MOTOROLA SOLUTIONS

ACCREDITED
TESTING CERT # 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

EME Test Laboratory
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Date of Report: 07/05/13
Report Revision: A
Report ID: SAR rpt_PMUF1629A _Rev.A 130705_SR11444

Responsible Engineer:	Tan KaiYan (EME Engineer)
Report Author:	Tan KaiYan (EME Engineer)
Date/s Tested:	06/04/2013-06/14/2013
Manufacturer/Location:	Motorola, Penang
Sector/Group/Div.:	PCR
Date submitted for test:	05/08/13
DUT Description:	Frequency band of 896-902 MHz (tx freq for repeater operation) and 935-941 MHz (talkaround freq) 2W, 2.402-2.480 GHz (Bluetooth), Non-GOB
Test TX mode(s):	TDMA (PTT), BT (CW, 77% duty cycle for Bluetooth)
Max. Power output:	2.4 W (900MHz), 4 mW (Bluetooth)
Nominal Power:	2 W (900MHz), 2.5 mW (Bluetooth)
Tx Frequency Bands:	896-902MHz (tx freq for repeater operation) and 935-941MHz (talkaround freq) , 2.402-2.480GHz (Bluetooth)
Signaling type:	TDMA, FHSS (BT)
Model(s) Tested:	PMUF1629A
Model(s) Certified:	PMUF1629A
Serial Number(s):	806TPK0002 and 806TPK0004
Classification:	Occupational/Controlled
FCC ID:	AZ489FT5867; Rule Part 90 (896-901 MHz & 935-940 MHz); Rule Part 15 (2402-2480 MHz)
IC:	109U-89FT5867; (896-901 MHz, 935-940 MHz & 2402-2480 MHz)

* Refer to section 15 of part 1 for highest SAR summary results.

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of 47 CFR 2.1093(d). The 10 grams result is not applicable to FCC filing.
The test results clearly demonstrate compliance with ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz), Health Physics 74, 494-522 RF Exposure limits of 10 W/kg averaged over 10grams of contiguous tissue.

I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements. This reporting format is consistent with the suggested guidelines of the TIA TSB-150 December 2004. The results and statements contained in this report pertain only to the device(s) evaluated.

Deanna Zakharia (signature)

Deanna Zakharia
EMS EME Lab Senior Resource Manager,
Laboratory Director
Approval Date: 7/8/2013

Certification Date: 7/8/2013

Certification No.: L1130705P

Part 1 of 2

APPENDICES

Part 2 of 2

Report Revision History

Date	Revision	Comments
06/26/2013	O	Initial release
07/05/2013	A	Antenna gain amend to 0.5dBi

1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for model number PMUF1629A.

2.0 Abbreviations / Definitions

CNR: Calibration Not Required
EME: Electromagnetic Energy
CW: Continuous Wave
DUT: Device Under Test
DC: Duty Cycle
FM: Frequency Modulation/Factory Mutual
TDMA: Time Division Multiple Access
4FSK: 4 Level Frequency Shift Keying
NA: Not Applicable
PTT: Push to Talk
RSM: Remote Speaker Microphone
SAR: Specific Absorption Rate
GPS: Global Positioning System
BT: Bluetooth
GFSK: Gaussian Frequency-Shift Keying
PI/4DQPSK: π/4 Differential Quadrature Phase-Shift Keying
8DPSK: 8 Differential Phase-Shift Keying
FHSS: Frequency Hopping Spread Spectrum

Audio accessories: These accessories allow communication while the DUT is worn on the body.
Body worn accessories: These accessories allow the DUT to be worn on the body of the user.
Maximum Power: Defined as the upper limit of the production line final test station.

3.0 Referenced Standards and Guidelines

This product is designed to comply with the following applicable national and international standards and guidelines.

- IEC62209-1*(2005) Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
- United States Federal Communications Commission, Code of Federal Regulations; Rule Part 47CFR § 2.1093 sub-part J:1999
- Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

- IEEE 1528*(2003), Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2005
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6 (2009), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2003)
- ANATEL, Brazil Regulatory Authority, Resolution No. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9 kHz and 300 GHz." and "Attachment to resolution # 303 from July 2, 2002"
- IEC62209-2 Edition 1.0 2010-03, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz).

* The IEC62209-1 and IEEE 1528 are applicable for hand-held devices used in close proximity to the ear only.

4.0 SAR Limits

TABLE 1

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average - ANSI - (averaged over the whole body)	0.08	0.4
Spatial Peak - ANSI - (averaged over any 1-g of tissue)	1.6	8.0
Spatial Peak – ICNIRP/ANSI - (hands/wrists/feet/ankles averaged over 10-g)	4.0	20.0
Spatial Peak - ICNIRP - (Head and Trunk 10-g)	2.0	10.0

5.0 SAR Result Scaling Methodology:

The calculated 1-gram and 10-gram averaged SAR results indicated as “Max Calc. 1g-SAR” and “Max Calc.10g-SAR” in the data tables is determined by scaling the measured SAR to account for power leveling variations and power slump. A table and graph of output power versus time is provided in APPENDIX H. For this device the “Max Calc. 1g-SAR” and “Max Calc.10g-SAR” are scaled using the following formula:

$$Max\_Calc = SAR\_meas \cdot 10^{\frac{-Drift}{10}} \cdot \frac{P\_\max}{P\_\text{int}} \cdot DC$$

P_max = Maximum Power (W)
P_int = Initial Power (W)
Drift = DASY drift results (dB)
SAR_meas = Measured 1-g or 10-g Avg. SAR (W/kg)
DC = Transmission mode duty cycle in % where applicable
50% duty cycle is applied for PTT operation

Note: for conservative results, the following are applied:
If P_int > P_max, then P_max/P_int = 1.
Drift = 1 for positive drift

Additional SAR scaling was applied using the methodologies outlined in FCC KDB450824 using tissue sensitivity values. SAR was scaled for conditions where the tissue permittivity was measured above the nominal target and for tissue conductivity that was measured below the nominal target.

6.0 Description of Device Under Test (DUT):

Model PMUF1629A contains transmit and receive circuitry for digital two way radio communications. The modulation scheme used for digital two-way radio communications is 4 Level Frequency Shift Keying (4FSK) and Time Division Multiple Access (TDMA).

4FSK is a modulation technique that transmits information by altering the frequency of the radio frequency (RF) signal. Data is converted into complex symbols, which alter the RF signal and transmit the information. When the signal is received, the change in frequency is converted back into symbols and then into the original data. The system can accommodate 2-voice channels in a standard 12.5 kHz channel as used in two-way radio. Time Division Multiple Access (TDMA) is used to allocate portions of the RF signal by dividing time into two slots. Time allocation enables independent units to transmit voice information without interference from each other. Transmission from a unit or base station is accommodated in time-slot lengths of 30 milliseconds and frame lengths of 60 milliseconds. The 4FSK TDMA modulation technique requires sophisticated algorithms and a digital signal processor (DSP) to perform voice compressions/decompressions and RF modulation/demodulation. This device is intended to be used with a maximum duty cycle of 50%.

This model is also wireless Bluetooth (BT) compatible, with the following operations: Supports Bluetooth 2.1 + EDR (Class 2 BT device) and incorporates Class 1 Bluetooth;

Utilizes the Frequency Hopping Spread Spectrum (FHSS) technology; Receiver sensitivity is -70dBm. The modulation schemes being used are GFSK with 79 hopping channels (for basic rate) and pi/4 DQPSK and 8 DPSK (for EDR). Worst case duty cycle for BT is derived from a 5-slot packet type operation which consists of receiving on 1-slot and transmitting on 5-slots, and thus maximum duty cycle is 77% as defined by BT standard.

The model represented under this filing utilizes internal fixed antennas (900 MHz band) capable of transmitting in the 896-941 MHz, and an internal fixed BT antenna capable of transmitting at 2.402 - 2.480 GHz bands respectively. The nominal output power is 2 W with maximum output power of 2.4 W and nominal BT output power is 2.5 mW and maximum output of 4 mW, as defined by upper limit of the production line final test station. The intended operating positions are “at the face” with the DUT at least 1 inch from the mouth, and “at the body” by means of the offered body worn accessories. Body worn audio and PTT operation is accomplished by means of optional remote accessories that are connected to the radio. Operation at the body without an audio accessory attached is possible by means of offered wireless BT accessories.

Model PMUF1629A are being offered with the accessories listed in section 7.0.

7.0 Optional Accessories and Test Criteria:

This device is offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required per the guidelines outlined in “SAR Test Reduction Considerations for Occupational PTT Radios” FCC KDB 643646 D01 dated 4/4/11 to assess compliance of this device. The following sections identify the test criteria and details for each accessory category. Refer to Exhibit 7B for antenna separation distances.

7.1 Antennas:

There are two antennas offered for this model. The table below lists the antennas and their descriptions.

TABLE 2

Antenna Models	Description	Selected for Test	Tested
85012072001	Fixed; 896-941 MHz; ¼ wave; 0.5dBi	Yes	Yes
PMLF4122A	Bluetooth Antenna, IFA; 2402-2480 MHz; ¼ wave; 0.5dBi	Yes	Yes

7.2 Battery:

There is only one battery offered for this model. The table below lists the battery and its description.

TABLE 3

Battery Models	Description	Selected for Test	Tested	Comments
HKNN4013A	Battery Pack, 1800 mAh Li-ion	Yes	Yes	

7.3 Body worn Accessories:

There are two body worn accessories offered for this model. The table below lists the body worn accessories and their descriptions.

TABLE 4

Body worn Models	Description	Selected for Test	Tested	Comments
PMLN5956A	Carry Holder	Yes	Yes	
PMLN6074A	Wrist Strap	No	No	

7.4 Audio Accessories:

All audio accessories were considered. The table below lists the offered audio accessories and their descriptions. Exhibit 7B illustrates photos of the tested audio accessories.

TABLE 5

Audio Acc. Models	Description	Selected for Test	Tested	Comments
PMLN5957A	Surveillance Earpiece with in-line microphone and PTT	Yes	Yes	
PMLN5958A	Swivel Earpiece with in-line microphone and PTT	Yes	No	Per KDB provisions test not required
NNTN8125B	Operations critical wireless earpiece, 12	No	No	BT accessory
NNTN8127B	Operations Critical Wireless Push to Talk POD (US)	No	No	BT accessory
89409N	HK200 Bluetooth Headset (US)	No	No	BT accessory
NNTN8126B	Operations critical wireless earpiece, 9.5	No	No	BT accessory

8.0 Description of Test System:

8.1 Descriptions of Robotics/Probes/Readout Electronics:

TABLE 6

Disometric System Type	System Version	DAE Type	Probe Type
Schmid & Partner Engineering AG SPEAG™ DASY5™	52.8.2.969	DAE4	ES3DV3 (E-field)

The DASY5™ system is operated per the instructions in the respective DASY5™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess EME SAR compliance was calibrated according to ISO/IEC 17025 A2LA guidelines. Section 9.0 presents additional test equipment information. Appendices B and C present the applicable calibration certificates. The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum SAR distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

8.2 Description of Phantom(s)

TABLE 7

Phantom Type	Phantom ID(s)	Material Parameters	Phantom Dimensions LxWxD (mm)	Material Thickness (mm)	Support Structure Material	Loss Tangent (wood)
Dual Flat	NA	300MHz -6GHz; Er = 4+/- 1, Loss Tangent = ≤0.05	600x400x190	2mm +/- 0.2mm	Wood	< 0.05
SAM	NA					
Elliptical	OVAL1022 OVAL1019 OVAL1108					

8.3 Description of Simulated Tissue:

The sugar based simulate tissue is produced by placing the correct measured amount of De-ionized water into a large container. Each of the dried ingredients are weighed and added to the water carefully to avoid clumping. If the solution has a high sugar concentration the water is pre-heated to aid in dissolving the ingredients. For Diacetin and similar type simulates, sugar and HEC ingredients are not needed. The solution is mixed thoroughly, covered, and allowed to sit overnight prior to use.

The simulated tissue mixture was mixed based on the Simulated Tissue Composition indicated in Table 8 for 900 MHz and 2450 MHz. During the daily testing of this product, the applicable mixture was used to measure the Di-electric parameters at each of the tested frequencies to verify that the Di-electric parameters were within the tolerance of the tissue specifications.

Simulated Tissue Composition (by mass)

TABLE 8

Reference Standards	% of Listed Ingredients	900 MHz		2450 MHz	
		Head	Body	Head	Body
FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) IEEE 1528 - 2003 IEC62209-1 (2005) CENELEC EN62209-1 (2006)	Sugar	56.5	44.9	0	0
	Diacetin	0	0	51.0	34.5
	De ionized -Water	40.95	53.06	48.75	65.20
	Salt	1.45	0.94	0.15	0.20
	HEC	1.0	1.0	0	0
	Bact.	0.1	0.1	0.1	0.1

Reference section 10.1 for target parameters

9.0 Additional Test Equipment:

The table below lists additional test equipment used during the SAR assessment.

TABLE 9

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
Power Meter (Agilent)	E4419B	MY45103725	3/1/2013	3/1/2014
E-Series Avg. Power Sensor (Agilent)	E9301B	MY50280001	8/3/2012	8/3/2013
E-Series Avg. Power Sensor (Agilent)	E9301B	MY50290001	8/3/2012	8/3/2013
Power Meter (Agilent)	E4418B	US39251152	3/1/2013	3/1/2014
Power Sensor (Agilent)	8482B	3318A06774	3/7/2013	3/7/2014
Signal Generator (Agilent)	E4438C	MY42082269	1/24/2012	1/24/2014
Signal Generator (Agilent)	E4428C	MY47381119	6/24/2011	6/24/2013
AMP (Amplifier Research)	10WD1000	28782	CNR*	CNR*
Bi-Directional Coupler (NARDA)	3020A	40296	2/9/2012	2/9/2014
Bi-Directional Coupler (NARDA)	3022	77115	3/2/2012	3/2/2014
Temperature Recording Equipment				
Dickson Temperature Recorder	TM320	7081356	9/10/2012	9/10/2013
Omega Digital Thermometer with J Type TC Probe	HH200A	20857	10/25/2012	10/25/2013
Omega Digital Thermometer with J Type TC Probe	HH202A	18812	6/25/2012	6/25/2013
Omega Digital Thermometer with J Type TC Probe	HH202A	18801	5/14/2013	5/14/2014
Tissue Station				
Agilent PNA-L Network Analyzer	N5230C	MY49002155	8/10/2012	8/10/2013
Dielectric Probe Kit (DAK)	DAK-3.5	1088	10/23/2012	10/23/2013
Dielectric Probe Kit (DAK)	DAK-12	1040	10/23/2012	10/23/2013
Dipole				
Speag Dipole	D2450V2	704	4/13/2012	4/13/2014
Speag Dipole	D900V2	84	4/15/2012	4/15/2015
DAE				
Speag DAE	DAE4	1231	1/28/2013	1/28/2014
Probe				
Speag Probe	ES3DV3	3147	1/28/2013	1/28/2014

*** Calibration is not required by the OEM. The dielectric probe kit is used in conjunction with a calibrated network analyzer. The dielectric probe kit is calibrated for short, open, and load using the calibrated network analyzer. A saline solution is routinely measured as an additional check point.**

10.0 SAR Measurement System Verification:

The system performance check was conducted daily and within 24 hours prior to testing. DASY output files of the probe/dipole calibration certificates and system performance test results are included in appendices B, C, D respectively.

10.1 Equivalent Tissue Test Results:

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify that the tissue is within +/- 5% of target parameters at the center of the transmit band. This measurement is done using the applicable equipment indicated in section 9.0. Table 10 below summarizes the measured tissue parameters used for the SAR assessment.

TABLE 10

Frequency (MHz)	Tissue Type	Conductivity Target & Range (S/m)	Dielectric Constant Target & Range	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
896	FCC Body	1.05 (0.99-1.10)	55.01 (52.26-57.76)	1.02	56.00	06/04/13
	IEEE / IEC Head	0.97 (0.92-1.01)	41.50 (39.43-43.58)	0.94	42.90	06/04/13
900	FCC Body	1.05 (1.00-1.10)	55.00 (52.25-57.75)	1.03	56.00	06/04/13
	IEEE / IEC Head	0.97 (0.92-1.02)	41.50 (39.43-43.58)	0.95	42.80	06/04/13
935	FCC Body	1.07 (1.01-1.12)	54.94 (52.19-57.69)	1.10	55.00	06/04/13
	IEEE / IEC Head	0.98 (0.94-1.03)	41.44 (39.36-43.51)	1.01	41.90	06/04/13
2441	FCC Body	1.94 (1.84-2.04)	52.71 (47.44-57.98)	1.92	55.40	06/14/13
2450	FCC Body	1.95 (1.85-2.05)	52.70 (47.43-57.97)	1.92	55.30	06/14/13

10.2 System Check Test Results:

System performance checks were conducted each day during the SAR assessment. The results are normalized to 1W. APPENDIX D includes DASY plots for each day during the SAR assessment. The table below summarizes the daily system check results used for the SAR assessment.

TABLE 11

Probe Serial #	Tissue Type	Dipole Kit / Serial #	Reference SAR @ 1W (W/kg)	System Check Results Measured (W/kg)	System Check Test Results when normalized to 1W (W/kg)	Tested Date
3147	FCC Body	SPEAG D900V2 / 84	10.7 +/- 10%	2.68	10.72	06/04/13
		SPEAG D2450V2 / 704	49.6 +/- 10%	1.59	53.00	06/14/13
	IEEE /IEC Head	SPEAG D900V2 / 84	10.5 +/- 10%	2.70	10.80	06/04/13

11.0 Environmental Test Conditions:

The EME Laboratory's ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 2°C of the temperature at which the dielectric properties were determined. The liquid depth within the phantom used for measurements was at least 15cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The table below presents the range and average environmental conditions during the SAR tests reported herein:

TABLE 12

	Target	**Measured**
Ambient Temperature	18 - 25 ˚C	Range: 21.4-21.8˚C Avg. 21.6˚C
Relative Humidity	30 - 70 %	Range: 50.3-50.9% Avg. 50.7%
Tissue Temperature	NA	Range: 20.3-21.5˚C Avg. 20.7˚C

Relative humidity target range is a recommended target

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the SAR scans are repeated.

12.0 DUT Test Methodology

12.1 Measurements

SAR measurements were performed using the DASY system described in section 8.0 using zoom scan. Elliptical flat phantoms filled with applicable simulated tissue were used for body and face testing.

12.2 DUT Configuration(s)

The DUT is a portable device operational at the body and face as described in section 6.0 while using the applicable accessories listed in section 7.0. All accessories listed in section 7.0 of this report were considered when implementing the guidelines specified in KDB 643646 D01.

12.3 DUT Positioning Procedures

The positioning of the device for each body location is described below and illustrated in APPENDIX I.

12.3.1 Body

The DUT was positioned in normal use configuration against the phantom with the offered body worn accessories as well as with and without the offered audio accessories as applicable.

12.3.2 Head

Not applicable.

12.3.3 Face

The DUT was positioned with its' front side separated 2.5cm from the phantom.

12.4 DUT Test Channels:

The number of test channels was determined by using the following IEEE 1528 equation. The use of this equation produces the same or more test channels compared to the FCC KDB 447498 number of test channels formula.

$$N_c = 2 * roundup[10 * (f_{high} - f_{low}) / f_c] + 1$$

Where
N_c = Number of channels
F_{high} = Upper channel
F_{low} = Lower channel
F_c = Center channel

12.5 DUT Test Plan:

The guidelines and requirements outlined in "SAR Test Reduction Considerations for Occupational PTT Radios" FCC KDB 643646 D01 dated 4/4/11 for head (face) and body were used to assess compliance of this device. All modes of operation identified in section 6.0 were considered during the development of the test plan. All tests were performed in 50% TDMA mode and then 50% duty cycle was applied to the final results. The initial powers measured are within the range of 95% to 100% of the max power.

13.0 DUT Test Data

13.1 Assessment at the Body for 896-901 MHz:

The only offered battery HKNN4013A was used for assessment at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (896-901 MHz) is indicated in Table 13. The channel with the highest conducted power will be identified as the default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. Highest SAR results from each table are bolded. SAR plots of the highest results are presented in Appendix E-G.

TABLE 13

Test Freq (MHz)	Power (W)
896.000	2.32
901.000	2.32

13.1.1 Assessment at the Body with Body worn PMLN5956A:

Assessment of the fixed antenna with the offered battery and body worn PMLN5956A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for the highest output power channel.

TABLE 14

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
85012072001 (Internal)	HKNN4013A	PMLN5956A	PMLN5957A	896.000	2.40	-0.35	2.98	2.12	**1.62**	**1.15**	ErC-Ab-130604-06
				901.000							

13.1.2 Assessment of other audio accessories at the body:

Assessment per KDB 643646 D01 Body SAR Test Considerations for Audio Accessories without Built-in Antenna; Sec 1, A. when overall < 4.0 W/kg, SAR tests for that audio accessory is not necessary. This was applicable to all remaining accessories.

13.1.3 Assessment of wireless BT configuration at the Body:

Assessment using the overall highest SAR configuration at the body from above without an audio accessory attached.

TABLE 15

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
85012072001 (Internal)	HKNN4013A	PMLN5956A	NONE	896.000	2.40	-0.39	3.57	2.57	**1.95**	**1.41**	CM-Ab-130604-13
				901.000							

13.2 Assessment at the Body for 935-940 MHz:

The only offered battery HKNN4013A was used for assessment at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (935-940 MHz) is indicated in Table 13. The channel with the highest conducted power will be identified as the default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. Highest SAR results from each table are bolded. SAR plots of the highest results are presented in Appendix E-G.

TABLE 16

Test Freq (MHz)	Power (W)
935.000	2.32
940.000	2.32

13.2.1 Assessment at the Body with Body worn PMLN5956A:

Assessment of the fixed antenna with the offered battery and body worn PMLN5956A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for the highest output power channel.

TABLE 17

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
85012072001 (Internal)	HKNN4013A	PMLN5956A	PMLN5957A	935.000	2.40	-0.36	2.76	1.98	**1.50**	**1.08**	ErC-Ab-130604-08
				940.000							

13.2.2 Assessment of other audio accessories at the body:

Assessment per KDB 643646 D01 Body SAR Test Considerations for Audio Accessories without Built-in Antenna; Sec 1, A. when overall < 4.0 W/kg, SAR tests for that audio accessory is not necessary. This was applicable to all remaining accessories.

13.2.3 Assessment of wireless BT configuration at the Body:

Assessment using the overall highest SAR configuration at the body from above without an audio accessory attached.

TABLE 18

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
85012072001 (Internal)	HKNN4013A	PMLN5956A	NONE	935.000	2.39	-0.34	3.07	2.19	**1.67**	**1.19**	ErC-Ab-130604-09
				940.000							

13.3 Assessment at the Face for 896-901 MHz:

The only offered battery HKNN4013A was used for assessment at the Face (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (896-901 MHz) is indicated in Table 19. The channel with the highest conducted power will be identified as the default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. Highest SAR results from each table are bolded. SAR plots of the highest results are presented in Appendix E-G.

TABLE 19

Test Freq (MHz)	Power (W)
896.000	2.32
901.000	2.32

Assessment of the fixed antenna with the default battery, front of DUT facing phantom per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Head SAR Test Considerations. Refer to Table 19 for highest output power channel.

TABLE 20

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
85012072001 (Internal)	HKNN4013A	NONE	NONE	896.000	2.40	-0.47	2.83	2.05	**1.58**	**1.14**	ErC-Face-130604-11
				901.000							

13.4 Assessment at the Face for 935-940 MHz:

The only offered battery HKNN4013A was used for assessment at the Face (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (935-940 MHz) is indicated in Table 21. The channel with the highest conducted power will be identified as the default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. Highest SAR results from each table are bolded. SAR plots of the highest results are presented in Appendix E-G.

TABLE 21

Test Freq (MHz)	Power (W)
935.000	2.32
940.000	2.32

Assessment of the fixed antenna with the default battery, front of DUT facing phantom per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Head SAR Test Considerations. Refer to Table 21 for highest output power channel.

TABLE 22

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
85012072001 (Internal)	HKNN4013A	NONE	NONE	935.000	2.40	-0.35	2.19	1.59	**1.19**	**0.86**	CM-Face-130604-12
				940.000							

13.5 Assessment for Industry Canada frequency range:

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (896-901 MHz and 935-940 MHz) as the testing performed is in compliance with Industry Canada frequency range.

13.6 Assessment for Bluetooth

The DUT was tested at the center of the BT band using the highest overall SAR configuration without the audio accessory cable attached. The highest SAR result from the table below (bolded) is included in Appendix E-G.

TABLE 23

BT Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMLF4122A	HKNN4013A	PMLN5956A	NONE	2441.000	0.004	0.71	0.00202	0.000732	**0.0020**	**0.0007**	ErC-Ab-130614-05

13.7 Shorten Scan Assessment:

A “shortened” scan using the highest SAR configuration overall from above was performed to validate the SAR drift of the full DASY5™ coarse and zoom scans. Note that the shortened scan represents the zoom scan performance result; this is obtained by first running a coarse scan to find the peak area and then, using a newly charged battery, a zoom scan only was performed. The results of the shortened cube scan presented in APPENDIX E demonstrate that the scaling methodology used to determine the calculated SAR results presented herein are valid. The SAR result from the table below is provided in Appendix E.

TABLE 24

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
85012072001 (Internal)	HKNN4013A	PMLN5956A	NONE	896.000	2.40	-0.34	3.66	2.63	**1.98**	**1.42**	CM-Ab-130604-14

14.0 Simultaneous Transmission:

Simultaneous Transmission applies. See section 15.0.

15.0 Conclusion:

Based on the test guidelines from KDB 643646 and satisfying frequencies within the FCC band to be in compliance with Industry Canada frequency range, the highest Operational Maximum Calculated 1-gram and 10-gram average SAR values found for this filing:

TABLE 25

Designator	Frequency band (MHz)	BODY				FACE	
		Max Calc (W/kg)		Simultaneous Calc (W/kg)		Max Calc (W/kg)	
		1g-SAR	10g-SAR	1g-SAR	10g-SAR	1g-SAR	10g-SAR
Overall	896-902	1.98	1.42	1.98	1.42	1.58	1.14
	935-941	1.67	1.19	NA	NA	1.19	0.86
FCC / Industry Canada	896-901	1.98	1.42	1.98	1.42	1.58	1.14
	935-940	1.67	1.19	NA	NA	1.19	0.86

All results are scaled to the maximum output power

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of 47 CFR 2.1093(d). The 10 grams result is not applicable to FCC filing.

APPENDIX A
Measurement Uncertainty

The Measurement Uncertainty tables indicated in this APPENDIX are applicable to the DUT test frequencies ranging from 800 to 3GHz, and for Dipole test frequencies ranging from 800MHz to 3GHz. Therefore, the highest tolerance for the probe calibration uncertainty is indicated.

Table 1:
Uncertainty Budget for Device Under Test, for 800 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	*IEEE 1528 section*	**Tol. (± %)**	**Prob Dist**	**Div.**	c_i **(1 g)**	c_i **(10 g)**	**1 g** u_i **(±%)**	**10 g** u_i **(±%)**	v_i
Measurement System									
Probe Calibration	E.2.1	6.0	N	1.00	1	1	6.6	6.6	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11	11	472
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	22	

FCD-0558 Uncertainty Budget Rev.8.1

Table 2:
Uncertainty Budget for System Verification (dipole & flat phantom) for 800 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	c_i **(1 g)**	c_i **(10 g)**	**1 g** u_i **(±%)**	**10 g** u_i **(±%)**	v_i
Measurement System									
Probe Calibration	E.2.1	6.0	N	1.00	1	1	6.6	6.6	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t. Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				10	9	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				19	18	

FCD-0558 Uncertainty Budget Rev.8.1

Notes for Tables 1 and 2

a) Column headings *a*-*k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

APPENDIX B
Probe Calibration Certificates

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Motorola EME**

Certificate No: **ES3-3147_Jan13**

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3147

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: January 28, 2013

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 29, 2013

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3147

Manufactured: July 12, 2007
Calibrated: January 28, 2013

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3147

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m)^2)[A]	1.26	1.20	1.19	± 10.1 %
DCP (mV)[B]	103.1	101.0	99.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√µV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	157.3	±3.3 %
		Y	0.0	0.0	1.0		152.9	
		Z	0.0	0.0	1.0		151.1	
10108	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.53	67.9	20.2	5.80	138.1	±1.2 %
		Y	6.46	67.3	19.7		133.3	
		Z	6.50	67.5	19.9		133.6	
10148	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.53	67.9	20.2	5.84	138.1	±12.2 %
		Y	6.46	67.3	19.7		133.3	
		Z	6.50	67.5	19.9		133.6	
10110	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.23	67.5	20.1	5.75	135.6	±1.2 %
		Y	6.15	66.8	19.4		130.8	
		Z	6.25	67.3	19.9		131.6	
10154	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.23	67.5	20.1	5.76	135.6	±12.2 %
		Y	6.15	66.8	19.4		130.8	
		Z	6.25	67.3	19.9		131.6	
10112	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	7.21	66.7	19.8	6.59	103.7	±1.4 %
		Y	7.74	68.1	20.4		144.8	
		Z	7.86	68.6	20.8		145.4	
10109	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	7.21	66.7	19.8	6.43	103.7	±12.2 %
		Y	7.74	68.1	20.4		144.8	
		Z	7.86	68.6	20.8		145.4	
10150	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	7.21	66.7	19.8	6.60	103.7	±12.2 %
		Y	7.74	68.1	20.4		144.8	
		Z	7.86	68.6	20.8		145.4	
10149	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	7.21	66.7	19.8	6.42	103.7	±12.2 %
		Y	7.74	68.1	20.4		144.8	
		Z	7.86	68.6	20.8		145.4	
10143	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	7.07	68.2	20.6	6.35	140.6	±1.2 %
		Y	6.94	67.4	19.9		135.5	
		Z	7.09	67.9	20.4		136.9	
10147	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	7.08	68.3	20.9	6.72	135.1	±1.2 %
		Y	6.92	67.5	20.2		129.5	
		Z	7.09	67.9	20.6		131.8	

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10159	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	7.08	68.3	20.9	6.56	135.1	±12.2 %
		Y	6.92	67.5	20.2		129.5	
		Z	7.09	67.9	20.6		131.8	
10157	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	7.08	68.3	20.9	6.49	135.1	±12.2 %
		Y	6.92	67.5	20.2		129.5	
		Z	7.09	67.9	20.6		131.8	
10164	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	7.08	68.3	20.9	6.44	135.1	±12.2 %
		Y	6.92	67.5	20.2		129.5	
		Z	7.09	67.9	20.6		131.8	
10165	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	7.08	68.3	20.9	6.69	135.1	±12.2 %
		Y	6.92	67.5	20.2		129.5	
		Z	7.09	67.9	20.6		131.8	
10146	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	7.08	68.3	20.9	6.41	135.1	±12.2 %
		Y	6.92	67.5	20.2		129.5	
		Z	7.09	67.9	20.6		131.8	
10158	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	7.59	68.6	21.0	6.62	145.3	±1.4 %
		Y	7.47	67.8	20.3		139.7	
		Z	7.58	68.2	20.7		141.2	
10111	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	7.59	68.6	21.0	6.44	145.3	±12.2 %
		Y	7.47	67.8	20.3		139.7	
		Z	7.58	68.2	20.7		141.2	
10113	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	7.59	68.6	21.0	6.62	145.3	±12.2 %
		Y	7.47	67.8	20.3		139.7	
		Z	7.58	68.2	20.7		141.2	
10155	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	7.59	68.6	21.0	6.43	145.3	±12.2 %
		Y	7.47	67.8	20.3		139.7	
		Z	7.58	68.2	20.7		141.2	
10161	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	7.59	68.6	21.0	6.43	145.3	±12.2 %
		Y	7.47	67.8	20.3		139.7	
		Z	7.58	68.2	20.7		141.2	
10162	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	7.59	68.6	21.0	6.58	145.3	±12.2 %
		Y	7.47	67.8	20.3		139.7	
		Z	7.58	68.2	20.7		141.2	
10163	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.83	67.0	19.8	5.68	131.0	±0.9 %
		Y	5.77	66.4	19.3		125.8	
		Z	5.85	66.6	19.5		127.4	
10156	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	5.83	67.0	19.8	5.79	131.0	±12.2 %
		Y	5.77	66.4	19.3		125.8	
		Z	5.85	66.6	19.5		127.4	
10145	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	5.83	67.0	19.8	5.76	131.0	±12.2 %
		Y	5.77	66.4	19.3		125.8	
		Z	5.85	66.6	19.5		127.4	