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TEST REPORT

of

FCC Part 2 Subpart J, Part 22 Subpart C/H,
Part 24 Subpart E, Part 27 Subpart C and Part 90 Subpart S
IC RSS-130 Issue 2, RSS-132 Issue 4, RSS-133 Issue 6,
RSS-139 Issue 4, RSS-199 Issue 4 and RSS-Gen Issue 5

FCC ID: BEJ-TM04ANNABM0
IC Certification: 2703H-TM04ANNABM0

Equipment Under Test	:	Telematics Module
Model Name	:	TM04ANNABM0
Variant Model Name(s)	:	-
Applicant	:	FCC: LG Electronics USA, Inc. IC: LG ELECTRONICS INC.
Manufacturer	:	LG Electronics Inc.
Date of Receipt	:	2024.06.25
Date of Test(s)	:	2024.08.25 ~ 2024.08.29
Date of Issue	:	2024.09.10

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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4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.
We are responsible for all the information of this test report except for the data(※) provided by the customer

Tested by: Hahyun Sung

Technical Manager: Jinhyoung Cho

SGS Korea Co., Ltd. Gunpo Laboratory

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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

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.
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1.2. Details of Applicant

FCC Applicant : LG Electronics USA, Inc.
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	TM04ANNABM0	
Model Serial Number	001, 002	
Power Supply	DC 12.5 V	
Rated Power	GSM 850: 33 ㏈m GSM 1 900: 30 ㏈m WCDMA Ⅱ, Ⅳ, Ⅴ: 24 ㏈m LTE Band 2, 4, 5, 7, 12, 13, 17, 25, 26, 41, 66, 71: 23 ㏈m	
Frequency Range	GSM 850: 824 ㎒ ~ 849 ㎒ GSM 1 900: 1 850 ㎒ ~ 1 910 ㎒ WCDMA Ⅱ: 1 850 ㎒ ~ 1 910 ㎒ WCDMA Ⅳ: 1 710 ㎒ ~ 1 755 ㎒ WCDMA Ⅴ: 824 ㎒ ~ 849 ㎒ LTE Band 2: 1 850 ㎒ ~ 1 910 ㎒ LTE Band 4: 1 710 ㎒ ~ 1 755 ㎒ LTE Band 5: 824 ㎒ ~ 849 ㎒ LTE Band 7: 2 500 ㎒ ~ 2 570 ㎒	LTE Band 12: 699 ㎒ ~ 716 ㎒ LTE Band 13: 777 ㎒ ~ 787 ㎒ LTE Band 17: 704 ㎒ ~ 716 ㎒ LTE Band 25: 1 850 ㎒ ~ 1 915 ㎒ LTE Band 26: 814 ㎒ ~ 824 ㎒ (FCC Only) LTE Band 26: 824 ㎒ ~ 849 ㎒ LTE Band 41: 2 496 ㎒ ~ 2 690 ㎒ (FCC) LTE Band 41: 2 500 ㎒ ~ 2 690 ㎒ (IC) LTE Band 66: 1 710 ㎒ ~ 1 780 ㎒ LTE Band 71: 663 ㎒ ~ 698 ㎒
Modulation Technique	QPSK, 16QAM, GMSK, 8PSK	
Antenna Type	Shark antenna	
Antenna Gain※	Refer to the clause 1.12	
H/W Version	Rev.C3	
S/W Version	WN22XA28	

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	100955	Mar. 08, 2024	Annual	Mar. 08, 2025
Spectrum Analyzer	Agilent	N9020A	MY53421758	Sep. 01, 2023	Annual	Sep. 01, 2024
Signal Generator	R&S	SMA100B	106887	Oct. 06, 2023	Annual	Oct. 06, 2024
DC Power Supply	R&S	HMP2020	102133	Apr. 23, 2024	Annual	Apr. 23, 2025
Mobile Test Unit	R&S	CMW 500	144034	Feb. 28, 2024	Annual	Feb. 28, 2025
Directional Coupler	KRYTAR	152613	140973	Jun. 07, 2024	Annual	Jun. 07, 2025
Low Pass Filter	Mini-Circuits	NLP-1200+	V 8979400903-1	May 17, 2024	Annual	May 17, 2025
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-10SS	21	Jun. 07, 2024	Annual	Jun. 07, 2025
High Pass Filter	Wainwright Instrument GmbH	WHNX7.5/26.5G-6SS	11	Oct. 17, 2023	Annual	Oct. 17, 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	9163-396	Apr. 02, 2024	Biennial	Apr. 02, 2026
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 × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RADIALL	TESTPRO 3	182287	Apr. 12, 2024	Semi-Annual	Oct. 12, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182288	Apr. 12, 2024	Semi-Annual	Oct. 12, 2024
Coaxial Cable	RADIALL	TESTPRO 3	182291	Apr. 12, 2024	Semi-Annual	Oct. 12, 2024
Coaxial Cable	SENSORVIEW	NMST-13A26-NMST-5 m	TPC2402190004	Apr. 03, 2024	Semi-Annual	Oct. 03, 2024
Coaxial Cable	SENSORVIEW	NMST-13A26-NMST-10 m	TPC2402190001	Apr. 03, 2024	Semi-Annual	Oct. 03, 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, 22, 24, 27 and 90 / IC part RSS-130 Issue 2, RSS-132 Issue 4, RSS-133 Issue 6, RSS-139 Issue 4, RSS-199 Issue 4 and RSS-Gen Issue 5			
Section in FCC	**Section in IC**	**Test Item**	**Result**
§22.913(a)(5) §24.232(c) §27.50(c)(10) §27.50(d)(4) §27.50(h) §90.635(b)	RSS-130 Issue 2 4.6 RSS-132 Issue 4 5.4 RSS-133 Issue 6 6.4 RSS-139 Issue 4 5.5 RSS-199 Issue 4 5.5	E.R.P. / E.I.R.P.	Compliant
§27.53(g) §27.53(m)(4)	RSS-130 Issue 2 4.7 RSS-199 Issue 4 5.6	Radiated Spurious Emissions	Compliant
§2.1046	RSS-Gen Issue 5 6.12	Conducted Output Power	N/A[1)]
§2.1049	RSS-Gen Issue 5 6.7	Occupied Bandwidth	N/A[1)]
§22.913(d) §24.232(d) §27.50(d)(5)	RSS-130 Issue 2 4.6 RSS-132 Issue 4 5.4 RSS-133 Issue 6 6.4 RSS-139 Issue 4 5.5 RSS-199 Issue 4 5.5	Peak-Average Ratio	N/A[1)]
§22.917(a) §24.238(a) §27.53(c)(2) §27.53(c)(4) §27.53(g) §27.53(h)(1) §27.53(m)(4) §90.691(a)	RSS-130 Issue 2 4.7 RSS-132 Issue 4 5.5 RSS-133 Issue 6 6.5 RSS-139 Issue 4 5.6 RSS-199 Issue 4 5.6	Spurious Emission at Antenna Terminal	N/A[1)]
§22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h)(1) §27.53(m)(4) §90.691(a)	RSS-130 Issue 2 4.7 RSS-132 Issue 4 5.5 RSS-133 Issue 6 6.5 RSS-139 Issue 4 5.6 RSS-199 Issue 4 5.6	Band Edge and Emission Mask	N/A[1)]
§2.1055 §22.355 §24.235 §27.54	RSS-Gen Issue 5 6.11 RSS-130 Issue 2 4.5 RSS-132 Issue 4 5.3 RSS-133 Issue 6 6.3 RSS-139 Issue 4 5.4 RSS-199 Issue 4 5.4	Frequency Stability	N/A[1)]

Note;

1) This product is a C2PC case due to the addition of antennas. So only radiation test was performed and the rules for spurious radiated emission were satisfied.

1.7. Sample Calculation for Offset

Where relevant, the following sample calculation is provided:

1.7.1. Radiation test

- E.I.R.P. (dB m) = Measured level (dBμV) + Antenna factor (dB) + 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. Measurement Uncertainty

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

Parameter	Uncertainty	
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.

1.9. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL00	2024.09.	Initial

1.10. Radiated Spurious Emissions Test Case

The Radiated spurious emissions were tested in the band with the lowest margin of previously data and selected respectively 663 MHz to 698 MHz, 2 496 MHz to 2 690 MHz in the band where the margin of previous test results is lowest.

Fundamental Frequency Range	Worst Case
2 496 MHz to 2 690 MHz	LTE Band 41 (20 MHz – QPSK)
663 MHz to 698 MHz	LTE Band 71 (15 MHz – QPSK)

1.11. Device Capabilities

This device contains the following capabilities;

LTE Band 12 (699 ㎒ ~ 716 ㎒) overlaps the entire frequency range of LTE Band 17 (704 ㎒ ~ 716 ㎒). Therefore, test data provided in this report covers LTE Band 17 as well as Band 12.
LTE Band 25 (1 850 ㎒ ~ 1 915 ㎒) overlaps the entire frequency range of LTE Band 2 (1 850 ㎒ ~ 1 910 ㎒). Therefore, test data provided in this report covers LTE Band 2 as well as Band 25.
LTE Band 26 (814 ㎒ ~ 849 ㎒) overlaps the entire frequency range of LTE Band 5 (824 ㎒ ~ 849 ㎒). Therefore, test data provided in this report covers LTE Band 5 as well as Band 26.
LTE Band 66 (1 710 ㎒ ~ 1 780 ㎒) overlaps the entire frequency range of LTE Band 4 (1 710 ㎒ ~ 1 755 ㎒). Therefore, test data provided in this report covers LTE Band 4 as well as Band 66.

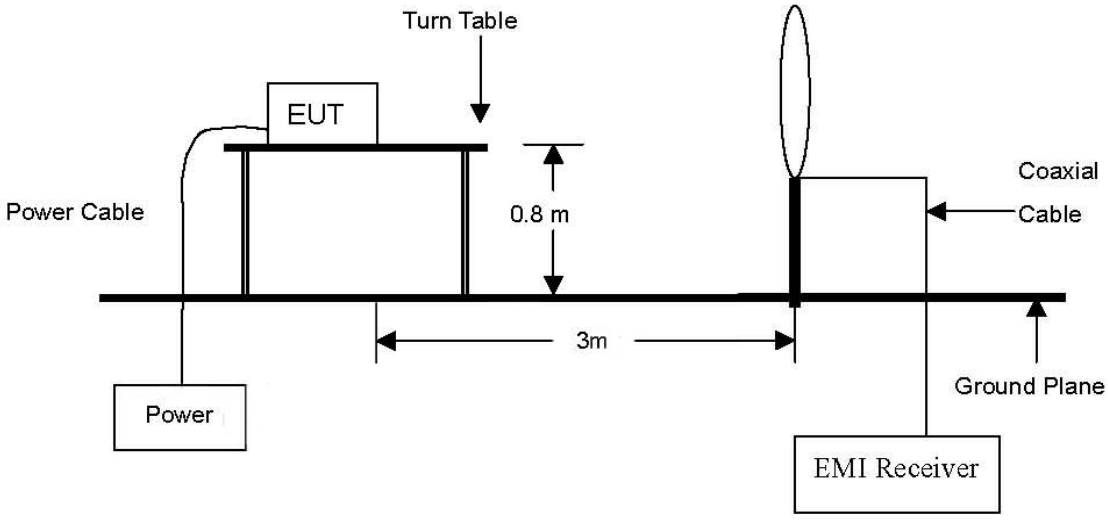
1.12. Antenna Information

Band	Operating Frequency (㎒)	Antenna Peak Gain (dBi)						
		Original [9825131_02]	Additional [920-747-018]			Additional [920-783-008]		
			Gain	Cable Loss	Final Gain	Gain	Cable Loss	Final Gain
LTE 7	2 500 ~ 2 570	2.70	7.20	5.40	1.80	3.80	5.40	-1.60
LTE 12/17	699 ~ 716	-2.10	2.70	2.90	-0.20	0.80	2.90	-2.10
LTE 13	777 ~ 787	-0.10	2.80	3.00	-0.20	1.90	3.00	-1.10
LTE 25/2	1 850 ~ 1 915	2.10	6.00	4.70	1.30	5.40	4.70	0.70
GSM 1900 WCDMA Ⅱ	1 850 ~ 1 910	2.00	6.00	4.70	1.30	5.40	4.70	0.70
WCDMA Ⅴ GSM 850 LTE 26/5	824 ~ 849	-1.90	1.90	3.06	-1.16	3.30	3.06	0.24
LTE 26	814 ~ 824	-1.10	1.90	3.06	-1.16	3.30	3.06	0.24
LTE 41	2 490 ~ 2 690	2.70	7.30	5.40	1.90	3.80	5.40	-1.60
LTE 66/4 WCDMA Ⅳ	1 710 ~ 1 780	2.60	2.60	4.18	-1.58	3.40	4.18	-0.78
LTE 71	663 ~ 698	-4.20	2.40	2.89	-0.49	0.90	2.89	-1.99

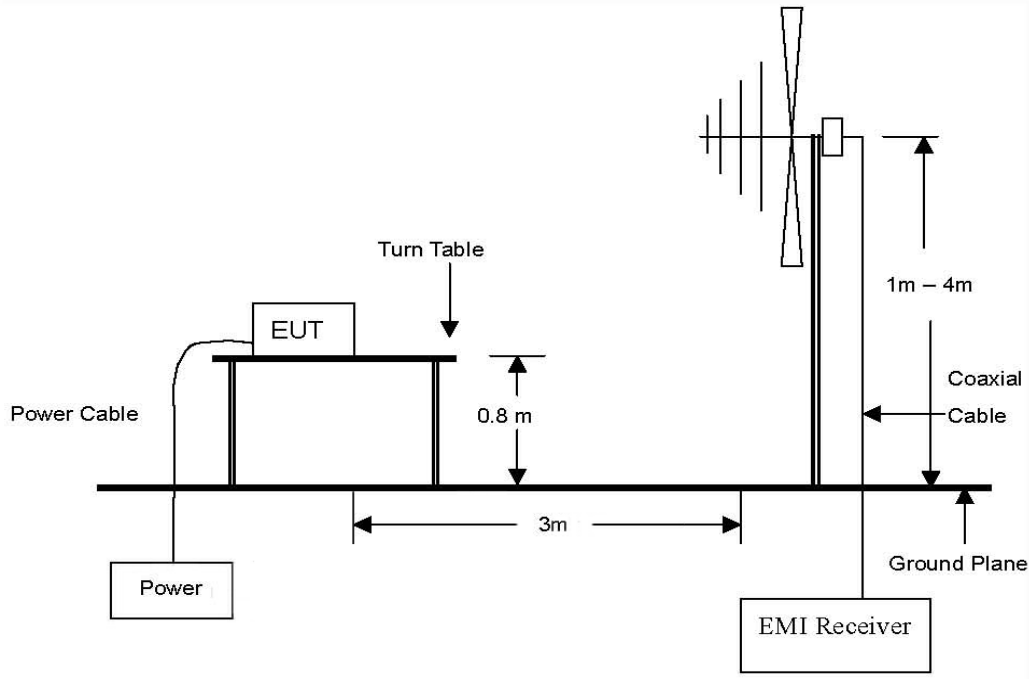
2. E.R.P. / E.I.R.P. & Radiated Spurious Emissions

2.1. Test Setup

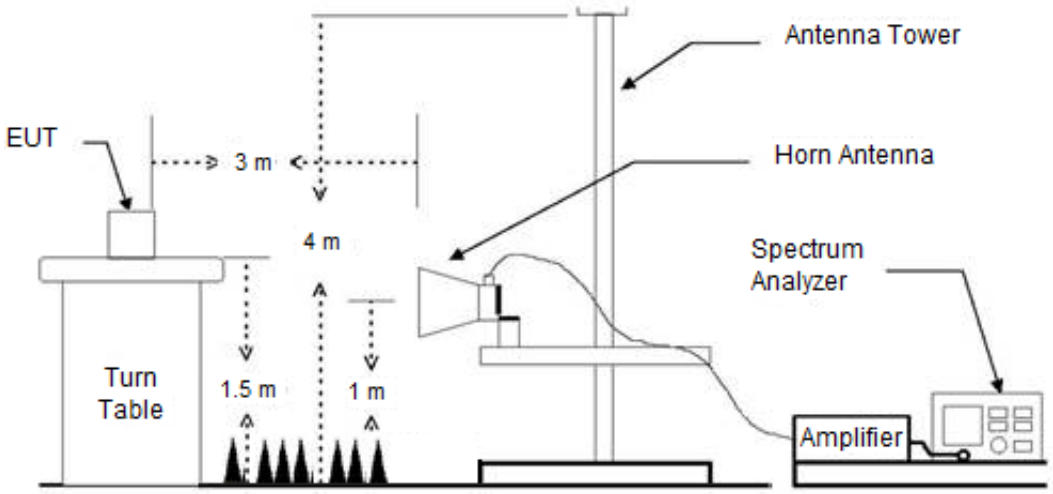
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒.



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



The diagram below shows the test setup that is utilized to make the measurements for emission.
The spurious emissions were investigated form 1 ㎓ to the 10th harmonic of the highest fundamental frequency or 40 ㎓, whichever is lower.



2.2. Limit

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

FCC

- §22.913(a)(5), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

- §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

- §27.50(b)(9), control stations and mobile stations transmitting in the 746-757 ㎒, 776-788 ㎒, and 805–806 ㎒ bands and fixed stations transmitting in the 787-788 ㎒ and 805-806 ㎒ bands are limited to 30 watts ERP.

- §27.50(c)(9), control and mobile stations in the 698–746 ㎒ band are limited to 30 watts ERP.

- §27.50(c)(10), portable stations (hand-held devices) in the 600 ㎒ uplink band and the 698-746 ㎒ band, and fixed and mobile stations in the 600 ㎒ uplink band are limited to 3 watts ERP.

- §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1 710-1 755 ㎒ band and mobile and portable stations operating in the 1 695-1 710 ㎒ and 1 755-1 780 ㎒ bands are limited to 1 watt EIRP.

- §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.

- §90.635(b), the maximum output power of the transmitter for mobile stations is 100 watts (20 ㏈W).

IC

- RSS-130 Issue 2

4.6.3, the e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

- RSS-132 Issue 4

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.

- RSS-133 Issue 6

6.4, the equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.

- RSS-139 Issue 4

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.

Table 3: Maximum power of equipment in the band 1 710-1 780 ㎒

Equipment type	Maximum power
Fixed station and base station	30 ㏈m e.i.r.p./ channel bandwidth
Subscriber equipment	30 ㏈m e.i.r.p./ channel bandwidth

- 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 ㎒
AAS: base station (outdoor), P-MP hub station	47 dBm TRP/5 ㎒
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 ㎒.

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

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

2.2.2. Limit of Spurious Radiated Emission

FCC

- §27.53(g), the power of any emission outside a 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, by at least 43 + 10 log (P) ㏈.

- §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than 40 + 10 $\log_{10}$ (P) ㏈ on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 $\log_{10}$ (P) ㏈ on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 $\log_{10}$ (P) ㏈ 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) ㏈ on all frequencies between 2 490.5 ㎒ and 2 496 ㎒ and 55 + 10 $\log_{10}$ (P) ㏈ at or below 2 490.5 ㎒. Mobile Satellite Service licensees operating on frequencies below 2 495 ㎒ 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-130 Issue 2

4.7.1, the unwanted emissions in any 100 ㎑ 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 (㏈ W), by at least 43 + 10 $\log_{10}$ p (watts), ㏈. However, in the 100 ㎑ band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 ㎑ may be employed.

- 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 ㎒ 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 ㎒ band, a resolution bandwidth of 1 ㎒ 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 ㎒, 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 (㎒)	Unwanted emission limit
≤1	-13 ㏈ m/(1% of OB*)
>1	-13 ㏈ m/㎒

* 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 (㎒)	Unwanted emission limit
0-1	-10 ㏈ m/(2% of OB*)
1-5	-10 ㏈ m/㎒
5-X**	-13 ㏈ m/㎒
≥X	-25 ㏈ m/㎒

* OB is the occupied bandwidth
** X is 6 ㎒ 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 ㏈ m/㎒ on all frequencies between 2 490.5 ㎒ and 2 496 ㎒, and -25 ㏈ m/㎒ at or below 2 490.5 ㎒.

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. 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) ℃
Relative humidity : 47 % R.H.

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

F66 Roof-top Antenna (920-747-018)

GSM

Band	Frequency (㎒)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Final 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
GSM 850	824 ~ 849	35.50	3.548	-1.16	34.34	2.716	32.19	1.656	7 W E.R.P.
GSM 1 900	1 850 ~ 1 910	31.00	1.259	1.30	32.30	1.698			2 W E.I.R.P.

WCDMA

Band	Frequency (㎒)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Final 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
Ⅱ	1 850 ~ 1 910	25.70	0.372	1.30	27.00	0.501			2 W E.I.R.P.
Ⅳ	1 710 ~ 1 755	25.70	0.372	-1.58	24.12	0.258			1 W E.I.R.P.
Ⅴ	824 ~ 849	25.70	0.372	-1.16	24.54	0.284	22.39	0.173	7 W E.R.P.

LTE

Band	Frequency (㎒)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Final 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
7	2 500 ~ 2 570	25.70	0.372	1.80	27.50	0.562			2 W E.I.R.P.
12/17	699 ~ 716	25.70	0.372	-0.20	25.50	0.355	23.35	0.216	30 W E.R.P.
13	777 ~ 787	25.70	0.372	-0.20	25.50	0.355	23.35	0.216	30 W E.R.P.
25/2	1 850 ~ 1 915	25.70	0.372	1.30	27.00	0.501			2 W E.I.R.P.
26	814 ~ 824	25.70	0.372	-1.16	24.54	0.284	22.39	0.173	100 W
26/5	824 ~ 849	25.70	0.372	-1.16	24.54	0.284	22.39	0.173	7 W E.R.P.
41	2 496 ~ 2 690	25.70	0.372	1.90	27.60	0.575			2 W E.I.R.P.
66/4	1 710 ~ 1 780	25.70	0.372	-1.58	24.12	0.258			1 W E.I.R.P.
71	663 ~ 698	25.70	0.372	-0.49	25.21	0.332	23.06	0.202	30 W E.R.P.

F67 Roof-top Antenna (920-783-008)

GSM

Band	Frequency (㎒)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Final 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
GSM 850	824 ~ 849	35.50	3.548	0.24	35.74	3.750	33.59	2.286	7 W E.R.P.
GSM 1 900	1 850 ~ 1 910	31.00	1.259	0.70	31.70	1.479			2 W E.I.R.P.

WCDMA

Band	Frequency (㎒)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Final 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
Ⅱ	1 850 ~ 1 910	25.70	0.372	0.70	26.40	0.437			2 W E.I.R.P.
Ⅳ	1 710 ~ 1 755	25.70	0.372	-0.78	24.92	0.310			1 W E.I.R.P.
Ⅴ	824 ~ 849	25.70	0.372	0.24	25.94	0.393	23.79	0.239	7 W E.R.P.

LTE

Band	Frequency (㎒)	Maximum Conducted Power (dB m)	Maximum Conducted Power (W)	Final 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
7	2 500 ~ 2 570	25.70	0.372	-1.60	24.10	0.257			2 W E.I.R.P.
12/17	699 ~ 716	25.70	0.372	-2.10	23.60	0.229	21.45	0.140	30 W E.R.P.
13	777 ~ 787	25.70	0.372	-1.10	24.60	0.288	22.45	0.176	30 W E.R.P.
25/2	1 850 ~ 1 915	25.70	0.372	0.70	26.40	0.437			2 W E.I.R.P.
26	814 ~ 824	25.70	0.372	0.24	25.94	0.393	23.79	0.239	100 W
26/5	824 ~ 849	25.70	0.372	0.24	25.94	0.393	23.79	0.239	7 W E.R.P.
41	2 496 ~ 2 690	25.70	0.372	-1.60	24.10	0.257			2 W E.I.R.P.
66/4	1 710 ~ 1 780	25.70	0.372	-0.78	24.92	0.310			1 W E.I.R.P.
71	663 ~ 698	25.70	0.372	-1.99	23.71	0.235	21.56	0.143	30 W E.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.
3. Final Gain (dB i) = Antenna Gain (dB i) + Cable Loss (dB)

*Cable loss is referenced on section 1.12.

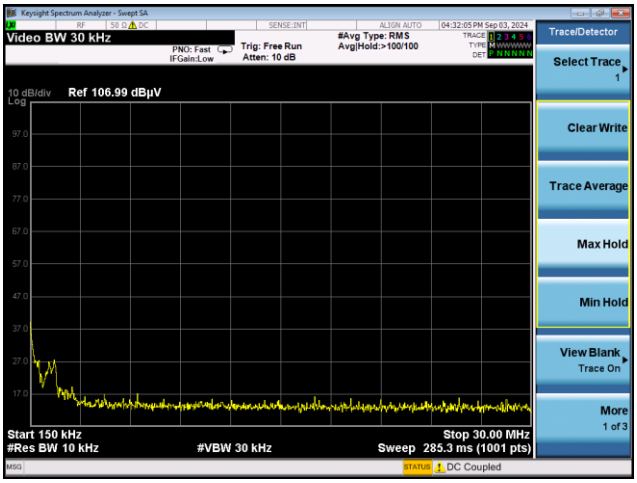
2.4.2. Radiated spurious emissions

F66 Roof-top Antenna (920-747-018)

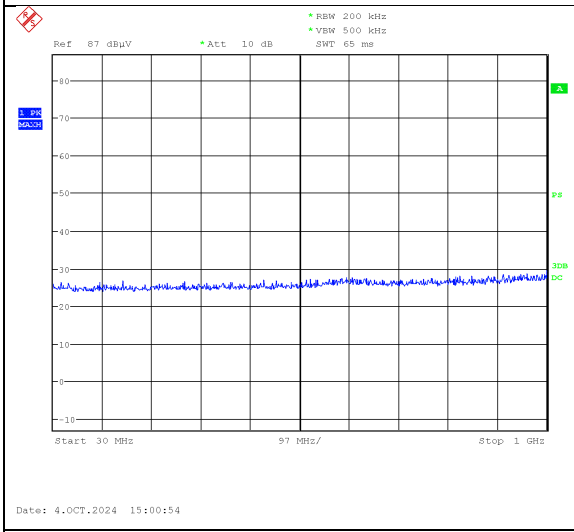
LTE band 41 (20 ㎒ – QPSK)

Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (2 498.5 ㎒)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (2 593.0 ㎒)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
High Channel (2 687.5 ㎒)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-

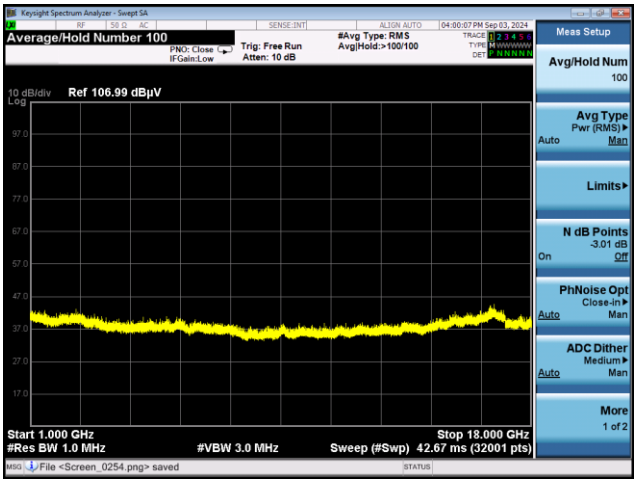
9 kHz – 150 kHz



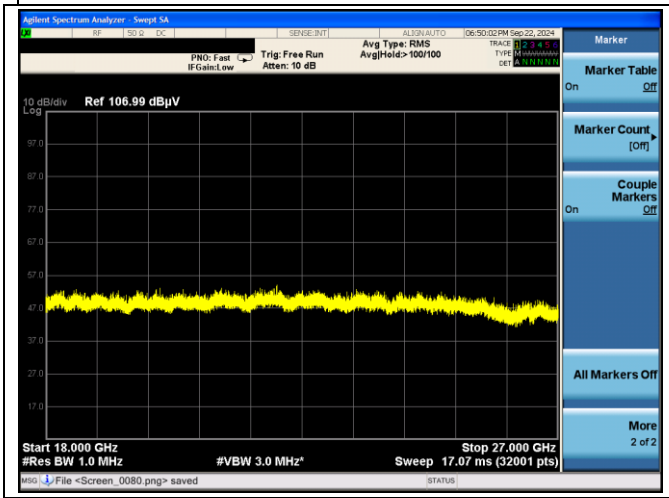
150 kHz – 30 MHz



30 MHz – 1 GHz



1 GHz – 18 GHz



18 GHz – 27 GHz

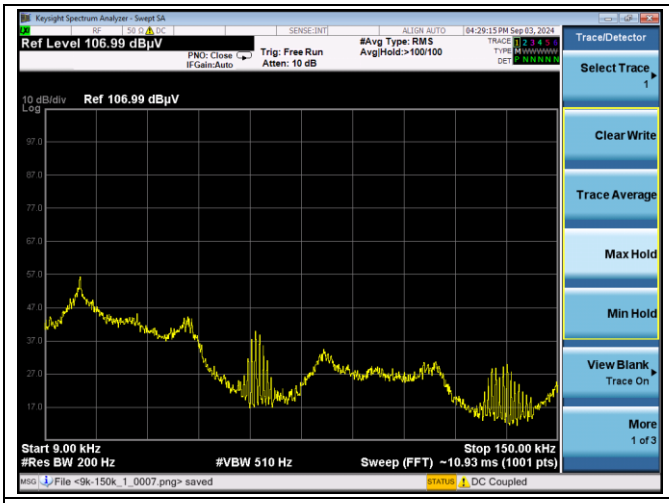
LTE band 71 (15 ㎒ – QPSK)

Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (665.5 ㎒)									
1 375.09	48.72	H	25.05	-37.79	35.980	-97.41	**-61.43**	-13	48.43
1 375.13	48.63	V	25.05	-37.79	35.89	-97.41	-61.52	-13	48.52
1 991.60	42.70	H	27.68	-35.82	34.56	-97.41	-62.85	-13	49.85
1 991.45	43.61	V	27.68	-35.83	35.46	-97.41	-61.95	-13	48.95
Above 2 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (680.5 ㎒)									
1 374.99	48.51	H	25.05	-37.79	35.77	-97.41	-61.64	-13	48.64
1 374.83	48.52	V	25.05	-37.79	35.78	-97.41	-61.63	-13	48.63
2 021.36	43.05	H	27.74	-35.78	35.01	-97.41	-62.40	-13	49.40
2 021.93	43.31	V	27.74	-35.78	35.27	-97.41	-62.14	-13	49.14
Above 2 100.00	Not detected	-	-	-	-	-	-	-	-
High Channel (695.5 ㎒)									
1 374.92	48.40	H	25.05	-37.79	35.66	-97.41	-61.75	-13	48.75
1 374.86	48.41	V	25.05	-37.79	35.67	-97.41	-61.74	-13	48.74
2 051.49	42.76	H	27.80	-35.74	34.82	-97.41	-62.59	-13	49.59
2 051.61	42.20	V	27.80	-35.74	34.26	-97.41	-63.15	-13	50.15
Above 2 100.00	Not detected	-	-	-	-	-	-	-	-

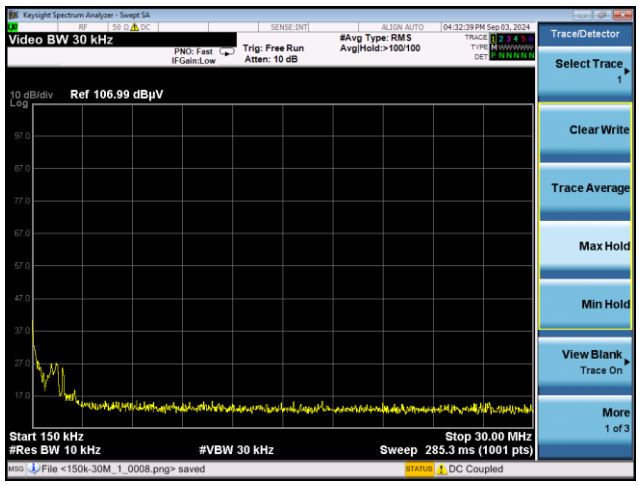
F67 Roof-top Antenna (920-783-008)

LTE band 41 (20 ㎒ – QPSK)

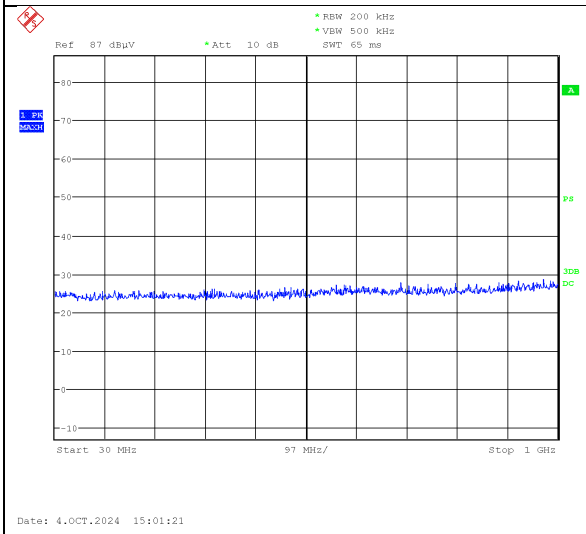
Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.I.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (2 498.5 ㎒)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (2 593.0 ㎒)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-
High Channel (2 687.5 ㎒)									
Below 1 000.00	Not detected	-	-	-	-	-	-	-	-
Above 1 000.00	Not detected	-	-	-	-	-	-	-	-



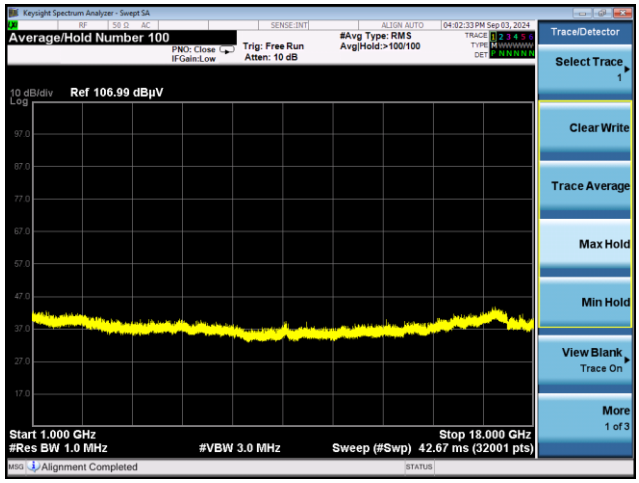
9 kHz – 150 kHz



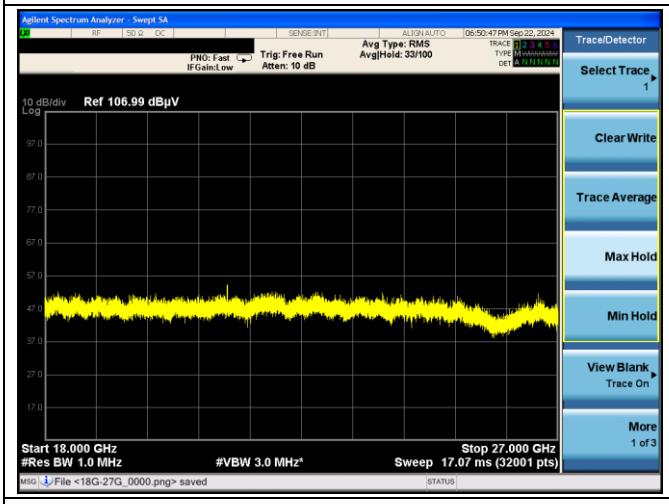
150 kHz – 30 MHz



30 MHz – 1 GHz



1 GHz – 18 GHz



18 GHz – 27 GHz

LTE band 71 (15 ㎒ – QPSK)

Frequency (㎒)	Measured Level (dB㎶)	Ant. Pol.	AF (dB/m)	AMP+CL (dB)	E (dB㎶/m)	CF (dB)	E.R.P. (dB m)	Limit (dB m)	Margin (dB)
Low Channel (665.5 ㎒)									
1 375.02	49.69	H	25.05	-37.79	36.95	-97.41	-60.46	-13	47.46
1 374.81	45.73	V	25.05	-37.79	32.99	-97.41	-64.42	-13	51.42
1 991.40	44.08	H	27.68	-35.83	35.93	-97.41	-61.48	-13	48.48
1 991.41	42.43	V	27.68	-35.83	34.28	-97.41	-63.13	-13	50.13
Above 2 000.00	Not detected	-	-	-	-	-	-	-	-
Middle Channel (680.5 ㎒)									
1 374.92	49.71	H	25.05	-37.79	36.97	-97.41	**-60.44**	-13	47.44
1 374.92	45.85	V	25.05	-37.79	33.11	-97.41	-64.30	-13	51.30
2 021.34	42.89	H	27.74	-35.78	34.85	-97.41	-62.56	-13	49.56
2 021.44	41.48	V	27.74	-35.78	33.44	-97.41	-63.97	-13	50.97
Above 2 100.00	Not detected	-	-	-	-	-	-	-	-
High Channel (695.5 ㎒)									
1 374.94	49.60	H	25.05	-37.79	36.86	-97.41	-60.55	-13	47.55
1 375.05	45.55	V	25.05	-37.79	32.81	-97.41	-64.60	-13	51.60
2 051.37	42.34	H	27.80	-35.74	34.40	-97.41	-63.01	-13	50.01
2 051.70	40.81	V	27.80	-35.74	32.87	-97.41	-64.54	-13	51.54
Above 2 100.00	Not detected	-	-	-	-	-	-	-	-

Remark;

1. E (dB㎶/m) = Measured Level (dB㎶) + Antenna Factor (dB/m) + Cable Loss (dB).
2. E.I.R.P. (dB m) = E (dB㎶/m) + 20 log D - 104.8; where D is the measurement distance in meters.
3. 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.
4. CF (dB) (E.I.R.P.) = 20 log D - 104.8 - Distance Correction Factor
5. CF (dB) (E.R.P.) = 20 log D - 104.8 - 2.15.
6. Distance Correction Factor = 20 log (specific distance / test distance)
7. AF = Antenna Factor, CL = Cable Loss, CF = Conversion Factor.

- End of the Test Report -