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## **ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART27 SUBPART C & SUBPART L REQUIREMENT **CLASS II PC REPORT**

**Product Name:** LTE Module

Model No.: **EC25-V** 

**Model Difference:** N/A

FCC ID: XMR201607EC25V

**Report No.:** ER/2017/70087

**Issue Date:** Aug. 04, 2017

FCC Rule Part: 2,27C & L

**Prepared for: Quectel Wireless Solutions Company Limited** 

Room 501, Building 13 No. 99 TianZhou

Road, Xuhui District, Shanghai, 200233 China

Prepared by: SGS Taiwan Ltd.

> **Electronics & Communication Laboratory** No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan

24803

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## VERIFICATION OF COMPLIANCE

Applicant: Quectel Wireless Solutions Company Limited

Room 501, Building 13 No. 99 TianZhou Road, Xuhui District,

Shanghai, 200233 China

LTE Module **Product Name:** 

EC25-V Model No.:

N/A **Model Difference:** 

FCC ID: XMR201607EC25V

ER/2017/70087 **Report Number:** 

Jul. 18, 2017 ~ Aug. 04, 2017 Date of test:

Jul. 18, 2017 Date of EUT Received:

## We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-D-2010 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By: Date: Aug. 04, 2017 Curry Chen / Engineer Prepared By: Aug. 04, 2017 Date: Yuri Tsai / Clerk Approved By: Date: Aug. 04, 2017 Jim Chang / Asst. Manager

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2017/70087	Rev.00	Initial creation of document	Aug. 04, 2017

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## 1. GENERAL PRODUCT INFORMATION

### 1.1. Product Description

#### General:

Rugged Handheld Computer		
unitech		
PA730		
N/A		
N/A		
N/A		
EC25-V		
The test report covers the radiated emissions requirements of the standards referenced in the report to allow system level approval of the module in this specific host.		
LTE Module INSTALLED IN Rugged Handheld Computer		
Model No.: 3C10-00000790, Supplier: Bitatek		
3.7Vdc from Rechargeable Li-polymer Battery or 5V from AC/DC Adapter		
Datte	Model No.: BTBAT2, Supplier: Leung's Communication & Electric Products (Guangzhou) LTD.	
Battery:	2. Model No.: BTBAT1, Supplier: Leung's Commu-	
	nication & Electric Products (Guangzhou) LTD.	
Adapter:	Model No.: S018BDU0900200, Supplier: Ten Pao Industrial Co., Ltd.	
	unitech PA730 N/A N/A N/A PC25-V The test restandards of the mod LTE Modu Model No 3.7Vdc from Battery:	

#### LTE:

Cellular Phone Standards Frequency Range and Power	Operating Frequency	
	LTE-Band 4 (Bandwidth 5MHz)	1712.5MHz – 1752.5MHz
	LTE-Band 4 (Bandwidth 10MHz)	1715.0MHz – 1750.0MHz
	LTE-Band 4 (Bandwidth 15MHz)	1717.5MHz – 1747.5MHz
	LTE-Band 4 (Bandwidth 20MHz)	1720.0MHz – 1745.0MHz
	LTE-Band 13 (Bandwidth 5MHz)	779.5MHz – 784.5MHz
	LTE-Band 13 (Bandwidth 10MHz)	782.0MHz – 782.0MHz

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#### 1.2. Test Methodology of Applied Standards

FCC 47 CFR Part 2, 27.

ANSI / TIA / EIA 603D-2010

KDB971168 D01 Power Meas license Digital System

TS 151 010-1 is used to set, and measure the output power.

#### Note:

- All test items have been performed and record as per the above standards.
- The composite system is compliance with FCC Subpart B is authorized under the certification procedure.

#### 1.3. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803, (TAF code 0513)

FCC Registration Numbers are: 509634

#### 1.4. Special Accessories

No special accessories were used during testing.

#### 1.5. Equipment Modifications

There were no modifications incorporated into the EUT.

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#### 2. SYSTEM TEST CONFIGURATION

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

#### 2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

#### 2.3. Test Procedure

#### 2.3.1 Conducted Measurement at Antenna Port

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

## 2.3.2 Radiated Emissions (ERP/EIRP)

According to measurement procured TIA/EIA 603C, The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13.

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#### 2.4. Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

#### Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

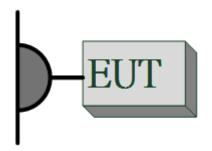
Following shows an offset computation example with cable loss and attenuator.

Band 4: Offset = RF cable loss (0.3dB) + splitter (4dB) + attenuator (10dB) = 14.3(dB)

Band 13: Offset = RF cable loss (0.9dB) + splitter (3dB) + attenuator (10dB) = 13.9(dB)

## 2.5. Configuration of Tested System

Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)



**Table 2-1 Equipment Used in** 

Ite m	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Test Software	N/A	N/A	N/A	N/A	N/A

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#### 3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1051 §27.53(c)(2), §27.53(c)(4), §27.53(c)(5), §27.53(h)	Field Strength of Spurious Radiation	Compliant

#### 4. DESCRIPTION OF TEST MODES

#### 4.1. The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. 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 worst case was found as listed below. Following channel(s) was (were) selected for the final test as listed below:

BAND	ERP/EIRP	RADIATED EMISSION
LTE Band 4 / 13	H-plan	H-plan

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#### LTE Band 4 MODE

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TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB/ 0,24 RB Offset
EIRP	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB/ 0,49 RB Offset
EIRP	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB/ 0,74 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB/ 0,99 RB Offset
FREQUENCY STABILITY	20000 to 20350	20175	10MHz	QPSK,	Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	Full RB
OCCUPIED	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	Full RB
BANDWIDTH	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	16QAM	Full RB
PEAK TO AVERAGE	20000 to 20350	20000, 20175, 20350	10MHz	16QAM	Full RB
RATIO	20025 to 20325	20025, 20175, 20325	15MHz	16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	16QAM	Full RB
	19975 to 20375	19975, 20375	5MHz	QPSK,	1 RB/ 0,24 RB Offset Full RB
BAND EDGE	20000 to 20350	20000, 20350	10MHz	QPSK,	1 RB/ 0,49 RB Offset Full RB
BAND EDGE	20025 to 20325	20025, 20325	15MHz	QPSK,	1 RB/ 0,74 RB Offset Full RB
	20050 to 20300	20050, 20300	20MHz	QPSK,	1 RB/ 0,99 RB Offset Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK,	1 RB, 0 RB Offset
CONDUCTED	20000 to 20350	20000, 20175, 20350	10MHz	QPSK,	1 RB, 0 RB Offset
EMISSION	20025 to 20325	20025, 20175, 20325	15MHz	QPSK,	1 RB, 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK,	1 RB, 0 RB Offset
RADIATED EMISSION	20050 to 20300	20050, 20175, 20300	20MHz	QPSK,	1 RB/ 0 RB Offset

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#### LTF Band 13 MODE

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TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM	1 RB/ 0,24 RB Offset
LIXI	23230	23230	10MHz	QPSK, 16QAM	1 RB/ 0,49 RB Offset
FREQUENCY STABILITY	23230	23230	10MHz	QPSK,	Full RB
OCCUPIED	23205 to 23255	23205, 23230, 23255	5MHz	QPSK, 16QAM	Full RB
BANDWIDTH	23230	23230	10MHz	QPSK, 16QAM	Full RB
PEAK TO AVERAGE	23205 to 23255	23205, 23230, 23255	5MHz	16QAM	Full RB
RATIO	23230	23230	10MHz	16QAM	Full RB
BAND EDGE	23205 to 23255	23205, 23255	5MHz	QPSK,	1 RB/ 0,24 RB Offset Full RB
BAND EDGE	23230	23230	10MHz	QPSK,	1 RB/ 0,49 RB Offset Full RB
CONDCUDETED	23205 to 23255	23205, 23230, 23255	5MHz	QPSK,	1 RB, 0 RB Offset
EMISSION	23230	23230	10MHz	QPSK,	1 RB, 0 RB Offset
RADIATED EMISSION	23230	23230	10MHz	16QAM	1 RB, 0 RB Offset

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#### **MEASUREMENT UNCERTAINTY**

Test Items	Uncertainty	
RF Power Output	+/- 1.10 dB	
ERP/ EIRP measurement	Vertical Polarization = +/- 4.74dB Horizontal Polarization =+/- 4.62dB	
99% Occupied Bandwidth	+/- 5.19 Hz	
Out of Band Emissions at Antenna	+/- 0.70 dB	
Terminals and Band Edge		
Peak to Average Ratio	+/- 0.70 dB	
Frequency Stability vs.	+/- 5.19 Hz	
Temperature	+/- 5.19112	
Frequency Stability vs.	+/- 5.19 Hz	
Voltage	17- 3.19 112	
Temperature	+/- 0.65 °C	
Humidity	+/- 4.6 %	
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%	

## Radiated Sourious Emission:

Radiated Optifieds Efficient:				
Measurement uncertainty (Polarization : <b>Vertical</b> )	9kHz-30MHz: +/-2.87dB			
	30MHz - 180MHz: +/- 3.37dB			
	180MHz -417MHz: +/- 3.19dB			
	0.417GHz-1GHz: +/- 3.19dB			
	1GHz - 18GHz: +/- 4.04dB			
	18GHz - 40GHz: +/- 4.04dB			

Measurement uncertainty (Polarization : <b>Horizontal</b> )	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

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#### 6. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

## 6.1. Standard Applicable

According to FCC §2.1053,

FCC §27.53(h), §27.53(c)(2) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

FCC §27.53(c) (4)

- (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

#### **Band Edge Measurement:**

FCC §27.53(c) (5)

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.

FCC §27.53(h)

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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.

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#### FCC §27.53 (f)

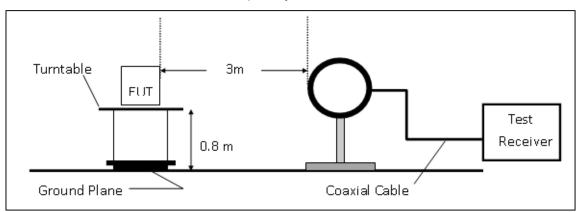
For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.EUT Setup

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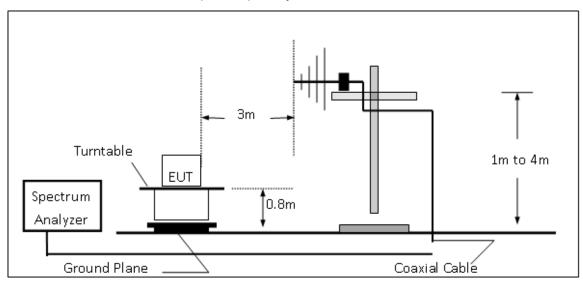


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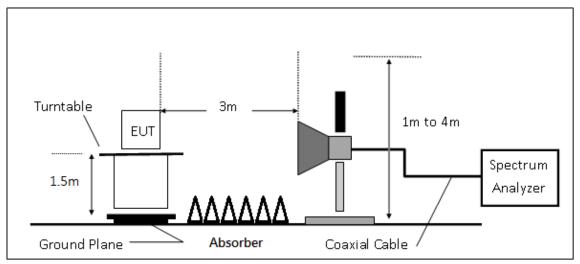
## (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



## (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



## (C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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#### 6.2. Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP= SG Level (dBm) + Antenna Gain (dBd) + Cable Loss (dB)

EIRP = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

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## 6.3. Measurement Equipment Used:

	SGS SAC-III											
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due							
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018							
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018							
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017							
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017							
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017							
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018							
Pre-Amplifier	EMC Instru- ments Corp.	EMC0126530	980038	01/05/2017	01/04/2018							
Turn Table	HD	DT420	N/A	N.C.R	N.C.R							
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R							
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R							
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018							
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018							
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018							
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017							
Pre-Amplifier	EMC Instru- ments Corp.	EMC184045	980135	01/05/2017	01/04/2018							
Radio Communication Analyzer	R&S	CMU200	102189	02/10/2017	02/09/2018							
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018							

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#### 6.4. Measurement Result:

Radiated Spurious Emission Measurement Result: 10MHz BW LTE-Band 4 (The Worst Case)

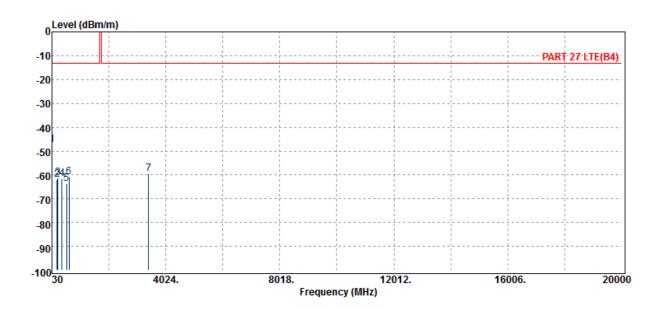
Temp./Humi. **Operation Band** :LTE B4 :23 deg C / 62 RH

Fundamental Frequen-:1711.5 MHz Engineer :Tin

**Operation Mode** :Tx CH LOW

Antenna :VERTICAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.00	S	-47.49	-33.91	-12.63	-0.96	-13.00	-34.49
206.54	S	-62.10	-65.97	5.53	-1.66	-13.00	-49.10
246.31	S	-61.28	-65.06	5.53	-1.75	-13.00	-48.28
390.84	S	-61.52	-65.17	5.98	-2.33	-13.00	-48.52
546.04	S	-63.82	-66.92	5.76	-2.66	-13.00	-50.82
626.55	S	-60.99	-63.83	5.34	-2.49	-13.00	-47.99
3423.00	Н	-59.41	-65.45	12.27	-6.23	-13.00	-46.41

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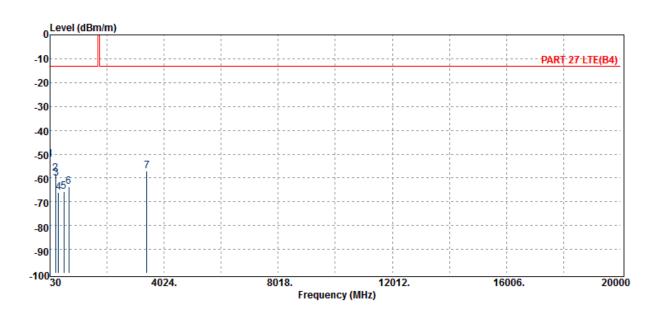
**Operation Band** :23 deg\_C / 62 RH :LTE B4 Temp./Humi.

Fundamental Frequen-:1711.5 MHz :Tin Engineer

**Operation Mode** :Tx CH LOW

Antenna :HORIZONTAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.00	S	-52.33	-38.74	-12.63	-0.96	-13.00	-39.33
219.15	S	-58.24	-62.03	5.49	-1.70	-13.00	-45.24
245.34	S	-60.33	-64.10	5.52	-1.75	-13.00	-47.33
330.70	S	-66.08	-70.09	5.92	-1.91	-13.00	-53.08
519.85	S	-65.89	-69.40	5.90	-2.39	-13.00	-52.89
691.54	S	-63.84	-66.26	5.24	-2.83	-13.00	-50.84
3423.00	Н	-56.94	-62.97	12.27	-6.23	-13.00	-43.94

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**Operation Mode** 

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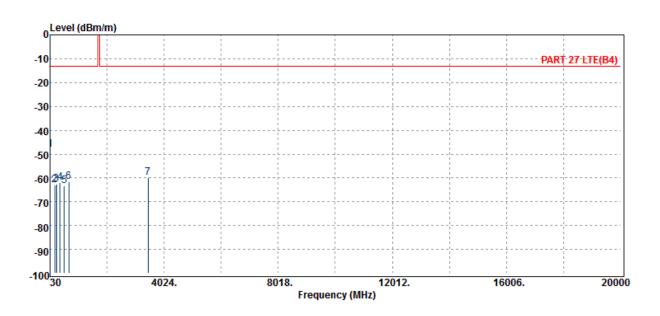
**Operation Band** :LTE B4 Temp./Humi. :23 deg\_C / 62 RH

Fundamental Frequen-:1732.5 MHz :Tin Engineer

:Tx CH MID

Antenna :VERTICAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.00	S	-47.96	-34.38	-12.63	-0.96	-13.00	-34.96
197.81	S	-63.10	-66.61	5.13	-1.63	-13.00	-50.10
257.95	S	-62.56	-66.57	5.78	-1.77	-13.00	-49.56
386.96	S	-62.00	-65.68	5.98	-2.30	-13.00	-49.00
531.49	S	-63.46	-66.78	5.84	-2.51	-13.00	-50.46
689.60	S	-61.72	-64.17	5.24	-2.79	-13.00	-48.72
3465.00	Н	-59.89	-65.98	12.34	-6.25	-13.00	-46.89

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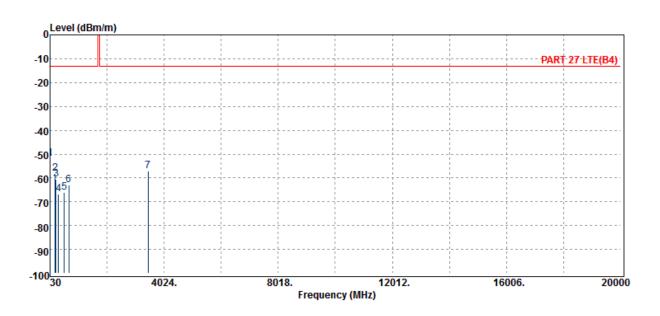
**Operation Band** :23 deg\_C / 62 RH :LTE B4 Temp./Humi.

Fundamental Frequen-:1732.5 MHz :Tin Engineer

**Operation Mode** :Tx CH MID

Antenna :HORIZONTAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.00	S	-52.00	-38.41	-12.63	-0.96	-13.00	-39.00
216.24	S	-58.29	-62.15	5.55	-1.69	-13.00	-45.29
245.34	S	-60.47	-64.23	5.52	-1.75	-13.00	-47.47
330.70	S	-66.65	-70.67	5.92	-1.91	-13.00	-53.65
521.79	S	-65.94	-69.42	5.89	-2.41	-13.00	-52.94
689.60	S	-63.13	-65.58	5.24	-2.79	-13.00	-50.13
3465.00	Н	-57.09	-63.18	12.34	-6.25	-13.00	-44.09

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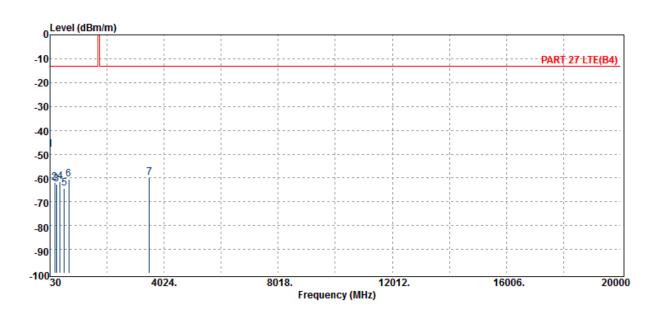
**Operation Band** :LTE B4 Temp./Humi. :23 deg\_C / 62 RH

Fundamental Frequen-:1753.5 MHz :Tin Engineer

Operation Mode :Tx CH HIGH

Antenna :VERTICAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.00	S	-48.03	-34.45	-12.63	-0.96	-13.00	-35.03
197.81	S	-62.10	-65.61	5.13	-1.63	-13.00	-49.10
251.16	S	-62.65	-66.51	5.62	-1.76	-13.00	-49.65
390.84	S	-61.54	-65.19	5.98	-2.33	-13.00	-48.54
522.76	S	-64.51	-67.97	5.88	-2.42	-13.00	-51.51
691.54	S	-60.50	-62.92	5.24	-2.83	-13.00	-47.50
3507.00	Н	-59.94	-65.86	12.40	-6.48	-13.00	-46.94

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Operation Mode

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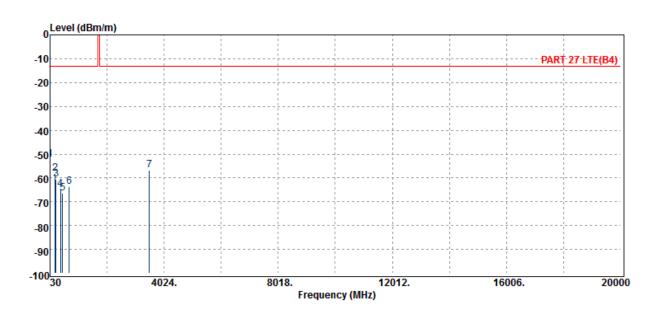
**Operation Band** :23 deg\_C / 62 RH :LTE B4 Temp./Humi.

Fundamental Frequen-:1753.5 MHz :Tin Engineer

:Tx CH HIGH

Antenna :HORIZONTAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
30.00	S	-52.39	-38.81	-12.63	-0.96	-13.00	-39.39
216.24	S	-58.06	-61.92	5.55	-1.69	-13.00	-45.06
245.34	S	-60.66	-64.43	5.52	-1.75	-13.00	-47.66
400.54	S	-64.61	-68.20	5.97	-2.38	-13.00	-51.61
466.50	S	-66.48	-70.13	5.87	-2.22	-13.00	-53.48
696.39	S	-63.59	-65.91	5.24	-2.91	-13.00	-50.59
3507.00	Н	-56.72	-62.65	12.40	-6.48	-13.00	-43.72

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# Radiated Spurious Emission Measurement Result: 10MHz BW LTE-Band 13 (The Worst

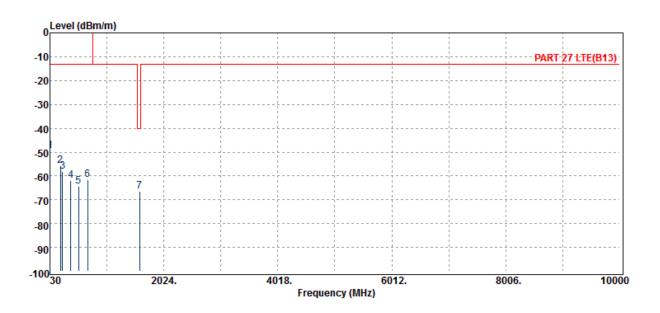
**Operation Band** :LTE B13 Temp./Humi. :23 deg\_C / 62 RH

Fundamental Frequen-:779.5 MHz Engineer :Tin

**Operation Mode** :Tx CH LOW

Antenna :VERTICAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
30.00	S	-49.55	-33.81	-14.78	-0.96	-13.00	-36.55
214.30	S	-55.65	-57.40	3.44	-1.68	-13.00	-42.65
248.25	S	-58.01	-59.67	3.41	-1.75	-13.00	-45.01
390.84	S	-62.11	-63.61	3.83	-2.33	-13.00	-49.11
529.55	S	-64.46	-65.66	3.70	-2.49	-13.00	-51.46
686.69	S	-61.67	-62.03	3.10	-2.74	-13.00	-48.67
1599.00	Н	-66.39	-69.15	6.93	-4.17	-40.00	-26.39

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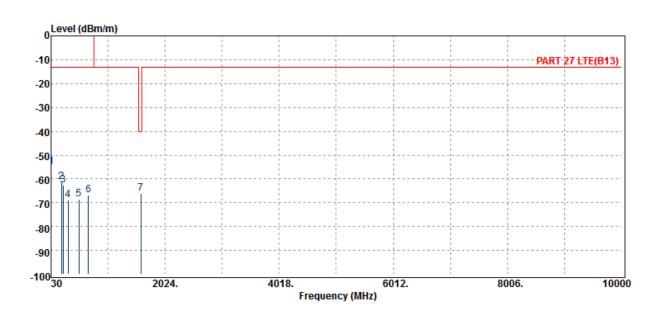
**Operation Band** :23 deg\_C / 62 RH :LTE B13 Temp./Humi.

Fundamental Frequen-:779.5 MHz Engineer :Tin

**Operation Mode** :Tx CH LOW

Antenna :HORIZONTAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
30.00	S	-55.02	-39.29	-14.78	-0.96	-13.00	-42.02
212.36	S	-61.38	-63.17	3.48	-1.68	-13.00	-48.38
240.49	S	-62.55	-64.10	3.29	-1.74	-13.00	-49.55
330.70	S	-68.79	-70.65	3.77	-1.91	-13.00	-55.79
519.85	S	-68.59	-69.94	3.75	-2.39	-13.00	-55.59
681.84	S	-66.88	-67.33	3.10	-2.65	-13.00	-53.88
1599.00	Н	-66.01	-68.76	6.93	-4.17	-40.00	-26.01

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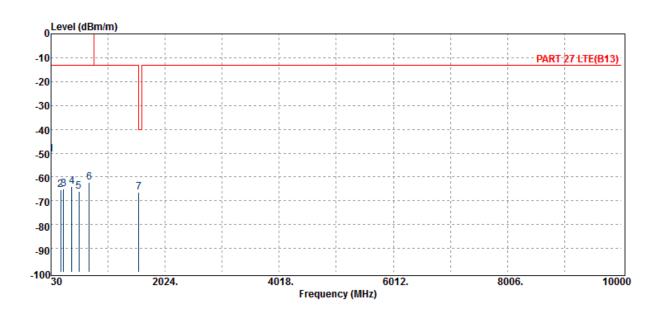
**Operation Band** :LTE B13 Temp./Humi. :23 deg\_C / 62 RH

Fundamental Frequen-:782 MHz Engineer :Tin

**Operation Mode** :Tx CH MID

Antenna :VERTICAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
30.00	S	-50.52	-34.78	-14.78	-0.96	-13.00	-37.52
197.81	S	-65.51	-66.86	2.98	-1.63	-13.00	-52.51
251.16	S	-65.18	-66.89	3.47	-1.76	-13.00	-52.18
390.84	S	-64.10	-65.61	3.83	-2.33	-13.00	-51.10
519.85	S	-66.14	-67.49	3.75	-2.39	-13.00	-53.14
696.39	S	-62.39	-62.57	3.09	-2.91	-13.00	-49.39
1564.00	Н	-66.58	-69.25	6.80	-4.13	-40.00	-26.58

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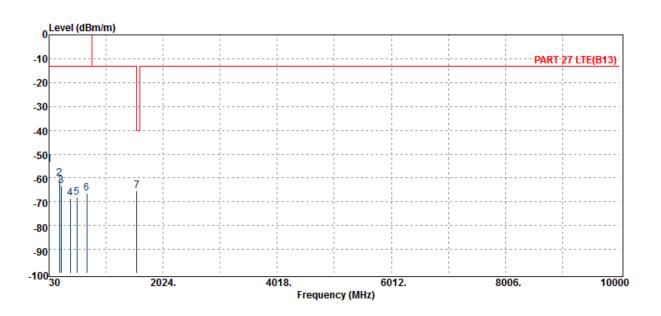
**Operation Band** :23 deg\_C / 62 RH :LTE B13 Temp./Humi.

Fundamental Frequen-:782 MHz Engineer :Tin

Operation Mode :Tx CH MID

Antenna :HORIZONTAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
30.00	S	-54.27	-38.53	-14.78	-0.96	-13.00	-41.27
216.24	S	-60.28	-61.99	3.40	-1.69	-13.00	-47.28
245.34	S	-63.27	-64.89	3.37	-1.75	-13.00	-50.27
400.54	S	-68.52	-69.95	3.82	-2.38	-13.00	-55.52
515.00	S	-68.04	-69.46	3.77	-2.36	-13.00	-55.04
687.66	S	-66.45	-66.79	3.10	-2.76	-13.00	-53.45
1564.00	Н	-65.37	-68.04	6.80	-4.13	-40.00	-25.37

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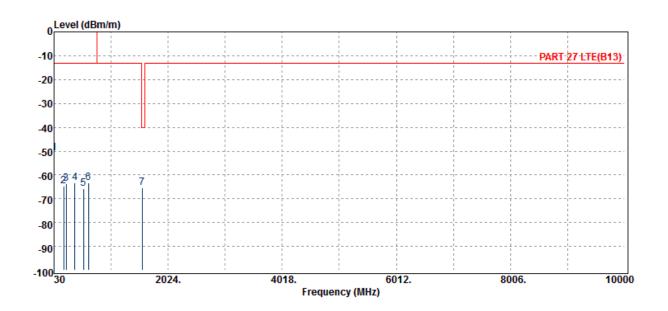
**Operation Band** :23 deg\_C / 62 RH :LTE B13 Temp./Humi.

Fundamental Frequen-:784.5 MHz Engineer :Tin

Operation Mode :Tx CH HIGH

Antenna :VERTICAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
30.00	S	-51.03	-35.29	-14.78	-0.96	-13.00	-38.03
197.81	S	-64.83	-66.19	2.98	-1.63	-13.00	-51.83
246.31	S	-63.65	-65.28	3.38	-1.75	-13.00	-50.65
390.84	S	-63.16	-64.66	3.83	-2.33	-13.00	-50.16
544.10	S	-65.85	-66.83	3.62	-2.64	-13.00	-52.85
634.31	S	-63.19	-63.91	3.17	-2.45	-13.00	-50.19
1569.00	Н	-65.23	-67.90	6.82	-4.14	-40.00	-25.23

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Operation Mode

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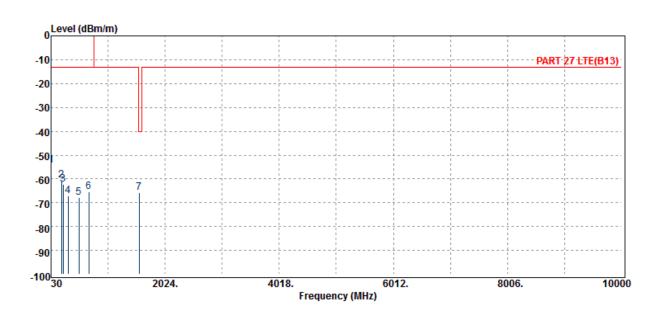
**Operation Band** :23 deg\_C / 62 RH :LTE B13 Temp./Humi.

Fundamental Frequen-:784.5 MHz Engineer :Tin

:Tx CH HIGH

Antenna :HORIZONTAL Measurement EUT Pol. :H Plane

Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
30.00	S	-54.37	-38.63	-14.78	-0.96	-13.00	-41.37
216.24	S	-60.50	-62.21	3.40	-1.69	-13.00	-47.50
246.31	S	-62.36	-64.00	3.38	-1.75	-13.00	-49.36
330.70	S	-67.22	-69.08	3.77	-1.91	-13.00	-54.22
519.85	S	-67.78	-69.14	3.75	-2.39	-13.00	-54.78
686.69	S	-65.28	-65.64	3.10	-2.74	-13.00	-52.28
1569.00	Н	-65.89	-68.56	6.82	-4.14	-40.00	-25.89

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## Radiated Spurious Emission Measurement Result: 10MHz BW LTE-Band13

(763MHz-775MHz)

**Operation Band** :LTE B13

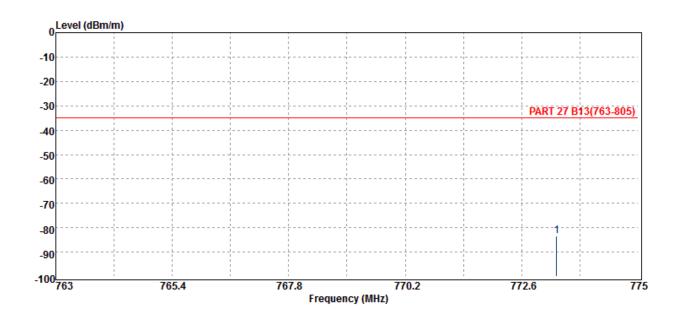
**Fundamental Frequency** :779.5 MHz

**Operation Mode** :Tx CH LOW EUT Pol. :H Plane

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



	Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
				Output Level	Gain	Loss		
_	MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
	773.32	S	-83.39	-83.71	3.26	-2.93	-35.00	-48.39

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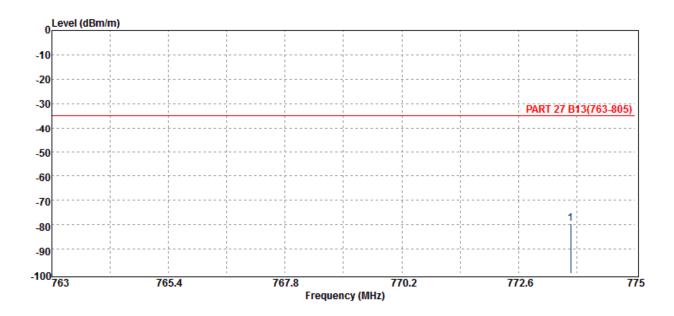
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**Operation Band** :LTE B13 Fundamental Frequency :779.5 MHz **Operation Mode** :Tx CH LOW

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
 MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
773.68	S	-79.47	-79.80	3.26	-2.93	-35.00	-44.47

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**Operation Band** :LTE B13 Fundamental Frequency :782 MHz

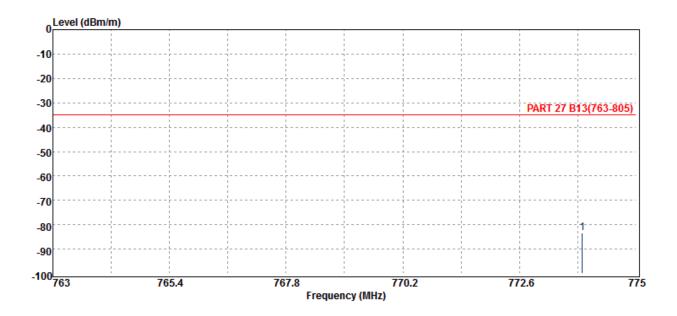
**Operation Mode** 

:Tx CH MID

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
773.90	S	-83.36	-83.69	3.26	-2.93	-35.00	-48.36

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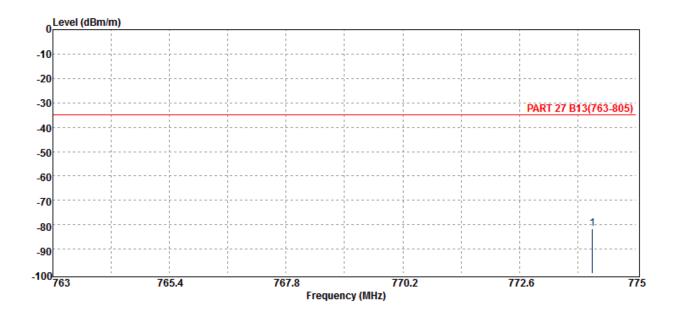
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**Operation Band** :LTE B13 Fundamental Frequency :782 MHz **Operation Mode** :Tx CH MID

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
774.10	S	-81.71	-82.04	3.26	-2.93	-35.00	-46.71

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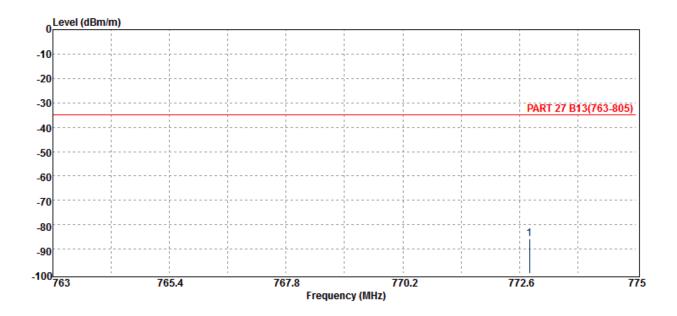
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**Operation Band** :LTE B13 Fundamental Frequency :784.5 MHz **Operation Mode** :Tx CH HIGH

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



Freq	. Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
772.8	so s	-85.82	-86.14	3.26	-2.94	-35.00	-50.82

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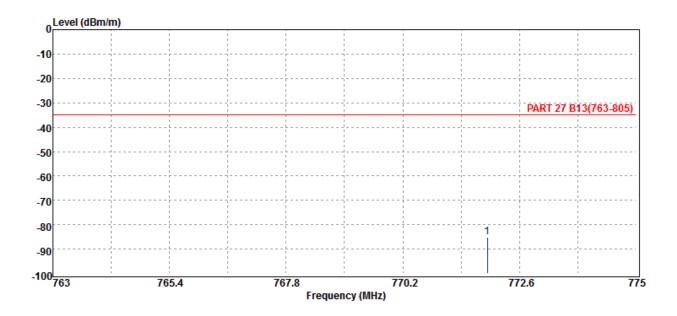
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**Operation Band** :LTE B13 Fundamental Frequency :784.5 MHz **Operation Mode** :Tx CH HIGH

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
 MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
771.94	S	-85.22	-85.53	3.25	-2.94	-35.00	-50.22

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# Radiated Spurious Emission Measurement Result: 10MHz BW LTE-Band13

(793MHz-805MHz) **Operation Band** 

:LTE B13

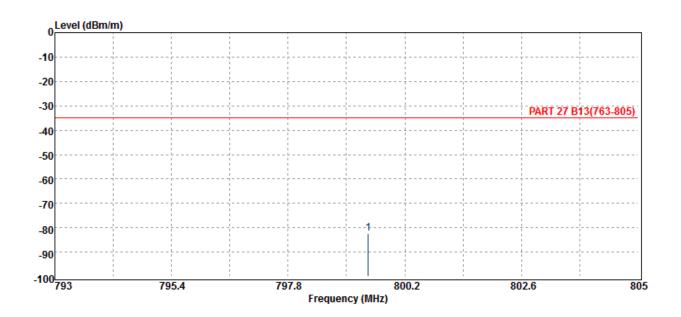
**Fundamental Frequency** :779.5 MHz

**Operation Mode** :Tx CH LOW EUT Pol. :H Plane

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



	Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
				Output Level	Gain	Loss		
_	MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
	799.44	S	-82.33	-82.77	3.34	-2.90	-35.00	-47.33

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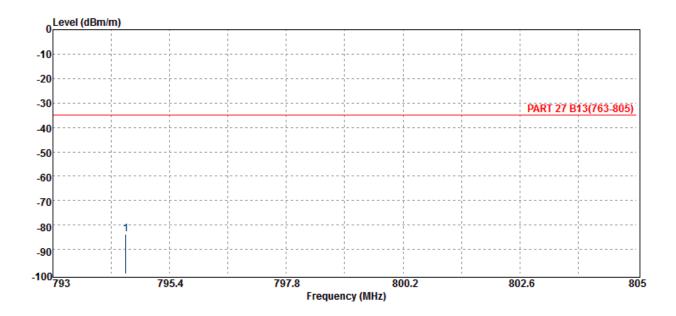
**Operation Band** Fundamental Frequency **Operation Mode** 

:LTE B13 :779.5 MHz :Tx CH LOW

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:HORIZONTAL Measurement Antenna Pol.



	Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
				Output Level	Gain	Loss		
_	MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
	794.50	S	-83.68	-84.10	3.32	-2.90	-35.00	-48.68

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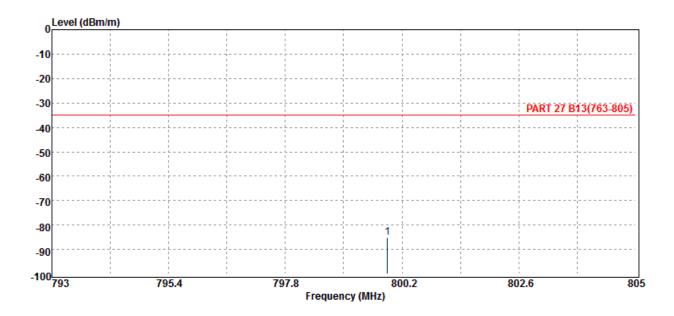
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**Operation Band** :LTE B13 Fundamental Frequency :782 MHz **Operation Mode** :Tx CH MID

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
799.90	S	-85.05	-85.50	3.34	-2.90	-35.00	-50.05

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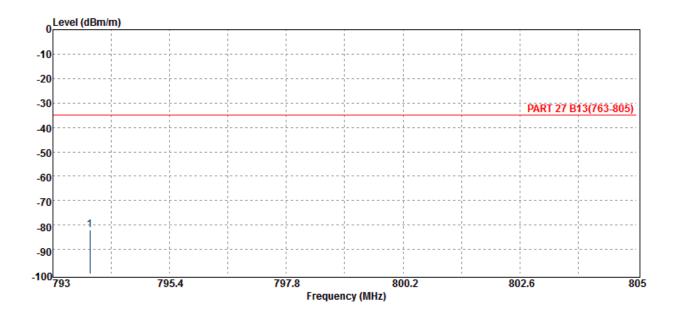
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**Operation Band** :LTE B13 Fundamental Frequency :782 MHz :Tx CH MID **Operation Mode** 

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:HORIZONTAL Measurement Antenna Pol.



	Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
				Output Level	Gain	Loss		
_	MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
	793.76	S	-82.13	-82.55	3.32	-2.90	-35.00	-47.13

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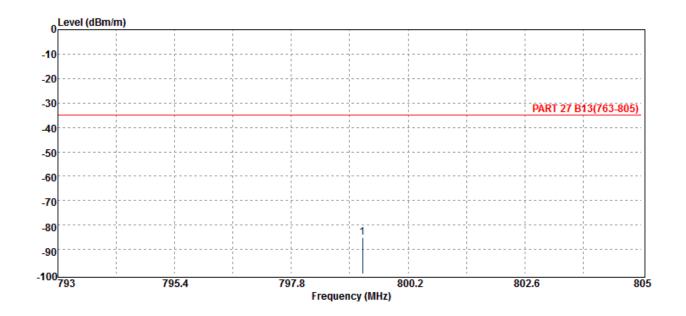
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**Operation Band** :LTE B13 Fundamental Frequency :784.5 MHz **Operation Mode** :Tx CH HIGH

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:VERTICAL Measurement Antenna Pol.



	Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
				Output Level	Gain	Loss		
_	MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
	799.26	S	-85.26	-85.70	3.34	-2.90	-35.00	-50.26

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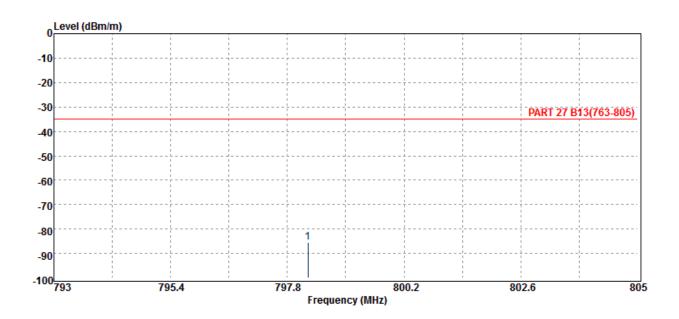
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**Operation Band** :LTE B13 Fundamental Frequency :784.5 MHz **Operation Mode** :Tx CH HIGH

EUT Pol. :H Plane Temp./Humi. :23 deg\_C / 62 RH

Engineer :Tin

:HORIZONTAL Measurement Antenna Pol.



	Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
				Output Level	Gain	Loss		
	MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
7	798.22	S	-85.53	-85.97	3.34	-2.90	-35.00	-50.53

#### ~ End of Report ~

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