

TEST REPORT No. AR19-0043840-01

performed in accordance with

FCC Rules: Code of Federal Regulations (CFR) no. 47
Part 15 Subpart C Section 15.247

PRODUCT	Radio module	
MODEL(s) TESTED	OXILR/A	
FCC ID	PMLOXILRA	
TRADE MARK(s)	NICE	

APPLICANT	NICE S.p.A. ~ Via Pezza alta, 13 ~ I-31046 Rustignè di Oderzo (TV)
-----------	--

Tested by	Robertino Torri [Laboratory technician]	
Approved by	Giovanni Di Turi [Laboratory manager]	

Revision Sheet

Release No.	Date	Revision Description	
Rev. 0	2020-06-24	First edition Digital signed - AR19-0043840-01_TR_FCC 15.247_NICE_OXILR-A	



1. GENERAL DATA

SAMPLE			
Samples received on	2020-04	1-08	(Item(s) sampled and sent by applicant)
IMQ reference samples	BEM	99151	
Samples tested No.	1		
Object under analysis recognition	Not car	ried out	
			red, characteristics of products were taken from client ere not verified by the laboratory
Date of acceptance of test item	2020-04	1-08	
TEST LOCATION	'		
Testing dates	2020-04	2020-04-20 ÷ 2020-04-21	
Testing laboratory.	IMQ S.p.A Via Quintiliano, 43 – I-20138 Milano		
Testing site	Via Quintiliano, 43 – I-20138 Milano		
ENVIRONMENTAL CONDITION	ING		
Parameter	Measur	red	
Ambient Temperature	21.0 ÷ 23.0 °C		
Relative Humidity	47 ÷ 55	47 ÷ 55 %	
Atmospheric Pressure	991 ÷ 1001 mbar		

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.

Unless otherwise specified, warnings, installation instruction and/or user manual provided with the sample have been checked in Italian or English version only.

IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.



2. REFERENCE DOCUMENT

DOCUMENT DA		DATE	TITLE
	47 CFR Part 15	2015	Radio Frequency Device
	ANSI C63.4	2014	American National Standard for 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 of Procedures for Compliance Testing of Unlicensed Wireless Devices



3. EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL DATA (according to manufacturer declaration)

MODEL (basic)	Description	
OXILR/A	Radio module	
VARIANTS (derived)	Description	
1	1	

FCC ID	PMLOXILRA

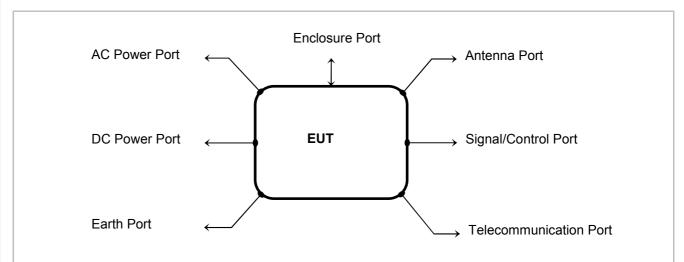
Manufacturer	NICE S.p.A. ~ Via Pezza alta, 13 ~ I-31046 Rustignè di Oderzo (TV)
--------------	--

Type of equipment	DTS - Digital transmission equipment		
Operating frequency	915.77 MHz		
Max RF radiated power	99.58 dBμV/m @3m		
Modulation	CSS		
Channel	1		
Occupied bandwidth	> 500 kHz		
Antenna	Dedicated wire length 170mm		
Remarks	None		



4. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

EUT PORTS



Port	Description	Max length
Enclosure	Plastic	1
AC power	/	I
DC power	5V DC (by external power supply adapter 12/24 V DC – 5V DC)	1
Signal/ Control	/	1
Antenna	170mm wire for terminal block connector	1

STATE OF THE EUT DURING TESTS

Ref.	Transmission Mode	Description	
#1	CW	Continuous unmodulated transmission mode (constant tone)	
#2	Modulated	Continuous modulated transmission (PBRS9 duty cycle close to 100%)	
#3	Normal operating	Receiving mode / Transmission only after BD encoding reception for acknowledge	

SUPPORT EQUIPMENT

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

Equipment	Manufacturer	Model
Universal baseplate for Nice plug-in transceivers (DC power supply adapter)	Nice	OX2UBP (678-A PCB)
DC power supply	HP	6038A
AC/DC adapter	Victory	VI1000-6CR



ELECTROMAGNETICALLY RELEVANT COMPONENTS

Component	No.	Manufa	acturer	Model
PCB board		1	NICE	647-B – R02

RFI SUPPRESSION DEVICES

Component	No.	Manufacturer	Model
1	1	1	1

EMI PROTECTION DEVICES

Component	No.	Manufacturer	Model
1	1	1	1

EUT TECHNICAL DOCUMENTATION

Document	Reference
1	1



5. 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

Radiated emission tests: from 9 kHz to tenth harmonic of fundamental.



6. 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, § 15.247 (b)(4)(i)	Antenna Requirements	PASS
§ 15.207 (a)	Conducted Emission	PASS
§ 15.209 (a) (f)	Radiated Emission	PASS
§ 15.247 (a)	Frequency Hopping Spread Spectrum Specifications	
§ 15.247(a)	20 dB Bandwidth	N.A. ¹
§ 15.247(a)(1)	Carrier frequency (Hopping Channel) Separation	N.A. ¹
§ 15.247(a)(1)(iii)	Number of Hopping Channels Used	N.A. ¹
§ 15.247(a)(1)(iii)	Channel occupancy time	N.A. ¹
§ 15.247(a)(2)	6dB Minimum Bandwidth	PASS
§ 15.247(b)	Maximum Peak Output Power	-
§ 15.247(b) (1)	Peak Output Power	N.A.
§ 15.247(b) (3)	RF power output, radiated (EIRP)	PASS
§ 15.247(b) (4)	Antenna gain	N.A.
§ 15.247(c)	Operation with directional antenna gains greater than 6 dBi	N.A.
§ 15.247 (d)	100 kHz Bandwidth of Frequency Band Edges	PASS
§ 15.247 (d)	Radiated Emission	PASS
§ 15.247 (e)	Power Spectral Density	PASS
§ 15.247 (f)	Hybrid systems	N.A. ¹
§ 15.247 (g)	FHSS Transmission characteristics	N.A. ¹
§ 15.247 (h)	Recognition of occupied channel and multiple transmission	N.A. ¹
§ 15.247(i), § 47CFR 1.1307(b)(1)	RF humane exposure	PASS

Date: 2020-06-24

Note 1 Not applicable for DTS equipment



7. TEST RESULTS

7.1 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.

Testing dates	2020-04-20

Antenna specifications		
N° of authorized antenna types	1	
Antenna type	170mm wire for terminal block connector	
Connector type	1	
Maximum total gain	1	
External power amplifiers	Not present	
Note: equipment for professionals uses		

Date: 2020-06-24

TEST RESULT

The EUT meets the requirements of section 15.203 and 15.204



7.2 POWER LINE CONDUCTED EMISSIONS

TEST REQUIREMENT		
Test setup	ANSI C63.4	
Frequency range	150 kHz ÷ 30 MHz	
IF bandwidth	9 kHz	
EMC class	В	
Limits	sections 15.207 (a)	
EUT operating condition	#2	
Remark	None	
Testing dates	2020-04-21	

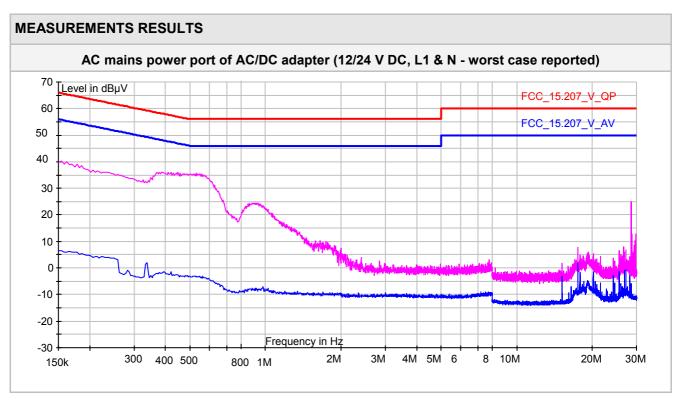
TEST RESULT

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).







7.3 RADIATED DISTURBANCES

TEST REQUIREMENT		
Test setup	ANSI C63.4	
Test method	ANSI C63.10 clauses 6.3, 6.4 and 6.6	
Test facility	Semi-anechoic chamber	
Test distance	3 meters	
Frequency range	9 kHz to tenth harmonic of fundamental	
IF bandwidth (below 30 MHz)	9 kHz	
IF bandwidth (below 1,000 MHz)	120 kHz	
IF bandwidth (above 1,000 MHz)	1 MHz	
EMC class	В	
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) = $40\log (300 \text{meter} / 3 \text{meter}) = +80 \text{db}$; Extrapolation (dB) = $40\log (300 \text{meter} / 3 \text{meter}) = +40 \text{db}$

Testing dates 2020-04-20 ÷ 2020-04-21

LIMITS			
Band of operations	Peak (dBμV/m)	Average Limit (dBμV/m)	
Restricted bands (§ 15.205)	74	54	
Others bands	According to 15.209	According to 15.209	

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 and EUT antenna was positioned to maximise emissions.
- 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).
- 7) The measurements with AVerage detector, above 1000 MHz are performed only for frequencies for which the Peak values are ≥ to AVerage limit.

TEST RESULT

The EUT has been tested in 3 orthogonal axes at the frequencies lowest, middle and highest for each modulation.

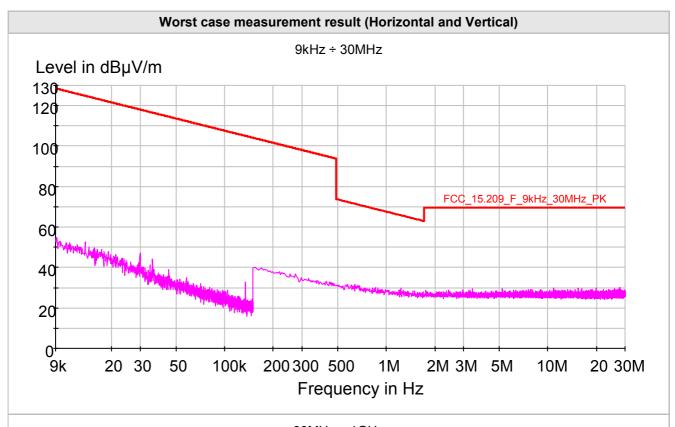
The results reported are worst case.

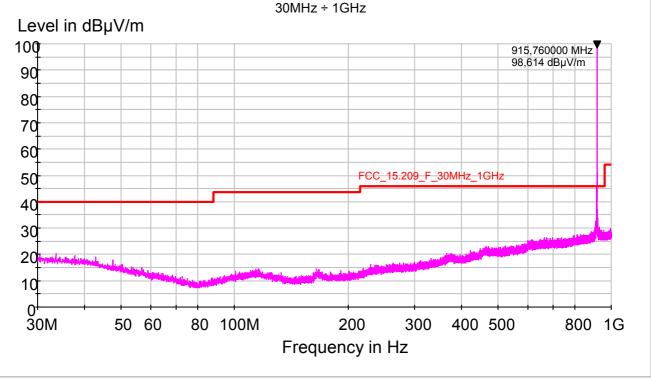
The measurement of spurious emission of EUT in receiver mode is deemed to be fulfilled as no limits are exceeded in transmitter mode (condition considered more burdensome).

Date: 2020-06-24

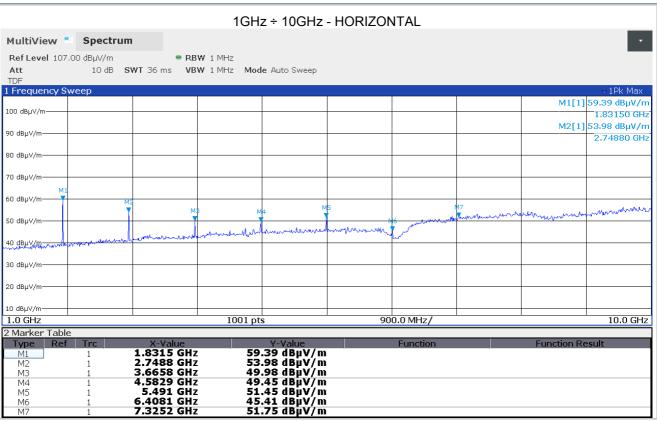
The EUT meets the requirements of sections 15.205 (b), 15.209 and 15.247.

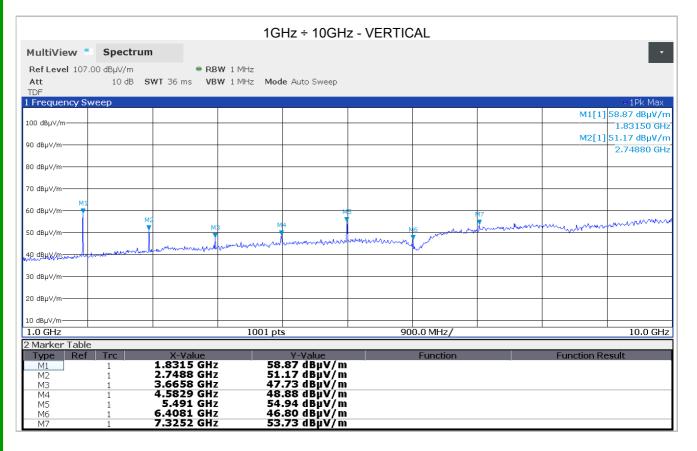














Tabular worst case measurement result >1,000 MHz

Frequency	PK	PK Limit	AV	AV Limit	PK Margin
(GHz)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)
1.8317	59.39	79.58			20.19
2.7488	53.98	74	1	54	20.02
3.6658	49.98	74	1	54	24.02
4.5829	49.45	74	1	54	24.55
5.4910	54.94	79.58			24.64
6.4081	46.80	79.58			32.78
7.3252	53.73	74	1	54	20.19



7.4 6 dB BANDWIDTH

TEST REQUIREMENT					
Spectrum analyzer settings					
Test setup	ANSI C63.4				
Test method	ANSI C63.10 clause 11.8.1				
Span	2 MHz				
Resolution bandwidth (RBW)	100 kHz				
Video bandwidth (VBW)	300 kHz				
Sweep time (SWT)	2,5 ms				
Detector function	Peak				
Trace	max hold				
Attenuator	1				
Deviation to test procedure	None				
EUT operating condition	#2				
Remark	None				
Testing dates	2020-04-20				

TEST RESULT

The EUT meets the requirements of sections 15.247 (a) (2)

TEST PROCEDURE

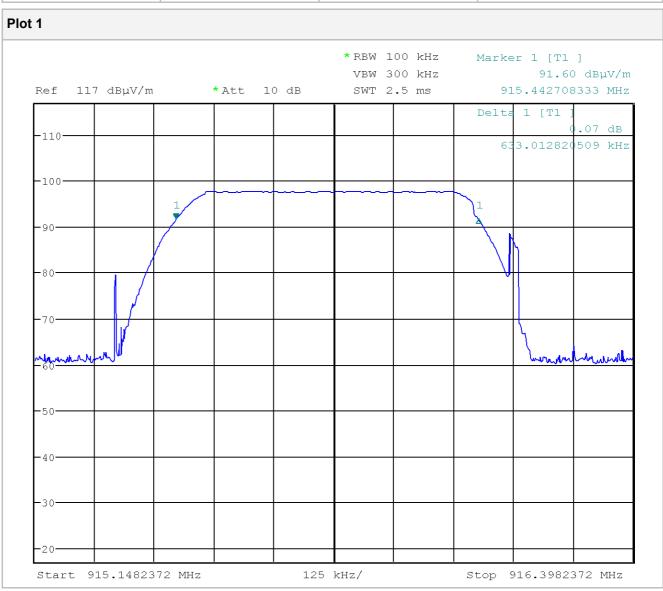
The EUT is set to transmit has its maximum data rate.

The Channel bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.



MEASUREMENTS RESULTS

Channel	Frequency	Channel Bandwidth	Plot
(No.)	(MHz)	(kHz)	(No.)
01	915.77	633.013	1





7.5 MAXIMUM PEAK OUTPUT POWER (DE FACTO EIRP)

TEST REQUIREMENT					
Spectrum analyzer settings					
Test setup	ANSI C63.4				
Test method	ANSI C63.10 clause 11.9.1.1				
Resolution bandwidth (RBW)	10 MHz				
Video bandwidth (VBW)	10 MHz				
Sweep time (SWT)	2,5 ms				
Detector function	Peak				
Trace	max hold				
Test distance	3 meters (for radiated measurement)				
EUT operating condition	#1				
Remark	None				
Testing dates	2020-04-20				

Date: 2020-06-24

TEST RESULT

The EUT meets the requirements of sections 15.247 (b) (3)

LIMITS

1 Watt (30dBm)

TEST PROCEDURE

Radiated measurements:

The effective radiated power is measured in a 3 m anechoic chamber.



RADIATED MEASUREMENTS RESULTS (DE FACTO EIRP)

Frequency (MHz)	Reading Powe (dBµV/m)	ng Power dBm)	Antenna (dB	a gain i)	Conducted power (dBm)		Conducted po (W)
915.77	98.14	2.91	-2.1	5	0.76		0.0012
Ref 107 dBμV/m *Att 10 dB		*RBW 10 MHz Marker 1 [T1] VBW 10 MHz 98.14 dF SWT 2.5 ms 917.210000000			14 dBμV/m		
-100			1				
-90							
-80							
-70 -60	AL PROPERTY OF THE PROPERTY OF					1	~~~~~
-50							
-40							
-30							
-20							

3 MHz/

Date: 2020-06-24

901.55 MHz

Start

Stop 931.55 MHz



7.6 BAND-EDGE COMPLIANCE OF RF RADIATED EMISSIONS

TEST REQUIREMENT					
Spectrum analyzer settings					
Test setup	ANSI C63.4				
Test method	ANSI C63.10 clauses 11.13.3.2 and 11.13.3.5				
Span	Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation				
Resolution bandwidth (RBW)	1 MHz (100 kHz band-edge)				
Video bandwidth (VBW)	1 MHz (100 kHz band-edge)				
Sweep time (SWT)	Auto				
Detector function	Peak				
Trace	Max hold				
Attenuator	1				
Deviation to test procedure	None				
EUT operating condition	#1				
Remark	None				
Testing dates	2020-04-20				

TEST RESULT

The EUT meets the requirements of sections 15.247 (d)

All out of band spurious emissions are more 20 dB below the in band power of the fundamental.

LIMITS

-20 dB below peak output power

TEST PROCEDURE

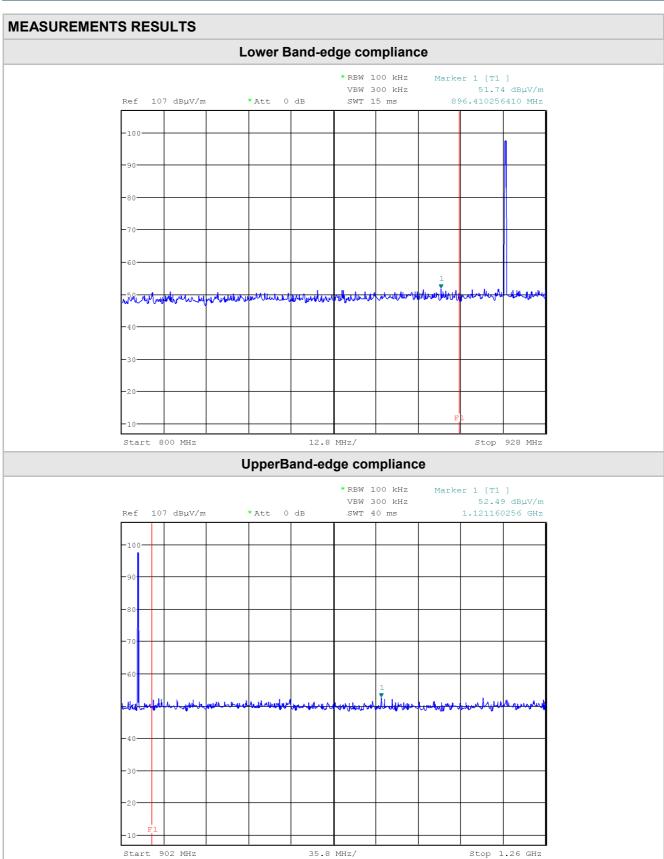
Only for measuring emissions up to 2 MHz removed from the band-edge the "delta" technique for Radiated emissions was used.

Delta technique: The transmitter output was connected to the spectrum analyser through a test fixture (radio frequency coupling device associated with the dedicated antenna of the equipment under test)

Once the trace is stabilized, by the marker the emission at the band edge (or on the highest modulation product outside of the band, if this level is greater than that at the band edge) was set.

The "n" by the marker-delta function and the marker-to-peak function the peak of the in-band emission was selected. The marker-delta value displayed was compared with the limit specified in this Section







7.7 RADIATED EMISSIONS OUTSIDE THE BAND

TEST REQUIREMENT					
Spectrum analyzer settings					
Test setup	ANSI C63.4				
Test method	ANSI C63.10 clauses 11.11 and 11.12				
Resolution bandwidth (RBW)	100 kHz				
Video bandwidth (VBW)	300 kHz				
Sweep time (SWT)	as necessary to capture the entire dwell time				
Detector function	Peak				
Trace	Max hold				
Deviation to test procedure	None				
EUT operating condition	#1				
Remark	None				
Testing dates	2020-04-20 ÷ 2020-04-21				

TEST PROCEDURE

The measure has been executed with the lowest transmit channel, the highest transmit channel and one located somewhere in the middle of the band. The EUT antenna was positioned to maximise emissions.

TEST RESULT

The EUT meets the requirements of sections 15.247 (d)

All out of band spurious emissions are more 20 dB below the in band power of the fundamental. No significant spurious emissions above 18GHz.

LIMITS

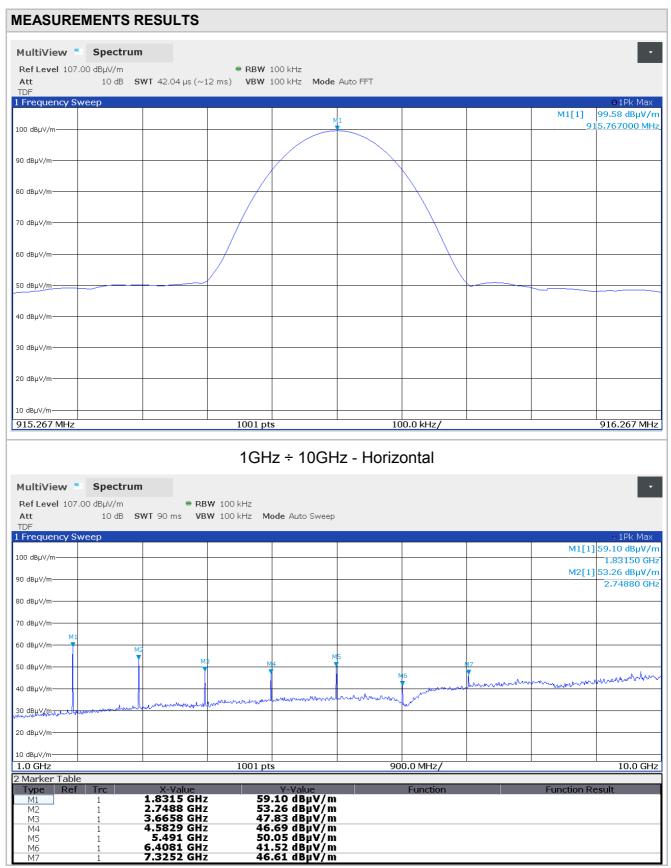
-20 dB below peak output power

TEST PROCEDURE

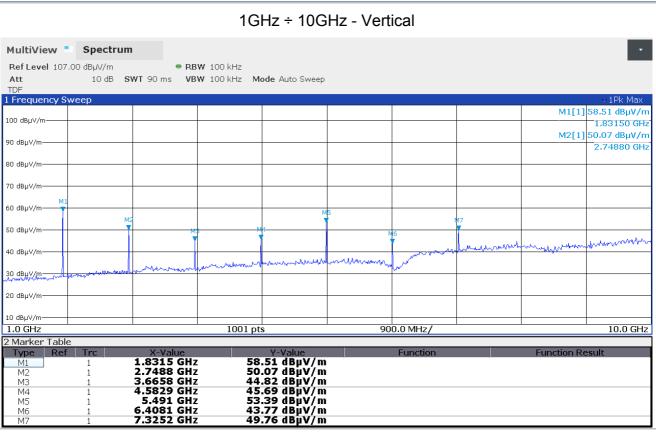
As the conducted measurement cannot performed because the transmitter antenna is integrated has been carried out radiated measurement, according to KDB 558074 measurements guidance for DTS equipment. The field strength levels shall be converted to equivalent conducted power levels for comparison to the applicable output power limit refer to KDB 412172.

The measure has been executed with the lowest transmit channel, the highest transmit channel and one located somewhere in the middle of the band.









Tabular worst case measurement result >1,000 MHz								
Frequency	PK	PK Limit	AV	AV Limit	PK Margin			
(GHz)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)			
0.91577	99.58							
1.8315	59.10	79.58			20.48			
2.7488	53.26	74	1	54	20.74			
3.6658	47.83	74	1	54	26.17			
4.5829	46.69	74	1	54	27.31			
5.4910	53.39	79.58			26.19			
6.4081	43.77	79.58			35.81			
7.3252	49.76	74	1	54	24.24			



7.8 TRANSMITTER POWER SPECTRAL DENSITY

TEST REQUIREMENT					
Spectrum analyzer settings					
Test setup	ANSI C63.4				
Test method	ANSI C63.10 clause 11.10.2				
Span	1.5 MHz				
Resolution bandwidth (RBW)	3 kHz				
Video bandwidth (VBW)	10 kHz				
Sweep time (SWT)	500 s				
Detector function	Peak				
Trace	Max hold				
Attenuator	1				
Deviation to test procedure	None				
EUT operating condition	#2				
Remark	None				
Testing dates	2020-04-20				

TEST RESULT

The EUT meets the requirements of sections 15.247 (e)

LIMITS

8 dBm in 3 kHz bandwidth.

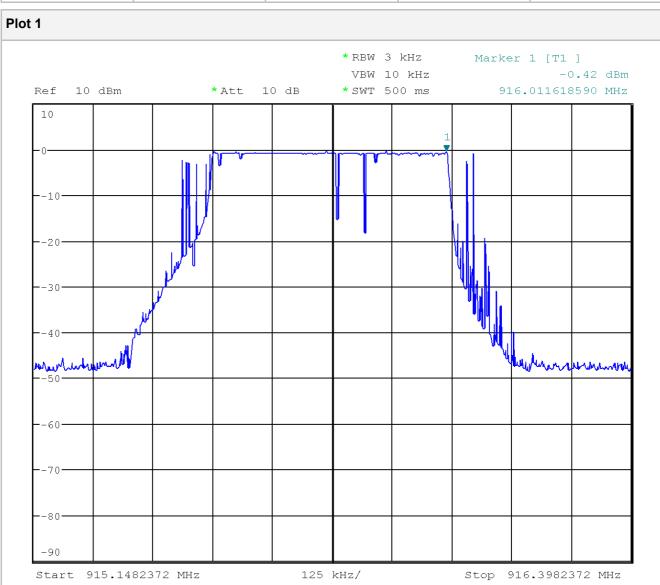
TEST PROCEDURE

After trace stabilisation, the marker shall be set on the signal peak. The indicated level is the power spectral density.



MEASUREMENTS RESULTS

Channel	Frequency	Reading Power	Limit	Plot
(No.)	(MHz)	(dBm)	(dBm)	(No.)
01	915.77	-0.42	8	1





8. MEASUREMENTS AND 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.

Methods/Standard	Parameter	Expanded Uncertainty	Unit	Confidence level
	QP detector 9 – 150 kHz	2.4	dB	95%
	QP detector 150 k – 30 MHz	2.2	dB	95%
Continuous disturbance	QP detector using Voltage Probe	1.5	dB	95%
	QP detector using ISN	2.5	dB	95%
	QP detector using Current Probe	1.8	dB	95%
	QP detector (30 MHz - 100 MHz) H polarization	4.0	dB	95%
	QP detector (30 MHz - 100 MHz) V polarization	3.9	dB	95%
	QP detector (100 MHz - 200 MHz) H polarization	2.9	dB	95%
	QP detector (100 MHz - 200 MHz) V polarization	4.0	dB	95%
Radiated disturbance	QP detector (200 MHz - 1000 MHz) H polarization	3.5	dB	95%
	QP detector (200 MHz - 1000 MHz) V polarization	3.4	dB	95%
	P detector 1-6 GHz	4.3	dB	95%
	P detector 6-18 GHz	4.8	dB	95%
	P detector 18-26 GHz	4.9	dB	95%
	P detector 26-40 GHz	5.2	dB	95%



9. LIST OF MEASURING EQUIPMENT AND CALIBRATION INFORMATION

				Calibration	
Instrument	Manufacturer	Model	IMQ Ref.	Last date	Due date
Shielded anechoic chamber			P02386	1	1
EMI RECEIVER	RHODE & SCHWARZ	ESU8	S05562	2019-07-31	2020-07-31
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSP40	S03629	2019-11-06	2020-11-30
LISN	ROHDE & SCHWARZ	ENV216	S03631	2019-11-11	2020-11-30
LOOP ANTENNA	ROHDE & SCHWARZ	HFH2-Z2E	S08326	2019-12-05	2020-12-31
LOG ANTENNA	ARA	LPB-2513	S02385	2017-06-08	2020-06-30
ANTENNA HORN	SCHWARZBECK	BBHA9120D	S03463	2017-07-21	2020-07-31
PRE-AMPLIFIER	HP	HP 8439 B	S03542	2019-03-27	2020-04-31(*)
SOFTWARE	ROHDE & SCHWARZ	EMC 32 Vers. 8.30	W-00124-K1	1	1

Note

(*) used before due date - Some calibration intervals may be extended, based on sufficient calibration data and experience of use (see IECEE OD-5011:2015 clause 8.3)

END OF TEST REPORT