

TEST REPORT

of

FCC Part 2 Subpart J, Part 22 Subpart C/H,
Part 24 Subpart E, Part 27 Subpart C and Part 90 Subpart S
IC RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6,
RSS-139 Issue 3 and RSS-Gen Issue 5

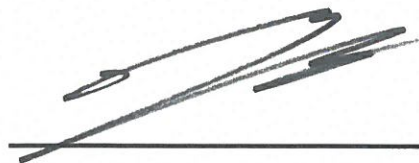
FCC ID: BEJ-TM04ANNABM0
IC Certification: 2703H-TM04ANNABM0

Equipment Under Test : Telematics Module
Model Name : TM04ANNABM0
Variant Model Name(s) : -
FCC Applicant : LG Electronics USA
IC Applicant : LG ELECTRONICS INC.
Manufacturer : LG Electronics Inc.
Date of Receipt : 2020.11.11
Date of Test(s) : 2020.11.11 ~ 2021.04.14
Date of Issue : 2021.04.20

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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Tested by:



Technical
Manager:



SGS Korea Co., Ltd. Gunpo Laboratory



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Report Number: F690501-RF-RTL001961

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

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- Designation number: KR0150

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1.2. Details of Applicant

FCC Applicant : LG Electronics USA

FCC Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, United States, 07632

IC Applicant : LG ELECTRONICS INC.

IC Address : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyenggi-do, Korea (Republic of), 451-713

Contact Person : Kim, Dae-woong

Phone No. : +1 201 266 2215

1.3. Details of Manufacturer

Company : LG Electronics Inc.

Address : 10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea, 07796

1.4. Description of EUT

Kind of Product	Telematics Module
Model Name	TM04ANNABM0
Model Serial Number	001, 002
Power Supply	DC 12.5 V
Rated Power	GSM 850: 33 dB m GSM 1900: 30 dB m WCDMA II, V: 24 dB m WCDMA IV: 24 dB m LTE Band 2, 4, 5, 12, 13, 17, 25, 26, 66, 71: 23 dB m
Frequency Range	GSM 850: 824 MHz ~ 849 MHz GSM 850: 1 850 MHz ~ 1 910 MHz WCDMA II: 1 850 MHz ~ 1 910 MHz WCDMA IV: 1 710 MHz ~ 1 755 MHz WCDMA V: 824 MHz ~ 849 MHz LTE Band 2: 1 850 MHz ~ 1 910 MHz LTE Band 4: 1 710 MHz ~ 1 755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1 850 MHz ~ 1 915 MHz LTE Band 26: 814 MHz ~ 824 MHz LTE Band 26: 824 MHz ~ 849 MHz LTE Band 66: 1 710 MHz ~ 1 780 MHz LTE Band 71: 663 MHz ~ 698 MHz

Emission Designator	GSM 850: 241KGXW (Voice) / 246KG7W (EDGE) GSM 1900: 241KGXW (Voice) / 245KG7W (EDGE) WCDMA II: 4M15F9W WCDMA IV: 4M15F9W WCDMA V: 4M14F9W LTE Band 12/17 (1.4 MHz): 1M10G7D (QPSK) / 1M10D7D (16QAM) LTE Band 12/17 (3 MHz): 2M69G7D (QPSK) / 2M69D7D (16QAM) LTE Band 12/17 (5 MHz): 4M52G7D (QPSK) / 4M53D7D (16QAM) LTE Band 12/17 (10 MHz): 8M97G7D (QPSK) / 8M97D7D (16QAM) LTE Band 13 (5 MHz): 4M52G7D (QPSK) / 4M53D7D (16QAM) LTE Band 13 (10 MHz): 8M92G7D (QPSK) / 8M94D7D (16QAM) LTE Band 25/2 (1.4 MHz): 1M10G7D (QPSK) / 1M10D7D (16QAM) LTE Band 25/2 (3 MHz): 2M69G7D (QPSK) / 2M70D7D (16QAM) LTE Band 25/2 (5 MHz): 4M52G7D (QPSK) / 4M53D7D (16QAM) LTE Band 25/2 (10 MHz): 8M97G7D (QPSK) / 8M97D7D (16QAM) LTE Band 25/2 (15 MHz): 13M6G7D (QPSK) / 13M5D7D (16QAM) LTE Band 25/2 (20 MHz): 18M0G7D (QPSK) / 18M0D7D (16QAM) LTE Band 26/5 (1.4 MHz): 1M10G7D (QPSK) / 1M10D7D (16QAM) LTE Band 26/5 (3 MHz): 2M69G7D (QPSK) / 2M69D7D (16QAM) LTE Band 26/5 (5 MHz): 4M52G7D (QPSK) / 4M52D7D (16QAM) LTE Band 26/5 (10 MHz): 8M97G7D (QPSK) / 8M97D7D (16QAM) LTE Band 26 (15 MHz): 13M5G7D (QPSK) / 13M5D7D (16QAM) LTE Band 66/4 (1.4 MHz): 1M10G7D (QPSK) / 1M10D7D (16QAM) LTE Band 66/4 (3 MHz): 2M70G7D (QPSK) / 2M69D7D (16QAM) LTE Band 66/4 (5 MHz): 4M52G7D (QPSK) / 4M52D7D (16QAM) LTE Band 66/4 (10 MHz): 8M97G7D (QPSK) / 8M97D7D (16QAM) LTE Band 66/4 (15 MHz): 13M5G7D (QPSK) / 13M5D7D (16QAM) LTE Band 66/4 (20 MHz): 17M9G7D (QPSK) / 18M0D7D (16QAM) LTE Band 71 (5 MHz): 4M52G7D (QPSK) / 4M53D7D (16QAM) LTE Band 71 (10 MHz): 8M97G7D (QPSK) / 8M97D7D (16QAM) LTE Band 71 (15 MHz): 13M5G7D (QPSK) / 13M5D7D (16QAM) LTE Band 71 (20 MHz): 17M9G7D (QPSK) / 18M0D7D (16QAM)
Modulation Technique	QPSK, 16QAM, GMSK, 8PSK
Antenna Type	Shark antenna
Antenna gain	663 MHz ~ 698 MHz: -3.4 dB i 699 MHz ~ 716 MHz: -3.1 dB i 777 MHz ~ 787 MHz: -0.4 dB i 814 MHz ~ 824 MHz: 0.0 dB i 824 MHz ~ 849 MHz: -0.2 dB i 1 710 MHz ~ 1 780 MHz: 3.0 dB i 1 850 MHz ~ 1 915 MHz: 2.3 dB i
H/W Version	Rev.C3
S/W Version	WN22XA28

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMR40	100272	Jul. 18, 2020	Annual	Jul. 18, 2021
Signal Generator	R&S	SMBV100A	255834	Jun. 03, 2020	Annual	Jun. 03, 2021
Spectrum Analyzer	R&S	FSV30	103453	Nov. 04, 2020	Annual	Nov. 04, 2021
Mobile Test Unit	R&S	CMW500	144035	Feb. 09, 2021	Annual	Feb. 09, 2022
High Pass Filter	Wainwright Instrument GmbH	WHKX10-900-1000-18000-40SS	7	Mar. 08, 2021	Annual	Mar. 08, 2022
High Pass Filter	Wainwright Instrument GmbH	WHKX2.2/12.75G-10SS	8	Mar. 04, 2021	Annual	Mar. 04, 2022
High Pass Filter	Wainwright Instrument GmbH	WHK3.0/18G-10SS	344	May 18, 2020	Annual	May 18, 2021
DC Power Supply	Agilent	U8002A	MY49030063	Feb. 02, 2021	Annual	Feb. 02, 2022
Preamplifier	R&S	SCU 18	10117	Jun. 10, 2020	Annual	Jun. 10, 2021
Preamplifier	TESTEK	TK-PA1840H	130016	Jan. 07, 2021	Annual	Jan. 07, 2022
Horn Antenna	R&S	HF906	100326	Feb. 04, 2021	Annual	Feb. 04, 2022
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA9170	9170-540	Nov. 26, 2020	Annual	Nov. 26, 2021
Antenna Master	Innco systems GmbH	MM4000	N/A	N.C.R.	N/A	N.C.R.
Turn Table	Innco systems GmbH	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/383 30516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 6.4 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	MWX221-NMSNMS (4 m)	J1023142	Dec. 01, 2020	Semi-annual	Jun. 01, 2021
Coaxial Cable	RFONE	PL520-NMNM-10M (10 m)	20200324001	Dec. 01, 2020	Semi-Annual	Jun. 01, 2021

► **Support Equipment**

Description	Manufacturer	Model	Serial Number
N/A	-	-	-

1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 2, 22, 24, 90 and 27 / IC part RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3 and RSS-Gen Issue 5			
Section in FCC	Section in IC	Test Item	Result
§2.1046 §22.913(a)(5) §24.232(c) §27.50(c)(10) §27.50(d)(4) §90.635(b)	RSS-130 Issue 2 4.6 RSS-132 Issue 3 5.4 RSS-133 Issue 6 6.4 RSS-139 Issue 3 6.5	E.R.P. / E.I.R.P.	Complied
§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)(1) §90.691(a)	RSS-130 Issue 2 4.7 RSS-132 Issue 3 5.5 RSS-133 Issue 6 6.5 RSS-139 Issue 3 6.6	Spurious Radiated Emission	Complied
§2.1046	RSS-Gen Issue 5 6.12	Conducted Output Power	N/A ¹⁾
§2.1049	RSS-Gen Issue 5 6.7	Occupied Bandwidth	N/A ¹⁾
§22.913(d) §24.232(d) §27.50(d)(5)	RSS-130 Issue 2 4.6 RSS-132 Issue 3 5.4 RSS-133 Issue 6 6.4 RSS-139 Issue 3 6.5	Peak-Average Ratio	N/A ¹⁾
§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)(1) §90.691(a)	RSS-130 Issue 2 4.7 RSS-132 Issue 3 5.5 RSS-133 Issue 6 6.5 RSS-139 Issue 3 6.6	Spurious Emission at Antenna Terminal	N/A ¹⁾
§22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)(1) §90.691(a)	RSS-130 Issue 2 4.7 RSS-132 Issue 3 5.5 RSS-133 Issue 6 6.5 RSS-139 Issue 3 6.6	Band Edge	N/A ¹⁾
§2.1055 §22.355 §24.235 §27.54 §90.213(a)	RSS-Gen Issue 5 6.11 RSS-130 Issue 2 4.5 RSS-132 Issue 3 5.3 RSS-133 Issue 6 6.3 RSS-139 Issue 3 6.4	Frequency Stability	N/A ¹⁾

Note;

1) This product is a C2PC case due to the addition of antennas. So only radiation test was performed and the rules for E.R.P. / E.I.R.P. and spurious radiated emission were satisfied.

1.7. Spurious Radiated Emission

The Radiated spurious emissions were tested in the band with the lowest margin of previously data and selected respectively 663 MHz to 698 MHz , 814 MHz to 849 MHz , 1 710 MHz to 1 780 MHz and 1 850 MHz to 1 915 MHz in the band where the antenna gain is increased.

Fundamental Frequency Range	Worst Case
663 MHz to 698 MHz	LTE Band 71 (5 MHz – QPSK)
814 MHz to 849 MHz	LTE Band 26 (1.4 MHz – QPSK)
1 710 MHz to 1 780 MHz	LTE Band 66 (1.4 MHz – QPSK)
1 850 MHz to 1 915 MHz	LTE Band 25 (20 MHz – QPSK)

1.8. Sample Calculation for Offset

Where relevant, the following sample calculation is provided:

1.8.1. Radiation Test

- E.I.R.P. (dB m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB) + 20 Log D - 104.5; where D is the measurement distance in meters.
- E.R.P (dB m) = E.I.R.P. (dB m) - 2.15 (dB)

1.9. Device Capabilities

This device contains the following capabilities;

LTE Band 12 (699 MHz ~ 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 MHz ~ 716 MHz). Therefore, test data provided in this report covers LTE Band 17 as well as Band 12.

LTE Band 25 (1 850 MHz ~ 1 915 MHz) overlaps the entire frequency range of LTE Band 2 (1 850 MHz ~ 1 910 MHz). Therefore, test data provided in this report covers LTE Band 2 as well as Band 25.

LTE Band 26 (814 MHz ~ 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 MHz ~ 849 MHz). Therefore, test data provided in this report covers LTE Band 5 as well as Band 26.

LTE Band 66 (1 710 MHz ~ 1 780 MHz) overlaps the entire frequency range of LTE Band 4 (1 710 MHz ~ 1 755 MHz). Therefore, test data provided in this report covers LTE Band 4 as well as Band 66.

1.10. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	
Radiated Emission, 9 kHz to 30 MHz	H	± 3.66 dB
	V	± 3.66 dB
Radiated Emission, below 1 GHz	H	± 4.90 dB
	V	± 4.82 dB
Radiated Emission, above 1 GHz	H	± 3.62 dB
	V	± 3.64 dB

Uncertainty figures are valid to a confidence level of 95 %.

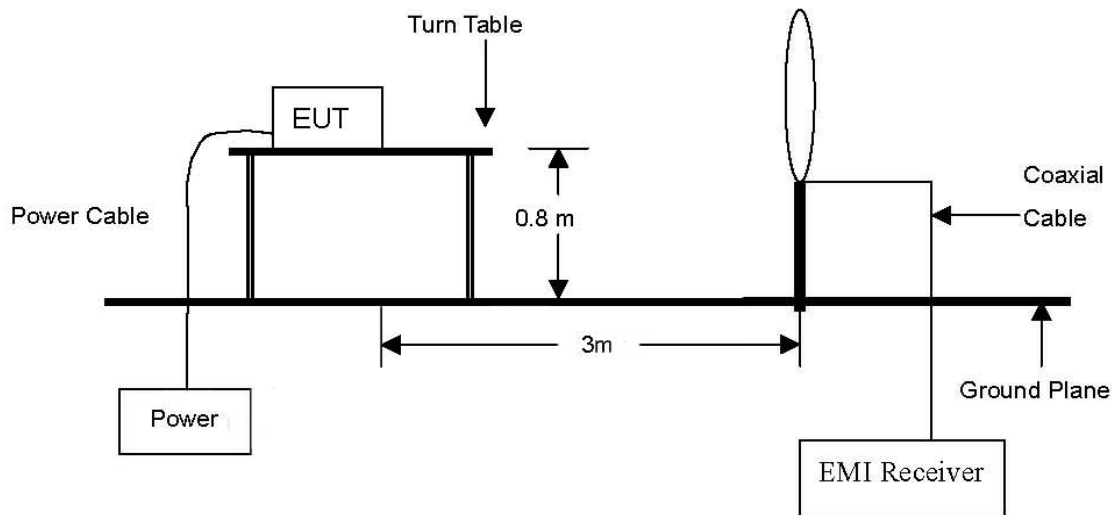
1.11. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL001961	2021.04.20	Initial

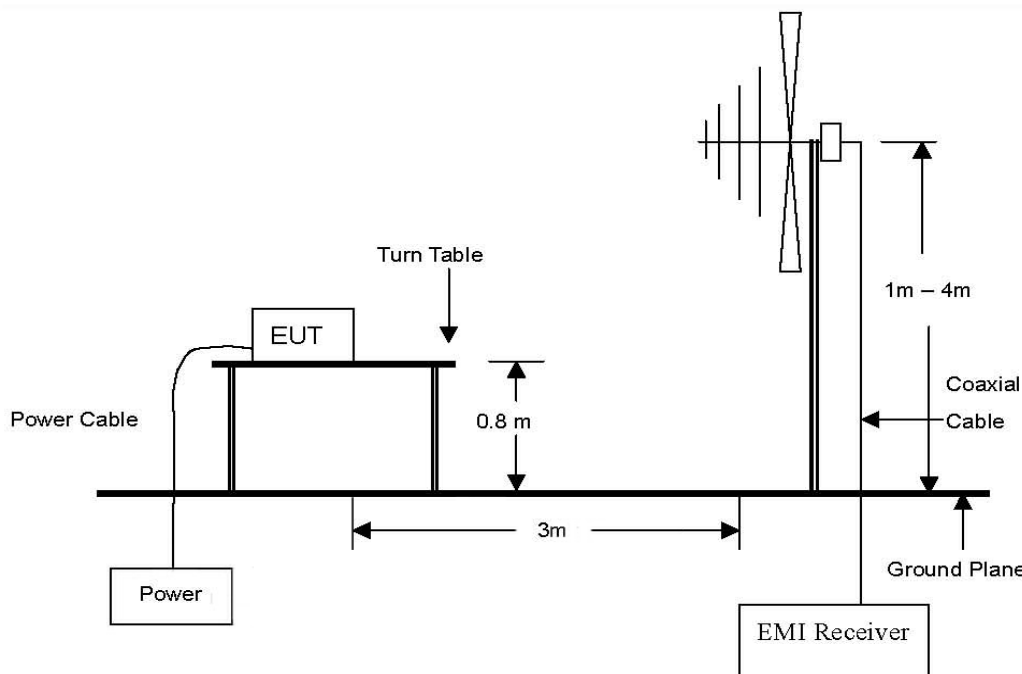
2. RF Radiated Output Power & Spurious Radiated Emission

2.1. Test Setup

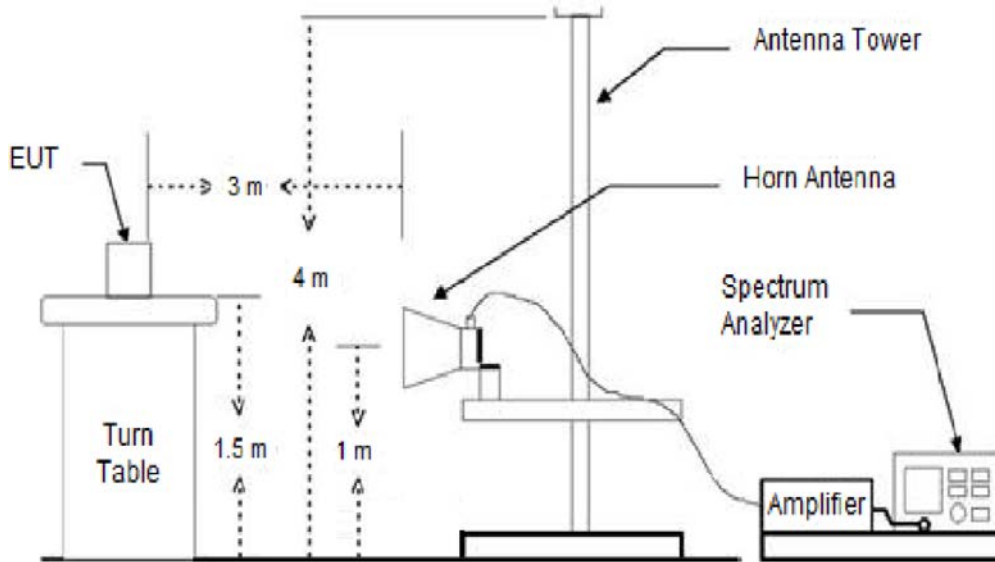
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz.



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



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 20 GHz.



2.2. Limit

2.2.1. Limit of Radiated Output Power

FCC

- §22.913(a)(5), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
- §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.
- §27.50(c)(10), portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.
- §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 MHz band and mobile and portable stations operating in the 1 695-1 710 MHz and 1 755-1 780 MHz bands are limited to 1 watt EIRP.
- §90.635(b), the maximum output power of the transmitter for mobile stations is 100 watts (20 dB W).

IC

- RSS-130 Issue 2

4.6.3, the e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

- RSS-132 Issue 3

5.4, the transmitter output power shall be measured in terms of average power.

The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

Refer to SRSP-503 for base station e.i.r.p. limits.

- RSS-133 Issue 6

6.4, the equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1 930-1 995 MHz shall not have output power exceeding 100 watts.

- RSS-139 Issue 3

6.5, the equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1 710-1 780 MHz shall not exceed one watt.

2.2.2. Limit of Spurious Radiated Emission

FCC

- §22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
- §27.53(c)(2), on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.
- §27.53(g), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.
- §27.53(h)(1), for operations in the 1 695-1 710 MHz, 1 710-1 755 MHz, 1 755-1 780 MHz, 1 915-1 920 MHz, 1 995-2 000 MHz, 2 000-2 020 MHz, 2 110-2 155 MHz, 2 155-2 180 MHz, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.
- §90.691(a), out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
 - (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \text{Log}_{10} (f / 6.1)$ decibels or $50 + 10 \text{Log}_{10} (P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
 - (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \text{Log}_{10} (P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

IC

- RSS-130 Issue 2

4.7.1, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dB W), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

- RSS-132 Issue 3

5.5, Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 kHz is required.

- RSS-133 Issue 6

6.5, Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1 % of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1 % of the emission bandwidth, power integration over 1.0 MHz is required.

- RSS-139 Issue 3

6.6, (i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1 % of the emission bandwidth shall be attenuated below the transmitter output power P (in dB W) by at least $43 + 10 \log_{10} p$ (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dB W) by at least $43 + 10 \log_{10} p$ (watts) dB.

2.3. Test Procedure: Based on ANSI/TIA 603E: 2016 and ANSI C63.26-2015, KDB 971168 D01 Power Meas License Digital Systems v03r01.

1. On a test site, the EUT shall be placed at 0.8 m or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions occupied bandwidth, $RBW = 1-5\%$ of the OBW (not to exceed 1 MHz), $VBW \geq 3 \times RBW$, Detector = power averaging (rms), sweep time = auto, trace average at least 100 traces in power averaging (rms) mode, per the guidelines of KDB 971168 D01 Power Meas License Digital Systems v03r01.
5. Radiated spurious emissions measurement method was set as follows:
RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz, $VBW \geq 3 \times RBW$,
Detector = RMS, trace mode = max hold, per the guidelines of ANSI C63.26-2015 and KDB 971168 D01 Power Meas License Digital Systems v03r01.
6. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
7. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
8. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
9. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
10. The maximum signal level detected by the measuring receiver shall be noted.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The measurement shall be repeated with the test antenna orientated for horizontal polarization.

2.4. Test Result for RF Radiated Output Power

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

GSM

Band	Frequency (MHz)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Antenna Gain (dB i)	Maximum E.I.R.P. (dB m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dB m)	Maximum E.R.P. (W)	Output Power Limit
1 900	1 850 ~ 1 910	30.70	1.175	2.3	33.00	1.995			2 W E.I.R.P.
850	824 ~ 849	35.50	3.548	-0.2	35.30	3.388	33.15	2.065	7 W E.R.P.

WCDMA

Band	Frequency (MHz)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Antenna Gain (dB i)	Maximum E.I.R.P. (dB m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dB m)	Maximum E.R.P. (W)	Output Power Limit
II	1 850 ~ 1 910	25.70	0.372	2.3	28.00	0.631			2 W E.I.R.P.
IV	1 710 ~ 1 755	25.70	0.372	2.8	28.50	0.708			1 W E.I.R.P.
V	824 ~ 849	25.70	0.372	-0.2	25.50	0.355	23.35	0.216	7 W E.R.P.

LTE

Band	Frequency (MHz)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Antenna Gain (dB i)	Maximum E.I.R.P. (dB m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dB m)	Maximum E.R.P. (W)	Output Power Limit
25/2	1 850 ~ 1 915	25.70	0.372	2.3	28.00	0.631			2 W E.I.R.P.
26	814 ~ 824 (Only for FCC)	25.70	0.372	0.0	25.70	0.372	23.55	0.226	100 W E.R.P.
26/5	824 ~ 849	25.70	0.372	-0.2	25.50	0.355	23.35	0.216	7 W E.R.P.
66/4	1 710 ~ 1 780	25.70	0.372	3.0	28.70	0.741			1 W E.I.R.P.
71	663 ~ 698	25.70	0.372	-3.4	22.30	0.170	20.15	0.104	3 W E.R.P.

Remark;

1. E.I.R.P. (dB m) = Maximum Conducted Power (dB m) + Antenna Gain (dB i)
2. E.R.P. (dB m) = E.I.R.P. (dB m) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.

2.5. Spurious Radiated Emission

LTE band 25/2 (20 MHz – QPSK)

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (1 860.0 MHz)									
3 702.29	70.11	H	32.11	-37.06	65.16	-95.26	-30.10	-13	17.10
3 702.23	70.52	V	32.11	-37.06	65.57	-95.26	-29.69	-13	16.69
5 553.38	51.45	H	34.00	-34.64	50.81	-95.26	-44.45	-13	31.45
5 553.21	44.27	V	34.00	-34.64	43.63	-95.26	-51.63	-13	38.63
7 404.27	45.12	V	36.19	-34.12	47.19	-95.26	-48.07	-13	35.07
9 255.61	68.16	H	37.01	-32.31	72.86	-95.26	-22.40	-13	9.40
9 255.67	73.39	V	37.01	-32.31	78.09	-95.26	<u>-17.17</u>	-13	4.17
11 106.69	48.18	H	38.20	-30.66	55.72	-95.26	-39.54	-13	26.54
11 106.38	46.43	V	38.20	-30.67	53.96	-95.26	-41.30	-13	28.30
12 957.66	45.31	H	39.20	-28.36	56.15	-95.26	-39.11	-13	26.11
12 957.67	38.75	V	39.20	-28.36	49.59	-95.26	-45.67	-13	32.67
14 808.89	53.49	H	40.96	-26.57	67.88	-95.26	-27.38	-13	14.38
14 808.82	52.29	V	40.96	-26.57	66.68	-95.26	-28.58	-13	15.58
Middle Channel (1 882.5 MHz)									
3 747.32	73.73	H	32.29	-37.13	68.89	-95.26	-26.37	-13	13.37
3 747.23	71.86	V	32.29	-37.13	67.02	-95.26	-28.24	-13	15.24
5 620.86	51.44	H	34.00	-34.71	50.73	-95.26	-44.53	-13	31.53
5 620.69	52.91	V	34.00	-34.71	52.20	-95.26	-43.06	-13	30.06
7 484.48	53.69	V	36.10	-34.35	55.44	-95.26	-39.82	-13	26.82
9 368.03	61.94	H	37.34	-32.11	67.17	-95.26	-28.09	-13	15.09
9 368.07	67.38	V	37.34	-32.11	72.61	-95.26	-22.65	-13	9.65
11 241.15	37.45	H	38.20	-30.03	45.62	-95.26	-49.64	-13	36.64
11 241.44	44.02	V	38.20	-30.03	52.19	-95.26	-43.07	-13	30.07
13 115.32	43.25	H	39.10	-27.98	54.37	-95.26	-40.89	-13	27.89
13 115.05	42.61	V	39.10	-27.98	53.73	-95.26	-41.53	-13	28.53
14 988.46	51.70	H	40.60	-26.34	65.96	-95.26	-29.30	-13	16.30
14 988.46	49.89	V	40.60	-26.34	64.15	-95.26	-31.11	-13	18.11



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High Channel (1 905.0 MHz)									
3 792.26	69.93	H	32.22	-37.09	65.06	-95.26	-30.20	-13	17.20
3 792.20	69.70	V	32.22	-37.09	64.83	-95.26	-30.43	-13	17.43
5 620.89	51.34	H	34.00	-34.71	50.63	-95.26	-44.63	-13	31.63
5 688.44	50.48	V	34.00	-34.64	49.84	-95.26	-45.42	-13	32.42
7 584.34	56.36	V	36.00	-33.67	58.69	-95.26	-36.57	-13	23.57
9 480.55	61.25	H	37.50	-31.87	66.88	-95.26	-28.38	-13	15.38
9 480.46	68.49	V	37.50	-31.87	74.12	-95.26	-21.14	-13	8.14
11 376.53	36.57	H	38.35	-30.08	44.84	-95.26	-50.42	-13	37.42
11 376.57	41.03	V	38.35	-30.08	49.30	-95.26	-45.96	-13	32.96
13 272.56	38.48	H	39.35	-27.98	49.85	-95.26	-45.41	-13	32.41
13 272.26	35.31	V	39.34	-27.98	46.67	-95.26	-48.59	-13	35.59
15 168.72	53.88	H	40.16	-26.48	67.56	-95.26	-27.70	-13	14.70
15 168.84	52.88	V	40.16	-26.48	66.56	-95.26	-28.70	-13	15.70

* 20 BW 1 RB size / 0 Offset for B25/2

LTE band 26 (1.4 MHz – QPSK) – Part 90

Frequency (MHz)	Measured Level (dB μ V)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB μ V/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (814.7 MHz)									
1 628.44	63.65	H	25.71	-40.07	49.29	-97.41	-48.12	-13	35.12
1 628.32	50.40	V	25.71	-40.07	36.04	-97.41	-61.37	-13	48.37
2 442.90	71.30	H	28.37	-38.68	60.99	-97.41	-36.42	-13	23.42
2 442.76	75.68	V	28.37	-38.68	65.37	-97.41	-32.04	-13	19.04
3 257.15	46.69	H	30.44	-37.71	39.42	-97.41	-57.99	-13	44.99
3 256.88	51.46	V	30.44	-37.71	44.19	-97.41	-53.22	-13	40.22
4 071.30	43.18	H	32.10	-36.20	39.08	-97.41	-58.33	-13	45.33
4 071.36	44.55	V	32.10	-36.20	40.45	-97.41	-56.96	-13	43.96
High Channel (823.3 MHz)									
1 645.88	64.94	H	25.78	-40.05	50.67	-97.41	-46.74	-13	33.74
1 645.66	53.93	V	25.78	-40.06	39.65	-97.41	-57.76	-13	44.76
2 468.54	77.04	H	28.36	-38.66	66.74	-97.41	-30.67	-13	17.67
2 468.56	75.52	V	28.36	-38.66	65.22	-97.41	-32.19	-13	19.19
3 291.40	47.82	H	30.65	-37.60	40.87	-97.41	-56.54	-13	43.54
3 291.16	49.96	V	30.65	-37.60	43.01	-97.41	-54.40	-13	41.40
4 114.25	44.52	H	32.13	-36.36	40.29	-97.41	-57.12	-13	44.12
4 114.16	46.10	V	32.13	-36.36	41.87	-97.41	-55.54	-13	42.54

* 1.4 BW 1RB size / 0 Offset for B26

LTE band 26/5 (1.4 MHz – QPSK) – Part 22

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (824.7 MHz)									
1 648.40	64.20	H	25.79	-40.05	49.94	-97.41	-47.47	-13	34.47
1 648.44	56.78	V	25.79	-40.05	42.52	-97.41	-54.89	-13	41.89
2 472.78	76.43	H	28.35	-38.65	66.13	-97.41	-31.28	-13	18.28
2 472.94	75.78	V	28.35	-38.65	65.48	-97.41	-31.93	-13	18.93
3 297.20	49.10	H	30.68	-37.57	42.21	-97.41	-55.20	-13	42.20
3 296.94	51.71	V	30.68	-37.57	44.82	-97.41	-52.59	-13	39.59
4 121.10	43.91	H	32.14	-36.28	39.77	-97.41	-57.64	-13	44.64
4 121.16	46.95	V	32.14	-36.28	42.81	-97.41	-54.60	-13	41.60
Middle Channel (836.5 MHz)									
1 671.98	69.22	H	26.02	-39.96	55.28	-97.41	-42.13	-13	29.13
1 671.76	62.82	V	26.02	-39.97	48.87	-97.41	-48.54	-13	35.54
2 508.06	76.69	H	28.32	-38.51	66.50	-97.41	-30.91	-13	17.91
2 508.10	75.78	V	28.32	-38.50	65.60	-97.41	-31.81	-13	18.81
3 344.38	45.91	V	30.79	-37.70	39.00	-97.41	-58.41	-13	45.41
4 180.35	47.20	H	32.14	-36.19	43.15	-97.41	-54.26	-13	41.26
4 180.48	51.01	V	32.14	-36.19	46.96	-97.41	-50.45	-13	37.45
High Channel (848.3 MHz)									
1 695.88	69.25	H	26.26	-39.74	55.77	-97.41	-41.64	-13	28.64
1 695.66	63.76	V	26.26	-39.75	50.27	-97.41	-47.14	-13	34.14
2 543.48	74.23	H	28.39	-38.38	64.24	-97.41	-33.17	-13	20.17
2 543.58	72.45	V	28.39	-38.38	62.46	-97.41	-34.95	-13	21.95
3 391.42	48.30	H	30.80	-37.67	41.43	-97.41	-55.98	-13	42.98
4 239.20	44.30	H	26.26	-39.74	55.77	-97.41	-41.64	-13	28.64
4 239.30	49.95	V	32.10	-36.24	45.81	-97.41	-51.60	-13	38.60

* 1.4 BW 1RB size / 0 Offset for B26/5

LTE band 66/4 (1.4 MHz – QPSK)

Frequency (MHz)	Measured Level (dB μ V)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB μ V/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (1 710.7 MHz)									
3 420.58	50.81	H	30.84	-37.68	43.97	-95.26	-51.29	-13	38.29
3 420.55	48.94	V	30.84	-37.68	42.10	-95.26	-53.16	-13	40.16
8 551.52	42.46	H	36.40	-32.92	45.94	-95.26	-49.32	-13	36.32
8 551.17	43.28	V	36.40	-32.92	46.76	-95.26	-48.50	-13	35.50
Middle Channel (1 745.0 MHz)									
3 489.12	49.61	H	31.06	-37.45	43.22	-95.26	-52.04	-13	39.04
3 488.98	49.74	V	31.06	-37.45	43.35	-95.26	-51.91	-13	38.91
8 722.30	54.02	H	36.89	-32.61	58.30	-95.26	-36.96	-13	23.96
8 722.87	53.07	V	36.89	-32.61	57.35	-95.26	-37.91	-13	24.91
High Channel (1 779.3 MHz)									
3 557.76	44.57	H	31.33	-36.99	38.91	-95.26	-56.35	-13	43.35
8 894.34	57.38	H	37.10	-32.55	61.93	-95.26	-33.33	-13	20.33
8 894.17	62.47	V	37.10	-32.55	67.02	-95.26	-28.24	-13	15.24

* 1.4 BW 1 RB size / 0 Offset for B66/4

LTE band 71 (5 MHz – QPSK)

Frequency (MHz)	Measured Level (dBμV)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dBμV/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (665.5 MHz)									
1 326.64	61.18	H	25.05	-40.60	45.63	-97.41	-51.78	-13	38.78
1 326.85	53.35	V	25.05	-40.60	37.80	-97.41	-59.61	-13	46.61
1 990.06	72.27	H	27.58	-39.59	60.26	-97.41	-37.15	-13	24.15
1 990.24	73.28	V	27.58	-39.59	61.27	-97.41	-36.14	-13	23.14
2 653.45	55.92	H	28.81	-38.17	46.56	-97.41	-50.85	-13	37.85
2 653.51	59.56	V	28.81	-38.17	50.20	-97.41	-47.21	-13	34.21
3 316.74	58.54	H	30.73	-37.63	51.64	-97.41	-45.77	-13	32.77
3 316.80	53.26	V	30.73	-37.63	46.36	-97.41	-51.05	-13	38.05
Middle Channel (680.5 MHz)									
1 356.58	62.70	H	25.13	-40.60	47.23	-97.41	-50.18	-13	37.18
1 356.71	59.95	V	25.13	-40.60	44.48	-97.41	-52.93	-13	39.93
2 034.99	74.90	H	27.67	-39.54	63.03	-97.41	-34.38	-13	21.38
2 034.92	65.21	V	27.67	-39.54	53.34	-97.41	-44.07	-13	31.07
2 713.20	47.69	H	28.87	-37.94	38.62	-97.41	-58.79	-13	45.79
2 713.34	47.00	V	28.87	-37.94	37.93	-97.41	-59.48	-13	46.48
3 391.55	61.59	H	30.80	-37.67	54.72	-97.41	-42.69	-13	29.69
3 391.74	59.90	V	30.80	-37.67	53.03	-97.41	-44.38	-13	31.38
High Channel (695.5 MHz)									
1 386.80	66.58	H	25.25	-40.47	51.36	-97.41	-46.05	-13	33.05
1 386.70	65.79	V	25.25	-40.47	50.57	-97.41	-46.84	-13	33.84
2 080.01	75.61	H	27.70	-39.39	63.92	-97.41	-33.49	-13	20.49
2 080.00	67.99	V	27.70	-39.39	56.30	-97.41	-41.11	-13	28.11
2 773.41	51.04	H	28.85	-37.91	41.98	-97.41	-55.43	-13	42.43
2 773.51	56.57	V	28.85	-37.91	47.51	-97.41	-49.90	-13	36.90
3 466.65	59.10	H	30.97	-37.56	52.51	-97.41	-44.90	-13	31.90
3 466.83	62.11	V	30.97	-37.56	55.52	-97.41	-41.89	-13	28.89

* 5 BW 1 RB size / 0 Offset for B71

Remark;

1. $E \text{ (dB}\mu\text{V/m)} = \text{Measured Level (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)}$.
2. $E.I.R.P. \text{ (dB m)} = E \text{ (dB}\mu\text{V/m)} + 20 \log D - 104.8$; where D is the measurement distance in meters.
3. $E.R.P. \text{ (dB m)} = E.I.R.P. \text{ (dB m)} - 2.15 \text{ (dB)}$; where E.R.P. and E.I.R.P. are expressed in consistent units.
4. $CF \text{ (dB) (E.I.R.P.)} = 20 \log D - 104.8 - \text{Distance Correction Factor}$
5. $CF \text{ (dB) (E.R.P.)} = 20 \log D - 104.8 - 2.15$.
6. Distance Correction Factor = $20 \log (\text{specific distance} / \text{test distance})$
7. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.

- End of the Test Report -