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TEST REPORT
No. AR22-0080073-05

performed in accordance with

FCC Rules: Code of Federal Regulations (CFR) no. 47
Part 15 Subpart C Section 15.225

PRODUCT	13.56 MHz module integrated in indoor video door phone
MODEL(s) TESTED	1760/32
FCC ID	REA176032
TRADE MARK(s)	URMET

APPLICANT	URMET S.p.A. ~ Via Bologna, 188/c ~ I-10154 TORINO

Tested by	Robertino Torri *[Laboratory technician]*	
Approved by	Roberto Colombo *[Laboratory manager]*	

Revision Sheet

Release No.	Date	Revision Description
Rev. 0	2022-10-12	First edition Digital signed – AR22-0080073-05_TR_FCC 15.225 - URMET - 1760-3x 13.56MHz

1. GENERAL DATA

SAMPLE		
Samples received on	**2022-07-21**	**(Item(s) sampled and sent by applicant)**
IMQ reference samples	**BEM**	**109750**
Samples tested No.	1	
Object under analysis recognition	**Not carried out** Except where stated, characteristics of products were taken from client description and were not verified by the laboratory	
Date of acceptance of test item	2022-09-13	
TEST LOCATION		
Testing dates	2022-09-13 ÷ 2022-09-26	
Testing laboratory.	IMQ S.p.A. - Via Quintiliano, 43 – I-20138 Milano	
Testing site	Viale Lombardia, 20 – I-20021 Bollate (MI)	
ENVIRONMENTAL CONDITIONING		
Parameter	***Measured***	
Ambient Temperature	21.7 ÷ 25.9 °C	
Relative Humidity	48 ÷ 57 %	
Atmospheric Pressure	990 ÷ 1000 mbar	
The laboratory is monitored by a continuous environmental conditions measurements system. Temperature, humidity and pressure data are recorded on a weekly basis and stored in local archive.		
REMARKS		
Throughout this report a point is used as the decimal separator. The ability or reliability of this product to perform its intended function in a particular application has not been investigated. The test results apply to the sample as received. All information relating to the details of the equipment under test at the § 3 of this document was provided by the applicant. IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.		

2. REFERENCE DOCUMENT

DOCUMENT		DATE	TITLE
☒	47 CFR Part 15	2015	Radio Frequency Device
☒	ANSI C63.4	2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
☒	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices

3. EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL DATA

MODEL (basic)	Description
1760/32	13.56 MHz module integrated in indoor video door phone
VARIANTS (derived)	**Description**
/	/

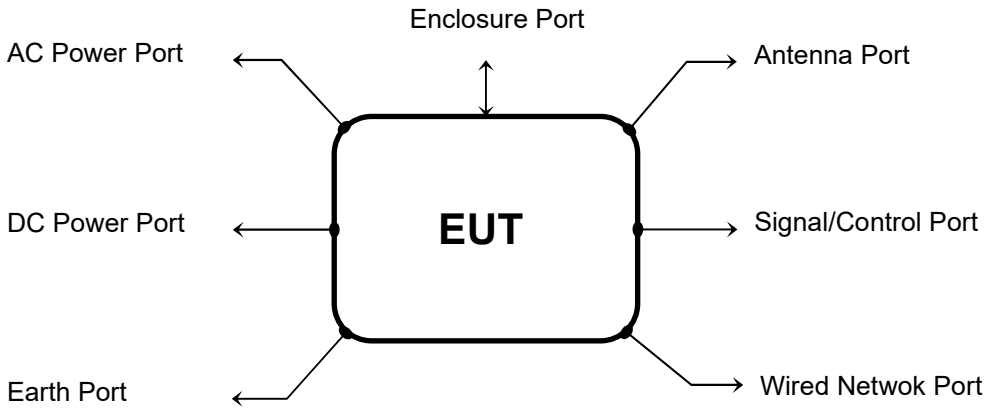
FCC ID	REA176032

MANUFACTURER	URMET S.p.A. ~ Via Bologna, 188/c ~ I-10154 TORINO
ASSEMBLY PLANT(s)	/

EUT IDENTIFICATION

EUT type	13.56 MHz radio module integrated in indoor video door phone			
EUT use	☒ Fixed	☐ Vehicular	☐ Portable	
EUT single or system	☒ Single	☐ System		
EUT standing	Wall			
Supply voltage	24 V AC/DC			
Frequency	/			
Radio Data				
Radio module(s) model	MFRC63002			
Modulation	/			
Number of channels	/	**Channel bandwidth**	/	
Operating frequency	13.553-13.567 MHz			
Antenna **Gain:**	/			
Model:	/			
Type:	☒ Integral	☐ Dedicated	☐ External	
Transmission protocol	/			

EUT PORTS



Port	Description	Cable >3 m	Cable Shielded
Enclosure	Plastic surface	/	/
AC power	24 V	Yes	/
DC power	/	/	/
Earth	/	/	/
Wired Network	/	/	/
Signal / Control	/	/	/
Antenna	Integral	/	/

STATE OF THE EUT DURING TESTS

Ref.	Mode	Description
#1	Operating	Supply in normal condition with TAG on RFID reader with AC/AC adapter (230/24V)

SUPPORT EQUIPMENT

Defined as equipment needed for correct operation or loading of the EUT, but not considered as tested:

Equipment	Manufacturer	Model
Notebook with dedicate SW for RF parameters management	/	/
AC/AC Power adapter	URMET	1723/22
TAG	URMET	/

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ELECTROMAGNETICALLY RELEVANT COMPONENTS

Component	No.	Manufacturer	Model
13.56 MHz radio module	1	NXP Semiconductor	MFRC63002
Wi-Fi radio module	1	B-LINK	BL-R8188EU1(EUS)
Main board	1	URMET	C1760-003A

RFI SUPPRESSION DEVICES

Component	No.	Manufacturer	Model
/	/	/	/

EMI PROTECTION DEVICES

Component	No.	Manufacturer	Model
/	/	/	/

EUT TECHNICAL DOCUMENTATION

Document	Reference
/	/

4. METHODS OF MEASUREMENT

All compliance measurements have been carried out using the procedures described in the standard ANSI C63.4:2014, ANSI C63.10:2013 and Section 15.31 of CFR47 Part 15 – Subpart A (General). Additional test requirements have been adopted according to the reference Section indicated in the § 6 of this test report.
FREQUENCY RANGE INVESTIGATED
Conducted emission tests : from 150 kHz to 30 MHz. Radiated emission tests: from 9 kHz to tenth harmonic of fundamental (or 1GHz)

5. SUMMARY OF TEST RESULTS

POSSIBLE TEST CASE VERDICTS:	
Test object meets the requirement	PASS
Test object does not meet the requirement	FAIL
Test case does not apply to the test object	N.A.
Test not performed	N.P.

CFR47 Part 15	TITLE	RESULT
§ 15.203	Antenna Requirements	PASS
§ 15.207 (a)	Conducted Emission	PASS
§ 15.209 (a) (f) § 15.225 (d)	Radiated Emission (Operation outside the band 13.110 – 14.010 MHz)	PASS
§ 15.225 (a) § 15.225 (b) § 15.225 (c)	Field strength (Operation within the band 13.110 – 14.010 MHz)	PASS
§ 15.225 (e)	Frequency tolerance of the carrier	PASS
§ 15.225 (f)	Radio frequency powered tags	N.A. [1]

Note 1	Radio frequency powered tag not present

6. TEST RESULTS

6.1 ANTENNA REQUIREMENTS

TEST REQUIREMENT
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

Antenna specifications	
N° of authorized antenna types	Not Applicable
Antenna type	Integral antenna
Maximum total gain	---
External power amplifiers	Not present

TEST RESULT
The EUT meets the requirements of section 15.203 and 15.204

6.2 CONDUCTED DISTURBANCES

TEST REQUIREMENT	
Test setup	ANSI C63.4
Frequency range	150 kHz ÷ 30 MHz
IF bandwidth	9 kHz
EMC class	B
Limits	sections 15.207 (a)
EUT operating condition	#1
Remark	None
Testing dates	2022-09-15 ÷ 2022-09-22

TEST RESULT
The EUT meets the requirements of sections 15.207.

TEST PROCEDURE
1) The EUT was placed on a wooden table of size, 80 cm by 80 cm, raised 80 cm in which is located 40 cm away from the vertical wall the shielded room.
2) Each EUT power cord input cord was individually connected through a 50Ω/50µH LISN to the input power source.
3) Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4) The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5) The measurements were made with the detector set to PEAK and AVERAGE amplitude within a bandwidth of 10 kHz during the measurements.
6) The measurements with Quasi-Peak detector are performed only for frequencies for which the Peak values are ≥ (Q.P. limit - 6 dB).

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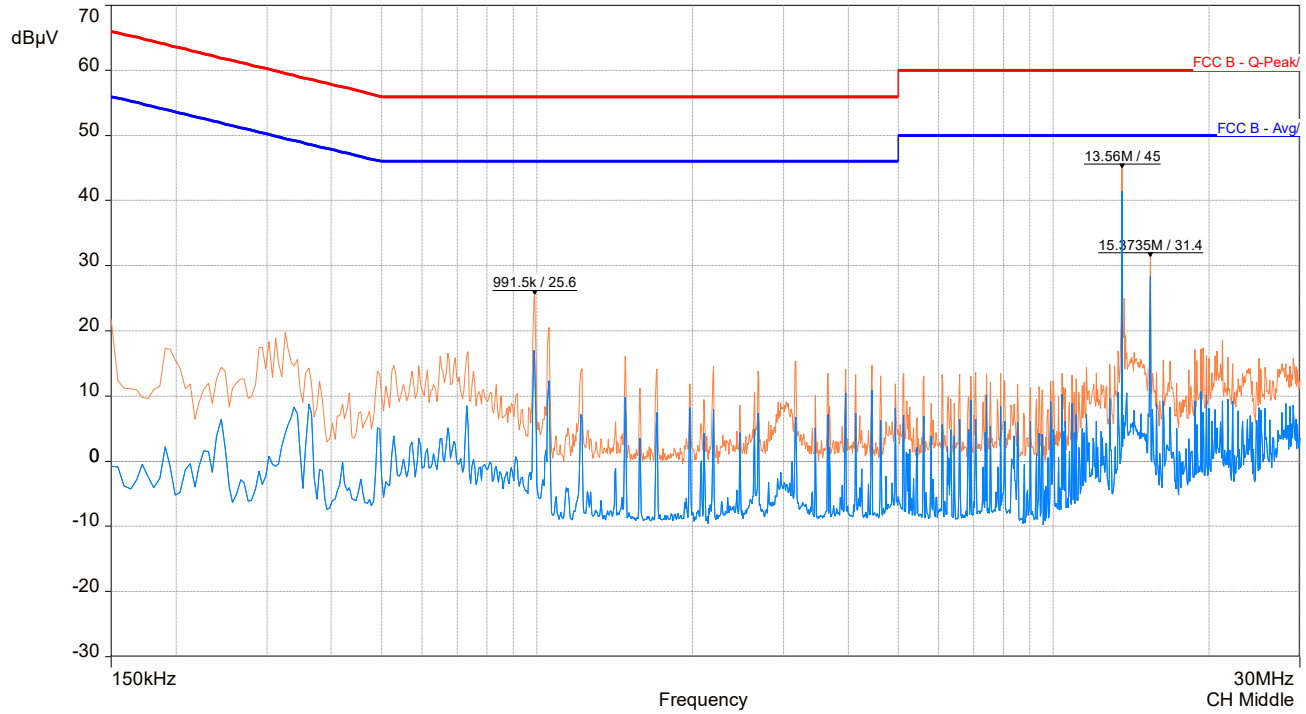
MEASUREMENTS RESULTS

Port: AC MAINS POWER PORT OF AC/AC ADAPTER (worst case)



6.3 RADIATED DISTURBANCES (OPERATION OUTSIDE THE BAND 13.110 – 14.010 MHZ)

TEST REQUIREMENT	
Test setup	ANSI C63.4
Test facility	Semi-anechoic chamber
Test distance	3 meters
Frequency range	9 kHz to tenth harmonic of fundamental (or 1 GHz)
IF bandwidth (below 30 MHz)	9 kHz
IF bandwidth (below 1,000 MHz)	120 kHz
Deviation to test procedure	None
Limits	sections 15.209 (a)
EUT operating condition	#1
Remark	(*) In accordance with part 15.31 (f) (2), where the measurement distance was specified to be 30 or 300 meters, a correction factor was applied in order to permit measurement to be performed at a separation distance. The applied formula for limits at 3 meter is: Extrapolation (dB) = 40log (300meter / 3meter) = +80db Extrapolation (dB) = 40log (30meter / 3meter) = +40db
Testing dates	2022-09-15 ÷ 2022-09-22

TEST RESULT
The EUT meets the requirements of sections 15.209 (a)

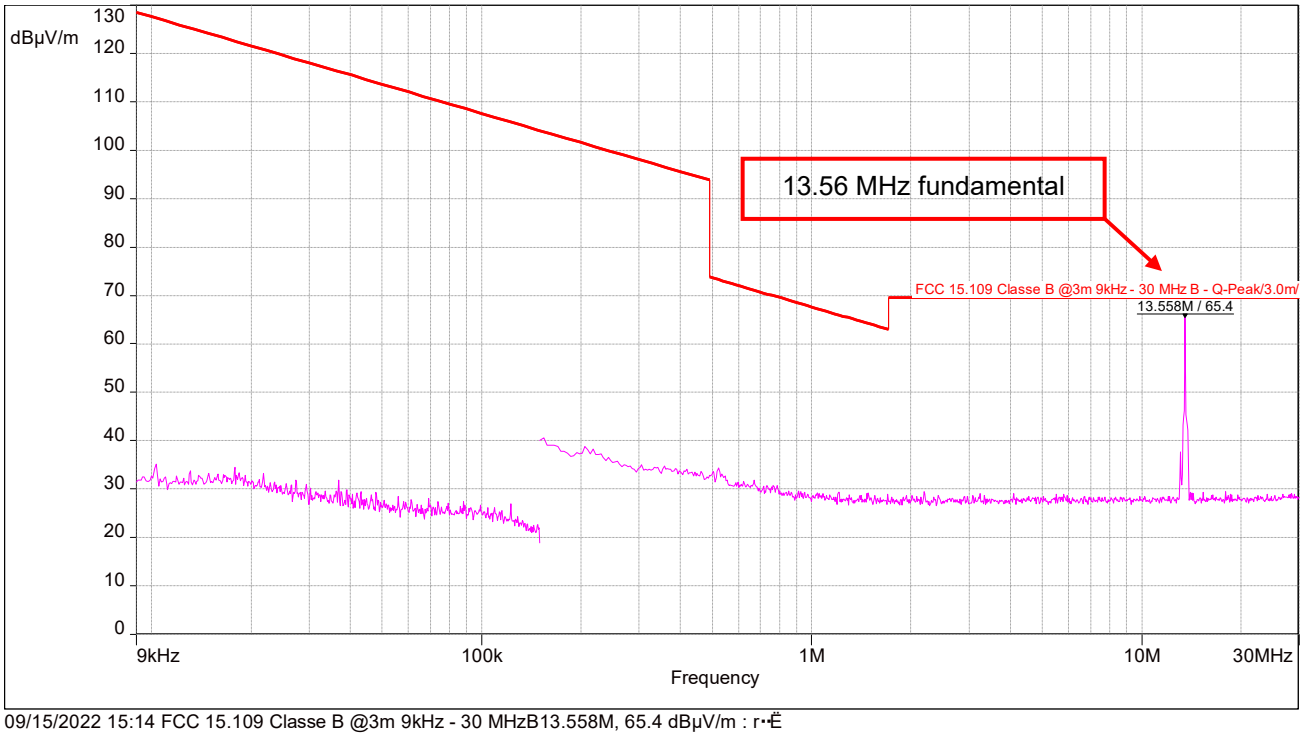
LIMITS FOR SPURIOUS		
Band of operations	**Peak (dBμV/m)**	**Average Limit (dBμV/m)**
Restricted bands (par. 15.205)	74	54
Other bands	According to 15.209 or fundamental –20dB (which is greater)	According to 15.209 or fundamental –20dB (which is greater)

TEST PROCEDURE

1) The EUT was placed on turntable which is 0.8 m above the ground plane
2) The turntable shall rotate from 0° to 360° degrees to determine the position of maximum emission level.
3) The EUT is positioned 3 m away from the receiving antenna which varied from 1 to 4 m to find the highest emission.
4) The measurements were made with the detector set to PEAK and AVERAGE amplitude within a bandwidth of 100 kHz below 1000 MHz and 1 MHz above 1000 MHz.
5) The receiving antenna was positioned in both horizontal and vertical polarization.
6) The measurements with Quasi-Peak detector, below 1000 MHz are performed only for frequencies for which the Peak values are ≥ (Q.P. limit – 6 dB).

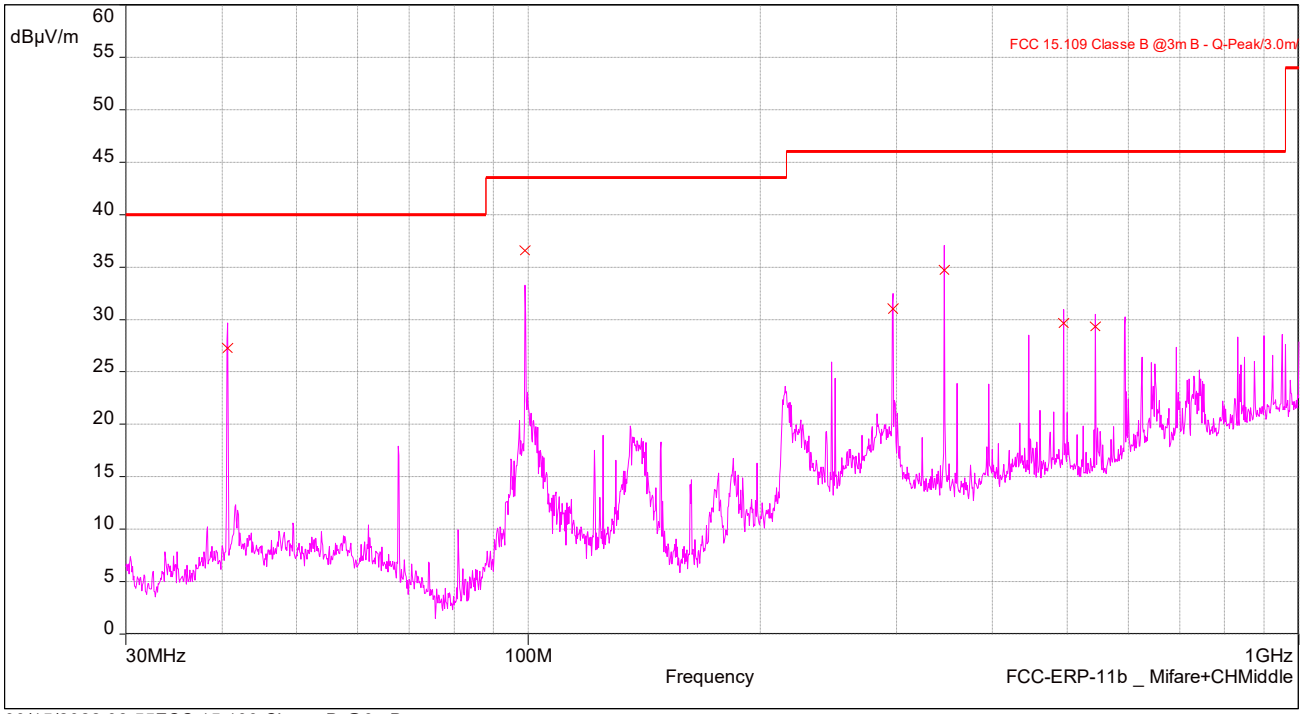
MEASUREMENTS RESULTS

Worst case measurement result 9 kHz÷30 MHz



09/15/2022 15:14 FCC 15.109 Classe B @3m 9kHz - 30 MHzB13.558M, 65.4 dBµV/m : r•Ë

Worst case measurement result 30÷1,000 MHz



09/15/2022 08:55FCC 15.109 Classe B @3mB

Frequency (MHz)	QPeak (dBµV/m)	QPeak Limit	Margin	Height	Angle	Polarization
40 665	27.30	40.00	12.70	1.00	289.50	Vertical
98 985	36.56	43.50	6.94	3.44	134.90	Horizontal
296 985	31.00	46.00	15.00	1.00	0.00	Horizontal
346 485	34.72	46.00	11.28	1.00	199.30	Vertical
494 985	29.65	46.00	16.35	1.00	0.00	Vertical
544 485	29.33	46.00	16.67	1.00	0.00	Vertical

6.4 FIELD STRENGHT (Operation within the band 13.110 – 14.010 MHz)

TEST REQUIREMENT	
Test setup	ANSI C63.4
Test facility	Semi-anechoic chamber
Test distance	3 meters
Frequency range	13.110 – 14.010 MHz
IF bandwidth (below 30 MHz)	9 kHz
Deviation to test procedure	None
Limits	sections 15.225 (a) 15.225 (b) 15.225 (c)
EUT operating condition	#1
Remark	(*) In accordance with part 15.31 (f) (2), where the measurement distance was specified to be 30 or 300 meters, a correction factor was applied in order to permit measurement to be performed at a separation distance. The applied formula for limits at 3 meter is: Extrapolation (dB) = 40log (300meter / 3meter) = +80db Extrapolation (dB) = 40log (30meter / 3meter) = +40db
Testing dates	2022-09-26

TEST RESULT
The EUT meets the requirements of sections 15.225 (a) 15.225 (b) 15.225 (c)

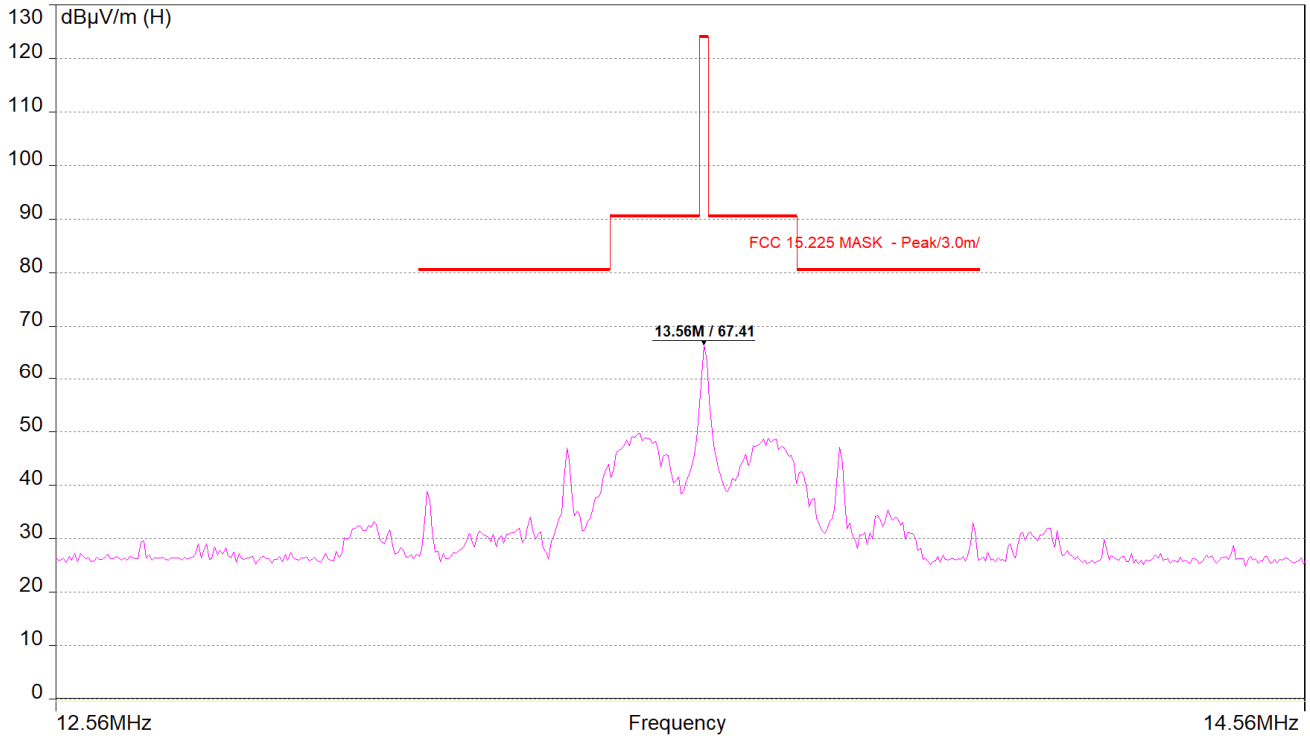
LIMITS		
Band of operations	**Peak at 30m distance**	**Peak at 3m distance**
13.553-13.567 MHz	15848 microvolts/meter (84 dBμV/m)	1584800 microvolts/meter (124 dBμV/m)
13.567-13.710 MHz	334 microvolts/meter (50,47 dBμV/m)	33400 microvolts/meter (90,47 dBμV/m)
13.710-14.010 MHz	106 microvolts/meter (40,51 dBμV/m)	10600 microvolts/meter (80,51 dBμV/m)

TEST PROCEDURE

1) The EUT was placed on turntable which is 0.8 m above the ground plane
2) The turntable shall rotate from 0° to 360° degrees to determine the position of maximum emission level.
3) The EUT is positioned 3 m away from the receiving antenna which varied from 1 to 4 m to find the highest emission.
4) The measurements were made with the detector set to PEAK amplitude within a bandwidth of 9 kHz below 30 MHz
5) The receiving antenna was positioned in both horizontal and vertical polarization.
6) The measurements with Quasi-Peak detector are performed only for frequencies for which the Peak values are ≥ (Q.P. limit – 6 dB).

MEASUREMENTS RESULTS

Operation within the band 13.110 – 14.010 MHz



Max. measured levels		
Frequency (MHz)	**Max measured level (dBµV/m) at 3m.**	**Limit (dBµV/m) at 3m.**
13.560 MHz	67.41	124

6.5 FREQUENCY TOLERANCE

TEST REQUIREMENT	
Test setup	ANSI C63.4
Test facility	Climatic chamber
Frequency range	13.110 – 14.010 MHz
IF bandwidth (below 30 MHz)	9 kHz
Deviation to test procedure	None
Limits	sections 15.225 (e)
EUT operating condition	#1
Remark	None
Testing dates	2022-09-26

TEST RESULT
The EUT meets the requirements of sections 15.225 (e)

LIMIT
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

TEST PROCEDURE
1) The transmitter was placed in a climatic chamber and powered at a nominal AC voltage. 2) The transmitter was connected to the spectrum analyzer through a test fixture (radio frequency coupling device associated with the dedicated antenna of the equipment under test) 3) Turn off the transmitter and set the temperature of climatic chamber at max. temperature (+50°C) 4) Once the temperature is stabilized, turn on the transmitter and executed the measure. Recorded the value. 5) Repeat the points 3 and 4 with the temperatures of climatic chamber set to the lowest temperature up to -20°C. Recorded all the values. 6) Turn off the transmitter and set the temperature of climatic chamber at normal temperature (+20°C) 7) Once the temperature is stabilized, turn on the transmitter and adjust the voltage at +85% and then at +115% of nominal voltage. Recorded the values.

MEASUREMENTS RESULTS

Test conditions		Measured frequency (kHz)	Frequency drift (kHz)
Power supply voltage	Temperature		
230 V	+50°C	13560.7299	+0.0050
230 V	+20°C	13560.7349	/
230 V	-20°C	13560.8231	+0.0882
195 V	+20°C	13560.7347	-0.0002
264 V	+20°C	13560.7350	+0.0001

7. TESTS UNCERTAINTY

Unless otherwise stated the uncertainties for the tests and measurements are evaluated in according to IMQ Operational Instruction IO-LAB-001 and IO-LAB-004. and requirement of NIST Technical Note 1297 and NIS 81:1994 “The Treatment of Uncertainty in EMC Measurements”

The expanded uncertainty was calculated for all measurements and tests listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainty in EMC Measurements“, with UKAS document LAB 34 and is documented in the quality system accordance to ISO/IEC 17025.

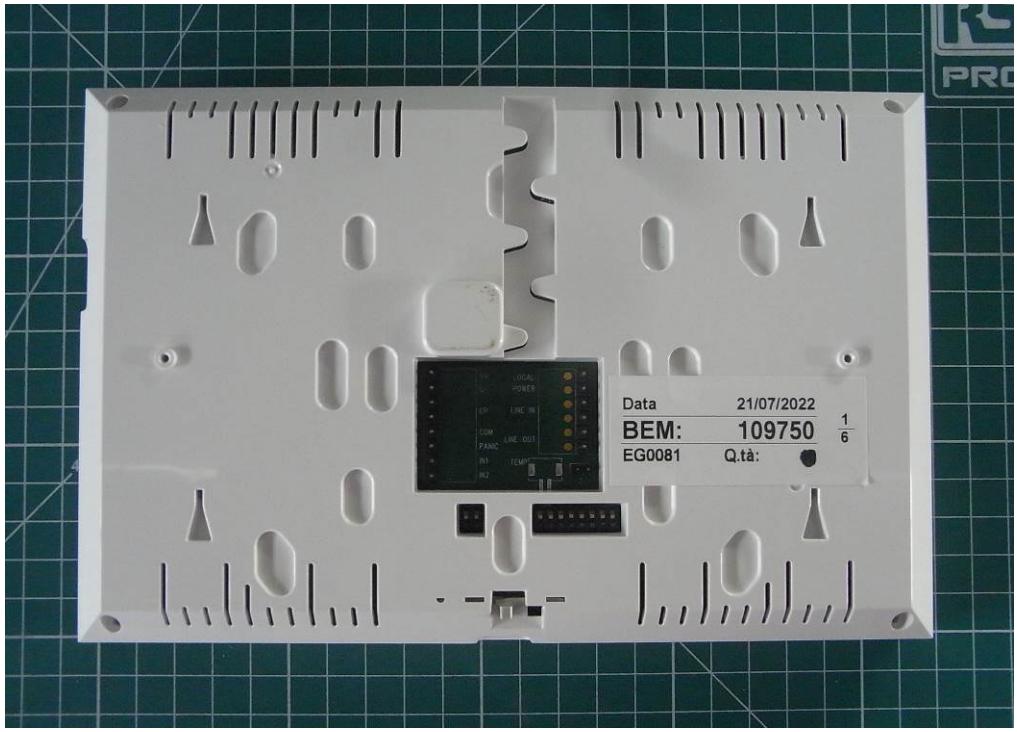
Internal Procedure PG-037 ensures that the requirements for traceability of calibrations, of all test equipment requiring calibration, and calibration intervals are met.

8. MEASUREMENT EQUIPMENT AND INSTRUMENTATION

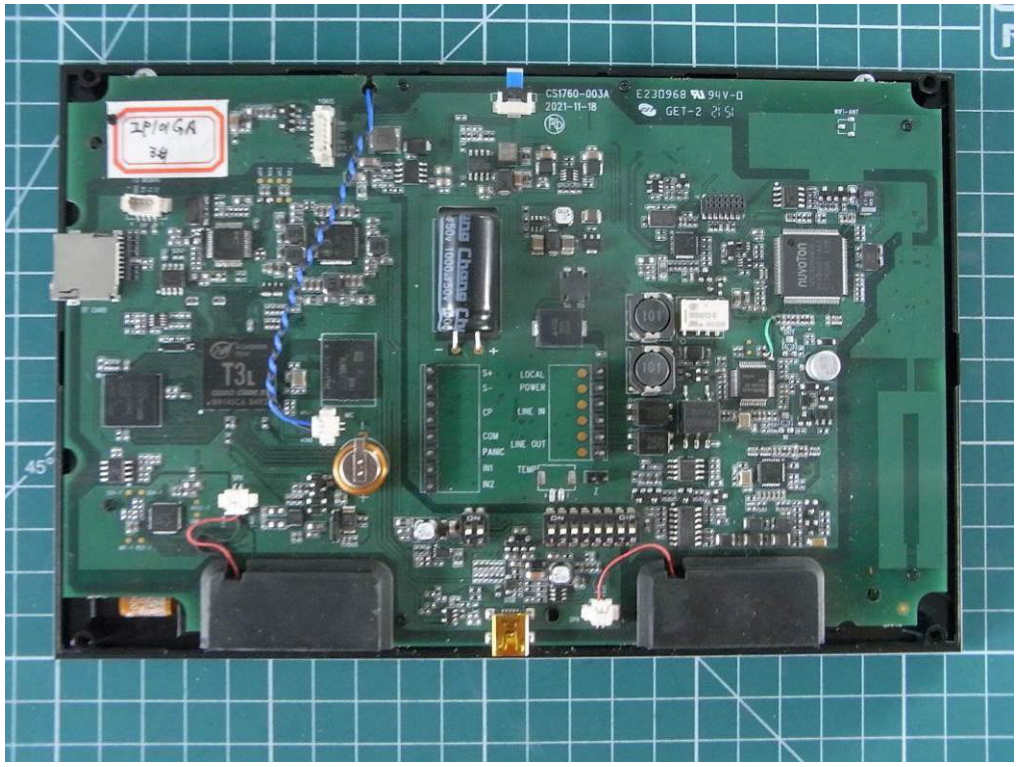
Instrument	Manufacturer	Model	IMQ Ref.	Calibration	
				Last date	Due date
SHIELDED ANECHOIC CHAMBER	SIDT-EUROPE	RFSD 100	P-01709	/	/
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	S-07965	2021-09-30	2022-09-30
ARTIFICIAL MAINS V–NETWORK	SCHWARZBECK	NSLK 8128 RC	S-09218	2022-05-26	2023-05-26
LOOP ANTENNA	ROHDE & SCHWARZ	HFH2-Z2E	S08623	2022-01-26	2023-01-26
LOG ANTENNA	SCHWARZBECK	VULB 9162	S09211	2021-05-21	2024-05-21
ANTENNA HORN	SCHWARZBECK	BBHA9120D	S03463	2020-07-06	2023-07-06
ANTENNA HORN	SCHWARZBECK	BBHA9170	S03724	2020-07-29	2023-07-29
SOFTWARE	NEXIO	BAT-EMC V3.21.0.14	/	/	/

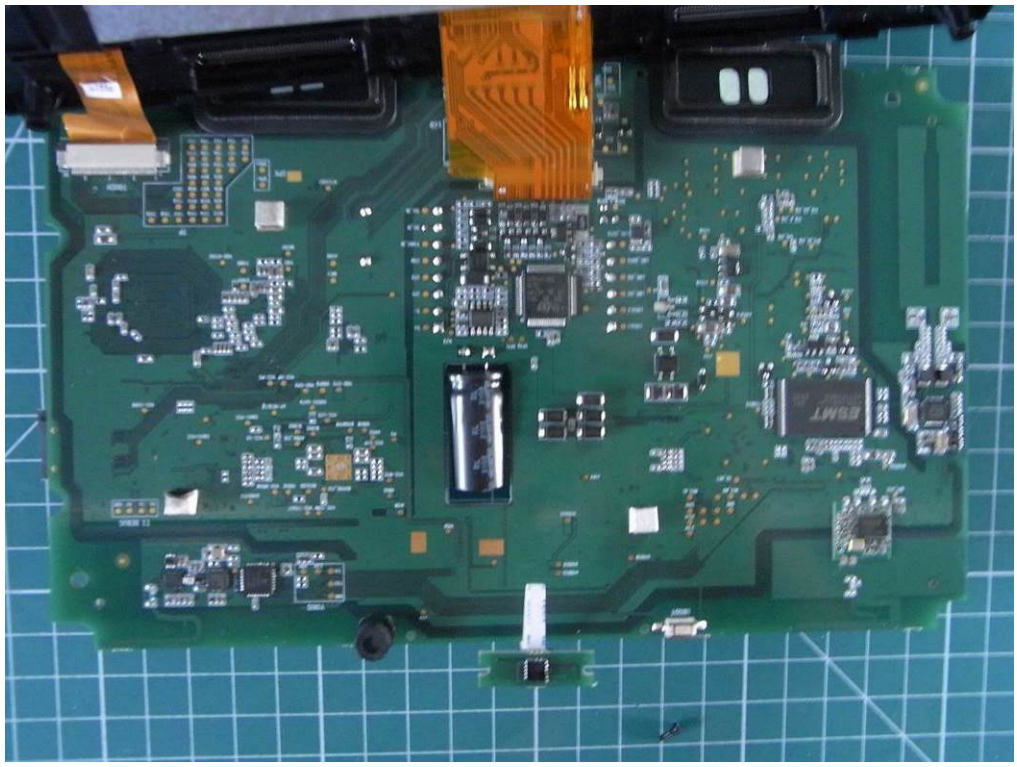
9. PHOTOGRAPHIC DOCUMENTATION

EUT IDENTIFICATION – External views

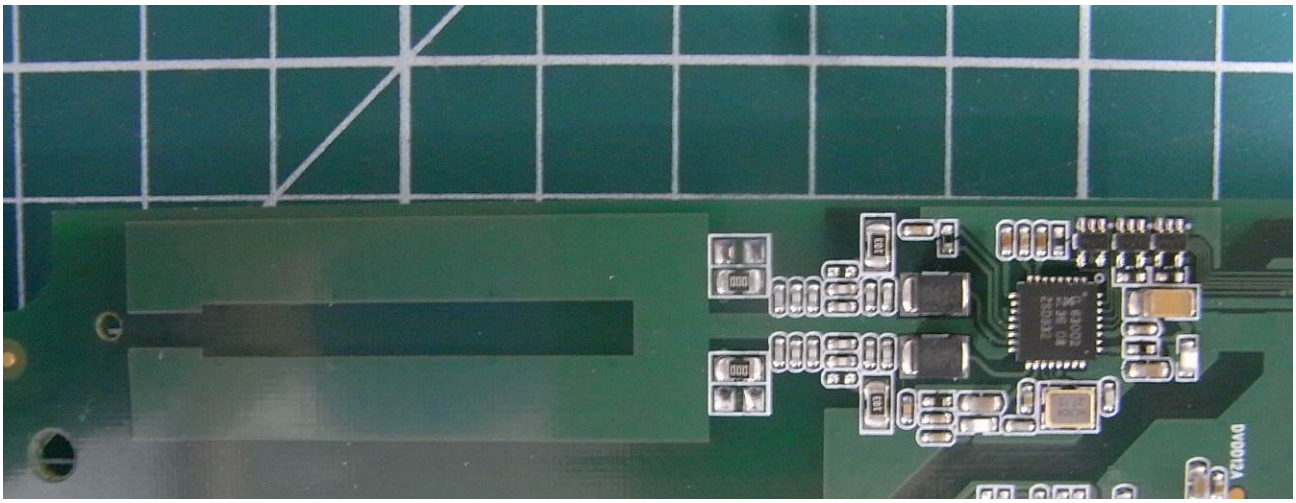


EUT IDENTIFICATION – Internal views

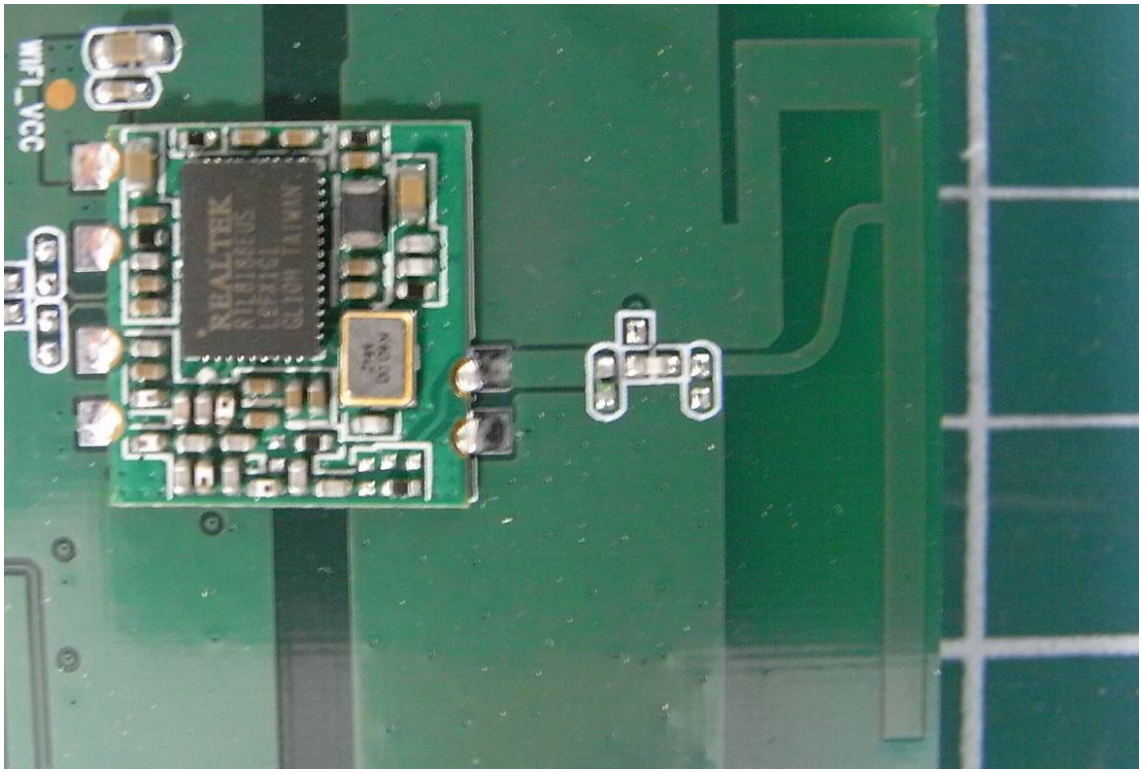




EUT IDENTIFICATION – Internal views – 13.56 MHz radio module and antenna

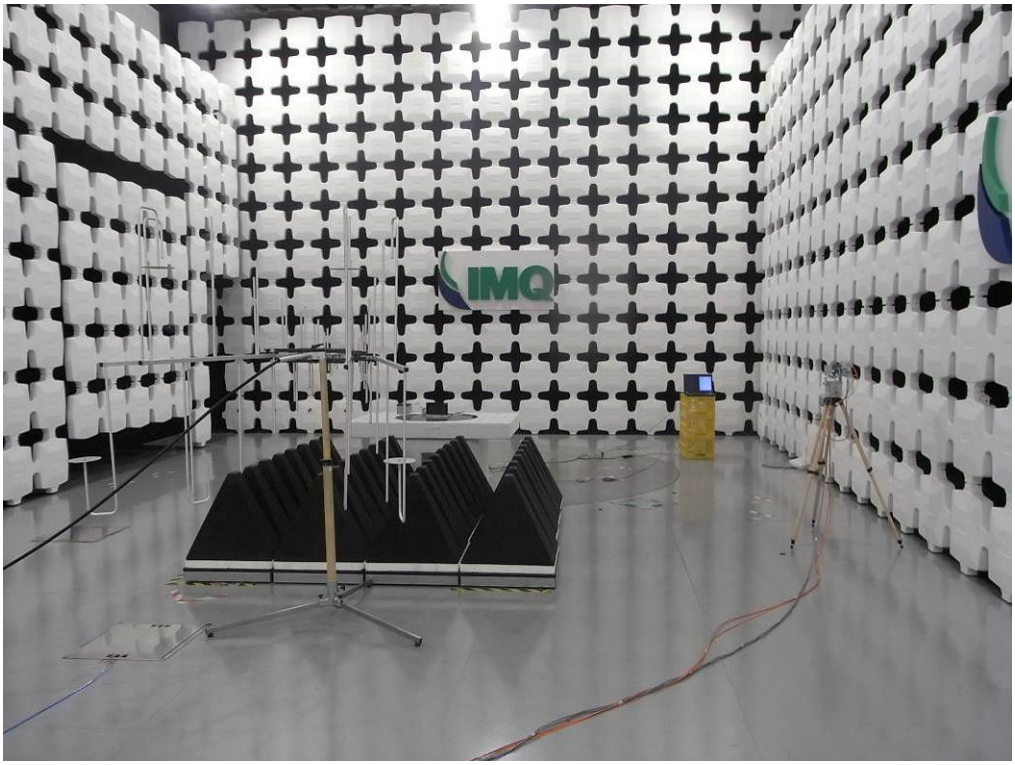


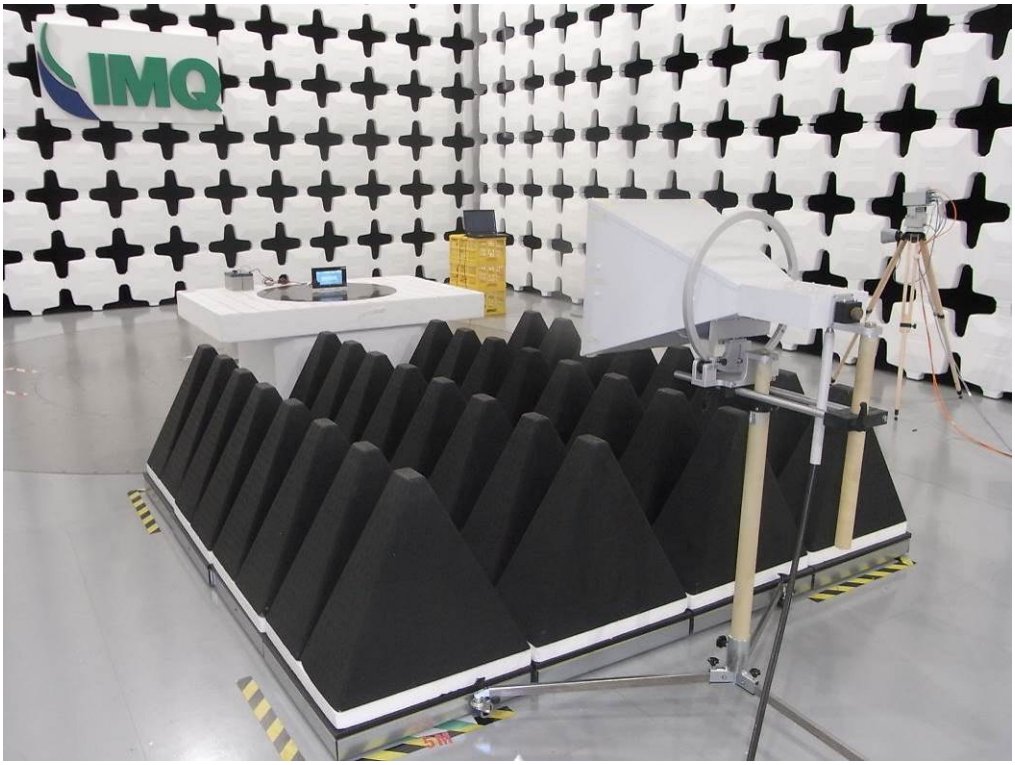
EUT IDENTIFICATION – Internal views – Wi-Fi radio module and antenna



SET-UP

SET-UP





END OF TEST REPORT