TEST REPORT

Report Reference No……..:	**TRE1703011902** **R/C…….: 64613**
Applicant's name..... :	**CPS Telecom Limited**
Address.....:	Office B, 15/F, King Palace Plaza, 55 King Yip Street, Kwun Tong, Kowloon, H.K.
Manufacturer.....:	Contrad (Huizhou) Limited
Address.....:	No. 8, He Chang East Five Road, Hui Tai Industrial Park, Zhong Kai New And High Tech Zones, Hui Zhou City, Guang Dong Province
Test item description ..... :	**DMR Walkie Talkie**
Trade Mark .....:	CPS
Model/Type reference.....:	CP300
Listed Model(s) .....:	-
Standard ..... :	**ETSI EN 300 113-1 V1.7.1: 2011-11** **ETSI EN 300 113-2 V1.5.1: 2011-11**
Date of receipt of test sample……..:	Mar. 14, 2017
Date of testing……:	Mar. 15, 2017- Jul. 13, 2017
Date of issue……...:	Jul. 14, 2017
Result.....……...:	**PASS**

Compiled by (position+printed name+signature)..:	File administrators Candy Liu	Candy Liu
Supervised by (position+printed name+signature)..:	Project Engineer Lion Cai	Lion Cai
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd.**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. Test Standards and Test Description

1.1. Test Standards

The tests were performed according to following standards:
ETSI EN 300 113-1 V1.7.1(2011-11) – Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment intended for the transmission of data(and/or specch) using constant or non-constact envelope modulation and having an antenna connector; Part1: Technical characteristics and methods of measurement.
ETSI EN 300 113-2 V1.5.1(2011-11) – Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment intended for the transmission of data(and/or specch) using constant or non-constact envelope modulation and having an antenna connector; Part1: Technical characteristics and methods of measurement; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive.
ETSI TR 100 028 (V1.4.1) (all parts):-"Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
EN 300 793 V1.1.1 (1998-02)- Electromagnetic compatibilityand Radio spectrum Matters (ERM);Land mobile service;Presentation of equipment for type testing

1.2. Report version

Version No.	Date of issue	Description
00	Dec. 20, 2016	Original

1.3. Test Description

Transmitter Requirement			
Test item	Standards requirement (EN 300 113-1)	Result	
		Pass	N/A
Frequency error	Sub-clause 7.1.3		☒
Carrier power (Conducted)	Sub-clause 7.2.3		☒
Maximum effective radiated power	Sub-clause 7.3.3		☒
Adjacent channel power	Sub-clause 7.4.3	☒	
Unwanted emissions in the spurious domain	Sub-clause 7.5.3	☒	
Intermodulation attenuation	Sub-clause 7.6.3		☒
Transmitter attack time	Sub-clause 7.7.3	☒	
Transmitter release time	Sub-clause 7.8.3	☒	
Transient behaviour of the transmitter	Sub-clause 7.9.4	☒	
Receiver Requirement			
Test item	Standards requirement (EN 300 113-1)	Result	
		Pass	N/A
Maximum usable sensitivity	Sub-clause 8.1.3	☒	
Maximum usable sensitivity(field strength)	Sub-clause 8.2.3		☒
Level of the wanted signal for the degradation measurements	Sub-clause 8.3		☒
Error behaviour at high input levels	Sub-clause 7.4.3		☒
Co-channel rejection	Sub-clause 8.5.3	☒	
Adjacent channel selectivity	Sub-clause 8.6.3	☒	
Spurious response rejection	Sub-clause 8.7.7		☒
Intermodulation response rejection	Sub-clause 8.8.3		☒
Blocking or desensitization	Sub-clause 8.9.3		☒
Spurious radiation	Sub-clause 8.10.4		☒

Note:

1. *Equipment may be designed to fulfil the requirements of one or more standards. In the case of combined full bandwidth analogue speech/full bandwidth digital equipment, if the analogue part of the equipment has already been measured according to EN 300 086-1, so the gray test items don't require.*
2. *N/A: Not Applicable.*

2. Summary

2.1. Client Information

Applicant:	CPS Telecom Limited
Address:	Office B, 15/F, King Palace Plaza, 55 King Yip Street, Kwun Tong, Kowloon, H.K.
Manufacturer:	Contrad (Huizhou) Limited
Address:	No. 8, He Chang East Five Road, Hui Tai Industrial Park, Zhong Kai New And High Tech Zones, Hui Zhou City, Guang Dong Province

2.2. Product Description

Name of EUT:	DMR Walkie Talkie	
Trade mark:	CPS	
Model/Type reference:	CP300	
Listed model(s):	-	
Power supply:	DC 3.8V from battery	
Battery information:	Model: TAD-8200 3.8c., 2200mAh/8.36Wh	
Charger information:	Input: 5Vd.c., 2000mA Output: 5Vd.c.,2000mA	
Adapter information:	Model: SA-A564K Input: 220Va.c., 60Hz, 0.3A Max Output: 5Vd.c., 2000mA	
Operation Frequency Range:	From 440MHz to 470MHz	
Alignment range type:	☐ AR0 ☒ AR1 ☐ AR2 ☐ AR3	
Rated Output Power:	☒ High Power: 3W (34.77dBm) ☒ Low Power 1W (30.00dBm)	
Modulation Type:	Digital Voice/Digital Data:	4FSK
Digital Type:	DMR	
Channel Separation:	Digital Voice/Digital Data:	☒ 12.5KHz ☐ 20KHz ☐ 25KHz
Emission Designator:	Digital Voice:	☒12.5kHz Channel Separation: 7K60FXW ☐20kHz Channel Separation: -- ☐25kHz Channel Separation: --
	Digital Data:	☒12.5kHz Channel Separation: 7K60FXD ☐20kHz Channel Separation: -- ☐25kHz Channel Separation: --
Support data rate:	9.6kbps	
Antenna Type:	External	
Maximum Transmitter Power:	Digital	2.98W for Digital 12.5 kHz Channel Separation

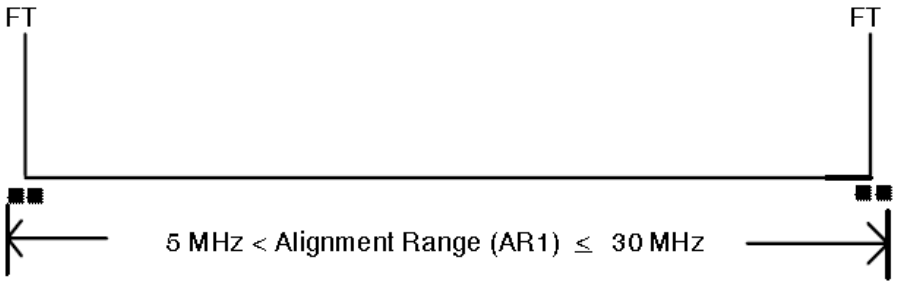
Note:

The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.

2.3. Test frequency list

According to EN300793 Annex A:

Category AR1



Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)		Test Description
			TX	RX	
Digital /4FSK 440-470MHz	12.5kHz	CH_L	440.05	440.05	FT
		CH_H	469.95	469.95	FT

2.4. EUT operation mode

Test mode	Transmitting	Receiving	Power level		Digital/4FSK
			High	Low	12.5KHz
TX1	√		√		√
TX2	√			√	√
RX1		√			√

√ : is operation mode.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	/
		Model No. :	/

3. Test Environment

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., LTD.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225
Shenzhen Huatongwei International Inspection Co., LTD. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories
(identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 3902.01
Shenzhen Huatongwei International Inspection Co., LTD. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

FCC-Registration No.: 317478
Shenzhen Huatongwei International Inspection Co., LTD. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B
The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., LTD. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., LTD. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA
Shenzhen Huatongwei International Inspection Co., LTD. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

3.3. Environmental conditions

Normal Conditon	Temperature	15 °C to +55 °C	
	Relative humidity	20 % to 75 %.	
	Voltage	☐Mains voltage	Nominal mains voltage
		☐Lead-acid battery	1.1 * the nominal voltage of the battery
		☒Other	the normal test voltage shall be that declared by the equipment provider
Extreme Conditon	Temperature	☒ -20 °C to +55 °C for All mobile and handportable equipment, Base stations for outdoor/uncontrolled climate conditions.	
		☐ -10 °C to +55 °C for Base stations for indoor/controlled climate conditions	
	Voltage	☐Mains voltage	±10 %* the nominal mains voltage
		☐Lead-acid battery	1,3 and 0,9 multiplied by the nominal voltage of the battery
		☒Leclanché or the lithium battery	Lower extreme voltage: 0.85*the nominal voltage upper extreme voltage: declared by the equipment provider
		☐Nickel-cadmium battery	Lower extreme voltage: 0.9*the nominal voltage upper extreme voltage: declared by the equipment provider
		☒Other	the normal test voltage shall be that declared by the equipment provider

Normal Conditon	Vn=nominal Voltage	DC 3.80
	Tn=normal Temperature	25 °C
Extreme Conditon	V_L=lower Voltage	DC 3.23
	T_L=lower Temperature	-20 °C
	V_H=higher Voltage	DC 3.80
	T_H=higher Temperature	55 °C

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., LTD. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Adjacent and alternate channel power Conducted	1.20 dB	(1)
Conducted spurious emission 9kHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9kHz-12.75 GHz	2.20 dB	(1)
Maximum useable receiver sensitivity	2.80 dB	(1)
Adjacent channel selectivity	2.80 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.5. Equipments Used during the Test

Adjacent Channel Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Receiver	Rohde&Schwarz	ESI26	100009	11/13/2016
2	Digital Radio Test Set	AEROFLEX	3920	299001967	11/13/2016

Maximum Usable Sensitivity					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Climate Chamber	ESPEC	EL-10KA	05107008	11/13/2016
2	Vertor Signal Genertor	Rohde&Schwarz	SMU200A	1141.2205.02	11/13/2016
3	Digital Radio Test Set	AEROFLEX	3920	299001967	11/13/2016

Adjacent Channel Selectivity					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Vertor Signal Genertor	Rohde&Schwarz	SMU200A	1141.2205.02	11/13/2016
2	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016
3	Signal Generator	Rohde&Schwarz	SMT03	100059	11/13/2016
4	Climate Chamber	ESPEC	EL-10KA	05107008	11/13/2016
5	Digital Radio Test Set	AEROFLEX	3920	299001967	11/13/2016

Transient Frequency Behaviour of Transmitter					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Storage Oscilloscope	Yokogawa	DL9140	DU103448	11/13/2016
2	Signal Analyzer	Aglient	N9030A	MY49430428	11/13/2016
3	Spectrum analyzer	Aglient	N9010A	MY58690031	11/13/2016

The Cal. Interval was one year.

4. Test Conditions and Results

4.1. ETSI EN 300 113-1 Transmitter Requirements

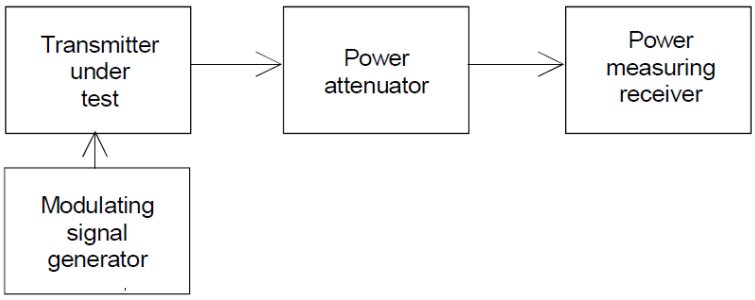
4.1.1. Adjacent Channel Power

The adjacent channel power is that part of the total power output of a transmitter under defined conditions of modulation, which falls within a specified pass-band centred on the nominal frequency of either of the adjacent channels. This power is the sum of the mean power produced by the modulation, hum and noise of the transmitter.

LIMIT

ETSI EN 300 113-1 Sub-clause 7.5.3
For a channel separation of 12.5 kHz, 20 kHz and 25 kHz,the adjacent channel power shall not exceed a value of 60.0 dB below the transmitter power(conducted) without the need to be below 0.2uW(-37dBm).

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ normal condition ☐ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 7.4.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Operation Mode	Bit Rate	Test Channel	Test Channel	Measurement Power (dBc)	Limit (dB)	Result
TX1	9600bps	CH_L	Lower adjacent	-66.23	⩽-60	Pass
			Upper adjacent	-66.15		
		CH_M	Lower adjacent	-66.02		
			Upper adjacent	-65.98		
		CH_H	Lower adjacent	-65.89		
			Upper adjacent	-66.12		
TX2	9600bps	CH_L	Lower adjacent	-65.48	⩽-60	Pass
			Upper adjacent	-65.40		
		CH_M	Lower adjacent	-65.27		
			Upper adjacent	-65.23		
		CH_H	Lower adjacent	-65.14		
			Upper adjacent	-65.37		

4.1.2. Unwanted emissions in the spurious domain-Conducted

Spurious emissions are emissions at frequencies other than those of the carrier and sidebands associated with normal modulation.

LIMIT

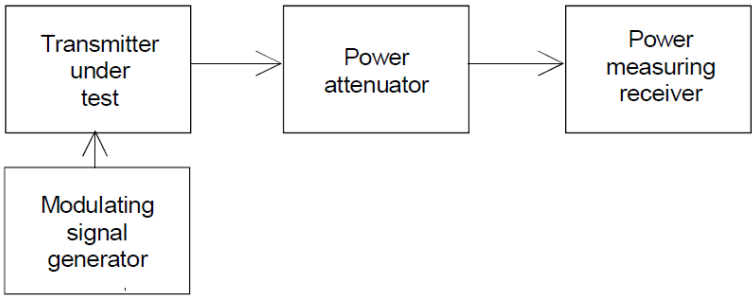
ETSI EN 300 113-1 Sub-clause 7.5.4

The power of any spurious emission shall not exceed the values given in Table 4

Table 4: Conducted emissions

Frequency range	Tx operating	Tx standby
9 kHz to 1 GHz	0,25 µW (-36 dBm)	2,0 nW (-57 dBm)
above 1 GHz to 4 GHz or above 1 GHz to 12,75 GHz	1,00 µW (-30 dBm)	20 nW (-47 dBm)

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ normal condition ☐ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 7.5.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Note：

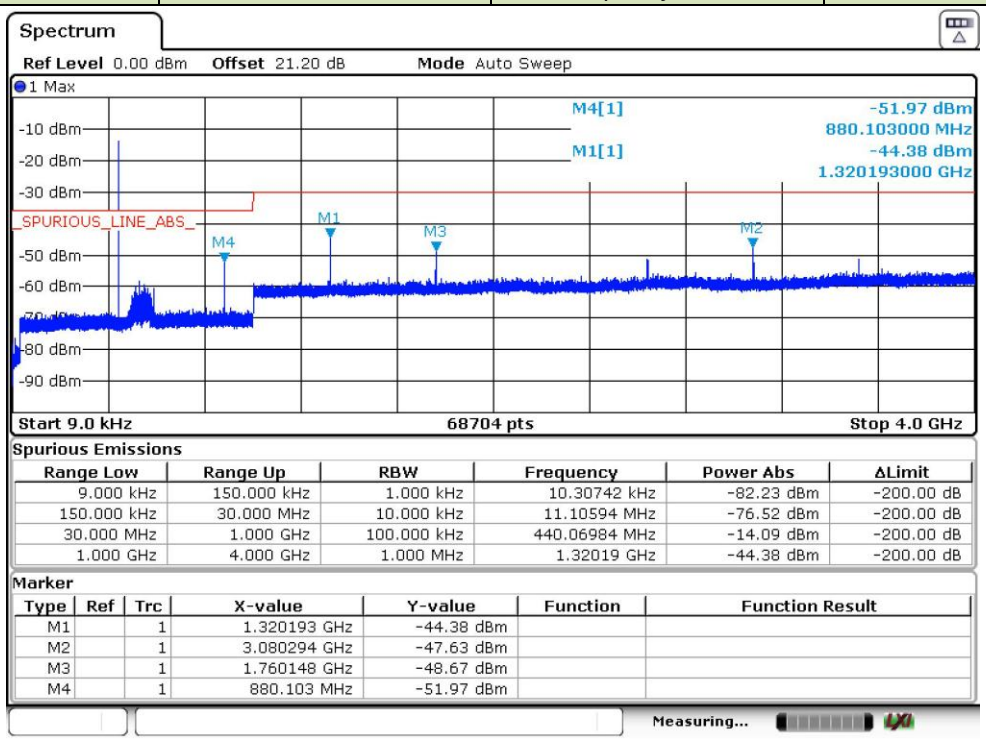
1) We tested TX1 to TX2, recorded worst case for TX1.

Close to the wanted emission:

Operation Mode	Test Channel	Freqency offset from carrier	RBW (kHz)	Max. Emission Observed		Limit	Result
				Frequency (MHz)	Datum (dBm)	(dBm)	
TX1	CH_L	-500kHz to -100kHz	10	439.66	-40.29	-36	Pass
		-100kHz to -250% of the CSP	1	439.97	-46.85		
		250% of the CSP to 100kHz	1	440.10	-47.76		
		100kHz to 500kHz	10	440.26	-43.81		
	CH_H	-500kHz to -100kHz	10	469.56	-40.83	-36	Pass
		-100kHz to -250% of the CSP	1	469.87	-46.95		
		250% of the CSP to 100kHz	1	470.00	-47.38		
		100kHz to 500kHz	10	470.16	-42.42		

Measurement of spurious emission:

Test mode:	TX1	Test Frequency:	CH_L



Spurious Emissions

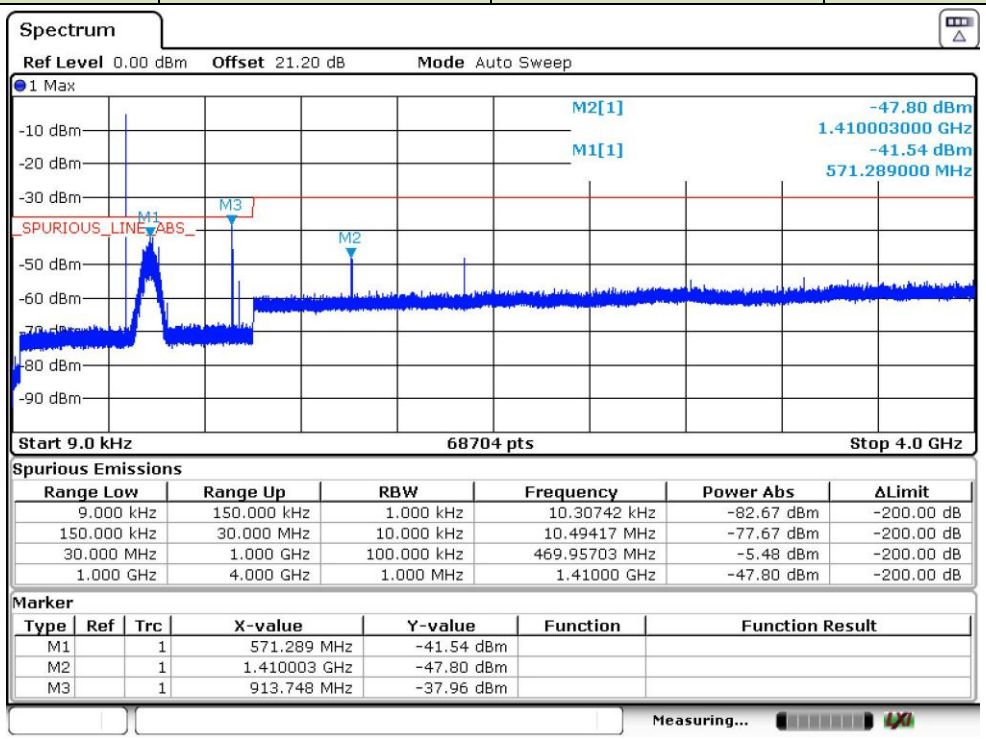
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	10.30742 kHz	-82.23 dBm	-200.00 dB
150.000 kHz	30.000 MHz	10.000 kHz	11.10594 MHz	-76.52 dBm	-200.00 dB
30.000 MHz	1.000 GHz	100.000 kHz	440.06984 MHz	-14.09 dBm	-200.00 dB
1.000 GHz	4.000 GHz	1.000 MHz	1.32019 GHz	-44.38 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.320193 GHz	-44.38 dBm		
M2		1	3.080294 GHz	-47.63 dBm		
M3		1	1.760148 GHz	-48.67 dBm		
M4		1	880.103 MHz	-51.97 dBm		

9kHz-4GHz

Test mode:	TX1	Test Frequency:	CH_H



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	10.30742 kHz	-82.67 dBm	-200.00 dB
150.000 kHz	30.000 MHz	10.000 kHz	10.49417 MHz	-77.67 dBm	-200.00 dB
30.000 MHz	1.000 GHz	100.000 kHz	469.95703 MHz	-5.48 dBm	-200.00 dB
1.000 GHz	4.000 GHz	1.000 MHz	1.41000 GHz	-47.80 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	571.289 MHz	-41.54 dBm		
M2		1	1.410003 GHz	-47.80 dBm		
M3		1	913.748 MHz	-37.96 dBm		

9kHz-4GHz

4.1.3. Unwanted emissions in the spurious domain-Radiated

Spurious emissions are emissions at frequencies other than those of the carrier and sidebands associated with normal modulation.

LIMIT

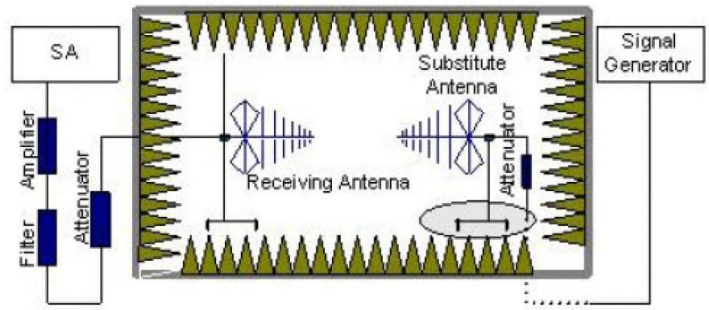
ETSI EN 300 113-1 Sub-clause 7.5.4

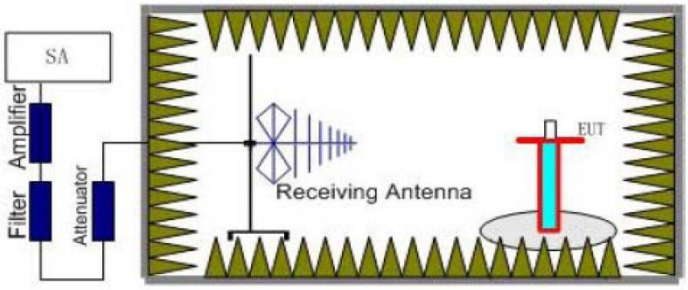
The power of any spurious emission shall not exceed the values given in Table 5

Table 5: Radiated emissions

Frequency range	Tx operating	Tx standby
30 MHz to 1 GHz	0,25 µW (-36 dBm)	2,0 nW (-57 dBm)
above 1 GHz to 4 GHz or above 1 GHz to 12,75 GHz	1,00 µW (-30 dBm)	20 nW (-47 dBm)

TEST CONFIGURATION





TEST PROCEDURE

1. The test conditions.

☒ normal condition ☐ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 7.5.3 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

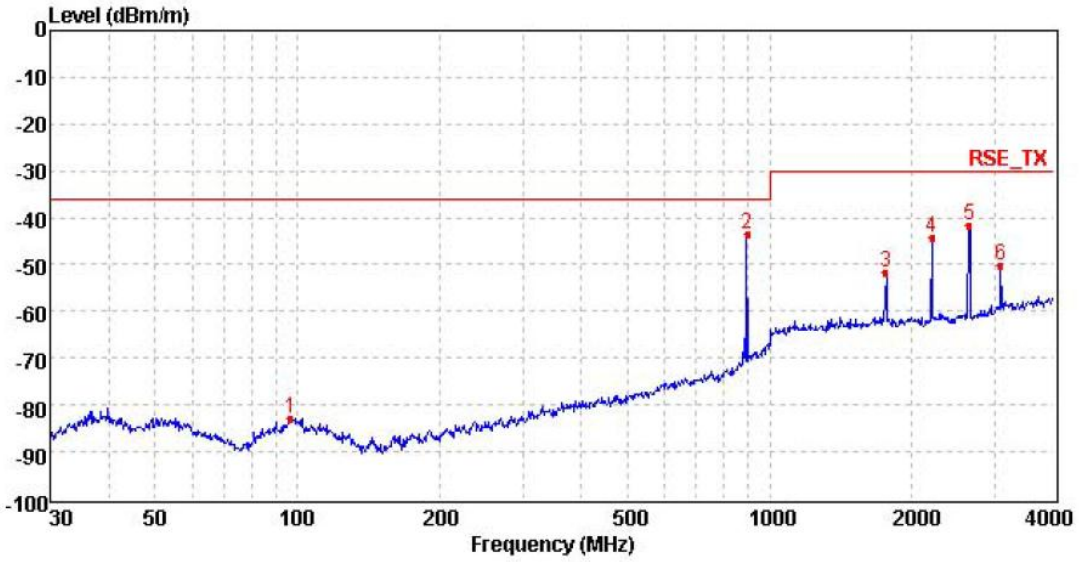
☒ **Passed** ☐ **Not Applicable**

Note：

1) We tested TX1 to TX2, recorded worst case for TX1.

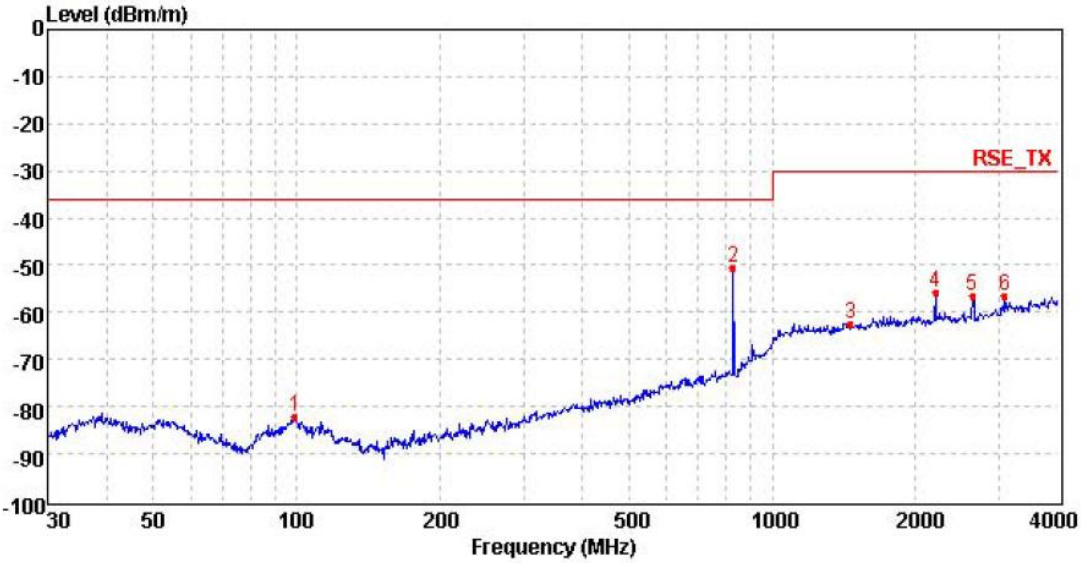
Test mode:	TX1	Test Frequency:	CH_L

Horizontal



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	96.76	-80.65	25.69	1.13	29.08	-82.91	-36.00	-46.91	Peak
2	896.18	-54.72	35.21	3.74	27.71	-43.48	-36.00	-7.48	Peak
3	1760.52	-60.94	40.61	5.88	37.06	-51.51	-30.00	-21.51	Peak
4	2200.76	-55.02	41.63	6.44	37.34	-44.29	-30.00	-14.29	Peak
5	2642.68	-53.17	42.63	7.01	37.95	-41.48	-30.00	-11.48	Peak
6	3082.28	-62.82	43.37	7.58	38.22	-50.09	-30.00	-20.09	Peak

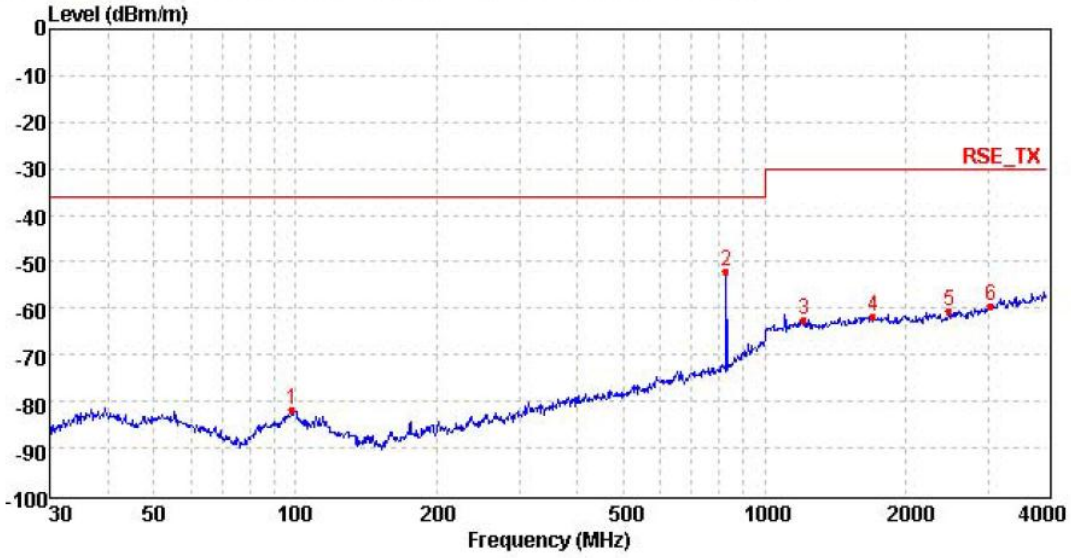
Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	99.52	-80.22	26.00	1.14	29.10	-82.18	-36.00	-46.18	Peak
2	826.55	-59.01	33.84	3.55	29.02	-50.64	-36.00	-14.64	Peak
3	1462.06	-70.96	39.93	5.18	36.54	-62.39	-30.00	-32.39	Peak
4	2200.76	-66.41	41.63	6.44	37.34	-55.68	-30.00	-25.68	Peak
5	2639.02	-68.20	42.63	7.00	37.94	-56.51	-30.00	-26.51	Peak
6	3082.28	-69.20	43.37	7.58	38.22	-56.47	-30.00	-26.47	Peak

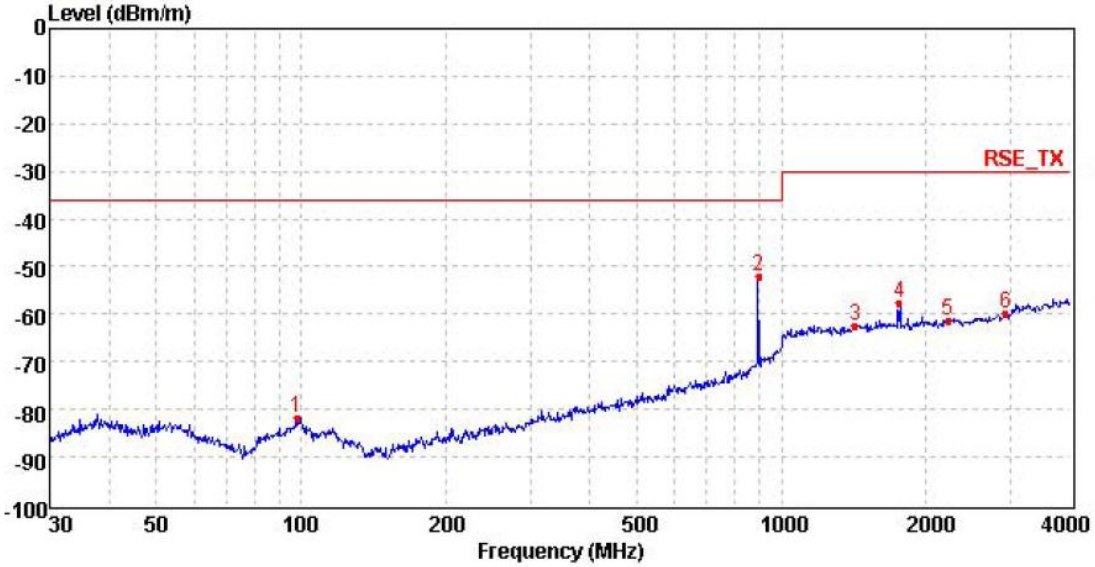
Test mode:	TX1	Test Frequency:	CH_H

Horizontal



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	98.47	-79.66	25.84	1.14	29.09	-81.77	-36.00	-45.77	Peak
2	826.55	-60.55	33.84	3.55	29.02	-52.18	-36.00	-16.18	Peak
3	1214.20	-69.78	39.15	4.68	36.56	-62.51	-30.00	-32.51	Peak
4	1705.27	-70.93	40.50	5.78	36.94	-61.59	-30.00	-31.59	Peak
5	2475.98	-71.66	42.29	6.82	37.88	-60.43	-30.00	-30.43	Peak
6	3027.23	-72.08	43.31	7.51	38.23	-59.49	-30.00	-29.49	Peak

Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	98.13	-79.51	25.84	1.14	29.09	-81.62	-36.00	-45.62	Peak
2	896.18	-63.26	35.21	3.74	27.71	-52.02	-36.00	-16.02	Peak
3	1424.05	-70.70	39.82	5.07	36.49	-62.30	-30.00	-32.30	Peak
4	1762.96	-66.99	40.61	5.89	37.06	-57.55	-30.00	-27.55	Peak
5	2225.30	-71.93	41.67	6.48	37.41	-61.19	-30.00	-31.19	Peak
6	2924.12	-72.13	43.16	7.44	38.28	-59.81	-30.00	-29.81	Peak

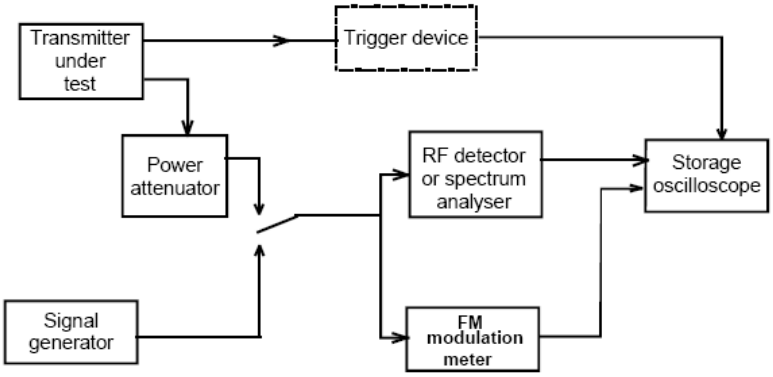
4.1.4. Transmitter attack time

LIMIT

ETSI EN 300 113-1 Sub-clause 7.7.3

The Transmitter attack time as defined in ETSI EN 300 113-1 Sub-clause 7.7.1,the transmitter attack time shall not exceed 25ms($t_{am} \leqslant t_{al}$),also a limit at +4dB above the steady state power shall not be exceeded during the transmitter attack time.

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

☒ normal condition ☐ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 7.7.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

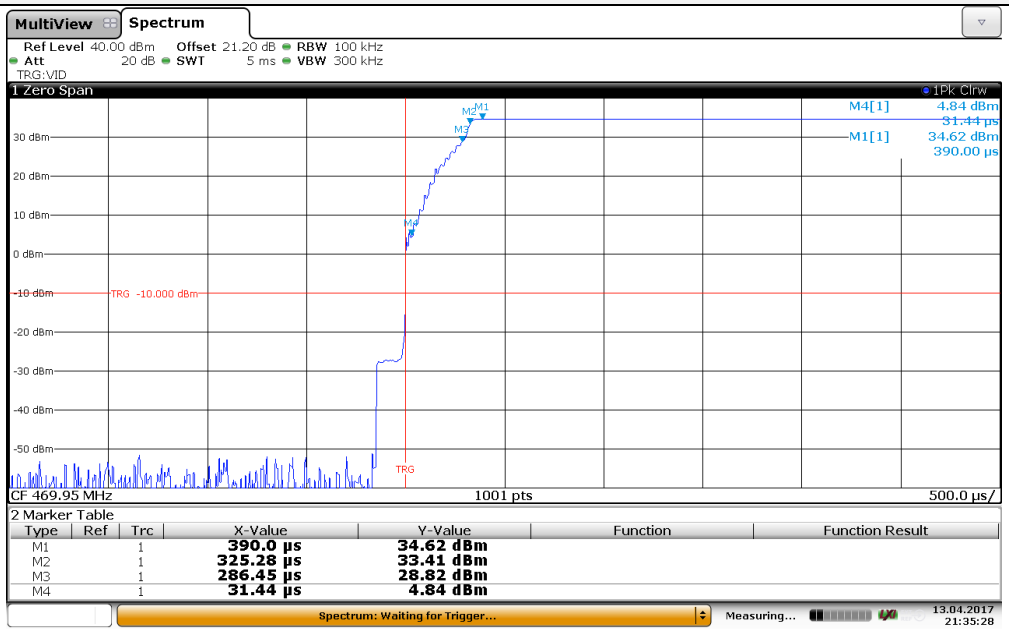
We tested all channels at both TX1 and TX2, recorded worst case for TX1 (Test Channel: CH_H) test condition.

Operation Mode	Test Channel	Test Item	Measurement	Limit	Result
TX1	CH_H	$t_{(Pc-6dB)}$	0.286	-	-
		$t_{(Pc-30dB)}$	0.031		
		$t_{(Pc-1dB)}$	0.325		
		t_{am}	0.325	≤25ms	Pass
		t_p	0.255	≥0.1ms	
		d_{f0}	0.232	≤1kHz	
		d_{fe}	0.498	≤6.25kHz	

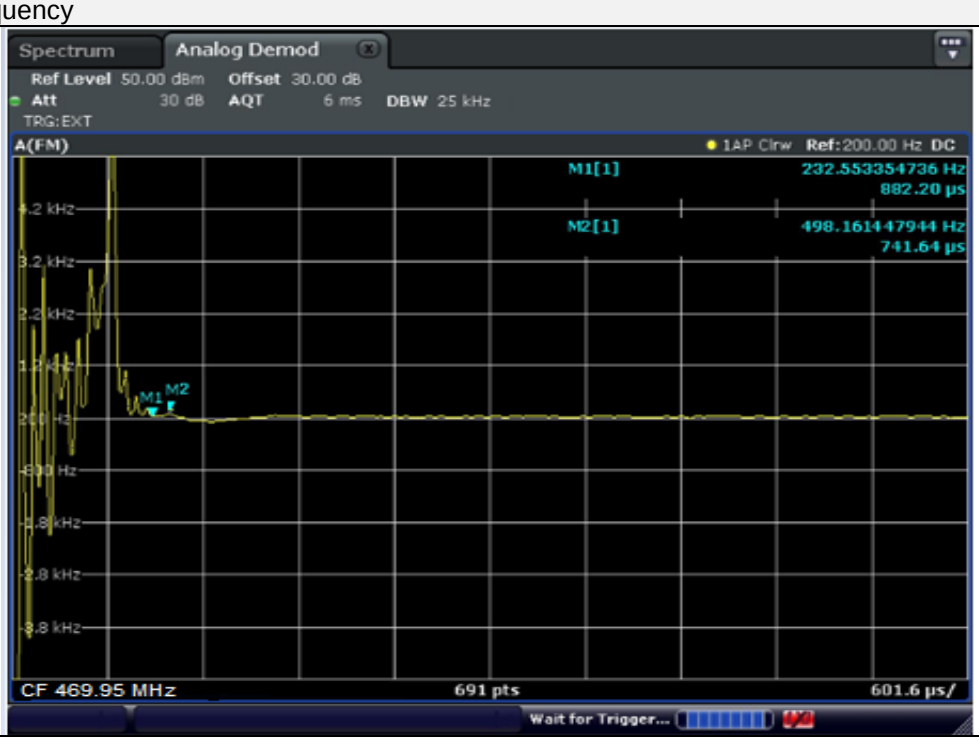
Noted: $t_{am} = t_{Pc-1dB}$, $t_p = t_{\triangle(Pc-30dB)} - t_{\triangle(Pc-6dB)}$

Refer to test plot as following:

Time VS Power



Time VS Frequency



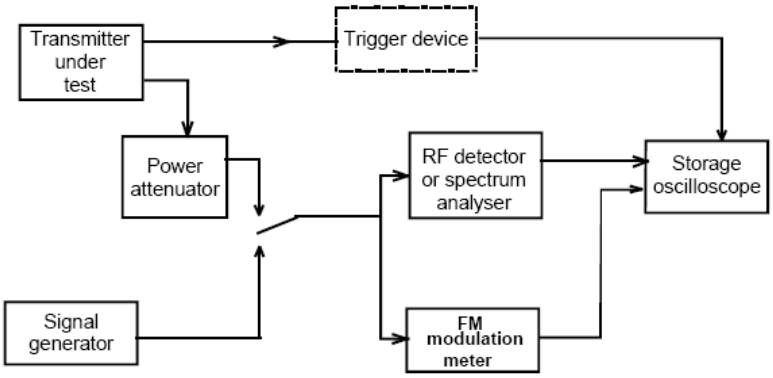
4.1.5. Transmitter Release Time

LIMIT

ETSI EN 300 113-1 Sub-clause 7.8.3

The Transmitter release time as defined in ETSI EN 300 113-1 Sub-clause 7.8.1,the transmitter release time shall not exceed 20ms($t_{rm} \leqslant t_{r1}$).

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.
   ☒ normal condition ☐ Extreme conditions
2. Please refer to ETSI EN 300 113-1 Sub-clause 7.8.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

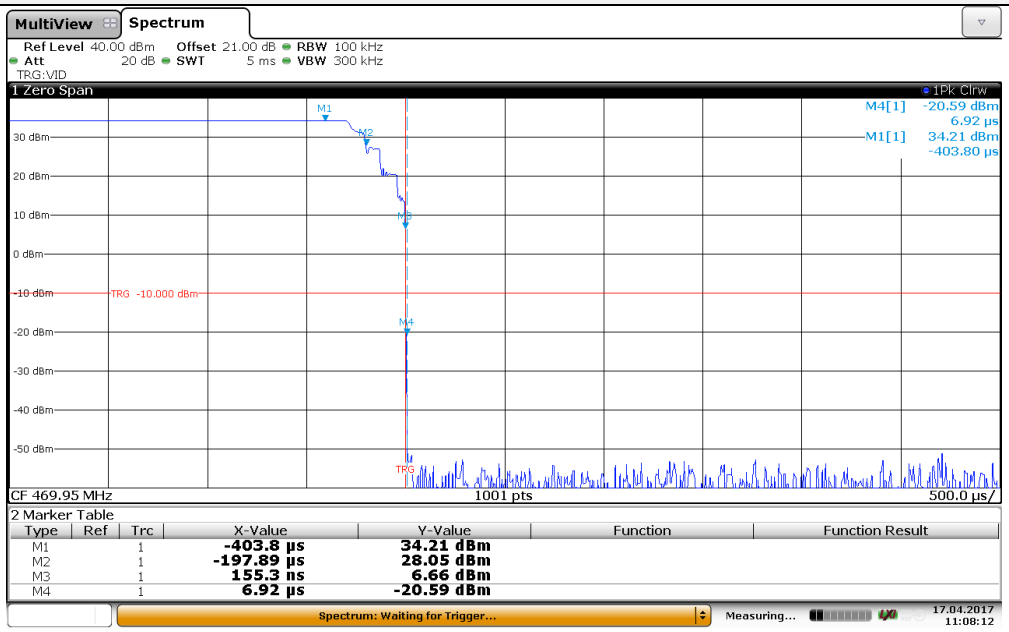
We tested all channels at both TX1 and TX2, recorded worst case for TX1 (Test Channel: CH_H) test condition.

Operation Mode	Test Channel	Test Item	Measurement	Limit	Result
TX1	CH_H	$t_{(Pc-6dB)}$	0.403	-	-
		$t_{(Pc-30dB)}$	0.198		
		$t_{(Pc-50dB)}$	0.155		
		t_{rm}	0.155	≤20ms	Pass
		t_d	0.205	≥0.1ms	
		d_{f0}	0.271	≤1kHz	
		d_{fe}	0.076	≤6.25kHz	

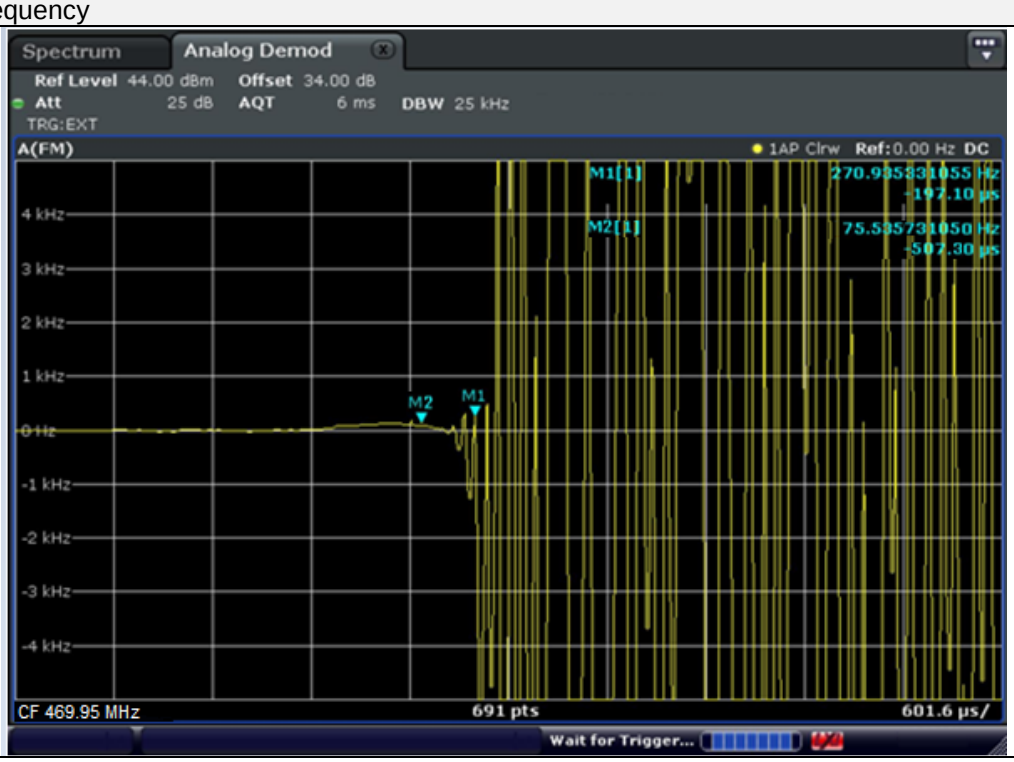
Noted: $t_{rm} = t_{Pc-50dB}$, $t_{d=} t_{\triangle(Pc-30dB)} - t_{\triangle(Pc-6dB)}$

Refer to test plot as following:

Time VS Power



Time VS Frequency



4.1.6. Adjacent channel transient power measurements

Transient power is the power falling into adjacent (or other) spectrum due to the switching on or off of a transmitter.

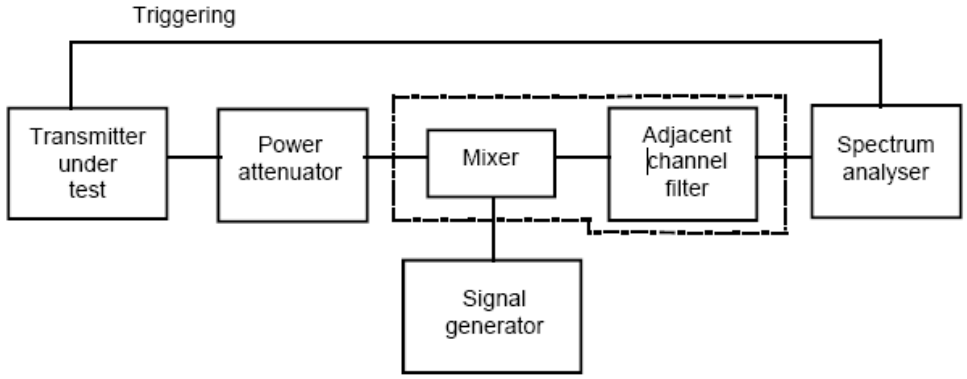
LIMIT

ETSI EN 300 113-1 Sub-clause 7.9.4.2

The Adjacent channel transient power measurements as defined in ETSI EN 300 113-1 Sub-clause 7.9.3.3,the ajiacent power shall not exceed a value of:

- 60.0 dB below the transmitter power (conducted) of the transmitter in decibels relative to the carrier power(dBc) without the need to be below 2 uW(-27.0 dBm),for channel separations of 20 KHz and 25 KHz;
- 50.0 dB below the transmitter power (conducted) of the transmitter (in dBc) without the need to be below 2 uW(-27.0 dBm), for a channel separations of 12.5 KHz.

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

   ☒ normal condition ☐ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 7.9.3.2 for the measurement method.

TEST RESULTS

Mode: TX-on → TX-off

Operation Mode	Test Channel	Test Channel	Measurement Power (dBc)	Limit (dB)	Result
TX1	CH_L	Lower adjacent	-58.50	⩽-50	Pass
		Upper adjacent	-59.75		
	CH_M	Lower adjacent	-58.57		
		Upper adjacent	-59.47		
	CH_H	Lower adjacent	-58.58		
		Upper adjacent	-59.36		
TX2	CH_L	Lower adjacent	-58.75	⩽-50	Pass
		Upper adjacent	-59.64		
	CH_M	Lower adjacent	-58.25		
		Upper adjacent	-59.77		
	CH_H	Lower adjacent	-58.64		
		Upper adjacent	-59.59		

Mode: TX-off → TX-on

Operation Mode	Test Channel	Test Channel	Measurement Power (dBc)	Limit (dB)	Result
TX1	CH_L	Lower adjacent	-58.25	⩽-50	Pass
		Upper adjacent	-58.77		
	CH_M	Lower adjacent	-58.88		
		Upper adjacent	-59.64		
	CH_H	Lower adjacent	-58.65		
		Upper adjacent	-57.75		
TX2	CH_L	Lower adjacent	-58.36	⩽-50	Pass
		Upper adjacent	-59.47		
	CH_M	Lower adjacent	-58.58		
		Upper adjacent	-59.36		
	CH_H	Lower adjacent	-58.65		
		Upper adjacent	-59.88		

4.2. ETSI EN 300 113-1 Receiver Requirements

4.2.1. Maximum Usable Sensitivity (Conducted)

The maximum usable sensitivity (data or messages, conducted) is the minimum level of signal (emf) at the receiver input, produced by a carrier at the nominal frequency of the receiver, modulated with the normal test signal which will, without interference, produce after demodulation a data signal with a specified bit error ratio or a specified successful message ratio. The specified bit error ratio is 10^{-2}. The specified successful message ratio is 80 %.

LIMIT

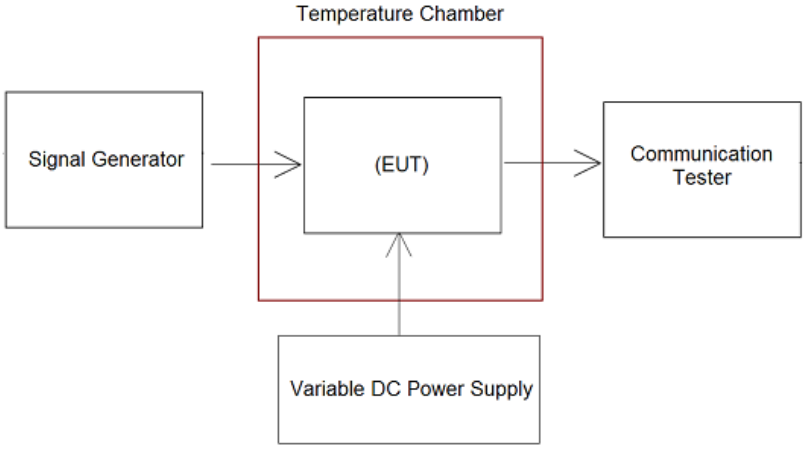
ETSI EN 300 113-1 Sub-clause 8.1.3

The maximum usable sensitivity shall not exceed the values given in table 9 under normal test conditions, and the values in table 9 plus 6 dB under extreme test conditions.

Table 9: Sensitivity levels (mean power) for different channel bandwidths and gross (on-air) bit rates

Channel BW	Data Rate	Sensitivity
12,5 kHz	9,6 kbit/s or less	-110 dBm
	more than 9,6 kbits to 16 kbit/s	-105 dBm
	more than 16 kbits to 38,4 kbit/s	-98 dBm
	greater than 38,4 kbit/s	-93 dBm
20 kHz and 25 kHz	9,6 kbit/s or less	-110 dBm
	more than 9,6 kbit/s to 38,4 kbit/s	-105 dBm
	more than 38,4 kbits to 76,8 kbit/s	-98 dBm
	greater than 76,8 kbit/s	-93 dBm

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

   ☒ normal condition ☒ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 8.1.2.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Operation Mode	Bit Rate (bps)	Temperature (℃)	Voltage (V)	Test Channel	Measured (dBm)	Limit (dBm)	Result
RX1	9600	Tn	Vn	CH_L	-114.0	⩽-110	Pass
				CH_H	-113.0		
		T_L	V_H	CH_L	-113.5	⩽-104	Pass
				CH_H	-112.0		
			V_L	CH_L	-113.2		
				CH_H	-112.2		
		T_H	V_H	CH_L	-113.1	⩽-104	Pass
				CH_H	-112.1		
			V_L	CH_L	-112.4		
				CH_H	-112.0		

4.2.2. Error behaviour at high input levels

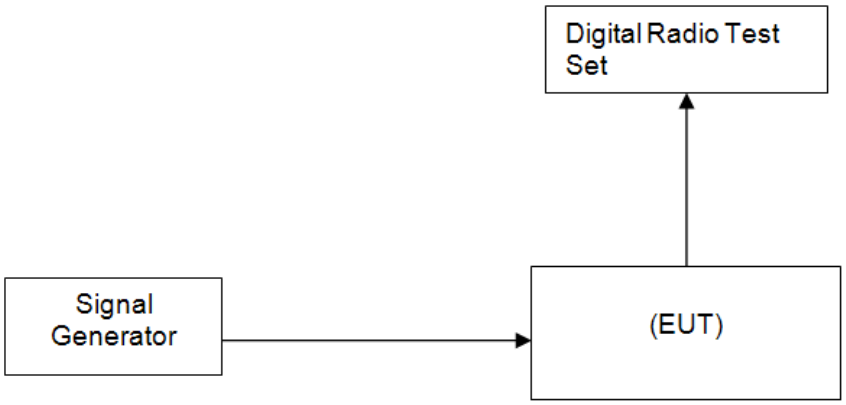
The error behaviour (performance) at high input levels (noise free operation) is defined by the bit error ratio (continuous bit stream) or by the number of messages lost or corrupted when the level of the wanted signal is significantly above the maximum usable sensitivity.

LIMIT

ETSI EN 300 113-1 Sub-clause 8.4.3

The Error behaviour at high input levels of the receiver as defined as in ETSI EN 300 113-1 Sub-clause 7.4.1
The bit error (continuous bit stream) shall not exceed 10^{-4}.
The number of messages not correctly received (lost or corrupted) shall not exceed 1.

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.
   ☒ normal condition ☐ Extreme conditions
2. Please refer to ETSI EN 300 113-1 Sub-clause 7.4.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☐ **Passed** ☒ **Not Applicable**

According to table A.1 of EN300 113-2 Annex A, this test item is not require.

4.2.3. Co-channel Rejection

The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.

LIMIT

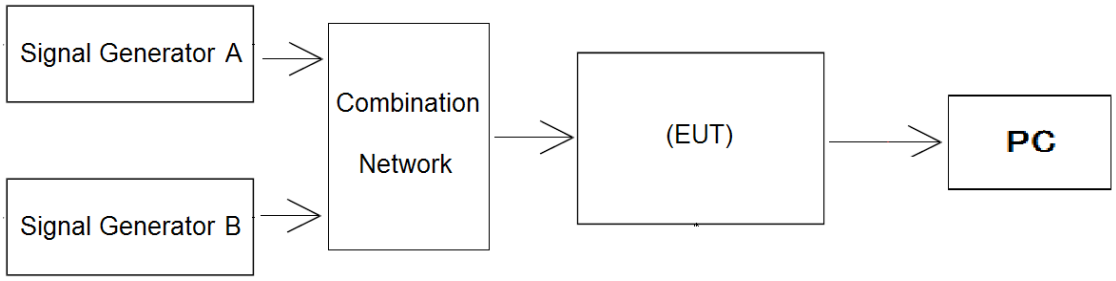
ETSI EN 300 113-1 Sub-clause 8.5.3

At any frequency of the unwanted signal within the specified range, shall be between:
the value of the co-channel rejection ratio, expressed in dB, is generally negative (therefore, for example, -12 dB is lower than -8 dB)
The value of the co-channel rejection ratio, expressed in dB, at the signal displacements given in the method of measurement, shall be between the values given in table 11.

Table 11: Co-channel limits (mean power) for different channel bandwidths and gross (on-air) bit rates

Channel BW	Data Rate	Sensitivity
12,5 kHz	9,6 kbit/s or less	between 12,0 dB and 0 dB
	more than 9,6 kbits to 16 kbit/s	between 17,0 dB and 0 dB
	more than 16 kbits to 38,4 kbit/s	between 24,0 dB and 0 dB
	greater than 38,4 kbit/s	between 29,0 dB and 0 dB
20 kHz and 25 kHz	9,6 kbit/s or less	between 8,0 dB and 0 dB
	more than 9,6 kbit/s to 38,4 kbit/s	between 12,0 dB and 0 dB
	more than 38,4 kbits to 76,8 kbit/s	between 19,0 dB and 0 dB
	greater than 76,8 kbit/s	between 24,0 dB and 0 dB

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.

   ☒ normal condition ☐ Extreme conditions

2. Please refer to ETSI EN 300 113-1 Sub-clause 8.5.2.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Operation Mode	Bit Rate (bps)	Test Channel	Measurement Offset (kHz)	SG B – SG A (dB)	Limit (dB)	Result
RX1	9600	CH_L	-1.5	-7.5	-12.0～0	Pass
			0	-8.2		
			1.5	-7.6		
		CH_H	-1.5	-10.5	-12.0～0	Pass
			0	-11.2		
			1.5	-9.8		

4.2.4. Adjacent Channel Selectivity

The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended.

LIMIT

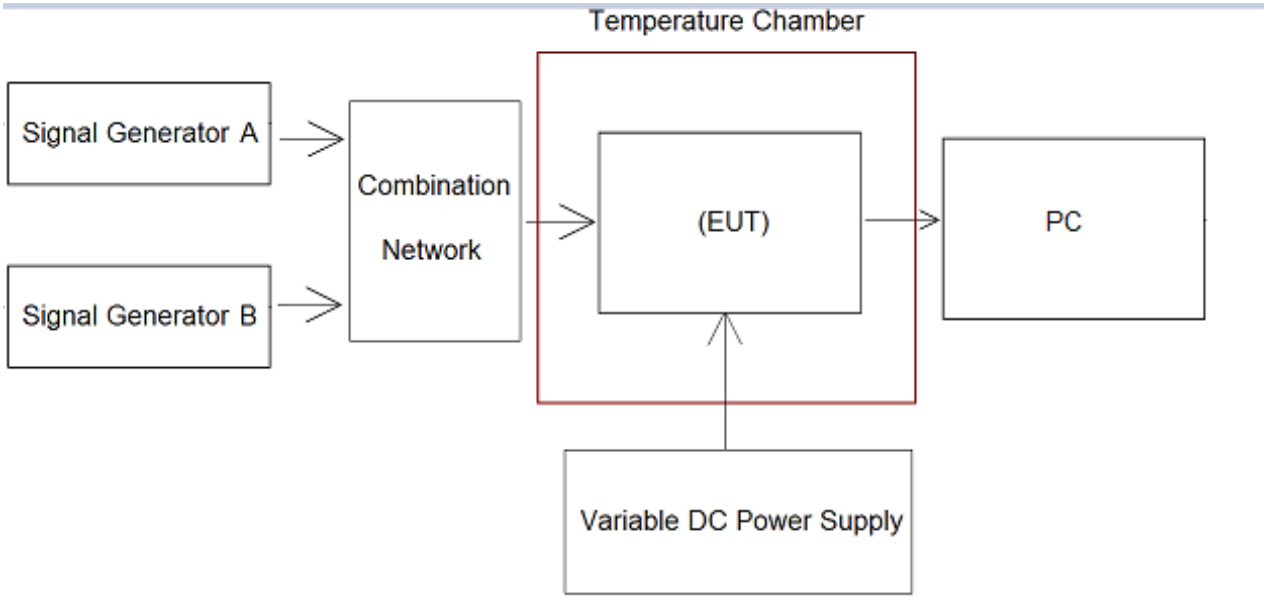
ETSI EN 300 113-1(V.1.7.1) Sub-clause 8.6.3

The adjacent channel selectivity for different channel separations shall not be less than the values given in table 12.

Table 12: Adjacent channel selectivity

	Channel separation	
	12,5 kHz	20/25 kHz
normal test conditions	60,0 dB	70,0 dB
extreme test conditions	50,0 dB	60,0 dB

TEST CONFIGURATION



TEST PROCEDURE

1. The test conditions.
   ☒ normal condition ☒ Extreme conditions
2. Please refer to ETSI EN 300 113-1 Sub-clause 8.6.2.2 for the measurement method.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Operation Mode	Test Condition		Test Channel	Measurement Position	SG B–SG A (dB)	Limit (dB)	Result
	Temperature (℃)	Voltage (V)					
RX1	Tn	Vn	CH_L	Lower adjacent	66.5	⩾60	Pass
				Upper adjacent	65.2		
			CH_H	Lower adjacent	63.5		
				Upper adjacent	64.7		
	T_L	V_H	CH_L	Lower adjacent	66.4	⩾50	Pass
				Upper adjacent	65.1		
			CH_H	Lower adjacent	63.6		
				Upper adjacent	65.2		
		V_L	CH_L	Lower adjacent	65.8	⩾50	Pass
				Upper adjacent	65.1		
			CH_H	Lower adjacent	63.6		
				Upper adjacent	65.2		
	T_H	V_H	CH_L	Lower adjacent	66.1	⩾50	Pass
				Upper adjacent	65.8		
			CH_H	Lower adjacent	63.5		
				Upper adjacent	64.8		
		V_L	CH_L	Lower adjacent	66.5	⩾50	Pass
				Upper adjacent	65.6		
			CH_H	Lower adjacent	63.7		
				Upper adjacent	64.5		

Remark: Bit Rate(bps)=9600

5. External and Internal Photos of the EUT

Reference to the test report No.: TRE1703011901.

--------End of Report---------