

TEST REPORT



Dt&C Co., Ltd.

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1. Report No : DRTFCC2312-0175

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 Certification

4. Product Name / Model Name : Telematics(24CY DCM 5G) / TF24SENI

FCC ID : BEJTF24SENI2

IC : 2703H-TF24SENI2

5. FCC Regulation(s): Part 22, 24, 27, 90

IC Standard(s): RSS-Gen Issue 5, 130 Issue 2, 132 Issue 4, 133 Issue 6, 139 Issue 4, 140 Issue 1

Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015

6. Date of Test : 2023.10.24 ~ 2023.12.14

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

8. Testing Environment : See appended test report.

9. Test Result : Refer to the 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	Technical Manager
	Name : SeungMin Gil (Signature)	Name : JaeJin Lee (Signature)

2023 . 12 . 28 .

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
DRTFCC2312-0175	Dec. 28, 2023	Initial issue	SeungMin Gil	JaeJin Lee

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1. GENERAL INFORMATION

Equipment Class	PCS Licensed Transmitter (PCB)
Product Name	Telematics(24CY DCM 5G)
Model Name	TF24SENI
Add Model Name	-
PMN(Product Marketing Name)	TF24SENI
FVIN(Firmware Version Identification Number)	N/A
EUT Serial Number	No Specified
Supplying power	DC 12 V

Band	Antenna Gain(dBi)			
	Internal Antenna 1 (PIFA Antenna)	Internal Antenna 2 (PIFA Antenna)	External Antenna 1 (Sharkfin Antenna)	External Antenna 2 (Pannel Antenna)
B12	-0.9	-1.8	-0.9	-3.0
B14	-1.4	-0.9	-0.3	-3.4
B5	0.4	-0.6	-0.7	-2.1
B66(4)	0.2	-1.7	0.1	0.5
B2	1.9	-0.7	-0.9	-2.2

Note: The antenna gain was corrected for path loss from the conducted feed point to the antenna terminal.

2. INTRODUCTION

2.1. EUT DESCRIPTION

This device supports the following capabilities:

Multi-Band LTE, LTE up-link carrier aggregation, 5G NR(FR1) and ENDC

5G NR supports SCS 15 kHz for FDD Band and SCS 30 kHz for TDD Band.

This device has 4 antennas and RF switch circuit.

LTE Band	Internal antenna 1	Internal antenna 2	External antenna 1	External antenna 2
B12, B14, B5, B66(4), B2	Support	Support	Support	Support

The device does not support MIMO technology.

2.2. TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 °C ~ +22 °C
▪ Relative Humidity	40 % ~ 41 %

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 %, $k = 2$)

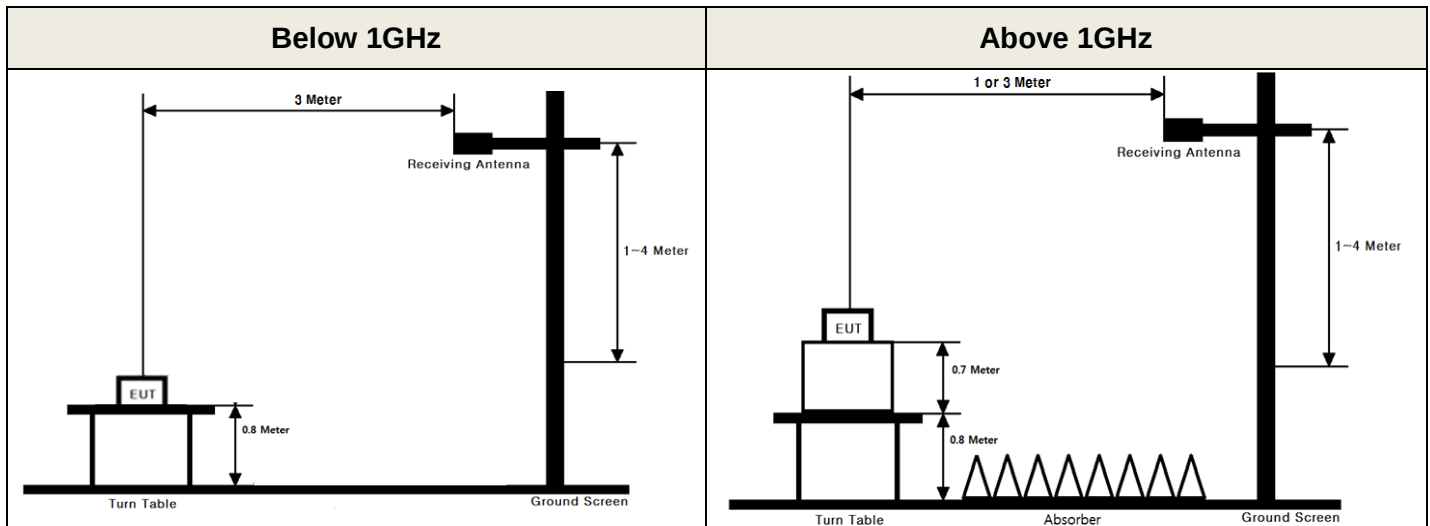
2.5. TEST FACILITY

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 complies with the requirements of Part 2.948 according to ANSI C63.4-2014.		
- 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



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 $\geq$ 3 x RBW.
4. Set number of points in sweep $\geq$ 2 x span / RBW.
5. Sweep time:
 - 1) Set = auto-couple, or
 - 2) Set $\geq$ [10 x (number of points in sweep) x (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.

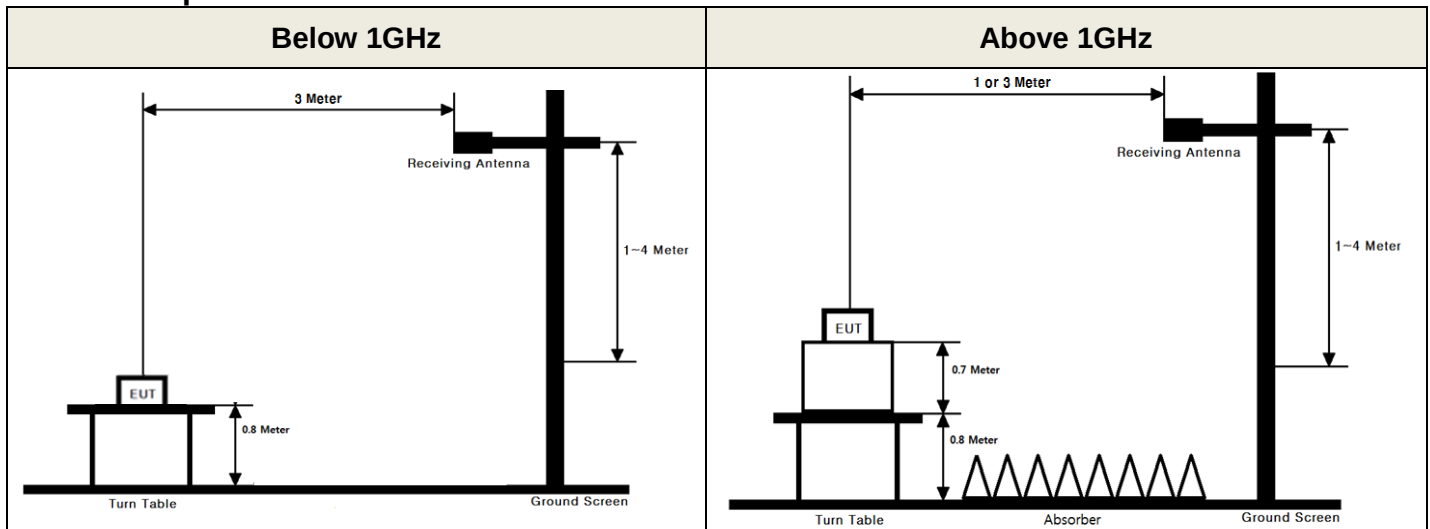
The ERP/EIRP is calculated using the following formula:

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



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 $\geq 3 \times$ RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ 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	22/12/16	23/12/16	MY50110097
Multimeter	FLUKE	17B+	22/12/16	23/12/16	36390701WS
Radio Communication Analyzer	Anritsu	MT8820C	23/06/23	24/06/23	6200951873
Radio Communication Analyzer	KEYSIGHT	E7515B	23/06/23	24/06/23	MY60192461
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	23/11/09	24/11/09	00060496
Bilog Antenna	Schwarzbeck	VULB 9160	22/12/16	23/12/16	3362
Dipole Antenna	Schwarzbeck	UHA 9105	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	23/06/23	24/06/23	155
PreAmplifier	H.P	8447D	22/12/16	23/12/16	2944A07774
PreAmplifier	Agilent	8449B	22/12/16	23/12/16	3008A02108
PreAmplifier	A.H.Systems Inc.	PAM-1840VH	23/06/23	24/06/23	163
Band Reject Fliter	Wainwright	WTRCTV5-1710-2000-20-60-40SSM	23/06/23	24/06/23	1
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	22/12/16	23/12/16	7
High-pass filter	Wainwright	WHKX10-2838-3300-18000-60SS	22/12/16	23/12/16	2
High-pass filter	Wainwright	WHKX6-6320-8000-26500-40CC	22/12/16	23/12/16	2
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-1
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-2
Cable	Junkosah	MWX241/B	23/01/04	24/01/04	M-3
Cable	Junkosah	MWX221	23/01/04	24/01/04	M-4
Cable	Junkosah	MWX221	23/01/04	24/01/04	M-5
Cable	JUNFLON	J12J101757-00	23/01/04	24/01/04	M-7
Cable	HUBER+SUHNER	SUCOFLEX104	23/01/04	24/01/04	M-8
Cable	HUBER+SUHNER	SUCOFLEX106	23/01/04	24/01/04	M-9
Cable	JUNFLON	MWX315	23/01/04	24/01/04	M-10
Cable	DTNC	Cable	23/01/04	24/01/04	RFC-44

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 Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
27.50(c.9) 90.542(a.6)	RSS-130 [4.6] RSS-140 [4.3]	Radiated Output Power (B12, 14)	For mobile equipment: < 3 Watts max. ERP	Radiated	C
22.913(a.5)	RSS-132 [5.4]	Radiated Output Power (B5)	For mobile equipment: < 7 Watts max. ERP		C
27.50(d.4)	RSS-139 [5.5]	Radiated Output Power (B66, 4)	For mobile equipment: < 1 Watts max. EIRP		C
24.232(c)	RSS-133 [6.4]	Radiated Output Power (B2)	For mobile equipment: < 2 Watts max. EIRP		C
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h) 90.543(e)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [5.6] RSS-140 [4.4]	Undesirable Emissions	> 43 + 10log ₁₀ (P) dB for all out-of-band emissions		C
90.543(f)	RSS-140[4.4]	Undesirable Emissions in 1559 ~ 1610 MHz	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions of less than 700 Hz bandwidth)		C
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. Note 3: This device uses the certified module.(FCC ID: BEJTM15FNNATY0, IC: 2703H-TM15FNNATY0) Please refer to the module test report for conducted signal test items. The conducted output power was verified to be the same as module. Note 4: All antenna configuration were investigated and worst case data were reported.					

6. SAMPLE CALCULATION

A. Emission Designator

- 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;

$$\text{EIRP(dBm)} = \text{LEVLE@ANTENNA TERMINAL} + \text{TX Antenna Gain (dBi)}$$

$$\text{ERP(dBm)} = \text{LEVLE@ANTENNA TERMINAL} + \text{TX Antenna Gain (dBd)}$$

$$\text{Where, TX Antenna Gain (dBd)} = \text{TX Antenna Gain (dBi)} - 2.15 \text{ dB}$$

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

<Test case: Internal ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	704	QPSK	1/25	H	21.01	-1.28	19.73	0.094
		16QAM	1/25	H	20.52	-1.28	19.24	0.084
		64QAM	1/25	H	19.76	-1.28	18.48	0.070
	711	QPSK	1/25	H	21.94	-1.36	20.58	0.114
		16QAM	1/25	H	21.29	-1.36	19.93	0.098
		64QAM	1/25	H	20.38	-1.36	19.02	0.080
5	701.5	QPSK	1/24	H	20.91	-1.26	19.65	0.092
		16QAM	1/24	H	20.26	-1.26	19.00	0.079
		64QAM	1/24	H	19.22	-1.26	17.96	0.063
	707.5	QPSK	1/12	H	21.78	-1.32	20.46	0.111
		16QAM	1/12	H	21.32	-1.32	20.00	0.100
		64QAM	1/12	H	20.37	-1.32	19.05	0.080
	713.5	QPSK	1/0	H	22.18	-1.39	20.79	0.120
		16QAM	1/0	H	21.80	-1.39	20.41	0.110
		64QAM	1/0	H	20.66	-1.39	19.27	0.085
3	700.5	QPSK	1/0	H	20.35	-1.25	19.10	0.081
		16QAM	1/0	H	19.61	-1.25	18.36	0.069
		64QAM	1/0	H	18.58	-1.25	17.33	0.054
	707.5	QPSK	1/7	H	21.64	-1.32	20.32	0.108
		16QAM	1/7	H	21.01	-1.32	19.69	0.093
		64QAM	1/7	H	19.85	-1.32	18.53	0.071
	714.5	QPSK	1/14	H	23.07	-1.40	21.67	0.147
		16QAM	1/14	H	22.59	-1.40	21.19	0.132
		64QAM	1/14	H	21.53	-1.40	20.13	0.103
1.4	699.7	QPSK	1/0	H	20.17	-1.24	18.93	0.078
		16QAM	1/0	H	19.42	-1.24	18.18	0.066
		64QAM	1/0	H	18.44	-1.24	17.20	0.052
	707.5	QPSK	1/2	H	21.54	-1.32	20.22	0.105
		16QAM	1/2	H	20.95	-1.32	19.63	0.092
		64QAM	1/2	H	19.78	-1.32	18.46	0.070
	715.3	QPSK	1/5	H	22.53	-1.41	21.12	0.129
		16QAM	1/5	H	21.91	-1.41	20.50	0.112
		64QAM	1/5	H	20.81	-1.41	19.40	0.087

<Test case: Internal ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
3	714.5	QPSK	1/14	H	22.85	-1.40	21.45	0.140
		16QAM	1/14	H	22.40	-1.40	21.00	0.126
		64QAM	1/14	H	21.33	-1.40	19.93	0.098

<Test case: External ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
3	714.5	QPSK	1/14	V	16.35	-1.40	14.95	0.031
		16QAM	1/14	V	15.89	-1.40	14.49	0.028
		64QAM	1/14	V	14.78	-1.40	13.38	0.022

<Test case: External ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
3	714.5	QPSK	1/14	H	21.02	-1.40	19.62	0.092
		16QAM	1/14	H	20.52	-1.40	19.12	0.082
		64QAM	1/14	H	19.34	-1.40	17.94	0.062

7.1.2 LTE Band 14

<Test case: Internal ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	793	QPSK	1/0	H	21.33	-1.40	19.93	0.098
		16QAM	1/0	H	20.82	-1.40	19.42	0.087
		64QAM	1/0	H	19.53	-1.40	18.13	0.065
5	790.5	QPSK	1/0	H	21.07	-1.40	19.67	0.093
		16QAM	1/0	H	20.45	-1.40	19.05	0.080
		64QAM	1/0	H	19.36	-1.40	17.96	0.063
	795.5	QPSK	1/0	H	21.15	-1.40	19.75	0.094
		16QAM	1/0	H	20.55	-1.40	19.15	0.082
		64QAM	1/0	H	19.24	-1.40	17.84	0.061

<Test case: Internal ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	793	QPSK	1/0	H	21.17	-1.40	19.77	0.095
		16QAM	1/0	H	20.45	-1.40	19.05	0.080
		64QAM	1/0	H	19.70	-1.40	18.30	0.068
5	790.5	QPSK	1/0	H	20.62	-1.40	19.22	0.084
		16QAM	1/0	H	19.84	-1.40	18.44	0.070
		64QAM	1/0	H	18.77	-1.40	17.37	0.055
	795.5	QPSK	1/0	H	21.25	-1.40	19.85	0.097
		16QAM	1/0	H	20.46	-1.40	19.06	0.081
		64QAM	1/0	H	19.61	-1.40	18.21	0.066

<Test case: External ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	793	QPSK	1/0	V	14.84	-1.40	13.44	0.022
		16QAM	1/0	V	14.10	-1.40	12.70	0.019
		64QAM	1/0	V	12.98	-1.40	11.58	0.014

<Test case: External ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	793	QPSK	1/0	H	19.49	-1.40	18.09	0.064
		16QAM	1/0	H	19.25	-1.40	17.85	0.061
		64QAM	1/0	H	17.86	-1.40	16.46	0.044

7.1.3. LTE Band 5

<Test case: Internal ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/25	H	22.84	-1.43	21.41	0.138
		16QAM	1/25	H	21.80	-1.43	20.37	0.109
		64QAM	1/25	H	20.98	-1.43	19.55	0.090
	836.5	QPSK	1/0	H	21.85	-1.44	20.41	0.110
		16QAM	1/0	H	20.94	-1.44	19.50	0.089
		64QAM	1/0	H	19.95	-1.44	18.51	0.071
	844	QPSK	1/0	H	22.22	-1.45	20.77	0.119
		16QAM	1/0	H	21.40	-1.45	19.95	0.099
		64QAM	1/0	H	20.69	-1.45	19.24	0.084
5	826.5	QPSK	1/0	H	21.79	-1.43	20.36	0.109
		16QAM	1/0	H	21.35	-1.43	19.92	0.098
		64QAM	1/0	H	20.35	-1.43	18.92	0.078
	836.5	QPSK	1/0	H	22.13	-1.44	20.69	0.117
		16QAM	1/0	H	21.33	-1.44	19.89	0.097
		64QAM	1/0	H	20.41	-1.44	18.97	0.079
	846.5	QPSK	1/0	H	22.49	-1.46	21.03	0.127
		16QAM	1/0	H	21.95	-1.46	20.49	0.112
		64QAM	1/0	H	21.01	-1.46	19.55	0.090
3	825.5	QPSK	1/0	H	22.19	-1.43	20.76	0.119
		16QAM	1/0	H	21.50	-1.43	20.07	0.102
		64QAM	1/0	H	20.42	-1.43	18.99	0.079
	836.5	QPSK	1/0	H	22.70	-1.44	21.26	0.134
		16QAM	1/0	H	22.02	-1.44	20.58	0.114
		64QAM	1/0	H	21.09	-1.44	19.65	0.092
	847.5	QPSK	1/0	H	22.15	-1.46	20.69	0.117
		16QAM	1/0	H	21.35	-1.46	19.89	0.097
		64QAM	1/0	H	20.25	-1.46	18.79	0.076
1.4	824.7	QPSK	1/0	H	22.02	-1.43	20.59	0.115
		16QAM	1/0	H	21.54	-1.43	20.11	0.103
		64QAM	1/0	H	20.44	-1.43	19.01	0.080
	836.5	QPSK	1/2	H	22.61	-1.44	21.17	0.131
		16QAM	1/2	H	22.09	-1.44	20.65	0.116
		64QAM	1/2	H	20.94	-1.44	19.50	0.089
	848.3	QPSK	1/0	H	22.12	-1.46	20.66	0.116
		16QAM	1/0	H	21.45	-1.46	19.99	0.100
		64QAM	1/0	H	20.19	-1.46	18.73	0.075

<Test case: Internal ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/25	H	22.51	-1.43	21.08	0.128
		16QAM	1/25	H	21.95	-1.43	20.52	0.113
		64QAM	1/25	H	20.72	-1.43	19.29	0.085

<Test case: External ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/0	V	17.50	-1.43	16.07	0.040
		16QAM	1/0	V	16.95	-1.43	15.52	0.036
		64QAM	1/0	V	15.69	-1.43	14.26	0.027

<Test case: External ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/0	H	19.71	-1.43	18.28	0.067
		16QAM	1/0	H	19.09	-1.43	17.66	0.058
		64QAM	1/0	H	17.81	-1.43	16.38	0.043

7.1.4. LTE Band 66(4)

<Test case: Internal ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1 720	QPSK	1/0	H	19.81	5.86	25.67	0.369
		16QAM	1/0	H	19.20	5.86	25.06	0.321
		64QAM	1/0	H	17.64	5.86	23.50	0.224
	1 745	QPSK	1/0	H	19.72	5.60	25.32	0.340
		16QAM	1/0	H	18.90	5.60	24.50	0.282
		64QAM	1/0	H	16.37	5.60	21.97	0.157
	1 770	QPSK	1/0	H	19.99	5.29	25.28	0.337
		16QAM	1/0	H	19.61	5.29	24.90	0.309
		64QAM	1/0	H	17.80	5.29	23.09	0.204
15	1 717.5	QPSK	1/0	H	19.35	5.89	25.24	0.334
		16QAM	1/0	H	18.84	5.89	24.73	0.297
		64QAM	1/0	H	17.22	5.89	23.11	0.205
	1 745	QPSK	1/0	H	19.09	5.60	24.69	0.294
		16QAM	1/0	H	18.47	5.60	24.07	0.255
		64QAM	1/0	H	17.09	5.60	22.69	0.186
	1 772.5	QPSK	1/0	H	20.20	5.26	25.46	0.352
		16QAM	1/0	H	19.32	5.26	24.58	0.287
		64QAM	1/0	H	17.18	5.26	22.44	0.175
10	1 715	QPSK	1/0	H	19.31	5.91	25.22	0.333
		16QAM	1/0	H	18.76	5.91	24.67	0.293
		64QAM	1/0	H	17.20	5.91	23.11	0.205
	1 745	QPSK	1/49	H	19.79	5.60	25.39	0.346
		16QAM	1/49	H	19.23	5.60	24.83	0.304
		64QAM	1/49	H	17.99	5.60	23.59	0.229
	1 775	QPSK	1/0	H	20.56	5.23	25.79	0.379
		16QAM	1/0	H	20.06	5.23	25.29	0.338
		64QAM	1/0	H	18.87	5.23	24.10	0.257
5	1 712.5	QPSK	1/0	H	19.23	5.94	25.17	0.329
		16QAM	1/0	H	18.58	5.94	24.52	0.283
		64QAM	1/0	H	17.60	5.94	23.54	0.226
	1 745	QPSK	1/0	H	19.49	5.60	25.09	0.323
		16QAM	1/0	H	18.94	5.60	24.54	0.284
		64QAM	1/0	H	17.64	5.60	23.24	0.211
	1 777.5	QPSK	1/0	H	20.69	5.20	25.89	0.388
		16QAM	1/0	H	20.30	5.20	25.50	0.355
		64QAM	1/0	H	19.35	5.20	24.55	0.285

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
3	1 711.5	QPSK	1/0	H	19.83	5.95	25.78	0.378
		16QAM	1/0	H	18.94	5.95	24.89	0.308
		64QAM	1/0	H	18.12	5.95	24.07	0.255
	1 745	QPSK	1/0	H	19.55	5.60	25.15	0.327
		16QAM	1/0	H	18.89	5.60	24.49	0.281
		64QAM	1/0	H	17.74	5.60	23.34	0.216
	1 778.5	QPSK	1/0	H	20.70	5.19	25.89	0.388
		16QAM	1/0	H	20.12	5.19	25.31	0.340
		64QAM	1/0	H	19.04	5.19	24.23	0.265
1.4	1 710.7	QPSK	1/0	H	19.47	5.95	25.42	0.348
		16QAM	1/0	H	18.88	5.95	24.83	0.304
		64QAM	1/0	H	17.22	5.95	23.17	0.207
	1 745	QPSK	1/0	H	19.59	5.60	25.19	0.330
		16QAM	1/0	H	18.99	5.60	24.59	0.288
		64QAM	1/0	H	17.92	5.60	23.52	0.225
	1 779.3	QPSK	1/0	H	20.91	5.18	26.09	0.406
		16QAM	1/0	H	20.34	5.18	25.52	0.356
		64QAM	1/0	H	19.29	5.18	24.47	0.280

<Test case: Internal ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
1.4	1 779.3	QPSK	1/0	H	20.52	5.18	25.70	0.372
		16QAM	1/0	H	19.84	5.18	25.02	0.318
		64QAM	1/0	H	18.81	5.18	23.99	0.251

<Test case: External ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
1.4	1 779.3	QPSK	1/0	V	14.02	5.18	19.20	0.083
		16QAM	1/0	V	13.35	5.18	18.53	0.071
		64QAM	1/0	V	11.24	5.18	16.42	0.044

<Test case: External ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
1.4	1 779.3	QPSK	1/0	H	18.91	5.18	24.09	0.256
		16QAM	1/0	H	18.49	5.18	23.67	0.233
		64QAM	1/0	H	17.39	5.18	22.57	0.181

7.1.5. LTE Band 2

<Test case: Internal ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1 860	QPSK	1/0	V	22.16	4.31	26.47	0.444
		16QAM	1/0	V	21.56	4.31	25.87	0.386
		64QAM	1/0	V	20.51	4.31	24.82	0.303
	1 880	QPSK	1/0	V	22.07	4.26	26.33	0.430
		16QAM	1/0	V	21.33	4.26	25.59	0.362
		64QAM	1/0	V	20.20	4.26	24.46	0.279
	1 900	QPSK	1/50	V	21.74	4.20	25.94	0.393
		16QAM	1/50	V	21.08	4.20	25.28	0.337
		64QAM	1/50	V	19.60	4.20	23.80	0.240
15	1 857.5	QPSK	1/36	V	23.03	4.32	27.35	0.543
		16QAM	1/36	V	22.34	4.32	26.66	0.463
		64QAM	1/36	V	21.06	4.32	25.38	0.345
	1 880	QPSK	1/0	V	22.22	4.26	26.48	0.445
		16QAM	1/0	V	21.47	4.26	25.73	0.374
		64QAM	1/0	V	20.26	4.26	24.52	0.283
	1 902.5	QPSK	1/36	V	22.18	4.21	26.39	0.436
		16QAM	1/36	V	21.36	4.21	25.57	0.361
		64QAM	1/36	V	20.42	4.21	24.63	0.290
10	1 855	QPSK	1/0	V	22.85	4.33	27.18	0.522
		16QAM	1/0	V	22.04	4.33	26.37	0.434
		64QAM	1/0	V	20.86	4.33	25.19	0.330
	1 880	QPSK	1/0	V	22.40	4.26	26.66	0.463
		16QAM	1/0	V	21.53	4.26	25.79	0.379
		64QAM	1/0	V	20.36	4.26	24.62	0.290
	1 905	QPSK	1/0	V	22.42	4.22	26.64	0.461
		16QAM	1/0	V	21.71	4.22	25.93	0.392
		64QAM	1/0	V	20.41	4.22	24.63	0.290
5	1 852.5	QPSK	1/0	V	22.07	4.33	26.40	0.437
		16QAM	1/0	V	21.38	4.33	25.71	0.372
		64QAM	1/0	V	20.27	4.33	24.60	0.288
	1 880	QPSK	1/0	V	22.10	4.26	26.36	0.433
		16QAM	1/0	V	21.33	4.26	25.59	0.362
		64QAM	1/0	V	20.34	4.26	24.60	0.288
	1 907.5	QPSK	1/12	V	21.83	4.23	26.06	0.404
		16QAM	1/12	V	21.21	4.23	25.44	0.350
		64QAM	1/12	V	20.12	4.23	24.35	0.272

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
3	1 851.5	QPSK	1/14	V	22.58	4.34	26.92	0.492
		16QAM	1/14	V	21.96	4.34	26.30	0.427
		64QAM	1/14	V	20.75	4.34	25.09	0.323
	1 880	QPSK	1/14	V	21.88	4.26	26.14	0.411
		16QAM	1/14	V	21.01	4.26	25.27	0.337
		64QAM	1/14	V	20.18	4.26	24.44	0.278
	1 908.5	QPSK	1/0	V	21.95	4.23	26.18	0.415
		16QAM	1/0	V	21.49	4.23	25.72	0.373
		64QAM	1/0	V	20.39	4.23	24.62	0.290
1.4	1 850.7	QPSK	1/0	V	22.05	4.34	26.39	0.436
		16QAM	1/0	V	21.34	4.34	25.68	0.370
		64QAM	1/0	V	20.32	4.34	24.66	0.292
	1 880	QPSK	1/0	V	21.96	4.26	26.22	0.419
		16QAM	1/0	V	21.21	4.26	25.47	0.352
		64QAM	1/0	V	20.21	4.26	24.47	0.280
	1 909.3	QPSK	1/0	V	21.94	4.24	26.18	0.415
		16QAM	1/0	V	21.27	4.24	25.51	0.356
		64QAM	1/0	V	20.34	4.24	24.58	0.287

<Test case: Internal ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
15	1 857.5	QPSK	1/36	V	21.57	4.32	25.89	0.388
		16QAM	1/36	V	21.16	4.32	25.48	0.353
		64QAM	1/36	V	20.15	4.32	24.47	0.280

<Test case: External ANT 1>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
15	1 857.5	QPSK	1/36	V	15.99	4.32	20.31	0.107
		16QAM	1/36	V	15.25	4.32	19.57	0.091
		64QAM	1/36	V	14.44	4.32	18.76	0.075

<Test case: External ANT 2>

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
15	1 857.5	QPSK	1/36	H	17.83	4.32	22.15	0.164
		16QAM	1/36	H	16.91	4.32	21.23	0.133
		64QAM	1/36	H	15.97	4.32	20.29	0.107

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 2/66(4)/12/14/5 = -13dBm
Limit for 1 559 MHz ~ 1 610 MHz in Band 14 = -40 dBm/MHz
(equivalent isotropically radiated power for wideband signals)

7.2.1. LTE Band 12

<Test case: Internal ANT 1>

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	1/25	QPSK	1 408.02	V	-61.24	3.12	-58.12	-13.00	45.12
				2 112.38	H	-61.47	3.22	-58.25	-13.00	45.25
			16QAM	1 408.36	V	-61.76	3.12	-58.64	-13.00	45.64
				2 112.36	H	-61.54	3.22	-58.32	-13.00	45.32
			64QAM	1 408.14	V	-63.34	3.12	-60.22	-13.00	47.22
				2 112.24	H	-63.21	3.22	-59.99	-13.00	46.99
	711	1/25	QPSK	1 422.16	V	-64.19	3.22	-60.97	-13.00	47.97
				2 133.43	H	-59.87	3.18	-56.69	-13.00	43.69
			16QAM	1 422.08	V	-64.69	3.22	-61.47	-13.00	48.47
				2 133.28	H	-59.97	3.18	-56.79	-13.00	43.79
			64QAM	1 422.13	V	-65.87	3.22	-62.65	-13.00	49.65
				2 133.31	H	-61.84	3.18	-58.66	-13.00	45.66
3	714.5	1/14	QPSK	1 431.47	V	-65.93	3.29	-62.64	-13.00	49.64
				2 147.45	H	-63.53	3.15	-60.38	-13.00	47.38
			16QAM	1 431.36	V	-66.20	3.29	-62.91	-13.00	49.91
				2 147.32	H	-63.94	3.15	-60.79	-13.00	47.79
			64QAM	1 431.79	V	-66.91	3.30	-63.61	-13.00	50.61
				2 147.17	H	-65.15	3.15	-62.00	-13.00	49.00

<Test case: Internal ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
3	714.5	1/14	QPSK	1 431.58	V	-56.85	3.29	-53.56	-13.00	40.56
				2 147.34	H	-59.13	3.15	-55.98	-13.00	42.98
			16QAM	1 431.59	V	-57.54	3.29	-54.25	-13.00	41.25
				2 147.28	H	-59.10	3.15	-55.95	-13.00	42.95
			64QAM	1 431.51	V	-59.20	3.29	-55.91	-13.00	42.91
				2 147.44	H	-61.15	3.15	-58.00	-13.00	45.00

<Test case: External ANT 1>

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)
3	714.5	1/14	QPSK	1 431.01	V	-68.72	3.29	-65.43	-13.00	52.43
			16QAM	1 431.25	V	-68.42	3.29	-65.13	-13.00	52.13
			64QAM	1 431.30	V	-68.65	3.29	-65.36	-13.00	52.36

<Test case: External ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
3	714.5	1/14	QPSK	1 430.91	V	-68.78	3.29	-65.49	-13.00	52.49
			16QAM	1 431.27	V	-68.69	3.29	-65.40	-13.00	52.40
			64QAM	1 430.24	V	-68.74	3.28	-65.46	-13.00	52.46

7.2.2 LTE Band 14

<Test case: Internal ANT 1>

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	793	1/0	QPSK	2 365.70	V	-57.91	3.81	-54.10	-13.00	41.10
			16QAM	2 365.82	V	-58.38	3.81	-54.57	-13.00	41.57
			64QAM	2 365.88	V	-60.11	3.81	-56.30	-13.00	43.30

UNDESIRABLE EMISSIONS IN 1559~1610MHz (LTE Band 14)

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)
10	793	1/0	QPSK	1 577.20	H	-65.43	6.05	-59.38	-40.00	19.38
			16QAM	1 577.16	H	-67.27	6.05	-61.22	-40.00	21.22
			64QAM	1 577.12	H	-66.96	6.05	-60.91	-40.00	20.91
5	790.5	1/0	QPSK	1 576.55	H	-68.32	6.04	-62.28	-40.00	22.28
			16QAM	1 576.82	H	-68.45	6.04	-62.41	-40.00	22.41
			64QAM	1 576.66	H	-69.09	6.04	-63.05	-40.00	23.05
	795.5	1/0	QPSK	1 586.69	H	-68.03	6.11	-61.92	-40.00	21.92
			16QAM	1 586.72	H	-68.60	6.11	-62.49	-40.00	22.49
			64QAM	1 586.51	H	-69.17	6.11	-63.06	-40.00	23.06

<Test case: Internal ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	793	1/0	QPSK	2 365.65	V	-55.61	3.81	-51.80	-13.00	38.80
			16QAM	2 365.88	V	-56.28	3.81	-52.47	-13.00	39.47
			64QAM	2 365.82	V	-57.57	3.81	-53.76	-13.00	40.76
5	795.5	1/0	QPSK	2 379.85	V	-56.48	3.81	-52.67	-13.00	39.67
			16QAM	2 379.89	V	-56.63	3.81	-52.82	-13.00	39.82
			64QAM	2 380.08	V	-58.19	3.81	-54.38	-13.00	41.38

UNDESIRABLE EMISSIONS IN 1559~1610MHz (LTE Band 14)

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)
10	793	1/0	QPSK	1 576.93	V	-63.25	6.04	-57.21	-40.00	17.21
			16QAM	1 577.25	V	-63.39	6.05	-57.34	-40.00	17.34
			64QAM	1 577.21	V	-64.85	6.05	-58.80	-40.00	18.80
5	790.5	1/0	QPSK	1 576.73	V	-63.39	6.04	-57.35	-40.00	17.35
			16QAM	1 576.63	V	-63.92	6.04	-57.88	-40.00	17.88
			64QAM	1 576.60	V	-64.96	6.04	-58.92	-40.00	18.92
	795.5	1/0	QPSK	1 586.42	V	-64.55	6.11	-58.44	-40.00	18.44
			16QAM	1 586.70	V	-64.65	6.11	-58.54	-40.00	18.54
			64QAM	1 586.87	V	-66.23	6.12	-60.11	-40.00	20.11

<Test case: External ANT 1>

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	793	1/0	QPSK	2 365.69	H	-60.24	3.81	-56.43	-13.00	43.43
			16QAM	2 365.77	H	-60.64	3.81	-56.83	-13.00	43.83
			64QAM	2 365.56	H	-61.05	3.81	-57.24	-13.00	44.24

UNDESIRABLE EMISSIONS IN 1559~1610MHz (LTE Band 14)

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)
10	793	1/0	QPSK	1 577.61	H	-70.13	6.05	-64.08	-40.00	24.08
			16QAM	1 574.73	H	-70.16	6.03	-64.13	-40.00	24.13
			64QAM	1 577.20	H	-69.93	6.05	-63.88	-40.00	23.88

<Test case: External ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	793	1/0	QPSK	2 363.60	H	-66.51	3.81	-62.70	-13.00	49.70
			16QAM	2 364.19	H	-66.26	3.81	-62.45	-13.00	49.45
			64QAM	2 365.27	H	-66.46	3.81	-62.65	-13.00	49.65

UNDESIRABLE EMISSIONS IN 1559~1610MHz (LTE Band 14)

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)
10	793	1/0	QPSK	1 577.12	H	-70.05	6.05	-64.00	-40.00	24.00
			16QAM	1 577.27	H	-70.10	6.05	-64.05	-40.00	24.05
			64QAM	1 578.60	H	-70.15	6.06	-64.09	-40.00	24.09

7.2.3 LTE Band 5

<Test case: Internal ANT 1>

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	1 658.15	H	-58.14	4.06	-54.08	-13.00	41.08
				2 487.18	V	-58.32	3.64	-54.68	-13.00	41.68
			16QAM	1 658.24	H	-58.25	4.06	-54.19	-13.00	41.19
				2 487.35	V	-58.55	3.64	-54.91	-13.00	41.91
			64QAM	1 658.13	H	-59.56	4.06	-55.50	-13.00	42.50
				2 487.23	V	-60.36	3.64	-56.72	-13.00	43.72
	836.5	1/0	QPSK	1 664.04	H	-55.62	4.04	-51.58	-13.00	38.58
				2 496.30	V	-59.96	3.58	-56.38	-13.00	43.38
			16QAM	1 664.21	H	-56.69	4.04	-52.65	-13.00	39.65
				2 496.18	V	-59.50	3.59	-55.91	-13.00	42.91
			64QAM	1 664.36	H	-57.88	4.04	-53.84	-13.00	40.84
				2 496.29	V	-61.98	3.58	-58.40	-13.00	45.40
	844	1/0	QPSK	1 679.26	H	-56.86	3.98	-52.88	-13.00	39.88
				2 518.78	V	-61.32	3.71	-57.61	-13.00	44.61
			16QAM	1 679.19	H	-57.66	3.98	-53.68	-13.00	40.68
				2 518.67	V	-61.59	3.71	-57.88	-13.00	44.88
			64QAM	1 679.16	H	-59.46	3.99	-55.47	-13.00	42.47
				2 518.91	V	-63.16	3.71	-59.45	-13.00	46.45
3	836.5	1/0	QPSK	1 670.37	H	-57.12	4.02	-53.10	-13.00	40.10
				2 505.71	V	-60.06	3.61	-56.45	-13.00	43.45
			16QAM	1 670.49	H	-57.53	4.02	-53.51	-13.00	40.51
				2 505.92	V	-59.90	3.61	-56.29	-13.00	43.29
			64QAM	1 670.53	H	-59.14	4.02	-55.12	-13.00	42.12
				2 505.88	V	-60.96	3.61	-57.35	-13.00	44.35

<Test case: Internal ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	829	1/25	QPSK	1 658.17	H	-60.85	4.06	-56.79	-13.00	43.79
				2 487.10	V	-57.73	3.65	-54.08	-13.00	41.08
			16QAM	1 658.18	H	-60.63	4.06	-56.57	-13.00	43.57
				2 487.09	V	-58.72	3.65	-55.07	-13.00	42.07
			64QAM	1 658.25	H	-59.68	4.06	-55.62	-13.00	42.62
				2 487.31	V	-59.94	3.64	-56.30	-13.00	43.30

<Test case: External ANT 1>

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	1/0	QPSK	1 651.08	V	-68.29	4.09	-64.20	-13.00	51.20
			16QAM	1 651.31	V	-68.44	4.09	-64.35	-13.00	51.35
			64QAM	1 650.59	V	-68.31	4.09	-64.22	-13.00	51.22

<Test case: External ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	829	1/0	QPSK	1 646.88	V	-68.33	4.09	-64.24	-13.00	51.24
			16QAM	1 651.09	V	-68.55	4.09	-64.46	-13.00	51.46
			64QAM	1 650.72	V	-68.25	4.09	-64.16	-13.00	51.16

7.2.4. LTE Band 66(4)

<Test case: Internal ANT 1>

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)
20	1 720	1/0	QPSK	3 421.92	H	-67.48	8.17	-59.31	-13.00	46.31
			16QAM	3 423.33	H	-67.42	8.17	-59.25	-13.00	46.25
			64QAM	3 420.46	H	-67.47	8.16	-59.31	-13.00	46.31
	1 745	1/0	QPSK	3 473.85	H	-67.39	8.37	-59.02	-13.00	46.02
			16QAM	3 470.43	H	-67.57	8.36	-59.21	-13.00	46.21
			64QAM	3 472.16	H	-67.47	8.36	-59.11	-13.00	46.11
	1 770	1/0	QPSK	3 523.21	H	-67.22	8.47	-58.75	-13.00	45.75
			16QAM	3 520.89	H	-67.40	8.47	-58.93	-13.00	45.93
			64QAM	3 520.06	H	-67.22	8.47	-58.75	-13.00	45.75
1.4	1 779.3	1/0	QPSK	3 558.51	H	-67.85	8.43	-59.42	-13.00	46.42
			16QAM	3 558.24	H	-67.49	8.43	-59.06	-13.00	46.06
			64QAM	3 558.05	H	-67.70	8.43	-59.27	-13.00	46.27

<Test case: Internal ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
1.4	1 779.3	1/0	QPSK	3 557.95	H	-66.98	8.43	-58.55	-13.00	45.55
			16QAM	3 557.52	H	-67.14	8.43	-58.71	-13.00	45.71
			64QAM	3 557.21	H	-67.19	8.44	-58.75	-13.00	45.75

<Test case: External ANT 1>

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)
1.4	1 779.3	1/0	QPSK	3 557.73	H	-66.88	8.43	-58.45	-13.00	45.45
			16QAM	3 557.83	H	-67.02	8.43	-58.59	-13.00	45.59
			64QAM	3 557.70	H	-67.19	8.43	-58.76	-13.00	45.76

<Test case: External ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
1.4	1 779.3	1/0	QPSK	3 557.76	H	-66.74	8.43	-58.31	-13.00	45.31
			16QAM	3 557.93	H	-66.88	8.43	-58.45	-13.00	45.45
			64QAM	3 557.85	H	-66.80	8.43	-58.37	-13.00	45.37

7.2.5. LTE Band 2

<Test case: Internal ANT 1>

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)
20	1 860	1/0	QPSK	3 701.94	H	-67.19	8.34	-58.85	-13.00	45.85
			16QAM	3 702.14	H	-67.30	8.34	-58.96	-13.00	45.96
			64QAM	3 702.22	H	-67.54	8.34	-59.20	-13.00	46.20
	1 880	1/0	QPSK	3 743.81	H	-67.96	8.29	-59.67	-13.00	46.67
			16QAM	3 739.59	H	-68.07	8.29	-59.78	-13.00	46.78
			64QAM	3 743.61	H	-67.96	8.29	-59.67	-13.00	46.67
	1 900	1/0	QPSK	3 802.31	H	-68.15	8.49	-59.66	-13.00	46.66
			16QAM	3 799.62	H	-68.15	8.48	-59.67	-13.00	46.67
			64QAM	3 801.92	H	-68.07	8.49	-59.58	-13.00	46.58
15	1 857.5	1/36	QPSK	3 714.77	H	-67.72	8.32	-59.40	-13.00	46.40
			16QAM	3 714.89	H	-67.67	8.32	-59.35	-13.00	46.35
			64QAM	3 715.40	H	-67.87	8.32	-59.55	-13.00	46.55

<Test case: Internal ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	1 857.5	1/36	QPSK	3 712.83	H	-67.14	8.32	-58.82	-13.00	45.82
			16QAM	3 711.94	H	-67.14	8.33	-58.81	-13.00	45.81
			64QAM	3 712.29	H	-67.20	8.33	-58.87	-13.00	45.87

<Test case: External ANT 1>

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)
15	1 857.5	1/36	QPSK	3 715.81	V	-68.18	8.32	-59.86	-13.00	46.86
			16QAM	3 715.74	V	-68.02	8.32	-59.70	-13.00	46.70
			64QAM	3 712.89	V	-68.11	8.32	-59.79	-13.00	46.79

<Test case: External ANT 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(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
15	1 857.5	1/36	QPSK	3 712.87	V	-68.06	8.32	-59.74	-13.00	46.74
				5 578.89	H	-62.78	10.35	-52.43	-13.00	39.43
			16QAM	3 713.16	V	-68.16	8.32	-59.84	-13.00	46.84
				5 578.77	H	-63.27	10.35	-52.92	-13.00	39.92
			64QAM	3 713.36	V	-68.15	8.32	-59.83	-13.00	46.83
				5 578.87	H	-64.23	10.35	-53.88	-13.00	40.88

Inter Band CA(PCC: 2A, SCC: 5A)

Band	Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode
2	15	1 857.5	1/36	QPSK
5	10	829	1/25	QPSK

Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal (dBm)	Substitute Antenna Gain(dBd)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
1 657.99	H	-69.10	4.06	-	-65.04	-13.00	52.04
3 714.54	H	-67.19	-	8.32	-58.87	-13.00	45.87
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Inter Band CA(PCC: 2A, SCC: 12A)

Band	Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode
2	15	1 857.5	1/36	QPSK
12	5	713 5	1/0	QPSK

Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal (dBm)	Substitute Antenna Gain(dBd)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
1 421.89	V	-68.59	3.22	-	-65.37	-13.00	52.37
3 714.48	H	-67.21	-	8.32	-58.89	-13.00	45.89
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Inter Band CA(PCC: 5A, SCC: 66A)

Band	Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode
5	10	829	1/25	QPSK
66	5	1 777.5	1/0	QPSK

Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal (dBm)	Substitute Antenna Gain(dBd)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
1 658.16	H	-67.75	4.06	-	-63.69	-13.00	50.69
2 487.29	V	-62.89	3.64	-	-59.25	-13.00	46.25
3 550.06	H	-67.30	-	8.45	-58.85	-13.00	45.85
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Inter Band CA(PCC: 12A, SCC: 66A)

Band	Channel Bandwidth (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode
12	5	713.5	1/0	QPSK
66	5	1 777.5	1/0	QPSK

Freq.(MHz)	Ant Pol (H/V)	Level at Antenna Terminal (dBm)	Substitute Antenna Gain(dBd)	Substitute Antenna Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
1 422.43	V	-67.17	3.23	-	-63.94	-13.00	50.94
2 133.85	H	-62.98	3.18	-	-59.80	-13.00	46.80
3 549.80	H	-67.62	-	8.45	-59.17	-13.00	46.17
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-