EMC TEST REPORT

Test Report No.	:	KES-E2-19T0063
Date of Issue	:	Jul. 08, 2019
Product name	:	SMART NECK
Model/Type No.	:	TF100
Variant Mode	:	-
Applicant	:	Twofive Co.,Ltd.
Applicant Address	:	#102, 34, Simin-daero, Manan-gu, Anyang-si, Gyeonggi-do, Korea
Manufacturer	:	Twofive Co.,Ltd.
Manufacturer Address	:	#102, 34, Simin-daero, Manan-gu, Anyang-si, Gyeonggi-do, Korea
FCC ID	:	2ASZB-TF100
Date of Receipt	:	Apr. 11, 2019
Test date	:	Jun. 04, 2019 ~ Jun. 07, 2019
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Hyun, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jul. 08, 2019	KES-E2-19T0063	Issued

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1.0 General Product Description

Main Specifications of EUT are:

Item	spec
Operating Frequency	2.4 ㎓ (Bluetooth)
Power	Input Power : AC 120 V / 60 ㎐ Output Power : DC 24 V (AC / DC Adapter)
Size	(800 x 1 315 x 1 000) ㎜
Weight	105 ㎏

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1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☐ 230 Vac ☒ 120 Vac ☐ 12 Vdc ☐ 24 Vdc ☐ PoE

Frequency ☐ 50 Hz ☒ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
SMART NECK	TF100	-	Twofive Co., Ltd.	EUT
AC/DC Adapter	BSG-100W2404170	-	-	-

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Smart Phone	SM-9550G	R33D713KA3F	Samsung Electronics Co., Ltd.	-

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1.6 External I/O Cabling

■ Bluetooth Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
SMART NECK (EUT)	Wireless	Smart Phone	Wireless	-	-

■ Operating Mode

Start		END		Cable Spec.	
Description	**I/O Port**	**Description**	**I/O Port**	**Length**	**Shield**
SMART NECK (EUT)	Wireless	Smart Phone	Wireless	-	-

1.7 EUT Operating Mode(s)

Test mode	operating
Bluetooth	Confirmed the operation of EUT through "SmartNeck" application of the SmarPhone.
Operating	Confirmed the operation of EUT through Pull Bar Control.

EUT Test operating S/W		
Name	**Version**	**Manufacture Company**
SmartNeck	1.20	Twofive Co., Ltd.

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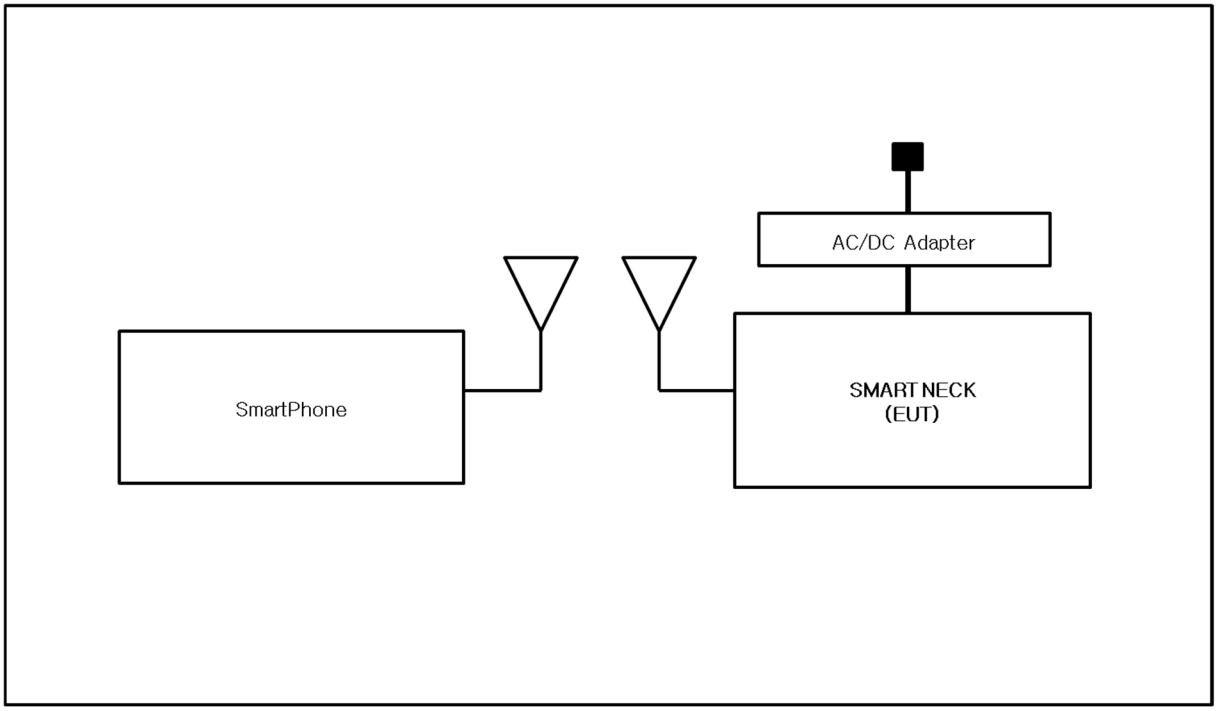
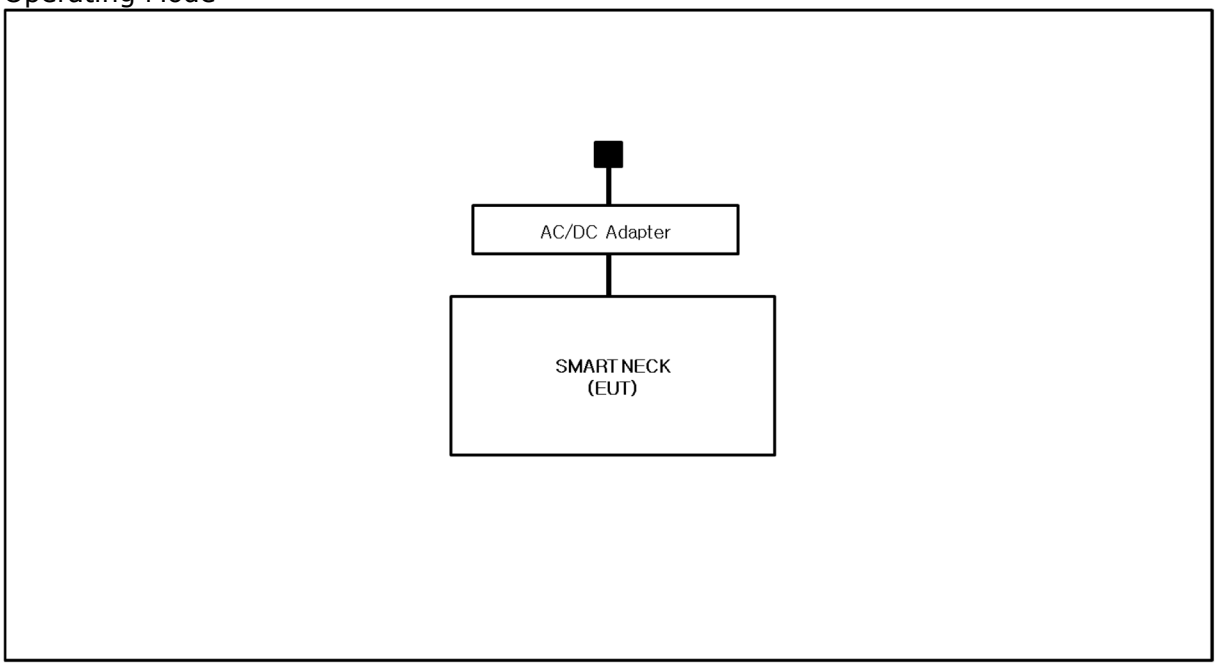
1.8 Configuration

■ AC Main
□ DC Main

■ Bluetooth Mode



■ Operating Mode



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1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Korea. The sites are constructed in conformance with the requirements of ANSI C63.4:2014 and CISPR 16-1-4:2012

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	**RRA**	EMI (3 m & 10 m Semi-Anechoic Chamber ,10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KR0100
International	**KOLAS**	EMI (3 m & 10 m Semi-Anechoic Chamber , and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	KT489
USA	**FCC**	3 m & 10 m Semi-Anechoic Chamber, 10 m Open Area and Conducted test site to perform FCC Part 15/18 measurements.	KR0100
Canada	**ISED**	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	23298-1
JAPAN	**VCCI**	Mains Ports Conducted Interference Measurement, Telecommunication Ports Conducted Disturbance Measurement and Radiation 10 meter site, Facility for measuring radiated disturbance above 1 GHz	R-20056, C-20036 T-20040, G-20057
Europe	**TÜV SÜD**	EMI (3 m & 10 m Semi-Anechoic Chamber , 10 m Open Area and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	CARAT 17 07 01633 001

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2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010 ☐ Group 1 ☐ Group 2
☐ Class A ☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55032:2015 ☐ Class A ☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013

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☐ **VCCI V-3 / 2015.04** ☐ Class A ☐ Class B

☐ **AS/NZS:2013** ☐ Class A ☐ Class B

☒ **47 CFR Part 15, Subpart B**

- ☐ CISPR 22:2009 +A1:2010 ☐ Class A ☐ Class B
- ☒ ANSI C63.4-2014 ☐ Class A ☒ Class B

☐ **IC Regulation ICES-003 : 2016**

- ☐ CAN/CSA CISPR 22-10 ☐ Class A ☐ Class B
- ☐ ANSI C63.4-2014 ☐ Class A ☐ Class B

☐ **RE– Directive 2014/53/EU**

☐ EN 301 489-1 V1.9.2

- ☐ Equipment for fixed use
- ☐ Equipment for vehicular use
- ☐ Equipment for portable use

☐ EN 301 489-3 V1.6.1

☐ EN 301 489-17 V2.2.1

☐ EN 60945:2002

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2.1 Conducted Emissions at Mains Power Ports

Test Date
Jun. 07, 2019

Test Location
Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101781	04, 22, 2020
☒	LISN	ENV216	R & S	101787	01, 04, 2020
☐	LISN	ESH2-Z5	R & S	100450	04, 22, 2020
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 26, 2019
☐	LISN	NNBM8124	SCHWARZBECK	8124-1002	08, 06, 2019
☐	LISN	NNBM8124	SCHWARZBECK	8124-1003	08, 06, 2019

Test Conditions
Temperature: 23.2 ℃
Relative Humidity: 46.1 % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.2 Radiated Electric Field Emissions(Below 1 ㎓)

Test Date
Jun. 04, 2019

Test Location
☐ OPEN AREA TEST SITE #2 ☒ SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020
☒	AMPLIFIER	SCU 01	R & S	100603	11, 26, 2019
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 11, 2020

Test Conditions
Temperature: 22.8 ℃
Relative Humidity: 43.5 % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.3 Radiated Electric Field Emissions(Above 1 ㎓)

Test Date
Jun. 06, 2019

Test Location
SEMI ANECHOIC CHAMBER #4(10 m)

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 09, 2020
☒	PREAMPLIFIER	8449B	AGILENT	3008A01742	01, 08, 2020
☒	ATTENUATOR	8491A	HP	35496	03, 11, 2020
☒	HORN ANTENNA	BBHA 9120D	SCHWARZBECK	9120D-1802	03, 12, 2020

Test Conditions
Temperature: 23.0 ℃
Relative Humidity: 43.0 % R.H.

Frequency Range of Measurement
1 ㎓ to 12.4 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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APPENDIX A – TEST DATA

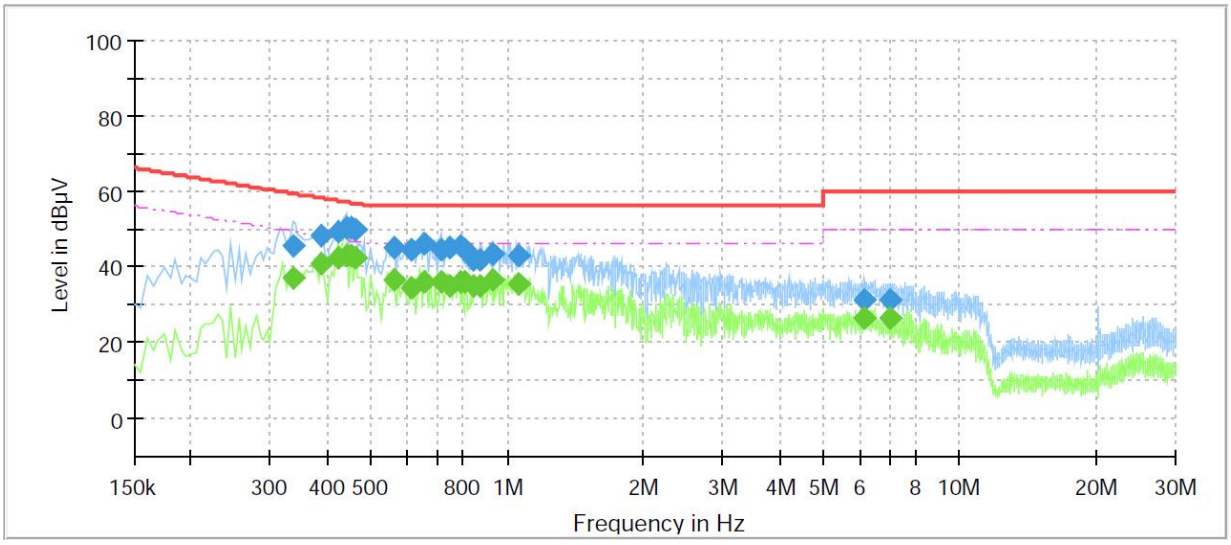
Conducted Emissions at Mains Power Ports

■ Bluetooth Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TF100
Mode	FCC / Bluetooth
Operator Name:	KES



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Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.335000	---	36.87	49.33	12.46	1000.0	9.000	L1	19.6
0.335000	45.40	---	59.33	13.93	1000.0	9.000	L1	19.6
0.390000	47.99	---	58.06	10.07	1000.0	9.000	L1	19.6
0.390000	---	40.85	48.06	7.21	1000.0	9.000	L1	19.6
0.425000	---	42.33	47.35	5.02	1000.0	9.000	L1	19.6
0.425000	49.33	---	57.35	8.02	1000.0	9.000	L1	19.6
0.440000	---	42.77	47.06	4.29	1000.0	9.000	L1	19.6
0.440000	50.55	---	57.06	6.51	1000.0	9.000	L1	19.6
0.450000	---	42.79	46.88	4.09	1000.0	9.000	L1	19.6
0.450000	50.24	---	56.88	6.64	1000.0	9.000	L1	19.6
0.460000	---	42.55	46.69	4.14	1000.0	9.000	L1	19.6
0.460000	49.74	---	56.69	6.95	1000.0	9.000	L1	19.6
0.565000	---	36.33	46.00	9.67	1000.0	9.000	L1	19.6
0.565000	44.79	---	56.00	11.21	1000.0	9.000	L1	19.6
0.615000	44.62	---	56.00	11.38	1000.0	9.000	L1	19.6
0.615000	---	34.19	46.00	11.81	1000.0	9.000	L1	19.6
0.655000	---	35.84	46.00	10.16	1000.0	9.000	L1	19.6
0.655000	46.29	---	56.00	9.71	1000.0	9.000	L1	19.6
0.715000	44.72	---	56.00	11.28	1000.0	9.000	L1	19.6
0.715000	---	35.77	46.00	10.23	1000.0	9.000	L1	19.6
0.745000	45.17	---	56.00	10.83	1000.0	9.000	L1	19.7
0.745000	---	35.00	46.00	11.00	1000.0	9.000	L1	19.7
0.785000	45.73	---	56.00	10.27	1000.0	9.000	L1	19.7
0.785000	---	36.15	46.00	9.85	1000.0	9.000	L1	19.7
0.810000	44.42	---	56.00	11.58	1000.0	9.000	L1	19.7
0.810000	---	35.80	46.00	10.20	1000.0	9.000	L1	19.7
0.845000	---	34.84	46.00	11.16	1000.0	9.000	L1	19.7
0.845000	41.81	---	56.00	14.19	1000.0	9.000	L1	19.7
0.875000	---	34.96	46.00	11.04	1000.0	9.000	L1	19.7
0.875000	41.62	---	56.00	14.38	1000.0	9.000	L1	19.7
0.925000	---	36.42	46.00	9.58	1000.0	9.000	L1	19.7
0.925000	43.40	---	56.00	12.60	1000.0	9.000	L1	19.7
1.065000	42.63	---	56.00	13.37	1000.0	9.000	L1	19.7
1.065000	---	35.73	46.00	10.27	1000.0	9.000	L1	19.7
6.185000	31.20	---	60.00	28.80	1000.0	9.000	L1	19.8
6.185000	---	26.54	50.00	23.46	1000.0	9.000	L1	19.8
6.985000	31.05	---	60.00	28.95	1000.0	9.000	L1	19.9
6.985000	---	26.47	50.00	23.53	1000.0	9.000	L1	19.9

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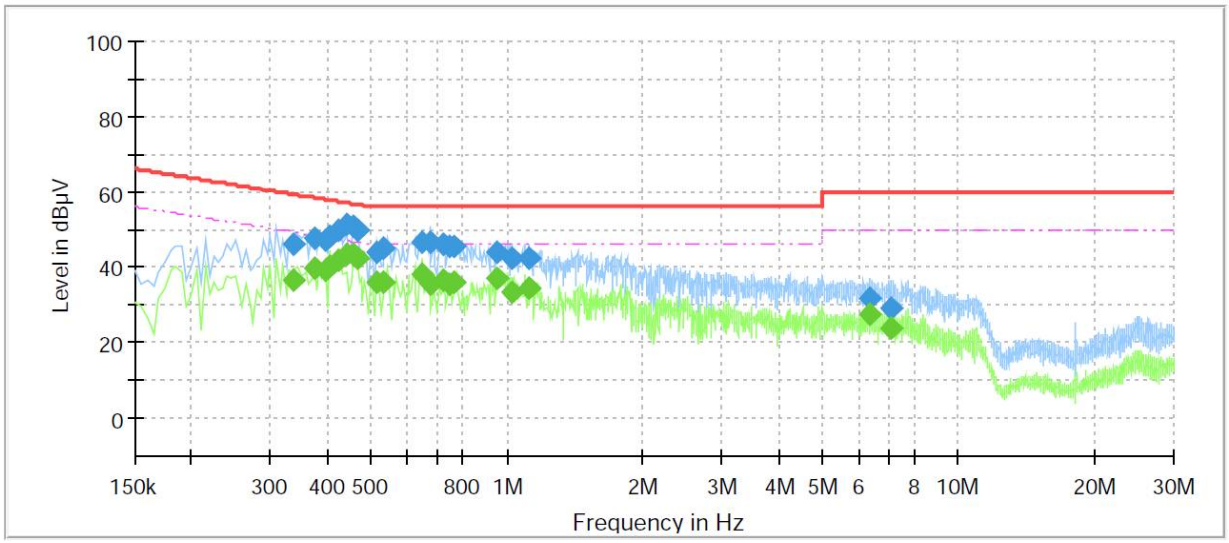
NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TF100
Mode	FCC / Bluetooth
Operator Name:	KES



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Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.335000	---	36.33	49.33	13.00	1000.0	9.000	N	19.6
0.335000	46.02	---	59.33	13.31	1000.0	9.000	N	19.6
0.375000	47.40	---	58.39	10.99	1000.0	9.000	N	19.6
0.375000	---	39.48	48.39	8.91	1000.0	9.000	N	19.6
0.395000	---	39.27	47.96	8.69	1000.0	9.000	N	19.6
0.395000	47.32	---	57.96	10.64	1000.0	9.000	N	19.6
0.405000	---	40.20	47.75	7.55	1000.0	9.000	N	19.6
0.405000	48.22	---	57.75	9.53	1000.0	9.000	N	19.6
0.425000	---	41.80	47.35	5.55	1000.0	9.000	N	19.6
0.425000	49.87	---	57.35	7.48	1000.0	9.000	N	19.6
0.440000	---	43.23	47.06	3.83	1000.0	9.000	N	19.6
0.440000	51.21	---	57.06	5.85	1000.0	9.000	N	19.6
0.455000	---	43.60	46.78	3.18	1000.0	9.000	N	19.6
0.455000	51.01	---	56.78	5.77	1000.0	9.000	N	19.6
0.465000	49.67	---	56.60	6.93	1000.0	9.000	N	19.6
0.465000	---	42.14	46.60	4.46	1000.0	9.000	N	19.6
0.515000	---	36.05	46.00	9.95	1000.0	9.000	N	19.6
0.515000	43.96	---	56.00	12.04	1000.0	9.000	N	19.6
0.535000	---	36.15	46.00	9.85	1000.0	9.000	N	19.6
0.535000	44.74	---	56.00	11.26	1000.0	9.000	N	19.6
0.645000	---	38.07	46.00	7.93	1000.0	9.000	N	19.6
0.645000	46.51	---	56.00	9.49	1000.0	9.000	N	19.6
0.675000	46.47	---	56.00	9.53	1000.0	9.000	N	19.6
0.675000	---	35.54	46.00	10.46	1000.0	9.000	N	19.6
0.725000	---	36.51	46.00	9.49	1000.0	9.000	N	19.6
0.725000	46.20	---	56.00	9.80	1000.0	9.000	N	19.6
0.745000	45.54	---	56.00	10.46	1000.0	9.000	N	19.6
0.745000	---	35.23	46.00	10.77	1000.0	9.000	N	19.6
0.765000	45.56	---	56.00	10.44	1000.0	9.000	N	19.6
0.765000	---	35.78	46.00	10.22	1000.0	9.000	N	19.6
0.955000	---	37.19	46.00	8.81	1000.0	9.000	N	19.7
0.955000	43.99	---	56.00	12.01	1000.0	9.000	N	19.7
1.025000	42.60	---	56.00	13.40	1000.0	9.000	N	19.7
1.025000	---	33.25	46.00	12.75	1000.0	9.000	N	19.7
1.115000	42.32	---	56.00	13.68	1000.0	9.000	N	19.7
1.115000	---	34.40	46.00	11.60	1000.0	9.000	N	19.7
6.375000	---	27.35	50.00	22.65	1000.0	9.000	N	19.8
6.375000	31.62	---	60.00	28.38	1000.0	9.000	N	19.8
7.090000	---	24.02	50.00	25.98	1000.0	9.000	N	19.9
7.090000	29.28	---	60.00	30.72	1000.0	9.000	N	19.9

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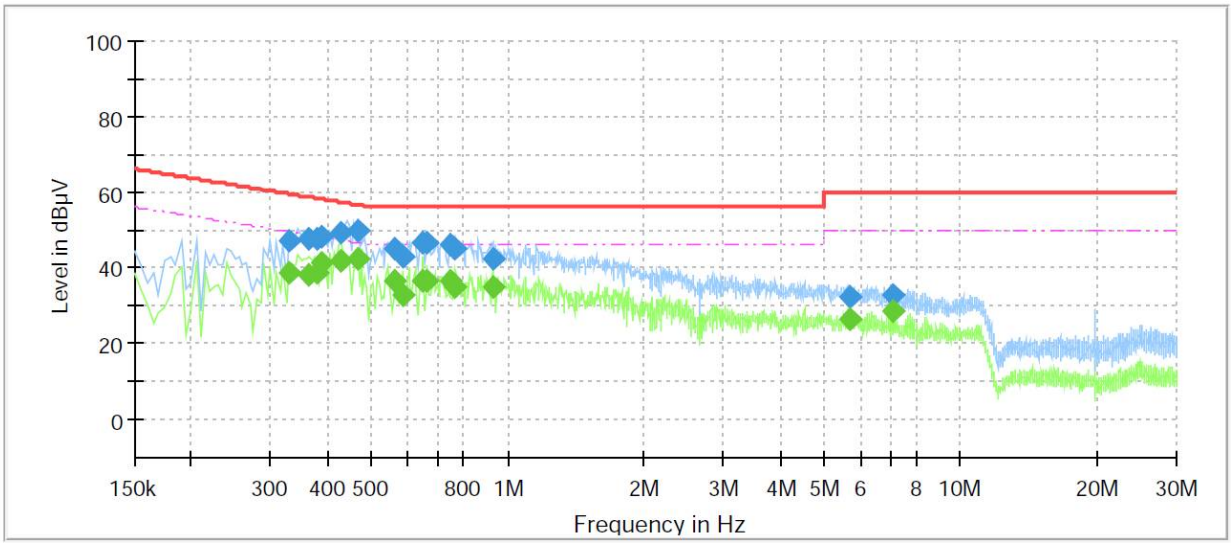
■ Operating Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TF100
Mode	FCC / Operating
Operator Name:	KES



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Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.330000	---	38.81	49.45	10.64	1000.0	9.000	L1	19.6
0.330000	46.87	---	59.45	12.58	1000.0	9.000	L1	19.6
0.365000	47.55	---	58.61	11.06	1000.0	9.000	L1	19.6
0.365000	---	37.93	48.61	10.68	1000.0	9.000	L1	19.6
0.380000	---	38.80	48.28	9.48	1000.0	9.000	L1	19.6
0.380000	47.86	---	58.28	10.42	1000.0	9.000	L1	19.6
0.390000	48.24	---	58.06	9.82	1000.0	9.000	L1	19.6
0.390000	---	41.08	48.06	6.98	1000.0	9.000	L1	19.6
0.430000	---	42.00	47.25	5.25	1000.0	9.000	L1	19.6
0.430000	49.27	---	57.25	7.98	1000.0	9.000	L1	19.6
0.465000	49.74	---	56.60	6.86	1000.0	9.000	L1	19.6
0.465000	---	42.16	46.60	4.44	1000.0	9.000	L1	19.6
0.560000	45.05	---	56.00	10.95	1000.0	9.000	L1	19.6
0.560000	---	36.41	46.00	9.59	1000.0	9.000	L1	19.6
0.590000	43.11	---	56.00	12.89	1000.0	9.000	L1	19.6
0.590000	---	32.78	46.00	13.22	1000.0	9.000	L1	19.6
0.650000	46.64	---	56.00	9.36	1000.0	9.000	L1	19.6
0.650000	---	36.31	46.00	9.69	1000.0	9.000	L1	19.6
0.665000	---	36.47	46.00	9.53	1000.0	9.000	L1	19.6
0.665000	46.38	---	56.00	9.62	1000.0	9.000	L1	19.6
0.750000	---	36.41	46.00	9.59	1000.0	9.000	L1	19.7
0.750000	46.07	---	56.00	9.93	1000.0	9.000	L1	19.7
0.760000	45.19	---	56.00	10.81	1000.0	9.000	L1	19.7
0.760000	---	35.19	46.00	10.81	1000.0	9.000	L1	19.7
0.925000	42.27	---	56.00	13.73	1000.0	9.000	L1	19.7
0.925000	---	35.20	46.00	10.80	1000.0	9.000	L1	19.7
5.700000	---	26.44	50.00	23.56	1000.0	9.000	L1	19.8
5.700000	32.41	---	60.00	27.59	1000.0	9.000	L1	19.8
7.065000	33.02	---	60.00	26.98	1000.0	9.000	L1	19.9
7.065000	---	28.36	50.00	21.64	1000.0	9.000	L1	19.9

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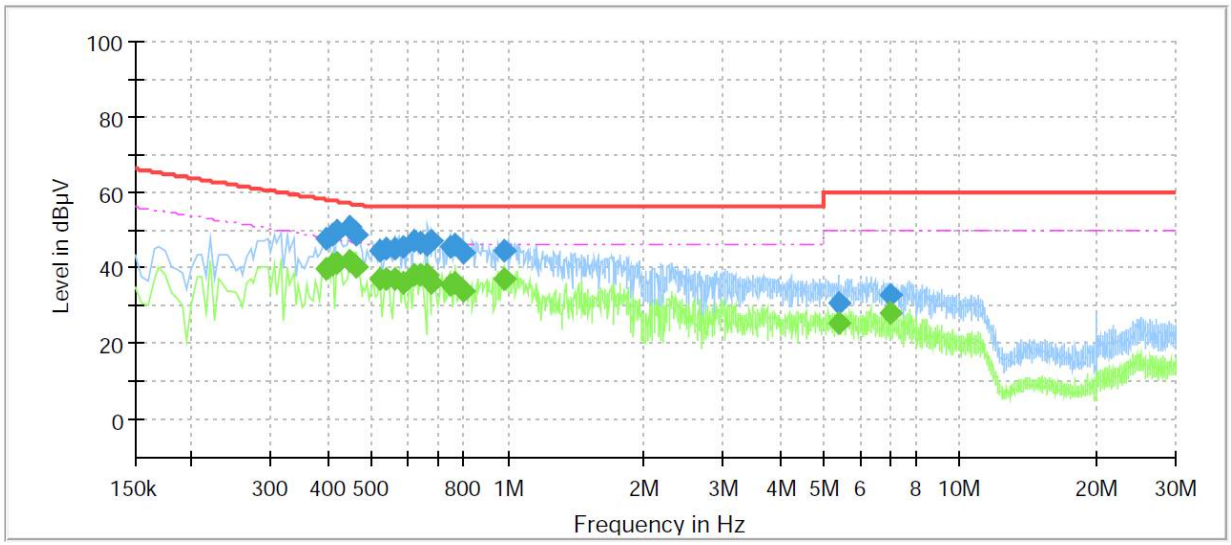
NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TF100
Mode	FCC / Operating
Operator Name:	KES



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.395000	---	39.95	47.96	8.01	1000.0	9.000	N	19.6
0.395000	47.70	---	57.96	10.26	1000.0	9.000	N	19.6
0.410000	---	40.78	47.65	6.87	1000.0	9.000	N	19.6
0.410000	48.78	---	57.65	8.87	1000.0	9.000	N	19.6
0.420000	---	41.39	47.45	6.06	1000.0	9.000	N	19.6
0.420000	49.78	---	57.45	7.67	1000.0	9.000	N	19.6
0.445000	---	42.06	46.97	4.91	1000.0	9.000	N	19.6
0.445000	50.73	---	56.97	6.24	1000.0	9.000	N	19.6
0.460000	---	40.13	46.69	6.56	1000.0	9.000	N	19.6
0.460000	48.89	---	56.69	7.80	1000.0	9.000	N	19.6
0.520000	---	37.16	46.00	8.84	1000.0	9.000	N	19.6
0.520000	44.70	---	56.00	11.30	1000.0	9.000	N	19.6
0.540000	---	36.83	46.00	9.17	1000.0	9.000	N	19.6
0.540000	45.05	---	56.00	10.95	1000.0	9.000	N	19.6
0.560000	44.85	---	56.00	11.15	1000.0	9.000	N	19.6
0.560000	---	36.92	46.00	9.08	1000.0	9.000	N	19.6
0.590000	---	36.17	46.00	9.83	1000.0	9.000	N	19.6
0.590000	45.61	---	56.00	10.39	1000.0	9.000	N	19.6
0.620000	46.90	---	56.00	9.10	1000.0	9.000	N	19.6
0.620000	---	38.12	46.00	7.88	1000.0	9.000	N	19.6
0.640000	46.56	---	56.00	9.44	1000.0	9.000	N	19.6
0.640000	---	38.18	46.00	7.82	1000.0	9.000	N	19.6
0.665000	---	37.97	46.00	8.03	1000.0	9.000	N	19.6
0.665000	46.10	---	56.00	9.90	1000.0	9.000	N	19.6
0.680000	---	35.96	46.00	10.04	1000.0	9.000	N	19.6
0.680000	46.91	---	56.00	9.09	1000.0	9.000	N	19.6
0.745000	---	35.38	46.00	10.62	1000.0	9.000	N	19.6
0.745000	45.78	---	56.00	10.22	1000.0	9.000	N	19.6
0.765000	45.83	---	56.00	10.17	1000.0	9.000	N	19.6
0.765000	---	35.96	46.00	10.04	1000.0	9.000	N	19.6
0.795000	44.02	---	56.00	11.98	1000.0	9.000	N	19.6
0.795000	---	34.09	46.00	11.91	1000.0	9.000	N	19.6
0.985000	44.25	---	56.00	11.75	1000.0	9.000	N	19.7
0.985000	---	37.03	46.00	8.97	1000.0	9.000	N	19.7
5.385000	30.63	---	60.00	29.37	1000.0	9.000	N	19.8
5.385000	---	25.19	50.00	24.81	1000.0	9.000	N	19.8
7.045000	32.86	---	60.00	27.14	1000.0	9.000	N	19.9
7.045000	---	27.98	50.00	22.02	1000.0	9.000	N	19.9

♦ Calculation
QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]
QuasiPeak / CAverage : The Final Value
Reading Value : Not shown in the table.
Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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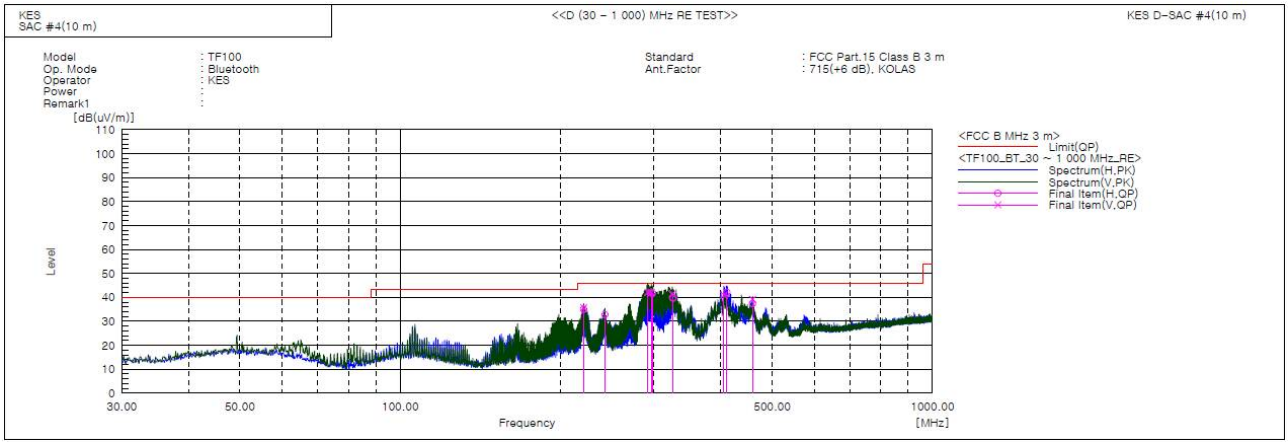
Radiated Electric Field Emissions(Below 1 ㎓)

■ Bluetooth Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	221.128	H	56.7	-21.6	35.1	46.0	10.9	357.0	143.0	
2	221.241	V	57.3	-21.6	35.7	46.0	10.3	162.0	99.0	
3	242.543	H	54.0	-21.2	32.8	46.0	13.2	195.0	143.0	
4	292.036	V	62.4	-20.2	42.2	46.0	3.8	116.0	95.0	
5	296.253	V	62.0	-20.0	42.0	46.0	4.0	152.0	115.0	
6	297.582	H	61.7	-19.9	41.8	46.0	4.2	247.0	167.0	
7	324.626	V	59.9	-18.5	41.4	46.0	4.6	138.0	99.0	
8	325.612	H	58.2	-18.4	39.8	46.0	6.2	355.0	40.0	
9	405.519	V	57.5	-16.5	41.0	46.0	5.0	229.0	71.0	
10	410.979	H	58.6	-16.5	42.1	46.0	3.9	204.0	135.0	
11	459.220	H	53.1	-15.7	37.4	46.0	8.6	220.0	24.0	
12	459.354	V	54.9	-15.7	39.2	46.0	6.8	311.0	350.0	

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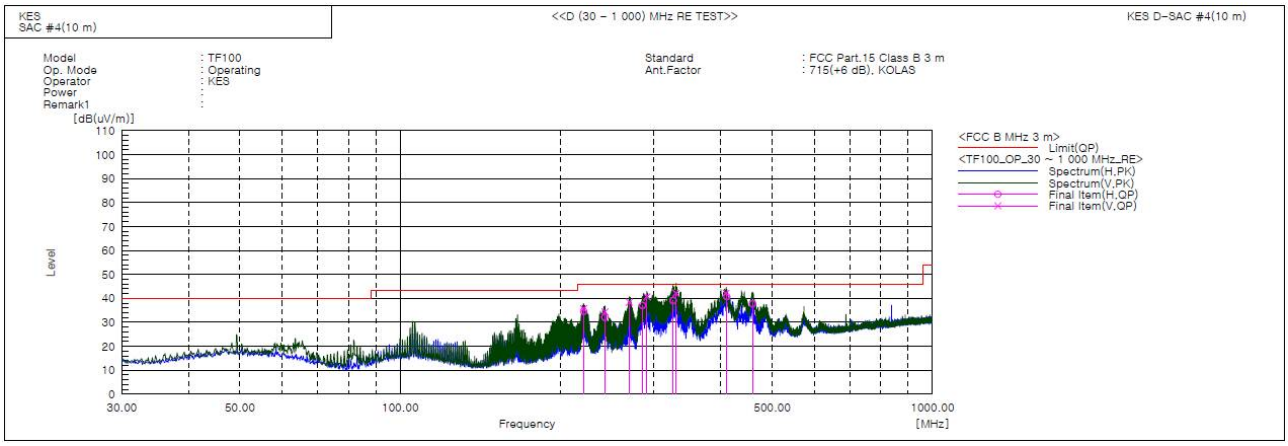
■ Operating Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	221.090	V	57.3	-21.6	35.7	46.0	10.3	195.0	87.0	
2	221.214	H	56.3	-21.6	34.7	46.0	11.3	328.0	135.0	
3	242.437	H	53.3	-21.2	32.1	46.0	13.9	216.0	135.0	
4	242.432	V	55.6	-21.2	34.4	46.0	11.6	115.0	83.0	
5	269.348	V	59.2	-20.8	38.4	46.0	7.6	242.0	43.0	
6	285.129	H	57.5	-20.4	37.1	46.0	8.9	384.0	139.0	
7	290.926	V	60.9	-20.2	40.7	46.0	5.3	139.0	230.0	
8	325.622	H	57.5	-18.4	39.1	46.0	6.9	200.0	43.0	
9	329.973	V	60.3	-18.2	42.1	46.0	3.9	107.0	190.0	
10	409.634	V	58.7	-16.5	42.2	46.0	3.8	129.0	111.0	
11	410.831	H	57.3	-16.5	40.8	46.0	5.2	260.0	131.0	
12	459.225	H	53.5	-15.7	37.8	46.0	8.2	320.0	35.0	

♦ Calculation – SAC #4(10 m)
Result(QP) [dB(㎶/m)] = (Reading(QP)[dB(㎶)] + c.f[dB(1/m)]
Margin(QP)[dB] = Limit[dB(㎶/m)] - Result(QP) [dB(㎶/m)]
Reading(QP) : Reading value, Result(QP) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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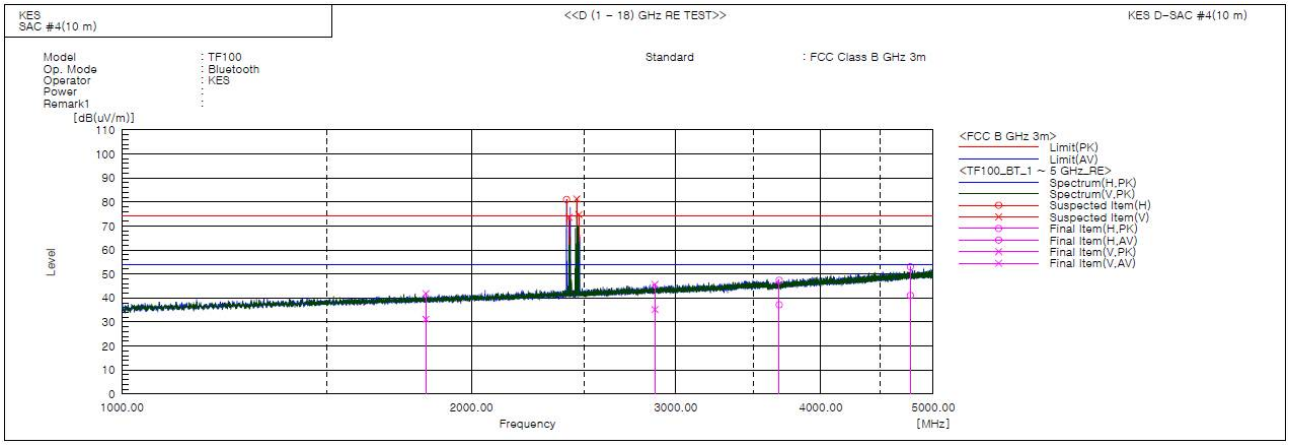
Radiated Electric Field Emissions(Above 1 GHz)

■ Bluetooth Mode – (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1827.455	V	43.1	-1.2	41.9	74.0	54.0	32.1	363.0	207.0	
2	2878.885	V	42.3	3.4	45.7	74.0	54.0	28.3	241.0	264.0	
3	3683.855	H	41.3	6.1	47.4	74.0	54.0	26.6	123.0	144.0	
4	4778.155	H	42.4	10.6	53.0	74.0	54.0	21.0	335.0	246.0	
5	2416.000	H	--------	1.5	--------	74.0	54.0	--------	100.0	123.0	
6	2428.000	V	--------	1.6	--------	74.0	54.0	--------	100.0	249.0	
7	2465.500	V	--------	1.8	--------	74.0	54.0	--------	100.0	18.0	
8	2476.000	V	--------	1.8	--------	74.0	54.0	--------	100.0	45.0	

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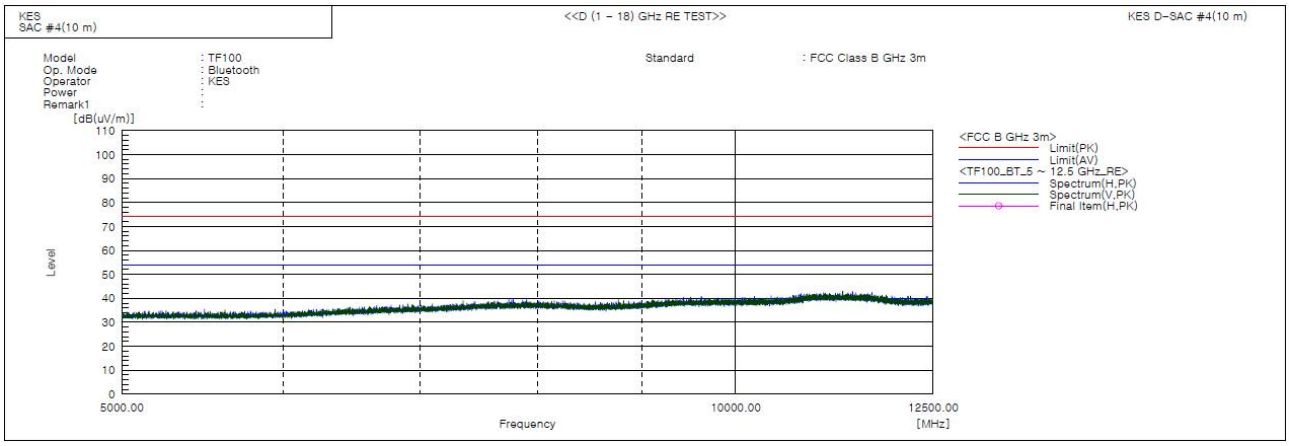
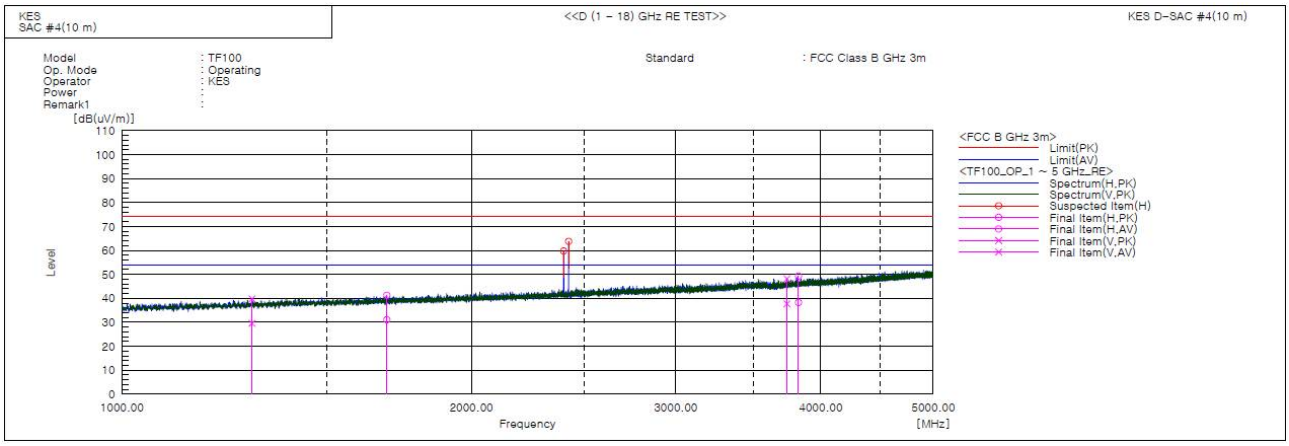
– (5 ~ 12.5) GHz


KES
SAC #4(10 m)
<<D (1 – 18) GHz RE TEST>>
KES D-SAC #4(10 m)
Model : TF100
Op. Mode : Bluetooth
Operator : KES
Power :
Remark1 :
Standard : FCC Class B GHz 3m
[dB(uV/m)]
Level
Frequency
[MHz]
5000.00
10000.00
12500.00
<FCC B GHz 3m>
Limit(PK)
Limit(AV)
<TF100_BT_5 ~ 12.5 GHz_RE>
Spectrum(H,PK)
Spectrum(V,PK)
Final Item(H,PK)

■ Operating Mode – (1 ~ 5) GHz



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1294.355	V	43.9	-4.1	39.8	74.0	54.0	34.2	251.0	106.0	
2	1691.360	H	43.1	-1.8	41.3	74.0	54.0	32.7	253.0	138.0	
3	3741.075	V	41.7	6.5	48.2	74.0	54.0	25.8	195.0	243.0	
4	3827.560	H	42.3	7.0	49.3	74.0	54.0	24.7	119.0	359.0	
5	2402.000	H	--------	1.5	--------	74.0	54.0	--------	100.0	48.0	
6	2426.000	H	--------	1.6	--------	74.0	54.0	--------	100.0	297.0	

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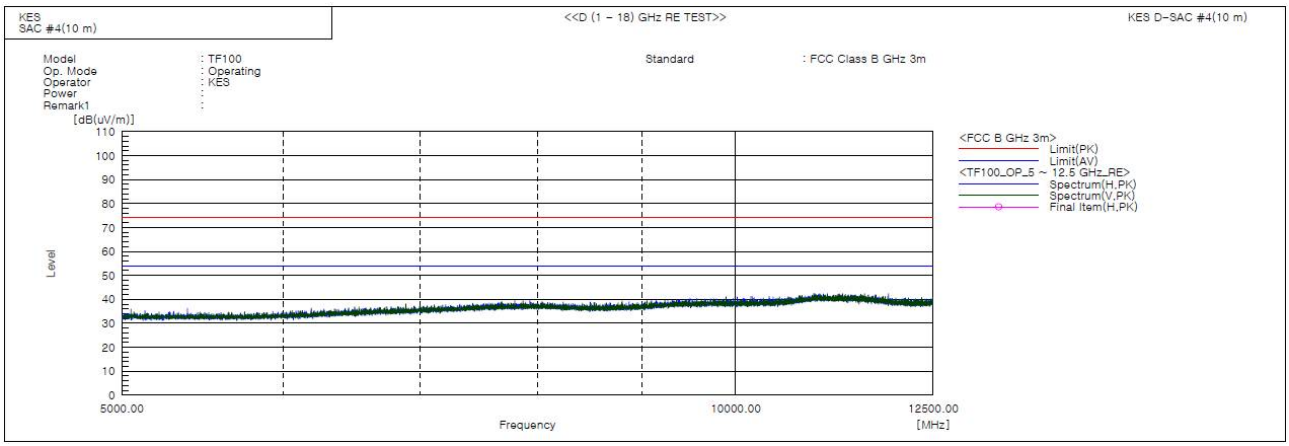
– (5 ~ 12.5) GHz



♦ Calculation

Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)]

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

* Exclusion Band : 2.4 GHz
* No spurious emission were detected above 5 GHz.

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