TEST REPORT

Report Number. : R14777408-E4

Applicant	:	Sony Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0075, Japan
FCC ID	:	PY7-43624K
EUT Description	:	GSM/WCDMA/LTE/5G Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, WPT & NFC
Test Standard(s)	:	FCC CFR 47 Part 2, Part 22, Part 24, and Part 27.

Date Of Issue:
2023-08-29

Prepared by:
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CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-08-10	Initial Review	Noah Bennett
V2	2023-08-29	TCB Feedback Round 1: -Added a note to section 7.3 clarifying what bands are referenced, and what bands were fully tested.	Noah Bennett

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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: QV7700EHHT, QV7700H2HT, QV7700GUHT, QV7700BTHT

SAMPLE RECEIPT DATE: 2023-06-23 and 2023-07-05

DATE TESTED: 2023-07-05 to 2023-07-20.

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 2	Complies
CFR 47 Part 22	Complies
CFR 47 Part 24	Complies
CFR 47 Part 27	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.

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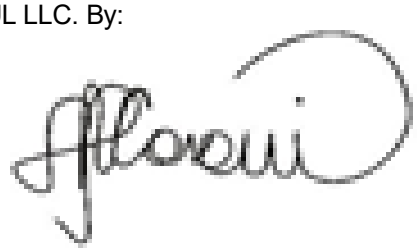

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2. SUMMARY OF TEST RESULTS

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) Antenna gain and type (see section 6.4)
2) Cable loss (see section 6.2,8,9)
3) Supported bands and modulations (see section 6.5)
4) Model Differences (see section 7)

Requirement Description	Band	Requirement Clause Number (FCC)	Result	Remarks
Equivalent Isotropic Radiated Power	4	27.50 (d) (4)		

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Occupied Bandwidth	2.1049	Compliant	None.
Band Edge and Emission Mask	2.1051, 27.53 (h)		
Out of Band Emissions	2.1051, 27.53 (h)		
Frequency Stability	2.1055, 27.54,		
Peak-to-Average Ratio	27.50 (d) (5)		
Field Strength of Spurious Radiation	2.1051, 27.53 (h)		

3. TEST METHODOLOGY

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

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 24 and Part 27.
- 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

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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
☒	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}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%

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

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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 WWAN testing.

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent 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 dBd (ERP) or 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 ERP/EIRP output powers as follows:

LTE BAND 4

Part 27	
EIRP Limit (W)	1.00
Antenna Gain (dBi)	-2.88

Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1710.7	1754.3	17.5	14.62	0.029	1092.2	1M09G7W
	16QAM			17.7	14.82	0.030	1093.8	1M09D7W
3.0	QPSK	1711.5	1753.5	17.7	14.82	0.030	2704.2	2M70G7W
	16QAM			17.8	14.92	0.031	2700	2M70D7W
5.0	QPSK	1712.5	1752.5	17.8	14.92	0.031	4509.3	4M51G7W
	16QAM			17.9	15.02	0.032	4508.2	4M51D7W
10.0	QPSK	1715.0	1750.0	17.7	14.82	0.030	8992.5	8M99G7W
	16QAM			17.9	15.02	0.032	8975.7	8M98D7W
15.0	QPSK	1717.5	1747.5	17.6	14.72	0.030	13465	13M5G7W
	16QAM			17.5	14.62	0.029	13479	13M5D7W
20.0	QPSK	1720.0	1745.0	17.5	14.62	0.029	17960	18M0G7W
	16QAM			17.8	14.92	0.031	17938	17M9D7W

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6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 5.34 for Conducted and radiated samples.

6.4. MAXIMUM ANTENNA GAIN

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

LTE Bands	Frequency Range (MHz)	Main 1 Antenna Gain (dBi)	Main 2 Antenna Gain (dBi)
GSM850, WCDMA B5, LTE Band 5	824 – 849	-5.31	
GSM1900, WCDMA B2	1850 - 1910		-3.95
LTE Band 12, LTE Band 17	699 – 716	-5.15	
LTE Band 13	777 – 787	-4.52	
LTE Band 41	2496 – 2690		-1.17
WCDMA B4, LTE Band 4	1710 – 1780		-2.88

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports the following GSM, WCDMA, and LTE Bands:
GSM850, GSM1900, WCDMA 2,4,5, LTE Band 4,5,12,13,17, and 41.

LTE Band 17 (704-716MHz, 1.4/3/5/10MHz bandwidth) is covered by LTE Band 12 because it is a subset of LTE band 12 and they have same output power.

The worst-case scenario for all measurements is based on conducted average power on different modulations. Output power measurements were measured on Rel 99, HSDPA, and HSUPA for WCDMA, and QPSK, 16QAM, and 64QAM modulations for LTE. The following was found as worst case. Therefore, all testing was done in these modes only.

Technology	Modulation
GSM850/1900	GPRS
WCDMA2/4/5	Rel 99
LTE (B4, B5, B12, B13)	64QAM
LTE (B41)	16QAM

The EUT was investigated in three orthogonal orientations X/Y/Z on both Low Band (Fundamental Below 1GHz) Mid Band (Fundamental between 1-3GHz) and High Band (Fundamental above 3GHz) for both the Main Antennas and the Sub antenna. For Sim Tx scans in which there are two or more Fc ranges with different WC orientations, scans were performed in both orientations, and the Worst-Case margin scan was reported as below:

Band (Frequency)	Antenna	Orientation
Low Band (Fc<1GHz)	Main	X
Mid Band (1GHz<Fc<3GHz)		Y
BT (For Sim Tx)	BT C0/C1	X/Y
5 WLAN (For Sim Tx)	WLAN Main	Y

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The EUT was tested while connected to AC Lines via charging cable and brick to represent worst case emissions. Worst Case emissions from 9kHz-30Mhz, 30-1000MHz, and 18-26.5GHz were done on the modes with the highest conducted average power. Only data with emissions within 20dB are reported.

The following scans were investigated for simultaneous transmission:

Scan #	Mode	Mode	Mode
1	LTE B4 1745MHz 20MHz RB1-49	2441MHz BT GFSK C0	5240MHz 11ax HE20 SU MIMO
2	LTE B4 1745MHz 20MHz RB1-49	2441MHz BT GFSK C1	5240MHz 11ax HE20 SU MIMO
3	LTE B4 1745MHz 20MHz RB1-49	2442MHz 11g 6Mbps MIMO	
4	LTE B41 2620MHz 20MHz RB1-49	5240MHz 11ax HE20 SU MIMO	
5	LTE B12 704MHz 10MHz RB1-24	2462MHz 11g 6Mbps MIMO	

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adaptor	Sony	XQZ-UC1	1821W34209742	NA
Headphones	Sony	MDR-EX15AP	NA	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB-C	1	USB-C	Shielded	<3m	XQZ-UB1 AI-0164
2	Aux	1	AUX	Shielded	<3m	

Test Setup

The EUT was connected to a base station simulator and set to transmit at max power for GSM/WCDMA/LTE testing.

Setup Diagram

Please see R14777408-EP4 for Setup Diagrams and Setup Photos.

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7. REUSE OF TEST DATA

7.1. INTRODUCTION

According to the manufacturer the major change between FCC ID: PY7-76732V (Lead Model), and FCC ID: PY7-43624K (This Model) is changing band configuration by software. The FCC ID: PY7-76732V (Lead Model) conducted test data shall remain representative of FCC ID: PY7-43624K so, FCC ID: PY7-43624K (This Model) leverages conducted test data from FCC ID: PY7-76732V (Lead Model).

The applicant takes full responsibility that the test data as referenced in this section represents compliance for this FCC ID.

7.2. DEVICE DIFFERENCES

Difference between PY7-76732V (Lead Model), and FCC ID: PY7-43624K (This Model):

Sony Corporation hereby declares that the PCB layout, components, and all antennas identical between PY7-76732V (lead model), and PY7-43624K (This Model). Therefore, the following conducted output power of licensed band for PY7-76732V can be re-used to PY7-43624K.

7.3. REFERENCE DETAIL

Equipment Class	Reference FCC ID	Report Title	Referenced Testing
Licensed (WWAN)	PY7-76732V	R14777340-E11 v2 FCC WWAN REPORT	GSM850/1900; WCDMA2/4/5; LTE5/12/13/41

*Notes:
1. Full radiated testing was done on all, LTE, WCDMA and GSM Bands to confirm that the parent model is representative for the variant model.
2. Power spot-checks were performed on all bands at mid channel at worst-case modulations to verify EUT compliance under customer tune-up. See the following section for power spot-checks.
3. LTE Band 4 was fully tested via both conducted tests and radiated tests, as the lead model had LTE Band 66 tested to cover LTE Band 4, as LTE Band 4 is a subset of LTE Band 66. However, this model does not support LTE Band 66. Therefore, LTE Band 66 test data from the lead model cannot cover LTE Band 4 on this model.

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7.4. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device PY7-43624K for Conducted output power. The data from the application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the summary.

PY7-95649X SPOT CHECK RESULTS						
Technology	RB/Mode	Data Rate	Measured Frequency (MHz)	PY7-76732V	PY7-43624K	Delta (dB) <+3dB
				Conducted Output Power (dBm)	Conducted Output Power (dBm)	Margin
GSM850	N/A	GPRS	836.6	31.82	32.09	-0.27
		EGPRS		26.84	27.26	-0.42
GSM1900	N/A	GPRS	1880.0	27.10	26.93	0.17
		EGPRS		26.11	26.29	-0.18
WCDMA2	Subtest 5	REL 99	1907.6	18.95	19.36	-0.41
		HSUPA	1880.0	18.07	18.33	-0.26
WCDMA4	Subtest 5	REL 99	1732.5	18.04	17.81	0.23
		HSUPA	1732.5	17.07	16.80	0.27
WCDMA5	Subtest 1	REL 99	836.6	21.88	22.48	-0.60
		HSDPA		20.88	21.47	-0.59
LTE 5	50-0	QPSK	836.5	20.84	20.66	0.18
		64QAM		20.46	20.70	-0.24
LTE 12	50-0	QPSK	707.5	20.96	20.98	-0.02
		64QAM		20.47	20.92	-0.45
LTE 13	50-0	QPSK	782.0	20.91	21.80	-0.89
		64QAM		20.37	21.79	-1.42
LTE 41	100-0	QPSK	2593	18.96	18.54	0.42
		16QAM		18.95	18.66	0.29

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8. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Common Equipment				
	Conducted Room 2				
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-13	2024-06-13
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SOFTEMI	Power Verification Software	UL	Version 3.4.9	NA	NA
208721	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2023-06-06	2024-06-06
212967	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2022-12-14	2023-12-14
	Conducted Room 1				
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SN 181474341	Environmental Meter	Fisher Scientific	15-077-963	2022-10-05	2023-10-05
210642	Environmental Meter	Fisher Scientific	15-077-963	2021-08-16	2023-08-16
207726	Temp/Humid Chamber	Thermotron	SM-32-8200	2023-01-20	2024-01-20
MM0169	True RMS Multimeter	Keysight Technologies	U1232A	2022-08-03	2023-08-03
SOFTEMI	Power Verification Software	UL	Version 3.4.9	NA	NA
208721	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2023-06-06	2024-06-06
213025	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2022-12-08	2023-12-08
135123	RF Power Meter	Keysight Technologies	N1911A	2022-09-10	2023-09-10
90779	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-04-03	2024-04-03

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Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Coupler				
CPL001	Ultra-Wideband Directional Coupler 0.5-18GHz	Mini-Circuits	ZUDC10-183+	2023-02-17	2024-02-17
	Attenuators				
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
226564	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
226565	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16
	Cables				
CBL091	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360-200200	2023-02-17	2024-02-17
CBL098	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-02-17	2024-02-17
CBL099	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-02-17	2024-02-17
CBL100	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-05-08	2024-05-08

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Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
	30-1000 MHz				
159203	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-23	2024-01-23
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-04-06	2024-04-06
	Gain-Loss Chains				
91974	Gain-loss string: 0.009-30MHz	Various	Various	2023-05-16	2024-05-16
91976	Gain-loss string: 25-1000MHz	Various	Various	2023-05-16	2024-05-16
91979	Gain-loss string: 1-18GHz	Various	Various	2023-05-16	2024-05-16
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-02-02	2024-02-02
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200539	Environmental Meter	Fisher Scientific	15-077-963 s/n 18474341	2022-10-05	2023-10-05
207619	Wideband Radio Communications Tester	Anritsu	MT8821C	2022-06-21	2023-06-21
169106 (BRF008)	1710-1785MHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50713-01	2023-02-15	2024-02-29
77836 (HPF004)	1GHz high-pass filter, 2W, Fhigh =18GHz	Micro-Tronics	HPM50115-01	2023-02-15	2024-02-29
231408 (BRF011)	2.495-2.690GHz notch filter, 2W, Fhigh = 18GHz	Micro-Tronics	BRM50709-01	2023-02-15	2024-02-29
169108 (BRF010)	1.85-1.97GHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50714-01	2023-02-15	2024-02-29
82635 (HPF009)	1GHz high-pass filter, 2W, Fhigh =10GHz	Micro-Tronics	HPM17672	2023-02-15	2024-02-29
77412 (BRF001)	900MHz notch filter, 2W, Fhigh =6GHz	Micro-Tronics	BRM50706	2023-02-15	2024-02-29
92495 (HPF014)	3GHz high-pass filter, 2W, Fhigh =18GHz	Micro-Tronics	HPM17543	2023-02-15	2024-02-29

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Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
88761	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-09-13	2023-09-13
	18-40 GHz				
78835	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2022-12-15	2023-12-15
77783	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2022-12-15	2023-12-15
	Gain-Loss Chains				
91977	Gain-loss string: 1-18GHz	Various	Various	2023-06-06	2024-06-06
136042	Gain-loss string: 18-40GHz	Various	Various	2023-06-06	2024-06-06
	Receiver & Software				
81018	Spectrum Analyzer	Agilent	E4446A	2022-08-02	2023-08-02
90416	Spectrum Analyzer	Keysight	N9030A	2023-06-09	2024-06-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200540	Environmental Meter	Fisher Scientific	15-077-963	2022-10-05	2023-10-05
212967	Wideband Radio Communications Tester	Rohde and Schwarz	CMW500	2022-12-14	2023-12-14
82635 (HPF009)	1GHz high-pass filter, 2W, Fhigh =10GHz	Micro-Tronics	HPM17672	2023-02-15	2024-02-29
169106 (BRF008)	1710-1785MHz notch filter, 2W, Fhigh = 9GHz	Micro-Tronics	BRM50713-01	2023-02-15	2024-02-29

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Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
	30-1000 MHz				
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-06	2024-01-06
	1-18 GHz				
89509	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-05-23	2025-05-23
	Gain-Loss Chains				
207638	Gain-loss string: 0.009-30MHz	Various	Various	2023-05-17	2024-05-17
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-05-17	2024-05-17
207640	Gain-loss string: 1-18GHz	Various	Various	2023-05-17	2024-05-17
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
21642	Environmental Meter	Fisher Scientific	15-077-963 (s/n 210701692)	2021-08-16	2023-08-16

NOTES:

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

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9. RF OUTPUT POWER VERIFICATION

CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

All LTE bands conducted average power is obtained from the CMW500 telecommunication test set.

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS136.101 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 TS136.101.

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 TS136.101 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
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	

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 conducted output powers as follows:

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9.1.1. LTE BAND 4

Test Engineer ID:	85502/44389	Test Date:	2023-07-05	EUT Serial Number:	QV7700EHHT

OUTPUT POWER FOR LTE BAND 4 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				19957	20175	20393
				1710.7 MHz	1732.5 MHz	1754.3 MHz
1.4	QPSK	1	0	17.3	17.5	17.3
		1	3	17.5	17.5	17.3
		1	5	17.5	17.5	17.3
		3	0	17.5	**17.5**	17.3
		3	1	17.5	17.5	17.3
		3	3	17.5	17.5	17.3
		6	0	17.5	17.5	17.2
	16QAM	1	0	17.5	17.6	17.4
		1	3	17.6	**17.7**	17.5
		1	5	17.6	17.6	17.5
		3	0	17.4	17.5	17.3
		3	1	17.4	17.5	17.4
		3	3	17.5	17.5	17.3
		6	0	17.4	17.4	17.2
	64QAM	1	0	17.7	17.6	17.4
		1	3	**17.9**	17.6	17.4
		1	5	17.7	17.6	17.3
		3	0	17.7	17.6	17.2
		3	1	17.7	17.6	17.3
		3	3	17.7	17.6	17.3
		6	0	17.5	17.5	17.2

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OUTPUT POWER FOR LTE BAND 4 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				19965	20175	20385
				1711.5 MHz	1732.5 MHz	1753.5 MHz
3.0	QPSK	1	0	17.4	17.6	17.4
		1	7	17.5	17.7	17.5
		1	14	17.4	17.6	17.4
		8	0	17.4	17.6	17.5
		8	4	17.4	17.7	17.5
		8	7	17.4	**17.7**	17.5
		15	0	17.4	17.6	17.4
	16QAM	1	0	17.5	17.7	17.6
		1	7	17.6	**17.8**	17.6
		1	14	17.6	17.7	17.5
		8	0	17.5	17.6	17.5
		8	4	17.8	17.7	17.5
		8	7	17.8	17.7	17.5
		15	0	17.7	17.6	17.4
	64QAM	1	0	18.0	17.9	17.7
		1	7	**18.0**	18.0	17.8
		1	14	17.9	17.9	17.7
		8	0	17.8	17.6	17.4
		8	4	17.8	17.7	17.5
		8	7	17.8	17.7	17.5
		15	0	17.7	17.6	17.5

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OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				19975	20175	20375
				1712.5 MHz	1732.5 MHz	1752.5 MHz
5.0	QPSK	1	0	17.6	17.6	17.4
		1	12	17.8	17.7	17.5
		1	24	17.7	17.6	17.4
		12	0	17.7	17.6	17.4
		12	6	**17.8**	17.6	17.5
		12	11	17.7	17.7	17.5
		25	0	17.7	17.6	17.4
	16QAM	1	0	17.8	17.8	17.5
		1	12	**17.9**	17.9	17.6
		1	24	17.8	17.8	17.6
		12	0	17.6	17.6	17.3
		12	6	17.7	17.7	17.3
		12	11	17.6	17.7	17.3
		25	0	17.7	17.6	17.4
	64QAM	1	0	17.9	18.0	17.6
		1	12	**18.0**	17.9	17.7
		1	24	17.9	17.9	17.6
		12	0	17.7	17.7	17.4
		12	6	17.8	17.7	17.5
		12	11	17.7	17.7	17.5
		25	0	17.7	17.6	17.4

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OUTPUT POWER FOR LTE BAND 4 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Ant 1		
				Conducted Average (dBm)		
				20000	20175	20350
				1715 MHz	1732.5 MHz	1750 MHz
10.0	QPSK	1	0	17.6	17.5	17.5
		1	24	17.6	17.6	17.5
		1	49	17.6	17.4	17.4
		25	0	17.7	17.6	17.5
		25	12	**17.7**	17.6	17.5
		25	24	17.7	17.6	17.5
		50	0	17.7	17.6	17.5
	16QAM	1	0	**17.9**	17.7	17.6
		1	24	17.8	17.7	17.7
		1	49	17.8	17.6	17.6
		25	0	17.7	17.5	17.6
		25	12	17.7	17.5	17.6
		25	24	17.7	17.4	17.5
		50	0	17.7	17.5	17.5
	64QAM	1	0	17.9	17.7	17.7
		1	24	17.9	17.8	17.7
		1	49	**17.9**	17.5	17.7
		25	0	17.7	17.4	17.6
		25	12	17.7	17.6	17.6
		25	24	17.6	17.5	17.5
		50	0	17.7	17.5	17.6

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OUTPUT POWER FOR LTE BAND 4 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				20025	20175	20325
				1717.5 MHz	1732.5 MHz	1747.5 MHz
15.0	QPSK	1	0	17.5	17.3	17.2
		1	37	17.5	17.4	17.1
		1	74	17.5	17.4	17.2
		36	0	**17.6**	17.4	17.3
		36	16	17.5	17.4	17.2
		36	35	17.5	17.3	17.2
		75	0	17.5	17.3	17.2
	16QAM	1	0	**17.5**	17.5	17.3
		1	37	17.5	**17.5**	17.3
		1	74	17.5	17.4	17.3
		36	0	17.4	17.4	17.3
		36	16	17.4	17.3	17.2
		36	35	17.4	17.2	17.3
		75	0	17.4	17.2	17.2
	64QAM	1	0	17.6	17.6	17.5
		1	37	17.7	17.6	17.5
		1	74	**17.7**	17.6	17.5
		36	0	17.5	17.3	17.3
		36	16	17.5	17.3	17.2
		36	35	17.5	17.3	17.2
		75	0	17.5	17.3	17.2

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OUTPUT POWER FOR LTE BAND 4 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Main 2		
				Conducted Average (dBm)		
				20050	20175	20300
				1720 MHz	1732.5 MHz	1745 MHz
20.0	QPSK	1	0	17.4	**17.5**	17.4
		1	49	17.3	17.4	17.3
		1	99	17.4	17.3	17.2
		50	0	17.4	17.4	17.4
		50	24	17.4	17.4	17.4
		50	49	17.4	17.4	17.3
		100	0	17.4	17.4	17.3
	16QAM	1	0	17.6	17.6	17.5
		1	49	**17.8**	17.7	17.3
		1	99	17.5	17.4	17.2
		50	0	17.3	17.4	17.2
		50	24	17.4	17.4	17.2
		50	49	17.5	17.3	17.1
		100	0	17.4	17.4	17.2
	64QAM	1	0	17.6	17.5	**17.7**
		1	49	17.7	17.7	17.6
		1	99	17.6	17.5	17.5
		50	0	17.4	17.4	17.3
		50	24	17.5	17.3	17.3
		50	49	17.5	17.3	17.2
		100	0	17.5	17.3	17.4

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10. CONDUCTED TEST RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)
FCC: §2.1049

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 99% and -26dB bandwidths was also measured and recorded.

RESULTS
There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Worst-case plots (highest bandwidth) are reported only.

LTE4

Test Engineer ID:	84740/44389	Test Date:	2023-07-12	EUT Serial Number:	QV7700H2HT

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 4	1.4MHz, QPSK	6/0	1732.5	1.09	1.34
	1.4MHz,16QAM			1.09	1.34
	3MHz, QPSK	15/0		2.70	3.06
	3MHz, 16QAM			2.70	3.09
	5MHz, QPSK	25/0		4.51	5.16
	5MHz, 16QAM			4.51	5.17
	10MHz, QPSK	50/0		8.99	9.98
	10MHz, 16QAM			8.98	9.89
	15MHz, QPSK	75/0		13.46	14.83
	15MHz, 16QAM			13.48	14.82
	20MHz, QPSK	100/0		17.96	19.61
	20MHz, 16QAM			17.94	19.72

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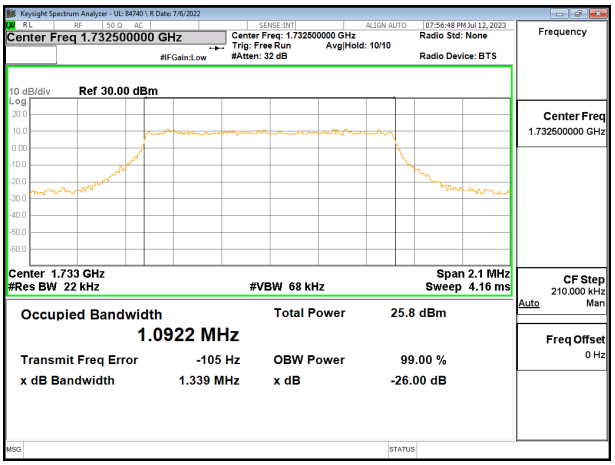
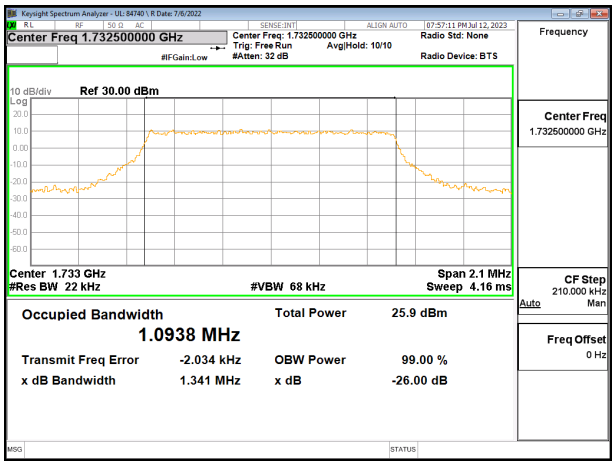
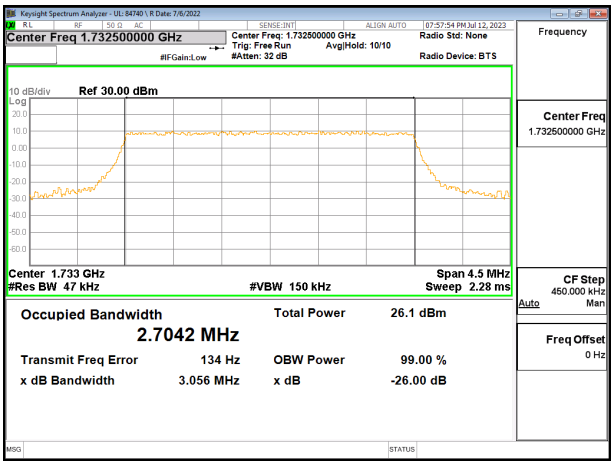
10.1.1. LTE4



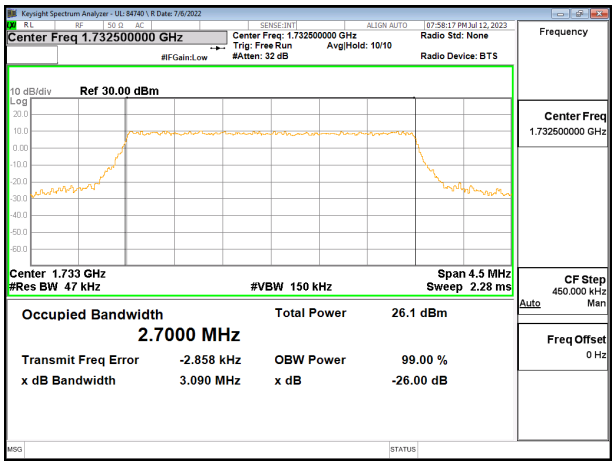
LTE4 1.4MHz QPSK MID Ch RB6-0



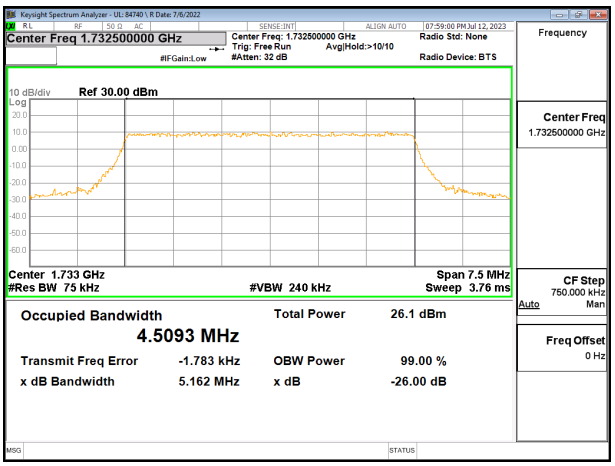
LTE4 1.4MHz 16QAM MID Ch RB6-0



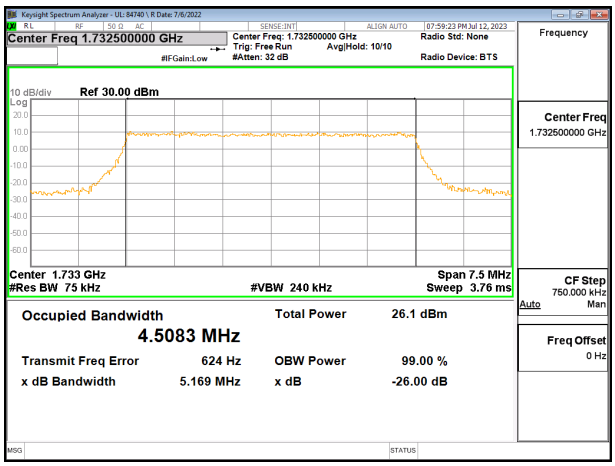
LTE4 3MHz QPSK MID Ch RB15-0



LTE4 3MHz 16QAM MID Ch RB15-0



LTE4 5MHz QPSK MID Ch RB25-0



LTE4 5MHz 16QAM MID Ch RB25-0

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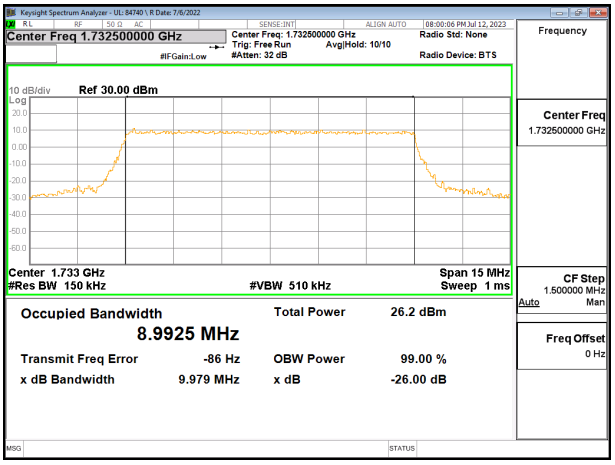
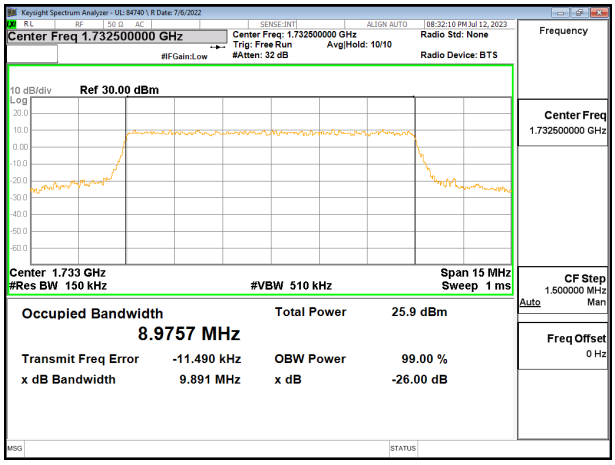
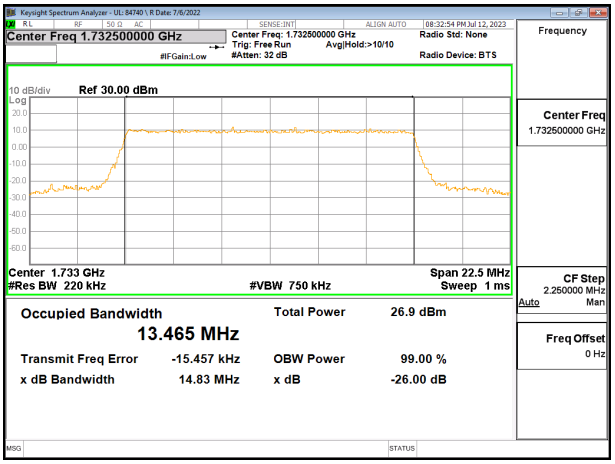


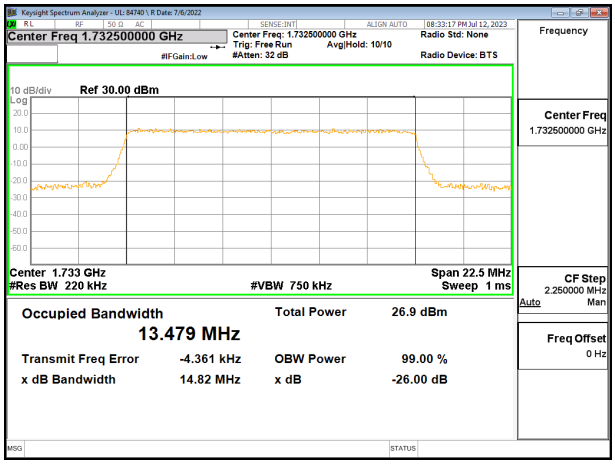
LTE4 10MHz QPSK MID Ch RB50-0



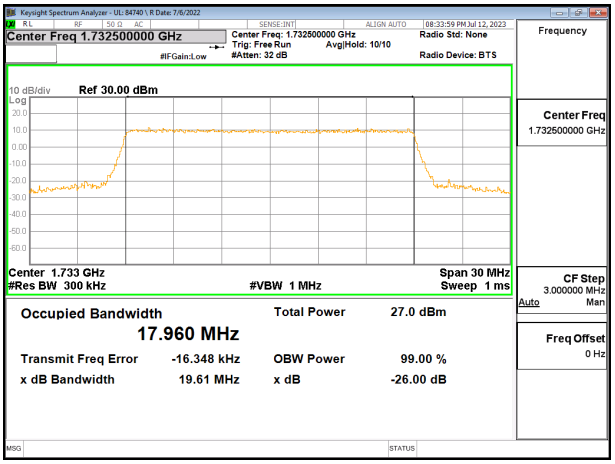
LTE4 10MHz 16QAM MID Ch RB50-0



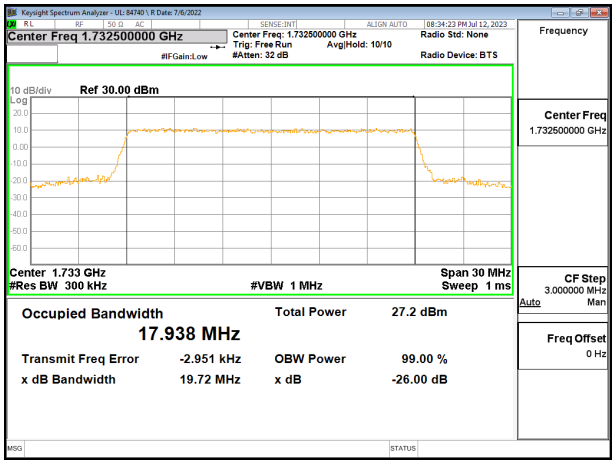
LTE4 15MHz QPSK MID Ch RB75-0



LTE4 15MHz 16QAM MID Ch RB75-0



LTE4 20MHz QPSK MID Ch RB100-0



LTE4 20MHz 16QAM MID Ch RB100-0

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10.2. OUT OF BAND EMISSIONS

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

(i) Set display line at -13 dBm, -25dBm and -40dBm according to the band Limit

(ii) Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

RESULTS

10.2.1. LTE4

LIMITS

FCC: §27.53(h)

The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

Test Engineer ID:	84740/44389	Test Date:	2023-07-20	EUT Serial Number:	QV7700H2HT

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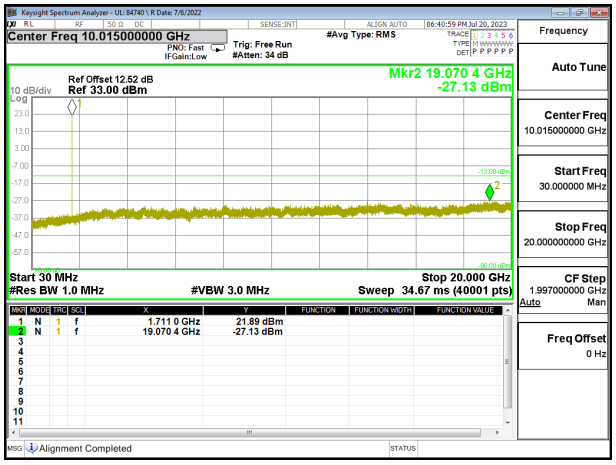
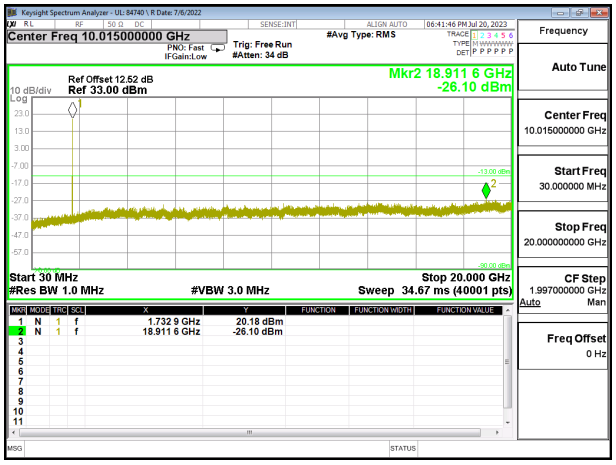
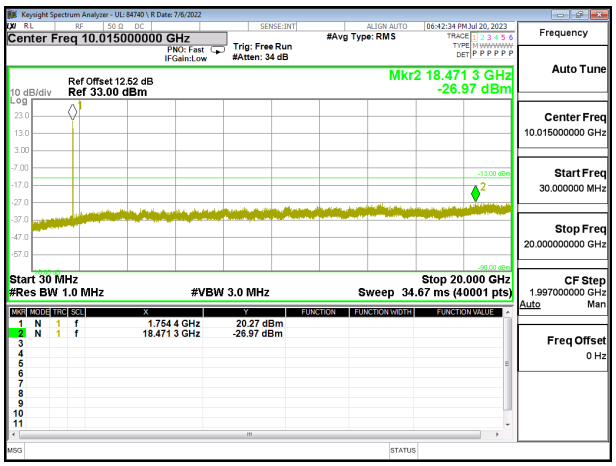


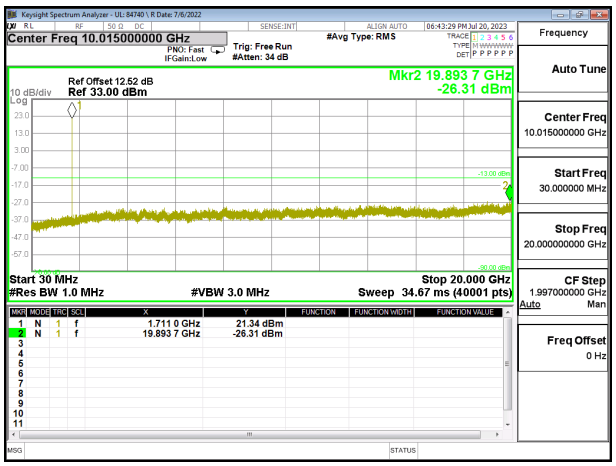
LTE4 1.4MHz 64QAM LOW Ch RB1-0



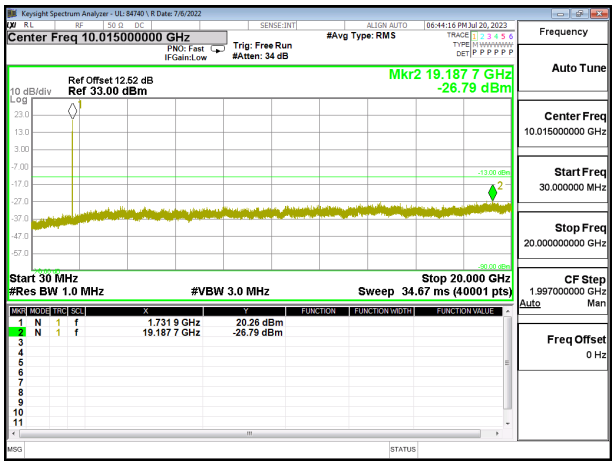
LTE4 1.4MHz 64QAM MID Ch RB1-0



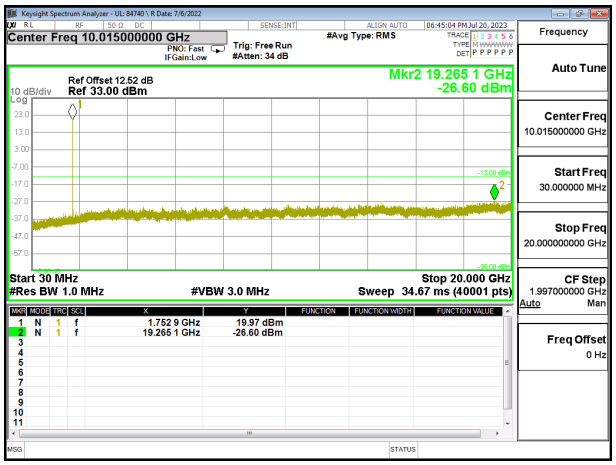
LTE4 1.4MHz 64QAM HIGH Ch RB1-0



LTE4 3MHz 64QAM LOW Ch RB1-0



LTE4 3MHz 64QAM MID Ch RB1-0



LTE4 3MHz 64QAM HIGH Ch RB1-0

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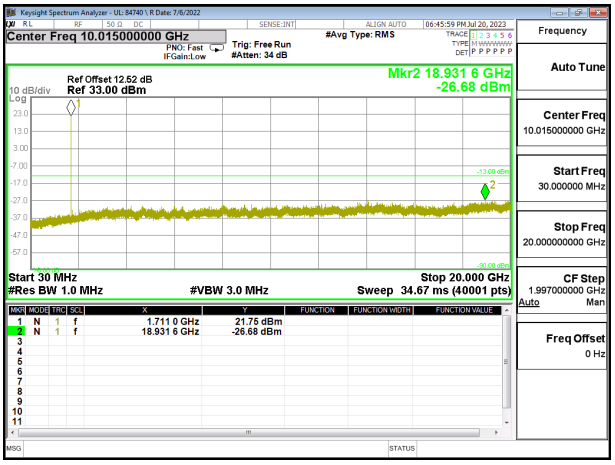
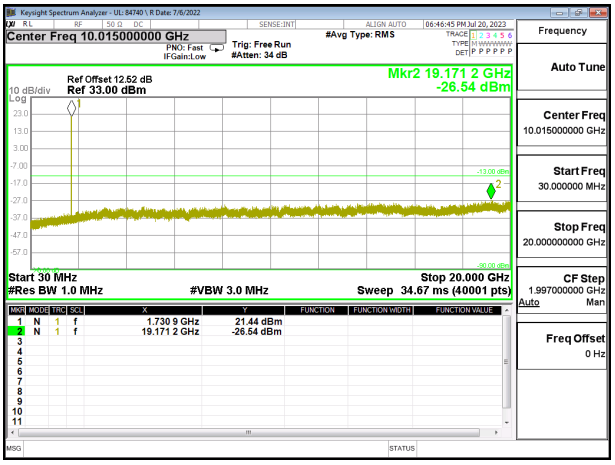
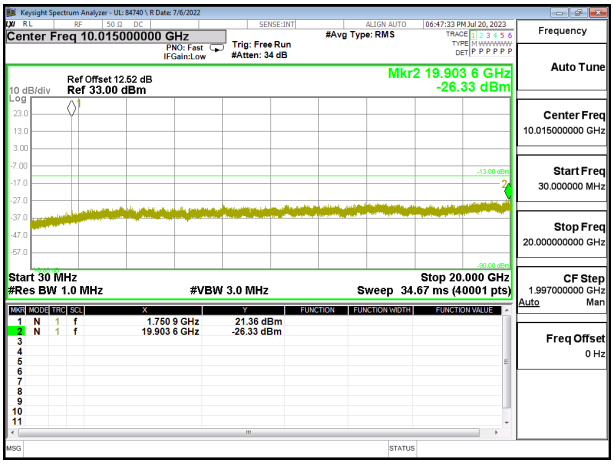


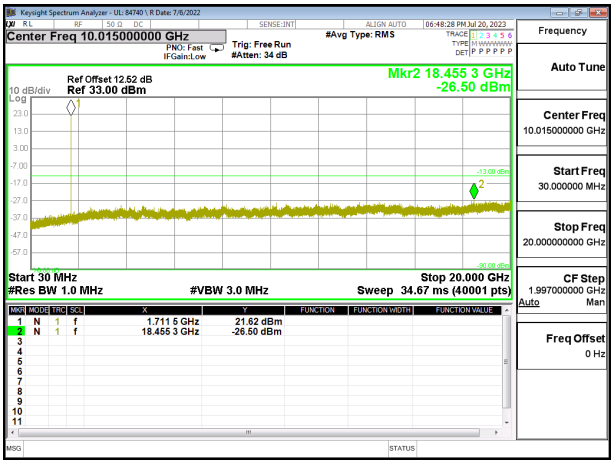
LTE4 5MHz 64QAM LOW Ch RB1-0



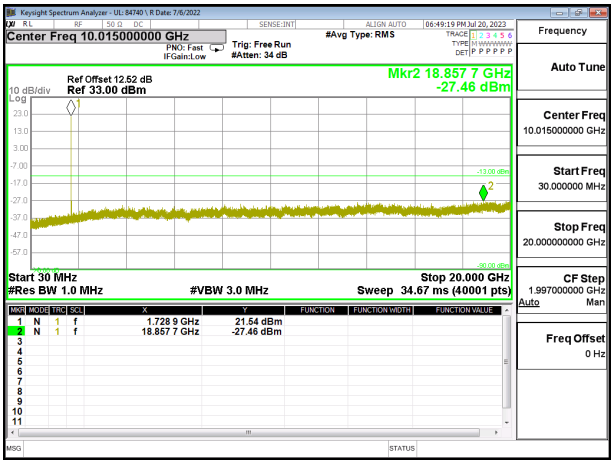
LTE4 5MHz 64QAM MID Ch RB1-0



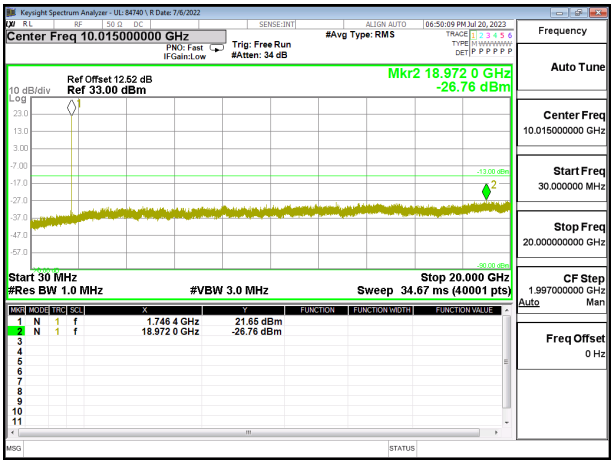
LTE4 5MHz 64QAM HIGH Ch RB1-0



LTE4 10MHz 64QAM LOW Ch RB1-0



LTE4 10MHz 64QAM MID Ch RB1-0



LTE4 10MHz 64QAM HIGH Ch RB1-0

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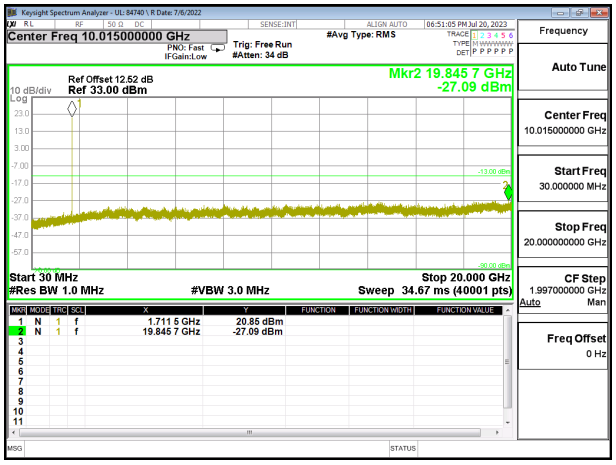
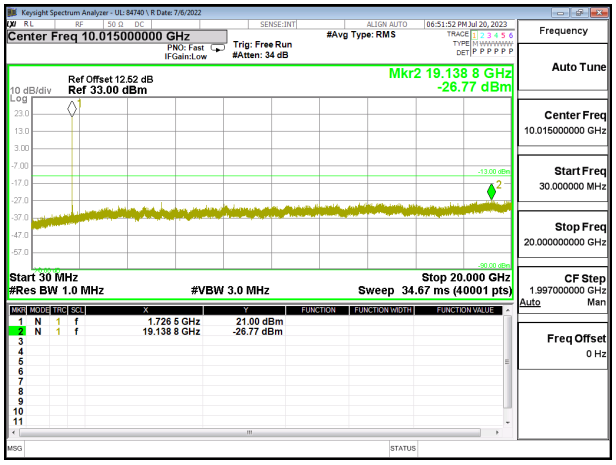
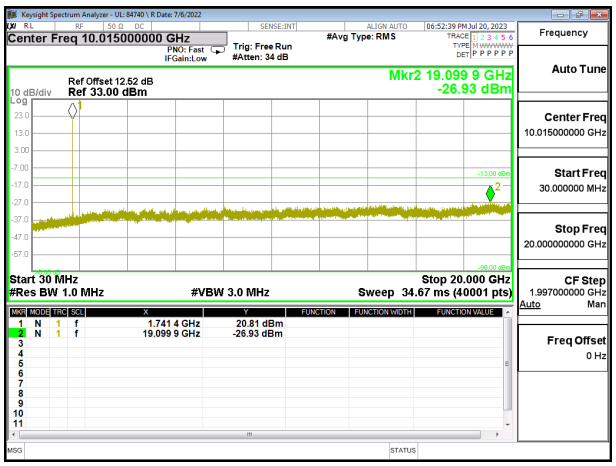


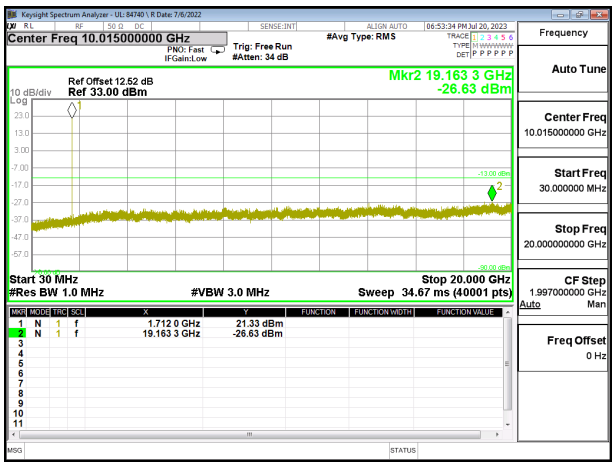
LTE4 15MHz 64QAM LOW Ch RB1-0



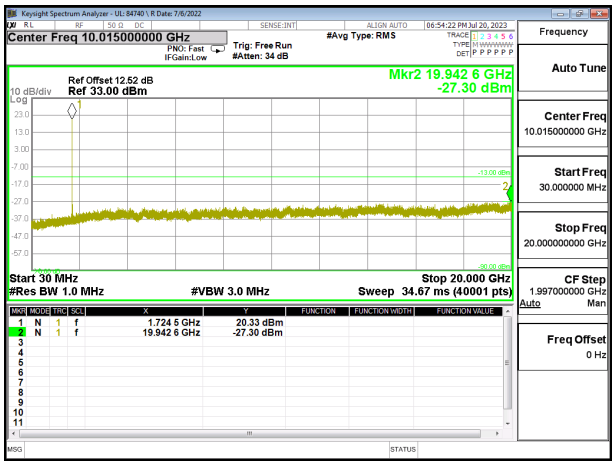
LTE4 15MHz 64QAM MID Ch RB1-0



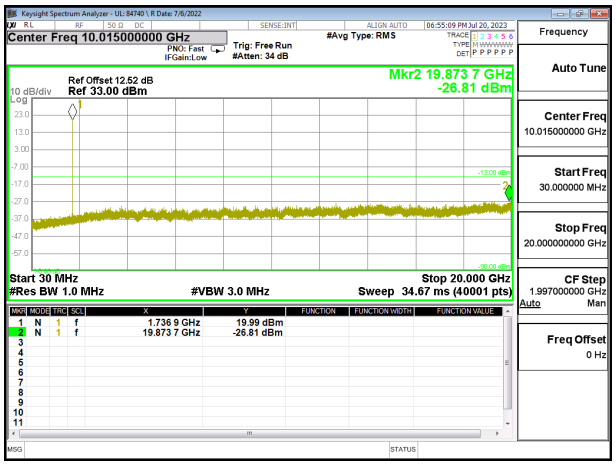
LTE4 15MHz 64QAM HIGH Ch RB1-0



LTE4 20MHz 64QAM LOW Ch RB1-0



LTE4 20MHz 64QAM MID Ch RB1-0



LTE4 20MHz 64QAM HIGH Ch RB1-0

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10.3. FREQUENCY STABILITY

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

(iii) Temp. = −30°C to +50°C

(iv) Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.
End Voltage, 3.2VDC.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

RESULTS

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10.3.1. LTE4

LIMITS

FCC: §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Engineer ID:	84740/44389	Test Date:	2023-07-18	EUT Serial Number:	QV7700EHHT

Band	4	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1710	1755	N/A		
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)		1720.0000	1745.0000			
Extreme (50°C)		1720.0000	1745.0000	8.05	0.005	Yes
Extreme (40°C)		1720.0000	1745.0000	6.34	0.004	Yes
Extreme (30°C)		1720.0000	1745.0000	-6.56	-0.004	Yes
Extreme (10°C)	Normal	1720.0000	1745.0000	-5.64	-0.003	Yes
Extreme (0°C)		1720.0000	1745.0000	-5.59	-0.003	Yes
Extreme (-10°C)		1720.0000	1745.0000	-7.84	-0.005	Yes
Extreme (-20°C)		1720.0000	1745.0000	9.43	0.005	Yes
Extreme (-30°C)		1720.0000	1745.0000	-6.17	-0.004	Yes
20°C	End Point Voltage	1720.0000	1745.0000	-6.47	-0.004	Yes

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10.4. PEAK TO AVERAGE RATIO

LIMIT

27.50(d)(5)

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

RESULTS

Antenna 1 was used to measure as the worst case; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

10.4.1. LTE4

Test Engineer ID:	85502/44389	Test Date:	2023-07-05	EUT Serial Number:	QV7700EHHT

Band	Mode	RB Allocation/RB Offset	f(MHz)	Peak Power (dBm)	Avg Power (dBm)	PAR (dB)
LTE Band 4	1.4MHz, QPSK	6	1732.5	21.90	17.46	4.44
	1.4MHz, 16QAM			23.92	17.53	6.39
	3MHz, QPSK	15		22.28	17.56	4.72
	3MHz, 16QAM			24.39	17.6	6.79
	5MHz, QPSK	25		22.55	17.59	4.96
	5MHz, 16QAM			24.48	17.58	6.90
	10MHz, QPSK	50		22.66	17.56	5.10
	10MHz, 16QAM			24.43	17.52	6.91
	15MHz, QPSK	75		22.46	17.32	5.14
	15MHz, 16QAM			24.31	17.34	6.97
	20MHz, QPSK	100		22.47	17.4	5.07
	20MHz, 16QAM			24.23	17.35	6.88

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10.5. BAND EDGE AND EMISSION MASK

TEST PROCEDURE

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 band edge measurement:

(v) Set the spectrum analyzer span to include the block edge frequency.
(vi) Set a marker to point the corresponding band edge frequency in each test case.
(vii) Set display line at -13 dBm
(viii) Set resolution bandwidth to at least 1% of emission bandwidth.

RESULTS

10.5.1. LTE4

LIMITS

FCC: §27.53(h)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

Test Engineer ID:	84740/44389	Test Date:	2023-07-20	EUT Serial Number:	QV7700H2HT

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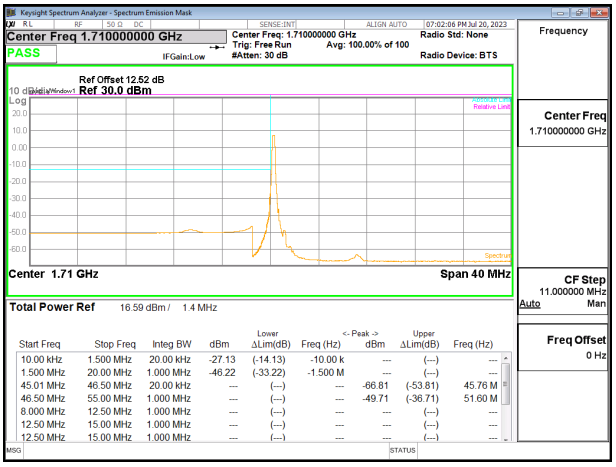
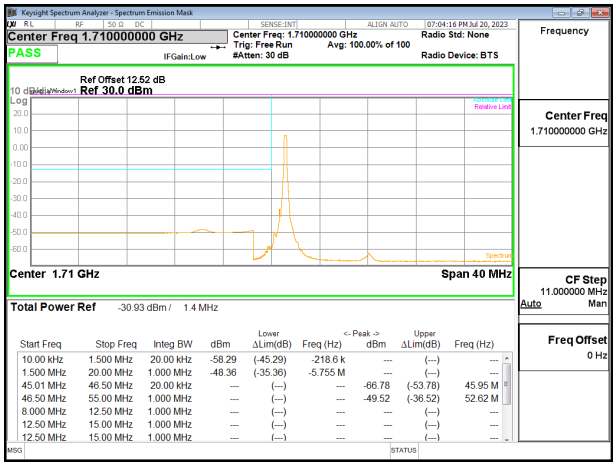
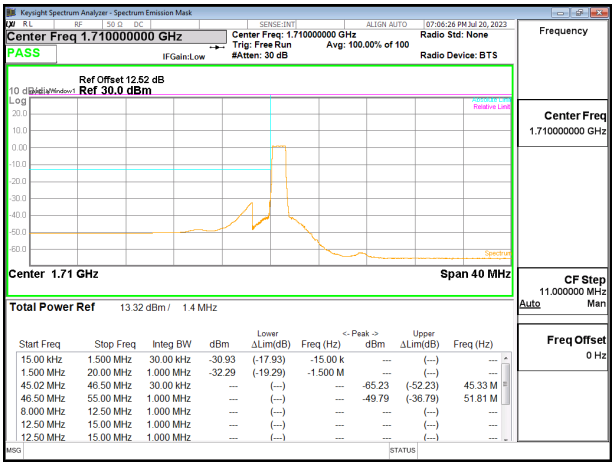


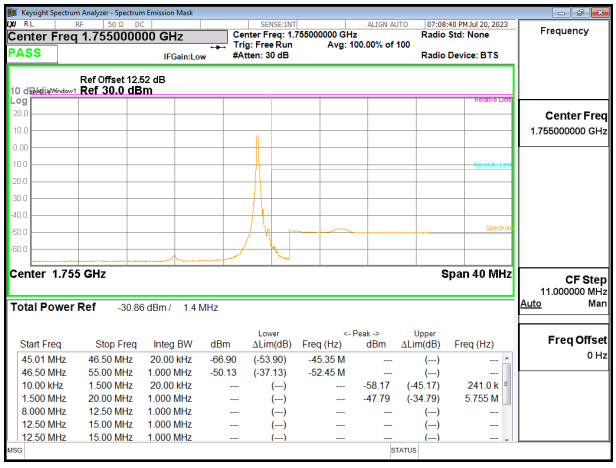
LTE4 1.4MHz 64QAM LOW Ch RB1-0



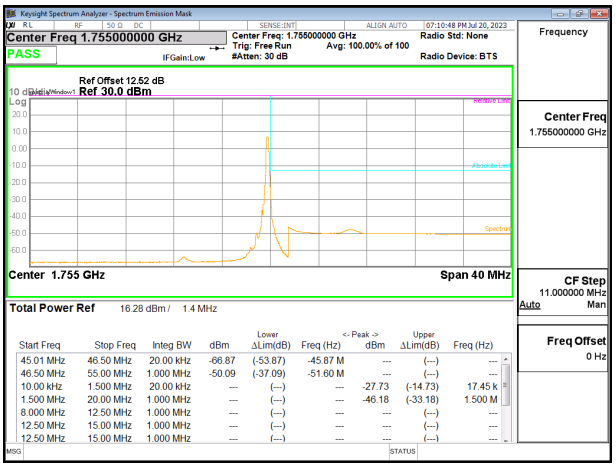
LTE4 1.4MHz 64QAM LOW Ch RB1-5



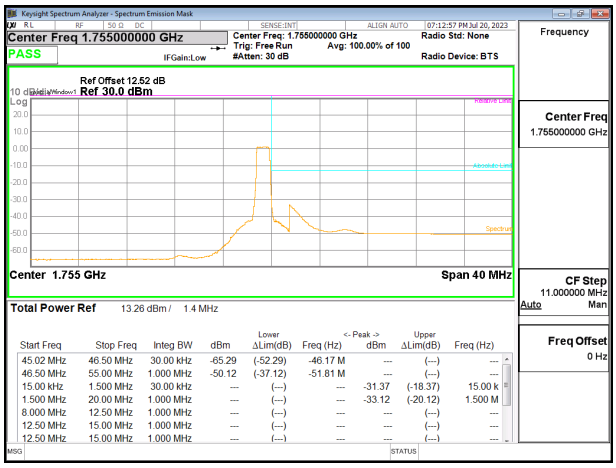
LTE4 1.4MHz 64QAM LOW Ch RB6-0



LTE4 1.4MHz 64QAM HIGH Ch RB1-0



LTE4 1.4MHz 64QAM HIGH Ch RB1-5



LTE4 1.4MHz 64QAM HIGH Ch RB6-0

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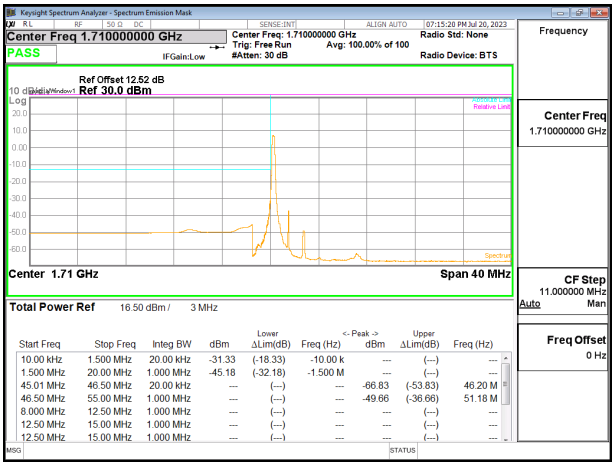
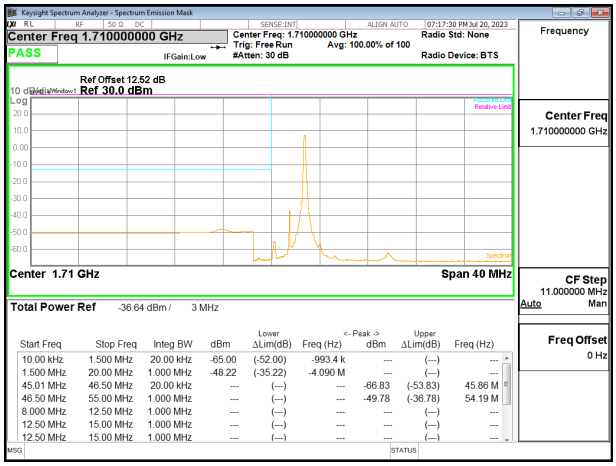
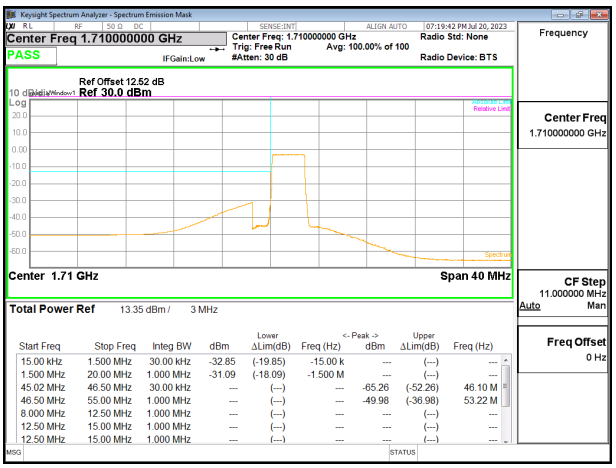


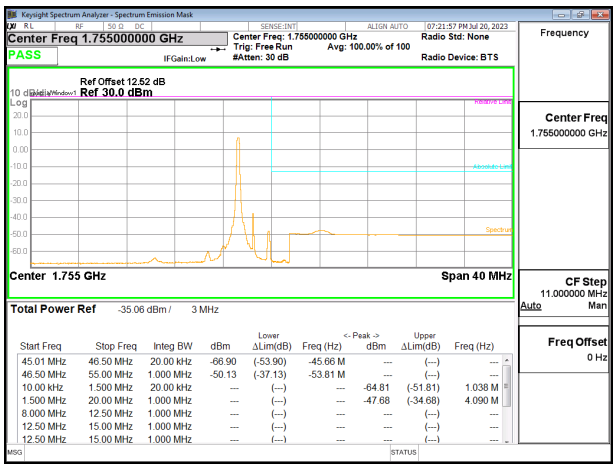
LTE4 3MHz 64QAM LOW Ch RB1-0



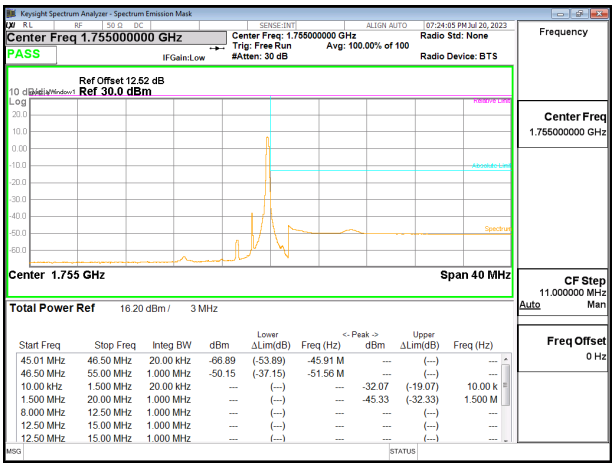
LTE4 3MHz 64QAM LOW Ch RB1-14



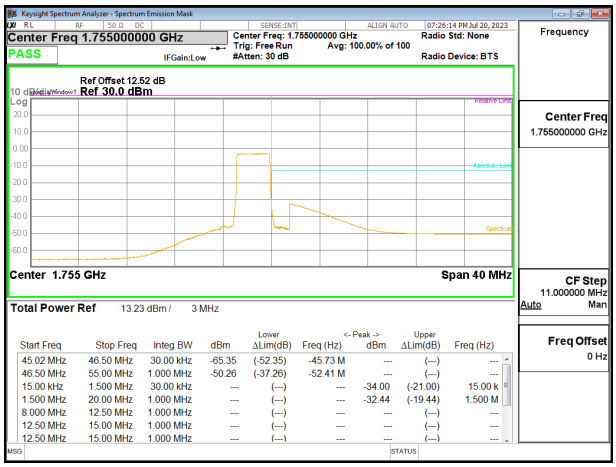
LTE4 3MHz 64QAM LOW Ch RB15-0



LTE4 3MHz 64QAM HIGH Ch RB1-0



LTE4 3MHz 64QAM HIGH Ch RB1-14



LTE4 3MHz 64QAM HIGH Ch RB15-0

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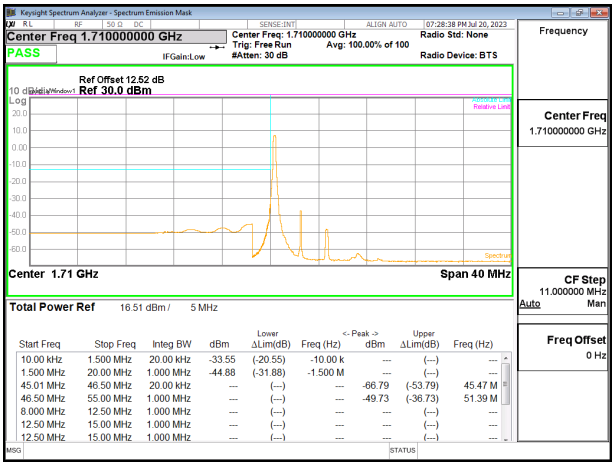
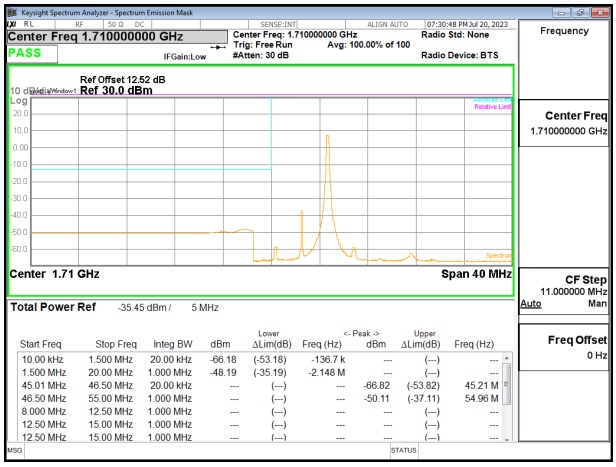
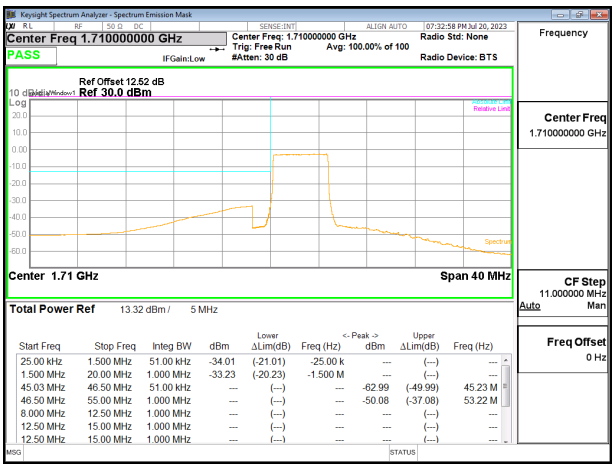


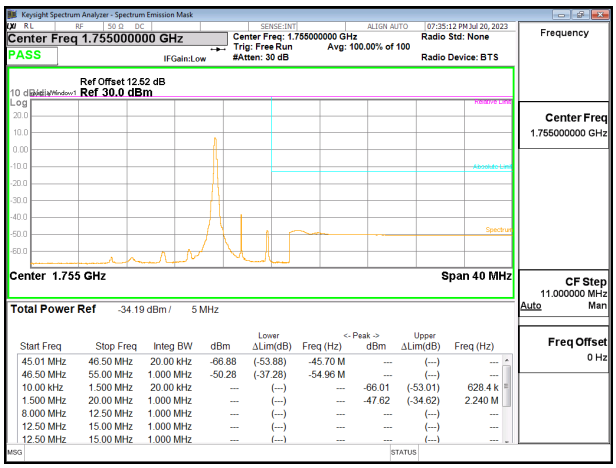
LTE4 5MHz 64QAM LOW Ch RB1-0



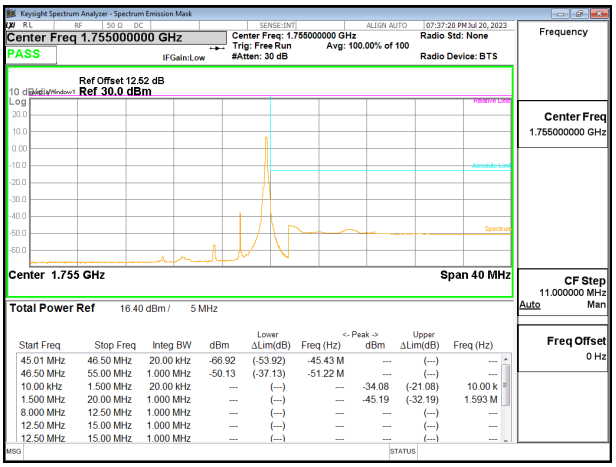
LTE4 5MHz 64QAM LOW Ch RB1-24



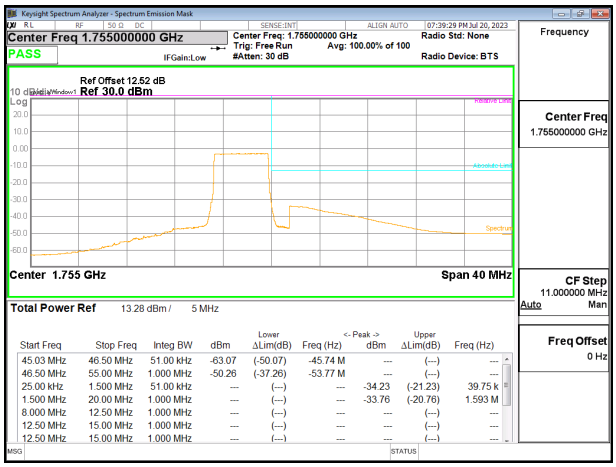
LTE4 5MHz 64QAM LOW Ch RB25-0



LTE4 5MHz 64QAM HIGH Ch RB1-0



LTE4 5MHz 64QAM HIGH Ch RB1-24



LTE4 5MHz 64QAM HIGH Ch RB25-0

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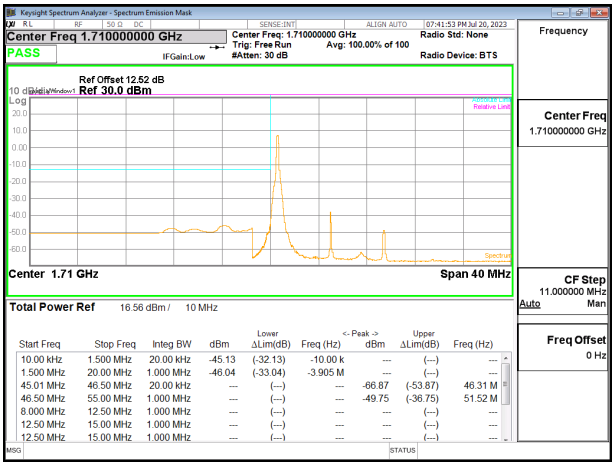
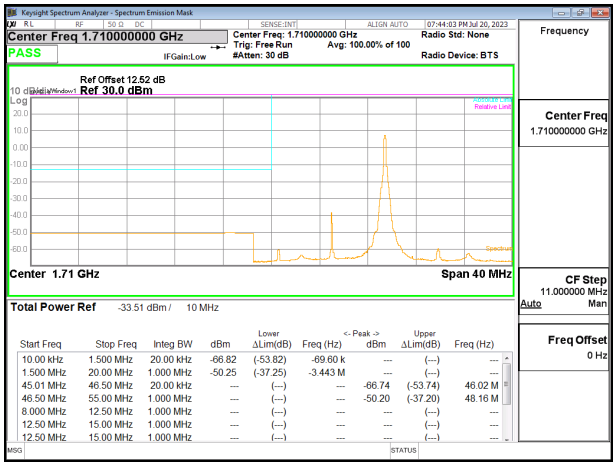
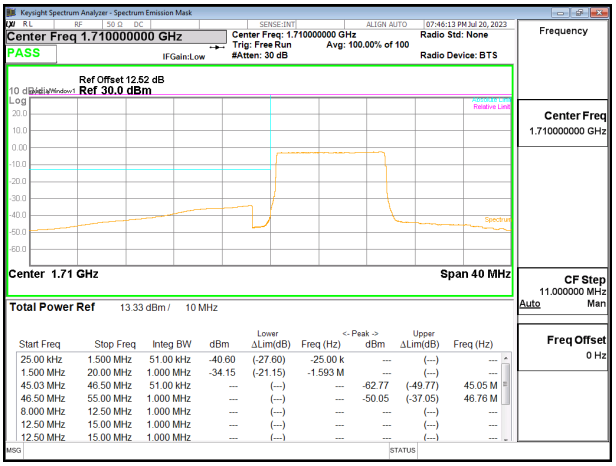


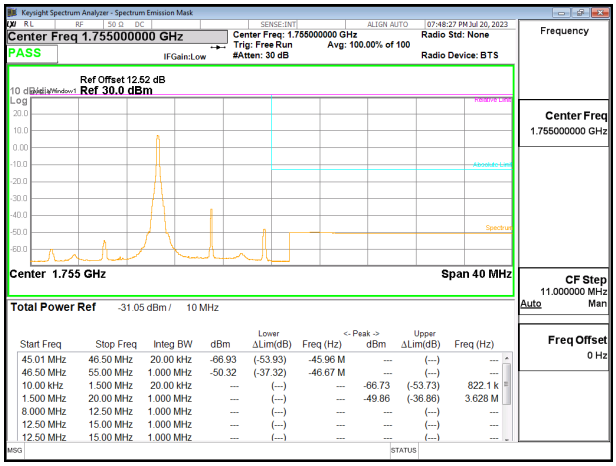
LTE4 10MHz 64QAM LOW Ch RB1-0



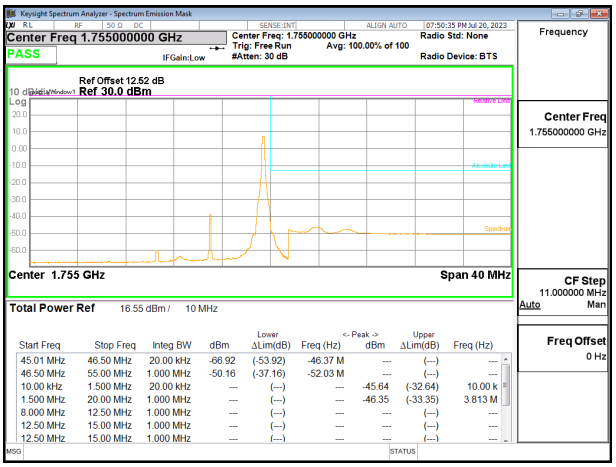
LTE4 10MHz 64QAM LOW Ch RB1-49



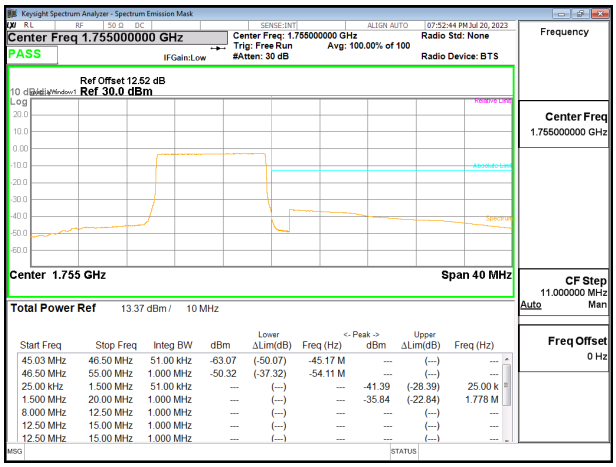
LTE4 10MHz 64QAM LOW Ch RB50-0



LTE4 10MHz 64QAM HIGH Ch RB1-0



LTE4 10MHz 64QAM HIGH Ch RB1-49



LTE4 10MHz 64QAM HIGH Ch RB50-0

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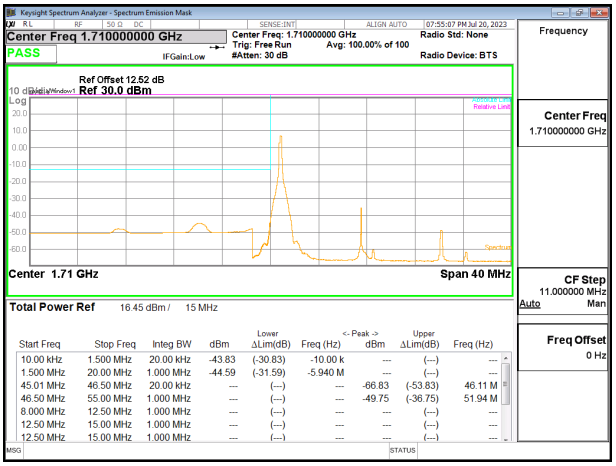
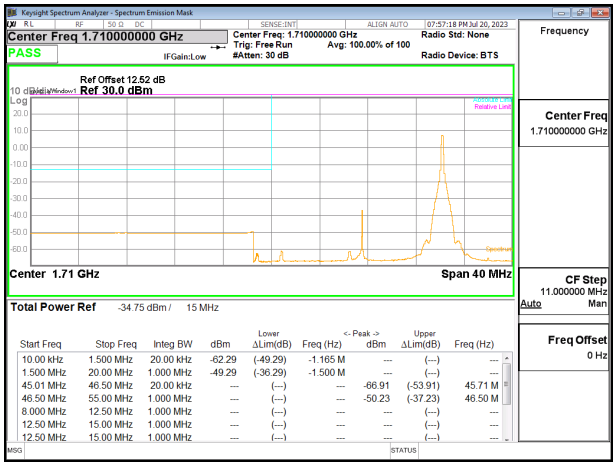
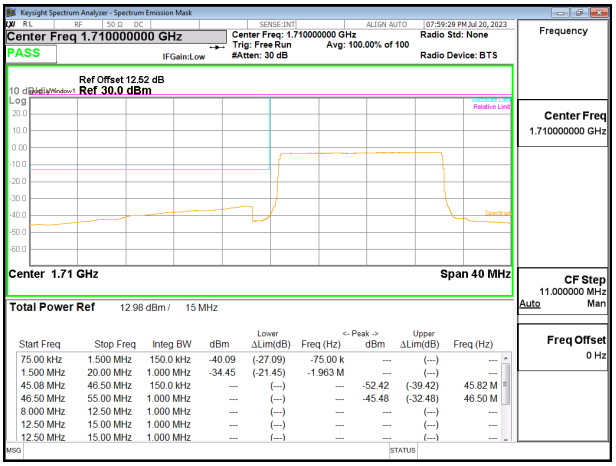


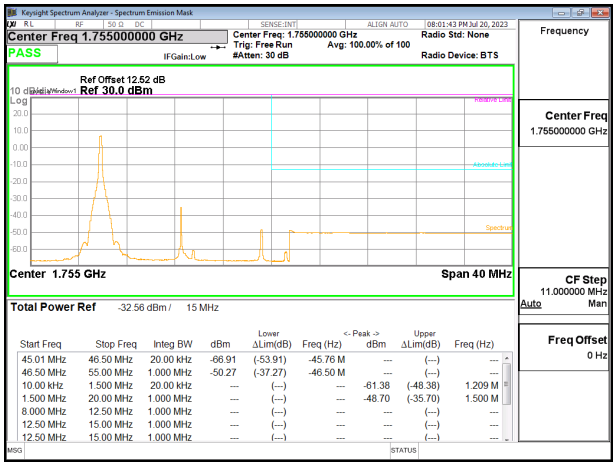
LTE4 15MHz 64QAM LOW Ch RB1-0



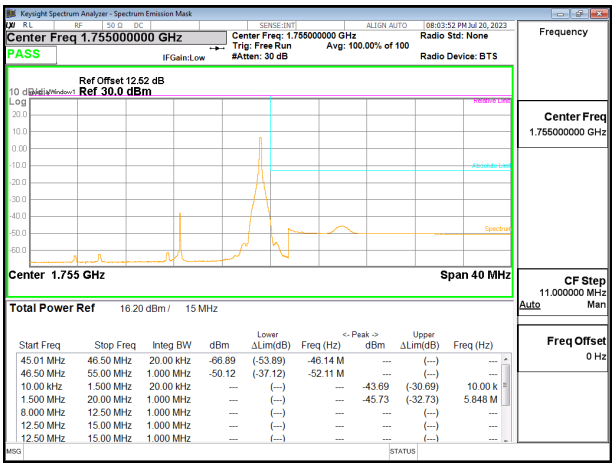
LTE4 15MHz 64QAM LOW Ch RB1-74



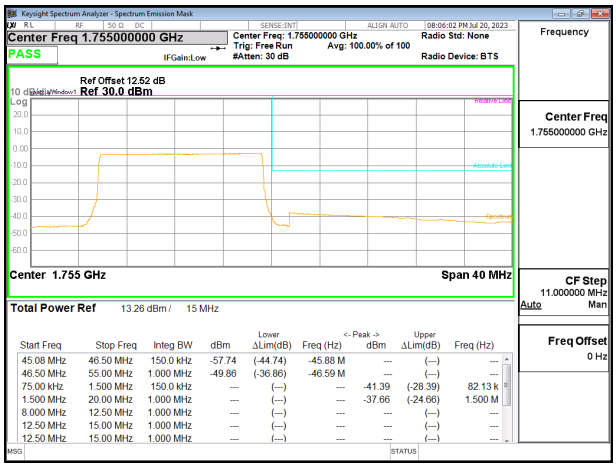
LTE4 15MHz 64QAM LOW Ch RB75-0



LTE4 15MHz 64QAM HIGH Ch RB1-0



LTE4 15MHz 64QAM HIGH Ch RB1-74



LTE4 15MHz 64QAM HIGH Ch RB75-0

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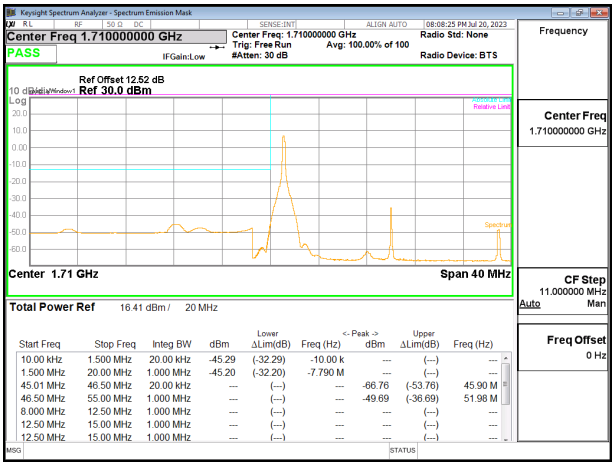
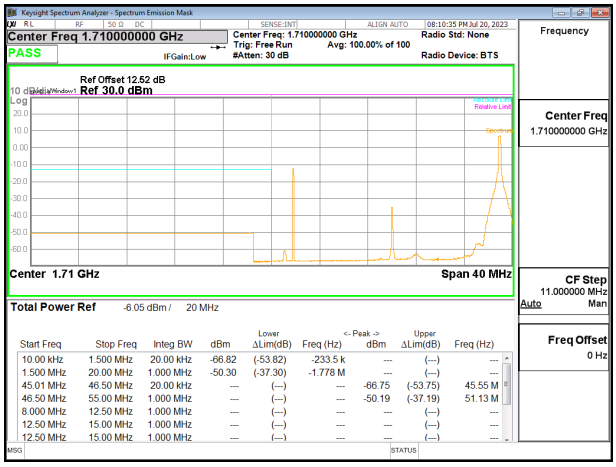
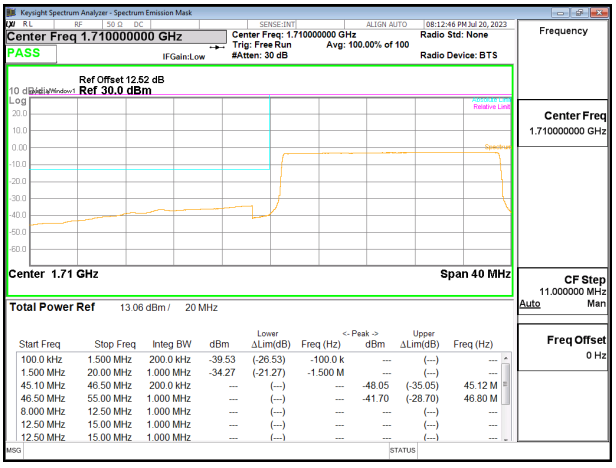


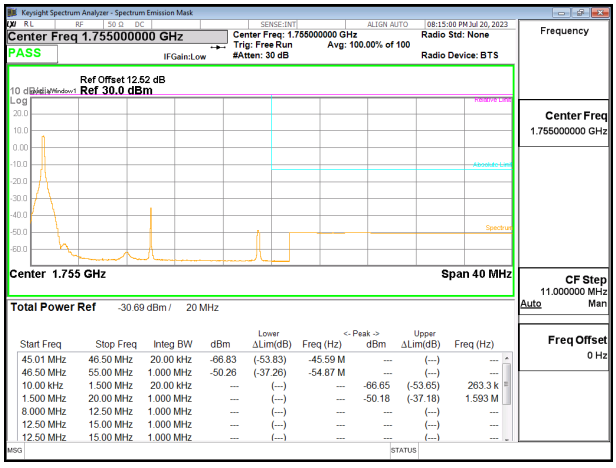
LTE4 20MHz 64QAM LOW Ch RB1-0



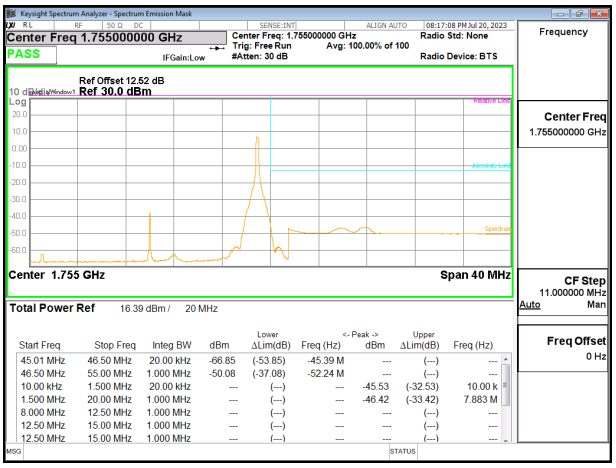
LTE4 20MHz 64QAM LOW Ch RB1-99



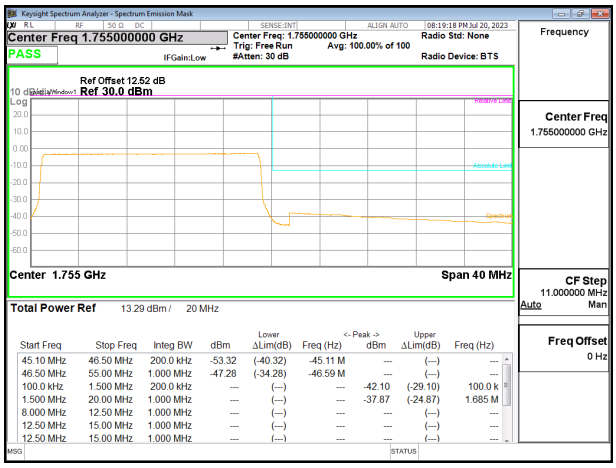
LTE4 20MHz 64QAM LOW Ch RB100-0



LTE4 20MHz 64QAM HIGH Ch RB1-0



LTE4 20MHz 64QAM HIGH Ch RB1-99



LTE4 20MHz 64QAM HIGH Ch RB100-0

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11. RADIATED TEST RESULTS

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, We measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement method.

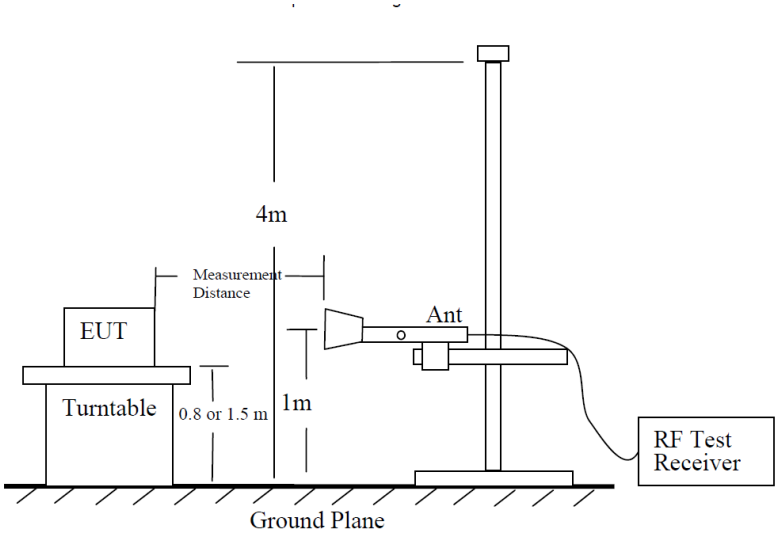

Figure 6—Test site-up for radiated ERP and/or EIRP measurements

Radiated Power Measurement Calculation According to ANSI C63.26-2015

a) E (dBμV/m) = Measured amplitude level (dBμV) + Cable Loss (dB) + Antenna Factor (dB/m).

b) E (dBμV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).

c) E (dBμV/m) = EIRP (dBm) − 20log(D) + 104.8; where D is the measurement distance (in the far field region) in m.

d) EIRP (dBm) = E (dBμV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is usually at 3m, then 20*Log(3)=9.5424

Then, EIRP (dBm) = E (dBμV/m) + 9.5424 − 104.8 = E (dBμV/m) – 95.2576

Note: Confidence check of each chamber is performed daily to see if any degradation from expected/normal reading reference data. Ambient check of each chamber is performed monthly.

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11.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz

TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02/r01

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz

RESULTS

Note: GPRS/EGPRS, REL99/HSDPA, QPSK/16QAM modes were tested for all bands, but only the worst-case mode is reported.

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11.1.1. GSM850

LIMITS

FCC: §22.917 (a)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

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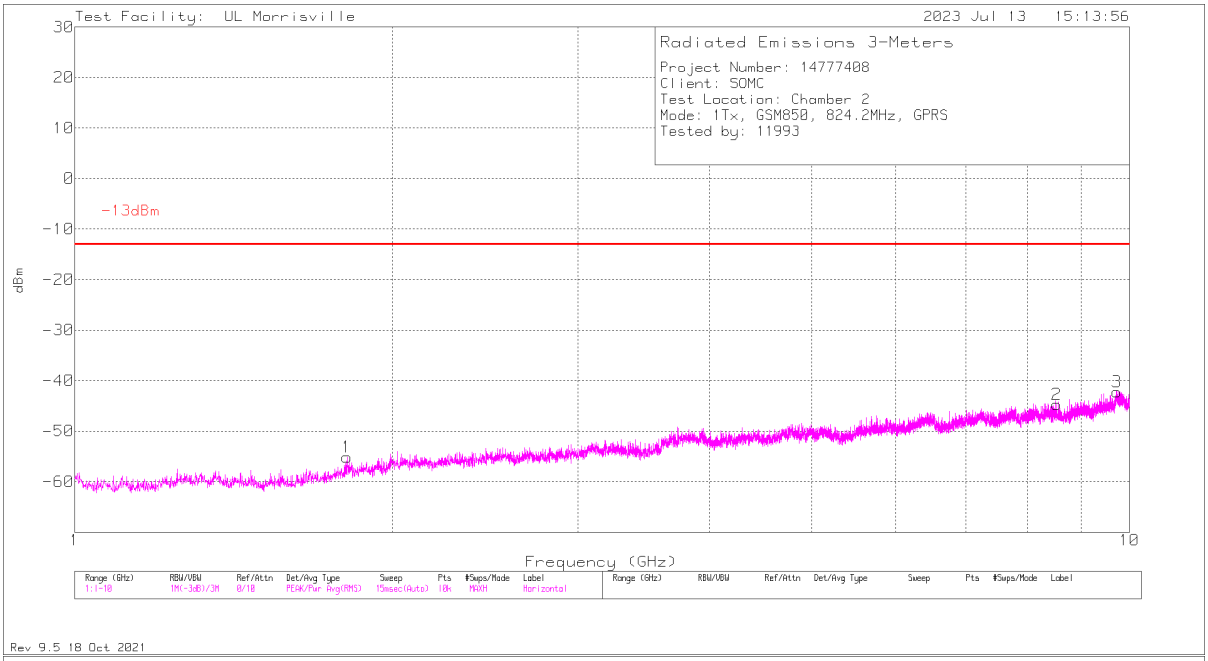
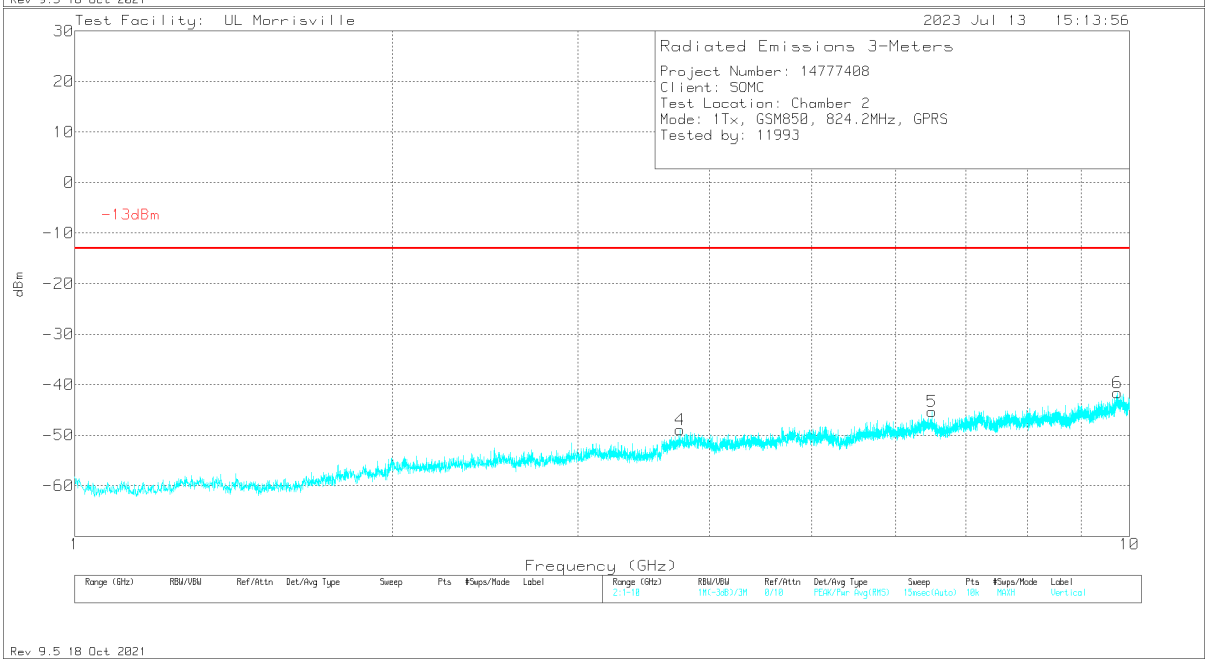
GPRS Low Channel





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	88761 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.8118	-63.05	Pk	30.1	-34.3	.3	11.8	-55.15	-13	-42.15	0-360	199	H
4	3.7504	-62.02	Pk	33.2	-32.5	.6	11.8	-48.92	-13	-35.92	0-360	101	V
5	6.4963	-64.82	Pk	35.5	-28.3	.5	11.8	-45.32	-13	-32.32	0-360	200	V
2	8.5312	-66.15	Pk	35.9	-26.8	.5	11.8	-44.75	-13	-31.75	0-360	300	H
3	9.7327	-66.59	Pk	36.9	-25.2	.9	11.8	-42.19	-13	-29.19	0-360	300	H
6	9.7453	-65.95	Pk	36.9	-25.3	.9	11.8	-41.65	-13	-28.65	0-360	101	V

Pk - Peak detector

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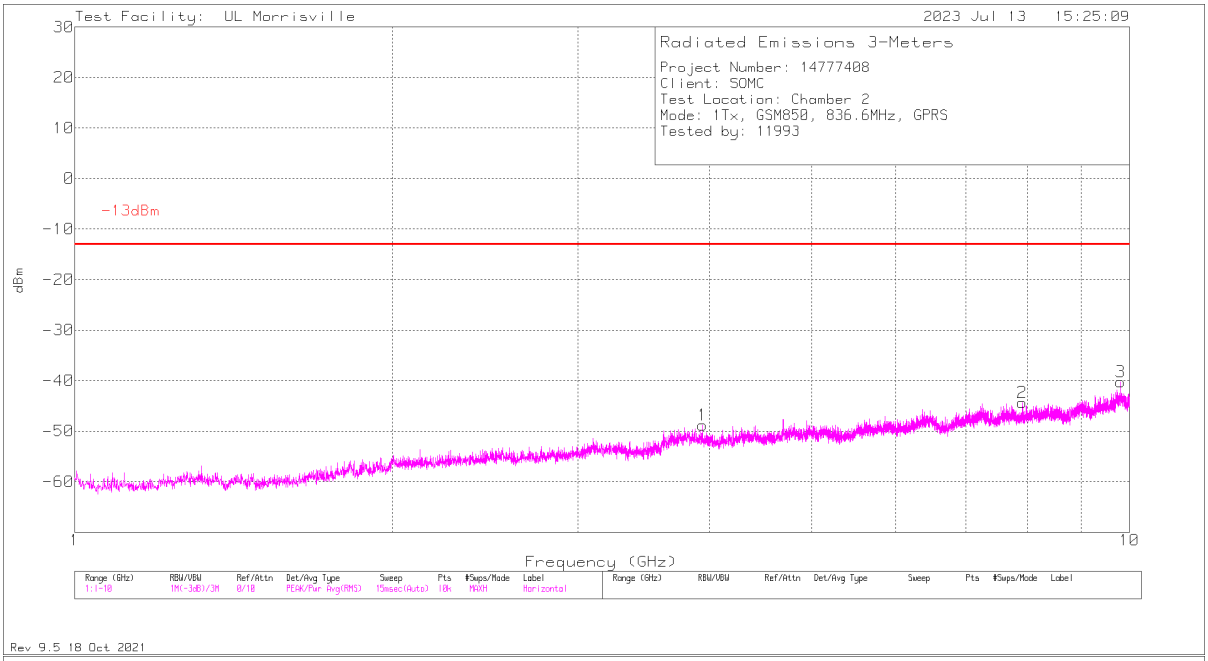
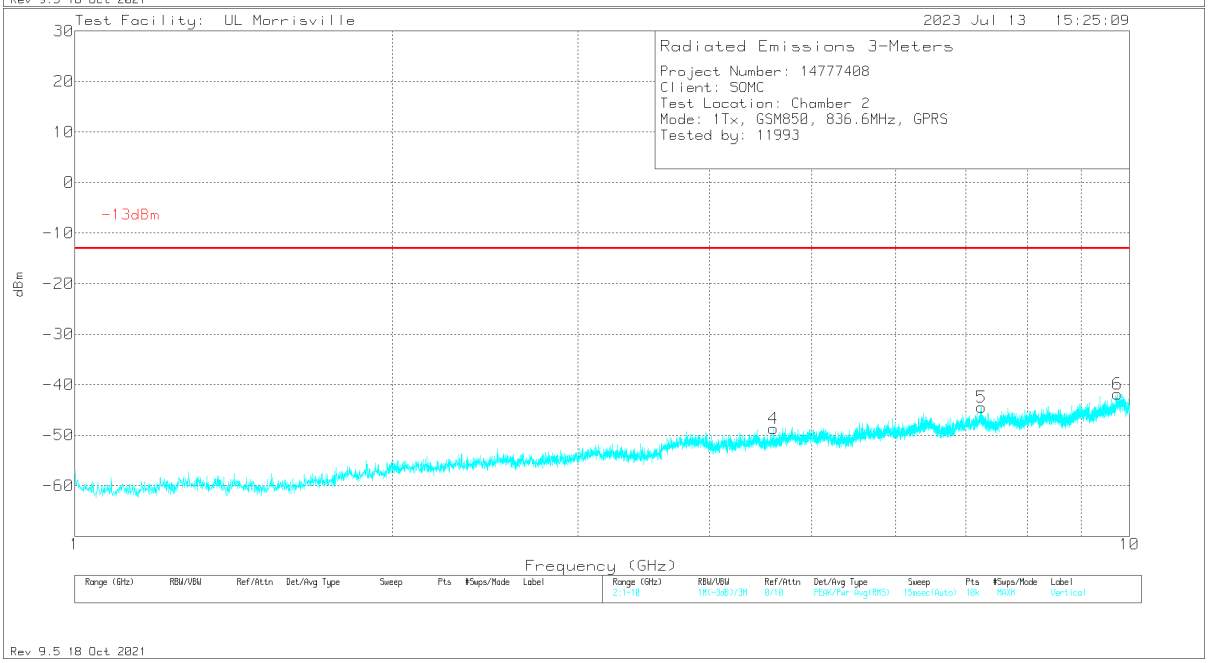
GPRS Mid channel





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	88761 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.9367	-62.21	Pk	33.4	-32	.2	11.8	-48.81	-13	-35.81	0-360	299	H
4	4.5982	-63.27	Pk	34	-31.6	.4	11.8	-48.67	-13	-35.67	0-360	299	V
5	7.2388	-65.1	Pk	35.6	-27.2	.4	11.8	-44.5	-13	-31.5	0-360	101	V
2	7.9129	-65.5	Pk	35.8	-26.8	.4	11.8	-44.3	-13	-31.3	0-360	101	H
6	9.7399	-66.15	Pk	36.9	-25.3	.9	11.8	-41.85	-13	-28.85	0-360	101	V
3	9.8047	-64.17	Pk	36.9	-25.3	.5	11.8	-40.27	-13	-27.27	0-360	101	H

Pk - Peak detector

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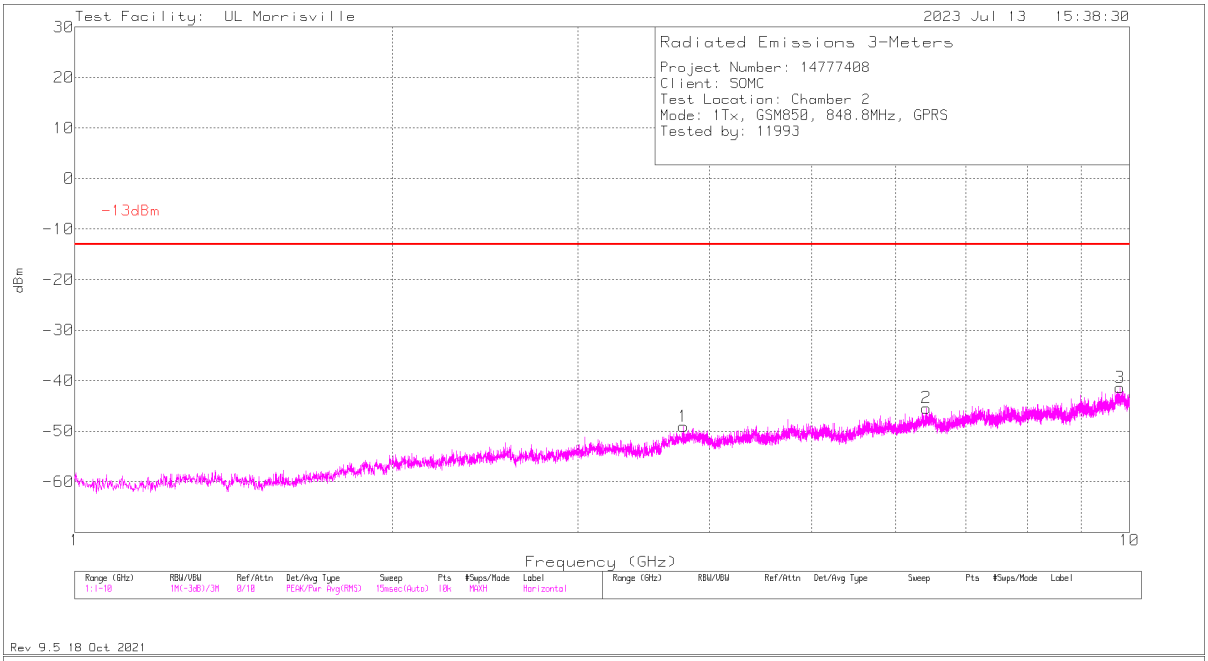
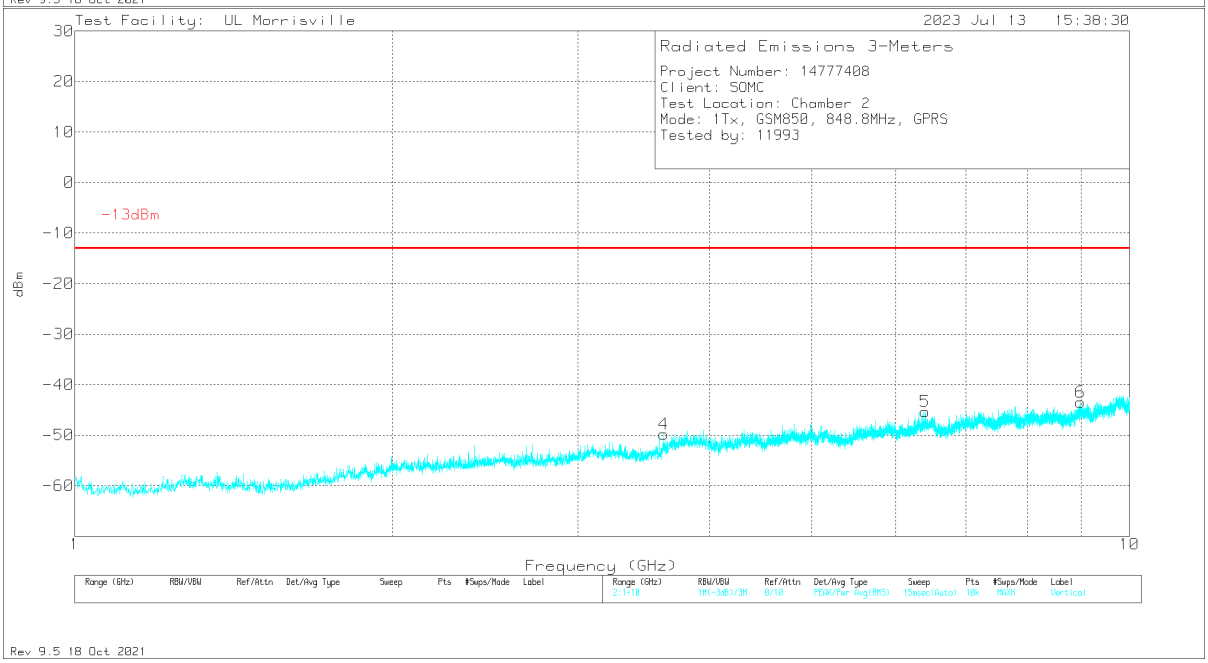
GPRS High Channel





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	88761 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	3.6172	-62.24	Pk	32.9	-32.8	.5	11.8	-49.84	-13	-36.84	0-360	101	V
1	3.7774	-62.05	Pk	33.3	-32.4	.3	11.8	-49.05	-13	-36.05	0-360	199	H
5	6.4	-64.09	Pk	35.5	-28.8	.3	11.8	-45.29	-13	-32.29	0-360	200	V
2	6.4225	-64.19	Pk	35.5	-28.8	.3	11.8	-45.39	-13	-32.39	0-360	199	H
6	8.9893	-65.34	Pk	36.2	-26.7	.6	11.8	-43.44	-13	-30.44	0-360	101	V
3	9.7957	-65.22	Pk	36.9	-25.2	.4	11.8	-41.32	-13	-28.32	0-360	199	H

Pk - Peak detector

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11.1.2. GSM1900

LIMITS

FCC: §24.238 (a)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

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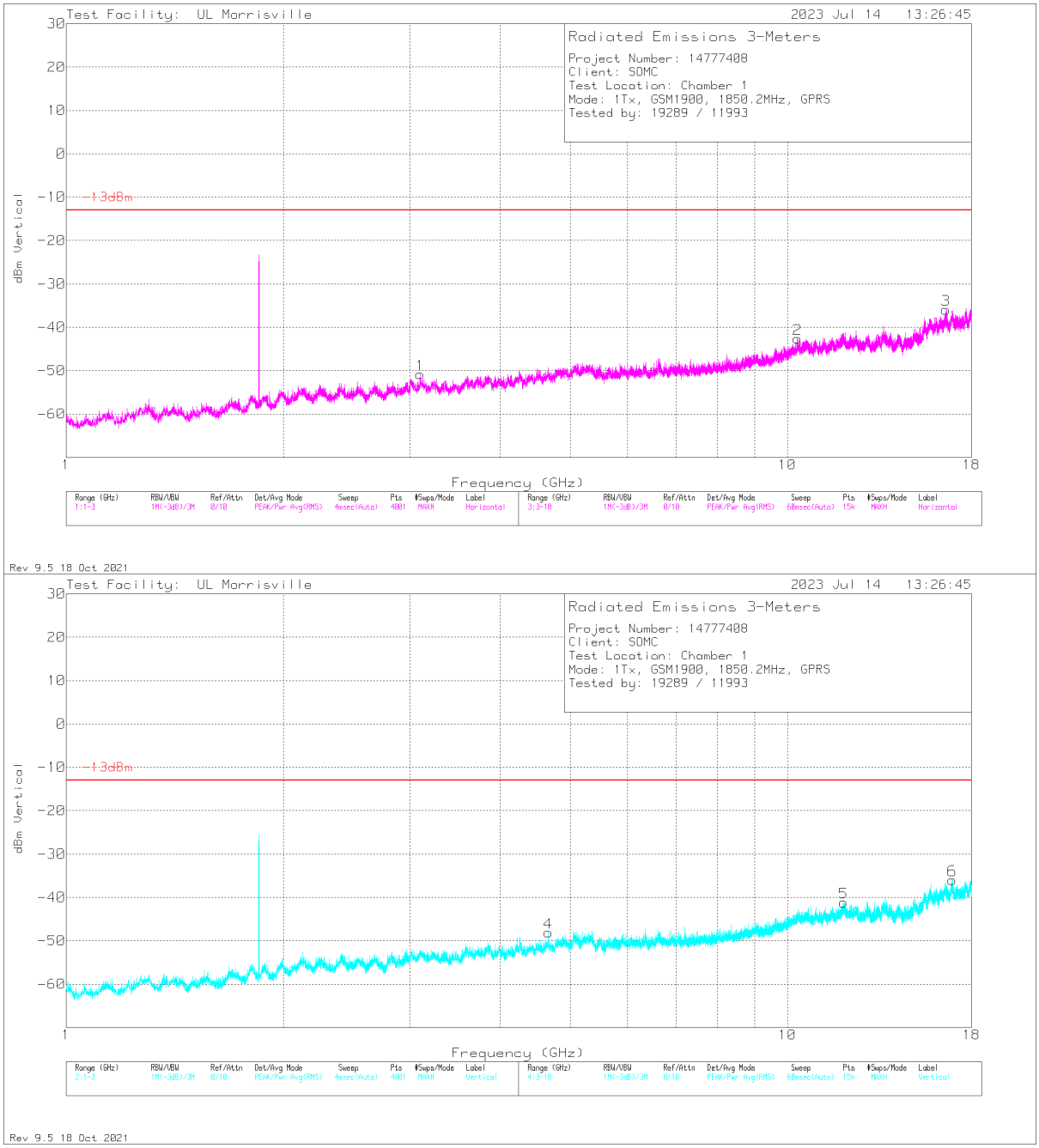
GPRS Low Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.096	-63.23	Pk	32.9	-32.3	11.8	0	-50.83	-13	-37.83	0-360	101	H
4	4.662	-62.91	Pk	34.2	-31.2	11.8	0	-48.11	-13	-35.11	0-360	300	V
2	10.329	-66.54	Pk	37.7	-25.6	11.8	0	-42.64	-13	-29.64	0-360	299	H
5	11.97	-65.97	Pk	38.6	-25.6	11.8	0	-41.17	-13	-28.17	0-360	201	V
3	16.583	-65.23	Pk	41.2	-23.7	11.8	0	-35.93	-13	-22.93	0-360	299	H
6	16.931	-66.29	Pk	41.7	-23.2	11.8	0	-35.99	-13	-22.99	0-360	101	V

Pk - Peak detector

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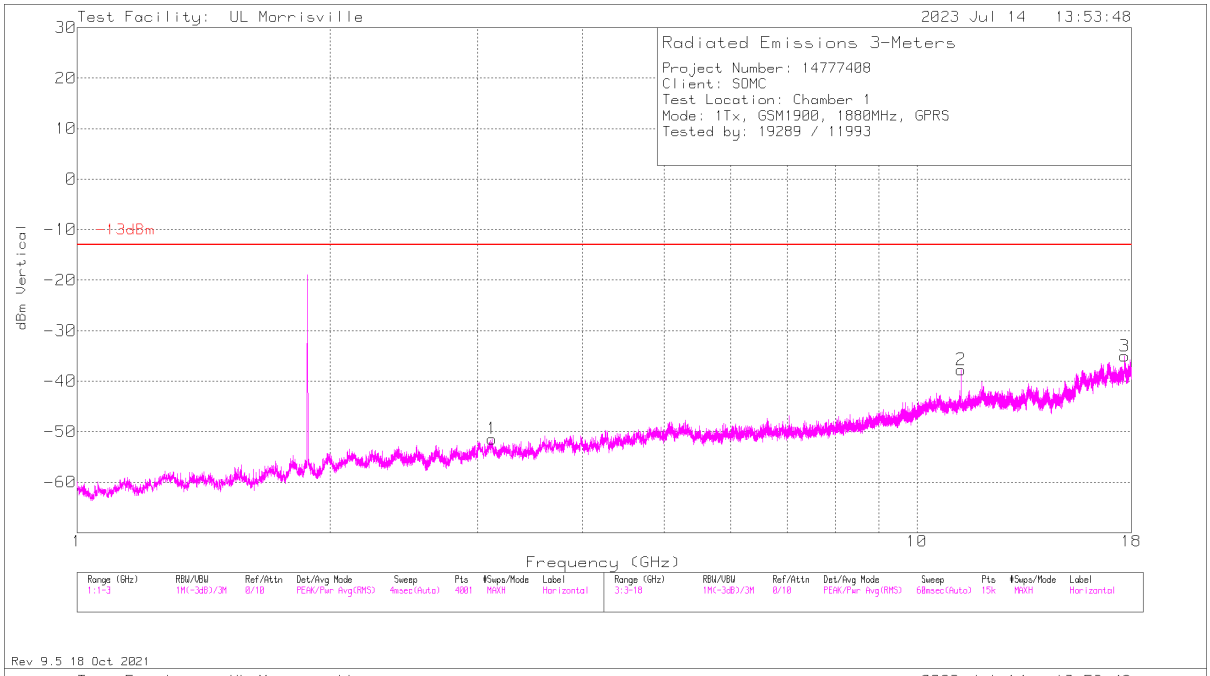
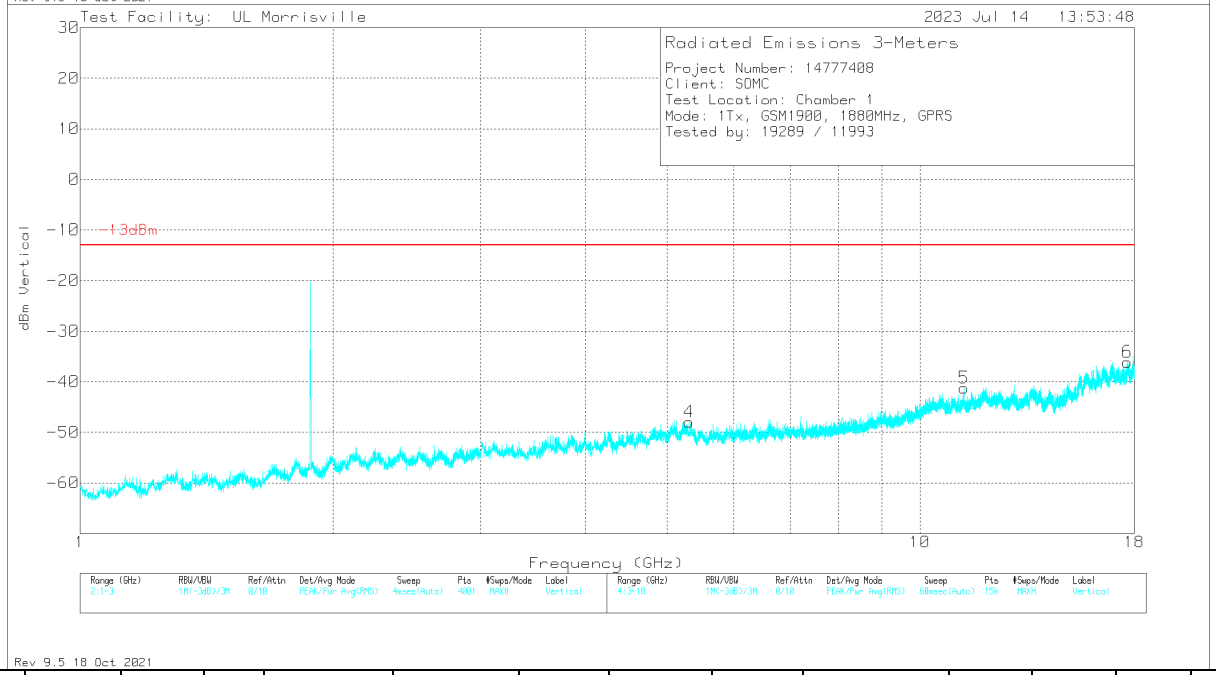
GPRS Mid Channel





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.118	-64.1	Pk	33	-32.1	11.8	0	-51.4	-13	-38.4	0-360	101	H
4	5.308	-65.55	Pk	34.5	-28.7	11.8	0	-47.95	-13	-34.95	0-360	300	V
2	11.28	-62.23	Pk	37.7	-25	11.8	0	-37.73	-13	-24.73	0-360	199	H
5	11.28	-65.73	Pk	37.7	-25	11.8	0	-41.23	-13	-28.23	0-360	101	V
6	17.67	-66.21	Pk	41.6	-23.3	11.8	0	-36.11	-13	-23.11	0-360	300	V
3	17.671	-65.25	Pk	41.6	-23.2	11.8	0	-35.05	-13	-22.05	0-360	199	H

Pk - Peak detector

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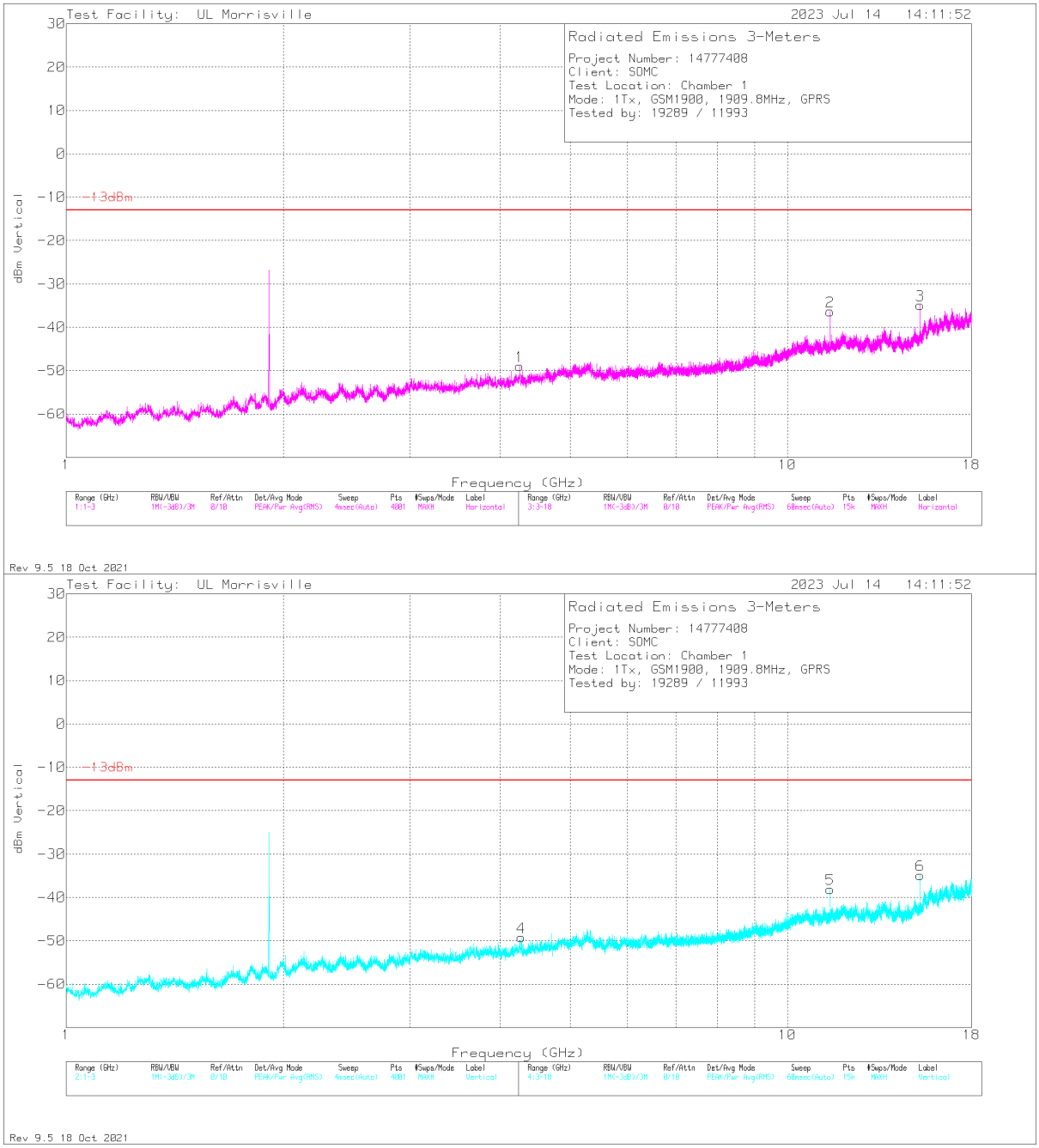
GPRS High Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	4.251	-64.45	Pk	33.4	-29.7	11.8	0	-48.95	-13	-35.95	0-360	200	H
4	4.277	-64.4	Pk	33.5	-30.1	11.8	0	-49.2	-13	-36.2	0-360	300	V
2	11.459	-59.62	Pk	37.8	-26.3	11.8	0	-36.32	-13	-23.32	0-360	101	H
5	11.459	-61.38	Pk	37.8	-26.3	11.8	0	-38.08	-13	-25.08	0-360	101	V
3	15.279	-60.55	Pk	40	-26.1	11.8	0	-34.85	-13	-21.85	0-360	300	H
6	15.279	-60.54	Pk	40	-26.1	11.8	0	-34.84	-13	-21.84	0-360	101	V

Pk - Peak detector

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11.1.3. WCDMA2

LIMITS

FCC: §24.238 (a)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

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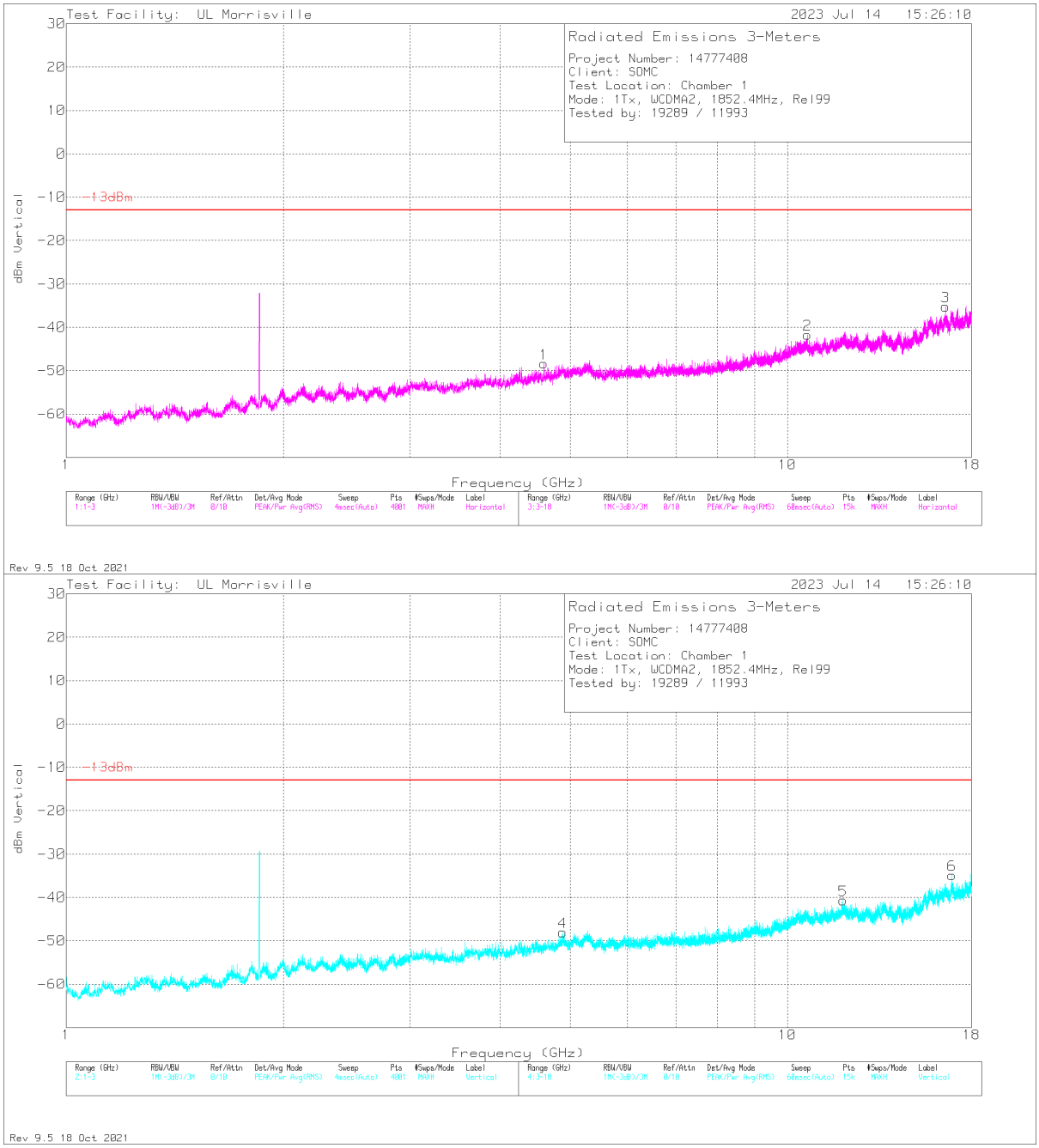
REL 99 Low Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	4.598	-63.17	Pk	34.1	-31.1	11.8	0	-48.37	-13	-35.37	0-360	299	H
4	4.879	-64.22	Pk	34	-29.6	11.8	0	-48.02	-13	-35.02	0-360	201	V
2	10.66	-65.88	Pk	37.9	-25.5	11.8	0	-41.68	-13	-28.68	0-360	299	H
5	11.947	-65.46	Pk	38.6	-25.6	11.8	0	-40.66	-13	-27.66	0-360	300	V
3	16.569	-65	Pk	41.2	-23.2	11.8	0	-35.2	-13	-22.2	0-360	101	H
6	16.923	-65.54	Pk	41.7	-22.8	11.8	0	-34.84	-13	-21.84	0-360	201	V

Pk - Peak detector

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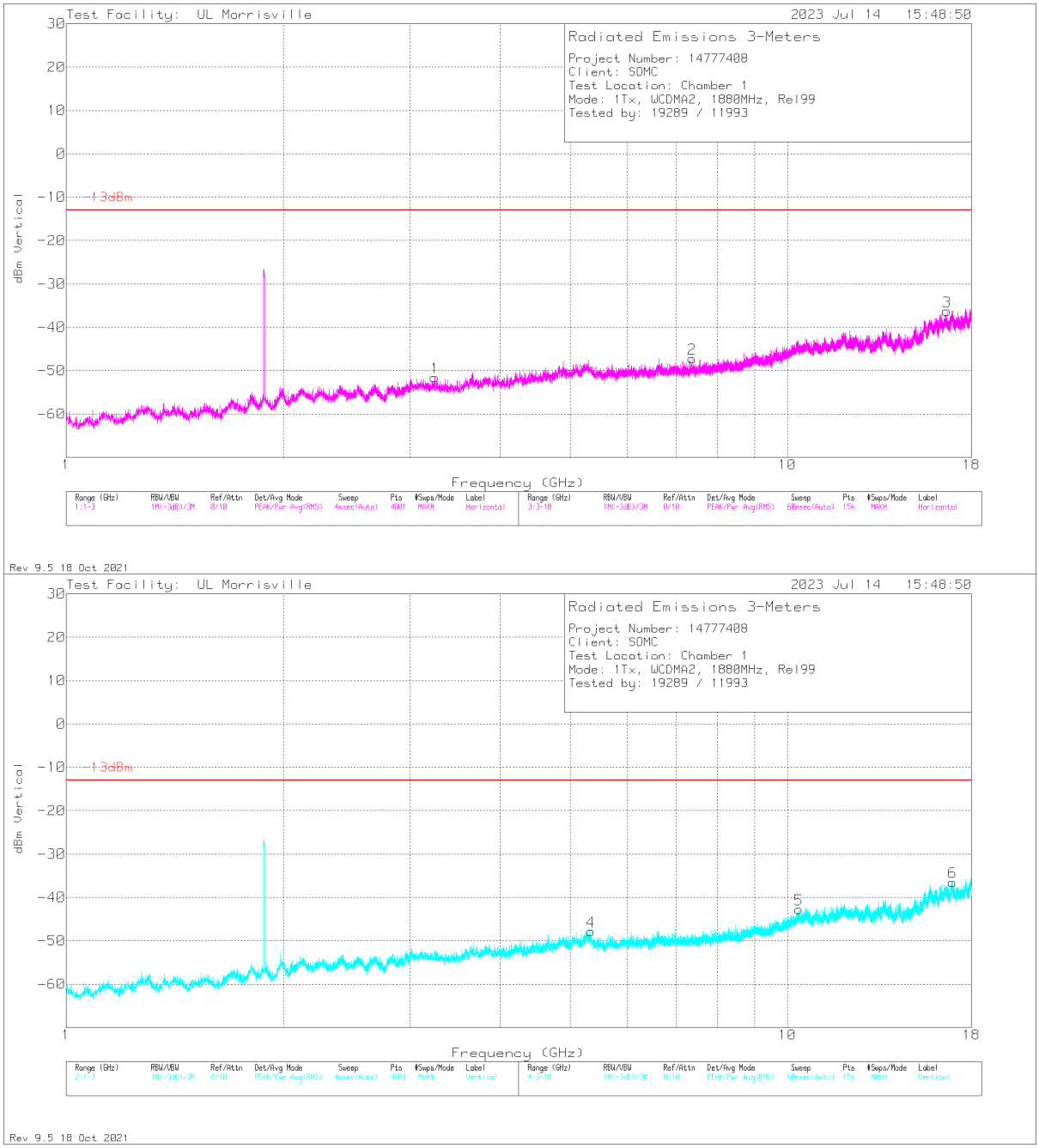
REL 99 Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.243	-64.42	Pk	32.9	-31.8	11.8	0	-51.52	-13	-38.52	0-360	300	H
4	5.34	-65.22	Pk	34.5	-28.9	11.8	0	-47.82	-13	-34.82	0-360	101	V
2	7.379	-65.29	Pk	35.7	-29.4	11.8	0	-47.19	-13	-34.19	0-360	199	H
5	10.376	-66.42	Pk	37.7	-25.8	11.8	0	-42.72	-13	-29.72	0-360	300	V
3	16.642	-66.26	Pk	41.4	-23.2	11.8	0	-36.26	-13	-23.26	0-360	101	H
6	16.941	-67.35	Pk	41.7	-22.6	11.8	0	-36.45	-13	-23.45	0-360	101	V

Pk - Peak detector

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