

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION **REFERENCING TEST DATA ACROSS SEPARATE EQUIPMENT** VERIFICATION

	OF
Product Name:	Smart Phone
FCC ID:	APYHRO00252
Report No.:	ER/2017/90076
Issue Date:	Sep. 14, 2017
FCC Rule Part:	§15.225 §15.247, Cat: DSS & DTS § 2 , 22H & 24E & 27BH
Prepared for:	Sharp Corporation, IoT Communication B.U. 2-13-1, Hachihonmatsu-Iida, Hi- gashi-hiroshima-shi, Hiroshima 739-0192, Japan
Manufacturer:	Sharp Corporation 1 Takumi-cho, Sakai-ku, Sakai-Shi, Osaka 590-8522, Japan SGS Taiwan Ltd.
Prepared by:	Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803
Taff Testing Laboratory 0513	<b>Note:</b> This report shall not be reproduced except in full, without the written approval of SGS Taiwan Ltd. This document may be altered or revised by SGS Taiwan Ltd. personnel only, and shall be noted in the revision section of the document.

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### VERIFICATION OF COMPLIANCE

Applicant:	Sharp Corporation, IoT Communication B.U. 2-13-1, Hachihonmatsu-Iida, Higashi-hiroshima-shi, Hiroshima 739-0192, Japan
Manufacturer:	Sharp Corporation 1 Takumi-cho, Sakai-ku, Sakai-Shi, Osaka 590-8522, Japan
Product Name:	Smart Phone
FCC ID:	APYHRO00252
File Number:	ER/2017/90076
Date of test:	Aug. 10, 2017 ~ Sep. 04, 2017
Date of EUT Received:	Aug. 10, 2017

### We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 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:	Ton Lis	Date:	Sep. 14, 2017
Prepared By:	Tin Lin/Engineer Vroletta Tang	Date:	Sep. 14, 2017
- Approved By: -	Violetta Tang / Clerk Jim Chang Jim Chang / Asst. Manager	Date:	Sep. 14, 2017

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2017/90076	Rev.00	Initial creation of document	Sep. 14, 2017

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# **Table of Contents**

1	GENERAL INFORMATION	5
2	SYSTEM TEST CONFIGURATION	7
3	SUMMARY OF TEST RESULTS	10
4	DESCRIPTION OF TEST MODES	11
5	MEASUREMENT UNCERTAINTY	12
6	RADIATED SPURIOUS EMISSION MEASUREMENT	13



#### **GENERAL INFORMATION** 1

#### **1.1 Product description**

#### General:

Product Name:	Smart Ph	one	
Hardware Version:	DVT		
Software Version:	C8080		
	3.85V from Rechargeable Li-ion Battery		
Power Supply:	Battery: Mode No.: UBATIA283AFN2, Supplier: SCUD(FUJIAN) Electronics Co		

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Report No.: ER/2017/90076 Page 6 of 72



### **1.2 Test Methodology of Applied Standards**

FCC Part 15, Subpart C §15.225

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

ANSI C63.10:2013

FCC 47 CFR Part 2, 22, 24, 27

ANSI / TIA / EIA 603-D-2010

KDB971168 D01 Power Meas license Digital System

KDB941225 of the Output power Procedure of (SAR Measurement Procedures for 3G Devices, WCDMA / HSPA) was used for EUT and Base station setting.

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.

### **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 / TW0001

### **1.4 Special Accessories**

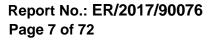
There are no special accessories used while test was conducted.

#### **1.5 Equipment Modifications**

There was no modification incorporated into the EUT.

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#### SYSTEM TEST CONFIGURATION 2

#### 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

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

#### 2.3 Test Procedure

#### 2.3.1 Radiated Emissions for DXX

The EUT is a placed on as turn table which is 0.8 m above ground plan. 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 one orthogonal axe 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.

#### 2.3.2 Radiated Emissions for DSS & DTS

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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 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.

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#### 2.3.2 Radiated Emissions (ERP/EIRP) for PCE

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 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 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration (NFC)



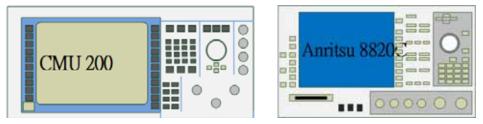
### Fig. 2-2 Radiated Emission Configuration (BT & BLE & WLAN)



Fig. 2-3 Radiated Emission Configuration (WWAN)



#### **Remote Side**



#### **Table 2-1 Equipment Used in Tested System**

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	NFC Test Software	N/A	N/A	N/A	N/A	N/A
2.	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A
3.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
4.	Notebook	Lenovo	L430	P0000081	Shielded	Unshielded
5.	Universal Radio Communication Tester	R&S	CMU200	102189	shielded	Un-shielded
6.	Universal Radio Communication Tester	Anritsu	MT8820C	6200307563	shielded	Un-shielded

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#### SUMMARY OF TEST RESULTS 3

FCC Rules	Description Of Test	Result
§15.225 (a)-(d)	Radiated Emission	Compliant
§15.247(d)	Radiated Spurious Emission	Compliant
§2.1053 §22.917(a) §24.238(a) §27.50(c)(5) §27.53(g) §27.53(h)(3) §27.53(m)(4)	Field Strength of Spurious Radiation	Compliant

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#### DESCRIPTION OF TEST MODES 4

## 4.1 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
- 3. Investigation has been done base on the worst case of original FCC ID: APYHRO00251 for DXX, DSS, DTS and PCE (2G+3G).

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	Worst Case Position H / E1 / E2
NFC	1	1	ASK	-	Н
Bluetooth	0 to 78	0,39,78	8-DPSK	3DH5	Н
Bluetooth LE	0 to 39	0,19,39	GFSK	1	Н
802.11b	1 to 11	1, 6, 11	DSSS	1	Н
802.11g	1 to 11	1, 6, 11	OFDM	6	Н
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Н

### **RADIATED EMISSION TEST:**

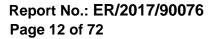
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	Worst Case Position H / E1 / E2
GPRS 850	128 to 251	128, 190, 251	Н
WCDMA Band V	9262 to 9538	9262, 9400, 9583	Н
GPRS 1900	512 to 810	512, 661, 810	Н

#### Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for NFC, BT, BLE, WLAN and WWAN Transmitter for channel Low, Mid and High, the worst case position was reported.

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#### **MEASUREMENT UNCERTAINTY** 5

Radiated Spurious Emission:

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

	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : <b>Horizontal</b> )	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.



#### RADIATED SPURIOUS EMISSION MEASUREMENT 6

#### 6.1 Measurement Equipment Used:

	SGS SAC-III									
Name of Equipment	Manufacturer	Model	Serial Num- ber	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	08/04/2017	08/03/2018					
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2017	01/02/2018					
Pre-Amplifier	EMC Instru- ments Corp.	EMC0126530	980038	01/03/2017	01/02/2018					
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					

Note: N.C.R refers to Not Calibrated Required.

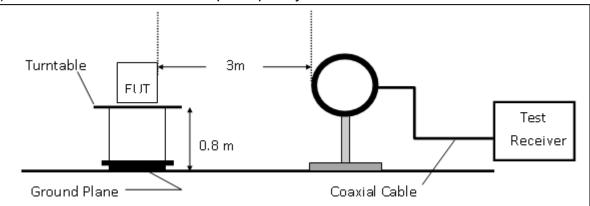
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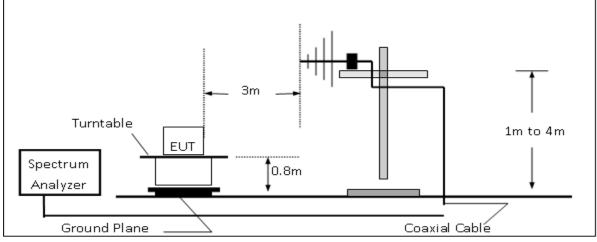


#### 6.2 Test SET-UP

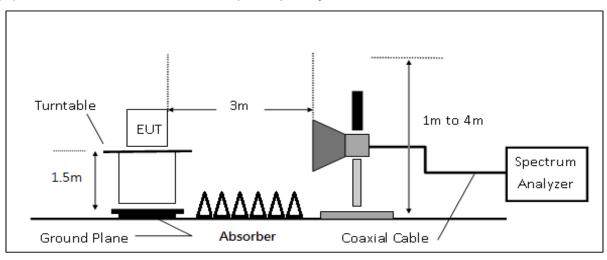




#### (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



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



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#### 6.3 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When 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.
- 6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 8. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 9. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- Repeat above procedures until all default test channel measured were complete.

#### 6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	6	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

#### Note :

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

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

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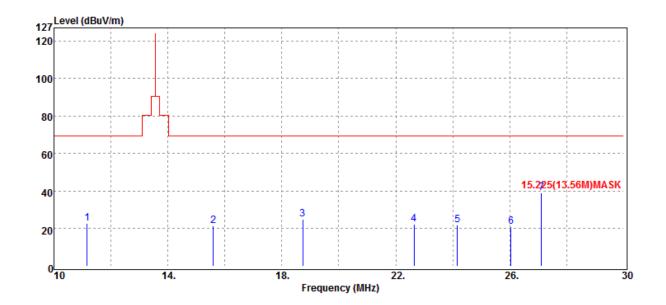
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#### 6.5 Measurement Result

Operation Band	:NFC
Fundamental Frequency	:13.56 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:H Plane

Test Date :2017-08-21 Temp./Humi. :21 deg\_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	11.16	S	Peak	11.68	11.38	23.06	69.54	-46.48
	15.60	S	Peak	10.19	11.48	21.67	69.54	-47.87
	18.74	S	Peak	13.55	11.55	25.10	69.54	-44.44
	22.64	S	Peak	11.71	10.80	22.51	69.54	-47.03
	24.16	S	Peak	11.38	10.40	21.78	69.54	-47.76
	26.04	S	Peak	11.31	9.95	21.26	69.54	-48.28
	27.12	Н	Peak	29.32	9.70	39.02	69.54	-30.52

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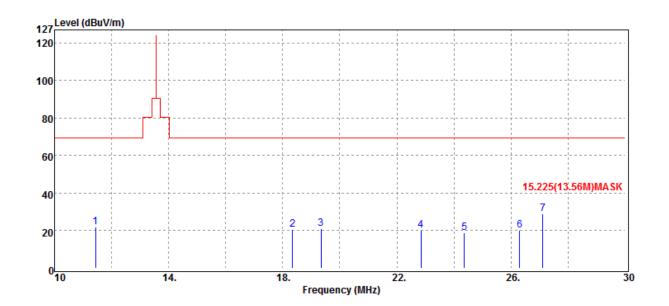
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**Operation Band** :NFC Fundamental Frequency :13.56 MHz **Operation Mode** :Tx CH MID EUT Pol. :H Plane

Test Date :2017-08-21 Temp./Humi. :21 deg\_C / 62 RH Engineer :Tin :HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11.44	S	Peak	10.41	11.38	21.79	69.54	-47.75
18.34	S	Peak	9.19	11.55	20.74	69.54	-48.80
19.34	S	Peak	9.33	11.57	20.90	69.54	-48.64
22.84	S	Peak	9.65	10.75	20.40	69.54	-49.14
24.36	S	Peak	8.59	10.36	18.95	69.54	-50.59
26.30	S	Peak	10.44	9.88	20.32	69.54	-49.22
27.12	Н	Peak	19.36	9.70	29.06	69.54	-40.48

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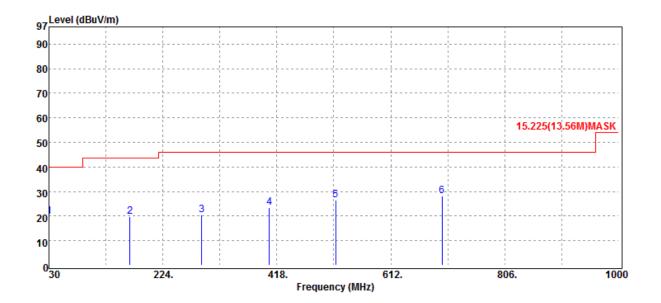
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**Operation Band** :NFC Fundamental Frequency :13.56 MHz **Operation Mode** :Tx CH MID EUT Pol. :H Plane

Test Date :2017-08-21 Temp./Humi. :21 deg\_C / 62 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.00	S	Peak	29.03	-9.19	19.84	40.00	-20.16
167.74	S	Peak	27.12	-7.46	19.66	43.50	-23.84
289.96	S	Peak	26.51	-6.07	20.44	46.00	-25.56
405.39	S	Peak	27.31	-3.70	23.61	46.00	-22.39
517.91	S	Peak	28.24	-1.82	26.42	46.00	-19.58
699.30	S	Peak	26.70	1.44	28.14	46.00	-17.86

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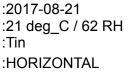
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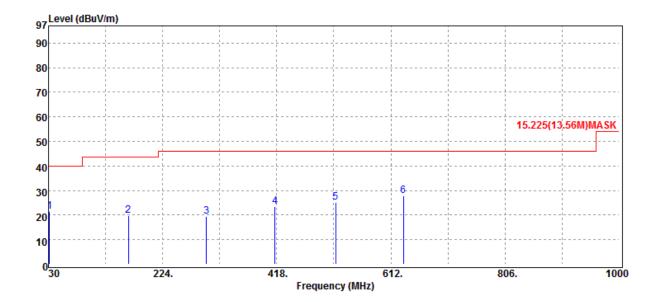
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**Operation Band** :NFC Fundamental Frequency :13.56 MHz **Operation Mode** :Tx CH MID EUT Pol. :H Plane

Test Date Temp./Humi. Engineer :Tin Measurement Antenna Pol.





Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	30.52	-9.11	21.41	40.00	-18.59
165.80	S	Peak	27.06	-7.40	19.66	43.50	-23.84
298.69	S	Peak	25.45	-5.95	19.50	46.00	-26.50
415.09	S	Peak	26.81	-3.21	23.60	46.00	-22.40
517.91	S	Peak	27.14	-1.82	25.32	46.00	-20.68
633.34	S	Peak	27.62	0.40	28.02	46.00	-17.98

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Н

Operation Band Fundamental Frequency Operation Mode EUT Pol.		:EDR(3M) :2402 MHz :Tx CH LOW :H Plane		Test Date Temp./Hu Engineer Measurer	umi.	:23 deg :Tin	:2017-08-17 :23 deg_C / 62 RH :Tin :VERTICAL	
07L	evel (dBuV/m)						_	
90-								
80								
70		· · · · · · · · · · · · · · · · · · ·				FCC RSE-PK	<u>.</u>	
60								
50 <sup>-</sup>						FCC RSE-AV	<u></u>	
	2							
<b>40</b>				1				
30								
20								
10								
0 <mark>_</mark> 1	000 6	100.	11200. Frequency (I	16300. MHz)	21400.	26	 500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4804.00	) Н	Average	24.98	4.92	29.90	54.00	-24.10	

Peak

35.68

4.92

40.60

74.00

-33.40



Н

Operation Band Fundamental Frequency Operation Mode EUT Pol.		:EDR(3M) :2402 MHz :Tx CH LOW :H Plane		Test Date Temp./Hu Engineer Measurer		:23 deg :Tin	:2017-08-17 :23 deg_C / 62 RH :Tin :HORIZONTAL	
97 <sup>L</sup>	evel (dBuV/m)						_	
90-							- •	
80				·	· · · · · · · · · · · · · · · · · · ·	FCC RSE-PI	c	
<b>7</b> 0	       							
<b>60</b>						FCC RSE-A	ï	
50	         					         		
<b>40</b>	2			·	· · · · · · · · · · · · · · · · · · ·	       	- ·	
30						 	- ·	
20							- ·	
10								
0L 1	000 6	100.	11200. Frequency (N	16300. IHz)	21400.	26	500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4804.00	) Н	Average	24.93	4.92	29.85	54.00	-24.15	

Peak

34.23

4.92

39.15

74.00

-34.85



Operation Band Fundamental Frequency Operation Mode EUT Pol.		:EDR(3M) :2441 MHz :Tx CH MID :H Plane		Test Date Temp./Hu Engineer Measurer		:23 deg :Tin	:2017-08-17 :23 deg_C / 62 RH :Tin :VERTICAL	
97	dBuV/m)							
90								
80						FCC RSE-F		
70		- L					<u>~~</u>	
60		-	L			FCC RSE-4		
50					· · · · · · · · · · · · · · · · · · ·	FUC KSE-4		
40	2							
30								
20								
10								
0 <mark></mark> 1000	6	100.	11200. Frequency (I	16300. MHz)	21400.	2	6500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4882.00	Н	Average	23.56	5.18	28.74	54.00	-25.26	
4882.00	Н	Peak	34.28	5.18	39.46	74.00	-34.54	



Operation Band Fundamental Frequency Operation Mode EUT Pol.		:EDR(3M) :2441 MHz :Tx CH MID :H Plane		Test Date Temp./Hu Engineer Measuren	mi. nent Antenna I	:23 deg :Tin	:2017-08-17 :23 deg_C / 62 RH :Tin :HORIZONTAL	
97 Level	(dBuV/m)							
90				·				
80						FCC RSE-P	K	
70						FUC NGE-P	<u>~</u>	
60						FCC RSE-A		
50						FUU KSE-A	· - ·	
40	2							
30				1 1 1 1				
20								
10								
0 <mark></mark> 1000	6	100.	11200. Frequency (	16300. MHz)	21400.	26	500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4882.00	н	Average	23.60	5.18	28.78	54.00	-25.22	
4882.00	Н	Peak	34.24	5.18	39.42	74.00	-34.58	



Н

Operation Band Fundamental Frequency Operation Mode EUT Pol.		:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane		Test Date Temp./Hu Engineer Measurer		:23 deg :Tin	:2017-08-17 :23 deg_C / 62 RH :Tin :VERTICAL	
97	(dBuV/m)							
90								
80						FCC RSE-P	K	
70					· · · · · · · · · · · · · · · · · · ·	FUC NGE-P	<u>n</u>	
<mark>60</mark>						FCC RSE-A	v	
50								
40	2							
30								
20						 		
10				           		 		
0 <mark>.</mark> 1000	6	100.	11200. Frequency (N	16300. IHz)	21400.	26	500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4960.00	н	Average	24.32	5.29	29.61	54.00	-24.39	

Peak

35.52

5.29

40.81

74.00

-33.19



Н

Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:EDR(3M) :2480 MHz :Tx CH HIG :H Plane	Н	Test Date Temp./Humi. Engineer Measurement Antenna Pol.			08-17 g_C / 62 RH ZONTAL
97	dBuV/m)						
90							
80						FCC RSE-P	
70		- L			· · · · · · · · · · · · · · · · · · ·	FUU KSE-P	<u>n</u>
60						FCC RSE-A	N
50					· · · · · · · · · · · · · · · · ·		
40	2			     	·		
30				       			
20				     		1 1 1 1	·
10							
0 1000	6	100.	11200. Frequency (	16300. MHz)	21400.	26	5500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4960.00	Н	Average	24.55	5.29	29.84	54.00	-24.16

34.31

Peak

5.29

39.60

74.00

-34.40



Н

Operation B Fundamenta Operation M EUT Pol.	al Frequency	:BLE :2402 MHz :Tx CH LOV :H Plane	V	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Tin	g_C / 61 RH
Leve	el (dBuV/m)						
90							
80							
70					· · · · · · · · · · · · · · · · · · ·	FCC RSE-F	<u>•K</u>
60		-					
50						FCC RSE-4	<u>v</u>
40	2	-					
30				     			
20				     			
10							
<sup>0</sup> 100	0 6	100.	11200. Frequency (	16300. (MHz)	21400	). 21	6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00	н	Average	24.94	4.92	29.86	54.00	-24.14

Peak

35.67

4.92

40.59

74.00

-33.41



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:BLE :2402 MHz :Tx CH LOV :H Plane	N	Test Date Temp./Humi. Engineer Measurement Antenna Pol.			08-17 9_C / 61 RH ZONTAL
97	(dBuV/m)			,			
90							
80						FCC RSE-P	ĸ
70							
<mark>60</mark>						FCC RSE-A	V
<b>50</b>							
40	2						
30						       	
20							
10							
0 <mark></mark>	6	100.	11200. Frequency (	16300. MHz)	21400.	26	5500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00	н	Average	25.10	4.92	30.02	54.00	-23.98

Peak

35.33

4.92

40.25

74.00

-33.75



Н

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:BLE :2442 MHz :Tx CH MID :H Plane		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Tin	J_C / 61 RH
97	(dBuV/m)	· ·					_
<mark>90</mark>				1 1 1 1 1			
80				1 1 1 1 1 1		FCC RSE-P	ĸ
70							
60						FCC RSE-A	v
<b>50</b>	 			       			
40	2			1 1 1 1		       	
30					· · · · · · · · · · · · · · · · · · ·		
20				1 		 	
10							
0 <sup>1</sup> 1000	6	100.	11200. Frequency (I	16300. ЛНz)	21400.	26	500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4884.00	н	Average	23.42	5.20	28.62	54.00	-25.38

Peak

33.87

5.20

39.07

74.00

-34.93



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:BLE :2442 MHz :Tx CH MID :H Plane	)	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Tin	_C / 61 RH
97	(dBuV/m)						_
90							
80						FCC RSE-PK	
70							-
60						FCC RSE-AV	
50							
40	2	- L					
30							
20							
10							
0 <mark></mark> 1000	6	100.	11200. Frequency (I	16300. MHz)	21400.	265	500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4884.00	н	Average	23.58	5.20	28.78	54.00	-25.22

Peak

33.53

5.20

38.73

74.00

-35.27



Н

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:BLE :2480 MHz :Tx CH HIG :H Plane	iΗ	Test Date Temp./Humi. Engineer Measurement Antenna Pol.			08-17  _C / 61 RH CAL
97	(dBuV/m)						_
<mark>90</mark>							
80						FCC RSE-P	ĸ
70							
60						FCC RSE-A	v
50						 	- ·
40	2					 	
30							
20							
10							
0 <sup>1</sup> 1000	6	100.	11200. Frequency (I	16300. ЛНz)	21400.	26	500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4960.00	н	Average	24.28	5.29	29.57	54.00	-24.43

Peak

34.55

5.29

39.84

74.00

-34.16



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:BLE :2480 MHz :Tx CH HIG :H Plane	Н	Test Date Temp./Humi. Engineer Measurement Antenna Pol.			7-08-17 eg_C / 61 RH RIZONTAL
97	(dBuV/m)						
90							
80						FCC RSE	-DK
70				       			
60						FCC RSE	-AV
50							
40	2						
30							
20							
10							
0 <mark></mark> 1000	6	: 100.	11200. Frequency (I	16300. ЛНz)	21400.		26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4960.00	н	Average	24.62	5.29	29.91	54.00	-24.09

Peak

34.19

5.29

39.48

74.00

-34.52



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11b :2412 MHz :Tx CH LOV :H Plane	N	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Tin	_C / 62 RH
97	(dBuV/m)						
90		-					
80						FCC RSE-P	
70							
60				       		FCC RSE-A	v
50							
40	2						
30					 		
20				       		       	
10							- ·
0 <sup>1</sup> 1000	6	100.	11200. Frequency (N	16300. IHz)	21400.	26	500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	н	Average	24.73	4.93	29.66	54.00	-24.34

Peak

35.87

4.93

40.80

74.00

-33.20



Н

Operatior Fundame Operatior EUT Pol.	ntal Frequency	:802.11b :2412 MHz :Tx CH LOV :H Plane	V	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Tin	08-17 9_C / 62 RH ZONTAL
97	Level (dBuV/m)						_
90					·		
80					·	FCC RSE-P	K
70					· · · · · · · · · · · · · · · · · · ·	<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	<u>n</u>
60						FCC RSE-A	
50					· · · · · · · · · · · · · · · · · · ·		· - ·
40	2				· · · · · · · · · · · · · · · · · · ·		
30					· · · · · · · · · · · · · · · · · · ·		
20					·		
10					·		
0	1000	<u>5100.</u>	11200.	16300.	21400	26	500
	1000		Frequency (I		21400.	. 20	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.0	0 H	Average	24.82	4.93	29.75	54.00	-24.25

Peak

35.68

4.93

40.61

74.00

-33.39



Operation Band Fundamental Frequency Operation Mode EUT Pol.		:802.11b :2437 MHz :Tx CH MID :H Plane	)	Test Date Temp./Hu Engineer Measuren		:Tin	_C / 62 RH
97 Level	(dBuV/m)	- <u>.</u>					_
90							
80						FCC RSE-PI	
70						FUC NJE-PI	
60						FCC RSE-A	
50					· · · · · · · · · · · · · · · · · · ·	FUU KSE-A	
40	2			1 1 1 1			
30				     			
20							
10							
0 <mark></mark> 1000	6	100.	11200. Frequency (I	16300. MHz)	21400.	26	500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	23.69	5.13	28.82	54.00	-25.18
4874.00	Н	Peak	36.15	5.13	41.28	74.00	-32.72



Н

undamental Frequency :24		:802.11b :2437 MHz :Tx CH MID	1	Test Date Temp./Hu Engineer	ımi.			
EUT Pol.		:H Plane		Measurer	ment Antenna F	ol. :HORI	ZONTAL	
97	(dBuV/m)							
90								
80								
70						FCC RSE-	<u>PK</u>	
60						FCC RSE-	A)/	
50						FUC KJE-	<u>AV</u>	
40	2							
30						·		
20						       		
10						 		
0 <mark>0</mark> 0	6	100.	11200. Frequency (I	16300. ЛНz)	21400.	2	6500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Н	Average	23.74	5.13	28.87	54.00	-25.13	
4074.00		<b>D</b> 1		= 40	~~~~			

Peak

34.26

5.13

39.39

74.00

-34.61



Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11b :2462 MHz :Tx CH HIG :H Plane	Н	Test Date Temp./Humi. Engineer Measurement Antenna Pol.			08-17 g_C / 62 RH TCAL
97	dBuV/m)						
90							
80					· · · · · · · · · · · · · · · · · · ·	·	
70	         			         		FCC RSE-	<u>PK</u>
60							
50		· · · · · · · · · · · · · · · · · · ·				FCC RSE-	<u>AV</u>
40	2						
30		· · · · · · · · · · · · · · · · · · ·					
20							
10							
0							
<sup>0</sup> 1000	6	100.	11200. Frequency	16300. (MHz)	21400	. 2	6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	н	Average	23.65	5.25	28.90	54.00	-25.10

Peak

34.63

Н

4924.00

5.25

39.88

74.00

-34.12



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11b :2462 MHz :Tx CH HIG :H Plane	Н	Test Date Temp./Hu Engineer Measurer	ımi.	:Tin	08-17 g_C / 62 RH ZONTAL
97	(dBuV/m)						
90					· · · · · · · · · · · · · · · · · · ·		
80						FCC RSE-	
70	·						
60					· · · · · · · · · · · · · · · · · · ·	FCC RSE-	AV
50							
40	2						
30				1 1 1 1		 	
20							
10							
0 <mark></mark> 1000	6	100.	11200. Frequency (I	16300. ЛНz)	21400.	2	 6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	н	Average	23.61	5.25	28.86	54.00	-25.14

Peak

34.70

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5.25

39.95

74.00

-34.05



Н

Operatior Fundame Operatior EUT Pol.	ntal Frequer	:802.11g ncy :2412 MHz :Tx CH LO :H Plane	N	Test Date Temp./Hu Engineer Measuren		:Tin	_C / 62 RH
97	Level (dBuV/m)						_
90					·	     	
80	·				·	FCC RSE-PK	
70	·					ruc Kae-Pr	<u>·</u>
60				· · · · · · · · · · · · · · · · · · ·		FCC RSE-AV	
50	·						
40		2			· · · · · · · · · · · · · · · · ·		
30	·	1					
20							
10					·		
0	1000	6100.	11200.	16300.	21400	26	500
	1000	0100.	Frequency		21400	. 20.	000
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/	S PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.0	0 Н	Average	24.77	4.93	29.70	54.00	-24.30

Peak

36.03

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4.93

40.96

74.00

-33.04



Н

Operation Fundamer Operation EUT Pol.	ntal Frequency	:802.11g :2412 MHz :Tx CH LOV :H Plane	V	Test Date Temp./Hu Engineer Measurer		:Tin	08-17 g_C / 62 RH ZONTAL
97 -	evel (dBuV/m)						
<b>90</b>							
80						FCC RSE-F	ĸ
70				 			
60	     					FCC RSE-4	
<b>50</b>					·		
<b>40</b>	2						
30							
20							·
10						 	
0_1 1	000 6	100.	11200. Frequency (N	16300. IHz)	21400.	20	5500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	) Н	Average	24.70	4.93	29.63	54.00	-24.37

Peak

35.08

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4.93

40.01

74.00

-33.99



Н

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11g :2437 MHz :Tx CH MID :H Plane	)	Test Date Temp./Hu Engineer Measurer		:Tin	g_C / 62 RH
97	(dBuV/m)						
90							
80						FCC RSE-P	ĸ
70				         			
<mark>60</mark>				1 1 1 1 1		FCC RSE-4	V
50							
40	2						
30							
20							
10						 	
0	6	100.	11200. Frequency (I	16300. ЛНz)	21400.	20	5500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	н	Average	23.64	5.13	28.77	54.00	-25.23

Peak

34.65

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5.13

39.78

74.00

-34.22



Operation Ba Fundamenta Operation Mo EUT Pol.	I Frequency	:802.11g :2437 MHz :Tx CH MID :H Plane	)	Test Date Temp./Hu Engineer Measurer		:Tin	08-17  _C / 62 RH CONTAL
97 Level	(dBuV/m)						
90							
80							
70						FCC RSE-PI	<u>~</u>
60							
50						FCC RSE-A	
40	2						
30							
20							
10							
0 <sup>L</sup> 1000	6	100.	11200. Frequency (I	16300. MHz)	21400.	26	500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	23.78	5.13	28.91	54.00	-25.09
4874.00	Н	Peak	35.18	5.13	40.31	74.00	-33.69



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11g :2462 MHz :Tx CH HIG :H Plane	iΗ	Test Date Temp./Hu Engineer Measurer	ımi.	:Tin	_C / 62 RH
97	dBuV/m)						_
90 							
80						FCC RSE-PK	
70							-
60						FCC RSE-AV	
50						 	
40	2						
30							
20	       						
10							
0 <mark></mark> 1000	6	100.	11200. Frequency (M	16300. ЛНz)	21400.	265	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	23.66	5.25	28.91	54.00	-25.09

Peak

34.18

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5.25

39.43

74.00

-34.57



4924.00

Н

Н

000 44

0047 00 47

Operation Mo	Frequency	:802.11g :2462 MHz :Tx CH HIG	н	Test Date Temp./Hu Engineer	ımi.	:Tin	g_C / 62 RI
UT Pol.		:H Plane		Measurer	ment Antenna I	Pol. HURIZ	ZONTAL
Level	(dBuV/m)						
97							
80				 i i		FCC RSE-P	<u>K</u>
70							
60				 I I		FCC RSE-A	<u>N</u>
50							
40	2					 	
30	<mark>1</mark>						
20							
10							
0							
0 <mark></mark>	6	5100.	11200. Frequency (I	16300. MHz)	21400.	26	3500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
			a a <b>-</b> 4		~~ ~~		

23.71

34.27

. . .

Average

Peak

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5.25

5.25

28.96

39.52

54.00

74.00

-25.04

-34.48



Н

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :2412 MHz :Tx CH LOV :H Plane		Test Date Temp./Hu Engineer Measurer	ımi.	:Tin	g_C / 62 RH
ozLevel	(dBuV/m)						
90							
80						FCC RSE-F	
70							
60				· · · · · · · · · · · · · · · · · · ·		FCC RSE-	W
50							
40	2						
30				             			
20				         			
10							
0 <mark></mark> 1000	6	100.	11200. Frequency (N	16300. IHz)	21400.	2	6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	24.79	4.93	29.72	54.00	-24.28

Peak

36.10

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4.93

41.03

74.00

-32.97



Н

Operation Ba Fundamenta Operation Mo EUT Pol.	I Frequency	:802.11n20 :2412 MHz :Tx CH LOV :H Plane	V	Test Date Temp./Hu Engineer Measurer		:Tin	08-17 g_C / 62 RH ZONTAL
ozLevel	(dBuV/m)						
90		-					
80		-				FCC DEF	
70				·		FCC RSE-	<u>PR</u>
60						FCC RSE-	AV
50						CC NGL-	<u></u>
40	2			·			
30							
20						     	
10							
0	6	100.	11200.	16300.	21400	. 2	6500
1000	·		Frequency (		21100		
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	24.80	4.93	29.73	54.00	-24.27

Peak

35.49

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4.93

40.42

74.00

-33.58



Н

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :2437 MHz :Tx CH MID :H Plane	)	Test Date Temp./Hu Engineer Measurer	ımi.	:21 de :Tin	-08-17 g_C / 62 RH TCAL
97 Level	(dBuV/m)						
90 							
<b>80</b>						FCC RSE-	DK
70							
<b>60</b>				1 1 1 1		FCC RSE-	AV
50							
40	2						
30							
20							
10						 	
0 <mark>.</mark> 1000	6	100.	11200. Frequency (I	16300. /Hz)	21400.	2	6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	н	Average	23.55	5.13	28.68	54.00	-25.32

Peak

35.93

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5.13

41.06

74.00

-32.94



Н

Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n20 :2437 MHz :Tx CH MID :H Plane		Test Date Temp./Hu Engineer Measurer		:Tin	08-17 g_C / 62 RH ZONTAL
97	(dBuV/m)						
90							
80						FCC RSE-P	ĸ
70	 			       			
60						FCC RSE-4	
50							
40	2						
30							
20							
10							
0 <mark></mark>	6	100.	11200. Frequency (I	16300. MHz)	21400.	20	5500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	н	Average	23.50	5.13	28.63	54.00	-25.37

Peak

34.76

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5.13

39.89

74.00

-34.11



4924.00

Н

Н

000 44 00

0047 00 47

Operation Ba Sundamental Operation Mo	Frequency	:802.11n20 :2462 MHz :Tx CH HIG	Н	Test Date Temp./Hu Engineer	ımi.	:21 de :Tin	-08-17 g_C / 62 R⊦
UT Pol.		:H Plane		Measurer	ment Antenna Po	ol. :VER1	ICAL
97	(dBuV/m)						
90							
80						FCC RSE-	PK
70							
60						FCC RSE-	AV
50		· - • · · · · · · · · · · · · · · · · ·					
40	2						
30							
20							
10							
0							
01000	6	j <b>100</b> .	11200. Frequency (N	16300. /Hz)	21400.	2	26500
				<b>.</b> ,			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

23.61

33.78

. . .

Average

Peak

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5.25

5.25

28.86

39.03

54.00

74.00

-25.14

-34.97



4924.00

Н

Н

000 44 00

0047 00 47

peration Ba undamental peration Mo UT Pol.	Frequency	:802.11n20 :2462 MHz :Tx CH HIG :H Plane	н	Test Date Temp./Humi. Engineer Measurement Antenna Pol		:21 de :Tin			
01101.				Measurer	nent Antenna Po				
	(10-1/)								
97	(dBuV/m)								
90				· · · · · · · · · · · · · · · · · · ·					
80						FCC RSE-	PK		
70									
60						FCC RSE-	W I		
50									
<b>40</b>	2								
30									
20						· · · · · · · · · · · · · · · · · · ·			
10				·					
0 <mark></mark> 1000	6	100.	11200. Frequency (N	16300. IHz)	21400.	2	6500		
Free	Nata	Detector	Croastrum	Fastar	Astual	Lingit	Cofe		
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe		
		Mode	Reading Level		FS	@3m	Margin		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB		

23.57

33.48

. . .

Average

Peak

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5.25

5.25

28.82

38.73

54.00

74.00

-25.18

-35.27



#### FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT 7

# 7.1 Standard Applicable

## According to FCC §2.1053,

FCC §22.917(a), §24.238(a), §27.53 (h), 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) (5) & FCC §27.53(g)

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) (3)

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(m) (4) (6)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

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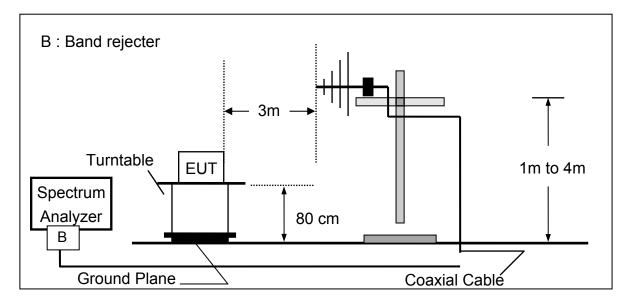
Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)^{Note}$
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)^{Note}$
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

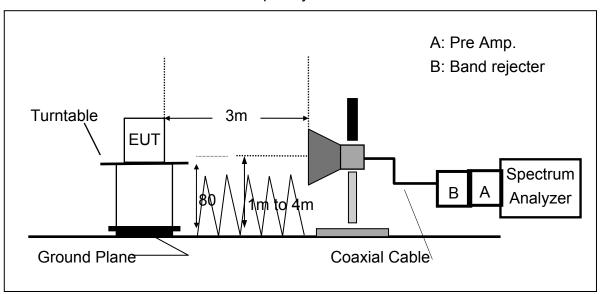
## 7.2 EUT Setup

Radiated Emission Test Set-Up, Frequency Below 1000MHz



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Radiated Emission Test Set-UP Frequency Over 1 GHz

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

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

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

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

"---": denotes Noise Floor.

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#### 7.4 Measurement Equipment Used:

ERP, I	EIRP MEASUREM		ENT List 966	Chamber	
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL 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	08/04/2017	08/03/2018
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2017	01/02/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/03/2017	01/02/2018
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 Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2017	02/10/2018
Radio Communication Analyzer	Anritsu	MT8820C	6201465317	01/03/2017	01/02/2018

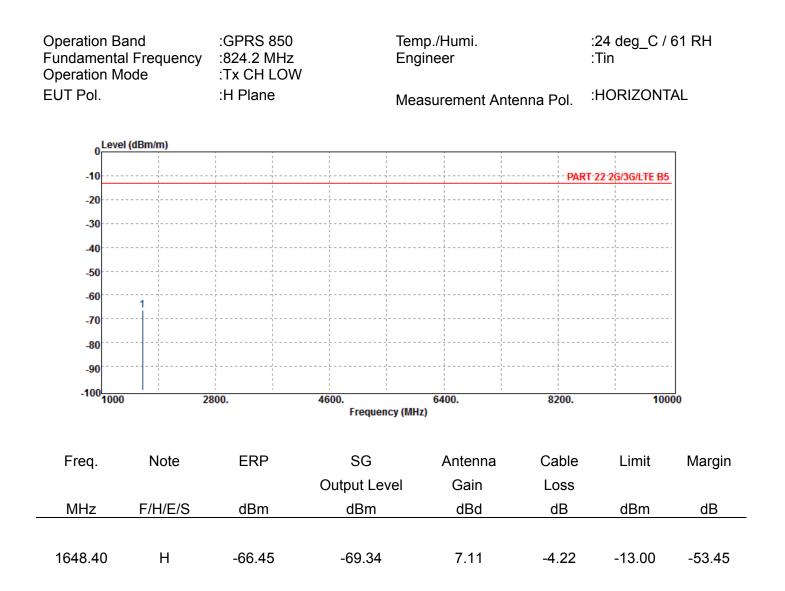


#### 7 5 Measurement Result

7.5 Measur	ement Res	ult:						
Operation Ba Fundamenta Operation Mo	I Frequency	:GPRS 850 :824.2 MHz :Tx CH LOW		Temp./Humi. Engineer		:24 deg_C / 61 RH :Tin		
EUT Pol.		:H Plane		Measurement Ar	ntenna Pol.	I. :VERTICAL		
0 Level	(dBm/m)						-	
-10					PAR	T-22-26/36/LTE B5		
-20								
-30				· · · · · · · · · · · · · · · · · · ·	·			
-40			       		         	       		
-50		-						
-60	1			· · · · · · · · · · · · · · · · · · ·				
-70								
-80					·			
-90						<sup>1</sup>		
-100 <mark>1000</mark>	2	800.	4600. Freque	6400. ncy (MHz)	8200.	100	00	
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin	
			Output Le	vel Gain	Loss			
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB	
1648.40	Н	-65.93	-68.82	7.11	-4.22	-13.00	-52.93	



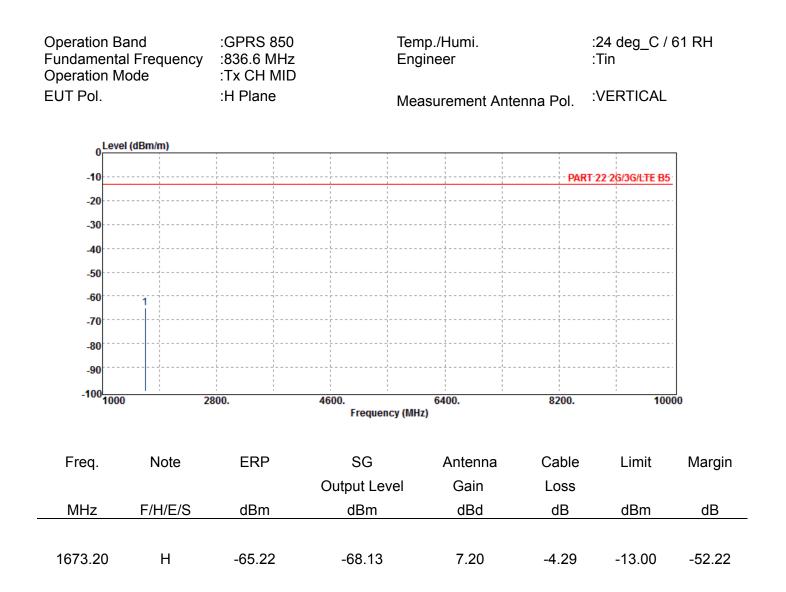
Report No.: ER/2017/90076 Page 56 of 72



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



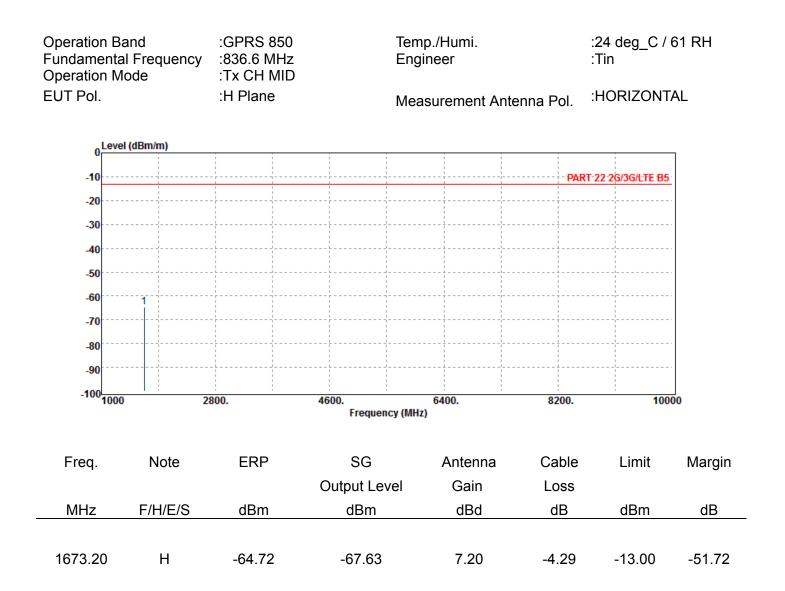
Report No.: ER/2017/90076 Page 57 of 72



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Report No.: ER/2017/90076 Page 58 of 72



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation B Fundamenta Operation M EUT Pol.	al Frequency	:GPRS 850 :848.8 MHz :Tx CH HIGI :H Plane	Н	Temp./Humi. Engineer Measurement Antenna Pol.		:24 deg_C / 61 RH :Tin :VERTICAL	
0 Leve	l (dBm/m)						_
-10					PAF	RT-22-26/36/LTE B5	
-20							
-30							
-40							
-50	       					       	
-60	1						
-70							
-80							
-90	· · · · · · · · · · · · · · · · · · ·						
-100	) 2	800.	4600. Frequen	6400. cy (MHz)	8200.	100	00
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Lev	vel Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1697.60	н	-65.32	-68.30	7.28	-4.31	-13.00	-52.32



Operation B Fundamenta Operation M EUT Pol.	I Frequency	:GPRS 850 :848.8 MHz :Tx CH HIG :H Plane	H	Engineer		:24 deg_C / 61 RH :Tin :HORIZONTAL	
Leve	l (dBm/m)						_
-10					DAR	RT-22-26/36/LTE B5	
-20		· · · · · · · · · · · · · · · · · · ·					
-30		·					
-40		·					
-50	 					 	
-60	1					 	
-70	·	· - F			·		
-80	·						
-90							•
-100 <mark>-1000</mark>	) 2	2800.	4600. Frequenc	6400. cy (MHz)	8200.	100	00
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Lev	el Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
( <b>66 - -</b>			<b>00</b> 5 i			10.05	
1697.60	Н	-65.23	-68.21	7.28	-4.31	-13.00	-52.23



Operation Ba Fundamenta Operation M EUT Pol.	I Frequency	:WCDMA B5 :826.4 MHz :Tx CH LOV :H Plane		Temp./Humi. Engineer Measurement Antenna Pol.		:24 deg_C / 61 RH :Tin :VERTICAL	
OLeve	l (dBm/m)						_
-10					PAF	RT-22-26/36/LTE B5	
-20							
-30		-					
-40			· · · · · · · · · · · · · · · · · · ·				
-50	       					 	
<b>-60</b>	1						
-70							
-80 <sup></sup>							
-90							
-100 <mark>-1000</mark> -1000	2	800.	4600. Frequen	6400. cy (MHz)	8200.	100	 00
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Lev	vel Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1652.80	Н	-64.60	-67.48	7.12	-4.24	-13.00	-51.60



Report No.: ER/2017/90076 Page 62 of 72

Operation Band Fundamental Frequency Operation Mode		:WCDMA B5 :826.4 MHz :Tx CH LOW		Temp./Humi. Engineer		:24 deg_C / 61 RH :Tin	
EUT Pol.		:H Plane		Measurement An	itenna Pol.	:HORIZONT	AL
_ Leve	el (dBm/m)						
0							7
-10			·		PAR	T-22-26/36/LTE B5	
-20		·					
-30			· · · · · · · · · · · · · · · · · · ·				
-40		·	·				
-50							
<b>-60</b>	1						
-70							
-80							
<b>-90</b>			, , , , , , , , , , , , , , , , , , ,				
-100	) 2	800.	4600.	6400.	8200.	100	00
			Frequency	(wr12)			
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Leve	el Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1652.80	Н	-66.06	-68.94	7.12	-4.24	-13.00	-53.06



Operation B Fundamenta Operation M EUT Pol.	al Frequency	:WCDMA B8 :836.6 MHz :Tx CH MID :H Plane	5	Temp./Humi. Engineer Measurement Antenna Pol.		:24 deg_C / :Tin :VERTICAL	61 RH
OLeve	l (dBm/m)						_
-10	, , , ,		· · · · · · · · · · · · · · · · · · ·		PAF	RT-22-26/36/LTE B5	
-20							-
-30							
-40							
-50	       					       	
-60	1					       	
-70							
-80							
-90							
-100	) 2	800.	4600. Frequen	6400. cy (MHz)	8200.	100	 00
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Lev	vel Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1673.20	Н	-65.63	-68.54	7.20	-4.29	-13.00	-52.63



Operation B Fundamenta Operation M EUT Pol.	I Frequency	:WCDMA B :836.6 MHz :Tx CH MID :H Plane		Temp./Humi. Engineer Measurement Antenna Pol.		:24 deg_C / :Tin :HORIZONT	
Leve	l (dBm/m)						
-10					DAR	T-22-2G/3G/LTE B5	
-20					PAN		
-30							
-40							
-50		· · · · · · · · · · · · · · · · · · ·					
-60	1	· · · · · · · · · · · · · · · · · · ·					
-70		· · · · · · · · · · · · · · · · · · ·					
-80	·						
-90							
-100		2800.	4600.	6400.	8200.	100	
1000			Frequen		0200.	100	
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Lev	vel Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1673.20	Н	-65.66	-68.57	7.20	-4.29	-13.00	-52.66

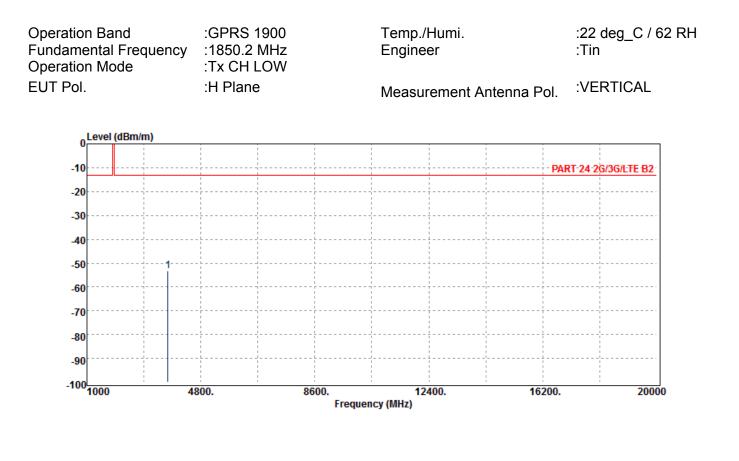


Operation B Fundamenta Operation M EUT Pol.	al Frequency	:WCDMA B5 :846.6 MHz :Tx CH HIGI :H Plane	4	Engineer		:24 deg_C / 61 RH :Tin :VERTICAL	
Leve	el (dBm/m)						_
-10					PAR	T-22-2G/3G/LTE B5	
-20							
-30 -40							
-50		-					
-60	1						
-70 <sup></sup>							
-90							
-100	) 2	800.	4600. Frequency	6400. 8 ncy (MHz)		10000	
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Leve		Loss		
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
1693.20	н	-64.62	-67.59	7.27	-4.30	-13.00	-51.62



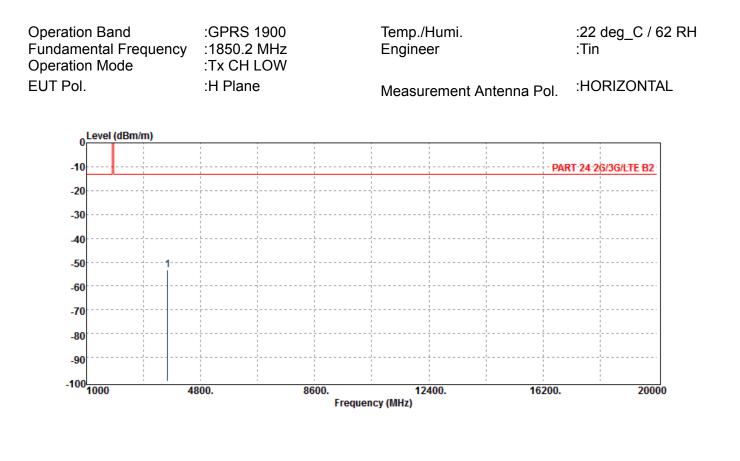
Operation Band Fundamental Frequency Operation Mode				Temp./Humi. Engineer		:24 deg_C / 61 RH :Tin	
EUT Pol.		:H Plane		Measurement Ar	ntenna Pol.	:HORIZONT	AL
0 Leve	l (dBm/m)						7
-10					PAR	T-22-26/36/LTE B5	
-20		· · · · · · · · · · · · · · · · · · ·					
-30							
-40		· · · · · · · · · · · · · · · · · · ·					
-50							
-60							
-70	1	·			·		
-80							
-90							
-100 <mark>-1000</mark>	2	2800.	4600. Frequenc	6400. y (MHz)	8200.	100	00
Freq.	Note	ERP	SG	Antenna	Cable	Limit	Margin
			Output Leve	el Gain	Loss		·
MHz	F/H/E/S	dBm	dBm	dBd	dB	dBm	dB
-							
1693.20	н	-65.92	-68.88	7.27	-4.30	-13.00	-52.92





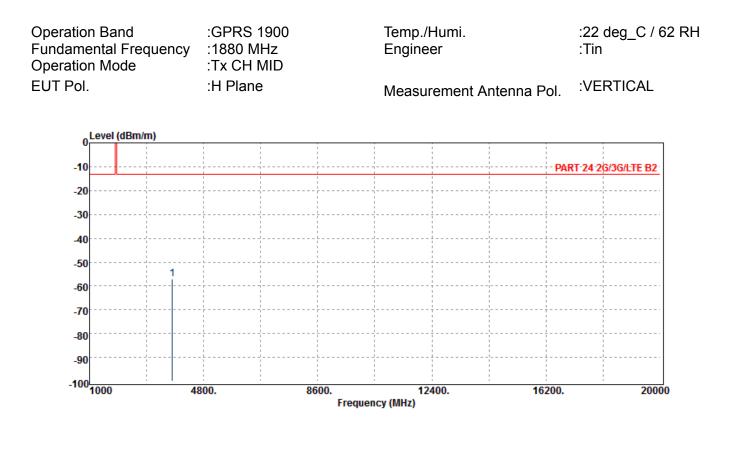
Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin	
			Output Level	Gain	Loss			
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB	
3700.40	Н	-53.36	-59.22	12.44	-6.58	-13.00	-40.36	





Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin	
			Output Level	Gain	Loss			
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB	
3700.40	Н	-53.26	-59.12	12.44	-6.58	-13.00	-40.26	

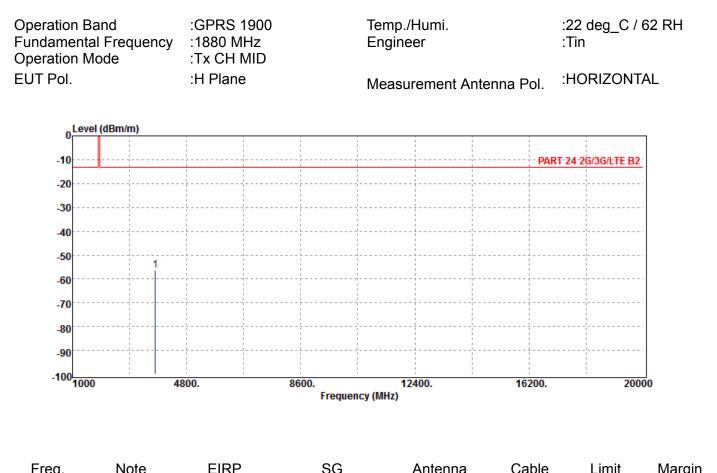




Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin	
			Output Level	Gain	Loss			
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB	
3760.00	Н	-57.17	-63.03	12.45	-6.60	-13.00	-44.17	



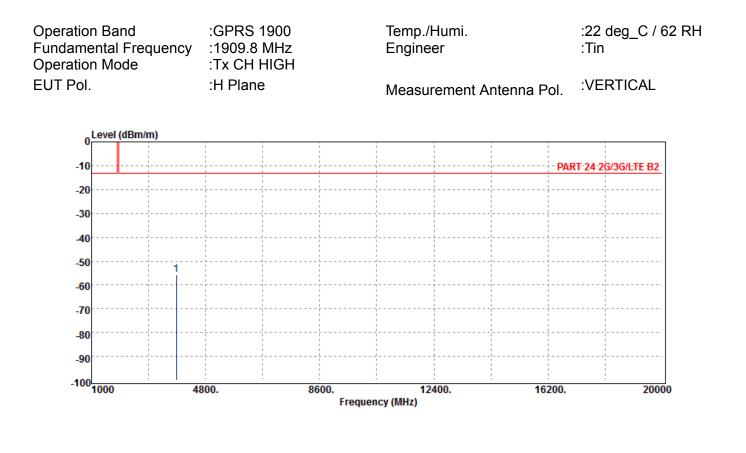
Report No.: ER/2017/90076 Page 70 of 72



rioq.	1000		00	741001110	Oubic		margin	
			Output Level	Gain	Loss			
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB	_
3760.00	Н	-56.36	-62.22	12.45	-6.60	-13.00	-43.36	

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Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Level	Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB
3819.60	Н	-55.75	-61.56	12.47	-6.65	-13.00	-42.75



Н

Report No.: ER/2017/90076 Page 72 of 72

Operation E Fundament Operation N	al Frequency	:GPRS 1900 :1909.8 MHz :Tx CH HIGF		Temp./Humi. Engineer		:22 deg_C / :Tin	62 RH
EUT Pol.		:H Plane		Measurement A	ntenna Pol.	:HORIZONT	AL
0 Lev	/el (dBm/m)						Г
-10					PAR	RT-24-26/36/LTE-B2	e l
-20							
-30					, , , , , , , , , , , , , , , , , , ,		
-40	         		         				
-50							
-60	1				, , , , , , , , , , , , , , , , , , ,		
-70					, , , , , , , , , , , , , , , , , , ,		
-80				· · · · · · · · · · · · · · · · · · ·			
					· · · · · · · · · · · · · · · · · · ·		
-90							
-100	00 4	800.	8600.	12400.	16200.	200	00
			Frequer	icy (MHz)			
Freq.	Note	EIRP	SG	Antenna	Cable	Limit	Margin
			Output Le	vel Gain	Loss		
MHz	F/H/E/S	dBm	dBm	dBi	dB	dBm	dB

~ End of Report ~

12.47

-6.65

-13.00

-43.14

-61.95

-56.14