

TEST REPORT



DT&C Co., Ltd.

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1. Report No : DRTFCC2009-0272

2. Customer

• Name : LG Electronics USA.

• Address : 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States, 07632

3. Use of Report : Verification for simultaneous transmission

4. Product Name / Model Name : Telematics / TCAA19ANANN

FCC ID : BEJTCAA19ANANN

5. FCC Regulation(s): Part 22, 24, 27

Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015

6. Date of Test : 2020.08.03 ~ 2020.08.07

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : Refer to appended test report.

9. Test Result : Refer to the attached test result.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by	Reviewed by
	Name : JungWoo Kim 	Name : JaeJin Lee  (Signature)

2020 . 09 . 01 .

DT&C Co., Ltd.

Not abided by KS Q ISO / IEC 17025 and KOLAS accreditation.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2009-0272	Sep. 01, 2020	Initial issue	JungWoo Kim	JaeJin Lee

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1. GENERAL INFORMATION

Applicant Name : LG Electronics USA
Address : 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States, 07632
FCC ID : BEJTCAA19ANANN
EUT Type : Telematics
Model Name : TCAA19ANANN
Add Model Name : NA
Supplying power : DC 12 V

2. INTRODUCTION

2.1 EUT DESCRIPTION

This ETU contains the following capabilities:
802.11b/g/n/ac WLAN(2.4 GHz), 802.11a/n/ac WLAN(5GHz),
This device is integrated the certified modules.

Certified module 1(FCC ID: BEJTM12ANNAGM0):

850/1900 WCDMA/HSUPA, LTE Single transmitting for band 2/4/5/12

Certified module 2(FCC ID: BEJTM12ANNAGM1);

LTE Single transmitting for band 2/4/5/13

Certified module3 (FCC ID: BEJTM12ANNAGM2);

1700/1900 WCDMA/HSUPA, LTE Single transmitting for band 2/4/12.

2.2 Scenario for simultaneous operations

- Certified module 1 + Certified module 2 + Certified module 3

Note: WLAN and WWAN(WCDMA,LTE) can not transmit simultaneously.

2.3 TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+22 °C ~ +24 °C
▪ Relative Humidity	43 % ~ 48 %

2.4 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated Disturbance (Below 1 GHz)	4.9 dB (The confidence level is about 95 %, $k = 2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.1 dB (The confidence level is about 95 %, $k = 2$)
Radiated Disturbance (Above 18 GHz)	5.3 dB (The confidence level is about 95 %, $k = 2$)

2.6. TEST FACILITY

DT&C Co., Ltd.		
The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The site is constructed in conformance with the requirements.		
- FCC & IC MRA Designation Number : KR0034		
www.dtnc.net		
Telephone	:	+ 82-31-321-2664
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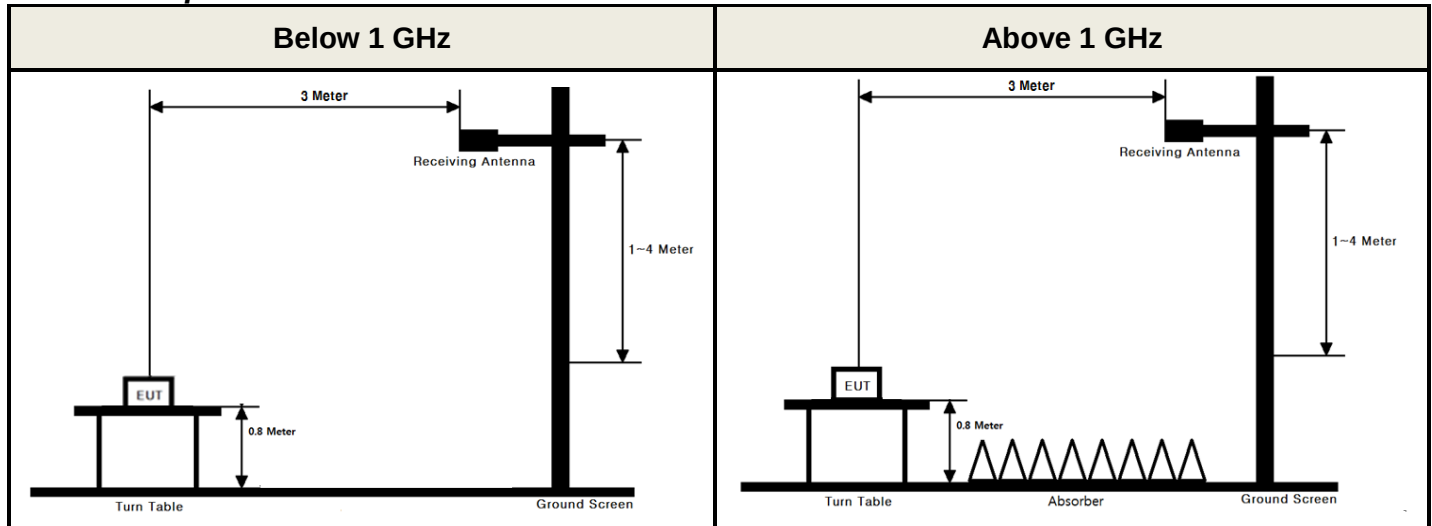
3. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
2.1053 22.917(a) 24.238(a) 27.53(h) 27.53(g)	Undesirable Emissions	> 43 + 10log ₁₀ (P) dB for all out-of-band emissions	Radiated	C
27.53(f)	Undesirable Emissions in 1 559 ~ 1 610 MHz	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions of less than 700 Hz bandwidth)		
Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable Note 2: This report only specifies tests for simultaneous operation mode of three certified WCDMA & LTE modules.				

4. DESCRIPTION OF TESTS

4.1 Radiated spurious emissions

Test Set-up



These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- ANSI/TIA-603-E-2016 - Section 2.2.12
- KDB971168 D01v03 - Section 5.8
- ANSI C63.26-2015 – Section 5.5

Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / $VBW \geq 3 \times RBW$
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times \text{span} / RBW$
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

Test Result

- Test note

Note 1: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter.

Note 2: No other unwanted emissions were found below listed frequencies.

Note 3: Limit Calculation = $43 + 10\log_{10}(P[\text{Watts}])$

Limit for 1559 ~ 1610MHz = -70 dBW/MHz

Test Mode 1

Configuration of simultaneously transmission

Module(FCC ID)	Feature(Band)	Mode	BW(MHz)	RB size/offset	Tx frequency (MHz)
BEJTM12ANNAGM0	LTE(Band 5)	QPSK	5	1/0	826.5
BEJTM12ANNAGM1	LTE(Band 13)	QPSK	5	1/24	784.5
BEJTM12ANNAGM2	WCDMA(Band 4)	RMC	-	-	1 732.4

Test Result

Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result (dBm)	Limit (dB)	Margin (dBm)
1571.80	V	-57.16	6.47	-50.69	-40.00	10.69
1648.42	V	-55.98	6.31	-49.67	-13.00	36.67
3464.18	V	-52.97	7.83	-45.14	-13.00	32.14
5197.16	V	-50.86	10.39	-40.47	-13.00	27.47
-	-	-	-	-	-	-

Test Mode 2

Configuration of simultaneously transmission

Module(FCC ID)	Feature(Band)	Mode	BW(MHz)	RB size/offset	Tx frequency (MHz)
BEJTM12ANNAGM0	LTE (Band 2)	QPSK	5	-	1/0
BEJTM12ANNAGM1	LTE (Band 13)	QPSK	5	-	1/24
BEJTM12ANNAGM2	LTE (Band 4)	QPSK	5	-	1/24

Test Result

Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result (dBm)	Limit (dB)	Margin (dBm)
1573.86	V	-57.29	6.49	-50.80	-40.00	10.80
1658.95	V	-45.25	6.10	-39.15	-13.00	26.15
1945.93	V	-45.50	4.58	-40.92	-13.00	27.92
3510.01	V	-54.38	8.10	-46.28	-13.00	33.28
3700.16	V	-54.14	8.30	-45.84	-13.00	32.84

5. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	20/06/24	21/06/24	US47360812
DC power supply	SM techno	SDP30-5D	20/06/24	21/06/24	305DNF079
Multimeter	FLUKE	17B+	19/12/16	20/12/16	36390701WS
Radio Communication Analyzer	Anritus	MT8820C	19/12/16	20/12/16	6201274516
Radio Communication Analyzer	Anritus	MT8820C	20/06/24	21/06/24	6201274519
Radio Communication Analyzer	KEYSIGHT	E7515A	20/06/24	21/06/24	MY55210201
Attenuator	SMAJK	SMAJK-50-10	20/06/24	21/06/24	2-50-10
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-2
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-1
Signal Generator	Rohde Schwarz	SMBV100A	19/12/16	20/12/16	255571
Signal Generator	ANRITSU	MG3695C	19/12/16	20/12/16	173501
Loop Antenna	ETS-Lindgren	6502	19/09/18	21/09/18	00226186
Bilog Antenna	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Dipole Antenna	A.H.Systems Inc.	FCC-4	19/03/26	21/03/26	710A
Dipole Antenna	Schwarzbeck	UHA9105	20/04/10	22/04/10	2262
HORN ANT	ETS	3117	20/04/24	21/04/24	00140394
HORN ANT	ETS	3117	20/03/26	21/03/26	00152145
HORN ANT	A.H.Systems	SAS-574	20/06/24	21/06/24	154
HORN ANT	A.H.Systems	SAS-574	20/06/24	21/06/24	155
Amplifier	EMPOWER	BBS3Q7ELU	20/06/24	21/06/24	1020
PreAmplifier	H.P	8447D	19/12/16	20/12/16	2944A07774
PreAmplifier	RFBAY.Inc	MPA-40-40	19/12/16	20/12/16	21151801
PreAmplifier	Agilent	8449B	20/06/24	21/06/24	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	20/06/24	21/06/24	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	20/06/24	21/06/24	3
Cable	DTNC	Cable	20/01/16	21/01/16	M-01
Cable	DTNC	Cable	20/01/16	21/01/16	M-02
Cable	Junkosha	MWX315	20/01/16	21/01/16	M-05
Cable	Junkosha	MWX221	20/01/16	21/01/16	M-06
Cable	DTNC	Cable	20/01/16	21/01/16	RF-09