

TEST REPORT

Report Number : 14523772-E24V1

Applicant : APPLE, INC
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

Model : A3105

Brand : APPLE

FCC ID : BCG-E8440A

IC : 579C-E8440A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR Part 2, Part 25
ISED RSS-GEN ISSUE 5, RSS-170 ISSUE 4

Date Of Issue:
2023-08-15

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Revision History

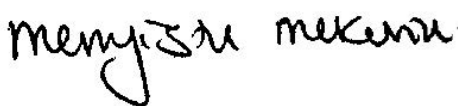
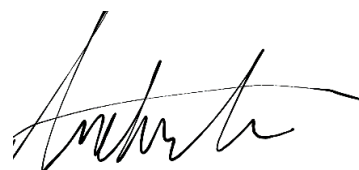
Rev.	Issue Date	Revisions	Revised By
V1	2023-08-15	Initial Review	Eric Ting

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A
Model	A3105
Brand	APPLE
FCC ID	BCG-E8440A
IC	579C-E8440A
EUT Description	SMARTPHONE
Serial Number	YN44MWQV93, R99VXPQQM9, C07GVV005R0000472, C07GVV00560000472 (CONDUCTED) AND JWDG4123TQ, THL2CQTMHY (RADIATED)
Sample Receipt Date	2023-03-24
Date Tested	2023-03-27 to 2023-06-30
Applicable Standards	FCC 47 CFR Part 2, PART 25 ISED RSS-GEN ISSUE 5, RSS-170 ISSUE 4
Test Results	COMPLIES
UL Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.	
Approved & Released By: 	Prepared & Reviewed By: 
Mengistu Mekuria Project Engineer UL Verification Services Inc.	Andrew Le Senior Lab Technician UL Verification Services Inc.

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. 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. Antenna gain and type (see section 6.4.)

Requirement Description	Band	Requirement Clause Number (FCC)	Requirement Clause Number (ISED)	Result	Remarks
RF Conducted Output Power	53	25.149 (c)(4)(iii)	RSS-170 5.4; SMSE-009-20 Annex A 9.d	Complies	
Equivalent Isotropic Radiated	53	25.149 (c)(4)(iii)	RSS-170 5.4; SMSE-009-20 Annex A 9.e	Complies	
Maximum Power Spectral Density	53	25.149 (c)(4)(iv)	SMSE-009-20 Annex A 9.f	Complies	
Duty Cycle	53	Reporting purpose	Reporting purpose	Complies	
Occupied Bandwidth		2.1049	Reporting purpose	Complies	
6 dB Bandwidth	53	25.149 (c)(4) (ii)	SMSE-009-20 Annex A 9.c	Complies	
Band Edge and Emission Mask	53	2.1051, 25.149 (c) (4) (v), (vi)	RSS-170 5.7.3; SMSE-009-20 Annex A 9.g and h	Complies	
Out of Band Emissions	53	2.1051, 25.149 (c) (4) (v), (vi)	RSS-170 5.7.3; SMSE-009-20 Annex A 9.g, h, and i	Complies	
Frequency Stability	53	25.202 (d)	RSS-170 5.3	Complies	
Field Strength of Spurious Radiation	53	2.1053, 25.149 (c) (4) (v), (vi)	RSS-170 5.7.3; SMSE-009-20 Annex A 9.g, h, and i	Complies	
Carrier-Off-State Emissions Radiation	53	25.216 (i)	RSS-170 5.10	Complies	

3. TEST METHODOLOGY

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

- ANSI C63.26:2015
- FCC 47 CFR Part 2 and 25
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP
- ISED RSS-GEN ISSUE 5, RSS-170 ISSUE 4
- SMSE-009-20

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, 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
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☐	Building 3: 843 Auburn Court, Fremont, CA 94538, USA			
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☒	Building 5: 47670 Kato Rd, Fremont, CA 94538, USA			

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}
Conducted Antenna Port Emission Measurement	1.940
Power Spectral Density	2.466
Time Domain Measurements Using SA	3.39 %
RF Power Measurement Direct Method Using Power Meter	0.450 db Peak, 1.300 db Ave.
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 db
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 db
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 db
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 db
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 db
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 db
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 db

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G NR1, IEEE 802.11a/b/g/n/ac/ax, Bluetooth (BT), Ultra-Wideband (UWB), GPS, NFC, NB UNII, 802.15.4, 802.15.4ab-NB and MSS technologies. The rechargeable battery is not user accessible.

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

$$\text{EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: EIRP = effective isotropic radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and peak EIRP output powers as follows:

Limit

FCC: §25.149 (c)(4) (iii): The maximum transmit power is no more than 1 W with a peak EIRP of no more than 6 dBW (36dBm or 3.98W).

ISED: SMSE-009-20 Annex A 9.e: The maximum equivalent isotropically radiated power (e.i.r.p.) shall not exceed 6 dBW (36dBm or 3.98W).

LTE BAND 53

FCC Part 25/ SMSE-009-20											
Peak EIRP Limit (W)		3.98									
Conducted Average Limit (W)		1.00									
Antenna Gain (dBi) (Ant 2)		0.00									
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	Conducted Peak (dBm)	EIRP Peak (dBm)	EIRP Peak (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	2484.2	2494.3	20.70	20.70	0.117	25.28	25.28	0.337	1091	1M09G7W
	16QAM			20.00	20.00	0.100	25.14	25.14	0.327	1086	1M09D7W
3.0	QPSK	2485.0	2493.5	20.70	20.70	0.117	24.50	24.50	0.282	2693	2M69G7W
	16QAM			20.70	20.70	0.117	24.42	24.42	0.277	2690	2M69D7W
5.0	QPSK	2486.0	2492.5	20.70	20.70	0.117	24.90	24.90	0.309	4480	4M48G7W
	16QAM			20.70	20.70	0.117	24.80	24.80	0.302	4514	4M51D7W
10.0	QPSK	2488.5	2490.0	20.70	20.70	0.117	24.57	24.57	0.286	8978	8M98G7W
	16QAM			20.70	20.70	0.117	24.56	24.56	0.286	8995	9M00D7W

5G NR n53

FCC Part 25 / SMSE-900-20											
Peak EIRP Limit (W)		3.98									
Conducted Average Limit (W)		1.00									
Antenna Gain (dBi) (Ant 2)		0.00									
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	Conducted Peak (dBm)	EIRP Peak (dBm)	EIRP Peak (W)	99% BW (kHz)	Emission Designator
10.0	BPSK	2488.5	2490.0	20.70	20.70	0.117	25.15	25.15	0.327	8620	8M62G7W
	QPSK			20.70	20.70	0.117	25.07	25.07	0.321	8602	8M60G7W
	16QAM			20.70	20.70	0.117	24.15	24.15	0.260	8626	8M63D7W

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version: 0.13.02.

6.4. MAXIMUM ANTENNA GAIN

The antenna(s) gain, as provided by the manufacturer' are as follows:

LTE Bands	Frequency Range (MHz)	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)
LTE BAND 53, 5G NR n53	2483.5 – 2495 MHz	-3.2	0.0

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports the following LTE and 5G NR Bands:
Band 53, and 5G NR n53

BPSK modulation applied only for 5G NR frequencies and has the same tune up power as QPSK modulations.

The DFT-s-OFDM and CP-OFDM waveforms were investigated, and DFT-s-OFDM was found to be the worst case.

The worst-case scenario for all measurements is based on an engineering evaluation made on different modulations. All modulations had the same target power for the worst-case antenna, so QPSK and BPSK were used to represent the worst mode for LTE bands and 5G NR bands respectively and were set for all conducted and radiated tests. Output power measurements were measured on BPSK, QPSK, 16QAM, 64QAM, and 256QAM modulations. For testing purposes emissions on sections 9 were measured while QPSK/BPSK was set at or above target power for all bands. Conducted tests were performed on the worst-case antenna because it has the highest conducted power. The worst-case antenna is shown in the table below.

LTE and 5G NR Bands	Worst case Antenna Port For Conducted Power
LTE BAND 53, and 5G NR n53	Ant 2

The EUT was investigated in three orthogonal orientations X/Y/Z on both ANT 1 and ANT2 antennas to determine the worst case orientation. The full tests of the EUT have made upon the orientations that shown in the table below.

Frequency Bands	ANT1	ANT2
2300 – 2700 MHz	Y	Y

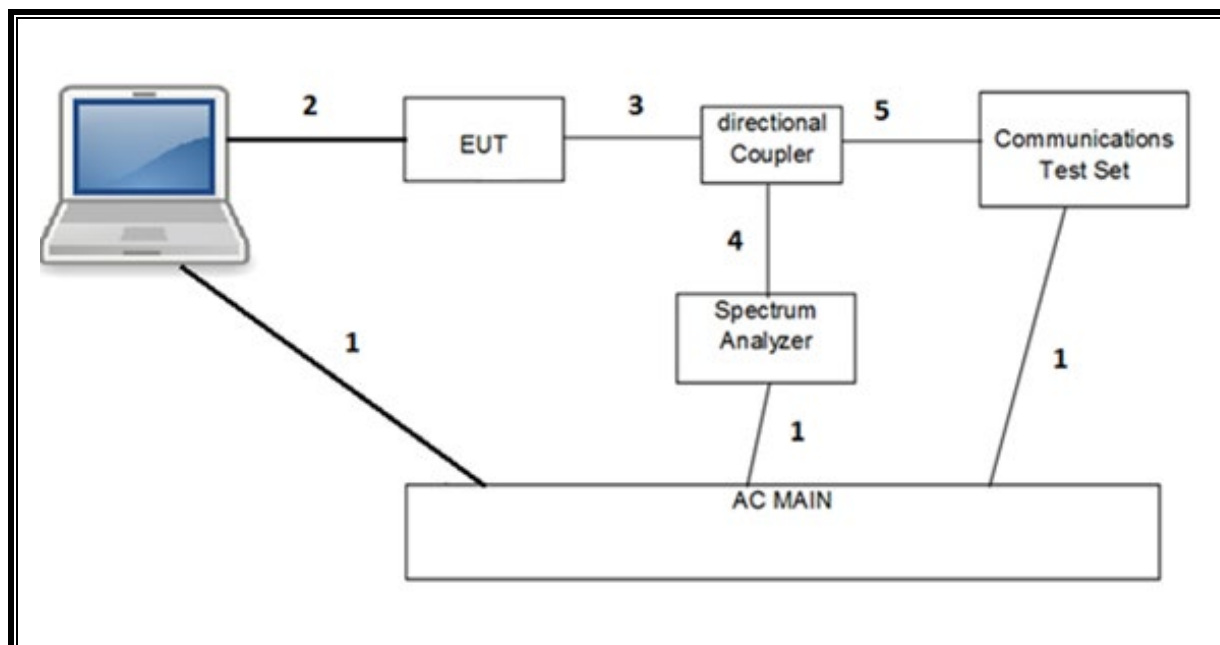
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 18GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For simultaneous transmission of multiple channels in the 2.4GHz/5GH WLAN, UWB, and Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

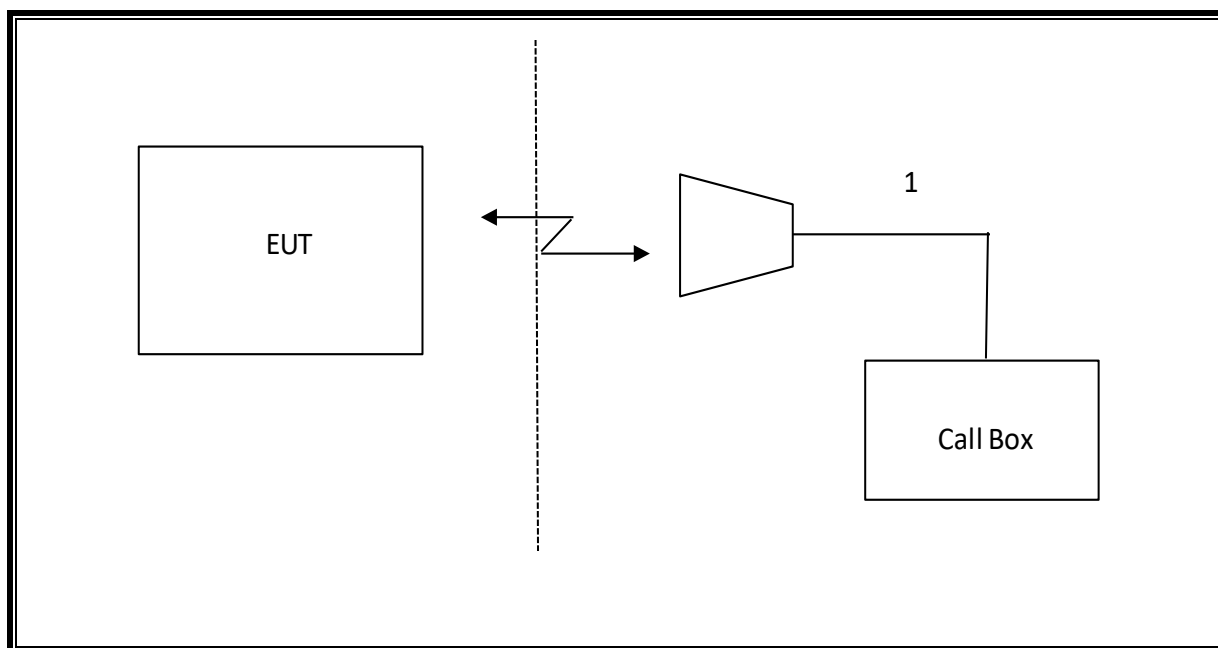
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	MacBook Pro	HRP082673		BCGA1708
AC/DC adapter		Apple	A1718	C4H64450HH3GN8RA6		--
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Antenna	Un-shielded	5.0	N/A

CONDUCTED SETUP



RADIATED SETUP



7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	79834	06/08/2023
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	85151	04/30/2024
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	85313	02/29/2024
Spectrum Analyzer, PXA	Keysight	N9030B	222074	07/16/2023
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	85201	02/29/2024
Spectrum Analyzer, PXA	Keysight	N9030B	85214	07/18/2023
Spectrum Analyzer, PXA	Keysight	N9030B	222073	07/22/2023
PXA Signal Analyzer	Keysight	N9030B	222073	07/22/2023
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230548	02/29/2024
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201498	02/29/2024
Directional Coupler	KRYTAR	152610	198816	09/23/2023
Directional Coupler	KRYTAR	152610	198817	09/23/2023
Directional Coupler	KRYTAR	152610	135712	09/23/2023
Power Meter, P-series single channel	Keysight	N1912A	90630	01/24/2024
Power Meter, P-series single channel	Keysight	N1912A	90719	01/31/2024
Power Meter, P-series single channel	Agilent	N1911A	82174	01/31/2024
Power Sensor, P – series, 50MHz to 18GHz, Wideband	Keysight	N1921A	90389	01/31/2024
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	222792	02/29/2024
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	230298	02/29/2024
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	230295	02/29/2024
*5G NR Communication Test Set, Call Box	Keysight	UXM	207269	01/31/2024
*5G NR Communication Test Set, Call Box	Keysight	UXM	199836	01/31/2024
*Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	82472	11/16/2023
*Amplifier, 218GHz to 26.5GHz	Ampical	AMP18G26.5-60	171583	02/29/2024
*Amplifier, 26.5GHz to 40GHz	Ampical	AMP26G40-65	172346	02/29/2024
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	172362	03/31/2024
Antenna, Horn 26.5GHz to 40GHz	ARA	MWH-2640/B	172365	03/31/2024
*Antenna, Active Loop 100KHz to 30MHz	ELECTRO-METRICS	EM-6872	219911	05/10/2023
*Antenna, Active Loop 30Hz to 1MHz	ELECTRO-METRICS	EM-6871	219909	05/10/2023
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	236360	N/A
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	236285	N/A
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	236355	N/A
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 3.4, May 20, 2022	
Power Measurement Software	UL	UL RF	Ver 3.1.4, April 29, 2022	
Radiated test software	UL	UL RF	Ver 9.5, Jan 21, 2022	

NOTES:

- * Testing is completed before equipment expiration date.
- **Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

8. RF OUTPUT POWER VERIFICATION

LIMITS

FCC: §25.204

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+ 40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

+ 40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

ISED RSS-170:

5.3.2 Mobile Earth Stations (MESs)

The application for MES certification shall state the MES e.i.r.p. that is necessary for satisfactory communication. The maximum permissible e.i.r.p. will be the stated e.i.r.p. plus a 2 dB margin. If a detachable antenna is used, the certification application shall state the recommended antenna type and manufacturer, the antenna gain and the maximum transmitter output power at the antenna terminal.

TEST PROCEDURE

The transmitter output is connected to a wideband power meter/sensor which is greater than the occupied bandwidth as worstcase scenario, also the total power readings still comply with the required limit.

The cable assembly insertion loss of 13.2 dB (ANT 1) / 12.32 dB (ANT 4) (including 10.70 dB coupler and 2.5 dB cable (ANT 1) / 10 dB pad and 2.32 dB cable (ANT 4)) was entered as an offset in the power meter to allow for a gated average reading of power.

RULE PART(S) AND LIMITS

FCC: §25.149 (c)(4) (iii): The maximum transmit power is no more than 1 W (30dBm) with a peak EIRP of no more than 6 dBW.

ISED: SMSE-009-20 Annex A 9.d: Transmitter output power shall not exceed 0 dBW (30dBm).

RESULTS

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average and peak conducted output powers as follows

8.1. LTE BAND 53

Test Engineer ID:	39004	Test Date:	4/12/2023
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OUTPUT POWER FOR LTE BAND 53 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1			Ant 2			Ant 1			Ant 2		
				Conducted Average (dBm)			Conducted Average (dBm)			Conducted Peak (dBm)			Conducted Peak (dBm)		
				60147	60195	60248	60147	60195	60248	60147	60195	60248	60147	60195	60248
				2484.2 MHz	2489.0 MHz	2494.3 MHz	2484.2 MHz	2489.0 MHz	2494.3 MHz	2484.2	2489.0	2494.3	2484.2	2489.0	2494.3
1.4	QPSK	1	0	20.61	20.63	20.68	20.65	20.62	20.60	24.38	24.43	24.48	24.60	24.57	24.61
		1	2	20.70	20.67	20.70	20.70	20.69	20.65	24.42	24.46	24.48	24.64	24.63	24.64
		1	5	20.62	20.65	20.66	20.70	20.67	20.70	24.40	24.48	24.47	24.68	24.65	24.71
		3	0	20.60	20.63	20.70	20.65	20.65	20.60	24.45	24.50	24.56	24.65	24.70	24.64
		3	1	20.60	20.68	20.70	20.66	20.69	20.61	24.44	24.55	24.55	24.68	24.72	24.65
		3	2	20.63	20.66	20.70	20.67	20.70	20.69	24.47	24.51	24.57	24.67	24.73	24.72
	16QAM	6	0	20.42	20.38	20.48	20.48	20.44	20.46	24.81	24.80	24.89	24.99	24.98	25.28
		1	0	20.65	20.66	20.60	20.59	20.46	20.68	24.88	24.91	24.79	24.93	24.90	25.12
		1	2	20.52	20.59	20.64	20.70	20.70	20.50	24.72	24.79	24.81	24.97	25.14	24.94
		1	5	20.70	20.70	20.63	20.63	20.53	20.64	24.91	24.95	24.81	24.97	25.00	25.09
		3	0	20.32	20.49	20.41	20.38	20.35	20.31	24.74	24.92	24.80	24.97	24.97	24.95
		3	1	20.30	20.48	20.43	20.40	20.37	20.30	24.74	24.91	24.81	24.99	24.99	24.93
	64QAM	3	2	20.31	20.50	20.70	20.34	20.38	20.29	24.73	24.92	24.82	24.93	24.99	24.92
		6	0	20.27	20.23	20.37	20.40	20.30	20.33	24.75	24.74	24.84	24.95	24.92	24.93
		1	0	20.48	20.63	20.63	20.57	20.64	20.54	24.62	24.74	24.69	24.80	24.91	24.84
		1	2	20.62	20.70	20.56	20.58	20.70	20.64	24.64	24.82	24.62	24.78	24.91	24.91
		1	5	20.61	20.59	20.57	20.63	20.62	20.57	24.64	24.79	24.65	24.84	24.88	24.88
		3	0	20.57	20.55	20.51	20.48	20.56	20.47	24.67	24.67	24.72	24.85	24.93	24.89
	256QAM	3	1	20.53	20.58	20.53	20.51	20.59	20.47	24.66	24.71	24.73	24.89	24.94	24.88
		3	2	20.70	20.58	20.50	20.51	20.59	20.55	24.66	24.73	24.71	24.86	24.95	24.96
		6	0	20.38	20.48	20.43	20.41	20.42	20.14	24.73	24.69	24.75	24.87	24.92	24.80
		1	0	20.54	20.60	20.60	18.55	18.60	18.63	22.51	22.47	22.69	22.80	22.96	23.07
		1	2	20.62	20.70	20.65	18.66	18.69	18.69	22.65	22.65	22.75	23.00	23.02	23.10
		1	5	20.53	20.63	20.61	18.63	18.59	18.63	22.60	22.59	22.78	22.82	23.03	23.00
		3	0	20.49	20.49	20.66	18.62	18.63	18.60	23.03	22.90	23.30	23.32	23.57	23.33
		3	1	20.56	20.64	20.66	18.60	18.70	18.58	23.11	23.26	23.37	23.21	23.40	23.24
		3	2	20.55	20.59	20.64	18.67	18.72	18.58	23.12	23.13	23.25	23.38	23.67	23.21
		6	0	20.35	20.47	20.58	18.55	18.54	18.59	23.61	23.23	23.52	23.98	23.84	24.02

OUTPUT POWER FOR LTE BAND 53 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1			Ant 2			Ant 1			Ant 2		
				Conducted Average (dBm)			Conducted Average (dBm)			Conducted Peak (dBm)			Conducted Peak (dBm)		
				60155	60195	60240	60155	60195	60240	60147	60195	60248	60147	60195	60248
				2485.0 MHz	2489.0 MHz	2493.5 MHz	2485.0 MHz	2489.0 MHz	2493.5 MHz	2484.2	2489.0	2494.3	2484.2	2489.0	2494.3
3.0	QPSK	1	0	20.56	20.53	20.53	20.56	20.55	20.53	23.46	23.46	23.47	23.61	23.65	23.63
		1	7	20.70	20.66	20.60	20.70	20.70	20.65	23.52	23.54	23.49	23.68	23.74	23.70
		1	14	20.63	20.55	20.50	20.61	20.57	20.70	23.56	23.55	23.50	23.71	23.72	23.70
		8	0	20.69	20.61	20.66	20.69	20.52	20.65	24.05	24.00	24.07	24.21	24.19	24.23
		8	4	20.50	20.63	20.70	20.70	20.66	20.70	24.12	24.06	24.10	24.27	24.25	24.30
		8	7	20.60	20.70	20.69	20.65	20.70	20.65	24.11	24.10	24.10	24.27	24.28	24.28
	16QAM	15	0	20.28	20.17	20.23	20.65	20.68	20.52	24.17	24.07	24.13	24.50	24.25	24.30
		1	0	20.55	20.43	20.45	20.55	20.59	20.54	23.85	23.86	23.87	24.02	24.11	24.04
		1	7	20.70	20.61	20.48	20.70	20.68	20.66	23.88	23.97	23.91	24.04	24.13	24.08
		1	14	20.55	20.50	20.43	20.59	20.57	20.50	23.92	23.95	23.89	24.10	24.16	24.08
		8	0	20.63	20.69	20.70	20.51	20.44	20.29	24.02	23.99	23.98	24.18	24.15	24.23
		8	4	20.00	20.70	20.70	20.32	20.46	20.70	24.07	24.00	24.00	24.23	24.14	24.21
	64QAM	8	7	20.57	20.58	20.57	20.70	20.31	20.33	24.06	24.05	24.00	24.23	24.24	24.22
		15	0	20.52	20.47	20.51	20.23	20.39	20.46	24.25	24.18	24.22	24.42	24.35	24.38
		1	0	20.66	20.70	20.68	20.23	20.32	20.25	23.72	23.73	23.73	23.82	23.90	23.88
		1	7	20.63	20.70	20.70	20.40	20.70	20.54	23.76	23.77	23.85	23.88	23.99	23.94
		1	14	20.64	20.69	20.67	20.40	20.40	20.55	23.87	23.84	23.83	23.96	24.04	23.97
		8	0	20.46	20.48	20.46	20.54	20.47	20.53	23.86	23.83	23.88	24.06	24.05	24.14
	256QAM	8	4	20.51	20.54	20.52	20.70	20.50	20.70	23.85	23.92	23.93	24.06	24.09	24.18
		8	7	20.52	20.57	20.52	20.56	20.52	20.52	23.92	23.95	23.94	24.09	24.11	24.13
		15	0	20.49	20.44	20.45	20.49	20.47	20.53	24.09	24.09	24.15	24.34	24.26	24.35
		1	0	20.62	20.70	20.59	18.52	18.60	18.68	21.81	21.62	21.65	21.71	22.03	22.07
		1	7	20.43	20.50	20.41	18.73	18.71	18.72	21.90	21.85	21.84	21.92	21.99	22.01
		1	14	20.70	20.46	20.30	18.61	18.63	18.55	21.88	22.04	21.77	22.02	22.17	21.79
		8	0	20.34	20.32	20.70	18.59	18.52	18.59	22.50	22.45	22.61	22.80	22.78	22.72
		8	4	20.40	20.38	20.35	18.60	18.56	18.64	22.55	22.58	22.55	22.80	22.70	22.73
		8	7	20.40	20.42	20.39	18.63	18.65	18.62	22.57	22.67	22.65	22.77	22.81	22.77
		15	0	20.35	20.31	20.32	18.56	18.52	18.55	22.59	22.53	22.53	22.83	22.79	22.79

OUTPUT POWER FOR LTE BAND 53 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1			Ant 2			Ant 1			Ant 2		
				Conducted Average (dBm)			Conducted Average (dBm)			Conducted Peak (dBm)			Conducted Peak (dBm)		
				60165	60195	60230	60165	60195	60230	60147	60195	60248	60147	60195	60248
5.0	QPSK	1	0	2486.0 MHz	2489.0 MHz	2492.5 MHz	2486.0 MHz	2489.0 MHz	2492.5 MHz	2484.2	2489.0	2494.3	2484.2	2489.0	2494.3
		1	12	20.51	20.55	20.55	20.45	20.49	20.46	23.53	23.53	23.53	23.72	23.78	23.68
		1	24	20.62	20.54	20.70	20.62	20.54	20.48	23.69	23.62	23.57	23.89	23.84	23.75
		12	0	20.63	20.57	20.61	20.61	20.54	20.60	24.01	23.99	24.03	24.21	24.17	24.22
		12	6	20.69	20.60	20.63	20.66	20.57	20.70	24.04	23.96	24.00	24.20	24.17	24.22
		12	11	20.66	20.56	20.61	20.64	20.53	20.61	24.05	23.96	23.99	24.24	24.17	24.24
		25	0	20.23	20.13	20.18	20.64	20.70	20.58	24.48	24.36	24.49	24.90	24.52	24.57
	16QAM	1	0	20.44	20.37	20.41	20.42	20.48	20.41	23.82	23.83	23.86	24.01	24.10	24.05
		1	12	20.66	20.53	20.50	20.70	20.65	20.52	24.01	23.99	23.93	24.21	24.29	24.19
		1	24	20.46	20.42	20.40	20.51	20.44	20.36	23.94	23.95	23.91	24.19	24.19	24.11
		12	0	20.69	20.54	20.70	20.68	20.52	20.52	23.98	23.91	24.05	24.19	24.20	24.24
		12	6	20.70	20.61	20.70	20.67	20.69	20.70	24.00	23.93	23.97	24.15	24.09	24.27
		12	11	20.70	20.54	20.70	20.70	20.51	20.70	24.02	23.91	24.00	24.22	24.11	24.28
		25	0	20.64	20.51	20.58	20.70	20.70	20.70	24.55	24.46	24.48	24.80	24.62	24.65
	64QAM	1	0	20.33	20.25	20.31	20.70	20.70	20.70	23.72	23.72	23.69	23.85	23.87	23.92
		1	12	20.38	20.51	20.42	20.57	20.70	20.65	23.83	23.93	23.88	24.02	24.02	24.10
		1	24	20.34	20.70	20.32	20.54	20.61	20.60	23.86	23.84	23.85	23.99	24.02	24.05
		12	0	20.56	20.52	20.53	20.55	20.53	20.57	23.90	23.91	23.92	24.11	24.11	24.14
		12	6	20.70	20.53	20.70	20.70	20.55	20.59	23.91	23.87	23.90	24.07	24.06	24.09
		12	11	20.60	20.52	20.56	20.56	20.52	20.55	23.93	23.88	23.93	24.10	24.07	24.09
		25	0	20.56	20.54	20.56	20.56	20.50	20.70	24.29	24.19	24.24	24.44	24.35	24.45
	256QAM	1	0	20.54	20.55	20.58	18.45	18.56	18.56	21.69	21.78	21.84	21.89	22.08	21.99
		1	12	20.70	20.70	20.65	18.58	18.63	18.56	21.80	21.99	22.27	22.05	22.01	22.06
		1	24	20.62	20.51	20.51	18.48	18.46	18.48	21.85	21.82	21.87	21.98	21.97	22.08
		12	0	20.52	20.48	20.50	18.45	18.40	18.45	22.82	22.75	22.79	22.94	22.97	23.00
		12	6	20.56	20.51	20.70	18.50	18.45	18.47	22.90	22.79	22.88	22.98	22.97	22.99
		12	11	20.54	20.48	20.51	18.47	18.41	18.43	22.87	22.77	22.77	22.97	22.98	22.96
		25	0	20.48	20.46	20.49	18.43	18.41	18.45	22.87	22.78	22.96	23.03	23.03	23.03

OUTPUT POWER FOR LTE BAND 53 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1			Ant 2			Ant 1			Ant 2		
				Conducted Average (dBm)			Conducted Average (dBm)			Conducted Peak (dBm)			Conducted Peak (dBm)		
				60190	60195	60205	60190	60195	60205	60147	60195	60248	60147	60195	60248
10.0	QPSK	1	0	2488.5 MHz	2489.0 MHz	2490.0 MHz	2488.5 MHz	2489.0 MHz	2490.0 MHz	2484.2	2489.0	2494.3	2484.2	2489.0	2494.3
		1	24	20.64	20.54	20.55	20.55	20.62	20.60	23.52	23.50	23.48	23.44	23.52	23.53
		1	49	20.70	20.63	20.66	20.70	20.70	20.67	23.64	23.66	23.66	23.64	23.69	23.67
		25	0	20.62	20.56	20.60	20.61	20.61	20.62	23.66	23.66	23.67	23.63	23.68	23.70
		25	12	20.70	20.70	20.70	20.70	20.70	20.70	24.10	24.00	24.01	24.04	24.02	24.00
		25	24	20.06	20.70	20.70	20.70	20.66	20.66	24.13	24.03	24.04	24.08	24.04	24.03
		50	0	20.00	20.69	20.70	20.65	20.65	20.64	24.13	24.05	24.06	24.06	24.04	24.05
	16QAM	1	0	20.36	20.29	20.27	20.68	20.66	20.70	24.63	24.54	24.53	24.57	24.49	24.50
		1	24	20.61	20.52	20.61	20.68	20.60	20.67	23.85	23.86	23.87	23.87	23.96	23.95
		1	49	20.70	20.65	20.65	20.61	20.70	20.70	23.97	24.01	23.98	23.97	24.04	24.06
		25	0	20.66	20.56	20.57	20.70	20.62	20.64	24.15	24.14	24.12	24.21	24.17	24.15
		25	12	20.70	20.60	20.58	20.70	20.67	20.65	24.03	23.92	23.87	23.97	23.92	23.92
		25	24	20.68	20.57	20.58	20.70	20.59	20.63	24.17	24.11	24.11	24.20	24.07	24.08
		50	0	20.64	20.53	20.55	20.68	20.62	20.62	24.63	24.51	24.55	24.56	24.50	24.51
	64QAM	1	0	20.70	20.66	20.69	20.70	20.67	20.70	23.75	23.72	23.74	23.66	23.67	23.72
		1	24	20.70	20.70	20.70	20.68	20.70	20.68	23.90	23.94	23.93	23.89	23.91	23.96
		1	49	20.70	20.65	20.69	20.70	20.70	20.70	23.94	23.94	23.95	23.90	23.94	23.94
		25	0	20.42	20.35	20.32	20.59	20.53	20.53	24.00	23.91	23.88	23.97	23.91	23.91
		25	12	20.47	20.39	20.36	20.65	20.70	20.70	23.92	23.85	23.82	23.89	23.84	23.83
		25	24	20.42	20.34	20.35	20.58	20.53	20.52	23.96	23.91	23.91	23.94	23.89	23.89
		50	0	20.43	20.35	20.33	20.70	20.52	20.53	24.38	24.30	24.30	24.31	24.30	24.26
	256QAM	1	0	20.56	20.52	20.48	18.21	18.23	18.19	21.59	21.71	21.67	21.66	21.54	21.69
		1	24	20.70	20.70	20.63	18.38	18.39	18.40	21.92	22.07	22.08	22.00	22.01	22.10
		1	49	20.55	20.51	20.51	18.40	18.40	18.22	21.79	21.97	21.95	22.05	21.82	21.97
		25	0	20.54	20.47	20.43	18.23	18.15	18.15	23.16	23.01	22.98	23.11	22.99	23.05
		25	12	20.59	20.47	20.70	18.26	18.40	18.21	23.18	23.12	22.96	23.01	23.06	22.91
		25	24	20.55	20.46	20.44	18.25	18.17	18.17	23.12	22.97	23.07	22.95	23.01	22.86
		50	0	20.53	20.46	20.42	18.23	18.19	18.17	23.09	23.19	23.06	23.19	23.14	23.09

8.1. 5G NR n53

Test Engineer ID:	27342	Test Date:	5/9/2023
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OUTPUT POWER FOR 5G NR n53 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1			Ant 2			Ant 1			Ant 2		
				Conducted Average (dBm)			Conducted Average (dBm)			Conducted Peak (dBm)			Conducted Peak (dBm)		
				497700	497800	498000	497700	497800	498000	497700	497800	498000	497700	497800	498000
				2488.5 MHz	2489.0 MHz	2490.0 MHz	2488.5 MHz	2489.0 MHz	2490.0 MHz	2488.5	2489.0	2490.0	2488.5	2489.0	2490.0
				1	0	20.12	20.07	20.20	20.05	20.09	20.22	24.33	24.28	24.41	24.42
				1	1	20.55	20.50	20.57	20.58	20.62	20.70	24.76	24.71	24.78	24.95
10.0	BPSK		1	22	20.64	20.70	20.62	20.67	20.61	20.65	24.85	24.87	24.83	25.04	24.98
			1	23	20.70	20.09	20.13	20.06	20.70	20.02	24.27	24.30	24.34	24.43	24.37
			12	6	20.55	20.55	20.63	20.70	20.61	20.60	24.76	24.76	24.84	24.96	24.98
			24	0	20.17	20.13	20.11	20.11	20.12	20.03	24.38	24.34	24.32	24.48	24.49
			1	0	20.16	20.27	20.22	20.65	20.64	20.70	23.80	23.91	23.86	24.02	24.01
			1	1	20.25	20.26	20.18	20.70	20.17	20.24	24.89	24.90	24.82	24.97	25.04
	QPSK		1	22	20.27	20.27	20.20	20.24	20.25	20.27	24.91	24.91	24.84	25.04	25.05
			1	23	20.25	20.21	20.20	20.14	20.17	20.25	23.89	23.85	23.84	23.94	23.97
			12	6	20.24	20.21	20.19	20.14	20.23	20.20	24.88	24.85	24.83	24.94	25.03
			24	0	20.17	20.20	20.21	20.14	20.17	20.06	23.81	23.84	23.85	23.94	23.97
			1	0	20.10	20.17	20.04	20.70	20.24	19.92	22.74	22.81	22.68	22.68	23.04
			1	1	20.06	20.70	20.70	20.70	20.35	20.70	23.70	23.63	23.62	23.71	24.15
	16QAM		1	22	20.11	20.15	20.70	20.00	20.25	20.08	23.75	23.79	23.61	23.80	24.05
			1	23	20.04	20.70	20.47	20.61	20.70	20.70	22.68	22.60	22.59	22.53	22.87
			12	6	20.22	20.04	20.29	20.11	20.10	20.70	23.86	23.68	23.93	23.91	23.90
			24	0	20.70	20.07	20.11	20.15	20.24	20.29	22.75	22.71	22.75	22.95	23.04
			1	0	20.53	20.70	20.53	20.70	20.67	20.76	22.17	22.50	22.17	22.68	22.47
			1	1	20.56	20.65	20.57	20.67	20.52	20.79	22.20	22.29	22.21	22.47	22.32
	64QAM		1	22	20.50	20.67	20.56	20.70	20.59	20.70	22.14	22.31	22.20	22.62	22.39
			1	23	20.47	20.66	20.56	20.63	20.56	20.64	22.11	22.30	22.20	22.55	22.36
			12	6	20.49	20.45	20.63	20.70	20.70	20.69	22.13	22.09	22.27	22.62	22.50
			24	0	20.55	20.59	20.61	20.66	20.67	20.66	22.19	22.23	22.25	22.46	22.47
			1	0	20.53	20.66	20.69	18.65	18.93	18.79	20.17	20.48	20.50	20.45	20.73
			1	1	20.70	20.69	20.67	18.65	18.92	18.79	20.31	20.34	20.38	20.45	20.72
	256QAM		1	22	20.68	20.70	20.70	18.71	19.08	18.90	20.32	20.43	20.41	20.51	20.88
			1	23	20.63	20.70	20.03	18.75	18.92	19.04	20.27	20.44	20.67	20.55	20.72
			12	6	20.63	20.70	20.70	18.73	18.74	18.65	20.27	20.40	20.41	20.53	20.54
			24	0	20.64	20.64	20.67	18.73	18.72	18.75	20.35	20.28	20.31	20.53	20.52

9. CONDUCTED TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

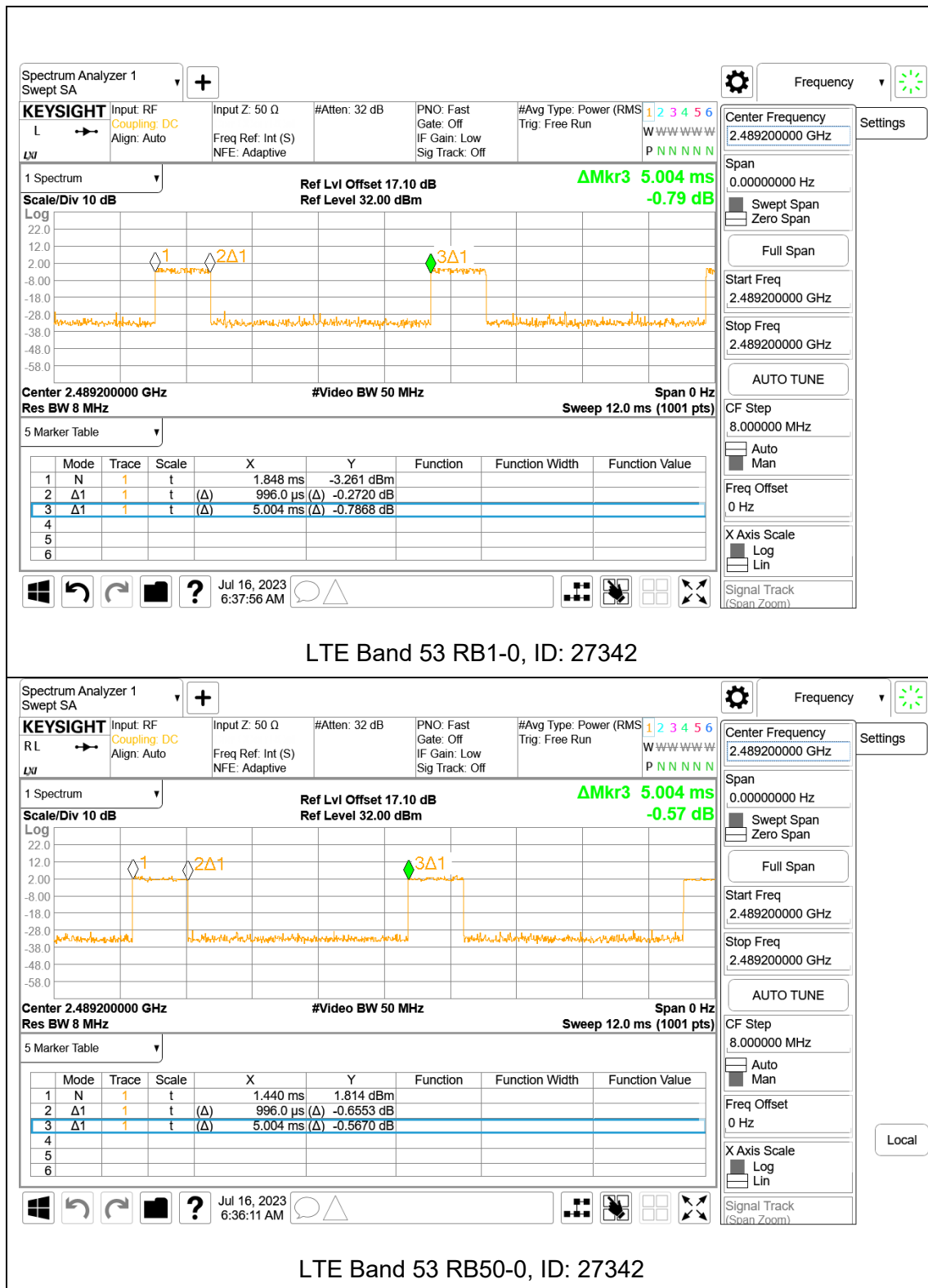
None; for reporting purposes only.

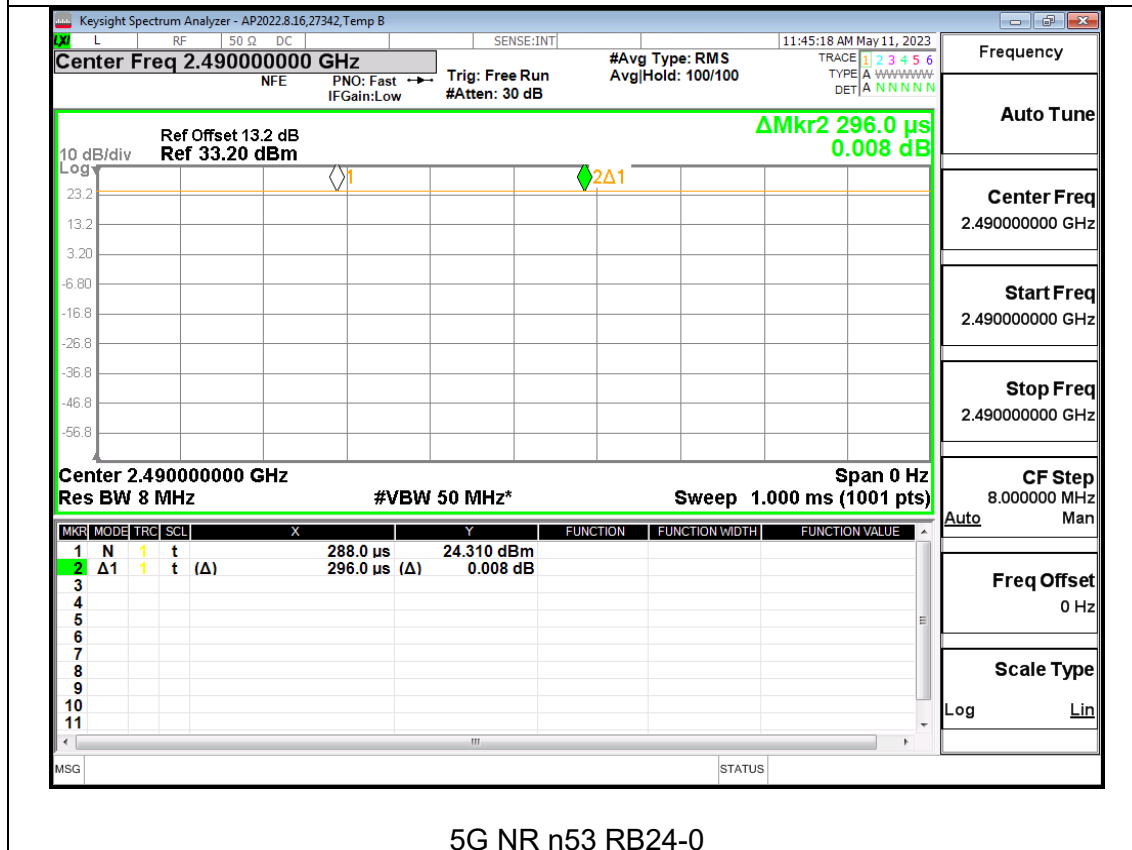
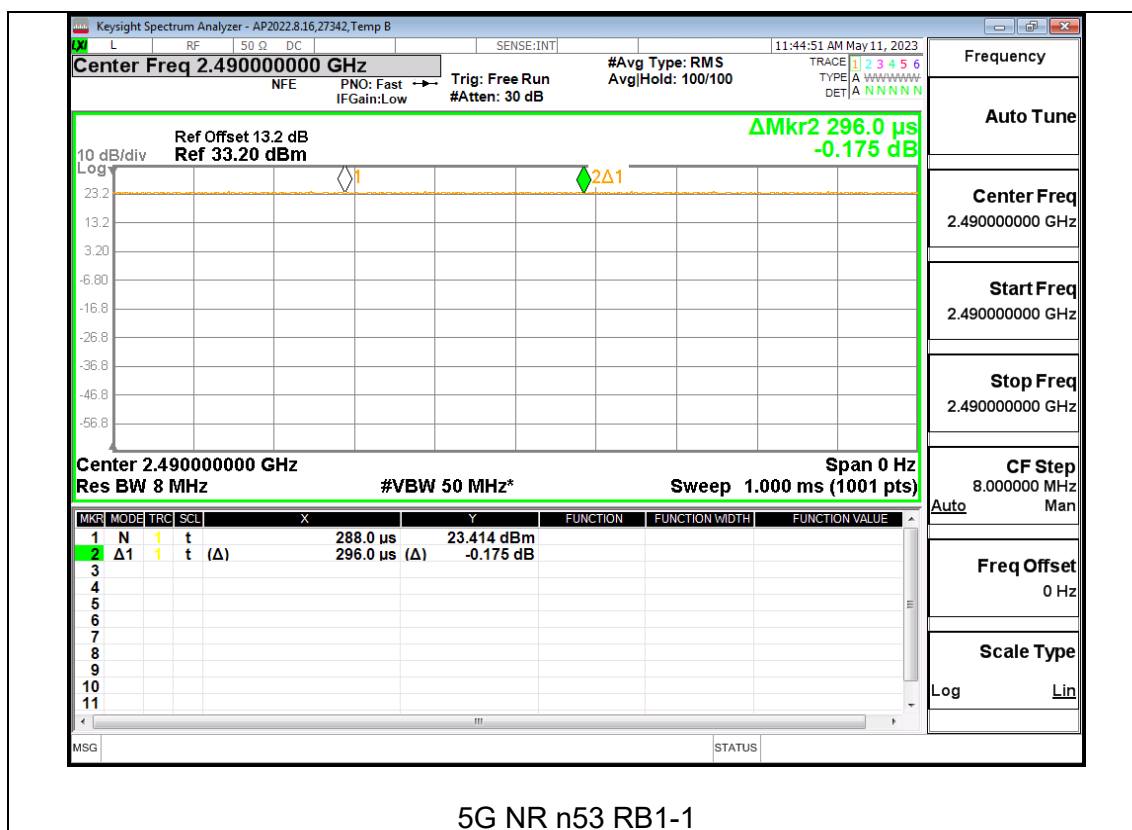
PROCEDURE

Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Band	RB Allocation / Offset	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
LTE Band 53	1 / 0	1.00	5.00	0.20	20.01	6.99
LTE Band 53	50 / 0	1.00	5.00	0.20	19.92	7.01
5G NR n53	1 / 1	N.A.	N.A.	1.00	100.00	0.00
5G NR n53	24 / 0	N.A.	N.A.	1.00	100.00	0.00





9.2. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
ISED RSS-170 and RSS-GEN

LIMITS

For reporting purposes only.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW. The 99% bandwidths were measured and recorded.

RESULTS

There is no limit required; therefore, only one port of higher power, ANT1, was tested.

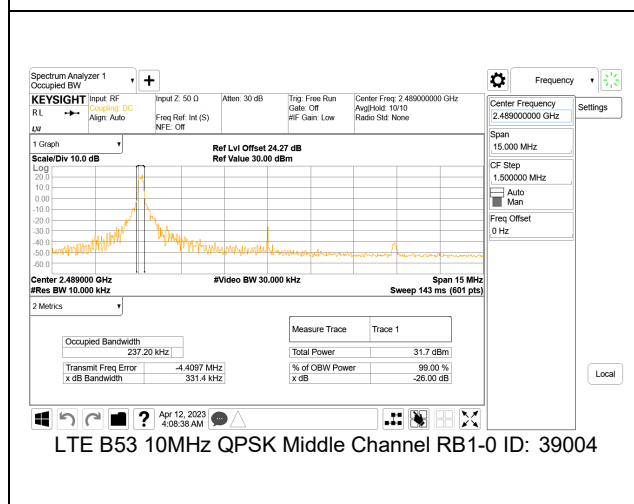
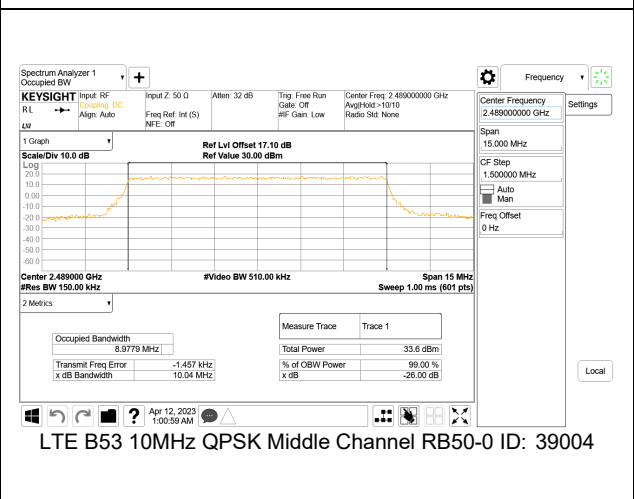
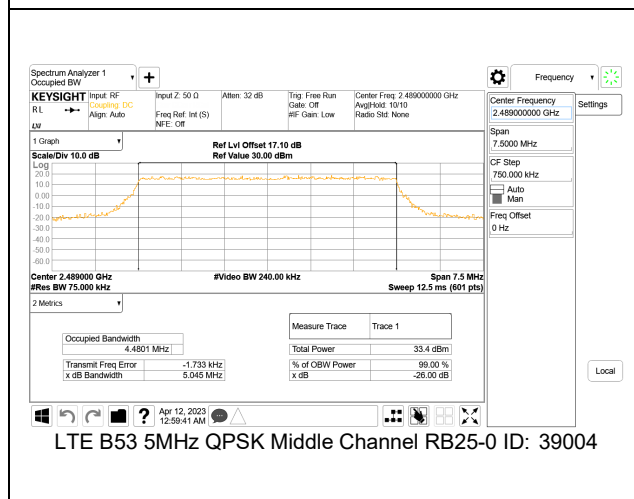
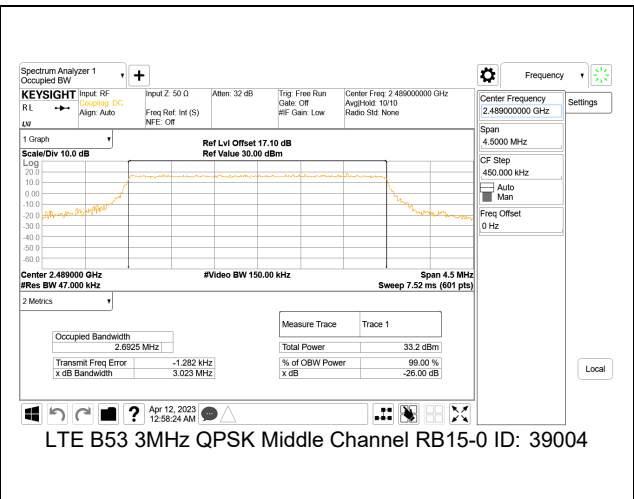
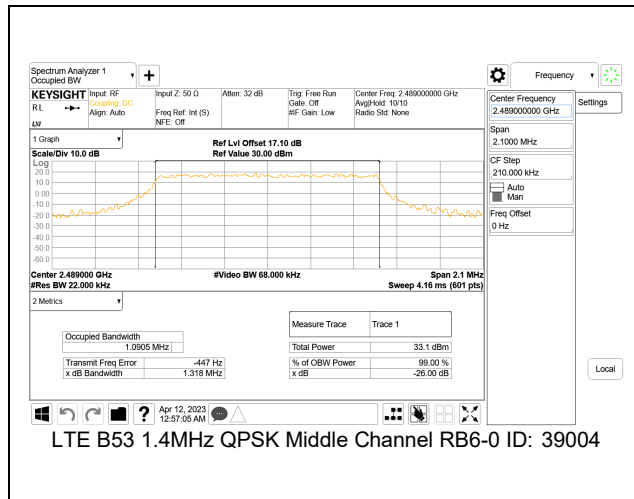
LTE BAND 53

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 53	1.4MHz, QPSK	6/0	2489	1.091	1.32
	1.4MHz, 16QAM			1.086	1.34
	3MHz, QPSK	15/0		2.693	3.02
	3MHz, 16QAM			2.690	3.08
	5MHz, QPSK	25/0		4.480	5.05
	5MHz, 16QAM			4.514	5.09
	10MHz, QPSK	50/0		8.978	10.04
	10MHz, 16QAM			8.995	9.83
	10MHz, QPSK	1/0		0.237	0.33

5G NR n53

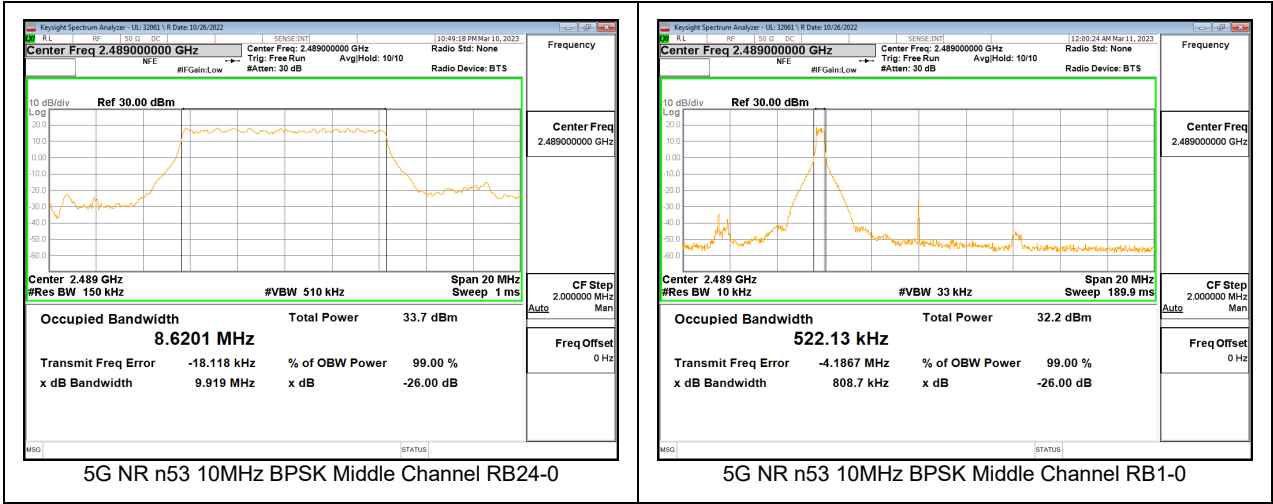
Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n53	10MHz, BPSK	24/0	2489	8.620	9.92
	10MHz, QPSK			8.602	9.87
	10MHz, 16QAM			8.626	9.66
	10MHz, QPSK	1/0		0.522	0.81

9.2.1. LTE BAND 53



Intentionally Blank

9.2.2. 5G NR n53



9.3. MAXIMUM POWER SPECTRAL DENSITY

RULE PART(S)

FCC: §25.149 (c)(4) (iv)
ISED: SMSE-009-20 Annex A 9.f

LIMITS

FCC: The maximum power spectral density conducted to the antenna is not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission;
ISED: The equipment's maximum power spectral density conducted to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The PSD was measured with the spectrum analyzer at the low/ middle/high channel in each band where RBW=3kHz, VBW ≥ 3 * RBW, detector= RMS (power averaging).

Note: The PSD measured values are corrected by duty cycle correction factors values that shows in section 9.1.

RESULTS

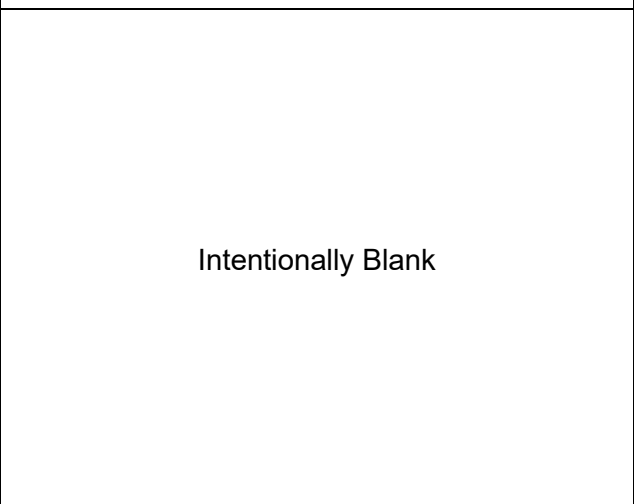
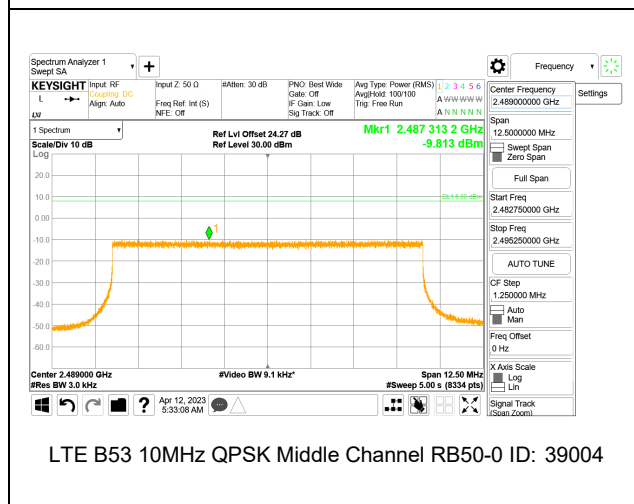
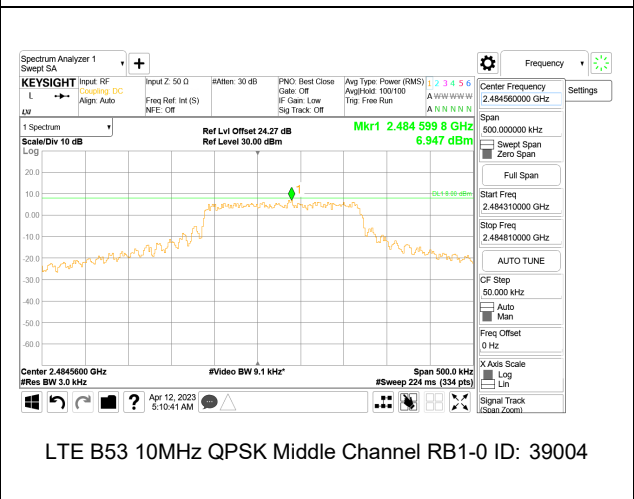
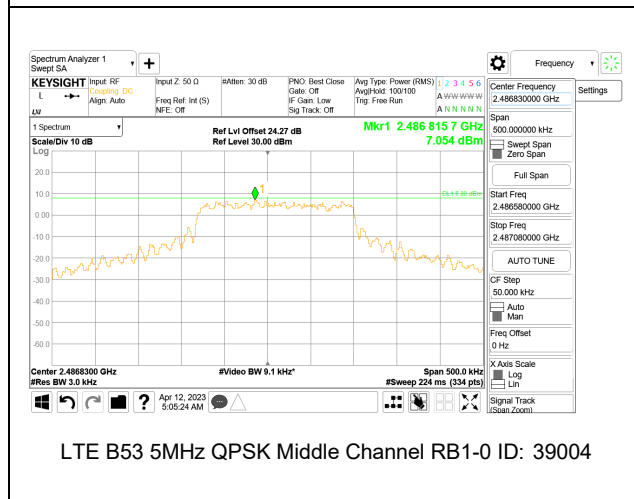
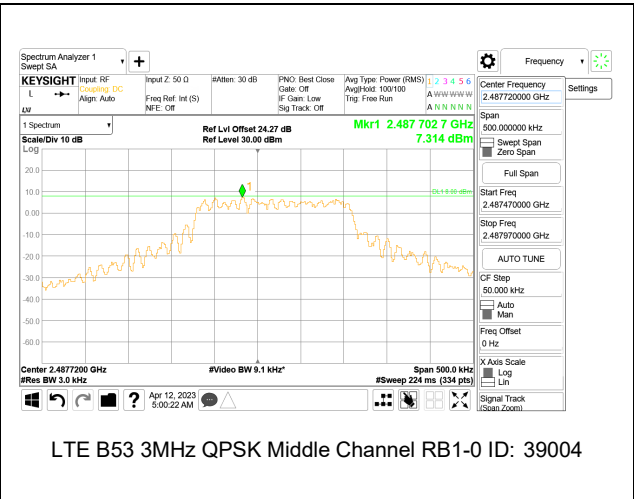
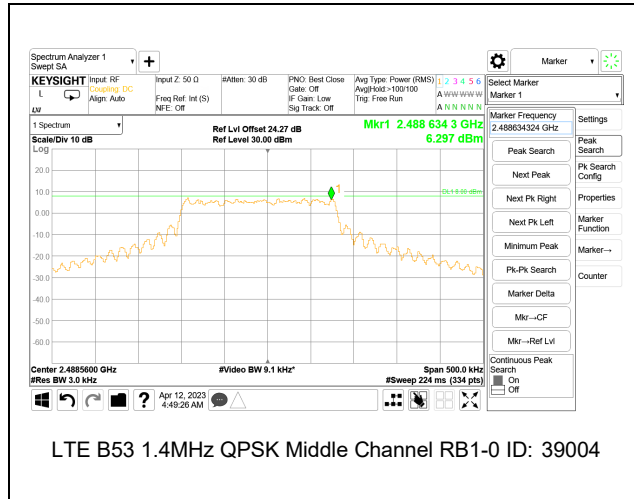
LTE BAND 53

Band	Mode	RB Allocation/RB Offset	f(MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)
LTE BAND 53	1.4MHz, QPSK	1/0	2484.2	7.226	8.0
			2489.0	6.297	
			2494.3	7.510	
	3MHz, QPSK	1/0	2485.0	7.533	
			2489.0	7.314	
			2493.5	6.635	
	5MHz, QPSK	1/0	2486.0	7.209	
			2489.0	7.054	
			2492.5	6.884	
	10MHz, QPSK	1/0	2488.5	7.539	
			2489.0	6.947	
			2490.0	7.398	
		50/0	2488.5	-9.122	
			2489.0	-9.813	
			2490.0	-8.908	

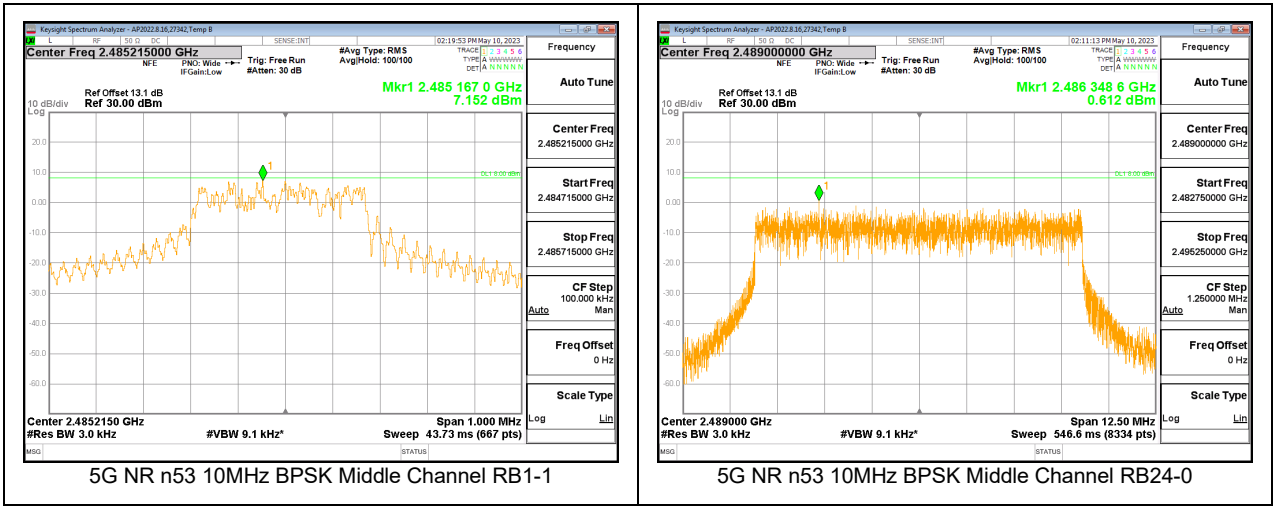
5G NR n53

Band	Mode	RB Allocation/RB Offset	f(MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)
5G NR n53	10MHz, BPSK	1/1	2488.5	7.003	8.0
			2489.0	7.152	
			2490.0	7.010	
		24/0	2488.5	0.123	
			2489.0	0.612	
			2490.0	-1.118	

9.3.1. LTE BAND 53



9.3.2. 5G NR n53



9.4. 6dB BANDWIDTH

RULE PART(S)

FCC: §25.149 (c)(4) (ii)
ISED: SMSE-009-20 Annex A 9.c

LIMITS

The 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The 6dB bandwidth was measured with the spectrum analyzer at the low/ middle/high channel in each band where RBW is 1%-5% of EBW, VBW $\geq 3 * RBW$, Peak detector and max hold.

RESULTS

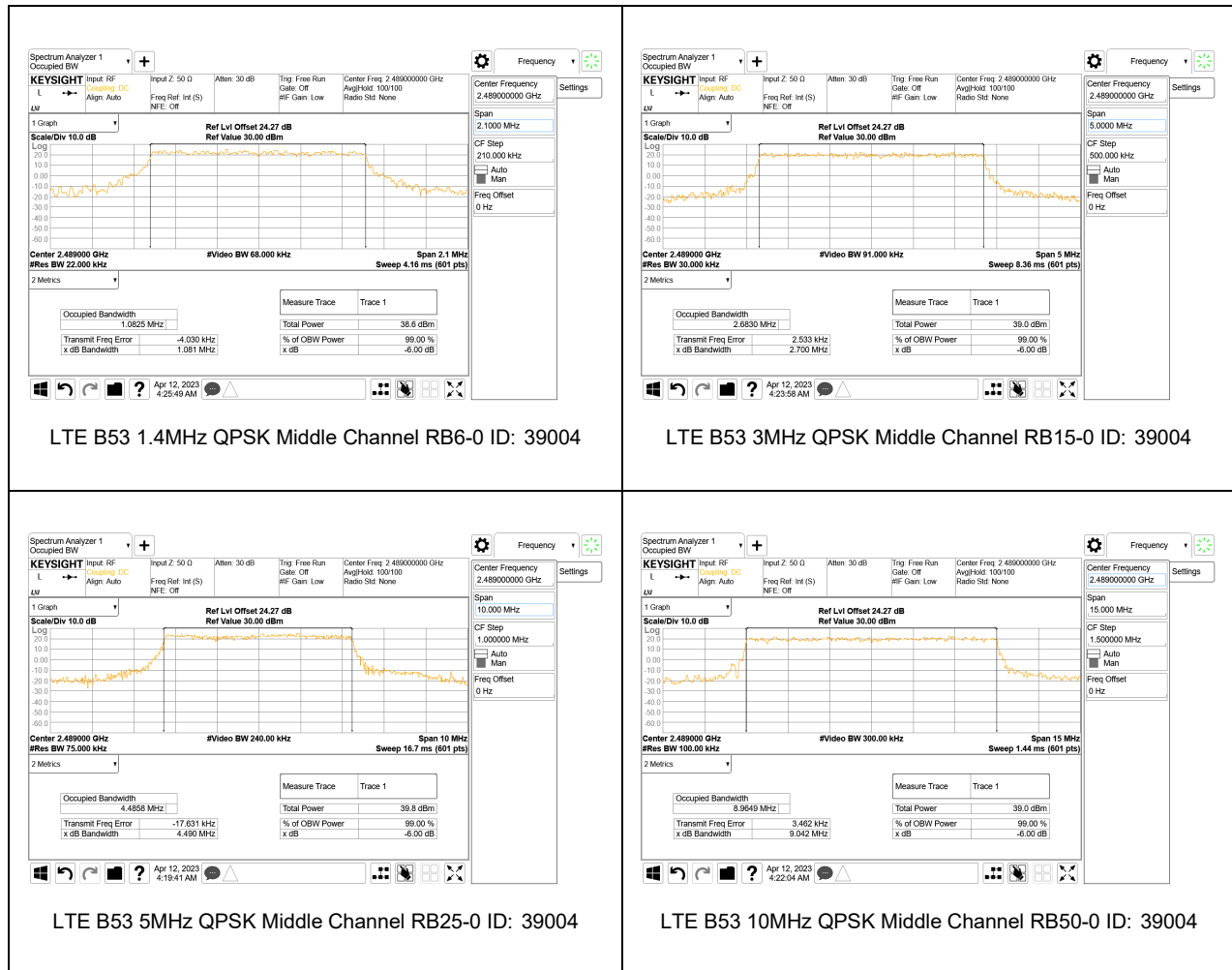
LTE BAND 53

Band	Mode	RB Allocation/RB Offset	f(MHz)	6dB BW (MHz)	6dB BW Limit (MHz)
LTE BAND 53	1.4MHz, QPSK	6/0	2489	1.081	0.5
	1.4MHz, 16QAM			1.078	
	3MHz, QPSK	15/0		2.700	
	3MHz, 16QAM			2.690	
	5MHz, QPSK	25/0		4.490	
	5MHz, 16QAM			4.493	
	10MHz, QPSK	50/0		9.042	
	10MHz, 16QAM			8.915	

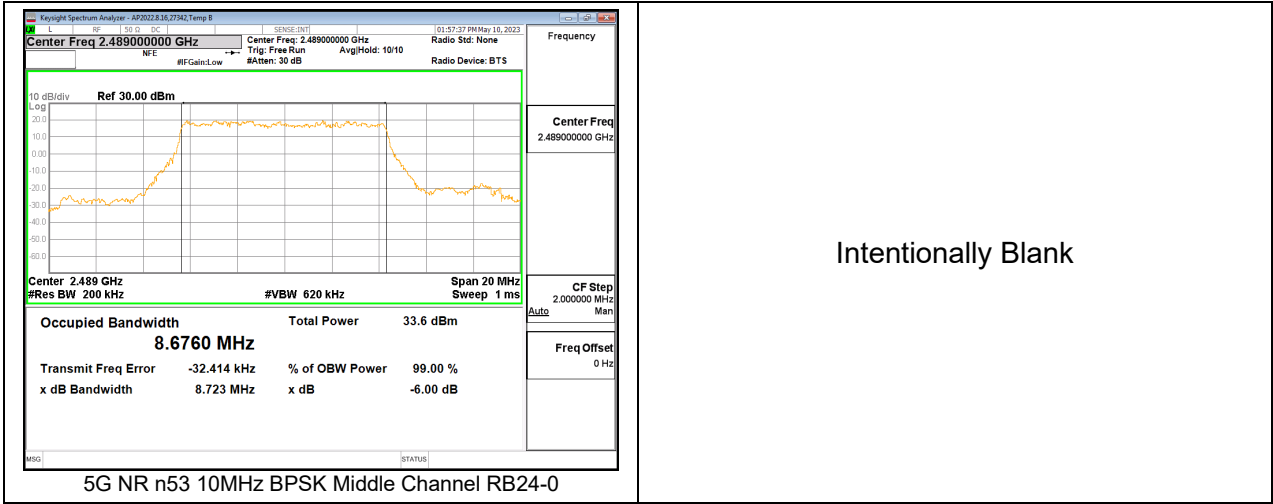
5G NR n53

Band	Mode	RB Allocation/RB Offset	f(MHz)	6dB BW (MHz)	6dB BW Limit (MHz)
5G NR n53	10MHz, BPSK	24/0	2489	8.723	0.5
	10MHz, QPSK	24/0		8.660	
	10MHz, 16QAM	24/0		8.617	

9.4.1. LTE BAND 53



9.4.2. 5G NR n53



9.5. EMISSION MASK AND BANDEDGE

RULE PART(S)

FCC: §25.149 (c)(4)
ISED: SMSE-009-20 Annex A 9

LIMITS

FCC: §25.149

(c) Equipment certification. (4) Applications for equipment authorization of terrestrial low-power system equipment that will operate in the 2483.5-2495 MHz band shall demonstrate the following:

(v) Emissions below 2483.5 MHz are attenuated below the transmitter power (P) measured in watts by a factor of at least $40 + 10 \log(P)$ dB at the channel edge at 2483.5 MHz, $43 + 10 \log(P)$ dB at 5 MHz from the channel edge, and $55 + 10 \log(P)$ dB at X MHz from the channel edge where X is the greater of 6 MHz or the actual emission bandwidth.

(vi) Emissions above 2495 MHz are attenuated below the transmitter power (P) measured in watts by a factor of at least $43 + 10 \log(P)$ dB on all frequencies between the channel edge at 2495 MHz and X MHz from this channel edge and $55 + 10 \log(P)$ dB on all frequencies more than X MHz from this channel edge, where X is the greater of 6 MHz or the actual emission bandwidth;

ISED: SMSE-900-20 Annex A 9:

(g) For the unwanted emission below 2483.5 MHz, the ATC system's transmitter power, P (Watt), shall be attenuated by at least:

- i. $40 + 10 \log(P)$ dB at the channel edge at 2483.5 MHz
- ii. $43 + 10 \log(P)$ dB at 5 MHz from the channel edge
- iii. $55 + 10 \log(P)$ dB at X MHz from the channel edge

where X is the greater of 6 MHz or the actual emission bandwidth.

(h) For the unwanted emission above 2495 MHz, the ATC system's transmitter power, P (Watt), shall be attenuated by at least:

- i. $43 + 10 \log(P)$ dB on all frequencies between the channel edge at 2495 MHz and X MHz from this channel edge
- ii. $55 + 10 \log(P)$ dB on all frequencies more than X MHz from this channel edge

where X is the greater of 6 MHz or the actual emission bandwidth.

Notwithstanding the above requirements, the e.i.r.p. density of the ATC system's unwanted emission shall not exceed:

- i. -44.1 dBW/30 kHz measured from the edge of the equipment channel bandwidth.
- ii. -70 dBW/MHz for broadband emissions and -80 dBW/kHz for discrete emissions in the band 1559-1610 MHz

TEST PROCEDURE FOR UNWANTED EMISSIONS

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each Emission Mask measurement:

1. Set the spectrum analyzer span to include the block edge frequency.
2. Set the Spectrum Emission Mask to cover all frequencies at their respective limits
3. Set the Spectrum Emission Mask to use the required Measurement Bandwidth
4. Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE For EIRP DENSITY LIMIT

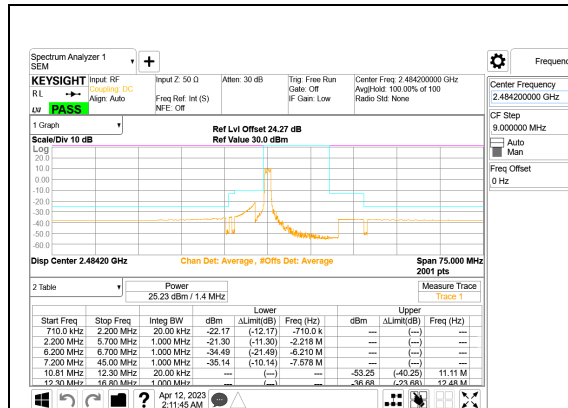
The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each Emission Mask measurement:

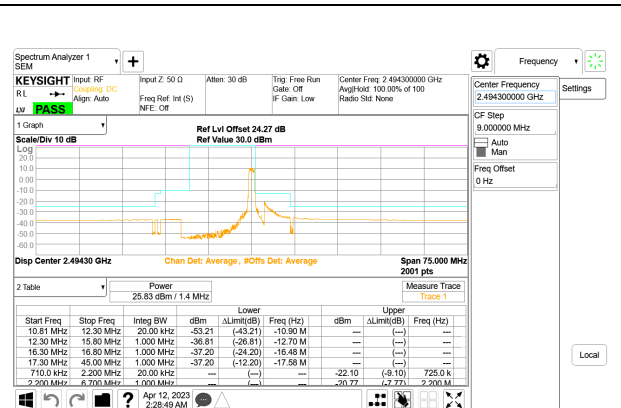
1. Set the Spectrum analyzer span to include the block edge frequency.
2. Set the Spectrum Emission Mask to cover all frequencies at their respective limits
3. Set the Spectrum Emission Mask to use the Measurement Bandwidth of 30kHz

9.5.1. LTE BAND 53

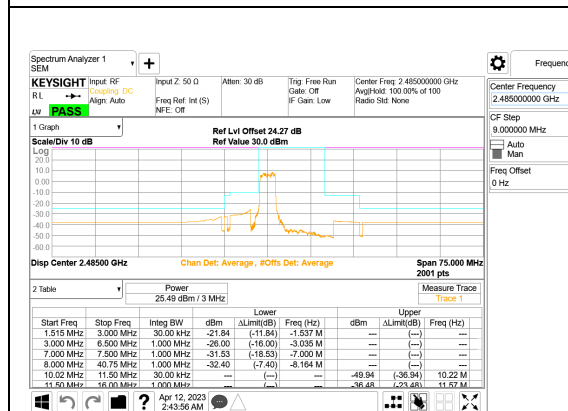
LTE BAND 53 BANDEGE



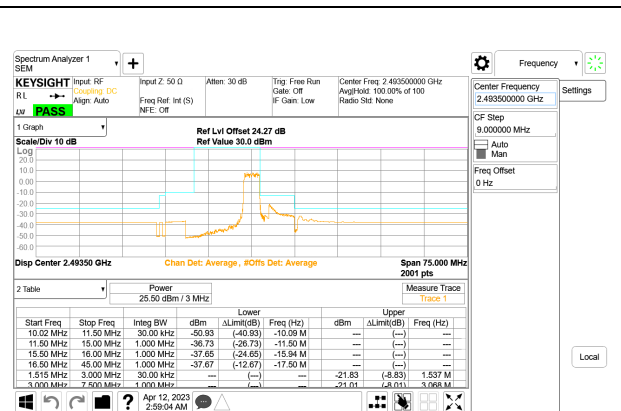
LTE B53 1.4MHz QPSK Low Channel RB6-0 ID: 39004



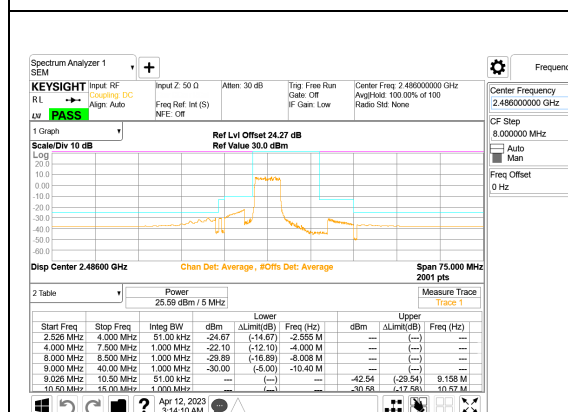
LTE B53 1.4MHz QPSK High Channel RB6-0 ID: 39004



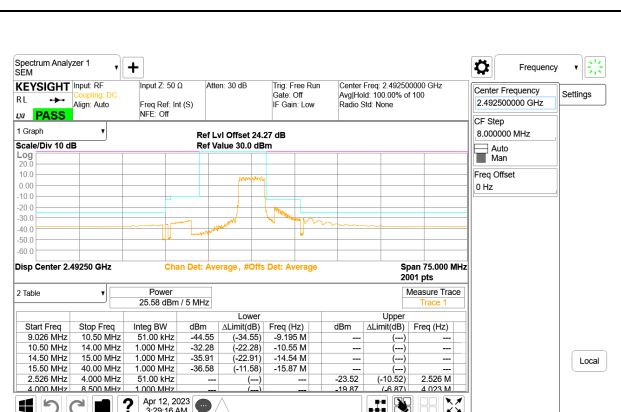
LTE B53 3MHz QPSK Low Channel RB15-0 ID: 39004



LTE B53 3MHz QPSK High Channel RB15-0 ID: 39004



LTE B53 5MHz QPSK Low Channel RB25-0 ID: 39004



LTE B53 5MHz QPSK High Channel RB25-0 ID: 39004

