Prüfbericht-Nr.: *Test Report No.*:	**60384807 001**	**Auftrags-Nr.:** *Order No.*:	168269603	Seite 1 von 24 *Page 1 of 24*
Kunden-Referenz-Nr.: *Client Reference No.*:	N/A	**Auftragsdatum:** *Order date*:	16.06.2020	
Auftraggeber: *Client*:	Telit Communications S.p.A. Viale Stazione di Prosecco 5/b, 34010, Trieste, Italy			
Prüfgegenstand: *Test item*:	Data Terminal Module			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	ME910G1-WWV			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification*:	47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 2		RSS-132 Issue 3 RSS-133 Issue 6 RSS-Gen Issue 5	

Wareneingangsdatum: *Date of receipt*:	16.06.2020	Refer to Photo Documentation
Prüfmuster-Nr.: *Test sample No.*:	A000981523-005	
Prüfzeitraum: *Testing period*:	16.06.2020 - 26.08.2020	
Ort der Prüfung: *Place of testing*:	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüflaboratorium: *Testing laboratory*:	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüfergebnis*: *Test result**:	Pass	

geprüft von / *tested by*:			**kontrolliert von /** *reviewed by*:		
28.08.2020	Lin Lin / Senior Project Manager		28.08.2020	Winnie Hou / Technical Certifier	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*: FCC ID: RI7ME910G1WW; IC: 5131A-ME910G1WW

1. This report is for GSM Voice mode operation only.
2. The product model name ME910G1-WW changed to ME910G1-WWV.
3. Based on the previous model ME910G1-WW, the model ME910G1-WWV support the GSM voice mode as through the firmware upgraded and the hardware changed in the digital area which do not involve the radio and radio configuration, detail difference refer to section 3.2, due to these change, the GSM vocie test cases are arragned test and the other mode (GPRS, EGPRS, eMTC, NB-IoT) refer to test report STS1912245W01, STS1912245W02, STS1912245W03 issued by Shenzhen STS Test Services Co., Ltd.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

5.1.1 EFFECTIVE (ISOTROPIC) RADIATED POWER
RESULT: Pass

5.1.2 MODULATION CHARACTERISTICS
RESULT: Pass

5.1.3 OCCUPIED BANDWIDTH AND 26DB BANDWIDTH
RESULT: Pass

5.1.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS
RESULT: Pass

5.1.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – BAND EDGE
RESULT: Pass

5.1.6 FIELD STRENGTH OF SPURIOUS RADIATION
RESULT: Pass

5.1.7 FREQUENCY STABILITY
RESULT: Pass

5.1.8 PEAK TO AVERAGE RATIO
RESULT: Pass

CONTENTS

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of GSM operation

Appendix B: Test Results of Field Strength of Spurious Radiation

1.2 Test Standard(s)

Applied Rules:	47 CFR FCC Part 22	RSS-132 Issue 3
	47 CFR FCC Part 24	RSS-133 Issue 6
	47 CFR FCC Part 2	RSS-Gen Issue 5
Test Method:	KDB 971168 D01	
	ANSI C63.26	

2. TEST SITES

2.1 TEST FACILITIES

TÜV Rheinland (Shenzhen) Co., Ltd.
(FCC Registration No.: 694916 & IC Registration Number: 25069)

Address: No. 362, Huanguan Road Middle, Longhua District, Shenzhen 518110, P.R. China

2.2 TEST DATE

Date of test: 16.06.2020 - 26.08.2020

2.3 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Table 1: List of Test and Measurement Equipment

Description	Manufacturer	Model	Serial No.	Calibrated until (DD.MM.YYYY)
Radio Spectrum Testing				
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	166305	20.09.2020
Signal Analyzer	Rohde & Schwarz	FSV 40	101475	20.09.2020
Vector Signal Generator	Rohde & Schwarz	SMBV100A	263466	20.09.2020
Signal Generator	Rohde & Schwarz	SMB100A	181041	17.12.2020
High Speed Power Supply	KEITHLEY	2303	4080052	17.12.2020
RF Control Unit	Tonscend	JS0806-1	19H8060192	N/A
Field Strength of Spurious Radiation				
Signal Generator	Rohde & Schwarz	SMB100A	180840	19.08.2021
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	165339	19.08.2021
Signal Analyzer	Rohde & Schwarz	FSV 40	101440	20.08.2021
System Controller Interface	Rohde & Schwarz	SCI-100	S10010036	N/A
Filterbank	Rohde & Schwarz	GSM	100811	20.08.2021
OSP	Rohde & Schwarz	OSP 120	102041	N/A
OSP	Rohde & Schwarz	OSP 150	101385	17.12.2020
Pre-amplifier	Rohde & Schwarz	SCU08F1	08320030	19.08.2021
Amplifier	Rohde & Schwarz	SCU-18F	180079	19.08.2021

Amplifier	Rohde & Schwarz	SCU40A	100450	20.09.2020
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	192	02.09.2020
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218719	02.09.2020
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18312	02.09.2020
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19066	02.09.2020
Biconical Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VUBA 9117	357	02.09.2020
Double Ridged Broadband Horn Antenna (1 – 18 GHz)	Schwarzbeck	BBHA 9120 D	01760	02.09.2020
Broadband Horn Antenna (15 – 40 GHz)	Schwarzbeck	BBHA 9170	00862	02.09.2020
Test software	Rohde & Schwarz	EMC32 (V10.40.00)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NW9P2	N/A
3m Fully Anechoic Chamber	Albatross	FAC-3m	APC17151-FAC	05.07.2021

2.4 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A and Appendix B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. facility located at No. 362, Huanguan Road Middle, Longhua District, Shenzhen 518110, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3. GENERAL PRODUCT INFORMATION

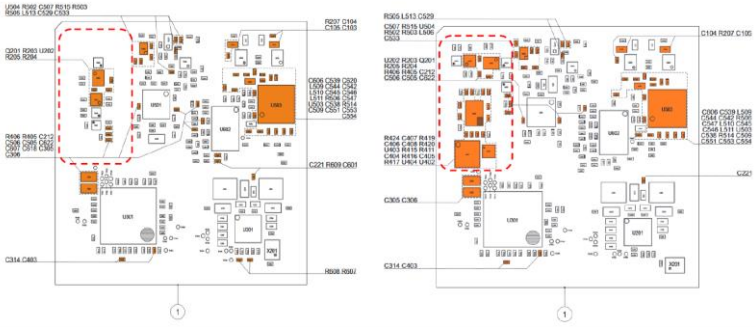
3.1 GENERAL DESCRIPTION

The EUT is wireless module which supports GSM wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 DIFFERENCE BETWEEN THE ME910G1-WW AND M910G1-WWV

Table 2: Difference between the ME910G1-WW and ME910G1-WWV

Items	Value
Model	ME910G1-WW, ME910G1-WWV
HW 0.0	ME910G1-WW
HW 1.0	ME910G1-WW ME910G1-WWV
Difference between the HW 0.0 and HW 1.0	1. Changed in the eSIM area. 2. Components are changed in the digital area (dotted lined in the picture below) and they do not involve the radio and radio configuration. 
SW version	M0C.400001
SW version	M0C.800002
Difference between the SW version	SW version M0C.400001 support eMTC bands 2/4/5/12/13/25/26/66/85, NB-IoT bands 2/4/5/12/13/25/26/66/74/85, GPRS/EGPRS 850/1900; SW version M0C.800002 support eMTC bands 2/4/5/12/13/25/26/66/85, NB-IoT bands 2/4/5/12/13/25/26/66/74/85, GSM/GPRS/EGPRS 850/1900;

Remark	Refer to test report STS1912245W01, STS1912245W02, STS1912245W03 issued by Shenzhen STS Test Services Co., Ltd. for eMTC, NB-IoT, GPRS/EGPRS radio test mode respectively. Refer to test report 60384807 001 issued by TÜV Rheinland (Shenzhen) Co., Ltd. for GSM radio test mode.

3.3 RATING AND SYSTEM DETAILS

Table 3: Rating of EUT

General Information of EUT	Description
Kind of Equipment:	Data Terminal Module
Type Designation:	ME910G1-WWV
FCC ID:	RI7ME910G1WW
IC:	5131A-ME910G1WW
Hardware Version:	1.0
Software Version:	M0C.800002
Type of Equipment:	Single Module
Operating Voltage:	3.8Vdc

Table 4: Technical Specification of EUT

Characteristic	Description
Wireless Technology:	GSM
Operating Frequency Band(s):	GSM: 850/1900
Power Class:	GSM 850: Class 4 GSM1900: Class 1
Type of Modulation:	GMSK
Channel separation	200KHz
Antenna Type:	External Antenna
Number of Antenna:	1
Extreme Voltage:	DC 3.2 ~ 4.5V
Extreme Temperature:	-40°C ~ +85°C

Table 5: Operating Frequency Range of EUT

Frequency Band(s)	Frequency Range					
	Transmitting f_{UL} (MHz)			Receiving f_{DL} (MHz)		
GSM 850	824	~	849	869	~	894
GSM 1900	1850	~	1910	1930	~	1990

3.4 INDEPENDENT OPERATION MODES

The basic operation modes are:

A. On, communication link established, Transmitting
   1) GSM operating
      i. Low channel
      ii. Middle channel
      iii. High channel

B. Off

3.5 NOISE GENERATING AND NOISE SUPPRESSING PARTS

Refer to the Circuit Diagram.

3.6 SUBMITTED DOCUMENTS

☒ User Manual
☒ Circuit Diagram
☒ Block Diagram
☒ Schematics
☐ Model Difference Letter
☒ Rating Label
☒ PCB Layout
☒ Photo Document
☒ Parts List

4. TEST SET-UP AND OPERATION MODES

4.1 PRINCIPLE OF CONFIGURATION SELECTION

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 TEST OPERATION AND TEST SOFTWARE

Test operation refers to test setup in chapter 5. All testing were performed according to the procedure in KDB 971168 D01 and ANSI C63.26.

Table 6: List of Frequencies under Test

Operation bands	Mode	Frequencies under Test					
		Uplink			Downlink		
		Range	EARFCN	Frequencies (MHz)	Range	EARFCN	Frequencies (MHz)
850	GSM	Low	128	824.2	Low	128	869.2
		Mid	190	836.6	Mid	190	881.6
		High	251	848.8	High	251	893.8
1900	GSM	Low	512	1850.2	Low	512	1930.2
		Mid	661	1880	Mid	661	1960
		High	810	1909.8	High	810	1989.8

Table 7: Test Environments

Environment Parameter	Selected Values During Tests		
	Temperature (°C)	Voltage (Vdc)	Relative Humidity
Normal (NTNV)	24	3.8	51%
HTHV	85 °C	4.5	---
LTHV	-40 °C	4.5	---
HTLV	85 °C	3.2	---
LTLV	-40 °C	3.2	---

4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT

Table 8: Cables used during test

Port	Quantity	Length (m)	Connector	Type of Cable
USB	1	1.2	USB	USB cable, shielding

Table 9: Auxiliary Equipment used during test

Name	Model	Manufacturer	S/N
Evaluation Kit	EVK2	Telit	N/A
Antenna	T-AT305 Frequency Range: 700-960 MHz / 1710-2700 MHz Omnidirectional antenna Gain: 2.14 dBi (Max.) Cable: RG 174mm 2500	ATEL-CAB	N/A

4.4 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE

The test sample, which has been tested, contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

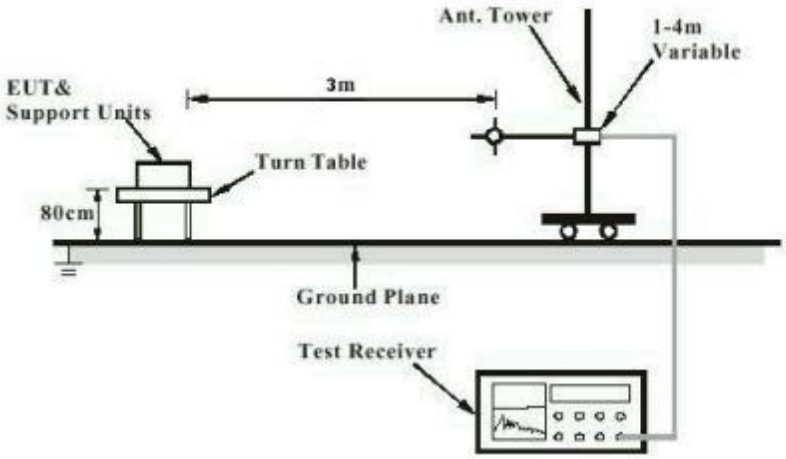


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

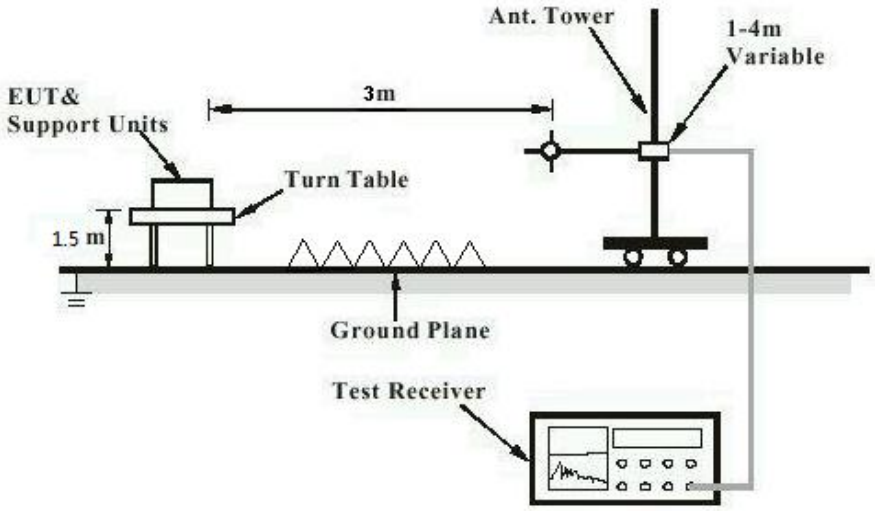
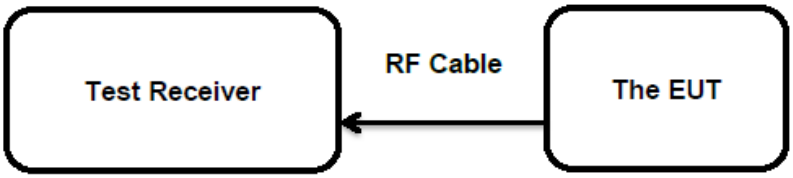


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5. TEST RESULTS

5.1 ESSENTIAL REQUIREMENTS OF STANDARD

5.1.1 EFFECTIVE (ISOTROPIC) RADIATED POWER

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 2	RSS-132 Issue 3 RSS-133 Issue 6 RSS-Gen Issue 5	
Limits	:	Operating band GSM 850 GSM 1900	FCC Limit ERP 7 watts EIRP 2 watts	ISED Limit ERP 11.5 watts EIRP 2 watts
Test procedure	:	Clause 5.2.4.2 of ANSI C63.26		
Kind of test site	:	Shielding Room		

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions ☐ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	25 ºC
Relative humidity	:	50%
Atmospheric pressure	:	101.0 kPa

Refer to attached Appendix A for details of test results.

5.1.2 MODULATION CHARACTERISTICS

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22	RSS-132 Issue 3
		47 CFR FCC Part 24	RSS-133 Issue 6
		47 CFR FCC Part 2	RSS-Gen Issue 5
Limits	:	"Other types of equipment", the use of higher order modulations such as OFDM or LTE or other modulation are acceptable for use	
Test procedure	:	Clause 5.3.2 of ANSI C63.26	
Kind of test site	:	Shielding Room	
		3.8Vdc	

Note:
The device implement digital modulation such as GMSK, hence the EUT is deemed to comply with this requirement without additional testing.

5.1.3 OCCUPIED BANDWIDTH AND 26DB BANDWIDTH

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22	RSS-132 Issue 3
		47 CFR FCC Part 24	RSS-133 Issue 6
		47 CFR FCC Part 2	RSS-Gen Issue 5
Test requirement	:	Section 2.1049 of 47 CFR FCC Part 2	
Limits	:	No limit	
Test procedure	:	Section 5.4.3 of ANSI C63.26	
		☒ Conducted measurements	
		☐ Radiated measurements	
Kind of test site	:	Shielding Room	

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions
		☐ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	25 ºC
Relative humidity	:	51%
Atmospheric pressure	:	101.0 kPa

Refer to attached Appendix A for details of test results.

5.1.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 2	RSS-132 Issue 3 RSS-133 Issue 6 RSS-Gen Issue 5	
Limits	:	Operating band	FCC Limit	ISED Limit
		GSM 850	< - 13 dBm /100kHz @ < 1GHz < - 13 dBm /1MHz @ > 1GHz	< - 13 dBm / 100 kHz
		GSM 1900	< - 13 dBm /1MHz	< - 13 dBm /1MHz
Test procedure	:	Clause 5.7.4 of ANSI C63.26		
Kind of test site	:	Shielding Room		

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions ☐ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	25 °C
Relative humidity	:	51%
Atmospheric pressure	:	101.0 kPa

The limit calculation:
Limit = P_{Meas} (dBm) – [43+10log(P_{Meas})] = −13 dBm

Refer to attached Appendix A for details of test results.

5.1.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – BAND EDGE

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 2		RSS-132 Issue 3 RSS-133 Issue 6 RSS-Gen Issue 5
Limits	:	Operating band	FCC Limit	ISED Limit
		GSM 850	< - 13 dBm /1%EBW	< - 13 dBm / 1%OBW
		GSM 1900	< - 13 dBm /1%EBW	< - 13 dBm / 1%OBW
Test procedure	:	Clause 5.7.3 of ANSI C63.26		
Kind of test site	:	Shielding Room		

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions ☐ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	25 °C
Relative humidity	:	51%
Atmospheric pressure	:	101.0 kPa

The limit calculation:
Limit = P_{Meas} (dBm) – [43+10log(P_{Meas})] = −13 dBm

Refer to attached Appendix A for details of test results.

5.1.6 FIELD STRENGTH OF SPURIOUS RADIATION

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 2	RSS-132 Issue 3 RSS-133 Issue 6 RSS-Gen Issue 5	
Limits	:	Operating band	FCC Limit	ISED Limit
		GSM 850	< - 13 dBm /100kHz @ < 1GHz < - 13 dBm /1MHz @ > 1GHz	< - 13 dBm / 100 kHz
		GSM 1900	< - 13 dBm /1MHz	< - 13 dBm /1MHz
Test procedure	:	Clause 5.5 of ANSI C63.26		
Kind of test site	:	3m Semi Anechoic Room		

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions ☐ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	23 °C
Relative humidity	:	42%
Atmospheric pressure	:	101.0 kPa

Note: All test modes are arrange pre-test, only the worst case mode are shown in this report.

Refer to attached Appendix B for details of test results.

5.1.7 FREQUENCY STABILITY

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 2	RSS-132 Issue 3 RSS-133 Issue 6 RSS-Gen Issue 5	
Limits	:	Operating band	FCC Limit	ISED Limit
		GSM 850	2.5 ppm	2.5 ppm
		GSM 1900	Within authorized bands	2.5 ppm
Test procedure	:	Clause 5.6.3 of ANSI C63.26		
Kind of test site	:	Shielding Room		

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions ☒ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	25 ºC
Relative humidity	:	51%
Atmospheric pressure	:	101.0 kPa

Refer to attached Appendix A for details of test results.

5.1.8 PEAK TO AVERAGE RATIO

RESULT: **Pass**

Test standard	:	47 CFR FCC Part 22		RSS-132 Issue 3
		47 CFR FCC Part 24		RSS-133 Issue 6
		47 CFR FCC Part 2		RSS-Gen Issue 5
Limits	:	Operating band	FCC Limit	ISED Limit
		GSM 850	PAR ≤ 13 dB	PAR ≤ 13 dB
		GSM 1900	PAR ≤ 13 dB	PAR ≤ 13 dB
Test procedure	:	Clause 5.2.6 of ANSI C63.26		
Kind of test site	:	Shielding Room		

Test Setup

Date of testing	:	16.06.2020 - 26.08.2020
Input voltage	:	3.8Vdc
Test environment	:	☒ Normal test conditions
		☐ Extreme test conditions
Operation mode	:	A.1
Ambient temperature	:	23 ºC
Relative humidity	:	50%
Atmospheric pressure	:	101.0 kPa

Refer to attached Appendix A for details of test results.

6. SYSTEM MEASUREMENT UNCERTAINTY

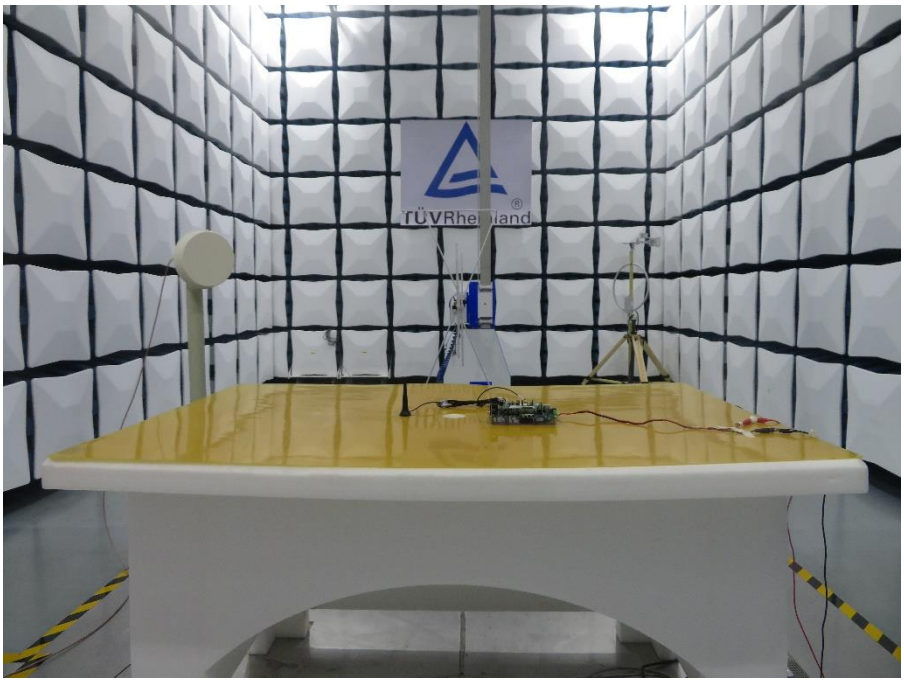
For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 10: System Measurement Uncertainty

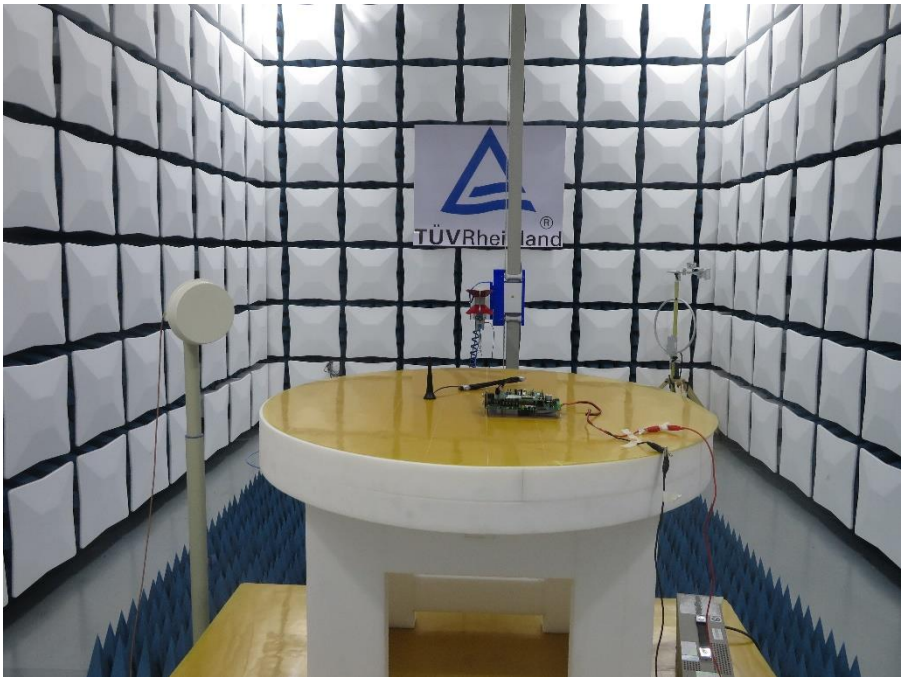
Items		Extended Uncertainty
RE	Radiated emission 9 kHz - 30 MHz	±3.97 dB
	Radiated emission 30 MHz - 1 GHz	±4.30 dB
Remark: 95% Confidence Levels, K=2.		

7. PHOTOGRAPHS OF THE TEST SET-UP

Photograph 1: Set-up for Field Strength of Spurious Radiation, below 1 GHz



Photograph 2: Set-up for Field Strength of Spurious Radiation, above 1GHz



8. LIST OF TABLES

9. LIST OF PHOTOGRAPHS