

FCC - TEST REPORT

Report Number : **60.790.15.008.01** Date of Issue : June 5, 2015

Model : **BKM4AB**

Product Type : **Combo Transmitter**

Applicant : DAYTON INDUSTRIAL CO., LTD

Address : 2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong

Production Facility : KENDY Enterprise Ltd

Address : 2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : 22

TÜV SÜD HONG KONG LTD. is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025. TÜV SÜD HONG KONG LTD. reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations TÜV SÜD HONG KONG LTD. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD HONG KONG LTD. issued reports. This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

1 Table of Contents

1 Table of Contents.....	2
2 Description of Equipment Under Test	3
3 Summary of Test Standards	4
4 Details about the Test Laboratory	5
4.1 Test Equipment Site List.....	6
4.2 Measurement System Uncertainty	7
5 Summary of Test Results.....	8
6 General Remarks.....	9
7 Emission Test Results	10
7.1 Radiated Emission.....	10
7.2 20dB & 99% Bandwidth	12
7.3 Bandedge Emission.....	14
8 Appendix A - Photographs of EUT	16
9 Appendix B - Setup Photographs of EUT.....	20
10 Appendix C - General Product Information	22

2 Description of Equipment Under Test

Description of the Equipment Under Test

Product:	Combo Transmitter
Model no.:	BKM4AB
FCC ID:	04GBKM4AB
Rating:	3.0VDC (1 x 3.0VDC size "CR2032" batteries)
Frequency:	2457MHz
Antenna gain:	0 dBi
Number of operated channel:	1
Modulation:	GFSK

3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-13 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

4 Details about the Test Laboratory

Site 1

Company name: TÜV SÜD Hong Kong Ltd.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin, Hong Kong

Site 2

Company name: TÜV SÜD China Ltd.
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 502708

Emission Tests	
Test Item	Test Site
FCC Part 15 Subpart C	
FCC Title 47 Part 15.249 & 15.209 Radiated Emission	Site 2
FCC Title 47 Part 15.249 & 15.207 Conduct Emission	NIL
FCC Title 47 Part 15.215 20dB & 99% Bandwidth	Site 2
FCC Title 47 Part 15.249 Bandedge Emission	Site 2

4.1 Test Equipment Site List

Radiated emission Test, Bandedge Emission – Site 3

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	17-Aug-15
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	17-Aug-17
Horn Antenna	Rohde & Schwarz	HF907	102294	17-Aug-17
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	17-Aug-15
3m Semi-anechoic chamber	TDK	9X6X6	----	29-May-19

20dB & 99% Bandwidth – Site 3

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	108272	17-Aug-15
Signal Analyzer	Rohde & Schwarz	FSV40	101030	17-Aug-15
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	17-Aug-15
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	17-Aug-15

4.2 Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.54dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Conducted RF test	2.04dB

5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
FCC Title 47 Part 15.249 & 15.209 Radiated Emission	10-11	☒	☐	☐
FCC Title 47 Part 15.249 & 15.207 Conduct Emission	NIL	☐	☐	☒
FCC Title 47 Part 15.215 20dB & 99% Bandwidth	12-13	☒	☐	☐
FCC Title 47 Part 15.249 Bandedge Emission	14-15	☒	☐	☐

6 General Remarks

Remarks

NIL

SUMMARY:

- All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

- The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: May 14, 2015

Testing Start Date: May 15, 2015

Testing End Date: May 29, 2015

- TÜV SÜD HONG KONG LTD. -

Reviewed by:



TSENG Chi Kit
EMC Project Engineer



Prepared by:



CHAN Kwong Ngai
EMC Test Engineer

7 Emission Test Results

7.1 Radiated Emission

EUT: BKM4AB
 Op Condition: Operated, TX Mode (2457MHz)
 Test Specification: FCC15.249 & 15.209, Antenna: Horizontal
 Comment: 3.0VDC
 Remark: 9kHz to 25GHz

Test Result	
☒	Passed
☐	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector
45.520	16.40	40	-23.60	Quasi Peak
59.463	17.51	40	-22.49	Quasi Peak
108.145	15.92	43.5	-27.58	Quasi Peak
2457.000	90.56	114	-23.44	Peak
2457.000	88.46	94	-5.54	Average
4913.750	51.71	74	-22.29	Peak
4913.750	49.88	54	-4.12	Average
9828.125	45.60	74	-28.40	Peak

Radiated Emission

EUT: BKM4AB
 Op Condition: Operated, TX Mode (2457MHz)
 Test Specification: FCC15.249 & 15.209, Antenna: Vertical
 Comment: 3.0VDC
 Remark: 9kHz to 25GHz

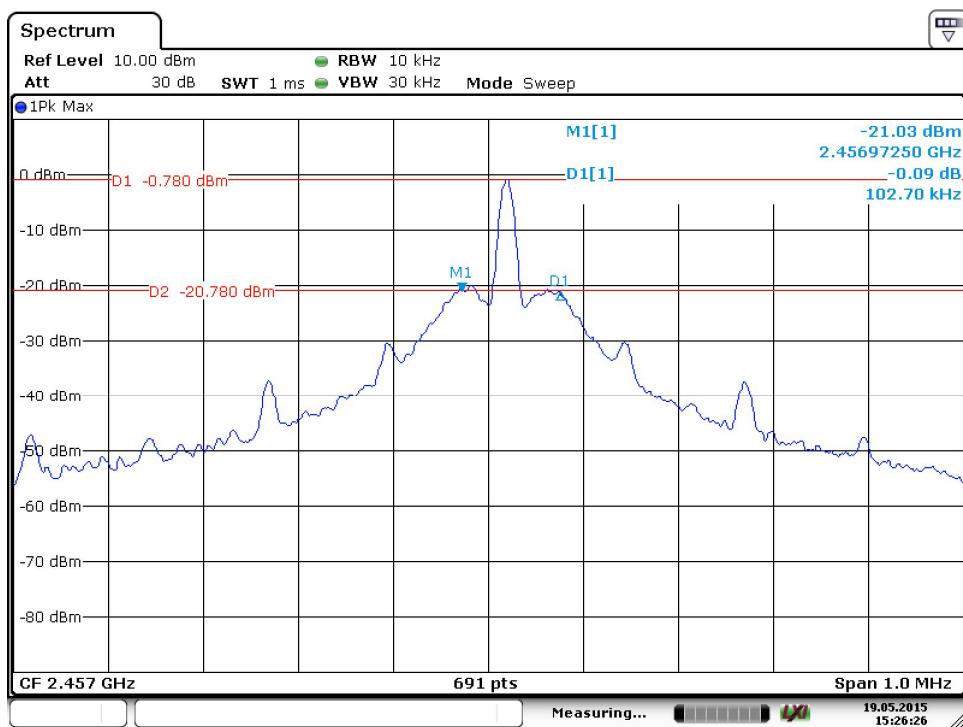
Test Result	
☒	Passed
☐	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector
41.397	17.13	40	-22.87	Quasi Peak
48.733	16.73	40	-23.27	Quasi Peak
62.798	15.24	40	-24.76	Quasi Peak
2457.000	89.43	114	-24.57	Peak
2457.000	87.16	94	-6.84	Average
4913.750	48.28	74	-25.72	Peak
4913.750	46.54	54	-7.46	Average
9828.125	47.15	74	-26.85	Peak

7.2 20dB & 99% Bandwidth

EUT: BKM4AB
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.215, 20dB Bandwidth
Comment: 3.0VDC

Test Result

☒ Passed☐ Not Passed

Date: 19.MAY.2015 15:26:26

20dB bandwidth

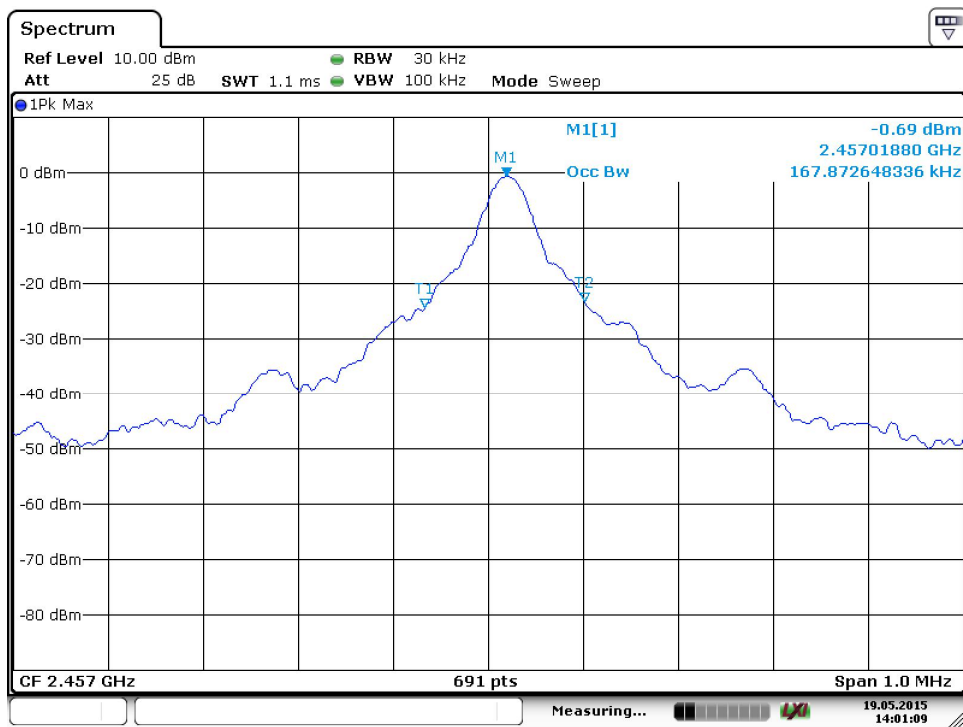
107.700 kHz

20dB & 99% Bandwidth

EUT: BKM4AB
Op Condition: Operated, TX Mode (2457MHz)
Test Specification: FCC15.215, 99% Bandwidth
Comment: 3.0VDC

Test Result

☒ Passed
☐ Not Passed



Date: 19.MAY.2015 14:01:09

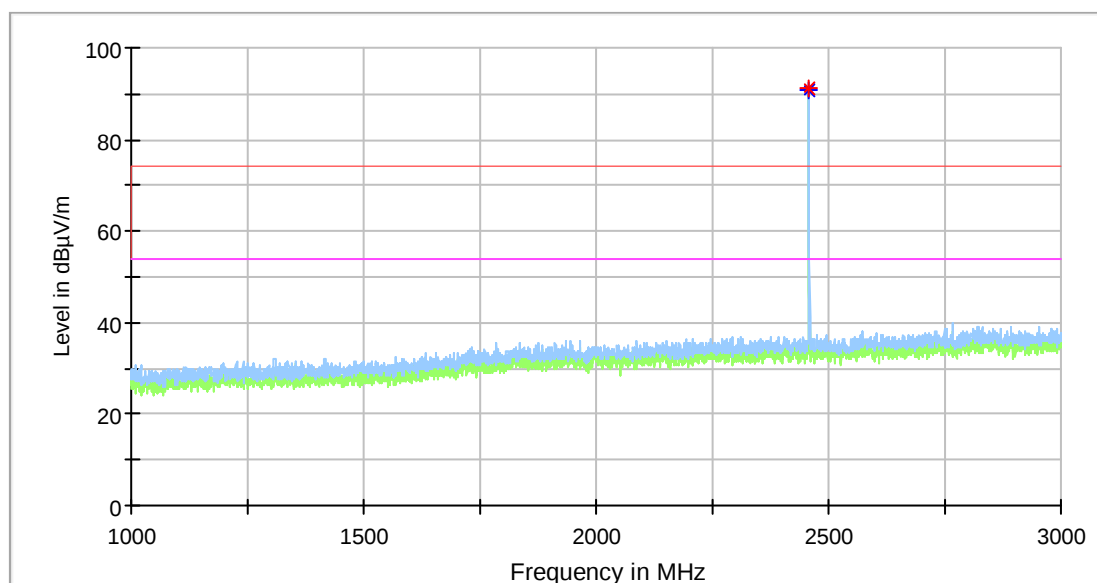
99% bandwidth

167.872 kHz

7.3 Bandedge Emission

EUT: BKM4AB
 Op Condition: Operated, TX Mode (2457MHz)
 Test Specification: FCC15.247, Antenna: Horizontal
 Comment: 3.0VDC

Test Result

☒ Passed☐ Not Passed

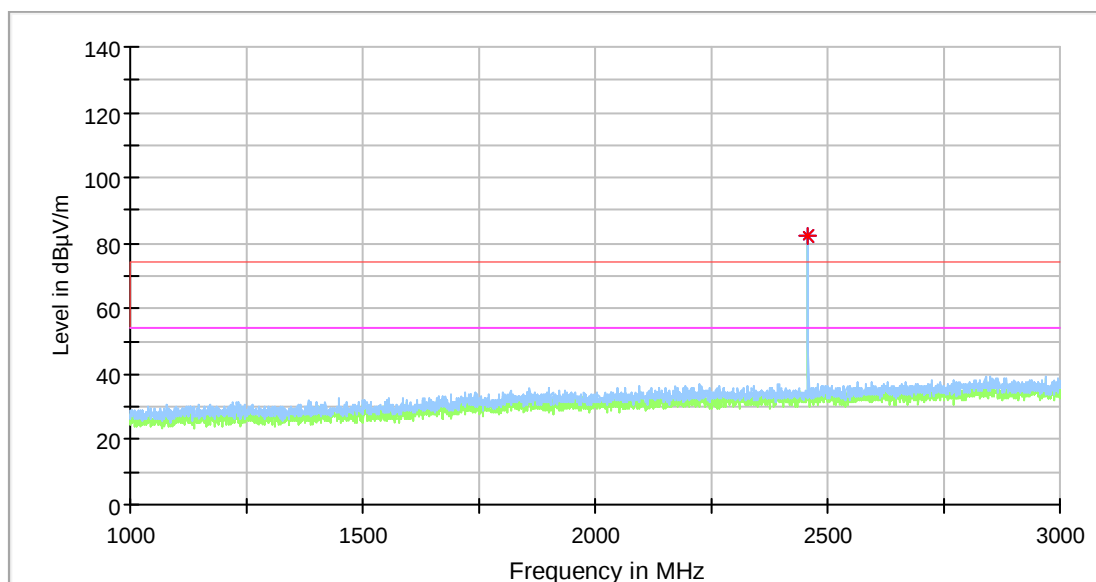
Band	Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector
Low	2396.000	34.72	74	-39.28	Peak
Low	2396.000	31.62	54	-22.38	Average
High	2491.000	36.98	74	-37.02	Peak
High	2491.000	32.88	54	-21.12	Average

Bandedge Emission

EUT: BKM4AB
 Op Condition: Operated, TX Mode (2457MHz)
 Test Specification: FCC15.247, Antenna: Vertical
 Comment: 3.0VDC

Test Result

☒ Passed
☐ Not Passed



Band	Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector
Low	2396.000	33.58	74	-40.42	Peak
Low	2396.000	30.17	54	-23.83	Average
High	2491.000	35.99	74	-38.01	Peak
High	2491.000	32.82	54	-21.18	Average

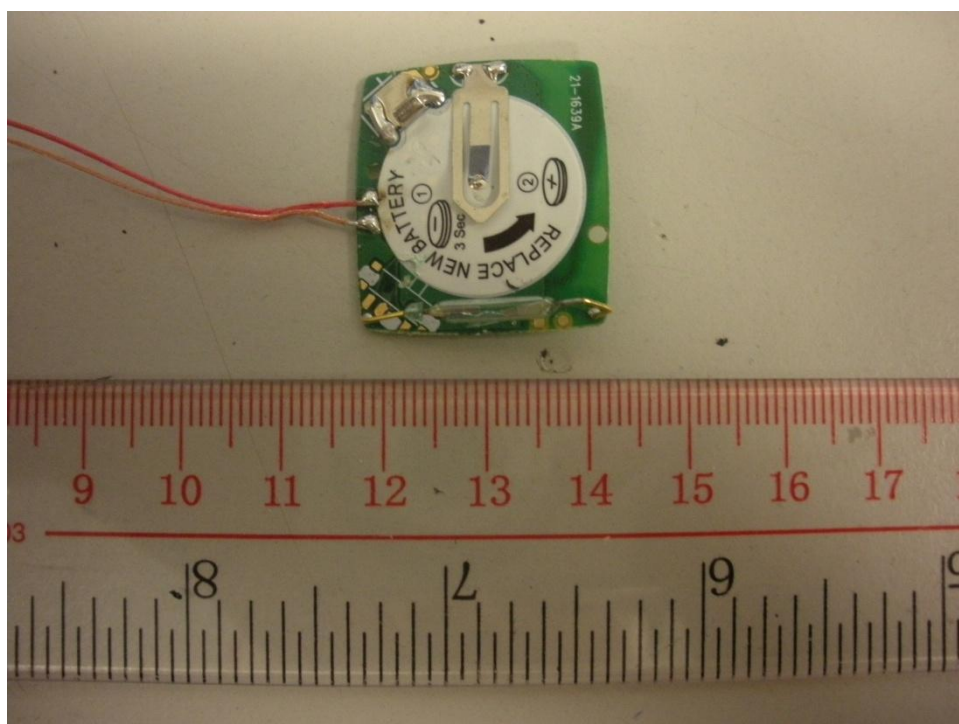
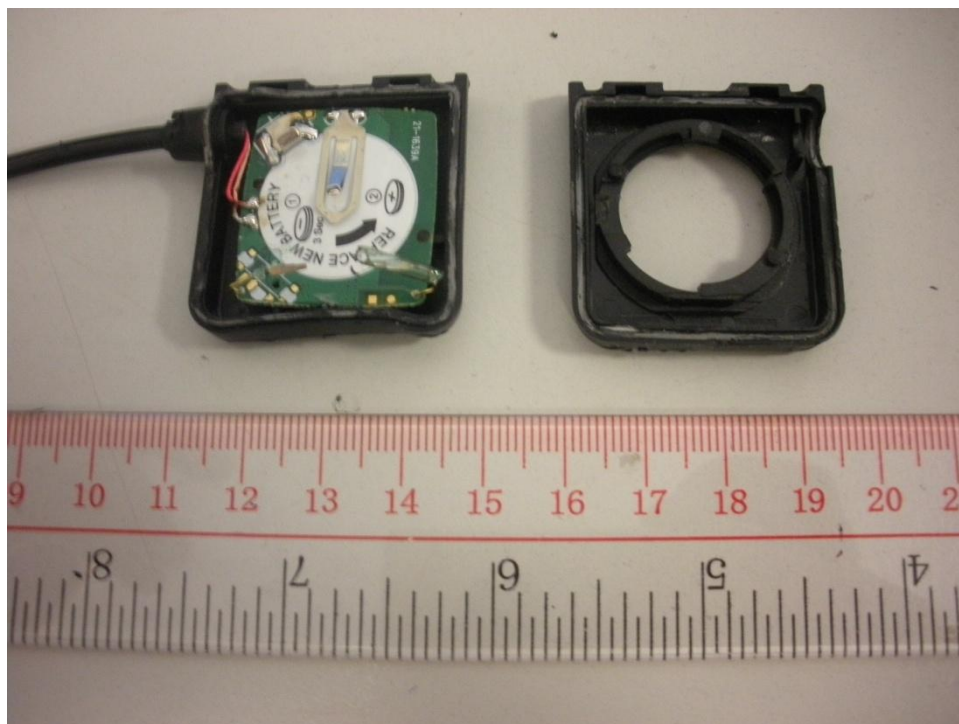
8 Appendix A - Photographs of EUT



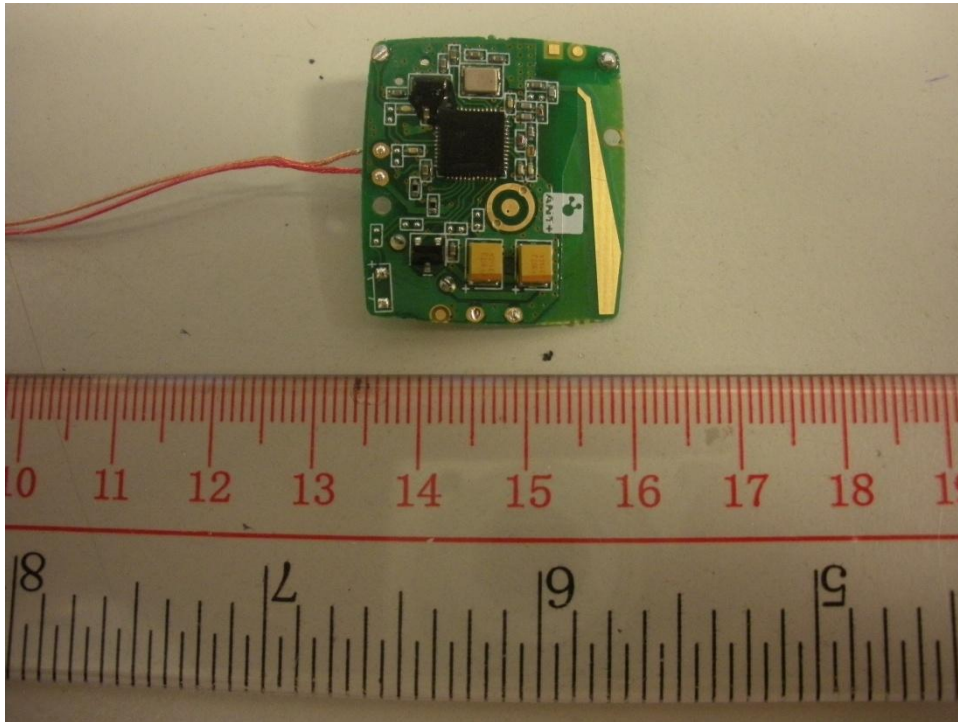
Appendix A



Appendix A

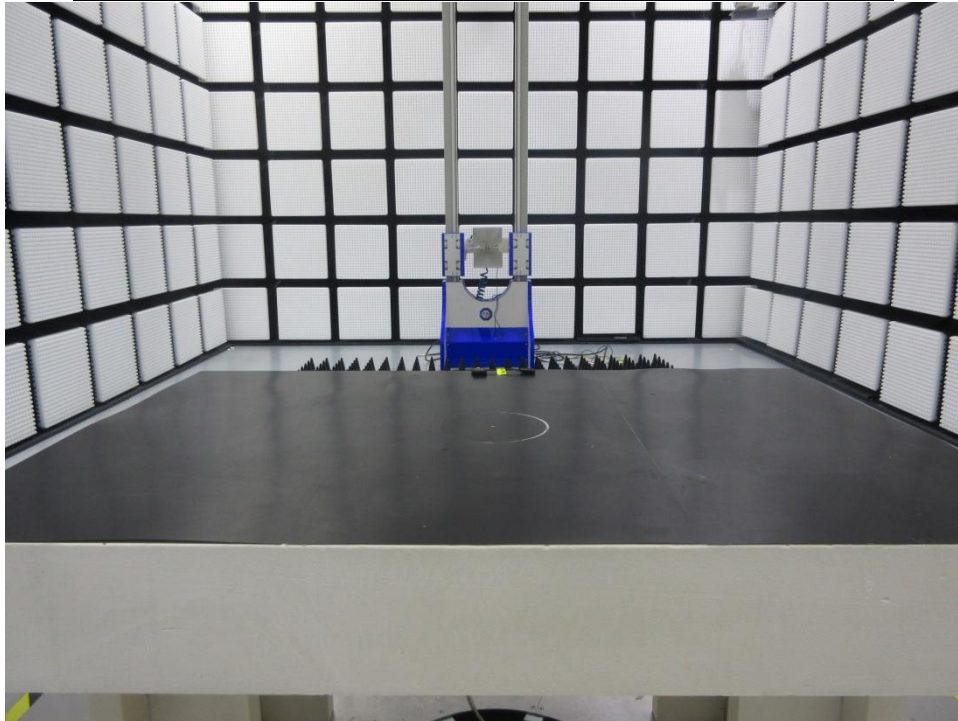


Appendix A

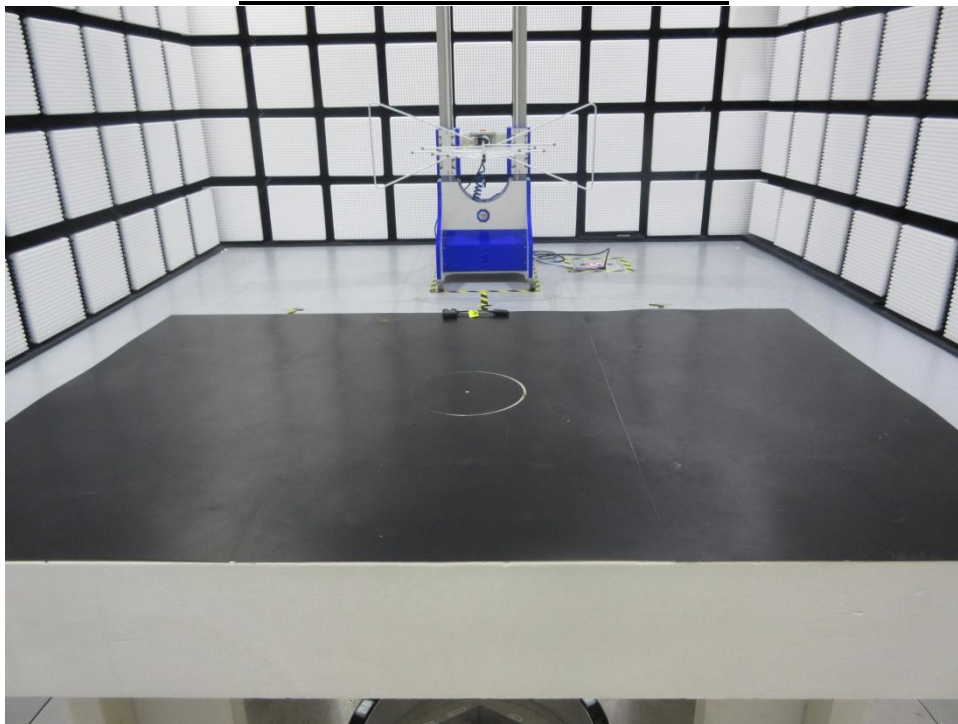


9 Appendix B - Setup Photographs of EUT

Radiated Emission 1GHz-25GHz / Bandedge Emission

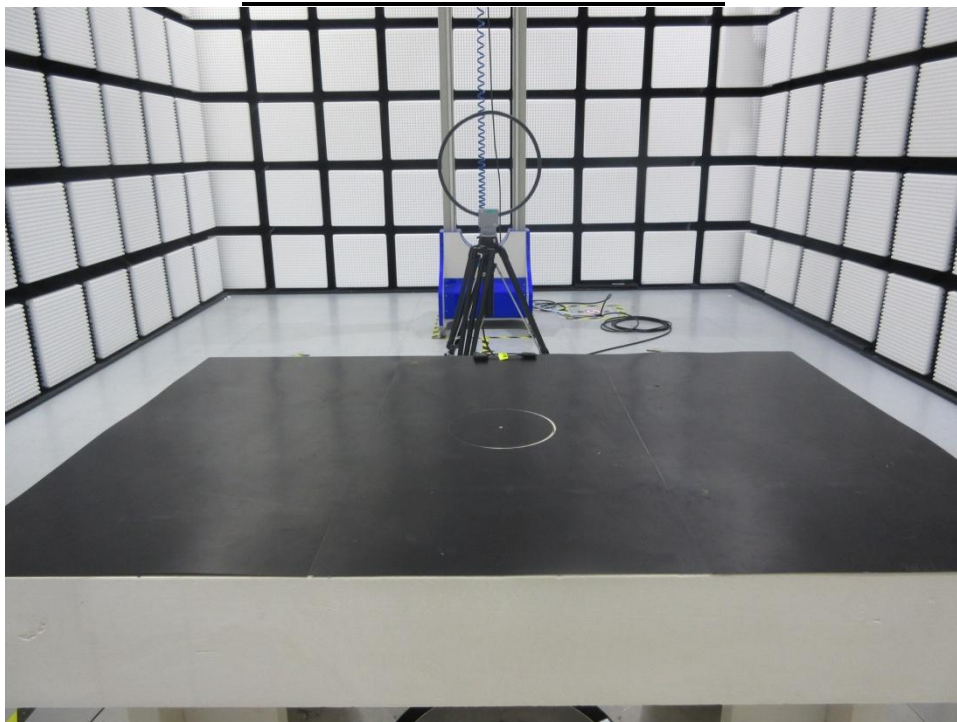


Radiated Emission 30MHz-1GHz

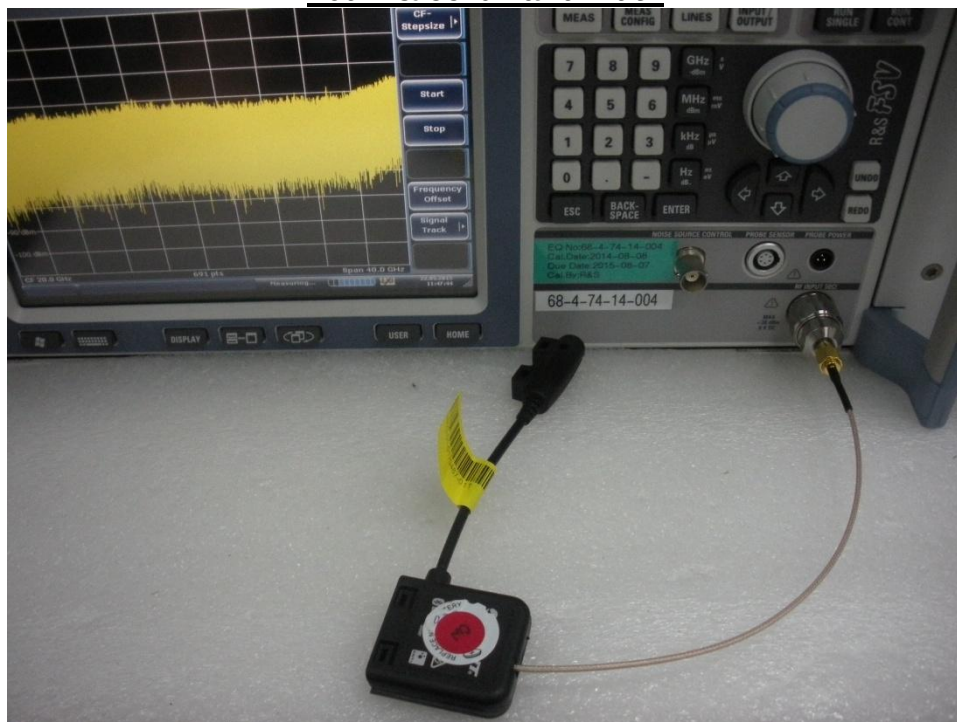


Appendix B

Radiated Emission 9kHz-30MHz



20dB & 99% Bandwidth



10 Appendix C - General Product Information

Radiofrequency radiation exposure evaluation

According to KDB 447498 D01v05r02 section 4.3.1,

>> The 1-g SAR test exclusion thresholds for 100MHz to 6GHz, at test separation distances ≤ 50 mm are determined by:

Power at 2457GHz = 0.8531 mW EIRP

$[(0.8531 \text{ mW}) / (50 \text{ mm})] \cdot [\text{sqrt}(2457 \text{ GHz})] = 0.8457$ which is ≤ 3.0 for 1-g SAR.

Therefore the device is exempt from stand-alone SAR test requirements.

>> The fundamental frequency of the EUT is 2402MHz-2480MHz, the test separation distance is $< 50\text{mm}$.

>> The power of EUT measured is:

- For 2457MHz: $0.8531\text{mW} = 10 \log(0.8531) \text{ dBm} \sim -0.69\text{dBm}$