
FCC Test Report

Report No.: AGC00408210801FE06C

FCC ID : ZL5BM1S4LE
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : 5G Smart phone
BRAND NAME : CAT
MODEL NAME : BM1S4L
APPLICANT : Bullitt Group
DATE OF ISSUE : May 24, 2022
STANDARD(S) : FCC Part 15.407
TEST PROCEDURE(S) : KDB 789033 D02 v02r01
REPORT VERSION : V1.0

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 24, 2022	Valid	Class II Permissive Change

Note: The original test report Ref. No. (AGC00408210801FE06A) (dated 2022-01-18), was modified on 2022-05-24 to include the following changes and additions for:

- Updated brand name, model name.
- Updated applicant name and applicant address.
- Updated manufacturer name and manufacturer address.
- Updated software version.
- Remove the adapter.

- Screen resolution changed from FHD to HD+

The prototype shell is somewhat different, and there is a Strong flashlight on the top

FCC LTE increases frequency band 12&13&17&25&26&66.

CDMA increases frequency band BC0/BC1/BC10

For the above described change(s), no further testing necessary.

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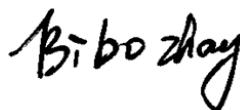
1. VERIFICATION OF CONFORMITY

Applicant	Bullitt Group
Address	One Valpy, Valpy Street, Reading, RG1 1AR United Kingdom
Manufacturer	Bullitt Group
Address	One Valpy, Valpy Street, Reading, RG1 1AR United Kingdom
Factory	Shenzhen AIJIEMO Technology Company Limited
Address	1st Floor 101 and 2nd Floor 201, Building A2, Huafeng Century Technology Park, Nanchang Community, Xixiang, Baoan District, Shenzhen, China
Product Designation	5G Smart phone
Brand Name	CAT
Test Model	BM1S4L
Date of test	Dec. 24, 2021~Jan. 18, 2022
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BGN/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Prepared By



Bibo Zhang
(Project Engineer)

Jan. 18, 2022

Reviewed By



Calvin Liu
(Reviewer)

May 24, 2022

Approved By



Max Zhang
Authorized Officer

May 24, 2022

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “5G Smart phone”. It is designed by way of utilizing the OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

Equipment Type	☐ Outdoor access points ☐ Indoor access points ☐ Fixed P2P access points ☒ Client devices
Operation Frequency	☒ U-NII 1:5150MHz~5250MHz ☒ U-NII 2A: 5250MHz~5350MHz ☒ U-NII 2C:5470MHz~5725MHz ☒ U-NII 3: 5725MHz~5850MHz
DFS Design Type	☐ Master ☐ Slave with radar detection ☒ Slave without radar detection
TPC Function	☐ Yes ☒ No
Modulation	802.11a/n:(64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11ac :(256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps
Number of channels	7 channels of U-NII-1 Band 7 channels of U-NII-2A Band 20 channels of U-NII-2C Band 8 channels of U-NII-3 Band
Hardware Version	V1.00
Software Version	BM1S4L.DEG
Antenna Designation	PIFA Antenna (Comply with requirements of the FCC part 15.203)
Number of transmit chain	2 (802.11a/n/ac all used two antennas, 802.11a/n/ac support MIMO)
Antenna Gain	Refer to Chapter 2.8 of the report.
Power Supply	DC 3.85V by battery or DC 5V /9V by adapter

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2.2. TABLE OF CARRIER FREQUENCIES

For 5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
42	5210 MHz	--	--

For 5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
58	5290 MHz	--	--

For 5500~5720MHz:

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	--	--

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channel is provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz
138	5690 MHz	--	--

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For 5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz	--	--

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
155	5775 MHz	--	--

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2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: ZL5BM1S4LE** filing to comply with the FCC Part 15 requirements.

2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.407 rules KDB 789033 D02

2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

2.8. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna Type	Frequency Band (MHz)	TX Paths	Bandwidth (MHz)	Max Peak Gain (dBi)		Max Directional Gain (dBi)
				Ant 1	Ant 2	
5G WIFI PIFA Antenna List (5GHz 2*2 MIMO)						
PIFA Antenna	5150 ~ 5250	2	20,40,80	0.4	0.4	3.41
	5250 ~ 5350	2	20,40,80	0.4	0.4	3.41
	5470 ~ 5725	2	20,40,80	0.4	0.4	3.41
	5725 ~ 5850	2	20,40,80	0.4	0.4	3.41

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/n/ac mode.

Note 2: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

If all antennas have the same gain, G_{ANT} , Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on devices:

$$\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01;$$

- For power measurements on IEEE 802.11 devices:

$$\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$$

$$\text{Array Gain} = 0 \text{ dB (i.e., no array gain) for channel widths } \geq 40 \text{ MHz for any } N_{ANT};$$

$$\text{Array Gain} = 5 \log(N_{ANT}/N_{SS}) \text{ dB or } 3 \text{ dB, whichever is less, for } 20 \text{ MHz channel widths with } N_{ANT} \geq 5.$$

If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

3. MEASUREMENT UNCERTAINTY

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

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 3.1 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.8 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2 \%$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2 \%$

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4. DESCRIPTION OF TEST MODES

Mode	Available channel	Tested channel	Modulation	Date rate(Mbps)
802.11a/n/ac20	36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 149, 153, 157, 161, 165	36, 40, 48, 52, 60, 64, 100, 120, 140, 149, 157, 165	OFDM	6Mbps/MCS0
802.11n/ac40	38, 46, 54, 62, 102, 110, 118, 126, 134, 151, 159;	38, 46, 54, 62, 102, 118, 134, 151, 159	OFDM	MCS0
802.11ac80	42, 58, 106, 122, 155	42, 58, 106, 122, 155	OFDM	MCS0

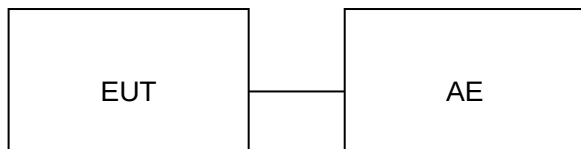
Note:

1. The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle>or equal 98%.
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	5G Smart phone	BM1S4L	ZL5BM1S4LE	EUT
2	Battery	PX1	DC 3.85V 5500mAh	AE
3	USB Cable	N/A	N/A	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.407	Conducted Spurious Emission	Compliant
§15.209	Radiated Emission	Compliant

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2021	May 14, 2022
LISN	R&S	ESH2-Z5	100086	Jun. 09, 2021	Jun. 08, 2022
Test software	R&S	ES-K1 (Ver V1.71)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Apr. 14, 2021	Apr. 13, 2022
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Nov. 17, 2021	Nov. 16, 2022
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Power Sensor	Aglient	U2021XA	MY54110007	May 11, 2021	May 10, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 19, 2021	Sep. 18, 2023
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 08, 2021	Jan. 07, 2023
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A
Test software	FARA	EZ-EMC(Ver.RA-0 3A)	N/A	N/A	N/A

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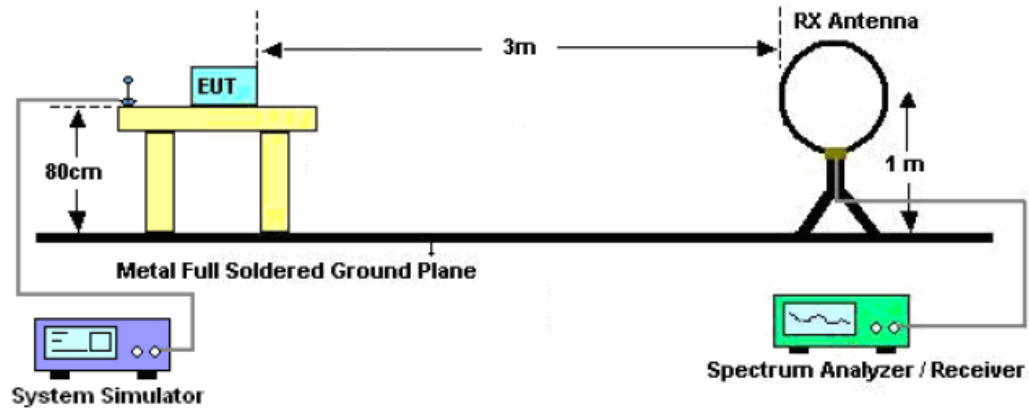
7. RADIATED EMISSION

7.1. MEASUREMENT PROCEDURE

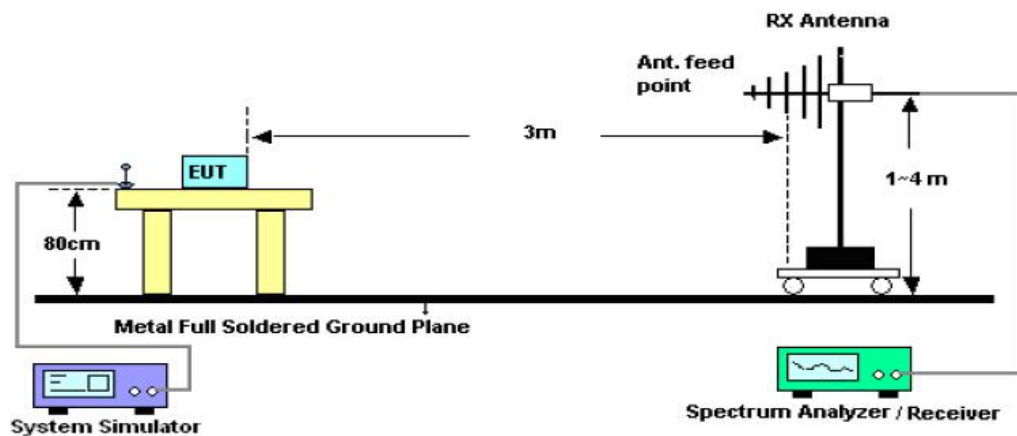
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3M VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

7.2. TEST SETUP

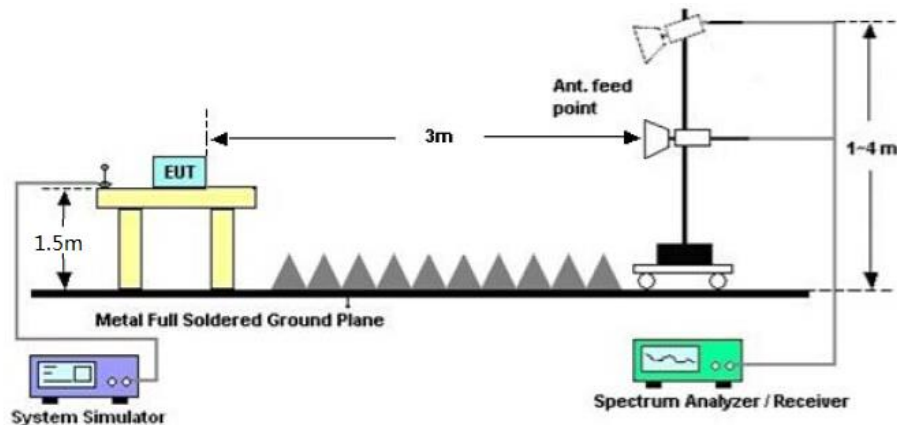
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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7.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

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

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

7.4. TEST RESULT

Radiated emission below 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

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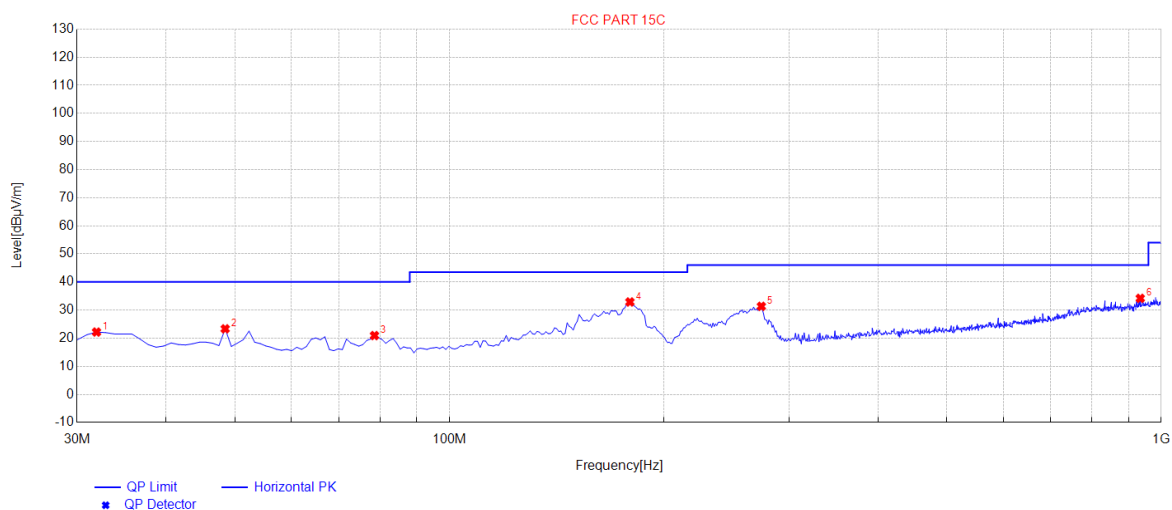
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Radiated emission from 30MHz to 1000MHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.94	22.18	10.19	40.00	17.82	100	357	Horizontal
2	48.43	23.32	11.53	40.00	16.68	100	77	Horizontal
3	78.5	20.92	7.46	40.00	19.08	100	104	Horizontal
4	179.38	32.88	13.06	43.50	10.62	100	279	Horizontal
5	274.44	31.33	15.79	46.00	14.67	100	291	Horizontal
6	935.01	34.18	28.16	46.00	11.82	100	59	Horizontal

RESULT: PASS

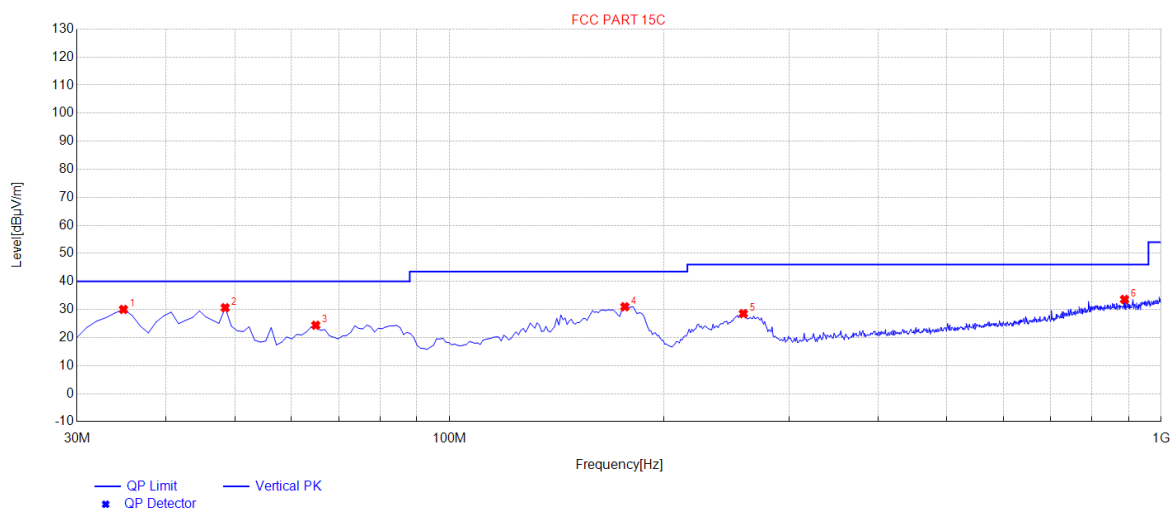
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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.85	30.02	10.70	40.00	9.98	100	289	Vertical
2	48.43	30.62	11.53	40.00	9.38	100	36	Vertical
3	64.92	24.37	10.09	40.00	15.63	100	3	Vertical
4	176.47	30.97	13.34	43.50	12.53	100	88	Vertical
5	258.92	28.52	14.51	46.00	17.48	100	1	Vertical
6	888.45	33.59	27.52	46.00	12.41	100	25	Vertical

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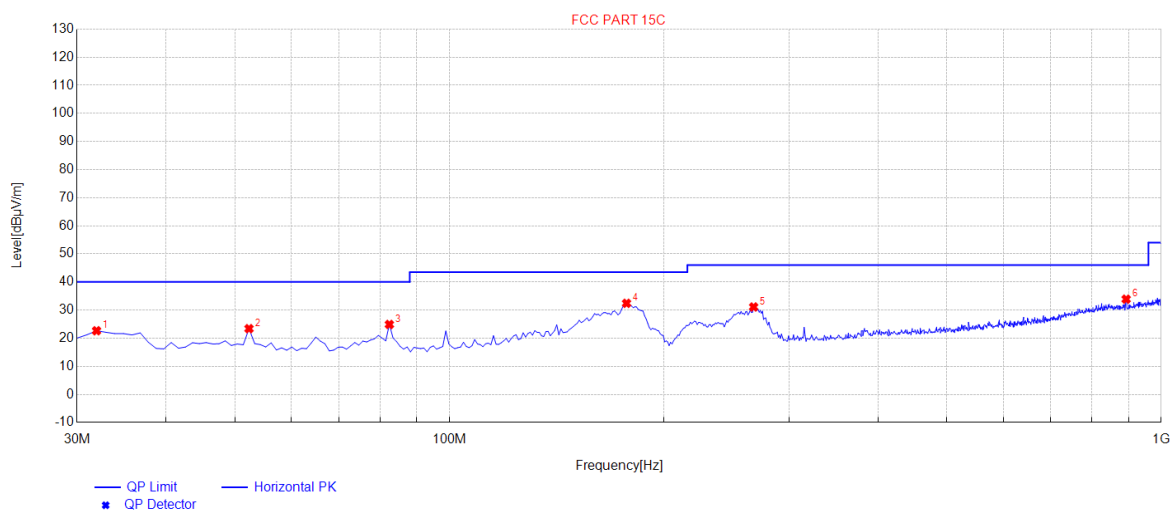
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Radiated emission from 30MHz to 1000MHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5260MHz	Antenna	Horizontal



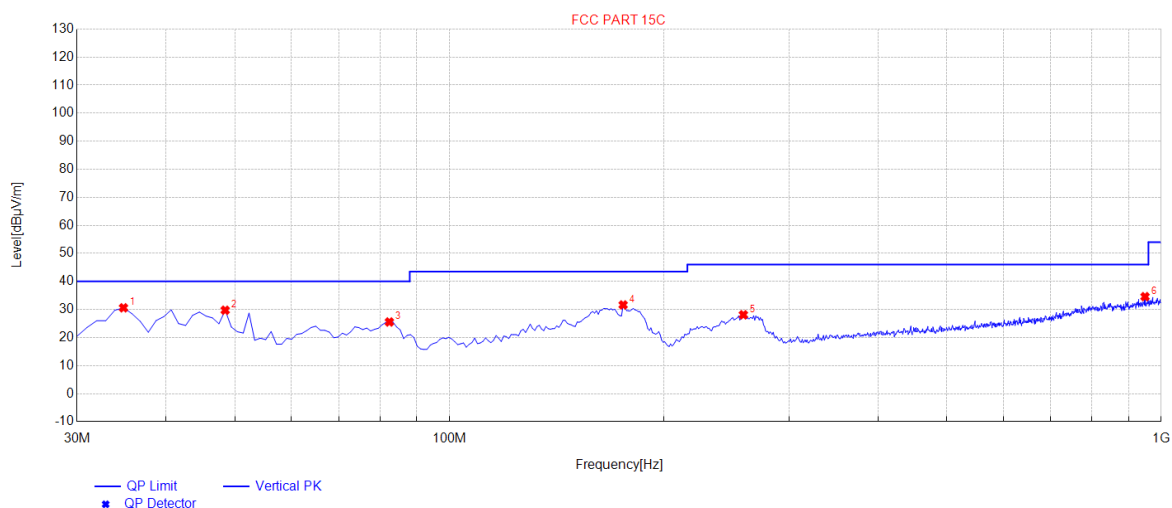
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.94	22.64	10.19	40.00	17.36	100	264	Horizontal
2	52.31	23.39	11.49	40.00	16.61	100	0	Horizontal
3	82.38	24.88	7.17	40.00	15.12	100	88	Horizontal
4	177.44	32.41	13.24	43.50	11.09	100	85	Horizontal
5	267.65	31.10	15.21	46.00	14.90	100	270	Horizontal
6	893.3	33.88	27.60	46.00	12.12	100	0	Horizontal

RESULT: PASS

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5260MHz	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.85	30.59	10.70	40.00	9.41	100	143	Vertical
2	48.43	29.73	11.53	40.00	10.27	100	302	Vertical
3	82.38	25.54	7.17	40.00	14.46	100	1	Vertical
4	175.5	31.63	13.43	43.50	11.87	100	28	Vertical
5	258.92	28.11	14.51	46.00	17.89	100	4	Vertical
6	949.56	34.58	28.40	46.00	11.42	100	360	Vertical

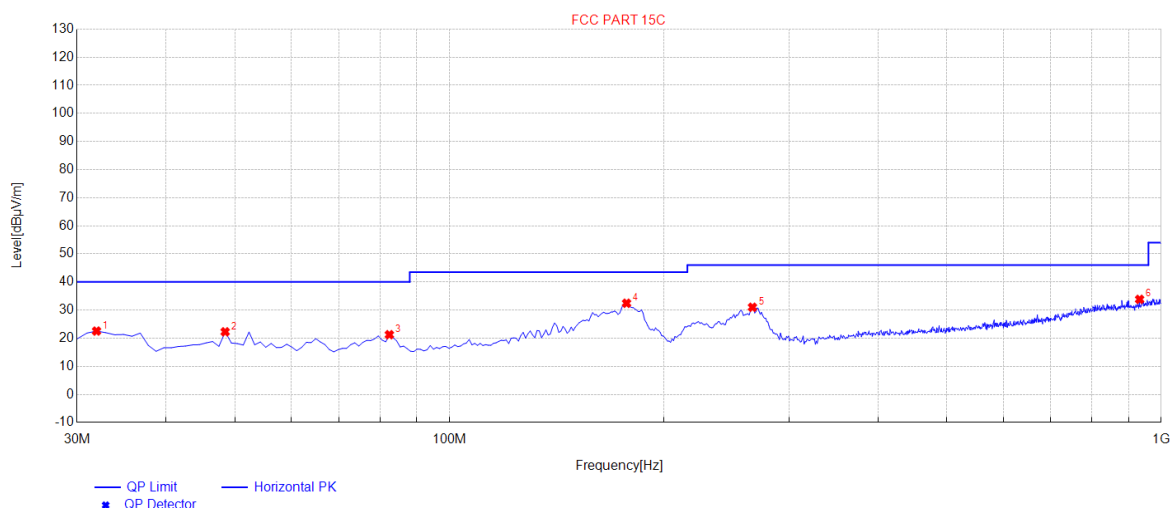
RESULT: PASS

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Radiated emission from 30MHz to 1000MHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5500MHz	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.94	22.53	10.19	40.00	17.47	100	344	Horizontal
2	48.43	22.26	11.53	40.00	17.74	100	347	Horizontal
3	82.38	21.24	7.17	40.00	18.76	100	44	Horizontal
4	177.44	32.43	13.24	43.50	11.07	100	84	Horizontal
5	266.68	31.00	15.13	46.00	15.00	100	285	Horizontal
6	933.07	33.82	28.12	46.00	12.18	100	359	Horizontal

RESULT: PASS

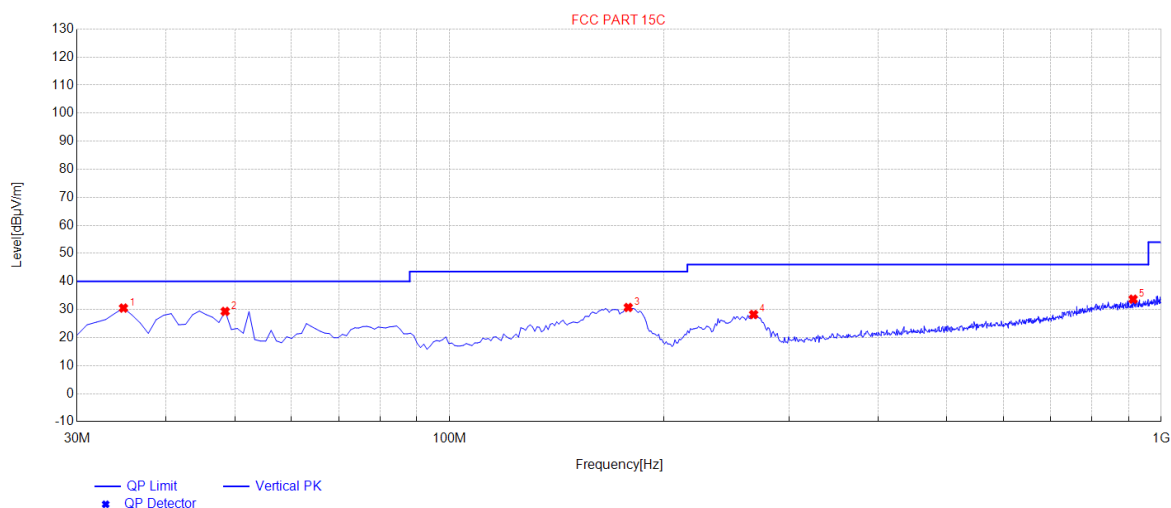
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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5500MHz	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.85	30.50	10.70	40.00	9.50	100	156	Vertical
2	48.43	29.31	11.53	40.00	10.69	100	360	Vertical
3	178.41	30.72	13.15	43.50	12.78	100	357	Vertical
4	267.65	28.21	15.21	46.00	17.79	100	356	Vertical
5	913.67	33.66	27.78	46.00	12.34	100	235	Vertical

RESULT: PASS

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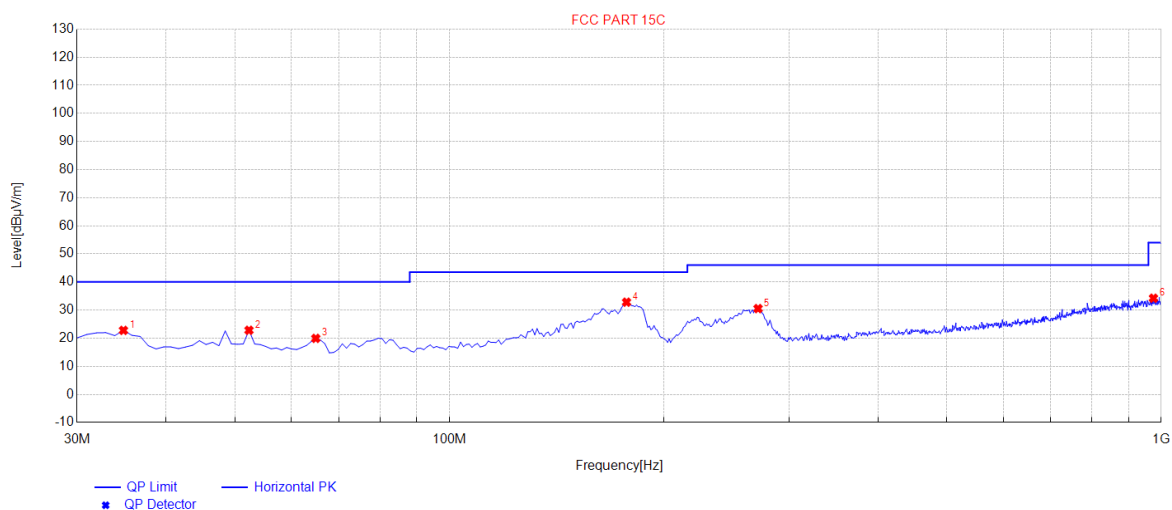
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Radiated emission from 30MHz to 1000MHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5775MHz	Antenna	Horizontal



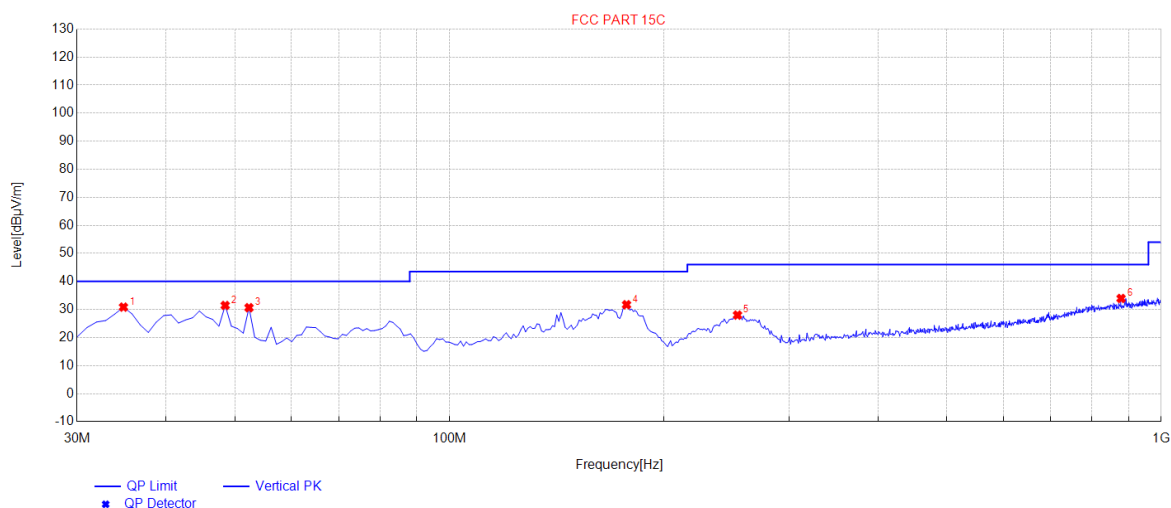
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.85	22.78	10.70	40.00	17.22	100	66	Horizontal
2	52.31	22.81	11.49	40.00	17.19	100	358	Horizontal
3	64.92	19.93	10.09	40.00	20.07	100	358	Horizontal
4	177.44	32.81	13.24	43.50	10.69	100	282	Horizontal
5	271.53	30.53	15.55	46.00	15.47	100	298	Horizontal
6	975.75	34.22	28.76	54.00	19.78	100	53	Horizontal

RESULT: PASS

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5775MHz	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.85	30.84	10.70	40.00	9.16	100	310	Vertical
2	48.43	31.43	11.53	40.00	8.57	100	1	Vertical
3	52.31	30.64	11.49	40.00	9.36	100	300	Vertical
4	177.44	31.69	13.24	43.50	11.81	100	64	Vertical
5	254.07	28.00	14.28	46.00	18.00	100	3	Vertical
6	878.75	33.93	27.32	46.00	12.07	100	64	Vertical

RESULT: PASS

Note: All the antennas have been pre-tested, and all modes of each antenna are tested. The 802.11a20 of antenna 1 at 5180MHz, 5260MHz, 5500MHz and 5745MHz are the worst case and recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

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Radiated emission above 1GHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5180MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.042	48.36	9.14	57.50	68.20	-10.70	peak
15540.063	41.89	10.22	52.11	74.00	-21.89	peak
15540.063	32.52	10.22	42.74	54.00	-11.26	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.042	47.16	9.14	56.30	68.20	-11.90	peak
15540.063	42.28	10.22	52.50	74.00	-21.50	peak
15540.063	31.78	10.22	42.00	54.00	-12.00	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5200MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10400.042	49.37	9.14	58.51	68.20	-9.69	peak
15600.063	42.58	10.22	52.80	74.00	-21.20	peak
15600.063	31.69	10.22	41.91	54.00	-12.09	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10400.042	48.52	9.14	57.66	68.20	-10.54	peak
15600.063	41.39	10.22	51.61	74.00	-22.39	peak
15600.063	33.63	10.22	43.85	54.00	-10.15	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5240MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	48.52	9.14	57.66	68.20	-10.54	peak
15720.063	43.35	10.22	53.57	74.00	-20.43	peak
15720.063	32.25	10.22	42.47	54.00	-11.53	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	47.96	9.14	57.10	68.20	-11.10	peak
15720.063	43.28	10.22	53.50	74.00	-20.50	peak
15720.063	31.89	10.22	42.11	54.00	-11.89	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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Radiated emission above 1GHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5260MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10520.022	48.24	9.14	57.38	68.20	-10.82	peak
15780.054	42.35	10.22	52.57	74.00	-21.43	peak
15780.054	32.56	10.22	42.78	54.00	-11.22	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10520.022	48.89	9.14	58.03	68.20	-10.17	peak
15780.054	41.36	10.22	51.58	74.00	-22.42	peak
15780.054	32.28	10.22	42.50	54.00	-11.50	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5300MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10600.022	51.36	9.14	60.50	74.00	-13.50	peak
10600.022	39.33	9.14	48.47	54.00	-5.53	AVG
15900.045	48.35	10.22	58.57	74.00	-15.43	peak
15900.045	35.58	10.22	45.80	54.00	-8.20	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10600.022	48.36	9.14	57.50	74.00	-16.50	peak
10600.022	37.17	9.14	46.31	54.00	-7.69	AVG
15900.045	49.37	10.22	59.59	74.00	-14.41	peak
15900.045	34.58	10.22	44.80	54.00	-9.20	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5320MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10640.015	47.38	9.14	56.52	74.00	-17.48	peak
10640.015	31.55	9.14	40.69	54.00	-13.31	AVG
15900.045	49.37	10.22	59.59	74.00	-14.41	peak
15900.045	32.52	10.22	42.74	54.00	-11.26	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10640.015	48.35	9.14	57.49	74.00	-16.51	peak
10640.015	32.46	9.14	41.60	54.00	-12.40	AVG
15900.045	47.36	10.22	57.58	74.00	-16.42	peak
15900.045	31.22	10.22	41.44	54.00	-12.56	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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Radiated emission above 1GHz

EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5500MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11000.056	48.37	9.14	57.51	74.00	-16.49	peak
11000.056	33.14	9.14	42.28	54.00	-11.72	AVG
16500.023	45.89	10.22	56.11	68.20	-12.09	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11000.056	49.38	9.14	58.52	74.00	-15.48	peak
11000.056	32.33	9.14	41.47	54.00	-12.53	AVG
16500.023	42.89	10.22	53.11	68.20	-15.09	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5600MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11200.022	47.35	9.14	56.49	74.00	-17.51	peak
11200.022	33.05	9.14	42.19	54.00	-11.81	AVG
16800.025	46.38	10.22	56.60	68.20	-11.60	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11200.022	48.39	9.14	57.53	74.00	-16.47	peak
11200.022	31.99	9.14	41.13	54.00	-12.87	AVG
16800.025	43.25	10.22	53.47	68.20	-14.73	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5700MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11400.025	48.25	9.14	57.39	74.00	-16.61	peak
11400.025	33.17	9.14	42.31	54.00	-11.69	AVG
17100.056	42.05	10.22	52.27	68.20	-15.93	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11400.025	49.35	9.14	58.49	74.00	-15.51	peak
11400.025	32.04	9.14	41.18	54.00	-12.82	AVG
17100.056	41.28	10.22	51.50	68.20	-16.70	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5745MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11490.042	47.65	9.14	56.79	74.00	-17.21	peak
11490.042	32.44	10.22	42.66	54.00	-11.34	AVG
17235.063	41.58	10.22	51.80	68.20	-16.40	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11490.042	46.96	9.14	56.10	74.00	-17.90	peak
11490.042	34.28	10.22	44.50	54.00	-9.50	AVG
17235.063	42.22	10.22	52.44	68.20	-15.76	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5785MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11570.042	48.31	9.14	57.45	74.00	-16.55	peak
11570.042	36.34	10.22	46.56	54.00	-7.44	AVG
17355.063	42.55	10.22	52.77	68.20	-15.43	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11570.042	47.28	9.14	56.42	74.00	-17.58	peak
11570.042	32.28	10.22	42.50	54.00	-11.50	AVG
17355.063	39.45	10.22	49.67	68.20	-18.53	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	5G Smart phone	Model Name	BM1S4L
Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a20 5825MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11650.042	48.33	9.62	57.95	74.00	-16.05	peak
11650.042	36.46	9.62	46.08	54.00	-7.92	AVG
17475.063	41.44	10.75	52.19	68.20	-16.01	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
11650.042	49.25	9.62	58.87	74.00	-15.13	peak
11650.042	36.22	9.62	45.84	54.00	-8.16	AVG
17475.063	42.28	10.75	53.03	68.20	-15.17	peak
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: Both adapters have been tested. All test channels of each antenna had been tested. The 802.11a20 of antenna 1 is the worst case and recorded in the test report.

Other frequencies radiation emission from 1GHz to 40GHz at least have 20dB margin and not recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

8. LINE CONDUCTED EMISSION TEST

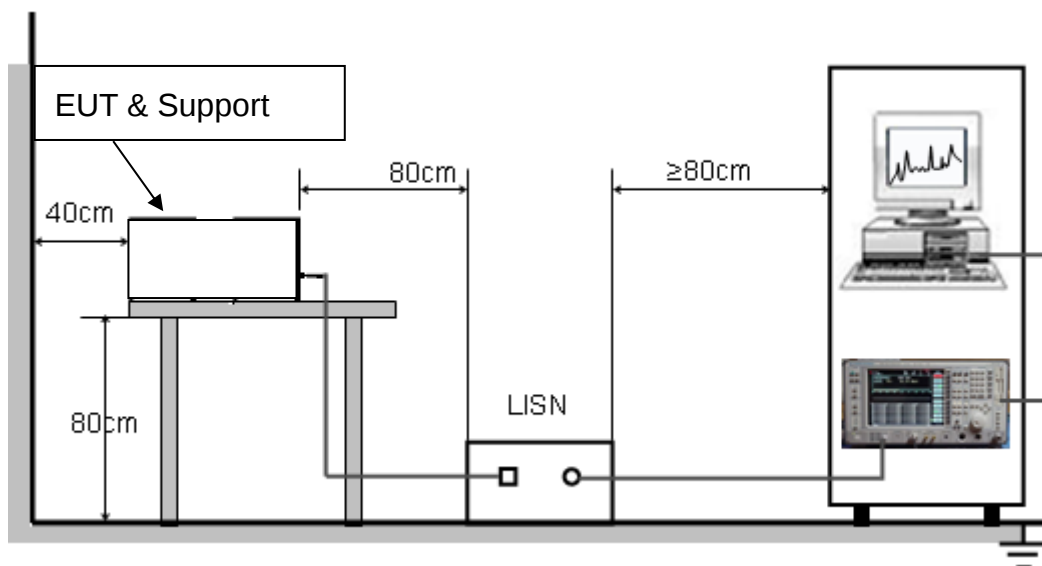
8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P (dB μ V)	Average (dB μ V)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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8.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hz power by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 Ohm load; the second scan had Line 1 connected to a 50 Ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

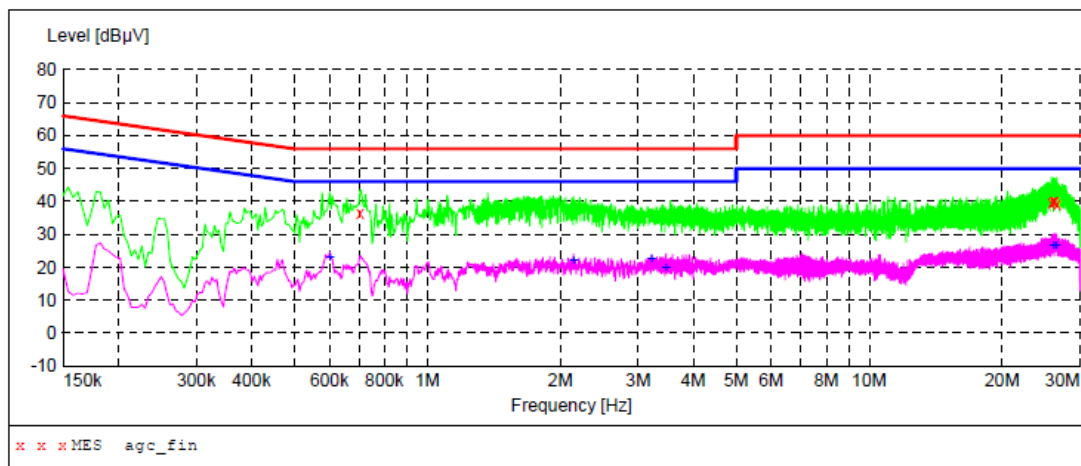
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

8.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case was reported on the Summary Data page.

8.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



MEASUREMENT RESULT: "agc_fin"

2021/12/28 23:51

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.706000	36.20	5.4	56	19.8	QP	L1
25.834000	39.70	9.2	60	20.3	QP	L1
26.086000	39.90	9.3	60	20.1	QP	L1
26.150000	39.80	9.3	60	20.2	QP	L1
26.326000	39.90	9.3	60	20.1	QP	L1
26.590000	39.30	9.3	60	20.7	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2021/12/28 23:51

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.602000	22.80	5.4	46	23.2	AV	L1
2.142000	22.00	6.5	46	24.0	AV	L1
3.218000	22.40	6.5	46	23.6	AV	L1
3.470000	19.80	6.5	46	26.2	AV	L1
26.110000	26.30	9.3	50	23.7	AV	L1
26.414000	26.30	9.3	50	23.7	AV	L1

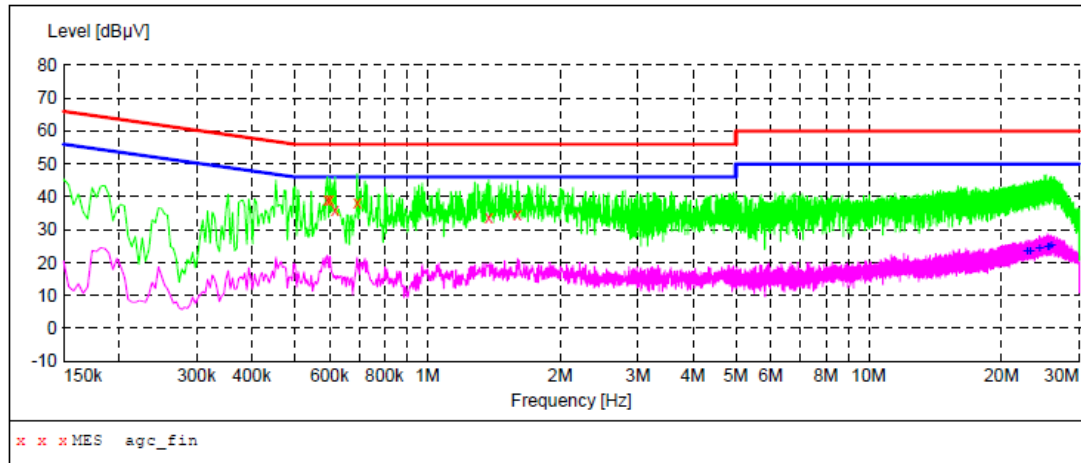
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LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "agc_fin"

2021/12/28 23:54

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.594000	39.00	5.4	56	17.0	QP	N
0.602000	39.20	5.4	56	16.8	QP	N
0.618000	35.80	5.4	56	20.2	QP	N
0.694000	38.00	5.4	56	18.0	QP	N
1.378000	33.60	5.9	56	22.4	QP	N
1.602000	34.70	6.1	56	21.3	QP	N

MEASUREMENT RESULT: "agc_fin2"

2021/12/28 23:54

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
22.834000	23.30	9.0	50	26.7	AV	N
23.178000	23.40	9.0	50	26.6	AV	N
24.354000	24.10	9.1	50	25.9	AV	N
25.414000	24.80	9.2	50	25.2	AV	N
25.574000	24.90	9.2	50	25.1	AV	N
25.878000	25.10	9.2	50	24.9	AV	N

RESULT: PASS

Note: All the antennas have been pre-tested, and all modes of each antenna are tested. The antenna 1 of 802.11a20 mode at 5180MHz is the worst case and is recorded in the test report.

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC00408210801AP01C

APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC00408210801AP03C

-----END OF REPORT-----



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9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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