



STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 1 of 87

Applicant (WHF001):

Whalen Furniture
4th Floor, Jing Lianxuan Building, Lotus Commercial Plaza,
Chang An Town, Dong Guan City, Guang Dong Province,
China

Manufacturer:

Whalen Furniture
4th Floor, Jing Lianxuan Building, Lotus Commercial Plaza,
Chang An Town, Dong Guan City, Guang Dong Province,
China

Description of Sample(s):

Submitted sample(s) said to be:
Product: Audio with Bluetooth
Brand Name: N/A
Model Number: 225124
IC ID: 11164A-225124

Date Sample(s) Received: 2012-05-27

Date Tested: 2013-05-27 to 2013-06-06

Investigation Requested:

Industry Canada Low Power Licence-Exempt
Radiocommunication devices (All Frequency Bands) –
RSS-210

Conclusion(s):

The submitted product COMPLIED with the requirements
of Industry Canada Low Power Licence-Exempt
Radiocommunication devices (All Frequency Bands) – RSS-
210. The tests were performed in accordance with the
standards described above and on Section 2.2 in this Test
Report.

Remark(s):



LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited

The Hong Kong Standards and Testing Centre Ltd.

10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 2 of 87

CONTENT:

Cover	Page 1 of 87
Content	Page 2-3 of 87
<u>1.0 General Details</u>	
1.1 Test Laboratory	Page 4 of 87
1.2 Equipment Under Test [EUT] Description of EUT operation	Page 4 of 87
1.3 Date of Order	Page 4 of 87
1.4 Submitted Sample(s)	Page 5 of 87
1.5 Test Duration	Page 5 of 87
1.6 Country of Origin	Page 5 of 87
<u>2.0 Technical Details</u>	
2.1 Investigations Requested	Page 6 of 87
2.2 Test Standards and Results Summary	Page 6 of 87
2.3 Table for Test Modes	Page 7 of 87
<u>3.0 Test Results</u>	
3.1 Emission	Page 8-80 of 87

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 3 of 87

Appendix A

List of Measurement Equipment

Page 81 of 87

Appendix B

Ancillary Equipment

Page 81 of 87

Appendix C

Photographs

Page 82-87 of 87

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 4 of 87

1.0 General Details

1.1 Test Laboratory

STC (Dongguan) Company Limited
EMC Laboratory
68 Fumin Nan Road, Dalang, Dongguan, China

Telephone: (86 769) 81119888
Fax: (86 769) 81116222

1.2 Equipment Under Test [EUT] **Description of Sample(s)**

Submitted Sample(s) said to be:

Product: Audio with Bluetooth
Manufacturer: Whalen Furniture
Brand Name: N/A
Model Number: 225124
Rating: 9Vd.c. with Jack

The AC/DC adaptor was provided by the applicant with following details:

Brand name: N/A; Model no.: AK06G-0900060UW; Input: 100-240V a.c. 50/60Hz 0.3A;
Output: 9Vd.c. 0.6A.

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is an Audio with Bluetooth of Whalen Furniture. The transmission transceiver operating in the 2.4GHz ISM frequency band. The EUT continues to transmit while switch bluetooth mode. Modulation by IC; and type is GFSK, $\pi/4$ DQPSK, 8DPSK modulation.

1.3 Date of Order

2013-05-27

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 5 of 87

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2013-05-27 to 2013-06-06

1.6 Country of Origin

China

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 6 of 87

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with RSS-210 and ANSI C63.4: 2009 for IC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary				
Test Condition	Test Requirement	Test Method	Class / Severity	
			Pass	Fail
Output Power of Fundamental Emissions	RSS-210 issue 8 December 2010	Section A8.4 (2)	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Radiated Emissions	RSS-Gen issue 3 December 2010	Section 7.2.5 Table 5 & Table 6	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
AC Mains Conducted Emissions	RSS-Gen issue 3 December 2010	Section 7.2.4 Table 4	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
20dB Bandwidth	RSS-210 issue 8 December 2010	Section A8.1 (b)	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
99% Bandwidth	RSS-210 issue 8 December 2010	Section A1.1.3	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Number of Operating Channel	RSS-210 issue 8 December 2010	Section A8.1 (d)	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Hopping Frequency Separation	RSS-210 issue 8 December 2010	Section A8.1 (b)	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Out-of-band Emission	RSS-210 issue 8 December 2010	Section A8.5	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Occupancy Time (Dwell time)	RSS-210 issue 8 December 2010	Section A8.1 (d)	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
RF Exposure	RSS-102	N/A	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 7 of 87

2.3 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate in the table below is the worst case rate with respect to the specific test item.

Investigation has been done on all the possible configurations for searching the worst cases.

The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate
Max. Conducted Output Power	GFSK / $\pi/4$ -DQPSK / 8DPSK	1MBps / 2MBps / 3MBps
Hopping Channel Separation	8DPSK	3MBps
Number of Hopping Frequency	8DPSK	3MBps
Dwell Time	DH1 / DH3 / DH5	3MBps
Radiated Emissions Below 1GHz	GFSK	1MBps
Radiated Emission Above 1GHz	GFSK	1MBps
Band Edge Emissions	GFSK / $\pi/4$ -DQPSK / 8DPSK	1MBps / 2MBps / 3MBps

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 8 of 87

3.0 Test Results

3.1 Emission

3.1.1 Maximum Peak Output Power

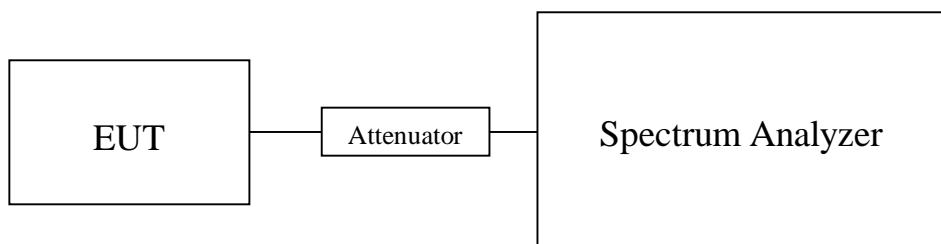
Test Requirement:	RSS-210
Test Method:	RSS-210 A8.4 (2)
Test Date:	2013-06-06
Mode of Operation:	Tx Mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in dBm.

RBW = 3 MHz, VBW= 3MHz, Sweep = Auto, Span = 10MHz
Detector = Peak, Trace = Max. hold

Test Setup:



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 9 of 87

Limits for Peak Output Power of Fundamental:

The maximum peak output power shall not exceed the following limits:
For frequency hopping systems employing at least 75 hopping channels: 1 Watt
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts
For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt

Results of Tx mode (GFSK) (Fundamental Power): Pass

Maximum conducted output power

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2402	0.000619

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2441	0.000644

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2480	0.000630

Results of Tx mode ($\pi/4$ -DQPSK) (Fundamental Power): Pass

Maximum conducted output power

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2402	0.000462

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2441	0.000440

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2480	0.000432

Results of Tx mode (8 DPSK) (Fundamental Power): Pass

Maximum conducted output power

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2402	0.000495

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2441	0.000485

Transmitter Frequency (MHz)	Maximum conducted output power (Watt)
2480	0.000482

Limit: 0.125W (20.97dBm)

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB
1GHz to 18GHz 1.7dB

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 10 of 87

3.1.2 Radiated Emissions

Test Requirement:	RSS-210/ RSS-Gen
Test Method:	RSS-210/ RSS-Gen
Test Date:	2013-06-06
Mode of Operation:	Tx mode / Aux in mode (Connected to iPod) / Bluetooth Communication mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-anechoic chamber located at DGSTC filed with Industry Canada File Number: IC4789B-1

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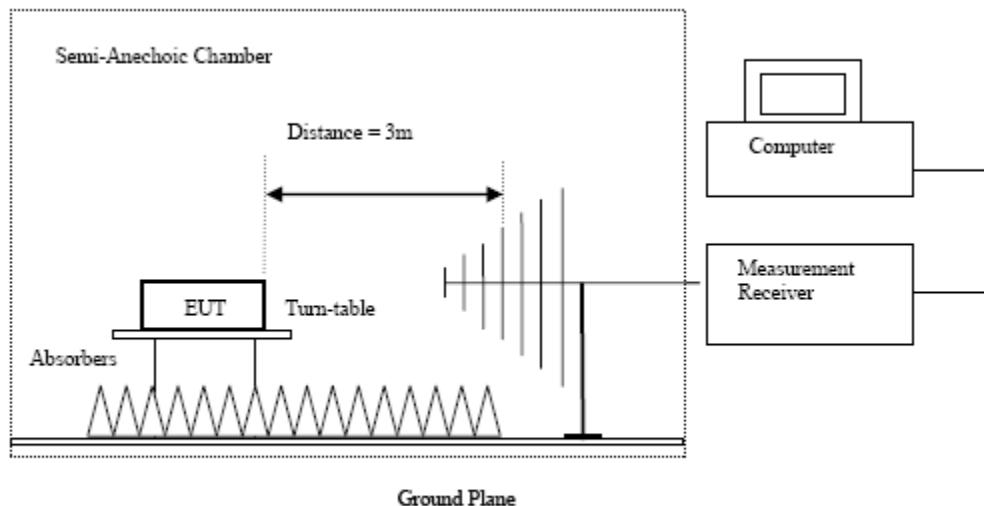
Date: 2013-06-19
No.: DM111332DT

Page 11 of 87

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW: 10kHz VBW: 30kHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
30MHz – 1GHz (QP)	RBW: 120kHz VBW: 120kHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
Above 1GHz (Pk & Av)	RBW: 1MHz VBW: 3MHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used.

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 12 of 87

Limits for Radiated Emissions [RSS-Gen Table 5 & Table 6]:

Frequency Range [MHz]	Quasi-Peak Limits (Transmitter & Receiver) [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication mode (GFSK mode / $\pi/4$ -DQPSK mode / 8 DPSK mode) (9kHz – 30MHz): Pass

The Low Frequency, which started from 9kHz to 30MHz, was Pre-scan and the result which was more than 20dB lower than the Limit line.

Result of Tx mode (2402.0 MHz) (GFSK mode) (Above 1GHz): Pass

Frequency MHz	Field Strength of Spurious Emissions Peak Value					
	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4804.0	13.6	41.5	55.1	74.0	18.9	Vertical
4804.0	12.7	42.4	55.1	74.0	18.9	Horizontal
7206.0	9.1	45.1	54.2	74.0	19.8	Vertical
7206.0	8.1	46.2	54.3	74.0	19.7	Horizontal
9612.0	6.9	48.0	54.9	74.0	19.1	Vertical
9612.0	7.2	48.8	56.0	74.0	18.0	Horizontal
12010.0	4.5	51.5	56.0	74.0	18.0	Vertical
12010.0	3.1	52.4	55.5	74.0	18.5	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 13 of 87

Result of Tx mode (2402.0 MHz) (GFSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4804.0	-0.8	41.5	40.7	54.0	13.3	Vertical
4804.0	-1.2	42.4	41.2	54.0	12.8	Horizontal
7206.0	-5.0	45.1	40.1	54.0	13.9	Vertical
7206.0	-7.0	46.2	39.2	54.0	14.8	Horizontal
9612.0	-7.9	48.0	40.1	54.0	13.9	Vertical
9612.0	-7.2	48.8	41.6	54.0	12.4	Horizontal
12010.0	-9.3	51.5	42.2	54.0	11.8	Vertical
12010.0	-11.5	52.4	40.9	54.0	13.1	Horizontal

Result of Tx mode (2441.0 MHz) (GFSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4882.0	12.9	41.6	54.5	74.0	19.5	Vertical
4882.0	11.6	42.5	54.1	74.0	19.9	Horizontal
7323.0	9.0	45.2	54.2	74.0	19.8	Vertical
7323.0	7.2	46.3	53.5	74.0	20.5	Horizontal
9764.0	7.3	48.1	55.4	74.0	18.6	Vertical
9764.0	7.8	48.9	56.7	74.0	17.3	Horizontal
12205.0	4.4	51.6	56.0	74.0	18.0	Vertical
12205.0	3.0	52.5	55.5	74.0	18.5	Horizontal

Result of Tx mode (2441.0 MHz) (GFSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4882.0	-1.7	41.6	39.9	54.0	14.1	Vertical
4882.0	-1.3	42.5	41.2	54.0	12.8	Horizontal
7323.0	-4.3	45.2	40.9	54.0	13.1	Vertical
7323.0	-7.2	46.3	39.1	54.0	14.9	Horizontal
9764.0	-6.2	48.1	41.9	54.0	12.1	Vertical
9764.0	-7.60	48.9	41.3	54.0	12.7	Horizontal
12205.0	-10.40	51.6	41.2	54.0	12.8	Vertical
12205.0	-12.50	52.5	40	54.0	14.0	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 14 of 87

Result of Tx mode (2480.0 MHz) (GFSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4960.0	13.8	41.4	55.2	74.0	18.8	Vertical
4960.0	11.9	42.7	54.6	74.0	19.4	Horizontal
7440.0	9.2	45.6	54.8	74.0	19.2	Vertical
7440.0	8.1	46.5	54.6	74.0	19.4	Horizontal
9920.0	6.6	48.6	55.2	74.0	18.8	Vertical
9920.0	5.2	49.7	54.9	74.0	19.1	Horizontal
12400.0	4.0	51.7	55.7	74.0	18.3	Vertical
12400.0	2.9	52.7	55.6	74.0	18.4	Horizontal

Result of Tx mode (2480.0 MHz) (GFSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4960.0	-0.7	41.4	40.7	54.0	13.3	Vertical
4960.0	-3.8	42.7	38.9	54.0	15.1	Horizontal
7440.0	-6.4	45.6	39.2	54.0	14.8	Vertical
7440.0	-6.4	46.5	40.1	54.0	13.9	Horizontal
9920.0	-7.4	48.6	41.2	46.0	4.8	Vertical
9920.0	-9.7	49.7	40.0	47.0	7.0	Horizontal
12400.0	-10.8	51.7	40.9	48.0	7.1	Vertical
12400.0	-11.7	52.7	41.0	49.0	8.0	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 15 of 87

Result of Tx mode (2402.0 MHz) ($\pi/4$ -DQPSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4804.0	12.7	41.5	54.2	74.0	19.8	Vertical
4804.0	11.7	42.4	54.1	74.0	19.9	Horizontal
7206.0	7.8	45.1	52.9	74.0	21.1	Vertical
7206.0	8.1	46.2	54.3	74.0	19.7	Horizontal
9612.0	7.0	48.0	55.0	74.0	19.0	Vertical
9612.0	6.3	48.8	55.1	74.0	18.9	Horizontal
12010.0	4.2	51.5	55.7	74.0	18.3	Vertical
12010.0	2.0	52.4	54.4	74.0	19.6	Horizontal

Result of Tx mode (2402.0 MHz) ($\pi/4$ -DQPSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4804.0	-0.5	41.5	41.0	54.0	13.0	Vertical
4804.0	-2.0	42.4	40.4	54.0	13.6	Horizontal
7206.0	-7.1	45.1	38.0	54.0	16.0	Vertical
7206.0	-5.5	46.2	40.7	54.0	13.3	Horizontal
9612.0	-7.9	48.0	40.1	54.0	13.9	Vertical
9612.0	-8.2	48.8	40.6	54.0	13.4	Horizontal
12010.0	-10.6	51.5	40.9	54.0	13.1	Vertical
12010.0	-12.3	52.4	40.1	54.0	13.9	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 16 of 87

Result of Tx mode (2441.0 MHz) ($\pi/4$ -DQPSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4882.0	12.6	41.6	54.2	74.0	19.8	Vertical
4882.0	11.8	42.5	54.3	74.0	19.7	Horizontal
7323.0	9.4	45.2	54.6	74.0	19.4	Vertical
7323.0	8.0	46.3	54.3	74.0	19.7	Horizontal
9764.0	7.8	48.1	55.9	74.0	18.1	Vertical
9764.0	6.4	48.9	55.3	74.0	18.7	Horizontal
12205.0	3.8	51.6	55.4	74.0	18.6	Vertical
12205.0	2.9	52.5	55.4	74.0	18.6	Horizontal

Result of Tx mode (2441.0 MHz) ($\pi/4$ -DQPSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4882.0	-1.1	41.6	40.5	54.0	13.5	Vertical
4882.0	-2.3	42.5	40.2	54.0	13.8	Horizontal
7323.0	-5.2	45.2	40.0	54.0	14.0	Vertical
7323.0	-5.5	46.3	40.8	54.0	13.2	Horizontal
9764.0	-7.4	48.1	40.7	54.0	13.3	Vertical
9764.0	-7.5	48.9	41.4	54.0	12.6	Horizontal
12205.0	-9.3	51.6	42.3	54.0	11.7	Vertical
12205.0	-11.7	52.5	40.8	54.0	13.2	Horizontal

Result of Tx mode (2480.0 MHz) ($\pi/4$ -DQPSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4960.0	13.7	41.4	55.1	74.0	18.9	Vertical
4960.0	11.5	42.7	54.2	74.0	19.8	Horizontal
7440.0	9.4	45.6	55.0	74.0	19.0	Vertical
7440.0	8.8	46.5	55.3	74.0	18.7	Horizontal
9920.0	6.3	48.6	54.9	74.0	19.1	Vertical
9920.0	4.4	49.7	54.1	74.0	19.9	Horizontal
12400.0	3.0	51.7	54.7	74.0	19.3	Vertical
12400.0	2.9	52.7	55.6	74.0	18.4	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 17 of 87

Result of Tx mode (2480.0 MHz) ($\pi/4$ -DQPSK mode) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4960.0	-1.7	41.4	39.7	54.0	14.3	Vertical
4960.0	-3.6	42.7	39.1	54.0	14.9	Horizontal
7440.0	-5.8	45.6	39.8	54.0	14.2	Vertical
7440.0	-6.5	46.5	40.0	54.0	14.0	Horizontal
9920.0	-8.0	48.6	40.6	54.0	13.4	Vertical
9920.0	-10.5	49.7	39.2	54.0	14.8	Horizontal
12400.0	-11.2	51.7	40.5	54.0	13.5	Vertical
12400.0	-11.0	52.7	41.7	54.0	12.3	Horizontal

Result of Tx mode (2402.0 MHz) (8DPSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4804.0	12.8	41.5	54.3	74.0	19.7	Vertical
4804.0	12.6	42.4	55.0	74.0	19.0	Horizontal
7206.0	10.0	45.1	55.1	74.0	18.9	Vertical
7206.0	6.5	46.2	52.7	74.0	21.3	Horizontal
9612.0	7.8	48.0	55.8	74.0	18.2	Vertical
9612.0	7.4	48.8	56.2	74.0	17.8	Horizontal
12010.0	4.1	51.8	55.9	74.0	18.1	Vertical
12010.0	3.8	52.4	56.2	74.0	17.8	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 18 of 87

Result of Tx mode (2402.0 MHz) (8DPSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4804.0	-1.4	41.5	40.1	54.0	13.9	Vertical
4804.0	-2.2	42.4	40.2	54.0	13.8	Horizontal
7206.0	-4.6	45.1	40.5	54.0	13.5	Vertical
7206.0	-6.8	46.2	39.4	54.0	14.6	Horizontal
9612.0	-6.7	48.0	41.3	54.0	12.7	Vertical
9612.0	-7.0	48.8	41.8	54.0	12.2	Horizontal
12010.0	-10	51.8	41.8	54.0	12.2	Vertical
12010.0	-10.1	52.4	42.3	54.0	11.7	Horizontal

Result of Tx mode (2441.0 MHz) (8DPSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4882.0	13.4	41.6	55.0	74.0	19.0	Vertical
4882.0	11.0	42.5	53.5	74.0	20.5	Horizontal
7323.0	8.8	45.2	54.0	74.0	20.0	Vertical
7323.0	7.1	46.3	53.4	74.0	20.6	Horizontal
9764.0	7.5	48.1	55.6	74.0	18.4	Vertical
9764.0	6.2	48.9	55.1	74.0	18.9	Horizontal
12205.0	4.4	51.6	56.0	74.0	18.0	Vertical
12205.0	2.8	52.5	55.3	74.0	18.7	Horizontal

Result of Tx mode (2441.0 MHz) (8DPSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4882.0	-1.8	41.6	39.8	54.0	14.2	Vertical
4882.0	-3.3	42.5	39.2	54.0	14.8	Horizontal
7323.0	-4.6	45.2	40.6	54.0	13.4	Vertical
7323.0	-7.3	46.3	39.0	54.0	15.0	Horizontal
9764.0	-6.4	48.1	41.7	54.0	12.3	Vertical
9764.0	-8.70	48.9	40.2	54.0	13.8	Horizontal
12205.0	-9.80	51.6	41.8	54.0	12.2	Vertical
12205.0	-11.70	52.5	40.8	54.0	13.2	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 19 of 87

Result of Tx mode (2480.0 MHz) (8DPSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4960.0	13.9	41.4	55.3	74.0	18.7	Vertical
4960.0	11.7	42.7	54.4	74.0	19.6	Horizontal
7440.0	6.6	45.6	52.2	74.0	21.8	Vertical
7440.0	7.3	46.5	53.8	74.0	20.2	Horizontal
9920.0	6.8	48.6	55.4	74.0	18.6	Vertical
9920.0	5.0	49.7	54.7	74.0	19.3	Horizontal
12400.0	3.6	51.7	55.3	74.0	18.7	Vertical
12400.0	2.5	52.7	55.2	74.0	18.8	Horizontal

Result of Tx mode (2480.0 MHz) (8DPSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
4960.0	-0.9	41.4	40.5	54.0	13.5	Vertical
4960.0	-2.8	42.7	39.9	54.0	14.1	Horizontal
7440.0	-5.9	45.6	39.7	54.0	14.3	Vertical
7440.0	-7.9	46.5	38.6	54.0	15.4	Horizontal
9920.0	-7.4	48.6	41.2	54.0	12.8	Vertical
9920.0	-9.1	49.7	40.6	54.0	13.4	Horizontal
12400.0	-11.9	51.7	39.8	54.0	14.2	Vertical
12400.0	-11.6	52.7	41.1	54.0	12.9	Horizontal

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 20 of 87

Limits for Radiated Emissions [RSS-Gen Table 5 & Table 6]:

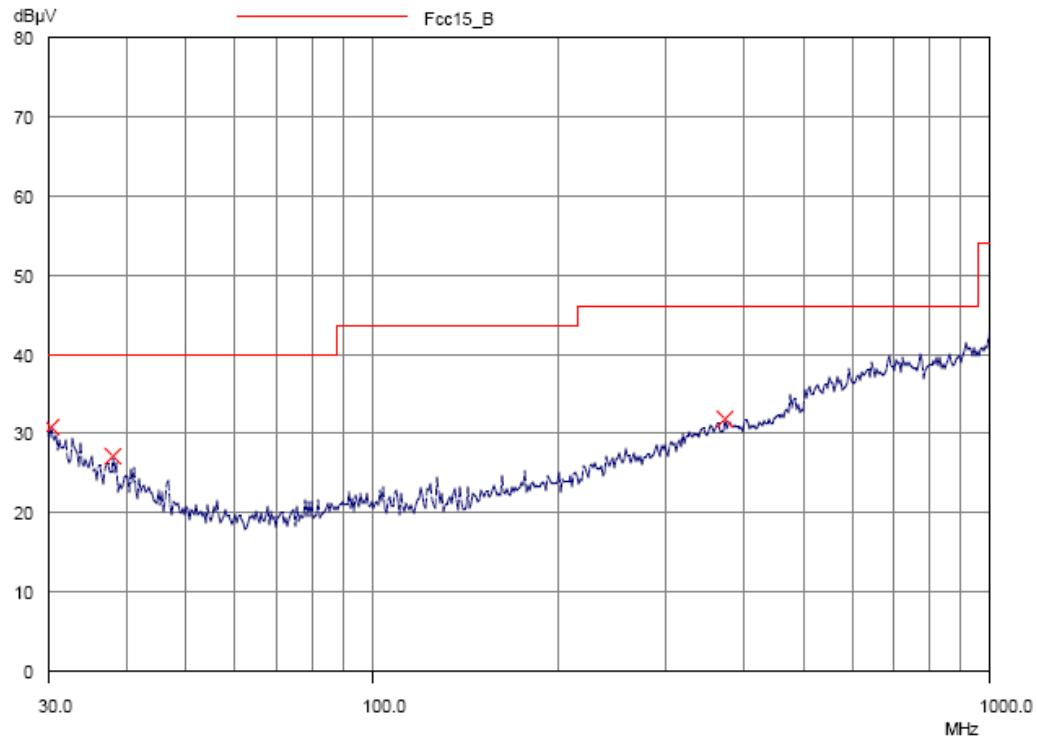
Frequency Range [MHz]	Quasi-Peak Limits (Transmitter & Receiver) [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Aux in mode (Connected to iPod) (9kHz – 30MHz): Pass
Emissions detected are more than 20 dB below the Limits.

Result of Aux in mode (Connected to iPod) (30MHz – 1GHz): Pass
Please refer to the following table for result details

Horizontal



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 21 of 87

Result of Aux in mode (Connected to iPod) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
30.2	Horizontal	30.9	40.0	35.1	100
38.1	Horizontal	27.2	40.0	22.9	100
372.8	Horizontal	31.9	46.0	39.4	200

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 22 of 87

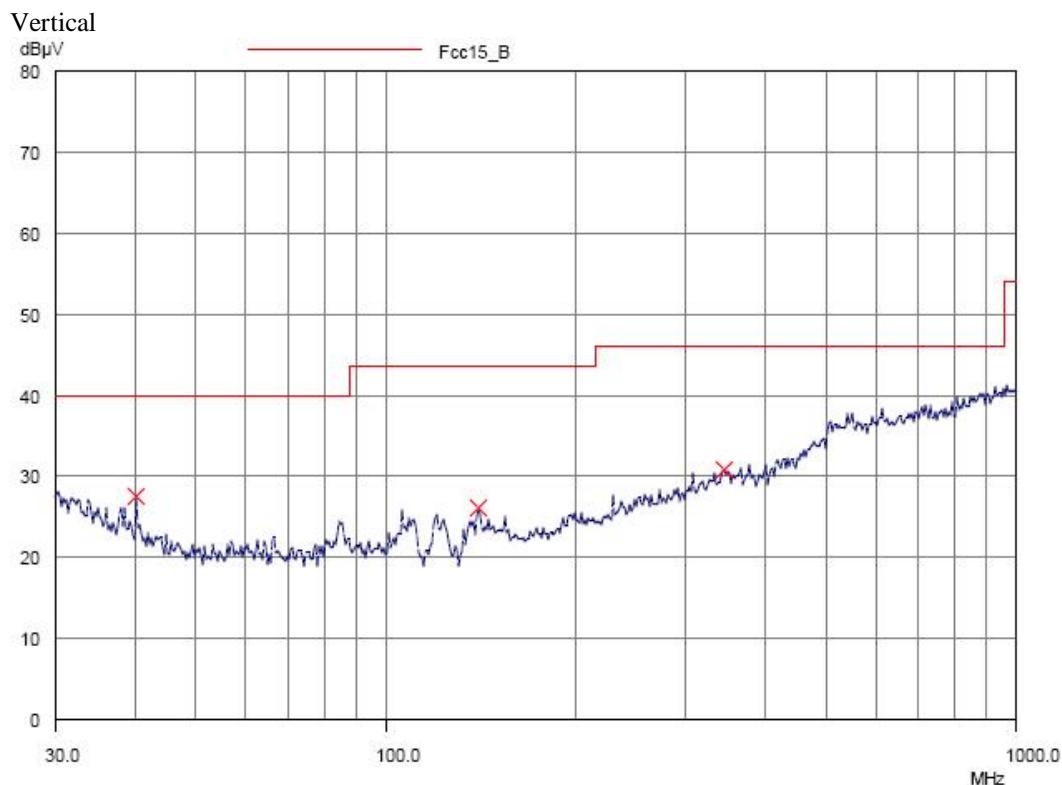
Limits for Radiated Emissions [RSS-Gen Table 5 & Table 6]:

Frequency Range [MHz]	Quasi-Peak Limits (Transmitter & Receiver) [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Aux in mode (Connected to iPod) (9kHz – 30MHz): Pass
Emissions detected are more than 20 dB below the Limits.

Result of Aux in mode (Connected to iPod) (30MHz – 1GHz): Pass
Please refer to the following table for result details



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 23 of 87

Result of Aux in mode (Connected to iPod) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
40.4	Vertical	27.5	40.0	23.7	100
141.1	Vertical	26.1	43.5	20.2	150
343.3	Vertical	31.0	46.0	35.5	200

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 24 of 87

Limits for Radiated Emissions [RSS-Gen Table 5 & Table 6]:

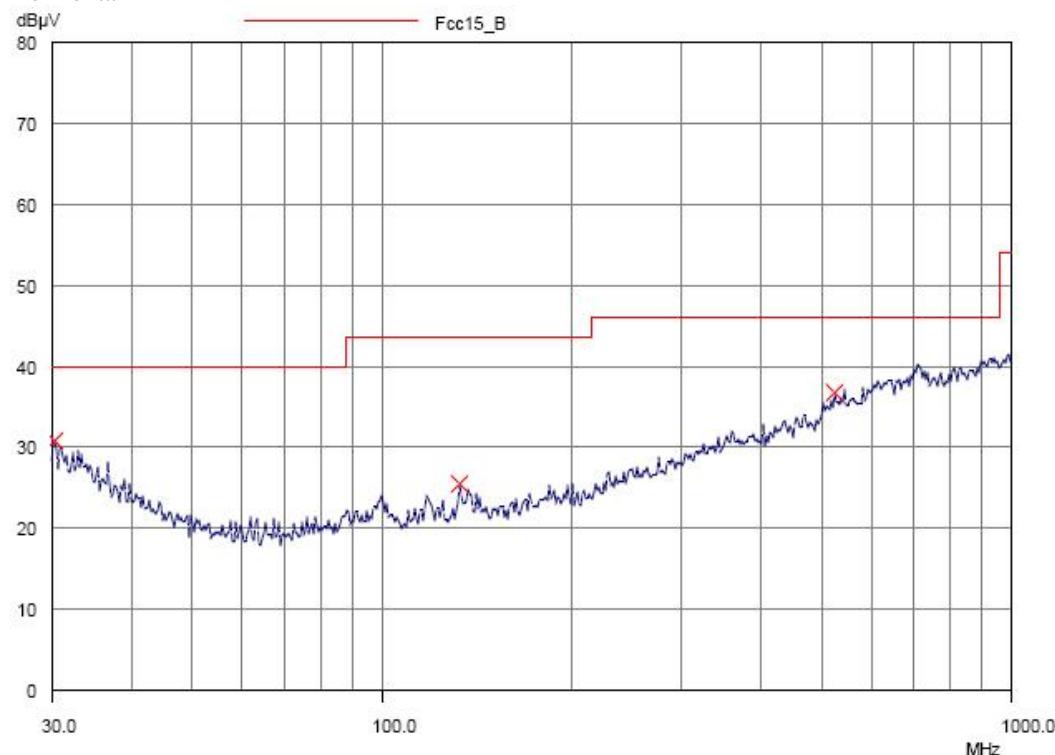
Frequency Range [MHz]	Quasi-Peak Limits (Transmitter & Receiver) [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Bluetooth Communication mode (9kHz – 30MHz): Pass
Emissions detected are more than 20 dB below the Limits.

Result of Bluetooth Communication mode (GFSK / $\pi/4$ -DQPSK/ 8DPSK) (30MHz – 1GHz): Pass
Please refer to the following table for result details

Horizontal



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 25 of 87

Result of Bluetooth Communication mode (GFSK / $\pi/4$ -DQPSK/ 8DPSK) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
30.2	Horizontal	31.0	40.0	35.5	100
133.3	Horizontal	25.6	43.5	19.1	150
525.0	Horizontal	36.8	46.0	69.2	200

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 26 of 87

Limits for Radiated Emissions [RSS-Gen Table 5 & Table 6]:

Frequency Range [MHz]	Quasi-Peak Limits (Transmitter & Receiver) [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

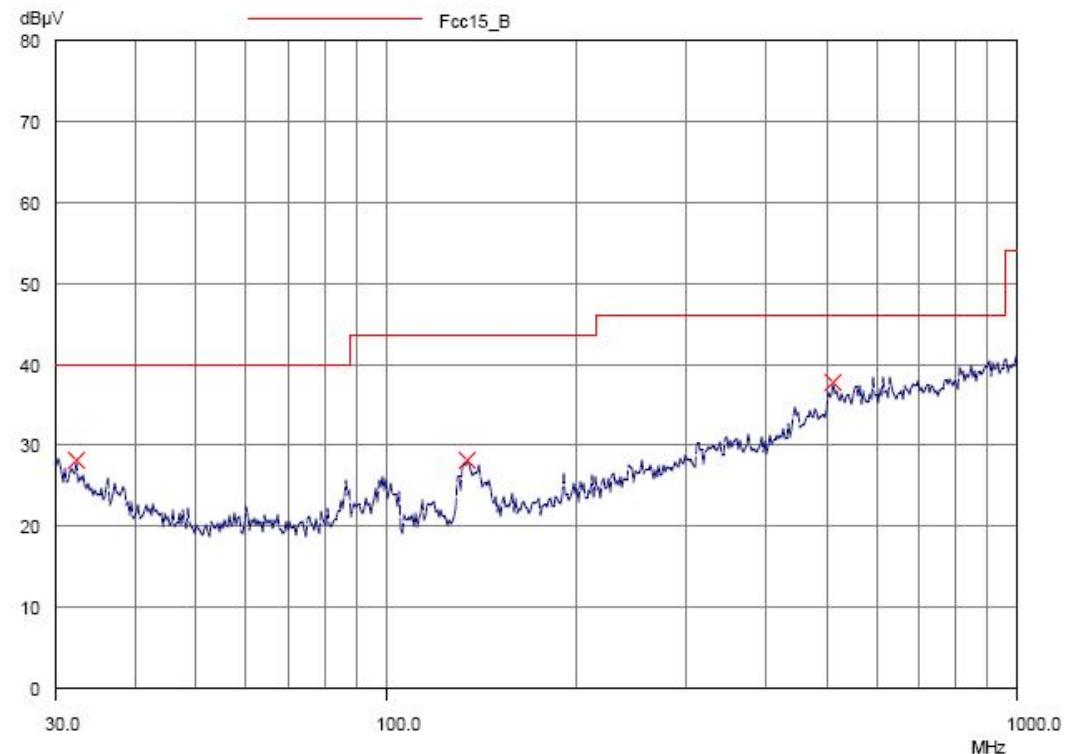
Results of Bluetooth Communication mode (9kHz – 30MHz): Pass

Emissions detected are more than 20 dB below the Limits.

Result of Bluetooth Communication mode (GFSK / $\pi/4$ -DQPSK/ 8DPSK) (30MHz – 1GHz): Pass

Please refer to the following table for result details

Vertical



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 27 of 87

Result of Bluetooth Communication mode (GFSK / $\pi/4$ -DQPSK/ 8DPSK) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
32.4	Vertical	28.2	40.0	25.7	100
135.1	Vertical	28.2	43.5	25.7	150
509.6	Vertical	37.8	46.0	77.6	200

Remarks:

*: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of Section 7.2.5 Table 5 and Table 6 were applied.

Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB

(1GHz - 26GHz): 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst -case test results are recorded in this report.

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 28 of 87

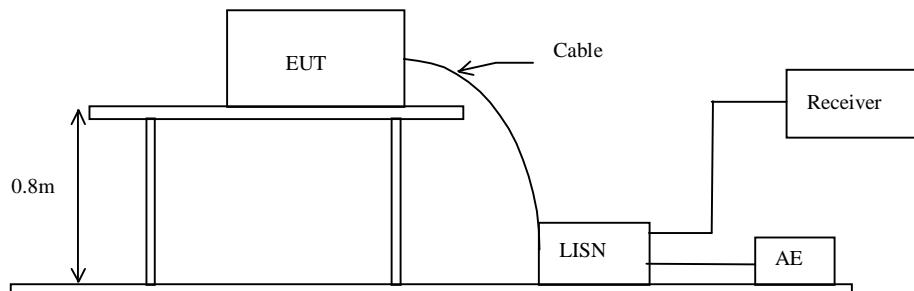
3.1.3 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	RSS-Gen
Test Method:	ANSI C63.4:2009
Test Date:	2013-05-27
Mode of Operation:	Aux in mode (Connected to iPod) / Bluetooth Communication mode

Test Method:

The test was performed in accordance with ANSI C63.4: 2009, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 29 of 87

Limit for Conducted Emissions (FCC 47 CFR 15.207):

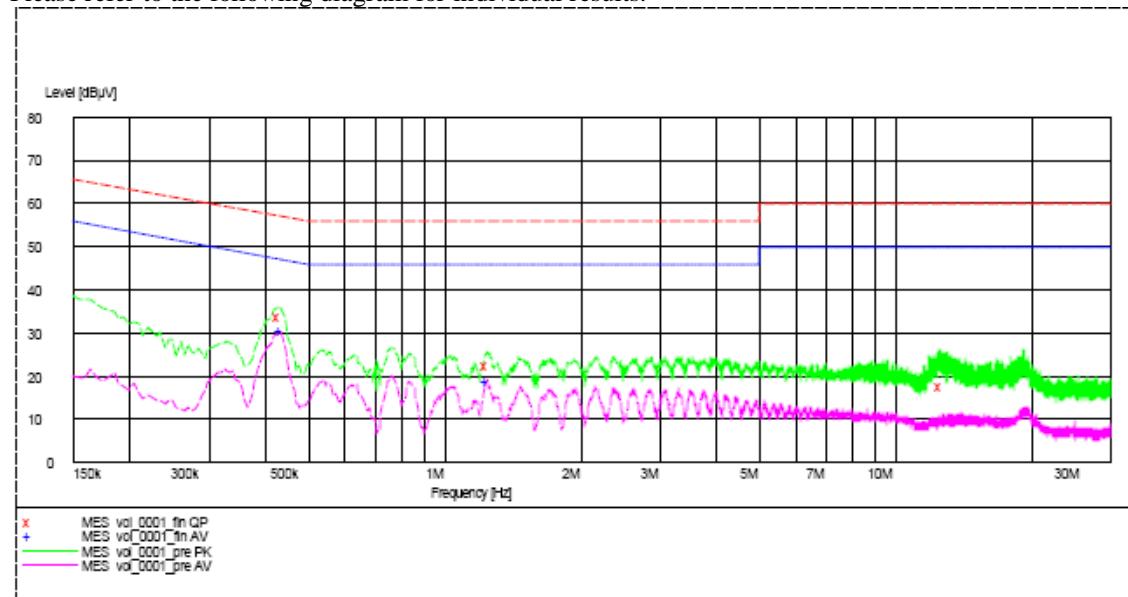
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Aux in mode (Connected to iPod) (L): PASS

Please refer to the following diagram for individual results.



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live	0.435	-*-	-*-	30.8	47.0
Live	1.245	-*-	-*-	18.9	46.0
Live	0.430	33.7	57.0	-*-	-*-
Live	1.245	22.5	56.0	-*-	-*-
Live	12.670	17.9	60.0	-*-	-*-

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 30 of 87

Limit for Conducted Emissions (FCC 47 CFR 15.207):

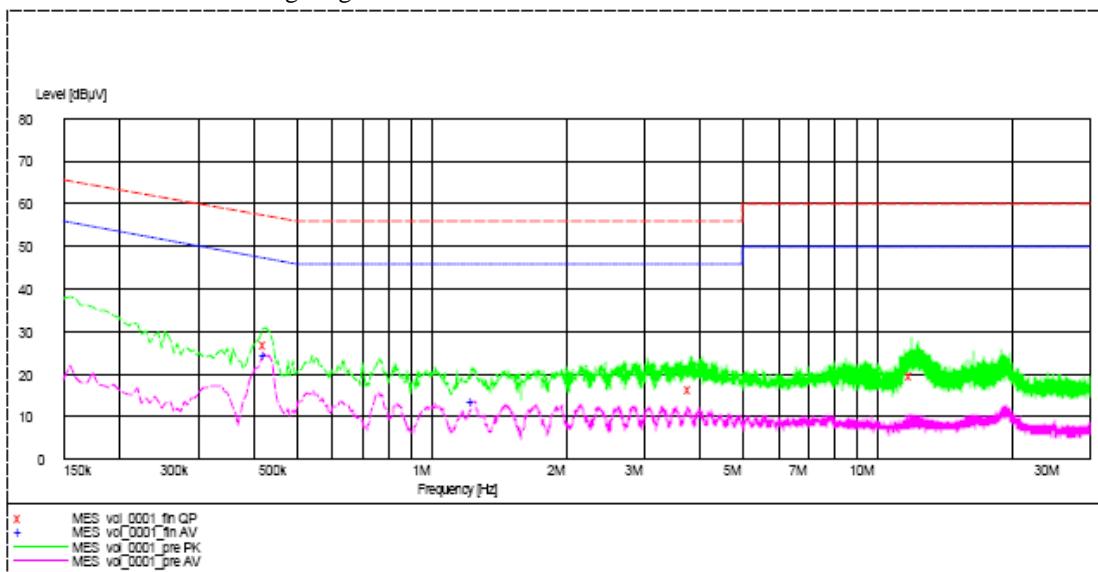
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Aux in mode (Connected to iPod) (N): Pass

Please refer to the following diagram for individual results.



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Neutral	0.425	27.0	57.0	24.5	47.0
Neutral	1.245	-*-	-*-	13.6	46.0
Neutral	3.825	16.4	56.0	-*-	-*-
Neutral	11.960	19.7	60.0	-*-	-*-

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 31 of 87

Limit for Conducted Emissions (FCC 47 CFR 15.207):

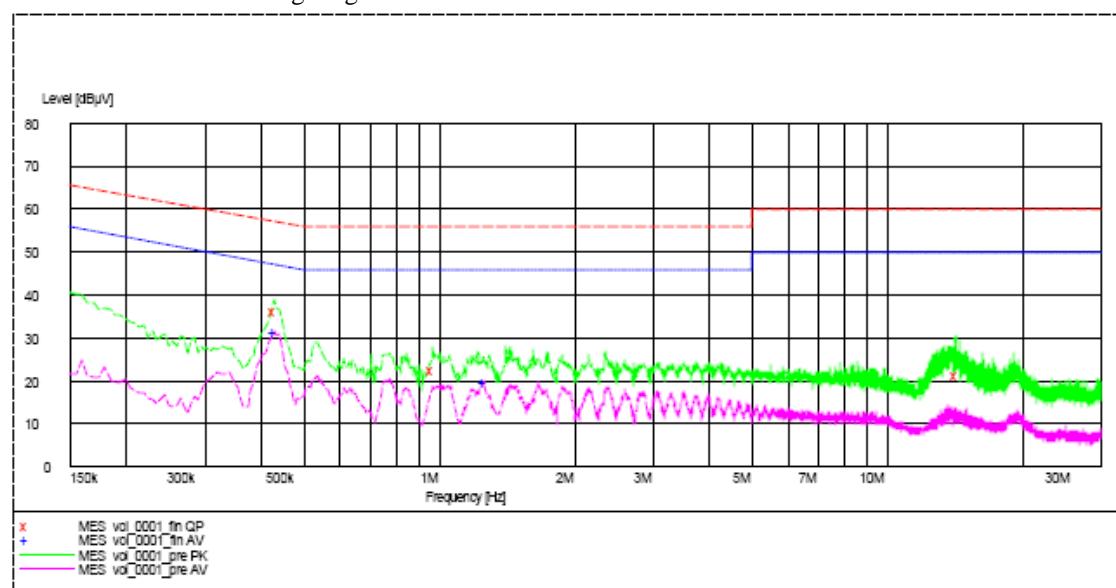
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Bluetooth Communication mode (GFSK / $\pi/4$ -DQPSK/ 8DPSK) (L): PASS

Please refer to the following diagram for individual results.



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live	0.430	36.3	57.0	31.4	47.0
Live	1.260	-*-	-*-	19.8	46.0
Live	0.970	22.5	56.0	-*-	-*-
Live	14.295	21.3	60.0	-*-	-*-

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 32 of 87

Limit for Conducted Emissions (FCC 47 CFR 15.207):

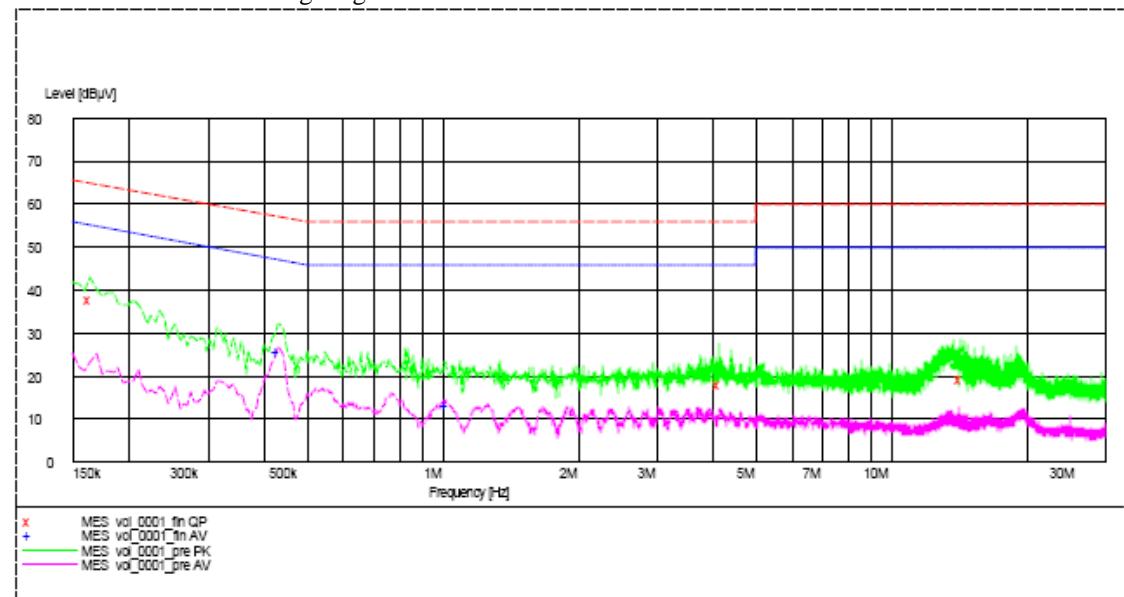
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Bluetooth Communication mode (GFSK / $\pi/4$ -DQPSK/ 8DPSK) (N): PASS

Please refer to the following diagram for individual results.



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Neutral	0.430	-*-	-*-	25.9	47.0
Neutral	1.020	-*-	-*-	13.5	46.0
Neutral	0.165	37.8	65.0	-*-	-*-
Neutral	4.135	18.1	56.0	-*-	-*-
Neutral	14.340	19.6	60.0	-*-	-*-

Remarks:

Calculated measurement uncertainty (0.15MHz - 30MHz): 3.2dB

-*- Emission(s) that is far below the corresponding limit line.

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 33 of 87

3.1.4 20dB Bandwidth of Fundamental Emission

Test Requirement: RSS-210 issue 8 December 2010
Test Method: RSS-210 A8.1 (b)
Test Date: 2013-06-06
Mode of Operation: Bluetooth Communication mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

The measurement bandwidth settings are $\text{RBW} = 100 \text{ kHz}$ and $\text{VBW} = 300 \text{ kHz}$.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.



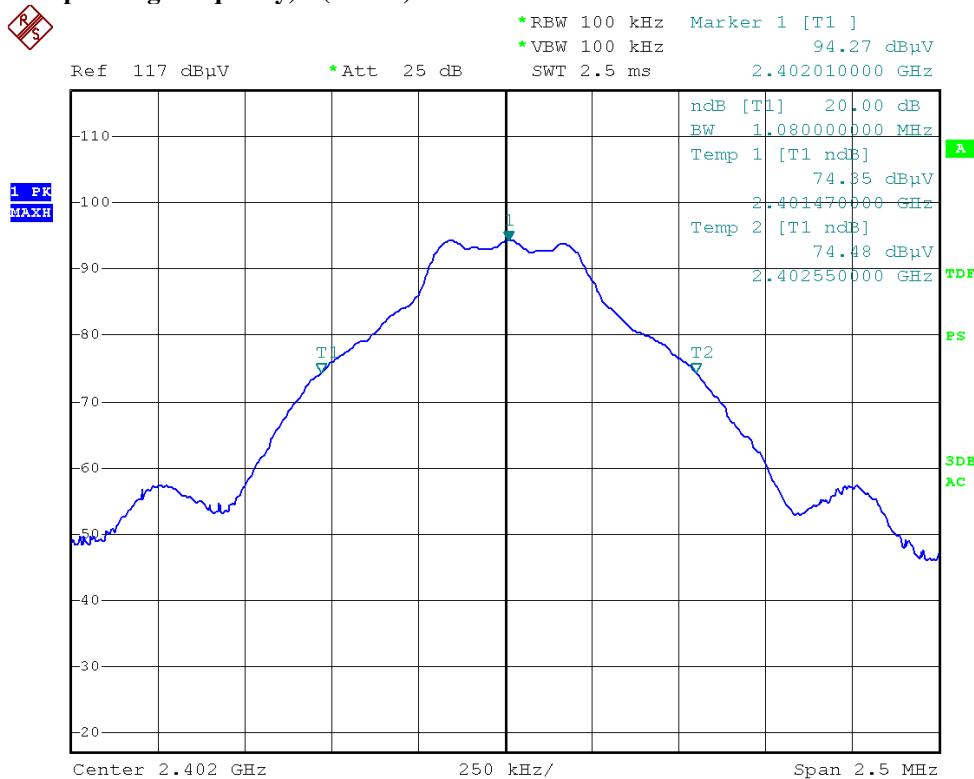
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 34 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2402	1.08

(Lowest Operating Frequency) - (GFSK)



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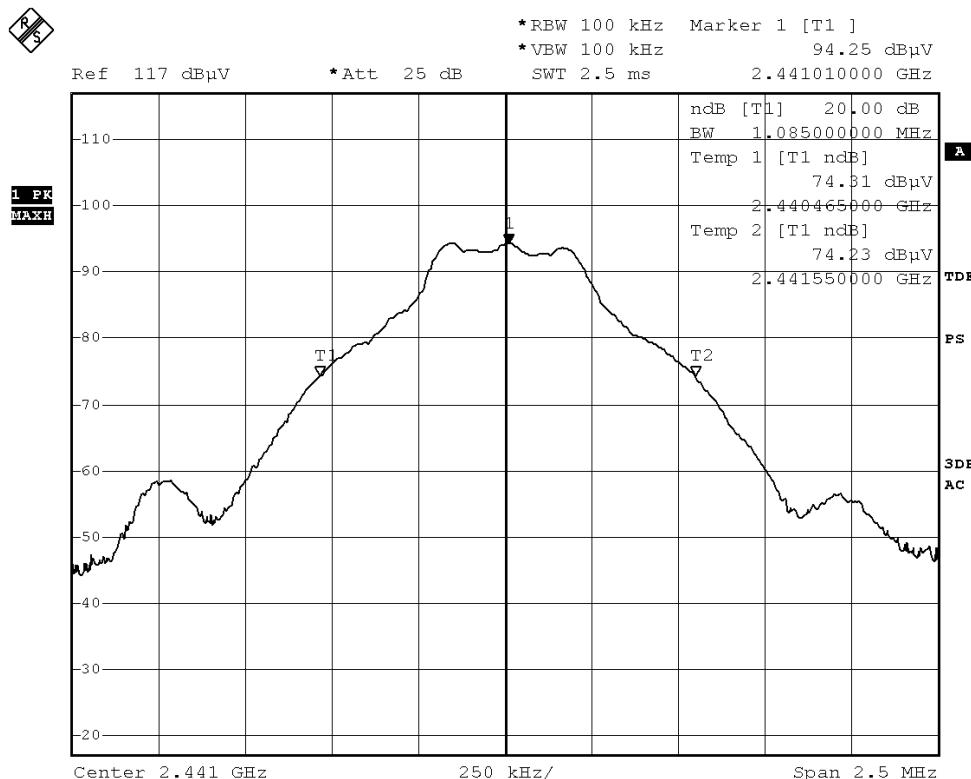
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 35 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2441	1.085

(Middle Operating Frequency) - (GFSK)



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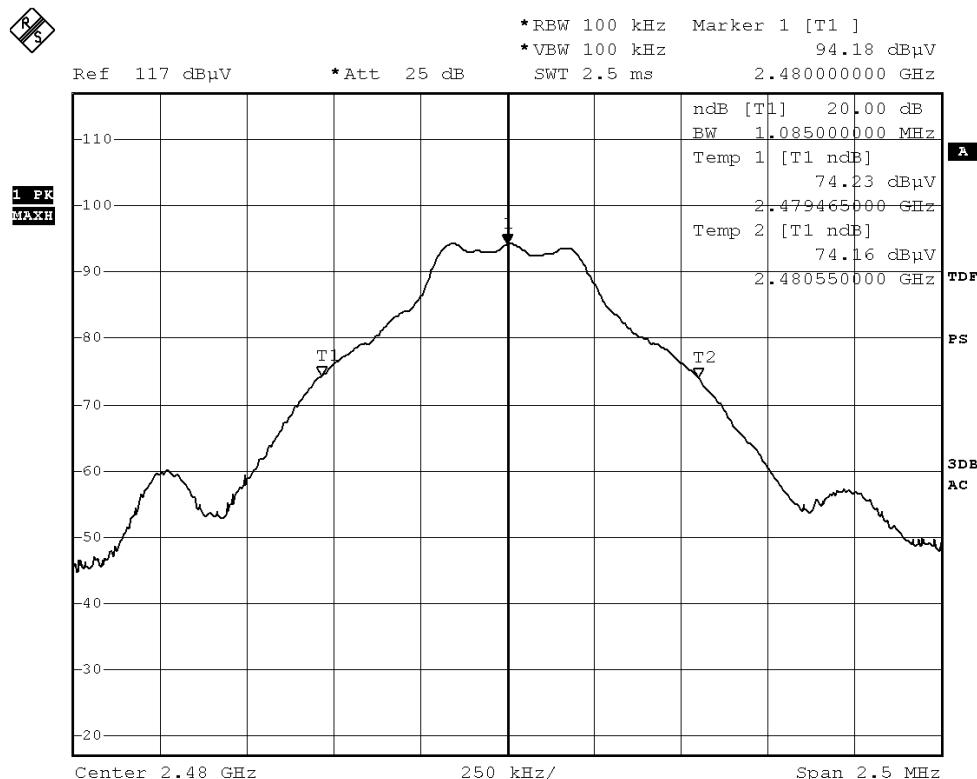
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 36 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2480	1.085

(Highest Operating Frequency) - (GFSK)



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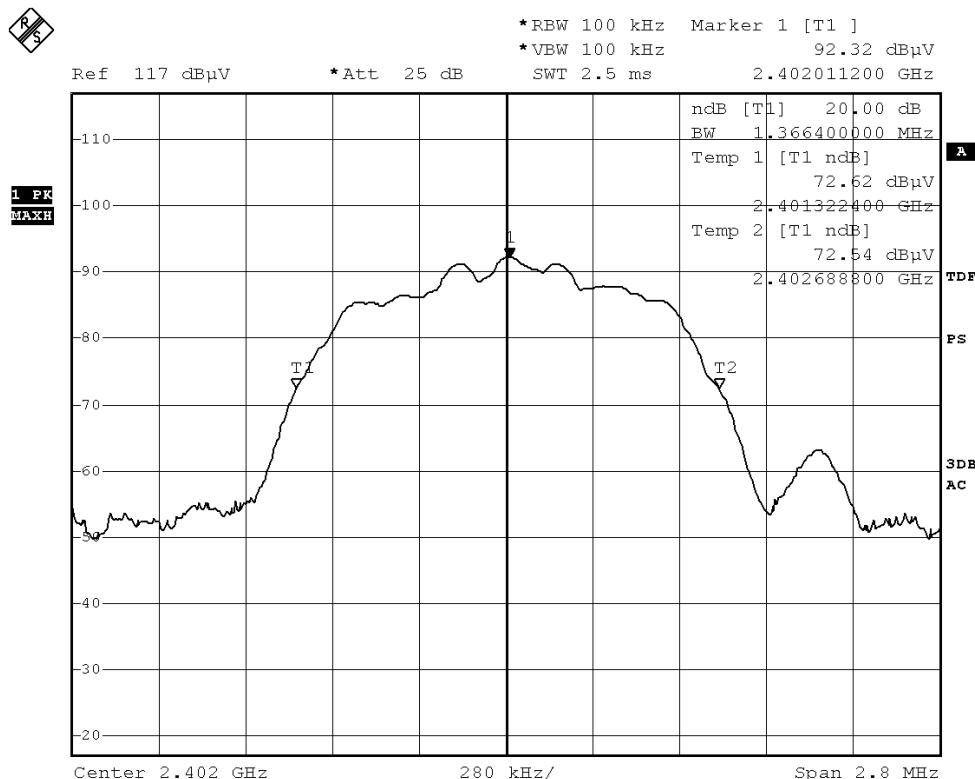
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 37 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2402	1.366

(Lowest Operating Frequency) - ($\pi/4$ DQPSK)



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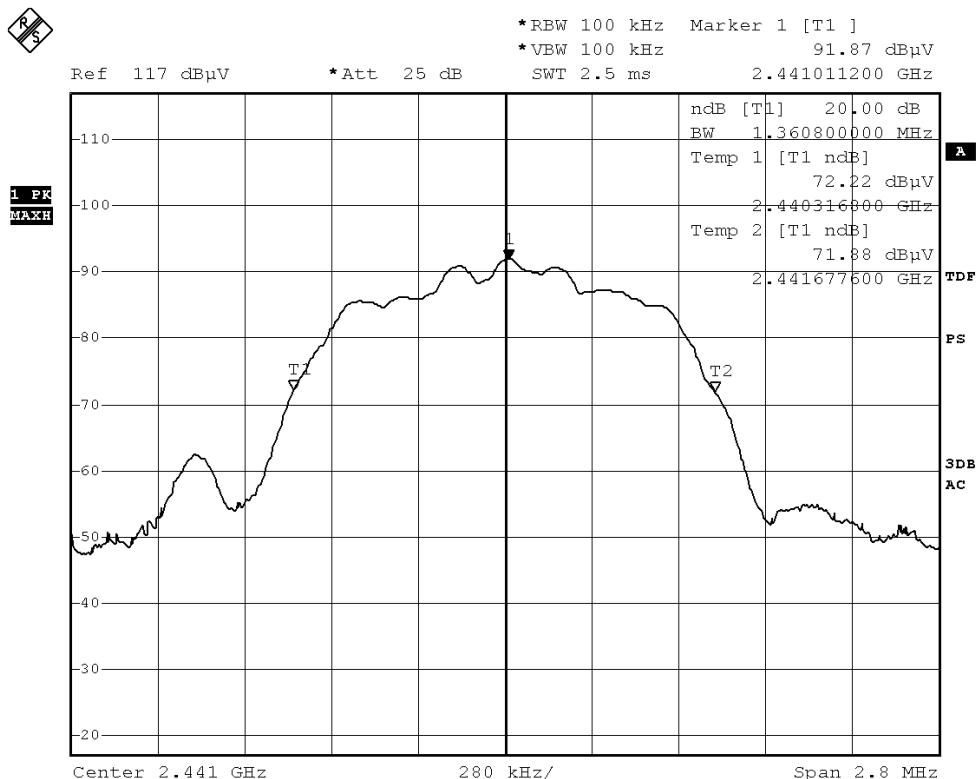
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 38 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2441	1.361

(Middle Operating Frequency) - ($\pi/4$ DQPSK)



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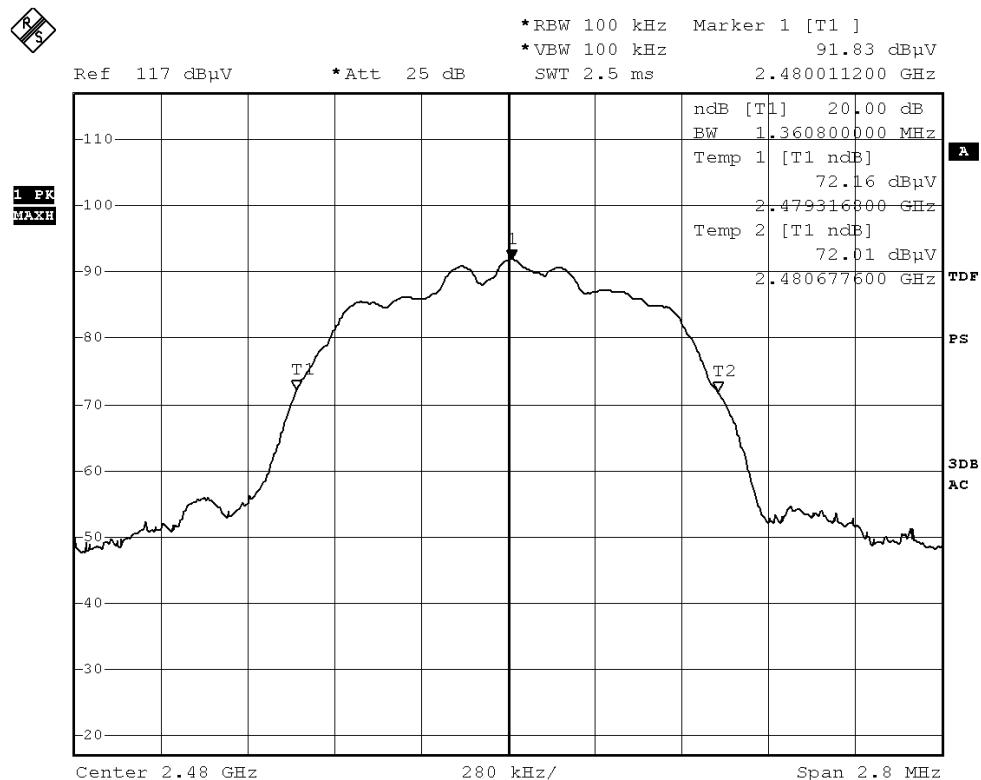
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 39 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2480	1.361

(Highest Operating Frequency) - ($\pi/4$ DQPSK)



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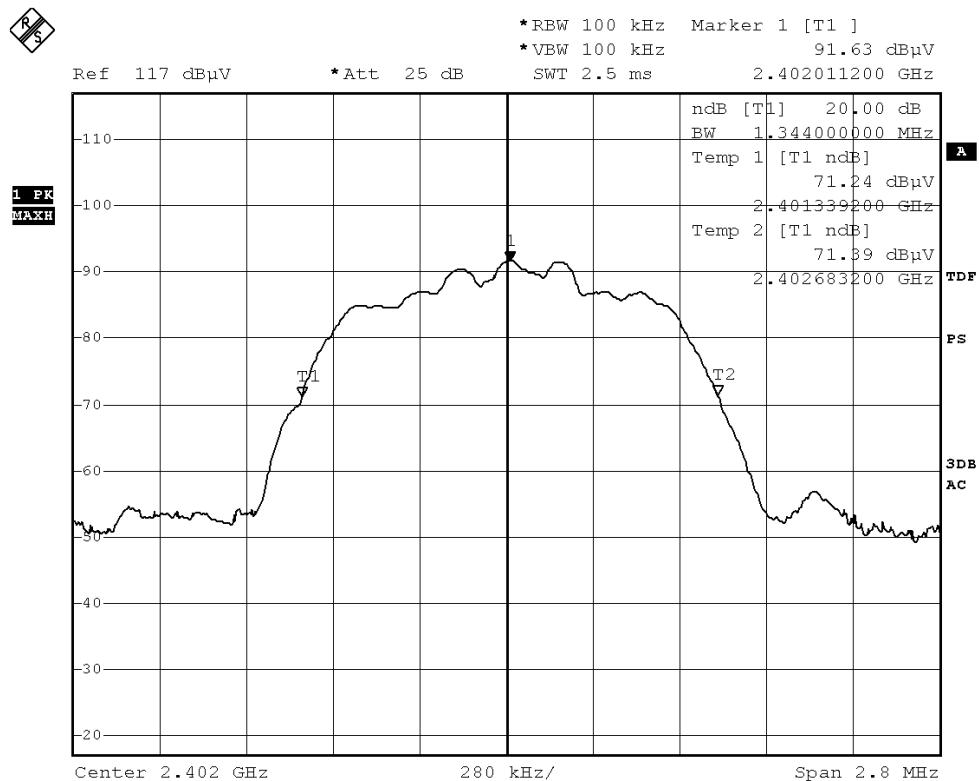
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 40 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2402.0	1.344

(Lowest Operating Frequency) - (8DPSK)



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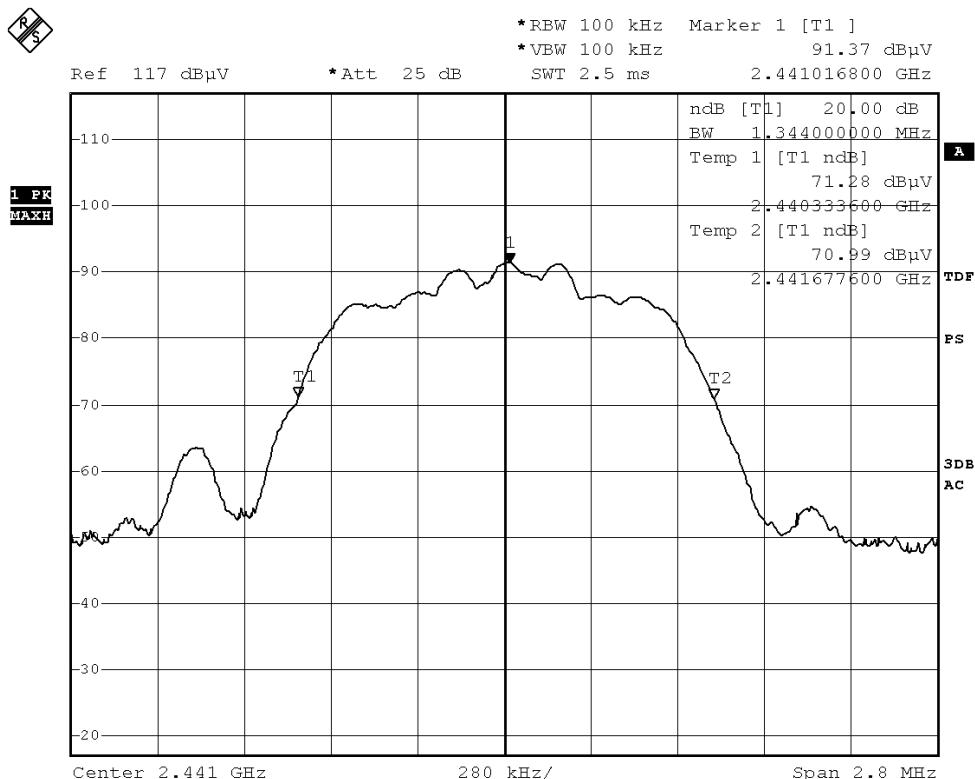
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 41 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2441	1.344

(Middle Operating Frequency) - (8DPSK)



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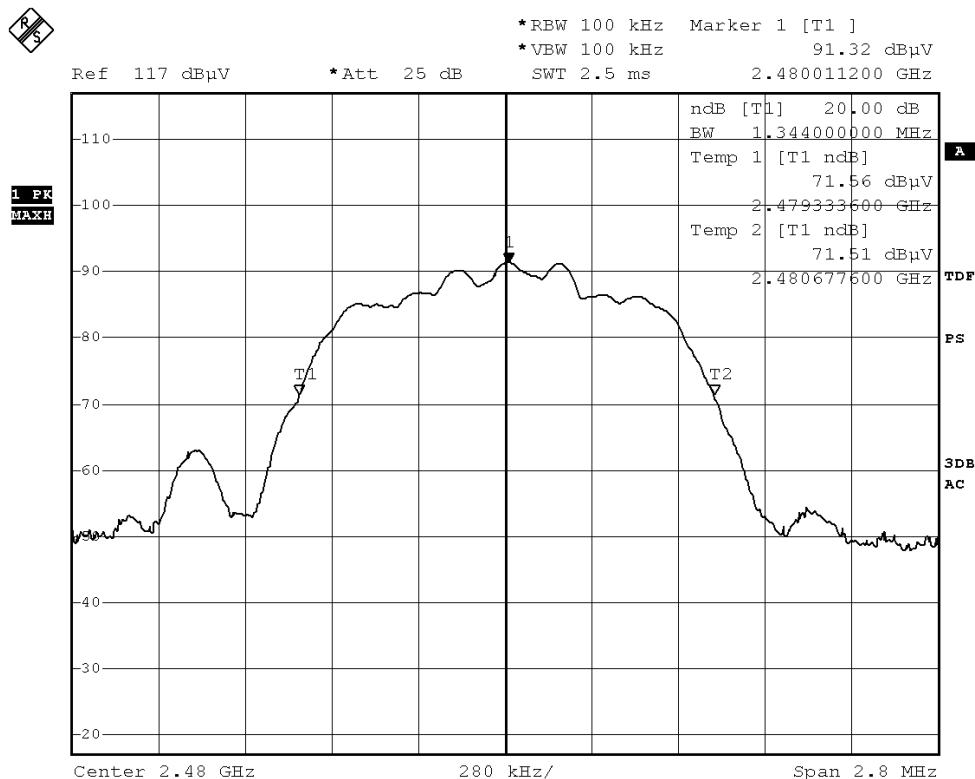
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 42 of 87

Fundamental Frequency [MHz]	20dB Bandwidth [MHz]
2480	1.344

(Highest Operating Frequency) - (8DPSK)



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 43 of 87

3.1.5 99% Bandwidth of Fundamental Emission

Test Requirement: RSS-210 A1.1.3
Test Method: ANSI C63.4:2009
Test Date: 2013-06-06
Mode of Operation: Bluetooth Communication mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

The measurement bandwidth settings are

Test Setup:

As Test Setup of clause 3.1.1 in this test report.



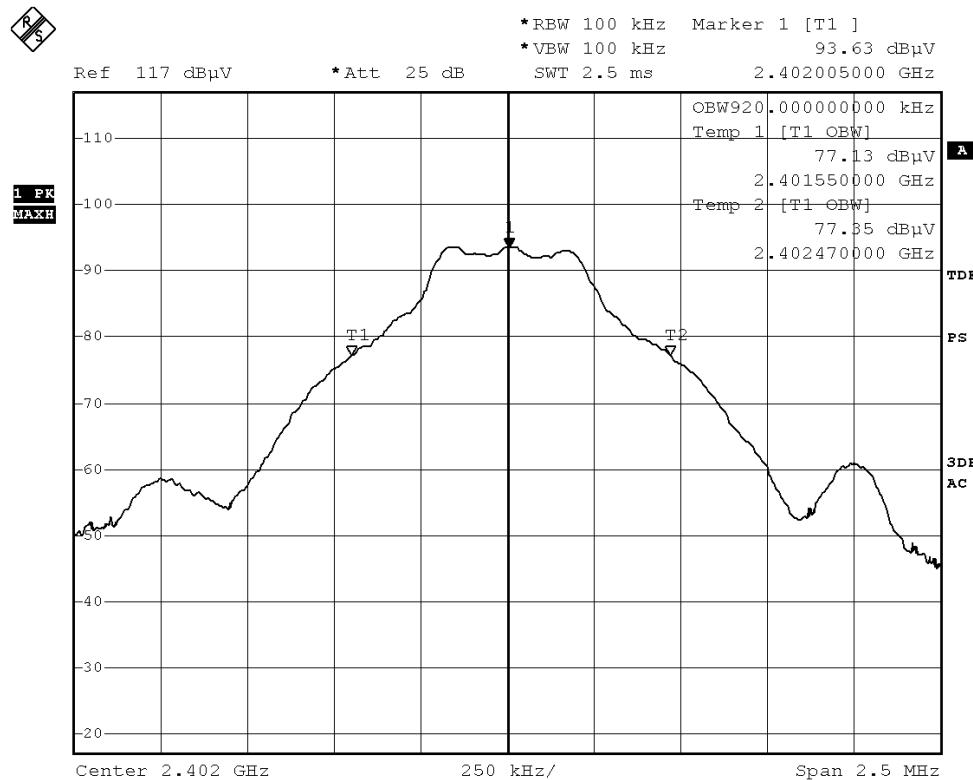
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 44 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2402	0.920

(Lowest Operating Frequency)- (GFSK)



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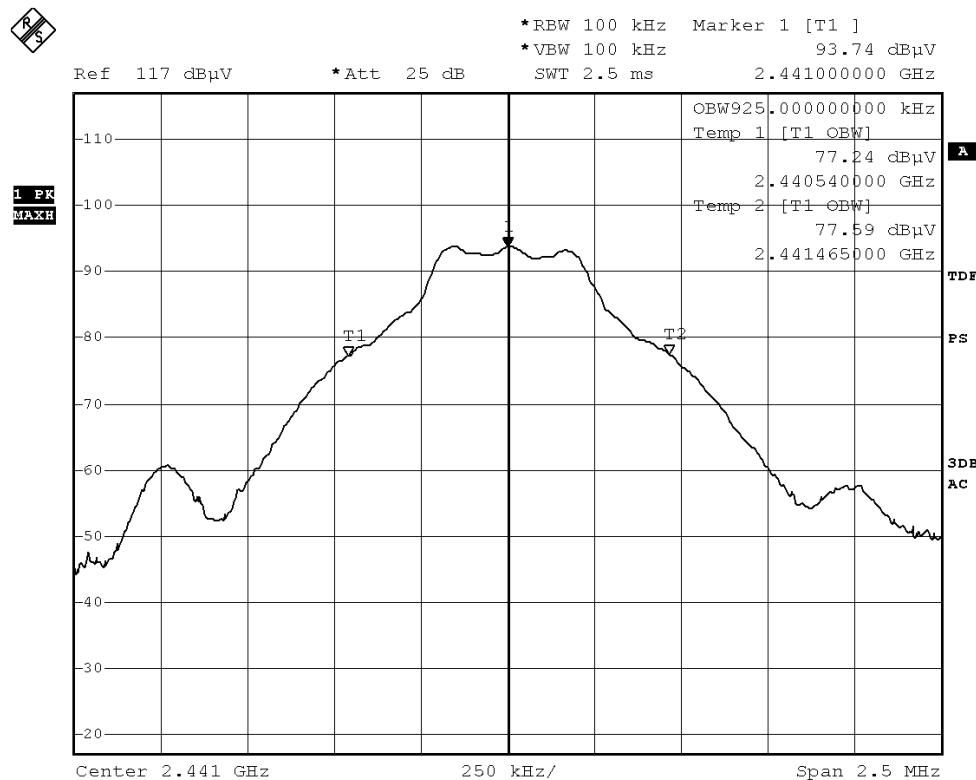
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 45 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2441	0.925

(Middle Operating Frequency)- (GFSK)



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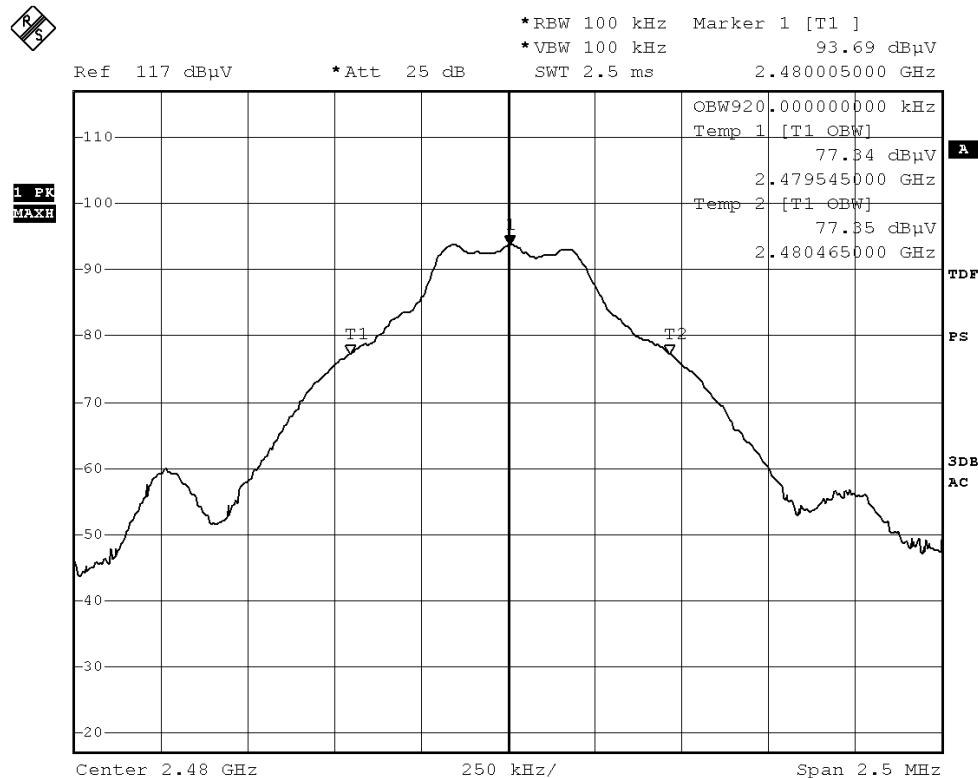
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 46 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2480	0.920

(Highest Operating Frequency)- (GFSK)



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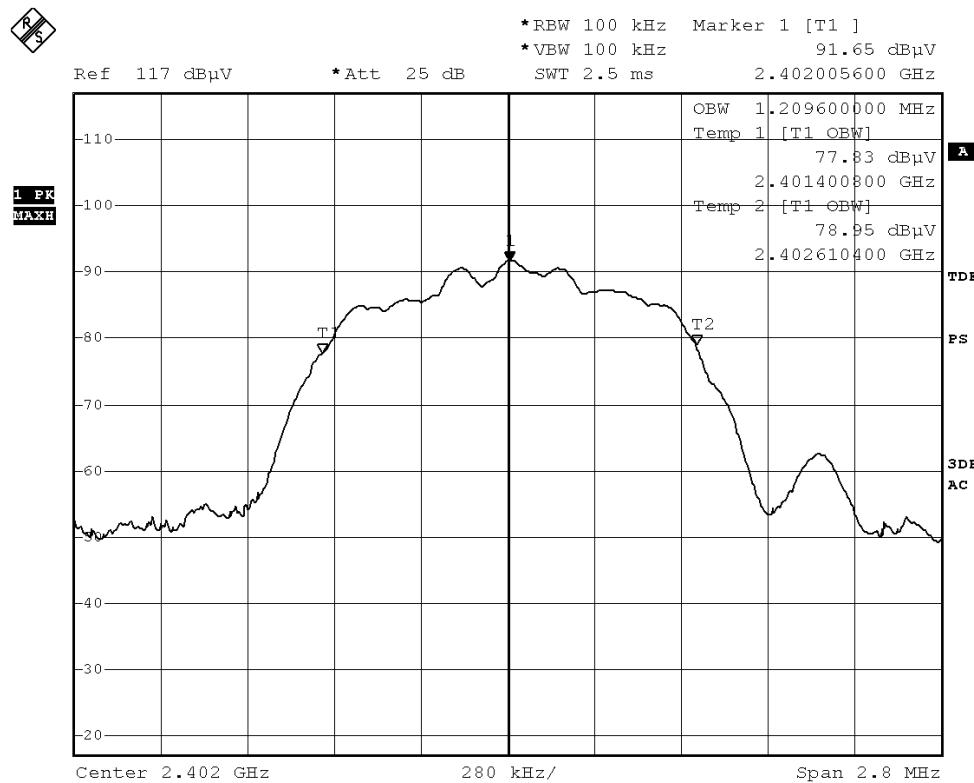
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 47 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2402	1.210

(Lowest Operating Frequency)- ($\pi/4$ DQPSK)



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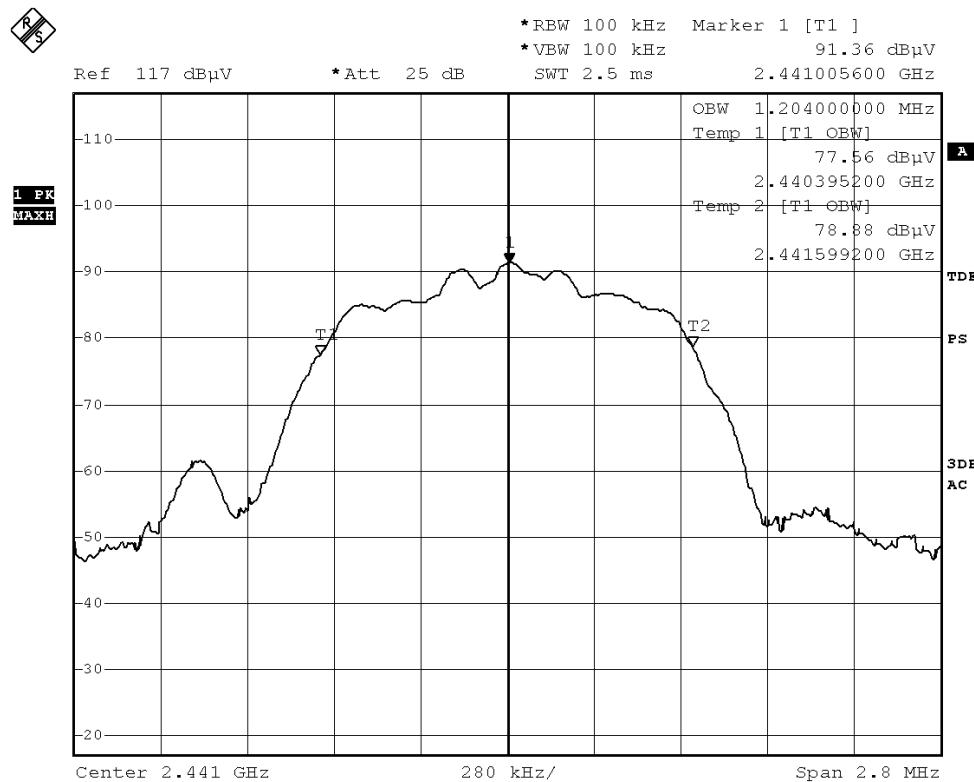
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 48 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2441	1.204

(Middle Operating Frequency)- ($\pi/4$ DQPSK)



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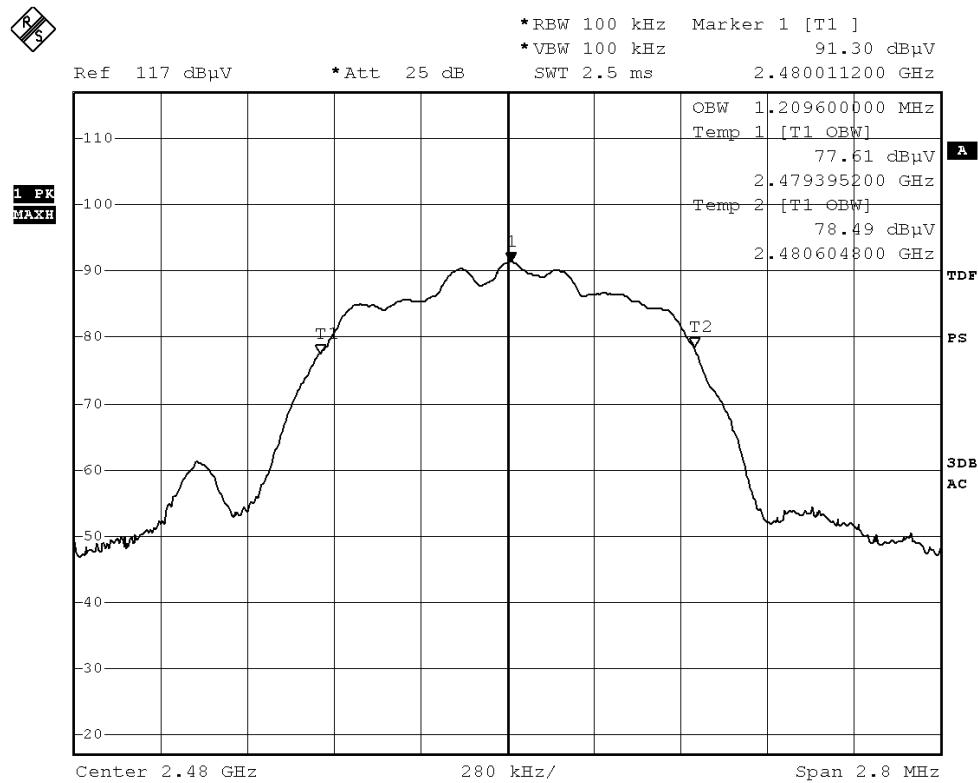
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 49 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2480	1.210

(Highest Operating Frequency)- ($\pi/4$ DQPSK)



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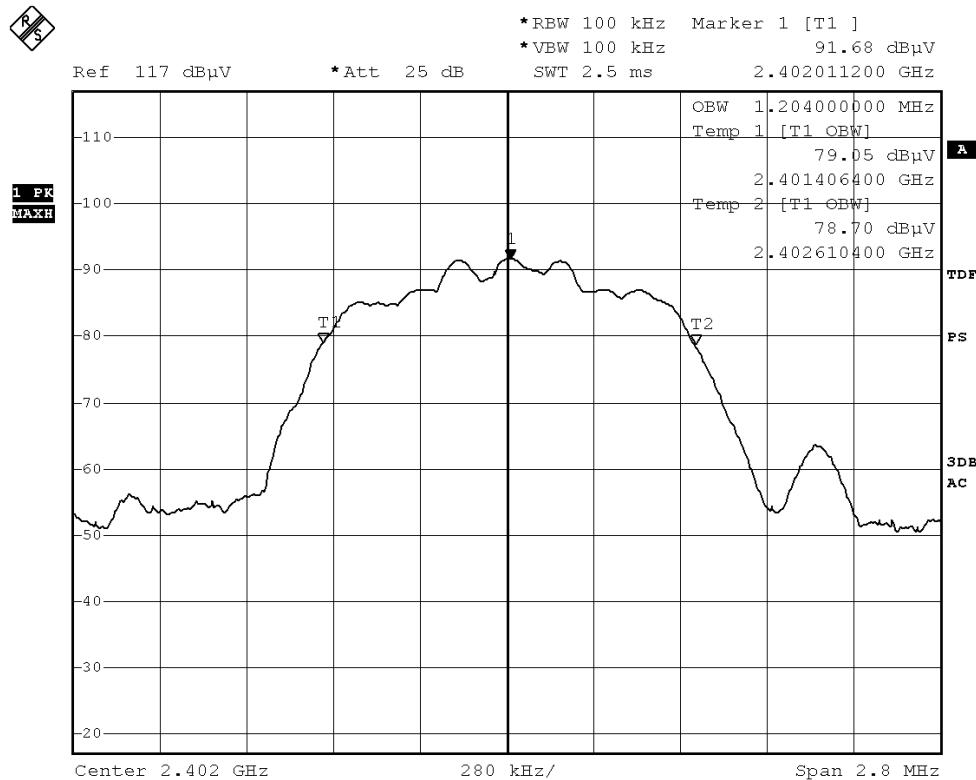
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 50 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2402	1.204

(Lowest Operating Frequency)- (8DPSK)



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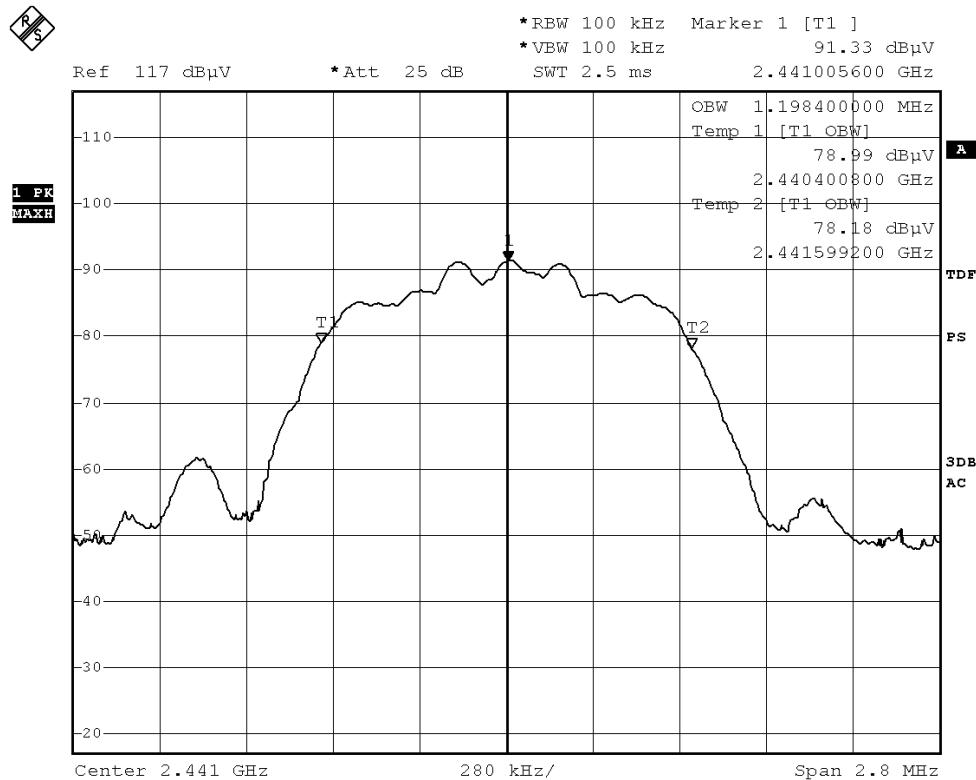
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 51 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2441	1.198

(Middle Operating Frequency)- (8DPSK)



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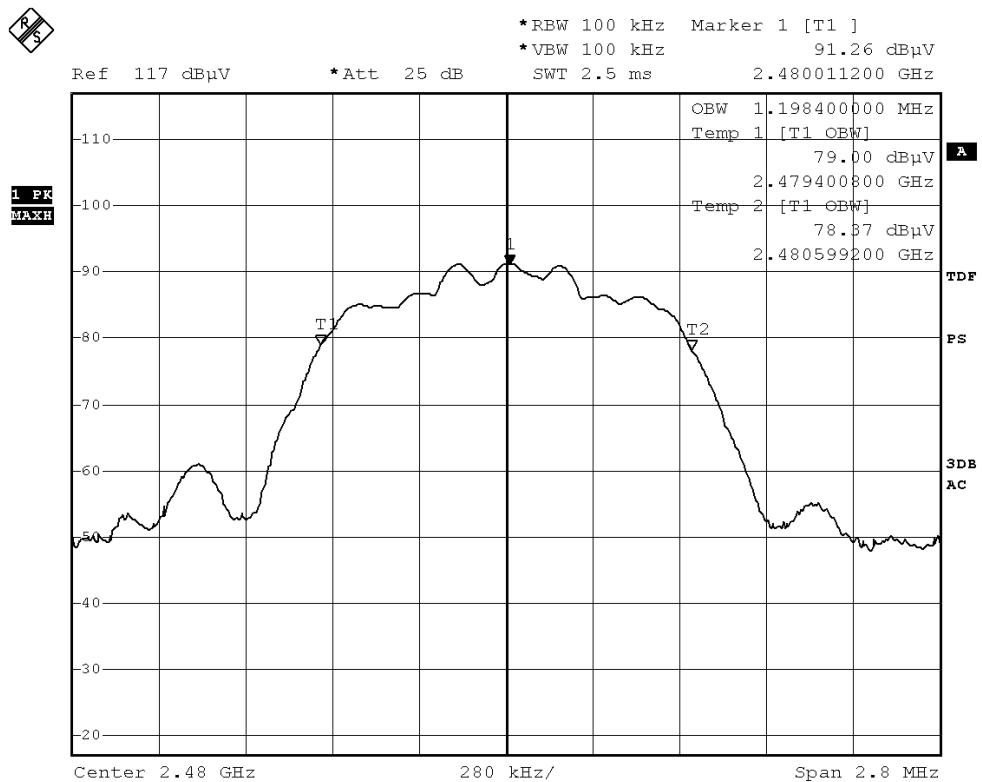
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 52 of 87

Fundamental Frequency [MHz]	99% Bandwidth [MHz]
2480	1.198

(Highest Operating Frequency)- (8DPSK)



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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 53 of 87

3.1.6 Number of Operating Channel

Requirements:

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

Item	Frequency (MHz)	Item	Frequency (MHz)	Item	Frequency (MHz)
1	2402	31	2432	61	2462
2	2403	32	2433	62	2463
3	2404	33	2434	63	2464
4	2405	34	2435	64	2465
5	2406	35	2436	65	2466
6	2407	36	2437	66	2467
7	2408	37	2438	67	2468
8	2409	38	2439	68	2469
9	2410	39	2440	69	2470
10	2411	40	2441	70	2471
11	2412	41	2442	71	2472
12	2413	42	2443	72	2473
13	2414	43	2444	73	2474
14	2415	44	2445	74	2475
15	2416	45	2446	75	2476
16	2417	46	2447	76	2477
17	2418	47	2448	77	2478
18	2419	48	2449	78	2479
19	2420	49	2450	79	2480
20	2421	50	2451		
21	2422	51	2452		
22	2423	52	2453		
23	2424	53	2454		
24	2425	54	2455		
25	2426	55	2456		
26	2427	56	2457		
27	2428	57	2458		
28	2429	58	2459		
29	2430	59	2460		
30	2431	60	2461		

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 54 of 87

3.1.7 Channel Centre Frequency

Requirements:

Frequency hopping system in the 2400-2483.5MHz band shall use at least 79 (Channel 0 to 78) non-overlapping channels.

The EUT operates in according with the Bluetooth system specification within the 2400 - 2483.5 MHz frequency band.

RF channels for Bluetooth systems are spaced 1 MHz and are ordered in channel number k. In order to comply with out-of-band regulations, a lower frequency guard band of 2.0 MHz and a higher frequency guard band of 3.5MHz is used.

The operating frequencies of each channel are as follows:

First RF channel start from 2400MHz + 2MHz guard band = 2402MHz

Frequency of RF Channel = 2402+k MHz, k = 0,...,78 (Channel separation = 1MHz)

3.1.8 Hopping Channel Separation

Requirements:

Frequency hopping systems operating in the 2400-2483.5 MHz band 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 the systems operate with an output power no greater than 125 mW.

Limit:

The measured Maximum bandwidth * 2/3 = 1.3664MHz * 2/3 = 910.9kHz

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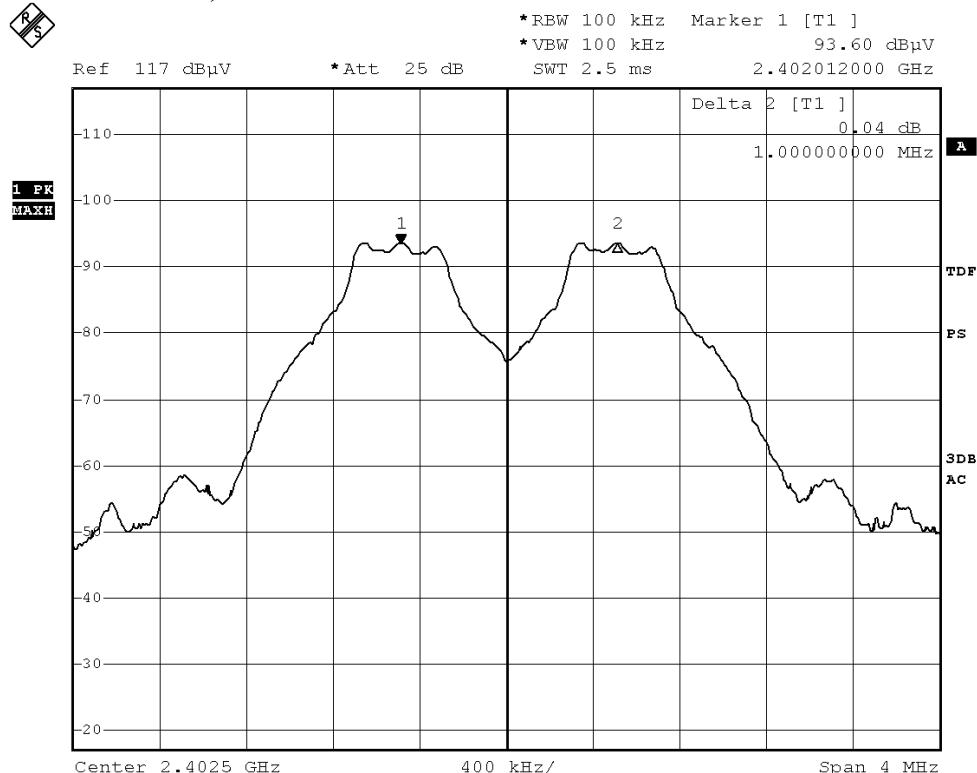
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 55 of 87

Channel separation = 1MHz (>910.9kHz) (GFSK)

Channel 0 – Channel 1, Pass



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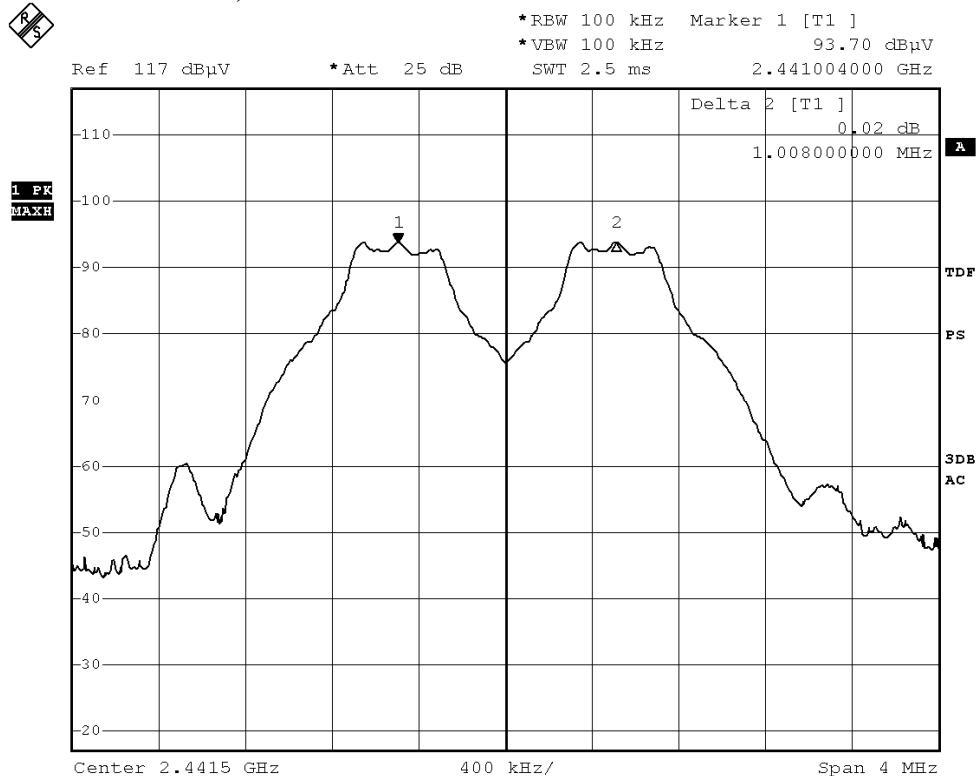


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 56 of 87

Channel 39 – Channel 40, Pass



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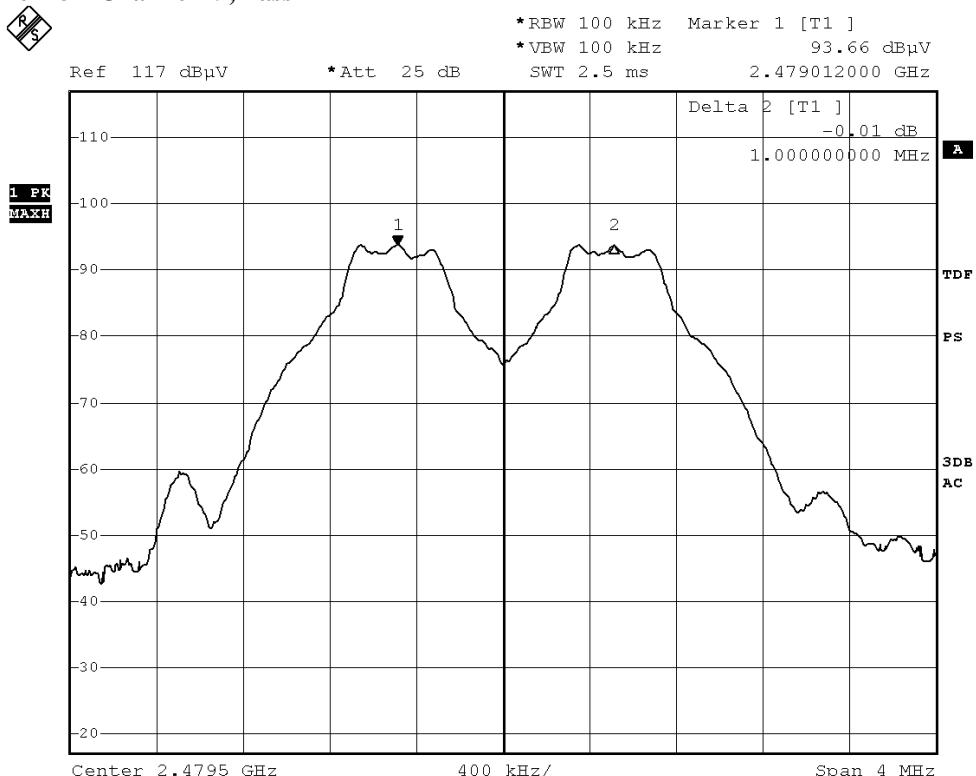


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 57 of 87

Channel 78 – Channel 79, Pass



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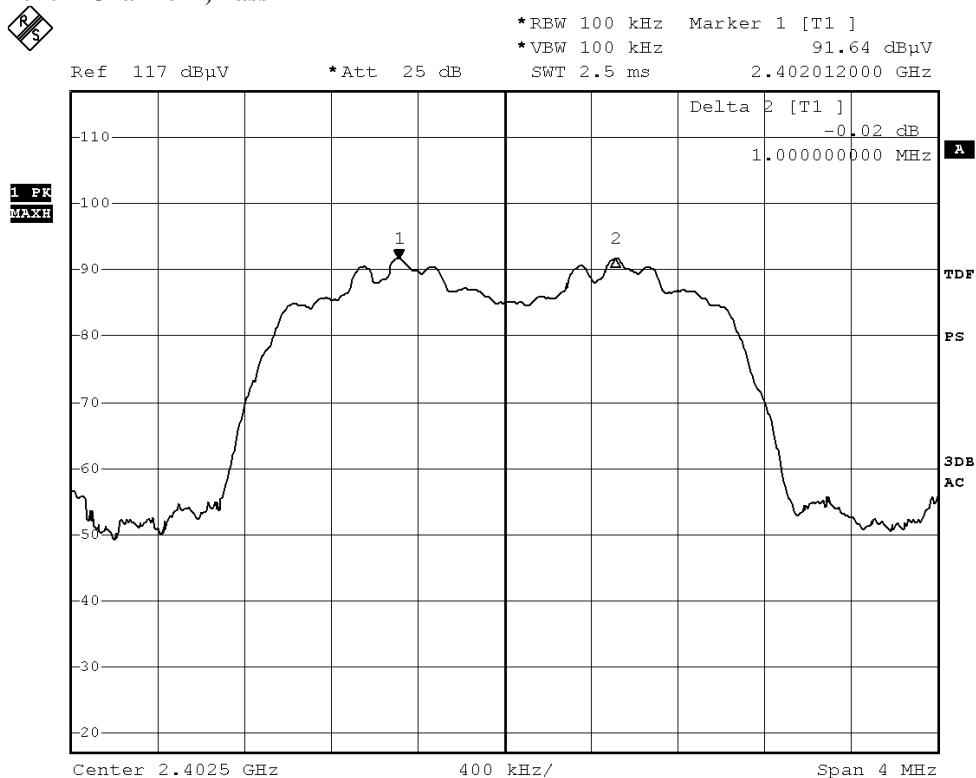
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 58 of 87

Channel separation = 1MHz (>910.9kHz) ($\pi/4$ DQPSK)

Channel 0 – Channel 1, Pass



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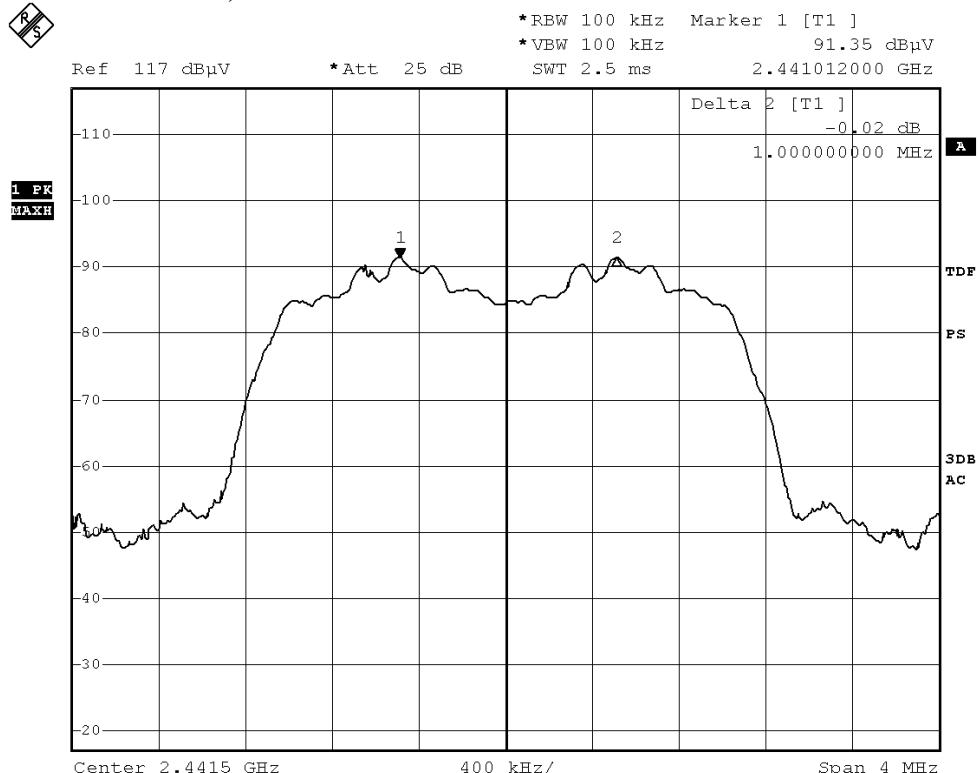


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 59 of 87

Channel 39 – Channel 40, Pass



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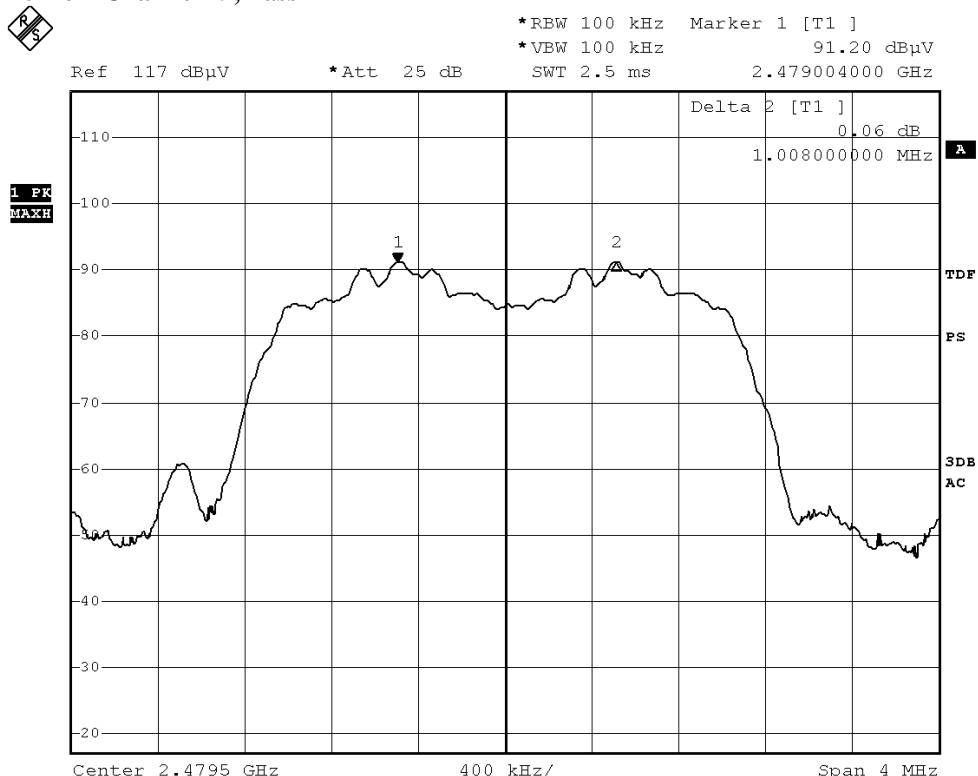


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 60 of 87

Channel 78 – Channel 79, Pass



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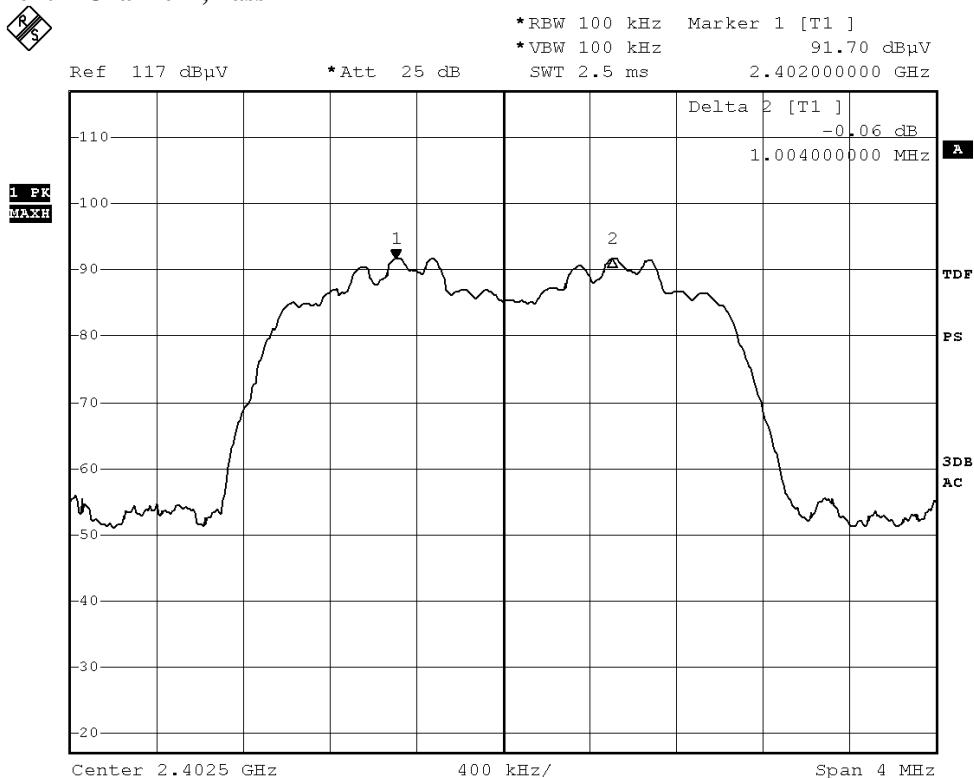
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 61 of 87

Channel separation = 1MHz (>910.9kHz) (8DPSK)

Channel 0 – Channel 1, Pass



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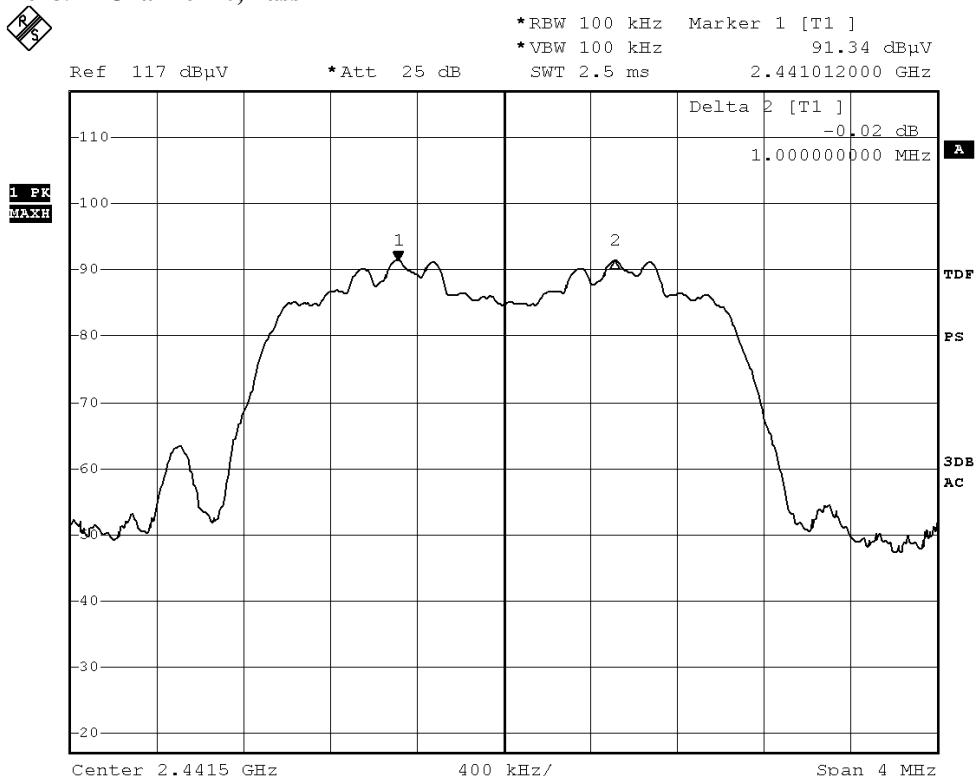


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 62 of 87

Channel 39 – Channel 40, Pass



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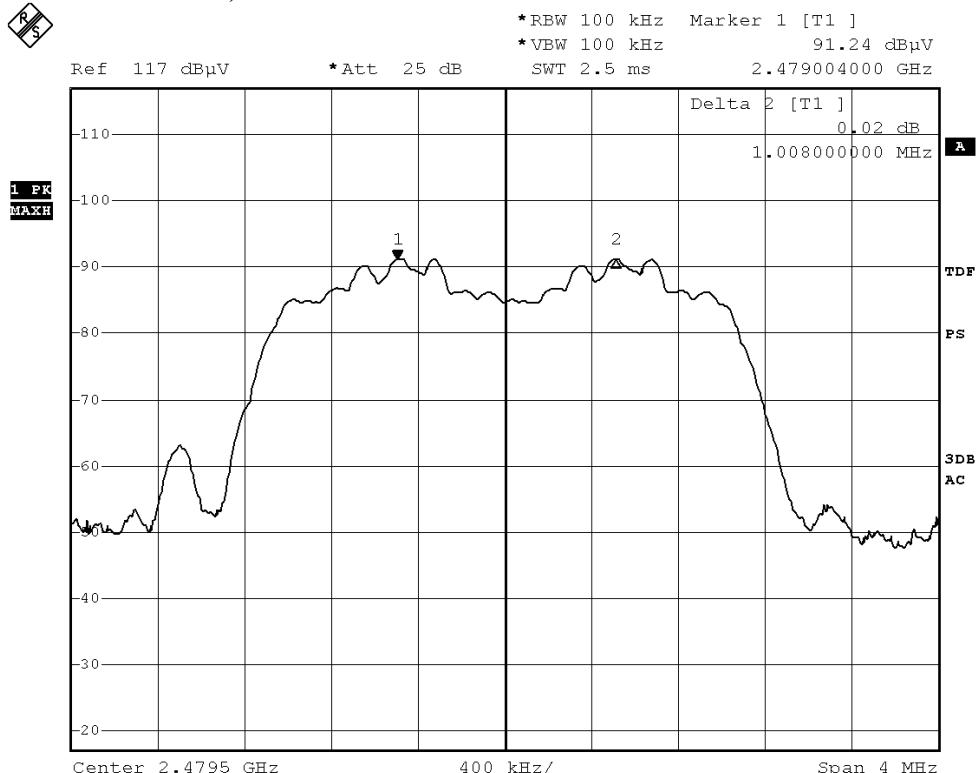


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 63 of 87

Channel 78 – Channel 79, Pass



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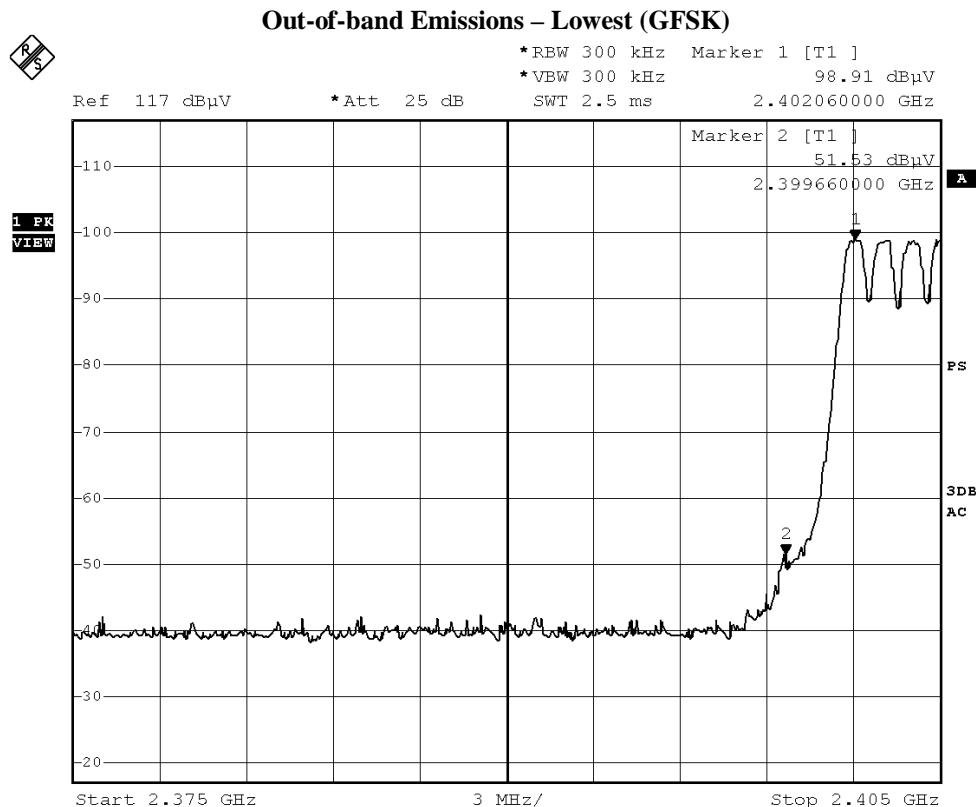


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 64 of 87

3.1.8 Out-of-band Emissions



Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
2400.0	16.3	35.4	51.7	74.0	22.3	Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
2400.0	4.8	35.4	40.2	54.0	13.8	Vertical

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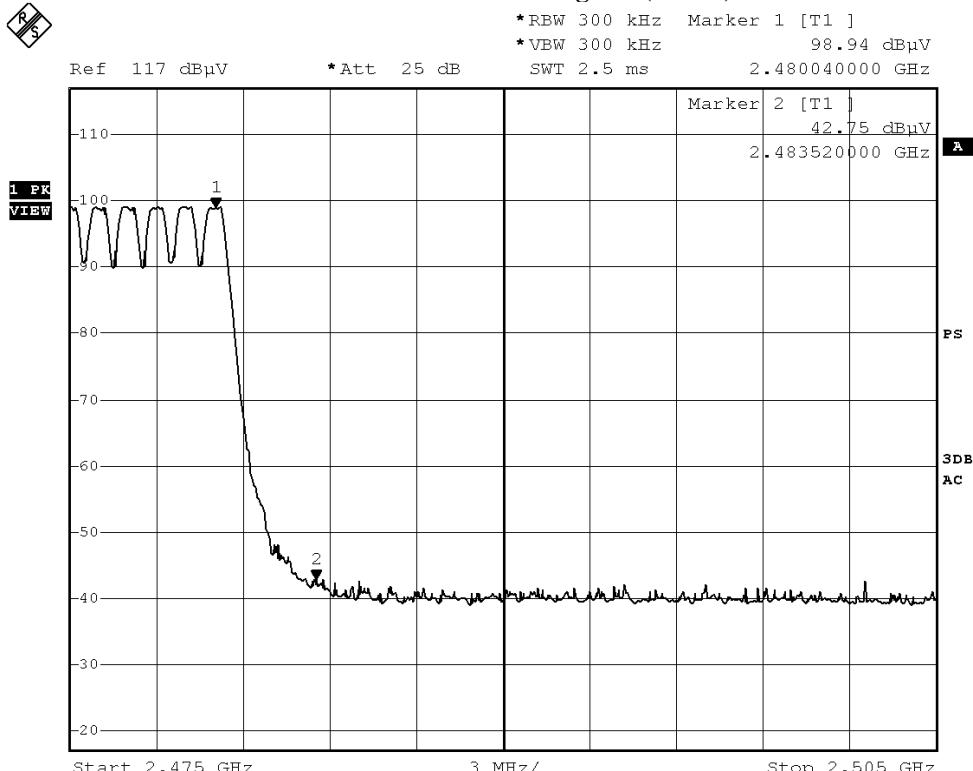


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 65 of 87

Out-of-band Emissions – Highest (GFSK)



Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2483.5	12.4	35.4	47.8	74.0	26.2	Vertical

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2483.5	1.9	35.4	37.3	54.0	16.7	Vertical

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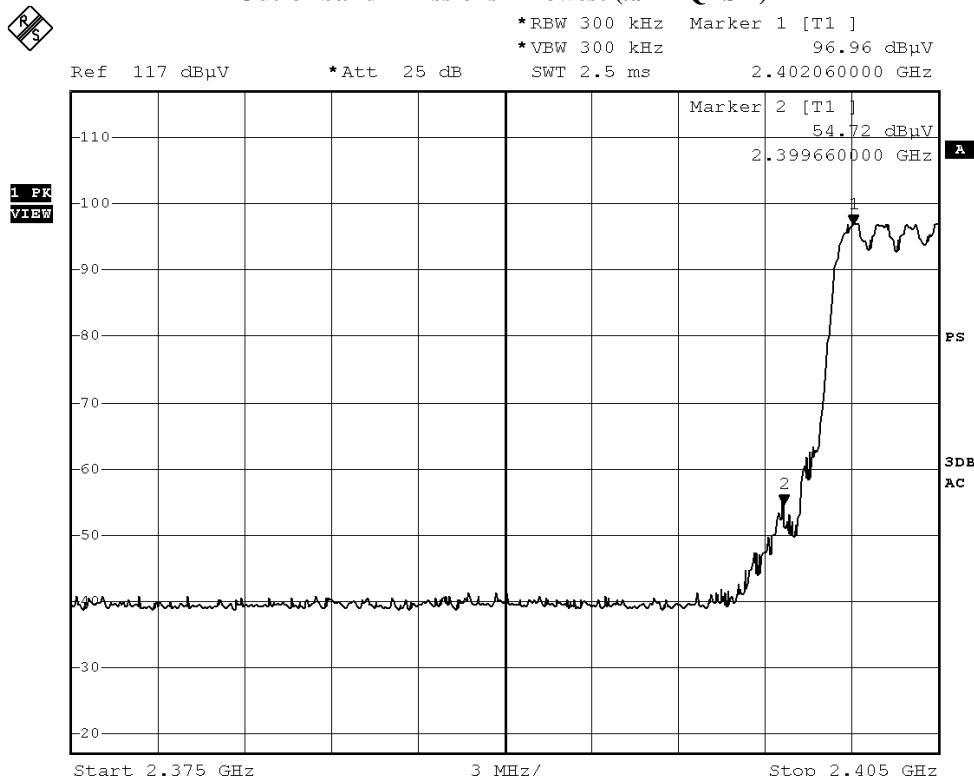


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 66 of 87

Out-of-band Emissions – Lowest ($\pi/4$ DQPSK)



Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2400.0	19.2	35.4	54.6	74.0	19.4	Vertical

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBuV	Correction Factor dB/m	Field Strength dBuV/m	Limit @3m dBuV/m	Margin dBuV/m	E-Field Polarity
2400.0	5.9	35.4	41.3	54.0	12.7	Vertical

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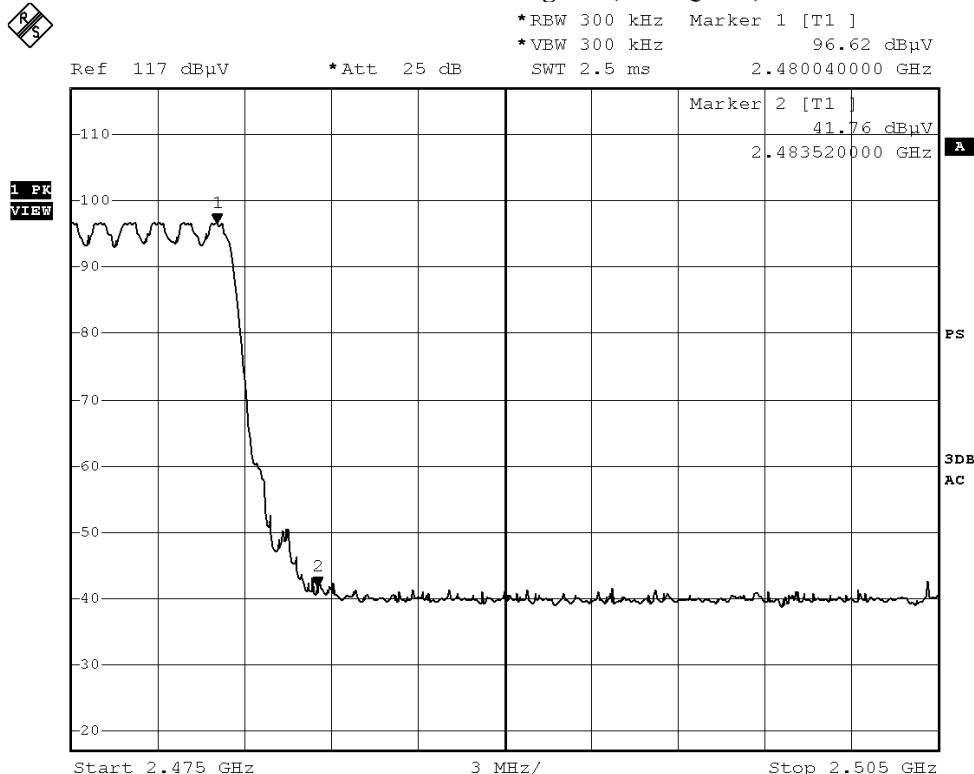


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 67 of 87

Out-of-band Emissions – Highest ($\pi/4$ DQPSK)



Field Strength of Spurious Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	

Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	
2483.0	9.3	35.4	44.7	74.0	29.3	Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	

Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	
2483.5	-1.4	35.4	34.0	54.0	20.0	Vertical

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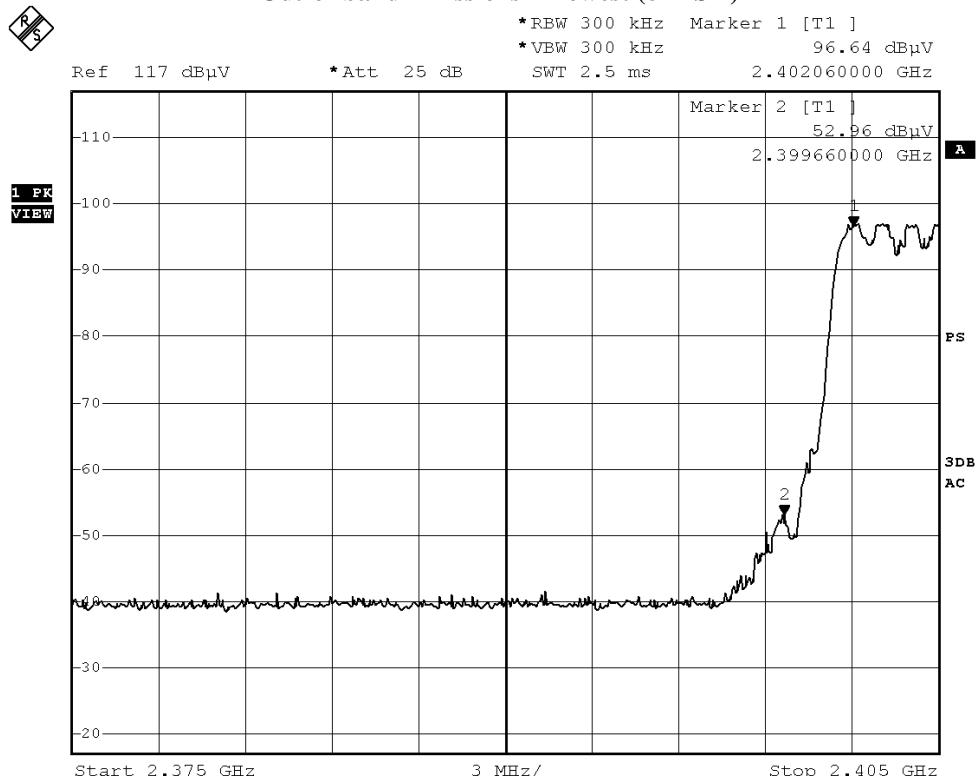


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 68 of 87

Out-of-band Emissions – Lowest (8DPSK)



Field Strength of Spurious Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	
2400.0	19.7	35.4	55.1	74.0	18.9	Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	
2400.0	5.9	35.4	41.3	54.0	12.7	Vertical

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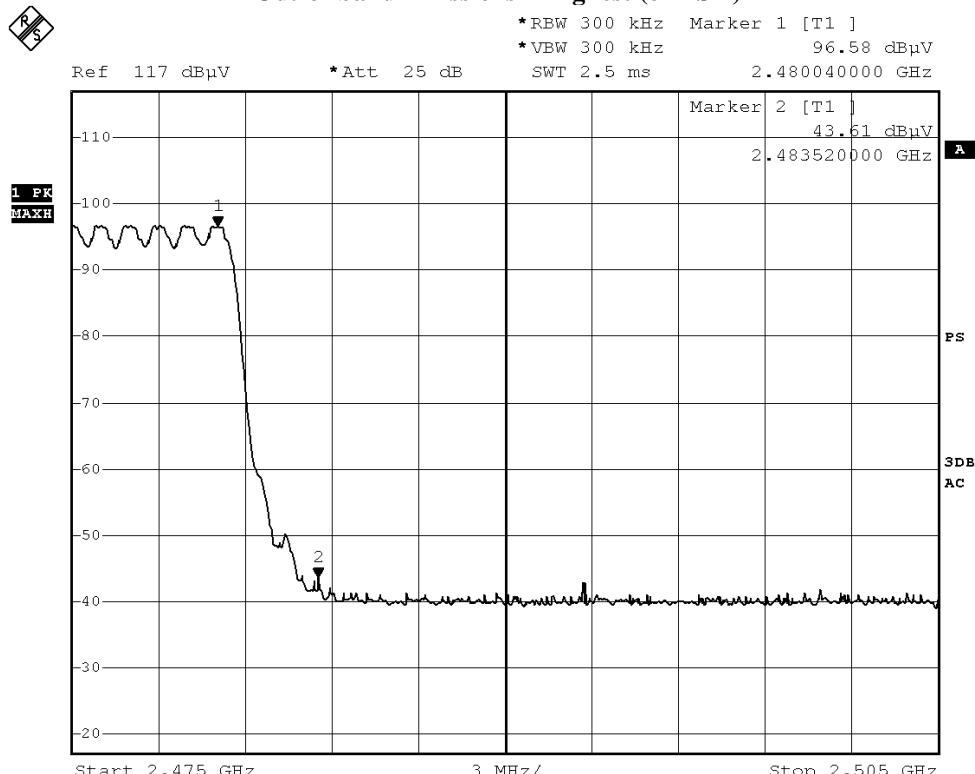


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 69 of 87

Out-of-band Emissions – Highest (8DPSK)



Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
2483.0	12.5	35.4	47.9	74.0	26.1	Vertical

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
2483.5	1.8	35.4	37.2	54.0	16.8	Vertical

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 70 of 87

3.1.9 Occupancy Time (Dwell time)

Requirements:

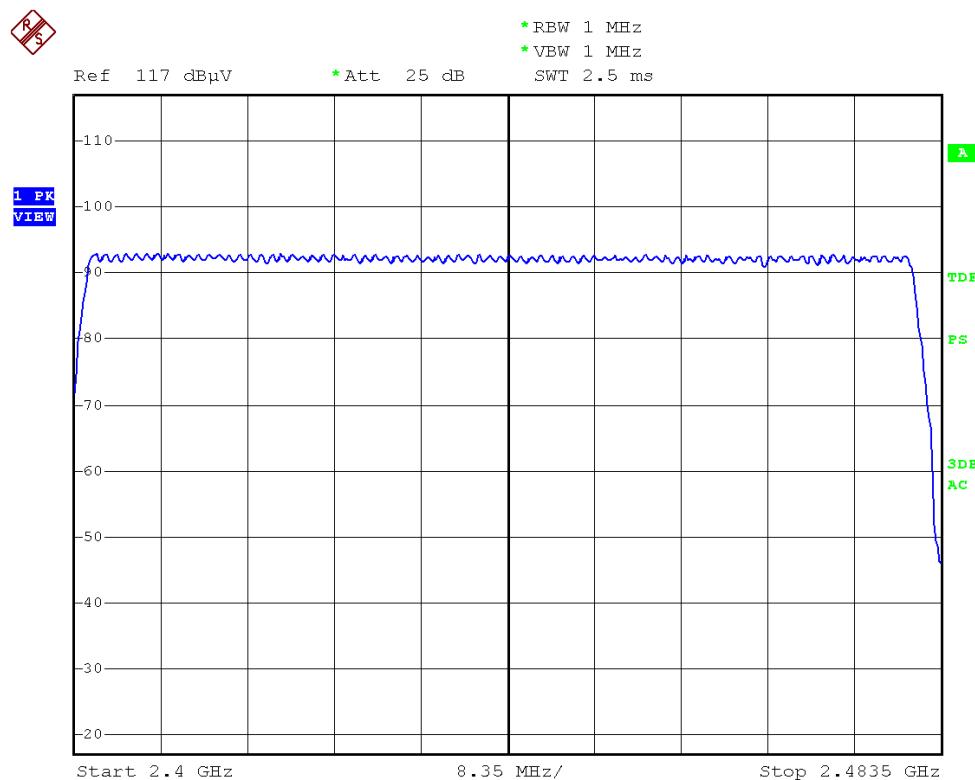
The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channel employed.
No requirements for Digital Transmission System.

Dwell Time = Pulse Duration * hop rate / number of channel * observation duration

Observed duration: 0.4s x79 = 31.6s

Measurement Data:

Channel Occupied in 8DPSK: 79 of 79 Channel



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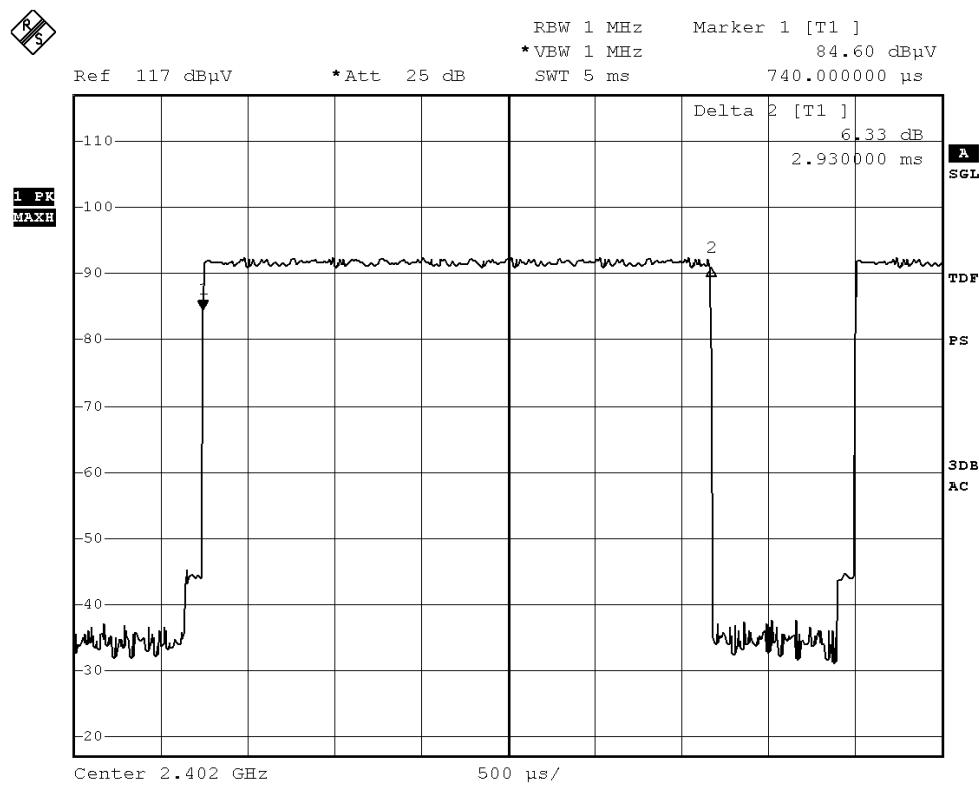
Date: 2013-06-19
No.: DM111332DT

Page 71 of 87

DH5 Packet:

DH5 Packet permit maximum $1600/79/6 = 3.37$ hops per second in each channel (5 time slots RX, 1 time slot TX). The Dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds

Fig. A
[Pulse duration of Lowest Channel]



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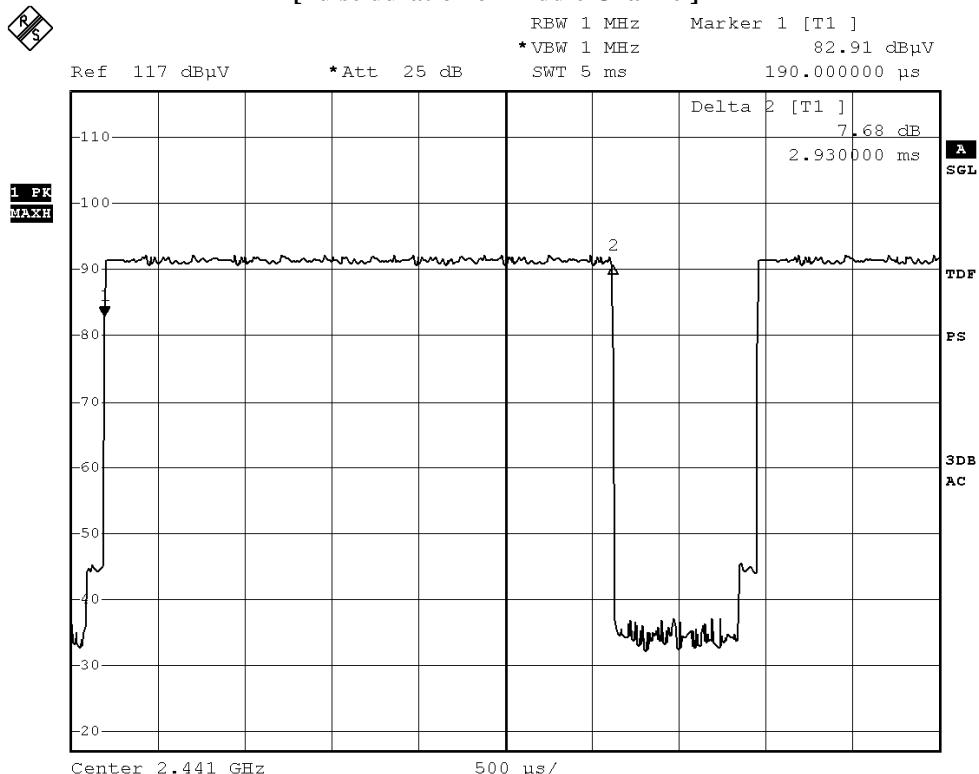


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 72 of 87

Fig. B
[Pulse duration of Middle Channel]



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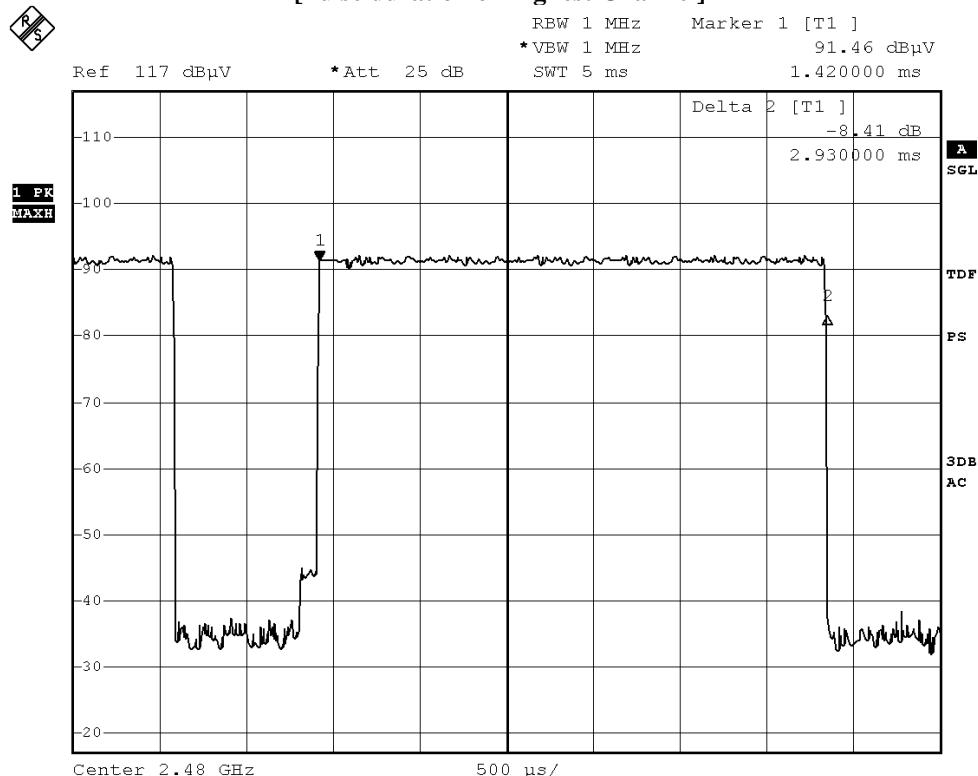


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 73 of 87

Fig. C
[Pulse duration of Highest Channel]



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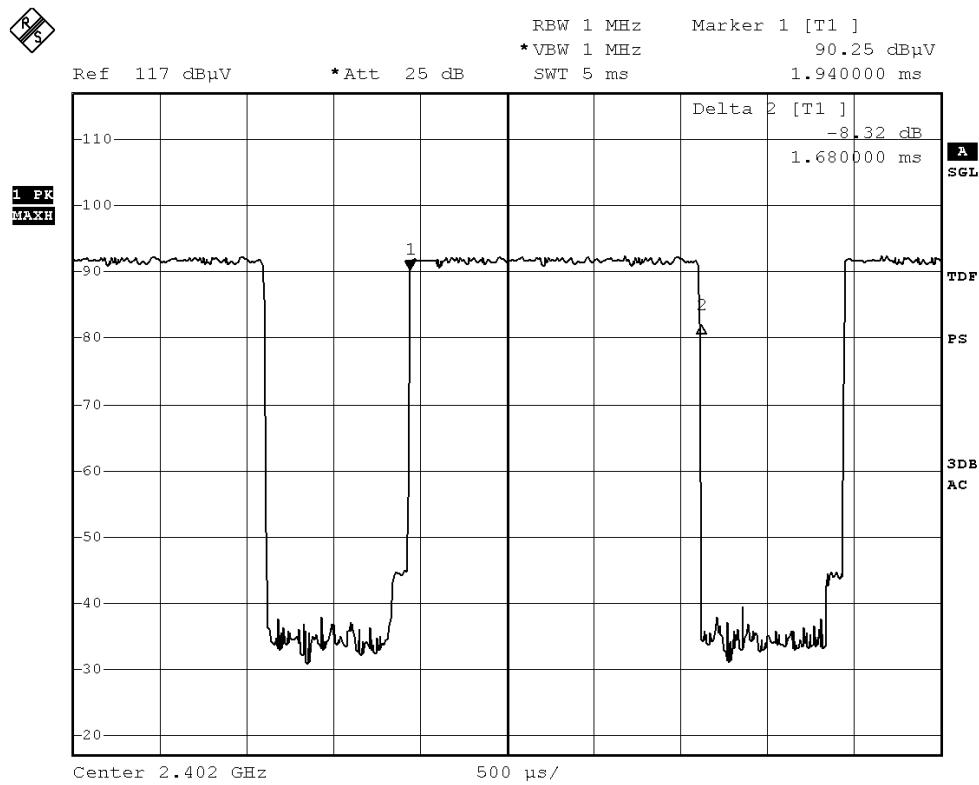
Date: 2013-06-19
No.: DM111332DT

Page 74 of 87

DH3 Packet:

DH3 Packet permit maximum $1600/79/4 = 5.06$ hops per second in each channel (3 time slots RX, 1 time slot TX). The Dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds

Fig. D
[Pulse duration of Lowest Channel]



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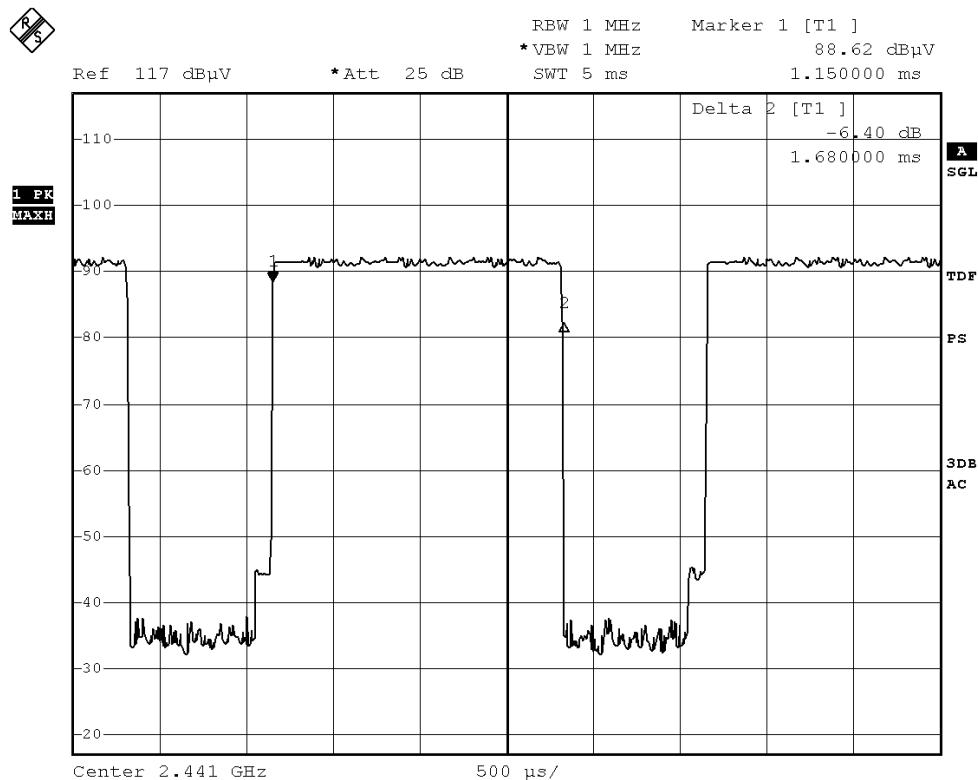


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 75 of 87

Fig. E
[Pulse duration of Middle Channel]



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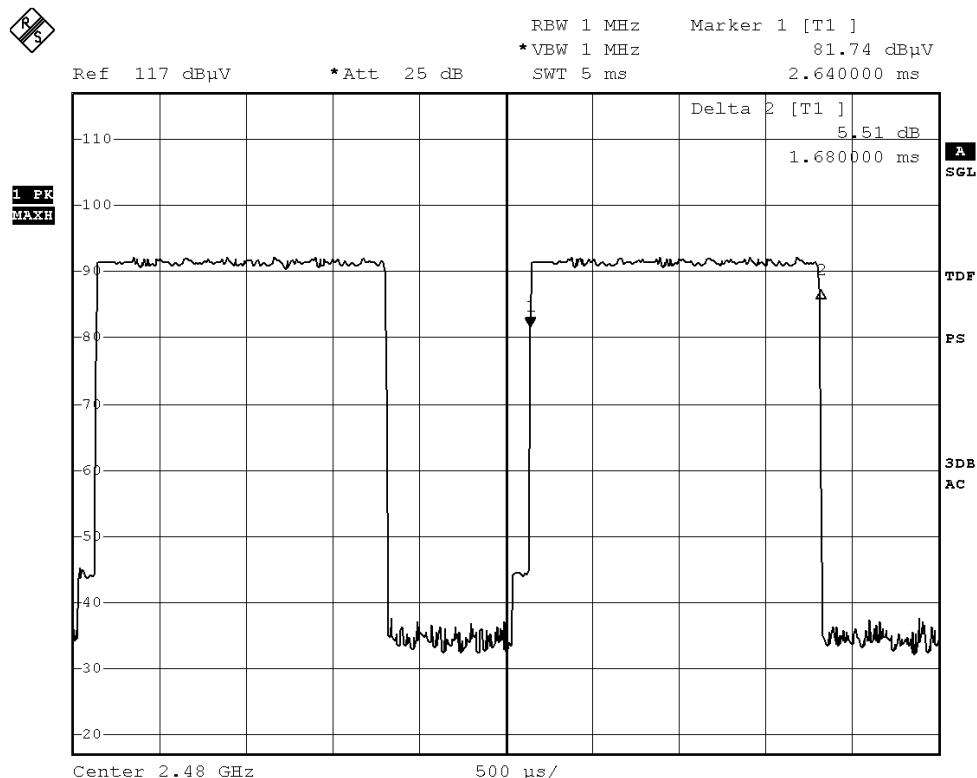


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 76 of 87

Fig. F
[Pulse duration of Highest Channel]



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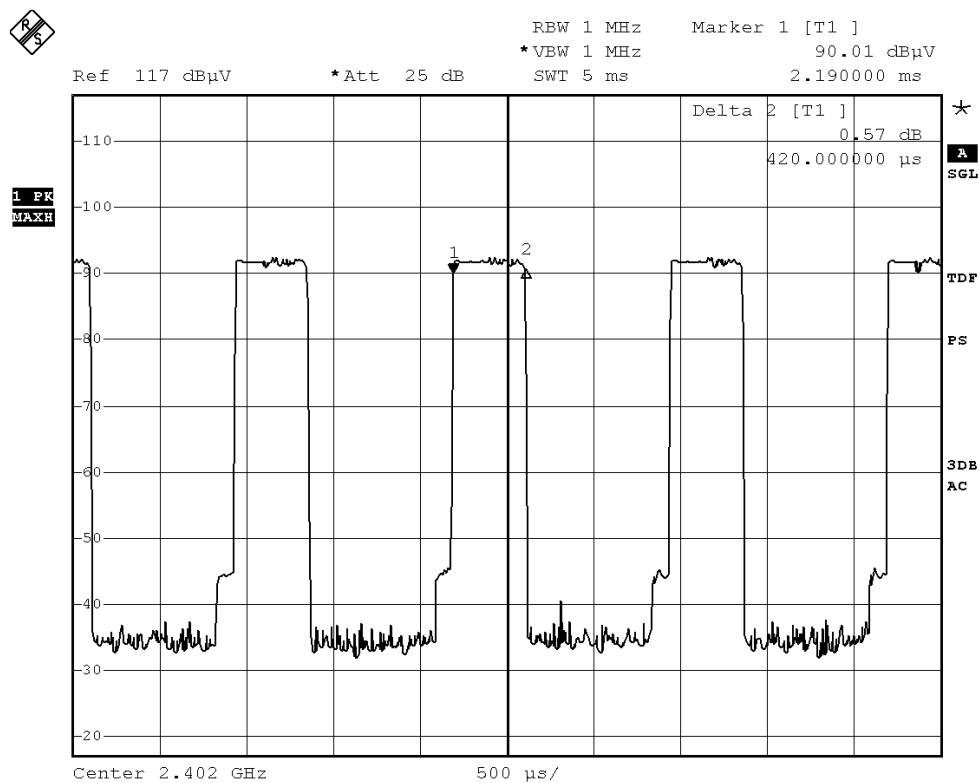
Date: 2013-06-19
No.: DM111332DT

Page 77 of 87

DH1 Packet:

DH1 Packet permit maximum $1600/79/2 = 10.12$ hops per second in each channel (3 time slots RX, 1 time slot TX). The Dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds

Fig. G
[Pulse duration of Lowest Channel]



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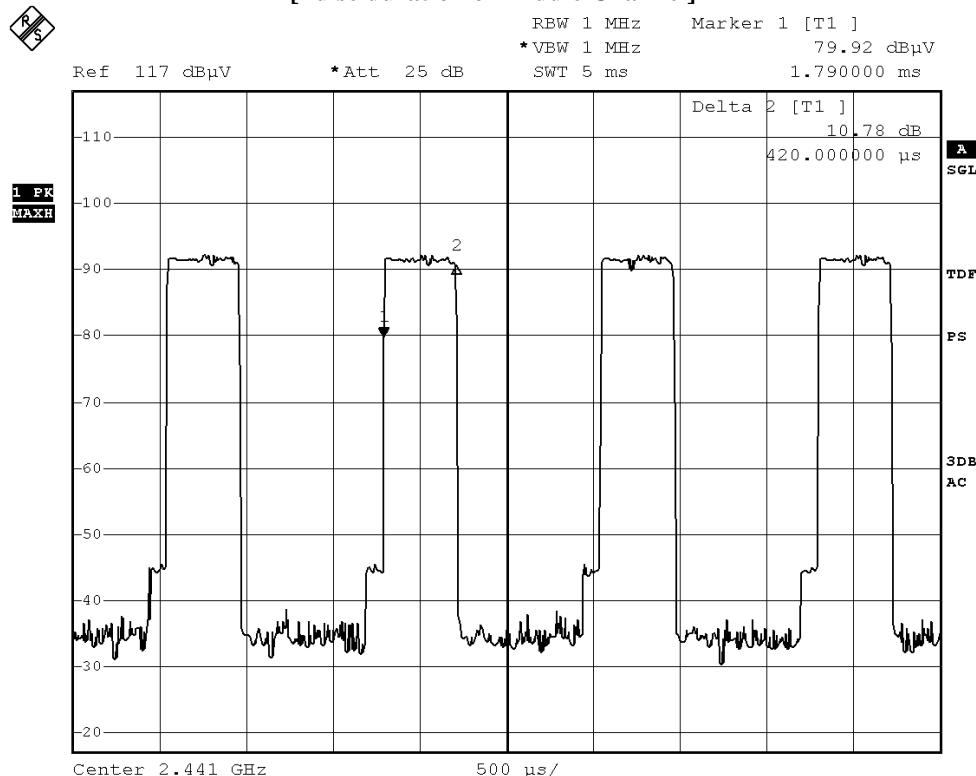


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 78 of 87

Fig. H
[Pulse duration of Middle Channel]



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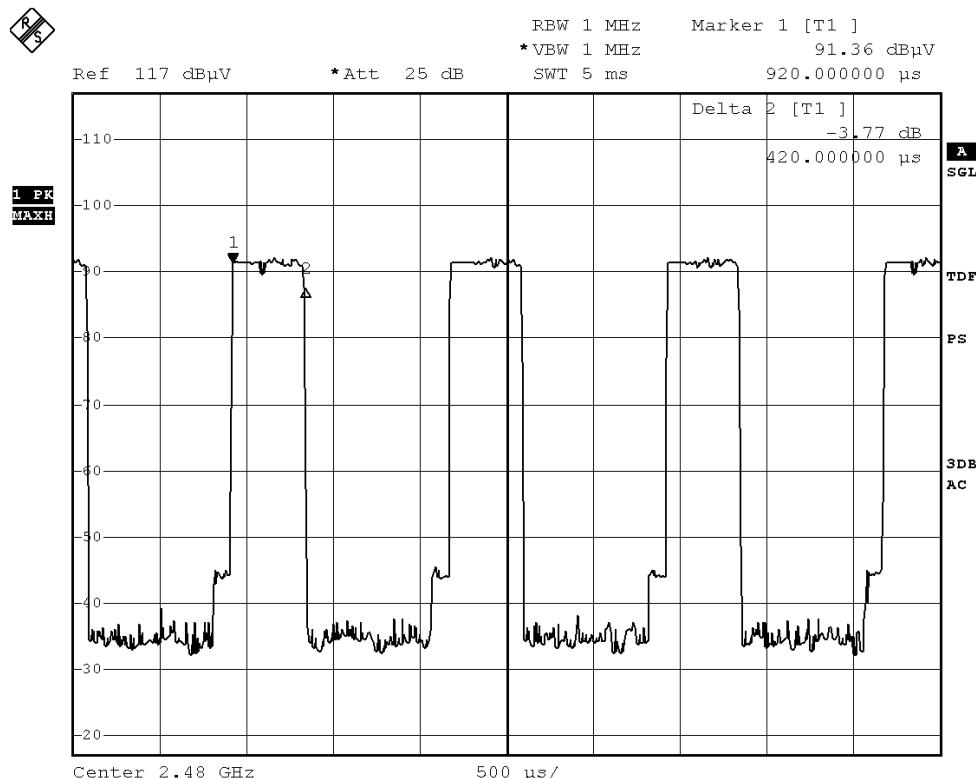


STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 79 of 87

Fig. I
[Pulse duration of Highest Channel]



Time of occupancy (Dwell Time):

Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Results
DH5	2402	2.930	0.312	0.400	Complies
DH5	2441	2.930	0.312	0.400	Complies
DH5	2480	2.930	0.312	0.400	Complies
DH3	2402	1.680	0.269	0.400	Complies
DH3	2441	1.680	0.269	0.400	Complies
DH3	2480	1.680	0.269	0.400	Complies
DH1	2402	0.420	0.134	0.400	Complies
DH1	2441	0.420	0.134	0.400	Complies
DH1	2480	0.420	0.134	0.400	Complies

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 80 of 87

3.1.10 RF Exposure

Test Requirement: FCC 47CFR 15.247(i)
Test Date: 2013-7-24
Mode of Operation: BT mode
Dimension of EUT: 175mm x 92mm x 78mm

Requirements:

In 15.247(i), an equipment shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the limits in §§ 1.1310 and 2.1093 of this chapter. Applications to the Commission for construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities must contain a statement confirming compliance with the limits unless the facility, operation, or transmitter is categorically excluded, as discussed below. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to KDB447498 D01 General RF Exposure Guidance v05, unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition.

Test Results:

RF Exposure Evaluation

The Maximum conducted output power = 0.644mW (at frequency = 2.441 GHz)

It's Conducted source-based time-averaging output power = 0.640 mW (at frequency = 2.441 GHz)

Since the SAR test exclusion thresholds for 2450MHz at test separation distances \leq 5 mm = 10mW and the Conducted source-based time-averaging output power is less than 10mW.

Therefore, the SAR evaluation can be exempted.

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 81 of 87

Appendix A

List of Measurement Equipment

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD004	LISN	ROHDE & SCHWARZ	ESH3-Z5	100102	2013.03.15	2014.03.14
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100314	2013.03.15	2014.03.14
EMD035	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100441	2012.07.06	2013.07.05
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB 26	100388	2012.07.06	2013.07.05
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2012.07.06	2013.07.05
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2012.11.03	2014.11.02
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2012.11.28	2014.11.27
EMD084	MULTI-DVICE CONTROLLER	ETS.LINDGREN	2090	00060107	N/A	N/A
EMD088	Video Control Unit	ETS.LINDGREN	Y21953A	2601073	N/A	N/A
EMD093	Monitor	ViewSonic	VA9036	Q8X064201876	N/A	N/A
EMD102	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707454	N/A	N/A
EMD103	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707455	N/A	N/A
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A	N/A
EMD111	Power meter	ROHDE & SCHWARZ	NRVD	102051	2013.03.15	2014.03.14
	100V Insertion Unit	ROHDE & SCHWARZ	URV5-Z4	100464	2013.03.15	2014.03.14
EMD113	Pre-Amplifier	ROHDE & SCHWARZ	N/A	1129588	2013.03.15	2014.03.14
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2012.03.26	2014.03.25
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO Inc.	JXTXLB-42-15-C-KF	J2021100721001	2013.01.25	2015.01.24

Remarks:-

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	iPod Touch	A1367	BCG-E2407	N/A

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STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 82 of 87

Appendix C

Photographs of EUT

Front View of the product



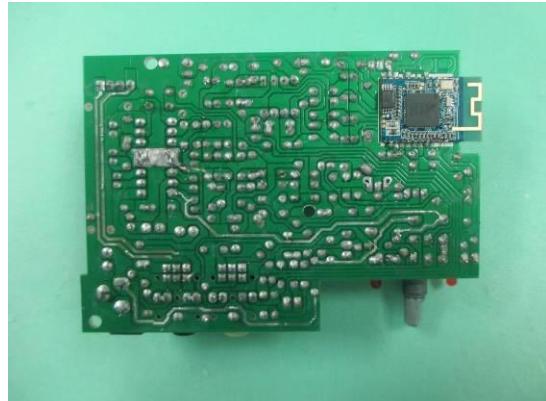
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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Date: 2013-06-19
No.: DM111332DT

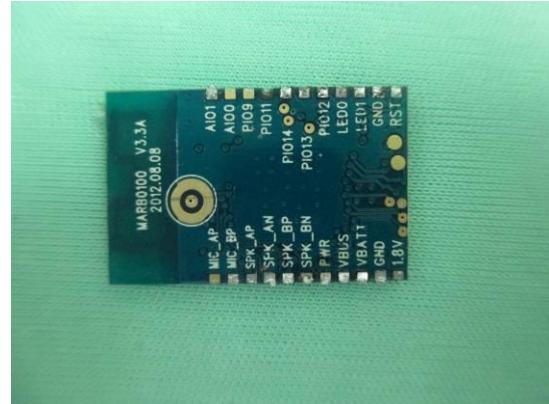
Page 83 of 87

Photographs of EUT

Inner Circuit Top View



Inner Circuit Bottom View



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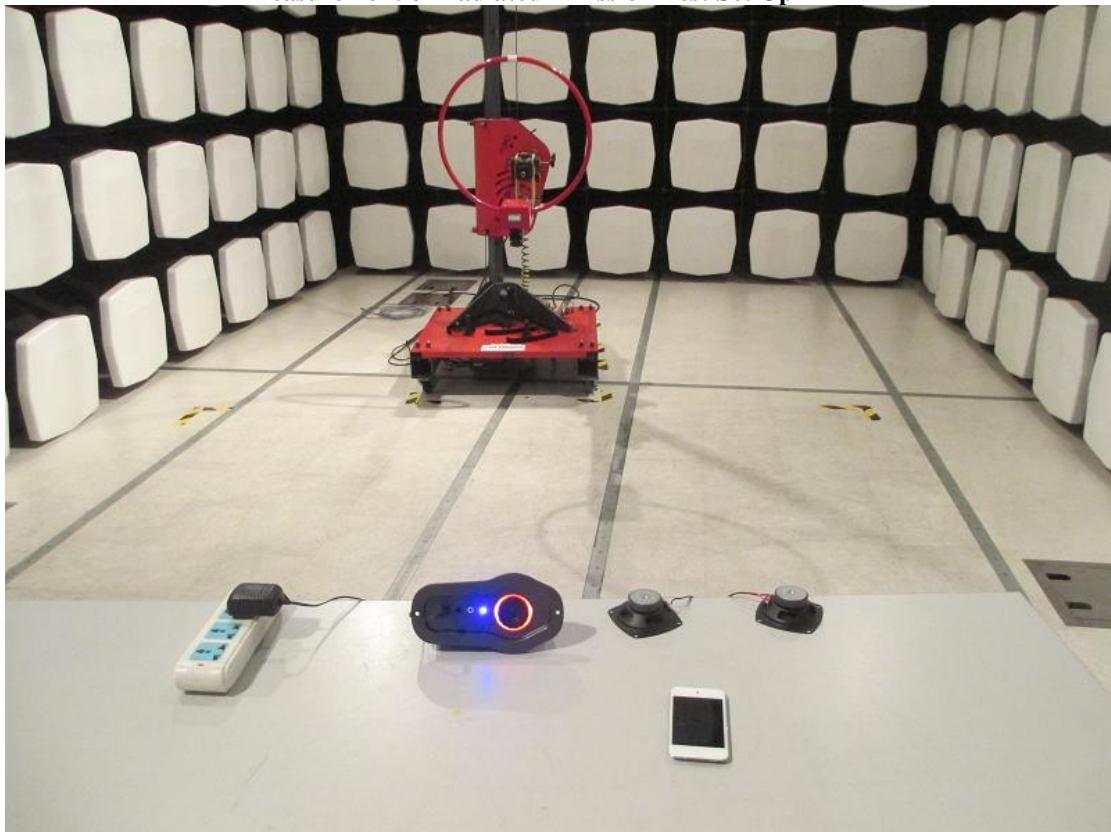
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 84 of 87

Photographs of EUT

Measurement of Radiated Emission Test Set Up



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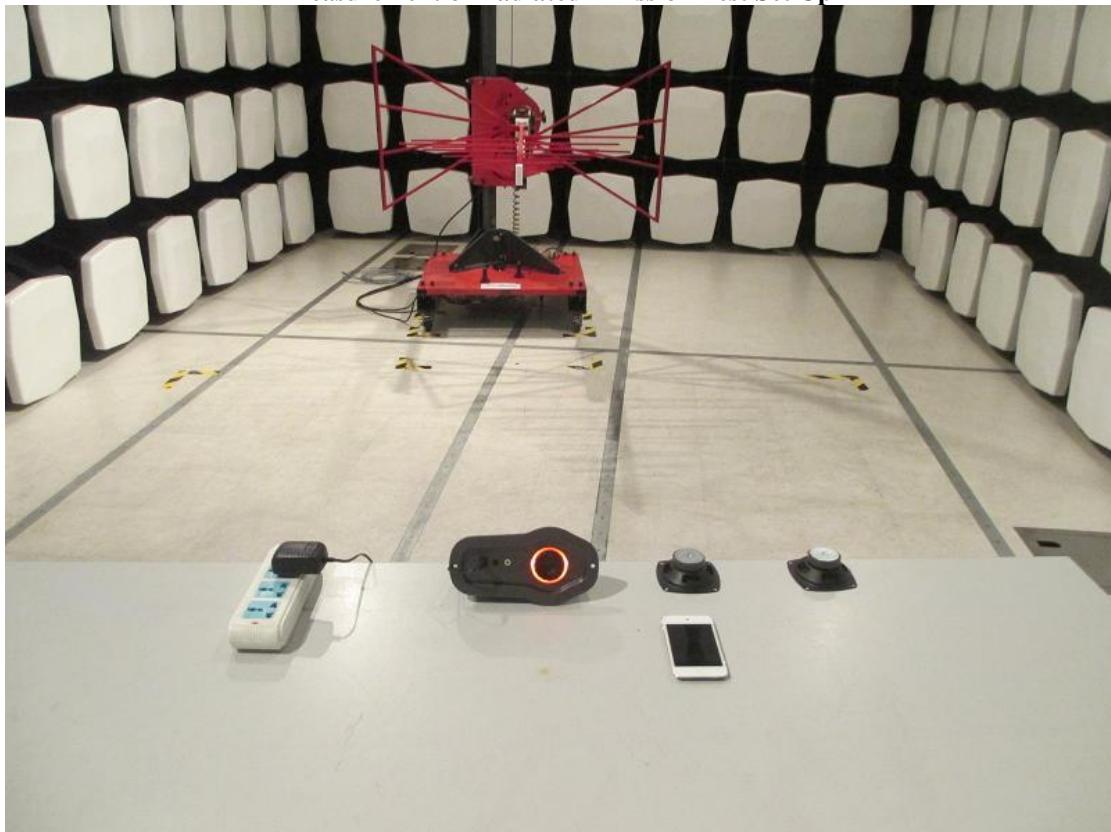
STC Test Report

Date: 2013-06-19
No.: DM111332DT

Page 85 of 87

Photographs of EUT

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No.: DM111332DT

Page 86 of 87

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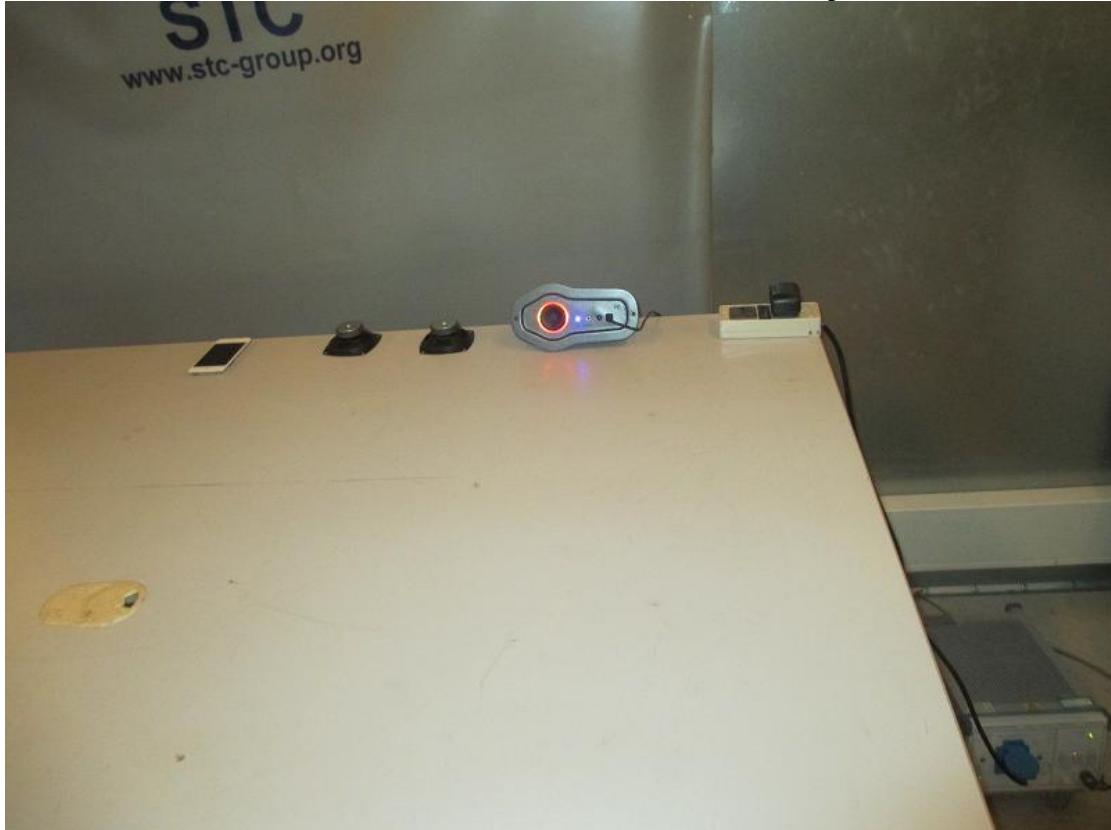
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No.: DM111332DT

Page 87 of 87

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******* End of Test Report *******

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