

FCC Radio Test Report

FCC ID: YIGQ-BOOM54069

This report concerns (check one): ☒ Original Grant ☐ Class II Change

Project No. : 1803C305
Equipment : QUALATEX Q-BOOM TRANSMITTER
Model Name : # 54077
Applicant : Netop Industrial Company Limited
Address : Dabu Industrial Zone, Gangzi Village, Changping Town, Dongguan City, Guangdong Province, China

Date of Receipt : Mar. 29, 2018
Date of Test : Mar. 30, 2018 ~ Jul. 13, 2018
Issued Date : Jul. 17, 2018
Tested by : BTL Inc.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1803C305	Original Issue.	Jul. 17, 2018

1. CERTIFICATION

Equipment : QUALATEX Q-BOOM TRANSMITTER
Trade Name : N/A
Test Model : # 54077
Series Model : N/A
Applicant : Netop Industrial Company Limited
Manufacturer : Netop Industrial Company Limited
Address : Dabu Industrial Zone, Gangzi Village, Changping Town, Dongguan City,
Guangdong Province, China
Factory : Netop Industrial Company Limited
Address : Dabu Industrial Zone, Gangzi Village, Changping Town, Dongguan City,
Guangdong Province, China
Date of Test : Mar. 30, 2018 ~ Jul. 13, 2018
Test Sample : Enginnering Sample No.:D180503904-2
Standard(s) : FCC Part15, Subpart C(15.231)/ ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1803C305) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.231)			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	NOTE(1)
15.209 & 15.231b & 15.205	Radiated Spurious Emission	PASS	
15.231(c)	20dB Occupied Bandwidth Measurement	PASS	
15.231(e) & 15.231a(1)	Timing Testing	PASS	

NOTE:

(1)" N/A" denotes test is not applicable to this device.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's test firm number for FCC: 854385

BTL's designation number for FCC: CN5020

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor) $k=1.96$ or $k=2$ (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$.

The BTL measurement uncertainty as below table:

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 18GHz	V	3.12
		1GHz ~ 18GHz	H	3.68
		18GHz ~ 40GHz	V	4.15
		18GHz ~ 40GHz	H	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	QUALATEX Q-BOOM TRANSMITTER	
Trade Name	N/A	
Model Name	# 54077	
Model Difference	N/A	
Product Description	Product Type	Remote Control Device
	Operation Frequency	433.92 MHz
	Modulation Type	FSK
	Number Of Channel	1CH, please see note 2.
	Antenna Designation	Dipole antenna
	Field Strength	78.41dBuV/m (AV Max.)
Power Source	Supplied from lithium battery.	
Power Rating	DC 3V	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- 2.

Channel	Frequency (MHz)
01	433.92

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

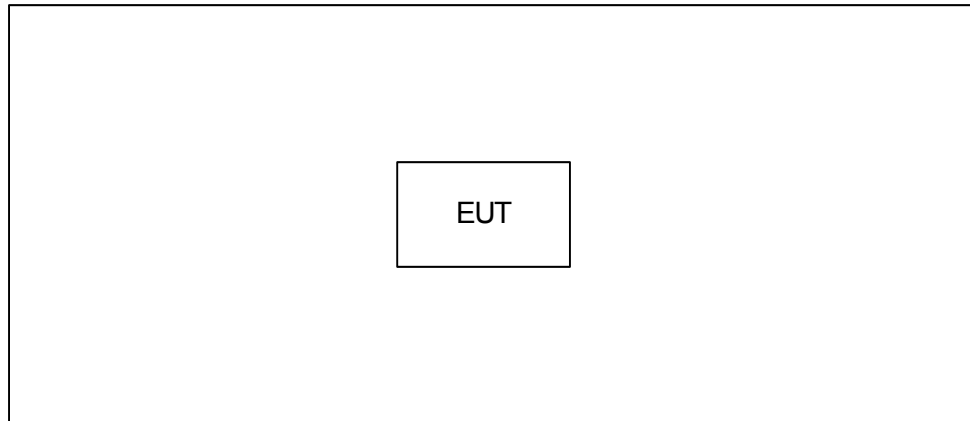
Pretest Mode	Description
Mode 1	TX CH 433.92MHz

For Radiated Test	
Final Test Mode	Description
Mode 1	TX CH 433.92MHz

Note:

The EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found positioned on Z-plane. Therefore only the test data of this Z-plane was used for radiated emission measurement test.

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

Note:

- (1) For detachable type I/O cable should be specified the length in m in 『Length』 column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 -0.5	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

- (1) The limit of " * " decreases with the logarithm of the frequency
- (2) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
 Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

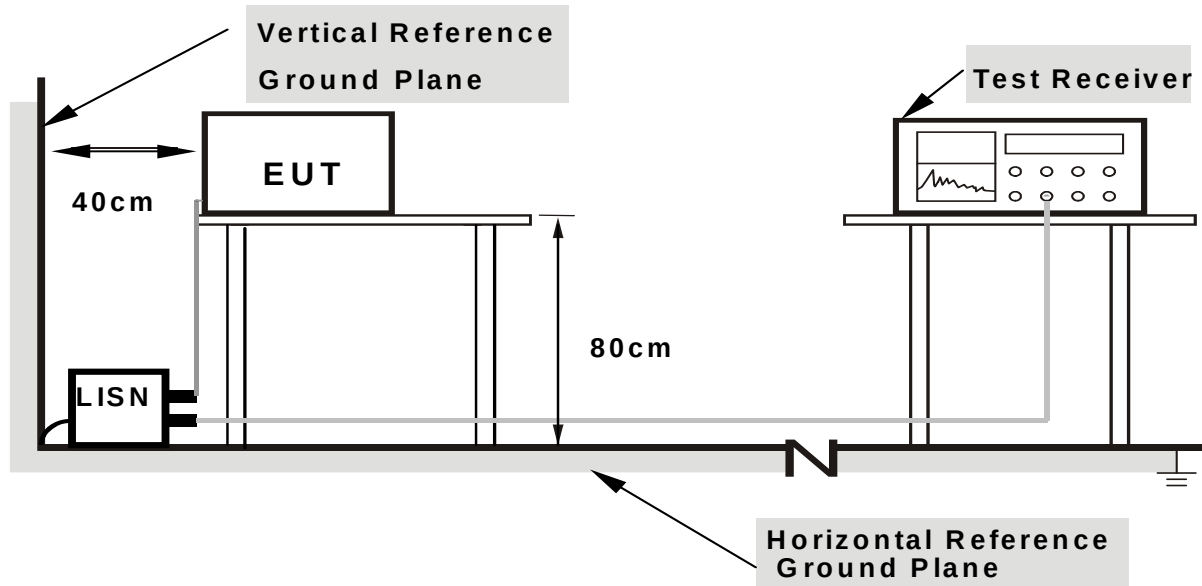
4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the groundplane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TESTSETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it).The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.6 EUT TEST CONDITIONS

Temperature: N/A

Relative Humidity: N/A

Test Voltage: N/A

4.1.7 TEST RESULTS

Please refer to the Appendix A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits,the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) ” N/A” denotes test is not applicable in this test report.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 FIELD STRENGTH OF FUNDAMENTAL EMISSIONS MEASUREMENT LIMIT

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750(**)	125 to 375(**)
174-260	3,750	375
260-470	3,750 to 12,500(**)	375 to 1,250(**)
Above 470	12,500	1,250

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dBV below the maximum permitted fundamental level.]

So the field strength of emission limits have been calculated in below table.

Carrier Frequency (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
433.92 MHz	80.83 (Average)
433.92 MHz	100.83 (Peak)

4.2.2 MEASURING INSTRUMENTS AND SETTING (FIELD STRENGTH OF FUNDAMENTAL EMISSIONS)

Receiver Parameter	Setting
Attenuation	Auto
Center Frequency	Fundamental Frequency
RBW	120 kHz
Detector	Peak / Average

4.2.3 RADIATED EMISSIONS MEASUREMENT

Devices complying with 47 CFR FCC part 15 subpart C, section 15.231a(1). The field strength of emissions from intentional radiators at 3 meters operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750(**)	125 to 375(**)
174-260	3,750	375
260-470	3,750 to 12,500(**)	375 to 1,250(**)
Above 470	12,500	1,250

(1) [Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dBV below the maximum permitted fundamental level.]

(2) The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear inside of the restriction band shall not exceed the general radiated emissions limits in Section 15.209(a).

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	$2400/F(\text{KHz})$	300
0.490~1.705	$24000/F(\text{KHz})$	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, AV Mode with Dwell time

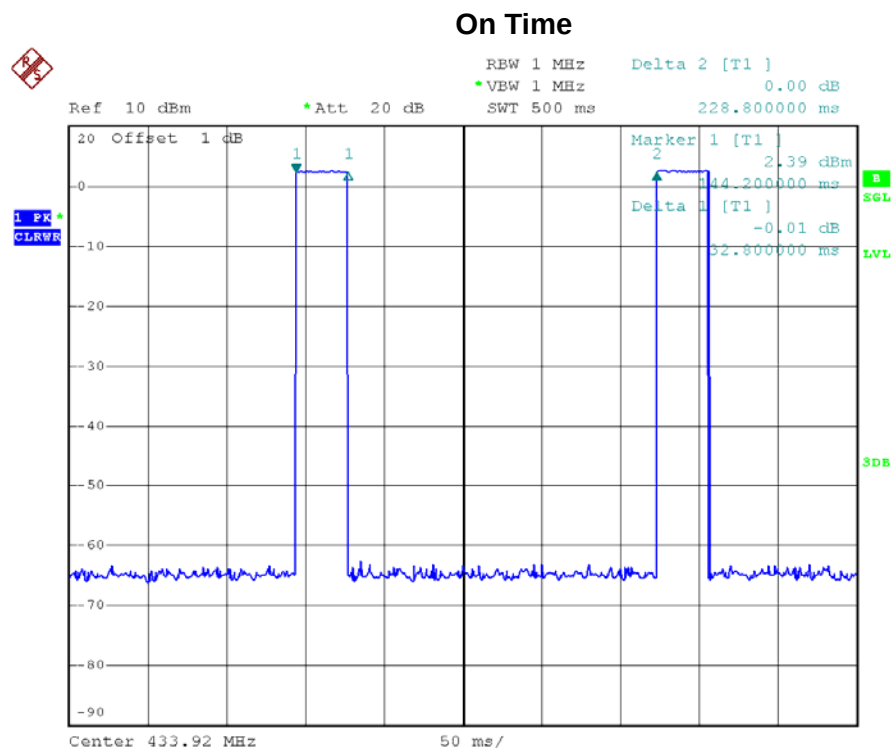
4.2.4 DWELL TIME OF PERIODIC OPERATION MEASUREMENT

Duty Cycle = $(N1*L1+N2*L2+...+Nn-1*Ln-1+Nn*Ln)/100$ or T

Duty Cycle = $32.8/100=32.8\%$

Average Reading = Peak Reading (dBuV/m) + $20\log$ (Duty cycle)

Average Reading = Peak value + $20\log$ (Duty cycle) = Peak + $20*\log(0.328)$, AV=PK-9.68



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4.2.5 TEST PROCEDURE

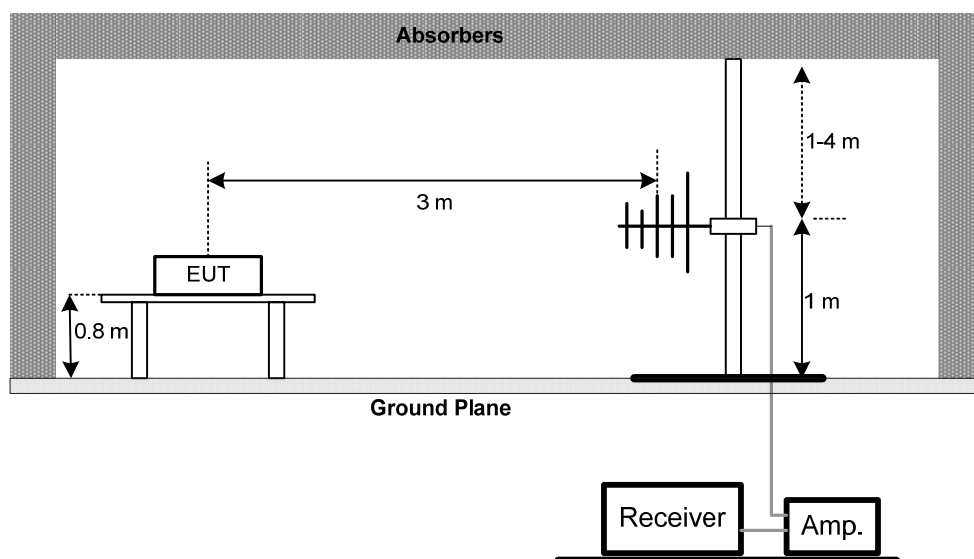
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.6 DEVIATION FROM TEST STANDARD

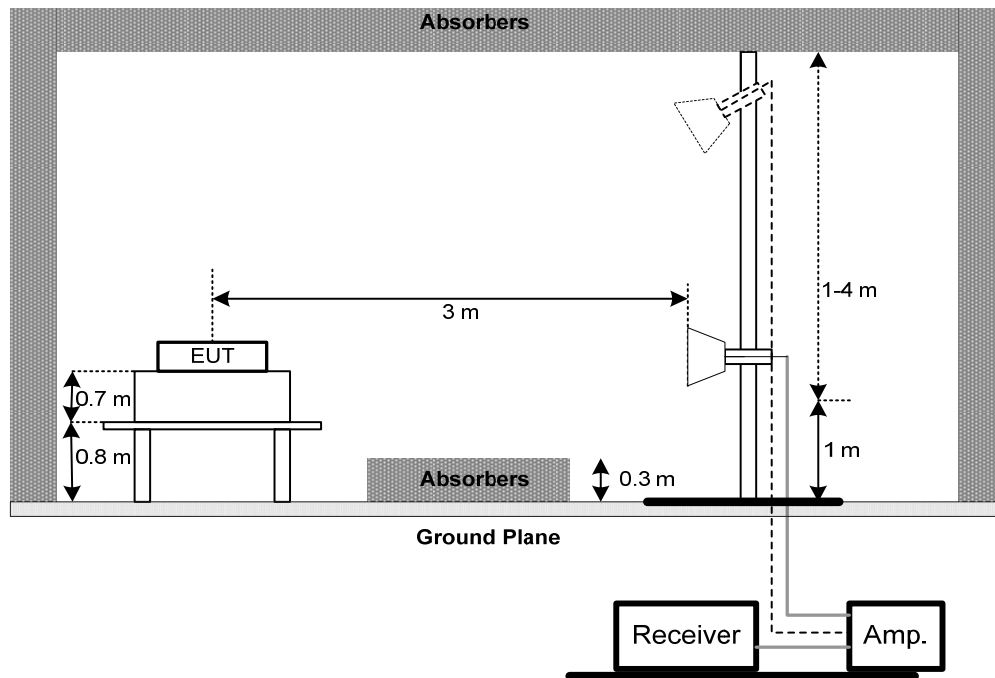
No deviation

4.2.7 TEST SETUP

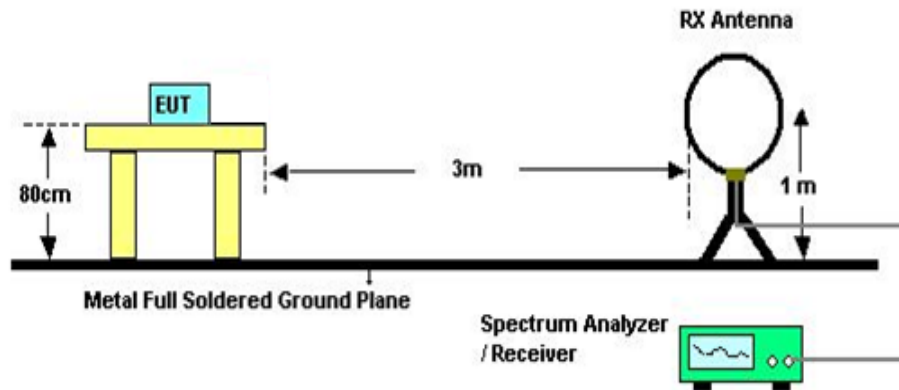
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For radiated emissions below 30MHz



4.2.8 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.9 EUT TEST CONDITIONS

Temperature: 24° C

Relative Humidity: 52%

Test Voltage: DC 3V

4.2.10 TEST RESULTS (9KHz to 30MHz)

Please refer to the Appendix B.

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.11 TEST RESULTS (30MHz to 1000MHz)

Please refer to the Appendix C.

4.2.12 TEST RESULTS (Above 1000 MHz)

Please refer to the Appendix D.

Remark:

- (1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5. 20dB SPECTRUM BANDWIDTH MEASUREMENT

5.1 LIMIT

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table.

Fundamental Frequency	20dB Bandwidth Limits (MHz)
433.92 MHz	1.0848

5.2 MEASURING INSTRUMENTS AND SETTING

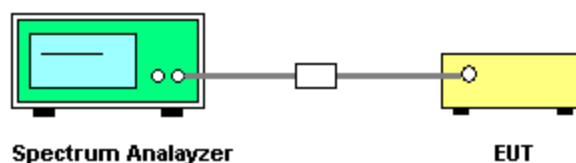
Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RB	10 kHz
VB	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 10 kHz and the video bandwidth of 10 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

5.4 TEST SETUP LAYOUT



5.5 TEST DEVIATION

There is no deviation with the original standard.

5.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

5.7 EUT TEST CONDITIONS

Temperature: 24° C
Relative Humidity: 52%
Test Voltage: DC 3V

5.8 TEST RESULTS

Please refer to the Appendix E.

6. TIMING TESTING

6.1 LIMIT

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.2 MEASURING INSTRUMENTS AND SETTING

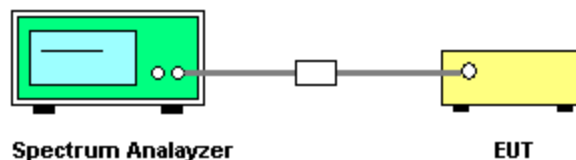
Please refer to section 6 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	Zero Span
RB	1MHz
VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	8 seconds

6.3 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 1MHz and the video bandwidth of 1MHz were used.

6.4 TEST SETUP LAYOUT



6.5 TEST DEVIATION

There is no deviation with the original standard.

6.6 EUT OPERATION DURING TEST

The EUT was programmed to be in normal mode.

6.7 EUT OPERATION DURING TEST

Temperature: 24° C
Relative Humidity: 52%
Test Voltage: DC 3V

6.8 TEST RESULTS

Please refer to the Appendix F.

7. MEASUREMENT INSTRUMENTS LIST AND SETTING

Radiated Emission Measurement - Below 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 11, 2019
2	Amplifier	HP	8447D	2944A09673	Oct. 19, 2018
3	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
4	Cable	emci	LMR-400(30MHz-1GHz)(8m+5m)	N/A	Jun. 26, 2019
5	Controller	CT	SC100	N/A	N/A
6	Controller	MF	MF-7802	MF780208416	N/A
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
8	Antenna	EM	EM-6876-1	230	Feb. 07, 2019
9	Cable	N/A	RG 213/U	C-102	Jun. 01, 2019
10	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019

Radiated Emission Measurement - Above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 11, 2019
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2019
3	Amplifier	Agilent	8449B	3008A02274	Mar. 11, 2019
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 11, 2019
5	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
6	Controller	CT	SC100	N/A	N/A
7	Controller	MF	MF-7802	MF780208416	N/A
8	Cable	emci	EMC104-SM-SM-1 2000(12m)	N/A	Jun. 26, 2019
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

20dB Spectrum Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018
2	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 14, 2019

Timing Testing					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018
2	Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 14, 2019

Remark: "N/A" denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

8. EUT TEST PHOTO

Radiated Measurement Photos

9KHz to 30MHz



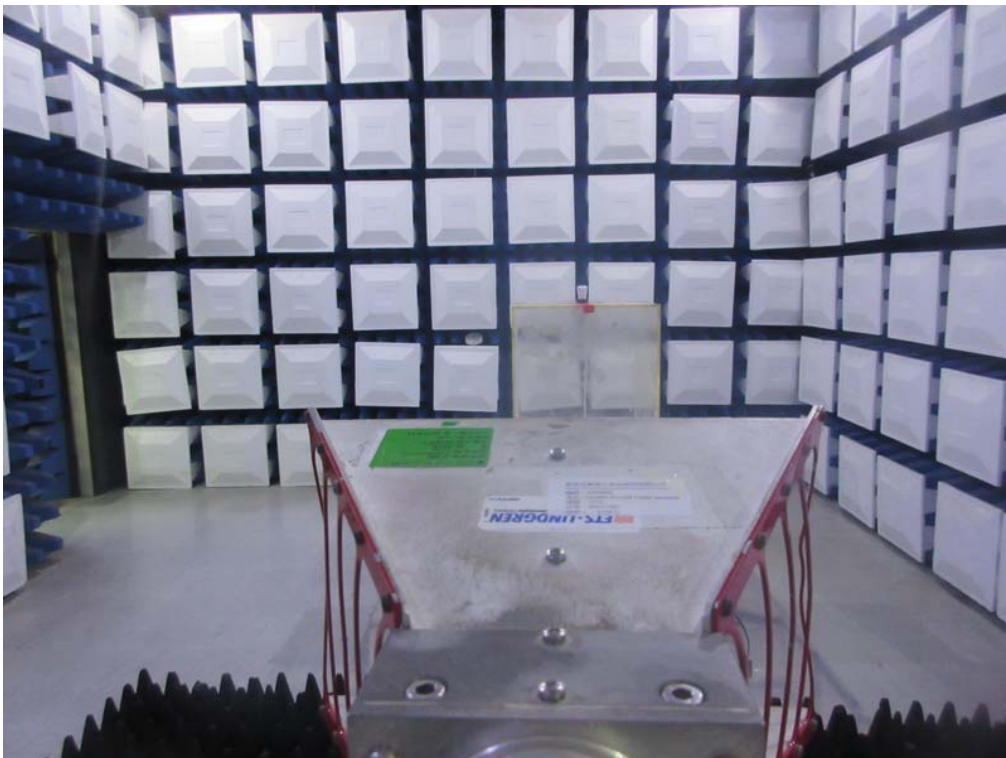
Radiated Measurement Photos

30MHz to 1000MHz



Radiated Measurement Photos

Above 1000MHz



APPENDIX A – CONDUCTED EMISSION

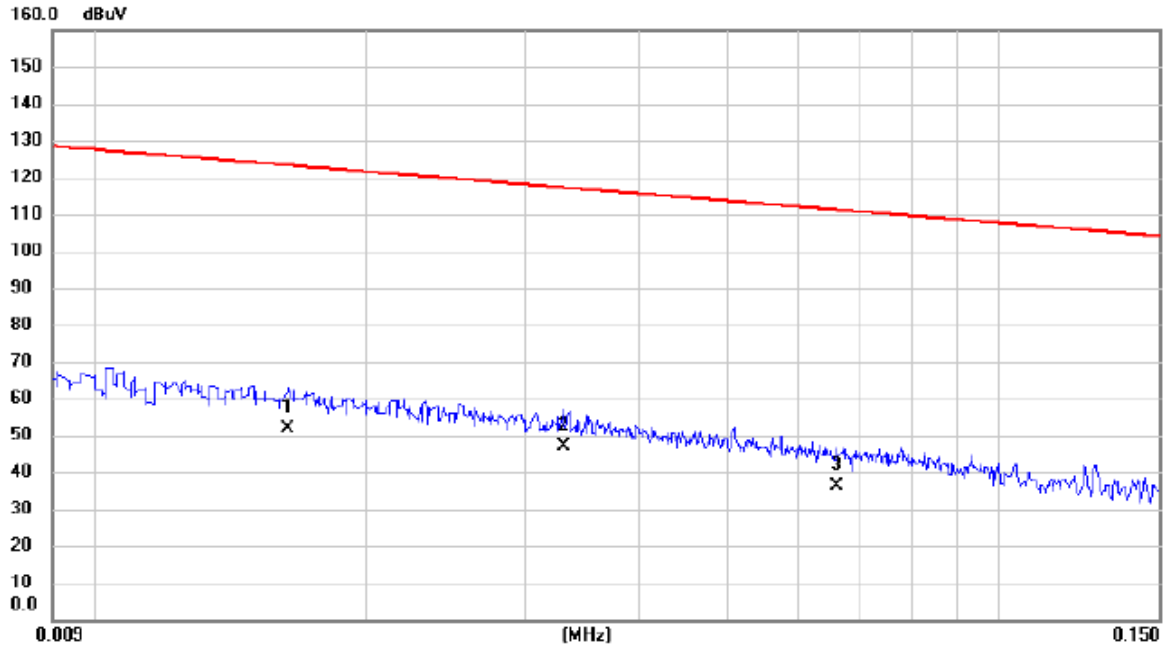
Test Mode: N/A

Note: “N/A” denotes test is not applicable to this device.

APPENDIX B – RADIATED EMISSION (9KHZ to30MHZ)

Test Mode: TX CH 433.92MHz

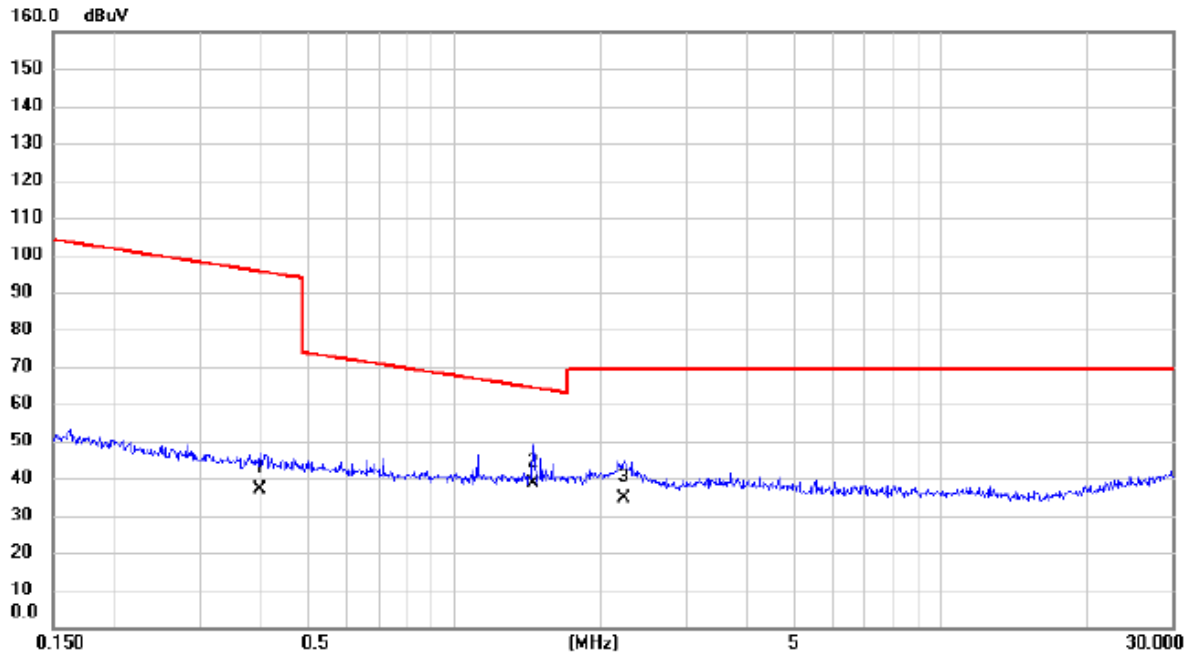
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.0164	31.70	20.09	51.79	123.31	-71.52	AVG	
2	*	0.0330	27.60	19.23	46.83	117.23	-70.40	AVG	
3		0.0662	17.80	18.41	36.21	111.19	-74.98	AVG	

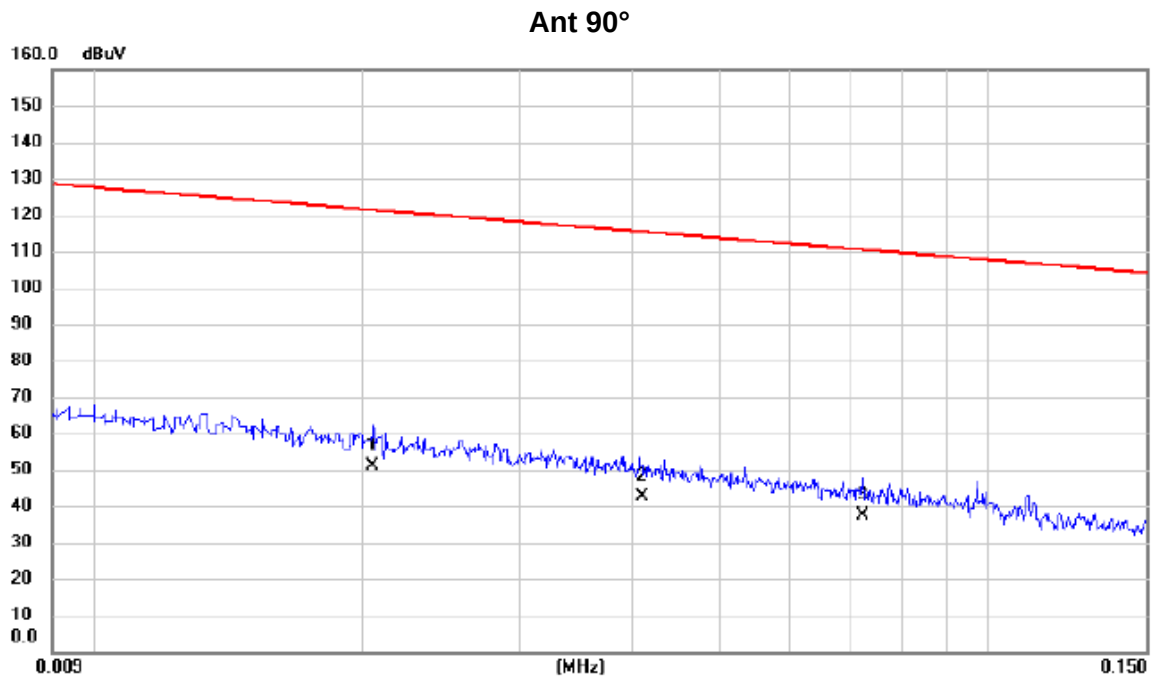
Test Mode: TX CH 433.92MHz

Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.3997	20.50	16.54	37.04	95.57	-58.53	AVG	
2	*	1.4562	22.80	15.72	38.52	64.34	-25.82	QP	
3		2.2367	19.20	15.44	34.64	69.54	-34.90	QP	

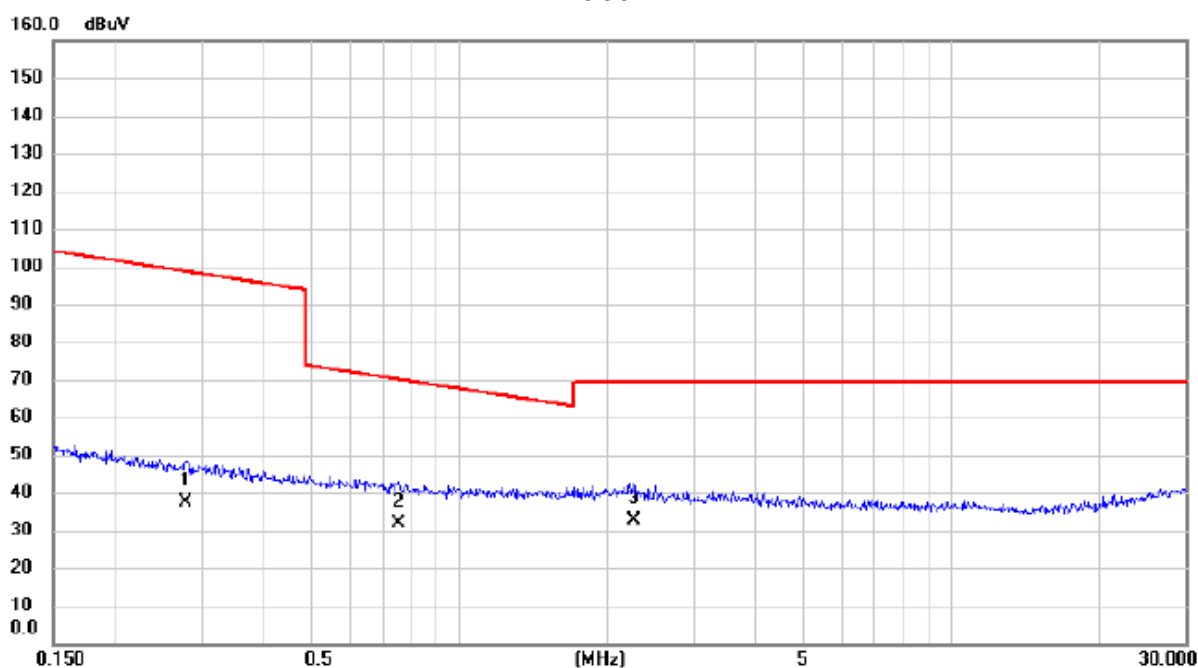
Test Mode:	TX CH 433.92MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.0205	31.40	19.61	51.01	121.37	-70.36	AVG	
2		0.0410	23.50	18.99	42.49	115.35	-72.86	AVG	
3		0.0724	19.10	18.28	37.38	110.41	-73.03	AVG	

Test Mode: TX CH 433.92MHz

Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2788	20.90	16.64	37.54	98.70	-61.16	AVG	
2		0.7550	15.70	16.17	31.87	70.05	-38.18	QP	
3	*	2.2726	17.10	15.44	32.54	69.54	-37.00	QP	

APPENDIX C – RADIATED EMISSION (30MHZ to 1000MHZ)

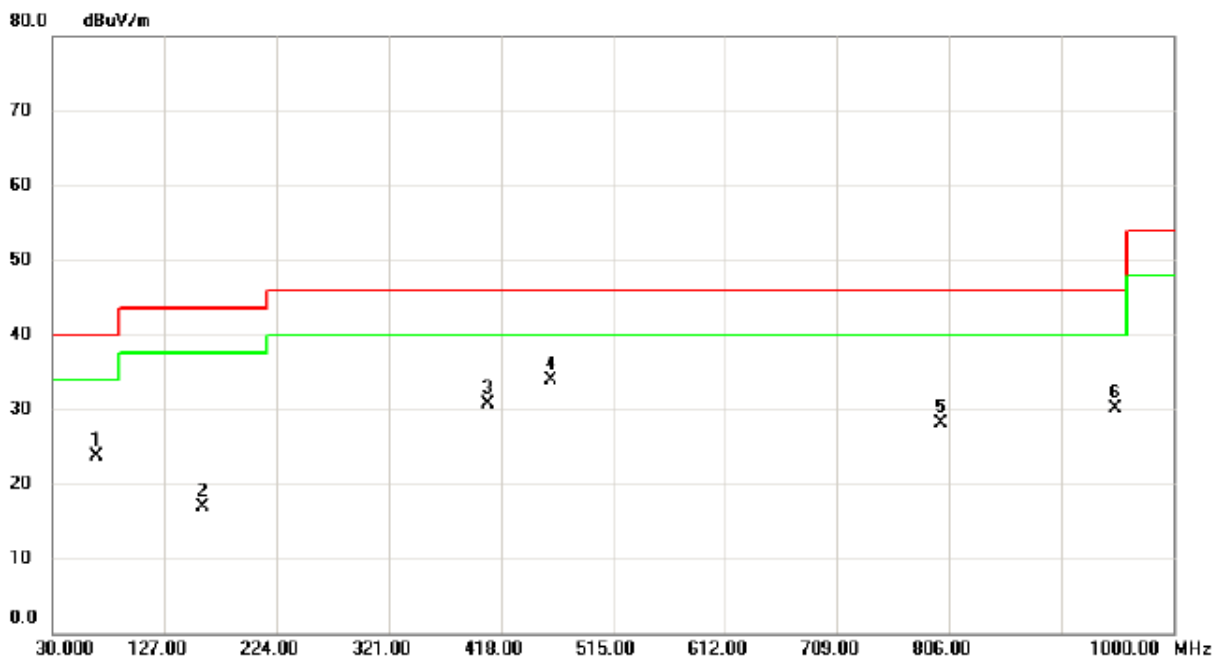
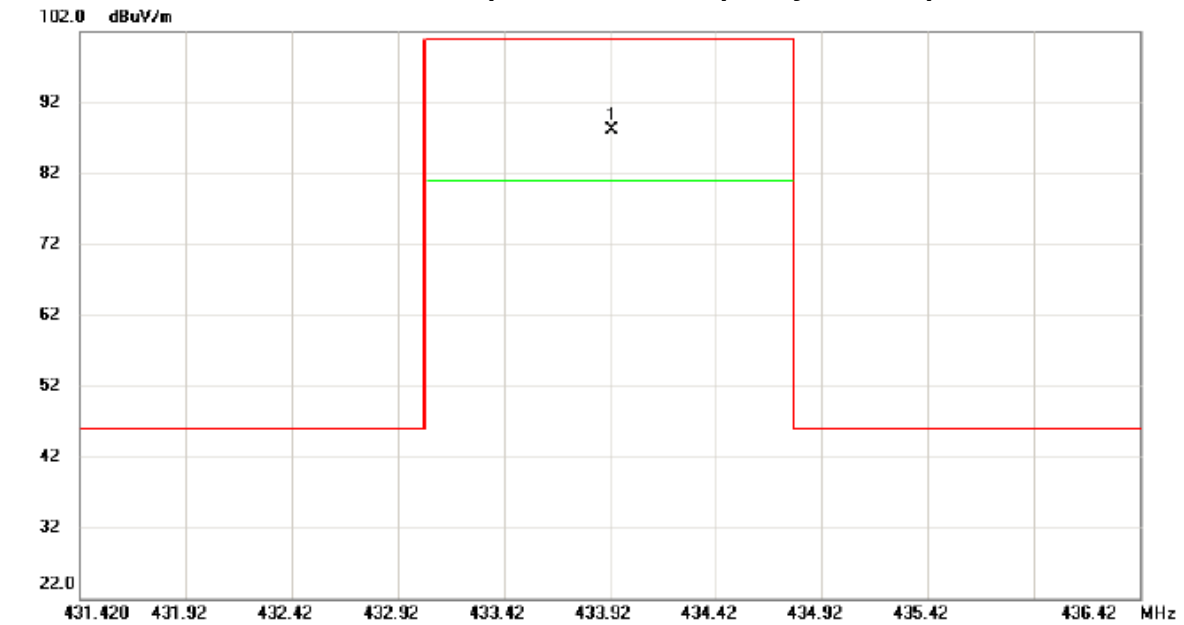
Test Mode :	TX CH 433.92MHz
About the duty cycle correction factor calculated, please refer to the page 16	

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.930	V	96.83		-8.74	88.09	78.41	100.83	80.83	Z/F
460.680	V	42.23		-8.34	33.89	24.21	80.83	60.83	Z/H

Remark:

- (1) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle), Final AV=PK-9.68

Orthogonal Axis: Z
TX 433.92 MHz (Fundamental frequency, Vertical)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		67.830	41.18	-17.53	23.65	40.00	-16.35	peak	
2		159.980	28.10	-11.29	16.81	43.50	-26.69	peak	
3		406.360	40.62	-9.84	30.78	46.00	-15.22	peak	
4	*	460.680	42.23	-8.34	33.89	46.00	-12.11	peak	
5		799.210	29.79	-1.66	28.13	46.00	-17.87	peak	
6		949.560	29.23	0.91	30.14	46.00	-15.86	peak	

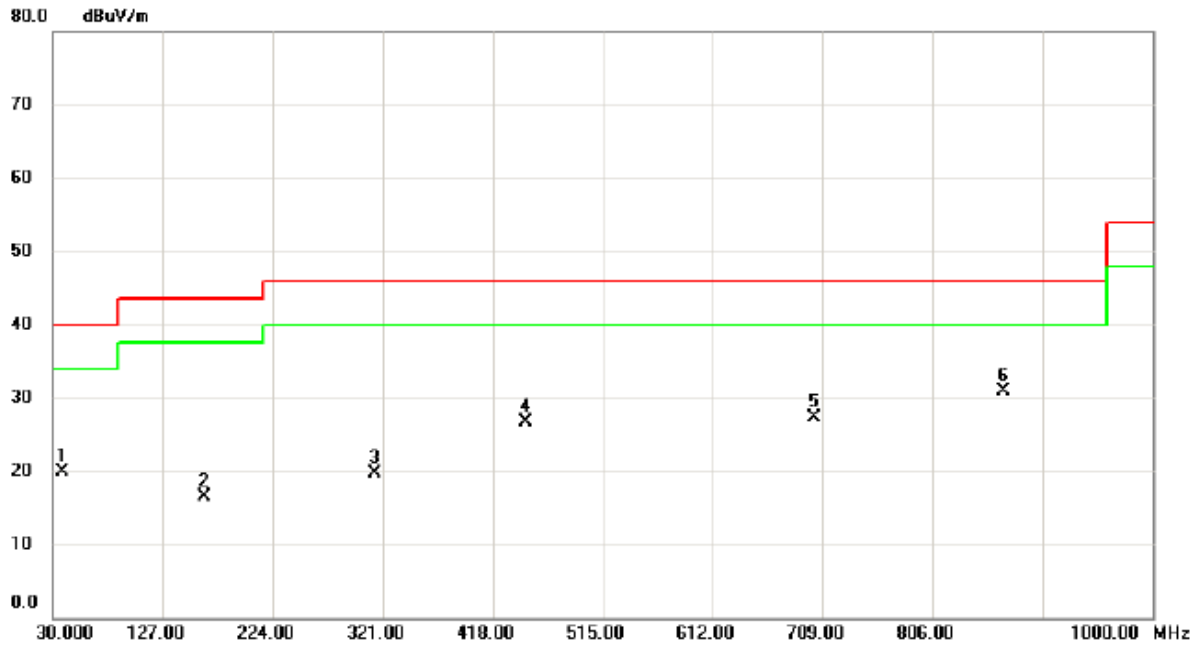
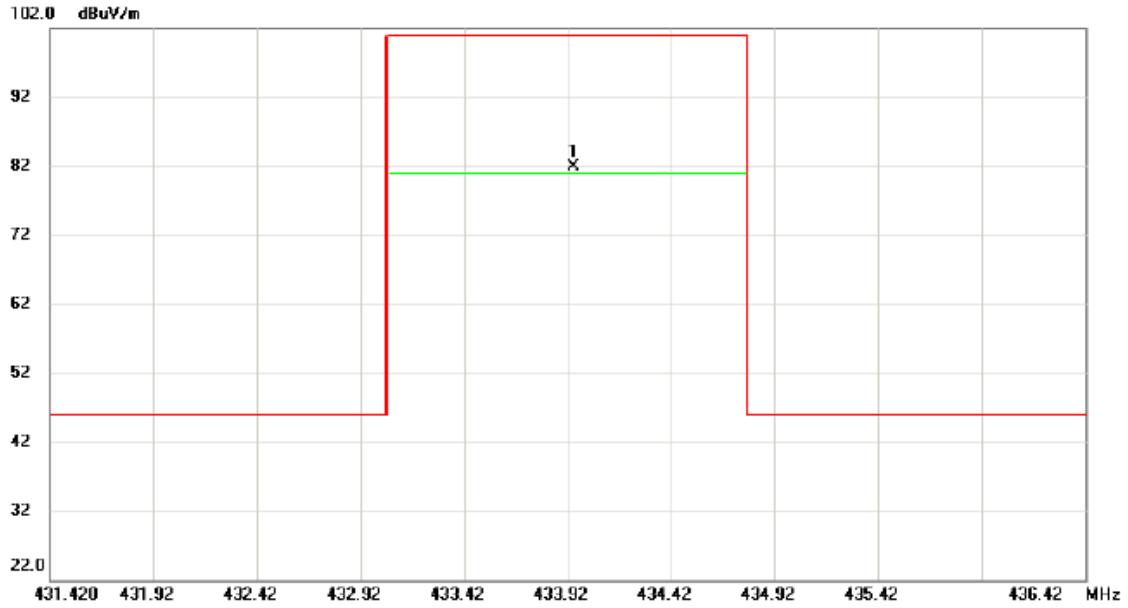
Test Mode :	TX CH 433.92MHz
About the duty cycle correction factor calculated, please refer to the page 16	

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
433.950	H	90.67		-8.74	81.93	72.25	100.83	80.83	Z/F
868.080	H	32.83		-1.90	30.93	21.25	80.83	60.83	Z/H

Remark:

- (1) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle), Final AV=PK-9.68

Orthogonal Axis: Z
TX 433.92 MHz (Fundamental frequency, *Horizontal*)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		37.760	34.93	-15.09	19.84	40.00	-20.16	peak	
2		163.860	28.08	-11.53	16.55	43.50	-26.95	peak	
3		314.210	31.12	-11.32	19.80	46.00	-26.20	peak	
4		447.100	35.01	-8.23	26.78	46.00	-19.22	peak	
5		701.240	30.72	-3.43	27.29	46.00	-18.71	peak	
6	*	868.080	32.83	-1.90	30.93	46.00	-15.07	peak	

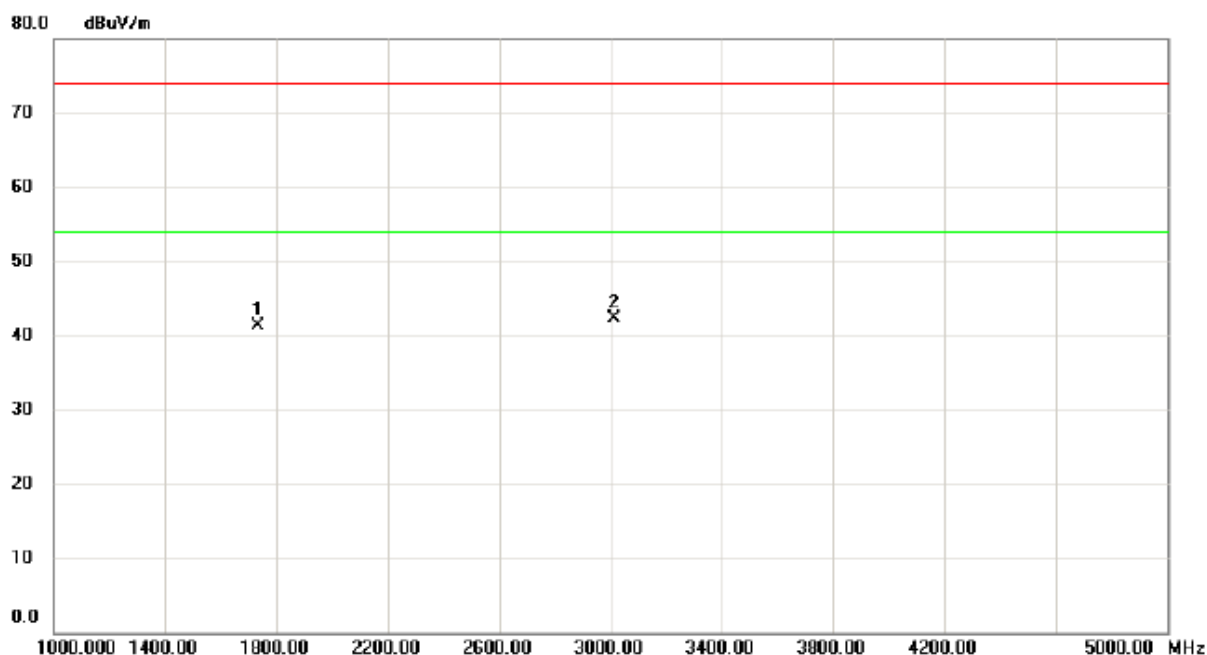
APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

Test Mode :	TX CH 433.92MHz
About the duty cycle correction factor calculated, please refer to the page 16	

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
3012.00	V	40.17		2.19	42.36		80.83		-38.47		Z/E

Remark:

(1) Peak value is much lower than the limit, so AV value isn't shown on this test item.

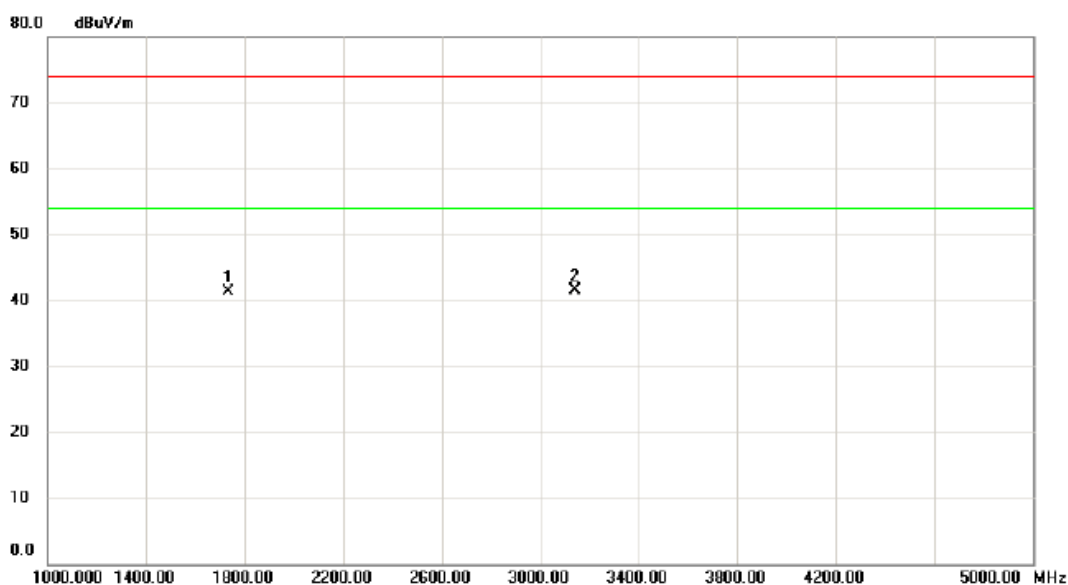


Test Mode :	TX CH 433.92MHz
About the duty cycle correction factor calculated, please refer to the page 16	

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
3140.00	H	39.34		2.24	41.58		80.83		-39.25		Z/E

Remark:

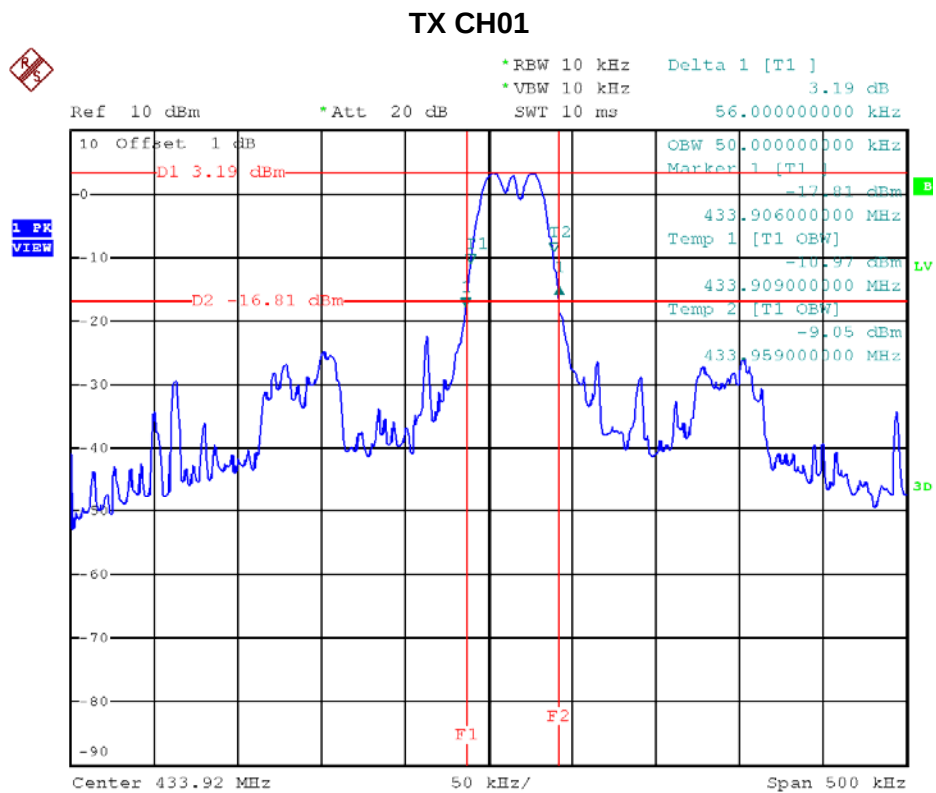
(1) Peak value is much lower than the limit, so AV value isn't shown on this test item.



APPENDIX E - 20dB SPECTRUMBANDWIDTH

Test Mode :	TX CH 433.92MHz
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Frequency (MHz)	20dB Bandwidth (kHz)	99% Occupied BW(kHz)	20 dB BW Limits (MHz)
433.92	56.00	50.00	1.0848

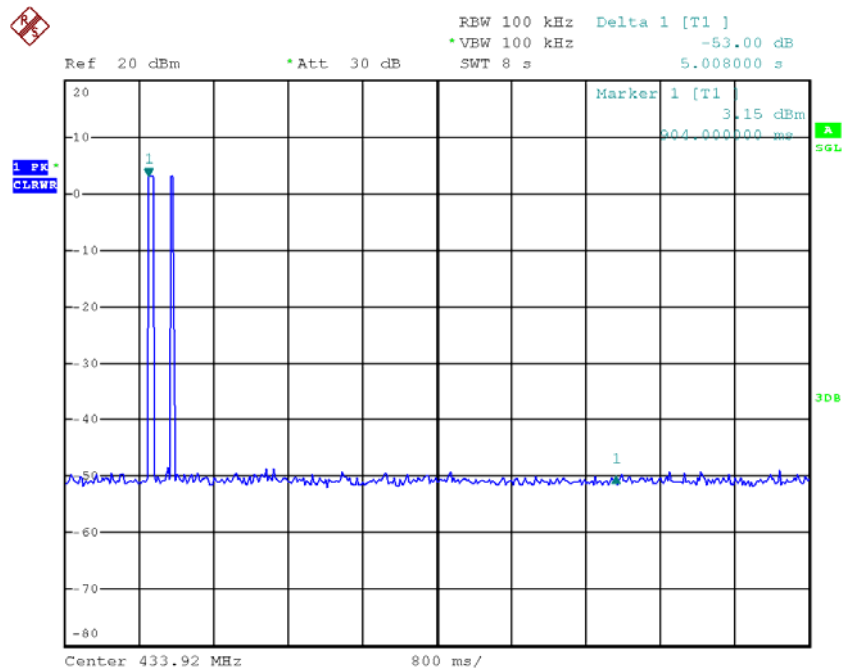


Date: 14.MAY.2018 19:14:48

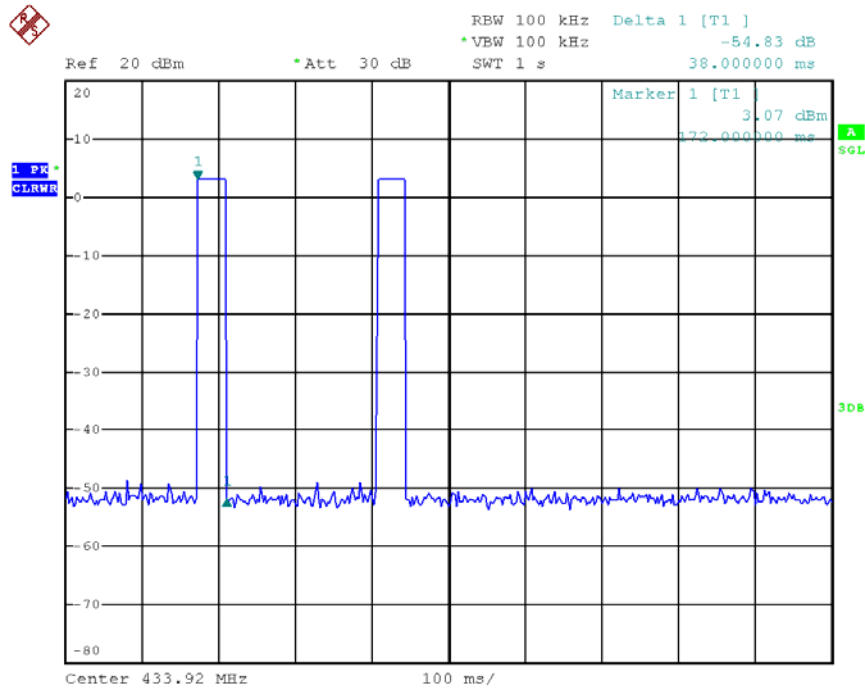
APPENDIX F - TIMING TESTING

Test Mode:	TX CH 433.92MHz
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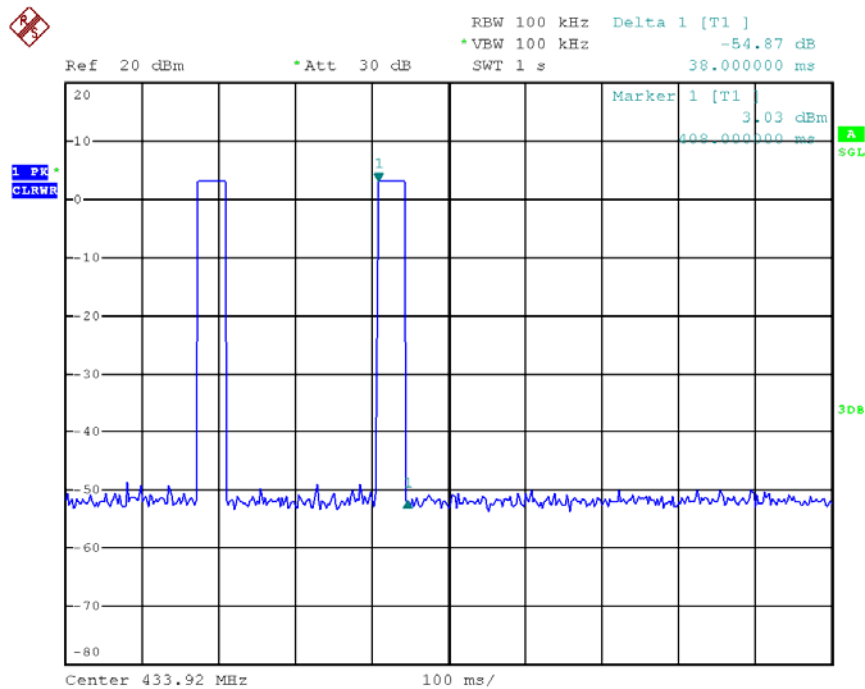
Activation Time(s)	Limit: not more than 5 seconds of being released	Conclusion
0.076	5	PASS



Date: 17.JUL.2018 10:07:45



Date: 17.JUL.2018 10:09:12



Date: 17.JUL.2018 10:09:40