

## ANNEX B\_EMI TEST RESULT

### REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	August 27, 2019	Initial Release

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2014. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

## CONTENTS

1. GENERAL INFORMATION	3
1.1 Details of Support Equipment	3
1.2 Cable Description	3
1.3 Noise Suppression Parts on Cable (I/O Cable)	3
1.4 Test Facility	4
1.5 Calibration of Measuring Instrument	4
1.6 Measurement Uncertainty	5
2. DESCRIPTION OF TEST	6
2.1 Measurement of Conducted Emission	6
2.2 Measurement of Radiated Emission	7
2.3 Configuration of Tested System	8
3. PRELIMINARY TEST	9
3.1 Conducted Emission	9
3.2 Radiated Emission	9
4. CONDUCTED EMISSION AND RADIATED EMISSION TEST SUMMARY	11
4.1 Conducted Emission	11
4.2 Radiated Emission Below 1 GHz	18
4.3 Radiated Emission Above 1 GHz	24
5. EMI TEST SETUP PHOTO	30

## 1. GENERAL INFORMATION

### 1.1 Details of Support Equipment

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Manufacturer	Tech. Information
EUT	SM-A908B	SAMSUNG	-
TA	EP-TA800	SOLU-M	Input: AC 100~240 V, 50~60 Hz, 0.7 A Output: (PDO) DC 5.0 V, 3.0 A or DC 9.0 V, 2.77 A / (PPS) (3.3 ~ 5.9) V, 3.0 A or (3.3 ~ 11.0) V, 2.25 A
Data Cable	EP-DA905BBE	Luxshare	-
Earphone	GHSS028-K4	BUJEON	-
Micro SD Card	-	SAMSUNG	-

### 1.2 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	USB Type C	Y	N/A	(P) 1.0
	USB Type C (Earphone)	N/A	N	(D) 1.2

NOTE. The marked "(D)" means the data cable and "(P)" means the power cable.

### 1.3 Noise Suppression Parts on Cable (I/O Cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	USB Type C	N	N/A	Y	Both End
	USB Type C (Earphone)	N	N/A	Y	EUT End

### 1.4 Test Facility

Test site is located at 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, South Korea. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014. The Normalized site attenuations (30 MHz to 1 GHz) and Site validation (1 GHz to 18 GHz) were performed in accordance with the standard in ANSI C63.4-2014

Measurement Facilities	Designation No.
Radiated Field strength measurement facility 3 m Semi Anechoic chamber	KR0032
Radiated Field strength measurement facility 10 m Semi Anechoic chamber #1	
Radiated Field strength measurement facility 10 m Semi Anechoic chamber #2	

### 1.5 Calibration of Measuring Instrument

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers recommendations for utilizing calibration equipment, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5:2017

## 1.6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. 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  $U_{CISPR}$  measurement uncertainty

values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty
Conducted Emission (0.15 MHz to 30 MHz)	1.8 dB
Radiated Emissions (30 MHz to 1 GHz)	4.8 dB
Radiated Emissions (1 GHz to 18 GHz)	5.4 dB
Radiated Emissions (18 GHz to 40 GHz)	5.7 dB

## 2. DESCRIPTION OF TEST

### 2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 7.3

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).  
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).  
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The frequency range from 150 kHz to 30 MHz was searched.

#### Conducted Emission Limits

Frequency (MHz)	Resolution Bandwidth (kHz)	Class A		Class B	
		Quasi-Peak (dBµV)	Average (dBµV)	Quasi-Peak (dBµV)	Average (dBµV)
0.15 to 0.5	9	79	66	66 to 56*	56 to 46*
0.5 to 5	9	73	60	56	46
5 to 30	9	73	60	60	50

NOTE. Decreases with the logarithm of the frequency.

## 2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 8.3

- a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- g. 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. (1 GHz to 40 GHz)

### Radiated Emission Limits

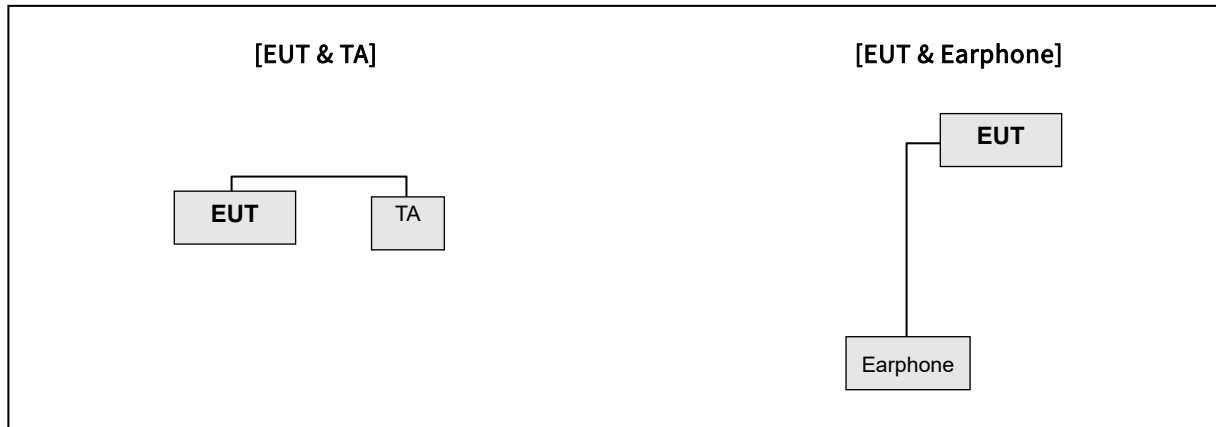
Frequency (MHz)	Class A			Class B		
	Antenna Distance (m)	Field Strength ( $\mu\text{V}/\text{m}$ )	Quasi-Peak ( $\text{dB}\mu\text{V}/\text{m}$ )	Antenna Distance (m)	Field Strength ( $\mu\text{V}/\text{m}$ )	Quasi-Peak ( $\text{dB}\mu\text{V}/\text{m}$ )
30 to 88	10	90	39.0	3	100	40.0
88 to 216	10	150	43.5	3	150	43.5
216 to 960	10	210	46.4	3	200	46.0
Above 960	10	300	49.5	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Class A		Class B		
		Peak ( $\text{dB}\mu\text{V}/\text{m}$ )	Average ( $\text{dB}\mu\text{V}/\text{m}$ )	Peak ( $\text{dB}\mu\text{V}/\text{m}$ )	Average ( $\text{dB}\mu\text{V}/\text{m}$ )	
Above 1 000	3	80	60	74	54	

### 2.2.1 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

### 2.3 Configuration of Tested System



Non-Conductive Table  
 Power Line: 120 VAC, 60 Hz



### 3. PRELIMINARY TEST

During preliminary tests, the following operating mode was investigated.

GSM 850 Idle (Low/Middle/High CH)	WCDMA 850 (Low/Middle/High CH)
LTE B5 Idle (Low/Middle/High CH)	LTE B12 Idle (Low/Middle/High CH)
LTE B13 Idle (Low/Middle/High CH)	LTE B17 Idle (Low/Middle/High CH)
LTE B26 Idle (Low/Middle/High CH)	

NOTE. The worst band is tested.

#### 3.1 Conducted Emission

It was tested the following operating mode, after connecting all peripheral devices.

Operating Modes:

Receiver mode (LTE B12+B13+B17 High CH Idle)

#### 3.2 Radiated Emission

It was tested the following operating mode, after connecting all peripheral devices.

Operating Modes:

##### 30 MHz to 1 GHz

##### [EUT & TA]

Receiver mode (LTE B26+B5 Low CH Idle)	Receiver mode (LTE B26+B5 Middle CH Idle)
Receiver mode (LTE B26+B5 High CH Idle)	Receiver mode (LTE B12+B13+B17 Low CH Idle)
Receiver mode (LTE B12+B13+B17 Middle CH Idle)	Receiver mode (LTE B12+B13+B17 High CH Idle)

##### [EUT & Earphone]

Receiver mode (LTE B26+B5 Low CH Idle)	Receiver mode (LTE B26+B5 Middle CH Idle)
Receiver mode (LTE B26+B5 High CH Idle)	Receiver mode (LTE B12+B13+B17 Low CH Idle)
Receiver mode (LTE B12+B13+B17 Middle CH Idle)	Receiver mode (LTE B12+B13+B17 High CH Idle)

**1 GHz to 30 GHz****[EUT & TA]**

Receiver mode (LTE B12+B13+B17 High CH Idle)

**[EUT & Earphone]**

Receiver mode (LTE B12+B13+B17 High CH Idle)

NOTE.

1. Three orientations have been investigated and the worst case orientation is reported.
2. The worst case of operating mode is reported.

## 4. CONDUCTED EMISSION AND RADIATED EMISSION TEST SUMMARY

### 4.1 Conducted Emission

#### 4.1.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	06.18.2019
<input checked="" type="checkbox"/>	LISN	Rohde & Schwarz	ENV216	102245	1 year	12.12.2018
<input checked="" type="checkbox"/>	Radio Communication Analyzer	ANRITSU	MT8820C	6201138643	1 year	08.21.2018
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
<input checked="" type="checkbox"/>	Software	Rohde & Schwarz	EMC32	-	-	-

#### 4.1.2 Operating Condition

The test results of conducted emission at mains ports provide the following information:

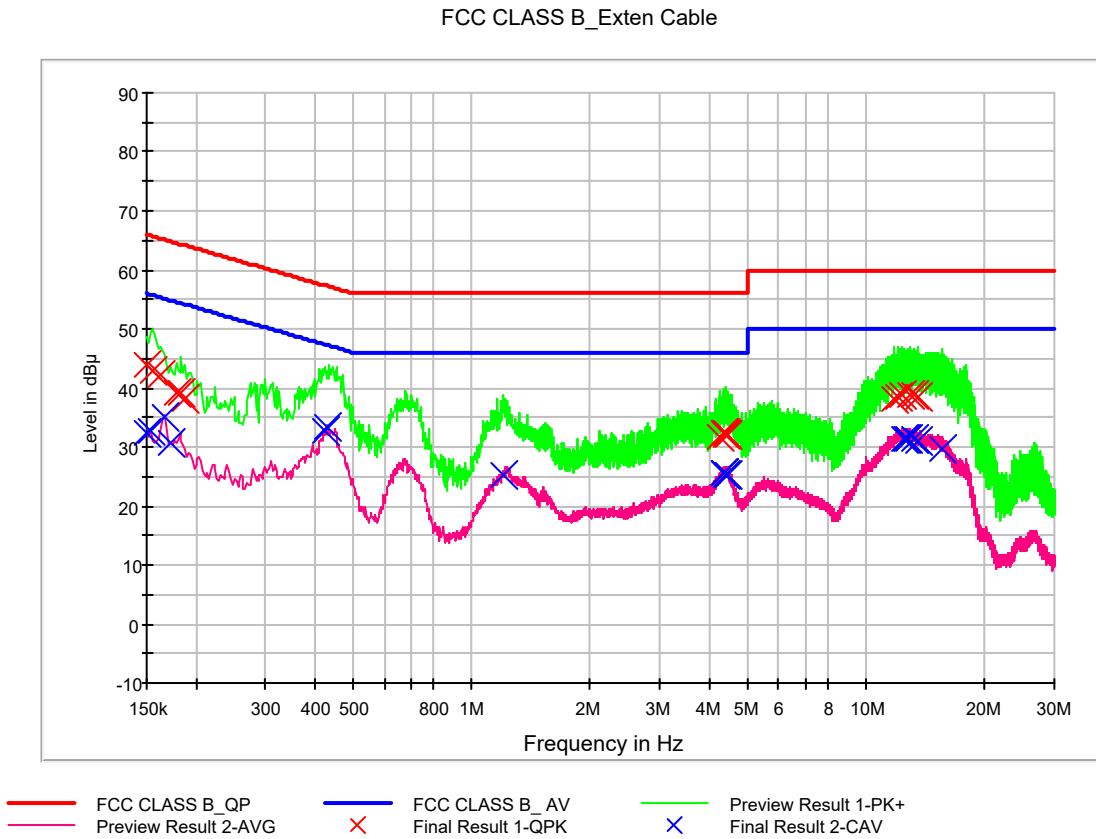
<b>Test Standard Used</b>	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
<b>Detector</b>	Quasi-Peak, CISPR-Average
<b>Bandwidth</b>	9 kHz (6 dB)
<b>Operating Mode</b>	Receiver mode (LTE B12+B13+B17 High CH Idle)
<b>Kind of Test Site</b>	Shielded Room
<b>Temperature</b>	21.9 °C
<b>Relative Humidity</b>	43.5 %
<b>Test Date</b>	August 13, 2019

#### -Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

### 4.1.3 Measuring Data

Figure 1: Conducted Emission, Receiver mode (LTE B12+B13+B17 High ch Idle), Line (L1)



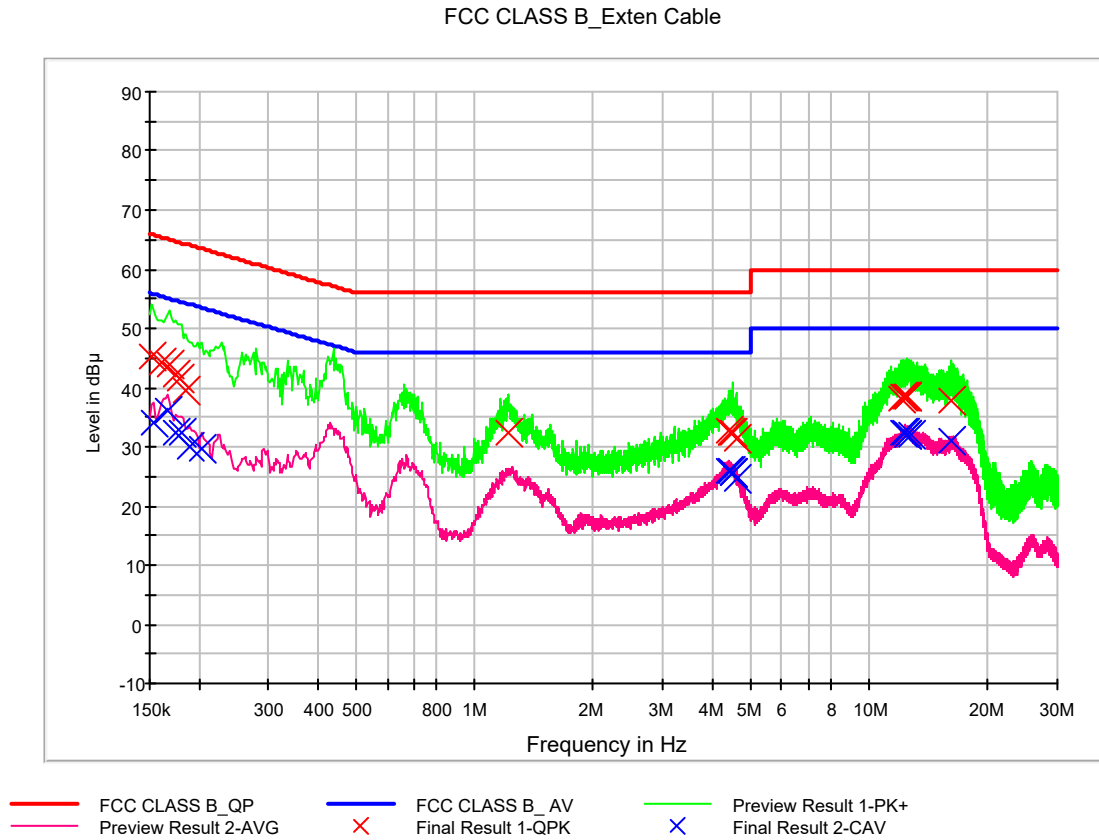
## QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.150000	43.8	9.000	L1	9.8	22.2	66.0
0.156000	42.7	9.000	L1	9.8	22.9	65.7
0.162000	42.4	9.000	L1	9.8	23.0	65.4
0.178000	39.0	9.000	L1	9.8	25.6	64.6
0.184000	39.3	9.000	L1	9.8	25.0	64.3
0.188000	38.2	9.000	L1	9.8	26.0	64.1
4.272000	31.7	9.000	L1	10.0	24.3	56.0
4.350000	32.4	9.000	L1	10.0	23.6	56.0
4.362000	32.4	9.000	L1	10.0	23.6	56.0
4.408000	32.4	9.000	L1	10.0	23.6	56.0
4.412000	32.2	9.000	L1	10.0	23.8	56.0
4.434000	32.2	9.000	L1	10.0	23.8	56.0
11.832000	38.2	9.000	L1	10.4	21.8	60.0
12.058000	38.5	9.000	L1	10.4	21.5	60.0
12.330000	38.9	9.000	L1	10.4	21.1	60.0
12.944000	39.0	9.000	L1	10.4	21.0	60.0
13.192000	38.8	9.000	L1	10.4	21.2	60.0
13.520000	38.6	9.000	L1	10.4	21.4	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.150000	32.2	9.000	L1	9.8	23.8	56.0
0.154000	32.6	9.000	L1	9.8	23.2	55.8
0.166000	35.0	9.000	L1	9.8	20.2	55.2
0.172000	30.7	9.000	L1	9.8	24.1	54.9
0.426000	32.6	9.000	L1	9.8	14.8	47.3
0.432000	33.3	9.000	L1	9.8	13.9	47.2
1.196000	25.2	9.000	L1	9.9	20.8	46.0
4.350000	25.6	9.000	L1	10.0	20.4	46.0
4.354000	25.5	9.000	L1	10.0	20.5	46.0
4.362000	25.4	9.000	L1	10.0	20.6	46.0
4.412000	25.4	9.000	L1	10.0	20.6	46.0
4.434000	25.3	9.000	L1	10.0	20.7	46.0
12.458000	31.4	9.000	L1	10.4	18.6	50.0
12.602000	31.5	9.000	L1	10.4	18.5	50.0
12.720000	31.5	9.000	L1	10.4	18.5	50.0
13.192000	31.3	9.000	L1	10.4	18.7	50.0
13.520000	30.9	9.000	L1	10.4	19.1	50.0
15.622000	29.5	9.000	L1	10.5	20.5	50.0

Figure 2: Conducted Emission, Receiver mode (LTE B12+B13+B177 High ch Idle), Line (N)



## QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.152000	45.4	9.000	N	9.9	20.5	65.9
0.160000	44.1	9.000	N	9.9	21.3	65.5
0.168000	43.9	9.000	N	9.9	21.1	65.1
0.174000	42.3	9.000	N	9.9	22.5	64.8
0.178000	41.5	9.000	N	9.9	23.1	64.6
0.186000	39.6	9.000	N	9.9	24.6	64.2
1.218000	32.2	9.000	N	10.1	23.8	56.0
4.432000	32.5	9.000	N	10.2	23.5	56.0
4.448000	32.5	9.000	N	10.2	23.5	56.0
4.474000	32.5	9.000	N	10.2	23.5	56.0
4.492000	32.4	9.000	N	10.2	23.6	56.0
4.592000	31.4	9.000	N	10.2	24.6	56.0
12.036000	38.2	9.000	N	10.6	21.8	60.0
12.240000	38.6	9.000	N	10.6	21.4	60.0
12.282000	38.5	9.000	N	10.6	21.5	60.0
12.502000	38.6	9.000	N	10.6	21.4	60.0
12.516000	38.5	9.000	N	10.6	21.5	60.0
16.102000	37.6	9.000	N	10.8	22.4	60.0



## CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.154000	34.2	9.000	N	9.9	21.6	55.8
0.166000	36.2	9.000	N	9.9	19.0	55.2
0.174000	32.4	9.000	N	9.9	22.4	54.8
0.180000	32.2	9.000	N	9.9	22.3	54.5
0.190000	30.0	9.000	N	9.9	24.0	54.0
0.204000	29.6	9.000	N	9.9	23.9	53.4
4.420000	26.0	9.000	N	10.2	20.0	46.0
4.454000	25.9	9.000	N	10.2	20.1	46.0
4.488000	25.7	9.000	N	10.2	20.3	46.0
4.492000	25.7	9.000	N	10.2	20.3	46.0
4.502000	25.6	9.000	N	10.2	20.4	46.0
4.592000	24.5	9.000	N	10.2	21.5	46.0
12.240000	32.3	9.000	N	10.6	17.7	50.0
12.282000	32.3	9.000	N	10.6	17.7	50.0
12.502000	32.2	9.000	N	10.6	17.8	50.0
12.516000	32.2	9.000	N	10.6	17.8	50.0
12.732000	32.0	9.000	N	10.6	18.0	50.0
16.102000	31.0	9.000	N	10.8	19.0	50.0

## 4.2 Radiated Emission Below 1 GHz

### 4.2.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
<input checked="" type="checkbox"/>	EMI test receiver	Rohde & Schwarz	ESU40	100524	1 year	05.17.2019
<input checked="" type="checkbox"/>	Trilog antenna	Schwarzbeck	VULB 9168	760	2 year	03.22.2019
<input checked="" type="checkbox"/>	Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
<input checked="" type="checkbox"/>	Antenna master controller	INNCO Systems	CO 3000	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/>	Turn Table	INNCO Systems	1060	-	N/A	-
<input checked="" type="checkbox"/>	Turn table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
<input checked="" type="checkbox"/>	Radio Communication Analyzer	ANRITSU	MT8820C	6201138643	1 year	08.21.2018
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
<input checked="" type="checkbox"/>	Software	Rohde & Schwarz	EMC32	-	-	-

#### 4.2.2 Operating Condition

The test results of radiated emission provide the following information:

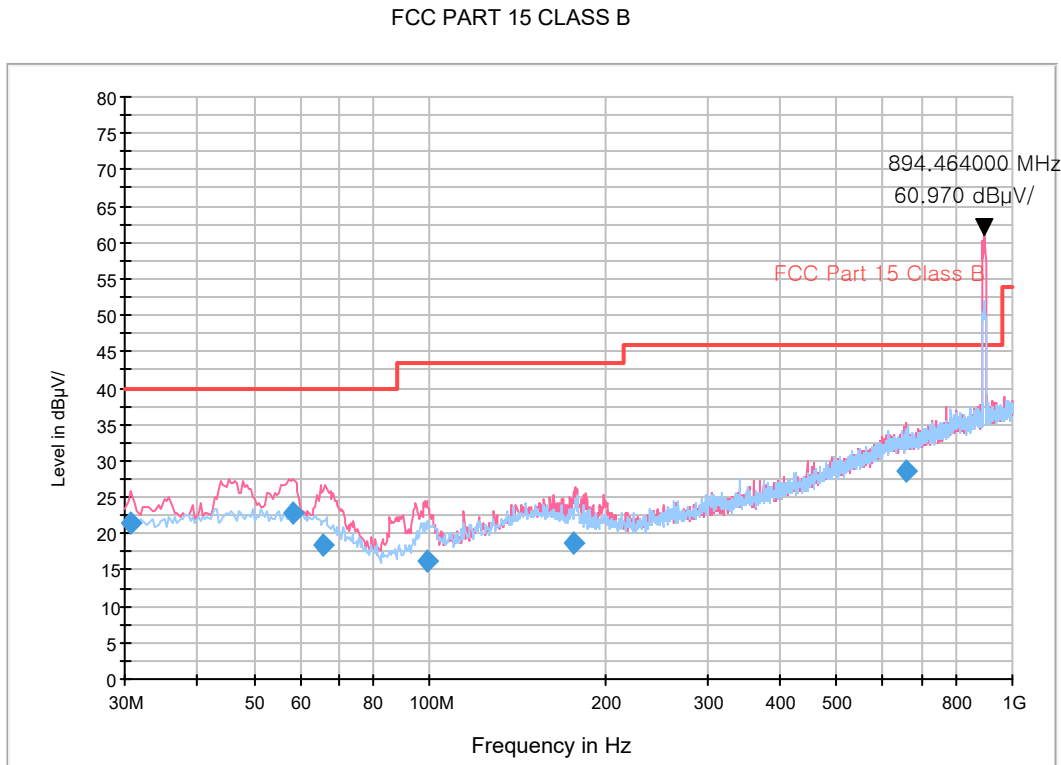
<b>Used Test Standard</b>	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
<b>Detector</b>	Quasi-Peak
<b>Bandwidth</b>	120 kHz (6 dB)
<b>Worst Case of Operating Mode</b>	[EUT+TA] Receiver mode (LTE B26+B5 High CH Idle) [EUT+TA] Receiver mode (LTE B12+B13+B17 High CH Idle) [EUT+Earphone] Receiver mode (LTE B26+B5 High CH Idle) [EUT+Earphone] Receiver mode (LTE B12+B13+B17 High CH Idle)
<b>Kind of Test Site</b>	3 m semi anechoic chamber
<b>Temperature</b>	23.5 / 22.6 °C
<b>Relative Humidity</b>	44.6 / 42.8 %
<b>Test Date</b>	August 05 / August 26 2019

**- Calculation Formula:**

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak

### 4.2.3 Measuring Data

Figure 3: Radiated Emission, [EUT & TA] Receiver mode (LTE B26+B5 High ch Idle)

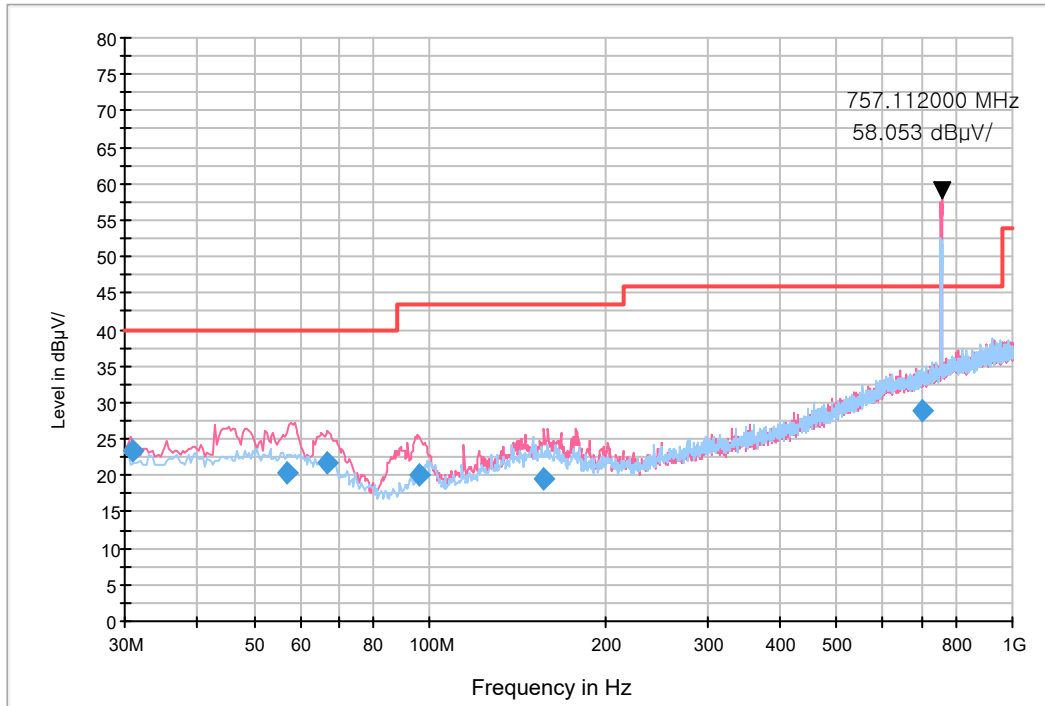


- NOTE. 1. LTE B26+B5 High CH RX Frequency: 894.464 MHz  
 2. These are signals for fundamental frequency from the base station

Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.806304	21.6	100.0	V	338.0	18.8	18.4	40.0
58.438400	22.9	100.0	V	82.0	19.8	17.1	40.0
65.772000	18.5	125.3	V	220.0	18.7	21.5	40.0
99.245600	16.3	125.3	V	334.0	15.6	27.2	43.5
176.823200	18.6	100.0	V	234.0	18.7	24.9	43.5
656.904000	28.5	100.0	V	142.0	28.5	17.5	46.0

Figure 4: Radiated Emission, [EUT & TA] Receiver mode (LTE B12+B13+B17 High ch Idle)

FCC PART 15 CLASS B

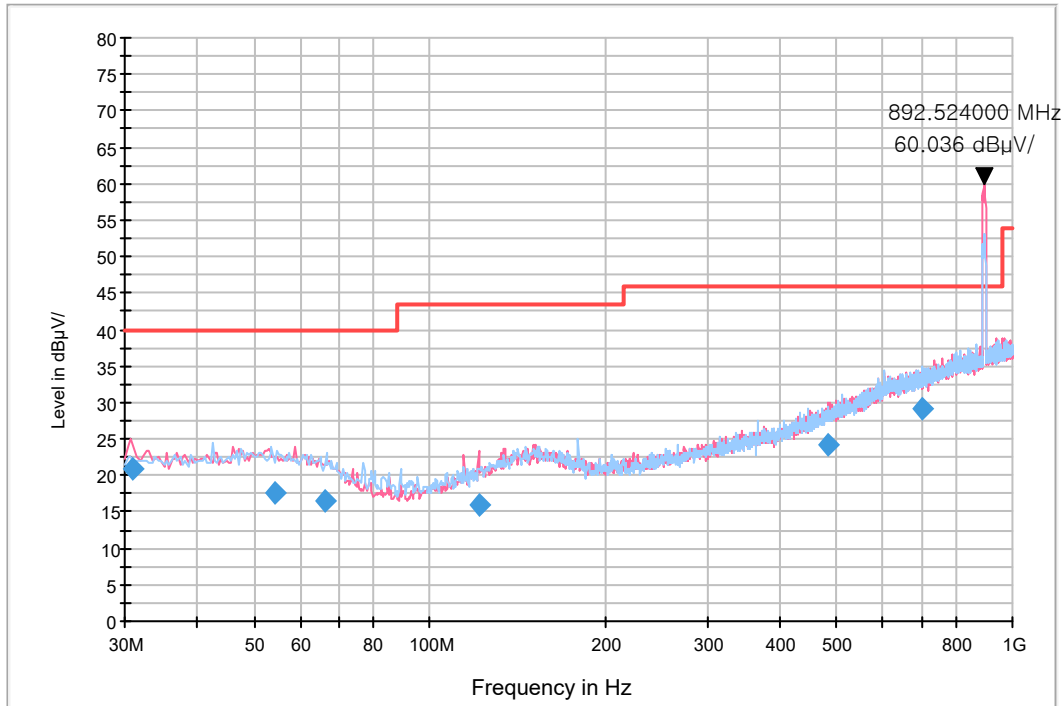


- NOTE. 1. LTE B12+B13+B17 High CH RX Frequency: 757.112 MHz  
 2. These are signals for fundamental frequency from the base station

Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.932045	23.2	100.0	V	0.0	18.8	16.8	40.0
57.162400	20.2	117.7	V	281.0	19.9	19.8	40.0
66.496800	21.7	100.0	V	26.0	18.5	18.3	40.0
96.088800	20.2	100.0	V	0.0	15.2	23.3	43.5
156.755200	19.5	100.0	V	173.0	20.0	24.0	43.5
698.135200	29.0	125.2	H	252.0	29.0	17.0	46.0

**Figure 5: Radiated Emission, [EUT & Earphone] Receiver mode (LTE B26+B5 High ch Idle)**

FCC PART 15 CLASS B

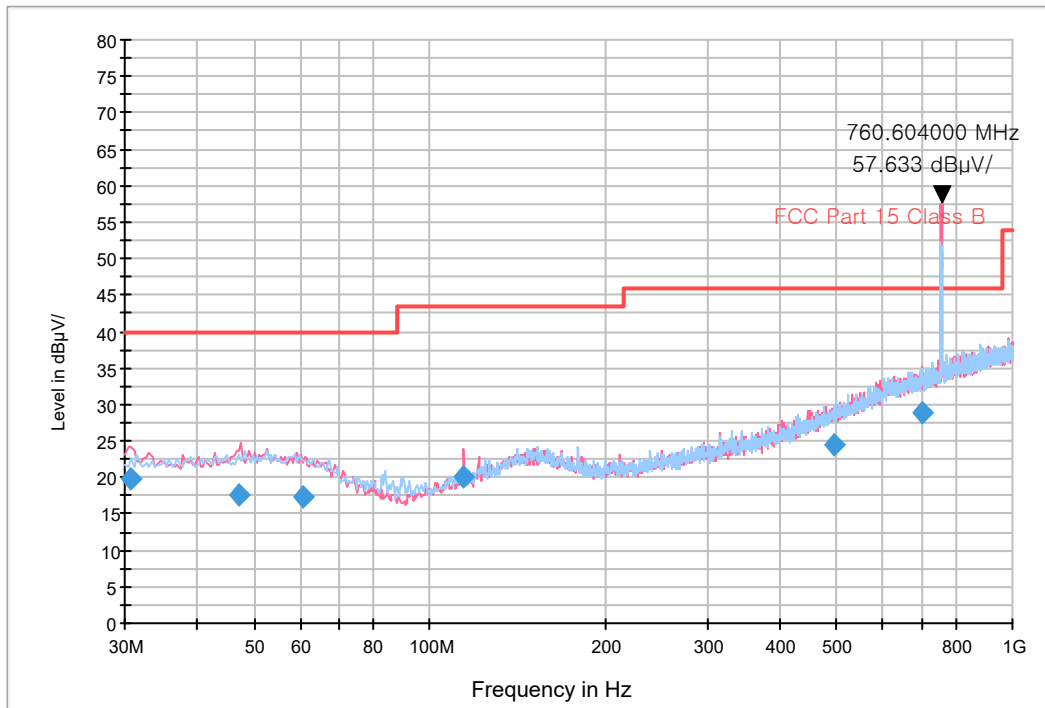


- NOTE. 1. LTE B26+B5 High CH RX Frequency: 892.524 MHz  
 2. These are signals for fundamental frequency from the base station

Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.907891	21.0	100.0	V	30.0	18.8	19.0	40.0
54.124800	17.5	174.8	H	31.0	20.0	22.5	40.0
66.104000	16.4	117.8	H	43.0	18.6	23.6	40.0
121.503200	15.8	174.8	V	129.0	17.7	27.7	43.5
481.354400	24.2	100.0	V	44.0	25.0	21.8	46.0
701.254400	29.0	100.0	H	6.0	29.0	17.0	46.0

Figure 6: Radiated Emission, [EUT & Earphone] Receiver mode (LTE B12+B13+B17 High ch Idle)

FCC PART 15 CLASS B



- NOTE. 1. LTE B12+B13+B17 High CH RX Frequency: 760.604 MHz  
 2. These are signals for fundamental frequency from the base station

Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.826195	19.8	116.7	V	308.0	18.8	20.2	40.0
47.156800	17.6	100.0	V	86.0	20.0	22.4	40.0
60.616800	17.3	100.0	V	317.0	19.7	22.7	40.0
114.587200	20.0	174.8	V	193.0	17.0	23.5	43.5
494.078400	24.5	208.9	H	89.0	25.3	21.5	46.0
697.960000	28.9	191.7	V	345.0	29.0	17.1	46.0

### 4.3 Radiated Emission Above 1 GHz

#### 4.3.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
<input checked="" type="checkbox"/>	EMI test receiver	Rohde & Schwarz	ESU40	100524	1 year	05.17.2019
<input checked="" type="checkbox"/>	Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
<input checked="" type="checkbox"/>	Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/>	Turn table	INNCO Systems	1060	-	N/A	-
<input checked="" type="checkbox"/>	Turn table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
<input checked="" type="checkbox"/>	Horn antenna	Schwarzbeck	BBHA 9120D	01836	1 year	07.19.2019
<input checked="" type="checkbox"/>	Low Noise amplifier	TESTEK	TK-PA18H	170034-L	1 year	03.04.2019
<input checked="" type="checkbox"/>	Power Amplifier	TESTEK	TK-PA1840H	170030-L	1 year	12.17.2019
<input checked="" type="checkbox"/>	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170 #786	2 year	12.05.2017
<input checked="" type="checkbox"/>	Radio Communication Analyzer	ANRITSU	MT8820C	6201138643	1 year	08.21.2018
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
<input checked="" type="checkbox"/>	Software	Rohde & Schwarz	EMC32	-	-	-



### 4.3.2 Operating Condition

The test results of radiated emission provide the following information:

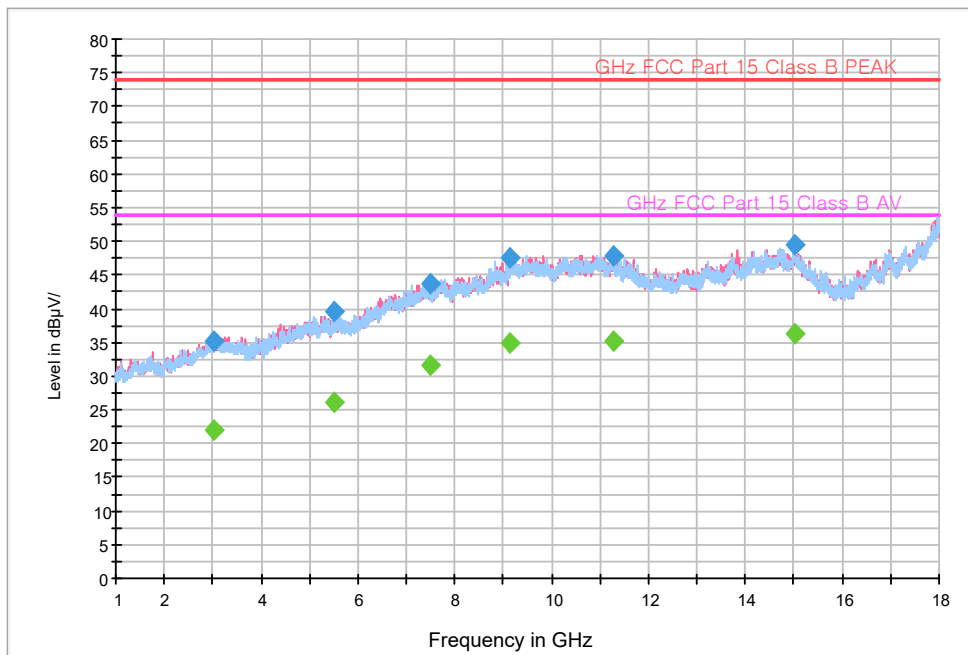
<b>Used Test Standard</b>	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
<b>Detector</b>	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
<b>Highest Frequency</b>	5 825 MHz
<b>Tested Frequency Range</b>	1 GHz to 30 GHz
<b>Operation Mode</b>	[EUT+TA] Receiver mode (LTE B12+B13+B17 High CH Idle) [EUT+Earphone] Receiver mode (LTE B12+B13+B17 High CH Idle)
<b>Kind of Test Site</b>	3 m semi anechoic chamber
<b>Temperature</b>	21.8 °C
<b>Relative Humidity</b>	43.6 %
<b>Test Date</b>	August 06, 2019

**- Calculation Formula:**

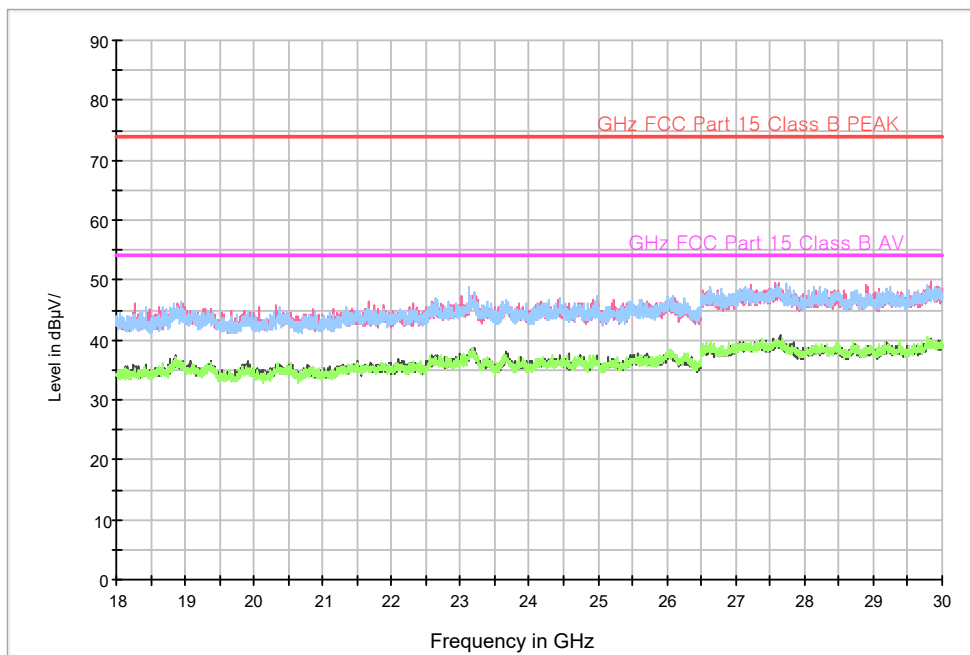
1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage

### 4.3.3 Measuring Data

Figure 7: Radiated Emission, [EUT & TA] Receiver mode (LTE B12+B13+B17 High ch Idle)  
Tilting of GHz FCC PART 15 CLASS B



Tilting of GHz FCC PART 15 CLASS B\_18~40GHz

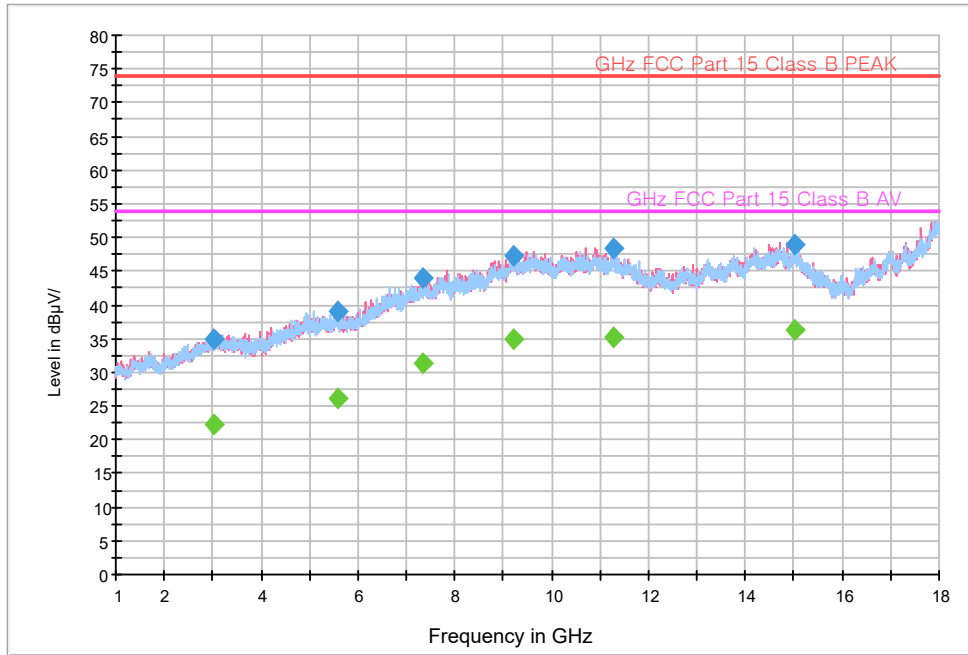


Frequency (MHz)	Peak (dB $\mu$ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)
3008.02000	35.1	111.5	V	12.0	-21.0	38.9	74.0
5503.71500	39.5	161.7	V	171.0	-15.2	34.5	74.0
7501.81500	43.7	189.5	H	238.0	-9.2	30.3	74.0
9150.23500	47.5	249.9	V	179.0	-6.1	26.5	74.0
11283.66500	47.8	204.5	H	250.0	-2.4	26.2	74.0
15005.58500	49.6	100.0	V	288.0	1.4	24.4	74.0

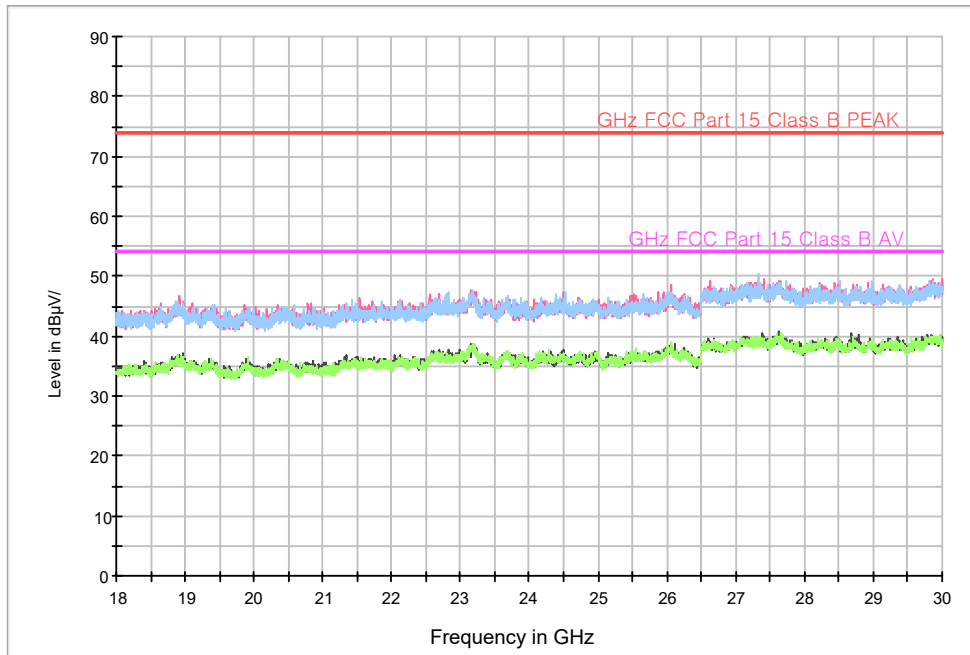
Frequency (MHz)	CAverage (dB $\mu$ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)
3008.02000	22.1	111.5	V	12.0	-21.0	31.9	54.0
5503.71500	26.0	161.7	V	171.0	-15.2	28.0	54.0
7501.81500	31.5	189.5	H	238.0	-9.2	22.5	54.0
9150.23500	34.9	249.9	V	179.0	-6.1	19.1	54.0
11283.66500	35.2	204.5	H	250.0	-2.4	18.8	54.0
15005.58500	36.4	100.0	V	288.0	1.4	17.6	54.0

Figure 8: Radiated Emission, [EUT & Earphone] Receiver mode (LTE B12+B13+B17 High ch Idle)

Tilting of GHz FCC PART 15 CLASS B



Tilting of GHz FCC PART 15 CLASS B\_18~40GHz



Frequency (MHz)	Peak (dB $\mu$ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)
3022.75000	34.9	150.0	V	92.0	-21.0	39.1	74.0
5571.02000	39.0	149.5	V	222.0	-15.1	35.0	74.0
7329.42500	43.9	149.5	V	95.0	-9.7	30.1	74.0
9213.02500	47.3	231.4	H	231.0	-5.9	26.7	74.0
11261.92500	48.3	150.0	V	290.0	-2.4	25.7	74.0
15019.77000	49.0	199.4	V	32.0	1.3	25.0	74.0

Frequency (MHz)	CAverage (dB $\mu$ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)
3022.75000	22.1	150.0	V	92.0	-21.0	31.9	54.0
5571.02000	26.2	149.5	V	222.0	-15.1	27.8	54.0
7329.42500	31.3	149.5	V	95.0	-9.7	22.7	54.0
9213.02500	34.9	231.4	H	231.0	-5.9	19.1	54.0
11261.92500	35.1	150.0	V	290.0	-2.4	18.9	54.0
15019.77000	36.4	199.4	V	32.0	1.3	17.6	54.0

## 5. EMI TEST SETUP PHOTO

Please refer to EMI TEST SETUP PHOTO and test setup photo file no. as follows;

Revision No.	Date of Issue	File No.
0	August 27, 2019	HCT-RF-1908-FC042-P

End of report