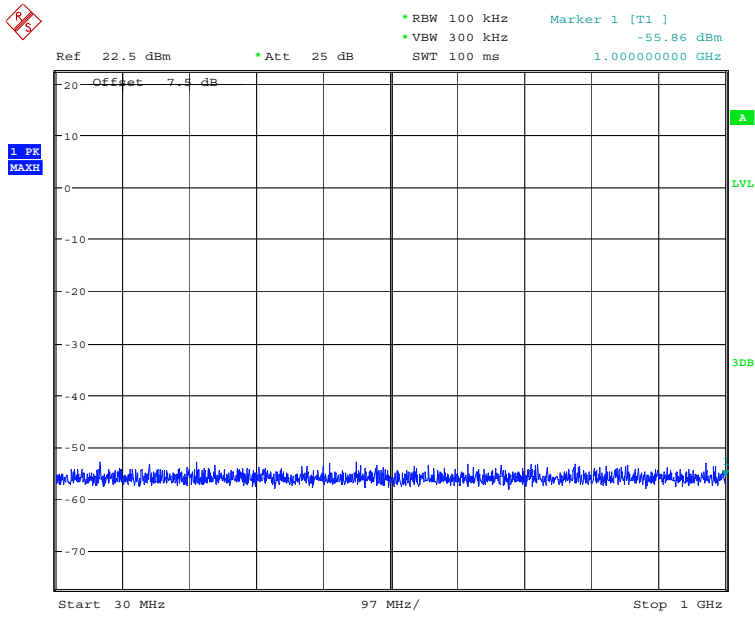


Date: 10.JUN.2011 18:33:19

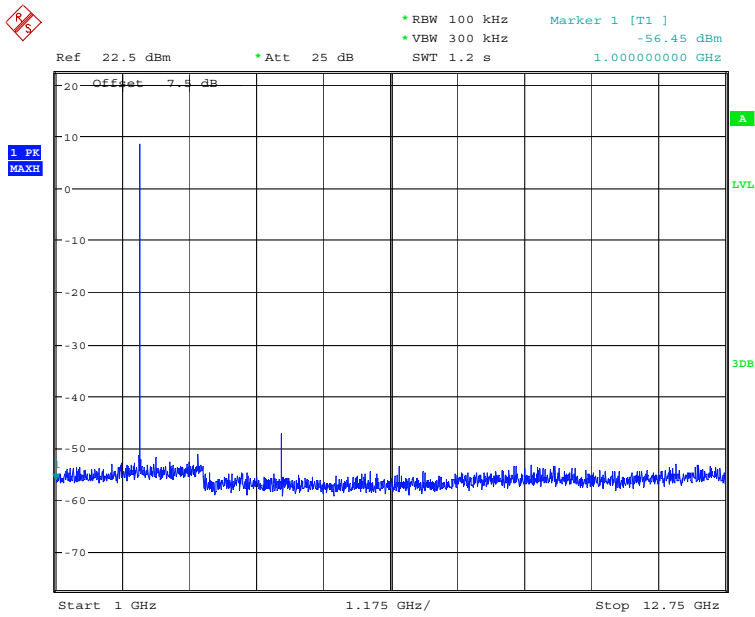


Date: 10.JUN.2011 18:33:32

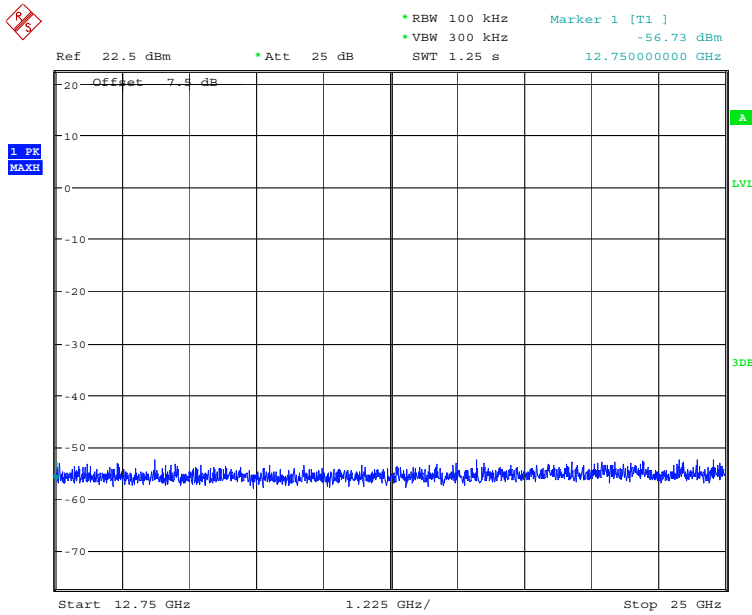
Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



Date: 10.JUN.2011 18:33:52



Date: 10.JUN.2011 18:34:11



Date: 10.JUN.2011 18:34:23

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 to limit dB
---	---	---	---	---
---	---	---	---	---

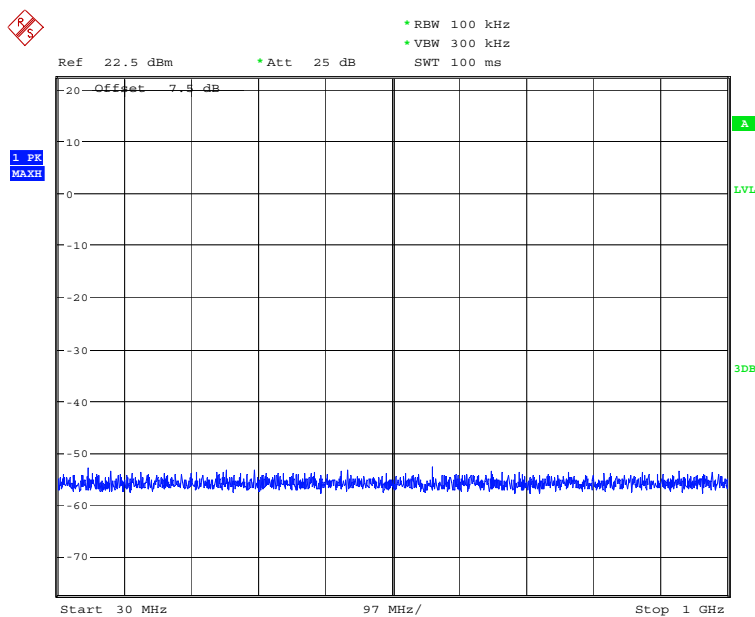
Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK

Frequency MHz	Corrected measurement value dBm	Reference value dBm	Limit dBm	Delta to limit dB
---	---	---	---	---
---	---	---	---	---

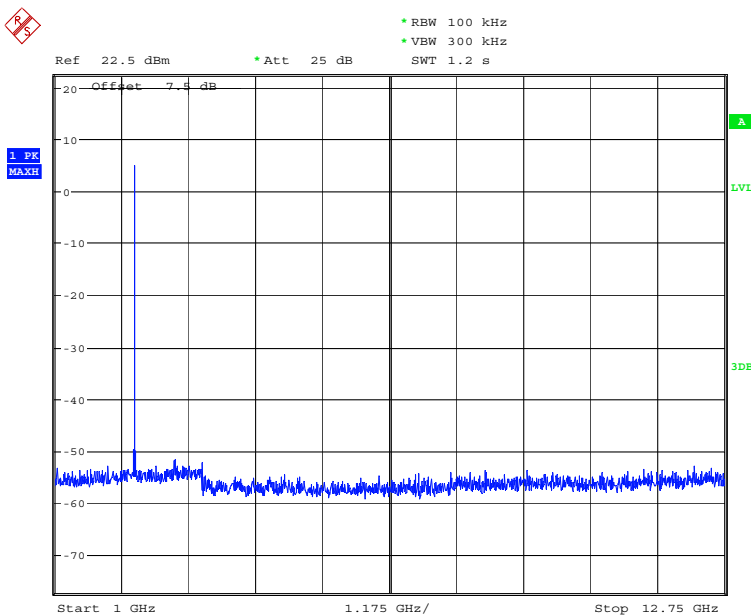
Carrier frequency (MHz): 2480
 Channel No.:78
 Modulation type: $\pi/4$ DQPSK

Frequency MHz	Corrected measurement value dBm	Reference value dBm	Limit dBm	Delta to limit dB
---	---	---	---	---
---	---	---	---	---

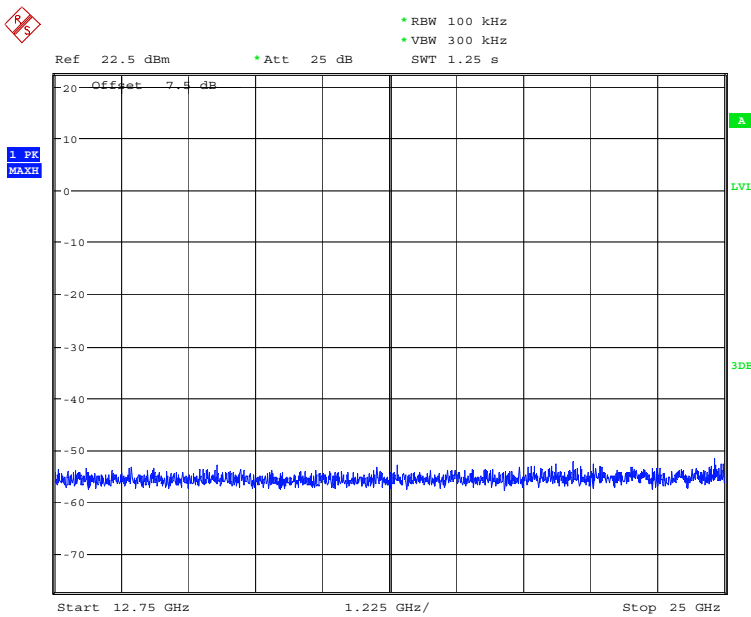
Note: The Reference value see 2.2.5 Band edge compliance



Date: 10.JUN.2011 18:35:13

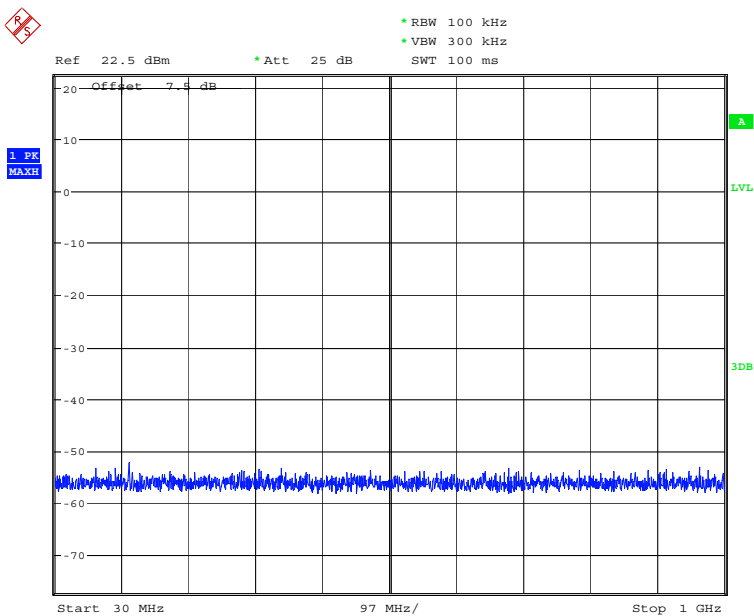


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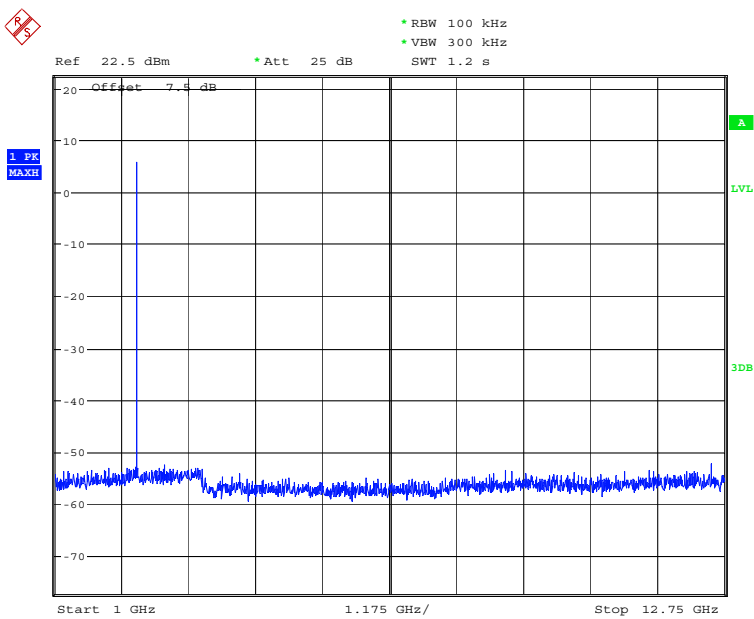


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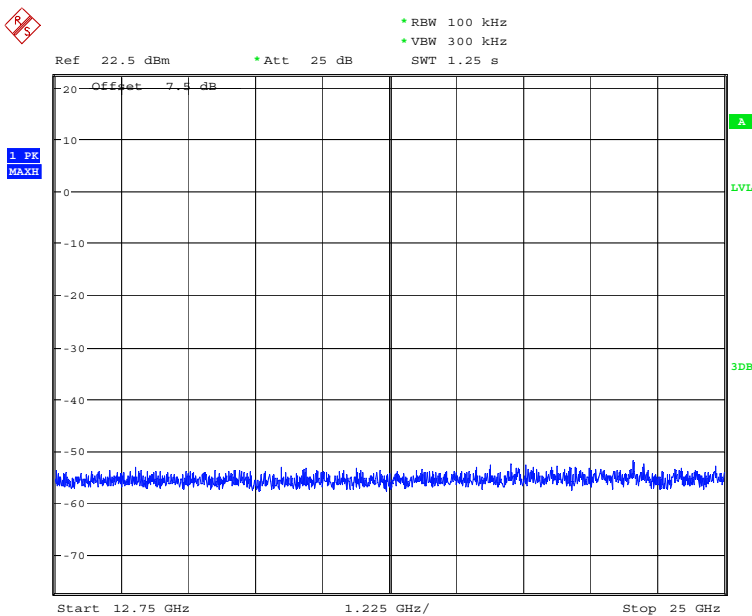
Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



Date: 10.JUN.2011 18:35:54

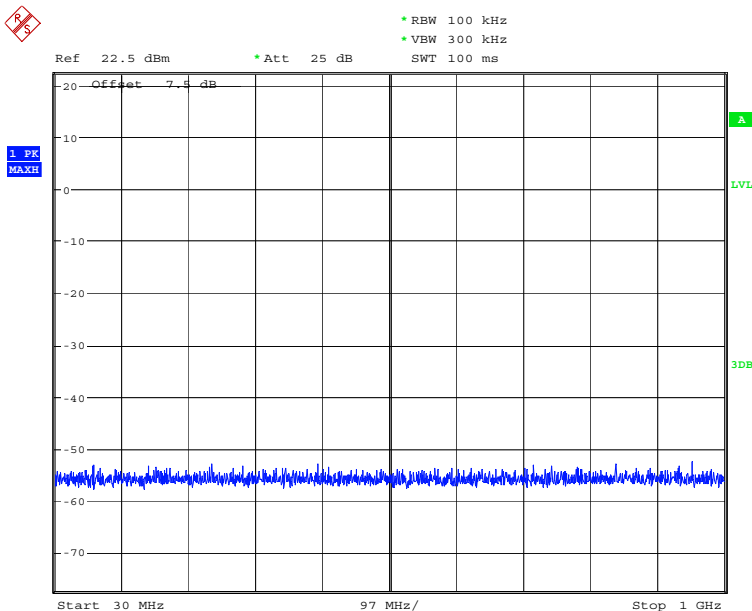


Date: 10.JUN.2011 18:36:05

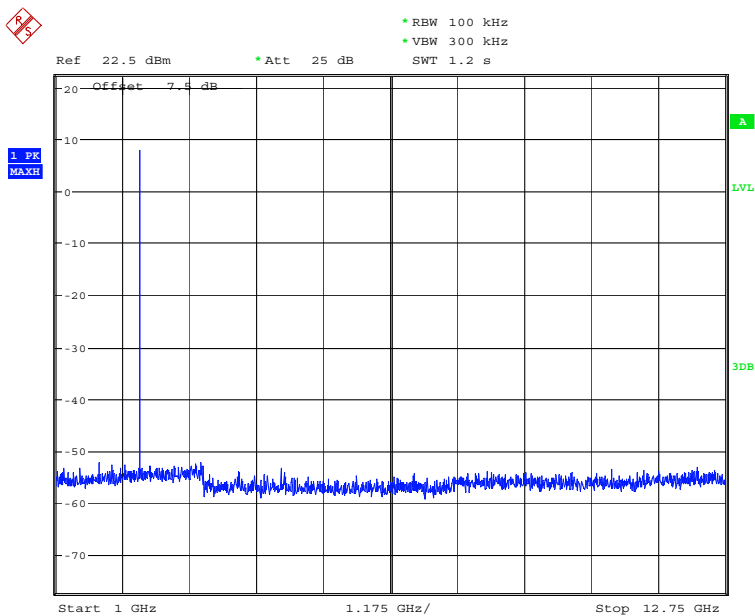


Date: 10.JUN.2011 18:36:15

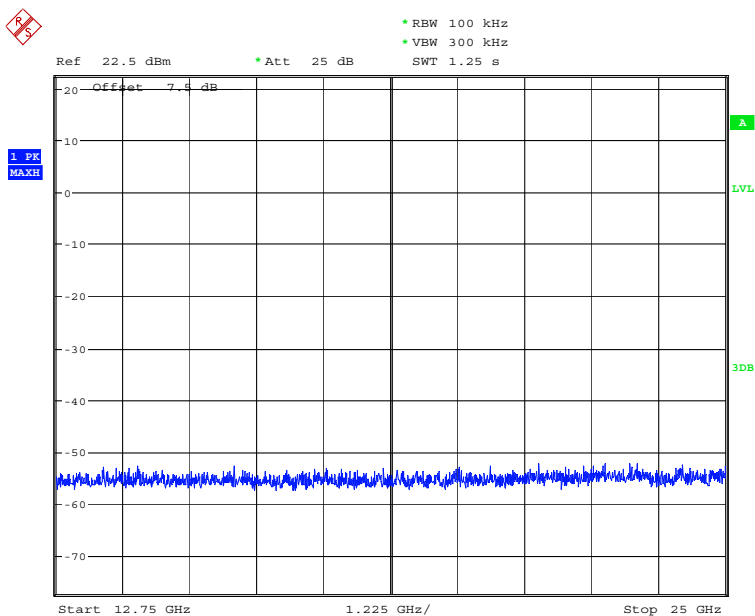
Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK



Date: 10.JUN.2011 18:36:36



Date: 10.JUN.2011 18:36:50



Date: 10.JUN.2011 18:37:02

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 to limit dB
---	---	---	---	---
---	---	---	---	---

Carrier frequency (MHz): 2441

Channel No.:39

Modulation type: 8DPSK

Frequency MHz	Corrected measurement value dBm	Reference value dBm	Limit dBm	Delta to limit dB
---	---	---	---	---
---	---	---	---	---

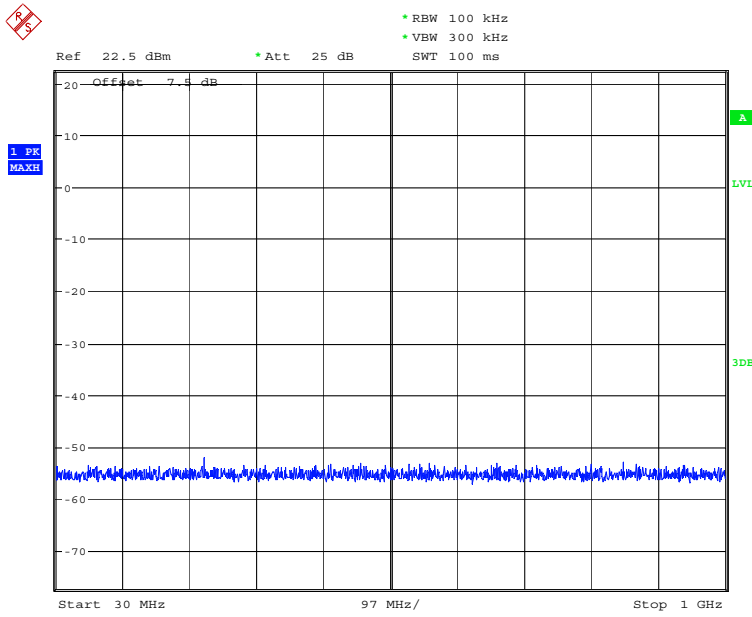
Carrier frequency (MHz): 2480

Channel No.:78

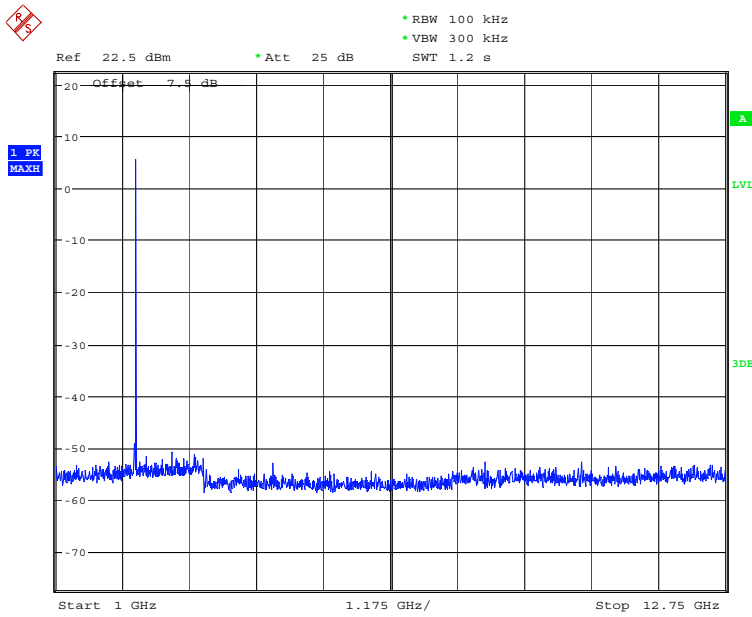
Modulation type: 8DPSK

Frequency MHz	Corrected measurement value dBm	Reference value dBm	Limit dBm	Delta to limit dB
---	---	---	---	---
---	---	---	---	---

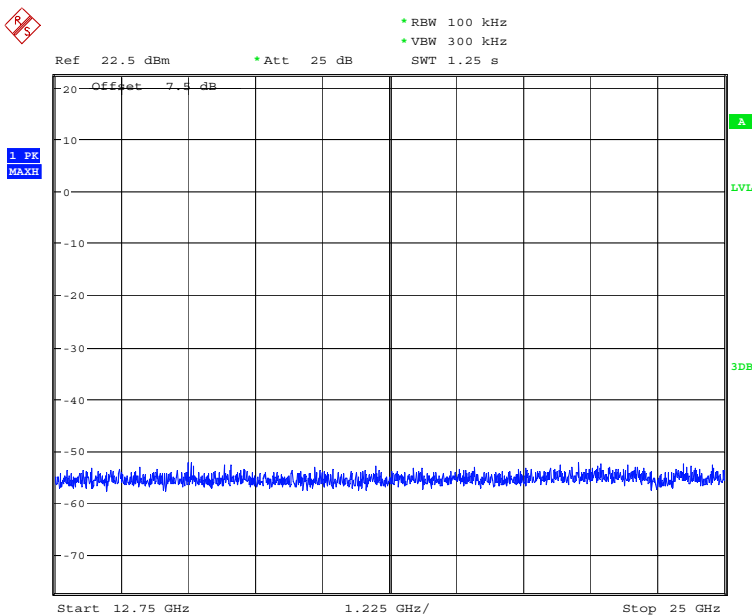
Note: The Reference value see 2.2.5 Band edge compliance



Date: 10.JUN.2011 18:37:37

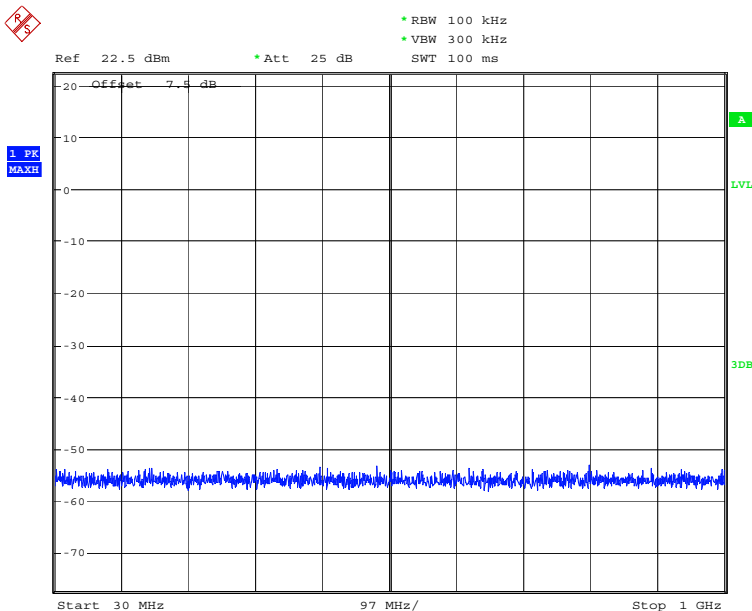


Date: 10.JUN.2011 18:37:51

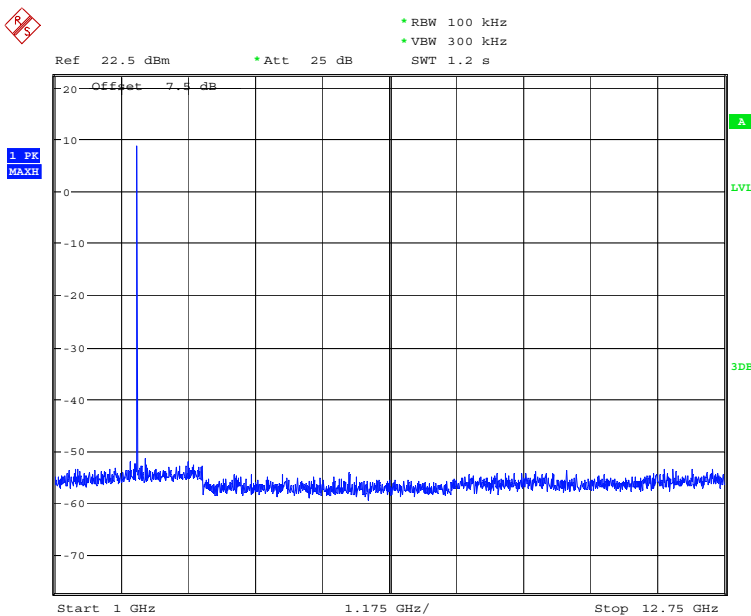


Date: 10.JUN.2011 18:38:02

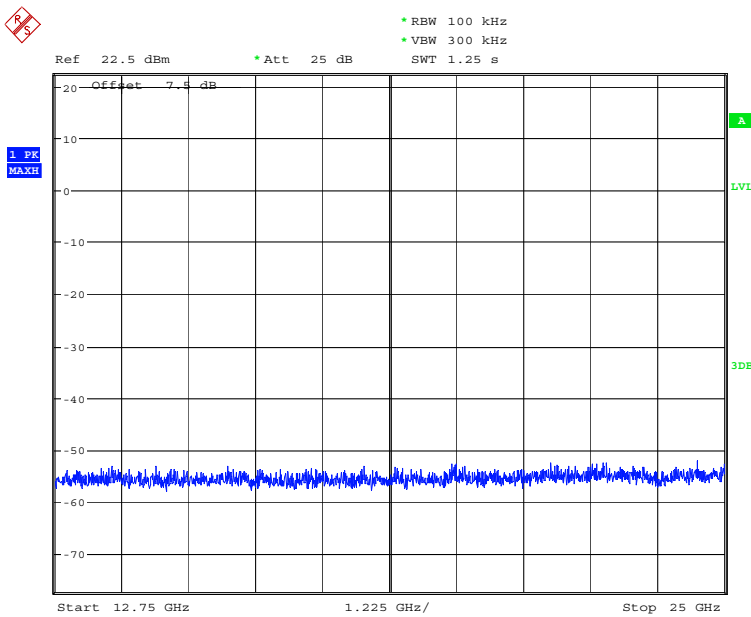
Carrier frequency (MHz): 2402
 Channel No.:0
 Modulation type: 8DPSK



Date: 10.JUN.2011 18:38:15

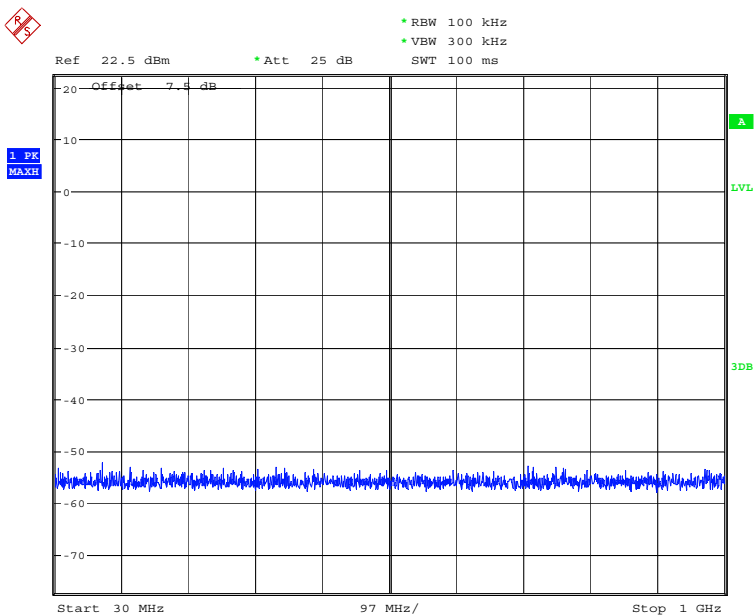


Date: 10.JUN.2011 18:38:28

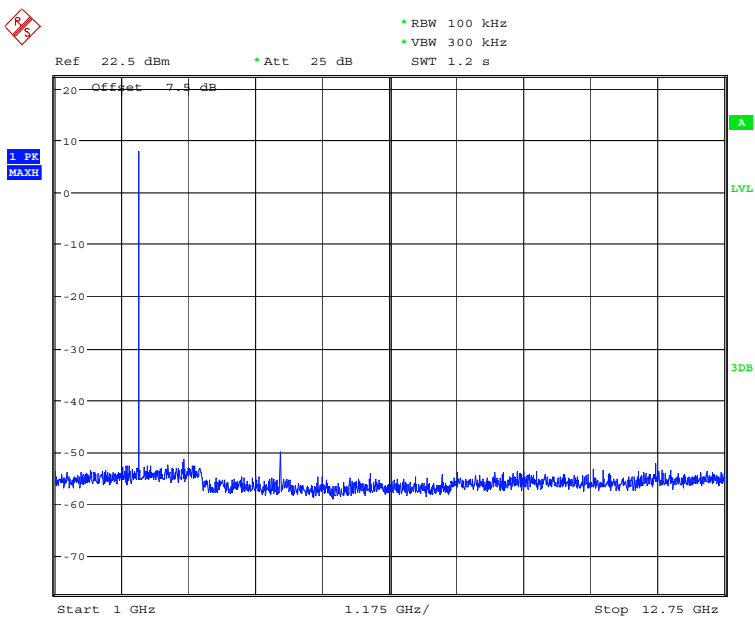


Date: 10.JUN.2011 18:38:40

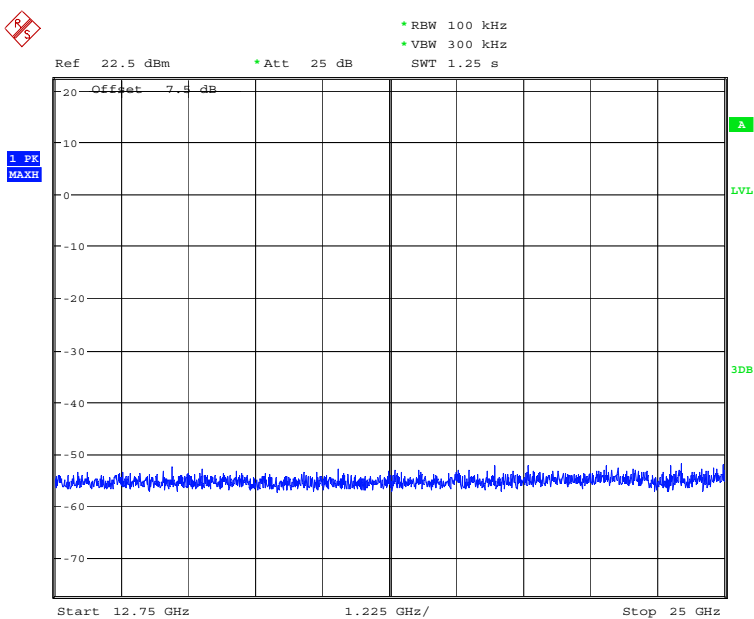
Carrier frequency (MHz): 2441
 Channel No.:39
 Modulation type: 8DPSK



Date: 10.JUN.2011 18:38:56



Date: 10.JUN.2011 18:39:11



Date: 10.JUN.2011 18:39:24

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

2.2.4 Spurious radiated emissions-§15.247(d),§15.35(b),§15.209

2.2.4.1 Ambient condition

Temperature	Relative humidity	Pressure
27.5°C	35%	99.8kPa

2.2.4.2 Test Description

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

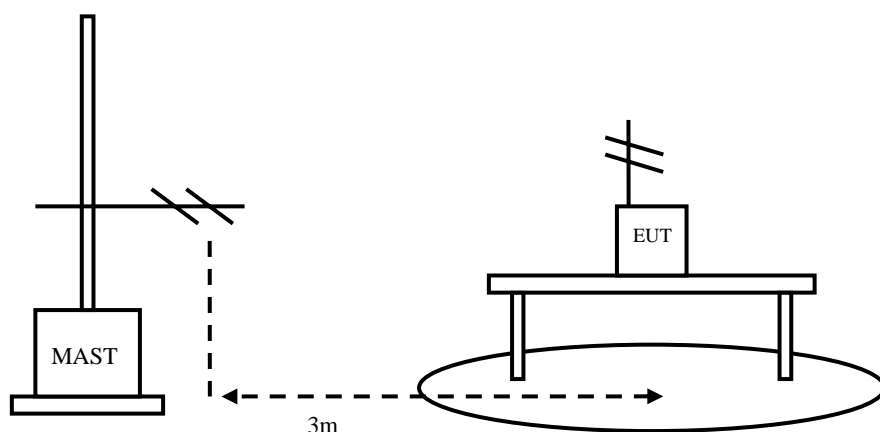
The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

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 Part 15, Subpart C, §15.247 (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 Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency Range (MHz)	Class B Limit (dBµV/m)
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
above 960	54.0

§15.35(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)

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:

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

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
9969.939880	40.44	-5.2	45.64	Vertical
14248.496994	43.23	1.0	42.23	Horizontal
17294.589178	43.36	7.4	35.96	Vertical
20062.124248	51.78	19.9	31.88	Vertical
22587.174349	51.59	20.1	31.49	Vertical
24523.046092	51.02	21.8	29.22	Horizontal

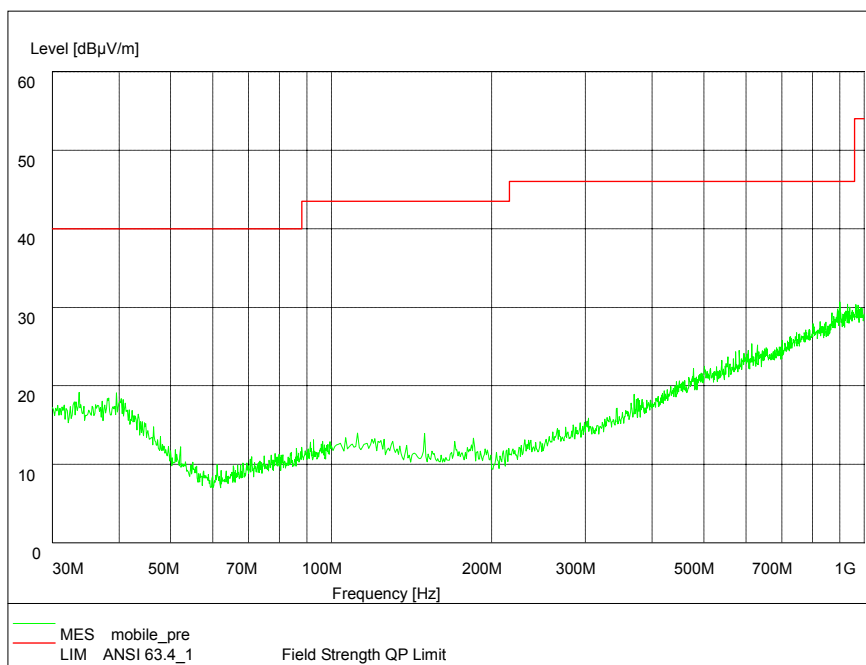
For $\pi/4$ DQPSK
Channel No.:39

Frequency(MHz)	Result(dBuV/m)	A _{Rpl} (dB)	P _{mea} (dBuV/m)	Polarity
9987.975952	40.52	-5.1	45.62	Vertical
10000.000000	39.41	-5.2	44.61	Vertical
14424.849699	43.07	1.0	42.07	Vertical
17294.589178	45.14	7.4	37.74	Horizontal
20048.096192	52.08	21.2	30.88	Horizontal
23246.492986	52.20	21.8	30.40	Horizontal

For 8DPSK
Channel No.:39

Frequency(MHz)	Result(dBuV/m)	A _{Rpl} (dB)	P _{mea} (dBuV/m)	Polarity
9969.939880	41.08	-5.1	46.18	Vertical
14248.496994	43.23	1.0	42.23	Vertical
14298.793256	44.09	1.0	43.09	Vertical
17289.613296	48.21	7.4	40.81	Horizontal
20058.543218	51.95	21.2	30.75	Vertical
24629.360083	51.32	21.8	29.52	Horizontal

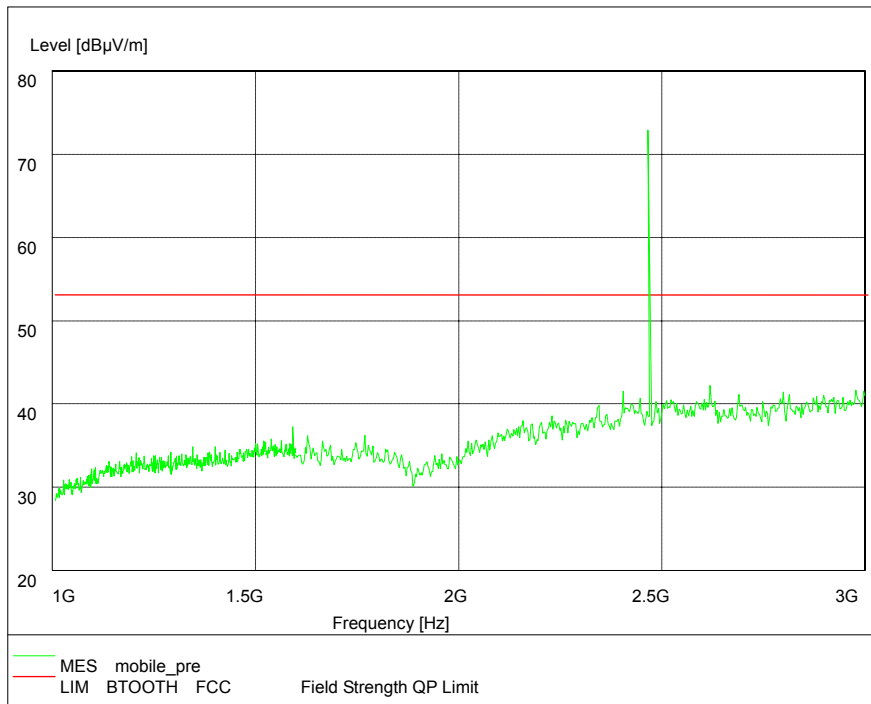
Refer to figures
Carrier frequency (MHz): 2441
Channel No.:39



Frequency Range :30MHz -1000 MHz

Detector: PK mode

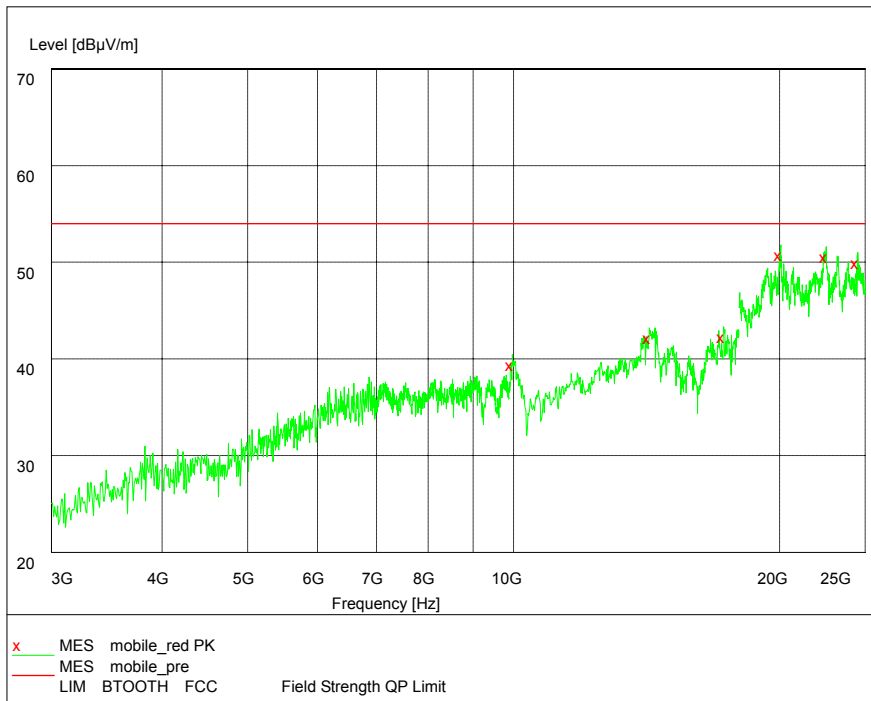
Modulation type: GFSK



Frequency Range : 1GHz -3GHz

Detector: PK mode

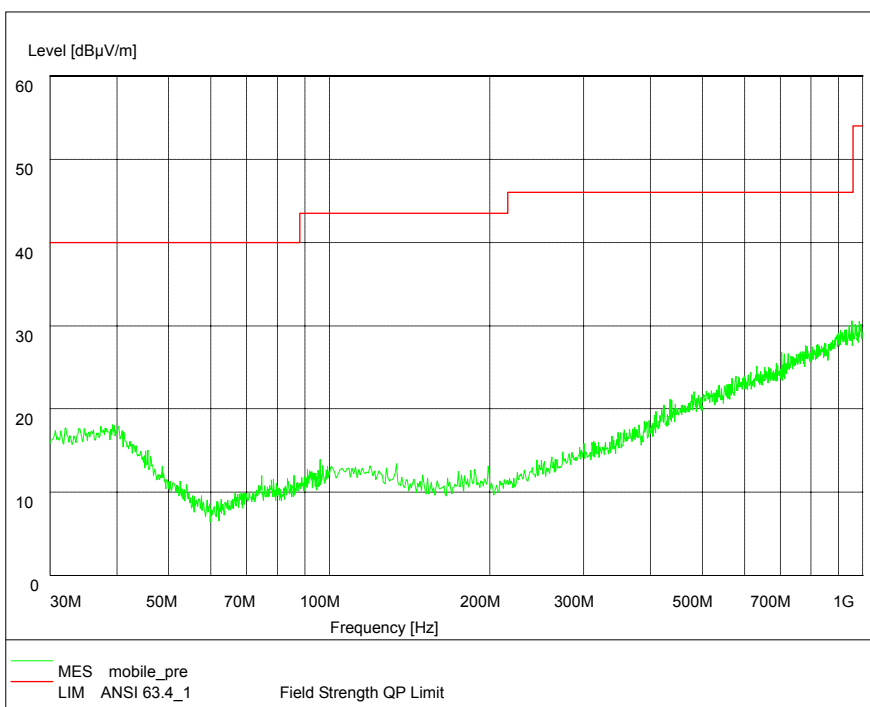
Modulation type: GFSK



Frequency Range :3GHz-25GHz

Detector: PK mode

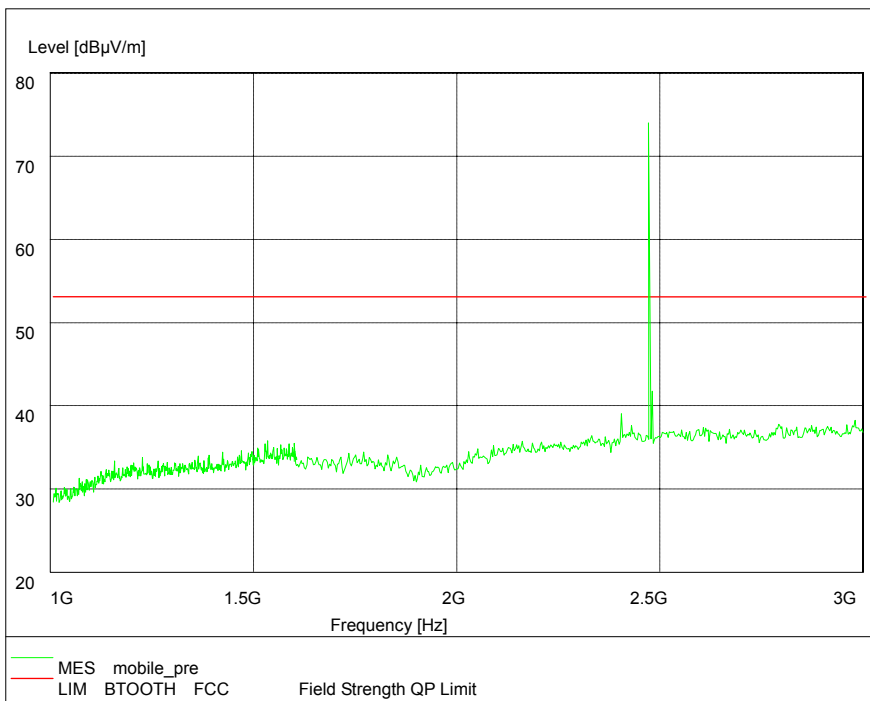
Modulation type: GFSK



Frequency Range :30MHz -1000 MHz

Detector: PK mode

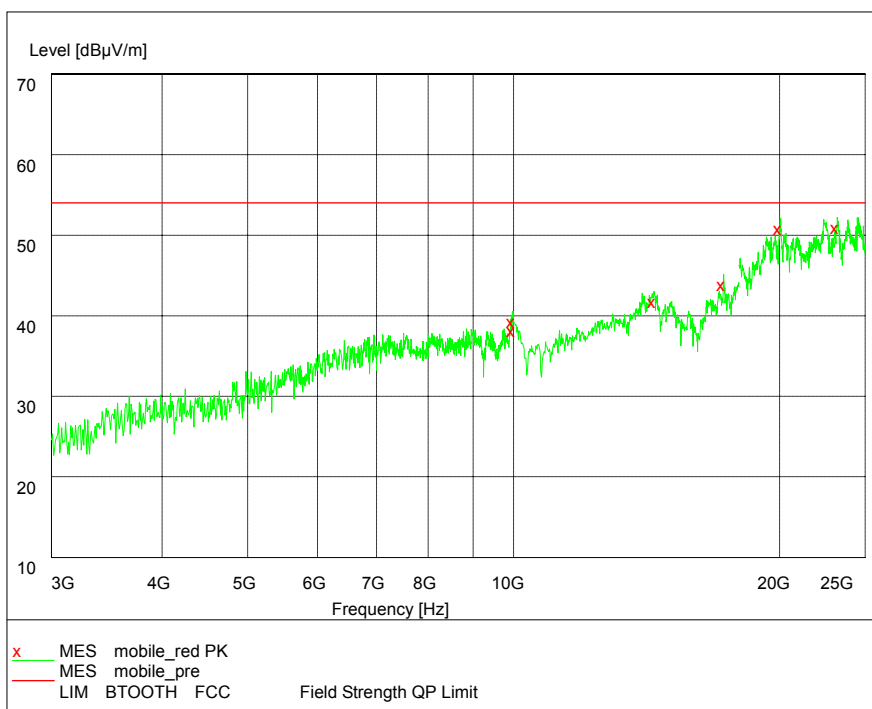
Modulation type: $\pi/4$ DQPSK



Frequency Range : 1GHz -3GHz

Detector: PK mode

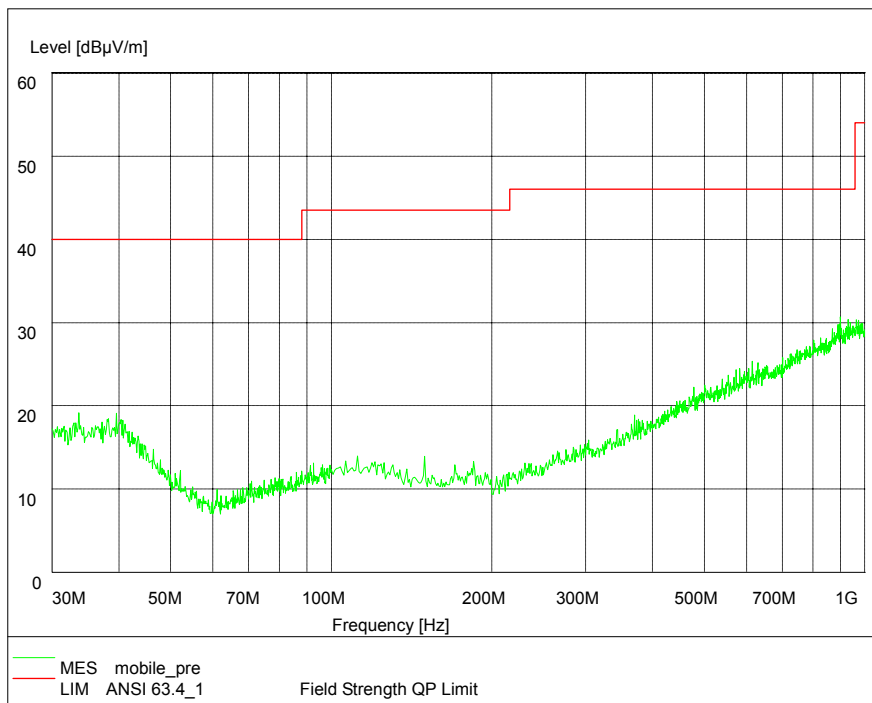
Modulation type: $\pi/4$ DQPSK



Frequency Range : 3GHz - 25GHz

Detector: PK mode

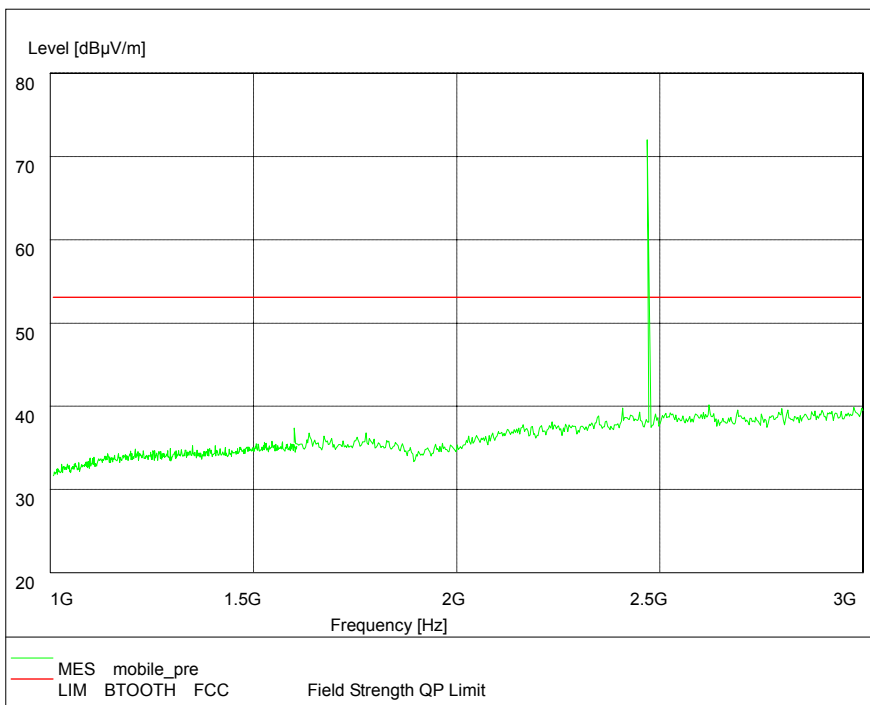
Modulation type: $\pi/4$ DQPSK



Frequency Range :30MHz -1000 MHz

Detector: PK mode

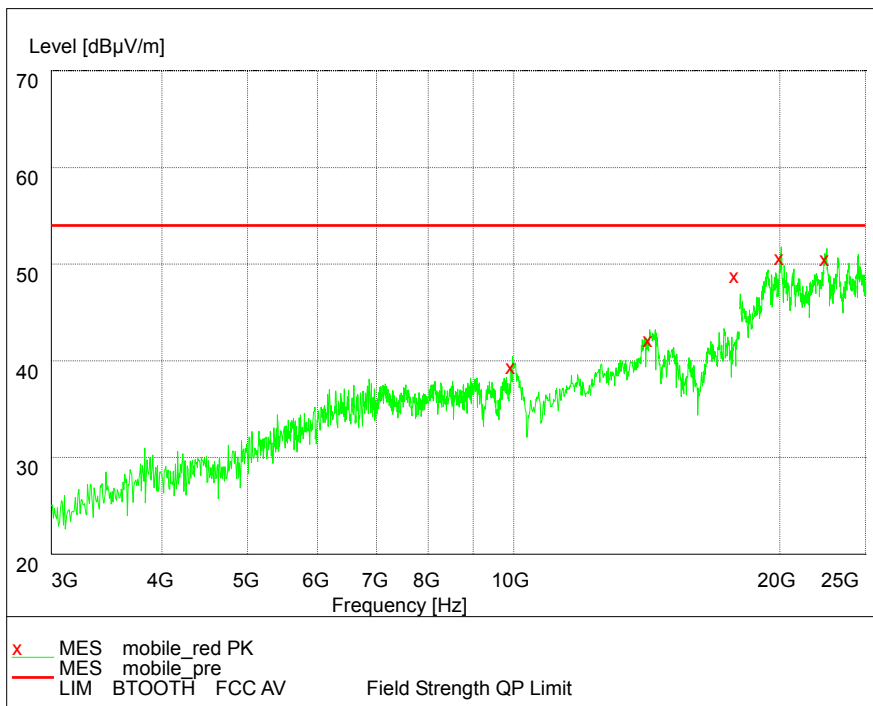
Modulation type: 8DPSK



Frequency Range : 1GHz -3GHz

Detector: PK mode

Modulation type: 8DPSK



Frequency Range : 3GHz -25GHz

Detector: PK mode

Modulation type: 8DPSK

2.2.5 Band edge compliance-§15.247(d)

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 2400 MHz.

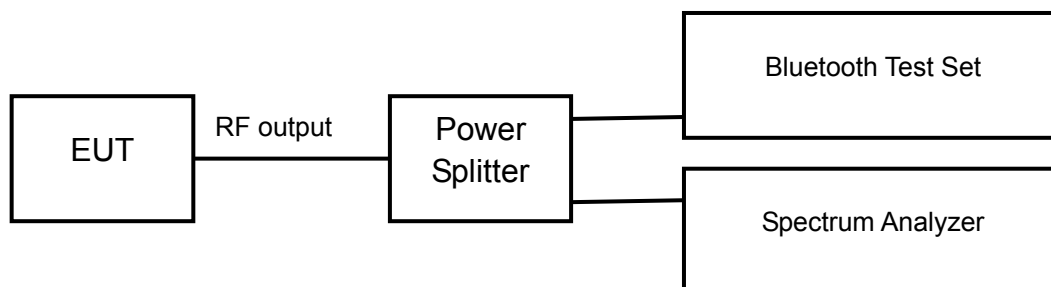
Analyzer settings:

- 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



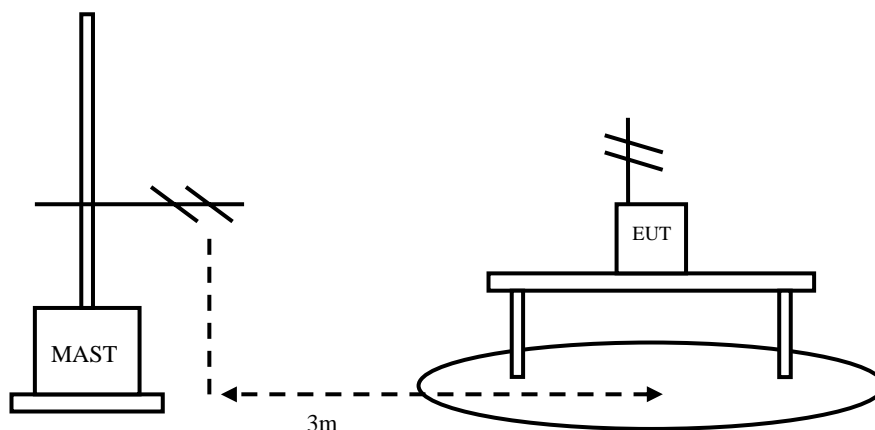
2.2.5.2.2 RF Radiated Measurement

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.



2.2.5.3 Test limit

FCC Part 15.247 (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.

2.2.5.4 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
2400	Hopping OFF	-43.14	10.47	-9.53	33.61
2400	Hopping ON	-47.68	10.20	-9.80	37.88

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	-49.72	8.97	-11.03	38.69
2483.5	Hopping ON	-54.01	8.50	-11.50	42.51

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	69.43	72.13	Peak
2402	Hopping ON	2.7	70.11	72.81	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	70.19	72.69	Peak
2480	Hopping ON	2.5	70.57	73.07	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
2400	Hopping OFF	72.13	33.61	38.52	Peak
2400	Hopping ON	72.81	37.88	34.93	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	72.69	38.69	34.00	Peak
2483.5	Hopping ON	73.07	42.51	30.56	Peak

Note:

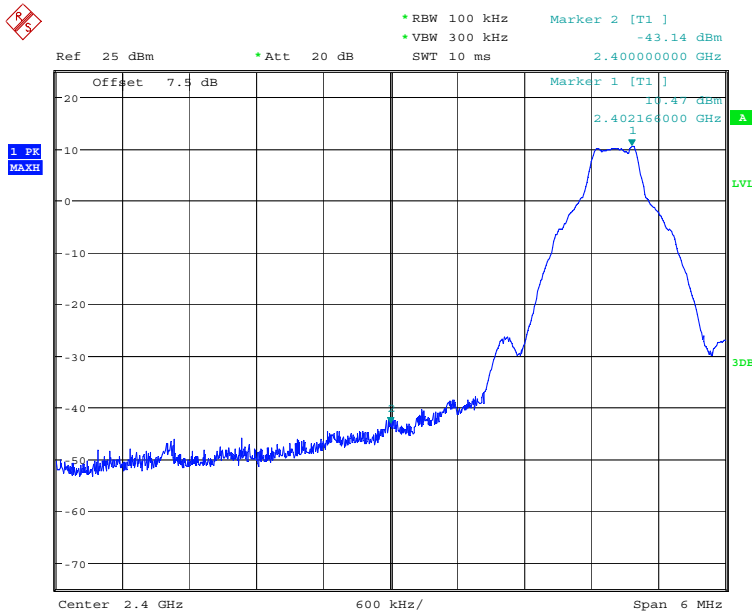
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

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

Band Edge field Strength = F - Delta

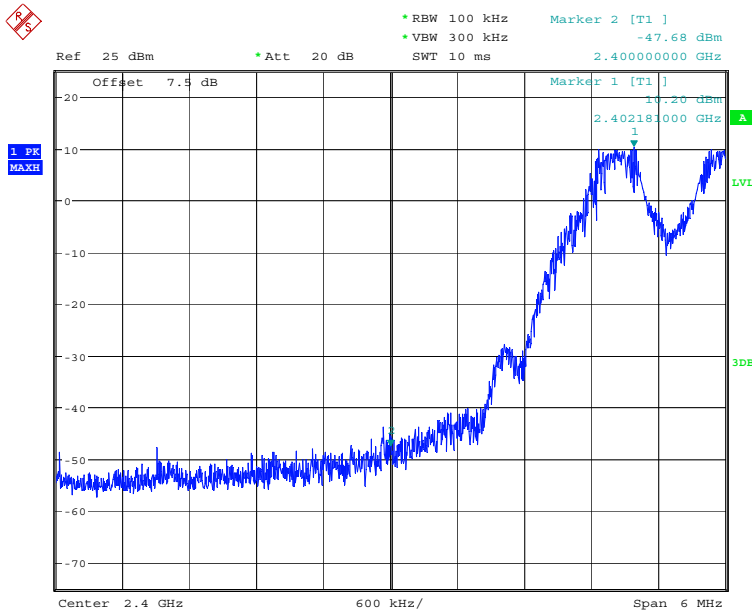
F = Fundamental field Strength (Peak or Average)

Delta= Conducted Band Edge Delta (Peak or Average)



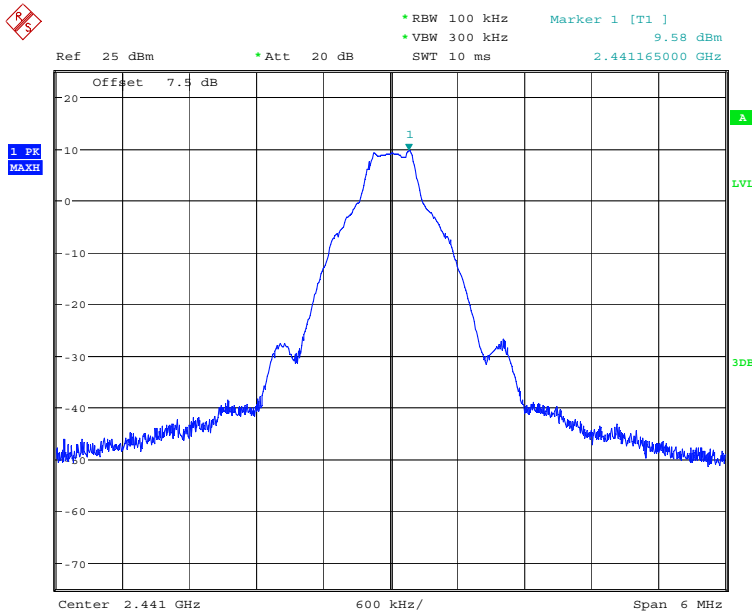
Date: 10.JUN.2011 18:43:45

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



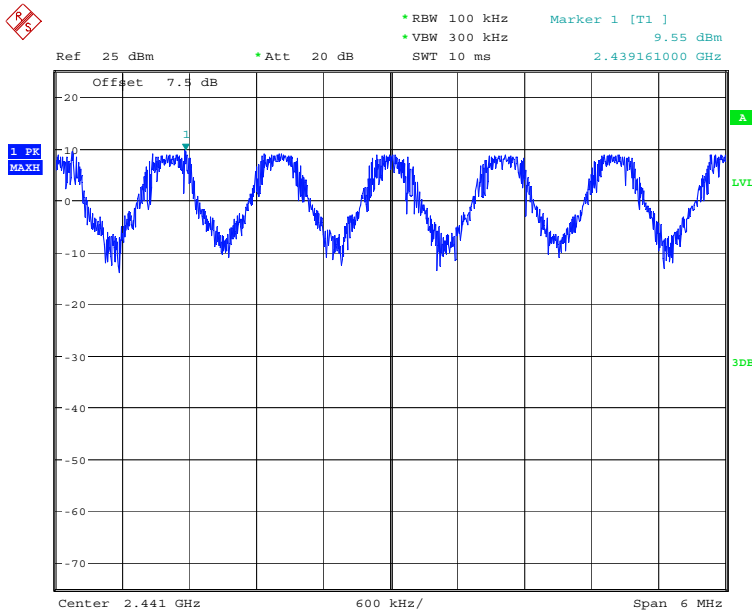
Date: 10.JUN.2011 19:00:24

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



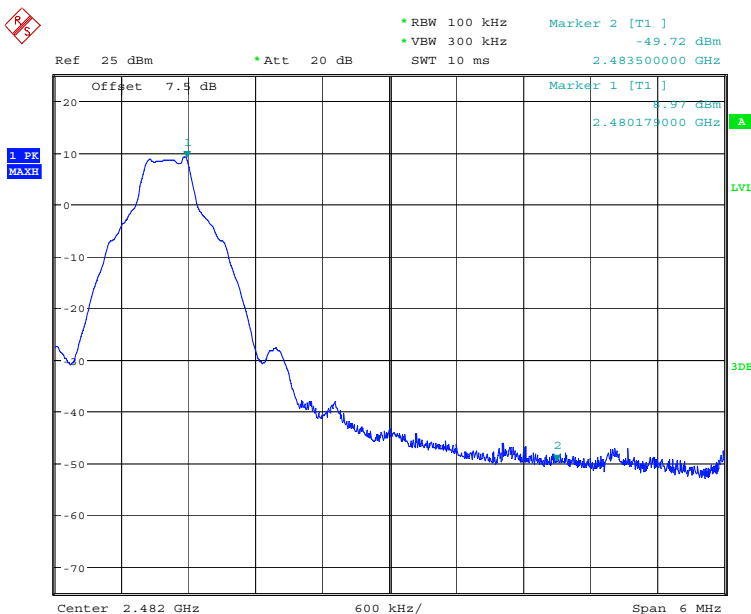
Date: 10.JUN.2011 18:53:17

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



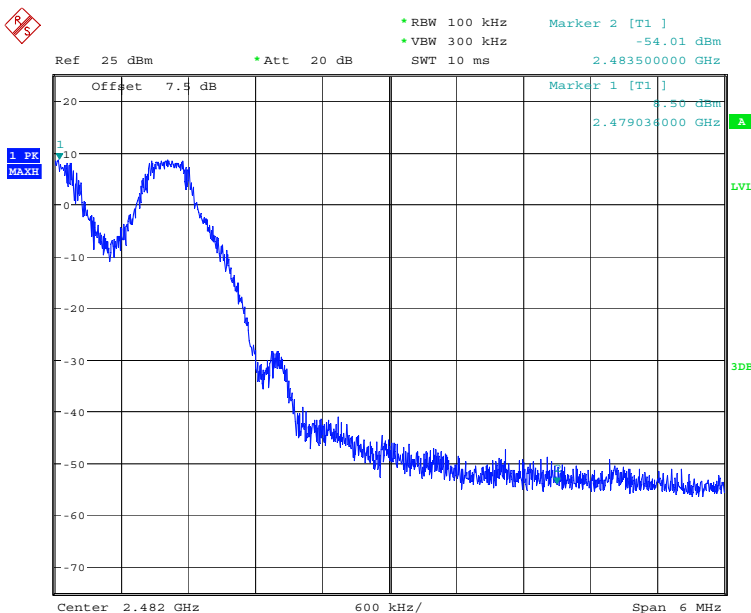
Date: 10.JUN.2011 19:01:02

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



Date: 10.JUN.2011 18:55:20

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



Date: 10.JUN.2011 19:01:44

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 to limit dB
2400	Hopping OFF	-46.58	9.33	-10.67	35.91
2400	Hopping ON	-52.53	9.13	-10.87	41.66

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 to limit dB
2483.5	Hopping OFF	-54.50	8.02	-11.98	42.52
2483.5	Hopping ON	-52.33	8.01	-11.99	40.34

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	72.13	74.83	Peak
2402	Hopping ON	2.7	72.51	75.21	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	72.66	75.16	Peak
2480	Hopping ON	2.5	73.15	75.65	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
2400	Hopping OFF	74.83	35.91	38.92	Peak
2400	Hopping ON	75.21	41.66	33.55	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	75.16	42.52	32.64	Peak
2483.5	Hopping ON	75.65	40.34	35.31	Peak

Note:

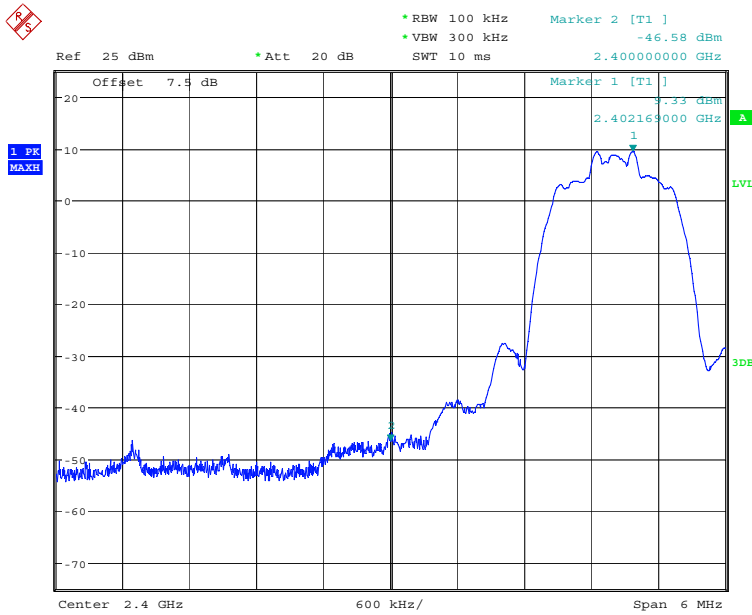
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

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

Band Edge field Strength = F - Delta

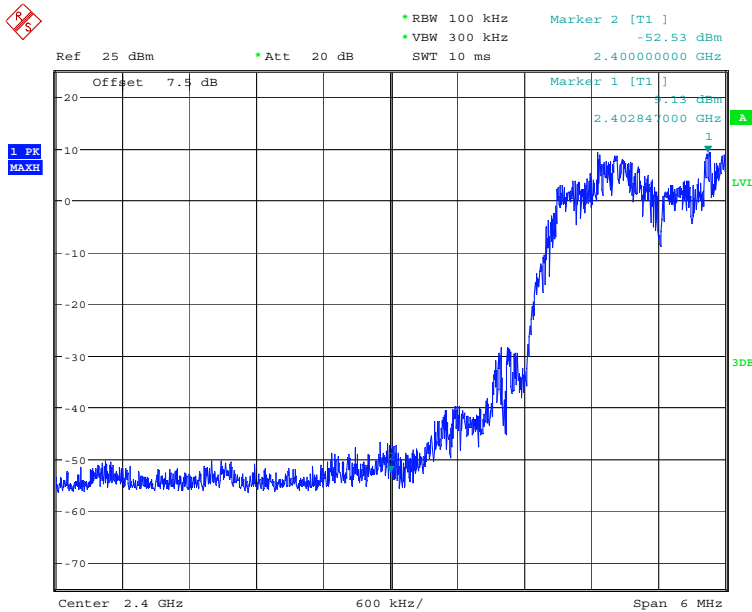
F = Fundamental field Strength (Peak or Average)

Delta= Conducted Band Edge Delta (Peak or Average)



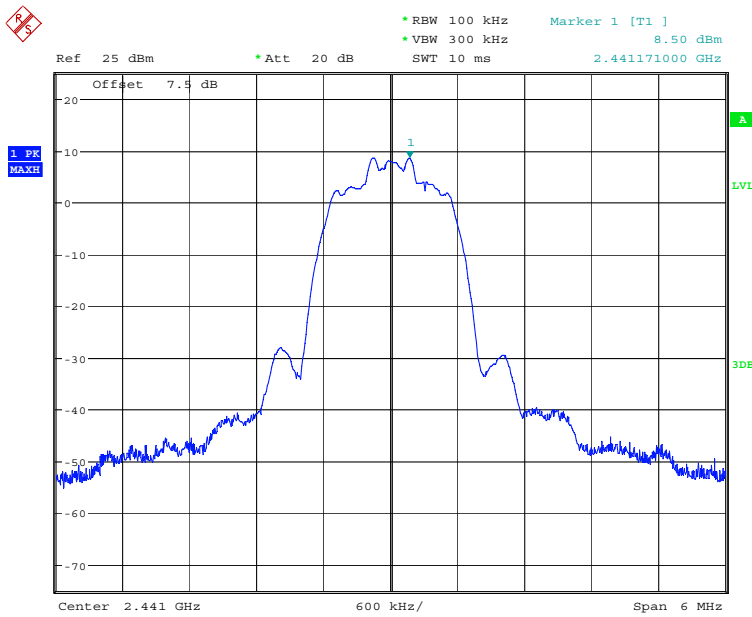
Date: 10.JUN.2011 18:56:32

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



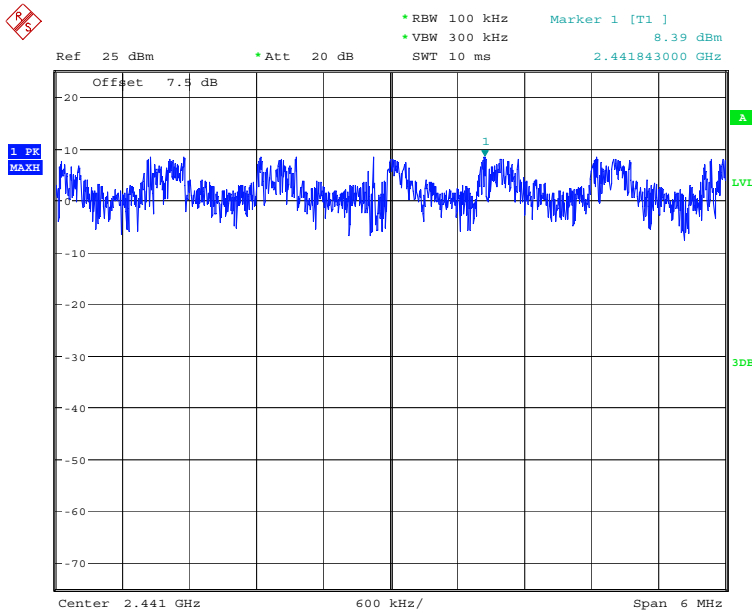
Date: 10.JUN.2011 19:03:45

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



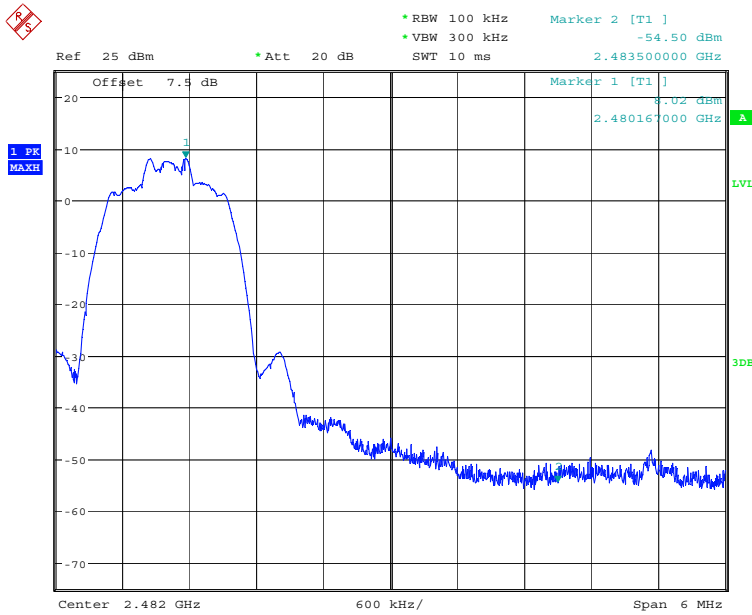
Date: 10.JUN.2011 18:57:30

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



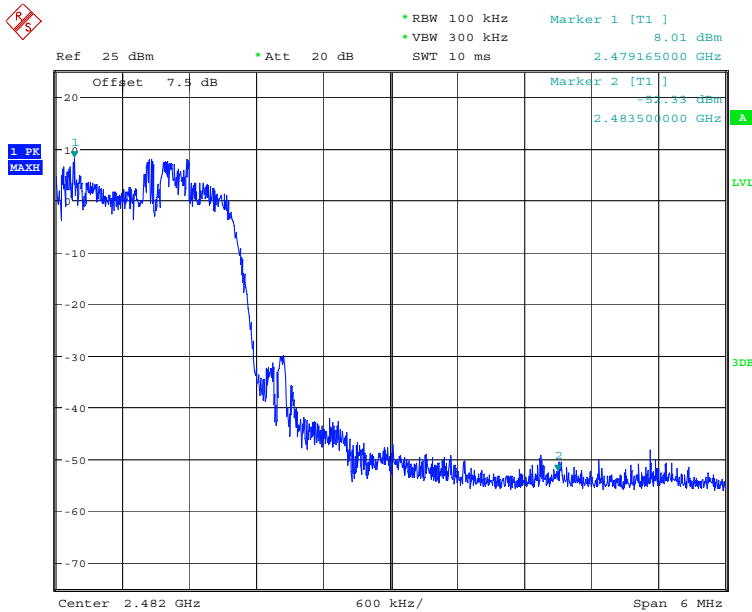
Date: 10.JUN.2011 19:04:51

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



Date: 10.JUN.2011 18:58:06

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



Date: 10.JUN.2011 19:06:43

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 to limit dB
2400	Hopping OFF	-49.59	9.34	-10.66	38.93
2400	Hopping ON	-52.51	9.30	-10.70	41.81

Carrier frequency (MHz): 2480

Channel No.:78

Modulation type: 8DPSK

Frequency MHz	Hopping Mode	Measured value dBm	Reference value dBm	Limit dBm	Delta to limit dB
2483.5	Hopping OFF	-47.68	10.20	-9.80	37.88
2483.5	Hopping ON	-52.44	7.99	-12.01	40.43

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	68.66	71.36	Peak
2402	Hopping ON	2.7	68.92	71.62	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	69.24	71.74	Peak
2480	Hopping ON	2.5	69.60	72.10	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
2400	Hopping OFF	71.36	38.93	32.43	Peak
2400	Hopping ON	71.62	41.81	29.81	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	71.74	37.88	33.86	Peak
2483.5	Hopping ON	72.10	40.43	31.67	Peak

Note:

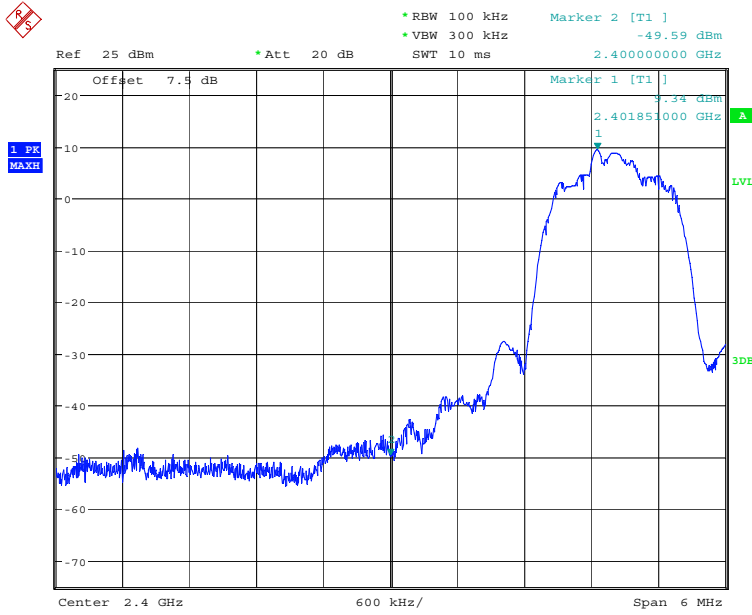
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge

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

Band Edge field Strength = F - Delta

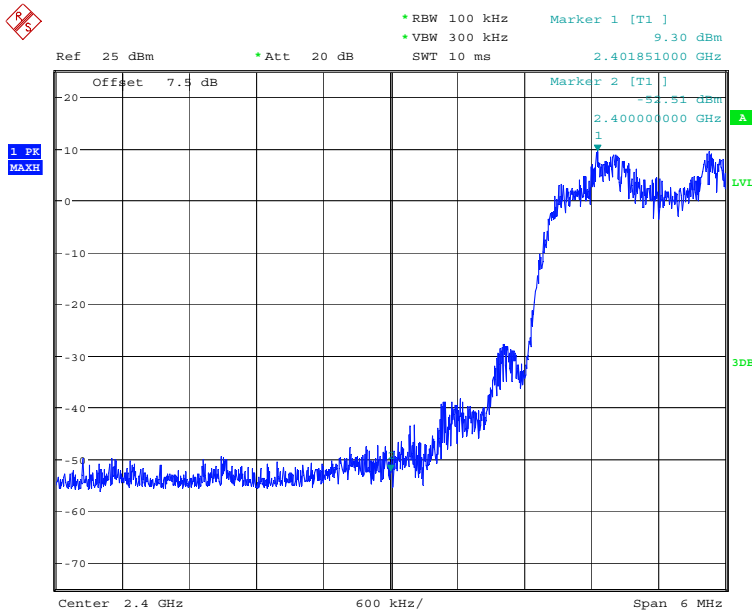
F = Fundamental field Strength (Peak or Average)

Delta= Conducted Band Edge Delta (Peak or Average)



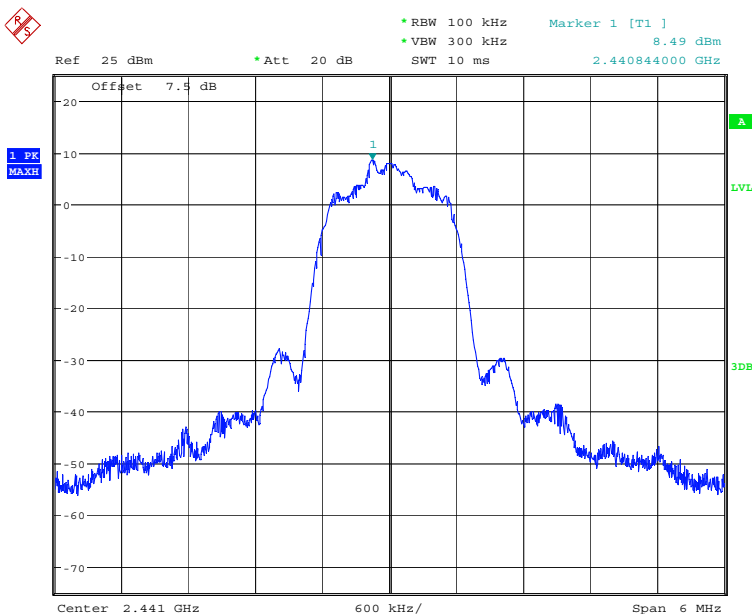
Date: 10.JUN.2011 18:58:47

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



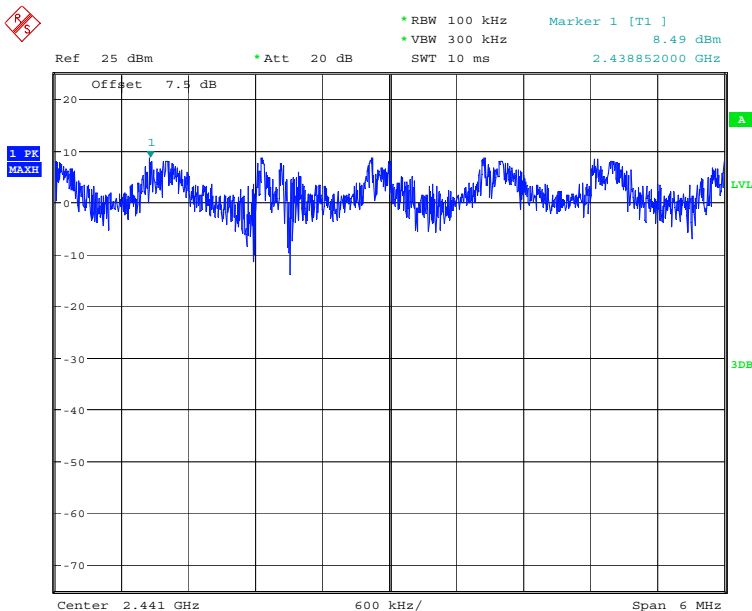
Date: 10.JUN.2011 19:08:40

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



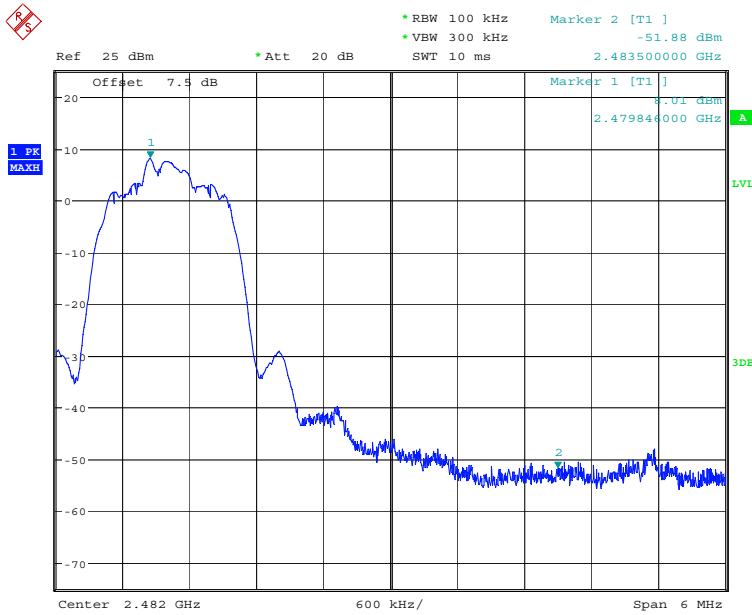
Date: 10.JUN.2011 18:59:13

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



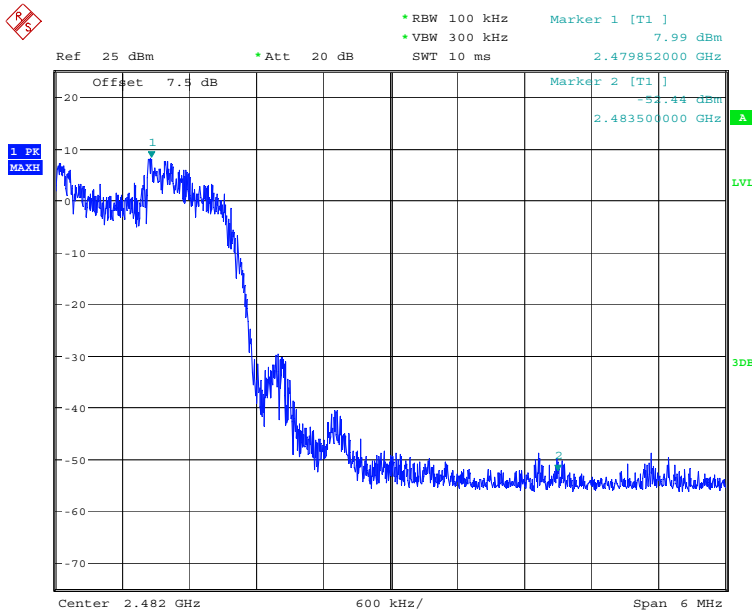
Date: 10.JUN.2011 19:13:27

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



Date: 10.JUN.2011 18:59:40

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



Date: 10.JUN.2011 19:11:47

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

2.2.6 Dwell time-§15.247(a) (1)(iii)

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.

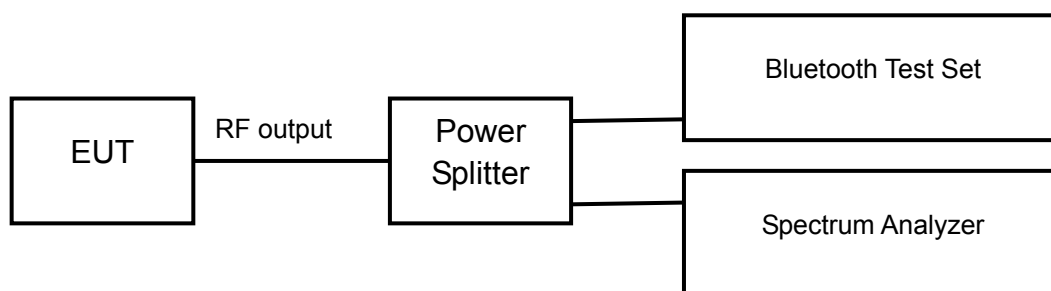
The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

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 * 1/s for DH1 packets =1600
- hop rate=1600/3 * 1/s for DH3 packets =533.33
- hop rate=1600/5 * 1/s for DH5 packets =320
- 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 Part 15, Subpart C, §15.247 (a) (1) (iii)

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

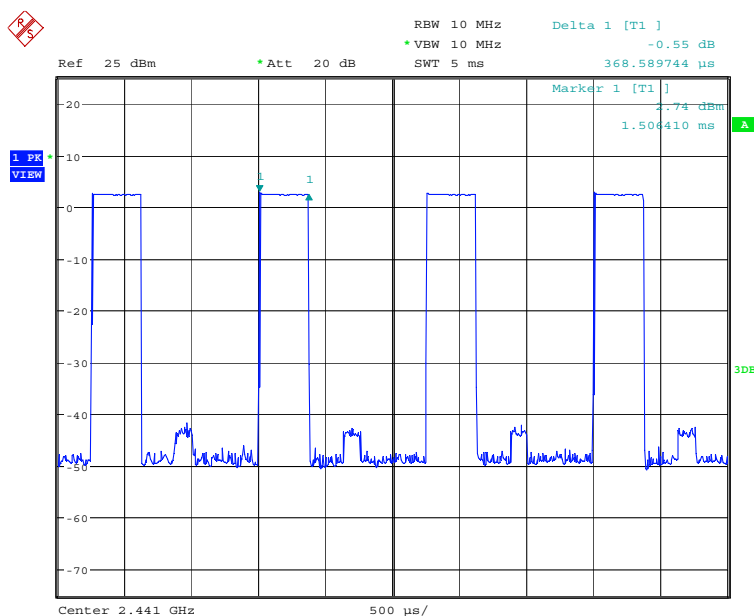
The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

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

2.2.6.4 Test result

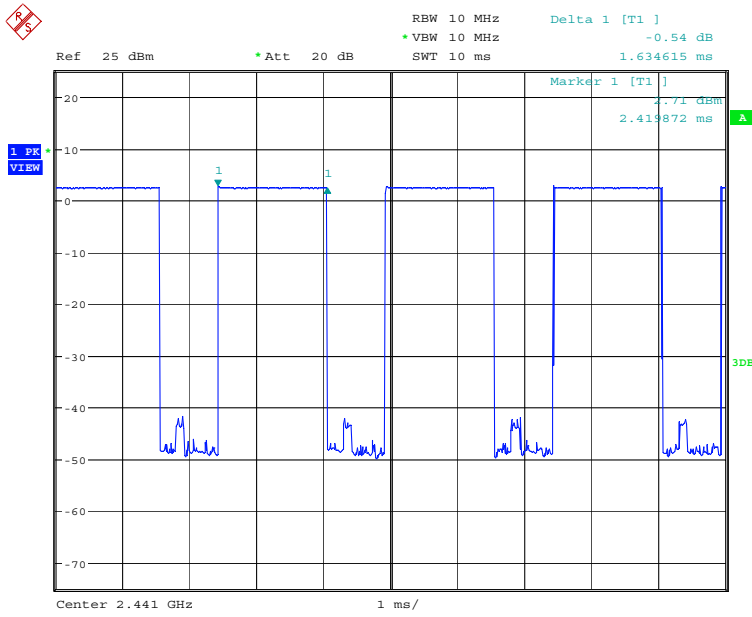
Modulation type: GFSK

Packet type	Time slot length ms	Dwell time	Dwell time ms
DH1	0.3686	time slot length * 1600* 31.6 /79	235.90
DH3	1.6346	time slot length * 31.6 *1600/3 /79	348.71
DH5	2.8846	time slot length * 31.6 *1600/5 /79	369.23



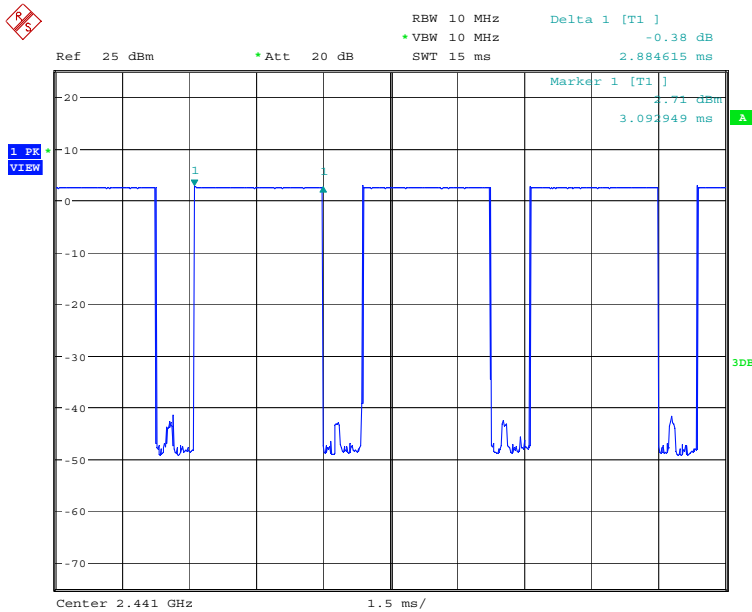
Date: 10.JUN.2011 19:20:21

Carrier frequency (MHz): 2441
Packet type: DH1
Modulation type: GFSK



Date: 10.JUN.2011 19:20:55

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

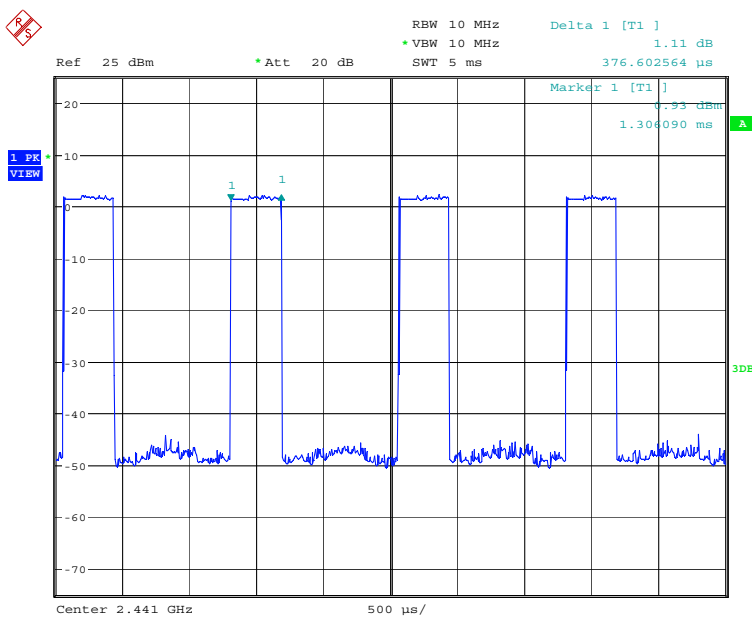


Date: 10.JUN.2011 19:21:25

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	0.3766	time slot length * 1600* 31.6 /79	241.02
DH3	1.6266	time slot length * 31.6 *1600/3 /79	347.01
DH5	2.9006	time slot length * 31.6 *1600/5 /79	371.28

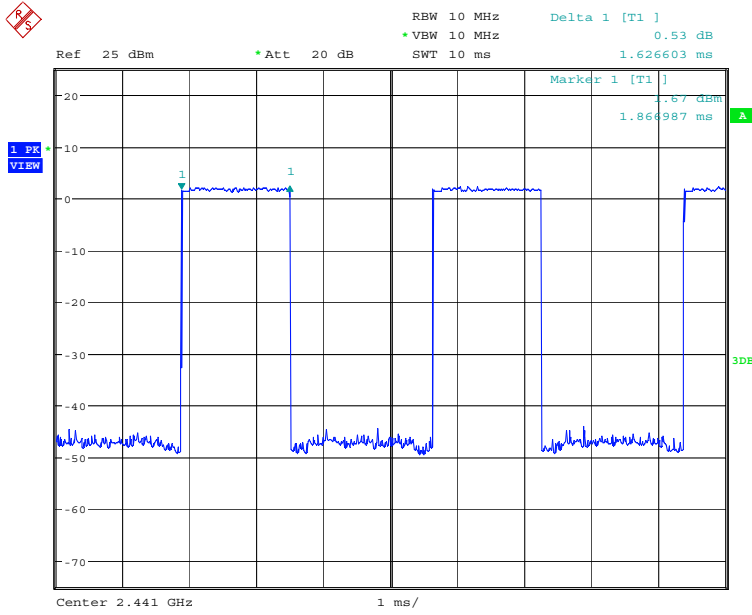


Date: 10.JUN.2011 19:24:18

Carrier frequency (MHz): 2441

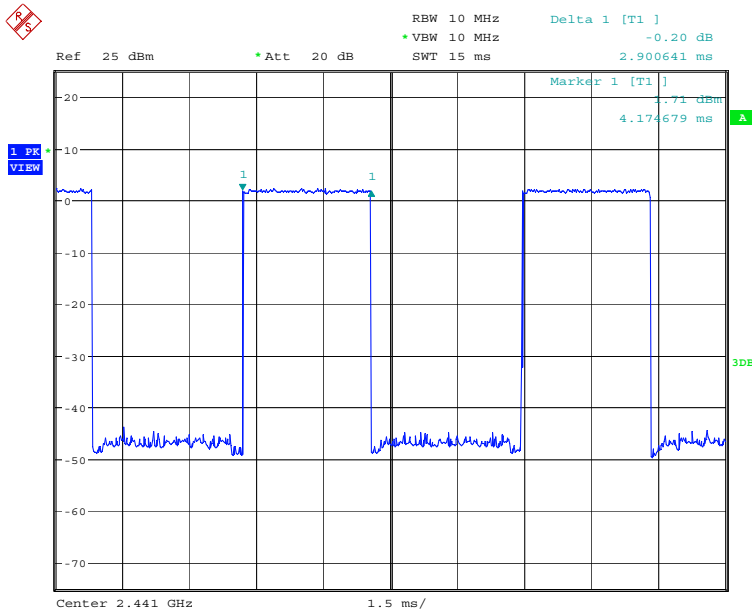
Packet type: DH1

Modulation type: $\pi/4$ DQPSK



Date: 10.JUN.2011 19:24:57

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

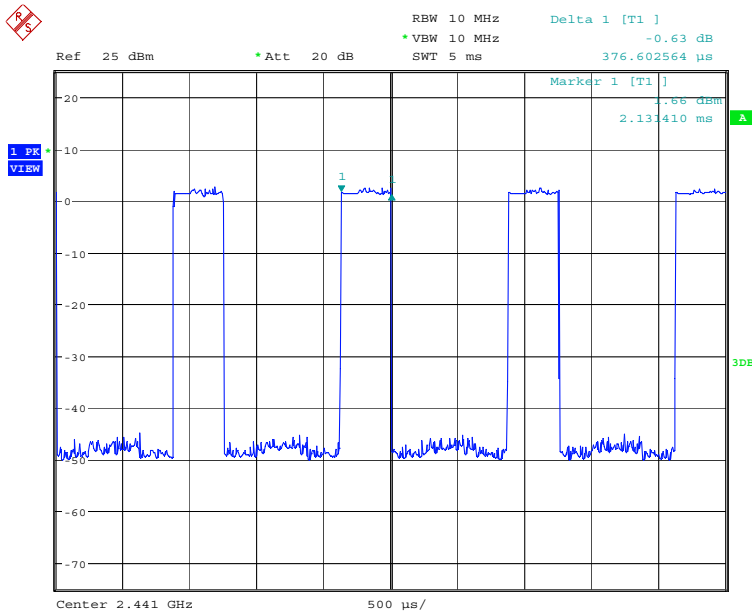


Date: 10.JUN.2011 19:25:32

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

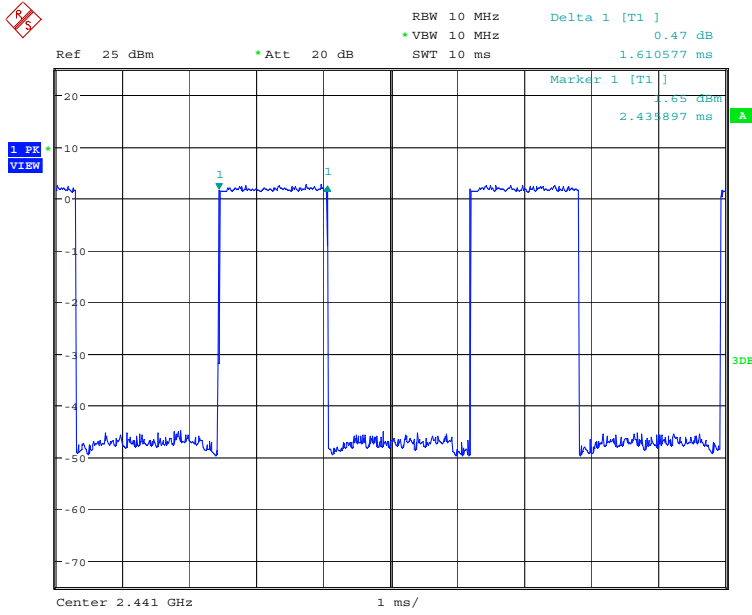
Modulation type: 8DPSK

Packet type	Time slot length ms	Dwell time	Dwell time ms
DH1	0.3766	time slot length * 1600* 31.6 /79	241.02
DH3	1.6106	time slot length * 31.6 *1600/3 /79	343.59
DH5	2.8846	time slot length * 31.6 *1600/5 /79	369.23



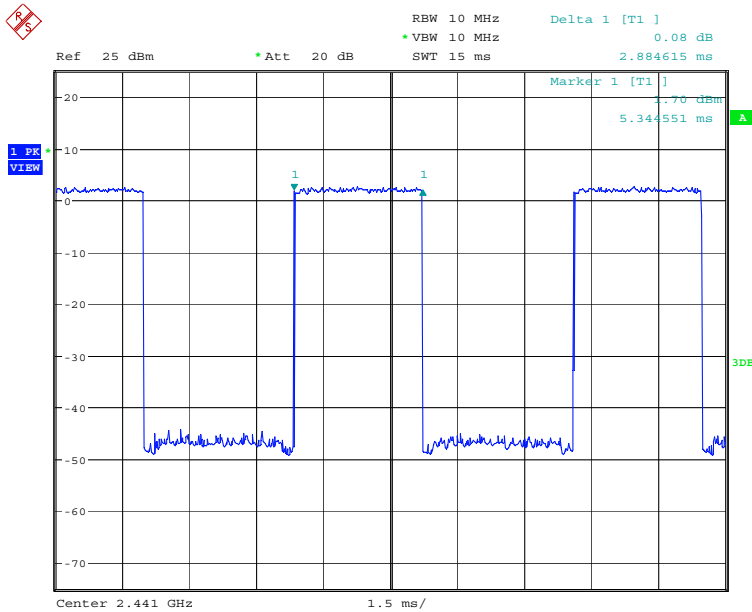
Date: 10.JUN.2011 19:26:26

Carrier frequency (MHz): 2441
 Packet type:DH1
 Modulation type: 8DPSK



Date: 10.JUN.2011 19:26:56

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



Date: 10.JUN.2011 19:27:31

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

2.2.7 Channel separation-§15.247(a) (1)

2.2.7.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.1kPa

2.2.7.2 Test Description

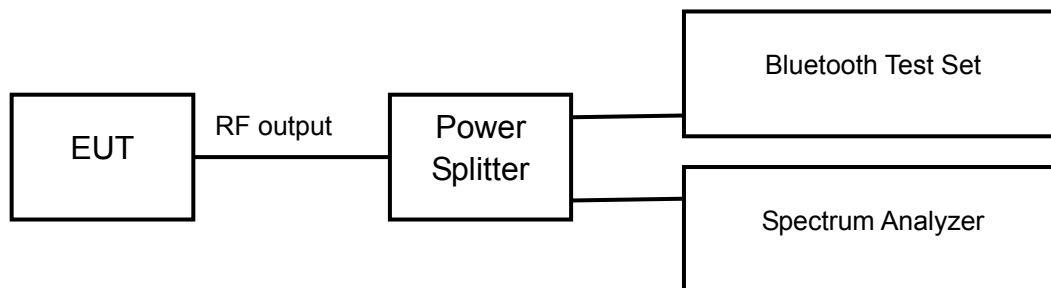
The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

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



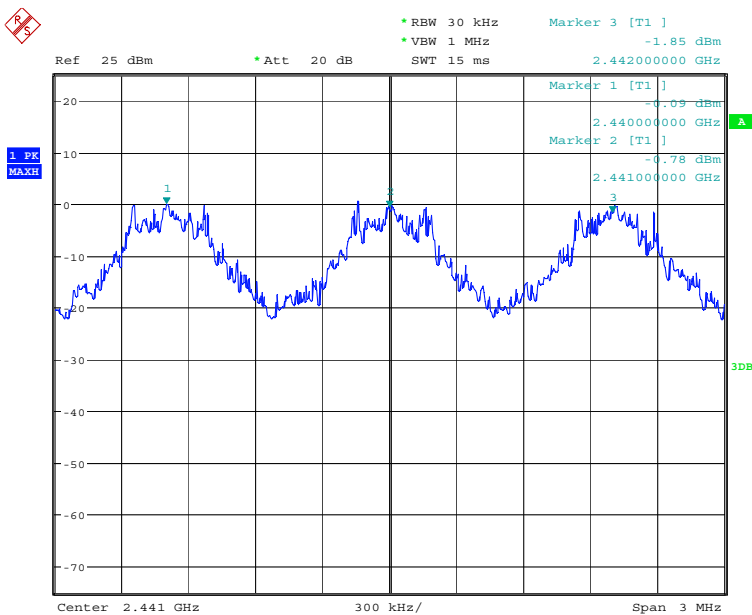
2.2.7.3 Test limit

FCC Part 15, Subpart C, §15.247 (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.

2.2.7.4 Test result

Op-mode	Channel separation MHz
Hopping mode	1



Date: 10 JUN.2011 19:31:28

Op-mode: Hopping mode

2.2.8 Number of hopping frequencies-§15.247(a) (iii)

2.2.8.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.1kPa

2.2.8.2 Test Description

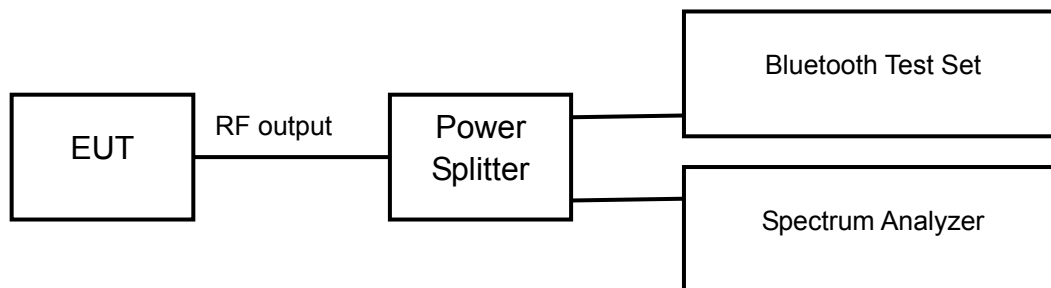
The measurement is made according to Public notice DA 00-705 and ANSI C63.4-2009.

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



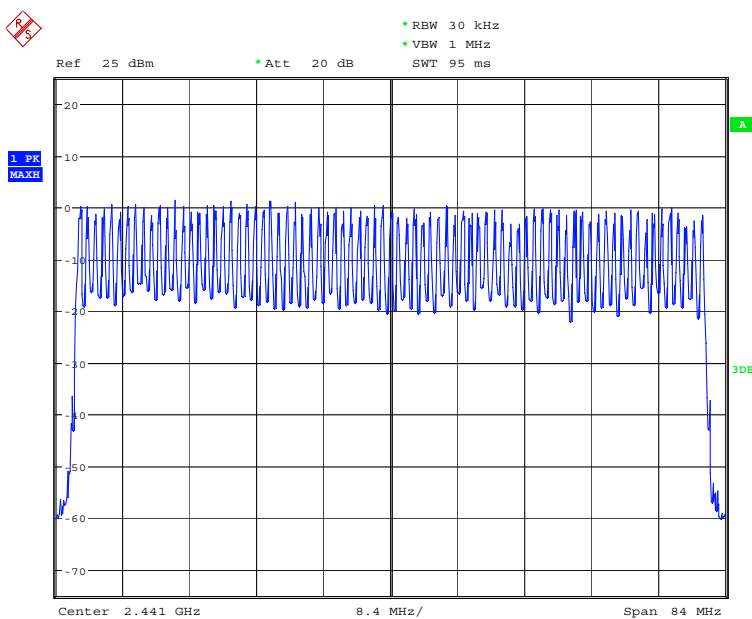
2.2.8.3 Test limit

FCC Part 15, Subpart C, §15.247 (a) (iii)

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

2.2.8.4 Test result

Op-mode	Result
Hopping mode	79



Date: 10.JUN.2011 19:33:57

Op-mode: Hopping mode

2.2.9 AC Powerline Conducted Emission-§15.107, §15.207

2.2.9.1 Ambient condition

Temperature	Relative humidity	Pressure
27°C	38%	99.9kPa

2.2.9.2 Test limit

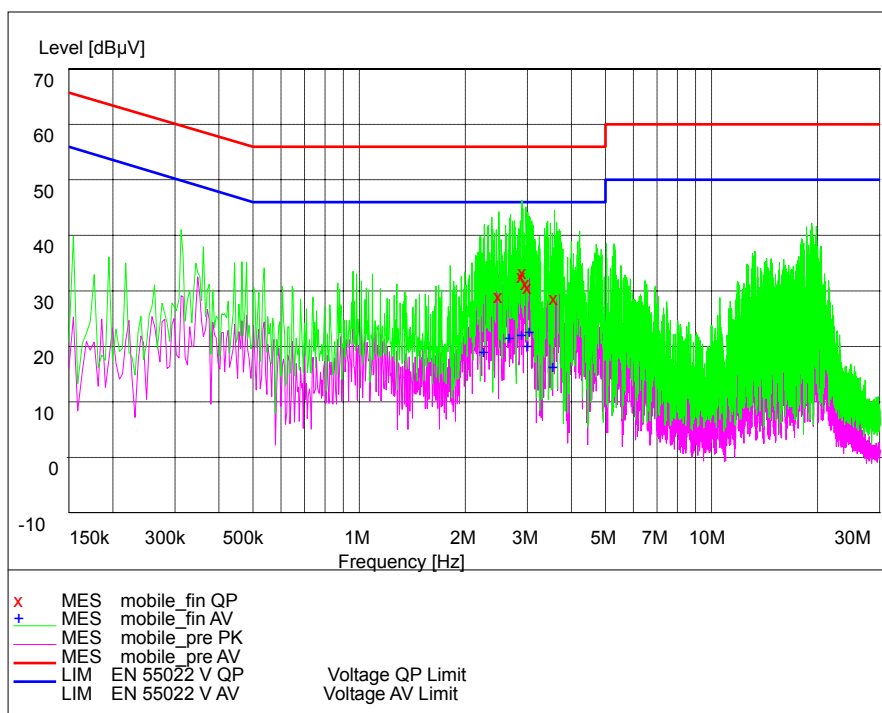
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

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 dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
2.256000	20.90	20.3	46	25.1	L1	GND
2.674500	23.50	20.3	46	22.5	L1	GND
2.899500	23.90	20.3	46	22.1	N	GND
3.012000	22.10	20.3	46	23.9	N	GND
3.043500	24.50	20.3	46	21.5	L1	GND
3.552000	18.20	20.3	46	27.8	N	GND

MEASUREMENT RESULT: "mobile_fin QP"

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
2.494500	31.00	20.3	56	25.0	N	GND
2.899500	34.60	20.3	56	21.4	L1	GND
2.913000	35.30	20.3	56	20.7	L1	GND
2.976000	33.30	20.3	56	22.7	N	GND
3.012000	32.60	20.3	56	23.4	L1	GND
3.583500	30.70	20.3	56	25.3	L1	GND

2.3. List of test equipment

No.	Name/Model	Manufacturer	S/N	Calibration Date
1	Bluetooth Test Set Anritsu MT8852B	Anritsu	6K00005827	Aug. 2010
2	R&S FSQ Spectrum Analyzer	R&S	200065	Mar. 2011
3	1506A Power Splitter	Weinschel	MN154	Aug. 2010
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	Aug. 2010
5	ESI 40 EMI test receiver	R&S	100015	Aug. 2010
6	SMR 20 Signal generator	R&S	100086	Aug. 2010
7	CMU 200 Radio tester	R&S	100313	Aug. 2010
8	12.65m*8.03m*7.50m Fully-Anechoic Chamber	FRANKONIA	-----	Aug. 2010
9	HL562 Ultra log test antenna	R&S	100016	Aug. 2010
10	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	Aug. 2010
11	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	Aug. 2010
12	PS2000 Turn Table	FRANKONIA	-----	Aug. 2010
13	MA260 Antenna Master	FRANKONIA	-----	Aug. 2010
14	ES-K1EMI test software	R&S	-----	-----
15	HL562 Receive antenna	R&S	100167	Aug. 2010