RF TEST REPORT

TEST STANDARD(S)	:	ETSI EN 303 413 V1.2.1 (2021-04)
CLIENT / APPLICANT	:	Robert Bosch (Pty) Ltd.
CLIENT ADDRESS	:	33 Piet Rautenbach, Industrial Site, Brits, 0250
TEST SAMPLE (EUT)	:	Tracking Device
MODEL NUMBER	:	MK2
UNTESTED VARIANT(s)	:	None
REPORT TYPE	:	Delta GNSS Test Report
REPORT NUMBER	:	TRR02193-5-23
ASSESSMENT RESULT	:	Pass
DATE ISSUED	:	04/12/2023
REVISION	:	1.0

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	04/12/2023	HE Olivier	All	N/A

TEST LABORATORY INFORMATION

Established in 2017, iSERT (Pty) Ltd. Provides EMC, RF & Safety 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.

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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)

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1. INTRODUCTION

This report details the results of the tests performed on the Robert Bosch Tracking Device with model number: MK2. The testing was carried out by HE Olivier on 17/10/2023.

The EUT was tested according to the following standards and methods:

- ETSI EN 303 413 V1.2.1 (2021-04): “Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) Receivers; Radio Equipment operating in the 1164 MHz to 1300 MHz and 1559 MHz to 1610 MHz Frequency Bands; Harmonized Standard for Access to Radio Spectrum”

2. SUMMARY OF TEST RESULTS

The module was fully tested according to the essential requirements of article 3.2 of Directive 2014/53/EU, see Appendix A.

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

Table 1: Summary of Test Results

ETSI EN 303 413 V1.2.1 (2021-04)			
Test Requirement	**Requirement**	**Method**	**Result**
Blocking	4.2.1	5.4	✔✔
Receiver Spurious Emission	4.2.2	5.5	✔

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 as a certified module, assessed by an ISO 17025 accredited laboratory, refer to the test report Appendix A.
✔	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 2: 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 Outdoor	
Operational Frequency Range	1 559 MHz to 1 610 MHz	
GNSS Signals	GPS L1	
	Galileo E1	
	GLONASS G1	
Centre Frequency	GPS	1575.42 MHz
	Galileo	1575.42 MHz
	GLONASS	1602 MHz
Channel Bandwidth	GPS	20.46 MHz
	Galileo	24.552 MHz
	GLONASS	562.5 kHz
Radio Modular Detail	Quectel BG600L-M3	
Other Radio Technologies	868 MHz LoRa, 868 MHz Sigfox, 2G, NB-IoT	
Antenna details	Location	Internal
	Type	Ceramic Patch Antenna
	Make/model	--
	Gain	--
Power Source	Internal	Lithium-Ion Polymer Battery
	External	--
Build Status	✓	Production
		Pre-production
		Prototype
Build Revision	Hardware	V1.04
	Software	Not Provided

5. MEASURING EQUIPMENT SETUP AND CONFIGURATION

5.1. MEASUREMENT EQUIPMENT

Table 3: Calibration Information of Measurement Equipment

Instrument	Manufacturer	Model	Serial number	Next Cal date
Signal Analyzer	Keysight	N9020A	MY52330018	June 2024
Horn antenna	AH systems	SAS-571	1129	February 2028
Combilog antenna	ETS Lingren	3142B	2613	June 2027
Pre-Amplifier	Adv Microwave	WLA652B	ISQ002	January 2024
High Pass Filter	Wainwright	WHKX12-1000	IS0002	November 2024
Coaxial Cable	Semflex	60637	X116BFSX10060	October 2024
Coaxial Cable	Mini-Circuits	CBL-0.5M-NMNM+	122547	November 2024
Multimeter	Fluke	179	40850243	November 2024
Laboratory Power Supply	Manson	HCS-3202	G071710100	Verify before use
Temperature Hygrometer	Flus	ET-951W	2015106449	November 2024
Environmental chamber	Jeiotech	PBV-012	1B097018	January 2024

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 4: 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°C
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.

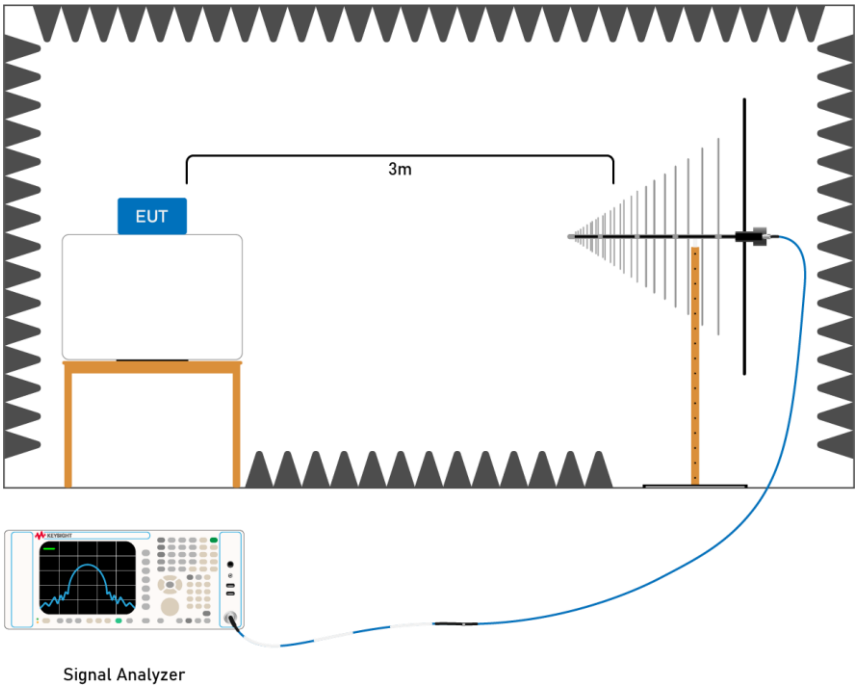


Figure 1: Radiated Emissions Setup Below 1 GHz

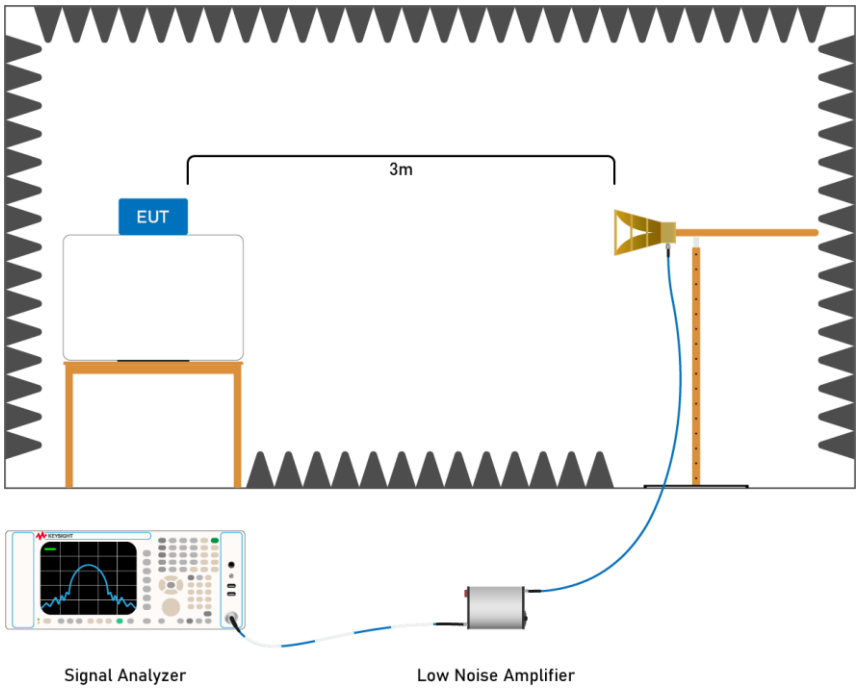


Figure 2: Radiated Emissions Setup Above 1 GHz

5.3.2. CONDUCTED SETUP

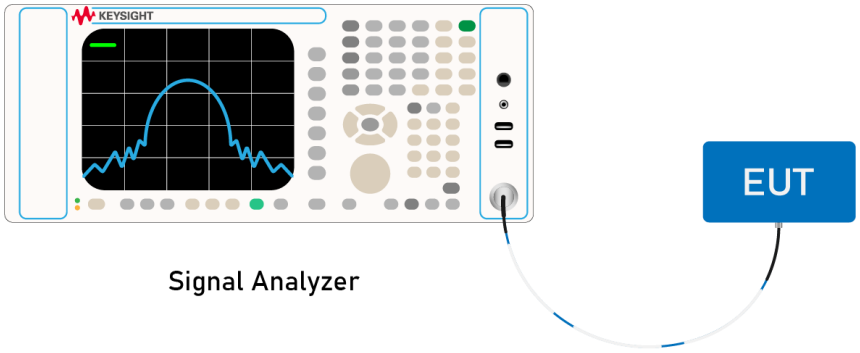


Figure 3: Conducted Setup

5.3.3. EXTREME CONDITIONS SETUP

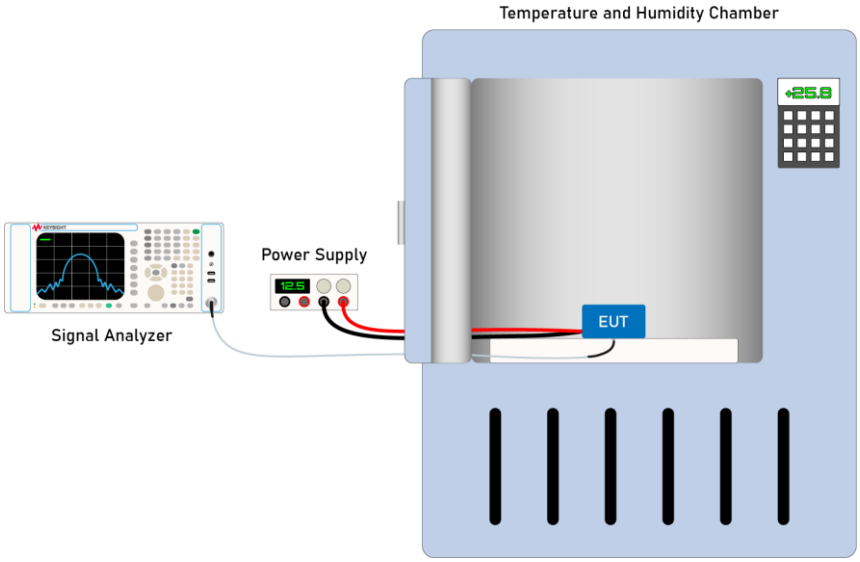


Figure 4: Extreme Conditions Setup

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 EN 303 413 V1.2.1 (2021-04) clause 5.1.

Table 5: Environmental Conditions during Testing

Condition	Value	Limit
Temperature	+20°C to +22°C	+15°C to +35°C
Relative Humidity	38% to 42%	Up to 75%

6.2. SUPPORT EQUIPMENT AND SOFTWARE

6.2.1. SUPPORT EQUIPMENT

The support equipment below was used during this assessment:

Table 6: List of Support Equipment

Instrument	Manufacturer	Model	Serial number
--	--	--	--

6.2.2. AUXILIARY EQUIPMENT

The EUT has been tested as an independent unit with Ancillary/auxiliary equipment. The following equipment/accessories were used to form a representative test configuration during this assessment:

Table 7: List of Auxiliary Equipment

Instrument	Manufacturer	Model	Serial number
GPS Signal Re-Radiator System	RF design	GPSRR-P2-TA-R	200272

6.2.3. INPUT/OUTPUT CABLES

Table 8: List of Input/Output Cables

Cable Description	Length (m)	From Port	To
--	--	--	--

6.2.4. EXERCISE SOFTWARE

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

6.3. MODIFICATION RECORD

No modification was made to the EUT during this assessment.

6.4. DEVIATIONS FROM THE TEST STANDARD

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

6.5. TEST CONFIGURATION

Table 9: Equipment Under Test Configuration

Parameter to be tested	State	Power Source	RF Port	Condition
Receiver Spurious Emissions	Receive	Internal	Radiated	Normal

7. DETAILS OF TEST RESULTS

7.1. RECEIVER SPURIOUS EMISSIONS

7.1.1. DESCRIPTION

According to ETSI EN 303 413 V1.2.1 (2021-04), receiver spurious emissions are emissions at any frequency when the GUE is active.

7.1.2. LIMITS

According to ETSI EN 303 413 V1.2.1 (2021-04), The receiver spurious emissions of the GUE shall not exceed the values given in Table 10.

Table 10: Receiver Spurious Emissions Limits

Frequency Range	Maximum Power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8.3 GHz	-47 dBm	1 MHz

7.1.3. RESULTS

Table 11: Results for Receiver Radiated Spurious Emissions

Frequency (MHz)	Level (dBm)	Receive Antenna Polarization	Receiver RBW (kHz)	Detector Used	Limit (dBm)	Margin (dB)	Test Result
30 – 1000	Noise Floor	H / V	100	PK	**Error! Reference source not found.**	--	Pass
1000 – 6000	Noise Floor	H / V	1000	PK		--	Pass

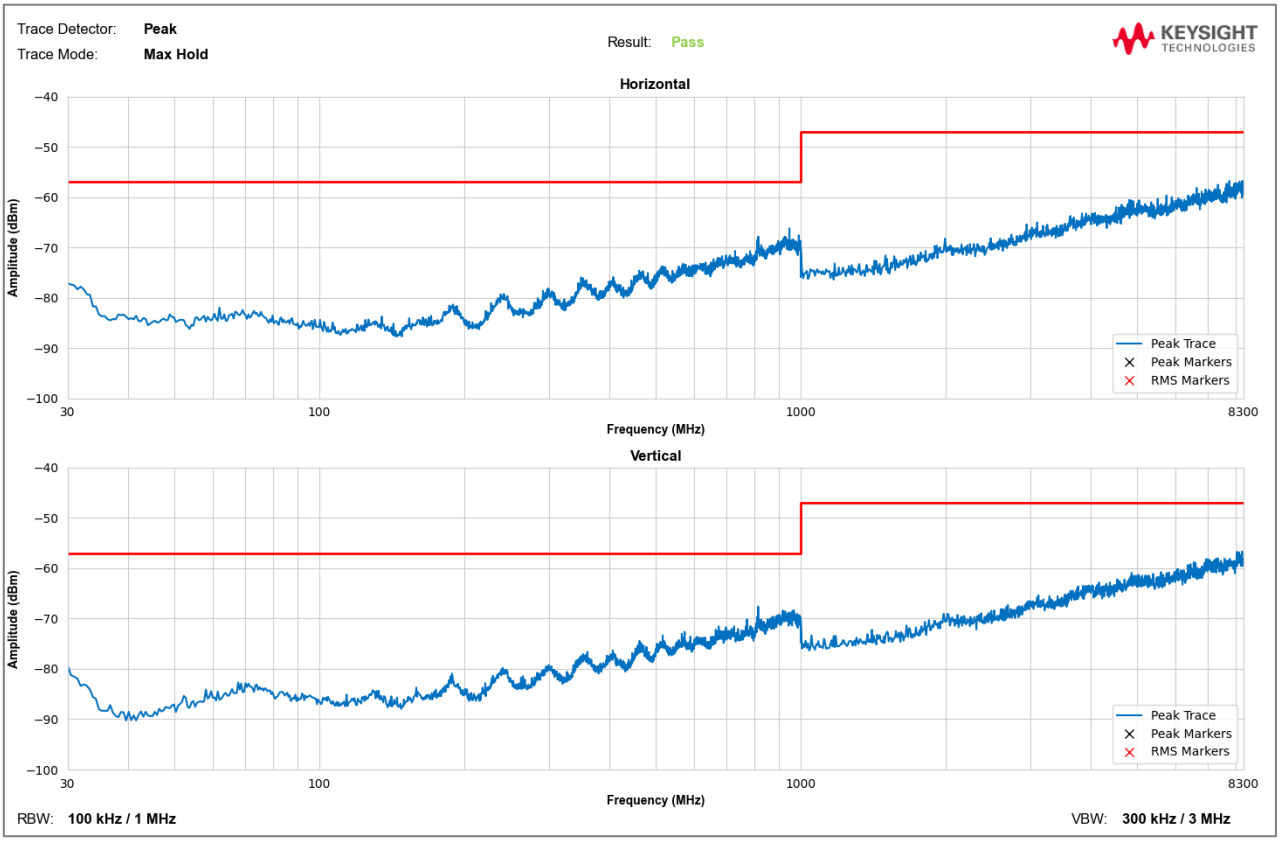
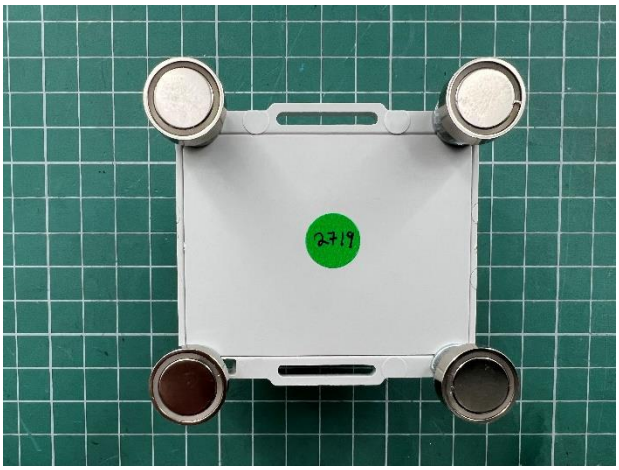


Figure 5: Results for Receiver Radiated Spurious Emissions

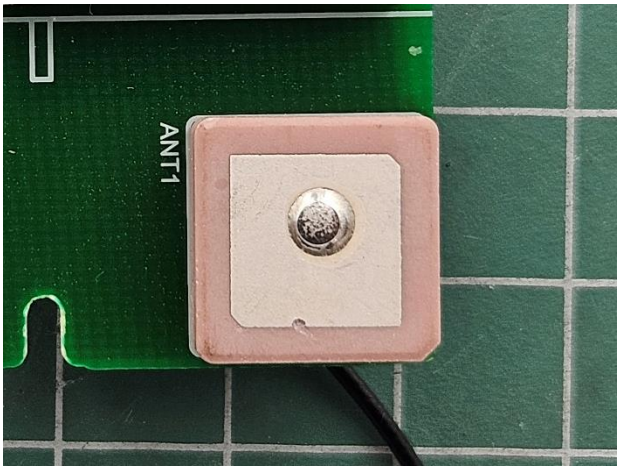
8. TEST IMAGES


Figures 6 & 7: Measurement Setup for Radiated Emissions between 30 MHz and 8.3 GHz



Figures 8 & 9: External Top and Bottom View of EUT


Figures 10 & 11: Internal Top and Bottom View of EUT



Figures 12 & 13: Detailed View of RF Circuit and Antenna

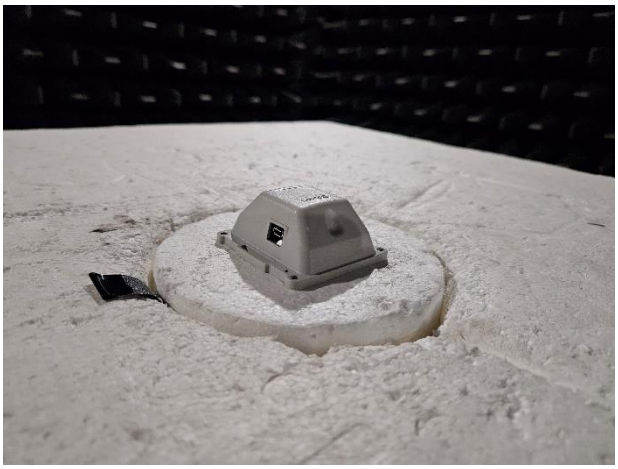


Figure 14: Setup of EUT in the Fully Anechoic Chamber

*** END OF THIS REPORT ***

APPENDIX A: MODULAR TEST REPORT

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RF TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd
Product	LTE Cat M1 & Cat NB2 & EGPRS Module
Brand	Quectel
Model	BG600L-M3
Report No.	R2003A0167-R7
Issue Date	June 23, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **ETSI EN 303 413 V1.1.1.** The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Peng Tao *Approved by: Kai Xu*

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

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TABLE OF CONTENT

Summary of Measurement Results

No.	Test Case	Clause (EN 303 413)	Conclusion
1	GUE adjacent frequency band selectivity performance	5.4	PASS
2	Receiver Spurious Emissions	5.5	PASS
Date of Testing: April 23, 2020 ~ June 3, 2020			
Note: All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

1. Test Laboratory

1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	Quectel Wireless Solutions Co., Ltd
Applicant address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer	Quectel Wireless Solutions Co., Ltd
Manufacturer address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

2.2. General information

EUT Description		
Model	BG600L-M3	
IMEI	860873040012816	
HW Version	R1.2	
SW Version	BG600LM3LAR02A03	
Antenna Type	The EUT don't have standard Antenna, The Antenna used for testing in this report is the after-market accessory (Dipole Antenna)	
Test Mode(s):	GPS, GLONASS, BDS, Galileo	
Frequency Range:	GPS L1	1559MHz ~ 1610 MHz
	GLONASS G1	1559MHz ~ 1610 MHz
	BDS	1559MHz ~ 1610 MHz
	Galileo E1	1559MHz ~ 1610MHz
Rated Power Supply Voltage:	3.8V	
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.		

3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

ETSI EN 303 413 V1.1.1 (2017-06)

4. Test Configuration

Test Mode

Test Mode	
Mode 1:	Adapter + USB cable + GPS L1 Rx
Mode 2:	Adapter + USB cable + GLONASS G1 Rx
Mode 3:	Adapter + USB cable + BDS Rx
Mode 3:	Adapter + USB cable + Galileo E1 Rx

5. Test Case Results

5.1. GUE adjacent frequency band selectivity performance

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

Methods of Measurement

1) Configure the GNSS signal generator to simulate those GNSS and GNSS signals declared as supported by the GUE, with power levels and other details as specified in clause B.2.

2) With the adjacent frequency signal switched off, the EUT shall be given sufficient time to acquire all simulated satellites from the declared GNSS system(s).

3) Record the baseline C/N0 value(s) reported by the EUT. Sufficient filtering shall be used to obtain a stable value. C/N0 may be averaged across all the satellites in view for each GNSS constellation. However, C/N0 shall not be averaged across satellite signals in different GNSS constellations. For a multi-GNSS EUT, there shall be a separate C/N0 value recorded for each GNSS constellation and each GNSS signal supported.

4) The adjacent frequency signal generator shall be configured to generate the signal defined, at the first test point centre frequency and signal power level as specified.

5) The adjacent frequency signal shall be switched on, and the EUT's C/N0 value(s) recorded as in step 3) to measure the degradation with respect to the baseline value(s) recorded in step 3).

6) Test point Pass/Fail Criteria: If the C/N0 degradation from step 5) does not exceed the value in equation 4-1, then this test point is set to "pass". If the C/N0 degradation exceeds the value in equation 4-1, then this test point is set to "fail." For a multi-GNSS and multi-signal EUT, there shall be a separate pass/fail determination for each GNSS and for each GNSS signal supported. If the C/N0 degradation exceeds the value in equation 4-1 for any supported GNSS or supported GNSS signal, then this test point is set to "fail".

7) Step 1) through step 6) shall be repeated for all test point centre frequencies (and associated signal power level) specified.

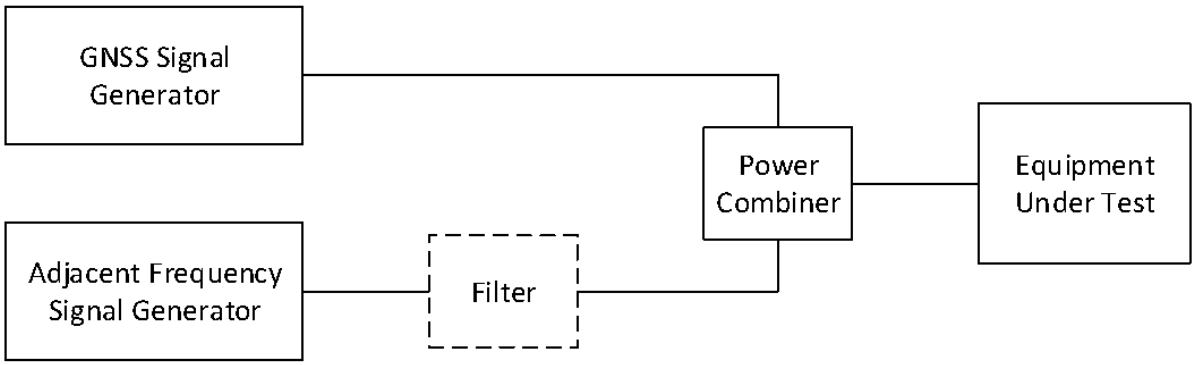


Figure 5-1: Conducted measurement setup for EUT adjacent frequency band selectivity

Limits

Maximum degradation in C/N0

$$\Delta \text{ C/N0} \leqslant 1 \text{ dB}$$

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 0.18 dB.

Test Results

GPS L1

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	No interfering signal	With interfering signal	Decrease of C/N0 (dB)	Limt (dB)	Result
GPS mode(signal level:-128.5dBm)							
1518 to 1525	1524	-65	43	43	0	≤1	PASS
1525 to 1549	1548	-95	43	43	0	≤1	PASS
1549 to 1559	1554	-105	43	43	0	≤1	PASS
1610 to 1626	1615	-105	43	43	0	≤1	PASS
1626 to 1640	1627	-85	43	43	0	≤1	PASS

GLONASS G1

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	No interfering signal	With interfering signal	Decrease of C/N0 (dB)	Limt (dB)	Result
GLONASS mode(signal level:-131dBm)							
1518 to 1525	1524	-65	40	40	0	≤1	PASS
1525 to 1549	1548	-95	40	40	0	≤1	PASS
1549 to 1559	1554	-105	40	40	0	≤1	PASS
1610 to 1626	1615	-105	40	40	0	≤1	PASS
1626 to 1640	1627	-85	40	40	0	≤1	PASS

Galileo E1

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	No interfering signal	With interfering signal	Decrease of C/N0 (dB)	Limt (dB)	Result
Galileo mode(signal level:-131dBm)							
1518 to 1525	1524	-65	40	40	0	≤1	PASS
1525 to 1549	1548	-95	40	40	0	≤1	PASS
1549 to 1559	1554	-105	40	40	0	≤1	PASS
1610 to 1626	1615	-105	40	40	0	≤1	PASS
1626 to 1640	1627	-85	40	40	0	≤1	PASS

BDS

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	No interfering signal	With interfering signal	Decrease of C/N0 (dB)	Limt (dB)	Result
BDS mode(signal level:-133dBm)							
1518 to 1525	1524	-65	40	40	0	≤1	PASS
1525 to 1549	1548	-95	40	40	0	≤1	PASS
1549 to 1559	1554	-105	40	40	0	≤1	PASS
1610 to 1626	1615	-105	40	40	0	≤1	PASS
1626 to 1640	1627	-85	40	40	0	≤1	PASS

5.2. Receiver Spurious Emissions

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

Methods of Measurement

The spectrum in the spurious domain shall be searched for emissions that exceed the limit values given in table or that come to within 6 dB below these limits. Each occurrence shall be recorded. The measurement procedure contains 2 parts.

Pre-scan

The procedure in step 1) to step 3) below shall be used to identify potential unwanted emissions of the EUT:

1) The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in table.

2) The emissions over the range 30 MHz to 1 000 MHz shall be identified.

Spectrum analyser settings:

- Resolution bandwidth: 100 kHz
- Video bandwidth: 300 kHz
- Filter type: 3 dB (Gaussian)
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ≥ 19 400 (for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented)
- Sweep time: Auto

Wait for the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.5.2.1.3 and compared to the limits given in table.

3) The emissions over the range 1 GHz to 8,3 GHz shall be identified.

Spectrum analyser settings:

- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Filter type: 3 dB (Gaussian)
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ≥ 14 600 (for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented)
- Sweep time: Auto

Wait for the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in

clause 5.5.2.1.3 and compared to the limits given in table.

2. **Measurement of the emissions identified during the pre-scan**

The procedure in step 1) to step 3) below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.

1) The level of the emissions shall be measured using the following spectrum analyser settings:

- Measurement Mode: Time Domain Power.
- Centre Frequency: Frequency of the emission identified during the pre-scan.
- Resolution Bandwidth: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz).
- Video Bandwidth: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz).
- Frequency Span: Zero Span.
- Sweep mode: Single Sweep.
- Sweep time: 30 ms.
- Sweep points: ⩾ 30 000.
- Trigger: Video (for burst signals) or Manual (for continuous signals).
- Detector: RMS.

2) Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the RMS value of the power measured within this window. If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to the start and stop times of the sweep.

Limits

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8,3 GHz	-47 dBm	1 MHz

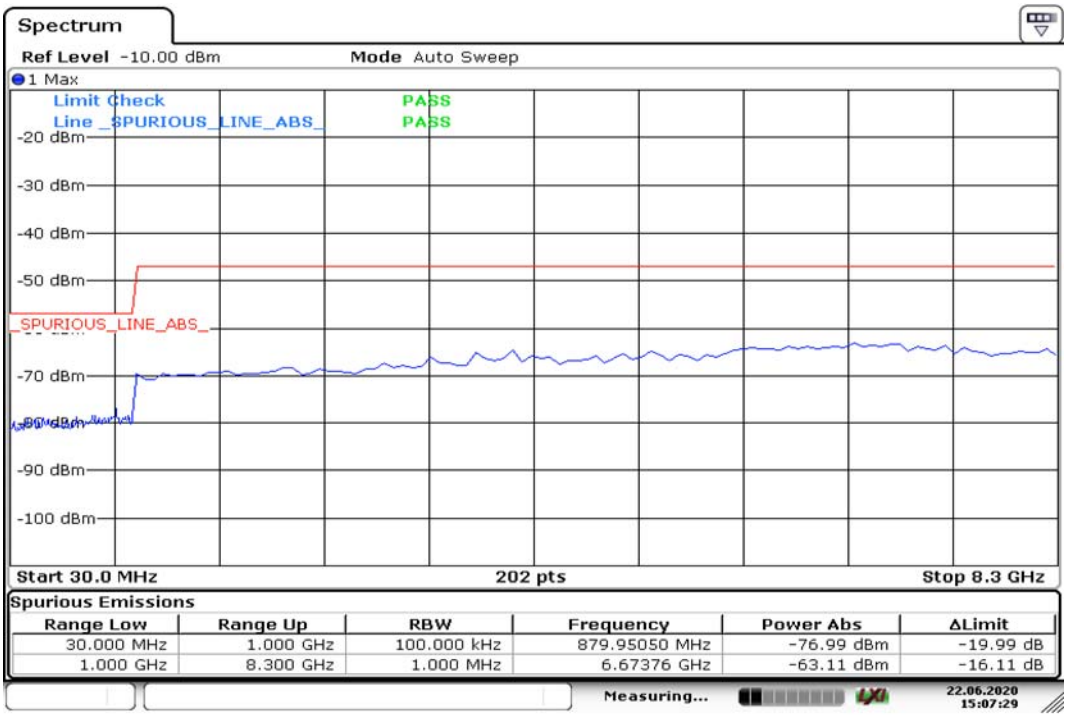
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 3.55 dB.

Test Results

Conducted

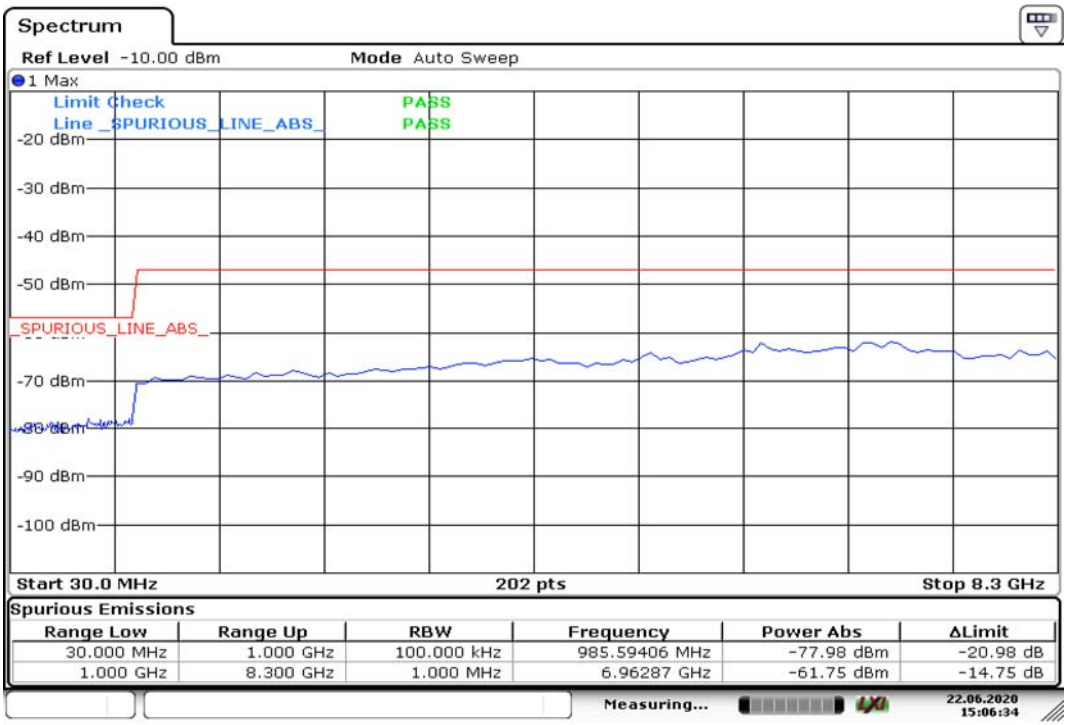
GPS L1



Date: 22.JUN.2020 15:07:29

Conducted spurious emissions 30MHz – 8.3GHz

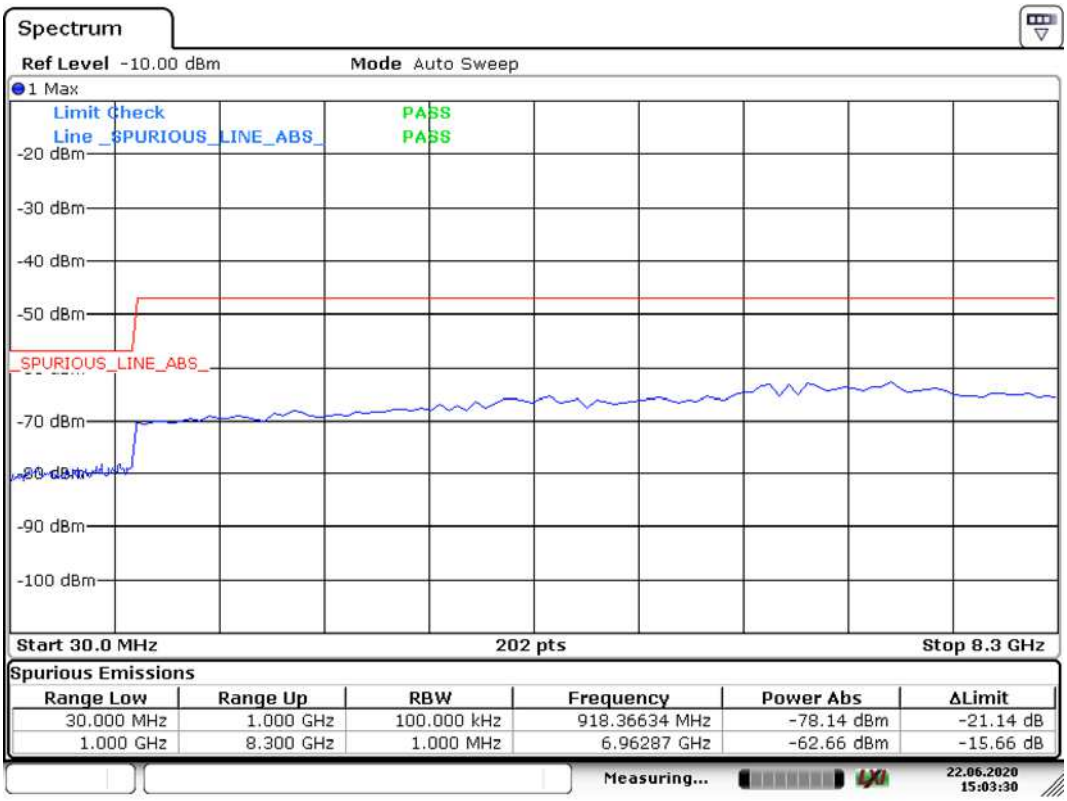
GLONASS G1



Date: 22.JUN.2020 15:06:34

Conducted spurious emissions 30MHz – 8.3GHz

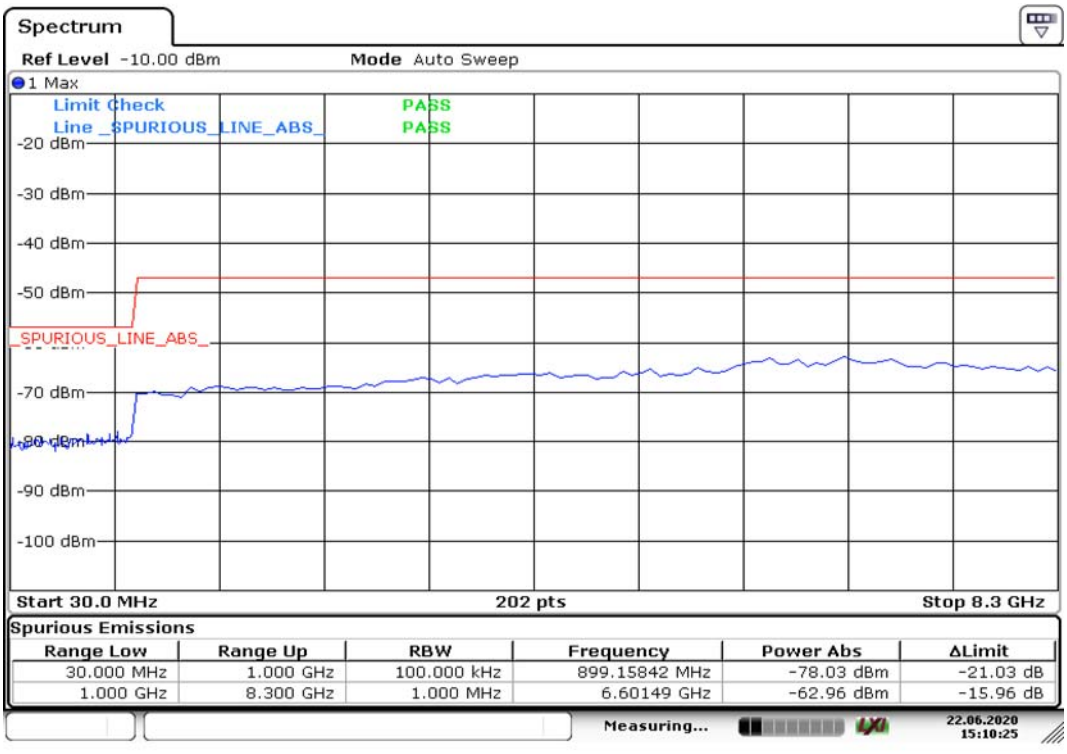
BDS



Date: 22.JUN.2020 15:03:30

Conducted spurious emissions 30MHz – 8.3GHz

Galileo E1



Date: 22.JUN.2020 15:10:26

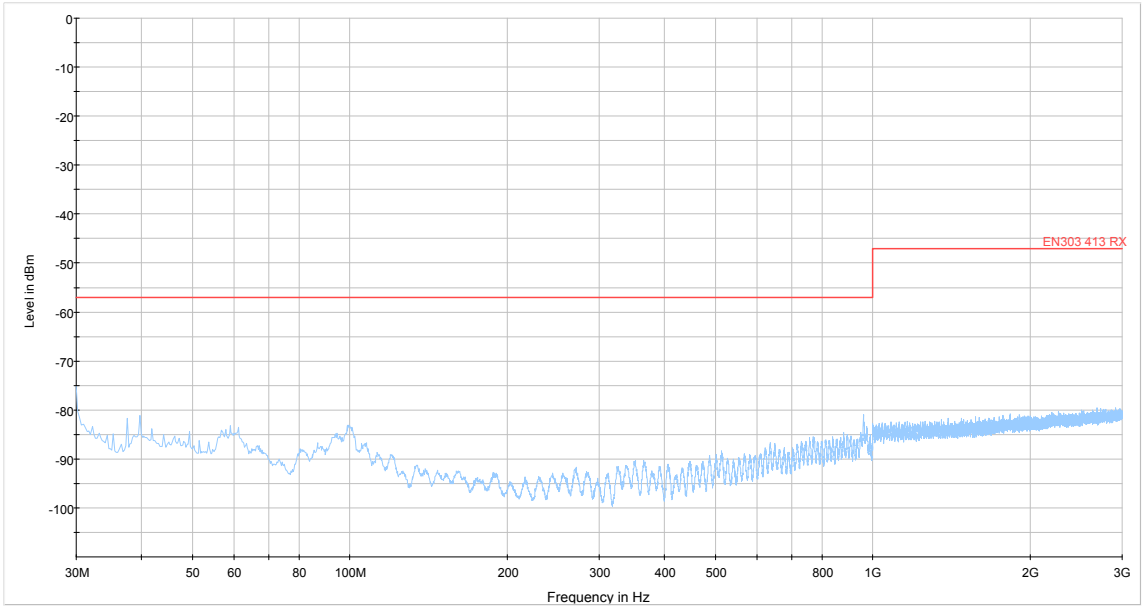
Conducted spurious emissions 30MHz – 8.3GHz

Radiated

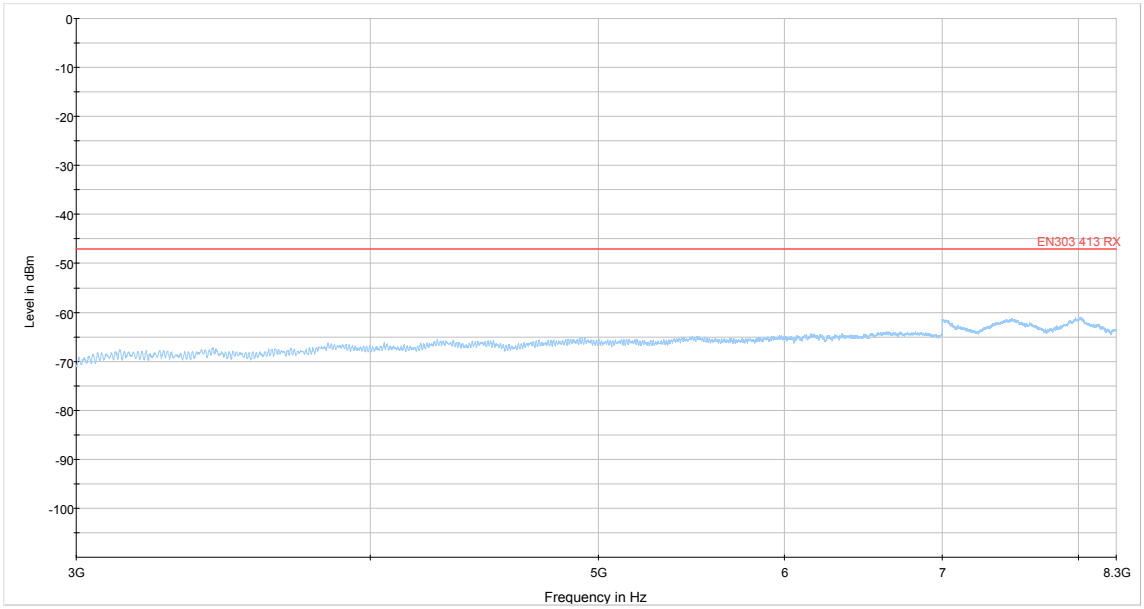
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes.EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (X axis, horizontal polarization) and the worst case was recorded.

During the test, the preliminary test was performed in all modes with all frequency bands, Mode 1 (GPS) are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

GPS L1



Radiated spurious emissions _30MHz – 3GHz



Radiated spurious emissions _3GHz – 8.3GHz

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Vector Signal Generator	R&S	SMBV100A	262573	2020-05-18	2021-05-17
Signal Analyzer	R&S	FSV30	100815	2019-12-15	2020-12-14
Trilog Antenna	Schwarzbeck	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	102723	2018-08-11	2021-08-10
Splitter	UCL Microwave	2 way	UCL-PD0512-2S	/	/
Signal Generator	R&S	SMB100A	102594	2020-05-18	2021-05-17
Signal Generator	R&S	SMBV100A	261305	2020-05-18	2021-05-17
Spectrum Analyzer	R&S	FSV40	101298	2020-05-18	2021-05-17
Software	R&S	EMC32	9.26.0	/	/

********END OF REPORT ********