MOTOROLA SOLUTIONS

CERTIFICATE 2518.08

SAMM 825

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.A

Date/s Tested	:	15-April-2024 - 28-June-2024
Report Issue Date	:	09-July-2024
Manufacturer/Location	:	Motorola Solutions Malaysia Sdn Bhd
Manufacturer Address	:	Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia
Requestor	:	CADOGAN SEAN
Product Type	:	Hand-held
Product Marketing Name (PMN)	:	APX N70
Hardware Version Identification Number (HVIN)	:	H35KET9PW8AN & H35KET9PW8AN-H
Frequency Band	:	Refer to section 1.4
Rated / Max RF Output Power	:	199.53mW / 252mW
Applicant Name	:	Motorola Solutions Inc
Applicant Address	:	Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia
FCC Registrations	:	461337
ISED Registrations	:	MY0001
Firmware Version Identification Number (FVIN)	:	D03.75.21 (BP), D00.00.16 (AP)

The equipment was tested accordance to the requirement listed below:

(LTE Band 17) **FCC 47 CFR Part 2 / 27** **ISED RSS GEN / 130**	**PASS**

Prepared By:

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Technician

Approve Signatory:

Maheshvaran A/L Rajagopal
Responsible Engineer

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev A.	Initial Report	9 July 2024	Awatif

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	022TAD0679
-	RSS-130 4.4	Peak-to-Average Power Ratio	Pass	Meet the requirement of limit	022TAD0679
2.1046	RSS-Gen 6.7	Occupied Bandwidth (26dBc, 99%)	Pass	Meet the requirement of limit	022TAD0679
2.1055 27.54	RSS-130 4.3	Frequency Stability	Pass	Meet the requirement of limit	022TAD0679
2.1051 27.53(g)	RSS-Gen 6.13 RSS-130 4.6	Band Edge Conducted Spurious Emission	Pass	Meet the requirement of limit	022TAD0679
2.1051 27.53(g)	RSS-Gen 6.13 RSS-130 4.6	Conducted Spurious Emissions	Pass	Meet the requirement of limit	022TAD0679
2.1053 27.53(g)	RSS-130 4.6	Radiated Spurious Emission	Pass	-44.2107 dBm (Margin: 31.2107 dB, Noise Floor)	022TAF1521
2.1049 27.50(c)(9)(10)	RSS-130 4.4	Effective Radiated Power (ERP)	Pass	Meet the requirement of limit	022TAD0679

1.1. Measurement Uncertainty

Measurement	Frequency	Expended 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)				
Wideband Radio Communication Tester	CMW500	154550	8-Aug-23	8-Aug-24
Signal Analyzer	FSV40	101431	7-Aug-23	7-Aug-24
Chamber	SH-641	92003150	15-Sep-23	15-Sep-24
Power Supply	6652A	3640A02967	15-Oct-23	15-Oct-24
Test Software	R&S CMWrun			
Version	V.1.9.8			
RADIATED SPURIOUS EMISSION (EMC CHAMBER 1)				
Drg Horn Freq.	SAS-571	1143	08-Mar-23	08-Mar-25
Drg Horn Freq.	SAS-571	720	18-Apr-23	18-Apr-25
Power Supply	NR973A	MY54180189	30-Aug-23	30-Aug-24
Signal Generator	SMB 100A	182511	4-Jun-21	4-Jun-24
Emi Test Receiver	ESW44	101731	11-Aug-23	11-Aug-24
Bilog Antenna	CBL6112B	2950	14-Dec-23	14-Dec-24
Bilog Antenna	CBL6112B	2964	25-Sep-23	25-Sep-24
Data Logger Thermohygrometer	SDL500	A.016800	21-Jun-23	21-Jun-24
Broad-Band Horn Antenna	BBHA9170	BBHA9170143	28-Aug-23	28-Aug-24
Preamplifier	PAM-0118P	269	28-Jun-23	28-Jun-24
Loop Antenna	6502	00208416	26-Oct-23	26-Oct-24
5m Semi-Anechoic Chamber	S800-HX	J2308	Not required	Not required
System Controller	SC104V	050806-1	Not required	Not required
Turntable Flush Mount 2m	FM2011	NA	Not required	Not required
Antenna Positioning Tower	TLT2	NA	Not required	Not required
Preamplifier 18-40Ghz	Miteq Hi Gain Sucoflex	002	Not required	Not required
Test Software	EMC_FCC_IC_BLUETOOTH_RE_TEST			
Version	EMC_FCC_RE_v1.6.5			

1.3. General Information

General Description of EUT

Product	APX N70			
Brand	Motorola Solutions			
Test Model	H35KET9PW8AN & H35KET9PW8AN-H			
Power Supply Rating	7.5 Vdc			
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. Conducted RF Output Power	LTE Band 17 QPSK	Channel Bandwidth 5MHz	23.218dBm (0.210W)	
		Channel Bandwidth 10MHz	**23.610dBm (0.230W)**	
	LTE Band 17 16QAM	Channel Bandwidth 5MHz	22.369dBm (0.173W)	
		Channel Bandwidth 10MHz	**22.578dBm (0.181W)**	
Emission Designator	LTE Band 17		**QPSK**	**16QAM**
		Channel Bandwidth 5MHz	4M47G7D	4M47D7W
		Channel Bandwidth 10MHz	8M93G7D	8M93D7W
Antenna Type	LTE Band 17	Stamped Metal, Antenna LTE Low Band 699 – 716MHz (-2.9dBi)		
SW Version	D03.75.21 (BP), D00.00.16 (AP)			
HW Version	P1			

Note:

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

Item	Brand	Model or P/N	Specification
Li-ion Battery	MOTOROLA	PMNN4818A	UL 3650mAH (using RN 2170 Li-Ion cell)

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 OOBE 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	710.0	713.5
	10 MHz	23780 ~ 23800	23780	23790	23800	709.0	710.0	711.0

1.5. Test Mode Applicability and Tested Channel Detail

Pre-scan also have been conducted with the accessory devices listed in section table 1.3, only the worst case radiated emission results of the combination test configuration is reported in this report.
The following channel(s) was (were) selected for the final test as listed below:

LTE Band 17

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Conducted RF Output Power	23755 ~ 23825	23755, 23710, 23825	5 MHz	QPSK, 16QAM	As per table 1.6.3
	23780 ~ 23800	23780, 23710, 23800	10 MHz		
Peak-to-Average Power Ratio	23755 ~ 23825	23755, 23710, 23825	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	23780 ~ 23800	23780, 23710, 23800	10 MHz		50 RB / 0 RB Offset
Occupied Bandwidth	23755 ~ 23825	23755, 23710, 23825	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	23780 ~ 23800	23780, 23710, 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, 23710, 23825	5 MHz	QPSK	1 RB / 24 RB Offset
	23780 ~ 23800	23780, 23710, 23800	10 MHz		1 RB / 0 RB Offset
Radiated Spurious Emission	23780 ~ 23800	23780, 23710, 23800	10 MHz	QPSK	1 RB / 0 RB Offset
Effective Radiated Power (ERP)	23755 ~ 23825	23755, 23710, 23825	5 MHz	QPSK, 16QAM	As per table 1.6.4
	23780 ~ 23800	23780, 23710, 23800	10 MHz		

NOTE:

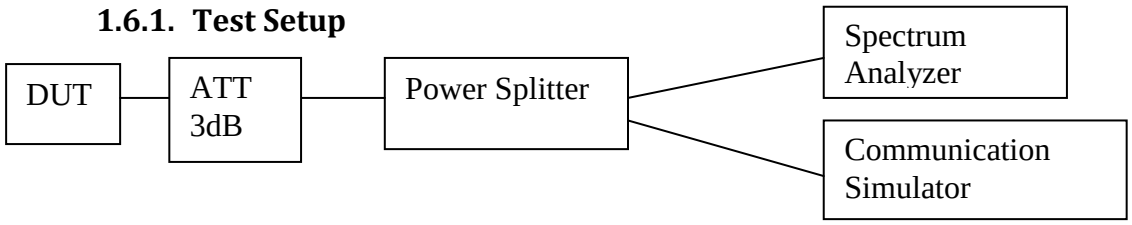
1. The Conducted RF Output Power for QPSK and 16QAM, measured value of QPSK mode is higher than 16QAM mode. Therefore, Conducted Spurious Emission and Radiated Emission had been tested under QPSK modes.
2. Band Edge was performed with 1 and full Resource Block at the lowest and highest operating frequency band.
3. The Effective Radiated Power (ERP) was performed based on worst case mode from Conducted RF Output Power in QPSK and 16QAM modulation.
4. The 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	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Peak-to-Average Power Ratio	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Occupied Bandwidth	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Frequency Stability	-30ºC ~ 60ºC	7.5 Vdc	Awatif Rahman
Band Edge Conducted Spurious Emission	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Conducted Spurious Emission	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Effective Radiated Power (ERP)	25ºC, 50% RH	7.5 Vdc	Awatif Rahman

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. Test 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**	23.077	23.172	**23.218**	22.146	**22.369**	22.301
	1	**13**	23.102	23.155	23.081	22.099	22.36	22.133
	1	**24**	23.094	23.107	23.064	22.165	22.274	22.099
	12	**0**	22.155	22.147	22.221	21.165	21.171	21.147
	12	**6**	22.135	22.074	22.279	21.154	21.074	21.192
	12	**13**	22.162	22.118	22.172	21.15	21.12	21.168
	25	**0**	22.121	22.182	22.096	21.11	21.195	21.112

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**	23.435	23.398	**23.61**	**22.578**	22.487	22.47
	1	**25**	23.129	23.164	23.154	22.447	22.042	22.26
	1	**49**	23.349	23.257	23.575	22.48	22.338	22.271
	25	**0**	22.148	22.187	22.196	21.238	21.274	21.33
	25	**13**	22.192	22.184	22.166	21.245	21.285	21.27
	25	**25**	22.162	22.003	22.09	21.184	21.12	21.148
	50	**0**	22.183	22.235	22.195	21.191	21.2	21.196

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

ERP (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	18.027	18.122	**18.168**	17.096	**17.319**	17.251	
	1	13	18.052	18.105	18.031	17.049	17.31	17.083	
	1	24	18.044	18.057	18.014	17.115	17.224	17.049	
	12	0	17.105	17.097	17.171	16.115	16.121	16.097	
	12	6	17.085	17.024	17.229	16.104	16.024	16.142	
	12	13	17.112	17.068	17.122	16.1	16.07	16.118	
	25	0	17.071	17.132	17.046	16.06	16.145	16.062	

ERP (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	18.385	18.348	**18.56**	**17.528**	17.437	17.42	
	1	25	18.079	18.114	18.104	17.397	16.992	17.21	
	1	49	18.299	18.207	18.525	17.43	17.288	17.221	
	25	0	17.098	17.137	17.146	16.188	16.224	16.28	
	25	13	17.142	17.134	17.116	16.195	16.235	16.22	
	25	25	17.112	16.953	17.04	16.134	16.07	16.098	
	50	0	17.133	17.185	17.145	16.141	16.15	16.146	

The maximum ERP/EIRP from the measured RF output power is given in Equation as follows:

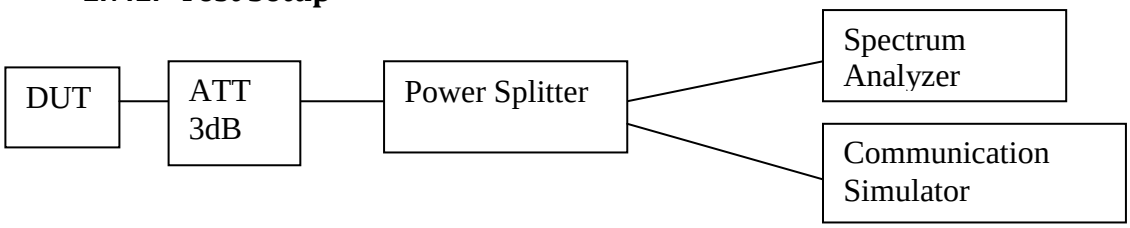
$$\mathbf{EIRP} = \mathbf{P_{Meas}} + \mathbf{G_T}$$
$$\mathbf{ERP} = \mathbf{EIRP} - \mathbf{2.15}$$

Where, ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (Expressed in the same units as PMeas, e.g., dBm)

$\mathbf{P_{Meas}}$ measured transmitter output power, in dBm
$\mathbf{G_T}$ gain of the transmitting antenna, in dBi (EIRP)

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

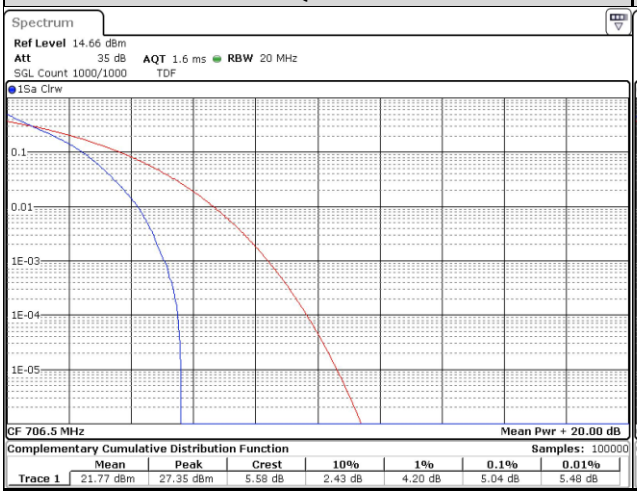
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

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

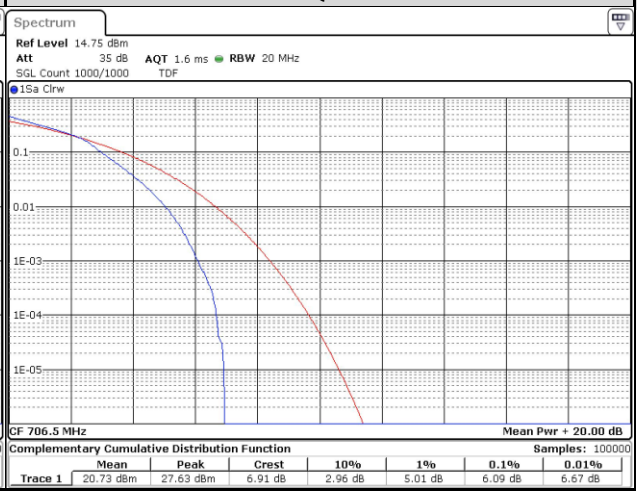
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 17/5MHz/25/0	Low CH 23755	706.5 MHz	**5.043**	**6.087**
	Mid CH 23790	710 MHz	4.899	5.884
	High CH 23825	713.5 MHz	4.957	5.855

Spectrum Plot of Worst Value

QPSK



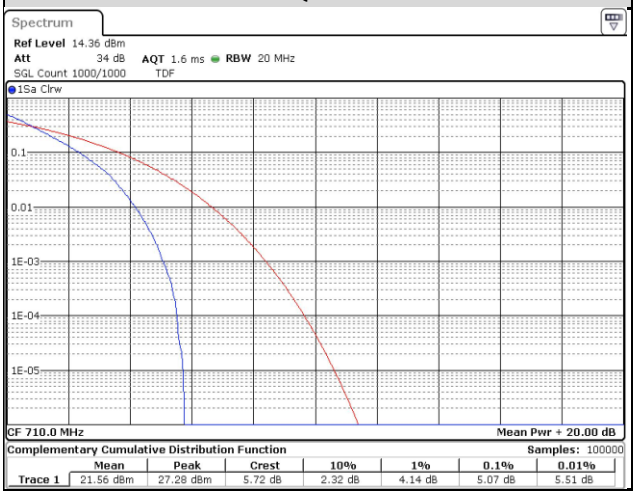
16QAM



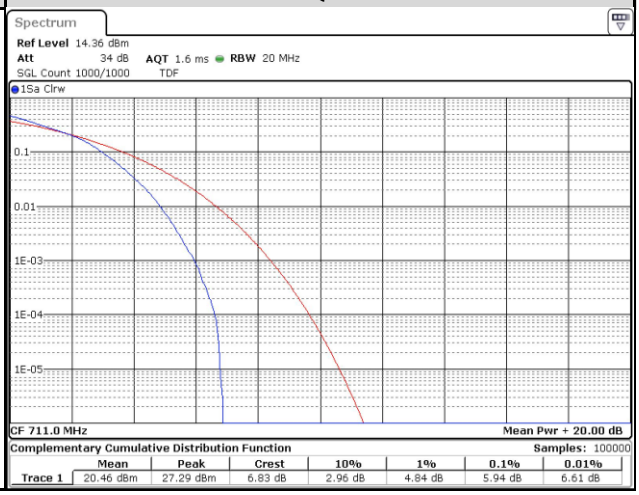
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 17/10MHz/50/0	Low CH 23780	709 MHz	5.014	5.884
	Mid CH 23790	710 MHz	**5.072**	5.913
	High CH 23800	711 MHz	4.957	**5.942**

Spectrum Plot of Worst Value

QPSK

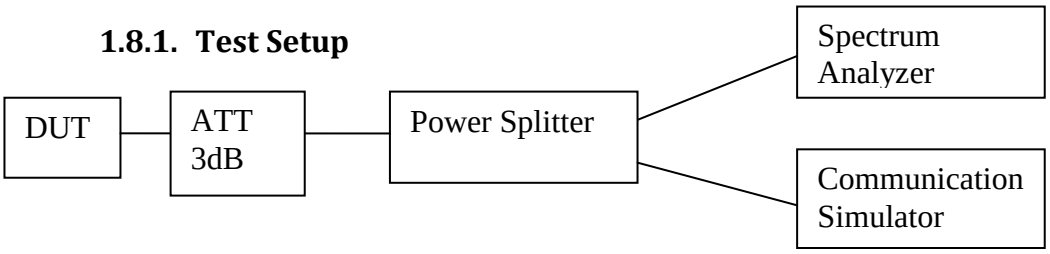


16QAM



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.

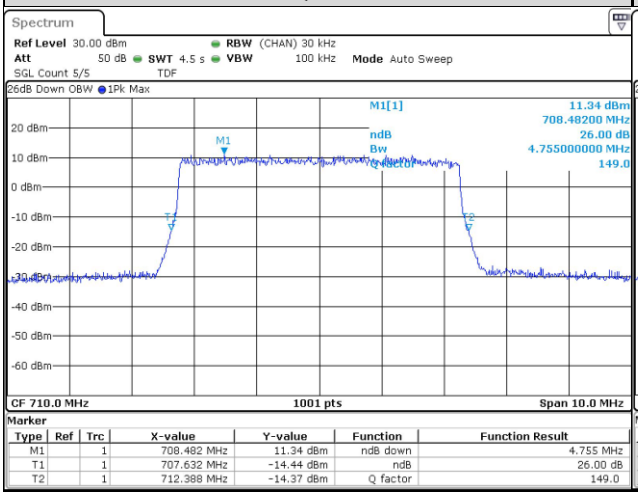
1.8.2. Test Limit

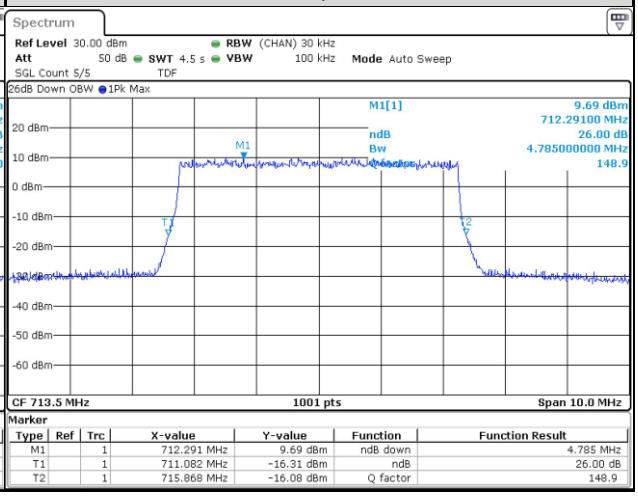
For measurement 99% of occupied bandwidth that is required by FCC 2.1046 and RSS Gen 6.7.

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**	4.745
	High CH 23825	713.5 MHz	4.755	**4.785**

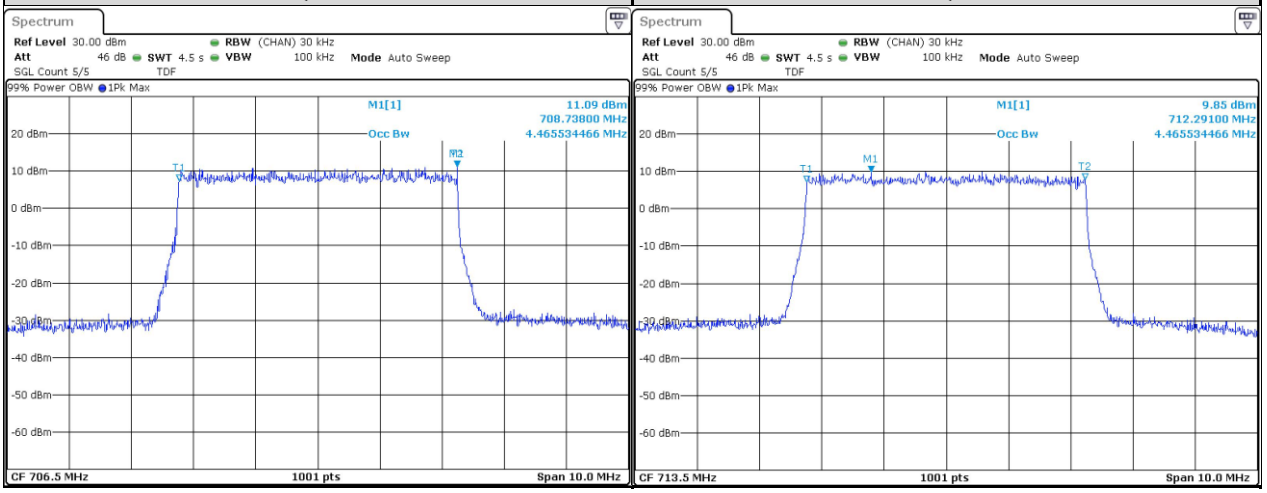
Spectrum Plot of Worst Value	
-26 dBC Bandwidth	
QPSK	16QAM





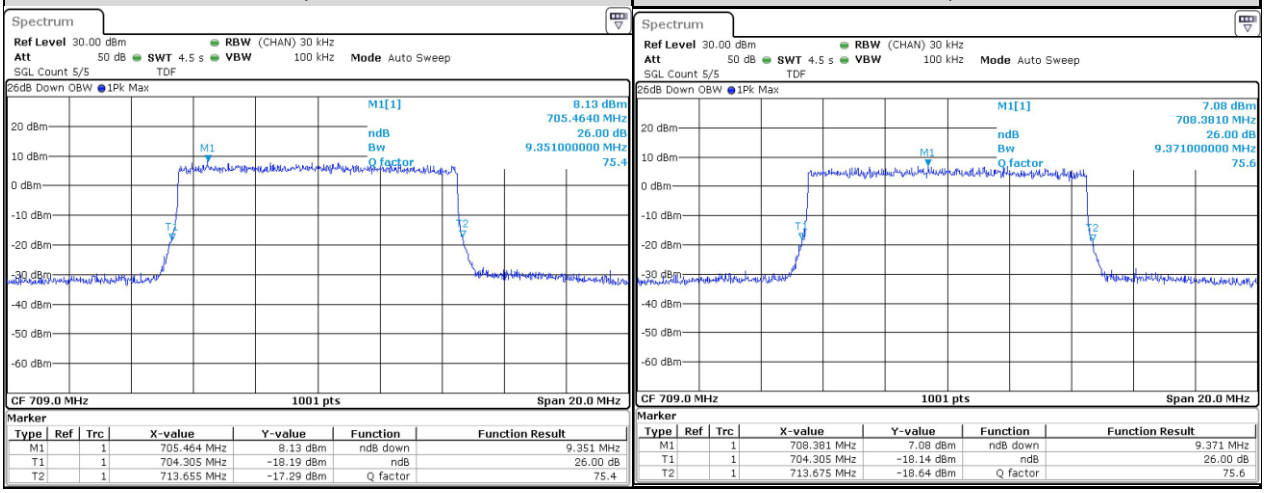
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/5MHz/25/0	Low CH 23755	706.5 MHz	**4.466**	4.456
	Mid CH 23790	710 MHz	4.456	4.456
	High CH 23825	713.5 MHz	4.466	**4.466**

Spectrum Plot of Worst Value	
99% Occupied Bandwidth	
QPSK	16QAM



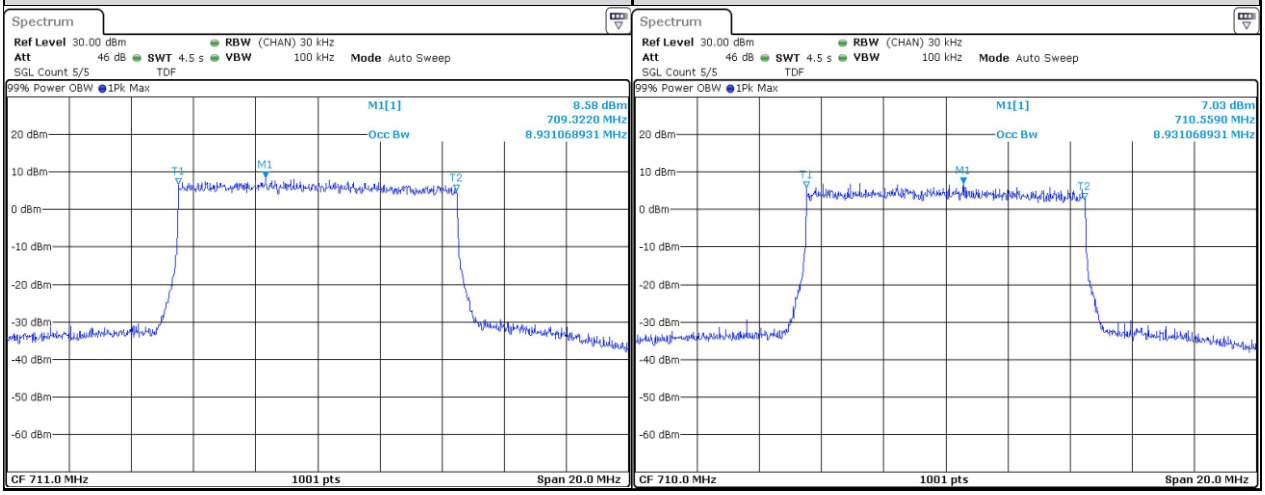
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/10MHz/50/0	Low CH 23780	709 MHz	**9.351**	**9.371**
	Mid CH 23790	710 MHz	9.331	9.291
	High CH 23800	711 MHz	9.331	9.291

Spectrum Plot of Worst Value	
-26 dBC Bandwidth	
QPSK	16QAM



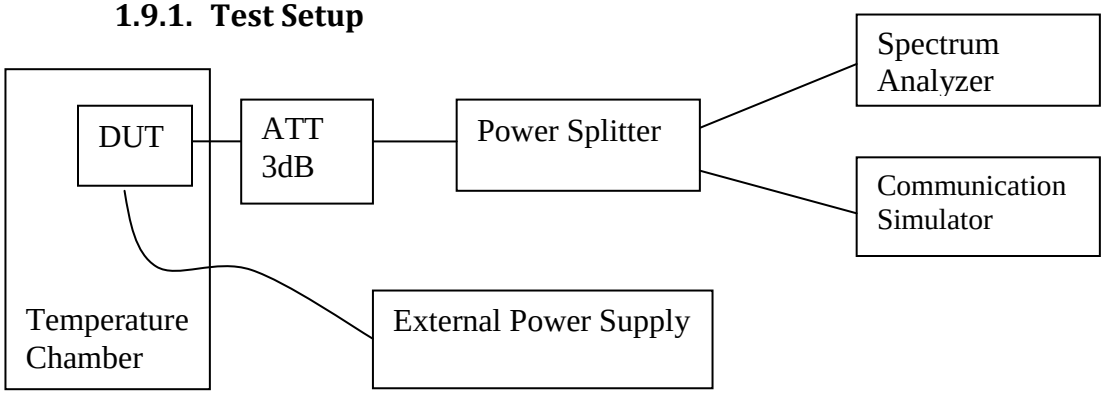
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 17/10MHz/50/0	Low CH 23780	709 MHz	8.911	8.891
	Mid CH 23790	710 MHz	8.891	**8.931**
	High CH 23800	711 MHz	**8.931**	8.911

Spectrum Plot of Worst Value	
99% Occupied Bandwidth	
QPSK	16QAM



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	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 17	**60**	706.500025	0.006115	713.500265	0.006797
	50	706.500563	-0.00488	713.500652	0.00828
	40	706.506466	-0.005123	713.506651	0.004712
	30	706.506235	0.006621	713.500035	0.010606
	20	706.505624	0.008302	713.505613	0.010385
	10	706.505463	0.004819	713.500556	0.005213
	0	706.500065	0.010002	713.500656	0.011248
	-10	706.500666	0.006095	713.500485	0.010185
	-20	706.500067	0.006216	713.500085	0.009884
	-30	706.500001	0.006722	713.500512	0.013794

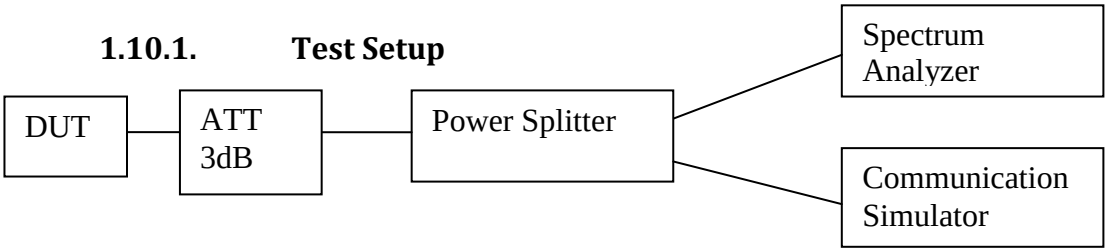
Band	Voltage (V)	Frequency Error VS Voltage			
		Channel Bandwidth: 5 MHz			
		Low Channel		High Channel	
		706.5MHz		713.5MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
LTE Band 17	**9**	706.500023	0.011622	713.500031	0.009463
	7.5	706.500123	0.006297	713.500356	0.009203
	6	706.510035	-0.005366	713.500985	0.009042

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**	709.000024	0.006941	711.000253	-0.004527
	50	709.000253	-0.005831	711.002536	-0.005473
	40	709.000356	0.010229	711.024683	0.004386
	30	709.006546	-0.006214	711.025633	0.007867
	20	709.000566	0.007324	711.055626	0.010523
	10	709.064666	0.005206	711.025638	-0.006297
	0	709.054562	0.006134	711.026658	0.008148
	-10	709.000654	0.0092	711.000545	0.005392
	-20	709.000023	0.006699	711.000415	0.009114
	-30	709.000021	0.007062	711.000065	0.005412

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**	709.000051	0.011723	711.000469	0.005654
	7.5	709.000631	-0.004741	711.000005	-0.007746
	6	709.003665	0.004883	711.003596	-0.004567

1.10. Band Edge Conducted Spurious Emission

1.10.1. 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) 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.

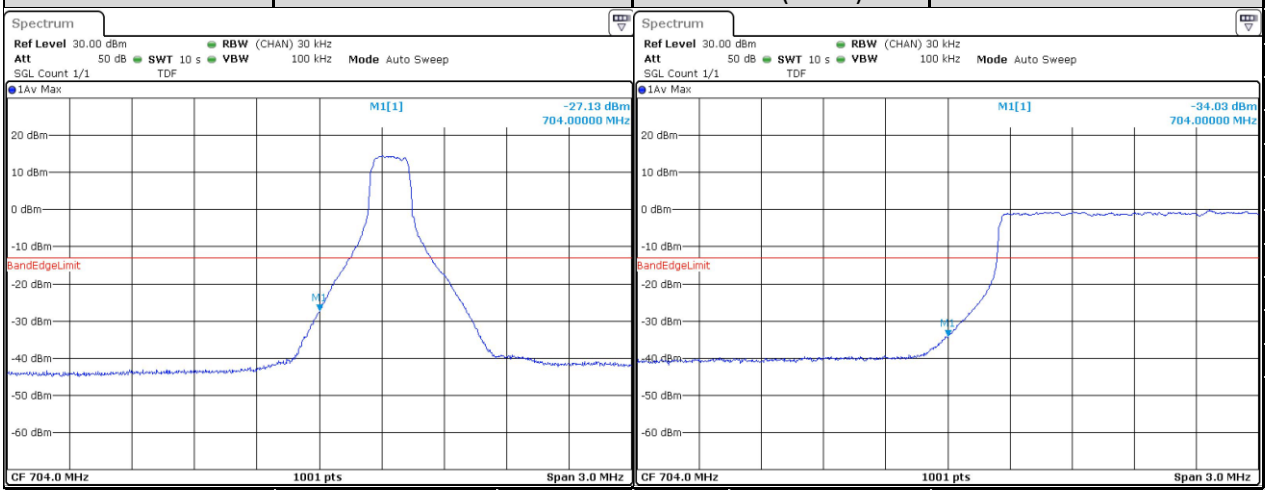
1.10.2. Test Limit

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.

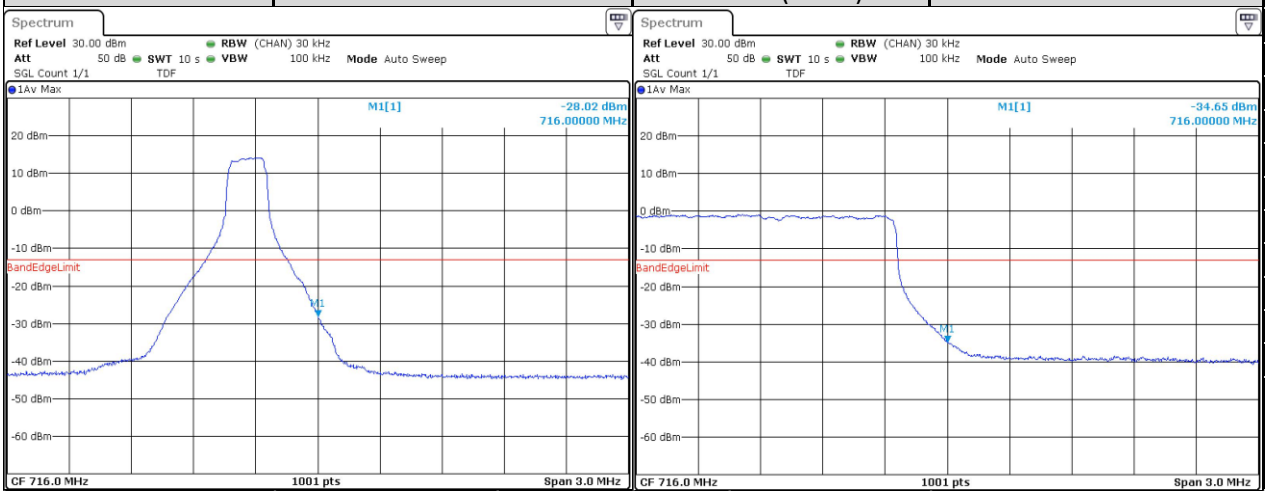
1.10.3. Band Edge Conducted Spurious Emission – LTE Band 17 (704-716MHz)

5MHz

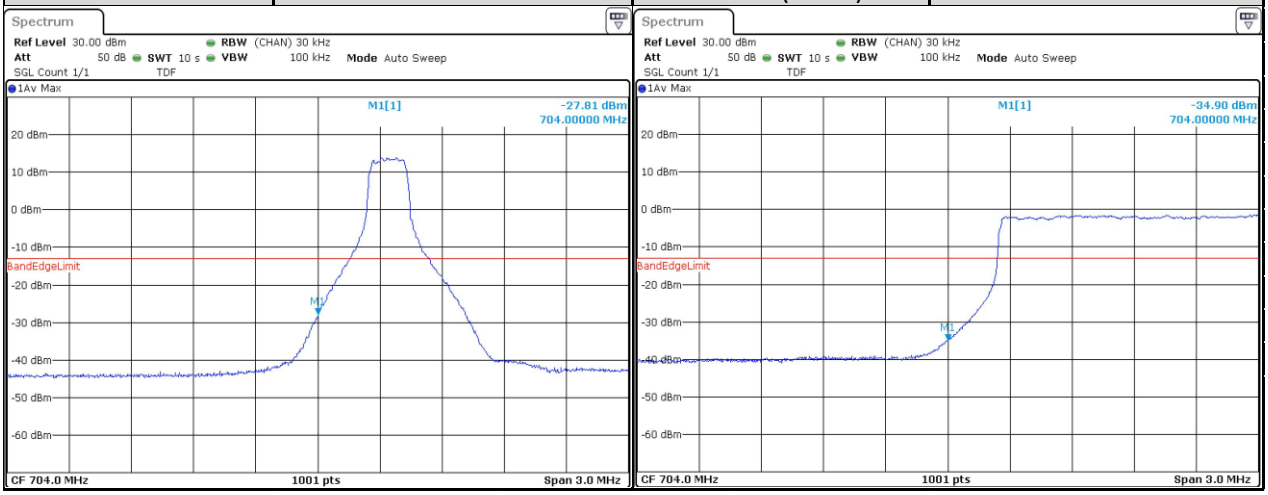
Band 17, 5MHz QPSK, Low CH 23755			
RB = 1	Offset = 0	RB = X (100%)	Offset = 0



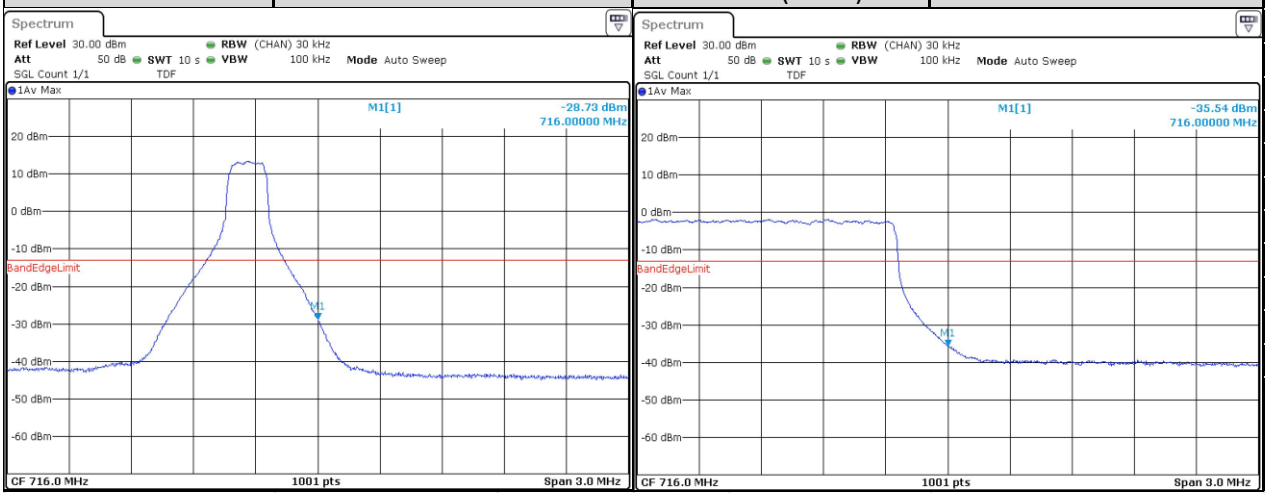
Band 17, 5MHz QPSK, High CH 23825			
RB = 1	Offset =X-1	RB = X (100%)	Offset = 0



Band 17, 5MHz 16-QAM, Low CH 23755			
RB = 1	Offset = 0	RB = X (100%)	Offset = 0

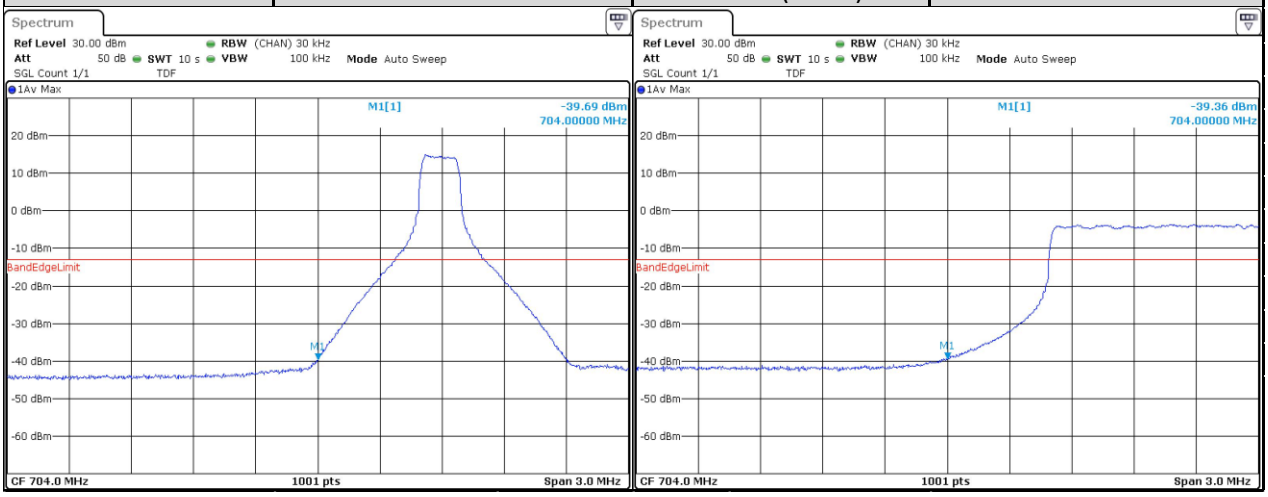


Band 17, 5MHz 16-QAM, High CH 23825			
RB = 1	Offset =X-1	RB = X (100%)	Offset = 0

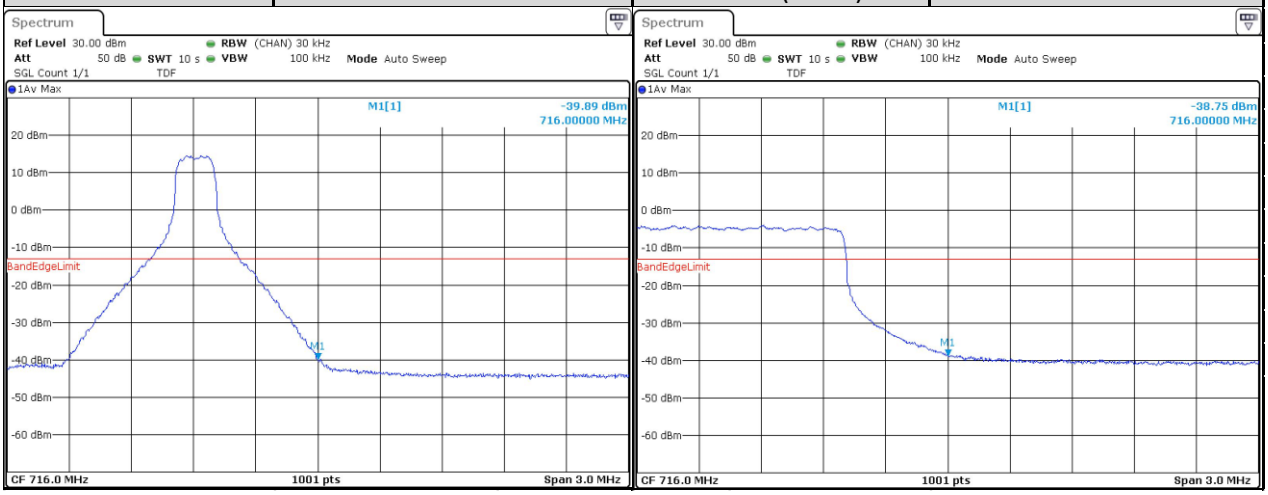


10MHz

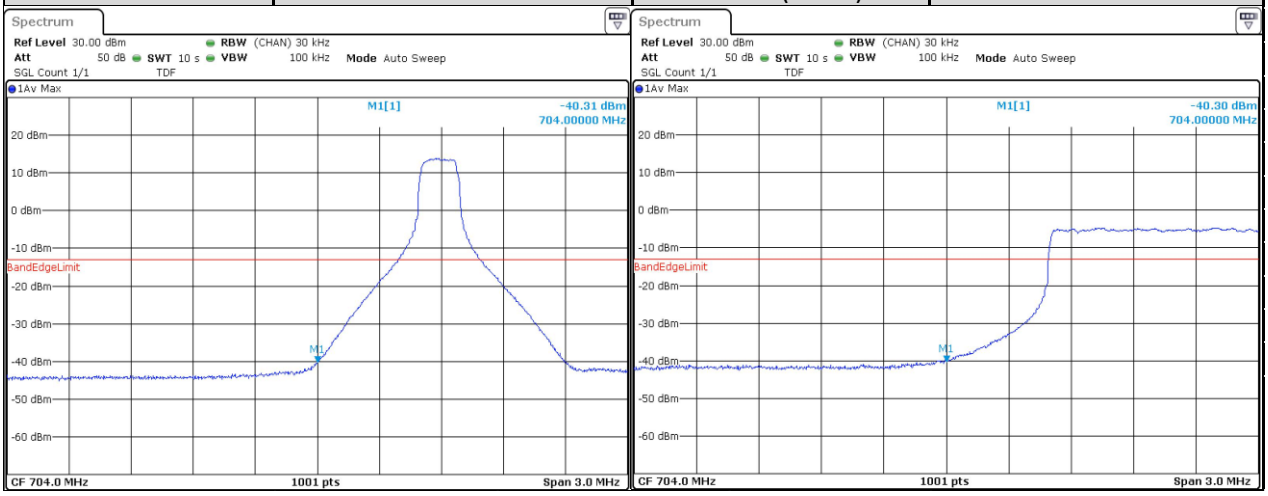
Band 17, 10MHz QPSK, Low CH 23780			
RB = 1	Offset = 0	RB = X (100%)	Offset = 0



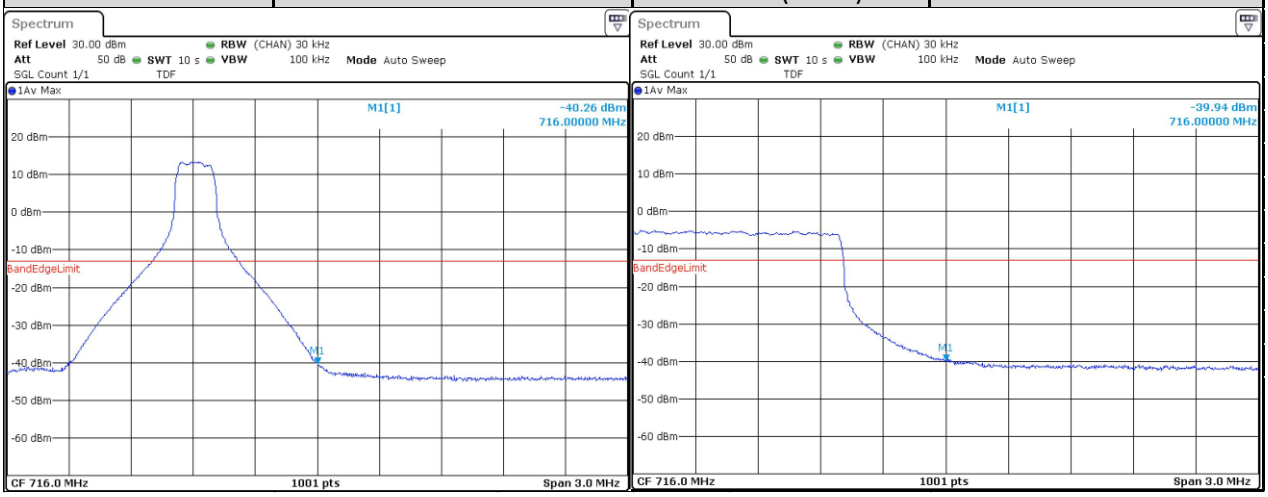
Band 17, 10MHz QPSK, High CH 23800			
RB = 1	Offset =X-1	RB = X (100%)	Offset = 0



Band 17, 10MHz 16-QAM, Low CH 23780			
RB = 1	Offset = 0	RB = X (100%)	Offset = 0

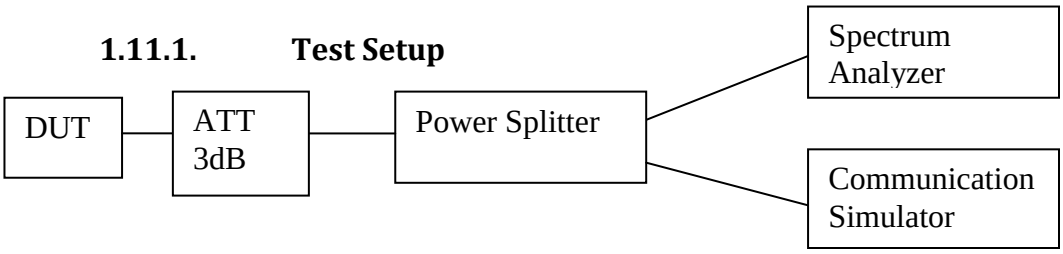


Band 17, 10MHz 16-QAM, High CH 23800			
RB = 1	Offset =X-1	RB = X (100%)	Offset = 0



1.11. Conducted Spurious Emission

1.11.1. 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) 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.

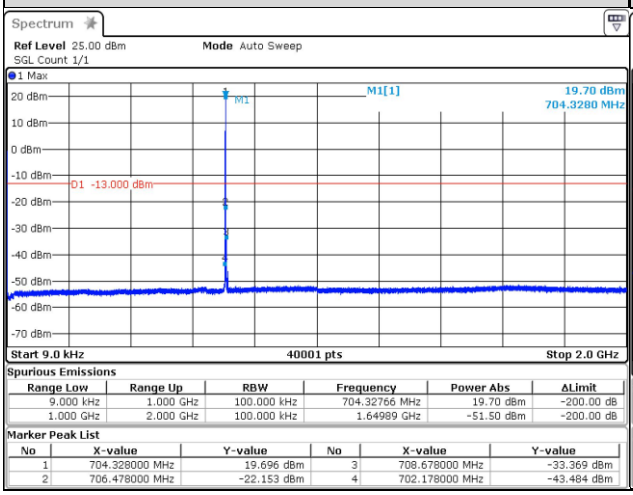
1.11.3. Conducted Spurious Emissions – LTE Band 17 (704-716MHz)

5MHz

QPSK - Low Freq (706.5 MHz)

RB Size =1, RB Offset = 0

9kHz ~ 2GHz



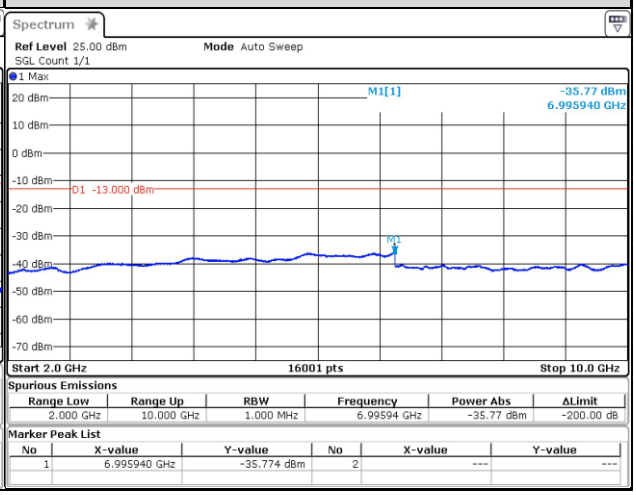
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	704.32766 MHz	19.70 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.64989 GHz	-51.50 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	704.328000 MHz	19.696 dBm	3	708.678000 MHz	-33.369 dBm
2	706.478000 MHz	-22.153 dBm	4	702.178000 MHz	-43.484 dBm

2GHz ~ 10GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.99594 GHz	-35.77 dBm	-200.00 dB

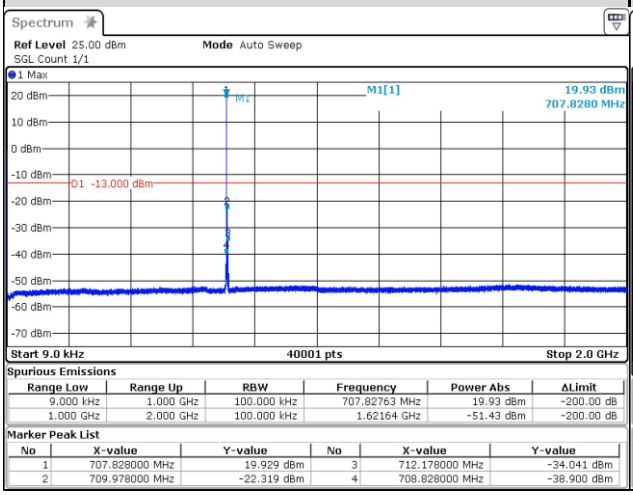
Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.995940 GHz	-35.774 dBm	2	---	---

QPSK - Mid Freq (710 MHz)

RB Size =1, RB Offset = 0

9kHz ~ 2GHz



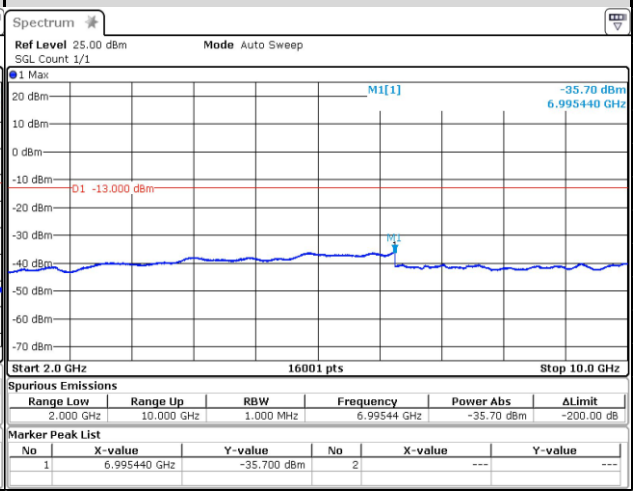
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	707.82763 MHz	19.93 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.62164 GHz	-51.43 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	707.828000 MHz	19.929 dBm	3	712.178000 MHz	-34.041 dBm
2	709.978000 MHz	-22.319 dBm	4	708.828000 MHz	-38.900 dBm

2GHz ~ 10GHz



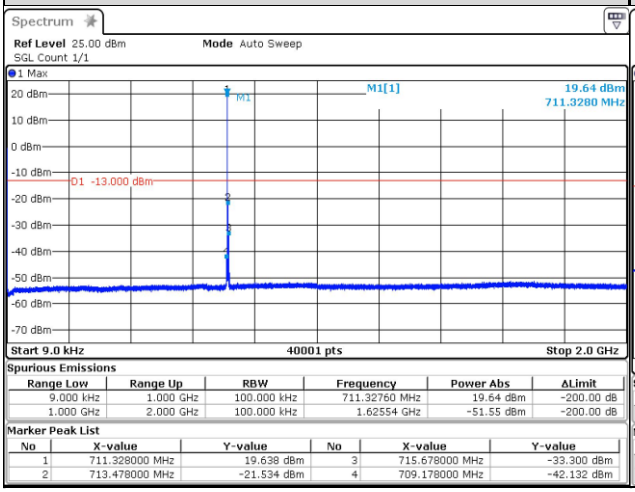
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.99544 GHz	-35.70 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.995440 GHz	-35.700 dBm	2	---	---

QPSK - High Freq (713.5 MHz)	
RB Size =1, RB Offset = 0	
9kHz ~ 2GHz	2GHz ~ 10GHz

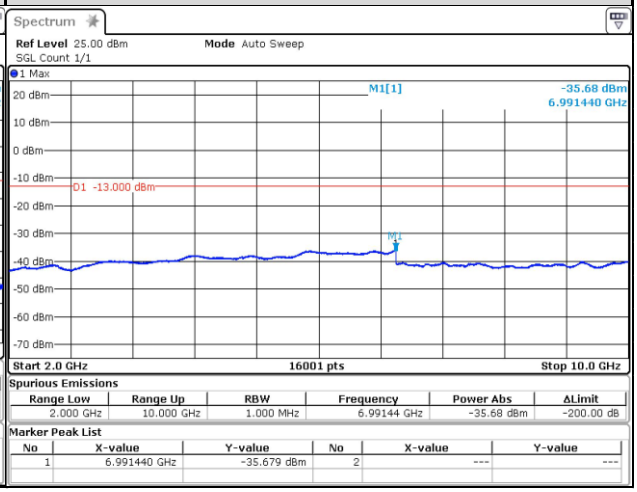


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	711.32760 MHz	19.64 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.62554 GHz	-51.55 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	711.328000 MHz	19.638 dBm	3	715.678000 MHz	-33.300 dBm
2	713.478000 MHz	-21.534 dBm	4	709.178000 MHz	-42.132 dBm



Spurious Emissions

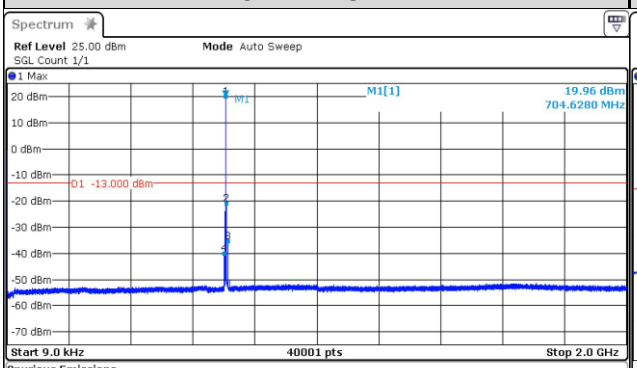
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.99144 GHz	-35.68 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.991440 GHz	-35.679 dBm	2	---	---

10MHz

QPSK - Low Freq (709 MHz)	
RB Size =1, RB Offset = 0	
9kHz ~ 2GHz	2GHz ~ 10GHz

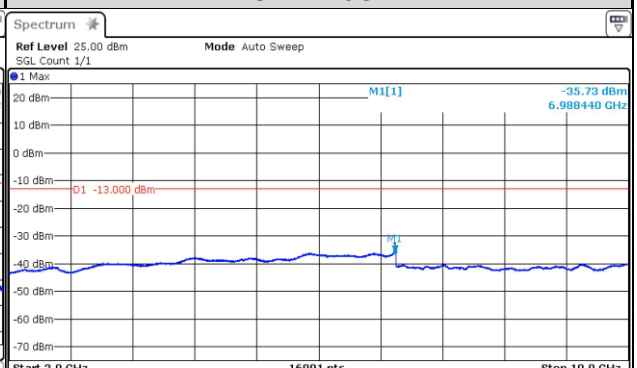


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	704.62766 MHz	19.96 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.71004 GHz	-51.54 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	704.628000 MHz	19.964 dBm	3	713.428000 MHz	-35.531 dBm
2	708.978000 MHz	-21.018 dBm	4	700.178000 MHz	-39.973 dBm



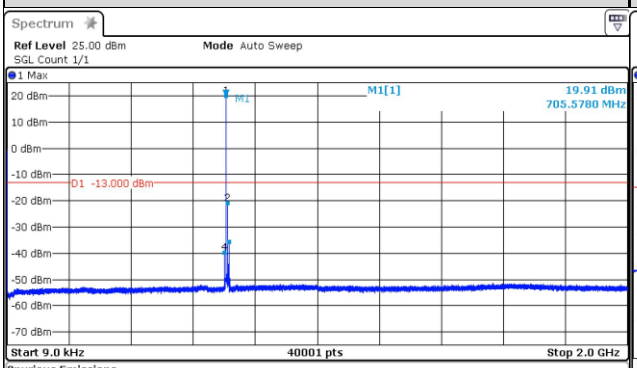
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.98844 GHz	-35.73 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.988440 GHz	-35.731 dBm	2	---	---

QPSK - Mid Freq (710 MHz)	
RB Size =1, RB Offset = 0	
9kHz ~ 2GHz	2GHz ~ 10GHz

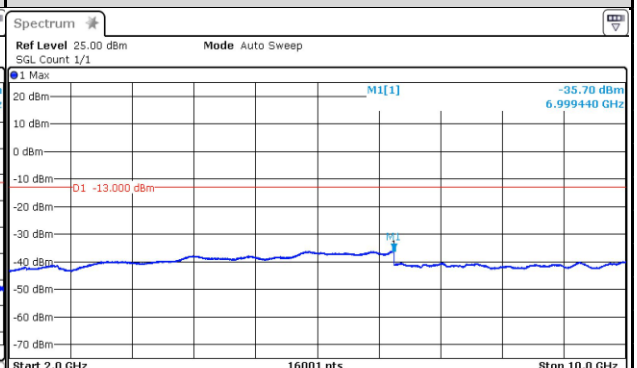


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	705.57765 MHz	19.91 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.56610 GHz	-51.41 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	705.578000 MHz	19.914 dBm	3	714.378000 MHz	-35.822 dBm
2	709.978000 MHz	-20.997 dBm	4	701.178000 MHz	-39.756 dBm



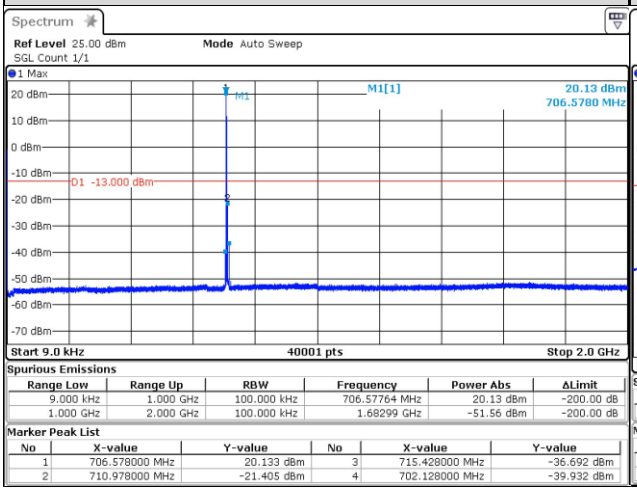
Spurious Emissions

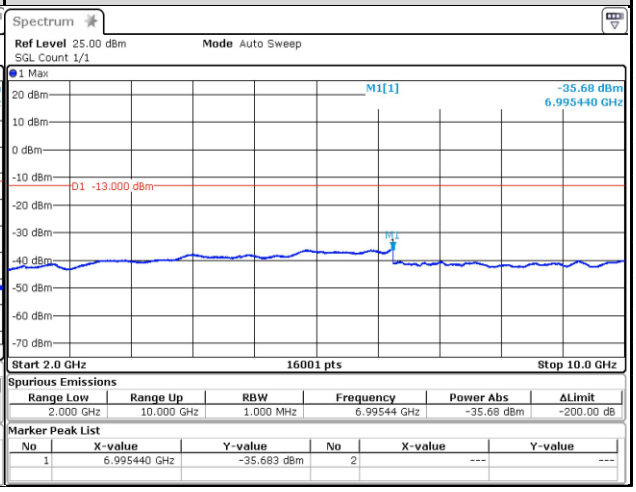
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.99944 GHz	-35.70 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.999440 GHz	-35.702 dBm	2	---	---

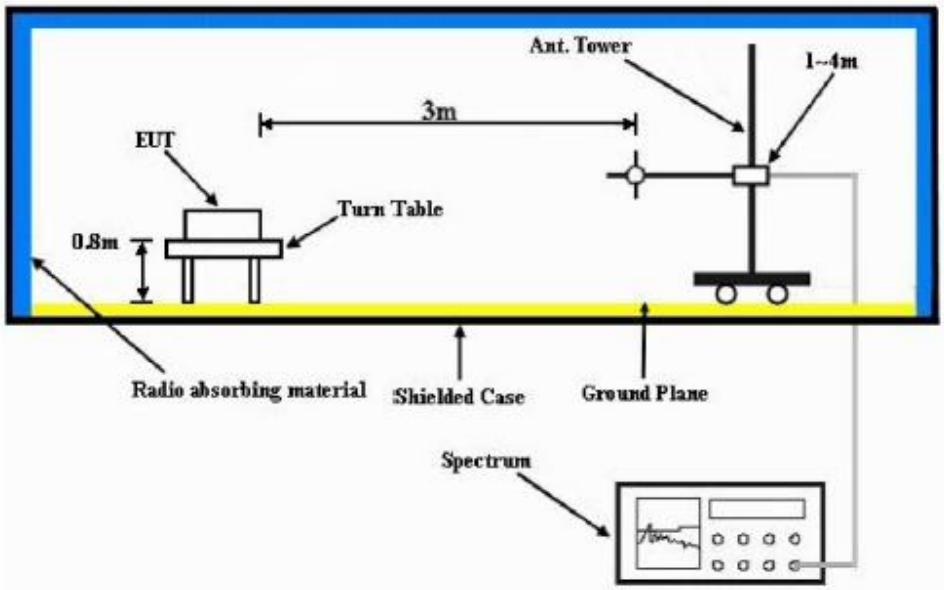
QPSK - High Freq (711 MHz)	
RB Size =1, RB Offset = 0	
9kHz ~ 2GHz	2GHz ~ 10GHz





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:

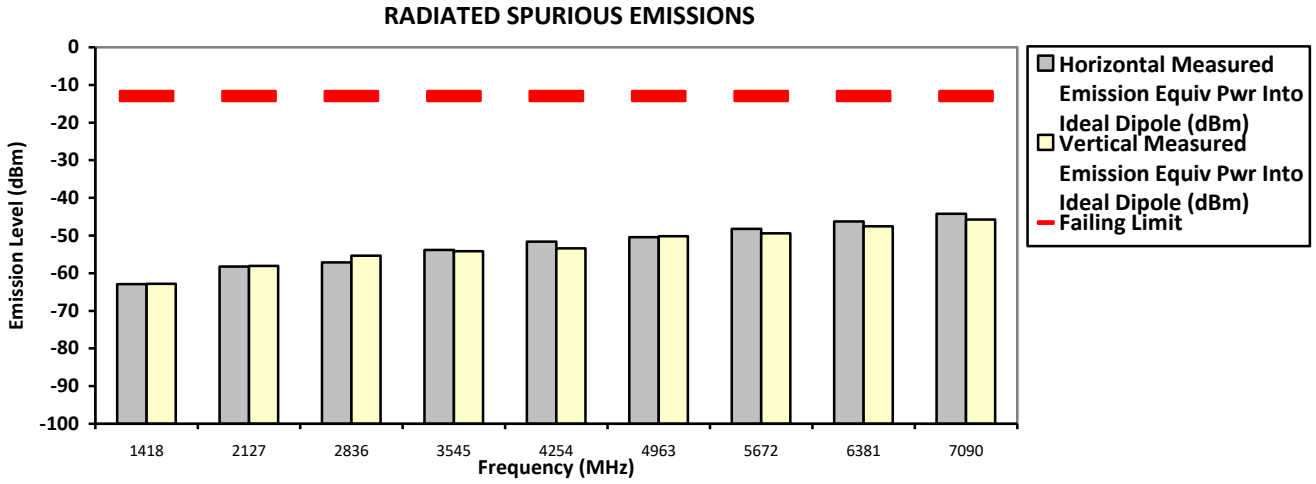
Model Number: H35KET9PW8AN-H **S/N: 022TAF1521** **SR:30468-EMC-00053**

Battery Part No: PMNN4818A **Accy Part No: AN000414A01**

Test Mode: TX LTE (Band 17) X-Plane

709.000000 MHz (Low) **Bandwidth 10MHz** **0.252 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)
1418.0000	-13.0000	-62.8733 **	-62.8329 **
2127.0000	-13.0000	-58.2226 **	-58.0986 **
2836.0000	-13.0000	-57.1068 **	-55.3638 **
3545.0000	-13.0000	-53.8018 **	-54.1972 **
4254.0000	-13.0000	-51.6004 **	-53.4180 **
4963.0000	-13.0000	-50.4598 **	-50.1904 **
5672.0000	-13.0000	-48.2341 **	-49.4182 **
6381.0000	-13.0000	-46.2407 **	-47.5654 **
7090.0000	-13.0000	-44.2107 **	-45.7285 **



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: Nazrin & Rezza **Sun, 26 May, 2024**

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): 23.7 Hum(%RH): 68.2

System MU: 4.03 dB

Remarks:

Passed Results	Marginal Results	Failed Results

SAC Transmitter Radiated Emission:

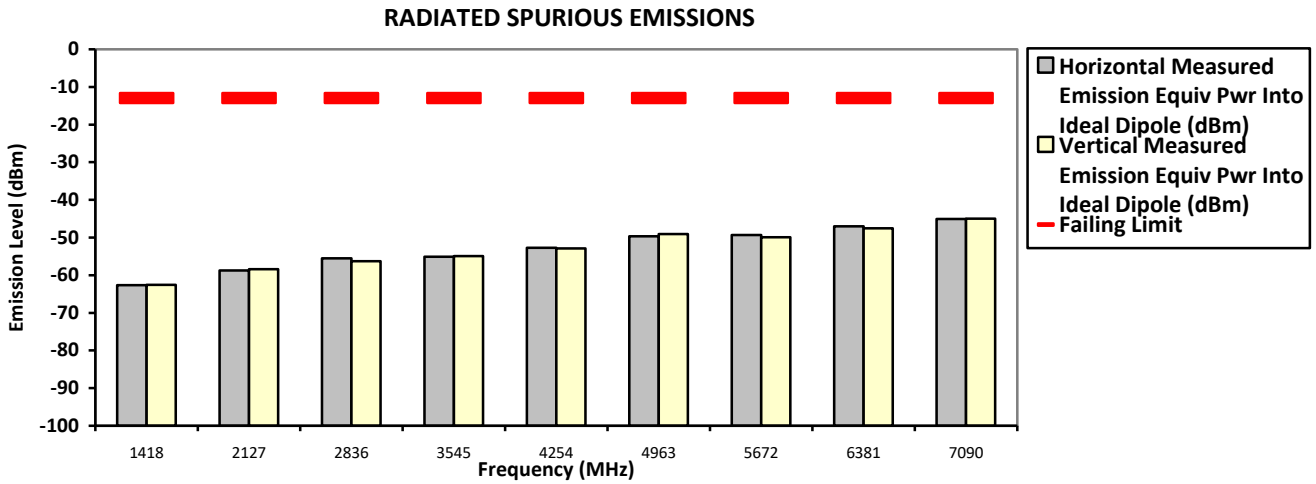
Model Number: H35KET9PW8AN-H **S/N: 022TAF1521** **SR:30468-EMC-00053**

Battery Part No: PMNN4818A **Accy Part No: AN000414A01**

Test Mode: TX LTE (Band 17) Y-Plane

709.000000 MHz (Low) **Bandwidth 10MHz** **0.252 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)
1418.0000	-13.0000	-62.6105 **	-62.6053 **
2127.0000	-13.0000	-58.7104 **	-58.3959 **
2836.0000	-13.0000	-55.5136 **	-56.2935 **
3545.0000	-13.0000	-55.1336 **	-54.9180 **
4254.0000	-13.0000	-52.7347 **	-52.9073 **
4963.0000	-13.0000	-49.6621 **	-49.0476 **
5672.0000	-13.0000	-49.3242 **	-49.9370 **
6381.0000	-13.0000	-47.0096 **	-47.5619 **
7090.0000	-13.0000	-45.0634 **	-44.9523 **



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: Nazrin & Rezza **Sun, 26 May, 2024**

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): 23.7 Hum(%RH): 68.2

System MU: 4.03 dB

Remarks:

Passed Results	Marginal Results	Failed Results

SAC Transmitter Radiated Emission:

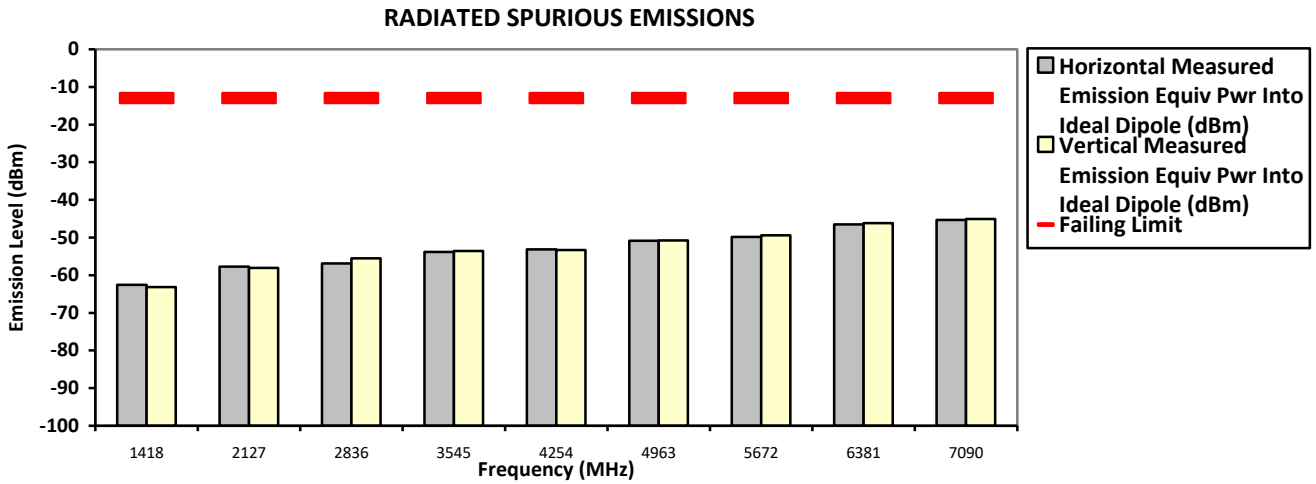
Model Number: H35KET9PW8AN-H **S/N: 022TAF1521** **SR:30468-EMC-00053**

Battery Part No: PMNN4818A **Accy Part No: AN000414A01**

Test Mode: TX LTE (Band 17) Z-Plane

709.000000 MHz (Low) **Bandwidth 10MHz** **0.252 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)
1418.0000	-13.0000	-62.5983 **	-63.1295 **
2127.0000	-13.0000	-57.7112 **	-58.1040 **
2836.0000	-13.0000	-56.8869 **	-55.4821 **
3545.0000	-13.0000	-53.8600 **	-53.5634 **
4254.0000	-13.0000	-53.1770 **	-53.2685 **
4963.0000	-13.0000	-50.8357 **	-50.7708 **
5672.0000	-13.0000	-49.8116 **	-49.4158 **
6381.0000	-13.0000	-46.5029 **	-46.1658 **
7090.0000	-13.0000	-45.2929 **	-45.1088 **



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: Nazrin & Rezza **Sun, 26 May, 2024**

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): 23.7 Hum(%RH): 68.2

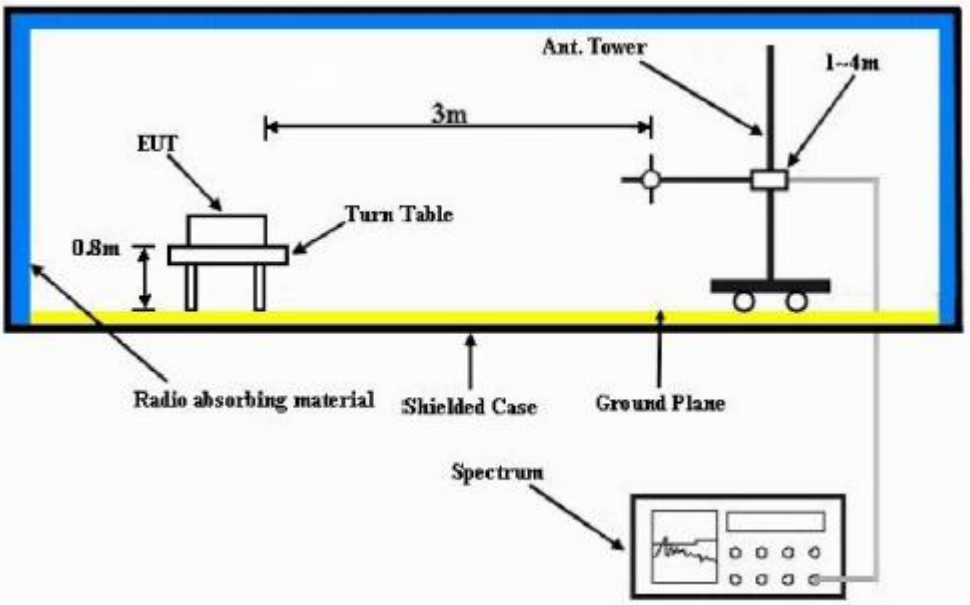
System MU: 4.03 dB

Remarks:

Passed Results	Marginal Results	Failed Results

1.13. Effective Radiated Power (ERP)

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 = “Read Value” + 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. Effective Radiated Power (ERP) - LTE Band 17 (704-716MHz)

Refer to 1.6.4 / Not Performed.

--End of Test Report--