

TEST REPORT

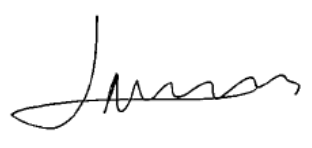
Applicant	GuangDong XinYu Technology Industrial Co.,Ltd
Address	Laimei Industrial zone, Chenghai District, Shantou, Guangdong

Manufacturer or Supplier	GuangDong XinYu Technology Industrial Co., Ltd	
Address	Laimei Industrial zone, Chenghai District, Shantou, Guangdong	
Product	RC TOYS	
Brand Name	N/A	
Model	XQRC24-5AA (3718)	
Additional Model & Model Difference	XQRC24-5AA (3718), XQ066-AA(3012), XQ072-AA(3020), etc; See items 2.1	
Date of tests	Jun. 05, 2016 ~ Jun. 23, 2016	

The submitted sample of the above equipment has been tested according to the requirements of the following standards:

- ☒ EN 300 220-1 V2.4.1 (2012-05)
- ☒ EN 300 220-2 V2.4.1 (2012-05)

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Ryan Lu Project Engineer / EMC Department	Approved by Madison Luo Supervisor / EMC Department
	 Date: Jun. 23, 2016

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Test Report No.: RE160602N028

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RE160602N028	Original release	Jun. 23, 2016

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: ETSI EN 300 220-1, ETSI EN 300 220-2		
CLAUSE IN ETSI EN 300 220-2	TEST PARAMETER	RESULT
TRANSMITTER PARAMETERS		
4.2.1.1	Frequency Error or Frequency Drift	PASS
4.2.1.3	Effective Radiated Power	PASS
4.2.1.5	Transient power	PASS
4.2.1.7	Modulation bandwidth	PASS
4.2.1.8	Unwanted emissions in the spurious domain	PASS
4.2.1.8	Frequency Stability Under Low- voltage Conditions	PASS
4.2.1.10	Duty Cycle	Not Applicable
RECEIVER PARAMETERS		
4.3.5	Blocking	PASS
4.3.7	Receiver spurious radiation	PASS

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

PARAMETER	UNCERTAINTY
Radio frequency	$\pm 2.06 \times 10^{-7}$
Adjacent channel power	$\pm 0.837 \text{ dB}$
Radiated emission of transmitter, valid up to 6GHz	$\pm 3.294 \text{ dB}$
Radiated emission of receivers, valid up to 6GHz	$\pm 3.294 \text{ dB}$
Temperature	$\pm 1^\circ \text{C}$
Humidity	$\pm 10 \%$

1.2 MAXIMUM MEASUREMENT UNCERTAINTY

For the test methods, according to ETSI EN 300 220 standard, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [4] and shall correspond to an expansion factor (coverage factor) $k = 1.96$ or $k = 2$ (which provide confidence levels of respectively 95 % and 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Maximum measurement uncertainty

PARAMETER	UNCERTAINTY
Radio frequency	$\pm 1 \times 10^{-7}$
Adjacent channel power	$\pm 3.0 \text{ dB}$
Radiated emission of transmitter, valid up to 6GHz	$\pm 6.0 \text{ dB}$
Radiated emission of receivers, valid up to 6GHz	$\pm 6.0 \text{ dB}$
Temperature	$\pm 1^\circ \text{C}$
Humidity	$\pm 10 \%$

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	RC TOYS			
MODEL	XQRC24-5AA (3718)			
ADDITIOANL MODELS	XQ066-AA(3012), XQ072-AA(3020), XQRC24-3AA(3716), XQRC24-6AA(3719), XQRC24-7AA(3720), XQRC24-8AA(3721), XQ066(3011), XQRC24-3(3142), 3381(3685), 3491(3742), 3382(3583), 3492, XQ075-AA(3024), XQ078-AA, XQ076-AA(3026), XQ080-AA(3004), XQ082-AA(3032), XQRC24-2AA(3715), XQ075(3023), XQ078(3027), XQ072(3019), XQ076(3025), XQ080(3029), XQ082(3031), XQRC24-2(3140), XQRC24-5(3146), XQRC24-6, XQRC24-7, XQRC18-10AA(3657), XQRC18-13AA(3661), XQRC18-18AA(3665), XQRC18-10(3549), XQRC18-13(3553), XQRC18-18(3557), XQ090(3033), XQ090-AA(3670)			
NOMINAL VOLTAGE	TX: DC 9V From Battery RX: DC 4.5V(1.5V*AA*3) From Battery			
OPERATING VOLTAGE RANGE	TX	$V_{nom} = 9V$	$V_{min} = 7.65V$	$V_{max} = 10.35V$
OPERATING TEMPERATURE RANGE	$-10^{\circ}C \sim 55^{\circ}C$			
MODULATION TYPE	ASK			
OPERATING FREQUENCY	27.145MHz			
NUMBER OF CHANNEL	1			
ERP POWER	-21.17dBm			
ANTENNA TYPE	Wire Antenna			
CABLE SUPPLIED	N/A			
I/O PORTS	Refer to the user's manual			

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
- Please refer to the EUT photo document (Reference No.: 160602N028) for detailed product photo.
- Additional models (see above table) are identical with the test model XQRC24-5AA (3718) except the model no. and the appearance for trading purpose.

2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 05,16	Apr. 04,17
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 16, 15	Jul. 15, 16
Horn Antenna	ETS-Lindgren	3117	00062558	May 30,15	May 29,17
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Feb. 13,14	Feb. 12,17
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 14	Aug. 07, 16
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 21,14	Jan. 20,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 11,15	Nov. 10,16
Power Sensor	Keysight	U2021XA	MY55060016	May 27,16	May 26,17
Power Sensor	Keysight	U2021XA	MY55060018	May 27,16	May 26,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct.11, 16
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.07,15	Sep. 06,16
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09,15	Nov. 08,16
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 01,15	Aug. 31,16

NOTE:

1. The calibration interval of the above test instruments is 12 months or 24 or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 966 Chamber and RF Oven room.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

2.3 DESCRIPTION OF TEST MODES

SAMPLE	MODE	FREQUENCY
TX	Transmitting	27.145MHz
RX	Receiving	27.145MHz

2.4 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO											DESCRIPTION
	FD	ERP	DC	MBW	SE<1G	SE≥1G	FSLV	TP	RSE<1G	RSE≥1G	RB	
1	√	√	-	√	√	-	√	√	√	-	√	

Where **FD**: Frequency Drift

ERP: Effective Radiated Power

MBW: Modulation Bandwidth

DC: Duty cycle

FSLV: Frequency Stability Under Low- voltage Conditions.

RSE<1G: Receiver Spurious Emissions below 1GHz

SE≥1G: Spurious Emissions above 1GHz

SE<1G: Spurious Emissions below 1GHz

TP: Transient Power

RB: Receiver Blocking

RSE≥1G: Receiver Spurious Emissions above 1GHz.

FREQUENCY DRIFT TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	OPERATING FREQUENCY (MHz)	MODULATION TYPE
-	1	27.145	ASK

EFFECTIVE RADIATED POWER:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	OPERATING FREQUENCY (MHz)	MODULATION TYPE
-	1	27.145	ASK

TRANSIENT POWER:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	OPERATING FREQUENCY (MHz)	MODULATION TYPE
-	1	27.145	ASK

MODULATION BANDWIDTH TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	OPERATING FREQUENCY (MHz)	MODULATION TYPE
-	1	27.145	ASK

SPURIOUS EMISSIONS TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	OPERATING FREQUENCY (MHz)	MODULATION TYPE
-	1	27.145	ASK

FREQUENCY STABILITY UNDER LOW- VOLTAGE CONDITIONS:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	OPERATING FREQUENCY (MHz)	MODULATION TYPE
-	1	27.145	ASK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
FD	25deg. C, 60%RH	TX: DC 9V from Battery	Ryan Lu
ERP	25deg. C, 60%RH	TX: DC 9V from Battery	Ryan Lu
MBW	25deg. C, 60%RH	TX: DC 9V from Battery	Ryan Lu
SE<1G	25deg. C, 51%RH	TX: DC 9V from Battery	Eric Fang
FSLV	25deg. C, 60%RH	TX: DC 9V from Battery	Ryan Lu
TP	25deg. C, 60%RH	TX: DC 9V from Battery	Ryan Lu
RSE<1G	25deg. C, 51%RH	RX: DC 4.5V from Battery	Eric Fang
RB	25deg. C, 60%RH	RX: DC 4.5V from Battery	Ryan Lu

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT has been tested and complied with the requirements of the following standards:

EN 300 220-1 V2.4.1 (2012-05)

EN 300 220-2 V2.4.1 (2012-05)

Notes: The above IEC basic standard are applied with latest version if customer has no special requirement

2.6 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

3 TEST PROCEDURES AND RESULTS

TRANSMITTER PARAMETERS

3.1 FREQUENCY ERROR OR FREQUENCY DRIFT

3.1.1 LIMITS OF FREQUENCY ERROR

Frequency error for systems with channel spacings of less than or equal to 25kHz

Channelization	Frequency error limit (kHz)				
	< 47 MHz	47 MHz to 137 MHz	> 137 MHz to 300 MHz	> 300 MHz to 500 MHz	> 500 MHz to 1000 MHz
Channelized systems	±10,0	±10,0	±10,0	±12,0	±12,5
NOTE 1: Adjacent channel power as defined in clause 7.6.1 shall not exceed the limit in clause 7.6.3. NOTE 2: For equipment having a channel spacing of 12.5 kHz or less, the frequency error limit shall not exceed 50% of the channel spacing.					

Frequency error for all other systems

Operating frequency	Frequency error limit (ppm), see note
≤ 1 000 MHz	±100
NOTE: The frequency error measured shall not exceed the designated frequency band.	

3.1.2 TEST PROCEDURE

Reference to ETSI EN 300 220-1 V2.4.1 clause 7.1

3.1.3 DEVIATION FROM TEST STANDARD

No deviation.

3.1.4 TEST SETUP

The EUT was placed at a site with temperature control and supplied with power for extreme voltage testing. Antenna with suitable frequency range was used during the test.

3.1.5 TEST RESULTS

27.145MHz

TEST CONDITION			CARRIER FREQUENCY (MHz)	FREQUENCY DRIFT (kHz)	FREQUENCY ERROR (ppm)
Tnom(°C)	25	Vnom(V)	27.145	0	0
Tmin(°C)	-10	Vmin(V)	27.1455	0.5	18.42
		Vmax(V)	27.1456	0.6	22.1
Tmax(°C)	55	Vmin(V)	27.1453	0.3	11.05
		Vmax(V)	27.1453	0.3	11.05
Limit : +/-100ppm					

NOTE:

1. This device is classified as wide band systems, and the frequency error is defined as the difference between the frequency measured of the device under normal test conditions and the frequency measured under extreme conditions relative to the maximum frequency of the assigned band.

2. The calculated formula: $(f - f_e) / 27.145\text{MHz}$

Where

f = the frequency measured under normal conditions.

f_e = the frequency as measured under extreme conditions.

3.2 EFFECTIVE RADIATED POWER

3.2.1 LIMITS OF EFFECTIVE RADIATED POWER

Frequency Bands/ frequencies	Maximum Radiated power, e.r.p. / power spectral density	Spectrum access and mitigation requirement (e.g. Duty cycle or LBT + AFA)
26.957 MHz to 27.283 MHz	10 mW (10dBm)	No restriction

3.2.2 TEST PROCEDURE

Reference to ETSI EN 300 220-1 V2.4.1 clause 7.3

3.2.3 DEVIATION FROM TEST STANDARD

No deviation.

3.2.4 TEST SETUP

The EUT was placed on the turntable in an Anechoic Chamber and supplied with nominated power source. It was adjusted to the maximum output power during the test.

3.2.5 TEST RESULTS

FREQUENCY (MHz)	ERP(dBm)	LIMIT (dBm)	PASS / FAIL
27.145	-21.17	10	PASS

3.3 TRANSIENT POWER

3.3.1 LIMITS OF TRANSIENT POWER

At all frequencies where the emission levels measured in step 1 exceed the modulation bandwidth spectrum mask limits(see clause 7.7.3) for wideband equipments or the spurious domain limits(clause 7.8.3) for narrowband equipments, the power level measured in step 1 shall not exceed the power level measured in step 2 by more than 3 dB.

3.3.2 TEST PROCEDURE

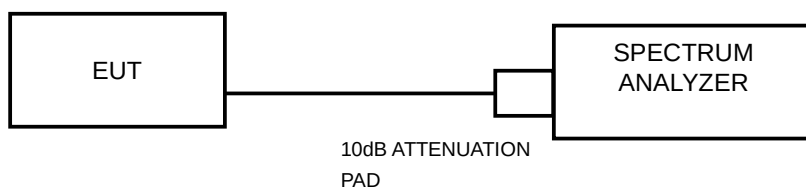
Reference to ETSI EN 300 220-1 V2.4.1 clause 7.5

3.3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.3.4 TEST SETUP

Under normal use condition, the transmitter will transmit power only when the EUT is powered on.



3.3.5 TEST RESULTS

Step 1: (Fa=27.136MHz, Fb=27.155MHz)

LOWER ENVELOPE POINT FREQUENCY				
No.	Fa-100KHz (MHz)	Measurement power level (dBm)	Limit (dBm)	Test Result
1	27.036	-19.32	-30	Step 2 shall be performed
2	27.036	-19.42	-30	Step 2 shall be performed
3	27.036	-19.22	-30	Step 2 shall be performed
4	27.036	-19.61	-30	Step 2 shall be performed
5	27.036	-18.88	-30	Step 2 shall be performed

UPPER ENVELOPE POINT FREQUENCY				
No.	Fb+100KHz (MHz)	Measurement power level (dBm)	Limit (dBm)	Test Result
1	27.255	-18.99	-30	Step 2 shall be performed
2	27.255	-18.42	-30	Step 2 shall be performed
3	27.255	-18.74	-30	Step 2 shall be performed
4	27.255	-18.55	-30	Step 2 shall be performed
5	27.255	-18.69	-30	Step 2 shall be performed

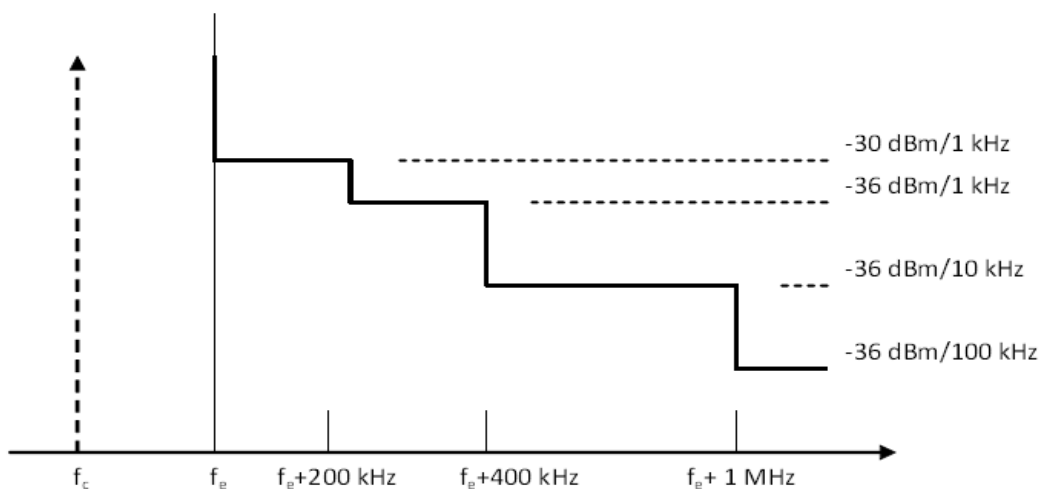
NOTE: If the resulting maximum power level in step 1 is above the spurious domain limit (see clause 7.8.3), the second measurement step shall be performed.

Step 2:

LOWER& UPPER ENVELOPE POINT FREQUENCY					
Lower& Upper	Frequency	Measurement power level (dBm)	Step1- Step2 (dB)	Limit	Test Result
Fa-120KHz	27.016	-20.36	0.75	<3dB	PASS
Fb+ 120KHz	27.275	-19.63	0.64	<3dB	PASS

3.4 MODULATION BANDWIDTH FOR WIDE BAND EQUIPMENT

3.4.1 LIMITS OF MODULATION BANDWIDTH



NOTE:

- f_c is the emission center frequency.
- f_e is the sub-band edge frequency.
- Only the upper half of the emission is shown. The lower half is a mirror image.

3.4.2 TEST PROCEDURE

Reference to ETSI EN 300 220-1 V2.4.1 clause 7.7

3.4.3 TEST SETUP

The EUT was placed at a site with temperature control and supplied with power for extreme voltage testing. Antenna with suitable frequency range was used during the test.

3.4.4 TEST RESULTS

OPERATING FREQUENCY	27.145MHz	INPUT POWER	DC 9V from Battery
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Frequency Bands: 26.957MHz~27.283MHz, fe=26.957MHz

LOWER ENVELOPE POINT MINIMUM FREQUENCY					
TEST CONDITION		EMISSION OF THE MODULATED SIGNAL			
		Edge A	Edge B	Edge C	Edge D
Tnom(°C)	Vnom(V)	-54.05	-69.30	-49.13	-38.57
Tmin(°C)	Vmin(V)	-52.39	-67.59	-47.39	-36.18
	Vmax(V)	-51.75	-67.86	-47.19	-36.30
Tmax(°C)	Vmin(V)	-56.55	-70.94	-51.14	-41.16
	Vmax(V)	-56.56	-70.70	-51.56	-40.59
Measured maximum value		-51.75	-67.59	-47.19	-36.18
Limit		1uW (-30dBm)	250nW (-36dBm)	250nW (-36dBm)	250nW (-36dBm)
PASS/FAIL		PASS	PASS	PASS	PASS

NOTE:

1. Power level at which the measurement has been performed: maximum output power.
2. Edge A : fe~fe-200kHz, Edge B: fe-200kHz~ fe-400kHz, Edge C: fe-400kHz~ fe-1000kHz, Edge D: Over 1000kHz. fe is the sub-band edge frequency.

OPERATING FREQUENCY	27.145MHz	INPUT POWER	DC 9V from Battery
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Frequency Bands: 26.957MHz~27.283MHz, $f_e=27.283\text{MHz}$

UPPER ENVELOPE POINT MINIMUM FREQUENCY					
TEST CONDITION		EMISSION OF THE MODULATED SIGNAL			
		Edge A	Edge B	Edge C	Edge D
Tnom(°C)	Vnom(V)	-63.07	-58.66	-50.41	-43.54
Tmin(°C)	Vmin(V)	-61.36	-56.00	-48.42	-41.94
	Vmax(V)	-61.41	-55.66	-48.55	-42.01
Tmax(°C)	Vmin(V)	-65.28	-61.11	-51.82	-45.95
	Vmax(V)	-65.13	-60.94	-51.95	-46.06
Measured maximum value		-61.36	-55.66	-48.42	-41.94
Limit		1uW (-30dBm)	250nW (-36dBm)	250nW (-36dBm)	250nW (-36dBm)
PASS/FAIL		PASS	PASS	PASS	PASS

NOTE:

1. Power level at which the measurement has been performed: maximum output power.
2. Edge A : $f_e \sim f_e + 200\text{kHz}$, Edge B: $f_e + 200\text{kHz} \sim f_e + 400\text{kHz}$, Edge C: $f_e + 400\text{kHz} \sim f_e + 1000\text{kHz}$, Edge D: Over 1000kHz. f_e is the sub-band edge frequency.

3.5 TRANSMITTER SPURIOUS EMISSIONS

3.5.1 LIMITS OF TRANSMITTER SPURIOUS EMISSIONS

LIMIT STATE FREQUENCY RANGE	47MHz TO 74MHz 87.5MHz TO 118MHz 174MHz TO 230MHz 470MHz TO 862MHz	OTHER FREQUENCIES BELOW 1GHz	FREQUENCIES ABOVE 1GHz
Operating	4nW (−54dBm)	250nW (−36dBm)	1μW (−30dBm)
Standby	2nW (−57dBm)	2nW (−57dBm)	20nW (−47dBm)

3.5.2 TEST PROCEDURE

Reference to ETSI EN 300 220-1 V2.4.1 clause 7.8

3.5.3 DEVIATION FROM TEST STANDARD

No deviation.

3.5.4 TEST SETUP

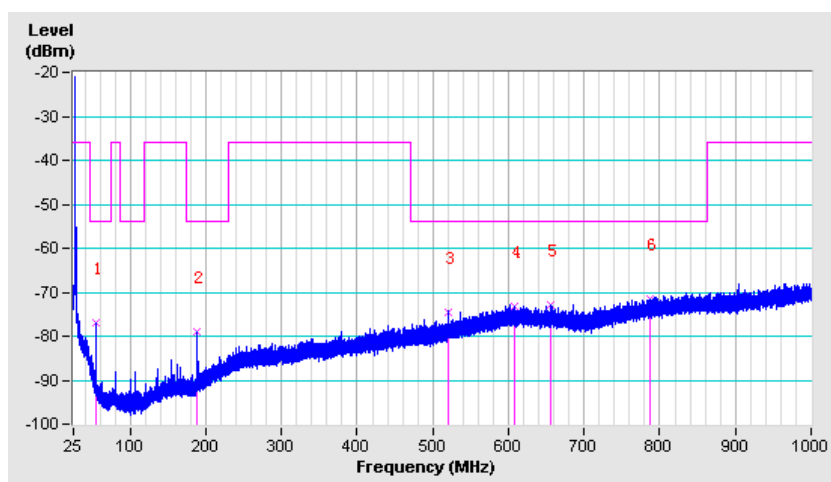
For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).

3.5.5 TEST RESULTS

OPERATING STATE	Transmitting	SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz
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SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
54.28	H	-76.89	-54.00	-22.89
188.98	H	-78.85	-54.00	-24.85
520.00	H	-74.55	-54.00	-20.55
607.90	H	-73.06	-54.00	-19.06
655.46	H	-72.74	-54.00	-18.74
787.42	H	-71.55	-54.00	-17.55

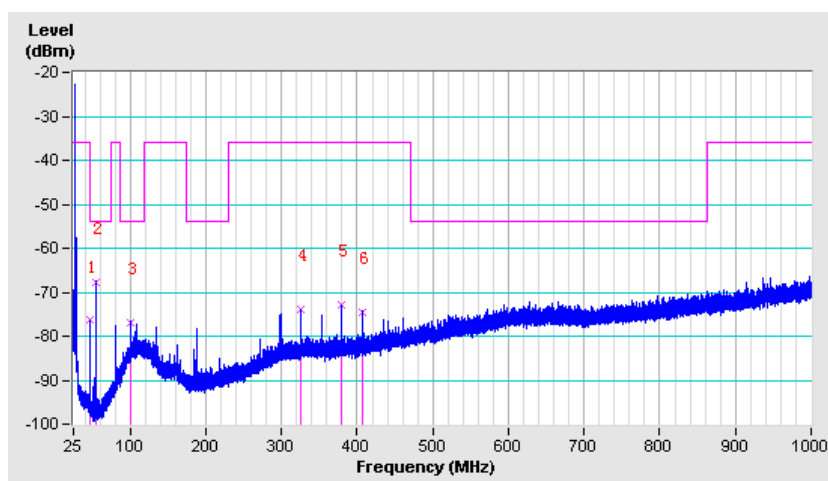
NOTE: The emission behavior belongs to narrowband spurious emission.



OPERATING STATE	Transmitting	SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz
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SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
46.97	V	-76.38	-36.00	-40.38
54.25	V	-67.79	-54.00	-13.79
100.68	V	-76.99	-54.00	-22.99
325.73	V	-73.90	-36.00	-37.90
380.05	V	-72.79	-36.00	-36.79
407.14	V	-74.51	-36.00	-38.51

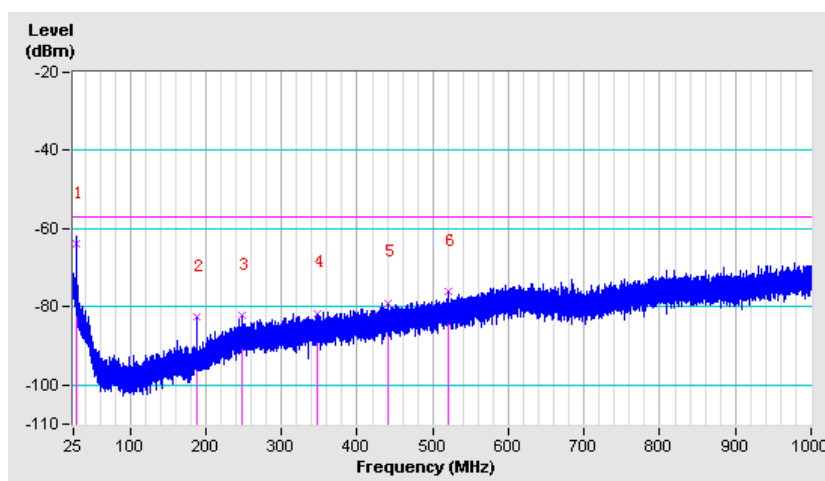
NOTE: The emission behavior belongs to narrowband spurious emission.



OPERATING STATE	Standby	SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz
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SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
28.56	H	-63.87	-57.00	-6.87
188.95	H	-82.69	-57.00	-25.69
248.79	H	-82.27	-57.00	-25.27
347.48	H	-81.62	-57.00	-24.62
439.98	H	-78.94	-57.00	-21.94
520.03	H	-76.08	-57.00	-19.08

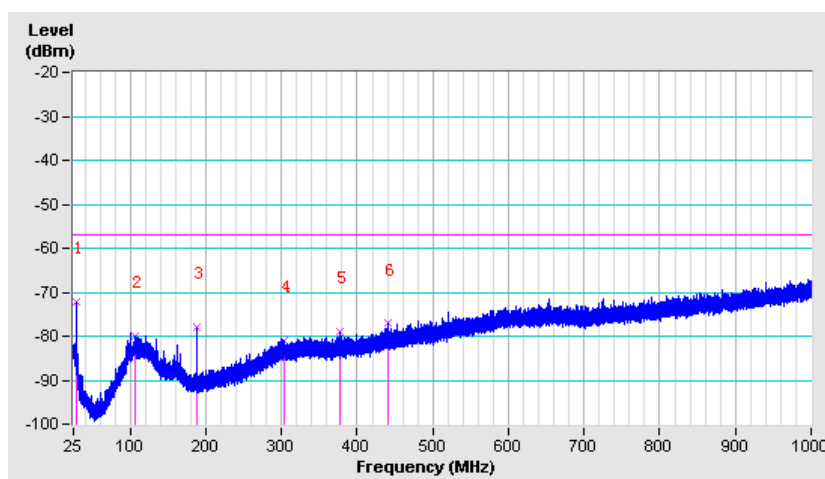
NOTE: The emission behavior belongs to narrowband spurious emission.



OPERATING STATE	Standby	SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz
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SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
28.60	V	-72.19	-57.00	-15.19
107.48	V	-79.83	-57.00	-22.83
188.98	V	-77.93	-57.00	-20.93
304.00	V	-81.07	-57.00	-24.07
377.49	V	-78.94	-57.00	-21.94
439.98	V	-77.09	-57.00	-20.09

NOTE: The emission behavior belongs to narrowband spurious emission.



3.6 FREQUENCY STABILITY UNDER LOW-VOLTAGE CONDITIONS

3.6.1 LIMITES OF FREQUENCY STABILITY UNDER LOW-VOLTAGE CONDITIONS

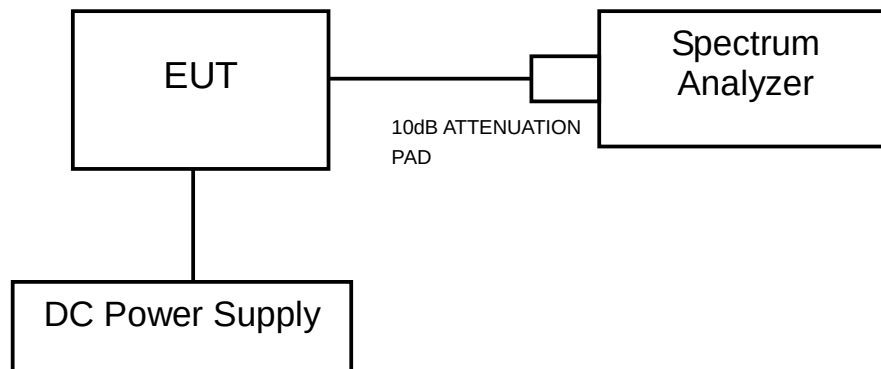
The equipment shall either:

- a) remain on channel, for channelized equipment within the limits stated in clause 7.1.3, or within the assigned operating frequency band, for non-channelized equipment, whilst the radiated or conducted power is greater than the spurious emission limits; or
- b) the equipment cease to function below the providers declared operating voltage.

3.6.2 TEST PROCEDURES

The carrier frequency shall be measured, where possible in the absence of modulation, with the transmitter connected to an artificial antenna. A transmitter without a 50 Ω output connector may be placed in a test fixture (see clause 6.3) connected to an artificial antenna. The measurement shall be made under normal temperature and humidity conditions (see clause 5.3.1), the voltage from the test power source shall be reduced below the lower extreme test voltage limit towards zero. Whilst the voltage is reduced the carrier frequency shall be monitor

3.6.3 TEST SETUP



3.6.4 TEST Results:

Frequency Stability under lowest voltage	Test Result (MHz)	Frequency Error (ppm)
9V	27.145	11.05
7.5V	27.1451	29.47
6V	27.1454	14.74
4.5V	27.1452	7.37
Max. frequency error (ppm)		29.47
Limit (ppm)	100	

3.7 RECEIVER SPURIOUS EMISSIONS

3.7.1 LIMITS OF RECEIVER SPURIOUS EMISSIONS

Frequency range	Frequencies below 1GHz	Frequencies above 1GHz
Limit	2nW or -57dBm	20nW or -47dBm

3.7.2 TEST PROCEDURE

Reference to ETSI EN 300 220-1 V2.4.1 clause 8.6

3.7.3 DEVIATION FROM TEST STANDARD

No deviation.

3.7.4 TEST SETUP

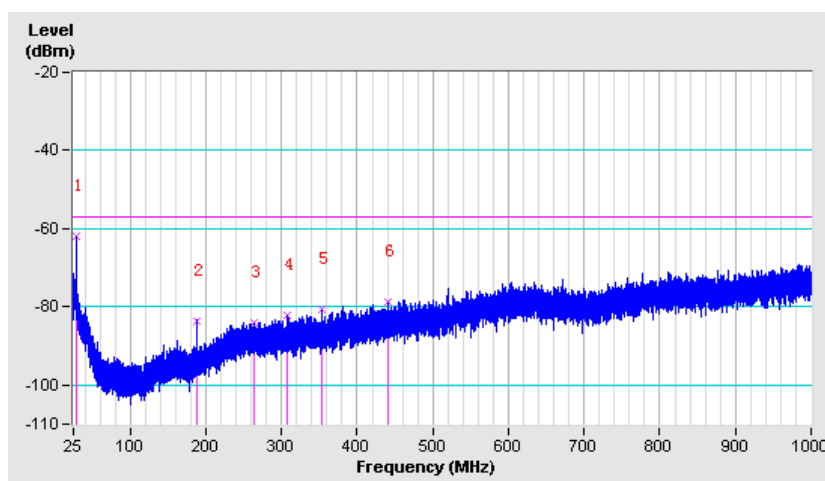
For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).

3.7.5 TEST RESULTS

OPERATING STATE	Receiving	SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz
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SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
28.60	H	-61.84	-57.00	-4.84
188.95	H	-83.64	-57.00	-26.64
263.17	H	-84.01	-57.00	-27.01
308.18	H	-82.34	-57.00	-25.34
353.09	H	-80.74	-57.00	-23.74
439.98	H	-78.77	-57.00	-21.77

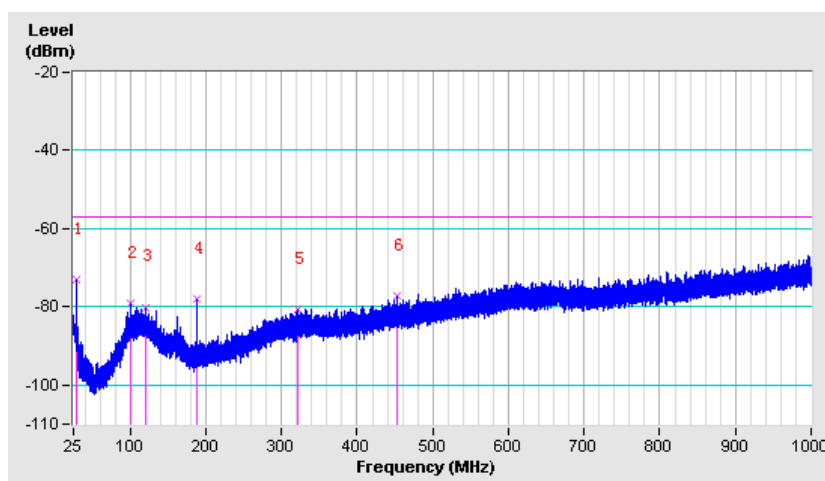
NOTE: The emission behavior belongs to narrowband spurious emission.



OPERATING STATE	Receiving	SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz
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SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
28.60	V	-72.97	-57.00	-15.97
100.81	V	-79.29	-57.00	-22.29
120.00	V	-80.09	-57.00	-23.09
188.98	V	-78.16	-57.00	-21.16
321.83	V	-80.68	-57.00	-23.68
453.76	V	-77.35	-57.00	-20.35

NOTE: The emission behavior belongs to narrowband spurious emission.



3.8 BLOCKING

3.8.1 LIMITS OF BLOCKING

The blocking level shall not be less than the values given below table, except at frequencies on which spurious responses are found.

RECEIVER CATEGORY	FREQUENCY OFFSET	LIMIT
1	±2 MHz	≥84 dB -A (note 2)
2	±2 MHz	≥35 dB -A (note 2)
3	±2 MHz	≥24 dB -A (note 2)
1	±10 MHz	≥84 dB -A (note 2)
2	±10 MHz	≥60 dB -A (note 2)
3	±10 MHz	≥44 dB -A (note 2)
NOTE 1: The limits apply also for the repeated tests in case of equipment using LBT or category 1 receivers, reduced by 13 dB or 40 dB, respectively, to account for the increased wanted signal level. NOTE 2: $A = 10 \log (BW \text{ kHz} / 16 \text{ kHz})$ BW is the receiver bandwidth (see clause 8.1.4).		

3.8.2 TEST PROCEDURES

Reference to ETSI EN 300 220-1 V2.4.1 clause 8.4

3.8.3 DEVIATION FROM TEST STANDARD

No deviation.

3.8.4 TEST SETUP

Under normal use condition, the transceiver will receive a wanted modulated signal when the EUT power on.

3.8.5 TEST RESULTS

OPERATING STATE	Receiving	OPERATING FREQUENCY	27.145MHz
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Interference Signal:	Modulation + CW mode			
TEST CONDITION	FREQUENCY OFFSET (+2MHz)		FREQUENCY OFFSET (-2MHz)	
	Test Result	Blocking Level	Test Result	Blocking Level
Normal Condition	Pass	-52.96	Pass	-52.96

Interference Signal:	Modulation + CW mode			
TEST CONDITION	FREQUENCY OFFSET (+10MHz)		FREQUENCY OFFSET (-10MHz)	
	Test Result	Blocking Level	Test Result	Blocking Level
Normal Condition	Pass	-32.96	Pass	-32.96



Test Report No.: RE160602N028

4 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

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