

TEST REPORT

Report Number: R15175160-E5

Applicant : Sony Corporation
1-7-1 Konan Minato-ku
Tokyo, 108-0075, Japan

FCC ID : PY7-27433F

EUT Description : GSM/WCDMA/LTE/5G Phone with BT,
DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC

Test Standard(s) : ANSI C63.26:2015 – Conducted output
power

Date Of Issue:
2024-04-23

Prepared by:
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-04-19	Initial issue	-
V2	2024-04-23	Added additional DL CA MIMO combinations measurements in §8.	Richard Jankovics

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sony Corporation
1-7-1 Konan Minato-ku
Tokyo, 108-0075, Japan

EUT DESCRIPTION: GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC

SERIAL NUMBER: QV7700BLLD

SAMPLE RECEIPT DATE: 2024-02-19

DATE TESTED: 2024-04-01 to 2024-04-19

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC KDB 941225 D05A §C.b)3)ii)	Complies

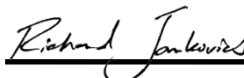
UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
UL LLC. By:

Prepared By:



Bob DeLisi
Principal Engineer
Consumer Technology Division
UL LLC

Richard Jankovics
Staff Engineer
Consumer Technology Division
UL LLC

2. SUMMARY OF TEST RESULTS

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer. Below is a list of the data provided by the customer:

- 1) Cable loss (port adapter)
- 2) Supported bands, bandwidths, modulations, power settings, supported DLCA combinations, and MPR configurations.
- 3) Worst-case BW and modulation for maximum output power for each band requiring SAR testing.

Measurements confirmed when downlink carrier aggregation is active, uplink maximum output power remains within the specified tune-up tolerance limits and not more than $\frac{1}{4}$ dB higher than the maximum output power measured when downlink carrier aggregation inactive, as specified in FCC KDB 941225 D05A §C.b)3)ii).

This report does not address SAR testing; this is a limited scope report addressing the conducted output power for downlink carrier aggregation active relative to inactive in Max power state.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- TCB Workshop April 2016; RF Exposure Procedures (LTE Carrier Aggregation for DL)
- TCB Workshop November 2017; RF Exposure Procedures (LTE UL/DL Carrier Aggregation SAR)
- TCB Workshop April 2018; RF Exposure Procedures (LTE DL CA SAR Test Exclusion)
- TCB Workshop April 2015; RF Exposure Procedures (Overlapping LTE Bands)

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
RF output power, conducted	0.45 dB (AV)
Temperature	0.57°C
Humidity	3.39%

Uncertainty figures are valid to a confidence level of 95%.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC. This report covers the LTE conducted output power for down-link carrier aggregation when active relative inactive.

The EUT supports the following LTE Bands and their antenna configurations:

WWAN Bands	Main 1 Antenna	Main 2 Antenna
LTE Band 2	-	Y
LTE Band 4	-	Y
LTE Band 5	Y	-
LTE Band 12	Y	-
LTE Band 13	Y	-
LTE Band 17	Y	-
LTE Band 25	-	Y
LTE Band 41	-	Y
LTE Band 66	-	Y

6.2. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.555.

6.3. DESCRIPTION OF TEST SETUP

Test Setup

The EUT was connected to a base station simulator and set to transmit at max power for LTE testing. All conducted average power for LTE bands is obtained from the CMW500 telecommunication test sets connected together via CMWC to support higher DLCA combinations.

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Date	Cal. Due Date
Network Analyzer	Keysight	E5063A	MY 54100681	8/4/2023	8/4/2024
Base Station Simulator	R & S	CMW 500	170733	1/3/2024	1/3/2025
Base Station Simulator	R & S	CMW 500	170732	12/18/2023	12/18/2024
Base Station Simulator	R & S	CMW 500	170193	1/16/2024	1/16/2025
Base Station Simulator	R & S	CMW 500	170194	6/6/2023	6/6/2024

8. LTE DOWN-LINK CARRIER AGGREGATION

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A

Maximum Output Power (Tune-up Limit) for LTE

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands as follows:

- a) The maximum output power, including tolerance, for the smaller band must be ≤ the larger band to qualify for the SAR test exclusion.
- b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.
 - LTE Band 2 (1850-1910 MHz) is covered by LTE Band 25 (1850-1915 MHz)
 - LTE Band 4 (1710-1755 MHz) is covered by LTE Band 66 (1710-1780 MHz)

Mode / Band	Antenna	Modulated Average Output Power (in dBm)
		Max Tune-up
LTE Band 12	Main1	22.0
LTE Band 17	Main1	22.0
LTE Band 13	Main1	22.0
LTE Band 5	Main1	22.0
LTE Band 66 (AWS)	Main2	21.0
LTE Band 4 (AWS)	Main2	21.0
LTE Band 25 (PCS)	Main2	19.0
LTE Band 2 (PCS)	Main2	19.0
LTE Band 41 PC3	Main2	19.0

The complete list of supported combinations of the device for DL Inter-band and DL Intra-band combinations are included in the manufacturer documentation.

When carrier aggregation is limited to downlink only, uplink maximum output power (single carrier) is measured for the supported combinations of downlink carrier aggregation listed in the table below. In applying the power measurement procedures of KDB 941225 D05A and April 2018 TCB workshop for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs (far right most configuration highlighted in the table below).

DL CA SISO Measured Results

Table with columns: Band, E-UTRA CA configuration, Restrictions, CCI (UL), CCI (DL), CC2 (DL), CC3 (DL), CC4 (DL), CC5 (DL), CC6 (DL), Aggregated BW, CA Inactive (dBm), CA Active (dBm), Delta. Rows list various CA configurations and their measured results.

DL CA MIMO Measured Results

Table with columns: Band, E-UTRA CA configuration, Restrictions, CCI (UL), CCI (DL), CC2 (DL), CC3 (DL), CC4 (DL), CC5 (DL), CC6 (DL), Aggregated BW, CA Inactive (dBm), CA Active (dBm), Delta. Rows list various CA configurations like CA_2A-[66A], CA_1A-[46A], etc., with associated frequency and power values.

DL CA MIMO Measured Results (continued)

Table with columns: Band, E-UTRA CA configuration, Restrictions, CCI (UL), CCI (DL), CC2 (DL), CC3 (DL), CC4 (DL), CC5 (DL), CC6 (DL), Aggregated BW, CA Inactive (dBm), CA Active (dBm), Delta. Rows include various CA configurations like CA_2A-2A-[4A]-[5A], CA_[2A]-[2A]-[4A]-[5A], etc.

DL CA MIMO Measured Results (continued)

FCC ID	Band	E-UTRA CA configuration	Restrictions	CC1 (L)			CC1 (U)			CC2 (L)			CC3 (L)			CC4 (L)			CC5 (L)			Aggregated BW	CA Inactive (dBm)	CA Active (dBm)	Delta													
				Mode	BW (MHz)	Channel	Freq (MHz)	RB Offset	BW (MHz)	Channel	Freq (MHz)	BW (MHz)	Channel	Freq (MHz)	BW (MHz)	Channel	Freq (MHz)	BW (MHz)	Channel	Freq (MHz)	BW (MHz)					Channel	Freq (MHz)											
5	5	66	2	CA_[2A]_[5B]_[6E]B	-	Q64	10	20525	836.5	1.25	10	2525	881.5	10	2624	891.4	10	66786	2145	10	66885	2154.9	20	900	1960	60	21.56	21.63	0.07									
				CA_[2A]_[5B]_[6E]B	-	Q16	10	132322	1745	1.0	10	66786	2145	10	66885	2154.9	10	2525	881.5	10	2624	891.4	20	900	1960	60	20.58	20.61	0.03									
5	5	66	2	CA_[2A]_[5B]_[6E]C	-	Q64	10	20525	836.5	1.25	10	2525	881.5	10	2624	891.4	10	66786	2145	10	66984	2164.8	20	900	1960	60	21.53	21.61	0.08									
				CA_[2A]_[5B]_[6E]C	-	Q16	10	132322	1745	1.50	20	66786	2145	20	66984	2164.8	10	2525	881.5	10	2624	891.4	20	900	1960	80	20.70	20.67	-0.03									
5	46	46	46	CA_[5A]_[4E]_[6E]A	B46 SCC Only	Q64	10	20525	836.5	1.25	10	2525	881.5	20	66786	2145	20	50492	5520.2	20	50690	5540	20	50888	5559.8	90	21.51	21.57	0.06									
				CA_[5A]_[4E]_[6E]A	B46 SCC Only	Q16	20	132322	1745	1.50	20	66786	2145	10	2525	881.5	20	50492	5520.2	20	50690	5540	20	50888	5559.8	90	20.66	20.68	0.02									
5	46	46	46	CA_[5A]_[4E]	B46 SCC Only	Q64	10	20525	836.5	1.25	10	2525	881.5	20	50490	5520	20	50688	5539.8	20	50889	5559.9	20	51090	5580	90	21.73	21.70	-0.03									
				CA_[5B]_[4E]	B46 SCC Only	Q64	10	20525	836.5	1.25	10	2525	881.5	10	2624	891.4	20	50492	5520.2	20	50690	5540	20	50888	5559.8	90	21.72	21.70	-0.02									
13	66	46	46	CA_[2A]_[13A]_[6E]A	B46 SCC Only	Q64	10	23230	782	1.49	10	5230	751	20	66786	2145	20	50492	5520.2	20	50690	5540	20	50888	5559.8	90	21.72	21.72	0.00									
				CA_[2A]_[13A]_[6E]A	B46 SCC Only	Q16	20	132322	1745	1.50	20	66786	2145	10	5230	751	20	50492	5520.2	20	50690	5540	20	50888	5559.8	90	20.62	20.61	-0.01									
41	46	46	46	CA_[4]_[1A]_[4E]	B46 SCC Only	Q16	20	41055	2636.5	1.50	20	41055	2636.5	20	50490	5520	20	50688	5539.8	20	50889	5559.9	20	51090	5580	100	18.53	18.46	-0.07									
				CA_[4A]_[4E]_[6E]A	B46 SCC Only	Q16	20	132322	1745	1.50	20	66786	2145	20	46890	5160	20	53942	5865.2	20	54140	5885	20	54338	5904.8	100	20.61	20.66	0.05									
66	46	46	46	CA_[4E]_[6E]A	B46 SCC Only	Q16	20	132322	1745	1.50	20	66786	2145	20	67036	2170	20	50492	5520.2	20	50690	5540	20	50888	5559.8	100	20.65	20.63	-0.02									
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	700	1940	20	1100	1980	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	90	21.76	21.75	-0.01			
66	2	12	66	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	66786	2145	20	700	1940	20	1100	1980	10	5095	737.5	20	700	1940	20	1100	1980	90	20.52	20.51	-0.01			
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	10	5095	737.5	20	700	1940	20	1100	1980	90	21.68	21.73	0.05
66	12	2	2	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	67036	2170	10	5095	737.5	20	700	1940	20	1100	1980	90	20.69	20.68	-0.01									
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	700	1940	20	1100	1980	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	90	21.65	21.75	0.10			
6	2	12	66	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	700	1940	20	1100	1980	10	5095	737.5	20	67036	2170	20	700	1940	20	1100	1980	90	20.75	20.62	-0.13			
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	700	1940	20	1100	1980	20	66786	2145	20	67036	2170	20	1100	1980	90	21.69	21.71	0.02						
66	2	12	66	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	700	1940	20	1100	1980	10	5095	737.5	20	67036	2170	20	700	1940	20	1100	1980	90	20.66	20.68	0.02			
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	1100	1980	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	90	21.75	21.66	-0.09						
66	2	12	66	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	1100	1980	20	700	1940	20	1100	1980	10	5095	737.5	20	67036	2170	20	700	1940	20	1100	1980	90	20.72	20.71	-0.01
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	10	5095	737.5	20	700	1940	20	1100	1980	90	21.65	21.58	-0.07
66	12	2	2	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	67036	2170	10	5095	737.5	20	700	1940	20	1100	1980	90	20.73	20.68	-0.05									
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	700	1940	20	1100	1980	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	90	21.72	21.71	-0.01			
66	2	12	66	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23095	707.5	1.49	10	5095	737.5	20	66786	2145	20	700	1940	20	1100	1980	10	5095	737.5	20	67036	2170	20	700	1940	20	1100	1980	90	20.79	20.73	-0.06
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	700	1940	20	1100	1980	10	5095	737.5	20	67036	2170	20	700	1940	20	1100	1980	90	21.74	21.74	0.00			
66	2	12	66	CA_[2A]_[2A]_[12A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	10	5095	737.5	20	67036	2170	20	700	1940	20	1100	1980	90	20.65	20.67	0.02
				CA_[2A]_[2A]_[12A]_[6E]A	-	Q64	10	23230	782	1.49	10	5230	751	20	700	1940	20	1100	1980	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	90	21.63	21.58	-0.05			
66	2	13	66	CA_[2A]_[2A]_[13A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	700	1940	20	1100	1980	10	5230	751	20	67036	2170	20	700	1940	20	1100	1980	90	20.63	20.68	0.05			
				CA_[2A]_[2A]_[13A]_[6E]A	-	Q64	10	23230	782	1.49	10	5230	751	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	10	5230	751	20	700	1940	20	1100	1980	90	21.60	21.60	0.00
66	13	2	2	CA_[2A]_[2A]_[13A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	67036	2170	10	5230	751	20	700	1940	20	1100	1980	90	20.83	20.67	-0.16									
				CA_[2A]_[2A]_[13A]_[6E]A	-	Q64	10	23230	782	1.49	10	5230	751	20	700	1940	20	1100	1980	20	66786	2145	20	67036	2170	20	700	1940	20	1100	1980	90	21.51	21.61	0.10			
13	2	13	66	CA_[2A]_[2A]_[13A]_[6E]A	-	Q16	10	23232	1745	1.50	20	66786	2145	20	700	1940	20	1100	1980	10	5230	751	20	67036	2170	20	700	1940	20	1100	1980	90	20.69	20.76	0.07			
				CA_[2A]_[2A]_[13A]_[6E]A	-	Q64	10	23230	782	1.49	10	5230	751	20	66786	2145	20	700	1940	20	1100	1980	10	5230	751	20	67036	2170	20	700	1940	20	1100	1980	90	21.58	21.57	-0.01
66																																						

DL CA MIMO Measured Results (continued)

Table with columns: Band, E-UTRA CA configuration, Restrictions, CCI (UL), CCI (DL), CC2 (DL), CC3 (DL), CC4 (DL), CC5 (DL), CC6 (DL), Aggregated BW, CA Inactive (dBm), CA Active (dBm), Delta. The table contains multiple rows of test results for various CA configurations and bands.

END OF REPORT