EMC TEST REPORT

Project No.	LBE20210078	Iss	ue No.	0
	Name of organization	Sam	sung Elec	tronics Co., Ltd.
Applicant	Address			129, Samsung-ro, Yeongtong-gu, nggi-do, 16677, Korea
	Date of receipt	February 02, 2021		
	Type of device	 ✓ All other Receivers subject to part15 ✓ Class B Personal Computers and peripherals ✓ Other Class B digital devices and peripherals ✓ FM Broadcast Receiver 		
	Equipment authorization	⊠ Ce	ertification	☐ Supplier's Declaration of Conformity
	FCC ID	A3LS	MA526U	
EUT	Kind of product	Mobile Phone		
	Model No.	SM-A526U		
	Variant Model No.	Refer to clause 4.6		
	Manufacturer	SAMSUNG ELECTRONICS VIETNAM CO., LTD. Yenphong 1 - I.P Yentrung Commune, Yenphong Dist., Bac Ninh Province, Vietnam		
Applied Sta	ındards	47 CFR Part 15, Subpart B, Class B / ANSI C63.4-2014		
Test Period		February 02, 2021 ~ Feburuary 08, 2021		
Issue date		February 09, 2021		
Test result : Complied The equipment under test has found (Refer to the attached test result for				with the applied standards.
Tested by: Soo-Joon Kim			Review	ed by : Sun-Ho Kim

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Samsung Electronics Co., Ltd., Global CS Center (Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si,Gyeonggi-Do 16677, Korea

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1. Report Information

1.1 Revision history

No.	Date of Issue	Revised detailed information
Issue 0	February 09, 2021	There are no revisions and this version is basic test report.

* Remark

Compliance with Part 15B requirements for the receiver part of the licensed transmitter (equipment code CXX) is covered by other test report.

2. Summary of test results

2.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result
	Conducted emission (Mains port)	47 CFR Part 15 Subpart B / ANSI C63.4-2014	Complied
\boxtimes	Radiated emission	(Class B)	Complied

3. General Information

3.1 Test facility

The Global CS Center is located on Samsung Electronics Co., Ltd. at (Maetan-dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea.

All testing are performed in Semi-anechoic chambers conforming to the site attenuation characteristics defined by ANSI C63.4, CISPR 32, CISPR 16-1-4 and Shielded rooms. And all antennas are properly calibrated using ANSI C63.5:2017.

The Global CS Center is an ISO/IEC 17025 accredited testing laboratory by the National Radio Research Agency with designation No. KR0004. for EMC testing.

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4. Test Setup configuration

4.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Mark	Description	Model No.	Serial No.	Manufacturer / Trademark	FCC ID	
Α	Mobile Phone	SM-A526U	-	SAMSUNG	A3LSMA526U	
В	Battery	EB-BG781ABY	-	SDI	-	
С	Headset	EHS64AVFWE	-	Cresyn	-	
D	Data Cable	EP-DR140	-	KSD	-	
Е	Micro SD Card	64GB	-	SAMSUNG	DoC	
F	Laptop	Latitude5580	1WYRYM2	Dell	DoC	
	Computer		D3HRYM2	Dell	DoC	
G	Laptop	· ·	5DEA	Dell	DoC	
	AC Adapter		5B3C	Dell	DoC	
Н	H Mouse	AA-SM7PCPB	CN57BA5903634ADV 8JJCD4371	SAMSUNG	DoC	
		SNJ-B138	Z5F8353	SAMSUNG	DoC	
	Douter	Router DIR-806A	RF0F1D8018454	D-Link	DoC	
'	Rouler		RF0F1D8011504	D-Link	DoC	
J	Travel Adapter	EP-TA200	R37N4F201S2SE3	Solu-m	-	

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4.2 EUT operating mode

To achieve compliance applied standard specification including CXX, JAB and JBP requirement, the following mode(s) were made during compliance testing:

4.2.1 Conducted Emission

No.	Operating mode
1	Camera (rear) + Charging (w/ TA) + Cellular receiver (LTE FDD26)
2	Camera (front) + Charging (w/ TA)
3	Video + Audio playback from internal memory data + Charging (w/ TA)
4	USB Data Communication with PC (from External memory data)

4.2.2 Radiated Emission

No.	Operating mode
1	Camera (rear) + Charging (w/ TA)
2	Camera (front)
3	Video + Audio playback from internal memory data(w/ Headset)
4	USB Data Communication with PC (from External memory data)

4.3 Details of Sampling

Customer selected, single unit.

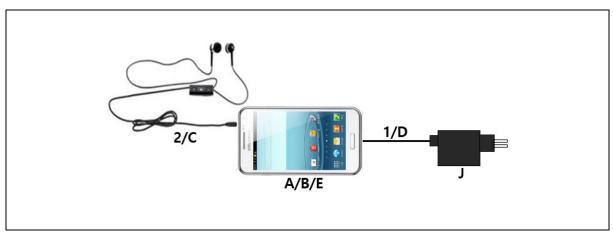
4.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected:

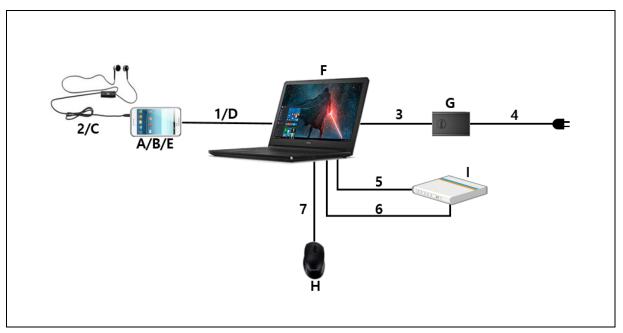
No.	Connected cable	Length [m]	Shielded [Y/N]	Note	
1	Data Cable	0.8	Y	From EUT to Laptop Computer or TA	
2	Headset	1.2	N	For EUT	
3	Power	1.8	N	From Laptop Computer to AC Adapter	
4	Power	1.5	N	For Laptop AC Adapter	
5	LAN	1.5	N	From Laptop Computer to Router	
6	USB	0.8	Y	From Laptop Computer to Router for DC Power	
7	USB	1.8	Y	From Laptop Computer to Mouse	

4.5 Test arrangement

4.5.1 Conducted Emission

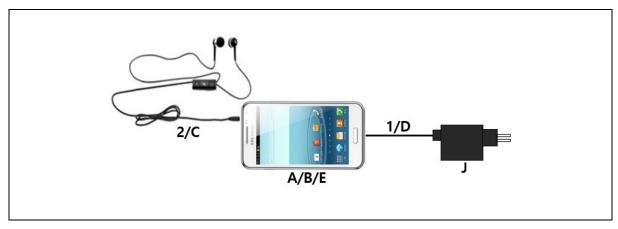


[Mode 1 - 3]

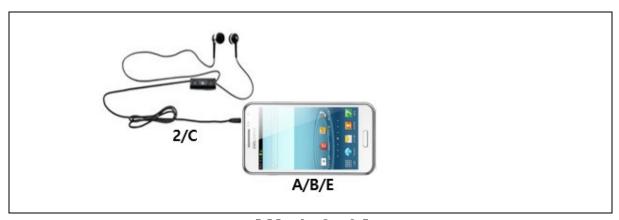


[Mode 4]

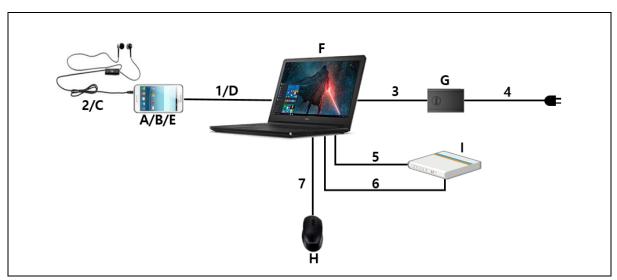
4.5.2 Radiated Emission



[Mode 1]



[Mode 2 - 3]



[Mode 4]

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4.6 EUT Description

The EUT is a bar type Mobile Phone which can operate on GSM850/900/1800/1900, WCDMA FDD1/2/4/5/8, LTE FDD 1/2/3/4/5/7/12/13/14/20/25/26/29/30/66/71, LTE TDD 38/39/40/41/46/48, 5G NR n2/5/12/25/41/66/71/77/78, CDMA BC0/1/10 and incorporates a Bluetooth, Wi-Fi, Camera, Audio, Video, GNSS and NFC.

4.6.1 The variant models

- SM-A526U1

4.7 EUT Frequencies

The highest frequencies (Generated and used)	Frequency [MHz]	
Wi-Fi	5 825	

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4.8 Test configuration and condition

The system was configured for testing in a typical fashion that a customer would normally use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. All the external I/O ports are exercised, as well as internal and the external SD card, by writing and reading arbitrary data or charging with TA.

The EUT was investigated in three orientations and the worst case orientation is reported.

RX mode(850MHz) testing was performed with the LTE FDD26 RX Test mode at center frequency. All licensed communication (850MHz) RX mode, GSM/WCDMA/LTE, test results are not significantly different.

The video and audio were repetitively played with the earphone connected.

The camera of the EUT was operated continuously.

Power source for the EUT operating was supplied by CVCF made by the Pacific Corp.

- Test Voltage: AC 120 V, 60 Hz

4.9 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4-2 and UKAS M3003)

4.9.1 Emission

Test type	Measurement uncertainty (C.L. approximately 95 %, <i>k</i> = 2)	
Conducted Emission	AC Mains	2.83 dB
Radiated Emission	Horizontal	4.47 dB
(Below 1 GHz)	Vertical	5.67 dB
Radiated Emission	Horizontal	5.21 dB
(Above 1 GHz)	Vertical	5.21 dB

^{*} Remark

1) The values for uncertainty of conducted and radiated emissions are less than the Corresponding values of Ucispr given in CISPR 16-4-2. Therefore no adjustment of measurement results is necessary when comparing them with the relevant limits.

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5. Results of individual test

5.1 Conducted Emission

The EUT is connected to a LISN via travel adapter. If the EUT is connected to the Laptop Computer USB port, the Laptop AC adapter is connected to a LISN.

Both conducted lines are measured in Quasi-Peak and CISPR-Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

Limits for Conducted emission at the mains ports of Class B ITE

Frequency range Limits	Resolution Bandwidth	Limits [dB(μV)]		
[MHz]	[kHz]	Quasi-peak	Average	
0.15 to 0.50	9	66 to 56	56 to 46	
0.50 to 5	9	56	46	
5 to 30	9	60	50	

NOTE 1 The lower limit shall apply at the transition frequency.

NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

5.1.1 Test instrumentation

EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Next Calibration	
					Date	Interval (Month)
E5I-006	LTE Communicator	CMW500	R&S	132728	2021-04-06	12
E5I-015	EMI Test Receiver	ESU8	R&S	100481	2021-07-01	12
E5I-127	LISN	ENV216	R&S	102061	2021-07-29	12
-	Test software	EMC32	R&S	Ver 9.26.01	-	-

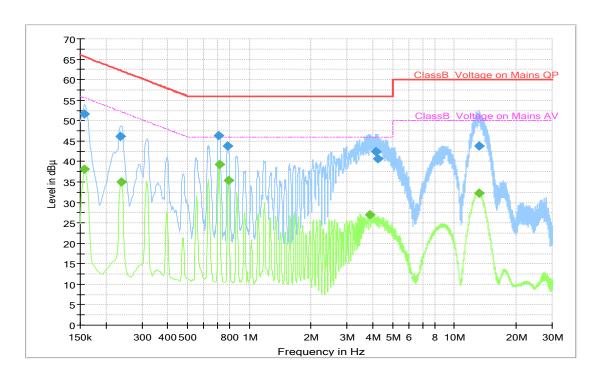
5.1.2 Temperature and humidity condition

Test date	2021-02-02	Test engineer	Soo-Joon Kim		
Climate condition	Ambient temperature	(22.8 ± 0.5) ℃	Limit (15.0 to 35.0) ℃		
	Relative humidity	(43.6 ± 0.5) % R.H.	Limit (25.0 to 75.0) % R.H.		
	Atmospheric pressure	(100.6 ± 0.5) kPa	Limit (86.0 to 106.0) kPa		
Test place	Shield Room (SR8)				

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5.1.3 Test results

☐ Operating Mode 1: AC Mains

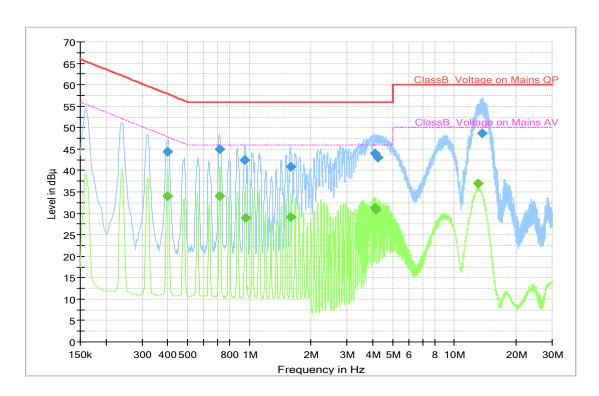


Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

Frequency (MHz)	QP (dBµV)	CAV (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.157	51.55		65.63	14.08	N	10.1
0.157		38.12	55.63	17.52	N	10.1
0.236	46.21		62.25	16.04	N	9.9
0.238		35.05	52.17	17.12	N	9.9
0.706	46.38		56.00	9.62	L1	10.1
0.713		39.33	46.00	6.67	N	10.1
0.782	43.79		56.00	12.21	L1	10.1
0.791		35.33	46.00	10.67	N	10.0
3.869		27.02	46.00	18.98	N	10.0
4.157	42.50		56.00	13.50	N	10.0
4.247	40.74		56.00	15.26	N	10.0
13.144		32.34	50.00	17.66	N	10.4
13.169	43.71		60.00	16.30	N	10.4

☐ Operating Mode 2: AC Mains

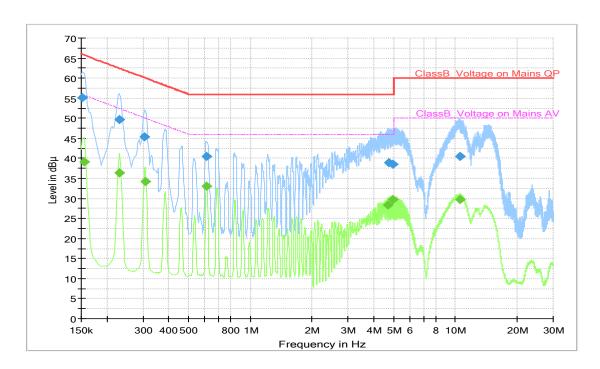


Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

Frequency (MHz)	QP (dBµV)	CAV (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.400		33.98	47.86	13.88	N	10.2
0.400	44.48		57.86	13.38	L1	10.2
0.717	44.97		56.00	11.03	N	10.1
0.719		34.00	46.00	12.00	L1	10.1
0.951	42.52		56.00	13.48	N	10.0
0.958		28.88	46.00	17.12	L1	10.0
1.595	40.83		56.00	15.17	N	9.9
1.597		29.10	46.00	16.90	L1	9.9
4.074		31.30	46.00	28.48	L1	10.0
4.099	43.97		56.00	12.03	N	10.0
4.155		30.91	46.00	15.09	L1	10.0
4.252	43.06		56.00	12.94	N	10.0
12.977		36.95	50.00	13.05	L1	10.2
13.583	48.77		60.00	11.23	N	10.4

☐ Operating Mode 3: AC Mains

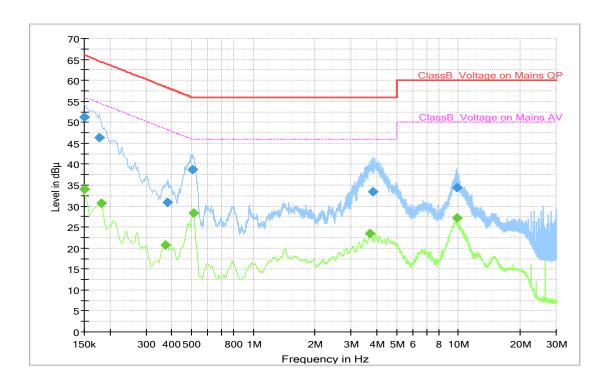


Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

Frequency (MHz)	QP (dBµV)	CAV (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.152	55.22		65.88	10.66	N	10.0
0.155		39.19	55.75	16.57	N	10.0
0.229	49.71		62.50	12.79	N	9.9
0.231		36.31	52.41	16.10	N	9.9
0.305	45.33		60.10	14.77	N	10.0
0.308		34.29	50.04	15.75	L1	10.0
0.609	40.54		56.00	15.46	L1	10.2
0.614		33.06	46.00	12.94	L1	10.2
4.713		28.34	46.00	17.66	L1	10.0
4.720	39.00		56.00	17.00	L1	10.0
4.938		29.75	46.00	16.25	L1	10.0
4.949	38.59		56.00	17.41	L1	10.0
10.498	40.52		60.00	19.48	L1	10.2
10.498		29.76	50.00	20.24	L1	10.2

☐ Operating Mode 4: AC Mains



Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

Frequency (MHz)	QP (dBµV)	CAV (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.150	51.31		66.00	14.69	N	9.9
0.150		33.99	56.00	22.01	L1	9.9
0.177	46.26		64.63	18.36	L1	10.3
0.182		30.77	54.42	23.65	L1	10.2
0.375		20.70	48.39	27.69	L1	10.2
0.380	30.89		58.29	27.40	L1	10.2
0.503	38.70		56.00	17.30	L1	10.2
0.510		28.34	46.00	17.66	L1	10.2
3.721		23.51	46.00	22.49	N	10.0
3.822	33.40		56.00	22.60	N	10.0
9.848		27.10	50.00	22.90	L1	10.1
9.879	34.48		60.00	25.52	L1	10.1

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5.2 Radiated Emission

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin.

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 3 m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution Bandwidth [kHz]	Video Bandwidth [kHz]	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	120	300	Continuous

Measurements within 6 dB of the limit were then maximized by adjusting turntable position. Final measurements were made using quasi-peak detector.

Peak/CISPR-Average measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5th harmonics of the highest frequency generated or used in the device or on which the device operates or tunes at a measurement distance of 3 m for the following antenna and turntable arrangements. The measurements above 1 GHz were performed with the bore-sighting antenna aimed at the EUT.

Antenna Height [cm]	Antenna Polarisation	Resolution Bandwidth [MHz]	Video Bandwidth [MHz]	Turntable position
100 ~ 400	Horizontal, Vertical	1	3	Continuous

Measurements within 6 dB of the limit were then maximized by adjusting turntable position. Final measurements were made using peak and CISPR-average detectors.

Limits for Radiated emission of Class B ITE at a measuring distance of 3 m and 10 m

Frequency range Limits	Field Strength				
[MHz]	3 m [μV/m]	3 m [dB(μV/m)]	10 m [dB(μV/m)]		
30 to 88	100	40.0	29.5		
88 to 216	150	43.5	33.0		
216 to 960	200	46.0	35.5		
Above 960	500	54.0	43.5		

Note) Distance correction fomula from $D_1(3m)$ to $D_2(10m)$

: Limit at D_2 = Limit at D_1 + 20Log(D_1/D_2)

Results checked manually; and points close to the limit line were re-measured.

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5.2.1 Test instrumentation

					Next Calibration		
EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Date	Interval (Month)	
E5I-020	EMI Test Receiver	ESU40	R&S	100375	2021-09-14	12	
E5I-072	BiLog Antenna	CBL6112D	TESEQ	36009	2022-05-15	24	
E5I-073	Preamplifier	310N	SONOMA	332016	2021-05-07	12	
E5I-035	Horn Antenna	HF907	R&S	100506	2021-08-30	24	
E5I-040	Signal Conditioning Unit	SCU-18	R&S	10210	2021-04-06	12	
E4I-A-056	Horn Antenna	QWH-SL-18- 40-K-HG-R	Steatite Antenna	19715	2021-04-23	24	
E5I-042	Signal Conditioning Unit	SCU-40A	R&S	10004	2021-09-09	12	
-	Test software	EP7RE	TOYO	Ver 5.8.2	-	-	
-	Test software	EMC32	R&S	Ver 9.25.00	-	-	

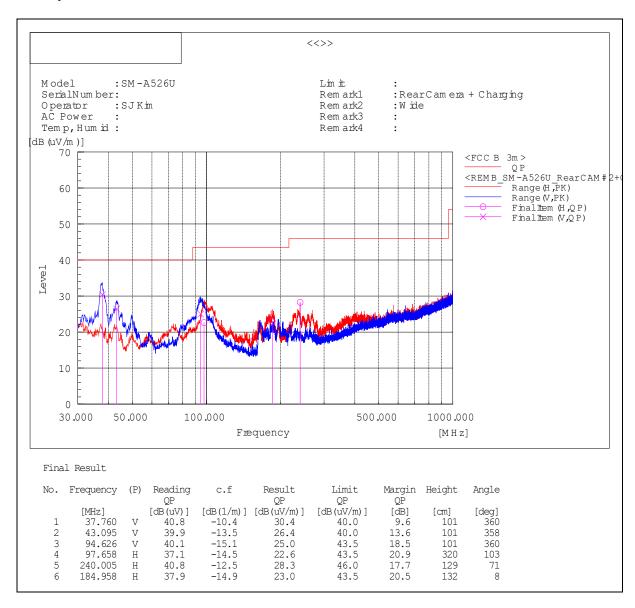
5.2.2 Temperature and humidity condition

Test date	Test date 2021-02-05, 2021-02-08		Soo-Joon Kim		
Climate condition	Ambient temperature	(22.8 ± 0.5) ℃	Limit (15.0 to 35.0) ℃		
	Relative humidity	(40.0 ± 0.5) % R.H.	Limit (25.0 to 75.0) % R.H.		
	Atmospheric pressure	eric pressure (100.8 ± 0.5) kPa Limit			
Test place	Semi-Anechoic Chamber (SAC5)				

5.2.3 Test results

□ Operating Mode 1

- Frequencies below 1 GHz



Note1) Receiving antenna polarization : Horizontal, Vertical Test Distance : 3 m, Antenna Height : 1 to 4 meters

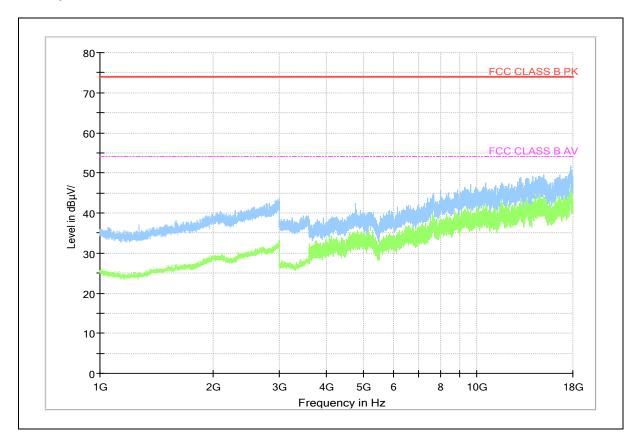
Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

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- Frequencies above 1 GHz



Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance: 3 m, Antenna Height: 1 to 4 meters

Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

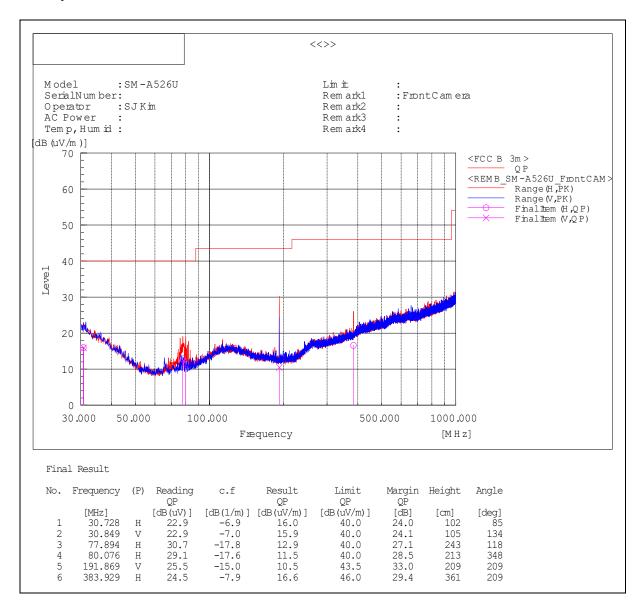
Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

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□ Operating Mode 2

- Frequencies below 1 GHz



Note1) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

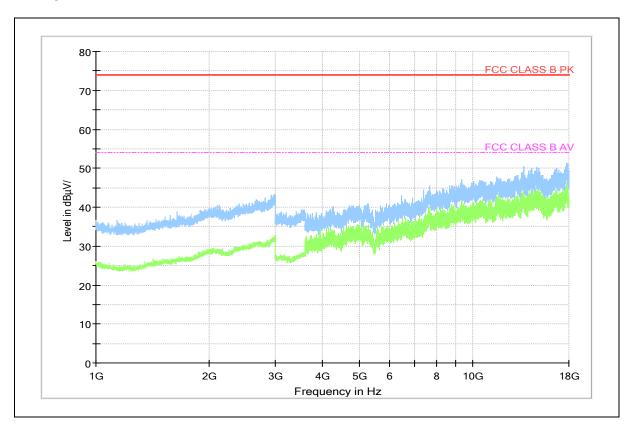
Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit - Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

Mobile Phone: SM-A526U

- Frequencies above 1 GHz



Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization: Horizontal, Vertical

Test Distance: 3 m, Antenna Height: 1 to 4 meters

Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

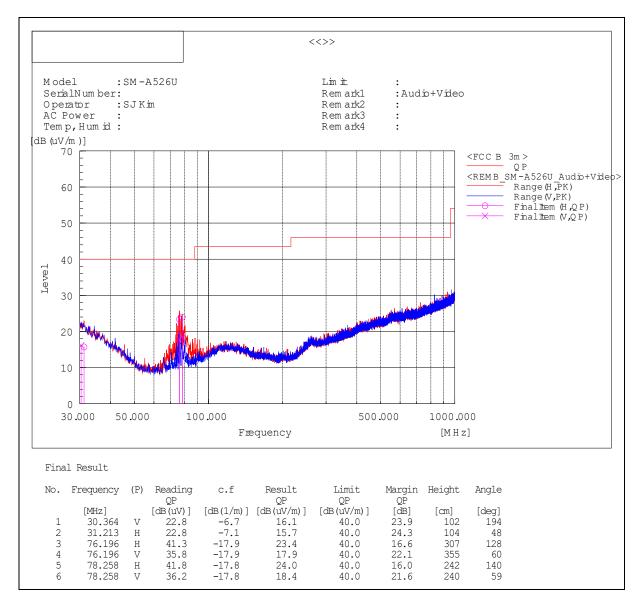
Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

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□ Operating Mode 3

- Frequencies below 1 GHz



Note1) Receiving antenna polarization: Horizontal, Vertical

Test Distance: 3 m, Antenna Height: 1 to 4 meters

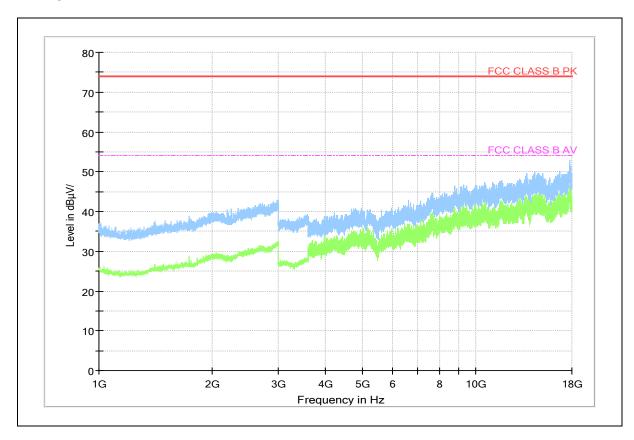
Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

Mobile Phone: SM-A526U

- Frequencies above 1 GHz



Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization: Horizontal, Vertical

Test Distance: 3 m, Antenna Height: 1 to 4 meters

Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

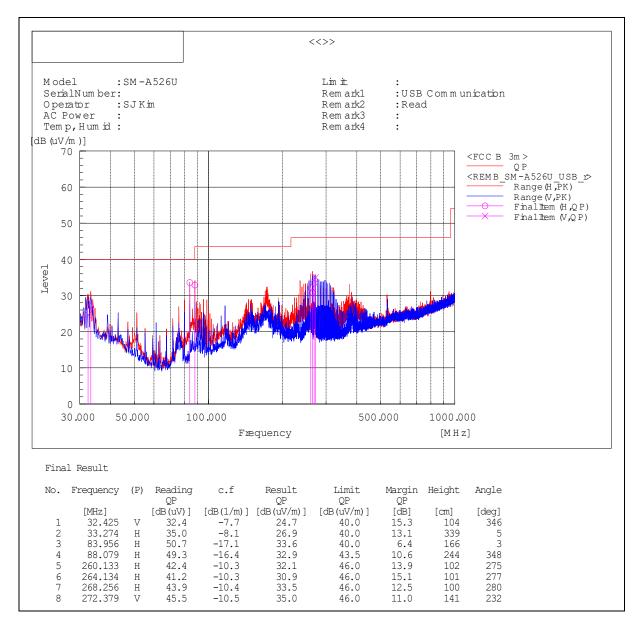
Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

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□ Operating Mode 4

- Frequencies below 1 GHz



Note1) Receiving antenna polarization: Horizontal, Vertical

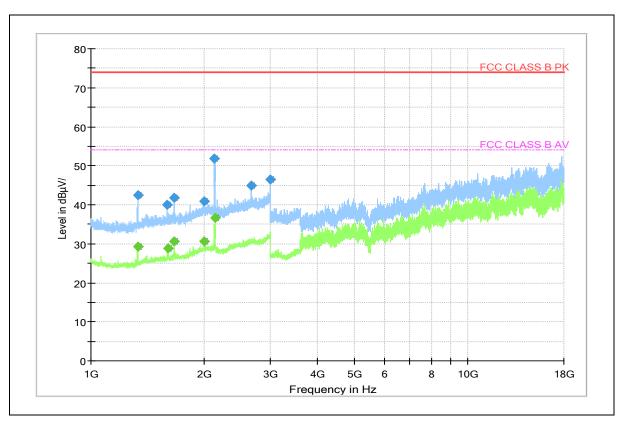
Test Distance: 3 m, Antenna Height: 1 to 4 meters

Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit - Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

- Frequencies above 1 GHz



Frequency (MHz)	PK (dBμV/m)	CAV (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1 329.600		29.27	54.00	24.73	100.0	V	0.0	8.2
1 331.600	42.53		74.00	31.47	100.0	V	167.0	8.2
1 596.800	40.09		74.00	33.91	102.0	V	132.0	10.2
1 600.000		28.73	54.00	25.27	101.0	V	132.0	10.2
1 664.000		30.60	54.00	23.40	101.0	V	122.0	10.5
1 665.200	41.84		74.00	32.16	104.0	V	132.0	10.5
1 998.800	40.81		74.00	33.19	100.0	V	16.0	13.2
1 999.200		30.56	54.00	23.44	100.0	V	16.0	13.2
2 128.800	51.77		74.00	22.23	108.0	V	342.0	13.0
2 132.800		36.62	54.00	17.38	102.0	V	348.0	13.0
2 656.800	44.92		74.00	29.08	100.0	V	280.0	15.2
3 000.000	46.57		74.00	27.43	103.0	V	214.0	17.1

Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization: Horizontal, Vertical

Test Distance: 3 m, Antenna Height: 1 to 4 meters

Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

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