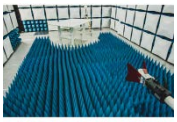
PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com



MEASUREMENT REPORT
LTE

Applicant Name:
LG Electronics USA, Inc.
111 Sylvan Avenue, North Building
Englewood Cliffs, NJ 07632
United States

Date of Testing:
09/08/2020 - 10/05/2020
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2007230115-04.ZNF

FCC ID:	**ZNFF100TM**
APPLICANT:	**LG Electronics USA, Inc.**

Application Type:	Class II Permissive Change
Model:	LM-F100TM
Additional Model(s):	LMF100TM, F100TM
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	22, 24, & 27
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04
Class II Permissive Change:	Please see FCC change document

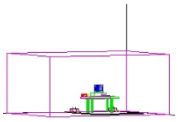
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

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

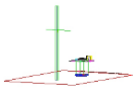
Randy Ortanez
President

ACCREDITED
CERT #2041.01

TABLE OF CONTENTS



MEASUREMENT REPORT
FCC Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	
LTE Band 71	27	673 - 688	0.070	18.42			QPSK
LTE Band 71	27	673 - 688	0.044	16.42			16QAM
LTE Band 71	27	673 - 688	0.036	15.58			64QAM
LTE Band 12/17	27	704 - 711	0.059	17.68	0.096	19.83	QPSK
LTE Band 12/17	27	704 - 711	0.044	16.45	0.072	18.60	16QAM
LTE Band 12/17	27	704 - 711	0.029	14.67	0.048	16.82	64QAM
LTE Band 13	27	782	0.058	17.65	0.096	19.80	QPSK
LTE Band 13	27	782	0.040	16.07	0.066	18.22	16QAM
LTE Band 13	27	782	0.032	15.06	0.053	17.21	64QAM
LTE Band 26/5	22H	829 - 844	0.044	16.39	0.071	18.54	QPSK
LTE Band 26/5	22H	829 - 844	0.029	14.56	0.047	16.71	16QAM
LTE Band 26/5	22H	829 - 844	0.024	13.86	0.040	16.01	64QAM

EUT Overview (<1 GHz)

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 66/4	27	1720 - 1770	0.200	23.01	QPSK
LTE Band 66/4	27	1720 - 1770	0.164	22.15	16QAM
LTE Band 66/4	27	1720 - 1770	0.130	21.13	64QAM
LTE Band 25/2	24E	1860 - 1905	0.248	23.94	QPSK
LTE Band 25/2	24E	1860 - 1905	0.212	23.26	16QAM
LTE Band 25/2	24E	1860 - 1905	0.171	22.32	64QAM

EUT Overview (Mid Bands)

Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Modulation
LTE Band 41 (PC2)	27	2506 - 2680	0.351	25.45	QPSK
LTE Band 41 (PC2)	27	2506 - 2680	0.104	20.16	16QAM
LTE Band 41 (PC2)	27	2506 - 2680	0.083	19.21	64QAM

EUT Overview (High Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP	
				Max. Power [W]	Max. Power [dBm]
NR Band n71	20 MHz	π/2 BPSK	673.0 - 688.0	0.067	18.23
		QPSK	673.0 - 688.0	0.061	17.82
		16QAM	673.0 - 688.0	0.050	17.01
		64QAM	673.0 - 688.0	0.050	16.99
		256QAM	673.0 - 688.0	0.032	15.00

EUT Overview (<1 GHz)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
NR Band n66	20 MHz	π/2 BPSK	1720 - 1770	0.121	20.83
		QPSK	1720 - 1770	0.119	20.74
		16QAM	1720 - 1770	0.092	19.66
		64QAM	1720 - 1770	0.057	17.57
		256QAM	1720 - 1770	0.038	15.76

EUT Overview (Mid Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
NR Band n41	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.221	23.44
		QPSK	2546.0 - 2640.0	0.211	23.25
		16QAM	2546.0 - 2640.0	0.175	22.43
		64QAM	2546.0 - 2640.0	0.111	20.45
		256QAM	2546.0 - 2640.0	0.069	18.36

EUT Overview (High Bands)

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFF100TM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 01845, 01837

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-Band 5G NR, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

LTE Band 12 (698 - 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz). Therefore, test data provided in this report covers Band 17 as well as Band 12.

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

LTE Band 66 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66.

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT**.**

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged 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 above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]}$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_{g\ [dBm]}$ – cable loss $_{[dB]}$.

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10 $\log_{10}$(Power $_{[Watts]}$).

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx2	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx2
-	LTx3	LIcensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx3
Agilent	N9038A	MXE EMI Receiver	8/11/2020	Annual	8/11/2021	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini Circuits	PWR-4GHS	USB Power Sensor	6/18/2020	Annual	6/18/2021	12001070013
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol Science	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

2. Equipment with a calibration date of “N/A” shown in this list was not used to make direct calibrated measurements.

6.0 SAMPLE CALCULATIONS

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics USA, Inc.

FCC ID: ZNFF100TM

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5/26)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 71, 12, 13)	< 3 Watts max. ERP			Section 7.2
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/25)	< 2 Watts max. EIRP			Section 7.2
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts max. EIRP			Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12, 13, 26/5, 66/4, 25/2)	> 43 + 10 $\log_{10}$ (P[Watts]) for all out-of-band emissions			Section 7.3
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz			Section 7.3
27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3

Table 7-1. Summary of Radiated Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

7.2 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

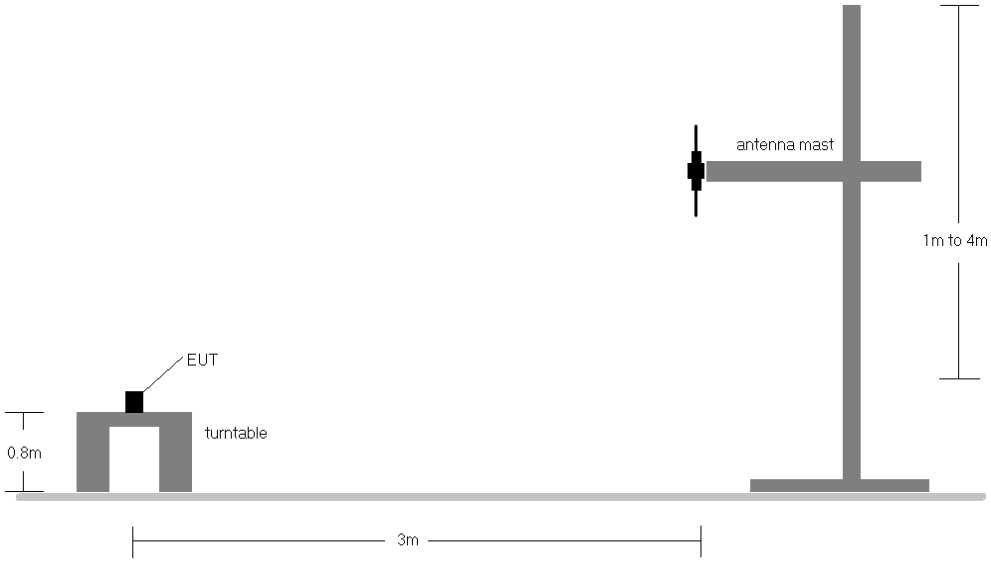


Figure 7-1. Radiated Test Setup <1GHz

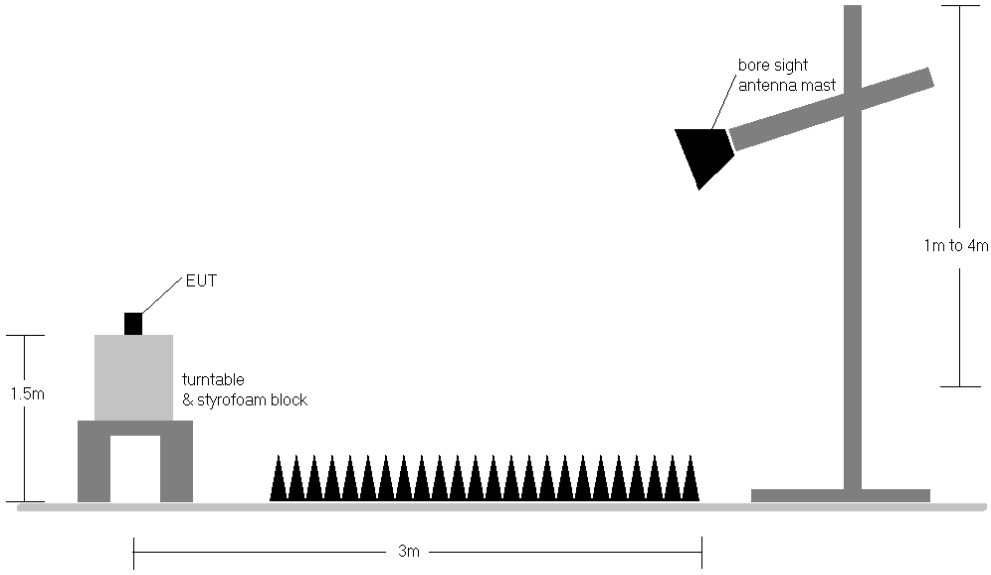


Figure 7-2. Radiated Test Setup >1GHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
673.00	20	QPSK	H	191	128	1 / 99	16.23	3.09	17.17	0.052	34.77	-17.60
680.50	20	QPSK	H	117	187	1 / 99	17.04	3.19	18.08	0.064	34.77	-16.70
688.00	20	QPSK	H	175	138	1 / 99	17.29	3.28	**18.42**	**0.070**	34.77	-16.35
680.50	20	16-QAM	H	117	187	1 / 99	15.38	3.19	**16.42**	0.044	34.77	-18.36
680.50	20	64-QAM	H	117	187	1 / 99	14.54	3.19	**15.58**	0.036	34.77	-19.20
688.00	20	QPSK	V	141	66	1 / 99	16.53	3.28	17.66	0.058	34.77	-17.11
680.50	20 (Camera)	QPSK	H	134	127	1 / 99	15.17	3.28	16.30	**0.043**	34.77	-18.47
688.00	20 (WCP)	QPSK	H	122	124	1 / 99	13.47	3.28	14.60	0.029	34.77	-20.17

Table 7-2. ERP Data (Band 71)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	TT/2 BPSK	673.0	H	X	154	94	3.70	1 / 50	16.66	20.36	0.109	36.99	-16.63	18.21	0.066	34.77	-16.56
		680.5	H	X	172	87	3.70	1 / 50	16.68	**20.38**	0.109	36.99	-16.61	**18.23**	0.067	34.77	-16.54
		688.0	H	X	134	34	3.70	1 / 50	16.43	20.13	0.103	36.99	-16.86	17.98	0.063	34.77	-16.79
	QPSK	673.0	H	X	154	94	3.70	1 / 50	16.12	19.82	0.096	36.99	-17.17	17.67	0.058	34.77	-17.10
		680.5	H	X	172	87	3.70	1 / 50	16.08	19.78	0.095	36.99	-17.21	17.63	0.058	34.77	-17.14
		688.0	H	X	134	34	3.70	1 / 50	16.27	**19.97**	0.099	36.99	-17.02	**17.82**	0.061	34.77	-16.95
	16-QAM	680.5	H	X	172	87	3.70	1 / 50	15.46	**19.16**	0.082	36.99	-17.83	**17.01**	0.050	34.77	-17.76
	64-QAM	680.5	H	X	172	87	3.70	1 / 50	15.44	**19.14**	0.082	36.99	-17.85	**16.99**	0.050	34.77	-17.78
	256-QAM	680.5	H	X	172	87	3.70	1 / 50	13.45	**17.15**	0.052	36.99	-19.84	**15.00**	0.032	34.77	-19.77

Table 7-3. ERP Data (Band n71)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
704.00	10	QPSK	V	144	250	1 / 0	15.25	4.58	**17.68**	**0.059**	34.77	-17.09	**19.83**	**0.096**	36.99	-17.16
707.50	10	QPSK	V	149	259	1 / 0	14.87	4.62	17.34	0.054	34.77	-17.43	19.49	0.089	36.99	-17.50
711.00	10	QPSK	V	100	264	1 / 0	14.96	4.67	17.48	0.056	34.77	-17.29	19.63	0.092	36.99	-17.36
711.00	10	16-QAM	V	100	264	1 / 0	13.93	4.67	**16.45**	0.044	34.77	-18.32	**18.60**	0.072	36.99	-18.39
707.50	10	64-QAM	V	149	259	1 / 0	12.20	4.62	**14.67**	0.029	34.77	-20.10	**16.82**	0.048	36.99	-20.17
704.00	10	QPSK	H	202	322	1 / 0	12.69	4.58	15.12	0.033	34.77	-19.65	17.27	0.053	36.99	-19.72
704.00	10 (WCP)	QPSK	V	138	178	1 / 0	10.51	4.58	12.94	0.020	34.77	-21.83	15.09	0.032	36.99	-21.90
704.00	10 (Camera)	QPSK	V	140	162	1 / 0	15.09	4.58	17.52	**0.057**	34.77	-17.25	19.67	**0.093**	36.99	-17.32

Table 7-4. ERP Data (Band 12/17)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
782.00	10	QPSK	V	134	104	1 / 49	14.01	5.79	**17.65**	**0.058**	34.77	-17.12	**19.80**	**0.096**	36.99	-17.19
782.00	10	16-QAM	V	134	104	1 / 49	12.43	5.79	**16.07**	0.040	34.77	-18.70	**18.22**	0.066	36.99	-18.77
782.00	10	64-QAM	V	134	104	1 / 49	11.42	5.79	**15.06**	0.032	34.77	-19.71	**17.21**	0.053	36.99	-19.78
782.00	10	QPSK	H	152	324	1 / 49	12.88	5.79	16.52	0.045	34.77	-18.25	18.67	0.074	36.99	-18.32
782.00	10 (WCP)	QPSK	V	164	201	1 / 49	10.90	5.79	14.54	0.028	34.77	-20.23	16.69	0.047	36.99	-20.30
782.00	10 (Camera)	QPSK	V	162	221	1 / 49	13.07	5.79	16.71	**0.047**	34.77	-18.06	18.86	**0.077**	36.99	-18.13

Table 7-5. ERP Data (Band 13)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
829.00	10	QPSK	H	201	125	1 / 0	10.66	6.80	15.31	0.034	38.45	-23.14	17.46	0.056	40.61	-23.15
836.50	10	QPSK	H	141	122	1 / 0	11.80	6.68	16.32	0.043	38.45	-22.13	18.47	0.070	40.61	-22.13
844.00	10	QPSK	H	139	121	1 / 0	11.88	6.66	**16.39**	**0.044**	38.45	-22.06	**18.54**	**0.071**	40.61	-22.07
829.00	10	16-QAM	H	201	125	1 / 0	9.91	6.80	**14.56**	0.029	38.45	-23.89	**16.71**	0.047	40.61	-23.90
836.50	10	64-QAM	H	141	122	1 / 0	9.34	6.68	**13.86**	0.024	38.45	-24.59	**16.01**	0.040	40.61	-24.59
829.00	10	QPSK	V	203	124	1 / 0	11.55	6.80	16.20	0.042	38.45	-22.25	18.35	0.068	40.61	-22.26

Table 7-6. ERP Data (Band 26/5)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1720.00	20	QPSK	V	151	47	1 / 99	13.70	9.31	**23.01**	**0.200**	30.00	-6.99
1745.00	20	QPSK	V	157	324	1 / 99	13.52	9.14	22.66	0.184	30.00	-7.34
1770.00	20	QPSK	V	130	214	1 / 99	13.45	9.17	22.62	0.183	30.00	-7.38
1720.00	20	16-QAM	V	151	47	1 / 99	12.84	9.31	**22.15**	0.164	30.00	-7.85
1720.00	20	64-QAM	V	151	47	1 / 99	11.82	9.31	**21.13**	0.130	30.00	-8.87
1720.00	20	QPSK	H	144	166	1 / 99	12.55	9.14	21.69	0.147	30.00	-8.31
1720.00	20 (WCP)	QPSK	V	132	48	1 / 99	9.09	9.14	18.23	0.066	30.00	-11.77
1720.00	20 (Camera)	QPSK	V	151	67	1 / 99	11.22	9.14	20.36	**0.109**	30.00	-9.64

Table 7-7. EIRP Data (Band 66/4)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	1720.0	H	X	140	351	9.31	1 / 50	11.44	20.75	0.119	30.00	-9.25
		1745.0	H	X	152	348	9.31	1 / 50	11.52	**20.83**	0.121	30.00	-9.17
		1770.0	H	X	147	234	9.31	1 / 50	11.48	20.79	0.120	30.00	-9.21
	QPSK	1720.0	H	X	140	351	9.31	1 / 50	11.36	20.67	0.117	30.00	-9.33
		1745.0	H	X	152	348	9.31	1 / 50	11.25	20.56	0.114	30.00	-9.44
		1770.0	H	X	147	234	9.31	1 / 50	11.43	**20.74**	0.119	30.00	-9.26
	16-QAM	1745.0	H	X	152	348	9.31	1 / 50	10.35	19.66	0.092	30.00	-10.34
	64-QAM	1745.0	H	X	152	348	9.31	1 / 50	8.26	17.57	0.057	30.00	-12.43
	256-QAM	1745.0	H	X	152	348	9.31	1 / 50	6.45	15.76	0.038	30.00	-14.24

Table 7-8. EIRP Data (Band n66)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1860.00	20	QPSK	H	321	255	1 / 99	11.71	9.90	21.61	0.145	33.01	-11.40
1882.50	20	QPSK	H	104	132	1 / 99	14.04	9.90	**23.94**	0.248	33.01	-9.07
1905.00	20	QPSK	H	105	107	1 / 99	11.51	9.90	21.41	0.138	33.01	-11.60
1882.50	20	16-QAM	H	104	132	1 / 99	13.36	9.90	23.26	0.212	33.01	-9.75
1882.50	20	64-QAM	H	104	132	1 / 99	12.42	9.90	22.32	0.171	33.01	-10.69
1860.00	20	16-QAM	V	160	127	1 / 99	13.92	9.90	23.82	0.241	33.01	-9.19
1860.00	20 (WCP)	16-QAM	H	157	133	1 / 99	13.72	9.90	23.62	0.230	33.01	-9.39

Table 7-9. EIRP Data (Band 25/2)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2506.00	20	QPSK	V	140	127	1 / 99	15.71	9.59	25.30	0.339	33.01	-7.71
2593.00	20	QPSK	V	150	29	1 / 99	15.86	9.59	**25.45**	0.351	33.01	-7.56
2680.00	20	QPSK	V	162	36	1 / 99	15.28	9.59	24.87	0.307	33.01	-8.14
2510.00	20	16-QAM	V	150	29	1 / 99	10.57	9.59	20.16	0.104	33.01	-12.85
2510.00	20	64-QAM	V	150	29	1 / 99	9.62	9.59	19.21	0.083	33.01	-13.80
2680.00	20	16-QAM	H	220	254	1 / 99	13.87	9.59	23.46	0.222	33.01	-9.55
2680.00	20 (WCP)	16-QAM	H	268	312	1 / 99	13.34	9.59	22.93	0.196	33.01	-10.08

Table 7-10. EIRP Data (Band 41)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
100 MHz	π/2 BPSK	2546.0	H	114	142	9.61	1 / 0	13.71	23.32	0.215	33.01	-9.69
		2593.0	H	102	180	9.61	1 / 0	13.83	**23.44**	0.221	33.01	-9.57
		2640.0	H	124	132	9.61	1 / 0	12.75	22.36	0.172	33.01	-10.65
	QPSK	2546.0	H	114	142	9.61	1 / 0	13.61	23.22	0.210	33.01	-9.79
		2640.0	H	124	132	9.61	1 / 0	13.64	**23.25**	0.211	33.01	-9.76
	16-QAM	2593.0	H	102	180	9.61	1 / 0	12.82	22.43	0.175	33.01	-10.58
	64-QAM	2593.0	H	102	180	9.61	1 / 0	10.84	20.45	0.111	33.01	-12.56
	256-QAM	2593.0	H	102	180	9.61	1 / 0	8.75	18.36	0.069	33.01	-14.65

Table 7-11. EIRP Data (Band n41)

7.3 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

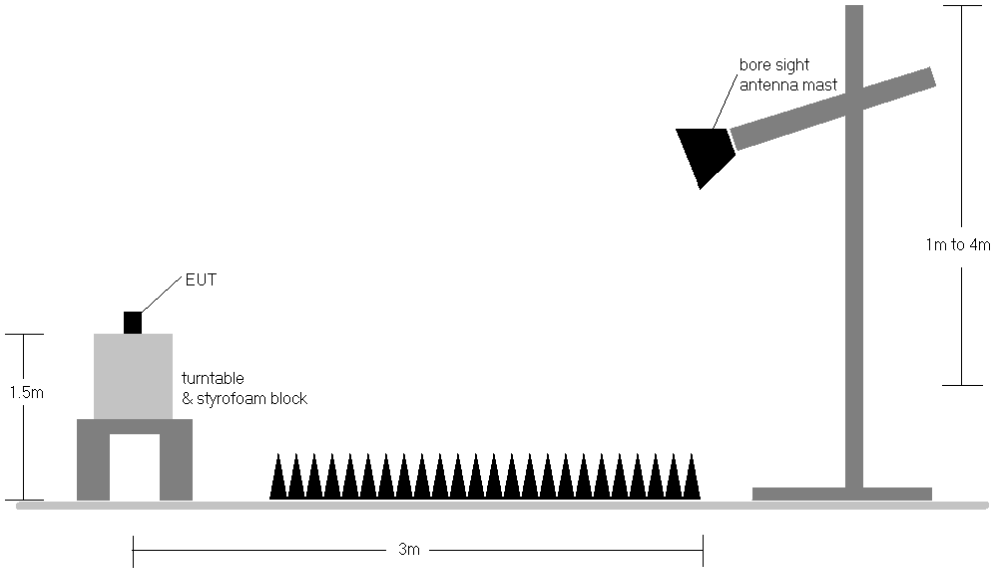


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

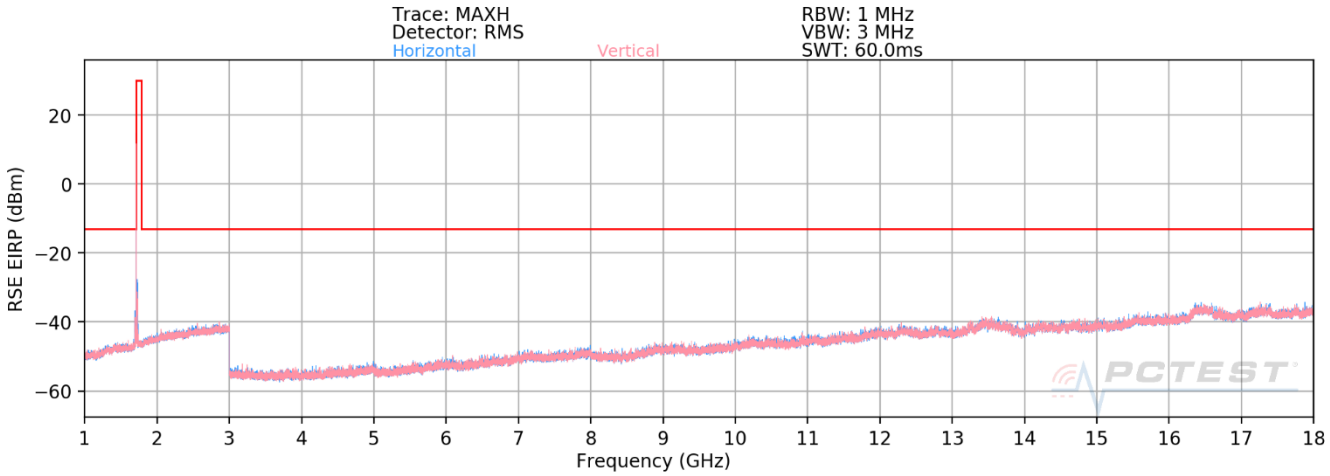
Band 71

OPERATING FREQUENCY:	680.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1361.00	H	116	13	-67.89	3.37	-64.52	-51.5
2041.50	H	124	0	-43.08	3.62	-39.46	-26.5
2722.00	H	-	-	-72.31	5.18	-67.13	-54.1
3402.50	H	-	-	-71.75	6.28	-65.47	-52.5
4083.00	H	-	-	-71.42	7.72	-63.70	-50.7
4763.50	H	-	-	-72.78	8.55	-64.22	-51.2

Table 7-12. Radiated Spurious Data (Band 71 – Mid Channel)

Sub6 n71



Plot 7-1. Radiated Spurious Plot above 1GHz (EN-DC n71 + Band 66)

Bandwidth (MHz):	20
Frequency (MHz):	680.5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1361.0	H	-	-	-78.39	-0.47	28.14	-67.11	-13.00	-54.11
2041.5	H	-	-	-76.96	3.43	33.47	-61.78	-13.00	-48.78
2722.0	H	-	-	-79.47	5.93	33.46	-61.80	-13.00	-48.80

Table 7-13. Radiated Spurious Data (Sub6 n71 – Mid Channel)

Band 12/17

OPERATING FREQUENCY:	707.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	110	188	-58.10	3.10	-55.00	-42.0
2122.50	H	108	194	-52.76	3.71	-49.05	-36.1
2830.00	H	-	-	-71.14	5.22	-65.91	-52.9
3537.50	H	-	-	-71.41	6.41	-65.00	-52.0
4245.00	H	-	-	-72.31	8.02	-64.29	-51.3

Table 7-14. Radiated Spurious Data (Band 12/17 – Mid Channel)

Band 13

OPERATING FREQUENCY:	782.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	199	1	-49.93	4.23	-45.70	-32.7
3128.00	H	-	-	-72.04	5.71	-66.33	-53.3
3910.00	H	150	140	-68.76	7.35	-61.41	-48.4
4692.00	H	-	-	-73.09	8.58	-64.51	-51.5
5474.00	H	-	-	-71.20	8.71	-62.50	-49.5
6256.00	H	-	-	-70.76	9.22	-61.54	-48.5

Table 7-15. Radiated Spurious Data (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	200	15	-69.89	3.92	-65.97	-26.0

Table 7-16. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

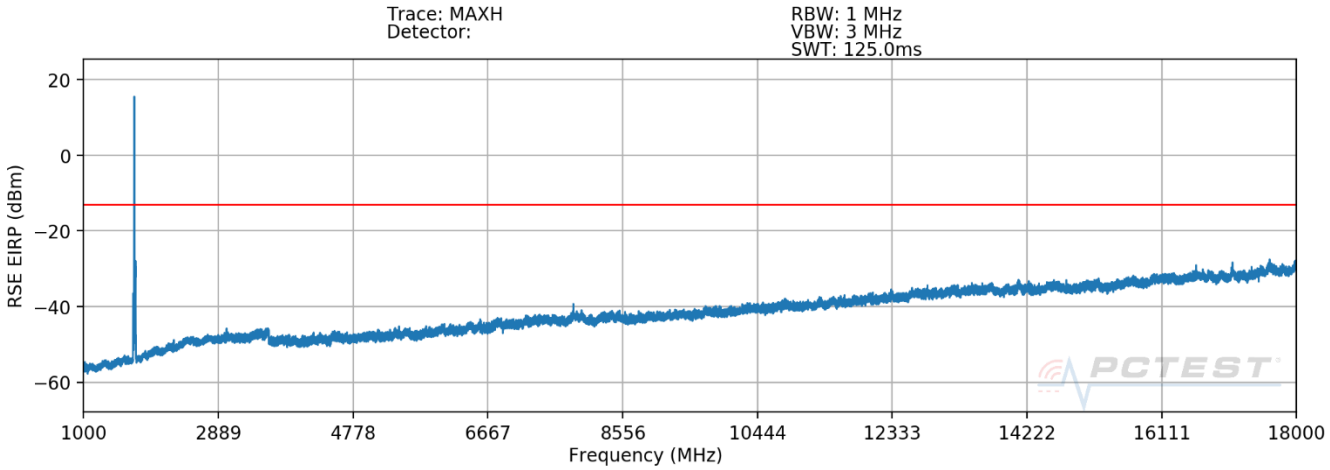
Band 26/5

OPERATING FREQUENCY:	836.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	V	-	-	-74.06	3.88	-70.18	-57.2
2509.50	V	100	51	-64.85	4.48	-60.37	-47.4
3346.00	V	-	-	-71.33	6.03	-65.29	-52.3
4182.50	V	-	-	-72.26	7.90	-64.36	-51.4
5019.00	V	-	-	-72.35	8.83	-63.52	-50.5

Table 7-17. Radiated Spurious Data (Band 26/5 – Mid Channel)

EN-DC Sub6 n5 + Band 66



Plot 7-2. Radiated Spurious Plot above 1GHz (EN-DC Sub6 n5 + Band 66)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 50
Mode:	EN-DC
Anchor Band:	LTE Band 66

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1649.9	H	-	-	-72.57	0.48	34.91	-60.35	-13.00	-47.35
1673.0	H	218	152	-71.63	0.67	36.04	-59.22	-13.00	-46.22
2474.9	H	-	-	-72.33	5.03	39.70	-55.55	-13.00	-42.55
2509.5	H	-	-	-73.43	5.01	38.58	-56.68	-13.00	-43.68
3346.0	H	-	-	-73.58	7.59	41.01	-54.25	-13.00	-41.25

Table 7-18. Radiated Spurious Data (EN-DC Sub6 n5 + Band 66 – Mid Channel)

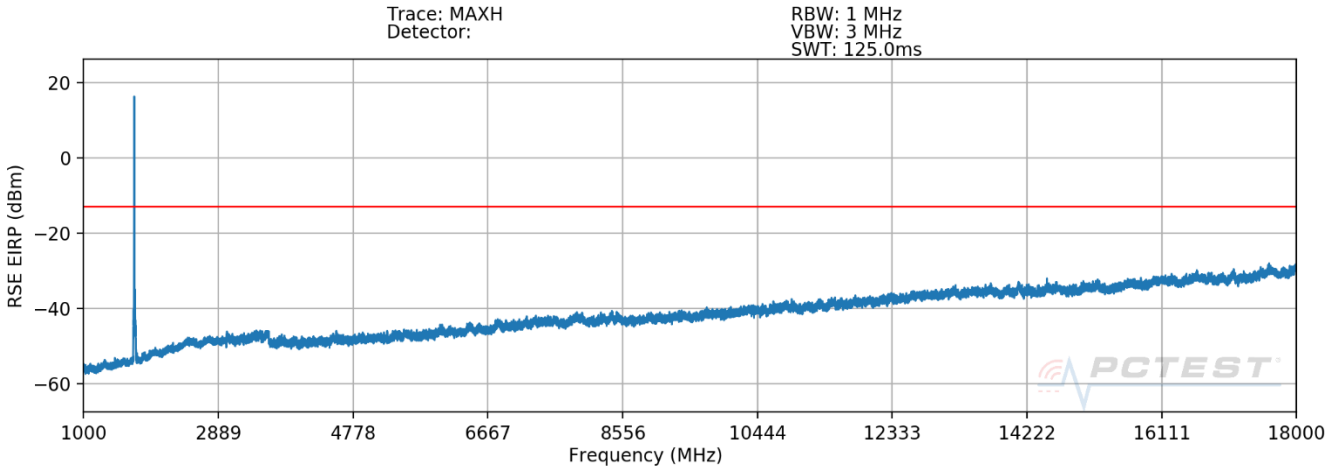
Band 66/4

OPERATING FREQUENCY:	1745.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

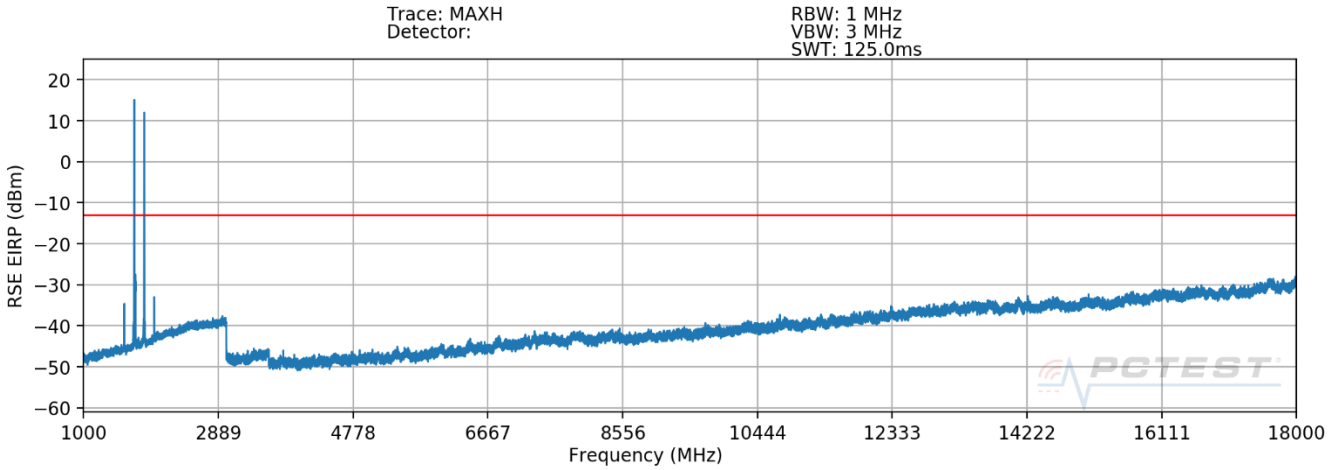
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-71.67	6.40	-65.27	-52.3
5235.00	H	-	-	-72.24	8.73	-63.50	-50.5
6980.00	H	-	-	-68.36	8.72	-59.65	-46.6
8725.00	H	-	-	-67.73	9.37	-58.36	-45.4

Table 7-19. Radiated Spurious Data (Band 66/4 – Mid Channel)

Sub6 n66



Plot 7-3. Radiated Spurious Plot above 1GHz (EN-DC Sub6 n66 + Band 12)



Plot 7-4. Radiated Spurious Plot above 1GHz (EN-DC Sub6 n66 + Band 2)

Bandwidth (MHz):	20
Frequency (MHz):	1745.0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3490.0	H	109	322	-75.79	7.19	38.40	-56.85	-13.00	-43.85
5235.0	H	-	-	-79.66	10.02	37.36	-57.90	-13.00	-44.90

Table 7-20. Radiated Spurious Data (Sub6 n66 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 50
Mode:	EN-DC
Anchor Band:	Band 12

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3490.0	H	-	-	-71.84	7.19	42.35	-52.90	-13.00	-39.90
5235.0	H	-	-	-73.45	10.02	43.57	-51.69	-13.00	-38.69

Table 7-21. Radiated Spurious Data (EN-DC Sub6 n66 + Band 12 – Mid Channel)

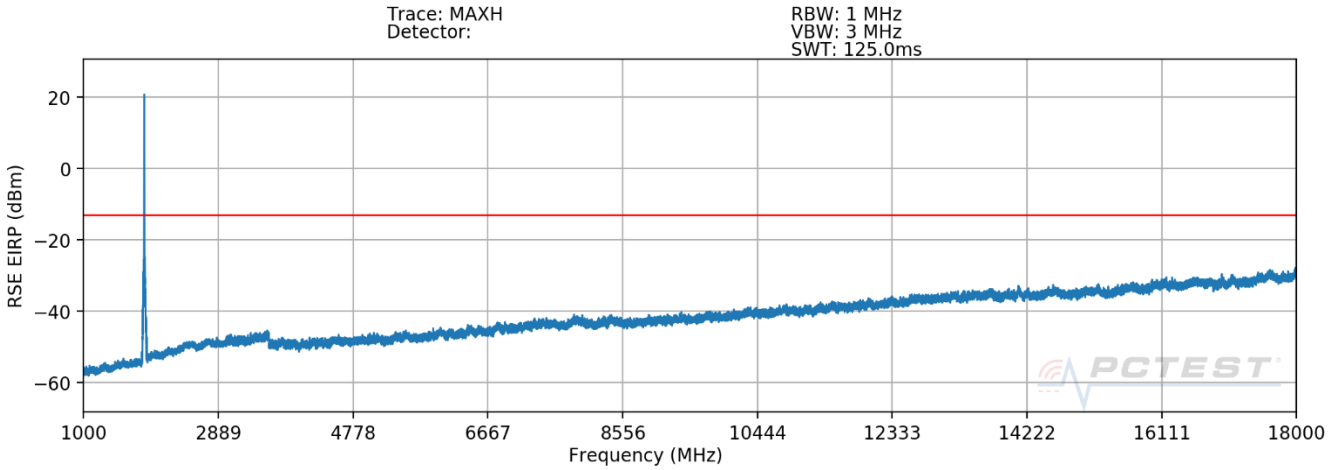
Band 25/2

OPERATING FREQUENCY:	1882.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

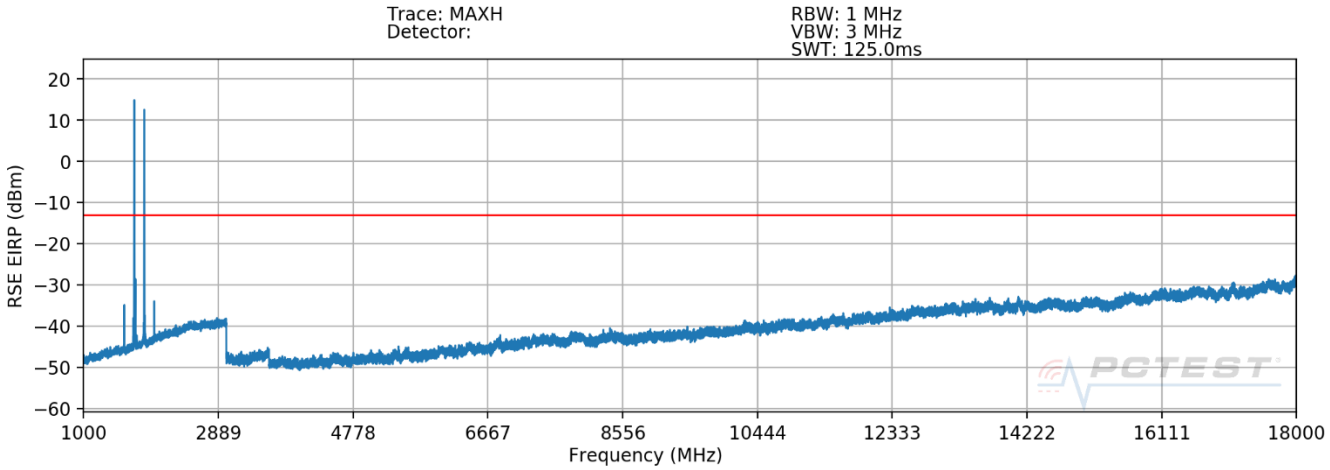
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	V	-	-	-71.01	6.93	-64.08	-51.1
5647.50	V	248	348	-66.17	8.94	-57.23	-44.2
7530.00	V	262	352	-61.26	8.44	-52.82	-39.8
9412.50	V	-	-	-66.20	9.29	-56.91	-43.9
11295.00	V	-	-	-65.58	9.38	-56.20	-43.2
13177.50	V	-	-	-62.15	9.07	-53.07	-40.1
15060.00	V	-	-	-60.40	8.95	-51.45	-38.5

Table 7-22. Radiated Spurious Data (Band 25/2 – Mid Channel)

EN-DC Sub6 n2 + Band 12 & EN-DC Sub6 n2 + Band 66



Plot 7-5. Radiated Spurious Plot above 1GHz (EN-DC Sub6 n2 + Band 12)



Plot 7-6. Radiated Spurious Plot above 1GHz (EN-DC Sub6 n2 + Band 66)

Bandwidth (MHz):	20
Frequency (MHz):	1880.0
RB / Offset:	1 / 50
Mode:	EN-DC
Anchor Band:	Band 12

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.0	H	-	-	-73.07	7.91	41.84	-53.42	-13.00	-40.42
5640.0	H	-	-	-73.40	10.76	44.36	-50.90	-13.00	-37.90
7520.0	H	-	-	-73.47	15.34	48.87	-46.39	-13.00	-33.39

Table 7-23. Radiated Spurious Data (EN-DC Sub6 n2 + Band 12 – Mid Channel)

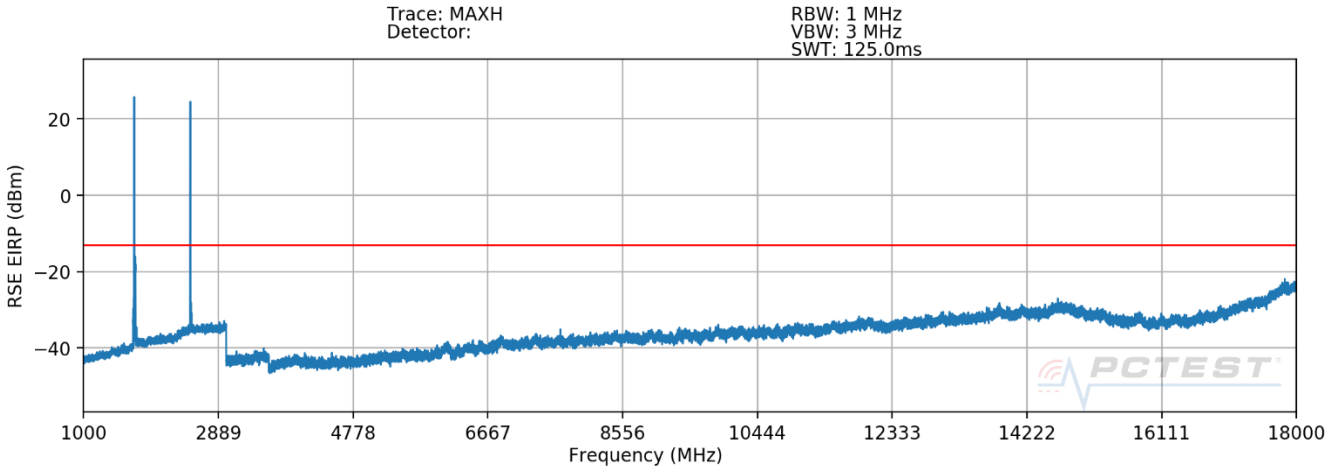
Band 41

OPERATING FREQUENCY:	2593.00	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	255	336	-39.12	8.81	-30.30	-5.3
7779.00	H	241	327	-46.63	8.73	-37.90	-12.9
10372.00	H	249	313	-55.52	9.42	-46.10	-21.1
12965.00	H	222	59	-49.59	9.14	-40.45	-15.5
15558.00	H	205	60	-50.84	8.70	-42.13	-17.1

Table 7-24. Radiated Spurious Data (Band 41 – Mid Channel)

Sub6 n41



Plot 7-7. Radiated Spurious Plot above 1GHz (EN-DC Sub6 n41 + Band 66)

Bandwidth (MHz):	100
Frequency (MHz):	2593.0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	H	-	-	-77.52	10.12	39.60	-65.20	-25.00	-40.20
7779.0	H	-	-	-80.12	15.55	42.43	-62.37	-25.00	-37.37
10372.0	H	-	-	-80.68	19.53	45.85	-58.95	-25.00	-33.95

Table 7-25. Radiated Spurious Data (Band n41 – Mid Channel)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	2593.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	2612.8
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3422.6	H	-	-	-62.56	2.17	46.61	-58.19	-25.00	-33.19
4993.6	H	119	319	-60.50	3.56	50.06	-54.74	-25.00	-29.74
5133.9	H	-	-	-64.17	3.95	46.78	-58.02	-24.00	-34.02
6845.2	H	-	-	-64.57	9.28	51.71	-53.09	-23.00	-30.09
7490.4	H	-	-	-63.02	8.90	52.88	-51.92	-22.00	-29.92
9987.2	H	-	-	-63.24	11.14	54.90	-49.90	-25.00	-24.90

Table 7-26. Radiated Spurious Data (EN-DC Sub6 n41 + Band 66 – Mid Channel)

7.4 Uplink Carrier Aggregation Radiated Measurements

§2.1053,

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. No. of sweep points ≥ 2 x span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

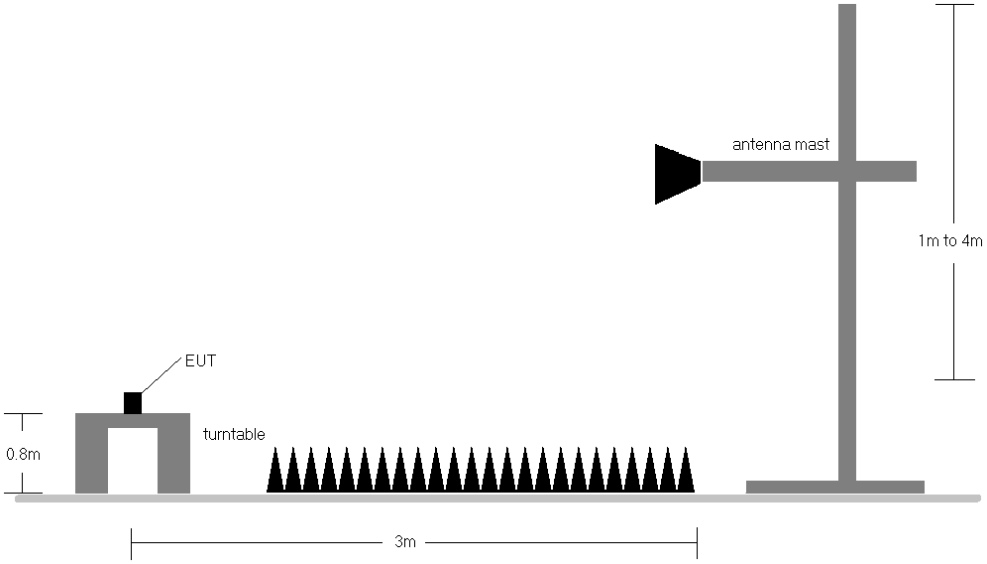


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

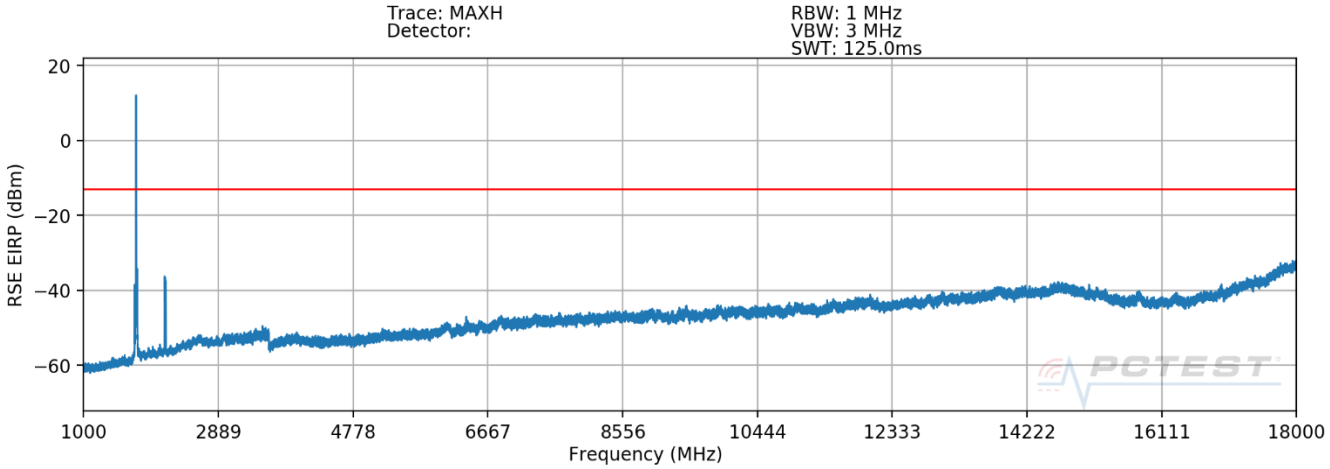
3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

6) No significant emissions were found as a result of two uplink carriers operating contiguously.

Inter-band Uplink CA 12A-66A



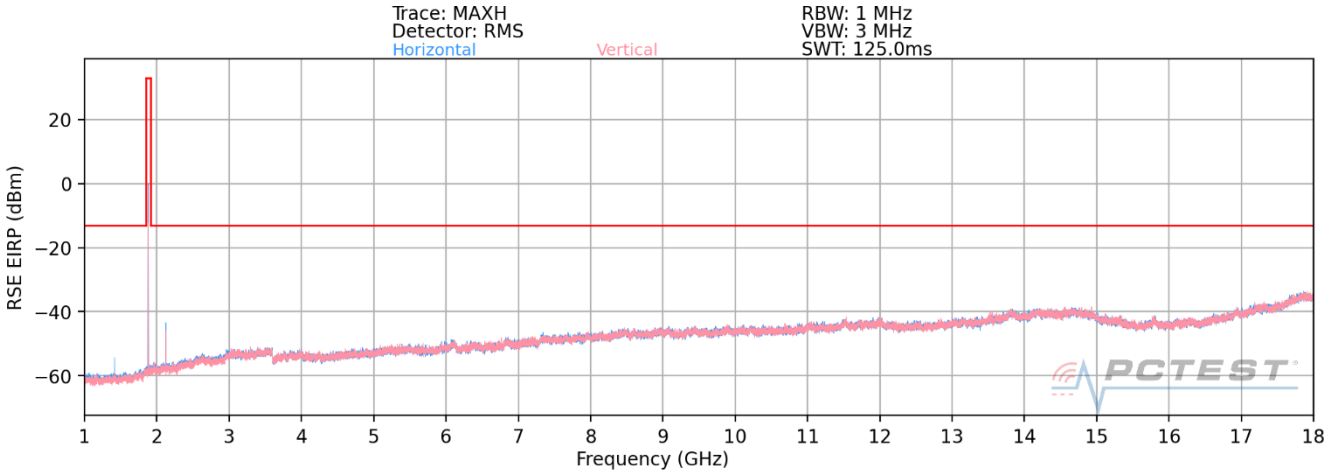
Plot 7-8. Radiated Spurious Plot 1GHz - 18GHz (ULCA 12A-66A)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	1745.0
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	707.5
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1406.7	V	321	241	-59.54	-5.53	41.93	-53.33	-13.00	-40.33
2110.0	V	-	-	-75.68	-3.09	28.23	-67.03	-13.00	-54.03
2813.4	V	-	-	-74.25	-1.55	31.20	-64.06	-13.00	-51.06
3472.2	V	-	-	-74.50	1.30	33.80	-61.46	-13.00	-48.46
4182.5	V	-	-	-77.87	2.55	31.68	-63.57	-13.00	-50.57
5208.3	V	-	-	-75.67	4.55	35.88	-59.38	-13.00	-46.38

Table 7-27. Radiated Spurious Data (ULCA 12A-66A – Mid Channel)

Inter-band Uplink CA 2A-12A



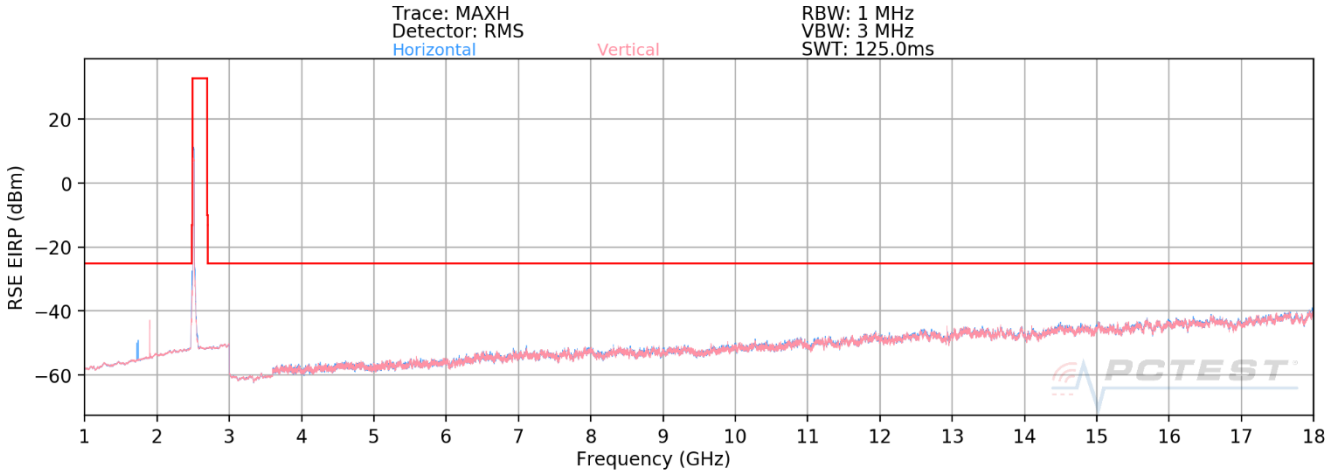
Plot 7-9. Radiated Spurious Plot 1GHz - 18GHz (ULCA 2A-12A)

OPERATING FREQUENCY (PCC):	1880.00	MHz
OPERATING FREQUENCY (SCC):	707.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 10	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	159	227	-77.58	8.09	-69.49	-56.5
2122.50	H	-	-	-67.72	9.11	-58.61	-45.6
2830.00	H	-	-	-76.86	10.14	-66.72	-53.7
3760.00	H	-	-	-71.69	9.59	-62.10	-49.1
5640.00	H	-	-	-72.79	11.30	-61.49	-48.5
7520.00	H	-	-	-68.73	11.08	-57.65	-44.6

Table 7-28. Radiated Spurious Data (ULCA 2A-12A – Mid Channel)

Uplink CA 41C



Plot 7-10. Radiated Spurious Plot 1GHz - 18GHz (ULCA 41C)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	2593.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	2612.8
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5206.0	H	109	314	-51.39	7.12	62.73	-42.07	-25.00	-17.07
7809.0	H	131	170	-68.40	12.75	51.35	-53.45	-25.00	-28.45
10412.0	H	-	-	-72.18	15.69	50.51	-54.29	-25.00	-29.29
13015.0	H	-	-	-72.02	19.39	54.37	-50.43	-25.00	-25.43

Table 7-29. Radiated Spurious Data (ULCA 41C – Mid Channel)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFF100TM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE and NR operations only.