PCTEST ENGINEERING LABORATORY, INC.
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
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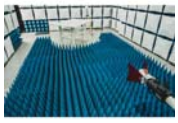

MEASUREMENT REPORT
LTE

Applicant Name:
LG Electronics MobileComm U.S.A
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
4/6 - 4/20/2018
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M1804030062-03.ZNF

FCC ID:	**ZNFG710VM**
APPLICANT:	**LG Electronics MobileComm U.S.A**

Application Type:	Class II Permissive Change
Model:	LM-G710VM
Additional Model(s):	LMG710VM, G710VM, LG-G710PM, LGG710PM, G710PM, LG-G710ULM, LGG710ULM, G710ULM, LM-G710VMP, LMG710VMP, G710VMP
EUT Type:	Portable Handset
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 v03, KDB 648474 D03 v01r04
Class II Permissive Change:	Please see 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
TESTING CERT#2041.01

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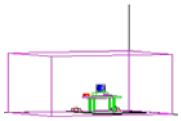
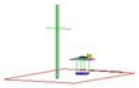


MEASUREMENT REPORT
Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)		
LTE Band 12	27	699.7 - 715.3	0.042	16.27	0.070	18.42	1M09G7D	QPSK
LTE Band 12	27	699.7 - 715.3	0.032	15.00	0.052	17.15	1M10W7D	16QAM
LTE Band 12	27	699.7 - 715.3	0.025	14.04	0.042	16.19	1M09W7D	64QAM
LTE Band 12	27	700.5 - 714.5	0.044	16.42	0.072	18.57	2M71G7D	QPSK
LTE Band 12	27	700.5 - 714.5	0.030	14.81	0.050	16.96	2M72W7D	16QAM
LTE Band 12	27	700.5 - 714.5	0.025	13.94	0.041	16.09	2M72W7D	64QAM
LTE Band 12/17	27	701.5 - 713.5	0.042	16.24	0.069	18.39	4M55G7D	QPSK
LTE Band 12/17	27	701.5 - 713.5	0.035	15.49	0.058	17.64	4M52W7D	16QAM
LTE Band 12/17	27	701.5 - 713.5	0.028	14.53	0.047	16.68	4M56W7D	64QAM
LTE Band 12/17	27	704 - 711	0.043	16.34	0.071	18.49	8M98G7D	QPSK
LTE Band 12/17	27	704 - 711	0.035	15.49	0.058	17.64	9M02W7D	16QAM
LTE Band 12/17	27	704 - 711	0.026	14.15	0.043	16.30	9M01W7D	64QAM
LTE Band 13	27	779.5 - 784.5	0.053	17.22	0.086	19.37	4M51G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.038	15.83	0.063	17.98	4M51W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.029	14.64	0.048	16.79	4M52W7D	64QAM
LTE Band 13	27	782	0.051	17.08	0.084	19.23	9M03G7D	QPSK
LTE Band 13	27	782	0.039	15.94	0.064	18.09	8M97W7D	16QAM
LTE Band 13	27	782	0.031	14.86	0.050	17.01	8M96W7D	64QAM
LTE Band 26/5	22H	824.7 - 848.3	0.069	18.41	0.114	20.56	1M09G7D	QPSK
LTE Band 26/5	22H	824.7 - 848.3	0.056	17.52	0.093	19.67	1M10W7D	16QAM
LTE Band 26/5	22H	824.7 - 848.3	0.048	16.77	0.078	18.92	1M10W7D	64QAM
LTE Band 26/5	22H	825.5 - 847.5	0.072	18.59	0.119	20.74	2M72G7D	QPSK
LTE Band 26/5	22H	825.5 - 847.5	0.055	17.38	0.090	19.53	2M72W7D	16QAM
LTE Band 26/5	22H	825.5 - 847.5	0.042	16.21	0.069	18.36	2M72W7D	64QAM
LTE Band 26/5	22H	826.5 - 846.5	0.072	18.58	0.118	20.73	4M56G7D	QPSK
LTE Band 26/5	22H	826.5 - 846.5	0.052	17.16	0.085	19.31	4M54W7D	16QAM
LTE Band 26/5	22H	826.5 - 846.5	0.040	16.01	0.065	18.16	4M54W7D	64QAM
LTE Band 26/5	22H	829 - 844	0.070	18.44	0.115	20.59	9M02G7D	QPSK
LTE Band 26/5	22H	829 - 844	0.055	17.38	0.090	19.53	9M03W7D	16QAM
LTE Band 26/5	22H	829 - 844	0.041	16.08	0.067	18.23	8M99W7D	64QAM
LTE Band 26	22H	831.5 - 841.5	0.068	18.34	0.112	20.49	13M5G7D	QPSK
LTE Band 26	22H	831.5 - 841.5	0.054	17.32	0.089	19.47	13M5W7D	16QAM
LTE Band 26	22H	831.5 - 841.5	0.040	16.00	0.065	18.15	13M5W7D	64QAM

EUT Overview (<1GHz)

Note:

The Class II Permissive Change test results reported herein are within the expected measurement tolerances of the original certification test results. It has been determined that the radiated powers did not change.

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 4/66	27	1710.7 - 1779.3	0.136	21.35	1M10G7D	QPSK
LTE Band 4/66	27	1710.7 - 1779.3	0.116	20.63	1M10W7D	16QAM
LTE Band 4/66	27	1710.7 - 1779.3	0.095	19.76	1M10W7D	64QAM
LTE Band 4/66	27	1711.5 - 1778.5	0.138	21.39	2M70G7D	QPSK
LTE Band 4/66	27	1711.5 - 1778.5	0.117	20.67	2M71W7D	16QAM
LTE Band 4/66	27	1711.5 - 1778.5	0.093	19.71	2M71W7D	64QAM
LTE Band 4/66	27	1712.5 - 1777.5	0.140	21.47	4M51G7D	QPSK
LTE Band 4/66	27	1712.5 - 1777.5	0.117	20.68	4M51W7D	16QAM
LTE Band 4/66	27	1712.5 - 1777.5	0.095	19.76	4M53W7D	64QAM
LTE Band 4/66	27	1715 - 1775	0.146	21.63	9M03G7D	QPSK
LTE Band 4/66	27	1715 - 1775	0.115	20.60	8M99W7D	16QAM
LTE Band 4/66	27	1715 - 1775	0.088	19.46	9M00W7D	64QAM
LTE Band 4/66	27	1717.5 - 1772.5	0.147	21.69	13M5G7D	QPSK
LTE Band 4/66	27	1717.5 - 1772.5	0.140	21.46	13M5W7D	16QAM
LTE Band 4/66	27	1717.5 - 1772.5	0.118	20.73	13M5W7D	64QAM
LTE Band 4/66	27	1720 - 1770	0.146	21.65	18M0G7D	QPSK
LTE Band 4/66	27	1720 - 1770	0.139	21.44	18M0W7D	16QAM
LTE Band 4/66	27	1720 - 1770	0.118	20.72	18M0W7D	64QAM
LTE Band 2/25	24E	1850.7 - 1914.3	0.149	21.74	1M09G7D	QPSK
LTE Band 2/25	24E	1850.7 - 1914.3	0.130	21.15	1M09W7D	16QAM
LTE Band 2/25	24E	1850.7 - 1914.3	0.109	20.37	1M09W7D	64QAM
LTE Band 2/25	24E	1851.5 - 1913.5	0.152	21.81	2M70G7D	QPSK
LTE Band 2/25	24E	1851.5 - 1913.5	0.131	21.19	2M71W7D	16QAM
LTE Band 2/25	24E	1851.5 - 1913.5	0.107	20.31	2M71W7D	64QAM
LTE Band 2/25	24E	1852.5 - 1912.5	0.149	21.73	4M51G7D	QPSK
LTE Band 2/25	24E	1852.5 - 1912.5	0.128	21.07	4M52W7D	16QAM
LTE Band 2/25	24E	1852.5 - 1912.5	0.112	20.47	4M52W7D	64QAM
LTE Band 2/25	24E	1855 - 1910	0.149	21.74	9M03G7D	QPSK
LTE Band 2/25	24E	1855 - 1910	0.127	21.04	8M99W7D	16QAM
LTE Band 2/25	24E	1855 - 1910	0.109	20.36	9M00W7D	64QAM
LTE Band 2/25	24E	1857.5 - 1907.5	0.147	21.67	13M5G7D	QPSK
LTE Band 2/25	24E	1857.5 - 1907.5	0.125	20.97	13M5W7D	16QAM
LTE Band 2/25	24E	1857.5 - 1907.5	0.105	20.20	13M5W7D	64QAM
LTE Band 2/25	24E	1860 - 1905	0.150	21.76	18M0G7D	QPSK
LTE Band 2/25	24E	1860 - 1905	0.128	21.07	18M0W7D	16QAM
LTE Band 2/25	24E	1860 - 1905	0.106	20.23	18M0W7D	64QAM
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.329	25.17	4M56G7D	QPSK
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.304	24.83	4M51W7D	16QAM
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.276	24.41	4M53W7D	64QAM
LTE Band 41 (PC2)	27	2501 - 2685	0.325	25.11	8M98G7D	QPSK
LTE Band 41 (PC2)	27	2501 - 2685	0.285	24.54	8M98W7D	16QAM
LTE Band 41 (PC2)	27	2501 - 2685	0.247	23.92	9M00W7D	64QAM
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.322	25.08	13M5G7D	QPSK
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.276	24.41	13M5W7D	16QAM
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.238	23.77	13M5W7D	64QAM
LTE Band 41 (PC2)	27	2506 - 2680	0.319	25.03	18M0G7D	QPSK
LTE Band 41 (PC2)	27	2506 - 2680	0.271	24.32	17M9W7D	16QAM
LTE Band 41 (PC2)	27	2506 - 2680	0.240	23.80	18M0W7D	64QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.199	22.98	8M98G7D	QPSK
LTE Band 41 (PC3)	27	2501 - 2685	0.156	21.94	8M98W7D	16QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.127	21.02	9M00W7D	64QAM

EUT Overview (>1GHz)

Note:

The Class II Permissive Change test results reported herein are within the expected measurement tolerances of the original certification test results. It has been determined that the radiated powers did not change.

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 Engineering Laboratory, Inc. 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 Engineering Lab 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 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 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 ID: ZNFG710VM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 12314, 12322

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 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 v03. 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-NG930 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 v03) were used in the measurement of the EUT.

3.2 Block C Frequency Range

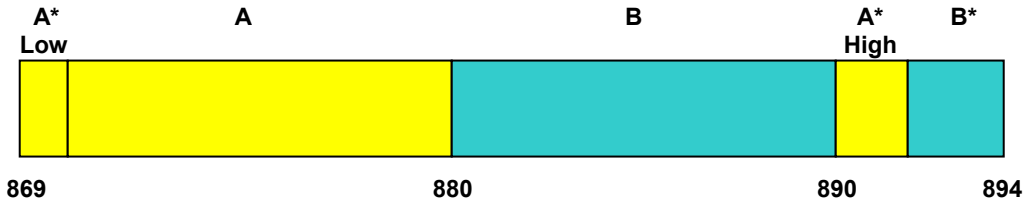
Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

3.3 Block A Frequency Range

698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

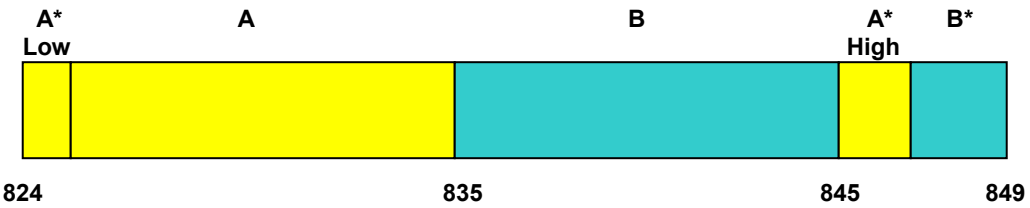
Block A: 698-704 MHz and 728-734 MHz;
Block B: 704-710 MHz and 734-740 MHz; and
Block C: 710-716 MHz and 740-746 MHz.

3.4 Cellular - Base Frequency Blocks



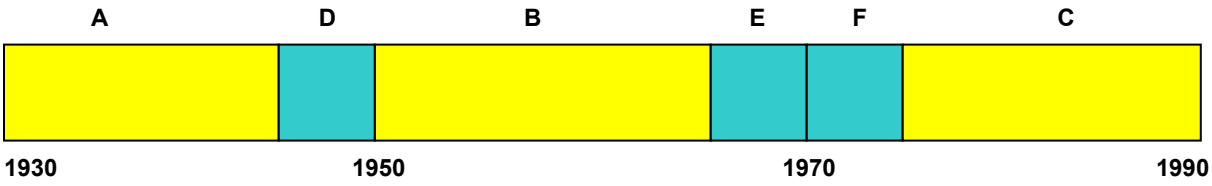
BLOCK 1: 869 – 880 MHz (A* Low + A)
BLOCK 2: 880 – 890 MHz (B)
BLOCK 3: 890 – 891.5 MHz (A* High)
BLOCK 4: 891.5 – 894 MHz (B*)

3.5 Cellular - Mobile Frequency Blocks



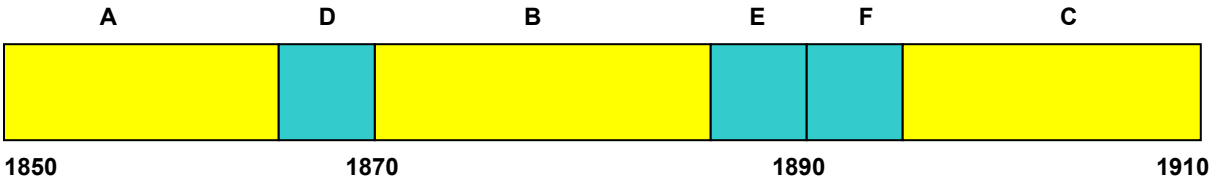
BLOCK 1: 824 – 835 MHz (A* Low + A)
BLOCK 2: 835 – 845 MHz (B)
BLOCK 3: 845 – 846.5 MHz (A* High)
BLOCK 4: 846.5 – 849 MHz (B*)

3.6 PCS - Base Frequency Blocks



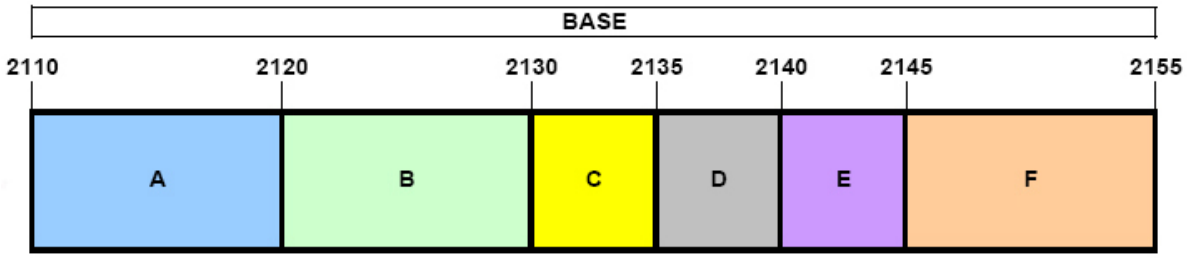
BLOCK 1: 1930 – 1945 MHz (A)
BLOCK 2: 1945 – 1950 MHz (D)
BLOCK 3: 1950 – 1965 MHz (B)
BLOCK 4: 1965 – 1970 MHz (E)
BLOCK 5: 1970 – 1975 MHz (F)
BLOCK 6: 1975 – 1990 MHz (C)

3.7 PCS - Mobile Frequency Blocks



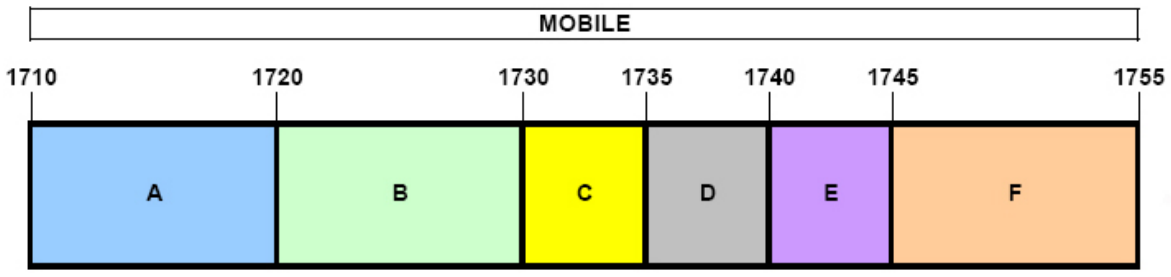
BLOCK 1: 1850 – 1865 MHz (A)
BLOCK 2: 1865 – 1870 MHz (D)
BLOCK 3: 1870 – 1885 MHz (B)
BLOCK 4: 1885 – 1890 MHz (E)
BLOCK 5: 1890 – 1895 MHz (F)
BLOCK 6: 1895 – 1910 MHz (C)

3.8 AWS - Base Frequency Blocks



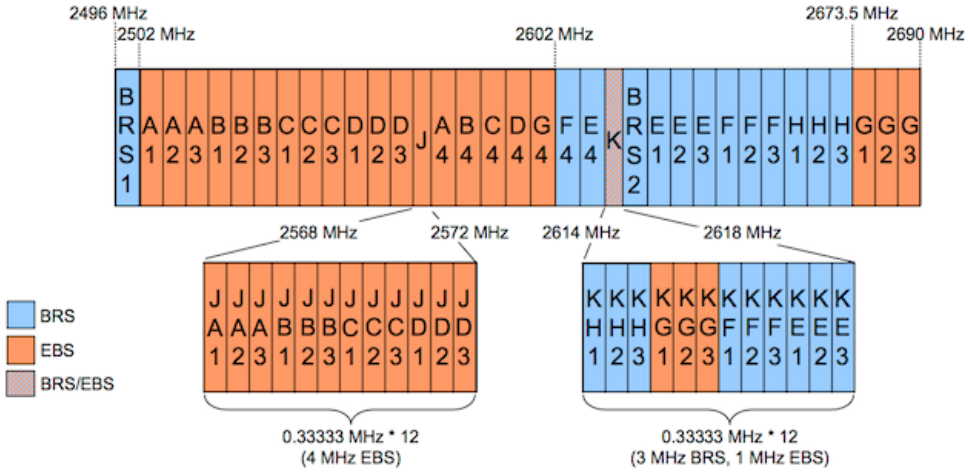
BLOCK 1: 2110 – 2120 MHz (A)
BLOCK 2: 2120 – 2130 MHz (B)
BLOCK 3: 2130 – 2135 MHz (C)
BLOCK 4: 2135 – 2140 MHz (D)
BLOCK 5: 2140 – 2145 MHz (E)
BLOCK 6: 2145 – 2155 MHz (F)

3.9 AWS - Mobile Frequency Blocks



BLOCK 1: 1710 – 1720 MHz (A)
BLOCK 2: 1720 – 1730 MHz (B)
BLOCK 3: 1730 – 1735 MHz (C)
BLOCK 4: 1735 – 1740 MHz (D)
BLOCK 5: 1740 – 1745 MHz (E)
BLOCK 6: 1745 – 1755 MHz (F)

3.10 BRS/EBS Frequency Block



3.11 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 v03.

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 $_{[Watts]}$). For Band 41, the calculated P_d levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of 55 + $10\log_{10}$(Power $_{[Watts]}$).

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)
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
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	6/21/2017	Annual	6/21/2018	441128
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	12/5/2016	Biennial	12/5/2018	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	PWR-SEN-4RMS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11210140001
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/11/2017	Annual	8/11/2018	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol Sciences	DRH-118	Horn Antenna (1-18GHz)	1/11/2018	Biennial	1/11/2020	A060215

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 MobileComm U.S.A

ID: ZNFG710VM

Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): LTE

Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 26/5)	< 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 12/13)	< 3 Watts max. ERP		PASS	Section 7.2
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2, 41)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 66/4)	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + $10\log_{10}$ (P[Watts]) for all out-of-band emissions		PASS	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		PASS	Section 7.3
27.53(m)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)		PASS	Section 7.3

Table 7-1. Summary of Radiated Test Results

Note:

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 v03 – 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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
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". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
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.

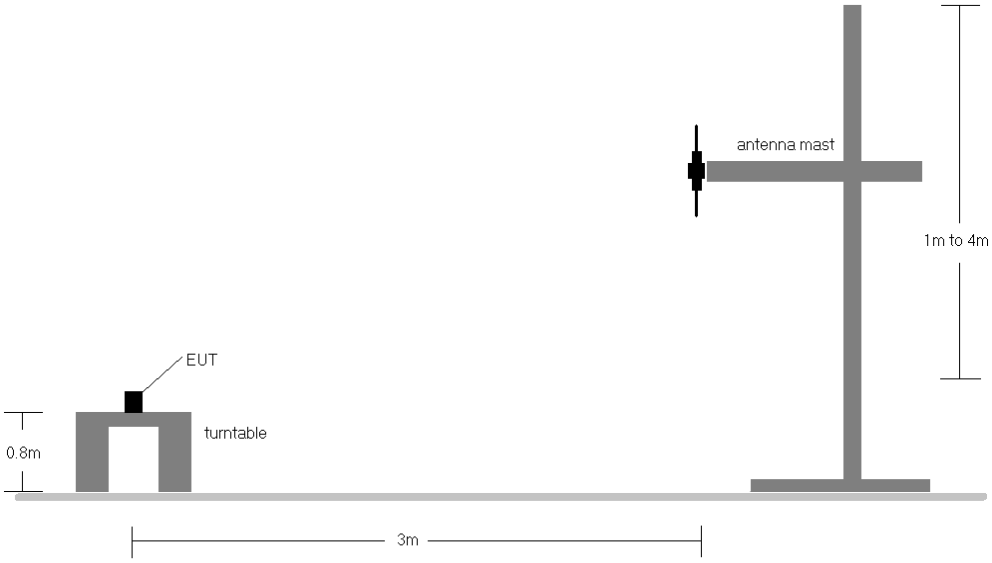


Figure 7-1. Radiated Test Setup <1GHz

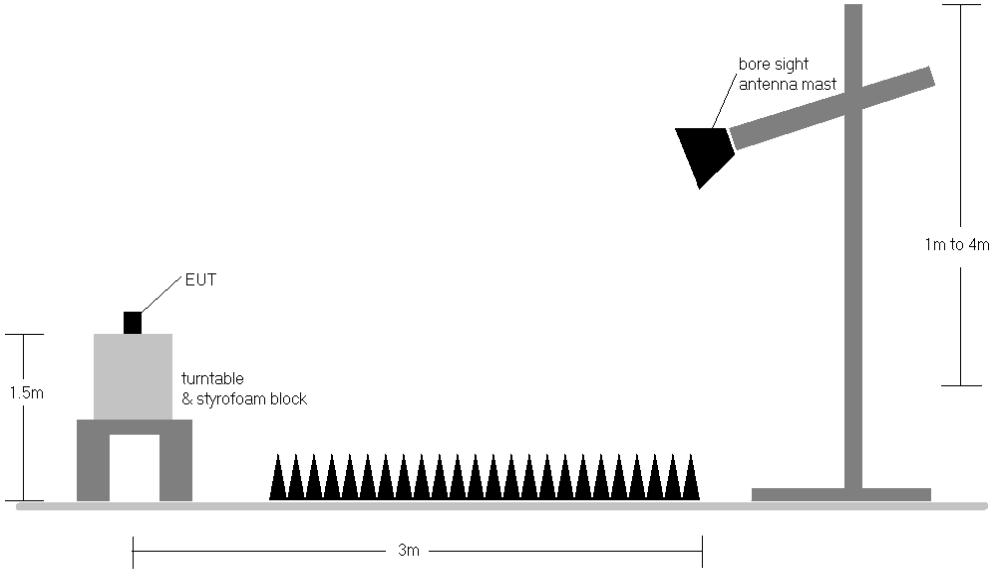


Figure 7-2. Radiated Test Setup >1GHz

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	150	255	1 / 3	16.44	1.10	15.39	0.035	34.77	-19.38	17.54	0.057	36.99	-19.45
707.50	1.4	QPSK	H	150	251	1 / 3	16.92	1.13	15.90	0.039	34.77	-18.87	18.05	0.064	36.99	-18.94
715.30	1.4	QPSK	H	150	252	1 / 3	17.26	1.16	**16.27**	0.042	34.77	-18.50	**18.42**	0.070	36.99	-18.57
715.30	1.4	16-QAM	H	150	252	1 / 3	15.99	1.16	**15.00**	0.032	34.77	-19.77	**17.15**	0.052	36.99	-19.84
715.30	1.4	64-QAM	H	150	252	1 / 3	15.03	1.16	**14.04**	0.025	34.77	-20.73	**16.19**	0.042	36.99	-20.80
700.50	3	QPSK	H	150	249	1 / 7	16.48	1.10	15.43	0.035	34.77	-19.34	17.58	0.057	36.99	-19.41
707.50	3	QPSK	H	150	264	1 / 7	16.97	1.13	15.95	0.039	34.77	-18.82	18.10	0.065	36.99	-18.89
714.50	3	QPSK	H	150	258	1 / 7	17.41	1.16	**16.42**	**0.044**	34.77	-18.35	**18.57**	**0.072**	36.99	-18.42
714.50	3	16-QAM	H	150	258	1 / 7	15.80	1.16	**14.81**	0.030	34.77	-19.96	**16.96**	0.050	36.99	-20.03
707.50	3	64-QAM	H	150	264	1 / 7	14.96	1.13	**13.94**	0.025	34.77	-20.83	**16.09**	0.041	36.99	-20.90
701.50	5	QPSK	H	150	260	1 / 12	16.41	1.11	15.37	0.034	34.77	-19.41	17.52	0.056	36.99	-19.47
707.50	5	QPSK	H	150	254	1 / 12	16.92	1.13	15.90	0.039	34.77	-18.87	18.05	0.064	36.99	-18.94
713.50	5	QPSK	H	150	263	1 / 12	17.24	1.15	**16.24**	0.042	34.77	-18.53	**18.39**	0.069	36.99	-18.60
713.50	5	16-QAM	H	150	263	1 / 12	16.49	1.15	**15.49**	0.035	34.77	-19.28	**17.64**	0.058	36.99	-19.35
713.50	5	64-QAM	H	150	263	1 / 12	15.53	1.15	**14.53**	0.028	34.77	-20.24	**16.68**	0.047	36.99	-20.31
704.00	10	QPSK	H	150	251	1 / 25	16.43	1.12	15.40	0.035	34.77	-19.37	17.55	0.057	36.99	-19.44
707.50	10	QPSK	H	150	264	1 / 25	16.95	1.13	15.93	0.039	34.77	-18.84	18.08	0.064	36.99	-18.91
711.00	10	QPSK	H	150	258	1 / 25	17.35	1.14	**16.34**	0.043	34.77	-18.43	**18.49**	0.071	36.99	-18.50
711.00	10	16-QAM	H	150	258	1 / 25	16.50	1.14	**15.49**	0.035	34.77	-19.28	**17.64**	0.058	36.99	-19.35
711.00	10	64-QAM	H	150	258	1 / 25	15.16	1.14	**14.15**	0.026	34.77	-20.62	**16.30**	0.043	36.99	-20.69
714.50	3	QPSK	V	150	355	1 / 7	16.57	1.16	15.58	0.036	34.77	-19.19	17.73	0.059	36.99	-19.26
714.50	3 (WCP)	QPSK	H	150	316	1 / 7	17.05	1.16	16.06	0.040	34.77	-18.71	18.21	0.066	36.99	-18.78

Table 7-2. 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]
779.50	5	QPSK	H	150	281	12 / 6	18.05	1.32	**17.22**	**0.053**	34.77	-17.55	**19.37**	**0.086**	36.99	-17.62
782.00	5	QPSK	H	150	281	1 / 0	17.99	1.33	17.17	0.052	34.77	-17.60	19.32	0.085	36.99	-17.67
784.50	5	QPSK	H	150	279	1 / 24	17.92	1.34	17.11	0.051	34.77	-17.66	19.26	0.084	36.99	-17.73
782.00	5	16-QAM	H	150	281	1 / 0	16.65	1.33	**15.83**	0.038	34.77	-18.94	**17.98**	0.063	36.99	-19.01
782.00	5	64-QAM	H	150	281	1 / 0	15.46	1.33	**14.64**	0.029	34.77	-20.13	**16.79**	0.048	36.99	-20.20
782.00	10	QPSK	H	150	283	1 / 0	17.90	1.33	**17.08**	0.051	34.77	-17.69	**19.23**	0.084	36.99	-17.76
782.00	10	16-QAM	H	150	283	1 / 0	16.76	1.33	**15.94**	0.039	34.77	-18.83	**18.09**	0.064	36.99	-18.90
782.00	10	64-QAM	H	150	283	1 / 0	15.68	1.33	**14.86**	0.031	34.77	-19.91	**17.01**	0.050	36.99	-19.98
779.50	5	QPSK	V	150	47	12 / 6	17.54	1.32	16.71	0.047	34.77	-18.06	18.86	0.077	36.99	-18.13
779.50	5 (WCP)	QPSK	H	150	323	12 / 6	17.39	1.32	16.56	0.045	34.77	-18.21	18.71	0.074	36.99	-18.28

Table 7-3. 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]
824.70	1.4	QPSK	H	150	285	1 / 0	19.06	1.50	**18.41**	0.069	38.45	-20.04	**20.56**	0.114	40.61	-20.05
836.50	1.4	QPSK	H	150	285	1 / 0	18.94	1.50	18.29	0.067	38.45	-20.16	20.44	0.111	40.61	-20.17
848.30	1.4	QPSK	H	150	282	1 / 0	18.58	1.50	17.93	0.062	38.45	-20.52	20.08	0.102	40.61	-20.53
824.70	1.4	16-QAM	H	150	285	1 / 0	18.17	1.50	**17.52**	0.056	38.45	-20.93	**19.67**	0.093	40.61	-20.94
824.70	1.4	64-QAM	H	150	285	1 / 0	17.42	1.50	**16.77**	0.048	38.45	-21.68	**18.92**	0.078	40.61	-21.69
825.50	3	QPSK	H	150	291	8 / 4	19.24	1.50	**18.59**	**0.072**	38.45	-19.86	**20.74**	**0.119**	40.61	-19.87
836.50	3	QPSK	H	150	283	1 / 0	19.04	1.50	18.39	0.069	38.45	-20.06	20.54	0.113	40.61	-20.07
847.50	3	QPSK	H	150	288	1 / 0	18.45	1.50	17.80	0.060	38.45	-20.65	19.95	0.099	40.61	-20.66
825.50	3	16-QAM	H	150	291	8 / 4	18.03	1.50	**17.38**	0.055	38.45	-21.07	**19.53**	0.090	40.61	-21.08
825.50	3	64-QAM	H	150	291	8 / 4	16.86	1.50	**16.21**	0.042	38.45	-22.24	**18.36**	0.069	40.61	-22.25
826.50	5	QPSK	H	150	294	12 / 6	19.23	1.50	**18.58**	0.072	38.45	-19.87	**20.73**	0.118	40.61	-19.88
836.50	5	QPSK	H	150	296	1 / 0	19.02	1.50	18.37	0.069	38.45	-20.08	20.52	0.113	40.61	-20.09
846.50	5	QPSK	H	150	302	1 / 0	18.54	1.50	17.89	0.062	38.45	-20.56	20.04	0.101	40.61	-20.57
826.50	5	16-QAM	H	150	294	12 / 6	17.81	1.50	**17.16**	0.052	38.45	-21.29	**19.31**	0.085	40.61	-21.30
836.50	5	64-QAM	H	150	296	1 / 0	16.66	1.50	**16.01**	0.040	38.45	-22.44	**18.16**	0.065	40.61	-22.45
829.00	10	QPSK	H	150	303	1 / 0	19.09	1.50	**18.44**	0.070	38.45	-20.01	**20.59**	0.115	40.61	-20.02
836.50	10	QPSK	H	150	290	1 / 0	18.96	1.50	18.31	0.068	38.45	-20.14	20.46	0.111	40.61	-20.15
844.00	10	QPSK	H	150	291	1 / 0	18.64	1.50	17.99	0.063	38.45	-20.46	20.14	0.103	40.61	-20.47
829.00	10	16-QAM	H	150	303	1 / 0	18.03	1.50	**17.38**	0.055	38.45	-21.07	**19.53**	0.090	40.61	-21.08
829.00	10	64-QAM	H	150	303	1 / 0	16.73	1.50	**16.08**	0.041	38.45	-22.37	**18.23**	0.067	40.61	-22.38
831.50	15	QPSK	H	150	288	1 / 0	18.96	1.50	18.31	0.068	38.45	-20.14	20.46	0.111	40.61	-20.15
836.50	15	QPSK	H	150	297	1 / 0	18.99	1.50	**18.34**	0.068	38.45	-20.11	**20.49**	0.112	40.61	-20.12
841.50	15	QPSK	H	150	295	1 / 0	18.60	1.50	17.95	0.062	38.45	-20.50	20.10	0.102	40.61	-20.51
831.50	15	16-QAM	H	150	288	1 / 0	17.97	1.50	**17.32**	0.054	38.45	-21.13	**19.47**	0.089	40.61	-21.14
831.50	15	64-QAM	H	150	288	1 / 0	16.65	1.50	**16.00**	0.040	38.45	-22.45	**18.15**	0.065	40.61	-22.46
825.50	3	QPSK	V	150	123	8 / 4	14.28	1.50	13.63	0.023	38.45	-24.82	15.78	0.038	40.61	-24.83
825.50	3 (WCP)	QPSK	H	150	352	8 / 4	19.01	1.50	18.36	0.069	38.45	-20.09	20.51	0.112	40.61	-20.10

Table 7-4. 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]
1710.70	1.4	QPSK	V	150	340	3 / 2	15.56	5.56	21.12	0.129	30.00	-8.88
1732.50	1.4	QPSK	V	150	341	3 / 2	15.94	5.41	**21.35**	0.136	30.00	-8.65
1754.30	1.4	QPSK	V	150	336	3 / 2	15.99	5.26	21.25	0.133	30.00	-8.75
1732.50	1.4	16-QAM	V	150	341	3 / 2	15.22	5.41	**20.63**	0.116	30.00	-9.37
1732.50	1.4	64-QAM	V	150	341	3 / 2	14.35	5.41	**19.76**	0.095	30.00	-10.24
1711.50	3	QPSK	V	150	342	8 / 4	15.54	5.55	21.09	0.129	30.00	-8.91
1732.50	3	QPSK	V	150	341	8 / 4	15.98	5.41	21.39	0.138	30.00	-8.61
1753.50	3	QPSK	V	150	347	8 / 4	16.13	5.26	**21.39**	0.138	30.00	-8.61
1732.50	3	16-QAM	V	150	341	8 / 4	15.26	5.41	**20.67**	0.117	30.00	-9.33
1732.50	3	64-QAM	V	150	341	8 / 4	14.30	5.41	**19.71**	0.093	30.00	-10.29
1712.50	5	QPSK	V	150	345	1 / 24	15.51	5.55	21.06	0.128	30.00	-8.94
1732.50	5	QPSK	V	150	344	1 / 24	16.04	5.41	21.45	0.140	30.00	-8.55
1752.50	5	QPSK	V	150	346	1 / 24	16.20	5.27	**21.47**	0.140	30.00	-8.53
1732.50	5	16-QAM	V	150	344	1 / 24	15.27	5.41	**20.68**	0.117	30.00	-9.32
1732.50	5	64-QAM	V	150	344	1 / 24	14.35	5.41	**19.76**	0.095	30.00	-10.24
1715.00	10	QPSK	V	150	339	1 / 49	15.54	5.53	21.07	0.128	30.00	-8.93
1732.50	10	QPSK	V	150	341	1 / 49	16.11	5.41	21.52	0.142	30.00	-8.48
1750.00	10	QPSK	V	150	340	1 / 0	16.34	5.29	**21.63**	0.146	30.00	-8.37
1750.00	10	16-QAM	V	150	340	1 / 0	15.31	5.29	**20.60**	0.115	30.00	-9.40
1750.00	10	64-QAM	V	150	340	1 / 0	14.17	5.29	**19.46**	0.088	30.00	-10.54
1717.50	15	QPSK	V	150	335	1 / 0	15.55	5.51	21.06	0.128	30.00	-8.94
1732.50	15	QPSK	V	150	337	1 / 0	16.18	5.41	21.59	0.144	30.00	-8.41
1747.50	15	QPSK	V	150	340	1 / 0	16.38	5.31	**21.69**	**0.147**	30.00	-8.31
1747.50	15	16-QAM	V	150	340	1 / 0	16.15	5.31	**21.46**	0.140	30.00	-8.54
1747.50	15	64-QAM	V	150	340	1 / 0	15.42	5.31	**20.73**	0.118	30.00	-9.27
1720.00	20	QPSK	V	150	332	1 / 0	15.53	5.49	21.02	0.127	30.00	-8.98
1732.50	20	QPSK	V	150	339	1 / 0	16.24	5.41	**21.65**	0.146	30.00	-8.35
1745.00	20	QPSK	V	150	340	1 / 0	16.31	5.32	21.63	0.146	30.00	-8.37
1745.00	20	16-QAM	V	150	340	1 / 0	16.12	5.32	**21.44**	0.139	30.00	-8.56
1745.00	20	64-QAM	V	150	340	1 / 0	15.40	5.32	**20.72**	0.118	30.00	-9.28
1747.50	15	QPSK	H	150	211	1 / 0	16.11	5.31	21.42	0.139	30.00	-8.58
1747.50	15 (WCP)	QPSK	H	150	355	1 / 0	16.31	5.31	21.62	0.145	30.00	-8.38

Table 7-5. EIRP Data (Band 66/4)

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]
1850.70	1.4	QPSK	V	150	351	1 / 0	16.92	4.82	**21.74**	0.149	33.01	-11.27
1880.00	1.4	QPSK	V	150	347	1 / 0	16.92	4.74	21.66	0.147	33.01	-11.35
1909.30	1.4	QPSK	V	150	348	1 / 3	16.80	4.68	21.48	0.141	33.01	-11.53
1850.70	1.4	16-QAM	V	150	351	1 / 0	16.33	4.82	**21.15**	0.130	33.01	-11.86
1850.70	1.4	64-QAM	V	150	351	1 / 0	15.55	4.82	**20.37**	0.109	33.01	-12.64
1851.50	3	QPSK	V	150	350	1 / 14	16.99	4.82	**21.81**	**0.152**	33.01	-11.20
1880.00	3	QPSK	V	150	349	1 / 0	17.03	4.74	21.77	0.150	33.01	-11.24
1908.50	3	QPSK	V	150	353	1 / 7	16.73	4.68	21.41	0.138	33.01	-11.60
1851.50	3	16-QAM	V	150	350	1 / 14	16.37	4.82	**21.19**	0.131	33.01	-11.82
1851.50	3	64-QAM	V	150	350	1 / 14	15.49	4.82	**20.31**	0.107	33.01	-12.70
1852.50	5	QPSK	V	150	344	1 / 0	16.92	4.81	**21.73**	0.149	33.01	-11.28
1880.00	5	QPSK	V	150	350	1 / 0	16.98	4.74	21.72	0.149	33.01	-11.29
1907.50	5	QPSK	V	150	352	1 / 24	16.47	4.68	21.15	0.130	33.01	-11.86
1852.50	5	16-QAM	V	150	344	1 / 0	16.26	4.81	**21.07**	0.128	33.01	-11.94
1852.50	5	64-QAM	V	150	344	1 / 0	15.66	4.81	**20.47**	0.112	33.01	-12.54
1855.00	10	QPSK	V	150	351	1 / 0	16.93	4.81	**21.74**	0.149	33.01	-11.27
1880.00	10	QPSK	V	150	355	1 / 0	16.96	4.74	21.70	0.148	33.01	-11.31
1905.00	10	QPSK	V	150	359	1 / 49	16.58	4.68	21.26	0.134	33.01	-11.75
1855.00	10	16-QAM	V	150	351	1 / 0	16.23	4.81	**21.04**	0.127	33.01	-11.97
1855.00	10	64-QAM	V	150	351	1 / 0	15.55	4.81	**20.36**	0.109	33.01	-12.65
1857.50	15	QPSK	V	150	347	1 / 0	16.87	4.80	**21.67**	0.147	33.01	-11.34
1880.00	15	QPSK	V	150	342	1 / 0	16.92	4.74	21.66	0.147	33.01	-11.35
1902.50	15	QPSK	V	150	350	1 / 74	16.63	4.69	21.32	0.135	33.01	-11.69
1857.50	15	16-QAM	V	150	347	1 / 0	16.17	4.80	**20.97**	0.125	33.01	-12.04
1880.00	15	64-QAM	V	150	342	1 / 0	15.46	4.74	**20.20**	0.105	33.01	-12.81
1860.00	20	QPSK	V	150	356	1 / 0	16.97	4.79	**21.76**	0.150	33.01	-11.25
1880.00	20	QPSK	V	150	353	1 / 0	16.83	4.74	21.57	0.144	33.01	-11.44
1900.00	20	QPSK	V	150	356	1 / 99	16.62	4.69	21.31	0.135	33.01	-11.70
1860.00	20	16-QAM	V	150	356	1 / 0	16.28	4.79	**21.07**	0.128	33.01	-11.94
1860.00	20	64-QAM	V	150	356	1 / 0	15.44	4.79	**20.23**	0.106	33.01	-12.78
1851.50	3	QPSK	H	150	114	1 / 14	16.18	4.82	21.00	0.126	33.01	-12.01
1851.50	3 (WCP)	QPSK	V	150	336	1 / 14	16.71	4.82	21.53	0.142	33.01	-11.48

Table 7-6. 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]
2498.50	5 (PC2)	QPSK	V	150	326	1 / 0	18.80	5.73	24.53	0.284	33.01	-8.48
2593.00	5 (PC2)	QPSK	V	150	321	1 / 12	19.10	6.07	**25.17**	**0.329**	33.01	-7.84
2687.50	5 (PC2)	QPSK	V	150	322	1 / 0	17.55	6.48	24.03	0.253	33.01	-8.98
2593.00	5 (PC2)	16-QAM	V	150	321	1 / 12	18.76	6.07	**24.83**	0.304	33.01	-8.18
2593.00	5 (PC2)	64-QAM	V	150	321	1 / 12	18.34	6.07	**24.41**	0.276	33.01	-8.60
2501.00	10 (PC2)	QPSK	V	150	318	1 / 0	18.76	5.73	24.49	0.281	33.01	-8.52
2593.00	10 (PC2)	QPSK	V	150	321	1 / 0	19.04	6.07	**25.11**	0.325	33.01	-7.90
2685.00	10 (PC2)	QPSK	V	150	316	1 / 0	17.47	6.47	23.94	0.248	33.01	-9.07
2593.00	10 (PC2)	16-QAM	V	150	321	1 / 0	18.47	6.07	**24.54**	0.285	33.01	-8.47
2593.00	10 (PC2)	64-QAM	V	150	321	1 / 0	17.85	6.07	**23.92**	0.247	33.01	-9.09
2503.50	15 (PC2)	QPSK	V	150	325	1 / 0	18.80	5.74	24.54	0.285	33.01	-8.47
2593.00	15 (PC2)	QPSK	V	150	320	1 / 74	19.01	6.07	**25.08**	0.322	33.01	-7.93
2682.50	15 (PC2)	QPSK	V	150	322	1 / 0	17.95	6.46	24.41	0.276	33.01	-8.60
2593.00	15 (PC2)	16-QAM	V	150	320	1 / 74	18.34	6.07	**24.41**	0.276	33.01	-8.60
2593.00	15 (PC2)	64-QAM	V	150	320	1 / 74	17.70	6.07	**23.77**	0.238	33.01	-9.24
2506.00	20 (PC2)	QPSK	V	150	326	1 / 0	18.86	5.75	24.61	0.289	33.01	-8.40
2593.00	20 (PC2)	QPSK	V	150	318	1 / 0	18.96	6.07	**25.03**	0.319	33.01	-7.98
2680.00	20 (PC2)	QPSK	V	150	315	1 / 99	17.74	6.45	24.19	0.263	33.01	-8.82
2593.00	20 (PC2)	16-QAM	V	150	318	1 / 0	18.25	6.07	**24.32**	0.271	33.01	-8.69
2680.00	20 (PC2)	64-QAM	V	150	315	1 / 99	17.35	6.45	**23.80**	0.240	33.01	-9.21
2593.00	5 (PC2)	QPSK	H	150	160	1 / 12	14.89	6.07	20.96	0.125	33.01	-12.05
2593.00	5 (PC2) (WCP)	QPSK	V	150	222	1 / 12	19.04	6.07	25.11	0.325	33.01	-7.90
2593.00	5 (PC3)	QPSK	V	150	321	1 / 12	16.91	6.07	22.98	0.199	33.01	-10.03
2593.00	5 (PC3)	16-QAM	V	150	321	1 / 12	15.87	6.07	21.94	0.156	33.01	-11.07
2593.00	5 (PC3)	64-QAM	V	150	321	1 / 0	14.95	6.07	21.02	0.127	33.01	-11.99

Table 7-7. EIRP Data (Band 41)

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 v03 – 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.

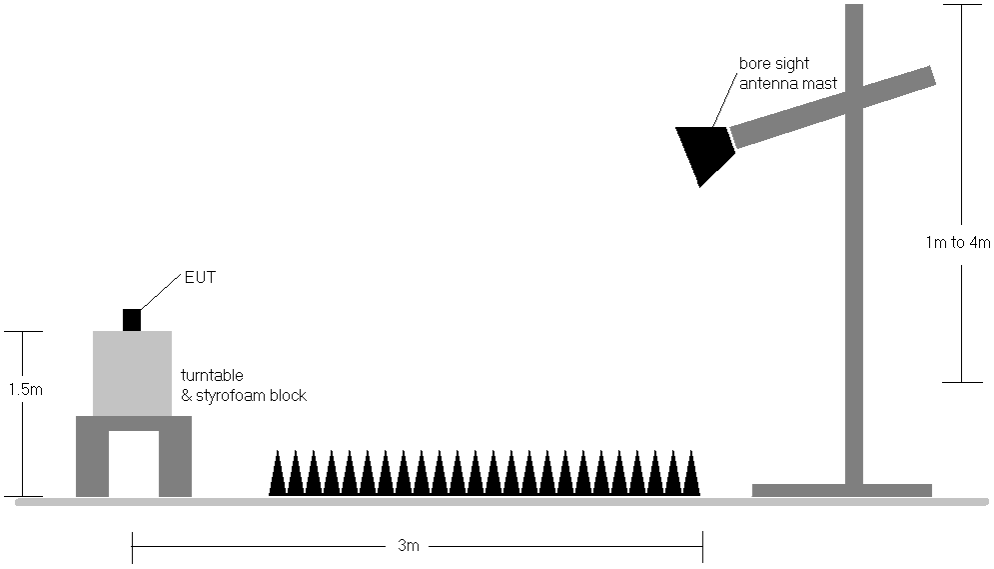


Figure 7-3. Test Instrument & Measurement Setup

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.

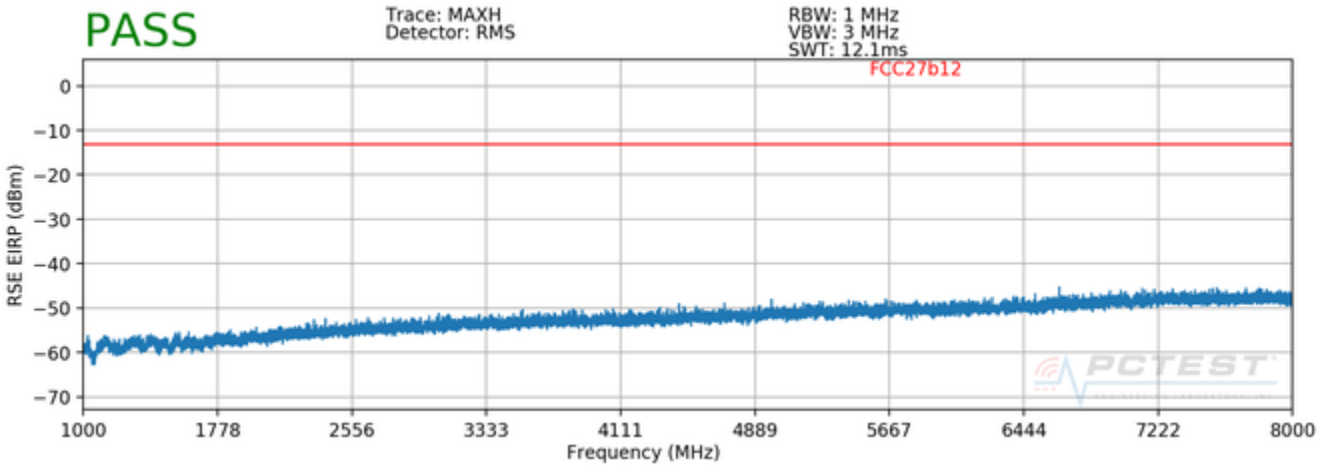
2) This unit was tested with its standard battery.

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 12/17



Plot 7-1. Radiated Spurious Plot above 1GHz (Band 12/17)

OPERATING FREQUENCY:	700.50	MHz
CHANNEL:	23025	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1401.00	H	150	163	-61.77	3.78	-57.99	-45.0
2101.50	H	150	151	-62.74	4.80	-57.94	-44.9
2802.00	H	-	-	-62.64	5.64	-57.00	-44.0

Table 7-8. Radiated Spurious Data (Band 12/17 – Low Channel)

OPERATING FREQUENCY:	707.50	MHz
CHANNEL:	23095	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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	150	190	-61.84	3.90	-57.93	-44.9
2122.50	H	150	168	-61.56	4.78	-56.78	-43.8
2830.00	H	-	-	-63.10	5.73	-57.37	-44.4

Table 7-9. Radiated Spurious Data (Band 12/17 – Mid Channel)

OPERATING FREQUENCY:	714.50	MHz
CHANNEL:	23165	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1429.00	H	150	158	-63.53	4.03	-59.50	-46.5
2143.50	H	150	155	-61.77	4.77	-57.01	-44.0
2858.00	H	-	-	-63.72	5.79	-57.93	-44.9

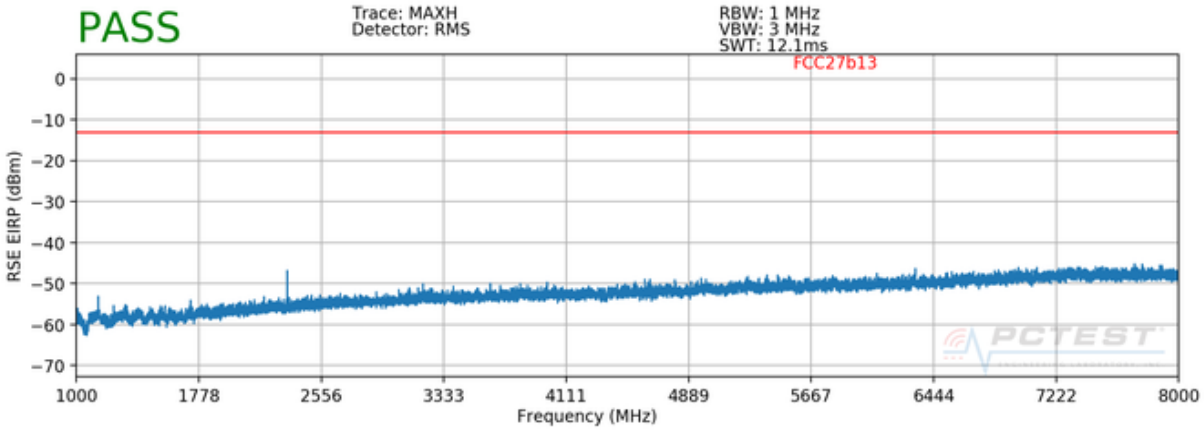
Table 7-10. Radiated Spurious Data (Band 12/17 – High Channel)

OPERATING FREQUENCY:	714.50	MHz
CHANNEL:	23165	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
1429.00	H	150	312	-64.62	4.03	-60.59	-47.6
2143.50	H	150	358	-62.91	4.77	-58.15	-45.1
2858.00	H	-	-	-63.17	5.79	-57.38	-44.4

Table 7-11. Radiated Spurious Data with WCP (Band 12/17 – High Channel)

Band 13



Plot 7-2. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	782.00	MHz
CHANNEL:	23230	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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	150	219	-53.39	4.88	-48.51	-35.5
3128.00	H	-	-	-62.87	6.02	-56.85	-43.8

Table 7-12. Radiated Spurious Data (Band 13)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.00	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]
1559.00	H	150	184	-59.29	4.47	-54.82	-14.8

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

OPERATING FREQUENCY:	779.50	MHz
CHANNEL:	23205	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
2338.50	H	150	222	-59.15	4.86	-54.28	-41.3
3120.50	H	-	-	-61.91	5.99	-55.92	-42.9

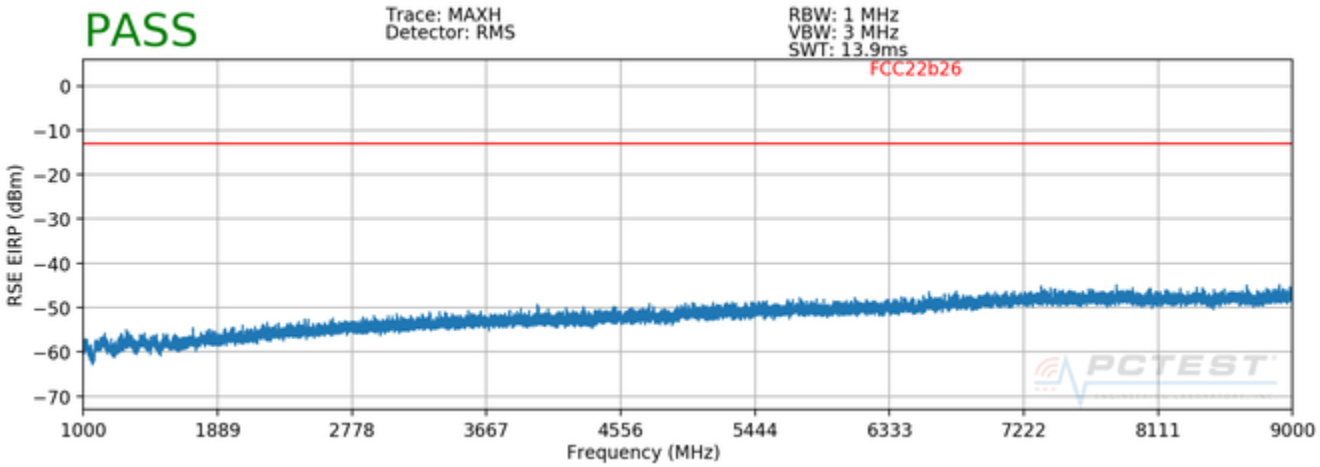
Table 7-14. Radiated Spurious Data with WCP (Band 13)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.00	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]
1559.00	H	150	329	-61.85	4.47	-57.38	-17.4

Table 7-15. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

Band 26



Plot 7-3. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	826.50	MHz
CHANNEL:	26815	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
1653.00	H	158	352	-75.29	8.99	-66.30	-53.3
2479.50	H	198	119	-59.58	9.12	-50.45	-37.5
3306.00	H	-	-	-69.86	9.37	-60.50	-47.5

Table 7-16. Radiated Spurious Data (Band 26/5 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	26915	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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	H	144	184	-74.85	8.85	-66.00	-53.0
2509.50	H	210	36	-58.85	9.17	-49.68	-36.7
3346.00	H	-	-	-69.29	9.36	-59.93	-46.9

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

OPERATING FREQUENCY:	846.50	MHz
CHANNEL:	27015	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
1693.00	H	139	69	-73.55	8.70	-64.84	-51.8
2539.50	H	204	287	-56.77	9.26	-47.51	-34.5
3386.00	H	-	-	-69.74	9.44	-60.30	-47.3

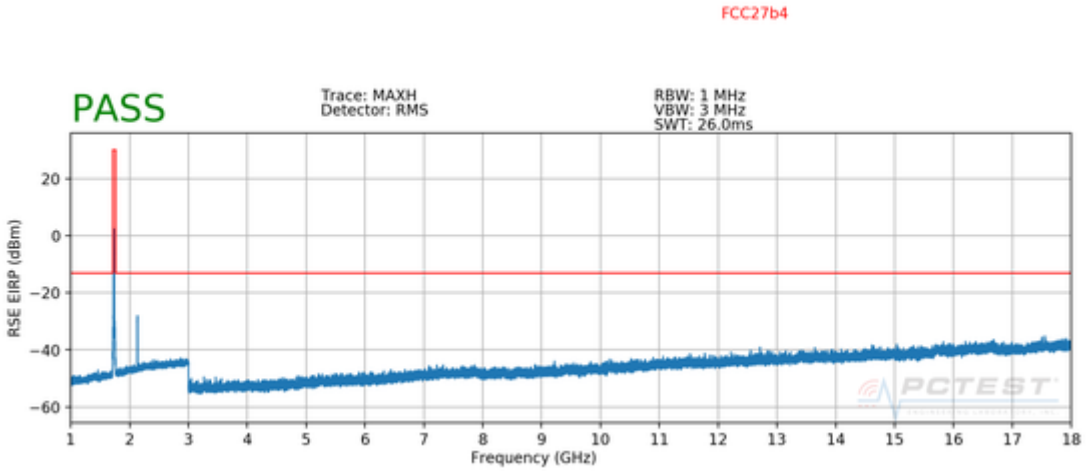
Table 7-18. Radiated Spurious Data (Band 26/5 – High Channel)

OPERATING FREQUENCY:	826.50	MHz
CHANNEL:	26815	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	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]
1653.00	H	209	329	-74.42	8.99	-65.43	-52.4
2479.50	H	144	179	-61.23	9.12	-52.10	-39.1
3306.00	H	-	-	-70.46	9.37	-61.10	-48.1

Table 7-19. Radiated Spurious Data with WCP (Band 26/5 – Low Channel)

Band 66/4



Plot 7-4. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY:	1717.50	MHz
CHANNEL:	20025	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3435.00	H	150	288	-56.81	6.50	-50.31	-37.3
5152.50	H	-	-	-58.83	8.44	-50.40	-37.4

Table 7-20. Radiated Spurious Data (Band 66/4 – Low Channel)

OPERATING FREQUENCY:	1732.50	MHz
CHANNEL:	20175	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3465.00	H	150	293	-56.02	6.56	-49.46	-36.5
5197.50	H	-	-	-57.45	8.45	-49.00	-36.0

Table 7-21. Radiated Spurious Data (Band 66/4 – Mid Channel)

OPERATING FREQUENCY:	1747.50	MHz
CHANNEL:	20325	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3495.00	H	150	269	-58.58	6.59	-51.99	-39.0
5242.50	H	-	-	-58.49	8.42	-50.07	-37.1

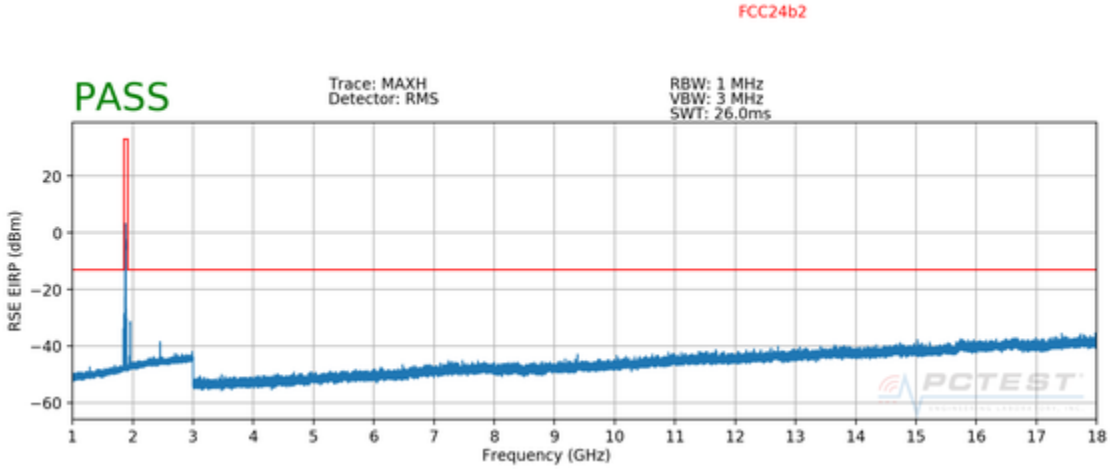
Table 7-22. Radiated Spurious Data (Band 66/4 – High Channel)

OPERATING FREQUENCY:	1747.50	MHz
CHANNEL:	20325	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3495.00	H	150	262	-58.48	6.59	-51.89	-38.9
5242.50	H	-	-	-59.77	8.42	-51.35	-38.4

Table 7-23. Radiated Spurious Data with WCP (Band 66/4 – High Channel)

Band 25/2



Plot 7-5. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY:	1851.50	MHz
CHANNEL:	18615	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
3703.00	H	150	266	-54.98	6.76	-48.22	-35.2
5554.50	H	-	-	-59.08	8.44	-50.64	-37.6

Table 7-24. Radiated Spurious Data (Band 25/2 – Low Channel)

OPERATING FREQUENCY:	1880.00	MHz
CHANNEL:	18900	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
3760.00	H	150	271	-54.71	6.84	-47.87	-34.9
5640.00	H	-	-	-59.70	8.52	-51.19	-38.2

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

OPERATING FREQUENCY:	1908.50	MHz
CHANNEL:	19185	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	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]
3817.00	H	150	3009	-56.56	6.99	-49.56	-36.6
5725.50	H	-	-	-59.88	8.58	-51.31	-38.3

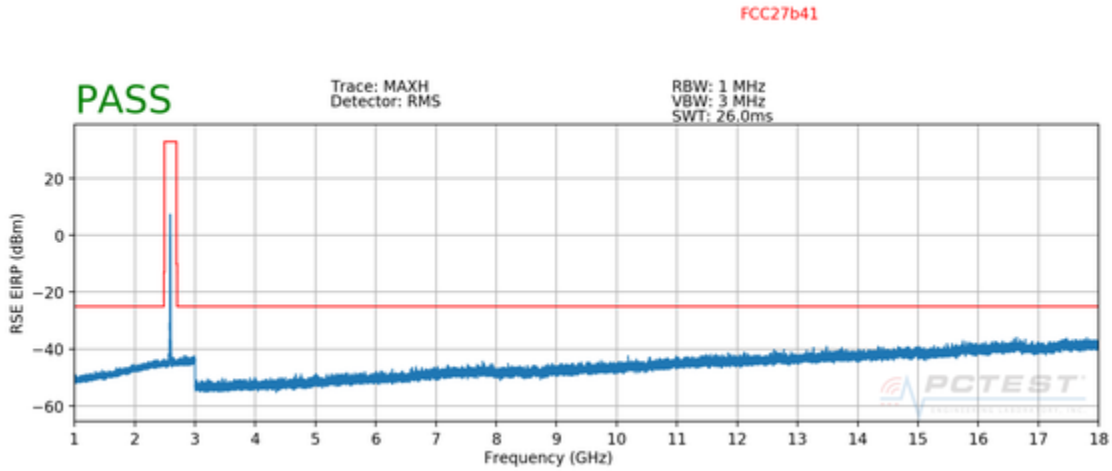
Table 7-26. Radiated Spurious Data (Band 25/2 – High Channel)

OPERATING FREQUENCY:	1851.50	MHz
CHANNEL:	18615	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

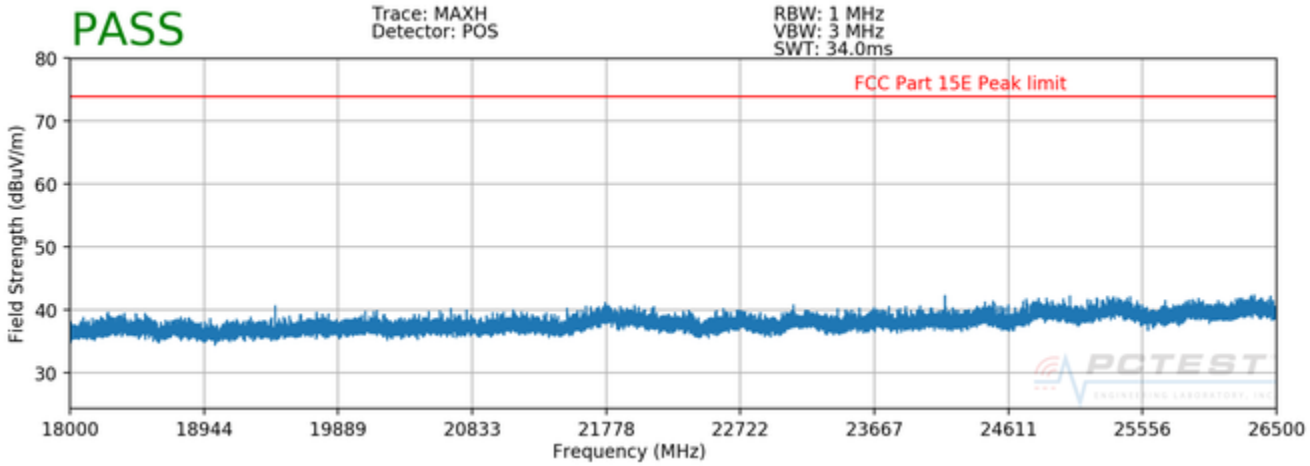
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3703.00	H	150	219	-57.30	6.76	-50.54	-37.5
5554.50	H	-	-	-60.52	8.44	-52.08	-39.1

Table 7-27. Radiated Spurious Data with WCP (Band 25/2 – Low Channel)

Band 41



Plot 7-6. Radiated Spurious Plot 1GHz - 18GHz (Band 41 PC2)



Plot 7-7. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 PC2)

OPERATING FREQUENCY:	2502.50	MHz
CHANNEL:	39715	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5 (PC2)	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]
5005.00	H	-	-	-67.71	11.17	-56.55	-31.5
7507.50	H	166	336	-57.05	11.00	-46.05	-21.1
10010.00	H	-	-	-59.70	12.14	-47.56	-22.6

Table 7-28. Radiated Spurious Data (Band 41 PC2 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5 (PC2)	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	-	-	-65.67	10.82	-54.85	-29.8
7779.00	H	169	329	-58.82	11.45	-47.36	-22.4
10372.00	H	-	-	-61.12	12.53	-48.58	-23.6

Table 7-29. Radiated Spurious Data (Band 41 PC2 – Mid Channel)

OPERATING FREQUENCY:	2687.50	MHz
CHANNEL:	41565	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5 (PC2)	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]
5375.00	H	-	-	-64.85	11.05	-53.81	-28.8
8062.50	H	166	327	-57.49	11.41	-46.08	-21.1
10750.00	H	-	-	-60.33	12.87	-47.46	-22.5

Table 7-30. Radiated Spurious Data (Band 41 PC2 – High Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5 (PC2)	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	-	-	-65.89	10.82	-55.07	-30.1
7779.00	H	163	342	-59.10	11.45	-47.64	-22.6
10372.00	H	-	-	-61.41	12.53	-48.87	-23.9

Table 7-31. Radiated Spurious Data with WCP (Band 41 PC2 – Mid Channel)

7.4 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §27.53(m)

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 = Max Hold
6. The trace was allowed to stabilize

Test Setup

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

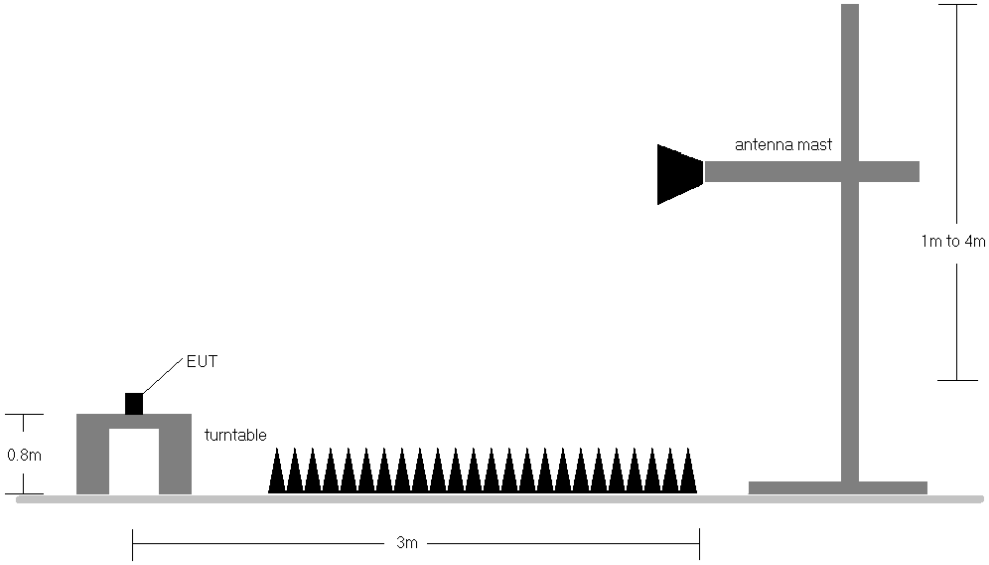


Figure 7-4. Test Instrument & Measurement Setup

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.

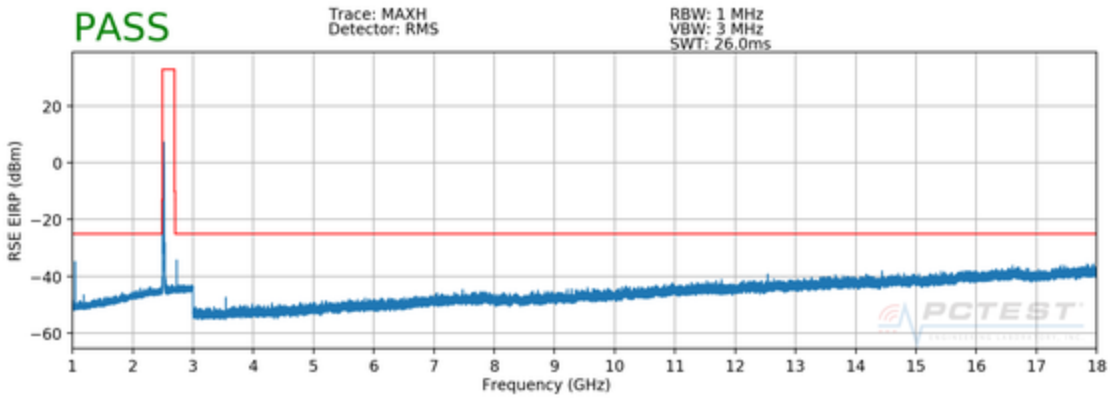
2) This unit was tested with its standard battery.

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.

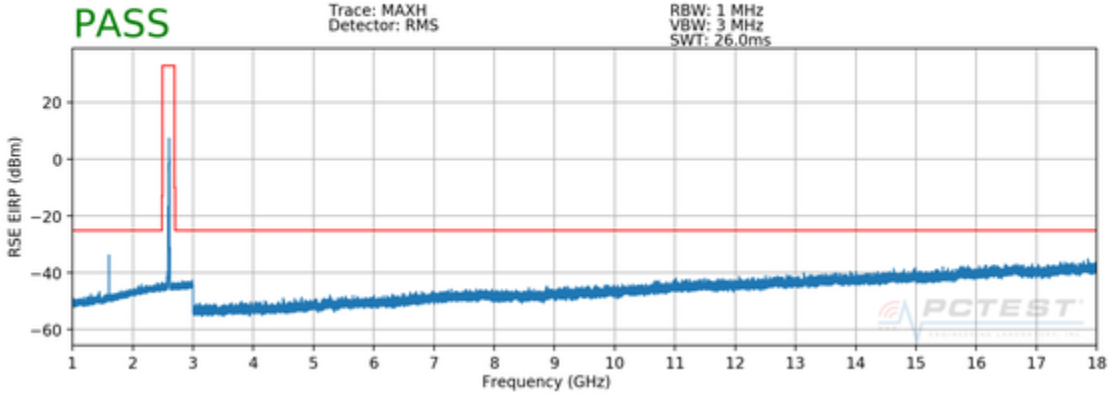
4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

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.

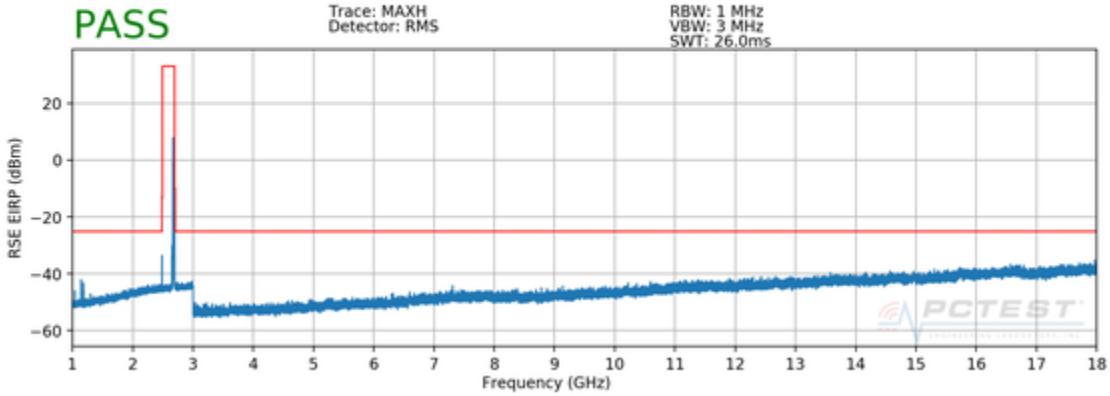
6) No significant emissions were found as a result of two uplink carriers operating contiguously.



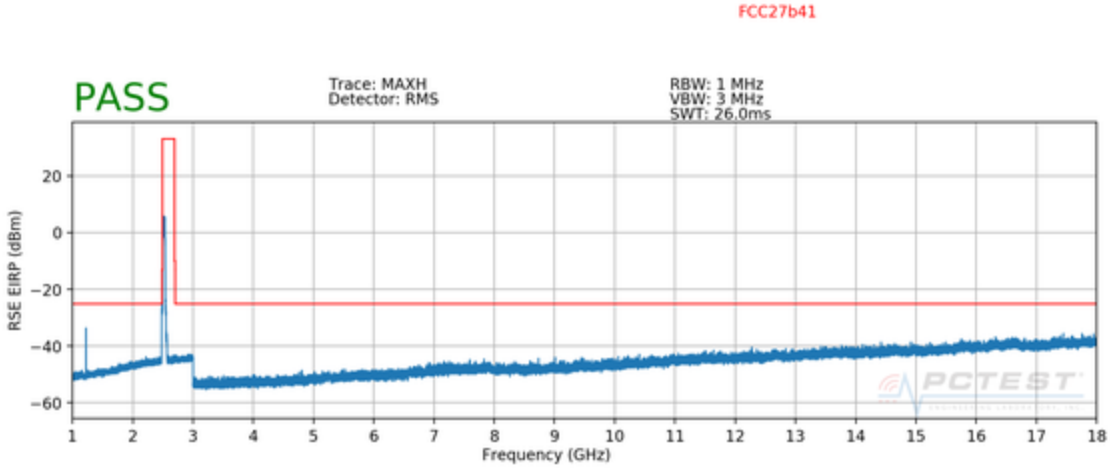
Plot 7-32. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)



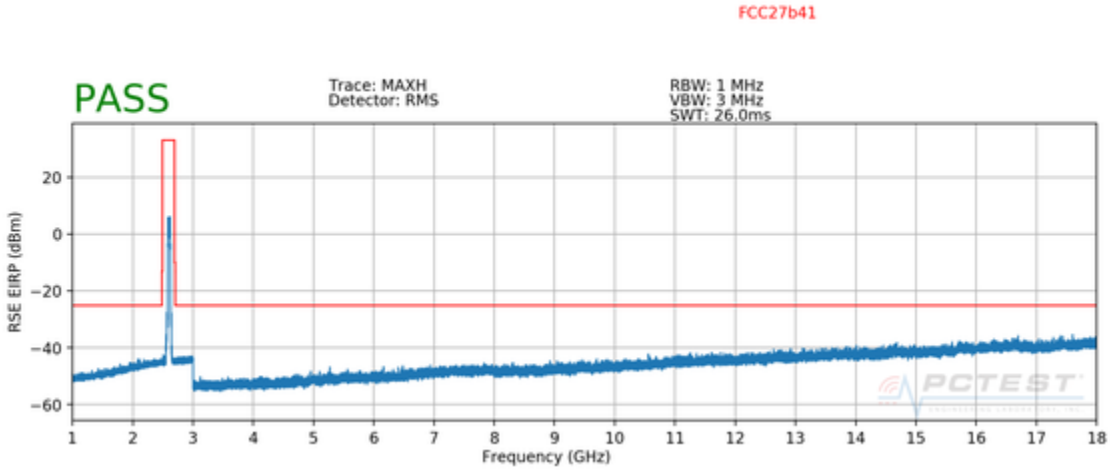
Plot 7-33. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)



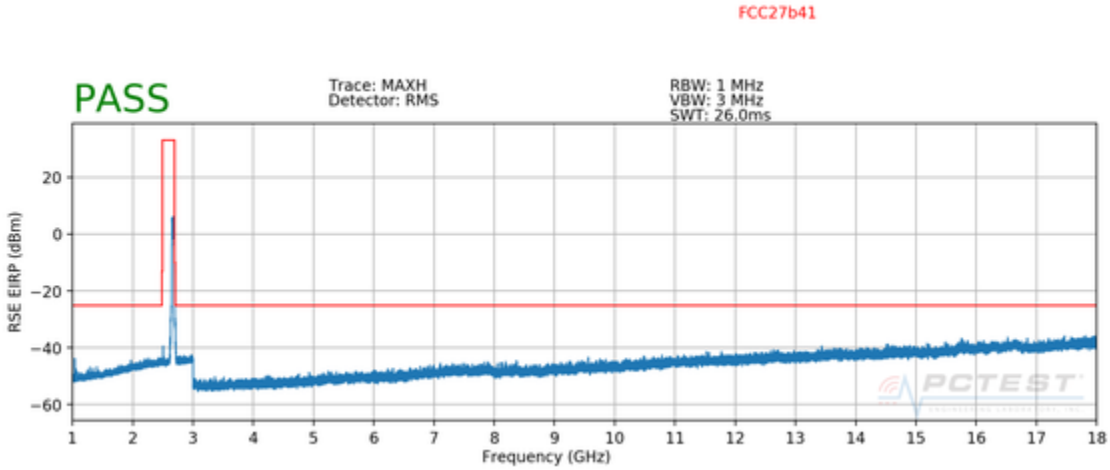
Plot 7-34. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)



Plot 7-35. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Low Channel)



Plot 7-36. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Mid Channel)



Plot 7-37. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – High Channel)

OPERATING FREQUENCY (PCC):	2506.00	MHz
OPERATING FREQUENCY (SCC):	2525.80	MHz
CHANNEL (PCC):	39750	
CHANNEL (SCC):	39948	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 20	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]
5012.00	H	-	-	-69.16	11.14	-58.02	-33.0
7514.50	H	164	321	-58.90	11.01	-47.88	-22.9
10017.00	H	-	-	-60.13	12.15	-47.98	-23.0

Table 7-38. Radiated Spurious Data (Band 41 ULCA – Low Channel)

OPERATING FREQUENCY (PCC):	2593.00	MHz
OPERATING FREQUENCY (SCC):	2612.80	MHz
CHANNEL (PCC):	40620	
CHANNEL (SCC):	40818	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 20	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

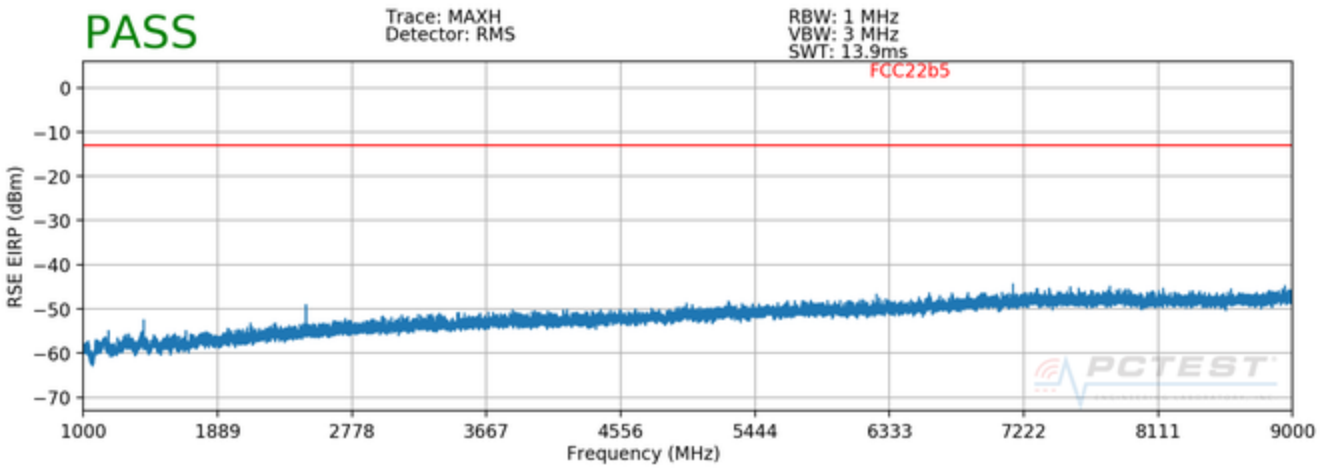
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	-	-	-65.66	10.82	-54.84	-29.8
7779.00	H	171	326	-60.47	11.45	-49.01	-24.0
10372.00	H	-	-	-59.95	12.53	-47.41	-22.4

Table 7-39. Radiated Spurious Data (Band 41 ULCA – Mid Channel)

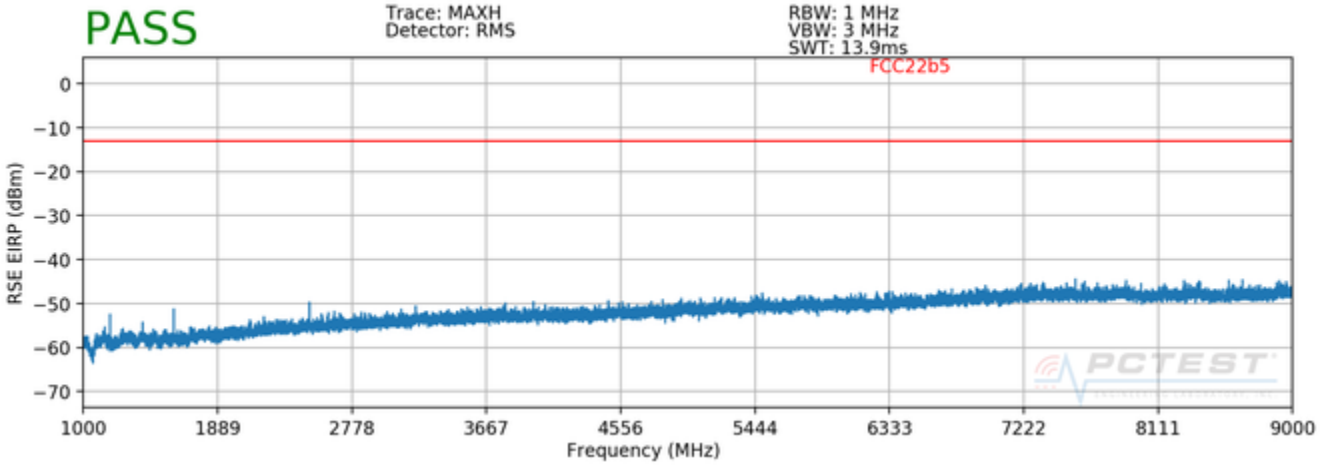
OPERATING FREQUENCY (PCC):	2680.00	MHz
OPERATING FREQUENCY (SCC):	2660.20	MHz
CHANNEL (PCC):	41490	
CHANNEL (SCC):	41292	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 20	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

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]
5360.00	H	-	-	-67.67	11.04	-56.63	-31.6
8047.50	H	167	324	-59.57	11.40	-48.16	-23.2
10735.00	H	-	-	-61.08	12.86	-48.22	-23.2

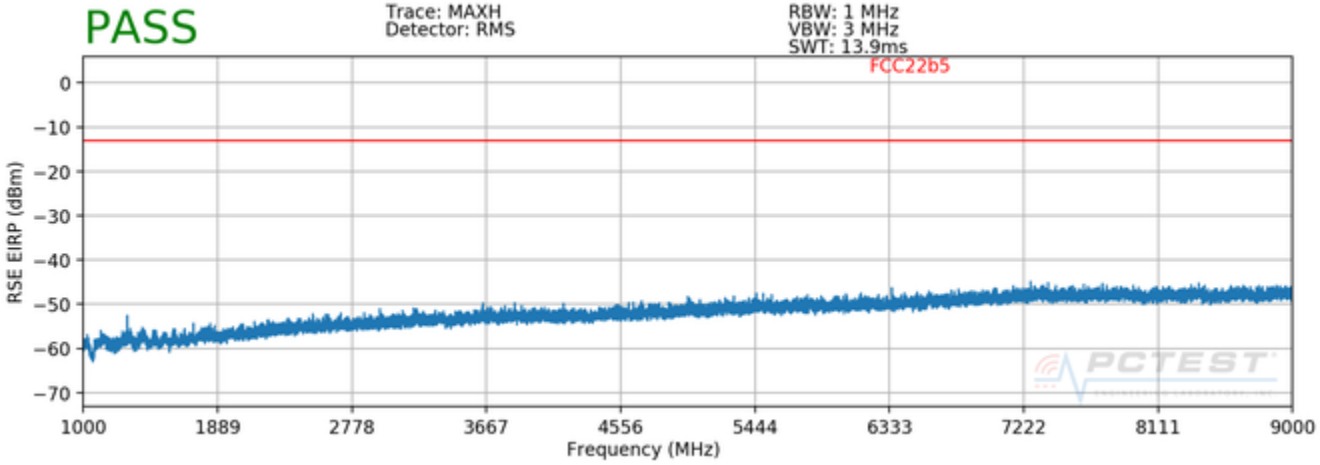
Table 7-40. Radiated Spurious Data (Band 41 ULCA – High Channel)



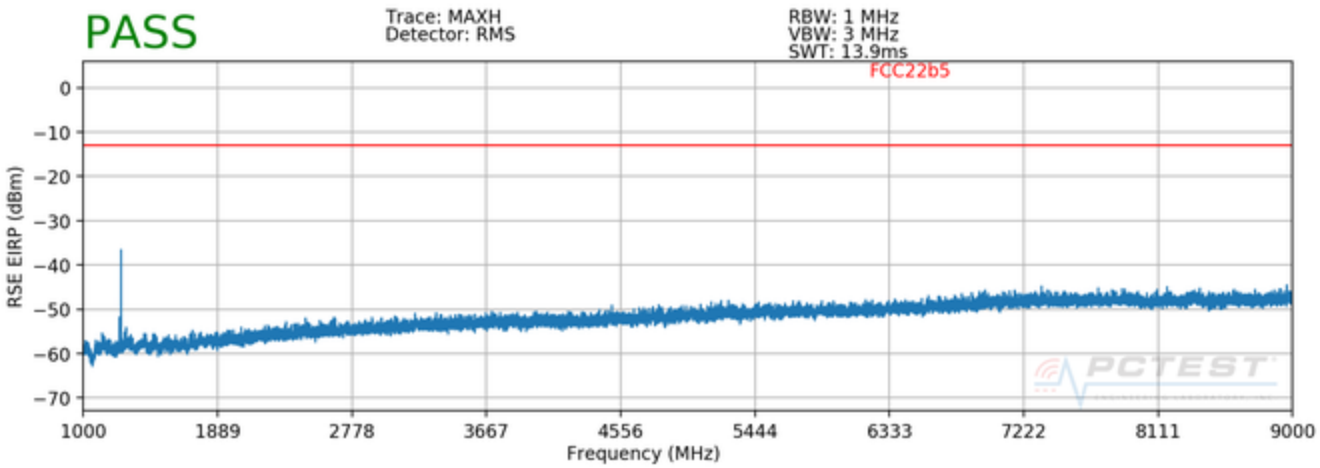
Plot 7-41. Radiated Spruious Plot (ULCA 5 PCC: RB 1 Offset 49, SCC: RB 1 Offset 0 – Low Channel)



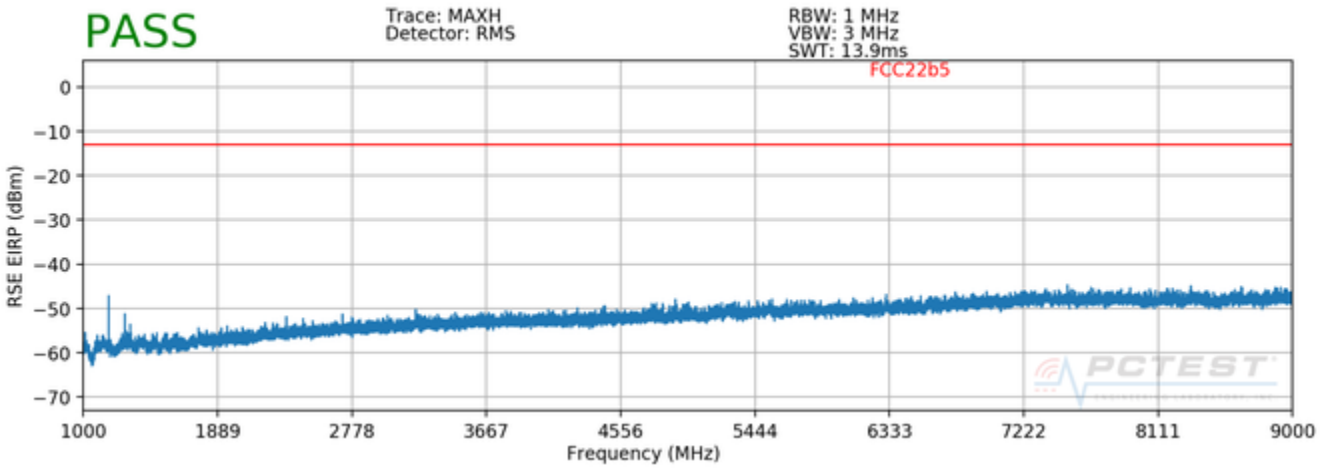
Plot 7-42. Radiated Spruious Plot (ULCA B5 PCC: RB 1 Offset 49, SCC: RB 1 Offset 0 – Mid Channel)



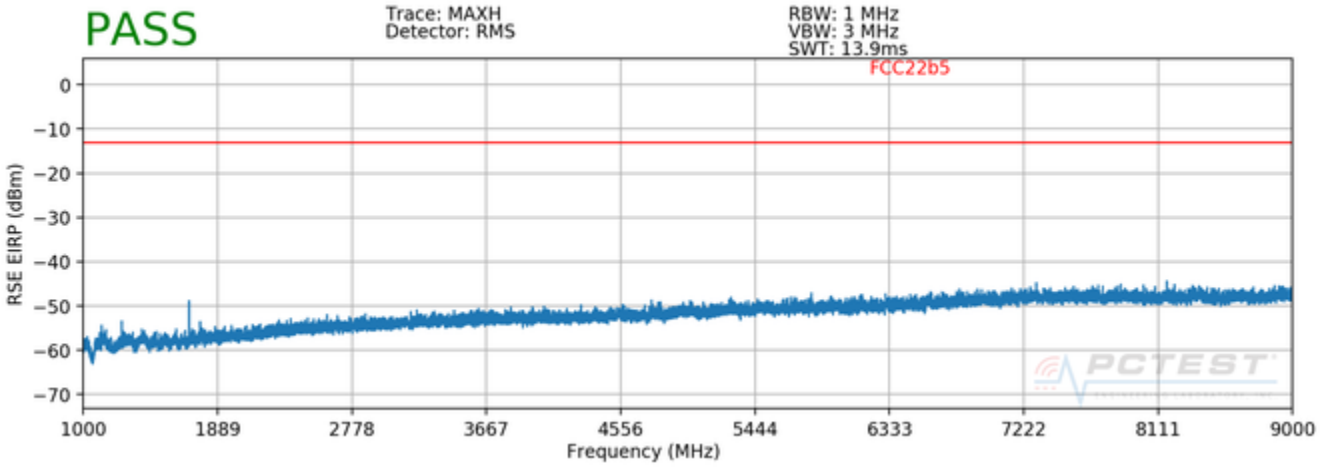
Plot 7-43. Radiated Spruious Plot (ULCA B5 PCC: RB 1 Offset 0, SCC: RB 1 Offset 49 – High Channel)



Plot 7-44. Radiated Spruious Plot (ULCA B5 PCC: RB 50 Offset 0, SCC: RB 50 Offset 0 – Low Channel)



Plot 7-45. Radiated Spruious Plot (ULCA B5 PCC: RB 50 Offset 0, SCC: RB 50 Offset 0 – Mid Channel)



Plot 7-46. Radiated Spruious Plot (ULCA B5 PCC: RB 50 Offset 0, SCC: RB 50 Offset 0 – High Channel)

OPERATING FREQUENCY (PCC):	829.00	MHz
OPERATING FREQUENCY (SCC):	838.90	MHz
CHANNEL (PCC):	20450	
CHANNEL (SCC):	20549	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10 + 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]
1658.00	H	-	-	-75.28	8.99	-66.29	-53.3
2483.50	H	258	55	-62.85	9.12	-53.72	-40.7
3309.00	H	-	-	-69.54	9.37	-60.18	-47.2

Table 7-47. Radiated Spurious Data (Band 5 ULCA – Low Channel)

OPERATING FREQUENCY (PCC):	831.60	MHz
OPERATING FREQUENCY (SCC):	841.50	MHz
CHANNEL (PCC):	20476	
CHANNEL (SCC):	20575	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10 + 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]
1663.20	H	-	-	-76.28	8.85	-67.43	-54.4
2499.70	H	169	84	-63.65	9.17	-54.48	-41.5
3336.20	H	-	-	-70.50	9.36	-61.14	-48.1

Table 7-48. Radiated Spurious Data (Band 5 ULCA – Mid Channel)

OPERATING FREQUENCY (PCC):	844.00	MHz
OPERATING FREQUENCY (SCC):	834.10	MHz
CHANNEL (PCC):	20600	
CHANNEL (SCC):	20501	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10 + 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]
1688.00	H	-	-	-74.71	8.70	-66.00	-53.0
2535.50	H	177	52	-60.18	9.26	-50.92	-37.9
3383.00	H	-	-	-68.70	9.44	-59.26	-46.3

Table 7-49. Radiated Spurious Data (Band 5 ULCA – High Channel)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFG710VM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.