


	    <p style="font-size: small;">MS ISO/IEC 17025 TESTING SAMM NO. 0825</p>
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CERTIFICATE 2518.08

MOTOROLA PENANG ADV. COMM. LABORATORY
 Motorola Solutions Malaysia Sdn Bhd,
 Plot 2A, Medan Bayan Lepas,
 Mukim 12 S.W.D, 11900 Bayan Lepas,
 Penang, Malaysia.

FCC / ISED TEST REPORT
Report Revision : Rev.B

<p>Date/s Tested : 31-March-2022 - 25-June-2022</p> <p>Manufacturer/Location : Motorola Solutions Malaysia Sdn Bhd</p> <p>Manufacturer Address : Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia</p> <p>Requestor : SIEW KHENG TAN</p> <p>Product Type : Hand-held</p> <p>Product Version (PMN) : MSLB-MKZ920</p> <p>Model Number (HVIN) : AAH90UCU9RH1AN</p> <p>Frequency Band : Refer to section 1.4</p> <p>Applicant Name : Motorola Solutions Inc</p> <p>Applicant Address : 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322.</p> <p>FCC Registrations : 461337</p> <p>ISED Registrations : MY0001</p> <p>Firmware Version (FVIN) : D02.22.01.0103 (BP), D00.01.86 (AP)</p> <p>The equipment was tested accordance to the requirement listed below:</p> <p>(LTE Band 17) FCC 47 CFR Part 2 / 27 ISED RSS GEN / 130</p>	
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PASS

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Prepared By: <hr style="width: 200px; margin-left: 0;"/> <p>Lim Khay Kwang Technician</p>	Approve Signatory: <hr style="width: 200px; margin-left: 0;"/> <p>Ho Sze Khian Technical Manager</p>
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REVISION HISTORY

Revision History	Description	Date	Originator
Rev A.	Initial Report	29-June-2022	Lim Khay Kwang
Rev B.	Update Frequency Stability Spec Limit	27-July-2022	Lim Khay Kwang

1.0. Summary of Test Results

FCC Clause	ISED Clause	Test Item	Results	Remarks	Serial Number Tested
2.1046	RSS-Gen 6.12 RSS-130 4.1	Conducted RF Output Power	Pass	Meet the requirement of limit	734TYF0012
-	RSS 130 4.4	Peak-to-Average Power Ratio	Pass	Meet the requirement of limit	734TYF0012
2.1046	RSS-Gen 6.7	Occupied Bandwidth (26dBc, 99%)	Pass	Meet the requirement of limit	734TYF0012
2.1055 27.54	RSS-130 4.3	Frequency Stability	Pass	Meet the requirement of limit	734TYF0012
2.1051 27.53(g)	RSS-Gen 6.13 RSS-130 4.6	Band Edge Conducted Spurious Emission	Pass	Meet the requirement of limit	734TYF0012
2.1051 27.53(g)	RSS-Gen 6.13 RSS-130 4.6	Conducted Spurious Emissions	Pass	Meet the requirement of limit	734TYF0012
2.1053 27.53 (g)	RSS-130 4.6	Radiated Spurious Emission	Pass	Meet the requirement of limit	734TYF0069
2.1049 27.50(c)(9)(10)	RSS-130 4.4	Effective Radiated Power (ERP)	Pass	Meet the requirement of limit	734TYF0012

1.1. Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) (±dB)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01
	200MHz ~ 1000MHz	5.01
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01
	18GHz ~ 25GHz	5.01

1.2. Equipment List

Description	Model	Serial Number	Calibration Date	Calibration Due Date
Broadband ATE 1 (RF Conducted Tests); Test Software Version: CMWRun v1.8.9				
Signal Analyzer	FSV40	101431	02-Dec-21	02-Dec-23
Chamber	SH-641	92003150	17-Sep-21	17-Sep-22
Wideband Radio Communication Tester	CMW500	154550	07-Mar-21	07-Mar-23
Power Supply	6652A	MY40001437	26-Aug-21	26-Aug-22
Radiated Spurious Emission (EMC Chamber 1); Test Software Version: EMC_FCC_RE_v1.6.2				
Drg Horn Freq.	SAS-571	720	06-Apr-21	06-Apr-23
Drg Horn Freq.	SAS-571	719	13-Sep-21	13-Sep-22
Power Supply	N7977A	MY54420118	17-Aug-21	17-Aug-22
Signal Generator	SMB 100A	182511	4-Jun-21	4-Jun-24
Emi Test Receiver	ESW44	101731	5-Nov-21	5-Nov-22
5m Semi-Anechoic Chamber	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
Bilog Antenna	CBL6112D	2950	30-Jul-21	30-Jul-22
Bilog Antenna	CBL6112D	30991	05-Oct-21	05-Oct-22
Data Logger Thermohyrometer	SDL500	A.016800	13-Jun-21	13-Jun-23
System Controller	SC104V	050806-1	No Cal. Req'd	No Cal. Req'd
Turntable Flush Mount 2m	FM2011	NA	No Cal. Req'd	No Cal. Req'd
Antenna Positioning Tower	TLT2	NA	No Cal. Req'd	No Cal. Req'd
Broad-Band Horn Antenna	BBHA9170	BBHA9170143	3-Aug-21	3-Aug-22
Preamplifier 18-40ghz	BBV9721	9721-007	No Cal. Req'd	No Cal. Req'd
Preamplifier	PAM-0118P	361	11-Sep-20	11-Sep-23
Loop Antenna	6502	00208416	8-Oct-21	8-Oct-22

1.3. General Information

General Description of EUT

Product	MACKENZIE 8/900 NAG MODEL		
Brand	Motorola Solutions		
Test Model	AAH90UCU9RH1AN		
Power Supply Rating	7.5Vdc		
Mode of operation	LTE Band 17		
Modulation Type	QPSK, 16QAM		
Operating Frequency	LTE Band 17	Channel Bandwidth 5MHz	706.5MHz~713.5MHz
		Channel Bandwidth 10MHz	709.0MHz~711.0MHz
Max. ERP Power	LTE Band 17 QPSK	Channel Bandwidth 5MHz	21.908dBm (0.155W)
		Channel Bandwidth 10MHz	21.894dBm (0.155W)
	LTE Band 17 16QAM	Channel Bandwidth 5MHz	21.184dBm (0.131W)
		Channel Bandwidth 10MHz	21.219dBm (0.132W)

Emission Designator	LTE Band 17		QPSK	16QAM
		Channel Bandwidth 5MHz	4M47G7D	4M47D7W
		Channel Bandwidth 10MHz	8M93G7D	8M91D7W
Antenna Type	LTE Band 17	LTE LOW BAND MAIN ANTENNA (0.29dBi)		
SW Version	D02.22.01.0103 (BP), D00.01.86 (AP)			
HW Version	P2			

Note:

1. The EUT contains following accessory devices and data cable.

Item	Brand	Model or P/N	Specification
Li-Ion	MOTOROLA	PMNN4805A	BATTERY PACK,BATTERY PACK,IMPRES GEN2, LIION,IP68, 4400T

Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	Product	Brand	Model No.	Serial No.	FCC ID
1	Wideband Radio Communication Tester	R&S	CMW500	154550	NA

NO.	Signal Cable Description of The above Support Units
1	NA

Note:

1. All power cords of the above support units are non-shielded.
2. Item 1 acted as a communication partner to transfer data.

EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

- FCC 47 CFR Part 2**
- FCC 47 CFR Part 27**
- KDB 971168 D01 Power Meas License Digital Systems v03r01**
- KDB 971168 D02 Misc OOB License Digital Systems v02r01**
- ANSI C63.26**

NOTE: All test items have been performed and recorded as per the above standards.

1.4. Channel number and frequency info

Band	Bandwidth supported	Available Channel Number	Test Channel Number			Test Channel Frequency (MHz)		
			Low Channel	Mid Channel	High Channel	Low Channel	Mid Channel	High Channel
LTE Band 17	5 MHz	23755 ~ 23825	23755	23790	23825	706.5	710	713.5
	10 MHz	23780 ~ 23800	23780	23790	23800	709	710	711

1.5. Test Mode Applicability and Tested Channel Detail

LTE Band 17

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Uplink Modulation	Mode
Conducted RF Output Power	23755 ~ 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	As per table 1.6.3
	23780 ~ 23800	23780, 23790, 23800	10 MHz		
Peak to Average Power Ratio	23755 ~ 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	23780 ~ 23800	23780, 23790, 23800	10 MHz		50 RB / 0 RB Offset
Occupied Bandwidth	23755 ~ 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	23780 ~ 23800	23780, 23790, 23800	10 MHz		50 RB / 0 RB Offset
Frequency Stability	23755 ~ 23825	23755, 23825	5 MHz	QPSK	25 RB / 0 RB Offset
	23780 ~ 23800	23780, 23800	10 MHz		50 RB / 0 RB Offset
Band Edge Conducted Spurious Emission	23755 ~ 23825	23755, 23825	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
	23780 ~ 23800	23780, 23800	10 MHz		1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
Conducted Spurious Emission	23755 ~ 23825	23755, 23790, 23825	5 MHz	QPSK	1 RB / 13 RB Offset
	23780 ~ 23800	23780, 23790, 23800	10 MHz		1 RB / 0 RB Offset
Radiated Spurious Emission	23755 ~ 23825	23755	5 MHz	QPSK	1 RB / 13 RB Offset
	23780 ~ 23800	23790	10 MHz		1 RB / 0 RB Offset
	23780 ~ 23800	23800	10 MHz		1 RB / 0 RB Offset
Effective Radiated Power (ERP)	23755 ~ 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	As per table 1.6.4
	23780 ~ 23800	23780, 23790, 23800	10 MHz		

NOTE:

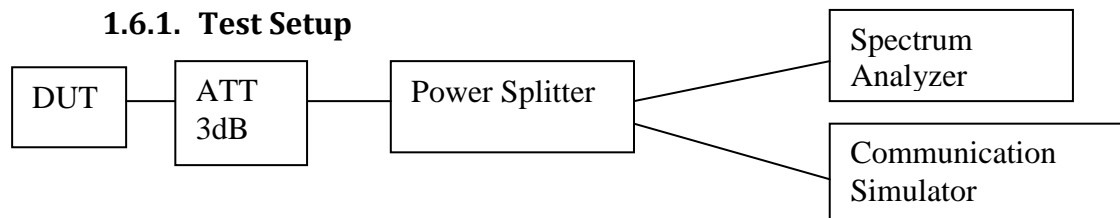
1. The Conducted RF Output Power for QPSK and 16QAM, measured value of QPSK mode is higher than 16QAM mode. Therefore, only Conducted Spurious Emission and Radiated Emission had been tested under QPSK modes.
2. Band Edge was performed with 1 and full Resource Block at the lowest and highest operating frequency band.
3. The Effective Radiated Power (ERP) was calculated from Conducted RF Output Power results in QPSK and 16QAM modulation.
4. Peak to Average and Occupied Bandwidth were performed with full Resource Block which is the worst case.
5. Frequency stability was performed with full Resource Block in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Conducted RF Output Power	25°C, 50% RH	7.5V DC	Nuraini
Peak-to-Average Power Ratio	25°C, 50% RH	7.5V DC	Nuraini
Occupied Bandwidth	25°C, 50% RH	7.5V DC	Nuraini
Frequency Stability	25°C, 50% RH	7.5V DC	Nuraini
Band Edge Conducted Spurious Emission	25°C, 50% RH	7.5V DC	Nuraini
Conducted Spurious Emission	25°C, 50% RH	7.5V DC	Nuraini
Radiated Spurious Emission	25°C, 63.7% RH	7.5V DC	Azil&Qawiman
Equivalent Isotropically Radiated Power (EIRP)	25°C, 63.7% RH	7.5V DC	Nuraini

1.6. Conducted RF Output Power

1.6.1. Test Setup



1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. All the measurement was done at low, mid, high channel for each band and different modulation.
5. Record the average power into the test report.

1.6.2. Limits

FCC: Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

ISED: The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

1.6.3. Conducted RF Output Power – LTE Band 17 (704-716MHz)

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23755	23790	23825	23755	23790	23825
			706.5MHz	710.0MHz	713.5MHz	706.5MHz	710.0MHz	713.5MHz
Band 17 / 5MHz	1	0	23.755	23.692	23.469	23.039	22.804	22.532
	1	13	23.768	23.712	23.505	23.044	22.807	22.56
	1	24	23.67	23.616	23.434	22.969	22.766	22.469
	12	0	22.768	22.738	22.6	21.809	21.737	21.677
	12	6	22.757	22.741	22.59	21.801	21.733	21.661
	12	13	22.758	22.711	22.554	21.768	21.719	21.604
	25	0	22.749	22.737	22.581	21.814	21.773	21.62

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23780	23790	23800	23780	23790	23800
			709.0MHz	710.0MHz	711.0MHz	709.0MHz	710.0MHz	711.0MHz
Band 17 / 10MHz	1	0	23.663	23.754	23.709	23.079	22.754	22.816
	1	25	23.605	23.686	23.619	22.998	22.699	22.747
	1	49	23.542	23.627	23.549	22.958	22.657	22.723
	25	0	22.763	22.745	22.762	21.871	21.898	21.884
	25	13	22.778	22.75	22.745	21.852	21.856	21.87
	25	25	22.72	22.693	22.692	21.829	21.82	21.818
	50	0	22.758	22.741	22.729	21.86	21.851	21.802

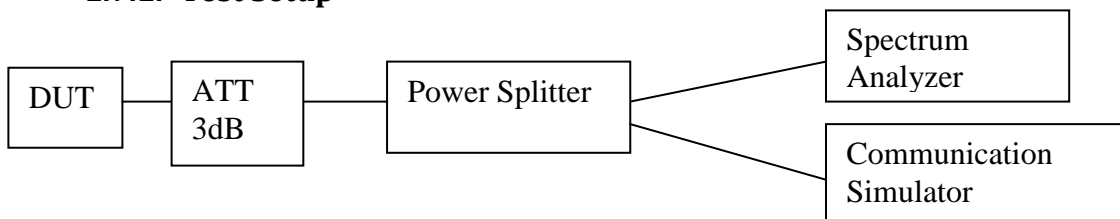
1.6.4 Effective Radiated Power (ERP) - LTE Band 17 (704-716MHz)

Effective Radiated Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23755	23790	23825	23755	23790	23825
			706.5MHz	710.0MHz	713.5MHz	706.5MHz	710.0MHz	713.5MHz
Band 17 / 5MHz	1	0	21.895	21.832	21.609	21.179	20.944	20.672
	1	13	21.908	21.852	21.645	21.184	20.947	20.7
	1	24	21.81	21.756	21.574	21.109	20.906	20.609
	12	0	20.908	20.878	20.74	19.949	19.877	19.817
	12	6	20.897	20.881	20.73	19.941	19.873	19.801
	12	13	20.898	20.851	20.694	19.908	19.859	19.744
	25	0	20.889	20.877	20.721	19.954	19.913	19.76

Effective Radiated Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			23780	23790	23800	23780	23790	23800
			709.0MHz	710.0MHz	711.0MHz	709.0MHz	710.0MHz	711.0MHz
Band 17 / 10MHz	1	0	21.803	21.894	21.849	21.219	20.894	20.956
	1	25	21.745	21.826	21.759	21.138	20.839	20.887
	1	49	21.682	21.767	21.689	21.098	20.797	20.863
	25	0	20.903	20.885	20.902	20.011	20.038	20.024
	25	13	20.918	20.89	20.885	19.992	19.996	20.01
	25	25	20.86	20.833	20.832	19.969	19.96	19.958
	50	0	20.898	20.881	20.869	20	19.991	19.942

1.7. Peak-to-Average Power Ratio

1.7.1. Test Setup



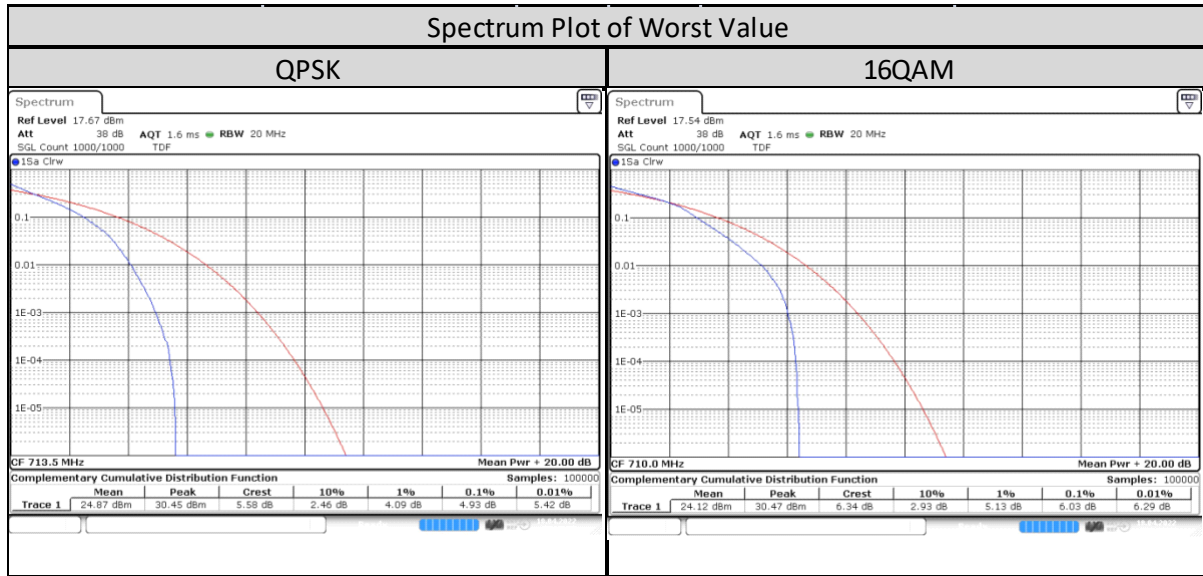
1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. Set the CCDF (Complementary Cumulative Distribution Function) option in the spectrum analyzer.
5. Spectrum Analyzer setting, RBW = 20MHz.
6. Recorded the maximum PAR level associated with a probability of 0.1% as Peak to Average Ratio.
7. All the measurement was done at low, mid, high channel for each band and different modulation.

1.7.2. Test Limit

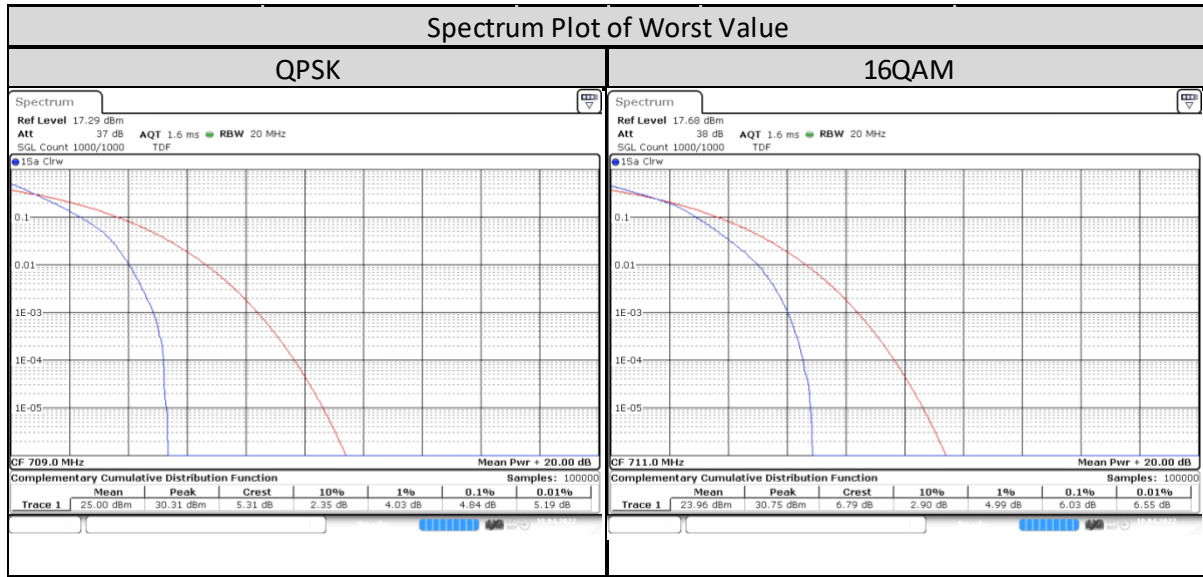
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

1.7.3. Peak-to-Average Power Ratio - LTE Band 17 (704-716MHz)

LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 17/5MHz/25/0	Low CH 23755	706.5 MHz	4.899	5.971
	Mid CH 23790	710 MHz	4.899	6.029
	High CH 23825	713.5 MHz	4.928	5.971

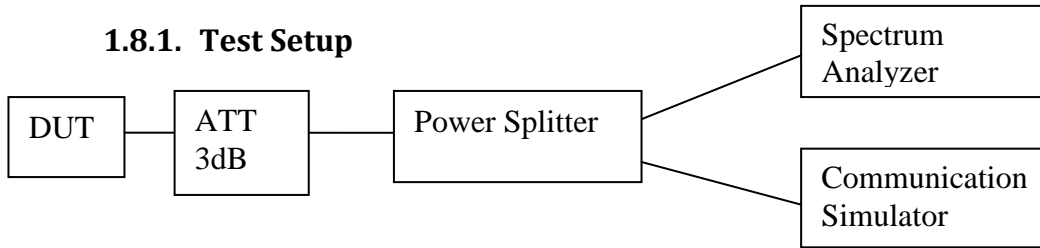


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 17/10MHz/50/0	Low CH 23780	709 MHz	4.841	6
	Mid CH 23790	710 MHz	4.841	6
	High CH 23800	711 MHz	4.812	6.029



1.8. Occupied Bandwidth

1.8.1. Test Setup



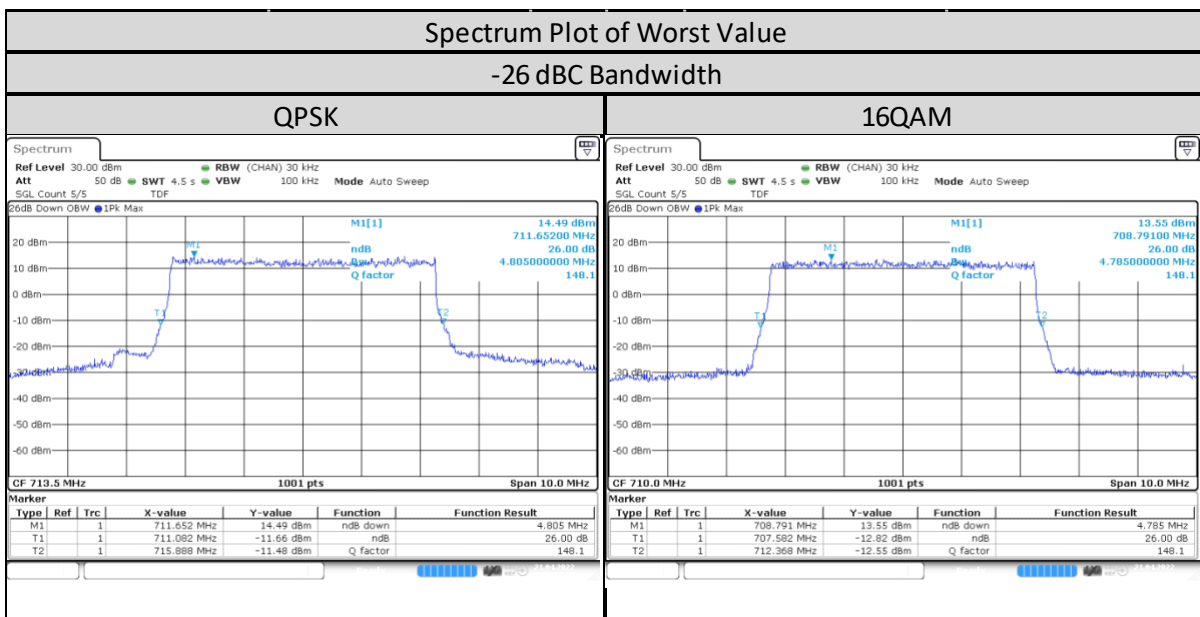
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) For LTE measurement, set DUT to transmit maximum power & full RB size through communication simulator.
- 4) For LTE measurement, set DUT to transmit maximum power through communication simulator.
- 5) Spectrum Analyzer setting, RBW is 1% of OBW and VBW is 3 times of RBW.
- 6) Measure & record -26dBc and 99% occupied bandwidth (BW).
- 7) All the measurement was done at low, mid, high channel for each band and different modulation.

1.8.2. Test Limit

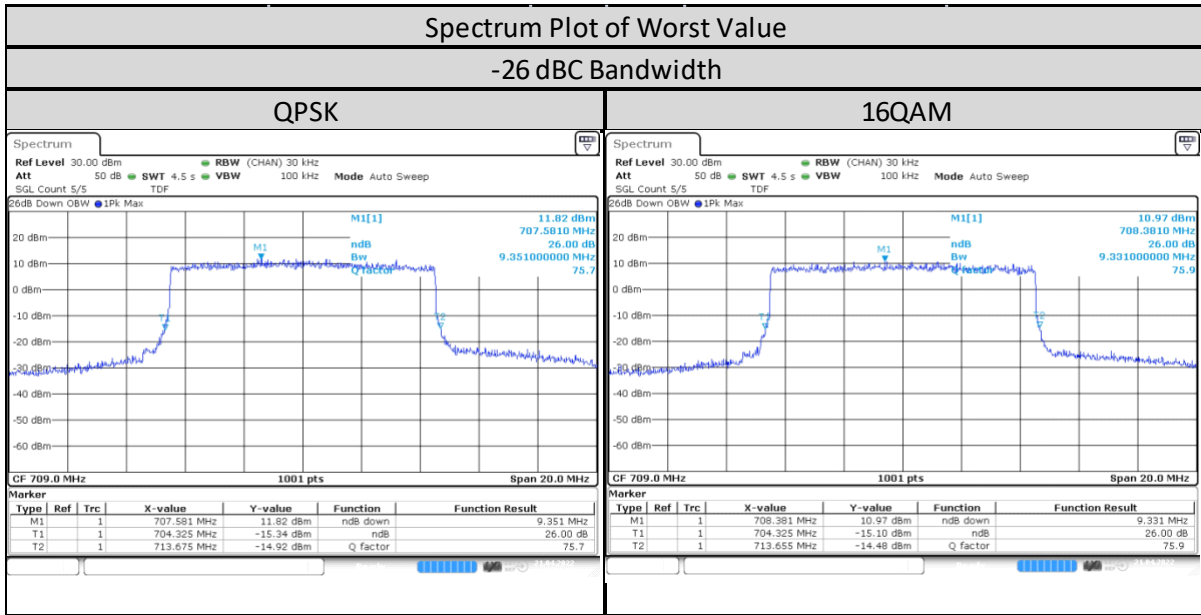
For measurement 99% of occupied bandwidth that is required by FCC 2.1049 and RSS Gen 6.6.

1.8.3. Occupied Bandwidth – LTE Band 17 (704-716MHz)

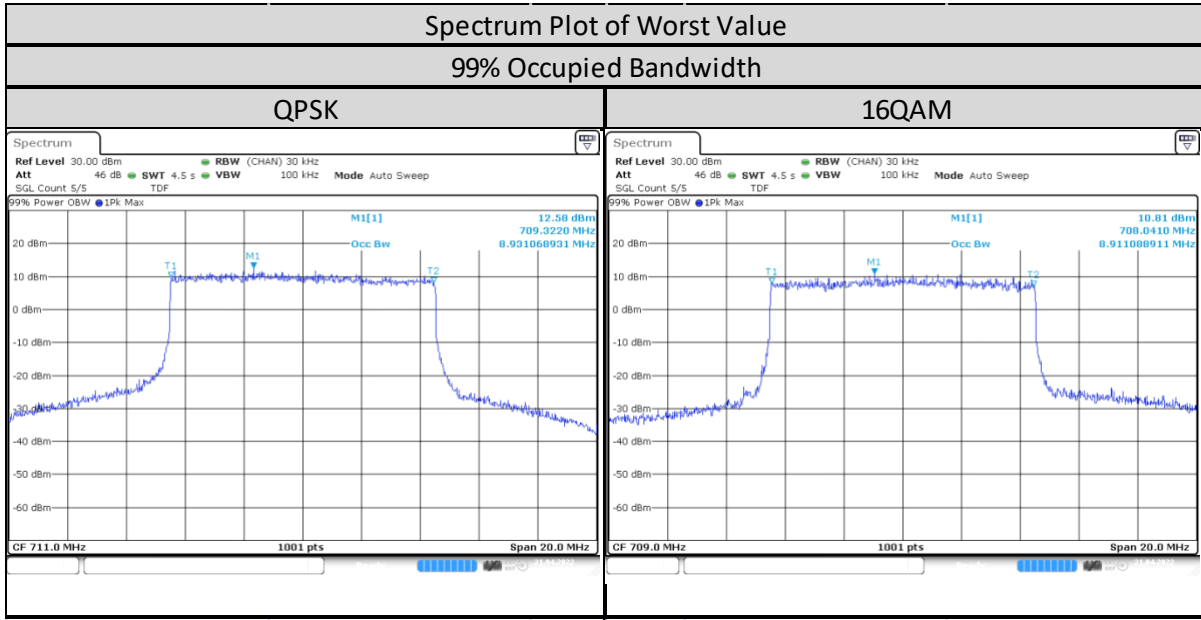
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/5MHz/25/0	Low CH 23755	706.5 MHz	4.745	4.725
	Mid CH 23790	710 MHz	4.755	4.785
	High CH 23825	713.5 MHz	4.805	4.745



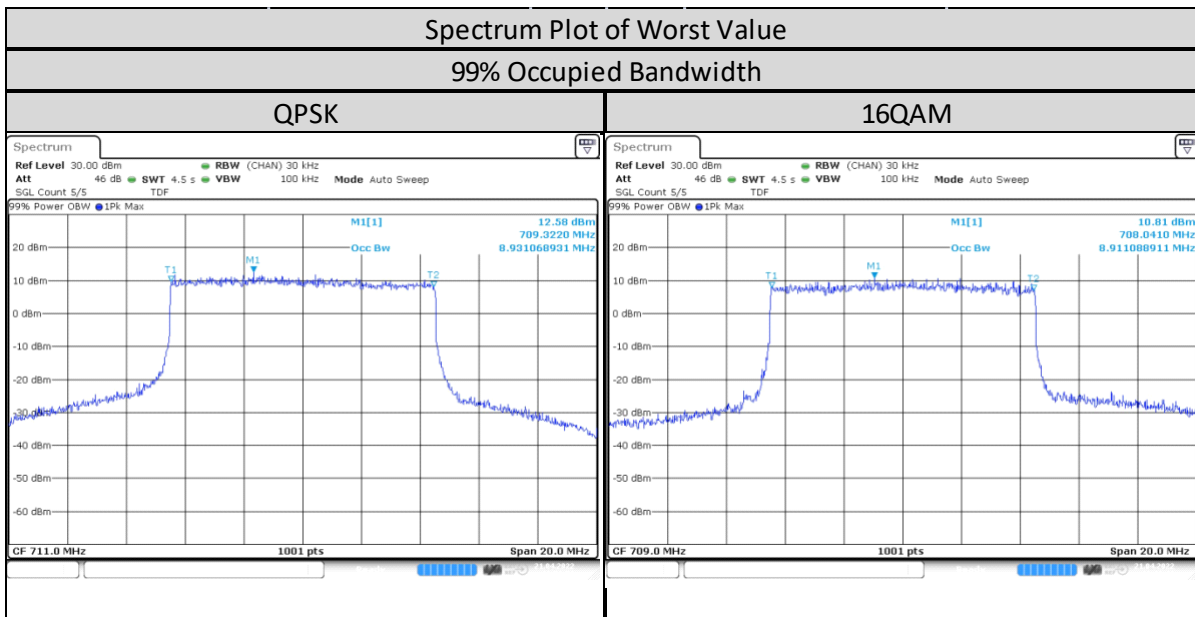
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/5MHz/25/0	Low CH 23755	706.5 MHz	4.446	4.456
	Mid CH 23790	710 MHz	4.466	4.456
	High CH 23825	713.5 MHz	4.466	4.466



LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/10MHz/50/0	Low CH 23780	709 MHz	9.351	9.331
	Mid CH 23790	710 MHz	9.311	9.271
	High CH 23800	711 MHz	9.351	9.271

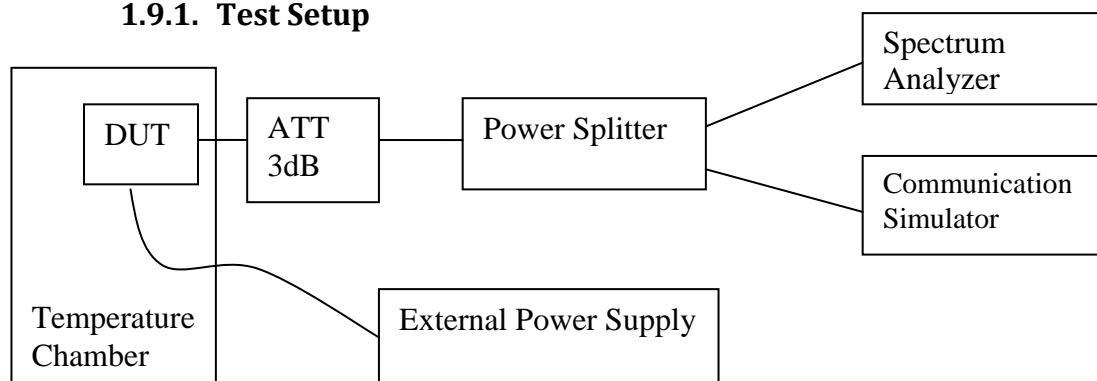


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/10MHz/50/0	Low CH 23780	709 MHz	8.911	8.911
	Mid CH 23790	710 MHz	8.911	8.911
	High CH 23800	711 MHz	8.931	8.911



1.9. Frequency Stability

1.9.1. Test Setup



- 1) The DUT is placed in the temperature chamber and DUT is power up by external power supply to control the DC input voltage.
- 2) The temperature chamber could control the temperature and humidity and external power supply could control the test voltage range from minimum to maximum operating voltage.
- 3) Measured frequency error from the communication simulator by vary below step :
 - i. Vary temperature of the temperature chamber from -30 ~ 60 deg C (10 deg C / Step) and set external supply voltage constant at nominal voltage.
 - ii. Vary external supply voltage from minimum to maximum operation voltage support by DUT and set temperature chamber constant at room temp.
- 4) All the measurement was done at mid channel for each band.

1.9.2. Test Limit

As per manufacturer declared product operating at -30 to 60 deg C with spec of +/- 0.1ppm.

1.9.3. Frequency Stability - LTE Band 17 (704-716MHz)

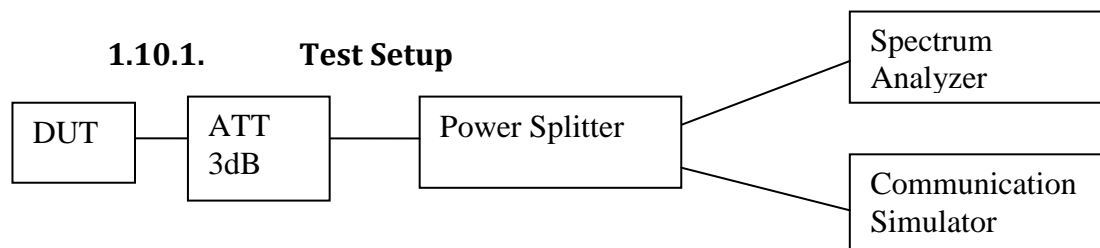
Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		706.5MHz		713.5MHz	
LTE Band 17		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	60	706.499993	-0.009881	713.49999	-0.013633
	50	706.499993	-0.010428	713.499991	-0.012791
	40	706.50001	0.013708	713.499986	-0.019869
	30	706.499991	-0.012655	713.499991	-0.01209
	20	706.500009	0.012797	713.499991	-0.013092
	10	706.500009	0.012392	713.499991	-0.012491
	0	706.500008	0.011885	713.49999	-0.013734
	-10	706.500006	0.009132	713.499992	-0.011328
	-20	706.500007	0.009456	713.499991	-0.012431
-30	706.500008	0.0114	713.499991	-0.01211	

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		706.5MHz		713.5MHz	
LTE Band 17		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
	9.0V	706.499992	-0.011683	713.499989	-0.014736
	7.5V	706.499993	-0.010164	713.499991	-0.011929
	6V	706.49999	-0.014052	713.499991	-0.012831

Band	Temp (Deg C)	Frequency Error VS Temperature			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		709MHz		711MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 17	60	708.999991	-0.012913	710.999993	-0.009637
	50	708.99999	-0.013781	711.000009	0.013259
	40	708.999988	-0.016303	711.000009	0.012333
	30	708.999991	-0.012772	711.000001	0.01342
	20	708.999992	-0.01146	710.999994	-0.009034
	10	708.999991	-0.013175	711.000006	0.009134
	0	708.999991	-0.013054	711.000008	0.011026
	-10	708.999989	-0.015415	711.000007	0.01008
	-20	708.999992	-0.011198	711.000008	0.011247
	-30	708.999991	-0.013095	711.000007	0.009476

Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 10 MHz			
		Low Channel		High Channel	
		709MHz		711MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 17	9.0V	708.99999	-0.014769	710.999993	-0.01008
	7.5V	708.999991	-0.013115	710.999993	-0.009678
	6V	708.99999	-0.013922	711.000008	0.011046

1.10. Band Edge Conducted Spurious Emission

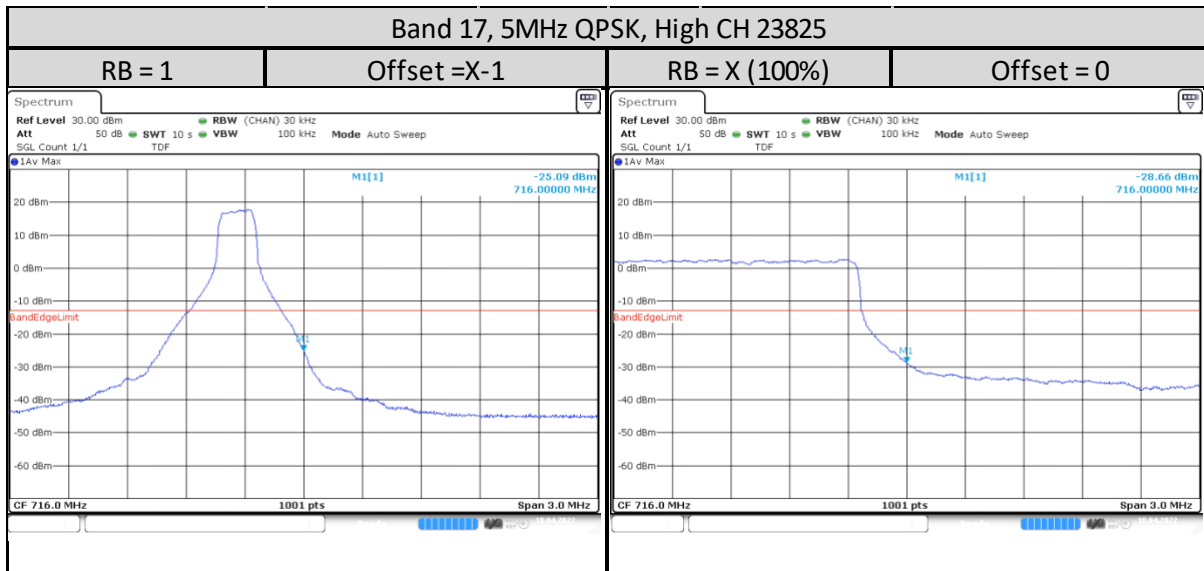
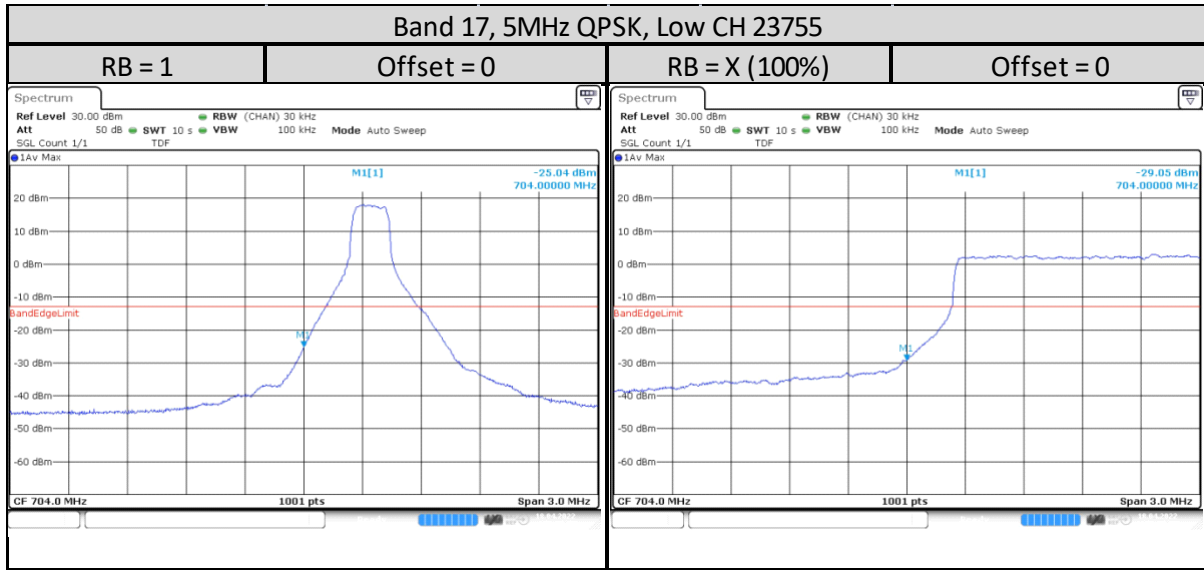


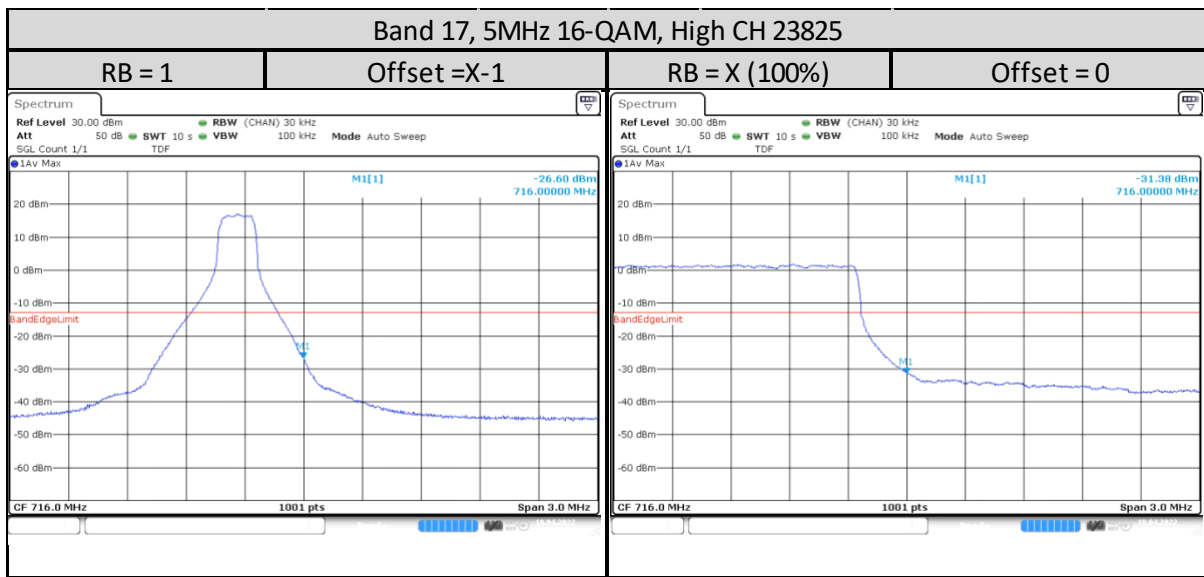
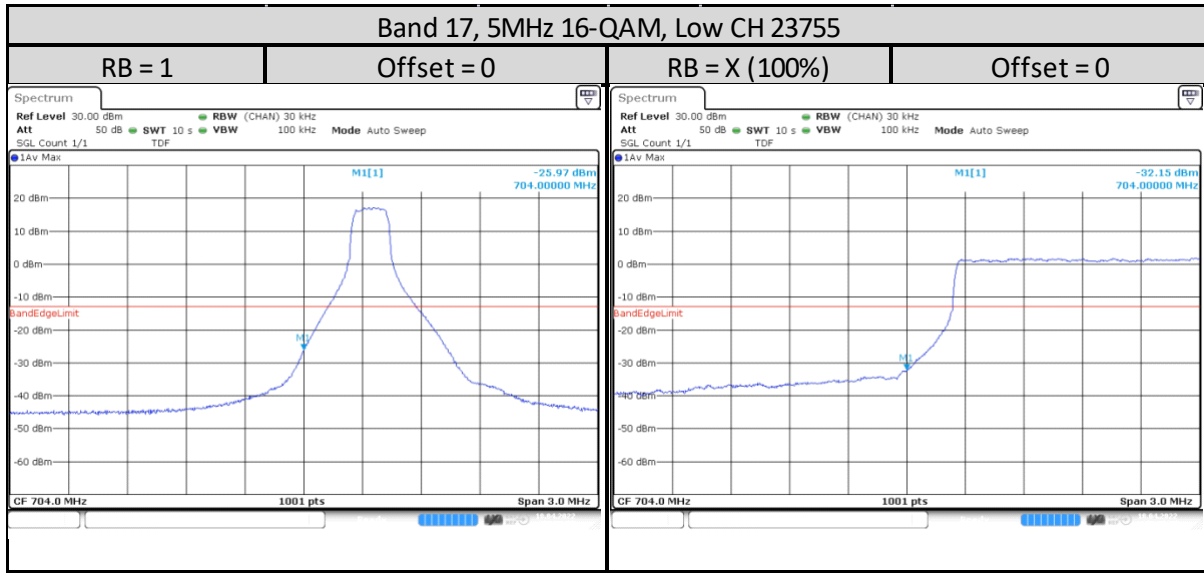
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) The band edges of lowest and highest channels with the highest RF powers were measured.
- 5) The center frequency of spectrum is the band edge frequency, span is 3MHz, RBW is 1~3% of EBW and VBW is at least 3 times of RBW
- 6) Record the maximum trace plot into the test report.

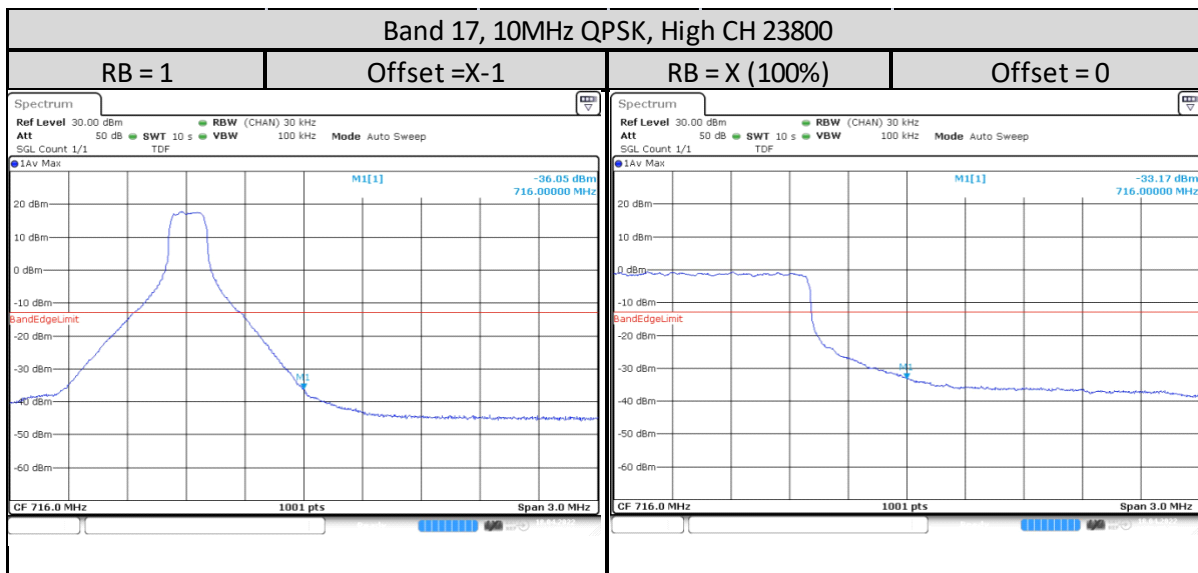
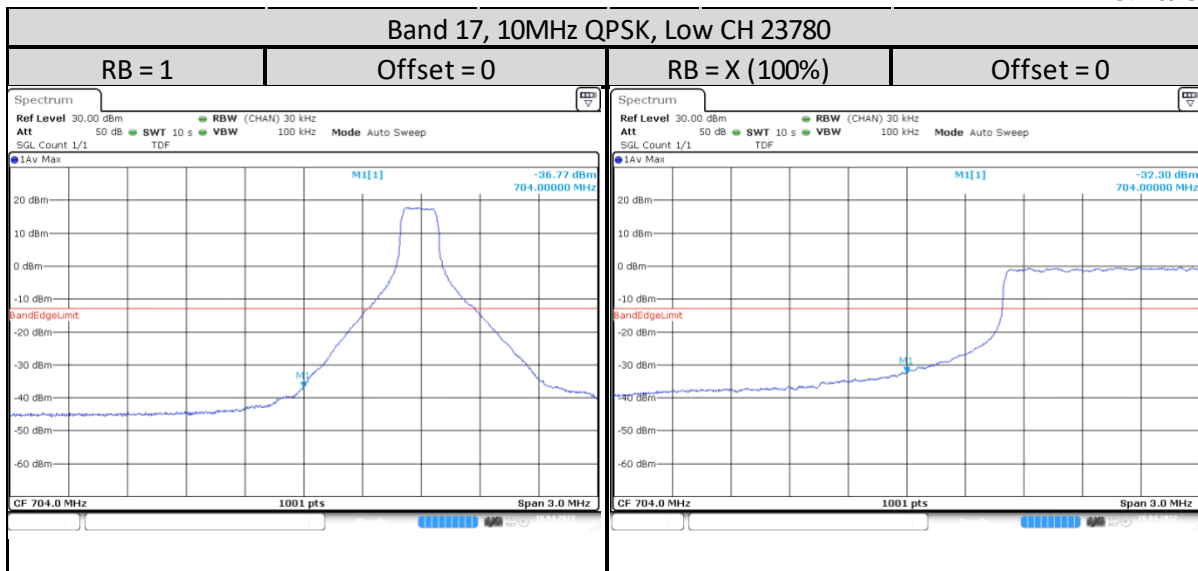
1.10.2. Test Limit

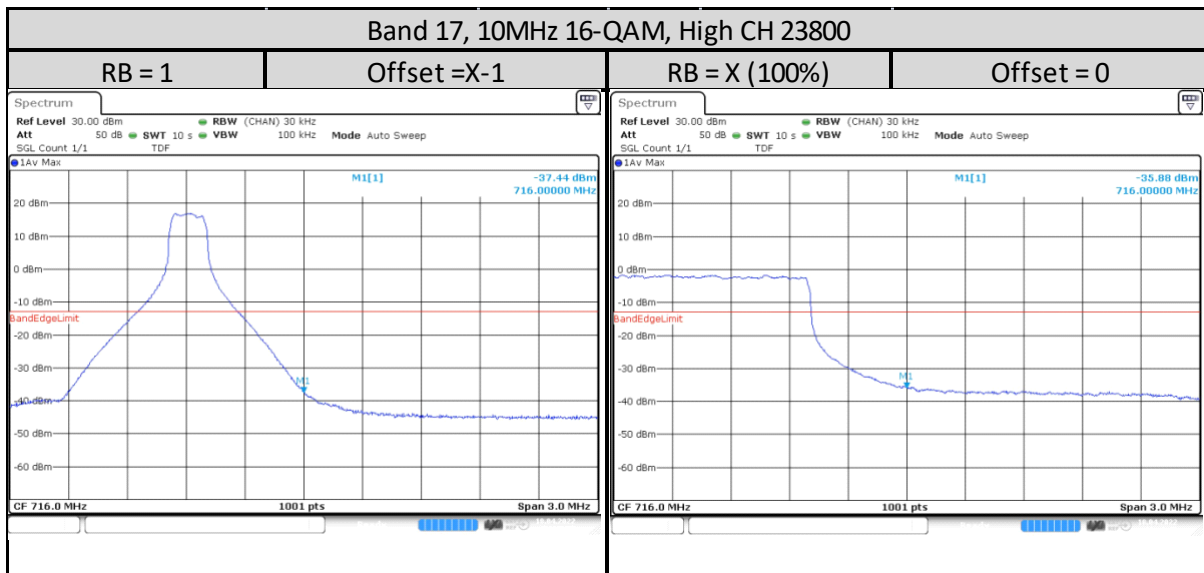
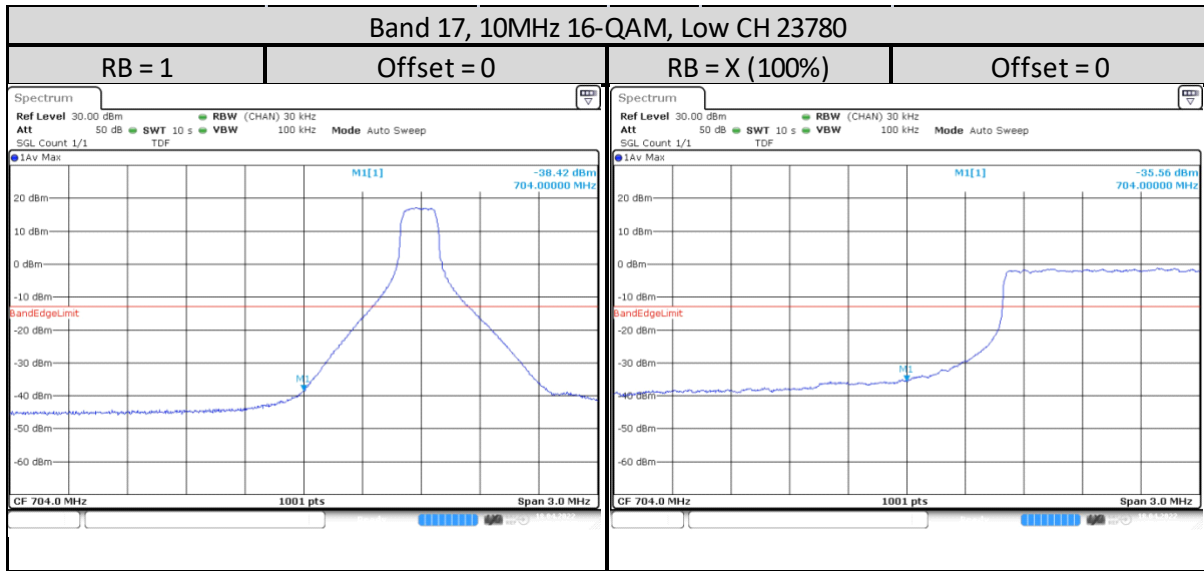
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

1.10.3. Band Edge / Emission Mask Conducted Spurious Emission - LTE Band 17 (704-716MHz)

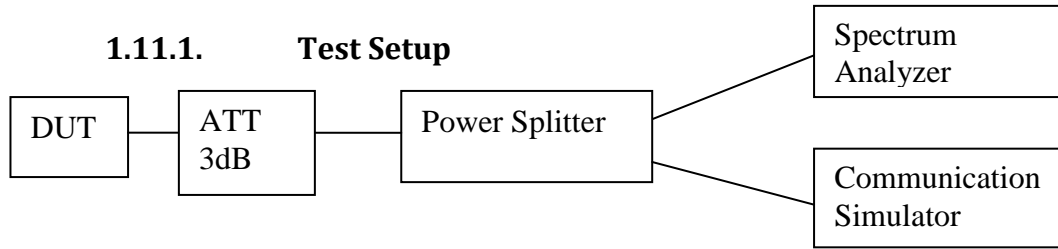








1.11. Conducted Spurious Emission



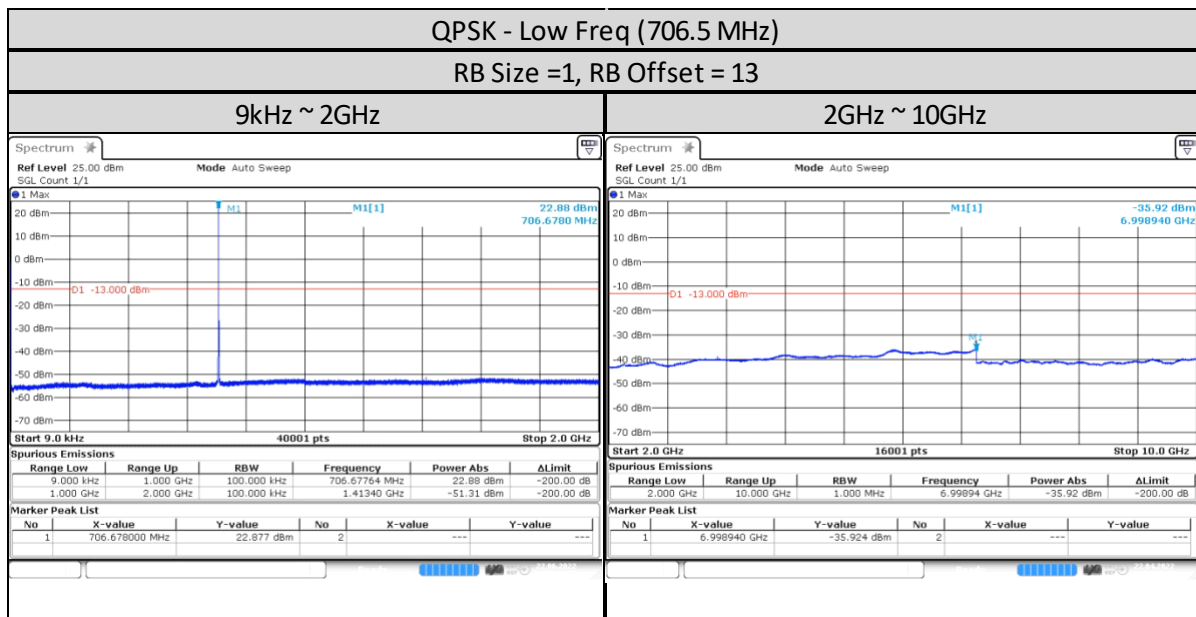
- 1) The DUT transmitter output port was connected to communication simulator with above setup.
- 2) Path loss for the measurement included.
- 3) Set DUT to transmit maximum power through communication simulator.
- 4) Spectrum Analyzer setting, RBW = 1 MHz, VBW = 3 MHz.
- 5) The spurious emission of lowest, middle and highest channels with the highest RF powers were measured.
- 6) Record the maximum trace plot into the test report.

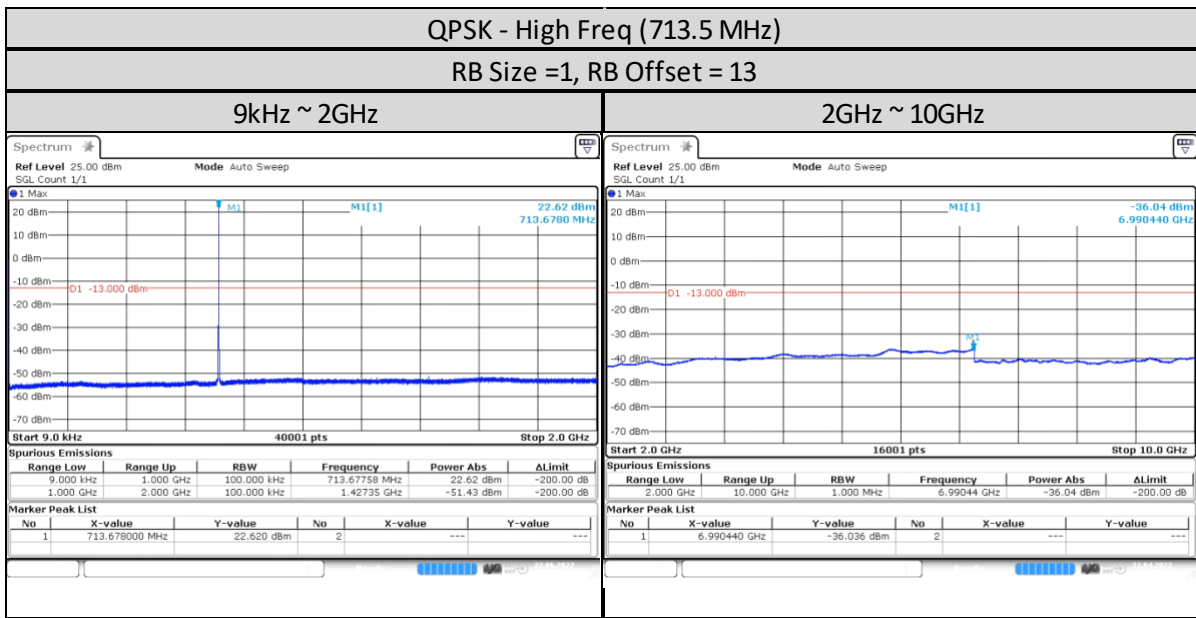
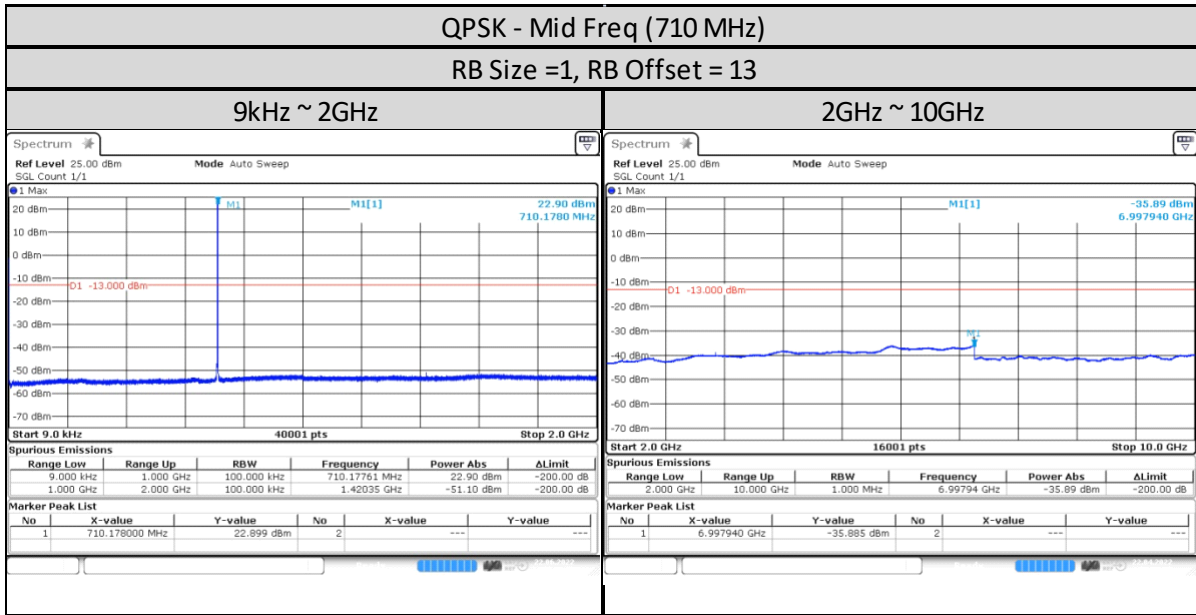
1.11.2. Test Limit

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

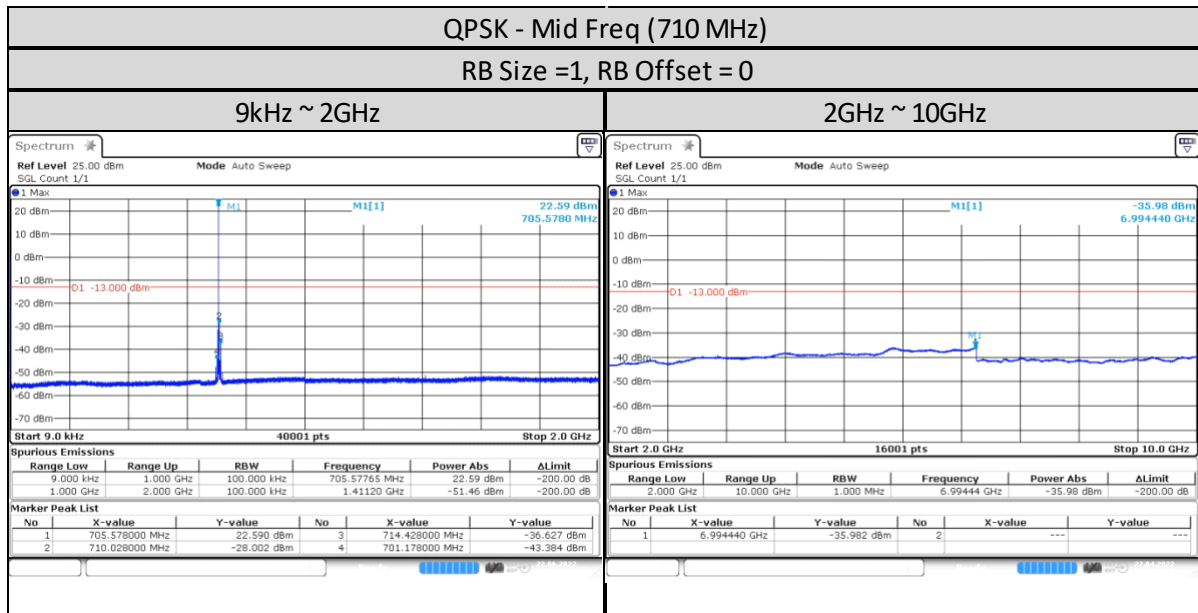
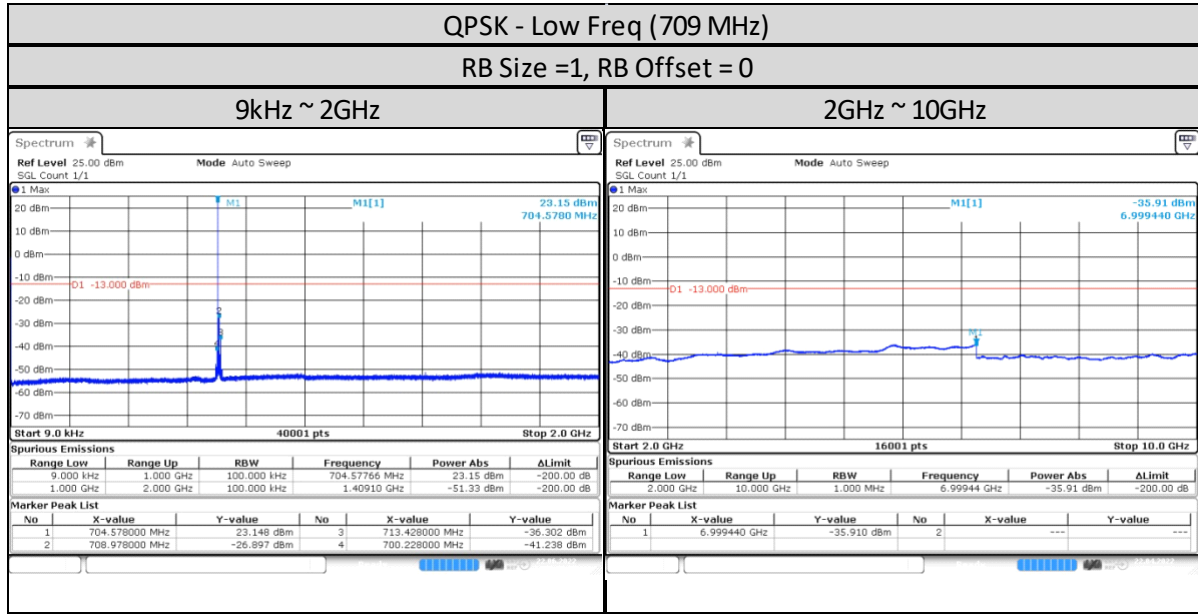
1.11.3. Conducted Spurious Emissions - LTE Band 17 (704-716MHz)

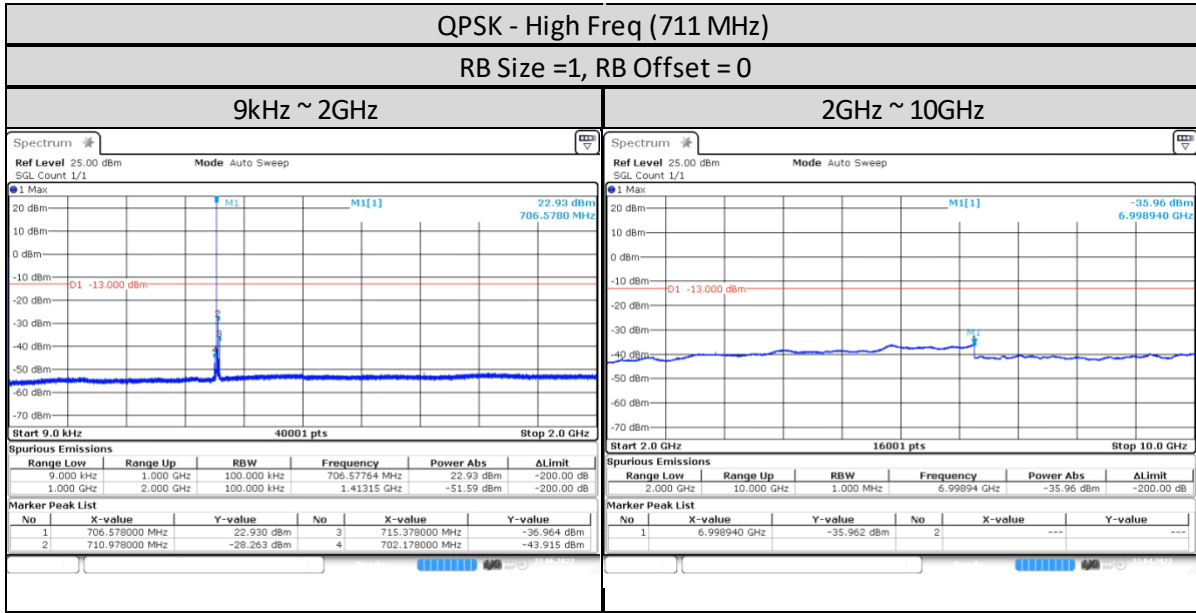
5MHz





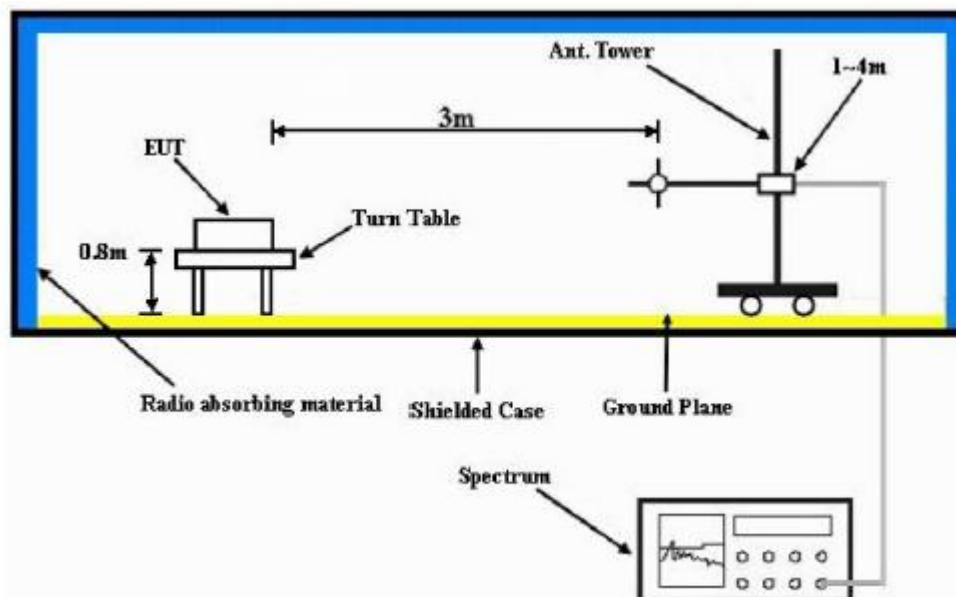
10MHz





1.12. Radiated Spurious Emission

1.12.1. Test Setup



- 1) The spectrum setting for scanning Radiated Emission below 1 GHz is RBW = 100 kHz, VBW = 300 kHz and above 1 GHz is RBW = 1MHz, VBW = 3MHz. Detector mode is positive peak.
- 2) In the semi-anechoic chamber, setup as illustrated above the EUT placed on the Turn Table at 0.8m height for below 1Ghz measurement and at 1.5m height for above 1GHz measurement, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- 3) The substitution antenna is substituted for EUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum. So, the measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.
- 4) Final Radiated Spurious Emission = “Read Value” + Measured substitution value.

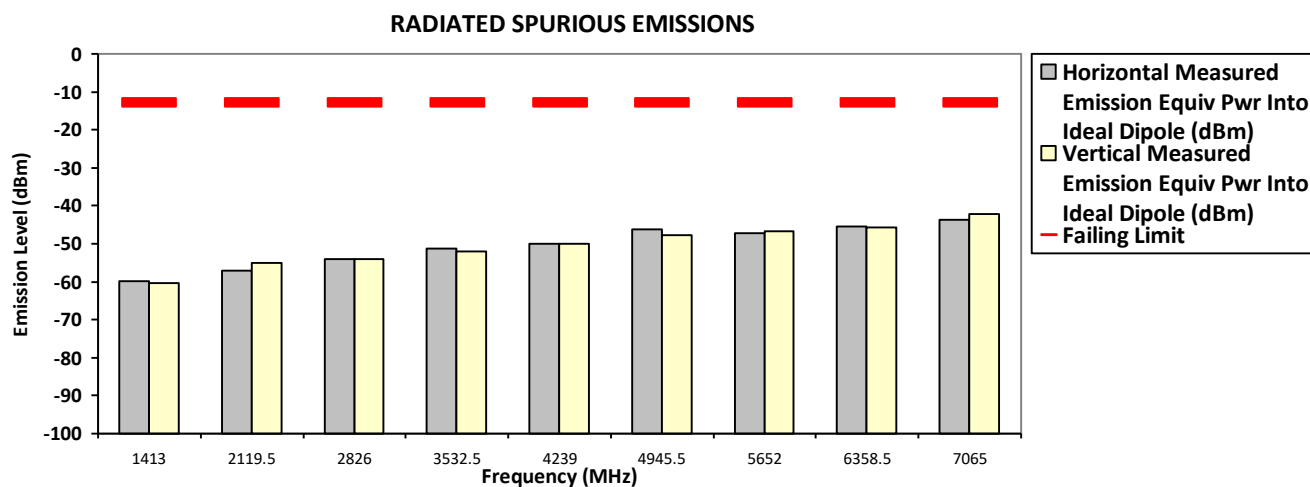
1.12.2. Test Limit

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

1.12.3. Radiated Spurious Emission – LTE Band 17 (704-716MHz)

SAC Transmitter Radiated Emission:
Model Number: AAH90UCU9RH1AN **S/N: 734TYF0069** **SR:27331-EMC-00034**
Battery Part No: PMNN4805A **Accy Part No: AN000415A01**
Test Mode: TX LTE (Band 17) X-Plane
706.50000 MHz (Low) **Bandwidth 5MHz** **0.282 Watt(s) /Max Power**

Frequency (MHz)	Limit	Horizontal Measured Emission Equip Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equip Pwr Into ideal Dipole (dBm)
1413.0000	-13.0000	-59.9659 **	-60.4369 **
2119.5000	-13.0000	-57.0082 **	-54.9662 **
2826.0000	-13.0000	-54.0081 **	-54.1296 **
3532.5000	-13.0000	-51.3155 **	-52.0262 **
4239.0000	-13.0000	-50.1205 **	-50.0583 **
4945.5000	-13.0000	-46.2267 **	-47.6763 **
5652.0000	-13.0000	-47.3196 **	-46.7224 **
6358.5000	-13.0000	-45.4597 **	-45.7527 **
7065.0000	-13.0000	-43.7560 **	-42.2072 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

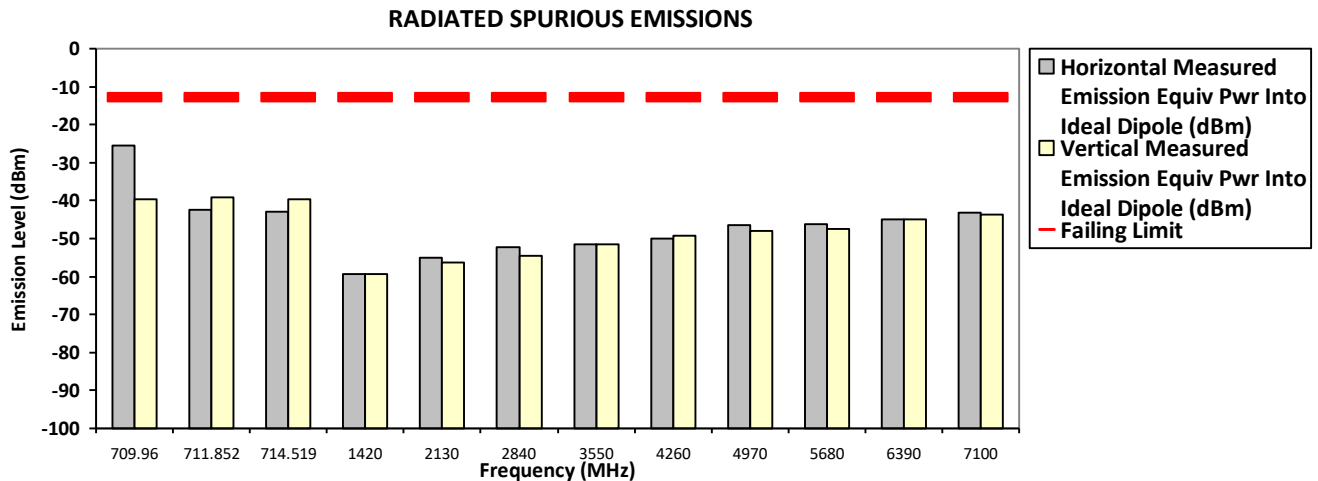
System MU: 4.03 dB

Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:

Model Number: AAH90UCU9RH1AN S/N: 734TYF0069 SR:27331-EMC-00034
 Battery Part No: PMNN4805A Accy Part No: AN000415A01
 Test Mode: TX LTE (Band 17) X-Plane
 710.000000 MHz (Mid) Bandwidth 10MHz 0.282 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1420.0000	-13.0000	-59.2931 **	-59.4176 **
2130.0000	-13.0000	-55.0181 **	-56.4065 **
2840.0000	-13.0000	-52.2952 **	-54.5361 **
3550.0000	-13.0000	-51.5696 **	-51.5788 **
4260.0000	-13.0000	-49.9824 **	-49.3522 **
4970.0000	-13.0000	-46.5790 **	-47.8766 **
5680.0000	-13.0000	-46.1910 **	-47.3676 **
6390.0000	-13.0000	-44.9467 **	-45.0474 **
7100.0000	-13.0000	-43.1666 **	-43.6794 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Thu, 21 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

System MU: 4.03 dB

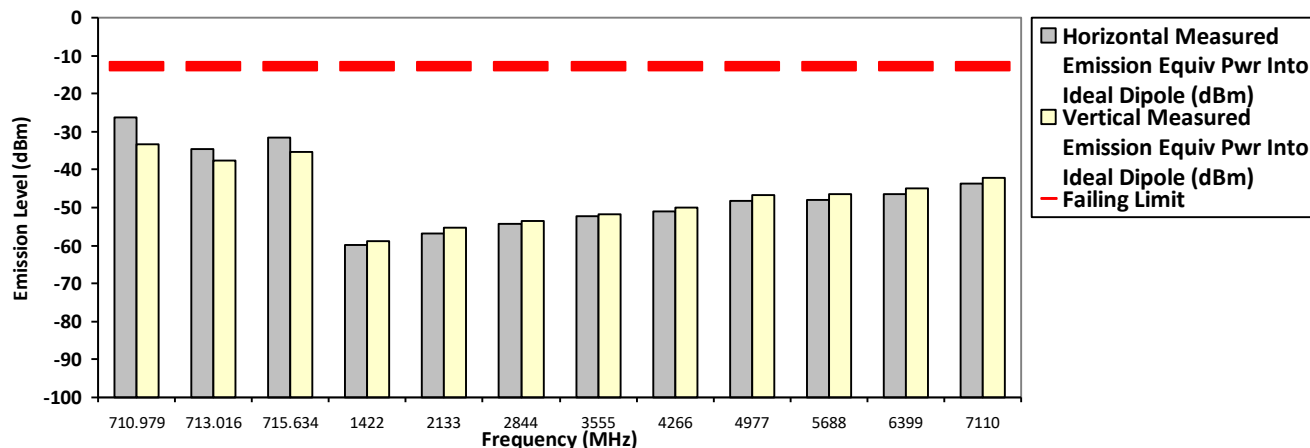
Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:

Model Number: AAH90UCU9RH1AN S/N: 734TYF0069 SR:27331-EMC-00034
 Battery Part No: PMNN4805A Accy Part No: AN000415A01
 Test Mode: TX LTE (Band 17) X-Plane
 711.000000 MHz (High) Bandwidth 10MHz 0.282 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1422.0000	-13.0000	-59.9677 **	-58.8394 **
2133.0000	-13.0000	-56.9319 **	-55.4281 **
2844.0000	-13.0000	-54.2642 **	-53.6130 **
3555.0000	-13.0000	-52.2041 **	-51.6969 **
4266.0000	-13.0000	-51.0665 **	-49.9339 **
4977.0000	-13.0000	-48.1677 **	-46.7434 **
5688.0000	-13.0000	-47.8729 **	-46.3859 **
6399.0000	-13.0000	-46.3857 **	-45.0595 **
7110.0000	-13.0000	-43.6663 **	-42.1401 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

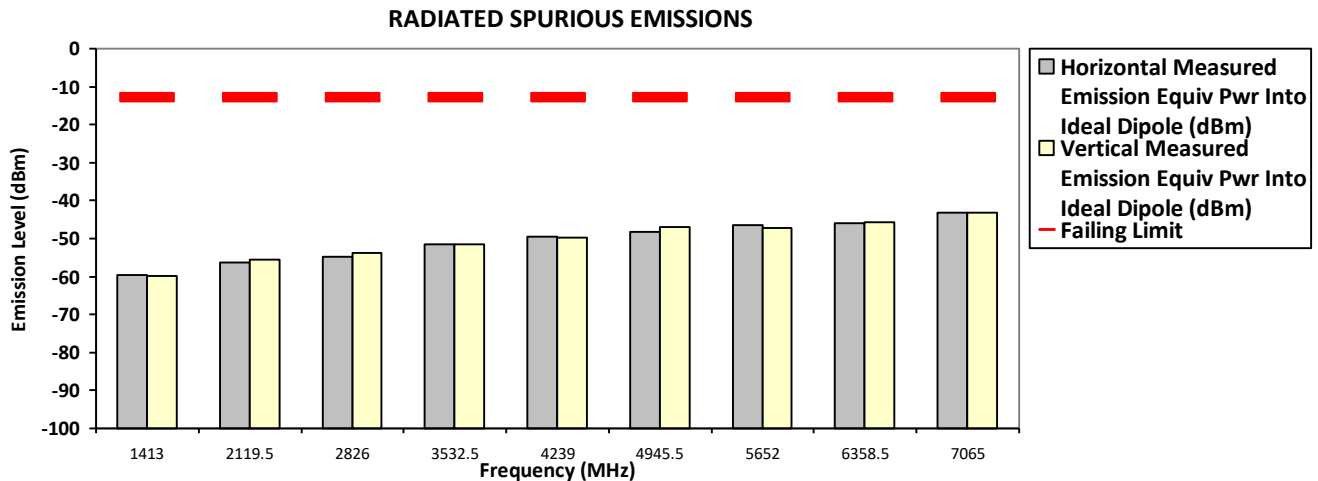
System MU: 4.03 dB

Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:

Model Number: AAH90UCU9RH1AN S/N: 734TYF0069 SR:27331-EMC-00034
 Battery Part No: PMNN4805A Accy Part No: AN000415A01
 Test Mode: TX LTE (Band 17) Y-Plane
 706.50000 MHz (Low) Bandwidth 5MHz 0.282 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1413.0000	-13.0000	-59.4986 **	-59.8243 **
2119.5000	-13.0000	-56.3179 **	-55.6253 **
2826.0000	-13.0000	-54.8059 **	-53.8848 **
3532.5000	-13.0000	-51.6037 **	-51.4559 **
4239.0000	-13.0000	-49.5073 **	-49.8171 **
4945.5000	-13.0000	-48.3498 **	-46.9811 **
5652.0000	-13.0000	-46.3411 **	-47.1668 **
6358.5000	-13.0000	-46.0771 **	-45.7138 **
7065.0000	-13.0000	-43.1001 **	-43.2573 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

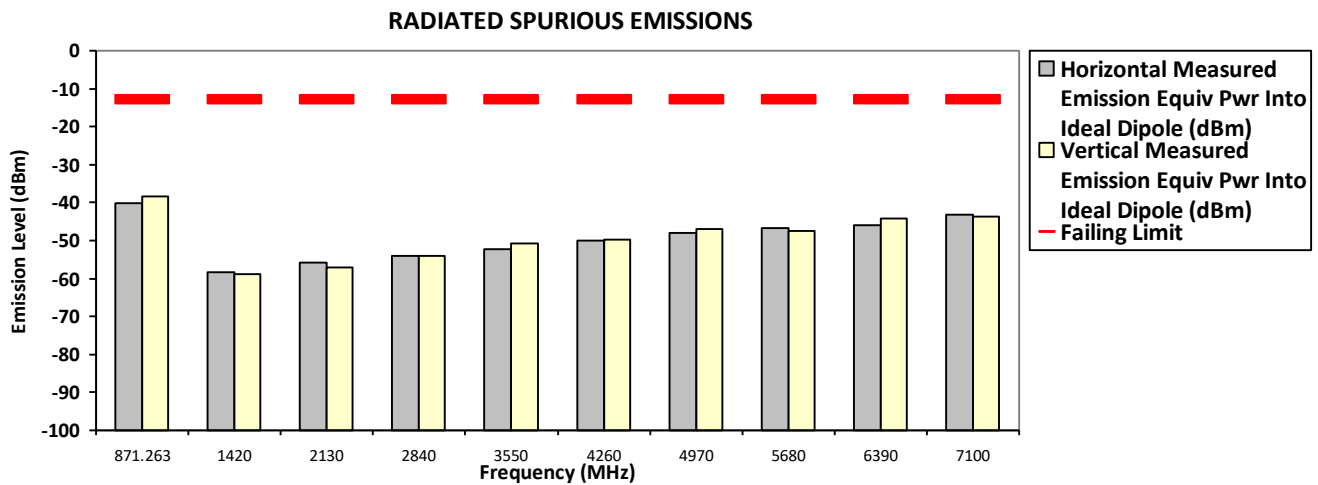
System MU: 4.03 dB

Remarks:

Passed Results	Marginal Results	Failed Results
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SAC Transmitter Radiated Emission:
Model Number: AAH90UCU9RH1AN **S/N: 734TYF0069** **SR:27331-EMC-00034**
Battery Part No: PMNN4805A **Accy Part No: AN000415A01**
Test Mode: TX LTE (Band 17) Y-Plane
710.000000 MHz (Mid) **Bandwidth 10MHz** **0.282 Watt(s) /Max Power**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
871.2630	-13.0000	-40.2400 *	-38.3200 *
1420.0000	-13.0000	-58.3608 **	-58.9120 **
2130.0000	-13.0000	-55.7196 **	-57.0394 **
2840.0000	-13.0000	-54.0339 **	-54.0368 **
3550.0000	-13.0000	-52.2999 **	-50.8737 **
4260.0000	-13.0000	-50.1096 **	-49.7720 **
4970.0000	-13.0000	-47.8824 **	-46.9327 **
5680.0000	-13.0000	-46.7269 **	-47.4339 **
6390.0000	-13.0000	-45.8616 **	-44.0868 **
7100.0000	-13.0000	-43.1076 **	-43.7018 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

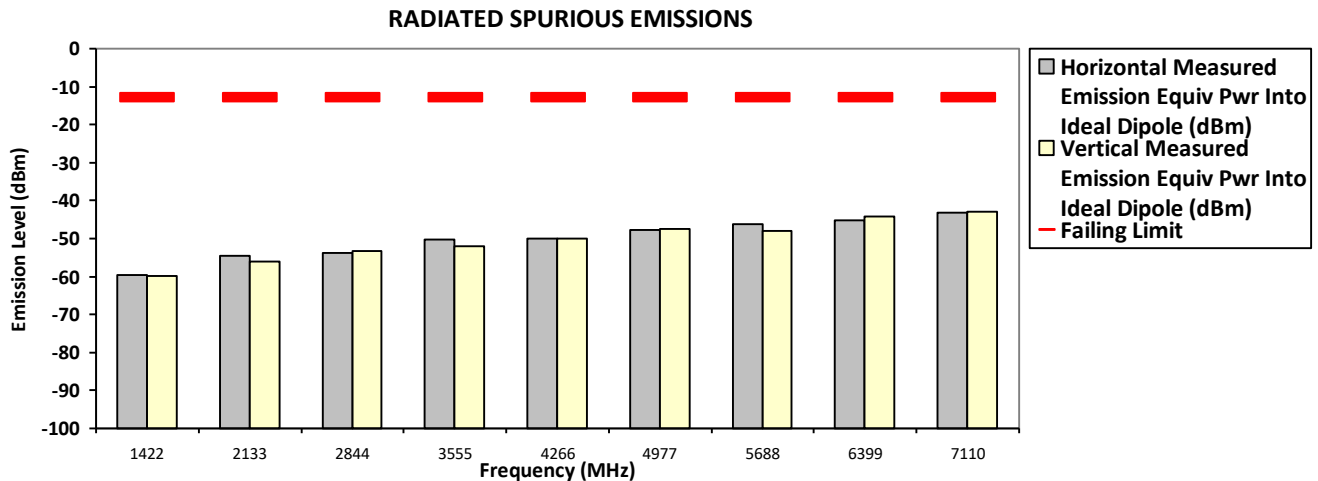
System MU: 4.03 dB

Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:

Model Number: AAH90UCU9RH1AN S/N: 734TYF0069 SR:27331-EMC-00034
 Battery Part No: PMNN4805A Accy Part No: AN000415A01
 Test Mode: TX LTE (Band 17) Y-Plane
 711.000000 MHz (High) Bandwidth 10MHz 0.282 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1422.0000	-13.0000	-59.6884 **	-59.8619 **
2133.0000	-13.0000	-54.6480 **	-56.0238 **
2844.0000	-13.0000	-53.7178 **	-53.3841 **
3555.0000	-13.0000	-50.2355 **	-52.0209 **
4266.0000	-13.0000	-49.9724 **	-50.0213 **
4977.0000	-13.0000	-47.8460 **	-47.5385 **
5688.0000	-13.0000	-46.2668 **	-47.9603 **
6399.0000	-13.0000	-45.2018 **	-44.1141 **
7110.0000	-13.0000	-43.1160 **	-43.0234 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

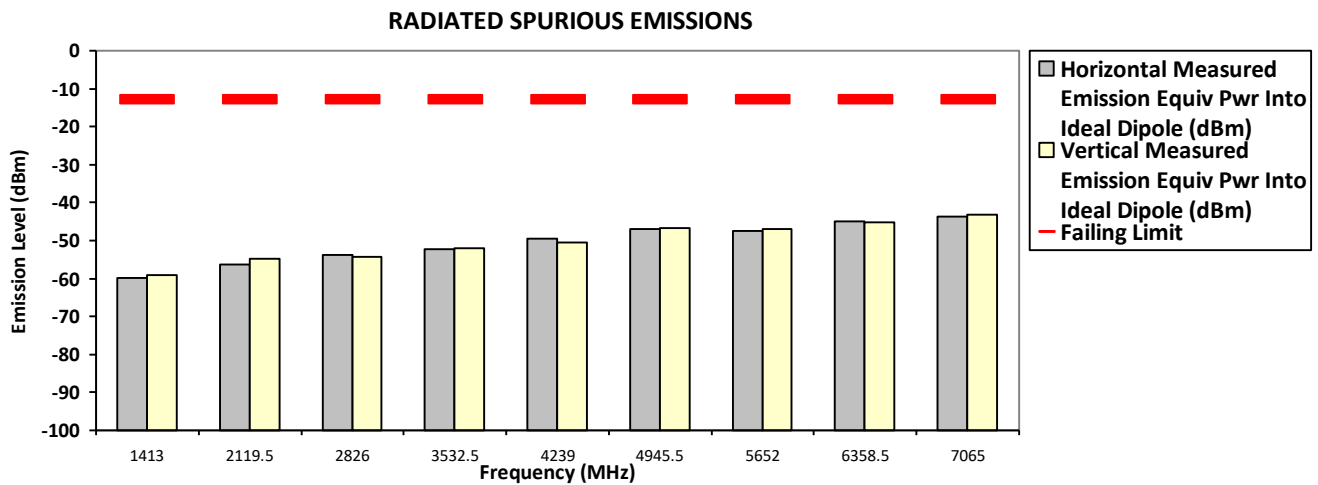
Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

System MU: 4.03 dB

Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:
Model Number: AAH90UCU9RH1AN **S/N: 734TYF0069** **SR:27331-EMC-00034**
Battery Part No: PMNN4805A **Accy Part No: AN000415A01**
Test Mode: TX LTE (Band 17) Z-Plane
706.500000 MHz (Low) **Bandwidth 5MHz** **0.282 Watt(s) /Max Power**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1413.0000	-13.0000	-59.7783 **	-59.1393 **
2119.5000	-13.0000	-56.4066 **	-54.8767 **
2826.0000	-13.0000	-53.8162 **	-54.3806 **
3532.5000	-13.0000	-52.1736 **	-52.0750 **
4239.0000	-13.0000	-49.4772 **	-50.4733 **
4945.5000	-13.0000	-47.0344 **	-46.6264 **
5652.0000	-13.0000	-47.4489 **	-46.9502 **
6358.5000	-13.0000	-44.9621 **	-45.0770 **
7065.0000	-13.0000	-43.6521 **	-43.2506 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

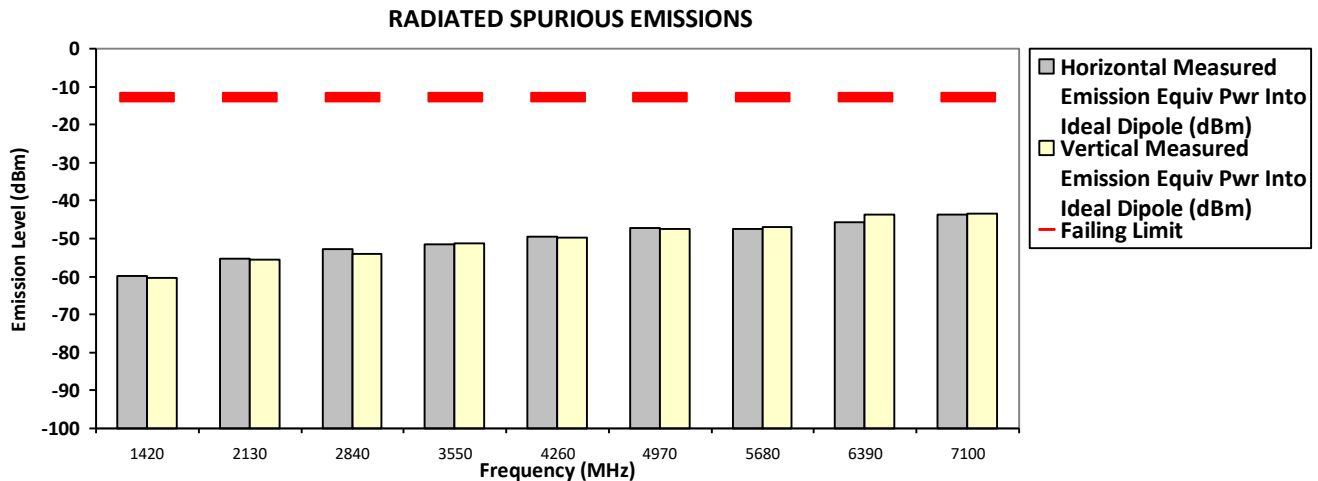
System MU: 4.03 dB

Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:

Model Number: AAH90UCU9RH1AN S/N: 734TYF0069 SR:27331-EMC-00034
 Battery Part No: PMNN4805A Accy Part No: AN000415A01
 Test Mode: TX LTE (Band 17) Z-Plane
 710.000000 MHz (Mid) Bandwidth 10MHz 0.282 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1420.0000	-13.0000	-59.7431 **	-60.3692 **
2130.0000	-13.0000	-55.2035 **	-55.4918 **
2840.0000	-13.0000	-52.7556 **	-53.9388 **
3550.0000	-13.0000	-51.6352 **	-51.2769 **
4260.0000	-13.0000	-49.5322 **	-49.8480 **
4970.0000	-13.0000	-47.2879 **	-47.5277 **
5680.0000	-13.0000	-47.4244 **	-46.8636 **
6390.0000	-13.0000	-45.7353 **	-43.8058 **
7100.0000	-13.0000	-43.7836 **	-43.3306 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

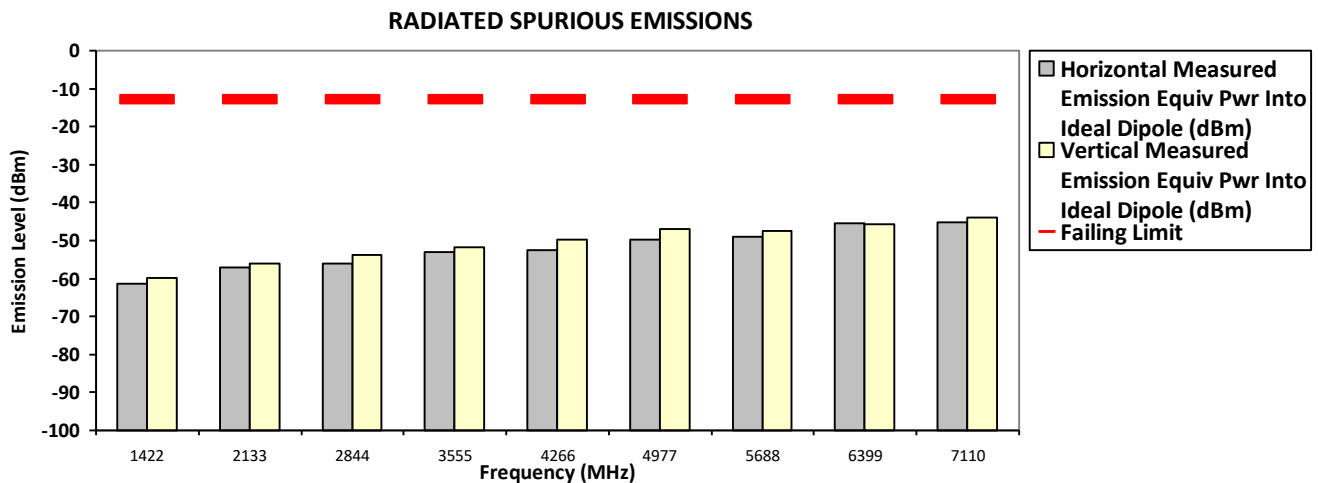
System MU: 4.03 dB

Remarks: Passed Results Marginal Results Failed Results

SAC Transmitter Radiated Emission:

Model Number: AAH90UCU9RH1AN S/N: 734TYF0069 SR:27331-EMC-00034
 Battery Part No: PMNN4805A Accy Part No: AN000415A01
 Test Mode: TX LTE (Band 17) Z-Plane
 711.000000 MHz (High) Bandwidth 10MHz 0.282 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1422.0000	-13.0000	-61.3051 **	-59.9484 **
2133.0000	-13.0000	-57.1325 **	-56.0868 **
2844.0000	-13.0000	-55.9612 **	-53.8069 **
3555.0000	-13.0000	-52.9535 **	-51.7466 **
4266.0000	-13.0000	-52.4971 **	-49.7519 **
4977.0000	-13.0000	-49.7857 **	-46.9915 **
5688.0000	-13.0000	-49.0127 **	-47.3745 **
6399.0000	-13.0000	-45.5023 **	-45.7479 **
7110.0000	-13.0000	-45.1552 **	-43.9619 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Azil&Qawiman Fri, 22 Apr, 2022

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
 *Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported
 Temp(Deg): 23.3 Hum(%RH): 69.3

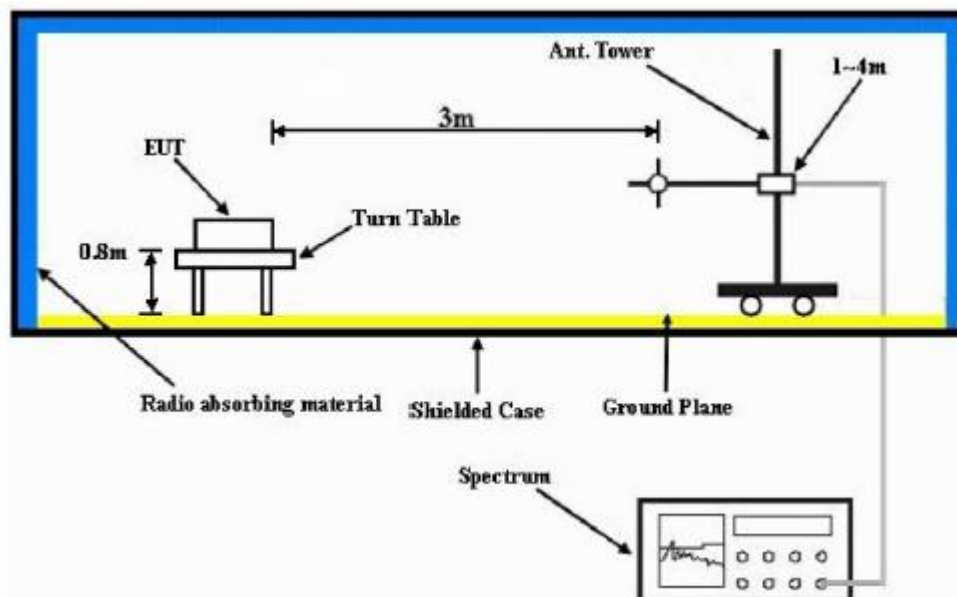
System MU: 4.03 dB

Remarks:

Passed Results	Marginal Results	Failed Results
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1.13. Equivalent Isotropically Radiated Power (EIRP)

1.13.1. Test Setup



- 1) The spectrum setting for scanning Radiated Emission below 1 GHz is RBW = 100 kHz, VBW = 300 kHz and above 1 GHz is RBW = 1MHz, VBW = 3MHz. Detector mode is RMS.
- 2) In the semi-anechoic chamber, setup as illustrated above the EUT placed on the Turn Table at 0.8m height for below 1Ghz measurement and at 1.5m height for above 1GHz measurement, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- 3) The substitution antenna is substituted for EUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum. So, the measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.
- 4) $EIRP = \text{“Read Value”} + \text{Measured substitution value.}$

1.13.2. Test Limit

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw). Power is given in terms of effective radiated power (ERP).

1.13.3. Equivalent Isotropically Radiated Power (EIRP) - LTE Band 17 (704-716MHz)

Not Performed.

--End of Test Report--