



## STC Test Report

Date : 2013-03-05

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No. : DM110386

**Applicant (DUM001):**

MASS FIDELITY

12-1064 Salk Road Suite 225, Pickering, Ontario, Canada  
L1W 4B5

**Manufacturer:**

MARQUESS CO., LTD,  
RM 901-02, 9/F., SINO INDUSTRIAL PLAZA, 9 KAI  
CHEUNG ROAD, KOWLOON BAY, KOWLOON,  
HONG KONG

**Description of Sample(s):**

Product: Bluetooth Audio Receiver  
Brand Name: Mass Fidelity  
Model Number: relay  
FCC ID: SEPRelay

**Date Sample(s) Received:** 2013-03-05

**Date Tested:** 2013-03-06 to 2013-03-08

**Investigation Requested:**

Perform ElectroMagnetic Interference measurement in  
accordance with FCC 47CFR [Codes of Federal Regulations]  
Part 15: 2012 and ANSI C63.4:2009 for FCC Certification.

**Conclusion(s):**

The submitted product COMPLIED with the requirements of  
Federal Communications Commission [FCC] Rules and  
Regulations Part 15. The tests were performed in accordance  
with the standards described above and on Section 2.2 in this  
Test Report.

**Remark(s):**

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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.**

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### **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)**

Product: Bluetooth Audio Receiver  
Manufacturer: MARQUESS CO., LTD  
Brand Name: Mass Fidelity  
Model Number: relay  
Input Voltage: 5Vd.c. with Jack

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

Brand name: N/A; Model no.: HK-U-050A100-CP; Input: 100-240Va.c. 50/60Hz 0.2A;  
Output: 5Vd.c. 1.0A.

#### **1.2.1 Description of EUT Operation**

The Equipment Under Test (EUT) is a Mass Fidelity, Bluetooth Audio Receiver, it is Audio System, modulation by IC; and type is frequency hopping speed spectrum Modulation.

#### **1.3 Date of Order**

2013-03-05

#### **1.4 Submitted Sample(s):**

1 Sample

#### **1.5 Test Duration**

2013-03-06 to 2013-03-08

#### **1.6 Country of Origin**

China

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### **1.7 RF Module Details**

Module Model Number:	JS-BTM513
Module FCC ID:	
Module Transmission Type:	Bluetooth V3.0+EDR
Modulation:	FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK)
Data Rates:	1MBps: GFSK 2 MBps: $\pi/4$ -DQPSK 3 MBps: 8DPSK
Frequency Range:	2400-2483.5MHz
Carrier Frequencies:	2402MHz – 2480MHz

Module Specification (specification provided by manufacturer)

### **1.8 Antenna Details**

Antenna Type:	RP-SMA Right Angle
Antenna Length:	41.5mm
Antenna Gain:	2.2dBi

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### **2.0 Technical Details**

#### **2.1 Investigations Requested**

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 Regulations and ANSI C63.4:2009 for FCC Certification.

#### **2.2 Test Standards and Results Summary Tables**

EMISSION Results Summary					
Test Condition	Test Requirement	Test Method	Class / Severity		
			Pass	Fail	N/A
Output Power of Fundamental Emissions	FCC 47CFR 15.247(b)(1)	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RF Conducted Spurious Emission	FCC 47CFR 15.247(c)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Spurious Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Number of Operating Channel	FCC 47CFR 15.247(a)(2)(b)(1)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Band-edge compliance of Conducted Emission	FCC 47CFR 15.247(c)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pseudorandom Hopping Algorithm	FCC 47CFR 15.247(a)(1)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time of Occupancy	FCC 47CFR 15.247(a)(1)(iii)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20dB Bandwidth	FCC 47CFR 15.247(a)(2)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Hopping Channel Separation	FCC 47CFR 15.247(a)(1)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Note: N/A – Not Applicable

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### 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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### **3.0 Test Results**

#### **3.1 Emission**

##### **3.1.1 Maximum Peak Output Power**

Test Requirement: FCC 47CFR 15.247(b)(1)

Test Method: N/A

Test Date: 2013-03-08

Mode of Operation: Tx mode

#### **Test Method:**

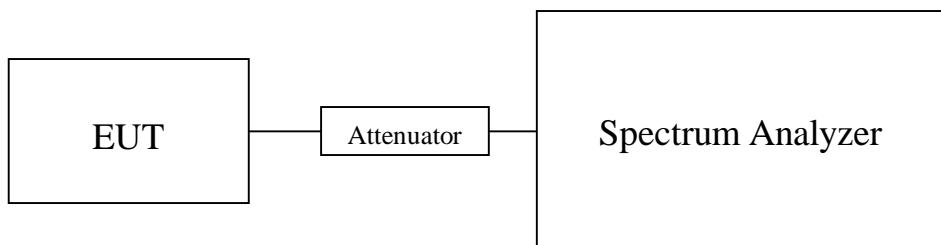
The RF output of the EUT was connected to the spectrum analyzer. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in dBm.

#### **Spectrum Analyzer Setting:**

RBW = 3 MHz, VBW= 3MHz, Sweep = Auto, Span = 10MHz

Detector = Peak, Trace = Max. hold

#### **Test Setup:**



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### **Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:**

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 Bluetooth Communication mode (GFSK) (Fundamental Power): Pass** **Maximum conducted output power**

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2402	0.00192

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2441	0.00221

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2480	0.00237

### **Results of Bluetooth Communication mode ( $\pi/4$ -DQPSK) (Fundamental Power): Pass** **Maximum conducted output power**

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2402	0.00135

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2442	0.00149

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2480	0.00156

### **Results of Bluetooth Communication mode (8 DPSK) (Fundamental Power): Pass** **Maximum conducted output power**

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2402	0.00139

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2442	0.00154

<b>Transmitter Frequency (MHz)</b>	<b>Maximum conducted output power (Watt)</b>
2480	0.00164

Limit: 0.125W (125mW)

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

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### **3.1.2 Radiated Spurious Emissions**

Test Requirement: FCC 47CFR 15.209

Test Method: ANSI C63.4:2009

Test Date: 2013-03-08

Mode of Operation: Tx mode / 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, considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turn table, 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 on the STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

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### **Spectrum Analyzer Setting:**

9KHz – 30MHz (Pk & Av)

RBW: 10kHz  
VBW: 30kHz  
Sweep: Auto  
Span: Fully capture the emissions being measured  
Trace: Max. hold

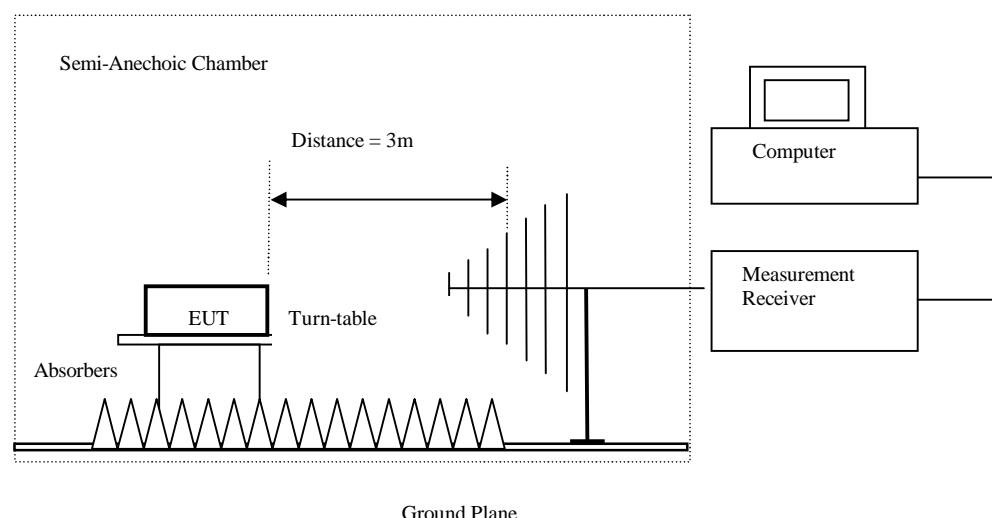
30MHz – 1GHz (QP)

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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### Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ 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
Above960	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 Tx mode (2402.0 MHz) (GFSK mode) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

### Result of Tx mode (2402.0 MHz) (GFSK mode) (30MHz – 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

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

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4804.0	12.1	41.5	53.6	74.0	20.4	Horizontal
4804.0	14.4	41.5	55.9	74.0	18.1	Vertical
7206.0	4.6	48.8	53.4	74.0	20.6	Horizontal
7206.0	6.9	48.8	55.7	74.0	18.3	Vertical

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

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4804.0	-2.3	41.5	39.2	54.0	14.8	Horizontal
4804.0	-1.7	41.5	39.8	54.0	14.2	Vertical
7206.0	-9.1	48.8	39.7	54.0	14.3	Horizontal
7206.0	-7.5	48.8	41.3	54.0	12.7	Vertical

**Result of Tx mode (2441.0 MHz) (GFSK mode) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

**Results of Tx mode (2441.0 MHz) (GFSK mode) (30MHz – 1000MHz): PASS**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

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

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4882.0	11.7	41.4	53.1	74.0	20.9	Horizontal
4882.0	15.0	41.4	56.4	74.0	17.6	Vertical
7323.0	4.5	48.7	53.2	74.0	20.8	Horizontal
7323.0	6.9	48.7	55.6	74.0	18.4	Vertical

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

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4882.0	-2.2	41.4	39.2	54.0	14.8	Horizontal
4882.0	-0.3	41.4	41.1	54.0	12.9	Vertical
7323.0	-10.3	48.7	38.4	54.0	15.6	Horizontal
7323.0	-7.9	48.7	40.8	54.0	13.2	Vertical

### **Result of Tx mode (2480.0 MHz) (GFSK mode) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

### **Results of Tx mode (2480.0 MHz) (GFSK mode) (30MHz – 1000MHz): PASS**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

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

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4960.0	13.4	41.4	54.8	74.0	19.2	Horizontal
4960.0	13.8	41.4	55.2	74.0	18.8	Vertical
7440.0	6.3	48.6	54.9	74.0	19.1	Horizontal
7440.0	8.0	48.6	56.6	74.0	17.4	Vertical

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
2400.0	24.2	35.4	59.6	74.0	14.4	Vertical
2483.5	10.1	35.4	45.5	74.0	28.5	Vertical

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

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4960.0	-1.3	41.4	40.1	54.0	13.9	Horizontal
4960.0	-1.1	41.4	40.3	54.0	13.7	Vertical
7440.0	-7.9	48.6	40.7	54.0	13.3	Horizontal
7440.0	-6.8	48.6	41.8	54.0	12.2	Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
2400.0	7.2	35.4	42.6	54.0	11.4	Vertical
2483.5	-3.5	35.4	31.9	54.0	22.1	Vertical

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### **Result of Tx mode (2402.0 MHz) ( $\pi/4$ -DQPSK mode) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

### **Result of Tx mode (2402.0 MHz) ( $\pi/4$ -DQPSK mode) (30MHz – 1GHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

### **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 dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4804.0	10.9	41.5	52.4	74.0	21.6	Horizontal
4804.0	14.6	41.5	56.1	74.0	17.9	Vertical
7206.0	5.8	48.8	54.6	74.0	19.4	Horizontal
7206.0	6.7	48.8	55.5	74.0	18.5	Vertical

### **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 dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4804.0	-3.6	41.5	37.9	54.0	16.1	Horizontal
4804.0	0.3	41.5	41.8	54.0	12.2	Vertical
7206.0	-8.5	48.8	40.3	54.0	13.7	Horizontal
7206.0	-7.9	48.8	40.9	54.0	13.1	Vertical

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**Result of Tx mode (2441.0 MHz) ( $\pi/4$ -DQPSK mode) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

**Results of Tx mode (2441.0 MHz) ( $\pi/4$ -DQPSK mode) (30MHz – 1000MHz): PASS**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

**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 dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4882.0	12.3	41.4	53.7	74.0	20.3	Horizontal
4882.0	13.5	41.4	54.9	74.0	19.1	Vertical
7323.0	5.7	48.7	54.4	74.0	19.6	Horizontal
7323.0	7.1	48.7	55.8	74.0	18.2	Vertical

**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 dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4882.0	-2.2	41.4	39.2	54.0	14.8	Horizontal
4882.0	-1.3	41.4	40.1	54.0	13.9	Vertical
7323.0	-9.1	48.7	39.6	54.0	14.4	Horizontal
7323.0	-7.0	48.7	41.7	54.0	12.3	Vertical

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**Result of Tx mode (2480.0 MHz) ( $\pi/4$ -DQPSK mode) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

**Results of Tx mode (2480.0 MHz) ( $\pi/4$ -DQPSK mode) (30MHz – 1000MHz): PASS**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

**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 dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4960.0	12.4	41.4	53.8	74.0	20.2	Horizontal
4960.0	13.8	41.4	55.2	74.0	18.8	Vertical
7440.0	5.0	48.6	53.6	74.0	20.4	Horizontal
7440.0	7.7	48.6	56.3	74.0	17.7	Vertical

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
2400.0	19.0	35.4	54.4	74.0	19.6	Vertical
2483.5	10.8	35.4	46.2	74.0	27.8	Vertical

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**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 dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4960.0	-1.7	41.4	39.7	54.0	14.3	Horizontal
4960.0	-1.5	41.4	39.9	54.0	14.1	Vertical
7440.0	-9.9	48.6	38.7	54.0	15.3	Horizontal
7440.0	-7.2	48.6	41.4	54.0	12.6	Vertical

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
2400.0	5.2	35.4	40.6	54.0	13.4	Vertical
2483.5	-2.9	35.4	32.5	54.0	21.5	Vertical

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### **Result of Tx mode (2402.0 MHz) (8DPSK) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

### **Result of Tx mode (2402.0 MHz) (8DPSK) (30MHz – 1GHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
Emissions detected are more than 20 dB below the FCC Limits						

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

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4804.0	11.7	41.5	53.2	74.0	20.8	Horizontal
4804.0	14.2	41.5	55.7	74.0	18.3	Vertical
7206.0	6.3	48.8	55.1	74.0	18.9	Horizontal
7206.0	8.0	48.8	56.8	74.0	17.2	Vertical

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

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4804.0	-0.2	41.5	41.3	54.0	12.7	Horizontal
4804.0	0.7	41.5	42.2	54.0	11.8	Vertical
7206.0	-7.1	48.8	41.7	54.0	12.3	Horizontal
7206.0	-6.4	48.8	42.4	54.0	11.6	Vertical

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**Result of Tx mode (2441.0 MHz) (8DPSK) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

**Results of Tx mode (2441.0 MHz) (8DPSK) (30MHz – 1000MHz): PASS**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

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

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4882.0	13.3	41.4	54.7	74.0	19.3	Horizontal
4882.0	14.4	41.4	55.8	74.0	18.2	Vertical
7323.0	5.8	48.7	54.5	74.0	19.5	Horizontal
7323.0	7.5	48.7	56.2	74.0	17.8	Vertical

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

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4882.0	-1.5	41.4	39.9	54.0	14.1	Horizontal
4882.0	-0.8	41.4	40.6	54.0	13.4	Vertical
7323.0	-8.0	48.7	40.7	54.0	13.3	Horizontal
7323.0	-3.2	48.7	45.5	54.0	8.5	Vertical

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**Result of Tx mode (2480.0 MHz) (8DPSK) (9kHz – 30MHz): Pass**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

**Results of Tx mode (2480.0 MHz) (8DPSK) (30MHz – 1000MHz): PASS**

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Field Strength $\mu$ V/m	Limit $\mu$ V/m	E-Field Polarity
<b>Emissions detected are more than 20 dB below the FCC Limits</b>						

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

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4960.0	13.9	41.4	55.3	74.0	18.7	Horizontal
4960.0	14.6	41.4	56.0	74.0	18.0	Vertical
7440.0	8.2	48.6	56.8	74.0	17.2	Horizontal
7440.0	7.0	48.6	55.6	74.0	18.4	Vertical

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
2400.0	18.3	35.4	53.7	74.0	20.3	Vertical
2483.5	11.1	35.4	46.5	74.0	27.5	Vertical

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

<b>Field Strength of Spurious Emissions</b>						
<b>Average Value</b>						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
4960.0	-2.2	41.4	39.2	54.0	14.8	Horizontal
4960.0	-1.1	41.4	40.3	54.0	13.7	Vertical
7440.0	-8.4	48.6	40.2	54.0	13.8	Horizontal
7440.0	-8.8	48.6	39.8	54.0	14.2	Vertical

<b>Field Strength of Spurious Emissions</b>						
<b>Average Value</b>						
Frequency MHz	Measured Level @3m dB $\mu$ V	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB $\mu$ V/m	E-Field Polarity
2400.0	3.2	35.4	38.6	54.0	15.4	Vertical
2483.5	-2.8	35.4	32.6	54.0	21.4	Vertical

#### Remarks:

\* Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty: (9kHz – 30MHz): 3.3dB

(30MHz – 1GHz): 4.6dB

(1GHz – 18GHz): 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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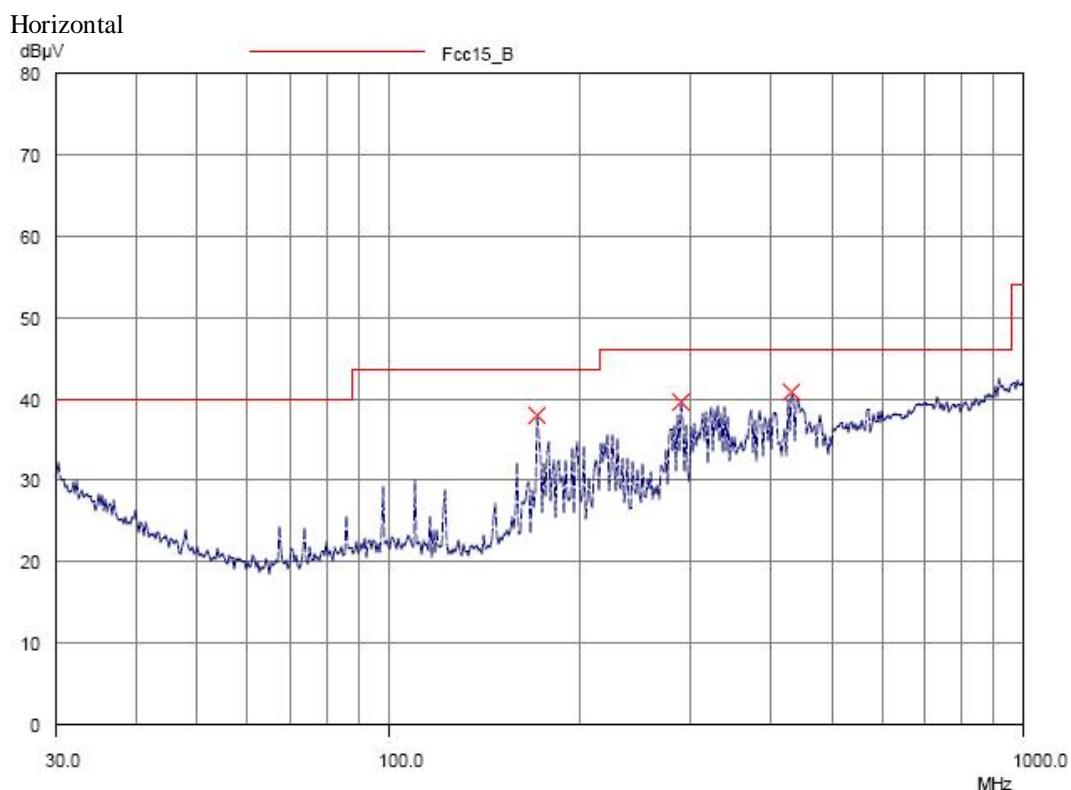
### **Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:**

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ 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 (30MHz – 1GHz): Pass**

Please refer to the following table for result details



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### **Result of Bluetooth Communication mode (30MHz – 1GHz): Pass**

Emission Frequency MHz	E-Field Polarity	Radiated Emissions Quasi-Peak			
		Level @ 3m dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Level @3m $\mu$ V/m	Limit @ 3m $\mu$ V/m
172.1	Horizontal	36.3	43.5	65.3	150
288.0	Horizontal	38.6	46.0	85.1	200
429.9	Horizontal	39.8	46.0	97.7	200

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### Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

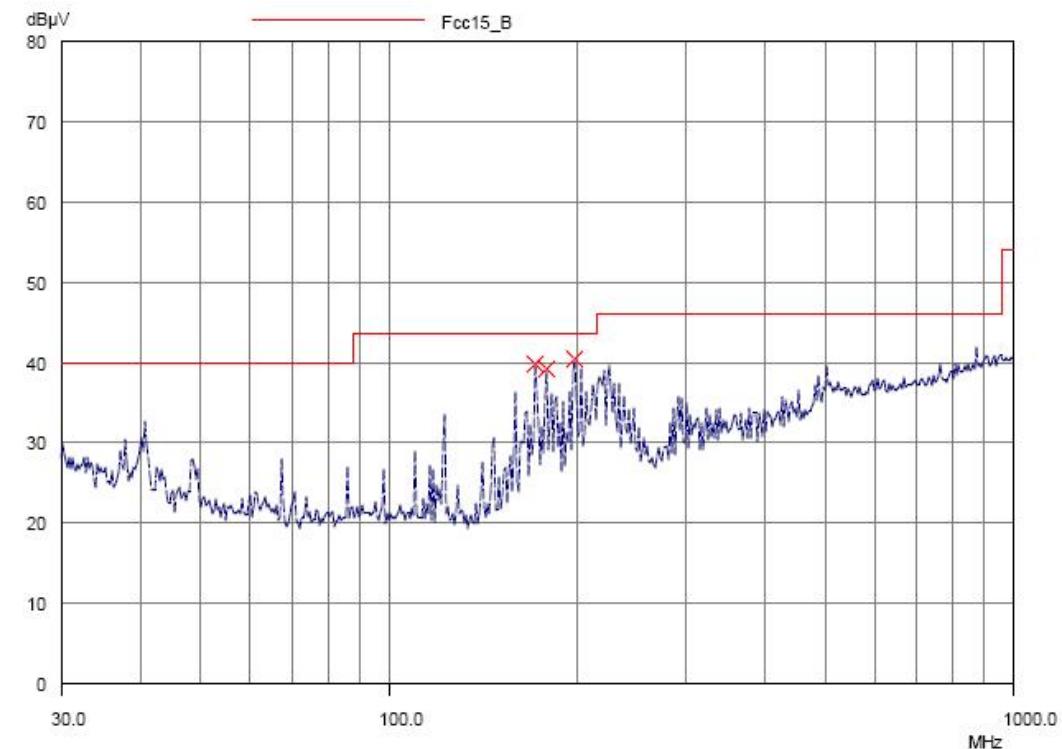
Frequency Range [MHz]	Quasi-Peak Limits [ $\mu$ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

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 (30MHz – 1GHz): Pass

Please refer to the following table for result details

Vertical



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**Result of Bluetooth Communication mode (30MHz – 1GHz): Pass**

<b>Radiated Emissions Quasi-Peak</b>					
Emission Frequency MHz	E-Field Polarity	Level @ 3m dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Level @3m $\mu$ V/m	Limit @ 3m $\mu$ V/m
172.1	Vertical	39.2	43.5	91.2	150
178.2	Vertical	37.3	43.5	73.3	150
198.4	Vertical	39.5	43.5	94.4	150

Remarks:

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

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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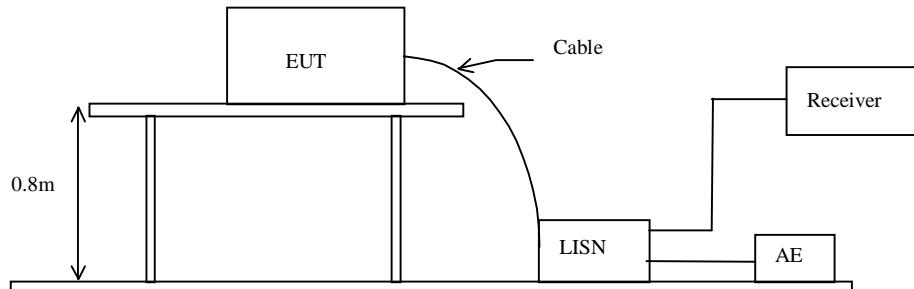
### **3.1.3 Conducted Emissions (0.15MHz to 30MHz)**

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2013-03-06
Mode of Operation:	Bluetooth communication mode
Test Voltage:	117V a.c., 60Hz

#### **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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### Limit for Conducted Emissions (FCC 47 CFR 15.207):

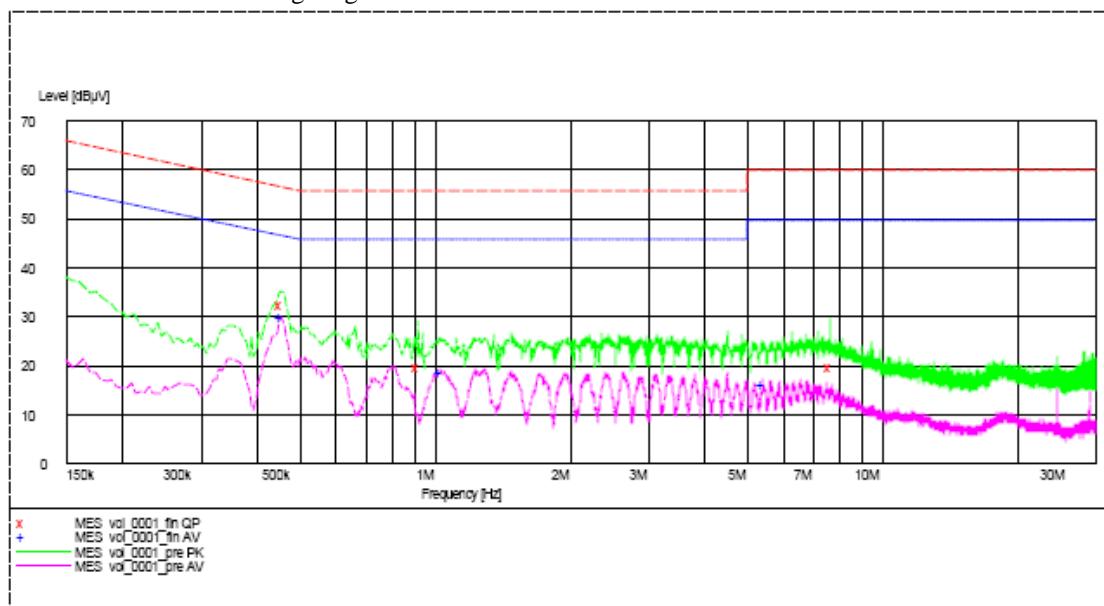
Frequency Range [MHz]	Quasi-Peak Limits [dB $\mu$ V]	Average [dB $\mu$ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

\* 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 (L): PASS

Please refer to the following diagram for individual results.



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### **Results of Bluetooth communication mode (L): PASS**

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB $\mu$ V	Limit dB $\mu$ V	Level dB $\mu$ V	Limit dB $\mu$ V
Live	0.455	-*-	-*-	32.4	47.0
Live	1.035	-*-	-*-	19.8	46.0
Live	5.420	-*-	-*-	19.9	50.0
Live	0.455	32.4	57.0	-*-	-*-
Live	0.920	19.8	56.0	-*-	-*-
Live	7.665	19.9	60.0	-*-	-*-

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## STC Test Report

Date : 2013-03-05

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No. : DM110386

### **Limit for Conducted Emissions (FCC 47 CFR 15.207):**

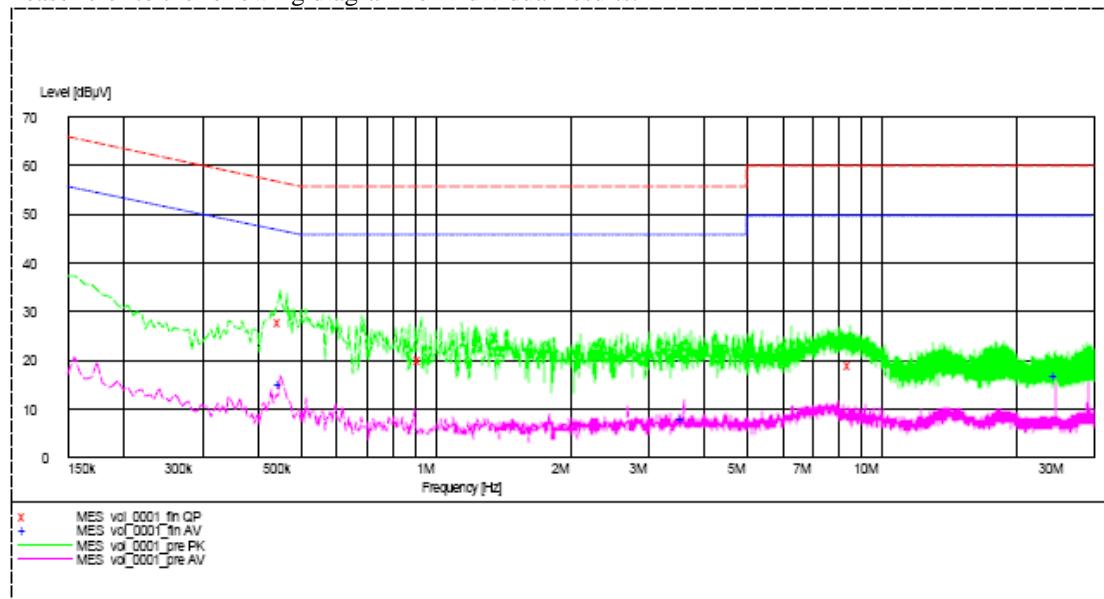
Frequency Range [MHz]	Quasi-Peak Limits [dB $\mu$ V]	Average [dB $\mu$ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

\* 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 (N): PASS**

Please refer to the following diagram for individual results.



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## **STC Test Report**

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### **Results of Bluetooth communication mode (N): PASS**

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB $\mu$ V	Limit dB $\mu$ V	Level dB $\mu$ V	Limit dB $\mu$ V
Neutral	0.450	27.8	57.0	15.4	47.0
Neutral	3.605	-*-	-*-	8.2	46.0
Neutral	24.575	-*-	-*-	16.9	50.0
Neutral	0.930	20.1	56.0	-*-	-*-
Neutral	8.545	19.0	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**

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### **3.1.4 20dB Bandwidth Measurement**

Test Requirement:	FCC 47CFR 15.247(a)(1)
Test Method:	ANSI C63.4:2009
Test Date:	2013-03-06
Mode of Operation:	Bluetooth communication mode

#### **Remark:**

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

#### **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.

#### **Test Setup:**

As Test Setup of clause 3.1.1 in this test report.

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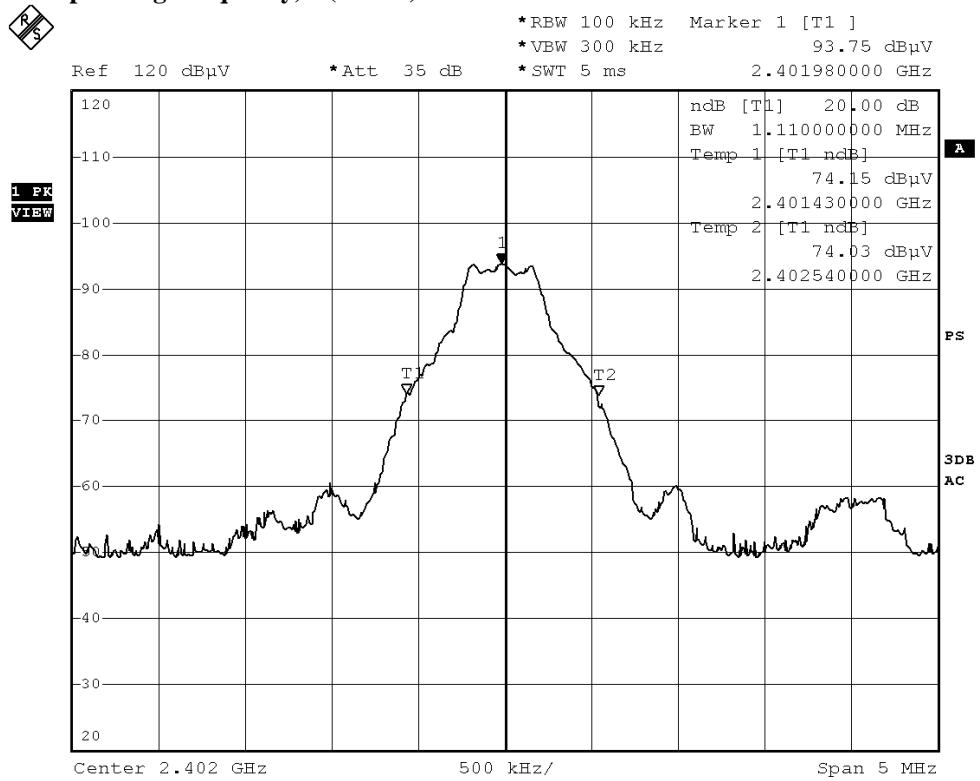
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2402	1.11	Within 2400-2483.5

### (Lowest Operating Frequency) - (GFSK)



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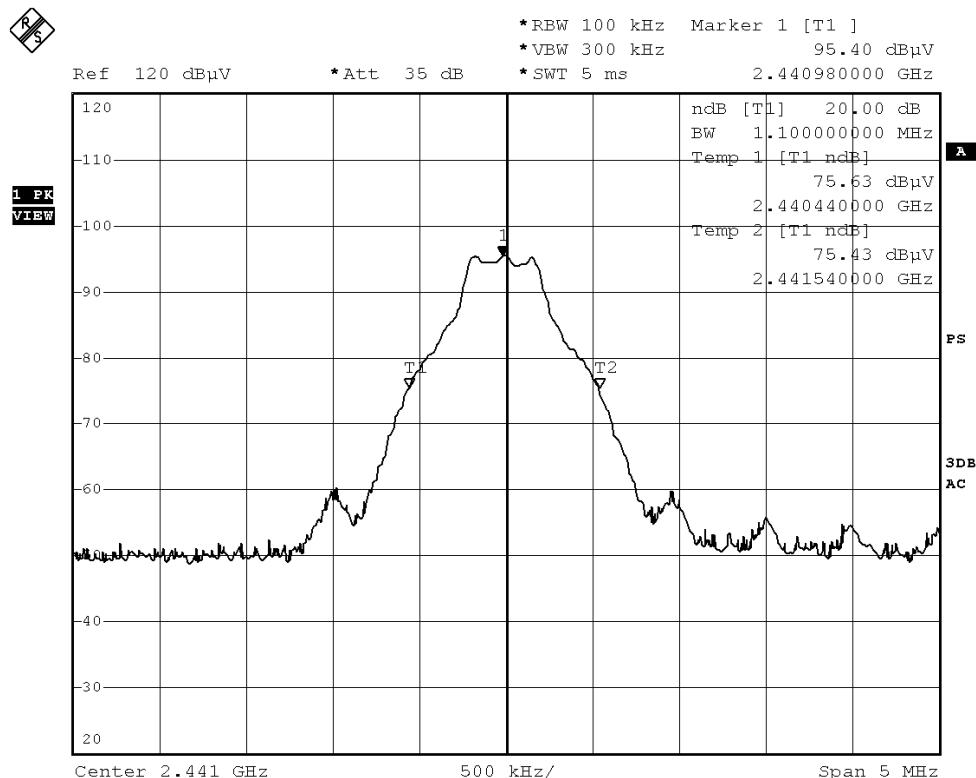
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2441	1.10	Within 2400-2483.5

### (Middle Operating Frequency) - (GFSK)



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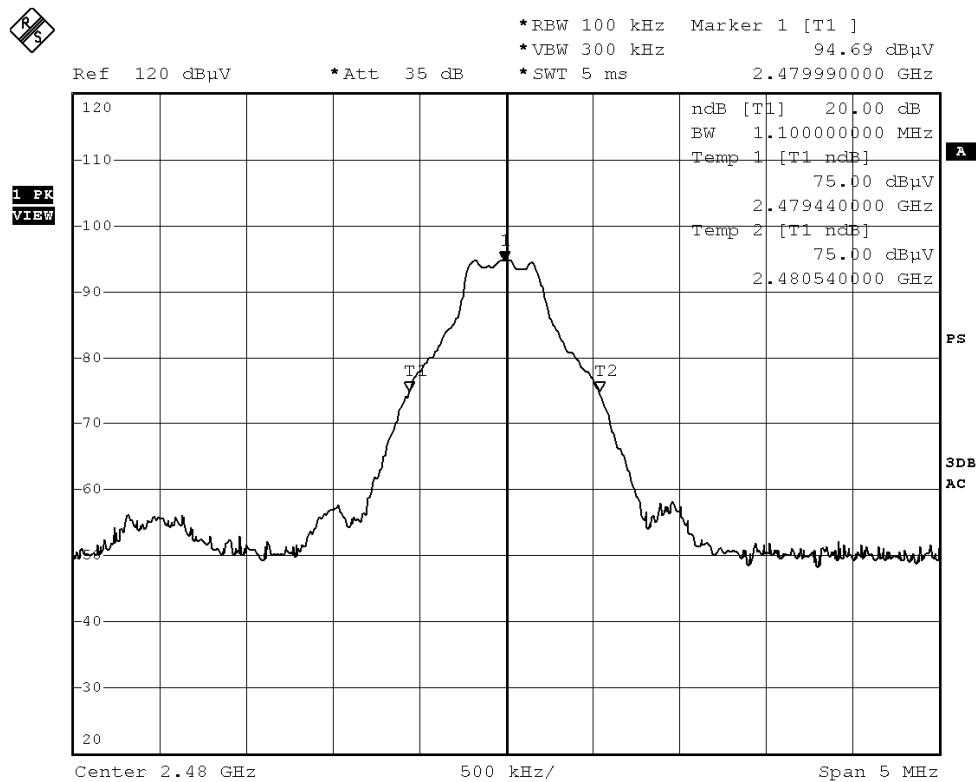
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2480	1.10	Within 2400-2483.5

### (Highest Operating Frequency) - (GFSK)



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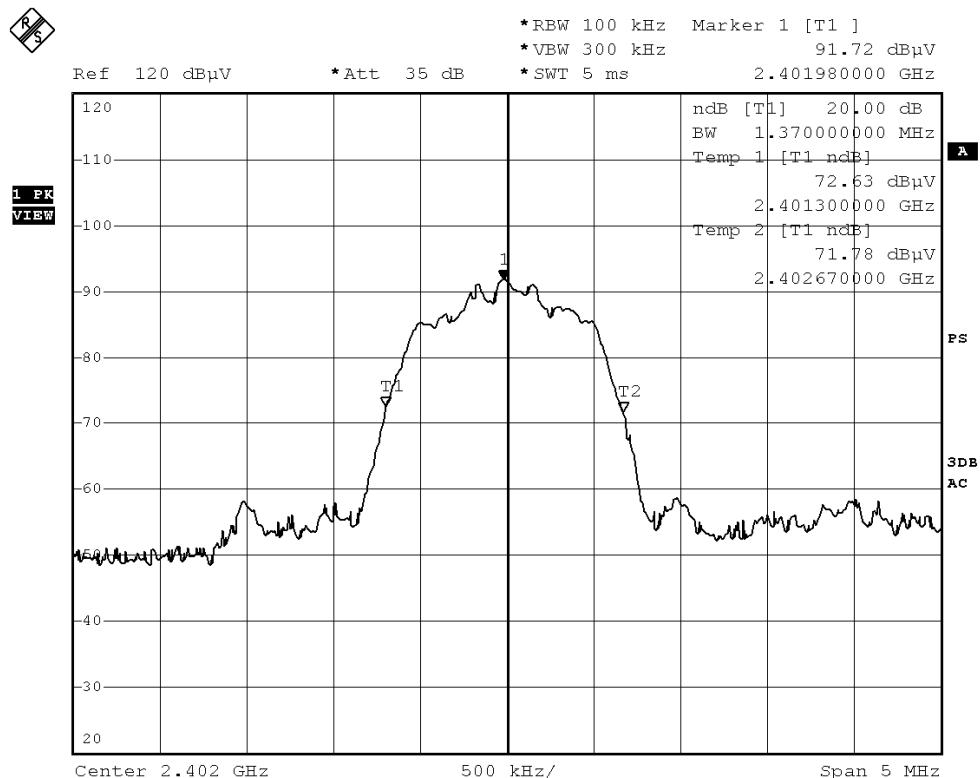
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2402	1.37	Within 2400-2483.5

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



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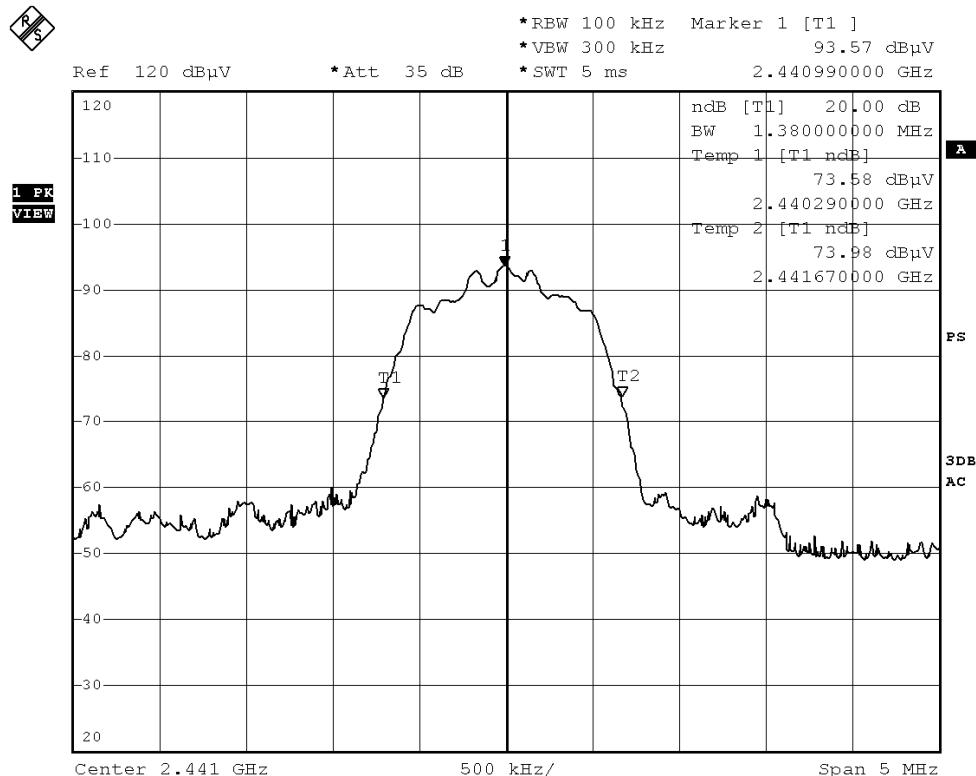
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2441	1.38	Within 2400-2483.5

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



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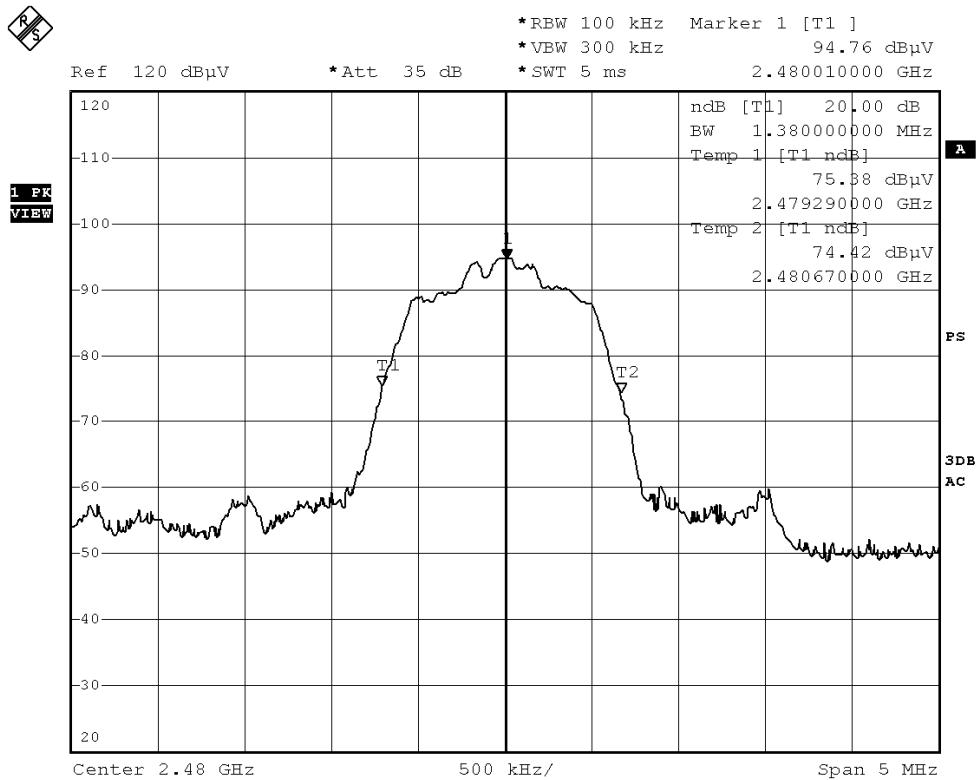
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2480	1.38	Within 2400-2483.5

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



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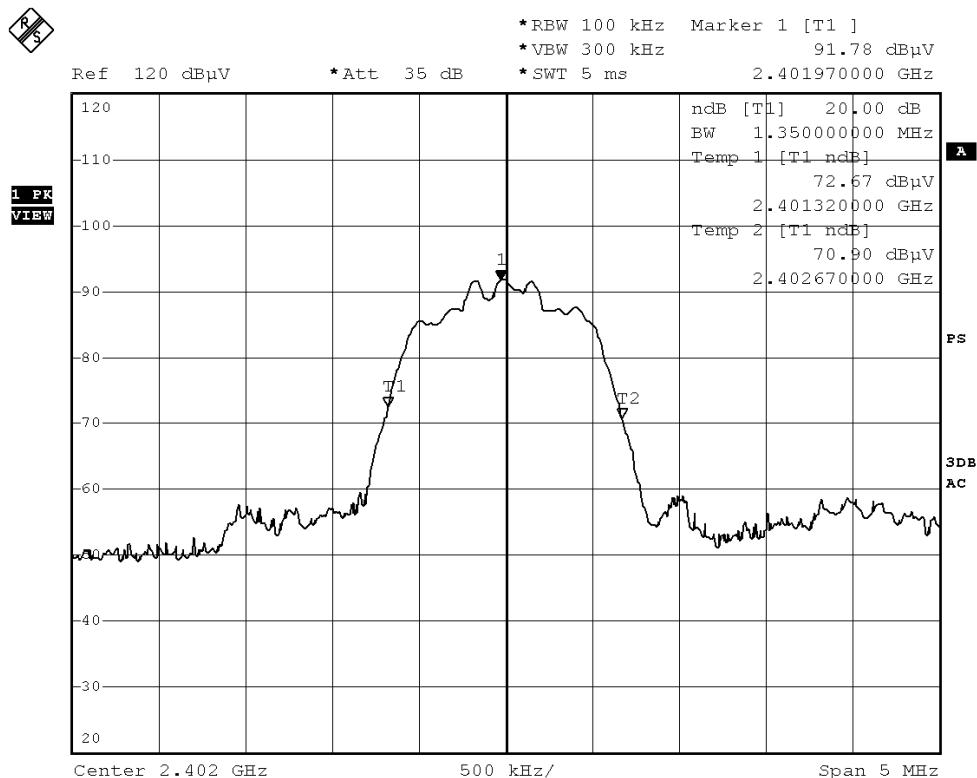
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2402	1.35	Within 2400-2483.5

### (Lowest Operating Frequency) - (8DPSK)



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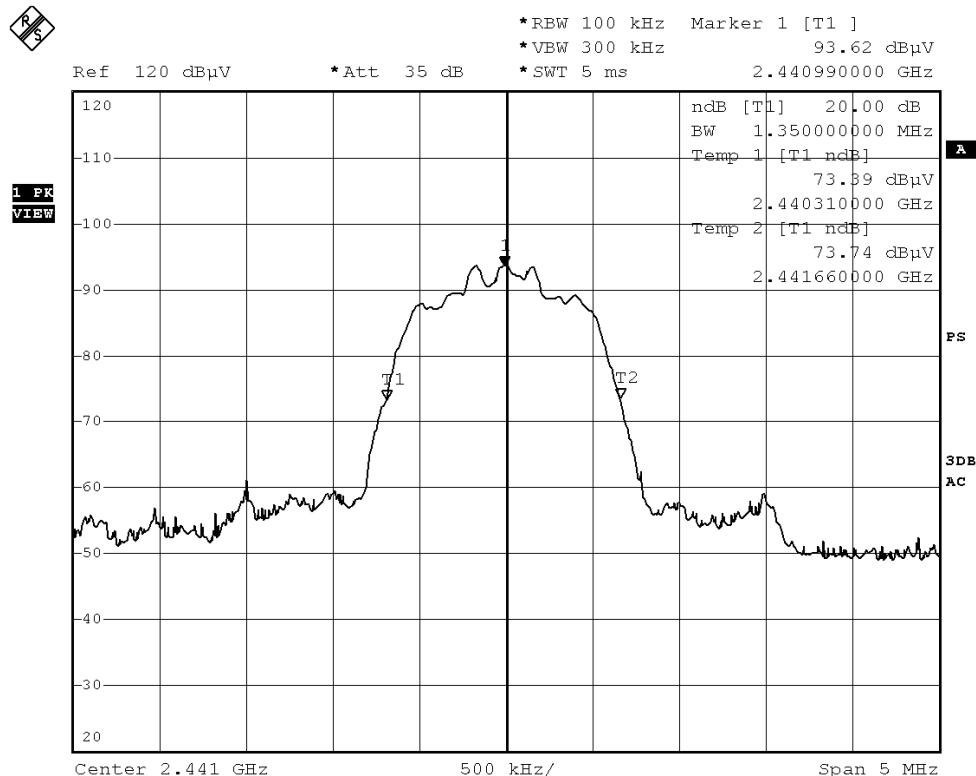
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2441	1.35	Within 2400-2483.5

### (Middle Operating Frequency) - (8DPSK)



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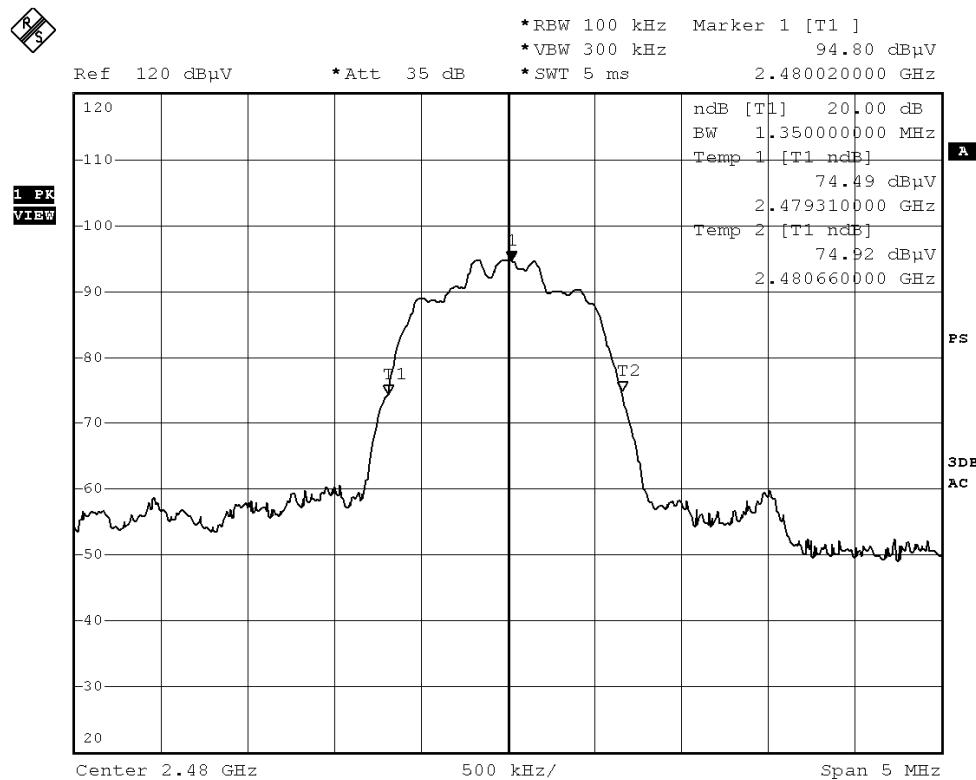
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Fundamental Frequency [MHz]	20dB Bandwidth [MHz]	FCC Limits [MHz]
2480	1.35	Within 2400-2483.5

### (Highest Operating Frequency) - (8DPSK)



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## STC Test Report

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### **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 accordance 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)

### **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 minimum bandwidth \* 2/3 = 1.380MHz \* 2/3 = 920kHz

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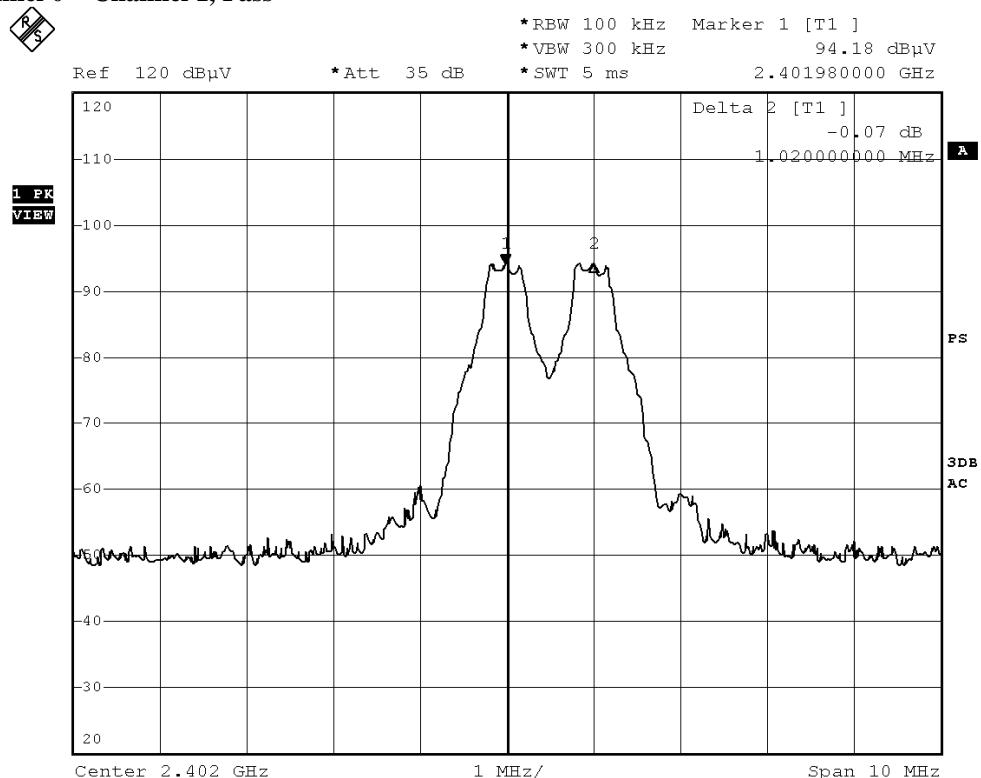
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**Channel separation = 1MHz (>920kHz) (GFSK)**

**Channel 0 – Channel 1, Pass**



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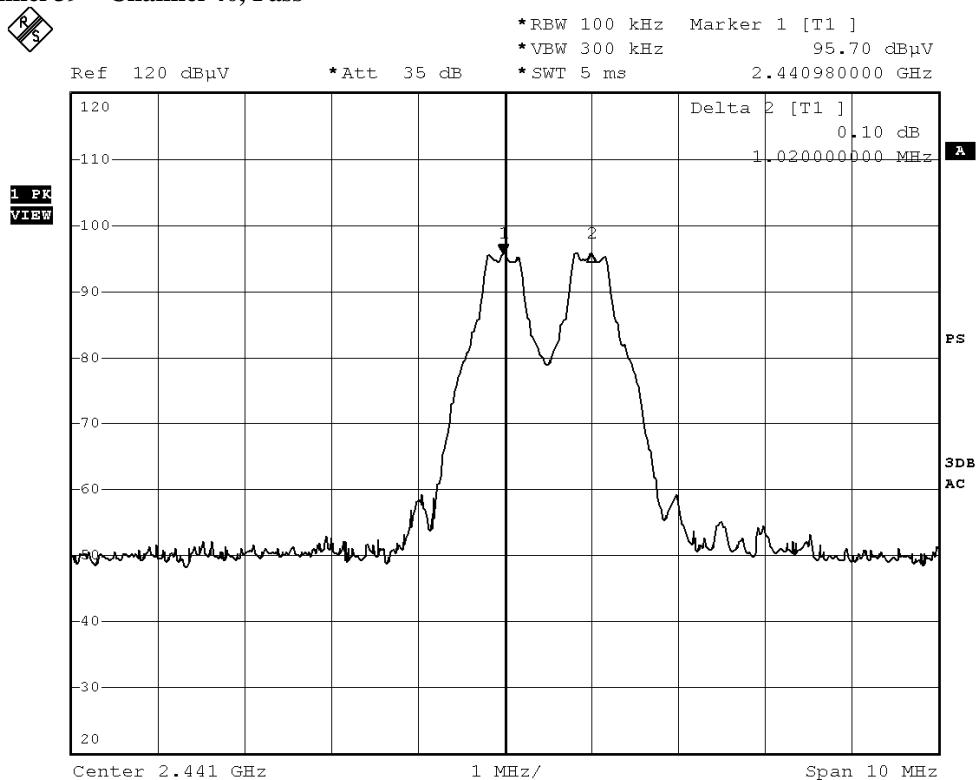
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### Channel 39 – Channel 40, Pass



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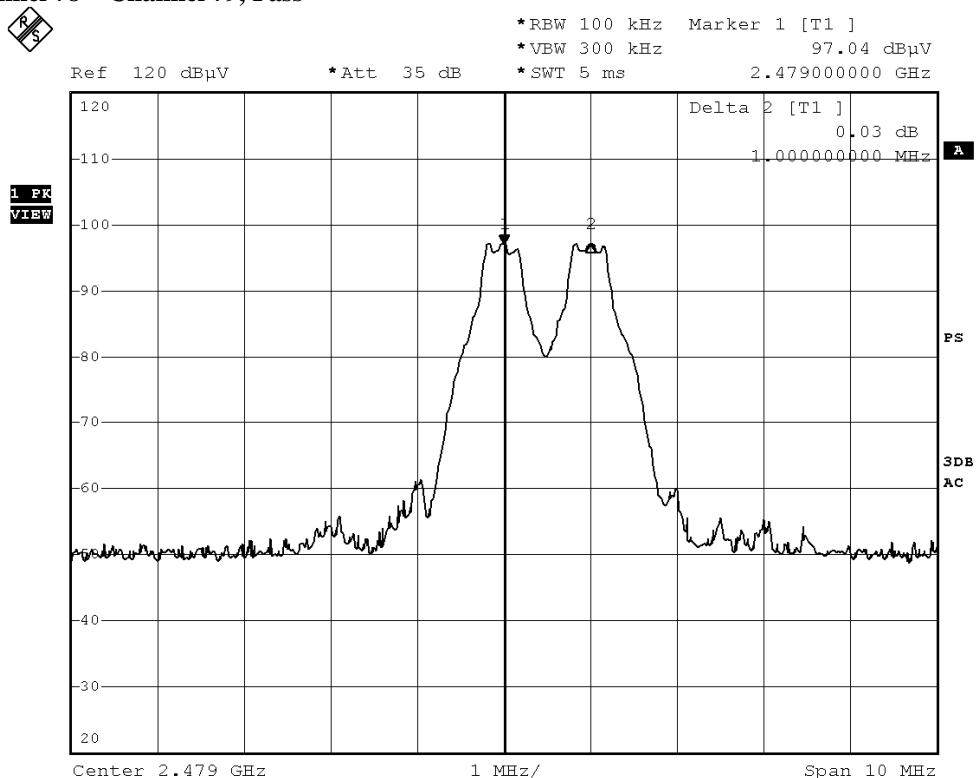
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## **Channel 78 – Channel 79, Pass**



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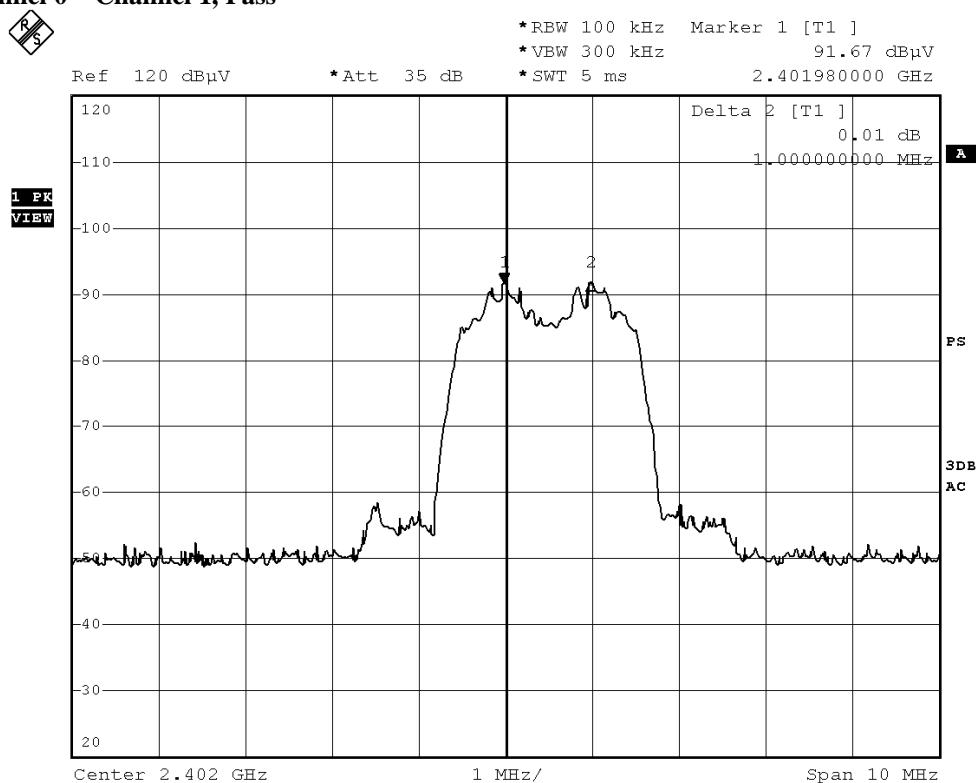
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Channel separation = 1MHz (>920kHz) ( $\pi/4$  DQPSK)

### Channel 0 – Channel 1, Pass



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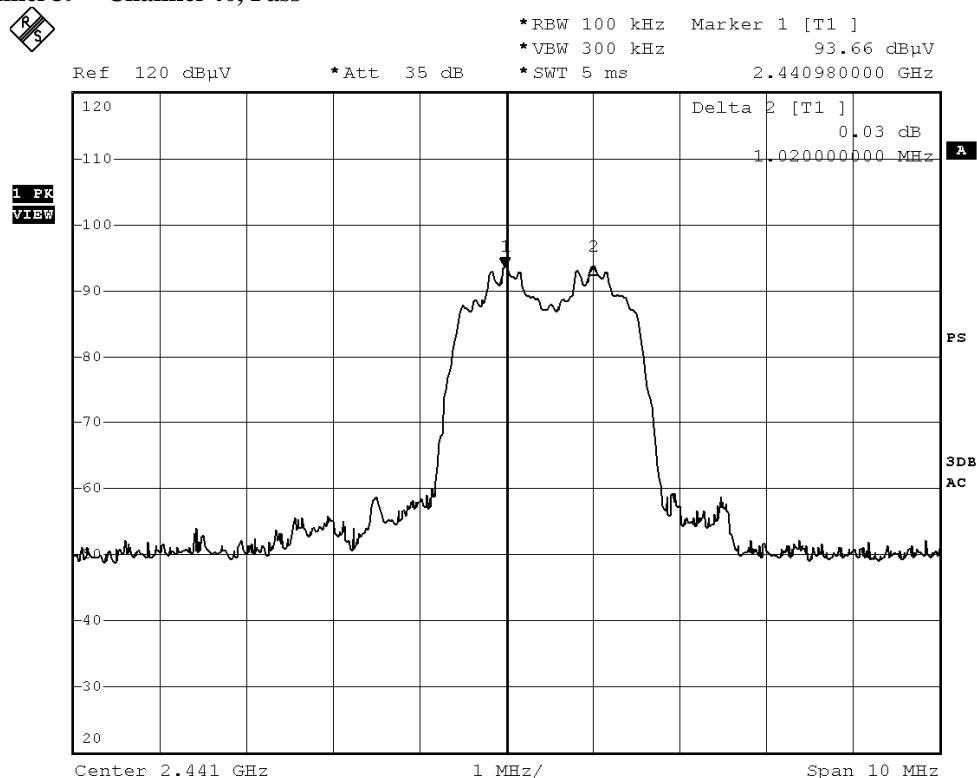
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### Channel 39 – Channel 40, Pass



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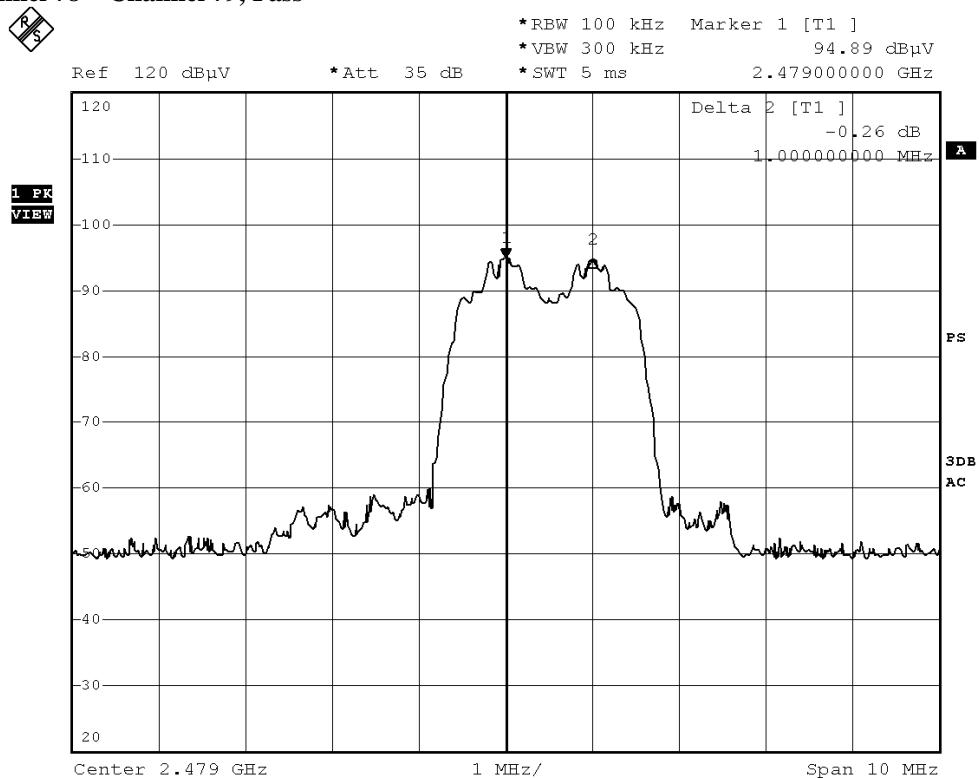
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### Channel 78 – Channel 79, Pass



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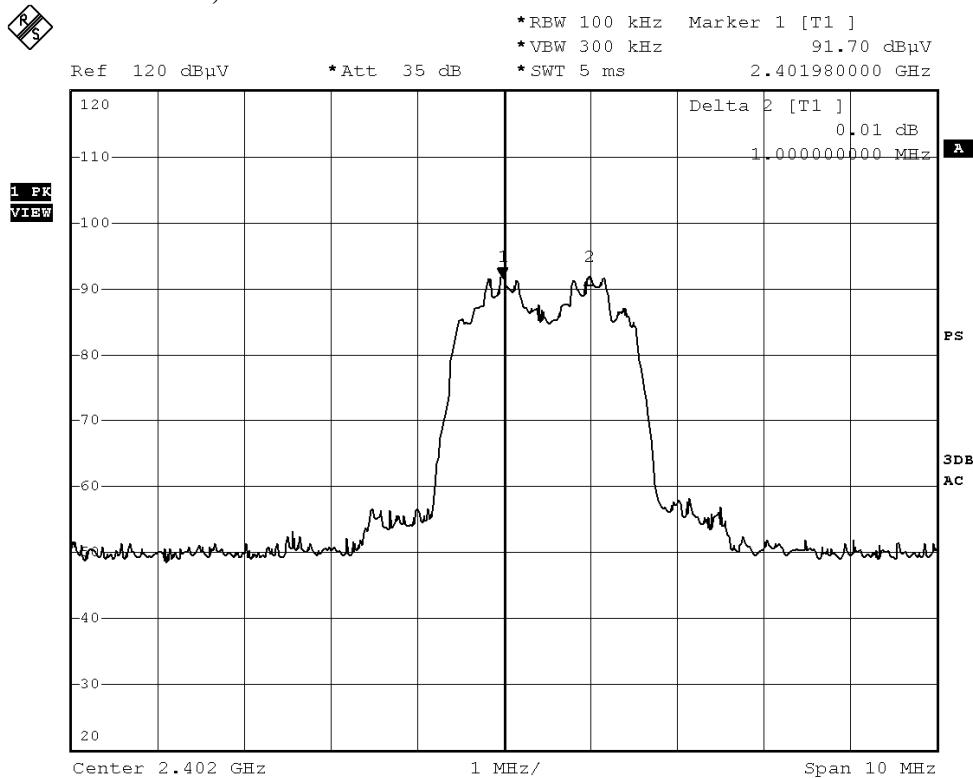
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### Channel separation = 1MHz (>920kHz) (8DPSK)

#### Channel 0 – Channel 1, Pass



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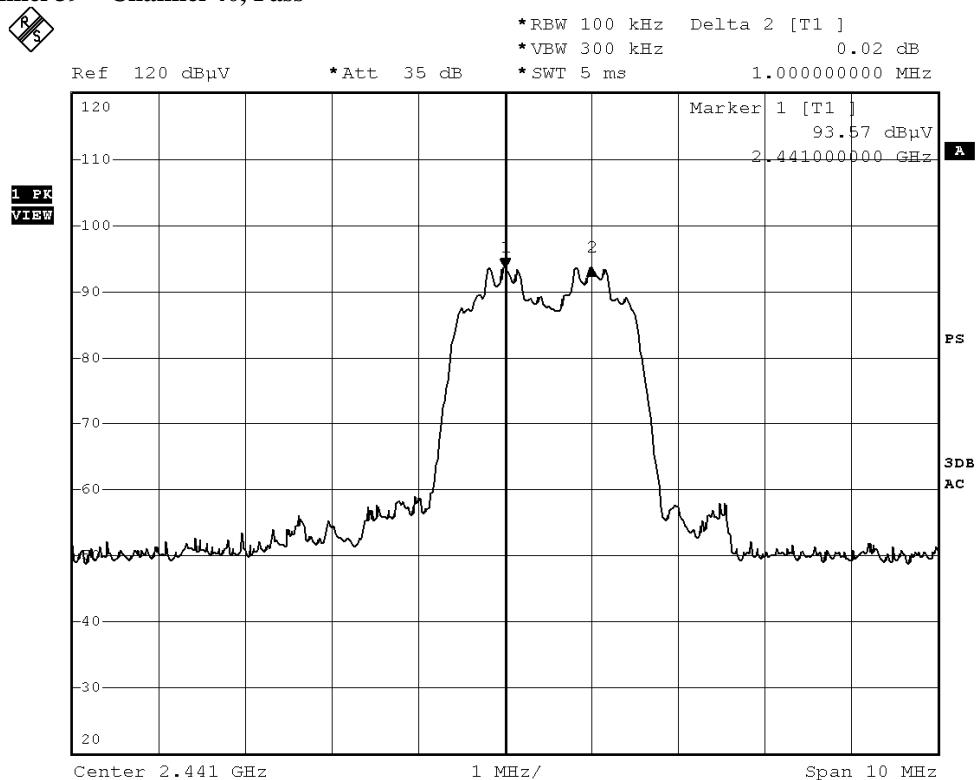
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### Channel 39 – Channel 40, Pass



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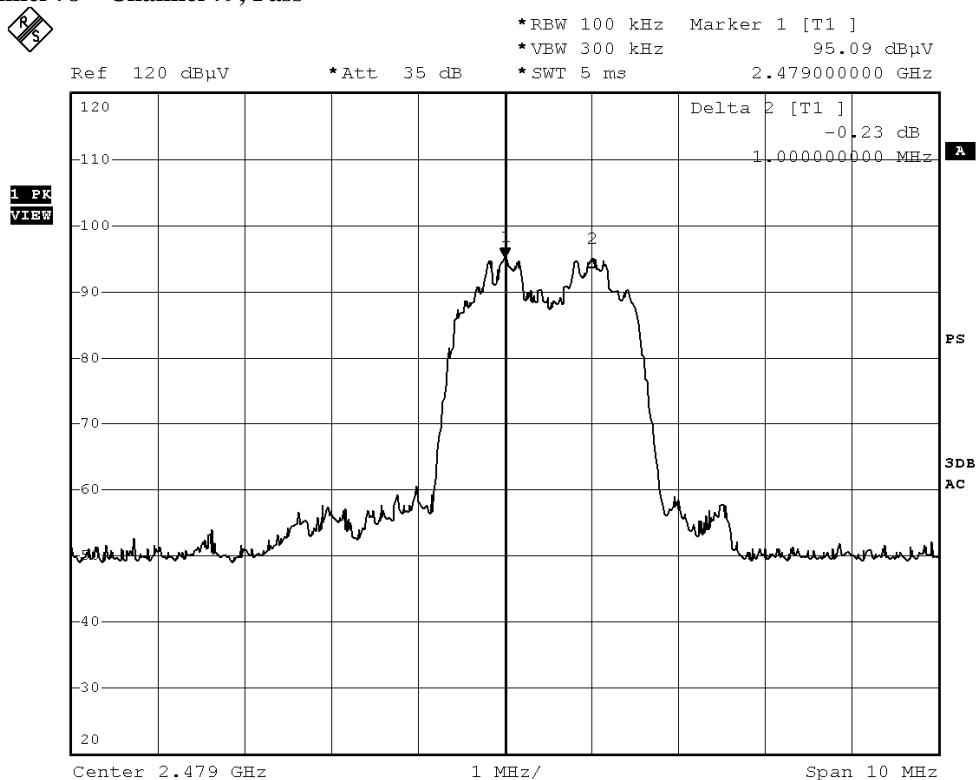
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### Channel 78 – Channel 79, Pass



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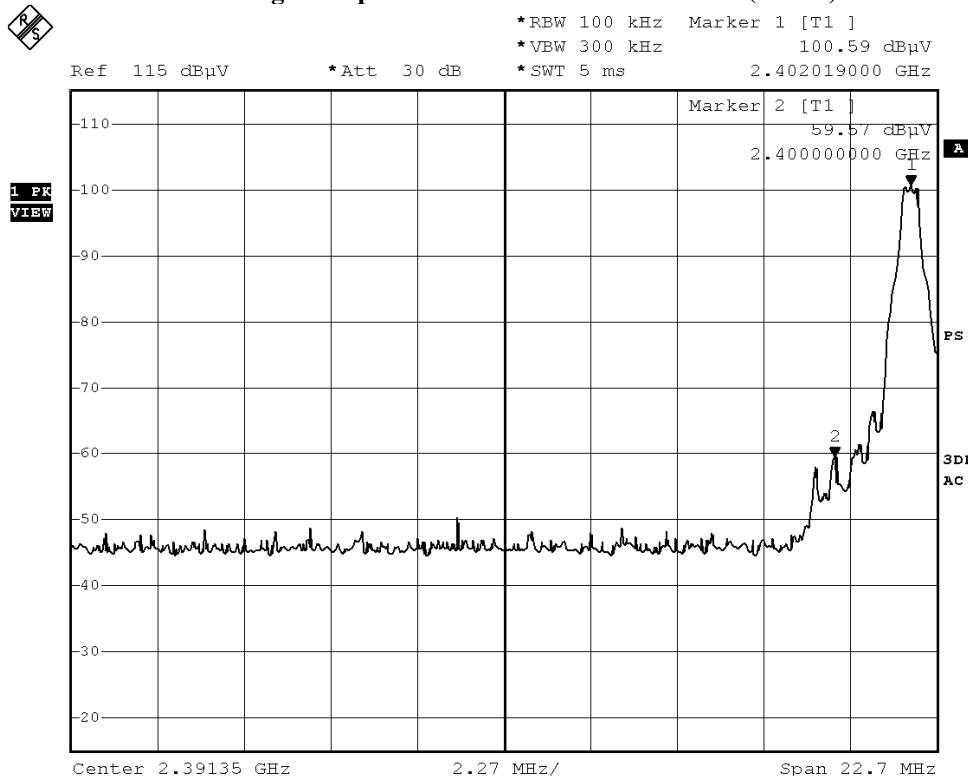
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### Band-edge Compliance of RF Emissions – Lowest (GFSK)



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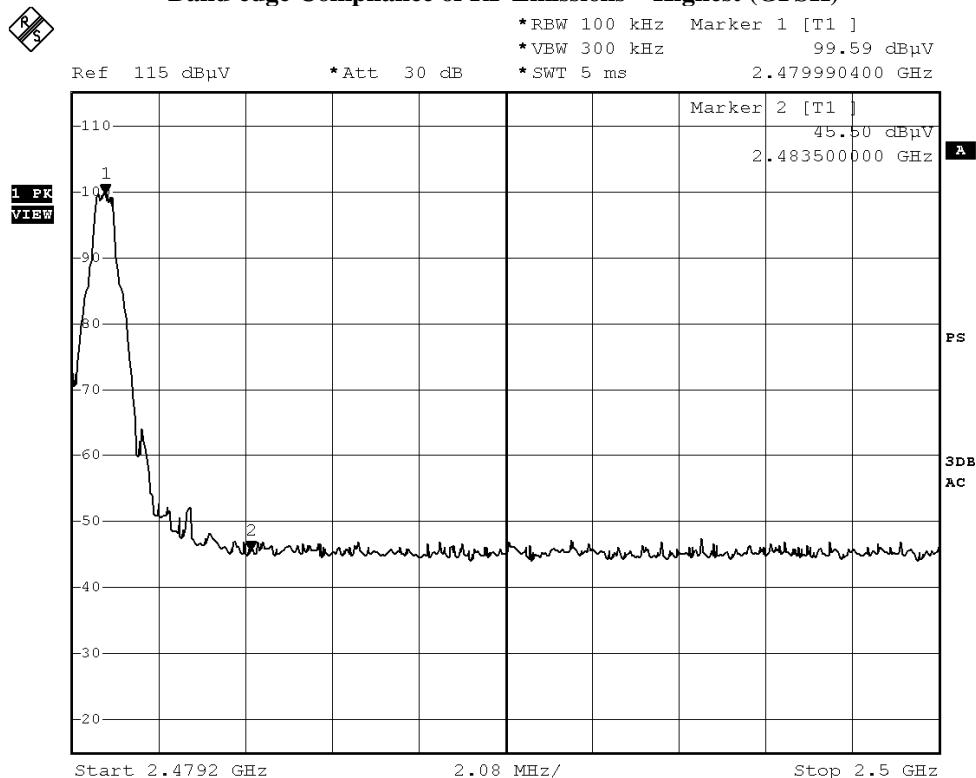
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### Band-edge Compliance of RF Emissions – Highest (GFSK)



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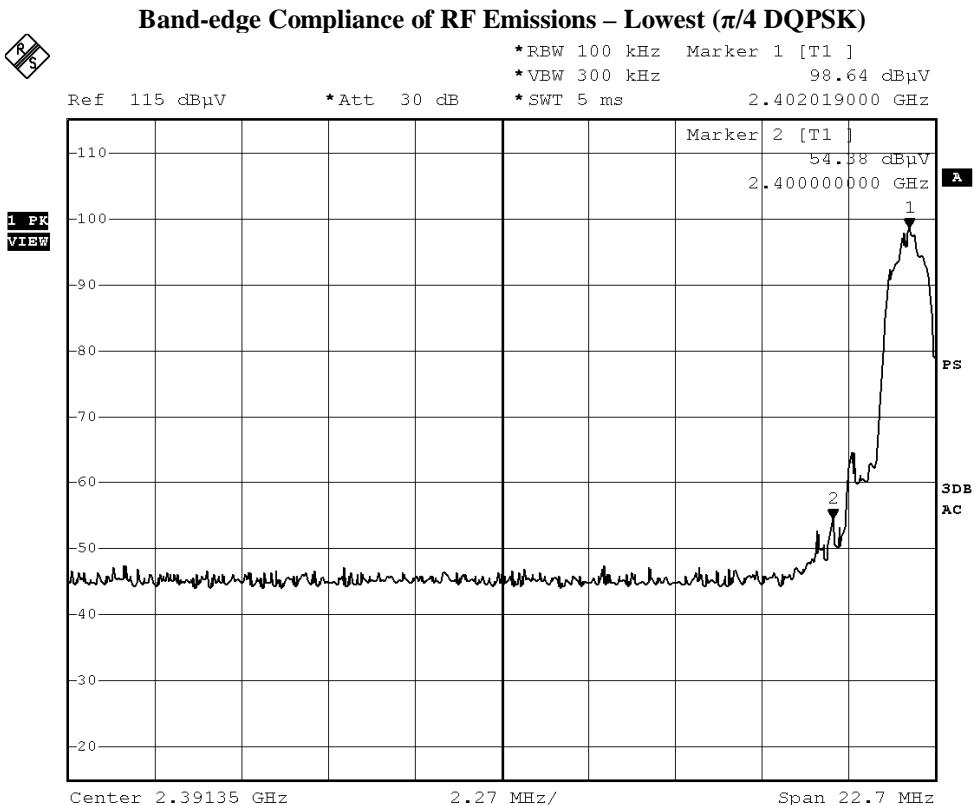


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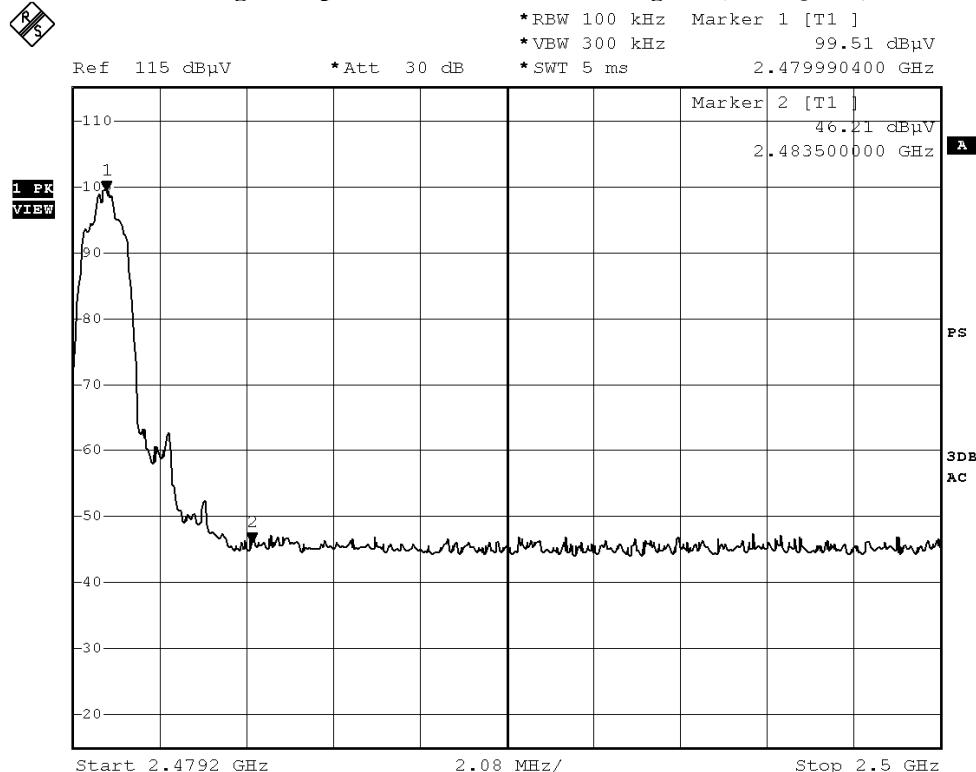
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### Band-edge Compliance of RF Emissions – Highest ( $\pi/4$ DQPSK)



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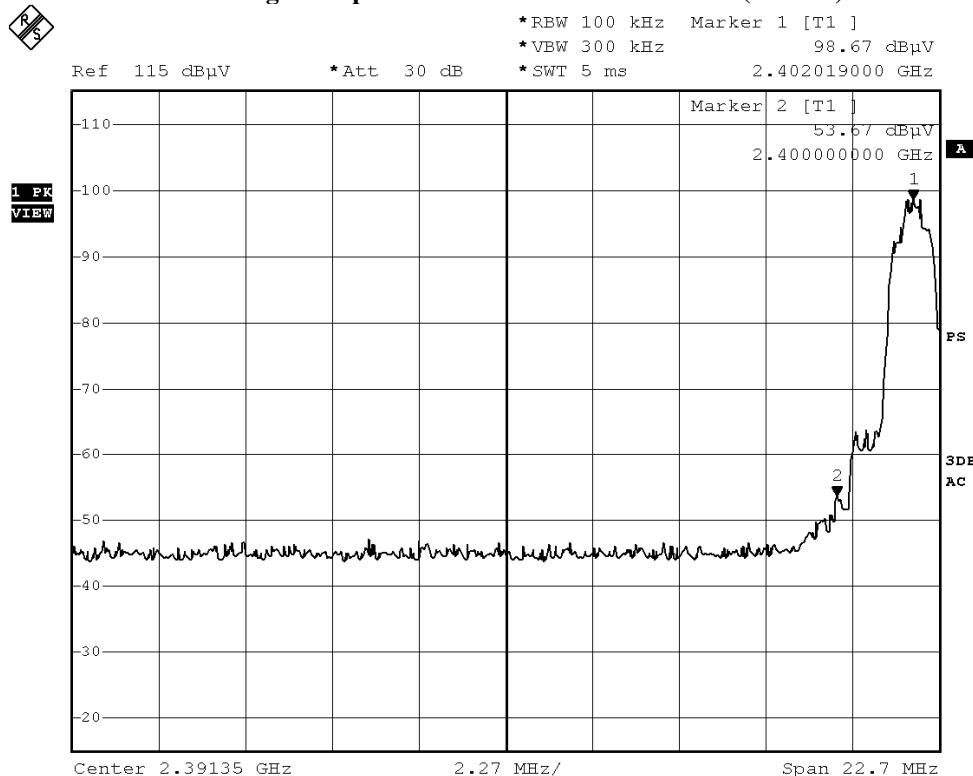
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### Band-edge Compliance of RF Emissions – Lowest (8DPSK)



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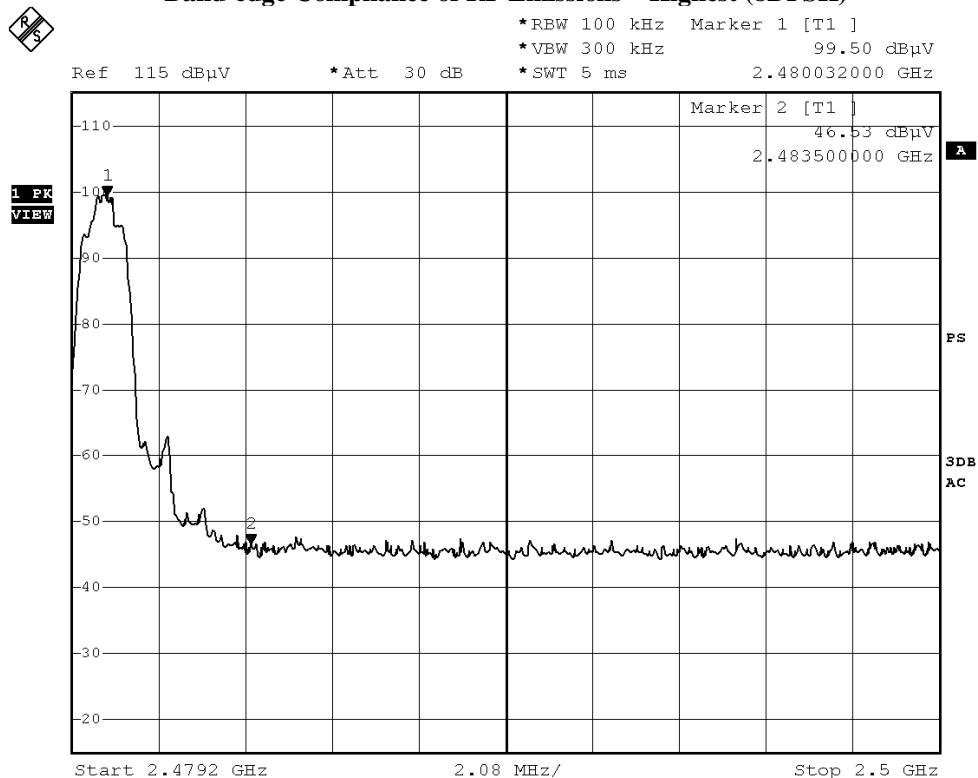
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### Band-edge Compliance of RF Emissions – Highest (8DPSK)



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### **Antenna Requirement**

**Test Requirements: § 15.203**

#### **Test Specification:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### **Test Results:**

The EUT has 1 [RP-SMA Right Angle Antenna] which is attached to the main unit and attached on PCB board, the antenna gain = 2.2dBi. All component install on inside of EUT.

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### **Pseudorandom Hopping Algorithm**

#### **Requirements:**

The channel frequencies shall be selected from a pseudorandom ordered list of hopping frequencies. Each frequency must be used equally by the transmitter.

#### **EUT Pseudorandom Hopping Algorithm**

The EUT is a Bluetooth device, the Pseudo-random hopping pattern; hopping characteristics and algorithm are based on the Bluetooth specification.

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### **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.

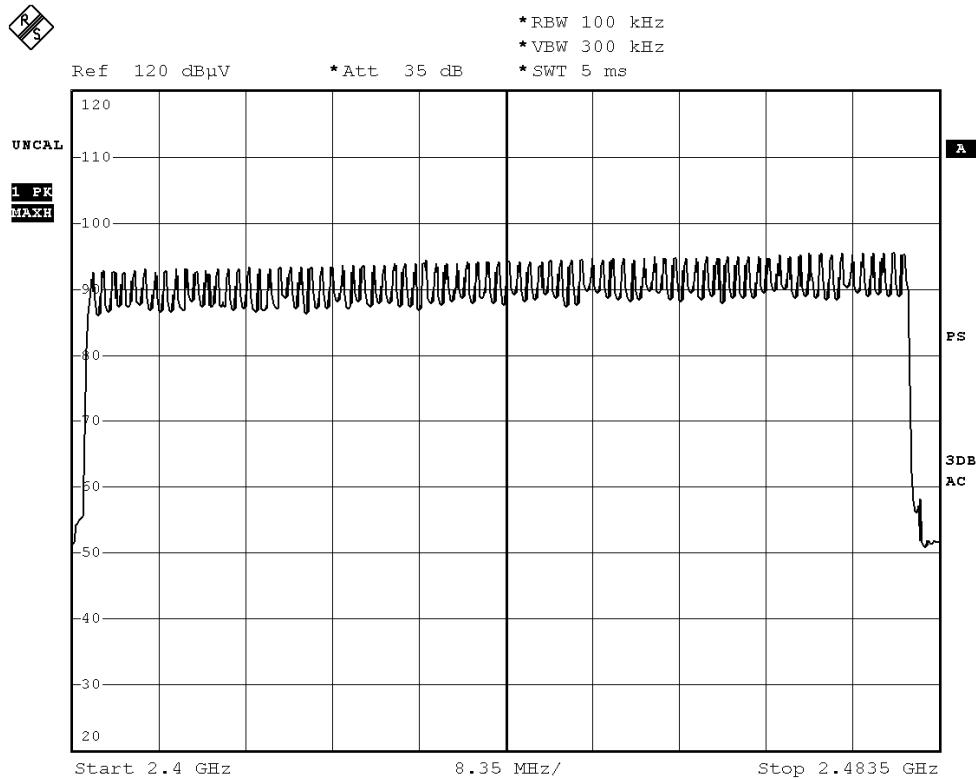
No requirements for Digital Transmission System.

**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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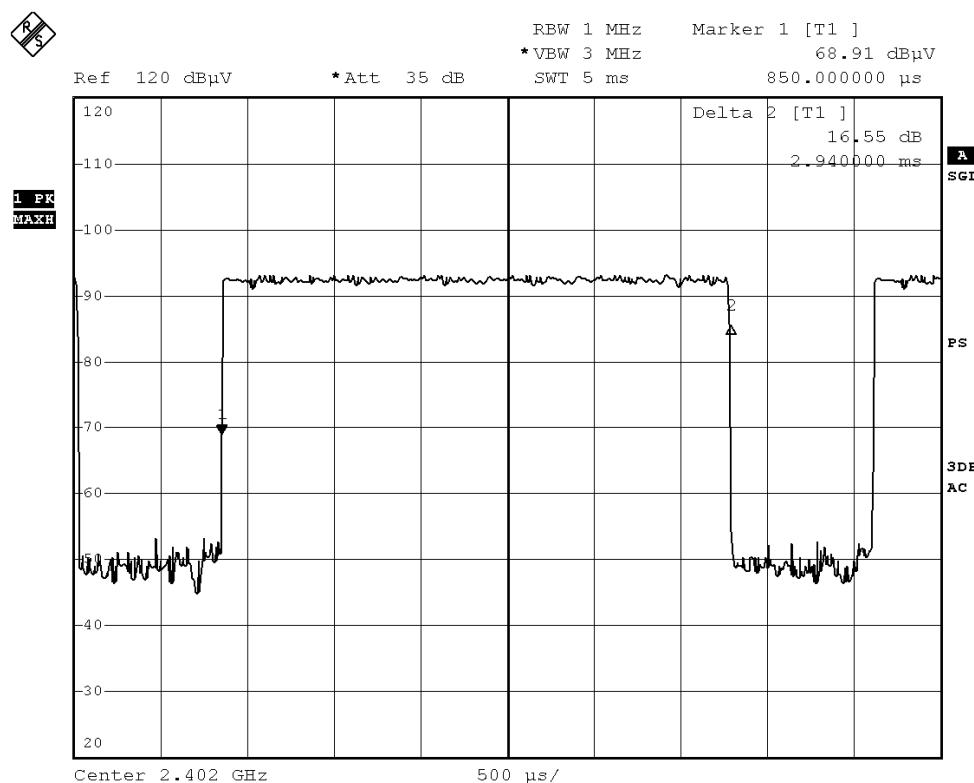
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### **DH5 Packet:**

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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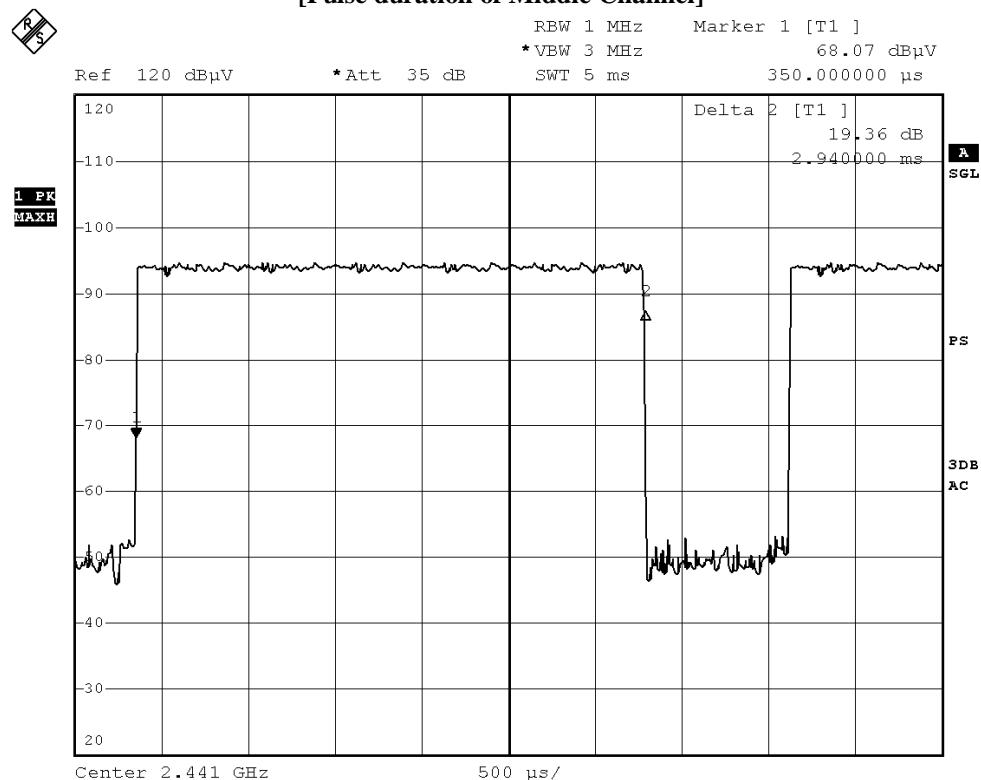
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**Fig. B**  
**[Pulse duration of Middle Channel]**



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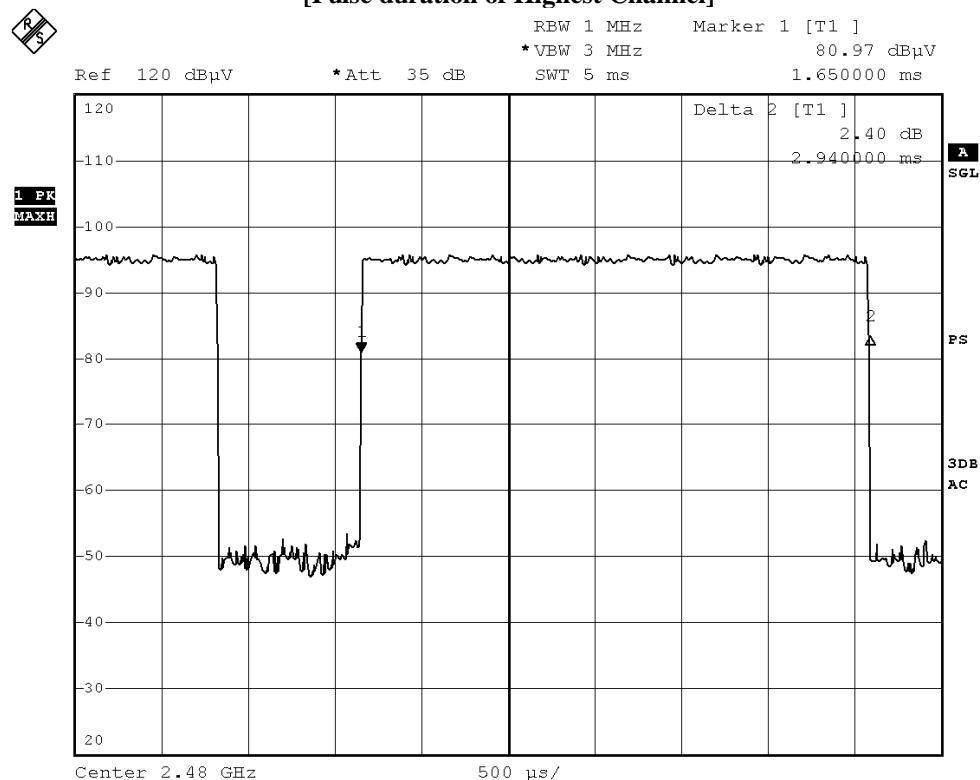
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**Fig. C**  
**[Pulse duration of Highest Channel]**



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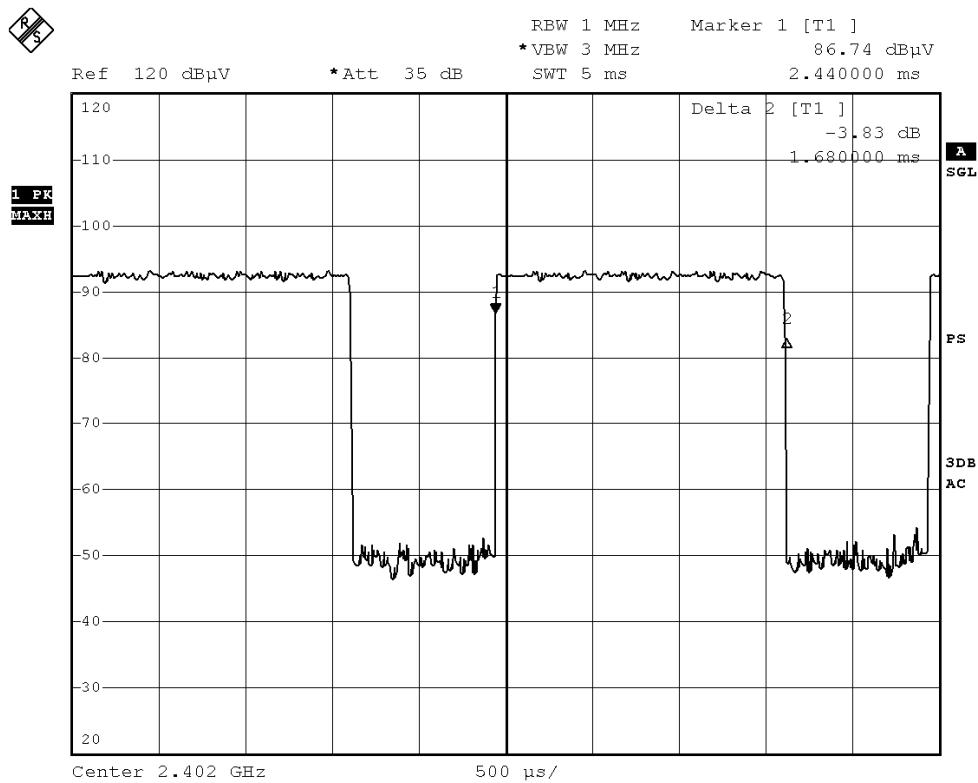
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### DH3 Packet:

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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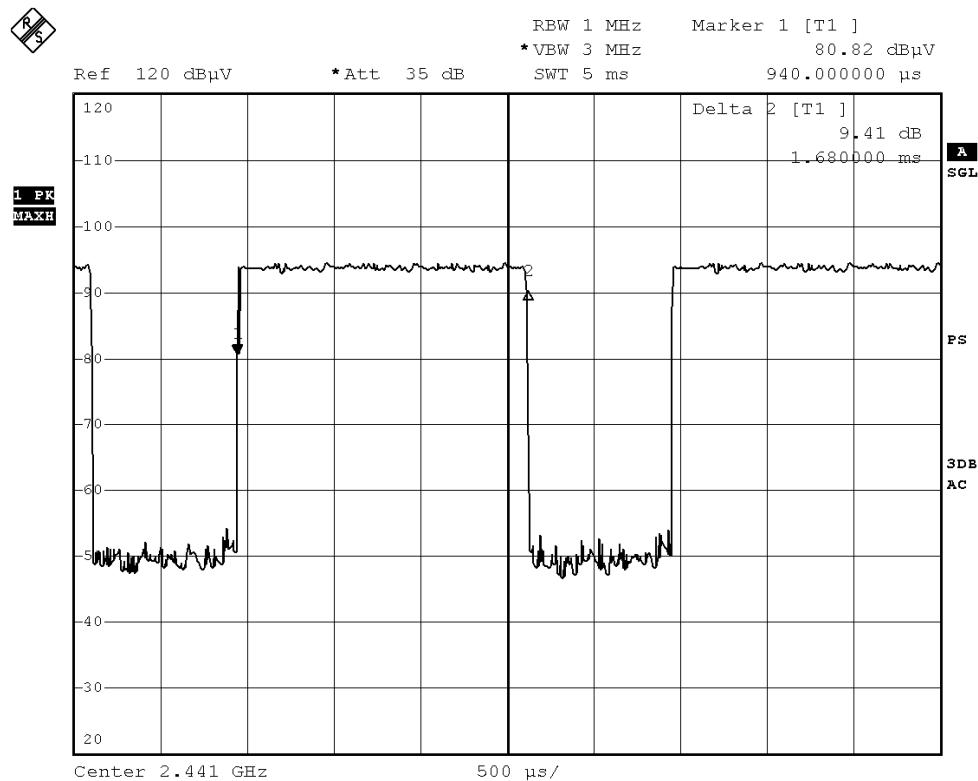
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**Fig. E**  
[Pulse duration of Middle Channel]



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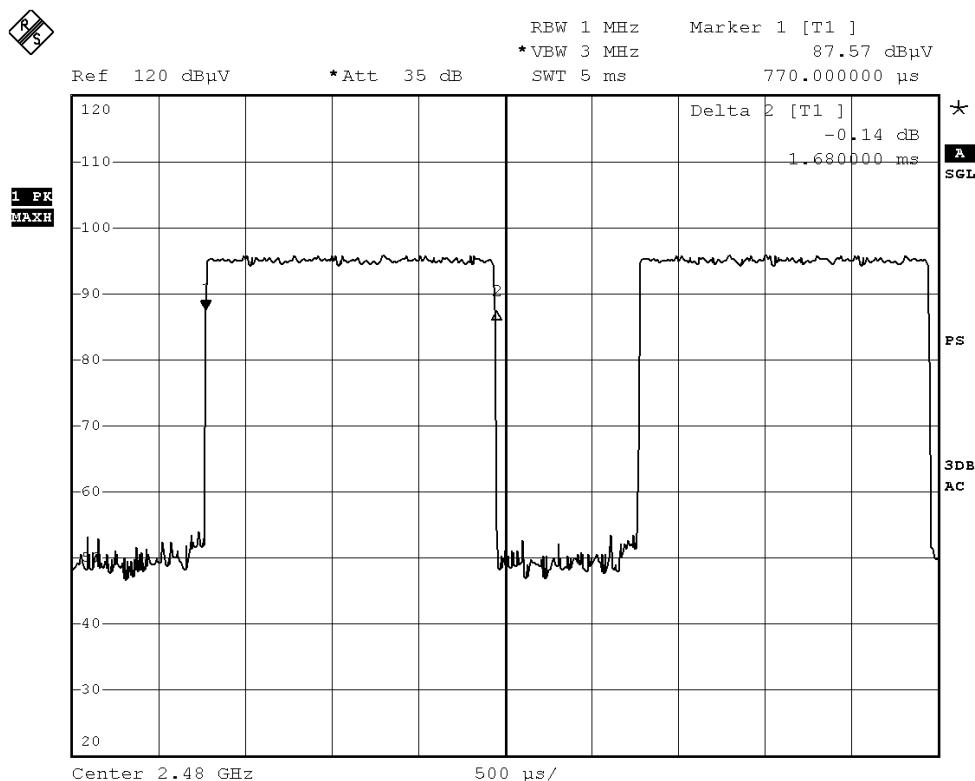
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**Fig. F**  
[Pulse duration of Highest Channel]



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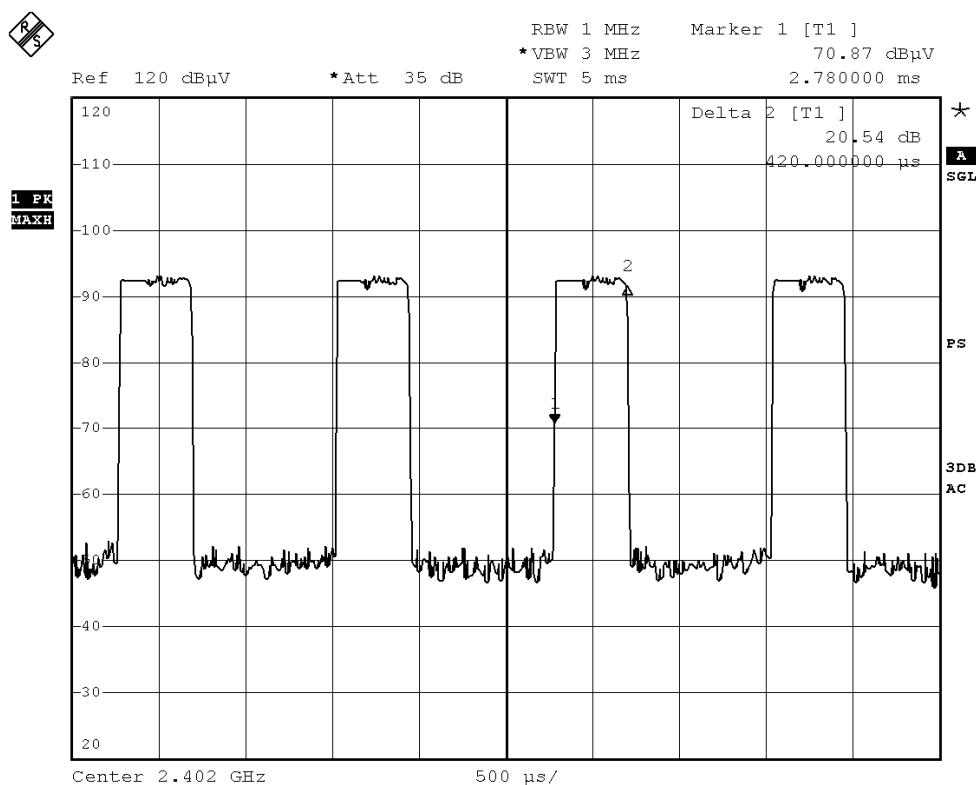
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### **DH1 Packet:**

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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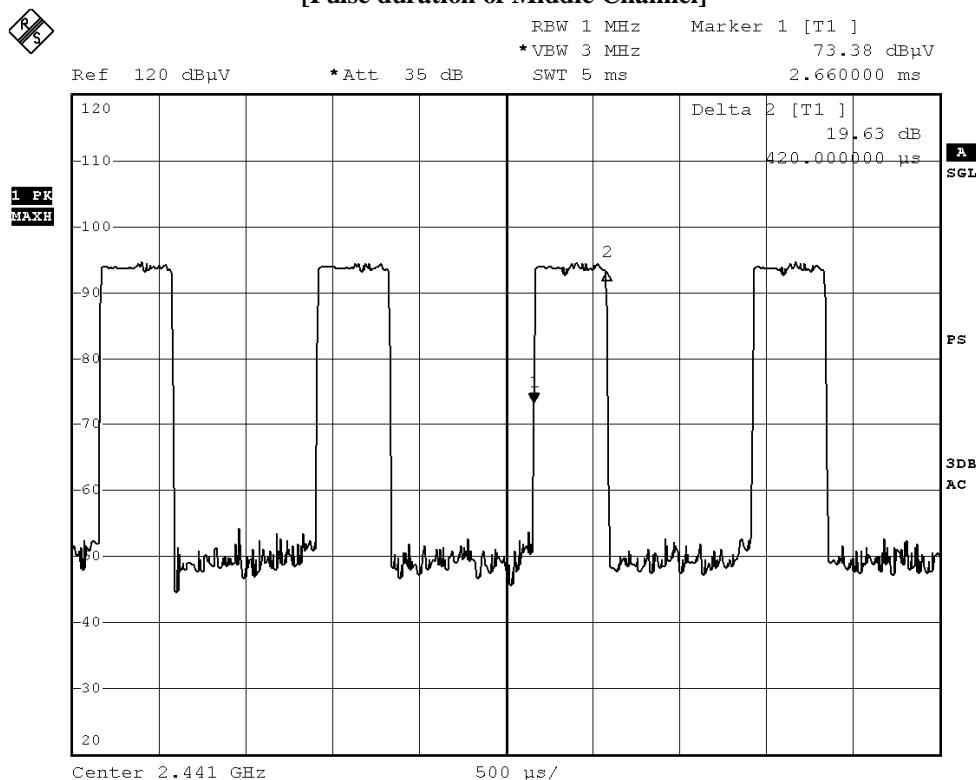
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**Fig. H**  
**[Pulse duration of Middle Channel]**



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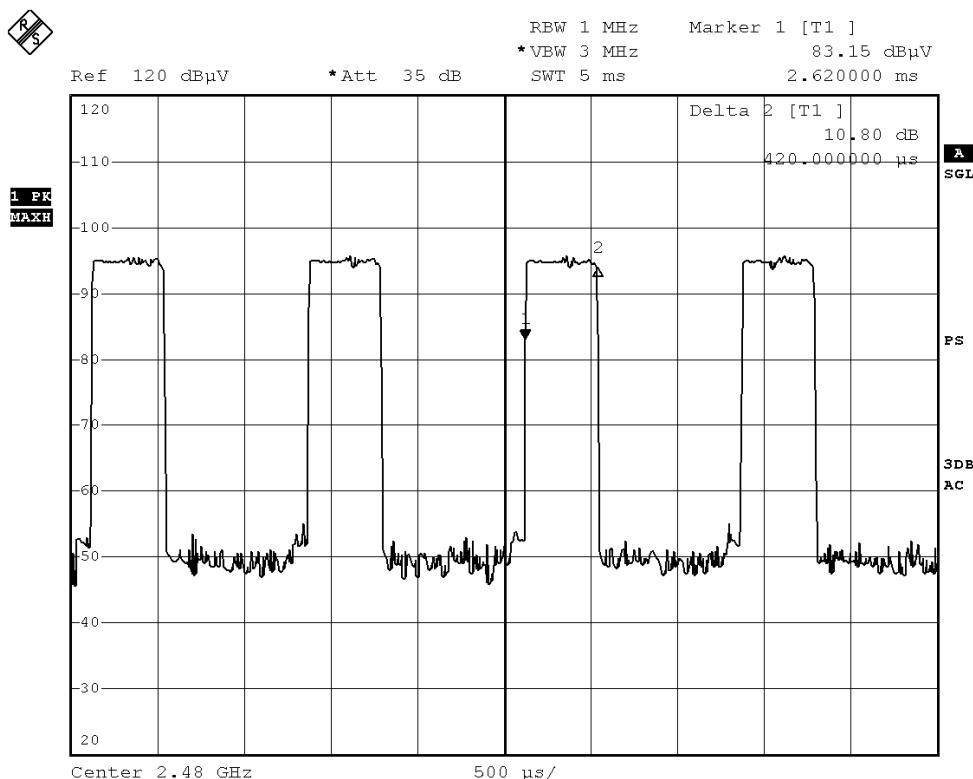
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**Fig. I**  
[Pulse duration of Highest Channel]



### Time of occupancy (Dwell Time):

Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Results
DH5	2402	2.940	0.314	0.400	Complies
DH5	2441	2.940	0.314	0.400	Complies
DH5	2480	2.940	0.314	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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### Appendix A

#### List of Measurement Equipment

##### Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD015	Signal Generator	MARCONI INSTRUMENTS	2030	112191/012	2013.03.15	2014.03.15
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	100388	2012.07.06	2013.07.06
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2012.11.03	2014.11.03
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2012.11.28	2014.11.28
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
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A	N/A
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2012.03.26	2014.03.26
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO Inc.	JXTXLB-42-15-C-KF	J2021100721001	2013.01.25	2015.01.25

##### Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD003	IMPULSEGRENZER PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100071	2013.03.15	2014.03.15
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	100314	2013.03.15	2014.03.15
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2012.07.06	2013.07.06
EMD103	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707455	N/A	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A	N/A

##### Remarks:-

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

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### **Appendix B**

#### **Ancillary Equipment**

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

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### Appendix C

#### Photographs of EUT

Front View of the product



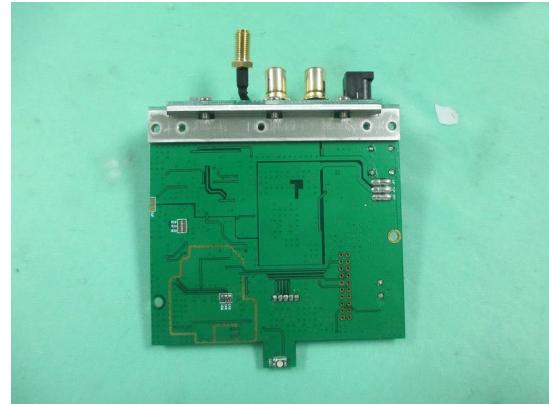
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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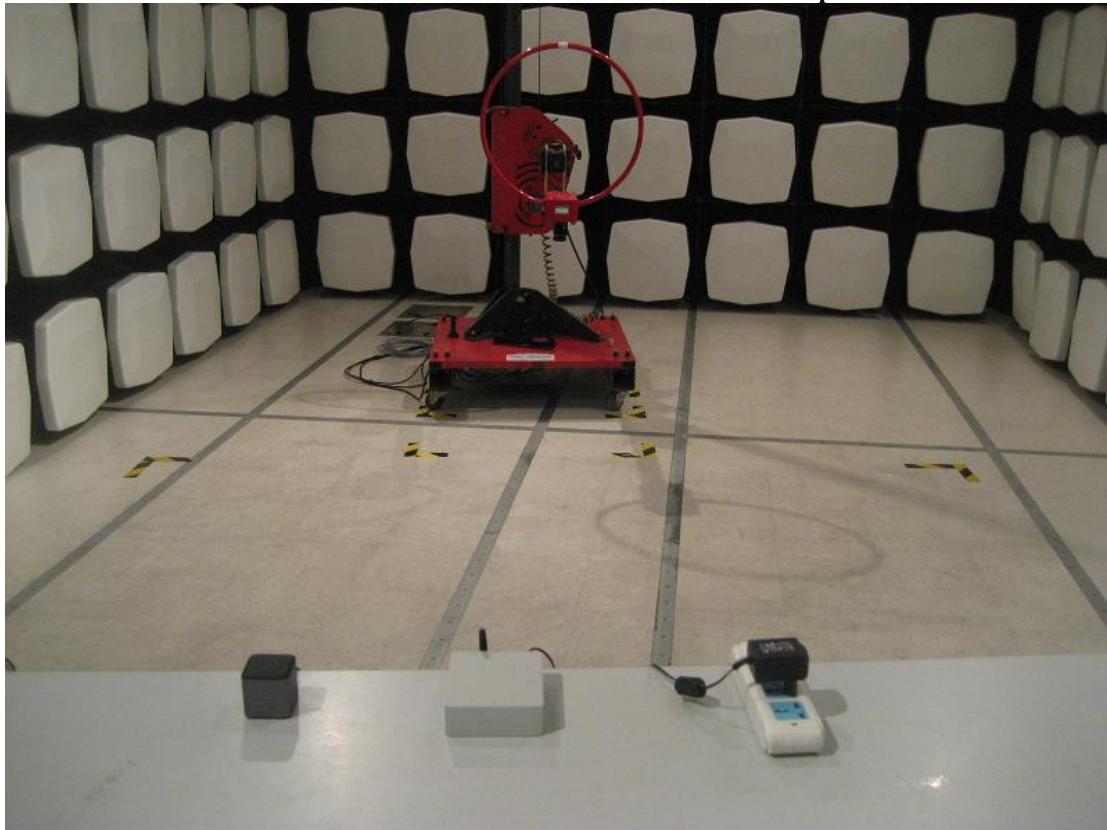
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### **Photographs of EUT**

**Measurement of Radiated Emission Test Set Up**



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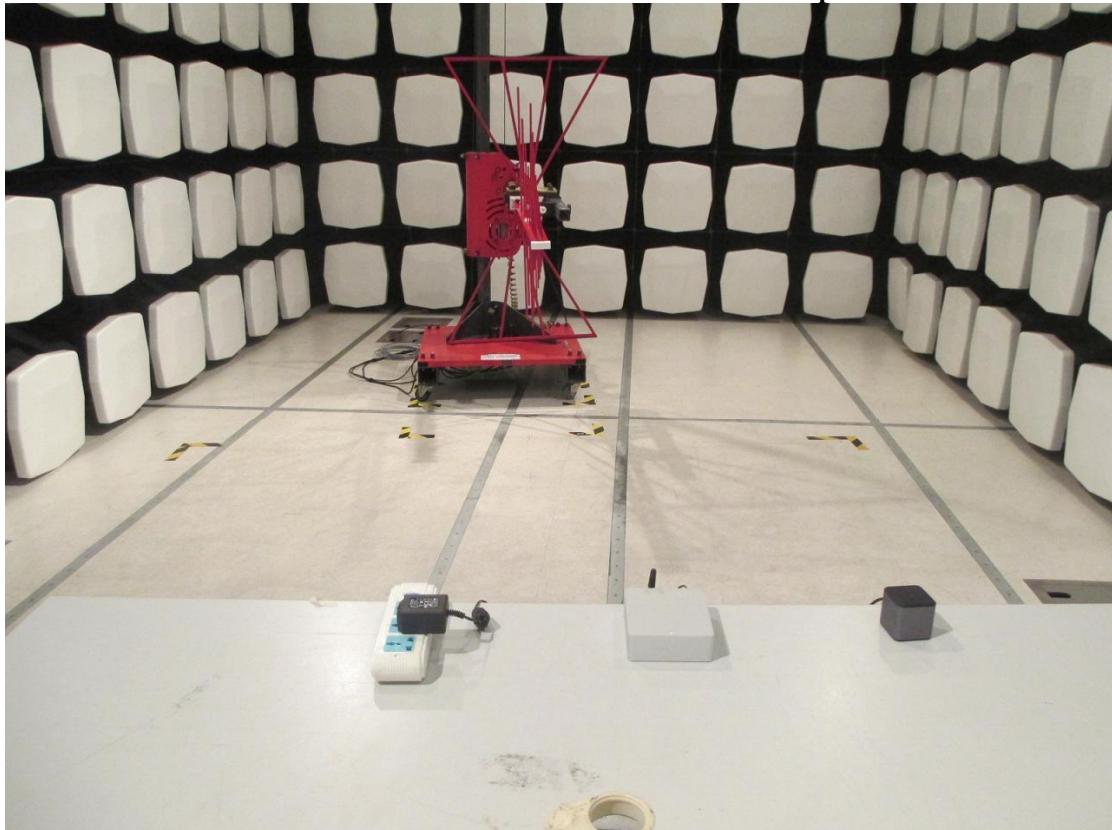
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### Photographs of EUT

**Measurement of Radiated Emission Test Set Up**



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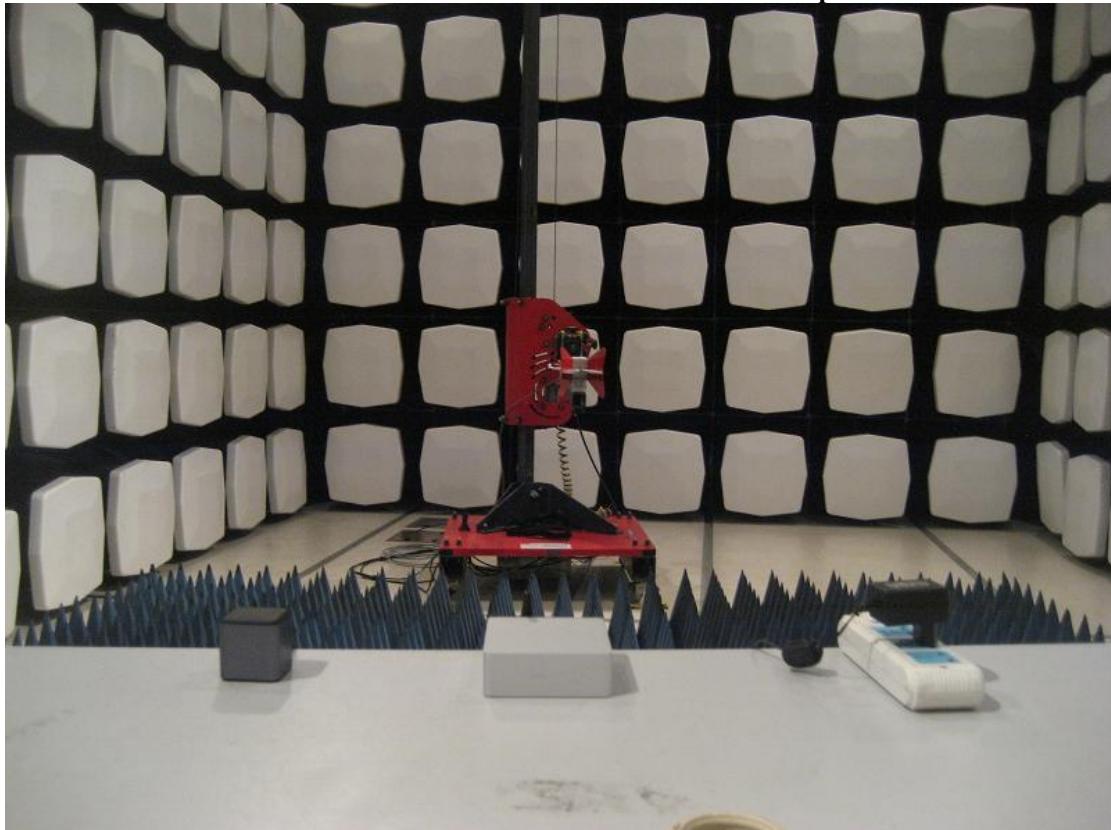
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**Measurement of Radiated Emission Test Set Up**



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**Measurement of Conducted Emission Test Set Up**



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