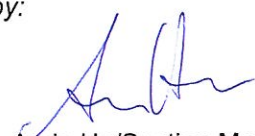



Produkte
Products

Prüfbericht - Nr.: 10040239 001			Seite 1 von 31 Page 1 of 31		
<i>Test Report No.:</i>					
Auftraggeber: PRIMAX Electronics LTD.					
<i>Client:</i>			669, Ruey Kuang Road, Neihu 114 Taipei, Taiwan, R.O.C.		
Gegenstand der Prüfung: Wireless Mouse					
<i>Test item:</i>					
Bezeichnung: MORFGOO		Serien-Nr.: N/A			
<i>Identification:</i>		<i>Serial No.:</i>			
Wareneingangs-Nr.: 800012006		Eingangsdatum: 09 Jan. 2013			
<i>Receipt No.:</i>		<i>Date of receipt:</i>			
Zustand des Prüfgegenstandes bei Anlieferung:			The sample is ok for testing and not damaged		
Condition of test item at delivery:					
Prüfört: TÜV Rheinland Taiwan Ltd.					
<i>Testing location:</i>			11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105 Taiwan FCC Registration No.: 365730		
Prüfgrundlage: FCC CFR47 Part 15: Subpart C Section 15.247					
<i>Test specification:</i>			ANSI C63.10:2009 RSS-210 (Issue 8): Dec. 2010 RSS-Gen (Issue 3): Dec. 2010		
Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).					
<i>Test Result:</i>			The test item passed the test specification(s).		
Prüflaboratorium: TÜV Rheinland Taiwan Ltd.					
<i>Testing Laboratory:</i>			11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105, Taiwan, R.O.C.		
geprüft/ tested by:			kontrolliert/ reviewed by:		
					
2013-02-25 Arvin Ho/Section Manager			2013-02-25 Rene Charton/Senior Project Manager		
Datum	Name/Stellung	Unterschrift	Datum	Name/Stellung	Unterschrift
Date	Name/Position	Signature	Date	Name/Position	Signature
Sonstiges/ Other Aspects:					
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet			Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested		
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>					

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT*RESULT: Passed***5.1.2 PEAK OUTPUT POWER***RESULT: Passed***5.1.3 6DB BANDWIDTH***RESULT: Passed***5.1.4 POWER DENSITY***RESULT: Passed***5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100KHZ BANDWIDTH***RESULT: Passed***5.1.6 SPURIOUS EMISSION***RESULT: Passed***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Passed*

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix P: Photo

(File:APPENDIX P)

Appendix D: Test Result of Radiated Emissions

(File:APPENDIX D)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.247
ANSI C63.10:2009, KDB558074 D01 DTS Meas Guidance v02

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC Registration No.: 365730
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2010-Jul-1st to 2013-Jun-30th



Testing Laboratory
0759

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	R&S	ESCI 7	1166.5950K07-100797-Pt	20-Dec-13
Bilog Antenna	TESEQ	CBL6111D	29802	29-Jun-13
Pre-Amplifier	HP	8447F	2805A03335	14-Sep-13
Spectrum Analyzer	R&S	FSV 40	100921	13-Dec-13
Horn Antenna (1GHz~18GHz)	COM-POWER	AHA118	701251	28-Sep-13
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	2-Nov-13
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	14-Sep-13
Preamplifier (18 GHz -40 GHz)	COMPOWER	PAM-840	461257	17-Sep-13
Power meter	R&S	NRVD	100439	27-Mar-13
Power sensor	R&S	NRV-Z1	100013	27-Mar-13
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	13-May-13
Signal Generator	R&S	SMU200	104260	13-Aug-13
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	28-Sep-13

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 1 \text{ dB}$
Adjacent channel power	$\pm 3 \text{ dB}$
Radiated emission of transmitter, valid up to 26 GHz	$\pm 6 \text{ dB}$
Radiated emission of receiver, valid up to 26 GHz	$\pm 6 \text{ dB}$
Temperature	$\pm 2 \text{ }^{\circ}\text{C}$
Humidity	$\pm 10 \%$

3. General Product Information

3.1 Product Function and Intended Use

The tested sample is a “Wireless Mouse” , which is linked to a PC via an USB Dongle. This device is powered by a Leclanche Cell
 For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	Wireless Mouse
Brand Name	PRiMAX Electronics LTD.
FCC ID	EMJMMORFGOO
Type Designation	MORFGOO
Operating Frequencies	2402MHz~2479MHz
Channel Spacing	1 MHz , 5 MHz for highest and lowest channel
Channel number	70
Operation Voltage	3.0
Modulation	GFSK
Antenna gain	0.5 dBi

Channel frequencies	2402, 2407 , 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416,
	2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427,
	2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438,
	2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449,
	2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460,
	2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471,
	2472, 2473, 2474, 2479

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Receiving
- C. Standby
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram and “Appendix P: Photo” for details.
No modification of the EUT was required during compliance test.

3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Technical Description
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test mode implemented in firmware

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

Full test was applied on all test modes, but only worst case was shown.

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Kind of Equipment	Manufacturer	Model Name	S/N
none	--	--	--

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

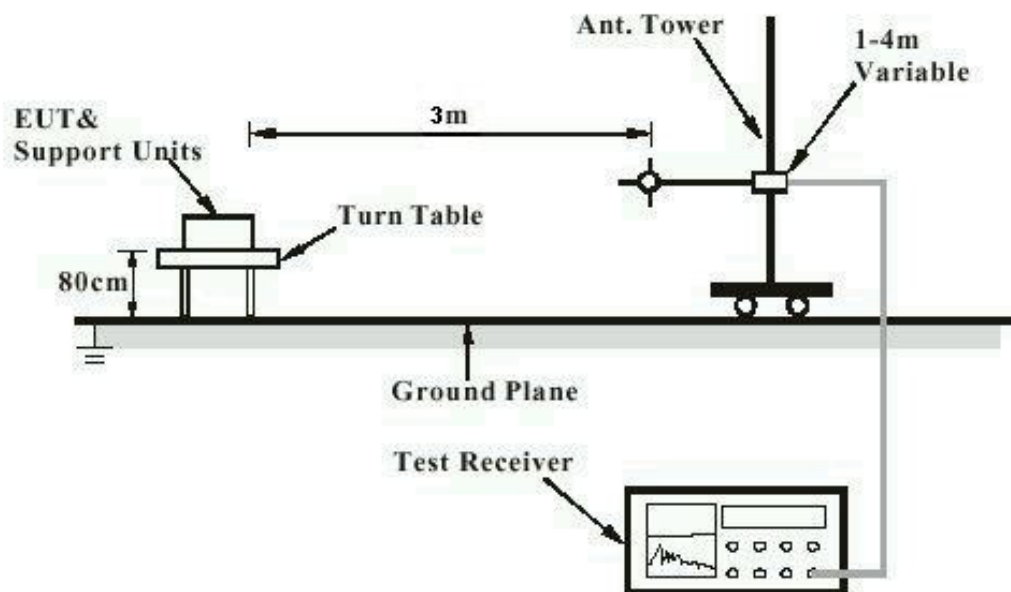


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

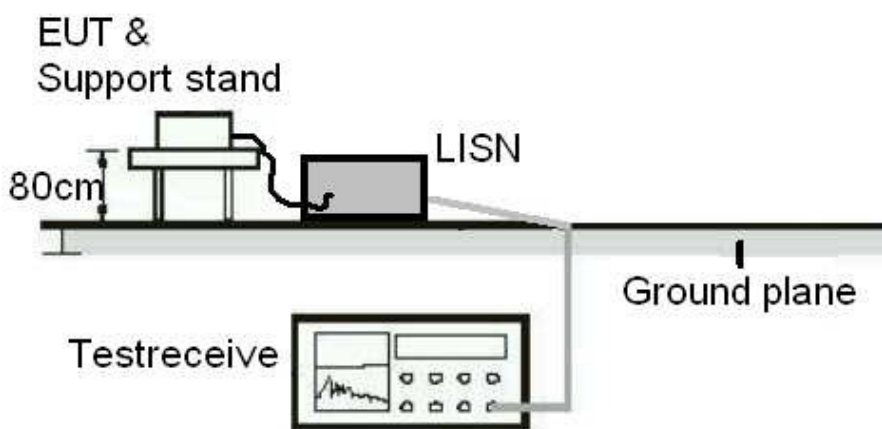
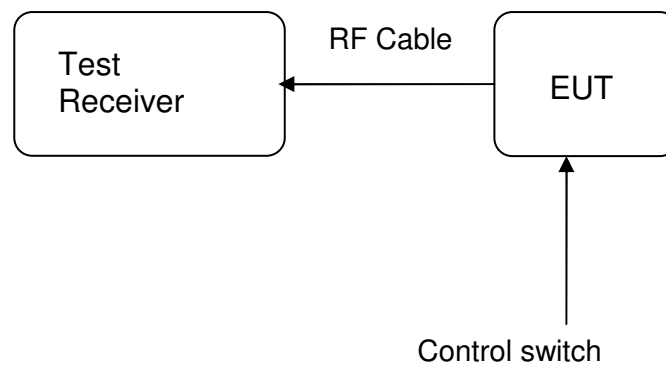


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test date	:	2012-12-12
Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and RSS-Gen 7.1.4
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an internal antenna with an directional gain of 0.5 dBi dBi, and the antenna is a Chip Antenna soldered to the PCB with no possibility of replacement. Therefore, the EUT is considered to comply the provision.

Refer to EUT photo for details.

5.1.2 Peak Output Power

RESULT:
Passed

Test standard : FCC Part 15.247(b)(3), RSS-210 A8.4(4)
 Basic standard : ANSI C63.10:2009, KDB558074
 Limit : 1 Watt
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A

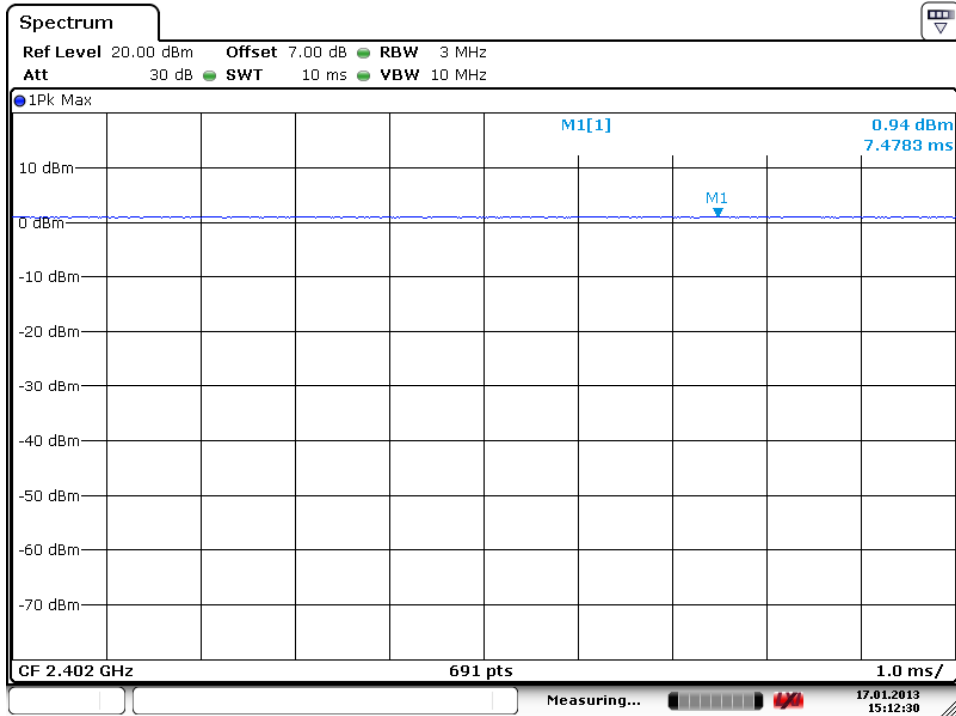
 Ambient temperature : 18-22 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 5: Test result of Peak Output Power, GFSK modulation

Channel	Channel Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2402	0.94	0.00124	1
Mid Channel	2442	0.69	0.00117	1
High Channel	2480	-0.09	0.00098	1

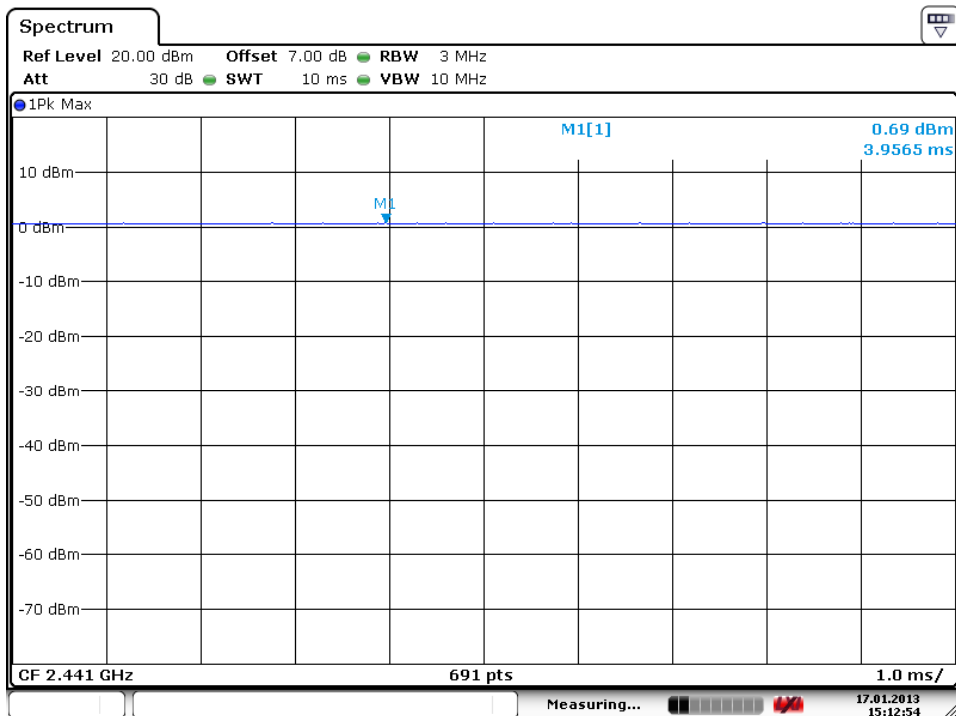
Test Plot of Peak Output Power, GFSK modulation

Low Channel

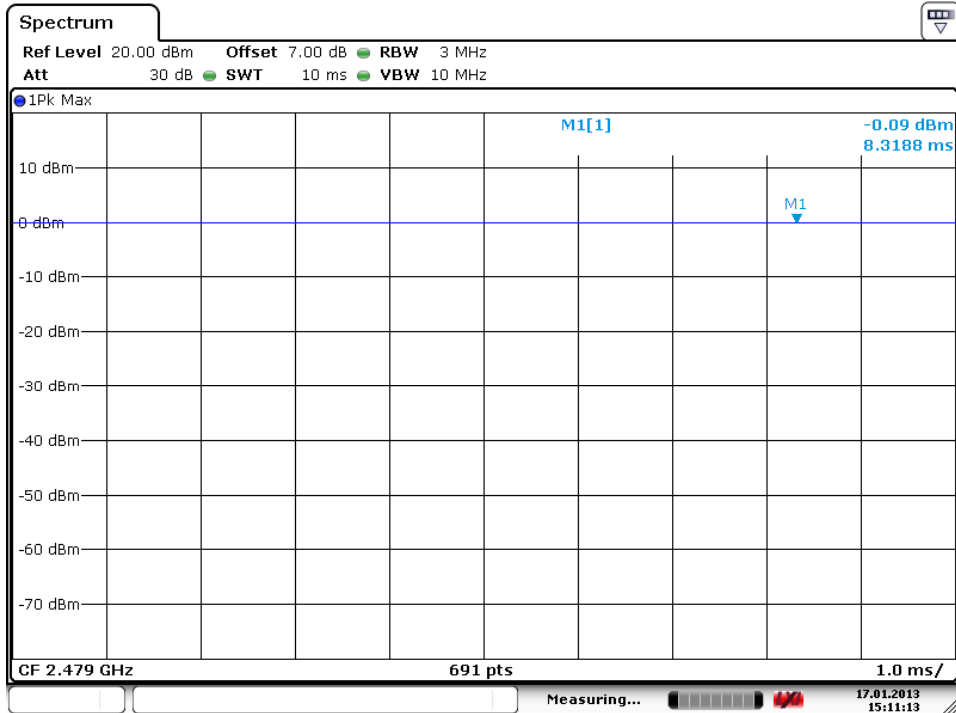


Date: 17.JAN.2013 15:12:30

Middle Channel



Date: 17.JAN.2013 15:12:54

High Channel


Date: 17.JAN.2013 15:11:13

5.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:
Passed

Test standard : FCC Part 15.247(a)(2), RSS-210 A8.2(1)
 Basic standard : ANSI C63.10:2009, KDB558074
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A

Ambient temperature : 18-22 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 6: Test result of 6 dB Bandwidth, GFSK modulation

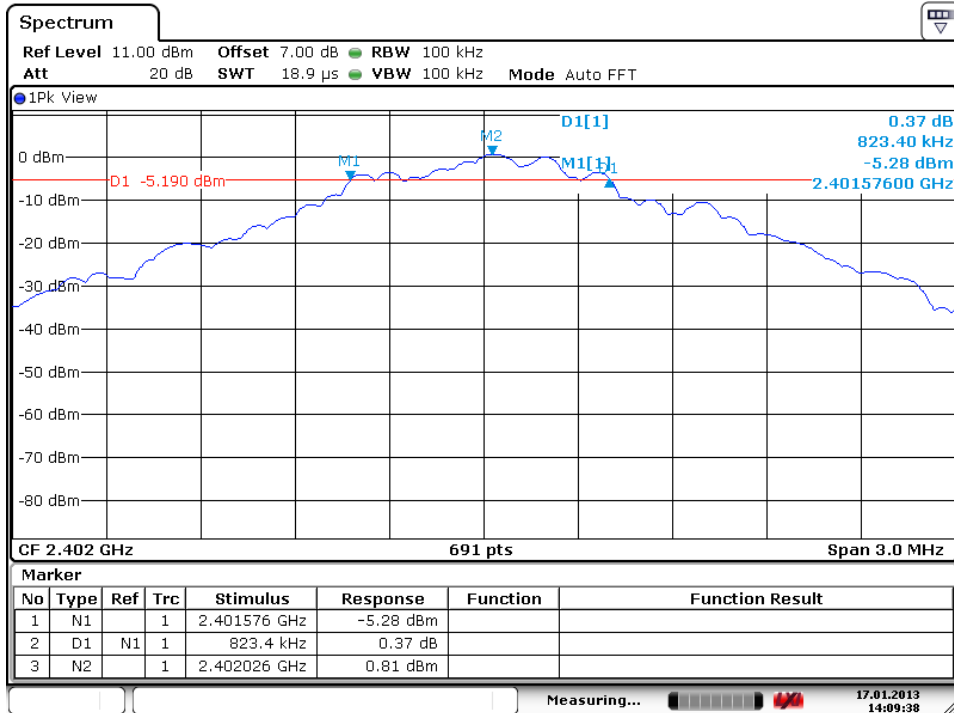
Channel	Channel Frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)	Result
Low Channel	2402	823	> 500	Pass
Mid Channel	2442	642	> 500	Pass
High Channel	2480	755	> 500	Pass

Table 7: Test result of 99% Bandwidth, GFSK modulation

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	
Low Channel	2402	1.567	
Mid Channel	2442	1.697	
High Channel	2480	1.485	

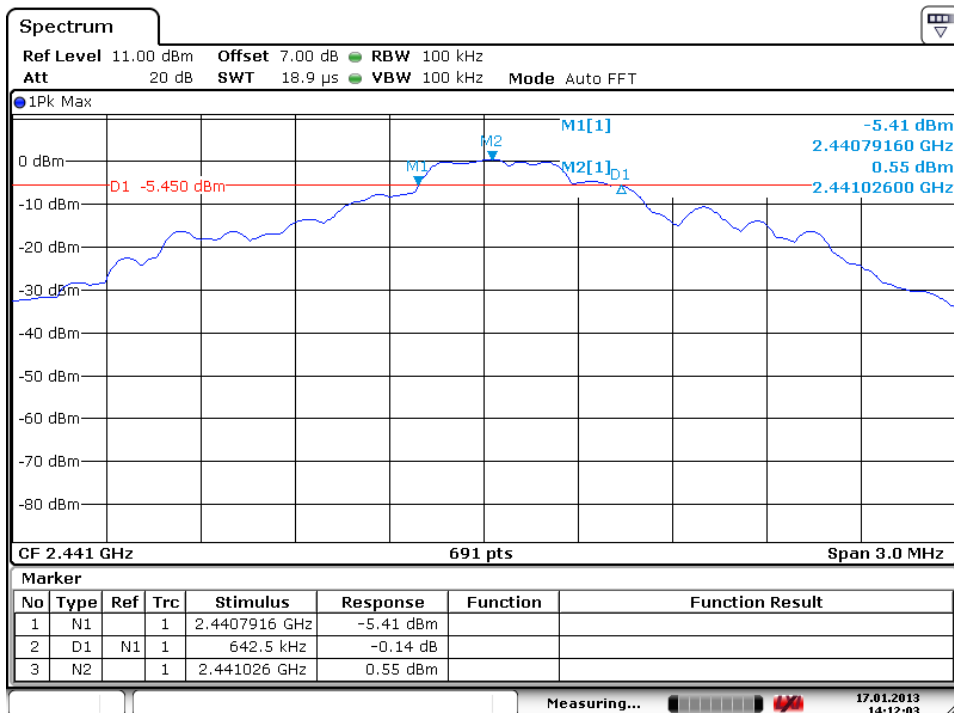
Test Plot of 6dB Bandwidth, GFSK modulation

Low Channel

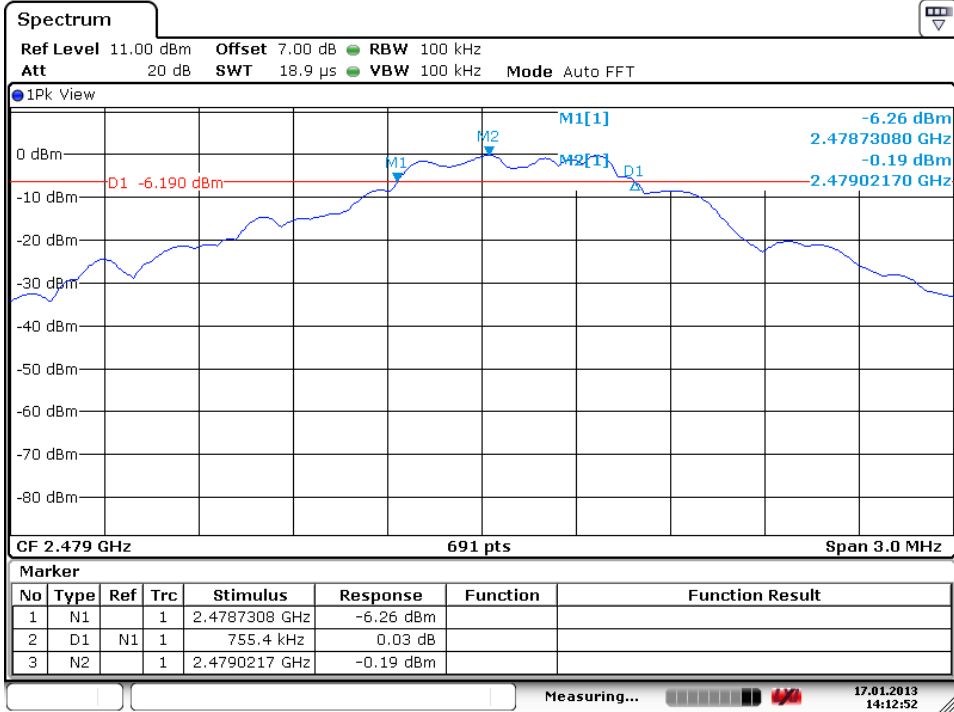


Date: 17.JAN.2013 14:09:37

Middle Channel



Date: 17.JAN.2013 14:12:03

High Channel


Date: 17.JAN.2013 14:12:52

5.1.4 Power Density

RESULT:
Passed

Test standard : FCC Part 15.247(e) , RSS-210 A8.2(2)
 Basic standard : ANSI C63.10:2009, KDB558074
 Kind of test site : Shielded room

Test setup

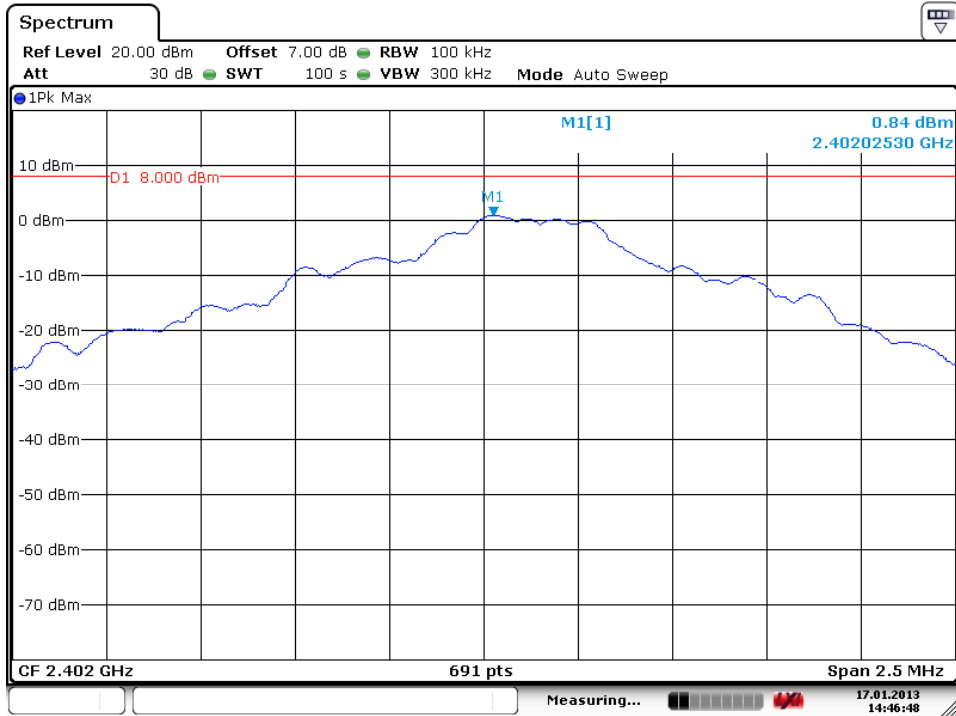
Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 18-22 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 8: Test result of Power Density, GFSK modulation

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/100kHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2402	0.84	-14.39	8	Pass
Mid Channel	2442	0.58	-14.65	8	Pass
High Channel	2480	-0.2	-14.65	8	Pass

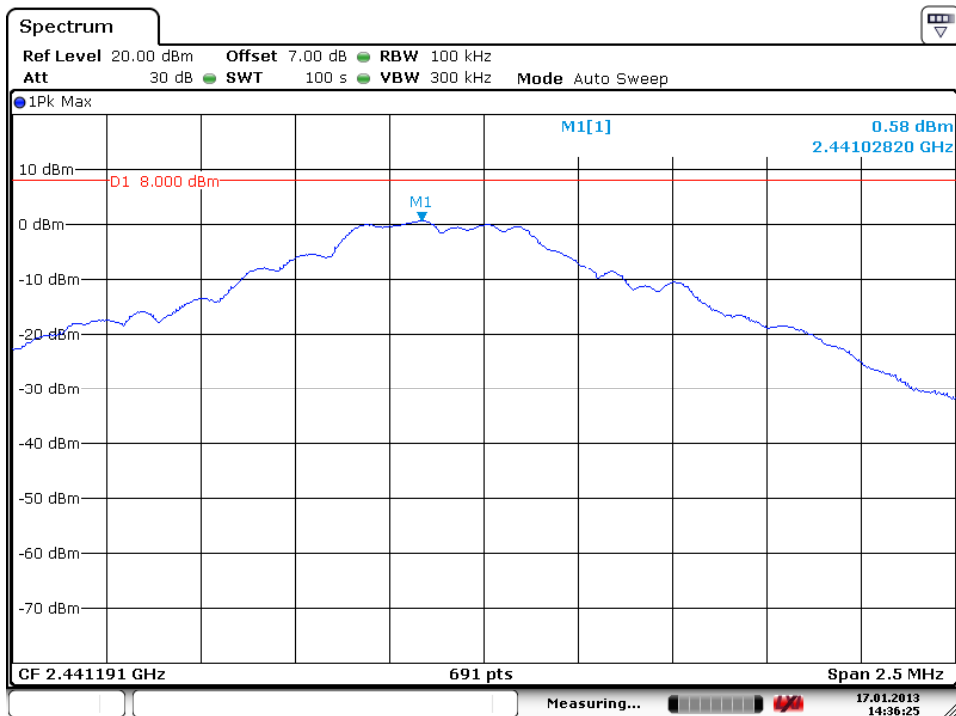
Test Plot of Power Density, GFSK modulation

Low Channel

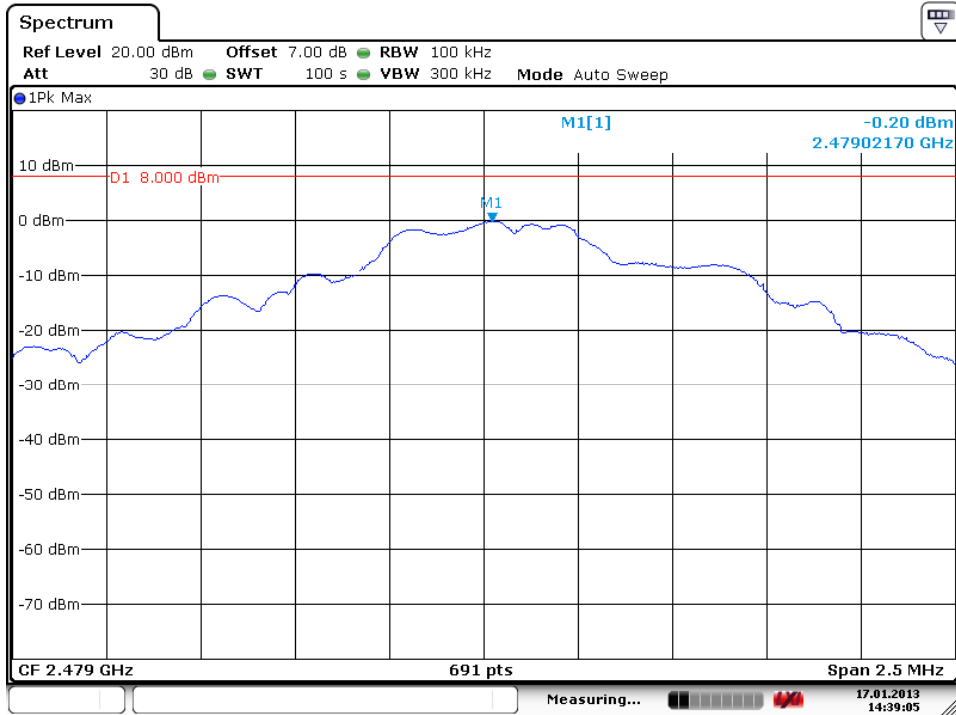


Date: 17. JAN. 2013 14:46:47

Middle Channel



Date: 17. JAN. 2013 14:36:25

High Channel


Date: 17.JAN.2013 14:39:05

5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT:**Passed**

Test standard : FCC part 15.247(d), RSS-210 A8.5
Basic standard : ANSI C63.10:2009, KDB558074
Limit : 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)
Kind of test site : Shielded room

Test setup

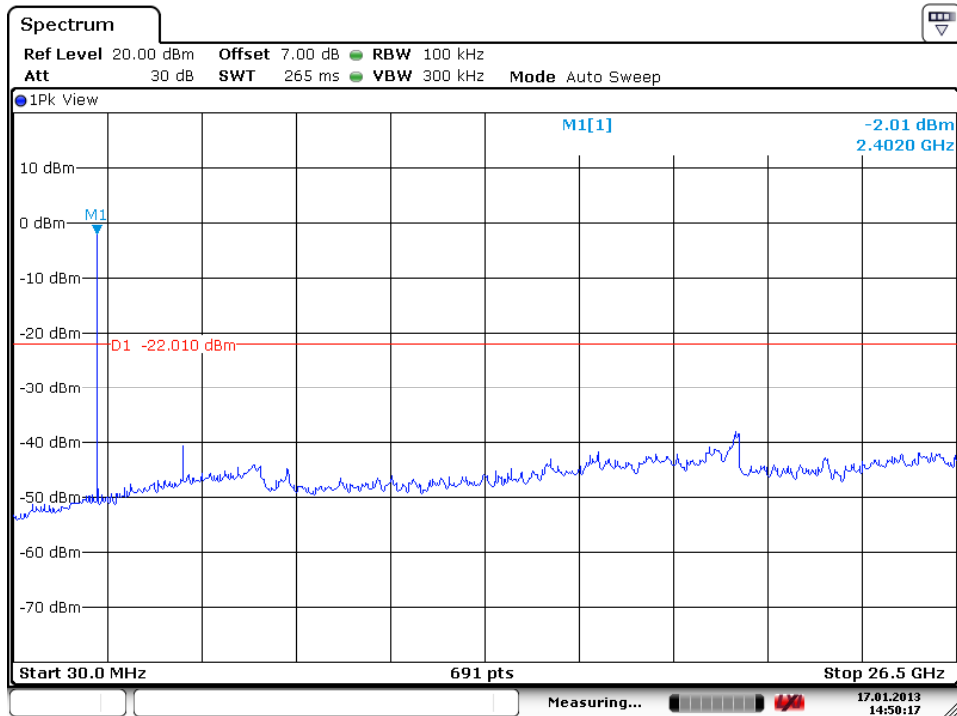
Test Channel : Low/ High
Operation mode : A
Ambient temperature : 18-22 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.

Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

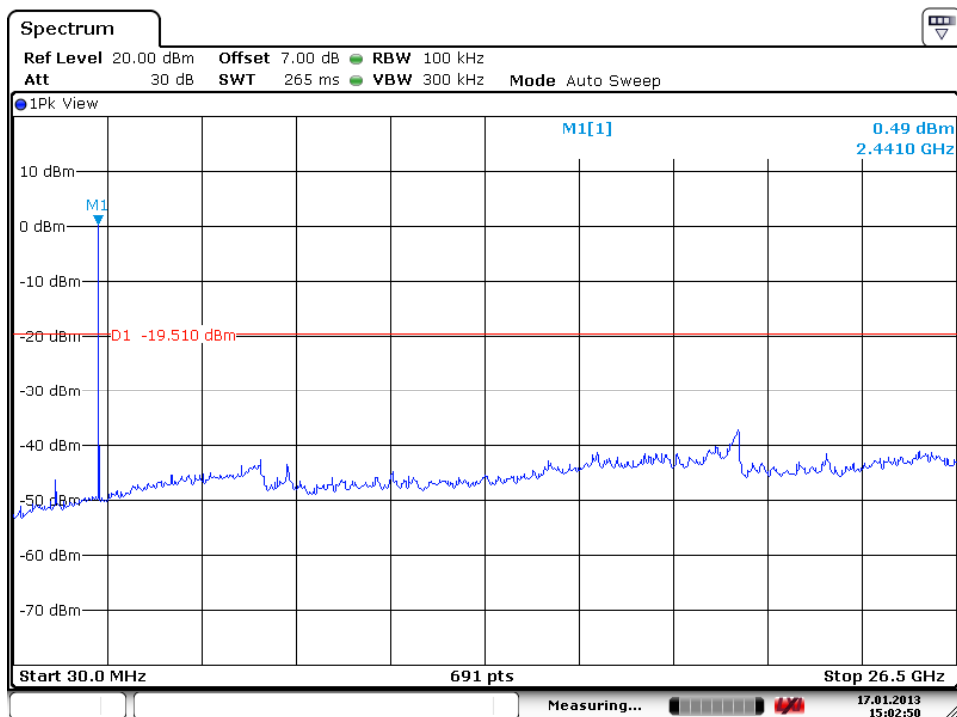
Test Plot of 100kHz Conducted Emissions, GFSK modulation

Low Channel



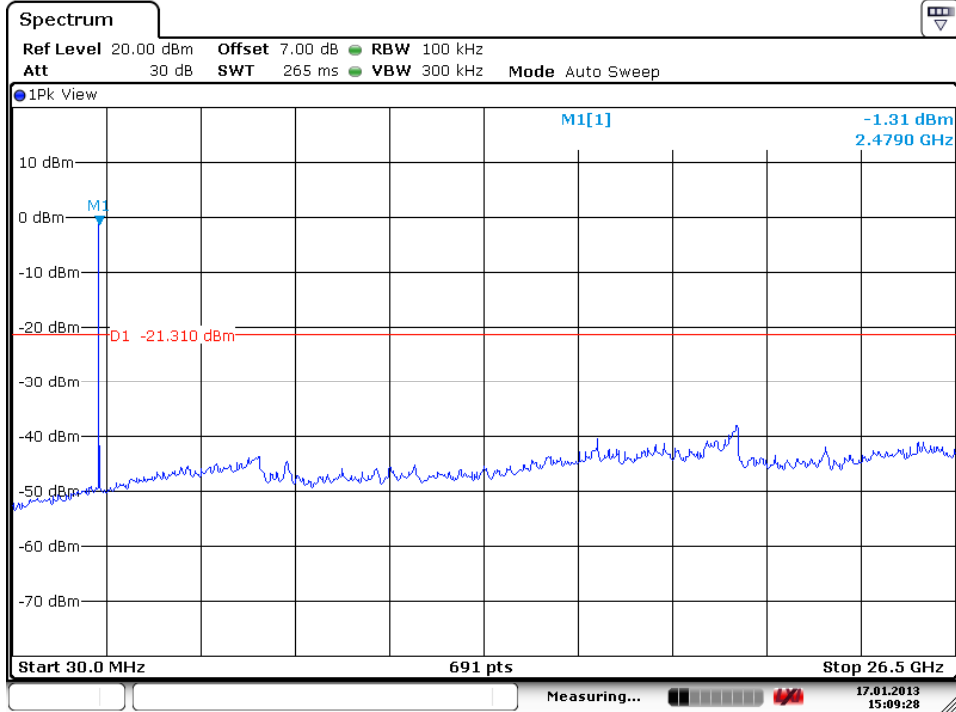
Date: 17.JAN.2013 14:50:17

Middle Channel



Date: 17.JAN.2013 15:02:50

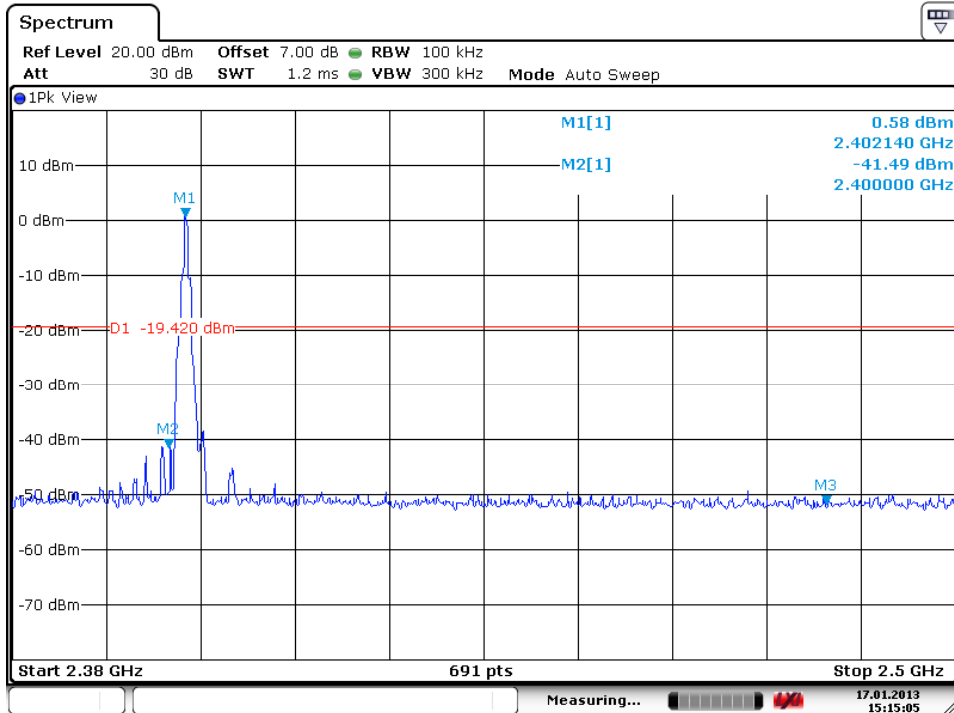
High Channel



Date: 17.JAN.2013 15:09:28

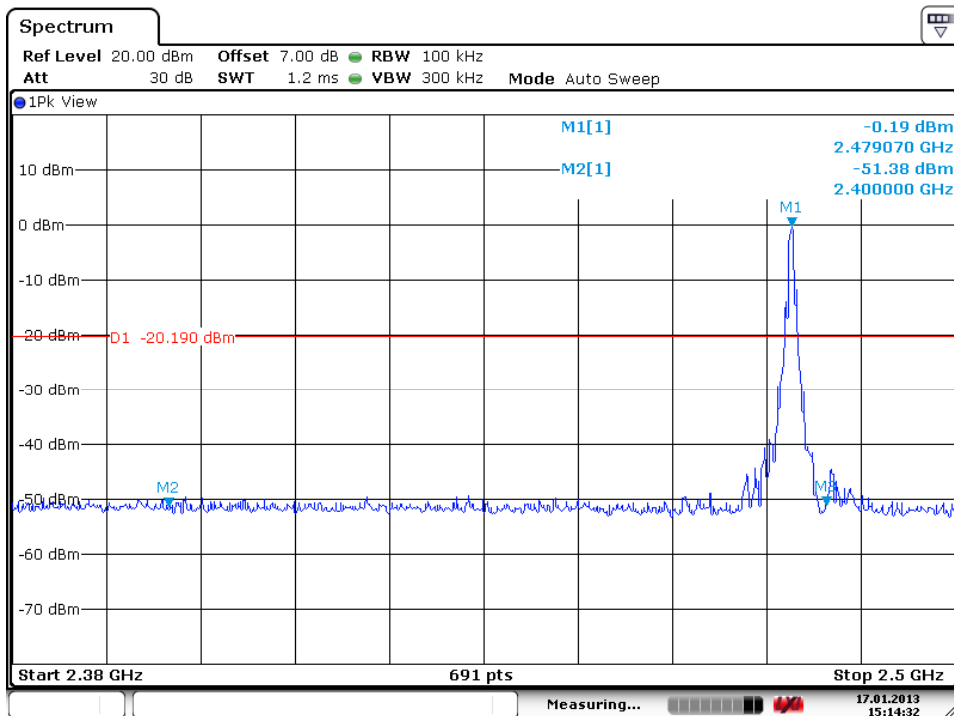
Test Plot of 100kHz Bandwidth of Frequency Band Edge, GFSK modulation

Low Channel



Date: 17.JAN.2013 15:15:05

High Channel



Date: 17.JAN.2013 15:14:31

5.1.6 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 and RSS-Gen 7.2.1
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, C

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details refer to Appendix D.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The X Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

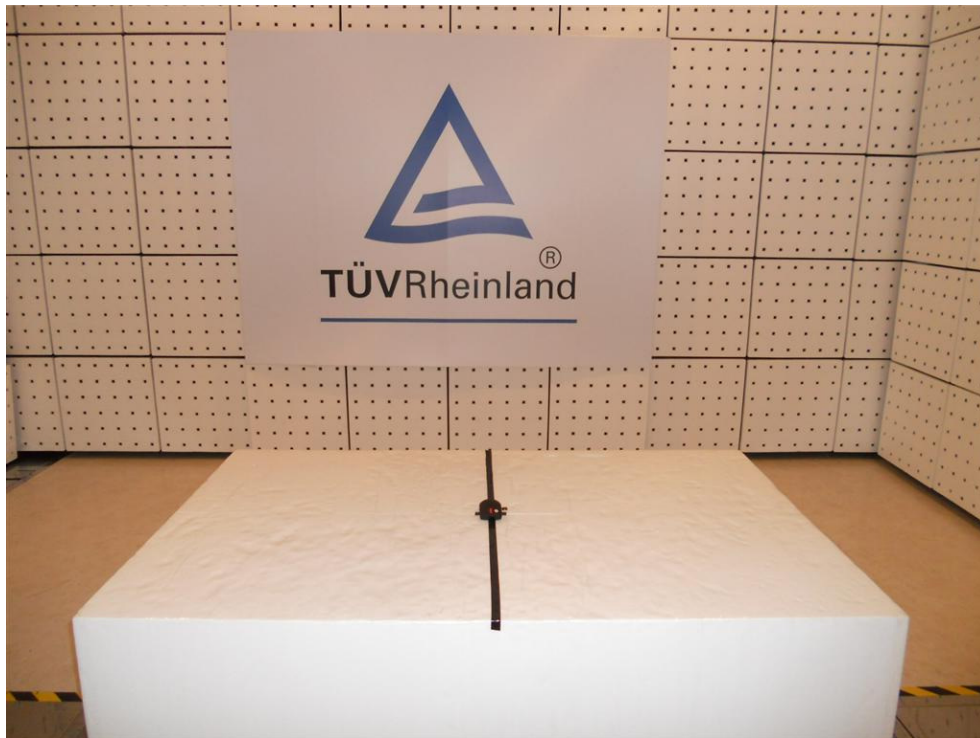
Test standard : FCC KDB Publication 447498 D01 v05

The maximum peak output power of the transmitter is 1.24 mW.
The separation between hand and antenna is more than 2mm.

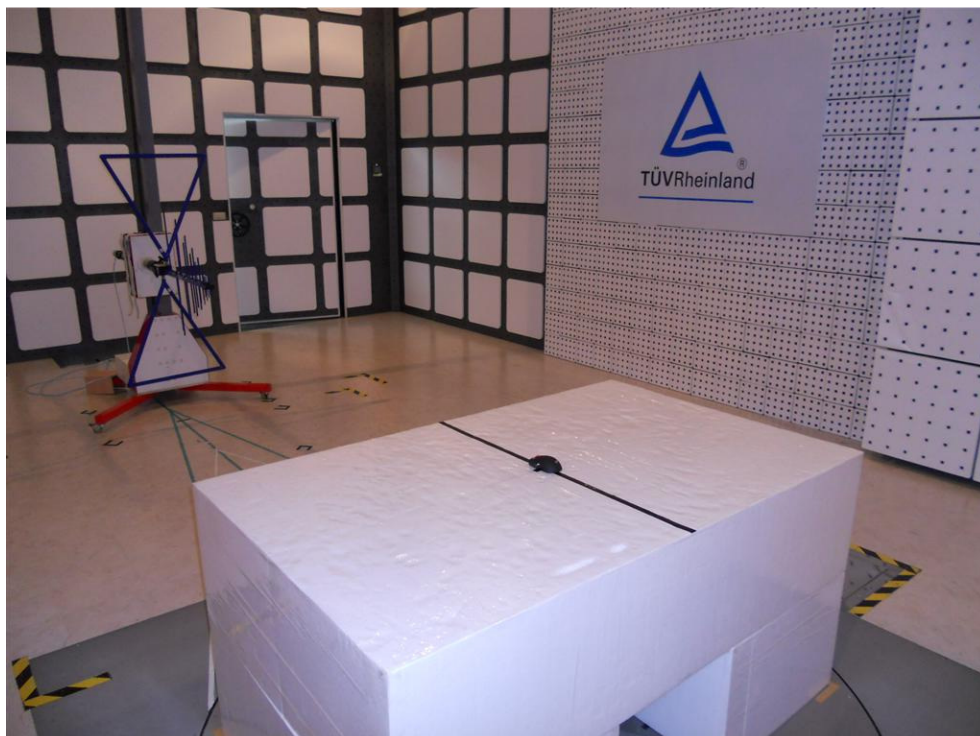
Hence the EUT is excluded from SAR evaluation.
Please also refer to FCC KDB publication 447498 D01 v05: Mobile Portable RF Exposure.

7. Photographs of the Test Set-Up

Photograph 1: Set-up for Spurious Emissions (Front View)



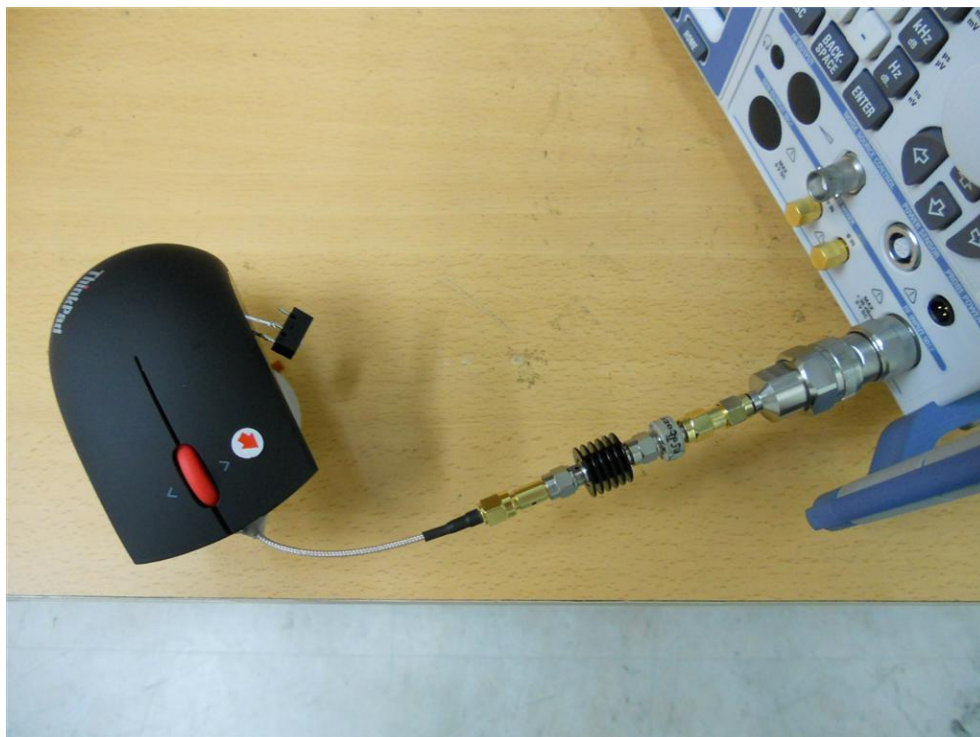
Photograph 2: Set-up for Spurious Emissions (Back View 1)



Photograph 3: Set-up for Spurious Emissions (Back View 2)



Photograph 4: Set-up for Conducted testing



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