MOTOROLA SOLUTIONS

CERTIFICATE 2518.08

MS ISO/IEC 17025
TESTING
SAMM NO. 0825

MOTOROLA PENANG ADV. COMM. LABORATORY
Motorola Solutions Malaysia SDN BHD,
Plot 2A, Medan Bayan Lepas,
Mukim 12 SWD, 11900 Bayan Lepas,
Penang, Malaysia.

FCC / ISED TEST REPORT
Report Revision : Rev.D

Date/s Tested	:	26-September-2018 - 10-June-2020
Report Issue Date	:	12-JUNE-2020
Manufacturer	:	Motorola Solutions GMBH
Manufacturer Address	:	AM BORSIGTURM 130, 13507 BERLIN, GERMANY
Requestor	:	SAROCKA, ROBERT
Product Type	:	Base Station
Model Number	:	SQM09SUM0010A / SQM08SUM0010A
Frequency Band	:	851-869 MHz
Firmware Version	:	R09.40.38
Max RF Output Power	:	48 Watts
Applicant Name	:	Motorola Solutions Inc
Applicant Address	:	1301 E. Algonquin Road, Room 1043, Schaumburg, IL 60196
ISED Registrations	:	MY0001
FCC Registrations	:	461337

The equipment was tested accordance to the requirement listed below:

(LMR)	
FCC 47 CFR Part 90	**PASS**
ISED RSS- Gen Issue 5 / 119 Issue 12	

Prepared By:

Lim Khay Kwang
Test Personnel

Approved Signatory:

Vincent Foong Chuen Kit
Deputy Technical Manager

Table of Contents

Report Revision History

Revision History	Description	Date	Originator
Rev. A	Initial Report	17-January-2019	Lim Khay Kwang
Rev. B	Added model numbers for every configuration to give clarity	21-November-2019	Vincent Foong
Rev. C	Updated address, added details in summary table	26-December -2019	Vincent Foong
Rev. D	Updated freq stability, applicant address, report date	13-June-2020	Vincent Foong

1.0 General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	π4/DQPSK , QAM4, QAM16, QAM64

General Description of Applied Standards
The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

ANSI C63.4-2014
ANSI C63.26-2015

2.0 Summary of Test Results

FCC General Rules Part (47CFR)	ISED General Rules Part	Test Item	Result	Remark
2.1046(a),	RSS-Gen	RF Power Output	Pass	-
2.1055	RSS-Gen	Frequency Stability	Pass	-
2.1047	-	Audio Frequency Response	NA	-
2.1047	-	Audio Low Pass Filter Response	NA	-
2.1047	-	Modulation limiting	NA	-
2.1049	RSS-Gen	Occupied Bandwidth	Pass	22K0D7E / 22K0D7D / 22K0D7W: 21.1532kHz
2.1051	-	Band Edge Conducted Spurious Emission	NA	-
90.214	RSS-119 (5.9)	Transient Frequency Behavior	NA	-
90.221(c)	RSS-119 (4.3), (5.8.9.1)	Adjacent Channel Power	Pass	-
2.1051, 90.210	RSS-Gen, RSS-119 (4.2), (5.8)	Conducted Spurious Emissions	Pass	No spur detected (noise floor)
2.1051	RSS-Gen	Radiated Spurious Emission	Pass	Worst case emission: -36dBm
-	-	GNSS (EIRP for 1559 – 1610MHz)	NA	-
-	-	Effective Radiated Power (ERP)	NA	-

NA → **Not Applicable**

3.0 Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43
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

4.0 Equipment List

FCC Analog ATE#1: (SW version: 2.4.5 & FCC_Frequency Stability 1.0.3 rev.)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
AUDIO ANALYZER	8903B	3729A17612	15-Nov-17	15-Nov-20
SIGNAL GENERATOR	2042	203002/956	20-Aug-19	20-Aug-20
MODULATION ANALYZER	8901B	3538A5696	4-Apr-19	4-Apr-20
DSA Dynamic Signal Analyzer	36570A	MY42506790	4-Apr-19	4-Apr-20
POWER SENSOR	E4412A	MY41502652	31-Jul-19	31-Jul-20
POWER METER	E4416A	GB41293747	19-Nov-18	19-Nov-20
POWER SUPPLY	6623A	2916A01562	31-Mar-19	31-Mar-20
CHAMBER	SH-641	92009188	29-Mar-19	29-Mar-20
N to N RF Cable # 1	M17/128-RG400	NA	NA	NA
BNC to N RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 2	RG 58	NA	NA	NA
BNC to BNC RF Cable # 3	RG 58	NA	NA	NA
BNC to BNC RF Cable # 4	RG 58	NA	NA	NA
BNC to BNC RF Cable # 5	RG 58	NA	NA	NA
BNC to BNC RF Cable # 6	RG 58	NA	NA	NA
BNC to BNC RF Cable # 7	RG 58	NA	NA	NA
N to SMA RF Cable # 1	RG 58	NA	NA	NA
N to SMA RF Cable # 2	RG 58	NA	NA	NA
N to SMA RF Cable # 3	RG 58	NA	NA	NA
Aeroflex Attenuator 30dB	49-30-34-LIM	NA	NA	NA

FCC Transient ATE #1: (SW version: FCC Transient ATE_R1.1.2)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
POWER SUPPLY	6031A	2430A00146	5-Apr-19	5-Apr-20
POWER SENSOR	E4412A	MY41498918	31-Jul-19	31-Jul-20
POWER METER	E4416A	GB41293866	26-Feb-19	26-Feb-21
ATTENUATORS/SWITCH DRIVER	11713A	2508A10141	CNR	CNR
STEP ATTENUATOR/11dB	8494G	MY52300223	2-Aug-19	2-Aug-20
STEP ATTENUATOR/110dB	8496G	MY52000176	9-Aug-19	9-Aug-20
OSCILLOSCOPE	MSO8104A	MY45002372	17-Jun-19	17-Jun-20
AUDIO ANALYZER	8903B	3011A08952	5-Jul-19	5-Jul-20
AUDIO ANALYZER	8903B	3729A17409	4-Jul-19	4-Jul-20
MODULATION ANALYZER	8901B	3226A04052	3-Apr-19	3-Apr-20
SIGNAL GENERATOR	8657B	3427U06025	5-Apr-19	5-Apr-20
SPECTRUM ANAYLYZER	E4440A	MY48250517	1-Aug-19	1-Aug-20
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA
N to N RF Cable # 2	M17/128-RG400	NA	NA	NA
N to N RF Cable # 3	M17/128-RG400	NA	NA	NA
N to N RF Cable # 4	M17/128-RG400	NA	NA	NA
N to N RF Cable # 5	M17/128-RG400	NA	NA	NA
N to N RF Cable # 6	M17/128-RG400	NA	NA	NA
N to N RF Cable # 7	M17/128-RG400	NA	NA	NA
N to N RF Cable # 8	M17/128-RG400	NA	NA	NA
N to N RF Cable # 9	M17/128-RG400	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 2	RG 58	NA	NA	NA
BNC to BNC RF Cable # 3	RG 58	NA	NA	NA
BNC to BNC RF Cable # 4	RG 58	NA	NA	NA
BNC to BNC RF Cable # 5	RG 58	NA	NA	NA
BNC to BNC RF Cable # 6	RG 58	NA	NA	NA
BNC to N RF Cable # 1	RG 58	NA	NA	NA
Aeroflex Attenuator 10dB	49-10-43-LIM	NA	NA	NA
Aeroflex Attenuator 10dB	33-10-34-LIM	NA	NA	NA
SWITCH CONTROL UNIT	3488A	2719A36210	CNR	CNR

CNR→Calibration Not Required

CONDUCTED SPUR EMISSION ATE # 1 (SW version: Conducted Spur ATE_rev 1.23.02)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A32735	CNR	CNR
PSA Series Spectrum Analyzer	E4445A	MY46181732	12-Mar-19	12-Mar-21
POWER SUPPLY	6032A	2723A02219	2-Jul-19	2-Jul-20
HIGH PASS FILTER SWITCH BOX	-	CS001	4-Jul-19	4-Jul-20
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA
N to N RF Cable # 2	SF126/11N/11N	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
Aeroflex Attenuator 30dB	49-30-43-LIM	NA	NA	NA
Aeroflex Attenuator 10dB	33-10-34-LIM	NA	NA	NA

Radiated Emission Station

EMC Chamber 1

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
DRG HORN FREQ.	SAS-571	720	21-Mar-19	21-Mar-21
DRG HORN FREQ.	SAS-571	1143	14-Feb-19	14-Feb-21
POWER SUPPLY (0-60V / 0-50A, 1000W)	6032A	MY41001736	25-May-19	25-May-20
SIGNAL GENERATOR	SMB 100A	181117	8-Nov-18	8-Nov-21
EMI TEST RECEIVER	ESW44	101750	24-Jul-19	24-Jul-20
EMI TEST RECEIVER	ESIB26	100017	19-Jul-19	19-Jul-20
5m Semi-anechoic Chamber	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
BILOG ANTENNA	CBL6112D	30991	5-Aug-19	5-Aug-20
BILOG ANTENNA	CBL6112B	2964	16-Feb-18	16-Feb-20
DATA LOGGER	SDL500	A.016800	19-Mar-19	18-Mar-20
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	23-Jun-19	23-Jun-20
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	001	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-20
LOOP ANTENNA	6502	00208416	5-Sep-19	5-Sep-20
Test Software	EMC_FCC_IC_Bluetooth_RE_Test			
Version	EMC_FCC_RE_v1.6.1			

5.0 Test Condition

5.1. Transmitter Test Conditions

Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By
RF Output Power	**Max**	π4/DQPSK , QAM64	**851.0125 , 860.0125 868.8875**	**Lim Khay Kwang**
Frequency Stability	**Max**	π4/DQPSK	**860.0125**	**Lim Khay Kwang**
Audio Frequency Response (12.5kHz / 25kHz)	**Max**	**Analog**	**NA**	**NA**
Audio Low Pass Filter Response (12.5kHz / 25kHz)	**Max**	Analog	**NA**	**NA**
Modulation limiting (12.5kHz / 25kHz)	**Max**	**Analog**	**NA**	**NA**
Occupied Bandwidth (12.5kHz / 20kHz / 25kHz)	**Max**	π4/DQPSK , QAM64	**851.0125 , 860.0125 868.8875**	**Lim Khay Kwang**
Band Edge Conducted Spurious Emissions (Part 22) (12.5kHz / 20kHz / 25kHz)	**Max**	**Analog, C4FM, Phase II**	**NA**	**NA**
Transient Frequency Behavior *(UHF & VHF Band)* (12.5kHz / 25kHz)	**Max**	**Analog, C4FM, Phase II**	**NA**	**NA**
Adjacent Channel Power *(700MHz Band)* (12.5kHz / 25kHz)	**Max**	π4/DQPSK , QAM64	**851.0125 , 860.0125 868.8875**	**Lim Khay Kwang**
Conducted Spurious Emissions- (12.5kHz / 25kHz)	**Max**	π4/DQPSK , QAM64	**851.0125 , 860.0125 868.8875**	**Lim Khay Kwang**
Radiated Spurious Emission (12.5kHz / 25kHz)	**Max**	π4/DQPSK , QAM64	**851.0125 , 860.0125 868.8875**	**Azil , Faris & Aiman**
GNSS (EIRP for 1559 - 1610MHz) (12.5kHz / 25kHz)	**Max**	**Analog**	**NA**	**NA**
Effective Radiated Power (ERP) (12.5kHz / 25kHz)	**Max**	**Analog**	**NA**	**NA**

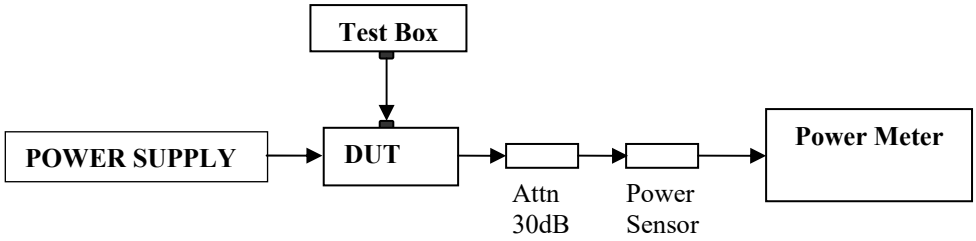
NA → Not Applicable

***Note: The configuration for each test is based on the worst case configuration for the particular test, based on engineering judgment.**

6.0 Transmitter Test Parameters

6.1. RF Output Power

6.1.1. Test Setup



1) The DUT transmitter connected to Power Meter using the 30 dB attenuator and power sensor with above setup.
2) Path loss for the measurement included.
3) All the measurement was done at low, mid, high frequency for each band.
4) Record the power into the test report.

6.1.2. Test Result

HIGH POWER
Two Cavity Combiners, 1 duplexer (SQM09SUM0010A)
π4/DQPSK

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	27.23	1.56	
860.01250	27.92	1.60	
868.88750	26.79	1.59	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	27.35	3.28	
860.01250	28.00	3.30	
868.88750	26.79	3.32	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	27.48	7.69	
860.01250	28.18	7.75	
868.88750	27.04	7.75	

QAM64

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	10.72	1.14	
860.01250	10.47	1.14	
868.88750	10.62	1.15	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	10.47	2.26	
860.01250	10.59	2.28	
868.88750	10.47	2.29	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	10.47	5.61	
860.01250	10.71	5.62	
868.88750	10.23	5.56	

One Hybrid Combiner, 1 duplexer (SQM08SUM0010A)

π4/DQPSK

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	27.35	1.42	
860.01250	28.18	1.44	
868.88750	27.00	1.44	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	27.41	2.97	
860.01250	28.05	3.01	
868.88750	26.97	3.05	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	27.48	7.16	
860.01250	28.12	7.21	
868.88750	26.97	7.29	

QAM64

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	10.71	0.98	
860.01250	10.96	0.99	
868.88750	10.69	1.00	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	10.67	1.97	
860.01250	10.64	2.01	
868.88750	10.59	2.02	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	10.83	5.06	
860.01250	10.69	5.06	
868.88750	10.86	5.12	

No Combiner, 1 duplexer (SQM08SUM0010A)

π4/DQPSK

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	42.46	1.45	
860.01250	44.16	1.44	
868.88750	43.25	1.44	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	42.17	2.99	
860.01250	44.06	2.99	
868.88750	43.35	2.99	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	42.27	7.00	
860.01250	44.87	6.98	
868.88750	43.45	7.00	

QAM64

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	20.89	1.17	
860.01250	21.98	1.17	
868.88750	22.18	1.17	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	20.89	2.32	
860.01250	21.47	2.34	
868.88750	21.13	2.34	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	20.89	5.61	
860.01250	22.86	5.59	
868.88750	21.48	5.60	

LOW POWER

Two Cavity Combiners, 1 duplexer (SQM09SUM0010A)

π4/DQPSK

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.82	0.89	
860.01250	3.87	0.89	
868.88750	3.72	0.89	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.71	1.72	
860.01250	3.80	1.71	
868.88750	3.73	1.70	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.80	4.18	
860.01250	3.89	4.18	
868.88750	3.73	4.19	

QAM64

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.09	0.83	
860.01250	2.19	0.84	
868.88750	2.19	0.82	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.20	1.55	
860.01250	2.22	1.55	
868.88750	2.16	1.57	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.24	3.88	
860.01250	2.15	3.86	
868.88750	2.14	3.86	

One Hybrid Combiner, 1 duplexer (SQM08SUM0010A)

π4/DQPSK

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.82	0.70	
860.01250	3.89	0.70	
868.88750	3.69	0.69	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.81	1.36	
860.01250	3.88	1.45	
868.88750	3.67	1.37	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.81	3.66	
860.01250	3.89	3.68	
868.88750	3.71	3.69	

QAM64

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.25	0.65	
860.01250	2.25	0.67	
868.88750	2.20	0.67	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.20	1.27	
860.01250	2.25	1.26	
868.88750	2.20	1.24	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.24	3.36	
860.01250	2.22	3.36	
868.88750	2.18	3.38	

No Combiner, 1 duplexer (SQM08SUM0010A)

π4/DQPSK

Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.70	0.80	
860.01250	3.89	0.80	
868.88750	3.82	0.00	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.70	1.47	
860.01250	3.89	1.47	
868.88750	3.82	1.47	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	3.69	3.86	
860.01250	3.91	3.86	
868.88750	3.82	3.86	

QAM64

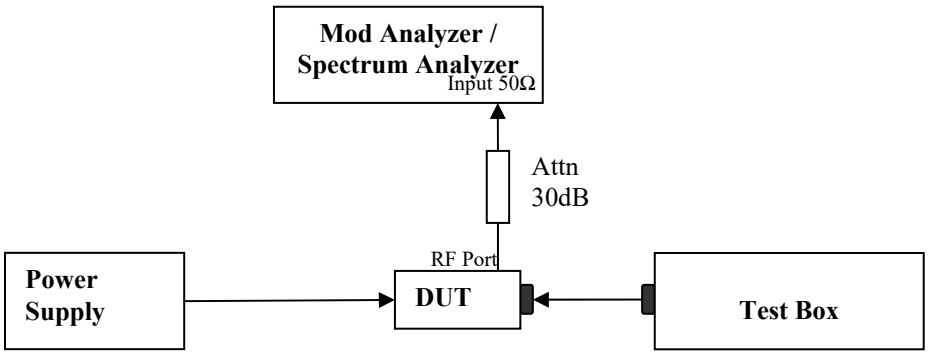
Temperature	25˚C		
Voltage (V)	230V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.15	0.76	
860.01250	2.25	0.76	
868.88750	2.30	0.76	

Temperature	25˚C		
Voltage (V)	110V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.19	1.39	
860.01250	2.26	1.40	
868.88750	2.15	1.40	

Temperature	25˚C		
Voltage (V)	48V		
Frequency (MHz)	Max Power (W)	Current (A)	Remark
851.01250	2.09	3.69	
860.01250	2.25	3.69	
868.88750	2.20	3.69	

6.2. Frequency Stability

6.2.1. Test Setup



1) The DUT transmitter output port was connected to Modulation / Spectrum Analyzer.
2) Path loss for the measurement included.
3) Transmit the DUT and record the freq in MCF_{MHz}.
4) Test in 2 conditions:
   - Temperature: The frequency of the transmitter was measured from -30°C to 50°C.
   - Supply Voltage:
     -Mobile: The frequency of the transmitter was measured from 85% to 115% of the nominal operating input voltage.
     -Portable: The frequency of the transmitter was measured from nominal ± x % as specified by the manufacturer

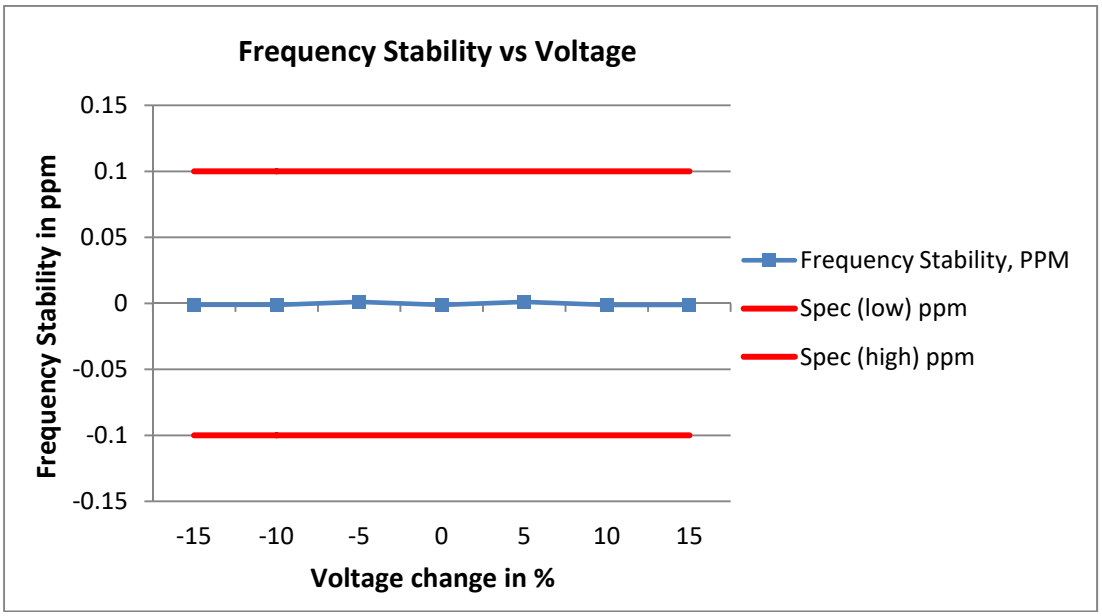
5) Calculate the ppm frequency error by the following:

$$ppm\ error = \left(\frac{MCF_{MHz}}{ACF_{MHz}} - 1\right) * 10^6$$

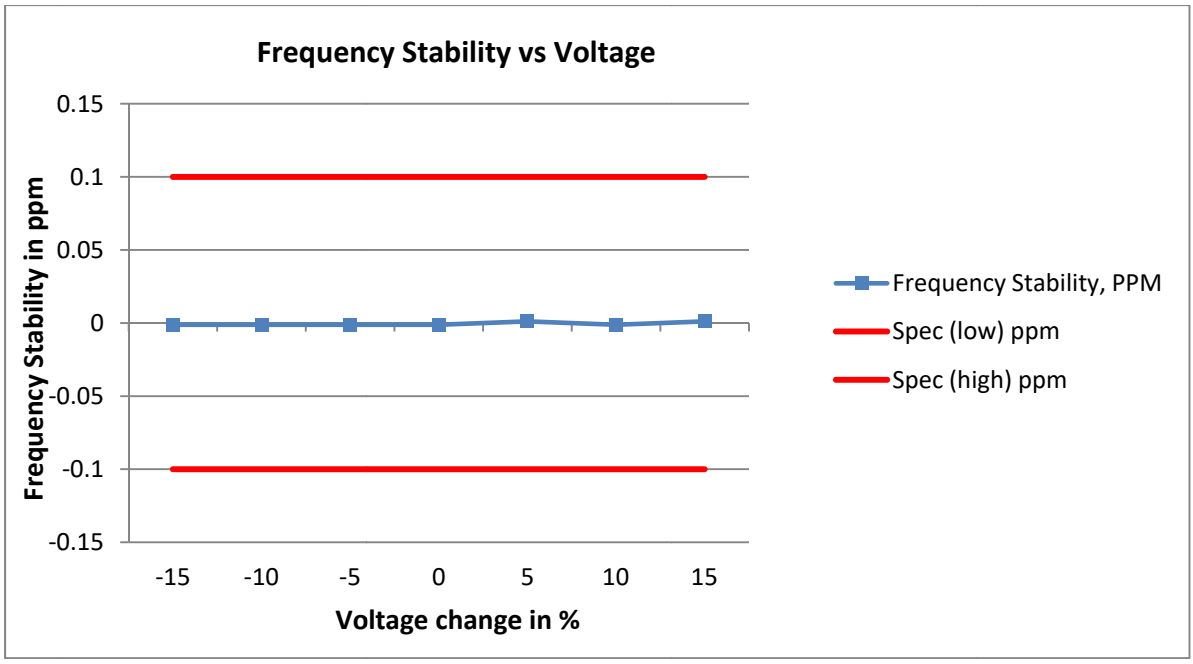
Where: MCF_{MHz} is the Measured Carrier Frequency in MHz
ACF_{MHz} is the Assigned Carrier Frequency in MHz

6.2.2. Test Result

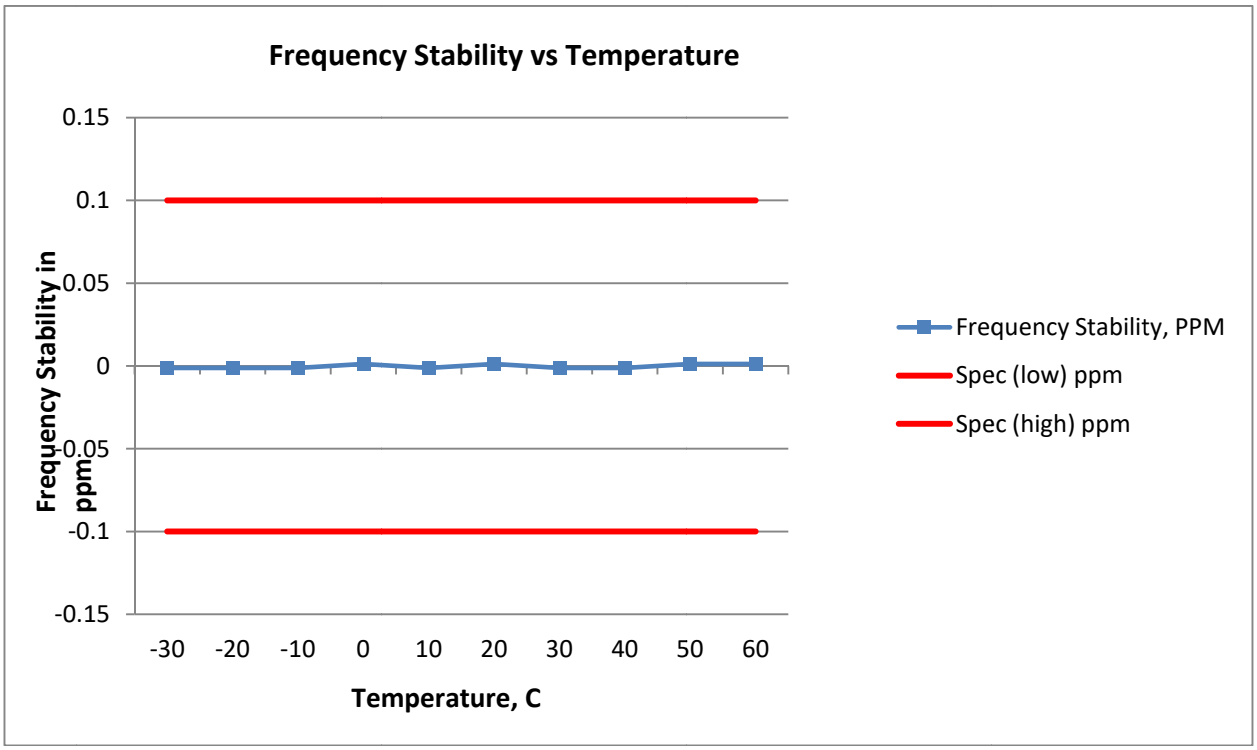
Two Cavity Combiners, 1 duplexer (SQM09SUM0010A)



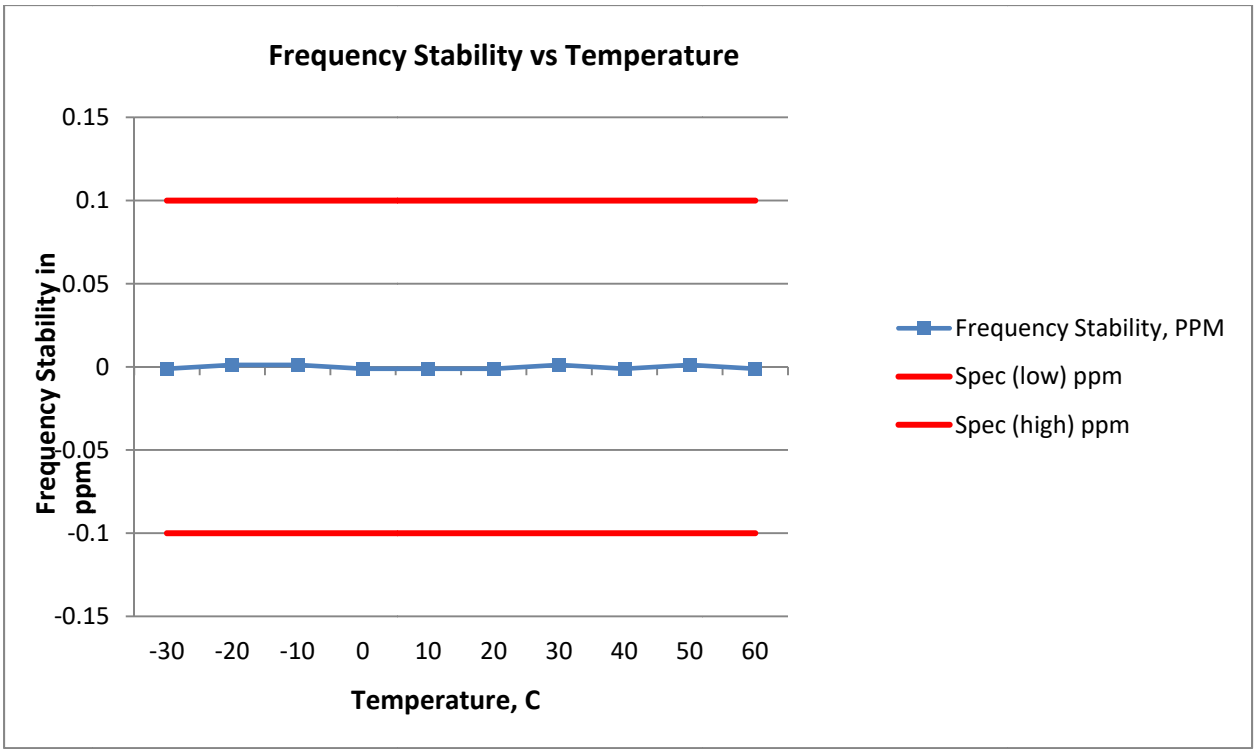
Frequency / Channel Spacing	860.0125 MHz / 25kHz				
Temperature, C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-15	93.5	860.012499	0.001162774	-0.1	0.1
-10	99	860.012501	-0.001162774	-0.1	0.1
-5	104.5	860.012501	-0.001162774	-0.1	0.1
0	110	860.012501	-0.001162774	-0.1	0.1
5	115.5	860.012501	-0.001162774	-0.1	0.1
10	121	860.012501	-0.001162774	-0.1	0.1
15	126.5	860.012501	-0.001162774	-0.1	0.1



Frequency / Channel Spacing	860.0125 MHz / 25kHz				
Temperature, C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-15	40.80	860.012499	0.001162774	-0.1	0.1
-10	43.20	860.012501	-0.001162774	-0.1	0.1
-5	45.60	860.012501	-0.001162774	-0.1	0.1
0	48.00	860.012501	-0.001162774	-0.1	0.1
5	50.40	860.012499	0.001162774	-0.1	0.1
10	52.80	860.012499	0.001162774	-0.1	0.1
15	55.20	860.012501	-0.001162774	-0.1	0.1

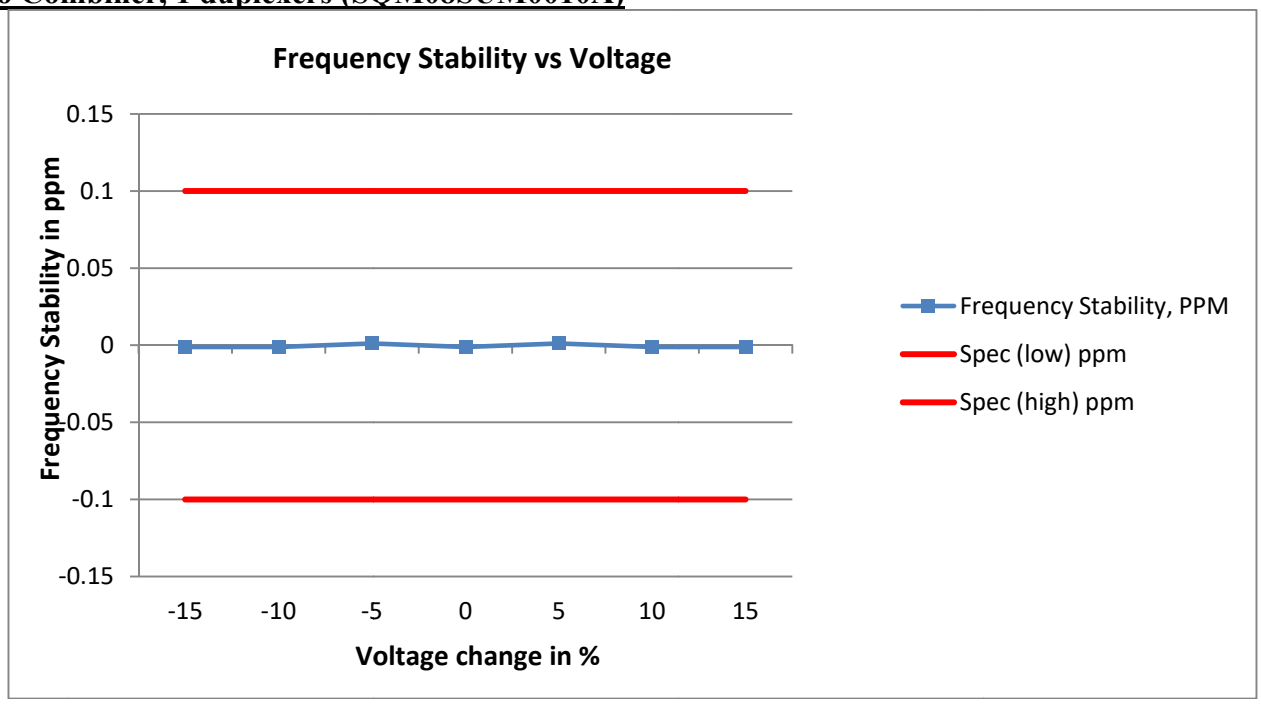


Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	110V AC			
Temperature, C	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-30	860.012501	-0.001162774	-0.1	0.1
-20	860.012501	-0.001162774	-0.1	0.1
-10	860.012499	0.001162774	-0.1	0.1
0	860.012499	0.001162774	-0.1	0.1
10	860.012501	-0.001162774	-0.1	0.1
20	860.012499	0.001162774	-0.1	0.1
30	860.012501	-0.001162774	-0.1	0.1
40	860.012499	0.001162774	-0.1	0.1
50	860.012499	0.001162774	-0.1	0.1
60	860.012499	0.001162774	-0.1	0.1

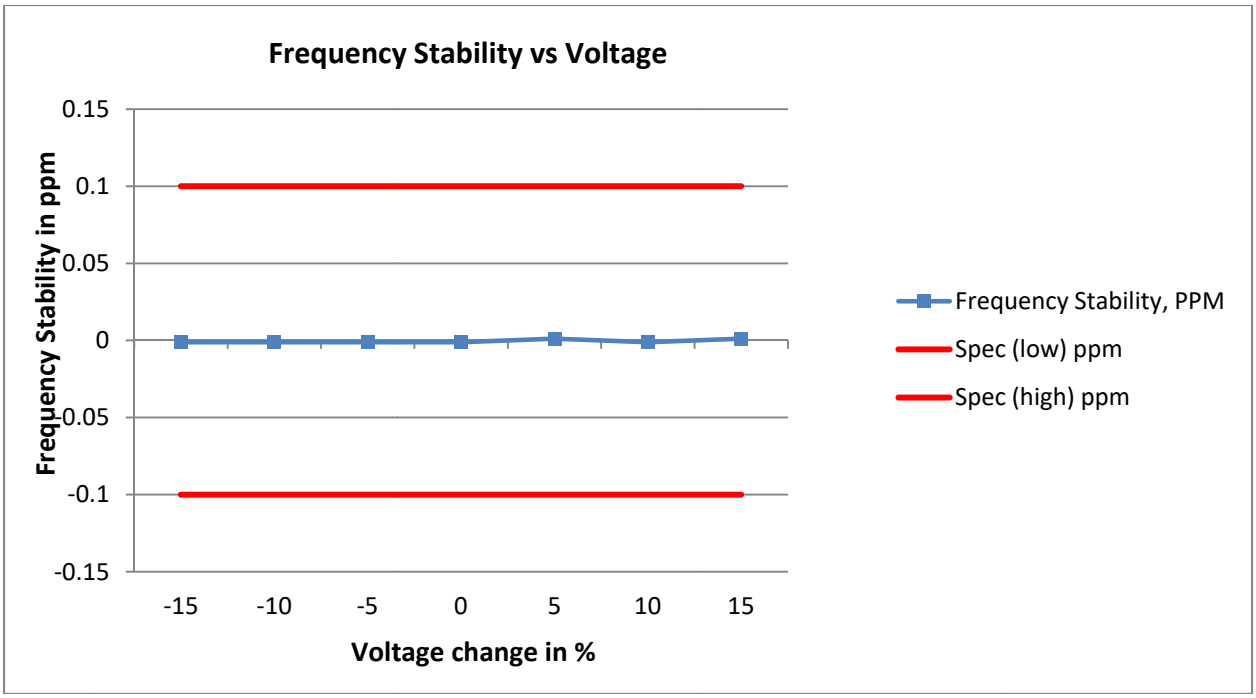


Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	48V DC			
Temperature, C	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-30	860.012501	-0.001162774	-0.1	0.1
-20	860.012501	-0.001162774	-0.1	0.1
-10	860.012499	0.001162774	-0.1	0.1
0	860.012501	-0.001162774	-0.1	0.1
10	860.012501	-0.001162774	-0.1	0.1
20	860.012501	-0.001162774	-0.1	0.1
30	860.012501	-0.001162774	-0.1	0.1
40	860.012499	0.001162774	-0.1	0.1
50	860.012501	-0.001162774	-0.1	0.1
60	860.012501	-0.001162774	-0.1	0.1

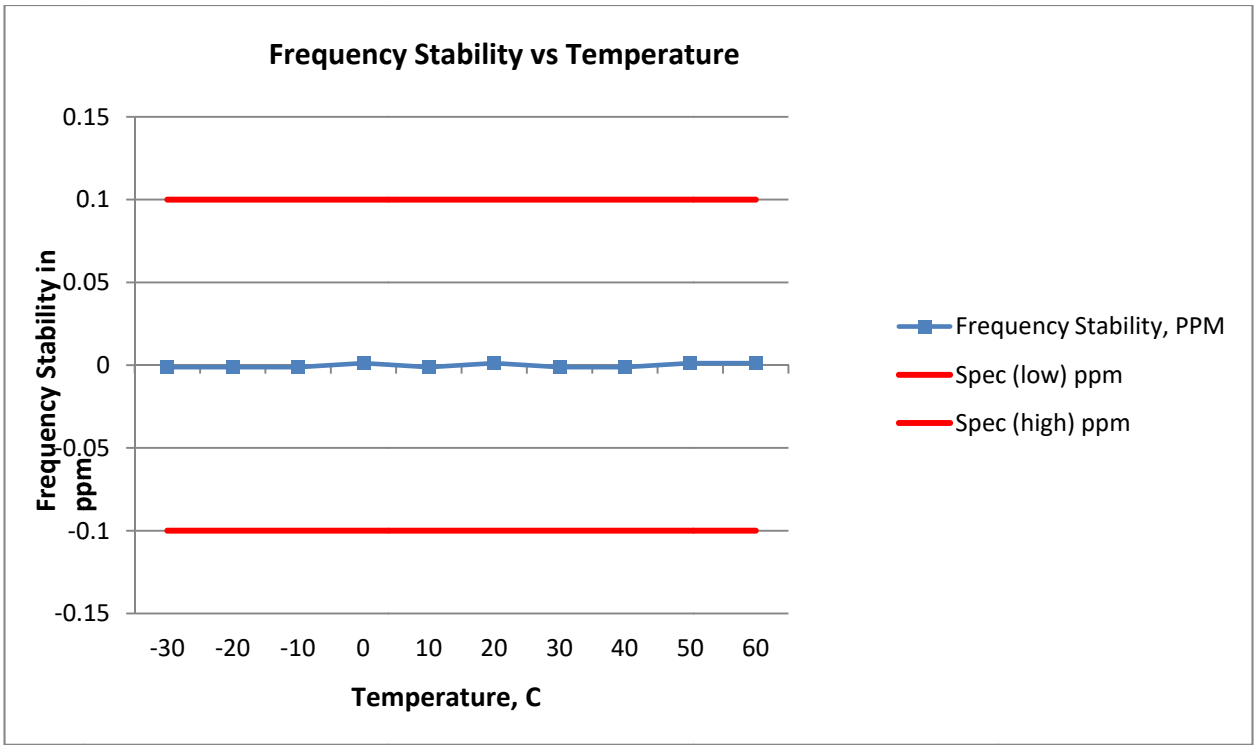
No Combiner, 1 duplexers (SQM08SUM0010A)



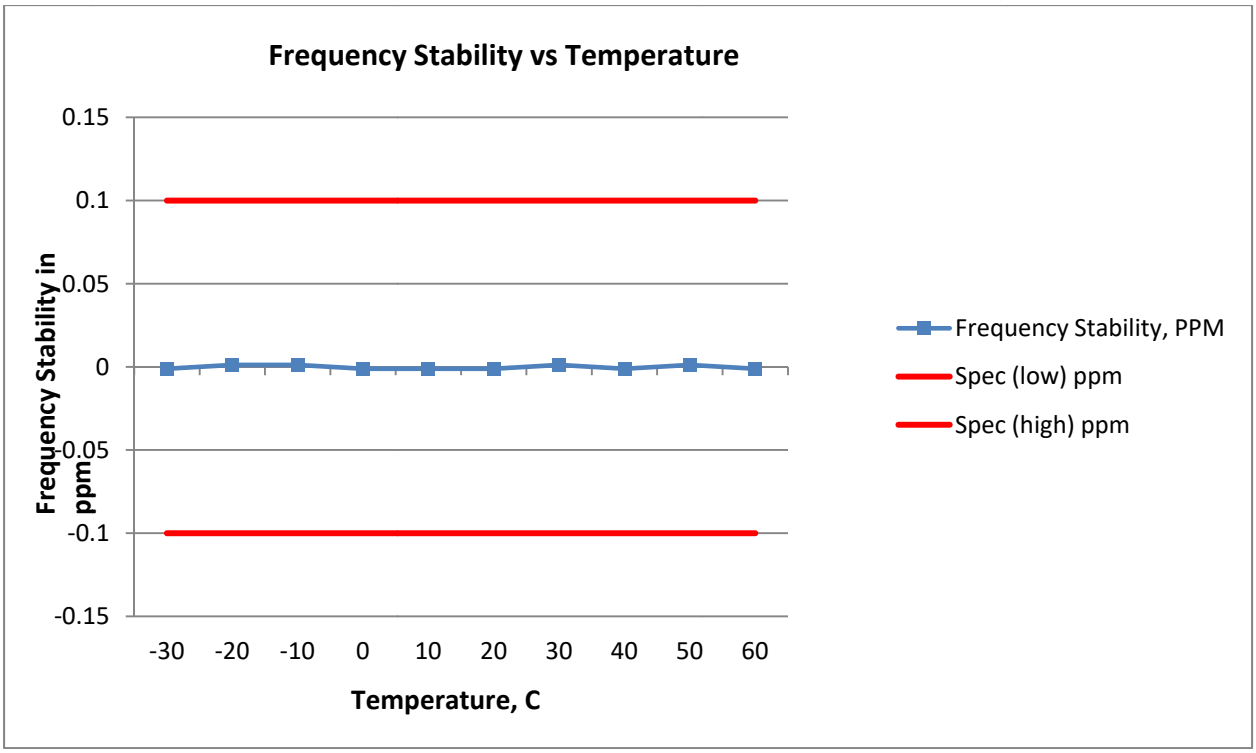
Frequency / Channel Spacing	860.0125 MHz / 25kHz				
Temperature, C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-15	93.5	860.012501	-0.001162774	-0.1	0.1
-10	99	860.012501	-0.001162774	-0.1	0.1
-5	104.5	860.012499	0.001162774	-0.1	0.1
0	110	860.012501	-0.001162774	-0.1	0.1
5	115.5	860.012499	0.001162774	-0.1	0.1
10	121	860.012501	-0.001162774	-0.1	0.1
15	126.5	860.012501	-0.001162774	-0.1	0.1



Frequency / Channel Spacing	860.0125 MHz / 25kHz				
Temperature, C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-15	40.80	860.012501	-0.001162774	-0.1	0.1
-10	43.20	860.012501	-0.001162774	-0.1	0.1
-5	45.60	860.012501	-0.001162774	-0.1	0.1
0	48.00	860.012501	-0.001162774	-0.1	0.1
5	50.40	860.012499	0.001162774	-0.1	0.1
10	52.80	860.012501	-0.001162774	-0.1	0.1
15	55.20	860.012499	0.001162774	-0.1	0.1



Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	110V AC			
Temperature, C	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-30	860.012501	-0.001162774	-0.1	0.1
-20	860.012501	-0.001162774	-0.1	0.1
-10	860.012501	-0.001162774	-0.1	0.1
0	860.012499	0.001162774	-0.1	0.1
10	860.012501	-0.001162774	-0.1	0.1
20	860.012499	0.001162774	-0.1	0.1
30	860.012501	-0.001162774	-0.1	0.1
40	860.012501	-0.001162774	-0.1	0.1
50	860.012499	0.001162774	-0.1	0.1
60	860.012499	0.001162774	-0.1	0.1



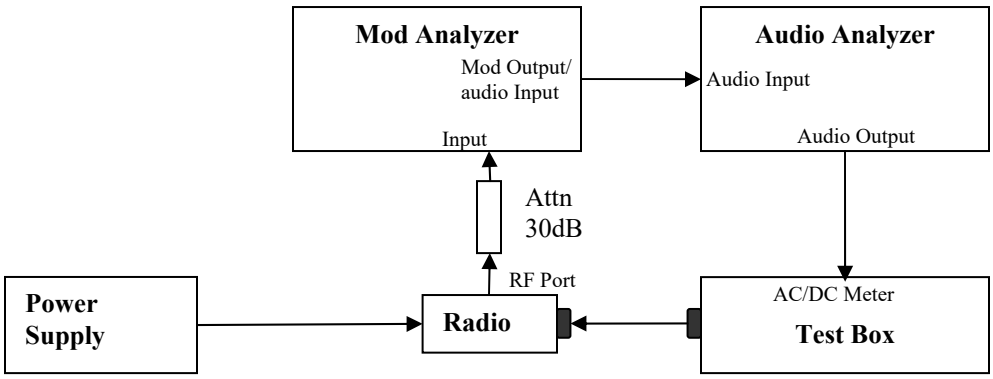
Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	48V DC			
Temperature, C	Frequency, MHz	Frequency Stability, PPM	Spec (low) ppm	Spec (high) ppm
-30	860.012501	-0.001162774	-0.1	0.1
-20	860.012499	0.001162774	-0.1	0.1
-10	860.012499	0.001162774	-0.1	0.1
0	860.012501	-0.001162774	-0.1	0.1
10	860.012501	-0.001162774	-0.1	0.1
20	860.012501	-0.001162774	-0.1	0.1
30	860.012499	0.001162774	-0.1	0.1
40	860.012501	-0.001162774	-0.1	0.1
50	860.012499	0.001162774	-0.1	0.1
60	860.012501	-0.001162774	-0.1	0.1

6.2.3. Test Limit

As per manufacturer declared spec +/- 0.1ppm

6.3. Audio Frequency Response

6.3.1. Test Setup

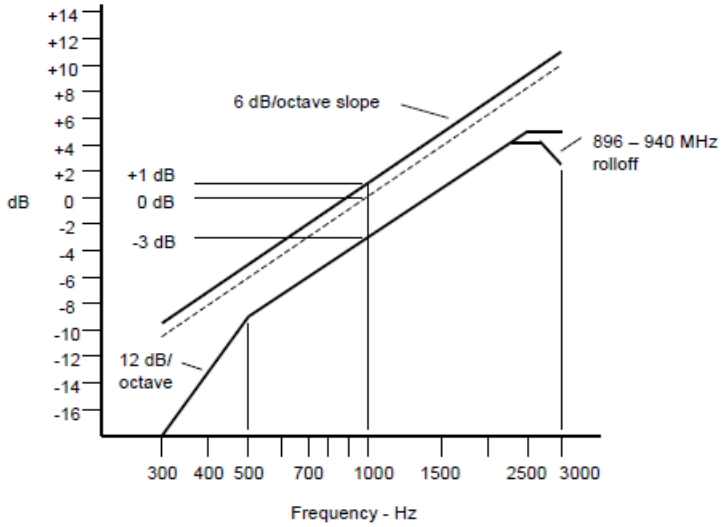


1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Set the audio bandwidth filter to 15 kHz and 50 kHz.
4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the Full rated system deviation.
5) On audio analyzer, set the rated level as reference to zero.
6) Vary the audio frequency from 300 Hz to 3 kHz. Record the change in dB on the audio analyzer.

6.3.2. Test Result

Not applicable.

6.3.3. Test Limit

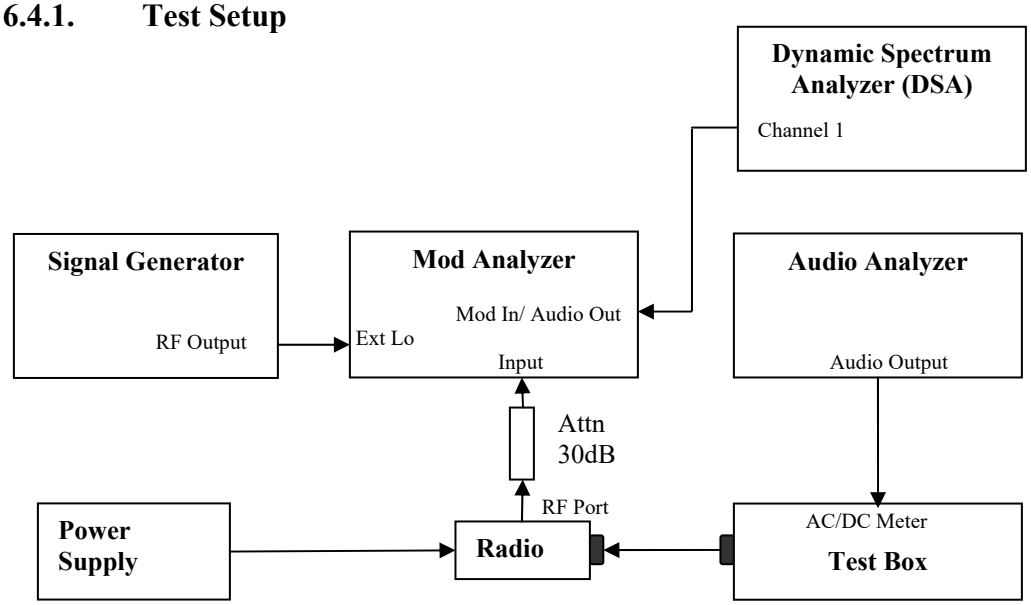


Note:

- *There are additional 6 dB per octave attenuation is allowed from 2.5KHz to 3KHz in equipment 25MHz to 869MHz radio.*
- *Additional 6 dB per octave attenuation is allowed from 2.3KHz to 2.7KHz & additional 12 dB per octave attenuation is allowed from 2.7KHz to 3KHz in equipment 896MHz to 940MHz radio.*

6.4. Audio Low Pass Filter Response

6.4.1. Test Setup

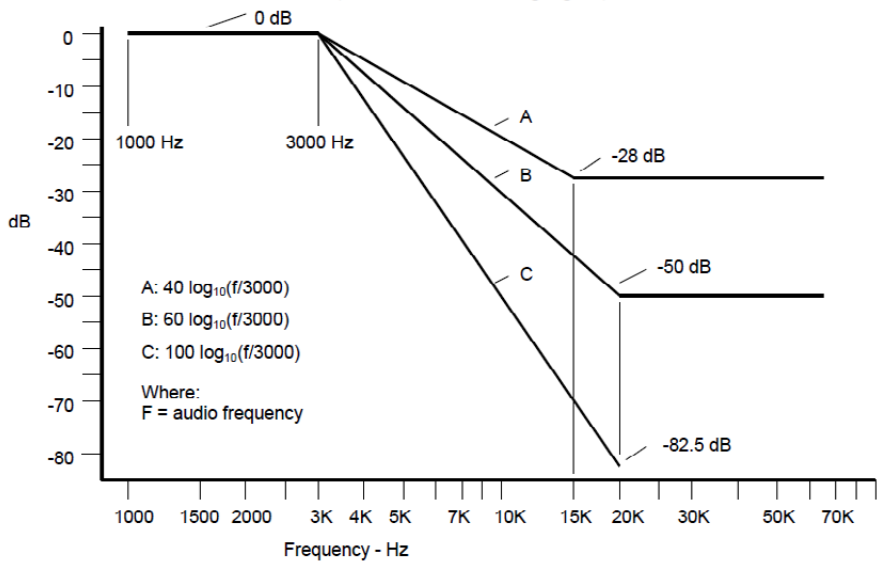


1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Press 23.1SPCL on modulation analyzer to enable the external LO from Sigen.
4) Set the Sigen frequency to Fc + 1.5 MHz, RF output level to 0dBm without modulation.
5) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
6) Up the amplitude by 20dB.
7) On DSA, get the reference point to 0dB.
8) Vary the frequency on audio analyzer from 3 kHz to 20 kHz, record the audio tone from DSA.

6.4.2. Test Result

Not applicable.

6.4.3. Test Limit



For audio frequencies above 3000 Hz, the audio response of the post limiter low-pass filter shall meet or exceed the following requirements:

a) For equipment operating on 20, 25 or 30 kHz channel bandwidth in the 25 MHz to 174 MHz range:

At frequencies from 3000 Hz through 15,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: $40 \log_{10}(f / 3000)$ dB

where: f is the audio frequency in Hz.

At frequencies above 15,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz, by at least: 28 dB.

b) For equipment operating with 25 kHz bandwidth channels between 406 and 512 MHz through 896 MHz, and between 929 MHz through 930 MHz:

At frequencies from 3000 Hz through 20,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz by at least: $60 \log_{10}(f / 3000)$ dB

where: f is the audio frequency in Hz.

At frequencies above 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: 50 dB.

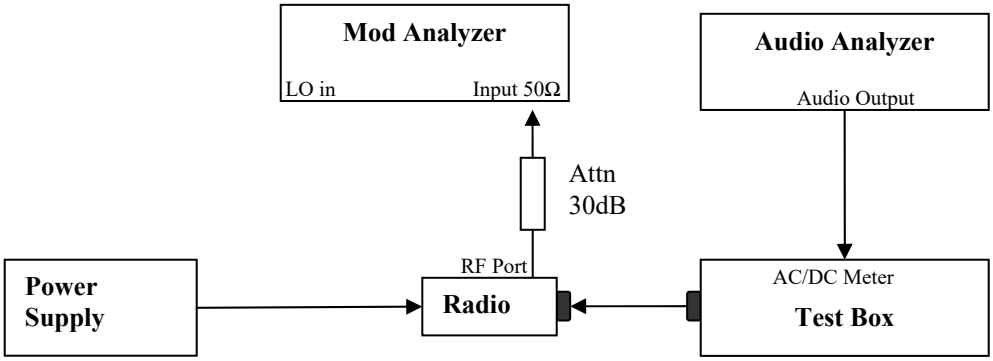
c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.

At frequencies from 3000 Hz through 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: $100 \log_{10}(f / 3000)$ dB

where: f is the audio frequency in Hz.

6.5. Modulation Limiting

6.5.1. Test Setup



1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Set the audio bandwidth filter to 15 kHz.
4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
5) Record the frequency deviation as 0dB input level at 1kHz audio frequency.
6) Repeat the step and record the frequency deviation from -20 dB to 20dB by 5 dB increments and different audio freq 300 Hz, 2.5 kHz and 3 kHz.

6.5.2. Test Result

Not applicable.

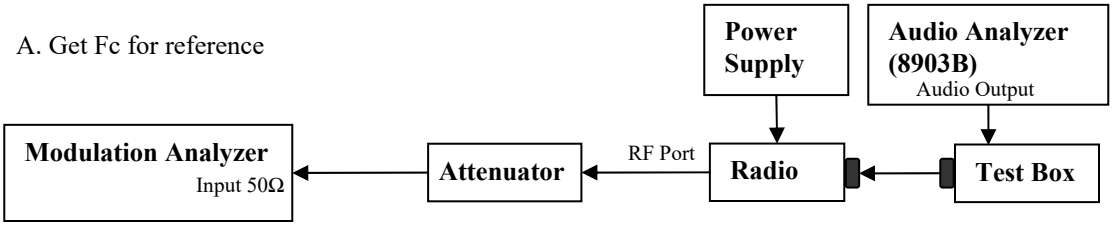
6.5.3. Test Limit

Modulation Limiting shall not exceed 100 percent.

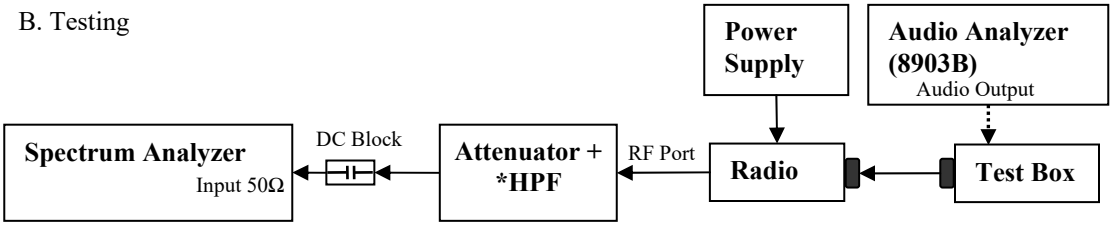
6.6. Occupied Bandwidth

6.6.1. Test Setup (Analog)

A. Get Fc for reference



B. Testing



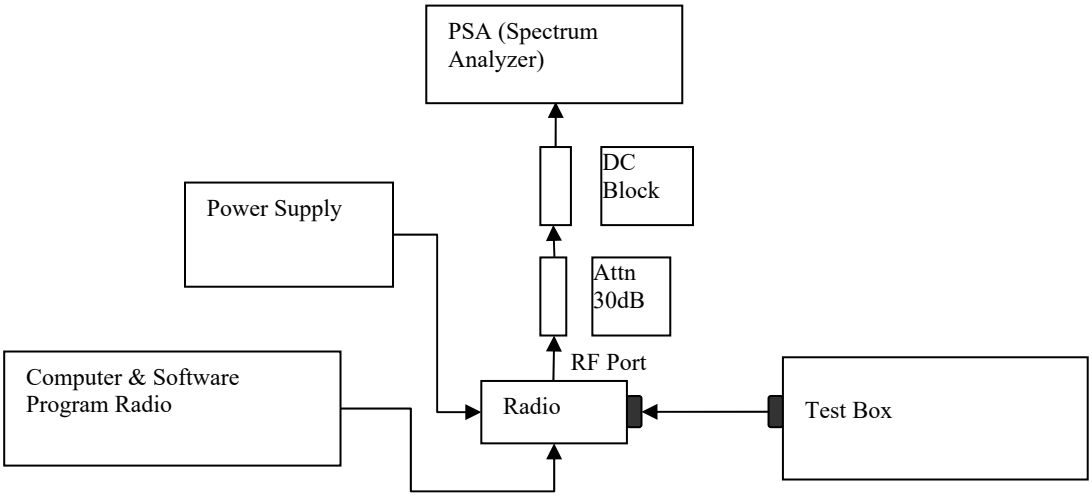
1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey the DUT.
4) Path loss for the measurement included.
5) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
6) Key in the Fc and Resolution Bandwidth (1 ~ 5 % of emission designator).
7) Transmit the DUT and record the occupied Bandwidth frequency.
8) Preset the spectrum analyzer for sideband spectrum measurement.
9) Set the span and Resolution Bandwidth (according to FCC/ ISED standard).
10) Save the screen shot as modulated signal
11) Remove the audio tone from audio analyzer to capture unmodulated signal.

* Only HPF added for Mask 80.211 measurement with attenuator.

6.6.2. Test Result (Analog)

Not applicable.

6.6.3. Test Setup (Digital)



1) Program and set radio to operate in desire test frequency and digital mode with modulation. (*4FSK, C4FM or other digital modulation form).
2) Path loss for the measurement included.
3) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
4) Key in the Fc and Resolution Bandwidth (1 ~ 5 % of emission designator).
5) Transmit the DUT and record the occupied Bandwidth frequency.
6) Preset the spectrum analyzer for modulation emission spectrum measurement.
7) Set the span and Resolution Bandwidth (according to FCC/ ISED standard).
8) Capture the screen shot as modulated signal.

*Note:

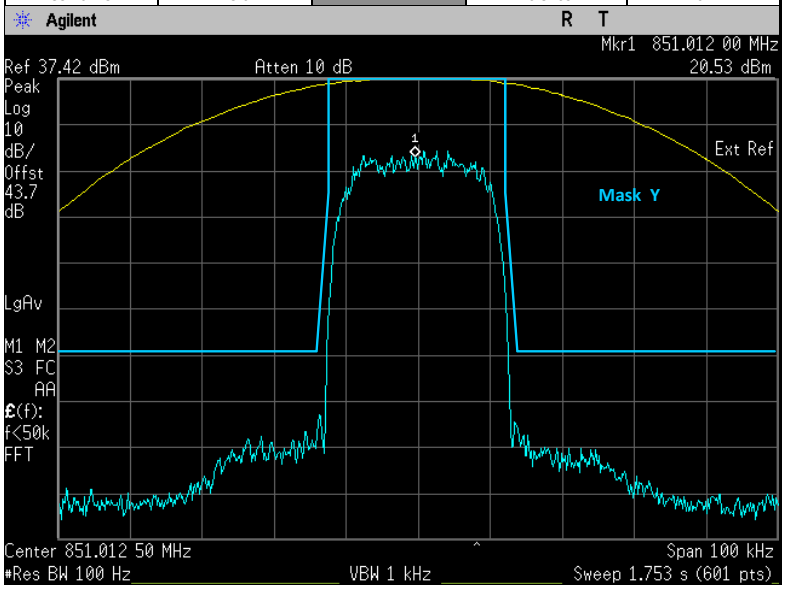
- All emission designators utilize a high deviation test patter n for the below tests, and are therefore identical. Therefore, only emission designator D7W will be shown.
- Based on 90.209 and 90.210, equipment is allowed to use an authorized bandwidth of up to 22kHz if it either meets emission mask 90.691 or ACP limits in 90.221. Both results can be seen in this report.

6.6.4. Test Result (Digital π4/DQPSK , QAM64)

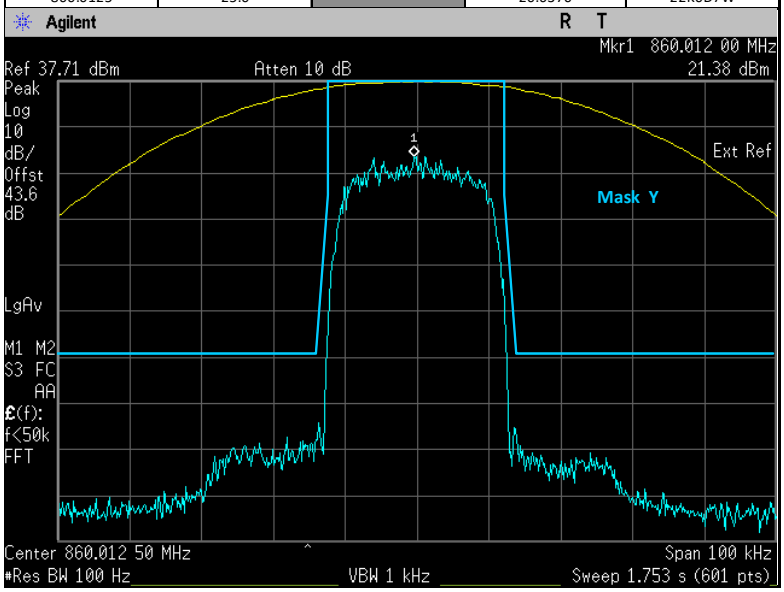
Two Cavity Combiners, 1 duplexer (SQM09SUM0010A)

π4/DQPSK

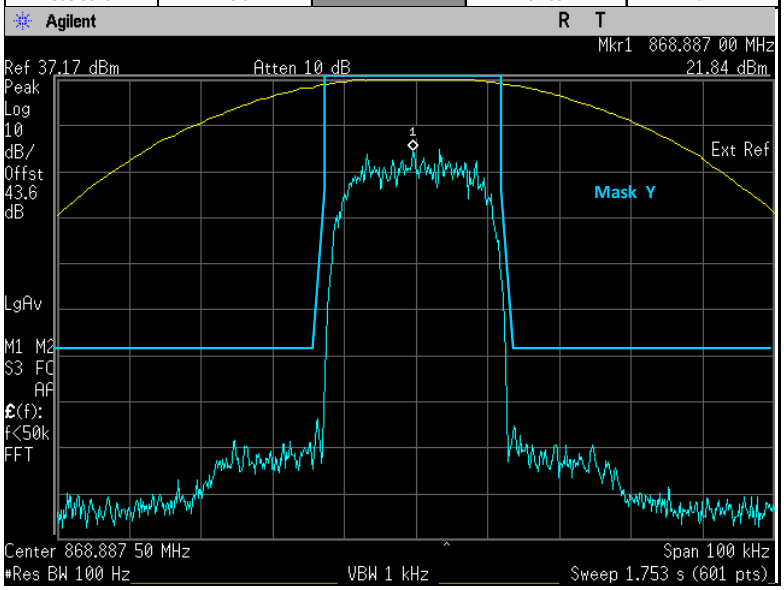
Modulation			Rules Part
π4/DQPSK			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
851.0125	25.0		20.8209	22K0D7W



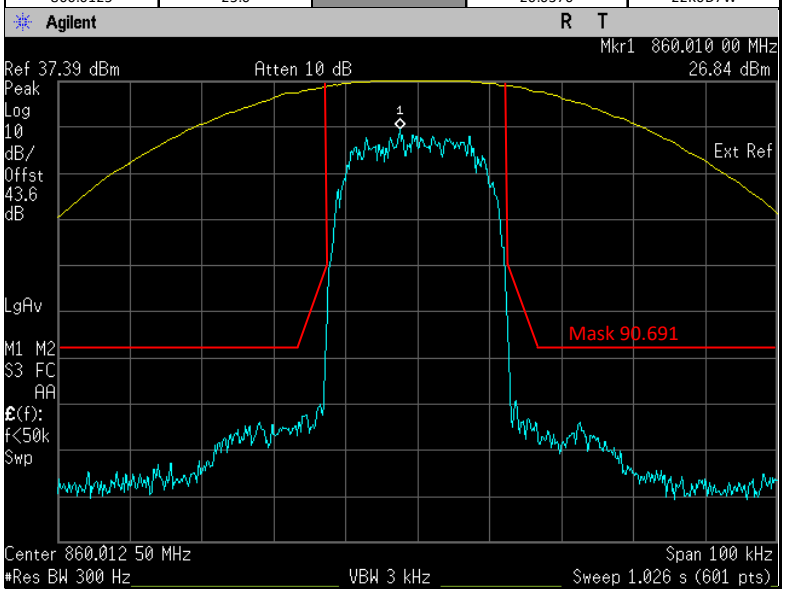
Modulation			Rules Part
π4/DQPSK			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		20.6370	22K0D7W



Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
868.8875	25.0		20.7857	22K0D7W

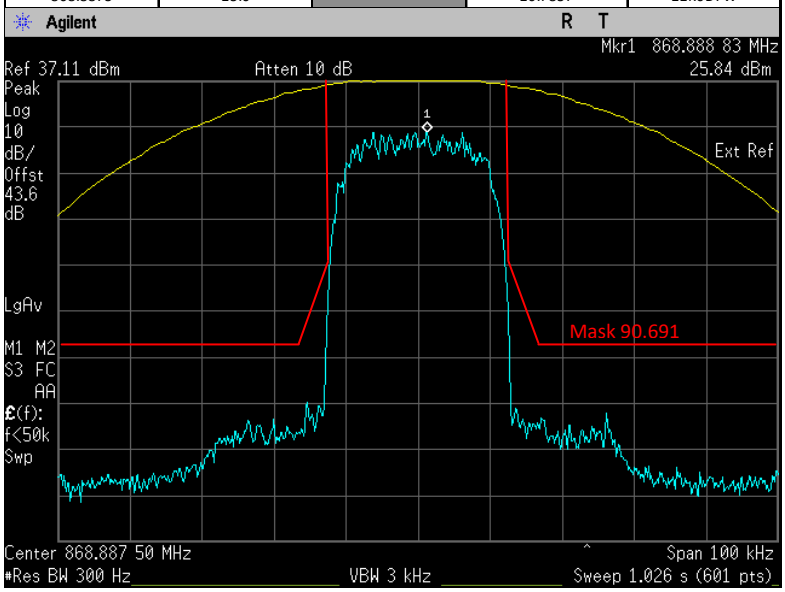


Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		20.6370	22K0D7W



Modulation	Rules Part
π4/DQPSK	

Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
868.8875	25.0		20.7857	22K0D7W



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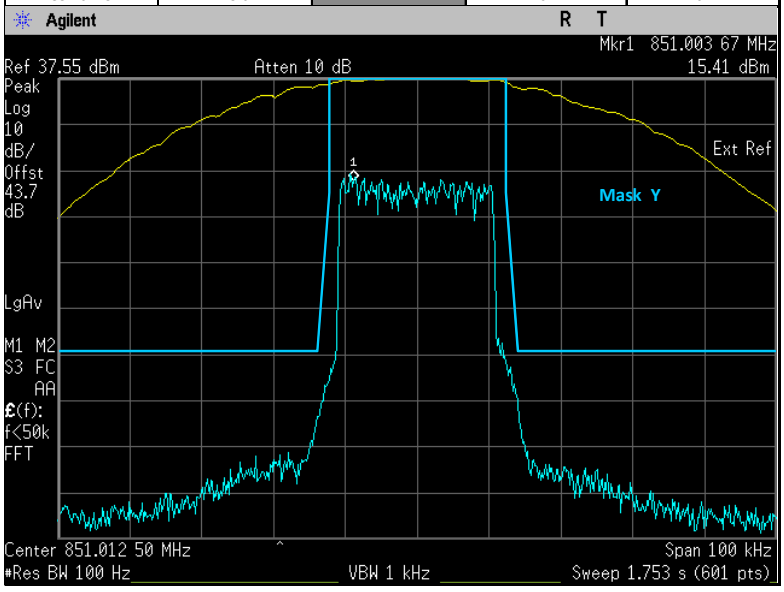
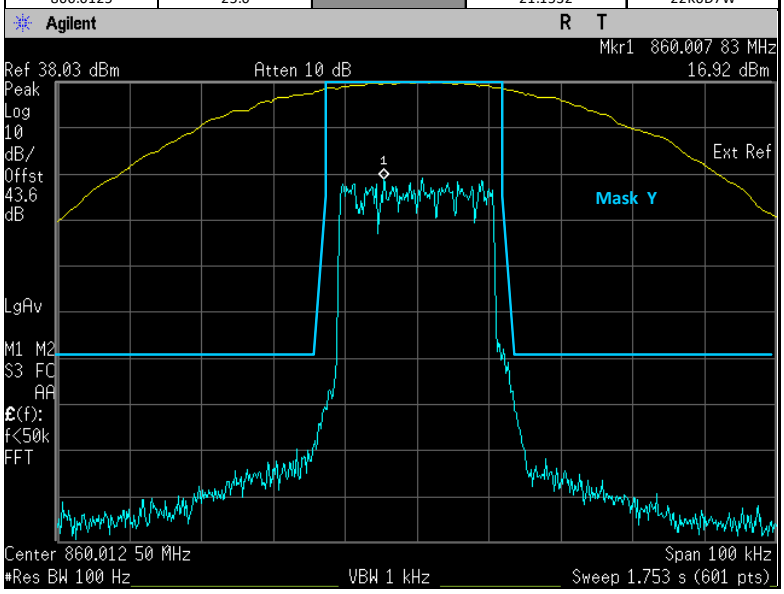
QAM64

Modulation	Rules Part
QAM64	

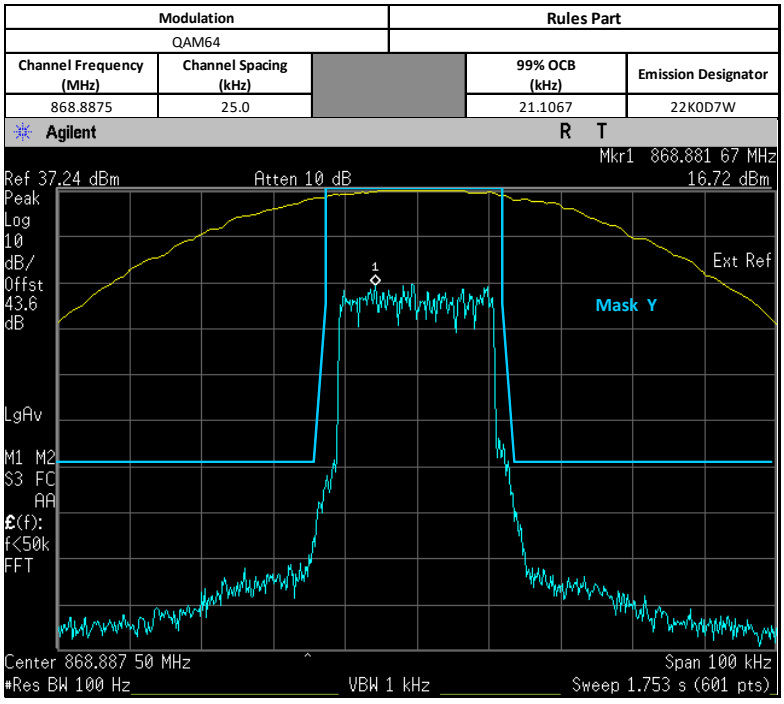
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
851.0125	25.0		21.0414	22K0D7W



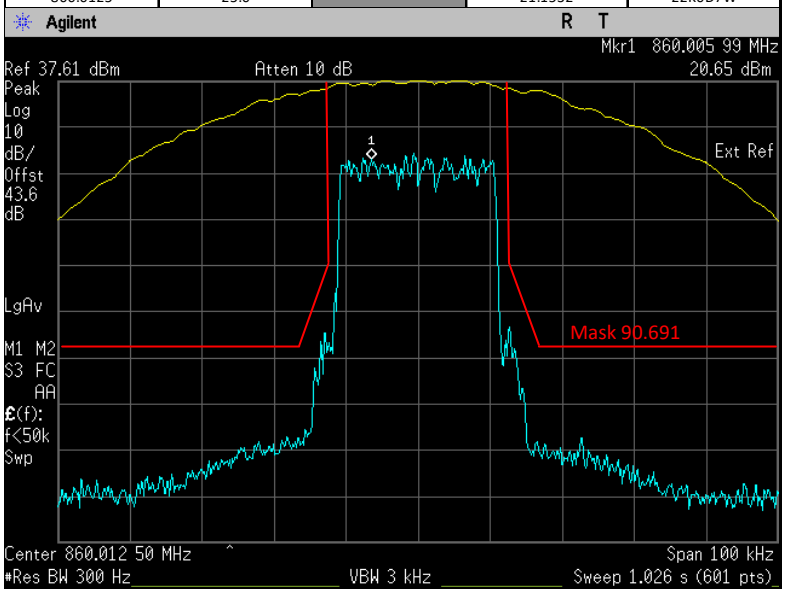
Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		21.1532	22K0D7W



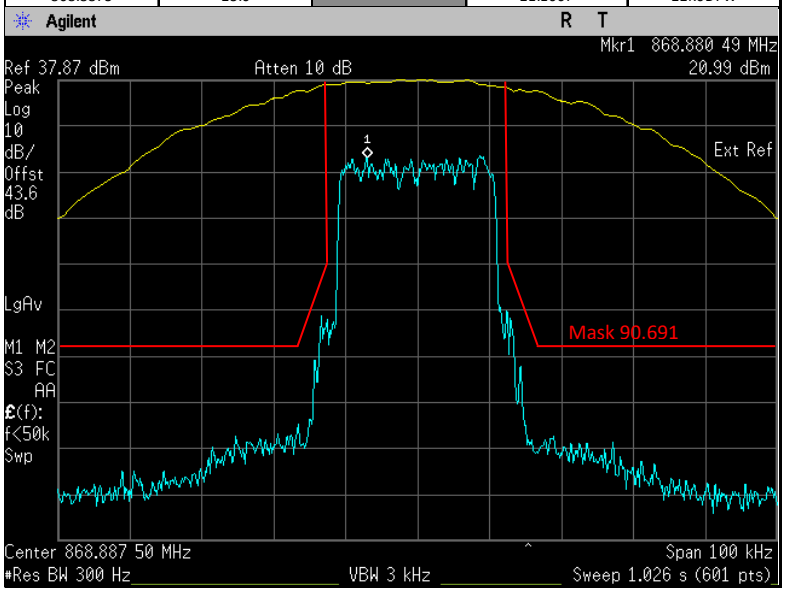
Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
868.8875	25.0		21.1067	22K0D7W



Modulation	Rules Part			
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		21.1532	22K0D7W



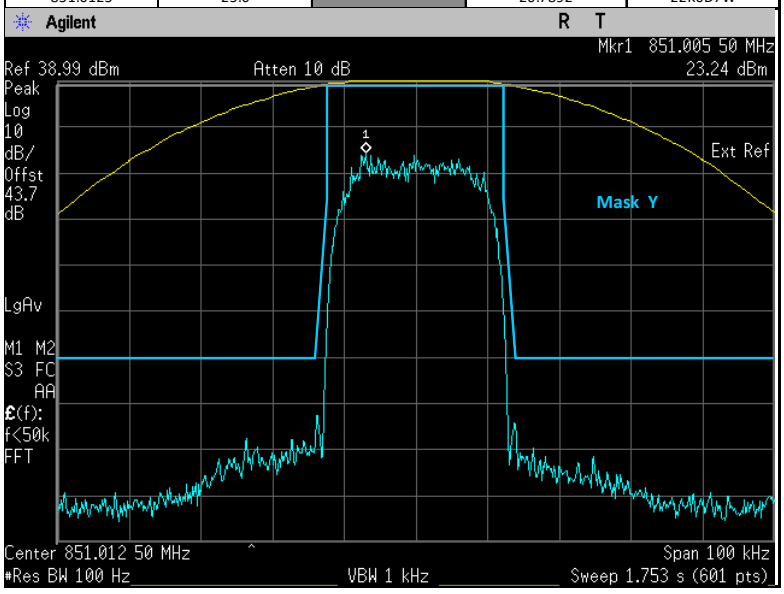
Modulation	Rules Part			
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
868.8875	25.0		21.1067	22K0D7W



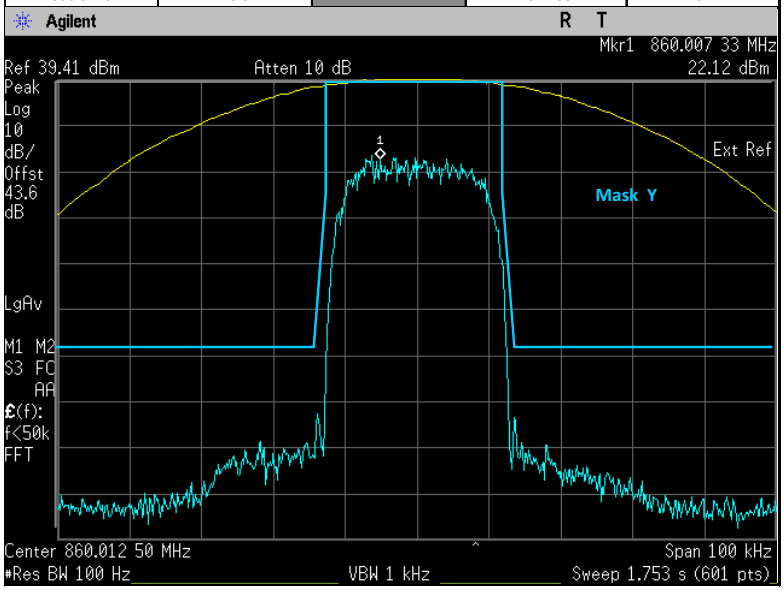
No Combiners, 1 duplexers (SQM08SUM0010A)

π4/DQPSK

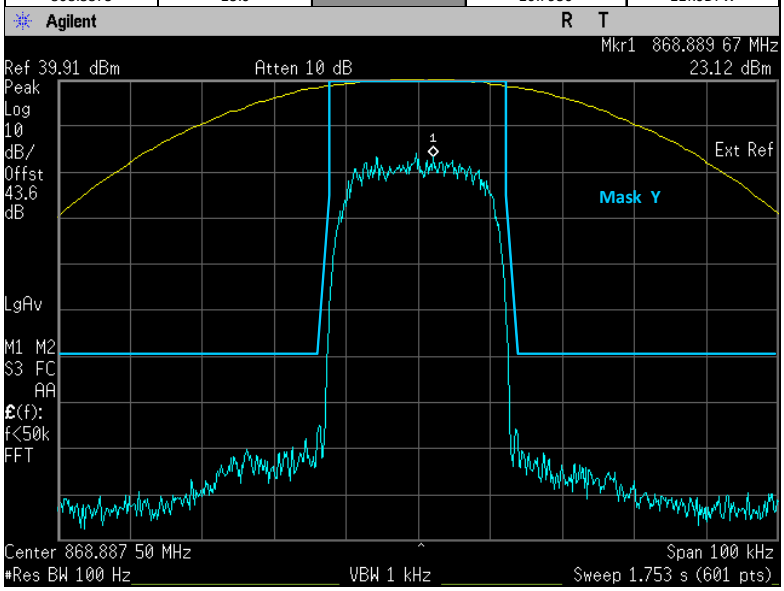
Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
851.0125	25.0		20.7892	22K0D7W



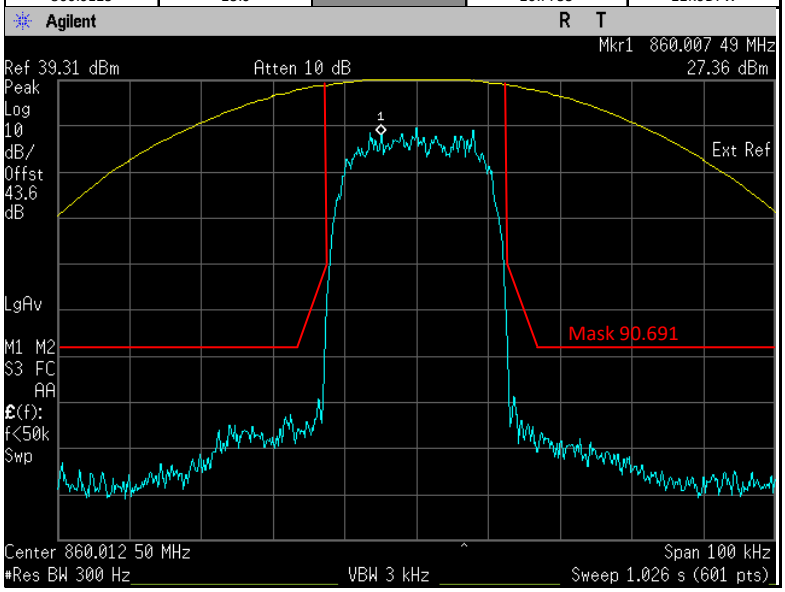
Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		20.7755	22K0D7W



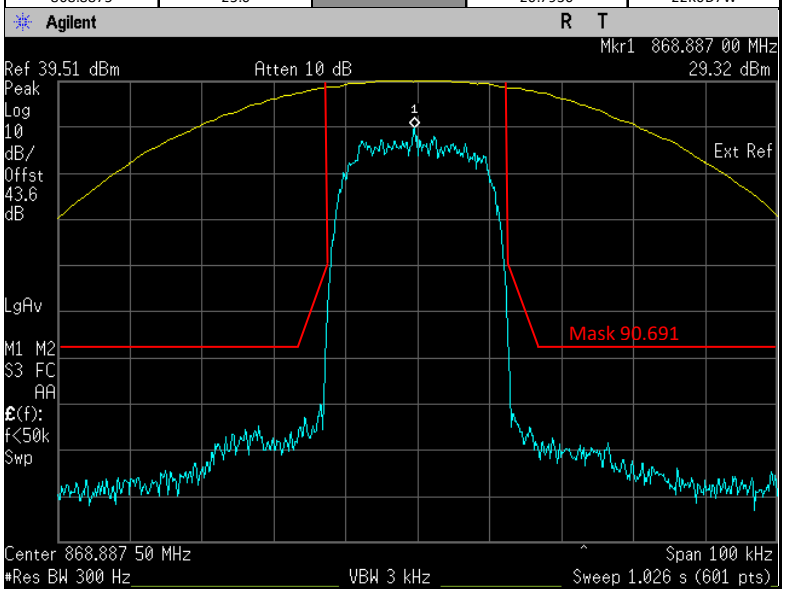
Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
868.8875	25.0		20.7930	22K0D7W



Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		20.7755	22K0D7W

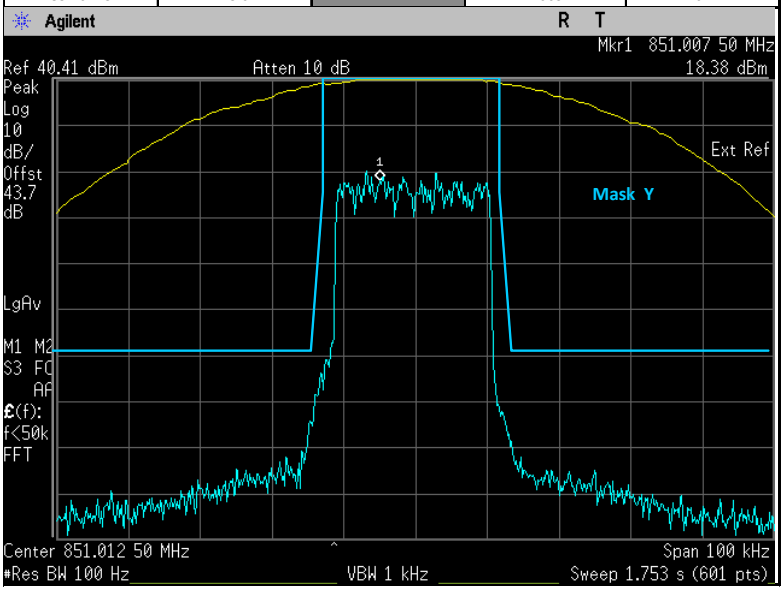


Modulation			Rules Part	
π4/DQPSK				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
868.8875	25.0		20.7930	22K0D7W

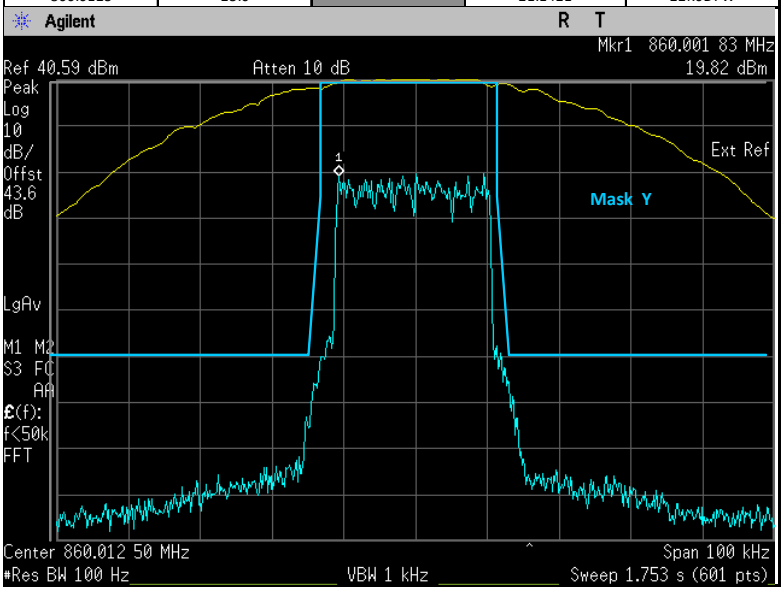


QAM64

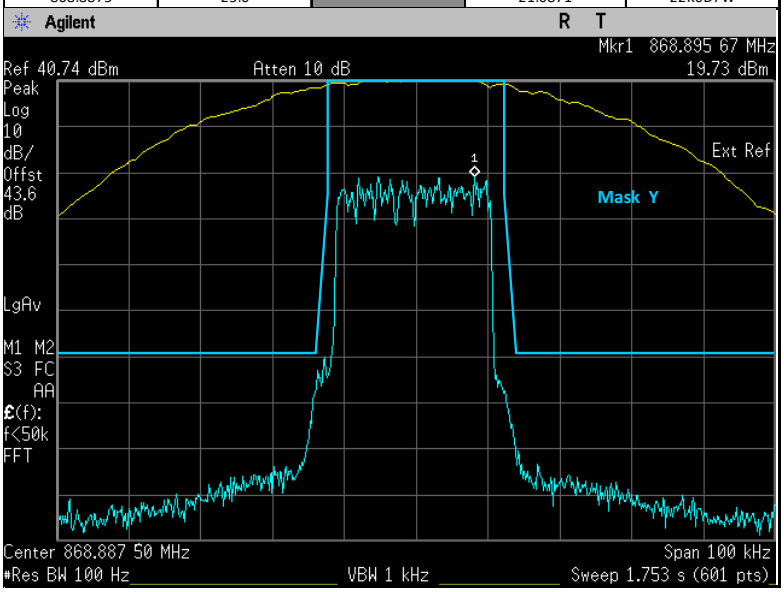
Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
851.0125	25.0		21.0692	22K0D7W



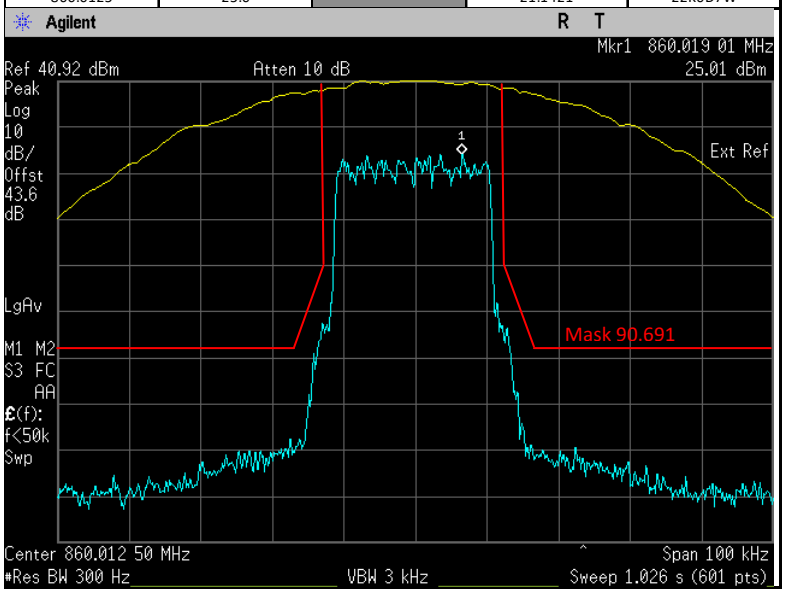
Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
860.0125	25.0		21.1421	22K0D7W



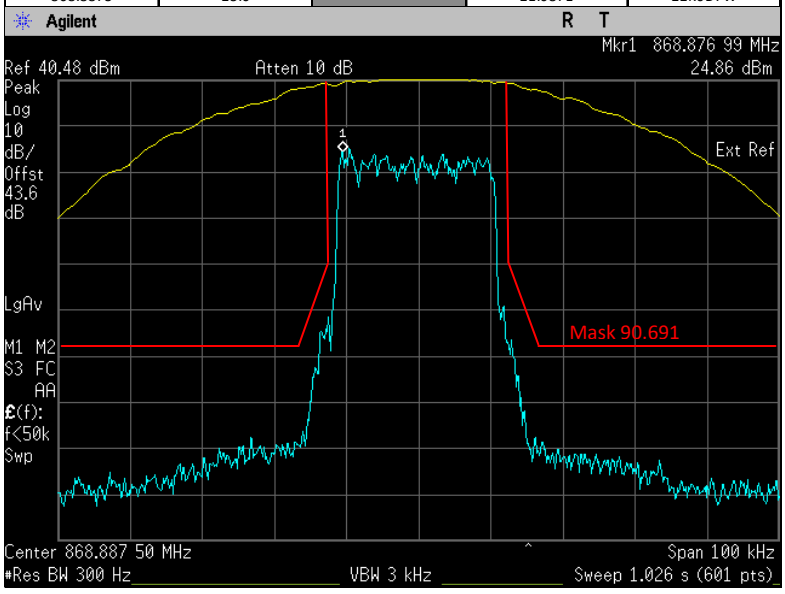
Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
868.8875	25.0		21.0871	22K0D7W



Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
860.0125	25.0		21.1421	22K0D7W



Modulation			Rules Part	
QAM64				
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
868.8875	25.0		21.0871	22K0D7W



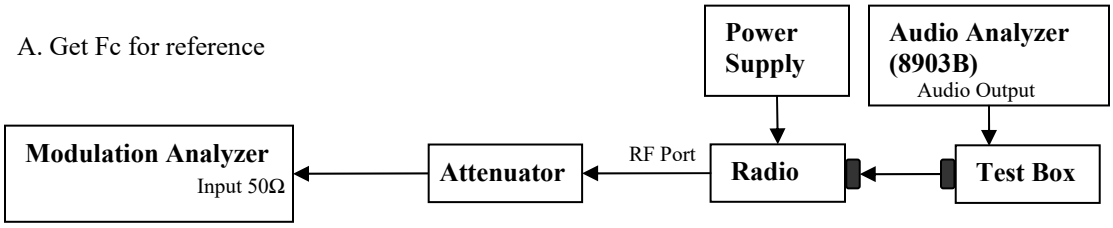
6.6.5. Test Limit

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

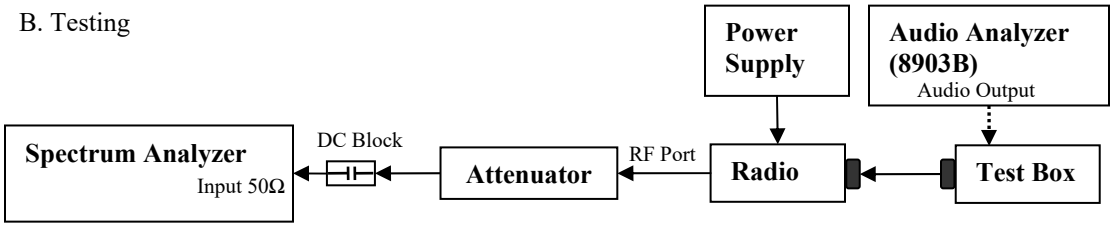
6.7. Band Edge Conducted Spurious Emission (Part 22)

6.7.1. Test Setup (Analog)

A. Get Fc for reference



B. Testing



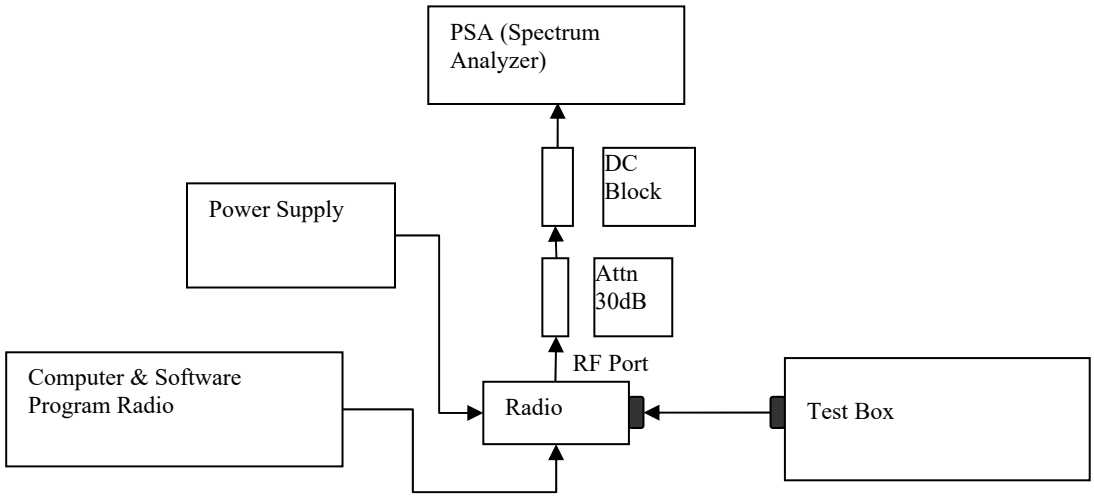
1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey the DUT.
4) Path loss for the measurement included.
5) Select the Occupied Bandwidth measurement for 99% and 26dB Emissions Bandwidth Measurement.
6) Key in the Fc and Resolution Bandwidth.
7) Transmit the DUT and record the occupied Bandwidth frequencies.
8) Preset the spectrum analyzer for band edge measurement.
9) The band edges of lowest and highest channels were measured.
10) Key in the Lowest and highest channel frequency, span is 60 kHz and Resolution Bandwidth is at least 1% of Emission Bandwidth.
11) Save the screen shot as modulated signal.
12) Remove the audio tone from audio analyzer to capture unmodulated signal.

*Note:
- For emission designator ending with F3E, 16K0F3E is the worst case and therefore only 16K0F3E will be shown.

6.7.2. Test Result (Analog)

Not applicable.

6.7.3. Test Setup (Digital)



1) Program and set radio to operate in desire test frequency and digital mode with modulation. (*4FSK, C4FM or other digital modulation form).
2) Path loss for the measurement included.
3) Select the Occupied Bandwidth measurement for 99% and 26dB Emissions Bandwidth Measurement.
4) Key in the Fc and Resolution Bandwidth.
5) Transmit radio record the occupied Bandwidth frequencies.
6) Preset the spectrum analyzer for band edge measurement.
7) Key in the lowest and highest channels frequency, span is 60 kHz and Resolution Bandwidth is at least 1% of Emission Bandwidth.
8) Save the screen shot.

*Note:
- For Digital Modulation, 12.5 kHz Data F1D & FXD would be the same. Therefore only measurements with F1D modulation shown below.
- For Digital Modulation, 12.5 kHz Data F1E & FXE would be the same. Therefore only measurements with F1E modulation shown below.

6.7.4. Test Result (Digital)

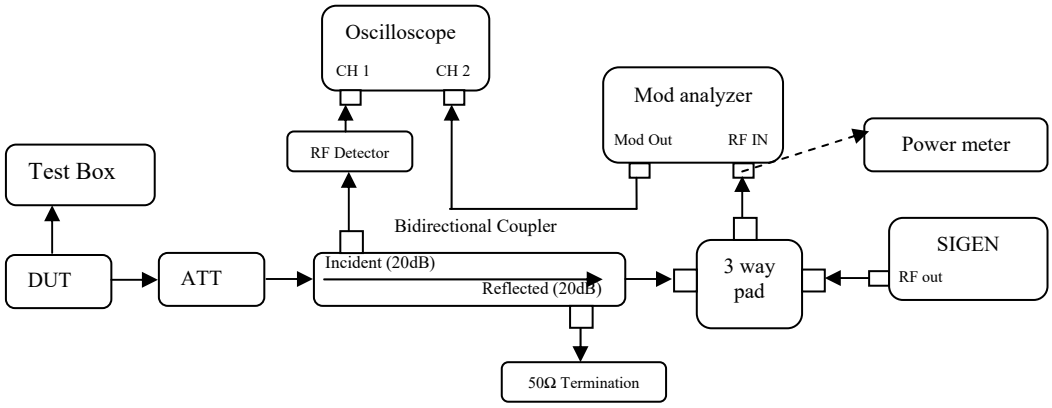
Not applicable.

6.7.5. Test Limit

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

6.8. Transient Frequency Behavior

6.8.1. Test Setup



1) Connect the setup as figure above.
2) Path loss for the measurement included.
3) Set on Sigen with the assigned center frequency, internal 1 kHz FM tone.
   FM Deviation: Analog 25kHz Channel Spacing = 25 kHz
   Analog 12.5 kHz Channel Spacing = 12.5 kHz
   C4FM = 12.5 kHz
4) Turn on 50 kHz high pass filter and 15 kHz low pass filter on modulation analyzer.
5) Supply sufficient attenuation ATT to provide the output power of ≤ -11dBm into power meter when DUT is keying up.
6) Note the power level on power meter and dekey the DUT.
7) Adjust the amplitude of the signal generator to the level power meter, maintained the amplitude throughout the rest of the measurement.
8) Connect the output to modulation analyzer.
9) Reduce 30dB attenuation and transmit the radio to get the trigger line.
10) Capture the screen shot for key-up (rising edge) and de-key (falling edge) mode.

6.8.2. Test Result

Not Applicable.

6.8.3. Test Limit

Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals[1] [2]	Maximum frequency difference[3]	All equipment	
		150 to 174 MHz	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t_1[4]	±25.0 kHz	5.0 ms	10.0 ms
t_2	±12.5 kHz	20.0 ms	25.0 ms
t_3[4]	±25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t_1[4]	±12.5 kHz	5.0 ms	10.0 ms
t_2	±6.25 kHz	20.0 ms	25.0 ms
t_3[4]	±12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t_1[4]	±6.25 kHz	5.0 ms	10.0 ms
t_2	±3.125 kHz	20.0 ms	25.0 ms
t_3[4]	±6.25 kHz	5.0 ms	10.0 ms

[1] t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.
t_1 is the time period immediately following t_{on}.
t_2 is the time period immediately following t_1.
t_3 is the time period from the instant when the transmitter is turned off until t_{off}.
t_{off} is the instant when the 1 kHz test signal starts to rise.

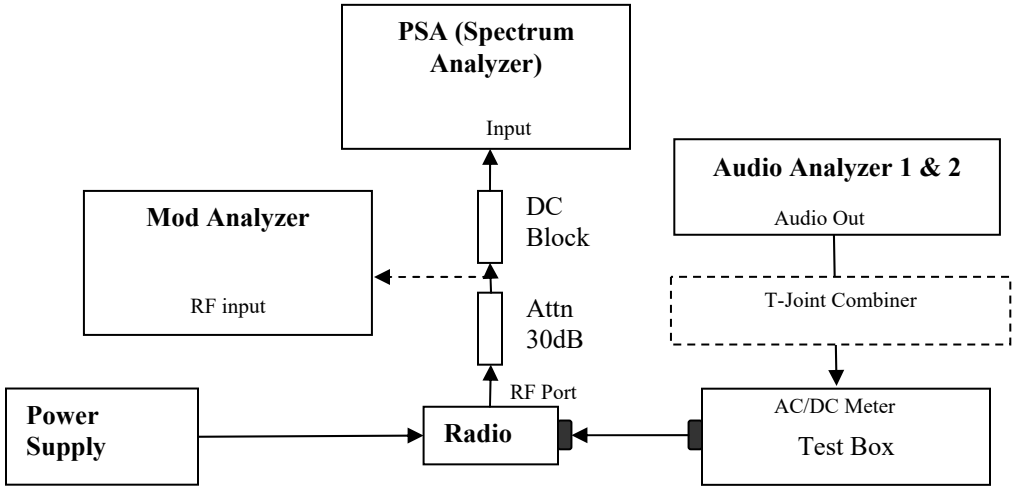
[2] During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in §90.213.

[3] Difference between the actual transmitter frequency and the assigned transmitter frequency.

[4] If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

6.9. Adjacent Channel Power

6.9.1. Test Setup (Analog)

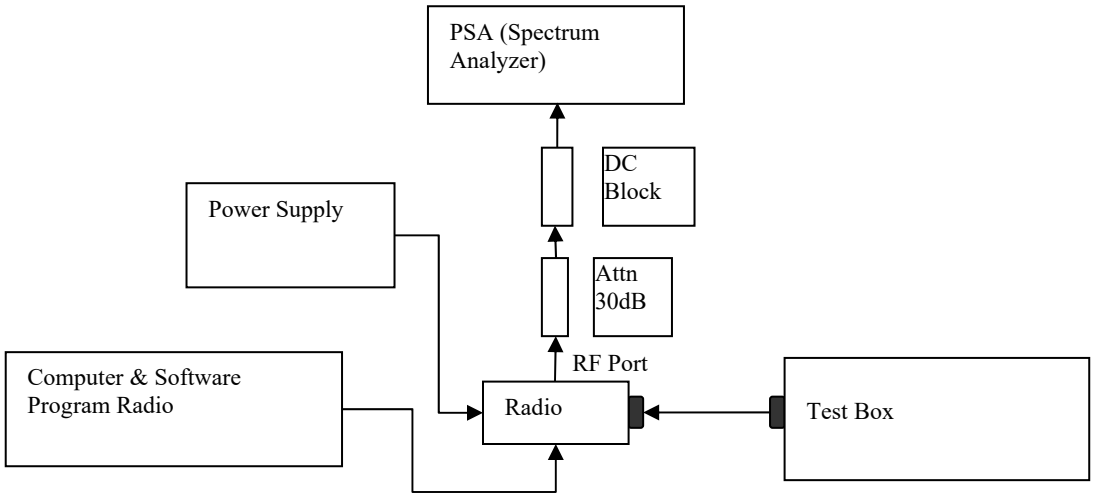


1) The DUT transmitter output port was connected to modulation analyzer.
2) Transmit the radio and turn on 1st audio analyzer with audio frequency 650Hz, 50% rated deviation, and record the amplitude value as AmpT1.
3) Turn off Audio analyzer 1 and turn on audio analyzer 2, set the audio frequency to 2.2 kHz and 50% deviation. Record the amplitude as AmpT2.
4) Turn both audio analyzers ON and up 10dB amplitude level.
5) Connect the output to PSA and set to assigned center frequency.
6) Set Span, Resolution Bandwidth and Video Bandwidth per rules part.
7) Transmit the radio and record the Adjacent Channel Power value in dBc.

6.9.2. Test Result

Not applicable.

6.9.3. Test Setup (Digital)



1) Program and set radio to operate in desire test frequency and digital mode with modulation. (4FSK, C4FM or other digital modulation form).
2) Prepare setup as per picture.
3) Turn on the ACP Measurement – Press Measure, ACP.
4) Set Span, Resolution Bandwidth and Video Bandwidth as per rules part.
5) Transmit the radio and record the Adjacent Channel Power value in dBc.

6.9.4. Test Result

Two Cavity Combiner, 1 duplexer (SQM09SUM0010A)

π4/DQPSK

Frequency / Channel Spacing	851.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	**Meas BW (kHz)**	Lower	Upper	**Spec (dB)**
25	18	-65.15	-65.17	-55
50	18	-74.21	-74.32	-65
75	18	-76.72	-76.39	-70

Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	**Meas BW (kHz)**	Lower	Upper	**Spec (dB)**
25	18	-64.81	-64.78	-55
50	18	-74.28	-74.71	-65
75	18	-76.32	-76.88	-70

Frequency / Channel Spacing	868.8875 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-64.72	-65.73	-55
50	18	-74.85	-74.91	-65
75	18	-76.44	-76.38	-70

QAM64

Frequency / Channel Spacing	851.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-63.51	-63.84	-55
50	18	-71.83	-71.28	-65
75	18	-75.06	-75.94	-70

Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-63.86	-63.15	-55
50	18	-71.15	-71.35	-65
75	18	-74.55	-74.98	-70

Frequency / Channel Spacing	868.8875 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-62.4	-63.56	-55
50	18	-71.48	-72.73	-65
75	18	-74.98	-74.53	-70

1 Hybrid Combiner, 1 duplexer (SQM08SUM0010A)

π4/DQPSK

Frequency / Channel Spacing	851.0125 MHz / 25kHz			
Voltage, V	230			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-65.09	-66.54	-55
50	18	-74.28	-74.04	-65
75	18	-76.74	-76.88	-70

Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	230			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-65.35	-66.44	-55
50	18	-73.48	-73.83	-65
75	18	-76.96	-76.57	-70

Frequency / Channel Spacing	868.8875 MHz / 25kHz			
Voltage, V	230			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-65.59	-66.13	-55
50	18	-73.18	-73.66	-65
75	18	-76.64	-76.58	-70

QAM64

Frequency / Channel Spacing	851.0125 MHz / 25kHz			
Voltage, V	230			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-63.7	-64.25	-55
50	18	-71.51	-71.92	-65
75	18	-74.52	-74.21	-70

Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	230			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-64.19	-64.68	-55
50	18	-71.47	-71.65	-65
75	18	-74.56	-74.53	-70

Frequency / Channel Spacing	868.8875 MHz / 25kHz			
Voltage, V	230			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-63.22	-63.31	-55
50	18	-71.42	-71.48	-65
75	18	-74.21	-74.47	-70

No Combiner, 1 duplexer (SQM08SUM0010A)

π4/DQPSK

Frequency / Channel Spacing	851.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-66.46	-67.63	-55
50	18	-74.05	-74.31	-65
75	18	-76.89	-76.98	-70

Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-66.85	-67.46	-55
50	18	-74.56	-74.16	-65
75	18	-76.92	-76.21	-70

Frequency / Channel Spacing	868.8875 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-66.21	-67.89	-55
50	18	-73.92	-73.55	-65
75	18	-76.20	-76.52	-70

QAM64

Frequency / Channel Spacing	851.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-64.08	-64.46	-55
50	18	-71.89	-71.33	-65
75	18	-74.40	-75.24	-70

Frequency / Channel Spacing	860.0125 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-64.75	-65.08	-55
50	18	-71.98	-71.61	-65
75	18	-74.07	-74.20	-70

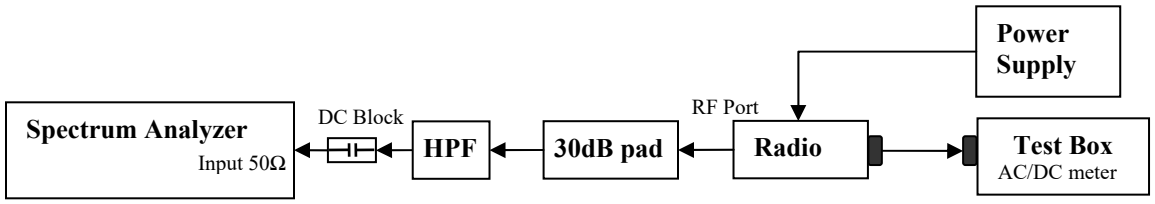
Frequency / Channel Spacing	868.8875 MHz / 25kHz			
Voltage, V	48			
Temperature, ^{0}C	25			
Offset (kHz)	Meas BW (kHz)	Lower	Upper	Spec (dB)
25	18	-63.44	-63.31	-55
50	18	-71.88	-71.46	-65
75	18	-74.28	-74.17	-70

6.9.5. Test Limit

Frequency offset	Maximum ACP (dBc) for devices less than 15 watts	Maximum ACP (dBc) for devices 15 watts and above
25 kHz	−55 dBc	−55 dBc
50 kHz	−65 dBc	−65 dBc
75 kHz	−65 dBc	−70 dBc

6.10. Conducted Spurious Emission

6.10.1. Test Setup



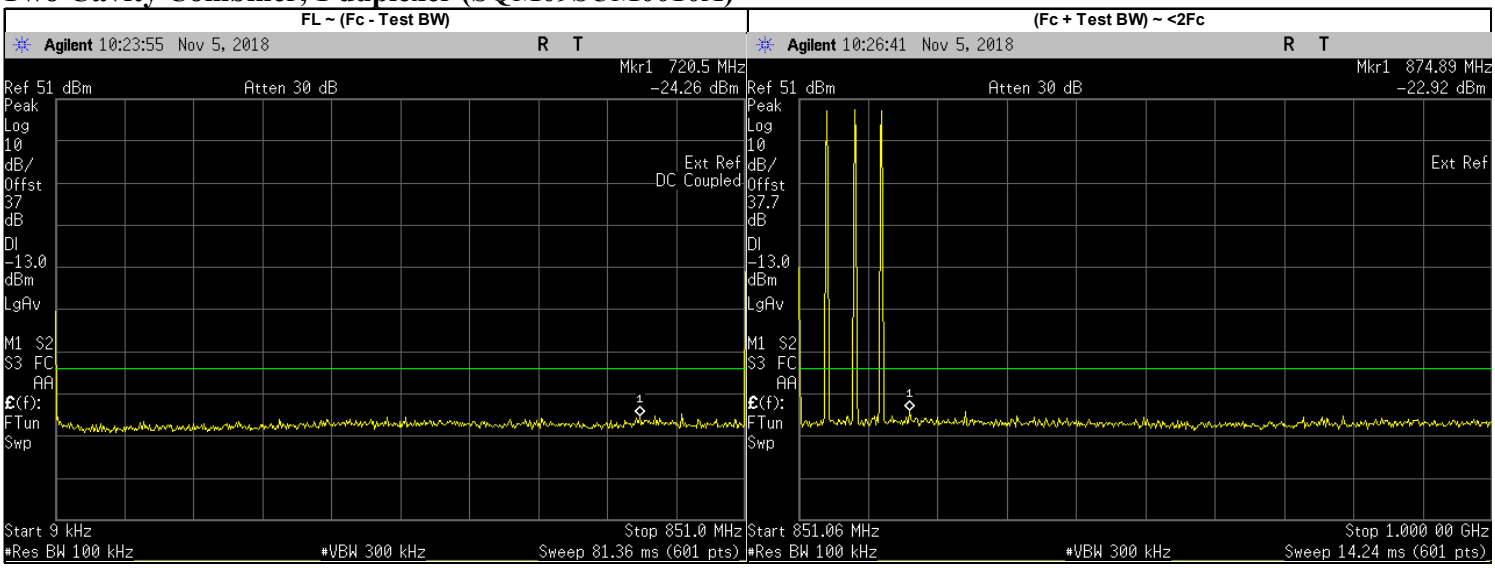
1) The DUT transmitter output port was connected to Spectrum Analyzer with above setup.
2) Program and set radio to operate in desire test frequency and mode. (Analog / digital modulation form).
3) Path loss for the measurement included.
4) Set the PSA Resolution Bandwidth as per rules part.
5) Set the Ref offset from the pathloss offset calibration file.
6) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:
    a. 9 KHz to Fc – Test Bandwidth
    b. Fc + Test Bandwidth to 2Fc – 5MHz.
7) Key up the DUT, Peak Search the highest Spur and record the levels of spurious emissions
8) Dekey the DUT.
9) Turn On High Pass Filter path and Key up the DUT.
10) Adjust the PSA Freq for incremental coverage of range from 2Fc to 10Fc
11) Key up the DUT and record the highest spur levels of spurious emissions.

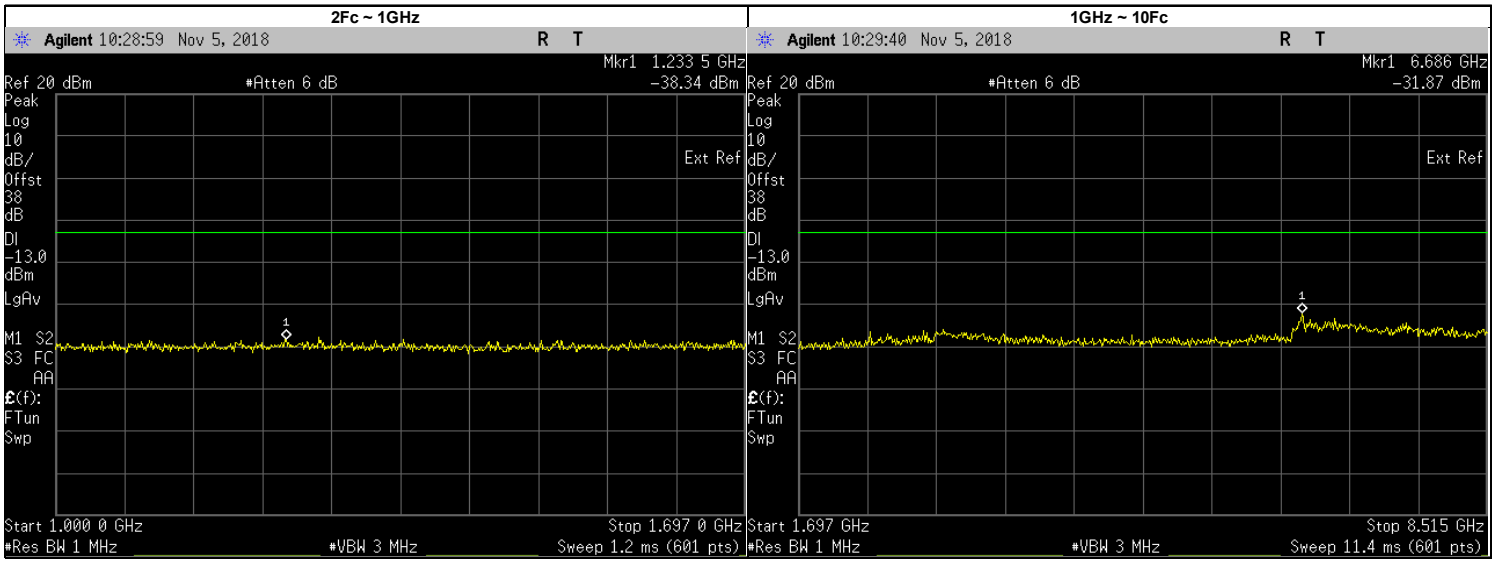
6.10.2. Test Result (Analog)

Not applicable.

6.10.3. Test Result (Digital π4/DQPSK , QAM64)

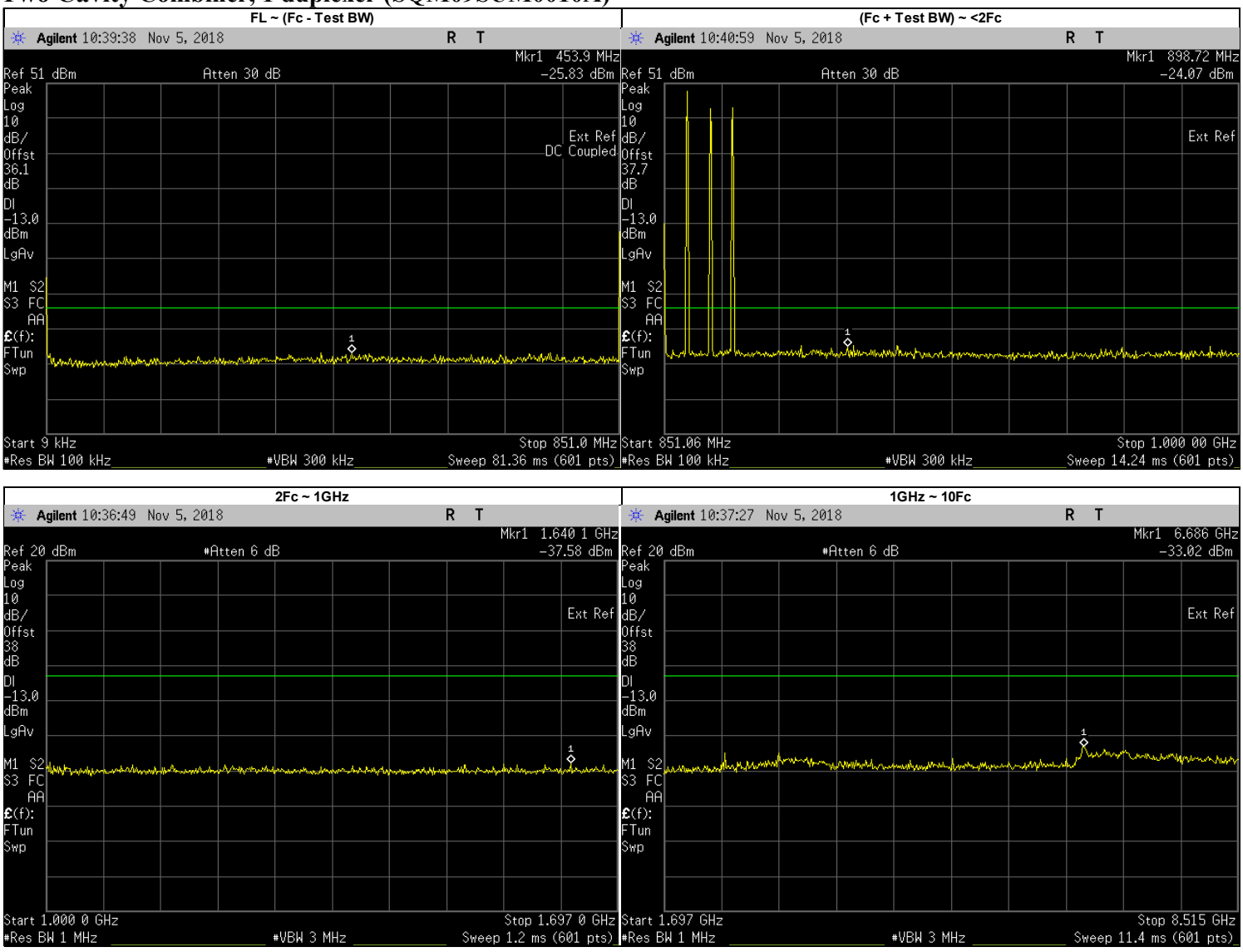
Digital π4/DQPSK: 851.0125MHz+857.0125+863.0125+868.8875MHz, 25kHz Channel Spacing, Max Power Two Cavity Combiner, 1 duplexer (SQM09SUM0010A)





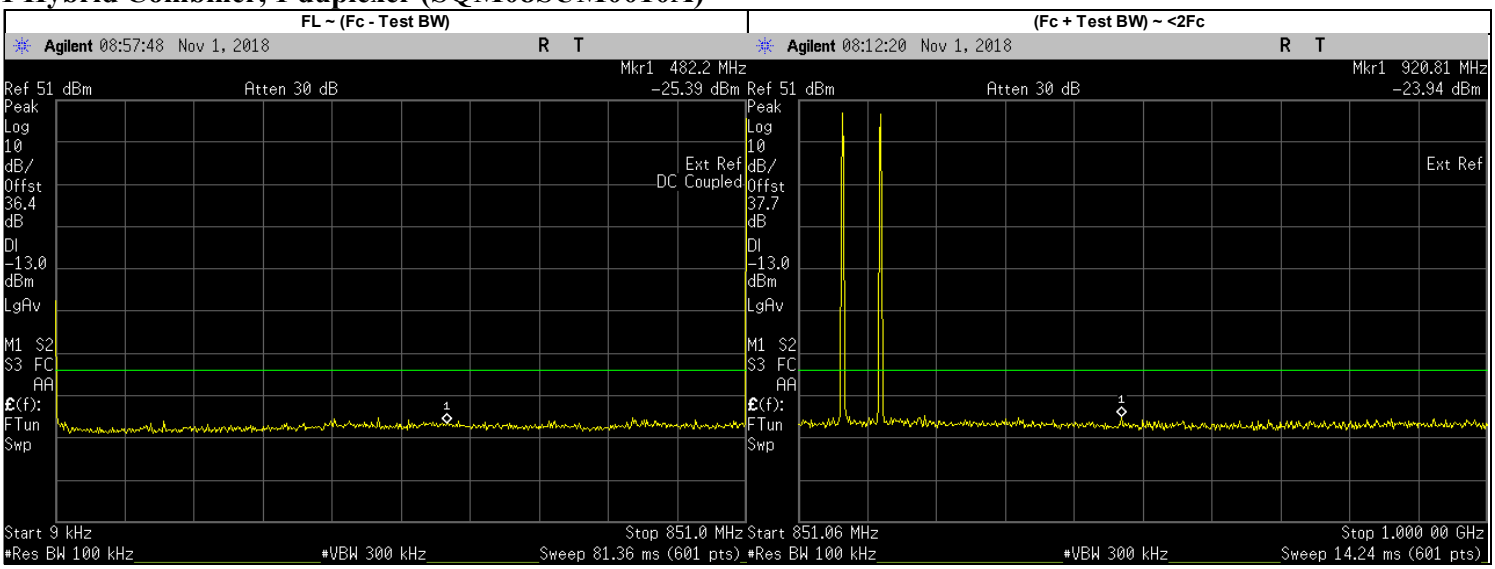
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	720.50	-24.26	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	874.89	-22.92	-13	PASS
1GHz~ 2Fc	1233.50	-38.34	-13	PASS
2Fc ~ 10Fc	6686.00	-31.87	-13	PASS

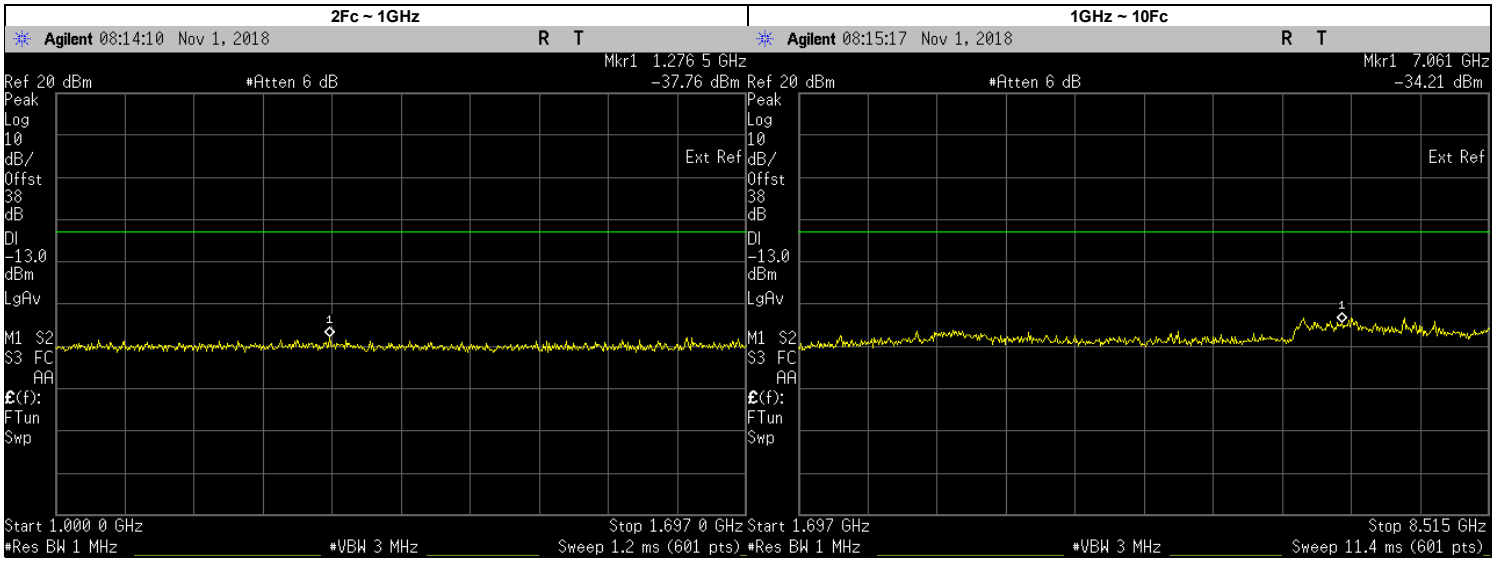
Digital QAM64: 851.0125MHz+857.0125+863.0125+868.8875MHz, 25kHz Channel Spacing, Max Power
Two Cavity Combiner, 1 duplexer (SQM09SUM0010A)



Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	453.90	-25.83	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	898.72	-24.07	-13	PASS
1GHz~ 2Fc	1640.10	-37.58	-13	PASS
2Fc ~ 10Fc	6686.00	-33.02	-13	PASS

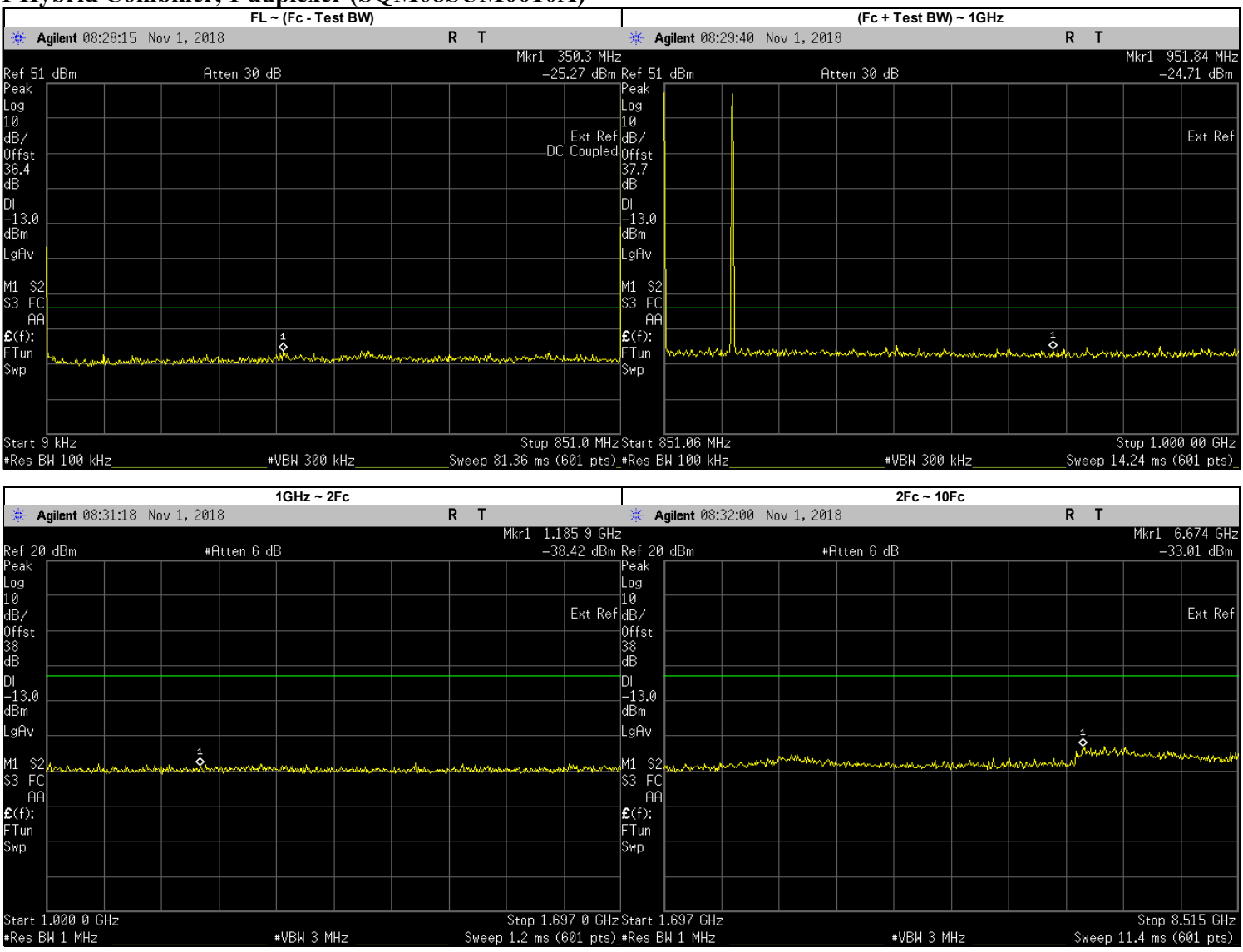
Digital π4/DQPSK: 851.0125MHz+868.8875MHz, 25kHz Channel Spacing, Max Power 1 Hybrid Combiner, 1 duplexer (SQM08SUM0010A)





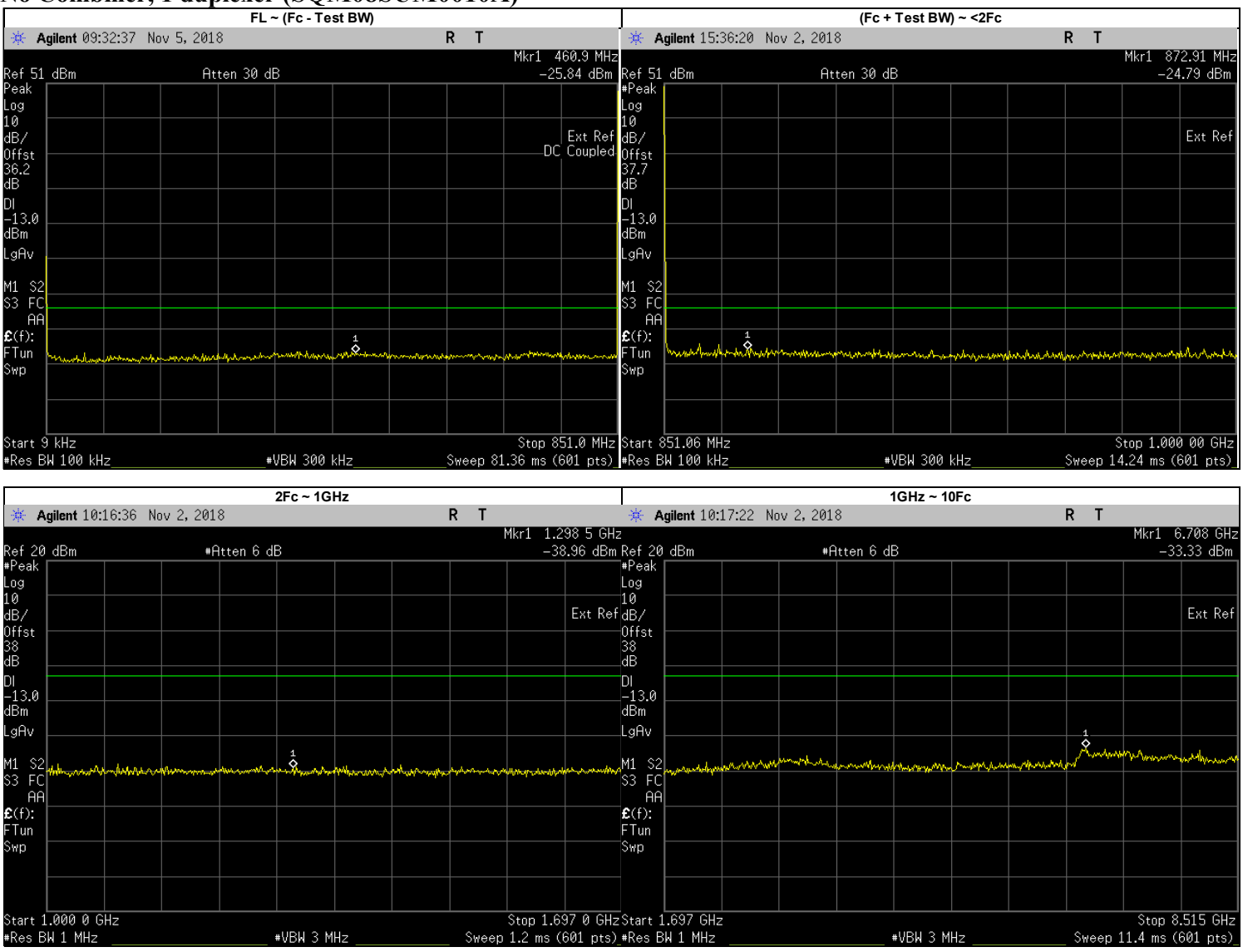
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	482.20	-25.39	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	920.81	-23.94	-13	PASS
1GHz~ 2Fc	1276.50	-37.76	-13	PASS
2Fc ~ 10Fc	7061.00	-34.21	-13	PASS

Digital QAM64: 851.0125MHz+868.8875MHz, 25kHz Channel Spacing, Max Power 1 Hybrid Combiner, 1 duplexer (SQM08SUM0010A)



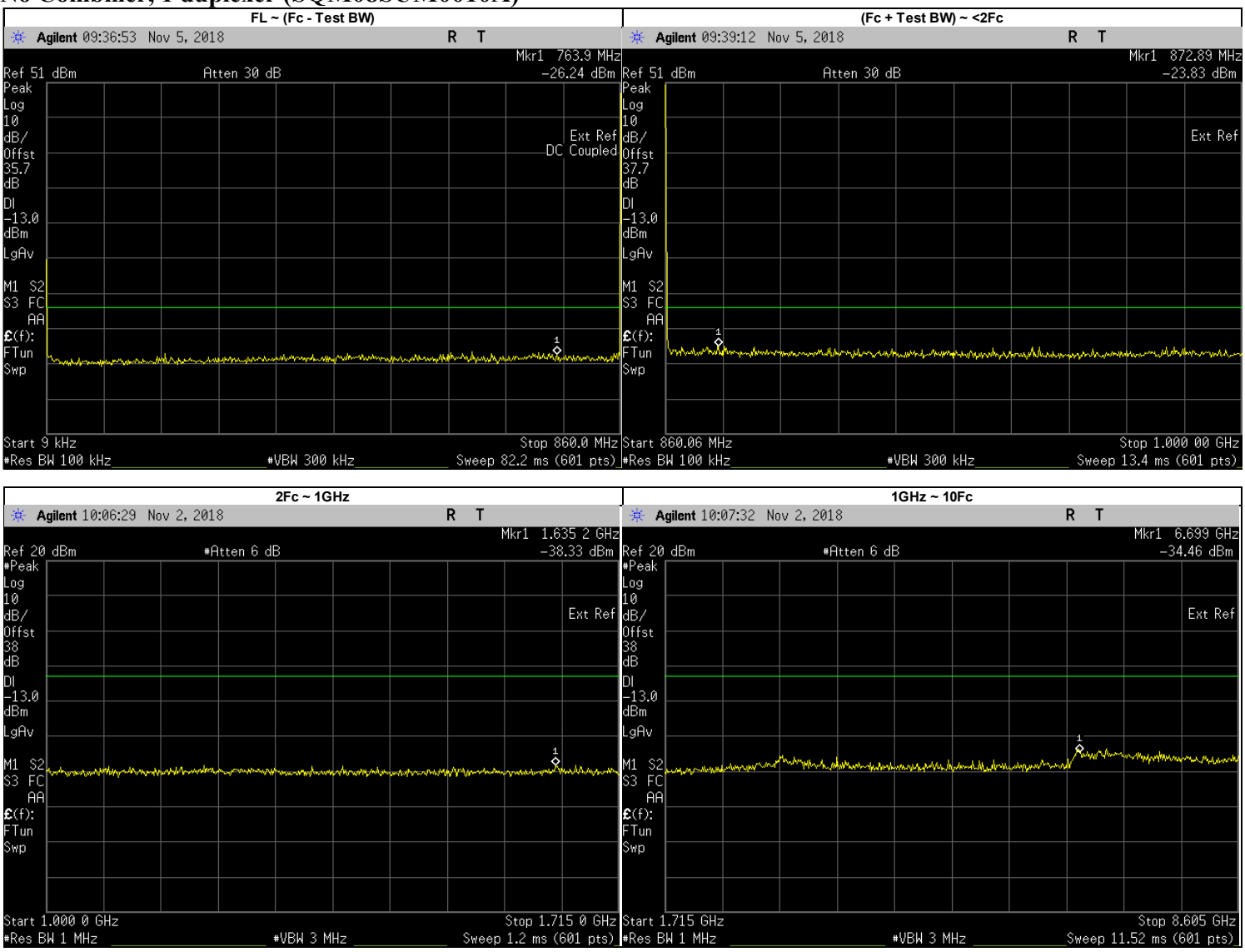
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	350.30	-25.27	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	951.84	-24.71	-13	PASS
1GHz~ 2Fc	1185.90	-38.42	-13	PASS
2Fc ~ 10Fc	6674.00	-33.01	-13	PASS

Digital π4/DQPSK: 851.0125MHz, 25kHz Channel Spacing, Max Power
No Combiner, 1 duplexer (SQM08SUM0010A)



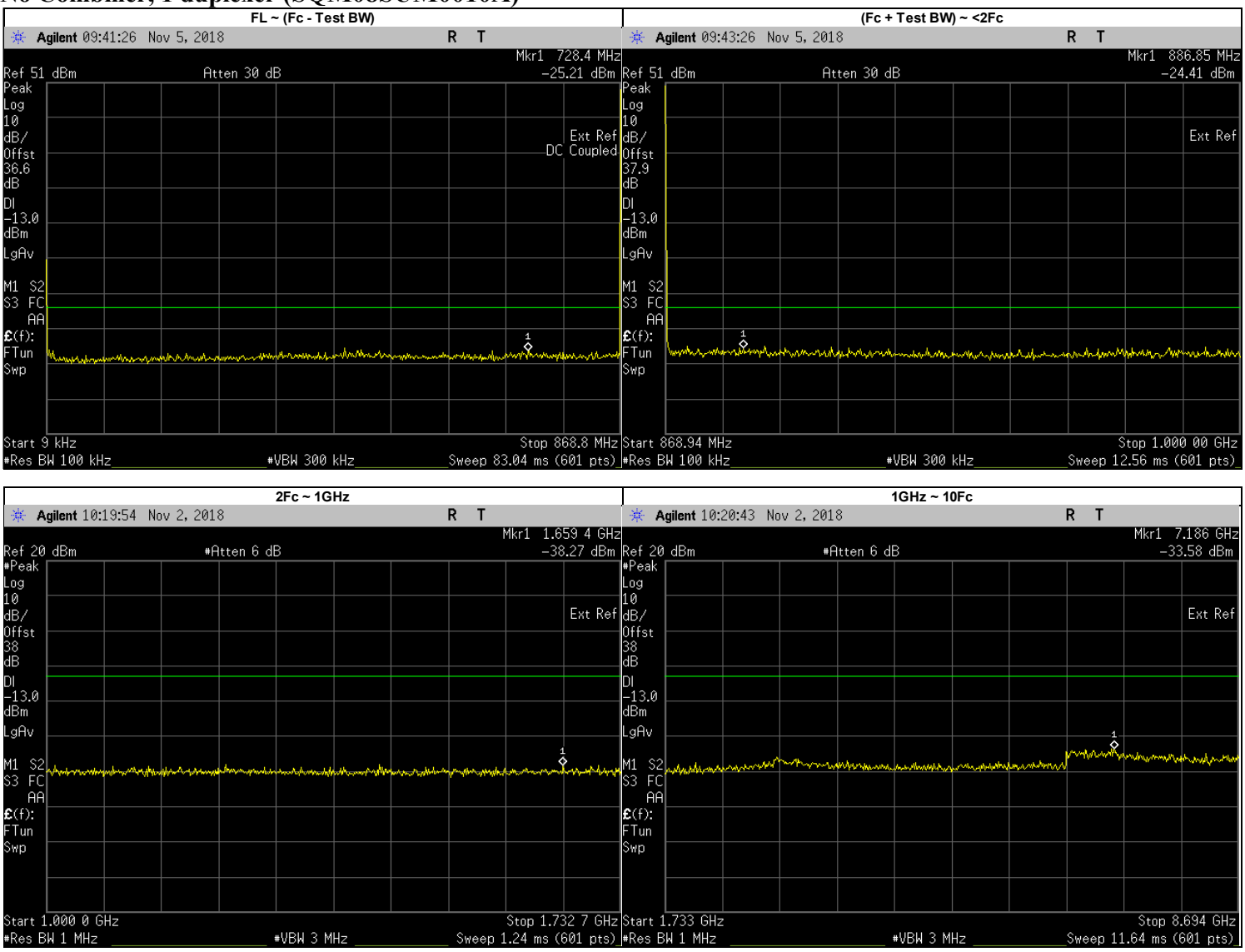
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	460.90	-25.84	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	872.91	-24.79	-13	PASS
1GHz~ 2Fc	1298.50	-38.96	-13	PASS
2Fc ~ 10Fc	6708.00	-33.33	-13	PASS

Digital π4/DQPSK: 860.0125MHz, 25kHz Channel Spacing, Max Power
No Combiner, 1 duplexer (SQM08SUM0010A)



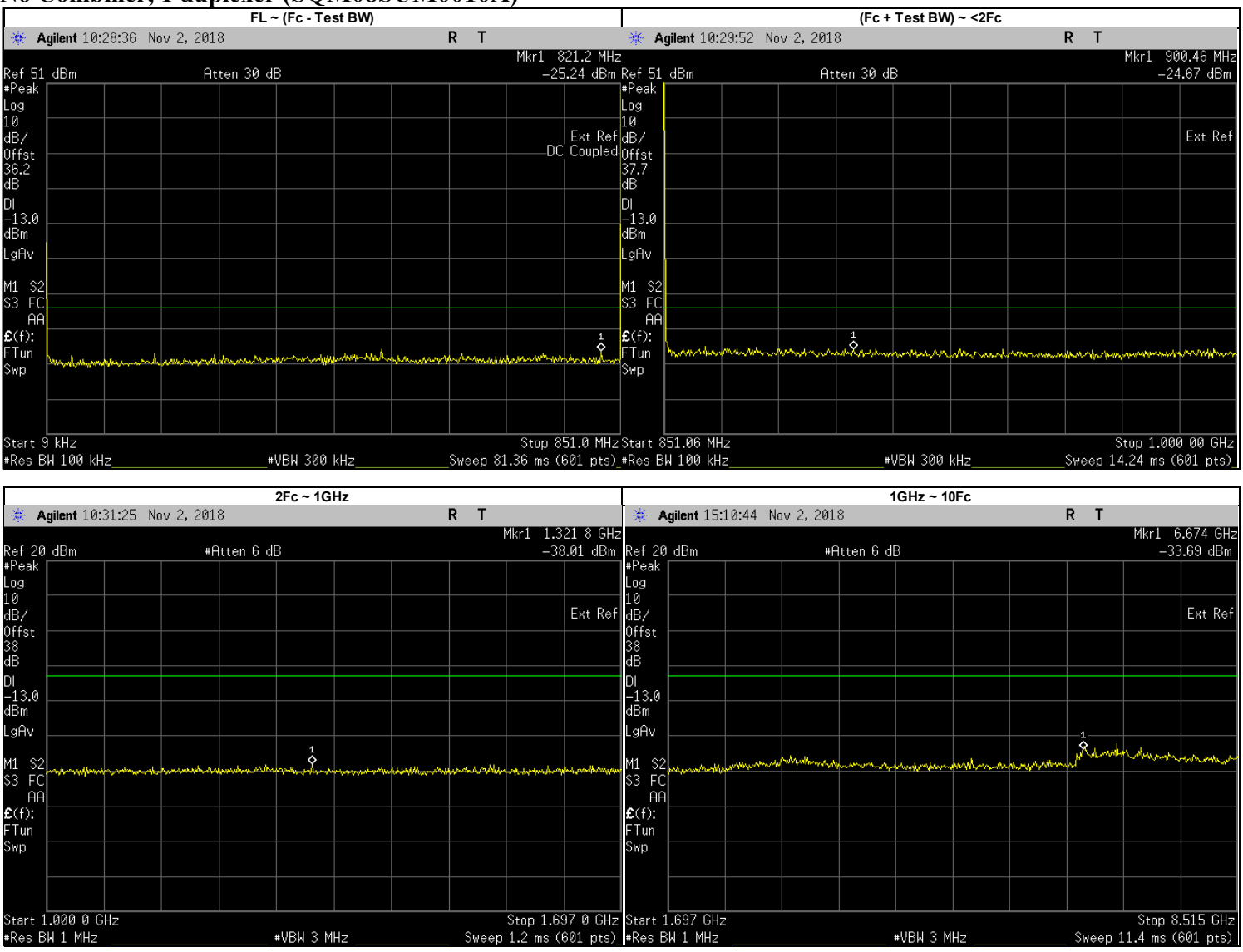
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	763.90	-26.24	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	872.89	-23.83	-13	PASS
1GHz~ 2Fc	1635.20	-38.33	-13	PASS
2Fc ~ 10Fc	6699.00	-34.46	-13	PASS

Digital π4/DQPSK: 868.8875MHz, 25kHz Channel Spacing, Max Power
No Combiner, 1 duplexer (SQM08SUM0010A)



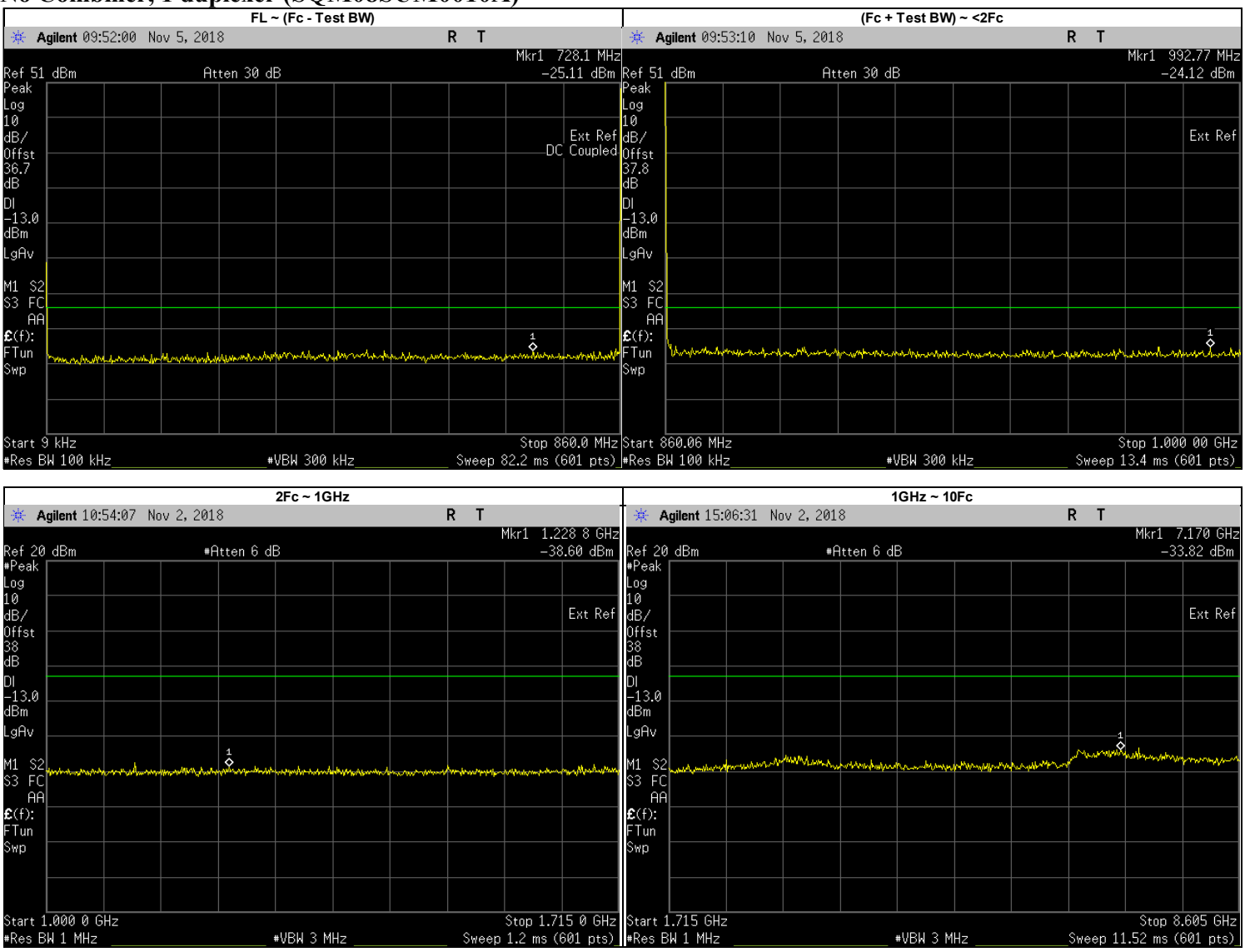
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	728.40	-25.21	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	886.85	-24.41	-13	PASS
1GHz~ 2Fc	1659.40	-38.27	-13	PASS
2Fc ~ 10Fc	7186.00	-33.58	-13	PASS

Digital QAM64: 851.0125MHz, 25kHz Channel Spacing, Max Power
No Combiner, 1 duplexer (SQM08SUM0010A)



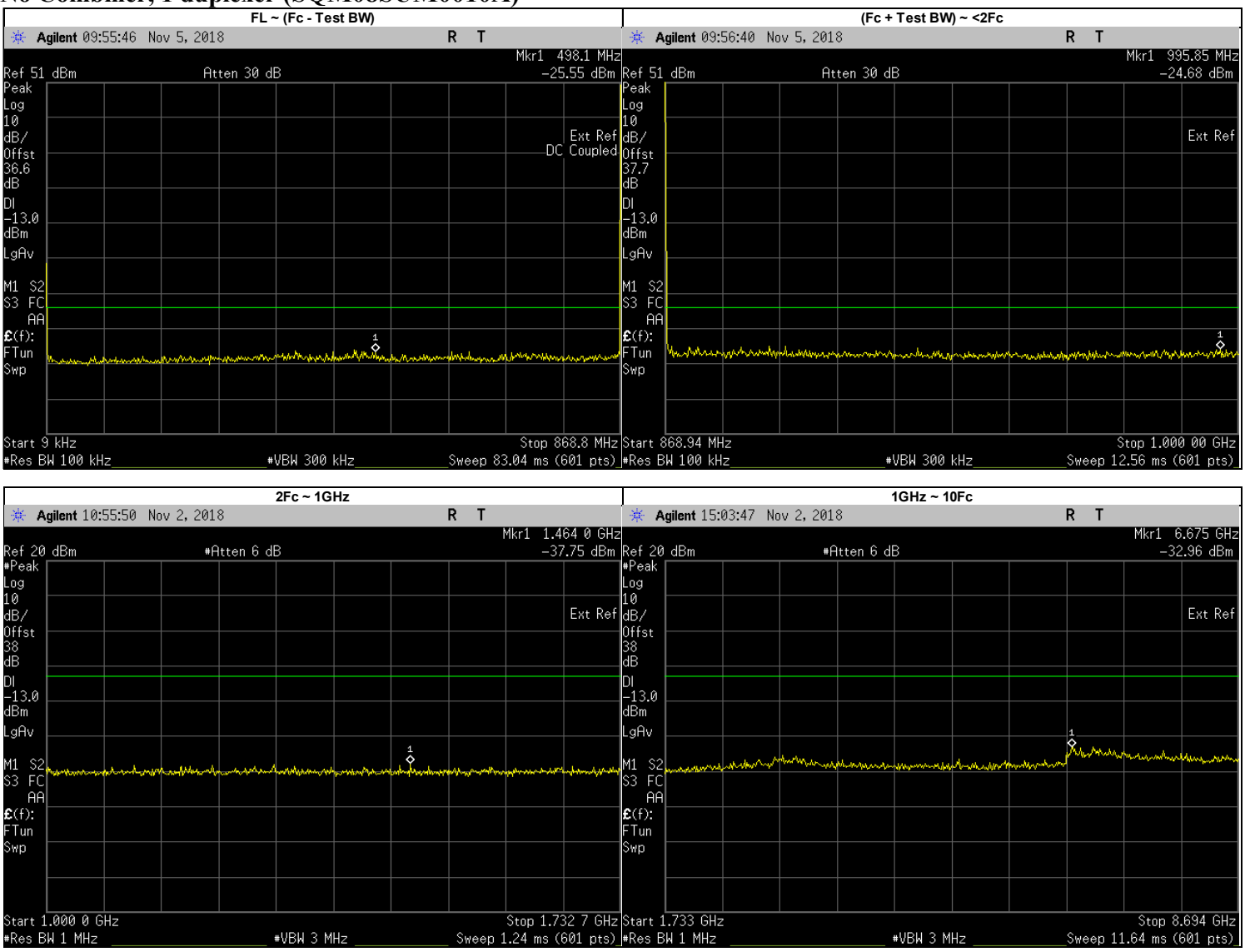
Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	821.20	-25.24	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	900.46	-24.67	-13	PASS
1GHz~ 2Fc	1321.80	-38.01	-13	PASS
2Fc ~ 10Fc	6674.00	-33.69	-13	PASS

Digital QAM64: 860.0125MHz, 25kHz Channel Spacing, Max Power
No Combiner, 1 duplexer (SQM08SUM0010A)



Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	728.10	-25.11	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	992.77	-24.12	-13	PASS
1GHz~ 2Fc	1228.80	-38.60	-13	PASS
2Fc ~ 10Fc	7170.00	-33.82	-13	PASS

Digital QAM64: 868.8875MHz, 25kHz Channel Spacing, Max Power
No Combiner, 1 duplexer (SQM08SUM0010A)



Frequency Range	Highest Spur Freq (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Result
FL ~ (Fc – Test Bandwidth)	498.10	-25.55	-13	PASS
(Fc + Test Bandwidth) ~ 1 GHz	995.85	-24.68	-13	PASS
1GHz~ 2Fc	1464.00	-37.75	-13	PASS
2Fc ~ 10Fc	6675	-32.96	-13	PASS

6.10.4. Test Limit

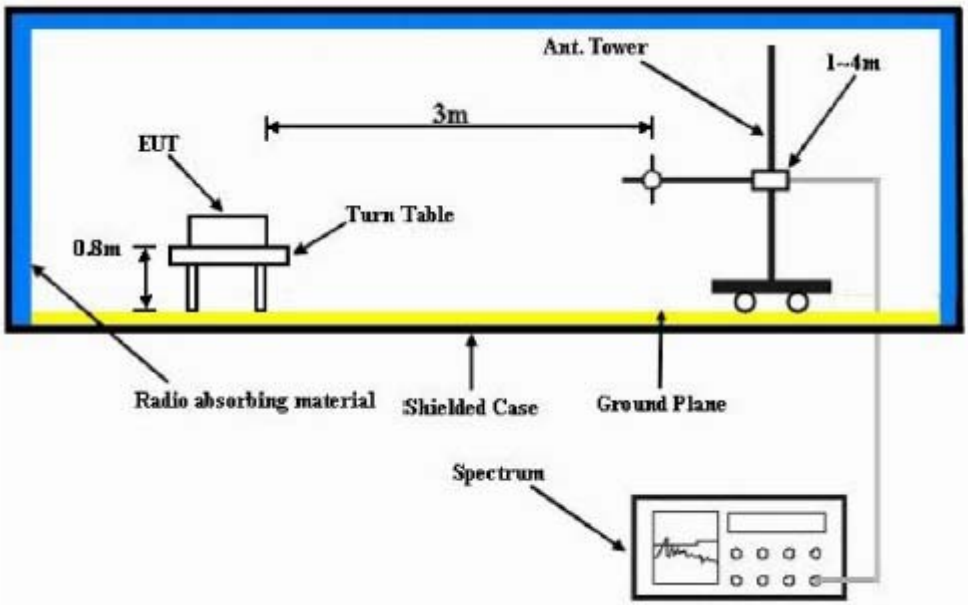
Table below summarized the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least

Channel Spacing	Part 22	Part 24D	Part 74	Part 80	Part 90 (UHF, VHF, 800, 900)	Part 90 (700)
12.5kHz	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	Not Applicable	50 + log10(P) (-20 dBm)	43 + log10(P) (-13 dBm)
25kHz		Not Applicable		43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)

Channel Spacing	RSS 134	RSS 182	RSS 119 (UHF, VHF, 800, 900)	RSS 119 (700)
12.5kHz	43 + log10(P) (-13 dBm)	Not Applicable	50 + log10(P) (-20 dBm)	43 + log10(P) (-13 dBm)
25kHz	Not Applicable	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)

6.11. Radiated Spurious Emission

6.11.1. Test Setup



1) The Resolution Bandwidth for scanning Radiated Emission below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector mode is positive peak.
2) In the semi- anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height (<1GHz) or 1.5m (>1GHz) of Turn Table, 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 DUT 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.

6.11.2. Test Result (Analog)

Not Applicable.

6.11.3. Test Result (Digital)

SAC Transmitter Radiated Emission:

Model Number: SQM09SUM0010A **S/N: 895GSU1541** **SR:13102-EMC-00003**

Battery Part No: NA **Accy Part No: NA**

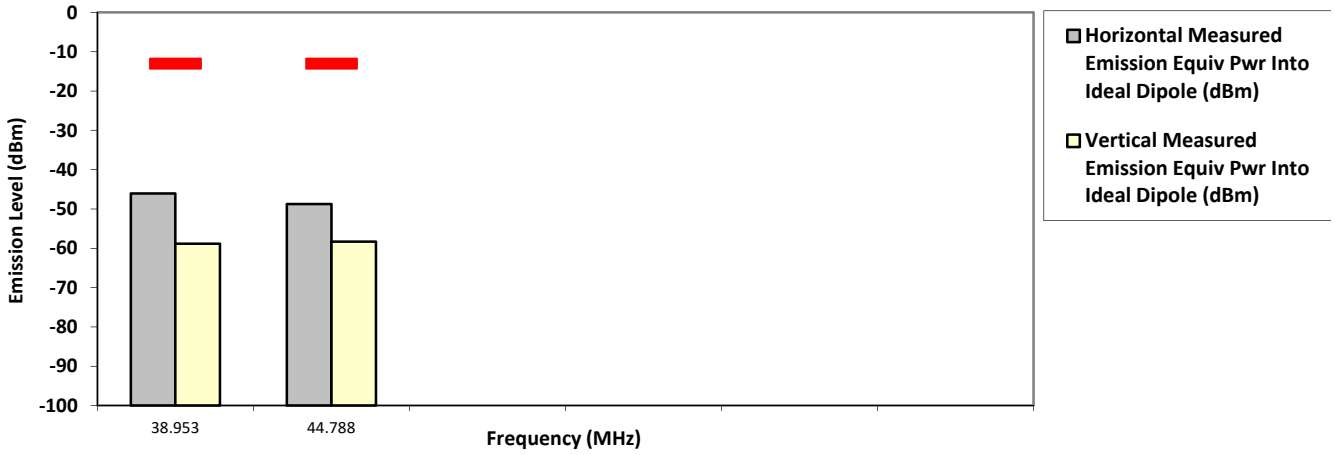
Test Mode: TX TETRA

851.0125+857.0125+863.0125+868.8875 MHz **25 kHz** **30.000 Watt(s) /Max Power**

240VAC

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
38.9530	-13.0000	-46.0600 *	-58.8300 *
44.7880	-13.0000	-48.7300 *	-58.3300 *

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, Faris & Aiman **Wed, Dec 05, 2018**

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): 22.9 Hum(%RH): 70.0

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

SAC Transmitter Radiated Emission:

Model Number: SQM09SUM0010A **S/N: 895GSU1541** **SR:13102-EMC-00003**

Battery Part No: NA **Accy Part No: NA**

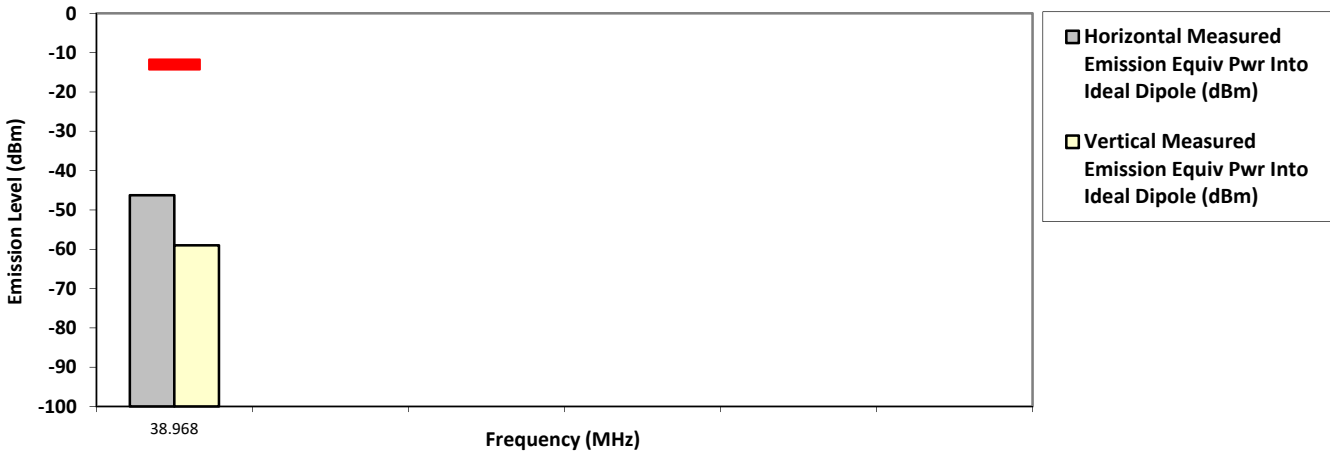
Test Mode: TX TEDS

851.0125+857.0125+863.0125+868.8875 MHz **25 kHz** **12.000 Watt(s) /Max Power**

240VAC

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
38.9680	-13.0000	-46.2700 *	-58.9900 *

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, Faris & Aiman **Wed, Dec 05, 2018**

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): 22.9 Hum(%RH): 70.0

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00003**

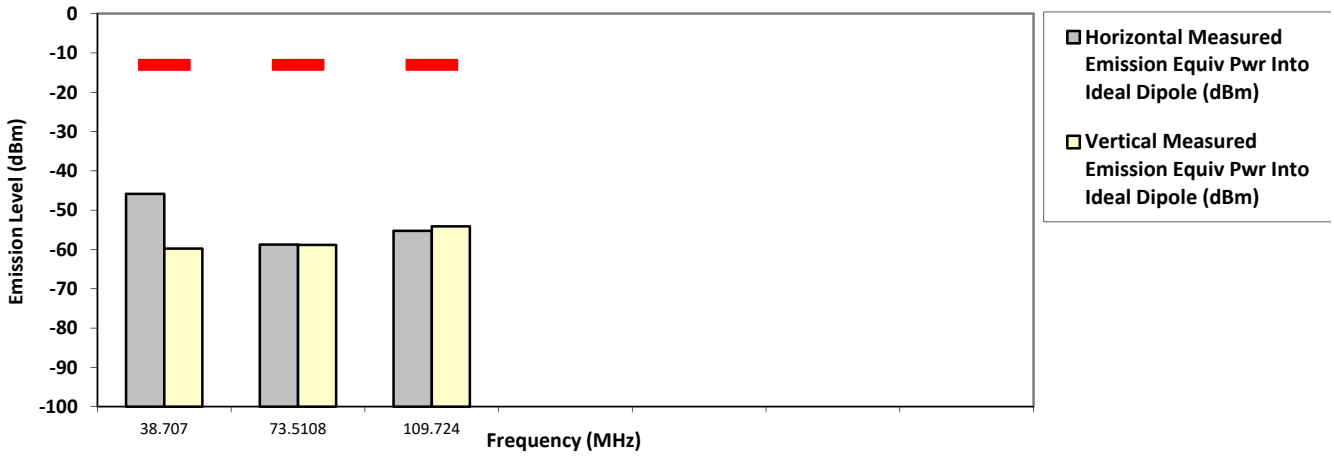
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TETRA

851.0125+868.8875 MHz **25 kHz** **30.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
38.7070	-13.0000	-45.8500 *	-59.7600 *
73.5108	-13.0000	-58.7600 *	-58.8400 *
109.7240	-13.0000	-55.2500 *	-54.1200 *

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, Faris & Aiman **Wed, Dec 05, 2018**

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): 22.9 Hum(%RH): 70.0

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00003**

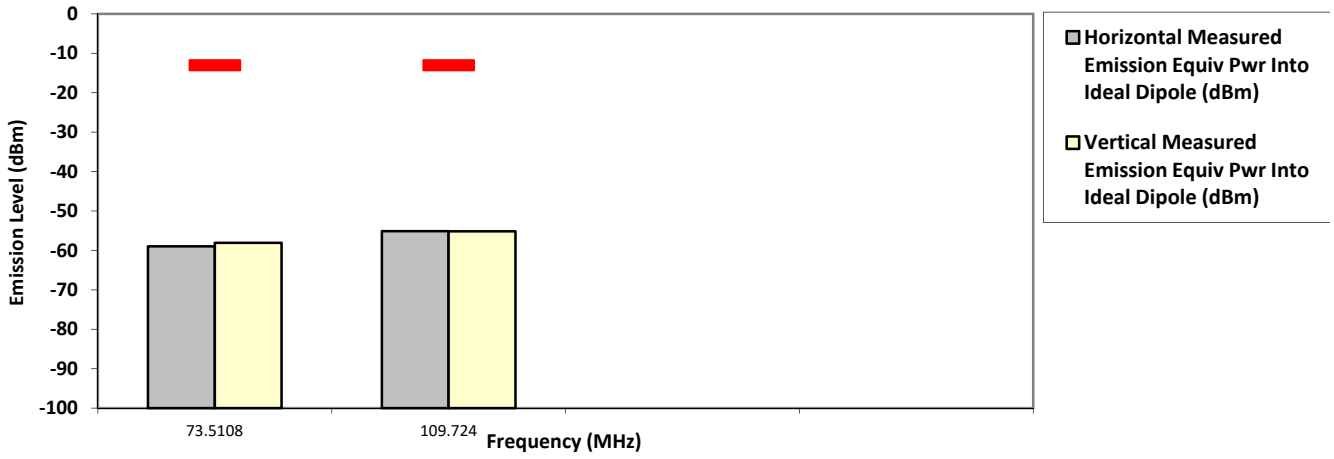
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TEDS

851.0125+868.8875 MHz **25 kHz** **12.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
73.5108	-13.0000	-58.9800 *	-58.0600 *
109.7240	-13.0000	-55.1000 *	-55.1700 *
	x		

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, Faris & Aiman **Thu, Dec 06, 2018**

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): 22.9 Hum(%RH): 70.0

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM09SUM0010A **S/N: 895GSU1541** **SR:13102-EMC-00001**

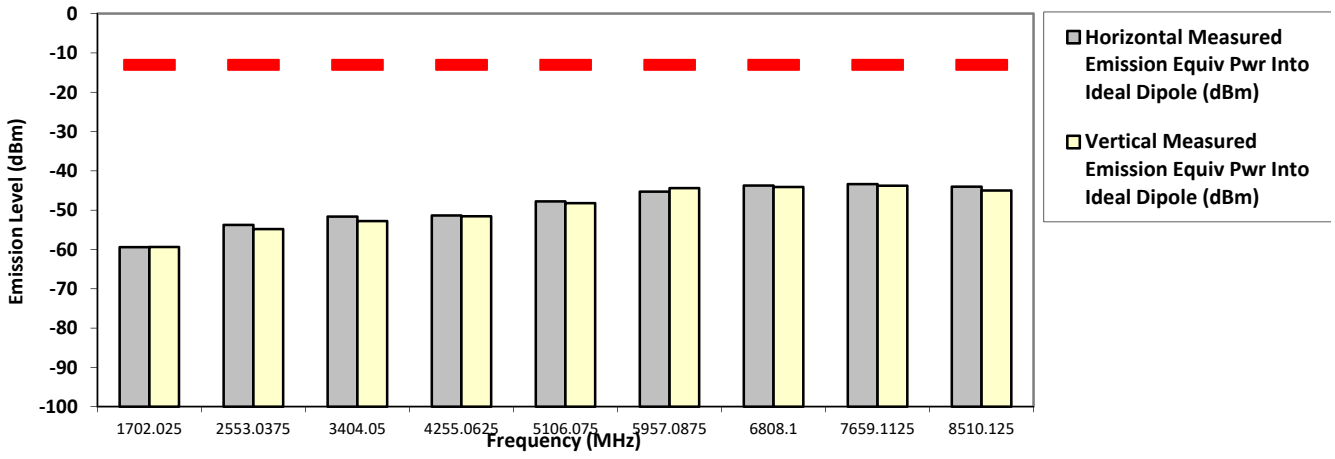
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TEDS

851.012500 MHz **25 kHz** **24.000 Watt(s) /Max Power** **240VAC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1702.0250	-13.0000	-59.4265 **	-59.3809 **
2553.0375	-13.0000	-53.7671 **	-54.8249 **
3404.0500	-13.0000	-51.6262 **	-52.7559 **
4255.0625	-13.0000	-51.3348 **	-51.5354 **
5106.0750	-13.0000	-47.7719 **	-48.2149 **
5957.0875	-13.0000	-45.2738 **	-44.3774 **
6808.1000	-13.0000	-43.7525 **	-44.0907 **
7659.1125	-13.0000	-43.3651 **	-43.7736 **
8510.1250	-13.0000	-44.0112 **	-45.0157 **

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, Faris, Qawiman, Aiman & Nazrin **Fri, Nov 30, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

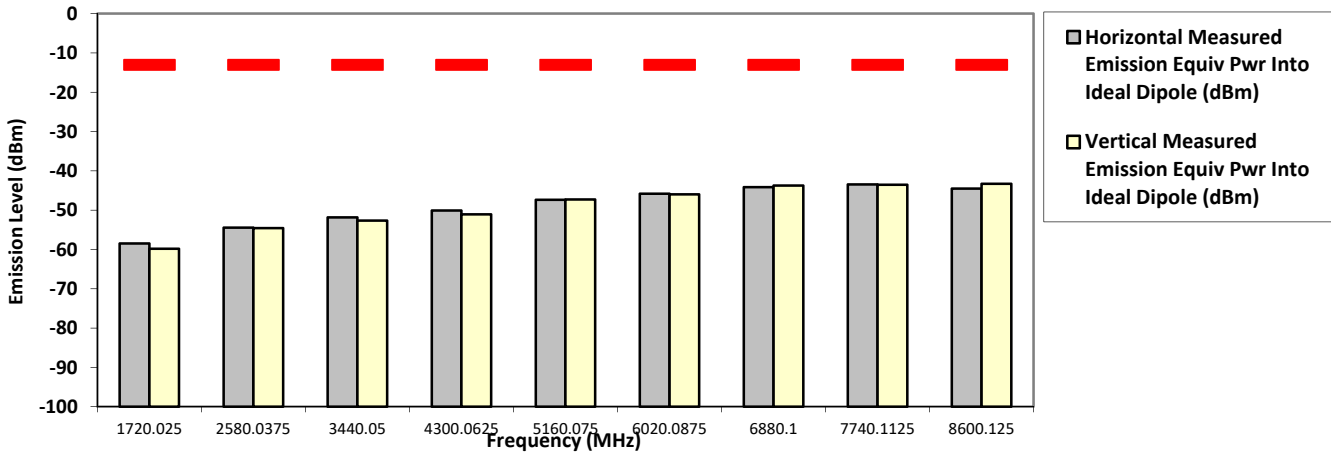
Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:
Model Number: SQM09SUM0010A **S/N: 895GSU1541** **SR:13102-EMC-00001**
Battery Part No: NA **Accy Part No: NA**
Test Mode: TX TEDS
860.012500 MHz **25 kHz** **24.000 Watt(s) /Max Power** **240VAC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1720.0250	-13.0000	-58.4870 **	-59.8043 **
2580.0375	-13.0000	-54.4489 **	-54.5627 **
3440.0500	-13.0000	-51.8478 **	-52.6681 **
4300.0625	-13.0000	-50.1007 **	-51.0468 **
5160.0750	-13.0000	-47.3660 **	-47.2620 **
6020.0875	-13.0000	-45.8113 **	-45.9809 **
6880.1000	-13.0000	-44.1594 **	-43.7514 **
7740.1125	-13.0000	-43.4482 **	-43.5279 **
8600.1250	-13.0000	-44.5255 **	-43.2814 **

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, Faris, Qawiman, Aiman & Nazrin **Fri, Nov 30, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks: Passed Results | **Marginal Results** | **Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM09SUM0010A **S/N: 895GSU1541** **SR:13102-EMC-00001**

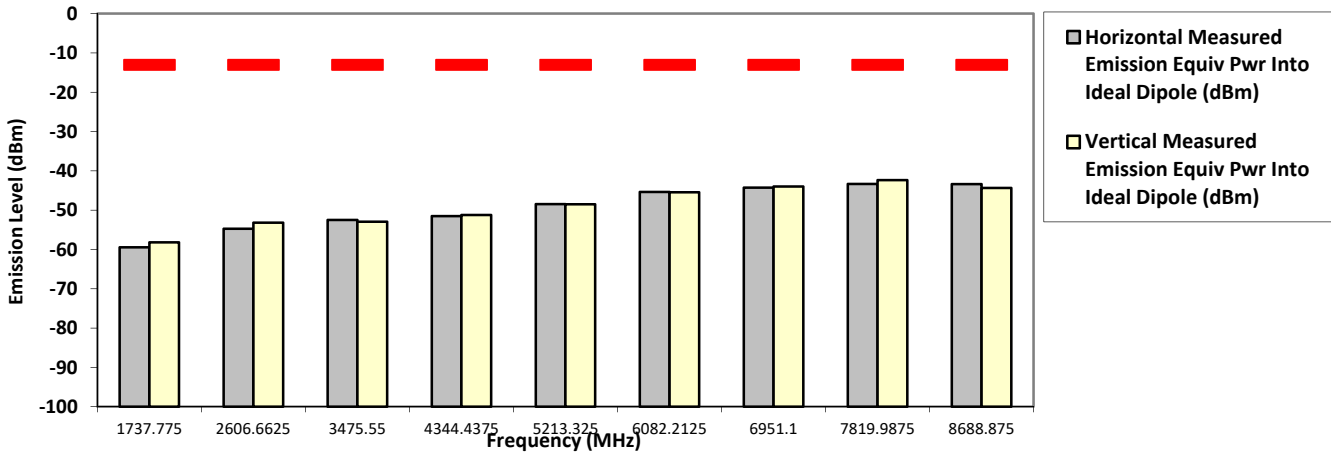
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TEDS

868.887500 MHz **25 kHz** **24.000 Watt(s) /Max Power** **240VAC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
1737.7750	-13.0000	-59.4671 **	-58.1997 **
2606.6625	-13.0000	-54.7245 **	-53.1854 **
3475.5500	-13.0000	-52.4988 **	-52.9525 **
4344.4375	-13.0000	-51.5250 **	-51.2075 **
5213.3250	-13.0000	-48.4793 **	-48.5031 **
6082.2125	-13.0000	-45.3704 **	-45.4430 **
6951.1000	-13.0000	-44.2680 **	-43.9650 **
7819.9875	-13.0000	-43.3171 **	-42.3486 **
8688.8750	-13.0000	-43.3840 **	-44.3497 **

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, Faris, Qawiman, Aiman & Nazrin **Fri, Nov 30, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00001**

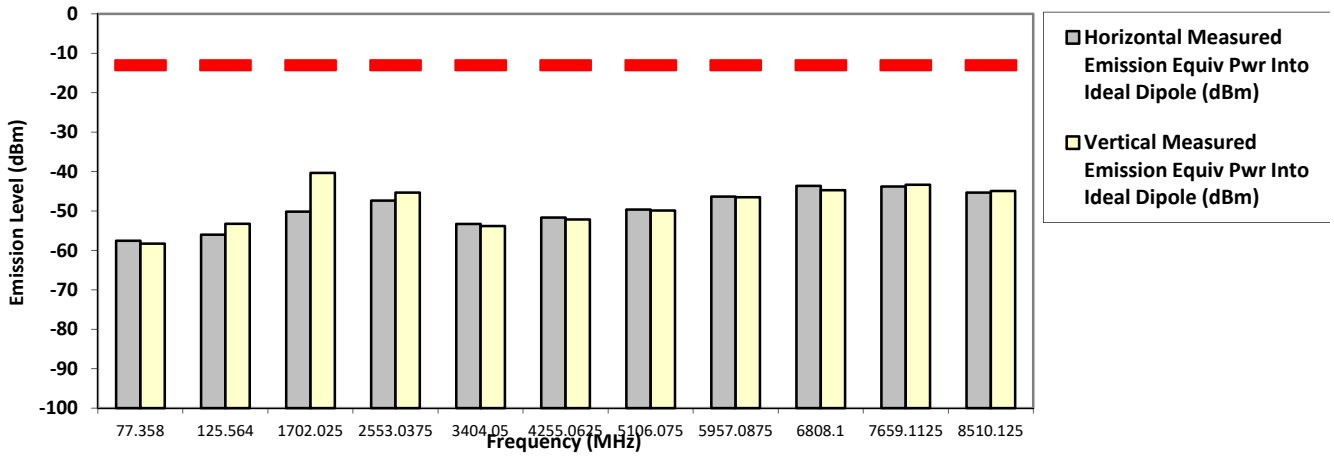
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TETRA

851.012500 MHz **25 kHz** **48.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
77.3580	-13.0000	-57.5600*	-58.2600*
125.5640	-13.0000	-55.9900*	-53.2600*
1702.0250	-13.0000	-50.1500 *	-40.3600 *
2553.0375	-13.0000	-47.3600 *	-45.3300 *
3404.0500	-13.0000	-53.2675 **	-53.8148 **
4255.0625	-13.0000	-51.6548 **	-52.1398 **
5106.0750	-13.0000	-49.6369 **	-49.8678 **
5957.0875	-13.0000	-46.3431 **	-46.5163 **
6808.1000	-13.0000	-43.6292 **	-44.7316 **
7659.1125	-13.0000	-43.8028 **	-43.3446 **
8510.1250	-13.0000	-45.3399 **	-44.9438 **

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: Aiman,Azil&Faris **Fri, Sep 28, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00001**

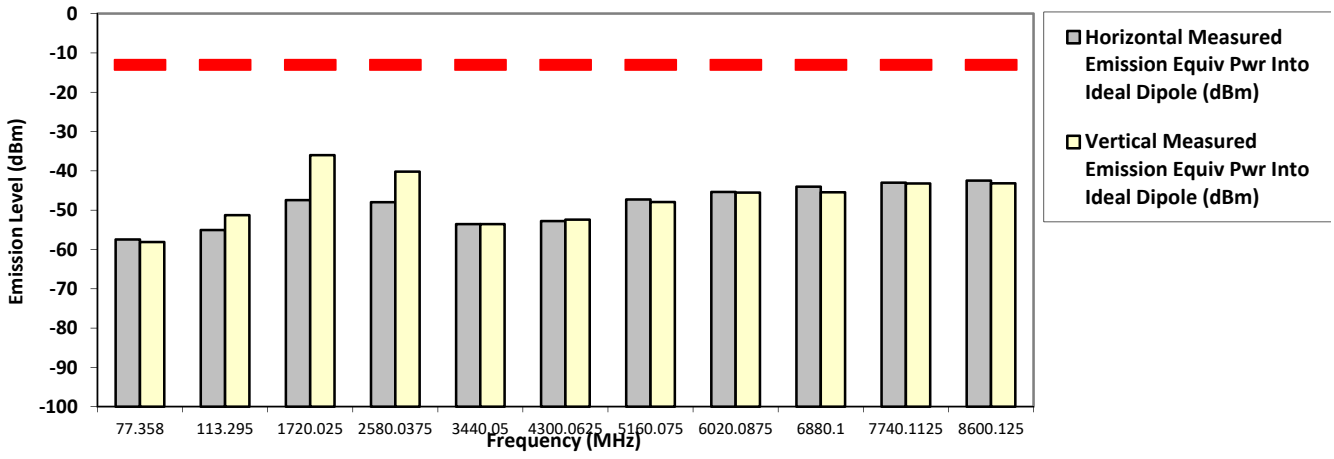
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TETRA

860.012500 MHz **25 kHz** **48.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
77.3580	-13.0000	-57.4400*	-58.1100*
113.2950	-13.0000	-55.0700*	-51.2800*
1720.0250	-13.0000	-47.4500 *	-36.0000 *
2580.0375	-13.0000	-47.9800 *	-40.2000 *
3440.0500	-13.0000	-53.5413 **	-53.5274 **
4300.0625	-13.0000	-52.7554 **	-52.4133 **
5160.0750	-13.0000	-47.2653 **	-47.9491 **
6020.0875	-13.0000	-45.3481 **	-45.5261 **
6880.1000	-13.0000	-44.0273 **	-45.4548 **
7740.1125	-13.0000	-43.0039 **	-43.1923 **
8600.1250	-13.0000	-42.4872 **	-43.1574 **

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: Aiman,Azil&Faris **Fri, Sep 28, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00001**

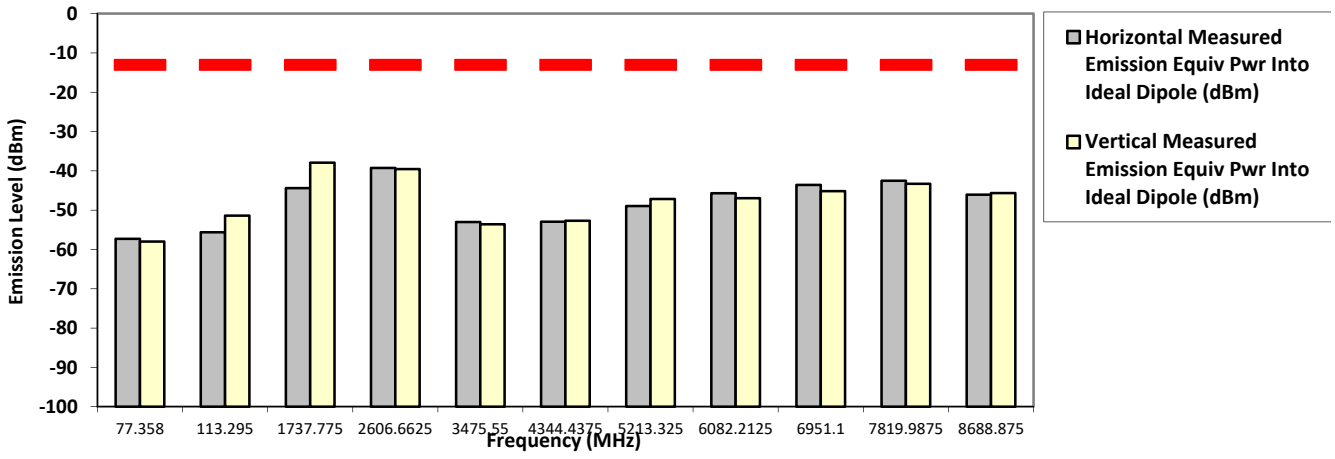
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TETRA

868.887500 MHz **25 kHz** **48.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
77.3580	-13.0000	-57.2800*	-57.9800*
113.2950	-13.0000	-55.6300*	-51.3700*
1737.7750	-13.0000	-44.3800 *	-37.9100 *
2606.6625	-13.0000	-39.2500 *	-39.5500 *
3475.5500	-13.0000	-53.0065 **	-53.5693 **
4344.4375	-13.0000	-52.9286 **	-52.6813 **
5213.3250	-13.0000	-48.9322 **	-47.1625 **
6082.2125	-13.0000	-45.6784 **	-46.9621 **
6951.1000	-13.0000	-43.5928 **	-45.1439 **
7819.9875	-13.0000	-42.4986 **	-43.2824 **
8688.8750	-13.0000	-46.0635 **	-45.6309 **

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: Aiman,Azil&Faris **Fri, Sep 28, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00001**

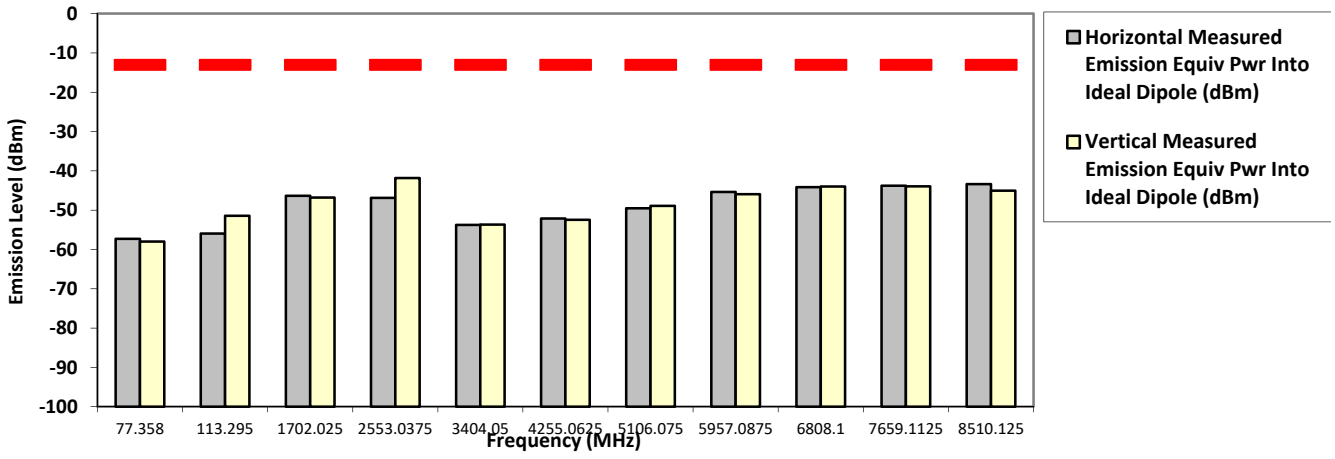
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TEDS

851.012500 MHz **25 kHz** **24.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
77.3580	-13.0000	-57.3000*	-57.9700*
113.2950	-13.0000	-55.9400*	-51.4300*
1702.0250	-13.0000	-46.3500 *	-46.7800 *
2553.0375	-13.0000	-46.8800 *	-41.8300 *
3404.0500	-13.0000	-53.7678 **	-53.6608 **
4255.0625	-13.0000	-52.1372 **	-52.4391 **
5106.0750	-13.0000	-49.5180 **	-48.9086 **
5957.0875	-13.0000	-45.3690 **	-45.9549 **
6808.1000	-13.0000	-44.1492 **	-43.9693 **
7659.1125	-13.0000	-43.7781 **	-43.9405 **
8510.1250	-13.0000	-43.3543 **	-45.0302 **

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: Aiman,Azil&Faris **Fri, Sep 28, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00001**

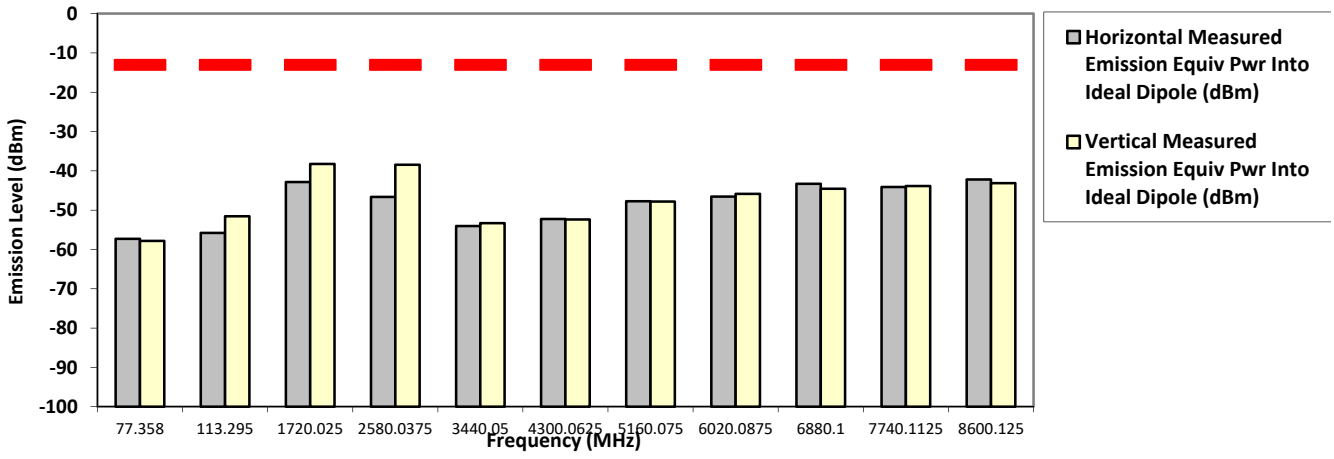
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TEDS

860.012500 MHz **25 kHz** **24.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
77.3580	-13.0000	-57.3100*	-57.8400*
113.2950	-13.0000	-55.7700*	-51.5500*
1720.0250	-13.0000	-42.8600 *	-38.2500 *
2580.0375	-13.0000	-46.6400 *	-38.4600 *
3440.0500	-13.0000	-54.0421 **	-53.3001 **
4300.0625	-13.0000	-52.2455 **	-52.3821 **
5160.0750	-13.0000	-47.7317 **	-47.8251 **
6020.0875	-13.0000	-46.5613 **	-45.8441 **
6880.1000	-13.0000	-43.2995 **	-44.5533 **
7740.1125	-13.0000	-44.1026 **	-43.8464 **
8600.1250	-13.0000	-42.1941 **	-43.1461 **

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: Aiman,Azil&Faris **Fri, Sep 28, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

SAC Transmitter Radiated Emission:

Model Number: SQM08SUM0010A **S/N: 398GTG0012** **SR:13100-EMC-00001**

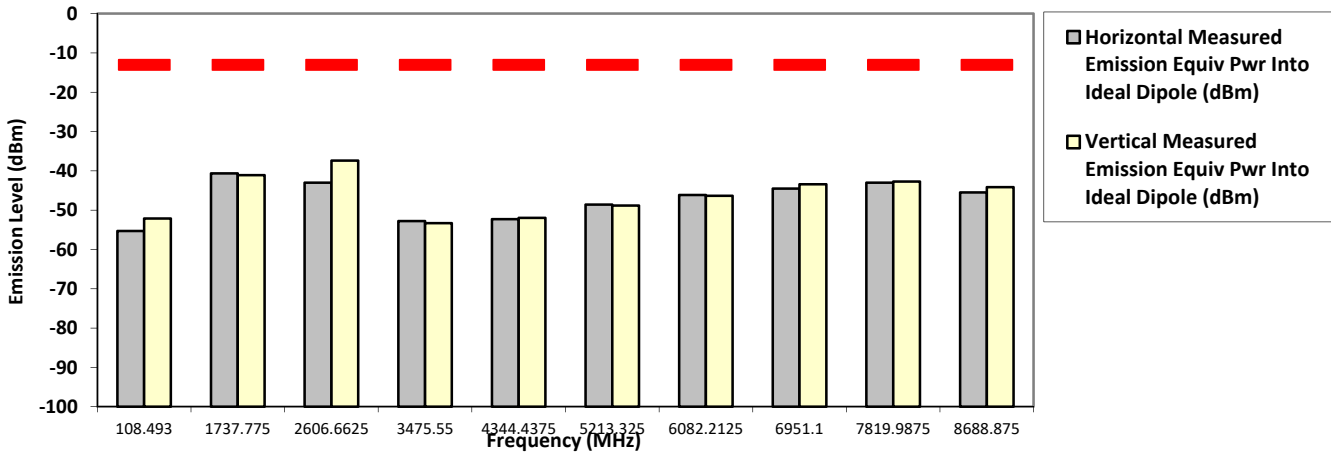
Battery Part No: NA **Accy Part No: NA**

Test Mode: TX TEDS

868.887500 MHz **25 kHz** **24.000 Watt(s) /Max Power** **48VDC**

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
108.4930	-13.0000	-55.2900*	-52.1100*
1737.7750	-13.0000	-40.6400 *	-41.1000 *
2606.6625	-13.0000	-43.0100 *	-37.3900 *
3475.5500	-13.0000	-52.7660 **	-53.3143 **
4344.4375	-13.0000	-52.2820 **	-51.9574 **
5213.3250	-13.0000	-48.5733 **	-48.8410 **
6082.2125	-13.0000	-46.1431 **	-46.3598 **
6951.1000	-13.0000	-44.5186 **	-43.4317 **
7819.9875	-13.0000	-42.9963 **	-42.7122 **
8688.8750	-13.0000	-45.4703 **	-44.1488 **

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: Aiman,Azil&Faris **Fri, Sep 28, 2018**

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): 22.8 Hum(%RH): 69.7

System MU: 5.01 dB

Remarks:

Passed Results	**Marginal Results**	**Failed Results**

6.11.4. Test Limit

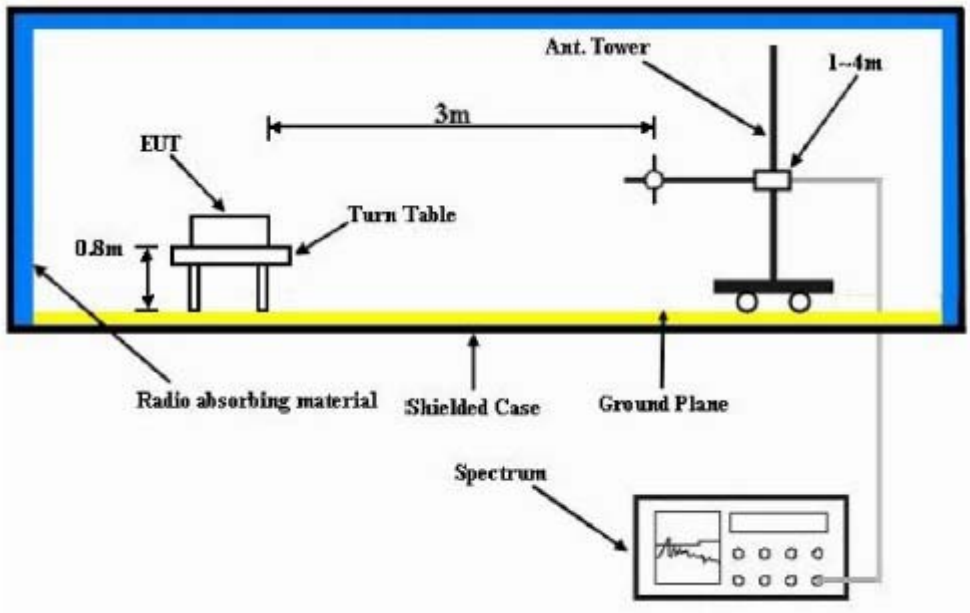
Table below summarized the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least

Channel Spacing	Part 22	Part 24D	Part 74	Part 80	Part 90 (UHF, VHF, 800, 900)	Part 90 (700)
12.5kHz	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	Not Applicable	50 + log10(P) (-20 dBm)	43 + log10(P) (-13 dBm)
25kHz		Not Applicable		43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)

Channel Spacing	RSS 134	RSS 182	RSS 119 (UHF, VHF, 800, 900)	RSS 119 (700)
12.5kHz	43 + log10(P) (-13 dBm)	Not Applicable	50 + log10(P) (-20 dBm)	43 + log10(P) (-13 dBm)
25kHz	Not Applicable	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)

6.12. Effective Radiated Power (ERP)

6.12.1. Test Setup



1) The Resolution Bandwidth for Equivalent Radiated Power (ERP) below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for EIRP above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector Mode is RMS.
2) In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval 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 for each degree interval. The “Read Value” is the spectrum reading of maximum power value.
3) The substitution antenna is substituted for DUT 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.

6.12.2. Test Result

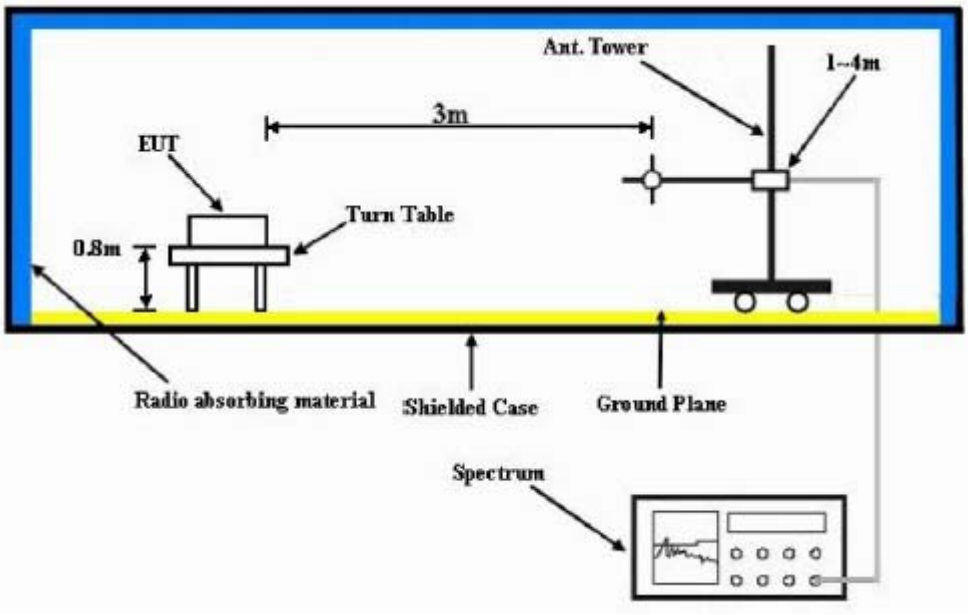
Not Applicable.

6.12.3. Test Limit

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

6.13. GNSS (EIRP for 1559 - 1610MHz)

6.13.1. Test Setup



4) The Resolution Bandwidth for Equivalent Isotropically Radiated Power (EIRP) below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for EIRP above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector Mode is RMS.
5) In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval 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 for each degree interval. The “Read Value” is the spectrum reading of maximum power value.
6) The substitution antenna is substituted for DUT 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.
7) EIRP = “Read Value” + Measured substitution value + 2.15.

6.13.1. Test Result

Not Applicable.

6.13.2. Test Limit

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

~ End of Test Report ~