



# TEST REPORT

<b>KCTL Inc.</b> 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 <a href="http://www.kctl.co.kr">www.kctl.co.kr</a>	Report No.: <b>KR21-SRF0238</b> Page (1) of (22)	
<p><b>1. Client</b></p> <ul style="list-style-type: none"> <li>◦ Name : Samsung Electronics Co., Ltd.</li> <li>◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea</li> <li>◦ Date of Receipt : 2021-08-09</li> </ul> <p><b>2. Use of Report</b> : Certification</p> <p><b>3. Name of Product / Model</b> : Mobile Phone / SC-56B</p> <p><b>4. Manufacturer / Country of Origin</b> : Samsung Electronics Co., Ltd. / Vietnam</p> <p><b>5. FCC ID</b> : A3LSMA223JPN</p> <p><b>6. Date of Test</b> : 2021-08-17 to 2021-09-16</p> <p><b>7. Location of Test</b> : <input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing          (Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)</p> <p><b>8. Test method used</b> : FCC Part 15 Subpart C, 15.225</p> <p><b>9. Test Result</b> : Refer to the test result in the test report</p>		
Affirmation	Tested by  Name : Kwonse Kim (Signature)	Technical Manager  Name : Seungyong Kim (Signature)
2021-09-29		
<h2>KCTL Inc.</h2> <p>As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.</p>		

**REPORT REVISION HISTORY**

Date	Revision	Page No
2021-09-29	Originally issued	-

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**General remarks for test reports**

**Statement concerning the uncertainty of the measurement systems used for the tests**

(may be required by the product standard or client)

**Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

**Procedure number, issue date and title:**

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

**Statement not required by the standard or client used for type testing**

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### 1. General information

Client : Samsung Electronics Co., Ltd.  
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677,  
Rep. of Korea  
Manufacturer : Samsung Electronics Co., Ltd.  
Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677,  
Rep. of Korea  
Laboratory : KCTL Inc.  
Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea  
Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132  
VCCI Registration No. : R-20080, G-20078, C-20059, T-20056  
CAB Identifier: KR0040  
ISED Number: 8035A  
KOLAS No.: KT231

### 2. Device information

Equipment under test : Mobile phone  
Model : SC-56B  
Modulation technique : Bluetooth(BDR/EDR)\_GFSK,  $\pi/4$ DQPSK, 8DPSK  
Bluetooth(BLE)\_GFSK  
WIFI(802.11a/b/g/n/ac)\_DSSS, OFDM  
LTE\_QPSK, 16QAM, 64QAM  
WCDMA\_QPSK  
NFC\_ASK  
Number of channels : Bluetooth(BDR/EDR)\_79 ch / Bluetooth(BLE)\_40 ch  
802.11b/g/n\_HT20 : 13 ch  
UNII-1: 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)  
UNII-2A: 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)  
UNII-2C: 12 ch (20 MHz), 6 ch (40 MHz), 3 ch (80 MHz)  
UNII-3: 5 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)  
NFC: 1 ch  
Power source : DC 3.88 V  
Antenna specification : LTE/WCDMA\_Metal Antenna  
WIFI/Bluetooth(BDR/EDR/BLE)\_LDS Antenna  
NFC\_LDS Antenna  
Antenna gain : WIFI/Bluetooth(BDR/EDR/BLE)\_-2.95 dBi  
UNII-1 : -3.06 dBi  
UNII-2A : -3.06 dBi  
UNII-2C : -4.03 dBi  
UNII-3 : -4.80 dBi

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Frequency range : Bluetooth(BDR/EDR/BLE)\_2 402 MHz ~ 2 480 MHz  
2 412 MHz ~ 2 472 MHz (802.11b/g/n\_HT20)  
UNII-1: 5 180 MHz ~ 5 240 MHz (802.11a/n/ac\_HT20/VHT20)  
UNII-1: 5 190 MHz ~ 5 230 MHz (802.11n/ac\_HT40/VHT40)  
UNII-1: 5 210 MHz (802.11ac\_VHT80)  
UNII-2A: 5 260 MHz ~ 5 320 MHz (802.11a/n/ac\_HT20/VHT20)  
UNII-2A: 5 270 MHz ~ 5 310 MHz (802.11n/ac\_HT40/VHT40)  
UNII-2A: 5 290 MHz (802.11ac\_VHT80)  
UNII-2C: 5 500 MHz ~ 5 720 MHz (802.11a/n/ac\_HT20/VHT20)  
UNII-2C: 5 510 MHz ~ 5 710 MHz (802.11n/ac\_HT40/VHT40)  
UNII-2C: 5 530 MHz ~ 5 690 MHz (802.11ac\_VHT80)  
UNII-3: 5 745 MHz ~ 5 825 MHz (802.11a/n/ac\_HT20/VHT20)  
UNII-3: 5 755 MHz ~ 5 795 MHz (802.11n/ac\_HT40/VHT40)  
UNII-3: 5 775 MHz (802.11ac\_VHT80)  
LTE Band 5\_824.7 MHz ~ 848.3 MHz  
LTE Band 12\_699.7 MHz ~ 715.3 MHz  
LTE Band 41\_2 498.5 MHz ~ 2 687.5 MHz  
GSM 850\_824.2 MHz ~ 848.8 MHz  
GSM 1900\_1 850.2 MHz ~ 1 909.8 MHz  
WCDMA 850\_826.4 MHz ~ 846.6 MHz  
NFC\_13.56 MHz

Software version : A223D.001  
Hardware version : REV1.0  
Test device serial No. : Conducted(R3CR70CAFJT, FD100000211C7ECE, R3CR70CAFGE,  
R3CR70CALHR)  
Radiated(R3CR70CAPCH, R3CR70CAPAA, R3CR70C6NHV)  
Operation temperature : -30 °C ~ 50 °C

## 2.1. Frequency/channel operations

This device contains the following capabilities:

WiFi (802.11a/b/g/n/ac), Bluetooth (BDR/EDR/BLE), NFC, LTE Band 5, LTE Band 12, LTE Band 41  
 GSM 850, GSM 1900, WCDMA 850

Ch.	Frequency (MHz)
01	13.56

Table 2.1.1. NFC

## 3. Antenna requirement

Requirement of FCC part section 15.203

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 shall be considered sufficient to comply with the provisions of this section.

- The transmitter has permanently attached LDS Antenna (Internal antenna) on board.

#### 4. Summary of tests

FCC Part section(s)	Parameter	Test Condition	Test results
15.225(a)	In-band Fundamental Emission	Radiated	Pass
15.225(b)	In-band Spurious Emission		Pass
15.225(c)	In-band Spurious Emission		Pass
15.225(d) 15.209	Out-of-band Spurious Emission		Pass
15.225(e)	Frequency Stability Tolerance	Conducted	Pass
15.215(c)	20 dB Bandwidth		Pass
15.207(a)	AC Conducted emissions		Pass

**Notes:**

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. These tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
3. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **Z** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Z** orientation
4. The test procedure(s) in this report were performed in accordance as following.
  - ◆ ANSI C63.10-2013
5. Radiated(fundamental level and spurious emissions) tests were performed both without reading a passive tag condition[test mode] and with reading a passive tag condition
  - ◆ Worst case : Without passive tag

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## 5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty ( $\pm$ )	
Radiated spurious emissions	9 kHz ~ 30 MHz:	2.3 dB
	30 MHz ~ 1 000 MHz	2.2 dB
Conducted emissions	9 kHz ~ 150 kHz	3.7 dB
	150 kHz ~ 30 MHz	3.3 dB



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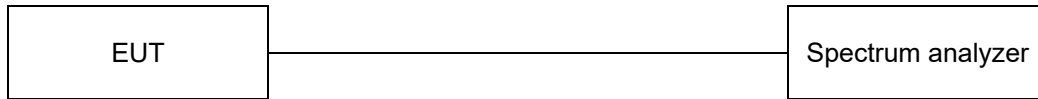
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## 6. Test results

### 6.1. 20 dB Bandwidth & 99% Bandwidth

#### Test setup



#### Limit

According to §15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

#### Test procedure

ANSI C63.10 - Section 6.9.2

**Test settings**

The occupied bandwidth is measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a specified ratio (or in decibels, a specified number of dB down from the reference value). Typical ratios, expressed in dB, are -6 dB, -20 dB, and -26 dB, corresponding to 6 dB BW, 20 dB BW, and 26 dB BW, respectively. In this subclause, the ratio is designated by “-xx dB.” The reference value is either the level of the unmodulated carrier or the highest level of the spectral envelope of the modulated signal, as stated by the applicable requirement. Some requirements might specify a specific maximum or minimum value for the “-xx dB” bandwidth; other requirements might specify that the “-xx dB” bandwidth be entirely contained within the authorized or designated frequency band.

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.
- b) Span: Two times and five times the OBW.
- c) RBW = 1 % to 5 % of the OBW and VBW  $\geq$  3 x RBW
- d) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Detector: peak
- g) Trace mode: max hold.
- h) Allow the trace to stabilize.
- i) Determine the “-xx dB down amplitude” using ((reference value) - xx). Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- j) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
- k) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

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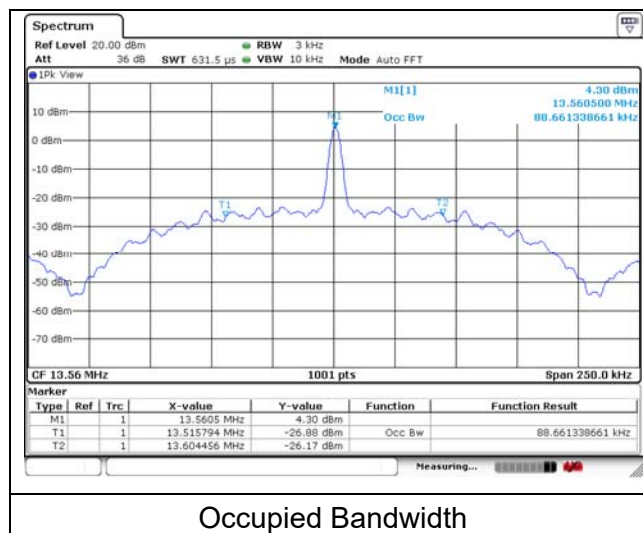
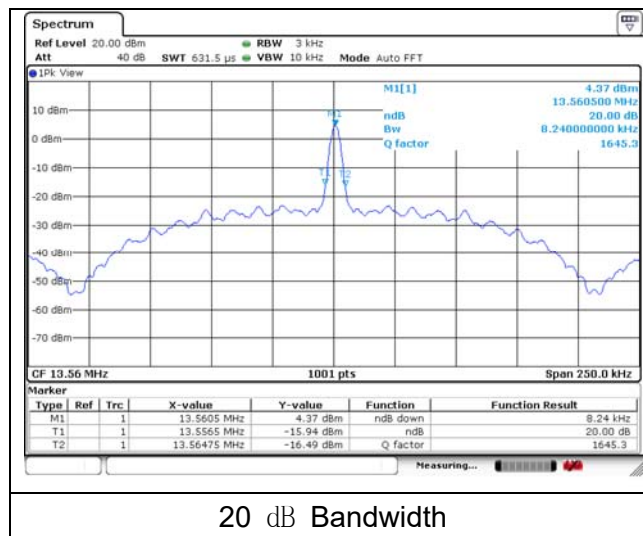
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## Test results

Frequency [MHz]	20 dB Bandwidth [MHz]		Limit [MHz]	20 dB Bandwidth [MHz]	Occupied Bandwidth (99 % BW) [MHz]
13.56	Lowest Frequency	13.557	13.110	0.008	0.089
	Highest Frequency	13.565	14.010		



### Note:

Because the measured signal is CW/CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW

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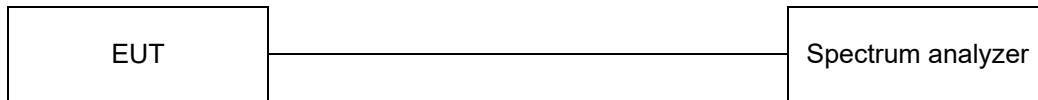
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## 6.2. Frequency tolerance

### Test setup



### Limit

15.225 (e) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01$  % of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### Test procedure

ANSI C63.10-2013 - Section 6.8.1

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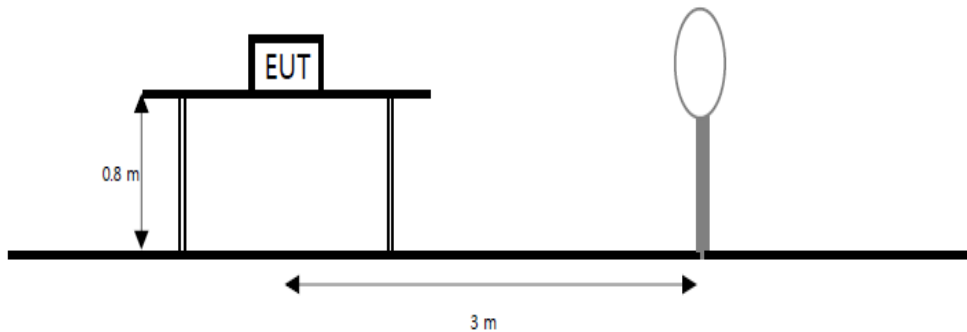
**KCTL****Test results**

Voltage [%]	Voltage [V]	TEMP [°C]	Maintaining time	Measure frequency [Hz]	Frequency deviation [Hz]	Deviation [%]		
100	3.88	20(Ref.)	Startup	13 560 602	44.39	0.004 44		
			2 minutes	13 560 601	44.32	0.004 43		
			5 minutes	13 560 601	44.32	0.004 43		
			10 minutes	13 560 601	44.32	0.004 43		
		-30	Startup	13 560 634	46.75	0.004 68		
			2 minutes	13 560 634	46.75	0.004 68		
			5 minutes	13 560 634	46.75	0.004 68		
			10 minutes	13 560 634	46.75	0.004 68		
		-20	Startup	13 560 661	48.74	0.004 87		
			2 minutes	13 560 661	48.74	0.004 87		
			5 minutes	13 560 661	48.74	0.004 87		
			10 minutes	13 560 661	48.74	0.004 87		
		-10	Startup	13 560 676	49.85	0.004 99		
			2 minutes	13 560 676	49.85	0.004 99		
			5 minutes	13 560 676	49.85	0.004 99		
			10 minutes	13 560 676	49.85	0.004 99		
		0	Startup	13 560 670	49.41	0.004 94		
			2 minutes	13 560 670	49.41	0.004 94		
			5 minutes	13 560 670	49.41	0.004 94		
			10 minutes	13 560 670	49.41	0.004 94		
		10	Startup	13 560 658	48.52	0.004 85		
			2 minutes	13 560 658	48.52	0.004 85		
			5 minutes	13 560 658	48.52	0.004 85		
			10 minutes	13 560 658	48.52	0.004 85		
		30	Startup	13 560 632	46.61	0.004 66		
			2 minutes	13 560 632	46.61	0.004 66		
			5 minutes	13 560 631	46.53	0.004 65		
			10 minutes	13 560 631	46.53	0.004 65		
		40	Startup	13 560 599	44.17	0.004 42		
			2 minutes	13 560 598	44.10	0.004 41		
			5 minutes	13 560 598	44.10	0.004 41		
			10 minutes	13 560 598	44.10	0.004 41		
		50	Startup	13 560 567	41.81	0.004 18		
			2 minutes	13 560 567	41.81	0.004 18		
			5 minutes	13 560 567	41.81	0.004 18		
			10 minutes	13 560 567	41.81	0.004 18		
		End Point	3.40	20	Startup	13 560 609	44.91	0.004 49
					2 minutes	13 560 609	44.91	0.004 49
					5 minutes	13 560 608	44.84	0.004 48
					10 minutes	13 560 607	44.76	0.004 48
115	4.46	20	Startup	13 560 597	44.02	0.004 40		
			2 minutes	13 560 597	44.02	0.004 40		
			5 minutes	13 560 597	44.02	0.004 40		
			10 minutes	13 560 598	44.10	0.004 41		

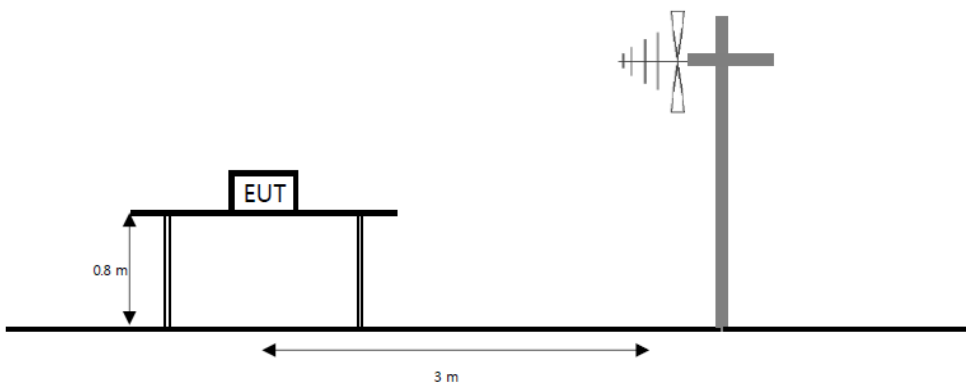
### 6.3. Radiated spurious emissions

#### Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



#### Limit

15.225 (a) The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15, 848 microvolts/meter at 30 meters.

15.225 (b) With in the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

15.225 (c) With in the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

15.225 (d) The Field Strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in 15.209.

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Frequency (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30(29.54 dB $\mu\text{V}/\text{m}$ )	30
30.0-88.0	100(40 dB $\mu\text{V}/\text{m}$ )	3
88-216	150(43.5 dB $\mu\text{V}/\text{m}$ )	3
216-960	200 (46 dB $\mu\text{V}/\text{m}$ )	3
Above 960	500 (53.98 dB $\mu\text{V}/\text{m}$ )	3

**Test procedure**

ANSI C63.10-2013 - Section 6.4, 6.5

**Test settings**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW  $\geq 3 \times$  RBW
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Table. RBW as a function of frequency**

Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz to 120 kHz
> 1 000 MHz	1 MHz

**Notes:**

1.  $f < 30$  MHz, extrapolation factor of 40 dB/decade of distance.  $F_d = 40 \log(D_m/D_s)$   
 $f \geq 30$  MHz, extrapolation factor of 20 dB/decade of distance.  $F_d = 20 \log(D_m/D_s)$   
Where:  
 $F_d$  = Distance factor in dB  
 $D_m$  = Measurement distance in meters  
 $D_s$  = Specification distance in meters
2. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in § 15.31(f)(2). Extrapolation Factor =  $40 \log_{10}(30/3) = 40$  dB.
3. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or  $F_d$ (dB)
4. Result = Reading + Cable loss + Amp gain + Ant. factor - Distance factor
5. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
6. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
7. Below 30 MHz frequency range, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported and the worse orientations of Face-on and Face-off were set for final test.
8. Face-on = Parallel, Face-off = Perpendicular
9. <sup>1)</sup> means restricted band

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## Test results for fundamental

### 15.225 (a) 13.553-13.567 MHz

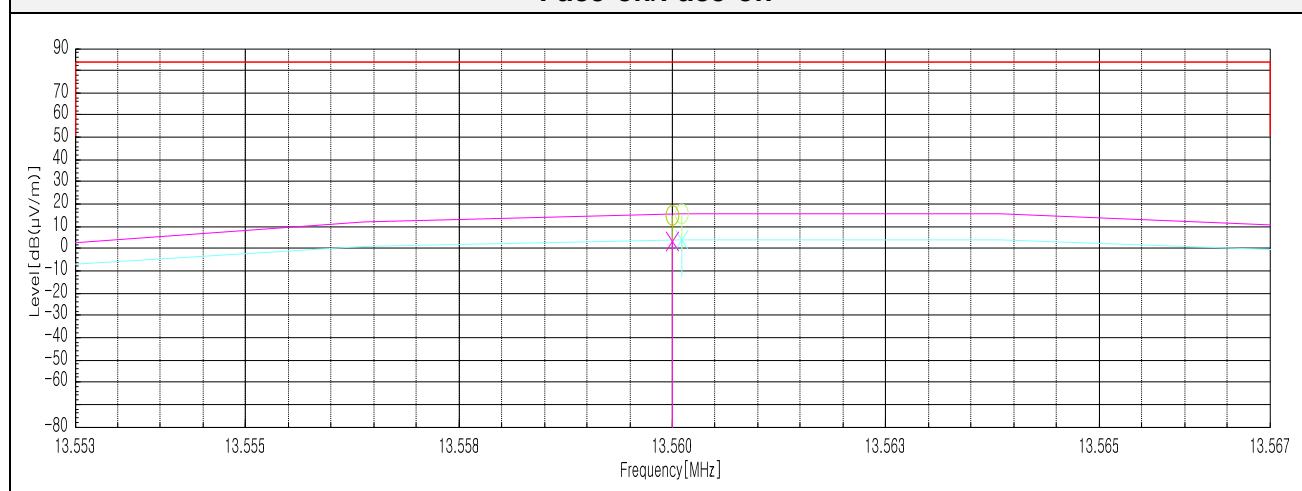
[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
13.56	65.70	20.20	-31.04	40.00	14.86	84.00	69.14

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
13.56	54.10	20.20	-31.04	40.00	3.26	84.00	80.74

### Face-on/Face-off





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## Test results for in-band & out-band (9 kHz to 30 MHz)

### 15.225 (b,c) 13.110-14.010 MHz

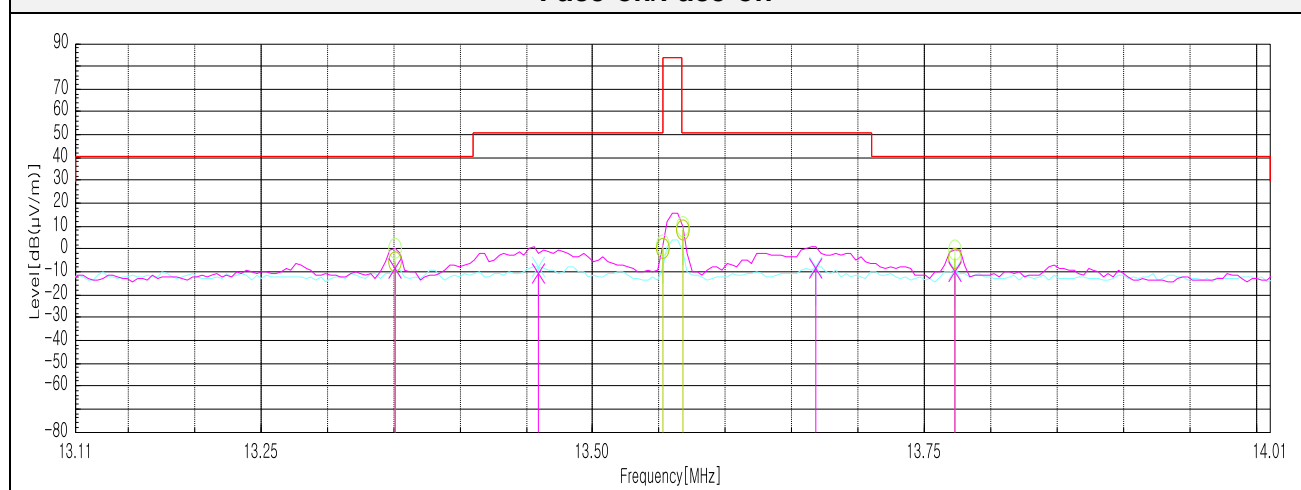
[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
13.35	45.30	20.20	-31.05	40.00	-5.55	40.50	46.05
13.55	50.90	20.20	-31.04	40.00	0.06	50.50	50.44
13.57	59.10	20.20	-31.04	40.00	8.26	50.50	42.24
13.77	46.70	20.20	-31.02	40.00	-4.12	40.50	44.62

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
13.35	42.00	20.20	-31.05	40.00	-8.85	40.50	49.35
13.46	40.30	20.20	-31.04	40.00	-10.54	50.50	61.04
13.67	42.40	20.20	-31.03	40.00	-8.43	50.50	58.93
13.77	40.50	20.20	-31.02	40.00	-10.32	40.50	50.82

### Face-on/Face-off



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## Test results (9 kHz to 30 MHz)

### 15.225 (d) 0.009-30 MHz

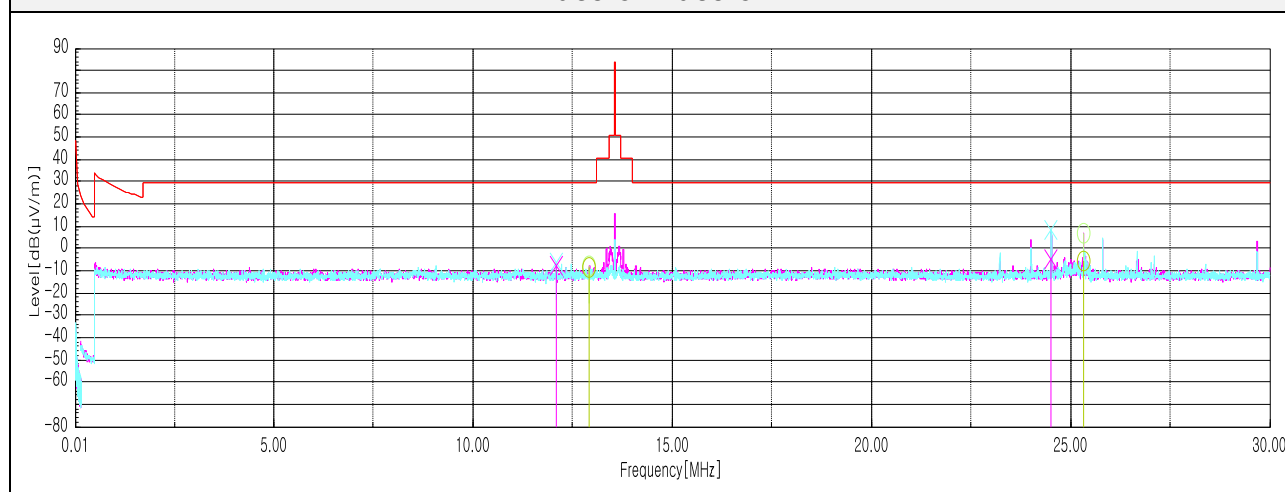
[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
12.93	42.60	20.20	-31.08	40.00	-8.28	29.50	37.78
25.33	43.80	20.75	-30.56	40.00	-6.01	29.50	35.51

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
12.10	43.20	20.20	-31.17	40.00	-7.77	29.50	37.27
24.52	44.60	20.78	-30.63	40.00	-5.25	29.50	34.75

### Face-on/Face-off



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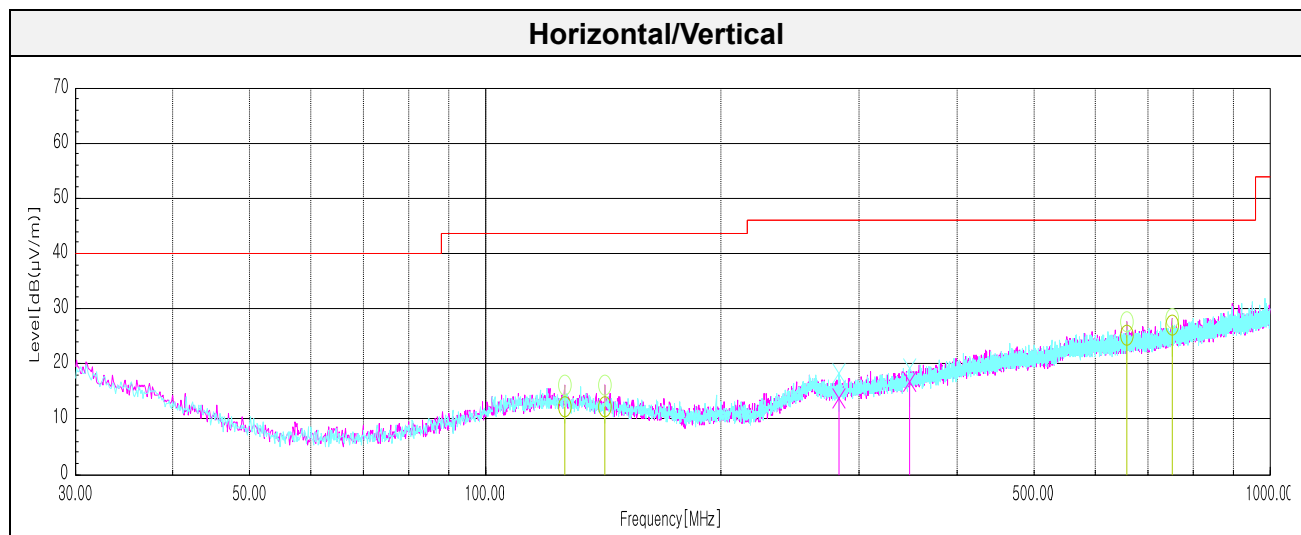
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## Test results (Below 1 000 MHz)

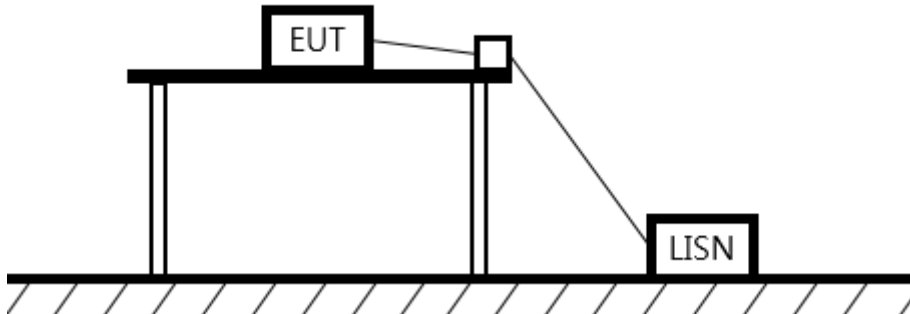
### 15.225 (d) 30-1000 MHz

Frequency (MHz)	Pol. (V/H)	Reading (dB( $\mu\text{V}$ ))	Antenna Factor (dB)	Amp. + Cable (dB)	Distance Factor (dB)	Result (dB( $\mu\text{V}/\text{m}$ ))	Limit (dB( $\mu\text{V}/\text{m}$ ))	Margin (dB)
<b>Quasi peak data</b>								
126.15 <sup>1)</sup>	H	22.60	17.90	-28.27	-	12.23	43.50	31.27
142.04	H	23.00	17.10	-27.98	-	12.12	43.50	31.38
282.44 <sup>1)</sup>	V	21.10	18.75	-26.09	-	13.76	46.00	32.24
347.19	V	21.80	20.19	-25.21	-	16.78	46.00	29.22
656.74	H	22.40	24.90	-22.12	-	25.18	46.00	20.82
749.98	H	22.70	25.60	-21.28	-	27.02	46.00	18.98



## 6.4. AC Conducted emission

### Test setup



### Limit

According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit (dB $\mu$ V/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

### Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50 $\Omega$ /50 $\mu$ H LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 kHz or to quasi-peak and average within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

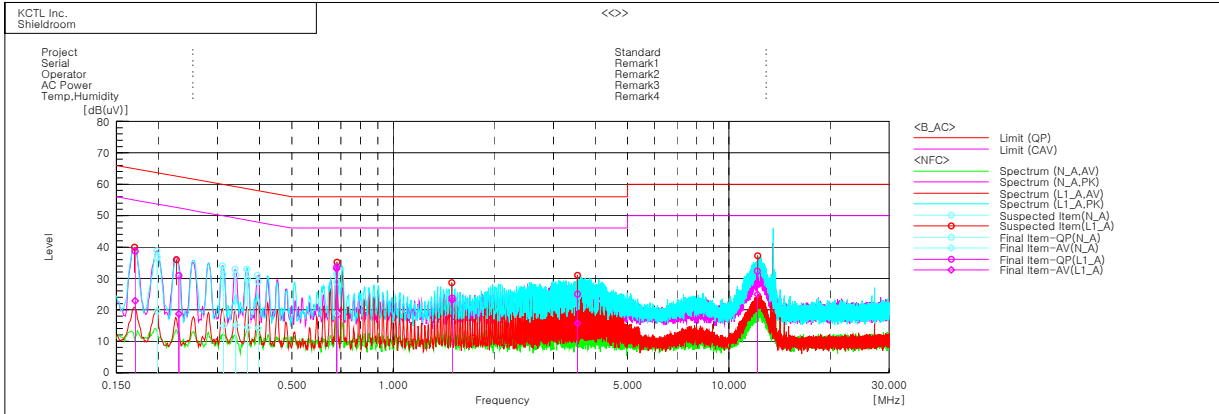
# KCTL Inc.

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## Test results



### Final Result

--- N_A Phase ---										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.19855	26.6	9.6	10.0	36.6	19.6	63.7	53.7	27.1	34.1
2	0.3124	21.5	5.1	9.8	31.3	14.9	59.9	49.9	28.6	35.0
3	0.33974	21.2	5.2	9.9	31.1	15.1	59.2	49.2	28.1	34.1
4	0.36881	19.9	4.5	9.9	29.8	14.4	58.5	48.5	28.7	34.1
5	0.3967	19.1	4.2	9.9	29.0	14.1	57.9	47.9	28.9	33.8
6	0.67992	19.0	8.9	9.9	28.9	18.8	56.0	46.0	27.1	27.2

--- L1_A Phase ---										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.17051	28.5	12.7	10.2	38.7	22.9	64.9	54.9	26.2	32.0
2	0.23018	21.1	8.9	9.8	30.9	18.7	62.4	52.4	31.5	33.7
3	0.67966	23.7	23.2	9.9	33.6	33.1	56.0	46.0	22.4	12.9
4	1.49764	13.9	13.1	9.9	23.8	23.0	56.0	46.0	32.2	23.0
5	3.54101	15.1	5.9	9.9	25.0	15.8	56.0	46.0	31.0	30.2
6	12.16587	22.0	14.6	10.3	32.3	24.9	60.0	50.0	27.7	25.1

## 7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100807	22.07.27
Signal Generator	R&S	SMB100A	176206	22.01.20
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Temp & Humid Chamber	Myeongseong R&P	CTHC-50P-DT	20150824-1	21.11.30
EMI TEST RECEIVER	R&S	ESCI7	100732	22.03.05
EMI TEST RECEIVER	R&S	ESCI3	100001	22.08.19*
LOOP Antenna	R&S	HFH2-Z2	100355	22.08.21
Bi-Log Antenna	TESEQ	CBL 6112D	55545	23.01.14
Attenuator	KEYSIGHT	8491B-6dB	MY39271060	23.01.14
ISOLATION TRANSFORMER	ONETECH CO., LTD	OT-IT500VA	OTR1-16026	22.04.02
Amplifier	SONOMA INSTRUMENT	310N	284608	22.08.19*
TWO-LINE V - NETWORK	R&S	ENV216	101358	21.09.29
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	DT2000	79	-

\* Tests related to this equipment were progressed after the calibration was completed.

**End of test report**