FCC CFR47 PART 22 SUBPART H/ IC RSS-132 ISSUE 3
FCC CFR47 PART 24 SUBPART E / IC RSS-133 ISSUE 6
FCC CFR47 PART 27 SUBPART D / IC RSS-195 ISSUE 2
FCC CFR47 PART 27 SUBPART H / RSS-130 ISSUE 1
FCC CFR47 PART 27 SUBPART L / RSS-139 ISSUE 3
FCC CFR47 PART 27 SUBPART M / RSS-199 ISSUE 3

WWAN

CERTIFICATION TEST REPORT

FOR

WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n and ANT+

MODEL NUMBER : SM-T387W

FCC ID: A3LSMT387W
IC: 649E-SMT387W

REPORT NUMBER: 4788665909-E6V1

ISSUE DATE: NOV 23, 2018

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ACCREDITED
Testing Laboratory

TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	11/23/18	Initial issue	Hoonpyo Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n and ANT+

MODEL NUMBER: SM-T387W

SERIAL NUMBER: R32K400HGXT,R32K500LY6E,R32K500LZSD,
R32K5010G4X,R32K5010HWZ (RADIATED, Original);
R32K400HFNH (CONDUCTED, Original);
R32K90005PP,R32K90005MR(RADIATED, Spot check & Additional test);
R32K90005DV,R32K90004ZX,R32K90005OL (CONDUCTED, Additional test)

DATE TESTED: JUN 09, 2018 - JUN 22, 2018, JUL 10, 2018 - JUL 21, 2018 (Original);
OCT 04, 2018 - OCT 25, 2018 (Spot check & Additional test);
NOV 21, 2018 – NOV 22, 2018 (Prescan for Part15B)

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E, 27D, 27H, 27L and 27M	Pass
INDUSTRY CANADA RSS-130,132,133,139,195, 199 and GEN	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

SungGil Park

Tested By:

Hoonpyo Lee

Suwon Lab Engineer
UL Korea, Ltd.

Suwon Lab Engineer
UL Korea, Ltd.

1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMT387AA (Model number: SM-T387AA) WWAN (FCC CFR 47 Part 22H, 24E, 27D, 27H, 27L and 27M).
And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMT387W (IC: 649E-SMT387W, Model number: SM-T387W) shares the same enclosure and circuit board as FCC ID: A3LSMT387AA (Model number: SM-T387AA). The WWAN antennas and surrounding circuitry and layout regarding test data re-used bands are identical between these two units. The FCC ID: A3LSMT387W (IC: 649E-SMT387W, Model number: SM-T387W), some components for additional band newly mounted and additional bands enabled by SW. And some of the bands are not used. Difference for these two units, PED(Product Equality Declaration) document described in details.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMT387AA (Model number: SM-T387AA) remains representative of FCC ID: A3LSMT387W (IC: 649E-SMT387W, Model number: SM-T387W). The test data of FCC ID: A3LSMT387AA (Model number: SM-T387AA) being submitted for this application to cover WWAN re-used bands features.

- Reuse bands - WCDMA Band 2 / 4 / 5, LTE Band 2 / 4 / 5 / 7 / 12 / 30
- Additional test band for FCC ID : A3LSMT387W

  - LTE Band 17(Covered by LTE Band 12) / 66

1.3. SPOT CHECK VERIFICATION DATA

(Worst case of the radiated spurious and band edge emissions)

Band	Test Item	Worst Mode	Frequency	Test Limit	Original model	Spot check model	Deviation	Remark
					SM-T387AA Results	SM-T387W Results		
					FCC ID : A3LSMT387AA	FCC ID : A3LSMT387W IC : 649E-SMT387W		
LTE Band 2	EIRP	15M QPSK	1857.5 MHz	33.00 dBm	22.83 dBm	24.05 dBm	1.22 dB	
	RSE	3M QPSK	3817.0 MHz	-13.00 dBm	-38.80 dBm	-42.20 dBm	-3.40 dB	
LTE Band 4	EIRP	1.4M QPSK	1754.3 MHz	30.00 dBm	25.91 dBm	26.02 dBm	0.11 dB	
	RSE	20M QPSK	3440.0 MHz	-13.00 dBm	-37.30 dBm	-38.70 dBm	-1.40 dB	
LTE Band 5	ERP	1.4M QPSK	836.4 MHz	38.50 dBm	24.12 dBm	23.71 dBm	-0.41 dB	
	RSE	3M QPSK	2542.5 MHz	-13.00 dBm	-32.90 dBm	-52.40 dBm	-19.50 dB	
LTE Band 7	EIRP	10M QPSK	2535.0 MHz	33.00 dBm	20.62 dBm	19.98 dBm	-0.64 dB	
	RSE	20M QPSK	12800.0 MHz	-25.00 dBm	-43.30 dBm	-52.50 dBm	-9.20 dB	
LTE Band 12	ERP	1.4M QPSK	715.3 MHz	34.80 dBm	18.60 dBm	18.51 dBm	-0.09 dB	
	RSE	10M QPSK	1422.0 MHz	-13.00 dBm	-55.30 dBm	-52.70 dBm	2.60 dB	
WCDMA Band 30	EIRP	10M QPSK	2310.0 MHz	24.00 dBm	19.98 dBm	18.68 dBm	-1.30 dB	
	RSE	5M QPSK	4620.0 MHz	-40.00 dBm	-43.20 dBm	-51.90 dBm	-8.70 dB	
WCDMA Band 2	EIRP	REL99	1852.4 MHz	33.00 dBm	24.38 dBm	23.00 dBm	-1.38 dB	
	RSE	REL99	3815.2 MHz	-13.00 dBm	-45.90 dBm	-47.50 dBm	-1.60 dB	
WCDMA Band 4	EIRP	REL99	1852.4 MHz	30.00 dBm	25.00 dBm	24.01 dBm	-0.99 dB	
	RSE	REL99	3815.2 MHz	-13.00 dBm	-44.10 dBm	-44.80 dBm	-0.70 dB	
WCDMA Band 5	ERP	REL99	826.4 MHz	38.50 dBm	23.00 dBm	22.46 dBm	-0.54 dB	
	RSE	HSDPA	2509.8 MHz	-13.00 dBm	-42.90 dBm	-45.60 dBm	-2.70 dB	

Comparison of two models, upper deviation is within 3dB range and all test results are under FCC Technical Limits.

1.4. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Type Grant/Permissive Change	Reference Application	Folder Test/RF Exposure	Report Tittle / Section
DTS	A3LSMT387AA	Grant	4788534512-E1V1	Test	FCC Report DTS WLAN / All sections
			4788534512-E2V1	Test	FCC Report BLE / All sections
DSS	A3LSMT387AA	Grant	4788534512-E3V1	Test	FCC Report BT / All sections
NII	A3LSMT387AA	Grant	4788534512-E4V2	Test	FCC Report UNII WLAN / All sections
DXX	A3LSMT387AA	Grant	4788534512-E5V1	Test	FCC Report ANT+ / All sections
PCE	A3LSMT387AA	Grant	4788534512-E6V2	Test	FCC Report WWAN / All sections (Only the reuse bands)

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 22.
3. FCC CFR 47 Part 24.
4. FCC CFR 47 Part 27.
5. IC RSS-130 Issue 1
6. IC RSS-132 Issue 3
7. IC RSS-133 Issue 6
8. IC RSS-139 Issue 3
9. IC RSS-199 Issue 3
10. IC RSS-GEN Issue 5
11. ANSI TIA-603-E, 2016
12. ANSI C63.4:2014
13. KDB 971168 D01 Power Meas License Digital Systems v03r01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1
☒ Chamber 2
☐ Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at http://www.iasonline.org/PDF/TL/TL-637.pdf.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	3.86 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n and ANT+.
This test report addresses the WWAN operational mode.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum average radiated ERP / EIRP output powers as follows:

WCDMA

FCC Part 22/24				
Band	Frequency Range	Modulation	Radiated	
	[MHz]		Avg [dBm]	Avg [mW]
Band 5	824~849	REL99	**23.00**	**199.53**
		HSDPA	22.02	159.22
Band 4	1710~1755	REL99	**25.01**	**316.96**
		HSDPA	23.86	243.22
Band 2	1850~1910	REL99	**24.38**	**274.16**
		HSDPA	23.65	231.74

Note: These data of Band 5 are ERP results.
(The EIRP conversion formula for IC : EIRP result (dBm) = ERP result (dBm) + 2.15 dB)

LTE Band 2

FCC Part 24					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Radiated	
				Avg [dBm]	Avg [mW]
Band 2	1850 ~ 1910	20	QPSK	22.68	185.35
			16QAM	21.69	147.57
		15	QPSK	**22.83**	**191.87**
			16QAM	**21.96**	**157.04**
		10	QPSK	22.55	179.89
			16QAM	21.46	139.96
		5	QPSK	22.37	172.58
			16QAM	21.48	140.60
		3	QPSK	21.89	154.53
			16QAM	21.34	136.14
		1.4	QPSK	22.09	161.81
			16QAM	21.23	132.74

LTE Band 4

FCC Part 27					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Radiated	
				Avg [dBm]	Avg [mW]
Band 4	1710 ~ 1755	20	QPSK	24.88	307.61
			16QAM	**24.24**	**265.46**
		15	QPSK	25.03	318.42
			16QAM	23.58	228.03
		10	QPSK	24.29	268.53
			16QAM	23.03	200.91
		5	QPSK	24.08	255.86
			16QAM	23.72	235.50
		3	QPSK	24.14	259.42
			16QAM	23.75	237.14
		1.4	QPSK	**25.91**	**389.94**
			16QAM	24.16	260.62

LTE Band 5

FCC Part 22					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Radiated	
				Avg [dBm]	Avg [mW]
Band 5	824 ~ 849	10	QPSK	23.16	207.01
			16QAM	22.37	172.58
		5	QPSK	23.84	242.10
			16QAM	22.41	174.18
		3	QPSK	23.79	239.33
			16QAM	22.54	179.47
		1.4	QPSK	**24.12**	**258.23**
			16QAM	**23.21**	**209.41**

Note: These data are ERP results.
(The EIRP conversion formula for IC : EIRP result (dBm) = ERP result (dBm) + 2.15 dB)

LTE Band 7

FCC Part 27					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Radiated	
				Avg [dBm]	Avg [mW]
Band 7	2500-2570	20	QPSK	19.61	91.41
			16QAM	18.42	69.50
		15	QPSK	19.60	91.20
			16QAM	18.21	66.22
		10	QPSK	**20.62**	**115.35**
			16QAM	**19.62**	**91.62**
		5	QPSK	20.15	103.51
			16QAM	19.50	89.13

LTE Band 12

FCC Part 27					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Radiated	
				Avg [dBm]	Avg [mW]
Band 12	699 ~ 716	10	QPSK	18.38	68.87
			16QAM	17.19	52.36
		5	QPSK	18.58	72.11
			16QAM	17.09	51.17
		3	QPSK	18.33	68.08
			16QAM	16.97	49.77
		1.4	QPSK	**18.60**	**72.44**
			16QAM	**17.37**	**54.58**

Note: These data are ERP results.
(The EIRP conversion formula for IC : EIRP result (dBm) = ERP result (dBm) + 2.15 dB)

LTE Band 17

LTE Band 17 (Frequency range: 704-716 MHz) is covered by LTE Band 12 (Frequency range: 699-716 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 30

FCC Part 27					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Radiated	
				Avg [dBm]	Avg [mW]
Band 30	2305~2315	10	QPSK	**19.98**	**99.54**
			16QAM	**18.99**	**79.25**
		5	QPSK	19.78	95.06
			16QAM	18.96	78.70

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LTE Band 66

FCC Part 27					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Radiated	
				Avg [dBm]	Avg [mW]
Band 66	1710 ~ 1780	20	QPSK	25.10	323.59
			16QAM	25.12	325.09
		15	QPSK	26.14	411.15
			16QAM	24.91	309.74
		10	QPSK	26.13	410.20
			16QAM	24.89	308.32
		5	QPSK	25.53	357.27
			16QAM	24.76	299.23
		3	QPSK	**26.73**	**470.98**
			16QAM	25.37	344.35
		1.4	QPSK	26.38	434.51
			16QAM	**25.48**	**353.18**

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a internal antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
WCDMA Band 2 / LTE Band 2 1850 ~ 1910 MHz	2.1
WCDMA Band 4 / LTE Band 4 / LTE Band 66 1710 ~ 1755 MHz	2.0
WCDMA Band 5 / LTE Band 5 824 ~ 849 MHz	-4.3
LTE Band 7 2500 ~ 2570 MHz	0.9
LTE Band 12 / LTE Band 17 699 ~ 716 MHz	-2.7
LTE Band 30 2305~ 2315 MHz	-1.4

5.4. WORST-CASE ORIENTATION

Following modes should be considered as worst-case scenario for all other measurements.

All LTE Bands (Except additional tested band 66), measurements were performed on each bandwidth for QPSK/16QAM modulations.

For LTE 66 Bands, the worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. All testing was performed using QPSK and 16QAM modulations to represent the worst case. However, the out of band emissions and spurious radiation were only performed on bandwidth and RB offset(with RB size 1) with the highest power in QPSK.

For WCDMA Band 5 / WCDMA Band 2 / LTE Band 2 / LTE Band 4 / LTE Band 5 / LTE Band 12 / LTE Band 30 / LTE Band 66, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

For LTE Band 7, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

For WCDMA Band 4, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

Note : All radiated spurious tests were performed connected with earphone and charger for evaluation of worst case mode.(For erp/eirp tests, the EUT didn't connected with earphone and charger)

For check the Part15B receiver mode:

For WCDMA Band 5 / LTE Band 5 / LTE Band 12, the unwanted emissions was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA50JWE	DK5K503VS/A-E	N/A
Data Cable	SAMSUNG	ECB-DU68WE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

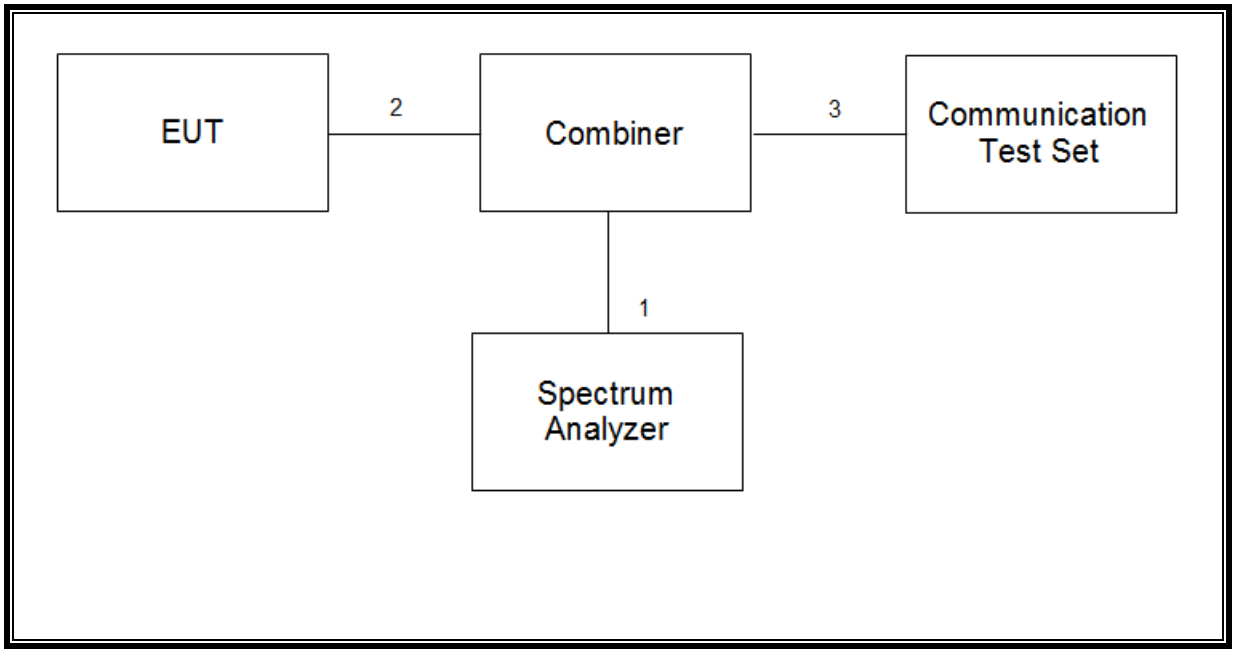
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.1m	N/A
2	Audio	2	Mini-Jack	Unshielded	1.2m	N/A

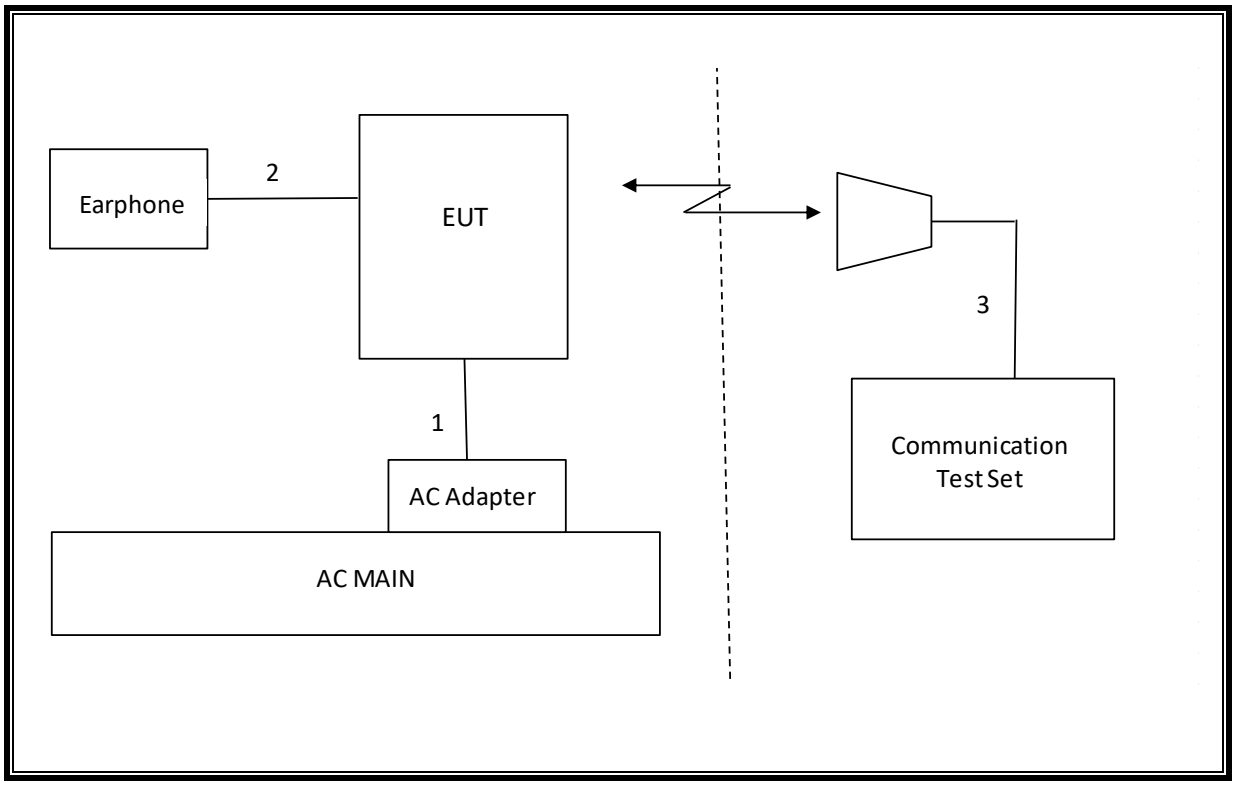
TEST SETUP

The EUT is continuously communicated to the call box during the tests.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. 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**	**S/N**	**Old Cal Due**	**New Cal Due**
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	06-30-19	
Antenna, Horn, 40 GHz	ETS	3116C	00166155	12-04-19	
Preamplifier	ETS	3116C-PA	00168841	11-13-19	08-09-19
Antenna, Horn, 40 GHz	ETS	3116C	00168645	12-04-19	12-04-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-31-19	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-31-19	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	09-14-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	03-10-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	05-31-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	11-29-18	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	05-31-19	08-04-20
Combiner	WEINSCHEL	1575	2152	08-08-18	08-08-19
Communications Test Set	R&S	CMW500	115331	08-07-18	08-07-19
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-07-18	08-06-19
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18	08-07-19
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-10-18	08-06-19
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18	08-07-19
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-08-18	08-07-19
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-11-18	08-07-19
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-08-18	08-07-19
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18	08-06-19
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18	08-06-19
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18	08-06-19
EMI Test Receive, 44 GHz	R&S	ESW40	101590	08-09-18	08-06-19
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-09-18	08-08-19
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	08-08-18	08-08-19
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	08-09-18	08-08-19
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	08-08-18	08-08-19
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	08-09-18	08-08-19
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	08-08-18	08-08-19
Attenuator	PASTERNACK	PE7087-10	A009	08-08-18	08-08-19
Attenuator	PASTERNACK	PE7087-10	A001	08-08-18	08-08-19
Attenuator	PASTERNACK	PE7087-10	A008	08-08-18	08-08-19
Attenuator	PASTERNACK	PE7087-10	2	08-10-18	08-07-19
Attenuator	PASTERNACK	PE7395-10	A011	02-12-19	08-08-19
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-26-19	
Temperature Chamber	ESPEC	SH-642	93001109	08-08-18	08-06-19

UL Software			
Description	**Manufacturer**	**Model**	**Version**
Antenna port test software	UL	CLT	Ver 2.4

7. Summary Table

FCC Part Section	IC Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass
22.917(a) 24.238(a) 27.53(g),(h)	RSS-130 (4.6) RSS-132 (5.5) RSS-133 (6.5) RSS-130 (4.6) RSS-139 (6.6)	Band Edge / Conducted Spurious Emission	-13dBm		Pass
27.53(a)	RSS-195 (5.6)	Conducted Spurious Emission	-40 dBm		Pass
27.53(m)	RSS-199 (4.5)		-25 dBm		Pass
27.53(a) 27.53(m)	RSS-195 (5.6) RSS-199 (4.5)	Emission mask	Section 9.2.2		Pass
2.1046	N/A	Conducted output power	N/A		See the RF exposure test report. (4788534503-S1 & 4788534512-S1 FCC Report SAR)
22.355 24.235 27.54	RSS-130 (4.3) RSS-132 (5.5) RSS-133 (6.3) RSS-139 (6.4) RSS-195 (5.4)	Frequency Stability	2.5PPM		Pass
22.913(a)(5)	RSS-132 (5.4)	Effective Radiated Power	38.5 dBm	Radiated	Pass
27.50(c)(10)	RSS-130 (4.4)		34.77 dBm		Pass
24.232(c) 27.50(h)(2)	RSS-133 (6.4) RSS-199 (4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass
27.50(a)	RSS-195 (5.5)		24dBm		Pass
27.50(d)(4)	RSS-139 (6.5)		30dBm		Pass
22.917(a) 24.238(a) 27.53(g),(h)	RSS-130 (4.6) RSS-132 (5.5) RSS-133 (6.5) RSS-130 (4.6) RSS-139 (6.6)	Radiated Spurious Emission	-13dBm		Pass
27.53(a)	RSS-195 (5.4)		-40dBm		Pass
27.53 (m)	RSS-199 (4.5)		-25dBm		Pass

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

8. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

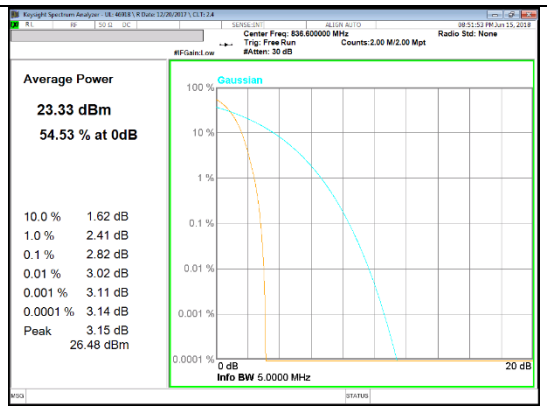
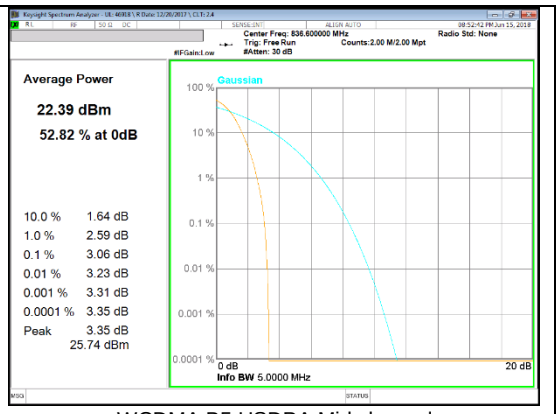
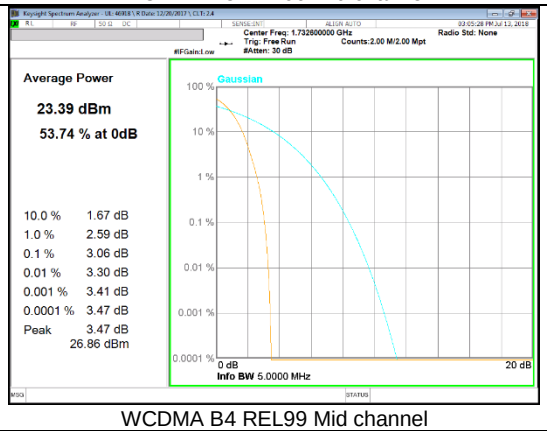
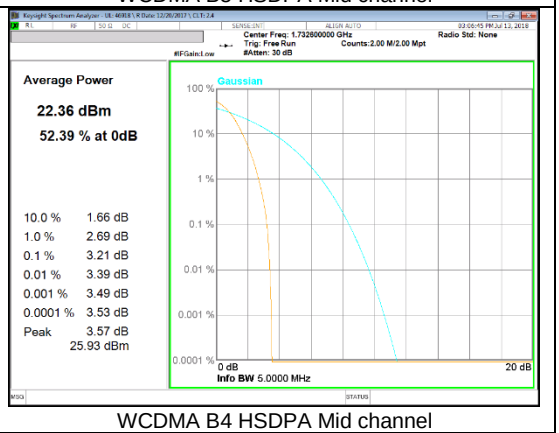
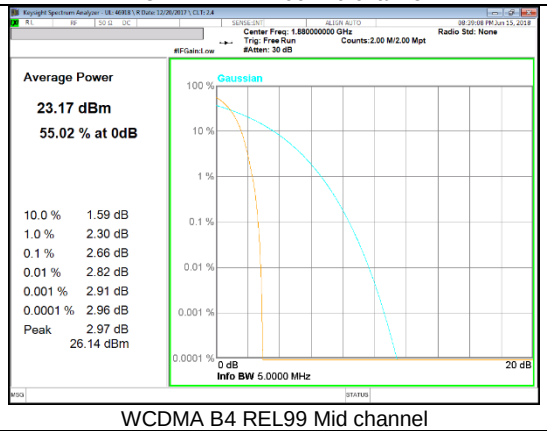
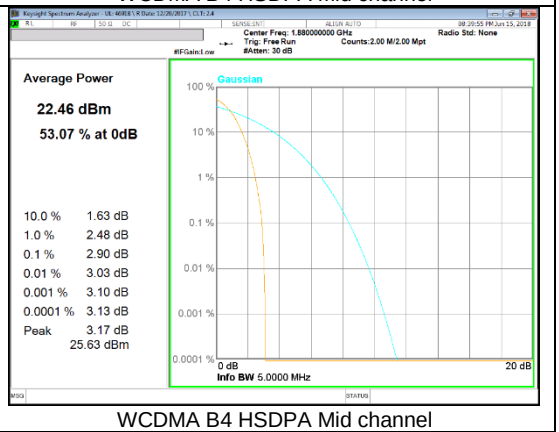
Test Spec

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

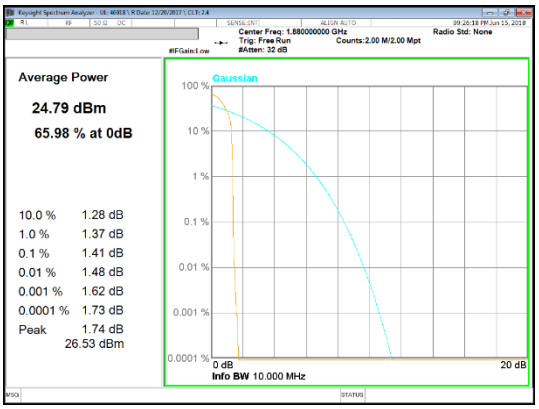
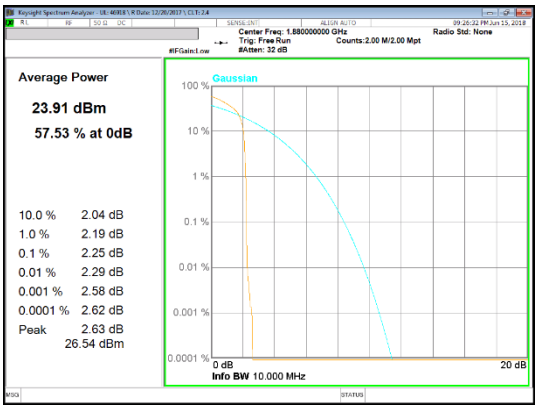
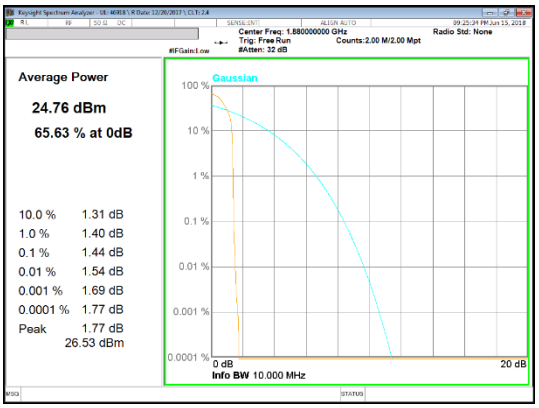
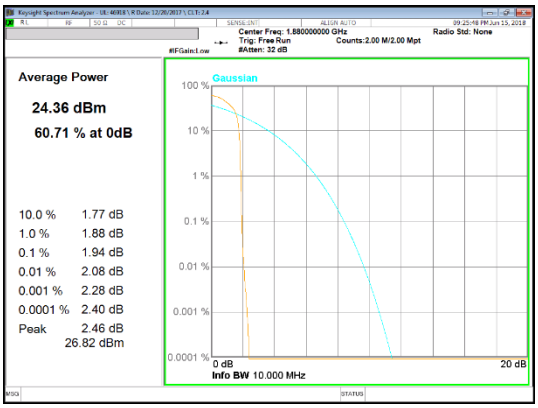
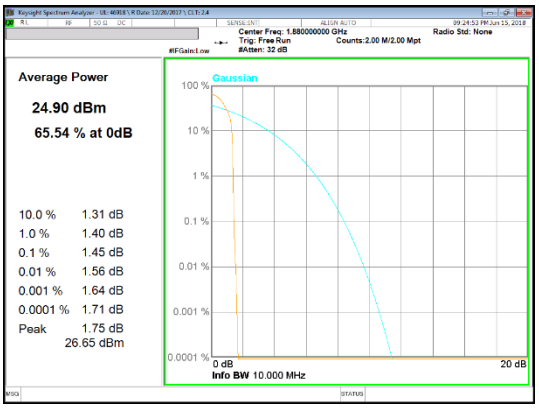
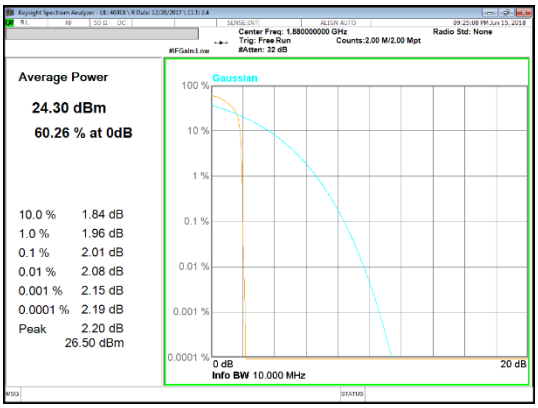
RESULTS

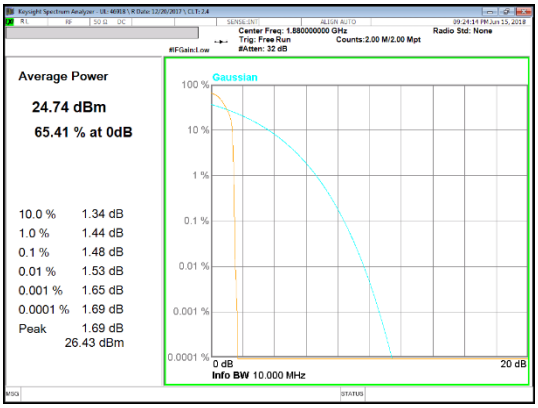
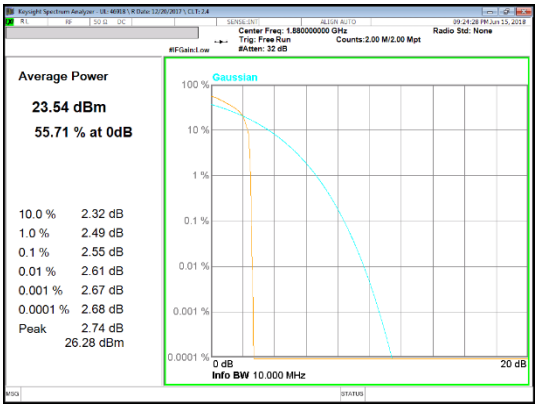
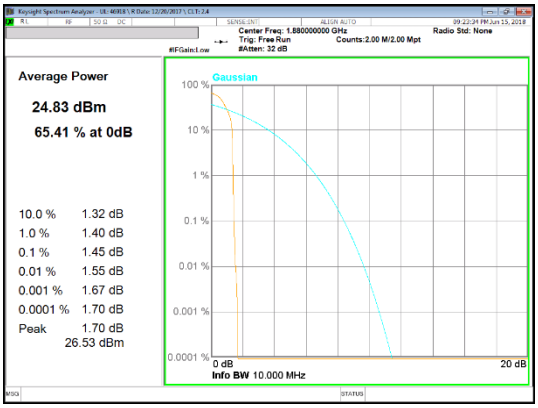
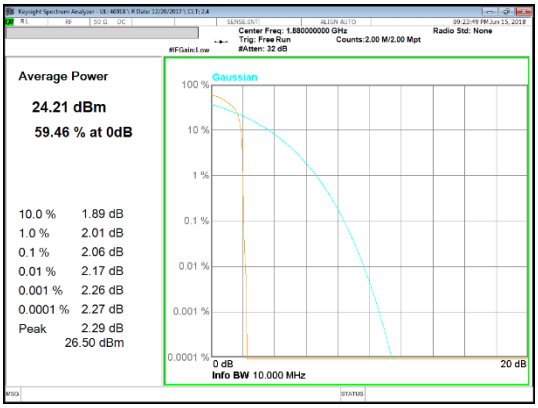
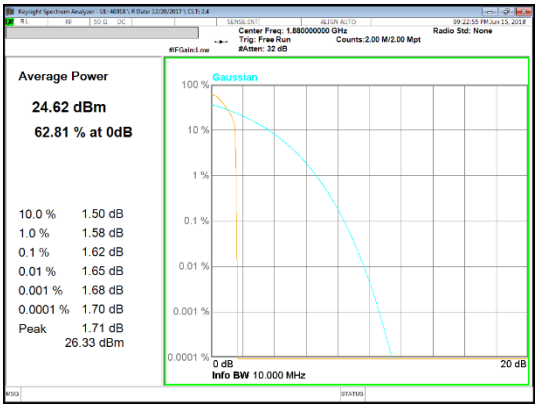
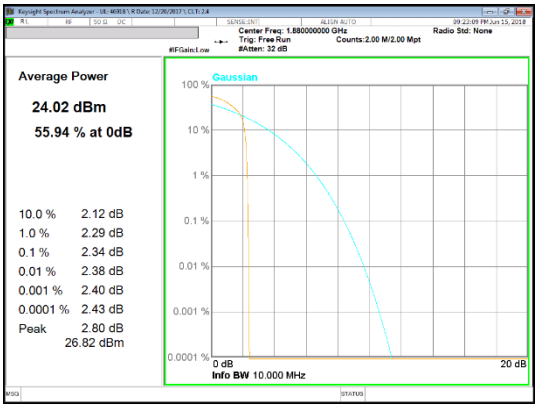
8.1. CONDUCTED PEAK TO AVERAGE RESULT

WCDMA

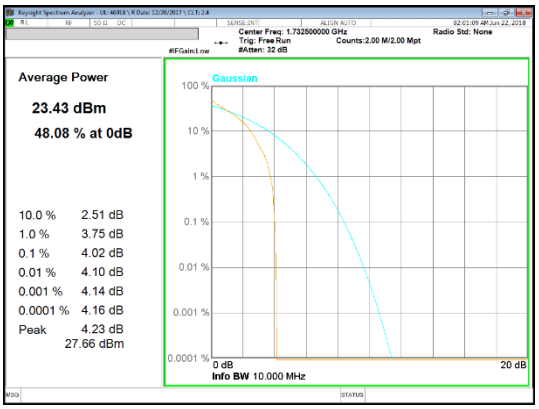
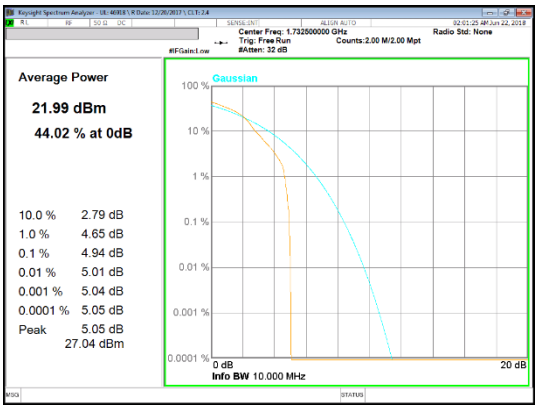
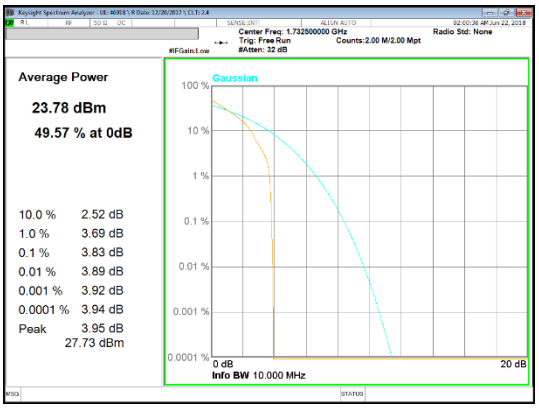
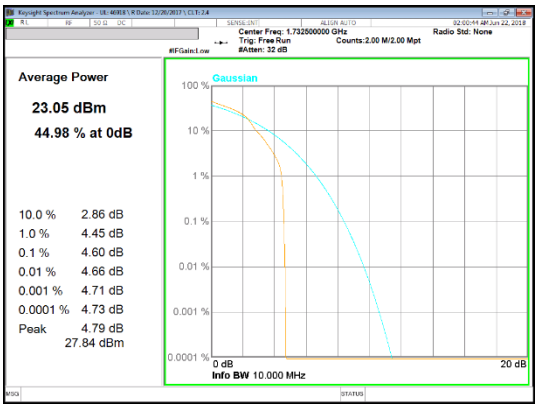
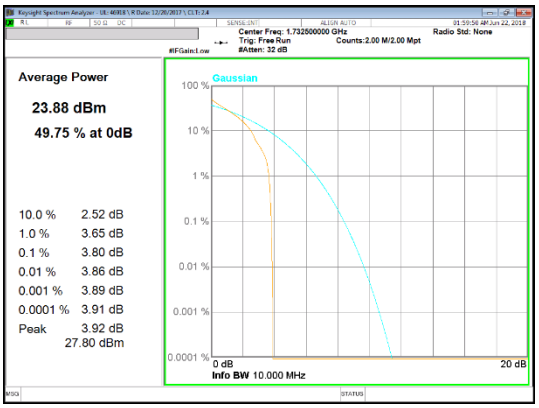
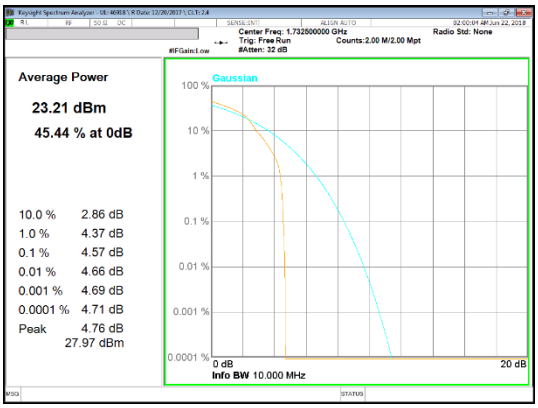
WCDMA Band 5	 WCDMA B5 REL99 Mid channel	 WCDMA B5 HSDPA Mid channel
WCDMA Band 4	 WCDMA B4 REL99 Mid channel	 WCDMA B4 HSDPA Mid channel
WCDMA Band 2	 WCDMA B4 REL99 Mid channel	 WCDMA B4 HSDPA Mid channel

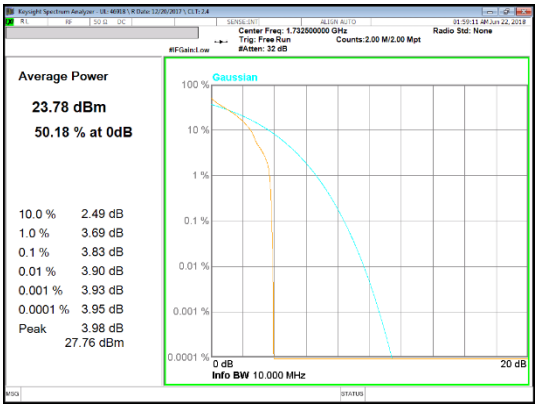
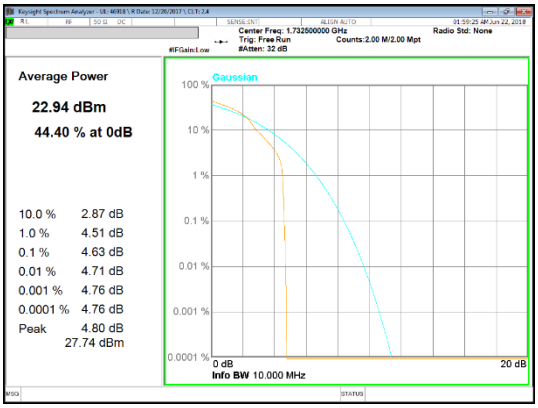
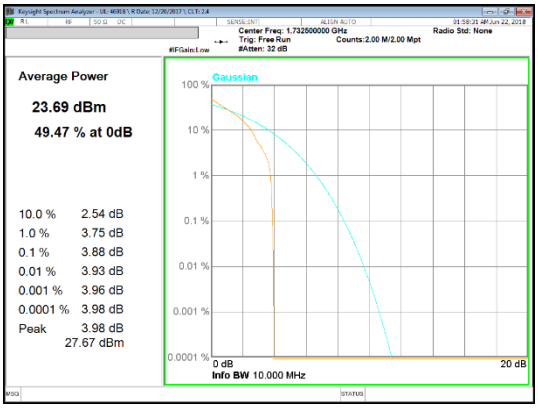
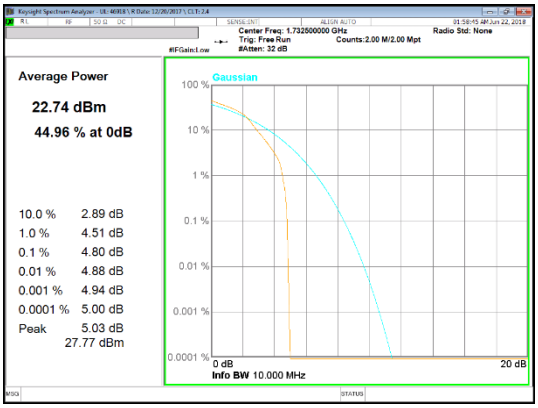
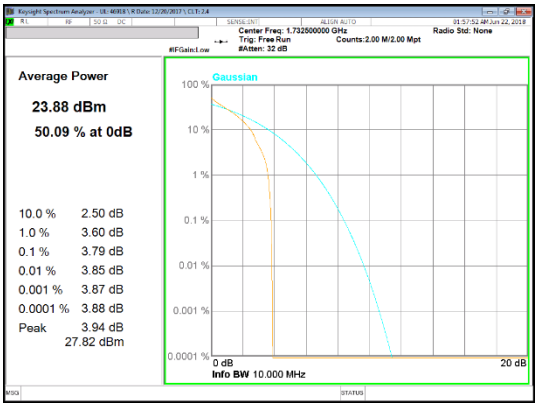
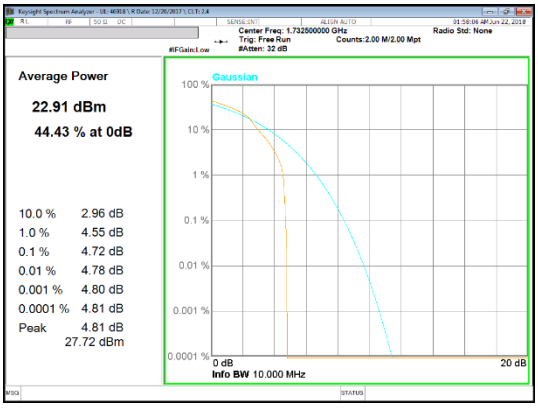
LTE Band 2

LTE Band 2 20 MHz	 LTE B2 20MHz QPSK Mid channel	 LTE B2 20MHz 16QAM Mid channel
LTE Band 2 15 MHz	 LTE B2 15MHz QPSK Mid channel	 LTE B2 15MHz 16QAM Mid channel
LTE Band 2 10 MHz	 LTE B2 10MHz QPSK Mid channel	 LTE B2 10MHz 16QAM Mid channel

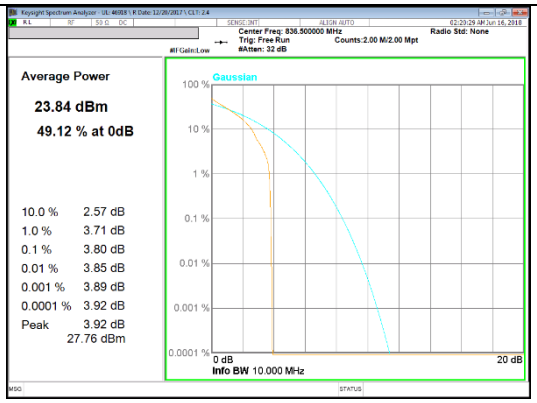
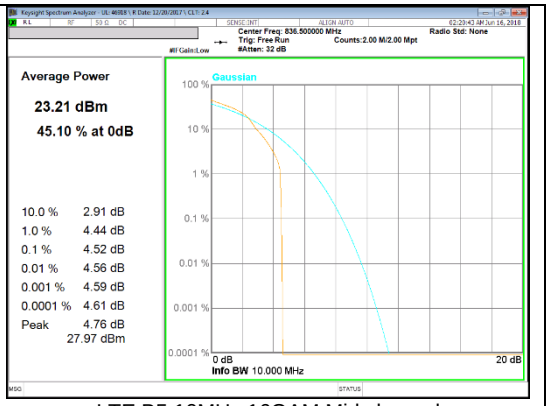
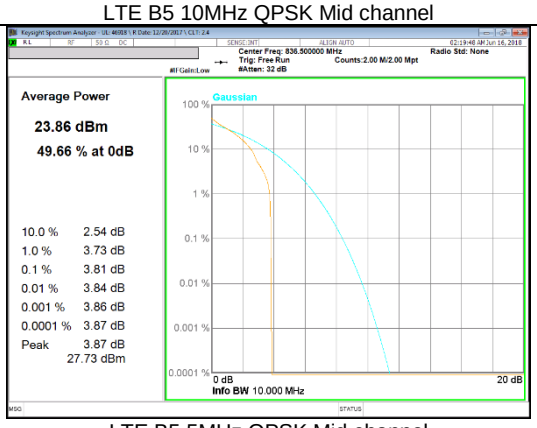
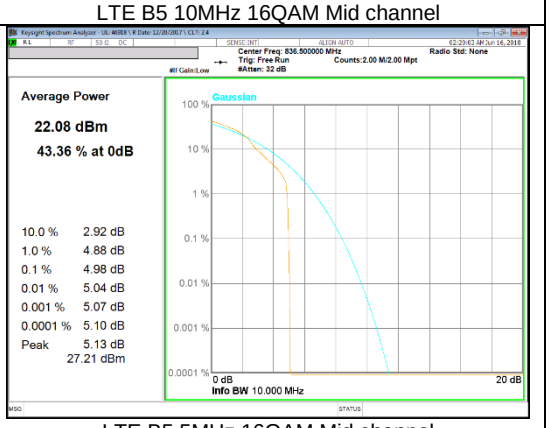
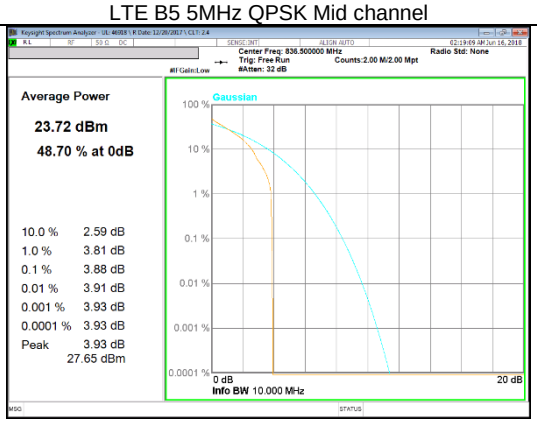
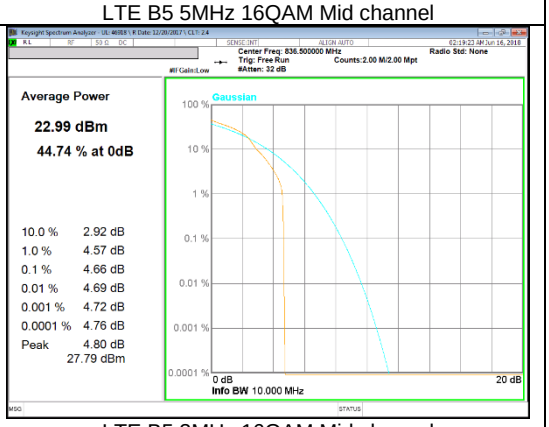
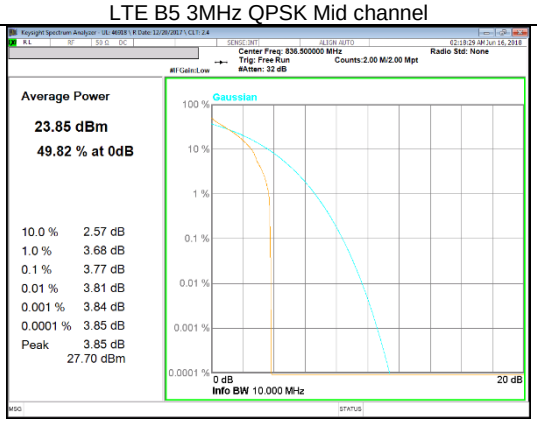
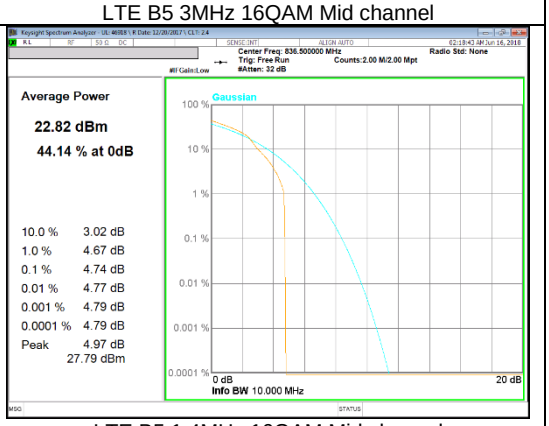
LTE Band 2 5 MHz	 LTE B2 5MHz QPSK Mid channel	 LTE B2 5MHz 16QAM Mid channel
LTE Band 2 3 MHz	 LTE B2 3MHz QPSK Mid channel	 LTE B2 3MHz 16QAM Mid channel
LTE Band 2 1.4 MHz	 LTE B2 1.4MHz QPSK Mid channel	 LTE B2 1.4MHz 16QAM Mid channel

LTE Band 4

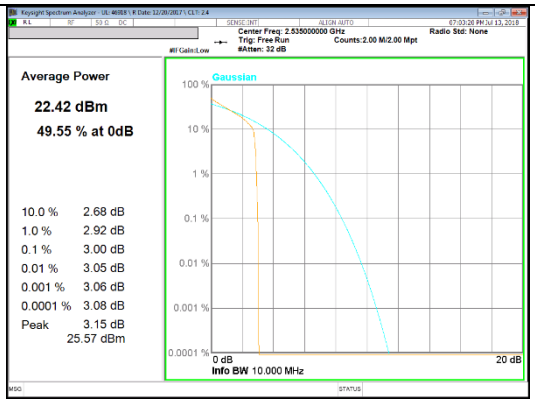
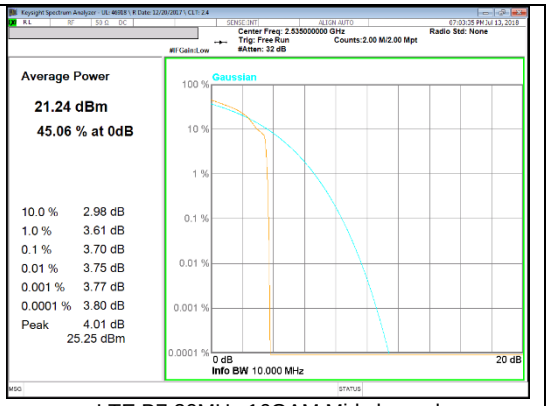
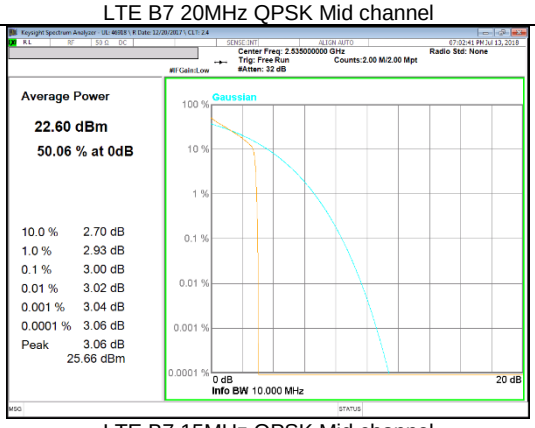
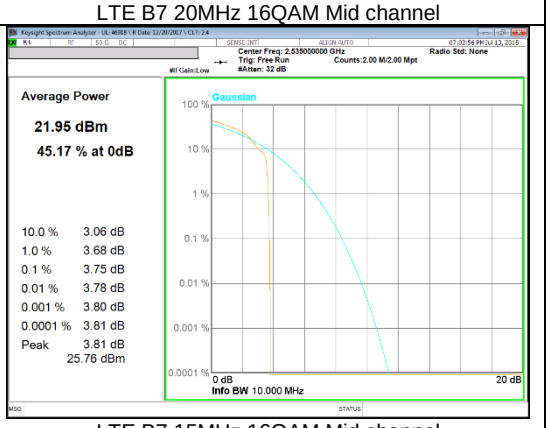
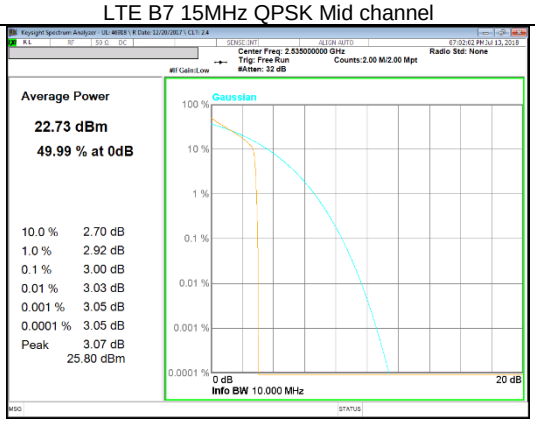
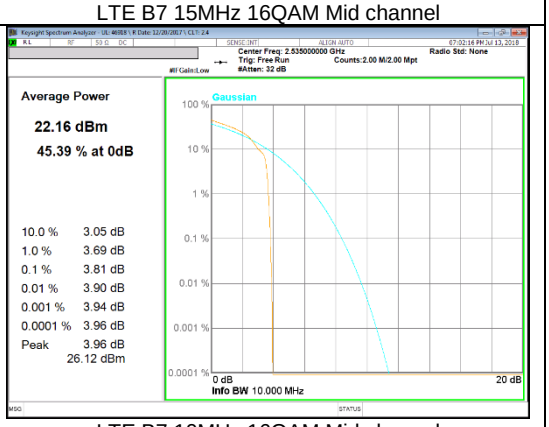
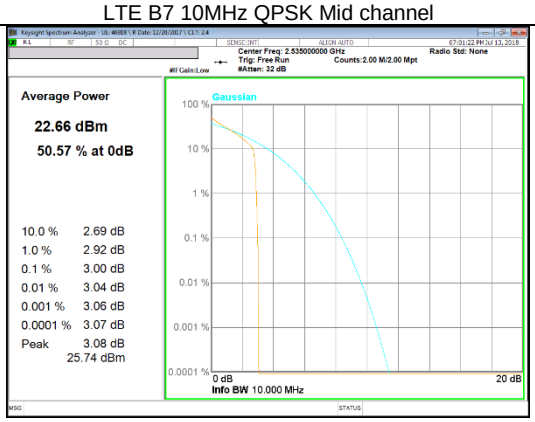
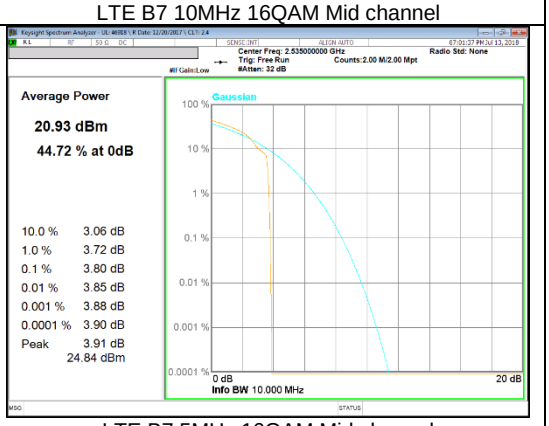
LTE Band 4 20 MHz	 LTE B4 20MHz QPSK Mid channel	 LTE B4 20MHz 16QAM Mid channel
LTE Band 4 15 MHz	 LTE B4 15MHz QPSK Mid channel	 LTE B4 15MHz 16QAM Mid channel
LTE Band 4 10 MHz	 LTE B4 10MHz QPSK Mid channel	 LTE B4 10MHz 16QAM Mid channel

LTE Band 4 5 MHz	 LTE B4 5MHz QPSK Mid channel	 LTE B4 5MHz 16QAM Mid channel
LTE Band 4 3 MHz	 LTE B4 3MHz QPSK Mid channel	 LTE B4 3MHz 16QAM Mid channel
LTE Band 4 1.4 MHz	 LTE B4 1.4MHz QPSK Mid channel	 LTE B4 1.4MHz 16QAM Mid channel

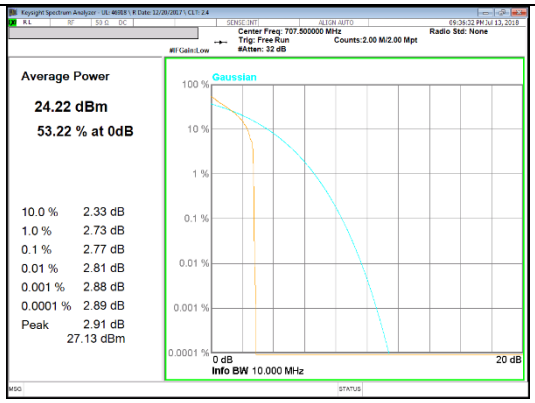
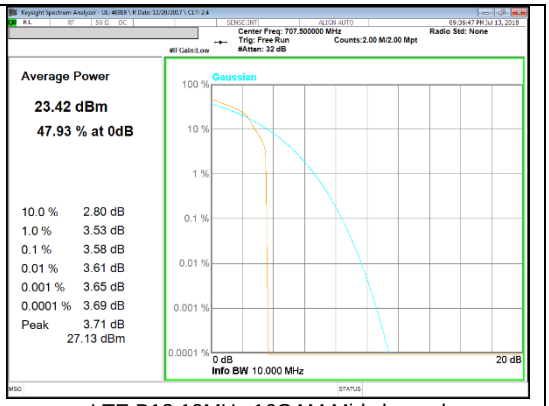
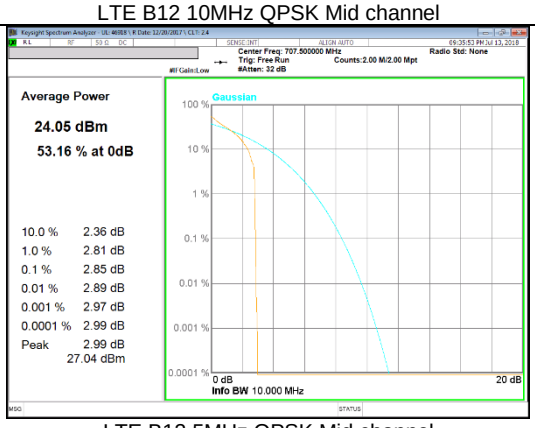
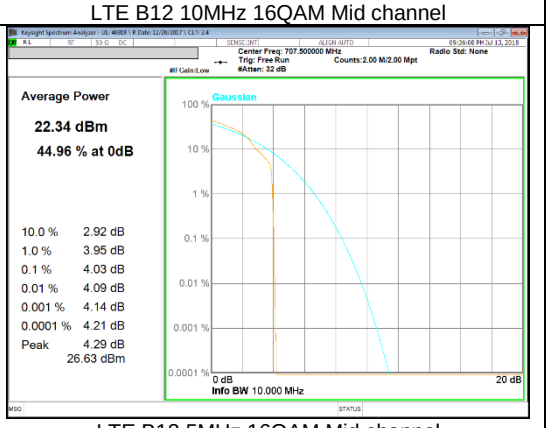
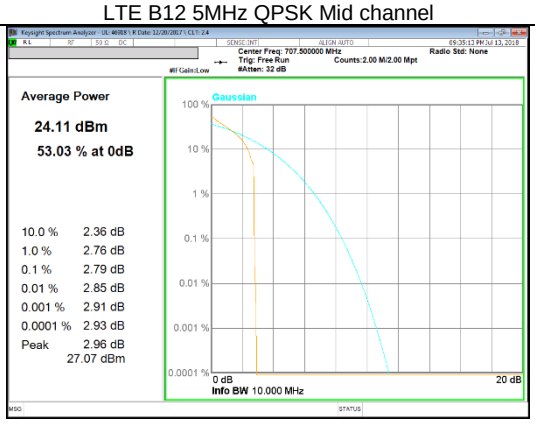
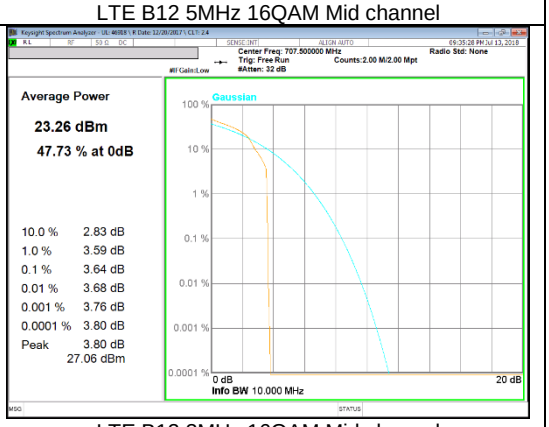
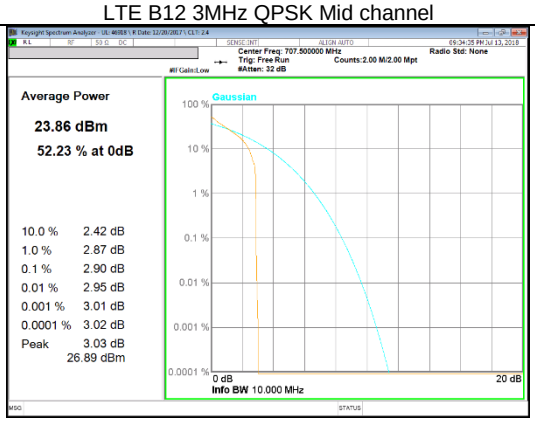
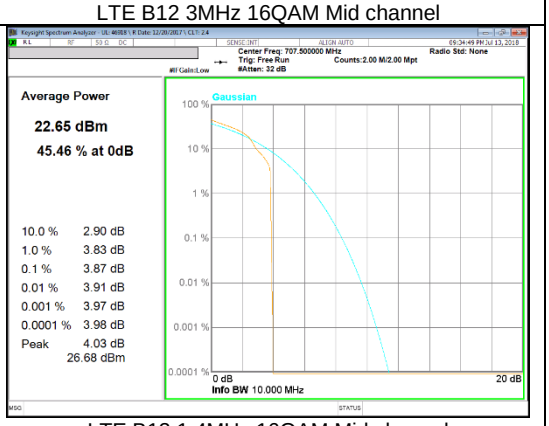
LTE Band 5

LTE Band 5 10 MHz		
	LTE B5 10MHz QPSK Mid channel	LTE B5 10MHz 16QAM Mid channel
LTE Band 5 5 MHz		
	LTE B5 5MHz QPSK Mid channel	LTE B5 5MHz 16QAM Mid channel
LTE Band 5 3 MHz		
	LTE B5 3MHz QPSK Mid channel	LTE B5 3MHz 16QAM Mid channel
LTE Band 5 1.4 MHz		
	LTE B5 1.4MHz QPSK Mid channel	LTE B5 1.4MHz 16QAM Mid channel

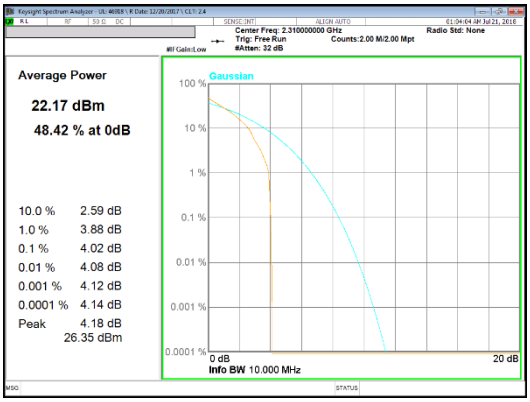
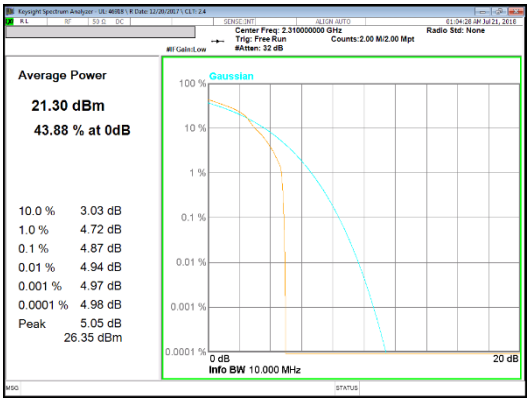
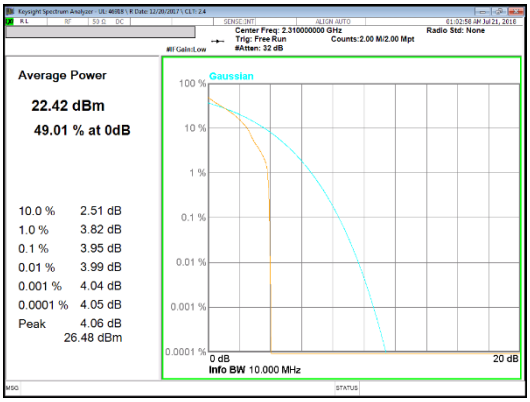
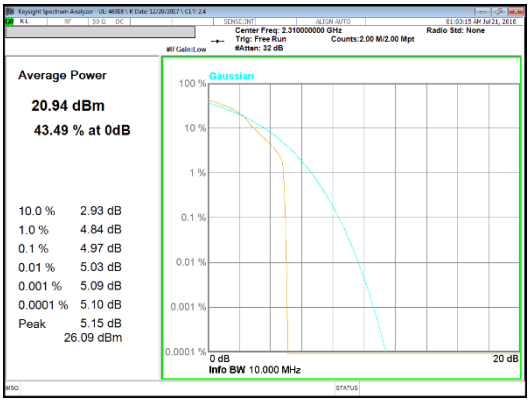
LTE Band 7

LTE Band 7 20 MHz	 LTE B7 20MHz QPSK Mid channel	 LTE B7 20MHz 16QAM Mid channel
LTE Band 7 15 MHz	 LTE B7 15MHz QPSK Mid channel	 LTE B7 15MHz 16QAM Mid channel
LTE Band 7 10 MHz	 LTE B7 10MHz QPSK Mid channel	 LTE B7 10MHz 16QAM Mid channel
LTE Band 7 5 MHz	 LTE B7 5MHz QPSK Mid channel	 LTE B7 5MHz 16QAM Mid channel

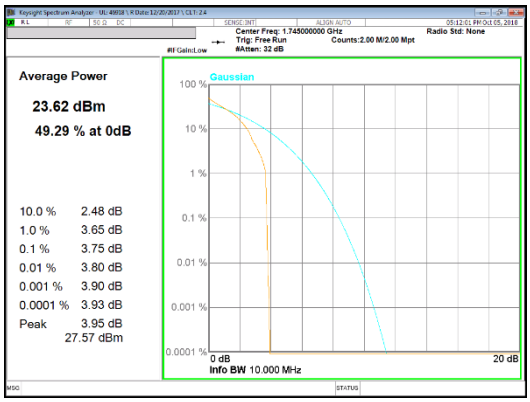
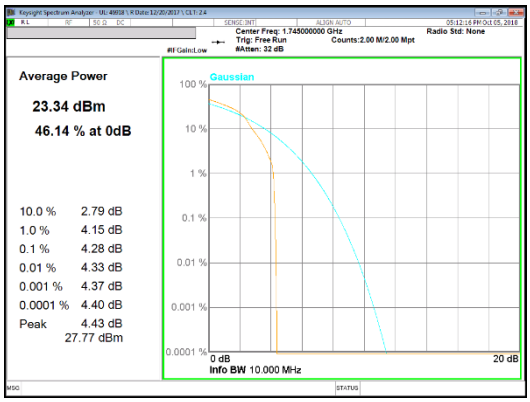
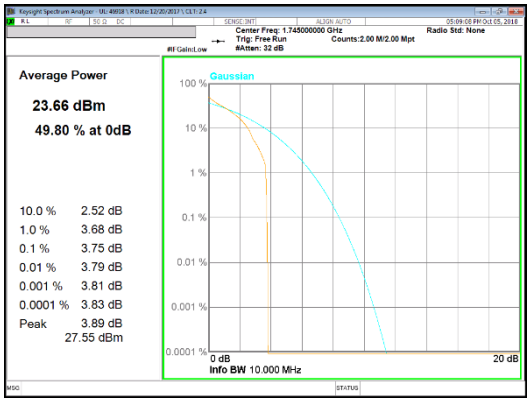
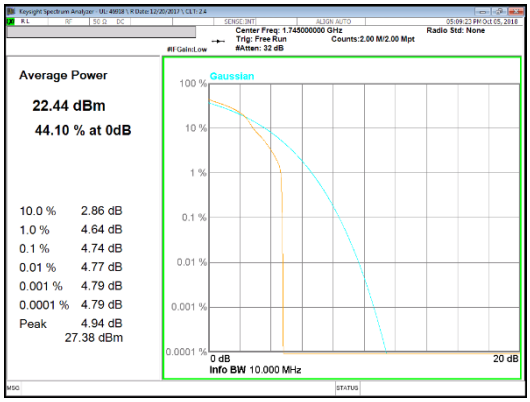
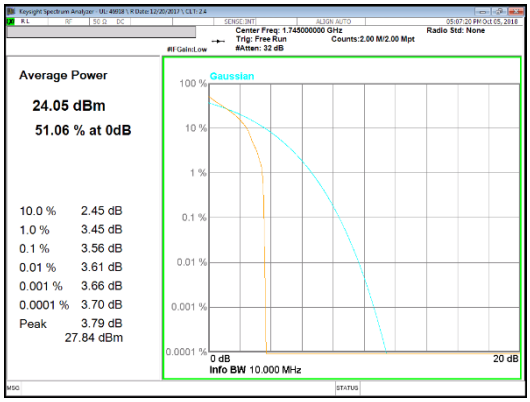
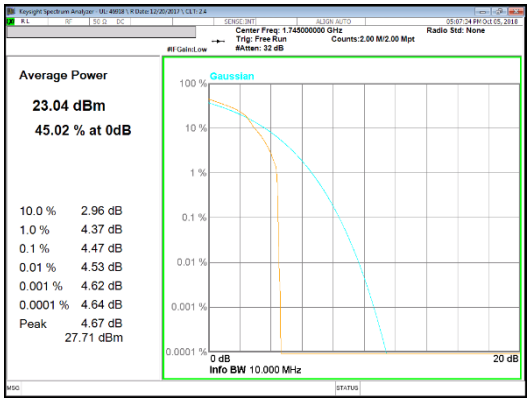
LTE Band 12

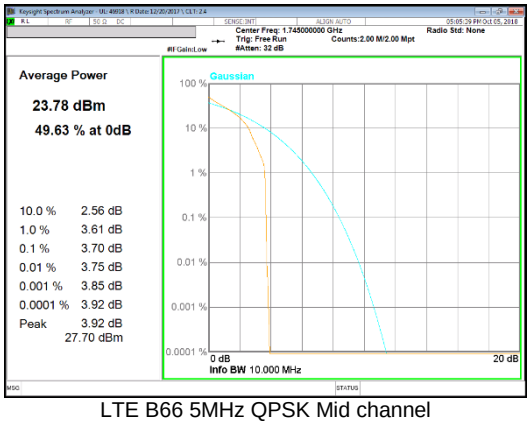
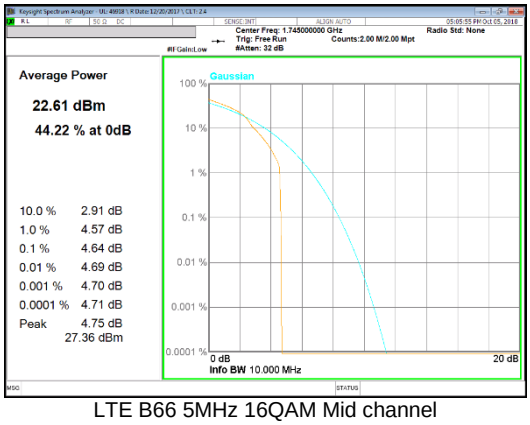
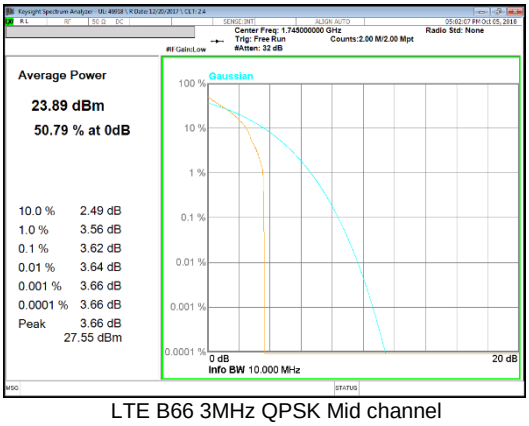
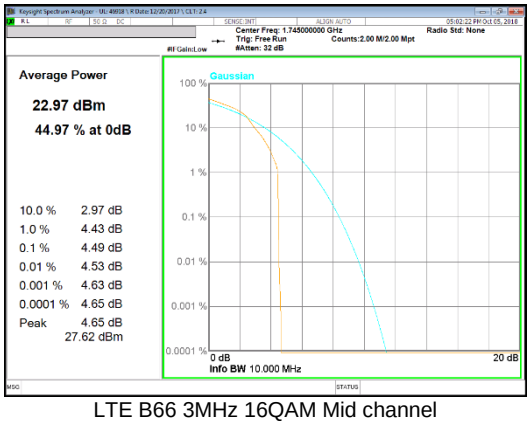
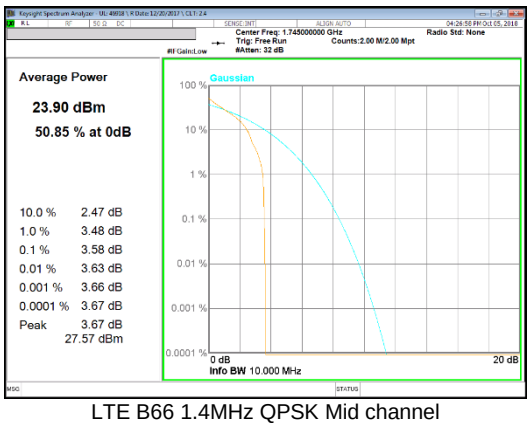
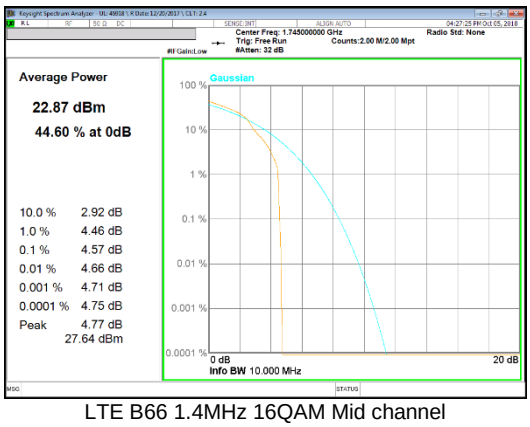
LTE Band 12 10 MHz	 LTE B12 10MHz QPSK Mid channel	 LTE B12 10MHz 16QAM Mid channel
LTE Band 12 5 MHz	 LTE B12 5MHz QPSK Mid channel	 LTE B12 5MHz 16QAM Mid channel
LTE Band 12 3 MHz	 LTE B12 3MHz QPSK Mid channel	 LTE B12 3MHz 16QAM Mid channel
LTE Band 12 1.4 MHz	 LTE B12 1.4MHz QPSK Mid channel	 LTE B12 1.4MHz 16QAM Mid channel

LTE Band 30

LTE Band 30 10 MHz	 LTE B30 10MHz QPSK Mid channel	 LTE B30 10MHz 16QAM Mid channel
LTE Band 30 5 MHz	 LTE B30 5MHz QPSK Mid channel	 LTE B30 5MHz 16QAM Mid channel

LTE Band 66

LTE Band 66 20 MHz	 LTE B66 20MHz QPSK Mid channel	 LTE B66 20MHz 16QAM Mid channel
LTE Band 66 15 MHz	 LTE B66 15MHz QPSK Mid channel	 LTE B66 15MHz 16QAM Mid channel
LTE Band 66 10 MHz	 LTE B66 10MHz QPSK Mid channel	 LTE B66 10MHz 16QAM Mid channel

LTE Band 66 5 MHz	 LTE B66 5MHz QPSK Mid channel	 LTE B66 5MHz 16QAM Mid channel
LTE Band 66 3 MHz	 LTE B66 3MHz QPSK Mid channel	 LTE B66 3MHz 16QAM Mid channel
LTE Band 66 1.4 MHz	 LTE B66 1.4MHz QPSK Mid channel	 LTE B66 1.4MHz 16QAM Mid channel

9. LIMITS AND CONDUCTED RESULTS

9.1. 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 low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

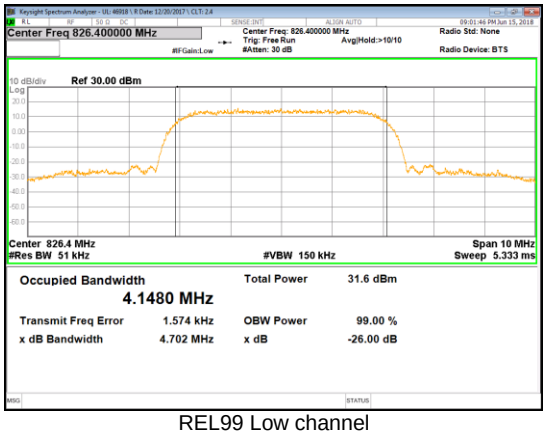
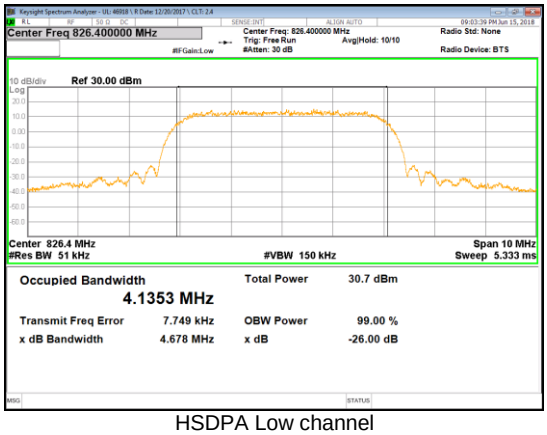
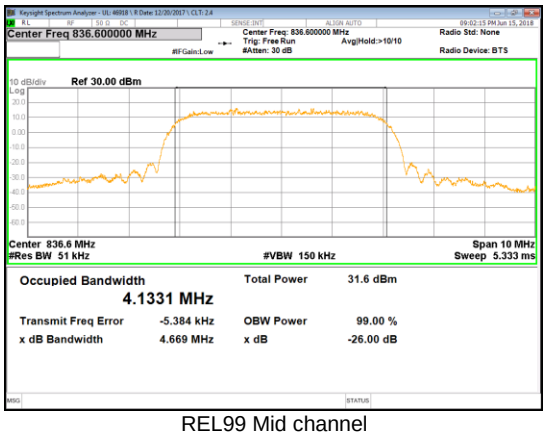
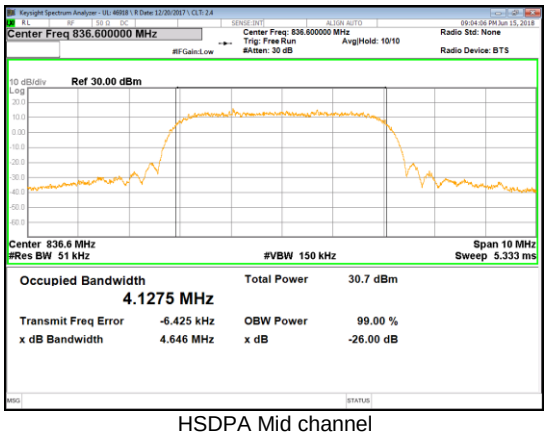
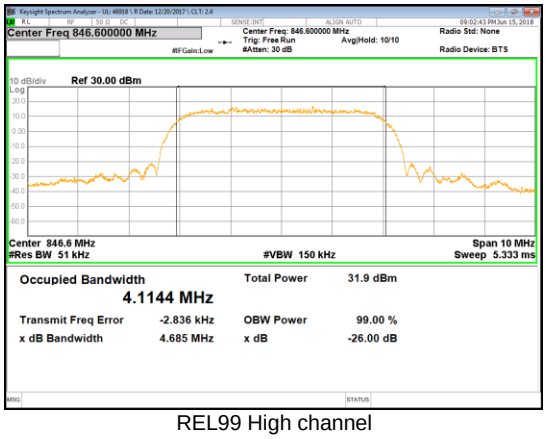
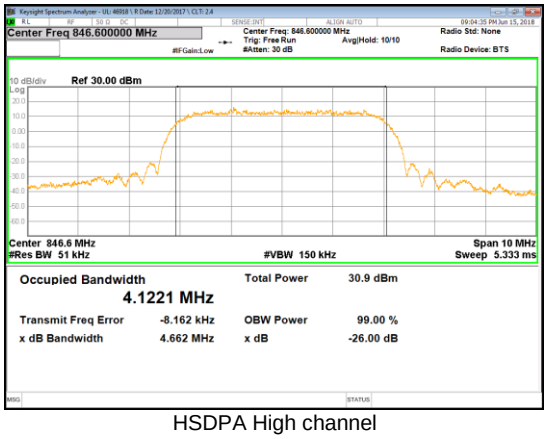
RESULTS

See the following pages.

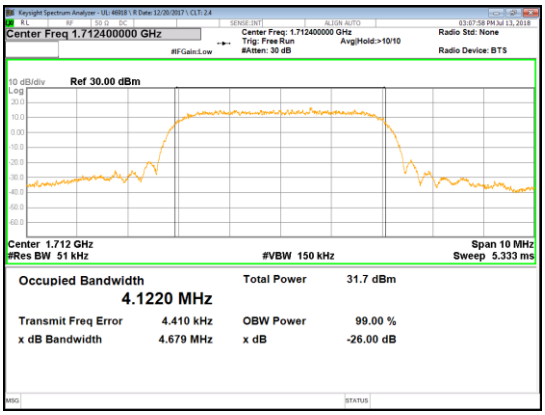
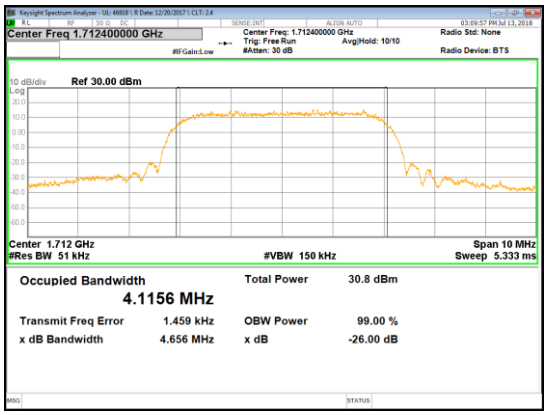
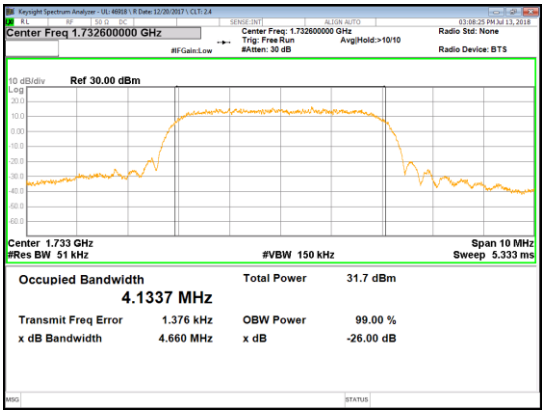
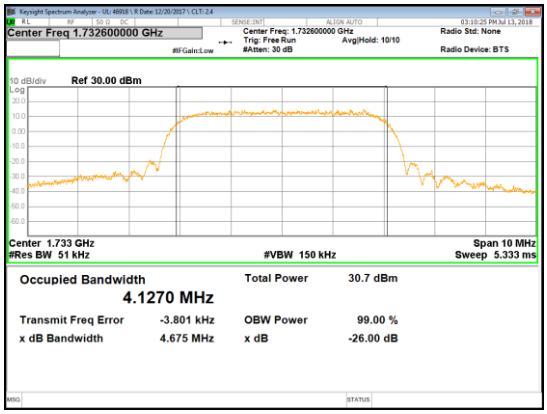
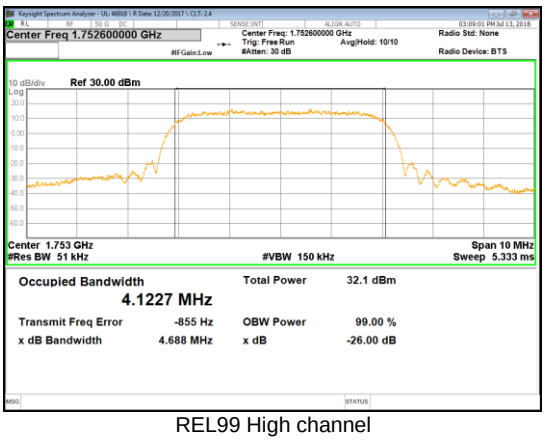
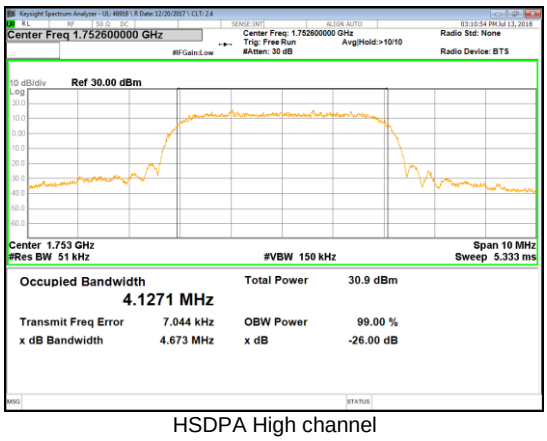
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

9.1.1. OCCUPIED BANDWIDTH RESULTS

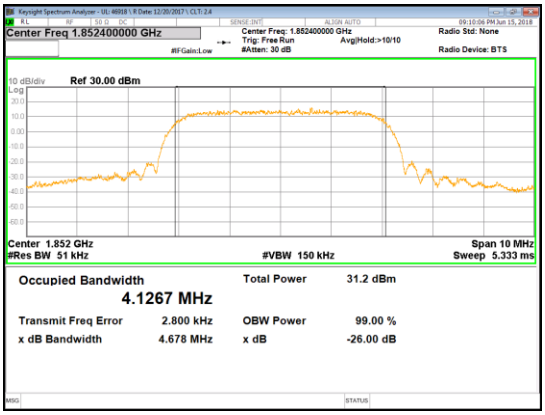
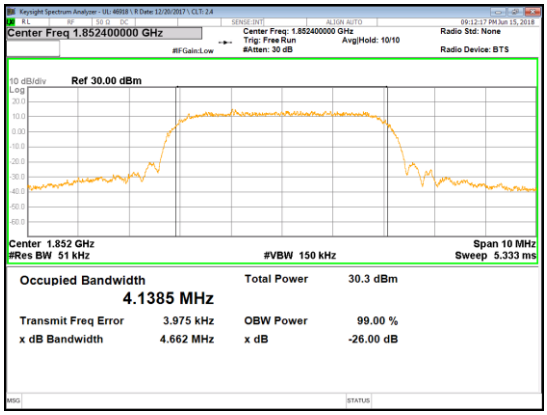
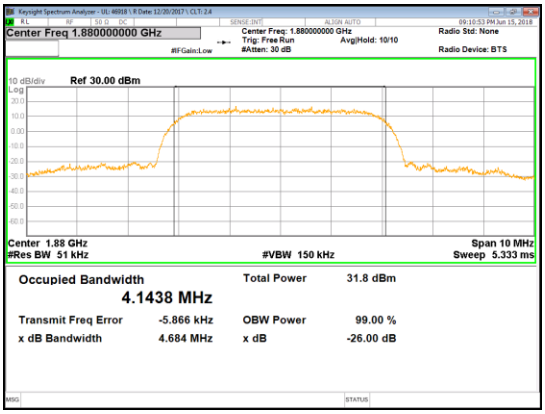
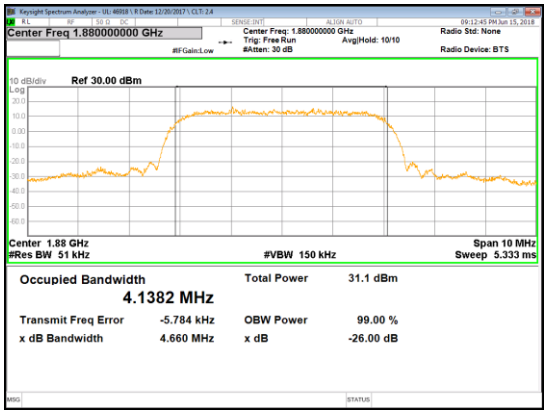
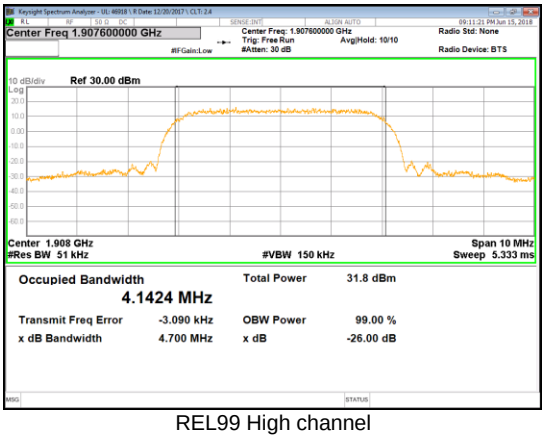
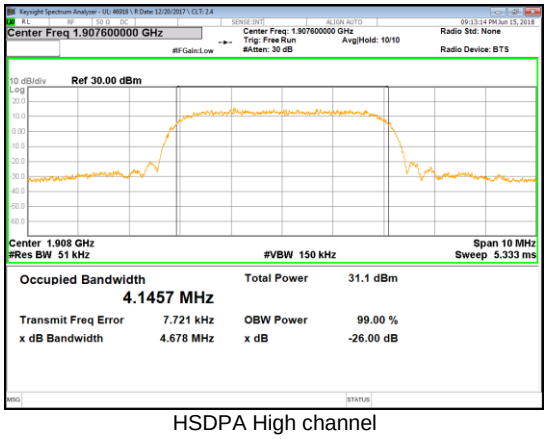
WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

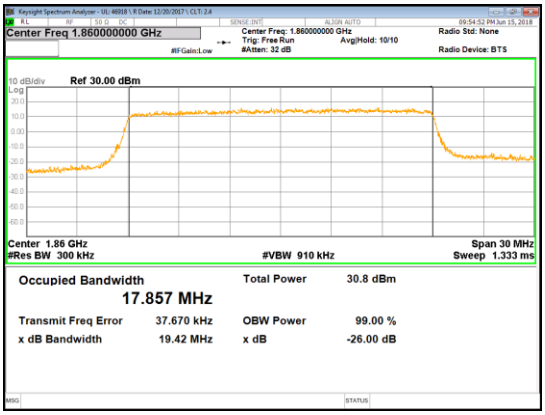
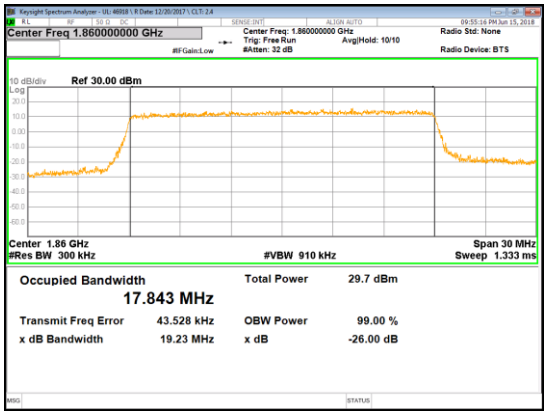
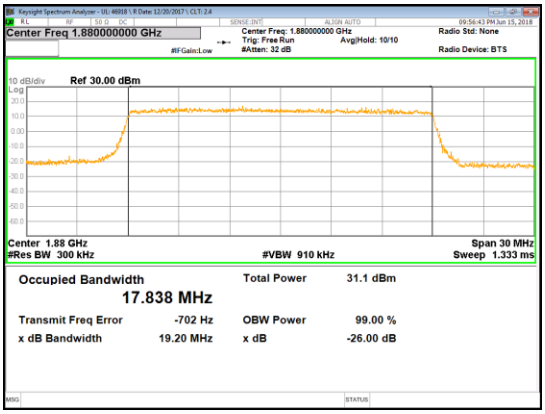
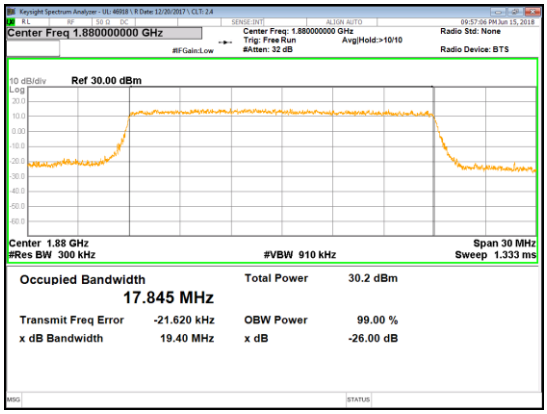
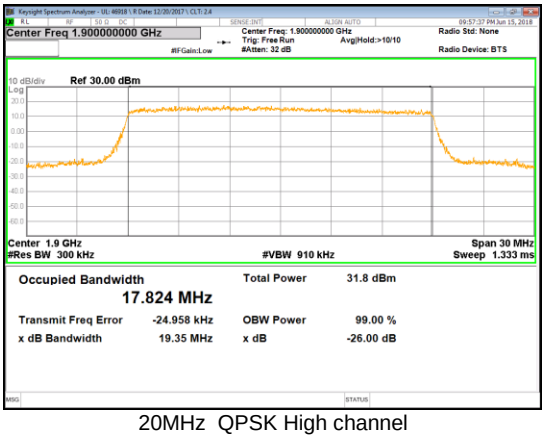
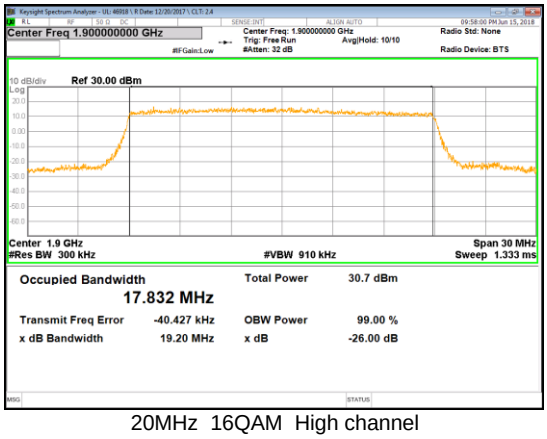
WCDMA Band 4

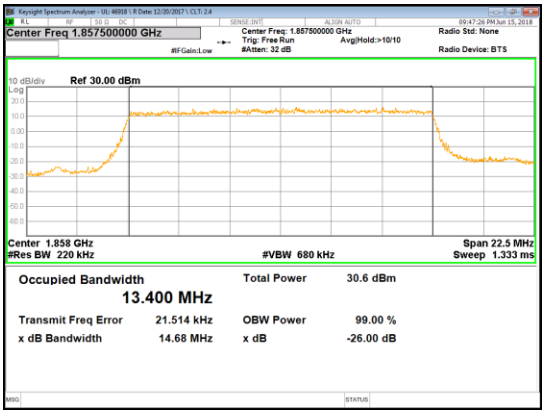
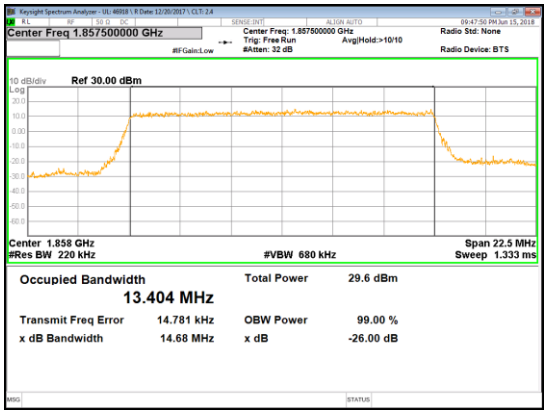
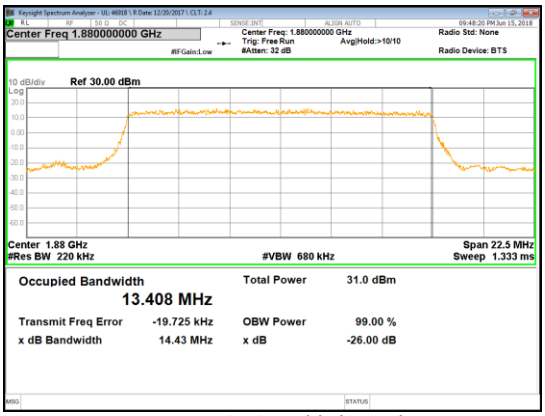
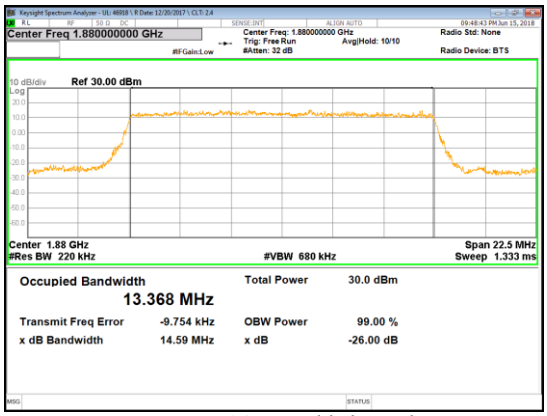
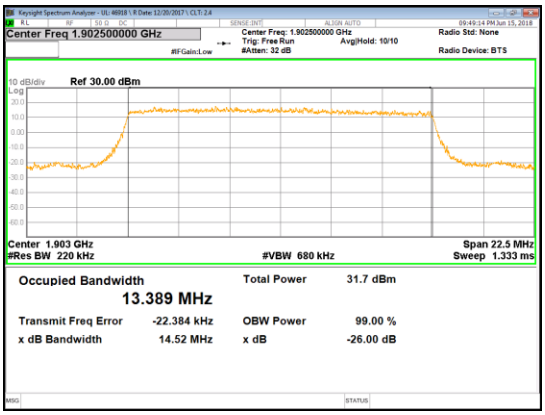
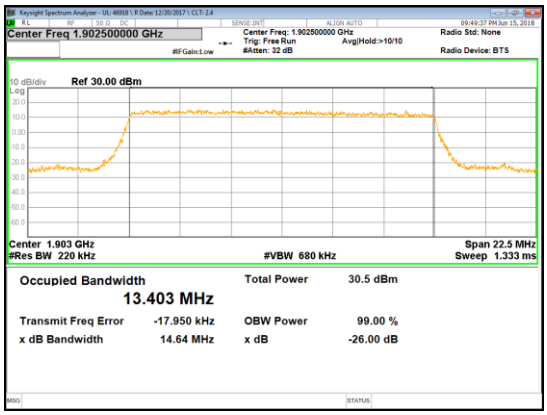
Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

LTE Band 2

Band 2 20MHz	 20MHz QPSK Low channel	 20MHz 16QAM Low channel
	 20MHz QPSK Mid channel	 20MHz 16QAM Mid channel
	 20MHz QPSK High channel	 20MHz 16QAM High channel

Band 2 15MHz	 15MHz QPSK Low channel	 15MHz 16QAM Low channel
	 15MHz QPSK Mid channel	 15MHz 16QAM Mid channel
	 15MHz QPSK High channel	 15MHz 16QAM High channel