MOTOROLA SOLUTIONS

MS ISO/IEC 17025 TESTING
SAMM No. 0825

MOTOROLA PENANG ADV. COMM. LABORATORY
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Penang, Malaysia.

FCC / IC TEST REPORT
Report Revision : Rev.B

Date/s Tested	:	20-Nov-2017 - 20-Mar-2018
Manufacturer/Location	:	Motorola Solutions – Penang
Requestor	:	RONI KOZIEL
Product Type	:	LEX L11 Mission Critical LTE Device
Model Number	:	LEX L11n
Frequency Band	:	Refer to section 1.4
Applicant Name	:	Motorola Solutions, Inc
Applicant Address	:	8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
FCC Registrations	:	461337
IC Registrations	:	109AK

The equipment was tested accordance to the requirement listed below:

(GSM 850) **FCC 47 CFR Part 2 / 22** **ISED RSS GEN Issue 4, November 2014** **ISED RSS 132 Issue 3, January 2013**	**PASS**

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Approved By:

Goh Aik Hong
Responsible Engineer

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev A.	Initial Report	20-March-2018	Maheshvaran Rajagopal
Rev B.	i. Applicant name and address has been added. ii. The battery model number has been revised. iii. AC adapter accessories devices information has been added.	30-May-2018	Maheshvaran Rajagopal

	iv. The Test report number of page format is corrected. v. RSSs version standard have been added to the cover page. vi. Justification statement of accessory devices is included at section 1.5.		

1.0. Summary of Test Results

FCC Clause	ISED Clause	Test Item	Result	Remark
2.1046	RSS-Gen 6.12 RSS-132 5.4	Conducted RF Output Power	Pass	Meet the requirement of limit
2.1055	RSS-132 5.4	Peak-to-Average Power Ratio	Pass	Meet the requirement of limit
2.1049 22.917	RSS-Gen 6.6	Occupied Bandwidth (26dBc, 99%)	Pass	Meet the requirement of limit
2.1055 22.355	RSS-Gen 6.11 RSS-132 5.3	Frequency Stability	Pass	Meet the requirement of limit
2.1051 22.917	RSS-Gen 6.13 RSS-132 5.5	Band Edge Conducted Spurious Emission	Pass	Meet the requirement of limit
2.1051 22.917	RSS-Gen 6.13 RSS-132 5.5	Conducted Spurious Emissions	Pass	Meet the requirement of limit
22.913(a)(2)	RSS-132 5.4	Effective Radiated Power (ERP)	Pass	Meet the requirement of limit
2.1053 22.917	RSS-132 5.5	Radiated Spurious Emissions	Pass	Meet the requirement of limit

1.1. Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±)
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				
Wideband Radio Communication Tester	CMW500	154550	14-Feb-17	14-Feb-19
Signal Analyzer	FSV40	101431	13-Jul-17	12-Jul-19
Chamber	SH-641	92002651	6-Mar-17	6-Mar-18
Power Supply	6621A	US37370810	5-Jun-17	5-Jun-18
Radiated Emission				
Radiated Spurious Emission (EMC Chamber 1)				
DRG HORN FREQ.	SAS-571	719	18-Jul-17	18-Jul-19
DRG HORN FREQ.	SAS-571	720	2-Mar-17	2-Mar-19
POWER SUPPLY	6032A	2615A01178	6-Jun-17	6-Jun-18
MICROWAVE SIGNAL GENERATOR	SMP04	100127	19-Jul-17	18-Jul-18

EMI TEST RECEIVER	ESIB26	100336	13-Jul-17	12-Jul-18
SIGNAL ANALYZER	FSV40	101103	18-Jul-17	17-Jul-18
5m Semi-anechoic Chamber	S800-HX	J2308	Not Required	Not Required
BILOG ANTENNA	CBL6112B	2950	23-Feb-16	23-Feb-18
BILOG ANTENNA	CBL6112B	2964	3-Feb-17	3-Feb-18
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	20-Mar-17	10-Apr-18
DATA LOGGER	SDL500	A.016776	18-Mar-17	18-Mar-18
LOOP ANTENNA	6502	208416	27-Jul-17	27-Jul-18
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
18 - 40GHz PREAMPLIFIER	BBV9721	9721-007	Not Required	Not Required
PREAMPLIFIER	PAM-0118P	361	Not Required	Not Required
Wideband Radio Communication Tester	CMW500	153174	9-Jan-17	9-Jan-18

1.3. General Information

General Description of EUT

Product	LEX L11 Mission Critical LTE Device		
Brand	Motorola Solutions		
Test Model	LEX L11n		
Power Supply Rating	3.7Vdc (Battery), 5Vdc (Adapter)		
Mode of operation	GSM 850, EDGE850		
Modulation Type	GMSK, 8PSK		
Operating Frequency	GSM 850 EDGE 850	Channel Bandwidth 200kHz	824.2MHz~848.8MHz
Max. ERP Power	GSM 850	**31.584dBm (1.440W)**	
	EDGE850	**25.898dBm (0.389W)**	
Antenna Type	GSM 850	Monopole with 0.78dBi gain	
SW Version	L11_D01.00.28		
HW Version	P3a		

Note:

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

Item	Brand	Model or P/N	Specification
Rechargeable Lithium ion battery	Motorola Solutions	PMNN4545A	2500mAH 3.7V LI-ION STD
Rechargeable Lithium ion battery	Motorola Solutions	PMNN4546A	5000mAH 3.7V LI-ION HICAP
Charger Vehicular Adapter VPA	Motorola Solutions	PMLN7779A	18W
Power Supply Adaptor, Power supply Wall cube, AC, DC (USB type A-C)	Motorola Solutions	PS000150A31 - US/JPN plug	7.5W, 100V-240V
Power Supply Adaptor (USB type C-C)	Motorola Solutions	PS000278A01 - US/JPN plug	27W
Detachable Power/Data Cable USB-A to USB-C	Motorola Solutions	CB000756A01	-
Detachable Power/Data Cable USB-C	Motorola Solutions	CB000754A01	-

to USB-C			

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 22
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI C63.26-2015

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

1.4. Channel number and frequency info

		Test Channel Number			Test Channel Frequency (MHz)		
Band	Available Channel Number	Low Channel	Mid Channel	High Channel	Low Channel	Mid Channel	High Channel
GSM 850	128~251	128	189	251	824.2	836.4	848.8

1.5. Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The Radiated Emission worst case was found when positioned on Z-Plane for GSM 850.
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:

GSM 850

Test Item	Available Channel	Tested Channel	Modulation	Mode
Conducted RF Output Power	128~ 251	128, 189, 251	GMSK, 8PSK	All Modes, per table 1.6.3
Peak to Average Power Ratio	128~ 251	128, 189, 251	GMSK, 8PSK	GSM uplink 1 slot, EDGE MCS-9 uplink 1 slot
Occupied Bandwidth	128~ 251	128, 189, 251	GMSK, 8PSK	GSM uplink 1 slot, EDGE MCS-9 uplink 1 slot
Frequency Stability	128~ 251	189	GMSK, 8PSK	GSM uplink 1 slot, EDGE MCS-9 uplink 1 slot
Band Edge Conducted Spurious Emission	128~ 251	128, 251	GMSK, 8PSK	GSM uplink 1 slot, EDGE MCS-9 uplink 1 slot
Conducted Spurious Emission	128~ 251	128, 189, 251	GMSK, 8PSK	GSM uplink 1 slot, EDGE MCS-9 uplink 1 slot
Radiated Spurious Emission	128~ 251	128, 189, 251	GMSK	GSM uplink 1 slot
Effective Radiated Power (ERP)	128~ 251	128, 189, 251	GMSK, 8PSK	All Modes, per table 1.6.4

NOTE:

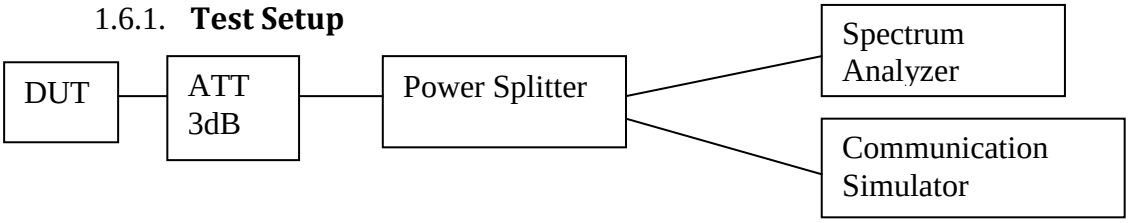
1. The Peak to average ratio, occupied bandwidth, frequency stability, band edge conducted spurious emission, and conducted spurious emission was performed under GSM uplink 1 slot and Edge MSC-9 uplink 1 slot because this is worst case value (highest power) found in 2 different modulations. The Radiated emission was performed under GSM uplink 1 slot only because of this is the worst case scenario (highest power) among different modulation. The Effective Radiated power (ERP) was calculated from the all modes of Conducted RF Output Power results.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Conducted RF Output Power/ Effective Radiated Power	**25°C, 50% RH**	**3.7V DC**	**Maheshvaran**
Peak-to-Average Power Ratio	**25°C, 50% RH**	**3.7V DC**	**Maheshvaran**
Occupied Bandwidth	**25°C, 50% RH**	**3.7V DC**	**Maheshvaran**
Frequency Stability	**25°C, 50% RH**	**3.7V DC**	**Maheshvaran**
Band Edge Conducted Spurious Emission	**25°C, 50% RH**	**3.7V DC**	**Maheshvaran**
Conducted Spurious Emission	**25°C, 50% RH**	**3.7V DC**	**Maheshvaran**
Radiated Spurious Emission	**25°C, 63.7% RH**	**3.7V DC**	**Nazrin/Qawiman**

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: The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
ISED: The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

1.6.3. **Conducted RF Output Power – GSM 850 (824-849MHz)**

Conducted Output Power (dBm)				
		Conducted Output Power (dBm)		
		Low CH 128	Mid CH 189	High CH 251
	Test Mode	824.2 MHz	836.4 MHz	848.8 MHz
GSM	**Uplink 1 slot**	32.783	32.857	**32.954**
GPRS, CS4	**Multislot class 8, uplink 1 slot**	32.761	32.834	32.941
	Multislot class 10, uplink 2 slot	30.285	30.105	30.237
EDGE MCS-9 (8-PSK)	**Multislot class 8, uplink 1 slot**	27.268	27.038	27.074
	Multislot class 10, uplink 2 slot	24.595	24.393	24.36

1.6.4. Effective Radiated Power – GSM 850 (824-849MHz)

ERP (dBm)				
		Conducted Output Power (dBm)		
		Low CH 128	Mid CH 189	High CH 251
	Test Mode	824.2 MHz	836.4 MHz	848.8 MHz
GSM	Uplink 1 slot	31.413	31.487	**31.584**
GPRS, CS4	Multislot class 8, uplink 1 slot	31.391	31.464	31.571
	Multislot class 10, uplink 2 slot	28.915	28.735	28.867
EDGE MCS-9 (8-PSK)	Multislot class 8, uplink 1 slot	**25.898**	25.668	25.704
	Multislot class 10, uplink 2 slot	23.225	23.023	22.99

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

$$\mathbf{EIRP} = \mathbf{P_{Meas}} + \mathbf{G_T}$$

$$\mathbf{ERP} = \mathbf{EIRP} - \mathbf{2.15}$$

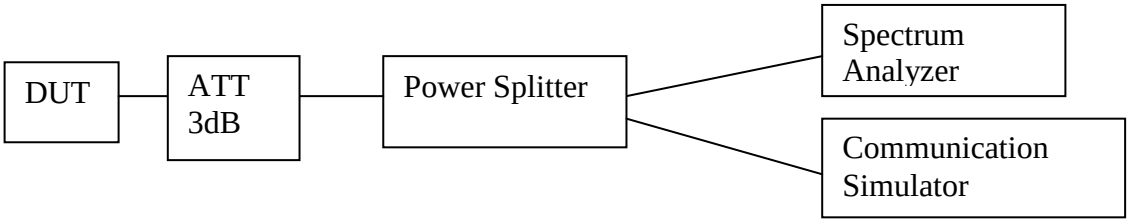
Where, ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (Expressed in the same units as P_{Meas}, e.g., dBm)

$\mathbf{P_{Meas}}$ 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.

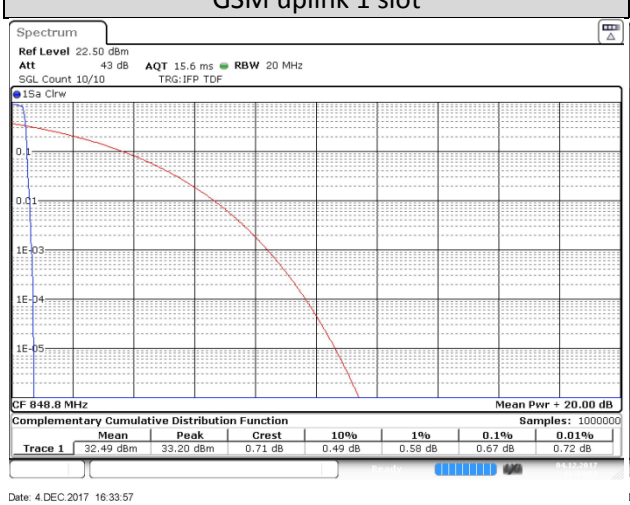
1.7.2. Test Limit

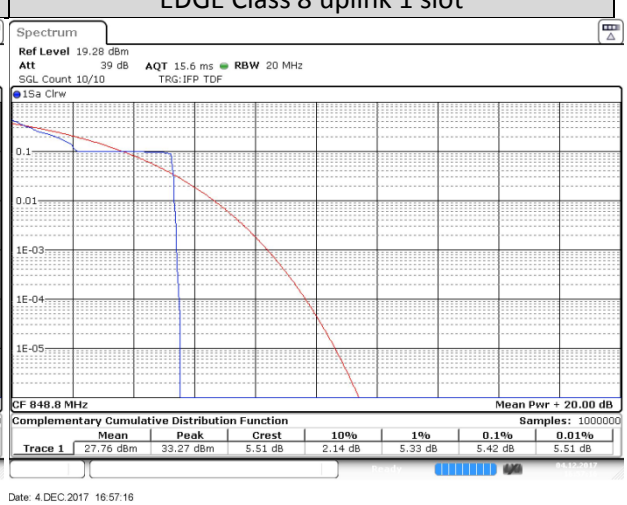
The peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

1.7.3. Peak To Average Power Ratio – GSM 850 (824-849MHz)

GSM Band	Channel Number	Tx Frequency (MHz)	Peak To Average (dB)	
			GSM uplink 1 slot	EDGE Class 8 uplink 1 slot
GSM850	Low CH 128	824.2 MHz	0.638	3.478
	Mid CH 189	836.4 MHz	0.493	3.536
	High CH 251	848.8 MHz	**0.667**	**5.42**

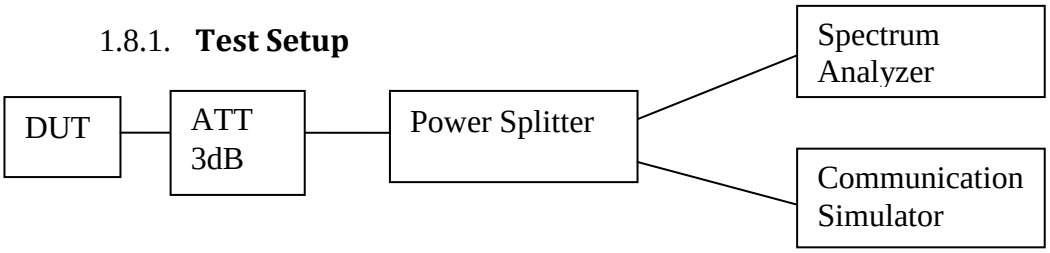
Spectrum Plot of Worst Value	
GSM uplink 1 slot	EDGE Class 8 uplink 1 slot





1.8. Occupied Bandwidth

1.8.1. **Test Setup**



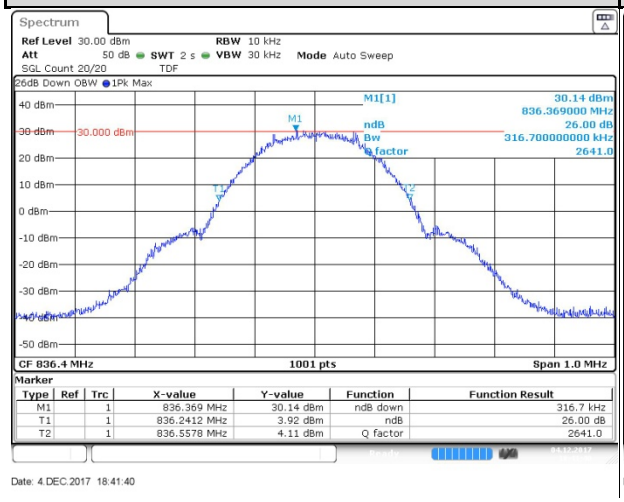
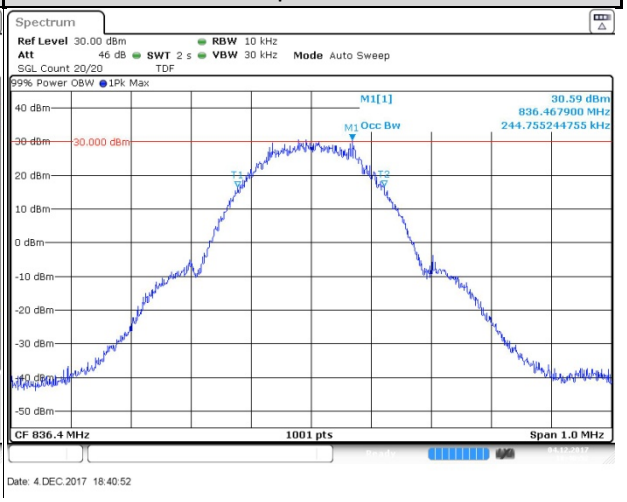
1) The DUT transmitter output port was connected to communication simulator with above setup.
2) Path loss for the measurement included.
3) For GSM measurement, set DUT to transmit maximum power through communication simulator.
4) Spectrum Analyzer setting, RBW is 1% of OBW and VBW is 3 times of RBW.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

1.8.2. **Test Limit**

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

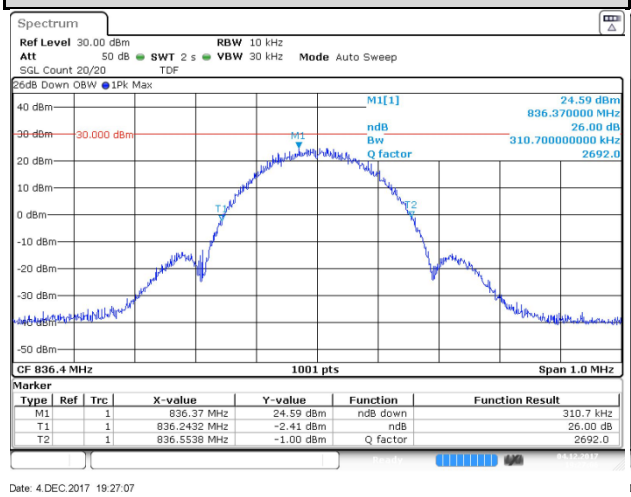
1.8.3. **Occupied Bandwidth - GSM 850 (824-849MHz)**

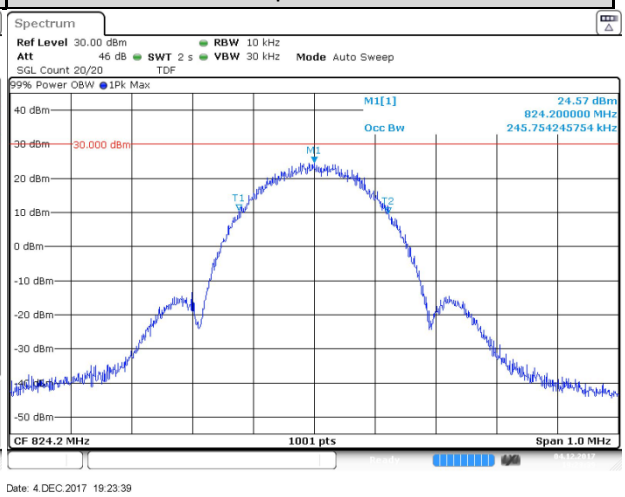
Mode	Channel Number	Tx Frequency (MHz)	-26 dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
GSM uplink 1 slot	Low CH 128	824.2 MHz	311.7	244.755
	Mid CH 189	836.4 MHz	**316.7**	**244.755**
	High CH 251	848.8 MHz	314.7	244.755

Spectrum Plot of Worst Value	
-26 dBc Bandwidth	99% Occupied Bandwidth
	

Mode	Channel Number	Tx Frequency (MHz)	-26 dBc Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
EDGE Class 8 uplink 1 slot	Low CH 128	824.2 MHz	307.7	**245.754**
	Mid CH 189	836.4 MHz	**310.7**	245.754
	High CH 251	848.8 MHz	304.7	243.756

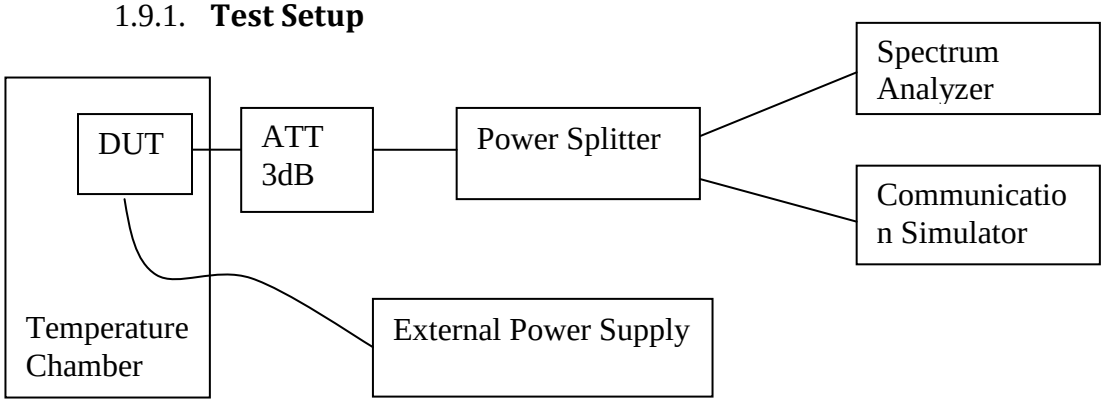
Spectrum Plot of Worst Value	
-26 dBc Bandwidth	99% Occupied Bandwidth





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 ~ 50 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**

The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations and ±1.5 ppm for base stations.

1.9.3. **Frequency Stability - GSM 850 (824-849MHz)**

Band	Temp (Deg C)	Frequency Error VS Temperature			
		GSM uplink 1 slot			
		Low Channel		High Channel	
		824.2MHz		848.8MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
GSM 850	**50**	824.200009	0.010812	848.800015	0.017649
	40	824.200011	0.013789	848.800012	0.013655
	30	824.200011	0.013906	848.800015	0.017383
	20	824.200011	0.01371	848.800012	0.014644
	10	824.200011	0.013671	848.800011	0.013161
	0	824.200012	0.015003	848.800013	0.015215
	-10	824.200008	0.009871	848.800017	0.019589
	-20	824.200016	0.019782	848.800017	0.020236
	-30	824.200017	0.020683	848.800016	0.018372

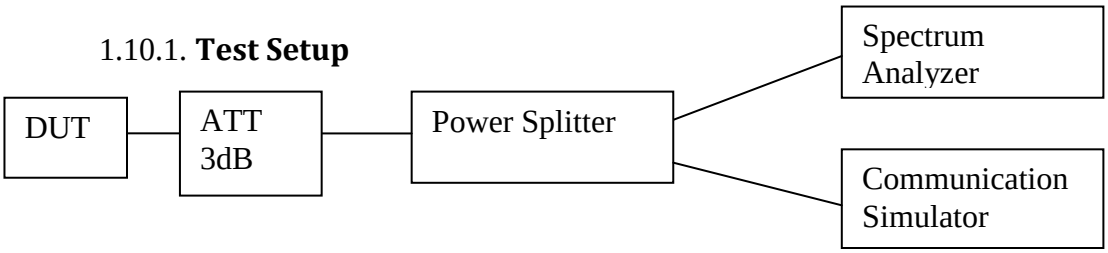
Band	Voltage (V)	Frequency Error VS Voltage			
		GSM uplink 1 slot			
		Low Channel		High Channel	
		824.2MHz		848.8MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
GSM 850	**4.35**	824.20004	0.047986	848.800014	0.015938
	3.7	824.200009	0.01089	848.800011	0.013009
	3.2	824.19999	-0.011595	848.800008	0.009928

Band	Temp (Deg C)	Frequency Error VS Temperature			
		EDGE Class 8 uplink 1 slot			
		Low Channel		High Channel	
		824.2MHz		848.8MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
GSM 850	**50**	824.200019	0.023268	848.80003	0.035108
	40	824.200026	0.03126	848.800031	0.03682
	30	824.200026	0.031534	848.800026	0.030734
	20	824.200028	0.033962	848.800029	0.033663
	10	824.200025	0.030202	848.800022	0.025941
	0	824.200031	0.037488	848.800033	0.039178
	-10	824.200027	0.033218	848.800024	0.028528
	-20	824.200027	0.032435	848.80003	0.035413
	-30	824.200028	0.034393	848.800032	0.037695

Band	Voltage (V)	Frequency Error VS Voltage			
		EDGE Class 8 uplink 1 slot			
		Low Channel		High Channel	
		824.2MHz		848.8MHz	
		Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
GSM 850	**4.35**	824.200029	0.035725	848.80003	0.03507
	3.7	824.200022	0.026755	848.800026	0.030125
	3.2	824.20002	0.024365	848.800025	0.030011

1.10. Band Edge Conducted Spurious Emission

1.10.1. **Test Setup**

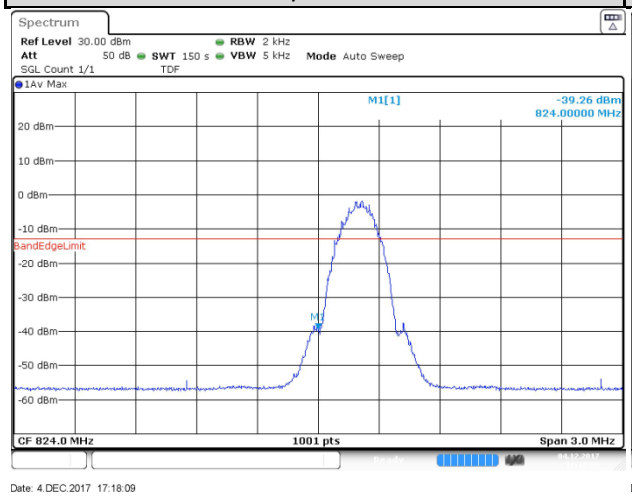
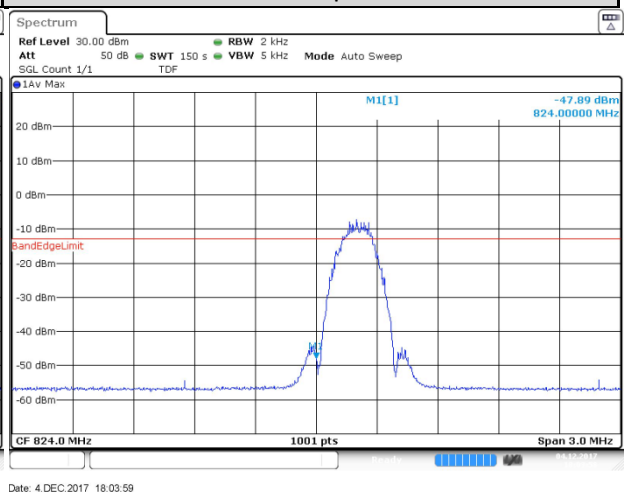


1) The DUT transmitter output port was connected to communication simulator with above setup.
2) Path loss for the measurement included.
3) Set DUT to transmit maximum power through communication simulator.
4) The band edges of lowest and highest channels with the highest RF powers were measured.
5)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

1.10.2. **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.

1.10.3. **Band Edge Conducted Spurious Emission - GSM 850 (824-849MHz)**

GSM 850, Low CH 128, 824.2MHz	
GSM uplink 1 slot	EDGE Class 8 uplink 1 slot
	

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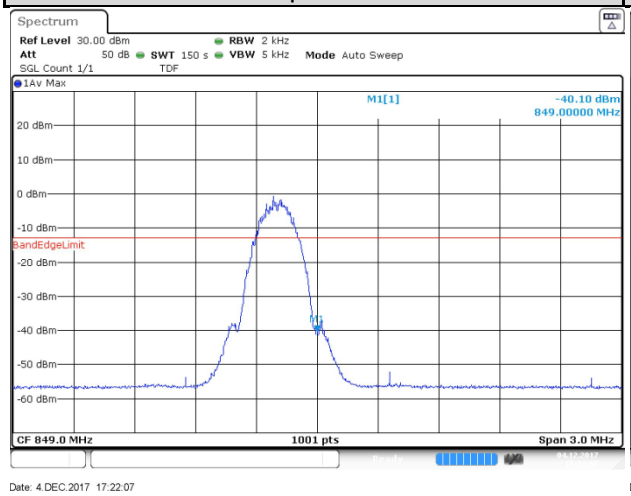
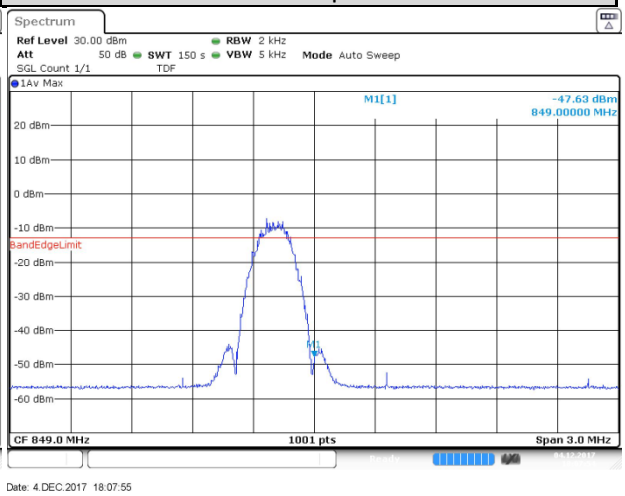
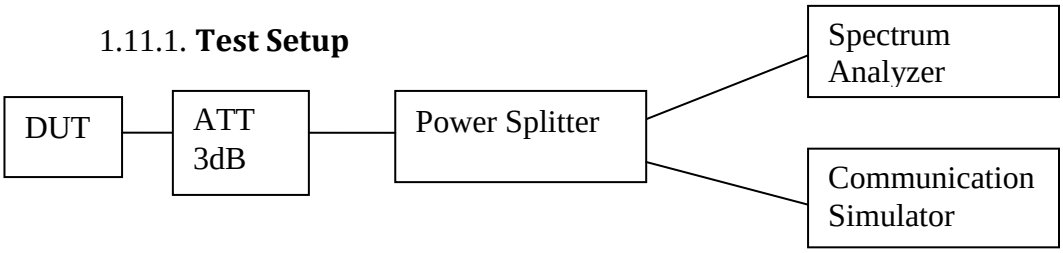
GSM 850 High CH 251, 848.8 MHz	
GSM uplink 1 slot	EDGE Class 8 uplink 1 slot
	

1.11. Conducted Spurious Emission

1.11.1. **Test Setup**



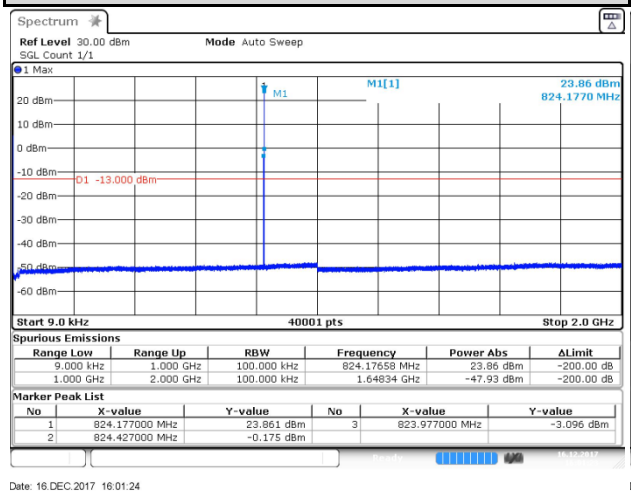
1) The DUT transmitter output port was connected to communication simulator with above setup.
2) Path loss for the measurement included.
3) Set DUT to transmit maximum power through communication simulator.
4) Spectrum Analyzer setting, RBW = 100 kHz or greater, VBW = 3*RBW.
5) The spurious emission of lowest, middle and highest channels with the highest RF powers were measured.
6) Record the maximum trace plot into the test report.

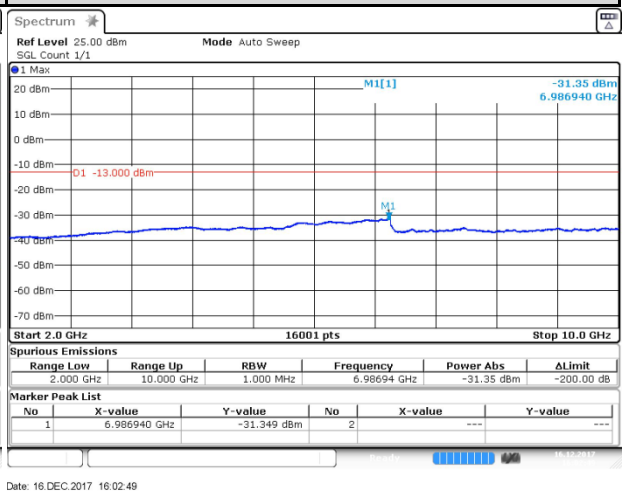
1.11.2. **Test Limit**

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.

1.11.3. **Conducted Spurious Emission - GSM 850 (824-849MHz)**

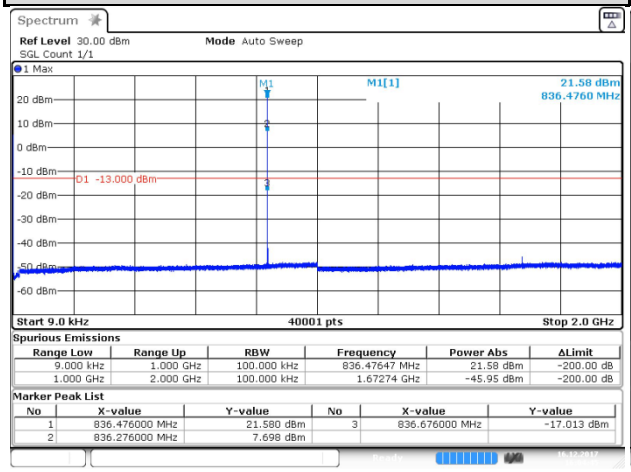
GSM uplink 1 slot - Low Freq (824.2 MHz)	
9kHz ~ 2GHz	2GHz ~ 10GHz





GSM uplink 1 slot - Mid Freq (836.4 MHz)

9kHz ~ 2GHz



Spurious Emissions

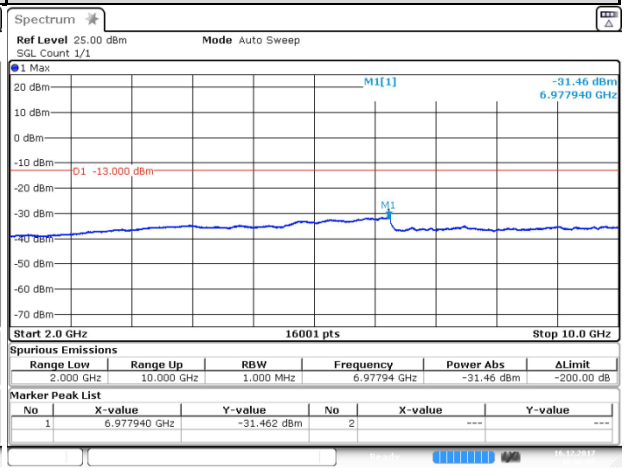
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	836.47647 MHz	21.58 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.67274 GHz	-45.95 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	836.476000 MHz	21.580 dBm	3	836.676000 MHz	-17.013 dBm
2	836.276000 MHz	7.698 dBm			

Date: 16.DEC.2017 16:04:45

2GHz ~ 10GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.97794 GHz	-31.46 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.977940 GHz	-31.462 dBm	2	---	---

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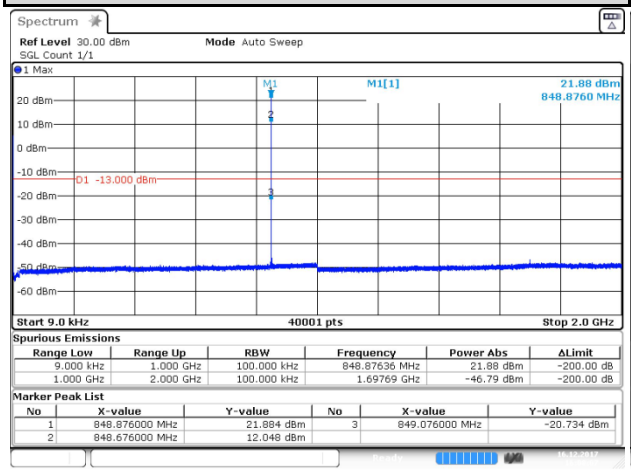
GSM uplink 1 slot - High Freq (848.8 MHz)

9kHz ~ 2GHz



Spurious Emissions

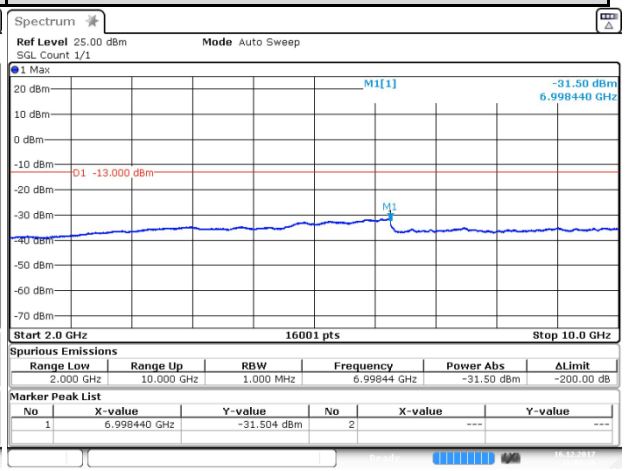
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	848.87636 MHz	21.88 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.69769 GHz	-46.79 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	848.876000 MHz	21.884 dBm	3	849.076000 MHz	-20.734 dBm
2	848.676000 MHz	12.048 dBm			

Date: 16.DEC.2017 16:08:06

2GHz ~ 10GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.99844 GHz	-31.50 dBm	-200.00 dB

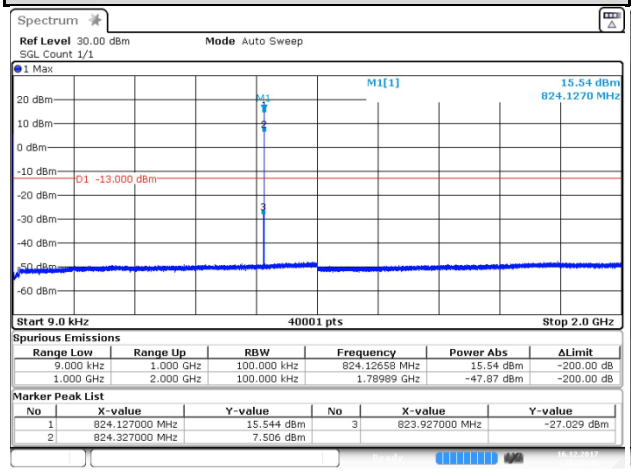
Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.998440 GHz	-31.504 dBm	2	---	---

Date: 16.DEC.2017 16:09:30

EDGE Class 8 uplink 1 slot - Low Freq (824.2 MHz)

9kHz ~ 2GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	824.12658 MHz	15.54 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.78989 GHz	-47.87 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	824.127000 MHz	15.544 dBm	3	823.927000 MHz	-27.029 dBm
2	824.327000 MHz	7.506 dBm			

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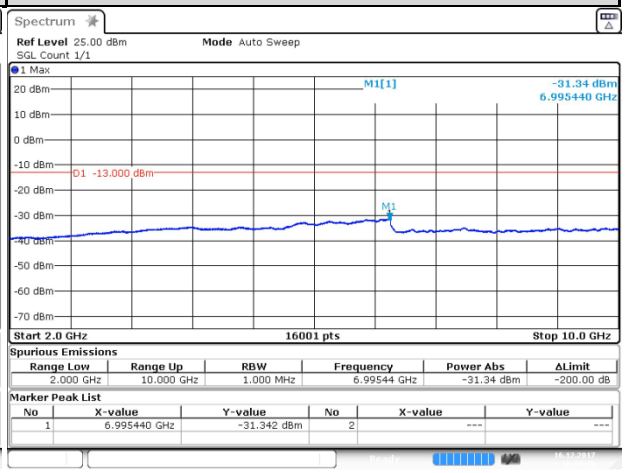
2GHz ~ 10GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.99544 GHz	-31.34 dBm	-200.00 dB

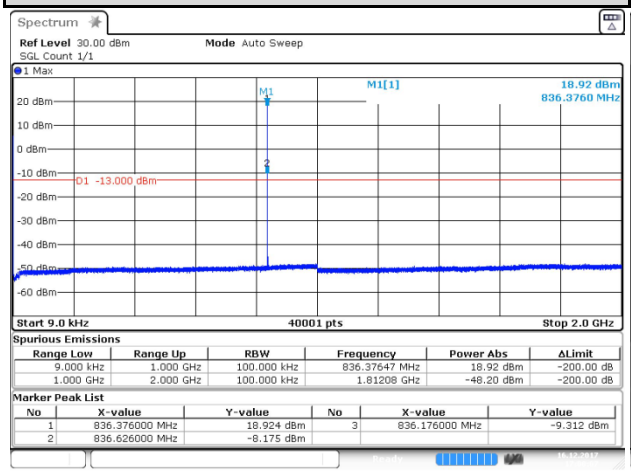
Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.995440 GHz	-31.342 dBm	2	---	---

Date: 16.DEC.2017 16:58:16

EDGE Class 8 uplink 1 slot - Mid Freq (836.4 MHz)

9kHz ~ 2GHz



Spurious Emissions

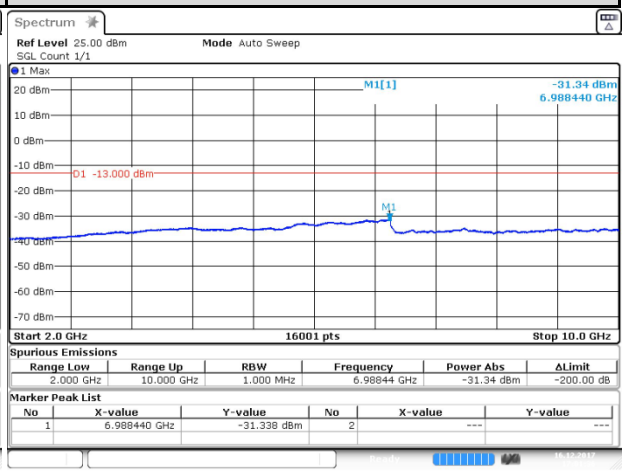
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	836.37647 MHz	18.92 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.81208 GHz	-48.20 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	836.376000 MHz	18.924 dBm	3	836.176000 MHz	-9.312 dBm
2	836.626000 MHz	-8.175 dBm			

Date: 16.DEC.2017 17:00:07

2GHz ~ 10GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.98844 GHz	-31.34 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.988440 GHz	-31.338 dBm	2	---	---

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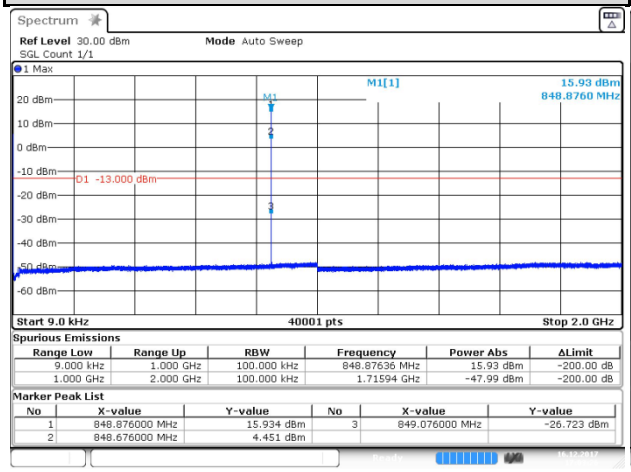
EDGE Class 8 uplink 1 slot - High Freq (848.8 MHz)	
9kHz ~ 2GHz	2GHz ~ 10GHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	1.000 GHz	100.000 kHz	848.87636 MHz	15.93 dBm	-200.00 dB
1.000 GHz	2.000 GHz	100.000 kHz	1.71594 GHz	-47.99 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	848.876000 MHz	15.934 dBm	3	849.076000 MHz	-26.723 dBm
2	848.676000 MHz	4.451 dBm			

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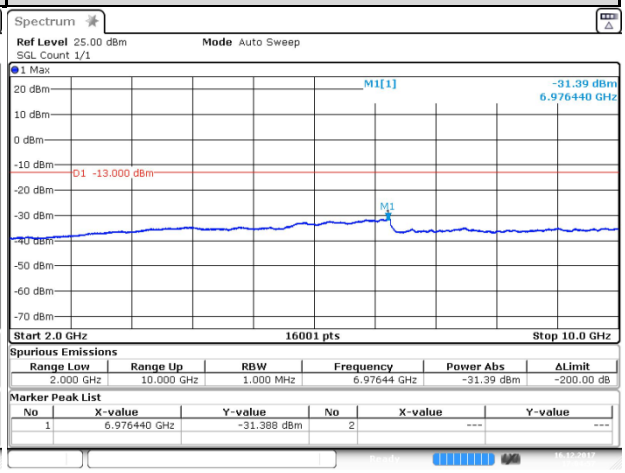

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.000 GHz	10.000 GHz	1.000 MHz	6.97644 GHz	-31.39 dBm	-200.00 dB

Marker Peak List

No	X-value	Y-value	No	X-value	Y-value
1	6.976440 GHz	-31.388 dBm	2	---	---

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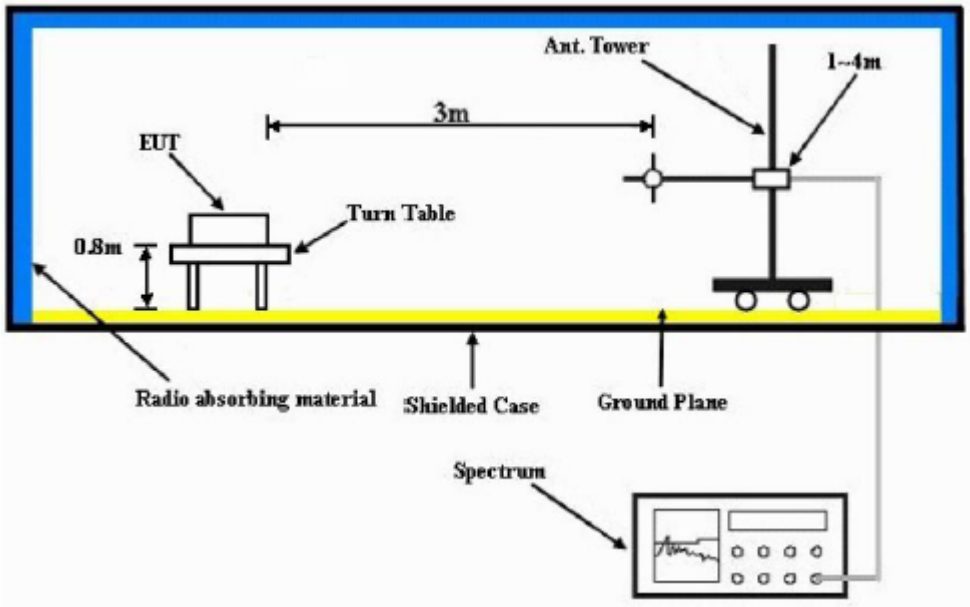
1.12. Radiated Spurious Emission

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

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.

1.12.3. **Radiated Spurious Emission – GSM 850 (824-849MHz)**

DC configuration: Link Mode 12V

Link Mode Radiated Emission:

Model Number: LEX L11n **S/N: 790TTV0214** **SR:08397-EMC-00061**

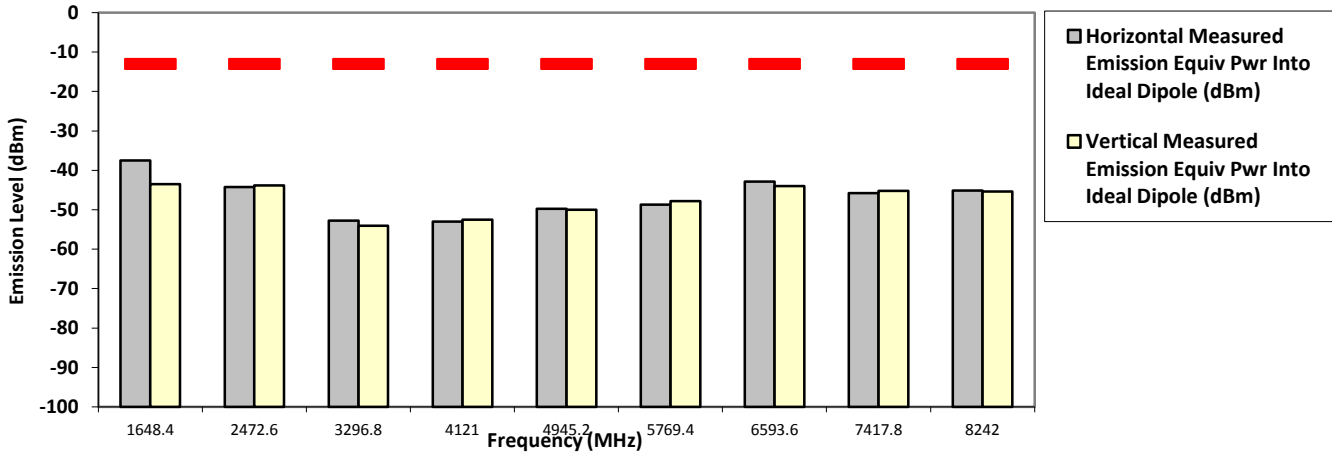
Battery Part No: PMNN4546A **Accy Part No: 8397-PMLN7779A-2, 8397-PMLN7779A-5**

Test Mode: TX GSM 850

824.200000 MHz (Low) **Bandwidth 0.2MHz** **2.512 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)
1648.4000	-13.0000	-37.4725 **	-43.5265 **
2472.6000	-13.0000	-44.2400 *	-43.8300 *
3296.8000	-13.0000	-52.7556 **	-54.0374 **
4121.0000	-13.0000	-53.0371 **	-52.5487 **
4945.2000	-13.0000	-49.7424 **	-50.0229 **
5769.4000	-13.0000	-48.7015 **	-47.8171 **
6593.6000	-13.0000	-42.8926 **	-43.9735 **
7417.8000	-13.0000	-45.8008 **	-45.1759 **
8242.0000	-13.0000	-45.1422 **	-45.3644 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the TIA/EIA-603E document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman **Tue, Dec 26, 2017**

Industry Canada: 109AK

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): 23.8 Hum(%RH): 71.2

System MU: 5.01 dB

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

Link Mode Radiated Emission:

Model Number: LEX L11n **S/N: 790TTV0214** **SR:08397-EMC-00061**

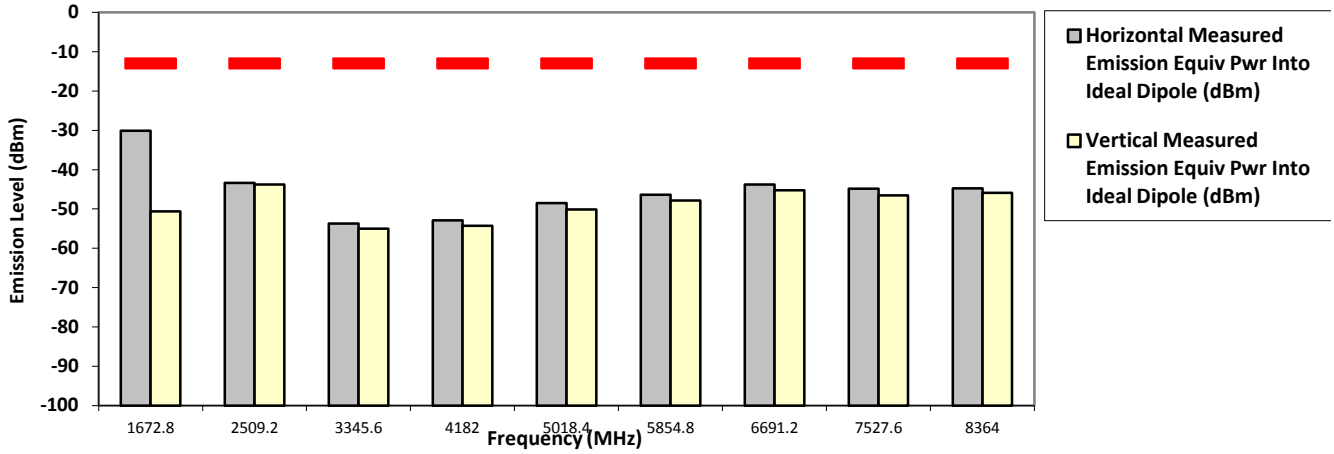
Battery Part No: PMNN4546A **Accy Part No: 8397-PMLN7779A-2, 8397-PMLN7779A-5**

Test Mode: TX GSM 850

836.400000 MHz (Mid) **Bandwidth 0.2MHz** **2.512 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)
1672.8000	-13.0000	-30.1096 **	-50.6308 **
2509.2000	-13.0000	-43.4100 *	-43.7800 *
3345.6000	-13.0000	-53.7425 **	-55.0047 **
4182.0000	-13.0000	-52.9089 **	-54.3130 **
5018.4000	-13.0000	-48.4842 **	-50.1052 **
5854.8000	-13.0000	-46.3599 **	-47.8562 **
6691.2000	-13.0000	-43.8106 **	-45.2394 **
7527.6000	-13.0000	-44.8090 **	-46.5829 **
8364.0000	-13.0000	-44.7513 **	-45.8706 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the TIA/EIA-603E document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman **Tue, Dec 26, 2017**

Industry Canada: 109AK

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): 23.8 Hum(%RH): 71.2

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

Link Mode Radiated Emission:

Model Number: LEX L11n **S/N: 790TTV0214** **SR:08397-EMC-00061**

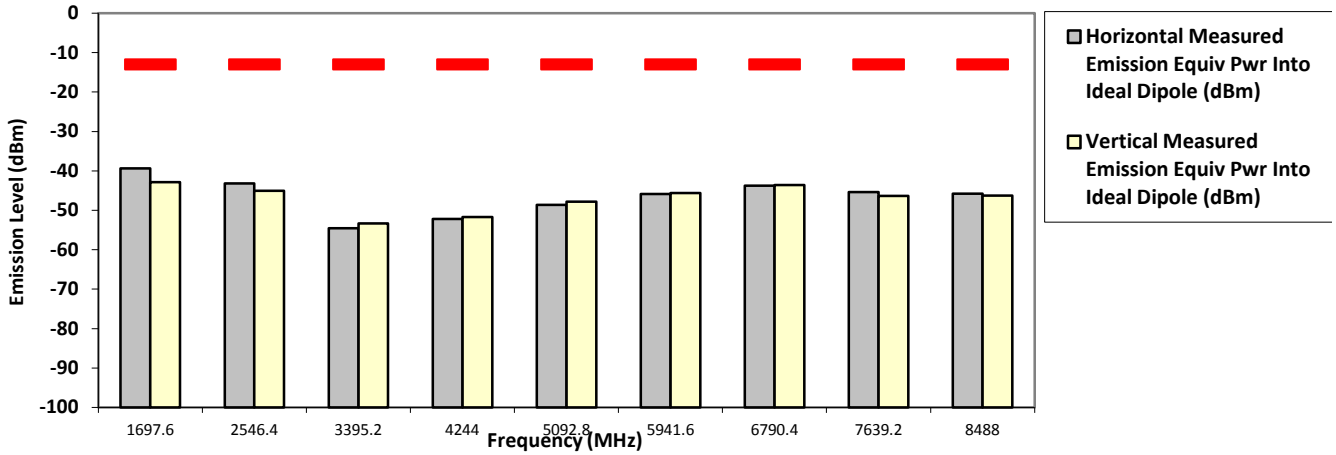
Battery Part No: PMNN4546A **Accy Part No: 8397-PMLN7779A-2, 8397-PMLN7779A-5**

Test Mode: TX GSM 850

848.800000 MHz (High) **Bandwidth 0.2MHz** **2.512 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)
1697.6000	-13.0000	-39.3463 **	-42.8694 **
2546.4000	-13.0000	-43.1500 *	-45.0400 *
3395.2000	-13.0000	-54.5699 **	-53.3308 **
4244.0000	-13.0000	-52.1586 **	-51.7027 **
5092.8000	-13.0000	-48.5823 **	-47.7898 **
5941.6000	-13.0000	-45.8983 **	-45.6017 **
6790.4000	-13.0000	-43.7764 **	-43.5789 **
7639.2000	-13.0000	-45.4039 **	-46.3244 **
8488.0000	-13.0000	-45.7453 **	-46.2697 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the TIA/EIA-603E document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman **Tue, Dec 26, 2017**

Industry Canada: 109AK

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): 23.8 Hum(%RH): 71.2

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

DC configuration: Link Mode 24V

Link Mode Radiated Emission:

Model Number: LEX L11n **S/N: 790TTV0214** **SR:08397-EMC-00061**

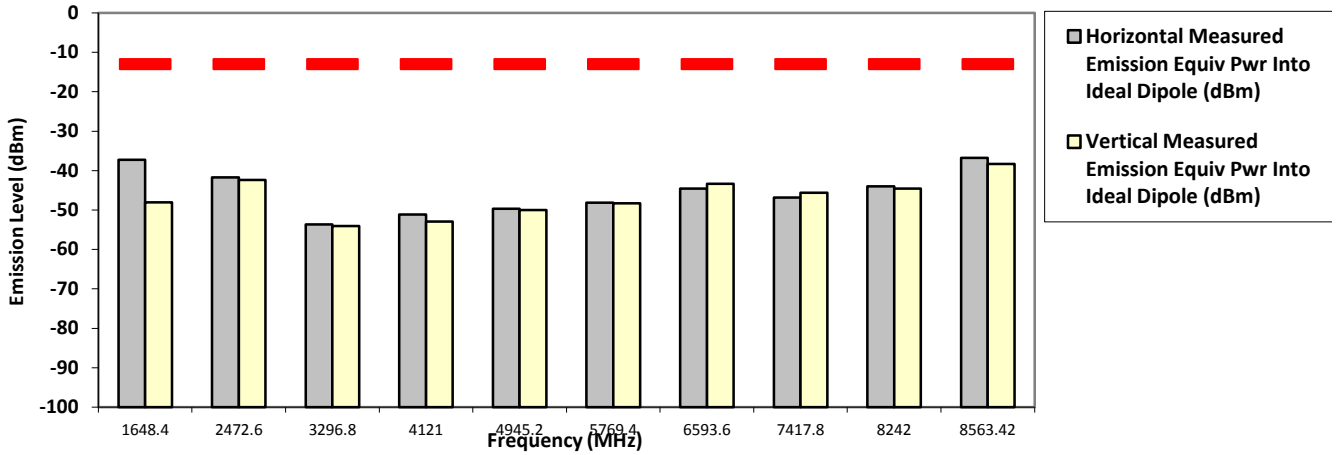
Battery Part No: PMNN4546A **Accy Part No: 8397-PMLN7779A-2, 8397-PMLN7779A-5**

Test Mode: TX GSM 850

824.200000 MHz (Low) **Bandwidth 0.2MHz** **2.512 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)
1648.4000	-13.0000	-37.2232 **	-48.0738 **
2472.6000	-13.0000	-41.7500 *	-42.4100 *
3296.8000	-13.0000	-53.6627 **	-54.0335 **
4121.0000	-13.0000	-51.1357 **	-52.9130 **
4945.2000	-13.0000	-49.6988 **	-50.0287 **
5769.4000	-13.0000	-48.1435 **	-48.3092 **
6593.6000	-13.0000	-44.5987 **	-43.3556 **
7417.8000	-13.0000	-46.8330 **	-45.6416 **
8242.0000	-13.0000	-43.9918 **	-44.5248 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the TIA/EIA-603E document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman **Tue, Dec 26, 2017**

Industry Canada: 109AK

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): 23.8 Hum(%RH): 71.2

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results

Link Mode Radiated Emission:

Model Number: LEX L11n **S/N: 790TTV0214** **SR:08397-EMC-00061**

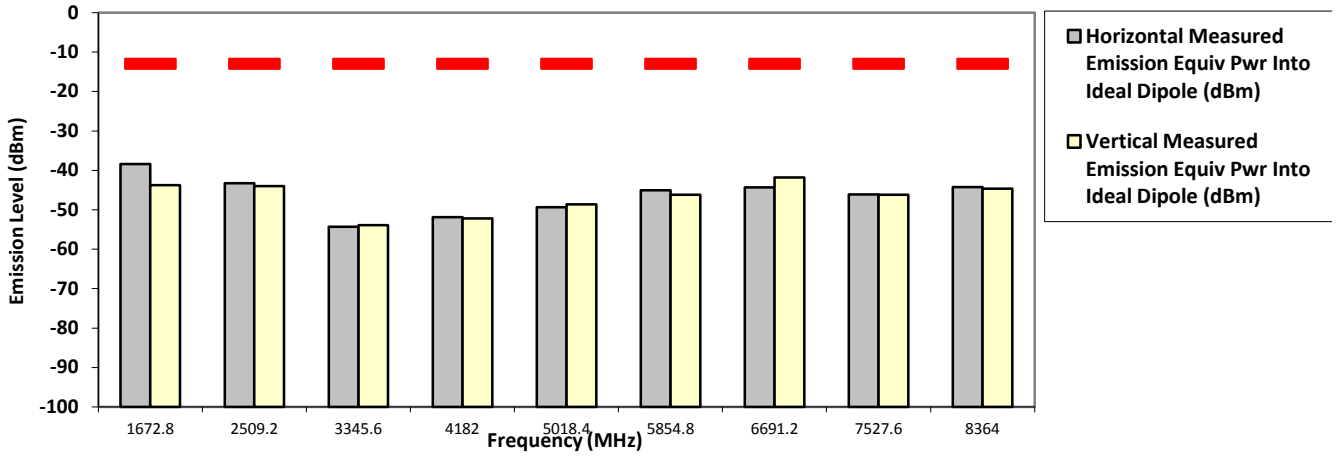
Battery Part No: PMNN4546A **Accy Part No: 8397-PMLN7779A-2, 8397-PMLN7779A-5**

Test Mode: TX GSM 850

836.400000 MHz (Mid) **Bandwidth 0.2MHz** **2.512 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)
1672.8000	-13.0000	-38.3857 **	-43.7799 **
2509.2000	-13.0000	-43.2400 *	-44.0100 *
3345.6000	-13.0000	-54.2787 **	-53.9161 **
4182.0000	-13.0000	-51.8627 **	-52.1574 **
5018.4000	-13.0000	-49.3353 **	-48.5933 **
5854.8000	-13.0000	-45.0291 **	-46.1640 **
6691.2000	-13.0000	-44.2944 **	-41.7930 **
7527.6000	-13.0000	-46.1147 **	-46.1876 **
8364.0000	-13.0000	-44.2004 **	-44.6125 **

RADIATED SPURIOUS EMISSIONS



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Remarks:

Passed Results	Marginal Results	Failed Results

Link Mode Radiated Emission:

Model Number: LEX L11n **S/N: 790TTV0214** **SR:08397-EMC-00061**

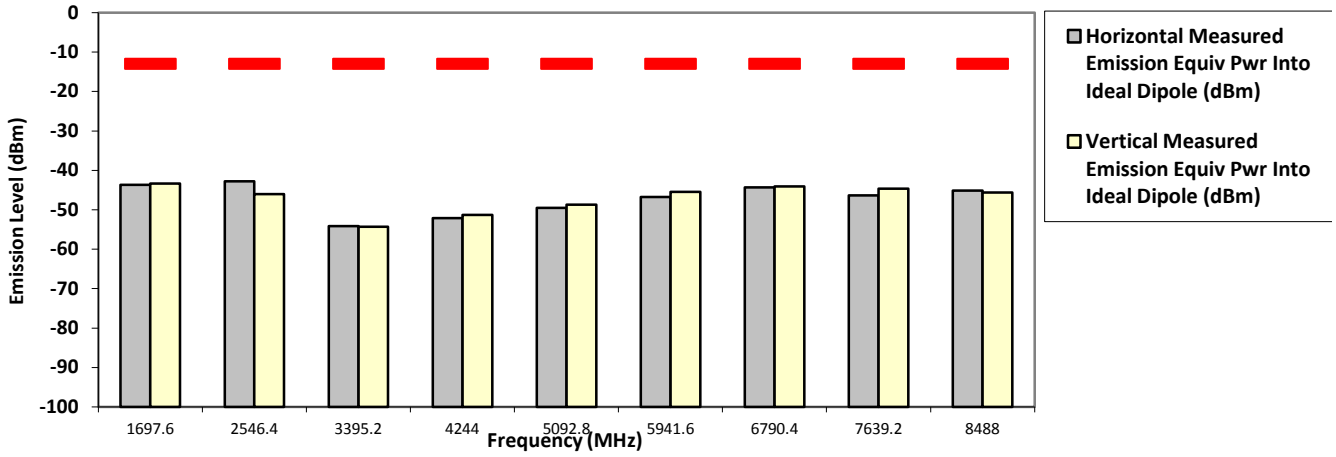
Battery Part No: PMNN4546A **Accy Part No: 8397-PMLN7779A-2, 8397-PMLN7779A-5**

Test Mode: TX GSM 850

848.800000 MHz (High) **Bandwidth 0.2MHz** **2.512 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)
1697.6000	-13.0000	-43.6916 **	-43.3761 **
2546.4000	-13.0000	-42.7700 *	-45.9900 *
3395.2000	-13.0000	-54.1464 **	-54.3119 **
4244.0000	-13.0000	-52.1187 **	-51.3193 **
5092.8000	-13.0000	-49.5183 **	-48.6646 **
5941.6000	-13.0000	-46.7579 **	-45.4634 **
6790.4000	-13.0000	-44.3075 **	-44.0872 **
7639.2000	-13.0000	-46.3491 **	-44.6794 **
8488.0000	-13.0000	-45.1111 **	-45.5961 **

RADIATED SPURIOUS EMISSIONS



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Remarks:

Passed Results	Marginal Results	Failed Results

--Test Report End--