TEST REPORT

Dt&C Co., Ltd.
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Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC2305-0066

2. Customer

- Name (FCC) : LG Electronics USA, Inc. / Name (IC) : LG ELECTRONICS INC.
- Address (FCC) : 111 Sylvan Avenue North Building Englewood Cliffs New Jersey United States 07632
  Address (IC) : 222, LG-ro, Jinwi-myeon Pyeongtaek-si, Gyeonggi-do 451-713 Korea (Republic Of)

3. Use of Report : FCC & IC Class II Permissive Change

4. Product Name / Model Name : Telematics / TLVHW3IU-N
   FCC ID : BEJTLVHW3IU-N
   IC : 2703H-TLVHW3IUN

5. FCC Regulation(s): Part 2, 22, 24, 27
   IC Standard(s): RSS-Gen Issue 5, 130 Issue 2, 132 Issue 4, 133 Issue 6, 139 Issue 4
   Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015

6. Date of Test : 2023.03.28 ~ 2023.04.05

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : See appended test report.

9. Test Result : Refer to attached test result.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test report is not related to KOLAS accreditation.

Affirmation	Tested by Name : SeungMin Gil (Signature)	Technical Manager Name : JaeJin Lee (Signature)

2023 . 05 . 16 .

Dt&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2305-0066	May. 16, 2023	Initial issue	SeungMin Gil	JaeJin Lee

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1. GENERAL INFORMATION

FCC Classification	PCS Licensed Transmitter (PCB)
Product Name	Telematics
Model Name	TLVHW3IU-N
Add Model Name	-
FVIN(Firmware Version Identification Number)	0686
EUT Serial Number	232VHKR000012
Supplying power	DC 12 V
Antenna Information	Antenna Type: Shark pin antenna (Model : 5WA.035.507.C 041)

	Antenna gain (dBi)	Cable loss(dB)	Antenna gain including connected cable loss between transmitter and antenna (dBi)
LTE Band 12(17)	1.32	-4.5	-3.18
LTE Band 13	0.64	-4.8	-4.16
LTE Band 5	1.49	-5.0	-3.51
LTE Band 4	-0.20	-7.4	-7.60
LTE Band 2	1.04	-7.7	-6.66

Mode	TX Frequency (MHz)	Modulation	ERP	
			Max power (dBm)	Max power (W)
LTE Band 12(17)	704 ~ 711	QPSK	11.59	0.014
LTE Band 12(17)	704 ~ 711	16QAM	10.92	0.012
LTE Band 12(17)	701.5 ~ 713.5	QPSK	12.31	0.017
LTE Band 12(17)	701.5 ~ 713.5	16QAM	11.39	0.014
LTE Band 12	700.5 ~ 714.5	QPSK	11.52	0.014
LTE Band 12	700.5 ~ 714.5	16QAM	10.85	0.012
LTE Band 12	699.7 ~ 715.3	QPSK	11.56	0.014
LTE Band 12	699.7 ~ 715.3	16QAM	10.94	0.012
LTE Band 13	782 ~ 782	QPSK	15.04	0.032
LTE Band 13	782 ~ 782	16QAM	14.05	0.025
LTE Band 13	779.5 ~ 784.5	QPSK	15.32	0.034
LTE Band 13	779.5 ~ 784.5	16QAM	14.20	0.026
LTE Band 5	829 ~ 844	QPSK	15.08	0.032
LTE Band 5	829 ~ 844	16QAM	14.27	0.027
LTE Band 5	826.5 ~ 846.5	QPSK	14.72	0.030
LTE Band 5	826.5 ~ 846.5	16QAM	14.00	0.025
LTE Band 5	825.5 ~ 847.5	QPSK	14.34	0.027
LTE Band 5	825.5 ~ 847.5	16QAM	13.48	0.022
LTE Band 5	824.7 ~ 848.3	QPSK	13.79	0.024
LTE Band 5	824.7 ~ 848.3	16QAM	12.98	0.020

Mode	TX Frequency (MHz)	Modulation	EIRP	
			Max power (dBm)	Max power (W)
LTE Band 4	1 720 ~ 1 770	QPSK	15.60	0.036
LTE Band 4	1 720 ~ 1 770	16QAM	15.00	0.032
LTE Band 4	1 717.5 ~ 1 772.5	QPSK	15.61	0.036
LTE Band 4	1 717.5 ~ 1 772.5	16QAM	14.82	0.030
LTE Band 4	1 715 ~ 1 775	QPSK	15.83	0.038
LTE Band 4	1 715 ~ 1 775	16QAM	15.05	0.032
LTE Band 4	1 712.5 ~ 1 777.5	QPSK	15.34	0.034
LTE Band 4	1 712.5 ~ 1 777.5	16QAM	14.50	0.028
LTE Band 4	1 711.5 ~ 1 778.5	QPSK	15.15	0.033
LTE Band 4	1 711.5 ~ 1 778.5	16QAM	14.33	0.027
LTE Band 4	1 710.7 ~ 1 779.3	QPSK	15.15	0.033
LTE Band 4	1 710.7 ~ 1 779.3	16QAM	14.26	0.027
LTE Band 2	1 860 ~ 1 905	QPSK	16.09	0.041
LTE Band 2	1 860 ~ 1 905	16QAM	15.54	0.036
LTE Band 2	1 857.5 ~ 1 907.5	QPSK	15.81	0.038
LTE Band 2	1 857.5 ~ 1 907.5	16QAM	15.11	0.032
LTE Band 2	1 855 ~ 1 910	QPSK	14.81	0.030
LTE Band 2	1 855 ~ 1 910	16QAM	14.14	0.026
LTE Band 2	1 852.5 ~ 1 912.5	QPSK	15.27	0.034
LTE Band 2	1 852.5 ~ 1 912.5	16QAM	14.56	0.029
LTE Band 2	1 851.5 ~ 1 913.5	QPSK	14.94	0.031
LTE Band 2	1 851.5 ~ 1 913.5	16QAM	14.16	0.026
LTE Band 2	1 850.7 ~ 1 914.3	QPSK	14.82	0.030
LTE Band 2	1 850.7 ~ 1 914.3	16QAM	13.89	0.024

1.1 Reference test data explanations

Introduction

This report includes the test data of FCC ID: BEJTLVHE4IU-N / IC: 2703H-TLVHE4IUN with reference to KDB 484596 D01v01. The applicant takes full responsibility that the test data as reference section below represents compliance for FCC ID: BEJTLVHW3IU-N / IC: 2703H-TLVHW3IUN.

Reference FCC ID/ IC	Exhibit type	Separated FCC ID/ IC
FCC ID: BEJTLVHE4IU-N	Class II Permissive Change	FCC ID: BEJTLVHW3IU-N
IC: 2703H-TLVHE4IUN	Class II Permissive Change	IC: 2703H-TLVHW3IUN

Explain the difference

FCC ID: BEJTLVHW3IU-N / IC: 2703H-TLVHW3IUN is same the hardware with FCC ID: BEJTLVHE4IU-N / IC: 2703H-TLVHE4IUN. The difference between the two products is the certification number for marketing purposes.

Spot check verification data

Not checked, because two products are essentially the same.

Reference section

Reference FCC ID: BEJTLVHE4IU-N / IC: 2703H-TLVHE4IUN.

FCC Rule	Technology	Band(MHz)	Exhibit type	Report title	Reference Sections
Part 27	LTE Band 12(17)	699 ~ 716	Class II Permissive Change	Test Report	ALL
Part 27	LTE Band 13	777 ~ 787			
Part 22	LTE Band 5	824 ~ 849			
Part 27	LTE Band 4	1710 ~ 1755			
Part 24	LTE Band 2	1850 ~ 1910			

IC Standard	Technology	Band(MHz)	Exhibit type	Report title	Reference Sections
RSS-130	LTE Band 12(17)	699 ~ 716	Class II Permissive Change	Test Report	ALL
RSS-130	LTE Band 13	777 ~ 787			
RSS-132	LTE Band 5	824 ~ 849			
RSS-139	LTE Band 4	1710 ~ 1755			
RSS-133	LTE Band 2	1850 ~ 1910			

2. INTRODUCTION

2.1 EUT DESCRIPTION

The Equipment Under Test (EUT) supports 850/1900 GPRS, 850/1700/1900 WCDMA, Multi-band LTE.

2.2 TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+22 ℃ ~ +24 ℃
▪ Relative Humidity	41 % ~ 43 %

2.3 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.4 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014. All measurement uncertainty values are shown with a coverage factor of *k* = 2 to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated Disturbance (Below 1 GHz)	4.8 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.0 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (Above 18 GHz)	5.2 dB (The confidence level is about 95 %, k = 2)

2.5 TEST FACILITY

Dt&C Co., Ltd.

The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042.
The test site comply with the requirements of § 2.948 according to ANSI 63.4-2014.

- FCC & IC MRA Designation No. : KR0034

- ISED #: 5740A

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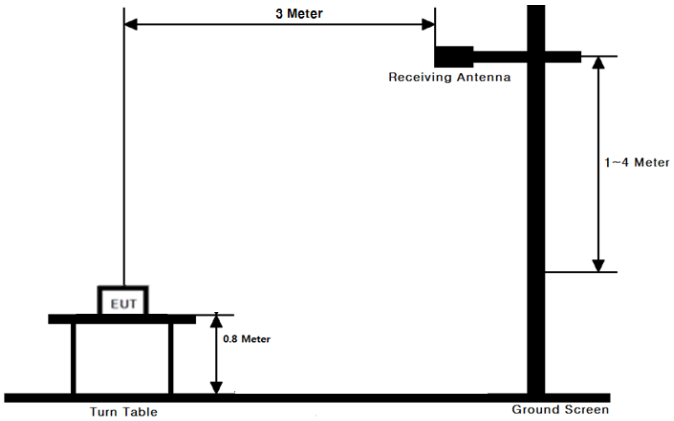
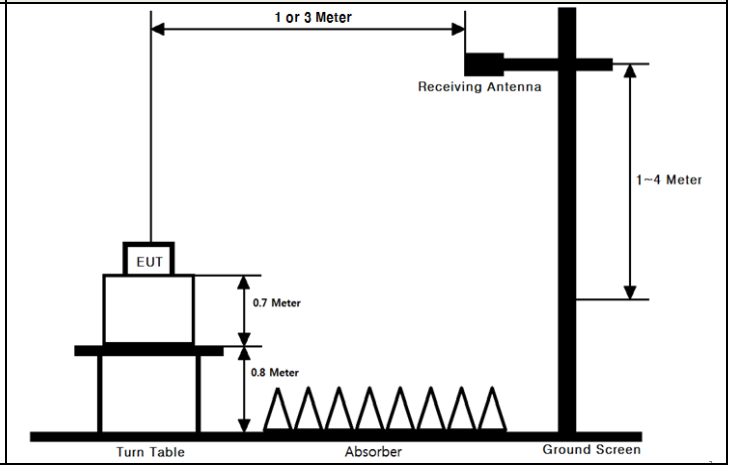
3. DESCRIPTION OF TESTS

3.1. ERP & EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.17**
- **KDB971168 D01v03 - Section 5.2.2**
- **ANSI C63.26-2015 – Section 5.2.4.4.1**

Test setting

1. Set span to 2 x to 3 x the OBW.
2. Set RBW = 1 % to 5 % of the OBW.
3. Set VBW ≥ 3 x RBW.
4. Set number of points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   1) Set = auto-couple, or
   2) Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6. Detector = power averaging (rms).
7. If the EUT can be configured to transmit continuously, then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receiver antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

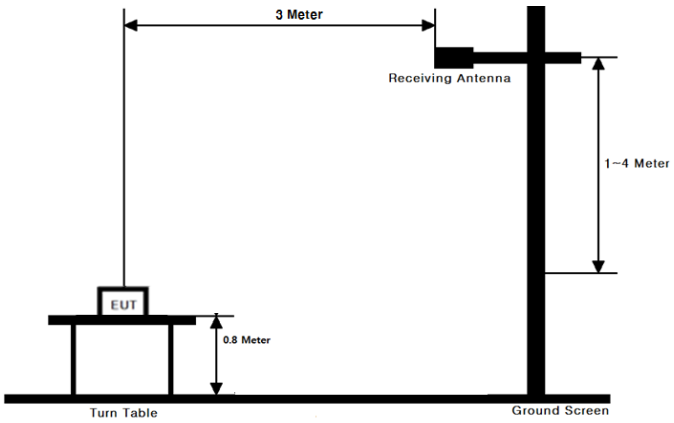
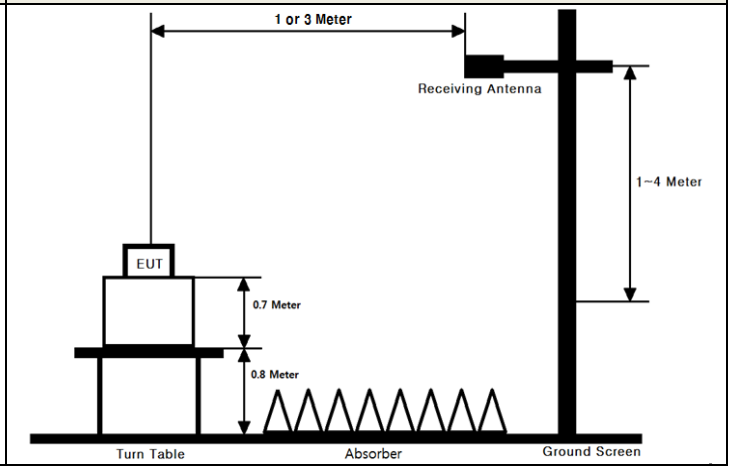
The ERP/EIRP is calculated using the following formula:

ERP/EIRP = The conducted power at the substitute antenna`s terminal [dBm] + Substitute Antenna gain [dBd for ERP , dBi for EIRP]

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference Between the gain of the horn antenna and an isotropic antenna are taken into consideration.

3.2 UNDESIRABLE EMISSIONS

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.12**
- **KDB971168 D01v03 - Section 5.8**
- **ANSI C63.26-2015 – Section 5.5**

Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW ≥ 3 X RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point ≥ 2 X span / RBW
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.
For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.
This measurement was performed with the EUT oriented in 3 orthogonal axis.

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	22/06/24	23/06/24	US47360812
Radio Communication Analyzer	Anritsu	MT8820C	22/06/24	23/06/24	6200978101
Thermohygrometer	BODYCOM	BJ5478	22/12/16	23/12/16	120612-2
Signal Generator	Rohde Schwarz	SMBV100A	22/12/16	23/12/16	255571
Signal Generator	ANRITSU	MG3695C	22/12/16	23/12/16	173501
Loop Antenna	ETS-Lindgren	6502	22/12/16	24/12/16	00226186
BILOG ANTENNA	Schwarzbeck	VULB9160	22/12/16	23/12/16	3362
Dipole Antenna	Schwarzbeck	UHA9105	22/12/16	24/12/16	2262
HORN ANT	ETS	3117	22/12/16	23/12/16	00140394
HORN ANT	A.H.Systems	SAS-574	22/06/24	23/06/24	155
PreAmplifier	H.P	8447D	22/12/16	23/12/16	2944A07774
PreAmplifier	Agilent	8449B	22/06/24	23/06/24	3008A02108
PreAmplifier	tsj	MLA-1840-J02-45	22/06/24	23/06/24	16966-10728
High Pass Filter	Wainwright Instruments	WHKX12-935-1000-15000-40SS	22/06/24	23/06/24	7
High Pass Filter	Wainwright Instruments	WHKX10-2838-3300-18000-60SS	22/06/24	23/06/24	2
High Pass Filter	Wainwright Instruments	WHKX6-6320-8000-26500-40CC	22/06/24	23/06/24	2
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-01
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-02
Cable	JUNKOSHA	MWX241/B	23/01/04	24/01/04	M-03
Cable	JUNKOSHA	MWX221	23/01/04	24/01/04	M-04
Cable	JUNKOSHA	MWX221	23/01/04	24/01/04	M-05
Cable	DTNC	Cable	23/01/04	24/01/04	M-06
Cable	JUNFLON	J12J101757-00	23/01/04	24/01/04	M-07
Cable	HUBER+SUHNER	SUCOFLEX104	23/01/04	24/01/04	M-08
Cable	HUBER+SUHNER	SUCOFLEX106	23/01/04	24/01/04	M-09
Cable	JUNKOSHA	MWX241	23/01/03	24/01/03	mmW-1
Cable	JUNKOSHA	MWX241	23/01/03	24/01/03	mmW-4

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017.
Note2: The cable is not a regular calibration item, so it has been calibrated by Dt&C itself.

5. SUMMARY OF TEST RESULTS

FCC Part	RSS Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
27.50(b.10) 27.50(c.10)	RSS-130 [4.6]	Radiated Output Power (B12, 17, 13)	< 3 Watts max. ERP	Radiated	C Note2
22.913(a.5)	RSS-132 [5.4]	Radiated Output Power (B5)	< 7 Watts max. ERP		C Note2
27.50(d.4)	RSS-139 [5.5]	Radiated Output Power (B4)	< 1 Watts max. EIRP		C Note2
24.232(c)	RSS-133 [6.4]	Radiated Output Power(B2)	< 2 Watts max. EIRP		C Note2
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [5.6]	Undesirable Emissions	> 43 + 10log$_{10}$ (P) dB for all out-of-band emissions		C Note2
27.53(f)	RSS-130 [4.7]	Undesirable Emissions in 1559 ~ 1610MHz	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions of less than 700 Hz bandwidth)		C Note2

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable
Note 2: This test item was performed in three orthogonal EUT positions and the worst case data was reported.

6. SAMPLE CALCULATION

A. For substitution method

1) The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1 GHz respectively above ground.
2) The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3) During the test, the turn table is rotated until the maximum signal is found.
4) Record the field strength meter's level. (ex. Spectrum reading level is -8.5 dBm)
5) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
6) Increase the signal generator output till the field strength meter's level is equal to the item (4). (ex. Signal generator level is -18.04 dBm)
7) The gain of the cable and amplifier between the signal generator and terminals of substituted antenna is 46.92 dB at test frequency.
8) Record the level at substituted antenna terminal. (ex. 28.88dBm)
9) The result is calculated as below;

EIRP(dBm) = LEVLE@ANTENNA TERMINAL + TX Antenna Gain (dBi)
ERP(dBm) = LEVLE@ANTENNA TERMINAL + TX Antenna Gain (dBd)
Where, TX Antenna Gain (dBd) = TX Antenna Gain (dBi) - 2.15 dB

7. TEST DATA

7.1 ERP & EIRP

- Test Notes

1) This is device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the below table.

7.1.1 LTE Band 12(17)

Channel Bandwidth (MHz)	Tx Freq. (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	ERP (W)
10	704	QPSK	1/0	H	12.30	-0.71	11.59	0.014
		16QAM	1/0	H	11.63	-0.71	10.92	0.012
	711	QPSK	1/0	H	12.03	-0.70	11.33	0.014
		16QAM	1/0	H	11.31	-0.70	10.61	0.012
5	701.5	QPSK	1/0	H	12.30	-0.72	11.58	0.014
		16QAM	1/0	H	11.42	-0.72	10.70	0.012
	707.5	QPSK	1/0	H	13.01	-0.70	12.31	0.017
		16QAM	1/0	H	12.09	-0.70	11.39	0.014
	713.5	QPSK	1/0	H	12.00	-0.69	11.31	0.014
		16QAM	1/0	H	11.05	-0.69	10.36	0.011

LTE Band 12

Channel Bandwidth (MHz)	Tx Freq. (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	ERP (W)
3	700.5	QPSK	1/0	H	12.24	-0.72	11.52	0.014
		16QAM	1/0	H	11.57	-0.72	10.85	0.012
	707.5	QPSK	1/0	H	11.80	-0.70	11.10	0.013
		16QAM	1/0	H	10.99	-0.70	10.29	0.011
	714.5	QPSK	1/0	H	11.63	-0.69	10.94	0.012
		16QAM	1/0	H	10.90	-0.69	10.21	0.010
1.4	699.7	QPSK	1/0	H	12.02	-0.72	11.30	0.013
		16QAM	1/0	H	11.17	-0.72	10.45	0.011
	707.5	QPSK	1/0	H	12.26	-0.70	11.56	0.014
		16QAM	1/0	H	11.64	-0.70	10.94	0.012
	715.3	QPSK	1/0	H	11.94	-0.69	11.25	0.013
		16QAM	1/0	H	11.07	-0.69	10.38	0.011

7.1.2 LTE Band 13

Channel Bandwidth (MHz)	Tx Freq. (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	ERP (W)
10	782	QPSK	1/0	H	15.58	-0.54	15.04	0.032
		16QAM	1/0	H	14.59	-0.54	14.05	0.025
5	779.5	QPSK	1/0	H	15.87	-0.55	15.32	0.034
		16QAM	1/0	H	14.75	-0.55	14.20	0.026
	784.5	QPSK	1/0	H	13.16	-0.53	12.63	0.018
		16QAM	1/0	H	12.18	-0.53	11.65	0.015

7.1.3 LTE Band 5

Channel Bandwidth (MHz)	Tx Freq. (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/25	H	15.27	-0.62	14.65	0.029
		16QAM	1/25	H	14.50	-0.62	13.88	0.024
	836.5	QPSK	1/0	H	15.73	-0.65	15.08	0.032
		16QAM	1/0	H	14.92	-0.65	14.27	0.027
	844	QPSK	1/0	H	15.23	-0.68	14.55	0.029
		16QAM	1/0	H	14.31	-0.68	13.63	0.023
5	826.5	QPSK	1/24	H	15.03	-0.61	14.42	0.028
		16QAM	1/24	H	14.23	-0.61	13.62	0.023
	836.5	QPSK	1/0	H	15.37	-0.65	14.72	0.030
		16QAM	1/0	H	14.65	-0.65	14.00	0.025
	846.5	QPSK	1/0	H	14.72	-0.69	14.03	0.025
		16QAM	1/0	H	13.89	-0.69	13.20	0.021
3	825.5	QPSK	1/14	H	14.67	-0.60	14.07	0.026
		16QAM	1/14	H	14.01	-0.60	13.41	0.022
	836.5	QPSK	1/0	H	14.99	-0.65	14.34	0.027
		16QAM	1/0	H	14.13	-0.65	13.48	0.022
	847.5	QPSK	1/0	H	14.21	-0.69	13.52	0.022
		16QAM	1/0	H	13.39	-0.69	12.70	0.019
1.4	824.7	QPSK	1/0	H	14.06	-0.60	13.46	0.022
		16QAM	1/0	H	13.24	-0.60	12.64	0.018
	836.5	QPSK	1/0	H	14.44	-0.65	13.79	0.024
		16QAM	1/0	H	13.63	-0.65	12.98	0.020
	848.3	QPSK	1/0	H	13.81	-0.70	13.11	0.020
		16QAM	1/0	H	13.04	-0.70	12.34	0.017

7.1.4 LTE Band 4

Channel Bandwidth (MHz)	Tx Freq. (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
20	1 720	QPSK	1/50	V	9.77	5.83	15.60	0.036
		16QAM	1/50	V	9.17	5.83	15.00	0.032
	1 732.5	QPSK	1/50	V	9.75	5.69	15.44	0.035
		16QAM	1/50	V	8.89	5.69	14.58	0.029
	1 745	QPSK	1/0	V	8.92	5.56	14.48	0.028
		16QAM	1/0	V	8.07	5.56	13.63	0.023
15	1 717.5	QPSK	1/0	V	9.75	5.86	15.61	0.036
		16QAM	1/0	V	8.96	5.86	14.82	0.030
	1 732.5	QPSK	1/0	V	9.52	5.69	15.21	0.033
		16QAM	1/0	V	8.65	5.69	14.34	0.027
	1 747.5	QPSK	1/0	V	8.20	5.53	13.73	0.024
		16QAM	1/0	V	7.47	5.53	13.00	0.020
10	1 715	QPSK	1/0	V	9.47	5.89	15.36	0.034
		16QAM	1/0	V	8.61	5.89	14.50	0.028
	1 732.5	QPSK	1/0	V	10.14	5.69	15.83	0.038
		16QAM	1/0	V	9.36	5.69	15.05	0.032
	1 750	QPSK	1/0	V	8.84	5.50	14.34	0.027
		16QAM	1/0	V	7.90	5.50	13.40	0.022
5	1 712.5	QPSK	1/0	V	8.70	5.91	14.61	0.029
		16QAM	1/0	V	7.75	5.91	13.66	0.023
	1 732.5	QPSK	1/0	V	9.65	5.69	15.34	0.034
		16QAM	1/0	V	8.81	5.69	14.50	0.028
	1 752.5	QPSK	1/0	V	7.49	5.47	12.96	0.020
		16QAM	1/0	V	6.70	5.47	12.17	0.016
3	1 711.5	QPSK	1/7	V	9.01	5.92	14.93	0.031
		16QAM	1/7	V	8.07	5.92	13.99	0.025
	1 732.5	QPSK	1/0	V	9.46	5.69	15.15	0.033
		16QAM	1/0	V	8.64	5.69	14.33	0.027
	1 753.5	QPSK	1/0	V	7.58	5.46	13.04	0.020
		16QAM	1/0	V	6.81	5.46	12.27	0.017
1.4	1 710.7	QPSK	1/0	V	8.18	5.93	14.11	0.026
		16QAM	1/0	V	7.55	5.93	13.48	0.022
	1 732.5	QPSK	1/0	V	9.46	5.69	15.15	0.033
		16QAM	1/0	V	8.57	5.69	14.26	0.027
	1 754.3	QPSK	1/0	V	7.66	5.45	13.11	0.020
		16QAM	1/0	V	6.68	5.45	12.13	0.016

7.1.5 LTE Band 2

Channel Bandwidth (MHz)	Tx Freq. (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	EIRP (dBm)	EIRP (W)
20	1 860	QPSK	1/0	V	11.40	4.69	16.09	0.041
		16QAM	1/0	V	10.85	4.69	15.54	0.036
	1 880	QPSK	1/0	V	9.54	4.56	14.10	0.026
		16QAM	1/0	V	8.65	4.56	13.21	0.021
	1 900	QPSK	1/0	V	8.73	4.42	13.15	0.021
		16QAM	1/0	V	7.87	4.42	12.29	0.017
15	1 857.5	QPSK	1/0	V	11.10	4.71	15.81	0.038
		16QAM	1/0	V	10.40	4.71	15.11	0.032
	1 880	QPSK	1/0	V	9.23	4.56	13.79	0.024
		16QAM	1/0	V	8.47	4.56	13.03	0.020
	1 902.5	QPSK	1/0	V	8.93	4.43	13.36	0.022
		16QAM	1/0	V	8.05	4.43	12.48	0.018
10	1 855	QPSK	1/0	V	10.08	4.73	14.81	0.030
		16QAM	1/0	V	9.41	4.73	14.14	0.026
	1 880	QPSK	1/0	V	9.87	4.56	14.43	0.028
		16QAM	1/0	V	9.04	4.56	13.60	0.023
	1 905	QPSK	1/0	V	9.46	4.43	13.89	0.024
		16QAM	1/0	V	8.98	4.43	13.41	0.022
5	1 852.5	QPSK	1/24	V	10.53	4.74	15.27	0.034
		16QAM	1/24	V	9.82	4.74	14.56	0.029
	1 880	QPSK	1/0	V	8.91	4.56	13.47	0.022
		16QAM	1/0	V	8.14	4.56	12.70	0.019
	1 907.5	QPSK	1/0	V	9.20	4.44	13.64	0.023
		16QAM	1/0	V	8.28	4.44	12.72	0.019
3	1 851.5	QPSK	1/7	V	10.19	4.75	14.94	0.031
		16QAM	1/7	V	9.41	4.75	14.16	0.026
	1 880	QPSK	1/0	V	8.61	4.56	13.17	0.021
		16QAM	1/0	V	8.01	4.56	12.57	0.018
	1 908.5	QPSK	1/7	V	9.51	4.44	13.95	0.025
		16QAM	1/7	V	8.80	4.44	13.24	0.021
1.4	1 850.7	QPSK	1/0	V	10.06	4.76	14.82	0.030
		16QAM	1/0	V	9.13	4.76	13.89	0.024
	1 880	QPSK	1/0	V	8.60	4.56	13.16	0.021
		16QAM	1/0	V	7.88	4.56	12.44	0.018
	1 909.3	QPSK	1/0	V	9.47	4.45	13.92	0.025
		16QAM	1/0	V	8.72	4.45	13.17	0.021

7.2 UNDESIRABLE EMISSIONS (Radiated)

- Test Notes

1) This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported.
2) The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter.
   No other spurious and harmonic emissions were reported greater than listed emissions.
3) Limit for Band 12(17)/13/5/4/2 = -13dBm
   Limit for 1 559 MHz ~ 1 610 MHz in Band 13 = −40dBm/MHz
   (equivalent isotropically radiated power for wideband signals)

7.2.1 LTE Band 12(17)

Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	704	1/0	QPSK	1 399.13	V	-45.60	2.88	-42.72	-13.00	29.72
				2 098.75	V	-35.33	2.87	-32.46	-13.00	19.46
			16QAM	1 399.15	V	-45.53	2.88	-42.65	-13.00	29.65
				2 098.69	V	-34.68	2.87	-31.81	-13.00	18.81
	711	1/0	QPSK	1 413.24	V	-43.48	3.03	-40.45	-13.00	27.45
				2 119.89	V	-35.94	2.89	-33.05	-13.00	20.05
			16QAM	1 413.30	V	-43.95	3.03	-40.92	-13.00	27.92
				2 119.79	V	-35.50	2.89	-32.61	-13.00	19.61
3	707.5	1/0	QPSK	1 410.72	V	-42.60	3.18	-39.42	-13.00	26.42
				2 116.01	V	-34.98	3.31	-31.67	-13.00	18.67
			16QAM	1 410.64	V	-42.95	3.18	-39.77	-13.00	26.77
				2 116.01	V	-34.92	3.31	-31.61	-13.00	18.61

7.2.2 LTE Band 13

Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	782	1/0	QPSK	1 555.15	V	-50.85	3.59	-47.26	-13.00	34.26
			16QAM	1 555.28	V	-51.65	3.60	-48.05	-13.00	35.05
5	779.5	1/0	QPSK	1 554.84	V	-51.31	3.81	-47.50	-13.00	34.50
			16QAM	1 554.69	V	-51.80	3.81	-47.99	-13.00	34.99

UNDESIRABLE EMISSIONS IN 1 559 MHz ~ 1 610 MHz (LTE Band 13)

Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
5	784.5	1/0	QPSK	1 564.70	V	-59.57	5.83	-53.74	-40.00	13.74
			16QAM	1 564.79	V	-60.44	5.83	-54.61	-40.00	14.61

7.2.3 LTE Band 5

Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	829	1/25	QPSK	1 658.11	V	-52.63	4.02	-48.61	-13.00	35.61
				2 487.21	V	-42.04	3.59	-38.45	-13.00	25.45
			16QAM	1 658.22	V	-52.46	4.02	-48.44	-13.00	35.44
				2 487.29	V	-42.04	3.59	-38.45	-13.00	25.45
	836.5	1/0	QPSK	1 664.22	V	-50.89	4.00	-46.89	-13.00	33.89
				2 496.26	V	-39.87	3.53	-36.34	-13.00	23.34
			16QAM	1 664.14	V	-50.75	4.00	-46.75	-13.00	33.75
				2 496.33	V	-39.79	3.53	-36.26	-13.00	23.26
	844	1/0	QPSK	1 679.30	V	-49.12	3.96	-45.16	-13.00	32.16
				2 518.84	V	-38.98	3.65	-35.33	-13.00	22.33
			16QAM	1 678.99	V	-49.36	3.96	-45.40	-13.00	32.40
				2 518.79	V	-39.31	3.65	-35.66	-13.00	22.66

7.2.4 LTE Band 4

Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 720	1/50	QPSK	3 440.54	V	-55.95	8.05	-47.90	-13.00	34.90
			16QAM	3 440.10	V	-56.39	8.05	-48.34	-13.00	35.34
	1 732.5	1/50	QPSK	3 465.25	V	-55.95	8.12	-47.83	-13.00	34.83
			16QAM	3 465.92	V	-56.28	8.12	-48.16	-13.00	35.16
	1 745	1/0	QPSK	3470.01	V	-56.41	8.14	-48.27	-13.00	35.27
			16QAM	3 470.65	V	-55.71	8.14	-47.57	-13.00	34.57
10	1 732.5	1/0	QPSK	3 455.39	V	-56.80	8.10	-48.70	-13.00	35.70
			16QAM	3 456.09	V	-56.68	8.10	-48.58	-13.00	35.58

7.2.5 LTE Band 2

Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal(dBm)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1 860	1/0	QPSK	3 702.24	V	-52.33	8.21	-44.12	-13.00	31.12
				5 553.35	V	-46.55	10.18	-36.37	-13.00	23.37
			16QAM	3 702.30	V	-52.60	8.21	-44.39	-13.00	31.39
				5 553.26	V	-45.97	10.18	-35.79	-13.00	22.79
	1 880	1/0	QPSK	3 742.00	V	-51.94	8.24	-43.70	-13.00	30.70
				5 613.31	V	-34.13	10.21	-23.92	-13.00	10.92
			16QAM	3 742.38	V	-51.89	8.24	-43.65	-13.00	30.65
				5 613.33	V	-33.85	10.21	-23.64	-13.00	10.64
	1 900	1/0	QPSK	3 782.04	V	-51.07	8.32	-42.75	-13.00	29.75
				5 673.30	V	-36.14	10.30	-25.84	-13.00	12.84
			16QAM	3 782.28	V	-51.22	8.32	-42.90	-13.00	29.90
				5 673.22	V	-36.08	10.30	-25.78	-13.00	12.78