

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

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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

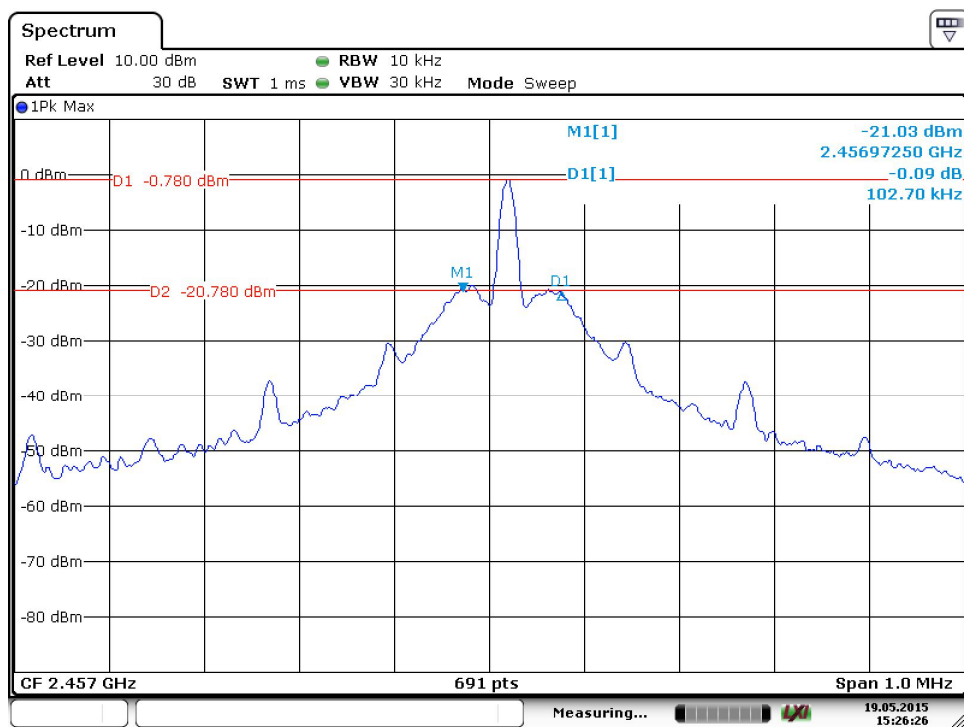
Test Result	
☒	Passed
☐	Not Passed

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

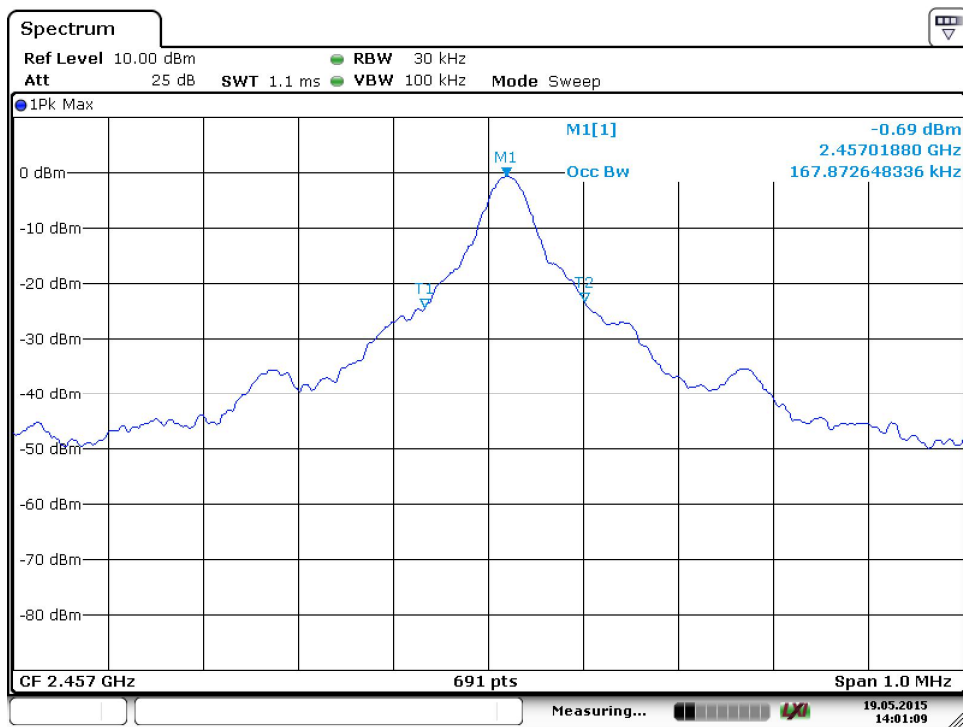
107.700 kHz

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

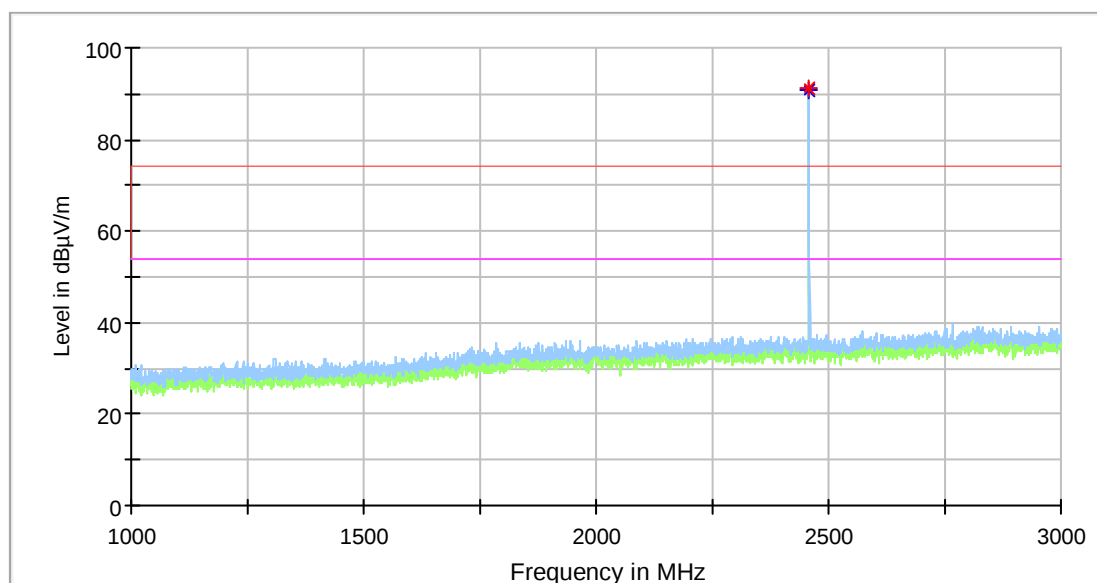
99% bandwidth

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

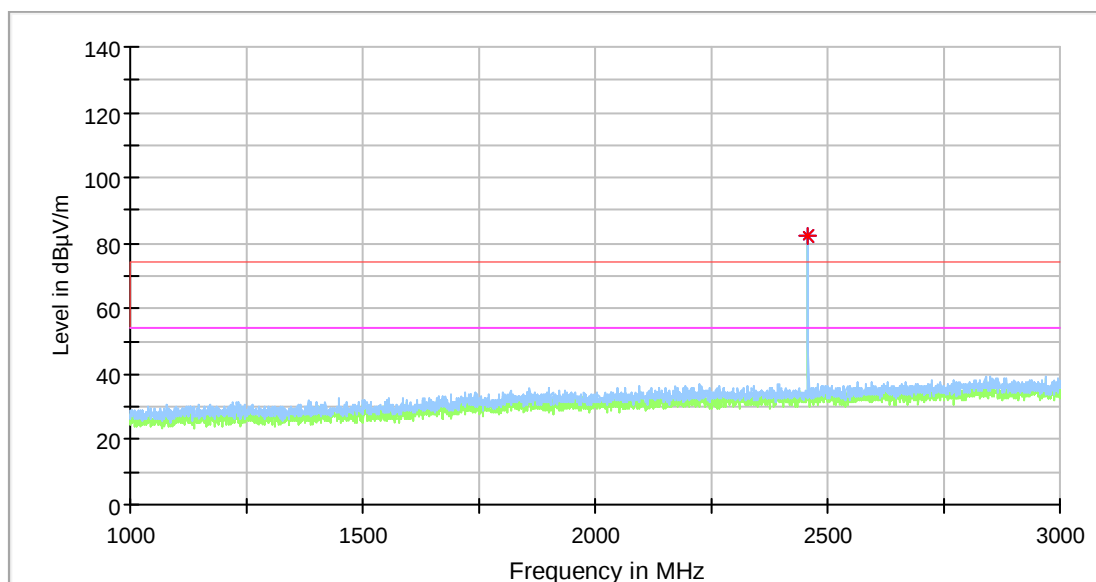
Band	Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector
Low	2396.000	34.72	74	-39.28	Peak
Low	2396.000	31.62	54	-22.38	Average
High	2491.000	36.98	74	-37.02	Peak
High	2491.000	32.88	54	-21.12	Average

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

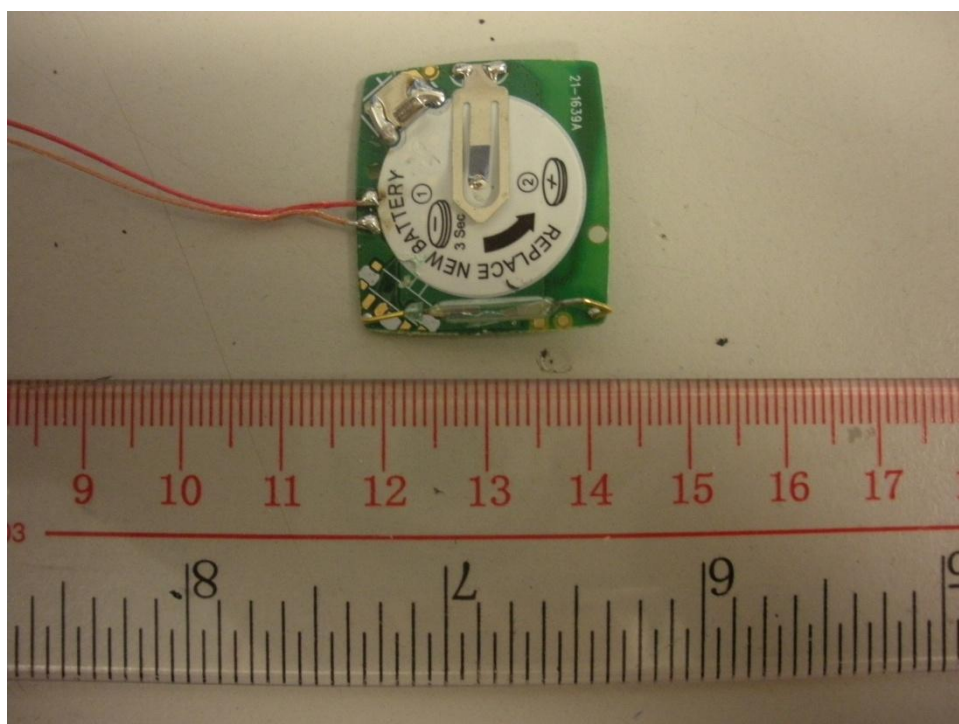
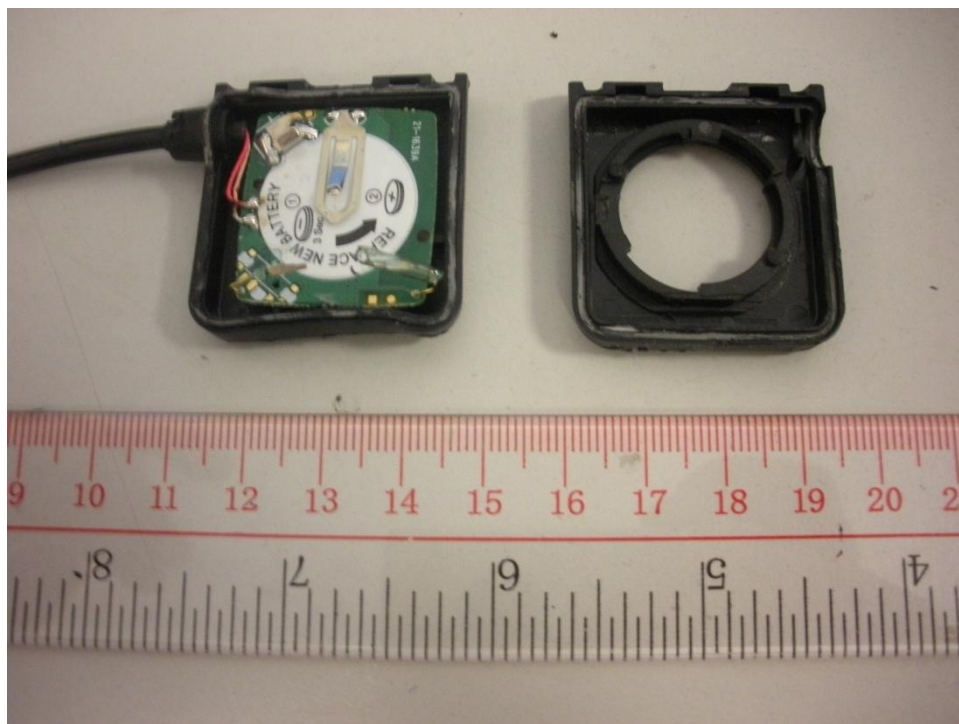
8 Appendix A - Photographs of EUT



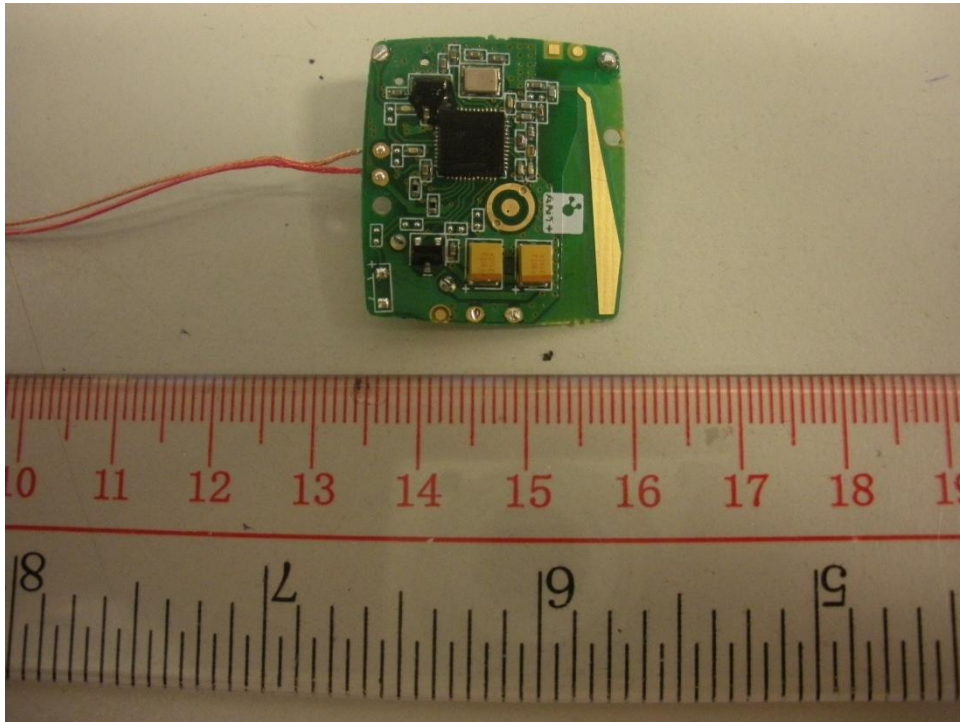
Appendix A



Appendix A

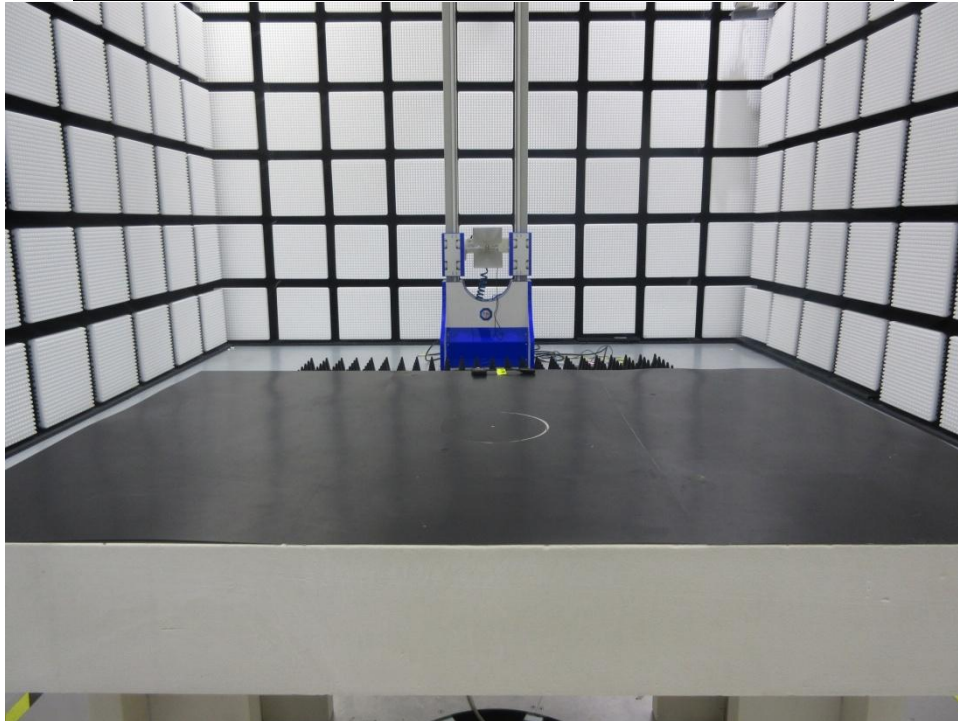


Appendix A

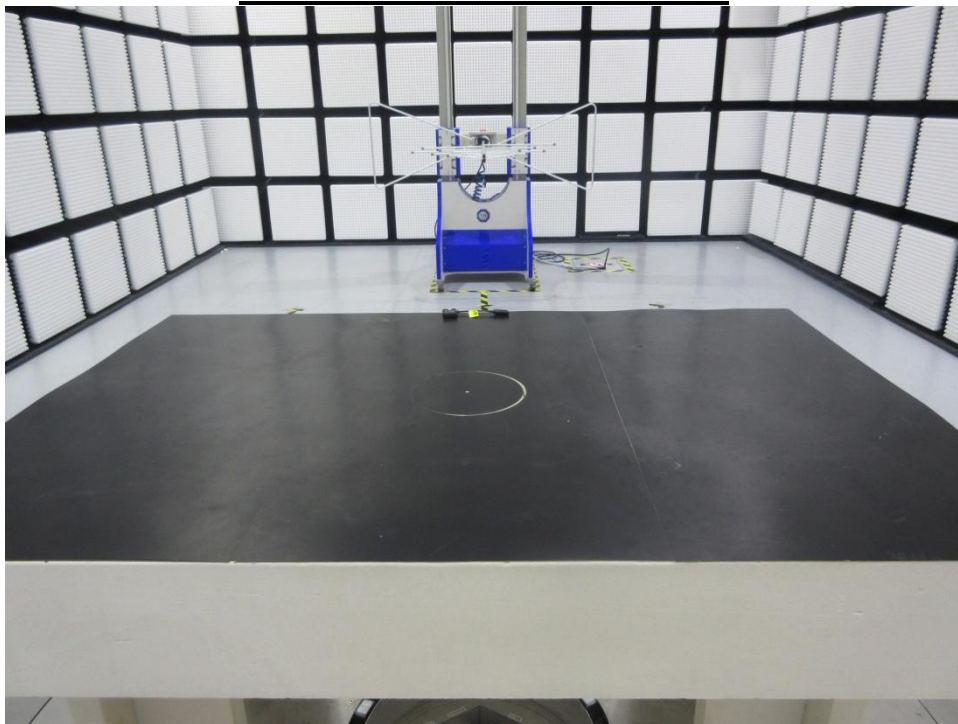


9 Appendix B - Setup Photographs of EUT

Radiated Emission 1GHz-25GHz / Bandedge Emission

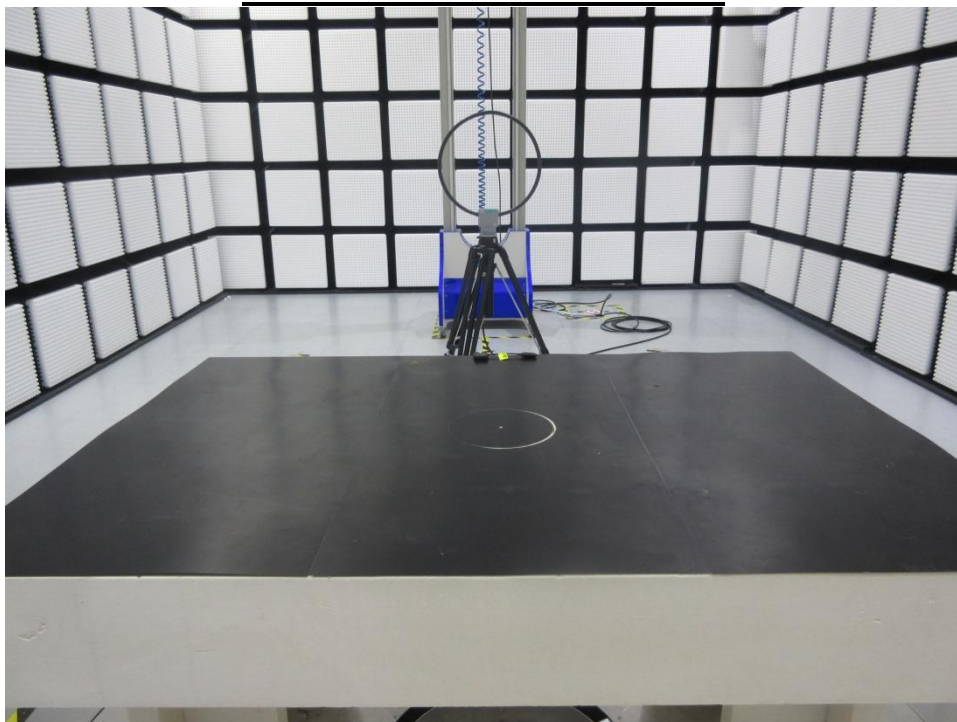


Radiated Emission 30MHz-1GHz

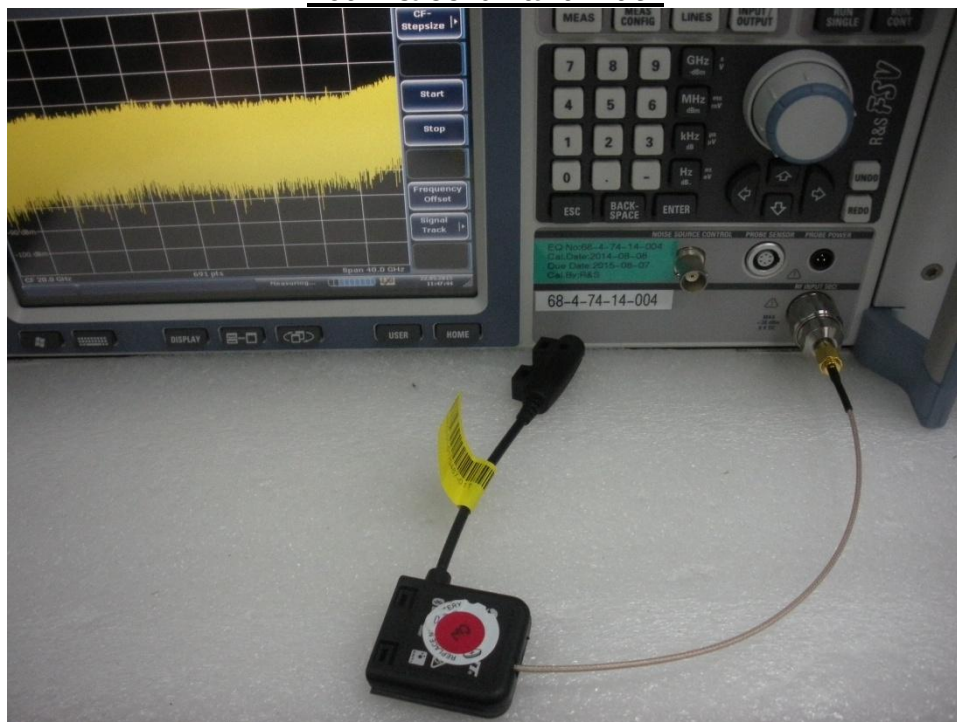


Appendix B

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