ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	Motive Technologies, Inc. 55 Hawthorne St. Suite #400, San Francisco, CA 94105, USA
Manufacturer:	Motive Technologies, Inc. 55 Hawthorne St. Suite #400, San Francisco, CA 94105, USA
Product Name:	AI Dashcam Plus
Brand Name:	Motive
Model No.:	DC64-NA.01
/ISED HVIN:	
Family No.:	DC63-NA.01, DC64-WW.01, DC63-WW.01
/ Family ISED HVIN:	
Model Difference:	DC64-NA.01 & DC64-WW.01 with 3 cameras design; DC63-NA.01 & DC63-WW.01 with 2 cameras design
ISED PMN:	AI Dashcam Plus
Report Number:	TERF2405001348ER
FCC ID	2AQM7-DC6
IC:	24516-DC6
Date of EUT Received:	April 22, 2024
Date of Test:	May 8, 2024～December 19, 2024
Issue Date:	December 30, 2024

Approved By _____
Jim Chang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI ANSI C63.26-2015 and the energy emitted by the sample EUT comply with FCC rule part 2, 22H & 24E & 27 C and ISED RSS-Gen, 130, 132, 133, 139, 140, 199.

The results of this report relate only to the sample identified in this report.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2405001348ER	00	Original	Dec. 2, 2024	Candice Li	
TERF2405001348ER	01	Modify Section 6.1, 9.2, Annex A Section 4; Add Duty cycle of Section 10	Dec. 23, 2024	Candice Li	*
TERF2405001348ER	02	Add PMN, Revision Note 3; Modify FVIN, Section 9.3	Dec. 30, 2024	Candice Li	*

Note:

1、 The remark "*" indicates modification of the report upon requests from certification body.

2、 Variant information of model numbers is provided by the applicant, test results of this report are applicable to the sample EUT(s) received.
And are assessed as electrically identical in RF characteristics, therefore, no further assessment required for the variant(s).

3、 There is no different camera module among HVINs, the DC63-NA.01 and DC63-WW.01 are depopulated 1 camera from the DC64-NA01 and DC64-WW.01. And DC64-WW.01 & DC63-WW.01 just for marketing purpose.

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Contents

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1 GENERAL PRODUCT INFORMATION

1.1 Product Description

Product Name:	AI Dashcam Plus
Brand Name:	Motive
Model No.: /ISED HVIN:	DC64-NA.01
Family No.: / Family ISED HVIN:	DC63-NA.01, DC64-WW.01, DC63-WW.01
Model Difference:	DC64-NA.01 & DC64-WW.01 with 3 cameras design; DC63-NA.01 & DC63-WW.01 with 2 cameras design
Hardware Version:	1
Firmware Version:	N/A
EUT Series No.:	AABV52BE140032 (Conducted) AABV85BE140141 (Radiated)
Power Supply:	12-24Vdc
Test Software (Name/Version)	default(Link Call Box)

1.2 Operation Frequency Range

LTE Band 2			
BW (MHz)	Operation Frequency (MHz)		
1.4	1850.7	-	1909.3
3	1851.5	-	1908.5
5	1852.5	-	1907.5
10	1855.0	-	1905.0
15	1857.5	-	1902.5
20	1860.0	-	1900.0

LTE Band 4			
BW (MHz)	Operation Frequency (MHz)		
1.4	1710.7	-	1754.3
3	1711.5	-	1753.5
5	1712.5	-	1752.5
10	1715.0	-	1750.0
15	1717.5	-	1747.5
20	1720.0	-	1745.0

LTE Band 5			
BW (MHz)	Operation Frequency (MHz)		
1.4	824.7	-	848.3
3	825.5	-	847.5
5	826.5	-	846.5
10	829.0	-	844.0

LTE Band 7			
BW (MHz)	Operation Frequency (MHz)		
5	2502.5	-	2567.5
10	2505.0	-	2565.0
15	2507.5	-	2562.5
20	2510.0	-	2560.0

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LTE Band 12			
BW (MHz)	Operation Frequency (MHz)		
1.4	699.7	-	715.3
3	700.5	-	714.5
5	701.5	-	713.5
10	704.0	-	711.0

LTE Band 13			
BW (MHz)	Operation Frequency (MHz)		
5	779.5	-	784.5
10	782.0		

LTE Band 14			
BW (MHz)	Operation Frequency (MHz)		
5	790.5	-	795.5
10	793.0		

LTE Band 25			
BW (MHz)	Operation Frequency (MHz)		
1.4	1850.7	-	1914.3
3	1851.5	-	1913.5
5	1852.5	-	1912.5
10	1855.0	-	1910.0
15	1857.5	-	1907.5
20	1860.0	-	1905.0

LTE Band 26 Part 90			
BW (MHz)	Operation Frequency (MHz)		
1.4	814.7	-	823.3
3	815.5	-	822.5
5	816.5	-	821.5
10	819.0		

LTE Band 26			
BW (MHz)	Operation Frequency (MHz)		
1.4	824.7	-	848.3
3	825.5	-	847.5
5	826.5	-	846.5
10	829.0	-	844.0
15	831.5	-	841.5

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1.3 Antenna Designation

Antenna Type	Antenna Model No.
IFA	Ant0
Note: Transmission in frequencies in this test report are only available by the above antenna(s).	

Modulation	Frequency (MHz)			Peak Antenna Gain (dBi)
				Ant0
LTE-Band 2	1850	~	1910	3.83
LTE-Band 4	1710	~	1755	3.38
LTE-Band 5	824	~	849	2.78
LTE-Band 7	2500	~	2570	3.92
LTE-Band 12	699	~	716	2.04
LTE-Band 13	777	~	787	2.71
LTE-Band 14	788	~	798	2.66
LTE-Band 25	1850	~	1915	3.83
LTE-Band 26 Part 90	814	~	824	2.76
LTE-Band 26	824	~	849	2.78

Note: Antenna information is provided by the applicant.

1.4 Type of Emission & Max ERP/EIRP Power Measurement Result:

LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
2	1.4	1850.7	1909.3	QPSK	26.46	EIRP	0.443	1.0878	1M09G7D
				16QAM	25.70	EIRP	**0.372**	1.0895	1M09D7W
2	3	1851.5	1908.5	QPSK	26.68	EIRP	0.466	2.6885	2M69G7D
				16QAM	25.48	EIRP	0.353	2.6887	2M69D7W
2	5	1852.5	1907.5	QPSK	26.46	EIRP	0.443	4.4867	4M49G7D
				16QAM	25.40	EIRP	0.347	4.4917	4M49D7W
2	10	1855.0	1905.0	QPSK	26.48	EIRP	0.445	8.9767	8M98G7D
				16QAM	25.37	EIRP	0.344	8.9318	8M93D7W
2	15	1857.5	1902.5	QPSK	26.84	EIRP	**0.483**	13.444	13M4G7D
				16QAM	24.95	EIRP	0.313	13.415	13M4D7W
2	20	1860.0	1900.0	QPSK	26.74	EIRP	0.472	17.875	17M9G7D
				16QAM	25.44	EIRP	0.350	17.886	17M9D7W

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LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
4	1.4	1710.7	1754.3	QPSK	26.07	EIRP	0.405	1.0899	1M09G7D
				16QAM	25.24	EIRP	**0.334**	1.0893	1M09D7W
4	3	1711.5	1753.5	QPSK	26.29	EIRP	0.426	2.6860	2M69G7D
				16QAM	25.05	EIRP	0.320	2.6907	2M69D7W
4	5	1712.5	1752.5	QPSK	26.09	EIRP	0.406	4.4885	4M49G7D
				16QAM	24.93	EIRP	0.311	4.4920	4M49D7W
4	10	1715.0	1750.0	QPSK	26.05	EIRP	0.403	8.9689	8M97G7D
				16QAM	24.99	EIRP	0.316	8.9362	8M94D7W
4	15	1717.5	1747.5	QPSK	26.40	EIRP	**0.437**	13.4440	13M4G7D
				16QAM	24.53	EIRP	0.284	13.4140	13M4D7W
4	20	1720.0	1745.0	QPSK	26.30	EIRP	0.427	17.8650	17M9G7D
				16QAM	25.04	EIRP	0.319	17.9080	17M9D7W
LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
5	1.4	824.7	848.3	QPSK	23.32	ERP	0.215	1.0894	1M09G7D
				16QAM	22.51	ERP	**0.178**	1.0902	1M09D7W
5	3	825.5	847.5	QPSK	23.56	ERP	**0.227**	2.6852	2M69G7D
				16QAM	22.32	ERP	0.171	2.6897	2M69D7W
5	5	826.5	846.5	QPSK	23.28	ERP	0.213	4.4829	4M48G7D
				16QAM	22.17	ERP	0.165	4.4846	4M48D7W
5	10	829.0	844.0	QPSK	23.29	ERP	0.213	8.9777	8M98G7D
				16QAM	22.20	ERP	0.166	8.9492	8M95D7W
LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
7	5	2502.5	2567.5	QPSK	26.13	EIRP	0.410	4.4843	4M48G7D
				16QAM	25.08	EIRP	0.322	4.4894	4M49D7W
7	10	2505.0	2565.0	QPSK	26.19	EIRP	0.416	8.9713	8M97G7D
				16QAM	25.10	EIRP	0.324	8.9255	8M93D7W
7	15	2507.5	2562.5	QPSK	26.18	EIRP	0.415	13.4220	13M4G7D
				16QAM	25.09	EIRP	0.323	13.4290	13M4D7W
7	20	2510.0	2560.0	QPSK	26.23	EIRP	**0.420**	17.9080	17M9G7D
				16QAM	25.11	EIRP	**0.324**	17.9110	17M9D7W
LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
12	1.4	699.7	715.3	QPSK	22.58	ERP	0.181	1.0898	1M09G7D
				16QAM	21.74	ERP	**0.149**	1.0898	1M09D7W
12	3	700.5	714.5	QPSK	22.73	ERP	**0.187**	2.6899	2M69G7D
				16QAM	21.57	ERP	0.144	2.6924	2M69D7W
12	5	701.5	713.5	QPSK	22.59	ERP	0.182	4.4932	4M49G7D
				16QAM	21.45	ERP	0.140	4.4936	4M49D7W
12	10	704.0	711.0	QPSK	22.56	ERP	0.180	8.9732	8M97G7D
				16QAM	21.50	ERP	0.141	8.9506	8M95D7W

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LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
13	5	779.5	784.5	QPSK	23.25	ERP	**0.211**	4.4890	4M49G7D
				16QAM	22.17	ERP	**0.165**	4.4931	4M49D7W
13	10	782.0	782.0	QPSK	22.94	ERP	0.197	8.9396	8M94G7D
				16QAM	22.15	ERP	0.164	8.9290	8M93D7W
LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
14	5	790.5	795.5	QPSK	23.07	ERP	0.203	4.4867	4M49G7D
				16QAM	22.11	ERP	0.163	4.4930	4M49D7W
14	10	793.0	793.0	QPSK	23.10	ERP	**0.204**	8.9744	8M97G7D
				16QAM	22.12	ERP	**0.163**	8.9499	8M95D7W
LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
25	1.4	1850.7	1914.3	QPSK	25.32	EIRP	0.340	1.0912	1M09G7D
				16QAM	24.37	EIRP	**0.274**	1.0905	1M09D7W
25	3	1851.5	1913.5	QPSK	25.32	EIRP	0.340	2.6884	2M69G7D
				16QAM	24.37	EIRP	**0.274**	2.6922	2M69D7W
25	5	1852.5	1912.5	QPSK	25.36	EIRP	**0.344**	4.4897	4M49G7D
				16QAM	24.33	EIRP	0.271	4.4911	4M49D7W
25	10	1855.0	1910.0	QPSK	25.36	EIRP	**0.344**	8.9661	8M97G7D
				16QAM	24.33	EIRP	0.271	8.9310	8M93D7W
25	15	1857.5	1907.5	QPSK	25.29	EIRP	0.338	13.4000	13M4G7D
				16QAM	24.30	EIRP	0.269	13.4160	13M4D7W
25	20	1860.0	1905.0	QPSK	25.25	EIRP	0.335	17.8580	17M9G7D
				16QAM	24.34	EIRP	0.272	17.8650	17M9D7W
LTE Band	BW	Frequency		Modulation	Conducted (dBm)		(W)	99%	Type of Emission
26 Part 90	1.4	814.7	823.3	QPSK	22.55	ERP	0.180	1.0903	1M09G7D
				16QAM	21.60	ERP	**0.145**	1.0890	1M09D7W
26 Part 90	3	815.5	822.5	QPSK	22.54	ERP	0.179	2.6856	2M69G7D
				16QAM	21.56	ERP	0.143	2.6900	2M69D7W
26 Part 90	5	816.5	821.5	QPSK	22.48	ERP	0.177	4.4836	4M48G7D
				16QAM	21.60	ERP	**0.145**	4.4907	4M49D7W
26 Part 90	10	819.0	819.0	QPSK	22.58	ERP	**0.181**	8.9433	8M94G7D
				16QAM	21.55	ERP	0.143	8.9059	8M91D7W

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LTE Band	BW	Frequency		Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission
26	1.4	824.7	848.3	QPSK	23.21	ERP	0.209	1.0897	1M09G7D
				16QAM	22.22	ERP	**0.167**	1.0900	1M09D7W
26	3	825.5	847.5	QPSK	23.19	ERP	0.208	2.6860	2M69G7D
				16QAM	22.21	ERP	0.166	2.6878	2M69D7W
26	5	826.5	846.5	QPSK	23.15	ERP	0.207	4.4846	4M48G7D
				16QAM	22.22	ERP	**0.167**	4.4902	4M49D7W
26	10	829.0	844.0	QPSK	23.17	ERP	0.207	8.9886	8M99G7D
				16QAM	22.15	ERP	0.164	8.9505	8M95D7W
26	15	831.5	841.5	QPSK	23.28	ERP	**0.213**	13.4670	13M5G7D
				16QAM	22.18	ERP	0.165	13.4530	13M5D7W

1.5 Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22H, 24E, 27C, Part 90.
ISED RSS-GEN Issue 5 Amendment 2 Feb. 2021
ISED RSS-130 Issue 2 Feb. 2019,
ISED RSS-132 Issue 4 Jan. 2023
ISED RSS-133 Issue 7,
ISED RSS-139 Issue 4 Amendment Oct. 2022
ISED RSS-140 Issue 1 Apr. 2018,
ISED RSS-199 Issue 4 July 2023
ANSI C63.26-2015
KDB971168 D01 Power Meas license Digital System v03r01
KDB412172 D01 Determining ERP and EIRP v01r01

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1.6 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 2		
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		
Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.				

1.7 Special Accessories

No special accessories were used during testing.

1.8 Equipment Modifications

There was no modifications incorporated into the EUT.

1.9 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*6m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.
There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Measurement at Antenna Port

The EUT is placed on a table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.3.2 Radiated Emissions (ERP/EIRP)

The EUT is placed on a turn table, for emission measurements below 1 GHz is 0.8 m above ground plane, for emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.
Note:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

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2.5 Final Amplifier Voltage and Current Information:

LTE Band 2

Test mode	DC voltage (V)	DC current (mA)
LTE Band 2_20M QPSK	12	230

LTE Band 4

Test mode	DC voltage (V)	DC current (mA)
LTE Band 4_20M QPSK	12	220

LTE Band 5

Test mode	DC voltage (V)	DC current (mA)
LTE Band 5_10M QPSK	12	180

LTE Band 7

Test mode	DC voltage (V)	DC current (mA)
LTE Band 7_20M QPSK	12	210

LTE Band 12

Test mode	DC voltage (V)	DC current (mA)
LTE Band 12_10M QPSK	12	200

LTE Band 13

Test mode	DC voltage (V)	DC current (mA)
LTE Band 13_10M QPSK	12	210

LTE Band 14

Test mode	DC voltage (V)	DC current (mA)
LTE Band 14_10M QPSK	12	220

LTE Band 25

Test mode	DC voltage (V)	DC current (mA)
LTE Band 25_20M QPSK	12	200

LTE Band 26 for Part 90S

Test Mode	DC voltage (V)	DC current (mA)
LTE Band 26_10M QPSK	12	210

LTE Band 26

Test mode	DC voltage (V)	DC current (mA)
LTE Band 26_15M QPSK	12	200

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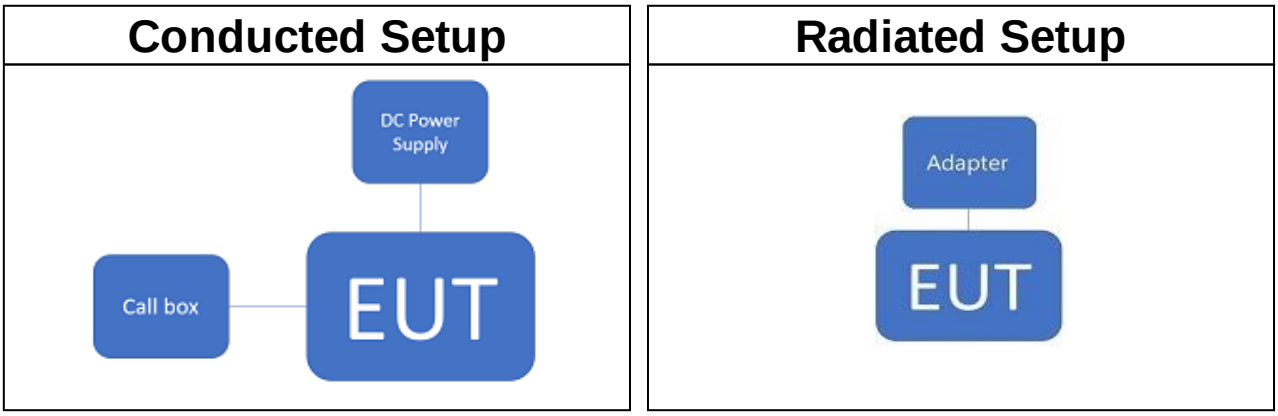
2.6 Test Configuration



Note: Radio Communication Analyzer is placed in remote side for radiated test.

2.7 Control Unit(s)

Radiated Emission Test Site: SAC D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Adapter	iMax	CHAO024-120200	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§2.1046(a)	RSS-GEN §6.12	RF Power Output	Compliant
§22.913(a)(5) §24.232(c) §27.50(b)(9) §27.50(c)(9) §27.50(d)(4) §27.50(h)(2) §90.542(a)(6) §90.635	RSS-130 §4.6 RSS-132 §5.4 RSS-133 §5.5 RSS-139 §5.5 RSS-140 §4.3 RSS-199 §5.5	ERP/ EIRP measurement	Compliant
§2.1049(h)	RSS-GEN §6.7	99% & 26dB Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a) §27.53(c)(2),(4) §27.53(g) §27.53(h) §27.53(m)(4)(6) §90.543 (e)(2)~(5) §90.691	RSS-GEN §6.13 RSS-130 §4.7 RSS-132 §5.5 RSS-133 §5.6 RSS-139 §5.6 RSS-140 §4.4 RSS-199 §5.6	Out of Band Emissions at Antenna Terminals and Band Edge / Emission mask re-quirements	Compliant
§2.1053 §24.238(a) §27.53(c)(2),(4) §27.53(f) §27.53(g) §27.53(h) §27.53(m)(4) §90.691(a)(1)(2)	RSS-GEN §6.13 RSS-130 §4.7 RSS-132 §5.5 RSS-133 §5.6 RSS-139 §5.6 RSS-140 §4.4 RSS-199 §5.6	Field Strength of Spurious Radiation	Compliant
§22.913(d) §24.232(d) §27.50(a)(1)(B)	RSS-130 §4.6.1 RSS-132 §5.4 RSS-133 §5.5 RSS-139 §5.5 RSS-140 §4.3 RSS-199 §5.5	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235 §27.54 §90.539 (e)	RSS-130 §4.5 RSS-132 §5.3 RSS-133 §5.4 RSS-139 §5.4 RSS-140 §4.2 RSS-195 §5.4 RSS-197 §5.3 RSS-199 §5.4	Frequency Stability	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Pre-Scan has been conducted to determine the worst-case scenario from all possible combinations among available modulations, data rates and antenna ports, the worst case configurations listed below for the final test.
3. The field strength of radiated emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.

4.2 Measurement Configuration

Test Items				Max. Output Power										
Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
	L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
5	v	v	v	v	v	v	v	-	-	v	v	v	v	v
7	v	v	v	-	-	v	v	v	v	v	v	v	v	v
12	v	v	v	v	v	v	v	-	-	v	v	v	v	v
13	v	v	v	-	-	v	v	-	-	v	v	v	v	v
14	v	v	v	-	-	v	v	-	-	v	v	v	v	v
25	v	v	v	v	v	v	v	v	v	v	v	v	v	v
26	v	v	v	v	v	v	v	v	-	v	v	v	v	v
26 P90	v	v	v	v	v	v	v	-	-	v	v	v	v	v
Test Items				Freqency Stability										
2	-	v	-	-	-	-	v	-	-	v	-	-	-	v
4	-	v	-	-	-	-	v	-	-	v	-	-	-	v
5	-	v	-	-	-	-	v	-	-	v	-	-	-	v
7	-	v	-	-	-	-	v			v	-	-	-	v
12	-	v	-	-	-	-	v	-	-	v	-	-	-	v
13	-	v	-	-	-	-	v	-	-	v	-	-	-	v
14	-	v	-	-	-		v	-	-	v	-	-	-	v
25	-	v	-				v			v	-	-	-	v
26	-	v	-				v		-	v	-	-	-	v
26 P90	-	v	-				v	-	-	v	-	-	-	v

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Test Items	26dB and 99% Bandwidth													
Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
	L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
2	v	v	v	v	v	v	v	v	v	v	v	-	-	v
4	v	v	v	v	v	v	v	v	v	v	v	-	-	v
5	v	v	v	v	v	v	v	-	-	v	v	-	-	v
7	v	v	v	-	-	v	v	v	v	v	v	-	-	v
12	v	v	v	v	v	v	v	-	-	v	v	-	-	v
13	v	v	v	-	-	v	v	-	-	v	v	-	-	v
14	v	v	v	-	-	v	v	-	-	v	v	-	-	v
25	v	v	v	v	v	v	v	v	v	v	v	-	-	v
26	v	v	v	v	v	v	v	v	-	v	v	-	-	v
26 P90	v	v	v	v	v	v	v	-	-	v	v	-	-	v
Test Items	Peak-to-Av erage Ratio													
2	v	v	v	v	v	v	v	v	v	v	v	-	-	v
4	v	v	v	v	v	v	v	v	v	v	v	-	-	v
5	v	v	v	v	v	v	v	-	-	v	v	-	-	v
7	v	v	v	-	-	v	v	v	v	v	v	-	-	v
12	v	v	v	v	v	v	v	-	-	v	v	-	-	v
13	v	v	v	-	-	v	v	-	-	v	v	-	-	v
14	v	v	v	-	-	v	v	-	-	v	v	-	-	v
25	v	v	v	v	v	v	v	v	v	v	v	-	-	v
26	v	v	v	v	v	v	v	v	-	v	v	-	-	v
26 P90	v	v	v	v	v	v	v	-	-	v	v	-	-	v

Test Items	Band Edge													
Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
	L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
2	v	-	v	v	v	v	v	v	v	v	-	v	v	v
4	v	-	v	v	v	v	v	v	v	v	-	v	v	v
5	v	-	v	v	v	v	v	-	-	v	-	v	v	v
7	v	-	v	-	-	v	v	v	v	v	-	v	v	v
12	v	-	v	v	v	v	v	-	-	v	-	v	v	v
13	v	-	v	-	-	v	v	-	-	v	-	v	v	v
14	v	-	v	-	-	v	v	-	-	v	-	v	v	v
25	v	-	v	v	v	v	v	v	v	v	-	v	v	v
26	v	-	v	v	v	v	v	v	-	v	-	v	v	v
26 P90	v	-	v	v	v	v	v	-	-	v	-	v	v	v
Test Items	Conducted Emission													
2	v	v	v	v	v	v	v	v	v	v	-	v	-	-
4	v	v	v	v	v	v	v	v	v	v	-	v	-	-
5	v	v	v	v	v	v	v	-	-	v	-	v	-	-
7	v	v	v	-	-	v	v	v	v	v	-	v	-	-
12	v	v	v	v	v	v	v	-	-	v	-	v	-	-
13	v	v	v	-	-	v	v	-	-	v	-	v	-	-
14	v	v	v	-	-	v	v	-	-	v	-	v	-	-
25	v	v	v	v	v	v	v	v	v	v	-	v	-	-
26	v	v	v	v	v	v	v	v	-	v	-	v	-	-
26 P90	v	v	v	v	v	v	v	-	-	v	-	v	-	-

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
Power Density	+/-	0.61	dB
RF Power Output	+/-	0.97	dB
ERP/ EIRP measurement	+/-	2.15	dB
	+/-	2.15	dB
Emission Bandwidth	+/-	1.38	Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/-	0.77	dB
Peak to Average Ratio	+/-	0.97	dB
Frequency Stability vs. Temperature	+/-	1.48	Hz
Frequency Stability vs. Voltage	+/-	1.48	Hz
Temperature	+/-	0.6	°C
Humidity	+/-	3	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.15**	**dB**	30MHz - 1000MHz
	+/-	**3.43**	**dB**	1GHz - 18GHz
	+/-	**3.86**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**1.89**	**dB**	9kHz~30MHz
	+/-	**4.02**	**dB**	30MHz - 1000MHz
	+/-	**3.43**	**dB**	1GHz - 18GHz
	+/-	**3.86**	**dB**	18GHz - 40GHz
Radiated Spurious Emission	**+/-**	**2**	**dB**	33GHz-50GHz
	+/-	**1.59**	**dB**	50GHz-60GHz
	+/-	**1.7**	**dB**	60GHz-90GHz
	+/-	**1.64**	**dB**	90GHz-140GHz
	+/-	**3.83**	**dB**	140GHz-220GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6 MEASUREMENT EQUIPMENT USED

6.1 Conducted Measurement

Conducted Emission Test Site: Conducted E					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Attenuator	Marvelous	MVE2213-10	RF06	11/15/2023	11/14/2024
Coaxial Cables	Woken	00100A1F1A185C	RF72	11/15/2023	11/14/2024
DC Block	PASTERNACK	PE8210	RF157	11/15/2023	11/14/2024
DC Power Supply	DHA	DPS-3003	9411005787	08/21/2023	08/20/2024
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	04/02/2024	04/01/2025
Spectrum Analyzer	KEYSIGHT	N9010A	MY57120200	04/03/2024	04/02/2025
Splitter	Woken	DOM35LW1A2	RF255	11/15/2023	11/14/2024
Temperature Chamber	Haich	HC-TOPH-30-CHP	QHC20230320-100-2	08/24/2023	08/23/2024
Test Software	SGS Taiwan	Radio Test Software	Ver.21	N.C.R	N.C.R

Conducted Emission Test Site: Conducted E					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Attenuator	Marvelous	MVE2213-10	RF06	11/14/2024	11/13/2025
Coaxial Cables	Woken	00100A1F1A185C	RF72	11/14/2024	11/13/2025
DC Block	PASTERNACK	PE8210	RF157	11/14/2024	11/13/2025
Splitter	Woken	DOM35LW1A2	RF255	11/14/2024	11/13/2025
Radio Communication Analyer	Anritsu	MT8820C	6201107337	07/18/2024	07/17/2025
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	10/16/2024	10/15/2025
DC Power Supply	DHA	DPS-3003	9411005787	08/19/2024	08/18/2025
Temperature Chamber	Haich	HC-TOPH-30-CHP	QHC20230320-100-2	08/23/2024	08/22/2025
Test Software	SGS Taiwan	Radio Test Software	Ver.21	N.C.R	N.C.R

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6.2 Radiated Measurement

Radiated Emission Test Site: SAC D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
3m Site NSA	SGS	966 chamber D	N/A	04/30/2024	04/29/2025
Band Reject Filter	WI	WRC GV695/920-635/980	RF194	11/15/2023	11/14/2024
Band Reject Filter	WI	WRC JV2300/2700-2240/2760-40/12SS	RF203	11/15/2023	11/14/2024
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-300	11/02/2023	11/01/2024
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-617	12/14/2023	12/13/2024
Coaxial Cable	Huber+Suhner	EMC106-SM-SM-7200	150703	11/15/2023	11/14/2024
Coaxial Cable	Huber+Suhner	RG 214/U	W21.01	11/15/2023	11/14/2024
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	MY17413/4	11/15/2023	11/14/2024
Horn Antenna	RF SPIN	DRH18-E	210105A18E	04/12/2024	04/11/2025
Horn Antenna	Schwarzbeck	BBHA9120D	1187	01/24/2024	01/23/2025
Horn Antenna	Schwarzbeck	BBHA9170	184	12/28/2023	12/27/2024
Horn Antenna	Schwarzbeck	BBHA9170	185	08/21/2023	08/20/2024
Notch Filter	Woken	EWT-54-0037	RF202	11/15/2023	11/14/2024
Notch Filter	Woken	EWT-54-0038	RF178	11/15/2023	11/14/2024
Pre-Amplifier	EMC Instruments	EMC12630SE	980273	11/15/2023	11/14/2024
Pre-Amplifier	EMC Instruments	EMC18405SEE	980881	11/15/2023	11/14/2024
Pre-Amplifier	EMC Instruments	EMC9135	980234	11/15/2023	11/14/2024
Radio Communication Analyer	Anritsu	MT8820C	6201465316	07/12/2024	07/11/2025
Radio Communication Analyer	Anritsu	MT8820C	6201107337	07/14/2023	07/13/2024
Spectrum Analyzer	KEYSIGHT	N9010A	MY57120200	04/03/2024	04/02/2025
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

NOTE: *N.C.R refers to Not Calibrated Required.*

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7 STANDARD APPLICABLE

7.1 Maximum Output Power

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

7.1.1 ERP/EIRP LIMIT

According to FCC §2.1046

FCC 22.913(a)

(5) mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

FCC 24.232(c)

Mobile and portable stations are limited to 2 W EIRP.

FCC 27.50 (b)

(9) Control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 30 watts ERP.

FCC 27.50(c)

(9) Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

FCC 27.50(d)

(4) Mobile, and portable (hand-held) stations operating in the 1710-1755 MHz, 1695-1710 MHz and 1755-1780 MHz bands are limited to 1W EIRP.

FCC 27, 50(h)

(2) Mobile and other user stations transmitting in the BRS and EBS bands are limited to 2 W EIRP.

FCC 90.542(a)

(6) Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP.

FCC 90.635(b)

Mobile station is limited to 100W ERP

RSS-130 §4.6

The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment operating in 698-756 and 777-787 MHz.

RSS-132 §5.4

The transmitter output power shall be measured in terms of average power. The equivalent radiated power (e.r.p.) shall not exceed 7 watts for mobile equipment and 3 watts for portable equipment.

The effective isotropic radiated power (e.i.r.p.) shall not exceed the limits specified in SRSP-503 for base station equipment.

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RSS-133 §5.5

The maximum power spectral density of the equipment, measured in terms of average values, shall comply with the limits specified in table 2. These limits are either specified in terms of equivalent isotropically radiated power (e.i.r.p.) or TRP for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-510 for more deployment details in the bands 1850-1915 MHz and 1930-1995 MHz. AAS equipment with eight antenna elements or less can demonstrate compliance with the e.i.r.p limit specified for non-AAS equipment in table 2, instead of the TRP limit.

Table 2: Maximum power spectral density of equipment

Equipment type	Maximum power spectral density
Non-AAS fixed station and base station	3280 W/MHz e.i.r.p
AAS fixed station and base station	46 dBm/MHz TRP
Subscriber equipment	2 W /channel bandwidth e.i.r.p

RSS-139 §5.5

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

The limits in this RSS are specified for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-513 and SRSP-519 for more details on the bands 2110-2180 MHz and 2180-2200 MHz respectively

Table 3: Maximum power of equipment in the band 1710-1780 MHz	
Equipment type	**Maximum power**
Fixed station and base station	30 dBm e.i.r.p./channel bandwidth
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Table 4: Maximum power of equipment in the band 2110-2180 MHz	
Equipment type	**Maximum power**
Non-AAS fixed station and base station	65 dBm e.i.r.p./MHz
AAS fixed station and base station	46 dBm TRP/MHz
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Table 5: Maximum power of equipment in the band 2180-2200 MHz	
Equipment type	**Maximum power**
Non-AAS base station	65 dBm e.i.r.p./MHz
AAS base station	46 dBm TRP/MHz

RSS-140 §4.3

The equivalent radiated power (e.r.p.) for control and mobile equipment shall not exceed 30 W. The e.r.p. for portable equipment including handheld devices shall not ex-ceed 3 W.

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RSS-199 §5.5

For Subscriber equipment other than fixed subscriber equipment operating in the Band 2500-2690MHz, the e.i.r.p. shall not exceed 2 W.

7.2 Occupied Bandwidth Measurement

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

7.3 Out Of Band Emission At Antenna Terminals

FCC §22.917(a), §24.238(a), §27.53(h), §90.543(e)(3)
RSS-130 §4.7, RSS-132 §5.5, RSS-133 §6.5.1, RSS-139 §5.6, RSS-140 §4.4, RSS-199 §5.6

Out of band emissions.The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

FCC §27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776– 788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB (-13dBm)

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC §27.53(g)

Compliance for operations in the 600 MHz, 698-746 MHz, 746-758 MHz and the 776-788 MHz band with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

ISED RSS-130 §4.7.1

Compliance for operations in the 617-652 MHz, 663-698 MHz, 698-756 MHz and the 777-787 MHz band, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

ISED RSS-130 §4.7.2

In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:
the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:

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76 + 10 log10 p (watts), dB, for base and fixed equipment and
65 + 10 log10 p (watts), dB, for mobile and portable equipment

the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

ISED RSS-132 §5.5

i. Equipment shall meet the unwanted emission limits specified below:

In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB.

ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

p is the output power specified in watts.

ISED RSS-133 §5.6

Unwanted emissions shall be measured in terms of average values while 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 in table 3, 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 bands 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 (OBW). Beyond these 1 MHz bands, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth may be used, provided that the Personal Communications Service Equipment Operating in the Bands 1850-1915 MHz and 1930-1995 MHz RSS-133 6 measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% of the OBW, 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 table 3.

Table 3: Unwanted emission limits for all equipment

Offset frequency from the edge of the frequency block group (MHz)	Unwanted emission limits
≤1	-13 dBm/(1% of OB*)
>1 MHz	-13 dBm/MHz

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FCC §27.53(h)(1)

(h) *AWS emission limits*—(1) *General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

RSS-139 §5.6

Unwanted emissions shall be measured in terms of average values.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors) of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in table 6.

Table 6: Table 6: Unwanted emission limits

Offset from the edge of the frequency block or frequency block group	Unwanted emission limits
1 MHz	-13 dBm/(1% of OB*)
>1 MHz	-13 dBm/MHz
Subscriber equipment	30 dBm e.i.r.p./channel bandwidth

*OB is the occupied bandwidth.

In addition to complying with the above limits, equipment operating in the band 2180-2200 MHz may require additional filtering (see SRSP-519).

ISED RSS-140 §4.4

a. For any frequency between 769-775 MHz and 799-806 MHz:
   i. 76 + 10 log (p), dB in a 6.25 kHz band for fixed and base station equipment
   ii. 65 + 10 log (p), dB in a 6.25 kHz band for mobile and portable/hand-held equipment

b. For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: 43 + 10 log (p), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

FCC §27.53(m) (4) (6)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (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 (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 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.

Measurement procedure. Compliance with these rules is based on the use of measurement nstrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to

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the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

ISED RSS-199 §5.6

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 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 limits
0-1	-10 dBm/(2% of OB*)
1-5	-10 dBm/MHz
5-X**	-13 dBm/MHz
≥ X	-25 dBm/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 dBm/MHz on all frequencies between 2490.5 MHz and 2496 MHz, and -25 dBm/MHz at or below 2490.5 MHz.

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FCC §90.543 (e)

For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

FCC §90.691 Emission mask requirements for EA-based systems

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

7.4 Field Strength Of Spurious Radiation Measurement

According to FCC §2.1053,

FCC §22.917(a), §24.238(a), §27.53(h), §90.543(e)(3)

RSS-130 §4.7, RSS-132 §5.5, RSS-133 §5.6, RSS-139 §5.6, RSS-140 §4.4, RSS-199 §5.6

Out of band emissions.The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

FCC §27.53(g)

Compliance for operations in the 600 MHz, 698-746 MHz, 746-758 MHz and the 776-788 MHz band with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee’s frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

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FCC §90.543 (f)

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC §27.53(h)(1)

(h) *AWS emission limits*—(1) *General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}$ (P) dB.

FCC §27.53(m) (4) (6)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (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 (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 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.

Measurement procedure. Compliance with these rules is based on the use of measurement nstrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

RSS-199 §5.6

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

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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 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 limits
0-1	-10 dBm/(2% of OB*)
1-5	-10 dBm/MHz
5-X**	-13 dBm/MHz
≥ X	-25 dBm/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 dBm/MHz on all frequencies between 2490.5 MHz and 2496 MHz, and -25 dBm/MHz at or below 2490.5 MHz.

§90.691 Emission mask requirements for EA-based systems

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

RSS-130 §4.7.1

Compliance for operations in the 617-652 MHz, 663-698 MHz, 698-756 MHz and the 777-787 MHz band, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

RSS-130 §4.7.2

In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:
the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:

76 + 10 log10 p (watts), dB, for base and fixed equipment and
65 + 10 log10 p (watts), dB, for mobile and portable equipment

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the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

RSS-132 §5.5

i. Equipment shall meet the unwanted emission limits specified below:

In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB.

ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dBW) by at least 43 + 10 log(p) dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

p is the output power specified in watts.

RSS-133 §5.6

Unwanted emissions shall be measured in terms of average values while 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 in table 3, 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 bands 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 (OBW). Beyond these 1 MHz bands, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth may be used, provided that the Personal Communications Service Equipment Operating in the Bands 1850-1915 MHz and 1930-1995 MHz RSS-133 6 measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% of the OBW, 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 table 3.

Table 3: Unwanted emission limits for all equipment

Offset frequency from the edge of the frequency block group (MHz)	Unwanted emission limits
≤1	-13 dBm/(1% of OB*)
>1 MHz	-13 dBm/MHz

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RSS-140 §4.4 for LTE B14

a. For any frequency between 769-775 MHz and 799-806 MHz:

   i. 76 + 10 log (p), dB in a 6.25 kHz band for fixed and base station equipment

   ii. 65 + 10 log (p), dB in a 6.25 kHz band for mobile and portable/hand-held equipment

b. For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: 43 + 10 log (p), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

7.5 Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7.6 Peak to Average Ratio

The peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

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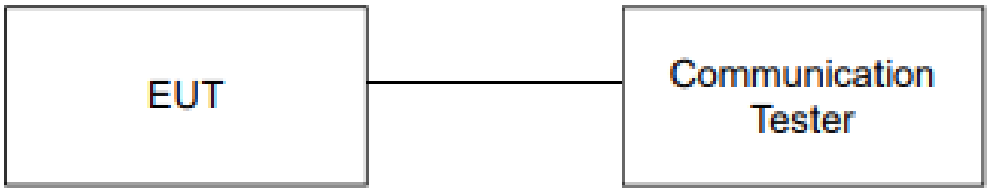
8 TEST SETUP

8.1 Maximum Output Power

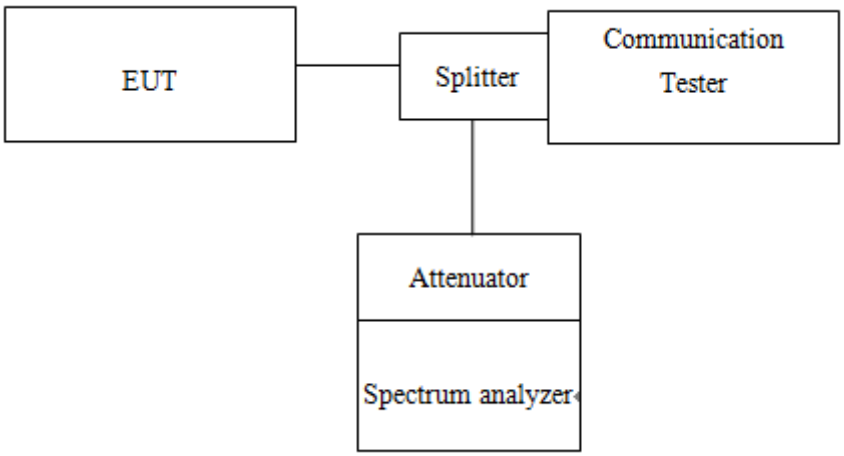


Note: *Measurement setup for testing on Antenna connector*

8.2 Occupied Bandwidth Measurement

Note: *Measurement setup for testing on Antenna connector*

8.3 Out of Band Emission At Antenna Terminals



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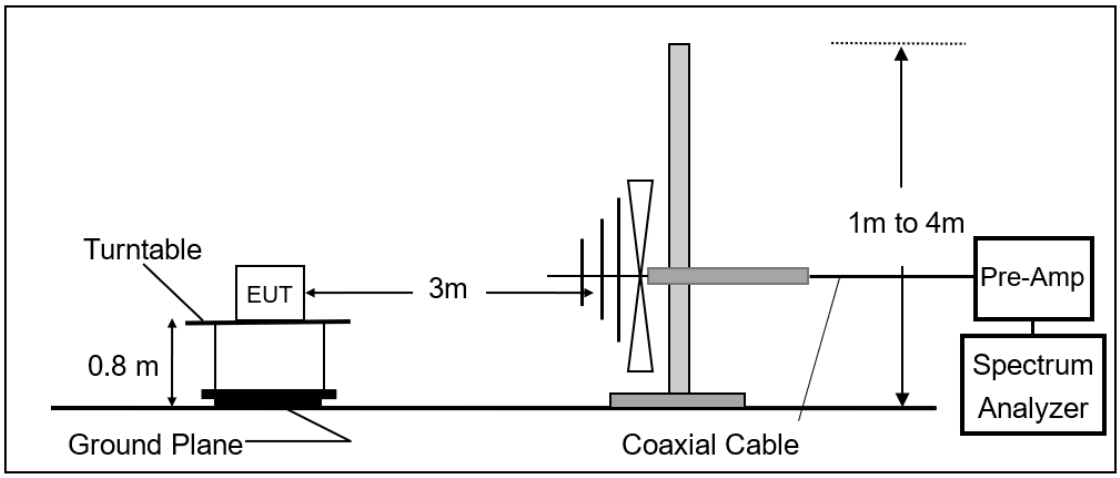
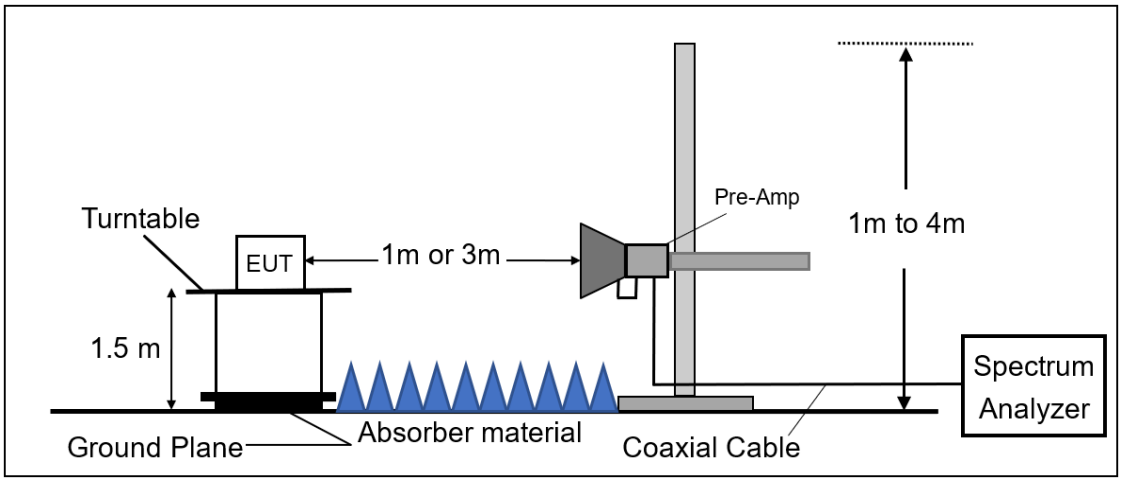
8.4 Field Strength of Spurious Radiation Measurement

Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



Radiated Emission Test Set-Up, Frequency Above 1GHz.



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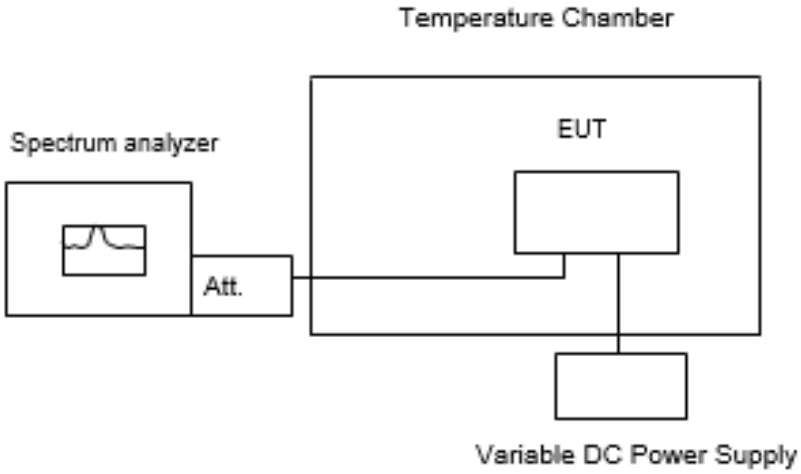
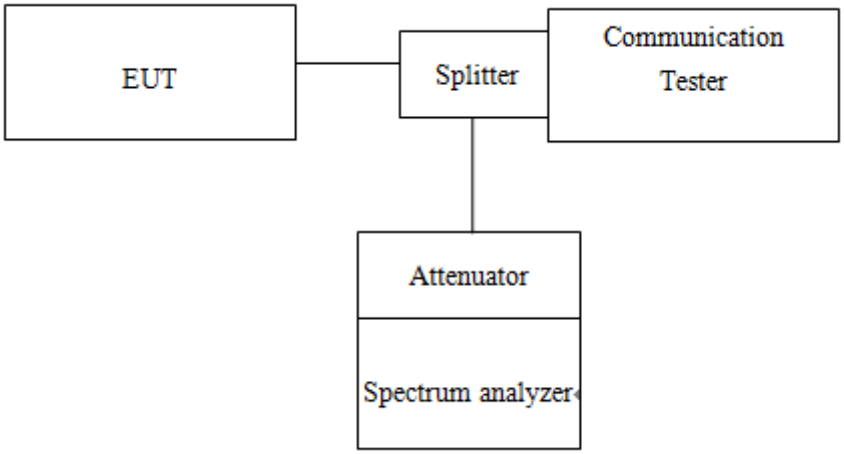
8.5 Frequency Stability Measurement



Note: *Measurement setup for testing on Antenna connector*

8.6 Peak To Average Ratio



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9 TEST PROCEDURE

9.1 Maximum Output Power

9.1.1 Output Power Measurement Applicable Guideance

The transmitter output was connected to a communication tester. Transmitter output was read off the communication tester in dBm. The power output at the transmitter antenna port was determined by the communication tester reading.
KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results.
All LTE bands conducted average power is obtained from the simulator telecommunication test set.

9.1.2 Determining ERP and/or EIRP from conducted RF output power measurements

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$,

$ERP = EIRP - 2.15$,

Where:

ERP or EIRP	= effective radiated power or equivalent isotropically radiated power (expressed in the same units as PT, typically dBW, dBm, or power spectral density (PSD)2), relative to either a dipole antenna (ERP) or an isotropic antenna (EIRP);
P_T	= transmitter output power, expressed in dBW, dBm, or PSD;
G_T	= gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
L_C	= signal attenuation in the connecting cable between the transmitter and antenna, in dB.

9.2 Occupied Bandwidth Measurement

99% &26dB Bandwidth with detector peak

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -26dBc display line was placed on the screen (or 26dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1% ~ 5%, VBW≥ 3 * RBW, with span > 2 * Signal BW, set % Power = 99%.

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9.3 Out of Band Emission at Antenna Terminals

9.3.1 Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize.
4. Repeat above procedures until all default test channel measured were complete.

9.3.2 Band Edge

1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting RBW ≥ 1% EBW.
3. Allow trace to fully stabilize.
4. Repeat above procedures until all default test channel measured were complete.

9.4 Field Strength of Spurious Radiation Measurement

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP (dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

EIRP (dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

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9.5 Frequency Stability Measurement

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Set chamber temperature to 25℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint as declared by the manufacturer, record the maximum frequency change.

9.6 Peak to Average Ratio

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth; & internal =1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

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10 DUTY CYCLE

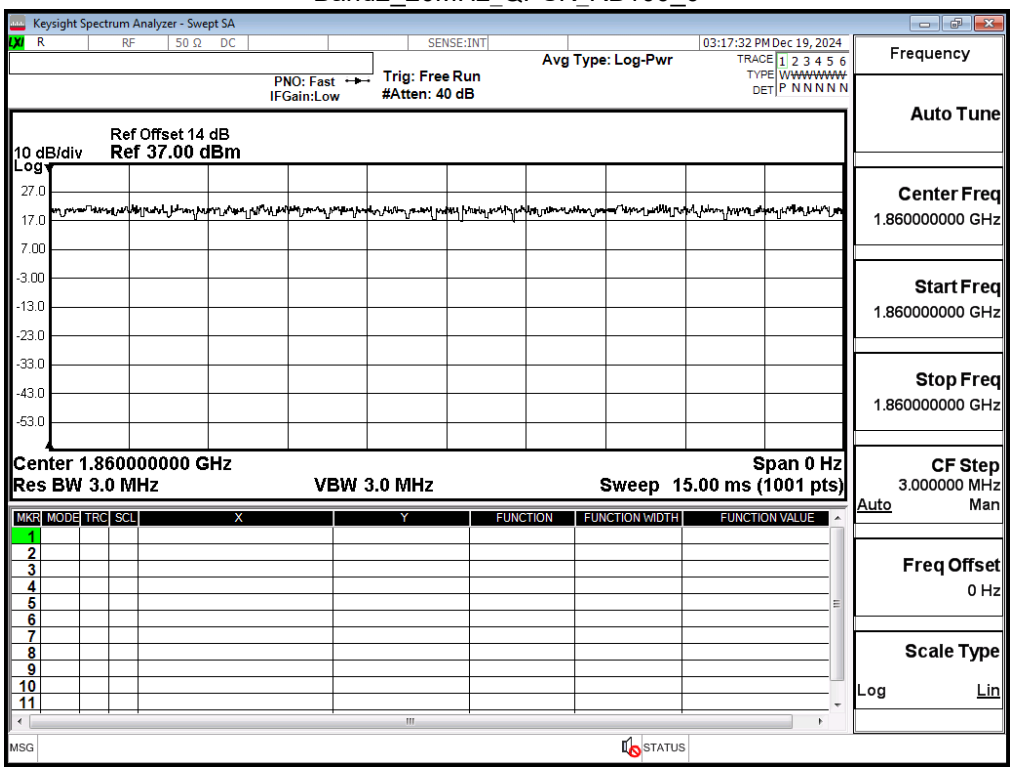
10.1 Maximum Output Power

10.1.1 Duty Cycle

1. Set span = Zero
2. RBW = 3 MHz
3. VBW = 3 MHz
4. Detector = Peak

10.2 Measurement Result

Band2_20MHz_QPSK_RB100_0



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Duty Cycle

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)
LTE_Band2_20MHz_QPSK	100.00	0.00
LTE_Band2_20MHz_16QAM	100.00	0.00
LTE_Band2_20MHz_64QAM	100.00	0.00
LTE_Band4_20MHz_QPSK	100.00	0.00
LTE_Band4_20MHz_16QAM	100.00	0.00
LTE_Band4_20MHz_64QAM	100.00	0.00
LTE_Band5_10MHz_QPSK	100.00	0.00
LTE_Band5_10MHz_16QAM	100.00	0.00
LTE_Band5_10MHz_64QAM	100.00	0.00
LTE_Band7_20MHz_QPSK	100.00	0.00
LTE_Band7_20MHz_16QAM	100.00	0.00
LTE_Band7_20MHz_64QAM	100.00	0.00
LTE_Band12_10MHz_QPSK	100.00	0.00
LTE_Band12_10MHz_16QAM	100.00	0.00
LTE_Band12_10MHz_64QAM	100.00	0.00
LTE_Band13_10MHz_QPSK	100.00	0.00
LTE_Band13_10MHz_16QAM	100.00	0.00
LTE_Band13_10MHz_64QAM	100.00	0.00
LTE_Band14_10MHz_QPSK	100.00	0.00
LTE_Band14_10MHz_16QAM	100.00	0.00
LTE_Band14_10MHz_64QAM	100.00	0.00
LTE_Band25_20MHz_QPSK	100.00	0.00
LTE_Band25_20MHz_16QAM	100.00	0.00
LTE_Band25_20MHz_64QAM	100.00	0.00
LTE_Band26 Part90_10MHz_QPSK	100.00	0.00
LTE_Band26 Part90_10MHz_16QAM	100.00	0.00
LTE_Band26 Part90_10MHz_64QAM	100.00	0.00
LTE_Band26_15MHz_QPSK	100.00	0.00
LTE_Band26_15MHz_16QAM	100.00	0.00
LTE_Band26_15MHz_64QAM	100.00	0.00

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11 MEASUREMENT RESULTS

Please refer to the Annex A-Measurement Results.

~ End of Report ~

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