

TEST REPORT

of

FCC Part 2 Subpart J and Part 27 Subpart C
IC RSS-192 Issue 5, RSS-199 Issue 4 and RSS-Gen Issue 5

FCC ID: BEJTM16FNNABM0
IC Certification: 2703H-TM16FNNABM0

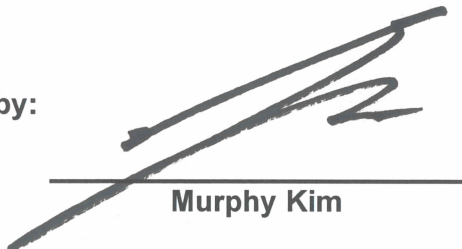
Equipment Under Test : Telematics Module
Model Name : TM16FNNABM0
Variant Model Name(s) : -
Applicant : FCC: LG Electronics USA
: IC: LG ELECTRONICS INC.
Manufacturer : LG Electronics Inc.
Date of Receipt : 2023.12.13
Date of Test(s) : 2023.12.13 ~ 2024.04.01
Date of Issue : 2024.04.01

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

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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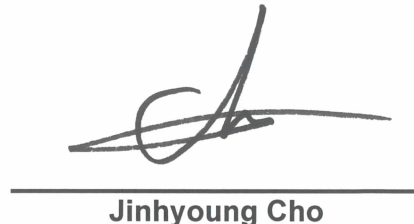
We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by:



Murphy Kim

Technical
Manager:



Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

INDEX

<u>Table of Contents</u>	Page
1. General Information -----	3
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions -----	9
3. Conducted Output Power -----	19
4. Occupied Bandwidth -----	26
5. Peak-Average Ratio -----	35
6. Spurious Emissions at Antenna Terminal -----	43
7. Band Edge and Emission Mask -----	51
8. Frequency Stability -----	94

1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
 - 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
 - 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
 - Designation number: KR0150

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1.2. Details of Applicant

FCC Applicant : LG Electronics USA
 FCC Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, United States, 07632
 IC Applicant : LG ELECTRONICS INC.
 IC Address : 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea (Republic of), 451-713
 Contact Person : Kim, David
 Phone No. : +1 201 470 2696

1.3. Details of Manufacturer

Company : LG Electronics Inc.
 Address : 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea, 07336

1.4. Description of EUT

Kind of Product	Telematics Module		
Model Name	TM16FNNABM0		
Serial Number	Conducted: FCC_04 Radiated: FCC Rad_02		
Power Supply	DC 4.10 V		
Rated Power	LTE Band 38, 42: 23 dB m LTE Band 48: 22 dB m		
Frequency Range	LTE Band 38: 2 570 MHz ~ 2 620 MHz LTE Band 42 (Only IC): 3 450 ~ 3 600 MHz LTE Band 48 (IC): 3 550 ~ 3 700 MHz		
Modulation Technique	QPSK, 16QAM, 64QAM, 256QAM		
Antenna Type	Ant. 1: PIFA Antenna	Ant. 2: PIFA Antenna	Ant. 3: PIFA Antenna
Antenna Gain*	Refer to the clause 1.13		
H/W Version	Rev.D		
S/W Version	IN25XA03		
FVIN	N/A		

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Signal Generator	R&S	SMA100B	106887	Oct. 06, 2023	Annual	Oct. 06, 2024
Spectrum Analyzer	R&S	FSV30	103453	Oct. 31, 2023	Annual	Oct. 31, 2024
Spectrum Analyzer	R&S	FSW43	100637	Apr. 06, 2023	Annual	Apr. 06, 2024
Spectrum Analyzer	Agilent	N9020A	MY53421758	Sep. 01, 2023	Annual	Sep. 01, 2024
Spectrum Analyzer	Agilent	N9030A	US51350132	Nov. 27, 2023	Annual	Nov. 27, 2024
Mobile Test Unit	R&S	CMW 500	144034	Feb. 28, 2024	Annual	Feb. 28, 2025
Communication Analyzer	Anritsu	MT8821C	6262192291	Feb. 08, 2024	Annual	Feb. 08, 2025
Power Meter	Anritsu	ML2495A	1223004	May 30, 2023	Annual	May 30, 2024
Power Sensor	Anritsu	MA2411B	1207272	May 30, 2023	Annual	May 30, 2024
Temperature Chamber	ESPEC CORP.	SH-662	93000533	Jun. 02, 2023	Annual	Jun. 02, 2024
Low Pass Filter	Mini-Circuits	NLP-1200+	V 8979400903-1	May 16, 2023	Annual	May 16, 2024
High Pass Filter	Wainwright Instrument GmbH	WHKX10-900-1000-18000-40SS	7	Feb. 27, 2024	Annual	Feb. 27, 2025
High Pass Filter	Wainwright Instrument GmbH	WHKX3.0/18G-6SS	21	Jun. 01, 2023	Annual	Jun. 01, 2024
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	11	Oct. 17, 2023	Annual	Oct. 17, 2024
BRIDGE COUPLER	MARKI MICROWAVE INC	CBR16-0012	1542	May 16, 2023	Annual	May 16, 2024
Directional Coupler	KRYTAR	152613	122660	Jul. 13, 2023	Annual	Jul. 13, 2024
DC Power Supply	Agilent	U8002A	MY49030063	Jan. 17, 2024	Annual	Jan. 17, 2025
Preamplifier	H.P.	8447F	2944A03909	Aug. 04, 2023	Annual	Aug. 04, 2024
Preamplifier	R&S	SCU 18F	101058	Dec. 07, 2023	Annual	Dec. 07, 2024
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Oct. 06, 2023	Annual	Oct. 06, 2024
Test Receiver	R&S	ESU26	100109	Jan. 16, 2024	Annual	Jan. 16, 2025
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 21, 2023	Biennial	Aug. 21, 2025
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	9163-437	May 31, 2023	Biennial	May 31, 2025
Horn Antenna	R&S	HF906	100326	Feb. 19, 2024	Annual	Feb. 19, 2025
Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9170	9170-540	Dec. 05, 2023	Annual	Dec. 05, 2024
Antenna Master	Innco systems GmbH	MA4640-XP-ET	MA4640/536/383 30516/L	N.C.R.	N/A	N.C.R.
Turn Table	Innco systems GmbH	DS 1200S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/383 30516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	MWX221-NMSNMS (4 m)	J1023142	Oct. 04, 2023	Semi-Annual	Apr. 04, 2024
Coaxial Cable	Qualwave Inc.	QA500-18-NN-10 (10 m)	22200114	Oct. 04, 2023	Semi-Annual	Apr. 04, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182287	Oct. 14, 2023	Semi-Annual	Apr. 14, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182288	Oct. 14, 2023	Semi-Annual	Apr. 14, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182291	Oct. 14, 2023	Semi-Annual	Apr. 14, 2024

Note;

- 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.

1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 2 and Part 27 / IC RSS-Gen Issue 5, RSS-199 Issue 4 and RSS-192 Issue 5			
Section in FCC	Section in IC	Test Item(s)	Result
§2.1046 §27.50(h)(2)	RSS-192 Issue 5 5.5 RSS-199 Issue 4 5.5	E.R.P. / E.I.R.P.	Complied
§27.53(m)(4)	RSS-192 Issue 5 5.6 RSS-199 Issue 4 5.6	Radiated Spurious Emissions	Complied
§2.1046	RSS-Gen Issue 5 6.12	Conducted Output Power	Complied
§2.1049	RSS-Gen Issue 5 6.7	Occupied Bandwidth	Complied
§27.50(d)(5)	RSS-192 Issue 5 5.5 RSS-199 Issue 4 5.5	Peak-Average Ratio	Complied
§27.53(m)(4)	RSS-192 Issue 5 5.6 RSS-199 Issue 4 5.6	Spurious Emission at Antenna Terminal	Complied
§27.53(m)(4)	RSS-192 Issue 5 5.6 RSS-199 Issue 4 5.6	Band Edge and Emission Mask	Complied
§2.1055 §27.54	RSS-Gen Issue 5 6.11 RSS-192 Issue 5 5.4 RSS-199 Issue 4 5.4	Frequency Stability	Complied

1.7. Sample Calculation for Offset

Where relevant, the following sample calculation is provided:

1.7.1. Conducted Test

Offset value (dB) = Directional Coupler (dB) + Cable loss (dB)

1.7.2. Radiation test

- E.I.R.P. (dB m) = Measured level (dB μ V) + Antenna factor (dB/m) + Cable loss (dB) + 20 Log D - 104.8;
 where D is the measurement distance in meters.
- E.R.P. (dB m) = E.I.R.P. (dB m) - 2.15 (dB)

1.8. Manufacturer Declaration

The EUT has three antennas, antennas 1 and 2 are the main antennas, and antenna 3 can be switched to the main antenna. Each antenna can't transmit simultaneously.

1.9. Worst Case Configuration and Mode

The worst-case is based on the conducted output power measurement investigation results. All testing was performed using QPSK, 16QAM, 64QAM and 256QAM modulations. However, the spurious radiated emission and spurious at antenna terminal were only performed on bandwidth and RB offset (with RB size 1) with the highest conducted power in QPSK.

The peak to average ratio were tested only 256QAM modulation as worst case.

The radiation test of the EUT was investigated in three orthogonal orientations X, Y, and Z, and the worst case data is reported.

1.10. Measurement Configuration

Test Items	Band	Test Channel			Bandwidth (MHz)						Modulation				RB #		
		Low	Mid	High	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full
Conducted Output Power	38	V	V	V			V	V	V	V	V	V	V	V	V	V	V
	42	V	V	V			V	V	V	V	V	V	V	V	V	V	V
	48	V	V	V			V	V	V	V	V	V	V	V	V	V	V
Frequency Stability	38	-	V	-			V	-	-	-	V	-	-	-	-	-	V
	42	-	V	-			V	-	-	-	V	-	-	-	-	-	V
	48	-	V	-			V	-	-	-	V	-	-	-	-	-	V
Occupied Bandwidth	38	-	V	-			V	V	V	V	V	V	-	-	-	-	V
	42	-	V	-			V	V	V	V	V	V	-	-	-	-	V
	48	-	V	-			V	V	V	V	V	V	-	-	-	-	V
Peak-to-Average Ratio	38	V	V	V			V	V	V	V	-	-	-	V	-	-	V
	42	V	V	V			V	V	V	V	-	-	-	V	-	-	V
	48	V	V	V			V	V	V	V	-	-	-	V	-	-	V
Band edge	38	V	V	V			V	V	V	V	V	V	-	-	V	-	V
	42	V	V	V			V	V	V	V	V	V	-	-	V	-	V
	48	V	V	V			V	V	V	V	V	V	-	-	V	-	V
Spurious at antenna terminal & Radiated Spurious Emissions	38	V	V	V	Worst case												
	42	V	V	V	Worst case												
	48	V	V	V	Worst case												

1.11. Measurement Uncertainty

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

Parameter	Uncertainty	
Conducted Output Power	0.33 dB	
Occupied Bandwidth	0.05 MHz	
Conducted Spurious Emissions	0.99 dB	
Peak to Average Ratio	0.66 dB	
Frequency Stability	116 Hz	
Radiated Emission, 9 kHz to 30 MHz	H	3.60 dB
	V	3.60 dB
Radiated Emission, below 1 GHz	H	4.60 dB
	V	4.90 dB
Radiated Emission, above 1 GHz	H	3.90 dB
	V	3.80 dB

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence.

1.12. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL004926	2024.04.01	Initial

1.13. Antenna Information

Ant. No.	Ant. Type	Frequency Range	Support Band		
			LTE	NR	WCDMA
Ant. 1	PIFA	Below 3 GHz	2, 4, 5, 7, 12, 13, 17, 25, 26, 38, 66, 71	2, 5, 7, 12, 25, 41, 66, 71	II, V
Ant. 2	PIFA	Above 3 GHz	42, 48	48, 77, 78	
Ant. 3	PIFA	Below 3 GHz	2, 4, 5, 7, 12, 13, 17, 25, 26, 38, 66, 71	2, 5, 7, 12, 25, 41, 66, 71	II, V

Band	Operating Frequency (MHz)	Antenna Peak Gain (dB i)		
		Ant. 1	Ant. 2	Ant. 3
LTE 25/2 WCDMA II NR 25/2	1 850 ~ 1 915	<u>1.86</u>		-0.32
LTE 66/4 NR 66	1 710 ~ 1 780	<u>1.37</u>		-0.03
LTE 26/5 WCDMA V NR 5	824 ~ 849	<u>-2.43</u>		-3.16
LTE 7 NR 7	2 500 ~ 2 570	0.92		<u>2.79</u>
LTE 12/17 NR 12	699 ~ 716	-3.98		<u>-1.20</u>
LTE 13	777 ~ 787	-4.60		<u>-3.16</u>
LTE 26	814 ~ 824	<u>-2.43</u>		-3.16
LTE 38	2 570 ~ 2 620	0.92		<u>2.79</u>
LTE 42	3 450 ~ 3 600		<u>-1.37</u>	
LTE 48 NR 48	3 550 ~ 3 700		<u>-1.37</u>	
LTE 71 NR 71	663 ~ 698	-2.45		<u>-1.60</u>
NR 41	2 496 ~ 2 690	0.92		<u>2.79</u>
NR 77	3 450 ~ 3 550		<u>0.12</u>	
	3 700 ~ 3 980		<u>0.12</u>	
NR 78	3 450 ~ 3 550		<u>0.12</u>	
	3 700 ~ 3 800		<u>0.12</u>	

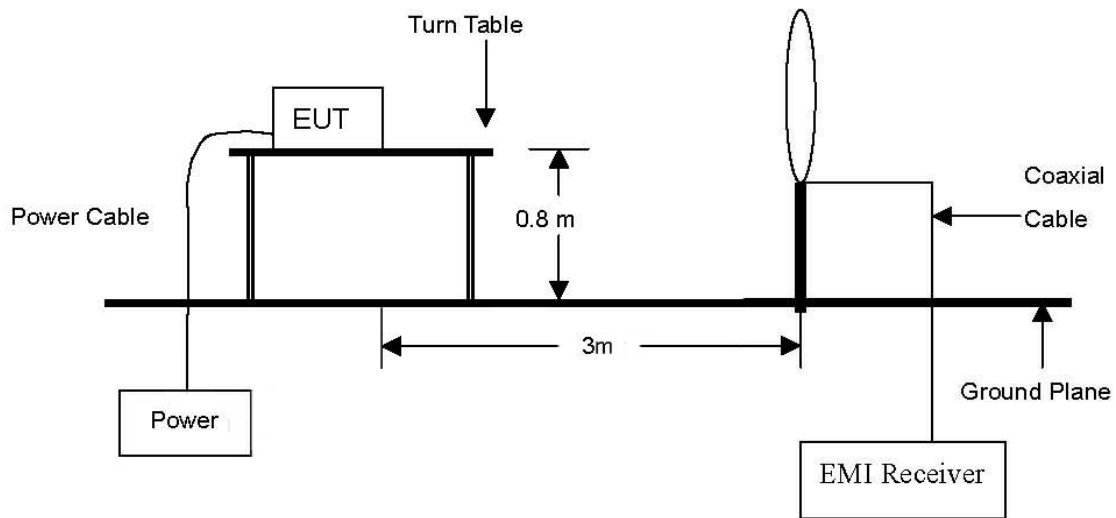
1.14. Emission Designator and Max Power

Band	Band width (MHz)	Modulation	Low Freq. (MHz)	Upper Freq. (MHz)	Conducted Average (dB m)	Worst Ant. Gain (dB i)	E.I.R.P. Average (dB m)	E.I.R.P. Average (W)	Emission Designator		
38	5	QPSK	2 572.5	2 617.5	22.51	2.79	25.30	0.339	4M53G7D		
		16QAM			21.60		24.39	0.275	4M50D7D		
	10	QPSK	2 575.0	2 615.0	22.56		25.35	0.343	8M94G7D		
		16QAM			21.68		24.47	0.280	8M97D7D		
	15	QPSK	2 577.5	2 612.5	22.69		25.48	0.353	13M5G7D		
		16QAM			21.95		24.74	0.298	13M5D7D		
	20	QPSK	2 580.0	2 610.0	22.79		25.58	0.361	17M9G7D		
		16QAM			21.95		24.74	0.298	17M9D7D		
	42 Only IC	5	QPSK	3 452.5	3 597.5		22.93	-1.37	21.56	0.143	4M52G7D
			16QAM				21.88		20.51	0.112	4M50D7D
10		QPSK	3 455.0	3 595.0	22.91	21.54	0.143		8M97G7D		
		16QAM			22.11	20.74	0.119		8M94D7D		
15		QPSK	3 457.5	3 592.5	22.93	21.56	0.143		13M5G7D		
		16QAM			22.00	20.63	0.116		13M5D7D		
20		QPSK	3 460.0	3 590.0	22.94	21.57	0.144		18M0G7D		
		16QAM			22.03	20.66	0.116		18M0D7D		
48 IC		5	QPSK	3 552.5	3 697.5	22.58	-1.37		21.21	0.132	4M53G7D
			16QAM			21.76			20.39	0.109	4M53D7D
	10	QPSK	3 555	3 695	22.85	21.48		0.141	8M97G7D		
		16QAM			21.69	20.32		0.108	8M97D7D		
	15	QPSK	3 557.5	3 692.5	22.85	21.48		0.141	13M5G7D		
		16QAM			21.70	20.33		0.108	13M5D7D		
	20	QPSK	3 560	3 690	22.87	21.50		0.141	18M0G7D		
		16QAM			22.02	20.65		0.116	17M9D7D		

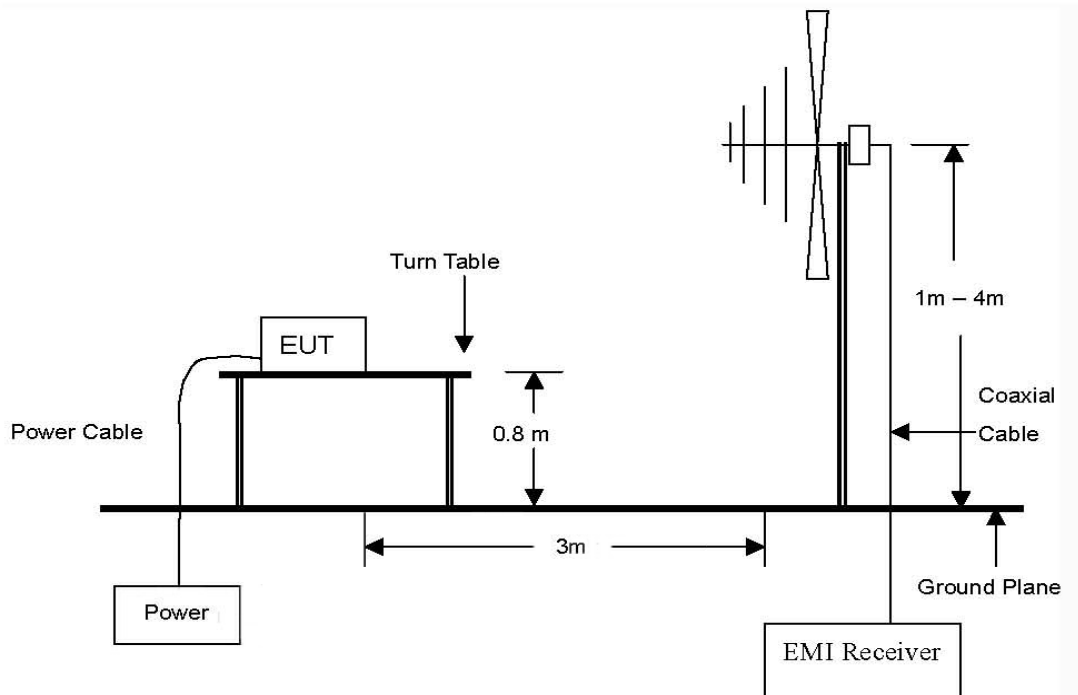
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions

2.1. Test setup

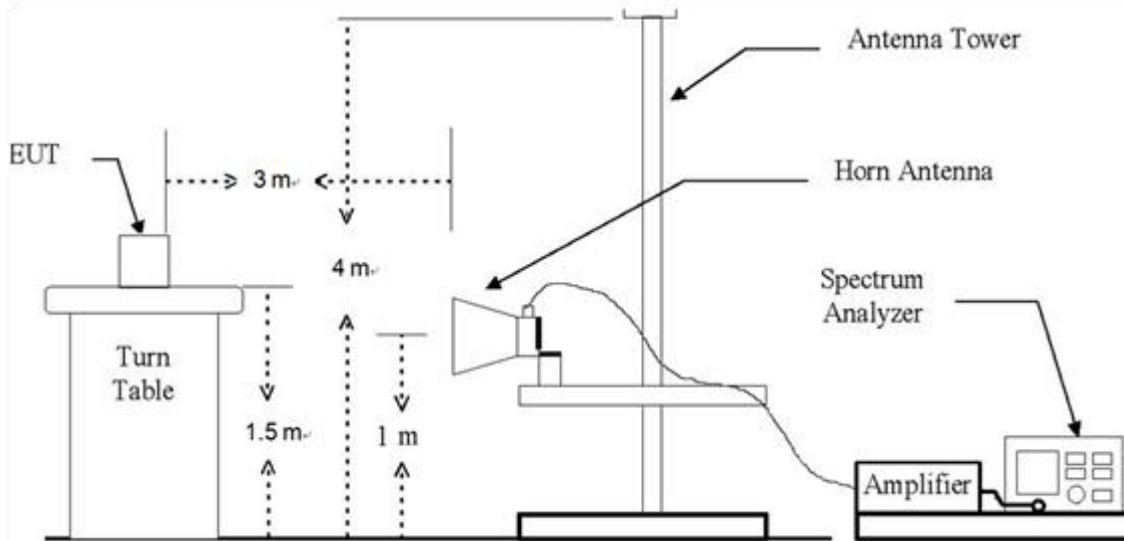
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz.



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



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 40 GHz Emissions.



2.2. Limit

2.2.1. Limit of E.R.P. / E.I.R.P.

FCC

- §27.50(h)(2), Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

IC

- RSS-192 Issue 5

5.5, the maximum output power of the equipment measured in terms of average values shall comply with the limits specified in table 1.

Table 1 : Maximum power of equipment

Equipment type	Maximum Power
Non-AAS: base station (outdoor), fixed P-P station, P-MP hub station	68 dBm e.i.r.p./5 MHz
AAS: base station (outdoor), P-MP hub station	47 dBm TRP/5 MHz
Indoor base station	39 dBm TRP/channel bandwidth
Fixed subscriber equipment	39 dBm e.i.r.p./channel bandwidth
Subscriber equipment other than fixed subscriber equipment	30 dBm e.i.r.p./channel bandwidth

- RSS-199 Issue 4

5.5, the maximum output power of the equipment shall comply with the limits specified in table 3. In this table, maximum power refers to the equivalent isotropically radiated power (e.i.r.p.) or total radiated power (TRP), measured in terms of average values.

Subscriber equipment other than fixed subscriber equipment shall not exceed an e.i.r.p of 2W per channel bandwidth.

Fixed subscriber equipment shall not exceed the following:

- I. conducted power of 2W per channel bandwidth for all ports
- II. e.i.r.p of 40 W per channel bandwidth

The maximum power limits for fixed station and base station are provided in Table 3. The limits in this RSS are specified for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-517 for more deployment details in the band 2 500-2 690 MHz.

Table 3: Maximum power of fixed station and base station in the band 2 500-2 690 MHz

Equipment type	Maximum power
Non-AAS fixed station and base station	e.i.r.p of 1 640 W / MHz
AAS fixed station and base station	TRP of 43 dB m / MHz

2.2.2. Limit of Radiated Spurious Emissions

FCC

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log_{10} (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log_{10} (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log_{10} (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log_{10} (P)$ dB on all frequencies between 2 490.5 MHz and 2 496 MHz and $55 + 10 \log_{10} (P)$ dB at or below 2 490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2 495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

IC

- RSS-192 Issue 5

5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer’s rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

If the transmitter is designed for multi-carrier operation, the tests shall be carried out using both the maximum and minimum number of carriers intended for the equipment.

5.6.3, subscriber equipment shall have the TRP or conducted power (per antenna), where applicable, of unwanted emission not exceeding the following:

- a. the limits in table 6
- b. a limit of -30 dBm/MHz in the frequency range greater than (B+5) MHz from the edge of the frequency band

Table 6: Unwanted emission limits for subscriber equipment

Frequency block group (B)	Offset frequency from the edge of the frequency block group (MHz)			
	0-1	1-5	5-B	>B
10 MHz, 20 MHz, 30 MHz and 40 MHz	-13 dBm/1% of B	-10 dBm/MHz	-13 dBm/MHz	-25 dBm/MHz
> 40 MHz	-13 dBm/400 kHz	-10 dBm/MHz	-13 dBm/MHz	-25 dBm/MHz

- RSS-199 Issue 4

5.6, unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

For the unwanted emission limits, in the 1 MHz band immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for fixed stations, base stations, and fixed subscriber equipment, and 2 % for subscriber equipment other than fixed subscriber equipment. Beyond this 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1 % or 2 % of the occupied bandwidth, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the tables below.

Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (MHz)	Unwanted emission limit
≤1	-13 dB m/(1% of OB*)
>1	-13 dB m/MHz

* OB is the occupied bandwidth

Table 5: Unwanted emission limits for subscriber equipment other than fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (MHz)	Unwanted emission limit
0-1	-10 dB m/(2% of OB*)
1-5	-10 dB m/MHz
5-X**	-13 dB m/MHz
≥X	-25 dB m/MHz

* OB is the occupied bandwidth

** X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition to complying with the limits in table 5, subscriber equipment other than fixed subscriber equipment shall not exceed -13 dB m/MHz on all frequencies between 2 490.5 MHz and 2 496 MHz, and -25 dB m/MHz at or below 2 490.5 MHz.

2.3. Test Procedure

2.3.1. E.R.P. or E.I.R.P. from conducted RF output power

According to subclause 5.2.5.5 of ANSI C63.26-2015 E.R.P. and E.I.R.P. are defined as the product of the power supplied to the antenna and its gain.

The relevant equation for determining the E.R.P. or E.I.R.P. from the conducted RF output power measured using the guidance provided above is:

$$E.R.P. \text{ or } E.I.R.P. = P_{Meas} + G_T$$

where:

E.R.P. or E.I.R.P. = effective radiated power or equivalent isotropically radiated power, respectively
 (expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

2.3.2. Radiated Spurious Emissions

The test based on ANSI/TIA 603E: 2016 and ANSI C63.26-2015 and KDB 971168 D01 Power Meas License Digital Systems v03r01.

1. On a test site, the EUT shall be placed at 0.8 m or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. Radiated spurious emissions measurement method was set as follows:
 RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz, VBW ≥ 3 x RBW,
 Detector = RMS, trace mode = max hold, per the guidelines of KDB 971168 D01 Power Meas License Digital Systems v03r01.
5. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
11. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
12. The measurement shall be repeated with the test antenna orientated for horizontal polarization.

2.4. Test results

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

2.4.1. E.R.P. / E.I.R.P.

Band	Frequency (MHz)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Worst Antenna Gain (dB i)	Maximum E.I.R.P. (dB m)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dB m)	Maximum E.R.P. (W)	Limit
38	2 570 ~ 2 620	22.79	0.190	2.79	25.58	0.361			2 W E.I.R.P.
42 Only IC	3 450 ~ 3 600	22.94	0.197	-1.37	21.57	0.144			30 dB m / E.I.R.P.
48 IC	3 550 ~ 3 700	22.87	0.194	-1.37	21.50	0.141			30 dB m / E.I.R.P.

Remark;

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

2.4.2. Radiated spurious emissions

- Ant. 1_Below 3 GHz

LTE band 38 (20 MHz - QPSK)

Frequency (MHz)	Measured Level (dB μ V)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB μ V/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (2 580.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (2 595.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
High Channel (2 610.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

- Ant. 2_Above 3 GHz

LTE band 42 (20 MHz - QPSK)

Frequency (MHz)	Measured Level (dB μ V)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB μ V/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (3 460.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (3 525.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
High Channel (3 590.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

LTE band 48 (20 MHz - QPSK)

Frequency (MHz)	Measured Level (dB μ V)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB μ V/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (3 560.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (3 625.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
High Channel (3 690.0 MHz)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

- Ant. 3_Below 3 GHz

LTE band 38 (20 MHz - QPSK)

Frequency (MHz)	Measured Level (dB μ V)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB μ V/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (2 580.0 MHz)									
5 142.19	38.12	H	33.58	-29.83	41.87	-95.26	-53.39	-25	28.39
5 142.24	37.53	V	33.58	-29.83	41.28	-95.26	-53.98	-25	28.98
Above 5 200.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (2 595.0 MHz)									
5 172.12	39.63	H	33.64	-29.27	44.00	-95.26	-51.26	-25	26.26
5 172.16	39.83	V	33.64	-29.27	44.20	-95.26	-51.06	-25	26.06
Above 5 200.00	Not detected	-	-	-	-	-	-	-	-
High Channel (2 610.0 MHz)									
5 202.14	39.04	H	33.70	-29.96	42.78	-95.26	-52.48	-25	27.48
5 202.35	37.87	V	33.70	-29.96	41.61	-95.26	-53.65	-25	28.65
Above 5 300.00	Not detected	-	-	-	-	-	-	-	-

Remark;

1. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.
2. E (dB μ V/m) = Measured Level (dB μ V) + Antenna Factor (dB/m) + AMP (dB) + Cable Loss (dB).
3. E.I.R.P. (dB m) = E (dB μ V/m) + CF (dB).
4. E.R.P. (dB m) = E (dB μ V/m) + CF (dB) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.
5. CF (dB) = 20 log D - 104.8; where D is the measurement distance in meters, According to KDB 971168 D01 v03r01 5.8.4.
6. The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

3. Conducted Output Power

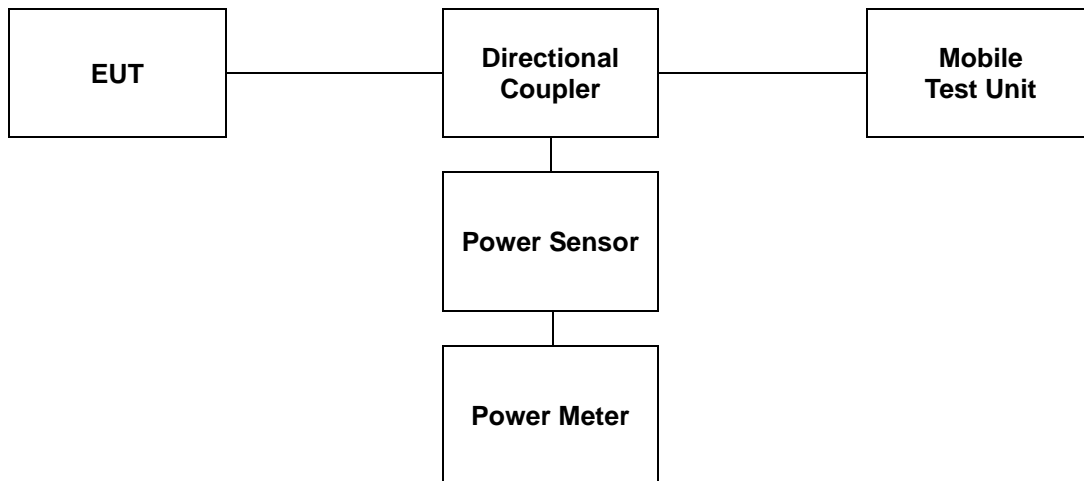
3.1. Limit

CFR 47, Section FCC §2.1046 and IC RSS-Gen Issue 5 6.12.

3.2. Test Procedure

Output power shall be measured at the RF output terminals for all configurations.

1. The RF output of the transmitter was connected to the input of the mobile test unit in order to establish communication with the EUT.
2. The EUT was set up for the max. output power with pseudo random data modulation by using mobile test unit parameters.
3. The measurement performed using a wideband RF power meter.
4. This EUT was tested under all configurations and the highest power was investigated and reported.



3.3. Test Result

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

LTE Band 38									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				37775 (2 572.5 MHz)		38000 (2 595.0 MHz)		38225 (2 617.5 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.51	0.178	22.16	0.164	22.25	0.168
		1	12	22.48	0.177	22.06	0.161	22.25	0.168
		1	24	22.49	0.177	22.16	0.164	22.12	0.163
		12	0	21.53	0.142	21.32	0.136	21.29	0.135
		12	6	21.52	0.142	21.17	0.131	21.23	0.133
		12	13	21.39	0.138	21.17	0.131	21.12	0.129
	16QAM	25	0	21.47	0.140	21.29	0.135	21.25	0.133
		1	0	21.60	0.145	21.37	0.137	21.41	0.138
		1	12	21.46	0.140	21.27	0.134	21.33	0.136
		1	24	21.47	0.140	21.21	0.132	21.29	0.135
		12	0	20.77	0.119	20.53	0.113	20.50	0.112
		12	6	20.69	0.117	20.50	0.112	20.49	0.112
	64QAM	12	13	20.60	0.115	20.36	0.109	20.45	0.111
		25	0	20.66	0.116	20.56	0.114	20.50	0.112
		1	0	20.65	0.116	20.37	0.109	20.43	0.110
		1	12	20.47	0.111	20.35	0.108	20.42	0.110
		1	24	20.59	0.115	20.36	0.109	20.34	0.108
		12	0	19.81	0.096	19.42	0.087	19.51	0.089
	256QAM	12	6	19.80	0.095	19.34	0.086	19.30	0.085
		12	13	19.74	0.094	19.33	0.086	19.44	0.088
		25	0	19.75	0.094	19.35	0.086	19.47	0.089
		1	0	17.36	0.054	17.22	0.053	17.26	0.053
		1	12	17.45	0.056	17.34	0.054	17.22	0.053
		1	24	17.61	0.058	17.64	0.058	17.69	0.059
LTE Band 38									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				37800 (2 575.0 MHz)		38000 (2 595.0 MHz)		38200 (2 615.0 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	22.56	0.180	22.37	0.173	22.36	0.172
		1	25	22.34	0.171	22.31	0.170	22.15	0.164
		1	49	22.46	0.176	22.44	0.175	22.11	0.163
		25	0	21.61	0.145	21.48	0.141	21.43	0.139
		25	12	21.45	0.140	21.53	0.142	21.23	0.133
		25	25	21.59	0.144	21.49	0.141	21.19	0.132
	16QAM	50	0	21.52	0.142	21.47	0.140	21.46	0.140
		1	0	21.67	0.147	21.65	0.146	21.51	0.142
		1	25	21.68	0.147	21.48	0.141	21.37	0.137
		1	49	20.64	0.116	21.43	0.139	21.32	0.136
		25	0	20.95	0.124	20.68	0.117	20.66	0.116
		25	12	20.75	0.119	20.68	0.117	20.59	0.115
	64QAM	25	25	20.88	0.122	20.60	0.115	20.60	0.115
		50	0	20.70	0.117	20.58	0.114	20.63	0.116
		1	0	20.87	0.122	20.65	0.116	20.72	0.118
		1	25	20.54	0.113	20.56	0.114	20.46	0.111
		1	49	20.65	0.116	20.67	0.117	20.58	0.114
		25	0	19.94	0.099	19.64	0.092	19.57	0.091
	256QAM	25	12	19.75	0.094	19.61	0.091	19.47	0.089
		25	25	19.79	0.095	19.71	0.094	19.44	0.088
		50	0	19.77	0.095	19.66	0.092	19.66	0.092
		1	0	17.39	0.055	17.34	0.054	17.27	0.053
		1	25	16.99	0.050	17.17	0.052	17.17	0.052
		1	49	17.53	0.057	17.41	0.055	17.37	0.055
LTE Band 38									
256QAM	25	0	17.44	0.055	17.39	0.055	17.35	0.054	
	25	12	17.51	0.056	17.42	0.055	17.42	0.055	
	25	25	17.32	0.054	17.22	0.053	17.25	0.053	
	50	0	17.36	0.054	17.31	0.054	17.36	0.054	

LTE Band 38									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				37825 (2 577.5 MHz)		38000 (2 595.0 MHz)		38175 (2 612.5 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
15	QPSK	1	0	22.69	0.186	22.37	0.173	22.36	0.172
		1	36	22.45	0.176	22.53	0.179	22.36	0.172
		1	74	22.41	0.174	22.51	0.178	22.52	0.179
		36	0	21.74	0.149	21.51	0.142	21.41	0.138
		36	18	21.48	0.141	21.60	0.145	21.47	0.140
		36	37	21.43	0.139	21.50	0.141	21.51	0.142
		75	0	21.63	0.146	21.41	0.138	21.33	0.136
	16QAM	1	0	21.95	0.157	21.63	0.146	21.59	0.144
		1	36	21.66	0.147	21.59	0.144	21.49	0.141
		1	74	21.53	0.142	21.53	0.142	21.62	0.145
		36	0	20.91	0.123	20.65	0.116	20.62	0.115
		36	18	20.79	0.120	20.77	0.119	20.38	0.109
		36	37	20.76	0.119	20.86	0.122	20.89	0.123
		75	0	20.79	0.120	20.60	0.115	20.51	0.112
	64QAM	1	0	20.97	0.125	20.66	0.116	20.52	0.113
		1	36	20.73	0.118	20.71	0.118	20.81	0.121
		1	74	20.85	0.122	20.73	0.118	20.76	0.119
		36	0	19.93	0.098	19.71	0.094	19.65	0.092
		36	18	19.92	0.098	19.79	0.095	19.87	0.097
		36	37	19.88	0.097	19.75	0.094	19.91	0.098
		75	0	19.79	0.095	19.59	0.091	19.57	0.091
	256QAM	1	0	17.45	0.056	17.42	0.055	17.43	0.055
		1	36	17.39	0.055	17.20	0.052	17.20	0.052
		1	74	17.50	0.056	17.34	0.054	17.16	0.052
36		0	17.54	0.057	17.51	0.056	17.59	0.057	
36		18	17.27	0.053	17.18	0.052	17.35	0.054	
36		37	17.44	0.055	17.34	0.054	17.16	0.052	
75		0	17.16	0.052	17.29	0.054	17.28	0.053	
LTE Band 38									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				37850 (2 580.0 MHz)		38000 (2 595.0 MHz)		38150 (2 610.0 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	QPSK	1	0	22.68	0.185	22.79	0.190	22.54	0.179
		1	50	22.52	0.179	22.42	0.175	21.31	0.135
		1	99	22.49	0.177	22.41	0.174	22.36	0.172
		50	0	21.69	0.148	21.85	0.153	21.51	0.142
		50	25	21.58	0.144	21.52	0.142	21.59	0.144
		50	50	21.61	0.145	21.59	0.144	21.58	0.144
		100	0	21.61	0.145	21.51	0.142	21.52	0.142
	16QAM	1	0	21.94	0.156	21.84	0.153	21.52	0.142
		1	50	21.95	0.157	21.59	0.144	21.47	0.140
		1	99	21.88	0.154	21.57	0.144	21.48	0.141
		50	0	21.00	0.126	20.77	0.119	20.71	0.118
		50	25	20.91	0.123	20.75	0.119	20.63	0.116
		50	50	20.76	0.119	20.84	0.121	20.57	0.114
		100	0	20.82	0.121	20.58	0.114	20.67	0.117
	64QAM	1	0	20.82	0.121	20.81	0.121	20.60	0.115
		1	50	20.83	0.121	20.78	0.120	20.51	0.112
		1	99	20.78	0.120	20.85	0.122	20.57	0.114
		50	0	20.04	0.101	19.77	0.095	19.70	0.093
		50	25	19.99	0.100	19.85	0.097	19.51	0.089
		50	50	20.01	0.100	19.92	0.098	19.63	0.092
		100	0	19.84	0.096	19.68	0.093	19.69	0.093
	256QAM	1	0	17.33	0.054	17.50	0.056	17.61	0.058
		1	50	17.16	0.052	17.34	0.054	17.36	0.054
		1	99	17.57	0.057	17.39	0.055	17.40	0.055
50		0	17.46	0.056	17.60	0.058	17.50	0.056	
50		25	17.72	0.059	17.62	0.058	17.69	0.059	
50		50	17.50	0.056	17.51	0.056	17.39	0.055	
100		0	17.20	0.052	17.39	0.055	17.39	0.055	

LTE Band 42 IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				42115 (3 452.5 MHz)		42840 (3 525.0 MHz)		43565 (3 597.5 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.69	0.186	22.67	0.185	22.74	0.188
		1	12	22.93	0.196	22.81	0.191	22.82	0.191
		1	24	22.93	0.196	22.74	0.188	22.66	0.185
		12	0	21.78	0.151	21.74	0.149	21.62	0.145
		12	6	21.95	0.157	21.86	0.153	21.86	0.153
		12	13	21.81	0.152	21.78	0.151	21.88	0.154
	25	0	21.87	0.154	21.74	0.149	21.93	0.156	
	16QAM	1	0	21.81	0.152	21.68	0.147	21.67	0.147
		1	12	21.58	0.144	21.65	0.146	21.47	0.140
		1	24	21.88	0.154	21.82	0.152	21.63	0.146
		12	0	20.50	0.112	20.63	0.116	20.61	0.115
		12	6	20.80	0.120	20.82	0.121	20.80	0.120
		12	13	20.96	0.125	20.79	0.120	20.62	0.115
	25	0	20.83	0.121	20.76	0.119	20.84	0.121	
	64QAM	1	0	21.03	0.127	21.04	0.127	21.16	0.131
		1	12	20.97	0.125	21.13	0.130	21.20	0.132
		1	24	20.82	0.121	20.64	0.116	20.50	0.112
		12	0	19.83	0.096	19.74	0.094	19.76	0.095
		12	6	19.89	0.097	19.82	0.096	19.72	0.094
		12	13	20.05	0.101	19.89	0.097	19.88	0.097
	25	0	19.97	0.099	19.85	0.097	19.86	0.097	
	256QAM	1	0	17.61	0.058	17.58	0.057	17.38	0.055
		1	12	17.75	0.060	17.85	0.061	17.76	0.060
		1	24	17.84	0.061	17.93	0.062	17.99	0.063
12		0	17.62	0.058	16.73	0.047	17.49	0.056	
12		6	17.72	0.059	16.83	0.048	17.67	0.058	
12		13	17.97	0.063	16.78	0.048	17.74	0.059	
25	0	17.58	0.057	16.83	0.048	17.76	0.060		
LTE Band 42 IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				42140 (3 455.0 MHz)		42840 (3 525.0 MHz)		43540 (3 595.0 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
10	QPSK	1	0	22.65	0.184	22.43	0.175	22.58	0.181
		1	25	22.84	0.192	22.62	0.183	22.74	0.188
		1	49	22.74	0.188	22.91	0.195	22.86	0.193
		25	0	21.91	0.155	21.73	0.149	21.85	0.153
		25	12	22.16	0.164	21.92	0.156	21.99	0.158
		25	25	21.72	0.149	21.78	0.151	21.79	0.151
	50	0	21.80	0.151	21.84	0.153	21.68	0.147	
	16QAM	1	0	21.71	0.148	21.52	0.142	21.69	0.148
		1	25	22.11	0.163	22.10	0.162	21.91	0.155
		1	49	21.73	0.149	21.80	0.151	21.89	0.155
		25	0	20.63	0.116	20.61	0.115	20.76	0.119
		25	12	20.63	0.116	20.61	0.115	20.80	0.120
		25	25	20.90	0.123	20.90	0.123	20.96	0.125
	50	0	20.79	0.120	20.63	0.116	20.60	0.115	
	64QAM	1	0	20.36	0.109	20.17	0.104	20.37	0.109
		1	25	21.14	0.130	21.05	0.127	20.94	0.124
		1	49	20.67	0.117	20.61	0.115	20.60	0.115
		25	0	19.63	0.092	19.64	0.092	19.71	0.094
		25	12	20.07	0.102	19.91	0.098	19.92	0.098
		25	25	19.99	0.100	19.96	0.099	19.85	0.097
	50	0	20.20	0.105	20.11	0.103	20.07	0.102	
	256QAM	1	0	17.66	0.058	17.71	0.059	17.64	0.058
		1	25	17.58	0.057	17.72	0.059	17.63	0.058
		1	49	17.94	0.062	17.98	0.063	17.88	0.061
25		0	17.51	0.056	17.77	0.060	16.72	0.047	
25		12	17.54	0.057	17.78	0.060	16.85	0.048	
25		25	17.84	0.061	17.77	0.060	16.86	0.049	
50	0	18.03	0.064	17.99	0.063	16.65	0.046		

LTE Band 42_IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				42165 (3 457.5 MHz)		42840 (3 525.0 MHz)		43515 (3 592.5 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
15	QPSK	1	0	22.52	0.179	22.57	0.181	22.64	0.184
		1	36	22.70	0.186	22.93	0.196	22.79	0.190
		1	74	22.71	0.187	22.79	0.190	22.81	0.191
		36	0	21.56	0.143	21.91	0.155	21.75	0.150
		36	18	22.11	0.163	22.00	0.158	21.98	0.158
		36	37	21.94	0.156	22.09	0.162	21.93	0.156
		75	0	21.73	0.149	21.75	0.150	21.75	0.150
	16QAM	1	0	21.81	0.152	21.75	0.150	21.74	0.149
		1	36	22.00	0.158	21.68	0.147	21.84	0.153
		1	74	21.66	0.147	21.70	0.148	21.86	0.153
		36	0	20.85	0.122	20.70	0.117	20.80	0.120
		36	18	20.74	0.119	20.88	0.122	20.81	0.121
		36	37	20.67	0.117	20.90	0.123	20.84	0.121
		75	0	20.68	0.117	20.85	0.122	20.77	0.119
	64QAM	1	0	20.44	0.111	20.30	0.107	20.38	0.109
		1	36	20.82	0.121	21.04	0.127	20.85	0.122
		1	74	20.90	0.123	20.57	0.114	20.71	0.118
		36	0	19.50	0.089	19.69	0.093	19.70	0.093
		36	18	20.01	0.100	19.94	0.099	19.86	0.097
		36	37	19.55	0.090	19.64	0.092	19.75	0.094
		75	0	20.17	0.104	20.18	0.104	20.09	0.102
	256QAM	1	0	17.39	0.055	17.38	0.055	17.51	0.056
		1	36	17.70	0.059	17.76	0.060	17.56	0.057
		1	74	17.97	0.063	18.08	0.064	18.03	0.064
36		0	17.45	0.056	17.45	0.056	16.57	0.045	
36		18	17.73	0.059	17.73	0.059	16.96	0.050	
36		37	18.05	0.064	17.89	0.062	16.72	0.047	
75		0	18.23	0.067	18.11	0.065	16.70	0.047	
LTE Band 42_IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				42190 (3 460.0 MHz)		42840 (3 525.0 MHz)		43490 (3 590.0 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	QPSK	1	0	22.87	0.194	22.63	0.183	22.76	0.189
		1	50	22.82	0.191	22.91	0.195	22.90	0.195
		1	99	22.65	0.184	22.93	0.196	22.94	0.197
		50	0	21.79	0.151	21.98	0.158	21.90	0.155
		50	25	21.94	0.156	22.07	0.161	21.99	0.158
		50	50	21.99	0.158	21.90	0.155	21.93	0.156
		100	0	21.56	0.143	21.78	0.151	21.76	0.150
	16QAM	1	0	22.03	0.160	21.96	0.157	21.87	0.154
		1	50	22.01	0.159	22.00	0.158	21.97	0.157
		1	99	21.95	0.157	21.90	0.155	21.97	0.157
		50	0	20.73	0.118	20.90	0.123	20.86	0.122
		50	25	21.01	0.126	20.80	0.120	20.94	0.124
		50	50	21.00	0.126	21.11	0.129	20.97	0.125
		100	0	20.71	0.118	20.81	0.121	20.78	0.120
	64QAM	1	0	20.29	0.107	20.61	0.115	20.45	0.111
		1	50	20.86	0.122	20.86	0.122	20.96	0.125
		1	99	20.84	0.121	20.61	0.115	20.73	0.118
		50	0	19.72	0.094	19.78	0.095	19.88	0.097
		50	25	20.09	0.102	19.89	0.097	19.96	0.099
		50	50	19.97	0.099	19.85	0.097	19.94	0.099
		100	0	19.96	0.099	20.19	0.104	20.12	0.103
	256QAM	1	0	17.89	0.062	17.88	0.061	17.69	0.059
		1	50	17.60	0.058	17.79	0.060	17.75	0.060
		1	99	18.06	0.064	17.89	0.062	18.06	0.064
50		0	17.67	0.058	17.73	0.059	16.72	0.047	
50		25	17.81	0.060	17.69	0.059	17.00	0.050	
50		50	17.63	0.058	17.94	0.062	16.89	0.049	
100		0	18.19	0.066	17.86	0.061	16.81	0.048	

LTE Band 48 IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55265 (3 552.5 MHz)		55990 (3 625.0 MHz)		56715 (3 697.5 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
5	QPSK	1	0	22.58	0.181	22.52	0.179	22.50	0.178
		1	12	22.28	0.169	22.20	0.166	22.20	0.166
		1	24	22.25	0.168	22.17	0.165	22.27	0.169
		12	0	21.38	0.137	21.44	0.139	21.30	0.135
		12	6	21.39	0.138	21.29	0.135	21.42	0.139
		12	13	21.29	0.135	21.36	0.137	21.28	0.134
	16QAM	25	0	21.19	0.132	21.24	0.133	21.30	0.135
		1	0	21.51	0.142	21.49	0.141	21.50	0.141
		1	12	21.76	0.150	21.62	0.145	21.58	0.144
		1	24	21.18	0.131	21.15	0.130	21.10	0.129
		12	0	20.29	0.107	20.26	0.106	20.44	0.111
		12	6	20.41	0.110	20.36	0.109	20.28	0.107
	64QAM	12	13	20.18	0.104	20.18	0.104	20.36	0.109
		25	0	20.20	0.105	20.22	0.105	20.34	0.108
		1	0	20.30	0.107	20.26	0.106	20.22	0.105
		1	12	20.18	0.104	20.14	0.103	20.03	0.101
		1	24	20.12	0.103	20.11	0.103	20.00	0.100
		12	0	19.18	0.083	19.19	0.083	19.17	0.083
	256QAM	12	6	19.27	0.085	19.37	0.086	19.21	0.083
		12	13	19.28	0.085	19.39	0.087	19.34	0.086
		25	0	19.38	0.087	19.37	0.086	19.36	0.086
		1	0	18.03	0.064	18.00	0.063	18.13	0.065
		1	12	17.82	0.061	17.75	0.060	17.84	0.061
		1	24	17.67	0.058	17.66	0.058	17.61	0.058
10	QPSK	12	0	16.84	0.048	16.90	0.049	16.82	0.048
		12	6	16.93	0.049	16.84	0.048	16.79	0.048
		12	13	16.91	0.049	16.91	0.049	16.73	0.047
		25	0	16.73	0.047	16.88	0.049	16.78	0.048
		1	0	22.35	0.172	22.78	0.190	22.79	0.190
		1	25	22.32	0.171	22.85	0.193	22.81	0.191
	16QAM	1	49	22.35	0.172	22.81	0.191	22.82	0.191
		25	0	21.50	0.141	21.79	0.151	21.78	0.151
		25	12	21.45	0.140	21.82	0.152	21.87	0.154
		25	25	21.45	0.140	21.73	0.149	21.28	0.134
		50	0	21.19	0.132	21.21	0.132	21.28	0.134
		1	0	21.46	0.140	21.48	0.141	21.47	0.140
	64QAM	1	25	21.64	0.146	21.68	0.147	21.69	0.148
		1	49	21.12	0.129	21.15	0.130	21.20	0.132
		25	0	20.42	0.110	20.39	0.109	20.34	0.108
		25	12	20.42	0.110	20.25	0.106	20.33	0.108
		25	25	20.20	0.105	20.34	0.108	20.20	0.105
		50	0	20.37	0.109	20.26	0.106	20.22	0.105
	256QAM	1	0	20.31	0.107	20.30	0.107	20.34	0.108
		1	25	20.06	0.101	20.04	0.101	20.16	0.104
		1	49	20.11	0.103	19.95	0.099	20.05	0.101
		25	0	19.25	0.084	19.25	0.084	19.23	0.084
		25	12	19.33	0.086	19.30	0.085	19.18	0.083
		25	25	19.45	0.088	19.32	0.086	19.29	0.085
QPSK	50	0	19.35	0.086	19.42	0.087	19.46	0.088	
	1	0	18.15	0.065	18.12	0.065	18.16	0.065	
	1	25	17.80	0.060	17.88	0.061	17.84	0.061	
	1	49	17.76	0.060	17.65	0.058	17.70	0.059	
	25	0	16.83	0.048	17.00	0.050	17.00	0.050	
	25	12	16.81	0.048	16.79	0.048	16.88	0.049	
16QAM	25	25	16.88	0.049	16.85	0.048	16.89	0.049	
	50	0	16.73	0.047	16.81	0.048	16.78	0.048	

LTE Band 48_IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55315 (3 557.5 MHz)		55990 (3 625.0 MHz)		56665 (3 692.5 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
15	QPSK	1	0	22.30	0.170	22.56	0.180	22.71	0.187
		1	36	22.24	0.167	22.22	0.167	22.85	0.193
		1	74	22.27	0.169	22.34	0.171	22.82	0.191
		36	0	21.39	0.138	21.31	0.135	21.73	0.149
		36	18	21.37	0.137	21.35	0.136	21.79	0.151
		36	37	21.44	0.139	21.33	0.136	21.76	0.150
		75	0	21.27	0.134	21.18	0.131	21.24	0.133
	16QAM	1	0	21.43	0.139	21.33	0.136	21.41	0.138
		1	36	21.67	0.147	21.70	0.148	21.70	0.148
		1	74	21.15	0.130	21.16	0.131	21.05	0.127
		36	0	20.43	0.110	20.28	0.107	20.30	0.107
		36	18	20.33	0.108	20.26	0.106	20.35	0.108
		36	37	20.31	0.107	20.36	0.109	20.19	0.104
		75	0	20.38	0.109	20.28	0.107	20.34	0.108
	64QAM	1	0	20.19	0.104	20.24	0.106	20.20	0.105
		1	36	20.19	0.104	20.16	0.104	20.16	0.104
		1	74	20.05	0.101	19.97	0.099	20.11	0.103
		36	0	19.32	0.086	19.23	0.084	19.30	0.085
		36	18	19.31	0.085	19.31	0.085	19.29	0.085
		36	37	19.44	0.088	19.29	0.085	19.42	0.087
		75	0	19.43	0.088	19.43	0.088	19.36	0.086
	256QAM	1	0	18.12	0.065	18.05	0.064	18.01	0.063
		1	36	17.79	0.060	17.72	0.059	17.81	0.060
		1	74	17.66	0.058	17.64	0.058	17.65	0.058
		36	0	16.90	0.049	16.81	0.048	16.81	0.048
		36	18	16.82	0.048	16.85	0.048	16.77	0.048
		36	37	16.89	0.049	16.82	0.048	16.85	0.048
		75	0	16.85	0.048	16.83	0.048	16.76	0.047
LTE Band 48_IC									
Bandwidth (MHz)	Modulation	RB Size	RB Offset	Conducted Output Power					
				55340 (3 560.0 MHz)		55990 (3 625.0 MHz)		56640 (3 690.0 MHz)	
				(dB m)	(W)	(dB m)	(W)	(dB m)	(W)
20	QPSK	1	0	22.61	0.182	22.63	0.183	22.72	0.187
		1	50	22.56	0.180	22.87	0.194	22.86	0.193
		1	99	22.35	0.172	22.71	0.187	22.78	0.190
		50	0	21.48	0.141	21.80	0.151	21.71	0.148
		50	25	21.53	0.142	21.89	0.155	21.88	0.154
		50	50	21.43	0.139	21.75	0.150	21.78	0.151
		100	0	21.37	0.137	21.72	0.149	21.69	0.148
	16QAM	1	0	21.52	0.142	21.90	0.155	21.64	0.146
		1	50	21.77	0.150	22.02	0.159	21.81	0.152
		1	99	21.24	0.133	21.77	0.150	21.77	0.150
		50	0	20.45	0.111	20.77	0.119	20.82	0.121
		50	25	20.45	0.111	20.72	0.118	20.87	0.122
		50	50	20.37	0.109	20.65	0.116	20.75	0.119
		100	0	20.39	0.109	20.67	0.117	20.81	0.121
	64QAM	1	0	20.34	0.108	20.59	0.115	20.76	0.119
		1	50	20.20	0.105	20.59	0.115	20.75	0.119
		1	99	20.13	0.103	20.66	0.116	20.83	0.121
		50	0	19.36	0.086	19.77	0.095	19.76	0.095
		50	25	19.38	0.087	19.71	0.094	19.87	0.097
		50	50	19.46	0.088	19.72	0.094	19.84	0.096
		100	0	19.51	0.089	19.71	0.094	19.75	0.094
	256QAM	1	0	18.16	0.065	18.08	0.064	18.15	0.065
		1	50	17.90	0.062	17.77	0.060	17.90	0.062
		1	99	17.78	0.060	17.76	0.060	17.80	0.060
		50	0	17.01	0.050	16.94	0.049	16.96	0.050
		50	25	16.96	0.050	17.01	0.050	16.85	0.048
		50	50	16.93	0.049	16.94	0.049	16.86	0.049
		100	0	16.89	0.049	16.87	0.049	16.89	0.049

4. Occupied Bandwidth

4.1. Limit

CFR 47, Section FCC §2.1049 and IC RSS-Gen Issue 5 6.7.

4.2. Test Procedure

FCC

The test follows section 5.4.4 of ANSI C63.26-2015.

- a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation. products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- b. The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d. Set the detection mode to peak, and the trace mode to max-hold.
- e. If the instrument does not have a 99 % OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5 % of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5 % of the total is reached and record that frequency as the upper OBW frequency. The 99 % power OBW can be determined by computing the difference these two frequencies.
- f. The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

IC

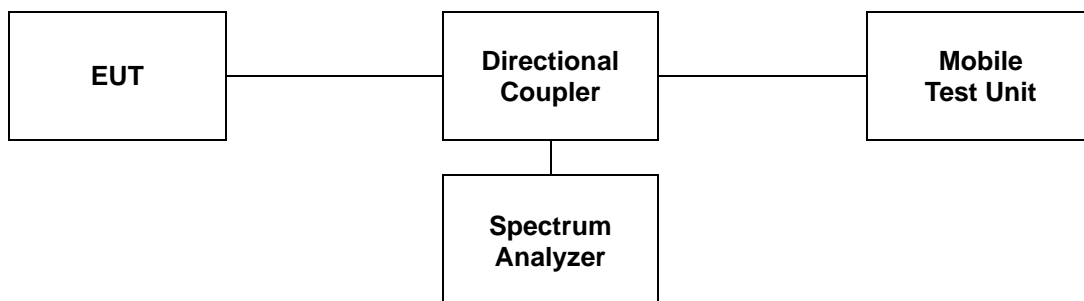
The test follows section 6.7 of RSS-Gen Issue 5.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99 % emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99 % emission bandwidth).



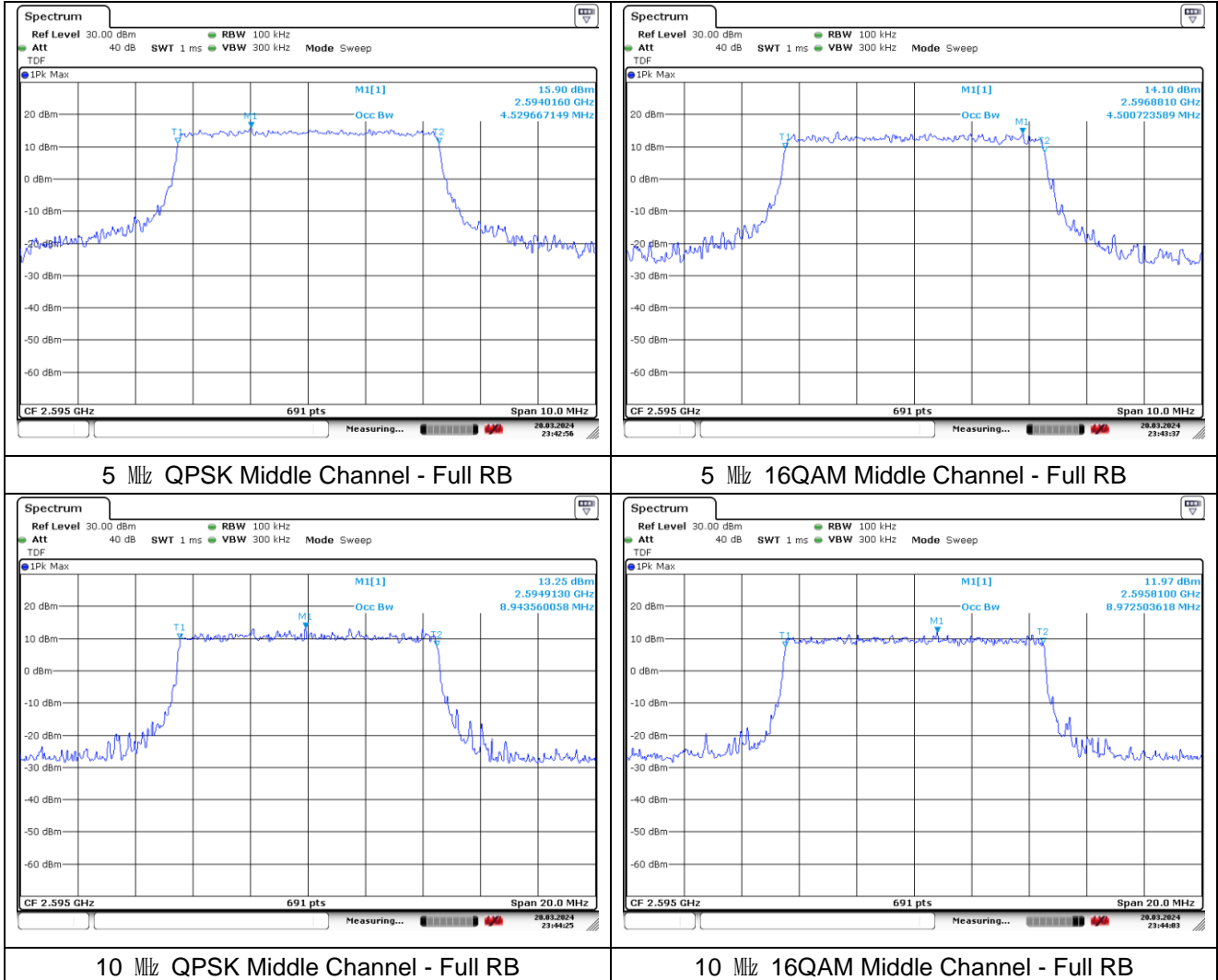
4.3 Test Results

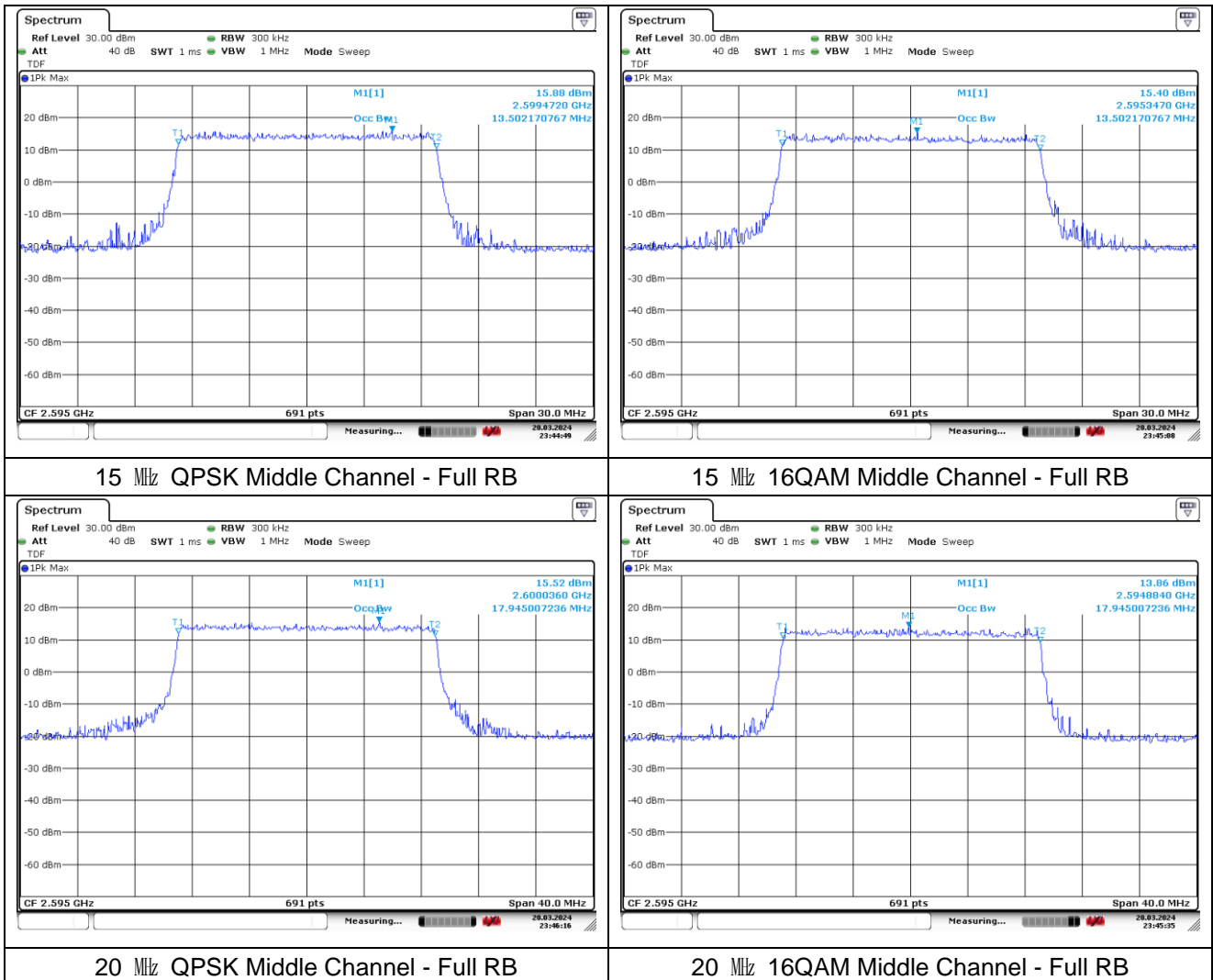
Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

Band	Bandwidth (MHz)	Frequency (MHz)	Occupied Bandwidth (MHz)	
			QPSK	16QAM
38	5	2 595.0	4.530	4.501
	10		8.944	8.973
	15		13.502	13.502
	20		17.945	17.945
42 Only IC	5	3 525.0	4.515	4.501
	10		8.973	8.944
	15		13.546	13.546
	20		18.003	18.003
48 IC	5	3 625.0	4.530	4.530
	10		8.973	8.973
	15		13.502	13.546
	20		18.003	17.945

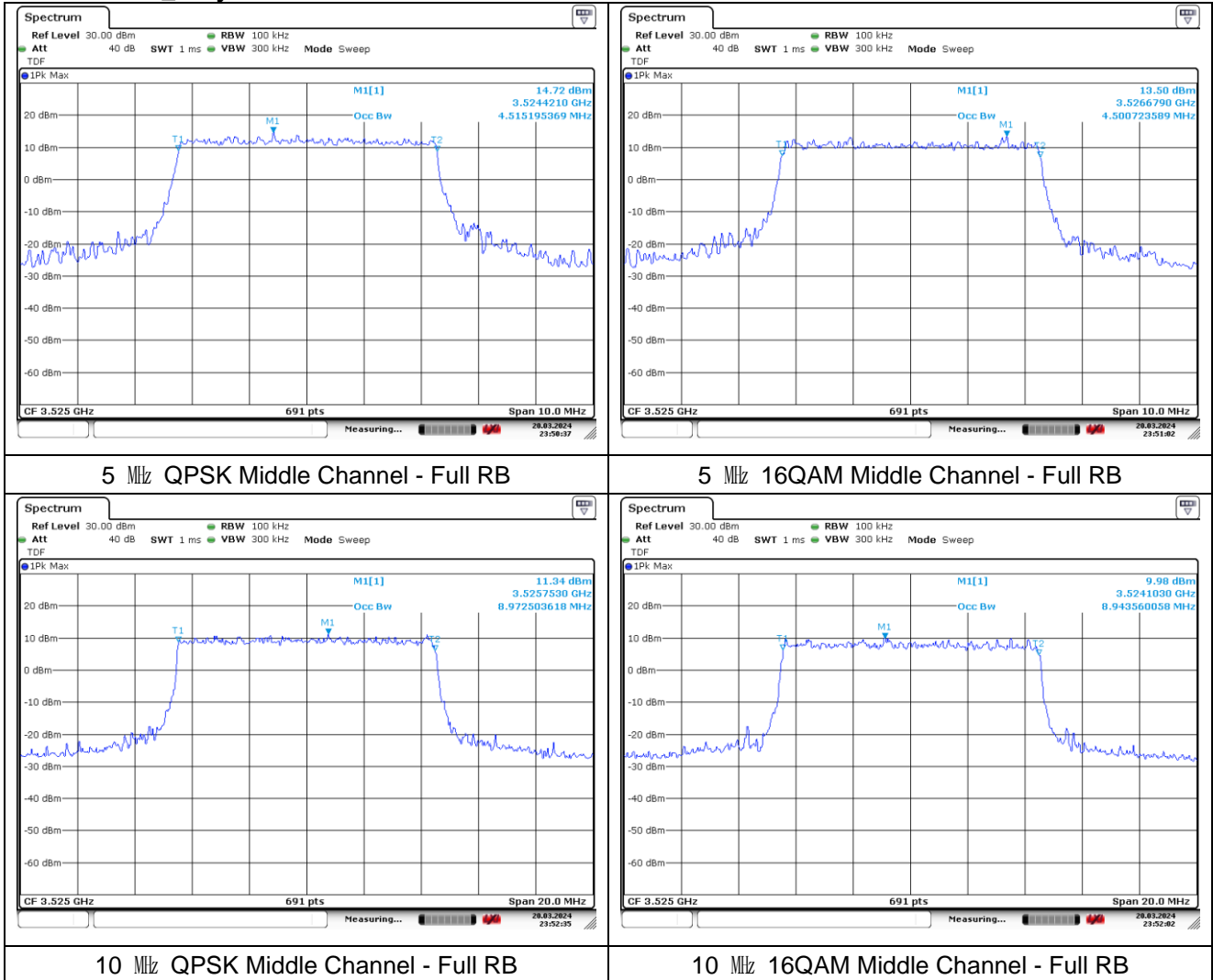
- Test plots

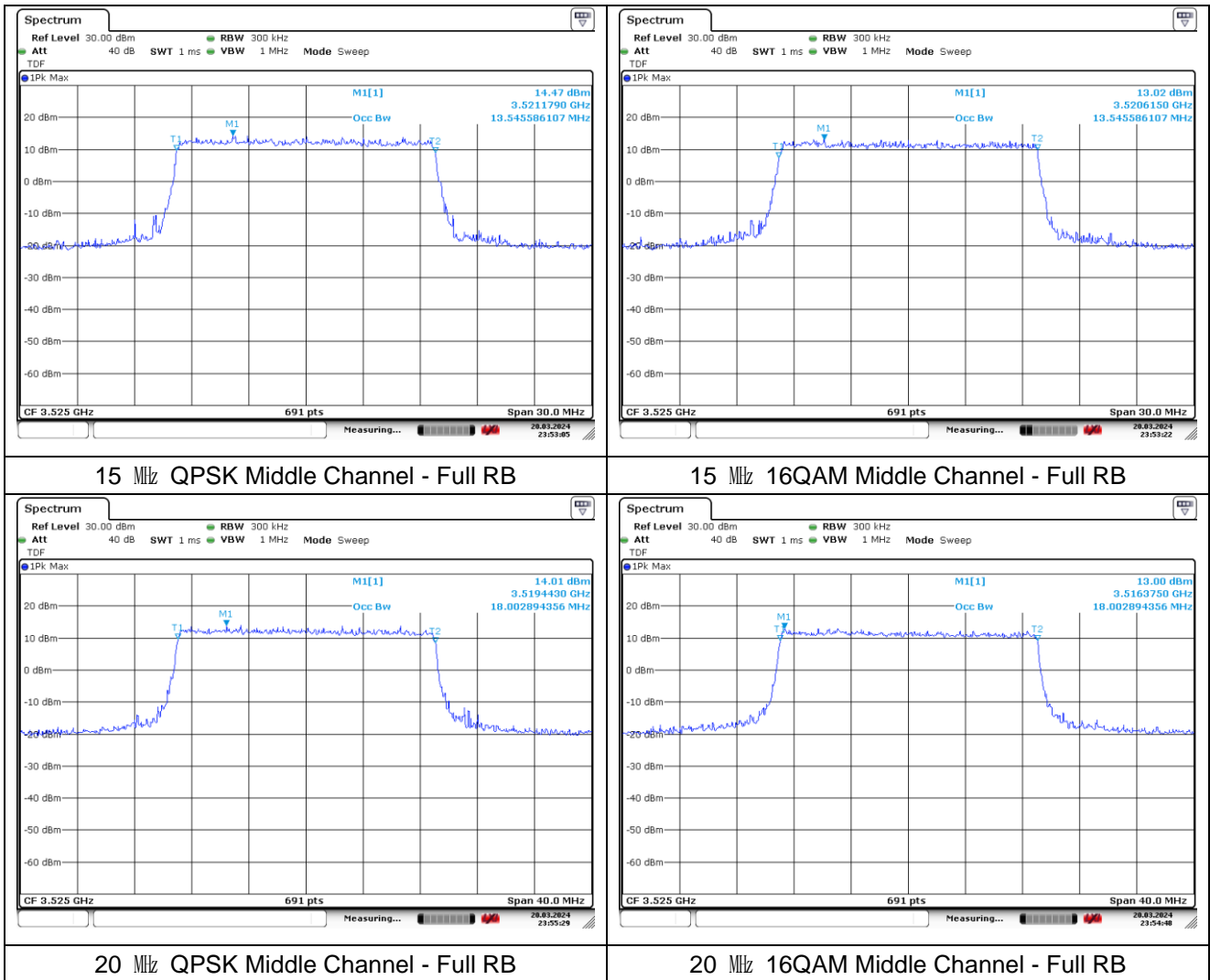
LTE band 38





LTE band 42_Only IC





LTE band 48 (IC)

