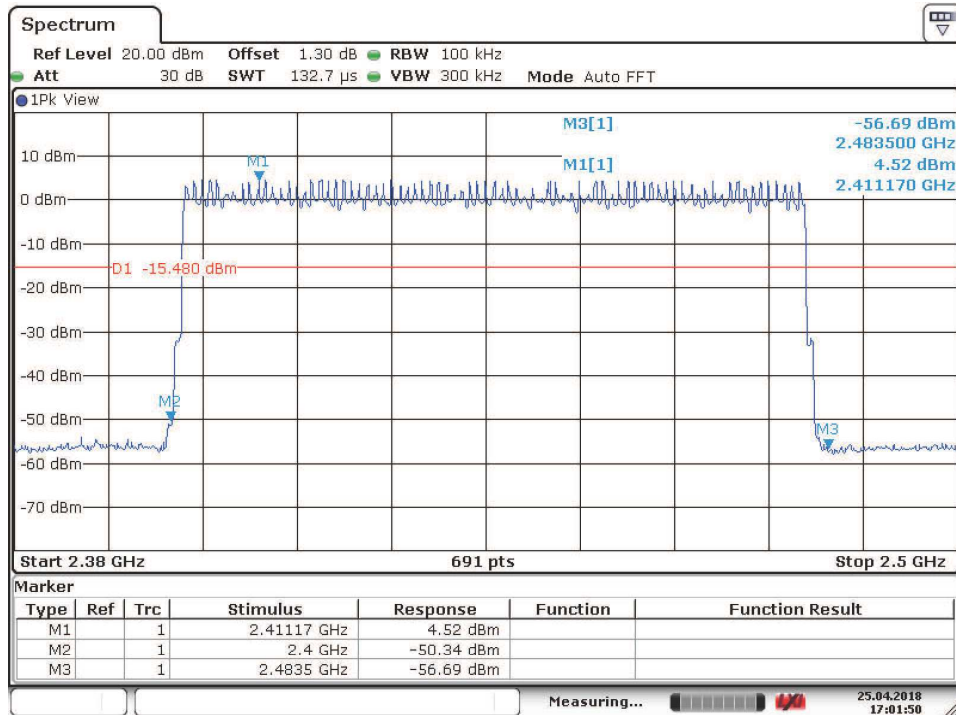


Hopping ON


Date: 25.APR.2018 17:01:49

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-247 5.5 and RSS-Gen 8.9

Basic standard : ANSI C63.10
Limits : Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-Gen i4, 8.9 (Table 6), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen i4, 8.9 (Table 4 and 5).
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), RSS-Gen i4, 8.9 (Table 4 and 5) and RSS-210 A2.9(a).

Kind of test site : 3m Semi-Anechoic Chamber

Test setup

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

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 worst-case Axis orientation is 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.

5.1.7 Frequency Separation

RESULT:
Passed

Test standard : FCC part 15.247(a)(1)
RSS-247 5.1

Basic standard : ANSI C63.10:2013

Limit : $\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater

Test setup

Test Channel : Middle

Operation Mode : A

Ambient temperature : 24°C

Relative humidity : 53%

Table 13: Test result of Frequency Separation (GFSK)

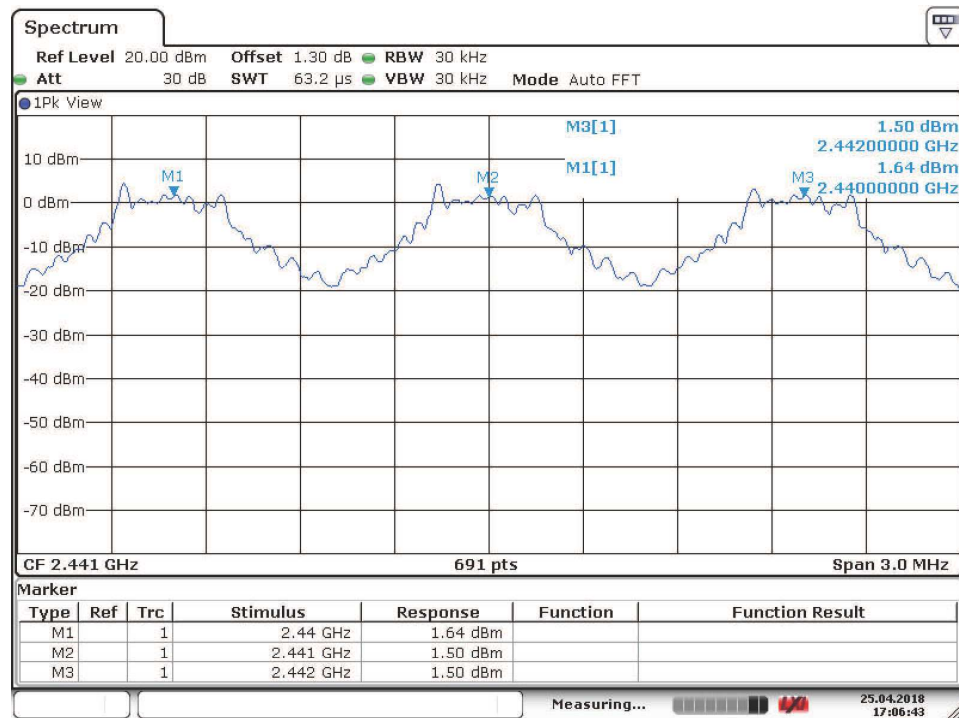
Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
Record Channel	2441	1	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth	Pass
Record Channel adj 1	2440			
Record Channel adj 2	2442			

Table 14: Test result of Frequency Separation (8DPSK)

Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
Record Channel	2441	1	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth	Pass
Record Channel adj 1	2440			
Record Channel adj 2	2442			

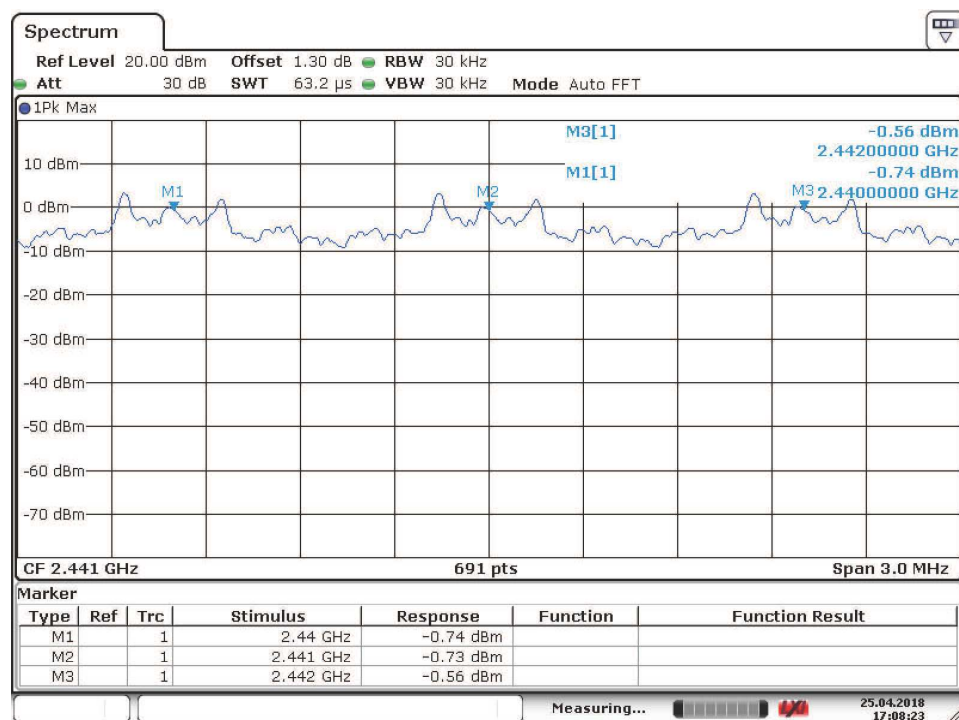
Test Plot of Frequency Separation

GFSK



Date: 25.APR.2018 17:06:42

8DPSK



Date: 25.APR.2018 17:08:23

5.1.8 Number of hopping frequency**RESULT:****Passed**Test standard : FCC part 15.247(a)(1)(iii)
RSS-247 5.1(5)

Basic standard : ANSI C63.10:2013

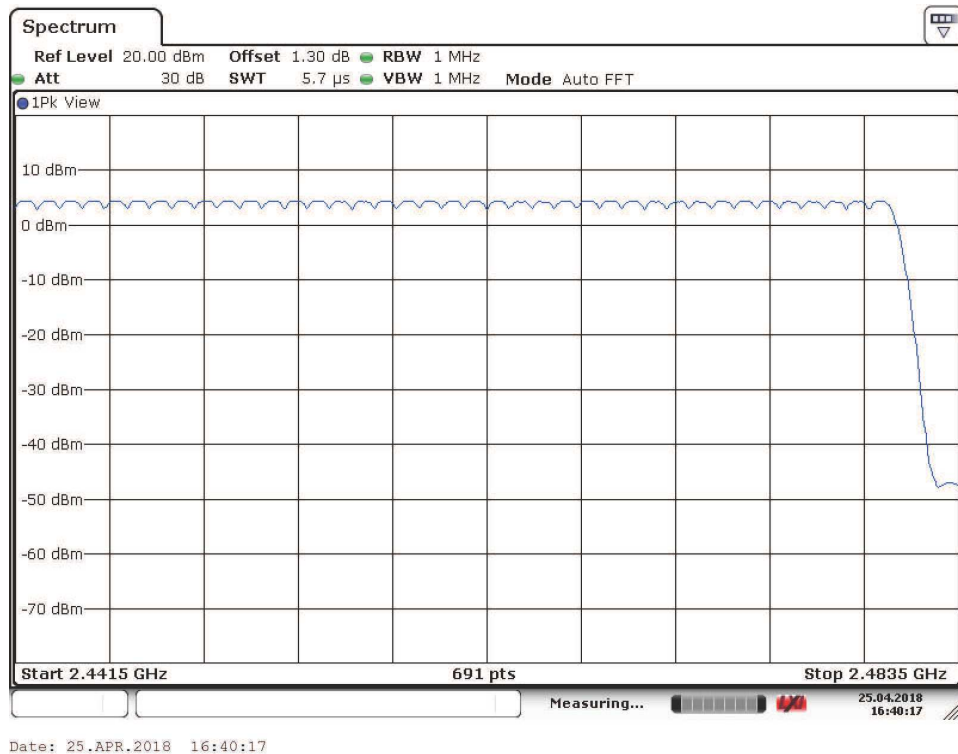
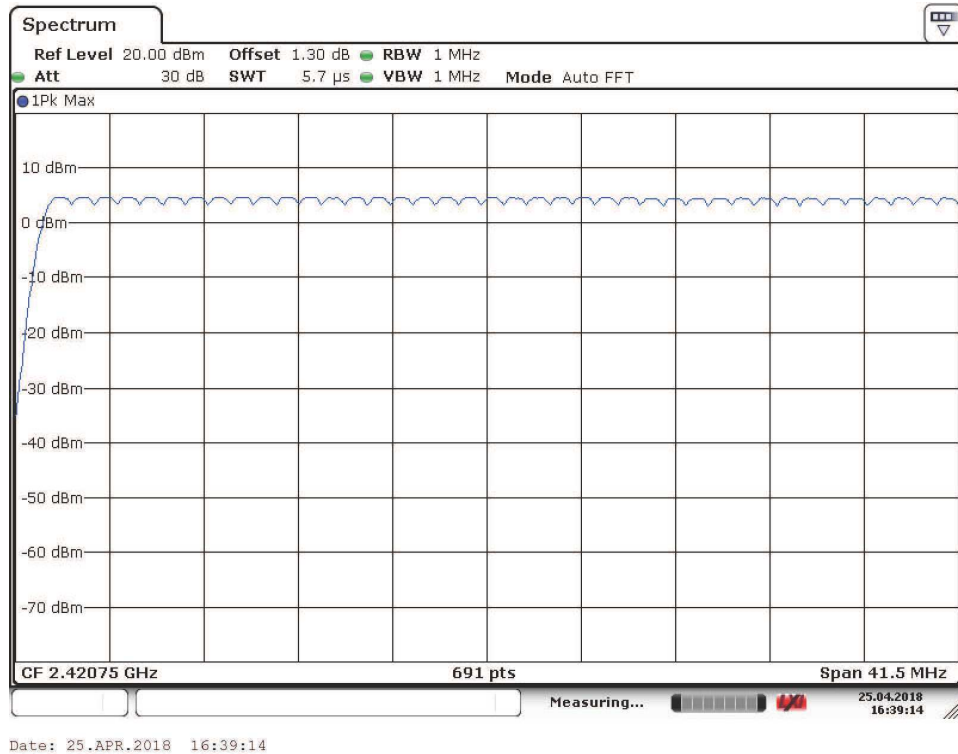
Test setup

Test Channel : Hopping On

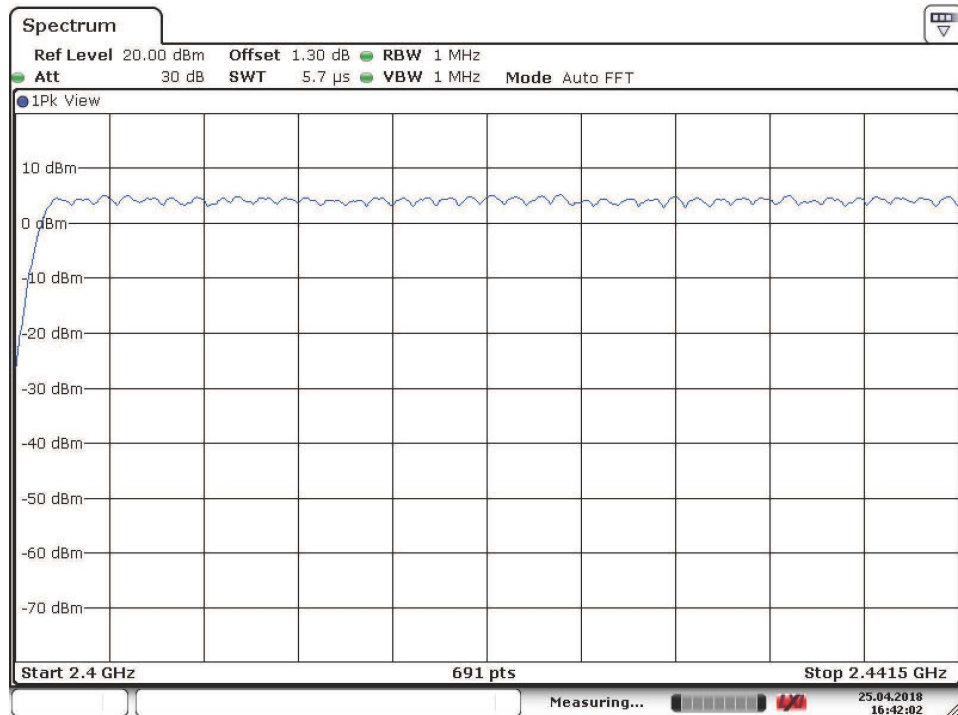
Ambient temperature : 22-26°C
Relative humidity : 50-65%
Atmospheric pressure : 100-103 kPa**Table 15: Test result of Number of hopping frequency**

Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
<u>2400</u> to <u>2483.5</u> MHz	79	≥15	Pass

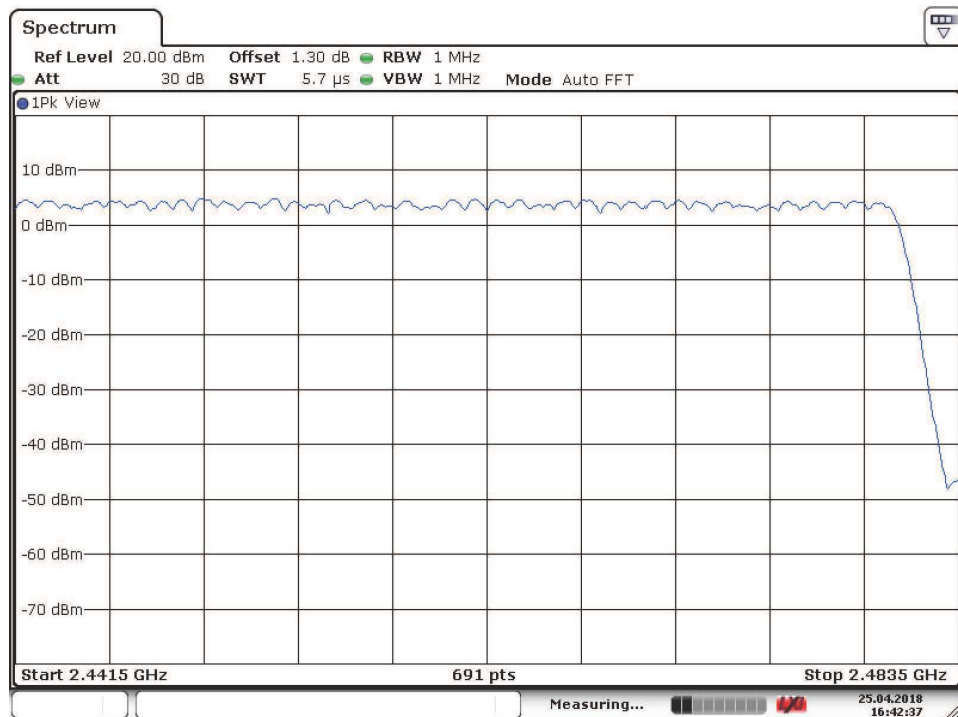
Test Plot of Number of hopping frequencies GFSK



8DPSK



Date: 25.APR.2018 16:42:02



Date: 25.APR.2018 16:42:37

5.1.9 Time of Occupancy

RESULT:
Passed

Test standard : FCC part 15.247(a)(1)(iii)
 RSS-247 5.1(5)

Basic standard : ANSI C63.10:2013

Limits : 0.4s

Kind of test site : Shield room

Test setup

Test Channel : Low

Operation Mode : A

Ambient temperature : 22-26°C

Relative humidity : 50-65%

Atmospheric pressure : 100-103 kPa

Table 16: Test result of Time of Occupancy

Data Mode	Captured Burst (s)	Dwell time (s)	On+Off time (s)	Limit (s)	Result
DH5	0.00294	0.3138	0.00377	0.4	Pass
3DH5	0.00293	0.375	0.00375	0.4	Pass

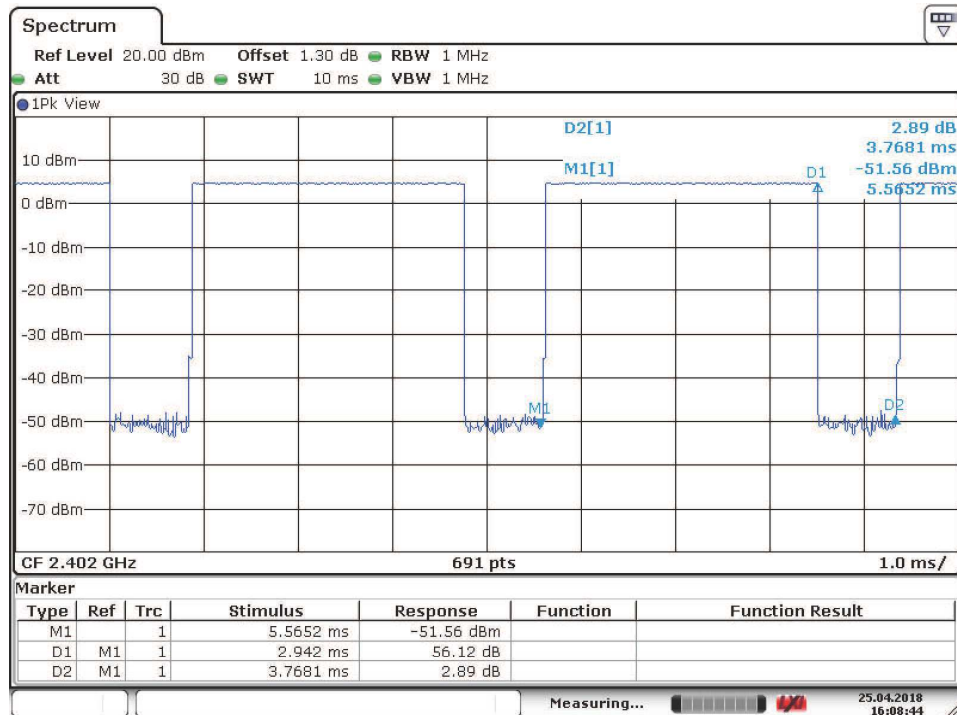
Note:

Dwell time = Pulse width x (Hopping rate / Number of channels) x Period

Period = 0.4 (seconds/ channel) x 79 (channel) = 31.6 seconds.

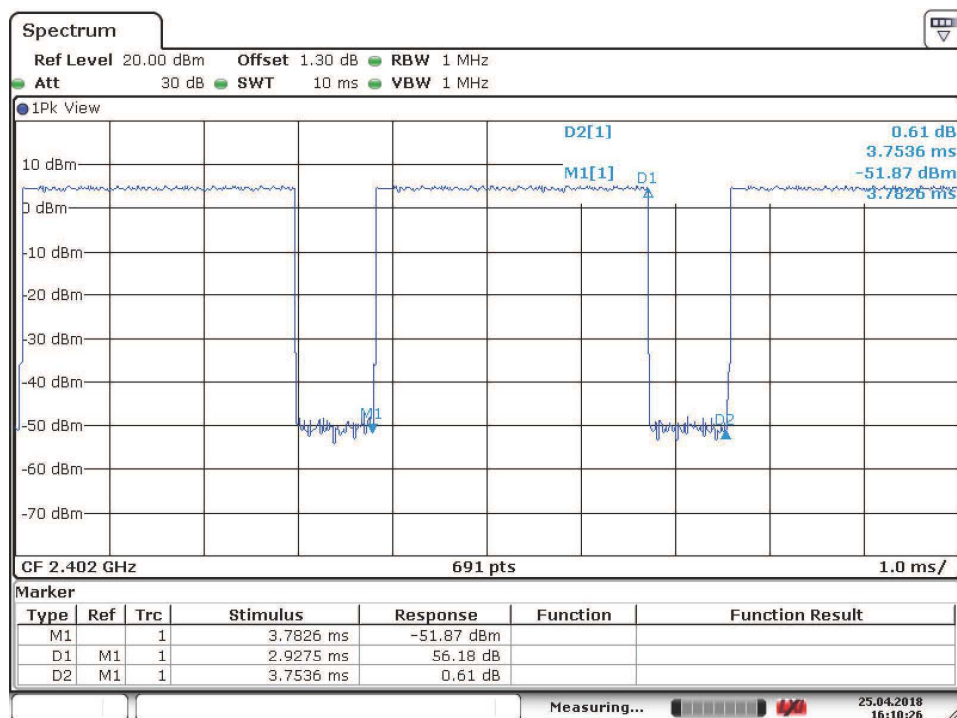
Hopping rate = 1 / (On+Off time) = 266 Hz

Test Plot of Time of Occupancy, GFSK modulation



Date: 25.APR.2018 16:08:44

Test Plot of Time of Occupancy, 8DPSK modulation



Date: 25.APR.2018 16:10:25

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT:**Passed**

Test standard : FCC Part 15.207
FCC Part 15.107
RSS-Gen 8.8

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
RSS-102 issue 5, Table 1

FCC:

Since maximum peak output power of the transmitter is $3.3651\text{mW} < 10\text{mW}$, hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498: Mobile Portable RF Exposure

Canada:

Maximum conducted peak power: 3.3651mW

Antenna Gain: 2.459dbi -> 1.76157

Maximum EIRP available 5.927 mW

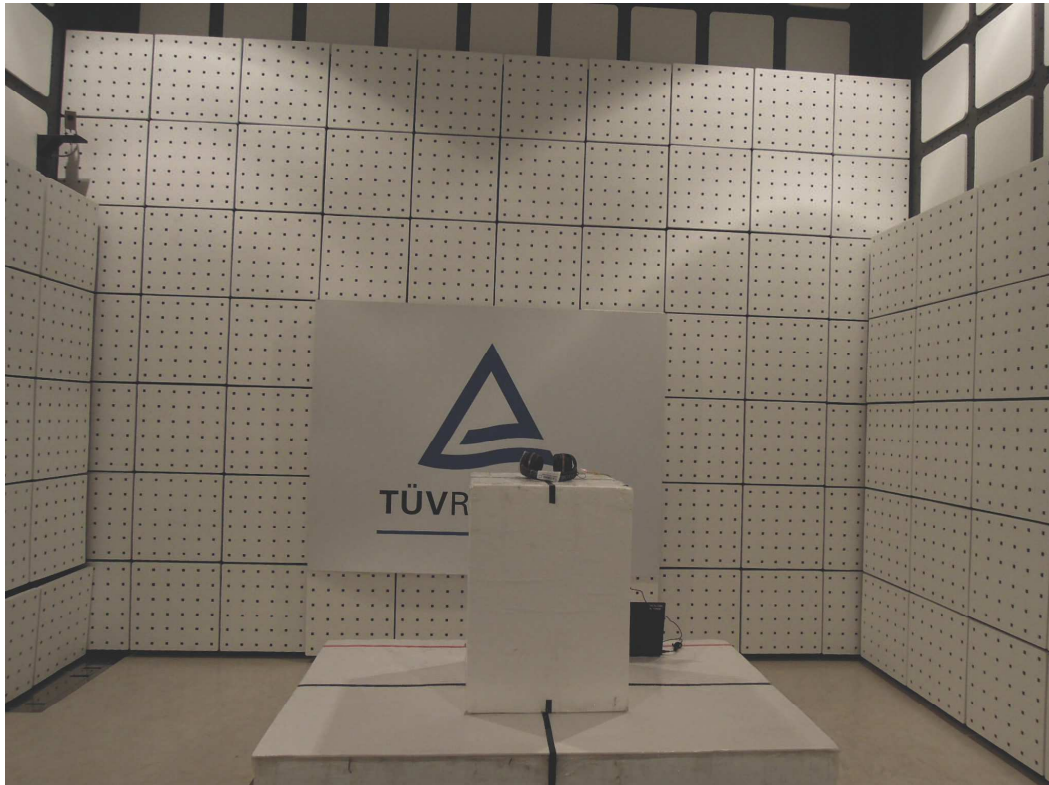
=====
Maximum Power available: 5.927 mW
(higher of EIRP or conducted)

Since maximum output power of the transmitter is $5.927\text{mW} < 7\text{mW}$, hence the EUT is excluded from SAR evaluation according to Table 1 in RSS-102

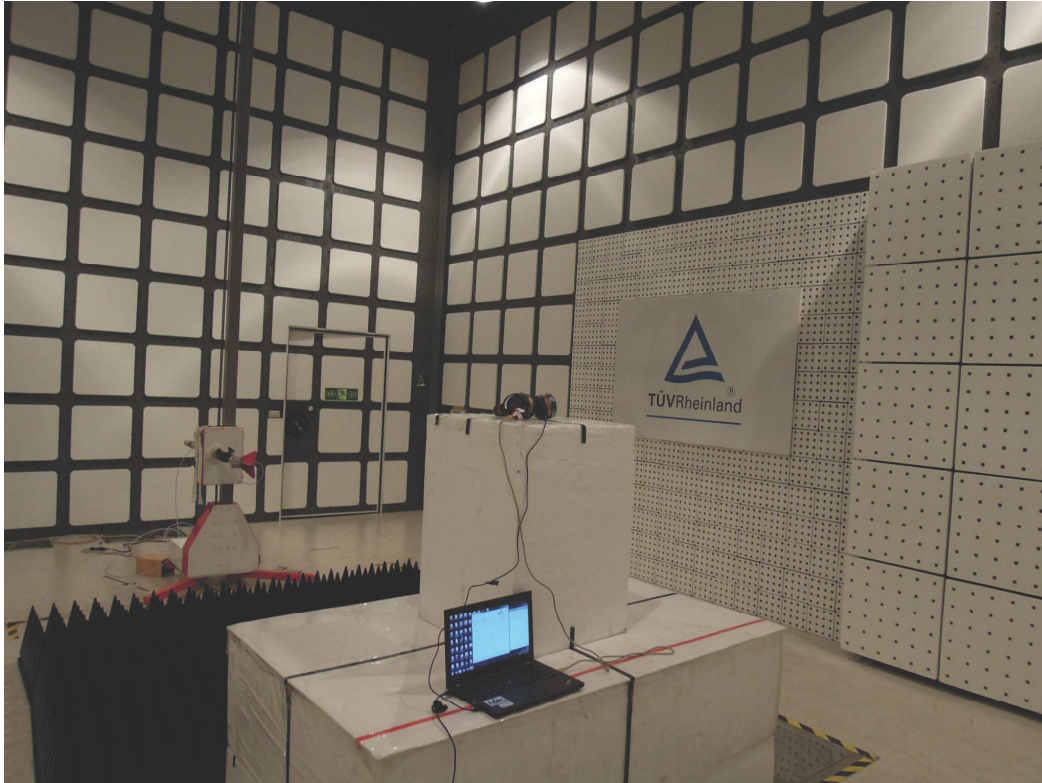
The enclosure outer surface has minimum 10mm distance to the RF antenna.
So it's guaranteed that distance between the RF antenna and the human body is more than 10mm.

7. Photographs of the Test Set-Up

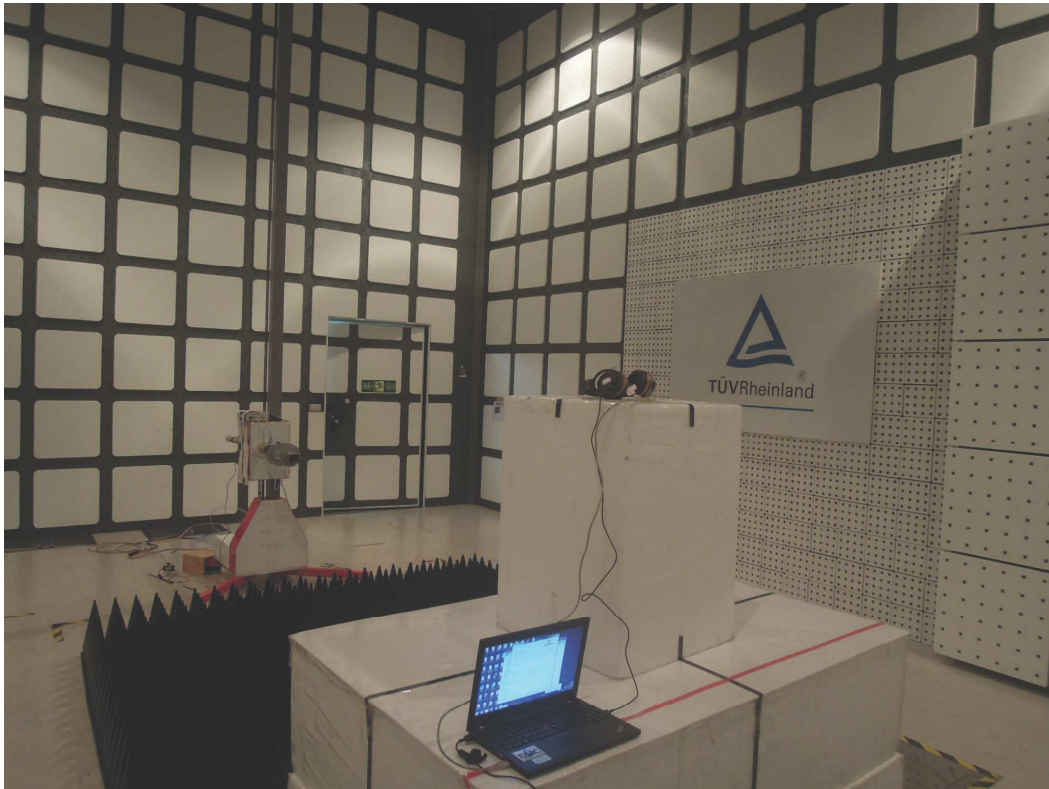
Photograph 1: Set-up for Spurious Emissions (Front View)



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 Mains Conducted testing (Back View)



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



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