RF TEST REPORT

TEST STANDARD(S)	:	ETSI EN 301 511 V12.5.1 (2017-03) ETSI TS 151 010-1 V12.8.0 (2016-05)
CLIENT / APPLICANT	:	Kovco (Pty) Ltd.
CLIENT ADDRESS	:	6 Milner Road, Metro industria, Parden Eiland, 7405
TEST SAMPLE (EUT)	:	Data Logger for Industrial Refrigeration
MODEL NUMBER	:	Data-V8 R2
UNTESTED VARIANT(s)	:	None
REPORT TYPE	:	Delta GSM Radio Test Report
REPORT NUMBER	:	TRR01706-1-22
ASSESSMENT RESULT	:	Pass
DATE ISSUED	:	01/03/2022

iSERT (Pty) Ltd. Test reports apply only to the specific sample(s) tested under stated conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to ensure that additional production units of this model are manufactured with identical electrical and mechanical components. iSERT (Pty) Ltd. shall have no liability for any deductions, inference or generalizations drawn by the client or others from the test reports issued by iSERT (Pty) Ltd. This report shall not be used to claim, constitute, or imply a product endorsement from iSERT (Pty) Ltd.

This test report was prepared by: ***Name:*** *HE Olivier*
Title: *RF Test Engineer*

This test report was approved by: ***Name:*** *RM van den Berg*
Title: *Technical Signatory (RF)*

T0812

This test report is issued in accordance with SANAS accreditation requirements. SANAS is a signatory to the ILAC Mutual Recognition arrangement for the mutual recognition of the equivalence of testing and calibration reports.

DOCUMENT CONTROL

Revision	Date	Author	Pages affected	Change proposal
1.0	01/03/2022	HE Olivier	All	N/A

TEST LABORATORY INFORMATION

Established in 2017, iSERT (Pty) Ltd. Provides EMC, RF, Safety & Performance testing services by our skilled Engineers. Our services employ a wide variety of advanced cutting-edge test equipment with one of the widest ranges of accredited standards in the country.

The site and apparatus are constructed in conformance with the requirements of CISPR 16-1-4, EN 50147-1 and other equivalent standards. The laboratory is compliant with the requirements of ISO/IEC 17025.

It is our definite objective to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise, and devotion to a certified value structure. Our passion is to grant our clients with the best EMC, RF & Safety services by knowledgeable and accommodating staff.

Our test site is located at 129 Khai-Appel Street, Montana, Pretoria, South Africa 0186.

Company details:

iSERT (Pty) Ltd.
Reg: 2017/186396/07
Tel: + 27 (0)12 548 0940
E-Mail: info@isert.co.za
Website: www.isert.co.za

ACRONYMS AND ABBREVIATIONS

AVE	Average
ARFCN	Absolute Radio Frequency Channel Number
C	Circular
CSE	Conducted Spurious Emissions
CSIR	Council for Scientific and Industrial Research
DCS	Digital Cellular System
E-Fields	Electric Fields
EIRP	Effective isotropic radiated power
ERP	Effective radiated power
EFT	Electrical Fast Transients
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge
EUT	Equipment Under Test
FW	Firmware
GPRS	General packet radio service
GSM	Global System for Mobile Communications
HW	Hardware
MS	Mobile Station
NIST	National Institute of Science and Technology
N/A	Not Applicable
OATS	Open Area Test Site
PC	Personal Computer
PK	Peak
Pol	Polarized
QP	Quasi-Peak
RSE	Radiated Spurious Emissions
RED	Radio Equipment Directive
RCSE	Receiver Conducted Spurious Emissions (idle mode)
RMS	Root Mean Square
RRSE	Receiver Radiated Spurious Emissions (idle mode)
RSE	Radiated Spurious Emissions
RF	Radio Frequency
R&TTE	Radio and telecommunications terminal equipment
SANAS	South African National Accreditation System
SRD	Short Range Equipment
TCSE	Transmitted conducted Spurious Emissions (allocated mode)
TRSE	Transmitted Radiated Spurious Emissions (allocated mode)
VH	Voltage High (Maximum
VL	Voltage Low (minimum)
VN	Voltage Normal
TH	Temperature High (maximum)
TN	Temperature Normal
TL	Temperature Low (Minimum)

TABLE OF CONTENTS

1. INTRODUCTION

This report details the results of the tests performed on the Kovco (Pty) Ltd. Data Logger for Industrial Refrigeration with model number: Data-V8 R2. The testing was carried out on 24/02/2022.

2. SUMMARY OF TEST RESULTS

2.1. MODULAR TEST RESULTS

The module was fully tested according to the essential requirements of Directive 2014/53/EU, see table below:

Table 1: Modular RF Report Details

Standard	Laboratory	Report Number
ETSI EN 301 511 V12.5.1 (2017-03)	Unilab (Shanghai) Co., Ltd.	UL15820141126CE037-3

2.2. DELTA TEST RESULTS

To fulfil the essential requirements of article 3.2 of Directive 2014/53/EU, delta tests were performed to ensure the EUT complies to the essential Radio Equipment Directive requirements after integration.

Table 2: Summary of Test Results

Test Requirement	Requirement (1)	Method (2)	Result
Transmitter Output Power (3)	4.2.5	13.3.4	✓
Conducted Spurious Emissions – MS Allocated	4.2.12	12.1.1	✓
Conducted Spurious Emissions – MS Idle	4.2.13	12.1.2	✓
Radiated Spurious Emissions – MS Allocated	4.2.16	12.2.1	✓
Radiated Spurious Emissions – MS Idle	4.2.17	12.2.2	✓

Notes:

1. *According to ETSI EN 301 511 V12.5.1 (2017-03).*
2. *According to ETSI TS 151 010-1 V12.8.0 (2016-05).*
3. *For RF exposure.*

Test Case Verdicts:

N/A	Test case does not apply to EUT.
N/T	Test case was not performed on EUT.
✓	Test case passed the minimum conformance requirements.
✓	Test case passed the minimum conformance requirements with a margin less than the uncertainty budget.
✗	Test case failed the minimum conformance requirements.

3. CONCLUSION

Based on the results of our investigation, it is concluded that the EUT (in the configuration tested) **complies** with the requirements of the standard(s) indicated in this test report. The results obtained in this test report are only valid for the item(s) tested. iSERT (Pty) Ltd. does not make any claims of compliance for samples or variants which were not tested.

In cases where levels measured are within the laboratory's stated uncertainty budget, there is a possibility that this unit, or a similar unit selected from production may not meet the required limit specification should it be tested by another agency.

4. EQUIPMENT DESCRIPTION

Table 3: Equipment Under Test Description

Description	Customer declaration	
Type of equipment	✓	Stand-alone radio equipment
		Plug-in radio intended for use within combined equipment
		Plug-in radio intended for use with or within a variety of host systems
Intended use	Portable	
Operational frequency band (s)	GSM900, DCS1800	
Supported Network	✓	Packet Data
		Circuit Switch
Radio Modular Detail	Simcom SIM800C	
Maximum Transmitter power	33 dBm	
Modulation	GMSK	
GPRS Class	10	
Other Radio Technologies	--	
Antenna details	Location	External
	Type	Blade Antenna
	Make/model	--
	Gain	2.5 dBi
Power Source	Internal	--
	External	12V AC/DC Adaptor
Build Status	✓	Production
		Pre-production
		Prototype
Build Revision	Hardware	3
	Software	2

5. MEASURING EQUIPMENT SETUP AND CONFIGURATION

5.1. MEASUREMENT EQUIPMENT

Table 4: Calibration Information of Measurement Equipment

Instrument	Manufacturer	Model	Serial number	Next Cal date
Signal Analyzer	Keysight	N9020A	MY52330018	May 2022
Universal Radio Tester	R & S	CMW500	112781	September 2022
Horn antenna	AH systems	SAS-571	1129	May 2022
Combilog antenna	Com-power	AC220	061128	May 2022
Pre-Amplifier	Adv Microwave	WLA652B	ISQ002	January 2024
High Pass Filter	Wainwright	WHKX12-1000	IS0002	October 2022
Coaxial Cable	AH Systems	SAC-26G-2	441	September 2022
Coaxial Cable	AH Systems	SAC-18G-4	1763	September 2022
Multimeter	Fluke	179	40850243	September 2022
Laboratory Power Supply	Manson	HCS-3202	G071710100	Verify before use
Temperature Hygrometer	Flus	ET-951W	2015106449	November 2022
Environmental chamber	Jeiotech	PBV-012	1B097018	January 2023

5.2. MEASUREMENT UNCERTAINTY

ISO / IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions results be included in the test report. The uncertainties were calculated according to TF 100 028 [2] and are based on a 95.45% confidence level (coverage factor k = 2).

Table 5: Measurement Uncertainty

Parameter	Range	Test Uncertainty
Radio frequency	9kHz to 26.5GHz	±22.8Hz
Total RF power conducted	400MHz to 6GHz	±0.47dB
Effective radiated power	400MHz to 1GHz	±2.18dB
Equivalent Isotopically Radiated Power	1GHz to 3GHz	±3.42dB
RF emissions radiated	30MHz to 200MHz	±5.16dB
	200MHz to 1GHz	±4.44dB
	1GHz to 18GHz	±4.15dB
	18GHz to 26.5GHz	±4.34dB
RF emissions conducted	9kHz to 10MHz	±1.78dB
	10MHz to 1GHz	±1.56dB
	1GHz to 18GHz	±2.76dB
	18GHz to 26.5GHz	±2.83dB
Transmitter maximum output power	700MHz to 3GHz	±0.47dB
DC voltages	10mV to 600V	±0.7%
Temperature	-20°C to +85°C	±0.9%
Humidity	10% to 75%	±5.0%

5.3. MEASUREMENT SETUP

5.3.1. RADIATED SETUP

All radiated measurements were performed inside a CISPR-16 compliant, fully anechoic shielded chamber, with an antenna-to-EUT distance of 3m, represented by Figures 1 and 2.

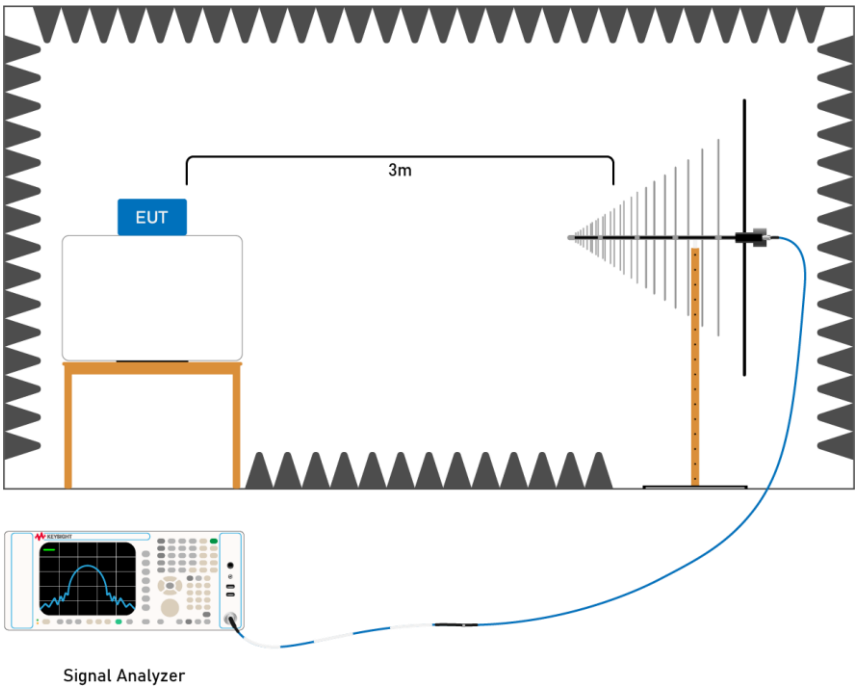


Figure 1: Radiated Emissions Setup Below 1 GHz

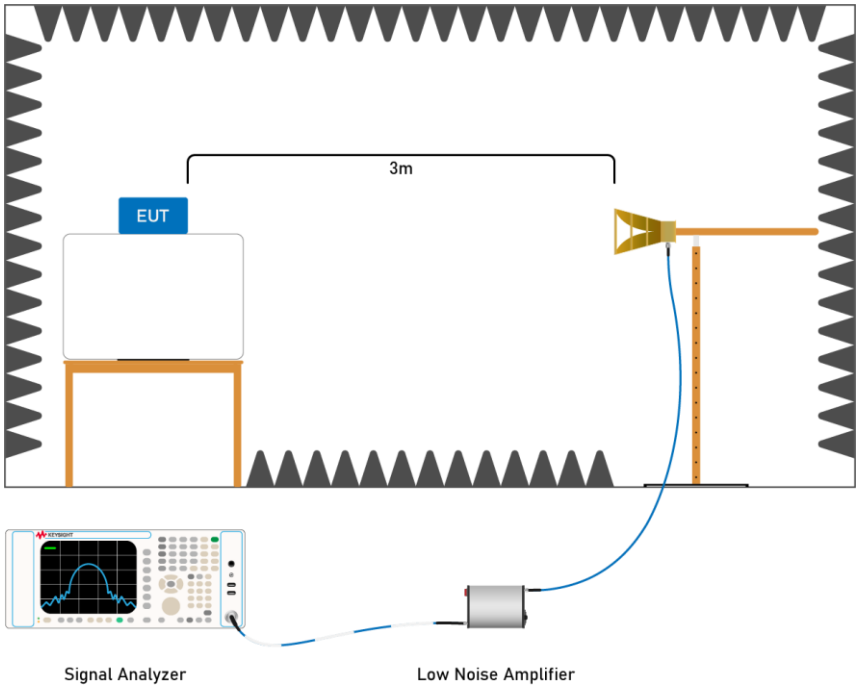


Figure 2: Radiated Emissions Setup Above 1 GHz

5.3.2. CONDUCTED SETUP

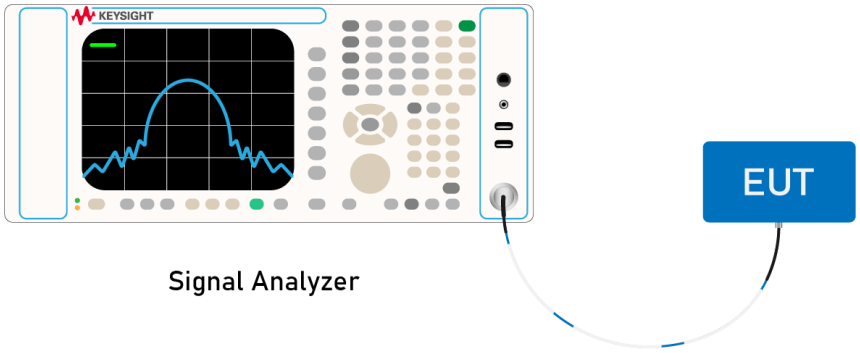


Figure 3: Conducted Setup

5.3.3. EXTREME CONDITIONS SETUP

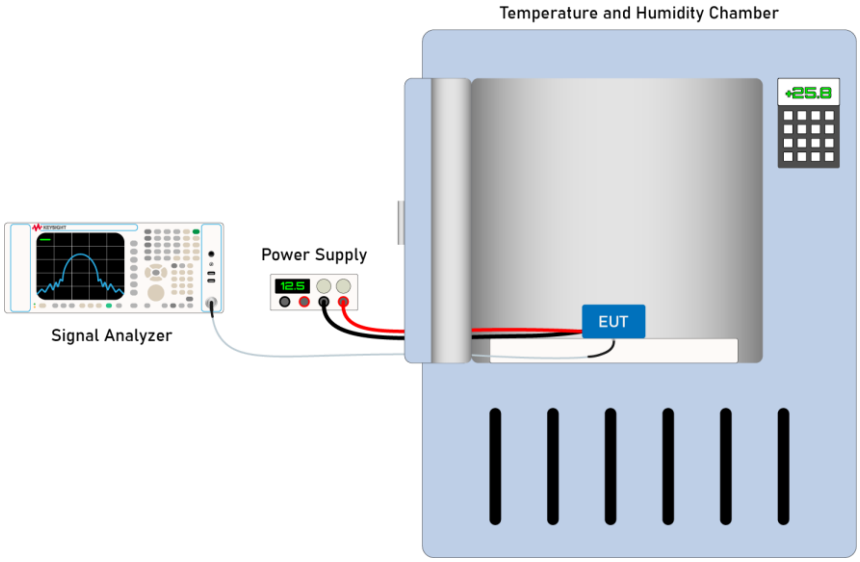


Figure 4: Extreme Conditions Setup

5.4. TEST SIGNALS

A test signal, according to ETSI TS 151 010-1 V12.8.0 (2016-05) A5.2, is a modulated or unmodulated carrier generated by the EUT to facilitate a test. During this assessment the EUT must generating one or more of the following test signals:

Table 6: List of Test Signals

Test Signal	Description
C0	Unmodulated continuous carrier.
C1	A standard signal with GMSK AQPSK, 8-PSK, 16-QAM or 32-QAM modulation as appropriate. The channel coder will depend on the test and the cipher mode shall be selectable by the test method. When using this signal in the non-hopping mode, the unused seven time slots shall also contain dummy bursts, with power levels variable with respect to the used timeslot, see also DYNAMIC LEVEL SETTING in subclause A5.3.4.7 of ETSI TS 151 010-1 V12.8.0 (2016-05).

6. TEST SETUP AND CONFIGURATION

6.1. TEMPERATURE CONDITIONS

6.1.1. NORMAL

All measurements were taken under conditions of temperature and humidity that were within the limits specified in ETSI TS 151 010-1 V12.8.0 (2016-05) clause A1.2.2.

Table 7: Environmental Conditions during Testing

Condition	Value	Limit
Temperature	+22°C to +24°C	+15°C to +35°C
Relative Humidity	48% to 51%	Up to 75%

6.1.2. EXTREME

For tests at extreme temperatures, measurements shall be made in accordance with the procedures specified in ETSI TS 151 010-1 V12.8.0 (2016-05) clause A1.2.3, at the upper and lower temperature ranges given in the table below.

Table 8: Extreme Temperature Ranges

Description	Temperature Range
Small MS Units	-10°C to +55°C
Other Units	-20°C to +55°C

The RF module was already certified at extreme temperatures through an accredited test lab, therefore all tests in this report were conducted in normal temperature conditions.

6.2. POWER SUPPLY DETAILS

The equipment shall be tested using the appropriate test power source as specified in ETSI TS 151 010-1 V12.8.0 (2016-05) clauses A1.2.2 and A1.2.3.

The EUT was assessed at test voltages described in the table below as declared by the manufacturer.

Table 9: Equipment Under Test Extreme Voltages

Source Location	Source Type	Source Description	Power source range (V)		
			VL	VN	VH
Internal	--	--	--	--	--
External	AC/DC	AC/DC Adaptor	(1)	12	(1)

Notes:

1. *The RF module was already certified at extreme voltages through an accredited test lab, therefore all tests in this report were conducted in normal voltage conditions.*

6.3. SUPPORT EQUIPMENT AND SOFTWARE

6.3.1. AUXILIARY EQUIPMENT

The EUT has been tested as an independent unit without Ancillary/auxiliary equipment.

6.3.2. INPUT/OUTPUT CABLES

Table 10: List of External Input and/or Output Cables

Cable Description	Length (m)	From Port	To
5 x Sensor Cables	2	EUT	Sensors

6.3.3. EXERCISE SOFTWARE

The EUT was programmed with production software for the test configuration.

6.4. MODIFICATION RECORD

No modification was made to the EUT during this assessment.

6.5. DEVIATIONS FROM THE TEST STANDARD

No deviations from the applicable test standards or test plan were made during this assessment.

6.6. OPERATING CHANNELS

Band	Name	DL Frequency (MHz)			DL / UL BW (MHz)	UL Frequency (MHz)			Network BW (kHz)	Tx Class	Power (dBm)
		Low	Middle	High		Low	Middle	High			
3	1800+	1805	1842.5	1880	75	1710	1747.5	1785	200	1	30
8	900 GSM	925	942.5	960	35	880	897.5	915	200	4	33

6.7. MODES OF OPERATION

6.7.1. MODE 1 – MS IDLE

The GSM on the EUT was enabled but not allowed to attach to any network. If the EUT consists of more than one transceiver, these transceivers are disabled.

6.7.2. MODE 2 – GSM900 MS ALLOCATED

The GSM on the EUT was enabled and allowed to connect to the Universal Radio Tester. A data cell was established in loop-back mode to transmit a continuous GPRS signal on ARFCN 62 (middle channel) with the settings below:

- Transmit Power: 33 dBm
- Transfer Rate: 85.6 Kbps (uplink)
- Modulation: GMSK

If the EUT consists of more than one transceiver, these transceivers were disabled.

For the worst possible condition with regards to transmit power (33 dBm), GPRS (class 4) was selected.

6.7.3. MODE 3 – DCS1800 MS ALLOCATED

The GSM on the EUT was enabled and allowed to connect to the Universal Radio Tester. A data cell was established in loop-back mode to transmit a continuous GPRS signal on ARFCN 698 (middle channel) with the settings below:

- Transmit Power: 30 dBm
- Transfer Rate: 85.6 Kbps (uplink)
- Modulation: GMSK

If the EUT consists of more than one transceiver, these transceivers were disabled.
For the worst possible condition with regards to transmit power (30 dBm), GPRS (class 1) was selected.

6.8. TEST CONFIGURATION

Table 11: Equipment Under Test Configuration

Parameter to be tested	Test Signal	Band	Mode	Test Channel	Power Source	RF Port	Condition
Transmitter Output Power	C1	900	2	Middle	Internal	Radiated	Normal
		1800	3				
Radiated Spurious Emissions – MS Allocated		900	2				
		1800	3				
Radiated Spurious Emissions – MS Idle		900	1				
		1800	1				

6.9. TYPES OF MOBILE STATIONS

ETSI EN 301 511 V12.5.1 (2017-03) Table B.1 lists the following types of mobile stations:

Table 12: Types of Mobile Stations

Item	Type of Mobile Station	Support	Mnemonic
1	HSCSD Multislot MS		Type_HSCSD_Multislot
2	R-GSM MS		Type_R-GSM
3	GPRS Multislot class on the UL	✓	Type_GPRS_Multislot_uplink
4	EGPRS		Type_EGPRS
5	EGPRS 8PSK in UL, of all Multislot classes		Type_EGPRS_8PSK_uplink
6	ER-GSM MS		Type_ER-GSM
7	DLMC MS		Type_DLMC
8	8W Improved Receiver R-GSM MS/ER-GSM MS		Type_8W_Improved_Receiver
9	2W Improved Receiver R-GSM MS/ER-GSM MS		Type_2W_Improved_Receiver

6.10. ADDITIONAL INFORMATION

Additional information related to the device configuration according to ETSI EN 301 511 V12.5.1 (2017-03) Table C.1:

Table 13: Device Configuration Additional Information

Item	Additional Information	Support	Mnemonic
1	Telephony		TSPC_Serv_TS11
2	Permanent Antenna Connector		TSPC_AddInfo_PermAntenna
3	Integrated Antenna	✓	TSPC_AddInfo_HHIntegAntenna

7. DETAILS OF TEST RESULTS

7.1. TRANSMITTER OUTPUT POWER

7.1.1. DESCRIPTION

According to ETSI TS 151 010-1 V12.8.0 (2016-05), the transmitter output power is the average value of the power delivered to an artificial antenna or radiated by the MS and its integral antenna, over the time that the useful information bits of one burst are transmitted.

7.1.2. LIMITS

Table 14: Transmitter Output Power Limits

Frequency Band	Mode of Operation	Power class	Power control level	Maximum power (dBm)
GSM900	GPRS	4	5	33
DCS1800	GPRS	1	0	30

7.1.3. RESULTS

Table 15: Transmitter Radiated Output Power Results

Test Condition		Power Control Level	Operating Band	ARFCN	Frequency (MHz)	Level Measured (dBm)	Limit (dBm)	Result
Temp (°C)	Voltage (V)							
TN	VN	5	GSM900	62	902.4	28.5	33	Pass
		0	DCS1800	698	1747.4	25.2	30	Pass

Table 16: Transmitter Conducted Output Power Results

Test Condition		Power Control Level	Operating Band	ARFCN	Frequency (MHz)	Level Measured (dBm)	Limit (dBm)	Result
Temp (°C)	Voltage (V)							
TN	VN	5	GSM900	62	902.4	32.4	33	Pass
		0	DCS1800	698	1747.4	28.6	30	Pass

7.2. CONDUCTED SPURIOUS EMISSIONS – MS ALLOCATED

7.2.1. DESCRIPTION

According to ETSI TS 151 010-1 V12.8.0 (2016-05), radiated spurious emissions, when the MS has been allocated a channel, are any emissions radiated by the cabinet and structure of the mobile station, including all interconnecting cables.

7.2.2. LIMITS

According to ETSI TS 151 010-1 V12.8.0 (2016-05), The radiated spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in Table 22 under normal and extreme voltage conditions.

Table 17: Limits for Radiated Spurious Emissions – MS Allocated

Frequency Range	Power Level Limit (dBm)		
	GSM 400 GSM 700 T-GSM 810 GSM 850 GSM 900	DCS 1800	PCS 1900
9 kHz to 1 GHz	-36	-36	-36
1 GHz to 12.75 GHz	-30	--	-30
1 GHz to 1710 MHz	--	-30	--
1710 MHz to 1785 MHz	--	-36	--
1785 MHz to 12.75 GHz	--	-30	--

7.2.3. RESULTS

Table 18: Results for Conducted Spurious Emissions – MS Allocated to GSM900

Frequency (MHz)	Level (dBm)	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
1810	-32.8	1000	PK	-30	-2.8	Pass
2710	-39.6	1000	PK	-30	-9.6	Pass
3610	-35.0	1000	PK	-30	-5.0	Pass
4510	-41.8	1000	PK	-30	-11.8	Pass

Table 19: Results for Conducted Spurious Emissions – MS Allocated to GSM1800

Frequency (MHz)	Level (dBm)	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
3495	-40.0	1000	PK	-30	-10.0	Pass

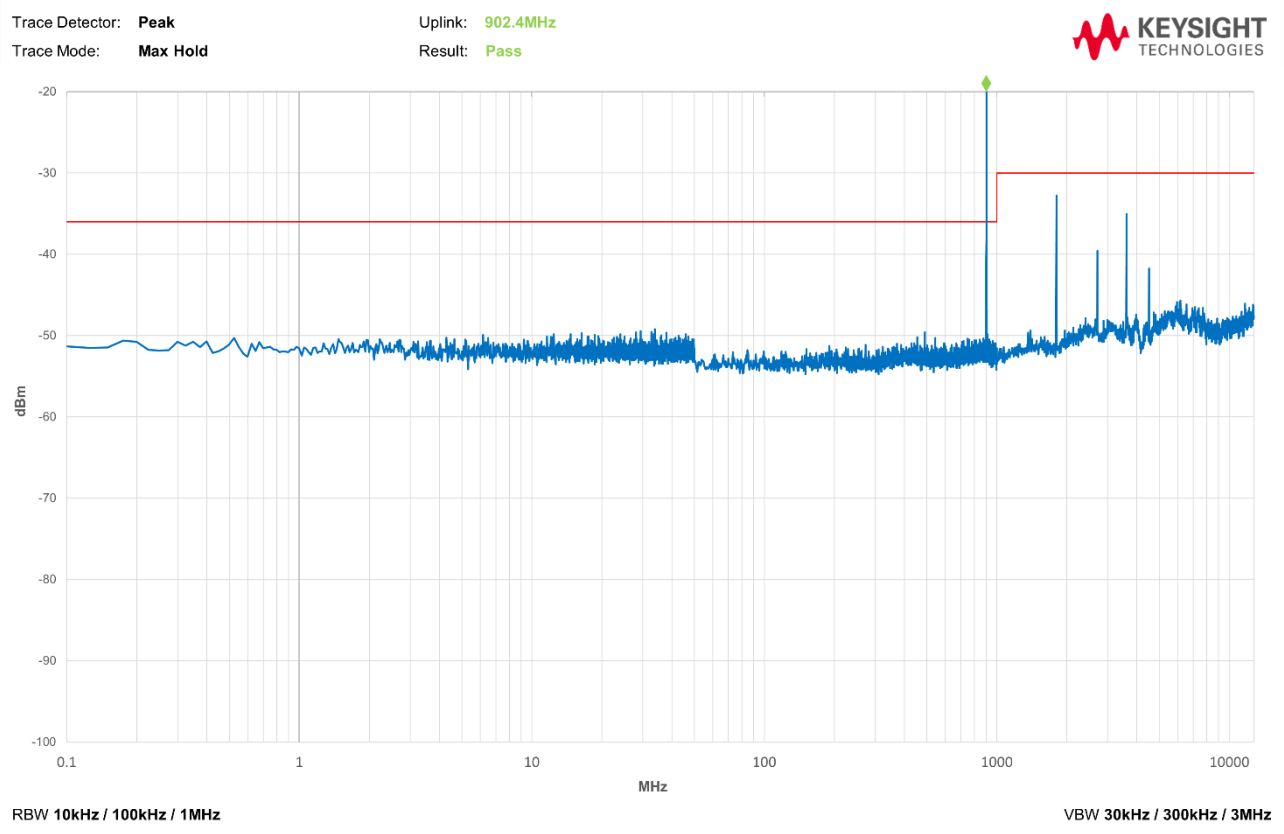


Figure 5: Results for Conducted Spurious Emissions – MS Allocated to GSM900

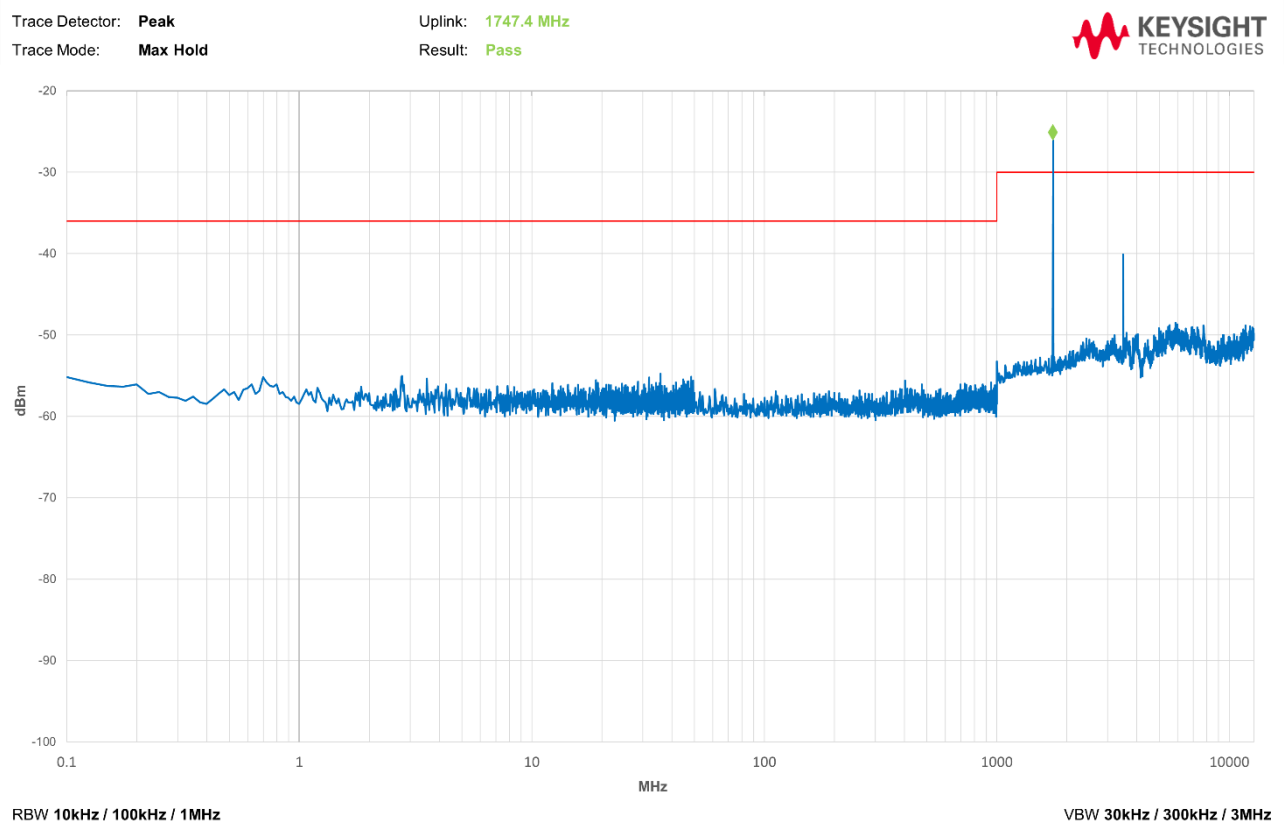


Figure 6: Results for Conducted Spurious Emissions – MS Allocated to GSM1800

7.3. CONDUCTED SPURIOUS EMISSIONS – MS IDLE

7.3.1. DESCRIPTION

According to ETSI TS 151 010-1 V12.8.0 (2016-05), radiated spurious emissions, when the MS is in idle mode, are any emissions radiated by the cabinet and structure of the mobile station, including all interconnecting cables.

7.3.2. LIMITS

According to ETSI TS 151 010-1 V12.8.0 (2016-05), the radiated spurious power emitted by the MS, when in idle mode, shall be no more than the levels in Table 25 under normal voltage conditions

Table 20: Limits for Radiated Spurious Emissions – MS Idle

Frequency Range	Power Level Limit (dBm)	
	GSM 400 T-GSM 810 GSM 900 DCS 1800	**GSM 700 GSM 850 PCS 1900**
9 kHz to 880 MHz	-57	-57
880 MHz to 915 MHz	-59	-57
915 MHz to 1 GHz	-57	-57
1 GHz to 1710 MHz	-47	--
1710 MHz to 1785 MHz	-53	--
1785 MHz to 12.75 GHz	-47	--
1 GHz to 1850 MHz	--	-47
1850 MHz to 1910 MHz	--	-53
1910 MHz to 12.75 GHz	--	-47

7.3.3. RESULTS

Table 21: Results for Conducted Spurious Emissions – MS Idle

Frequency (MHz)	Level (dBm)	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
30 – 1000	Noise Floor	100	PK	-57	--	Pass
1000 – 4000	Noise Floor	1000	PK	-47	--	Pass

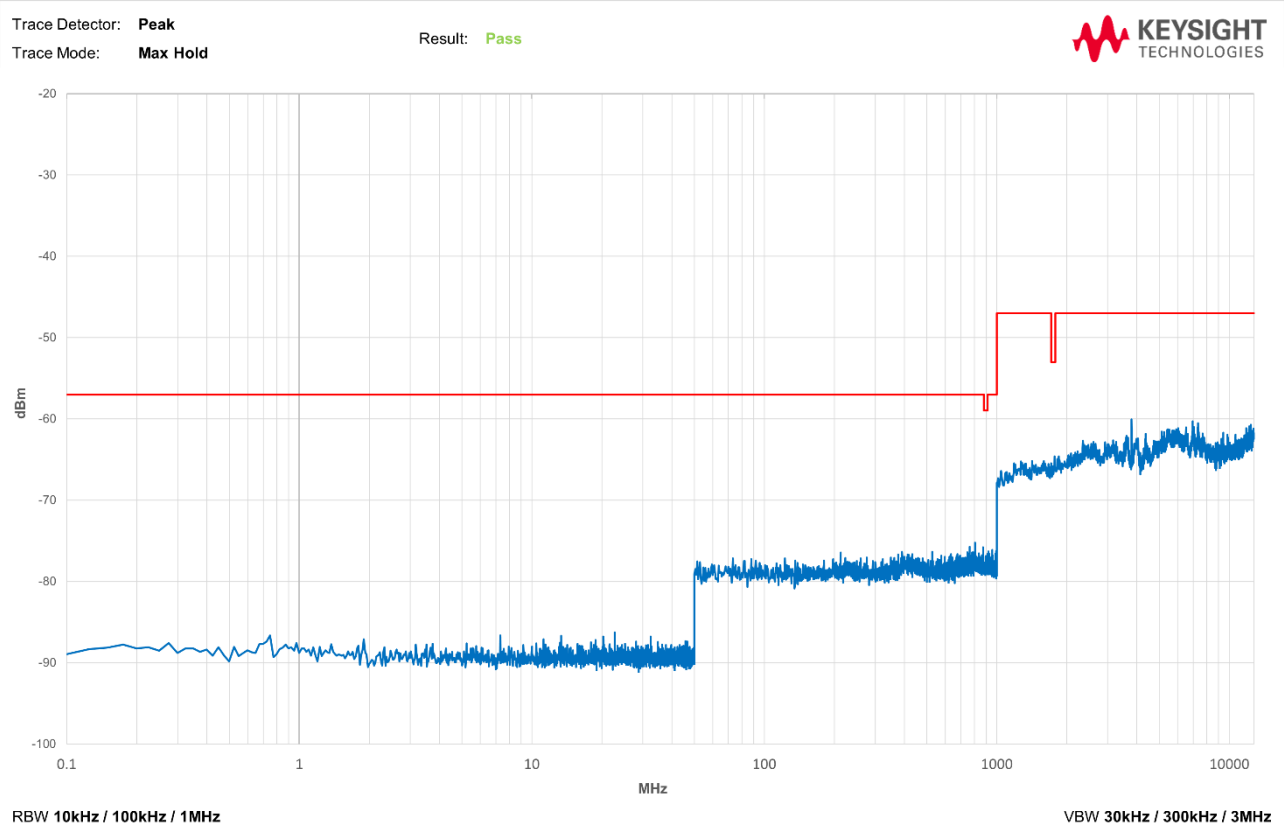


Figure 7: Results for Conducted Spurious Emissions – MS Idle

7.4. RADIATED SPURIOUS EMISSIONS – MS ALLOCATED

7.4.1. DESCRIPTION

According to ETSI TS 151 010-1 V12.8.0 (2016-05), radiated spurious emissions, when the MS has been allocated a channel, are any emissions radiated by the cabinet and structure of the mobile station, including all interconnecting cables.

7.4.2. LIMITS

According to ETSI TS 151 010-1 V12.8.0 (2016-05), The radiated spurious power emitted by the MS, when allocated a channel, shall be no more than the levels in Table 22 under normal and extreme voltage conditions.

Table 22: Limits for Radiated Spurious Emissions – MS Allocated

Frequency Range	Power Level Limit (dBm)		
	GSM 400 GSM 700 T-GSM 810 GSM 850 GSM 900	**DCS 1800**	**PCS 1900**
30 MHz to 1 GHz	-36	-36	-36
1 GHz to 4 GHz	-30	--	-30
1 GHz to 1710 MHz	--	-30	--
1710 MHz to 1785 MHz	--	-36	--
1785 MHz to 4 GHz	--	-30	--

7.4.3. RESULTS

Table 23: Results for Radiated Spurious Emissions – MS Allocated to GSM900

Frequency (MHz)	Level (dBm)	Receive Antenna Polarization	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
1804	-35.8	H	1000	PK	-30	-5.8	Pass
1804	-46.8	V	1000	PK	-30	-16.8	Pass
2706	-35.4	H	1000	PK	-30	-5.4	Pass
2708	-30.5	V	1000	PK	-30	-0.5	Pass
3610	-47.6	H	1000	PK	-30	-17.6	Pass
3610	-47.5	V	1000	PK	-30	-17.5	Pass

Table 24: Results for Radiated Spurious Emissions – MS Allocated to GSM1800

Frequency (MHz)	Level (dBm)	Receive Antenna Polarization	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
3495	-45.1	H	1000	PK	-30	-15.1	Pass
3495	-50.6	V	1000	PK	-30	-20.6	Pass

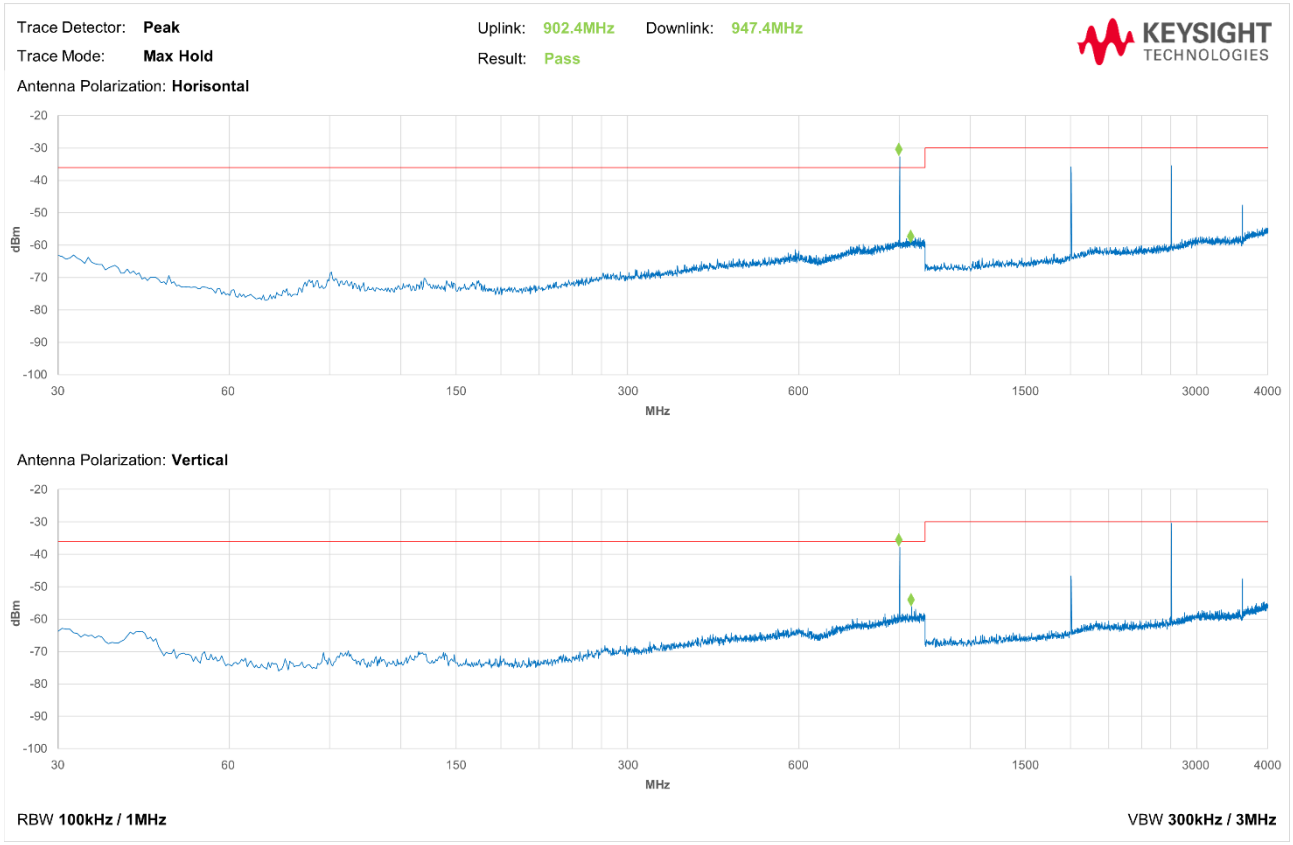


Figure 8: Results for Radiated Spurious Emissions – MS Allocated to GSM900

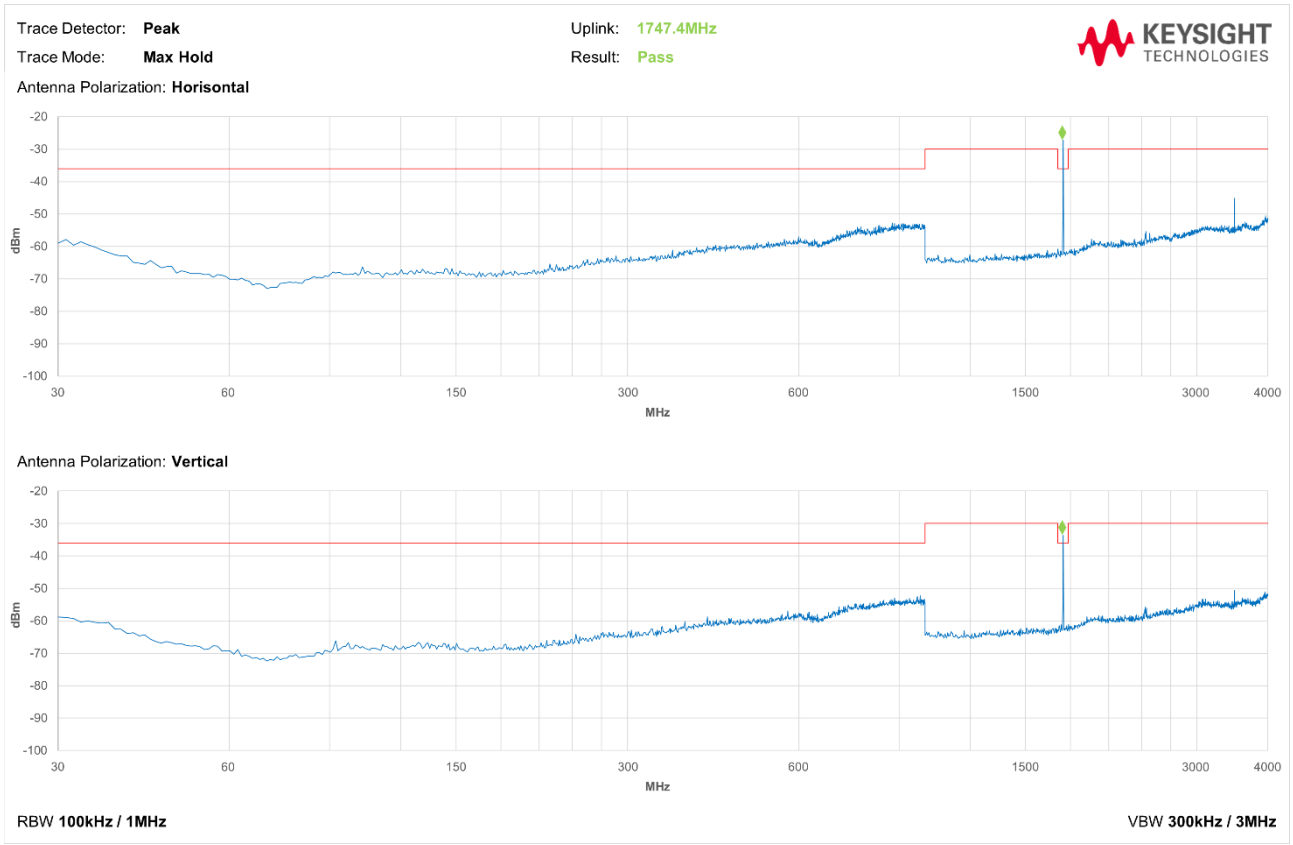


Figure 9: Results for Radiated Spurious Emissions – MS Allocated to GSM1800

7.5. RADIATED SPURIOUS EMISSIONS – MS IDLE

7.5.1. DESCRIPTION

According to ETSI TS 151 010-1 V12.8.0 (2016-05), radiated spurious emissions, when the MS is in idle mode, are any emissions radiated by the cabinet and structure of the mobile station, including all interconnecting cables.

7.5.2. LIMITS

According to ETSI TS 151 010-1 V12.8.0 (2016-05), the radiated spurious power emitted by the MS, when in idle mode, shall be no more than the levels in Table 25 under normal voltage conditions

Table 25: Limits for Radiated Spurious Emissions – MS Idle

Frequency Range	Power Level Limit (dBm)	
	GSM 400 T-GSM 810 GSM 900 DCS 1800	**GSM 700 GSM 850 PCS 1900**
30 MHz to 880 MHz	-57	-57
880 MHz to 915 MHz	-59	-57
915 MHz to 1 GHz	-57	-57
1 GHz to 1710 MHz	-47	--
1710 MHz to 1785 MHz	-53	--
1785 MHz to 4 GHz	-47	--
1 GHz to 1850 MHz	--	-47
1850 MHz to 1910 MHz	--	-53
1910 MHz to 4 GHz	--	-47

7.5.3. RESULTS

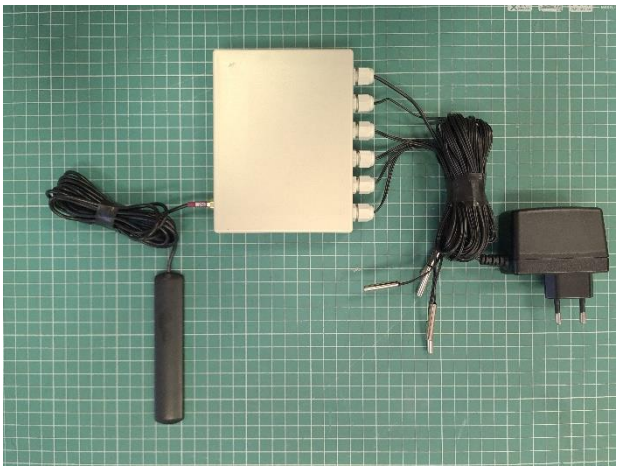
Table 26: Results for Radiated Spurious Emissions – MS Idle

Frequency (MHz)	Level (dBm)	Receive Antenna Polarization	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
44	-71.4	V	100	PK	-57	-14.4	Pass
84	-71.2	H	100	PK	-57	-14.2	Pass
95	-78.2	V	100	PK	-57	-21.2	Pass
105	-73.6	H	100	PK	-57	-16.6	Pass
130	-74.5	V	100	PK	-57	-17.5	Pass
133	-75.9	H	100	PK	-57	-18.9	Pass
140	-76.5	V	100	PK	-57	-19.5	Pass
216	-78.5	V	100	PK	-57	-21.5	Pass

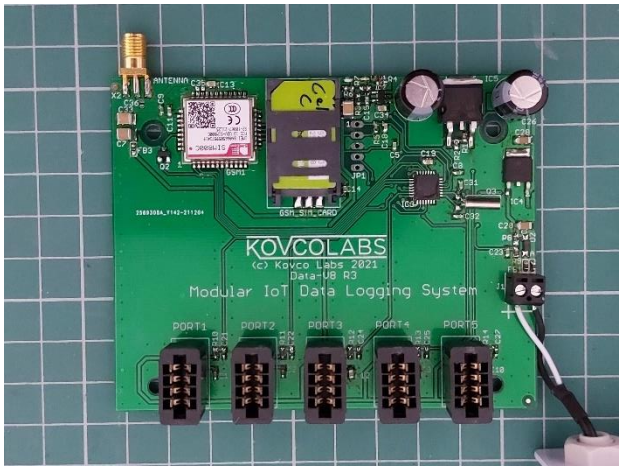
Figure 10: Results for Radiated Spurious Emissions – MS Idle

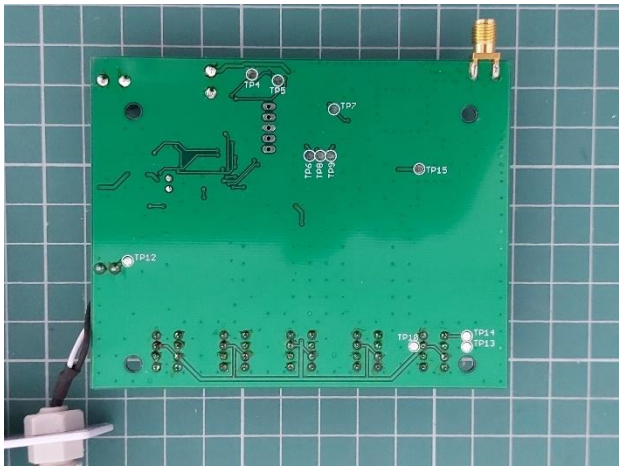
8. TEST IMAGES


Figures 11 & 12: Measurement Setup for Radiated Emissions between 30 MHz and 4 GHz

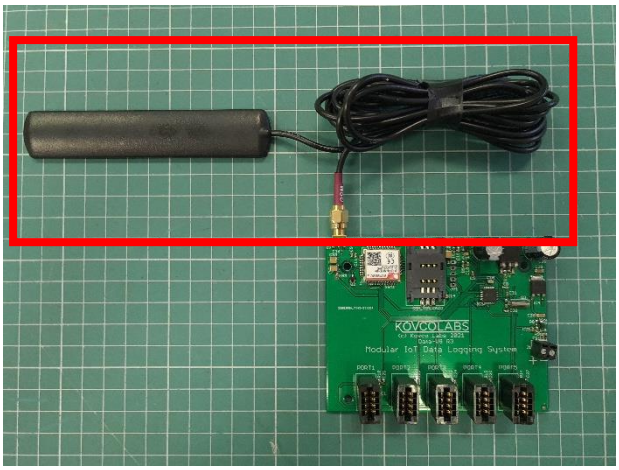



Figures 13 & 14: External Top and Bottom View of EUT

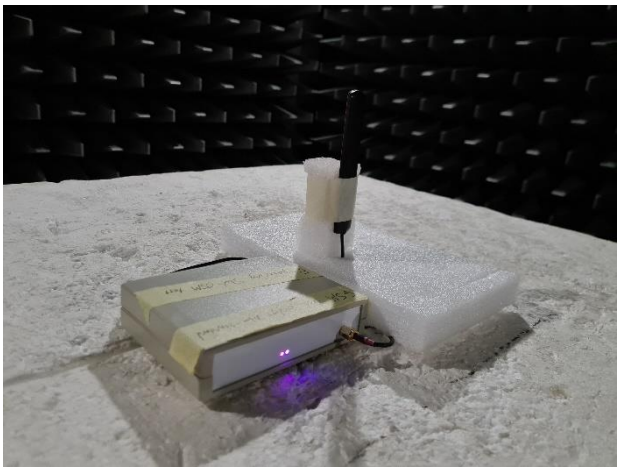




Figures 15 & 16: Internal Top and Bottom View of EUT



Figures 17 & 18: Detailed View of RF Circuit and Antenna



Figures 19: Setup of EUT in the Fully Anechoic Chamber

*** END OF REPORT ***