

TEST REPORT

Applicant: CoreTigo Ltd

Address of Applicant: Giborey Israel 5, Poleg, Natanya, Israel 4250405

Manufacturer/Factory: CoreTigo Ltd

Address of Manufacturer/Factory: Giborey Israel 5, Poleg, Natanya, Israel 4250405

Equipment Under Test (EUT)

Product Name: TigoBridge

Model No.: TigoBridge B1

Trade Mark: CoreTigo

FCC ID: 2ATSM-TGBRIDGEA1

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: September 01, 2021

Date of Test: September 02, 2021-October 26, 2021

Date of report issued: October 26, 2021

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

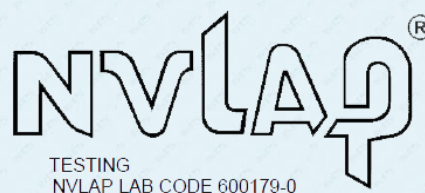
Authorized Signature:



Robinson Luo

Laboratory Manager

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TESTING
NVLAP LAB CODE 600179-0

2 Version

Version No.	Date	Description
00	October 26, 2021	Original

Prepared By:

Tiger Chen

Date:

October 26, 2021

Project Engineer

Check By:

Robinson Lu

Date:

October 26, 2021

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	N/A
Conducted Output Power	15.247 (b)(3)	N/A
Channel Bandwidth	15.247 (a)(2)	N/A
Power Spectral Density	15.247 (e)	N/A
Band Edge	15.247(d)	N/A
Spurious Emission	15.205/15.209	Pass

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	TigoBridge
Model No.:	TigoBridge B1
Test sample(s) ID:	GTS202109000002-1
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	2401MHz~2480MHz
Channel Numbers:	80
Channel Separation:	1MHz
Modulation Type:	GFSK
Antenna Type:	Integral Antenna
Antenna Gain:	2.0dBi(Declare by applicant)
Power Supply:	DC 18V-32V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2401MHz	21	2421MHz	41	2441MHz	61	2461MHz
2	2402MHz	22	2422MHz	42	2442MHz	62	2462MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
19	2419MHz	39	2439MHz	59	2459MHz	79	2479MHz
20	2420MHz	40	2440MHz	60	2460MHz	80	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2401MHz
The middle channel	2441MHz
The Highest channel	2480MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
CINCON	Adapter	TRE25240-E	NA
Lenovo	Notebook PC	E40-80	N/A

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: • FCC—Registration No.: 381383 Designation Number: CN5029 Global United Technology Services Co., Ltd., Shenzhen 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 files. • IC —Registration No.: 9079A CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing • NVLAP (LAB CODE:600179-0) Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).
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5.7 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

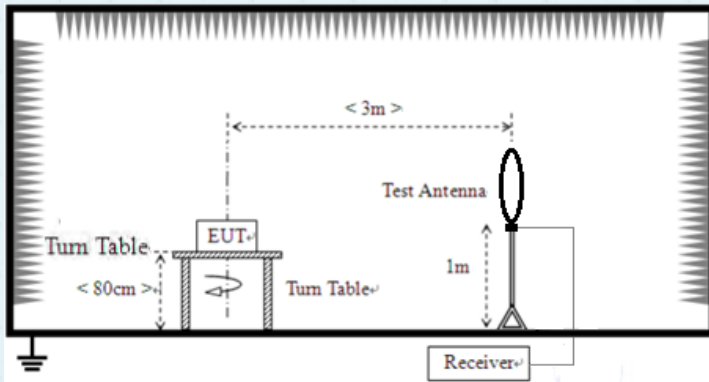
7 Test results and Measurement Data

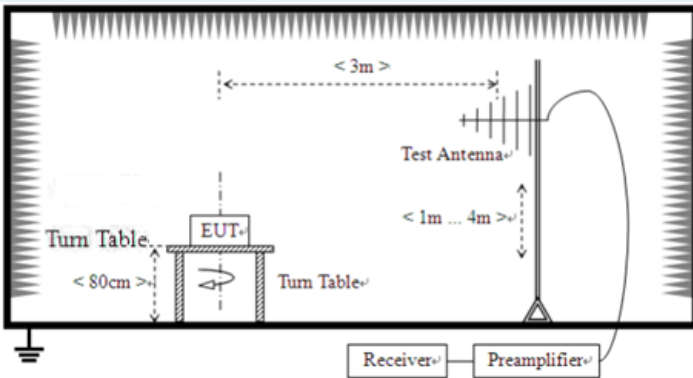
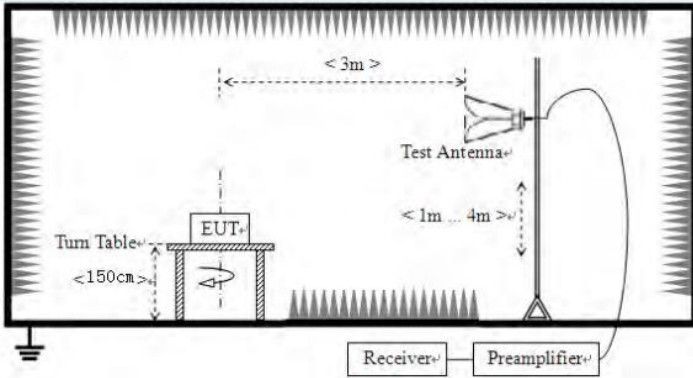
7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 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, 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.	
15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
<i>The antenna is Integral antenna; the best case gain of the antenna is 2.0dBi, reference to the appendix II for details.</i>	

7.2 Spurious Emission

7.2.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit:	Frequency	Limit (uV/m)		Value	Measurement Distance
	0.009MHz-0.490MHz	2400/F(KHz)		QP	300m
	0.490MHz-1.705MHz	24000/F(KHz)		QP	30m
	1.705MHz-30MHz	30		QP	30m
	30MHz-88MHz	100		QP	3m
	88MHz-216MHz	150		QP	
	216MHz-960MHz	200		QP	
	960MHz-1GHz	500		QP	
	Above 1GHz	500		Average	
		5000		Peak	
Test setup:	For radiated emissions from 9kHz to 30MHz				
					

	For radiated emissions from 30MHz to 1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details

Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Measurement data:

Remark:

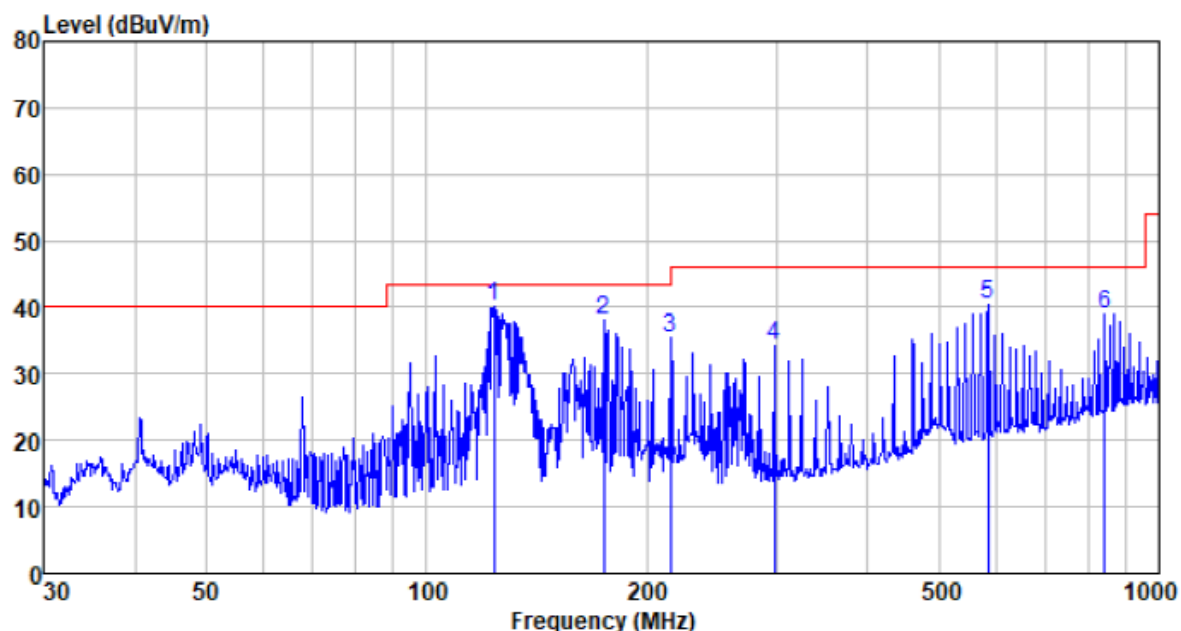
Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

■ 9kHz~30MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

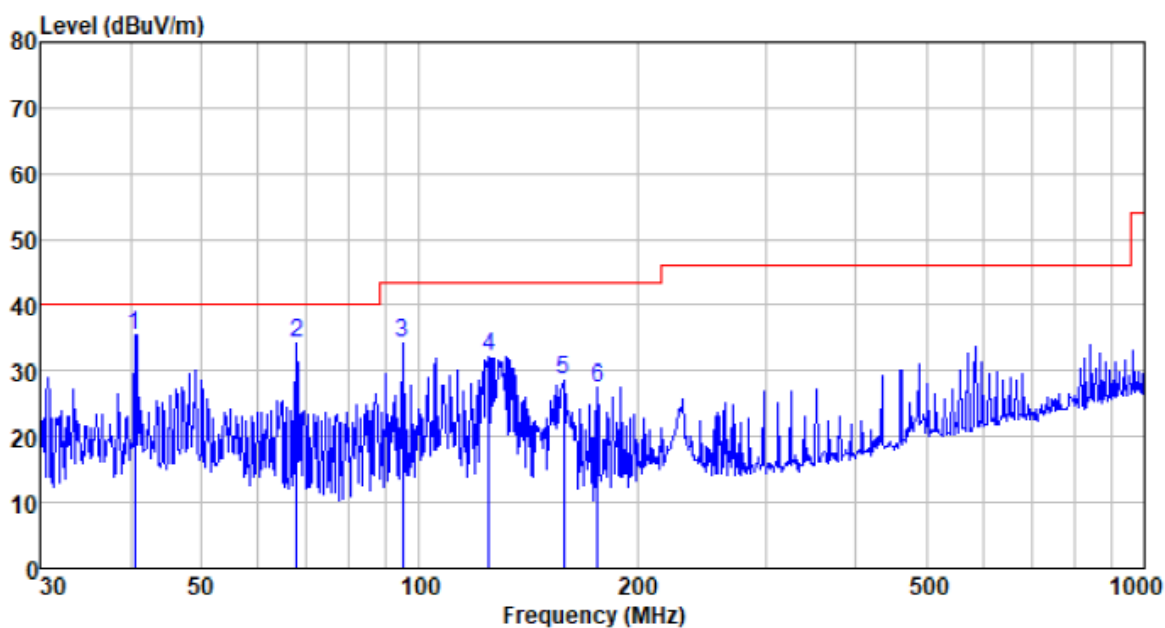
■ Below 1GHz

Pre-scan all test modes, found worst case at 2480MHz, and so only show the test result of 2480MHz
Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
123.699	64.91	9.96	1.39	36.15	40.11	43.50	-3.39	QP
174.424	63.04	9.58	1.71	36.13	38.20	43.50	-5.30	QP
215.268	57.73	11.80	1.93	36.12	35.34	43.50	-8.16	QP
298.268	53.98	13.95	2.35	36.09	34.19	46.00	-11.81	QP
584.790	53.59	19.01	3.66	35.93	40.33	46.00	-5.67	QP
842.130	48.57	21.55	4.63	35.69	39.06	46.00	-6.94	QP

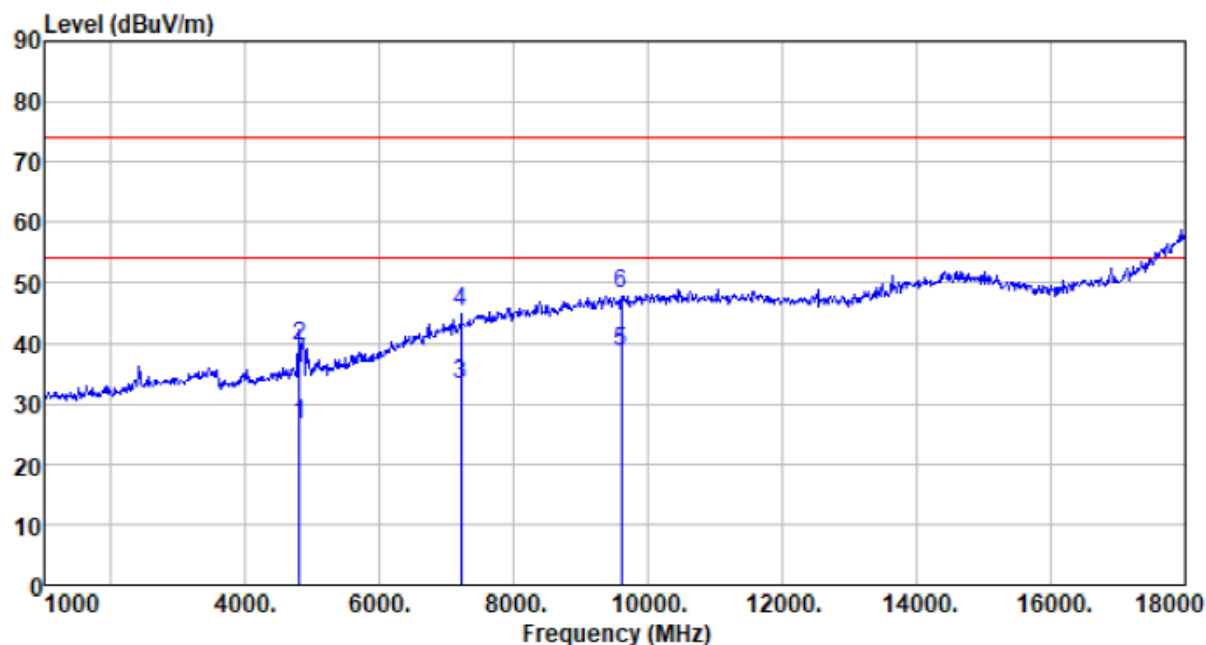
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
40.559	57.11	12.35	0.67	34.78	35.35	40.00	-4.65	QP
67.675	59.02	9.86	0.92	35.45	34.35	40.00	-5.65	QP
94.760	57.83	11.37	1.15	36.04	34.31	43.50	-9.19	QP
124.569	57.11	9.85	1.40	36.15	32.21	43.50	-11.29	QP
158.112	54.32	8.91	1.62	36.14	28.71	43.50	-14.79	QP
176.269	52.26	9.65	1.72	36.13	27.50	43.50	-16.00	QP

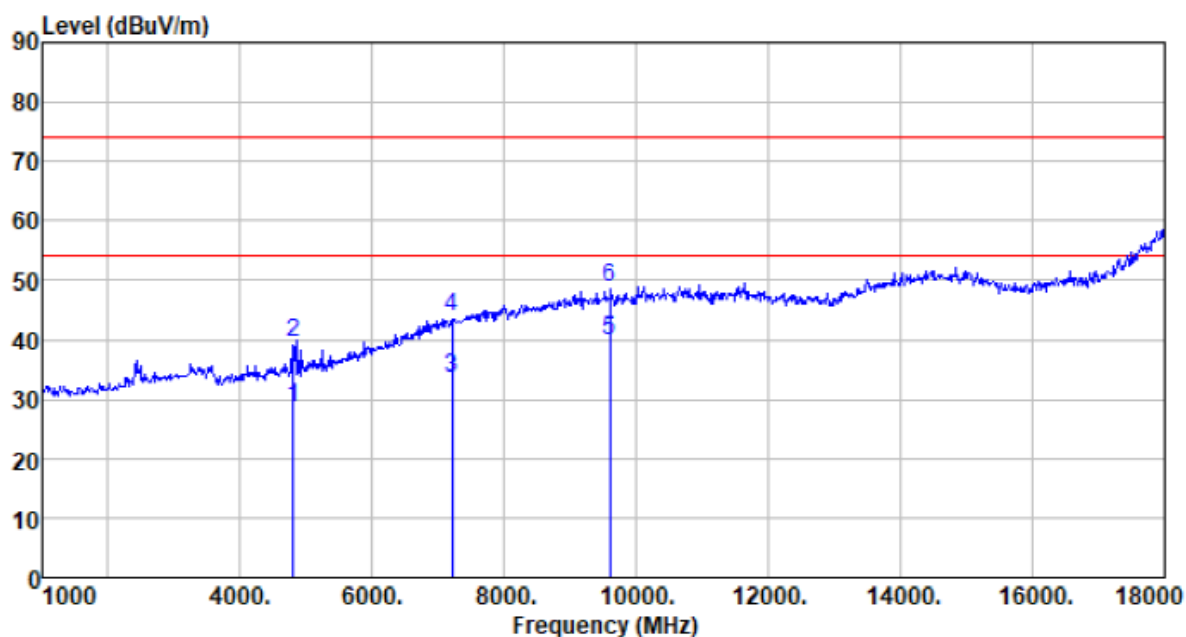
■ Above 1GHz

Test channel:	Lowest	Polarization:	Horizontal
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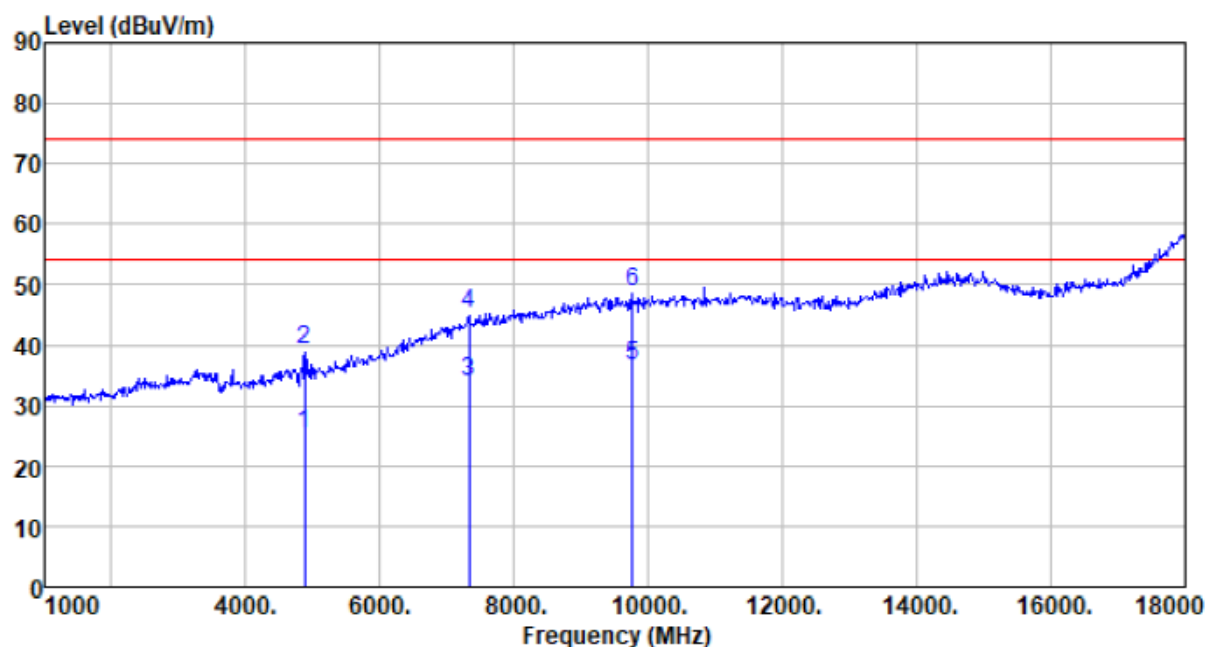
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4802.000	28.63	31.20	4.61	37.73	26.71	54.00	-27.29	Average
4802.000	41.50	31.20	4.61	37.73	39.58	74.00	-34.42	Peak
7203.000	26.30	36.16	6.48	35.63	33.31	54.00	-20.69	Average
7203.000	38.02	36.16	6.48	35.63	45.03	74.00	-28.97	Peak
9604.000	27.61	37.93	7.97	34.94	38.57	54.00	-15.43	Average
9604.000	37.16	37.93	7.97	34.94	48.12	74.00	-25.88	Peak

Test channel:	Lowest	Polarization:	Vertical
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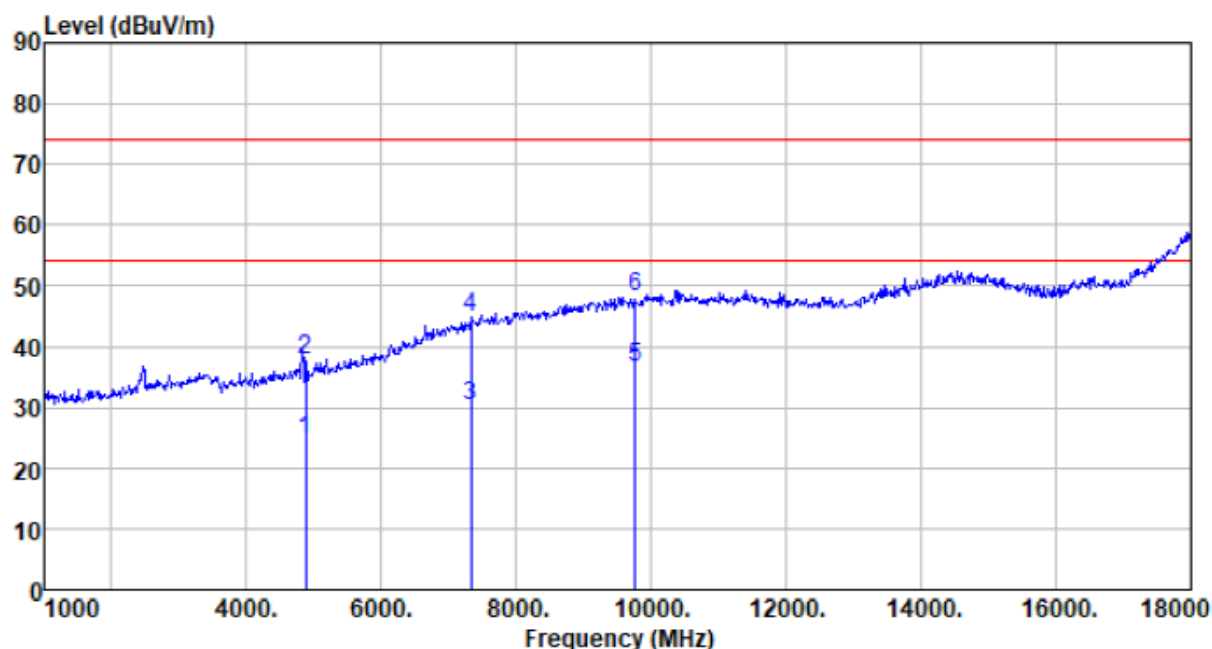
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4802.000	30.65	31.20	4.61	37.73	28.73	54.00	-25.27	Average
4802.000	41.58	31.20	4.61	37.73	39.66	74.00	-34.34	Peak
7203.000	26.47	36.16	6.48	35.63	33.48	54.00	-20.52	Average
7203.000	36.71	36.16	6.48	35.63	43.72	74.00	-30.28	Peak
9604.000	29.00	37.93	7.97	34.94	39.96	54.00	-14.04	Average
9604.000	37.75	37.93	7.97	34.94	48.71	74.00	-25.29	Peak

Test channel:	Middle	Polarization:	Horizontal
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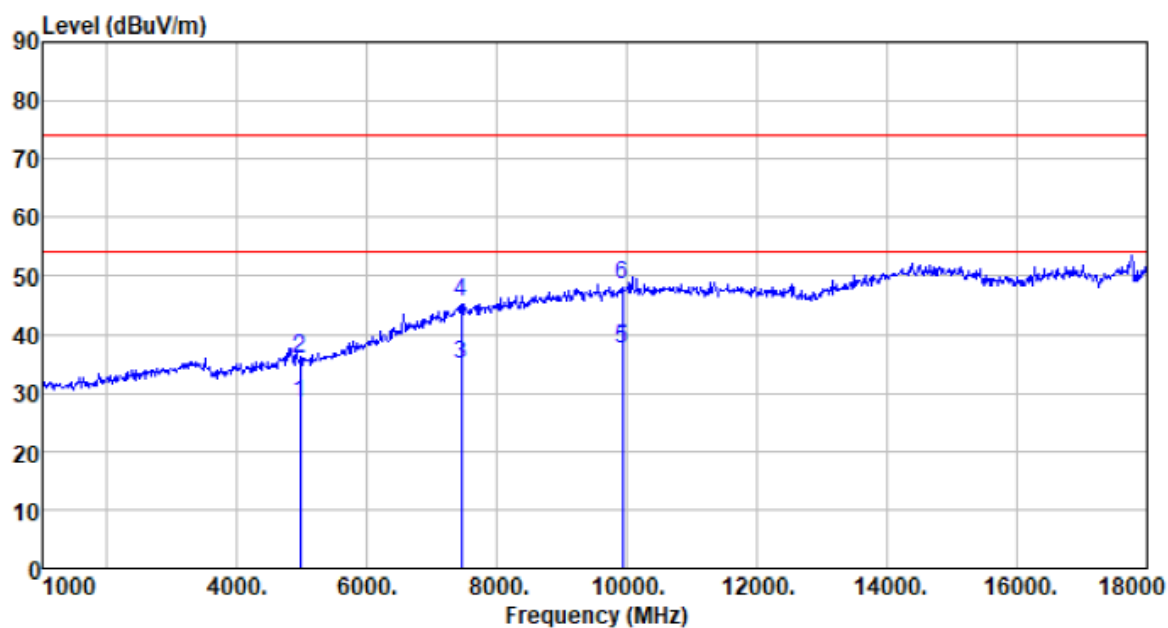
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4882.000	27.00	31.33	4.69	37.76	25.26	54.00	-28.74	Average
4882.000	40.87	31.33	4.69	37.76	39.13	74.00	-34.87	Peak
7323.000	26.26	36.43	6.63	35.60	33.72	54.00	-20.28	Average
7323.000	37.68	36.43	6.63	35.60	45.14	74.00	-28.86	Peak
9764.000	25.35	38.10	8.03	35.03	36.45	54.00	-17.55	Average
9764.000	37.75	38.10	8.03	35.03	48.85	74.00	-25.15	Peak

Test channel:	Middle	Polarization:	Vertical
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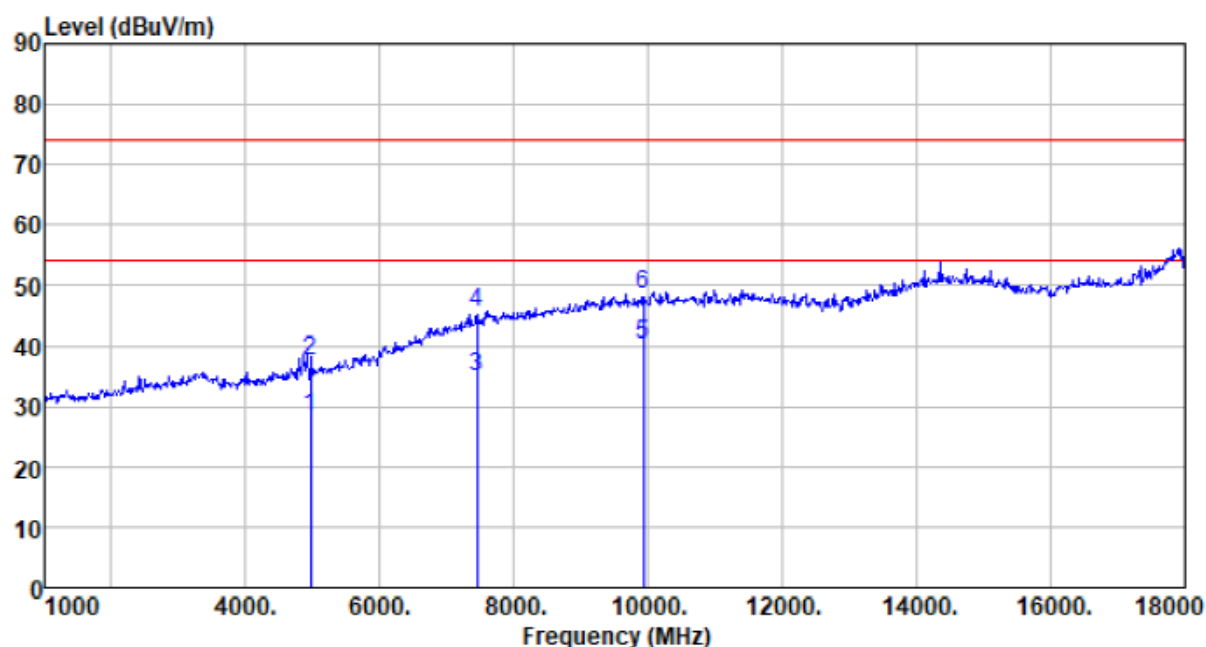
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4882.000	26.37	31.33	4.69	37.76	24.63	54.00	-29.37	Average
4882.000	39.69	31.33	4.69	37.76	37.95	74.00	-36.05	Peak
7323.000	22.68	36.43	6.63	35.60	30.14	54.00	-23.86	Average
7323.000	37.33	36.43	6.63	35.60	44.79	74.00	-29.21	Peak
9764.000	25.39	38.10	8.03	35.03	36.49	54.00	-17.51	Average
9764.000	37.17	38.10	8.03	35.03	48.27	74.00	-25.73	Peak

Test channel:	Highest	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4960.000	29.68	31.44	4.79	37.78	28.13	54.00	-25.87	Average
4960.000	37.50	31.44	4.79	37.78	35.95	74.00	-38.05	Peak
7440.000	26.98	36.66	6.77	35.56	34.85	54.00	-19.15	Average
7440.000	37.55	36.66	6.77	35.56	45.42	74.00	-28.58	Peak
9920.000	26.14	38.30	8.09	35.14	37.39	54.00	-16.61	Average
9920.000	37.22	38.30	8.09	35.14	48.47	74.00	-25.53	Peak

Test channel:	Highest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4960.000	29.77	31.44	4.79	37.78	28.22	54.00	-25.78	Average
4960.000	39.21	31.44	4.79	37.78	37.66	74.00	-36.34	Peak
7440.000	27.16	36.66	6.77	35.56	35.03	54.00	-18.97	Average
7440.000	37.62	36.66	6.77	35.56	45.49	74.00	-28.51	Peak
9920.000	28.97	38.30	8.09	35.14	40.22	54.00	-13.78	Average
9920.000	37.25	38.30	8.09	35.14	48.50	74.00	-25.50	Peak

Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----