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FCC Part 15B TEST REPORT

Report No.: STS2104059E01

Issued for

ABSOLUTE SOLUTION CO., LTD

111/11 Soi Kubon35-37, Kubon Rd. Bangchan Klongsamwa,
Bangkok, 10510, Thailand

Product Name:	Core board module 4G
Brand Name:	SHADOW
Model Name:	ABSL-G
Series Model:	XY6762CA-C
FCC ID:	2AZVC-ABSL-G
Test Standard:	FCC 47 CFR Part 15: Subpart B

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**TEST RESULT CERTIFICATION**

Applicant's Name : ABSOLUTE SOLUTION CO., LTD
Address : 111/11 Soi Kubon35-37, Kubon Rd. Bangchan Klongsamwa, Bangkok, 10510, Thailand

Manufacture's Name : ABSOLUTE SOLUTION CO., LTD
Address : 111/11 Soi Kubon35-37, Kubon Rd. Bangchan Klongsamwa, Bangkok, 10510, Thailand

Product Description

Product Name : Core board module 4G
Brand Name : SHADOW
Model Name : ABSL-G
Series Model : XY6762CA-C

Standards : FCC 47 CFR Part 15: Subpart B

Test Procedure : ANSI C63.4-2014

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Date of Test :

Date of Receipt of Test Item : 26 Apr. 2021

Date of Performance of Tests : 26 Apr. 2021 ~ 10 May 2021

Date of Issue : 10 May 2021

Test Result : **Pass**

Compiled by :

(Bulun)

Technical Manager :

(Barry Li)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	10 May 2021	STS2104059E01	ALL	Initial Issue





1. SUMMARY OF THE TEST RESULTS

Test procedures according to the technical standards:

EMISSION			
Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B	Conducted Emission	N/A	--
	Radiated Emission	PASS	Meet Class B limit

NOTE:

(1) N/A=Not Applicable.

1.1 TEST FACTORY

Company Name:	SHENZHEN STS TEST SERVICES CO.,LTD.
Address:	A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
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Registration No.:	FCC test Firm Registration Number: 625569
	IC test Firm Registration Number: 12108A
	A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 % .

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.79dB
2	Conducted Emission (150KHz-30MHz)	±2.80dB
3	All emissions, radiated(<1G) 30MHz-1000MHz	±4.39dB
4	All emissions, radiated(>1G) 1GHz-6GHz	±5.10dB
5	All emissions, radiated(>1G) 6GHz-26GHz	±5.48dB



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Core board module 4G	
Brand Name	SHADOW	
Model Name	ABSL-G	
Series Model	XY6762CA-C	
Model Difference	Only different in model name	
Frequency Bands	GSM	850: 824.2~849MHz
	WCDMA	Band V: 824~849MHz
	LTE	Band 5: 824~849MHz Band 41: 2555~2655MHz
	Bluetooth	2402~2480MHz
	2.4G WLAN	IEEE 802.11b/g/n(20MHz): 2412~2462 MHz IEEE 802.11n(40MHz): 2422~2452MHz
	5G WLAN	IEEE 802.11a/ n(HT20)/ac(VHT20): 5.180GHz-5.240GHz IEEE 802.11n(HT40)/ac(VHT40): 5.190GHz-5.310GHz IEEE 802.11ac(VHT80): 5.210GHz
		IEEE 802.11a/ n(HT20)/ac(VHT20): 5.260GHz-5.320GHz IEEE 802.11n(HT40)/ac(VHT40): 5.270GHz-5.310GHz IEEE 802.11ac(VHT80): 5.290GHz
		IEEE 802.11a/ n(HT20)/ac(VHT20): 5.500GHz-5.700GHz IEEE 802.11n(HT40)/ac(VHT40): 5.510GHz-5.670GHz IEEE 802.11ac(VHT80): 5.530GHz-5.610GHz
		IEEE 802.11a/ n(HT20)/ac(VHT20): 5.745GHz-5.825GHz IEEE 802.11n(HT40)/ac(VHT40): 5.755GHz-5.795GHz IEEE 802.11ac(VHT80): 5.775GHz
Modulation Mode	GSM	GMSK for GPRS; GMSK and 8PSK for EDGE
	WCDMA	QPSK; HSDPA:QPSK/16QAM; HSUPA:BPSK
	LTE	QPSK /16QAM
	Bluetooth	BT: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8DPSK(3Mbps) BLE: GFSK
	WLAN	2.4GHz: 802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM 5GHz: 802.11a(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11ac(OFDM):BPSK,QPSK,16-QAM,64-QAM,256-QAM
Power Rating	Input: 3.45~4.35V	
Hardware version number	K367-MB-V1.1	
Software version number	K367-XY6762CA-C.1616.01.P0.66.V1.1-userdebug	

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.2 DESCRIPTION OF THE TEST MODES

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

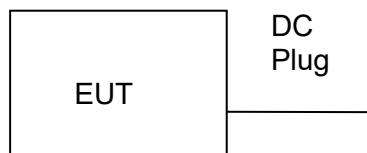
Pretest Mode	Description
Mode 1	GSM 850 Link+BT Link+WLAN(2.4G) Link
Mode 2	WCDMA850 Link+BT Link+WLAN(5G) Link
Mode 3	LTE B5 Link+BT Link+WLAN(5G) Link
Mode 4	LTE B41 Link+BT Link+WLAN(5G) Link

For Radiated Test	
Final Test Mode	Description
Mode 1	GSM 850 Link+BT Link+WLAN(2.4G) Link

Note:

1. For radiated emission test, test mode 1 was the worst case and only this mode was presented in this report.
2. We have been tested for all available U.S. voltage and frequencies (For 120V, 50/60Hz) for which the device is capable of operation.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF THE SYSTEM TESTED





2.4 DESCRIPTION OF THE 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.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) "YES" is means "with core"; "NO" is means "without core".



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

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.

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESCI	101427	2020.10.12	2021.10.11
Bi-log Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZB ECK	BBHA 9120D	1343	2020.10.12	2022.10.11
Pre-amplifier(1- 26.5G)	Agilent	8449B	3008A02383	2020.10.12	2021.10.11
Pre-amplifier(0.1M- 3GHz)	EM	EM330	060665	2020.10.12	2021.10.11
Spectrum Analyzer	Agilent	N9020A	MY49100060	2020.10.12	2021.10.11
RE Cable (9K-1G)	N/A	R01	N/A	2020.10.12	2021.10.11
RE Cable (1-26G)	N/A	R02	N/A	2020.10.12	2021.10.11
Temperature & Humidity	Mieo	HH660	N/A	2020.10.13	2021.10.12
Horn Antenna(18- 40G)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Testing Software	EZ-EMC(Ver.STSLAB-03A1 RE)				



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	<input type="checkbox"/> Class A (dB μ V)		<input checked="" type="checkbox"/> Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.5 ~ 5	73.00	60.00	56.00	46.00
5 ~ 30	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

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

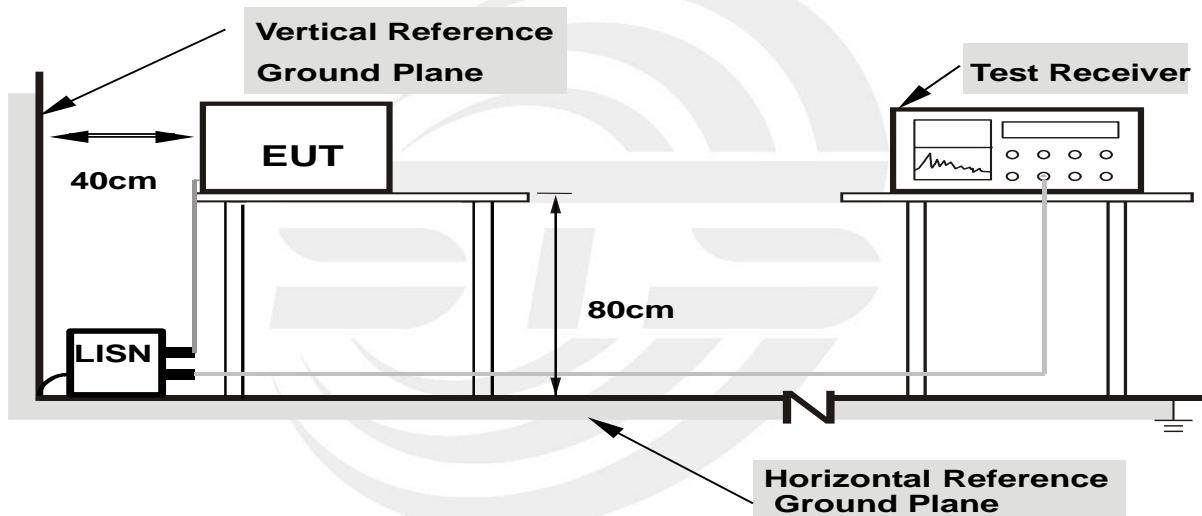
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane 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. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note:

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.5 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.



3.1.6 TEST RESULTS

Temperature:	26.8 °C	Relative Humidity:	66%
Phase:	L/N	Test Mode:	--
Test Voltage:	--	Test Date:	--

Note: N/A





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

Below 1 GHz

Measurement Method and Applied Limits:

ANSI C63.4:

Frequency (MHz)	<input type="checkbox"/> Class A		<input checked="" type="checkbox"/> Class B
	Field strength (dBuV/m) (at 10m)	Field strength (dBuV/m) (at 3m)	Field strength (dBuV/m) (at 3m)
30 ~ 88	39	49	40
88 ~ 216	43.5	53.5	43.5
216 ~ 960	46	56	46
Above 960	49.5	59.5	54

Above 1 GHz

Measurement Method and Applied Limits:

ANSI C63.4:

Frequency (MHz)	<input type="checkbox"/> Class A				<input checked="" type="checkbox"/> Class B	
	(dBuV/m) (at 3m)		(dBuV/m) (at 10m)		(dBuV/m) (at 3m)	
	Peak	Average	Peak	Average	Peak	Average
Above 1000	80	60	69.5	49.5	74	54

Frequency Range of Radiated Disturbance Measurement

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 ~ 108	1000
108 ~ 500	2000
500 ~ 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

Note:

- (1) The limit for radiated test was performed in the following: FCC PART 15B.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m) = 20log Emission level (uV/m).



3.2.2 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. EUT as the center to the edge of the auxiliary device, the distance from the maximum edge to the center of the antenna is 3 meter.
- c. The height of antenna is varied from 1 meter to 4 meter 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.
- d. 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 meter and the rotatable table was turned from 0 degrees to 360 degree to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

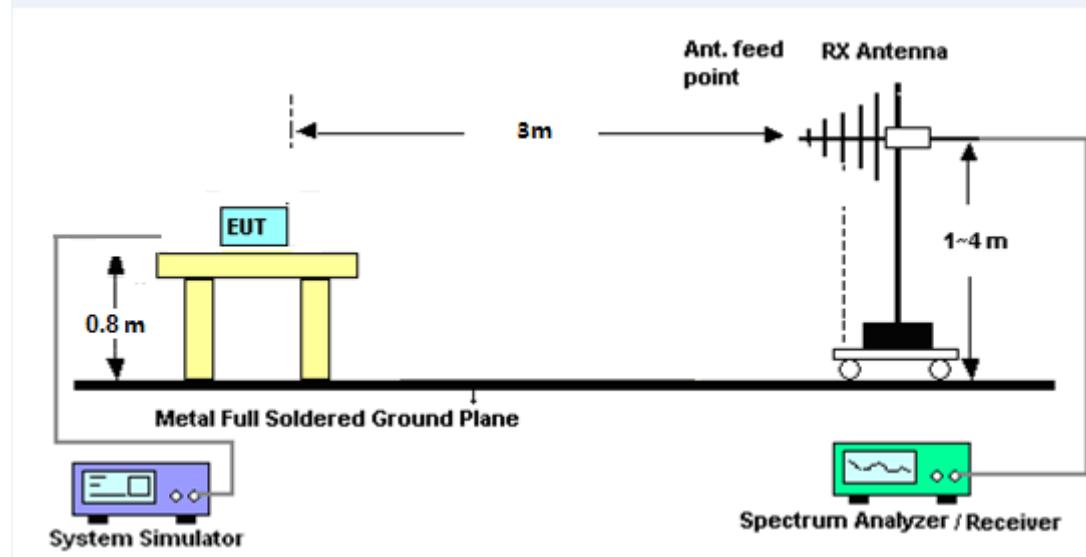
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

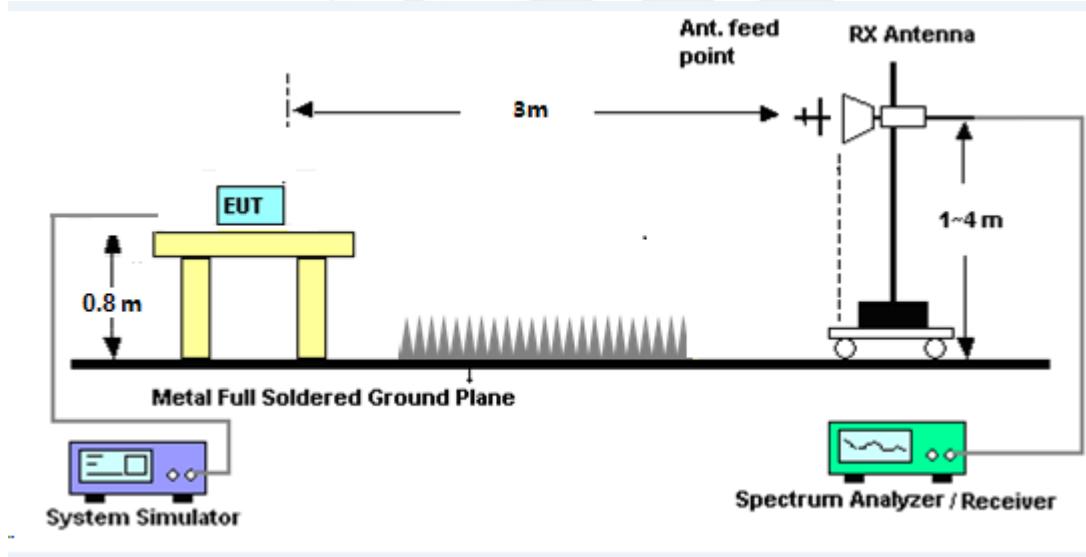
No deviation

3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency 30MHz~1GHz



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



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 described unless otherwise a special operating condition is specified in the following during the testing.

3.2.6 TEST RESULTS

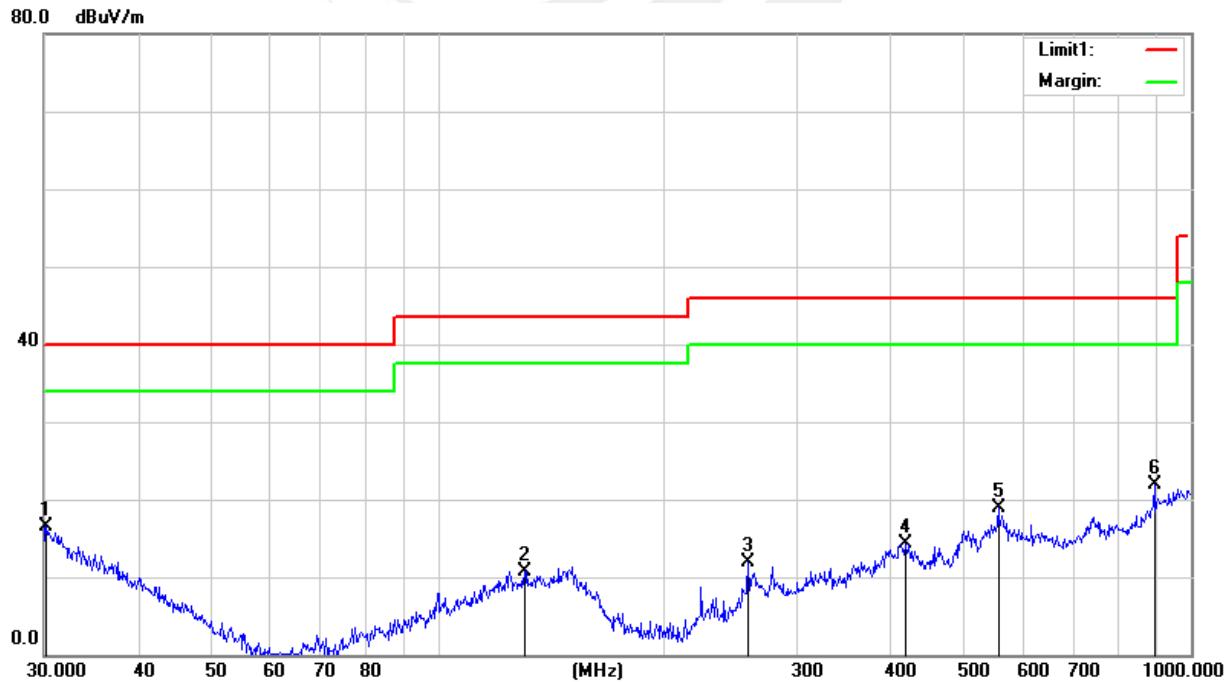
30MHz - 1000MHz

Temperature:	25.6°C	Relative Humidity:	59%
Phase:	Horizontal	Test Mode:	Mode 1
Test Voltage:	DC 12V	Test Date:	2021.04.30

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.2110	27.78	-11.28	16.50	40.00	-23.50	QP
2	130.3788	28.39	-17.60	10.79	43.50	-32.71	QP
3	258.3263	29.77	-17.86	11.91	46.00	-34.09	QP
4	417.6410	28.34	-13.99	14.35	46.00	-31.65	QP
5	554.8253	29.44	-10.60	18.84	46.00	-27.16	QP
6	893.8567	30.63	-8.75	21.88	46.00	-24.12	QP

Remark:

1. All readings are Quasi-Peak
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain



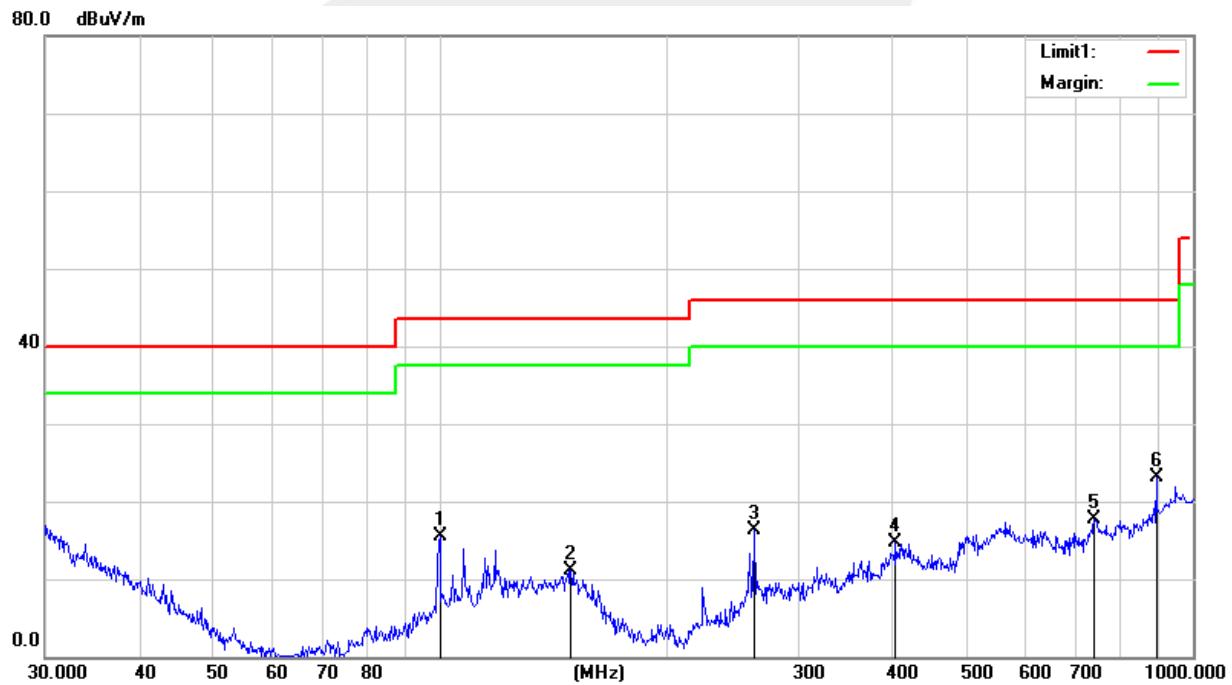


Temperature:	25.6°C	Relative Humidity:	59%
Phase:	Vertical	Test Mode:	Mode 1
Test Voltage:	DC 12V	Test Date:	2021.04.30

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	100.2286	36.48	-20.96	15.52	43.50	-27.98	QP
2	149.4857	27.73	-16.53	11.20	43.50	-32.30	QP
3	261.9753	34.00	-17.65	16.35	46.00	-29.65	QP
4	403.2500	28.76	-14.02	14.74	46.00	-31.26	QP
5	739.6604	27.76	-10.09	17.67	46.00	-28.33	QP
6	893.8567	31.89	-8.75	23.14	46.00	-22.86	QP

Remark:

1. All readings are Quasi-Peak
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain



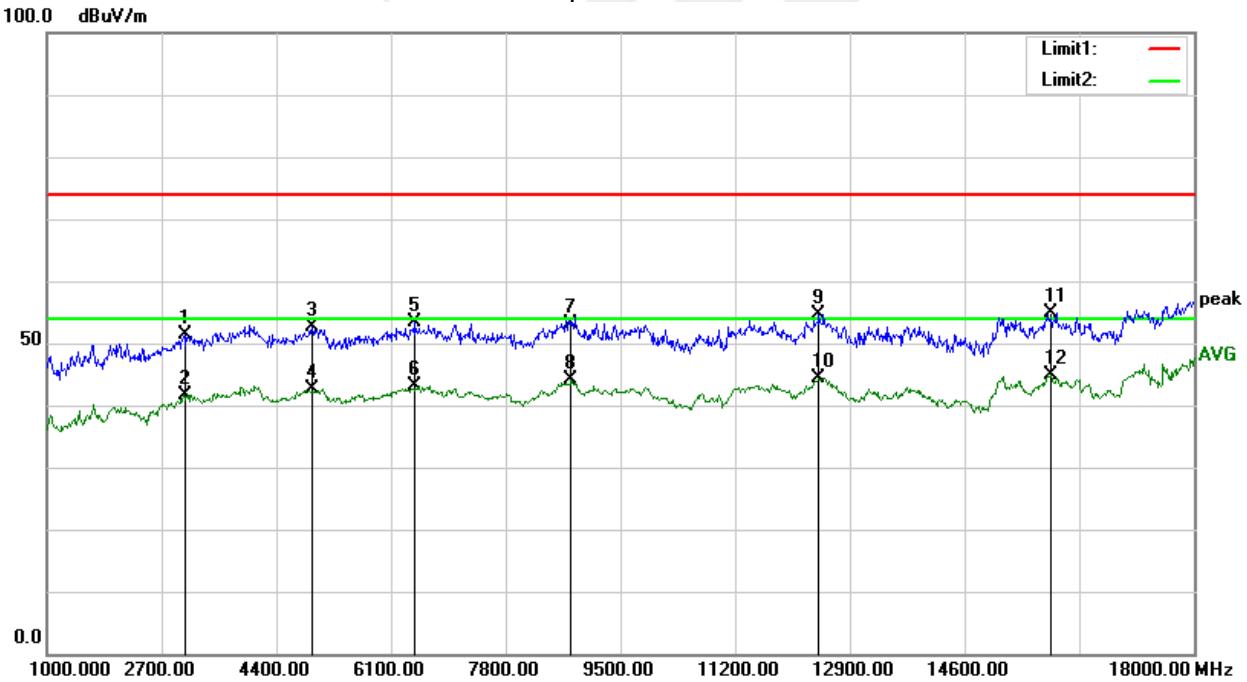
(1 GHz - 18GHz)

Temperature:	27.1°C	Relative Humidity:	67%
Phase:	Horizontal	Test Mode:	Mode 1
Test Voltage:	DC 12V	Test Date:	2021.04.27

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	3040.000	49.29	2.19	51.48	74.00	-22.52	Peak
2	3040.000	39.50	2.19	41.69	54.00	-12.31	AVG
3	4927.000	46.76	5.94	52.70	74.00	-21.30	Peak
4	4927.000	36.81	5.94	42.75	54.00	-11.25	AVG
5	6457.000	43.64	9.73	53.37	74.00	-20.63	Peak
6	6457.000	33.40	9.73	43.13	54.00	-10.87	AVG
7	8769.000	39.74	13.34	53.08	74.00	-20.92	Peak
8	8769.000	30.90	13.34	44.24	54.00	-9.76	AVG
9	12441.000	39.19	15.46	54.65	74.00	-19.35	Peak
10	12441.000	29.00	15.46	44.46	54.00	-9.54	AVG
11	15875.000	38.26	16.57	54.83	74.00	-19.17	Peak
12	15875.000	28.31	16.57	44.88	54.00	-9.12	AVG

Remark:

1. All readings are Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain





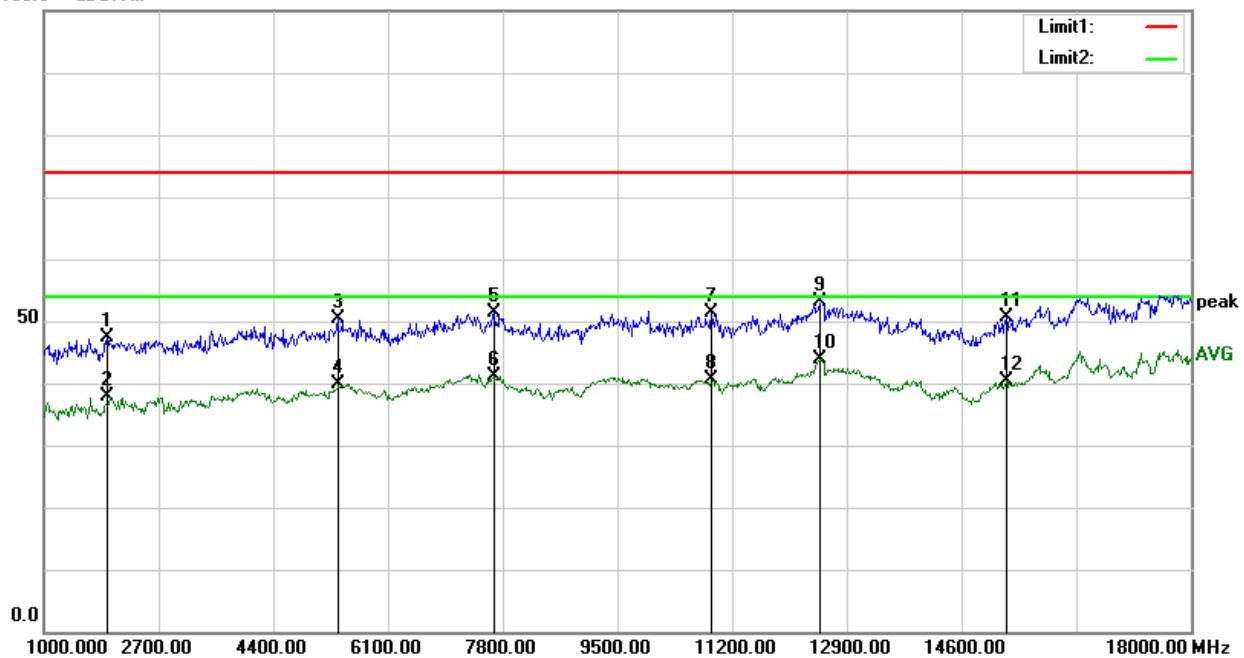
Temperature:	27.1°C	Relative Humidity:	67%
Phase:	Vertical	Test Mode:	Mode 1
Test Voltage:	DC 12V	Test Date:	2021.04.27

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	1935.000	48.57	-1.30	47.27	74.00	-26.73	Peak
2	1935.000	39.29	-1.30	37.99	54.00	-16.01	AVG
3	5352.000	43.30	7.03	50.33	74.00	-23.67	Peak
4	5352.000	32.78	7.03	39.81	54.00	-14.19	AVG
5	7664.000	40.19	11.09	51.28	74.00	-22.72	Peak
6	7664.000	30.01	11.09	41.10	54.00	-12.90	AVG
7	10894.000	37.36	14.13	51.49	74.00	-22.51	Peak
8	10894.000	26.60	14.13	40.73	54.00	-13.27	AVG
9	12509.000	37.65	15.56	53.21	74.00	-20.79	Peak
10	12509.000	28.35	15.56	43.91	54.00	-10.09	AVG
11	15263.000	33.04	17.61	50.65	74.00	-23.35	Peak
12	15263.000	22.69	17.61	40.30	54.00	-13.70	AVG

Remark:

1. All readings are Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain

100.0 dBuV/m



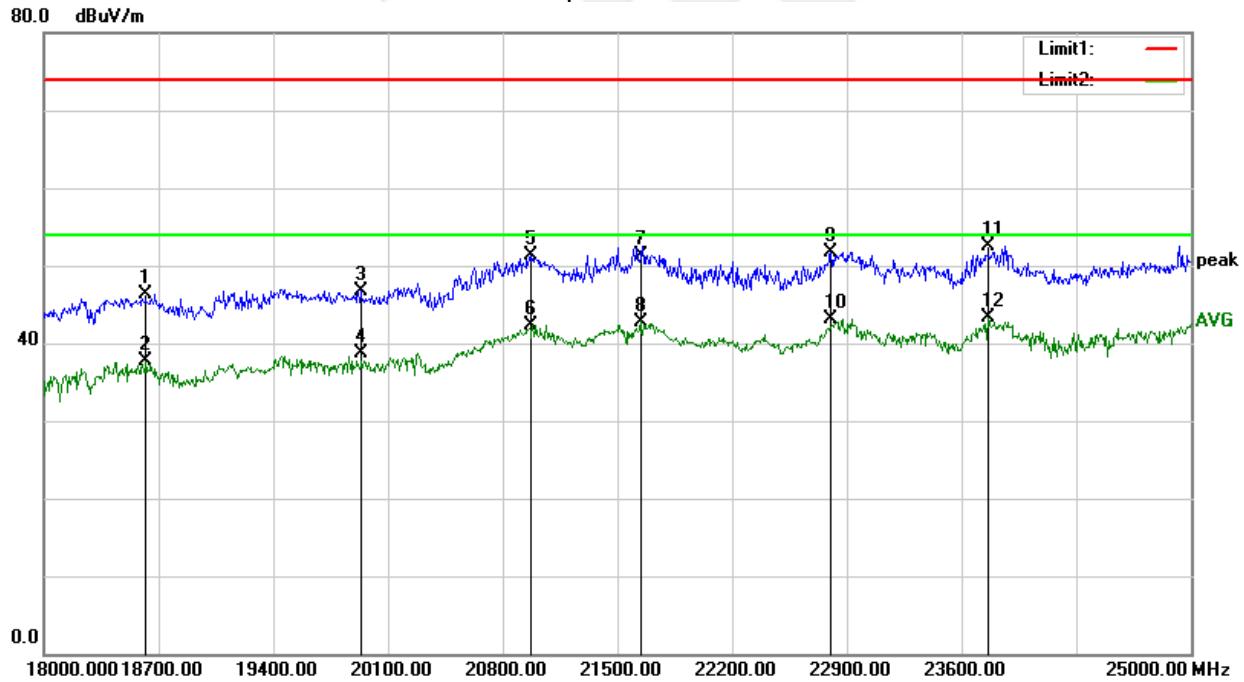
(18 GHz - 25GHz)

Temperature:	24.1°C	Relative Humidity:	44%
Phase:	Horizontal	Test Mode:	Mode 1
Test Voltage:	DC 12V	Test Date:	2021.04.27

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	18623.000	21.76	24.59	46.35	74.00	-27.65	Peak
2	18623.000	13.03	24.59	37.62	54.00	-16.38	AVG
3	19932.000	21.84	24.82	46.66	74.00	-27.34	Peak
4	19932.000	13.86	24.82	38.68	54.00	-15.32	AVG
5	20975.000	26.41	24.92	51.33	74.00	-22.67	Peak
6	20975.000	17.43	24.92	42.35	54.00	-11.65	AVG
7	21640.000	26.63	24.69	51.32	74.00	-22.68	Peak
8	21640.000	18.11	24.69	42.80	54.00	-11.20	AVG
9	22802.000	27.26	24.50	51.76	74.00	-22.24	Peak
10	22802.000	18.61	24.50	43.11	54.00	-10.89	AVG
11	23761.000	27.67	24.79	52.46	74.00	-21.54	Peak
12	23761.000	18.43	24.79	43.22	54.00	-10.78	AVG

Remark:

1. All readings are Peak and Average values
2. Margin = Result (Result = Reading + Factor) - Limit
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain



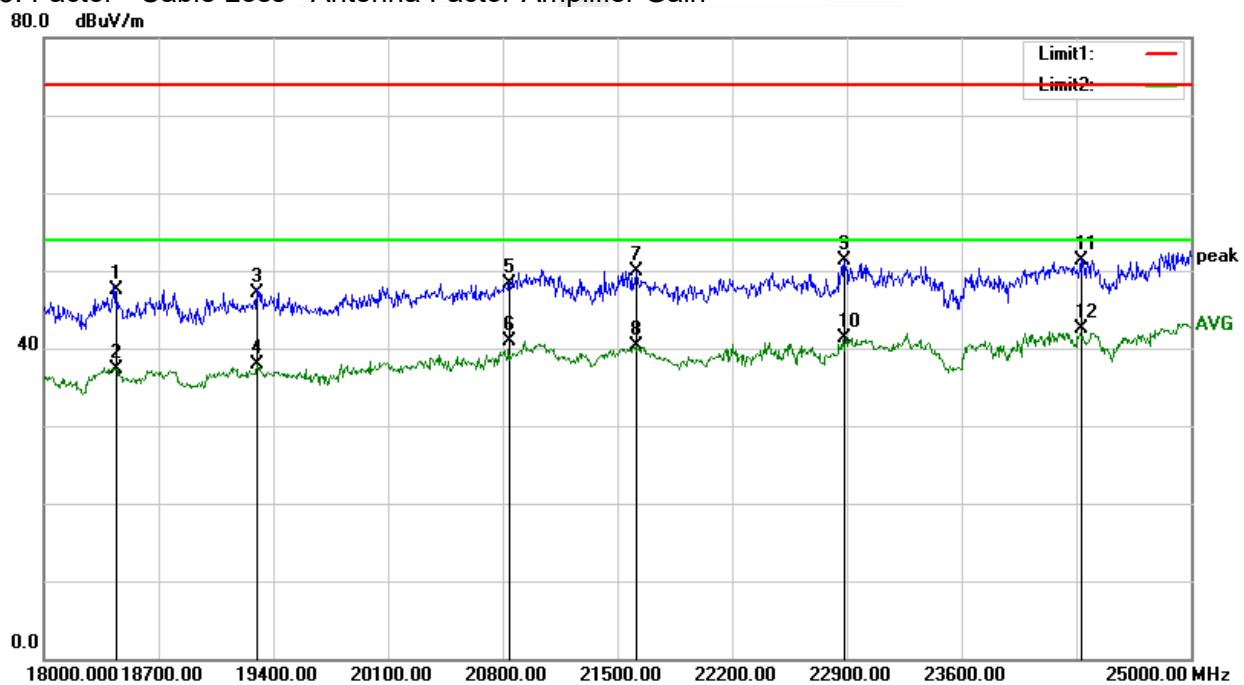


Temperature:	24.1°C	Relative Humidity:	44%
Phase:	Vertical	Test Mode:	Mode 1
Test Voltage:	DC 12V	Test Date:	2021.04.27

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	18441.000	22.61	24.85	47.46	74.00	-26.54	Peak
2	18441.000	12.47	24.85	37.32	54.00	-16.68	AVG
3	19302.000	21.78	25.23	47.01	74.00	-26.99	Peak
4	19302.000	12.77	25.23	38.00	54.00	-16.00	AVG
5	20842.000	23.48	24.92	48.40	74.00	-25.60	Peak
6	20842.000	16.08	24.92	41.00	54.00	-13.00	AVG
7	21612.000	25.14	24.69	49.83	74.00	-24.17	Peak
8	21612.000	15.55	24.69	40.24	54.00	-13.76	AVG
9	22886.000	26.73	24.52	51.25	74.00	-22.75	Peak
10	22886.000	16.84	24.52	41.36	54.00	-12.64	AVG
11	24328.000	26.48	24.92	51.40	74.00	-22.60	Peak
12	24328.000	17.65	24.92	42.57	54.00	-11.43	AVG

Remark:

1. All readings are Peak and Average values
2. Margin = Result (Result = Reading + Factor) - Limit
3. Factor = Cable Loss + Antenna Factor - Amplifier Gain



* * * * * END OF THE REPORT * * * * *