Prüfbericht-Nr.: *Test Report No.:*	**10046528 001**	**Auftrags-Nr.:** *Order No.:*	114017450	Seite 1 von 36 *Page 1 of 36*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	February 12, 2014	
Auftraggeber: *Client:*	Adonit Co., Ltd., Rm. A, 9F No. 107 Sec. 4 Ren-Ai Rd., TW-10689 Da-An Dist. Taipei Taiwan, R.O.C.			
Prüfgegenstand: *Test item:*	Ink			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	042			
Auftrags-Inhalt: *Order content:*	FCC Part 15C Test report			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart C Section 15.247 RSS-210 (12-2010) A8			

Wareneingangsdatum: *Date of receipt:*	4/3/2014
Prüfmuster-Nr.: *Test sample No.:*	A000045675-004 A000045675-003
Prüfzeitraum: *Testing period:*	10-Apr-2014 - 11-Apr-2014
Ort der Prüfung: *Place of testing:*	EMC Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von / *tested by:*			**kontrolliert von** / *reviewed by:*		
2014-04-30	Arvin Ho/Department Manager		2014-04-30	Rene Charton/Senior Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:*	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V04

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 PEAK OUTPUT POWER
RESULT: Passed

5.1.3 6DB BANDWIDTH AND 99% 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

5.2.1 MAINS CONDUCTED EMISSIONS
RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Passed

Contents

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 Documentation
(File Name: 10046528APPENDIX P)
Appendix D: Test Result of Radiated Emissions
(File Name: 10046528APPENDIX 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: 2013-Jul-1st to 2016-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	ESR	101062	1-Sep-14
Bilog Antenna	TESEQ	CBL6111D	29802	29-Jun-14
Spectrum Analyzer	R&S	FSV 40	100921	9-Dec-14
Horn Antenna	ETS-Lindgren	3117	00138160	10-Jan-15
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	29-Oct-15
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2-Sep-14
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2-Sep-14
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	060558	24-Oct-14
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	28-Sep-14
EMI Test Receiver	R&S	ESCI	101094	29-Aug-14
LISN (1 phase)	R&S	ENV216	101243	5-Jun-14
LISN	Rolf Heine	NNB-2/16Z	99080	30-Aug-14
EMI Test Receiver	R&S	ESR	101062	1-Sep-14

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 in a suitably accredited Calibration Lab. 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:

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-7}
RF power, conducted	± 1.5 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 ºC
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Touch Pen which can be used to draw on the touch screen of a portable device which needs to have a Bluetooth 4.0 RF interface. The pen can transmit the pen status (touch pressure) to the portable device through the built-in Bluetooth LE transmitter.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	Ink
Type Designation	042
FCC ID	ZCC-J10005 IC ID:11771A-J10005

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	2402~2480 MHz
Channel Spacing	2 MHz
Channel number	40
Operation Voltage	3.8 V
Modulation	GFSK
Antenna gain	0.5 dBi

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.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

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 samples are provided with a SPI interface which makes it possible to control them through a test software installed on a notebook computer.

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. The samples were used as follows:

The samples were used as follows:
Conducted: A000045675-003
Radiation: A000045675-004

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
Laptop	HP	HSTNN-Q78C-3	CNF0339QBM

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

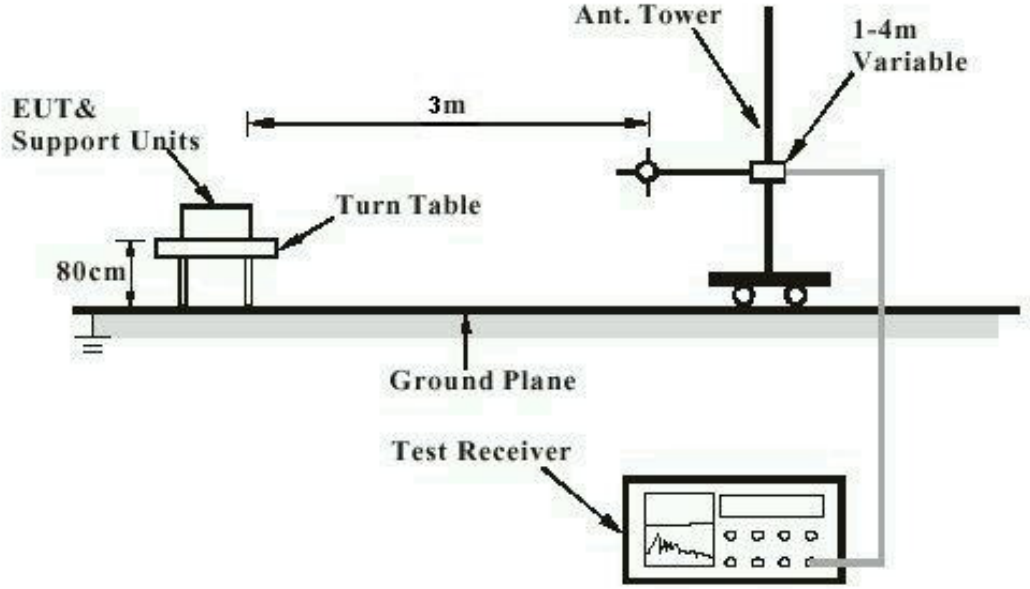


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

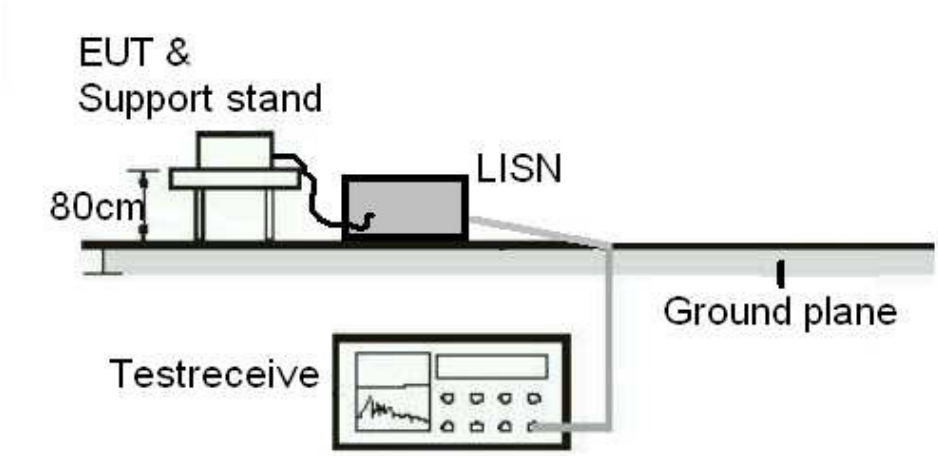
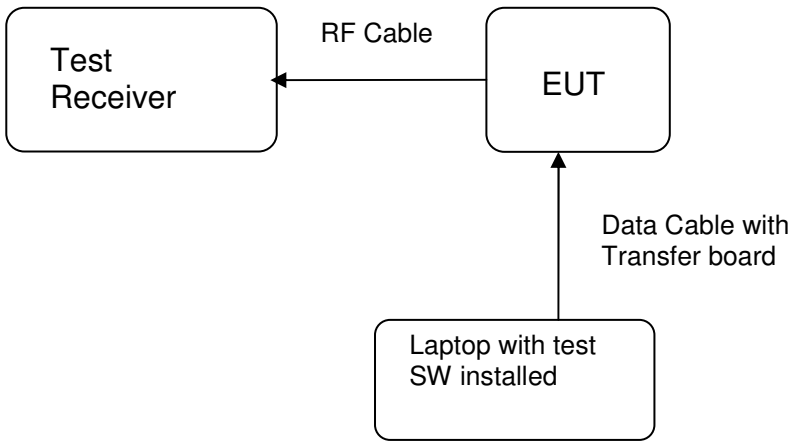


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Test 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 antenna with a directional gain of 0.5 dBi dBi. The antenna is a Chip Antenna soldered to the PCB with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this 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

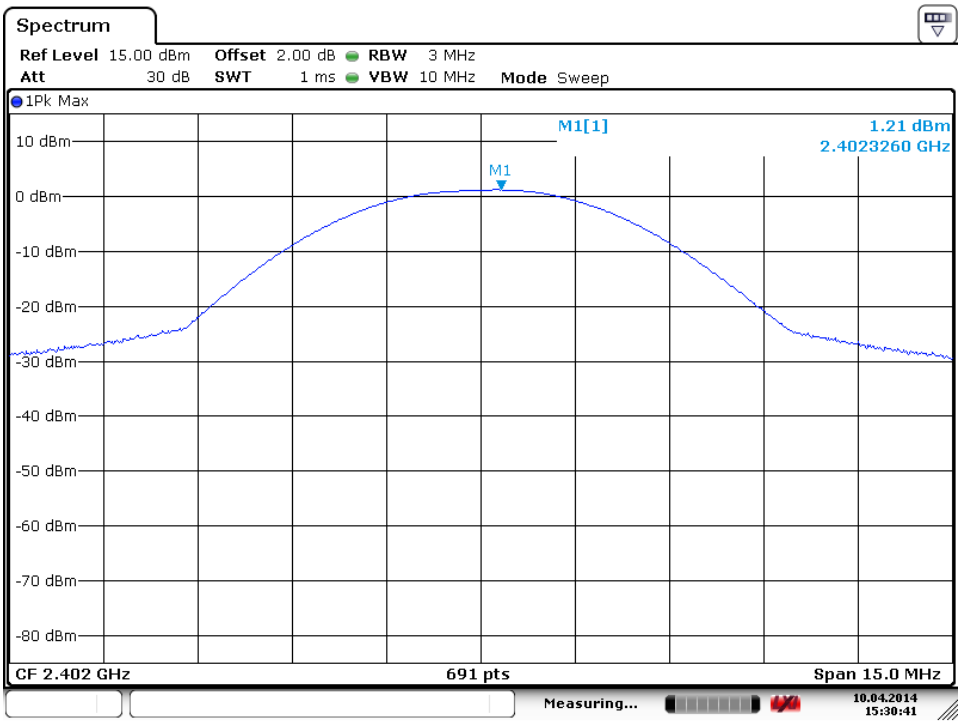
Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 6: Test result of Peak Output Power, GFSK modulation

Channel	Channel Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2402	1.21	0.0013	1
Mid Channel	2442	2.66	0.0018	1
High Channel	2480	2.64	0.0018	1

Test Plot of Peak Output Power, GFSK modulation

Low Channel



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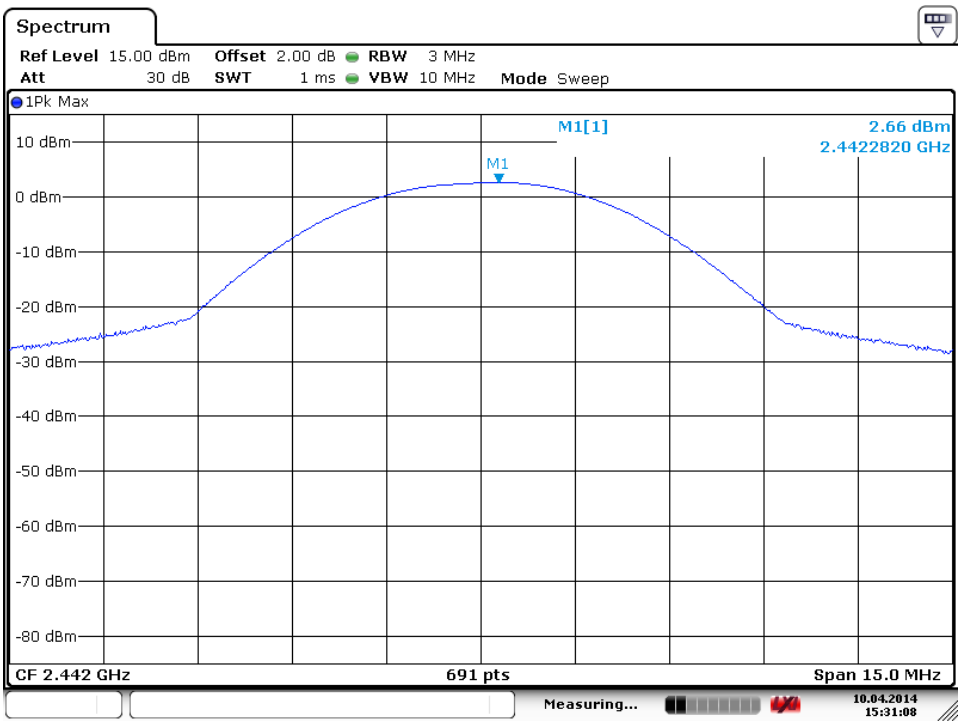
Middle Channel



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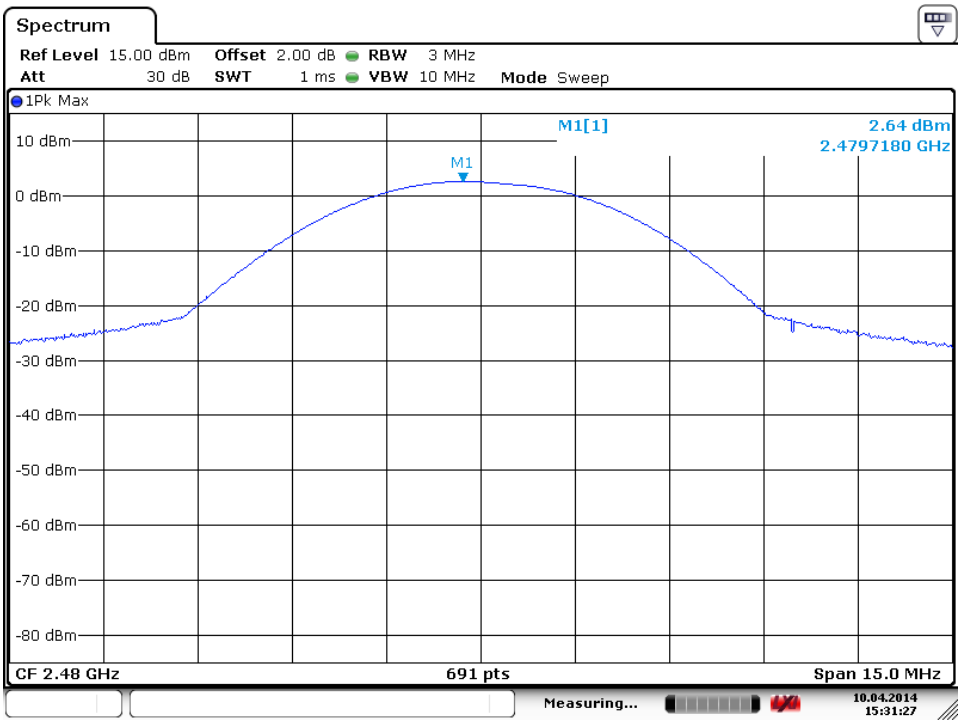
High Channel



Date: 10.APR.2014 15:31:28

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	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

Table 7: Test result of 6 dB Bandwidth, GFSK modulation

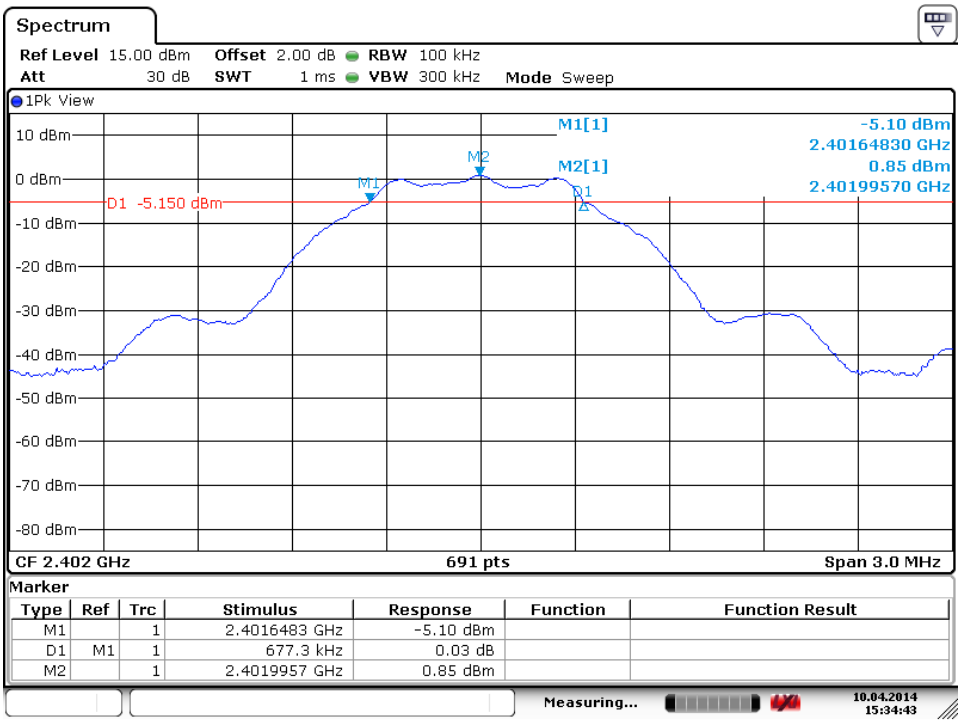
Channel	Channel Frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)	Result
Low Channel	2402	677.3	> 500	Pass
Mid Channel	2442	690.3	> 500	Pass
High Channel	2480	699	> 500	Pass

Table 8: Test result of 99% Bandwidth, GFSK modulation

Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)	
Low Channel	2402	1015.9	
Mid Channel	2442	1015.9	
High Channel	2480	1007.2	

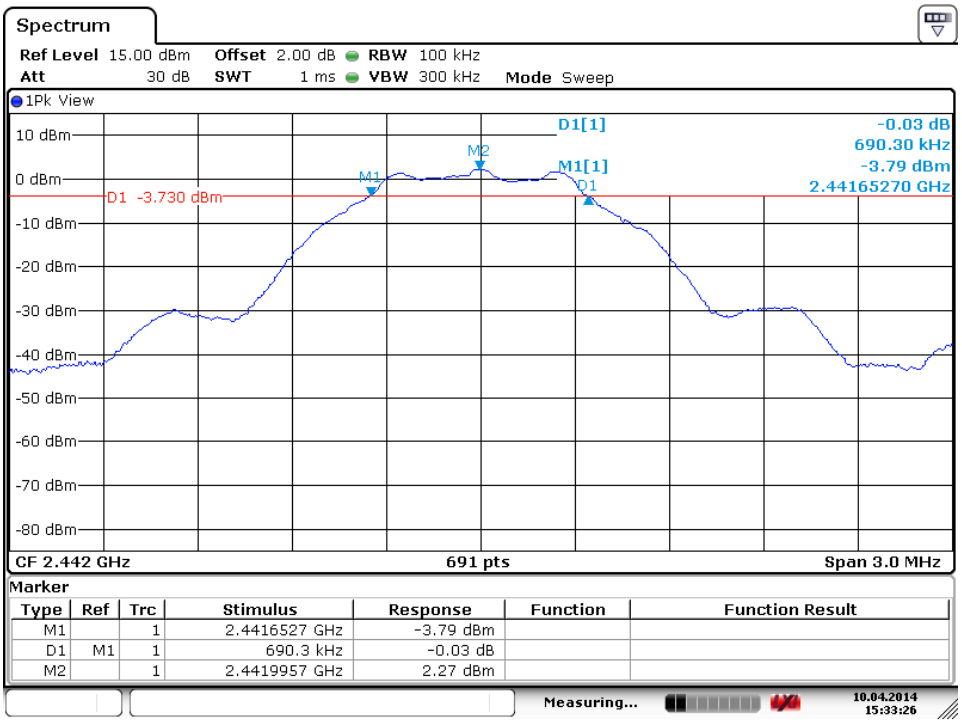
Test Plot of 6dB Bandwidth, GFSK modulation

Low Channel



Date: 10.APR.2014 15:34:43

Middle Channel



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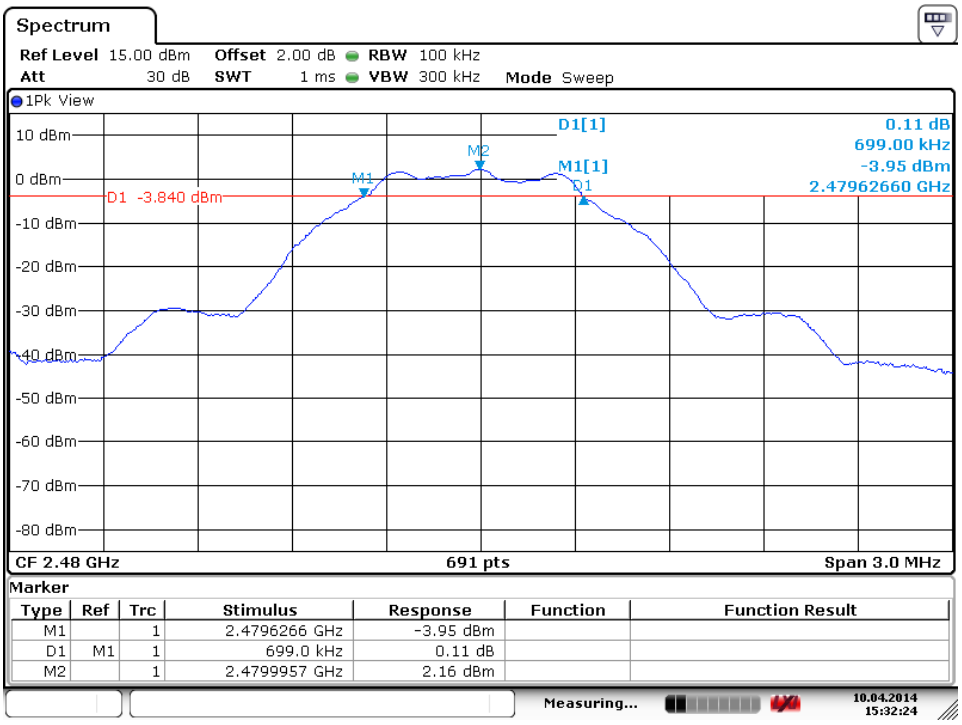
High Channel



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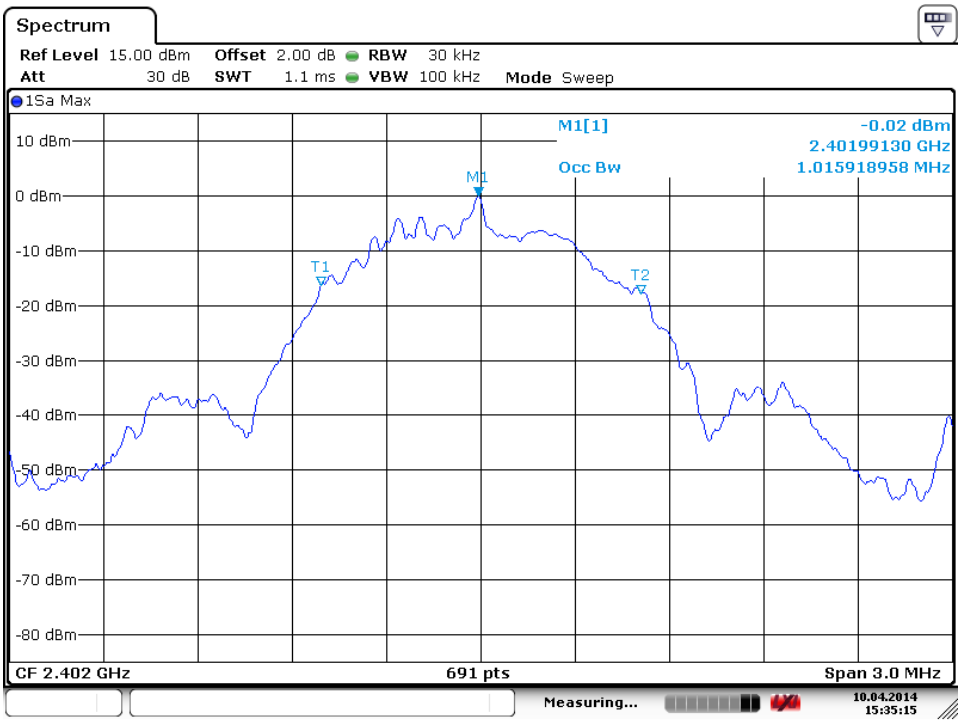
Test Plot of 99% Bandwidth, GFSK modulation

Low Channel



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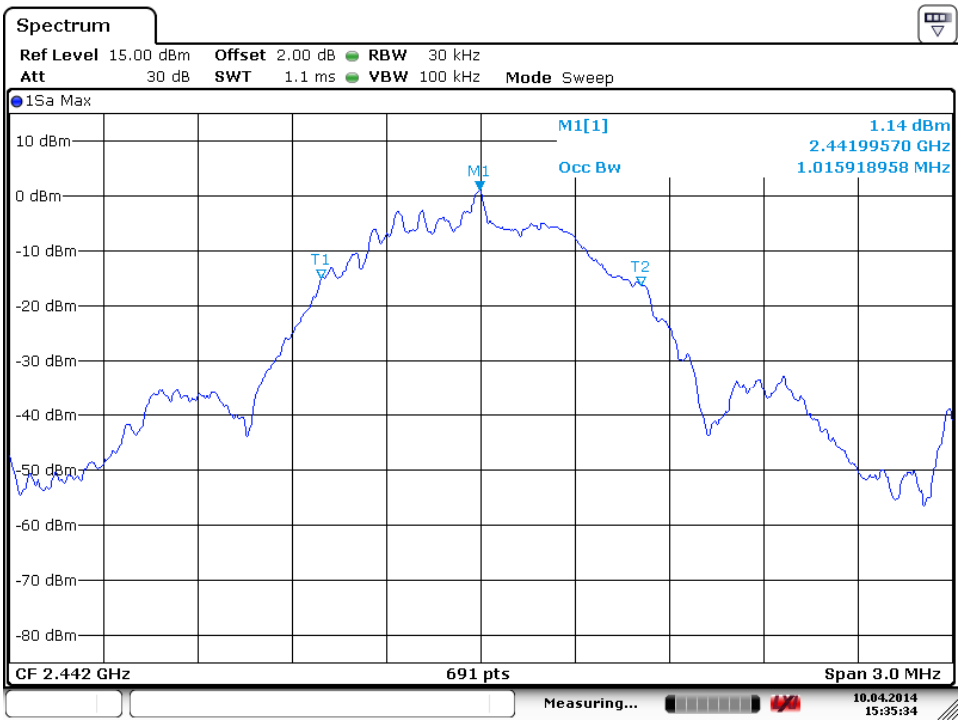
Middle Channel



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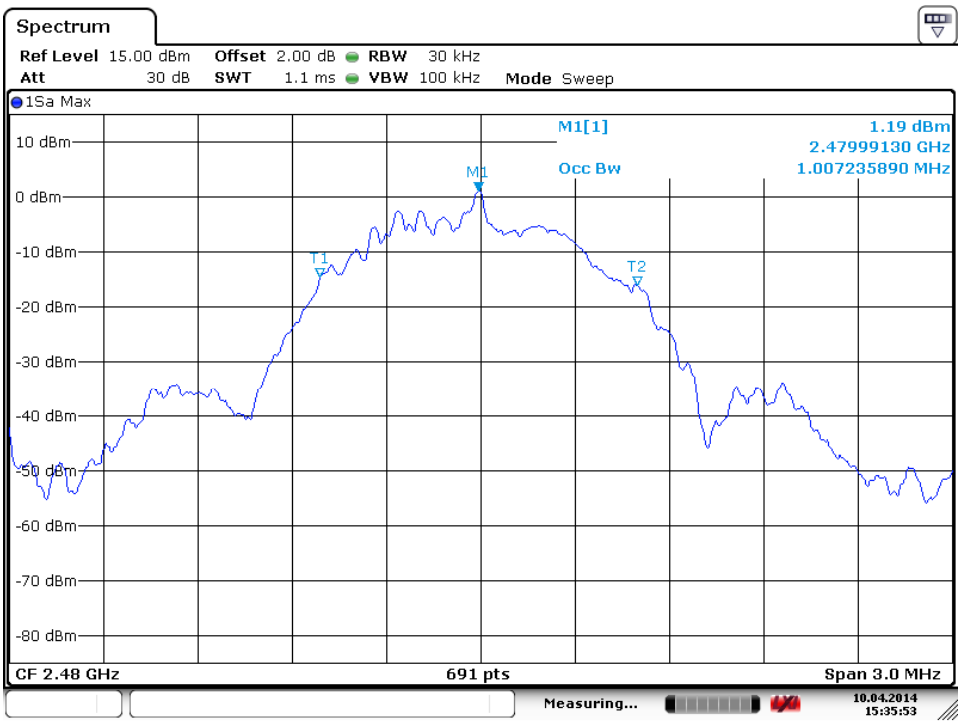
High Channel



Date: 10.APR.2014 15:35:54

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

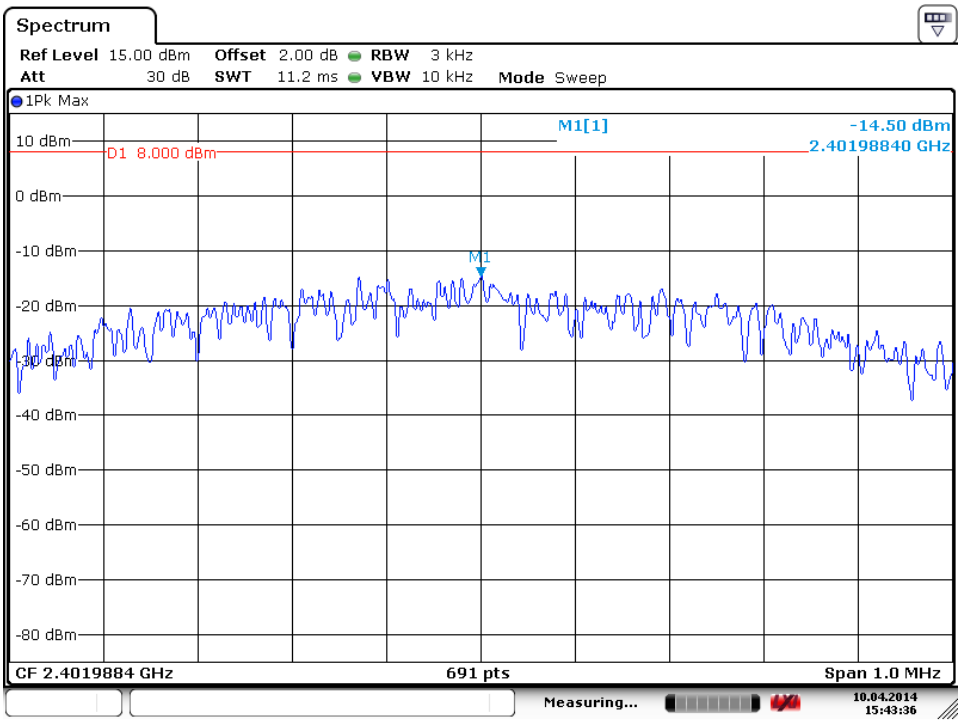
Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

Table 9: Test result of Power Density, GFSK modulation

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/ 3kHz)	Result
Low Channel	2402	-14.5	8	Pass
Mid Channel	2442	-13.22	8	Pass
High Channel	2480	-13.38	8	Pass

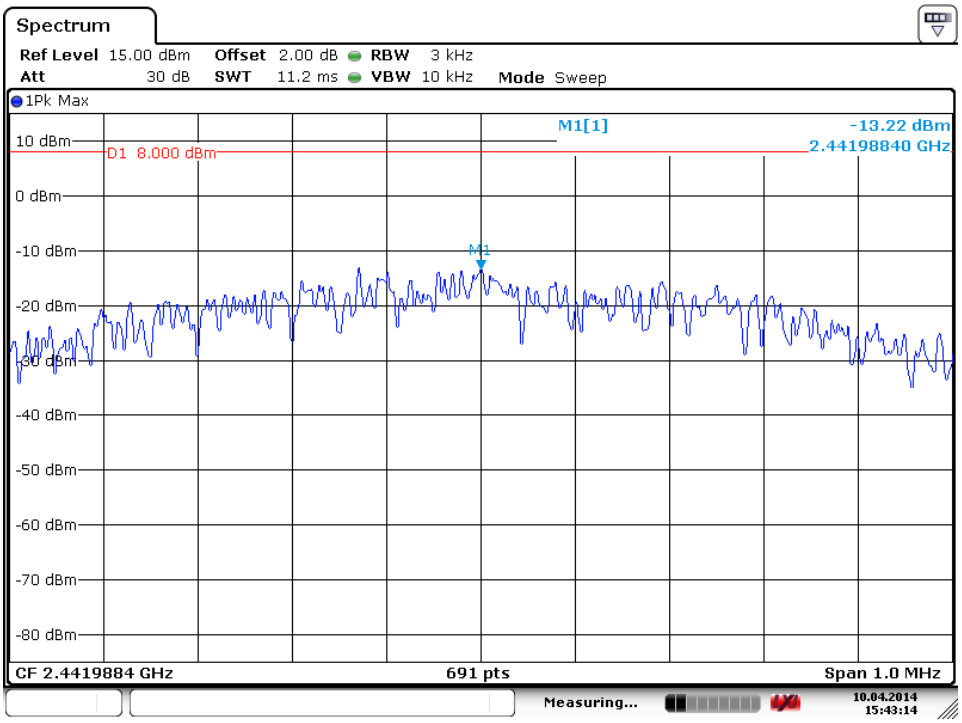
Test Plot of Power Density, GFSK modulation

Low Channel



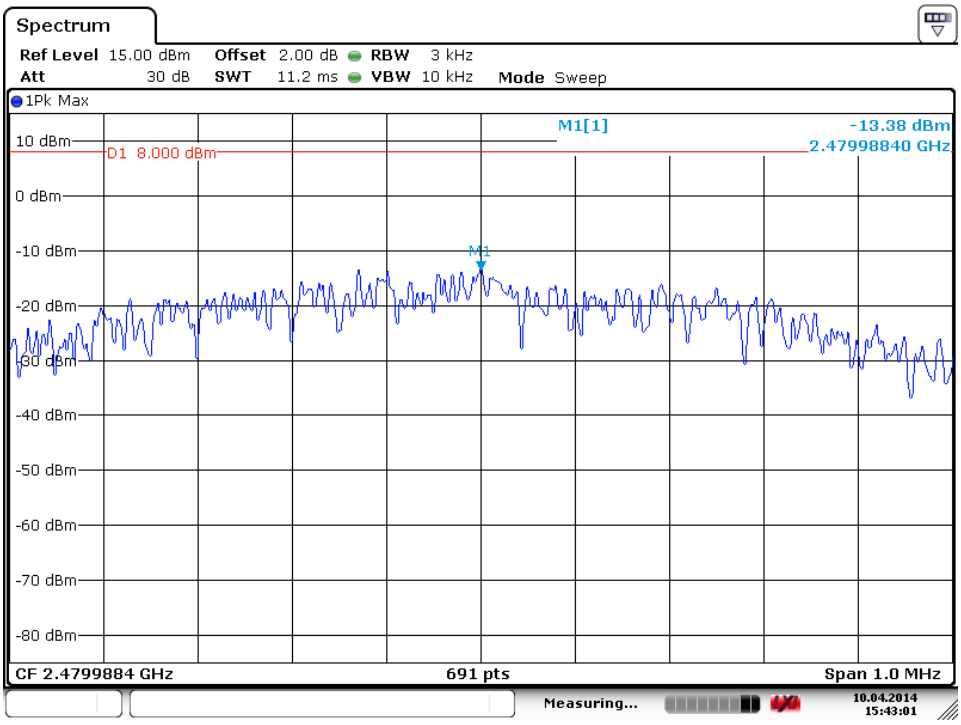
Date: 10.APR.2014 15:43:36

Middle Channel



Date: 10.APR.2014 15:43:15

High Channel



Date: 10.APR.2014 15:43:02

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

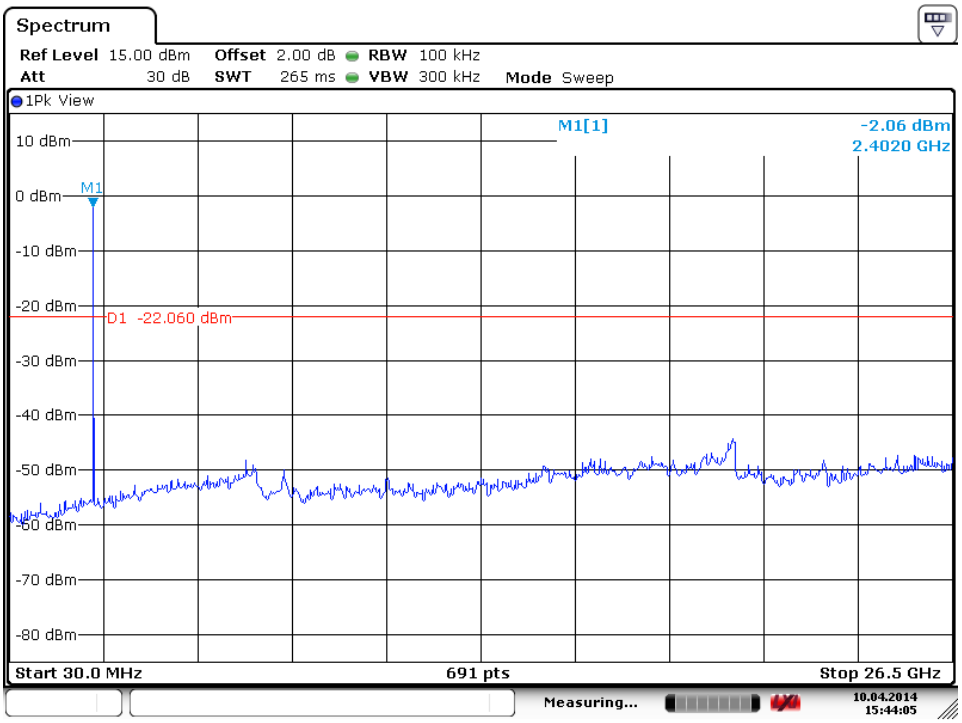
Test setup

Test Channel	:	Low/ High
Operation mode	:	A
Ambient temperature	:	22-26°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 achived 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



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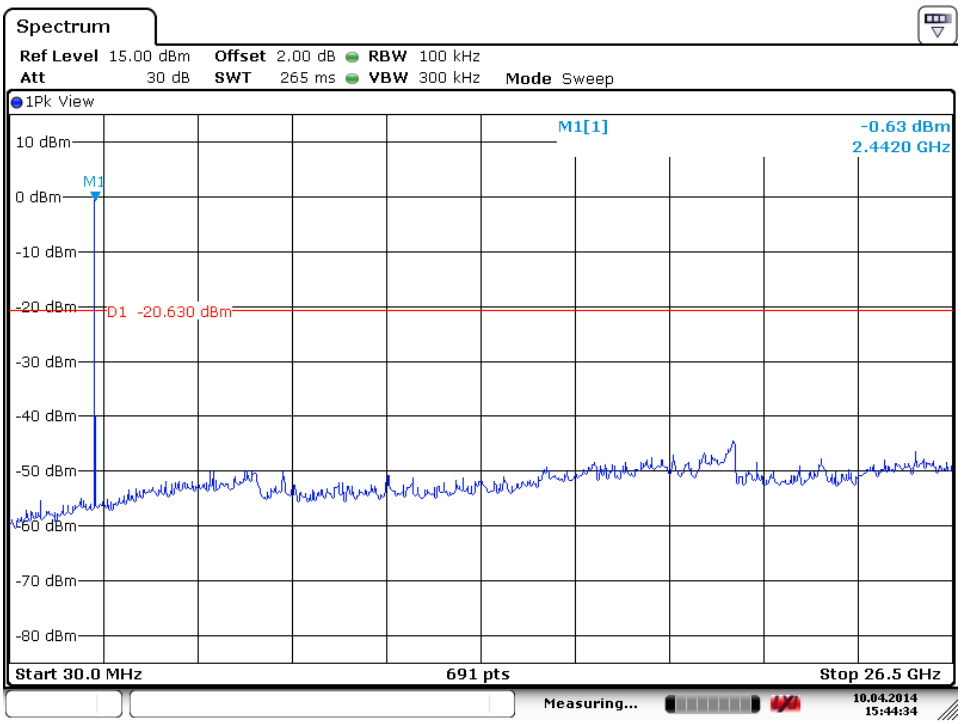
Middle Channel



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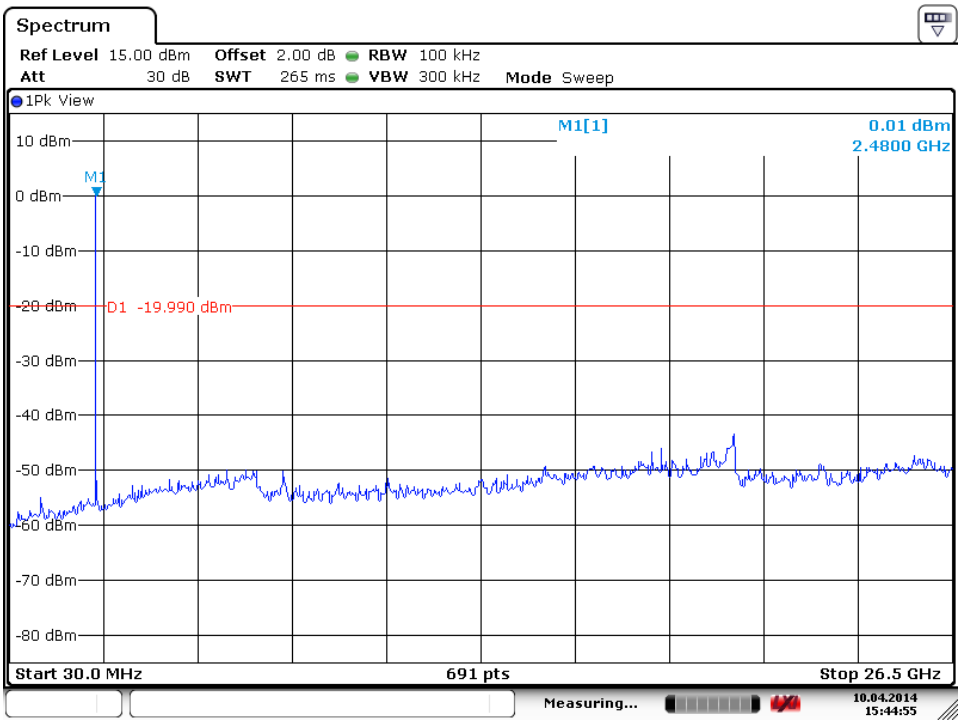
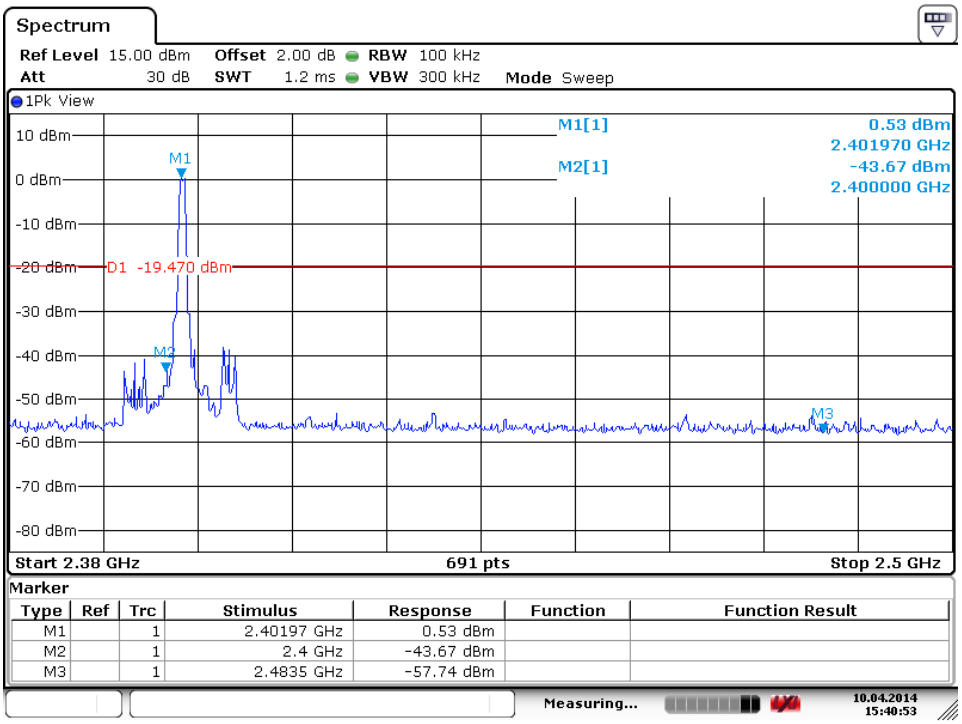
High Channel



Date: 10.APR.2014 15:44:55

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

Low Channel



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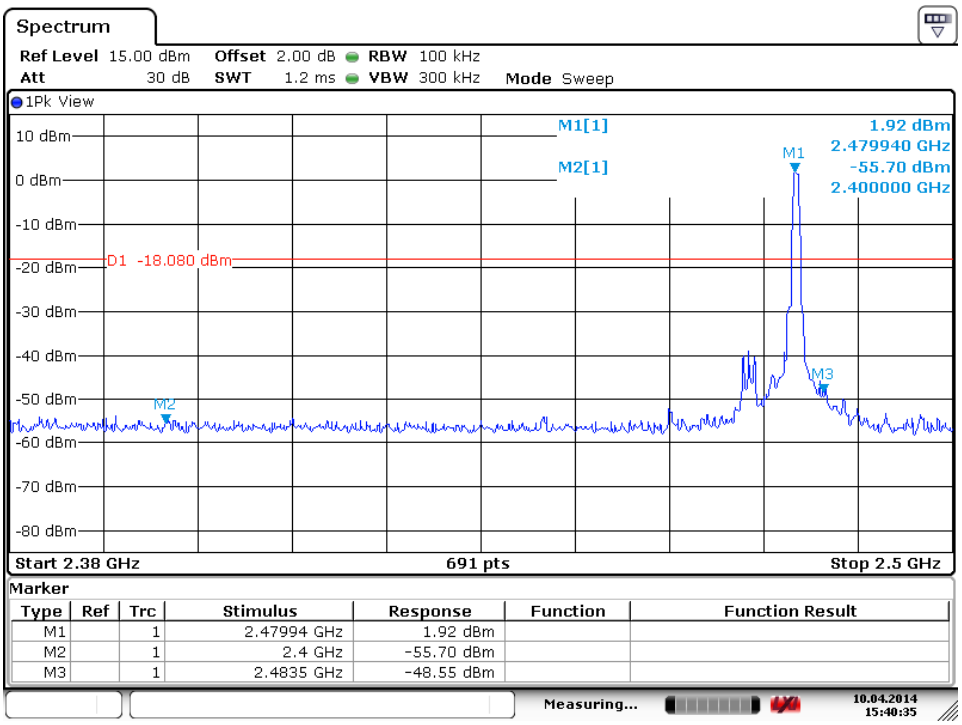
High Channel



Date: 10.APR.2014 15:40:36

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,

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.

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT: **Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 RSS-Gen 7.2.4 LP0002: 2.3
Limits	:	Mains Conducted emissions as defined in above test standards must comply with the mains conducted emission limits specified
Kind of test site	:	Shielded Room

Test setup

Test Channel	:	Middle
Operation mode	:	A

Remark: For details refer to Appendix D.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Passed**

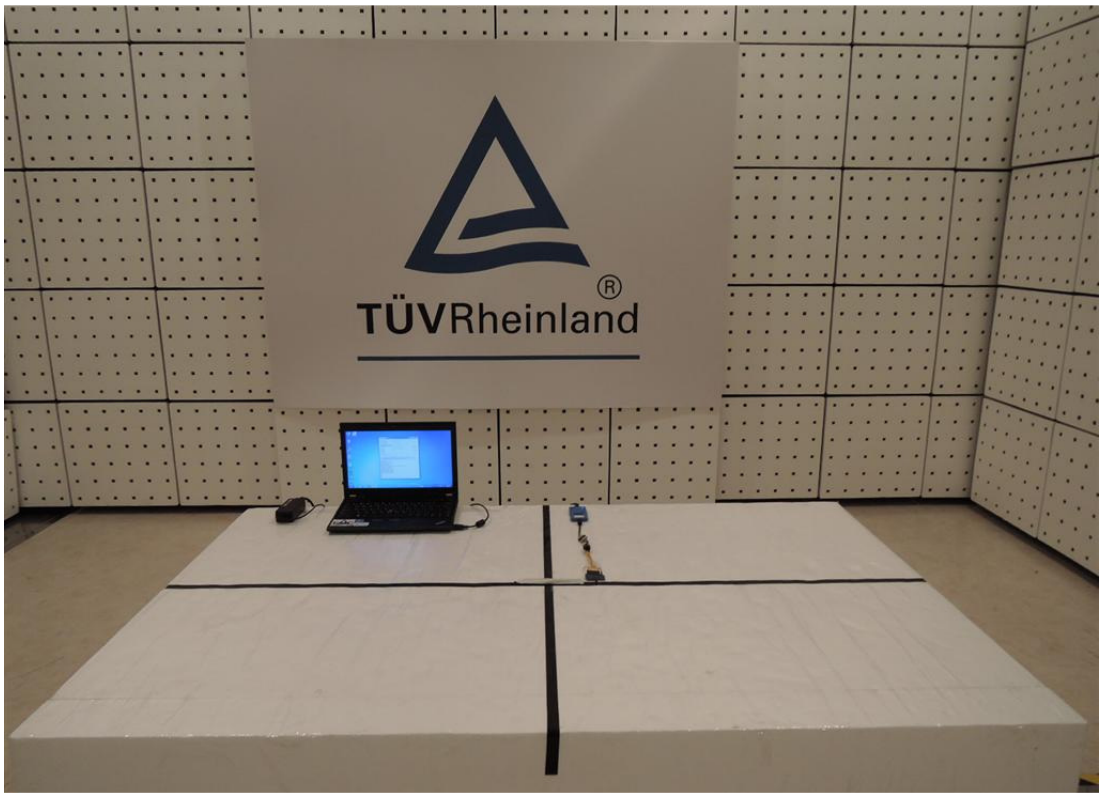
Test standard : FCC KDB Publication 447498 D01 v05

The maximum peak output power of the transmitter is 1.84 mW.
The separation between hand and antenna is more than 5 mm.

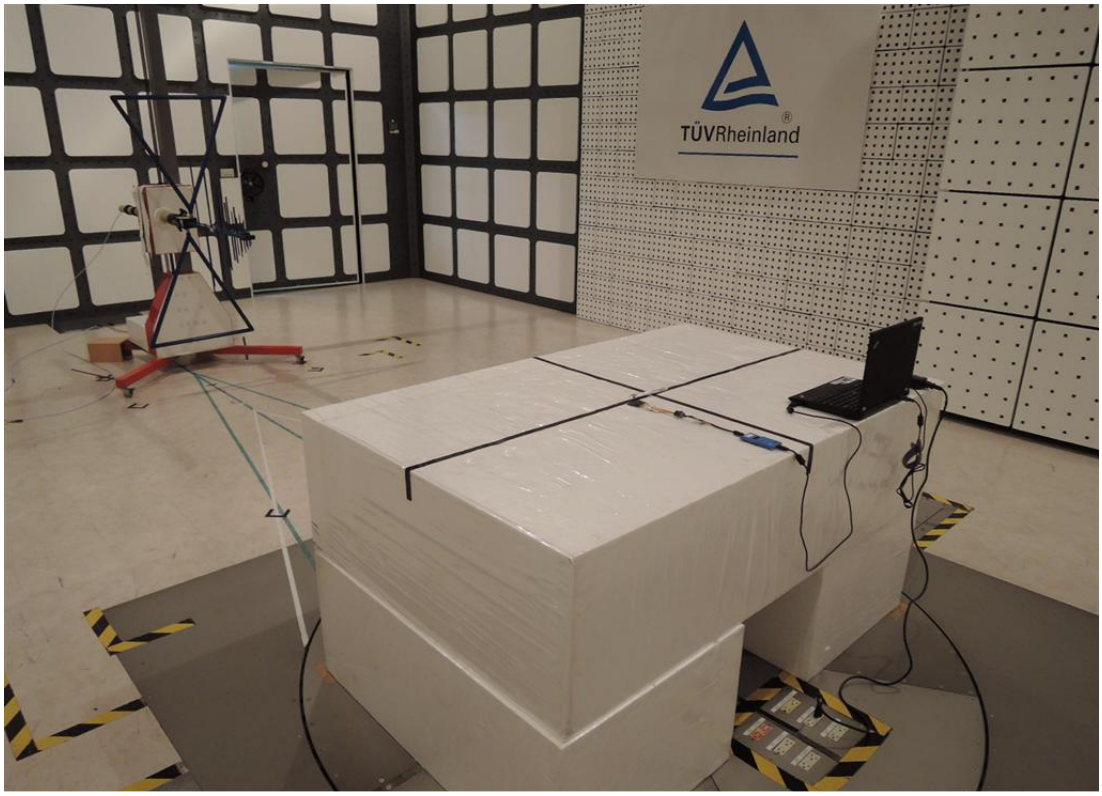
Hence the EUT is exclueded from SAR evaluation.
Please also refer to FCC KDB publication 447498 D01 v05: Mobile Portable RF Exposure

7. Photographs of the Test Set-Up

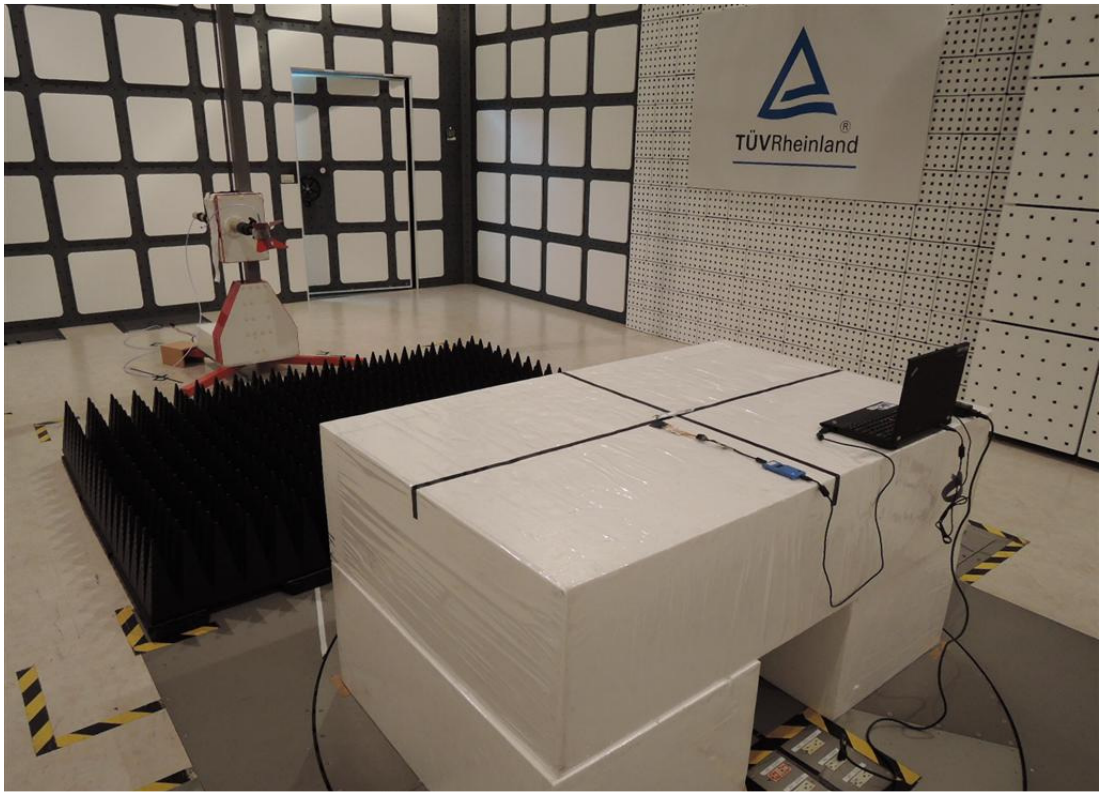
Photograph 1: Set-up for Spurious Emissions (Front View)



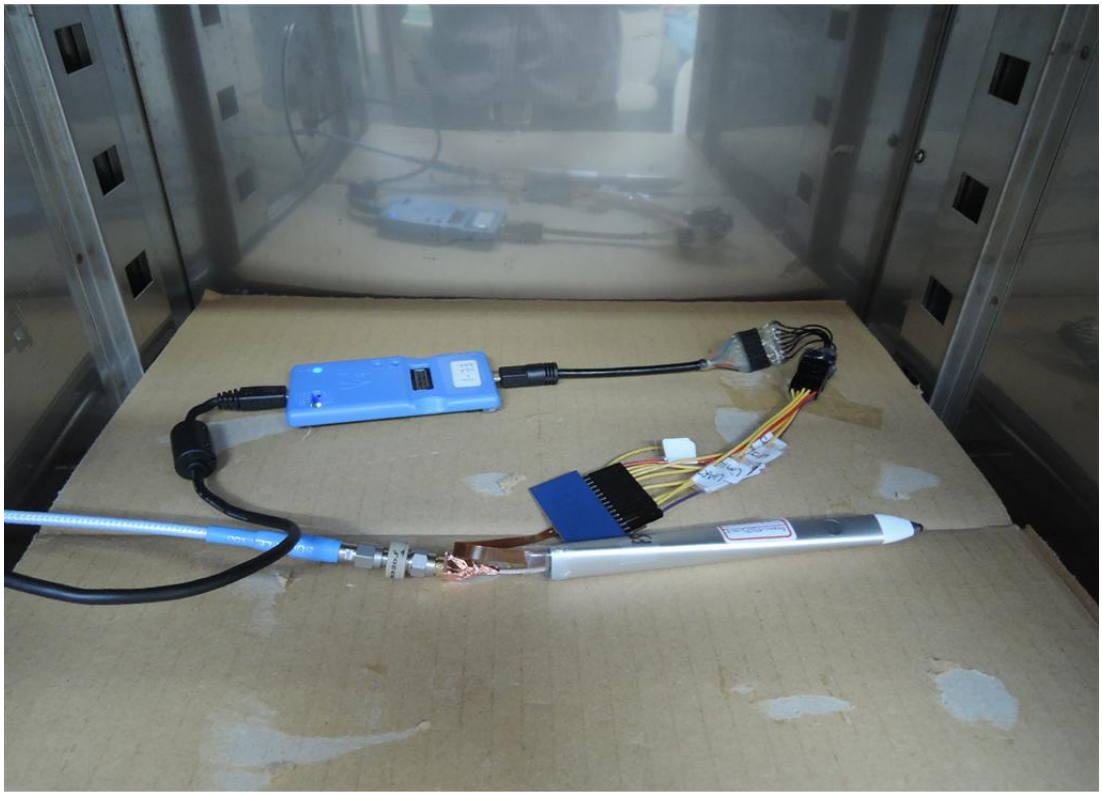
Photograph 2: Set-up for Spurious Emissions (Back View 1)



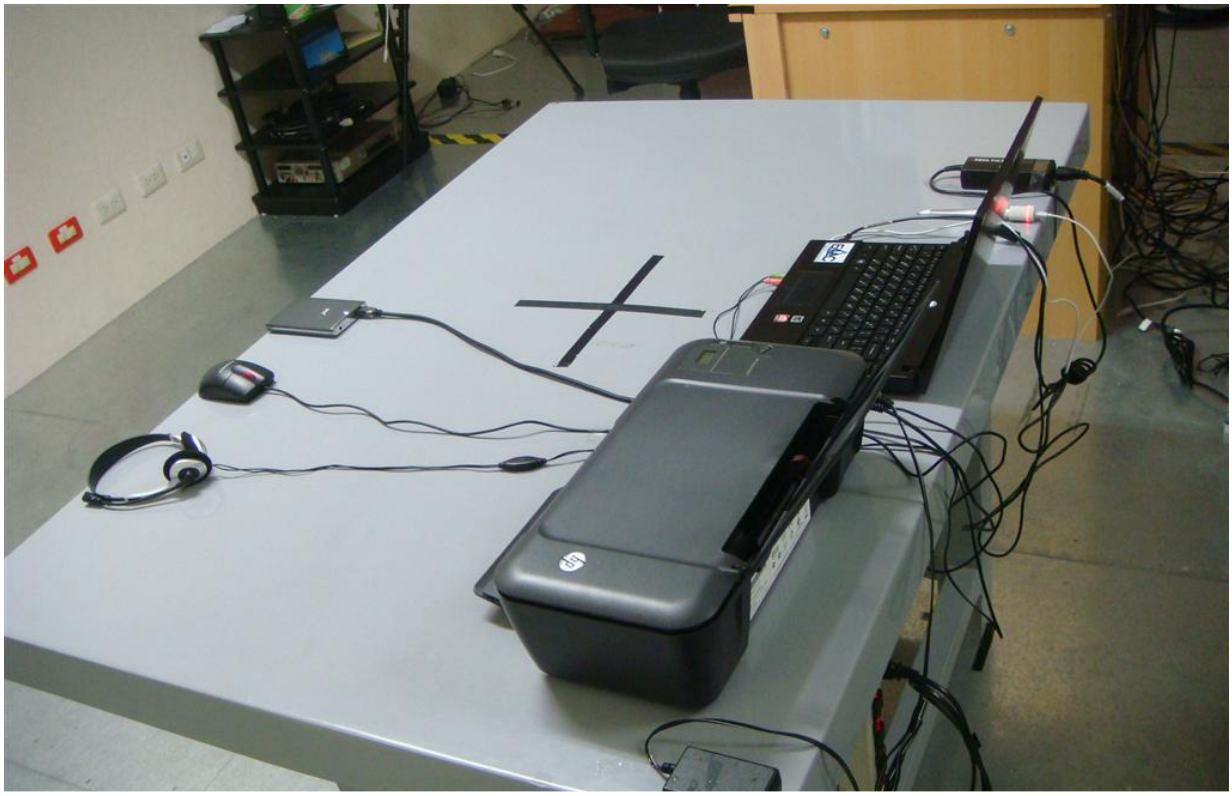
Photograph 3: Set-up for Spurious Emissions (Back View 2)



Photograph 4: Set-up for Conducted testing



Photograph 5: Set-up for for Mains Conducted testing Back



Photograph 6: Set-up for for Mains Conducted testing Front

8. List of Tables

9. List of Photographs